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

Doc. No.: T10/99-175r1
Date: May 20, 1999
Reply to: John Lohmeyer

To: T10 Membership
From: Ralph Weber & John Lohmeyer
Subject: SPI-3 Working Group Meeting -- May 3-4, 1999
Manchester, NH

Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. SPI-3 Topics
   - 4.1 Proposed Modifications to Annex A (99-174) [Aloisi/et.al.]
   - 4.2 Review of SPI-3 working draft [Penokie]
   - 4.3 A Common CRC Method for Packetized and Legacy Devices (99-141) [Lamers]
   - 4.4 Fairness Feature Control in SPI-3 (99-160) [Elliott/Houlder]
   - 4.5 Groundwork for Expander Communication (99-169r1) [Lamers/Bastiani]
   - 4.6 Packetized cleanup and improvements (99-170r1) [Galloway]
   - 4.7 Restrict QAS to Packetized (99-173r0) [Galloway]
   - 4.8 Implied Assumptions in SPI-3 Timing Budget (99-171) [Ham]
   - 4.9 Asynchronous Information Protection (99-119r4) [Evans/Lashay]
   - 4.10 Spec issue on MSE leakage current in SPI-3 (reflector message) [Lohmeyer]
   - 4.11 Change CRC timing values (99-185r0) [Elliott & Childs]
   - 4.12 Slow DT Timing Revision Proposal for SPI-3 (99-183) [Milligan]
   - 4.13 Packetized Extensions (99-139r4) [Lamers/Penokie/Milligan]
   - 4.14 SPI-3 Technical Changes (99-184r0) [Penokie]
   - 4.15 SPI-3 Table Restructuring [Smith]
5. SPI-4 Topics
   - 5.1 Project Proposal for SPI-4 (Ultra320 SCSI) (99-140r2) [Lamers]
   - 5.2 Staged Contact Resistance (98-240r0) [Herrmann]
   - 5.3 Load Compensation (98-238r1) [Novak]
   - 5.4 Cable/System Simulation Issues [Wallace]
   - 5.5 Next Generation Cable Performance [Ham]
6. Meeting Schedule
7. Adjournment

Results of Meeting

1. Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 1:10 p.m., Monday May 3, 1999. He thanked Zane Daggett of Hitachi Cable Manchester 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:

4.10 Spec issue on MSE leakage current in SPI-3 (reflector message) [Lohmeyer]
4.11 Change CRC timing values (99-185r0) [Elliott & Childs]
4.12 Slow DT Timing Revision Proposal for SPI-3 (99-183) [Milligan]
4.13 Packetized Extensions (99-139r4) [Lamers/Penokie/Milligan]

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

4.9 Asynchronous Information Protection (99-119r4) [Evans/Lashay]
4.14 SPI-3 Technical Changes (99-184r) [Penokie]
4.15 SPI-3 Table Restructuring [Smith]

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. Bill Mable	P	Amphenol Interconnect	bmable@spectra.net
Mr. Gregg Neely	O	Andataco	greggn@andataco.com
Mr. Ron Roberts	A	Apple Computer	rkroberts@aol.com
Mr. Douglas Wagner	P	Berg Electronics	wagnerdl@bergelect.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. Douglas Hagerman	A#	Compaq Computer Corp.	douglas.hagerman@compaq.com
Dr. William Ham	A	Compaq Computer Corp.	bill.ham@digital.com
Mr. Charles Tashbook	P	Dallas Semiconductor	charles.tashbook@dalsemi.com
Mr. Ben-Koon Lin	P	Fujitsu (FCPA)	blin@fcpa.fujitsu.com
Ms. Jacqueline Sylvia	A	Hitachi Cable Manchester	jsylvia@hcm.hitachi.com
Mr. Zane Daggett	P	Hitachi Cable Manchester, Inc	zdaggett@hcm.hitachi.com
Mr. George O. Penokie	P	IBM Corp.	gop@us.ibm.com
Mr. Dennis Moore	P	KnowledgeTek, Inc.	dmoore@ix.netcom.com
Mr. Louis Grantham	P	Linfinity Micro	lgrantham@linfinity.com
Mr. John Lohmeyer	P	LSI Logic Corp.	lohmeyer@ix.netcom.com
Mr. Ralph O. Weber	A	LSI Logic Corp.	roweber@acm.org
Mr. Frank Gasparik	V	LSI Logic Corp.	frank.gasparik@lsil.com
Mr. Matt Muresan	V	LSI Logic Corp.	matt.muresan@lsil.com
Mr. Steve Stefek	V	LSI Logic Corp.	steve.stefek@lsil.com
Ms. Jie Fan	P	Madison Cable Corp.	jfan@madisoncable.com

