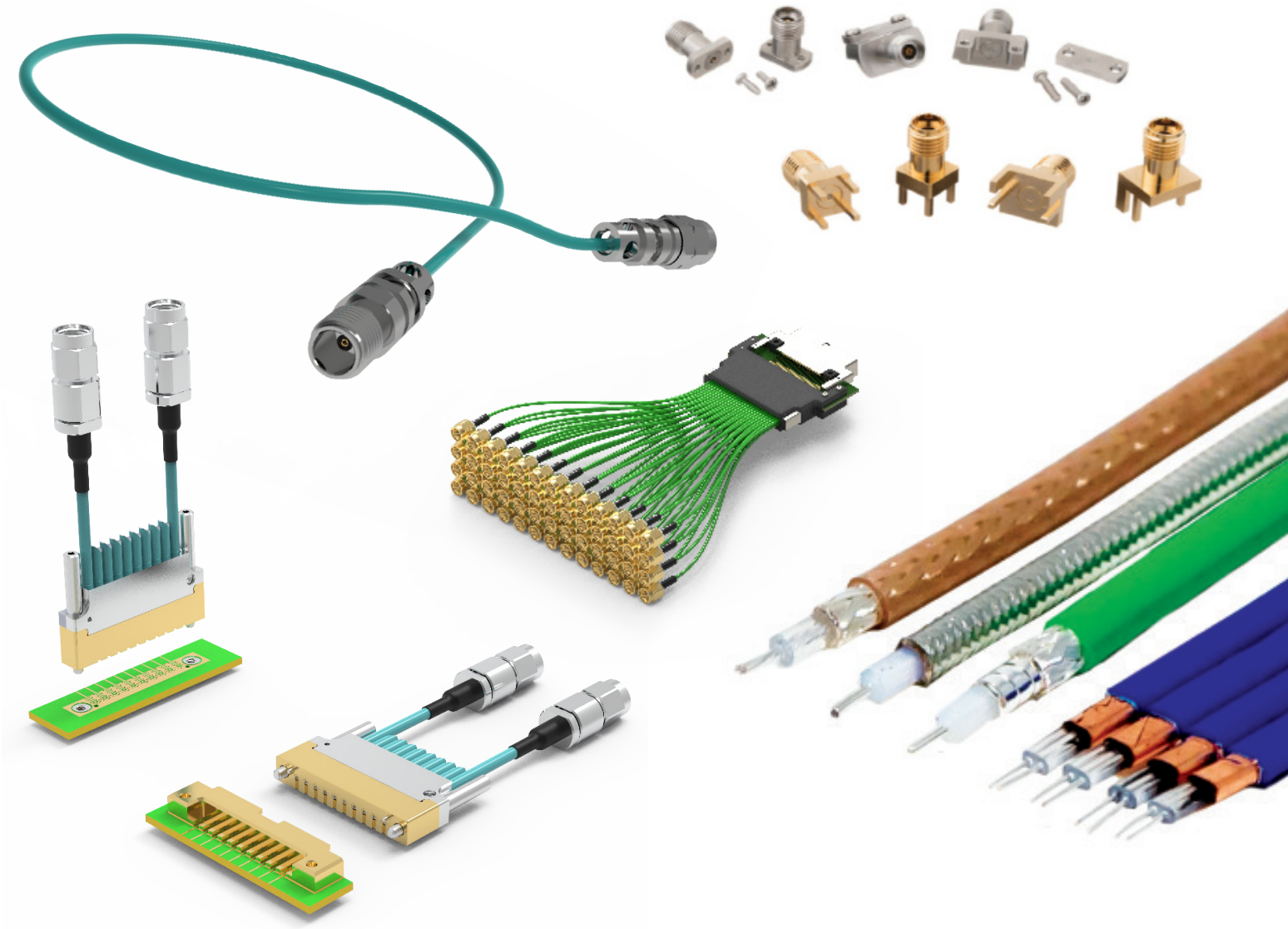
Test & Measurement

# Products & Services



**High-Performance Wire & Cable**
**RF Products**
**Digital Products**
**Probes**
**Signal Integrity Services**

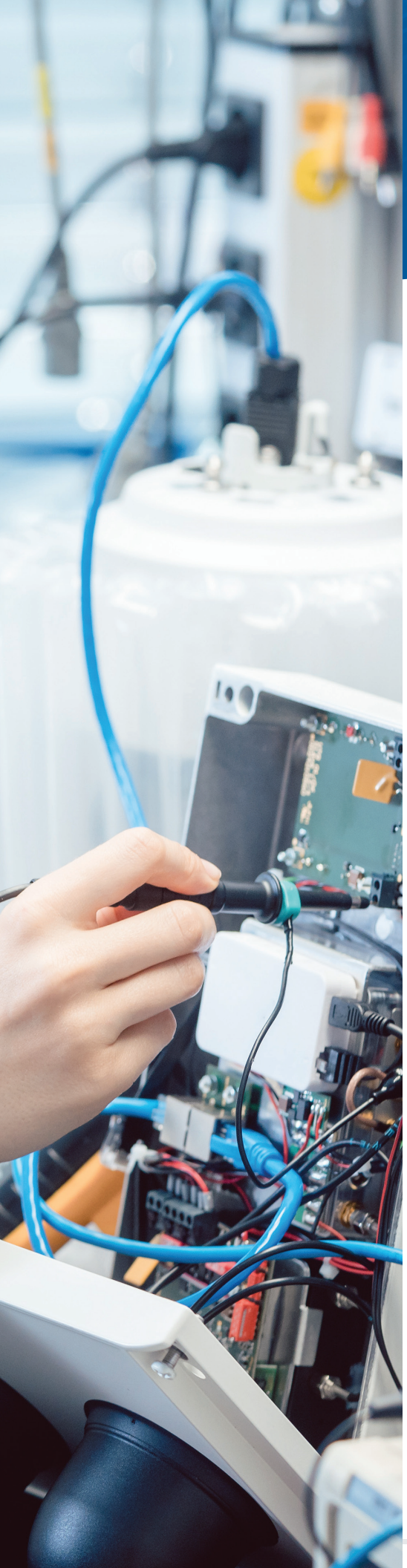
Amphenol CDI

## Recalibrating the Standard for

# Test & Measurement

Our products are designed with you in mind. Our full lineup of customizable interconnect solutions leverage our unique hybrid technology (RF + Digital + Power) and can test up to 100 GHz.

Amphenol CDI



