

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

Doc. No.: T10/00-249r0

Date: July 17, 2000

Reply to: John Lohmeyer

To: T10 Membership
From: Ralph Weber & John Lohmeyer
Subject: Parallel SCSI Working Group Meeting -- July 11, 2000
Colorado Springs, CO

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. SPI-4 review [Penokie]
5. SPI-4 Physical Topics
 - 5.1 Free Running Clock
 - 5.1.1 SPI-4 clocking proposal (99-262) [Petty]
 - 5.2 Training Patterns
 - 5.2.1 Training Performance (00-236) [Brown]
 - 5.2.2 Precompensation plus equalization (00-225) [Uber]
 - 5.2.3 Data Out Phase 00-272 [Leshay]
 - 5.2.4 Enhancing Performance by Reducing Training Overhead (00-270) [Day]
 - 5.3 Timings
 - 5.4 Test Configurations
 - 5.4.1 Requirements for Measuring Receive Signals in SPI-4 and beyond (00-149) [Ham]
 - 5.4.2 Receiver Input Voltage Budget for Eye Patterns (00-158) [Bridgewater]
 - 5.4.3 Specifying signals at receiver using receiver equalization (00-223) [Uber]
 - 5.4.4 Precompensation and test measurements (00-194) [Manildi]
 - 5.4.5 Cable Attenuation (00-235r0) [Uber]
 - 5.4.6 Cable measurements and Calculated Signal Loss (00-276) [Manildi]
 - 5.4.7 10-Slot Backplane (00-274) [Brown]
 - 5.4.8 System Noise (00-273) [Brown]
 - 5.5 Other SPI-4 Physical Topics
 - 5.5.1 The zero offset problem for receiver equalization (00-201) [Bridgewater]
 - 5.5.2 PIP & SSM Report (Ham)
 - 5.5.3 Calculated Signal Losses (00-227 and 00-246) [Aloisi]
 - 5.6 Protocol
 - 5.6.1 QAS without IU in SPI-4 (00-252) [Elliott]
 - 5.6.2 Fast-160 Data Group Support (00-277) [Milligan]
 - 5.6.3 REQ/ACK Offset (00-271) [Leshay]
 - 5.6.4 Flow Control (00-285) [Leshay]
 - 5.7 Receiver Issues
 - 5.7.1 Receiver Specifications [Ham]
6. Expanders and Domain Validation Topics
 - 6.1 Alternate Selection and Communications Protocol (99-213) [Petty]

*Operating under the procedures of The American National Standards Institute.
NCITS Secretariat, Information Technology Industry Council (ITI)
1250 Eye Street NW, Suite 200, Washington, DC 20005-3922
Email: ncits@itic.org Telephone: 202-737-8888 FAX: 202-638-4922

- 6.2 Expander Control Protocol (00-257) [Lohmeyer]
- 6.3 Report on the SCSI Domain Validation Meeting [Lohmeyer]
- 7. New Business
- 8. Meeting Schedule
- 9. Adjournment

Results of Meeting

1. Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 9:00 a.m., Tuesday July 11, 2000. 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:

- 5.2.3 Data Out Phase 00-272 [Leshay]
- 5.2.4 Enhancing Performance by Reducing Training Overhead (00-270) [Day]
- 5.4.6 Cable measurements and Calculated Signal Loss (00-276) [Manildi]
- 5.4.7 10-Slot Backplane (00-274) [Brown]
- 5.4.8 System Noise (00-273) [Brown]
- 5.6.2 Fast-160 Data Group Support (00-277) [Milligan]
- 5.6.3 REQ/ACK Offset (00-271) [Leshay]
- 5.6.4 Flow Control (00-285) [Leshay]
- 6.3 Report on the SCSI Domain Validation Meeting [Lohmeyer]

There were no agenda items were added/revised during the course of the meeting.

