

Accredited Standards Committee\*  
**National Committee for Information Technology Standards (NCITS)**

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Date: October 15, 1999

Reply to: John Lohmeyer

To: T10 Membership  
From: John Lohmeyer  
Subject: SCSI Physical Working Group Meeting -- October 13-14, 1999  
Colorado Springs, CO

### Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. SPI-3 Topics
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5. SPI-4 Topics
  - 5.1 Load Compensation [Novak]
  - 5.2 Cable/System Simulation Issues (99-204) [Wallace]
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  - 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]
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  - 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 Proposal for Fast-160 to be included in SPI-4 (99-295) [Milligan]
  - 5.14 Fast-160 Simplified Timing presentation (99-296) [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 Fast-160 Presentation (99-300) [Patel]
  - 5.18 Compaq inputs on SPI-4 (99-301) [Ham]
6. Domain Validation Technical Report Topics
7. New Business
  - 7.1 How to verify goodness (99-305) [Bastiani]
  - 7.2 Where do we go from here? [Penokie]
8. Meeting Schedule
9. Adjournment

### Results of Meeting

\*Operating under the procedures of The American National Standards Institute.  
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## 1. Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 1:20 p.m., Wednesday October 13, 1999. He thanked LSI Logic 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:

### 5.18 Compaq inputs on SPI-4 (99-301) [Ham]

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

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

7.2 Where do we go from here? [Penokie]

## 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.	ljlammers@ieee.org
Mr. Vincent Bastiani	A#	Adaptec, Inc.	bastiani@corp.adaptec.com
Mr. Wally Bridgewater	A#	Adaptec, Inc.	wally@eng.adaptec.com
Mr. Bill Galloway	P	BREA Technologies, Inc.	billg@breatech.com
Mr. Robert C. Elliott	P	Compaq Computer Corp.	Robert.Elliott@compaq.com
Dr. William Ham	A	Compaq Computer Corp.	bill.ham@digital.com
Mr. Roger Cummings	P	Distributed Processing Tech.	cummings_roger@dpt.com
Mr. George O. Penokie	P	IBM Corp.	gop@us.ibm.com
Mr. John Lohmeyer	P	LSI Logic Corp.	lohmeier@t10.org
Mr. Frank Gasparik	V	LSI Logic Corp.	frank.gasparik@lsil.com
Mr. Alan Littlewood	V	LSI Logic Corp.	alanl@lsil.com
Mr. William Petty	V	LSI Logic Corp.	william.petty@lsil.com
Mr. Richard Moore	A#	QLogic Corp.	r_moore@qlc.com
Mr. Ting Li Chan	V	QLogic Corp.	t_chan@qlc.com
Mr. Mark Evans	P	Quantum Corp.	mark.evans@quantum.com
Mr. Bruce Leshay	V	Quantum Corp.	bleshay@tdh.qntm.com
Mr. Gene Milligan	P	Seagate Technology	Gene_Milligan@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. Paul D. Aloisi	P	Unitrode Corporation	Paul_Aloisi@ti.com

21 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]

This topic was deferred to a subsequent meeting.

#### 5. SPI-4 Topics

##### 5.1 Load Compensation [Novak]

This topic was deferred to a subsequent meeting.

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

This topic was deferred to a subsequent meeting.

##### 5.3 Next Generation Cable Performance [Ham]

This topic was deferred to a subsequent meeting.

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

Bill Petty said he had not revised his proposal since he had first presented it. The topic was deferred to a subsequent meeting.

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

Vince Bastiani presented 99-302. He proposed that the minimum driver rise time be increased as compared to SPI-3. It was noted that driver rise time only affects short cables; on longer cables the cable attenuation controls the rise time. Bill Ham argued that fast rise times on short cables are not a problem because the signal is stronger (due to less attenuation) so the glitches do not reach the receiver threshold. No agreement was reached.

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

This topic was deferred to a subsequent meeting.

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

Bill Petty said he had made no changes to make to this proposal. The rev. 0 proposal was discussed again. There was some discussion of whether it is better to use timing compensation or amplitude compensation. It was suggested that either method be allowed in SPI-4.

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

Bill Petty presented 99-261r1, SPI-4 timing budget utilizing receiver signal deskew method. Bill noted that the REQ and ACK edges are sent at the same time as the data. This is necessary during training and simplifies the normal data phases as it allows the receiving device to determine its own setup and hold timing.

The issue of how often to do training was discussed. Bill noted that the LSI Logic performance analysis group planned to study the impact of using a training pattern on all data phases for various workloads-- if the impact is not too great, then he would propose doing training on each data phase.

Bill said he would revise his proposal based on the input received.

Late in the meeting, Gene Milligan presented a hand-drawn foil with some differences in the timing budget. Bruce Leshay suggested that rather than creating another document dealing with this subject that Gene should work with Bill Petty to capture Gene's differences. Gene agreed provided that Bill's document accommodate the timing budget for a non-free running clock. Bill agreed to work with Gene.

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

Bill Petty presented 99-262r1, SPI-4 REQ/ACK ISI removal via qualified clocking method. He had doubled the setup and hold budget for the P1 signal by only sampling the P1 signal on the assertion edge of the clock signal. This proposal would also simplify the internal data path design as compared to using both edges.

