P7380A 8 GHz
P7360A 6 GHz
P7340A 4 GHz

Tektronix

Z-Active Differential Probe Family 071-1705-02

User manual

P7313 12.5 GHz

www.tektronix.com

Tektronix products are protected by registered and pending United States and foreign patents. The material in this document supersedes that of other previously published materials. Please also note that the specifications and price of this product are subject to change without notice.

TEKTRONIX, TEK, and Z-Active are registered trademarks of Tektronix,

Inc. Velcro is a registered trademark of Velcro Industries B.V.

Tip-Clip is a trademark of Tektronix, Inc.

Tektronix Contact

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

Product information, distributors, service, and technical support:■
In North America: Call 1-800-833-9200.
■ In other parts of the world, visit www.tektronix.com to find your local distributor.
This is a warranty regarding the probe.

Guarantee 2

We warrant this product to be free from defects in materials and workmanship for a period of one year from the date of shipment. If the Product proves to be defective during this warranty period, we will, at our option, either repair the defective Product without charge for parts and labor; We will provide you with a replacement for the defective product. Parts, modules and replacement products used by us under warranty may be new or refurbished to accommodate new performance. We retain all replaced parts, modules, and products.

In order to receive service under this warranty, you must notify us of any defects prior to the expiration of this warranty period and take appropriate steps to perform service. You must package the defective product and send it, shipping prepaid, to our designated service center. If this product is returned to you, we will pay the return shipping costs if the product is shipped to a location within the country where the applicable service center is located. However, you will be responsible for all shipping, duties, taxes, and other charges for products returned to other locations. This warranty does not cover any defects, failures or damage

caused by improper use or improper or inadequate maintenance and handling. Regarding the following matters, our company will
We are not obligated to provide services based on the certificate. a) Repair for damage resulting from attempts to install, repair or service the Product by anyone other than our personnel. b) Repairs for damage resulting from improper use or connection to incompatible equipment. c) Repairs for damage or malfunction caused by the use of supplies not manufactured by us. d) Servicing of the Product if the Product has been modified or integrated with other products and the effect of the modification or integration increases the time or difficulty of servicing the Product.

This warranty is provided by us to you with respect to the product and in lieu of any other warranties, express or implied. WE AND VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Our responsibility to repair or replace defective products is your sole and exclusive remedy for any breach of this warranty. In no event shall Company or its vendors be liable for any indirect, special, incidental, or consequential damages, whether or not the Company and its vendors have been advised in advance of the possibility of such damages.
This is the warranty for probe accessories.

Guarantee 14

Tektronix warrants this product to be free from defects in materials and workmanship for a period of three months from the date of purchase from an authorized Tektronix distributor. If the Product proves to be defective during the Warranty Period, we will, at our option, repair or replace the defective Product without charge for parts and labor. We will provide you with a replacement item in exchange. Batteries are not covered by warranty.
Masu. Parts, modules and replacement products used by us under warranty may be new or refurbished to accommodate new performance. All replaced parts, modules, and products become our property.

In order for you to receive service under this warranty, you must notify us of the defect and make appropriate arrangements for service to be performed prior to the expiration of the warranty period. You are responsible for packaging and shipping the defective product, along with a copy of your proof of purchase, shipping charges prepaid, to our designated service center. We will pay return shipping costs when returning the product to you if the return destination is in the same country as our service center. For products returned to locations other than those listed above, you are responsible for paying all shipping charges, duties, taxes, and other charges.

This warranty does not cover any defects, failures, or damage caused by abuse, or by unauthorized or improper maintenance and handling. We are not obligated to provide services under this warranty with respect to the following: a) repair of damage resulting from attempts to install, repair or service the Product by anyone

other than our personnel; b) Repairs for damage resulting from improper use or connection to incompatible equipment. c) Repairs for damage or malfunction caused by the use of supplies not manufactured by us. d) Servicing of the Product if the Product has been modified or integrated with other products and the effect of such modification or integration increases the time or difficulty of servicing the Product.

This warranty is provided by us to you with respect to the product and in lieu of any other warranties, express or implied. COMPANY AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. OUR RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS YOUR SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THIS WARRANTY. Company and its vendors shall not be liable for any indirect, special, incidental, or consequential damages, whether or not Company or its vendors have been advised of the possibility of such damages. We are not responsible for any damages.

table of contents

table of contents

table of contents

surface

figure

For safe use

To avoid personal injury and damage to this product or the products connected to it, please read the following safety precautions carefully.

To use this product safely, please follow the instructions provided with this product.

Only qualified service personnel should perform maintenance procedures.

To avoid fire and personal injury

Please connect and disconnect correctly.。Connect the probe output to the measurement equipment before connecting the probe to the circuit under test. Disconnect the probe input from the circuit under test before disconnecting the probe from the measurement equipment.

Follow all terminal ratings。To avoid the risk of fire or electric shock, follow all ratings and markings on this product. Please refer to the product manual for rating details before connecting power to this product.

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

Do not operate with the cover removed.。Do not operate this product with any covers or panels removed.

Avoid exposing circuits。Do not touch exposed ground surfaces or components when the power is on.

Do not operate if a problem is suspected.。If you suspect damage to this product, have it inspected by qualified service personnel.

Do not operate in humid areas.。

Do not operate in explosive environments。

Keep product surfaces clean and dry。

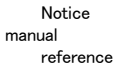
Symbols and terminology

Terms in this manual。This manual uses the following terms:

warn : A WARNING alerts you to conditions or actions that could result in personal injury or death.

Notice : A CAUTION alerts you to conditions or actions that could damage this product or other property.

Symbols related to this product。This product uses the following symbols:



Preface

This manual describes the installation and operation of the P7313, P7380A, P7360A, and P7340A Z-Active differential probes. It also explains basic probe operation and concepts. All manuals listed below are included on the documentation CD that comes with your product. These manuals are also available from the Tektronix home page. The URL for this home page is listed under "Contact Tektronix" on the Copyright Information page.

Conventions used in this manual

This manual uses the following icons to indicate the order of steps.

