

User Manual

Tektronix

P7380

8 GHz 5X/25X Differential Probe

071-1393-00

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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 symbols 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 for these documents.

Warranty

There are two warranties at the front of this manual, a one year warranty for the P7380 Probe and a 90 day warranty for the Accessories.

Documentation

To read about	Use these documents
Installation and Operation (overviews)	Read the <i>P7380 User Manual</i> for general information about how to use your probe.
In-Depth Operation	Use the <i>P7380 Technical Reference Manual</i> (Tektronix Part Number 071-1544-XX) along with the <i>P7380 User Manual</i> .
Performance Verification and Specifications	Use the <i>P7380 Technical Reference Manual</i> .
Applications	Read the <i>Application Examples</i> section of the <i>User Manual</i> .
Reordering Tip-Clip Assemblies	Use the <i>Probe Accessory Reorder</i> 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 ¹
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 ¹
Service support	1-800-833-9200, select option 2 ¹
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3 ¹ 6:00 a.m. - 5:00 p.m. Pacific time

¹ 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 K Ω differential
 - 50 K Ω 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

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.

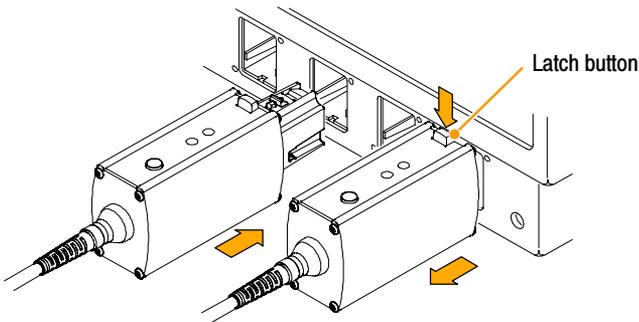


Figure 2-1: Connect TekConnect to instrument

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

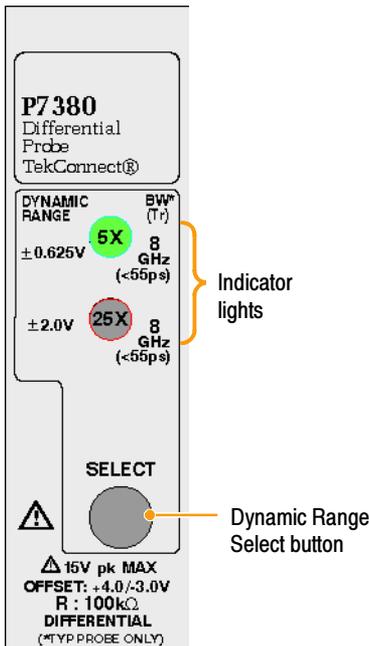


Figure 2-2: Probe (front)

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.

Functional Check

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

Required Equipment

- P7380 probe with Long Flex, Large Resistor, 1/8 Watt Tip-Clip Assembly (Tektronix part number 020-2605-XX)
- BNC (m)-to-Minigrabbers (Tektronix part number 013-0342-XX)
- TDS6804B oscilloscope

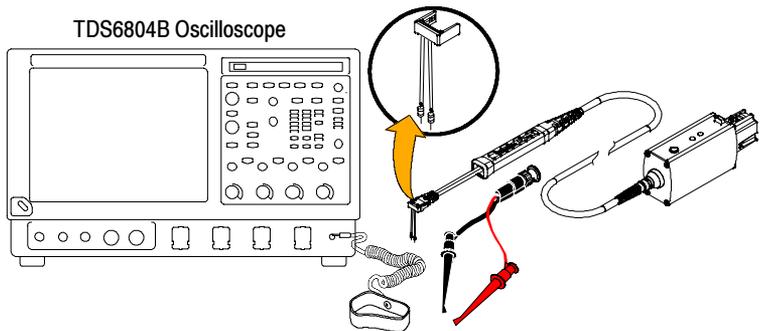


Figure 2-3: Required equipment for functional check



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 to the oscilloscope PROBE CAL connector. See Figure 2-4.

