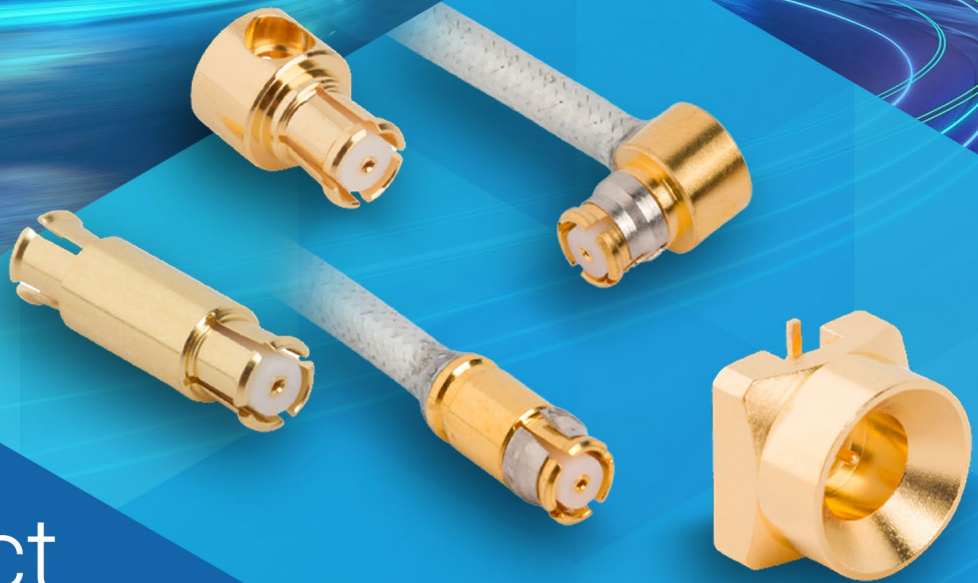


Amphenol® RF



# SMP Product Series Solutions Guide

Board-to-Board and Cable-to-Board Solutions

# ABOUT AMPHENOL RF

**Amphenol RF, a division of Amphenol Corporation, is the largest manufacturer of radio frequency connectors, coaxial adapters and RF cable assemblies in the world.**

With a global team of experienced engineers, Amphenol RF is able to offer the broadest portfolio of standard RF products on the market today.

As a leader in design and manufacturing of RF interconnect products, our dedicated team of engineers specialize in custom product development to meet the challenges of design-specific constraints.

## GLOBAL PRESENCE



With a global presence, Amphenol RF has experienced engineers and production capabilities in multiple regions across the globe. Our experienced cross-functional teams oversee the entire process from the initial design through delivery, and beyond.

Amphenol RF has a global footprint of operations in North America, Europe and Asia.

