

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

**Doc. No.:** X3T9.2/93-092 R0

**Date:** August 11, 2000

**Project:**

**Ref. Doc.:**

**Reply to:** J. Lohmeyer

**To:** Membership of X3T9.2

**From:** Lawrence J. Lamers

**Subject:** Minutes of X3T9.2 General Working Group May 18-19, 1993

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**Agenda**

1. Opening Remarks
2. Attendance and Membership
3. Approval of Agenda
4. Physical Topics
  - 4.1 Low-power (3.3 volt) SCSI Physical Layer (X3T9.2/93-xxx) [Lohmeyer]
  - 4.2 Setup and Hold times in SPI (X3T9.2/93-094) [Frazier]
  - 4.3 PCMCIA SCSI connector and cable (X3T9.2/93-023) [Lohmeyer]
  - 4.4 Comments on SPI R12 Section 10 (X3T9.2/93-081) [Stai]
  - 4.5 Recouping Seemingly Lost Ground SCSI (X3T9.2/93-090) [Spence]
  - 4.6 Lost A and P cable nomenclature (X3T9.2/93-090) [Spence]
  - 4.7 SCSI-3 Wide Bus Parity Handling (X3T9.2/93-089) [Harris]
5. General Working Group Items
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  - 5.2 SCSI Programmable Address Select (X3T9.2/93-095) [McGrath]
6. SCSI-3 Architecture Model - SAM (X3T9.2/994D) [Monia]
  - 6.1 Queue Full Handling (X3T9.2/92-214) [Binford]
  - 6.2 Isochronous Queue Tags (X3T9.2/93-071) [Penokie]
7. SCSI-3 Command Sets (SPC, SBC, SSC, SGC, and SMC)
  - 7.1 SCSI-3 Primary Commands (X3T9.2/995D) [Weber]
    - 7.1.1 Dealing with 8-bit tag values in ASC 4Dh (X3T9.2/064) [Weber]
    - 7.1.2 Structure of parameter data to add source & destination identifiers (X3T9.2/93-038) [Weber]
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  - 7.3 SCSI-3 Stream Commands (X3T9.2/997D) [Stephens]
  - 7.4 SCSI-3 Graphics Commands (X3T9.2/998D) []
  - 7.5 SCSI-3 Medium Changer Commands (X3T9.2/999D) [Stephens]
8. SCSI-3 Protocols (SIP, SBP, FCP, GPP)
  - 8.1 SCSI-3 Interlocked Protocol - SIP (X3T9.2/856D) [Lamers]
    - 8.1.1 Interoperation Issues with SCSI-2 initiators and SCSI-3 targets (X3T9.2/93-065) [Frazier]

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- 8.1.2 Review of SIP revision 2 (X3T9.2/856D) [Lamers]
- 8.1.3 When to issue SDTR after WDTR (X3T9.2/93-037) [Penokie]
- 8.2 SCSI-3 Generic Packetized Protocol - GPP (X3T9.2/991D) [Stephens]
- 8.3 SCSI-3 Serial Bus Protocol - SBP (X3T9.2/992D) [Marazas]
- 8.4 SCSI-3 Fiber Channel Protocol - FCP (X3T9.2/993D) [Snively]
- 8.5 SCSI-3 Serial Storage Protocol - SSP (X3T9.2/93-061) [Scheible]

9. Meeting Schedule

10. Adjournment

## **Results of Meeting**

### **1. Opening Remarks**

John Lohmeyer the Chair, called the meeting to order at 9:00 a.m., Tuesday, May 18, 1993. He thanked Don Tolmie of Los Alamos National Labs 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 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:

