

# ALTERNATIVE BACKPLANE ARCHITECTURES FOR 100Gb/s APPLICATIONS

100Gb/s Ethernet Electrical Backplane and Twinaxial Copper Cable  
Assemblies Study Group

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Nathan Tracy & Megha Shanbhag



# STANDARD BACKPLANE CHANNEL

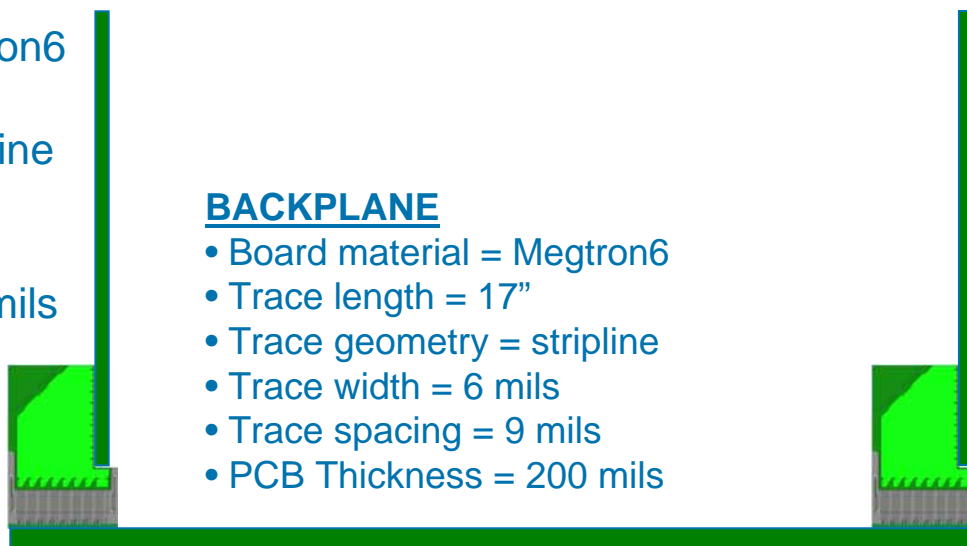
## 27" Link Simulation Set-up

### DAUGHTER CARD

- Board material = Megtron6
- Trace length = 5"
- Trace geometry = stripline
- Trace width = 6 mils
- Trace spacing = 9 mils
- PCB Thickness = 126 mils

### BACKPLANE

- Board material = Megtron6
- Trace length = 17"
- Trace geometry = stripline
- Trace width = 6 mils
- Trace spacing = 9 mils
- PCB Thickness = 200 mils



### CONNECTOR

- STRADA Whisper
- Vertical Header
- Right Angled Receptacle

# CABLED BACKPLANE CHANNEL

## 49.4" Link Simulation Set-up

### DAUGHTER CARD

- Board material = Megtron6
- Trace length = 5"
- Trace geometry = stripline
- Trace width = 6 mils
- Trace spacing = 9 mils
- PCB Thickness = 126 mils