1

manual

Item to refer to	Manual to use
Installation, Operation (Overview)	For general information on how to use the probe, refer to the user manual. Please refer to it.
Detailed Operation	User Manual is accompanied by Technical Reference Manual (Manual (included on the CD-ROM).
Performance Verification and Specifications	Use the Technical Reference Manual.
See "Example Usage" in the application user manual.	
Tip- Additional orders for Clip assemblies and Tip- Clip performance Tip- When ordering additional Clip accessories and Tip- To check Clip performance, please use the	Probe Accessories Additional Order Sheet (included on the Manual CD-ROM). This sheet is located in the probe's soft case pocket.

About environmental conditions

This section describes the environmental impact of the product.

How to dispose of the product

Observe the following guidelines when recycling equipment or components:

Equipment Recycling Natural resources were used in the production of this equipment. This product contains substances that may be hazardous to the environment or to humans and must be disposed of properly at end of life. To prevent the release of hazardous substances and reduce the use of natural resources, please recycle this product properly so that most of the material can be reused or recycled.

The symbol shown to the left indicates that this product is
Standards for the disposal of electrical and electronic equipment
Complies with the requirements of 2002/96/EC (WEEE)
It represents and. For information on how to recycle, please see
Tektronix home page (www.tektronix.com)
Please refer to the Support/Service section.
stomach.

Regulations regarding hazardous substances

This product is classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. This product contains lead, cadmium, mercury, and hexavalent chromium.

Introduction

Main features

Z-Active differential probe family
When used, it can be used in tight spaces.
Even in roving, the high frequency band
maintained and improved connectivity at low loads
I will. The main features are as follows:
vinegar.

④ Frequency band >12.5 GHz (typical) P7313
>8.0 GHz (typical value) P7380A
>6.0 GHz (typical value) P7360A
>4.0 GHz (typical value) P7340A

④ Rise time 10 to 90% <40 ps (guaranteed) P7313
<55 ps (guaranteed value) P7380A
<70 ps (guaranteed value) P7360A
<100 ps (guaranteed value) P7340A

④ Differential ± 1 V (5X): P7380A, P7360A, P7340A Signal ± 2.5 V (25X): P7380A, P7360A, P7340A Range ± 0.625 V (5X): P7313
(DC coupling) ± 2.0 V (5X): P7313 type

④ input resistance
④ 100 KOh (differential)
④ 50 KOh (Above the ground)
④ AC Load (see Technical Reference)

④ Interchangeable probe tip-Clip assembly
④ Soldering and square pin features
④ Handheld adapter (includes space-adjustable Tip-Clip assembly)
④ Fixture with adapter
④ Compact probe head for easy SMD probing④ TekConnect Interface

Handling the probe

This probe is a precision high frequency device. Care must be taken when using and storing the probe. Probes and cables can be damaged if not handled carefully. Always handle the probe using the compensation box and probe head, and avoid physical deformations by twisting, over-bending, or pulling the probe cable. Please do not add more than necessary. Visible dents in the cable can cause signal aberrations.
increase. Be careful not to drop the probe or subject it to physical shock. Probe may be damaged.

Notice : To prevent damage to the probe, always wear an antistatic wrist strap connected to an antistatic work surface when handling the probe. It's big. The probe input contains electronic components that can be damaged by contact with high voltages, including electrostatic discharge.

cleaning

The probe must be protected from harsh climatic conditions. This probe is not waterproof.

Notice : Avoid contact with sprays, liquids, and solvents. Probe damage may result. Avoid getting the inside of the probe moist while cleaning the outside.

Do not use chemical cleaning agents. There is a risk of damaging the probe. Do not use chemicals containing benzine, benzene, toluene, xylene, acetone, or similar solvents.

Clean the external surfaces of the probe with a dry, soft cloth or soft bristle brush. If the stain persists, use a soft cloth or cotton swab moistened with 75% isopropyl alcohol and wipe with deionized water. Cotton swabs are useful for cleaning tight spaces on the probe.。 Moisten the cotton swab or cloth with sufficient solution before use. Do not use abrasive materials on any part of the probe.

Basic operations

Connecting to host equipment

Notice : Prevent probe damage from ESD.
To prevent static electricity, always use an antistatic wrist strap.
Wear the probe (included with your probe) and
Use anti-static precautions when handling the
Please work at the workbench.

The TekConnect interface features a spring-loaded latch that provides audible and tactile confirmation of a secure connection to the host device.

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

1. Plug the probe into the TekConnect receptacle on the host device. When the probe is inserted into the receptacle, it will fully engage.

Figure 1: Connect TekConnect to your device

When the probe is connected, the host equipment reads information from the probe to identify the device and turns on the appropriate power supply. The host equipment preamp input remains grounded until a valid TekConnect device is detected, thus protecting it from ESD.

Note: See page 27 for DC typical characteristics. For detailed electrical performance information, please refer to the Technical Reference Manual (included on the CD).

Probe attenuation selection (scaling)

Upon power-up, the indicator LED lights briefly to indicate that attenuation is selected.

2. Push the Dynamic Range Select button and select between 5X and 25X probe attenuation settings. Note that changing the attenuation setting changes the dynamic range. See Figure 2.

Figure 2: Probe (front)

Tip- Connecting the Clip assembly

Tip-For instructions on how to connect the Clip assembly to the probe, see Tip on page 7.-Clip Assembly", "Connecting to the Circuit Board" on page 14, and "Accessories" section on page 34.

Function check

After installing the probe on the oscilloscope, perform a functional check using the probe compensation connection or the fast edge connection on the oscilloscope's front panel. (varies by model).

For more information about accessories, see the "Accessories" section on page 29.

Figure 3: Equipment used for function check

Test procedure

The following shows how to connect the probe to a standard compensation connector.

1. Connect the probe to any channel on the oscilloscope.
2. Set the oscilloscope to display the probe channels.
3. Set probe gain to 25X.
4. BNC (M)- Mini grabber (SMA (M)- Connect the BNC (F) (with adapter) to the probe compensation connector on the oscilloscope. See Figure 4.

Figure 4: Connecting probe for function check

Tip- Installing the Clip assembly

A tip with a long cord and small resistor is available from the accessory kit included with the probe.-Remove the Clip assembly. Tip-A list of Clip assemblies (illustrated) can be found in the ``Accessories'' section on page 34.

