

Accredited Standards Committee\*

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

**Doc. No.:** T10/98-125r0

**Date:** March 24, 1998

**Reply to:** John Lohmeyer

To: T10 Membership  
From: Ralph Weber / John Lohmeyer  
Subject: SPI-2 / SPI-3 Working Group Meeting -- March 16, 1998  
San Diego, CA

## Agenda

1. Opening Remarks
2. Approval of Agenda
3. Attendance and Membership
4. SPI-3 Topics
  - 4.1 Staged Contact Resistance (98-xxx) [Herrman]
  - 4.2 Load Compensation (97-281) [Novak]
  - 4.3 Universal Backplane Annex (98-101) [Wallace]
  - 4.4 Bias Reduction Proposal (98-132) [Bridgewater]
  - 4.5 Dual Clocking Proposal (97-208) [Bastiani]
  - 4.6 Test results on dual edge signals (98-113r0) [Bastiani]
  - 4.7 Testing results on hot plugging perturbations (98-129r0) [Gintz]
  - 4.8 Packetized Protocol review (97-230r5) [Penokie/Williams]
  - 4.9 QAS review (97-199r7 and 98-133r0) [Moore]
  - 4.10 CRC proposal for SPI-3 [Penokie]
5. SPI-2 Topics
  - 5.1 0.5 pF balance capacitance for LVD SCSI (98-131) [Aloisi/Kapraun]
  - 5.2 LVD ESD Concerns [Kapraun]
  - 5.3 Removal of overlapped commands (duplicate queue tags) checking in SPI-2 [Williams]
  - 5.4 Terminator Power voltage level [Wallace]
  - 5.5 SPI-2 Proposed letter ballot response review (98-108r1) [Penokie]
    - 5.5.1 EIA - 485 versus ISO/IEC 8482 versus SPI-2 [Milligan]
    - 5.5.2 SPI-2 Differential Cable Common Mode Voltage Requirements [Milligan]
6. Meeting Schedule
7. Adjournment

## Results of Meeting

### 1. Opening Remarks

John Lohmeyer, the T10 Chair, called the meeting to order at 9:00 a.m., Monday March 16, 1998. He thanked Skip Jones and QLogic for arranging and hosting the meeting.

\*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.nw.dc.us Telephone: 202-737-8888 FAX: 202-638-4922

As is customary, the people attending introduced themselves and a copy of the attendance list was circulated. John noted that standards cannot contain known patented material unless the patent holder agrees to comply with the ANSI patent policy.

