Tektronix®

TAP1500 Series
1.5 GHz, 10X Active Probes

Instruction Manual

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077-1830-00 August 2024

Contents

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

This product shall be used in accordance with local and national codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

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. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead 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 rating 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, or with the case open. Hazardous voltage exposure is possible.

Avoid exposed circuitry

Do not touch exposed connections and components when power is present.

Do not operate with suspected failures.

If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Do not operate in wet/damp conditions

Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere

Keep product surfaces clean and dry

Remove the input signals before you clean the product.

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.

Terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

Symbols on the product

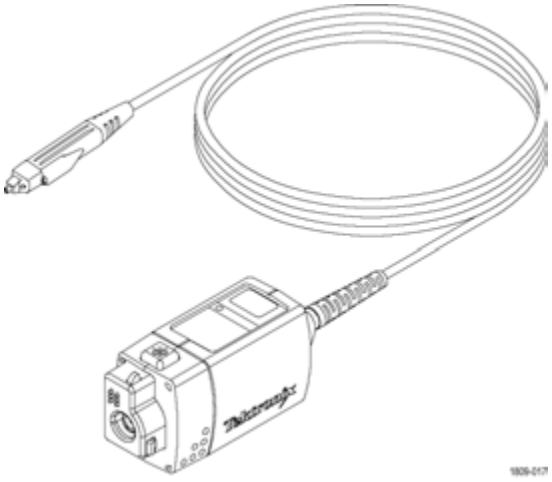
When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbols(s) may appear on the product.

CAUTION: Refer to Manual

Preface

This manual describes the installation and operation of the TAP1500 Series active probes. The TAP1500 Series active probes enable you to make accurate measurements with minimal circuit loading from DC to 1.5 GHz, using oscilloscopes featuring the Tektronix TekVPI oscilloscope interface.



Key features

- DC to >1.5 GHz Bandwidth
- Risetime <267 ps
- ±8 Volts Dynamic Range with ±10 volt offset capability
- 1 MΩ Input Resistance
- <1 pF Input Capacitance
- 10X Attenuation
- TekVPI Interface
- Small, low-mass probe head for probing dense circuitry

Documentation

Review the following user documents before installing and using your instrument. These documents provide important operating information.

Product documentation

The following table lists the primary product specific documentation available for your product. These and other user documents are available for download. Other information, such as demonstration guides, technical briefs, and application notes, can also be found.

Document	Content
Instruction Manual (this document)	In-depth operating information for the product, including specifications and performance verification.

How to find your product documentation

1. Click **Download** in the green sidebar on the right side of the screen.
2. Select **Manuals** as the Download Type, enter your product model, and click **Search**.
3. View and download your product manuals. You can also click the Product Support Center and Learning Center links on the page for more documentation.

Standard accessories

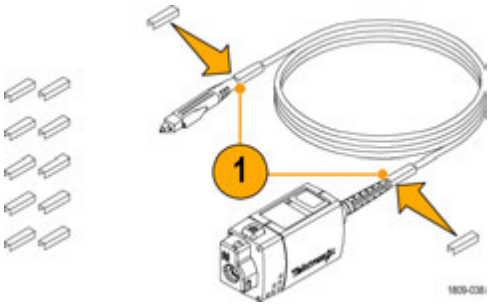
This section lists the standard accessories and provides information on how to use the accessories. Specifications are provided where appropriate so that you can choose the accessory that best fits your needs. In some cases, reorder kit quantities differ from the actual number of accessories included with the probe.

Color band kit

Using the color band kit (five colored pairs)

1. Attach one band to the probe cable and another one of the same color near the probe compensation box.
2. Connect the probe to the channel that matches the color of the band.

Tektronix part number: 016-1315-XX



Push-in probe tip

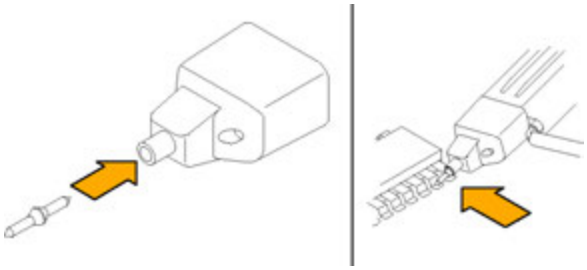
Use the push-in probe tip for general purpose probing by hand. You can also use the push-in probe tip with the other socketed leads and adapters.

Push the tip into the socket until it is seated. Either end of the tip may be used.

CAUTION: Do not force the tip. Be careful not to injure yourself on the sharp point.

To remove the tip, gently grab the tip with small pliers and pull the tip out.

Tektronix part number: 131-5638-XX, qty. 10



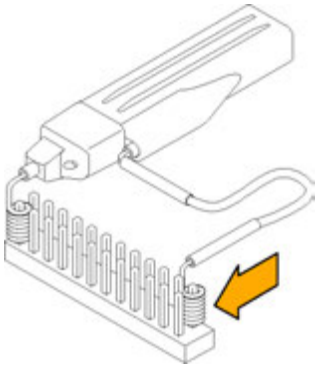
Right-angle adapter

Use the right-angle adapter for low-profile probing of 0.025 inch diameter square pins. The right-angle adapter allows the probe to lie flat against a circuit board, enabling you to probe in vertical circuits such as computer or communications backplanes, or in tight areas such as between circuit cards.

The right-angle adapter can be used directly with the probe head, or attached to the Y-lead adapter or ground leads.

Attach the right-angle adapter the same way as the push-in probe tip.

Tektronix part number: 214-4227-XX, qty. 1

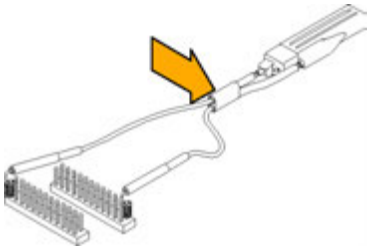


Y-Lead adapter

Use the Y-lead adapter to extend the reach of the probe and ground. The Y-lead adapter accepts any of the probe tips or adapters, and can be pushed directly onto 0.025 inch pins.

When selecting the grounding connection, maintain as short a ground path as possible.

Tektronix part number: 196-3463-10, qty. 2



Ground leads

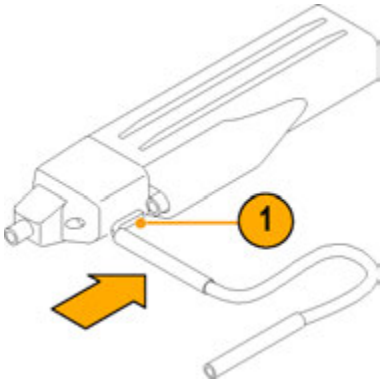
Use the three and six inch ground leads for general, lower-frequency probing. The socketed end of the leads may be connected to any of the probe tips and adapters, or fitted onto 0.025 inch pins.

When selecting the grounding connection, maintain as short a ground path as possible. (See *Probing Principles*.)

Press and rotate the lead pin connector into the ground socket on the probe head. Remove the lead by pulling the pin out by hand.