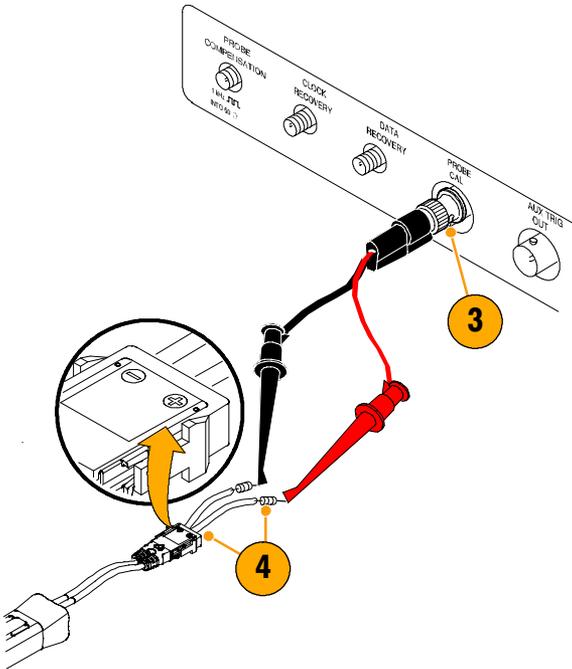


Figure 2-4: Connect to the probe for functional check

5. Connect the BNC (m)-to-Minigrabbers to the probe with the Long Flex, Large Resistor, 1/8 Watt Tip-Clip Assembly.
 - Connect the probe + output to the BNC red (+) terminal.
 - Connect the probe - output to the adapter - or ground.

Quick Tip: The PPM203B Articulating Arm and the Probe 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.

6. Adjust the oscilloscope to display a stable waveform (we recommend that you use the Autoset function). When you see a stable 1 KHz square wave, your probe is functioning correctly.

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

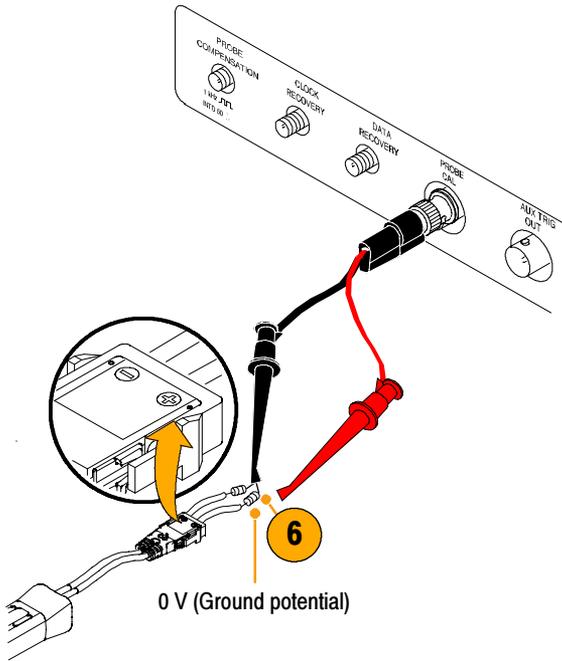


Figure 2-5: Short resistor leads

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

8. Set the oscilloscope volts/division to 2 V .
9. Adjust the PROBE OFFSET between +4 V and -3 V. The displayed waveform should vary between approximately +3 V and -4 V.
10. 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.*

Required Equipment.

You can use the required equipment listed on page 2-3 in the *Functional Check* 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.

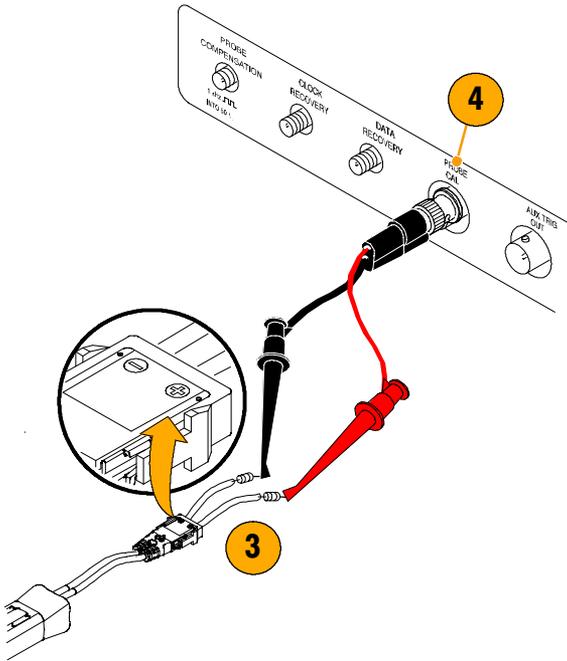


Figure 2-6: Connect the probe for probe calibration

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.

Connecting to your circuit

You can use the probe in two modes:

- Use one or several Tip-Clip assemblies for measurements in tight spaces. See page 3-11.
- Use the Handheld Adapter where probe clearance is less of an issue. See page 3-19.

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. See Figure 2-7.



Figure 2-7: 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-inch if possible, and the lead lengths the same.
- To avoid damaging the resistors, we recommend that you leave a small ball of solder next to the resistor body when soldering the resistor leads. Typically, the nickel lead reduces the heat transfer to the resistor body, but a large ball of solder may eliminate this protection heat.
- 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.*

Connecting to an Oscilloscope

You can connect the P7380 probe TekConnect interface to the TDS6804B oscilloscope or any oscilloscope using the TekConnect interface. See Figure 2-8.

