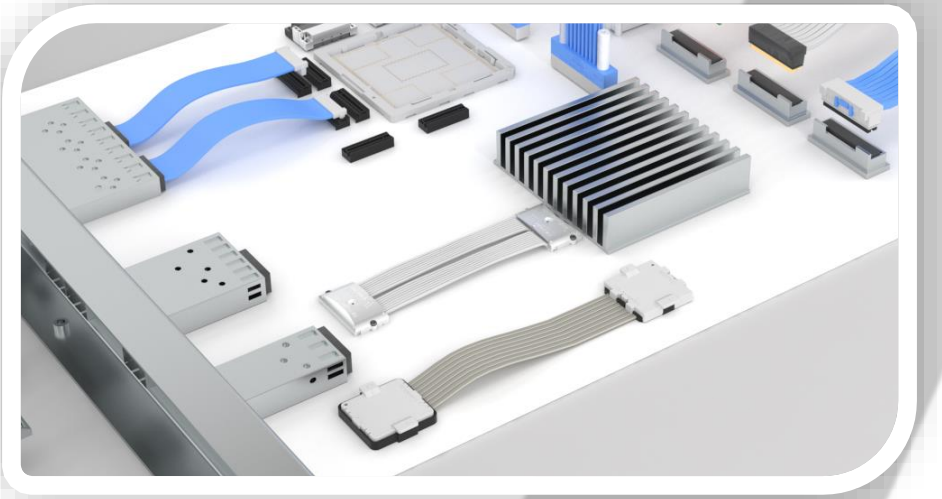
ARDENT CONCEPTS
An Amphenol Company

FIN TEST



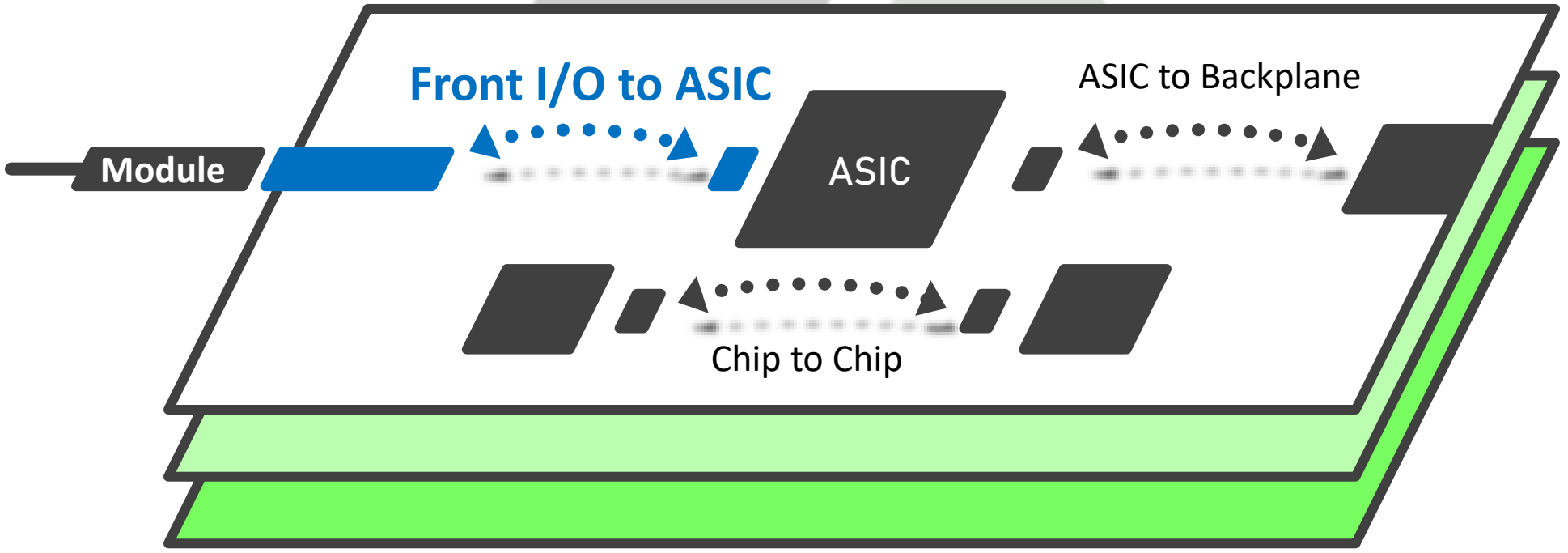
micro-LinkOVER™ Above PCB Connector System

A near-chip termination in Amphenol's **OverPass™** Portfolio

Amphenol OverPass™

I like it. What is it?

It's a cabled alternative to PCB high speed signal transmission. OverPass solutions can be cost effective approach to unlock the design flexibility needed to manage the technical challenges of PAM4 56G and 112G systems.



Amphenol OverPass™

Why cable?

- The physical reach of signal transmission through printed circuit boards becomes limited as speeds increase to 56G and 112G PAM4. This limitation is commonly addressed by implementing higher performance PCB materials and signal conditioning elements (retimers) which adds cost and complexity to the end system.

- **Insertion loss per unit length** is dramatically less for cable vs PCBs
  - OverPass solutions attach high performance cable directly from the front IO to near the chip or on the package. This purely passive link effectively creates a bonus in loss budget which can be used to manage the signal integrity & thermal challenges of 56G and 112G systems.

- Designers can solve reach limitation issues and unlock other benefits with OverPass solutions.

The advantages of cabled host channels (OverPass) are complementary to those of traditional PCB based host channels. A system architect can enjoy more design freedom by leveraging the strengths of both.

micro-LinkOVER™ Drainless Parallel Pair Twinax

SKEWCLEAR® *from Amphenol Spectra-Strip*

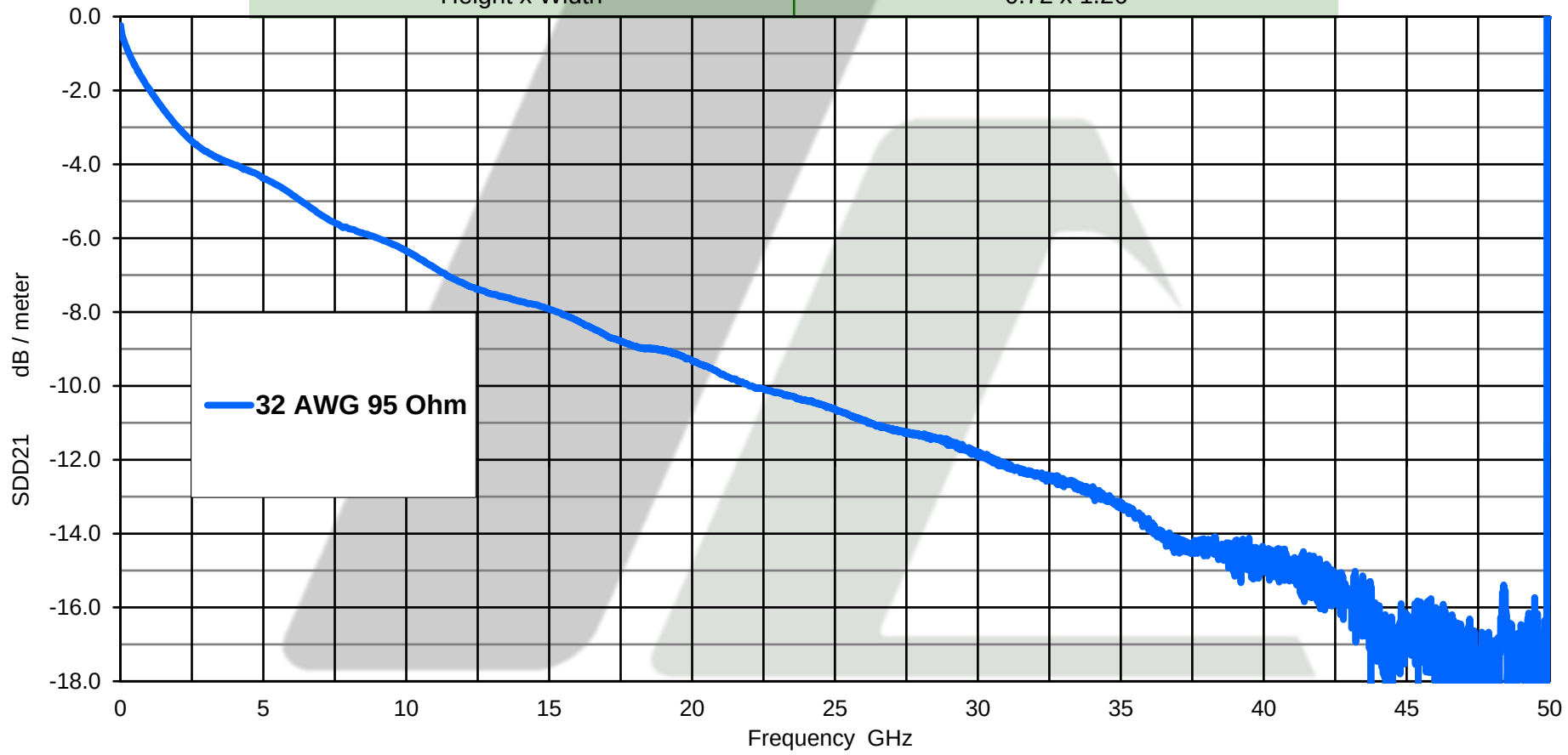
Meeting the Challenges of 112G

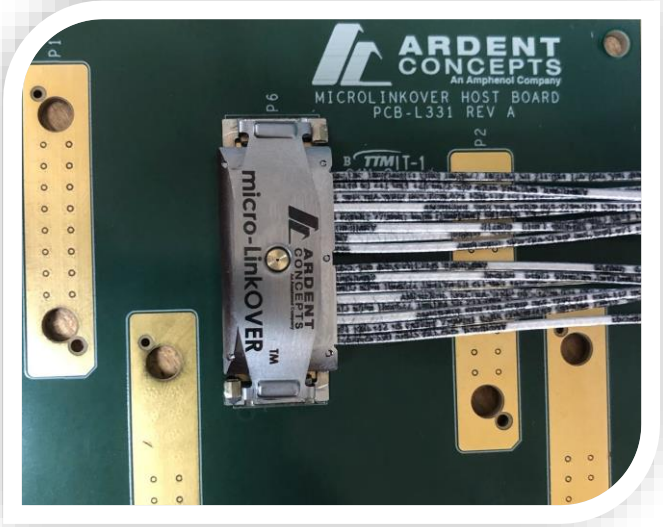
- 32AWG Solid Silver Plated Conductor
- 95 Ω
- FEP Insulation Supports Near Chip Applications
- Impedance tuned designs support:
  - **micro-LinkOVER**
  - OSFP
  - QSFP-DD
  - QSFP112
  - Paladin

- Proven EXD™ Longitudinal Shield Technology & Process
- Drainless construction
- Linear Response to 42+GHz
- RoHS Compliant
- RU AWM Style 22018
  - 30V 80°C VW1

Twinax Cable Performance

AWG	32
dB/M @ 14 GHz	7.7
dB/M @ 28 GHz	11.4
Height x Width	0.72 x 1.26





micro-LinkOVER™ Above PCB Connector System

Description:

Amphenol Ardent Concepts' patented micro-LinkOVER™ technology is a featured termination in Amphenol's OverPass™ products. micro-LinkOVER is an above PCB twinaxial connector system that provides system designers and layout engineers a cost effective approach to unlock the design flexibility needed to manage the technical challenges of PAM4 56G and 112G systems and beyond. Supporting data rates from 10G to more than 112G PAM4 per lane with high signal-to-noise ratio & low VSWR. micro-LinkOVER's direct to PCB compression mount solution eliminates the need for any lossy paddle cards, minimizing transitions and losses on system budgets. micro-LinkOVER's modular design allows for multiple form factors in dense footprints to fit in crowded real estate environments. micro-LinkOVER is an ideal solution for 100G/200G/400G Systems, Infiniband™, PCIe®, Chip-to-Chip links, and 5G systems.

