TELEDYNE LECROY
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Operator's Manual

ZS4000

High-Impedance Active Probe

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Operator's Manual

April, 2017

ZS4000 High-Impedance Active Probe Operator's Manual

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Warranty

Teledyne LeCroy warrants this oscilloscope accessory for normal use and operation within specification for a period of one year from the date of shipment. Spare parts, replacement parts and repairs are warranted for 90 days.

In exercising its warranty, Teledyne LeCroy, at its option, will either repair or replace any assembly returned within its warranty period to the Customer Service Department or an authorized service center. However, this will be done only if the product is determined by Teledyne LeCroy's examination to be defective due to workmanship or materials, and the defect is not caused by misuse, neglect, accident, abnormal conditions of operation, or damage resulting from attempted repair or modifications by a non-authorized service facility.

The customer will be responsible for the transportation and insurance charges for the return of products to the service facility. Teledyne LeCroy will return all products under warranty with transportation charges prepaid.

This warranty replaces all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness or adequacy for any particular purposes or use. Teledyne LeCroy shall not be liable for any special, incidental, or consequential damages, whether in contract or otherwise.

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Safety Instructions

Observe generally accepted safety procedures in addition to the precautions listed here. **The overall safety of any system incorporating this accessory is the responsibility of the assembler of the system.**

Symbols

These symbols appear on the probe body or in documentation to alert you to important safety considerations.

CAUTION of potential for damage to equipment, or **WARNING** of potential for bodily injury. Attend to the information, and do not proceed until conditions are fully understood and met.

ELECTROSTATIC DISCHARGE (ESD) HAZARD. The probe is susceptible to damage if anti-static measures are not taken.

Precautions

Connect and disconnect properly. Connect probe to the measurement instrument before connecting the test leads to a circuit/signal being tested.

Use only within operational environment listed. Do not use in wet or explosive atmospheres.

Use indoors only.

Keep product surfaces clean and dry.

Be careful with sharp tips. The tips may cause bodily injury if not handled properly.

Use only accessories designed for use with the product.

Observe all terminal ratings. To avoid electric shock or probe damage, do not use the probe above the input limits shown on the probe.

Do not excessively bend cables.

Do not operate with suspected failures. Do not use the probe if any part is damaged. Cease operation immediately and secure the probe from inadvertent use.

Operating Environment

The accessory is intended for indoor use and should be operated in a clean, dry environment. Before using this product, ensure that its operating environment is maintained within these parameters:

Temperature: 0 to 40° C

Humidity: Maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40° C

Altitude: Up to 10,000 ft (3,048 m)

Introduction

The ZS4000 is a small, high-impedance active probe designed to meet today's increasing demand for measurements on a variety of test points. With low input capacitance and high input resistance, circuit loading is minimized.

The ZS4000 can be used with a variety of Teledyne LeCroy oscilloscopes with MAUI firmware version 7.1.1.2 or later (see the product page at teledynelecroy.com/oscilloscope for compatibility). With the ProBus interface, the probe becomes an integral part of the oscilloscope, controlled from the oscilloscope's front panel. The oscilloscope provides power to the probe, so there is no need for a separate power supply or batteries.

See the ZD4000 product page at teledynelecroy.com for probe specifications.

Key Benefits	Features
High frequency performance Low input capacitance Wide dynamic range ProBus interface	Small, low mass probe head is designed for ease of use and high performance. Probe tip socket fits easily onto 0.025 inch square pins for direct access to test points. Several available adaptors connect directly to the probe socket. Ground socket accepts several different ground leads to provide a short ground path for high frequency performance.

Standard Accessories

The ZS4000 probe is shipped with the following standard accessories:

Standard Accessory	QTY	Replacement Part Number
Straight Tip	3	PK-ZS-001
Pogo Tip	3	PK-ZS-017
Bent Tip	1	PACC-PT003
IC Tip	1	PACC-PT005
Right Angle Socket	1	PK-ZS-006
2.54mm Square Pin Adaptor	1	PK-ZS-018
Offset Ground	2	PK-ZS-016
Ground Blade, Narrow	1	PK-ZS-021
Copper Tape Pad	2	PK-ZS-009
Ground Blade, Wide	2	PK-ZS-015
Pogo Ground Lead	1	PK-ZS-020
2.54 mm PCB Adaptor	5	PK-ZS-024
Straight Pin Lead – Short	1	PK-ZS-022
Straight Pin Lead – Long	1	PK-ZS-023
Right Angle Lead – Short	1	PACC-LD-003
Right Angle Lead – Long	1	PACC-LD-004
Y Lead Adaptor	1	PK-ZS-014
Channel ID Clips (set of 4)	1	PK-ZS-010
Micro-Grabbers (1 each)	2	PK-ZS-007R / PK-ZS-007B
QFPIC Clips (set of 2)	1	PK-ZS-025
Freehand Probe Holder	1	PK-ZS-019
Instruction Manual	1	N/A*
Certificate of Calibration	1	

* PDF copy of this manual available free at teledynelecroy.com/support/techlib.