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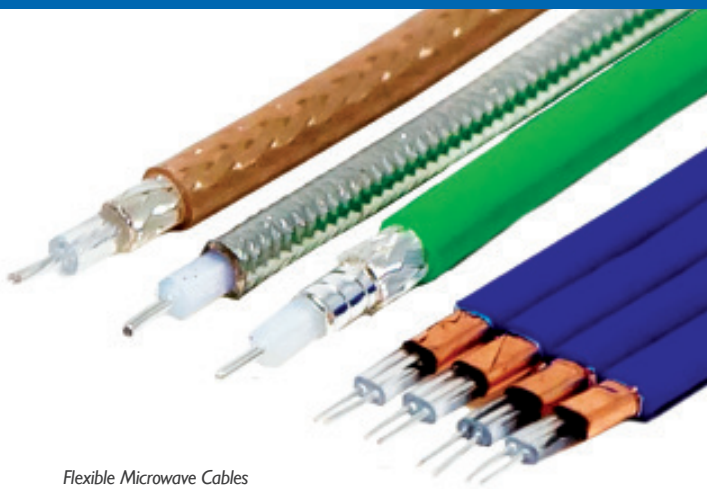
# High-Performance Microwave Cables

We offer a complete line of high-performance microwave cables with excellent loss characteristics, outstanding phase stability, and unsurpassed flexibility, compared to standard flexible cables—all without sacrificing mechanical integrity.

We have also greatly increased connector reliability through a unique connector attachment that withstands mechanical and thermal stresses far better than standard connectors.



