

Attendance

Mr. Bernhard Laschinsky	Agere Systems
Mr. Ziad Matni	Agere Systems
Mr. Fred Giordiano	Agere Systems
Mr. Ken Paist	Agere Systems
Mr. Kevin Marks	Dell, Inc.
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. George O. Penokie	IBM Corp.
Mr. James Rockrohr	IBM Corp.
Mr. Schelto van Doorn	Intel Corp
Dr. Mark Seidel	Intel Corp.
Mr. Michael Jenkins	LSI Logic Corp.
Mr. Wei Zhou	Marvell
Mr. David Geddes	Marvell
Ms. Helen Lui	Maxxim
Mr. Galen Fromm	Molex Inc.
Mr. Yuriy Greshishchev	PMC-Sierra
Mr. Robert Watson	PMC-Sierra
Mr. Alvin Cox	Seagate Technology
Mr. Dan Smith	Seagate Technology
Mr. Gregory Tabor	Vitesse Semiconductor
Mr. Kevin Witt	Vitesse Semiconductor

21 People Present

Agenda:

1. Training sequence/speed negotiation

The following ideas are for consideration. Please investigate and discuss on the 6/15 call. Reflector traffic is welcome and encouraged. Some concerns related to how the information is handled and whether it reaches beyond the PHY layer.

Idea floated in the WG meeting of just sending G1 traffic in the G3 window. This should get through without needing training.

It would diverge from the normal window definition by:

- * Start with training pattern? (Suggest leaving as idle time since speed will be determined later)
- * Continue with ALIGN (0)/ALIGN (1) algorithm like today
- * End by sending information about supported rates and features, not just sending ALIGN (1)s.

Include:

- Additional rates supported (G3, G4, G5, etc.)
- Whether the phy can receive SSC
- Advice to the other transmitter to help it decide about tx amplitude, preemphasis, etc.
 - * "Receiver device" characteristics (which it should know)
 - * System interconnect characteristics (which it may know)

This would be the last trial window; there'd be no need for subsequent (G4, G5, etc.) windows following the current algorithm. The next window would be the final one, which would enable SSC if supported, start with a training sequence, perform whatever is needed for dword sync, etc. like has been discussed. If lock is unsuccessful, the phys restart OOB. If lock is repeatedly unsuccessful, turn off the fastest rate and try again. (Same issues as today)

2. Spread Spectrum Clocking
a. SSC options / trade-offs [Witt]

Kevin presented this draft for review prior to posting. Should be on the T10 site soon. Compares up-, center- and down-spreading for SSC. Conclusion was that the short-term buffering impact of SSC is minimal, but long-term impact was not covered. Makes a possible case for center-spreading.

Some discussion concerning buffer management, can credits be used to handle the overflows, and where is SSC implemented. Also discussed how STP works and that it is done at the initiator to device rather than the expander doing the translation. It is important that SSC be implement between the device and expander as well as between the expander(s) and initiator. This may complicate center-spreading or clocking since the SATA device supports down-spreading only. Kevin's proposal suggests that the SSC should be handled independently at each PHY.

b. SAS-2 Spread-spectrum clocking by upspreading (06-263) [Elliott]
<http://www.t10.org/ftp/t10/document.06/06-263r0.pdf>

Present cases and issues with different SSC schemes. Supports up-spreading, but it looks like the center-spreading calculation may have not been done correctly regarding the buffer dword total. Kevin Witt will contact Rob about this.

Alvin brought up a couple of concerns. A minor detail on clock numbers in the information section where the +350/-5350 ppm was mentioned. Since this is referring to a SAS expander, Alvin suggested that this should have the SAS +/- 100 ppm for clock tolerance rather than the SATA +/- 350 ppm.

3. Specification of transmitter device equalization (TCTF, system intelligence?)
Would the item 1 ability to identify system loss take care of the "fixed de-emphasis" idea that was discussed at the face-to-face? Probably not for external connections where the cable length is an unknown. Should a mathematical TCTF be defined rather than having a physical requirement? (Other issues (SSC and training) are being worked first, so not much time has been spent on this.)
4. Secondary port connector electrical characterization – In process
5. New items - None
6. Next conference call June 15, 2006 - **Primary agenda will be items 1 and 2 above.**

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Topic: SAS-2 PHY WG

Date: Thursday, June 15, 2006

Time: 10:00 am, Central Daylight Time (GMT -05:00, Chicago)

Meeting number: 826 515 680

Meeting password: 6gbpsSAS