

SCSI passive interconnect performance working group (SPIP) 00-110r1  
February 10, 2000  
Rochester, MN

Subject: Approved minutes for the SCSI cable media performance working group SCMP (Rochester, MN)

Zane Daggett of Hitachi led the meeting. Bill Ham of Compaq took these minutes. There was a good attendance from a broad spectrum of the industry. Jonathan Fasig of Western Digital hosted the meeting.

Previous approved minutes: 99-328r1

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### 1. Introduction

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

### 2. Attendance

The following folks were present:

Martin Ogbuokiri, Molex, mobuokiri@molex.com  
Larry Barnes, LSI Logic, larry.barnes@lsil.com  
Jonathan Fasig, Western Digital, jonthan.L.Fasig@wdc.com  
Bill Ham, Compaq, bill\_ham@ix.netcom.com  
Dave Chapman, Amphenol, dave.chapman@aipc.fabrik.com  
Greg Vaupotic, Amphenol, greg/vaupotic@snet.net  
Zane Daggett, Hitachi Cable, zdaggett@hcm.hitachi.com  
Dean Wallace, Qlogic, d\_wallace@qlc.com  
Thom Kreuzel, HP, thom\_kruesel@hp.com  
Rollie O'Groske, JPM, Jit2pan3@us.jpm.com  
Martin Ogbuokiri, Molex, mogbuokiri@molex.com  
Tariq Abou-Jeyeb, Adaptec, tajeyab@corp.adaptec.com  
Paul Aloisi, TI, paul\_aloisi@ti.com  
George Penokie, IBM, GOP@us.ibm.com

### 3. Agenda development

The agenda shown was that used.

#### 4. Approval of previous minutes

Greg Vaupotic moved and Andrew Bishop 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. SPI-3 topics

A preliminary version of SPI-3 was prepared by George Penokie and was reviewed in detail. Several issues were discovered as noted below:

##### 1. Review of Rev 11 of SPI-3

- ◆ Under table E.1 for Differential Impedance should read 1ns and 3 ns NOT 0,5
- ◆ In the same table, under Differential extended distance (balanced) Zo the frequency range should be 30MHz to 600MHz and not 1MHz to 1GHz
- ◆ In the same table under Dielectric frequency range should read 300KHz to 600MHz.
- ◆ Under Tp (differential propagation) time per meter (note) 1 should read "Launched rise time between 1ns & 3ns-propagation time is measured @ the amplitude mid-point of the STD\*\*"
- ◆ Directly under the table the use of flat cable is referenced and needs to be changed to planar
- ◆ Under E2.1.4 we state "These measurements include a small error factor caused by losses in the cable which varies with gauge size. This error increases the measured impedance slightly." Please change to "These measurements ignore the small error factor caused by losses in the cable which varies with gauge size. This error increases the measured impedance slightly."
- ◆ Under E2.2.2 item 6. This was an oversight on the working groups part. The last sentence "Tie all other pairs and the shield together." needs to be removed.
- ◆ In Section E.2.2.3.3 the word "across the pair." appear twice and should be dropped to be consistent with the wording used in the Single Ended section.
- ◆ In Section E.2.2.3.3 the equation for determining the corrected impedance states a multiplier factor of "25". This should be changed to "100"
- ◆ In Section E.2.2.3.4 the word "across the pair" should be removed to be technically correct.
- ◆ Under E2.2.4 we state "These measurements include a small error factor caused by losses in the cable which varies with gauge size. This error increases the measured impedance slightly." Please

- change to "These measurements ignore the small error factor caused by losses in the cable which varies with gauge size. This error increases the measured impedance slightly."
- ◆ Section E.3.2 needs to drop the heading of unbalanced from "Differential capacitance."
  - ◆ Section E.7.4—remove the words "at least"
  - ◆ Section E.7.4—remove the words "anywhere from"
  - ◆ The text immediately following Figure 16 is incorrectly states as 50  $\Omega$  single ended to 150 $\Omega$  differential. The 150 $\Omega$  should be changed to 122 $\Omega$  differential.

## 6. SPI-4 topics

### 6.1 Administrative structure

With the addition of cable assembly and other constructions it is clear that expansion of the administrative structure of this working group is desirable. After some discussion Zane decided to accept Dave Chapman's offer to become vice chair and to represent the interests of the cable assembly technologies.

With this new appointment the administrative structure becomes:

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

### 6.2 Naming of this organization

With the expanded work scope for SPI-4 a discussion of an appropriate name was undertaken. The definition of launched and received signals as produced / used by the transceivers was deemed to be outside the scope of this working group. On the other hand all passive elements of a SCSI bus segment were deemed possibly appropriate. After due process of elimination it was agreed that the new name of the group will incorporate the words passive and interconnect. Therefore: Greg V. moved and Paul Aloisi seconded that the formal name of working group be "SCSI Passive Interconnect Performance Working Group" Motion passed unanimously. The acronym becomes: SPIP (replacing SCMP).

It is the understanding that this group will address cable assemblies and possibly backplanes (with connectors). As separate requirements for media are already specified in SPI-3 this will provide a base for starting the work. Obviously not presently specified are performance requirements for connectors as separate elements. It is likely that the electrical performance of the connectors will also be part of the work of this group.

### 6.3 Dielectric variation with frequency

A article provided by Larry Barnes relating to measuring the very high frequency properties of dielectric materials was discussed. This technique uses a carefully prepared probe made from a semi rigid coax with a "polished" end. This polished end is placed in deionized water and other stable liquids such as alcohol to establish a calibration for the probe.

The probe is then placed against the processed dielectric used in the cable under test. One issue identified was the deformation required to remove the extruded dielectric from conductor. Further deformation is required to flatten the dielectric so that the probe can make uniform contact. The deformation may be important for foamed dielectrics since the air content may be reduced by the compression. This reduction in air content may make the dielectric appear to be more sensitive to frequency since there is more solid dielectric in the test than in service.

There is another method that requires a slab of dielectric and that does not appear to be useful with processed dielectrics. However, this method will also be considered after some data is acquired.

Action item: Larry Barnes to attempt the polished coax test

Action item: Zane (and possibly Greg Vaupotic) to provide some data from the dielectric slab method.

#### 6.4 Topics for consideration for SPI-4 passive interconnect

The following topics were identified for consideration for SPI-4 passive interconnect

- Non uniform media issues
- Connector performance specifications
- Connector variations
- Assembly construction variations
- EMC
- Balance
- Baluns
- Resonance
- 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.

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

The next meetings will begin to attack these issues to arrive at a set of practical specifications

## 7. Next meetings

### Approved schedule:

Feb 07, 2000 1PM to 8PM, Huntington Beach, CA (Qlogic)  
Feb 29, 2000 9AM to 5PM, Manchester, NH (Hitachi)

### Requested schedule:

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

## 8. Action Items:

### Old action items from previous meetings:

Larry Barnes to provide a proposal for dielectric constant measurements for SPI-3.  
Status: done

### New actions from this meeting:

Larry Barnes to data from the coax probe method for dielectric constant frequency variations.  
Status: new

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

Bill Ham to ensure that the meeting schedules for SPIP and SSM are consistent with T10 schedules.  
Status: new

Bill Ham to post the minutes to the T10 web site