*Flexible Microwave Cables*

*Double Shielded Coax Cables*

## Available Types

### Flexible

- Versatile low-loss cables operating up to 70 GHz
- Excellent shielding effectiveness and precision phase matching

### Semi-Flex/Conformable

- Hand-formable with lower leakage and superior bending radius to semi-rigid types

### Semi-Rigid

- Benchmark by which all other RF cables are measured
- Highest RF shielding and lowest attenuation

### RG

- Higher reliability with excellent crush, torque, and kink resistance for rugged use

### Armor Braid

- Excellent crush, torque, and kink resistance for use in rugged environment


# Low-Loss RF Coax Jumpers

We offer RF cable jumpers in multiple configurations to cater to most applications. If you are looking for a length or configuration not found in the options below, please contact us to inquire about custom orders. We aim to provide an end-to-end solution that encompasses precision RF connectors, jumpers, and adapters.

## Available Configurations

Standard Fluorinated Ethylene Propylene (FEP) Jacket

- Phase matched to +/-2 ps in pair (+/-1ps and +/-0.5 ps is available upon request)
- Come in 0.125" and 0.092" cable jacket sizes (or 0.078" and 0.105" outer shield sizes, respectively)

Stainless Steel Armor

- Excellent tensile, torsional, abrasion, and cut-through resistance
- Come in 0.125" and 0.092" cable jacket sizes (or 0.078" and 0.105" outer shield sizes, respectively)

Clear PVC Armor

- Excellent tensile, torsional, abrasion, and cut-through resistance
- Come in 0.125" and 0.092" cable jacket sizes (or 0.078" and 0.105" outer shield sizes, respectively)

Custom

- Custom cable assemblies available upon request

| Jumper Configuration Options | Connector Options | | | | | |
|---|---|---|---|---|---|---|
| | 3.50 mm (123 GHz) | 2.92 mm (40 GHz) | 2.40 mm (50 GHz) | 1.85 mm (65 GHz) | 1.00 mm (110 GHz) | SecureThread™ SMPM (123 GHz) |
| Standard FEP Jacket | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Stainless Steel Armor | ✓ | ✓ | ✓ | ✓ | ✓ | NA |
| Clear PVC Armor | ✓ | ✓ | ✓ | ✓ | ✓ | NA |

# Low-Loss RF Coax Jumpers Cont'd.

## Standard Part Number Guide for RF Jumper Cables

TM | 7S | - | S | ST | M | - | S | ST | M | 4 | - | 00 | 21 | E

**Cable Type**

| | |
|---|---|
| 7 | 0.0789 Coax |

**Strain Releif**

| | |
|---|---|
| S | Short |
| M | Medium |
| L | Long |

**Connector 1 Type**

| | |
|---|---|
| 1 | 1.0 mm |
| 4 | 2.4 mm |
| 5 | 3.5 mm |
| 8 | 1.85 mm |
| 9 | 2.92 mm |
| ST | SecureThread SSMP (SMPM) |

**Connector 1 Gender**

| | |
|---|---|
| M | Male |
| F | Female |

**Connector 1 Orientation**

| | |
|---|---|
| S | Straight (No Mounting) |
| 2 | 2 Hole Flange |
| 4 | 4 Hole Flange |

**Connector 2 Type**

| | |
|---|---|
| 1 | 1.0 mm |
| 4 | 2.4 mm |
| 5 | 3.5 mm |
| 8 | 1.85 mm |
| 9 | 2.92 mm |
| ST | SecureThread SSMP (SMPM) |

**Phase Matching (Pairs)**

| | |
|---|---|
| Null | +/- 2ps |
| D: | +/- 1ps |
| E: | +/- 0.5ps |

**Length in cm**

| | |
|---|---|
| 999 | 2 or 3 digit cm |

**Standard/Custom Connectors**

| | |
|---|---|
| 00 | Standard |
| XX | Custom |

**Connector 2 Orientation**

| | |
|---|---|
| S | Straight (No Mounting) |
| 2 | 2 Hole Flange |
| 4 | 4 Hole Flange |

**Connector 2 Gender**

| | |
|---|---|
| M | Male |
| F | Female |

# High-Density RF Ganged Interconnects

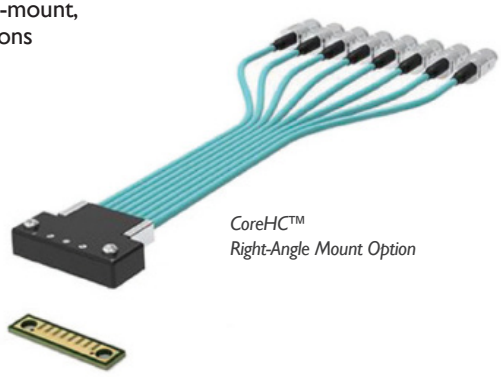
CoreHC™and CoreGD™, our multichannel test-point systems, are targeted for high-density boards where space is limited. These products result in reduced trace lengths and higher signal integrity, compared to boards using traditional SMA-type connectors.

