User Manual

Tektronix

P7380
8 GHz 5X/25X Differential Probe

071-1393-01

www.tektronix.com

Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077

PROBE WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a 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.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

ACCESSORY WARRANTY

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of three (3) months from the date of shipment. If any such product proves defective during the three-month 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.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the respective warranty period and make suitable arrangements for the performance of service. Tektronix will provide such service at Customer's site without charge during the warranty period, if the service is performed within the normal on-site service area. Tektronix will provide on-site service outside the normal on-site service area only upon prior agreement and subject to payment of all travel expenses by Customer. When or where on-site service is not available, Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE LISTED PRODUCTS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

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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.

To Avoid Fire or Personal Injury

Connect and Disconnect Properly. 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.

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.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

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:

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

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

Symbols on the Product. The following symbol may appear on the product:

CAUTION
Refer to Manual

Preface

This manual describes the installation and operation of the P7380 Differential Probe. Basic probe operations and concepts are presented in this manual. All documents listed below are located on the P7380 Documentation CD that came with your product. You can also access the Tektronix web site (see next page) for these documents.

Convention Used in this Manual

The following icon is used throughout this manual to indicate a step sequence.

Documentation

To read about	Use these documents
Installation and Operation (overviews)	Read the *P7380 User Manual* for general information about how to use your probe.
In-Depth Operation	Use the *P7380 Technical Reference Manual* (Tektronix Part Number 071-1544-XX) along with the *P7380 User Manual*.
Performance Verification and Specifications	Use the *P7380 Technical Reference Manual.*
Applications	Read the *Application Examples* section of the *User Manual.*
Reordering Tip-Clip Assemblies	Use the *Probe Accessory Reorder* sheet (Tektronix Part Number 001-1381-XX) when reordering Tip-Clip assemblies and related Tip-Clip accessories. This sheet is located in a pocket of the P7380 Probe soft case.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	www.tektronix.com/support 1-800-833-9200, select option 3* 6:00 a.m. – 5:00 p.m. Pacific Standard Time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Getting Started

Getting Started

Key Features

The P7380 probe can help you probe in tight places while preserving high bandwidth and improving connectivity with low loading. Key features include:

- Bandwidth >8.0 GHz (typical)
- Risetime 10-90% <55 ps (guaranteed)
- Input resistance
  - 100 KΩ differential
  - 50 KΩ per side
- Interchangeable probe Tip-Clip assemblies
- Solder down capability
- Variable space compliant Handheld Adapter
- Fixturing
- Small probe head for easy probing of SMDs
- TekConnect Interface

Handling the Probe

The P7380 is a precision high-frequency device; exercise care when using and storing the probe. The probe and cable are susceptible to damage caused by careless use. Always handle the probe using the compensation box and probe head, avoiding undue physical strain to the probe cable, such as kinking, excessive bending, or pulling. Visible dents in the cable will increase signal aberrations. Do not drop the probe or subject it to physical shock. Damage to the probe may result.

Cleaning

Protect the probe from adverse weather conditions. The probe is not waterproof.

CAUTION. *To prevent damage to the probe, do not expose it to sprays, liquids, or solvents. Avoid getting moisture inside the probe during exterior cleaning.*

Do not use chemical cleaning agents; they may damage the probe. Avoid using chemicals that contain benzine, benzene, toluene, xylene, acetone, or similar solvents.

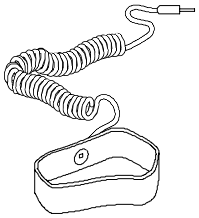
Clean the exterior surfaces of the probe with a dry, lint-free cloth or a soft-bristle brush. If dirt remains, use a soft cloth or swab dampened with a 75% isopropyl alcohol solution and rinse with deionized water. A swab is useful for cleaning narrow spaces on the probe, use only enough solution to dampen the swab or cloth. Do not use abrasive compounds on any part of the probe.

Operating Basics

Operation Basics

Connecting to the Host Instrument

CAUTION. *To avoid ESD damage to the probe, always use an antistatic wrist strap (provided with your probe), and work at a static-approved workstation when handling the probe.*



The TekConnect interface features a spring-loaded latch that provides audible and tactile confirmation that a reliable connection has been made to the host instrument.

Follow these steps to connect the TekConnect interface and set the probe to 5X or 25X probe attenuation.

1. Slide the probe into the TekConnect receptacle on the host instrument. The probe snaps into the receptacle when fully engaged.

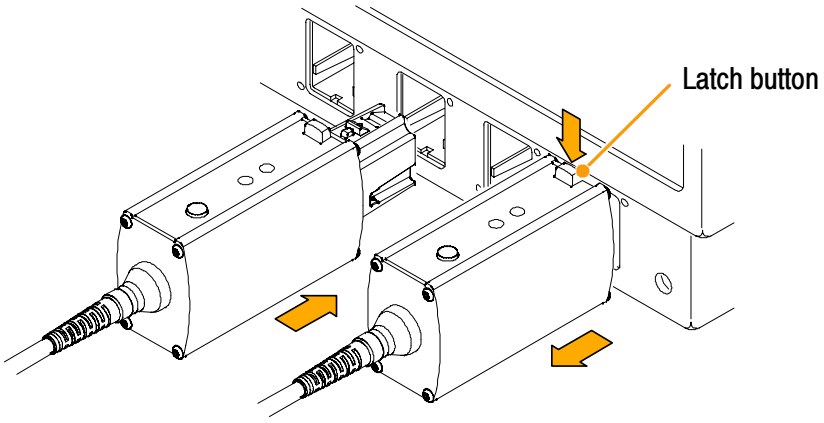
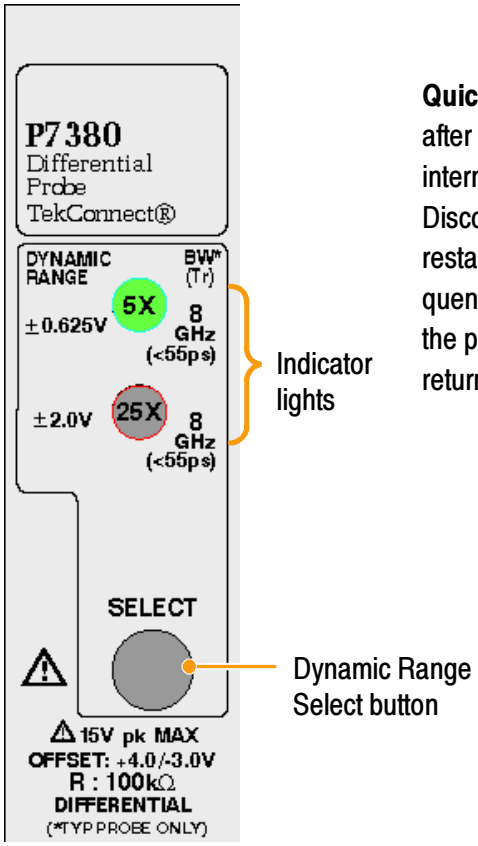


Figure 2-1: Connect TekConnect to instrument

When the probe is connected, the host instrument reads information from the probe, identifies the device, and powers on the appropriate power supplies. The preamp inputs on the host instrument are ESD protected by remaining grounded until a valid TekConnect device is detected.

Select the Probe Attenuation (Scaling). When powered on, the indicator LEDs light briefly, and indicate that the attenuation is selected.

2. Press the Dynamic Range Select button to choose between 5X and 25X probe attenuation settings. Note that the dynamic range changes when the attenuation setting is changed. See Figure 2-2.



Quick Tip. Flashing LEDs during or after the probe power on indicate an internal probe diagnostic fault exists. Disconnect and reconnect the probe to restart the power-on diagnostic sequence. If the LEDs continue to flash, the probe is defective, and must be returned to Tektronix for repair.

