Agilent Technologies

User's Guide

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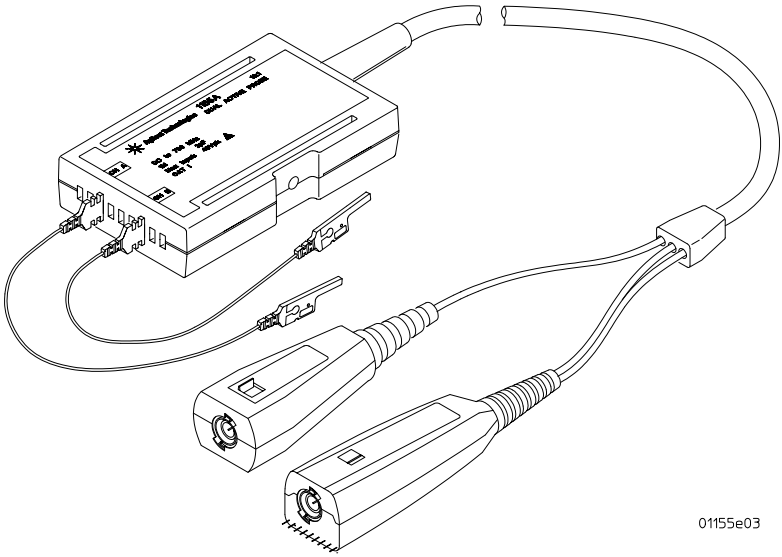


For Safety and Regulatory information, and publishing information, see the pages at the back of this book.

1155A 2-Channel, Low-Mass Active Oscilloscope Probe

Contents

Inspect the probe

❑ **Inspect the shipping container for damage.**

Keep a damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the probe has been checked mechanically and electrically.

❑ **Check the accessories.**

Accessories supplied with the probe are listed in "Accessories supplied" in this manual.

- If the contents are incomplete or damaged, notify your Agilent Technologies Sales Office.

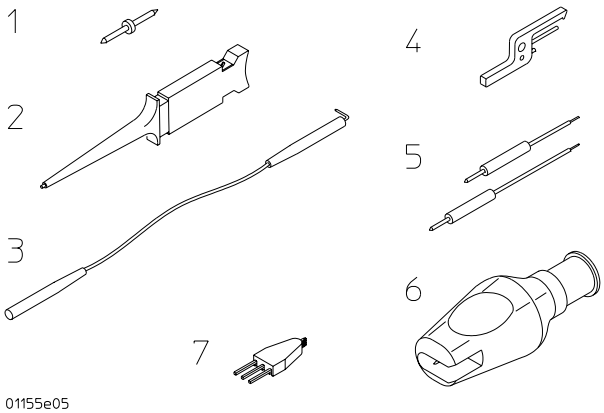
❑ **Inspect the instrument.**

- If there is mechanical damage or defect, or if the probe does not operate properly or pass calibration tests, notify your Agilent Technologies Sales Office.
- If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier as well as your Agilent Technologies Sales Office. Keep the shipping materials for the carrier's inspection. The Agilent Technologies office will arrange for repair or replacement at Agilent Technologies' option without waiting for claim settlement.

1155A 2-Channel, Low-Mass Active Oscilloscope Probe

The 1155A 2-Channel, Low-Mass Active Oscilloscope Probe is a 10:1 probe with a 750 MHz bandwidth. The FET amplifier allows a high-input resistance (1 MΩ, <2 pF) and low input capacitance which minimizes the loading of the circuit under test. This active probe is powered by the Infiniium active interface.

Accessories supplied



Accessories Supplied with the 1155A Active Probe

Item	Description
1	Probing pin, quantity supplied is 4
2	SMT clip, quantity supplied is 5
3	Flexible lead, quantity supplied is 2
4	Spacing ground adapter, quantity supplied is 2
5	SMT leads, quantity supplied is 2 red, 2 black
6	BNC-to-Probe Tip Adapter

Item	Description
7	Wedge Probe Adapter (2613A)

You can order additional quantities of these parts. See the ordering information in this manual.

Replacement parts

Item	Quantity	Part number
Probe tip and cable	1	01145-61602

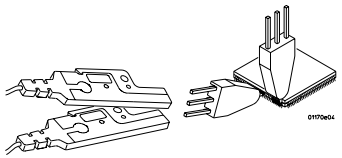
Replacement accessories

Item	Quantity	Part number
SMT Leads	4 red, 4 black	16517-82104
Spacing Ground Adapter	20	16517-82105
Flexible Lead	20	16517-82106
Pin Probe Kit	4	16517-82107
SMT Clip	20	16517-82109
0.5 mm x 3-signal Wedge Probe Adapter	1	E2613A
0.5 mm x 3-signal Wedge Probe Adapters	2	E2613B
0.5 mm x 8-signal Wedge Probe Adapter	1	E2614A
0.65 mm x 3-signal Wedge Probe Adapter	1	E2615A
0.65 mm x 3-signal Wedge Probe Adapters	2	E2615B
0.65 mm x 8-signal Wedge Probe Adapters	1	E2616A

Check your Wedge Probe Adapter User's Guide to verify the latest Wedge models.

Using the Wedge Probe Adapter

The Wedge Probe Adapter probing solution provides accurate and mechanically non-invasive contact to the TQFP/PQFP package leads.
Follow the guidelines in the Wedge Probe Adapter User's Guide for problem-free probing.