Tips

Straight Tip

The straight tip is rugged and designed for general probing. Fits in either probe socket.

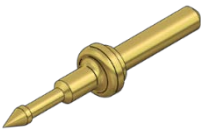
IC Lead Tip

The IC Lead Tip is covered in insulation on all sides (except for a small edge), this tip was designed to prevent shorting neighboring IC leads. The gold part of the tip is not insulated and should touch the IC lead to be tested. It is one-size-fits-all and will work with any IC lead pitch. Fits in either probe socket.

Bent Tip

The Bent Tip is made out of titanium, this tip is ideal for situations that require you to hold the probe parallel to the circuit board under test. Also gives you more control when holding the probe like a pencil. Fits in either probe socket.

Pogo Tip



The pogo tip provides z-axis compliance. The tip can fit into a socket or onto an IC leg.

Right-Angle Socket

The Right Angle Socket allows the probe to be connected to a pin on the board under test, while keeping the probe parallel to the board.

Grounds

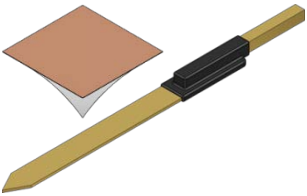
2.54 mm Square Pin Adaptor

The 2.54 mm square pin adaptor fits into the ground socket of the ZS4000 probe for easy connection to standard 2.54 mm square pin spacing on a circuit board.

Offset Ground

The Offset Ground is designed to be attached to either socket of the probe head. The Offset Ground connects to the ground socket and wraps around the probe head, making it possible to probe a signal and ground that are extremely close together. The short length provides the highest quality grounding for high frequency applications.

Narrow Ground Blade and Copper Pad



The Narrow Ground Blade and Copper Pad together are the best grounding solution for probing an IC. The Narrow Ground Blade is designed to provide a short, low inductance ground path. The Copper Pad is adhesive backed to stick to the top of an IC, and can then be soldered to the IC ground.

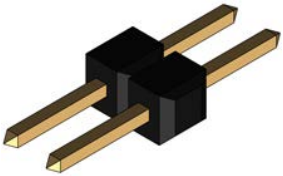
Wide Ground Blade

The Wide Ground Blade is ideal for use when the best quality ground is needed. The wide blade offers the minimal inductance compared to the narrow ground blade.

Pogo Ground Lead

The Pogo Ground Lead allows flexibility for bending and positioning the ground lead onto hard-to -reach test points, while maintaining z-axis compliance.

2.54 mm PCB Adaptor



The 2.54 mm PCB adaptor fits into the tip socket of the ZS4000 probe for easy connection to standard 2.54 mm square pin spacing on a circuit board.

Leads

While longer leads provide greater flexibility when connecting the probe to a circuit, the added inductance may degrade the fidelity of high frequency signals.

Short and Long Straight Pin Lead

These leads have a socket on one end and a square pin on the other to connect to the input or ground socket of the probe body, and may be used for general purpose probing.

Short and Long Right Angle Pin Lead

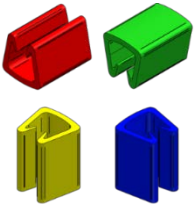
These leads have a socket on one end with a right angle and a square pin on the other to connect to the input or ground socket of the probe body, and may be used for general purpose probing.

Y Lead

This lead is used for both ground and input lead simultaneously. It has two sockets on one end and two square pins on the other and may be used for general purpose probing.

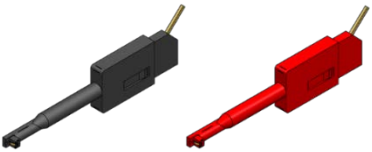
Clips and Grabbers

Channel ID Clips



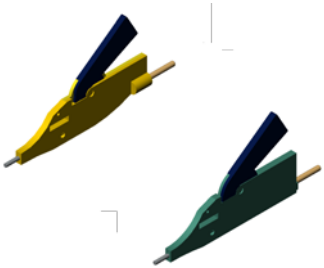
The Channel ID Clips can be attached to the probe cable to quickly identify to which channel the probe is currently connected: CH1 yellow, CH2 red, CH3 green, and CH4 blue.

Micro-Grabbers



The micro-grabbers are ideal for connecting to small IC legs or pins very tightly spaced.