Three inch ground leads, Tektronix part number: 196-3437-10, qty. 2

Six inch ground leads, Tektronix part number: 196-3436-10, qty. 2

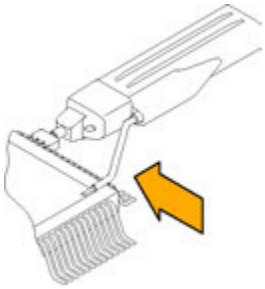


Low-inductance ground lead

Use the low-inductance ground lead to substantially reduce ground lead inductance. Because the ground lead touches the ground reference, you can easily move the probe to different points on the device under test.

To attach, press the ground lead into the probe head ground socket.

Tektronix part number: 196-3438-10, qty. 2

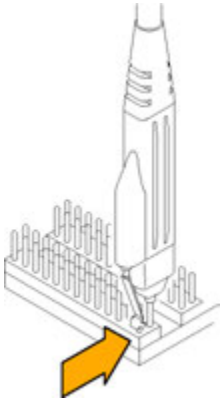


Signal-Ground adapter

The signal-ground adapter is ideal for use with signal/ground pairs on 0.100 inch header pins. Attach the signal-ground adapter by gently pressing it into the ground socket on the probe head.

Use the stabilization notch whenever possible to avoid slipping the probe off your test point.

Tektronix part number: 131-5777-XX, qty. 1



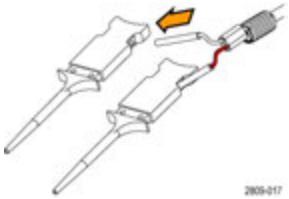
MicroCKT test tip

Use the MicroCKT test tips to access fragile, dense circuitry.

MicroCKT test tip can be connected to the Y-lead or three or six inch ground leads. Simply press the lead socket into the test tip handle.

Tektronix part number: 206-0569-XX, qty. 1

Tektronix part number: 020-2896-XX, qty. 10

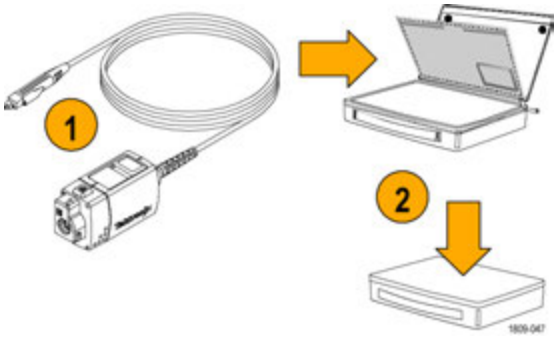


Pouch, nylon carrying case with inserts

Use the carrying case to hold the probe and the accessories.

1. Place the probe, accessories, and desired manuals in the carrying case.
2. Close the carrying case to transport the accessories to another location or for storage.

Tektronix part number: 016-1952-XX



Optional accessories

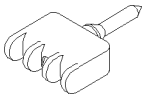
The following optional accessories are available for purchase to help you with your probing tasks.

SureFoot™probe tips

The SureFoot tips are an integral probe tip and miniature guide that enables fault-free probing of fine-pitch SMD packages. Attach the SureFoot adapters the same way as the push-in probe tips.

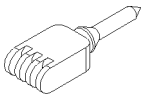
SureFoot tips are available in three sizes:

The yellow, 0.050 inch SureFoot tip is compatible with 50 mil JEDEC packages such as SOIC, PLCC, CLCC.



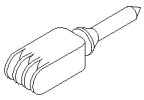
Tektronix part number: SF501, qty. 12

The blue, 0.025 inch SureFoot tip is compatible with 0.65 mm JEDEC and EIAJ packages.



Tektronix part number: SF502, qty. 12

The red, 0.5 mm SureFoot tip is compatible with EIAJ packages.

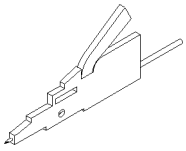


Tektronix part number: SF503, qty. 12

IC Micro-Grabber

Use the IC Micro-Grabber to probe the leads on integrated circuits that are surface-mounted.

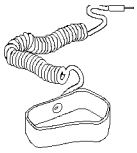
Tektronix part number: 013-0309-XX, qty. 2



Antistatic wrist strap

When using the probe, always work at an antistatic workstation and wear the antistatic wrist strap.

Tektronix part number: 006-3415-XX



Service options

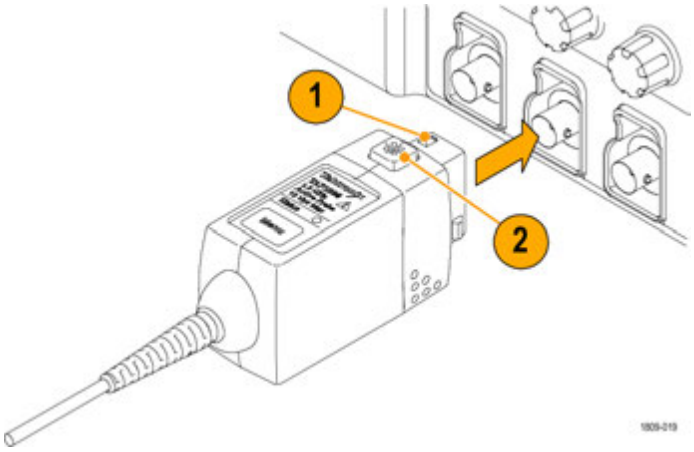
See the product datasheet for the latest options available.

Installation

These procedures show how to connect and install the probe.

Connecting to the host instrument

1. Slide the probe into the TekVPI receptacle. The probe snaps when fully engaged. When the probe is connected, the host instrument reads information from the probe and identifies the device.
2. To disconnect, press the latch release button and pull away from the instrument.



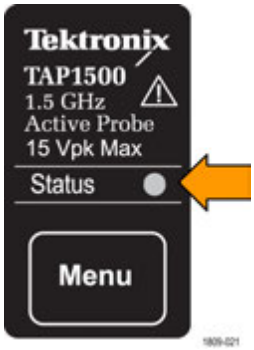
Probe controls and indicators

This section describes the controls and indicators on TAP1500 active probes.

Status LED

When the probe is powered on, the multicolor Status LED:

- Glows green after successfully completing the power-on self test routine. The probe is in normal operating mode.
- Glows red if an error condition exists.

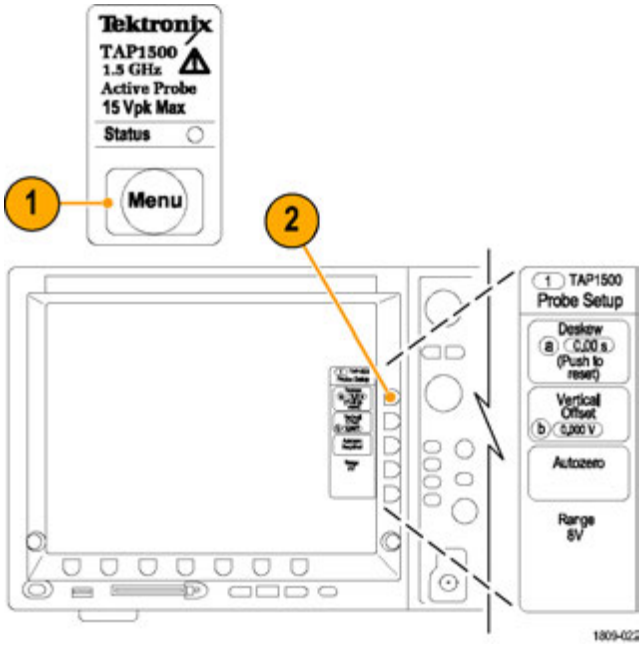


If the LED does not light, and other probes are connected to the host instrument, the available probe power may be limited. Try disconnecting another probe from the instrument to reduce the load.