Figure 2-2: Probe (front)

Functional Check

After installing the probe on the oscilloscope, a functional check can be performed using the PROBE COMPENSATION connection on the front panel of the oscilloscope.

For more information about accessories used in the *Functional Check* procedure, see the *Accessories* section starting on page 3-1.

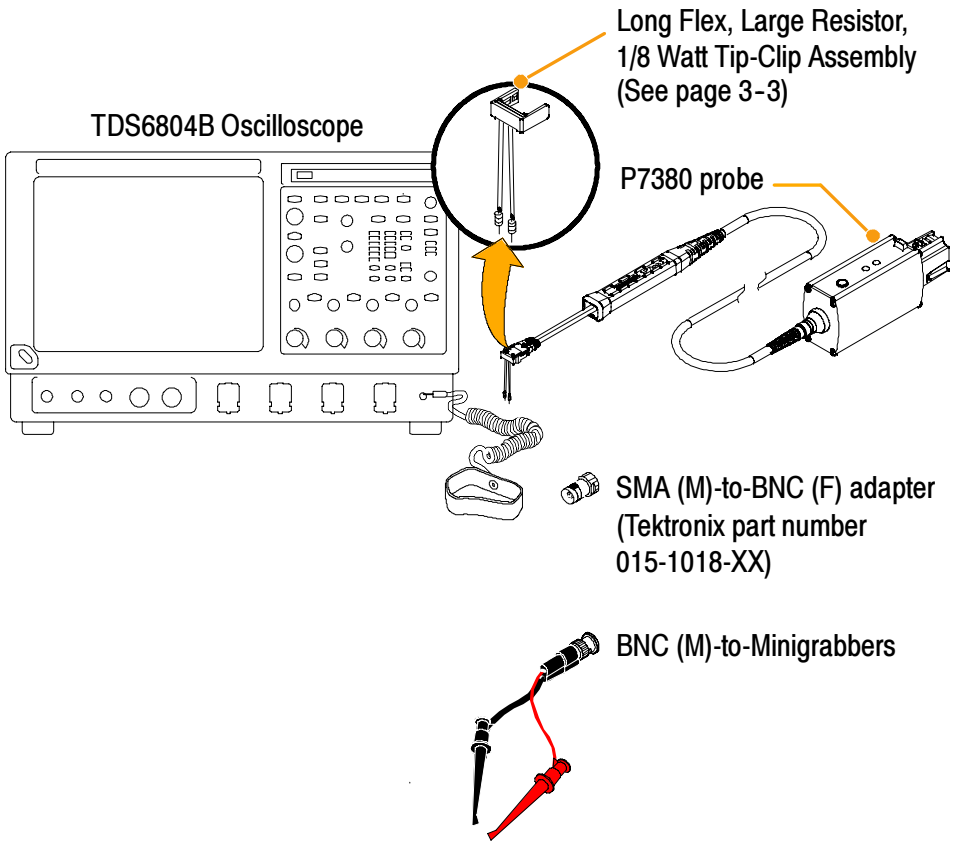


Figure 2-3: Equipment used for the functional check

CAUTION. *To avoid ESD damage to the probe, always use an antistatic wrist strap (provided with your probe), and work at a static-approved workstation when handling the probe.*

Test Procedure

Following is a method for connecting the probe to a typical compensation connector.

1. Connect the P7380 probe to any channel of the oscilloscope.
2. Set the oscilloscope to display the probe channel.
3. Set the probe gain to 25X.
4. Connect the BNC (M)-to-Minigrabbers (with an SMA (M)-to-BNC (F) adapter) to the oscilloscope PROBE COMPENSATION connector. See Figure 2-4.

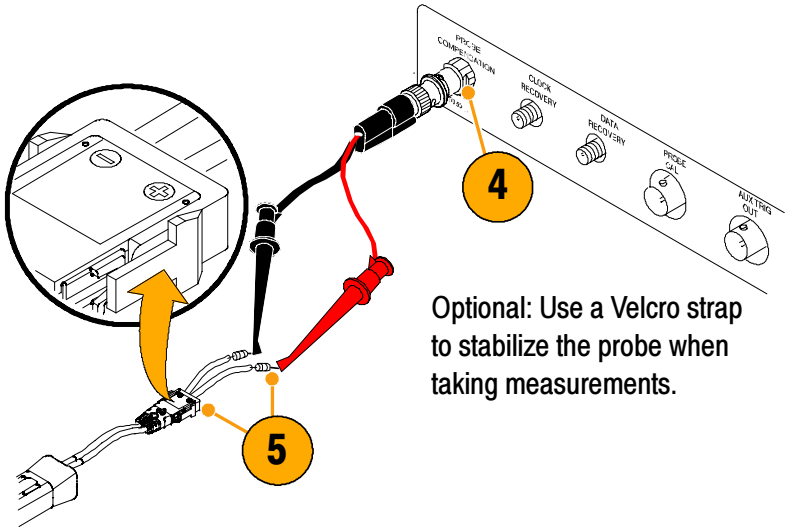


Figure 2-4: Connect to the probe for functional check

5. Attach a Long Flex, Large Resistor, 1/8 Watt Tip-Clip Assembly to the probe tip.
6. Connect the BNC-to-Minigrabbers to the Long Flex, Large Resistor, 1/8 Watt Tip-Clip Assembly on the probe.

- Connect the probe + input to the BNC red (+) terminal.
- Connect the probe - input to the adapter - or ground.

Quick Tip: The PPM203B Articulating Arm or PPM100 Positioner Arm (used with the Probe Arm Adapter) are not required, but may be used to support the probe body. This relieves strain on the Tip-Clip Assembly and provides a stable waveform measurement. See the *Accessories* section of this manual on page 3-7.

7. Adjust the oscilloscope to display a stable waveform (we recommend that you use the Autoset function). When you see a stable waveform, your probe is functioning correctly.

8. Use the (-) Minigrabber to short the resistor leads together and connect to a ground potential. See Figure 2-5.

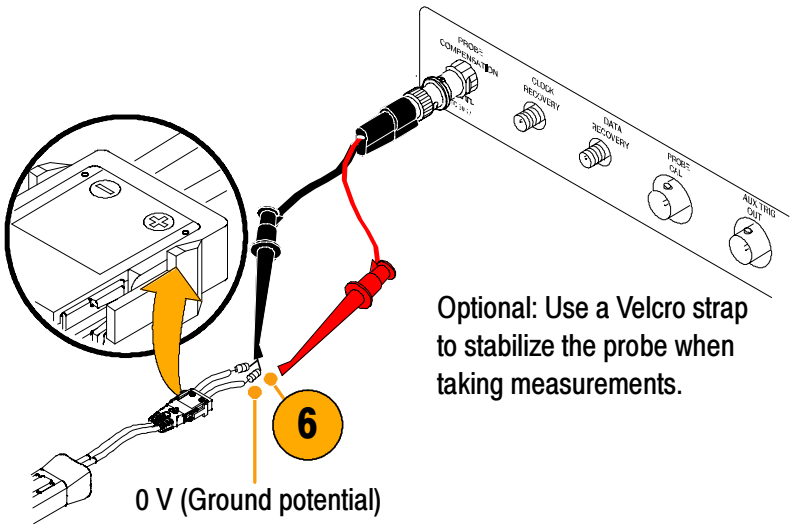


Figure 2-5: Short resistor leads

With the probe offset set to 0.0 V. The oscilloscope display should be at the ground reference.

9. Set the oscilloscope volts/division to 2 V .

10. Adjust the PROBE OFFSET between +4 V and -3 V. The displayed waveform should vary between approximately +3 V and -4 V.