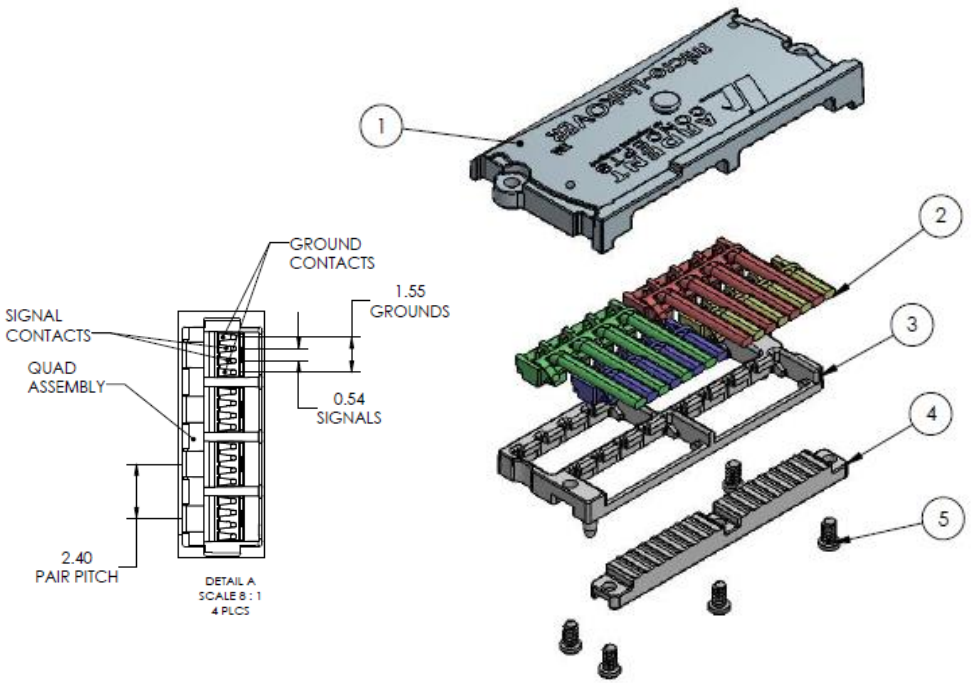
Applications

- 100G/200G/400G Systems
- 5G
- Infiniband™
- PCIe®
- Data centers
- Backside PCB interconnect
- Backplanes
- Future-proofing for 400G designs
- Chip-to-Chip link

Benefits:

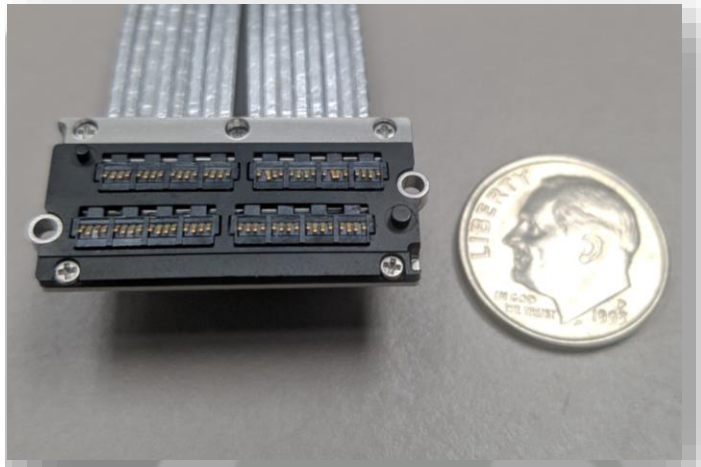
- Performance up to 112G+ PAM4 per lane (demonstrated 100 Gbaud per lane)
- Signal-to-noise performance of >30dB of Insertion Loss to Crosstalk @ 50 GHz
- Eliminates complicated and lossy trace routing
- High density footprint gets **MORE CHANNELS** closer to IC
- Eliminates retimers
- Lowers power requirements significantly compared to optical engines
- Designed specifically for differential pairs/routing

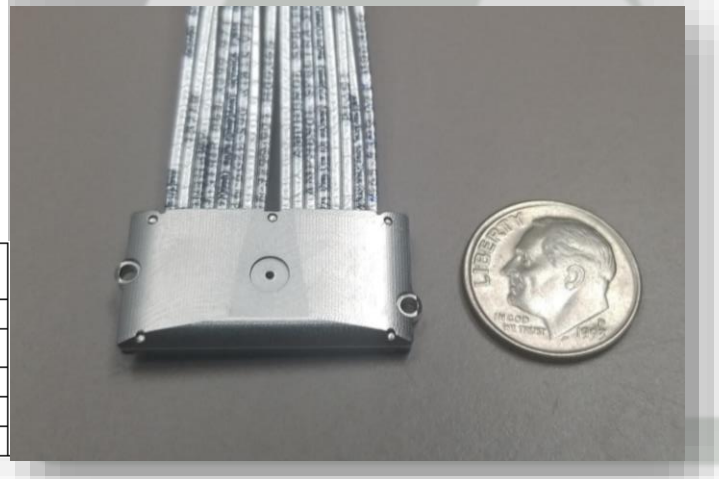
micro-LinkOVER Mechanicals



ITEM NO.	PART NUMBER	DESCRIPTION	ONE END ONLY/SCREW-DOWN/QTY.
1	mLO-LD-16X2-01	LID	2
2	QA-XXX-95-32DL-DT	QUAD ASSEMBLY	4
3	mLO-GP-16X2-01	GUIDE PLATE	2
4	mLO-SR-16X2-01	STRAIN RELIEF	2
5	M10PHCS02	M1 PAN HEAD, 2mm L	10

