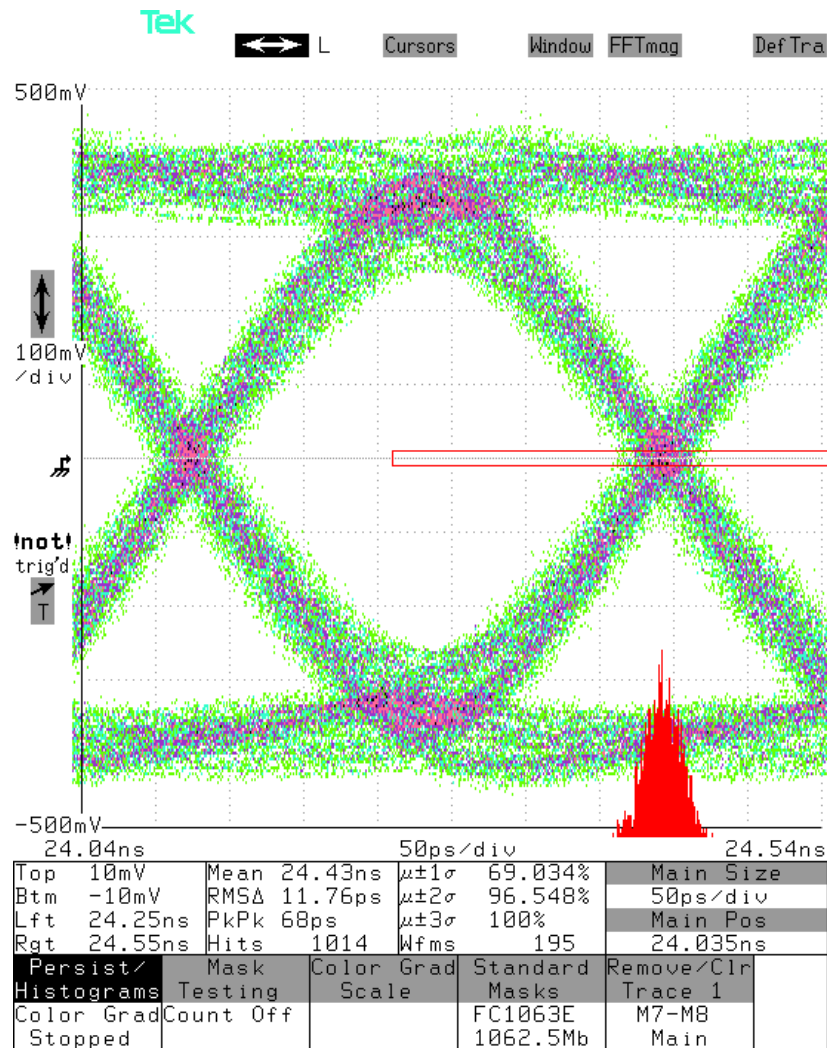


Feasibility of 3.125 Gb/s in CMOS

**Mike Jenkins
LSI Logic Corporation**

Feasibility of 3.125 Gb/s in CMOS

----- Transmitter -----



----- Receiver -----

