

Accredited Standards Committee\*  
**X3, Information Processing Systems**

**Doc. No.:** X3T9.2/92-194 R0

**Date:** October 5, 1992

**Project:**

**Ref. Doc.:**

**Reply to:**

To: Membership of X3T9.2

From: Lawrence J. Lamers, Secretary X3T9.2  
John B. Lohmeyer, Chair X3T9.2

Subject: Minutes of X3T9.2 September '92 Working Group Meetings

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**Agenda**

1. Opening Remarks
2. Attendance and Membership
3. SCSI-3 Command Set (SCS)
  - 3.1 Enhancement of Sequential Access for Medium Changers (92-006R1) [Stephens]
  - 3.2 Synchronization Status and Errors (92-130) [Robison]
  - 3.3 Change INQUIRY Mode Page (92-085R3) [Penokie]
  - 3.4 Density Code Addition for Tape (92-164r1) [Williams]
4. SCSI-3 Architecture Model (SAM)
5. Serial Protocol Topics
  - 5.1 SCSI-3 Serial Bus Protocol (SBP)
  - 5.2 Directly-Addressable Device Interface
  - 5.3 SCSI-3 Fiber Channel Protocol (FCP)
  - 5.4 SCSI-3 Generic Packetized Protocol (GPP)
  - 5.5 SSA Report
6. General WG Topics
  - 6.1 SCSI-3 Queuing Issues (92-141R1) [Penokie]
  - 6.2 Proposal to add a disconnect unconditionally after command phase (92-133R2) [Smyers]
  - 6.3 Conformance Testing [Stephens]
  - 6.4 ASC/ASCQ for Power-On Reset (92-162R1) [Houlder]
  - 6.5 SCSI Common Access Method (CAM-2) (92-154) [Gallant]
7. SPI Topics
  - 7.1 Unitized Cable Connector for SCSI-3 (92-139R1, -153) [Cornaby, Gardner]
  - 7.2 SFF Submission for SPI Annex (92-170) [Allan]
  - 7.3 Active Termination Requirements [Wallace] {October 14 SPI Mtg}
8. Working Group Schedule
9. Adjournment

## **Results of Meeting**

### **1. Opening Remarks**

John Lohmeyer, the Chair, called the meeting to order at 9:00 p.m., Tuesday September 22, 1992. He thanked Kumar Mallavali of Canstar for hosting the meeting.

As is customary, the people attending introduced themselves. A copy of the attendance list was circulated for attendance and corrections.

It was stated that the meeting had been authorized by X3T9.2 and would be conducted under the X3 rules. Ad hoc meetings take no final actions, but prepare recommendations for approval by the X3T9.2 task group. The voting rules for the meeting are those of the parent committee, X3T9.2. These rules are: one vote per company; and any participating company member may vote.

The minutes of this meeting will be posted to the SCSI BBS and the SCSI Reflector within 14 calendar days and will be included in the next committee mailing.

### **2. Attendance and Membership**

Attendance at working group meetings does not count toward minimum attendance requirements for X3T9.2 membership. Working group meetings are open to any person or company to attend and to express their opinion on the subjects being discussed.

The following people attended the meeting:

