Initiated_Reset Clarifications

TO: **IEEE P1394a Working Group**

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Background - 1394-1995

Section 4.1.1.1 PHY control request (PH_CONTROL.request) states:
"The node controller uses this service to request the PHY layer to perform specific actions and to specify PHY layer parameters. It may also be used to request status about the PHY layer. The PHY layer shall service the requests immediately upon receipt by the PHY layer. This service is confirmed.
"The following actions shall be provided by this service:
a) Bus Reset. The PHY layer shall reset the bus and initialize itself.
...
d) Present Status. The PHY layer shall return status to the node controller. The PHY layer shall return status via the PHY control confirmation service.

Section 4.1.1.2 PHY control confirmation (PH_CONTROL.confirmation) states:
"The PHY layer uses this service to confirm the results of a PHY control request service. The PHY layer shall communicate this service to the node controller upon completion of a PHY control request. There are no actions provided by the service. When the corresponding control request is "Present Status," the following parameters are communicated via the service:
— Physical_ID. As described in 4.3.8.
...
— Initiated_reset. As described in 4.3.8.

Section 4.3.8 Node variables lists in tabular form "a set of variables that are set by the Bus Manager via PHY packets, the arbitration process, and / or the bus reset process." The table lists "initiated_reset – Set true if this node started the bus reset process (is not repeating it)"

The intent of the above quoted sections is clear – no ambiguity – the link shall have some way of inquiring whether its PHY initiated reset.

Table 4-29, in Section 4.3.4.1 Self-ID packet, enumerates the bit fields in the self-id packet, including:
"i — initiated reset — If set, this node initiated the current bus reset (i.e., it started sending a bus reset signal before it received one).[b] (Optional. If not implemented, this bit shall be returned as a zero.)
[b] There is no guarantee that exactly one node will have this bit set. More than one node may be requesting a bus reset at the same time.

And finally, Annex J (which is "informative,") makes no mention of the initiated_reset bit. (See section J.4.1, PHY register map.)

Historical perspective - the initiated_reset bit was made optional in the self-id packet, so as to not render non-compliant some of the early silicon. This optional nature should have been reflected as well in the other sections of the standard – 4.1.1.2 and 4.3.8 – the omission and inconsistency was / is inadvertent. This is unfortunately not much help to today's implementors, nor does it shed much light on the meaning of "compliance."

P1394a Clarifications

P1394a hasn't yet clarified the ambiguities.
a) Sections 4.1.1.2 and 4.3.8 are unaffected by P1394a.
b) The i bit in the Self-ID packet is still optional (see Table 7-3 in Draft 1.4).
c) initiated_reset is still a node variable (see Table 7-15 in Draft 1.4).
d) The PHY register map still has no entry for initiated_reset (see Table 6.1 in Draft 1.4).
e) There's no mention of initiated_reset in the C code; consequently there are different opinions on when it should be cleared.

Strawman Proposal

(1) Make the i bit in the Self-ID packet mandatory.
<I believe all current PHY implementors are including this bit, and furthermore that all PHYs which have come out in the last couple of years have included this bit. I can't claim to have looked at the behavior of all silicon on the market or in development, but of the silicon we have looked at, we've found no exceptions.>

(2) Add it to the C code; set or clear the bit as appropriate upon entry to R0:Bus Reset Start.
<This allows some bus memory. PHY pinging could be used at any time after a Bus Reset to find the "offending node", even if the Self_ID packets were not parsed.>

(3) Regarding the question of adding the bit to a PHY register: open this to discussion.

<If SW interests are satisfied that the reporting of initiated_reset via the self-ID packet is adequate, and that there will be no need to query the local PHY later, then it needn't be added.
It is true that if the bit is mandatory in the Self_ID packet, then SW could "read" the bit by doing a self-ping, which would return one's own Self_ID packet. This burns some bus bandwidth, is somewhat indeterminate in response time (bus arbitration must be won first), and is just plain different from any other "Present Status" access. But if SW expects to access its local i bit about as often as remote i bits (other nodes), then it seems reasonable to have one access method for all – PHY pinging. >