Notice : Tip-To prevent damage to the Clip, use the Tip-Please handle the Clip assembly with care.

5. Long cord, tip with small resistor-Attach the Clip assembly to the probe tip.

   a. Tip-Grasp the sides of the Clip assembly and slide it behind the probe tip. Tip-The assembly is properly seated when the Clip assembly clicks over the stepped section of the probe tip. See Figure 5.

   b. Tip-Make sure the Clip housing fits snugly over the probe tip contacts.

Figure 5: Tip- Installing the Clip assembly

Basic operations

6. BNC- Mini-grabber with long cord on probe, tip with small resistor-Connect to the Clip assembly.

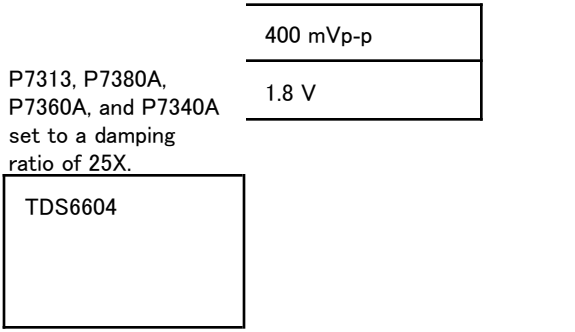
④ Connect the + input of the probe to the red (+) terminal of the BNC.

④ Connect the probe input to the adapter or ground.

Hint:The PPM203B Articulating Arm (used with the Probe Arm Adapter) and the PPM100 Positioner Arm are not required, but may be used to support the probe. Tips on using this arm-The force applied to the Clip assembly is reduced, allowing for more stable waveform measurements. See the Accessories section on page 41 of this manual.

7. Adjust the oscilloscope to display a stable waveform (we recommend using the autoset feature). Once a stable square wave appears, check the amplitude.

The amplitude and common-mode voltage of the probe correction signal vary depending on the oscilloscope model. Make sure that the oscilloscope signal amplitude and common mode voltage are close to the values in the following table.



8. (−) Using a mini−grabber, short the leads of both resistors and connect them to ground potential. See Figure 6.

Figure 6: Shorting resistor leads

Set the probe offset to 0.0V. The oscilloscope display is referenced to ground.

9. Set the oscilloscope V/div to 2 V.

10. Set the probe offset between +4 V and −3 V. The displayed waveform varies between approximately +3 V and −4 V.

11. Disconnect the shorted (−) mini grabber.

Probe calibration

After performing a functional check of the probe, run the probe calibration routine. Calibrating the probe and optimizing the gain and offset of the probe and oscilloscope combination can minimize measurement errors. We recommend repeating the probe calibration for each channel you use. Separate calibration constants are saved for each probe on each channel.

If you remove the probe after calibration, a small offset may appear on the screen. This small offset occurs when the probe input is left open. In a typical measurement configuration, the probe offset is calibrated with respect to a low source impedance. To check offset calibration, short the probe tips together. The probe calibration has been successfully completed when the offset returns to zero.

Notice:To prevent ESD from damaging the probe, always wear an antistatic wrist strap (provided with your probe) when handling the

probe. work on an anti-static work surface.

Page 5 Figure 3″Function check″You can calibrate your probe using the equipment shown below.

Test procedure

The calibration status of the instrument's signal path correction test must pass for the probe calibration routine you run.

1. Select Instrument Calibration from the Utilities menu.
2. In the Calibration box, make sure the Status field says Pass. If not, remove all probes and signal sources from the oscilloscope and run the signal path correction routine.

If the signal path correction test status is Pass, run the next probe calibration routine.

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

Note : Connect the + probe input to the positive mini-grabber and − connect the probe input to the ground mini-grabber.

4. BNC- Connect the minigrabber to the oscilloscope's probe calibration connector as shown in Figure 7 on page 11.

If your oscilloscope does not have a probe calibration connector available, you may be able to use a probe compensation connector during the probe calibration procedure. For instructions specific to probe calibration, refer to your oscilloscope manual or online help.

Figure 7: Connecting the probe for probe calibration (for TDS6000B/C)

5. In the menu bar, select Vertical and select Probe Cal.

6. When the Probe Cal dialog box appears, select Clear Probe Cal, then Calibrate Probe. Select.

A probe calibration routine runs to optimize the probe to the oscilloscope for both probe attenuation settings.

7. If the probe calibration is successfully completed, the screen will display Pass.

Tip- Clip ejector

Tip-The Clip ejector is shipped attached to the probe tip and-Used to remove the Clip assembly.

Notice : Tip-To prevent the Clip housing from wearing out, use the Tip-Tip from the probe tip using the Clip ejector-We recommend removing the Clip assembly.

Tip- Clip assembly removal

Follow these steps and Tip-Tip using the Clip ejector-Remove the Clip assembly.

1. Tip-Clip Grasp the sides of the ejector and insert the Tip in front

of the probe tip.-Slide the Clip ejector. Tip-Clip You will hear a click when the ejector passes over the stepped part of the probe tip.-Clip assembly will come loose. See Figure 8.

2. Tip-Remove the Clip assembly.

Figure 8: Tip- Clip assembly removal

Tip- Clip ejector installation

Tip-If you find that the Clip ejector is disconnected from the probe tip, perform the following steps to remove the Tip-Reinstall the Clip ejector.

Tip on the probe tip-When installing the Clip ejector, use the Magni-We recommend using a Spec magnifier.

1. If necessary, remove all tips from the probe tip.-Remove the Clip assembly.
2. Turn the probe tip over so you can see the back of the probe tip. See Figure 9.
3. Tip with the diagonal side facing the probe tip.-Align the Clip ejector.
4. Insert the Tip into the slot on the back of the probe tip.-Insert the Clip ejector. Tip-Clip ejectors are easy to insert once aligned correctly.

Figure 9: Tip- Clip ejector installation

Connection to circuit board

When connecting to a circuit, you can use the probe in three modes:

④ One or more tips for making measurements in tight spaces-Solder the Clip assembly to the circuit board. See Figure 10.

④ If probe space is not a major constraint, use the handheld adapter with the variable spacing adapter.

④ Use fixed adapter for hands-free probing.

④ Probe a pair of square pins using the Square Pin Tip-Clip assembly.

