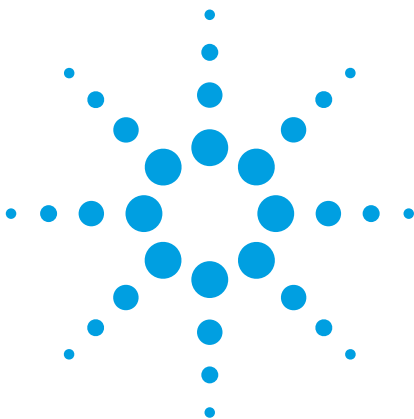


Agilent N1020A TDR Probe User's Guide



Agilent Technologies

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Agilent N1020A—At a Glance

The Agilent N1020A TDR Probe facilitates accurate, repeatable time domain reflectometry measurements in situations where RF connectors are unavailable. It is ideal for use with the Agilent 54753A and Agilent 54754A TDR plug-in modules.



Figure 1. Agilent N1020A TDR Probe

The Agilent N1020A TDR Probe includes the following items:

- RF cable (SMA, 36-inch) (quantity 1)
- Calibration substrate (quantity 1)
- Grounding pin (quantity 1)
- Tweezer (quantity 1)

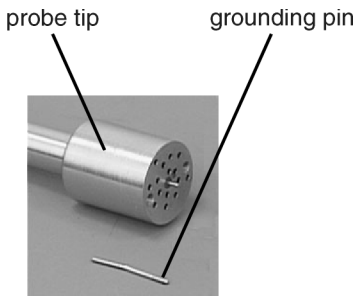


Figure 2. Probe tip and grounding pin

Accessories available

The following accessories are available from Cascade Microtech®.

Internet address: <http://www.cascademicrotech.com>

Fixed-pitch compliant 50Ω probe for testing SMTs, hybrids, and MCMs. Bandwidth from dc to 20 GHz. Order FPC-GSG-xxxx probe.

Fine-pitch active $100k\Omega$ probe for testing SMTs, hybrids, and MCMs. Bandwidth from dc to 2.5 GHz. Order FPA-10X probe.

DC coaxial microprobes

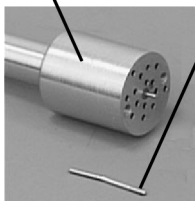
Fine-pitch microprobes

Fine-pitch DC needle holder

Installing the Probe

- 1 Locate the grounding pin supplied with the probe.

probe tip grounding pin



- 2 As explained in the following caution statement, insert the long end of the grounding pin into one of the holes that are located in the tip of the probe. Select any hole that is located in the spiral pattern.

CAUTION The grounding pin consists of two solid end pieces connected by a spring. To avoid damaging the grounding pin, always insert the longest solid end into the probe tip.

- 3 Using tweezers, gently push the pin until it is fully seated into the hole.
- 4 Connect the supplied SMA cable to the TDR probe.

CAUTION The input circuits on the Agilent 83480A plug-in modules can be damaged by electrostatic discharge.

- 5 Discharge any static buildup on the SMA cable. Momentarily short the center and outer conductors of the cable together. Avoid touching the front-panel input connectors without first touching the frame of the instrument.

- 6 Connect the other end of the SMA cable to the TDR plug-in module's Channel input connector.

Moving the grounding pin

The probe comes with a movable grounding pin to make connections to the ground plane easier. Use the following steps to move of grounding pin:

- 1 Using the supplied tweezers, gently pull the pin out of the probe tip.
- 2 Insert the pin into one of the adjacent, conveniently-located holes. Notice that these holes are in a spiral pattern.
- 3 Using the tweezers, gently push the pin until it is fully seated into the hole.

Normalizing the Probe

Normalizing the probe ensures accurate measurements with Agilent 54753A and Agilent 54754A TDR plug-in modules. To learn more about normalization, refer to the *Agilent 83480A User's Guide* and the *Agilent 54753A and Agilent 54754A User's Guide*. For the most recent version of these books, visit the following Internet web site <http://www.agilent.com/go/light-wave>, and “click” on *Support*.

The TDR probe comes with one calibration substrate. During the normalization procedure, the calibration substrate is used to move the measurement plane from the module's input connector to the end of the probe tip. The calibration substrate provides one short pad, three 28Ω pads, three 50Ω pads, and three 75Ω pads for probing. Three pads of each type are provided in the event that pads becomes damaged or worn out with use.

When probing, always connect the probe's ground to the larger side of the resistant pad.

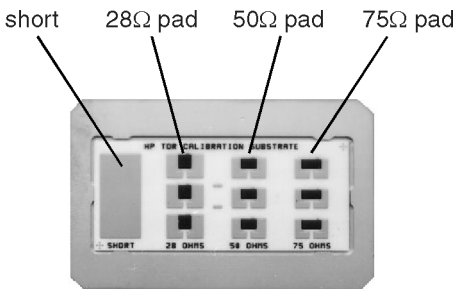


Figure 3. Calibration substrate

The 28Ω and 75Ω pads are provided so that you can verify measurement normalization on devices that have a characteristic impedance other than 50Ω . For example, Rambus® technology has a 28Ω characteristic impedance. Regardless of the characteristic impedance of the device being measured, *always* use the 50Ω termination pad during the normalization procedure.

CAUTION Do not touch the 75Ω , 50Ω , or 28Ω pads. These pads are precision resistors. Their values can be altered by contamination (such as oils and dirt) or electrostatic discharge.

To normalize the probe

- 1** Press the Setup key and then *Default setup* on the Agilent 83480A mainframe.
- 2** Remove any connections from the Agilent 54753A or Agilent 54754A front-panel channel input connectors.
- 3** Press Utility, *Calibrate*, and then *Calibrate plug-in*.