Connecting the Probe to an Wedge Adapter

Probe specifications

Rise time:[1,2] ≤470 ps
Attenuation:[3] 10:1 ±3%
Input Resistance: 1 MΩ ±2%

[1] Above 35 °C, bandwidth and rise time degrade approximately 1/2% / °C.
[2] Bandwidth figure calculated from BW = 0.35 / t_r (rise time).
[3] When connected to an instrument input of 50 Ω ±0.5%.

Probe characteristics

Bandwidth:[1,2] ≥750 MHz; derived from rise time
Input Capacitance: 2 pF (typical)
Overshoot and Ringing[3]: Less than ±10% for the first 6 ns,
±4% from 6 ns to 20 µs,
±1.5% thereafter.
Output Voltage Offset Error at output: Less than ±1 mV
Input Dynamic Range: 0 to ±6.0 V
Output Load Requirement: 50 Ω
Maximum Input Voltage: ±40 V (dc + peak ac) (CAT I)

[1] Above 35 °C, bandwidth and rise time degrade approximately 1/2% / °C.
[2] Bandwidth figure calculated from BW = 0.35 / t_r (rise time).
[3] Measured with 54845A.

CAT I and CAT II Definitions

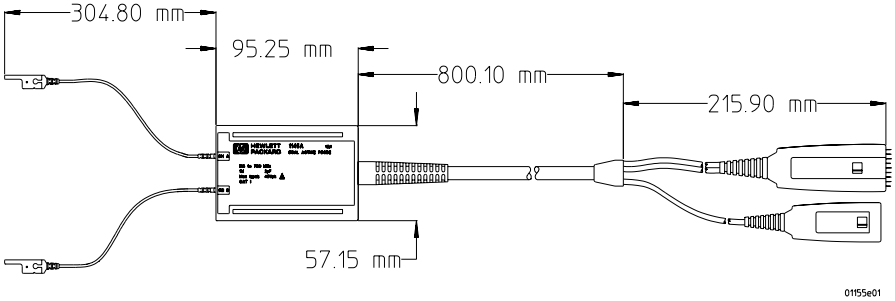
Installation category (overvoltage category) I: Signal level, special equipment or parts of equipment, telecommunication, electronic etc., with smaller transient overvoltages than installation category (overvoltage category) II.

Installation category (overvoltage category) II: Local level, appliances, portable equipment etc., with smaller transient overvoltages than installation category (overvoltage category) III.

General characteristics

General Characteristics of the 1155A Probe

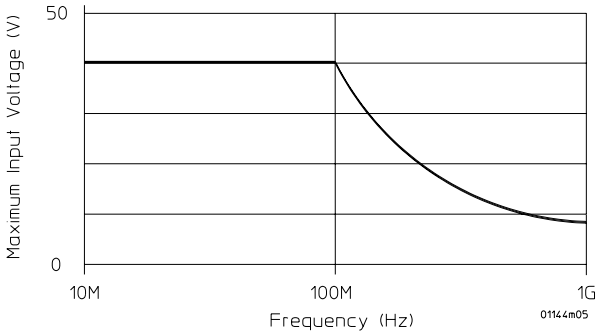
Environmental Conditions	**Operating**	**Non-operating**
Temperature	0 °C to +55 °C	-40 °C to +70 °C
Humidity	Up to 95% relative humidity (noncondensing) at +40 °C.	Up to 90% relative humidity at +65 °C.
Altitude	Up to 4,600 meters.	Up to 15,300 meters.
Vibration	Random vibration 5 to 500 Hz, 10 minutes per axis, 0.3 g_{rms}.	Random vibration 5 to 500 Hz, 10 minutes per axis, 2.41 g_{rms}. Resonant search 5 to 500 Hz swept sine, 1 octave/minute sweep rate, (0.75g), 5-minute resonant dwell at 4 resonances per axis.
Weight	Net: Approximately 0.23 kg. Shipping: Approximately 1 kg.	
Dimensions	Refer to the outline drawing below for approximate dimensions.	
Indoor Use		
Pollution degree 2	Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.	



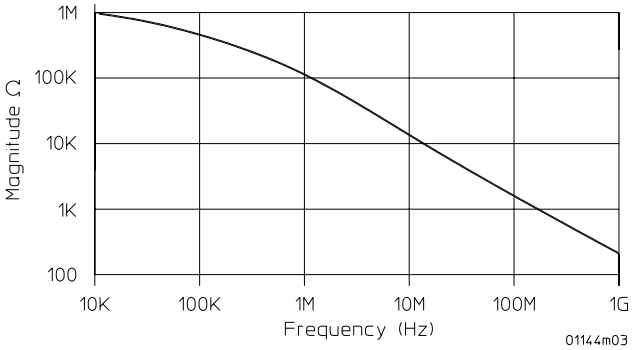
1155A Probe Dimensions

Operating the probe

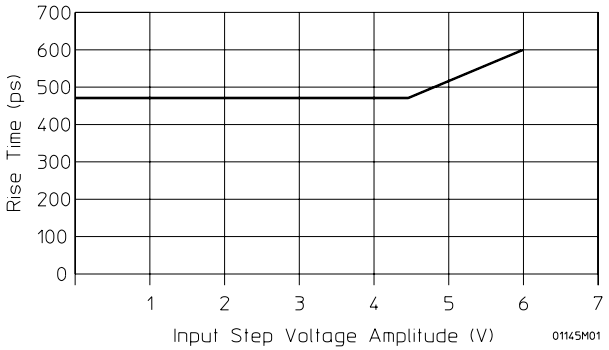
The following information will help you get the most out of your measurement when operating the probe.