Name	Status	Organization	Phone Number
Mr. Norm Harris	P	Adaptec, Inc.	(408) 945-8600 x2230
Mr. Charles Brill	P	AMP, Inc.	(717) 561-6198
Mr. Jan V. Dedek	P	Ancot Corp.	(415) 322-5322
Mr. Scott Smyers	P	Apple Computer	(408) 974-7057
Mr. James Blair	A	Apple Computer	(408) 862-3078
Mr. Bob Gannon	O	C&M Corp.	(203) 774-4812
Mr. Peter Robinson	A	C&M Corporation	(203) 774-4812
Mr. Joe Chen	P	Cirrus Logic Inc.	(510) 226-2101
Mr. Charles Monia	P	Digital Equipment Corp.	(508) 841-6757
Mr. Ralph Weber	A	Digital Equipment Corp.	(603) 881-1497
Mr. Edward A. Gardner	A	Digital Equipment Corp.	(719) 548-2247
Mr. William Dallas	A	Digital Equipment Corp.	(603) 881-2508
Dr. William Ham	A	Digital Equipment Corp.	(508) 841-2629
Mr. Skip Jones	P	Emulex Corp.	(714) 668-5058
Mr. I. Dal Allan	P	ENDL	(408) 867-6630
Mr. Robert Liu	P	Fujitsu Computer Products, Am	(408) 894-3790
Mr. Jeffrey L. Williams	P	Hewlett Packard Co.	(208) 323-5030
Mr. Kurt Chan	A	Hewlett Packard Co.	(916) 785-5621
Mr. Howard Wang	O	Hitachi Computer Products	(408) 986-9770 x207
Mr. George Penokie	P	IBM Corp.	(507) 253-5208
Mr. Gary R. Stephens	A	IBM Corp.	(602) 799-2246
Mr. Giles Frazier	S	IBM Corp.	(512) 838-1802
Mr. Tom Taetsch	O	Intellistor, Inc.	(303) 682-6651
Mr. Lawrence J. Lamers	P	Maxtor Corp.	(408) 432-3889
Mr. John Lohmeyer	P	NCR Corp.	(719) 596-5795 x362
Mr. Rod DeKoning	S	NCR Corp.	(316) 636-8842
Mr. Gene Freeman	V	NCR Corp.	(719) 596-5795
Mr. James McGrath	P	Quantum Corp.	(408) 894-4504
Mr. Gene Milligan	A	Seagate Technology	(405) 324-3070
Mr. Hale Landis	A	Seagate Technology	(408) 439-2443
Mr. Forrest Crowell	P	SGS-Thomson Microelectronics	(714) 957-6018
Mr. Stephen G. Finch	O	Silicon Systems	(714) 573-6855
Mr. Daniel E. Moczarny	O	Silicon Systems, Inc.	(714) 573-6750
Mr. Robert N. Snively	P	Sun Microsystems, Inc.	(415) 336-5332
Mr. Harvey Waltersdorf	P	Thomas & Betts	(803) 676-2905
Mr. Jeff Stai	P	Western Digital	(714) 932-7644

36 People Present

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

### 3. SCSI-3 Command Set (SCS)

TUESDAY 9:30-11:00

#### 3.1 Enhancement of Sequential Access for Medium Changers (92-006R1) [Stephens]

This item is on the agenda for the next plenary and was not discussed further.

#### 3.2 Synchronization Status and Errors (92-130) [Robison]

Rod DeKoning presented the proposal on adding some feed back information for synchronized spindles. The use of a modified TEST UNIT READY was soundly rejected. There was no overwhelming consensus, but two suggestions were offered: 1) develop a proposal using SEND DIAGNOSTIC pages or 2) develop a proposal with a new command.

Rod will revise the proposal and try again.

**3.3 Change INQUIRY Mode Page (92-085R3) [Penokie]**

George Penokie presented his latest revision on changing the inquiry data. A heated debate ensued.

A straw pole was taken to recommend this approach to plenary. The vote was 8:4. There was debate over the mechanism of changing the INQUIRY data and over whether any mechanism should even exist. The proposal makes a fundamental change in SCSI by allowing a customer to change the default values. Since no consensus was reached the battle was remanded to the plenary.

**3.4 Density Code Addition for Tape (92-164r1) [Williams]**

The working group recommends that the plenary accept this proposal.

**4. SCSI-3 Architecture Model (SAM)**

TUESDAY 11:00-1:00

Charles presented his view of domains. The intent is to restrict the architecture and represents homogeneity. Dal wanted to see a non-homogeneous variation. There was still dissension on how we talk to the logical unit.

It was agreed that the LUN identifier should be 64 bits and the SCSI device ID should be 64 bits. Target Routines will occupy the same address space as logical units, not a separate space (another way of looking at this is that the LUNTAR bit is the high order bit of the LUN field).

With the much larger address spaces, there is a new problem: How to find all devices during system initialization? Polling does not work so some form of a broadcast will be necessary for the physical layers that support the larger address spaces.

No consensus was reached on whether to extend the queue tag field beyond 8 bits.

**5. Serial Protocol Topics**

TUESDAY 2:00-8:00

Dal offered his perspective on the serial bus protocol race. He views SSA, GPP, SBP as preservation protocols, FCP as a progressive protocol, and DADI as a memory model protocol. A preservation protocol is one that to a large degree preserves existing software investments. A progressive protocol aims to efficiently use the physical layer at the expense of added development effort. He also stated that a goal to maximize the amount of commonality that can be achieved is needed.

**5.1 SCSI-3 Serial Bus Protocol (SBP)**

Representatives from Apple, IBM, and Dec stated a mutual agreement on a serial bus protocol for use on P1394. It is a scheme similar to the "mailbox" approach used by several existing host adapters. The protocol proposes a 48-byte command block and an 8-byte status block. Since this was the first exposure to this protocol there was little discussion other than relief that the combatants were now in agreement.

