Accredited Standards Committee*
X3, Information Technology

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
            September 9, 1996 -- Natick, MA

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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 SPI-2 Document Review (X3T10/1142D) [Ham]
    4.4 Relaxing Delta Vcm specification in section 13.2.2 [Harris]

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

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

7. Missing SPI Requirement (reflector message) [Milligan]

8. Configuration Rules [Ham/Gingerich]

9. Termination Power Requirements for HVD [Ham]

10. Meeting Schedule

11. Adjournment

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Results of Meeting

1.   Opening Remarks

John Lohmeyer, the X3T10 Chair, called the meeting to order at 9:15 a.m., Monday September 9, 1996. He thanked Charles Monia of Digital 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:
        7. Missing SPI Requirement (reflector message) [Milligan]
        8. Configuration Rules [Ham/Gingerich]
        9. Termination Power Requirements for HVD [Ham]

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:

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        Name           S       Organization         Electronic Mail Address
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Mr. Norm Harris        P  Adaptec, Inc.            nharris@eng.adaptec.com
Mr. Michael Wingard    P  Amphenol Interconnect    mikwingard@aol.com
Mr. Borden Moller      A  CMD Technology           borden@cmd.com
Mr. Louis Grantham     P  Dallas Semiconductor     grantham@dalsemi.com
Mr. Siegfried Schmalz  V  Dallas Semiconductor     schmalz@dalsemi.com
Mr. Greg McSorley      O  Data General Corp.       greg_mcsorley@dgc.ceo.dg.
                                                   com
Dr. William Ham        A# Digital Equipment Corp.  ham@subsys.enet.dec.com
Mr. George Penokie     P  IBM Corp.                gop@rchvmp3.vnet.ibm.com
Mr. Dean Wallace       P  Linfinity Micro          75671.3443@compuserve.com
Mr. Robert Bellino     P  Madison Cable Corp.      robert_bellino@madisonusa
                                                   .ccmail.compuserve.com
Mr. Edward A. Gardner  P  Ophidian Designs         gardner@acm.org
Mr. Skip Jones         P  QLogic Corp.             sk_jones@qlc.com
Mr. Richard Uber       V  Quantum Corp.            duber@tdh.qntm.com
Mr. Gene Milligan      P  Seagate Technology       Gene_Milligan@notes.
                                                   seagate.com
Mr. Vit Novak          A  Sun Microsystems, Inc.   vit.novak@sun.com
Mr. John Lohmeyer      P  Symbios Logic Inc.       john.lohmeyer@symbios.com
Mr. Ralph O. Weber     A# Symbios Logic Inc.       roweber@acm.org
Mr. Kenneth J. Hallam  P  UNISYS Corporation       ken.hallam@mv.unisys.com
Mr. Paul D. Aloisi     P  Unitrode Integrated      Aloisi@uicc.com
                          Circuits
Mr. Doug Piper         P  Woven Electronics        549.9900@mcimail.com

20 People Present

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

4.1   Hot Plugging [Ham]

John Lohmeyer and Bill Ham discussed possible improvements in hot plugging for case 4. John noted that laboratory work seemed promising. He suggested that more extensive presentations might be forthcoming.

4.2   Universal Backplane [Ham/Wallace]

Dean Wallace noted that the simulations are proving more difficult to process than he expected. However, he expressed a belief that a universal backplane layout will be possible. Bill and Dean discussed the details of the

electrical properties of a probable universal backplane. Dean requested that further discussion be deferred until the next meeting.

Bill and John questioned whether the universal backplane should be included in SPI-2. Concerns were raised that including universal backplane documentation could delay stabilizing SPI-2. Options suggested were pushing the universal backplane to EPI or to an informative annex in SPI-2 (developed after the stabilization vote).

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

Bill stepped through revision 10 of SPI-2 soliciting comments both editorial and technical. Many of the comments were editorial. Bill agreed to prepare a revision 11 of the document based on the results of the discussions at this meeting.

After lunch, there was a discussion of the Transfer Period Factor value to use in the Synchronous Data Transfer Request (SDTR) Message for the Fast-40 transfer rate. The group agreed to use a Transfer Period Factor of 10h for Fast-40 and 11h for Fast-33. Devices running at the Fast-33 data rate must meet the Fast-40 setup and hold times, but will transfer and receive data at 33 mega-repetitions/second or less.

Values below 10 are reserved for future standardization. Paul Aloisi suggested some possible future assignments for these code values and Bill Ham suggested an alternate set.

