Accredited Standards Committee*
X3, Information Technology

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Reply to: John Lohmeyer

To: Membership of X3T10

From: Ralph Weber, Secretary X3T10
John Lohmeyer, Chair X3T10

Subject: Minutes of X3T10 SCSI Working Group Meeting
Lake Tahoe, NV -- January 10-11, 1995

Agenda

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   - 7.1 Plug and Play SCSI Industry Specification {Tuesday 4:00 p -- ??}
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   - 7.3 CAM-2 CCBs and General CAM-2 Rules

8. Meeting Schedule

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Results of Meeting

1. Opening Remarks

John Lohmeyer, the X3T10 Chair, called the meeting to order at 9:00 a.m., Tuesday January 10, 1995. He thanked Steve Finch of Silicon Systems for arranging and hosting 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 X3T10 were made available to those attending.

2. Approval of Agenda

The draft agenda was approved with the addition of 4.5 (Bus transition timing) and 6.10 (Determining the status of an immediate command).

3. Attendance and Membership

Attendance at working group meetings does not count toward minimum attendance requirements for X3T10 membership. Working group meetings are open to any person or organization directly and materially affected by X3T10's scope of work.

The following people attended the meeting:

Name	S	Organization	Electronic Mail Address
Mr. Norm Harris	P	Adaptec, Inc.	nharris@eng.adaptec.com
Mr. Lawrence J. Lamers	A#	Adaptec, Inc.	ljlamers@aol.com
Mr. Carl Booth	O	Amphenol/Spectra-Strip	
Mr. Ron Roberts	A	Apple Computer	rkroberts@aol.com
Mr. Dennis R. Haynes	P	Burr-Brown Corp.	haynes_dennis@bbrown.com
Mr. Joe Stoupa	A	Burr-Brown Corp.	Stoupa_Joe@bbrown.com
Mr. Clifford E. Strang Jr.	P	BusLogic	skip@buslogic.com
Mr. Bob Gannon	O	C&M Corp.	bobg848740@aol.com
Mr. Ian Morrell	P	Circuit Assembly Corp.	crctassmbl@aol.com
Mr. Nicos Syrimis	A	Cirrus Logic Inc.	nicos@cirrus.com
Mr. Peter Johansson	P	Congruent Software, Inc.	pjohansson@aol.com
Mr. Michael Alexenko	A#	Conner Peripherals	Mike.Alexenko@conner.com
Mr. Louis Grantham	P	Dallas Semiconductor	grantham@dalsemi.com
Mr. Michael Smith	A	Dallas Semiconductor	msmith@dalsemi.com
Mr. Charles Monia	P	Digital Equipment Corp.	monia@shr.dec.com
Dr. William Ham	A#	Digital Equipment Corp.	ham@subsys.enet.dec.com
Mr. William Dallas	A#	Digital Equipment Corp.	dallas@wasted.enet.dec.com
Mr. Kenneth J. Hallam	A	ENDL	3450626@mcimail.com
Mr. Ralph O. Weber	A#	ENDL Associate	roweber@acm.com
Mr. Edward Lappin	P	Exabyte Corp.	tedl@exabyte.com
Mr. Gary R. Stephens	P	FSI Consulting Services	6363897@mcimail.com
Mr. Mike Chenery	A#	Fujitsu	mchenery@fcpa.fujitsu.com
Mr. J. R. Sims	V	Hewlett Packard Co.	robsims@depeche.lvld.hp.com