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. Ron Roberts	A	Adaptec, Inc.	Ron_Roberts@adaptec.com
Mr. Bill Galloway	P	BREA Technologies, Inc.	billg@breatech.com
Mr. Joseph Basista	O	C&M Corp.	joebasista@aol.com
Mr. Edward Haske	P	CMD Technology	haske@cmd.com
Mr. Robert C. Elliott	P	Compaq Computer Corp.	Rob_Elliott@compuserve.com
Mr. John Tyndall	A	Crossroads Systems, Inc.	jtyndall@crossroads.com
Mr. Titkwan Hui	A.	Dallas Semiconductor	tk.hui@dalsemi.com
Mr. Ralph O. Weber	A	ENDL Texas	roweber@acm.org
Mr. Eugene Lew	P	Fujitsu	elew@fcpa.fujitsu.com
Mr. Nathan Hastad	P	General Dynamics	nathan.j.hastad@gd-is.com

Mr. Robert Canniff	A	Hitachi Cable Manchester, Inc	rcanniff@hcm.hitachi.com
Mr. George O. Penokie	P	IBM Corp.	gop@us.ibm.com
Mr. John Lohmeyer	P	LSI Logic Corp.	lohmeier@t10.org
Mr. Brian Day	V	LSI Logic Corp.	brian.day@lsil.com
Mr. Frank Gasparik	V	LSI Logic Corp.	frank.gasparik@lsil.com
Mr. William Petty	V	LSI Logic Corp.	william.petty@lsil.com
Mr. Eskild Arntzen	V	LSI Logic Corp.	eskild.arntzen@lsil.com
Mr. Larry Barnes	V	LSI Logic Corp.	larry.barnes@lsil.com
Mr. Jeffrey J. Gauvin	V	LSI Logic Corp.	jeff.gauvin@lsil.com
Mr. Glenn Laskie	V	LSI Logic Corp.	gloskie@lsil.com
Mr. David Noeldner	V	LSI Logic Corp.	dave.noeldner@lsil.com
Mr. Sriram Srinivasan	V	LSI Logic Corp.	sriram.srinivasan@lsil.com
Ms. Jie Fan	P	Madison Cable Corp.	jfan@madisoncable.com
Mr. Pete McLean	P	Maxtor Corp.	pete_mclean@maxtor.com
Mr. Jay Neer	P	Molex Inc.	jneer@molex.com
Mr. Glen Griessler	O	Molex Inc.	ggriessler@molex.com
Mr. Richard Moore	A#	QLogic Corp.	r_moore@qlc.com
Mr. Richard L. Romaniec	V	QLogic Corp.	r_romaniec@qlc.com
Mr. Henry Kuo	V	QLogic Corp.	h_kuo@qlc.com
Mr. Mark Evans	P	Quantum Corp.	mark.evans@quantum.com
Mr. Russ Brown	V	Quantum Corp.	russ.brown@quantum.com
Mr. Bruce Leshay	V	Quantum Corp.	bleshay@tdh.qntm.com
Mr. Richard Uber	V	Quantum Corp.	duber@tdh.qntm.com
Mr. Gene Milligan	P	Seagate Technology	Gene_Milligan@notes.seagate.com
Mr. Gerald Houlder	A	Seagate Technology	gerry_houlder@notes.seagate.com
Mr. Umesh Chandra	V	Seagate Technology	umesh_chandra@notes.seagate.com
Mr. A. Bruce Manildi	V	Seagate Technology	bruce_manildi@notes.seagate.com
Mr. Erich Oetting	P	Storage Technology Corp.	erich_oetting@stortek.com
Mr. Vit Novak	A	Sun Microsystems, Inc.	vit.novak@sun.com
Mr. Paul D. Aloisi	P	Texas Instruments	Paul_Aloisi@ti.com
Mr. Donald R. Getty	A#	Texas Instruments	donald_getty@ti.com
Mr. Doug Piper	P	Woven Electronics	doug.piper@wovenelectronics.com

42 People Present

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

4. SPI-4 review [Penokie]

George Penokie reviewed the editor's notes in SPI-4 revision 0. The group noted several areas needing correction and George noted the changes for revision 1.

Richard Romaniec moved that the PACE_ON bit be made reserved in the PPR message. Bill Galloway seconded the motion. He noted that the bit is completely redundant with other bits in the PPR message and with proposals approved today all other available bits are used. The motion passed on a vote of 9:2:0.

5. SPI-4 Physical Topics

5.1 Free Running Clock

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

Bill Petty asked that this item be dropped from future agendas. The group agreed that all free running clock agenda items should be dropped from future agendas.

5.2 Training Patterns

5.2.1 Training Performance (00-236) [Brown]

Mark Evans asked that this item be dropped from future agendas.

5.2.2 Precompensation plus equalization (00-225) [Uber]

Mark Evans asked that this item be dropped from future agendas.

5.2.3 Data Out Phase 00-272 [Leshay]

Bruce Leshay presented a couple of problems with changing to Data Out phase related to initiation of a training pattern at the beginning of the phase and proposed corrections for them. He noted that the proposal gives the target only two deskew delays to assert SEL, signaling the beginning of training. The group discussed the ramifications of the proposal.