Operating Voltage Derating



Typical Input Impedance vs. Frequency



Typical Rise Time vs. Input Voltage

System bandwidths

The approximate system bandwidths are shown here when using the 1155A Active Probe with these Infiniium Oscilloscopes:

When Using this Scope:	System Bandwidth is:
500 MHz Infiniium Oscilloscope	Approximately 500 MHz
1.5 GHz Infiniium Oscilloscope	Approximately 670 MHz

CAUTION Be sure to limit the input of this probe to voltages within the specified working voltage. Though the probe is designed with safeguards against static electricity and noise, the input is sensitive to and may be damaged by excessive voltage.

CAUTION The probe is a delicate device. Dropping it or exposing it to strong vibration or shock can damage it and cause a malfunction. Handle it with care.

How to replace the probe cable and tip

To replace the main cable

Due to the difficulty in soldering the main cable to the printed circuit assembly, Agilent Techologies recommends that you return the probe to an Agilent Technologies Service Center if the main cable or printed circuit assembly needs to be replaced. Because there are low-temperature solder connections inside the main cable, make sure you heat sink the main cable before soldering on it.

To replace the probe tip and cable

1. Take precautions against electro-static discharge (ESD) by grounding yourself and the probe.
2. Use a Torx 10 screwdriver to remove the four screws holding the probe pod case together.
3. Lift off the top of the probe pod case.
4. Use a solder iron to unsolder the center conductor wire of the faulty probe lead from the bonding pad on the printed circuit assembly.
5. Because the ground legs plug into small sockets under the cable, use a pair of needle nose pliers to lift the faulty probe lead away from the printed circuit assembly.
6. Flow enough solder onto the vacant solder pad for a good solder joint.
7. Insert the probe ground legs of the new cable into the circuit board pin sockets.
8. While holding the probe ground legs in position, place the notched strain relief into the slot of the lower half of the probe cover.
9. Because the wire to the center lead is very fragile, use caution when soldering it. Resolder the center lead on the vacant solder joint. The resulting solder joint should be very similar to the other probe lead.
10. Inspect the solder joint for good soldering integrity.
11. Check cable alignment inside the probe pod. Replace the top of the probe pod, then install the four screws.
12. Perform the calibration testing procedures on the probe.

Cleaning the probe

Clean the probe with a mild soap and water and immediately wipe the probe with a dry cloth. Do not use petroleum based solvents to clean the probe.

Returning the probe to Agilent Technologies for service

Before shipping the instrument to Agilent Technologies, contact your nearest Agilent Technologies Sales Office for additional details.

1 Write the following information on a tag and attach it to the instrument.

- Name and address of owner
- Instrument model number
- Instrument serial number
- Description of the service required or failure indications

2 Remove all accessories from the instrument.
Accessories include all cables. Do not include accessories unless they are associated with the failure symptoms.

3 Protect the instrument by wrapping it in plastic or heavy paper.
Antistatic wrapping or packaging is strongly recommended.

4 Pack the instrument in foam or other shock absorbing material and place it in a strong shipping container.
You can use the original shipping materials, or order materials from an Agilent Technologies Sales Office. If neither are available, place 3 to 4 inches of shock-absorbing material around the instrument and place it in a box that does not allow movement during shipping.

5 Seal the shipping container securely.

6 Mark the shipping container as FRAGILE.
In any correspondence, refer to the instrument by model number and full serial number.

To order replaceable parts

To order a replaceable part, in the United States call our toll-free hotline at 1-800-452-4844, or call your local Agilent Technologies Sales Office.

Adjusting the 1155A

There is no defined adjustment interval for the 1155A active probe. The adjustments are done at Agilent Technologies and do not require periodic maintenance. You should only make adjustments when replacing the probe tip.

When making adjustments to the probe, use the BNC-to-probe tip adapter (listed in the following table). Allow the probe to warm up for at least 15 minutes before starting adjustments.

Equipment required for making adjustments is listed below. You can substitute any equipment for the recommended model that satisfies the critical specifications listed.

