

# Next Step on 100G C2C-S and C2C-L

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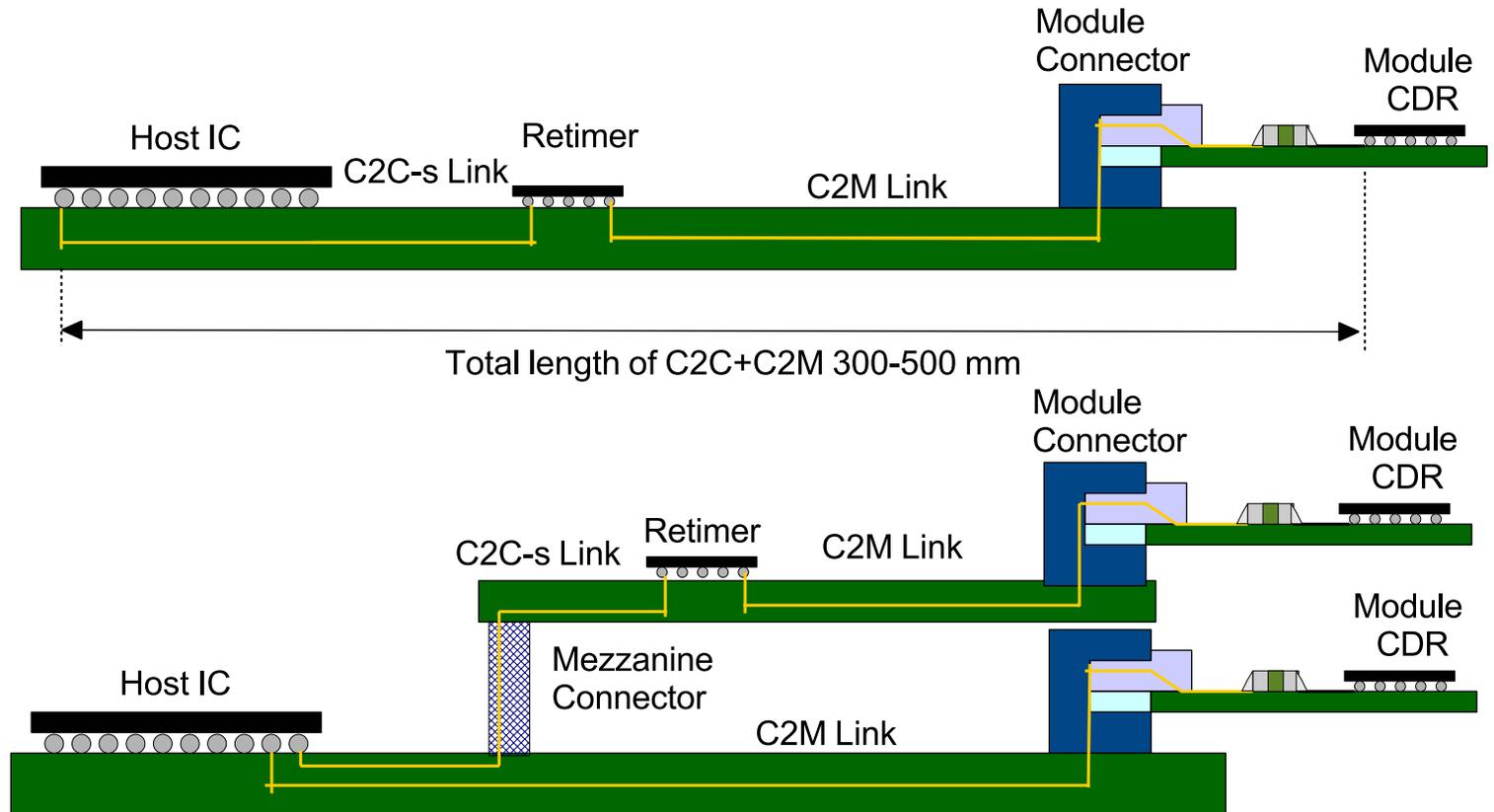
# Background

- ❑ **Use case and benefit of C2C-S interface in support of pluggable modules were presented in Bangkok**
  - [http://www.ieee802.org/3/ck/public/18\\_11/ghiasi\\_3ck\\_01\\_1118.pdf](http://www.ieee802.org/3/ck/public/18_11/ghiasi_3ck_01_1118.pdf)
- ❑ **The advantage of C2C-S are**
  - Operating with single end-end FEC over 2 C2C-S links, plus 2 AUI links, and optical link
  - Avoid having 3 segmented FEC with 3x the latency
  - C2C-S link with <16 dB loss or ~300 mm will extend pluggable module range and support mezzanine card
  - C2C-S by not utilizing DFE or just light DFE can operate over end-end link transparently
  - C2C-S transparently will support 100 GbE non-interleaved FEC in support of optical PMDs
  - C2C-S transparently will support 200GbE/400GbE interleaved FEC in support of optical PMDs.