Mr. Zane Daggett	V	Hitachi Cable Manchester,Inc	74354.2576@compuserve.com
Ms. Nancy Cheng	V	Hitachi Computer Products	n_cheng@hitachi.com
Mr. John Lohmeyer	O	HMPD	john.lohmeyer@hmpd.com
Mr. George Penokie	P	IBM Corp.	gop@rchvmp3.vnet.ibm.com
Mr. Giles Frazier	O	IBM Corp.	gfrazier@ausvm6.vnet.ibm.com
Mr. Duncan Penman	O	IIX Consulting	penman@netcom.com
Ms. Jeanne T. Martin	O	Lawrence Livermore Nat'l Lab	jtm@llnl.gov
Mr. Lansing Sloan	O	Lawrence Livermore Nat'l Lab	ljsloan@llnl.gov
Mr. Dean Wallace	P	Linfinity Micro	
Mr. Robert Bellino	P	Madison Cable Corp.	
Mr. Pete McLean	P	Maxtor Corp.	pete_mclean@maxtor.com
Mr. Bob Masterson	P	Methode Electronics, Inc.	rwmast@aol.com
Mr. Joe Dambach	P	Molex Inc.	
Mr. Jay Neer	A	Molex Inc.	jneer@usa.molex.com
Mr. Peter Brown	P	Oak Technology, Inc.	brown@oaktech.com
Mr. Doug Prins	A#	QLogic Corp.	d_prins@qlc.com
Mr. James McGrath	P	Quantum Corp.	JMCGRATH@QNTM.COM
Mr. Edward A. Gardner	A	Quantum Corp.	gardner@acm.org
Mr. Keith Staub	V	Quantum Corp.	kstaub@tdh.qntm.com
Mr. Peter VanBeckum	V	Samsung Semiconductor	syed@sam.com
Mr. Kazushige Yoshino	V	Sanyo Electric Co., Ltd.	
Mr. Gene Milligan	P	Seagate Technology	Gene_Milligan@notes.seagate.com
Mr. Gerald Houlder	A	Seagate Technology	Gerry_Houlder@notes.seagate.com
Mr. Erich Oetting	P	Storage Technology Corp.	Erich_Oetting@Stortek.com
Mr. Roger Cummings	A	Storage Technology Corp.	Roger_Cummings@Stortek.com
Mr. Robert N. Snively	P	Sun Microsystems Computer Co	bob.snively@eng.sun.com
Mr. Patrick Mercer	P	SyQuest Technology Corp.	patrick.mercer@syquest.com
Mr. John Moy	P	Tandem Computers	moy_john@tandem.com
Mr. Bill Boyd	O	Texas Instruments	bboy%mimi@magic.itg.ti.com
Mr. Paul D. Aloisi	P	Unitrode Integrated Circuits	Aloisi@uicc.com
Mr. Tak Asami	A	Western Digital Corporation	asami@dt.wdc.com
Mr. Tom Hanan	A#	Western Digital Corporation	hanan_t@a1.wdc.com
Mr. Devon Worrell	A#	Western Digital Corporation	worrell@dt.wdc.com
Mr. Dennis P. Moore	P	Zadian Technologies	dmoore@netcom.com

57 People Present

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

4. Physical Topics

4.1 Next-Generation SPI Proposals [Aloisi, Ham, Harris, Lohmeyer, Penman]

John Lohmeyer reviewed the work performed at the November Working Group meeting. At that meeting, a list of interesting topics in the SCSI parallel bus area was created and reviewed. Several committee members agreed to write proposals regarding specific items on the list.

Paul Aloisi started the next-generation presentations with a discussion 3.3 volt TERMPWR. Paul's discussion was based on X3T10/94-164r2. The issues are important for low-voltage systems, both battery and non-battery environments. Paul noted that 2.7 volt terminators are required and a minimum single-ended VDC of 2.8 (as opposed to the 2.8 and 2.9 values shown in his document).

Gene Milligan questioned the relationship between X3T10 battery electrical issues and similar work in the PCMCIA arena. John suggested that X3T10 should be helping the PCMCIA group as they are focusing on connector issues.

Bill Ham noted that many of the concepts being presented apply to systems other than 3.3 volt configurations. He suggested that smaller wire gauge systems also could benefit. Paul agreed but noted that his charter was for 3.3 volt systems.

