

DESIGNCON[®] 2014

13-TU1, Tuesday Jan 28th, 3rd Speaker 9:55 am to 10:30 am

28 Gb/s SERDES Channel Overview

Heidi Barnes

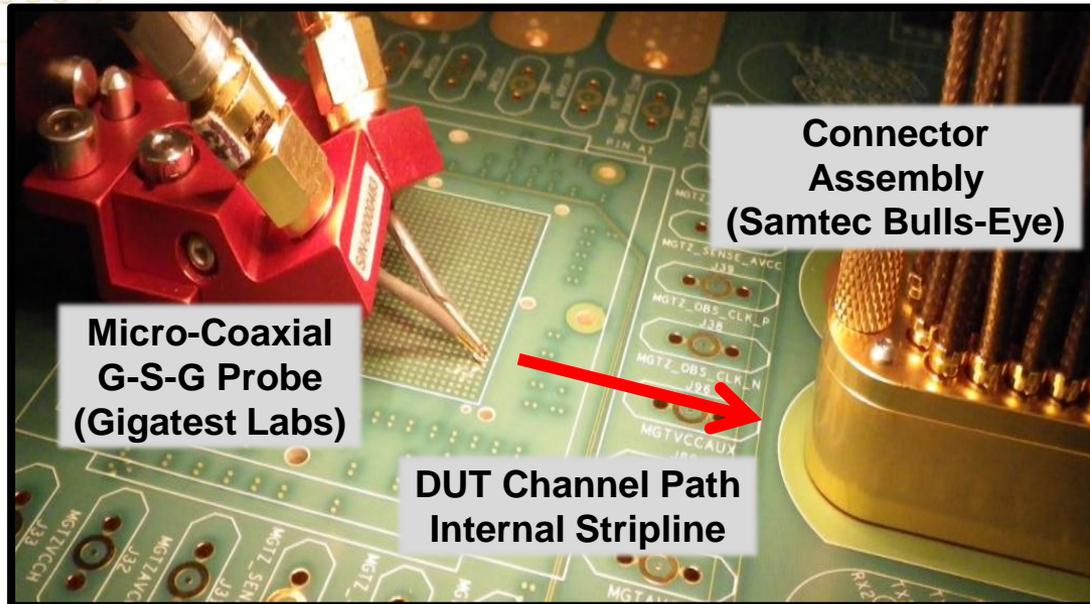


January 28-31, 2014 | Santa Clara Convention Center | Santa Clara, CA



Hybrid Fixture De-Embedding

High Density Fixture with Multiple High Speed Connections



Channel Model De-Embedding Options

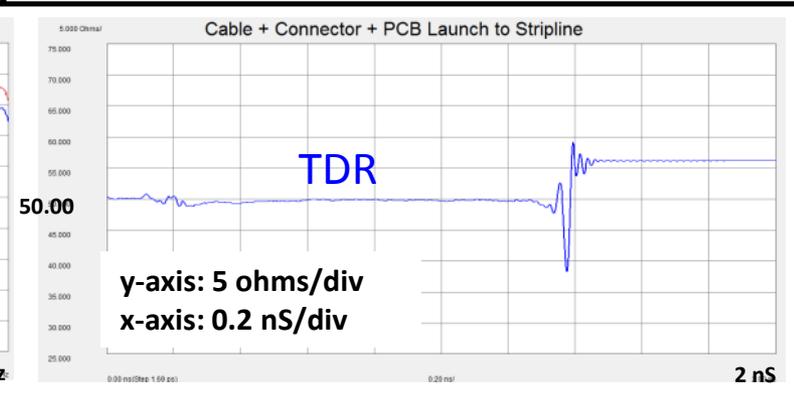
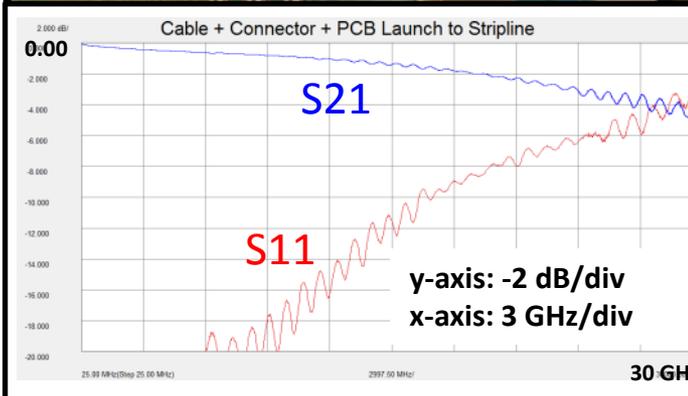
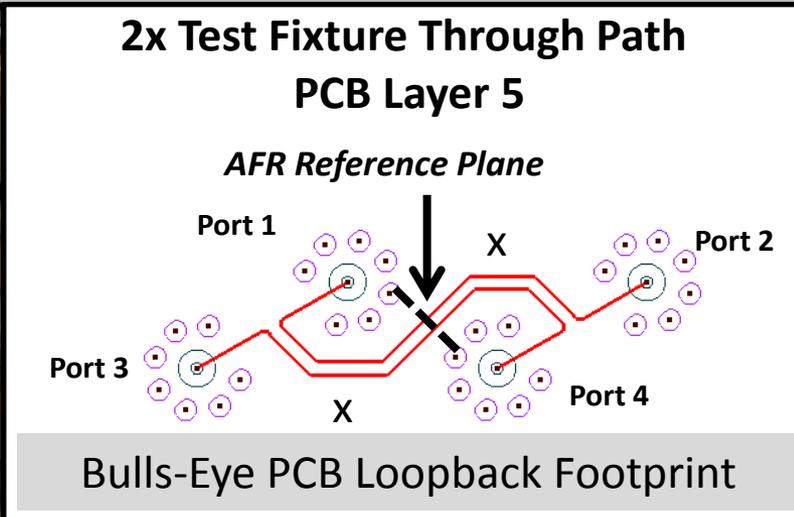
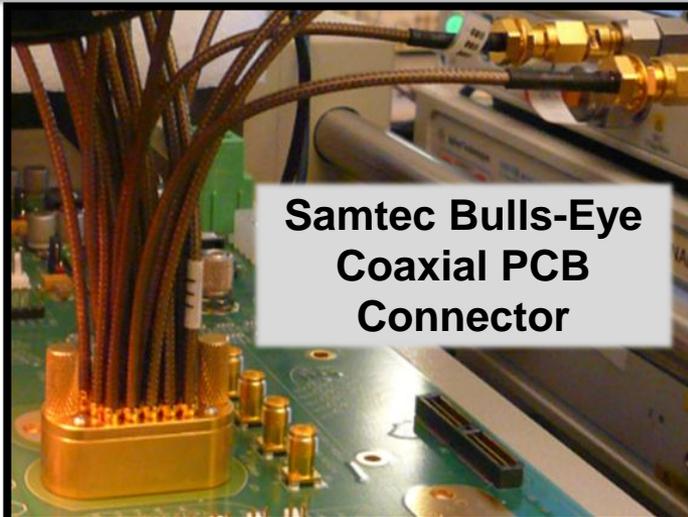
- 1) Direct Probe Measurement
- 2) Test Coupon Structure with AFR
- 3) Hybrid Multi-Path Simulation with Minimal Test Structures

Method #3 - Hybrid Channel Model De-Embedding Solution

Direct Measurement of the Cable/Connector Assembly and PCB Transition
+
Measurement Based PCB Path Model for Variable Path Lengths

Hybrid Fixture Cable Assembly

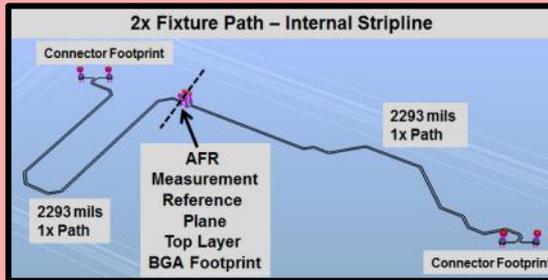
Direct Measurement of the Cable/Connector Assembly and PCB Transition
using
2x Through Path Automatic Fixture Removal (AFR)



Hybrid Fixture Channel Simulation

Measurement Based Transmission Line Model Creation
Tune PCB DK and Loss Characteristics to Match Measurements