# Two Common C2C-S Applications

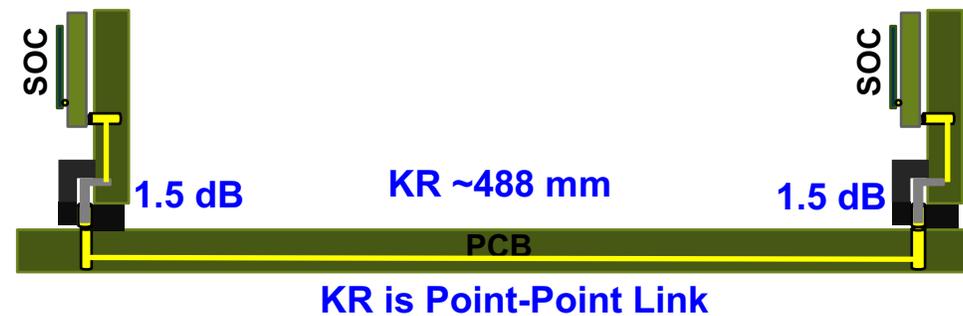
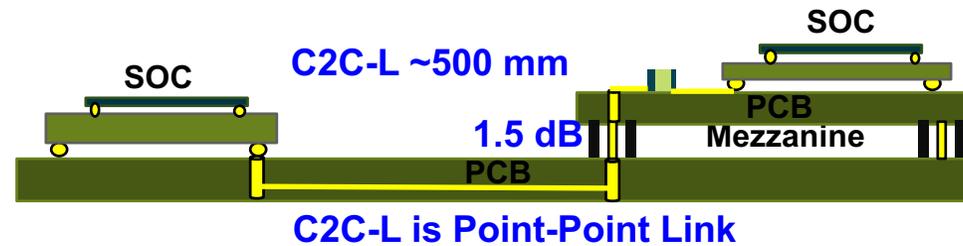
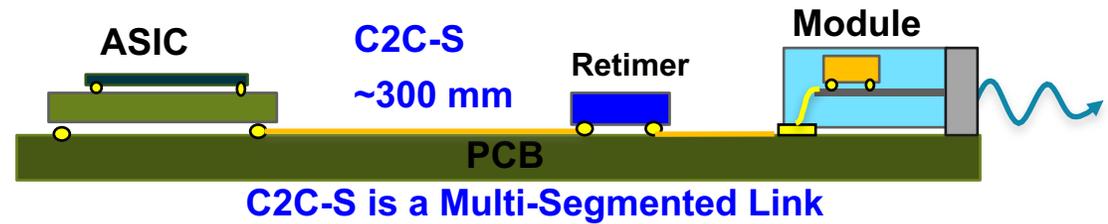
□ These two common C2C-S applications can be satisfied with ~300 mm trace and by repurposing 16 dB C2M budget

- Connecting to far-side of the ASIC IO may require retimer
- Modules mounted on mezzanine card.



# Key Differences Between C2C-S/L and KR

- ❑ C2C-S based on 16 dB C2M budget can support following reaches assuming Megtron 7 (1.3 dB/in) ~300 mm on PCB or ~280 mm on PCB with one connector
- ❑ C2C-L assuming ~500 mm reach on Megtron 7 (1.3 dB/in) with 1 connector (1.5 dB) results in 27.1 dB ball-ball budget
- ❑ KR supports 28 dB ball-ball with two connectors (3 dB) the reach on Megtron 7 (1.3 dB/in) is ~488 mm.



# Overview of C2C-S and C2C-L Attributes

- ❑ C2C-S will leverage C2M link and reference equalizer
- ❑ C2C-L will leverage KR link and reference equalizer

Parameters	C2M	C2C-S	KR	C2C-L
Chip configuration	ASIC to CDR	ASIC to CDR	ASIC to ASIC	ASIC to ASIC
Link configuration	One Connector	One Connector	Two Connectors	One Connector
Host PCB Reach (mm)	~225	~300	~500	~500
FEC operation	Pass Through	Pass Through	Terminated	Terminated
FEC Interleave/Non-Interleave	NA	Same as C2M	TBD for 100G	Same as KR
Back Channel Link Training	NA	NA	Required	Optional
ASIC, CDR Package Losses (dB)	4+1	4+1	4+4	4+4
Max channel loss at Nyquist (dB)	16	16	28	26.5*
Max Bump-Bump Loss (dB)	~21	~21	~36	~34.5

\* C2C-L loss is lower by 1.5 dB compare to KR because the link only has one connector with about same PCB loss.

# C2C-S/L Test Point and Compliance

## ❑ C2C-S test points are TP0 and TP5

- C2M measurable test points TP1, TP4, TP1a, and TP4a are not applicable
- MCB/HCB boards not applicable

## ❑ Transmitter training

- Set based on loss/COM analysis or measurement

## ❑ Compliance

- Channel compliance with COM
- Receiver interference tolerance
- Receiver jitter tolerance.

