Precision Test Adapters

TRUtest Precision test adapters are available in a variety of interface configurations. Our modular design approach provides flexibility in selecting the best adapter combination without reducing VSWR and phase matched performance. Gold plated, stainless steel contacts ensure precise mating without sacrificing reliability. The table below illustrates the range of interface combinations available as an in-series or between series adapter.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
<th>VSWR</th>
<th>Phase Match</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mm (male)</td>
<td>3.5 mm (female) Adapter</td>
<td>1.00</td>
<td>0</td>
<td>TRU-11221</td>
</tr>
<tr>
<td>2.92 mm (female)</td>
<td>2.92 mm (male) Adapter</td>
<td>1.00</td>
<td>0</td>
<td>TRU-11235</td>
</tr>
<tr>
<td>2.4 mm (female)</td>
<td>2.4 mm (male) Adapter</td>
<td>1.00</td>
<td>0</td>
<td>TRU-11244</td>
</tr>
<tr>
<td>1.25 mm (female)</td>
<td>1.25 mm (male) Adapter</td>
<td>1.00</td>
<td>0</td>
<td>TRU-11247</td>
</tr>
<tr>
<td>1.0 mm (female)</td>
<td>1.0 mm (male) Adapter</td>
<td>1.00</td>
<td>0</td>
<td>TRU-11250</td>
</tr>
</tbody>
</table>

General Purpose Test Cable Assemblies

TRUtest™ Series cable assemblies combine MIL-standard test-grade interfaces with flexible and durable cable construction to provide reliable performance and long service life. They are available in a wide variety of designs and terminations. TRUtest™ Series cable assemblies are available for rapid delivery to your test application—SMA, Type N and 7 mm interfaces.

Precision Millimeter-wave Test Adapters

TRUtest Precision Millimeter-wave test adapters provide reliable test solutions for use with today’s sophisticated (PNAS) precision network analyzers. Precision adapters are available in 2.4 mm (DC – 50 GHz), 3.5 mm (DC – 33 GHz) and 2.4 mm (DC – 50 GHz) interface combinations.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
<th>VSWR</th>
<th>Finish</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5 mm (female)</td>
<td>3.5 mm (female) Adapter</td>
<td>1.15</td>
<td>Passivated Stainless Steel</td>
<td>TRU-11223</td>
</tr>
<tr>
<td>3.5 mm (male)</td>
<td>3.5 mm (female) Adapter</td>
<td>1.15</td>
<td>Passivated Stainless Steel</td>
<td>TRU-11222</td>
</tr>
<tr>
<td>2.4 mm (female)</td>
<td>2.4 mm (female) Adapter</td>
<td>1.20</td>
<td>Passivated Stainless Steel</td>
<td>TRU-11244</td>
</tr>
<tr>
<td>2.4 mm (male)</td>
<td>2.4 mm (male) Adapter</td>
<td>1.20</td>
<td>Passivated Stainless Steel</td>
<td>TRU-11247</td>
</tr>
<tr>
<td>1.25 mm (female)</td>
<td>1.25 mm (female) Adapter</td>
<td>1.00</td>
<td>Passivated Stainless Steel</td>
<td>TRU-11250</td>
</tr>
</tbody>
</table>

Specifications subject to change without notice. For additional specifications or other products, visit us online or contact the factory.
Precision Test Adapters

TRU offers a broad range of precision adapters in a variety of interface configurations. Our modular design approach provides flexibility in selecting the best adapter combination without sacrificing VSWR and phase matched performance. Conical six-slot center contacts on the 7 mm and type N interfaces ensure precise mated connections. Electrically-matched pin insulators are designed to mechanically hold the center contacts and operate over temperatures ranging from 0° to 85°C. The gold plated, durable stainless steel body and coupling nut construction will provide long-lasting connections. Electrically-matched Noryl insulators are designed to mechanically capture and reliable performance life.

Specifications subject to change without notice. For additional information, visit us online or contact the factory.

Our modular design approach provides flexibility in selecting the best combination without sacrificing VSWR and phase matched performance. Gold plated, durable stainless steel body and coupling nut construction will provide long-lasting connections. Electrically-matched Noryl insulators are designed to mechanically capture and reliable performance life.