- Attach one of the Tip-Clip Assemblies to your probe and then solder the leads to a test point on your circuit board.
- Attach the Tip-Clip Tape to the base of the Tip-Clip Assembly to stabilize and secure the Tip-Clip Assembly to your circuit board.
- Use the Velcro fastening strap and dots to secure the probe body to the circuit board.

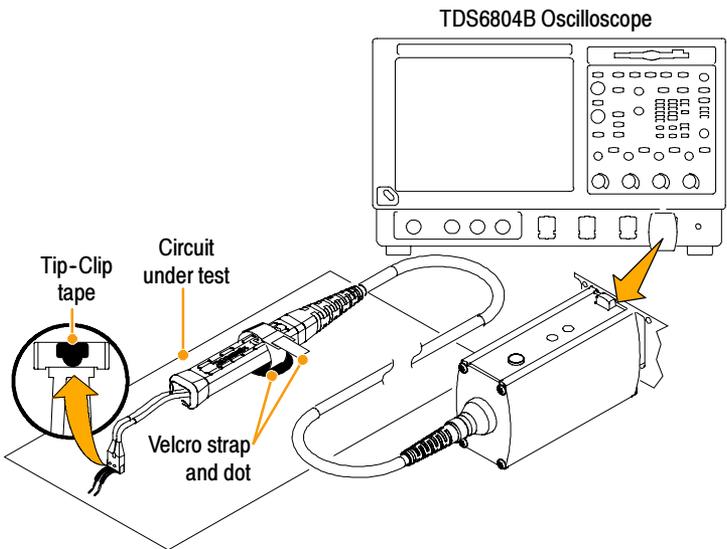


Figure 2-8: Connect to a TDS6804B oscilloscope

You can use the P7380 probe connected to a TDS8000 and CSA8000 Series sampling oscilloscope. The 80A03 TekConnect Probe interface adapts the P7380 probe to the TDS8000 and CSA8000 Series oscilloscope. See Figure 2-9.

See page 3-24 for an alternate set up.

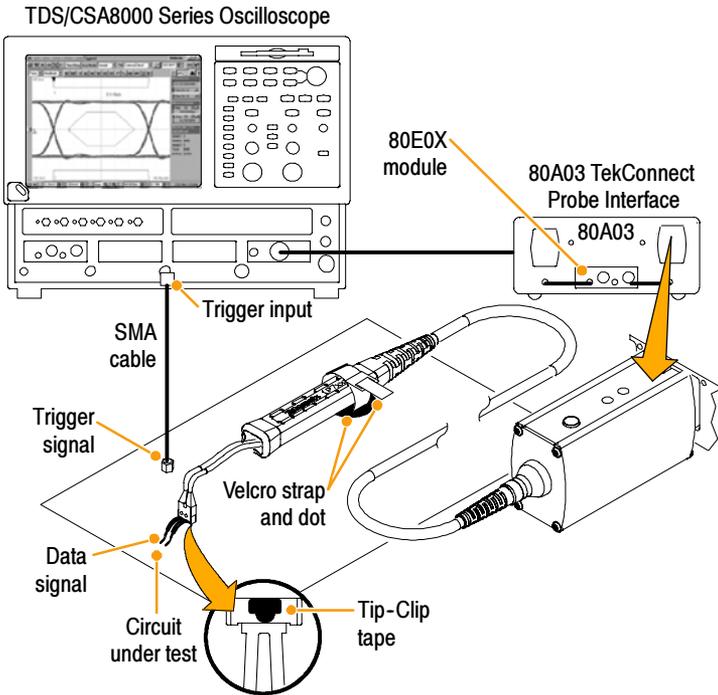


Figure 2-9: Connect to a TDS/CSA8000 Series sampling oscilloscope

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.



Reference

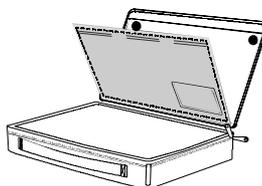
Accessories

The following accessories come with the P7380 Probe. You can reorder the following parts separately if a part number is listed, but in many cases the quantities differ from those originally shipped.

Standard Accessories

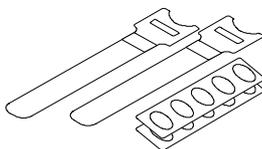
Pouch, nylon carrying case with inserts. This carrying case has several compartments to hold the probe, the accessories, and the Tip-Clip plastic box.

Tektronix part number 016-1952-XX



Attachment kit (Velcro fastening strap and dots). This kit stabilizes the probe body when taking measurements.

Tektronix part number
016-1953-XX

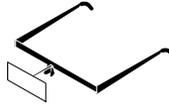


BNC (m)-to-Minigrabber adapter. This adapter connects the probe to the oscilloscope during the functional test.

