

# Instruction Manual



**80A03**

**TekConnect Probe Interface Module**

**071-1298-03**

This document applies to firmware version 2.3 and above.

**Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

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## **Contacting Tektronix**

Tektronix, Inc.  
14200 SW Karl Braun Drive  
P.O. Box 500  
Beaverton, OR 97077  
USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit [www.tektronix.com](http://www.tektronix.com) to find contacts in your area.

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Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

## To Avoid Fire or Personal Injury

**Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground from the circuit under test before disconnecting the probe from the measurement instrument.

**Ground the Product.** This product is indirectly grounded through the grounding conductor of the mainframe power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The common terminal is at ground potential. Do not connect the common terminal to elevated voltages.

Connect the ground lead of the probe to earth ground only.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Keep Product Surfaces Clean and Dry.**

**Symbols and Terms**

**Terms in this Manual.** These terms may appear in this manual:



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**WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

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**CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

---

**Terms on the Product.** These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

**Symbols on the Product.** The following symbols may appear on the product:





# Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

**Do Not Service Alone.** Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

**Disconnect Power.** To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

**Use Care When Servicing With Power On.** Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.



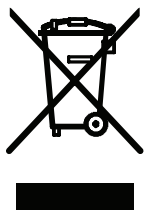
# Environmental Considerations

This section provides information about the environmental impact of the product.

## **Product End-of-Life Handling**

Observe the following guidelines when recycling an instrument or component:

**Equipment Recycling.** Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



This symbol indicates that this product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For information about recycling options, check the Support/Service section of the Tektronix Web site ([www.tektronix.com](http://www.tektronix.com)).

## **Restriction of Hazardous Substances**

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive.

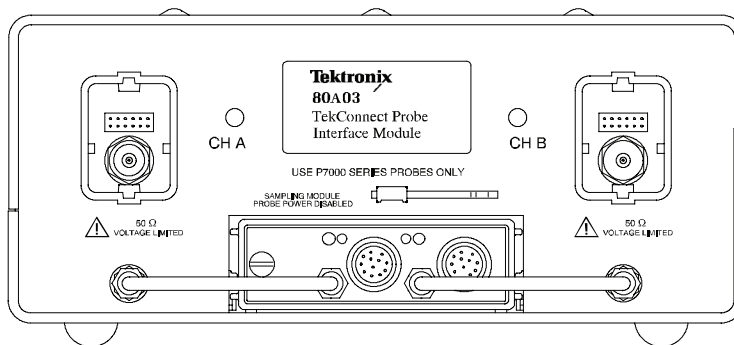


# Getting Started

The 80A03 TekConnect Probe Interface Module is an adapter that allows you to use TekConnect probes with 80E0X sampling modules and the following main instruments (mainframes):

- DSA8200 Digital Serial Analyzer
- CSA8000, CSA8000B, and CSA8200 Communications Signal Analyzers
- TDS8000, TDS8000B, and TDS8200 Digital Sampling Oscilloscopes

The interface is comprised of an enclosure that houses a compartment for one 80E0X electrical sampling module and two TekConnect probe inputs. The interface connects to the mainframe through a permanently attached 1 meter extender cable.



**Figure 1: The 80A03 TekConnect Probe Interface Module**

The 80A03 TekConnect Probe Interface Module also allows you the flexibility of using the interface as a general-purpose sampling module extender cable by simply disconnecting the short semi-rigid cables on the front panel of the interface and using the sampling module inputs directly.

The TekConnect Probe Interface Module supports probe interface conversion between the previously listed mainframes and the following supported TekConnect probes:

- P7225
- P7240
- P7260
- P7313
- P7313SMA
- P7330
- P7340A
- P7350
- P7350SMA
- P7360A
- P7380
- P7380A
- P7380SMA
- P7513
- P7516

The following electrical sampling modules are recommended for use with the TekConnect Probe Interface Module.

Supported Tektronix sampling modules	Description
80E01 <sup>1</sup>	Single channel, 50 GHz
80E02 <sup>2</sup>	Dual channel, 12.5 GHz
80E03 <sup>2</sup>	Dual channel, 20 GHz
80E04 <sup>2</sup>	Dual Channel, 20 GHz with TDR
80E06 <sup>1</sup>	Single channel, 70 GHz

<sup>1</sup> Requires 2.4/1.85 mm to 2.92 mm SMA adapter (Tektronix part number 011-0157-00, standard with these sampling modules). Also requires custom cable not available from Tektronix: use a short high-quality SMA cable or fabricate your own semi-rigid cable. Bandwidth using these modules is limited by the 80A03 adapter.

<sup>2</sup> Recommended for use with 80A03 TekConnect Probe Interface Module.

The 80A03 disables the Probe Power interface on the front of the sampling modules. Do not use the 80A03 with probes that connect directly to the Probe Power, such as the P6209 and P6207.

There is also no support for TekProbe Level 2 legacy probes that utilize the TCA-1MEG, TCA-BNC, and TCA75 adapters.

## The TekConnect Interface

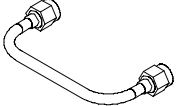
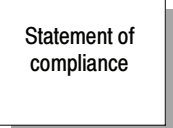
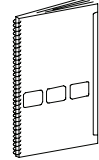
Power for the 80A03 TekConnect Probe Interface Module, sampling module, and TekConnect probes is supplied through the cable that connects the TekConnect Probe Interface Module to your mainframe. The same cable also provides a data and communications path from the probe contact pins through the interface to the mainframe. Power, signal, offset, and probe characteristic data transfers through this interface.

When a probe is connected, the TekConnect Probe Interface Module reads information from the probe, identifies the device, and turns on the appropriate power supplies.

## Standard Accessories

Table 1 lists the 80A03 TekConnect Probe Interface Module features and standard accessories.

