

# DESIGNCON® 2014

13-TU1, Tuesday Jan 28<sup>th</sup>, 5<sup>th</sup> Speaker 11:45 am to 12:00 pm

## Lessons Learned

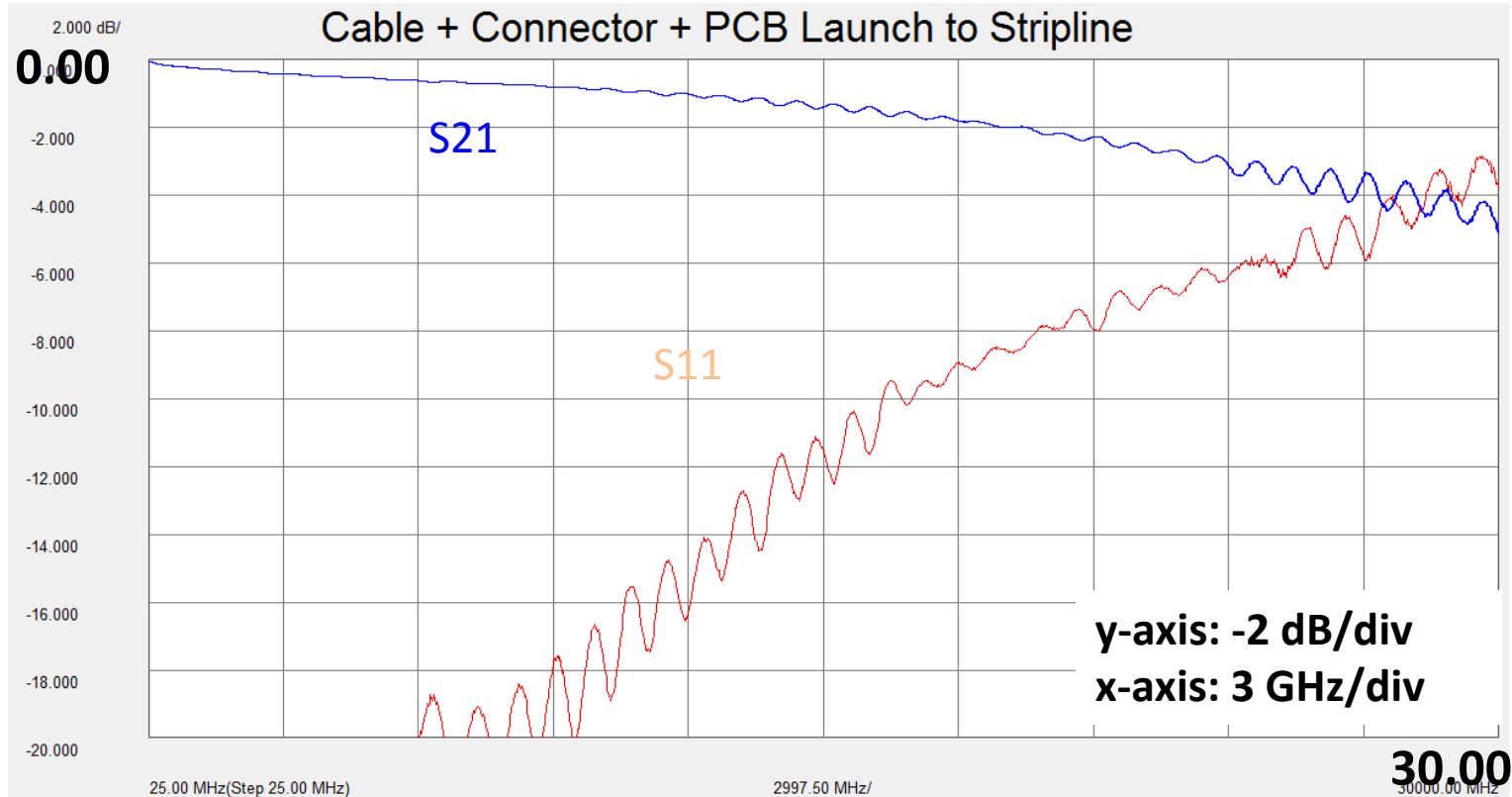
Jack Carrel

 XILINX  ALL PROGRAMMABLE™

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

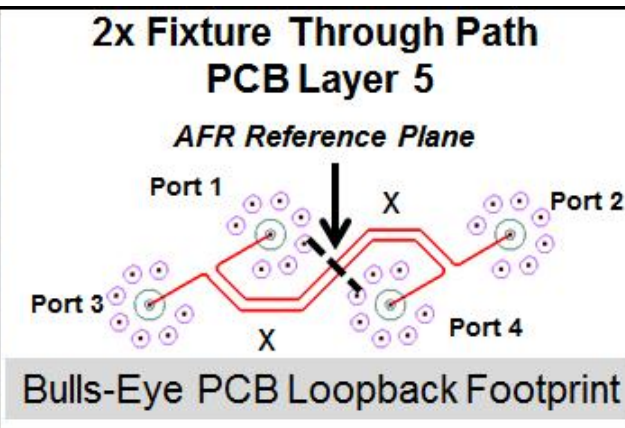
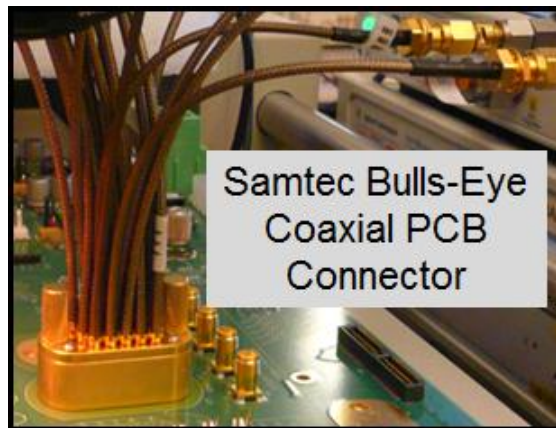
# Lessons Learned for 28Gbps - Loss

1. *Well designed broad band via transitions are achievable and are very repeatable.*