## CoreHC™

CoreHC is a compression-force interconnect system with 2.5 mm channel spacing that can be attached directly to a board without a connector.

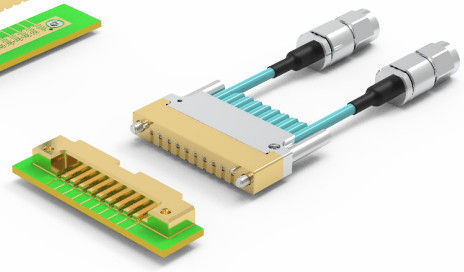
Key Features

- 1.85 mm and 2.92 mm cable-side connectors
- 2.5 mm pitch
- Vertical, right-angle, edge-mount, and board-to-board options



*CoreHC™*
*Right-Angle Mount Option*

*CoreHC™*
*Direct-Attach Option*



# High-Density RF Ganged Interconnects Cont'd.

*CoreGD™*
*Surface Mount Option*

## CoreGD™

CoreGD™ is a typical male, female mate/de-mate type interface using SSMP (SMPM) and WMP (SMPS) connectors.

Key Features

- 1.85 mm and 2.92 mm cable-side connectors
- 4 mm pitch
- Vertical, edge-mount, and board-to-board options

# Precision RF Connectors.

We offer a wide portfolio of low-loss, high-frequency precision RF connectors in various configurations for design flexibility and multiple applications.

## Key Features

- 50 Ω impedance
- Frequencies ranging from 26.5 to 110 GHz
- Field-replaceable options available
- 1.00 mm, 1.85 mm, 2.40 mm, and 3.50 mm mating interfaces

## Solder-Mount PNs & Specifications

| Size | Frequency | Termination | Description | P/N | Product |
|---|---|---|---|---|---|
| Vertical Mount | | | | | |
| 1.85 mm | DC - 65 GHz | Solder Mount; Stripline Trace | 1.85 mm Female Straight | TMB-V8FS-3SM |  |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Female Straight | TMB-V4FS-3SM | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Female Straight | TMB-V9FS-3SM | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female Straight | TMB-V5FS-3SM | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female Straight, Long Leads | TMB-V5FS-3SM-01 | |