**Table 1: 80A03 features and standard accessories**

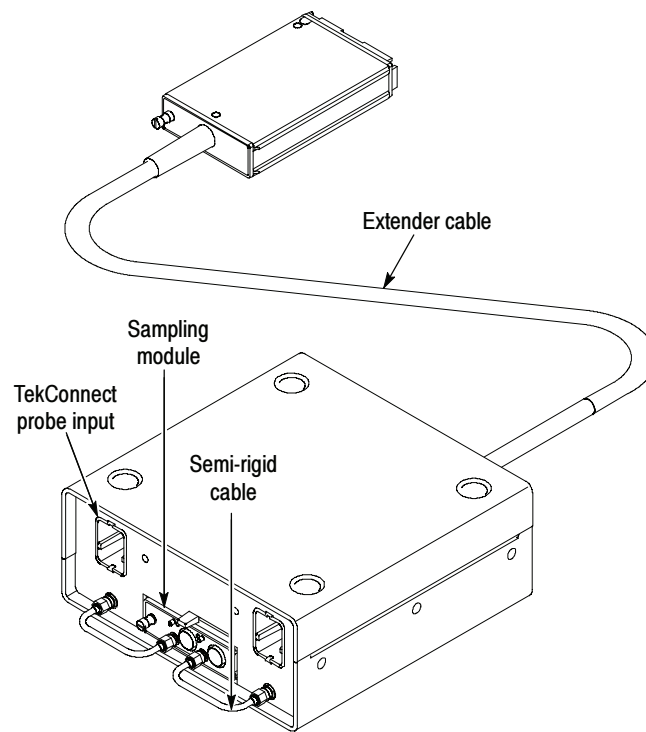
Accessory	Description
	<p><b>Semi-Rigid Cables.</b> Consists of two semi-rigid SMA-to-SMA cables for connecting the electrical sampling module to the TekConnect Probe Interface Module, Tektronix part number 174-4857-XX.</p>
	<p>Statement of compliance. A certificate verifying the product was assembled and verified using established procedures and work instructions. When applicable, test equipment is traceable to known standards.</p> <p>Included with product at initial shipment. This accessory cannot be ordered.</p>
	<p><b>Instruction Manual.</b> Provides instructions for operating and maintaining the 80A03 TekConnect Probe Interface Module, Tektronix part number 071-1298-XX.</p>

## Optional Accessories

No optional accessories are available for the 80A03 TekConnect Probe Interface Module.

## Installing the TekConnect Probe Interface Module

Figure 2 shows the TekConnect Probe Interface Module and locations of the sampling module and probe inputs. The extender cable on the rear of the interface connects to the mainframe front panel.



**Figure 2: TekConnect Probe Interface Module inputs and outputs**

Installing the TekConnect Probe Interface Module consists of the following steps:

1. Connecting the Interface Module to the mainframe.
2. Installing the Sampling Module.
3. Installing the Semi-Rigid SMA Connector Cables.
4. Installing the TekConnect Probe.



## Connecting the Interface Module to the Main Instrument



To install the TekConnect Probe Interface Module Extender Cable into the front panel of your mainframe, perform the following tasks:

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**CAUTION.** To prevent damage to the sampling module, never install or remove a module when the mainframe is powered on or when either input connector is left unprotected. Follow the precautions described in your sampling module and mainframe documentation to avoid damage.

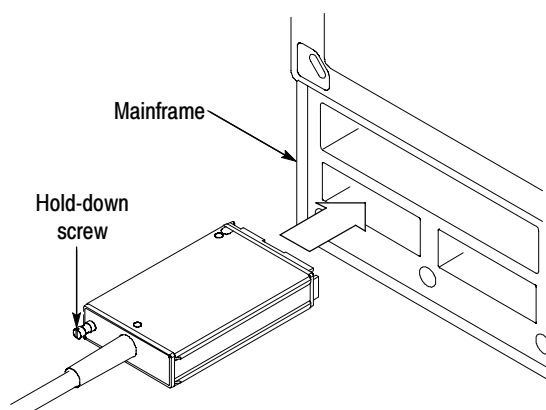
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1. Turn off the mainframe using the front-panel On/Standby switch.
2. Install the TekConnect Probe Interface Module Extender Cable connector into any of the small sampling module compartments on the front panel of the mainframe. See Figure 3.
3. Push the module in slowly with firm pressure to seat it.
4. Tighten the hold-down screw to hold the connector in place. To remove the connector later, loosen the hold-down screw and slide the ejector lever.

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**NOTE.** Installing a large sampling module into a large compartment of the mainframe may disable channels on a small module already installed. Refer to the documentation for your mainframe about compartment interaction.

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**Figure 3: Extender cable connection to the mainframe**

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**NOTE.** Do not use any additional extender cables to connect the 80A03 TekConnect Probe Interface Module to the mainframe.

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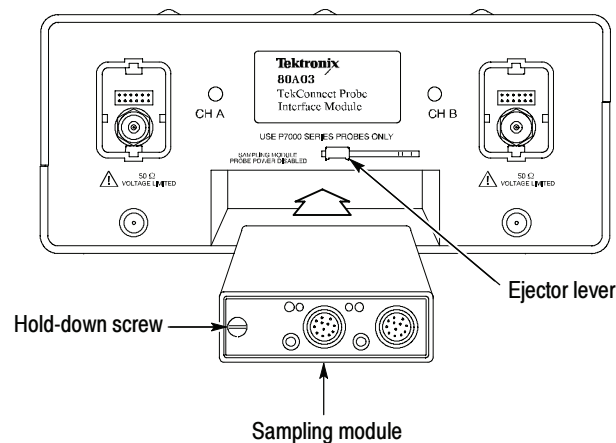
## Installing the Sampling Module

To install the sampling module into the front panel of the TekConnect Probe Interface Module, perform the following tasks:



**CAUTION.** Sampling modules are inherently vulnerable to static damage. Always observe static-safe procedures and precautions as outlined in your sampling module user manual.

1. Verify that the mainframe is powered off; if necessary, toggle the front-panel On/Standby switch.
2. Insert the sampling module into the front-panel compartment of the TekConnect Probe Interface Module as shown in Figure 4.
3. Push the module in slowly with firm pressure to seat it.
4. Once the module is seated, turn the hold-down screw to tighten the sampling module in place. See Figure 4.
5. To release the module later, loosen the hold-down screw fully, and then slide the ejector lever.



**Figure 4: Installing the sampling module into the TekConnect Probe Interface Module**

**NOTE.** To remove the sampling module, first loosen the hold-down screw; then use the ejector lever on the interface module to eject the sampling module.

## Installing the Semi-Rigid SMA Connector Cables

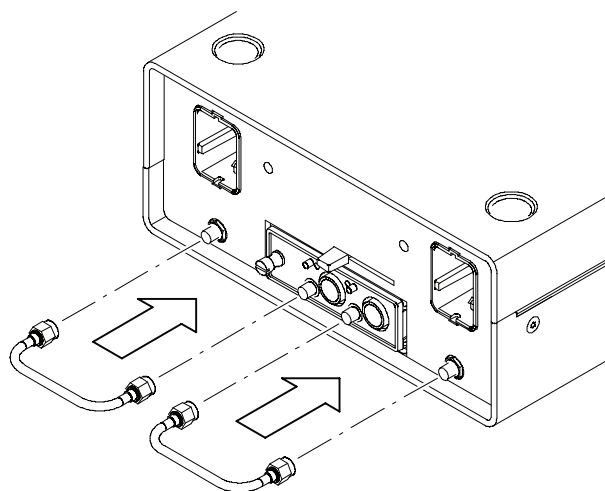
To provide a signal path between the sampling module and the TekConnect Probe Interface Module, perform the following tasks:

1. Connect your wrist strap to the antistatic connector on the front of the mainframe.
2. Use the two semi-rigid SMA cables (included with this product) to connect the TekConnect Probe Interface Module to the sampling module as shown in Figure 5. You may need to bend the SMA cables slightly to obtain proper alignment to mate the SMA connectors.

