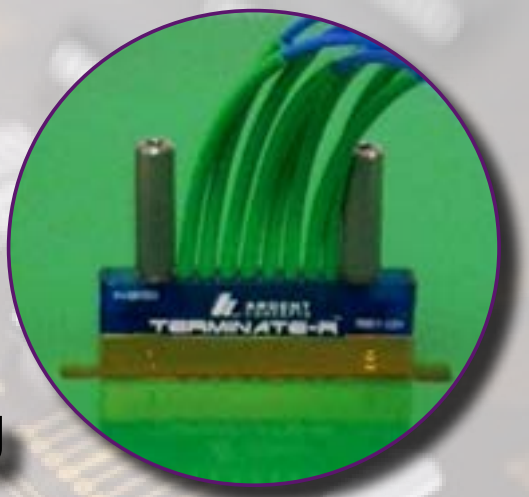
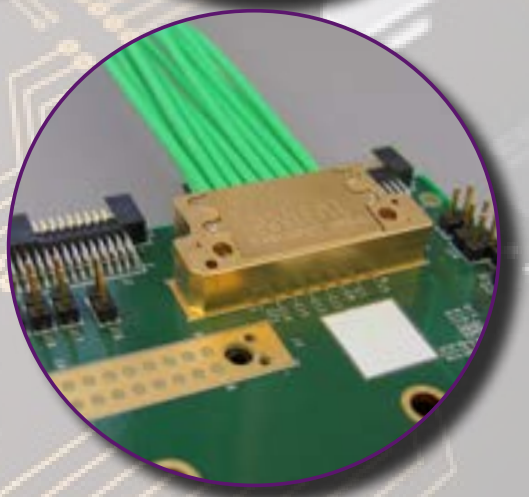
ARDENT CONCEPTS

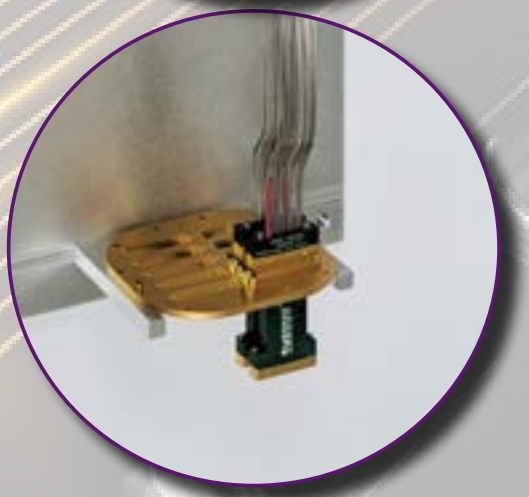
An Amphenol Company

TR™ Series Multicoax Catalog

High Speed | Solderless







TR Series Multicoax Connectors

Ardent Design Support 3
TR Multicoax Connector 4
Contact Technology 5
Form Factors 6
Understanding the TR Footprint 7
Coaxial Launch Optimization 8
Connector Types 9
Specialty Connectors 15
TR Multicoax Evaluation Kit 18
FAQ 19
Signal Integrity Data 21
Repeatability 22
Additional Information 23
Ordering Information 24

Ardent Design Support

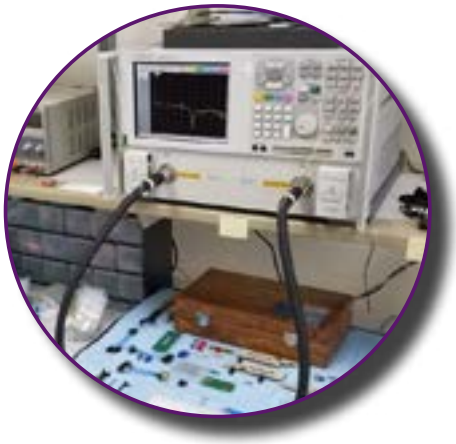
Unmatched Design Services

DESIGN

Ardent engineers bring novel approaches to solving even the most difficult connector challenges by working with customers to identify their electrical and mechanical needs.

SIMULATE

Advanced HFSS simulation lets our Signal Integrity Engineers ensure that our proprietary contacts will perform at the ever increasing speeds demanded by the markets we support.



MEASURE

We recognize that simulation on its own is not always sufficient. Ardent's in house Signal Integrity Lab features 40 GHz & 67.5 GHz PNAs, and equipment to ensure that your connectors and interposers are measured to ensure success.

TR Multicoax Connector

Description

Click for more information

TR™ Multicoax delivers superior signal integrity from multiple high speed analog or digital channels. With a choice of 20 GHz, 40 GHz, or 70 GHz+ configurations, users can upgrade their connectors as bandwidth requirements on their applications increases. TR is the highest density high speed multicoax connector on the market. The interface is compression mount which drives lower total cost of testing by avoiding costly solder-down components that can't be recovered, encouraging reuse across programs.

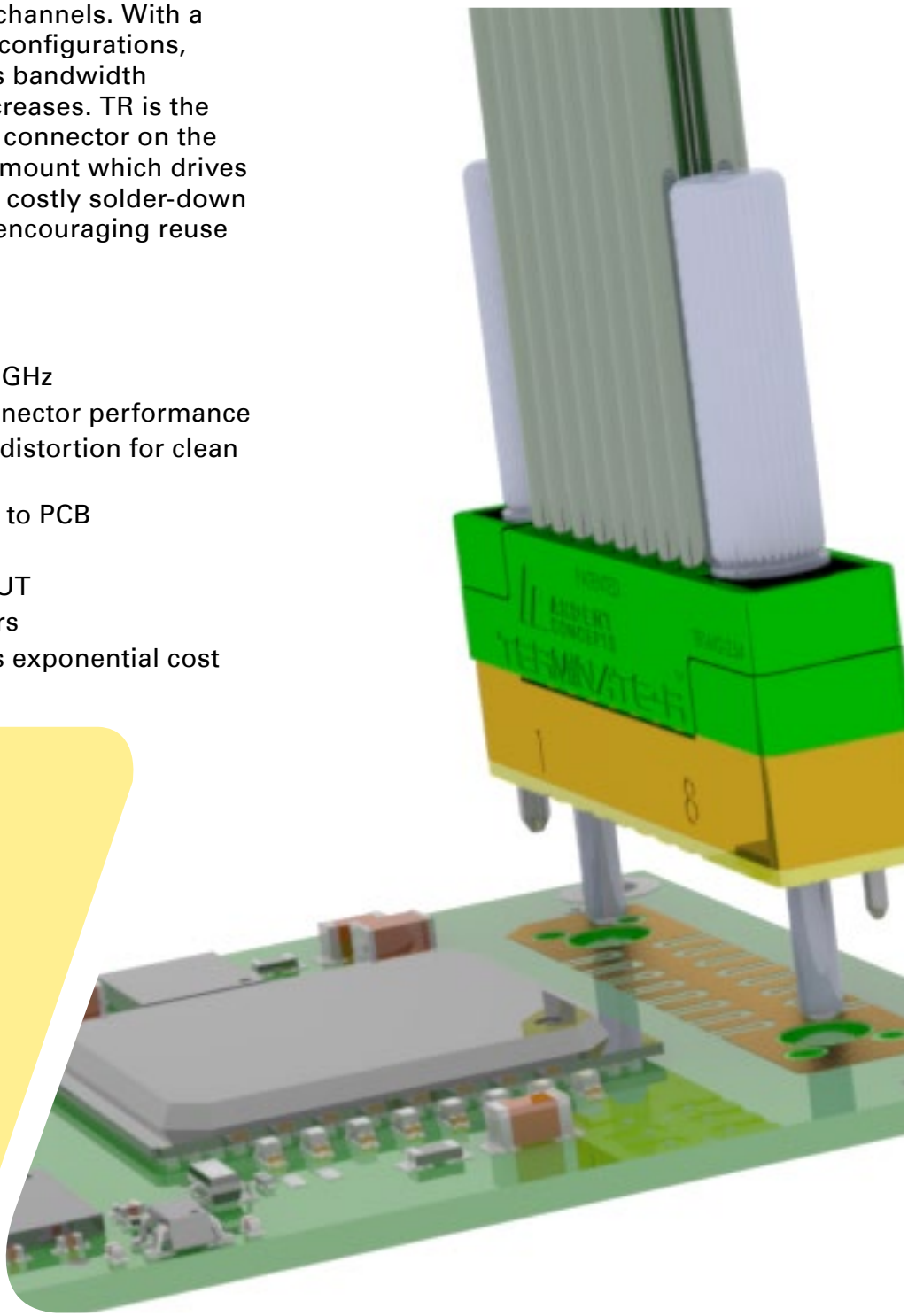
Key Benefits

- Superior signal integrity out past 70 GHz
- Better long term repeatability of connector performance
- Solderless system eliminates signal distortion for clean signal integrity
- Quick connection of multiple signals to PCB
- 80% space savings over SMPs
- High density gets TR closer to the DUT
- No more failing of snap-in connectors
- Reusable across programs promotes exponential cost savings

Applications

TR Multicoax connectors are ideal for use in:

