

Accredited Standards Committee*
X3, Information Processing Systems

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Project:

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Reply to: J. Lohmeyer

To: Membership of X3T9.2

From: Lamers/Lohmeyer

Subject: Minutes of X3T9.2 General Working Group July 21, 1993

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Results of Meeting

1. Opening Remarks

John Lohmeyer, the Chair, called the meeting to order at 9:00 a.m., Wednesday, July 21, 1993. He thanked Ralph Weber and Charles Monia of Digital 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:

Name	S	Organization	Electronic Mail Address
Mr. Norm Harris	P	Adapttec, Inc.	nharris@adapttec.com
Mr. Jan V. Dedek	P	Ancot Corp.	
Mr. Clifford E. Strang Jr.	P	BusLogic	
Mr. Charles Monia	P	Digital Equipment Corp.	monia@starch.enet.dec.com
Mr. Ralph Weber	A	Digital Equipment Corp.	weber@star.enet.dec.com
Mr. Edward A. Gardner	A	Digital Equipment Corp.	gardner@ssag.enet.dec.com
Mr. D. W. Spence	A	ENDL Associates	5051038@mcimail.com
Mr. Edward Lappin	P	Exabyte Corp.	tedl@exabyte.com
Mr. Jeff Epstein	O	Future Domain	jeffe@fdc.mhs.compuserve.com
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
Dr. Sam Karunanithi	P	Hitachi Micro Systems, Inc.	skarunan@hmsi.hitachi.com
Mr. George Penokie	P	IBM Corp.	gop@rchvmp3.vnet.ibm.com
Mr. Giles Frazier	S	IBM Corp.	gfrazier@ausvm6.vnet.ibm.com
Mr. Gary Brandvold	A	Iomega Corp.	
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. Steve Timm	V	Microsoft	stevetim@microsoft.com
Mr. John Lohmeyer	P	NCR Corp.	john.lohmeyer@ftcollinsco.ncr.com
Mr. Stephen F. Heil	P	Panasonic Technologies, Inc	
Mr. James McGrath	P	Quantum Corp.	JMCGRATH@QNTM.COM
Mr. Gerald Houlder	A	Seagate Technology	Gerry_Houlder@notes.seagate.com
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. Robert N. Snively	P	Sun Microsystems, Inc.	Bob.Snively@eng.sun.com
Mr. Paul D. Aloisi	S	Unitrode Integrated Circuits	Aloisi@uicc.com
Mr. Jeff Stai	P	Western Digital	stai@dt.wdc.com
Mr. Tak Asami	A	Western Digital	asami@dt.wdc.com

30 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 SCSI-3 Physical Interface (Project 855 rev 12b) [Lamers]

4.1.1 Multi-wipe contact requirement (93-104r0) [Cannon]

John Lohmeyer presented the comment made by Mr. Cannon of Methode regarding the multi-wipe contact requirement in SPI. John noted that this comment was received after the close of the X3T9 letter ballot and was not "officially" counted by the X3T9 Secretary. However, in the interest of forestalling a public review comment he suggested that the group develop a recommendation.

John noted that no specific wording was offered by Mr. Cannon for inclusion in the document. He also noted that he had sent a response letter to Mr. Cannon (see 93-105r0).

John stated three possible options are: 1) reject the comment; 2) change 'shall' to 'should'; or 3) develop a set of performance parameters to replace the multi-wipe requirement.

George Penokie stated his objection to altering the requirement in SPI since it was developed with due diligence by experts in this area. Furthermore, the multi-wipe design is crucial to the long-term reliability of the connector. The existing tests do not specifically test this aspect of the connector.

Bob Masterson was not present; no one else was willing to defend the comment. The consensus was to recommend no change to SPI.

4.1.2 Shield resistance specification (93-103r0) [Milligan]

In his X3T9 letter ballot comments, Gene Milligan requested that the 10 milliohm shield connection requirement be changed to a larger value because the contact test procedure allows a 15 milliohm increase in contact resistance after subjecting the connector to mixed flowing gas. John Lohmeyer suggested that 75 milliohms is the number specified in HIPPI.

Bill Ham explained that the tests specified in SPI do not adequately address the real issues of proper shielding (uniform coverage). It is important for EMI protection to have a good connection to the shield completely enclosing the signals.