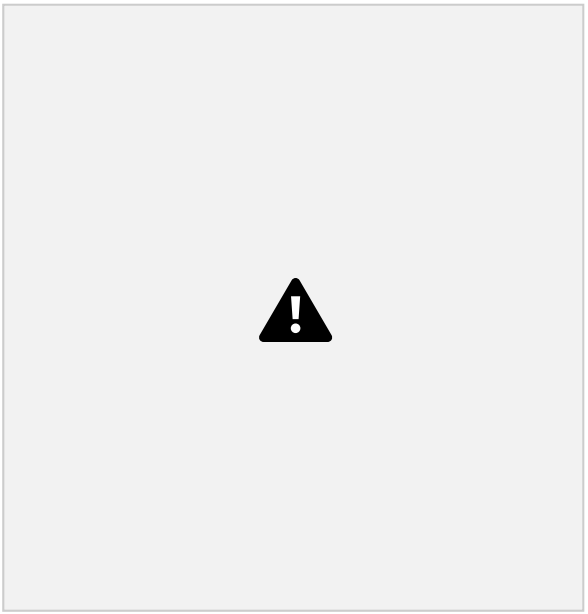


Figure 10: Soldered Tip- Clip assembly

Soldered Tip-Clip assembly

Follow these steps to-Solder the Clip assembly to the circuit board. However, HBW Tip-See page 18 for the Clip assembly.

Note:Select Tip-Clip assembly and Tip-For information on Clip performance, please refer to the ``Accessories'' section on page 33.

Identify possible locations for Tip-Clips near the circuit under test and select recommended Tips.-Solder the circuit with lead lengths with clip damping resistors (see step 4).

1. Tip-Attach the Clip tape to the circuit board and-Press the Clip assembly onto the tape. See Figure 11. Wait a moment for the adhesive to harden.

Figure 11: Connection to circuit board

Connect the probe to other oscilloscopes that have a TekConnect interface.

2. Tip-Attach the probe to the Clip assembly.

Notice : Velcro retention straps and dots and tips are provided to prevent accidental movement of the probe or soldered leads and damage the circuit board or circuit board connections.-Tip using Clip tape-We recommend securing the Clip assembly and probe to the circuit board.

3. Attach the Velcro securing strap and dot to the probe and circuit board.

Notice :To prevent damage to the Tip-Clip or the circuit under test, be careful not to apply excessive heat with the soldering iron. Use a low-power, temperature-controlled soldering iron and an appropriately sized soldering iron tip.

4. Tip-Solder the leads of the clip to the test points on the circuit board. See "Tips".

tips

④ To ensure optimal performance and signal integrity, connect the DUT (device under test) and Tip if possible.-Keep the lead length between Clip resistors less than 0.050 inch and align the leads to the same length.

④ The loading of the Tip-Clip is relatively low, around 0,1 pF, so depending on the sensitivity of the circuit to loading, it is possible to have multiple Tip-Clip assemblies in the circuit while making measurements. It may be possible to leave it on. of the circuit to be tested
Tip-Clip loading is lowest when the probe is attached to the Tip-Clip.

TekConnect probes can be connected to some non-TekConnect equipment using special probe adapters. The 80A03 TekConnect probe interface is compatible with all TekConnect probes connected to TDS8X00 and CSA8X00 series oscilloscopes. The RTPA2A TekConnect probe interface is compatible with all TekConnect probes connected to RTSA real-time spectrum analyzers. See page 40 for alternative configurations. .

Figure 12: TDS/CSA8X00 Series Sampling oscilloscope

Note : For proper operation, you must use 80A03 firmware version 2.0 or later. The firmware version label is located on the rear panel of the 80A03 instrument.

Soldered HBW Tip- Clip assembly (P7313 only)

HBW Soldering Tip-Clip requires full bandwidth measurements using the P7313 probe. HBW Tip-The Clip is designed with a damping resistor attached to the cord circuit and a circuit attachment wire soldered to the end of the damping resistor (see Figure 13).).

Figure 13: HBW Tip-Clip assembly wire lead length

Attachment wires can be bent symmetrically to vary the spacing of interconnections. HBW Tip on the circuit to be tested-When soldering the Clip, be careful not to remove the solder from the mounting wire or damping resistor.

HBW Tip-When soldering the Clip, please observe the following precautions:

④ Do not deform the mounting wire. To prevent deformation of the mounting wire, insert the Tip as shown in Figure 11 on page 15.-Using Clip tape, HBW Tip-Attach the Clip to the circuit

board.

④ To replace the wire on the HBW Tip-Clip damping resistor, use the high temperature solder provided in the wire replacement kit. Damping resistors have a relatively large thermal mass, and when hot solder is used to attach the wire to the damping resistor, the attachment wire is removed from the damping resistor. You can reduce the risk of the solder accidentally coming off. However, HBW Tip-When attaching the Clip wire to the circuit under test, be careful not to apply excessive heat with the soldering iron.

④ HBW Tip on the circuit to be tested-Use cold solder to attach the Clip wire.

④ Use a low-power, temperature-controlled soldering iron and a small soldering iron tip. Set the temperature of the soldering iron as low as possible to ensure reliable soldering.

④ Pre-trim circuits interconnected to the circuit board if possible to minimize installation dwell time. Carefully trimmed tips-Clip wire also reduces the soldering iron dwell time required to attach the wire to the circuit.

handheld adapter

Before probing with a handheld adapter, follow these steps to install the handheld adapter housing and variable spacing tip.-Clip assembly must be attached to the probe.

1. Variable Spacing Tip-Attach the Clip assembly to the probe tip

(see Figure 14 on page 20). Tip-The Clip does not need to distinguish mechanical mounting polarity, but the measurement polarity of the probe can be adjusted using the variable spacing Tip.-Affected by the polarity of the probe input connected to the Clip.

Figure 14: Variable Spacing Tip- Clip assembly

Note : Variable spacing Tip-The Clip assembly is a small precision part, so it must be handled with care if it is to be used for a long period of time. When probing or handling, use the probe tip.-Be careful about the force you apply to the Clip assembly.

Variable spacing Tip-To smooth the lever arm movement of the Clip assembly, rotate the lever arm three to four times.