11. Disconnect the shorting (-) Minigrabber.

Probe Calibration

After you perform a functional check of the probe, run a probe calibration routine. Probe calibration minimizes measurement errors by optimizing the gain and offset of the probe and oscilloscope combination. We recommend that you repeat the probe calibration on each channel that you use. Individual calibration constants are stored for each probe on each channel.

CAUTION. *To avoid ESD damage to the probe, always use an antistatic wrist strap (provided with your probe), and work at a static-approved workstation when handling the probe.*

You can use the equipment shown in the *Functional Check* in Figure 2-3 on page 2-3 to perform the probe calibration.

Test Procedure

The Calibration Status of the instrument Signal Path Compensation test must be pass for the probe calibration routine to run:

1. From the Utilities menu, select Instrument Calibration.
2. In the Calibration box, check that the Status field is pass. If it is not, disconnect all probes and signal sources from the oscilloscope, and run the Signal Path Compensation routine.

When the Signal Path compensation test status is pass, run the following probe calibration routine:

3. Connect the probe to one of the oscilloscope channels, and set the oscilloscope to display the channel. Allow the probe to warm up for 20 minutes.

NOTE*. Connect the + probe input to the positive Minigrabber, connect the - probe input to the ground Minigrabber.*

4. Connect the BNC-to-Minigrabbers to the oscilloscope PROBE CAL connector as shown in Figure 2-6.

   If a PROBE CAL connector is not available on your oscilloscope, you can connect to the PROBE COMPENSATION connector for the probe calibration procedure.

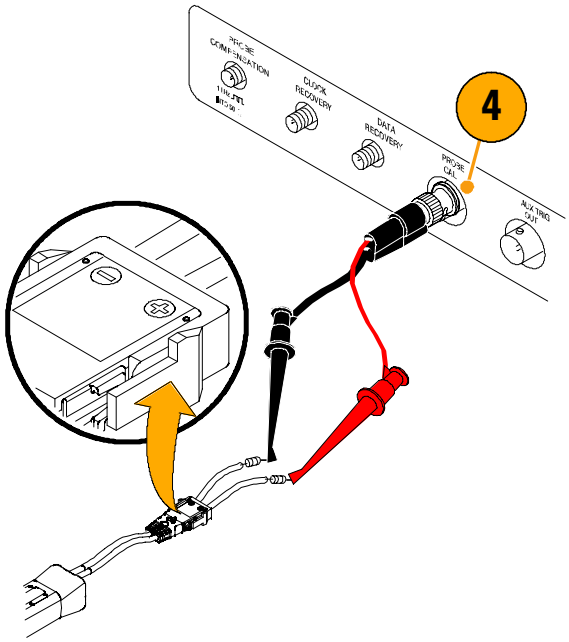


Figure 2-6: Connect the probe for probe calibration

5. In the menu bar, select Vertical and then select Probe Cal.
6. When the Probe Cal dialog box appears, select Clear Probe Cal, and then select Calibrate Probe.

   The probe calibration routine runs, optimizing the probe to the oscilloscope for both probe attenuation settings.

7. After a successful Probe Cal, the screen displays Pass.

Reinstalling the Flex Strip

If the flex strip separates from the Tip-Clip housing, follow these instructions to reinstall the flex strip.

Position the flex strip and Tip-Clip housing as shown in step 1 in Figure 2-7, and then follow step 2 to reinstall the flex strip. Check that the flex strip is seated evenly against the Tip-Clip housing.

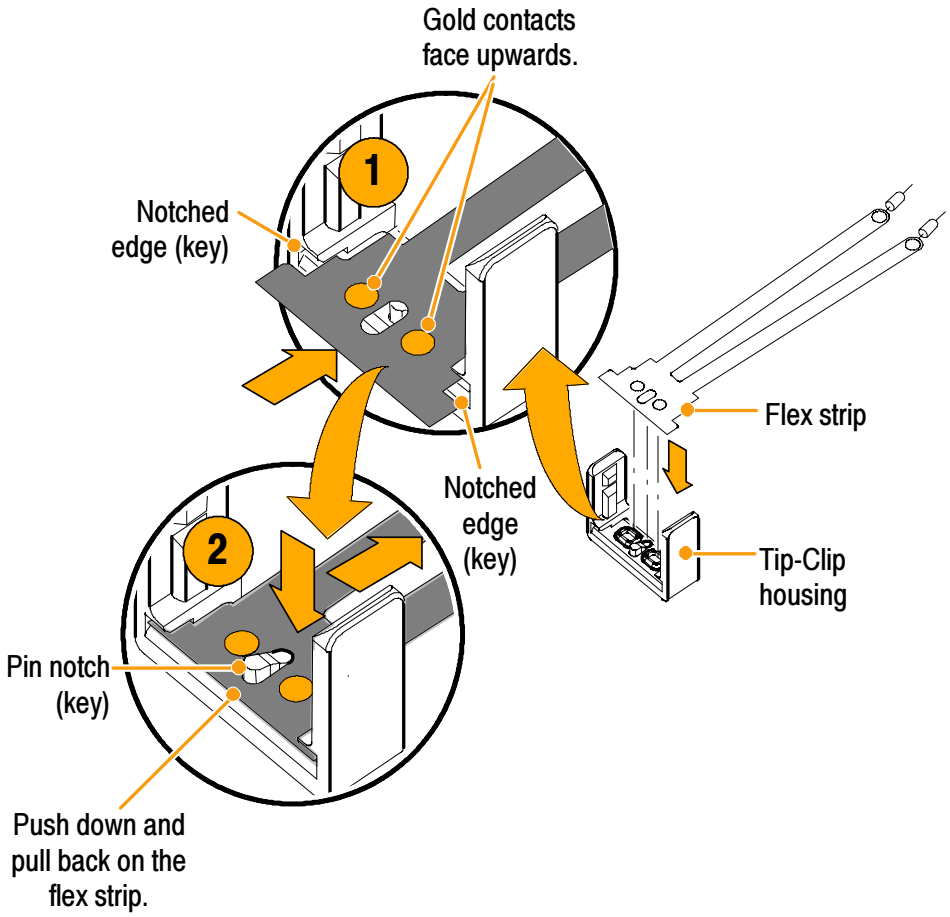


Figure 2-7: Reinstalling the flex strip

Tip-Clip Ejector

A Tip-Clip Ejector is shipped installed on the probe tip.

CAUTION. *To prevent wear to the Tip-Clip housing, it is recommended that you use the Tip-Clip Ejector to remove the Tip-Clip Assembly from the probe tip.*

Tip-Clip Removal

Follow these steps to remove the Tip-Clip Assembly using the Tip-Clip Ejector:

1. Grasp the sides of the Tip-Clip Ejector and slide the Tip-Clip Ejector towards the front of the probe tip. You will feel the Tip-Clip Ejector click past a ridge on the probe tip and the Tip-Clip Assembly will loosen. See Figure 2-8.
2. Remove the Tip-Clip Assembly.

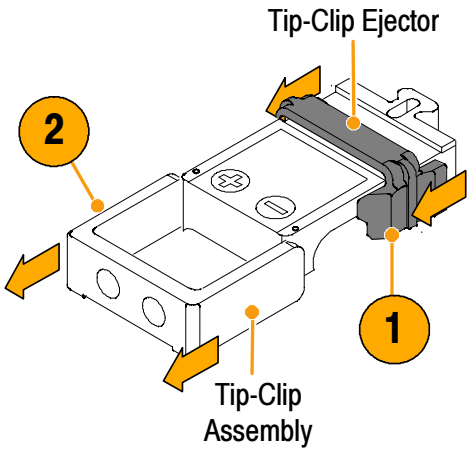


Figure 2-8: Removing a Tip-Clip Assembly

Tip-Clip Ejector Installation

Follow these steps to attach the Tip-Clip Ejector to the probe tip:

We recommend that you use the Magni-Spec magnifiers when attaching the Tip-Clip Ejector to the probe tip.