---

**NOTE.** Always use a calibrated torque wrench to install adapters, attenuators, cables, or power sensors in any setup. Torque all connections to  $8 \pm 0.3$  inch pounds. For information on proper installation and torquing techniques, refer to your module user manual.

---



**Figure 5: Connecting the sampling module**



**CAUTION.** The semi-rigid SMA connector cables used on the 80A03 TekConnect Probe Interface Module are not compatible with the input connections of 80E01 and 80E06 sampling modules.

Do not attempt to force a connection between the semi-rigid connector cables on the TekConnect Probe Interface Module and these sampling modules. Use the proper adapter or damage to the module will occur. See page 2 for additional information.

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## Installing the TekConnect Probe

The TekConnect probe features a spring-loaded latch that provides audible and tactile confirmation that a reliable connection has been made to the TekConnect Probe Interface Module.

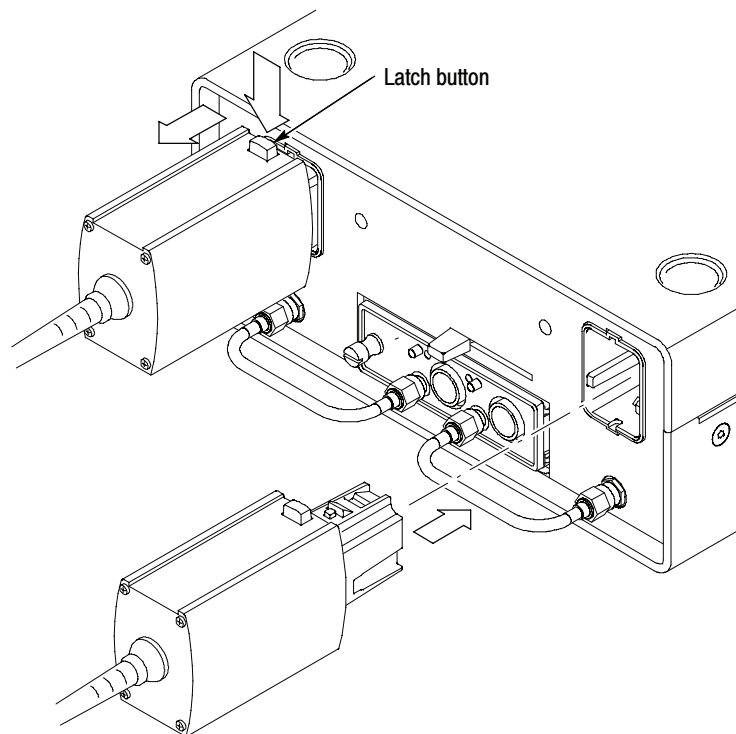
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**NOTE.** *It is not necessary to power off the mainframe when removing or installing a TekConnect probe.*

---

To connect a TekConnect probe to the TekConnect Probe Interface Module, perform the following tasks:

1. Slide the probe into the TekConnect receptacle on the TekConnect Probe Interface Module. The probe snaps into the TekConnect Probe Interface Module when fully engaged. See Figure 6.
2. To release the probe from the TekConnect Probe Interface Module, grasp the compensation box, press the latch button, and pull out on the probe.



**Figure 6: Installing TekConnect probes**

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**NOTE.** *Use thumb screws to secure the probe on those models that have the option.*

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## Performing a Functional Check

To verify that the 80A03 TekConnect Probe Interface Module is functioning properly, perform the following procedure.

Refer to Table 2 for a list of recommended equipment.

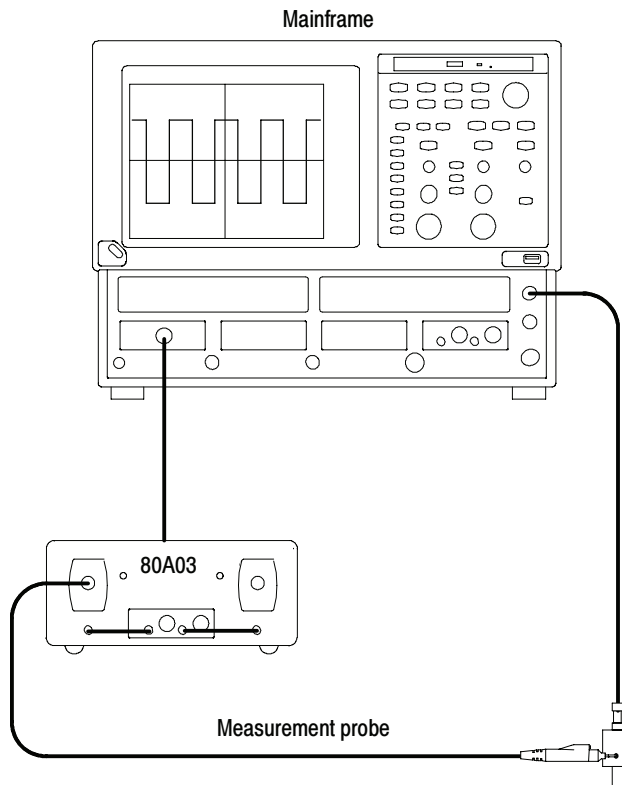
**Table 2: Recommended equipment for performing a functional check**

Item description	Recommended example
Sampling oscilloscope or signal analyzer	Tektronix DSA8200, CSA8000 or TDS8000
Sampling module	Tektronix 80E02, 80E03, or 80E04
TekConnect probe	Tektronix P7000 Series
Probe tip adapter	Tektronix P7225, P7240: 015-0678-XX Tektronix P7260: 067-1456-XX Tektronix P7330, P7350: 067-0419-00 Tektronix P7513, P7516: 067-1821-XX
Semi-rigid SMA cables (2)	Tektronix part number 174-4857-XX
SMA cable	Tektronix part number 174-1427-00
50 $\Omega$ termination, SMA-type	Tektronix part number 015-1022-XX
Torque wrench	SMA 5/16, 8 in-lb

To verify the functionality of Channel A, perform the following tasks:

1. Initialize the system:
  - a. Power on the mainframe.
  - b. Wait for the boot up process to complete.
  - c. Press the front panel **Default Setup** button.
2. Connect the signal source:
  - a. On the mainframe, connect the SMA cable to the Internal Clock Output. See Figure 7 on page 10 for details.
  - b. Connect the Probe Tip Adapter with 50  $\Omega$  termination to the other end of the SMA cable.
3. Set up the trigger system:
  - a. Set the mainframe trigger source to **Internal Clock**.