Variable Spacing Tip-For Clip assembly specifications, refer to the Technical Reference on the Manual CD or the Tektronix home page.

Variable spacing Tip-Store the Clip assembly in the plastic accessory box.

2. If necessary, separate the handheld adapter housing (see Figure 16 on page 22 for latch location) and install the probe in the lower housing. See Figure 15.
   a. Make sure the plastic pins on the lower housing engage the slots on the probe (on either side). When properly secured, the probe will not move within the lower housing.

b. Fit the wire around the post in the lower housing. To match polarity, do not cross wires.

c. Secure the probe tip to the metal pin in the nose of the lower housing.

Figure 15: Handheld Adapter Assembly

3. Hold the lower housing and probe in place and fit the nose of the upper housing into the nose of the lower housing.

4. Align the two housings.

5. Slide the upper housing latch forward to secure the housing in place. See Figure 16.

Figure 16: Securing the Handheld Adapter

Note : When the handheld adapter is properly assembled, an elastomeric pad on the nose of the handheld adapter (see Figure 15) applies pressure to the probe tip. The pressure will be evenly distributed as long as it is not too large. Even pressure distribution across the probe tip makes it easier to connect two interconnect points for differential measurements.

Removing the Handheld Adapter Housing

Notice : To avoid damaging the handheld adapter when removing it from the probe, first slide the latch on the upper housing and then separate the housing. Sai.

To remove the handheld adapter housing from the probe:

1. Slide the latch to the unlocked position.
2. Slide the upper housing behind the probe tip and remove the upper half of the probe housing.

Store the handheld adapter in the probe case provided with the probe.

Square Pin Tip-Clip Assembly

Use the square pin Tip-Clip assembly when probing 0.025-inch diameter square pins with 0.1-inch center spacing. Square pins are less than ideal as a transmission path for high-speed electrical signals and are not recommended for signals faster than 100 ps or 3 GHz.

Figure 17: Square Pin Tip-Clip Assembly

fixed probing

Fixed probing allows you to make hands-free connections to the circuit under test. Use the probe arm adapter to attach the probe body or handheld adapter to the PPM203B joint or PPM100 probe

fixture. Figure 18 shows the fixed probe (PPM203B and probe arm adapter).

Figure 18: Fixed probe

To make solder-free and hands-free connections to the circuit under test, connect fixed probing to handheld adapters and variable spacing tips.-Used with Clip assembly. Fixed probing can also be used to reduce deformation at the probe using soldered probing connections.

Reinstalling the Flex Strip

Flex strip tips-If it is separated from the Clip housing, follow these steps to reinstall the flex strip.

1. Two elastomeric support buttons-Make sure it is placed in the Clip housing. Place the flex strip and Tip-Clip housing as shown

in Figure 19, 1.

2. Reinstall the flex strip as shown in Figure 18, 2. Flex strip tips-Make sure it is evenly seated in the Clip housing.

Figure 19: Reinstalling the flex strip

Wire replacement (P7313 only)

HBW Tip-If you need to resolder the Clip's leads, please refer to the wire replacement kit instructions. This kit is included in the accessory kit box that comes with your probe.

It's in. Wire replacement kit includes HBW Tip-Contains the recommended high temperature solder to use when replacing the

Clip's wire leads. The kit also includes replacement 8-mil and 4-mil wire for use in small circuit board traces and vias.

Representative characteristics

The Typical Characteristics (Tables 1 and 2) represent typical but not guaranteed performance.

Table 1: Representative environmental characteristics

Characteristic	Description
Temperature	During operation: 0 ~ 40 ℃ When not operating: −55 ~ 75 ℃ 11
Humidity (No condensation)	Operating: 0 to 90%RH (at temperatures below 30° C) 0 to 75%RH (at temperatures between 30 and 40° C) Non-operating: 0 to 90%RH (at temperatures below 30° C) 0 to 75%RH (at temperatures between 30 and 75° C)
Operating altitude	3,000 m (approximately 10,000 ft) Non-operating: 15,000 m (approximately 50,000 ft)
Pollution level	2, but for indoor use only

[1] See the following warning.

WARNING: If the probe has been stored in an environment above 55° C, allow sufficient time for the probe to cool before handling to prevent burns from high ambient temperatures.

Table 2: Typical electrical

characteristics

Characteristic	Description
Differential signal range (DC coupling)	P7360A, Type P7340A ± 1 V (5X) ± 2.5 V (25X) Model P7313 ± 0.625 V (5X) ± 2.0 V (25X)
operating voltage window	P7380A, P7360A, P7340A −3.0 to +5.0 V (5X and 25X) Model P7313 −3.0 to +4.0 V (5X and 25X)
Differential offset range	−3.0 to +4.0 V
maximum non-destructive input voltage [1]	Type P7380A, Type P7360A, Type P7340A ± 15 V between each input or between the probe input and ground (DC + peak AC)

[1] See note below

ATTENTION: To avoid damaging the probe, do not allow peak voltages on the differential inputs to exceed 15V pk with respect to ground.

accessories

Parts whose part numbers are listed can be ordered separately, but in most cases the quantities will be different from those shipped with the unit.

Tip-For information on Clip performance and usage, see page 33 of this section. Tip-For Clip details (dimensions and waveforms), refer to your probe's manual CD.- Please refer to the Specifications section of the Technical Reference Manual included in the ROM.

standard accessories

The following standard accessories are shipped with the probes listed below. The number in parentheses in the Additional Orders column indicates the quantity of the additional order.

◦

Table 3: Standard accessories

accessories
will be included in the package probe

P7313 1 P7380A 1 P7360A 1 P7340A 1	P7313 1 P7380A 1 P7360A 1 P7340A 1	carrying case has multiple compartments for storing probes and accessories. 016- 1952- XX (1)
		BNC (M) - Mini grabber adapter. This adapter is used to connect the probe to an oscilloscope for functional testing.
	additional order (Our part number)	
	Nylon carrying case with pouch and divider. This	013- 0342- XX (1)

accessories

Table 3: Standard accessories (continued)

accessories		
will be included in the package probe	P7313 1 P7380A 1 P7360A 1 P7340A 1	the Clip Tip- Clip A hands-free magnifying glass that simplifies the process of installing ejectors. If you don't need it for your work, you can flip the magnifying glass lens upwards. 378- 0486- XX (1)
P7313 1 P7380A 1 P7360A 1 P7340A 1	Option D1	Antistatic wrist strap. Always wear an antistatic wrist strap and work on an antistatic work surface when using the probe.
P7313 1 P7380A 1 P7360A 1 P7340A 1	additional order (Our part number)	006- 3415- XX (1)
	Machines- Spec magnifying glass. If you wear it as is or over glasses, it will cause a tip to the circuit board.- Attaching the lead wire of	Calibration certificate. All probes come with a traceable certificate of calibration.