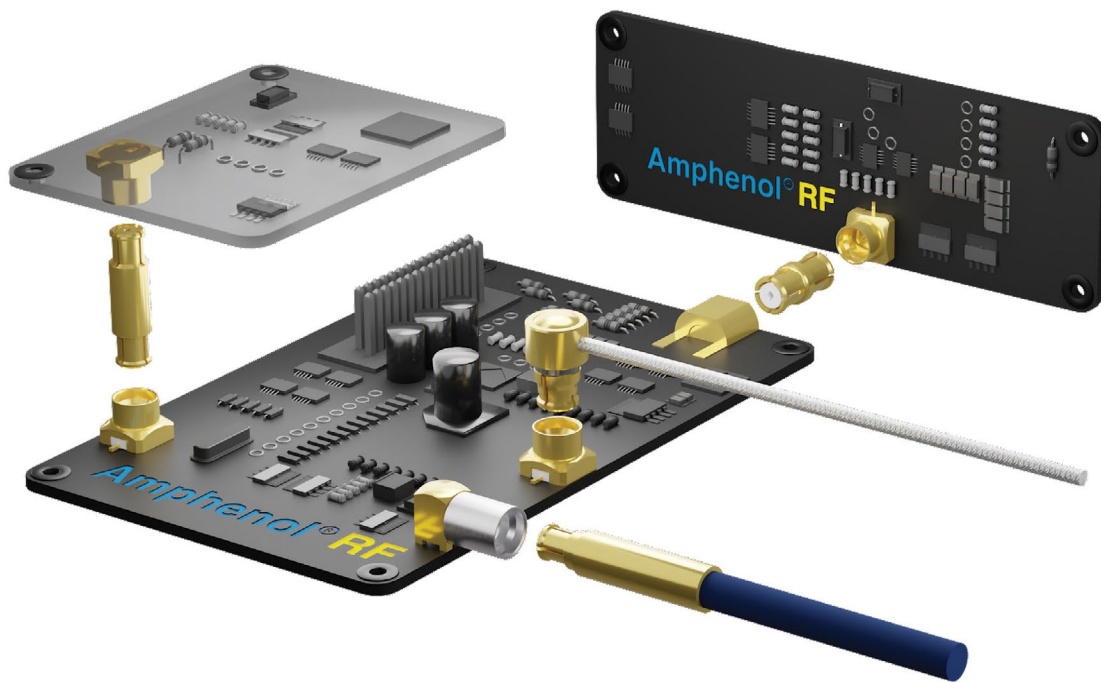
# SMP PRODUCT SERIES

The SMP interface is a microminiature interface known for its high performance up to 40 GHz and is a common choice for board-to-board designs. The broad frequency range and small package size allows the SMP to be considered for a wide range of designs including telecommunications, test and measurement and military applications.

A critical element of the SMP board-to-board solution is the ability to tolerate and withstand misalignment when mating. The bullet adapter provides a link between PCB jacks and can compensate for up to four degrees of radial misalignment without affecting performance. The available detent systems - full, limited, and smooth bore - provide respective levels of engagement/disengagement forces.

For a cable-to-board mated pair, right-angle and straight plugs with termination capability to various semi-rigid, conformable or flexible coax cables are available. The receptacles are designed for surface, through hole, or end launch mounting.

The SMP is also available in a non-magnetic material, for use in medical or quantum computing applications.



*The SMP product series is available in a variety of board-to-board and cable-to-board configurations for versatile design capabilities.*



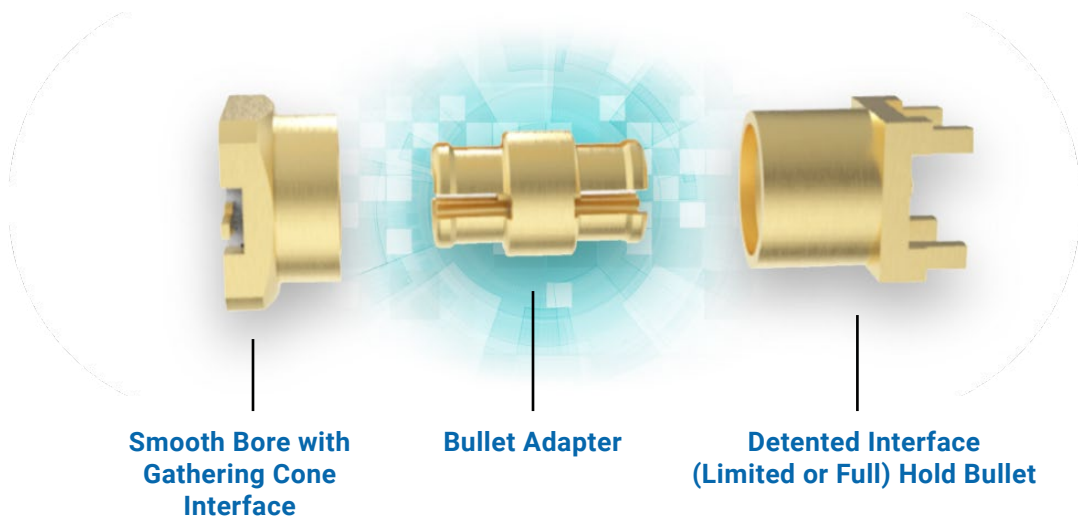
## FEATURES AND BENEFITS

- Nominal impedance: 50Ω
- Frequency range up to 40 GHz
- Minimum board-to-board distance: 9.1 mm
- Axial misalignment:  $\pm 0.25$  mm
- Radial misalignment: 4° max. with bullet solution
- Different detent types: smooth bore, limited detent and full detent
- Mating cycles: Full detent:  $\geq 100$ ; Limited detent:  $\geq 500$ ; Smooth bore:  $\geq 1000$
- Interface dimensions per MIL-STD-348
- High density mounting potential due to minimum pitch and board-to-board distances
- Push/snap-on locking for fast and easy disconnection
- Automatic and cost-effective assembly with tape and reel packaging options