Next, Paul presented document 94-229r1, SCSI-3 SPI Low Power. Much of the discussion concerned what information should appear in a standard. Some of those present thought that Paul's material over emphasized engineering details.

Gene Milligan noted that a key issue in the low power area is a sleep mode for the interface. This is different from the drive sleep mode already approved in document X3T9.2/91-014R6. Gene noted that equivalent effort already is in progress in PCMCIA.

Discussion turned to the need for a separate meeting on future SPI low-voltage work. After reviewing the available dates, the group selected 17 February in a straw poll. George Penokie suggested that the issue should be discussed again at the Plenary. Gene Milligan suggested that preliminary discussions should occur on the Internet. Gene thought that the Internet discussion might eliminate the need for a meeting. John disagreed, saying that he has seen non-controversial Internet discussions become very controversial at subsequent meetings.

Next, Paul presented 94-240r1, Hot Swap Issues. Paul indicated that this material is not as ready for discussion as the other topics. Paul listed the issues with hot-swap. Bob Snively said that some of the written material is not applicable to generic SCSI.

Bill Ham presented his review of the action items. Bill's list started with overhead reduction for performance reasons. Bill said that faster data phase speeds will be swamped by overhead from the other bus phases. Bill's other concerns were physical size and several system issues. Bill's system issues included TermPwr distribution, longer busses (incident wave switching, attenuation, and skew), shield effectiveness, bus media (cables, backplanes, and propagation speed), low-power differential, and bus sleep modes.

Jim McGrath proposed the following additions to Bill Ham's list: 32-bit bus width support, longer cable plant (using SCSI repeaters), lower device capacitance (take device off the bus when it's not selected). Jim's SCSI repeater configuration generated substantial discussion.

4.2 3.3 Volt SCSI (94-164r2) [Aloisi]

This item was discussed as part of the previous agenda topic.

4.3 Fast-20 Timing Considerations [Asami]

Tak Asami presented 95-109r0, which describes a problem with the timing descriptions in the Fast-20 document. Tak indicated that the Fast-20 document can confuse someone reading it to a point where they implement something that is faster than Fast-20. After some discussion, the group decided that a combination of the SPI document and the Fast-20 document already covers Tak's comment. However, many of those present felt that the proposal enhances Fast-20.

It was noted that the Fast-20 letter ballot resulted in numerous comments, of which this is only one. Therefore, the Fast-20 document should be in a position to accept this change. The group also agreed that the change is fundamentally editorial.

Concerns were raised about the practice of copying SPI material to the Fast-20 document (in order to make the Fast-20 document clear). John asked that anyone opposed accepting Tak's comment describe their opposition. Jim McGrath asked that the response to the letter ballot comment state that the described problem does not really exist. Gene Milligan asked that the working group recommend to the Plenary that the response to the Western Digital comment say that the described behavior is **not** allowed in SCSI, but that X3T10 will add the proposed text, in the interest of clarifying the Fast-20 document.

4.4 Review of SCSI-3 Fast-20 Letter Ballot Comments

John Lohmeyer presented the results of the Fast-20 forwarding letter ballot. The forwarding to first public review passed 50:2:0:4. AMD, Compaq, Interphase, and NEC failed to return their ballots.

IBM registered a comment requesting that the glitch filters be restored on the REQ/REQQ and ACK/ACKQ lines. Gary Stephens said that the current wording requires the filters because SPI requires the filters and Fast-20 contains no statement eliminating the filters. George Penokie describes IBM's concern that the current wording is unclear (based on knowledge of the Fast-20 authors' intent). In addition, IBM is concerned with interoperation in old (slow) systems that depend on the glitch filter for proper operation.

