LeCroy

Instruction Manual

ZD Series Differential Probes
(ZD500, ZD1000, ZD1500)



LeCroy

ZD Series Differential Probes

Instruction Manual



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Warranty

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, 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 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.

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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. LeCroy shall not be liable for any special, incidental, or consequential damages, whether in contract or otherwise.

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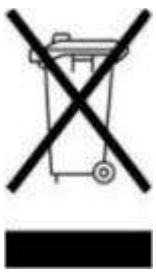
Manufactured under an ISO 9000 Registered Quality Management System. Visit www.lecroy.com to view the certificate.		This electronic product is subject to disposal and recycling regulations that vary by country and region. Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles. For more information about proper disposal and recycling of your LeCroy product, please visit **www.lecroy.com/recycle**.

ZDSERIES-GSM-REVA

919316-00 Rev A

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Introduction

The ZD Series of Differential Probes (ZD500, ZD1000 and ZD1500) are high bandwidth active differential probes. The probes feature low noise, very high input impedance and high common mode rejection, and are ideally suited for signal integrity measurements in high-speed digital systems.

With low input capacitance and high input resistance, circuit loading is minimized.

The ZD Series probes can be used with LeCroy's WaveSurfer, WaveRunner, WavePro, and WaveMaster series platforms with firmware version 6.4.1.x or later.

With the ProBus interface, the ZD Series probes become an integral part of the oscilloscope. The probe can be 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.

Key Benefits

The ZD Series probes feature:

- High frequency performance
- Low input capacitance
- Wide dynamic range
- ProBus interface
- A wide variety of tips, leads, and grabbers for probing

Standard Accessories

The ZD Series probe is shipped with the following standard accessories:

Standard Accessory	Quantity	Part Number
Straight Tip	4	PACC-PT001
Solder-in Lead	2	PACC-ZD002
Right Angle Connector (Long)	2	PACC-LD004
Micro-Grabber	2	PK006-4

Standard Accessory	Quantity	Part Number
Mini-Grabber	2	PACC-CL001
Spring-loaded Ground (Long)	2	PACC-ZD003
Spring-loaded Ground (Short)	2	PACC-CD008
Small IC Adapter	2	PACC-ZD006
Tip Saver	2	PACC-ZD004
Y-lead Adapter	1	PACC-ZD001
Swivel Tip Adapter	1	PACC-ZD005
Probe Calibration Fixture	1	PCF200
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Features and Accessories

The ZD Series probes are provided with numerous features and accessories to make probing and connecting to different test points easier than ever.

- The small, low mass probe head is designed for ease of use and high performance.
- The probe tip socket fits easily onto 0.025 inch square pins for direct access to test points. Several different adapters are available which connect directly in the probe socket.
- The ground socket will accept several different ground leads to provide a short ground path for low noise susceptibility.

Tips

Straight Tip

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



Swivel Tip Adapter

The swivel tip adapter is designed for multi-purpose browsing and features adjustable tip spacing to reach test points .300” apart with Z-axis compliance. Resistive compensation to reduce inductive peaking is included.



Tip Saver

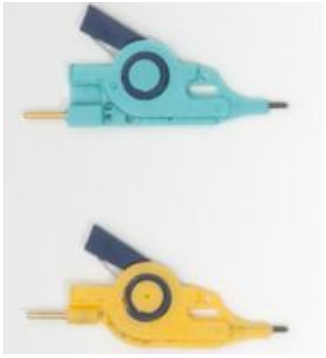
To prevent excessive wear on the probe input leads, it is recommended to use tip saver in most probing scenarios. The tip saver offers full system bandwidth and will not degrade signal under test.



Grabbers

Micro- and Mini-Grabbers

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





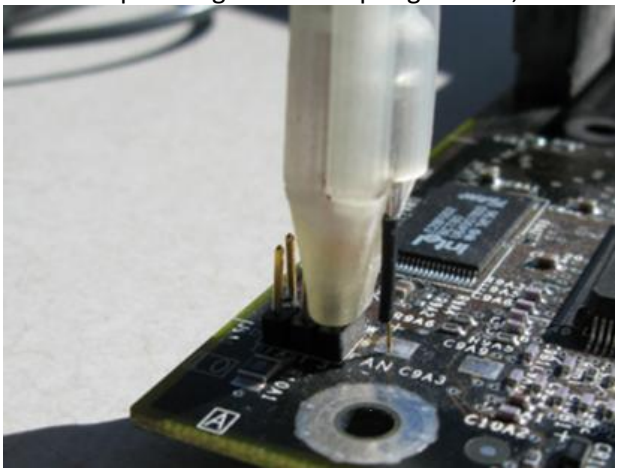
Grounds

Long and Short Spring Loaded Bendable Ground

The bendable ground leads are designed to be attached to the offset ground socket or be attached to either socket of the probe head.