1. Remove any Tip-Clip assemblies from the probe tip, if necessary.
2. Turn the probe tip over with the back of the probe tip facing you. See Figure 2-9.
3. Position the Tip-Clip Ejector with the angled faces pointing towards the probe tip.
4. Place the Tip-Clip Ejector into the slot on the back of the probe tip. The Tip-Clip Ejector slides easily in this slot when placed correctly.

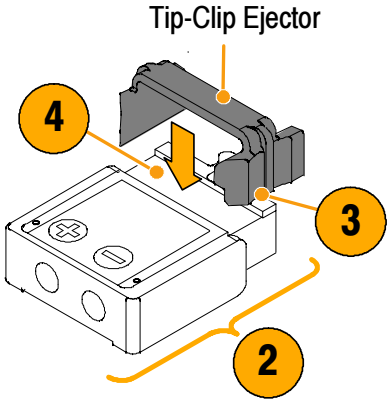


Figure 2-9: Attaching a Tip-Clip Ejector

Connecting to a Circuit Board

You can connect the P7380 probe to the TDS6804B oscilloscope or any oscilloscope that features the TekConnect interface. Follow these steps to connect to a circuit board:

1. Attach the Tip-Clip Tape to the base of a Tip-Clip Assembly.
2. Solder the Tip-Clip leads to a test point on your circuit board.
3. Attach the probe to the Tip-Clip Assembly.

***NOTE**. For Tip-Clip performance information, see page 3-5 in the* Accessories *section.*

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4. Use the Velcro fastening strap and dots to secure the probe body to the circuit board. See Figure 2-10.

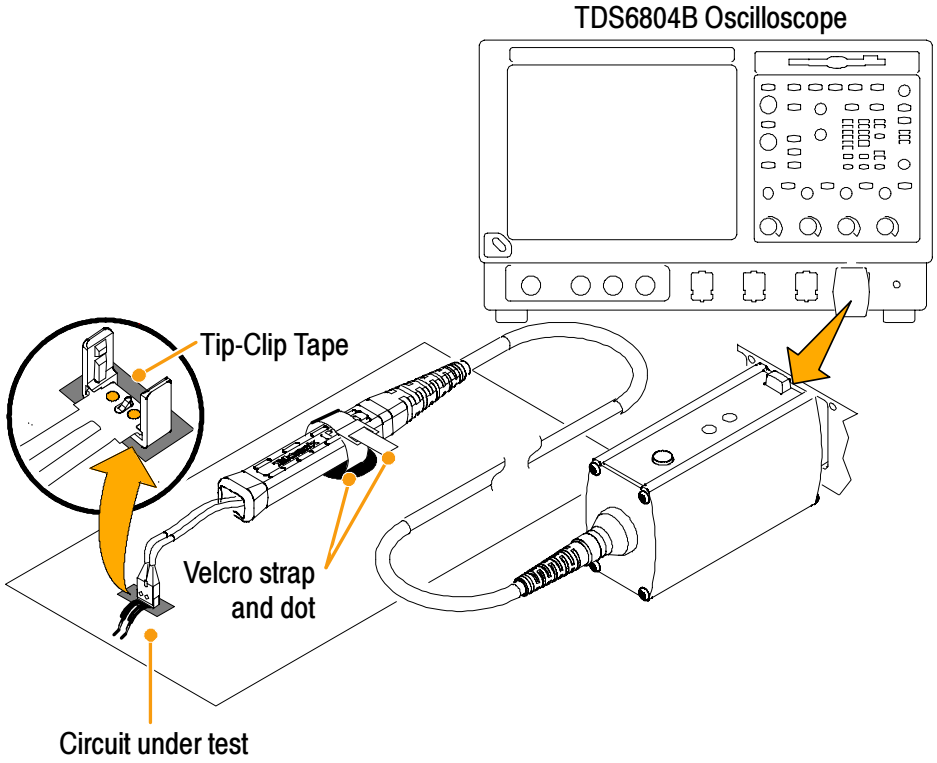


Figure 2-10: Connect to a circuit board

You can connect the P7380 probe to a TDS8000 or CSA8000 Series sampling oscilloscopes. The 80A03 TekConnect Probe Interface adapts the P7380 probe to the TDS8000 and CSA8000 Series oscilloscopes. See Figure 2-11.

See page 3-12 for alternate setups.

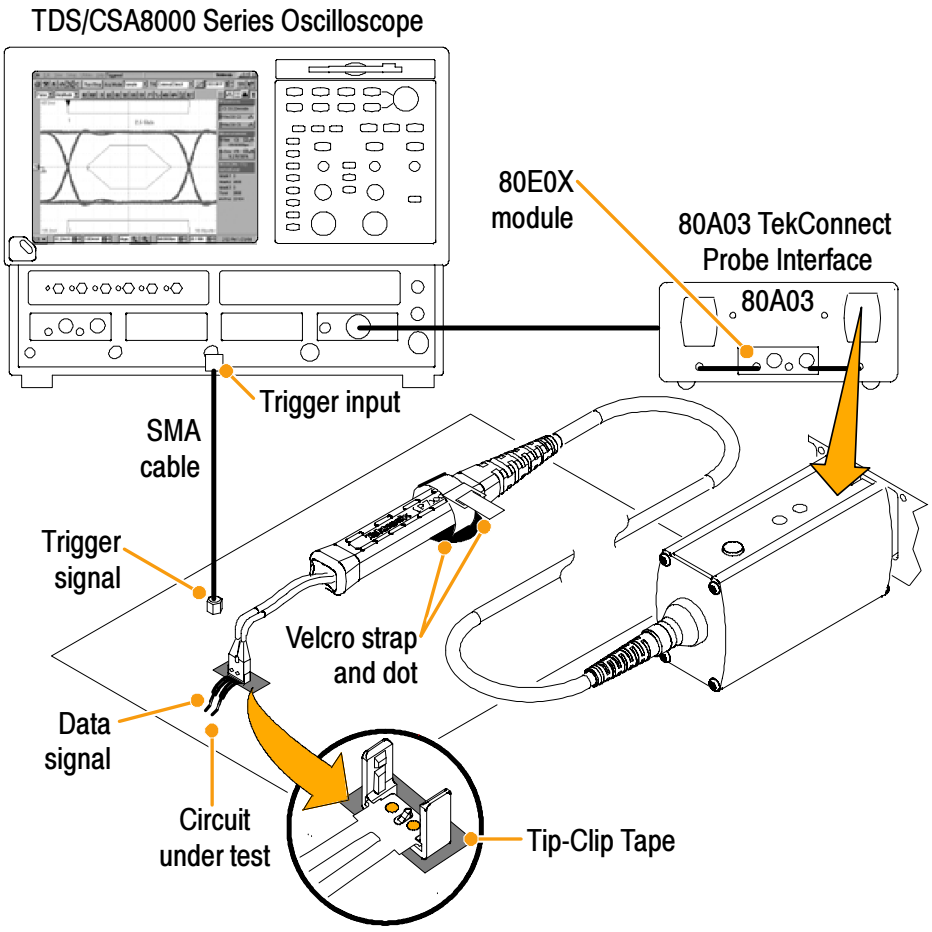


Figure 2-11: Connect to a TDS/CSA8000 Series sampling oscilloscope

***NOTE**. For proper operation, the 80A03 firmware must be version 1.2 or above. The firmware version label is on the rear panel of the 80A03 instrument.*

When connecting to your circuit, you can use the probe in two modes:

- Solder one or several Tip-Clip assemblies to a circuit board for taking measurements in tight spaces. See Figure 2–12.
- Use the Handheld Adapter where probe clearance is less of an issue.