LSI GBG11RD.mdb - GigaBlaze G11 Evaluation System

File Edit View Scripts Help

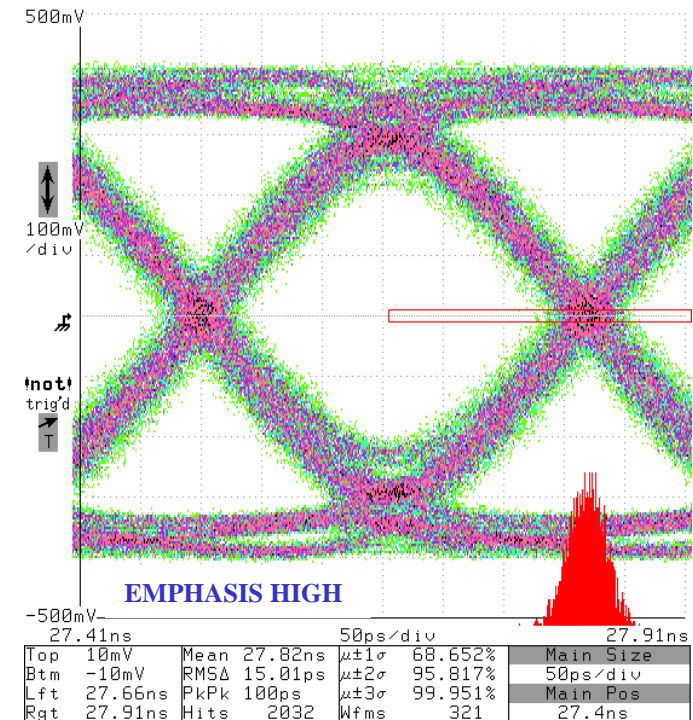
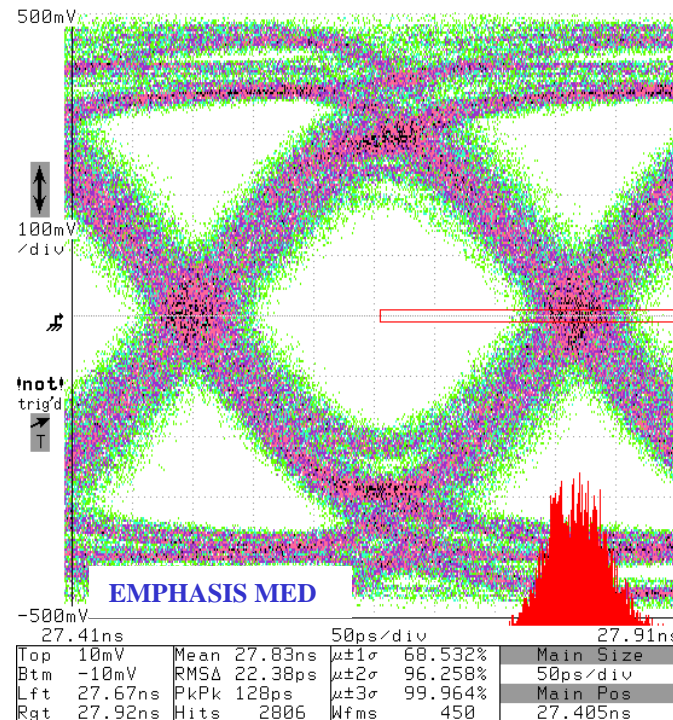
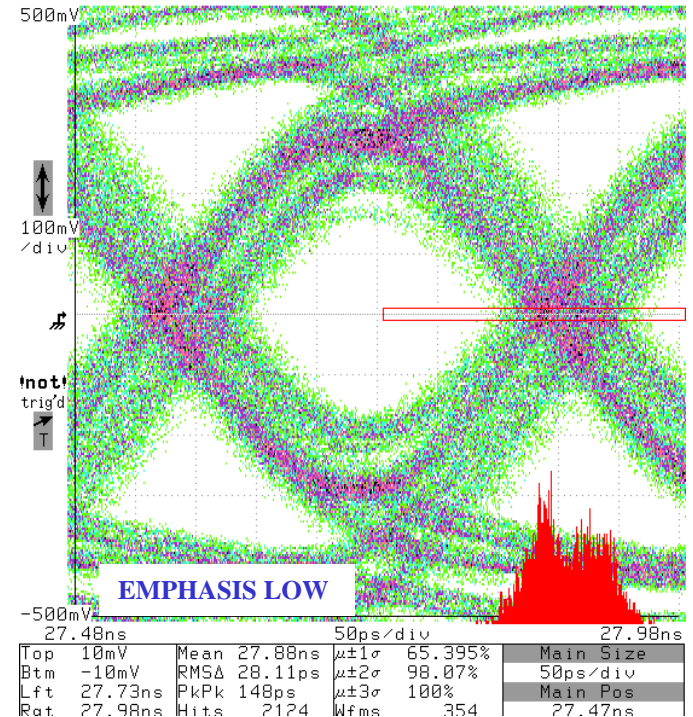
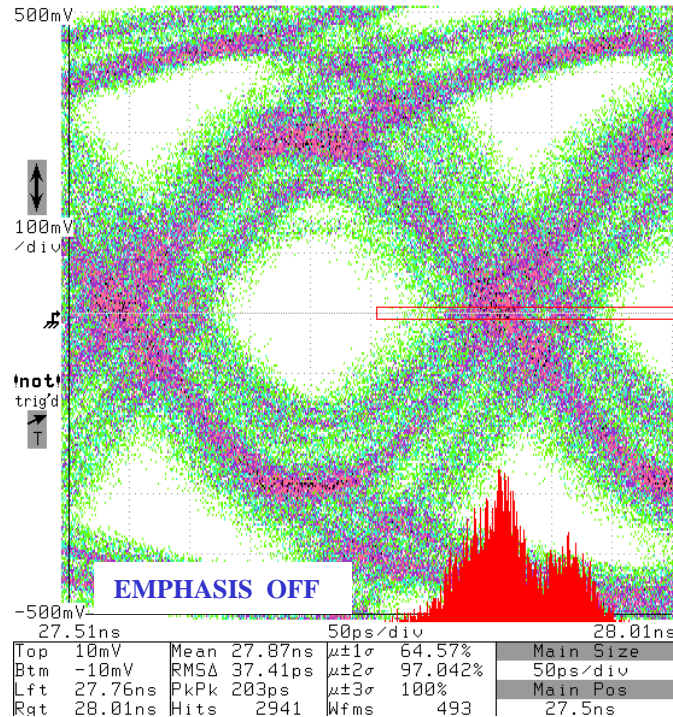
Core1