QFPIC Clips



The QFPIC clips are ideal for connecting to the legs or pins of Quad Flat Pack ICs.

Probe Holder

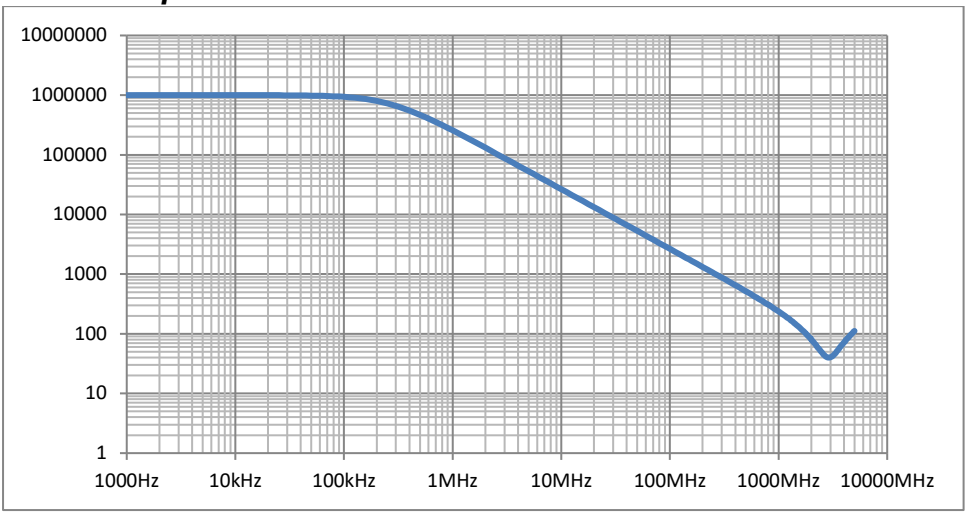
Freehand Probe Holder

The FreeHand lets you focus on the oscilloscope screen instead of on maintaining contact to multiple test points. It allows you to concentrate on what is really important – the waveform.

It is designed to keep most of the weight on the probe tip and will prevent lost contact when a bump to the table shakes the circuit under test.

Probe Impedance and Equivalent Circuit

ZS4000 Impedance Chart



ZS4000 Equivalent Circuit

Probe Operation

Handling the Probe

The ZS4000 probe is a precision test instrument. Exercise care when handling and storing the probe. Always handle the probe by the probe body or compensation box. Avoid putting excessive strain or exposing the probe cable to sharp bends.

ESD Sensitive: The tips of the probes are sensitive to Electrostatic Discharge (ESD). Avoid causing damage to the probe by always following anti-static procedures (wear wrist strap, etc.) when using or handling the probe.

Connecting the Probe to the Test Circuit

To maintain the high performance capability of the probe in measurement applications, care must be exercised in connecting the probe to the test circuit. Increasing the parasitic capacitance or inductance in the input paths may introduce a “ring” or slow the rise time of fast signals. Input leads which form a large loop area will pick up any radiated electromagnetic field which passes through the loop and may induce noise into the probe input.

Using one of the available accessories makes the ZS4000 probe with its small profile and low mass head ideally suited for applications in dense circuitry.

Connecting the Probe to an Oscilloscope

ZS4000 probes are designed for use with Teledyne LeCroy platforms equipped with the ProBus interface. When you attach the probe output connector to the oscilloscope’s input connector, the oscilloscope recognizes the probe, provides proper termination, and activates the probe control functions in the user interface.

Operation with a Teledyne LeCroy Oscilloscope

When the ZS4000 probe is connected to any compatible Teledyne LeCroy oscilloscope, the displayed scale factor and measurement values are automatically adjusted. A Probe dialog appears behind the corresponding Channel dialog.

The probe can be controlled through the oscilloscope front panel:

- The **Volts/Div** knob controls the oscilloscope's scale factor to give full available dynamic range up to 2 V/div (16 V peak to peak).
- The channel **Offset** knob controls the probe input offset circuit over its range of ±12 V.

Auto Zero

Auto Zero corrects for DC offset drifts that naturally occur from thermal effects in the amplifier. The probe incorporates Auto Zero capability to remove the DC offset from the probe's amplifier output to improve the measurement accuracy.

Auto Zero is invoked manually from the ZS4000 dialog that appears when the probe is connected to the oscilloscope.

Always perform Auto Zero after the probe is warmed up (recommended warm-up time is 20 minutes). Depending on the measurement accuracy desired and/or changes in ambient temperature where the probe is located, it may be necessary to perform Auto Zero more often. If the probe is disconnected from the oscilloscope and reconnected, repeat Auto Zero after a suitable warm-up time.