## X3T9.2 General Working Group Meeting Attenders

Name	S	Organization	Electronic Mail Address
Mr. Norm Harris	P	Adaptec, Inc.	harris@adaptec.com
Mr. Douglas Fields	A	Adaptec, Inc.	
Mr. Charles Brill	P	AMP, Inc.	cbrill@cup.portal.com
Mr. Bob Whiteman	A	AMP, Inc.	whiteman@cup.portal.com
Mr. Jan V. Dedek	P	Ancot Corp.	
Mr. Bob Gannon	O	C&M Corp.	
Mr. Tom Hunt	S	Dallas Semiconductor	74230.2271@compuserve.com
Mr. Charles Monia	P	Digital Equipment Corp.	monia@starch.enet.dec.com
Mr. William Dallas	A	Digital Equipment Corp.	dallas@wasted.enet.dec.com
Dr. William Ham	A	Digital Equipment Corp.	ham@subsys.enet.dec.com
Mr. Edward A. Gardner	A	Digital Equipment Corp.	gardner@ssag.enet.dec.com
Mr. Ralph Weber	A	Digital Equipment Corp.	weber@star.enet.dec.com
Mr. Bryan J. Ruffner	O	E-Systems	
Mr. Skip Jones	P	Emulex Corp.	sk_jones@emulex.com
Mr. I. Dal Allan	P	ENDL	2501752@mcimail.com
Mr. Kenneth J. Hallam	S	ENDL	3450626@mcimail.com
Mr. D. W. Spence	A	ENDL Associates	5051038@mcimail.com
Mr. Colm Tracey	V	Fujikura America, Inc.	
Mr. Jeff Epstein	O	Future Domain	
Mr. Jeffrey L. Williams	P	Hewlett Packard Co.	jlw@hpdmd48.boi.hp.com
Mr. Michael Nguyen	O	Hitachi Computer Products	m_nguyen@ipd.hitachi.com
Mr. Larry Chen	O	Hitachi Computer Products	lchen@hitachi.com
Mr. Yoshihiko Yano	S	Hitachi Computer Products	y_yano@ipd.hitachi.com
Mr. George Penokie	P	IBM Corp.	gop@rchvmp3.vnet.ibm.com
Mr. Gerald Marazas	A	IBM Corp.	marazas@bcrvmpc2.vnet.ibm.com
Mr. Ray Muggli	O	IBM Corp.	
Mr. John P. Scheible	O	IBM Corp.	Scheible@vnet.ibm.com
Mr. Giles Frazier	S	IBM Corp.	gfrazier@ausvm6.vnet.ibm.com
Mr. Gary Fredrickson	O	ICL	ghf@irv.icl.com
Mr. Kevin R. Pokorney	O	Intellistor, Inc.	
Mr. Robert Bellino	P	Madison Cable Corp.	
Mr. Lawrence J. Lamers	P	Maxtor Corp.	71540.2756@compuserve.com
Mr. Ron Roberts	A	Maxtor Corp.	ron_roberts@maxtor.com
Mr. Thomas Newman	S	Mission Peak Designs	71246.1573@compuserve.com
Mr. Joe Dambach	P	Molex Inc.	
Mr. Robbie Shergill	P	National Semiconductor	
Mr. John Lohmeyer	P	NCR Corp.	john.lohmeyer@ftcollinsco.ncr.com
Mr. Charles Binford	S	NCR Corp.	Charles.Binford@WichitaKS.NCR.COM
Mr. James McGrath	P	Quantum Corp.	
Mr. Gene Milligan	A	Seagate Technology	Gene_Milligan@notes.seagate.com
Mr. Stephen G. Finch	P	Silicon Systems, Inc.	5723283@mcimail.com
Mr. Erich Oetting	P	Storage Technology Corp.	Erich_Oetting@Stortek.com
Mr. Gary A. Glass	O	Storage Technology Corp.	Gary_Glass@Stortek.com
Mr. Robert N. Snively	P	Sun Microsystems, Inc.	Bob.Snively@eng.sun.com
Mr. Alan Wetzel	A	Texas Instruments	4274968@mcimail.com

45 people present

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

### **3. Approval of Agenda**

The proposed agenda was approved.

### **4. Physical Topics**

#### **4.1 3.3 volt SCSI Physical Layer [Lohmeyer]**

John presented a foil showing suggestions for what to do about the TERMPWR line when mixing 5-volt and 3.3-volt SCSI devices:

##### 3.3 volt Single-Ended SCSI Suggestions

1. Use the same signal levels and currents as specified in SPI.
2. 3.3-volt SCSI devices may source 3.3-volt TERMPWR.
3. 3.3-volt SCSI devices at the end of the SCSI bus may sink up to 750 milliamperes from TERMPWR.
4. 3.3-volt SCSI devices shall be designed so that they are not damaged by voltage levels of 0 to 5.25 volts on TERMPWR.

John distributed copies of a proposal from Florin Oprescu from 1991 entitled, "Proposal for a Portable Machine SCSI Bus Termination" (91-187). He noted that Florin's proposal had not been pursued at the time, but that it contained a number of good ideas for operating in the battery-powered environment.

Ed Gardner suggested that the termination problem can be solved with a terminator that senses the voltage present on the TERMPWR line and uses a DC-to-DC convertor to create the necessary voltage internally. This is less expensive than requiring all devices to source 5 volt TERMPWR (making all 3.3-volt devices include a DC-to-DC convertor).

Gene Milligan pointed out that very low-power environments go still further with exotic techniques to save power. Standardizing these tricks may be inappropriate.

#### **4.2 Setup and Hold times in SPI (X3T9.2/93-094) [Frazier]**

Giles Frazier presented an analysis of the setup and hold times in SPI. His conclusion is that the transmit hold time should be extended by 20 ns to 53 ns.

The group tentatively accepted this recommendation for the slow transmit hold time with the caveat that the issue be revisited if their silicon folks back at the ranch have difficulties.