4. Connect the probe:
  - a. Attach the P7000 Series probe to the Channel A input of the 80A03 TekConnect Probe Interface Module.
  - b. Install the probe tip onto the probe tip adapter.



**Figure 7: Equipment setup for functional check**

5. Set up the channel for test:
  - a. On the mainframe, press the channel button to select the channel that is connected.  
  
The Channel button lights, the sampling module LED lights, and the selected channel on the mainframe becomes active.
  - b. Turn the Vertical scale knob and set the sensitivity to display a square waveform of several cycles, similar to the one shown in Figure 7.
  - c. Turn the Horizontal scale knob to indicate 2  $\mu\text{s}/\text{div}$ .

6. Verify the channel operation:
  - a. Verify the LED on the TekConnect Probe Interface Module for the channel under test is Green.
  - b. Verify the probe model, serial number, scale, dynamic range, impedance, and other information on the mainframe by selecting the **Utilities > System Properties > Probes** menu for the channel under test.

---

**NOTE.** The mainframe displays the first six characters of the TekConnect probe model and truncates the remaining characters. For example, it will identify a P7350SMA probe as P7350S.

The impedance value displayed for P7330, P7350, P7350SMA, P7513, and P7516 probes is for single-ended configuration. The displayed value is one half the value listed on the probe label.

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- c. On the mainframe, verify that the extender cable length is listed as 1 meter in the **Utilities > System Properties > Sampling Modules** menu.
- d. On the mainframe, verify that the signal displayed is a square wave of approximately 1 V<sub>p-p</sub> with a 5 μs period.
- e. Adjust the offset and verify that the display signal moves vertically to the offset level.
- f. Adjust the vertical scale and verify that the displayed signal height changes.

To verify functionality of the TekConnect Probe Interface Module Channel B, perform the following tasks:

1. Connect the probe to Channel B instead of Channel A.
2. Repeat steps 5 through 6 above.

### Functional Checks for Other Equipment

To verify that the mainframe, sampling module, or TekConnect probe is performing properly, run the calibration, compensation, or functional verification procedure recommended for the individual product. For detailed instructions, refer to the user documentation that accompanied these products.

## **Calibrating the TekConnect Probe Interface Module**

The 80A03 TekConnect Probe Interface Module requires no internal calibration. However, after installing any sampling module, you should run a compensation procedure from your mainframe. This ensures that the entire test system meets warranted accuracy specifications with the TekConnect interface and probe attached. Refer to your sampling module, probe, and mainframe documentation for specific calibration procedures.



# Operating Basics

This section contains information you need to operate the 80A03 TekConnect Probe Interface Module.

## Understanding the Controls

The 80A03 TekConnect Probe Interface Module front panel has one multi-color LED for each channel. During power on and normal operation, the LEDs report red, green, or off as explained below. The TekConnect Probe Interface Module contains no additional user controls.

- **Red.** Indicates that an incompatible probe is attached to the TekConnect input. See page 2 for a list of compatible probes.
- **Green.** Indicates that a supported probe is attached to the TekConnect input.
- **Off.** Indicates that the probe interface is disconnected from the mainframe (no power) or that no probe is attached to the TekConnect input.

### Power On Status

The following describes typical TekConnect Probe Interface Module operation when you power on the mainframe with the probe interface installed:

- Both LEDs flicker green, then red, then green, and turn off. This indicates that proper power is applied and initialization has occurred.
- The LEDs do not light. This indicates that the probe interface is not receiving power and may be disconnected from the mainframe.

### Probe Status

The following describes typical TekConnect Probe Interface Module operation when you attach a TekConnect probe:

- The LED turns green, indicating that a valid probe is attached. If you pressed the mainframe channel button, the display also becomes active for the channel selected.
- The LED turns red, indicating that an invalid or unrecognized probe is attached.
- The LED remains off, indicating that no probe is detected.

## Triggering the Mainframe

Use the following procedures to set up the 80A03 TekConnect Probe Interface Module to trigger and view signals on your mainframe.

### Trigger Bandwidth Considerations

The TekConnect Probe Interface Module supports many models of TekConnect probes. Since the trigger bandwidth limit is determined by the probe bandwidth and mainframe trigger capability, some probes may be more suitable than others to your measurement needs.

Your mainframe provides two trigger inputs you can use with external probes, direct or prescaled. When selecting an input, you should consider the frequency of the signal being measured. The bandwidth specification of the measurement probe must also meet or exceed that of the signal being measured.

In addition, consider the following factors when setting up equipment to take measurements:

- The mainframe trigger sensitivity relative to the amplitude of the signal being measured.
- The probe scale factor.
- The attenuation factor of the power divider used, if you choose to view signals on the mainframe following the trigger.

---

**NOTE.** Refer to your mainframe documentation for direct and prescaled trigger specifications.

---

### Recommended Equipment

Refer to Table 3 for a list of equipment you need to implement the triggering setups.

**Table 3: Recommended equipment for triggering setups**

To trigger only	To trigger and view a signal
Tektronix DSA8200 and CSA8000 or TDS8000 Series instrument	Tektronix DSA8200, CSA8000, CSA8000B, CSA8200, TDS8000, TDS8000B, or TDS8200 instrument
Tektronix 80A03 TekConnect Probe Interface Module	Tektronix 80A03 TekConnect Probe Interface Module
Tektronix 80E02, 80E03, or 80E04 electrical sampling module	Tektronix 80E02, 80E03, or 80E04 electrical sampling module
Compatible TekConnect probe. See page 2.	Compatible TekConnect probe. See page 2.

**Table 3: Recommended equipment for triggering setups (cont.)**

To trigger only	To trigger and view a signal
(1) SMA cable, 0.5 m <sup>1</sup>	(3) SMA cables, 0.5 m <sup>1</sup>
Torque wrench, SMA 5/16, 8 in-lb	Torque wrench, SMA 5/16, 8 in-lb
-----	(1) 6 dB power divider <sup>2</sup>

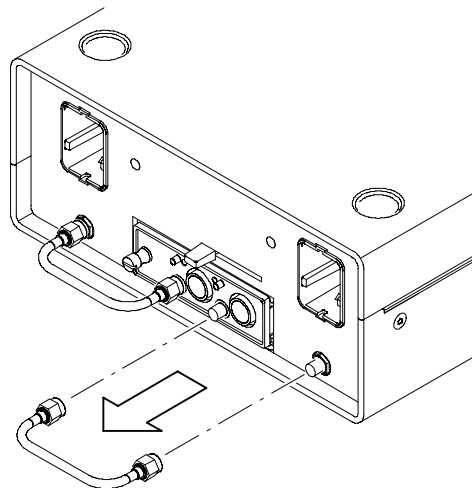
<sup>1</sup> Tektronix part number 174-1427-00.