# High-Density RF Ganged Interconnects Cont'd.

## Solderless/Field-Replaceable Connectors Product Numbers & Specifications

| Size | Frequency | Termination | Description | P/N | Product |
|---|---|---|---|---|---|
| Vertical Mount - CPW | | | | | |
| 1.00 mm | DC - 110 GHz | Solderless/Field-Replaceable CPW Trace | 1 mm Female; 2 Hole Flange Type | TMB-V1F2-3LC-0X |  |
| 1.85 mm | DC - 65 GHz | | 1.85 mm Female; 2 Hole Flange Type | TMB-V8F2-3LC | |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Female; 2 Hole Flange Type | TMB-V4F2-3LC | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Female; 2 Hole Flange Type | TMB-V9F2-3LC | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female; 2 Hole Flange Type | TMB-V5F2-3LC | |
| Vertical Mount - Stripline | | | | | |
| 1.00 mm | DC - 110 GHz | Solderless/Field-Replaceable Stripline Trace | 1 mm Female; 2 Hole Flange Type | TMB-V1F2-2L1 |  |
| 1.85 mm | DC - 65 GHz | | 1.85 mm Female; 2 Hole Flange Type | TMB-V8F2-3L1 | |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Female; 2 Hole Flange Type | TMB-V4F2-3L1 | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Female; 2 Hole Flange Type | TMB-V9F2-3L1 | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female; 2 Hole Flange Type | TMB-V5F2-3L1 | |
| Edge Launch - Solderless Standard | | | | | |
| 1.00 mm | DC - 110 GHz | Solderless/Field-Replaceable; CPW Trace | 1 mm Female Straight | TMB-E1F2-1L1 |  |
| 1.85 mm | DC - 65 GHz | | 1.85 mm Female Straight | TMB-E8F2-1L1 | |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Female Straight | TMB-E4F2-1L1 | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Female Straight | TMB-E9F2-1L1 | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female Straight | TMB-E5F2-1L1 | |
| Edge Launch - Solderless Narrow Body | | | | | |
| 1.85 mm | DC - 65 GHz | Solderless/Field-Replaceable; CPW Trace | 1.85 mm Female Narrow Body | TMB-E8F2-1L1-01 |  |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Female Narrow Body | TMB-E4F2-1L1-01 | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Female Narrow Body | TMB-E9F2-1L1-01 | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Female Narrow Body | TMB-E5F2-1L1-01 | |
| Edge Launch - 30° Angled | | | | | |
| 1.85 mm | DC - 65 GHz | Solderless/Field-Replaceable; CPW Trace | 1.85 mm Angled Connector Jack | TM14-0089-00 |  |
| 2.4 mm | DC - 50 GHz | | 2.4 mm Angled Connector Jack | TM14-0143-00 | |
| 2.92 mm | DC - 40 GHz | | 2.92 mm Angled Connector Jack | TM14-0141-00 | |
| 3.5 mm | DC - 34 GHz | | 3.5 mm Angled Connector Jack | TM14-0142-00 | |

# RF Adapters

With the introduction of the industry's first swept right-angle microwave adapter in the 1970s, we have become synonymous with precision RF and microwave adapters.

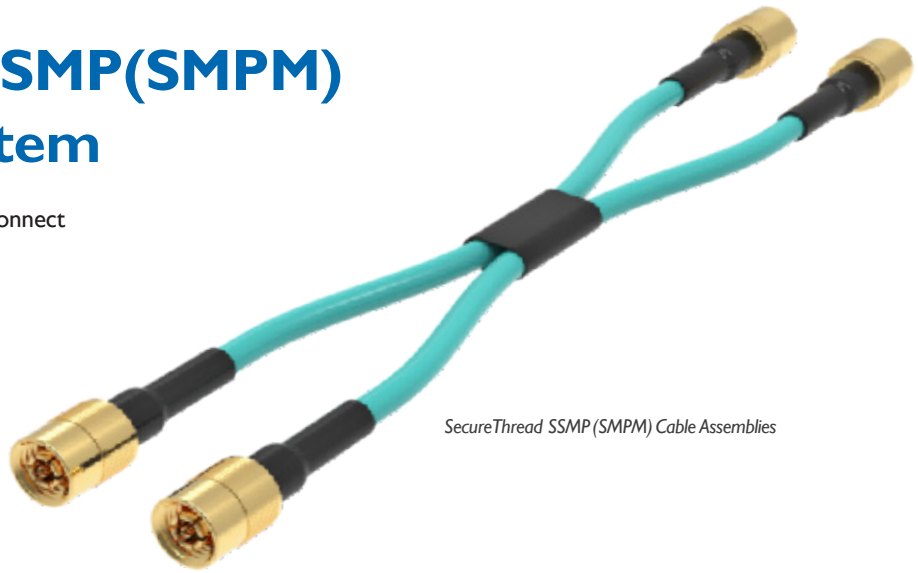
We offer a full-gender family of precision RF adapters in different connector options to cover applications ranging from DC – 65 GHz. These adapters come standard in a passivated stainless steel body with a captivated beryllium copper center conductor to ensure mating repeatability. In addition, options such as gold-plated housing or non-captivated center conductor are also available to fit the desired application. All of our adapters are 100% tested to ensure optimum performance over their respective frequency range.

