SMB Series Subminiature RF Connectors

Snap-on mating
Frequency range DC-4 GHz
Lightweight and economical

SLB and SMC connectors also shown for comparison
SMB Specifications

**Specifications (MIL-PRF-39012 as applicable)**

**Materials:**
- **Body components, male contacts:** Brass per ASTM-B-16, alloy 360, 1/2 hard.
- **Female contacts:** Beryllium copper per ASTM-B-196, Condition HT.
- **Insulators:** Teflon TFE per ASTM-D-1710.

**Finish:**
- **Center contacts:** Gold plated per current revision of MIL-PRF-39012*
- **Other metal parts:** Gold or nickel plated to meet current MIL-PRF-39012 corrosion requirements.*

**Electrical:**
- **Impedance:** 50Ω. **Frequency range:** DC–4 GHz.  **Insulation Resistance:** 1,000 megohms minimum.
- **Voltage Rating:** 250VRMS @ sea level (RG-178 cable); 335VRMS @ sea level (RG-316 cable).
- **Dielectric Withstanding Voltage:** 750VRMS @ sea level (RG-178 cable); 1000VRMS @ sea level (RG-316 cable).
- **Contact Resistance:**
  - Straight connectors: Initial: 6 milliohms maximum; after environmental test conditions: 8 milliohms maximum.
  - Right angle connectors: Initial: 12 milliohms maximum; after environmental test conditions: 16 milliohms maximum.
- **Corona level:** 125V @70,000 ft.  **RF highpot:** 400 VRMS @ 5 MHz.
- **RF leakage:** -55 dB min @ 2–3 GHz.  **Insertion loss:** .30 dB max (straight connectors), .60 dB max (right angle connectors) @ 1.5 GHz.
- **VSWR:**
  - **Cable**
    - RG-178: 1.30 + (.04 x F[GHz])
    - RG-316: 1.25 + (.04 x F[GHz])
  - **Straight connector**
    - 1.45 + (.06 x F[GHz])
  - **Right angle connector**
    - 1.35 + (.04 x F[GHz])

**Mechanical:**
- **Force to engage:** 14 pounds max.
- **Contact retention:** 2 pounds min axial force.  **Durability:** 500 mating cycles.

**Environmental (MIL-STD-202):**
- **Temperature range:** -65˚ C to +165˚ C.  **Corrosion:** Method 101, condition B, 5% salt solution.
- **Vibration (Method 204):** Condition B.
- **Mechanical shock (Method 213):** Condition B.  **Thermal shock (Method 107):** Condition B.

*These specifications change periodically with updates to MIL-PRF-39012 requirements. Contact factory for latest specifications.

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**Interface Dimensions**

**Jack**
- **REFERENCE PLANE**
- **.065 MIN**
- **.007 MAX CONTACT & INSULATOR**

**Plug**
- **REFERENCE PLANE**
- **.141 MIN**
- **.007 MIN INSULATOR**

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APPLIED ENGINEERING PRODUCTS
(203) 776-2813 • FAX (203) 776-8294  www.aepconnectors.com • aepsales@aepconnectors.com
SMB Cable Attachment Methods

All SMB cable connectors in this catalog have captivated contacts which are soldered to the cable center conductor.
Both crimp and clamp types for flexible cable grip the cable braid with a force greater than the breaking strength of the braid.

Clamp Type For Flexible Cable

These connectors can be assembled without special tooling, and are field replaceable. They provide metal-to-metal clamping of the cable braid.

Crimp Type For Flexible Cable

Crimping the cable braid is the most reliable and repeatable method of cable assembly, and provides support for the cable during flexure. AEP crimp type connectors are assembled quickly and easily using readily-available commercial or MIL crimp tools.