### CABLE

- TE Madison TurboTwin™
- Cable length = 1 meter
- Cable Size = 30AWG



### CONNECTOR

- STRADA Whisper – Cabled
- Cabled Vertical Header
- Right Angled Receptacle

# CABLED BACKPLANE CHANNEL

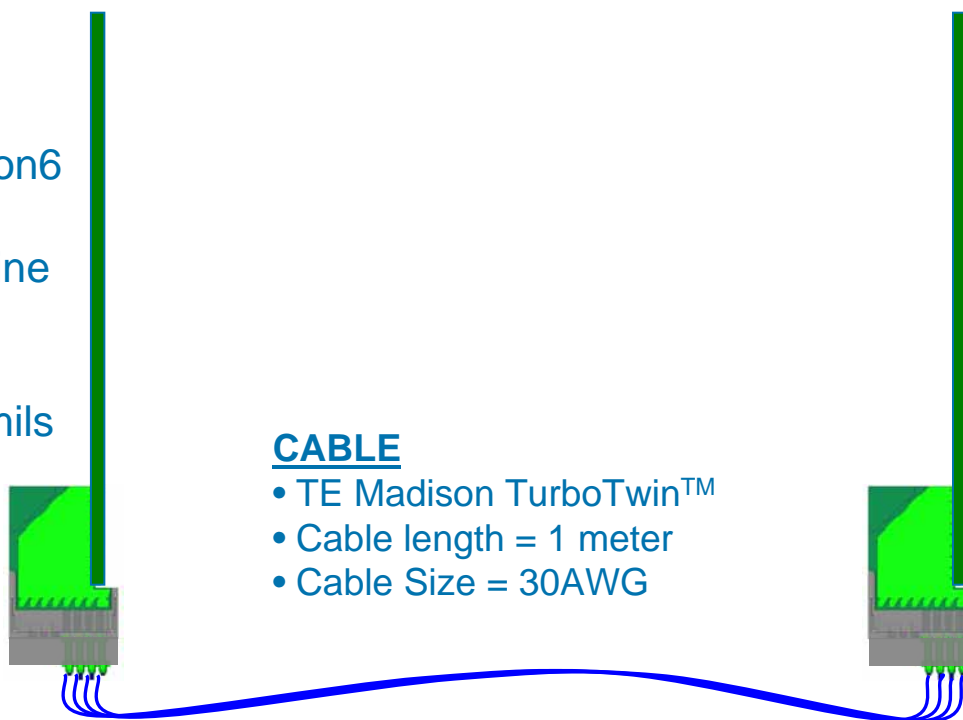
## 59.4" Link Simulation Set-up

### DAUGHTER CARD

- Board material = Megtron6
- Trace length = 10"
- Trace geometry = stripline
- Trace width = 6 mils
- Trace spacing = 9 mils
- PCB Thickness = 126 mils