- › Semiconductor Design & Test
  - Customer Evaluation Boards
  - PCIe
  - Pam4
  - High Speed SerDes
- › Automated Test & Measurement
- › Communications
  - Clock/Data Recovery (CDR)
  - Backplane Connector Characterization
- › Quantum Computing
  - Shielding Can Connector
  - Cryogenic Testing
- › Defense/Aerospace
- › Server/Data
- › Medical
- › Custom Applications

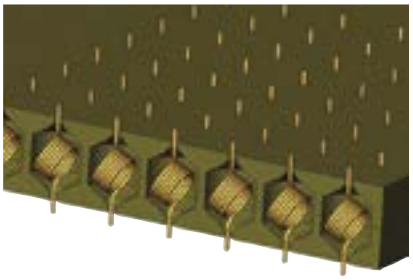


Contact Technology

Let us help you choose the right contact set for your application

Spring Probe™

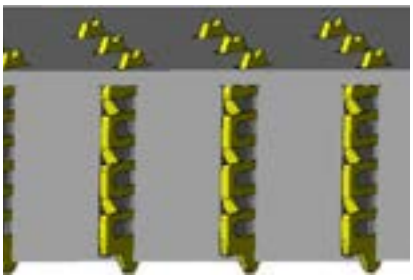
- Scalable solutions for connectors down to .4 mm Pitch
- Eliminates the barrel and the plunger from a traditional “pogo” style spring pin (Less mechanical components to fail)
- Patented “wipe action” of the coils causes contact to behave like a solid element Instead of behaving like an inductor. The result is exceptionally clean AC performance in an extremly short electrical path



Specifications	
Pitch	0.4 mm and above
Frequency	70 GHz+
Insertion Loss	-1 dB at 40 GHz @ 1 mm pitch
Self-Inductance	.5 nH
Mated Height	.76 mm and above

Connect-R™

- Cost-Effective Automation Loaded Contacts
- High Performance
- Stamped Contact for Area Array Applications Down to .6mm Pitch



Specifications	
Pitch	0.8 mm and above (area), .6 mm and above (linear)
Frequency	40 GHz+
Insertion Loss	-1 dB at 40 GHz @ 1 mm pitch
Self-Inductance	.5 nH
Mated Height	1.57 mm

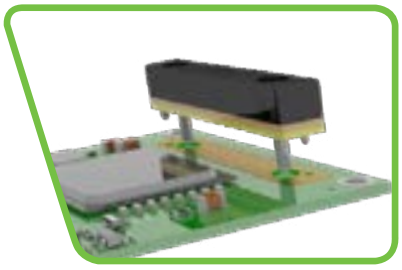
Form Factors

Straight Mount allows users to mount to a solderless footprint on your PCB with two or three thumb screws, ensuring a quick and reliable/repeatable connection out past 70 GHz for over 1000 mates and demates.

Quantum Computing form factors are designed to support the many unique challenges of Quantum Computing applications (e.g. density, substantial environmental changes, an increasing need for more high-speed lanes). By utilizing custom cabling materials (e.g. CuNi, NbTi) and our existing patented contact technology, engineers will be able to drastically decrease real estate required by individual connectors and increase their channel count while improving signal integrity in their systems.

Right Angle adds the ability to get high speed signals off the board in situations where you are Z-height limited. For example, to take signals from underneath the board, to go from board to board, or to get the cables out under a thermal shroud.

Blind Mate Test Head Interface solutions are ideal for applications where engineers need superior signal integrity with multiple reliable and repeatable connections out past 70 GHz. With precision designed interconnect solutions from Ardent, these connections can be designed into an automated mate/de-mate process capable of thousands of insertions with no degradation. Connectors can be cable to cable or cable to PCB.

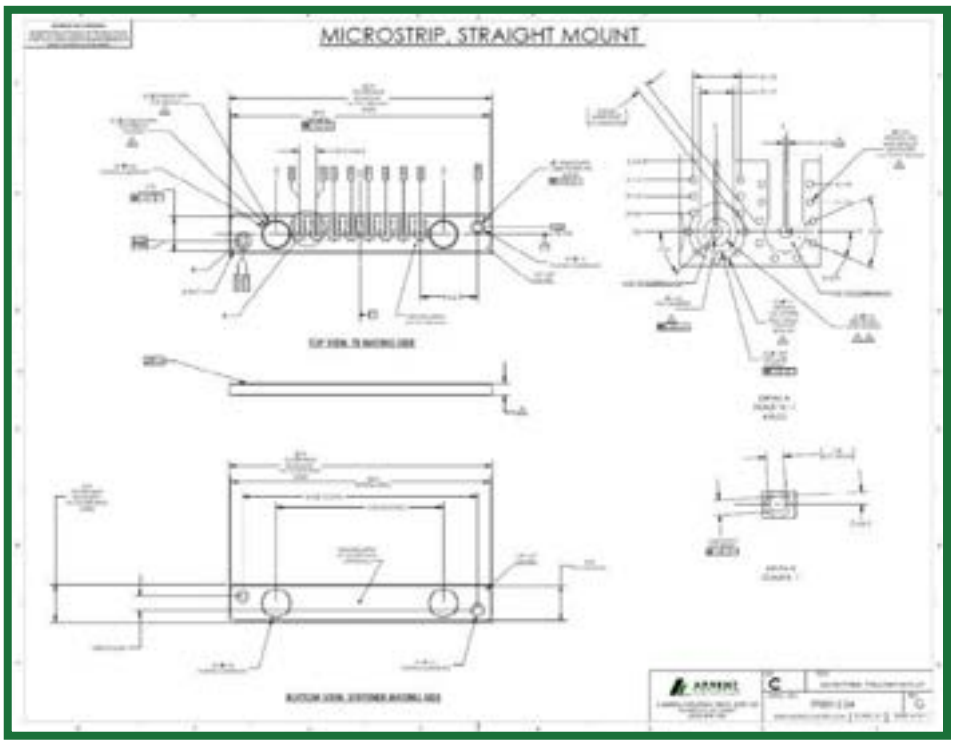


Loopback Allows engineers to test SERDES interfaces for at-speed defects in the analog transmission (TX) and reception (RX) buffers.

Understanding the TR Footprint

The Footprint:

- Amphenol Ardent Concepts' unique footprint technology is a piece of artwork printed directly onto the PCB.
- The straight mount and right angle TR Multicoax connectors mount to the PCB using either a board stiffener or a PEM nut.
- While they can be installed in the lab, it is best to install the stiffener or PEM nut during the fabrication process.
- A standard microstrip footprint is shown in the image to the right. This footprint is optimized for up to 20 GHz applications. For anything over 20 GHz, we recommendthe performance of a Footprint Optimization, which is a service that Amphenol Ardent offers.



Plating:

In the footprint document, the notes call out for hard gold over nickel plating. It is important to note that this is not the only acceptable form of plating and that ENIG, ENIPIG, or any other form of noble metal plating is acceptable. Tin or lead plating is prohibited.

Important Notes When Reviewing Footprint:

- The TR Footprint requires no soldermask within the artwork. Soldermask is often uneven and causes planarity issues, which is problematic for the TR's compression mount technology as it relies on a flat surface to make a proper connection.
- There are two different sized callouts for the TR's mounting holes:
  - 3.99mm diameter mounting holes for PCBs that have a thickness greater than 93 mils (2.36mm)
  - 3.73mm diameter mounting holes for PCBs that have a thickness of less than 93 mils (2.36mm)
- The TR Footprint has an alternating ground via bolt pattern, which is shown in the footprint. This is important to implement as it severely cuts down on crosstalk between TR channels.

Coaxial Launch Optimization

Description

Our patented TR Series compression mount, high frequency connector assembly stands alone as the only industry solution for high density multicoax cable assembly capable of measurements out past 70 GHz.

Due to the highly precise and high performance nature of the assembly, Ardent Concepts strives to optimize all aspects of the TR Series design, including the PCB launch (footprint). The PCB launch for the TR connector is integral in producing the maximum performance from the TR connector.

Key Benefits

Each optimization is uniquely performed around the customer's specific PCB design to account for differences in:

- Board materials (dielectric constants)
- Layer thicknesses
- Complete PCB stack-up

3D models of the customer's PCB board and along with in-house 3D models of the TR connectors, advanced electro-magnetic 3D simulation is used to analyze and provide corrective solutions for the optimal launch configuration.

