

Accredited Standards Committee*
X3, Information Technology

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| Doc. No.: X3T10/96-227r0 |
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Date: August 15, 1996

Project: 1142-D

Ref. Doc.:

Reply to: John Lohmeyer

To: Membership of X3T10

From: Bill Ham, SPI-2 Technical Editor
Larry Lamers, Vice-chair X3T10
John Lohmeyer, Chair X3T10

Subject: Minutes of SPI-2 Working Group
August 13-14, 1996 -- Milpitas, CA

Agenda

1. Opening Remarks
 2. Approval of Agenda
 3. Attendance and Membership
 4. LVD Topics
 - 4.1 Hot Plugging [Ham]
 - 4.2 Universal Backplane [Ham/Wallace]
 - 4.3 Proposed corrections and clarifications regarding Release Glitches (96-226r0) [Lohmeyer]
 - 4.4 SPI-2 Document Review (X3T10/1142D) [Ham]
 5. High-Voltage Differential Fast-40 (96-190) [Gingerich]
 6. SPI-2 Single-ended Termination (X3T10/1142D) [Milligan]
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Results of Meeting

1. Opening Remarks

John Lohmeyer, the X3T10 Chair, called the meeting to order at 9:00 a.m., Tuesday August 13, 1996. He thanked Joe Molina of Technology Forums 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 agenda was approved with the following additions:

* Operating under the procedures of The American National Standards Institute.
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3. Attendance and Membership

Attendance at working group meetings does not count toward minimum attendance requirements for X3T10 membership. Working group meetings are open to any person or organization directly and materially affected by X3T10's scope of work. The following people attended the meeting:

| Name | S | Organization | Electronic Mail Address |
|------------------------|----|-------------------------------|---|
| Mr. Norm Harris | P | Adaptec, Inc. | nharris@eng.adaptec.com |
| Mr. Lawrence J. Lamers | A | Adaptec, Inc. | ljlammers@aol.com |
| Mr. Wally Bridgewater | V | Adaptec, Inc. | wally@eng.adaptec.com |
| Mr. Richard Moore | V | Adaptec, Inc. | richard_moore@corp.adaptec.com |
| Mr. Louis Grantham | P | Dallas Semiconductor | grantham@dalsemi.com |
| Mr. Siegfried Schmalz | V | Dallas Semiconductor | schmalz@dalsemi.com |
| Dr. William Ham | A# | Digital Equipment Corp. | ham@subsys.enet.dec.com |
| Mr. Robert Liu | P | Fujitsu Computer Products, Am | rliu@fcpa.fujitsu.com |
| Mr. Dean Wallace | P | Linfinity Micro | 75671.3443@compuserve.com |
| Mr. Wayne E. Werner | O | Lucent Technologies | wew@aluxpo.lucent.com |
| Mr. Chuck Grant | A | Madison Cable Corp. | charles_grant@madisonusa.ccmil.compuserve.com |
| Mr. Brian N. Davis | V | Mylex-Buslogic | briand@mylex.com |
| Mr. Ting Li Chan | A | QLogic Corp. | t_chan@qlc.com |
| Mr. Henry Wong | V | Quantum Corp. | hwong@asic.qntm.com |
| Mr. Richard Uber | V | Quantum Corp. | duber@tdh.qntm.com |
| Mr. John A. Fobel | O | Rancho Technology, Inc. | scsi@rancho.com |
| Mr. Gene Milligan | P | Seagate Technology | Gene_Milligan@notes.seagate.com |
| Mr. William C. Gintz | V | Seagate Technology | bill.gintz@conner.com |
| Mr. Curt Ridgeway | V | Seagate Technology | ridgeway@cdg.seagate.com |
| Mr. Greg Alvey | V | Solution Technology | g.alvey@genie.geis.com |
| Mr. Vit Novak | A | Sun Microsystems, Inc. | vit.novak@sun.com |
| Mr. John Lohmeyer | P | Symbios Logic Inc. | john.lohmeyer@symbios.com |
| Mr. Brian Day | V | Symbios Logic Inc. | brian.day@symbios.com |
| Mr. Pete Tobias | A | Tandem Computers | tobias_pete@tandem.com |
| Mr. Kevin Gingerich | O | Texas Instruments, Inc. | k-gingerich@ti.com |
| Mr. Paul D. Aloisi | P | Unित्रode Integrated Circuits | Aloisi@ui.cc.com |

26 People Present

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

4. LVD Topics

4.1 Hot Plugging [Ham]

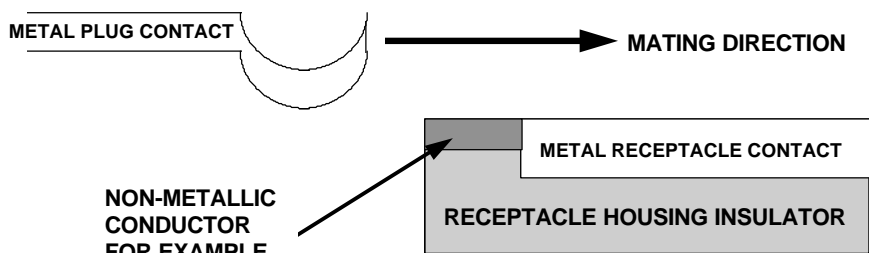
Bill Ham noted that the section in SPI-2 that deals with hot plugging needs more work. We need to clarify that plugging LVD devices into a live LVD bus may result in signal errors, but will not cause physical damage to the devices. Notes also need to be added regarding HVD, LVD, and SE mixing.