<sup>2</sup> Tektronix part number 015-0565-00.

### Triggering the Mainframe

To set up the TekConnect Probe Interface Module to trigger your mainframe, do the following:

1. Remove the semi-rigid cable that connects the CH B TekConnect Probe Interface Module to the sampling module. See Figure 8.



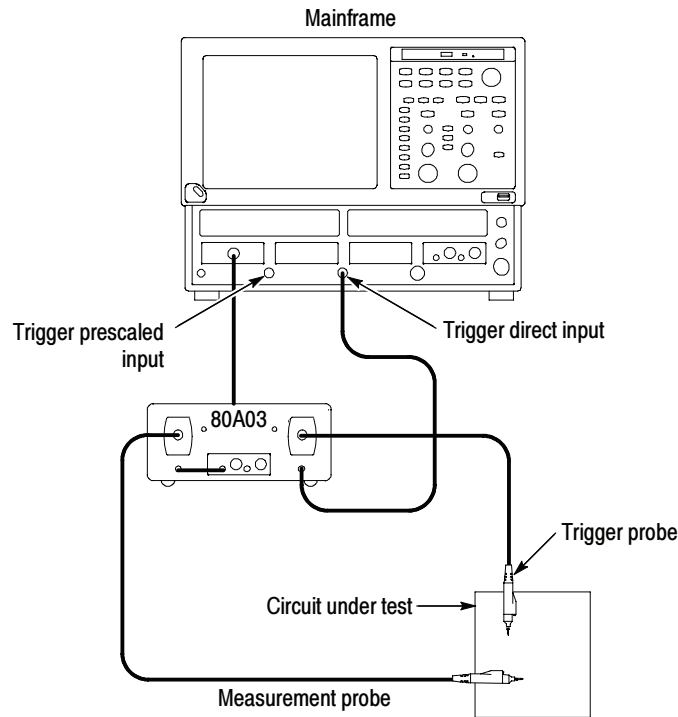
**Figure 8: Removing the semi-rigid cable**

2. Use a 0.5 m SMA cable to connect the CH B TekConnect Probe Interface Module to the mainframe trigger input (Trigger Direct or Trigger Prescaled). See Figure 9 on page 16.
3. Attach the TekConnect measurement probe to CH A on the TekConnect Probe Interface Module. See Figure 9.
4. Attach a TekConnect trigger probe to CH B on the TekConnect Probe Interface Module. See Figure 9.

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**NOTE.** Do not connect any other accessory to the mainframe Trigger Probe power port, or use the disconnected sampling module channel for any other purpose while using this setup. Doing so may cause confusion that can lead to measurement errors.

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**Figure 9: Setup for triggering the mainframe using the 80A03 TekConnect Probe Interface Module**

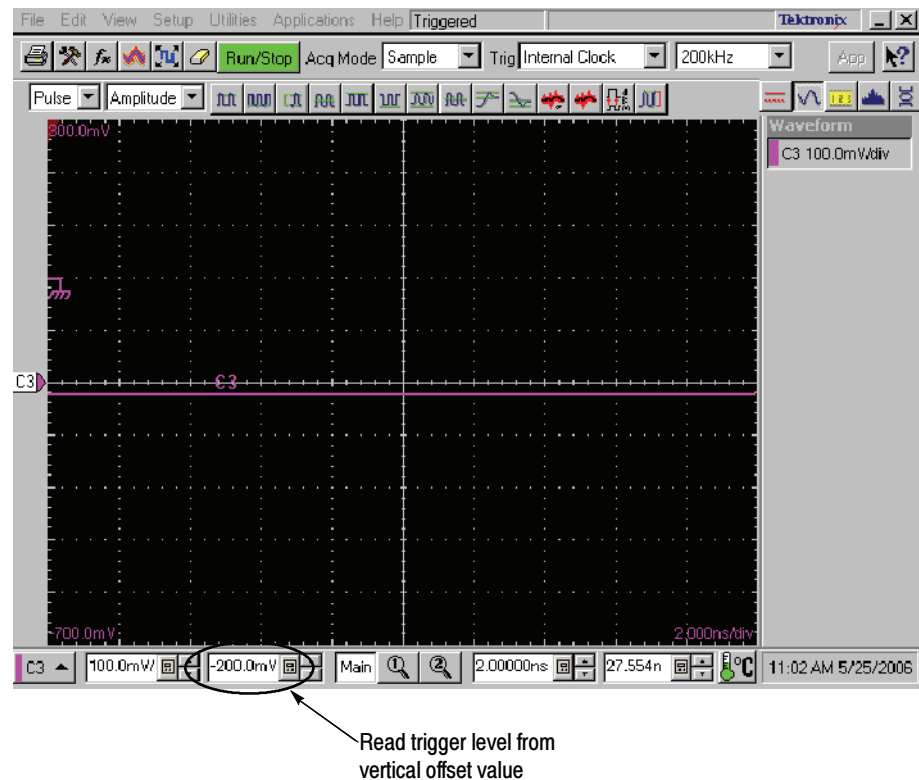
The mainframe responds to the CH A probe as though it were connected to the vertical sampling channel:

- The Trigger probe is serviced and controlled by the mainframe CH B vertical channel controls.
- The probe scale is not reflected in any trigger level settings assigned by the trigger setup menu.
- The offset control for the vertical channel adjusts the probe offset (if equipped).
- The sampling module offset control is disabled.

- You can view probe characteristics in the system properties menu for the measurement channel.

If you use the mainframe Trigger Direct input, it is recommended that you set the trigger level to 0 volts and control the trigger level by directly assigning the vertical offset for the probe at the probe tip. Because the offset control in the probe affects the signal level at its output, this method of vertical offset adjustment provides calibrated trigger level operation.

To operate the offset control as a trigger level adjustment, rotate the offset adjust on CH B. This will control the offset at the probe tip so you can read the trigger level directly from the offset indicator on the mainframe. See Figure 10.