CAUTION: Disconnect the probe from the circuit before Auto Zero, or else any DC component that is part of the Signal to be measured will be zeroed out.

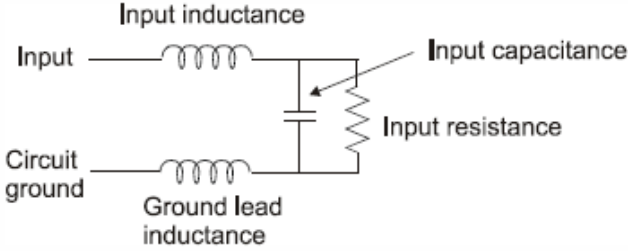
High Frequency Measurements

Probe Input Loading

When you touch a probe to the circuit under test, the probe will affect your measurement because of the probe's input impedance introduced into the circuit. All probes present resistive, capacitive and inductive loading.

Inductive Loading (Lead Length)

A significant element in this circuit is the inductance shown in the input ground leads of the oscilloscope probe.



Probe input equivalent circuit

The ground lead is the primary return path for the current resulting from the input voltage acting on the probe's input impedance. The ground lead and input lead inductances act with the probe's input capacitance to form series LC network. The impedance of a series LC network drops dramatically at its resonant frequency. This is the cause of the "ring" we often see after the leading edge of pulses in measured waveforms.

This effect is referred to as ground lead corruption. Because it is impossible to eliminate either the L or C from this circuit, the method to improve waveform fidelity is to raise the resonant frequency beyond the bandwidth of interest in the measurement.

The resonant frequency of a simple LC circuit can be represented by:

$$F_{resonance} = \frac{1}{2\pi\sqrt{LC}}$$

The resonant frequency of a series LC circuit can be raised by decreasing the inductance, capacitance or both. Since the input capacitance is already very

low and cannot be reduced, you can only try to reduce the inductance. This can be accomplished by using the shortest possible input lead as well as the shortest possible ground lead.

For example, to obtain the shortest possible ground lead when measuring IC related signals, attach a small piece of copper clad material to the top of the IC package and connect this to the package grounding wires.

Using the shortest ground lead and input lead available makes probing signals on the package easier and makes for the shortest lead length for the best signal fidelity. To illustrate how dramatic this effect is, we will work a simple example. Assuming an input capacitance of 0.6 pF and a total lead length (input and ground) of 2 inches (inductance of ≈ 25 nH/inch) such a setup may cause ringing with a resonant frequency (f0) of:

$$f_o = \frac{1}{2\pi\sqrt{50 * 10^{-9} * 0.6 * 10^{-12}}} = 920\ MHz$$

This frequency is well within the passband of the probe and therefore shows up as part of the measured signal at faster time/div settings.

To determine how fast a waveform to be measured can be without causing ringing on a probe like this, divide the BW (ringing frequency) of the probe into 0.35:

$$t_{rise} = \frac{0.35}{BW} = \frac{0.35}{920\ MHz} = 380\ ps$$

Any input signal with a rise time faster than 380 ps can cause ringing.

Capacitive Loading

Capacitive loading is usually the most troublesome of the three loading effects. It can affect the rise time, bandwidth and delay time measurements. At higher frequencies the capacitive loading can affect the amplitude as well as the waveshape of the measured signal by introducing an exponential response to the waveform.

For a simple RC network the time constant of this exponential response is:

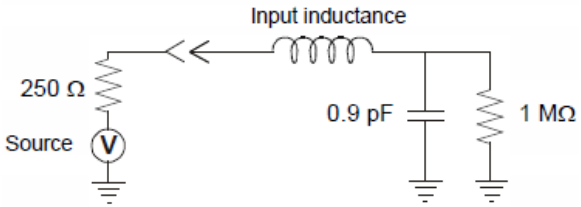
$$t_{rise} = 2.2 \times C_{total} \times R_{total}$$

Where C_{total} is the combined probe and circuit capacitance and R_{total} is combined circuit and probe resistance.

For a setup where Ct = 0.6 pF and a source resistance is 250 Ω, the measured rise time will be 330 ps, which will correspond to a bandwidth of 909 MHz, assuming no inductive loads.

$$t_{rise} = 2.2 \times 0.6 \times 10^{-12} \times 250\,\Omega = 330\ \text{ps}$$

Parallel combination of 250 Ω and 1 MΩ is still 250 Ω



Probe input equivalent circuit

To illustrate the effect of capacitive loading at higher frequencies:

- At frequency 750 MHz the reactance of the 0.6 pF capacitance is 354 Ω
- At frequency 1.0 GHz the reactance has been lowered to 265 Ω

If, at a given frequency, the source impedance is large with respect to the input impedance, a measurable reduction in the output signal amplitude may occur.

$$V_{out} = \frac{Z_{probe}}{Z_{probe} + Z_{source}} \times V_{in}$$

where Z_{probe} is the probe's input impedance and Z_{source} is the source impedance.