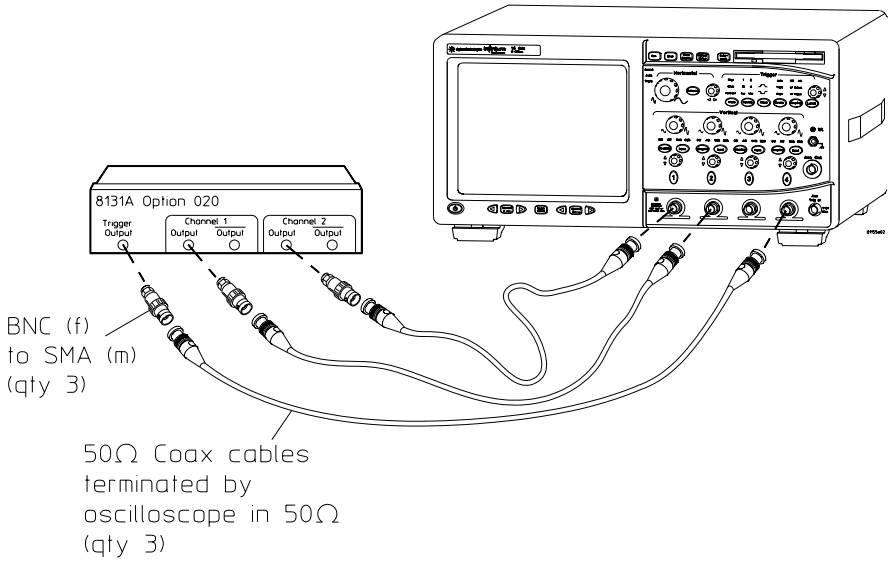
Equipment Required

Equipment	Qty	Critical Specification	Recommended Model or Agilent Part Number
Signal Generator	1	Square wave, <200 ps, 0 V to 1 Vp, <5% flatness, period 50 ms to 50 μs.	8131A (or equivalent)
Oscilloscope	1	>1.5 GHz bandwidth, 50-Ω source	54845A (or equivalent)
Terminations	2	50 Ω BNC plug to BNC socket	10100C (or equivalent)
Coaxial Cables	3	50 Ω, low loss	10503A (or equivalent)
Adapters	3	BNC to SMA	1250-1200
Clip	1	SMT Clip	16517-82109 (pkg of 20)
Adapter	2	BNC to probe tip	5063-2174
Adapter	2	BNC to BNC	1250-0080
Driver	1	Torx: T-10	

CAUTION Allow the probe to warm up for at least 15 minutes before starting the adjustments. Failure to allow the probe to warm up may cause faulty adjustments and failure of calibration test.

Setting up test system

1 To determine test system rise time, connect the equipment as shown below. Then go to the next step to make the control settings on the oscilloscope.



Setting Up Test System

2 Make the equipment settings as shown below.

Equipment Setup and Initial Characterization

8131A Signal Generator Control	Ch1 Setting	Ch2 Setting	54845A Acquisition Control	Setting	54845A Trigger and Display Control	Setting
Mode	Auto		Horizontal	500 ps	Trigger control Source	Triggered Channel 4
Period	50 μs	50 μs	Position	0 s	Slope	Positive
Delay	0 s	0s	Acquisition	Equiv. Time	Trigger Level	-300 mV
Duty cycle	50%	50%	Channel 1	200 mV/div, 50 Ω Offset 500 mV	Average	4
High	1 V		Channel 2	200 mV/div, 50 Ω Offset 500 mV	Graticule	Grid
Low	0 V		Channel 3	OFF		
Offset	0.5 V		Channel 4	200 mV/div, 50 Ω Offset -350 mV		
Output CH1	Enabled					
$\overline{\text{Output CH1}}$	Disabled					
Output CH2	Enabled					
$\overline{\text{Output CH2}}$	Disabled					

3 Adjust the oscilloscope position for leading edge of the waveform to be 2 major divisions from the left-hand side of the screen.

4 Drag and drop the rise time icon onto channel 1 rising edge and channel 2 rising edge respectively.

5 Press **Clear Display** button.

6 Read the mean rise time after the oscilloscope reaches 4 averages.

7 Record the test system rise time for channels 1 and 2.

Mean rise time of channel 1: _____

Mean rise time of channel 2: _____

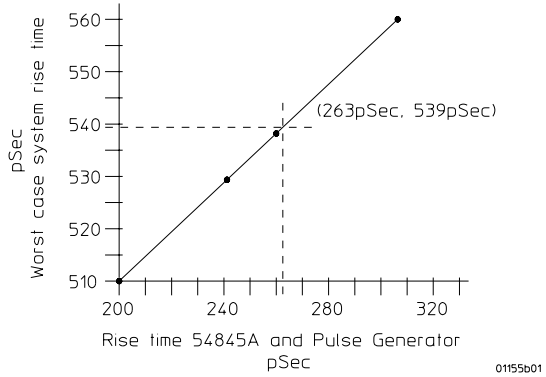
This information will be required for calculating the 1155A rise time.

You should expect to see that the rise times for channel 1 and channel 2 are similar.

Determine probe pass/fail criteria

The 1155A Probe is specified to have a rise time of ≤ 470 ps. The combined rise time of the **total system** (8131A, 1155A, and 54845A) is approximately 539 ps worst case.

To determine if the probe itself meets the specification of ≤ 470 ps, it is necessary to account for the **test system** rise time (8131A and 54845A) and to relate this to the **total system** rise time. The following graph allows you to relate these two times and to determine that the probe rise time is less than the worst case **total system** rise time. When adjusting the probe, the graph is useful for understanding when the probe is properly adjusted.



