

Accredited Standards Committee\*  
**National Committee for Information Technology Standards (NCITS)**

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**Project:**

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**Reply to:** John Lohmeyer

To: Membership of T10

From: Ralph Weber, Secretary T10  
Larry Lamers, Vice-chair T10  
John Lohmeyer, Chair T10

Subject: Minutes of SCSI Working Group Meeting  
San Diego, CA -- March 11-12, 1997

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### Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. EPI Topics
5. Physical Topics
6. Protocol Topics
  - 6.1 Add Mode Page for Fibre Channel features (96-195r1) [Houlder]
  - 6.2 Command Exception Conditions (95-352r3) [Monia]
  - 6.3 SIP Message Issues (97-141r0) [Penokie]
  - 6.4 SAM-2 [Monia]
    - 6.4.1 Addressing Model for SAM-2 (was REPORT LUNS Issue) (97-122r0) [Penokie]
7. Command Set Topics
  - 7.1 SPC-2
    - 7.1.1 SPC Link Event Timeout (96-240r1) [Stephens]
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    - 7.1.3 Proposed change in Qerr=1 Behavior in SPC-2 (96-277r1) [Weber]
    - 7.1.4 Prevent Allow Medium Removal Issue (96-266) [Basham]
    - 7.1.5 Additional Device Types for ASC/ASCQ (97-140r0) [Penokie]
    - 7.1.6 RESERVE/RELEASE Issues (97-142r0) [Penokie]
8. Other Topics
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  - 8.2 Project Proposal for SCSI Socket/SSL Services (SSS) (97-129r0) [Parker]
  - 8.3 Review of T10.1 Proposed Resolution to SSA-PH2, SSA-TL2, and SSA-S3P Letter Ballot Comments [Lamers]
  - 8.4 Higher Performance SCSI [Ham]
  - 8.5 Logical Unit Response to Transceiver Mode Changes (96-270r2) [Penokie]
  - 8.6 SCAM Removal [Milligan]
9. Meeting Schedule

\*Operating under the procedures of The American National Standards Institute.

**NCITS Secretariat, Information Technology Industry Council (ITI)**

1250 Eye Street NW, Suite 200, Washington, DC 20005-3922

Email: ncits@itic.nw.dc.us Telephone: 202-737-8888 FAX: 202-638-4922

## 10. Adjournment

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**Results of Meeting**
**1. Opening Remarks**

John Lohmeyer, the T10 Chair, called the meeting to order at 9:00 a.m., Tuesday March 11, 1997. He thanked Skip Jones of QLogic for hosting and arranging the meeting.

As is customary, the people attending introduced themselves and a copy of the attendance list was circulated. Copies of the draft agenda and general information on T10 were made available to those attending.

**2. Approval of Agenda**

The draft agenda was approved with the following additions:

- 8.4 High Performance SCSI [Ham]
- 8.5 Logical Unit Response to Transceiver Mode Changes (96-270r2) [Penokie]
- 8.6 SCAM Removal [Milligan]

