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TO: P1394a Working Group

DATE: November 21, 1997

RE: Fairness Policy for PHY Packets

P1394a has defined two basic fairness policies for transmission of asynchronous packets. Transmission of asynchronous response packets is governed by Clause 9.8 of the 1.1 draft, *Priority arbitration for response packets*. Asynchronous request packet transmission is likewise governed by Clause 9.13, *FAIRNESS_BUDGET register*.

However, the specification is silent on how either of these policies applies to transmission of PHY packets.

It is my opinion that many optimized P1394a links will implement two queues for transmission of asynchronous packets. One queue will deliver response packets while the other will be reserved for request packets. (Such a configuration is preferred when addressing the deadlock or starvation scenarios that arise in split-transaction buses.) OHCI, for example, calls out an Asynchronous Request DMA context as well as an Asynchronous Response DMA context.

Fairness policies are then most obviously implemented on a per queue basis. The response queue is free to always use priority arbitration while the request queue's use of priority arbitration is subject to the limit specified in the FAIRNESS_BUDGET register.

To avoid the cost of adding a new queue type, links are likely to make reuse of an existing queue to transmit PHY packets. This in turn implies that delivery of PHY packets will be subject to one of the two aforementioned fairness policies.

Given the relatively infrequent occurrence of PHY packets outside of self-ID, I see no benefit in requiring link designs to implement a 3rd fairness policy just for PHY packets. Instead, I propose that PHY packets be subject to the same fairness restrictions as asynchronous request packets, thereby allowing links to queue PHY packets within their request queue.

In support of this proposal, the following sentence would be added to clause 9.13:

> In addition to the primary packets called out in table 9-6, PHY packets may also use priority asynchronous arbitration.