Mr. Charley Riegger	A	Maxtor Corp.	charles_riegger@maxtor.com
Mr. Jay Neer	A	Molex Inc.	jneer@molex.com
Mr. Allen King	A	Mylex Corp.	allenk@mylex.com
Mr. Richard Moore	V	QLogic Corp.	r_moore@qlc.com
Mr. Mark Evans	P	Quantum Corp.	mark.evans@quantum.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. 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	T	Seus, Inc.	wcgintz@ix.netcom.com
Mr. Robert Morris	P	Silicon Systems, Inc.	bob.morris@ti.com
Mr. Tom Schneider	V	Texas Instruments	tom.schneider@ti.com
Mr. Paresh Sheth	V	Texas Instruments	paresh.sheth@ti.com
Mr. Bob Gannon	V	The JPM Co.	rgannon@jpmo.com
Mr. Paul D. Aloisi	P	Unitrode Corporation	aloisi@unitrode.com
Mr. Richard S. DeMars	V	Unitrode Corporation	demars@unitrode.com
Mr. Jeffrey L. Williams	P	Western Digital Corporation	Jeffrey.L.Williams@wdc.com
Mr. Steve Nelson	V	Western Digital Corporation	stephen.e.nelson@wdc.com

44 People Present

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

4. SPI-3 Topics

4.1 Proposed Modifications to Annex A (99-174) [Aloisi/et.al.]

99-174 was discussed briefly, but concerns turned to SPI-3 Timing Budget assumptions (see 4.8). In a discussion led by Bill Ham, the group agreed that many assumptions exist in SPI-3 and defined the first two entries in that list:

1) The receiver will not detect a state change with an overdrive magnitude of less than 30 mV
   - negative going: +30 mV to 0 will not detect
   - positive going: -30 mV to 0 will not detect; and
2) The positive going and negative going D.C. offsets in the receiver are the same (i.e., no hysteresis)

It was agreed to hold a meeting in either Colorado Springs or Denver on the afternoon of 26 May and all day on 27 May. The objective of the meeting will be to develop a proposal for changes in SPI-3 clause 9 and Annex A regarding SPI-3 Timing Budget issues.

Paul Aloisi questioned the voltage range at the end of the first paragraph in A.4.1 and suggested conflicts with table 16. George Penokie noted that table 16 specifies currents and the paragraph voltage, which means that the two statements are not in conflict.

George asked the group to recommend incorporation of 99-174r0 in SPI-3. Gene Milligan objected to inclusion because the work in this area is incomplete and that no consideration is being given to correcting SPI-2. George countered that the drive current information in SPI-3 is sufficiently inaccurate that the 99-174 should be incorporated to improve SPI-3 (even if perfection is not achieved). The recommendation was approved 15:1.

4.2 Review of SPI-3 working draft [Penokie]

George Penokie questioned the increase of cable impedance that appeared to result from the document 99-111, which was recommended for inclusion in SPI-3 by the January SPI-3 working group. Bill Ham explained how the new specifications make cable construction easier. Bill and George discussed the status and plans for the cable testing annex.

George Penokie began the review at the Foreword, page xvi, and complete a review of the entire document.

