Dick Scheel called the meeting to order at 9:00 and requested the participants to introduce themselves. The minutes from the previous meeting, March 19 - 20, 1997, were accepted with one minor correction---in the section on deadlock and starvation avoidance, the phrase "...responses over responses" should read "...responses over requests." The small group in attendance also expressed thanks to Sony for hosting the meeting and providing refreshments.

REVIEW OF ACTION ITEMS

- Peter Johansson to work with David James to prepare a proposal based upon concepts from P1394.2 Annex C. Carried over.
- Bob Gugel to investigate whether or not the write behavior of NODE_IDS in the backplane environment could be redefined so that the physical ID is not altered. Carried over.
- Dick Scheel to post the document registry requirements to the reflector. Completed.
- Peter Johansson to edit the next draft revision. Carried over.

AGENDA

1. Simple bridges
2. Global broadcast
3. Isochronous routing
4. CIP Issues
5. Reset notification
6. Asynchronous streams
7. System heartbeat

SIMPLE BRIDGES

The concept of reducing the scope of P1394.1 to "simple" bridges was discussed by the working group. The proposal is that a simple bridge:

a) implements two portals;
b) supports routing *via* spanning tree parse of the net;
c) does not support security; and
d) guarantees sufficient internal isochronous bandwidth for all plug control registers (PCR's) implemented.

There was consensus to restrict P1394.1 to the above scope.
The editor is directed to revise the current draft in
accordance with discussions that followed.

Open issues that do not affect the simplicity of the model
are:

    - CSR-based model *vs.* command-based model
    - Mandate bridge manager in all bridge modules

Dick Scheel will take these discussions to the reflector.

GLOBAL BROADCAST

The working group considered a proposal (from the March
meeting) to differentiate local and global broadcasts based
upon both the destination_ID and source_bus_ID. It was
agreed to document the following in the next draft:

    - a local broadcast (not propagated by bridges) is an
      asynchronous request packet whose destination ID is
      0xFFFF and whose source_bus_ID is 0x3FF; and
    - a global broadcast (propagated by bridges) is an
      asynchronous request packet whose destination_ID is
      0xFFFF and whose source_bus_ID is not 0x3FF.

This definition does not affect the meaning of broadcast and
non-broadcast addresses for any given bus; the 1394-1995
specifications are unchanged.

The editor has an action item to canvass the 1394 community,
via principal reflectors, to determine a) the extent to
which broadcasts are used today and b) whether or not the
proposed definition above poses difficulties for existing
applications.

Mark Knecht observed that the bridge should be configurable
to enable or disable the global broadcast feature. This
might be useful to support legacy applications / equipment.

ISOCHRONOUS ROUTING

The current draft describes a method to route isochronous
data flows based upon plug control registers (PCR's). There
was a lengthy discussion about the applicability of this
model to bridges. Of particular concern (as always!) are the
effects of a bus reset and the corresponding responsibility
to reallocate isochronous resources, bandwidth and channels,
as well as to update the appropriate input and output PCR's.
Three problematical areas are a) the talker's output PCR, b)

the isochronous resource manager on the same bus as the
talker and c) the listeners' input PCR's.

If the bridge is to be a proxy for some or all of this
activity, it would need to maintain context, by EUI-64, for
up to 62 listener PCR's for each portal with an active,
talking isochronous stream.

The one second specified in 1394-1995 for the reallocation
of isochronous resources (which is the same one second
described by IEC 1883 for the reestablishment of connections
in the PCR's) is at the heart of the difficulties. There is
insufficient empirical data to know whether or not real-
world systems can function well within this time limit.

Whether the model for bridges is PCR's (or not), bridge
context necessary for isochronous routing is fourfold: a)
bandwidth, b) inbound channel (listener), c) outbound
channel (talker) and d) connection count.

The discussion broadened into a larger concept of "context"
subsequent to a bus reset. Should the bridge be responsible
to a) verify whether or not changeable context (*e.g.*, the
correlation between EUI-64 and physical node ID) has
remained unaltered and b) to reestablish context that may be
lost as a result of bus reset (*e.g.*, reallocation of
isochronous bandwidth and channels).

The definition of what is contained in context can be
separated from the strategies used to report context change
notifications to other nodes, *e.g.*, the bridge manager or
various connection managers.

CIP ISSUES

Discussion of the time-stamp modifications that bridges have
to perform was deferred to the next meeting.

RESET NOTIFICATION

Dick Scheel discussed the ideas first raised in BR002r0.pdf
at the last meeting. The intent is to avoid the necessity
for quarantine bits in the bridge portals and to provide a
distributed mechanism that both a) destroys request and
response packets whose destination_ID is known to be invalid
(as the result of a bus reset) and b) provide notification
to the potential originators of the requests and responses.

ASYNCHRONOUS STREAMS

A discussion on the use of asynchronous streams for multicast was deferred to the next meeting.

SYSTEM HEARTBEAT

Du Hung Hou presented a summary proposal for the system heartbeat schemes discussed in earlier meetings. The "heartbeat" is a periodic write by the bridge manager to a bridge portal CSR. If the bridge portal does not receive such a write within a configurable time-out period, the bridge portal reverts to "unowned." This in turn is a signal to any local bridge managers to initiate a contention process and take over from the (presumably) dead bridge manager.

ACTION ITEMS

In addition to the carried over action items from last meeting, the following new action items were assigned:

- Dick Scheel to explore CSR-based *vs.* command-based bridge models *via* reflector discussions;
- Peter Johansson to canvass 1394 implementers about the effect of global broadcast;
- Calto Wong to initiate reflector discussions on Connection Management Protocol (CMP) and plug control registers---how they do or do not relate to bridge architecture.
- Dick Scheel to refine his reset notification ideas and bring in a proposal for the next meeting.

MEETING SCHEDULE

The following tentative meeting schedule was agreed:

- Thursday and Friday, July 10 - 11, 1997
- Tuesday and Wednesday, August 26 - 27, 1997

Dick Scheel volunteered Sony to host both meetings in San Jose, CA.

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