The ease of interchangeability of the Tip-Clip assemblies allow a single P7380 Probe to move between a group of Tip-Clip assemblies that are soldered in place.

Figure 2-12: Connected Tip-Clip assemblies

Quick Tips

- For optimum performance and signal integrity, keep the lead length between the DUT (Device Under Test) and the Tip-Clip resistor short, less than 0.050-in if possible, and the lead lengths the same.
- To ensure a strong solder joint without using an excessive amount of solder, always use enough flux when soldering leads to a DUT.

CAUTION. *To prevent damage to the circuit board or circuit board connections due to accidental movement of the probe and soldered leads, it is recommended that the Tip-Clip Assembly and probe body be secured to the circuit board using the provided Velcro fastening strap and dots, and the Tip-Clip Tape.*

Handheld Adapter

Follow these steps to attach the handheld adapter housings to the probe:

1. Attach the variable spacing Tip-Clip assembly to the probe head.
2. Place the probe in the lower housing. Check that the four plastic pins on the housing are keyed in the slots on the probe body. When seated correctly, the probe body will not move in the lower housing.
3. Dress the wires around the post in the lower housing. For consistent polarity, do not cross the wires (See Figure 2-13).
4. Seat the probe tip on the metal pin in the nose of the lower housing.

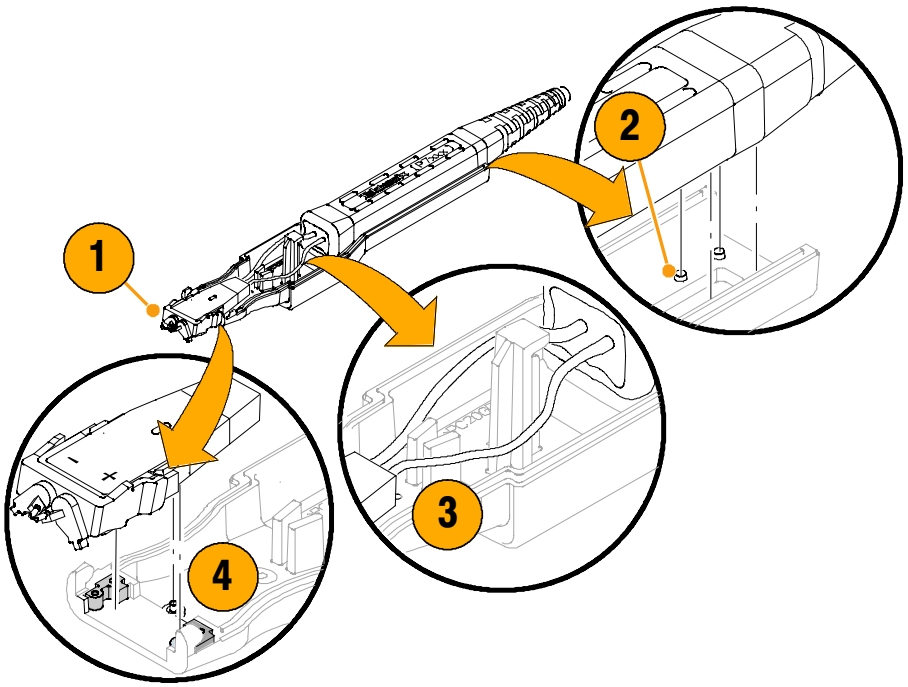


Figure 2-13: Assemble the handheld adapter

5. While holding the lower housing and probe body still, hook the nose of the upper housing into the nose of the lower housing.

6. Bring the two housing together.
7. Slide the latch forward on the upper housing to lock the housings in place. See Figure 2-14.

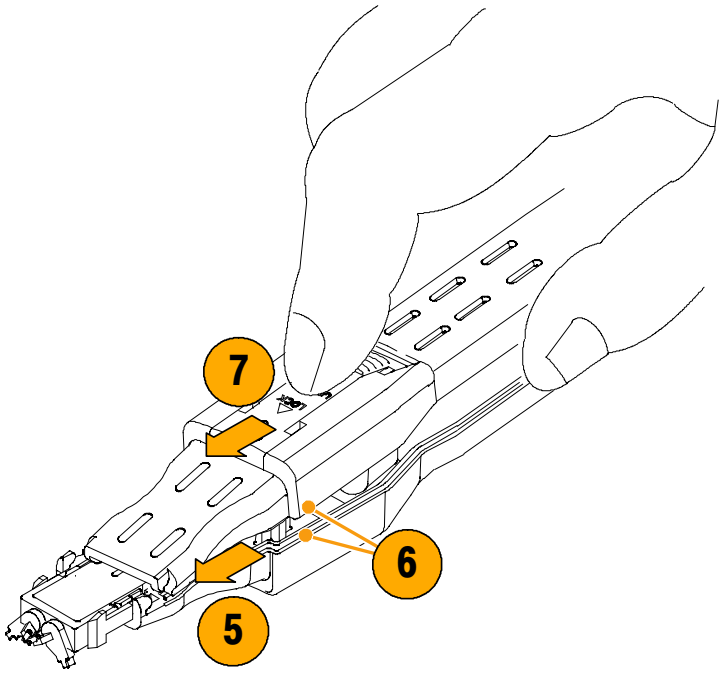


Figure 2-14: Lock the handheld adapter

Variable Spacing Tip-Clip Assembly

To adjust the pins on the variable spacing Tip-Clip Assembly, rotate the lever arms in the Tip-Clip housing. See Figure 2-15. You may need to use the tweezers (not provided) and the Magni-Spec magnifier. For the variable spacing Tip-Clip Assembly specifications, refer to the Technical Reference on the P7380 Documentation CD.

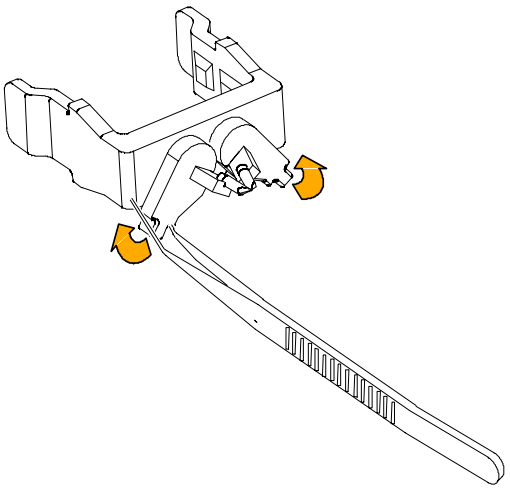


Figure 2-15: Adjusting the variable spacing Tip-Clip assembly

How to Remove the Handheld Adapter

CAUTION. *To prevent damage to the handheld adapter when removing it from the probe, slide the latch on the upper housing first before attempting to separate the housings.*

To remove the handheld adapter housings from the probe, slide the latch to the unlock position. Slide the top housing back from the probe head, and then separate and remove the probe body halves.

Storage

Store the Handheld Adapter in the probe case that the probe was shipped in.

Handheld Adapter Labels

These labels are located on the inside of the probe housings and show how to assemble the probe body halves. See Figure 2-16.

