IEEE P1394.1 Working Group
AGENDA
Monday-Tuesday, April 27th & 28th 1998
Newport Beach, California

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Secretary: please.volunteer@your-email.com

1. **Administrative**
   a) Minutes of March 19, 1998 meeting
   b) Update of meeting Schedule
   c) Status of New reflector
2. **Technical topics**
   a) Review of March '98 proposals -- Hiraiwa & Akahane
   b) Configuration process proposal -- Hiraiwa & Akahane
   c) Cycle propagation - Ueno
   d) Cycle clock synchronization - Banerjee
   e) Portal-scalable routing method -- Banerjee
   f) Reset Notification needed (virtual addressing)?
   g) Frequency lock to outside connection required?
3. **Assignment of action items**

Notes taken by:
Steven Ray Bard
and Dick Scheel

Minutes of March 19, 1998 meeting

Hard copy of minutes from the previous meeting and today's agenda were made available.

Dick Scheel noted the minutes of the last meeting needed the following corrections:
- Peter Johansson's correct email address is "pjohansson@aol.com"
- The dates of the June meeting are changed to June 9-10 (was 11-12)

Peter Johansson moved that the minutes be approved as corrected. Steve Bard seconded the motion. The motion passed unanimously.

The new reflector is now up and functional (a majordomo list server managed by IEEE). Over 200 people are on the list. Notify Dick Scheel if there are any problems.

Call for additional agenda items (there were none). Items f & g were added at the beginning of the second day.

Agenda item 2a: "Review of March '98 proposals"
Hisaki Hiraiwa & Masa Akahane delivered a review of the proposals they delivered at the meeting in March. The key topics were: wireless as bridge fabric, loose coupled bridges, and subnet architecture.

Agenda Item 2b: "Configuration process proposal"
Hisaki Hiraiwa & Masa Akahane delivered a presentation describing the configuration process of tightly coupled subnets and loosely coupled groupings of these subnets. The primary steps are:
1. Bus configuration (according to 1394-1995 / 1394a)
2. Subnet configuration
3. Net manager selection
4. Net configuration

A presentation concerning Clock Synchronization was included. Concerns and proposed solutions for the concerns were brought forth.

Agenda item 2c: "Cycle Propagation (Bridge Specifications for IR-Fabric Bridge)"
Masatoshi Ueno delivered a presentation about an infra-red bridge fabric. This presentation included a report of a presentation made to IEC SC100C WG17 on the topic of "Bridge specifications for IR-fabric bridge" on April 23-24.

Features of the IR-fabric bridge are:

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- Sub-carrier frequency allocation
- Star topology
- Slower transmission rate than cable 1394
- Cycle propagation must be from root of star to leaves of star

Questions arose as to whether IR should be specific to bridges or whether IR-1394 was a much broader subject and simply another medium for 1394 interconnects.

Peter Johansson (supported by John Fuller) voiced the opinion that this subject seemed to be outside the scope of this group and that, perhaps, it would be more appropriate to have an IEEE PAR approved for further work in 1394-IR. He also suggested that at IEC SC100C, maybe WG26 is more appropriate than WG17.

The discussion then turned to the topic of subnet architecture. Peter Johansson pointed out that the subnet idea primarily came up because wireless bridges have less stable connections, and are proposed to be multiportal. It was suggested that an alternate method is to make all of the bridges be two portal, and allow RF or IR to be an alternate medium for a bus. The wireless bridges would be two portal devices that connect a wired 1394 bus to a wireless 1394 bus. The nature of the wireless bus would need to be abstracted somewhat through bridge commands, since such things as isochronous bandwidth allocation behave differently on such buses.