Menu button

1. Select the probe **Menu** button to display the Probe Setup screen on the oscilloscope.

2. Use the buttons on the instrument to set the probe parameters.
3. Select the probe **Menu** button again to close the Probe Setup screen.



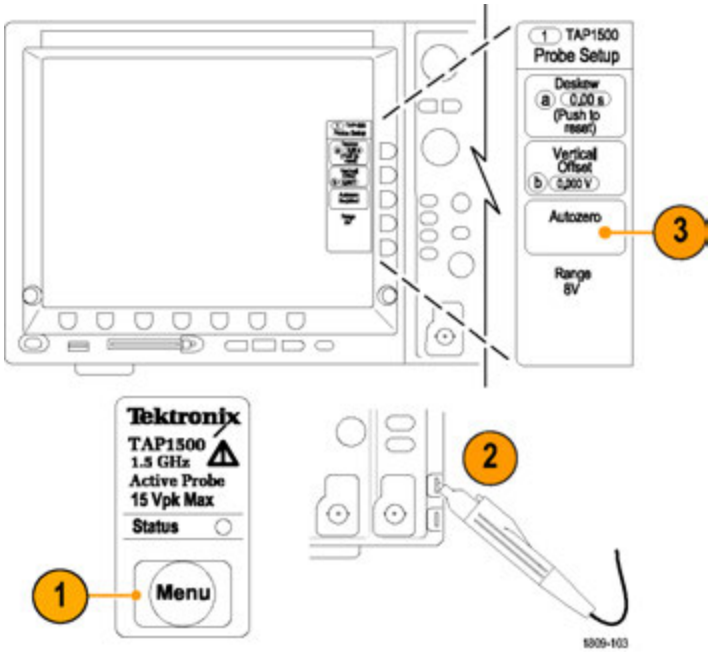
If the LED does not light, and other probes are connected to the host instrument, the available probe power may be limited. Try disconnecting another probe from the instrument to reduce the load.

AutoZero

It is recommended you Run the probe AutoZero routine:

- After the 20 minute warm-up period
- When the operating temperature of the probe changes by ±5 °C

1. Select the probe **Menu** button to display the Probe Setup screen on the oscilloscope.
2. Short the probe tip to ground.
3. Select the **AutoZero** button on the instrument to run the AutoZero routine.
4. Select the probe **Menu** button again to close the Probe Setup screen.



Functional check

Use the following procedure to check that your probe is functioning properly. If you want to verify that your probe meets the warranted specifications, refer to the *Performance Verification* procedures in this document.

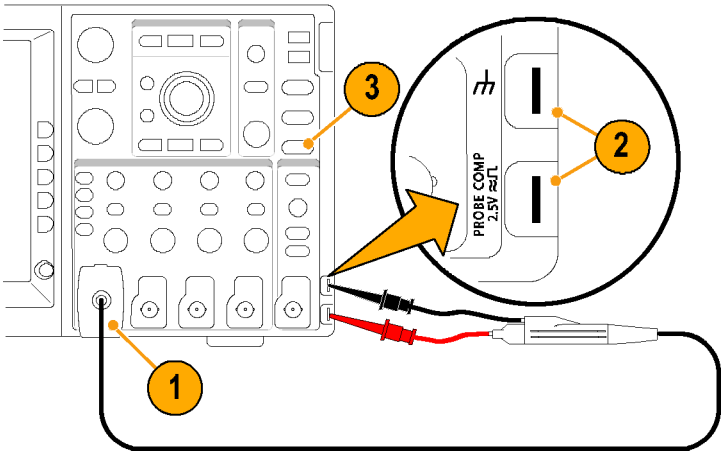
Table 1: Required equipment

Description and quantity	Performance requirement	Recommended example
Oscilloscope	TekVPI Interface	Tektronix MSO44B or MSO46B
Y-Lead adapter	0.025 inch square pins for probe tip connections	Tektronix part number 196-3463-XX
MicroCKT test tips (2)	0.025 inch square pins-to-mini clips	Tektronix part number 206-0569-XX

Signal

1. Connect the probe to any channel of the oscilloscope and set the oscilloscope to display that channel.
2. Use the Y-lead Adapter and two MicroCKT test tips to connect the probe tip to the PROBE COMP terminals on the oscilloscope.
3. Select **AUTOSET** (or adjust the oscilloscope) to display the calibration waveform. A stable waveform indicates that your probe is functioning correctly.

   If desired, continue with the following steps to check the probe offset function.

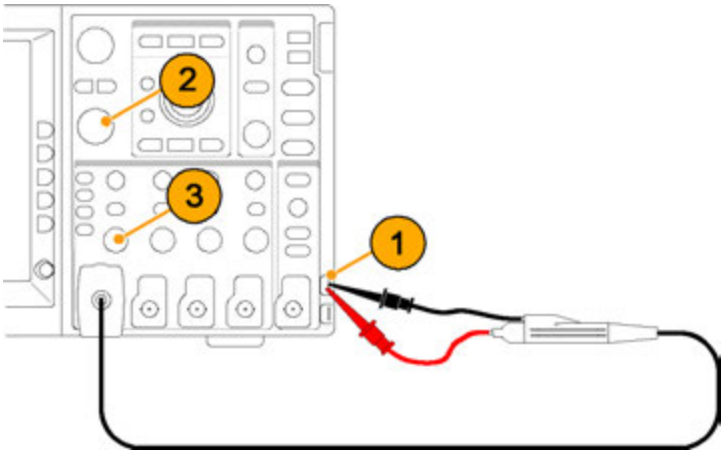


Offset

The following procedure assumes you have just finished the steps for the Signal functional check.

1. Disconnect the MicroCKT test tip from the PROBE COMP SIGNAL terminal and connect the MicroCKT test tip to the ground terminal.
2. Set the probe offset to 0.0 V. The oscilloscope trace goes to the ground reference. If it does not, run the Autozero routine to null out the offset error.
3. Set the oscilloscope volts/division to 5 V.
4. Adjust the probe offset. The displayed waveform should vary between approximately +10 V and -10 V. (A +10V offset displays a -10 V level on your instrument.)

If the probe does not pass these functional checks, go to the *Troubleshooting*section in this document.