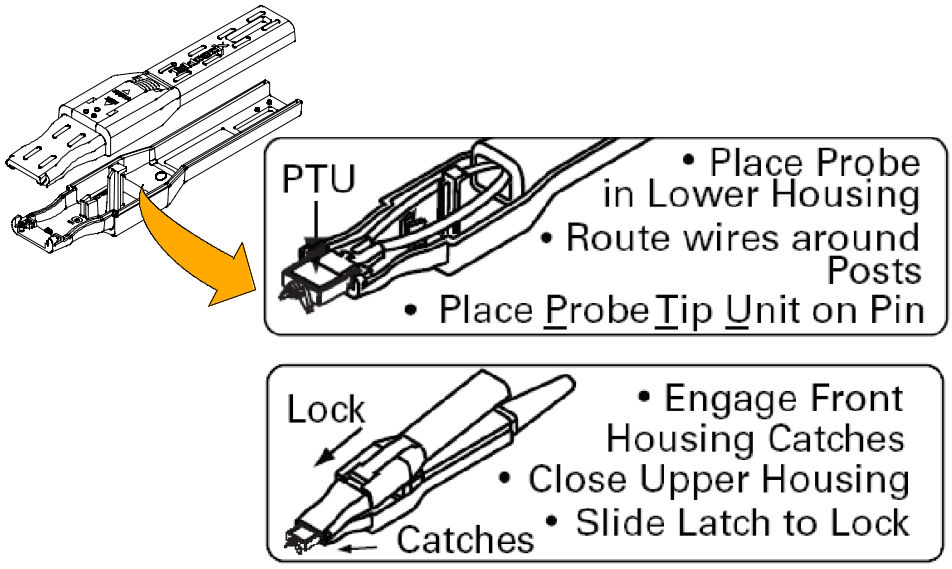


Figure 2-16: Handheld adapter labels

Reference

Accessories

You can reorder the following parts separately if a part number is listed, but in many cases the quantities differ from those originally shipped.

Tip-Clip performance and application information is in this section starting on page 3–5. For more detailed Tip-Clip information (waveforms and dimensions), see the *Specification* section in the technical reference manual on the P7380 documentation CD.

Standard Accessories

The following standard accessories are shipped with the P7380 Probe. If a quantity is not listed under the Reorder column, it is understood to be a quantity of one.

Table 3-1: Standard accessories

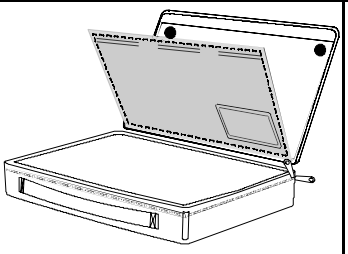
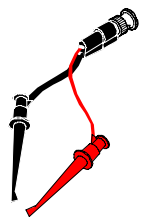
Accessory	Reorder part number and quantity	Description
	016-1952-XX	**Pouch, nylon carrying case with inserts.** This carrying case has several compartments to hold the probe and accessories.
	013-0342-XX	**BNC (M)-to-Minigrabber adapter.** This adapter connects the probe to the oscilloscope during the functional test.

Table 3-1: Standard accessories (Cont.)

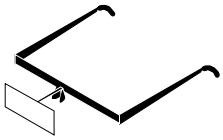
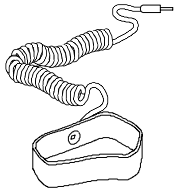
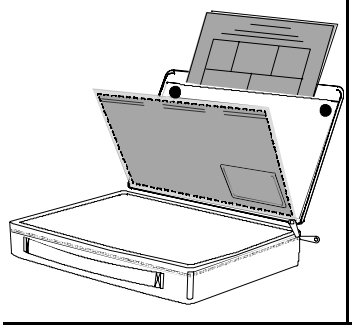
Accessory	Reorder part number and quantity	Description
	378-0486-XX	**Magni-Spec Magnifier.** A hands-free magnifier that can be worn alone or over eyeglasses to assist you when attaching the Tip-Clip leads to your circuit board or the Tip-Clip Ejector. When not needed, you can flip the magnifier lenses up.
	006-3415-XX	**Antistatic Wrist Strap.** When using the probe, always work at an antistatic work station and wear the antistatic wrist strap.
	---	**Calibration Certificate.** A certificate of traceable calibration is provided with every probe.
	---	**Data Calibration Report.** The Data Calibration Report lists the manufacturing test results of your probe at the time of shipment and is included with every probe.
	001-1381-XX	**Accessory Reorder and Tip-Clip Data Sheet.** Use the accessory reorder sheet as a quick guide for ordering probe accessories. An illustration of each Tip-Clip Assembly is on the reorder sheet. This sheet is located in the probe case.

Table 3-1: Standard accessories (Cont.)

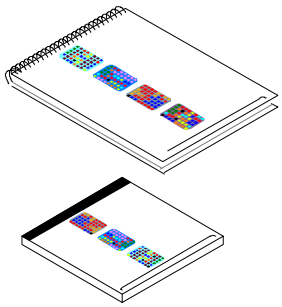
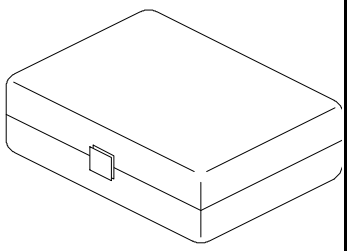
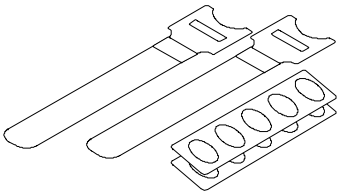
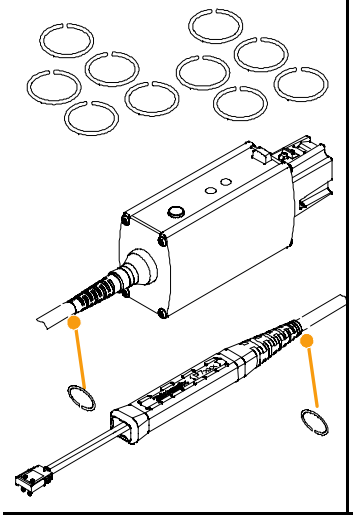
Accessory	Reorder part number and quantity	Description
	020-2576-XX	**User Manual and CD-ROM.** The user manual provides instructions for operating and maintaining the P7380 differential probe. The P7380 documentation CD-ROM contains PDFs of primers, basic probe and measurement literature, the probe manuals.
	020-2557-XX	**Accessory Kit:** This kit includes an attachment kit, a color band kit, adhesive Tip-Clip Tape, keying labels, an ejector kit, and an assortment of Tip-Clip Assemblies.
Note. *The following standard accessories are included in the Accessory kit.*		
	016-1953-XX	**Attachment kit.** This kit includes two Velcro fastening straps and ten Velcro dots, and stabilizes the probe body when taking measurements.
	016-1948-XX (1 set of five colored pairs)	**Color Band Kit (five colored pairs).** When you are using more than one probe, the bands enable you to quickly match the probes to the channels that they are connected to. To use the marker bands, attach a band to the indent on the end of the molded strain relief of the probe cable and the probe compensation box. Use the color band that matches the color of the channel that the probe is connected to.

Table 3-1: Standard accessories (Cont.)

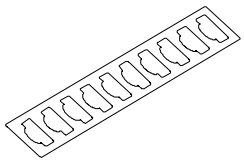
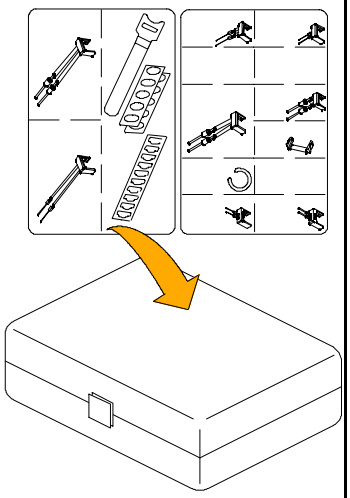
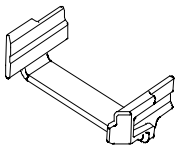
Accessory	Reorder part number and quantity	Description
	---	**Adhesive Tip-Clip Tape (3 strips of 10)**. Use the Tip-Clip Tape to secure the Tip-Clip Assembly to your circuit board.
	---	**Label Accessory Key**. These keying labels are attached to the insides of the accessory kit lids. Turn the box over for access to the second lid.
	---	**Tip-Clip Ejector Kit**. This kit includes three Tip-Clip Ejectors which are used to assist in the removal of the Tip-Clip Assemblies from the probe tip.