## APPLICATIONS

- Antennas
- Broadband
- Military
- Instrumentation
- Test and Measurement
- Medical
- Quantum Computing
- Handheld and Portable Devices
- Wireless Telecommunications

## BOARD-TO-BOARD MATING CONFIGURATION



## BOARD-TO-BOARD SOLUTIONS

The SMP connector series offers a board-to-board solution delivering consistent performance through 26.5 GHz. PCB optimization analysis also allows for enhanced performance up to 40 GHz for some connector designs. This dependable mating system utilizes a three-piece configuration and is focused on keeping a consistent RF signal with up to 4° radial float angle and 0.010" (0.25 mm) axial float.

PCB spacing varies depending upon the PCB jack design and the bullet adapter length, with minimum achievable nominal spacing of 9.91 mm.

This performance focus makes SMP connectors a good choice for military, measurement and quantum computing applications.



## BOARD-TO-CABLE SOLUTIONS

The SMP connector series offers cable-to-board mated pairs. The plug side can be provided in either straight or right-angle with termination capability to either 0.047 or 0.086 inch, semi-rigid or conformable coax cable. The receptacles are designed for surface, through-hole or end launch mounting.

## MATERIALS

SMP connectors are manufactured using the latest high-speed efficient methods. Proven designs include stamped contacts and bullet adapter bodies, and injection molded insulator-contact components. These methods, coupled with extensive RF engineering analysis, provide consistent high-performing interconnect products.

### HFSS PCB OPTIMIZATION MODELS

Amphenol RF strives to provide engineers with the tools they need to design the best applications for our products to work in. Because of the endless number of PCB design options, HFSS 3D component models are available, allowing our users to optimize their board launch designs. Designs are available on our website for many of our SMP products, with new models being added all the time.

## WATERPROOF IP67 RATED SOLUTIONS FOR HARSH AND RUGGED APPLICATIONS

Exclusive to Amphenol RF and designed to meet IP67 performance for moisture protection, SMP connector configurations are available which can be sealed in the mated condition and will withstand submersion in water up to 1 meter for 30 minutes. This unique design utilizes o-rings incorporated into a standard SMP plug and a customized jack interface to achieve the expected performance. Both connectors have panel mounting features for additional versatility.

## NON-MAGNETIC PRODUCTS

Ideal for medical, aerospace and quantum computing applications, non-magnetic SMPs offer high-performance with low magnetic field susceptibility and no electric field distortion. Materials and plating are confirmed to be non-magnetic in nature and provide the same reliable connections for board-to-board or board-to-cable applications. interconnect products.

# NON-MAGNETIC SMP SOLUTIONS

Amphenol RF offers a variety of non-magnetic SMP connectors and adapters constructed from non-ferrous materials and platings. These high-performance RF interconnect feature low magnetic field susceptibility and no electric field distortion while providing the same reliable connections for board-to-board and board-to-cable as standard SMP products. Non-Magnetic SMP options are ideal for sensitive applications such as medical, aerospace and quantum computing.

## FEATURES & BENEFITS

- 50 Ohm impedance
- Reliable electrical performance up to 40 GHz
- Available in various detent types: smooth bore, limited and full detent
- Engineered from non-ferrous materials and platings
- Snap-on locking mechanism
- Radial and axial float provides board-to-board misalignment correction
- PCB spacing options based on bullet adapter length

## APPLICATIONS

- Magnetic Resonance Imaging (MRI)
- Magnetic Resonance Angiography (MRA)
- Patient Tracking Systems
- Military/Aerospace
- Quantum Computing Components

## CORE COMPETENCIES

- Blindmate connector systems
- Custom cable assemblies and sub-systems
- Quick mating and quick disconnect
- Customized hybrid solutions supporting RF, signal and power

