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Jitter issues

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Jitter budget reviewed, based on Fibre Channel MJS methodology

- found error in FC budget

FC have just updated their methodology for calculating jitter tolerance

- they agreed a new budget three weeks ago for 1GBaud, 2GBaud still under review

Updated the P1394b proposed budget and spreadsheet to align to the latest FC methodology and budget

- reviewed yesterday
- spotted an error in the S1600 budget, but this is very tentative anyway

ACTION - transceiver, connector, cable and system people

- REVIEW THE BUDGET

Jitter test methodology and patterns

Goals

- simple to run, minimum need for “special modes” or special hardware
- exercise normal operation and stress testing

Use the MJS recommended test methods

- recommend TIA for jitter output
- communications analysers have proven to be inadequate

Need test equipment in the connection

- generate “noise” etc.
- measure jitter output

Leverage the FC test patterns

- use standard packet formats
- generated by software
- run using “normal” bus operation

Random pattern SB-RPAT

Random pattern shall be an indefinitely repeated sequence of maximum size isochronous packets (depending on transmission speed, see Table 9-1 in IEEE 1394a-1999),

- Transmitted continuously (i.e. by using ISOC_ODD or ISOC_EVEN requests, depending on the current isochronous interval).
- Packet payload shall be all zeros,
- Scrambled by the transmitting PHY into a random pattern.
- A TIA should be primed to capture each packet.

If asynchronous transfers are used, the maximum length packet within the capabilities of both transmitter and receive nodes shall be used (this may be longer than the 2048/4096 byte maximum asynchronous payload).

Receive jitter tolerance pattern (SB_JTPAT)

Need a succession of low transition density symbols followed by a succession of high transition density symbols

- length of each sub-pattern depends on receiver PLL characteristics - see draft

■ Packets of length at least 50 bytes, separated by idle time of at least 167 byte times (1.67 microseconds at S800) (use a special NOP control char)

- – the TIA should be armed to start at the beginning of the isochronous packet, and to capture the transitions up to the start of the next packet.
- – longer times may be used, but if so, should remain within the capabilities of the equipment being used.

■ The transmitter data scrambler shall be disabled (once synchronization has been achieved) and the payload shall comprise repeated D21.5 symbols (8 bit data value B5 16).

- – Note that the latter is more extreme than can be experienced in practice.

For an operational test, the data in the packet can be all zeros, scrambled by the transmitting PHY.

Note that the length of the two parts of the test pattern may need adjustment (following the guidelines given above) according to the cut-off frequency of the receiver PLL, particularly for transmission at speeds other than S800.

Supply noise test sequence (SB_SPAT)

The aim of this test sequence is to maximize supply noise by changing all lines on the PHY/Link interface.

- It shall comprise a maximum length isochronous packet containing alternate 00 16 and FF 16 bytes, which shall be transmitted without regard to the isochronous interval (i.e. by using ISOC_ODD or ISOC_EVEN requests, depending on the current isochronous interval).
- The scrambler shall be enabled for this test sequence.
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