Simple 'Optimization Checklist'

ARDENT CONCEPTS **Terminate-R (TR) Launch Optimization Checklist**

COMPANY NAME: GENERIC COMPANY A

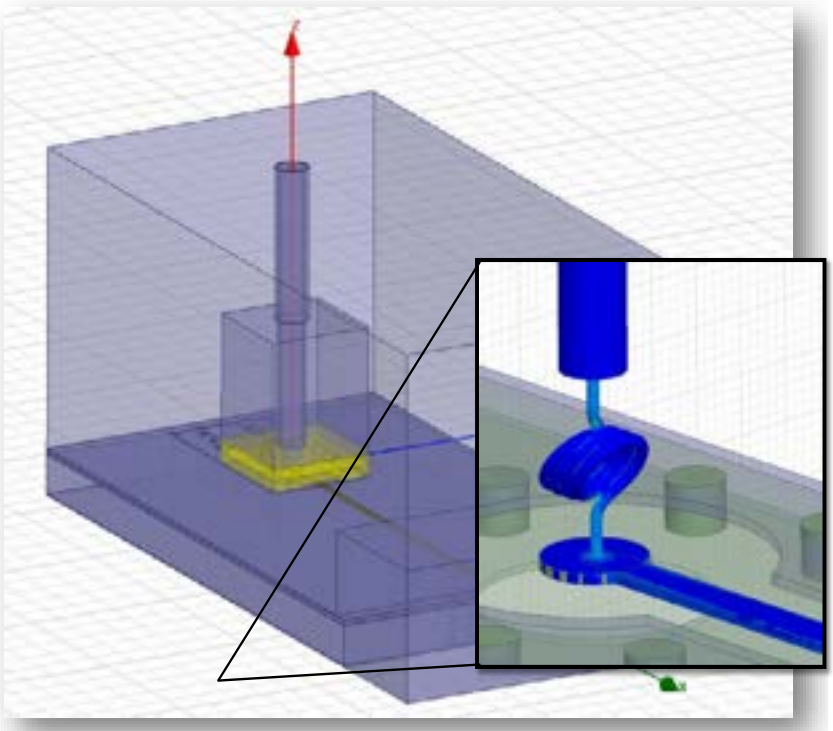
1. What is the maximum operating frequency?
   12 GHz
2. What type of signal?
   Digital ☒ Analog ☒
3. How many channels will the TR Multi-coax cable have?
   1 ☐ 4 ☐ 8 ☒ 12 ☐ 16 ☐ 24 ☐
4. What is the pitch of the connector? (NOTE: The standard pitch is 2.54mm)
   Standard
5. Is the PCB stack-up included? (NOTE: The PCB stack-up must be included to start work on order)
   YES ☒ NO ☐
6. What is the PCB total thickness?
   See stackup file
7. Is the PCB trace design microstrip or stripline?
   Microstrip ☒ Stripline ☐
8. If the PCB trace design is microstrip, is the transmission line CPWG?
   CPWG ☐ NON-CPWG ☐
9. What layers are there to be signals launched on?
   microstrip
10. What is the dielectric constant of the PCB material surrounding the signal layers?
    Meg 6
11. How many total layers does the PCB have?
    MS routing – no vias in design
12. If the PCB stack does not specify, indicate reference/ground layer numbers
    See stackup
13. If the PCB stack does not specify, indicate power layers' numbers
    See stackup
14. If the PCB stack does not specify, indicate signal layers' numbers
    See stackup
15. Is the TR mounted on Top (Layer 1) or the Bottom of the PCB?
    Top (Layer 1) ☒ Bottom ☐
16. Via drill diameters are .010" (.25mm) as standard. Will these drill diameters be used? If not, what is the desired drill diameter?
    10mil
17. What is the desired return loss at a given frequency of the optimization?
    The default is: [-20 dB to 20 GHz] and [-12 dB to 40GHz]
    Default is o.k.

Consult factory for checklist

What's Provided

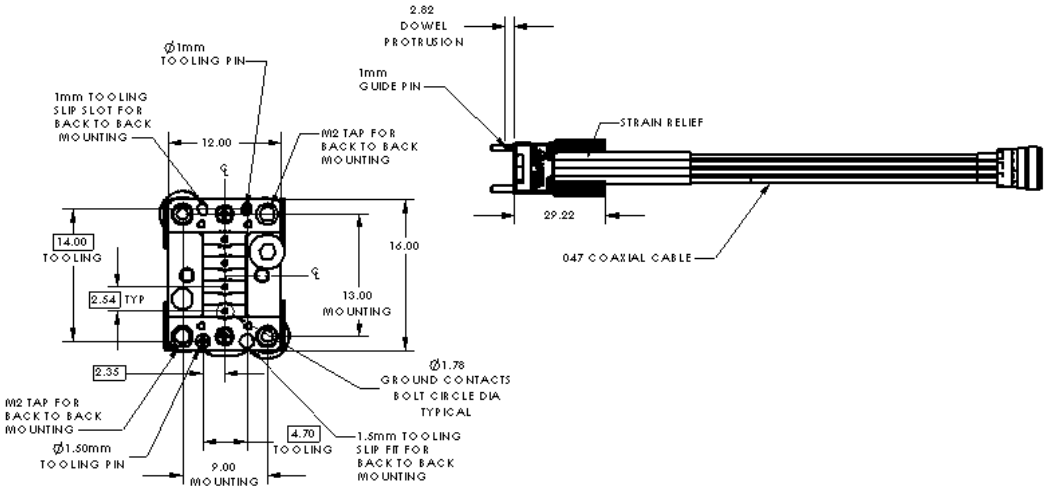
Included in your Launch Optimization:

- › Dimensional results
  - Signal pad
  - Top layer anti-pad
  - Return layer anti-pad
  - Ground via depth
  - Narrow trace (under the connector)
- › Modeling results
  - Insertion loss (S21)
  - Return loss (S11)
  - TDR
- › S-Parameter file (.S2P)
- › Footprint review
- › xlsx data output



Example of 3-D EM model created with ANSYS® HFSS

TR Multicoax 4x1 (20/40/70 GHz Configurations Available)

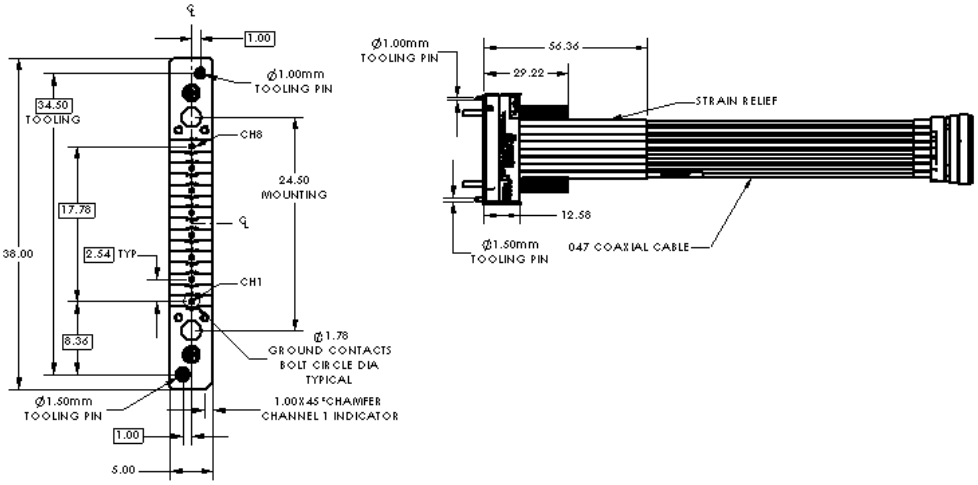


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/ 152 mm, 12"/ 304 mm, 24"/ 608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR Multicoax 8x1 (20/40/70 GHz Configurations Available)



Electrical Specifications	
Frequency Range	DC to 70 GHz+
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Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
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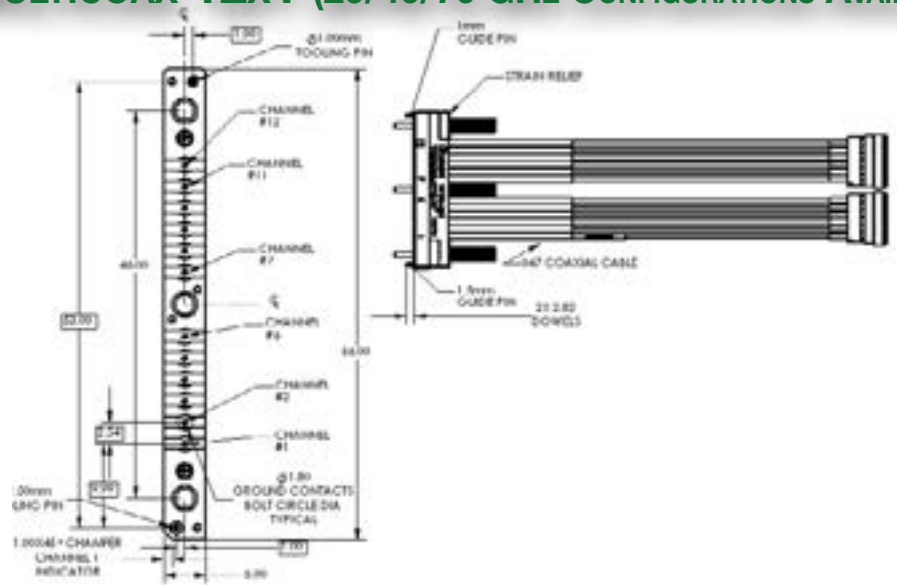
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX 12X1 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)