Tektronix part number
013-0342-00



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 up.



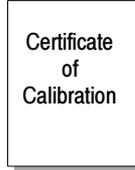
Tektronix part number
378-0486-XX

Antistatic Wrist Strap. When using the probe, always work at an antistatic work station and wear the antistatic wrist strap.

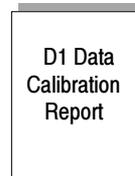


Tektronix part number
006-3415-XX

Calibration Certificate. A certificate of traceable calibration is provided with every probe.



D1 Data Calibration Report. When purchased, the D1 Data Calibration Report lists the manufacturing test results of your probe at the time of shipment.



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 back of the reorder sheet. This sheet is located in the probe case.

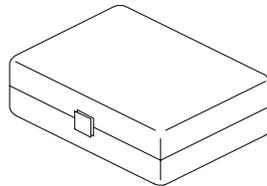
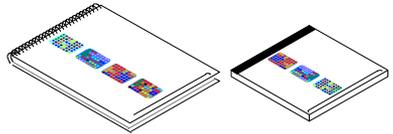
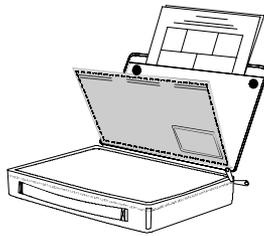
Tektronix part number
001-1381-XX

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 User Manual, and the Technical Reference Manual.

Tektronix part number
020-2576-XX

Replacement Accessory Kit. This kit comes with the following parts: Color band kit, Ejector Tool, Labels, and Tip-Clip Assemblies.

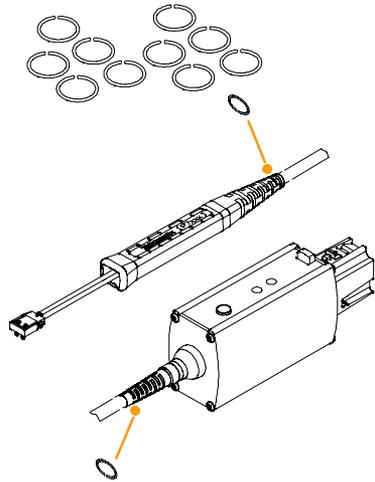
Tektronix part number
020-2557-XX



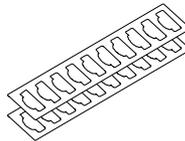
Color Band Kit (five colored pairs).

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.

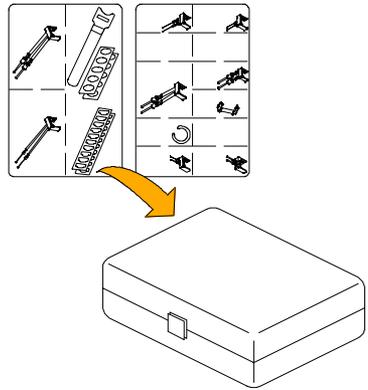
Tektronix part number 016-1948-XX (1 set of five colored pairs)



Adhesive Tip-Clip Tape (2 strips of 10). Use the Tip-Clip tape to secure the probe head to your circuit board.



Label Accessory Key (2 ea).
 Attach this label to the inside of the replacement accessory kit lid.

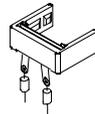


Ejector Tool (3 ea). Used to assist in the removal of the Tip-Clip assemblies from the probe head.
 Tektronix part number
 020-2595-XX (Reorder 10 ea)

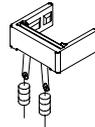


NOTE. The following Tip-Clip Assemblies each include: three replacement Tip-Clip Ejectors and two Tip-Clip Tape adhesive strips.

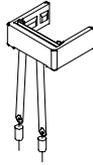
Short Flex, Small Resistor
 (3 ea)
 Tektronix part number
 020-2600-XX (Reorder 10 ea)



Short Flex, Large Resistor, 1/8 Watt (3 ea)
 Tektronix part number
 020-2601-XX (Reorder 10 ea)



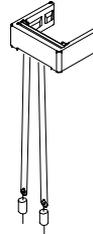
Medium Flex, Small Resistor
(3 ea)
Tektronix part number
020-2602-XX (Reorder 10 ea)



Medium Flex, Large Resistor, 1/8 Watt (3 ea)
Tektronix part number
020-2603-XX (Reorder 10 ea)



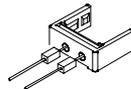
Long Flex, Small Resistor (3 ea)
Tektronix part number
020-2604-XX (Reorder 10 ea)



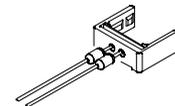
Long Flex, Large Resistor, 1/8 Watt (3 ea)
Tektronix part number 020-2605-XX (Reorder 10 ea)



