

**HP 11878A  
ADAPTER KIT  
50 $\Omega$  Type-N to 3.5 mm**

HP Part Number 11878-90001  
Printed June 1989



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**HEWLETT  
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## DESCRIPTION

The HP 11878A 50 ohm Type-N to 3.5 mm Adapter Kit contains four type-N to precision 3.5 mm adapters. The kit is especially useful for testing 3.5 mm devices on a network analyzer equipped with type-N test port connectors.

## Caring for Your Adapter Kit

To obtain optimum performance from this adapter kit, observe these precautions:

- Keep the protective rubber end-caps on the adapters when possible.
- Make connections carefully to avoid misalignment and connector damage or inaccurate measurements.
- Keep the connectors free of dirt and metallic particles.
- If you must clean the connectors, try clean compressed air first. Do not use abrasives. If further cleaning is required, refer to "Cleaning Connectors" later in this guide.
- Periodically gage the adapter connectors using the instructions provided in the *Microwave Connector Care* manual (HP part number 08510-90064). The mechanical tolerance for 3.5 mm center connector recession (male and female) is 0.0 to 0.003 inch.
- Read and follow the directions provided later if mating these adapters with SMA connectors.

## AVAILABLE ACCESSORIES

Description	HP Part Number	Recommended Use
3.5 mm Connector Gage Kit	85052-80010	Periodic gaging of connectors. Gage every SMA connector before use!
8 in-lb (96 N-cm) Torque Wrench	8710-1765	Use when mating two precision 3.5 mm connectors.
5 in-lb (60 N-cm) Torque Wrench	8710-1582	Use when mating a precision 3.5 mm connector to SMA.

## CONTENTS OF THIS KIT

Quantity	Description	HP Part Number
1	3.5 (male) to type-N (male)	1250-1743
1	3.5 (female) to type-N (male)	1250-1744
1	3.5 (female) to type-N (female)	1250-1745
1	3.5 (male) to type-N (female)	1250-1750
1	User's Manual	11878-90001

## MECHANICAL SPECIFICATIONS

Male pin depth: 0.208 to 0.211 inches

Female pin depth: 0.204 to 0.207 inches

## GENERAL CHARACTERISTICS

**Typical Performance:** Return loss  $\geq 28$  dB up to 18 GHz  
Insertion loss  $\leq 0.1$  dB up to 18 GHz

**Weight:** Net: 0.8 kg (1 lb. 12 oz.)  
Shipping Weight: 1.3 kg (2 lb. 12 oz.)

## MATING HP 11878A ADAPTERS WITH PRECISION 3.5 DEVICES

The adapters in this kit are precision 3.5 mm connectors, and are best used with other precision 3.5 mm devices. When mating connectors, observe the following precautions:

- Push them straight together.
- Make sure the male contact pin is precisely aligned with the female.
- Do not overtighten the connectors.
- NEVER rotate either center conductor (by turning the device body).
- Only turn the outer nut of the male connector.
- Torque to 8 in-lb (96 N-cm) for the final connection.

An 8 in-lb torque wrench is available from Hewlett-Packard. Refer to "Accessories" at the beginning of this manual for the part number.

## MATING HP 11878A ADAPTERS WITH SMA DEVICES



**SMA connectors are not precision devices, and are often out of mechanical tolerances even when new. Out of tolerance SMA connectors will likely ruin a precision 3.5 mm connector on the first mating. Gage SMA connectors before use.**

Each adapter in this kit has a type-N connector on one end and a *precision* 3.5 mm connector on the other. SMA connectors will mate with precision 3.5 mm connectors. However, caution is necessary to prevent accidental damage due to worn or out-of-tolerance SMA connectors. Such connectors can destroy a precision 3.5 mm connector *even on the first connection*. Hewlett-Packard recommends that you remember the following important information:

- SMA connectors are not precision mechanical devices.
- They are not designed for repeated connections.
- They are very susceptible to mechanical wear.
- SMA connectors are often out of mechanical tolerances when new.