The table below illustrates the range of interface combinations available as an in-series or between-series adapter.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
<th>3.5 mm (male)</th>
<th>3.5 mm (female)</th>
<th>SC (male)</th>
<th>ATNC (male)</th>
<th>SMA (male)</th>
<th>N (male)</th>
<th>7 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-series</td>
<td>3.5 mm (male) to 3.5 mm (female) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in-series</td>
<td>3.5 mm (female) to 3.5 mm (male) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>2.92 mm (female) to 2.92 mm (male) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>2.4 mm (female) to 2.4 mm (male) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>3.5 mm (female) to 3.5 mm (male) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>3.5 mm (male) to 3.5 mm (female) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>7 mm (male) to 7 mm (female) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>between-series</td>
<td>7 mm (female) to 7 mm (male) Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition to our standard catalog products, TRU can engineer a wide range of custom design solutions to meet your challenge. Call your local sales or authorized distribution office for additional information and availability.

To request literature, marketing@trucorporation.com

Precision Millimeter-wave Test Adapters

TRU precision adapters feature MIL-STD-348 test grade interfaces and robust stainless steel and Cu construction to ensure optimal electrical performance, measurement accuracy and repeatability in your test application.

Our broad range of millimeter-wave precision adapters are available for use with today’s sophisticated (PNAs) precision network analyzers. Precision adapters are available in 2.92 mm (DC - 40 GHz), 7 mm (DC - 33 GHz) and 2.4 mm (DC - 18 GHz) interface combinations.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Frequency</th>
<th>VSWR</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRU-11234</td>
<td>2.4-50 GHz</td>
<td>2.00</td>
<td>Passivated Stainless Steel</td>
</tr>
</tbody>
</table>

To request literature, marketing@trucorporation.com

General Purpose Test Cable Assemblies

- Matched performance to 18 GHz
- Repeatability: stable performance
- Low Insertion loss and VSWR
- 100% B/S tested
- MIL-STD-348 test interfaces
- Stainless steel connectors
- Excellent cable connector retention

TRUtest™ Series cable assemblies combine MIL-standard test-grade interfaces with flexible and durable cable construction to provide repeatable, reliable performance and long service life. These standard connector configurations are available for a variety of requirements including 2.4 mm, 3.5 mm, and 7 mm. TRUtest™ Series cable assemblies utilize a low density, PTFE tape-wrapped core to provide excellent loss and phase stability over a broad temperature rating.

TRU test™ Series cable assemblies are designed with a variety of connector combinations to provide excellent reliability and performance in all your test applications. In addition to our general-purpose cable assemblies, TRU also offers a wide variety of associated test solutions that include precision and millimeter-wave adapters.

In addition to our standard catalog products, TRU can engineer a range of customized cable assemblies to meet your challenge. Call your local sales or authorized distribution office for additional information and availability.

TRUtest™ Series...
TRUtest® Specifications

**TRUtest 18 Series General Purpose Test Cables**

**Performance Specifications**

- **Typical Insertion Loss**
  - 3.5 mm male to 3.5 mm male, 30 inches (0.762 meter) long
  - Start: 0.050000000 GHz, Stop: 18.000000000 GHz
  - S21 LOG: 0.5 dB REF: -1.5 dB
  - 1:1.2540 dB

- **Typical VSWR**
  - 3.5 mm male to 3.5 mm male, 30 inches (0.762 meter) long
  - Start: 0.050000000 GHz, Stop: 18.000000000 GHz
  - S11 LOG: 1:1.1848

**Custom Requirements**

TRUtest® cable assemblies are also available in custom lengths, configurations or with alternate connector interfaces to meet your specific application requirements. Contact your local sales representative or distribution sales office to discuss your requirement or request a quote. Our sales offices can be conveniently found on our website at trucorporation.com.

**Specifications**

Subject to change without notice. For additional specifications or other products, visit us online or contact the factory.