The following image is an example using the short spring-loaded, bendable ground.



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 Right Angle Lead

This lead has 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 or can be connected to the Mini-Grabber or Micro-Grabber accessories.



Y Lead Adapter

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. Resistive compensation to reduce inductive peaking is included.



Solder-In Lead

This lead can be soldered directly to the test points for a secure probe connection.



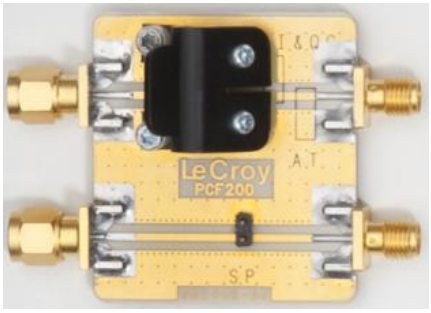
Small IC Adapter

The Small IC adapters are designed for probing the leads of an IC. One side is insulated to prevent shorting one pin to the adjacent pin. The IC adapters can probe between IC legs with a width as narrow as .010” up to .100”. Resistive compensation to reduce inductive peaking is included.



Probe Calibration Fixture

The probe deskew fixture (PCF-200) is provided as a standard accessory with ZD500, ZD1000, and ZD1500 probes.



The fixture can be used one of two ways:

1. The fixture may be used to determine the effect of probe input loading on the circuit under test and verification of the probe response to the signal being measured.
2. The fixture may be used as a convenient way to deskew several probes/oscilloscope channels. This can be accomplished in the following ways:
    - Connect a fast edge to one or both inputs, and terminate the corresponding connector. Connect the probe tip(s) to the appropriate connection point. Solder-in probe tips and browser tips may be inserted under the clamping mechanism. Display the probe signals on the oscilloscope screen and use the channel deskew adjust to align them to a common point.
    - Connect the WavePro 7 Zi and Zi-A or WaveMaster 8 Zi and Zi-A fast edge output to one of the inputs. Set the Zi Series oscilloscope to trigger on the internal Fast Edge source. Set the trigger delay to zero. Now, on the vertical dialog, use the Probe Cal - Cable Deskew button to align one signal/channel at a time to the specified zero delay trigger point (center of screen). Repeat for as many probes as you have connected, each time aligning them to the common point.

Probe Operation

Handling the Probe

The ZD Series probes are precision test instruments. 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 ZD Series 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 a LeCroy Oscilloscope

The ZD Series probe has been designed for use with LeCroy's WaveSurfer, WaveRunner, WaveMaster, and WavePro 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 LeCroy Oscilloscope

When the ZD Series probes are connected to any compatible LeCroy oscilloscope, the displayed scale factor and measurement values are automatically adjusted.

Control through the oscilloscope's interface can be found on the channel dialog that corresponds with the connected probe. Refer to your oscilloscope's manual for specific operation instructions.

Turning the **Volts/Div** knob controls the oscilloscope's scale factor to give full available dynamic range up to 2.25 V/div.

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 ZD Series probe with its small profile and low mass head ideally suited for applications in dense circuitry.

Care and Maintenance

Cleaning

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



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

Calibration Interval

The recommended calibration interval is one year. (Performance Verification and Adjustment Procedures are included in this manual.)

Service Strategy

The ZD Series probe utilizes fine pitch surface mount devices. It is therefore impractical to attempt to repair in the field. Defective probes must be returned to a 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.

Returning a Probe for Calibration or Service

Return a probe for calibration or service by contacting your local LeCroy sales representative. They tell you where to return the product. All returned products should be identified by both **model** and **serial number**. Provide your **name** and **contact number**, and a **description of the defect or failure** (if possible).

Products returned to the factory require a **Return Material Authorization (RMA)** acquired by contacting your nearest LeCroy sales office, representative or the North America Customer Care Center.

- Return shipment should be prepaid.
- LeCroy cannot accept COD or Collect Return shipments.
- We recommend air-freighting.

Note: It is important that the RMA be clearly shown on the outside of the shipping package for prompt redirection to the appropriate department.