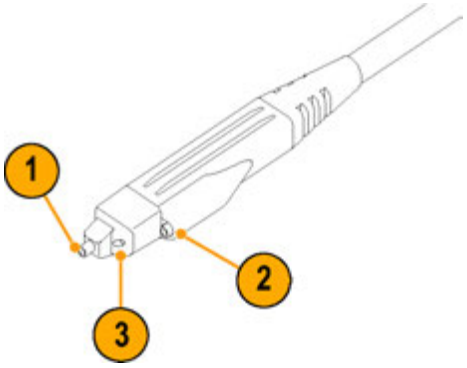
Basic operation

Follow these operating guidelines to get optimum performance from your probe.

Probe head assembly

The probe head is designed for ease of use and high performance. Its small size makes it easy to handle in tight areas.

1. The probe tip socket is sized to easily press onto 0.025 inch pins for direct access.
2. The ground socket provides a short ground path for high-fidelity ground connections.
3. The stabilization notch permits you to use adjacent pins to reduce stresses on the probe and pins.



Probe input

The probe is electrically protected against static voltage. However, applying voltages above its design limits may damage the probe tip amplifier.

Input linear dynamic range

The probe head amplifier used by the probe has a limited linear operating range. To keep the input linearity error less than 4% you must limit the signal input voltage to ±8 V (including any DC offset).

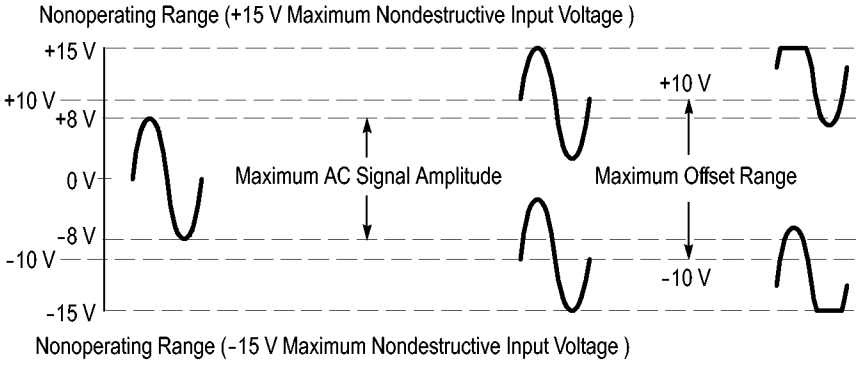


Figure 1: Dynamic and Offset limitations

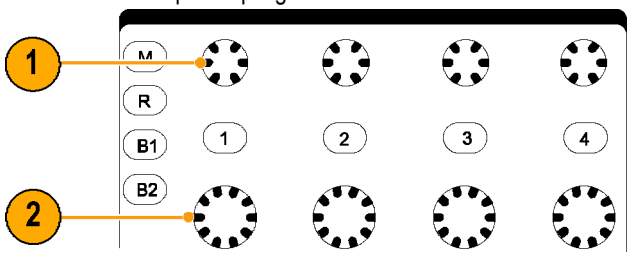
Probe offset

The probe offset is adjustable to permit operation within the linear range of the probe, and to increase the sensitivity of the probe at higher DC measurement voltages. Using the offset to cancel DC signal components enables optimal probe performance.

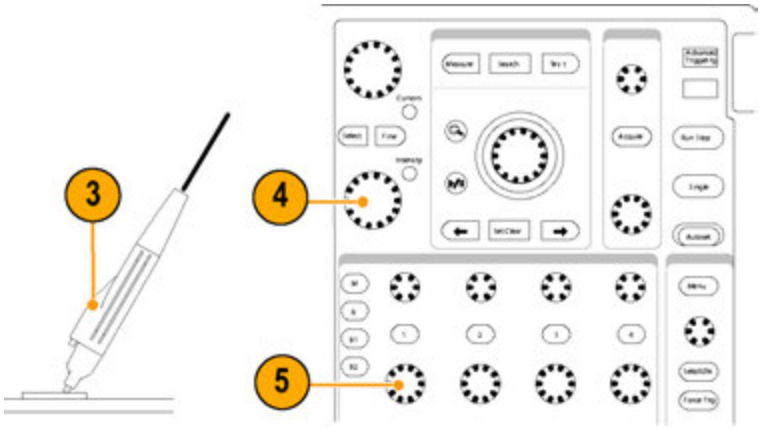
See your oscilloscope manual for specific instructions on its operation and offset control.

To set the probe offset, follow these steps:

1. Use the vertical position control to set a zero reference level on the oscilloscope display.
2. Set the oscilloscope coupling to **DC** and scale to **5V/div**. This sets the oscilloscope to display the full offset dynamic range of the probe.



3. Attach the probe to the circuit.
4. Adjust the probe offset to bring the trace to the oscilloscope zero reference.
5. Change the volts/division setting to the desired range, adjusting the offset to keep the trace on the zero reference level.



The probe has a ±10 V offset range. The linear operating range is ±8 V. If cursors are used on the oscilloscope, the zero reference will be at the probe offset voltage.

DSP filter for TAP1500L models only

A DSP filter was shipped with your TAP1500L probe and must be applied for valid measurements.

You will need to create a MATH channel on the oscilloscope to apply the filter. For the low profile scopes, set up using a series of remote commands.

The following procedures show you how to create the channel and apply the filter for standard and low profile oscilloscopes.

Guidelines

The DSP filter is valid for all oscilloscope sample rates between 12.5 MS/s and 25 GS/s. Different sample rates will require a different number of points from the source waveform to generate the filtered waveform.

The following table shows the number of points used by the DSP filter to generate the adjusted waveform, based on the sampling rate of the oscilloscope. Consider these values when configuring the oscilloscope for the use of the TAP1500L probes.

Oscilloscope sample rate	Number of points used by the filter
25 GS/s	11696
12.5 GS/s	11696
6.25 GS/s	11696
3.125 GS/s	1048
1.5625 GS/s	956
1.25 GS/s	888
625 MS/s	880
312.5 MS/s	5642
250 MS/s	4512
125 MS/s	2296
62.5 MS/s	2206
31.25 MS/s	1124
25 MS/s	902
12.5 MS/s	466

Standard oscilloscopes: Create channel and apply filter

1. Insert the USB stick shipped with the TAP1500L probe into the oscilloscope USB port.
2. Plug the probe into any of the physical channels of the oscilloscope. In this example, Channel 1 is used.
3. Select **Add New Math**. This will create a new MATH channel. The default MATH channel takes the input of Channel 1 and subtracts the input of Channel 2 from it.
4. Double click the icon on the bottom bar of the screen to view the details of the new MATH channel.
5. Select **Math Type** > **Advanced**.
6. Select **Edit** under **Math 1**. If you selected a channel other than 1 initially, then that channel number will be displayed (Math [x]).
7. Select **Add Filter** in the Equation Editor window that appears.
8. In the Add Filter window, set **Filter Type** to **ArbFlt**.
9. Select **Load**. Go to the USB directory in the explorer window that opens.
10. Select the *TAP1500L_filter.flt* filter file and then select **Open**.
11. Select **OK** in the Add Filter window.