The group agreed to revise the proposal so that SEL must be kept asserted until a REQ is observed.

Gene Milligan moved that the group accept the proposal in principle and that the authors be requested to bring forward a proposal with specific changes. Mark Evans seconded the motion. In the absence of any objections, the motion passed unanimously.

5.2.4 Enhancing Performance by Reducing Training Overhead (00-270) [Day]

Brian Day presented a proposal to add a 'remember training information' bit to the PPR message. The group discussed specific aspects of the proposal, such as how much information is to be remembered, how the target initiates retraining, and how the initiator forces the target to initiate retraining.

Mark Evans moved that 00-270r0 be approved for incorporation in SPI-4 subject to review of the SPI-4 changes at the next working group meeting. George Penokie seconded the motion. The motion passed on a vote 16:1:1.

5.3 Timings

The group agreed to discuss timing topics during the SPI-4 review (see item 4.).

5.4 Test Configurations

5.4.1 Requirements for Measuring Receive Signals in SPI-4 and beyond (00-149) [Ham]

Bill Ham asked that discussion of this topic be deferred to the next meeting.

5.4.2 Receiver Input Voltage Budget for Eye Patterns (00-158) [Bridgewater]

Vince Bastiani asked that this item be dropped from future agendas.

5.4.3 Specifying signals at receiver using receiver equalization (00-223) [Uber]

Mark Evans asked that this item be deferred to the next meeting.

5.4.4 Precompensation and test measurements (00-194) [Manildi]

Bruce Manildi asked that this item be dropped from future agendas.

5.4.5 Cable Attenuation (00-235r0) [Uber]

Mark Evans asked that this item be deferred to the next meeting.

5.4.6 Cable measurements and Calculated Signal Loss (00-276) [Manildi]

Bruce Manildi presented laboratory results based on the work and techniques developed by the PIP (Passive Interconnect Performance) working group. The conclusion of the presentation was a set of changes to eliminate the TBDs introduced by the May meetings.

The group considered accepting the changes proposed to eliminate the TBDs but Paul Aloisi asked that discussion be deferred until his material had been covered (see item 5.5.3).

5.4.7 10-Slot Backplane (00-274) [Brown]

Russ Brown presented laboratory data showing the effects of precompensation and AAF (Adjustable Active Filtering).

5.4.8 System Noise (00-273) [Brown]

Russ Brown presented data on noise in Fast-160 configurations.

5.5 Other SPI-4 Physical Topics

5.5.1 The zero offset problem for receiver equalization (00-201) [Bridgewater]

Vince Bastiani presented SPICE simulation data based on precompensation (00-201r1). The group discussed how to represent the concepts described by Vince in SPI-4. Some consensus appeared when Russ Brown presented an eye diagram with special processing that rendered those signals that did not transition at the beginning of the cell in a special color thus identifying the signals that need not meet the eye mask requirement.

5.5.2 PIP & SSM Report (Ham)

Bill Ham reported on the June PIP meeting (minutes in 00-253). There is a major issue in PIP concerning the definition of an 'interoperability point' and Bill stated a belief that the issue will come this working group in time. He noted that there will be a PIP meeting on 14-15 August in Colorado Springs.

5.5.3 Calculated Signal Losses (00-227 and 00-246) [Aloisi]

Paul Aloisi presented the latest revision of his signal loss spreadsheet 00-227r4. Paul then presented specific changes to SPI-4 to remove the TBDs inserted in the May meetings (00-246r1). It was noted that 00-246r1 had not been available to the committee prior to the meeting.

Paul Aloisi moved that the working group recommend that, in SPI-4 Table A.2, the last line be removed, the TBDs be replaced with the old values, and a new line be added to the table with the following equations $\text{Min } 0,85 \times |V_n| + 50$ and $\text{Max } 1,15 \times |V_n| - 57$. Gene Milligan seconded the motion. In the absence of any objections, the motion passed unanimously.

Paul Aloisi moved that those parts of 00-246r1 applying to Annex A table A.1 be approved for inclusion in SPI-4. Rob Elliott seconded the motion. Gene Milligan questioned the use of 'subsequent' in the proposed wording. George Penokie stated that the editor can incorporate the text correctly. Gene countered that he couldn't tell what the text says and thus could not be certain of what the editor would do. George explained what he would do, but Gene was not satisfied with the explanation.

