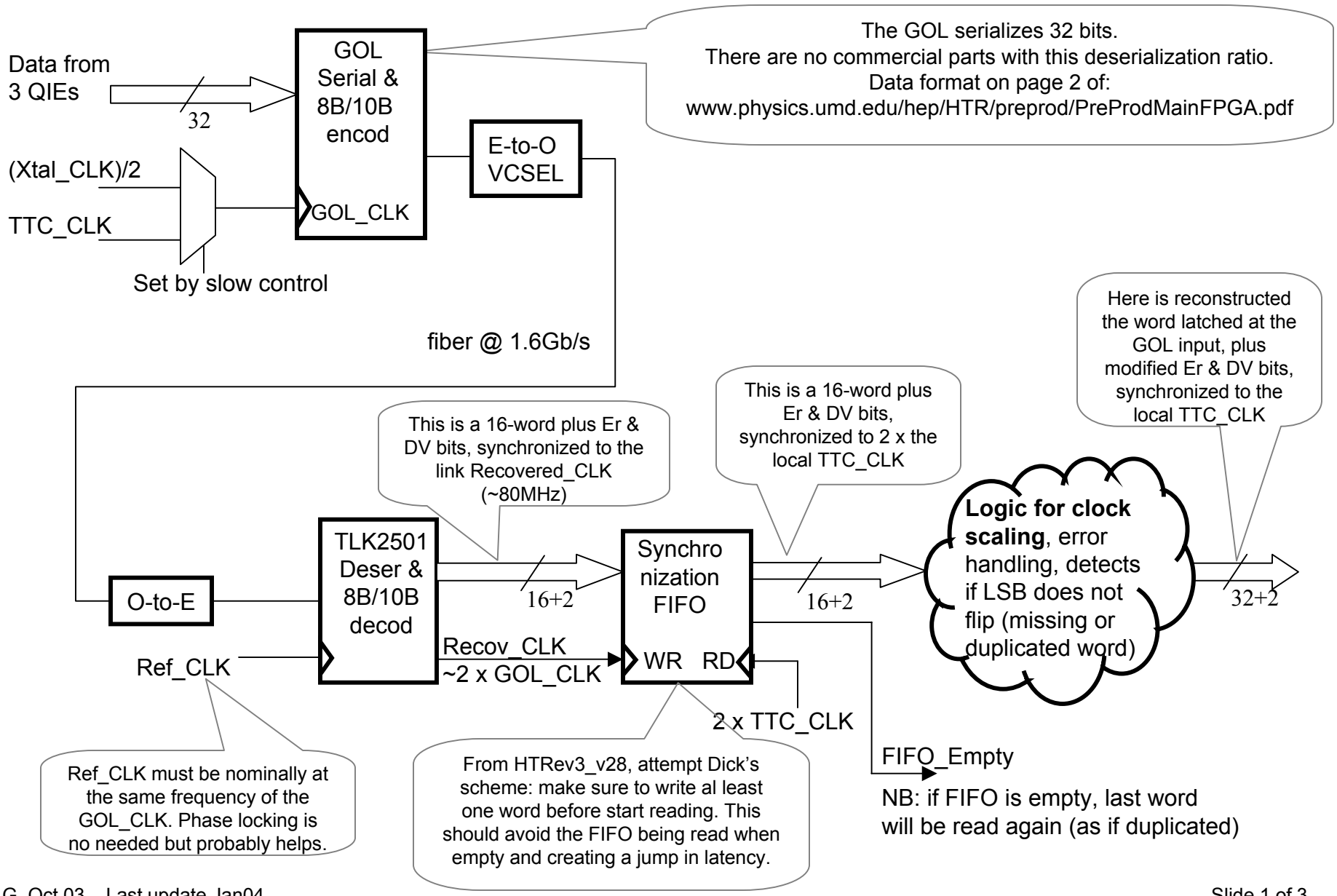
FE-link logic diagram



Optical Scheme

Date: Thu, 10 Jul 2003 11:05:50 -0500 (CDT)
From: Julie Whitmore <jaws@fnal.gov>
To: Tullio Grassi <tullio@Glue.umd.edu>
Cc: Drew Baden <drew@physics.umd.edu>, tshaw@fnal.gov Subject:
Re: fiber optic diagram