12. Find the Sources section in the Equation Editor window.
13. The filter file you loaded will be displayed as a button under **Filters**. Select that button.
14. To finish the equation:
    a. In the Sources section, in the Channels column, select Ch 1.
    b. Follow that with a closing parentheses found in the Keypad section.
15. The equation for the Math channel will show at the bottom as follows: `^[CoefFileName="F:/TAP1500L_filter.flt"]ArbFlt(Ch1)`

    The drive location of the CoefFileName varies depending on the USB directory.
16. Select **Apply** and then **OK** to close the window.

Low-profile oscilloscopes: Create channel and apply filter remotely

Note: When transferring the filter file from a host PC to the target oscilloscope, it is recommended that you perform the transfer with a Ethernet cable connection. A USB connection is unreliable during the file transfer.

The remote commands in this procedure apply to both standard and low-profile oscilloscopes.

1. Setup remote communications between the target oscilloscope and the host PC.
2. Send the following commands to create the MATH channel:

```
:MATH:ADDNEW “Math1”
:MATH:MATH1:TYPE ADV
```

3. To set the equation for the MATH channel, send the following command:

```
:MATH:MATH1:DEFINE “^[CoefFileName=””/media/{FILE LOCATION}””]ArbFlt({PROBE CHANNEL})”
```

   Substitute `{FILE LOCATION}` with the location of the filter file and substitute `{PROBE CHANNEL}` with the physical channel the TAP1500L probe is connected to.

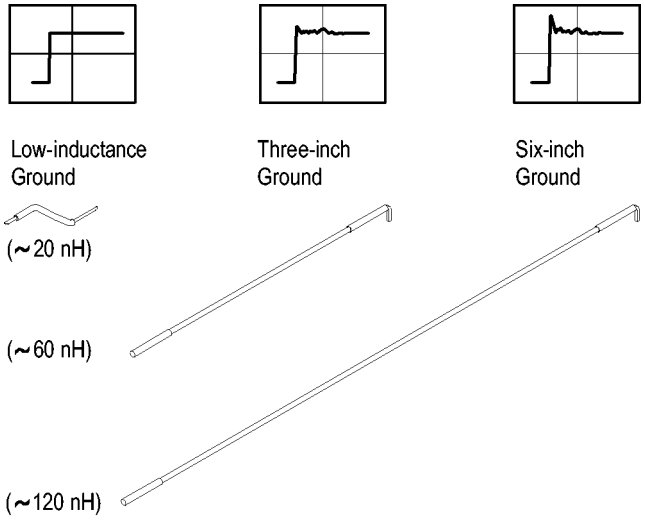
   For example, if the filter file was located on the C: drive of the scope and the probe was connected to channel 1, the command to set the equation would be: `:MATH:MATH1:DEFINE "^[CoefFileName=””/media/C:/TAP1500L_filter.flt””]ArbFlt(Ch1)”`

Probing principles

Follow the probing principles to make probing easier and noise free.

Ground lead length

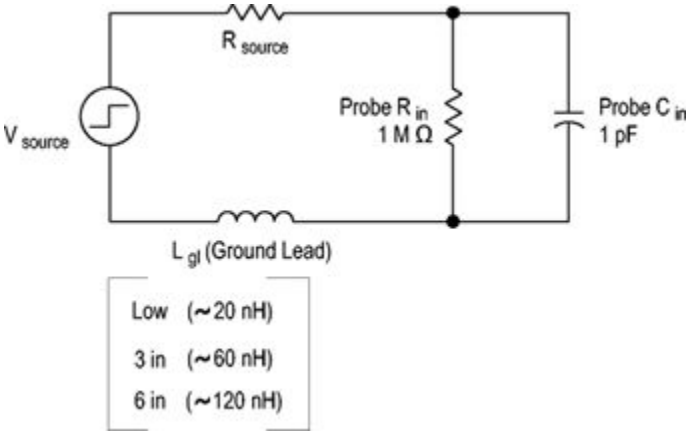
When you are probing a circuit, you should always use as short a ground lead as possible between the probe head and circuit ground. (See the illustration for the effects of lead length on waveform distortion.)



The series inductance added by the probe tip and ground lead can result in a resonant circuit; this circuit may cause parasitic "ringing" within the bandwidth of your oscilloscope.

Ground lead inductance

When you touch your probe tip to a circuit element, you are introducing a new resistance, capacitance, and inductance into the circuit. (Refer to the illustration.)



You can determine if ground lead effects may be a problem in your application if you know the self-inductance (L) and capacitance (C) of your probe and ground lead. Calculate the approximate resonant frequency (f_0) at which this parasitic circuit will resonate with the following formula.

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

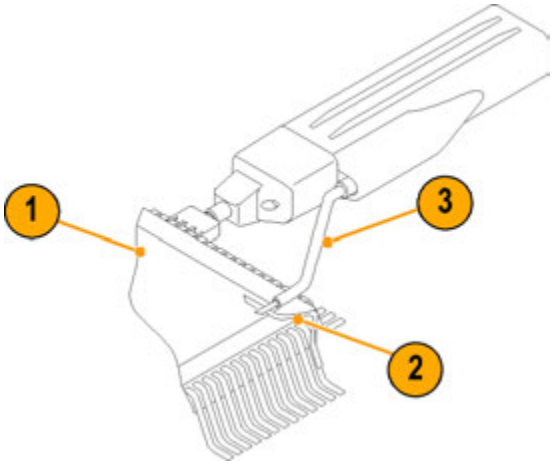
The preceding equation shows that reducing the ground lead inductance will raise the resonant frequency. If your measurements are affected by ringing, your goal is to lower the inductance of your ground path until the resulting resonant frequency is well above the frequency of your measurements.

The low-inductance ground contacts described in the *Accessories* topic can help you reduce the effects of ground lead inductance on your measurements.

Low-inductance grounding

Use a ground plane on the package to make probing the package easier, and to avoid adding unnecessary ground lead length and distortion:

1. Attach a small piece of copper clad on top of the package.
2. Connect the copper clad to the package ground connection.
3. Use the low-inductance ground lead to keep the ground lead length as short as possible.

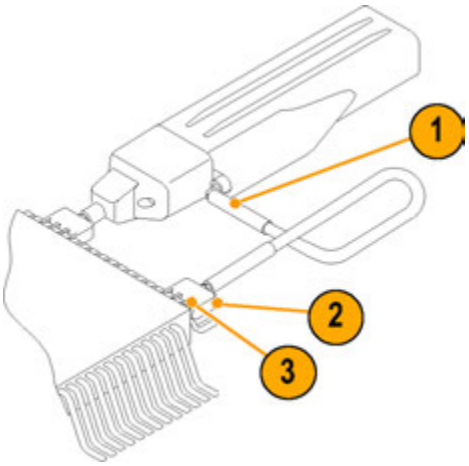


Note: This method is very useful when making many measurements on the same package.

SureFoot™ grounding

If you cannot use the low-inductance grounding method recommended, the probe may be grounded to the package under test using a SureFoot adapter.

1. Connect a short ground lead to the probe.
2. Attach a SureFoot adapter at the end of the ground lead.
3. Connect the SureFoot adapter directly to the package ground.