## 5.2 Directly-Addressable Device Interface

This topic was not discussed. Scott Smyers did indicate that he is dropping the CCU proposal in deference to the SBP agreement.

## 5.3 SCSI-3 Fiber Channel Protocol (FCP)

Bob Snively made a presentation on fiber channel protocol and how it relates to SCSI-3. The revised document and the presentation will be included in the next mailing.

## 5.4 SCSI-3 Generic Packetized Protocol (GPP)

Gary Stephens compared GPP to FCP. GPP has inherently lower latency because the user data can be transferred with the command or status. A transfer ready sequence is not needed to start the data flow. In a configuration that has multiple switches, FCP suffers a turn around delay, and the latency is proportional to the number of switches. GPP on the hand requires the packet to be interpreted on the fly as it is received, whereas the FCP automatically directs the packet to the correct place.

GPP was contrasted with IP (internet protocol) and it turns out to be very similar. Kurt Chan stated that a preliminary look indicates that GPP may be cheaper if you want to preserve existing software and change the physical layer. Kurt also believes that hardware parsing will be the rule at 1 Gbit transfer rates.

Bob Snively's pointed out that if the hardware line is drawn at the CAM layer, as is being done today, then the link layer is not relevant and FCP and GPP have equal levels of preservation.

## 5.5 SSA Report

George Penokie read the following report prepared by John Scheible on SSA:

*On September 16th, an SSA Industry group Kick-off meeting was held to get interested parties together,*

- *indicate IBM's commitment to set up some form of industry group,*
- *to get feedback,*
- *and have a technical discussion.*

*Approximately 16 companies were represented. Several others who expressed interest could not attend due to schedule conflicts. Items discussed included:*

- \* *Patent rights (royalties not acceptable)*
- \* *Testers (some form of tester is a must)*
- \* *Implementation options (buy specs/rights, buy design, buy chips)*
- \* *Selling IBM's design (needed for simulation purposes as well as saving time implementing)*
- \* *Design languages (VHDL vs Verilog)*
- \* *Problems with existing Industry groups*
- \* *Need for the specifications and chip spec as soon as possible*

*IBM presented two strawman proposals for developing SSA.*

- 1) *Set up a new X3T9.x task group to develop SSA as a standard Also set up a User's Group to facilitate implementation.*
- 2) *Set up an independent industry group to develop SSA (not ANSI/X3T9)*

*After much discussion, a vote was taken and the majority favored strawman #1 (X3T9.x*

*task group with a User's group). Volunteers were solicited to develop the charter (John Scheible (IBM), Colin Butterworth (IBM), Larry Lamers (Maxtor), and Skip Jones (Emulex)).*

*A tentative schedule was developed as follows...*

<i>now</i>	<i>Begin work to request a X3T9.x task group</i>
<i>11/03/92</i>	<i>Complete the charter and explain it to interested parties.</i>
<i>11/10/92</i>	<i>Release the SSA-PH and SSA-SCSI specification.</i>
<i>12/18/92</i>	<i>Send payments in for the User's</i>
<i>01/13/93</i>	<i>First User's group meeting</i>

A discussion about the appropriate venue for the SSA work ensued. John Lohmeyer related a phone call he had with John Scheible. It appears that a project proposal will be developed for a new X3T9 Task Group to do the SSA standardization work. John advocated creating more task groups rather than continuing to cram more work into the existing task groups. He also suggested that X3T9 have grown beyond the size envisioned for a Technical Committee within X3; X3T9 no longer does technical work and has become a management committee. We should consider splitting X3T9 into two or more TCs.

## **6. General WG Topics**

WEDNESDAY 9:00-1:00

### **6.1 SCSI-3 Queuing Issues (92-141R1) [Penokie]**

George Penokie presented the latest incarnation of SCSI-3 queuing model. He introduced a new concept of suspended information and a new message (CLEAR AUTO-CONTINGENT ALLEGIANCE). The backwards compatibility debate occurred again, this time over whether a non-ACA I/O process would clear the ACA condition on a parallel SCSI implementation.

A LIMITED RELEASE message was introduced to allow other initiator's queues to resume processing while preserving the ACA for the initiator to which it was reported. The target folks were not enamored with this capability. The situation where a second ACA occurred causes headaches just to think about. George plans to remove this capability in the next revision. However there were still some folks that felt the capability should be provided.