Bill Ham noted that the shorter bus lengths required by Fast-20 gain no benefits from the glitch filters. The group began a discussion of how the glitch filters can be managed so that the filters are present when the device is operating a speeds slower than the Fast-20 rules. Both the real-world operating mechanics and the standards wording were discussed. George stated that IBM would change its vote if a statement were added clarifying the usage of glitch filters in Fast-20 and in less-than-Fast-20 operation. It was noted that glitch filters are required in synchronous less-than-Fast-20 and optional in Fast-20 operation.

John announced that a Fast-20 editing meeting is being proposed for mid-February in the San Jose area. This meeting would be co-located with the SPI futures meeting discussed earlier in this meeting. [Chair's note: George Penokie, Larry Lamers, and John Lohmeyer met later in the week and resolved most of the editing issues intended for this meeting. The proposed meeting probably will not be needed.]

Next the group turned to the Gene Milligan's (Seagate) comments. Gene wrote 29 comments. The comments were discussed individually. Many of the comments were accepted, as is. Other comments were accepted with revisions that were acceptable to the group. Gene's comment 15 was rejected. Comment 12 was accepted in principle, but not necessarily for inclusion in the SPI. Comments 2, 8, and 11 were accepted with some wording revisions. All other comments were accepted.

Norm Harris presented the Adaptec position on Fast-20 in mixed bus width environments. Adaptec voted "yes with comment" on the Fast-20 letter ballot. Adaptec believe that mixed bus width

environments are viable and worthwhile for Fast-20 systems. Norm presented some skew data showing that mixed bus width environments have acceptable characteristics.

John asked if all the technical experts agreed that Norm's data supports mixed bus width operation. Gene Milligan questioned the contents of the data. Otherwise, everybody (including Gene) agreed that mixed bus width operation is desirable and possible. Norm proposed that the current wording prohibiting mixed bus width operation be replaced with wording that specifically allows mixed bus width operation. Several members suggested that the current wording be deleted, and that Fast-20 be silent on mixed bus width operation. Norm agreed that making Fast-20 silent on mixed bus width operation will be acceptable to Adaptec.

John noted that the Fast-20 requirement for even spacing seems to apply to all configurations. However, the intent is that even spacing apply to the 3m bus length case. Resolution of the second Adaptec comment was to make the even spacing requirement a recommendation that is especially applicable to 3m bus length systems.

It was noted that Gary Stephens is reviewing the Fast-20 document, finding many editorial problems, and will be discussing his findings with Larry Lamers, the Fast-20 technical editor.

4.5 Bus transition timing [Snively]

Bob Snively asked the group about delays involved in switching the data bus direction. He was informed that the required delay is at least the sum of the data release delay and the bus settle delay. Bob noted that he had found this information in SCSI-2, but not SCSI-3. He was pointed to the definition in the SCSI-3 Parallel Interface.

5. Protocol Topics

5.1 Review of Generic Packetized Protocol (GPP) Letter Ballot Comments

Gary Stephens reviewed the Gene Milligan (Seagate) comments on his yes letter ballot vote on forwarding of the GPP Technical Report to public review. Gary and Gene discussed the status of normative references in a Technical Report. Gary agreed with Gene that normative references cannot appear in a technical report. Gene's comment 8 was rejected due to the amount of document restructuring required. Gary agreed to add an explanatory note about the Annex pairs. Comment 9 was accepted with the modification that 'unreliable' is changed to 'unconfirmed'. Gene Milligan accepted all the responses to his comments.

John announced that the letter ballot vote on GPP forwarding passed 51:0:0:5. John noted that the majority of the work on GPP will be done before the Plenary meeting. If the Plenary approves the letter ballot responses, then GPP will have passed most of the hurdles on the way to ANSI publication as a technical report.

5.2 CA and ACA Presentation (95-110r0) [Monia]

Charles Monia presented document 95-110r0, Comparison of Contingent Allegiance and Auto Contingent Allegiance. This document was prepared in response to a request from the November 1994 Plenary meeting. A few minor corrections were made. Charles agreed to provide a revised document for the mailing.

