**IEEE P1394.1 Meeting**
**July 17 – 18, 2000**
**Oakland, CA**

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4. Prior action items
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5. Informal BRAN liaison report [Sato]
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## 1. Introductions and procedures

The meeting was called to order at 9:00 AM and commenced with introductions. The agenda was approved. David Hunter, acting Secretary, took these minutes.

## 2. Selection of new Chair

As first order of business, the working group selected a new Chair to replace Dick Scheel. Dick's focus of activity has taken him away from Serial Bus bridges and he is unable to continue as Chair. The working group wishes to thank Dick for all his effort during his tenure as Chair.

At the Harper's Ferry meeting, Peter Johansson offered to serve as Chair. A final decision was deferred to permit this to be advertised on the reflector with an announcement that the vote would be taken in Oakland.

John Fuller moved and David Hunter seconded that Peter Johansson be selected as Chair of the IEEE 1394.1 working group. The motion carried unanimously.

John mentioned that the IEEE has password protected the web site for access to the draft standard. Peter will be in communication with the IEEE to resolve the issue. In the meantime, members of the working group and others who require access to the draft standard for the purpose of review and comment should know that the user name is "P1394" and the password is "High-Perf"; both are case-sensitive.

## 3. Call for patents

This is a regular agenda item to identify potential patent issues with developing standards and technical reports. A call for patents, in compliance with ANSI and IEEE policy, was made. There were no responses.

Section 1.2.11 of the document "Procedures for the Development and Coordination of American National Standards" contains the ANSI patent policy. This document is available from ANSI at no charge or from http://www.ncits.org/help/ansi_sdo.html.

## 4. Prior action items

There was only one action item from the previous meeting, to publish a new revision of the draft standard. Peter Johansson reported that this had been carried over.

Peter distributed an informal copy of the draft, D00_0X.pdf. It contains edits made since the Harpers Ferry meeting and was used for draft review during the meeting. This interim revision has not been published on the web site. The next official draft, D00_09.pdf, will be available prior to the Redmond, WA meeting.

**5. Informal BRAN liaison report [Sato]**

Takashi Sato reported to the working group on recent work done by the Broadband Radio Access Networks (BRAN) task group of the European Telecommunications Standards Institute (ETSI). Their URL is http://www.etsi.org.

There has not been much progress on the bridge part of the BRAN effort, because the emphasis has been on finishing Sub-part 1 of the IEEE 1394 Service Specific Convergence Sublayer (SSCS). Subpart 1 concerns itself with "1394-like" functionality within a wireless domain and does not address bridge issues. This document is now complete, as of BRAN 19.

Sub-part 2, Bridge functionality, is the next task to be undertaken. The next meeting, BRAN 19.5, is September 7 – 8 in Rennes, France.

BRAN's goal is to finish a simple bridge specification that would enable a two-bus solution as soon as possible; they have decided to spend no group time on versions which could accommodate up to four "hops" through bridges. So far there has been little or no checking of the IEEE P1394.1 draft for incompatibilities; it still is undecided (other than the fact that the BRAN bridge disables its own bridge-related functions) what happens when an IEEE P1394.1 bridge is detected on a bus.

Sato-san mentioned two aspects of the BRAN design that may indicate incompatible assumptions about the bridged environment: a universal clock for system-wide time across the net and a split-transaction timeout scheme within the wireless domain that relies upon "time of death" information transmitted with each subaction. Although the latter is specific to the wireless domain, there was some concern that it might impact remote timeout.

## 6. New Business

### 6.1 Review changed material in draft

Working from the informal D00_0X distributed at the meeting, Peter Johansson conducted a review of changes in the draft since the Harpers Ferry meeting.