mLO-S16X2-020-S-01

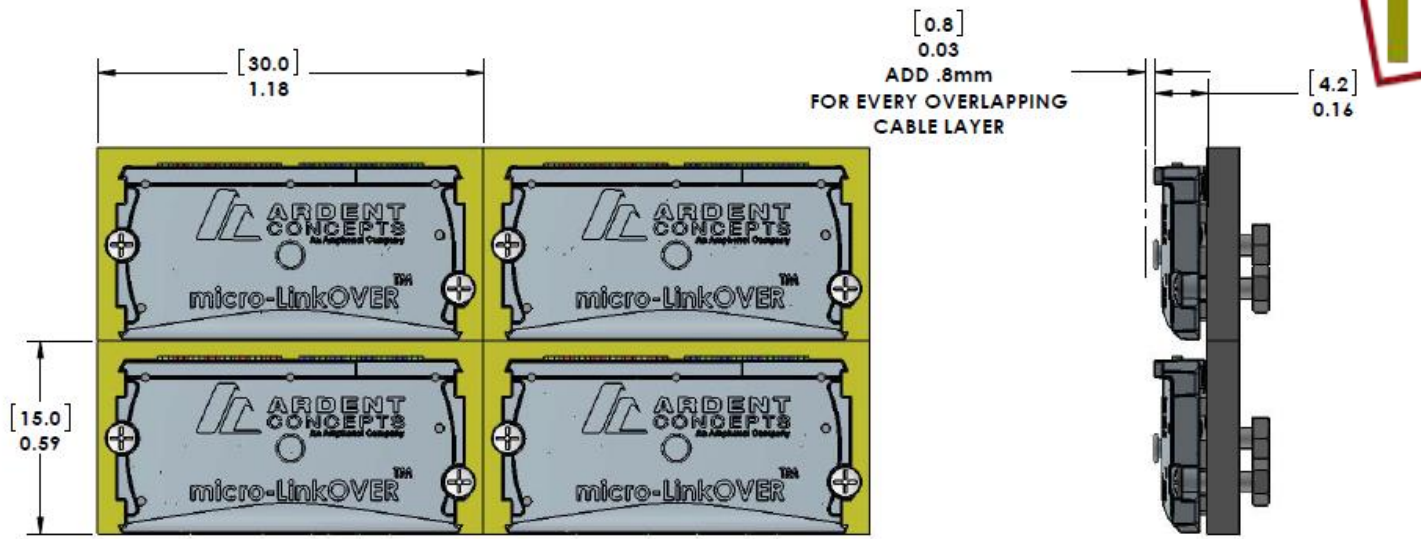




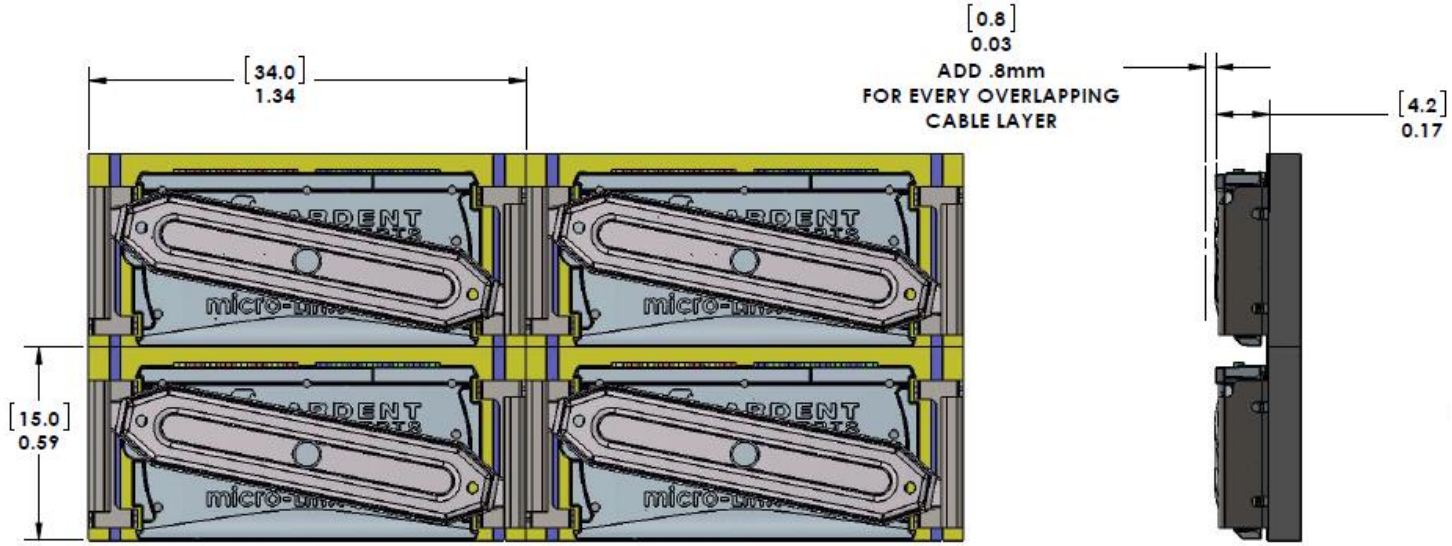
Quad

micro-LinkOVER Attachment Options

Manufacturing
NOW

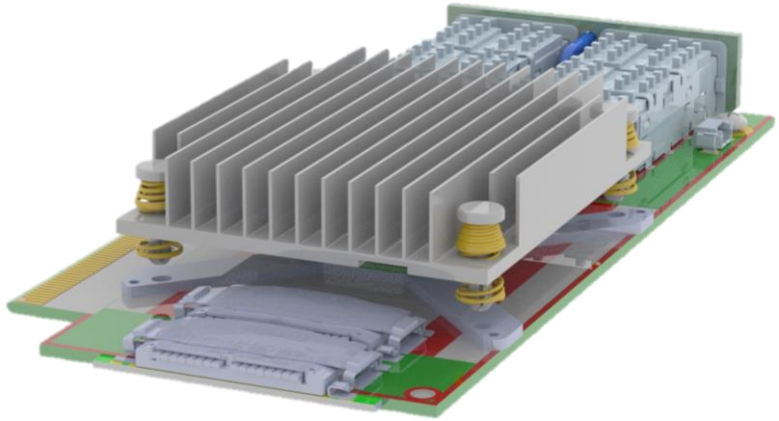


Prototyping
NOW

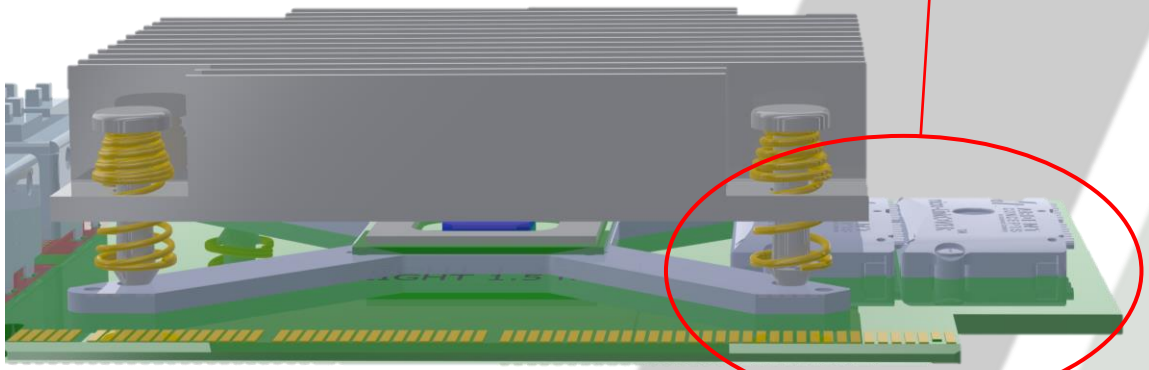


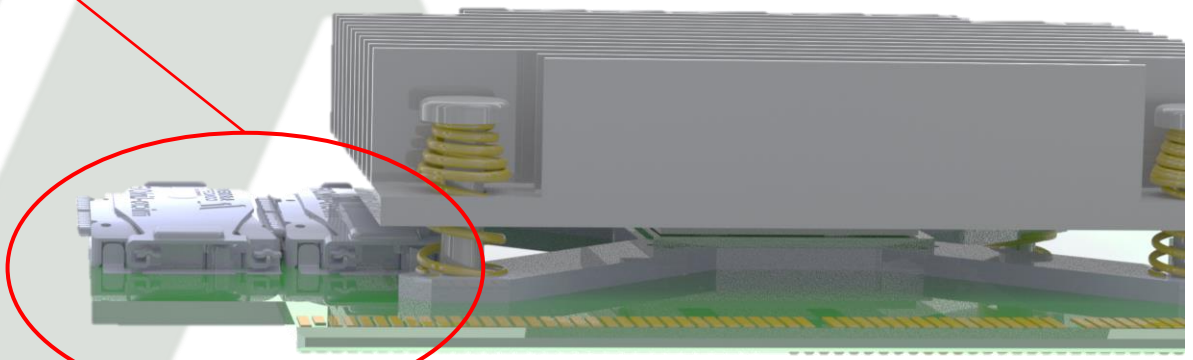
Low Profile

micro-LinkOVER can escape under a device heatsink



micro-LinkOVER's low profile mated height is ideal for getting closer to the device and escaping under heatsinks or between PCBs





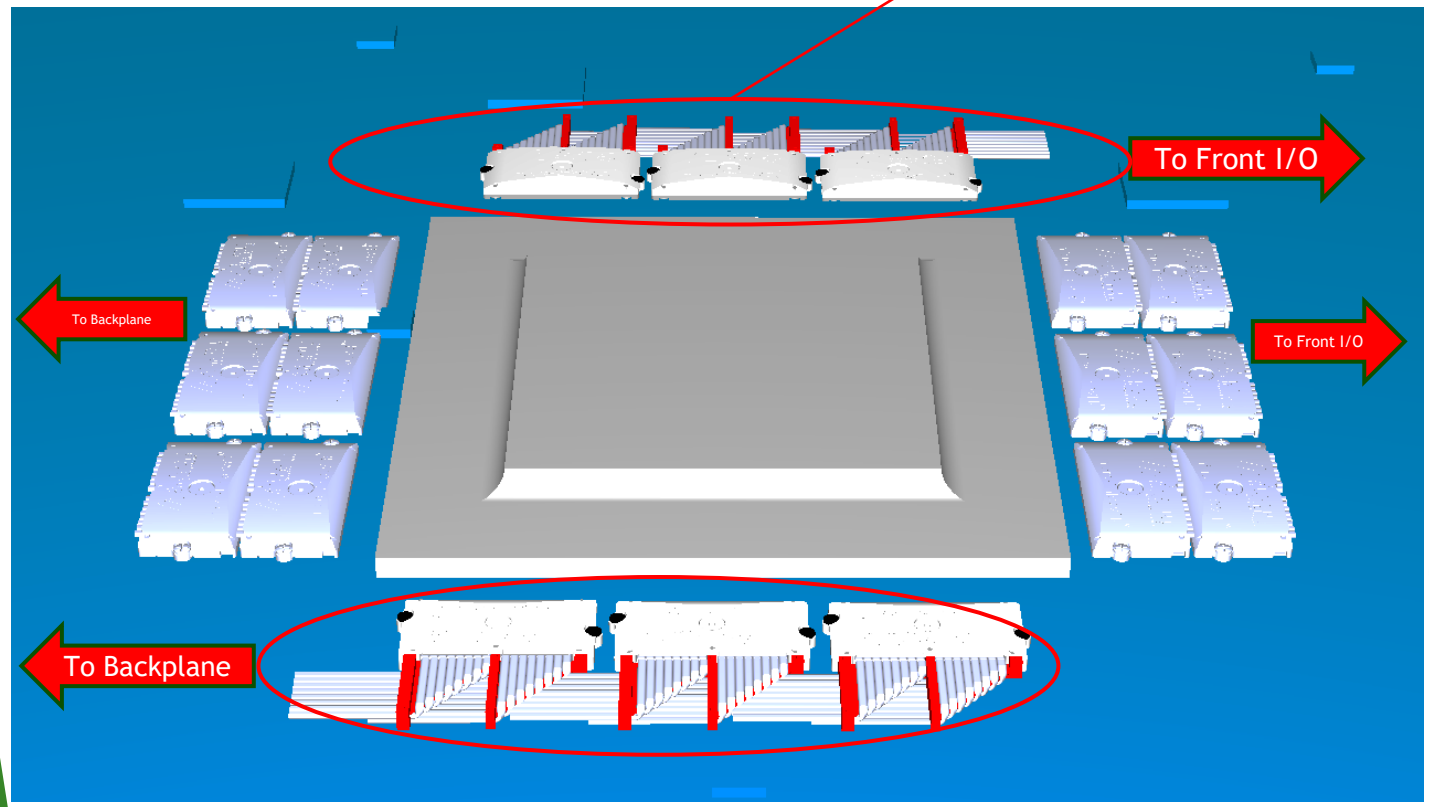
Screw mount 4.2mm mated height

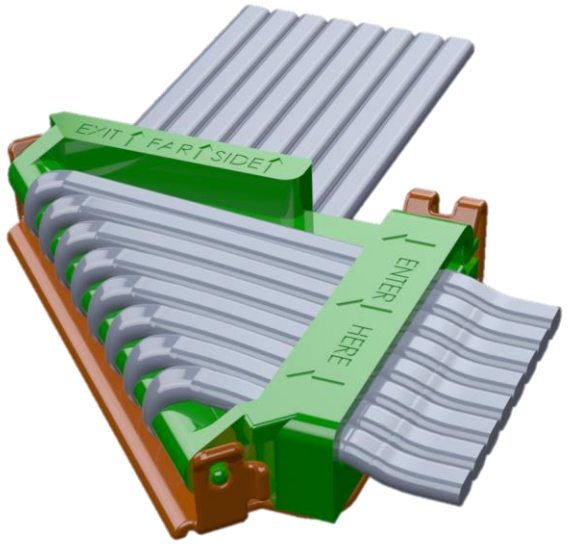
Surface mount 4.2mm mated height

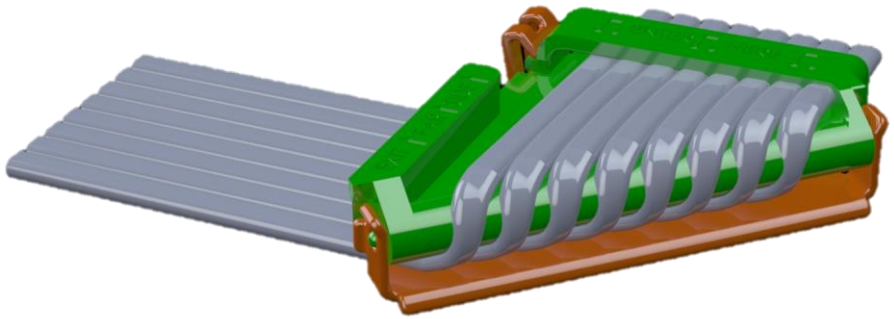
Cable Egress Option

Ability to egress at a right angle

Easily escape multiple micro-LinkOVER cables surrounding the chip in the same direction



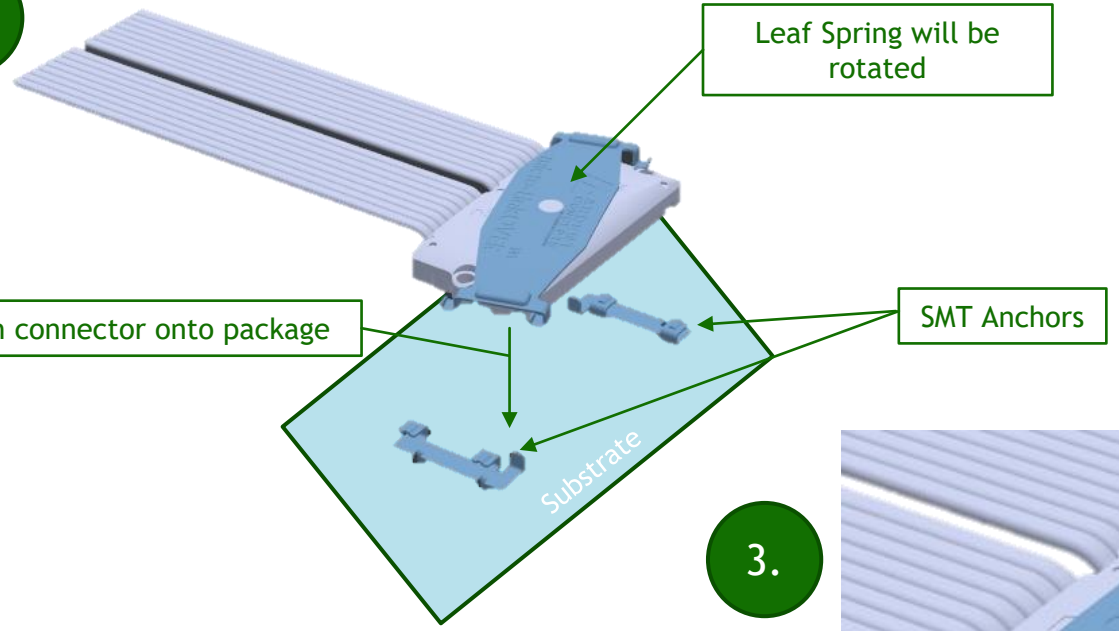




micro-LinkOVER SMT Anchor Form Factor (Prototyping NOW)

Mating Process

1.