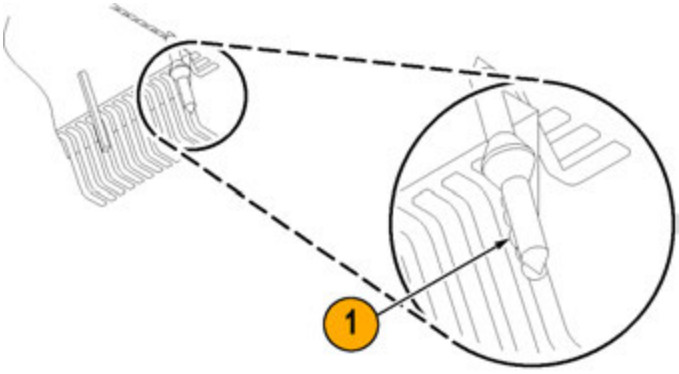


This method is preferred over using an adjacent circuit ground because it is the shortest ground path possible.

Probe tip test points

The push-in probe tip or a 0.025 square pin can be soldered into a circuit to be used as a temporary test point:

1. Solder the tip onto a lead or pin with a low-power soldering iron.
2. Press the probe head onto the tip to make a measurement
3. Pull the probe head off when you are done.



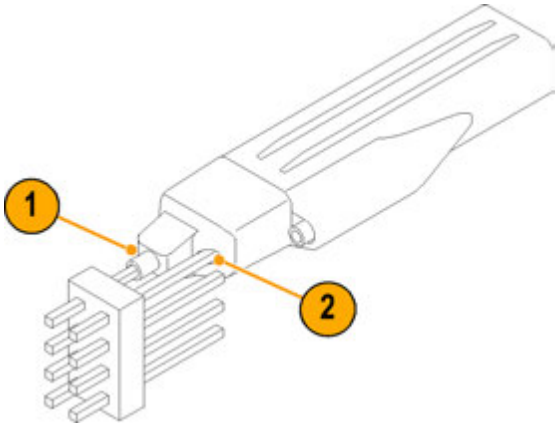
The probe tip may be removed and reused by desoldering it from the circuit, and soldering it into another circuit in the future.

Note: Do not use pieces of solid-core copper wire as test points. If the wire breaks off in the probe tip socket, it may be impossible to remove the wire, and it will prevent insertion of other accessory tips.

Probe tip stabilization

The probe head has a stabilizing notch for use with 0.100 inch-spaced header pins:

1. Press the probe onto the header pin.
2. Insert the stabilizing notch of the probe onto an adjacent pin. This prevents unnecessary force from being applied directly to the probe tip or pins.



The signal-ground adapter can rest on the stabilized pin without a risk of its moving out of place.

Specifications

The specifications are valid under the following conditions.

- The probe has been calibrated at an ambient temperature of 23 °C ±5 °C.
- The probe is connected to a host instrument with an input impedance of 50 Ω.
- The probe and oscilloscope must have a warm-up period of at least 20 minutes and be in an environment that does not exceed the limits described.
- The Signal Path Compensation (SPC) has been run on the oscilloscope prior to testing the probe specifications.

Specifications for the TAP1500 Series active probes fall into three categories: warranted, typical, and nominal characteristics.

Warranted characteristics

Warranted characteristics describe guaranteed performance within tolerance limits or certain type-tested requirements. Warranted characteristics that have checks in the *Performance Verification* section are marked with the ✓ symbol.

Table 2: Warranted electrical characteristics

Characteristic	Description
✓ DC attenuation accuracy	10:1 ±2%
Temperature	Operating: 0 to +50 °C (+32 to +122 °F), Non operating: -40 to +71 °C (-40 to +160 °F)
Humidity	Operating: 5-95% RH, tested up to +30 °C (+86 °F) 5-85% RH, tested at +30 °C to +50°C (+86 to +122 °F)
	Non operating: 5-95% RH, tested up to +30 °C (+86 °F) 5-85% RH, tested at +30 °C to +75°C (+86 to +167 °F)
Altitude	Operating: Up to 4400 meters (15000 feet), Non operating: Up to 12192 meters (51,594 feet)

Typical electrical characteristics

Typical characteristics describe typical but not guaranteed performance.

Table 3: Typical electrical characteristics

Characteristic	Description
Bandwidth	DC to ≥1.5 GHz (probe only)
	TAP1500L only: Requires Tektronix-recommended DSP filter. The DSP filter is compatible with 4, 5, and 6 Series oscilloscopes only.
Rise time	≤267 ps (probe only)
	TAP1500L only: Requires Tektronix-recommended DSP filter. The DSP filter is compatible with 4, 5, and 6 Series oscilloscopes only.
Input resistance	1 MΩ
Input capacitance	≤1.0 pF
Input signal range	-8.0V to +8.0 V
Input offset range	-10.0V to +10.0 V

Table continued…

Characteristic	Description
Maximum non-destructive input voltage	±15 $V_{(DC+ peak AC)}$
Linearity	±4% or less of dynamic range
Output Zero	±10 mV or less displayed on screen
DC offset drift	1 mV/° C or less displayed on screen
Signal delay	5.3 ns ± 0.2 ns