John Lohmeyer noted that the 10 milliohm recommendation was inherited from SCSI-2 and that the mixed flowing gas test procedure had not been in SCSI-2. He contended that the MFG test was intended to cover the signal contacts, not the shield. However, SPI is ambiguous on this point.

It appeared that the 10 milliohm recommendation is not really in conflict with the MFG test and that changing the value of this parameter does not substantially improve the draft standard. If a transfer impedance test procedure is developed, it should be considered as a replacement for the shield contact resistance.

4.1.3 SPI comments (93-113r0, 114r0) [Houlder, Asami]

Gerry Houlder had two comments on SPI. Document 93-113r0 requests a single word change to clarify that the control signals are not allowed to change during a REQ/ACK handshake. The consensus is that this is an editorial change and is appropriate to express the intended requirement.

Document 93-114r0 requests that measurement techniques for differential be included similar to those established for single-ended. Gerry Houlder volunteered to attempt suggested wording for the measure techniques.

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

Not discussed.

5. Protocol Topics**5.1 SCSI-3 Interlocked Protocol (Project 856D r3) [Lamers]****5.1.1 ACA () []**

It was proposed that a bit be added to the control byte to control the duration of the ACA condition. A value of zero would end the ACA condition when sense data is returned. A value of one would extend the ACA condition until an explicit ACA CLEAR was issued.

In another feat of amazement there was no major disagreement with this proposal. Such a feature exists in SBP and FCP already. The proposal would added in an architecturally-consistent fashion that is compatible with SCSI-3 devices working on SCSI-2 initiators. To a large extent this address Giles Frazier's issues with SCSI-3 ACA.

George Penokie suggested changing the status code for ACA ACTIVE to 38h from 30h so that a busy indication is made to the initiator. Later, Jeff Williams confessed that HP had already implemented the 30h code and requested that the code not be changed.

5.1.2 ULP Services () []

There was a brief discussion of ULP services in the protocol documents. Should these all be common? What about exceptions such as the login services provided by FCP? There was consensus that SAM should document the services. The protocol editors should develop a common set of services, both mandatory and optional. This topic was assigned to the general editing meeting on Sunday September 12.

5.1.3 Should ECA be added back into SCSI-3?

The consensus is to recommend that ECA be removed from SCSI-3. ACA should be used instead.

5.1.4 SDTR & WDTR (93-037r3) [Penokie]

The clause in SIP that contains this needs to be re-written in the client-server model. The clarification of SDTR/WDTR will be done at that time.

5.1.5 Isoch Queue Tag (93-071r2) [Penokie]

Withdrawn due to lack of interest -- The SBP folks have found another way.

5.2 SCSI-3 Fibre Channel Protocol (Project 993D) [Snively]

Bob Snively presented a status report for FCP. He requested that the group recommend to the X3T9.2 plenary acceptance of FCP rev 5 as the current working draft for project 993D.

5.3 SCSI-3 Generic Packetized Protocol (Project 991D) [Stephens]

Gary Stephens presented revision 6. He noted that multi-pathing support has been removed from the command sets and moved into the lower level protocol.

6. Command Sets

6.1 SCSI-3 Medium Changer Commands (Project 999D) [Stephens]

Gary Stephens presented revision 1 of the medium changer commands. The READ ELEMENT STATUS command was made mandatory.

32-bit luns - does not want to do RESERVE/RELEASE in SMC, these commands should be in SPC. Should 6-byte CDBs be allowed in SCSI-3?

6.2 SCSI-3 Primary Commands (Project 995D) [Weber]

Ralph had not had time to generate a draft document yet.

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

Charles Monia outlined the changes to the revision 10 document (see 93-124).

8. General Working Group Items

8.1 Queue Full Handling (93-102r0) [Williams]

There was a great deal of wheel spinning. Once again, there seemed to be differences of opinion between RAID folks and non-RAID folks. Objections were cited that the proposal adds more protocol, but doesn't really solve the problems much better than can be done with existing protocol.

The working group does not recommend this proposal be accepted, but does want the plenary to vote on it.