The *brdg* field (clause 6.1) in the self-ID packet was discussed; its value shall be ignored if the *L* bit in the self-ID packet is zero. A bridge portal's change in state (or lack thereof) is defined with respect to its state just prior to bus reset. When no significant state change has occurred, normal routing operations may be resumed rapidly. The all-clear process allows a bridge to reset this bit back to "unchanged state"

John Fuller suggested that a *brdg* value of one indicate that the node is "bridge-aware". Takashi Sato commented that this value had first been proposed as a way to enable experimental bridge architectures. Further discussion was deferred.

Takashi expressed a concern that BRAN has thus far assumed that a *brdg* value of one indicates a "BRAN bridge" and not just any experimental bridge. The problems with this assumption should be communicated to BRAN as soon as possible.

Peter pointed out a new clause, 9.1, on CSR architecture assumptions. Specifically, "In order for devices separated by a bridge to successfully communicate with each other, it is essential that each bus conform to certain assumptions about the format and meaning of the bus information block. Specifically, the location and usage of the *max_rec*, *max_ROM*, *node_vendor_ID*, *chip_ID_hi* and *chip_ID_lo* fields shall be identical to that specified by IEEE Std 1394a-2000." David Hunter asked that the text be reworded as a simple requirement statement which omits the rationale. This was agreed and David took an action item to draft changed text.

There was more discussion of clause 9.2, "Bridge-aware devices". A note was suggested, to the effect that in addition to the above requirements, a device intended to control other, remote devices should implement some method of device discovery that operates across bridges.

Peter Johansson stated that the REMOTE_TIMEOUT register should be removed from the draft, because remote timeout is an end-to-end property between communicating nodes, not a net-wide value. Instead, a bridge-aware requester should send a packet with the

appropriate *snarf* field value; the response reports accumulated timeout to the requester (for a description of the *snarf* field, see BR057R00 and BR058R00). If bridge aware nodes care, they can keep track of all such timeouts to each individual remote device--or else could keep track of the largest remote timeout. Remote timeouts do not change so long as a virtual node ID remains valid.

John Fuller observed that this implies a requirement for the coordinator to transmit a list of valid virtual bus IDs as part of the "all clear" signal. Peter suggested that this could be a GASP packet (which, by a remote possibility, might not be observed by some nodes) so long as a node could independently obtain the list of valid bus IDs. John agreed, so long as the GASP packet is restricted to the local bus.

Conversation returned to the general requirements for "bridge-aware" devices. Peter noted that bridge-aware nodes shall observe self-ID packets in order to determine whether or not one or more bridge portals are present. As an optimization, bridge-aware nodes may process the *brdg* field information and if there have been not net topology changes they may resume remote operations in advance of an "all clear" signal from the coordinator. John added that bridge-aware devices must also comprehend the *snarf* bits and have the ability to generate commands addressed to remote bridges. These commands are identified both by the data payload of the packet and the value of the *snarf* field in the packet header of block write requests.

Peter also said that bridge-aware devices shall understand the *proxy_ID* field in the packet header.

**6.2 Identification of legacy devices [Fuller]**

John Fuller led a discussion on accommodations in P1394.1 for legacy devices. The topic quickly transformed itself into a discussion of bridge behavior after bus reset when John stated that we need to create a new list of requirements in clause 10.2 that encompasses bridge transmit queue rules after a bus reset:

- If both source and destination are local, normal IEEE 1394 rules apply and the subaction is terminated in error;
- If *source_ID* is remote, the subaction has reached the final bus. Although the subaction shall not be terminated in error, it may be necessary to readjust *destination_ID* to reference the intended recipient (PHY IDs may have changed);

- If *destination_ID* is remote, the remote subaction is originated by the portal. No adjustment to the packet is necessary (this will be done by the first bridge portal that forwards the subaction off the local bus) but the subaction shall be held in suspense until the coordinator signals 'all clear"; and
- If both source and destination are remote, no adjustment of the node ID fields is required but the subaction shall be held in suspense until the coordinator signals 'all clear".