## 2. Approval of Agenda

The draft agenda was approved with the no additions or changes. No agenda items were added 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. Lawrence J. Lamers	P	Adaptec, Inc.	ljlamers@ix.netcom.com
Mr. Vincent Bastiani	A#	Adaptec, Inc.	bastiani@corp.adaptec.com
Mr. Mark Delsman	A#	Adaptec, Inc.	mdelsman@corp.adaptec.com
Mr. Tak Asami	V	Adaptec, Inc.	asami@itc.adaptec.com
Mr. Wally Bridgewater	V	Adaptec, Inc.	wally@eng.adaptec.com
Mr. Bill Gintz	V	Adaptec, Inc.	bgintz@corp.adaptec.com
Mr. Richard Moore	V	Adaptec, Inc.	richard_moore@corp.adaptec.com
Mr. Tom Schneider	V	Adaptec, Inc.	schneid@itc.adaptec.com
Mr. Charles Brill	P	AMP, Inc.	cebrill@amp.com
Mr. Scott Lindstrom	O	AMP, Inc.	slindstr@amp.com
Mr. Hank Herrmann	V	AMP, Inc.	Hank.Herrmann@amp.com
Mr. Bill Mable	A	Amphenol Interconnect	bmable@spectra.net
Mr. Ron Roberts	A	Apple Computer	rkroberts@aol.com
Mr. Douglas Wagner	P	Berg Electronics	wagnerdl@bergelect.com
Mr. Bob Gannon	O	C&M Corp.	rgannon@cm-corp.com
Mr. Edward Haske	O	CMD Technology	haske@cmd.com
Mr. Robert C. Elliott	O	Compaq Computer Corp.	relliott@compaq.com
Mr. Bill Galloway	O	Compaq Computer Corp.	Bill.Galloway@compaq.com
Mr. Charles Tashbook	P	Dallas Semiconductor	charles.tashbook@dalsemi.com
Mr. Greg McSorley	P	Data General / Clariion	greg_mcsorley@dgc.ceo.dg.com
Dr. William Ham	A#	Digital Equipment Corp.	bill.ham@digital.com
Mr. George Penokie	P	IBM Corp.	gop@us.ibm.com
Mr. Dan Colegrove	A#	IBM Corp.	colegrov@us.ibm.com
Mr. Dennis Moore	P	KnowledgeTek, Inc.	dmoore@ix.netcom.com
Mr. Dean Wallace	P	Linfinity Micro	75671.3443@compuserve.com
Mr. Alan Littlewood	P	LSI Logic Corp.	alanl@lsil.com
Mr. Jay Neer	A	Molex Inc.	jneer@molex.com
Mr. Chris Millsaps	V	Mylex Corp.	chrism@mylex.com
Mr. Skip Jones	P	QLogic Corp.	sk_jones@qlc.com
Mr. Ting Li Chan	A	QLogic Corp.	t_chan@qlc.com
Mr. Chuck Micalizzi	V	QLogic Corp.	c_micalizzi@qlc.com
Mr. Patrick McGarrah	P	Quantum Corp.	pat.mcgarrah@quantum.com
Mr. James McGrath	A#	Quantum Corp.	JMCGRATH@QNTM.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. John M. Wright	V	Seagate Technology	John_M_Wright@notes. seagate.com
Mr. Dave Guss	P	Silicon Systems, Inc.	dave.guss@tus.ssil.com
Mr. Vit Novak	A	Sun Microsystems, Inc.	vit.novak@sun.com
Mr. John Lohmeyer	P	Symbios, Inc.	lohmeier@ix.netcom.com
Mr. Ralph O. Weber	A	Symbios, Inc.	roweber@acm.org
Mr. Graeme Weston- Lewis	A#	Symbios, Inc.	gwl@symbios.com
Mr. Frank Gasparik	V	Symbios, Inc.	frank.gasparik@symbios. com
Mr. Steve Stefek	V	Symbios, Inc.	steve.stefek@symbios.com
Mr. Paul D. Aloisi	P	Unitrode Corporation	aloisi@unitrode.com
Mr. Jeffrey L. Williams	P	Western Digital Corporation	Jeffrey.L.Williams@wdc. com
Mr. Gregory Kapraun	A	Western Digital Corporation	Gregory.D.Kapraun@wdc.com

48 People Present

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

## 4. SPI-3 Topics

### 4.1 Staged Contact Resistance (98-xxx) [Herrman]

Hank Herrman noted that AMP had applied for a patent related to the material to be presented. He expected that AMP would comply with the ANSI patent policy should the material be included in SPI-3.

Hank presented an analysis of signal behavior on connector mating. The analysis included a model for initial contact (touching of conductors) and several other properties of connector mating behavior. Hank showed signal traces based on the model for transients caused by contact mating. He then described a mechanical change to the contact surfaces that would introduce several levels of resistance in the contacts with the effect that the transients are reduced. The group expressed interest in the connector design and the hope that such a design would make hot-plugging more reliable for parallel SCSI busses. It was felt that more discussions would be required before a specific proposal could be made.

### 4.2 Load Compensation (97-281) [Novak]

Vit Novak followed-up on his presentation from the previous meeting showing how compensating circuitry can be placed on a backplane to improve the signal quality seen by devices. He noted that many components are required to support a typical backplane and suggested that the components might be applied to sets of around three drives with equal effectiveness, thus reducing the cost.

Bill Ham asked the group to think about where the information could be placed. George Penokie suggested an informative annex in SPI-3. Vit indicated that the ideas presented are not needed for LVD SCSI and would be useful only for higher transfer rates, thus confirming that SPI-3 would be more appropriate than SPI-2.

#### **4.3 Universal Backplane Annex (98-101) [Wallace]**

Dean Wallace reported that a revised draft of the document will be in the mailing and requested that further discussion be deferred to the May agenda.