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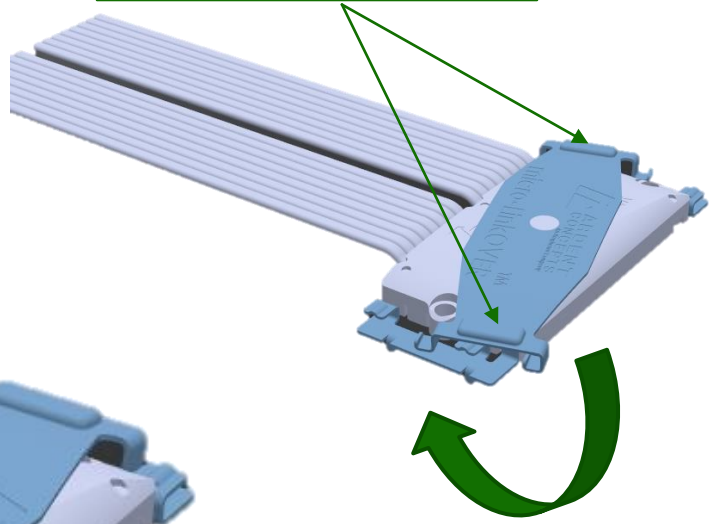
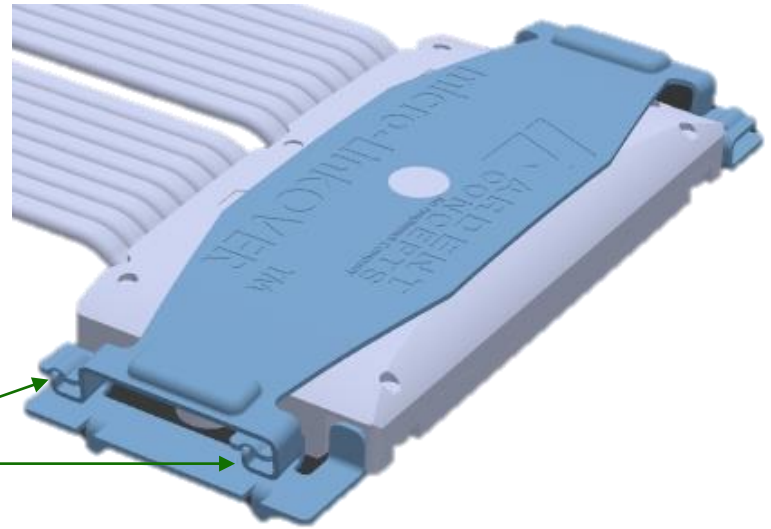
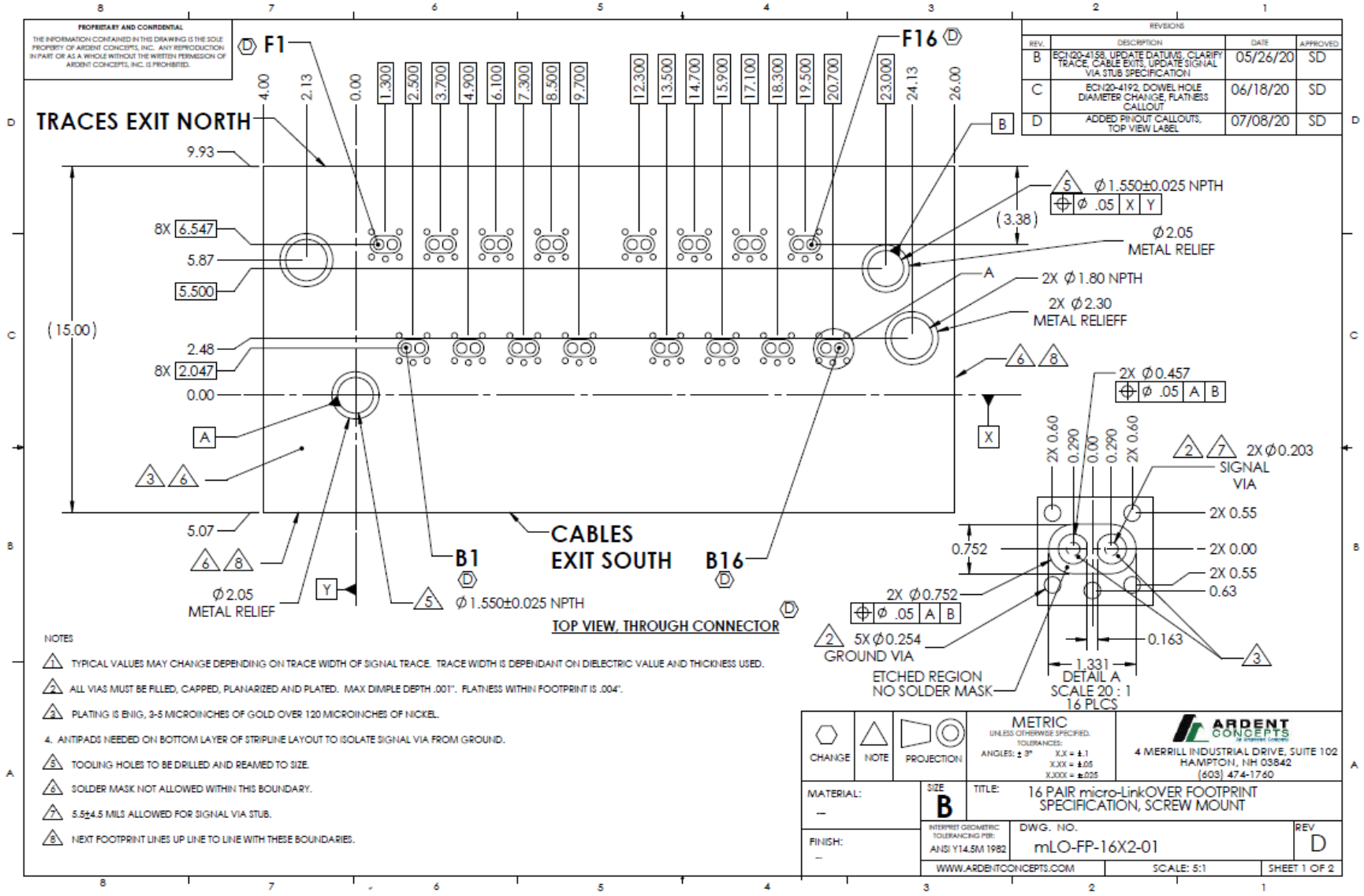


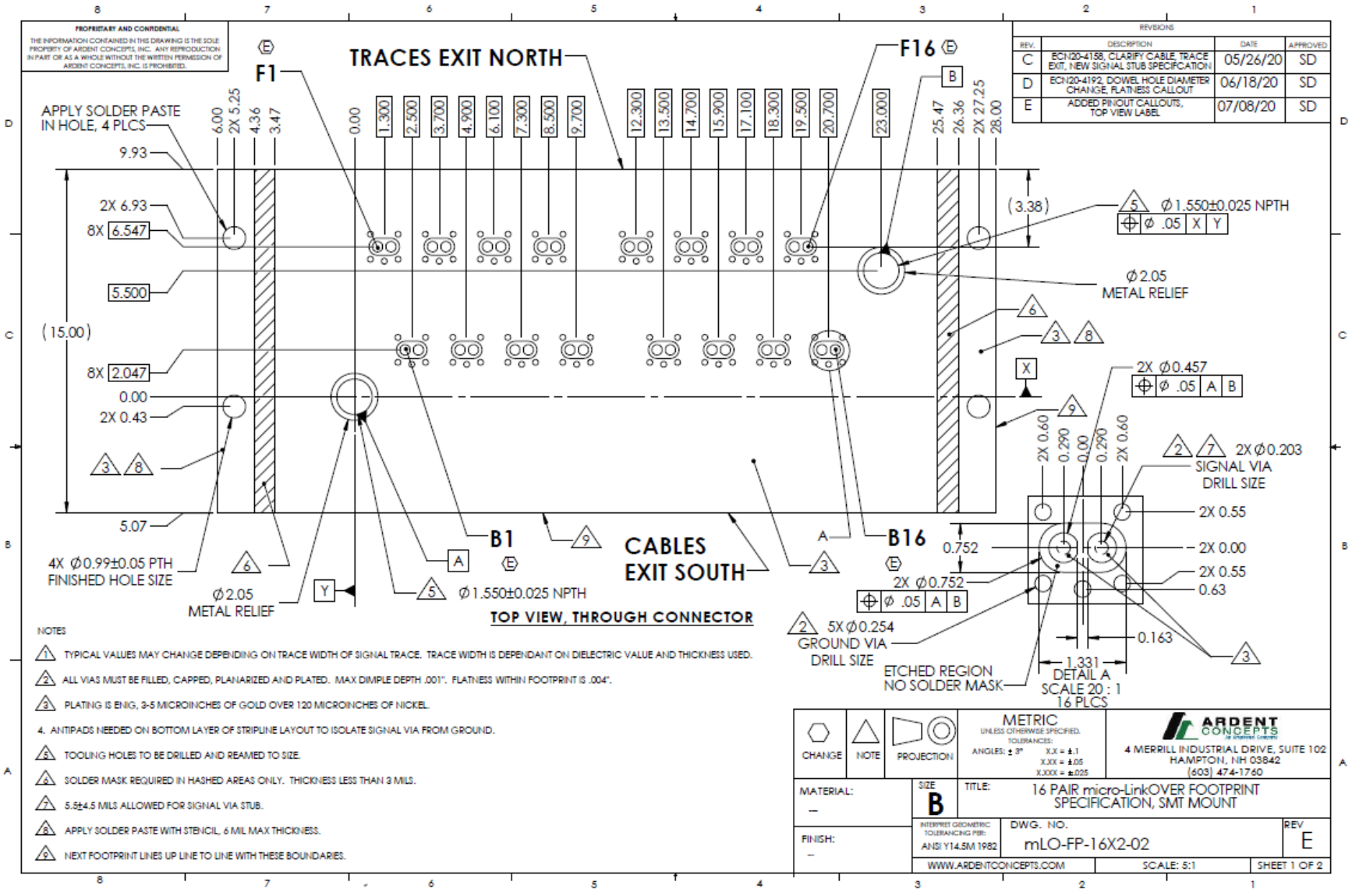
3.