**Table:**

<table>
<thead>
<tr>
<th>Cable Construction</th>
<th>Description 1</th>
<th>Description 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEP Jacket</td>
<td>3.5 mm male to 3.5 mm male, 30 inches (0.762 meter) long</td>
<td>1:1.1848</td>
</tr>
<tr>
<td>Type: 50 ohm nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VSWR: 1.35:1 maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation: 0.4 dB/ft + 0.4 dB/18 GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shielding Effectiveness: &gt; -95 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable Outer Diameter</td>
<td>3.5 mm: 0.35 inch (8.9 mm) nominal</td>
<td></td>
</tr>
<tr>
<td>Connector Outer Diameter</td>
<td>Type N: 0.8 inch (20.3 mm) nominal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMA: 0.35 inch (8.9 mm) nominal</td>
<td></td>
</tr>
<tr>
<td>Mate Durability</td>
<td>500 cycles minimum</td>
<td></td>
</tr>
<tr>
<td>Cable Materials</td>
<td>Stainless steel bodies, gold-plated beryllium copper contacts, TRU flaxed FEP insulation</td>
<td></td>
</tr>
<tr>
<td>Connector Materials</td>
<td>Gold-plated beryllium copper contacts, TPX, fluoroloy, PTFE insulators</td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
<td>Cable/Connector Retention: 50 pounds minimum (tested IAW MIL-C-87104)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positively mechanical captive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torque: IAW MIL-C-87104</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexure: 100,000 cycles minimum (IAW MIL-C-87104)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum Bend Radius: 1.0 inch (25.4 mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum Bend Radius: 1/2 inch (25.4 mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connector Diameter: SMA: 0.35 inch (8.9 mm) nominal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N: 0.6 inch (15.2 mm) nominal</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental**

- Temperature: 18°C to 120°C
- Phase Stability: < 2500 PPM (-40 to +120°C)
- 4-quadrant bending at minimum bend radius: ±10° at 18 GHz

**Electrical**

- Frequency: 0.05 to 18 GHz, depending on connectors
- Impedance: 50 ohms nominal
- Velocity of Propagation: 90% nominal
- Attenuation: 0.4 dB/ft - 0.4 dB at 18 GHz
- Standing Wave Ratio: 1:1.25

**TRUtest Specifications**

- Specifications subject to change without notice. For additional specifications or other products, visit us online or contact the factory.
- TRUtest™ cable assemblies are also available in custom lengths, configurations or with alternate connector interfaces to meet your specific application requirements. Contact your local sales representative or distribution sales office to discuss your requirement or request a quote. Our sales offices can be conveniently found on our website at trucorporation.com.

- **Cable Construction**
  - ROUNDSILVER
  - PLATEDCOPPERBRAID
  - POLYMIDE
  - INNERLAYER
  - FLAT, SILVER PLATED COPPER STRIP
  - EXPANDEDPTFE DIELECTRIC
  - CENTER
  - CONDUCTOR
Specifications subject to change without notice. For additional specifications or other products, visit us online or contact the factory.

TRU test™ Specifications

TRU test™ Series General Purpose Test Cables

Figure 1: SMA to SMA schematic

Figure 2: N to N schematic

Figure 3: 3.5 mm to 3.5 mm schematic

Cable Construction

Environmental

Mechanical

Performance Specifications

Custom Requirements

TRU test™ cable assemblies are also available in custom lengths, configurations or with alternate connector interfaces to meet your specific application requirements. Contact your local sales representative or distribution sales office to discuss your requirement or request a quote. Our sales offices can be conveniently found on our website at trucorporation.com.

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TRUtest™ Series General Purpose Test Cables

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TRU-16002-03</td>
<td>TRUtest18–SMA straight plug to SMA straight plug</td>
</tr>
<tr>
<td>2</td>
<td>TRU-16003-03</td>
<td>TRUtest18–N straight plug to N straight plug</td>
</tr>
<tr>
<td>3</td>
<td>TRU-16001-03</td>
<td>TRUtest18–3.5 mm straight plug to 3.5 mm straight plug</td>
</tr>
</tbody>
</table>

Cable Construction

- FEP jacket
- Round silver plated copper braid
- POLYMIDE inner layer
- Flat, silver plated copper strip
- EXPANDED PTFE dielectric
- CENTER CONDUCTOR