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Mechanical Specifications	
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Connectors	V (1.85 mm)
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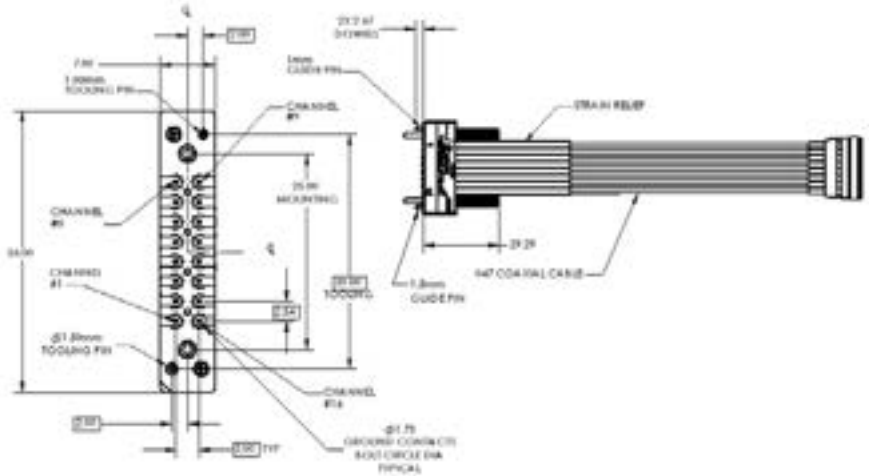
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX 16X2 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)

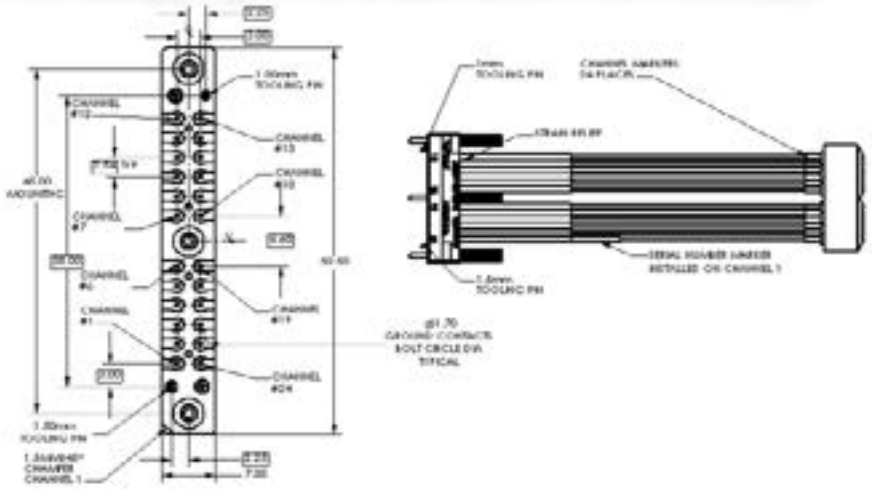


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX 24X2 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)



Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

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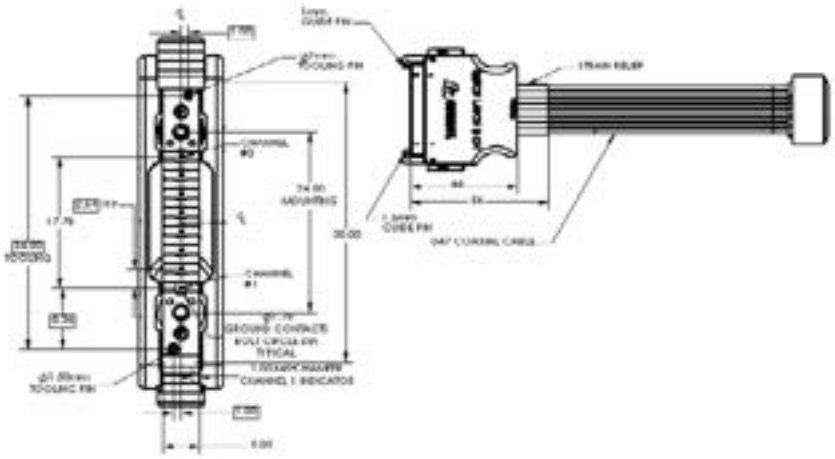
Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX QUICK LATCH 8X1 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)

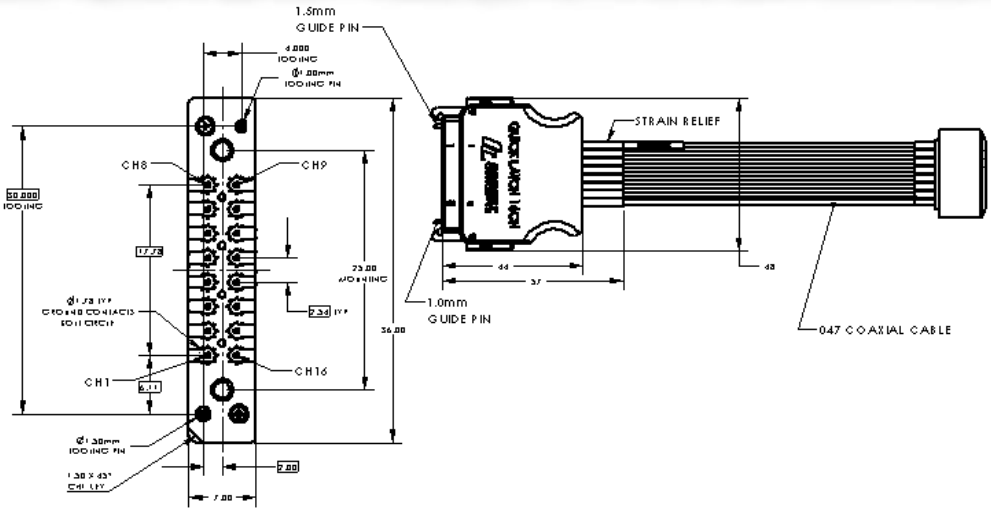


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX QUICK LATCH 16X2 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)

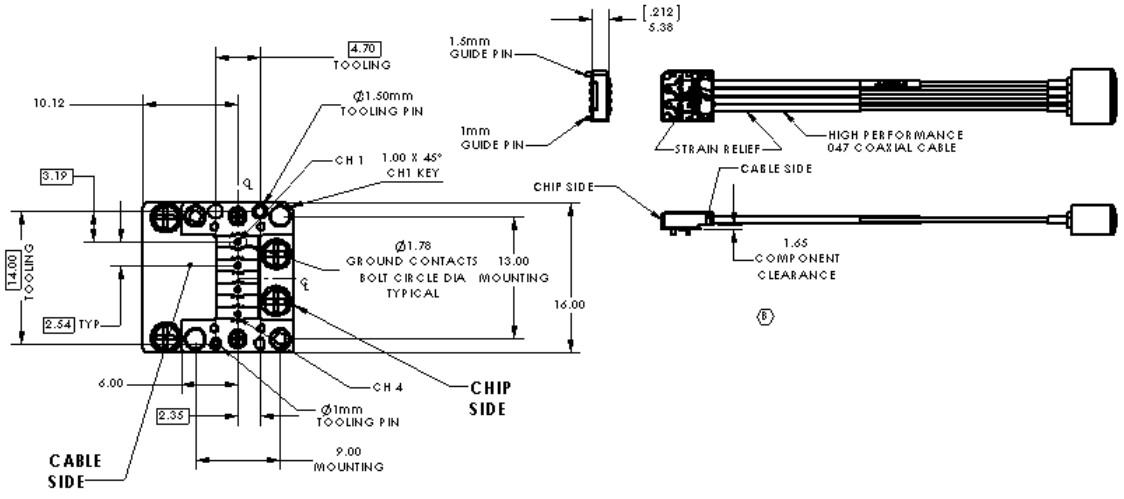


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

TR MULTICOAX RIGHT ANGLE 4X1 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)



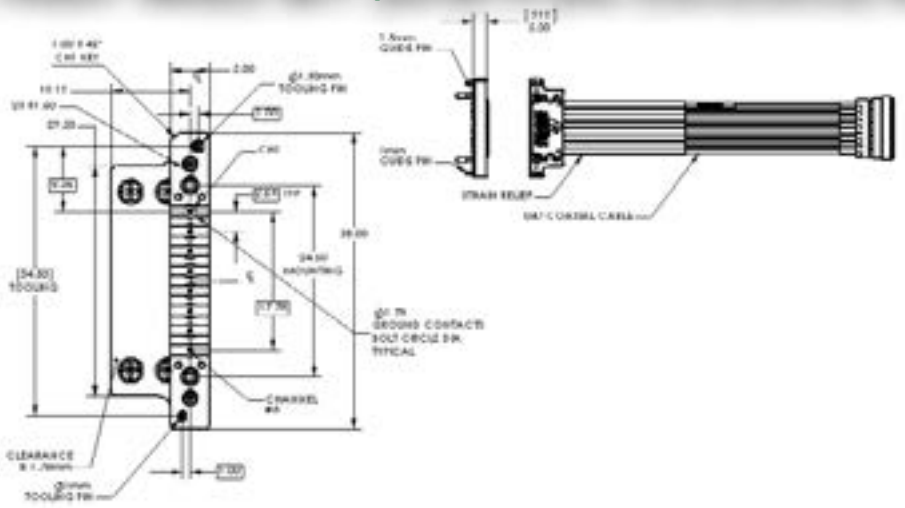
BOTTOM VIEW
LOOKING THROUGH PCB

Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

TR Multicoax Right Angle 8x1 (20/40/70 GHz Configurations Available)