Use the following steps for a smooth product return.

1. Contact your local LeCroy sales or service representative to obtain a Return Material Authorization.
2. Remove all accessories from the probe. Do not include the manual.
3. Pack the probe in its case, surrounded by the original packing material (or equivalent) and box.
4. Label the case with a tag containing
    - The RMA
    - Name and address of the owner
    - Probe model and serial number
    - Description of failure
5. Package the probe case in a cardboard shipping box with adequate padding to avoid damage in transit.
6. Mark the outside of the box with the shipping address given to you by the LeCroy representative; be sure to add the following:
    - ATTN: <RMA assigned by the LeCroy representative>
    - FRAGILE
7. Insure the item for the replacement cost of the probe.
8. Ship the package to the appropriate address.

Returning a Probe to a Different Country

Note: Be sure to properly mark shipments returned for service from a different country to avoid customs duty for a full purchase price of a new probe or accessory.

In addition to the items mentioned in the previous topic, mark shipments returned for service as a **Return of US manufactured goods for warranty repair/recalibration**. If there is a cost involved in the service, put the cost of the service in the value column and the original value of the product at time of purchase in the body of the invoice marked **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.

Replacement Parts

The probe connection accessories and other common parts can be ordered through the North America Customer Care Centers.

Replacement Part	Part Number
Straight Tip	PACC-PT001
Solder-in Lead	PACC-ZD002
Right Angle Connector (Long)	PACC-LD004
Micro-Grabber	PK006-4
Mini-Grabber	PACC-CL001
Spring-loaded Ground (Long)	PACC-ZD003
Spring-loaded Ground (Short)	PACC-CD008
Small IC Adapter	PACC-ZD006
Tip Saver	PACC-ZD004
Y-lead Adapter	PACC-ZD001
Swivel Tip Adapter	PACC-ZD005
Probe Calibration Fixture	PCF200

Performance Verification

Performance Verification Overview

This procedure can be used to verify the warranted characteristics of the ZD Series High Impedance Active Probe.

The recommended calibration interval for the models ZD Series is one year. The complete performance verification procedure should be performed as the first step of annual calibration. Test results can be recorded on a photocopy of the Test Record provided in Appendix A at the end of the manual.

Performance verification can be completed without removing the probe covers or exposing the user to hazardous voltages. Adjustment should only be attempted if a parameter measured in the Performance Verification Procedure is outside the specification limits.

> **Note**: Adjustment should only be performed by qualified personnel

This procedure tests the following specifications:

- Output Zero Voltage
- LF Attenuation Accuracy

Required Test Equipment

The following table lists the test equipment and accessories (or their equivalents) that are required for performance verification of the ZD Series Probes.

This procedure has been developed to minimize the number of calibrated test instruments required.

Only the parameters listed in boldface in the Minimum requirements column 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 adapters or cables may be required.

Description	Minimum Requirement	Test Equipment Examples
Digital Oscilloscope	ProBus Interface; Windows-based	LeCroy WaveRunner Zi or WaveSurfer Xs
Digital Multimeter (DMM) with test probe leads	4.5 digit DC: 0.1% Accuracy AC: 0.1% Accuracy	Agilent Technologies 34401A or Fluke 8842A-09
Function Generator	Sine Wave output amplitude adjustable to 14.14 Vp-p (5 Vrms) into 1 MΩ at 70 Hz	Agilent Technologies 33120A or Stanford Research Model 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 or Pomona 5697-36
BNC Tee Connector	Male to Dual Female	Pomona 3285
Calibration Fixture	ProBus Extender Cable	LeCroy PROBUS-CF01
Terminator, Precision, BNC	50 Ω ± 0.05%	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

List of Required Equipment.

Preliminary Procedure

1. Connect the ZD Series 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 the oscilloscope on and allow at least 30 minutes warm-up time for the ZD Series and test equipment 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 (located in Appendix A), and fill in the necessary data.
5. Select the channel to which the probe is connected. Set the oscilloscope scale factor to 20 mV/div.
6. Disconnect the ProBus Extender Cable from the oscilloscope. Verify that the scale factor changes from 20 mV/div to 2 mV/div.
7. Reconnect the ProBus extender Cable to the oscilloscope.

The warranted characteristics of the ZD Series are valid at any temperature within the Environmental Characteristics listed in the Specifications. 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 instruments used in this procedure.