Analogous rules for the bridge portal's pending requests are also required:

- All response subactions, whether their source is local or remote, may be processed since they arrived prior to the bus reset;
- If *destination_ID* is remote, a local node has just originated a remote subaction. The validity of the subaction is unaffected by the bus reset (it may be forwarded after the "all clear" signal) but exercise care when *source_ID* is changed into a virtual ID: use the PHY ID mapping information valid just before the bus reset;
- If *source_ID* is remote, this is a subaction that has arrived at its destination: the bridge portal itself. It may be immediately indicated to the application layer;
- If both source and destination are remote, it is a subaction in transit across the local bus. Since bridge portals may forward remote subactions away from the local bus without an 'all clear" from the coordinator, this may be passed on to the co-portal.

It was agreed that, subsequent to a bus reset, there shall always be a coordinator–-even if its only job on some bus resets is to signal "all clear" to the other nodes.

In the vicinity of table 10-1, the LOCAL state requires definition and more explanation (it's an intermediate state needed to track information otherwise lost in the final states). In the final transformation (after the survivor clan has been identified), LOCAL maps to VALID only for the survivor clan and maps to DIRTY for all other (victim) clans.

**6.3 Completion road map [Johansson]**

The goal of this discussion was to take stock of the state of the draft standard and determine whether or not there exist

uncompleted areas that require substantial "invention" before we go to ballot. Peter started an informal outline of the issues (a version of this may be published as a working group document) and the group collaborated to fill in the details.

The result was consensus that although significant effort is required to document the working group's progress (*.e.,* get the details committed to the draft standard promptly), no major problems are outstanding. The working group is comfortable with a completion schedule that envisions a finished and reviewed draft standard by the end of the year, with sponsor ballot to follow in the first quarter of 2001.

**6.4 Functional requirements for bridged buses [Sparrell]**

Unfortunately, Carlton had to miss the second day of the meetings, so this item was carried forward to the next meeting.

**6.5 Relationship with BRAN**

This started as a discussion of the use of the *brdg* field, raised earlier by John Fuller but deferred. John suggested that a *brdg* value of one indicate "bridge-aware". BRAN could still use this bit to identify their own devices, which would now have to be "IEEE P1394.1 bridge-aware".

John went on to observe that the uses of *brdg* values two and three requires that the entire *brdg* field be programmable across the PHY/link interface, *i.e.*, new PHY hardware is required to enable IEEE P1394.1, not just new link hardware.

John Fuller moved and David Hunter seconded that the Chair send a letter to the IEEE P1394b BRC to request that the two bits of self-ID packet zero (currently labeled *reserved* in IEEE Std 1394a-2000) be made programmable and have a power reset value of zero unless a hardware strappable option is provided to configure their power reset value. The motion passed unanimously.

Discussion returned to the relationship between IEEE P1394.1 and BRAN. With respect to a *brdg* value of one, the working group believes that "experimental" has always described any bridge architecture other than IEEE P1394.1. In other words, a value of one does not indicate a "BRAN bridge", even if this is assumed to be the case by BRAN. As a consequence, the working group thinks that a change in the definition of *brdg* value one to mean "bridge-aware" should not cause any new problems for BRAN, as it has always been necessary to consult configuration ROM for more

complete information when a *brdg* value of one is observed in self-ID packet zero.

John Fuller pointed out another problem area in the realm of interoperability when both experimental bridges IEEE P1394.1 bridges are present on the same bus. Although the experimental bridge is required to shut down its bridge functions, it is unlikely that the IEEE P1394.1 bridges will fulfill the assumptions made by experimental bridge-aware devices. There is no list of assumptions made by bridge-aware devices that operate with experimental bridges.

All agreed that the whole question of interoperability and even the feasibility of a BRAN definition of a bridge in advance of the completion of IEEE P1394.1 were debatable. David Hunter and Peter Johansson took an action item to jointly pen an Email to BRAN to clarify the perceived issues.