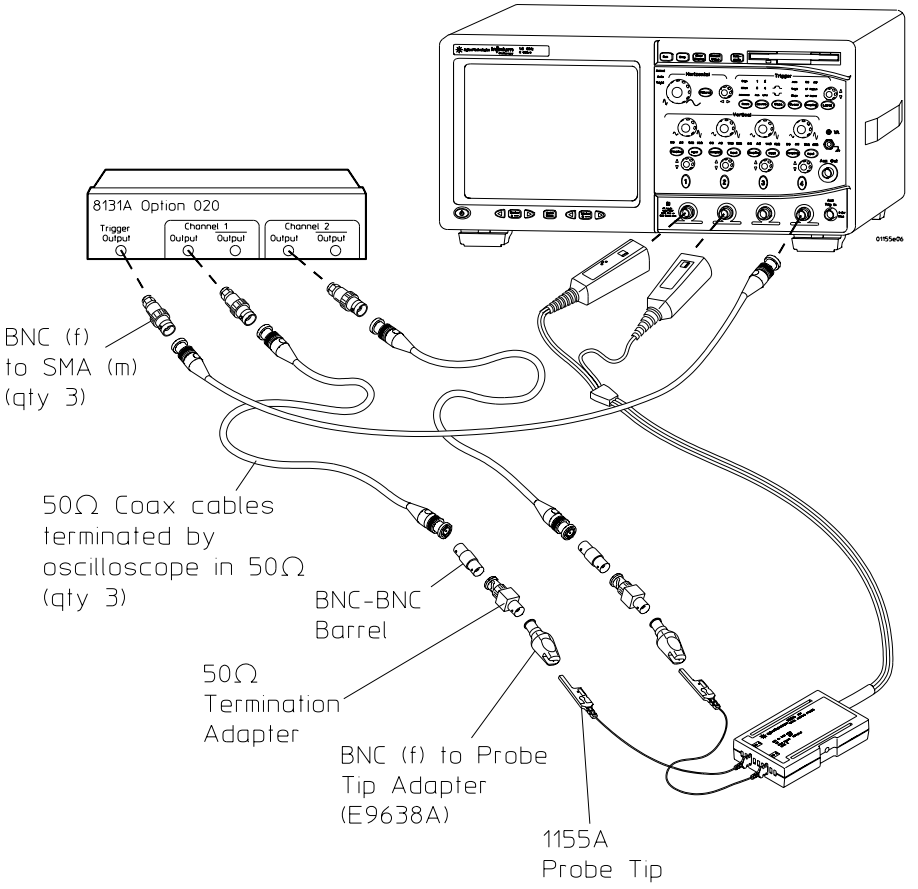
Comparing Test System Rise Time to Total System Rise Time

Example

In this example, the rise time of the oscilloscope and the signal generator (test system) is 263 ps. This allows for the rise time of the probe, signal generator, and oscilloscope (total system) to be a maximum of 539 ps which corresponds to a probe rise time of 470 ps.

Set up for probe adjustment

1 Attach the probe to the setup you made earlier setting up test system as indicated below.



Equipment Setup with 1155A Active Probe Attached

2 Remove the 50 Ω cables from channel 1 and channel 2 of the oscilloscope.

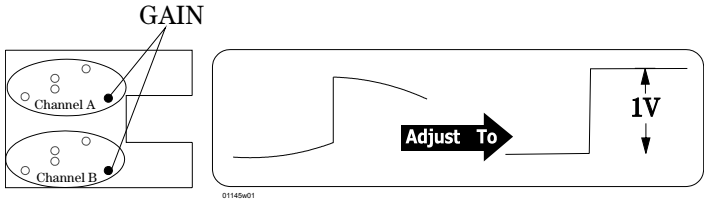
3 Add 50 Ω terminations to both cables using BNC to BNC barrels as indicated above.

4 Connect BNC to probe tip adapter to the terminations and connect the 1155A probes.
5 Remove the 4 screws of the probe housing using the T10 torx driver.

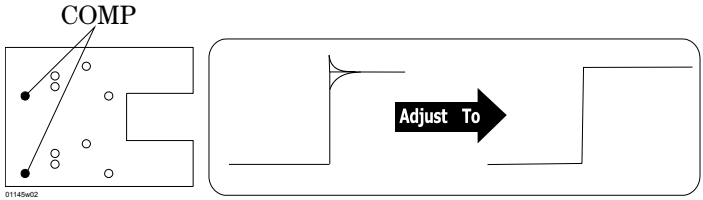
Adjusting the probe

1 Change the oscilloscope settings as follows:
- Time/div to 5 ms/div
- 8131A Signal Generator period to 50 ms (both channels)

2 If you installed a new board or cable assembly, set all the adjustments (except COMP) to the clockwise position. If you are tweaking the adjustments, you can set them to the clockwise position or leave them where they were last set. If only replacing cables, do not preset adjustments fully clockwise.
3 Connect ChA (large pod) to channel 1 of the oscilloscope; message displayed should read 10:1.
Connect ChB (small pod) to channel 2 of the oscilloscope; message displayed should read 10:1.
4 Adjust GAIN for a flat pulse on both probes.
If you turn on the DeltaV marker, you can use it as a reference for a flat line.



5 Change the signal generator to a 50-µs period and change the scope to 5 µs/div.
6 Adjust COMP for a flat pulse.
Again, you can use the DeltaV marker as a reference for a flat line.



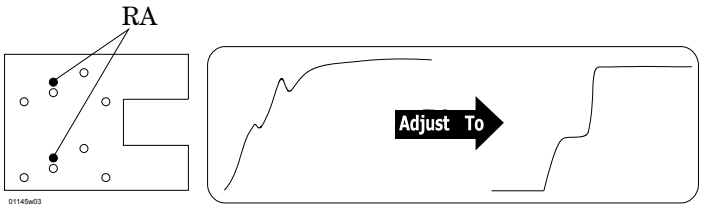
7 Change the scope to 1 ns/div. Adjust the oscilloscope's position to place the leading edge two major divisions from the left-hand side of the oscilloscope.