Then, the group debated the details and usage of ECA and ACA. The group also debated a request that sense data be preserved after the receipt of the first ACA command. The latter issue is based on concerns raised in the Fiber Channel - Arbitrated Loop working group.

5.3 Addressability of TARGET RESET task management function (94-236r0) [Snively]

Bob Snively presented his request for a Logical Unit Reset task management function. He reviewed the history that produced this specific proposal. There was a lengthy discussion of the BUS DEVICE RESET message on the parallel bus. Also, Bob verified that use of a unique task management function is the preferred mechanism for the SAM. Resetting multi-port targets also was discussed at length.

Bob was instructed to provide two task management functions (target reset and logical unit reset) for inclusion in the SAM. He also was instructed to redefine the BUS DEVICE RESET as the basis for supporting the logical unit reset on the parallel bus. For FCP, Bob plans to do an “address target” reset function.

6. Command Set Topics

6.1 Proposed INQUIRY Command Enhancements (94-188r7) [Weber]

Ralph Weber mumbled his way through a review of the INQUIRY Command Enhancements proposal. Ed Gardner noted that the proposal is not clear regarding the CDB Usage Data definition for reserved fields. Ed proposed that tested reserved field bits should be shown as one bits in the CDB Usage Data. George Penokie and Ralph felt that all reserved field bits should be shown as zero bits, regardless of whether those bits are tested. Most of the group agreed that reserved field bits should be shown as zeros.

Ted Lappin and Ed Gardner noted that the description of whole or partial field usage was ambiguous. A device could report using three out of four bytes in a field and satisfy the proposal. Ralph stated his intention to disallow this. Ted and Ed stated that Ralph’s intention must be clarified in the proposal.

Ralph agreed to revise the proposal in time for the next mailing. The revised proposal will be considered at the March X3T10 meetings.

6.2 Exception Handling Selection Mode Page (94-190r3) [Penokie]

George Penokie presented revision 3 of his proposal for controlling the reporting of asynchronous events. He noted that Adaptec has identified a few grammatical errors. All such errors will be corrected in the next proposal revision. The working group recommended some corrections in wording in table 2 of the proposal.

At Ed Gardner’s suggesting, the proposal will be changed to affect the SPC and apply to all device types. Since all the revisions were of a non-technical nature, the working group recommended that the proposal, as revised, be approved by the Plenary.

6.3 Partition Mode Pages for Tape (94-152r1) [Lappin]

Ted Lappin presented his proposal modifying the Medium partition mode page (1-4) definitions. His proposal clarifies the functions (options) that the application client is requesting. The proposal also adds gigabytes to the PSUM field. Ted noted that many of the notes in revision 0 were converted to standard text in revision 1. Ted proposed that 94-152 be remanded to the SSC/SMC working group. There was no objection.

6.4 Command Extensions for PCMCIA (94-203) [Joslin]

Since this is the second working group at which no one was present to discuss the proposal, John Lohmeyer proposed that the item be dropped from future agendas. There was no objection to dropping this agenda item.

6.5 Multiple Port Operations (94-233) [Snively]

Bob presented his proposal for multiple port operations (94-233r1). He noted that the changes are a few minor wording changes in the SPC, addition of a Priority Reserve feature, and addition of a task management function in SAM. Next, Bob reviewed the outstanding issues with the proposal.

Bob noted the issues with generic global identifiers. Bob suggested that the RESET DEVICE OTHER PORT message should be kept, in the SIP. He said that the PORT STATUS command is not as important as it was. Bill Dallas suggested that a persistent reservation (with key) be added to the proposal. Bob and Bill agreed to develop a specific proposal on this subject. The working group discussed the concepts of persistent reserve.

Bob agreed to revise the proposal based on working group input and ongoing work with Bill. Gerry Houlder agreed that, if all the dual port features discussed cover the needs that the PORT STATUS command addresses, he will agree to making the PORT STATUS command vendor unique and thus obsolete it.