Note: The correct operation of the ZD Series controls requires software version 6.4.1.x or higher. The software version in the test oscilloscope can be verified by selecting **Utilities, Utilities Setup...** from the menu bar, then the **Status** tab.

Contact your local LeCroy representative or visit **www.lecroy.com** if the software in your oscilloscope requires updating.

Functional Check

The functional check will verify the basic operation of the probe functions.

It is recommended that the Functional Check be performed prior to the Performance Verification Procedure.

1. Return to the factory default settings by:
    a. Selecting **File, Recall Setup...** from the menu bar.
    b. Then touching the **Recall Default** button.
2. Touch the **C1** trace label to open the **C1 Vertical Adjust** dialog.
3. Verify that the probe sensed (ZD Series) is displayed as a dialog tab.

Verification Procedure

A. Output Zero Voltage

1. Connect the appropriate calibration fixture to the output of the probe to be tested (shown in the following figure).
2. Provide power to the probe by connecting the ProLink-CF01 to any input of a WavePro (any model) or WaveMaster (any model) oscilloscope.
3. No signal input connection to the oscilloscope is required for the Output Zero test.
4. 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.
5. Connect the Precision 50 Ω Terminator, using another BNC cable, to the free end of the BNC Tee.
6. Set the DMM to DC volts.
7. Connect the Precision 50 Ω Terminator to the DMM input.
8. After a warm-up time of at least 20 minutes, measure the output voltage and record the result as **Output Voltage** on the Test Record.
9. Initiate an AutoZero
10. Wait an additional 15 minutes, then record the DMM reading to 1 mV resolution in the Test Record as **Output Voltage after AutoZero**.
11. Take the difference of the two readings recorded steps 8 and 10 (previous)
12. Record the result as **Output Zero** on the Test Record.
13. Verify the absolute value of Output Zero is less than 10 mV.

B. LF Attenuation Accuracy

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 generator. (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 positive (+) signal input and the black lead to the negative (-) 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 the Effective Gain noted in step 6 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 1 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. Set the scope to 200mV/div and note the “Effective Gain” under the ZDxxx tab of the channel setting menu.
19. Divide the reading recorded in step B-17 by Effective Gain noted in step 18.
20. Record the result to 100 µV resolution as "Expected Output Voltage, low range" in the test record.
21. 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.
22. After the DMM has stabilized, record the reading to 100 µV resolution as "Measured Output Voltage, mid range" in the Test record.
23. 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.
24. Record the calculated error to two decimal places (±0.xx %) as "Gain Error, low range" in the Test record.
25. Verify that the mid range gain error is less than ±1.0%

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

Apply suitable calibration label to the ZD Series housing as required.

Reference Material

Specifications

Note: Specifications are subject to change without notice.

Please refer to the LeCroy website at www.lecroy.com for detailed specification information.

Contact LeCroy for Support

Use the following regional contacts to find the appropriate support location nearest you.

Whether you're looking for sales or technical support, our staff can provide assistance with installation, calibration, and product knowledge regarding a full-range of our software applications and accessories.

You can also find contact information for our offices on the LeCroy Web site shown for the following regions:

<table>
<tr><th colspan="2">Contact Your Local LeCroy Office for Sales and Technical Assistance</th></tr>
<tr><td colspan="2">United States and Canada
Phone (Sales, Applications, and Service): 1-800-553-2769 (options 1, 2, and 3, respectively) or 845-425-2000
Fax (Sales, Applications, and Service): 845-578-5985
Email (Sales, Applications, and Service): contact.corp@lecroy.com
Web Site: <u>www.lecroy.com</u>/</td></tr>
<tr><td>Korea - Seoul
Phone (Sales and Support): ++ 82 2 3452 0400Fax (Sales and Support): ++ 82 2 3452 0490
Web Site: www.lecroy.co.kr</td><td>Europe
Phone (Sales and Support): + 41 22 719 2228
Fax (Sales and Support): + 41 22 719 2230
Email (Sales and Support): contact.sa@lecroy.com
Web Site: www.lecroy.com/europe</td></tr>
<tr><td>China
Phone (Sales and Support): ++86 28- 86527180 / 7181 / 7182
Fax (Sales and Support): +86 28-8652 7183
Email (Sales and Support): george.ni@lecroy.com</td><td>Singapore
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Fax (Sales and Support): ++ (65) 64427811
Email (Sales and Support): jimmy.ong@lecroy.com</td></tr>
<tr><td>Taiwan
Phone (Sales and Support): (886) 2 8226 1366
Fax (Sales and Support): (886) 2 8226 1368
Email (Sales and Support): sales_twn@lecoln.com.tw
Web Site: www.lecoln.com.tw</td><td>Tokyo
Phone (Sales and Support): ++ 81 3 3376 9400
Fax (Sales and Support): ++ 81 3 3376 9587
Web Site: www.lecroy.com/japan</td></tr>
</table>

Safety Symbols

The following symbols appear on the accessory or in this manual and indicate important safety considerations.