Solder-Clamp For Semi-Rigid Cable

This method allows retrimming of the cable dielectric, if necessary, during assembly. Connectors can be repositioned relative to the cable after assembly by loosening the clamp nut. Solder-clamp connectors are field replaceable without special tools.
SMB Cable Plugs

Click on part number to go directly to cable assembly instructions

**Straight Plugs**

**Straight Female Cable Plug**

Clamp type for flexible cable: Solder-clamp for semi-rigid cable:

- 2002-1551-0XX (Gold plated)
- 2002-1551-0XX (Gold plated)
- 2002-7551-0XX (Nickel plated)
- 2002-7551-0XX (Nickel plated)

QPL version available (M39012/67)

**Straight Female Cable Plug**

Crimp type for flexible cable:

- 2002-1571-0XX (Gold plated)
- 2002-7571-0XX (Nickel plated)

QPL version available (M39012/67)

**Right Angle Plugs**

**Right Angle Female Cable Plug**

Clamp type for flexible cable:

- 2005-1551-0XX (Gold plated)
- 2005-7551-0XX (Nickel plated)

Solder-clamp for semi-rigid cable:

- 2005-1541-0XX (Gold plated)
- 2005-7541-0XX (Nickel plated)

QPL version available (M39012/69)

**Right Angle Female Cable Plug**

Crimp type for flexible cable:

- 2105-1521-0XX (Gold plated)
- 2105-7521-0XX (Nickel plated)

QPL version available (M39012/69)

---

Substitute the appropriate cable group number for "XX" when ordering:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>CABLE TYPES</th>
<th>GROUP</th>
<th>CABLE TYPES</th>
<th>GROUP</th>
<th>CABLE TYPES</th>
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<tbody>
<tr>
<td>02</td>
<td>RG178, RG196, M17/93, M17/169</td>
<td>05</td>
<td>RG178DS, RG196DS</td>
<td>10</td>
<td>.085&quot; semi-rigid, RG405, M17/133</td>
</tr>
<tr>
<td>03</td>
<td>RG174, RG179, RG316, M17/113, M17/119, M17/172, M17/189</td>
<td>09</td>
<td>.141&quot; semi-rigid, RG 402M17/130</td>
<td>19</td>
<td>RG174DS, RG316DS, M17/151, M17/152, Times RD-316</td>
</tr>
</tbody>
</table>
SMB Cable Plugs
Click on part number to go directly to cable assembly instructions

Straight Bulkhead Mounted Plugs

<table>
<thead>
<tr>
<th>GROUP</th>
<th>CABLE TYPES</th>
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</thead>
<tbody>
<tr>
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<td>RG178, RG196, M17/93, M17/169</td>
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<td>RG174, RG179, RG316, M17/113, M17/119, M17/172, M17/189</td>
</tr>
</tbody>
</table>

Bulkhead Mounted Straight Cable Plug

Clamp type for flexible cable:
2028-1551-0XX (Gold plated)
2028-7551-0XX (Nickel plated)

Solder-clamp for semi-rigid:
2028-1541-0XX (Gold plated)
2028-7541-0XX (Nickel plated)

Bulkhead Mounted Straight Cable Plug

Crimp type for flexible cable:
2028-1571-0XX (Gold plated)
2028-7571-0XX (Nickel plated)

<table>
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<td>RG178DS, RG196DS</td>
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APPLIED ENGINEERING PRODUCTS
(203) 776-2813 • FAX (203) 776-8294 www.aepconnectors.com • aepsales@aepconnectors.com
SMB Cable Jacks
Click on part number to go directly to cable assembly instructions

Straight Male Cable Jack
Clamp type for flexible cable: 2001-1551-0XX (Gold plated)
2001-7551-0XX (Nickel plated)
Solder-clamp for semi-rigid cable: 2001-1541-0XX (Gold plated)
2001-7541-0XX (Nickel plated)
QPL version available (M39012/68)

Right Angle Male Cable Jack
Clamp type for flexible cable: 2041-1551-0XX (Gold plated)
2041-7551-0XX (Nickel plated)
Solder-clamp for semi-rigid cable: 2041-1541-0XX (Gold plated)
2041-7541-0XX (Nickel plated)

Right Angle Male Cable Jack
Clamp type for flexible cable: 2141-1521-0XX (Gold plated)
2141-7521-0XX (Nickel plated)