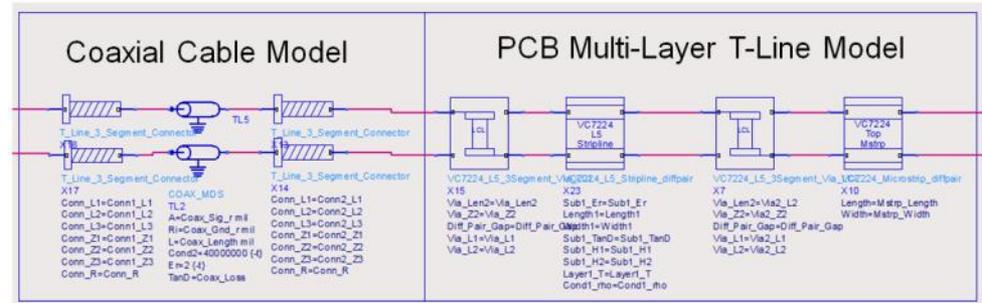
Test Fixture Structures



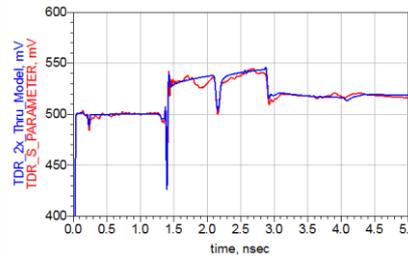
a) 2x Through Path

b) 2x Through Path + 2 inches

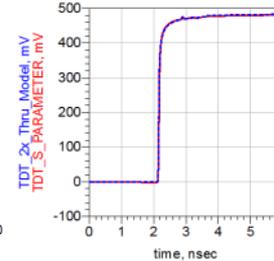
Measurement Based Model



Match TDR



Match TDT



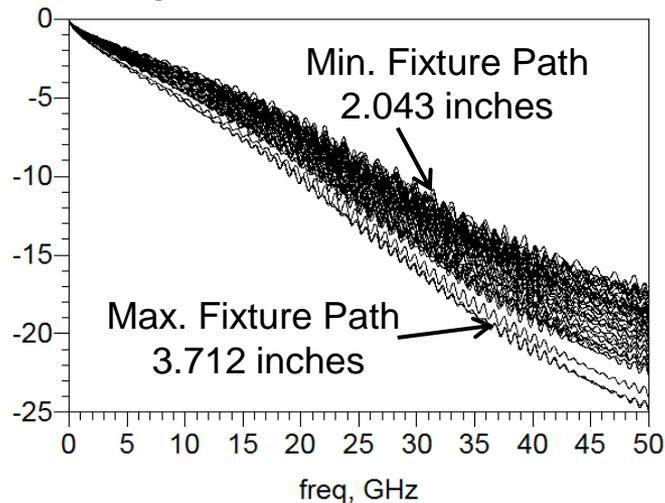
Extract Material Properties

Megtron, Layer 5
 Stripline Width = 4.1 mils
 DK Height Above = 4.1 mils
 DK Height Below = 6 mils
 DK = 3.7
 Loss Tangent .0132
 Copper Conductivity = 3e7
 Copper Thickness = 0.5 mils

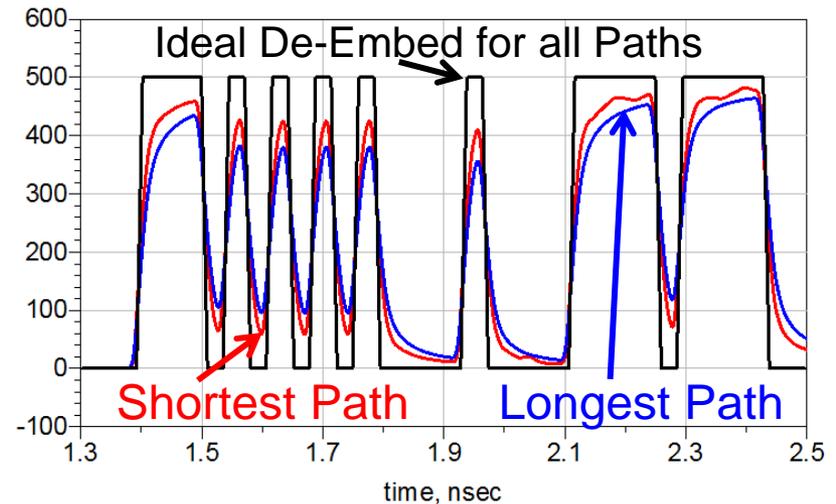
Hybrid Fixture De-Embed Data

“Hybrid Channel Model De-Embedding easily corrects for path length variation enabling best case routing for each high speed connection. Costly length matching to the longest path is avoided.”