Table 3-1: Standard accessories (Cont.)

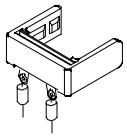
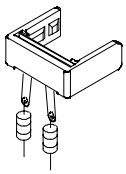
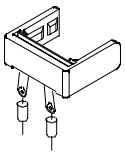
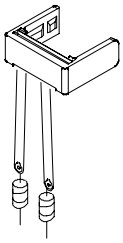
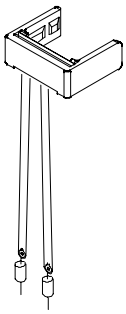
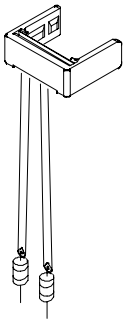
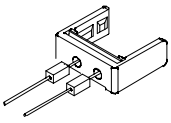
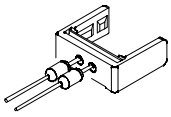
Accessory	Reorder part number and quantity	Description
The Accessory kit, shipped with the probe, has three Tip-Clip Assemblies of each type.		
	020-2600-XX (kit of 10)	**Short Flex, Small Resistor** Bandwidth: >8.0 GHz TR: 10/90 <55 ps (Guaranteed), 20/80<35 ps Loading: Differential Z_{MIN} 290 Ω to 8 GHz Best overall signal fidelity. The small resistors are ideal for connecting to small vias and fine pitch circuitry.
	020-2601-XX (kit of 10)	**Short Flex, Large Resistor, 1/8 Watt** Bandwidth: >8.0 GHz T_R: 10/90 <55 ps, 20/80 <35 ps Loading: Differential Z_{MIN} 290 Ω to 8 GHz High bandwidth and good signal fidelity, ideal for connecting to large features.
	020-2602-XX (kit of 10)	**Medium Flex, Small Resistor** Bandwidth: >7.0 GHz T_R: 10/90 <55 ps, 20/80 <35 ps Loading: Differential Z_{MIN} 290 Ω to 8 GHz Good compromise between ease-of-use and maximum performance when attaching to smaller devices or circuit board vias.
	020-2603-XX (kit of 10)	**Medium Flex, Large Resistor, 1/8 Watt** Bandwidth: >8.0 GHz T_R: 10/90 <55 ps, 20/80 <35 ps Loading: Differential Z_{MIN} 260 Ω to 8 GHz Good compromise between ease-of-use and maximum performance when attaching to larger devices

Table 3-1: Standard accessories (Cont.)

Accessory	Reorder part number and quantity	Description
	020-2604-XX (kit of 10)	**Long Flex, Small Resistor** Bandwidth: >6.0 GHz T_R: 10/90 <130 ps, 20/80 <40 ps Loading: Differential Z_{MIN} 360 Ω to 8 GHz Extended reach with good step response. Useful for connecting to hard to reach small vias and fine pitch circuitry. Conveniently sized to fit between DIMM modules. Not recommended for signals faster than 4 GHz.
	020-2605-XX (kit of 10)	**Long Flex, Large Resistor, 1/8 Watt** Bandwidth: >7.0 GHz T_R: 10/90 <75 ps, 20/80 <40 ps Loading: Differential Z_{MIN} 300 Ω to 8 GHz Extended reach with good step response. Useful for connecting to hard to reach circuitry with large features. Conveniently sized to fit between DIMM modules. Not recommended for signals faster than 4 GHz.
	020-2599-XX (kit of 10)	**Small Resistor, 1/16 Watt, 8 mil dia** Bandwidth: >8.0 GHz T_R: 10/90 <55 ps, 20/80 <35 ps Loading: Differential Z_{MIN} 270 Ω to 8 GHz Excellent signal fidelity. Similar to Short Flex Small Resistor.
	020-2598-XX (kit of 10)	**Large Resistor, 1/8 Watt, 20 mil dia** Bandwidth: >8.0 GHz T_R: 10/90 <55 ps, 20/80 <35 ps Loading: Differential Z_{MIN} 230 Ω to 8 GHz Highest bandwidth and highest loading. Performance similar to Short Flex 1/8 W Resistor.

Optional Accessories

Table 3-2: Optional accessories

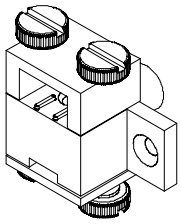
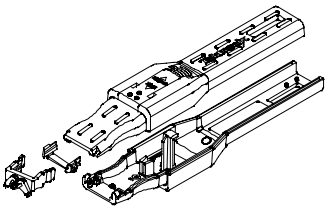
Optional accessory	Part number	Description
	PPM203B	**PPM203B Articulating Arm.** High precision articulating arm with fine adjustment controls of all three axis. Designed for probing PC boards, hybrids and MCMs that employ fine-pitch devices and interconnects. Use the Articulating Arm to provide stability and support for the P7380 probe when taking measurements. Use the Probe Arm Adapter to attach the P7380 probe to the PPM203B Articulating Arm.
	013-0339-XX	**Probe Arm Adapter.** This adapter is used to attach the P7380 probe to the end of the PPM203B Articulating Arm or the PPM100 Probe Positioner.
	PPM100	**PPM100 Probe Positioner.** A general purpose bench top probe holder with flexible arm, designed for hands-free probing and fine positioning adjustments. The heavy duty base can be replaced with the clamp for securing the probe arm in a variety of situations. Use the Probe Arm Adapter to attach the P7380 probe.
	P7380HHA	**Handheld Adapter Kit.** This kit includes two probe body halves, a Variable Spacing Tip-Clip Kit, and an Tip-Clip Ejector kit. The handheld adapter is used to move freely between test points on your circuit board when clearance is less of an issue.

Table 3-2: Optional accessories (Cont.)

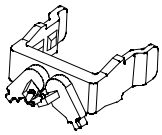
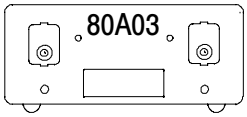
Optional accessory	Part number	Description
	020-2596-XX	**Variable Spacing Tip-Clip Kit**. This kit includes three variable spacing Tip-Clip Assemblies and three Tip-Clip Ejectors. Bandwidth: >8 GHz† TR: 10/90 <55 ps†, 20/80 <35 ps† Loading†: Differential Z_{MIN} 190 W to 8 GHz †Preliminary specification Use the variable spacing Tip-Clip Assembly for probing test points spaced from 0.020-in to 0.180-in apart. Exercise care when handling the articulated pins. Optional Accessories, are not included with the probe. This accessory is used only with the P7380 Handheld Adapter.

Table 3-2: Optional accessories (Cont.)

Optional accessory	Part number	Description
	80A03	The 80A03 TekConnect Probe Interface Module is an adapter that allows you to use TekConnect probes with CSA8000 and TDS8000 Series sampling oscilloscopes and 80E0X sampling modules. The interface is comprised of an enclosure that houses a compartment for one 80E0X electrical sampling module and two TekConnect probe inputs. The interface routes the probe signal outputs through SMA connectors on the front panel. Semi-rigid SMA cables link the probe outputs to the 80E0X module inputs.The 80A03 Interface Module is required to complete a performance verification of the probe. See the technical reference manual on your P7380 documentation CD for the performance verification procedure.

Order replacement resistors from the following manufacturers.