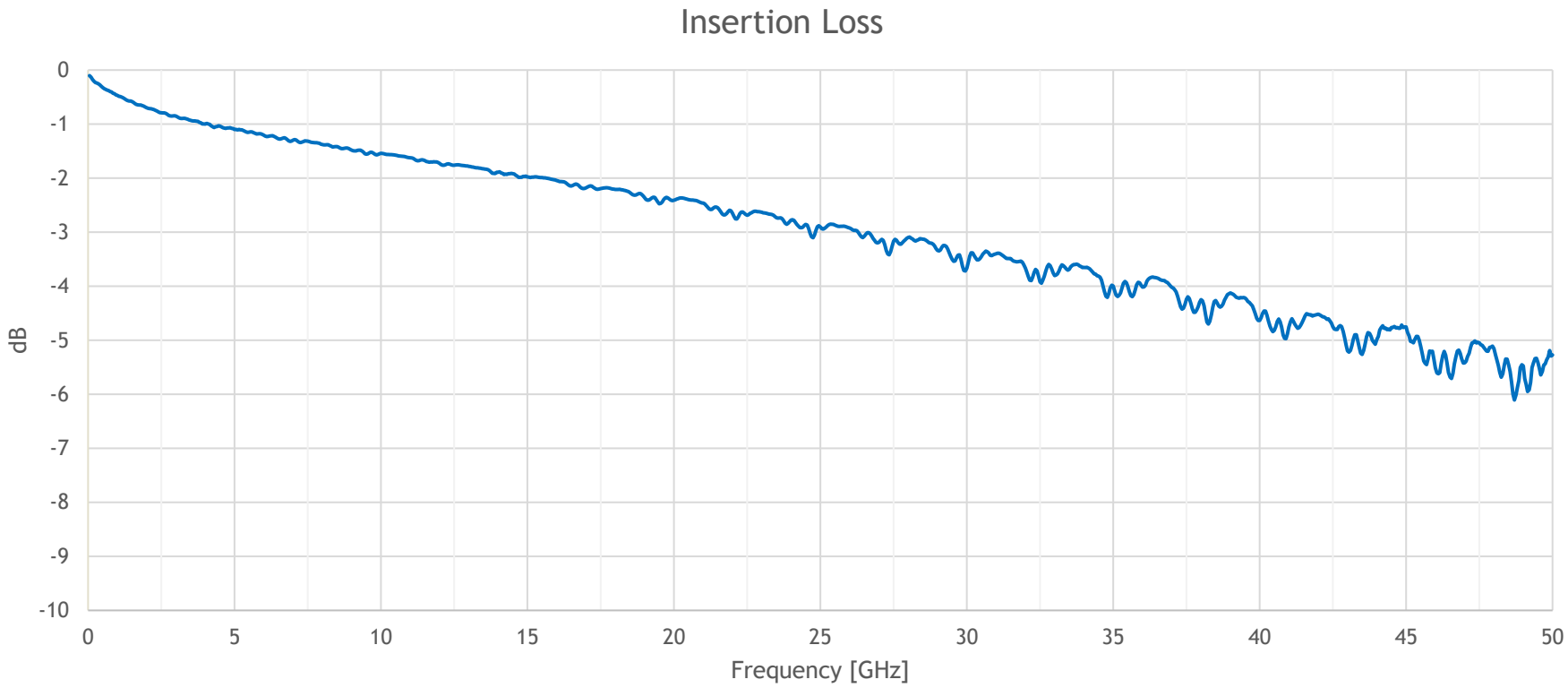
micro-LinkOVER Screw Mount Footprint



micro-LinkOVER Surface Mount Footprint

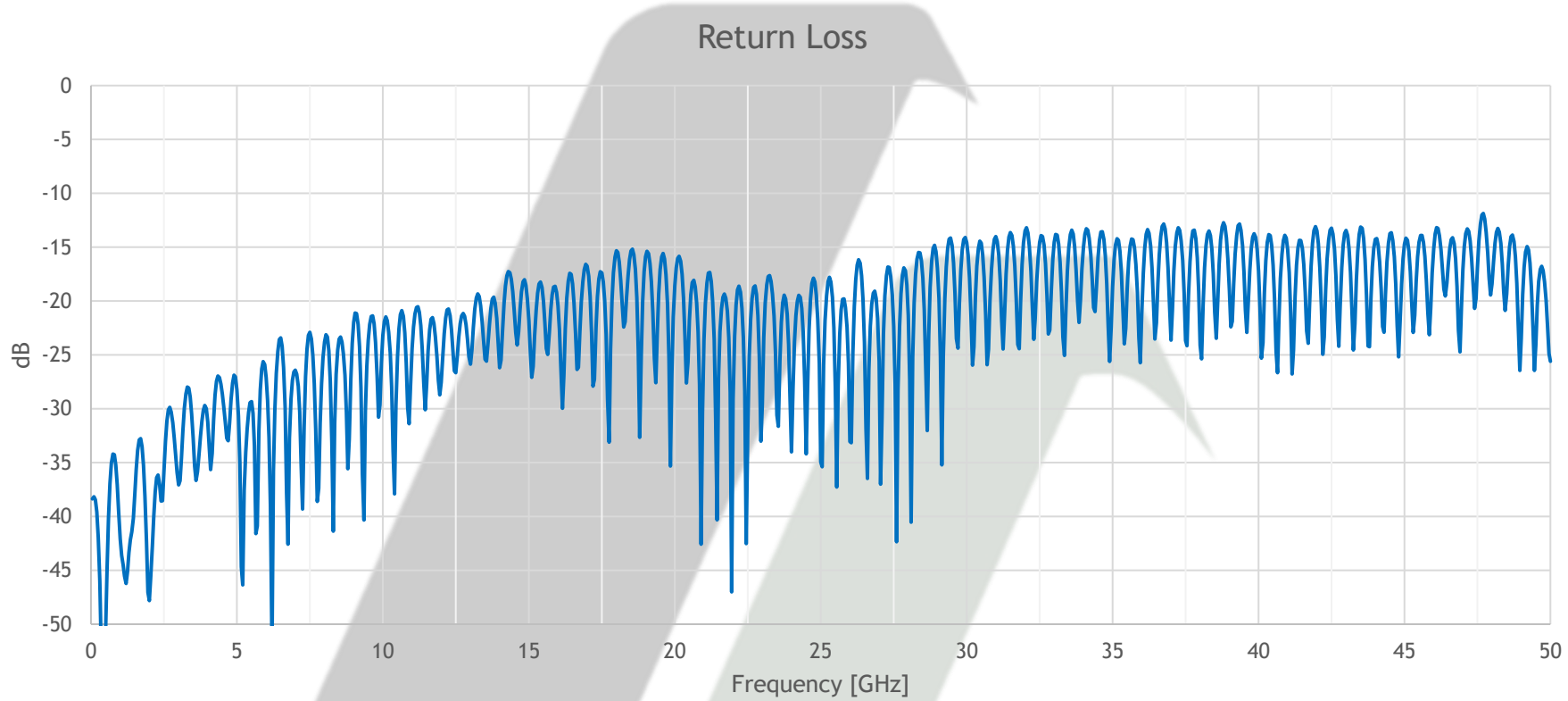


Measurement Data



- De-Embedded physical measurements of micro-LinkOVER Assembly (micro-LinkOVER to micro-LinkOVER) with 8” of 95 Ω 32 AWG cable. Measured data of the micro-LinkOVER with a stripline differential trace length of 2 mm made with Tachyon Dk 3.25 10 mils thick.

Measurement Data



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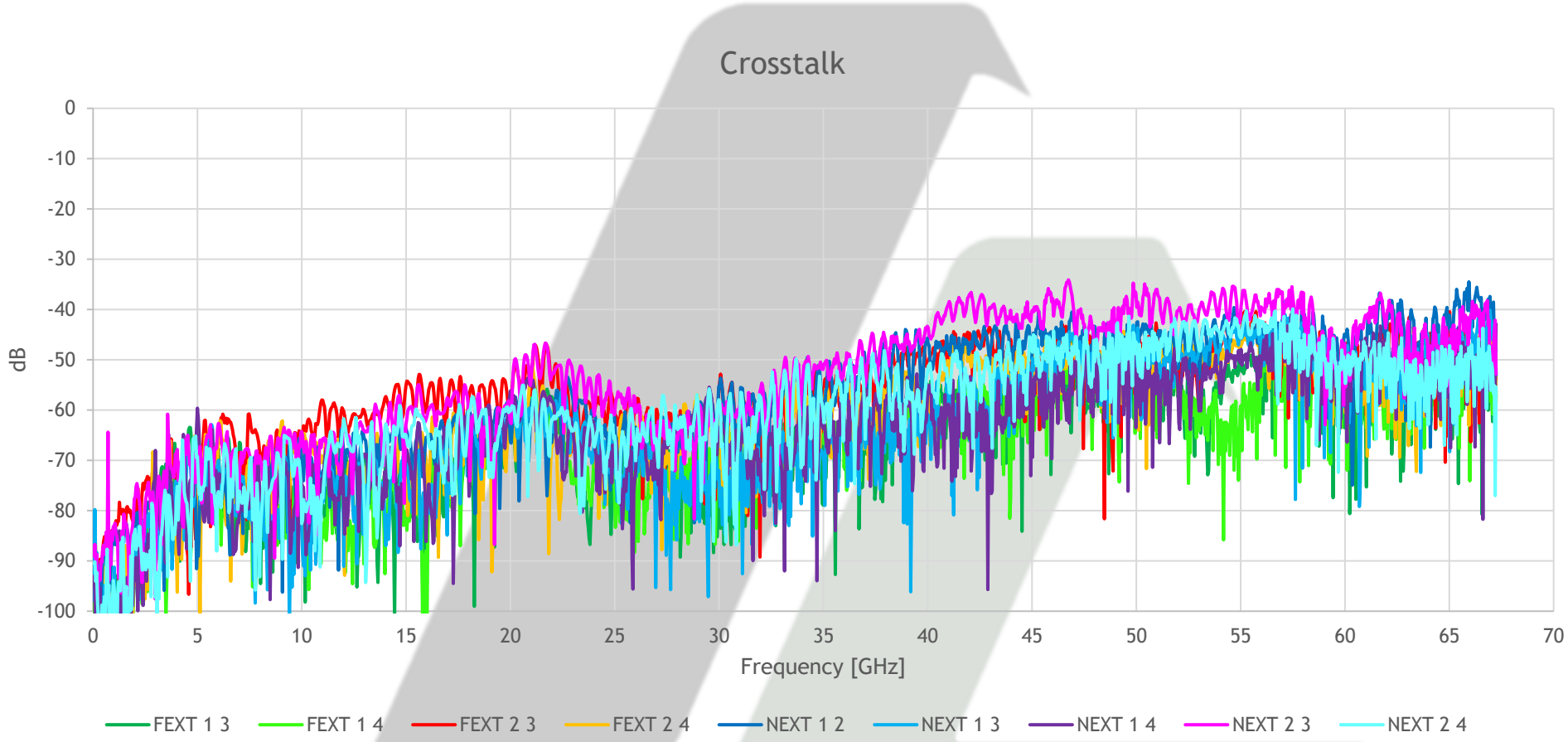
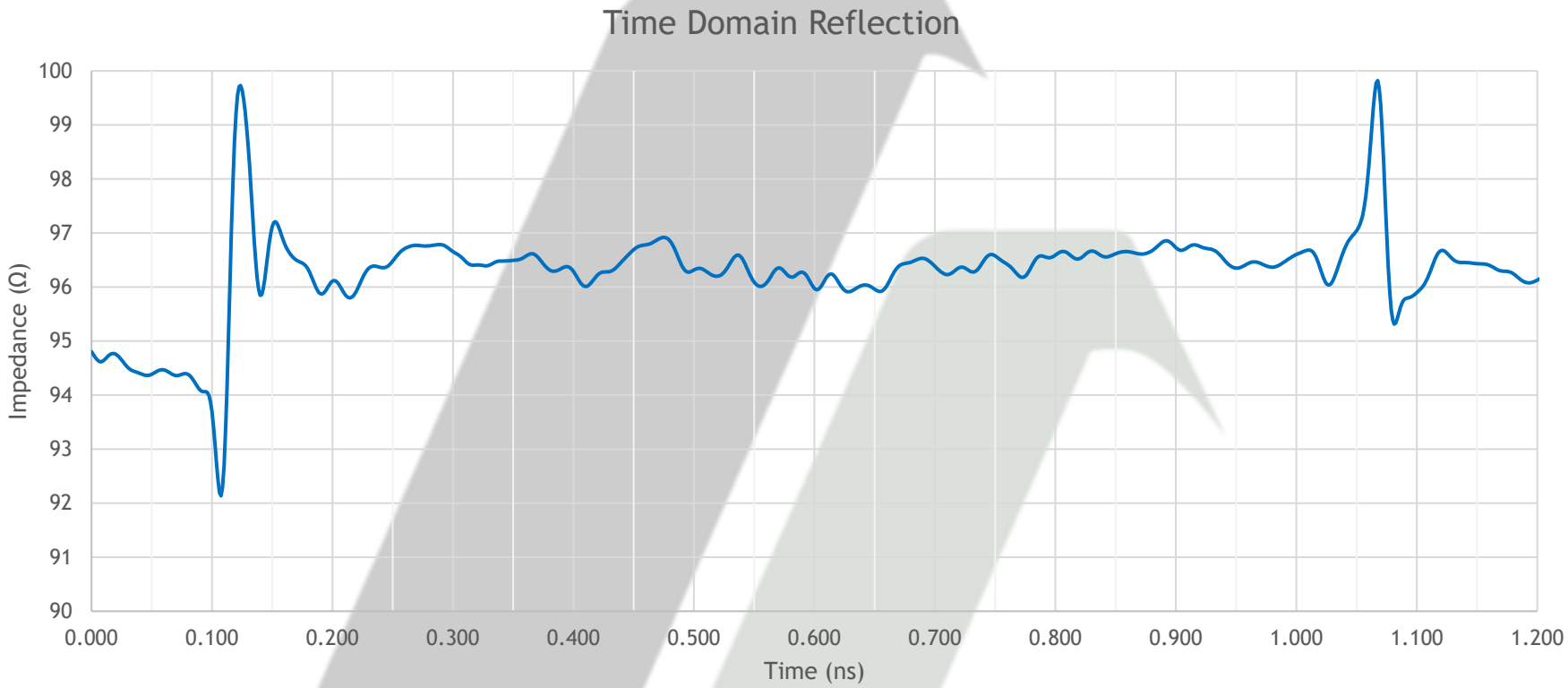
NEXT and FEXT of 8” µLO to µLO with two TR70-03VF Fixtures