8.2 SCSI Configured AutoMagically (93-109r2) [Gardner]

Ed Gardner presented the latest automatic configuration proposal for SCSI. The intent is to make SCSI ID assignment more friendly for PC applications.

The SCAM protocol has been designed to work with many, but not all, existing protocol chips. Chips that can implement SCAM without changes must provide low-level signal controls so that firmware can implement the protocol. Chips that do not provide low-level signal controls would require changes to implement the new protocol. Jeff Stai voiced strong opposition to any solution that does not work with all existing silicon, but did not get much sympathy.

A two-step implementation plan was proposed:

- 1) Initial implementations would use the low-level programming modes of protocol chips and firmware to implement the SCAM protocol. Systems based on these implementations could support a mixture of new and old (pre-SCAM) devices, but hot-plugging would only work for those systems that can tolerate devices generating hard reset conditions.
- 2) Later implementations based on revised protocol chips could support hot-plugging (and devices

powered on after the system) without the need for hard reset conditions.

It was pointed out that RAID systems which are most concerned about hot plugging already use other solutions to ID assignment (e.g., geographic ID assignment). Using a reset condition to solve hot-plugging would only work on systems that can recover from hard reset conditions (not too many).

A recent tweak was to have SCAM-capable devices with a default ID (to use in non-SCAM systems) hold off on responding to selection for at least 2 ms until they have determined they are in a SCAM system or not. Once the determination is made, they revert to fast responses to selections. If they receive a selection to their default ID for more than 2 ms, then they conclude they are not in a SCAM system and use their default ID.

SCAM masters may safely scan the bus for non-SCAM devices using a selection timeout period of 1 ms. Jeff Stai pointed out that this time may need to be a bit longer (say 3 ms) as some chips cannot generate a 1 ms timeout.

John summarized low-level silicon requirements for implementing SCAM with firmware:

- 1) Firmware control and sensing on BSY, SEL, C/D, I/O, MSG, and DB(0-7).
- 2) Active negation must be turned off, all lines are used in wired-OR mode. [This requires extra enable lines for differential drivers/receivers].
- 3) Need to be able to arbitrate without an ID, (if multiple masters are supported or for a hot-plugged target).
- 4) If hot-plugging is a requirement (also includes separately powered targets), then a SCAM selection (not_BSY*SEL*MSG) must be reconized while operating in normal (high-speed) mode.
- 5) Each SCAM device must have a unique node identification.

Further work on the SCAM proposal is to be done using the SCSI Reflector. If a separate face-to-face meeting on SCAM is required, it will be called via the SCSI Reflector. Those people who are still not on the reflector should contact Ed Gardner or John Lohmeyer for further information.

8.3 Automatic SCSI ID Acquisition (93-122r0) [Frazier]

Giles Frazier presented an alternative proposal for automatic configuration of the SCSI bus that works by allowing devices to "borrow" an ID to find an unused ID. He stated that IBM has a patent application that covers some aspects of this protocol, but that they were willing to adhere to the ANSI patent policy if his proposal was adopted.

What is needed?

- a random timer
- perform a reselection without an outstanding I/O process
- the ability to not respond to a selection

The proposal also assumes that any unique SCSI ID is satisfactory and does not provide the capability of reassign IDs to optimize performance. Silicon changes are required to latch the winner's ID during arbitration phase and to use this ID to NOT respond to selections if some other SCSI device has "borrowed" your ID. Devices that do not support this protocol can exist on the SCSI bus, but they must be configured at SCSI IDs at the high or low end of the ID range. New devices cannot borrow an ID from an old device, so all old devices must be configured at one end of the ID range.

Collisions when borrowing IDs are resolved by random backoff intervals, much like in CSMA/CD protocols.

The consensus was to continue to pursue the SCAM proposal at this time as it appears to have fewer

configuration dependencies.

9. Meeting Schedule

The next working group meetings will be September 13-17, 1993 at the Westchester Marriott Hotel (914-631-2200) in Tarrytown, NY hosted by The IBM Corporation. The room rates are \$99.00 plus tax. The reservation deadline for these rates is August 27, 1993. The group name is IBM X3T9. The host contact is Bob Dugan at 914-435-7801.

10. Adjournment

The meeting was adjourned at 5:00 p.m. on Wednesday July 21, 1993.