10 Gb/s NRZ Signalling on Ethernet Backplane

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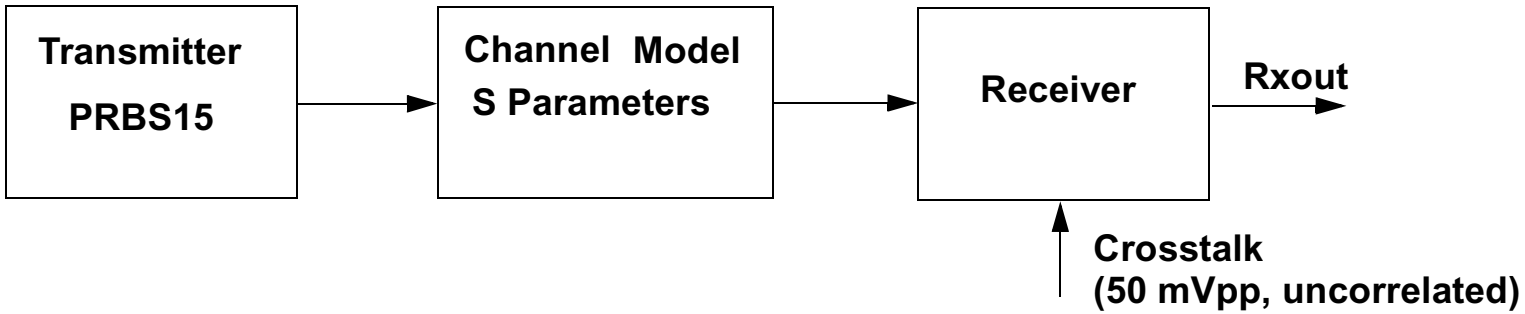
1. Outline

- NRZ Signalling
- Simulation Environment
- Results Evaluation Methodology
- Simulation Results

2. NRZ Signalling

- This contribution provides simulation results of performance across a subset of test channels using NRZ signalling.
- 10.3 Gb/s NRZ signalling for 10GBAS-KR is compatible with 1000BASE-KX and 10GBASE-KX4, and can use the same transmitter and receiver.
- NRZ signalling can be evaluated using current lab equipment and methodologies.
- NRZ signalling can use the latest developments in high speed equalization techniques and low geometry CMOS processing.
- Based on our estimates, using NRZ signalling will result in lowest power dissipation and highest density.

3. Simulation Environment



Transmitter

- 600 mVpp differential
- 0.35 UIpp total jitter
- 0.17 UIpp deterministic jitter
- 2 tap DFE capability (programmable)

Channel

- Tyco case 1 to 7
- Intel T1, T12, M1

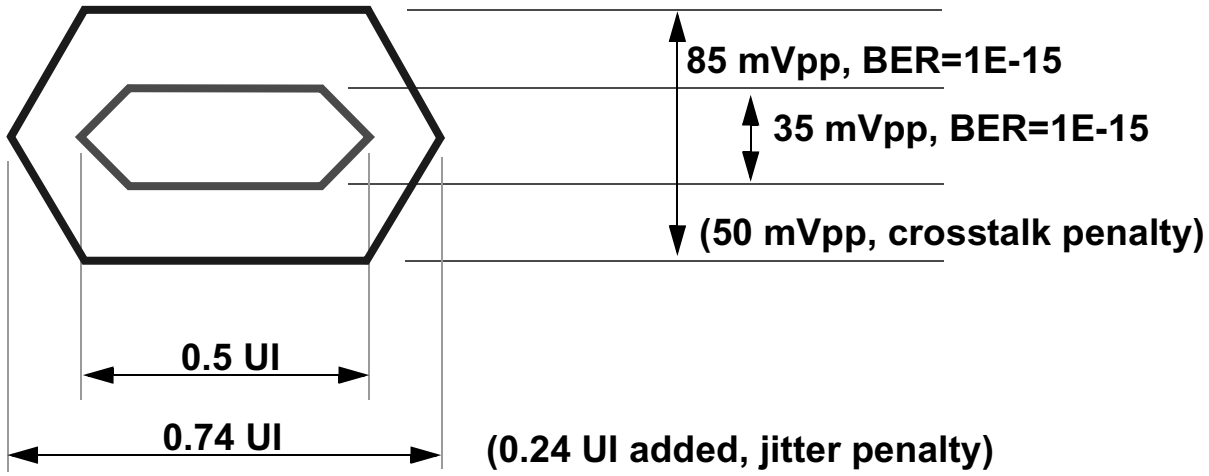
Receiver

- receiver noise 2.2 mVrms
- receiver bandwidth 7.5 GHz (4th order BT)
- AGC capability
- 7 tap FFE and 5 tap DFE
- self adaptive
- CDR jitter 0.07 UIpp
- 0.5 UI, eye opening for BER=1E-15

Note 1: The package models are not included in these simulations.
Note 2: The receiver architecture was chosen based on existing circuit implementation and is not intended to be recommended as required receiver architecture.

4. Results evaluation methodology

Received signal (Rxout, equalizer output) eye mask for BER=1E-15



- Transmitter deterministic jitter (0.17 UI), will close the received eye.
- Receiver clock jitter 0.07 UI will reduce the horizontal eye opening.
- Crosstalk signal amplitude maximum 50 mVpp, uncorrelated with the incoming data.

5. Simulation results summary

Channel	Transmitter DFE taps	Eye Mask BER 1E-15
Tyco Case 1	1	Pass
Tyco Case 2	1	Pass
Tyco Case 3	1	Pass
Tyco Case 4	1	Pass
Tyco Case 5	0	Pass
Tyco Case 6	0	Pass
Tyco Case 7	0	Pass
Intel T1	0	Pass
Intel T12	0	Pass
Intel M1	1	Pass