### SMP PRODUCTS



PCB JACKS



CABLE PLUGS



BULLET ADAPTERS

### ALSO AVAILABLE



MCX  
50 & 75 Ohm



MMCX  
50 Ohm



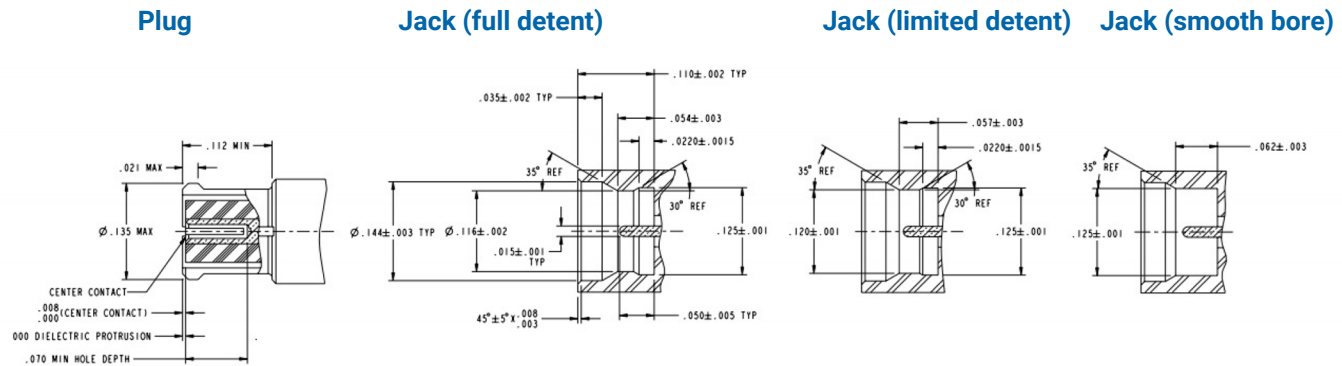
SMB / Mini-SMB  
50 & 75 Ohm



SMP  
50 Ohm

# SMP PRODUCT SERIES

## INTERFACE DIMENSIONS



## PCB MOUNT CONNECTORS

SMP PCB mount connectors are available in straight and right-angle smooth bore or detent jack configurations with surface mount (SMT) contact termination in a variety of body styles including round, catcher's mitt and low profile. This board-to-board solution is designed to maximize radial and axial float, eliminating the need for cables between boards and simplifying designs to eliminate assembly errors. Most of these connectors are sold in either individual or tape and reel packaging.






### Connector Body Types

**Full Detent** - A full detent has an undercut that the female tines snap into, allowing for secure mating.





**Limited Detent** - Limited detent is similar to full detent, but requires a lower mating/de-mating force.

**Smooth Bore** - A smooth bore interface does not use an undercut. The female tines compress to ensure a secure connection.



### Straight Jacks – Limited Detent

Part Number	Packaging Type	Body Mount	Body Termination	Special Features	Image
<a href="#">SMP-MSLD-PCS-20</a>	Individual Bag	Surface Mount	Right-Angle SMT	--	
<a href="#">SMP-MSLD-PCS20T</a>	Tape & Reel	Surface Mount	Right-Angle SMT	--	
<a href="#">SMP-MSLD-PCS-18</a>	Individual Bag	Surface Mount	Straight SMT	--	
<a href="#">SMP-MSLD-PCS18T</a>	Tape & Reel	Surface Mount	Straight SMT	--	
<a href="#">SMP-MSLD-PCT-19</a>	Individual Bag	Through Hole	Right-Angle SMT	--	










### Straight Jacks – Limited Detent (continued)

Part Number	Packaging Type	Body Mount	Body Termination	Special Features	Image
<a href="#">SMP-MSLD-PCS-2</a>	Tray	Through Hole	Right-Angle SMT	Round Body	
<a href="#">SMP-MSLD-PCS11T</a>	Tape & Reel	Surface Mount	Right-Angle SMT	Round Body	
<a href="#">SMP-MSLD-PCS-16</a>	Tape & Reel	Surface Mount	Straight SMT	Catcher's Mitt, Low Profile	
<a href="#">SMP-MSLD-PCT-3</a>	Individual Bag	Through Hole	Through Hole	Round Body	

### Straight Jacks – Full Detent

Part Number	Packaging Type	Body Mount	Body Termination	Special Features	Image
<a href="#">SMP-MSFD-PCT</a>	Individual Bag	Through Hole	Through Hole	--	
<a href="#">SMP-MSFD-PCT-2</a>	Tape & Reel	Through Hole	Through Hole	Round Body	