#### **4.3 PCMCIA SCSI connector and cable (X3T9.2/93-023) [Lohmeyer]**

Bill Spence reported that the essence of the proposal is to use twisted pairs for the data and clock signals. One shielded bundle contains the REQ and ACK signals. Three more shielded bundles contain data and parity signals. The remaining control signals are in a fifth bundle as single signals with one shared ground. See document 93-093 for details.

#### **4.4 Comments on SPI R12 Section 10 (X3T9.2/93-081) [Stai]**

Jeff was not present.

#### **4.5 Recouping Seemingly Lost Ground SCSI (X3T9.2/93-090) [Spence]**

Bill Spence proposed that the wording related to backplanes be re-incorporated. He believed that specific guidance needs to be given to people implementing backplane SCSI.

John Lohmeyer suggested establishing a small ad-hoc group during the meeting to develop specific wording on the subject. Bill came back after lunch with the following wording proposal:

Interconnection of SCSI devices by means other than cables is allowed, e.g., by backplanes using printed wiring boards. Detailed descriptions of these other means are not part of this standard, however, all segments of an SCSI bus are subject to the electromagnetic concepts presented in this standard. These are a) characteristic impedance (see table 5); b) propagation delay (see table 6); c) cumulative length; d) stub length; and e) device spacing (see 6.4 and 6.5).

#### **4.6 Lost A and P cable nomenclature (X3T9.2/93-090) [Spence]**

Bill Spence railed against the loss of A and P nomenclature. Bill offered definitions for the glossary. It was agreed that these would be incorporated in a future revision.

#### **4.7 SCSI-3 Wide Bus Parity Handling (X3T9.2/93-089) [Harris]**

Norm Harris cited the problems of narrow devices not being able to reselect wide devices. One proposal he made was to eliminate parity checking. The group did not feel this was acceptable. A second proposal was to require initiators to use the first 8 SCSI IDs. This also was not acceptable.

An implementors note will be considered pointing out the issue.

It was suggested that an annex be developed to include the informative matter in his document. Norm agreed to develop a revision 1 that could be used for this.

During this discussion it was discovered that table 11 in SPI incorrectly labels the parity signals in the first line.

### **5. General Working Group Items**

#### **5.1 X3T9.2 Procedure on Electronic Notification (X3T9.2/93-019r0) [Lamers]**

John Lohmeyer stated that e-mail sequence numbering was being investigated.

#### **5.2 SCSI Programmable Address Select (X3T9.2/93-095) [McGrath]**

Jim McGrath presented a proposal (actually a reincarnation of SPASTIC from 1988) to have an SCSI bus do automatic assignment of SCSI IDs.

There are several assumptions needed to even consider doing this:

- 1) assume a single-initiator environment;
- 2) assume the protocol chip permits firmware to wiggle the individual signals;
- 3) assume active negation can be disable on the signals used.

One approach is to use special cables and a binary encoded SCSI ID at each connector. This approach is not being pursued.

A second approach is a deterministic signaling protocol. This requires a front end protocol to establish unique SCSI IDs followed by a reconfiguration if needed to optimize the bus. See 93-095r0 for details.

An unique ID (e.g., 64-bit global address) is required in order for this proposal to work.

Jim described a protocol that would occur with RST continuously asserted. After some discussion it was noted that most of today's silicon forces their drivers to a high-impedance state while RST is true.

The consensus was that no way would be found that did not require some silicon to change. The silicon folks desired to not use the RST signal as the qualifier. Jim agreed to work on an alternative proposal. He expects to distribute this proposal on the reflector the first week of June.

## **6. SCSI-3 Architecture Model - SAM (X3T9.2/994D) [Monia]**

On every option in SAM the document that specifies the use of it should be identified and the reader should be directed to read the appropriate document as well as the product specification.

### **6.1 Queue Full Handling (X3T9.2/92-214) [Binford]**

Jeff Williams proposed a 'yellow flag' for queue full with a NEAR QUEUE FULL status that is returned when the threshold set in the near queue full threshold.

The group liked it...well most did. Jeff will document it.

### **6.2 Isochronous Queue Tags (X3T9.2/93-071) [Penokie]**

George Penokie presented his revision 1 wording that is politically correct with SAM. The proposal was modified and George agreed to yet another revision.

## **7. SCSI-3 Command Sets (SPC, SBC, SSC, SGC, and SMC)**

### **7.1 SCSI-3 Primary Commands (X3T9.2/995D) [Weber]**

#### **7.1.1 Dealing with 8-bit tag values in ASC 4Dh (X3T9.2/064) [Weber]**

Ralph Weber intends to drop this proposal for dealing with greater than 255 tags. A note in the protocol document should point out the limits of tag values for which it is capable.

#### **7.1.2 Structure of parameter data to add source & destination identifiers (X3T9.2/93-038) [Weber]**

The group recommendation is to add 32 bytes to the segment descriptor.