4.3 A Common CRC Method for Packetized and Legacy Devices (99-141) [Lamers]

Larry Lamers stated that no proposal would be available until SPI-3 is forwarded. He stated that this item could be deleted from the agenda until then.

4.4 Fairness Feature Control in SPI-3 (99-160) [Elliott/Houlder]

Rob Elliott presented a proposal to better define controls over arbitration fairness in SPI-3 (and incidental to this meeting, in SPC-2, and FCP-2). George Penokie asked that the group to recommend inclusion of 99-160r1 in SPI-3 (SPI-3 changes only). The group approved the recommendation 14:2:2.

4.5 Groundwork for Expander Communication (99-169r1) [Lamers/Bastiani]

In response to a question from John Lohmeyer, Bill Galloway and George Penokie verified that the proposed behavior is required for initiators that support QAS and strongly recommended but not required for all initiators (as it may become required in SPI-4). In the absence of any objections, the group recommended that 99-169r1 be approved for inclusion in SPI-3.

4.6 Packetized cleanup and improvements (99-170r1) [Galloway]

Bill Galloway presented three proposed corrections to the information units definitions in SPI-3. In the absence of any objections, the working group recommended that T10 approve 99-170r1 for inclusion in SPI-3.

4.7 Restrict QAS to Packetized (99-173r0) [Galloway]

Bill Galloway presented a brief proposal that QAS be restricted to information units in SPI-3. He noted that QAS is broken for non-packetized and that the previous working group concluded that eliminating usage of QAS would be easier than fixing it. In the absence of any objections, the working group recommended that T10 approve 99-173r0 for inclusion in SPI-3.

4.8 Implied Assumptions in SPI-3 Timing Budget (99-171) [Ham]

See 4.1.

4.9 Asynchronous Information Protection (99-119r4) [Evans/Lashay]

Mark Evans noted that the latest revision of the proposal has been modified to look like an annex, as requested by the last working group. He noted corrections in figure x1 that will appear in revision 5. Concerns were raised about the C code example not compiling on some compilers.

Jeff Williams questioned enabling the protection without PPR. Enabling and disabling issues were discussed, driven by concerns about hot plug replacement of a protection drive with a non-protection drive and avoiding bus resets in such cases.

Mark agreed to revise the proposal based on group comments and bring the revised proposal to the July SPI-3 working group meeting for review.

4.10 Spec issue on MSE leakage current in SPI-3 (reflector message) [Lohmeyer]

John Lohmeyer reviewed the T10 reflector discussion of MSE leakage current requirements. He noted that differences expressed on this topic on the reflector concern the differences between 3.3 V and 5 V chips. Based on inputs from the group, John agreed to draft a proposal for specific changes to SPI-3.

Later, John Lohmeyer presented a draft figure showing proposed leakage current requirements. Bill Gintz and Wally Bridgewater recommended that negative current values be covered by the figure. Bill Ham suggested a change in the title of the figure. John agreed to bring a fully developed proposal to the July SPI-3 working group meeting.

4.11 Change CRC timing values (99-185r0) [Elliott & Childs]

Rob Elliott questioned the need for the extra 10 ns of setup time accorded to the P_CRCA line and noted that, since the line is parity for single transition transfers, the requirement causes problems for some expander designs. Rob proposed that we specify the same transmit and receive setup times for P_CRCA as specified for the other data lines. As, an alternate Rob proposed better correlation between the current values and the times for other lines.

It was generally agreed that consultations were necessary with product engineers. So, the group agreed to defer consideration of this proposal to the July meeting.

4.12 Slow DT Timing Revision Proposal for SPI-3 (99-183) [Milligan]

Gene Milligan presented a proposal to change the double-transition timing for Fast-40. Wally Bridgewater requested changes that allow Fast-40 receivers more latitude. Bill Galloway suggested that cable contributions to skew should not be reduced to make the change. Changes were marked up on the proposal, but the majority preferred the proposal as written.