Data calibration report.	The Data Calibration Report lists the manufacturing test results for your probe at	the time of shipment and is included with every probe.

accessories

Table 3: Standard accessories (continued)

accessories		
	P7313 1 P7380A 1 P7360A 1 P7340A 1	(Order by language)
will be included in the package probe		P7313 1 pair P7380A 1 pair P7360A 1 pair P7340A 1 pair

additional order (Our part number) Accessories additional order sheet and tips- Clip data sheet. Accessories Use the additional ordering sheet as a quick guide when ordering accessories for your probe. The additional order sheet includes each tip.- An illustration of the Clip assembly is included. This sheet is located in	the probe case. 001- 1389- XX (1) User manual and CD-ROM. The user manual provides instructions for operating and maintaining the P7313, P7380A, P7360A, and P7340A differential probes. Manual CD- The ROM contains an introductory guide for basic probe and measurement documentation, as well as	probe manuals (user manuals and probe–specific technical references) in PDF format. 020- 2640- XX (English) 020- 2648- XX (Japanese) 020- 2649- XX (Simplified Chinese) HHA Housing. One pair of handheld adapter housings. 015–0717–XX (1 pair)

accessories

Table 3: Standard accessories (continued)

accessories
will be included in the package probe

P7313 1 kit P7380A 1 kit P7360A 1 kit P7340A 1 kit	Accessory kit. This kit includes a fixation kit, color band kit, and adhesive tip.-Clip Tape, Key Label, Tip-Clip ejector kit and various tips-Clip Contains assembly. The key label is stored inside the lid of the accessory kit. To open the second lid, flip the box over. A wire replacement kit is included in the P7313 accessory kit only.	020- 2636- XX P7313 (10 kits) 020- 2557- XX P7380A (10 kits) 020–2690–XX P7360A and P7340A (kit of 10)

Note: The standard accessories listed below are included in the accessory kit unless otherwise noted.

P7313 1 kit P7380A 1 kit P7360A 1 kit P7340A 1 kit	Fixing kit. This kit includes two Velcro retention straps and ten Velcro dots, which are used to stabilize the probe when making measurements.	016- 1953- XX (1 kit)

Table 3: Standard accessories (continued)

accessories
will be included in the package probe
P7313 1 kit P7380A 1 kit P7360A 1 kit P7340A 1 kit

P7313 1 Kit
P7380A –
P7360A –
P7340A –

additional order (Our part number)

Color band kit. This kit contains 2 pairs of 5 colors. When using multiple probes, you can use this band to quickly match probes to the channels to which they connect. To use a marker band, attach the band to the molded strain relief on the probe cable and the indentation at each end of the probe compensation box. Use a color band that matches the color of the channel to which you connect the probe.

016- 1948- XX (1 kit)

Wire replacement kit. (P7313 Accessory Kit only). Includes 3 bobbins, solder, 4 mil wire, and 8 mil wire. This kit includes HBW Tip- Used to replace the lead wire of the Clip assembly.

020- 2644- XX (1 kit)

Table 3: Standard accessories (continued)

accessories		
will be included in the package probe	additional order (Our part number)	
P7313 3	P7313 3	HBW TipClip assembly provides maximum bandwidth and optimal probe loading. Wire change kits allow you to solder 8 mil or 4 mil wire into small vias. 020- 2639- XX (Kit of 10) 020- 2657- XX (5 kits)
P7380A –	P7380A –	8 Mil Wire Tip of HBW Right Angle Cord- Clip assembly Bandwidth: >12 GHz (P7313) T_R: 10/90 <42 ps, 20/80 <27 ps Load: Z_{MIN} >150 Oh ～ 10 GHz
P7360A –	P7360A –	You can now change the connection direction. Wire replacement kits allow you to solder 8 mil or 4 mil wire into small vias. 020- 2638- XX (Kit of 10) 020- 2656- XX (5 kits)
P7340A –	P7340A –	HBW Straight Cord 8 Mil Wire Tip- Clip assembly Bandwidth: >12.5 GHz (P7313) T_R: 10/90 <40 ps, 20/80 <25 ps Load: Z_{MIN} >200 Oh ~10 GHz

Table 3: Standard accessories (continued)

accessories will be included in the package probe	additional order (Our part number)	Best signal fidelity throughout. Small resistors are ideal when connecting to circuits with small vias and fine pitches.
P7313 3 P7380A 3 P7360A 2 P7340A 2	Tip with short cord and small resistor- Clip assembly. Bandwidth: >8.0 GHz (P7313 and P7380A) T_R : 10/90 <55 ps (guaranteed value), 20/80<35 ps Load: Z_{MIN} 290 Oh ～ 8 GHz Bandwidth: >6.0 GHz (P7360A) T_R : 10/90 <70 ps、20/80 <50 ps load : Z_{MIN} 290 Ω ～ 6 GHz Bandwidth: >4.0 GHz (P7340A) T_R : 10/90 <100 ps、20/80 <75 ps load : Z_{MIN} 290 Ω ～ 4 GHz	020- 2600- XX (10 kits)

accessories

Table 3: Standard accessories (continued)

accessories will be included in the package probe		additional order (Our part number)
	P7313 3	Medium length cord, tip with small resistor- Clip assembly. Bandwidth: >7.0 GHz (P7313 and P7380A) T_R: 10/90 <55 ps, 20/80 <35 ps Load: Z_{MIN} 290 Oh ～ 8 GHz
	P7380A 3	
	P7360A 2	Bandwidth: >5.0 GHz (P7360A and P7340A) T_R : 10/90 <70 ps, 20/80 <50 ps Load: ZMIN 290 Ω ~ 6 GHz
	P7340A 2	Bandwidth: >4.0 GHz (P7340A) T_R : 10/90 <100

ps, 20/80 <75 ps Load: ZMIN 360 Ω ~ 4 GHz Suitable for installation in	small devices or vias on circuit boards, providing ease of use and best performance in equal	measure. 020- 2602- XX (10 kits)