Small Resistor, 1/16 Watt, 8 mil dia (3 ea)
Tektronix part number
020-2599-XX (Reorder 10 ea)



Large Resistor, 1/8 Watt, 20 mil dia (3 ea)
Tektronix part number
020-2598-XX (Reorder 10 ea)



Optional Accessories

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. You need the Probe Arm Adapter (Tektronix part number 013-0339-XX) to attach the P7380 probe to the PPM203B Articulating Arm



Probe Arm Adapter. This adapter attaches the P7380 probe to the end of the PPM203B Articulating Arm. Tektronix part number 013-0339-XX



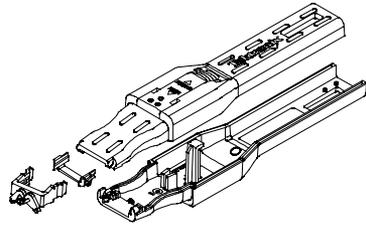
PPM100 Probe Positioner. A general purpose bench top probe holder with flexible arm, designed for hands-free probing and fine positioning adjustments. The heavy duty base can be replaced with the clamp for securing the probe arm in a variety of situations. Use flexible retention rings to attach the probe to the probe holder.



P7380HHA Handheld Adapter

Kit. This kit includes two probe body halves and a Variable Spacing Tip-Clip Kit (Tektronix part number 020-2596-XX) with three Variable Spacing Tip-Clip Assemblies and three Ejector Tools. The Handheld Adapter is used to move freely between test points on your circuit board when clearance is less of an issue.

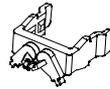
Tektronix part number
020-2597-XX.



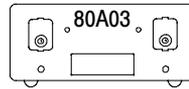
Variable Spacing Tip-Clip Kit

(3 ea). The Tip-Clip Assembly pins expand the probe pin access between any two circuit points to provide a range of contact.

Tektronix part number
020-2596-XX (Reorder 3 ea)



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.



Order replacement resistors from the following manufacturers.

Table 3-1: Resistor values for replacement resistor Tip-Clip assemblies

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

Option R3. Repair Service 3 years

Option R5. Repair Service 5 years



Tip-Clip Applications

This section suggests applications for the Tip-Clip Assemblies and contains installation instructions for the Ejector tool. For more detailed Tip-Clip information (waveforms and dimensions), see the *Specification* section in the *Technical Reference Manual* on the P7380 documentation CD.

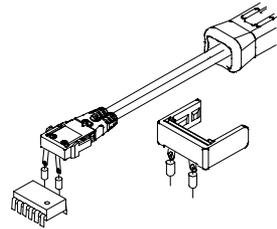
Flex Tip-Clip Applications

There is a total of six Flex Tip-Clip Assemblies. There are three different lengths, with two different axial-lead resistor sizes available. The Flex Tip-Clip Assembly supplies a differential interconnect to the bottom of the Tip-Clip Assembly. The following specifications are all typical unless indicated otherwise.

Short Flex, Small Resistor
Tektronix part number:
020-2600-XX

Bandwidth: >8.0 GHz
TR: 10/90 <55 ps*,
20/80 <35 ps
*Guaranteed
Loading: Single-ended Z_{MIN}
238 Ω to 8 GHz

Best overall signal fidelity and low loading. The small resistors are ideal for connecting to small vias and fine pitch circuitry.

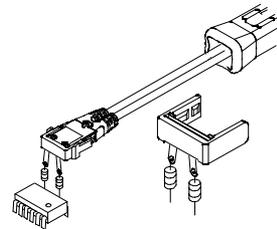


Short Flex, Large Resistor
1/8 Watt,

Tektronix number:
020-2601-XX

Bandwidth: >8.0 GHz
 T_R : 10/90 <55 ps,
20/80 <35 ps
Loading: Single ended Z_{MIN}
300 Ω to 8 GHz

High BW, good signal fidelity, more loading than short flex small resistor and are ideal for connecting to large features.

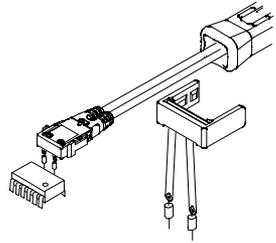


Medium Flex, Small Resistor

Tektronix part number:
020-2602-XX

Bandwidth: >8 GHz
 T_R : 10/90 <55 ps,
 20/80 <35 ps
 Loading: Single-ended Z_{MIN}
 280 Ω to 8 GHz

Good compromise between ease-of-use and maximum performance when attaching to smaller devices or circuit board vias.

