SCSI passive interconnect performance working group (SPIP) 00-163r0
February 29, 2000
Manchester, NH

Subject: Draft minutes for the SCSI passive interconnect performance working group, SPIP, in Manchester, NH on February 29, 2000

Zane Daggett of Hitachi, chair, led the meeting. Dave Chapman of Amphenol is the vice chair, Bill Ham of Compaq, secretary, took these minutes. There was a good attendance from a broad spectrum of the industry. Zane Daggett of Hitachi hosted the meeting.

Previous approved minutes: 00-145r1

1. Introduction

Zane opened the meeting, conducted the introductions, and reviewed the meeting purpose.

2. Attendance

The following folks were present:

Name	Company	E-Mail
Dave Chapman	Amphenol	dave.chapman@aipc.fabrik.com
Jeff Rosa	Amphenol	jeff.rosa@aipc.fabrik.com
Bill Ham	Compaq	bill_ham@ix.netcom.com
Paul Aloisi	TI	Paul_Aloisi@TI.com

Zane Daggett	Hitachi	zdaggett@hcm.hitachi.com
Martin Ogbuokiri	Molex	mogbuokiri@molex.com
Larry Barnes	LSI	larry.barnes@lsil.com
Bob Gannon	JPM	rgannon@jpmco.com
Ken Plourde	Temp-Flex	kplourde@tempflex.com
David MacQuown	Adaptec	david_macquown@corp.adaptec.com
Jason Chou	Foxconn	jasonc@foxconn.com

3. Agenda development

The agenda shown was that used.

4. Approval of previous minutes

Bill Ham moved and Paul Aloisi seconded that the draft minutes from the previous meeting be approved as modified. Motion passed unanimously.

The methodology for minutes uses the draft/approved minutes scheme with posting to the t10 web site of the minutes as the vehicle for publication. Postings are announced to the SCSI reflector after the posting is verified to be on the web site.

Minutes will be in .pdf format.

5. Review of action items

Action items were reviewed and the status is listed below in the action items section.

6. Administrative structure:

The present administrative structure is:

Chair: Zane Daggett, Hitachi
Vice Chair: Dave Chapman, Amphenol
Secretary: Bill Ham, Compaq

7. Review of industry activities

- Bill Ham noted that an effort similar to the SCSI modeling effort is being started for FC. He also reiterated the importance of the modeling work to SCSI now and especially in the future.

8. Presentations

8.1 Frequency dependence of dielectric constant test methodology - Barnes

Deferred to April.

9. SPIP documentation - Daggett

This working group will proceed to develop an internal committee document Titled: SCSI passive interconnect performance requirements whose schedule is independent from SPI-x standards schedule. Zane Daggett is editor, Bill Ham is assistant editor. The document will follow the same general format as 99-219rx. Extensive coordination with the SSM group is expected.

An working outline should be completed in the next meeting.

Action item: Zane to get a document number for the SPIPR document

9.1 Topics for consideration for SPI-4 passive interconnect

The in this section were reviewed from the last meeting as possible candidates for consideration for the SPIPR document.

9.1.1 Components of passive interconnect

The following constitute the basic building blocks of passive interconnect:

media (wire and backplane)
connectors
transition regions (connector termination / comb out / lacing regions / vias)

9.1.2 Construction

The following physical constructions are part of SPIP:

Point to point:
- two connector shielded
- two connector unshielded

Multidrop:
- multi connector shielded (e.g. Y cables)
- multi connector unshielded
- multi connector backplanes

Stubs:
- backplane stubs
- unshielded cable stubs
- shielded cable stubs

Overall length and specific placement and properties of stubs are essential parts of the description of the construction. Note that the length and position may not be measured in inches but rather in nanoseconds.

In general the passive interconnects for SCSI are complex multiport circuits whose performance must be considered from every connector in the interconnect.

9.1.3 Specific technical concentration areas

- Non uniform media issues (e.g. twisted flat)
- Connector performance specifications
- Connector variations
- Assembly construction variations
- EMC - reference SFF-8410 for CMPT and EMR for emissions - applies to shielded versions only
    - Susceptibility issue for backplanes?

9.1.4 Test types

The following tests are presently view as the candidate list

Local impedance
Extended distance impedance
Capacitance (SE, DF)
Frequency dependence of dielectric constant
Propagation time - within the pair
Propagation time skew - pair to pair
+ signal to - signal balance - within the pair (balance degradation)
Attenuation - within the pair
Attenuation skew - pair to pair
Eye diagrams (signal degradation)
Rise time degradation
Common mode (treat each pair as a single conductor) impedance
Common mode capacitance
Common mode noise
Near end crosstalk
Far end crosstalk
Attenuation to cross talk ratio (ACR)
EMC (CMPT, EMR) shielded versions only

The Level 1 and Level 2 approach described in SFF-8410 will be used. Level 1 is required for performance and has specific acceptable limits defined. Level 2 is diagnostic and has no specific limits defined.