In the real system, the number of connections is somewhat larger than in the test beam. See my ESR presentation pages 21 & 22 http://www-ppd.fnal.gov/tshaw.myweb/CMS_Optical_Links.html (link to pdf file is at the bottom of the page)
[...]
In the real system, we have the following pieces (see ESR pp. 21&22):
1)Octopus inside RM (VCSEL to RM front panel, Molex PN 8628-4269)
2)Ribbon to patch panel [~20m] (fans-out at patch, but no fiber break)
3)Octopus inside patch panel (where channels are mapped)
4)Ribbon trunk to HTR [~70m]
5)Octopus on HTR
So the connections are
1)coupling to VCSEL, 2)coupling at RM front panel, 3)coupling at front of patch panel, 4)coupling at back of patch panel, 5)coupling at HTR front panel, 6) coupling to receiver.
The largest number of connections is with the calibration modules, where for some fibers we will have additional connections near the HTRs to try to fully populate the ribbon fibers. This is also true for the overlap regions of HB/HE, where we will have an additional patch panel to complete the mapping. I believe that adds an 2 extra connections (for the front and back part of the extra patch panel). So in the worst regions, we can have up to 8 connections. As for attenuation, the typical attenuation is 0.5dB per connection. The fiber attenuation is 2.5dB/km or 0.25dB for 100m. So we an exptect up to 3.25-4.25dB for the real system. Terri made a measurement with 10 connections and 150m of fiber. She measured 7.3dB attenuation, but she also had a 62.5um connection to her optical probe (fibers are 50um), where she said she expected to lose an additional ~3dB from her setup. So we expected 5.4dB and measured ~4.3dB (7.3dB - 3dB (for probe)).
I hope this information helps. –julie
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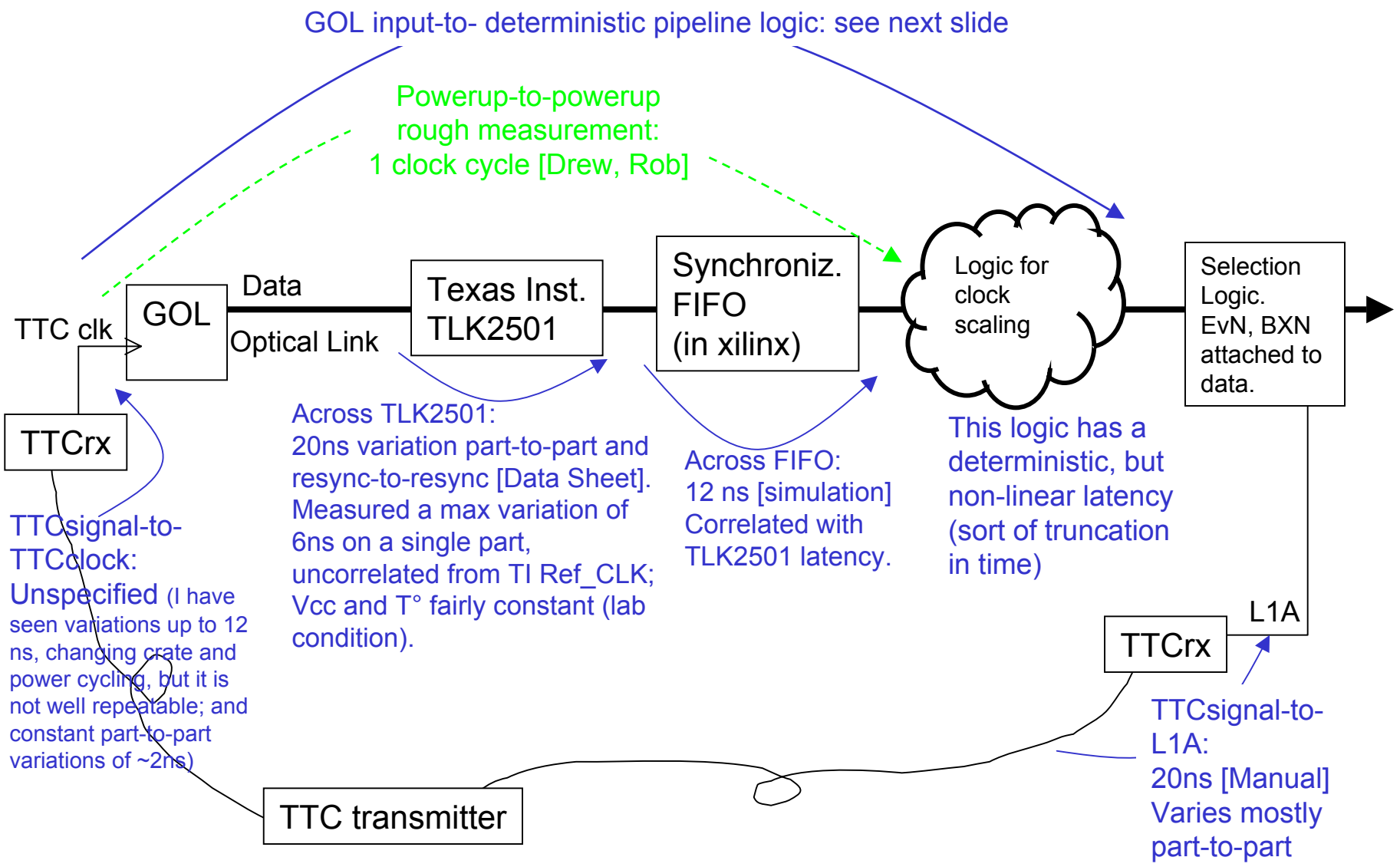
Date: Fri, 19 Dec 2003 16:37:40 -0600 (CST)
From: Julie Whitmore <jaws@fnal.gov>
To: Tullio Grassi <tullio@Glue.umd.edu>
Cc: Drew Baden <drew@physics.umd.edu>, Theresa Shaw <tshaw@fnal.gov>
Subject: Re: summary of tests
[CUT] I spec'd 50/125 graded-index multimode, which means that there is not an index of refraction interface at the core boundary (variable index of refraction out to 125um).[CUT] The fiber is Germanium doped Silicon.