- Complete family of in-series and inter-series adapters
- These adapters come standard in a passivated stainless steel body with a captivated beryllium copper center conductor to ensure mating reliability
- 50 Ω impedance, low VSWR, and insertion loss for high signal integrity

| Series | Type | Series | Type | Series | Type | Series | Type |
|---|---|---|---|---|---|---|---|
| 1.85 mm | Male to Male | 2.4 mm | Male to Male | 2.92 mm | Male to Male | 3.5 mm | Male to Male |
| | Female to Male | | Female to Male | | Female to Male | | Female to Male |
| | Female to Female | | Female to Female | | Female to Female | | Female to Female |
| 1.85 mm to 2.4 mm | Male to Male | 1.85 mm to 2.92 mm | Male to Male | 1.85 mm to 3.5 mm | Female to Female | 2.4 mm to 2.92 mm | Female to Female |
| | Female to Male | | Female to Male | | Male to Female | | Male to Female |
| | Female to Female | | Female to Female | | Female to Male | | Female to Male |
| | Male to Male | | Male to Male | | Male to Male | | Male to Male |
| | | 2.4 mm to 3.5 mm | Female to Female | 2.92 mm to 3.5 mm | Female to Female | | |
| | | | Male to Female | | Male to Female | | |
| | | | Female to Male | | Female to Male | | |
| | | | Male to Male | | Male to Male | | |

# SecureThread™ SSMP(SMPM) Interconnect System

SecureThread™, our high-performance interconnect system, uses a blind-mateable push-on interface with a threaded coupling nut that prevents the cable assembly from moving once the connection is made. It supports frequencies from DC - 65 GHz with excellent signal integrity.



*SecureThread SSMP (SMPM) Cable Assemblies*

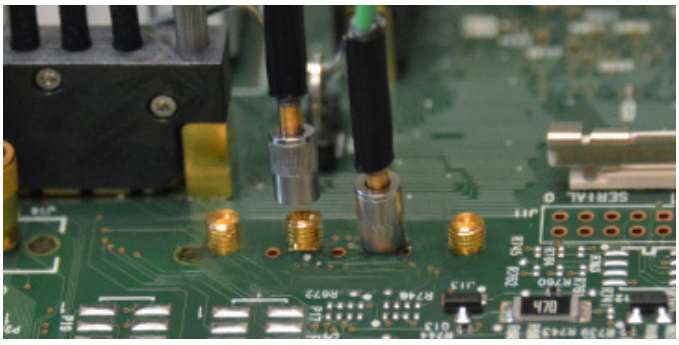
## Key Features

- Easily and repeatedly configurable into applications, significantly reducing time and cost
- Compatible with several Amphenol CDI cables, including:
  - Semi-Rigid
  - Semi-Flex
- Phase matching up to 2 ps for cable pairs
- Surface mount type and field replacement board-side connectors
- Compression pin mount solderless secure CoreHC solution

## Connector Options

Solderless Direct Attach
The solderless system uses a compression mount type connector on cable side and a hollow plastic housing that is mounted on standard SMA connector footprint on board, using screws on bottom side. The board side connector can be moved on the PCB as long as the footprint is there.

Solder
The board-mount solutions include a surface-mount board-side connector and a coaxial cable assembly. The threaded-lock female SSMP (SMPM) board-mount connector needs to be soldered onto the board using surface-mount technology. In order to support automatic pick-and-place assembly, it is available in tape-and-reel packing with a maximum of 500 connectors per 13" diameter reel.



*SecureThread WMP (SMPS)*

## Cable Assembly Options

- CoreHC to CoreHC
- CoreHc to Precision Connector (1.85 mm, 2.4 mm, 2.92 m, and 3.5 mm)
- SecureThread SSMP (SMPM) to SecureThread SSMP (SMPM)
- SecureThread SSMP (SMPM) to Precision Connector (1.85 mm, 2.4 mm, 2.92 m, and 3.5 mm)