For example: At 750 MHz, where the probe input impedance has reduced to 354 Ω, and a source resistance of 250 Ω the probe output amplitude is reduced to:

$$V_{out} = \frac{354}{354 + 250} = 0.59 * V_{in}$$

Care and Maintenance

Cleaning

The exterior of the probe and cable should be cleaned using a soft cloth moistened with water. Abrasive agents, strong detergents, or other solvents may damage the probe. Always ensure that input leads are free of debris.

CAUTION. The probe case is not sealed and should never be immersed in any fluid.

Calibration Interval

The recommended calibration interval is one year from the time the probe is put into service. The complete performance verification procedure should be performed as the first step of annual calibration.

Service Strategy

The ZS4000 probes utilize fine pitch surface mount devices. It is therefore impractical to attempt to repair in the field. Defective probes must be returned to a Teledyne LeCroy service facility for diagnosis and exchange. Defective probes under warranty are repaired or replaced. A probe that is not under warranty can be exchanged for a factory refurbished probe for a modest fee. You must return the defective probe in order to receive credit for the probe core.

Replacement Parts

The probe connection accessories and other common parts can be ordered through the North America Customer Care Centers. Refer to the Standard Accessories table (p.3).

Performance Verification

This procedure can be used to verify the warranted characteristics of the ZS4000 High Impedance Active Probe. It tests:

- Output Zero Voltage
- LF Attenuation Accuracy

Performance verification can be completed without removing the probe covers or exposing the user to hazardous voltages.

NOTE: The correct operation of the ZS4000 controls requires software version 7.1.1.2 or higher. The oscilloscope software version can be verified by going to Utilities > Utilities Setup > Status. Contact your local Teledyne LeCroy representative or visit teledynelecroy.com if the software in your oscilloscope requires updating.

Required Test Equipment

This procedure has been developed to minimize the number of calibrated test instruments required. Only equipment listed in boldface must be calibrated to the accuracy indicated. Because the input and output connector types may vary on different brands and models of test instruments, additional adaptors or cables may be required.

The warranted characteristics of the probe are valid at any temperature within the Operating Environment (p.2) listed in this manual. However, some of the other test equipment used to verify the performance may have environmental limitations required to meet the accuracy needed for the procedure. Be sure that the ambient conditions meet the requirements of all the test equipment used in his procedure.

NOTE: The function generator used in this Performance Verification Procedure is used for making relative measurements. Because the output of the generator is measured with an oscilloscope in this procedure, it is not required to calibrate the generator.

Description	Minimum Requirement	Example Equipment
Oscilloscope	ProBus Interface; Windows-based	Teledyne LeCroy WaveRunner 6 Zi or WaveSurfer MXs-B
Digital Multimeter (DMM) with test probe leads	**4.5 digit** **DC: 0.1% Accuracy** **AC: 0.1% Accuracy**	Keysight 34401A Fluke 8842A-09
Function Generator	Sine Wave output Amplitude adjustable to 14.14 Vp-p (5 Vrms) into 1 MΩ at 70 Hz	Keysight 33120A Stanford Research DS340
Power Supply	0-12 V, settable to 10 mV	HP E3611A
BNC Coaxial Cable (2 ea.)	Male to Male, 50 Ω, 36" Cable	Pomona 2249-C-36 Pomona 5697-36
BNC Tee Connector	Male to Dual Female	Pomona 3285
Calibration Fixture	ProBus Extender Cable	Teledyne LeCroy PROBUS-CF01
Terminator, Precision, BNC	50 Ω ± 0.05%	Teledyne LeCroy TERM-CF01
Banana Plug Adapter (2 ea.)	Female BNC to Dual Banana Plug	Pomona 1269
BNC to Mini-grabber	BNC Mail to Mini-grabber Cable, 36"	Pomona 5187-C-36

Test Setup and Preliminary Procedure

1. Connect the probe to the female end of the ProBus Extension Cable. Connect the male end of the ProBus Extension Cable to channel 1 of the oscilloscope.
2. Turn on the oscilloscope and allow at least 20 minutes warm-up time for the probe and oscilloscope before performing the Verification Procedure.
3. Turn on the other test equipment and allow them to warm up for the manufacturer's recommended timeframe.
4. While the instruments are reaching operating temperature, make a photocopy of the Performance Verification Test Record and fill in the necessary data.