Refer to information near this symbol to protect against personal injury or damage to the instrument.



The CAUTION sign indicates a potential hazard. It calls attention to a procedure, practice or condition, which, if not followed, could possibly cause damage to the equipment. If a CAUTION is indicated, do not proceed until its conditions are fully understood and met.



The ESD sign indicates a potential hazard. It calls attention to the susceptibility of the equipment to Electrostatic Discharge (ESD) induced damage if anti-static measures are not taken.

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: 5 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).

Note: Direct sunlight, radiators, and other heat sources should be taken into account when assessing the ambient temperature.

Safety Requirements



CAUTION

Avoid personal injury or damage to your accessory or any equipment connected to it by reviewing and complying with the following safety precautions:

- **Use only as intended**. The accessory is intended to be used only with the compatible LeCroy instruments. Use of the accessory and/or the equipment it is connected to in a manner other than specified may impair the protection mechanisms.
- **Connect and disconnect properly**. Avoid damage through excessive bending of cables and other equipment.
- **Do not use in wet/damp or explosive atmospheres**.
- **For indoor use only**. The accessory is intended for indoor use and should be operated in a clean, dry, environment.
- **Do not operate with suspected failures**. Do not use the product if any part is damaged. All maintenance should be referred to qualified service personnel.
- **Keep product surfaces clean and dry**.
- **Completely assemble the measurement instrument before circuit/signal contact**. Connect probe to the measurement instrument before connecting the probe test leads to a circuit/signal being tested.
- **Do not apply a voltage to any input that exceeds the maximum rating of that input**. Refer to the Specifications on LeCroy website at **www.lecroy.com** for detailed information.
- **Be careful with sharp tips**. Handle the probe with care as it has sharp tips that may cause bodily injury if not handled properly.

Compliance Information

This LeCroy accessory is CE Compliant and bears the CE mark.

CE Declaration of Conformity

This ZD Series Probes meet intent of the European Council Directive 2006/95/EEC for Product Safety and 2004/108/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

- EN 61010-031:2002 Safety requirements for electrical equipment for measurement, control, and laboratory use.

  Part 031: Safety requirements for the hand-held probe assemblies for electrical measurement and test.

  The design of the differential probe has been verified to conform to EN 61010-031 safety standard per the following limits:

  - Installation (Overvoltage) Category I: Refers to signal level which is applicable for equipment measuring terminals that are connected to source circuits in which measures are taken to limit transient voltages to an appropriate low level.
  - Pollution Degree 2: Refers to an operating environment where normally only dry non-conductive pollution occurs. Occasionally a temporary conductivity caused by condensation must be expected.
- EN 61326-1:2006, EN 61326-2-1:2006 EMC requirements for electrical equipment for measurement, control and laboratory use.
  - EN 55011/A2:2002 Radiated and Conducted Emissions, Group 1, Class A *
  - EN 61000-4-2:2001 Electrostatic Discharge Immunity (±4 kV contact discharge, ±4 kV air discharge, ±4 kV vertical/horizontal coupling planes)
  - EN 61000-4-3:2006 RF Radiated Electromagnetic Field Immunity (3 V/m, 80 MHz to 1 GHz; 3 V/m, 1.4 GHz to 2 GHz; 1 V/m, 2 GHz to 2.7 GHz , 80% amplitude modulated with 1 kHz sinewave)