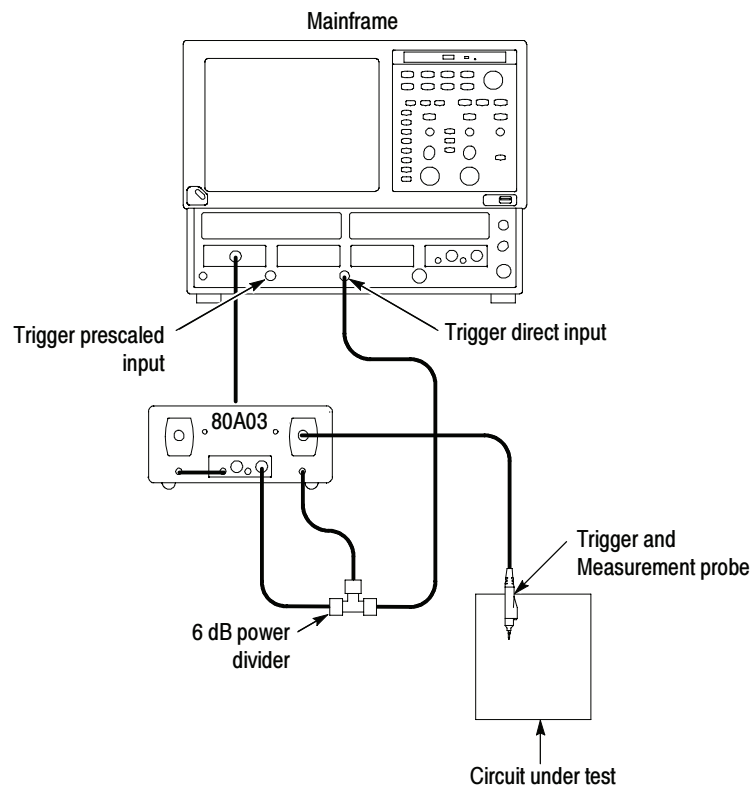
**Figure 10: Trigger offset indicator**

**NOTE.** Rotation of the control knob for this configuration is reversed. Clockwise rotation introduces a negative offset adjustment, which provides a negative trigger level. Counterclockwise rotation introduces a positive offset and a positive trigger level.

## Triggering and Viewing Signals on the Mainframe

To set up the TekConnect Probe Interface Module to trigger your mainframe, do the following:

1. Remove the semi-rigid cable that connects the CH B TekConnect Probe Interface Module to the sampling module. See Figure 8 on page 15.
2. Use a 0.5 m SMA cable to connect the 6 dB (2X) power divider to the disconnected CH B SMA connector on the TekConnect Probe Interface Module. See Figure 11.
3. Use a 0.5 m SMA cable to connect the disconnected port on the sampling module to one side of the 6 dB (2X) power divider. See Figure 11.
4. Use a 0.5 m SMA cable to connect the other side of the power divider to the mainframe trigger input (Trigger Direct or Trigger Prescaled). See Figure 11.
5. Attach a TekConnect trigger probe to CH B on the TekConnect Probe Interface Module. See Figure 11.



**Figure 11: Setup for triggering the mainframe and viewing signals using the 80A03 TekConnect Probe Interface Module**

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**NOTE.** *Do not connect any other accessory to the mainframe Trigger Probe power port. Doing so may cause confusion that can lead to measurement errors.*

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If you use the mainframe Trigger Direct input, it is recommended that you set the trigger level to 0 volts.

With this configuration, you can control the trigger level by directly assigning the vertical offset for the CH B probe at the probe tip. Because the offset control in the probe affects the signal level at its output, this method of vertical offset adjustment provides calibrated trigger level operation.

To operate the offset control as a trigger level adjustment, rotate the offset adjustment on the sampling module channel that has the probe output disconnected. This will control the offset at the probe tip and you can read the trigger level directly from the offset indicator on the mainframe, as shown in Figure 10.

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**NOTE.** *The 2X power divider used in this setup introduces a vertical scale error factor of 2.*

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## Sampling Module Incompatibility

Due to SMA cable incompatibility, you cannot directly use 80E01 or 80E06 sampling modules with the 80A03 TekConnect Probe Interface Module. See page 2 for additional information.





## Reference

This section contains information you may need to take measurements or to avoid damaging the 80A03 TekConnect Probe Interface Module.

### Avoiding Damage from Overvoltage

Know your signal source. If it is capable of delivering overvoltages, it is safer to not depend on the signal source settings for protection, but instead use an external attenuator that protects the input from the worst-case conditions. For example, for a 20 V maximum source connected to a 3 V maximum sampling module, use a 10X attenuator. Where possible, connect your cables to the signal source first, and to the sampling module second.

You can use a Tektronix 80A02 EOS/ESD Protection Module to protect the sensitive input stage of sampling module from damage due to electro-overstress (EOS) and electro-static discharge (ESD) from the device under test (DUT). Use the 80A02 in applications such as TDR circuit-board testing and cable testing where large static charges can be stored on the device under test.

Install the 80A02 EOS/ESD Protection Module between the device under test (DUT) and the sampling module. When used with the P8018 TDR probe, the 80A02 achieves static protection using normal probing procedures — no intentional user intervention (such as stepping on a foot switch) is required. This eliminates instrument damage due to human error in coordinating probing with control switching to achieve static protection.

### Avoiding Damage from Electrostatic Discharge

Circuitry in the sampling module is very susceptible to damage from electrostatic discharge or from overdrive signals. Be sure to only operate the sampling module in a static-controlled environment. Be sure to discharge to ground any electrostatic charge that may be present on the center and outer connectors of cables before attaching the cable to the sampling module.



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**CAUTION.** *To prevent damage from electrostatic discharge, install 50  $\Omega$  terminations (Tektronix part number 015-1022-xx) on the sampling-module connectors before removing the sampling modules from a main instrument (mainframe) or when it is not in use. Store the sampling module in a static-free container, such as the shipping container. Whenever you move the sampling module from one instrument to another, use a static-free container to transport the sampling module.*

*To prevent damage to the sampling module, discharge to ground any electrostatic charge that may be present on the center and outer conductors of cables before attaching the cable to the sampling module.*

*To prevent damage to the sampling module, do not create an ESD antenna by leaving cables attached to the sampling-module input with the other end of the cable open.*

*To prevent damage to the sampling module or instrument, never install or remove a sampling module when the instrument is powered-on.*

*Always use a wrist strap (provided with your instrument) when handling sampling modules or making signal connections. Wear anti-static clothing and work in a static-free workstation when using sampling modules.*

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# Specifications

This section lists the electrical, environmental, and physical characteristics of the 80A03 TekConnect Probe Interface Module.

Specifications listed in this section are guaranteed unless labeled “typical”. Typical specifications are provided for your convenience and are not guaranteed.

The electrical characteristics listed in Table 4 are valid when the 80A03 TekConnect Probe Interface Module operates within the environmental conditions listed in Table 5 on page 23.

**Table 4: Electrical characteristics**

Characteristic	Description
Output Impedance, nominal	50 $\Omega$ <sup>1</sup>
Frequency range <sup>2</sup> , typical	DC to > 18 GHz
Insertion Loss <sup>3</sup> , typical	DC to 10 GHz: < 0.3 dB DC to 18 GHz: < 0.5 dB
Return Loss <sup>3</sup> , typical	DC to 5 GHz: > 25 dB DC to 10 GHz: > 20 dB DC to 18 GHz: > 15 dB
Electrical Delay <sup>3</sup> , nominal	0.90 ns
Extender Delay, nominal	5 $\mu$ s

<sup>1</sup> Provided by the sampling module input.