Transfer Period Factor	Transfer Period	Maximum Data Rate		Comments
12	50 ns	Fast-20		Defined in Fast-20/SIP
11	30.3 ns	Fast-33		To be defined in SPI-2 annex
10	25 ns	Fast-40		To be defined in SPI-2 annex
		Paul's Proposal	Bill's Proposal	
9		Fast-60	Fast-100	\
8		Fast-80		|
7		Fast-120		|
6		Fast-160	Fast-200	|
5		Fast-240		> Reserved for future standardization
4		Fast-320	Fast-400	|
3		Fast-480		|
2		Fast-640	Fast-800	|
1		Fast-960	Fast-1000	/
0	Reserved			

Gene Milligan pointed out that the transfer period tolerances in SPI (Receive Period Tolerance and Transmit Period Tolerance) should also apply to SPI-2 (and Fast-20, for that matter). The group agreed.

The working group agreed by unanimous consent to recommend to X3T10 that SPI-2 Revision 10 with the agreed upon changes be technically stabilized for the current content.

4.4   Relaxing Delta Vcm specification in section 13.2.2 [Harris]

Bill Ham and John Lohmeyer described recent discussions about problems with the offset (common-mode output) voltage requirements in SPI-2 revision 10. Chip designers at both IBM and Adaptec had indicated that the current specification would be difficult to meet. Bill showed the definition of both the DC common mode voltage requirements and the AC common mode voltage requirements (section 13.2.5 in SPI-2). The group discussed procedural issues associated with the problem.

Bill summarized the issue as concerning common mode current and signal cross talk. The problem is mostly affected by the AC specifications (not the DC specifications). Nobody is complaining about the AC specifications. So, why not relax the DC specification?

In the absence of any objections, the group recommended changing the DC common mode voltage delta in section 13.2.2 from 50 mV or less to 120 mV or less.

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

John noted that Kevin Gingerich will not be attending. Therefore, discussion of this topic will be deferred to the next meeting.

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

Gene Milligan raised an issue (see 96-222) on how the single-ended terminator current is specified in SPI. Specifically the 48 mA maximum at 0.2 V seems to outlaw the existing SCSI-2 alternative-2 terminator, which can deliver more than 48 mA at 0.2 V.

Dean Wallace presented a written description that proposed allowing 22.4 mA at 0.5 V and 25.4 mA at 0.2 V for each terminator, for a total of 50.8 mA at 0.2 V. John noted that the silicon folks have previously rejected increasing the driver current specification because of the expense of re-characterizing the parts. The group discussed the history of terminator current requirements at length. Dean agreed to revise the problem description based on the working group discussion and distribute the proposal on the SCSI Reflector.

7.   Missing SPI Requirement (reflector message) [Milligan]

Gene noted that both SCSI-2 and SPI carefully specify bus capacitance for a device be measured at the end of the stub for single-ended but that similar requirements are needed (but not present) for differential busses. Bill Ham contested Gene's assertion and attempted to show how the differential requirements described by Gene are present in SPI-2.

It was agreed that the desired requirement is present but not worded as well as Gene desired. Final resolution of the issue was deferred to the SPI-2 document review topic (which precedes this topic on the agenda but followed this topic in the timeline of the meeting).

8.   Configuration Rules [Ham/Gingerich]

Bill presented a configuration rules proposal developed by Kevin Gingerich intended to reduce the contribution to skew and propagation delay introduced by configuration. Bill noted that the proposal, in part, simply changes the way the existing requirements are shown (in the standard). Bill criticized the modeling methodology on which the proposal is based and noted that the results disagree with his laboratory results. Bill then asked the group to develop ideas for a better presentation of the requirements.

Bill and the group generally approved of Kevin's proposal regarding device spacing. The group substantially edited Kevin's proposal, keeping some parts and returning to SPI-2 revision 10 wording for others. In a couple of instances, configuration rules were modified slightly to align with the configuration rules being promoted by the SCSI Trade Association (i.e., 16 devices and 12 meters for LVD).

9.   Termination Power Requirements for HVD [Ham]

Bill noted an absence of defined termination power requirements for high-voltage differential systems and displayed an editor's note on the topic in clause 7.2 of SPI-2 revision 10. Siegfried Schmalz, Dean Wallace, Paul Aloisi, and several others described the requirements as 1 amp at 4 volts for a narrow bus. Bill described this requirement as the most difficult termination power distribution problem in SCSI. He then proceeded to try to simplify the termination power distribution complications, with little success.

10.   Meeting Schedule

The next meeting of SPI-2 Working Group is scheduled for October 10, 1996 in St. Petersburg Beach, FL with X3T11 hosted by AMP. A subsequent meeting is planned for November 4, 1996 in Palm Springs, CA.

Chair's Note: Since X3T10 stabilized the SPI-2 working draft, it is anticipated that the next couple SPI-2 working group meetings will focus on the editorial issues of merging the SPI, SIP, and Fast-20 documents into SPI-2.

11.   Adjournment

The meeting was adjourned at 7:15 p.m. on Monday September 9, 1996.