A 12.5Gb/s Non-Contact Multi Drop Bus System with Impedance-Matched Transmission Line Couplers and Dicode Partial-Response Channel Transceivers

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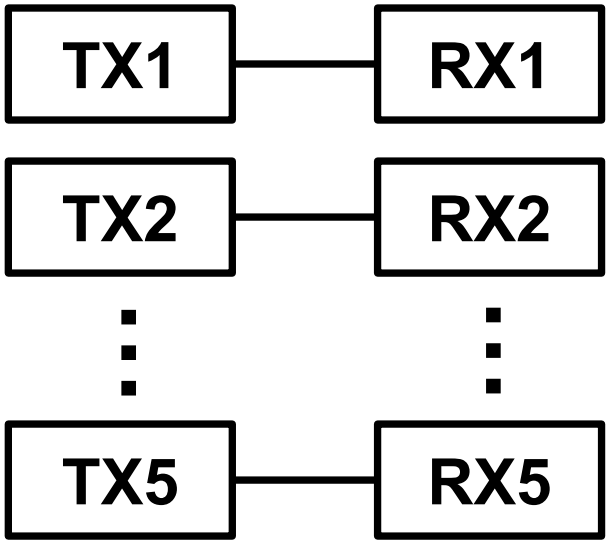
Background

Point-to-Point

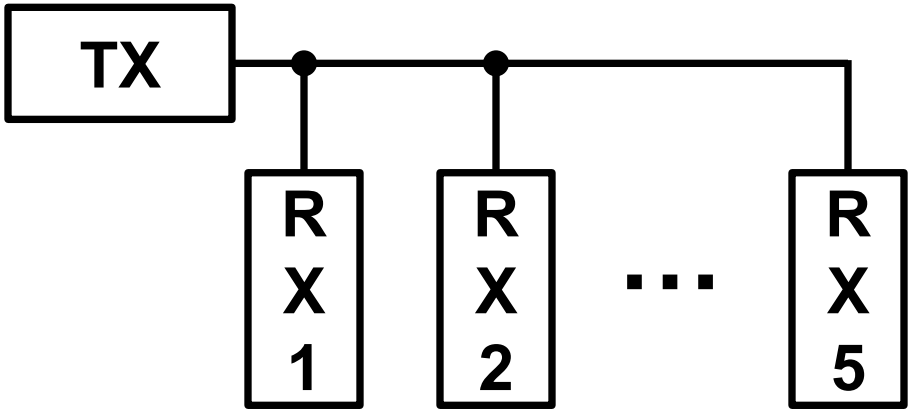


☺ High link speed (>20Gb/s/ch)