## ❑ C2C-L test points are TP0a and TP5a identical to KR

## ❑ Transmitter training

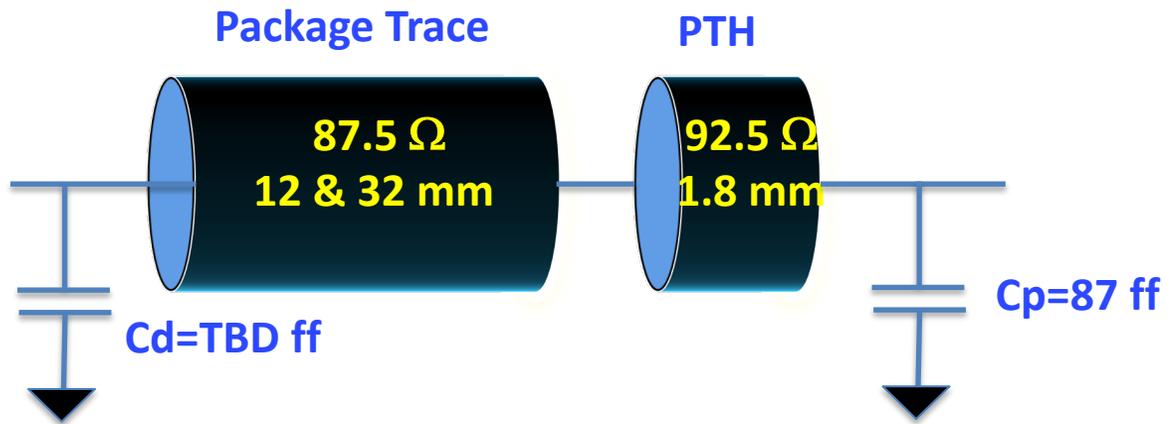
- Set based on loss/COM analysis, measurement, or optional use KR link training

## ❑ Compliance

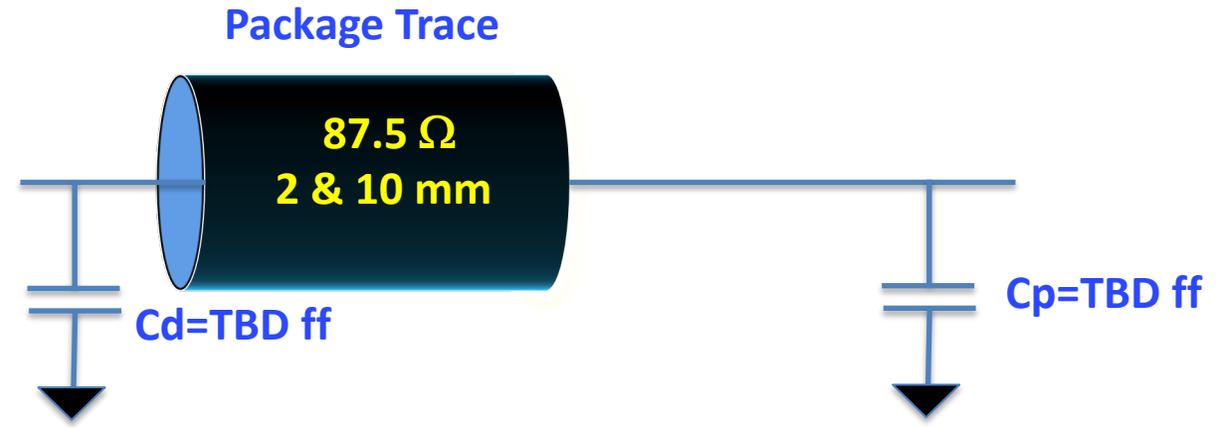
- Channel compliance with COM
- Receiver interference tolerance
- Receiver jitter tolerance.

# Reference Packages

## □ ASIC package



## □ CDR package has no PTH



## COM Table for C2C-S/L

**C2C-S will use C2M COM table**  
**area of possible exception:**

- TP4a not applicable.

**C2C-L will use KR COM table**  
**area possible exceptions:**

- C(-3) if adopted for KR
- Floating taps.

Under construction

# Summary

- ❑ **Assuming we still see benefit of defining both C2C-S and C2C-L we can start drafting two C2C clauses one based on C2M and the other based on KR**
- ❑ **C2C-S will leverage C2M specifications**
  - Test points for C2C-S are TP0a and TP5a
    - C2M measurable test point TP1, TP1a, TP4, or TP4a are not used
  - C2C-S transmitter FFE is set based on COM and/or empirical measurements similar to C2M
  - COM will be used as channel compliance
- ❑ **C2C-L will leverage KR specifications, test points, and compliance**
- ❑ **There are enough difference between C2C-L and KR that we should define C2C-L clause instead of making C2C-L as a KR application**
  - C2C-L with one connector has a loss of 26.5 dB vs 28 dB for KR
  - C2C-L may not use C(-3)
  - Link training might be optional for C2C-L.