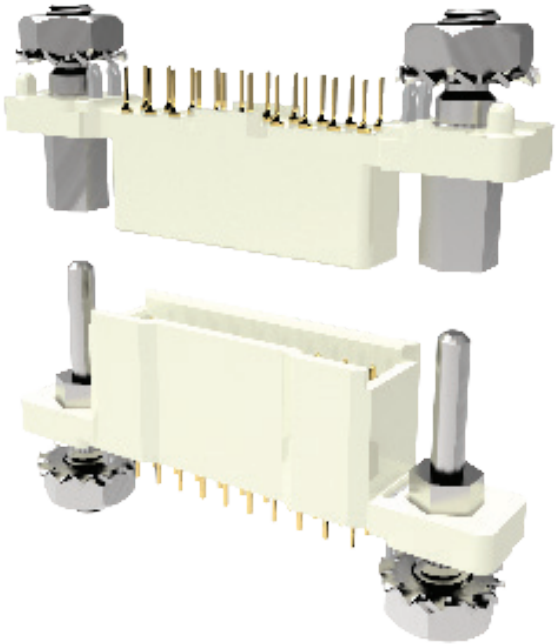
The interconnect consists of coaxial cable assembly with male SSMP connector and a threaded coupling nut. There is a female SSMP board mount connector on the board side, which needs to be soldered.

# AltaVel™ High-Speed Digital Connector Family

AltaVel™, our family of open-pin-field high-speed digital interconnect solutions, is optimized to provide scalability and reliability in dense, high mate/demate cycle applications with data rates greater than 25 Gbps. This product offering is part of our full lineup of cost-effective, off-the-shelf, and customizable interconnect solutions delivering signal integrity performance and value.

Available Configurations
- Board to Board
- Board to Cable
- Cable to Cable
- Cable to Panel

Available Styles:
- Vertical to Vertical
- Right-Angle to Vertical
- Right-Angle to Right-Ange



## Key Features

### 10,000 mate/de-mate cycles
- High signal integrity and reliability in a long life package ensures high performance and lower cost of ownership

### Flexible, scalable design
- High-density, scalable design provides multiple configurations, enabling optimum performance at the lowest total cost. Size ranges from 10 to 200 pins; configurable in 1 to 4 rows by 10, 20, 30, 40, or 50 positions. Configurable by Pin/Spacer height, 8 mm, 12 mm, 16 mm, and 20 mm.

### With or without metal shells
- Rugged/EMI housing option is a readily available option for applications used in extreme environments

### Open pin field design
- Design allows for flexibility in routing and coding schemes, including: single-ended, differential pair, power, ground, and sideband signals

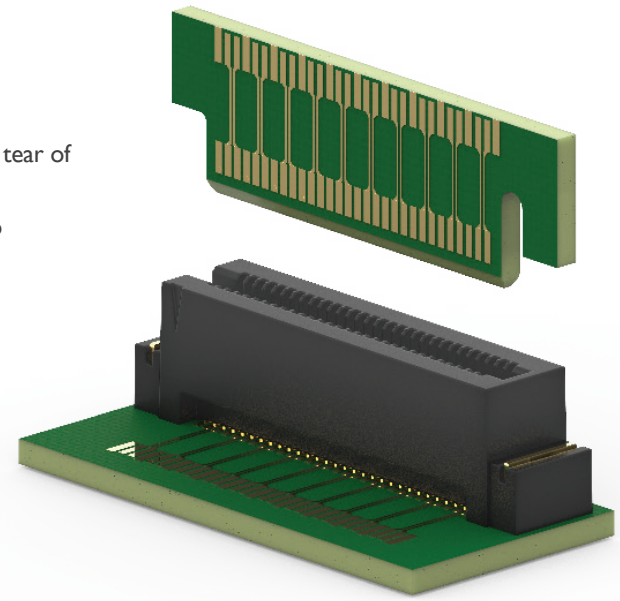
### Impedance
- Multiple impedance options ensure a solution to meet your application

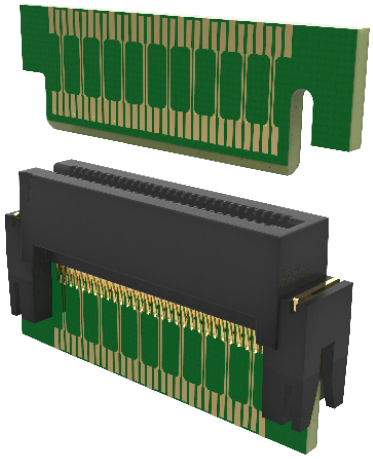
### Board mounting options
- Termination styles: Surface Mount (SMT), Paste-In-Hole (PIH), and Plated Through-Hole (PTH)