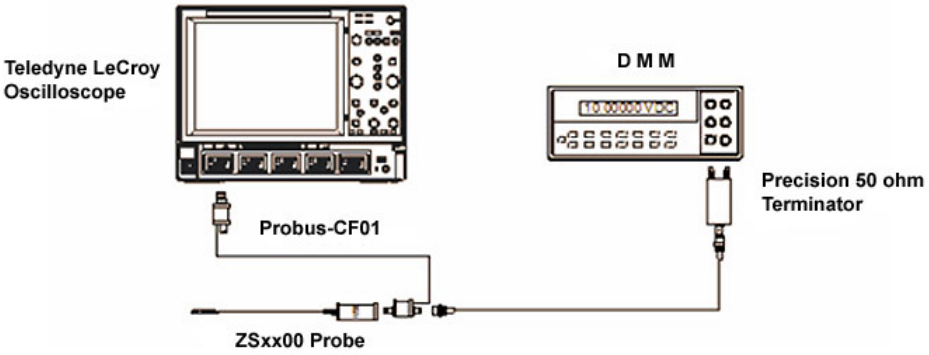
Functional Check

The functional check verifies the basic operation of the probe functions. Perform the Functional Check prior to the Performance Verification.

1. Return to the factory default settings:
   - Choose File > Recall Setup from the menu bar.
   - Touch the Recall Default button.
2. Touch the C1 descriptor box to open the C1 dialog.
3. Verify that the probe is sensed and the correct model is displayed on the probe dialog tab behind the C1 dialog.

Verification Procedure

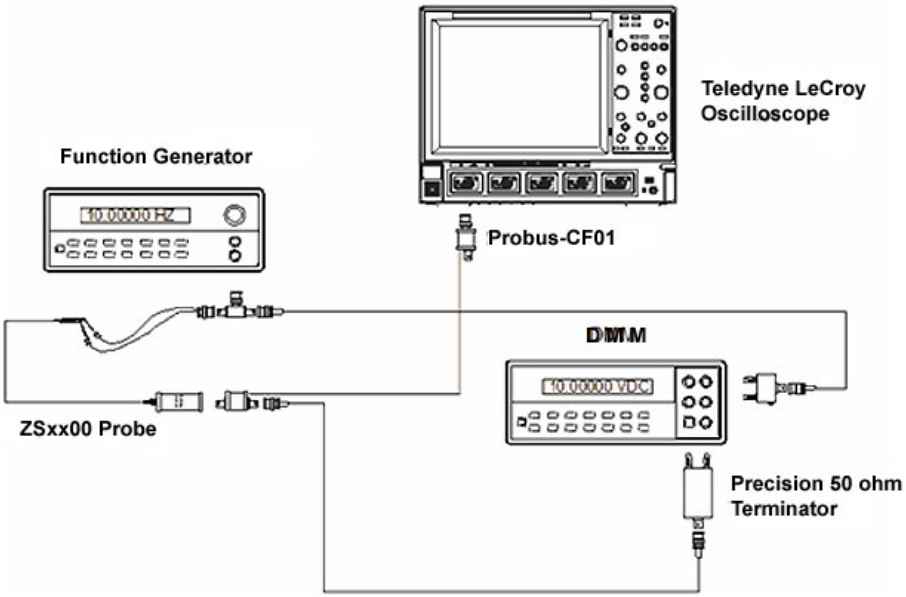
A. Output Zero Voltage



Output Zero Voltage Test Setup

1. Connect one end of a BNC cable to the female BNC connector on the probe end of the ProBus extender cable. Connect the precision 50 Ω terminator to the other end of the BNC cable.
2. Connect the banana plugs of the Precision terminator to the input of the DMM. Make sure that the plug corresponding to the BNC shield (marked "Ground") is connected to the **LOW** or **COMMON** input of the DMM.
3. Set the OFFSET on the oscilloscope to zero.
4. Set the DMM to read DC Volt on the most sensitive range.
5. Record the voltage measured on the DMM to 100 µV resolution as "Output Zero Voltage" in the Test record.
6. Check that the voltage indicated by the DMM is between ±1.0 mV.
7. Disconnect the DMM from the precision 50 Ω terminator. Leave the remaining setup in place for the next test.