**6.6 Configuration ROM for "bridge aware" devices**

It was generally agreed that devices read the bus information blocks of other devices just to obtain their EUI-64s, so it is no more burden to read the single bit in the bus information block to determine whether a device is “bridge aware”.

(See also comments about bridge aware devices in section 6.1, above.)

**6.7 Clan merging**

This was a far-ranging discussion and the minutes may not capture with any precision decisions reached by the working group.

The initial belief was that the bigger clan (the one with the most bus IDs) ought to be the survivor. In all clans, victim and survivor, the non-duplicated bus IDs are retained and the collisions are cycled through DIRTY to CLEAN. Someone observed that preserving bus IDs is immaterial, what we’re really trying to preserve is clock distribution, so as not to disrupt active isochronous streams.

John Fuller pointed out that the only reason the net cycle master needs to be on the same bus as the prime portal is that, if it were allowed on another bus, that location would have to be one more thing that all portals would have to keep track of. Peter noted that, at a minimum, the prime portal’s location is

important because it indicates the direction to the net cycle master.

A discussion ensued about whether some clock sources are superior to others and whether a choice of clock source on the prime portal's bus should be allowed (if only for marketing reasons).

Another discussion involved the possible use of weighting bits to determine the survivor clan. For instance, some clans could indicate their unwillingness to host the prime portal when joined with another net. A wireless domain could be an example of a bus poorly suited for the prime portal while a bus in a fixed location, such as in the wiring closet, might express a preference to contain the prime portal. The consensus was that weights should only be taken into account after all other topology considerations. Again there was some concern that for marketing reasons, some companies might desire weighting to override topology.

Still more discussion centered on the used of powered lines inside the walls of homes; the general belief is that 24V power would be allowed, without special standardization, in almost all countries.

Assuming no weighting in the determination of the prime portal, John described four non-loop cases and a rationale for choosing a particular prime portal in each:

- Break a net into two or more nets. On one of the two buses formed as a result of the disconnection, the coordinator discovers that it no longer has a route to the prime portal, so it declares itself prime;
- Join two nets, both prime portals on the joined bus. Pick the prime with the highest PHY ID (partially because it may be root);
- Join two nets, only one prime being on the joined bus. Pick the prime that is NOT on the joined bus, because then the sense of "direction" (anad consequently, the clock distribution) of the other buses doesn't have to change; and
- Join two nets, neither prime being on the joined bus. Choose the prime whose clan has the most bus IDs.

Peter requested that these conclusions be recast algorithmically and the working group derived the following:

a) If there is at least one off-bus prime portal, pick the off-bus prime portal whose clan owns the largest number of bus IDs;

b) If there are no off-bus prime portals, pick one of the prime portals on the local bus; else

c) If there are routes to a prime portal, the coordinator picks itself.

**7. Meeting schedule**

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| August 21 – 22 | Redmond, WA (Microsoft) |
| September 25 – 26 | Briarcliff Manor, NY (Philips) |
| October 30 – 31 | Chicago, IL |
| December 4 – 5 | (location not yet determined) |
| January 18 – 19 | Hawaii, HI |

At the January, 2001 meeting, the working group intends to vote to forward a draft standard to the IEEE for sponsor ballot.

**8. Review of action items**

The following action items were confirmed by their owners as having been assigned during the course of the meeting:

Letter from Chair to P1394b BRC [Johansson]
EMail to BRAN to clarify brdg field [Hunter / Johansson]
EMail to reflectors about programmability of brdg field [Johansson]
Complete IEEE paperwork for new Chair [Johansson]

**9. Adjournment**

The meeting was adjourned at 4:00 PM, July 18.

**Attendance**

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|---|---|---|
| Peter Johansson | Congruent Software | PJohansson@ACM.org |
| John Nels Fuller | Microsoft | JFuller@Microsoft.com |
| David Hunter | Sony | David.Hunter@AM.Sony.com |
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