The very intrinsic nature of link control embedded within the definition of I/O process in SCSI-2 causes consternation in the SCSI-3 queuing model. Gary Stephens pointed out that messages (link control) are in-band within serial SCSI but are out-band in current parallel SCSI. This difficulty arose during the discussion of the workings of an ordered I/O process. The real question is whether or not transfer of link information is an I/O process. If an I/O process is re-defined to not include link information then George's queuing rules work. The SAM document needs to deal with this subject; the SAM document today assumes link control is out-band. More discussion and work is needed to reach a conclusion on this subject area.

The ACA message description will be changed to generate a CA if one does not exist when the ACA message is received. Interaction when reservations are in place needs to be thought through.

The CLEAR AUTO-CONTINGENT ALLEGIANCE message needs some restrictions on when it can be delivered. The consensus was to restrict the message to following an IDENTIFY message.

George stated his intention to request a vote on this subject at the next plenary meeting.

**6.2 Proposal to add a disconnect unconditionally after command phase (92-133R2) [Smyers]**

The proposal is in the mailing and a vote is expected at the next plenary. It will also be distributed on the reflector.

**6.3 Conformance Testing [Stephens]**

This item was deferred to next meeting because Gary Stephens has not received clearance on the document.

John Lohmeyer cited a letter that was generated by X3B11 and responded to by X3 on this subject. Dal Allan suggested that the correct X3T9 response on this subject is to concur with the reaffirmation of the principal of building conformance testing into our standards and we should state that since this principal is already in effect, it should have no effect on our current development projects.

**6.4 ASC/ASCQ for Power-On Reset (92-162R1) [Houlder]**

Gerry Houlder was not present.

**6.5 SCSI Common Access Method (CAM-2) (92-154) [Gallant]**

The project proposal will be reviewed at the next plenary meeting. John Gallant was not present at this meeting. (John does not plan to attend future meetings; he is being replaced by William Dallas.)

**7. SPI Topics**

WEDNESDAY 2:00-6:00

**7.1 Unitized Cable Connector for SCSI-3 (92-139R1, -153) [Cornaby, Gardner]**

There was a meta discussion on venues for connector topics. Should SFF address all these connector issues with its new charter? The opinions were divided: several folks expressed concern regarding opening up any connector topics with X3T9.2 because of the length of time they consume. Others were not comfortable because it was not clear how these would be handled within SFF. Still others wanted to split the items, having X3T9.2 make signal assignments, SFF agree on physical connectors, and EIA actually standardize the connector.

Steve Cornaby had planned to revise his proposal, however he was not present at the meeting. Dal Allan volunteered to follow up with Steve.

**7.2 SFF Submission for SPI Annex (92-170) [Allan]**

Dal Allan suggested pursuing the connector dimensional definitions within EIA, with the signal definition being dealt with elsewhere.

Scott Smyers suggested a straw poll on recommending that 92-170 be including in SPI as an annex. The chairman recited the standard lingo on voting procedures at a working group. Nonetheless, a straw poll was taken with the results of 10 in favor of recommending 92-170 to the plenary and 3 opposed.

The project editor pointed out that someone needs to submit the document and figures in the required form if they are to be included. The wording in 92-170 is not suitable for a standard. There were no volunteers to do this.

**7.3 Active Termination Requirements [Wallace] {October 14 SPI Mtg}**

This item is scheduled for the October SPI working group meeting.

**8. Working Group Schedule**

The General Working Group meeting schedule is:

Date	Location	Host
Nov 9-13, 1992	Sunnyvale, CA	Amdahl
Jan 11-15, 1993	Sunnyvale, CA	Tandem
Mar 15-19, 1993	Orange County, CA	Emulex
May 17-21, 1993	Sante Fe, NM	Los Alamo
Jul 19-23, 1993	Manchester, NH	DEC
Sep 13-17, 1993	Poughkeepsie, NY	IBM
Nov 8-12, 1993	Colo Spgs, CO	NCR

The tentative meeting schedule for the X3T9.2 November working group week is:

Day	Meeting	Times
Monday	Small Form Factor Committee	9:00a - 1:00p
	ATA Extensions	2:00p - 5:00p
Tuesday	X3T9.2 General Working Group	9:00a - 1:00p
	SPI Working Group	2:00p - 8:00p
Wednesday	X3T9.2 General Working Group	9:00a - 5:00p
Thursday	SCSI Editors	9:00a - 5:00p

**9. Adjournment**

The meeting was adjourned at 3:30 p.m. on Wednesday September 23, 1992.