IEEE P1394a Working Group
January 8-9, 1998
Houston, Texas

Chairman: Peter Johansson
Secretary: Prashant Kanhere
First day's minutes taken by: Steve Bard (Thanks Steve!)

This meeting was held in Houston, TX., and was hosted by Compaq Computers. Meeting started at 8:30 AM.

1.0 Introductions and procedures
2.0 Review of minutes
Colin Whitby-Strevens moved and Dave LaFollette seconded that the minutes of the last meeting be approved. The motion passed unanimously.

3.0 Old action items
3.1 Single- and dual-phase retry protocol revalidation [Johansson**]**
Deferred to next meeting.

3.2 Multi-speed packet concatenation vs. token-style arbitration [Duckwall / Johansson]
Deferred to next meeting.

3.3 Update and publish SCAT [Whitby-Strevens]
Completed. See 5.0 below.

3.4 Apple patent letter [Anderson / Johansson]
The letter is available for general perusal by accessing document number 98-001r0.PDF on the P1394a ftp repository. A general call for patent disclosure was made by Peter. No response came from the membership.

3.5 Revise 4-pin cable / connector, isolation [Bassler et al].
Deferred to next meeting.

3.6 SCAT 51, 90, and other agreed changes into draft [Johansson]

3.7 PHY designer SCAT items 36, 82, 87, 88, 92, 95 and 96 With the exception of 95 which will be covered in item 5 of the agenda.

3.8 Annex K modifications [Brunker]

Dave provided hard copies of his presentation. The hard-copy will be made available on the ftp repository as a soft copy. Proposed crosstalk revision to Annex K-1394-1995: 1) Revise the value used for the frequency sweep to reflect equivalent of 3ns rise time with 20ns pulse width; 2) Fourier analysis was conducted to evaluate power distribution with above pulse signature; 3) Power Sum demonstrates approx. 4/5ths of the power available for crosstalk coupling to occur below 7 MHz (500 MHz is far too stringent); 4) Single ended frequency sweep is therefore recommended from 1 to 75 MHz (Section K.8) Proposed Impedance addition to Annex K-1394-1995: 1) Add impedance evaluations at 50, 100, and 150ps into the cable/connector assembly; 2) Asses A + B pairs in differential mode with 0.5ns rise time filter; 3) Establish performance target across 100ps exception window at 110 ohms +/- 25 ohms; 4) Given round-trip TDR function actual on-screen evaluation points become 100, 200, and 300ps. Action summary: 1) Revision details to be added: 1) K.2 - Update test fixture description to include shield to Vg RC network; 2) K.3 - Detail TDR method to include differential drive and 0.5ns Filter condition; 3) K.8 - Provide revision detail to support specific 1 - 75 MHz frequency domain crosstalk sweeps. Colin moved 98-002r0 (Dave Brunker’s presentation) be accepted with editorial revisions into the next draft Richard Baker seconded. Motion carries unanimously.

3.9 International Participation Fee mechanism [Johansson]
Deferred to next meeting.

3.10 Voltage drop constants [Weiner/Bard]

John Fuller moved to include the node resistance (port to port) of 0.5 ohm to be incorporated into a normative section of the specification. Seconded by David Wooten. Carried unanimously.

4.0 Other old business

4.1 Suspend / resume review [Johansson]
Peter presented 97-086R2 Several items were noted for editorial correction and technical clarification which Peter wrote on the foils being presented or Steve Bard incorporated as post-it notes on the soft copy PDF of the presentation. A significant amount of discussion took place surrounding the high level transaction protocol layer for suspend/resume. David Wooten moved

to incorporate 97-086R2 as modified into the next draft revision (1.4) of the P1394a Specification. Seconded by David LaFollette.
29 in favor, 4 opposed, 0 abstaining; Opposing comments: Renard Ulrey & Bill Duckwall: adding this will push acceptance of the p1394a draft specification past the February deadline

4.2 Per port speed information and the SPEED_MAP [Brown]

Item closed since there was no one to present the subject matter.

4.3 LPS Reset/disable [Whitby-Strevens]

Colin presented his continuous SCLK proposal and explained that there is a class of applications that could potentially operate within a single clock domain provided by the SCLK from the PHY. These applications could achieve significant cost savings by eliminating multiple clock sources and synchronizers. He explained that the current proposal almost allows the single clock domain operation except for the fact that the SCLK is taken away during the PHY - Link interface reset. This proposal essentially separates the mechanism of resetting the PHY/link interface Vs disabling it and removing the SCLK. Document 97-082R3 on the ftp site contains a detailed description of this proposal. During the discussion some of the timing parameters were modified. These changes will be available in the R4 version of the document. Colin also discussed the power-on behavior of the PHY-Link interface. There was some discussion on the states of PHY-link interface signals during the power-on reset.