☹ Less aggregated bandwidth

☹ Wiring complexity

Multi-Drop Bus



☺ Simple architecture

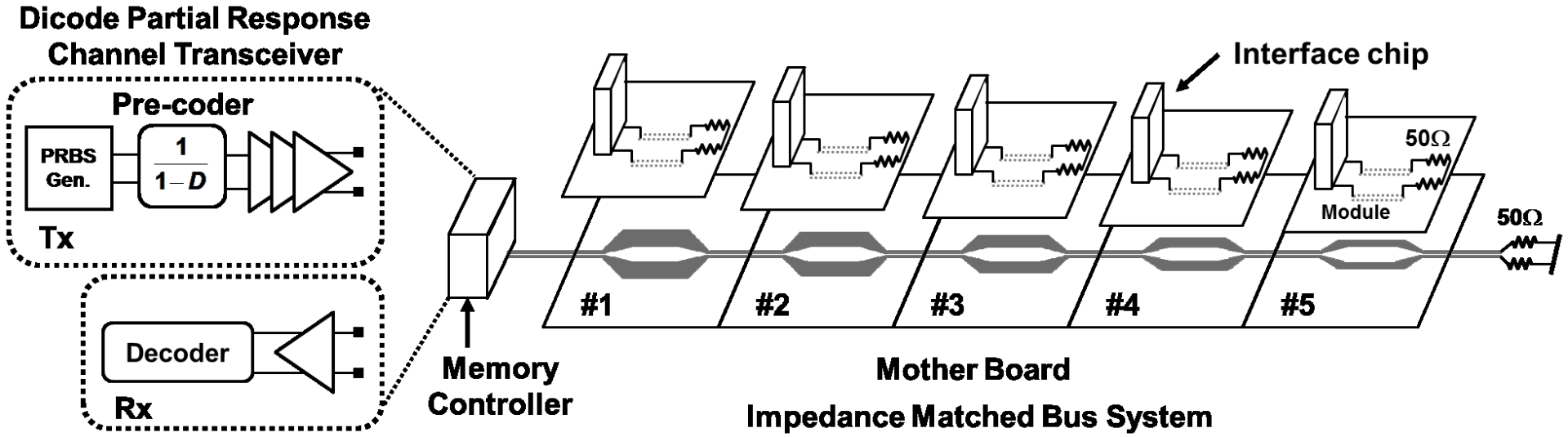
☺ Large aggregated bandwidth

☹ Bad signal integrity

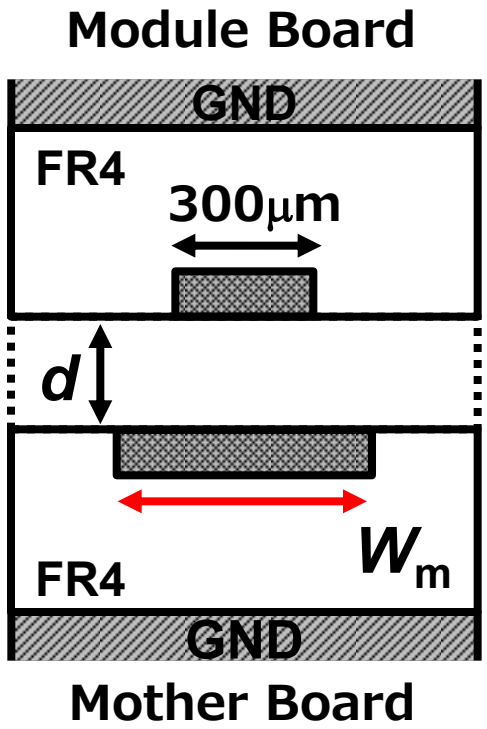
☹ Low link speed (~4.8Gb/s/ch)