Substitute the appropriate cable group number for "XX" when ordering:

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<td>19</td>
<td>RG174DS, RG316DS, M17/151, M17/152, Times RD-316</td>
</tr>
</tbody>
</table>
SMB Bulkhead Mounted Cable Jacks
Click on part number to go directly to cable assembly instructions

**Straight Jacks**

**Straight Male Bulkhead Cable Jack**
Clamp type for flexible cable: Solder-clamp for semi-rigid cable:
2003-1551-0XX (Gold plated) 2003-1541-0XX (Gold plated)
2003-7551-0XX (Nickel plated) 2003-7541-0XX (Nickel plated)
QPL version available (M39012/70)

**Right Angle Jacks**

**Bulkhead Mounted Right Angle Male Cable Jack**
Clamp type for flexible cable:
2006-1551-0XX (Gold plated)
2006-7551-0XX (Nickel plated)
Solder-clamp for semi-rigid cable:
2006-1541-0XX (Gold plated)
2006-7541-0XX (Nickel plated)

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<td>RG174, RG179, RG316, M17/113, M17/119, M17/172, M17/189</td>
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</tr>
<tr>
<td>19</td>
<td>RG174DS, RG316DS, M17/151, M17/152, Times RD-316</td>
</tr>
</tbody>
</table>
SMB Bulkhead Jack Receptacles

### Straight Jacks

#### Straight Male Bulkhead Jack Receptacle
- Solder pot contact
- Rear mount

2004-1511-000 (Gold plated)
2004-7511-000 (Nickel plated)
QPL version available (M39012/71)

#### Straight Male Bulkhead Jack Receptacle
- Solder pot contact
- Front mount

2019-1511-000 (Gold plated)
2019-7511-000 (Nickel plated)
QPL version available (M39012/71)

#### Straight Male Bulkhead Jack Receptacle
- Solder pot contact
- Recessed front mount

2014-1511-000 (Gold plated)
2014-7511-000 (Nickel plated)

### Right Angle Jacks

#### Right Angle Male Bulkhead Jack Receptacle
- Solder pot contact
- Front mount

2012-1511-000 (Gold plated)
2012-7511-000 (Nickel plated)

(All fit .093" max panel thickness)
SMB Bulkhead Plug Receptacles

Straight Plugs

**Straight Female Bulkhead Plug Receptacle**
- Solder pot contact
- Front mount

2017-1511-000 (Gold plated)
2017-7511-000 (Nickel plated)

Right Angle Plugs

**Right Angle Female Bulkhead Plug Receptacle**
- Solder pot contact
- Front mount

2097-1511-000 (Gold plated)
2097-7511-000 (Nickel plated)

*(All fit .093” max panel thickness)*
SMB P.C. Board Receptacles

### Straight Male Jack Receptacle

- **2009-1511-000** (Gold plated)
- **2009-7511-000** (Nickel plated)
- **2009-1511-050** (Gold plated)
- **2009-7511-050** (Nickel plated)

QPL version available (M39012/95)

### Bulkhead Mounted Straight Male Jack P.C. Board Receptacle

- **2109-1511-000** (Gold plated)
- **2109-7511-000** (Nickel plated)

### Straight Plug

#### Straight Female Plug Receptacle

- **2025-1511-000** (Gold plated)
- **2025-7511-000** (Nickel plated)
SMB P.C. Board Receptacles

Right Angle Jacks

Right Angle Male Jack Receptacle

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>.43</td>
<td>.15</td>
<td>.50</td>
<td>.38</td>
<td></td>
</tr>
<tr>
<td>2010-1511-000 (Gold plated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-7511-000 (Nickel plated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th></th>
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<tbody>
<tr>
<td>.50</td>
<td>.215</td>
<td>.56</td>
<td>.437</td>
<td></td>
</tr>
<tr>
<td>2010-1511-002 (Gold plated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-7511-002 (Nickel plated)</td>
<td></td>
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<td></td>
<td></td>
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</tbody>
</table>