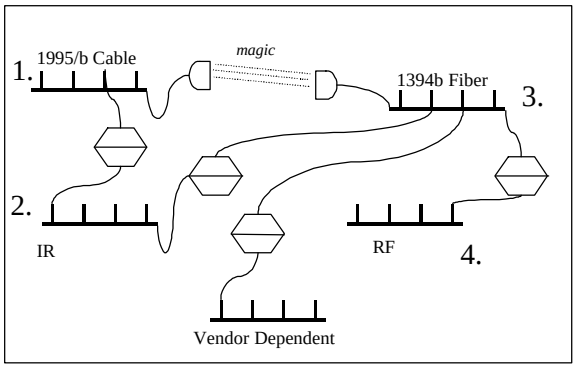

Figure 1

Significant discussion ensued. Peter Johansson moved that we change from upper and lower bound routing registers to some form of bit mapped routing table (with or without subnets not specified). David Wooten seconded the motion. The motion was accepted without opposition.

We discussed the scope of the charter, e.g. whether the "bridge" specification is to deal with bridging a connection between two 1394 buses only and does not specify the fabric between the portals (possibly including “magic” if the bridge internally goes over some other medium). It was decided that the bridge specification will not incorporate details regarding IR, RF, etc. (such subjects are not in scope of the P1394.1 charter). A common opinion was that if a set of wireless devices presented the same appearance to the attached wired 1394 buses as a set of two portal bridges connected to a 1394 bus, then they could be considered compatible with our specification.

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Peter Johansson moved to NOT do sub-nets (use only a linear 1023 entry routing table). John Fuller seconded the motion. In the following discussion, the group decided that it would not be good to decide the matter at this time (not enough information is known yet). Peter withdrew his motion and John agreed.

DAY TWO - Tuesday

As a result of the previous day's discussion about what topics fit our charter, Dick agreed to put a copy of the working group's PAR on the ftp site.

Agenda item 2e: "Portal-scalable routing method"
Subrata Banerjee delivered a proposal on automatic addressing, address reassignment, Bus ID assignments.

A concept of BUS ID offset and local/global BUS_IDs was proposed. The maximum bus ID in one cluster is used as the starting bus ID of the next bridged cluster (e.g. if 10 is the maximum bus-ID in cluster one, then 11 will be the first Bus-ID of cluster two - even though "local" ID's could be from 0 to 8). The bus-ID numbers consumed by the second cluster will be equal to the total number of "local" ID's (in the instance being cited, the second cluster would have logically re-mapped bus-ID's numbered from 11 to 20). If the second cluster become connected to a third cluster that contained bus-ID's of 0-4 and 8, then the "Logical" re-mapping of the bus-ID's in the bridge would become 21-25 and 29 - an offset of 21 from the local bus-ID's in cluster three. This has an advantage that when a particular cluster is disconnected, bus-ID's do not have to be reassigned AND when a cluster becomes attached, bus-ID's for the new cluster can be assigned inside the bridge without causing a reassignment of the local bus-IDs in the cluster.

Another method would be to reset at joining and reassign local bus-IDs in the cluster using the previous clusters maximum Bus-ID plus one) as the starting bus-ID for the newly attached cluster. This has the same benefit of not having to reset and reassign bus-IDs when a cluster is removed, but there is a reassignment of bus-IDs in the cluster at the time it is attached to a bridge.

Discussion of transaction packet routing from cluster one to cluster three through cluster two included a proposal to NOT pass the transaction packet through all nodes in cluster two. Instead, have the two bridge portals on cluster two in the same "box" such that they know that packets coming from cluster one is supposed be routed to cluster three and therefore, does so - without passing the packet through all nodes in cluster two. This met with resistance from Peter Johansson and David Wooten. One reason for objection had to do with bus analyzers that, if the proposal was accepted, would never see transaction packets from cluster one to three if it were to be attached to a node on cluster two.

The next discussion dealt with bridges that have portals to a wireless environment. Peter and David objected to Phillips suggestions to more clearly define the protocols inside the wireless "ether" (e.g. from one wireless portal to another wireless portal). Peter and

David made it very clear that P1394.1 scope ends at the 1394 side of the portal. The P1394.1 charter does not incorporate detailed specifications and protocols for arbitrary portal fabrics. P1394.1 does not care what happens in the fabric - it concerns itself only with the goes-in-to and goes-out-of signals and protocols (as agreed upon in the discussion which took place yesterday afternoon).