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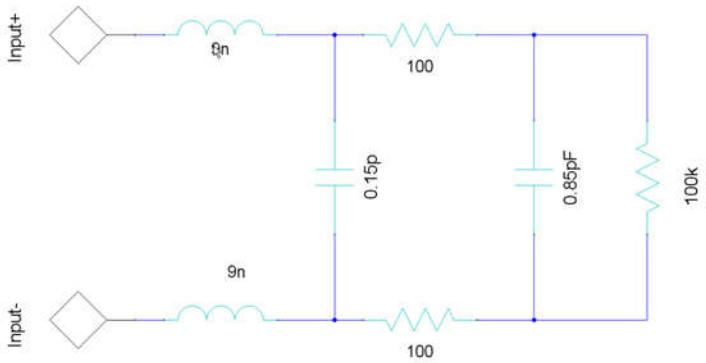
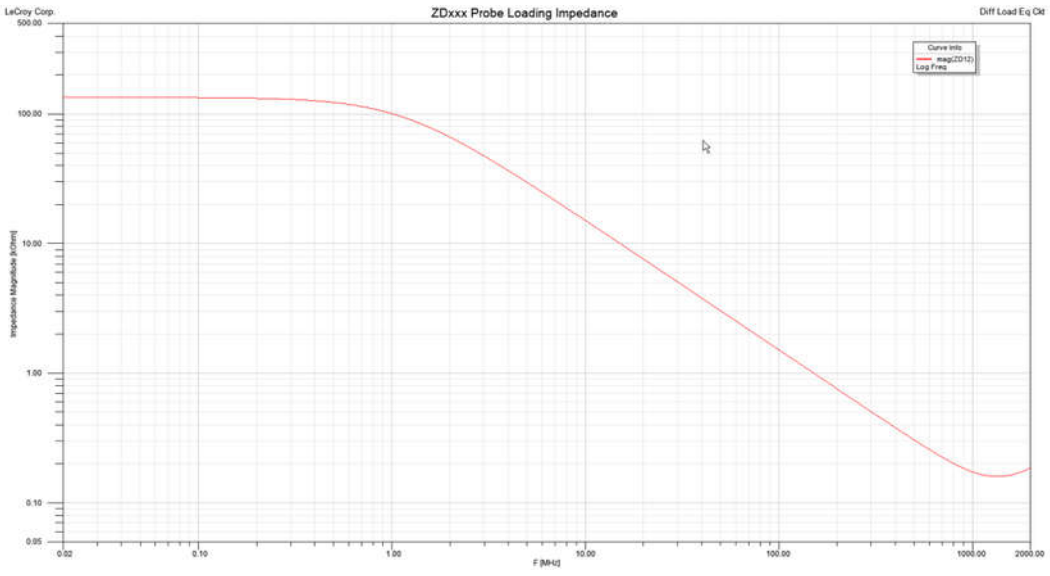
* This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

Probe Input Loading

Attaching any probe to a test circuit add some loading to the circuit under test. In most applications the high impedance of the probe, compared to the impedance of the circuit under test, imparts an insignificant load to the test circuit. However, at very high frequencies the capacitive reactance of the probe tip or lead may load the circuit enough to affect the measurement. These probes are designed to minimize these effects at high frequencies. Refer to the figures in this topic for equivalent input circuit information.

ZDxxx Differential Input Equivalent Circuit





Appendix A - Performance Verification Test Record

This record can be used to record the results of measurements made during the performance verification of the ZD Series Probes. Photocopy this page and record the results on the copy. File the completed record as required by applicable internal quality procedures. The section in the test record corresponds to the parameters tested in the performance verification procedure. The numbers preceding the individual data records correspond to the steps in the procedure requiring the recording of data.

Results to be recorded in the column labeled **Test Result** are the actual specification limit check. The test limits are included in all of these steps. Other measurements and the results of intermediate calculations that support the limit check are to be recorded in the column labeled **Intermediate Results**.

Permission is granted to reproduce these pages for the purpose of recording test results.

Note: Use a new Test Record for each tested probe, probe tip module, and lead assembly.

Items Tested

Item	Serial Number	Date	Technician
ZD500			
ZD1000			
ZD1500			

Equipment Used

Instrument	Model	Serial Number	Calibration Due Date
Oscilloscope			
Digital Multimeter			
Function Generator			

Note: The function generator used in this Performance Verification Procedure is used for making relative measurements. The output of the generator is measured with a DMM or oscilloscope in this procedure. Thus, the generator is not required to be calibrated.

Test Record

Output Zero Voltage

Step	Description	Intermediate Data
A-5.	**Output Zero** (Test limit ≤ ±800 µV)	

LF Attenuation Accuracy

Step	Description	Intermediate Data
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, top range	V
B-21	Measured Output Voltage, top range	V
B-23	**Gain Error**, top range (Test Limit ≤ ± 1.0%)	%

Thank you for purchasing a ZD Series Differential Probe.

LeCroy

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