- NEXT and FEXT with two TR70-03VF fixtures of µLO to µLO with eight inches of 95 Ω 32 AWG twinax cable on GCPW Stripline Differential with Tachyon Dk 3.25 10 mils thick.

Measurement Data

Rise Time: 20 ps



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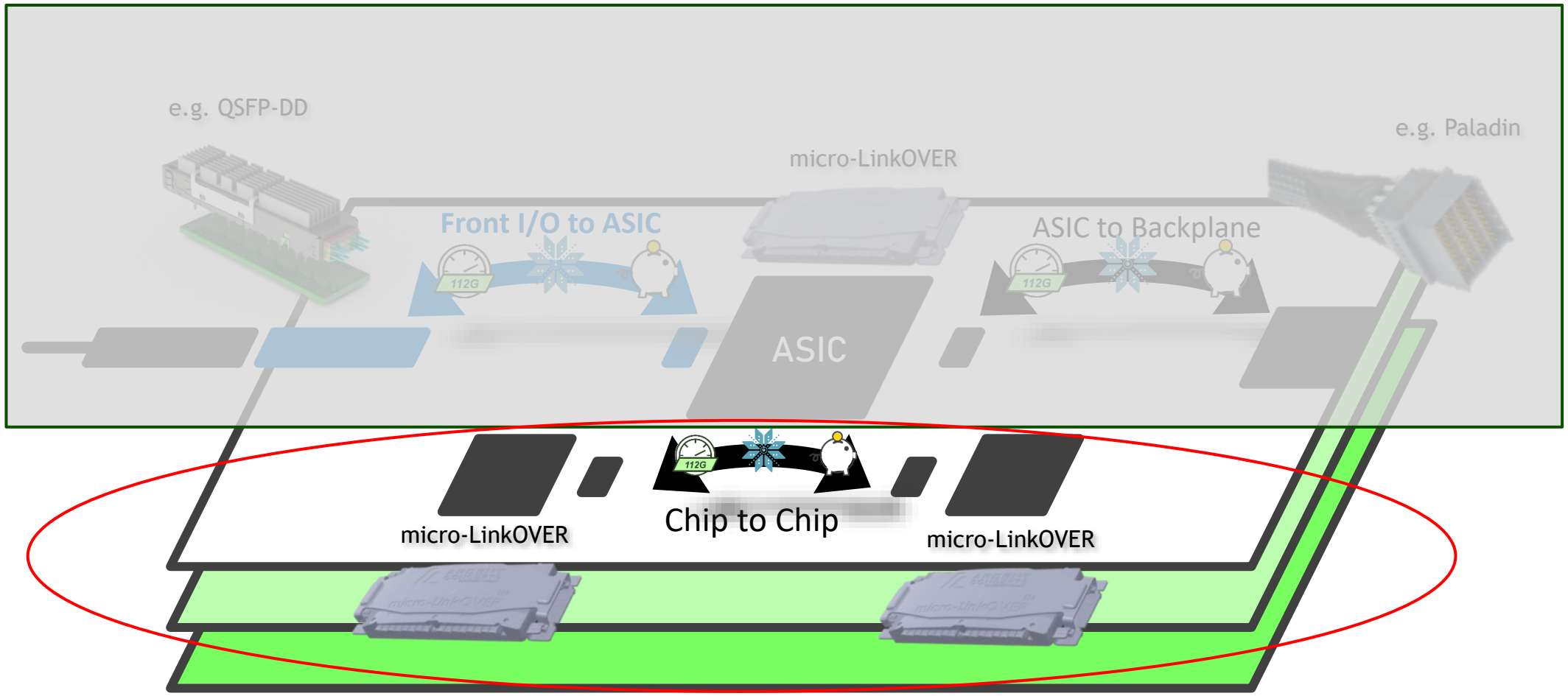
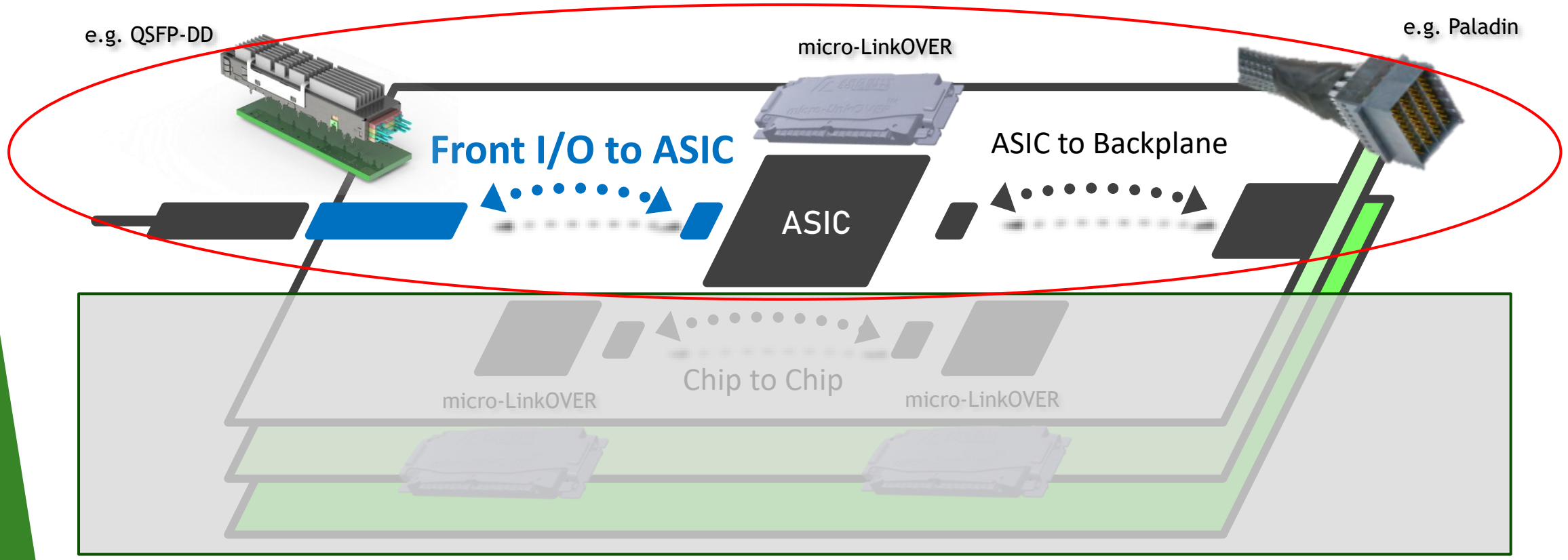
Use Case #1: micro-LinkOVER to micro-LinkOVER



Use Case #2:

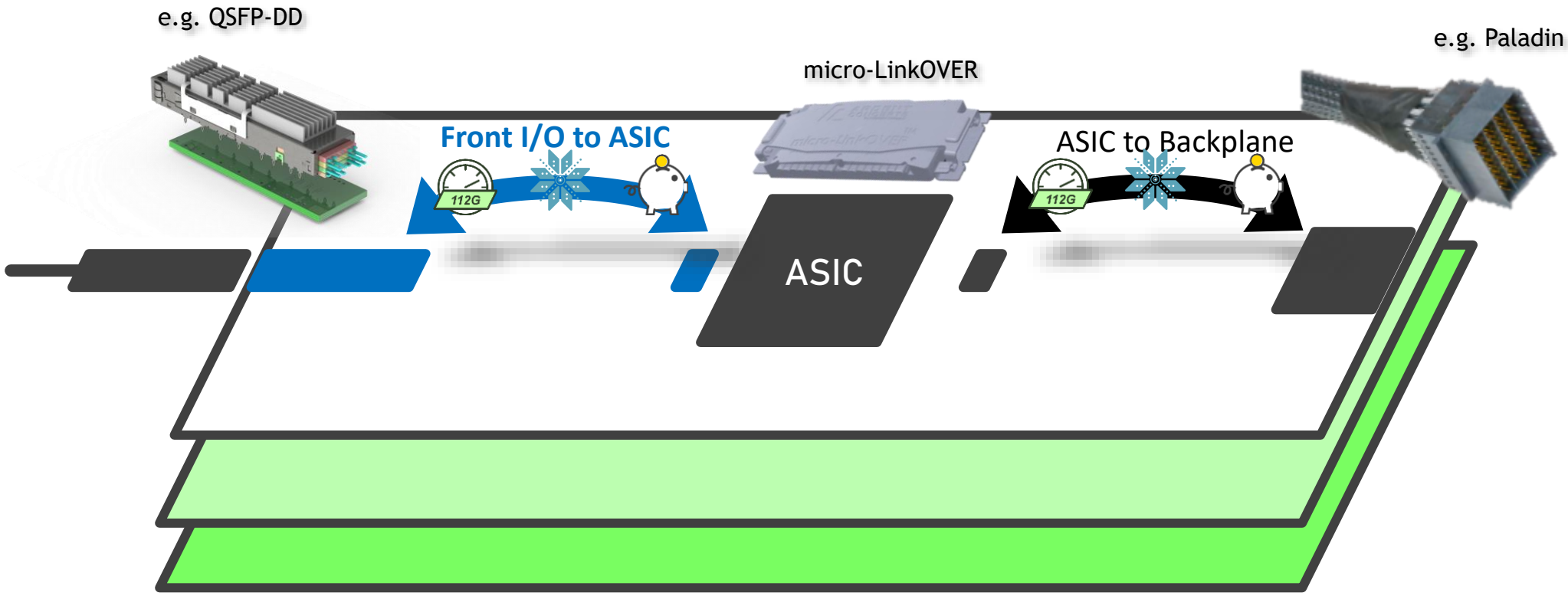
Front I/O Connectors to **micro-LinkOVER**
&
micro-LinkOVER to Backplane Connectors