Before mating an SMA connector (even a new one) to a precision 3.5 mm connector, inspect the SMA connector carefully both visually and mechanically. To measure the mechanical tolerances, use a precision connector gage. A male SMA connector pin which is too long can smash or break the delicate fingers on the precision 3.5 mm female connector, damaging it beyond possibility of repair. Gaging SMA connectors is the most important step in preventing damage to your equipment, and it takes very little time. Gaging instructions and gage part numbers are provided in the Hewlett-Packard *Microwave Connector Care* manual, HP part number 08510-90064.

Use the following precautions when mating SMA and precision 3.5 mm connectors:

- Push them straight together.
- Make sure the male contact pin is precisely aligned with the female.
- Do not overtighten the connectors.
- NEVER rotate either center conductor (by turning the device body).
- Only turn the outer nut of the male connector.
- Torque to 5 in-lb (50 N-cm) for the final connection.

Note that the torque listed above is less than when mating two precision 3.5 mm connectors. A 5 in-lb torque wrench is available from Hewlett-Packard. Refer to "Accessories" in the beginning of this manual for the part number.

Significant structural and dimensional differences exist between these two types of connectors. Precision 3.5 mm connectors use an air dielectric. Only air exists between the center and outer conductors. The male or female center conductor is supported by a plastic bead, deep within the body of the connector. In SMA connectors a plastic dielectric supports the entire length of the center conductor. In addition, the diameters of both the inner and outer conductors differ between SMA and precision 3.5 connectors.

Using only precision 3.5 mm connectors will provide superior SWR and insertion loss. It will also extend the life of your adapters (and other test equipment connectors) by reducing mechanical wear.

## **CLEANING CONNECTORS**

Cleaning connectors improperly can result in measurement instability that lasts for several days. Please read the following material carefully and follow the suggested guidelines.

### **Recommended Cleaning Supplies**

**Foam Swabs** Foam swabs (HP Part Number 9300-1270) are preferred over cotton. Cotton swabs can leave strands inside the connector, which may have an effect on your measurements. The part number for foam swabs is listed below.

**Isopropyl Alcohol** is now recommended rather than Freon because of environmental considerations. Freon can also damage the plastic inner bead that holds the center conductor in place.

**Compressed Air** the only environmentally-safe source of compressed air is from an actual air compressor. If you use an air compressor, make sure it is a model that produces clean, pure air without traces of oil or moisture. All types of "air in a can" contain fluorocarbons, which damage the Earth's ozone layer.

## Procedure

**Important:** Apply alcohol only to the swab, do not pour or spray alcohol directly into the connector. If you fail to heed this note, and apply liquid alcohol directly, it will collect inside the connector bead. (A connector bead is not a sphere, it is a disk of noticeable thickness. The disk has holes running through it from one side to the other. These holes can collect and hold alcohol for days.) alcohol trapped in the bead causes the electrical characteristics of the device to change (as the alcohol slowly evaporates). As a result, your measurements will change until all the alcohol has evaporated. This can take several days. The calibration feature of most network analyzers can cancel out errors caused by alcohol. However, the characteristics of the device change constantly, rendering the calibration useless in a matter of minutes or hours.



**Do not clean adapters while they are connected to static sensitive devices, like network analyzers or a device under test. Disconnect adapters before cleaning. When cleaning the connectors of a network analyzer (or similar products) ALWAYS wear a grounded anti-static wrist strap! Most network analyzers can be damaged by a static charge entering a test port connector.**

1. Apply enough alcohol to the swab to wet it. Do not soak the swab completely or alcohol will run into the connector (see the important note above).
2. Wipe the connector threads gently to clean them. insert the swab carefully when cleaning interior threads. Use an illuminated magnifying lens or microscope to see the areas being cleaned.
3. Blow the connector dry with clean compressed air.
4. If your instrument or device shows signs of measurement inaccuracy after cleaning, lay it aside for two or three days before using it again.

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