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Reply to: John Lohmeyer

To: T10 Membership
From: Ralph Weber / John Lohmeyer
Subject: SCSI Physical Working Group Meeting -- November 1-2, 1999
Monterey, CA

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. SPI-3 Topics
 - 4.1 Cable Media Performance Testing (98-219, 99-111) [Ham]
 - 4.2 SPI-3 Letter Ballot Comments Review [Penokie]
5. SPI-4 Topics
 - 5.1 Load Compensation [Novak]
 - 5.2 Cable/System Simulation Issues (99-204) [Wallace]
 - 5.3 Next Generation Cable Performance [Ham]
 - 5.4 SCSI out of band communications method (99-213) [Petty]
 - 5.5 Presentation on Ultra320 (99-302) [Bastiani]
 - 5.6 Extended Addressing for SPI-4 (99-249, 99-250) [Monia]
 - 5.7 SPI-4 ISI reduction via transmit pre-compensation (99-260) [Petty]
 - 5.8 SPI-4 timing budget utilizing receiver signal deskew method (99-261) [Petty]
 - 5.9 SPI-4 clocking proposal (99-262) [Petty]
 - 5.10 Margin Control (99-264) [Lamers]
 - 5.11 Setting Extended Addresses (99-273) [Milligan]
 - 5.12 Flow Control & Continue I/O Process Flag (99-142) [Lamers]
 - 5.13 Fast-160 Presentation (99-300) [Patel]
 - 5.14 Proposal for Fast-160 to be included in SPI-4 (99-295) [Milligan]
 - 5.15 Proposal for a training pattern for SPI-4 (99-297) [Evans]
 - 5.16 Proposal for turn-on/turn-off of a free-running clock (99-298) [Evans]
 - 5.17 How to verify goodness (99-305) [Bastiani]
 - 5.18 Hot-Plug Problem & its Solution (99-319) [Herrmann]
 - 5.19 Fast-160 Phase Encoded Data Enabling (99-323) [Moore]
 - 5.20 Fast-160 Buffer Credit Transfer Mechanism (99-324) [Moore]
 - 5.21 ISI Measurements for Ultra4 Discussion (99-326) [Smith]
 - 5.22 ISI Measurements (99-337r0) [Bridgewater/Bastiani]
 - 5.23 Measurements of Compensation Schemes (99-335r0) [Bishop]
 - 5.24 Expander Guidelines (99-282) [Lamers]
6. Domain Validation Technical Report Topics
7. New Business
 - 7.1 Echo Buffer Considerations (99-306r0) [Lamers]
8. Meeting Schedule
9. Adjournment

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Results of Meeting

1. Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 1:00 p.m., Monday November 1, 1999. He thanked Larry Lamers of Adaptec for hosting the meeting.

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

2. Approval of Agenda

The draft agenda was approved with the following additions and changes:

- 4.2 SPI-3 Letter Ballot Comments Review [Penokie]
- 5.21 ISI Measurements for Ultra4 Discussion (99-326) [Smith]
- 5.22 ISI Measurements [Bridgewater]
- 5.23 Measurements of Compensation Schemes () [Bishop]
- 5.24 Expander Guidelines (99-282) [Lamers]

The following agenda items were added or revised during the course of the meeting:

- 7.1 Echo Buffer Considerations (99-306r0) [Lamers]

3. Attendance and Membership

Attendance at working group meetings does not count toward minimum attendance requirements for T10 membership. 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	P	Adaptec, Inc.	ljlamers@ieee.org
Mr. Vincent Bastiani	A#	Adaptec, Inc.	bastiani@corp.adaptec.com
Mr. Wally Bridgewater	A#	Adaptec, Inc.	wally@eng.adaptec.com
Mr. Tariq Abou-Jeyab	O	Adaptec, Inc.	tajeyab@corp.adaptec.com
Mr. Charles Monia	V	Adaptec, Inc.	cmonia@corp.adaptec.com
Mr. Charles Brill	P	AMP, Inc.	cebrill@ix.netcom.com
Mr. Gregg Neely	P	Andataco	greggn@andataco.com
Mr. Bill Galloway	P	BREA Technologies, Inc.	billg@breatech.com
Mr. Dennis Lang	A	Circuit Assembly Corp.	dennisl@circuitassembly.com
Mr. Robert C. Elliott	P	Compaq Computer Corp.	Robert.Elliott@compaq.com
Mr. Arthur Bizley	V	CTS Interconnect	arthur.bizley@is.ctscorp.com
Mr. Charles Tashbook	P	Dallas Semiconductor	charles.tashbook@dalsemi.com
Mr. Wayne Mendenhall	A	Dallas Semiconductor	wayne.mendenhall@dalsemi.com
Mr. Titkwan Hui	V	Dallas Semiconductor	tk.hui@dalsemi.com

