Eye opening simulations

Matt Brown

Quake Technologies

mbrown@quaketech.com

Introduction

- This slide package presents the eye opening simulation results for the reference THRU channel and XTALK channels proposed by Charles Moore.

- The eye openings obtained from these simulations are compared with the power to crosstalk power ratios presented in brown_01_xxxx and by Charles Moore.

- Charles Moore proposed THRU and XTALK channels are presented in his e-mail to the IEEE 802.3ap reflector:

  - http://ieee802.org/3/bladesg/email/msg00649.html.

Channels

- THRU and XTALK channels proposed by Charles Moore

  - THRU = modITTC23withCoupler.s4p

  - XTALK =

    - Molex/1m_OUTBOUND_FEXT/sj5k5g4h4_SPARS.s4p (molex out5 fext4)

    - Tyco/Case5/Case5DS1310N2D13L6.s4p (tyco case6 next2)

    - Intel/peters_01_0605_T1_next5.s4p (intel_0605 t1 next5)

    - No xtalk

Simulation Parameters

- Tx: DJ = uniform 0.15 UIpp, RJ = 0.15 UIPP @ 1e-12 probability, DCD = 0 !!!!

- Rx: DJ = 0, RJ = 0.15 UIPP @ 1e-12 probability

- Rx input referred noise = 1 mVrms

- NDFE = 5, NFFE = 3

- THRU & XTALK Tx launch voltage = 800 mVpp

- THRU & XTALK Tx rise time = 24 ps

- Rx Filter = two pole, $f_1 = f_b$, $f_2 = 0.7 * f_b$

- Data Rate = 10.3125 Gbps

- Ideal package, i.e., RL = infinite;

- XTALK coefficients = [-0.05, 0.675, -0.275]

- Random sequence

Results

- The eye opening for the Molex XTALK channel was about half that of the Tyco and Intel XTALK channels.

- The trend of the simulated eye openings corresponds with the calculated power ratios (Moore and Brown) and eye opening (Abler) from other sources.

		power ratios from brown_01_xxxx			moore e-mail Jan 23, 2006	
	Simulated eye opening (input referred)	with no Tx FFE no BL SNR1	Tx FFE no BL SNR2	Tx FFE BL SNR3	power ratio	eye opening from Abler simulations
molex out5 fext4	4.5 mVpp	31.1	24.7	25.0	27.9	34 mUI
tyco case5 next2	9.1 mVpp	37.7	31.2	33.0	33.8	168 mUI
intel_0605 t1 next5	8.5 mVpp	36.7	30.3	32.7	33.7	183 mUI
no crosstalk	10.3 mVpp	inf	inf	inf	inf	185 mUI

Conclusions

- For the THRU channel and XTALK channels simulated, the simulation results support the validity of the the THRU to XTALK power ratio as a criteria for specifying the crosstalk on backplane channels.