B. LF Attenuation Accuracy



LF Attenuation Accuracy Setup

1. Disconnect the BNC tee at the power supply from the dual banana plug adapter. Connect the BNC tee to the output of the function gen erator. (Use a 50 Ω termination if the function generator requires such a load.)
2. Carefully insert the Straight Tips (supplied in accessory kit) into the sockets of the probe head. Attach the red lead of the mini-grabber to the signal input and the black lead to the ground input of the probe head.
3. Connect the BNC tee to the output of the function generator. (Use a 50 Ω termination if the function generator requires such a load).
4. Attach a BNC cable to the unused female port of the BNC tee and connect a dual banana plug adapter to the other end of the cable and plug the dual banana plug adapter into the DMM input. Be sure the side of the banana plug adapter corresponding to the BNC shield (marked "GROUND") is connected to the **LOW** or **COMMON** input of the DMM.

5. Set the DMM to read AC volt and set the range to measure 5.0 Vrms.
6. Set the mode of the function generator to sine wave, the frequency to 70 Hz and the output amplitude to 5 Vrms ±10 mV as measured on the DMM.
7. Record the output voltage to 1 mV resolution as "Generator Output Voltage" in the Test Record. Be careful not to alter the output amplitude after the reading is recorded.
8. Divide the reading recorded in step B-7 by 10 and record the result with 100 µV resolution as "Expected Output Voltage, top range" in the Test Record.
9. Remove the banana plug adapter, connected to the function generator, from the DMM and connect the precision 50 Ω terminator to the DMM, making sure that the banana plug side marked "GROUND" is connected to the **LOW** or **COMMON** input of the DMM.
10. After the DMM reading has stabilized, record the reading to 100 µV resolution as "Measured Output Voltage, top range" in the Test Record.
11. Calculate the error by dividing the measured top range output voltage recorded in step B10 by the expected top range output voltage recorded in step B-8. Subtract 1 from this ratio and multiply by 100% to get the error in percent.
12. Record the calculated error to two decimal places (±0.xx%) as "Gain Error, top range" in the test record.
13. Verify that the error is less than ±1.0 %.
14. Disconnect the precision 50 Ω terminator from the DMM.
15. Connect the banana plug adapter connected via a BNC cable to the BNC tee at the function generator to the DMM. Verify that the side of the plug marked 'Ground' is connected to the **LOW** or **COMMON** input of the DMM.
16. Adjust the sine wave generator output amplitude to approximately 2.5 Vrms as measured on the DMM.
17. Record the reading to 1 mV resolution as "Generator Output Voltage, mid range" in the Test Record. Be careful not to alter the output amplitude after the reading is recorded.

18. Divide the reading recorded in step B-17 by 10.
19. Record the result to 100 µV resolution as "Expected Output Voltage, mid range" in the test record.
20. Remove the banana plug adapter from the DMM and connect the precision 50 Ω terminator to the DMM, making sure that the banana plug side marked "GROUND" is connected to the LOW or COMMON input of the DMM.
21. After the DMM has stabilized, record the reading to 100 µV resolution as "Measured Output Voltage, mid range" in the Test record.
22. Calculate the error by dividing the measured mid range output voltage recorded in step B-21 by the expected mid range output voltage recorded in step B-19. Subtract 1 from this ratio and multiply by 100% to get the error in percent.
23. Record the calculated error to two decimal places (±0.xx %) as "Gain Error, mid range" in the Test record.
24. Verify that the mid range gain error is less than ±1.0%

This completes the Performance Verification of the ZS4000. Complete and file the Test Record, as required to support your internal calibration procedure.

Apply suitable calibration label to the probe housing as required.

ZS4000 Test Record

Technician:_____

Date:_____

Equipment Used

Equipment	Model	Serial Number	Cal Due Date
Oscilloscope			
Digital Multimeter			
Function Generator			
Probe			
Lead			
Tip			

Test Record

OUTPUT ZERO VOLTAGE

Step	Description	Results
A-4	**Output Zero** (Test limit ≤ ±1.0 mV)	mV

LF ATTENUATION ACCURACY

Step	Description	Results
B-7	Generator Output Voltage	V
B-8	Expected Output Voltage, top range	V
B-10	Measured Output Voltage, top range	V
B-12	**Gain Error**, top range (Test Limit ≤ ± 1.0%)	%
B-17	Generator Output Voltage	V
B-19	Expected Output Voltage, mid range	V
B-21	Measured Output Voltage, mid range	V
B-23	**Gain Error**, mid range (Test Limit ≤ ± 1.0%)	%

Permission is granted to photocopy this page to record the results of the Performance Verification procedure. The test limits are included in each step. Create a new record for each probe, lead, and tip combination.

Reference Material

Certifications

Teledyne LeCroy certifies compliance to the following standards as of the date of publication. For the current certifications, see the EC Declaration of Conformity shipped with your product.