### Straight Jacks – Smooth Bore

Part Number	Packaging Type	Body Mount	Body Termination	Special Features	Image
<a href="#">SMP-MSSB-PCS-17</a>	Individual Bag	Surface Mount	Right-Angle SMT	--	
<a href="#">SMP-MSSB-PCS17T</a>	Tape & Reel	Surface Mount	Right-Angle SMT	--	
<a href="#">SMP-MSSB-PCT-10</a>	Individual Bag	Through Hole	Right-Angle SMT	20 GHz	
<a href="#">SMP-MSSB-PCT10T</a>	Tape & Reel	Through Hole	Right-Angle SMT	20 GHz	
<a href="#">SMP-MSSB-PCT</a>	Individual Bag	Through Hole	Through Hole	--	
<a href="#">SMP-MSCM-PCT-10</a>	Individual Bag	Through Hole	Right-Angle SMT	Catcher's Mitt	
<a href="#">SMP-MSCM-PCT10T</a>	Tape & Reel	Through Hole	Right-Angle SMT	Catcher's Mitt	
<a href="#">SMP-MSCM-PCS-12</a>	Individual Bag	Surface Mount	Right-Angle SMT	Catcher's Mitt	
<a href="#">SMP-MSCM-PCS12T</a>	Tape & Reel	Surface Mount	Right-Angle SMT	Catcher's Mitt	



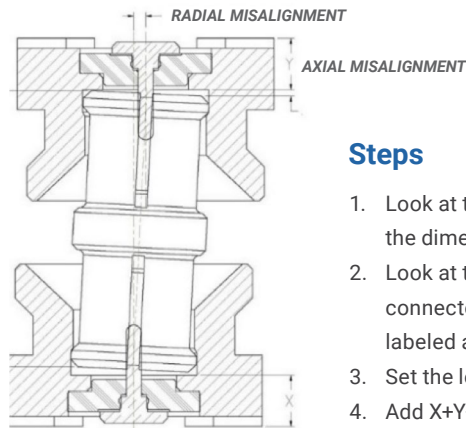
## SMP BULLET ADAPTERS

SMP bullet adapters are mated between a smooth bore and a detented jack. The detented jack retains the bullet while the smooth bore jack allows for a degree of freedom. The floating bullet provides a link between mated pairs in order to compensate for any radial and axial misalignment.

Part Number	Length
<a href="#">SMP-FSBA-594</a>	5.94 mm
<a href="#">SMP-FSBA-645</a>	6.45 mm
<a href="#">SMP-FSBA-696</a>	6.96 mm
<a href="#">SMP-FSBA-739</a>	7.39 mm
<a href="#">SMP-FSBA-860</a>	8.60 mm
<a href="#">SMP-FSBA-090</a>	9.00 mm
<a href="#">SMP-FSBA-093</a>	9.30 mm
<a href="#">SMP-FSBA-990</a>	9.90 mm
<a href="#">SMP-FSBA-114</a>	11.4 mm
<a href="#">SMP-FSBA-1259</a>	12.59 mm
<a href="#">SMP-FSBA-131</a>	13.10 mm
<a href="#">SMP-FSBA-1316</a>	13.16 mm
<a href="#">SMP-FSBA-145</a>	14.50 mm
<a href="#">SMP-FSBA-1674</a>	16.74 mm
<a href="#">SMP-FSBA-1716</a>	17.16 mm
<a href="#">SMP-FSBA-1950</a>	19.50 mm
<a href="#">SMP-FSBA-2030</a>	20.30 mm
<a href="#">SMP-FSBA-224</a>	22.40 mm
<a href="#">SMP-FSBA-254</a>	25.40 mm



## How to Calculate Minimum PCB Spacing



### Steps

1. Look at the product drawing and determine the dimension labeled as "X"
2. Look at the product drawing for the second connector and determine the dimension labeled as "Y"
3. Set the length of the bullet adapter as "Z"
4. Add  $X+Y+Z$  = Minimum PCB Spacing

## CABLE MOUNT

SMP cable-to-board solutions are available in straight or right-angle plug configurations to a variety of cable types and sizes, with 0.047" and 0.086" semi-rigid or conformable cable being common. These receptacles are designed for surface, through hole or end launch mounting.