6.6 Attached Medium Changer Model (95-103r0) [Weber]

Ralph Weber described a problem with reused operation codes that prevents CD-ROM devices from using the MOVE MEDIUM and READ ELEMENT STATUS commands in the attached medium changer model. Ralph proposed specific operation codes that can be used for MOVE MEDIUM and READ ELEMENT STATUS. Ralph noted that the proposed operation codes are assigned to array devices in the SCC.

Ed Gardner stated that existing tape products use the existing MOVE MEDIUM and READ ELEMENT STATUS operation codes in the attached medium changer way. Ed insisted that the existing X3T9.2/92-006r2 be allowed for existing products. Erich Oetting suggested making the new operations codes the preferred ones for future devices, but allowing the existing operation codes for existing stream device products. Ralph agreed to revise the proposal as described by Erich.

After discussing the pros and cons of sharing operation codes with the array device commands, a straw poll was taken. The working group unanimously favored using operation codes that currently are unused (are unique) for the MOVE MEDIUM and READ ELEMENT STATUS commands.

Ted Lappin suggested that MOVE MEDIUM and READ ELEMENT STATUS should be allowed for line printer devices. Ralph agreed to make all the changes requested by the working group, draft a new document, and deliver the revised document for inclusion in the next mailing.

6.7 Conflict Between Read Long and the Read-write Error Recovery Page [Milligan]

Gene Milligan reviewed the history of conflicting requirements between the READ LONG command an the Read/Write Error Recovery mode page. In March 1994, the working group decided that the CORRCT and DCR mode page bits cannot be set during a READ LONG. If they are, the READ LONG shall be failed with an ILLEGAL REQUEST status. Gene found more cases of conflicts between READ LONG command and the Read/Write Error Recovery mode page. As a result, Gene proposed four possible actions based on the new conflicts that have been found.

Gene's four proposals were: 1) Obsolete the READ LONG command, 2) sanction ad hoc behavior, 3) retract 3/94 and declare the two independent, 4) address all the conflicts. Responses to Gene's email

discussion of the four proposals were as follows. A non-user of READ LONG suggested rigorously defining the behavior. An engineering tool user favored ad hoc behavior. An adamant OS user needed functional READ LONG and WRITE LONG commands.

By unanimous consent, the working group recommended adoption of proposal 3 to the Plenary. Gene next discussed two ancillary issues. If the CORRCT is set to don't correct, the status will be GOOD unless some non-data error is encountered. Gene will draft a proposal that reflects the consensus of the working group.

6.8 SPC Rev 4 Comments (95-106r0) [Penokie]

Ralph Weber reviewed and responded to the SPC comments provided by George Penokie. George made 21 comments. Ralph accepted 15 comments. Comment 3 was accepted provided Ralph send the revised wording to George and Bob Snively for approval. Comments 1, 7, 8, 9, and 13 were rejected because they conflict with previously approved documents. George was satisfied with the reasons for rejecting comment 8. However, George maintained that the MOVE MEDIUM, READ ELEMENT STATUS, and processor commands should not be in the SPC.

6.9 Distributed SCSI (95-112r0) [Sloan]

Lansing Sloan (from Lawrence Livermore National Laboratory) described the storage interests of LLNL. He said that LLNL believes that SCSI network-attached peripherals can enhance file and storage servers, particularly if more capability is added to SCSI. Lansing described three ways for processor-to-peripheral transfers: conventional READ/WRITE, current third-party COPY, and data transfers with separated command paths.

The working group generally favored the READ/WRITE mechanisms, which expanded the features in the RESERVE and RELEASE commands. Actually, the RESERVE/RELEASE mechanism may fit very well with the persistent reserve feature discussed earlier in the day. The COPY command option was mostly rejected as too complex.

John suggested that a study effort should be setup when Lansing is ready. Lansing agreed that the LLNL team is not fully ready yet. The advice received today was very helpful to Lansing. He will return to the working group when the new advice as been assimilated.