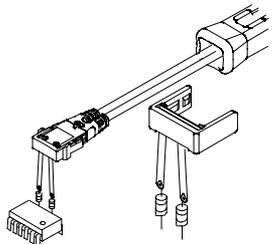


Medium Flex, Large Resistor, 1/8 Watt

Tektronix part number:
020-2603-XX

Bandwidth: >8.0 GHz
 T_R : 10/90 <55 ps,
 20/80 <35 ps
 Loading: Single-ended Z_{MIN}
 200 Ω to 8 GHz

Good compromise between ease-of-use and maximum performance when attaching to larger devices

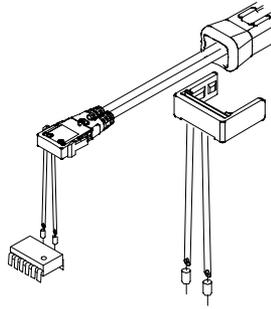


Long Flex, Small Resistor

Tektronix part number:
020-2604-XX

Bandwidth: >6.0 GHz
 T_R : 10/90 <130 ps,
20/80 <40 ps
Loading: Single-ended
 Z_{MIN} 265 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.

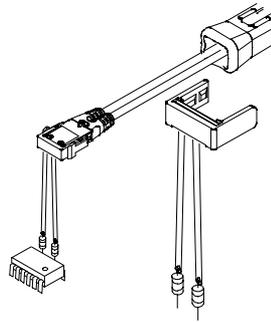


Long Flex, Large Resistor, 1/8 Watt,

Tektronix part number:
020-2605-XX

Bandwidth: >7.0 GHz
 T_R : 10/90 <75 ps,
20/80 <40 ps
Loading: Single-ended
 Z_{MIN} 277 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.



Resistor Tip-Clip Applications

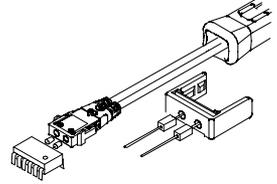
There are two resistor Tip-Clip Assemblies. The resistor Tip-Clip Assemblies provide differential interconnects out of the end of the Tip-Clip Assembly.

Small Resistor, 1/16 Watt,
8 mil dia lead

Tektronix part number:
020-2599-XX

Bandwidth: >8.0 GHz
 T_R : 10/90 <55 ps,
 20/80 <35 ps
 Loading: Single-ended
 Z_{MIN} 260 Ω to 8 GHz

Excellent signal fidelity and low loading. Similar to Short Flex Small Resistor.

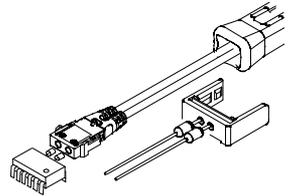


Large Resistor, 1/8 Watt,
20 mil dia lead

Tektronix part number:
020-2598-XX

Bandwidth: >8.0 GHz
 T_R : 10/90 <55 ps,
 20/80 <35 ps
 Loading: Single-ended
 Z_{MIN} 175 Ω to 8 GHz

Highest BW and highest loading. Performance similar to Short Flex 1/8W Resistor.



Variable Spacing Tip-Clip Application

The Variable Spacing Tip-Clip Assembly is used with the Handheld Adapter and is designed to provide the best possible performance with minimal loading.

Variable Spacing Tip-Clip Assembly

Tektronix part number:
020-2596-XX

Bandwidth: >8 GHz[†]

T_R : 10/90 <55 ps[†],

20/80 <35 ps[†]

Loading[†]: Single-ended

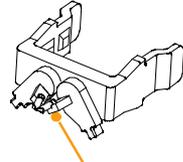
Z_{MIN} ~300 Ω to 8 GHz

[†]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 Accessory, not included with the probe.



Articulated pins

Ejector Tool

The Ejector tool is shipped installed on the Tip-Clip Assemblies. The Tip-Clip Assemblies can be removed and replaced by hand or you can use the Tip-Clip Ejector tool.

Follow these steps if the Ejector tool is in place on the Tip-Clip Assembly:

1. Grasp the sides of the Ejector tool and slide the Ejector tool towards the front of the probe head. You will feel the Ejector tool click past a ridge on the probe head which will loosen the Tip-Clip Assembly. See Figure 3-1.
2. After the Ejector tool loosens the Tip-Clip Assembly, remove it.

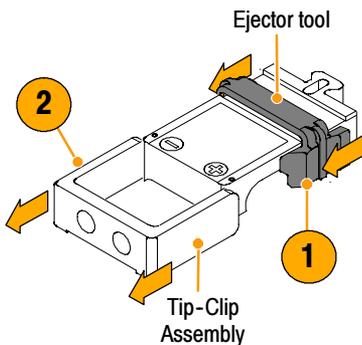


Figure 3-1: Removing a Tip-Clip Assembly

Follow these steps to attach the Ejector tool to the Tip-Clip Assembly:

We recommend that you use the Magni-Spec magnifiers when attaching the Ejector tool to the probe head.

