SpaceFiber Draft D feedbacks

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Session 1: SpaceWire evolution (Convenor D. Jameux, ESA/ESTEC)

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Document quality

- Very interesting document
- Large enhancement from previous revision
- Need re-reading to remove some inconsistencies
  - E.G : Table 5.9 K28.4 declared “not used” but used in control word definition, synchronisation word and EBF
- Some typos
  - E.G : §5.7.5 “use… (n+16,n) block code, where (n+8) is…

Technical remarks

- Some definition are missing or ambiguous
  - Node is not defined, channel = node ?
  - Lane is understood as being one TX/RX pair but it is not written
  - VC FIFO shall accept also EEP §4.3.1
- CRC16 and PRBS algorithms are still TBD
- §5.7.6 ACK/NACK The modulo usage is not clear

Technical remarks

- Message by packet implied very high rate notification.
  - 512 N-Char every 2 µs @2,5Gbps
  - Usage of coalescence , specific DMA ?
  - Custom implementation could lead with impracticable HW

    => Need for a consensus at system level.
- Number of VC/port. 256 * 32 = 8192 channels max Is this number of VC needed ?

SpaceWire reference

- The notion of SpaceWire packet should be removed
  - VC to VC link usage

A general definition with a SpaceWire specialization should be better

Virtual Channel Buffer Usage

- The VC FIFO buffer shall be at least 9 bits wide to handle EOP,EEP.
- The reference to 32 bit alignment is not clear.
- The Null insertion in the VC buffer is not clear (figure 5.1).

Switches and routing

- The switches behaviour is not described but it seems to be quite important for future architecture.
- The switch has to do packet inspection to route data.
  - Complexity of the routing table
  - VC channel static routing possible ?

Technical remarks

- Latency
  - The latency of a SerDes is in order of 600 bits in a RocketIO : 240 ns @ 2,5Gbps
- Interoperability with SpaceWire Time-code and SpaceFiber Time Broadcast ?
  - Maximum rate
  - Jitter

Open points

- Protocol seems symmetric.
  - Asymmetric protocol could be very interesting reducing the number of physical link.
- Power management ?
  - There is standy mode but no Wake-up mechanism
  - OOB signalling ?