Bill noted that his proposal would require that all REQ/ACK offsets be even and that all transfers be done in pairs.

#### 5.10 Margin Control (99-264) [Lamers]

This topic was deferred to a subsequent meeting.

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

This topic was deferred to a subsequent meeting.

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

This topic was deferred to a subsequent meeting.

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

Gene Milligan presented 99-296r0, Proposal for Fast-160 to be included in SPI-4. Gene reviewed the timing assumptions and the various wording changes that would be necessary to incorporate his Fast-160 proposal (without a free-running clock) into SPI-4, assuming we start with the SPI-3 document.

Dan Smith presented 99-303r0, Skew Measurements and 99-304r0, ISI Measurements.

#### 5.14 Fast-160 Simplified Timing presentation (99-296) [Milligan]

Gene Milligan presented 99-296r0, Fast-160 Simplified Timing presentation. The more-detailed proposal is contained in 99-295r0 and was covered (later) under agenda item 5.13.

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

Mark Evans briefly described 99-297r0, proposal for a training pattern for SPI-4. There was a discussion over whether the pattern should be 010101... or 00110011... or 00110011...010101... The key difference is whether

there can more than 6.25 ns of signal skew. If so, then the lower frequency pattern will be necessary. If not, then only the high frequency pattern is needed. We need more test data to make this decision.

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

Bruce Leshay presented 99-298r0, proposal for turn-on/turn-off of a free running clock. Bruce noted that this proposal does not address ISI training and some changes would be necessary to deal with the ISI training sequence.

There was a discussion about the 400 ns. settling time following the changes to the phase signals (C/D, I/O, and MSG). Bruce assured the group that his proposal did not make any changes to this time, which has been in SCSI forever. The question of why 400 ns. kept coming up throughout the meeting. John noted that 400 ns. was considered a very small time in the early days of SCSI and was most likely selected because it allowed signals to settle without depending on incident wave switching.

It was noted that for a DT DATA OUT phase there are some problems with the P0 signal timing, which goes the opposite direction of the rest of the data signals. Since P0 does not transition very often, the easiest solution is to add extra setup and hold time around the P0 transitions. Bruce agreed to revise his proposal per the group's input.

#### 5.17 Fast-160 Presentation (99-300) [Patel]

Mayank Patel presented 99-300r0, Fast-160 Presentation. A major difference in this proposal from the other Fast-160 proposals is that it does not include a free running clock. The contention is that there is adequate timing budget to make Fast-160 work without requiring a free-running clock.

#### 5.18 Compaq inputs on SPI-4 (99-301) [Ham]

Bill Ham presented 99-301, Compaq's inputs on SPI-4. Some items were controversial. John reminded the group that the controversial items may need to be resolved at the T10 plenary level and the working group should not bog down on these items.

### 6. Domain Validation Technical Report Topics

John Lohmeyer said that the SCSI Domain Validation (SDV) Technical Report project had been authorized by NCITS and project number 1378-DT had been assigned.

### 7. New Business

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

Vince Bastiani presented 99-305r0, how to verify goodness. His main point was that it would be useful to have specific test configurations to use to evaluate the 'goodness' of the various SPI-4 proposals.

#### 7.2 Where do we go from here? [Penokie]

George Penokie said that he believes we now have proposals for most of the areas of SPI-4. We now need to get serious about the detailed numbers. He proposed that we target the December meeting for making decisions on the SPI-4 direction. He wants convergence on the technical direction so he can begin work on putting together the SPI-4 draft document.

## 8. Meeting Schedule

The next meeting of the SCSI Physical Working Group will be Monday, November 1, 1999 commencing at 1 p.m. recessing on Monday evening and resuming at 9 a.m. until 6 p.m. on Tuesday, November 2, 1999 at the Embassy Suites on Monterey Bay (831-393-1115) in Monterey, CA hosted by Adaptec, Inc.

John Lohmeyer presented a foil showing the planned SCSI Physical Working Group meetings:

Meeting	Dates		Location / Contact
SCSI PHY WG	11/1/99	1:00p Mon	Monterey, CA / Larry Lamers
	11/2/99	Tue	Monterey, CA / Larry Lamers
SCSI PHY WG	12/2/99	1:00p Thur	Rochester, MN / Fasig
	12/3/99	Fri	Rochester, MN / Fasig
SCSI PHY WG	1/10/00	1:00p Mon	Brisbane, Aus. / Dal Allan
	1/11/00	Tue.	Brisbane, Aus. / Dal Allan
SCSI PHY WG	2/2/00	1:00p Wed	Huntington Beach, CA / Skip Jones ***
	2/3/00	Thur	Huntington Beach, CA / Skip Jones

\*\*\* Proposed Meeting -- Not authorized yet

Gene Milligan and Mark Evans noted that the 12/2/99 and 12/3/99 meeting is in conflict with the 12/3/99 T13 meeting. John said that since T10 had already approved this meeting, the issue should be addressed at the 11/4/99 T10 meeting.

It was noted that the proposed meeting on 2/2/00 and 2/3/00 is in conflict with a proposed Cable Performance and SSM meeting proposed for 2/1/00 and 2/2/00. John took an action item to contact Skip Jones regarding this issue.

## 9. Adjournment

The meeting was adjourned at 12:20 p.m. on Thursday October 14, 1999.