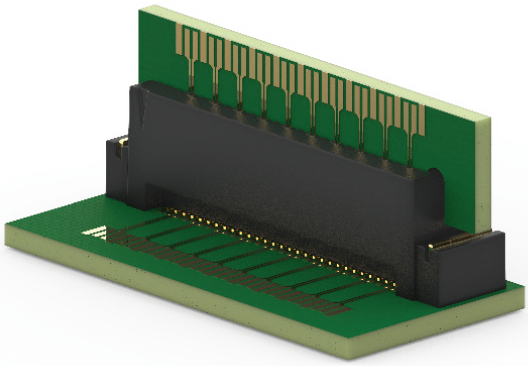
# Card Edge Connectors

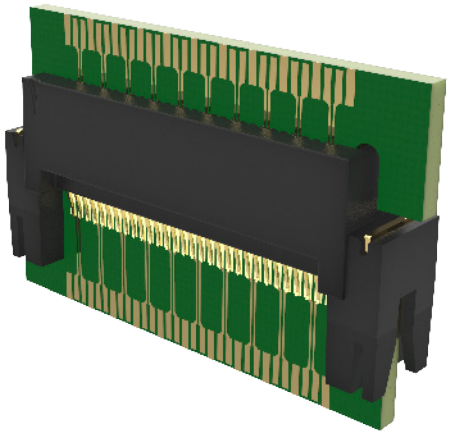
Our card edge connectors contact system is designed for high-speed, high-density applications. They have a smooth mating surface area, which reduces the wear and tear of contacts and increases the durability and cycle life of the contact system.

They also lower insertion and withdrawal forces while supporting data rates up to 32 Gbps with excellent signal integrity.









## Key Features

### High-speed differential data rate
- Offers excellent signal integrity and performance up to 32 Gbps

### Multiple PCB thicknesses (0.062" and 0.093")
- Allows for complex PCB designs

### Surface mount and edge mount options
- Enables high-speed, pick-and-place assembly

### 0.8 mm pitch
- Access signals in dense environments and save PCB space

### 8.5 mm max height
- Up to 60 pins for low-profile system designs

### 500 mate/demate cycles
- High reliability and low cost of ownership

### Wide operating temperatue
- -55 °C to 155 °C

# Passive Probes

We offer low-cost, high-performance, compact CAT III and CAT IV-rated probes in a UL-certified plastic body suitable for a variety of applications. The passive probe is a standard, commercial, off-the-shelf system engineered to deliver consistent, repeatable, and dependable results. It provides an industry-leading combination of high bandwidth and high voltage in a low-cost, rugged, general-purpose probing solution.

*Passive Probes*

## Key Features

### 500 MHz bandwidth and 1,000 V Cat III, 600 V CAT IV

- A combination of high bandwidth and high voltage reduces the number of probes needed for a variety of applications, simplifying the toolkit and lowering costs

### 1X, 10X, and 100X configurations

- Multiple configurations give the flexibility to choose the passive probe that fits your application

### Third-party certified, exceeds UL61010-31, IEC61010-31

- Superior product quality and safety greatly reduces risk in high-voltage applications

### Small, compact probe head and body

- Enhanced visibility to small, dense geometry circuit elements within the contact device-under-test (DUT) ensures correct and accurate test point

# Signal Integrity Services

We offer signal integrity services to our customers to optimize the complex designs for best possible system performance. CST, Solidworks, and ProE are some of the tools used to simulate the customer's printed circuit board stack-ups integrated with our RF connector footprints. Board designs are optimized for the lowest return loss, insertion loss, and crosstalk. PCB materials like Megtron, Nelco, Rogers, and High-Speed FR4 affect the signal integrity including insertion loss, return loss, and board impedance. Additionally, the size and layout of signal traces, vias, and ground layers in the board stack-up need to be optimized for lowest losses and matched impedance in the required frequency range of operation.

VNA and Time Domain Reflectometry measurements are also performed to validate the simulations and characterize the designs.

Amphenol CDI

See our full line of Test & Measurement products at: AmphenolCDI.com

For quotes: Sales@AmphenolCDI.com



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