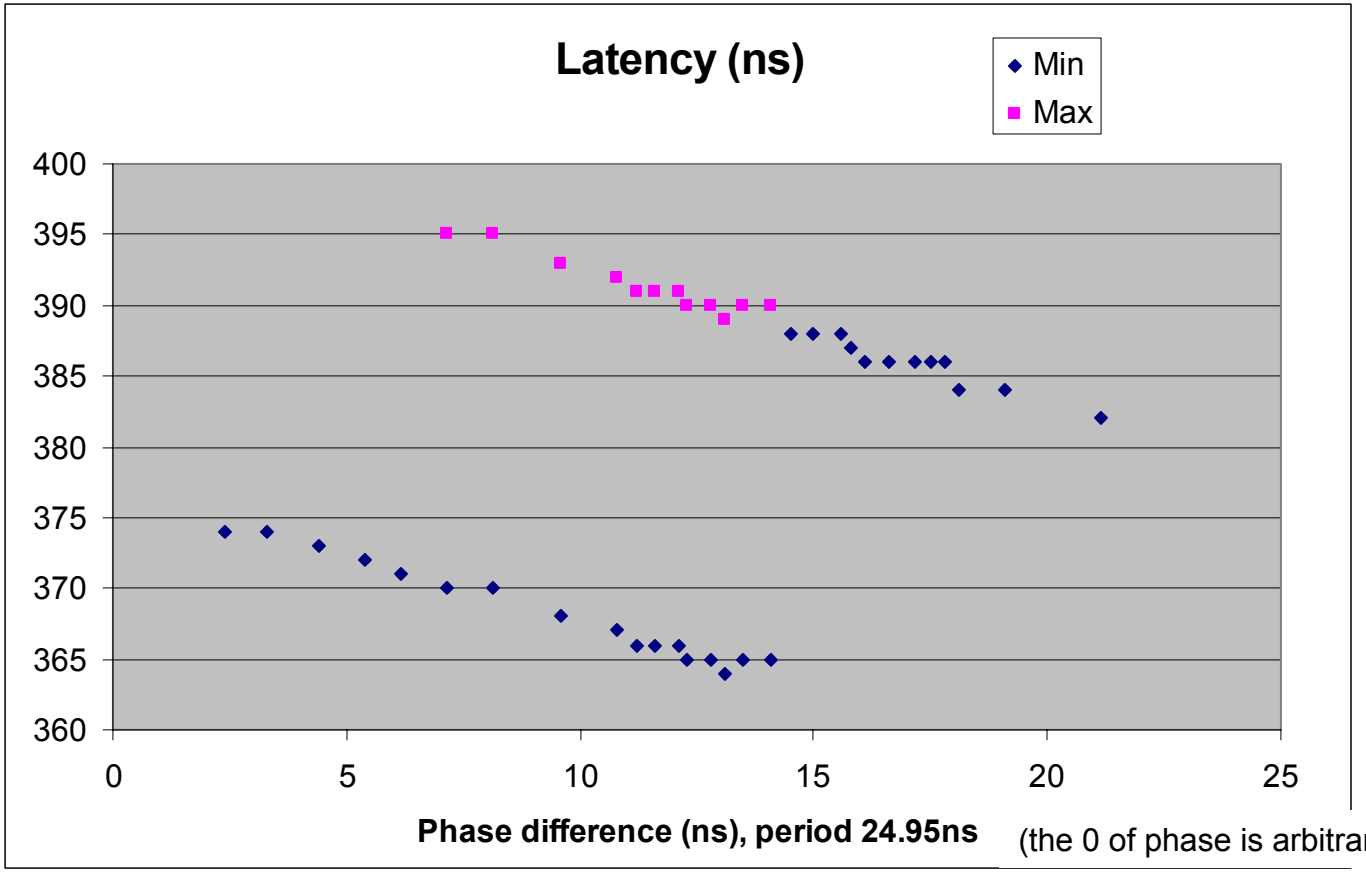
Random Latency in HCAL electronics

- Only components with a random latency are sketched -



Overall Link Latency Randomness

from GOL input to the SLB input (equivalent to the point before L1A selection), as a function of the relative phases of HTR_CLK and GOL_CLK



Test Setup: ~10m of fibers; one GOL, optical splitter to three inputs of a single HTR Rev3; TI RefCLK = SysCLKx2; HTRev3_v25 firmware does not sum into TPs and does not control read/write sequence of FIFO.

At TB2003 there was no control of the phase of the clocks, and the phase could have changed every time the link was established.

Absolute latency

Measure with:

- GOL
- fiber length ~ 10m
- TI deser. (no rest of HTR logic)

The resulting latency was anywhere btw 164ns and 171ns uncorrelated from the clock phase.
It seems ok to me:

GOL 50 ns
fiber 50 ns
TI 75 ns