micro-LinkOVER to Front I/O or Backplane Connectors

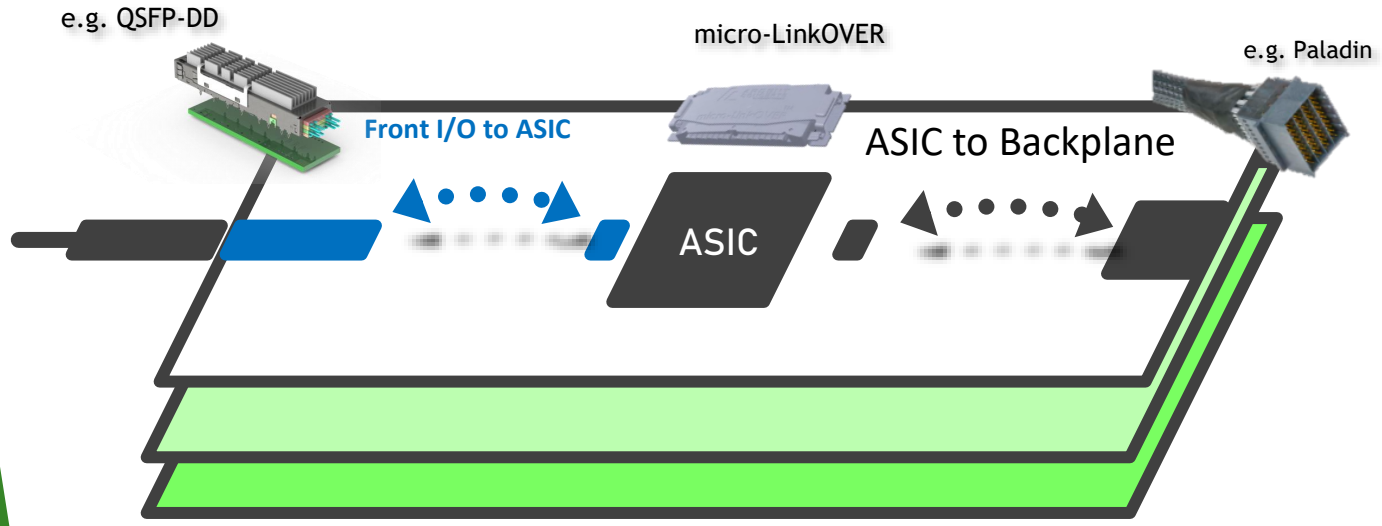
Benefits

micro-LinkOVER to Front I/O or Backplane Connector solutions offer designers enhanced signal integrity, thermal efficiency, and design flexibility to solve next gen challenges with cost effective solutions.



micro-LinkOVER to Front I/O or Backplane Connectors

Benefits: Signal Integrity

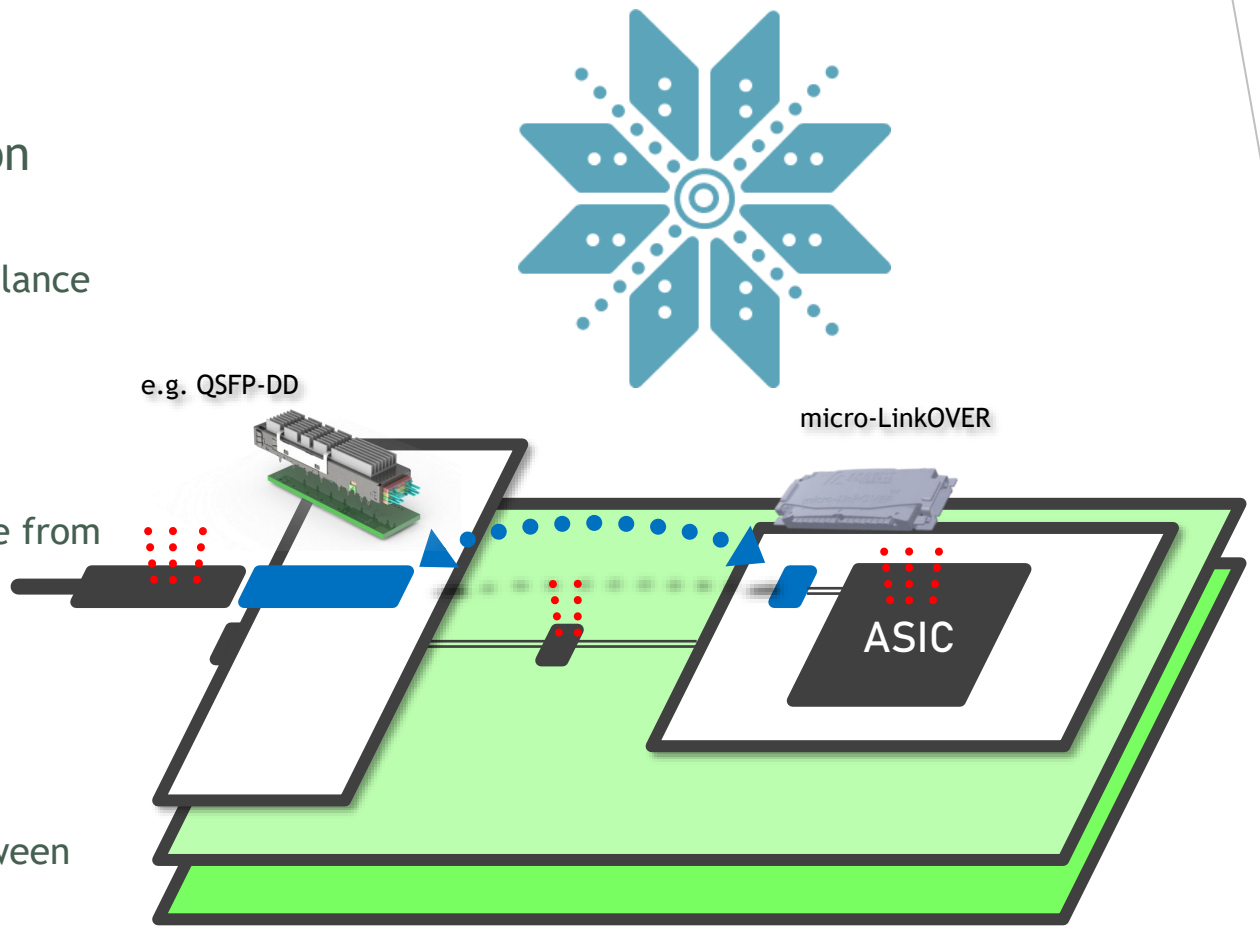


- Improved Signal Integrity
  - Cable vs PCB Insertion Loss
    - 112G OIF VSR recommended host loss budget:
      1. Mostly PCB trace reaching at least 14cm (5.5in)
      2. Mostly cable reaching at least 40cm (15.75in)
  - Direct wire attach to leadframe vs R/A board connector = improved loss & XT isolation
  - Stacked solutions = no SI penalty for upper port
  - Extra loss budget enables:
    - Higher Channel Operating Margin (COM)
    - Longer passive DAC's
    - Smaller wire size on DAC's
    - Cost effective host PCB materials
    - Removal of retimers
    - More spatial freedom to balance thermal loads
      - Optical modules, retimers, ASICs

micro-LinkOVER to Front IO

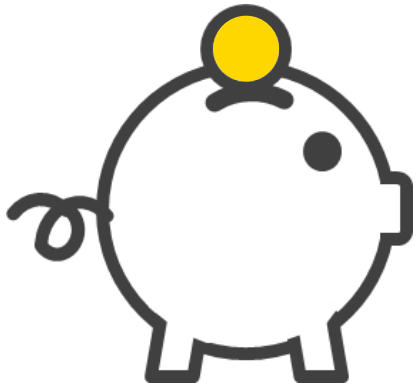
Benefits: Thermal

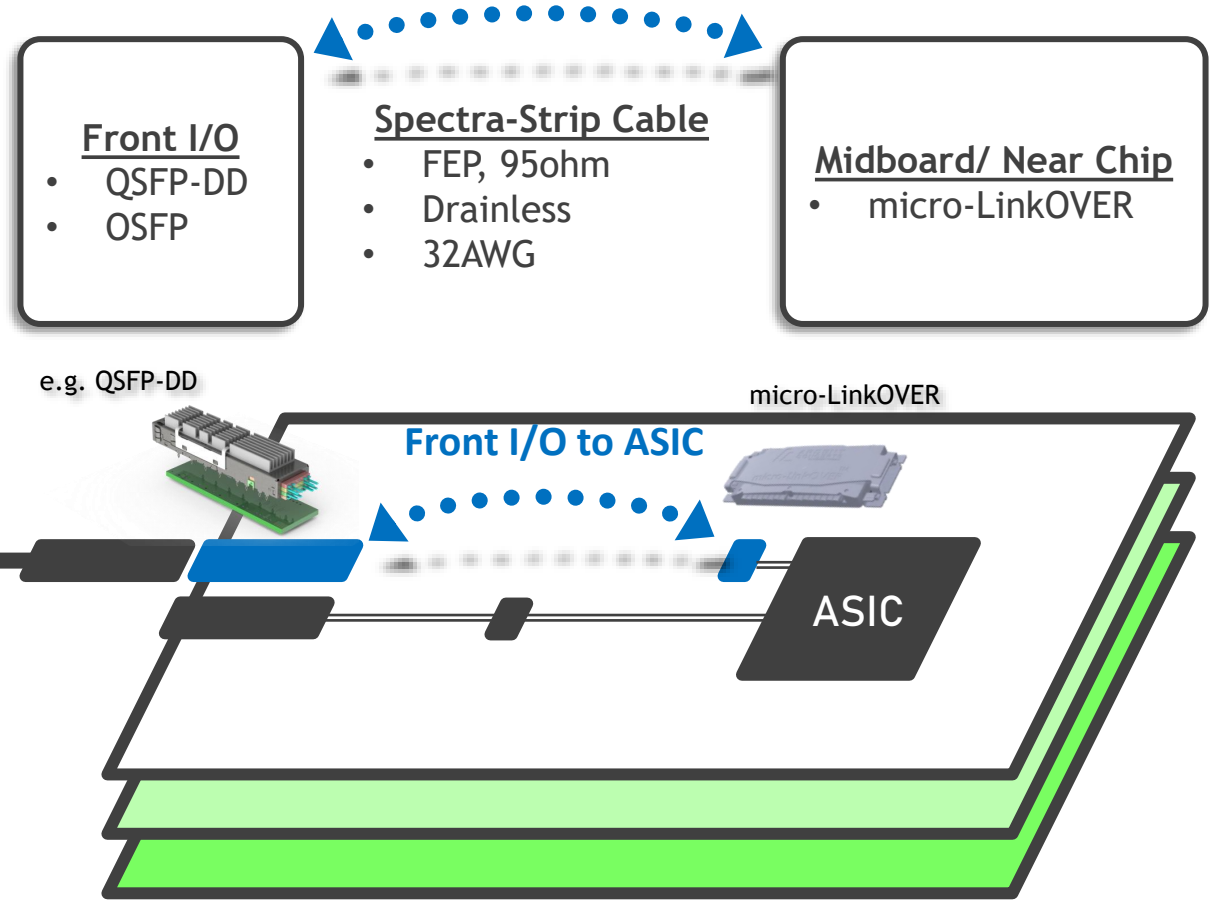
- Improve thermal efficiency
  - Eliminate retimers
- Relocated within plane (OverPass and ASIC on same plane)
  - Reposition ASIC away from the optical module to balance high thermal loads
- Relocate plane to plane
  - Move front IO to a different plane inside the box
  - Move the IO out of the box to isolate optical module from high temps inside the box.
  - Transfer the ASIC to another plane
- Other
  - Change front IO orientation to vertical
  - Stacked solutions can support airflow channels between upper and lower ports
  - Create PCB islands (modular architecture)