## **7.2 SCSI-3 Block Commands (X3T9.2/996D) [Lamers]**

No activity.

## **7.3 SCSI-3 Stream Commands (X3T9.2/997D) [Stephens]**

No activity.

## **7.4 SCSI-3 Graphics Commands (X3T9.2/998D) []**

No activity.

## **7.5 SCSI-3 Medium Changer Commands (X3T9.2/999D) [Stephens]**

No activity.

# **8. SCSI-3 Protocols (SIP, SBP, FCP, GPP)**

## **8.1 SCSI-3 Interlocked Protocol - SIP (X3T9.2/856D) [Lamers]**

### **8.1.1 Interoperation Issues with SCSI-2 initiators and SCSI-3 targets (X3T9.2/93-065) [Frazier]**

Giles identified three possible resolutions:

- a one line change in SIP
- use CHANGE DEFINITION command
- use a mode parameter

The debate raged on and on until starvation overtook them. The conclusion is that a vote is needed at the plenary on converting the implementors note in SAM to a requirement (as possibly moving it to SIP).

### **8.1.2 Review of SIP revision 2 (X3T9.2/856D) [Lamers]**

Larry had copies of SIP rev 2 at the meeting. Several comments were received and Larry plans to rev the document for the June mailing.

### **8.1.3 When to issue SDTR after WDTR (X3T9.2/93-037) [Penokie]**

George Penokie presented his latest wording on issuing WDTR and handling the MESSAGE REJECT message.

The issue of dealing with unexpected bus free conditions (e.g., some implementations do not use the MESSAGE PARITY ERROR message on parity errors) during synchronous or wide negotiations was brought up but not dealt with.

The working group recommends that the proposal be incorporated in SIP.

**8.2 SCSI-3 Generic Packetized Protocol - GPP (X3T9.2/991D) [Stephens]**

A GPP editing session had been held on Tuesday evening. The document is fairly stable, but Gary Stephens is delaying the forwarding motion until SAM is closer to completion.

**8.3 SCSI-3 Serial Bus Protocol - SBP (X3T9.2/992D) [Marazas]**

Jerry Marazas presented an update on SBP activity.

In the nomenclature department, 'command data structure' has replaced 'command data block'. The asynchronous transfer protocol is stable; one area yet to be finalized is reporting of tap slot availability in the status block. The isochronous transfer protocol is firming up but still has a number of issues to be resolved.

The login fifo will be restricted to command data structures defined within SBP. For those structures carrying a CDB, that CDB is defined in the SCSI-2 or SCSI-3 command set documents.

The support elements required were enumerated as they applied to async and isoch transfers. See X3T9.2/93-098 for details of the last SBP working group.

Jerry went over several rules developed at the last working group:

- 1) It is an error to send an ACA command to any fifo unless an ACA condition exists.
- 2) ACA commands can only be sent to an ACA fifo.
- 3) ACA commands shall not be sent to the isoch fifo.

There was concern expressed about having isoch CDS's defined within the SBP document.

Jerry stated that profiles will be developed for specifying implementation characteristics instead of putting those requirements into SBP.

**8.4 SCSI-3 Fiber Channel Protocol - FCP (X3T9.2/993D) [Snively]**

Bob Snively presented an update of the changes to FCP (see X3T9.2/93-097).

Is there an absolute ordering requirement for database applications? The group did not think so.

Should there be enforced boundaries on data sequences? Bob will check on problems with boundaries.

The mechanism for choosing class 1, class 2, or hybrid behavior is not clearly defined.

There was a discussion on RAID addressing issues. Will the FCP RAID approach conflict/complement the RAID study group?

Bob intends to develop a revision 5 for the next mailing.

**8.5 SCSI-3 Serial Storage Protocol - SSP (X3T9.2/93-061) [Scheible]**

John Scheible stated that a project proposal is being submitted for Serial Storage Protocol that ships SCSI commands over SSA. This proposal is for a SCSI-3 mapping. The SSA UIG intends to maintain a SCSI-2+ implementation guideline.

John Lohmeyer requested that the project proposal be transmitted on the SCSI reflector.

SSA has a four-byte routing address; when the address is zero that node takes the packet; the initiator provides a return address. The topology of the network is determined by queries at power-up. Targets do not have unique IDs. The routing address is relative to the starting node.

There was a long discussion on unique addresses and target ids.

## **9. Meeting Schedule**

The next working group meetings will be June 19-22, 1993 at the Sheraton Tara Wayfarer Inn (603-622-3766) in Bedford, NH hosted by Digital Equipment Corporation. The room rates are \$85.00 plus tax. The reservation deadline for these rates is June 28, 1993. The group name is X3T9.

## **10. Adjournment**

The meeting was adjourned at 5:00 p.m. on Wednesday May 19, 1993.