### CABLE

- TE Madison TurboTwin™
- Cable length = 1 meter
- Cable Size = 30AWG

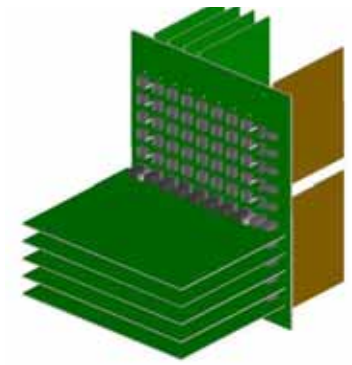


### CONNECTOR

- STRADA Whisper – Cabled
- Cabled Vertical Header
- Right Angled Receptacle

# ORTHOGONAL CHANNEL

## 12" Link Simulation Set-up



### CONNECTOR

- STRADA Whisper – Orthogonal
- Orthogonal Header
- Right Angled Receptacle

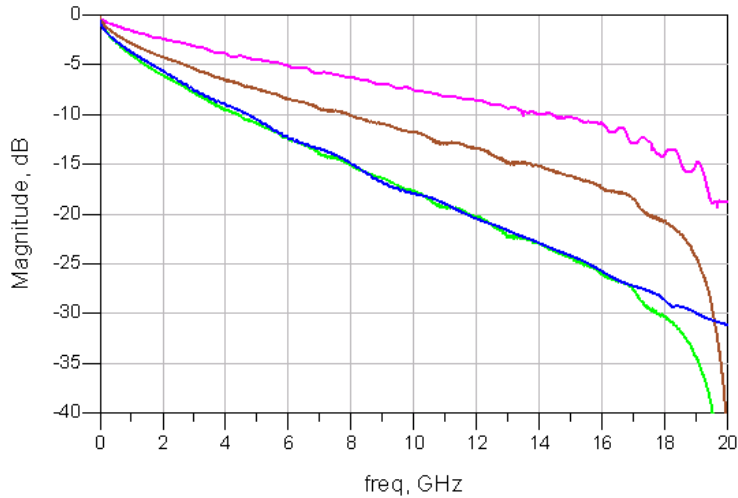


### DAUGHTER CARD

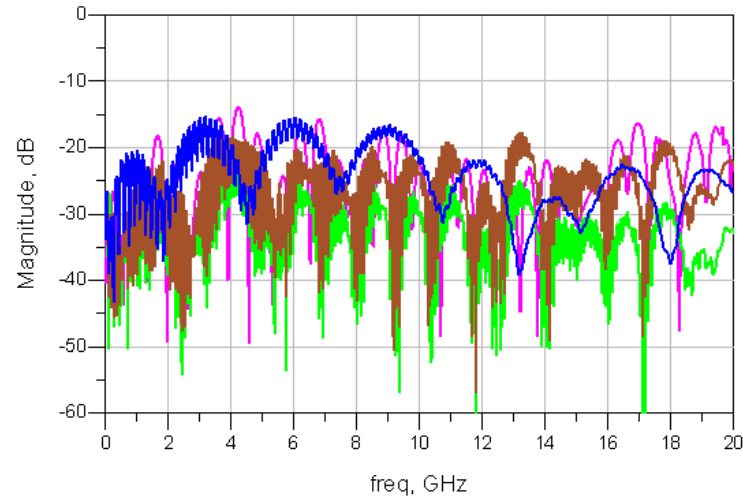
- Board material = Megtron6
- Trace length = 5"
- Trace geometry = stripline
- Trace width = 6 mils
- Trace spacing = 9 mils
- PCB Thickness = 126 mils

# PERFORMANCE COMPARISON

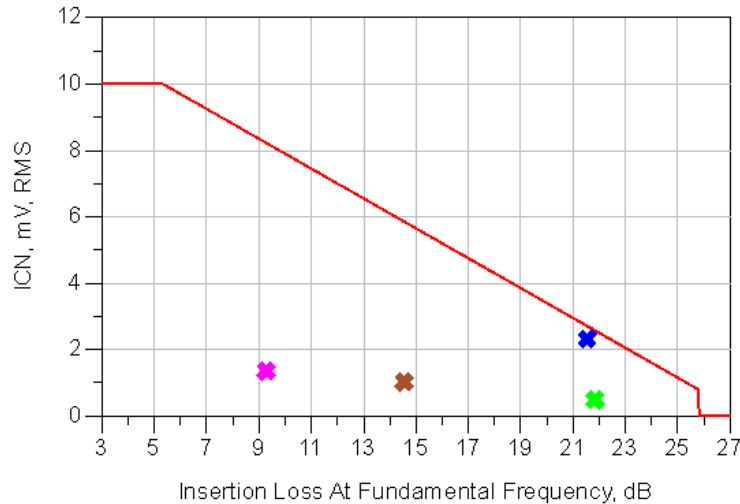
CHANNEL INSERTION LOSS



CHANNEL RETURN LOSS



INTEGRATED CROSSTALK NOISE



**Standard Backplane Channel:** 5" DC - 17" BP - 5" DC  
**Cabled Backplane Channel:** 5" DC - 1m cable - 5" DC  
**Cabled Backplane Channel:** 10" DC - 1m cable - 10" DC  
**Orthogonal Channel:** 5" DC - 5" DC



- Data Rate [fb] = 25.8 Gbps
- Rise Time [T<sub>nt</sub>, T<sub>ft</sub>] = 8ps [20-80%]
- F<sub>max</sub> = 25.8GHz
- D<sub>f</sub> = 0.01GHz

—  $S_x \leq S_{x,max} = 10$ , for  $3 \leq IL \leq 5.3$   
 $= 12.4 - 0.45 * IL$ , for  $5.3 < IL \leq 25.5$   
 Where IL is Insertion Loss in dB at half baud rate

# SUMMARY

- Alternative backplane architectures have been presented
- Combined with latest channel improvements
  - improved board materials
  - latest connectors
- Provides a viable path to 100Gb/s speeds along with the potential for longer reach options