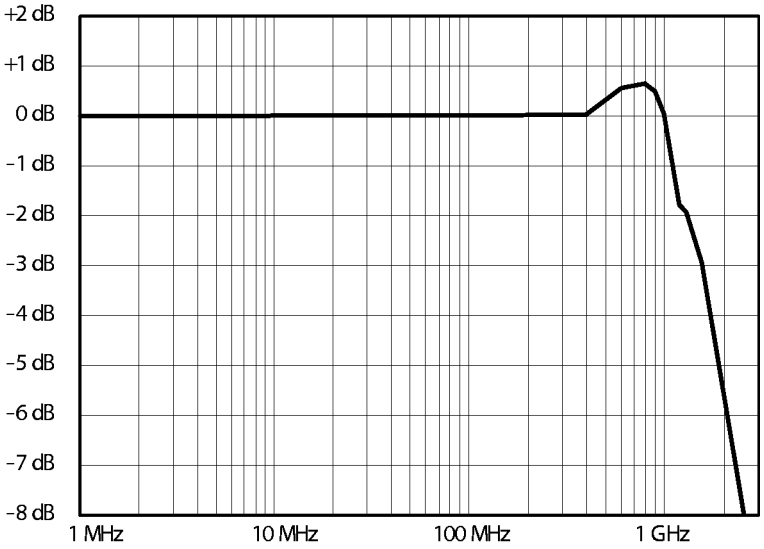


Figure 2: Typical bandwidth

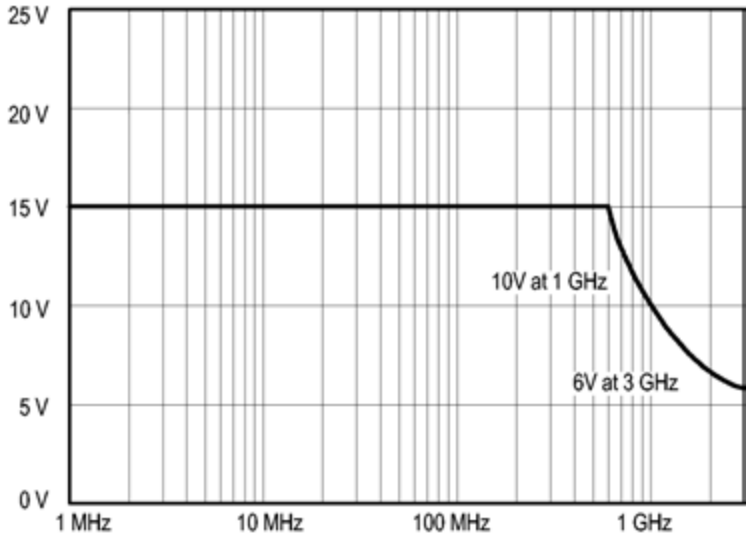


Figure 3: Typical Non-Destructive Peak Voltage Derating vs Frequency

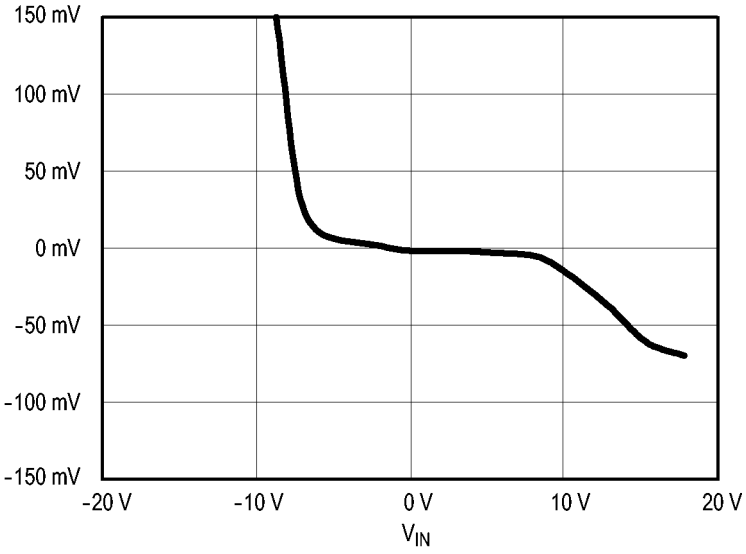


Figure 4: Typical Linearity Error vs V_{IN}

Figure 5: Typical Input Impedance vs Frequency

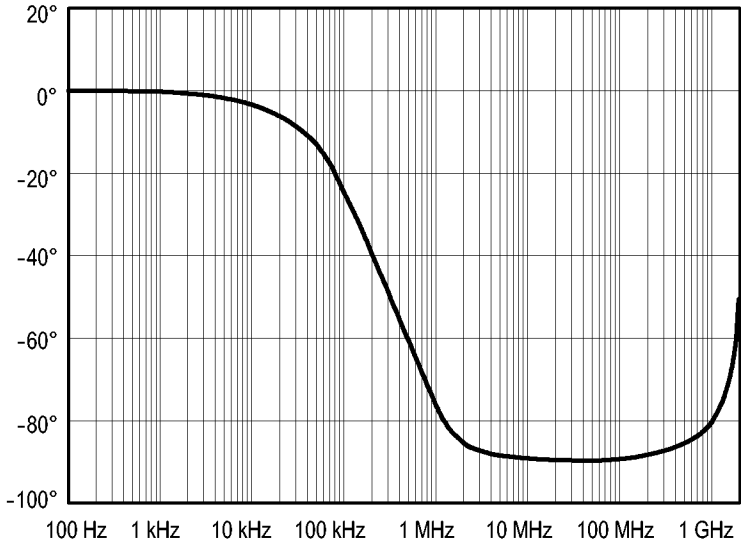
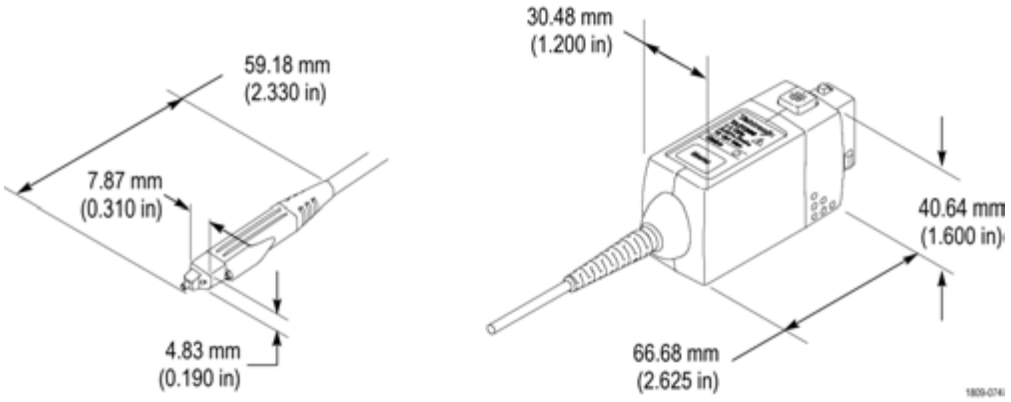


Figure 6: Typical Phase vs Frequency

Table 4: Typical mechanical characteristics

Characteristics	Description
Dimensions, compensation box	66.68 mm × 40.64 mm × 30.48 mm (2.625 in × 1.6 in × 1.2 in)
Dimensions, probe head	59.18 mm × 4.83 mm × 7.87 mm (2.33 in × 0.19 in × 0.31 in)
Dimensions, cable length	1.3 m (51 in); from the probe head to the compensation box
Unit weight	1.55 kg (3.44 lbs); probe, accessories and packaging



Nominal characteristics

Nominal characteristics describe guaranteed traits, but the traits do not have tolerance limits.

Table 5: Nominal electrical characteristics

Characteristics	Description
Input coupling	DC
Termination	Terminate output into 50 Ω
Compatibility	Oscilloscopes equipped with the TekVPI interface

Performance verification

The procedures that follow verify the warranted specifications of the probe. The recommended calibration interval is one year. Perform the verification procedures in the order listed.

The following equipment is required for the performance verification procedures.

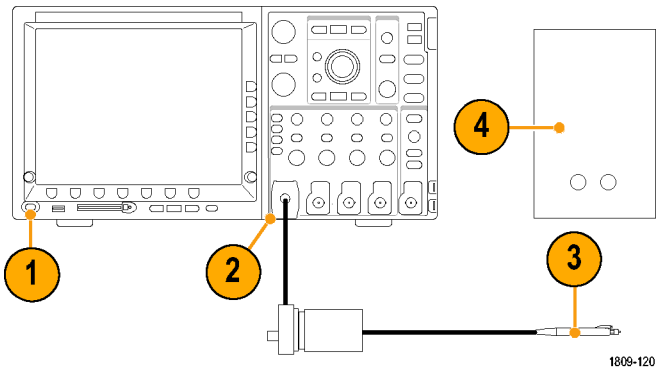
Table 6: Required equipment

Description and quantity	Performance requirement	Recommended example
Oscilloscope	TekVPI Interface	4 Series MSO
TekVPI Calibration/Verification adapter	TekVPI Interface	067-1701-XX
DC voltage adapter	-1.0 to +1.0 VDC, 0.2% accuracy	Wavetek 9100
Digital multimeter (DMM)	Resistance,0.1% accuracy	Keithley 2700
SMA M-to-BNC F adapter	SMA male-to-BNC female	015-0554-00
BNC-to-dual banana adapter (2)		103-0090-00
BNC cable	50 Ω, 0.76 m (30 in) length	012-0117-00
Precision termination	50 Ω, 0.1%, 0.5W	011-0129-00
Y-lead adapter	0.25-in square pins for probe tip connections	196-3463-XX
MicroCKT test tips (2)	0.25-in square pins-to-mini clips	206-0569-XX

Equipment setup

Use the following procedure to set up and warm up the equipment to test the probe.