Table 3: Standard accessories (continued)

accessories
will be included in the package probe

P7313 3 P7380A 3 P7360A 2 P7340A 2	P7313 – P7380A 3 P7360A – P7340A –	additional order (Our part number) Long cord, tip with small resistor- Clip assembly. Bandwidth: >6.0 GHz (P7313 and P7380A) T_R: 10/90 <130 ps, 20/80 <40 ps Load: Differential Z_{MIN} 360 Oh ～ 8 GHz Bandwidth: >4.0 GHz (P7360A) T_R : 10/90 <100 ps、20/80 <75 ps load : Z_{MIN} 360 Ω ～ 6 GHz Bandwidth: >4.0 GHz (P7340A) T_R : 10/90 <100 ps、20/80 <75 ps load : Z_{MIN} 360 Ω ～ 4 GHz It is an assembly with good step response and wide reach. Useful for connecting to circuits with small vias and fine pitches in hard-to-reach locations. DIMM module You can adjust the size to fit the width between joules. Not recommended for signals faster than 4 GHz. 020- 2604- XX (10 kits) 1/8 W Tip with short cord, large resistor- Clip assembly. Bandwidth: >8.0 GHz (P7380A) T_R: 10/90 <55 ps, 20/80 <35 ps Load: Z_{MIN} 290 Oh ～ 8 GHz Good signal fidelity for high frequencies. Ideal for connecting to large components. 020- 2601- XX (10 kits)

accessories

Table 3: Standard accessories (continued)

accessories	will be included in the package probe

P7313 – P7380A 3 P7360A 2 P7340A 2	additional order (Our part number) Medium length cord, 1/8 W tip with large resistor-Clip assembly. Bandwidth: >8.0 GHz (P7380A) T_R: 10/90 <55 ps、20/80 <35 ps Load : Z_{MIN} 260 Oh ～ 8 GHz Bandwidth: >5.0 GHz (P7360A) T_R : 10/90 <70 ps、20/80 <50 ps load : Z_{MIN} 260 Ω ～ 6 GHz Bandwidth: >4.0 GHz (P7340A) T_R : 10/90 <100 ps、20/80 <75 ps load : Z_{MIN} 260 Ω ～ 4 GHz Suitable for providing ease of use and best performance in equal measure when installed in larger devices. 020- 2603- XX (10 kits) 1/8 W Tip with long cord and large resistor- Clip assembly.	Bandwidth: >7.0 GHz (P7380A) T_R: 10/90 <75 ps、20/80 <40 ps Load : Z_{MIN} 300 Oh ～ 8 GHz It is an assembly with good step response and wide reach. Useful for connecting circuits of large mechanisms in hard-to-reach locations. You can adjust the size to fit the width between DIMM modules. Not recommended for signals faster than 4 GHz. 020- 2605- XX (10 kits)
P7313 – P7380A 3 P7360A – P7340A –		

Table 3: Standard accessories (continued)

accessories	will be included in the package probe
	P7313 1 P7380A 1 P7360A 1 P7340A 1

	P7313 3 of P7380A 3 of P7360A 3 of P7340A 3 of

square pins that are spaced 0.1 inch on center. Square pins are not ideal for transmitting high-speed electrical signals and are not recommended for signals faster than 100 ps or 3 GHz.

020-2701-XX (3)

Both parts are included when ordering additional Tip-Clip assemblies. It cannot be ordered separately.

Then Tip-Clip tape (3 strips with 10 adhesives). Tip-Clip tape to the circuit board-Used to secure the Clip assembly.

Tip- Clip ejector (3). Tip-The Clip ejector removes the tip from the probe tip.- Used to assist in removing the Clip assembly.

additional order
(Our part number)

Square Pin Tip-Clip Assembly

Bandwidth: >6.0 GHz (all probes)

T_R : 10/90 <70 ps, 20/80 <50 ps

Use the square pin adapter when probing 0.025 inch diameter

accessories

Table 3: Standard accessories (continued)

accessories	will be included in the package	probe

P7313 3 P7380A 3 P7360A 3 P7340A 3	additional order (Our part number) Variable spacing Tip- Clip kit. Bandwidth: >8 GHz (P7313 and P7380A) T_R : 10/90 <55 ps、20/80 <35 ps load : Z_{MIN} 220 Ω ～ 8 GHz Bandwidth: >6 GHz $(P7360A)_R$: 10/90 <70 ps、20/80 <50 ps load : Z_{MIN} 220 Ω ～ 6 GHz Bandwidth: >4 GHz	020- 2596- XX (3)	$(P7340A)_R$: 10/90 <130 ps、20/80 <60 ps load : Z_{MIN} 220 Ω ～ 6 GHz Variable spacing tip when probing test points spaced 0.020 to 0.180 inches apart.- Use Clip assembly.

Options/Accessories

Table 4: Options/Accessories

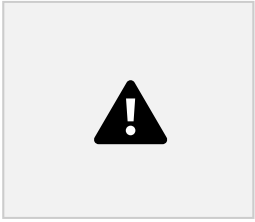
part number
PPM203B
013- 0339- XX
PPM100

Options/Accessories Description

PPM203B articulated arm. This high precision
Articulated arm for all three axes
Includes controls for fine-tuning
Masu. This arm has a fine pitch.
using different devices and interconnections.
PC boards, hybrid boards, and
and for probing MCM boards.
Designed. This articulated arm
allows you to use the printer when making measurements.
The robe can be fixed and supported.
Masu. PPM203B Plow to joint arm

When installing a probe,
Use arm adapter.

Probe arm adapter. this
The adapter is compatible with PPM203B articulated arm or
or PPM100 probe positioner
to attach the probe to the tip of
used for.