2. *PCB T-Line Loss is easily managed by modern pre- and post- emphasis techniques.*



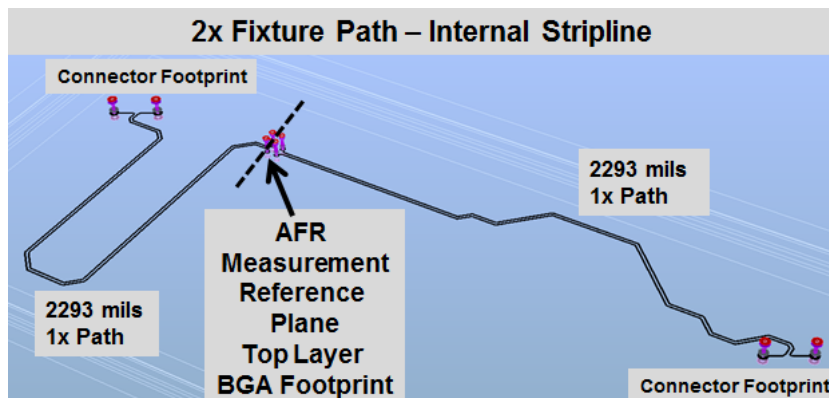
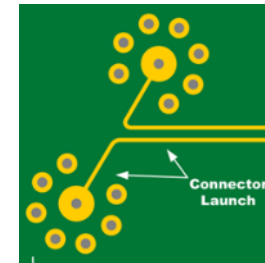
# Lessons Learned for Fixture De-Embed

1. PCB T-Line loss dominates in a well designed fixture, but this is easy to De-Embed.
2. Measured Test Coupons enable building blocks for simulating all path lengths.



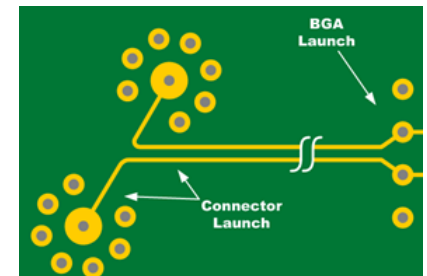
The cable loopback provides the Fixture Input.