8 Drag and drop the rise time icon to the channel 1 display. Then pull the rise time icon to the channel 2 display.

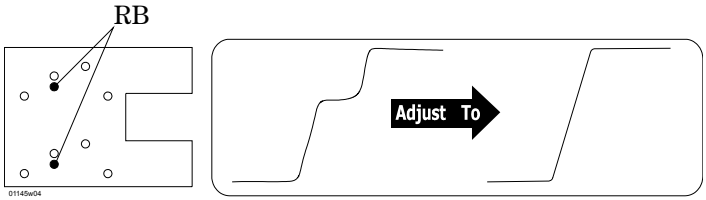
9 Drag and drop the overshoot icon to the channel 2 display.

> The following steps require iteration of RA, RB, and DAMP adjustments to achieve the best result.

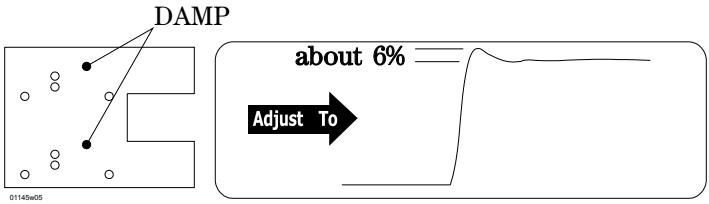
10 Adjust RA for a flat pulse top. RA, RB, and DAMP are mutually dependent.



11 Adjust RB for a linear rising edge. RA, RB, and DAMP are mutually dependent.



12 Adjust DAMP for about 6% overshoot. RA, RB, and DAMP are mutually dependent.



13 Repeat steps 10 through 12 to achieve the best pulse.

14 Temporarily place the cover on top of the probe body, then measure the pulse rise time.

You may need to remove the cover and make minor adjustments to RA, RB, and DAMP to meet specifications.

15 Repeat steps 10 through 12 for the other channel if the measured rise time is greater than the worst case **total system** rise time

16 Record ChA total rise time _____.
Record ChB total rise time _____.
This is the rise time of the probe and test system (total rise time.)

17 Calculate the probe rise time using the following equation:

$$Probe_{risetime} = \sqrt{(Total_{risetime})^2 - (TestSystem_{risetime})^2}$$

18 Note:
Channel A $Probe_{risetime}$ = _____.
Channel B $Probe_{risetime}$ = _____.

19 Install the cover and verify that both probes still meet the rise time specification.

The result should be about 6 to 10% overshoot, and the rise time should be less than the rise time you determined in step 16.

20 Disconnect the probe tips from the 8131A signal generator.

21 Perform the probe tip calibration for ChA and ChB.

22 Look at the probe attenuation in the probe setup dialog box of the 54845A oscilloscope. The attenuation for Ch1 and Ch2 should be less than 10.4 or greater than 9.6. This allows 1% for the oscilloscope and 3% for the 1155A probe.

Calibration Testing Procedures

These procedures are used to test the warranted specifications for the 1155A Active Probe. Use the equipment listed in the Test Equipement Required section to complete the calibration procedures.

Testing interval

The calibration test procedures may be performed for incoming inspection of the instrument and should be performed periodically thereafter to ensure and maintain peak performance. The recommended calibration test interval is yearly or every 2,000 hours of operation. The amount of use, environmental conditions, and the user's experience concerns regarding the need for testing will contribute to your specific calibration test interval.

When you return the 1155A probe to Agilent for calibration, a new certificate is provided which verifies that the probe performed within specified limits and against equipment which is traceable to the National Institute of Standards and Technology.

Equipment required for performance tests

The equipment required for the calibration tests is listed in the test. Any equipment satisfying the critical specifications listed may be substituted for the recommended model.

CAUTION Allow the probe to warm up for at least 15 minutes prior to starting the calibration tests. Failure to allow the probe to warm up may cause the probe to fail tests.

Verifying probe input resistance

Specification: 1.0 MΩ ±2%

Equipment Required

Equipment	Critical Specification	Recommended Model/Part
Digital Multimeter (DMM)	Resistance ±1%	34401A

1 Connect the DMM probes between the probe tip (ChA) and the ground at the tip of the probe.
2 Set up the DMM to measure resistance.
The resistance should read 1.0 MΩ ±20 kΩ.
3 Record resistance and repeat steps 1 through 3 for ChB.
ChA input resistance _____.
ChB input resistance _____.
4 Enter these value in the Test Card.