Table 3-3: Replacement resistor Tip-Clip values

Manufacturer part number	Description	Manufacturer name and address
HR01750J	75 Ω, 5%, 1/16W,8MIL WIRE LEAD MINI-RESIS-TOR, AXIAL LEAD	AVX/KYOCERA CORP 69 LANDRY ST, AIRPORT INDUSTRIAL PK BIDDEFORD, ME 04005-4319
HR01101J	100 Ω, 5%, 1/16W, 8MIL WIRE LEAD MINI-RESIS-TOR, AXIAL LEAD	
CCF50-75R0F-R36	75 Ω,1%, 20 MIL WIRE, RES,FXD,FILM; AXIAL LEAD, TC=T-1,SMALL BODY	DALE ELECTRONIC COM-PONENTS 1122 23RD ST COLUMBUS, NE 68601

Options

Option C3. Calibration Service 3 years

Option C5. Calibration Service 5 years

Option D3. Calibration Data Report, 3 years (with Option C3)

Option D5. Calibration Data Report, 5 years (with Option C5)

Option R3. Repair Service 3 years

Option R5. Repair Service 5 years

Probe Applications

The following are representative applications where the P7380 probe characteristics should enable measurements with good signal fidelity. Refer to *Z-Active: A New High Performance Probe Architecture* document (2FW-17826-0, at www.tektronix.com) for an in-depth discussion of these applications.

Dual In-line Memory Module (DIMM) Testing

- Solder a group of Tip-Clip assemblies to the circuit board and leave them in place on critical signal measurement locations. (The DIMMs are then inserted into the motherboard sockets).
- Attach one or more probes to the Tip-Clip assemblies and probe the critical measurement nodes. See Figure 3-1.

Figure 3-1: Circuit board with Tip-Clip assemblies

P7380 Probe with a TDS8000 Sampling Oscilloscope

- Connect one channel of the 80A03 to probe a clock that is source synchronous to the signal to be measured, to provide a trigger signal. See Figure 3-2.
- Connect a cable between the TekConnect socket output connector of the probed trigger signal and the sampling oscilloscope External Trigger input.
- Probe the synchronous data signal you want to measure on the other 80A03 channel.

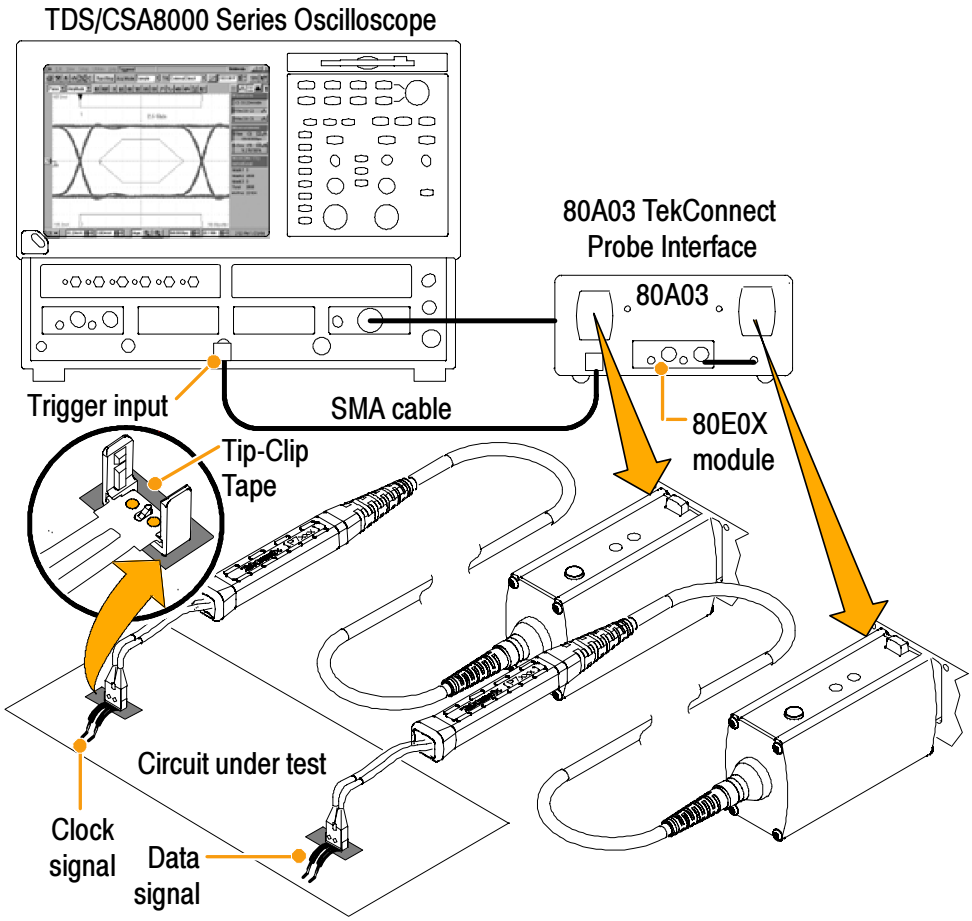


Figure 3-2: TDS8000 sampling oscilloscope

This TekConnect measurement signal should be connected between the TekConnect socket output and the embedded electrical sampling module in the 80A03 interface using the standard short semi-rigid cable.

If a synchronous clock signal source is not available, then use a 80A05 Module to recover a clean trigger signal that is synchronous to the input signal.

Measuring a PCI Express signal with a P7380 probe

RT-Eye Application Software

When the P7380 probe is used with a TDS6000 or TDS7000 real-time oscilloscope configured with RT-Eye application software, physical layer testing on PCI Express signals are performed with greater ease and accuracy. See Figure 3-3.

As shown in Figure 3-3, the RT-Eye software separates the acquired transition and nontransition bits. The RT-Eye software also provides an extensive collection of measurements and statistics on the analyzed waveform record.

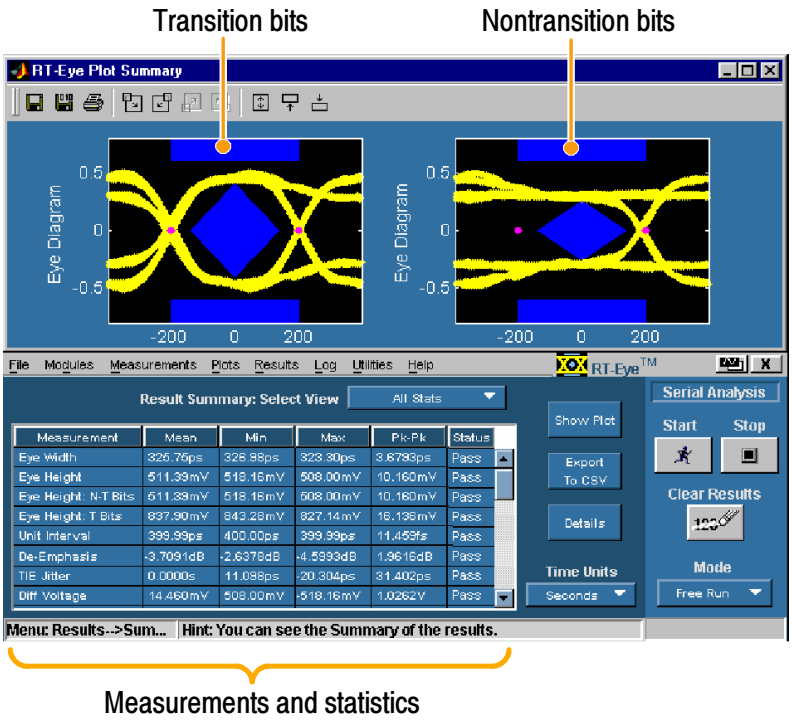


Figure 3-3: RT-Eye application