**3. Attendance and Membership**

John reminded the group that attendance at working group meetings does not count toward minimum attendance requirements for T10 membership. He noted that 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. Lawrence J. Lamers	A	Adaptec, Inc.	ljlamers@aol.com
Mr. Charles Brill	P	AMP, Inc.	cebrill@amp.com
Mr. Bob Atkinson	O	AMP, Inc.	rdatkins@amp.com
Ms. Bonnie Rose	V	Amphenol	brose@cosmosgroup.com
Mr. Bob Gannon	O	C&M Corp.	bobg848740@aol.com
Mr. Richard Wagner	P	Cable Design Technologies	rwagner@montrose-cdt.com
Mr. Edward Haske	P	CMD Technology	haske@cmd.com
Mr. Roger Wang	O	CMD Technology	
Mr. Peter Johansson	P	Congruent Software, Inc.	pjohansson@aol.com
Mr. Greg McSorley	P	Data General / Clariion	greg_mcsorley@dgc.ceo.dg.com
Mr. Charles Monia	P	Digital Equipment Corp.	charles.monia@shr.mts.dec.com
Dr. William Ham	A#	Digital Equipment Corp.	ham@subsys.enet.dec.com
Mr. Douglas Hagerman	A#	Digital Equipment Corp.	hagerman@starch.enet.dec.com
Mr. Keith W. Parker	V	Diogenes-SCSI	diogenes@europa.com
Ms. Constance Kephart	P	Exabyte Corp.	conniek@exabyte.com
Mr. Mark Hammang	V	Fujitsu (Intellistor)	hammang@intellistor.com
Mr. George Penokie	P	IBM Corp.	gop@rchvmp3.vnet.ibm.com
Mr. Dan Colegrove	A#	IBM Corp.	colegrove@vnet.ibm.com
Mr. John P. Scheible	A	IBM Corp.	Scheible@vnet.ibm.com
Mr. Dennis Moore	P	KnowledgeTek, Inc.	dmoore@netcom.com
Mr. Edward A. Gardner	P	Ophiidian Designs	gardner@acm.org
Mr. Dan Davies	O	Overland Data Inc.	ddavies@ovrland.com
Mr. Skip Jones	P	QLogic Corp.	sk_jones@qlc.com
Mr. James McGrath	P	Quantum Corp.	JMCGRATH@QNTM.COM
Mr. Mark Evans	A	Quantum Corp.	mevans@qntm.com
Mr. John A. Fobel	O	Rancho Technology, Inc.	johnf@rancho.com

Mr. Gene Milligan	P	Seagate Technology	Gene_Milligan@notes.seagate.com
Mr. Gerald Houlder	A	Seagate Technology	Gerry_Houlder@notes.seagate.com
Mr. Dave Guss	P	Silicon Systems, Inc.	dave.guss@tus.ssi1.com
Mr. Erich Oetting	P	Storage Technology Corp.	erich_oetting@stortek.com
Mr. Robert N. Snively	P	Sun Microsystems Computer Co	bob.snively@eng.sun.com
Mr. Vit Novak	A	Sun Microsystems, Inc.	vit.novak@sun.com
Mr. John Lohmeyer	P	Symbios Logic Inc.	john.lohmeyer@symbios.com
Mr. Ralph O. Weber	A	Symbios Logic Inc.	roweber@acm.org
Mr. Rod DeKoning	A#	Symbios Logic Inc.	rod.dekoning@symbios.com
Mr. Brian McKean	A	SyQuest Technology, Inc.	brian.mckean@syquest.com
Mr. Arlan P. Stone	A	UNISYS Corporation	arlan.stone@mv.unisys.com
Mr. Paul D. Aloisi	P	Unitrode Corporation	aloisi@unitrode.com
Mr. Gregory Kapraun	V	Western Digital Corp.	kapraun@wdroc.wdc.com
Mr. Jeffrey L. Williams	P	Western Digital Corporation	jwilliam@wdroc.wdc.com
Mr. Arnold Limjoco	O	Yamachi Electronics	arnold.l@yeu.com

#### 41 People Present

Status Key: P - Principal  
 A, A# - Alternate  
 O - Observer  
 L - Liaison  
 V - Visitor

#### 4. EPI Topics

Bill Ham described the work completed thus far by reviewing the table of contents of revision 8. He also reviewed the rules for SCSI domains including the addition of a sixth rule on REQ/ACK offset counters. The group identified a need to add a clause describing smart expanders. The current draft assumes only dumb expanders. The group discussed the need to add a clause on counting and latching; Vit Novak accepted the task of writing this clause.

Bill reviewed the clause on adding and removal of segments. Only a segment with one expander can be added or removed at a time.

Bill stated that the next frontier is LUN-Bridges, which should allow some 450 targets to be attached to an initiator. Some work was done on labels and terminology; in particular, the group agreed to bifurcate 'expanders' into 'simple expanders' and 'bridging expanders'. Simple expanders do not have (or need) a SCSI ID, while bridging expanders occupy one or more SCSI IDs. Bill stated his plans to reflect the changes discussed by the group in the next revision.