Verifying probe rise time

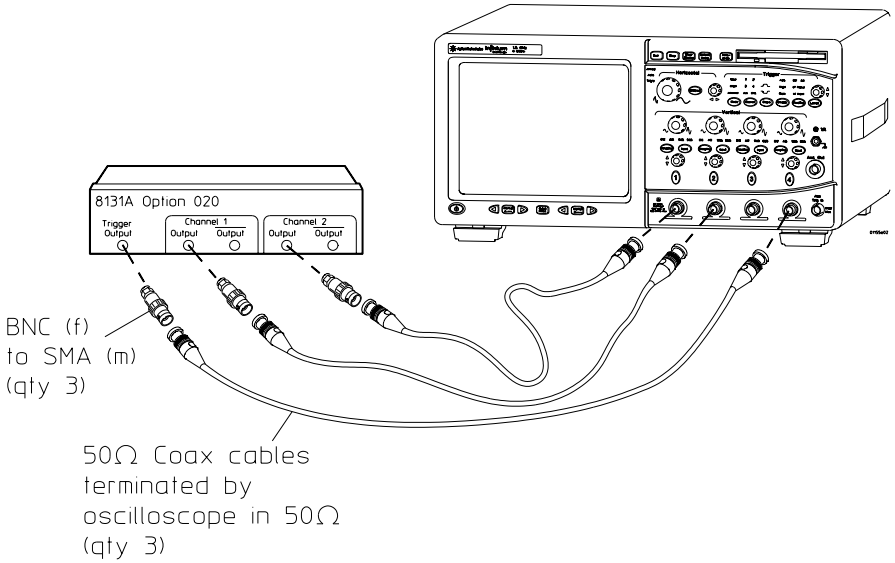
Specification: ≤ 470 ps

Equipment Required

Equipment	Qty	Critical Specification	Recommended Model or Agilent Part Number
Signal Generator	1	Square wave, <200 ps, 0 V to 1 Vp, <5% flatness, period 50 ms to 50 μs.	8131A (or equivalent)
Oscilloscope	1	>1.5 GHz bandwidth, 50-Ω source	54845A (or equivalent)
Terminations	2	50 Ω BNC plug to BNC socket	10100C (or equivalent)
Coaxial Cables	3	50 Ω, low loss	10503A (or equivalent)
Adapters	3	BNC to SMA	1250-1200
Adapter	2	BNC to probe tip	5063-2174
Adapter	2	BNC to BNC	1250-0080

CAUTION Allow the probe to warm up for at least 15 minutes prior to starting the calibration tests. Failure to allow the probe to warm up may cause the probe to fail tests.

1 To determine test system rise time, connect the equipment as shown below. Then go to the next step to make the control settings on the oscilloscope.



Setting Up Test Equipment

2 Make the equipment settings as shown below.

Equipment Setup and Initial Characterization

8131A Signal Generator Control	Ch1 Setting	Ch2 Setting	54845A Acquisition Control	Setting	54845A Trigger and Display Control	Setting
Mode	Auto		Horizontal	500 ps	Trigger control Source	Triggered Channel 4
Period	50 μs	50 μs	Position	0 s	Slope	Positive
Delay	0 s	0s	Acquisition	Equiv. Time	Trigger Level	-300 mV
Duty cycle	50%	50%	Channel 1	200 mV/div, 50 Ω Offset 500 mV	Average	4
High	1 V		Channel 2	200 mV/div, 50 Ω Offset 500 mV	Graticule	Grid
Low	0 V		Channel 3	OFF		
Offset	0.5 V		Channel 4	200 mV/div, 50 Ω Offset -350 mV		
Output CH1	Enabled					
$\overline{\text{Output CH1}}$	Disabled					
Output CH2	Enabled					
$\overline{\text{Output CH2}}$	Disabled					

3 Adjust the oscilloscope position for leading edge of the waveform to be 2 major divisions from the left-hand side of the screen.

4 Drag and drop the rise time icon onto channel 1 rising edge and channel 2 rising edge respectively.

5 Press **Clear Display** button.

6 Read the mean rise time after the oscilloscope reaches 4 averages.

7 Record the test system rise time for channels 1 and 2.

Mean rise time of channel 1: _____

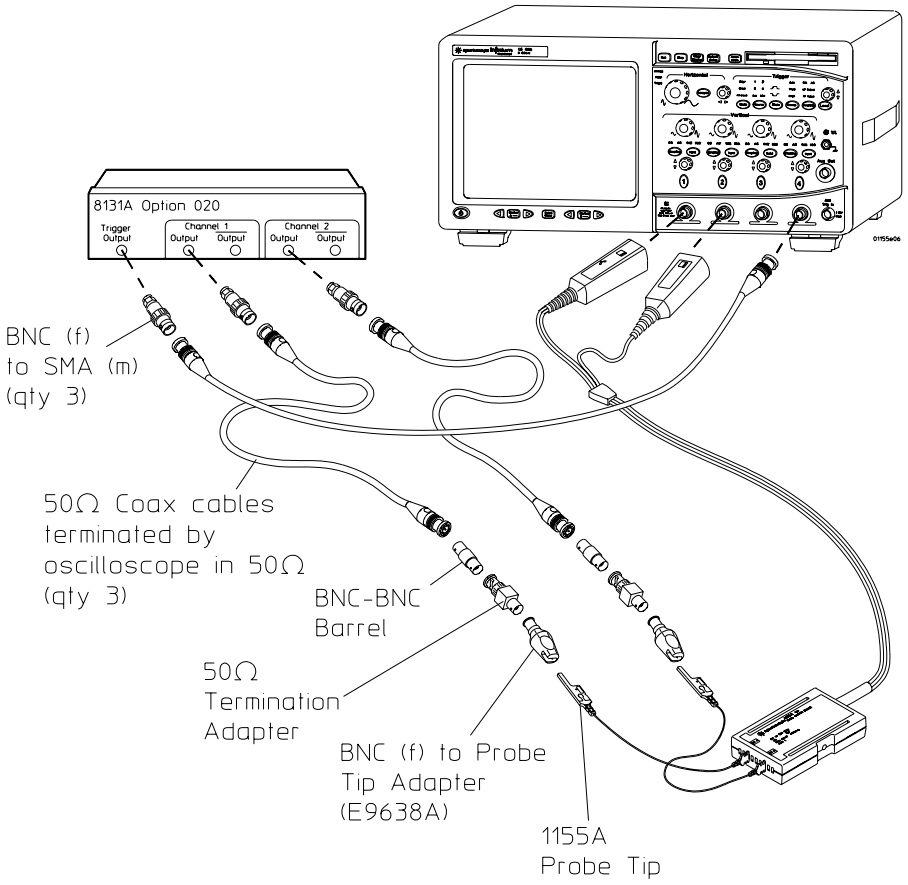
Mean rise time of channel 2: _____

This information will be required for calculating the 1155A rise time.