*. Rambus® is a trademark of Rambus Inc.

- 4 Select the plug-in module to be calibrated, press *1 and 2* or *3 and 4*.
- 5 Press *Start cal* to start the calibration, and follow the on-screen instructions. This step completes a plug-in module vertical calibration.

CAUTION The input circuits on the Agilent 83480A plug-in modules can be damaged by electrostatic discharge.

- 6 Discharge any static buildup on the TDR probe's SMA cable. Momentarily short the center and outer conductors of the cable together. Avoid touching the front-panel input connectors without first touching the frame of the instrument.
- 7 Connect the SMA cable on the probe to the TDR plug-in module's Channel input connector.
- 8 Press Setup on the TDR plug-in module. Press *Stimulus* and select *1 only*. Press *Enter* and then *Preset TDR/TDT*.
- 9 Connect the TDR probe to the device that you are testing.
- 10 Use the Agilent 83480A's Time base key to adjust the time scale and position so that the desired response is displayed. Changing the time base setting after the calibration voids the calibration.

The following two steps perform a normalization routine. These steps move the measurement plane from the module's input connector to the end of the probe tip.

- 11 Press Setup on the plug-in module. Press *Normalize response* and then *Establish normalization & ref plane*.

12 Follow the onscreen instructions (upper left-hand corner). Use the short and 50Ω pads on the calibration substrate for short and 50Ω terminations.

NOTE During the normalization procedure, use *only* the short and 50Ω termination pads on the calibration substrate. After the procedure, you can use the 28Ω pad or 75Ω pad to verify measurement accuracy for devices having a characteristic impedance of 28Ω or 75Ω .

The following two steps activate the normalized response.

13 Press Setup on the TDR plug-in module.

14 Press *Normalize Response* and then set *TDR normalize* to *on*.

15 Press Channel 1/3 and then set *Display* to *off*. This step is optional.

16 On the Agilent 83480A mainframe, press Marker. Set *Mode* to *TDR/TDT*.

17 Set + *Source* to *response 1* and then press *Enter*.

18 Set *Reference* so that *ref plane* is selected.

19 Press + *Position*, the 0 key, and then the Enter key that is located next to the numeric keypad.

20 Press \times *Position*, the 0 key, and then the Enter key that is located next to the numeric keypad.

21 Set \times *Source* to *response 1* and then press *Enter*.

The + and \times markers should now be visible on the displayed normalized response.

Use the following optional steps to simulate the impedance profile of the device that you are testing as a function of the incident TDR step rise time.

22 Press *Setup* on the TDR plug-in module.

23 Press *Normalize response* and then *Risetime*.

24 Enter the desired rise time, and then press *Enter*.

Setting the rise time value too fast results in a noisy normalized waveform. This is because the bandwidth of the system has been exceeded. Increase the rise time until the noise on the normalized waveform disappears.

Probe Characteristics

There are no specifications for the Agilent N1020A TDR Probe. (Product specifications describe warranted performance.) However, the following characteristics provide useful information by giving functional, but nonwarranted, performance parameters.

Table 1. Characteristics of TDR Probe

Description	Characteristic
Bandwidth	<i>DC to 6 GHz</i>
Insertion loss	<i>< 1.5 dB</i>
Return loss	<i>> 16 dB</i>
Connector	<i>3.5 mm SMA</i>
Weight	<i>1.3 kg</i>
Joystick travel	<i>17 x 17 x 13 mm</i>
Arm reach	<i>100 to 220 mm</i>
Arm sweep angle	<i>+90°</i>
Probe pitch	<i>1.5 to 5.0 mm</i>

Regulatory Information

The product is a passive component. This device is not considered to have EMC or safety related concerns, therefore a Declaration of Conformity does not exist.

The product is classified as a “component performing no direct function” in Section 4.7.3.1 of Guidelines for the Application of the EMC Directive, EMC/III/95/04E.

The Low Voltage Directive 73/23/EEC is not applicable to this product because it is rated at less than 50 V AC and 75 V DC.

Replaceable Parts

The following table lists the replaceable parts for the probe. Notice that the grounding pin must be ordered from Inter-Continental Microwave Company:

Phone: (408) 727-1596
Fax number: (408) 727-0105
Internet address: <http://www.icmicrowave.com>
Email address: ICMfixture@aol.com

Table 2. Replaceable Parts and Accessories

Description	Part Number
Grounding pin*	41112542
SMA cable (m) 36" (91.4 cm)	8120-4977
Calibration substrate	1NB7-8474
Tweezer	8710-1308

*. Order from Inter-Continental Microwave Co.

Contacting Agilent Technologies

To learn about other signal integrity test solutions, visit our Internet web site at the following address:

<http://www.agilent.com/go/tdr>

Before returning the probe for service, call the Agilent Technologies Instrument Support Center at (800) 403-0801. Always call the Agilent Technologies Instrument Support Center first to initiate service before returning your probe to a service office. This ensures that the repair can be properly tracked and that your probe will be returned to you as quickly as possible. Call this number regardless of where you are located.

If the instrument is still under warranty or is covered by an Agilent Technologies maintenance contract, it will be repaired under the terms of the warranty or contract. If the instrument is no longer under warranty or is not covered by an Agilent Technologies maintenance plan, Agilent Technologies will notify you of the cost of the repair after examining the unit. When an instrument is returned to a Agilent Technologies service office for servicing, it must be adequately packaged and have a complete description of the failure.

Safety Symbols

CAUTION The *caution* sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the product. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

WARNING The *warning* sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning sign until the indicated conditions are fully understood and met.

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