Example Path Loss Distribution



Shortest Path vs. Longest Path



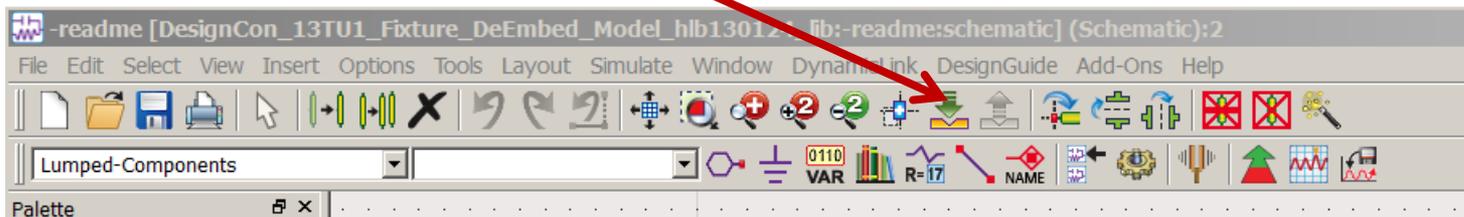
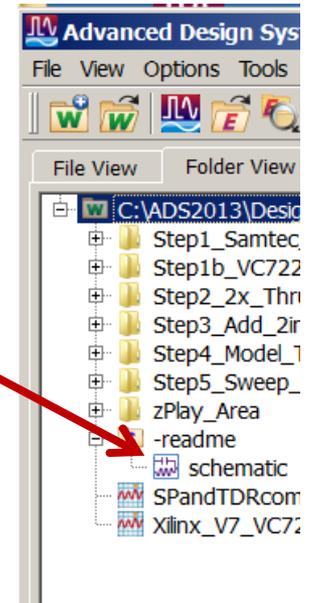
Open ADS

- Check the task bar – it should be running...
 - If not open ADS and select recently opened workspace



DesignCon_13TU1_Fixture_DeEmbed_Model_hlb130124_wrk

- Make sure the **-readme schematic** is open
 - double click on the **-readme schematic** in the Folder View
- Use the Push and Pop Icons to step through the **-readme schematic**:



-readme Examples

Push into and Pop out of the schematic symbols

Simulated Measurement Based Model Creation:

Example 1: 2x Thru (set up the model)

Time Domain Sweep  [Xilinx_V7_VC7224_2x_fixture_Opt](#)



Frequency Domain Sweep  [Xilinx_V7_VC7224_2x_fixture](#)

Example 2: 2x Thru + 2inches (refine the model)

Time Domain Sweep  [Xilinx_V7_VC7224_2x_fixture](#)

Frequency Domain Sweep  [Xilinx_V7_VC7224_2x_fixture](#)

Final_2x_Thru_Model  [Xilinx_V7_VC7224_2x_fixture](#)

Select the Subcircuit Icon
Then use **Push and Pop** to go
To the subcircuit example
And return to the top level
-readme

Example 3: 1x Thru (use half of the 2x model)

Frequency Domain S-Parameter Model  [Xilinx_V7_VC7224_TX1_Model_SP](#)

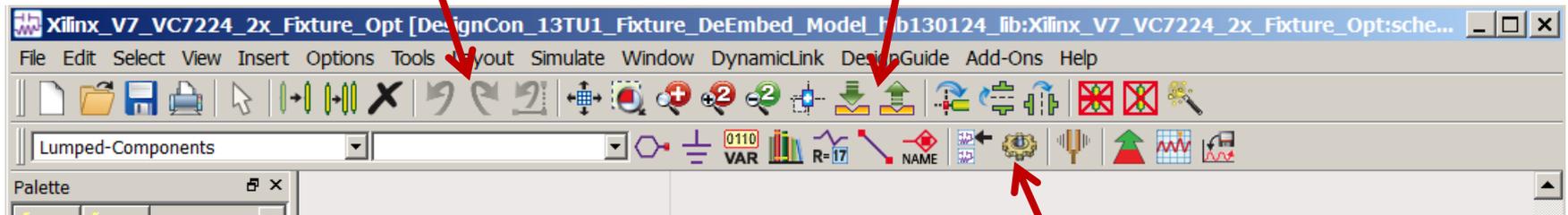
Frequency Domain Sweep  [Xilinx_V7_VC7224_L5_Sweep_SP](#)

Schematic ToolBar

Undo and Redo Changes



Pop back up to the -readme schematic



Simulate and see results



Next Speaker

- **28 Gb/s SERDES Channel Overview – Romi Mayder and Jack Carrel (20min)**
- **Fixture S-parameter model from 2x Fixture Physical Test Structures – Mike Resso (40 min)**
- **Fixture S-parameter model from Simulated Measurement Based Model – Heidi Barnes (40 min)**
- **Waveform Measurements at the DUT using S-parameter model de-embedding. Rob Sleigh (1 hour)**
- **Lessons Learned – Jack Carrel (15 min)**