1. Remove any Tip-Clip Assemblies from the probe head, if necessary.

2. Turn the probe head over with the back of the probe head facing you. See Figure 3-2.
3. Position the Ejector tool with the angled faces pointing towards the probe tip.
4. Place the Ejector tool into the slot on the back of the probe head. The Ejector tool slides easily in this slot when placed correctly.

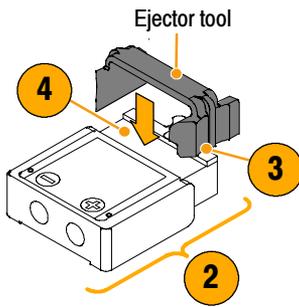


Figure 3-2: Attaching an Ejector Tool

Handheld Adapter

Follow these steps to assembly the Handheld Adapter:

1. Attach the Variable Spacing Tip-Clip Assembly to the probe.
2. Place the probe in the lower housing. Check that the four tabs 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 3-3).
4. Seat the probe head on the key in the nose of the lower housing.

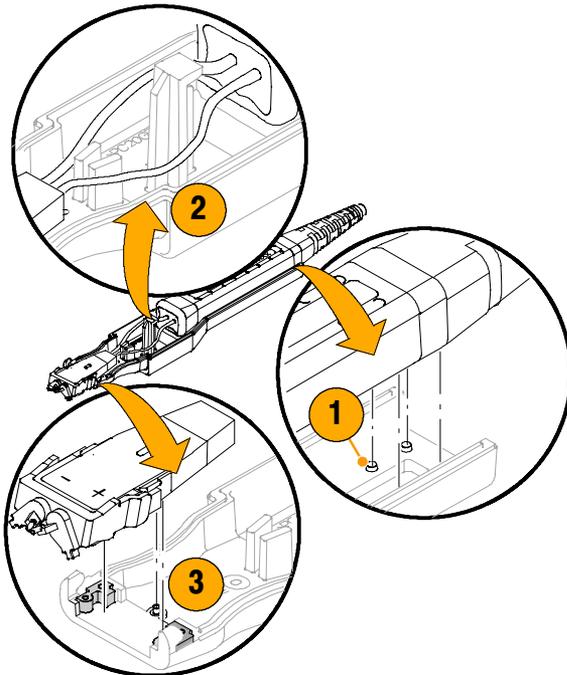


Figure 3-3: Assemble Handheld Adapter

5. While holding the lower housing and probe body still, slide the nose of the upper housing into the nose of the lower housing.
6. Slide the button forward on the upper housing to lock the housings in place. See Figure 3-4.

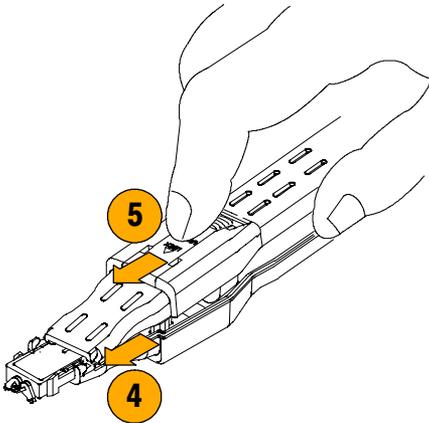


Figure 3-4: Lock Handheld Adapter

7. Attach the Variable Spacing Adapter (to adjust, see page 3-22).

How to Remove the Handheld Adapter



CAUTION. To prevent damage to the probe housing when removing it from the probe, slide the tab on the top of the probe housing first before attempting to separate the probe housings.

To remove the Handheld Adapter from the probe, slide the tab to the unlock position. Slide the top housing back from the probe head, and then separate and remove the probe body halves.

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 3-5.

NOTE. The Tip-Clip Assembly is referred to on the label as the Probe Tip Unit (PTU).

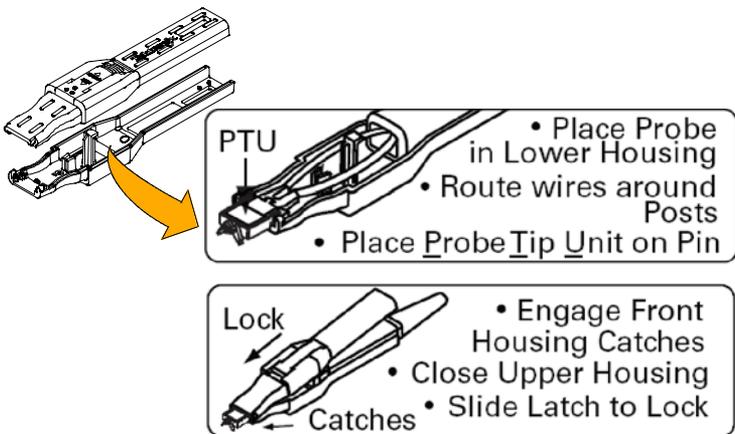


Figure 3-5: Handheld Adapter Labels

Variable Spacing Adapter

Use the Variable Spacing Adapter with the Handheld Adapter.