#### 5. Physical Topics

Aside from agenda topics 8.4 and 8.5, no issues concerning physical interfaces were brought before the group.

#### 6. Protocol Topics

##### 6.1 Add Mode Page for Fibre Channel features (96-195r1) [Houlder]

Gerry Houlder presented the proposal, as revised based on input from the last working group meeting. There was concern that having the same page code for all interfaces may cause confusion. It is also anticipated that a device might support multiple protocols. However, there are a limited number of page codes left for all devices.

There was a concern regarding the requirement for having the information in flash memory for storage.

Gerry agreed to modify the proposal to remove the flash memory requirement and make the page code specific to Fibre Channel. Later in the meeting, Gerry presented the revised proposal to the group.

While discussing the revised proposal, concerns were expressed regarding the relationship to the power on condition described in one paragraph of the proposal. As a result of these concerns, the paragraph was removed. Charles Monia expressed concern about use of a mode page to control a link-layer function. He noted the difficulties this approach causes for layered software constructs.

The group recommended that the plenary approve the revised proposal (96-195r4, the second draft proposal presented by Gerry, as further revised by the working group) on a vote of 13:2. Describing their votes against recommending the proposal, Peter Johansson and Charles Monia stated their belief that the matter should be resolved in the Fibre Channel link layer. Attempts were made to address the objections, but no technically feasible resolution could be found.

## **6.2 Command Exception Conditions (95-352r3) [Monia]**

Charles Monia reviewed the previous discussions regarding command exception conditions handling (97-151r0). The group discussed the arguments and counter-arguments that Charles presented. Charles presented several options for reaching closure regarding the original proposal and the group discussed the options. Charles accepted the group consensus that he undertake the option recommending research in to the market need for resolution of the command exception issues raised in his original proposal. If a market need is identified, then a proposal representing the market needs will be brought to the group. Otherwise, the issue will be closed.

## **6.3 SIP Message Issues (97-141r0) [Penokie]**

George Penokie presented three issues concerning SCSI-3 parallel bus message handling. His general description of the issues was that they involve wording oversights in SIP or needs for clarifications of text in SIP (SCSI-3 Interlocked Protocol).

The Clear ACA proposal generated some controversy. The proposal would require the device server to process a command in the same transaction. Bob Snively reported that FCP requires separate packets for the Clear ACA and the command. The software impacts of the proposal were discussed and the group concluded that the software impacts are negligible and can be confined to the link-layer software. The group accepted the Clear ACA proposal as written.

The proposal to bring the SCSI-2 wording relating disconnect privilege and queued tasks in to SCSI-3 also generated some discussion. Jim McGrath was concerned that the proposed SCSI-3 wording was unclear. Jeff Williams expressed concern over the definition of conditions where the proposal required the prohibition of disconnects when doing a disconnect might cause a lockup. George accepted changes in the proposal's wording.

Grammatical changes were made to the last part of the proposal dealing with message out.

Later in the meeting, George presented the revised wording for the disconnect privilege. The group asked that the sentence be restructured for better readability. In the absence of any objections, the group recommended that the plenary approve 97-141r2 (r1 as revised) for inclusion in SPI-2.

## **6.4 SAM-2 [Monia]**

### **6.4.1 Addressing Model for SAM-2 (was REPORT LUNS Issue) (97-122r0) [Penokie]**

George Penokie presented a proposal that the SCC LUN structure wording be incorporated in SAM-2. He described the proposed wording as being basically the wording now found in SCC, but with changes that make it more general and make it better fit the current SAM wording. George reviewed the proposal in detail. Gene Milligan requested that the wording be revised to clarify how someone developing firmware for a disk should implement the proposed logical unit numbering structure. George agreed to revise the proposal based on comments from the working group and to present the revised proposal at the next general working group meeting.