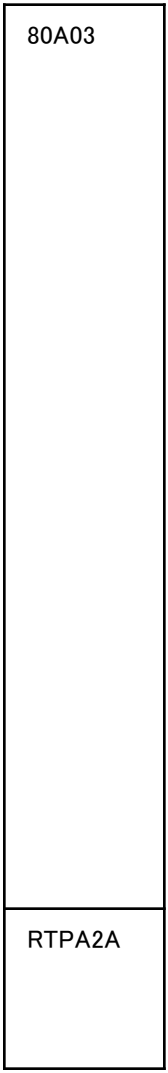


PPM100 probe positioner. Ha
Free probing and location
Flexible, designed for fine-tuning
General-purpose workbench with flexible arm
Robe holder. various conditions
When fixing the probe arm in
If the heavy pedestal is attached to the clamp,
It can be replaced.

accessories

Table 4: Optional accessories (continued)

part number



Options/Accessories Description

80A03 TekConnect Probe In
Interface module. This model
Using joules, CSA8200
and TDS8200 series sample
oscilloscope and 80E0X
with sampling module
TekConnect probes can be used.
vinegar.

This interface has one
80E0X Electrical Sampling Module
and two TekConnect probes.
with one partition for each block input.
Consists of one enclosure
I'm here. 80A03 interface
connect the SMA connector on the front panel.
Send the probe signal output through the
vinegar. SMA cable with a little stiffness
and connect the probe output to the 80E0X model.
Connect to the input of the joule.
P7313, P7360A and P7340A
The robe has a firmware bar.
Requires version 2.0 or higher. P7380A
The probe has firmware
Requires version 1.2 or higher.

80A03 Interface Module
is for testing the performance of the probe.
You will need it. performance test procedure
are included with the probe.
Technical guide on manual CD
Please refer to the reference.

RTPA2A TekConnect Probe Adapter

Puta. This module allows you to
connect TekConnect probes to
real-time spectrum analyzers.

options

Option C3. 3 years of calibration services

Option C5. 5 years of calibration services

Option D3. 3-Year Calibration Data Report (with Option C3) Option

D5. 5-Year Calibration Data Report (With Option C5) Option R3. 3-Year Repair Service

Option R5. 5 years of repair service

Option L0. English

Option L5. Japanese

Option L7. Simplified Chinese

Option CA1. One-time calibration or functional verification service (limited to calibration of recommended products)

accessories

Examples of probe usage

The following are typical use cases where you can take advantage of the characteristics of the Z-Active differential probe family to make measurements with superior signal fidelity. For more information on this use case, refer to the Z-Active: A New High-Performance Probe Architecture manual (2FW-17826-X at www.tektronix.com) or CD. It's bad.

Testing Dual Inline Memory Modules (DIMMs)

④ Tip-Solder the group of Clip assemblies to the circuit board at critical signal measurement locations (then insert the DIMM into the motherboard socket).

④ Tip one or more probes-Attach to the Clip assembly to probe critical measurement nodes. See Figure 20.

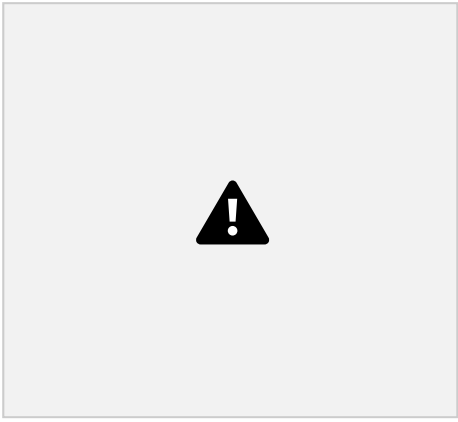


Figure 20: Tip- Circuit board with Clip assembly installed

Connecting the P7000 probe to the TDS8000 sampling oscilloscope

④ Connect to one of the channels of the 80A03 and probe the source clock that provides a trigger signal in synchronization with the signal you want to measure. See Figure 21.

④ Connect a cable between the TekConnect socket output connector of the trigger signal you want to probe and the external trigger input of the sampling oscilloscope.

④ Probe the synchronous data signal you want to measure on the other channels of the 80A03.

Figure 21: TDS8000 sampling oscilloscope

For this TekConnect measurement signal, a standard short, slightly stiff cable is used to connect the output of the TekConnect socket to the electrical sampling module built into the 80A03 interface. connection between the two cables.

If a synchronous clock signal source is not available, use the 80A05 module to generate a crisp trigger signal that is synchronized to the input signal.

Using P7000 Series Probes
Measuring RF signals

Using the RTPA2A TekConnect Probe Adapter with a real-time spectrum analyzer and TekConnect probe makes it very easy to perform measurements on specific RF components. See Figure 21.

Figure 22: RTPA2A TekConnect Probe Adapter Setup

Measuring PCI Express signals using the P7000 probe

RT- Eye Application SoftwareRT- When you use a P7000 probe with a TDS6000 or TDS7000 real-time oscilloscope that is configured with the Eye (Real-Time Eye) application software, the PCI Express signal physical layer tests with great ease and accuracy. See Figure 23.

As shown in Figure 23, the captured transition bits and non-transition bits are- It will be displayed separately in the Eye software. Also, RT- Eye software provides a wealth of measurement results and statistics for analyzed waveform records.

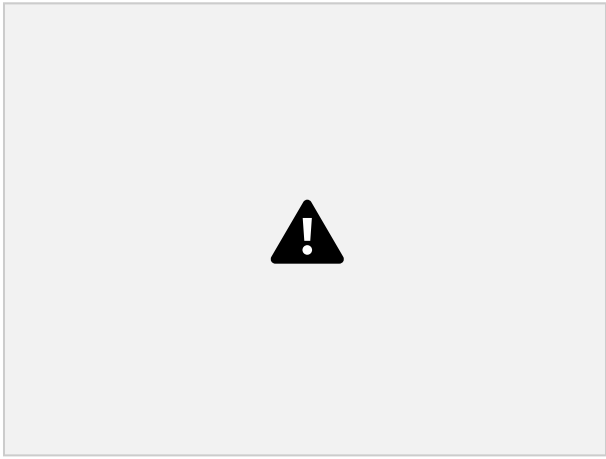


Figure 23: RT- Eye application

Examples of probe usage