To support building two portal bridges into and out of wireless media, it was proposed that our specification include a prohibition (such as “It is not defined when …”) against devices doing 1394 transactions against bus resources (such as IRM registers) on other buses. The bridge specification would include suitable commands and responses to perform the required functions (such as allocating bandwidth) on behalf of the requestor. This would hide the characteristics of other media from standards 1394 devices.

The group discussed how the routing tables should be set up. One possibility is to use one of the common distributed algorithms used in the Internet that uses neighbor discovery.

Net broadcast needs some thought if we don’t break the net into a spanning tree. Some possibilities are:
1) Overlaid spanning tree
2) Controlled flooding
3) Separate bit vector for broadcast

John Fuller suggested that the routing table information is sufficient. The broadcast packet would be forwarded in the direction opposite that used by a packet being routed to the bus that the broadcast originated from.

Agenda item 2d: "Cycle Clock Synchronization"

Subrata Banerjee presented some additional ideas following on to the discussion at the last meeting of cycle clock synchronization.

Each bus has its own independent cycle master; When two buses are joined via a bridge then do not disturb their cycle timer registers; but frequency synchronize their clocks; one approach for frequency synchronization is via "go-fast" and "go-slow" commands;

The proposal is to send a "wrap at 3070 until further notice" command instead of a "go-fast" commands.

A quantifiable amount of discussion ensued surrounding what a "go-fast" command actually does and how often it is sent and whether it is "sticky" or not (e.g. always goes fast until a "go-slower" command "cancels" it (returns it to nominal or slows it down).

Dick asked if there is any problem with setting the wrap around value up or down by 1 count, since that makes the cycles more than 100 ppm away from the correct period.

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Mike Teener pointed out that applications cannot depend on cycle time + offset for short term timing anyway (due to delivery jitter). A very stiff PLL is needed to filter out the jitter.

Dick asked if it is necessary to frequency lock with an external clock source, such as a satellite feed into a home. Mike pointed out that any adapter device that connects to the 1394 net will need to deal with frequency mismatches anyway, so it is probably not necessary.

The group seemed top prefer a semi-sticky go fast/slow (with timeout). In other words, go fast or go slow for a predetermined period of time and then return to nominal. Should isoch, async, or isoch ack be used to deliver the commands? One problem with using an async transaction to deliver the command is that in the worst case it is possible to not win arbitration for 196 cycles (almost 25 ms.) according to some calculations at Yamaha. Some form of isochronous delivery would guarantee access to the bus on every cycle.

A straw poll revealed that the group consensus is to use some sort of isoch method to deliver the insert/remove a tick.

A request will go out on the reflector to endeavor to come to consensus or at least come up with some reasonable proposals, as to how/what isoch method to use for this.

The floor was opened for discussion on virtual node IDs. David Wooten said virtual ID's are generated and owned by bridges. Even though the PHY ID's and topology change in one bus, the virtual ID of that bus (and the target), as exposed to another bus through a bridge would not change. An initiator would have to inquire of the bridge as to what the virtual ID is of a specific target. The virtual ID would expire after a specific period of time of no access.

One concern is how to deal with node ids contained in the data portion of packets. Bridges cannot change them as the packet passes through the bridge.

Mike Teener made an observation that it is quite possible that if the BUS_ID of a packet is 0x3FF then the PHY_ID is specific and physical. If, however, the BUS_D field of a packet is something other than 0x3FF, then the PHY_ID is virtual and remains (is sticky) through bus resets.

Dick requested concrete proposals for virtual node IDs.

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Administrative information of interest:

FTP Repository: ftp://ftp.symbios.com:/pub/standards/io/1394/P1394.1
Reflector: stds-1394-1@majordomo.ieee.org (automated IEEE majordomo list server)

Conventions used n the FTP Repository:

BRnnnRrr.pdf - general documents
Where:
nnn = document number assigned by the Secretary
rr = revision level of the document

Mddmmmyy.pdf meeting minutes document
Where:
dd = day of the meeting
mmm = month
yy = year

Dvv_rr.pdf Working draft of the standard
Where:
vv = version level
rr = revision level

Current draft = D00_03.pdf

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