QPL version available (M39012/96)

Bulkhead Mounted Right Angle Male Jack P.C. Board Receptacle

2110-1511-000 (Gold plated)
2110-7511-000 (Nickel plated)

Right Angle Plug

Right Angle Female Plug Receptacle

2042-1511-000 (Gold plated)
2042-7511-000 (Nickel plated)
SMB Panel Receptacles

**Straight Jack**

Straight Male Panel Receptacle

<table>
<thead>
<tr>
<th>A sq.</th>
<th>B</th>
<th>C dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.500</td>
<td>.340</td>
<td>.102</td>
</tr>
<tr>
<td>2486-1511-000 (Gold plated)</td>
<td>2486-7511-000 (Nickel plated)</td>
<td></td>
</tr>
<tr>
<td>A sq.</td>
<td>B</td>
<td>C dia.</td>
</tr>
<tr>
<td>.375</td>
<td>.232</td>
<td>.093</td>
</tr>
<tr>
<td>2484-1511-000 (Gold plated)</td>
<td>2484-7511-000 (Nickel plated)</td>
<td></td>
</tr>
</tbody>
</table>

**Right Angle Jack**

Right Angle Male Panel Receptacle

<table>
<thead>
<tr>
<th>A sq.</th>
<th>B</th>
<th>C dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.500</td>
<td>.340</td>
<td>.102</td>
</tr>
<tr>
<td>2490-1511-000 (Gold plated)</td>
<td>2490-7511-000 (Nickel plated)</td>
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</tr>
<tr>
<td>A sq.</td>
<td>B</td>
<td>C dia.</td>
</tr>
<tr>
<td>.375</td>
<td>.232</td>
<td>.093</td>
</tr>
<tr>
<td>2488-1511-000 (Gold plated)</td>
<td>2488-7511-000 (Nickel plated)</td>
<td></td>
</tr>
</tbody>
</table>
SMB Stripline Receptacles

### Straight Jack

**Straight Male Top Launch Jack**
- Non-captive contact

<table>
<thead>
<tr>
<th>Dim. A</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.031</td>
<td>2029-1211-001</td>
<td>(Gold plated)</td>
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<tr>
<td></td>
<td>2029-7211-001</td>
<td>(Nickel plated)</td>
</tr>
<tr>
<td>.063</td>
<td>2029-1211-002</td>
<td>(Gold plated)</td>
</tr>
<tr>
<td></td>
<td>2029-7211-002</td>
<td>(Nickel plated)</td>
</tr>
<tr>
<td>.125</td>
<td>2029-1211-003</td>
<td>(Gold plated)</td>
</tr>
<tr>
<td></td>
<td>2029-7211-003</td>
<td>(Nickel plated)</td>
</tr>
</tbody>
</table>

### Right Angle Jack

**Right Angle Male Top Launch Jack**
- Removable rear contact

<table>
<thead>
<tr>
<th>Dim. A</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.031</td>
<td>2092-1511-001</td>
<td>(Gold plated)</td>
</tr>
<tr>
<td></td>
<td>2092-7511-001</td>
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<td>.063</td>
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<td>(Nickel plated)</td>
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<td>.125</td>
<td>2092-1511-003</td>
<td>(Gold plated)</td>
</tr>
<tr>
<td></td>
<td>2092-7511-003</td>
<td>(Nickel plated)</td>
</tr>
</tbody>
</table>
SMB Adapters

**Straight Male Jack To Jack Adapter**
- Connects two plugs

5213-1501-000 (Gold plated)
5213-7501-000 (Nickel plated)

**Bulkhead Mounted Straight Male Jack To Jack Adapter**
- Connects two plugs
- For .093" max. panel

5222-1501-000 (Gold plated)
5222-7501-000 (Nickel plated)

**Straight Female Plug To Plug Adapter**
- Connects two jacks

5216-1501-000 (Gold plated)
5216-7501-000 (Nickel plated)
SMB Adapters

Tee Adapters

**Tee Adapter (Unmatched Power Divider) Jack To Plug To Jack**
- Connects two plugs and one jack

5215-1501-000 (Gold plated)
5215-7501-000 (Nickel plated)