The following represents the present thinking on the tests required for level 1 and level 2.

Level 1

- Local impedance
- Extended distance impedance
- Propagation time - within the pair
- A.C. balance degradation within the pair (+ signal to - signal balance /common mode)
- A.C. signal degradation - all pairs to clock (Full signal characterization - e.g. Eye diagrams)
- D.C. leakage to ground [impacts receiver bias / d.c. offset]
- end to end resistance skew within the pair
- Near end crosstalk
- EMC (CMPT, EMR) shielded versions only

Level 2

- Signal degradation within the pair (Full signal characterization - e.g. Eye diagrams
- Rise time degradation
- Frequency dependence of dielectric constant
- Far end crosstalk
- Attenuation to cross talk ratio (ACR)
- Attenuation - within the pair
- Attenuation skew - pair to pair
- Capacitance (SE, DF)
- Propagation time skew - pair to pair

Problem areas needing future attention - not classified yet:

- Common mode impedance
- Common mode capacitance
- Common mode noise

9.1.5 Instrumentation / measurement methods:

- Baluns
- Eye diagram / signal degradation testing (including cross talk noise)
- Filtering schemes for eye pattern generation

These topics are in addition to other issues already identified for media.

9.1.6 Acceptable performance values

All level 1 tests will have specific acceptable values assigned.

10. Goals for SPIP

The following is a list of goals for SPIP generated:

- Focused on the cable assembly/backplane as a finished component including all connectors and transition regions.
- May be either internal or external.
- Define how to specify the output signal from a cable assembly in light of the possible use of adaptive filtering (called equalization by some) in receivers.
- Allow for the following schemes that are presently being considered for SPI-4: transmitter compensation, adaptive filtering, compensation of skew
- Define how to specify cable assembly construction in terms of performance rather than only in mechanical terms. For example, connector to connector spacing in terms of propagation time rather than length, transition regions in terms of cross talk contribution rather than physical extent, discontinuities in impedance due to connectors rather than nothing, etc.
- Preserve the present testing methodologies for media if possible.
- For example, the attenuation test can be generalized to two port amplitude transfer function (which will include resonance caused by connectors etc). The cross talk test can be generalized by using repeated pulses and varying the rep rate while observing the response of on the victim line.
- Recognize that the effects of data pattern and placement of cable assembly features may produce complex interference patterns and recommend how to minimize the impact of these features on the delivered signal.
- Use the same test specification methodology as used for SPI-3 cable media.
- Add common mode requirements to the cable assembly tests (both shielded and unshielded)

11. Architectural definitions

This refers to issues like defining the test points, nomenclature, and the like. It was decided to use the same conventions commonly used for modeling and transmission lines if possible. Larry B to propose a specific syntax for the next meeting.

All measurements will be through a mated connector. This means that the test fixturing specification will be critical since part of the tested interconnect will remain with the test environment and part will be removable with the IUT.

Zane is create a summary table for all tests defined above and to start the document.

It was agreed that a special filtering function is needed for some tests to account for the filtering that may occur in the receivers. See 00-149r0 for more detail.

12. Next meetings

Approved schedule:
April 11, 2000 9AM to 5PM, Monterey, CA (Adaptec)

Requested schedule:
June 12-13, 2000 9AM to 5PM 6/12 9AM to 12:00PM 6/13, Lisle, IL (Molex)
August 14-15, 2000 9AM to 5 PM 8/14 9AM to 12PM 8/14, Colorado Spgs (LSI logic)

13. Action Items:

13.1 Old action items from previous meetings

Larry Barnes to acquire data from the polished coax probe method for dielectric constant frequency variations.
Status: cable now in hand, test results expected before 04/11

Zane (and possibly Greg V.) to provide data from the HP slab method for dielectric constant frequency variations
Status: carried over

Bill Ham to post the minutes to the T10 web site
Status: done 00-145r0

13.2 New actions from this meeting

Bill Ham to post the minutes to the T10 web site
Status: new

Zane to get a document number for the SPIPR document
Status: new

Larry B to propose a specific syntax for a general cable assembly.
Status: new

Zane is create a summary table for all tests defined above and to start the document.
Status: new