### Cable Plugs - Straight

Part Number	Cable Type	Body	Contact	Image
<a href="#">SMP-FS-C06-1-R</a>	0.047-Inch Semi-Rigid	Solder	Solder	
<a href="#">SMP-FS-C07-5</a>	RG-405	Solder	Solder	
<a href="#">SMP-FS-C08-1-R</a>	RG-174, RG-188, RG-316, Times LMR-100A	Surface Mount	Solder	
<a href="#">SMP-FS-C19</a>	RG-178, RG-196	Crimped	Solder	

### Cable Plugs – Right-Angle

Part Number	Cable Type	Body	Contact	Image
<a href="#">SMP-FR-C07-2-R</a>	RG-405	Solder	Solder	
<a href="#">SMP-FR-C06-2</a>	0.047-Inch Semi-Rigid	Solder	Solder	





## Cable Plugs – Right-Angle (continued)

Part Number	Cable Type	Body	Contact	Image
<a href="#">SMP-FR-C08-1</a>	RG-174, RG-188, RG-316, Times LMR-100A	Crimped	Solder	
<a href="#">SMP-FR-C08-3-R</a>	RD-316, RD-188	Crimped	Solder	
<a href="#">SMP-FR-C19</a>	RG-178, RG-196, Belden 83265	Solder	Solder	




## NON-MAGNETIC SMP

Non-magnetic SMP connectors offer a compact and reliable solution for high-frequency signal transmission without the presence of magnetic materials in their construction. They find extensive use in industries such as medical devices, aerospace, and military, where avoiding magnetic interference is critical for equipment functionality and safety.




### PCB Straight Jacks

Part Number	Packaging Type	Body Mount	Contact Termination	Detent	Image
<a href="#">SMP-MSLD-PCT-NM</a>	Tray	Through Hole	Through Hole	Limited	
<a href="#">SMP-MSLD-PCS-NM</a>	Tray	Surface Mount	Right-Angle SMT	Limited	
<a href="#">SMP-MSSB-PCT-NM</a>	Tray	Through Hole	Through Hole	Smooth Bore	
<a href="#">SMP-MSSB-PCS-NM</a>	Tray	Surface Mount	Right-Angle SMT	Smooth Bore	

### SMP Bullet Adapters








Part Number	Length	Image
<a href="#">SMP-FS2A-645-NM</a>	6.45 mm	
<a href="#">SMP-FS2A-860-NM</a>	8.60 mm	
<a href="#">SMP-FS2A-990-NM</a>	9.90 mm	

## Cable Plugs

Part Number	Cable Type	Body	Contact	Image
<a href="#">SMP-FS-C08-R-NM</a>	RG-174, RG-188, RG-316, Times LMR-100A	Solder	Solder	
<a href="#">SMP-FR-C08-NM</a>	RG-174, RG-188, RG-316, Times LMR-100A	Crimped	Solder	
<a href="#">SMP-FS-C21-NM</a>	0.041-Inch Semi-Rigid, 0.141-Inch Conformable, RG-402, Times Microwave Systems Tflex 402	Solder	Solder	



## CABLE ASSEMBLIES

SMP coaxial cable assemblies are used in various industries for high-frequency signal transmission and connectivity. These assemblies play a crucial role in ensuring reliable and efficient communication in applications such as telecommunications, aerospace and test and measurement equipment. SMP coaxial cable assemblies are used to connect antennas, radios and other RF devices, facilitating the transmission of data, voice, or video signals with minimal loss and interference. Their compact size, durability, and superior electrical performance make them essential for high-frequency applications where signal quality and precision are paramount.






Part Number	Cable Configuration	Cable Type	Image
<a href="#">095-725-107-XXX</a>	SMP Straight Plug to SMP Straight Plug	Times Microwave Systems Tflex 405	
<a href="#">095-725-108-XXX</a>	SMP Straight Plug to SMP Straight Plug	Hand Formable 0.085-Inch	
<a href="#">095-725-117-XXX</a>	SMP Right-Angle Plug to SMP Right-Angle Plug	Hand Formable 0.085-Inch	
<a href="#">095-725-118-XXX</a>	SMP Right-Angle Plug to SMP Straight Plug	Hand Formable 0.085-Inch	
<a href="#">095-725-119-XXX</a>	SMP Straight Plug to SMP Straight Plug	Hand Formable 0.047-Inch	
<a href="#">095-725-120-XXX</a>	SMP Right-Angle Plug to SMP Straight Plug	Hand Formable 0.047-Inch	
<a href="#">095-725-121-XXX</a>	SMP Right-Angle Plug to SMP Right-Angle Plug	Hand Formable 0.047-Inch	