You should expect to see that the rise times for channel 1 and channel 2 are similar.

Set up for probe rise time verification

1 Attach the probe to the setup you made earlier as indicated below.



Equipment Setup with 1155A Active Probe Attached

2 Adjust the oscilloscope position for leading edge of the waveform to be 2 major divisions from the left-hand side of the screen.

3 Drag and drop the rise time icon onto channel 1 rising edge and channel 2 rising edge respectively.

4 Press **Clear Display** button.

5 Read the mean rise time after the oscilloscope reaches 4 averages.

6 Record the total system rise time for channels 1 and 2.
Mean rise time of channel A_{total}: _____
Mean rise time of channel B_{total}: _____

7 Calculate the probe rise time using the following equation:

$$Probe_{risetime} = \sqrt{(Total_{risetime})^2 - (TestSystem_{risetime})^2}$$

8 Enter value in the Test Card.

Calibration Test Record

Agilent Technologies	**1155A Active Probe**
Serial No._____	Tested by_____
Recommended Test Interval - 1 Year/2000 hours	Work Order No._____
Recommended next testing_____	Date_____
	Temperature_____

Test	Limits	Results Channel A	Results Channel B
Input Resistance	1 MΩ ±2%, 980 kΩ to 1.020 MΩ	_____	_____
Attenuation	10:1 ±3%, 9.6:1 to 10.4:1	_____	_____
Rise Time	< 470 ps	_____	_____

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:	Agilent Technologies
Manufacturer's Address:	Colorado Springs Division 1900 Garden of the Gods Rd. Colorado Springs, CO 80907 USA

declares that the product

Product Name:	Digitizing Oscilloscope Probe
Model Number(s):	1155A
Product Option(s):	All

conforms to the following Product Specifications:

Safety:	IEC 1010-1:1990+A1 / EN 61010-1:1993 UL 3111 CSA-C22.2 No. 1010.1:1993
EMC:	CISPR 11:1990 / EN 55011:1991 Group 1, Class A IEC 555-2:1982 + A1:1985 / EN 60555-2:1987 IEC 555-3:1982 + A1:1990 / EN 60555-3:1987 + A1:1991 IEC 801-2:1991 / EN 50082-1:1992 4 kV CD, 8 kV AD IEC 801-3:1984 / EN 50082-1:1992 3 V/m, {1kHz 80% AM, 27-1000 MHz} IEC 801-4:1988 / EN 50082-1:1992 0.5 kV Sig. Lines, 1 kV Power Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC, and carries the CE-marking accordingly.

This product was tested in a typical configuration with Agilent Technologies test systems.

Colorado Springs, 11/13/98

Ken Wyatt

Ken Wyatt / Product Regulations Manager

European Contact: Your local Agilent Technologies Sales and Service Office or Agilent Technologies GmbH, Department ZQ / Standards Europe, Herrenberger Strasse 130, D-71034 Boeblingen, Germany (FAX +49-7031-14-3143)

Product Regulations

Safety IEC 1010-1: 1990+A1 / EN 61010-1: 1993
UL 3111
CSA-C22.2 No.1010.1:1993

EMC This Product meets the requirements of the European Communities (EC) EMC Directive 89/336/EEC.

Emissions EN55011/CISPR 11 (ISM, Group 1, Class A equipment), IEC 555-2 and IEC 555-3

Immunity EN50082-1	Code[1]	Notes[2]
IEC 801-2 (ESD) 8kV AD	2	
IEC 801-3 (Rad.) 3V/m	2	
IEC 801-4 (EFT) 1kV	2	

[1] Performance Codes:

1 Pass - Normal operation, no effect.

2 Pass - Temporary degradation, self recoverable.

3 Pass - Temporary degradation, operator intervention required.

4 Fail - Not recoverable, component damage.

[2] Notes: (none)

Sound Pressure Level N/A

Regulatory Information for Canada

ICES/NMB-001

This ISM device complies with Canadian ICES-001.
Cet appareil ISM est confomre à la norme NMB-001 du Canada.

Regulatory Information for Australia/New Zealand

This ISM device complies with Australian/New Zealand AS/NZS 2064.1

N10149

Safety Notices

This apparatus has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

Warnings

• Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.

• Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders. To do so could cause a shock or fire hazard.

• If you energize this instrument by an auto transformer (for voltage reduction or mains isolation), the common terminal must be connected to the earth terminal of the power source.

• Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.

• Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

• Do not install substitute parts or perform any unauthorized modification to the instrument.

• Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.

• Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

• Do not use the instrument in a manner not specified by the manufacturer.

To clean the instrument

If the instrument requires cleaning: (1) Remove power from the instrument. (2) Clean the external surfaces of the instrument with a soft cloth dampened with a mixture of mild detergent and water. (3) Make sure that the instrument is completely dry before reconnecting it to a power source.

Safety Symbols

Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product..

Hazardous voltage symbol.

Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

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Notices

Manual Part Number
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WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

Agilent Technologies

User's Guide

Agilent Technologies
Printed in the Malaysia

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