Proposed
Non Contact Multi Drop Bus System

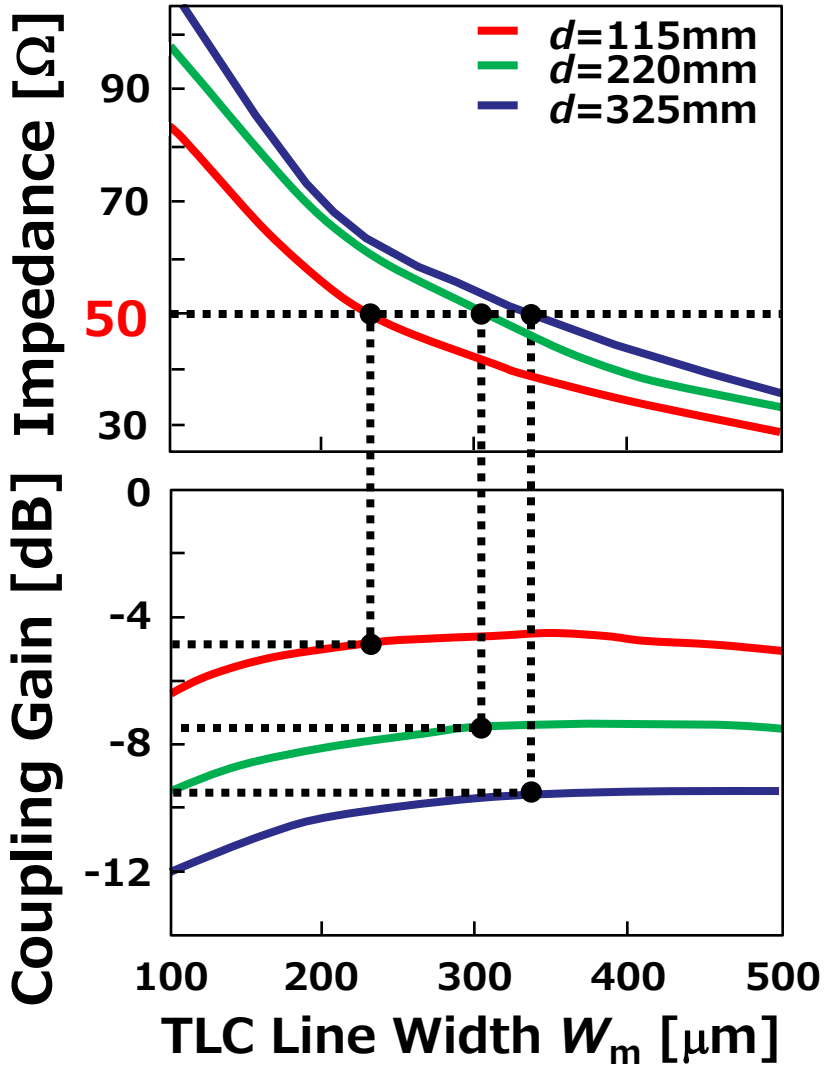
- Impedance-Matched Transmission Line Coupler (IM-TLC) allows impedance uniformity.
  - Wide-bandwidth, less reflection.
- Dicode partial Channel Transceiver enhances the operating speed.
  - In conventional Hysteresis Receiver, latching settling time limits the operating speed.



Impedance-Matched Transmission Line Coupler (IM-TLC)

