Subject: stds-1394: Minutes 1394 over GigE Meeting 2003 03 04
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From: Henehan, Burke <BHenehan@ti.com>
To: 'STDs-1394' <stds-1394@ieee.org>
Cc: "'1394-net@1394ta.org'" <1394-net@1394ta.org>

1394 over gigabit Ethernet Meeting Minutes - 2003 03 04

Attendees:
Mike Teener - Apple - teener@apple.com
Sam Liu - Newnex - saml@newnex.com
Les Baxter - Avaya - les@baxter-enterprises.com
Peter Johansson - Congruent SW - pjohansson@acm.org
Colin Whitby-Strevens - Apple Computer - colinws@apple.com
Kevin Brown - Broadcom - kbrown@broadcom.com
Rafael Herrera - DCM Industries - dcmsales@dcmindustries.com
Wolfgang Herrmann - Molex - wherrmann@molex.com

Administration:
Michael Teener - chair; Burke Henehan - note taker
Call for Patents. (see IEEE web site for details on IEEE patent policy) Apple
declares one, but plans to submit to patent pool, with a statement of intent. Michael
T. will try to get an official statement on this.

Committee work status:
Peter Johansson - This group is now officially the IEEE S800baseT Study Group. A
study group decides what needs to be done. The output is a PAR to form a "real
group".

Choose a chair: Michael Teener volunteers to be chair. Offer accepted. Peter J.
will notify Bob Davies of Microcomputer Standards Committee (MSC) of official
chair.

Documents to be placed on the IEEE web site. Peter J. to request web URL from
IEEE for study group, will be something like: grouper.ieee.org\1394baseT

Schedule and goals:
Is it possible we could have something in 3 months for Silicon companies to start
architecting by June 2003? That is the goal. Then the goal is to finish about 3
months after that. If this schedule holds, this group's work can be added to 1394r.

1394r will endeavor to make Physical Media Dependent layers easy to add to its
document. Noted that 1394r will create a need for new terms to ID and differentiate
1394-1995, 1394a, and 1394b, since they will be combined in the new document.
Since only 1394-1995 and 1394a are committed to combining in 1394r, will
explore requesting the 1394TA to fund putting 1394b in to 1394r document, once

1394-1995 + 1394a document done. 1394r working group will start meeting when a draft document is complete enough for review. Will wait until the merger of 1394b into 1394r is underway before deciding whether to try to include S800baseT into the 1394r document or leave a separate document.

Proposed S100baseT change to existing IEEE 1394b:
        Proposal has been made to change the connector pins used by 1394b to be exactly the same pins as are used by Ethernet.

The advantages are:
All the existing Ethernet "patch" cables only twist pairs 1&2 and 3&6. These cables do not twist 1&2 and 7&8. If change can reuse existing cables and existing integrated magnetics + connectors.
Can then do, if want to, a modification of the existing autonegotiation that includes 1394b along with 10baseT, 100baseT, & 1000baseT.
The dis-advantages are:
Can get up to 12dB worse crosstalk performance from internal pairs as opposed to outside pairs (reason why originally selected 1&2 and 7&8). However this still meets the CAT5 requirements. Les Baxter forwarded a spreadsheet with calculations on these numbers (see web site)
There is a company shipping equipment into the market today that uses 1394b as defined today. Will this cause them difficulty?
There are companies doing board designs today for equipment that uses the existing pinout. How much of a problem will this be.
There are companies looking at integrating magnetics with connectors today, they need to be notified.
Old Ethernet silicon just looks for activity on the bus and will see 1394b as Ethernet and call it a valid link.
To help determine the correct course of action a notification shall be sent to all relevant reflectors proposing the change and if anyone raises any issues. Will look at architecture WG to announce to 1394 TA attendees.

NOTE: Silence is assent.

S800baseT architecture of   Reconciliation layer by Kevin Brown
Please see web site for presentation. Notes below:
Requirements:
At PHY/Link interface must appear to be standard 1394b PHY
At GMII must appear to be standard 1000BASE-T PHY
When network port negotiates to be 1394, must appear to be standard 1394b port

connection to 1394 management software - Looks like network unconnected to Ethernet software
When a network port negotiates to be Ethernet, must appear to be standard Ethernet

connection to Ethernet management software - Looks like unconnected port to 1394 software
Must support 1394b S100 as defined, and S800 using 1000BASE-T modulation
Must support 10BASE-T, 100BASE-T, 1000BASE-T (full and half duplex) Ethernet
Negotiation preference set at device endpoint (NOT at hub/switch/bridge) ... e.g.,

Block Diagram showing 1394b PHY and Ethernet PHY connected internally by a reconciliation layer.   The 1394b PHY digital core connects to the GMII interface on the GigE PHY.

Discussion followed on whether to include the 1394b scrambler and serializer and the need to be able to differentiate between data and control. Issue discussed but not resolved.

A proposal was shown for the FIFOing required in the transmit path of the Reconciliation sub-layer.
It was noted that 1000 base T uses idles to maintain lock - so must send idles every so often. 17/1000 is average number of idles are required for lock. 1.7% idle.

A proposal was shown for the FIFOing required in the receive path of the Reconciliation sub-layer.

An estimate was shown for the added latency: Total adds up to about 1us.

A proposal was shown for using Auto negotiation to determine what to come up as. To be compatible with 802.3 can use the "next page" portion of auto-negotiation and use an unused code for each type of 1394. Currently Ethernet uses the "first page" to set expectations. This will require coordination with the IEEE 802.3 committee & that both 1394 and Ethernet use the same signal pairs (see "Proposed S100baseT change to existing IEEE 1394b" item above).

Work Planning
Items that need to be finished
Autonegotiation. Come up with proposal for auto-negotiation using "next" page and preferences for behavior for hubs and endpoints and all cases (1394 has peers, Ethernet has hubs and endpoints; endpoint to endpoint - endpoint to hub - hub to hub - etc) Assigned to Kevin Brown
Connection Management. What is process to establish the connection (1394b connection management) - Assigned to Colin WS
Clocking and FIFO sizing for the reconciliation layers (what clocks, sharing FIFOs, etc) - Assigned to Colin WS
PHY delay fields - Assigned to Colin WS
1394b PHY changes.   Leave scrambling in or out/ leave serializer in or out? Use simpler coder/decoder (8bit + 1 bit code or full 10 bits codes) - Assigned to Mike JT
Ethernet or IP bridging - Pending assignment to Peter J.
1394.1 bridging or not. - Pending assignment to Peter J.

Make future proof to allow for higher data rates.
GigE changes -
S100 over same pairs and negotiate correctly as 100 base TX
Path for S100baseT
Require a low power mode that does not go back to auto-negotiation - not what Gig E does today. (use 10baseT method 42 times a second to "tone"?)
Progress/error reporting to PHY registers

Next meetings:
1394 TA meetings - Shanghai - Introduction/Coordination Meeting - Sam Liu to check for meeting space.
Hosted by Broadcom - Irvine - April 22
Hosted by Apple - Cupertino - June 10
1394 TA meetings - Oxford - July 8

Regards, Burke Henehan