<sup>2</sup> TekConnect adapter

<sup>3</sup> TekConnect adapter to electrical sampling module. Does not include probe or sampling module extender.

**Table 5: Environmental characteristics**

Characteristic	Description	
Temperature Range		
	Operating	10 °C to 40 °C (50 °F to 104 °F)
	Nonoperating	-22 °C to +60 °C (-7.6 °F to 140 °F)
Humidity		
	Operating	20 to 80% RH, noncondensing
	Nonoperating	5 to 90% RH, noncondensing

**Table 5: Environmental characteristics (Cont.)**

Characteristic	Description	
Altitude		
	Operating	3,000 m (9,843 ft)
	Nonoperating	12,190 m (40,000 ft)
Mechanical Shock	50 g half-sine: 11 ms	

**Table 6: Physical characteristics**

Characteristic	Description
Weight <sup>1</sup>	2.04 kg (4.5 lbs)
Dimensions	Height: 110 mm (4.250 in) Width: 70 mm (2.750 in) Depth: 42 mm (1.625 in)
Cable Length, nominal	1 m (3.28 ft)

<sup>1</sup> **Does not include accessories and shipping container.**

The graphs of insertion loss and return loss are as follows:

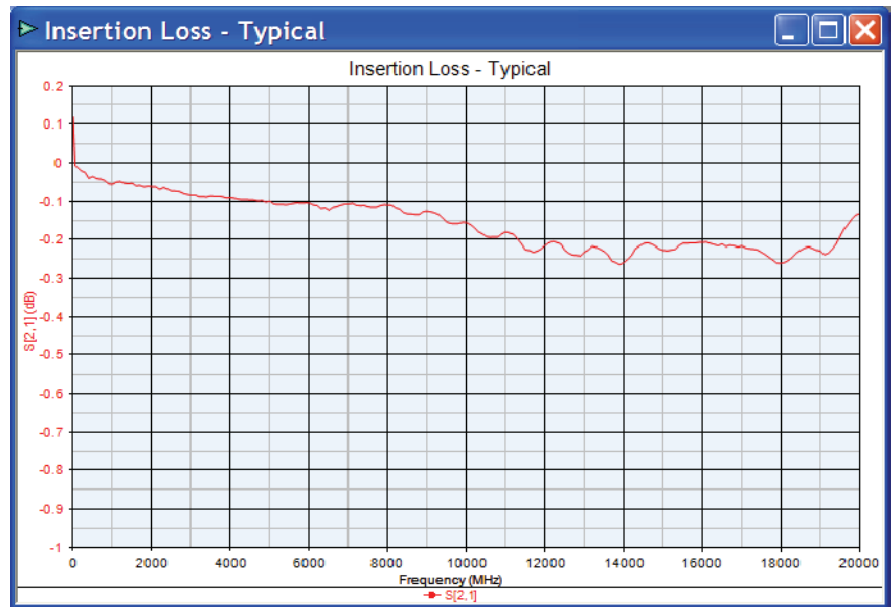


Figure 12: Insertion loss

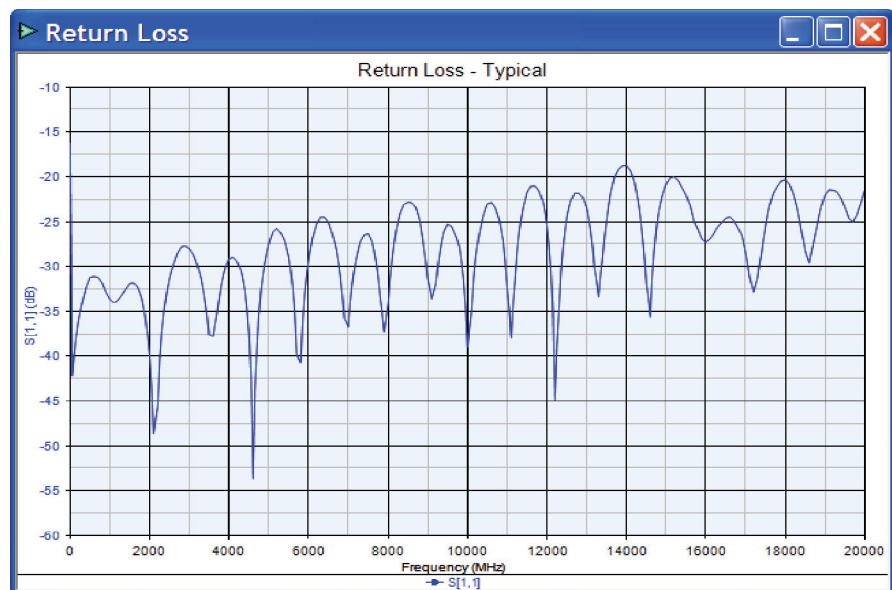


Figure 13: Return loss



# Maintenance

This section contains information you can use to clean and maintain your equipment.

## Inspecting and Cleaning

Remove accumulated loose dust from the TekConnect Probe Interface Module and sampling module with a soft cloth or brush. Remaining dirt may be removed with a soft cloth dampened with a mild detergent and water solution, or use isopropyl alcohol.

Do not immerse any equipment in cleaning solutions or use abrasive cleaners.



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**CAUTION.** To prevent damage, avoid using cleaning materials that contain acetone, benzene, toluene, xylene, or similar solvents.

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## Troubleshooting

If you encounter problems installing or operating the TekConnect Probe Interface Module, try the following troubleshooting procedures.

### Power On Indicators

To verify that the interface module and microcontroller are functioning properly, perform the following steps:

1. Attach a valid probe to the TekConnect input:

The LED turns green if the interface module is receiving power and the microcontroller is functioning normally.

2. Attach an invalid probe to the TekConnect input:

The LED turns red if the interface module is receiving power, the microcontroller is functioning normally, and a probe is being sensed.

### No Signal Detected

If the LEDs respond normally at power on, but no signal is detected by the mainframe (probe connected), check the sampling module and semi-rigid cable connections.

### **Product Requires Service**

The following conditions indicate an internal failure:

- No LED activity at power on
- LEDs are inactive on a single channel
- LED response is inconsistent when connecting the same probe alternately to both channels

## **Replacing Parts**

Refer to the *Replaceable Parts* section on page 29 for a list of customer replacement parts.