Colin moved to accept this proposal as modified in 97082R4 seconded by Jerry Hauck.

Motion passed unanimously.

4.4 Mandatory isolation [Prouty]

Bill Prouty provided a review of events since his presentation given in Ft. Lauderdale. Compaq and HP "safety" people got together to list the concerns that isolation may be concerned with. Fire is of concern from inside a wall and outside a wall. Inside wall has been rejected - leaving only external cable. This is considered to be a low-impact event because of fire-retardant PVC coating. Shock is only an issue when the external shield is connected to the chassis.

The 1394 chassis connection eliminates any potential of shock hazard because insufficient current is achievable through the 1 Megaohm resistor. Bill has changed his view on the requirement for isolation. He has been convinced that there are no significant safety issues. If a node implements isolation, however, there is a potential shock hazard if a user is to open the unit and begin "futzing" around inside the box. Bill will write up a presentation on the shock hazard in nodes implementing isolation. This will most likely take the form of a TA White Paper and will first be seen as an e-mail on the reflector.

4.5 DC Specifications [Whitby-Strevens]

Colin presented the objectives for defining the DC specs for the PHY-Link interface signals. The DC Specifications have been discussed extensively in the PHY Designers Review meetings and the current specifications result from input from the various PHY designers. There were some objections to a few of the parameters and the consensus was to discuss these in the next PHY Designers Review meeting.

4.6 Per Port speed information [Zhang]

Deferred to P1394B.

4.7 Remove token-style arbitration from scope [Johansson]

Jerry Hauck moved that token-style arbitration be removed from the p1394a draft specification. Seconded by John Fuller. Carried unanimously.

5.0 SCAT Review and Closure [Whitby-Strevens]

33: Open
56: Connector and cable testing. Agreed in principle on 1/9/98. PJ to incorporate in the draft
80: Isochronous bandwidth allocation(John Fuller) Open
91: Apple patent release for ACK acceleration. Closed. Letter received from Apple.
94: Open. Jerry to present later at this meeting.
95: Open
96: PHY Link electricals. Agreed in principle. To be included in the draft.
1: 4 pin cable and connector. Max to provide revised drawings to the editor. Peter has received the drawings
and will put them in the draft
31: Sleep mode: PJ to put into the draft.
36: Speed signal sampling requirements. Agreed and in

the draft.
51: Token style arbitration. Agreed and PJ will remove all references to it in the draft.
55: Topology management informative annex. Agreed in principle. Dave LaFollette has given the document to Peter Johansson. Jim Skidmore to provide some input to Peter Johansson. Peter Johansson to include in the draft.
82: Link On Specification: Agreed and in the draft.
88: Isolated interface specifications: Agreed and in the draft.
90: Voltage drop through nodes and cables. Done. Peter Johansson to put it into the draft.

New SCAT items:
1. Continuous SCLK. Peter Johansson to include in the draft.
2. Sony 4 pin patent. Peter Johansson to send request to Sony. (Critical item before going to Ballot)

6.0 New Business
6.1 Suggested wait times after ack_tardy [Hauck]

Jerry pointed out that the current draft has place holders for min and max timings for the time required for a node to become fully operational after having issued ack_tardy. Since there was no guidance from developers he proposed that the estimate offered by the standard should be removed. Jerry proposed and Jack Hollins seconded to remove the reference to the min and max timing.

Motion passed unanimously.

6.2 PHY timing constants [PHY dogs/Hauck]

Jerry presented the amended PHY Constants table with changes to the constants that have changed during the course of 1394A discussions. Jerry suggested that we replace the 1394-1995 PHY Constants table with a modified table that includes all the changes to existing constants as well as the new constants for 1394A. This will solve the problem of having to refer to two separate standards documents to understand the PHY constants. He also presented a new table that defines the constants for the PHY-Link interface timing.

Jerry moved and Colin seconded to include Jerry’s document 97-on updated PHY constants R1 as modified into the draft.

Motion passed unanimously.

6.3 Short hop considerations [Churchil]

Richard Churchill made a presentation on the low power requirements needed for mobile applications even when 1394 is fully active. This topic will be presented again at the January 1394 TA meeting in Santa Cruz and may lead to a separate IEEE study group to address low power issues.

6.4 SCLK Available time [Hauck]

Jerry discussed the requirement for the a limit on the maximum time the PHY will take to re-start SCLK on after the link asserts LPS. The consensus was 10mS should be a reasonable limit and the editor will add this to the draft.

6.5 GAP count stickiness [Hauck]
Renard Ulrey had pointed out in a reflector message that in a topology consisting of "A" PHYs and 1394-1995 PHYs, a short bus reset in the presense of an old PHY causes the initiating PHY to call reset_start_actions() twice, resetting the gap count to 63. This causes a problem since "A" spec requires that any change to the gap count shall be followed by a bus reset. In this case if a 1995 PHY is present, the gap count will revert to 63. This may require a fix in the C code. The consensus was to make the change after discussing it in the PHYDOGs meeting.