**Tee Adapter (Unmatched Power Divider) Jack To Jack To Jack**
- Connects three plugs

5207-1501-000 (Gold plated)
5207-7501-000 (Nickel plated)

**Tee Adapter (Unmatched Power Divider) Plug To Plug To Plug**
- Connects three jacks

5208-1501-000 (Gold plated)
5208-7501-000 (Nickel plated)
SMB Terminations

Plug Termination

**Female Plug Resistive Termination**
(Dummy load)

Standard resistor:
51 ohm, 1/2 watt,
5% tolerance

2036-1511-051 (Gold plated)
2036-7511-051 (Nickel plated)

Available with other resistances.

Jack Termination

**Male Jack Resistive Termination**
(Dummy load)

Standard resistor:
51 ohm, 1/2 watt,
5% tolerance

2037-1511-051 (Gold plated)
2037-7511-051 (Nickel plated)

Available with other resistances
Cable Assembly Instructions
Clamp type connectors for flexible cable

Straight Connectors—Flexible Cable

Parts list

Body assembly
Insulator
Ferrule
Compression washer
Contact (male or female)
Backnut

1

—Trim cable per trim code below; tin end of center conductor.
—Slide backnut onto cable. Slide compression washer onto cable in the orientation shown until it stops against cable jacket.
—Flare cable braid by rotating dielectric and slide ferrule under braid.

2

—Press ferrule against compression washer.
—Trim excess braid flush with outer diameter of compression washer and ferrule.
—Assemble insulator over cable center conductor and dielectric.

3

—Assemble contact onto cable center conductor.
—Solder contact to center conductor by heating rear of contact (do not feed additional solder through inspection hole in contact).

4

—Insert cable assembly into body assembly. Tighten to 90–100 inch-ounces torque. (Hold cable/hardware assembly stationary and rotate body when tightening.)

Right Angle Connectors—Flexible Cable

Parts list

Body assembly
Insulator
Cap
Ferrule
Compression washer
Backnut

1

—Trim cable per trim code below; tin end of center conductor.
—Slide backnut onto cable. Slide compression washer onto cable in the orientation shown until it stops against cable jacket.
—Flare cable braid by rotating dielectric and slide ferrule under braid.

2

—Press ferrule against compression washer.
—Trim excess braid flush with outer diameter of compression washer and ferrule.
—Assemble insulator over cable center conductor and dielectric.

3

—Insert cable assembly into body assembly. Tighten to 90–100 inch-ounces torque. (Hold cable/hardware assembly stationary and rotate body when tightening.)
—Solder center conductor into notch in rear of contact with .025–.032" diameter chisel-tip soldering iron.
—Solder should cover center conductor, but not extend over top of notch in contact, or exceed contact diameter.

4

—Place insulator in body cavity, and press cap into place. Properly assembled cap will be slightly below end of body assembly.

Cable Trim Dimensions

Center conductor
Dielectric
Braid
Jacket

A
B
C

<table>
<thead>
<tr>
<th>CONNECTOR TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRAIGHT CONNECTORS</td>
<td>.080</td>
<td>.120</td>
<td>.240</td>
</tr>
<tr>
<td>RIGHT ANGLE CONNECTORS</td>
<td>.080</td>
<td>.180</td>
<td>.300</td>
</tr>
</tbody>
</table>
Cable Assembly Instructions
Crimp type connectors for flexible cable

Straight Connectors—Flexible Cable

Parts list

1. Assemble insulator and contact onto cable dielectric and center conductor.
2. Solder contact to center conductor by heating rear of contact (do not feed additional solder through inspection hole in contact).
3. Insert cable assembly into body assembly. Tighten to 90–100 inch-ounces torque. (Hold cable/hardware assembly stationary and rotate body when tightening.)
4. Place insulator in body cavity, and press cap into place. Properly assembled cap will be slightly below end of body assembly. Slide shrink tubing over crimp sleeve and shrink to fit.