Register	Addr (Hex)	Data (Hex)
ERRCNT	2000	00000
CYCCNT	2001	46F40
CYCCNT	2002	109EE
CYCCNT	2003	00000
ERRCNT	2004	7BA...
CPZR	2005	0070C
TGWR	2007	5557C
TGWR	2008	95A56
TGMR	2009	FFFFF
TGMR	200A	FFFFF
TGAR	200B	00000
LTXAR	200C	00071
LEXAR	200D	00065
STATE...	200E	00044
COREO...	200F	000C8

Zero errors in more than
 2^{36} cyc x 20 bits/cyc
 $\rightarrow < 10^{-12}$ BER



Feasibility of 3.125Gb/s in CMOS: through 20" of PCB vs. Emphasis

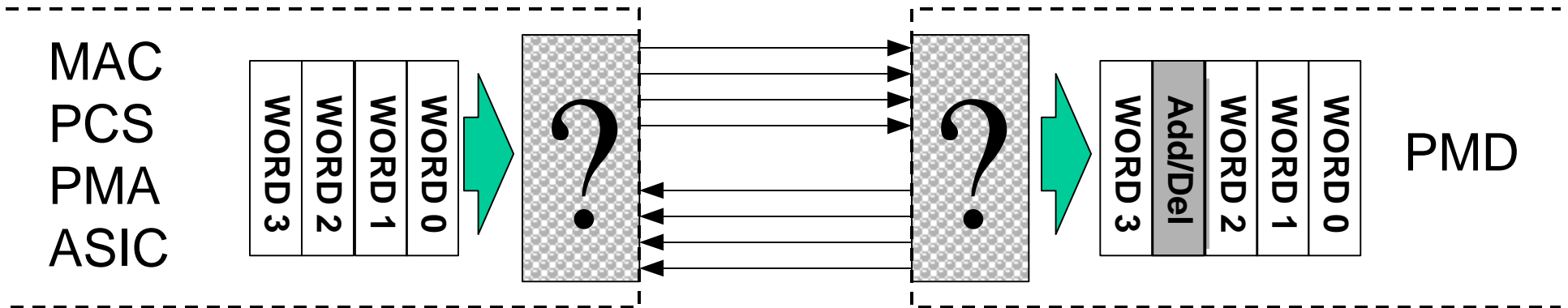


Technical Details



- Hardware used for this demo is nominal G11 GigaBlaze evaluation parts. G11 GigaBlaze is not fully characterized nor planned to be offered at this speed.
- Transmitter waveform is after 20" of board trace plus 1 meter of cable (100 ohm differential impedance). Differential PCB traces are microstrip (15 mils wide, 35 mil space & 8 mil dielectric). Transmitter emphasis is used. Transmitted pattern is CRPAT.
- Receiver data looped back from transmitter through ~6 inches of board trace plus 1 meter cable plus ~6 inches of board trace. (There wasn't an error after 10^{12} bits. I just got tired of waiting.)
- Power dissipation (TX plus RX, nominal) = 404 mW.

Striping / Coding Alternatives



- Hardware that produced these results is compatible with *word striping* proposal. It is **not** compatible with *byte striping* proposal, which requires higher clock rates, more complex logic plus training sequences.
- Both proposals transfer data organized as shown above. Both do add/delete in 4-byte increments.

Summary



- Feasibility of 3.125 Gb/s in LSI Logic's CMOS technology has been demonstrated.
- For low-risk implementations, the *word striping* approach on the PCS/PMA-to-PMD interface is strongly recommended.