The Variable Spacing Tip-Clip Assembly expands the probe pin access between any two circuit points from 20 mil to 130 mil pitch.

- To adjust the pins on the Variable Spacing Adapter, rotate the lever arms in the Tip-Clip housing. See Figure 3-6. You may need to use tweezers (not provided) and the Magni-Spec magnifier.

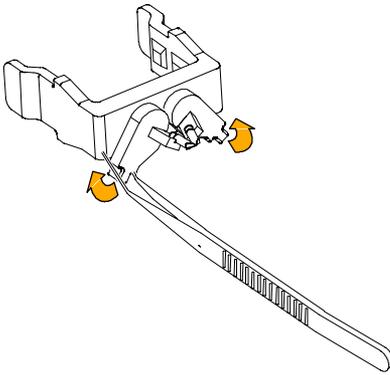


Figure 3-6: Adjust the Variable Spacing Adapter

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, see Tektronix Web site) for an in-depth discussion of these applications.

Dual In-line Memory Module (DIMM) Testing

1. 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).
2. Attach one or more probes to the Tip-Clip assemblies and probe the critical measurement nodes. See Figure 3-7.



Figure 3-7: Circuit board with Tip-Clip assemblies

P7380 Probe with a TDS8000 Sampling Oscilloscope

1. 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 3-8.
2. Connect a cable between the TekConnect socket output connector of the probed trigger signal and the sampling oscilloscope External Trigger input.
3. Probe the synchronous data signal you want to measure on the other 80A03 channel.

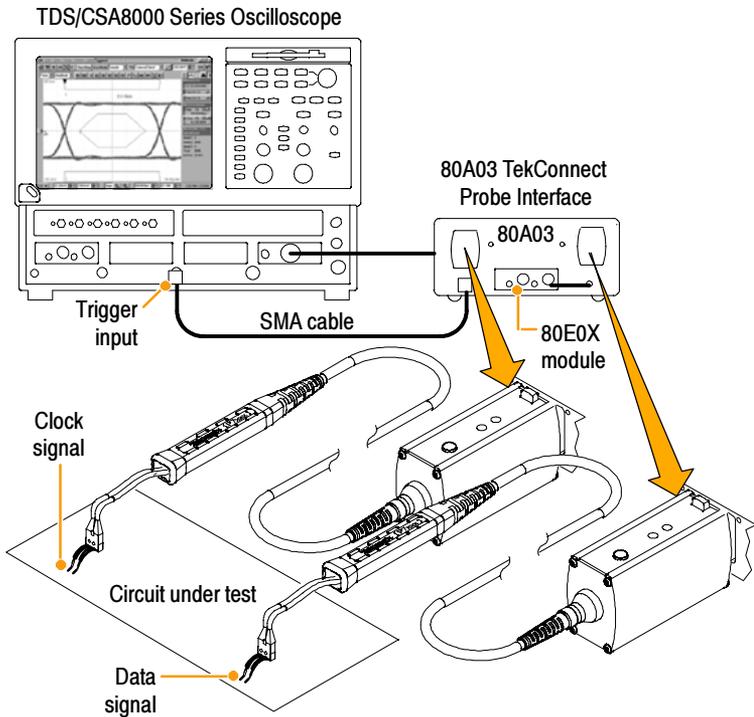


Figure 3-8: TDS8000 sampling oscilloscope

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 3-9.

As shown in Figure 3-9, 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.

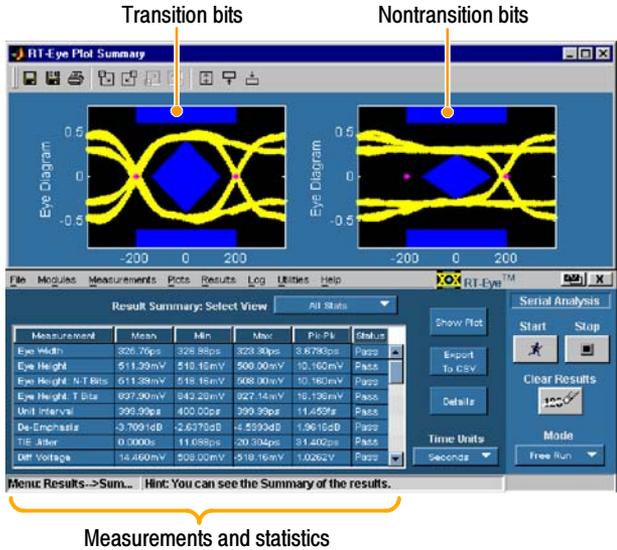


Figure 3-9: RT-Eye application