## ADAPTERS

### SMP to SMA Adapters


Part Number	Description	Configuration	Image
<a href="#">AD-SMAJSMPP-2</a>	SMA Jack to SMP Plug Adapter 50 Ohm Straight	SMA Jack to SMP Plug	
<a href="#">AD-SMAJSMJP-3</a>	SMA Jack to SMP Jack Adapter 50 Ohm Straight	SMA Jack to SMP Jack	

## SMP to SMA Adapters (continued)

Part Number	Description	Configuration	Image
<a href="#">AD-SMAPSMPJ-1</a>	SMA Plug to SMP Jack Adapter 50 Ohm Straight	SMA Plug to SMP Jack	
<a href="#">AD-SMAJSMPP-1</a>	SMA Jack to SMP Plug Adapter 50 Ohm Straight	SMA Jack to SMP Plug	
<a href="#">AD-SMAPSMPJ-2</a>	SMA Plug to SMP Jack Adapter 50 Ohm Straight	SMA Plug to SMP Jack	
<a href="#">AD-SMAPSMPP-1</a>	SMA Plug to SMP Plug Adapter 50 Ohm Straight	SMA Plug to SMP Plug	
<a href="#">SMP-MSPR-FL-1*</a>	SMP Plug to SMA Jack 50 Ohm Straight	SMA Jack to SMP Plug	

\*Please note this configuration is a spring-loaded probe and not a true adapter.

## SMP to N-Type Adapters

Part Number	Description	Configuration	Image
<a href="#">AD-NJSMPP-1</a>	N-Type Jack to SMP Plug Adapter 50 Ohm Straight	N-Type Jack to SMP Plug	

We understand that some designs require a waterproof IP67 solution and the experienced engineers at Amphenol RF are available to create a custom product to meet the specific needs of your project. It is important to keep the following information in mind when designing in an IP-rated connector:

IP67 designs must always be a matched mated pair – an IP67 SMP plug is not intermateable with a non-IP67 jack and still able to maintain its rating, and vice versa.

An IP67 interface does not comply with all of the dimensions of MIL-STD-348 like all other SMPs.

**Contact us to speak with a member of the RF team today.**



# TECHNICAL SPECIFICATIONS

## Electrical

Impedance	50 Ohm
Frequency Range	DC - 26.5 GHz (DC - 40 GHz on Extended Range Designs)
Voltage Rating	335 Volts RMS Max Continuous
Dielectric Withstanding Voltage	500 VRMS Min
VSWR (Return Loss)	DC - 18 GHz 1.2 (-21 dB) Max
	18 - 26.5 GHz 1.3 (-18 dB) Max
	26.5 - 40 GHz 1.7 (-12 dB) Max
Insulation Resistance	5000 MΩ Min
Center Contact Resistance	6 mΩ Max
Outer Contact Resistance	2 mΩ Max
RF Leakage (Interface)	-85 dB Max (DC - 4 GHz)
Insertion Loss	.1 √(f(GHz)) dB Max
Power Handling	32 W @ 1 GHz @ 25°C

## Environmental

Temperature Range	-65°C to +165°C
Thermal Shock	MIL-STD-202, Method 107, Condition C
Corrosion	MIL-STD-202 Method 101 (Test Condition B) - 5% Salt Solution
Vibration	MIL-STD-202, Method 204, Condition B
Mechanical Shock	MIL-STD-202, Method 213, Condition B
Moisture Resistance	MIL-STD-202, Method 106, Condition D

## Mechanical

Mating Cycles	Full detent: 100 min; Limited detent: 500 min; Smooth bore: 1000 min
Coupling Mechanism	Push-On
Interface Specification	MIL-STD-348
Engagement Force	≤ 15.0 lbs (40 N) (Full Detent)
Disengagement Force	≤ 0.5 lbs (2N) (Smooth Bore)
Mechanical Misalignment	Axial 0.25 mm
	Float Angle 4° Max with Bullet Solution
	Radial Gathering 0.25 mm Min. with standard smooth bore Jack
	Min Board to Board Distance 9.1 mm

Note: Technical specifications are typical and may vary by specific part number and design. See component drawing for additional details.

# Amphenol® RF

[www.amphenolrf.com](http://www.amphenolrf.com)



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**Learn more**  
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product portfolio