Environmental

- Temperature: -55°C to +120°C
- Phase Stability: ≤ 2500 PPM (−40°C to +120°C)
- 4-quadrant bending @ minimum bend radius ±10° @ 18 GHz

Performance Specifications

- Typical Insertion Loss
  - 3.5 mm male to 3.5 mm male: 30 inches (0.762 meter) long
  - START 0.050000000 GHz STOP 18.000000000 GHz
  - S21 LOG: 0.4 dB/REF-1.5 dB 1:-1.2540 dB 17.5961 25000 G Hz

- Typical VSWR
  - 3.5 mm male to 3.5 mm male: In water & air: 1:1.1848 17.0576 50000 G Hz

- Phase Temperature Profile
  - 3.5 mm male to 3.5 mm male: In water & air: 1:1.1848 17.0576 50000 G Hz
Precision Test Adapters
TRU offers a broad range of precision adapters in a variety of interface configurations. Our modular design approach provides flexibility in selecting the best adapter combination without sacrificing electrical performance or assembly time. Our custom-designed center contacts on the 7 mm and type N interfaces ensure precise matched connections. Electrically-matched low-inductance adapters designed to minimize resistance and the center contacts and operate over temperatures ranging from −55°C to +200°C. The gold plated, durable stainless steel body and coupling nut construction provides long-lasting connections and reliable performance life.

The table below illustrates the range of interface combinations available as an in-series or between series adapter.

<table>
<thead>
<tr>
<th>Interface Description</th>
<th>3.5mm (female) to 3.5mm (male) Adapter</th>
<th>3.5mm (female) to 3.5mm (female) Adapter</th>
<th>2.92mm (female) to 2.92mm (female) Adapter</th>
<th>2.92mm (female) to 2.92mm (male) Adapter</th>
<th>2.4mm (female) to 2.4mm (female) Adapter</th>
<th>2.4mm (female) to 2.4mm (male) Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>TRU-11231</td>
<td>TRU-11232</td>
<td>TRU-11241</td>
<td>TRU-11242</td>
<td>TRU-11243</td>
<td>TRU-11244</td>
</tr>
<tr>
<td>Frequency (GHz)</td>
<td>0.00 – 40.00</td>
<td>0.00 – 40.00</td>
<td>0.00 – 33.00</td>
<td>0.00 – 33.00</td>
<td>0.00 – 50.00</td>
<td>0.00 – 50.00</td>
</tr>
<tr>
<td>VSWR</td>
<td>1.00:1</td>
<td>1.00:1</td>
<td>1.00:1</td>
<td>1.00:1</td>
<td>1.00:1</td>
<td>1.00:1</td>
</tr>
<tr>
<td>Finish</td>
<td>Passivated Stainless Steel</td>
<td>Passivated Stainless Steel</td>
<td>Passivated Stainless Steel</td>
<td>Passivated Stainless Steel</td>
<td>Passivated Stainless Steel</td>
<td>Passivated Stainless Steel</td>
</tr>
</tbody>
</table>

TRU test™ Series
TRU precision adapters feature MIL-STD-348 test grade interfaces and robust stainless steel and BeCu construction to ensure optimal electrical performance, measurement accuracy and repeatability in your test application.

Our broad range of millimeter-wave precision adapters are available for use with today’s sophisticated (PN A) precision network analyzers. Precision adapters are available in 2.92 mm (DC – 40 GHz), 3.5 mm (DC – 33 GHz) and 2.4 mm (DC – 50 GHz) interface combinations.

<table>
<thead>
<tr>
<th>Interface Description</th>
<th>Typical VSWR Performance (mated pair)</th>
<th>Typical Phase Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRU-11231</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
<tr>
<td>TRU-11232</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
<tr>
<td>TRU-11241</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
<tr>
<td>TRU-11242</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
<tr>
<td>TRU-11243</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
<tr>
<td>TRU-11244</td>
<td>1.00:1</td>
<td>0°</td>
</tr>
</tbody>
</table>

CELEBRATING 60 YEARS
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(1800) 202-TRU
978-532-0775
trucorporation.com
1-800-862-9876
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