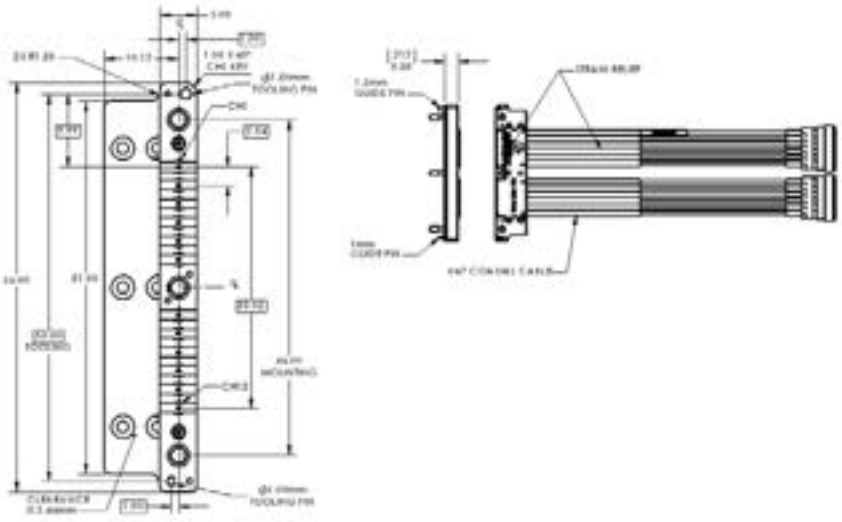


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/ 152 mm, 12"/ 304 mm, 24"/ 608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR Multicoax Right Angle 12x1 (20/40/70 GHz Configurations Available)

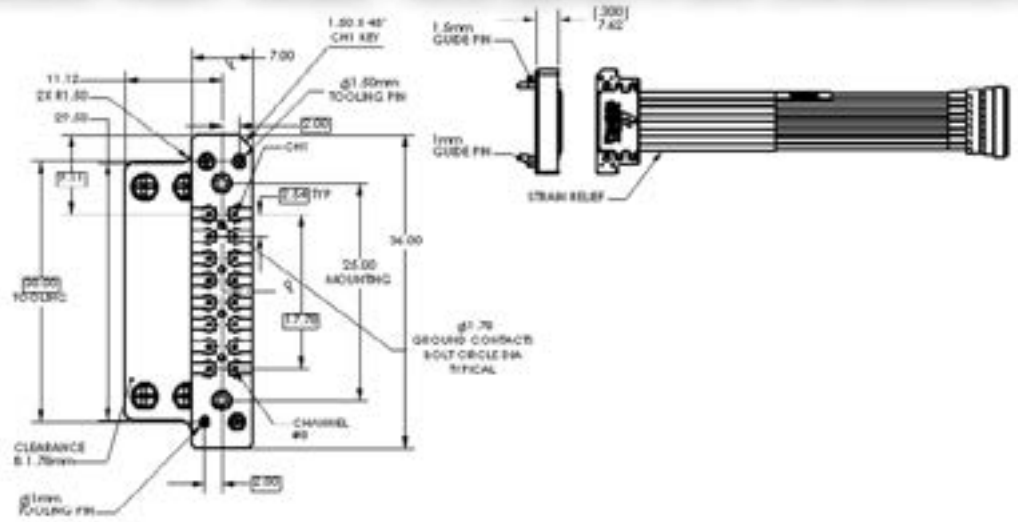


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/ 152 mm, 12"/ 304 mm, 24"/ 608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX RIGHT ANGLE 16X2 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)



Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
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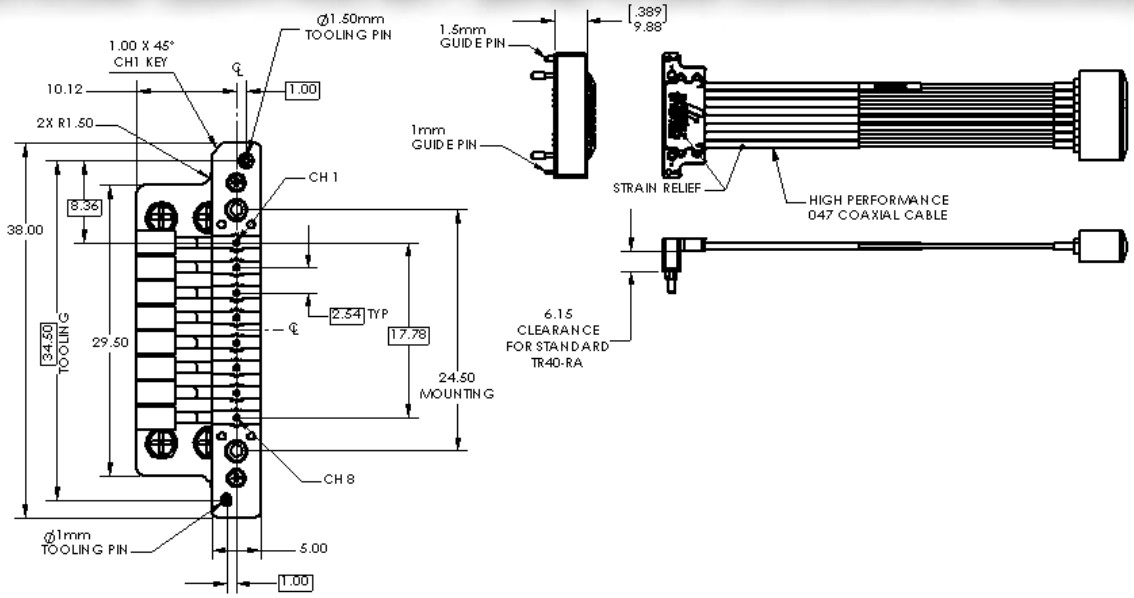
Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR MULTICOAX LEAPFROG 8X1 (20/40/70 GHZ CONFIGURATIONS AVAILABLE)

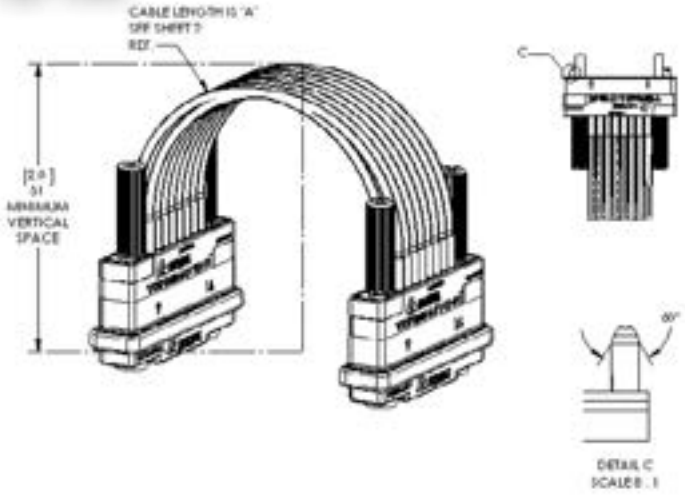


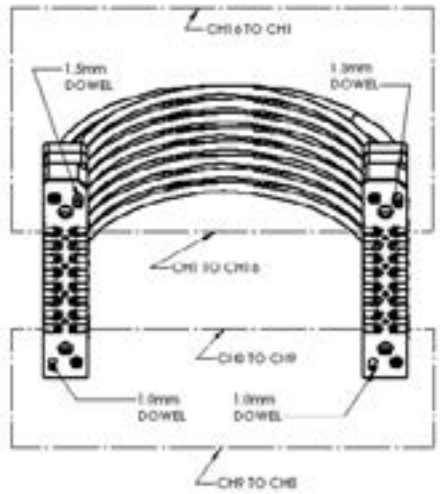
Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/152 mm, 12"/304 mm, 24"/608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR to TR



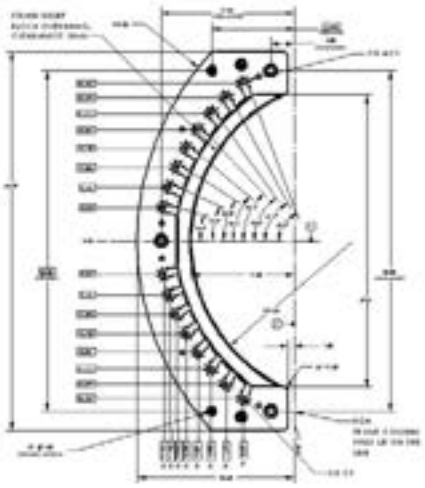


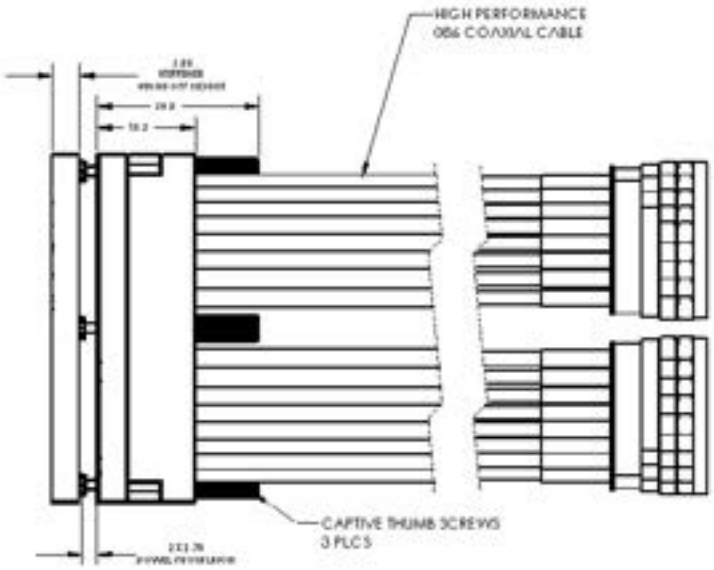
Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	.047" diameter cables[3]
Connectors	V (1.85 mm)
Cable Length	6"/ 152 mm, 12"/ 304 mm, 24"/ 608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR Multicoax Equal Trace