6.6 Null Packets [Duckwall]
Bill Duckwall pointed out that line skew may cause data_prefix - data_end transition to be received as a 2 bit packet. Robust PHY designs must tolerate this 2 bit null packet.

6.7 IP 1394 CSR [Johansson]
Peter explained to the working group the recent discussions in the Internet Engineering Task Force (IETF) about broadcast mechanisms for Internet protocol (IP). The IETF has been persuaded not to use general-purpose 1394 broadcast (in part because of its adverse effect on existing consumer devices) but to use instead the P1394a asynchronous streams facility.

In order to make use of a channel for asynchronous streams there must be some method to communicate the channel number to IP-capable nodes. The IETF has

requested the assignment of a well-known address, a quadlet CSR to serve this purpose.
John Fuller moved and X seconded that a quadlet CSR address be reserved for standardization by the IETF.

6.8 PHY review misc.

a) Power distribution and current limiters: Colin mentioned that the current limiting diagram in the draft is not accurate and needs some modifications. David Wooten took the action item to write a clarification note to be included in the draft.

b) Jerry discussed that between draft 1.2 and 1.3 clause 9.8 (page 140) was changed. Steve Finch moved and Jerry seconded that priority requests and response packets be not counted against the fairness budget and the PHY packets may be counted against the fairness budget. Peter Johansson and Sushant Berman spoke against the motion because they believe it is unreasonable to require that the response packets be not counted against the faireness budget.

Motion passed unanimously.

c) Clause 5.42 of draft 1.3 bullet b) is inaccurate. Peter Johansson will make the necessary editorial change

d) Clause 5.6 of Draft 1.3: "one cycle after sampling idle". Jerry proposed that this language be made consistent between the PHY-Link interface control changing from the PHY to Link Vs the Link to PHY.

e) SCLK resume time: Jerry reminded the group of a requirement for a max time spec. that defines the time it takes a PHY to complete the PHY/Link interface reset from assertion of LPS (10 mS). David Wooten moved and Jerry seconded to add a phrase to clause 5.11 requiring a 10mS max for the time it takes a PHY to complete the PHY-Link interface reset from assertion of LPS. Peter Johansson called the question. Motion passed unanimously.

f) Peter brought up a question about counting SCLKs when the PHY-Link interface is being reset and SCLK never goes away. What is the reference point for counting the number of SCLKs in this case? Peter took the action to send a message on the PHYDOGs reflector.

g) Jerry pointed out that when the PHY starts sending the SCLK, it must guarantee that SCLK Low and High minimum times must be met.

h) Short Bus Resets vs. Clearing Gap Count: Renard Ulrey had pointed out on a reflector message that in a topology consisting of P1394a PHYs and 1394-1995 PHYs, a short bus reset in the presense of an old PHY causes the initiating PHY to call reset_start_actions() twice, resetting the gap count to 63. This causes a problem since P1394a spec requires that any change to the gap count shall be followed by a bus reset. In this case if a 1995 PHY is present, the gap count will revert to 63. This may require a fix in the C code. The consensus was to make the change after discussing it in the PHYDOGs meeting.

i) Jerry presented the fact that draft 1.3 does not contain a way to detect an P1394a PHY Vs 1995 PHY from its self-id packet. Jim Skidmore has previously proposed that "del" field in the Self-ID packet be replaced with Version field. Consensus was that higher level software can get the same information by attempting remote register reads or PHY Ping packets.

j) Jerry pointed out that Table 5-14 states: "The values returned by a register read are unspecified after the PHY gives indication of a bus reset until the PHY successfully transfers register zero to the link." This can be a problem for the link designs. A better approach would be to indicate somewhere that the PHY should send a "snapshot" of the register map rather than "unspecified" values. Peter Johansson took the action to modify this text.

7.0 Meeting schedule
February 11th & 12th (Santa Cruz, CA)

7.2 Editorial sessions

8.0 Review of action items

* Single- and dual-phase retry protocol revalidation [Johansson]
* Update and publish SCAT [Whitby-Strevens]
* SCAT 1, 31, 51, 56, 78, 90, 97 and other agreed changes into draft [Johansson]
* PHY designer SCAT items 94, 95 and 96
* International Participation Fee mechanism [Johansson]
* Sony patent letter [Johansson]
* Isochronous bandwidth allocation (informative)

[Fuller]
* Revisions to Annex K [Brunker]
* Correct current limiting for multiport PHYs [Wooten]
* Clarify Table 5-14 [Johansson]
* Topology management input to Peter Johansson. [Skidmore]

Adjourned at 5:00 PM.

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