Cable Trim Dimensions

CONNECTOR TYPE | A | B | C
---|---|---|---
STRAIGHT CONNECTORS | .100 | .430 | .700
RIGHT ANGLE CONNECTORS | .070 | .200 | .450

Crimp Die Sizes

<table>
<thead>
<tr>
<th>CABLE GROUP</th>
<th>HEX DIE SIZE</th>
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<td>02</td>
<td>.105</td>
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<tr>
<td>03</td>
<td>.128</td>
</tr>
<tr>
<td>05</td>
<td>.128</td>
</tr>
</tbody>
</table>

Right Angle Connectors—Flexible Cable

Parts list

1. Trim cable per trim code below; tin end of center conductor.
2. Slide heat-shrink tubing and crimp sleeve over cable.
3. Flare cable braid by rotating dielectric and slide cable into crimp tail.
4. Solder center conductor into notch in rear of contact with .025–.032” diameter chisel-tip soldering iron.

Cable Trim Dimensions

Solder center conductor into notch in rear of contact with .025–.032” diameter chisel-tip soldering iron.
Solder should cover center conductor, but not extend over top of notch in contact, or exceed contact diameter.

—Position cable so braid touches rear of body assembly.
—Slide crimp sleeve forward to touch rear of body assembly.
—Crimp braid with appropriate die size from chart below.

Insert cable assembly into body assembly. Tighten to 90–100 inch-ounces torque. (Hold cable/hardware assembly stationary and rotate body when tightening.)
—Slide shrink tubing over crimp sleeve and shrink to fit.

Braid
Insulator
Heat-shrink tubing (optional)
Jacket
Dielectric
Center conductor
A
B
C
**Cable Assembly Instructions**

**Solder-clamp connectors for semi-rigid cable**

**Straight Connectors—Semi-Rigid Cable**

**Parts list**

- Body assembly
- Solder Ferrule
- Insulator
- Backnut
- Contact (male or female)

1. **Assemble insulator and contact onto cable dielectric and center conductor.** If insulator is not flush against solder ferrule due to dielectric extrusion, retrim dielectric.

2. **Solder cable jacket to ferrule.**

3. **Insert cable assembly into body assembly. Tighten to 90–100 inch-ounces torque.** (Hold cable/hardware assembly stationary and rotate body when tightening.)

**Right Angle Connectors—Semi-Rigid Cable**

**Parts list**

- Insulator
- Body assembly
- Solder Ferrule
- Cap
- Backnut

1. **Assemble insulator and contact onto cable dielectric and center conductor.** If insulator is not flush against solder ferrule due to dielectric extrusion, retrim dielectric.

2. **Insert cable assembly into body assembly.** Tighten to 90–100 inch-ounces torque. (Hold cable/hardware assembly stationary and rotate body when tightening.)

3. **Place insulator in body cavity, and press cap into place.** Properly assembled cap will be slightly below end of body assembly.

**Cable Trim Dimensions**

- **Center conductor**
- **Dielectric**
- **Jacket**

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Mounting Dimensions

**Bulkhead Receptacles**

- .195 dia.  
- .180

Flat of mounting surface is aligned with body hex as shown.

**P.C. Board Receptacles**

- .100 typ.  
- .047 dia.  
- .200 typ.  
- .067 dia. min. (typ.)

Assembly Tooling

**Crimp tool**

- DESCRIPTION: Crimp tool with .105” and .128” hex dies  
- AEP P/N: TA-0105

**Torque Wrench**

- DESCRIPTION: Torque wrench with 7/32” jaws for SMB connector backnuts; 95 inch-ounces torque  
- AEP P/N: TA-0436

**Capping Press**

- DESCRIPTION: Capping tool (arbor press) with base for SMB right angle plugs  
- AEP P/N: CP-1

- DESCRIPTION: Capping tool (arbor press) with base for SMB right angle jacks  
- AEP P/N: CP-6
# Index by Part Number

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* Indicates cable connectors with various types on specified page.

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