Bill Ham asked that a requirement on the dynamic response of the receiver be added to the motion. He described his concern that without a response requirement the receiver might be so 'hot' that it would detect any noise glitch present, no matter how small.

It became clear that parts of the proposal described in the motion could not be approved at the this time. Paul accepted a friendly amendment to reduce the motion to approving a change in the table A.1 row 3 maximum to -100 mV. In the absence of any objections, the amended motion passed unanimously.

5.6 Protocol

5.6.1 QAS without IU in SPI-4 (00-252) [Elliott]

In order to allow QAS support on tapes and SES devices, Rob Elliott presented a proposal to allow use of QAS by devices that are not running packetized protocol. Concerns were raised about the requirement that all messages be snooped. A straw poll recommended that work not be continued on this proposal on a vote of 1 for continuing and 19 opposed.

5.6.2 Fast-160 Data Group Support (00-277) [Milligan]

Noting that Seagate will support packetized transfers in Fast-160, Gene Milligan presented several reasons for supporting data group (non-packetized) transfers at Fast-160. He informed the group that Seagate will be supporting data groups at Fast-160 transfer rates. He stated a preference to have the standard cover data group transfers at Fast-160. No other action was taken.

5.6.3 REQ/ACK Offset (00-271) [Leshay]

Bruce Leshay proposed that the REQ/ACQ handshake in Fast-160 be modified to 'acknowledge' 32 bits of data transfer, as opposed to the current method of 'acknowledging' 16 bits of data transfer. Bruce noted that some issues arise at the end of a phase and described the ways to solve those problems. The proposal ran afoul of the snooping requirements needed to make QAS work, but both Bruce Leshay and Richard Moore proposed solutions for the problems.

Gene Milligan spoke against the proposal stating that it breaks existing silicon and has been brought forward too late in the development of Fast-160.

Bruce Leshay moved that 00-271r1 (r0 as modified) be approved for inclusion in SPI-4. Skip Jones seconded the motion.

Gene asked if the change would apply to the training pattern too. Bruce recommended against changing training.

The motion passed on a vote of 7:5:1.

5.6.4 Flow Control (00-285) [Leshay]

Bruce Leshay presented 00-285r0 describing issues with the last available Flow Control proposal 00-142r3. He noted that 00-142r4 is not available on the web site, which made it necessary for him to use 00-142r3 for his proposal. George Penokie noted that nothing has been incorporated in SPI-4 because the approved proposal is not available, thus there was no certainty that Bruce's proposal to correct the text covers the right thing.

Through the magic of e-mail and sneaker net, 00-142r4 was displayed on the meeting room screen. Ron Roberts described the changes between r3 and r4. The changes in 00-142r4 addressed only one of Bruce's issues and there were no conflicts between the other 00-142r4 changes and Bruce's proposed changes.

Bruce Leshay moved that 00-285r1 (r0 as modified) be approved for inclusion in SPI-4. Bill Galloway seconded the motion. In the absence of any objections, motion passed unanimously. Bruce produced 00-285r1. The group reviewed the modified document.

5.7 Receiver Issues

5.7.1 Receiver Specifications [Ham]

Bill Ham stated that he is still looking for volunteers to provide proposals for how to specify the dynamic response of receivers. Several of those present indicated a willingness to provide input to the process. He requested that the item remain on the agenda until proposals are received and be renamed to 'Receiver Response Requirements'.

6. Expanders and Domain Validation Topics

6.1 Alternate Selection and Communications Protocol (99-213) [Petty]

The group agreed to replace this item with the SCSI Domain Validation Meeting status report (see item 6.3).

6.2 Expander Control Protocol (00-257) [Lohmeyer]

The group agreed to replace this item with the SCSI Domain Validation Meeting status report (see item 6.3).

6.3 Report on the SCSI Domain Validation Meeting [Lohmeyer]

John Lohmeyer reported on the activities of the Domain Validation working group (minutes in 00-284).

7. New Business

No new business was brought before this meeting.

8. Meeting Schedule

The group requested a meeting in Denver on 24 and 25 August. John Lohmeyer agreed to host the meeting, if T10 approves it, in a hotel near DIA to start at 1:00 p.m. on Thursday August 24th and end by 2:00 p.m. on Friday August 25th.

The subsequent meeting of the Parallel SCSI Working Group will be Tuesday September 12, 2000 commencing at 9:00 a.m. in Huntington Beach, CA.

9. Adjournment

The meeting was adjourned at 7:30 p.m. on Tuesday, July 11, 2000.