Bill Galloway requested minor changes in the timing table and Gene agreed to make the changes in a new revision.

Gene Milligan asked that the group recommend incorporation of 99-183r1 (r0 as revised) in SPI-3. The recommendation was approved 9:1.

4.13 Packetized Extensions (99-139r4) [Lamers/Penokie/Milligan]

Larry Lamers presented the data streaming and CRC interval proposal as revised by the April working group meeting. In the absence of any objections, the working group recommended that 99-139r4 be approved for inclusion in SPI-3.

4.14 SPI-3 Technical Changes (99-184r0) [Penokie]

George Penokie presented a list of technical changes in SPI-3. He noted that the list is a collection of unrelated changes that have been requested by individuals or arose during working group discussions. George asked that the working group recommend inclusion of 99-184r1 (r0 as revised) in SPI-3. The group approved the recommendation 18:1. Jeff Williams objected to including the proposal because it prohibits ending a packet transfer before the end of the packet.

4.15 SPI-3 Table Restructuring [Smith]

Dan Smith presented some preliminary ideas he was considering proposing as changes in SPI-3 clause 7. He noted that this was a rough presentation of preliminary ideas and not a proposal for immediate action. He described ambiguities and inconsistencies in the tables. A few changes to SPI-3 resulted from this review.

5. SPI-4 Topics

5.1 Project Proposal for SPI-4 (Ultra320 SCSI) (99-140r2) [Lamers]

Larry Lamers reviewed the SPI-4 project proposal. John Lohmeyer requested that item 3 be dropped from the list of proposed new work. Bill Ham was concerned that item 2 is ahead of the cart because expanders are not defined in any existing standard. Several other concerns were raised about the list of proposed new work. Larry accepted wording corrections in the list.

In the absence of any objections, the working group recommended that 99-140r3 (r2 as revised) be forward by T10 to NCITS as new project proposal.

5.2 Staged Contact Resistance (98-240r0) [Herrmann]

Bill Ham reported that SFF does not have an approved project on this topic. He described an intent in SFF to define an SCA-3 project to cover the staged resistance connector when AMP is ready. However, as of yet no project has been requested.

John Lohmeyer reviewed the proposal. He then proposed that SFF reject the proposal based on the presence of CRC and the Hamming code in SCSI, which he felt provide adequate, cost-effective answers to the hot plugging problem. Bill Gintz noted additional skew problems produced by hot plugging that the connector does not solve.

Larry Lamers requested that this topic be dropped from the T10 agenda because it's really an SFF topic.

5.3 Load Compensation (98-238r1) [Novak]

John Lohmeyer reported that discussion of load compensation will be deferred to the July meeting since Vit Novak was not able to attend.

5.4 Cable/System Simulation Issues [Wallace]

Bill Ham expressed concern that no progress is being made on this topic. Richard Moore volunteered to ask Dean Wallace about the status of this work.

5.5 Next Generation Cable Performance [Ham]

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

6. Meeting Schedule

The next meeting of the SPI-3 Working Group will be Monday, July 12, 1999 commencing at 1 p.m. recessing on Monday evening and continuing until 6 p.m. on Tuesday, July 13, 1999 at the Double Tree World Arena Hotel (719-576-8900) in Colorado Springs, CO hosted by LSI Logic Corp.

A SPI-3 editing session is tentatively scheduled in Colorado Springs or Denver on Monday, May 17, 1999 commencing at 1 p.m. recessing on Monday evening and continuing until 6 p.m. on Tuesday, May 18, 1999 hosted by LSI Logic Corp.

A SPI-3 timing budget meeting will be held in Colorado Springs or Denver on Wednesday, May 26, 1999 commencing at 1 p.m. recessing on Wednesday evening and continuing until 6 p.m. on Thursday, May 27, 1999 hosted by LSI Logic Corp.

7. Adjournment

The meeting was adjourned at 6:50 p.m. on Tuesday May 4, 1999.