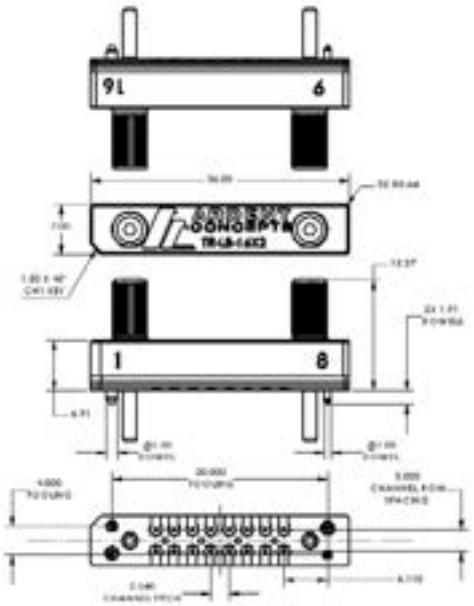


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	Less than -15 dB to 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	3.60 mm
Cables	.086" diameter cables[3]
Connectors	SMK (2.92 mm), or V (1.85 mm)
Cable Length	6"/ 152 mm, 12"/ 304 mm, 24"/ 608 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR Loopback

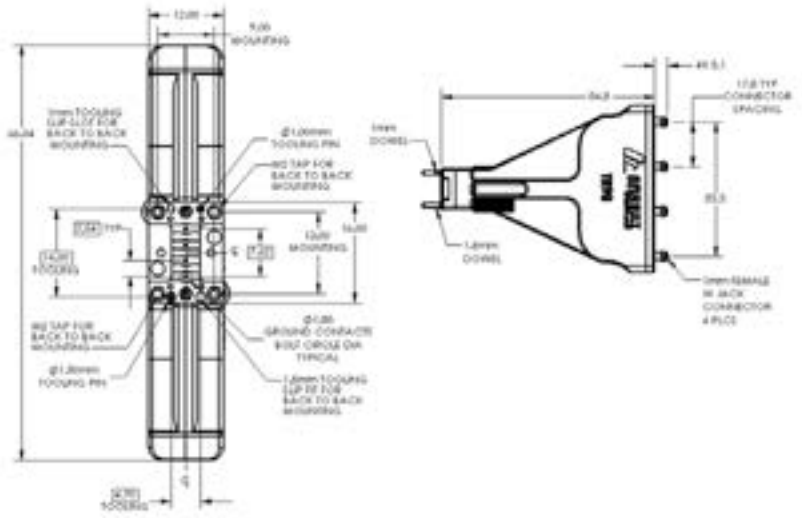


Electrical Specifications	
Frequency Range	DC to 70 GHz+
Return Loss[1]	-18 dB through 70 GHz
Insertion Loss[2]	-1.5 dB through 40 GHz, -3 dB through 70 GHz
Crosstalk	-70 dB through 70 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	±2 ps standard for cable length ≤ 9"[4]

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options. [4]Consult factory for additional phase matching specifications.

Mechanical Specifications	
Pitch	2.54 mm
Cables	
Connectors	
Cable Length	
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

TR90 (90 GHz) *Preliminary*

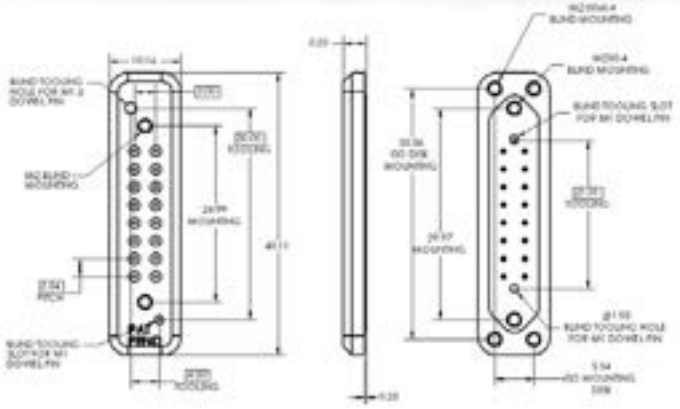


Electrical Specifications	
Frequency Range	70 - 90 GHz+
Return Loss[1]	-10 dB or better from 71 GHz to 90 GHz
Insertion Loss[2]	No resonance out to 90 GHz
Crosstalk	-30 dB from 71 GHz to 86 GHz
Impedance[1]	50 Ω ± 2.5 Ω
Phase Matching	± 2 ps standard

Notes: [1]Largely a function of PCB design. [2]Measurement includes 3" of cable. [3]Consult factory for additional cable options.

Mechanical Specifications	
Pitch	2.54 mm
Cables	Semirigid
Connectors	1.0 mm female
Cable Length	3"/76 mm
Insertion Life	1,000+ mating cycles
Field Replaceable Interface	Yes
Footprint	Microstrip & Stripline compatible

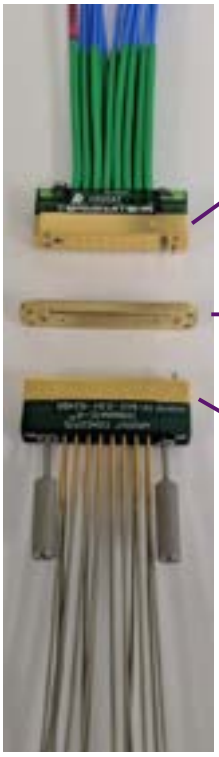
TR Multicoax Series | 50Ω Hermetic Feedthrough



Click for more information

Description

Amphenol Ardent Concepts TR Multicoax Series connectors mated with our 50Ω Hermetic Feedthrough are ideal for applications where hermeticity is crucial to the transmission of high speed signals. In these applications, TR connectors are mated to the hermetic feedthrough on either end ensuring an impedance matched 50Ω channel between any two chambers. The feedthrough is fixed to a flange (such as an ISO disk) with screws in blind-holes from the inside of the vacuum. Lastly, the hermetic feedthrough is completely sealed using an epoxy potting.



Key Benefits

- Leak-proof design (Max leak rate 2.00E^{-09} LTorr)
- Variety of coaxial cable materials available (Flexible, CuNi, NbTi, BeCu)
- Extremely dense form factor (160+ channels in standard ISO disc)
- Easily mate/de-mate multiple high-speed lanes

Applications

The 50Ω Hermetic feedthrough is ideal for use in:

› Dilution refrigerators/Cryogenic devices
› Quantum Computing
› Vacuum Chambers
› Anywhere where RF signals need to be passed through a sealed wall

Highly Scalable

Ten (10) 16-channel Hermetic Feedthroughs

TR Multicoax Evaluation Kit

Introduction:

The TR series compression mount connector assembly stands alone as the only industry solution for high density multi-coaxial cable assembly capable of speeds out past 70 GHz. We understand that many clients wish to evaluate the devices themselves, so Amphenol Ardent Concepts is pleased to offer the TR Evaluation kit for the TR20, TR40, and TR70 GHz+ product series.

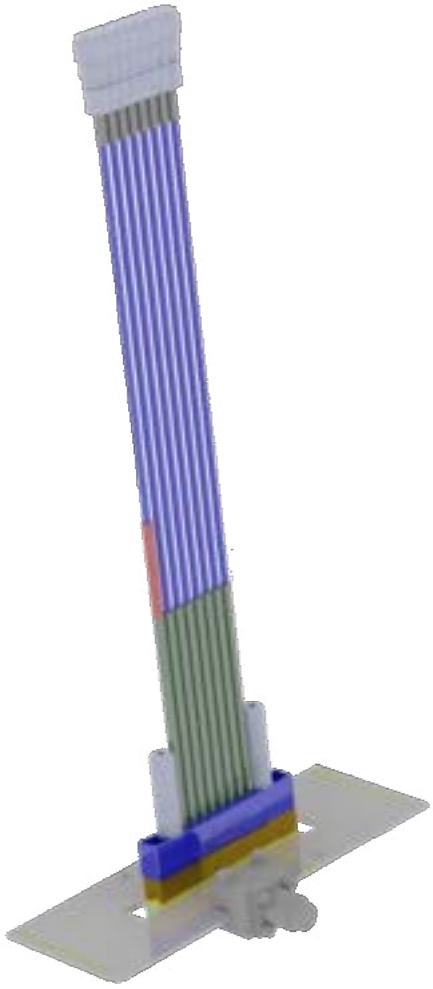
Contents:

The TR Evaluation Kit is delivered with all of the necessary components to evaluate the TR product, which are as follows:

o TR70± an 8-channel TR device with a 6" coaxial cable and a 1.85 mm jack connector in the Straight Mount configuration.

o Evaluation Board – An 8-channel PCB designed for use with the TR device provided. This board has 1.85 mm edge launch jack connectors to properly align with the TR70+ model. The Evaluation PCB is a Rogers brand core laminated onto a FR4 stiffener with the following stack-up:

- Top metal copper layer 0.0432 mm thick with ENIG plating
- Rogers 3003 dielectric layer 0.254 mm thick; Dk = 3.075; tan(δ) = 0.0065
- Reference ground metal copper 0.018 mm thick
- FR4 stiffening layer with floating solid bottom metal



FAQ

Frequently Asked Questions

1. Your TR Multi-Coax assembly looks like nothing I have ever seen, what exactly is it?

- Amphenol Ardent Concepts' patented TR Series compression mount high frequency connector assembly stands alone as the only industry solution for high density multi-coaxial cable assembly capable of measurements out past 70 GHz.
- At the board level, the TR Series multi-coaxial cable assembly saves PCB real-estate with its unique compact interface design.
- On the opposite end of teh assembly, Amphenol Ardent Concepts offers familiar styles of precision coaxial connectors.
- The unique solderless design eliminates the need for components to be soldered to the board, and instead relies on a special compression mount connection which works in conjunction with the footprint on the PCB board.

2. How do I choose the right TR Multicoax assembly for my application?

- Ardenet makes the cable selection process simple
- We have grouped our multicoax assemblies firstly by frequency.
- We have (3) main families available: the TR20, TR40, and TR70+.
- The numerical designation after the number signifies the maximum frequency range (GHz) of the assembly.
- Once a coaxial cable assembly is chosen based on frequency, we offer a few unique mounting options.
- Our most economical option is the Straigh Mount, designed to be easily installeed using screws which hold the interface to the board and save the most board real-estate.
- A step above the standard Straight Mount is our Quick Latch design, which allows users to install the connector in a simple push-on motion. The Quick Latch design does not require any screws to secure the interface to the board.
- The Right Angle connector design has been quickly developed when there is limited space above the board.
- Ardent gives cusomer flexibility over length of assembly and desired number of channels.
- Lastly, we have automatically paired our coaxial assemblies with industry standard connecotrs which perform within the cables' frequency range. However, we leave the selection of the connector gender up to the customer.

3. Is there a maximum or minimum length for the multicoax assembly?

- For the most economical costs, we would advise choosing length listed within the table shown on page 20.
- However, we have accommodated custom applications as short as 3" and as long as 36". For custom applications, please contact Amphenol Ardent Concepts.

4. Do the multicoax assemblies undergo any testing?

- All our multicoaxial assemblies are visually inspected during multiple stages of assembly.
- At final assembly, the TR connector assembly is subjected to a short mechanical cycle to ensure that the compression mount technology is functioning properly.
- Lastly, all assemblies are checked for continuity to ensure the electrical connections have been made successfully.

5. Is your TR Multicoaxial cable assembly phase matched?

- All assemblies are guaranteed to have a relative phase match of ± 2 picoseconds.
- Special requests can be considered for applications requiring tighter relative phase matching tolerances.

6. Does Amphenol Ardent Concepts provide any supplemental data for the TR Multicoax assembly?

- Amphenol Ardent Concepts offers de-embedded data for most of the TR Multicoax standard configurations listed in the table above.

7. Where can I find a footprint for the TR Multicoax assembly?

- To receive a footprint, please contact the Applications Engineering Department at support@ardentconcepts.com

8. Are there any special considerations which need to be addressed for the PCB?

- For the TR Multicoax assembly, it is highly recommended that customers run optimizations on the PCB footprint.
- Amphenol Ardent Concepts offers services to optimize the PCB footprint based on the customer's unique PCB stack-up and design.
- As part of our commitment to excellence, we also request to see a model of all customer's boards to verify the TR Multicoax footprint was implemented correctly.

9. Is there any warranty or guarantee against defects?

- Amphenol Ardent Concepts will provide free repairs on any shipped TR Multicoax assembly for up to one year.

10. What can I expect for a lead time on the TR Multicoax Assembly?

- Our sales team can typically deliver quotations for standard TR Multicoax assemblies the same day a customer request is received.
- For standard TR Multicoax assemblies, Ardent can usually deliver within 6 weeks from the date the P.O. is received.

11. Your footprint drawings call out "no solder-mask in TR Footprint area", is this a strict requirement and why?

- The face of the TR which interfaces to the PCB must hard stop on the top metal surface.
- If solder-mask is applied to the footprint, it can sometimes be thicker than the top metal layer.
- The result of this would be that the compliant pin technology would not be fully compressed, resulting in degraded signal integrity.

12. Have more questions?

- Please visit our website, www.ardentconcepts.com, or email one of our Application Engineers at support@ardentconcepts.

FAQ Corresponding Tables

TR 20	Mounting Option	# of channels (Form Factor)	Pitch (mm)	Cable Length & Connector Type	
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMA Female (AF), SMA Male (AM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMA Female (AF), SMA Male (AM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMA Female (AF), SMA Male (AM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMA Female (AF), SMA Male (AM)
TR 40	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
TR 70	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03" (03), 6" (06), 12" (12), 24" (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
TR Equal Trace	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	16 (16x1)	3.6 mm	6" (06), 12" (12), 24" (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)

NOTE: For parts and pricing regarding quantum applications, please contact us directly.

Telephone: 603.474.1760

Email: info@ardentconcepts.com

	RC04-04 RC Springprobe™	RC05-01 RC Springprobe™	RC08-02 RC Springprobe™	RC10-07 RC Springprobe™	RC13-04 RC Springprobe™	RC12-06 RC Springprobe™	CR08-062 RC Connect-R™
Contact Material	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper	Gold Plated Beryllium Copper
Mated Height (in/mm)	0.030/0.76	0.030/0.76	0.045/1.14	0.055/1.40	0.085/2.16	0.090/2.29	.062/1.57
Pitch (in/mm)	0.0157/0.40	0.0197/0.50	0.0315/0.80	0.0394/1.00	0.3394/1.00	0.0500/1.27	0.0315/0.80
Compression Force/Contact (grams +/-20%)	20	20	20	24	22	38	45
Compression Range (in/mm)	0.006/0.15	0.006/0.15	0.009/0.23	0.010/0.25	0.015/0.38	0.015/0.38	0.010/0.25
Contact Resistance (mΩ)	60	45	60	50	46	65	<50
Self Inductance (nH)	~.50	0.45	0.73	0.92	1.35	~1.50	0.61
High Freq Capacity (-1 dB point, GHz)	~20	25	20	37	11	~20	60 (@1mm Pitch)
Characteristic Impedance at Native Pitch (Ohms)	58	65	61	73			57 (@1mm Pitch)
Durability (cycles)*	10,000	10,000	10,000	10,000	10,000	10,000	1000+
Current Carrying Capacity (single contact at 30C temp offset, Amps)	~1	~1	1.8	~4	3.3	3.55	~2

info@ardentconcepts.com
1-603-474-1760
Rev05242018

-All contacts insulators are machinable, capable of withstanding 15Gs, 10-2000 Hz Vibration with no Discontinuity greater than 1 microsecond, 1000Gs 6ms Shock with no discontinuity greater than 1 microsecond, and 96 hours at 160C.
RC Connect-R Stamped and formed contacts are stitched an d autoloaded into final assemablies

Dielectric Strength of Insulator Materials
- Black Ultem 1000 = 830 v/mil
- Vespel SP1 = 560 v/mil
- Torlon 4203 = 580 v/mil