EMC Compliance

EC DECLARATION OF CONFORMITY - EMC

The probe meets intent of EC Directive 2014/30/EU for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

IEC/EN 61326-1:2013 EMC requirements for electrical equipment for measurement, control, and laboratory use[1]

Electromagnetic Emissions:
IEC/EN 55011/A1:2010 Radiated and Conducted Emissions Group 1 Class A[2] [3]

Electromagnetic Immunity:
IEC/EN 61000-4-2:2009 Electrostatic Discharge, 4 kV contact, 8 kV air, 4 kV vertical/horizontal coupling planes [4]

IEC/EN 61000-4-3/A2:2010 RF Radiated Electromagnetic Field, 3 V/m, 80-1000 MHz; 3 V/m, 1400 MHz - 2 GHz; 1 V/m, 2 GHz - 2.7 GHz

1 To ensure compliance with applicable EMC standards, use high-quality shielded interface cables.

2 This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

3 Emissions which exceed the levels required by this standard may occur when the probe is connected to a test object.

4 Meets Performance Criteria "B" limits of the standard: during disturbance, product undergoes a temporary degradation or loss of function or performance which is self-recoverable.

European Contact:
Teledyne LeCroy Europe GmbH
Im Breitspiel 11c
D-69126 Heidelberg
Germany
Tel: (49) 6221 82700

AUSTRALIA & NEW ZEALAND DECLARATION OF CONFORMITY - EMC

The probe complies with the EMC provision of the Radio Communications Act per the following standards, in accordance with requirements imposed by the Australian Communication and Media Authority (ACMA):

AS/NZS CISPR 11:2009/A1:2010, IEC 55011:2009/A1:2010 Radiated and Conducted Emissions, Group 1, Class A.

Australia / New Zealand Contacts:*

RS Components Pty Ltd.
Suite 326 The Parade West
Kent Town, South Australia 5067

RS Components Ltd.
Units 30 & 31 Warehouse World
761 Great South Road
Penrose, Auckland, New Zealand

* Visit teledynelecroy.com/support/contact for the latest contact information.

Safety Compliance

EC DECLARATION OF CONFORMITY – LOW VOLTAGE

The probe meets the intent of EC Directive 2014/35/EU for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

IEC/EN 61010-031:2015 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for handheld probe assemblies for electrical measurement and test.

Environmental Compliance

END-OF-LIFE HANDLING

The probe is marked with this symbol to indicate that it complies with the applicable European Union requirements to Directives 2012/19/EU and 2013/56/EU on Waste Electrical and Electronic Equipment (WEEE) and Batteries.

The probe is subject to disposal and recycling regulations that vary by country and region. Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles. For more information about proper disposal and recycling of your Teledyne LeCroy product, visit teledynelecroy.com/recycle.

RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS)

The product and its accessories conform to the 2011/65/EU RoHS2 Directive.

Returning a Product for Service

Contact your regional Teledyne LeCroy service center for calibration or other service. If the product cannot be serviced on location, the service center will give you a Return Material Authorization (RMA) code and instruct you where to ship the product. All products returned to the factory must have an RMA. Return shipments must be prepaid.

Teledyne LeCroy cannot accept COD or Collect shipments. We recommend air-freighting. Insure the item for at least the replacement cost.

1. Remove all accessories from the probe. Do not include the manual.
2. Pack the probe in its case, surrounded by the original packing material (or equivalent).
3. Label the case with a tag containing:
    - The RMA
    - Name and address of the owner
    - Probe model and serial number
    - Description of failure or requisite service
4. Package the probe case in a cardboard shipping box with adequate padding to avoid damage in transit.
5. Mark the outside of the box with the shipping address given to you by Teledyne LeCroy; be sure to add the following:
    - ATTN: <RMA code assigned by the Teledyne LeCroy>
    - FRAGILE
6. Insure the item for the replacement cost of the probe.
7. **If returning a probe to a different country**:
    - Mark the shipment as a "Return of US manufactured goods for warranty repair/recalibration."
    - If there is a cost for the service, list the cost in the value column and the original purchase price "For insurance purposes only."
    - Be very specific as to the reason for shipment. Duties may have to be paid on the value of the service.

Technical Support

Live Support

Registered users can contact their local Teledyne LeCroy service center at the number listed on our website. You can also request Technical Support via the website at:

teledynelecroy.com/support/techhelp

Resources

Teledyne LeCroy publishes a free Technical Library on its website. Manuals, tutorials, application notes, white papers, and videos are available to help you get the most out of your Teledyne LeCroy products. Visit:

teledynelecroy.com/support/techlib

Service Centers

For a complete list of offices by country, including our sales and distribution partners, visit:

teledynelecroy.com/support/contact

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