Mr. Julian Ferry	O	Foxconn I/O	julferry@aol.com
Mr. Stephen Jarvis	O	Foxconn I/O	s.jarvis@foxconn.com
Mr. Eugene Lew	P	Fujitsu	elew@fcpa.fujitsu.com
Mr. Tim Mackley	A	General Dynamics	timothy.a.mackley@gd-is.com
Mr. George O. Penokie	P	IBM Corp.	gop@us.ibm.com
Mr. John Lohmeyer	P	LSI Logic Corp.	lohmeier@t10.org
Mr. Ralph O. Weber	A	LSI Logic Corp.	roweber@acm.org
Mr. William Petty	V	LSI Logic Corp.	william.petty@lsil.com
Mr. Jay Neer	A	Molex Inc.	jneer@molex.com
Mr. Richard Moore	A#	QLogic Corp.	r_moore@qlc.com
Mr. Dean Wallace	A	QLogic Corp.	d_wallace@qlc.com
Mr. Ting Li Chan	V	QLogic Corp.	t_chan@qlc.com
Mr. Mark Evans	P	Quantum Corp.	mark.evans@quantum.com
Mr. Patrick McGarrah	A	Quantum Corp.	pat.mcgarrah@quantum.com
Mr. Bruce Leshay	V	Quantum Corp.	bleshay@tdh.qntm.com
Mr. Richard Uber	V	Quantum Corp.	duber@tdh.qntm.com
Dr. Andrew Bishop	V	Quantum Corp.	andrew.bishop@quantum.com
Mr. Gene Milligan	P	Seagate Technology	Gene_Milligan@notes.seagate.com
Mr. Gerald Houlder	A	Seagate Technology	gerry_houlder@notes.seagate.com
Mr. Jon P. Baker	O	Seagate Technology	jon_baker@notes.seagate.com
Mr. Daniel (Dan) F. Smith	O	Seagate Technology	daniel_f_smith@notes.seagate.com
Mr. Mayank R. Patel	V	Seagate Technology	mayank_r_patel@notes.seagate.com
Mr. Bill Gintz	V	Seus, Inc.	wcgintz@ix.netcom.com
Mr. Vit Novak	A	Sun Microsystems, Inc.	vit.novak@sun.com
Mr. Paul D. Aloisi	P	Texas Instruments	Paul_Aloisi@ti.com
Mr. Robert Morris	A	Texas Instruments	bob.morris@ti.com
Mr. Paresh Sheth	A#	Texas Instruments	paresh.sheth@ti.com
Mr. Hank Herrmann	O	Tyco Electronics	hank.herrmann@tycoelectronics.com
Mr. Michael F. Laub	O	Tyco Electronics	mike.laub@tycoelectronics.com
Mr. Jeffrey L. Williams	P	Western Digital Corporation	Jeffrey.L.Williams@wdc.com

44 People Present

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

4. SPI-3 Topics

4.1 Cable Media Performance Testing (98-219, 99-111) [Ham]

George Penokie asked that discussion of this topic be considered under the SPI-3 Letter Ballot comments review.

4.2 SPI-3 Letter Ballot Comments Review [Penokie]

George Penokie stated that issues related to the cable testing material will be reviewed by the cable testing group meeting in December.

George reviewed the letter ballot comments from Advansys, Compaq, Seagate, Qlogic, and BREA Technologies. Not all of the letter ballot comments were discussed. Further review is planned for the December 2-3 meeting.

5. SPI-4 Topics

George Penokie asked that the group prepare electronic copies of all presentations *prior* to coming to the meeting. He stated that he plans to give priority to those presentations that are available prior to the meeting.

5.1 Load Compensation [Novak]

Vit Novak asked that discussion of this topic be deferred to the next meeting.

5.2 Cable/System Simulation Issues (99-204) [Wallace]

Dean Wallace reported that a study group met last week, minutes in 99-329.

5.3 Next Generation Cable Performance [Ham]

Bill Ham reported on the activities of the cable performance study group, minutes in 99-328.

5.4 SCSI out of band communications method (99-213) [Petty]

Bill Petty stated that no new material is available for discussion on this topic.

5.5 Presentation on Ultra320 (99-302) [Bastiani]

Vince Bastiani asked that this topic be removed from future agendas.

5.6 Extended Addressing for SPI-4 (99-249, 99-250) [Monia]

Larry Lamers asked that this topic be deferred to the SCSI protocol working group meeting, minutes in 99-309.

5.7 SPI-4 ISI reduction via transmit pre-compensation (99-260) [Petty]

Bill Petty noted that no new revision of the LSI ISI proposal is available at this time (no revision of 99-260). He then presented some preliminary ISI laboratory data (99-332r0).

5.8 SPI-4 timing budget utilizing receiver signal deskew method (99-261) [Petty]

Bill Petty noted that no new revision of the LSI deskew proposal is available at this time.

5.9 SPI-4 clocking proposal (99-262) [Petty]

Bill Petty asked that discussion of the clocking proposal be deferred to the next meeting.

5.10 Margin Control (99-264) [Lamers]

Larry Lamers presented a revised version of his proposal for a Margin Control command. His suggestion that this function be done instead with a message met resistance from people who preferred using a command. Larry noted that there is some issue of coupling the Margin Control command with subsequent Write and Read Buffer commands. While using linked commands seems like a logical way to do this coupling, a lot of people are opposed to linked commands. There was also a suggestion that the Send Diagnostic command should be expanded to include this function rather than defining a separate command.