$$S_{\text{Fixture\_Input}}$$



The 2x Through Path provides the Fixture Input and Fixture Output

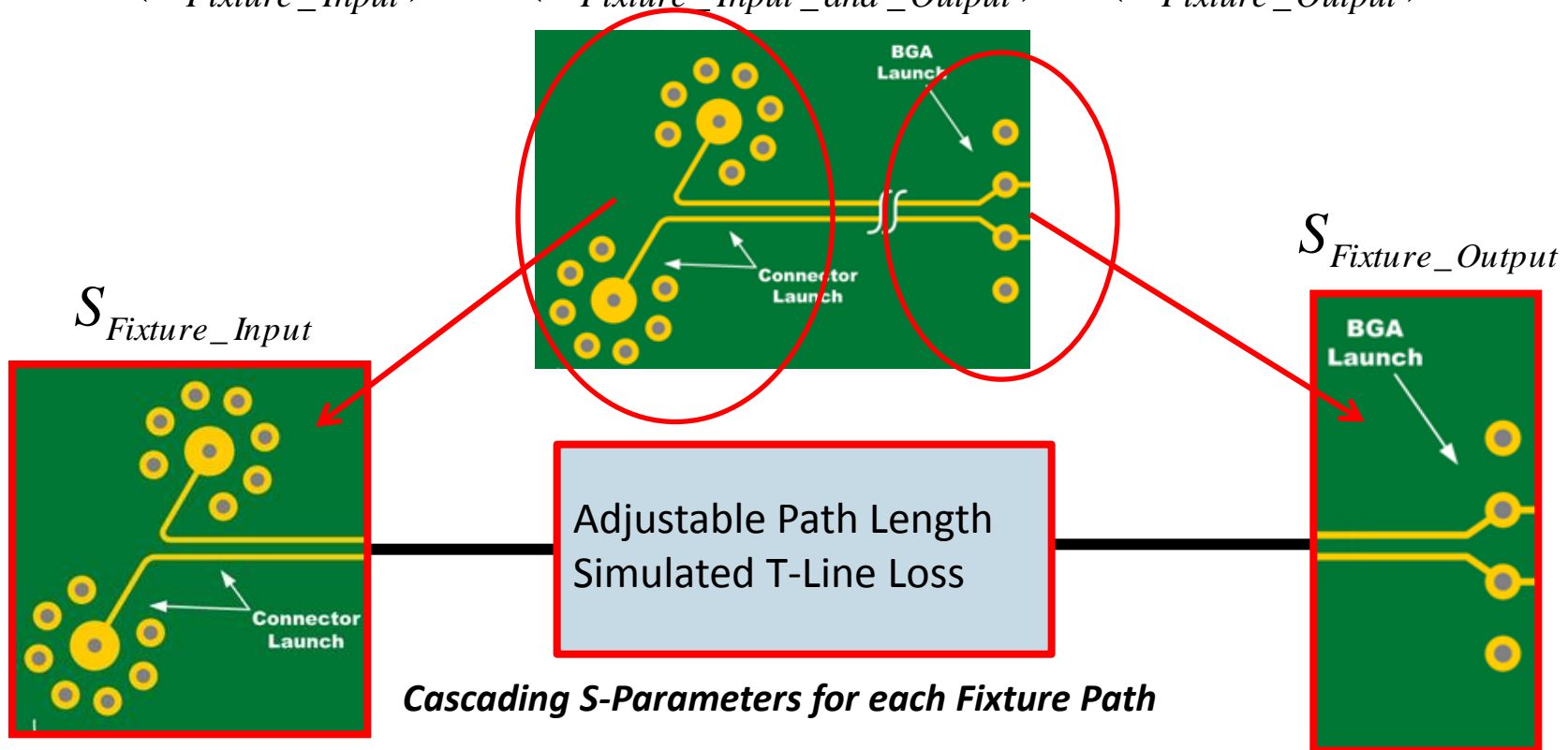
$$S_{\text{Fixture\_Input\_and\_Output}}$$



# Hybrid Fixture De-Embed

The Fixture Input can be De-Embedded from the 1x Fixture Path to get Fixture Output

$$(S_{\text{Fixture\_Input}})^{-1} \times (S_{\text{Fixture\_Input\_and\_Output}}) = (S_{\text{Fixture\_Output}})$$



# Conclusion

- Test Fixture is simple to build and measure
- Partial de-embedding
  - Substantially less effort than full de-embed
  - Results are sufficient in most cases
- Hybrid de-embed allows test fixture to be used for many channel lengths
- Results of de-embed are comparable to actual
- This methodology is useful because:
  - Economical use of time and resources
  - Does not require elaborate measurement equipment and set up
  - Results are adequate without expensive effort and resources