Later in the meeting, the group discussed the need for non-hierarchical LUN numbering in some devices. George was concerned that leaving an opening for non-hierarchical LUNs might resurrect the problems that resulted in the original draft of his proposal. Bob Snively discussed these issues with George, and a few other group members provided supplementary ideas to the discussion. George took the input from the group for application on his next draft proposal.

## **7. Command Set Topics**

### **7.1 SPC-2**

#### **7.1.1 SPC Link Event Timeout (96-240r1) [Stephens]**

The group agreed to drop this item from future agendas. It was agreed that, if the concept introduced by Gary Stephens is needed, a good home for it would be the mode page defined by Gerry Houlder in his proposal (see 6.1 above). It was not however added at this time. If the issue needs further attention, a new agenda item will be introduced.

#### **7.1.2 World Wide Names (97-101r2) [Snively]**

Bob Snively noted that the one significant change appears on page 10 and concerns the usage of globally unique identifiers by RAID controllers. The group located a typo in the revised document and Bob agreed to revise the document to correct the problem. In the absence of any objections, the group recommended that the plenary send revision 3 to IEEE.

#### **7.1.3 Proposed change in Qerr=1 Behavior in SPC-2 (96-277r1) [Weber]**

Ralph Weber presented a revised proposal that included the changes requested by the previous working group meeting. Almost immediately, the proposal was divided in two parts: the proposed wording changes for SPC-2 and the proposed changes to the requirements in the previously approved Basic Queuing proposal (96-198r4). In the proposed SPC-2 changes, there was no objection to adding the QErr=11b definition, but some group members wanted the proposed note revised or removed.

The discussion of the proposed amendment to the Basic Queuing proposal was long, convoluted, and covered a wide variety of opinions. The group eventually agreed that the Basic Queuing description should be amended to not specify any one QErr behavior. Ralph agreed to revise the proposed amendment to 96-198r4 with wording that was agreeable to the group.

For the purposes of straw polling, the proposal was split in three parts: the new QErr-11b definition, the note (as revised by the group), and the Basic Queuing amendment (as revised by the group). The group favored the new QErr=1 definition 15:0. The group opposed the note 5:10. The group favored the revised Basic Queuing amendment 15:1. Ralph agreed to prepare a revised proposal based on the input from the group for consideration by the plenary.

#### **7.1.4 Prevent Allow Medium Removal Issue (96-266) [Basham]**

The group deferred action on this topic to the May 1997 meeting.

#### **7.1.5 Additional Device Types for ASC/ASCQ (97-140r0) [Penokie]**

George presented a proposal for changes that allow several ASC/ASCQs to be applied to additional device types, not just array type devices. In the absence of any objections, the group recommended that the plenary accept the proposal for inclusion in SPC-2.

#### **7.1.6 RESERVE/RELEASE Issues (97-142r0) [Penokie]**

George presented a proposal describing several minor clarifications for the Reserve and Release commands. The group noted a few grammatical corrections for the proposal. Whether the changes should be applied to SPC or SPC-2 was discussed. It was noted that SPC recently completed second public review. The group agreed that the incorrect section references and the wording "extent list length" should be corrected in SPC, but the other

changes should be incorporated in SPC-2. In the absence of any objections, the group recommended that the plenary accept the proposal, as revised, for inclusion in SPC-2 and that, with plenary approval, the technical editor make the changes discussed as non-substantive in SPC.

## **8. Other Topics**

### **8.1 High-Availability Profile [Hagerman]**

Doug noted that a new draft of the High-Availability Profile (HAP) technical report was not available yet. However, Doug had several questions on which he wanted working group advice. One topic was the name for the entity that contains a device server, i.e., if a host contains an application client, then a blank contains a device server. Doug noted that the editorial meeting suggested "appliance" to fill in the blank. The group offered no better suggestions. Doug described several other terms and the definitions for them as found in the draft HAP document.

### **8.2 Project Proposal for SCSI Socket/SSL Services (SSS) (97-129r0) [Parker]**

Keith Parker presented a draft project proposal for a standard that maps Platform/Device Independent (PDI) socket services to SCSI commands. The group discussed the proposal at length. The group sought a substantial amount of background information and tutorial description of the ideas that form the basis of the proposal.