micro-LinkOVER to Front IO

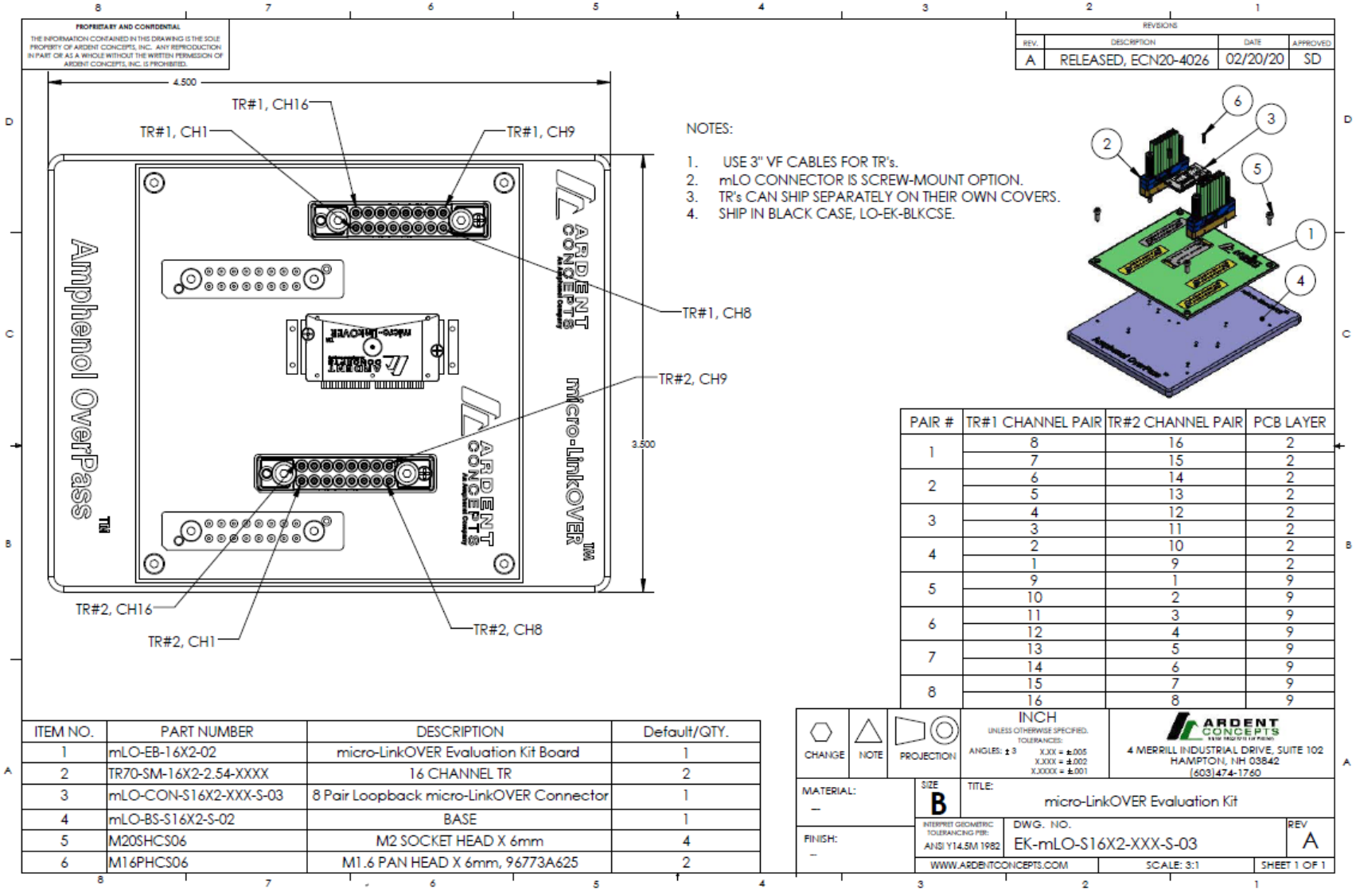
Benefits: Cost effective





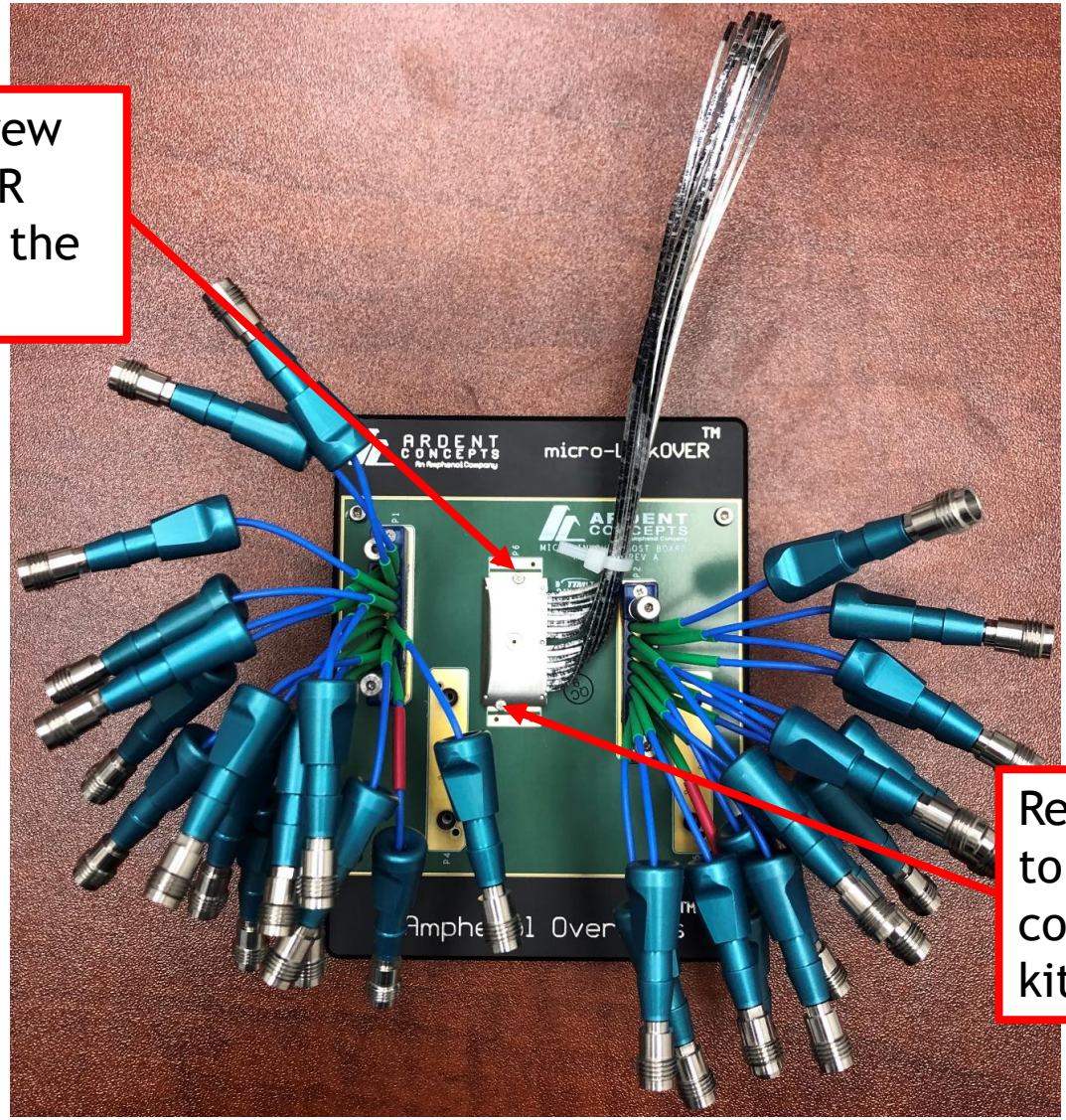
- Eliminate retimers
- Enable lower cost optical modules by isolating front IO from thermal load
- Extend the reach of passive DAC's
- Support the use of lower cost PCB materials
- Reduce number of high performance host PCB layers
- Reduce footprint of high performance host PCB area
- Reduced energy consumption by reducing and balancing the thermal load

Evaluation Kit



Evaluation Kit

Remove M1.6 Pan Head Screw to separate micro-LinkOVER connector from the rest of the kit



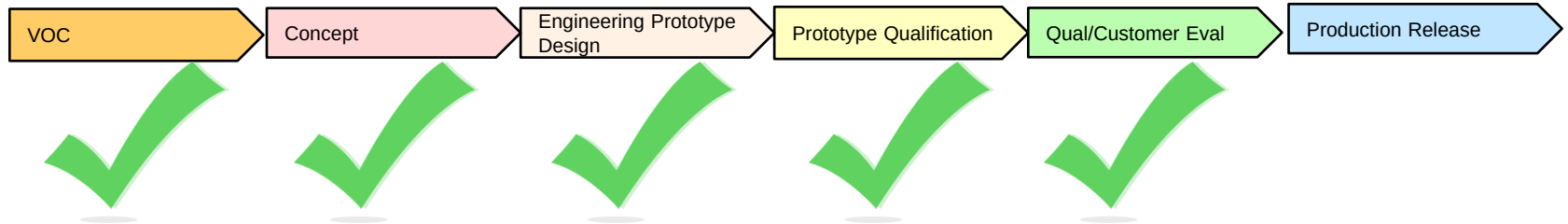
Remove M1.6 Pan Head Screw to separate micro-LinkOVER connector from the rest of the kit

micro-LinkOVER Production Timeline

Product	2020 Q1	2020 Q2	2020 Q3	2020 Q4
micro-LinkOVER (32 AWG)	Prototype Qualification	Qual/Customer Eval	Production Release	

Telecordia 12-17GR Testing

Key:



micro-LinkOVER Summary

- Performance up to 112G+ PAM4 (demonstrated 100 Gbaud per lane)
- Bypass lossy board traces
- Eliminate the need for retimers
- Lowers power requirements significantly compared to optical engines
- Extremely dense differential footprint
- Terminations to **Front I/O** and **Backplane** connectors for full system integration

ARDENT CONCEPTS
An Amphenol Company

FIN TEST

销售与技术支持：sales@fin-test.com

www.fin-test.com

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