A straw poll attempting to decide between the use of commands or messages for margin control was inconclusive.

Larry agreed to bring a revised proposal to the next working group meeting.

5.11 Setting Extended Addresses (99-273) [Milligan]

Gene Milligan reported that he will revise the document, per discussion at the last meeting. He asked that this topic be removed from the agenda for future meetings, noting that it can be reinstated when needed.

5.12 Flow Control & Continue I/O Process Flag (99-142) [Lamers]

Larry Lamers reviewed the proposal and its status with the group.

5.13 Fast-160 Presentation (99-300) [Patel]

Mayank Patel requested that this topic be dropped from the agenda.

5.14 Proposal for Fast-160 to be included in SPI-4 (99-295) [Milligan]

Gene Milligan started with an overview of the issues and agreements (99-327r0). Bruce Leshay and Vince Bastiani questioned the level of agreement on leaving the precompensation definition vendor specific, both felt that standardizing precompensation would be required for interoperability.

Gene continued with a review of the proposal (99-295r1). The group agreed to several changes in the proposal and Gene agreed to prepare a new revision for consideration at the next meeting.

5.15 Proposal for a training pattern for SPI-4 (99-297) [Evans]

Bruce Leshay asked that this item be dropped from the agenda.

5.16 Proposal for turn-on/turn-off of a free-running clock (99-298) [Evans]

Bruce Leshay asked that discussion of this topic be deferred to the next meeting.

5.17 How to verify goodness (99-305) [Bastiani]

Vince Bastiani asked that this item be dropped from the agenda.

Larry Lamers and Gene Milligan asked that a new agenda item be added to future agendas with no name or document number and the title "Physical Configuration Testing and Methodology".

5.18 Hot-Plug Problem & its Solution (99-319) [Herrmann]

Hank Herrmann described the current status of the variable resistance connector, designed for hot plugging. He explained the requirement that the variable resistance be on the disk drive as being related to the tolerances of the portion of the connector that has the maximum participation in the connection wipe. There was some discussion over whether or not the CRC and AIP features introduced in SPI-3 have overcome the need for a physical connector solution to hot plugging.

The group agreed to drop this item from future agendas.

5.19 Fast-160 Phase Encoded Data Enabling (99-323) [Moore]

The group recommended that the training management aspects of Richard's proposal be kept and other aspects be discarded. Richard agreed to bring a revised proposal to the next meeting.

5.20 Fast-160 Buffer Credit Transfer Mechanism (99-324) [Moore]

The group did not agree with the proposal and Richard dropped the proposal until he can find more support.

5.21 ISI Measurements for Ultra4 Discussion (99-326) [Smith]

Dan Smith presented ISI measurement data based on corrections in the test setup recommended by the last working group meeting.

5.22 ISI Measurements (99-337r0) [Bridgewater/Bastiani]

Wally Bridgewater informed the group of instances of voltage mode drivers in multi-drop environments:

<http://www.ednmag.com/endmag/reg/1999/061099/12ms466.htm>

He demonstrated aspects of the ISI problem and proposed solutions.

Vince Bastiani presented laboratory data on cross talk (99-338r0). It was noted that the data looks far worse than SCSI currently permits in cables. Vince decided to collect more data and present it at the next meeting.

5.23 Measurements of Compensation Schemes (99-335r0) [Bishop]

Andrew Bishop presented calculated and measured data on timing and amplitude ISI pre-compensation.

5.24 Expander Guidelines (99-282) [Lamers]

Larry Lamers presented a collection of requirements that should be placed on expanders. The group reviewed the proposal and asked for some changes. Noting that the proposal is a work in progress, Larry asked everybody to review the proposal and send him comments.

6. Domain Validation Technical Report Topics

Larry Lamers asked that discussion of this topic be deferred to the next meeting.

7. New Business

7.1 Echo Buffer Considerations (99-306r0) [Lamers]

Larry presented a proposal to change some of the definition of the echo buffer. The group requested changes and Larry agreed to prepare a revised proposal.

8. Meeting Schedule

The next meeting of the SCSI Physical Working Group will be Thursday, December 2, 1999 commencing at 1 p.m. recessing on Thursday evening and resuming at 9 a.m. until 6 p.m. on Friday, December 3, 1999 at the Radisson Plaza Hotel (507-281-8000) in Rochester, MN hosted by Western Digital (see 99-318). The following meeting is Monday, January 10, 2000 commencing at 1 p.m. recessing on Monday evening and resuming at 9 a.m. until 6 p.m. on Tuesday, January 11, 2000 at the Marriott Resort (+61-7-5592-9800) in Surfer's Paradise, Queensland, Australia hosted by ENDL Pacific Technologies.

Gene Milligan and Mark Evans noted that the December 2-3 meeting is in conflict with a T13 meeting. John Lohmeyer said that since T10 had approved the December 2-3 meeting at its last meeting, the issue would need to be resolved at the T10 meeting on Thursday. (Chair's Note: T10 did not elect to change this meeting.)

9. Adjournment

The meeting was adjourned at 6:00 p.m. on Tuesday November 2, 1999.