The group discussed the methodology for acting on the project proposal. John noted that he has revised the proposal to match the normal project proposal wording used by T10. The group discussed the liaisons to be named by the project proposal, and John collected a list of liaisons.

The group recommended that the plenary forward revised project proposal to NCITS for processing as a proposal for a new project, on a vote of 7:1. Gene Milligan expressed concern about the readiness of the project proposal for forwarding, i.e., several terms such as http and sockets need definitions. Keith agreed to provide definitions before the project proposal was presented to the plenary.

John proposed that a revised proposal be constructed including the changes made by the group, the definitions requested by Gene, and the list of liaisons. Based on the working group vote, John proposed that the revised draft project proposal be presented to the plenary.

### **8.3 Review of T10.1 Proposed Resolution to SSA-PH2, SSA-TL2, and SSA-S3P Letter Ballot Comments [Lamers]**

John Lohmeyer described the history of comments resolutions for the second generation of SSA documents. Issues concerning additional information published on a world wide web site were discussed. Comparison were made to information in SPC annexes that have additional data published on the T10 world wide web site. The group agreed to changes in the documents proposed by T10.1 as a result of the letter ballot comments.

### **8.4 Higher Performance SCSI [Ham]**

Bill Ham presented several ideas for improving parallel SCSI bus performance. The group discussed potential future developments in SCSI and market reaction to past SCSI improvements. The group discussed setting aside time for a special ad hoc to discuss future changes in SCSI. Keeping a recurring agenda item in the working group also was discussed and was accepted as the approach that the group will use. The timing of the meeting and possible coordination with the STA technical meeting were discussed. Thursday morning was suggested for STA technical meeting slot for future meeting weeks. After a lengthy discussion, the group agreed to keep its own recurring agenda item on Tuesday afternoons.

Jim McGrath also provided the committee with 97-150r0, describing his perspective on higher performance parallel SCSI busses. Jim's conclusions were that increasing device addressability is the primary goal, increasing transfer performance is secondary, and lowering overhead has only a tertiary effect. Doug Hagerman opposed focusing only on addressability. Several others also questioned Jim's conclusions. The group agreed to continue discussion of this type in future meetings.

### **8.5 Logical Unit Response to Transceiver Mode Changes (96-270r2) [Penokie]**

George reviewed the proposal to require a reset event and unit attention conditions to notify application clients of changes to and from LVD transceiver mode. Charles Monia questioned the need for adding wording to SAM-2, on the grounds that the reset event already is listed as a cause of a unit attention condition. George removed the SAM changes from the proposal. Gene Milligan questioned whether a bus can go from non-LVD to LVD mode. The group felt that it is possible to go from non-LVD to LVD mode.

In the absence of any objections, the group recommended that the plenary approve 96-270r2 (which includes the revisions George made at the SPI-2 working group and at this meeting) for inclusion in SPI-2 and SPC-2, as noted in the proposal.

### **8.6 SCAM Removal [Milligan]**

Gene Milligan expressed the concern that SCAM is implemented only in drives but not in host software. He felt that the SCAM firmware in disks is substantially untested, due to the lack of host software. Gene also expressed concerns about how SCAM might adversely affect future plans for Ultra3 SCSI. In light of these concerns, Gene proposed that SCAM be removed from all T10 standards and technical reports subsequent to SPI and the SPI Amendment. The group discussed the pros and cons of Gene's proposal at length. Ed Gardner reported that his PC implements SCAM and Jim McGrath claimed that some implementers would be upset if SCAM were not available. No clear conclusions were reached.

## **9. Meeting Schedule**

The next meeting of SCSI Working Group will be May 6-7, 1997, in Natick, MA at the Crowne Plaza Hotel (508-653-8800), hosted by Digital Equipment Corp.

## **10. Adjournment**

The meeting was adjourned at 5:14 p.m. on Wednesday March 12, 1997.