6.10 Determining the status of an immediate command (94-244r0) [Lappin]

Ted Lappin presented a proposal that would expand the cases in which the status of an active immediate command can be determined. Ted's proposal basically is an extension of the current "format in progress" capability. Bob Snively raised concerns about multiple concurrent incomplete immediate commands. The working group recommended that the revised proposal be approved by the Plenary.

7. Other Topics

7.1 Plug and Play SCSI Industry Specification {Tuesday 4:00 p -- ??}

At Larry Lamers' request, the Plug and Play discussion was remanded to a separate non-X3T10 ad hoc group (as opposed to within the context of the Working Group meeting). In the absence of any objections, the Working Group meeting was recessed and the ad hoc group convened to discuss Plug and Play. For information on this meeting, please contact Steve Timm (Microsoft).

7.2 ANSI/AIIM MS59 Log Pages (94-113r2) [Podio] {Wednesday am}

Fernando Podio described the use of SCSI log page codes in the AIIM C21 committee's MS59 Standard. His presentation covered document 94-113r2. He described the review of optical vendor specific log page code usage, by which log page codes 39h and 3Ah were selected for use with SCSI-2. He described the process by which X3T10 assigned log page codes 09h and 0Ah for use with SCSI-3. Log page code 39h/09h is used for a Media Error log page. Log page code 3Ah/0Ah is used for the Clear Media Error log page.

Fernando also described the MS59-specific usage of the Read/Write Error Recovery and Verify Error Recovery mode pages. He also reported that the C21 committee is currently working to get the MS59 Standard in the applicable ISO document. Fernando requested X3T10 coordination of C21 and X3T10 positions regarding these log page and mode page usage. Gene Milligan suggested writing a letter from SC25 to TC121 requesting support for the MS59 during ISO processing.

The group discussed the X3T10 documentation of the MS59 log page and mode page usage. It was agreed that the log pages can be documented in the SPC and SBC simply by noting that the 09h and 0Ah log page codes are defined by the AIIM C21 MS59 Standard. The log page codes should be documented as being used only by optical devices.

The mode page changes were more difficult because MS59 proposes extensions to the existing Read/Write Error Recovery and Verify Error Recovery mode pages. The best way to document these extensions was discussed. Duplicating the MS59 information in the SBC was rejected, due to the difficulties with keeping the two standards documents synchronized. The accepted solution was to note the existence of longer Read/Write Error Recovery and Verify Error Recovery mode pages in the SBC. The structure diagrams for the Read/Write Error Recovery and Verify Error Recovery mode pages would not be changed, but note text would be added.

Fernando asked any interested persons to contact him at fernando@pegasus.ncsl.nist.gov.

7.3 CAM-2 CCBs and General CAM-2 Rules

Bill Dallas described the progress in the CAM working group. The general direction of CCB restructuring has been agreed. Bill also described a proposed expansion of the XPT functions to make peripheral drivers more portable between operating systems.

Gerry Houlder began a discussion of allowing both DATA IN and DATA OUT for a single command. Currently, the CAM CCB does not permit this operational mode. At a minimum, a second data pointer must be defined. There was some debate about the historical and practical limits on both DATA IN and DATA OUT for a single command.

Bill asked that the project be changed from CAM-2 to CAM-3. John said that a title change can be made without revising the project proposal.

8. Meeting Schedule

The working group reviewed the March map for X3T10 meetings. The group recommended that the policies and procedures meeting was not needed in March. Moving the XOR meeting in to the general working group meeting was discussed, but not recommended.

The next plenary meeting of X3T10 SCSI Working Group will be March 7-8, 1995, in Newport Beach, CA, at the Hyatt Hotel (714-729-1234), hosted by QLogic.

9. Adjournment

The meeting was adjourned at 5:40 p.m. on Wednesday January 11, 1995.