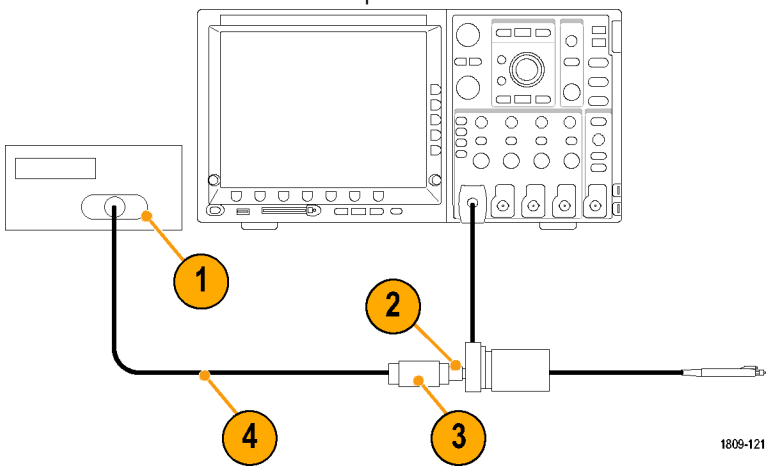
1. Turn on the oscilloscope.
2. Connect the TekVPI Calibration/Verification adapter to the oscilloscope.
3. Connect the probe to the TekVPI Calibration/Verification adapter and verify that the Status LED on the probe turns green.
4. Turn on the remaining test equipment.
5. Allow 20 minutes for the equipment to warm up.
6. Make a copy of the test record and use it to record the test results. (See *Test record*)



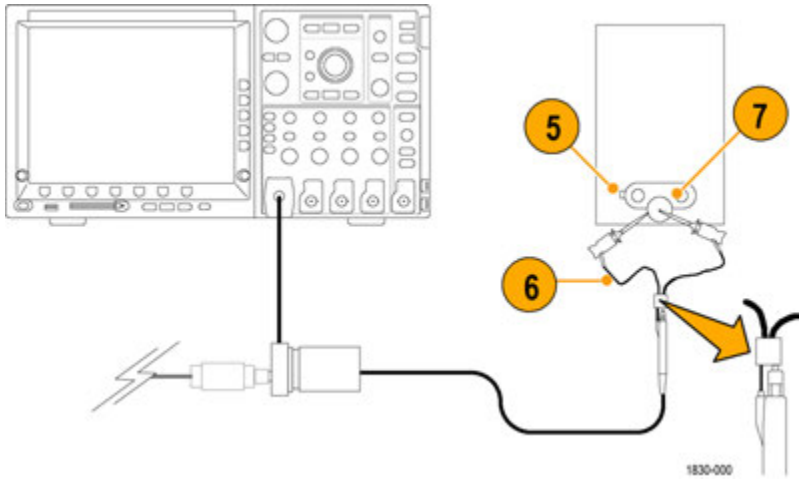
DC gain accuracy

This test checks the DC gain accuracy of the probe.

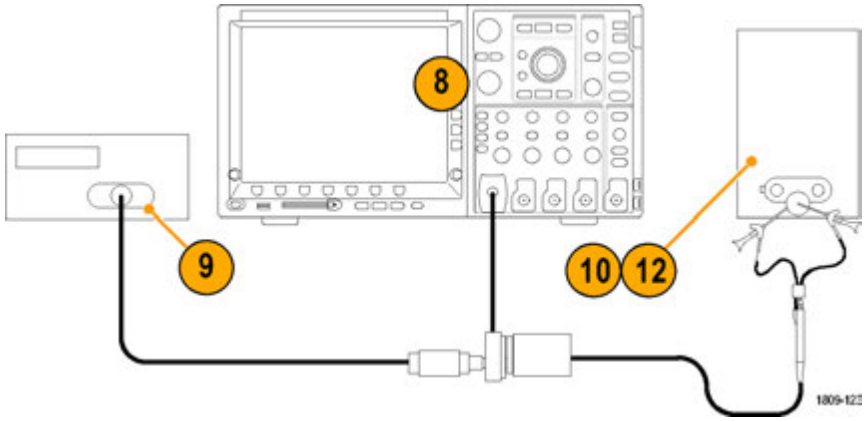
1. Connect the BNC-to-dual banana adapter to the DMM input.
2. Connect the SMA M-to-BNC F adapter to the SMA output of the TekVPI Calibration/Verification adapter.
3. Connect the precision termination to the BNC end of the SMA M-to-BNC F adapter.
4. Connect the BNC cable between the precision termination and the BNC-to-dual banana adapter attached to the DMM.



5. Connect the second BNC-to-dual banana adapter to the output of the DC voltage source.
6. Connect the Y-lead adapter and MicroCKT test tip to the probe input.
7. Attach the MicroCKT test tip to the BNC-to-dual banana adapter connected to the DC voltage source. Make sure the polarity is correct-ground to outer shield and probe input to center conductor.



8. Set oscilloscope probe offset to 0.0 V.
9. Set the DMM to DCV.
10. Set the DC voltage source to +1.00 VDC and enable the output.
11. Record the DMM measurement in the test record.
12. Set the DC voltage source to -1.00 VDC.
13. Record the DMM measurement in the test record.



Note: An unacceptable error value may result if a precision 50 Ω termination is not used for the recommended termination, or if the oscilloscope probe offset is not set to zero.

Test record

Probe Model/Serial Number:

Certificate Number:

Temperature:

RH %:

Date of Calibration:

Technician:

Performance test	Source voltage	Minimum	Measured	Calculated	Maximum
DC gain accuracy	+1.00 VDC	+98 mV		NA	+102 mV
	-1.00 VDC	-102 mV		NA	-98 mV

Maintenance

This section contains maintenance information for your probe.

Error condition

The TAP1500 active probe is designed to work with all TekVPI interface oscilloscopes and adapters. However, there may be some cases where all of the probe features may not work properly.

If the Status LED glows red during or after probe power on, an internal probe diagnostic fault exists. Disconnect and reconnect the probe to restart the power on diagnostic sequence. If the Status LED continues to glow red, the probe is defective, and must be returned to Tektronix for repair.

Replaceable parts

There are no user replaceable parts within the probe. Refer to the *Accessories* section for a list of replaceable accessories for your probe.

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. 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.

Returning the probe for servicing

If your probe requires servicing, you must return the probe to Tektronix. If the original packaging is unfit for use or not available, use the following packaging guidelines.

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