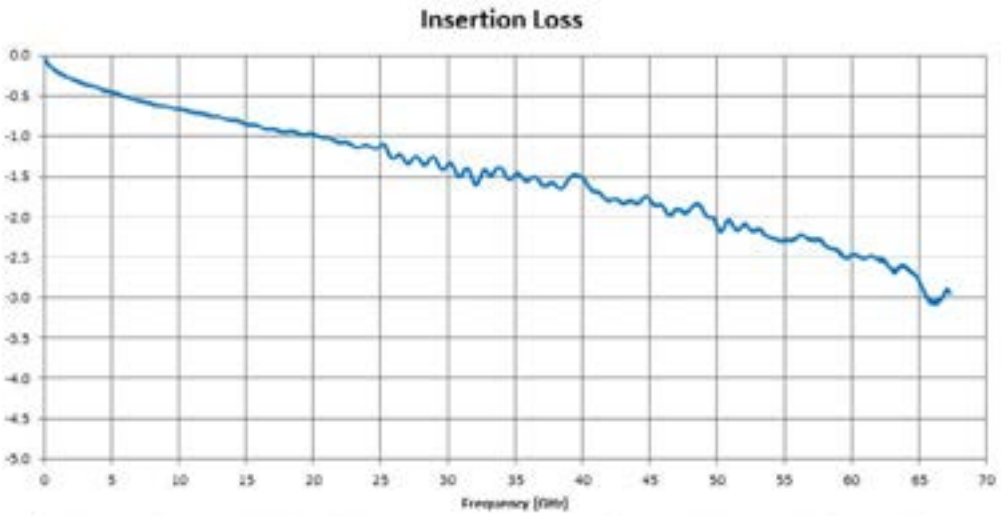
Signal Integrity Data

Benefits and SI Measurements

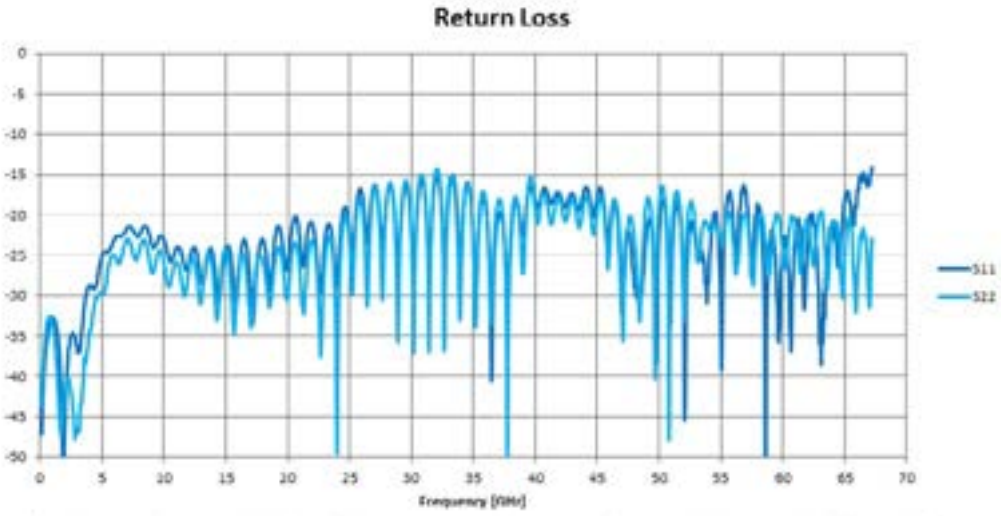
TR20™ - Low loss, production quality, cost saving alternative to cumbersome surface mount connectors

TR40™ - Industry proven, reliable high frequency, space saving performance in today's leading edge applications from an industry proven product

TR70™ - True 70 GHz performance for tomorrow's highest frequency applications



- Through Only De-Embedding of the TR70-03VF with 2 mm of PCB Launch de-embedded from the fixture with end launch and 0.5" GCPW Trace using the 1" ThroughX2 Fixture.



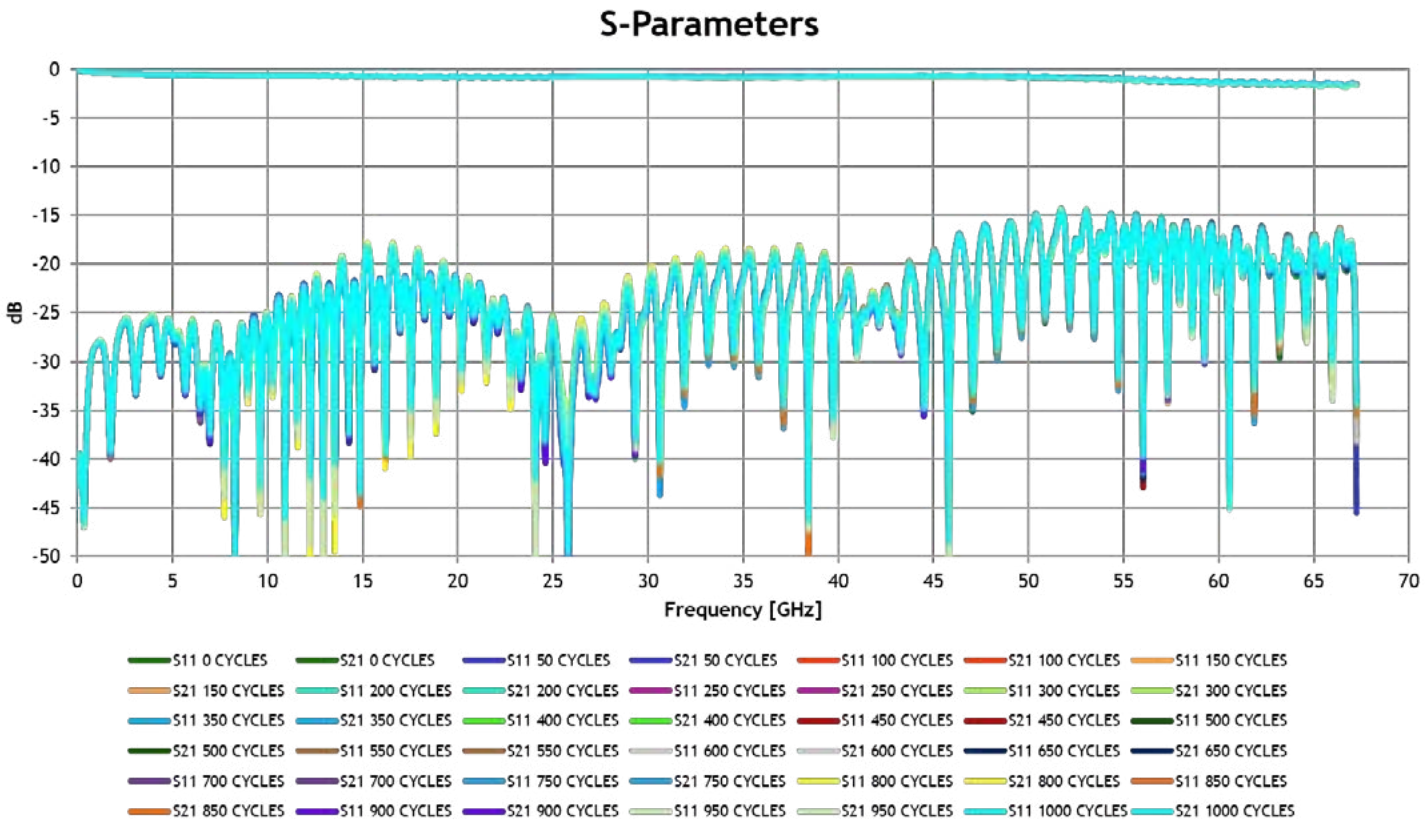
- Through Only De-Embedding of the TR70-03VF with 2 mm of PCB Launch de-embedded from the fixture with end launch and 0.5" GCPW Trace using the 1" ThroughX2 Fixture.

Repeatability

Our connectors demonstrate repeatability over 1000 cycles and we have the data to prove it:

- Measurements of 56 different channels (4 different channels on 14 different TR™ assemblies), all other transmission lines are the same.
- Repeatability of single channel over 1000 cycles.
- Measurements at 0, 50, 100, 500, and 1000 cycles.

De-Embedded Interface Only



Additional Information

Ask about our Application Notes and Case Studies

For more resources including: case studies, application notes, video demonstrations, webinars, and more, please don't hesitate to contact our support team or visit the resources area on our website at www.ardentconcepts.com.

More Information

For questions please contact us:

Phone: (603)474-1760

E-mail: info@ardentconcepts.com

Technical: support@ardentconcepts.com

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Hampton, NH 03842

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Ordering Information

TR 20	Mounting Option	# of channels (Form Factor)	Pitch (mm)	Cable Length & Connector Type	
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMA Female (AF), SMA Male (AM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMA Female (AF), SMA Male (AM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMA Female (AF), SMA Male (AM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMA Female (AF), SMA Male (AM)
TR 40	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	SMK 2.92 mm Female (KF), SMK 2.92 mm Male (KM)
TR 70	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16X2), 24 (24X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Quick Latch (QL)	8 (8X1), 16 (16X2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Leap Frog (LF)	8 (8x1), 12 (12x1)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
	Right Angle (RA)	4 (4X1), 8 (8X1), 12 (12X1), 16 (16x2)	2.54 mm	03″ (03), 6″ (06), 12″ (12), 24″ (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)
TR Equal Trace	**Mounting Option**	**# of channels (Form Factor)**	**Pitch (mm)**	**Cable Length**	**Connector Type**
	Straight Mount (SM)	16 (16x1)	3.6 mm	6″ (06), 12″ (12), 24″ (24)	V 1.85 mm Female (VF), V 1.85 mm Male (VM)

Example Part Number:
TR40-SM-4X1-2.54-06KF

www.ardentconcepts.com/tr

Related Products

SK Series™ - High Speed | Compression Mount Sockets

- Durable 40 GHz+ socket solutions offer low loss connection for high performing devices
- Up to 70 x 70 mm package sizes
- Multiple lid and base design options
  OEM moldable designs available
- Compression mount solderless design

QUICKLINK™ Coaxial Connector

- Superior signal integrity DC to 70 GHz+
- Reusable across programs promotes exponential cost savings
- Board component reduction while increasing reliability and density
- Rapid connection to PCB - No threading or tools required

CA Series™ - Connectors & Interposers

- 32 Gbps+
- Area array to 0.4mm pitch
- Compression mount & solderless
- Pure vertical interface – no offset required
- Ideal for high shock and vibration/extreme temperatures applications

More Information

For questions
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