## **Repackaging for Shipment**

If the original packaging is unfit for use or not available, use the following packaging guidelines:

1. Use a corrugated cardboard shipping carton having inside dimensions at least one inch greater than the probe dimensions. The box should have a carton test strength of at least 200 pounds.
2. Put the probe into an antistatic bag or wrap to protect it from dampness.
3. Place the probe into the box and stabilize it with light packing material.
4. Seal the carton with shipping tape.



# Replaceable Parts

This section contains a list of the replaceable parts for the 80A03 TekConnect Probe Interface Module. Use this list to identify and order replacement parts.

## Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

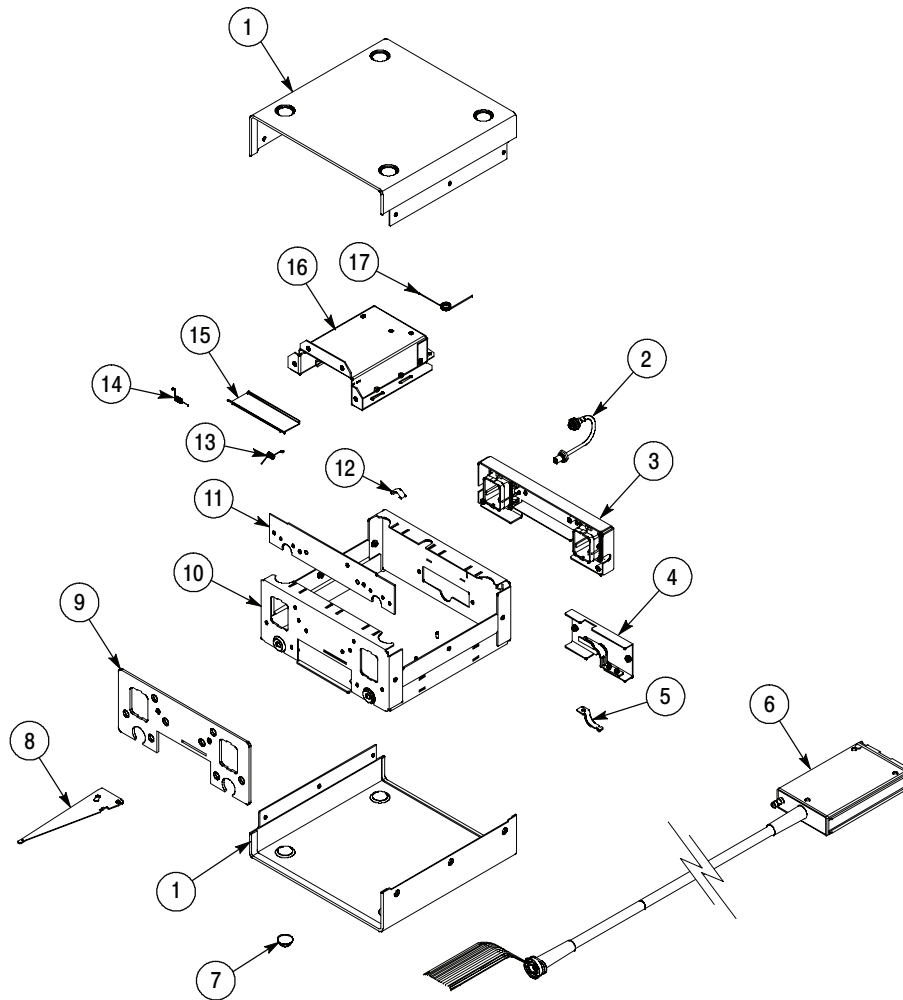
## Using the Replaceable Parts List

This section contains a list of the mechanical and or electrical components that are replaceable for the 80A03 TekConnect Probe Interface Module. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

### Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (;). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.

**Abbreviations**      Abbreviations conform to American National Standard ANSI Y1.1-1972.



**Figure 14: 80A03 replaceable parts**

**Replaceable parts list**

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
14-1	200-4827-00			1	COVER; EXTERIOR,AL;GOLDEN GATE,SAFETY CONTROLLED	TK1943	200-4827-00
14-2	174-4856-00			2	CA,ASSY;SP,ELEC,SEMI-RIGID COAX, 0.141 OD,PLATED	060D9	174-4856-00
14-3	407-4954-01			1	BRACKET ASSY,TEKCONNECT;ACQUISITION,AL	TK1943	407-4954-01
	426-2625-00			1	MODULAR KIT; RECEPTACLE; PROBE ASSEMBLY, LATCHING, SAFETY CONTROLLED		426-2625-00
14-4	386-7392-00			1	PLATE,STRAIN RELIEF; EXTENDER CABLE	80009	386-7392-00
14-5	343-1684-00			1	CLAMP,CABLE RETENTION	TK1943	343-1684-00
14-6	174-4855-00			1	CA ASSY; SP, ELEC, 28-26 AWG, 6 COAX WIRES,39 INCH LONG	060D9	174-4855-00
14-7	348-0430-00			1	BUMPER,PLASTIC; POLYURETHANE,BLACK	2K262	ORDER BY DESCRIPTION
14-8	105-1132-00			1	LEVER,EJECT; 0.048 THK SST,ELECTRICAL HEAD	TK1943	105-1132-00
14-9	386-7393-01			1	PLATE,MOUNTING; AL	TK1943	386-7393-01
14-10	441-2328-01			1	CHASSIS ASSEMBLY, MAIN	TK1943	441-2328-01
14-11	671-5711-50			1	CIRCUIT BD ASSY, FOR SERVICE ONLY	80009	671-5711-50
14-12	131-6417-00			1	CONTACT,ELEC; GROUNDING,0.600 L X 0.250 W X 0.220 D,ELECTROLESS NICKEL PLATE	TK6457	131-6417-00
14-13	214-4892-00			1	SPRING,TORSION; 0.126 OD,0.094 ID,DOOR,LEFT,0.018 DIA,MUSIC WIRE	8X345	R07SPRG3
14-14	214-4892-00			1	SPRING,TORSION; 0.126 OD,0.094 ID,DOOR,LEFT,0.018 DIA,MUSIC WIRE	8X345	R07SPRG3
14-15	200-4560-00			1	COVER; ELECTRICAL SLOT,0.031	TK1943	200-4560-00
14-16	441-2326-00			1	CHASSIS ASSY; MODULE	TK1943	441-2326-00
14-17	214-4891-00			1	SPRING,TORSION; 0.304 X 0.256 X 1.152,EJECT,0.024 DIA,MUSIC WIRE	8X345	214-4891-00
					<b>STANDARD ACCESSORIES</b>		
Not shown	174-4857-01			1	CA ASSY;SP, ELEC,SEMI-RIGID COAX, 0.141 OD,PLATED	060D9	174-4857-01
Not shown	071-1298-XX			1	MANUAL,TECH:INSTRUCTION,80A03	80009	071-1298-XX