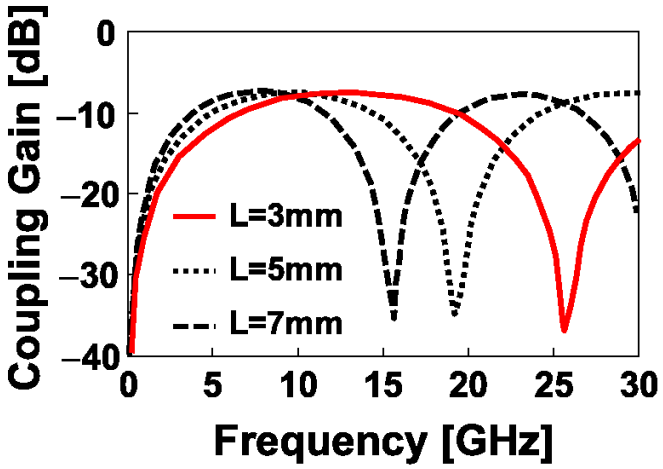


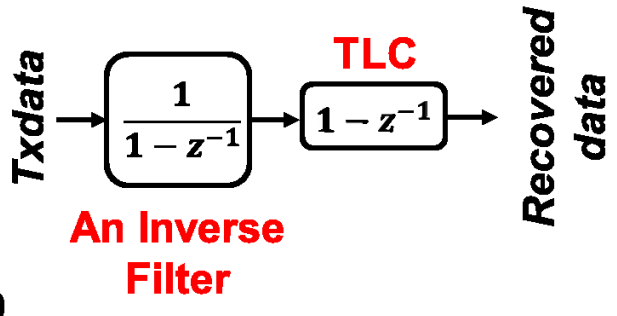
Cross section view of IM-TLC

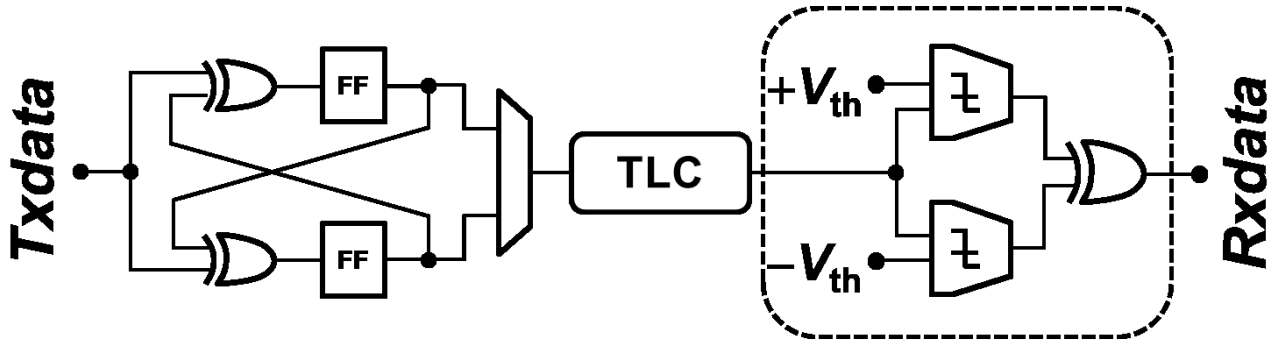


Partial Response Signaling with TLC

- ►TLC has an ideal Dicode $1-z^{-1}$ characteristics.
- ►$1/(1-z^{-1})$ filter cancels out channel characteristics.

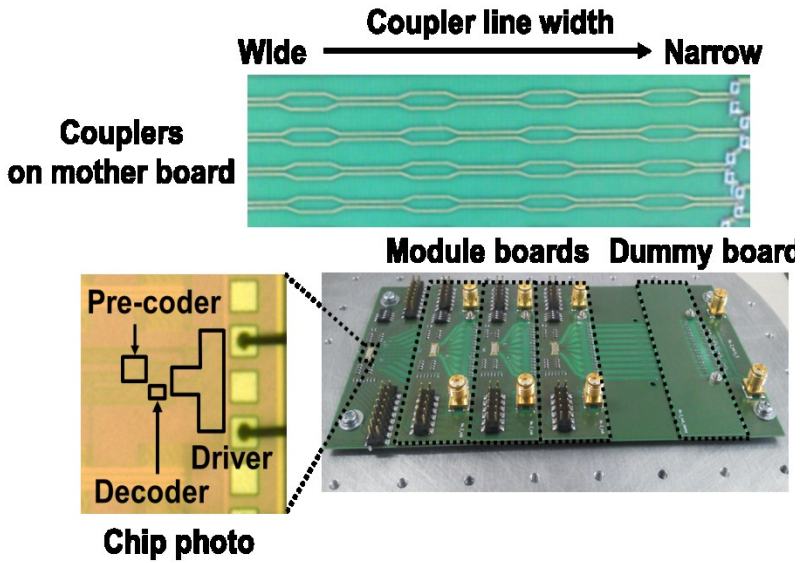




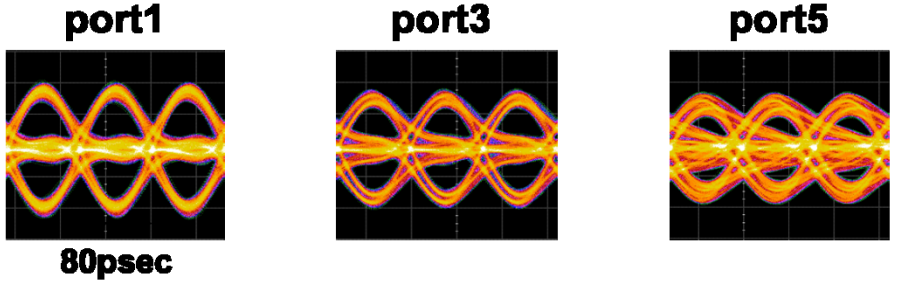


Measurement Setup and Results

- ► Impedance-Matched TLC realizes good signal integrity.
- ► Dicode Partial Response Channel Transceiver enhances the receiver operation speed
- ► Implemented multi-drop bus system reached 12.5 Gb/s.



- Eye Diagrams of Receiver Input at each port



- Recovered Data at port3 (2^7-1 PRBS @12.5Gb/s)