#### **4.4 Bias Reduction Proposal (98-132) [Bridgewater]**

Wally started his presentation by proposing that the bias be removed for Fast-80, having the host or the target supply the bias, and be able to turn it off during data phase. It developed that the proposal depends on the initiator knowing in advance when the target is switching to a data phase. Such knowledge would be required to change the bias quickly. The group discussed how to minimize the time required to switch the bias when changing in to or out of data phase, including the time needed to let the bus settle (or adjust to the bias change).

It was noted that the proposal allows compensation for some of the fixed tolerances currently present in the SPI-2 electrical signaling requirements. This led to a discussion of compensating for other tolerances by adding a signal integrity testing procedure to the protocol. Both ideas met with general agreement, but issues around effects on higher protocol levels were raised. Wally agreed to bring a more detail proposal to the next meeting.

Wally then repeated his request that the open circuit LVD driver voltage be reduced to 2.5 volts. Noting that the request depends on a long succession of future performance improvements in parallel SCSI, some present suggested that no change may be necessary.

#### **4.5 Dual Clocking Proposal (97-208) [Bastiani]**

Vince Bastiani reported that dual-edge signal testing is still in progress and requested that further discussion be deferred to the May agenda.

#### **4.6 Test results on dual edge signals (98-113r0) [Bastiani]**

Vince Bastiani reported that testing is still in progress and requested that further discussion be deferred to the May agenda.

#### **4.7 Testing results on hot plugging perturbations (98-129r0) [Gintz]**

Bill Gintz presented some laboratory results on hot plugging. His experimental setup included a scope that triggered on between 50 and 100 millivolt swings on an ACK line in nanosecond time frames. The first scope triggered a second scope scanning at a hundred microseconds per division. This allowed for examination of both the high-speed and low-speed effects of hot plugging. Bill felt that some of his observed results were explained by the theoretical calculations described by Hank Herrman (see 4.1).

Bill noted several glitches on all of the lines he sampled, as well as concerns about transients caused by unplugging, an situation that he felt the group was ignoring.

#### **4.8 Packetized Protocol review (97-230r5) [Penokie/Williams]**

George Penokie reviewed the packetized protocol proposal placed on the FTP site in December. The group commented on the proposal, noting several specific technical and typographical errors. It was agreed to remove selection with ATN when information unit phases are enabled (unless the proposal authors can provide a justification for its presence in the standard). George stated his plan to revise the document for another round of review during the SCSI Working Group meeting.

#### **4.9 QAS review (97-199r7 and 98-133r0) [Moore]**

Richard Moore presented a overview (98-133r0) of latest revision of the Quick Arbitrate and Select (QAS) proposal (97-199r7). In the course of the discussion, it became clear to two expander vendors that the current expanders will not work with QAS. Also, total bus length for many bus expander implementations might be reduced by some of the timing specifications in QAS. Still, those present felt that bus expanders can be built to support QAS. Richard agreed to prepare a new revision of the QAS proposal for consideration at the May meeting. He expressed the belief that the next revision will not be the last.

#### **4.10 CRC proposal for SPI-3 [Penokie]**

George Penokie asked that discussion of this proposal be deferred to the May meeting.

### **5. SPI-2 Topics**

#### **5.1 0.5 pF balance capacitance for LVD SCSI (98-131) [Aloisi/Kapraun]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

#### **5.2 LVD ESD Concerns [Kapraun]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

#### **5.3 Removal of overlapped commands (duplicate queue tags) checking in SPI-2 [Williams]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

#### **5.4 Terminator Power voltage level [Wallace]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

#### **5.5 SPI-2 Proposed letter ballot response review (98-108r1) [Penokie]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

##### **5.5.1 EIA - 485 versus ISO/IEC 8482 versus SPI-2 [Milligan]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

##### **5.5.2 SPI-2 Differential Cable Common Mode Voltage Requirements [Milligan]**

Due to the late hour, discussion of this topic was moved to the SCSI Working Group meeting.

### **6. Meeting Schedule**

The next meeting of SPI-3 Working Group will be May 4, 1998 in Colorado Springs, CO at the Doubletree World Arena Hotel (719-576-8900), hosted by Symbios, Inc. The meeting will begin at 9:00 a.m. on Monday.

## **7. Adjournment**

The meeting was adjourned at 7:00 p.m. on Monday March 16, 1998.