Minutes of SAS Physical Working Group teleconference, June 1, 2006

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             Maxim
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]
   [Elliott]
   [http://www.t10.org/tp/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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Webex information:  
https://seagate.webex.com/seagate
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