If the connector contact design can be modified to have a lead-in area with high-impedance followed by a normal low-impedance contact, then Case 4 hot-plugging can be supported (should this be called Case 5?). Some of the connector people are looking into this issue. We need to make sure that all of the connector people are aware of this need.

HOT PLUGGING CONNECTOR ARCHITECTURE THAT ELIMINATES THE ELECTRICAL DISTURBANCE CAUSED BY A METAL TO METAL FIRST CONTACT

PLUG CONTACT MAKES FIRST CONTACT WITH THE NON-METALLIC CONDUCTOR AND ALLOWS THE VOLTAGE TO EQUALIZE BETWEEN THE PLUG CONTACT AND THE RECEPTACLE CONTACT BEFORE A METAL TO METAL CONTACT HAPPENS -- THIS COULD BE USED ON THE SIGNAL PINS FOR SCSI DEVICES FOR EXAMPLE WHERE NO CURRENT FLOWS AFTER THE CAPACITANCE IS CHARGED ON THE CONTACTS

THE SERVICE POSITION IS METAL TO METAL



NON-METALLIC CONDUCTOR FOR EXAMPLE CARBON IMPREGNATED PLASTIC

NOTE THAT THE NON-METALLIC CONDUCTOR IS ELECTRICALLY CONNECTED TO THE RECEPTACLE CONTACT

THE DESIGN CONCEPT SHOWN IS THE SAME AS THE SCA-2 WITH THE TOP PART OF THE HOUSING INSULATOR REPLACED WITH A NON-METALLIC REGION

BILL HAM DIGITAL EQUIPMENT SPI-2 WORKING GROUP AUG 13, 1996

4.2 Universal Backplane [Ham/Wallace]

There was little discussion on this item, since Dean Wallace was not present when it came up. Dean's action item on this topic was carried over.

4.3 Proposed corrections and clarifications regarding Release Glitches (96-226r0) [Lohmeyer]

John Lohmeyer presented 96-226r0 that had been distributed on the reflector. The proposal completely replaces section 11.1 and Annex C with a new section 11.1. John noted that the rule in 11.1 requiring devices to first negate signals for a bus settle delay prior to releasing them conflicts with some protocol (notably turning the bus direction around). Furthermore, following the rule would cause release glitches. John's new section 11.1, deletes the rule; incorporates the needed parts of Annex C into Table 12; and it attempts to improve the wording to be more consistent with SPI terminology.

The group suggested some further improvements, which John included in revision 1. Revision 1 was reviewed the second day and the group agreed that it should be incorporated into Rev 10 of the working document.

4.4 SPI-2 Document Review (X3T10/1142D) [Ham]

Bill stepped through the remaining part of the draft that was not covered at the previous meeting. A number of corrections and adjustments were made. The draft still needs a thorough editorial review.

5. High-Voltage Differential Fast-40 (96-190) [Gingerich]

Kevin's proposal included a redefinition of the timings to allow HVD.

Kevin proposed modifications to the DIFFSENS signal definition. Bill argued that burdening LVD with the cost of meeting a higher common mode test for the DIFFSENS signal is not justified. He suggested reducing the voltage range of the test to -0.5 to 4.1 V d.c., the range for HVD is -4.5 to 12.0 V d.c. This will result in two separate specifications in the working draft.

If the maximum voltage on the LVD input pins is not specified at 6 V then adding a differential device to an SE/LVD bus might damage the SE/LVD terminators. This is particularly possible with some HVD devices that omitted the 1 kohm pull-up resistor from Vcc to DIFFSENS. A caution note will be added to the draft on possible damage to SE/LVD devices when inserting an HVD device. A driver circuit for HVD DIFFSENS will be added with real requirements on including the pull-up resistor.

The separate "delay skew" and "distortion skew" values will be replaced with just a "skew" value for the setup and hold times figure. The load imbalance may contribute up to 1.2 ns of skew according to the theoretical analysis. Bill Ham noted that these numbers are over twice what has been experimentally measured in similar testing. The issue of the amount of load related skew is still open but it appears that there is still a desire to reduce the amount of capacitive imbalance allowed on device loads. There was some discussion of reducing the data/ack capacitive difference to 1 pF from the presently specified 2 pF.

6. SPI-2 Single-ended Termination (X3T10/1142D) [Milligan]

Gene Milligan raised an issue (see 96-222) on how the single-ended termination driver current is specified. Specifically the 48 ma max at 0.2 V d.c. seems to outlaw the existing SCSI-2 alternative-2 termination.

Dean Wallace, Louis Grantham, and Paul Aloisi, are working on a proposal that would address the issue of keeping the terminator within the driver specifications.

7. Meeting Schedule

The next meeting of SPI-2 Working Group is scheduled for September 9, 1996 in Natick, MA hosted by Digital Equipment. Another meeting is scheduled for October 10, 1996 in St. Petersburg Beach, FL with X3T11 hosted by AMP.

8. Adjournment

The meeting was adjourned at 5:00 p.m. on Wednesday August 14, 1996.