TELEDYNE LECROY
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Getting Started Manual

ZD200 Differential Probe

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January 2013

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

This section contains instructions that must be observed to keep this oscilloscope accessory operating in a correct and safe condition. You are required to follow generally accepted safety procedures in addition to the precautions specified in this section. **The overall safety of any system incorporating this accessory is the responsibility of the assembler of the system.**

Symbols

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

CAUTION. Potential for damage to probe or instrument it is connected to. Attend to the accompanying information to protect against personal injury or damage. 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.

DOUBLE INSULATION

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.

Do not operate with suspected failures. Do not use the probe if any part is damaged. Cease operation immediately and sequester 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: 5° to 40° C.

Humidity: Maximum relative humidity 90 % 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 ZD200 Differential Probe is ideally suited for automotive and serial data signals. The wide dynamic range (+/- 20V differential) and 1 MOhm input resistance make the ZD200 ideally suited for a wide range of applications.

The ZD200 probe can be used with Teledyne LeCroy's WaveSurfer, WaveRunner, WavePro, and WaveMaster series platforms with firmware version 6.4.1.x or later.

With the ProBus interface, the ZD200 probe becomes 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 ZD200 probe features:

- 1 MOhm input resistance
- Low input capacitance
- Wide dynamic range
- ProBus interface
- Complete accessory kit consisting of 3 sets of grabbers, one alligator clip, 2 sets of leads and 2 tip options for probing a variety of test points

Standard Accessories

The ZD200 probe is shipped with the following standard accessories:

Standard Accessory	Quantity
Straight Tip	6
Hook Clip	2
Y Leadset	1
Micro IC Clips	2
Micro-Grabbers	2
Extension Leads (5 cm)	2
Extension Leads (10 cm)	2
Dual Pin Set (12.8 mm)	2
Dual pin set (16.8 mm)	2
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Features and Accessories

The ZD200 probe is 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 following image shows the standard accessories for the ZD200 probe:

Number	Part	Description
1	Hook Clips	
2	Micro-Grabbers	The micro- and mini-grabbers are ideal for connecting to small IC legs or pins very tightly spaced.
3	Micro IC Grabbers	The micro- and mini-grabbers are ideal for connecting to small IC legs or pins very tightly spaced.
4	Straight Tips and Dual Pin Sets	The Straight Tip and Dual Pin Sets are designed to connect to the smallest vias and small test points. Fits in either probe socket.
5	Extension Leads	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.
6	Y Lead Adapter	This lead is used for both ground and input lead simultaneously. It has two sockets on one end for connection to the provided hook clips and two square pins on the other and may be used for general purpose probing.

Probe Operation

Handling the Probe

The ZD200 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 ZD200 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 an Oscilloscope

The ZD200 probe has been designed for use with Teledyne 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 an Oscilloscope

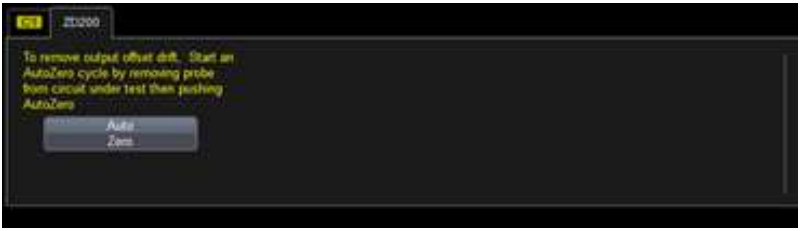
When the ZD200 probe is connected to any compatible Teledyne LeCroy oscilloscope, the displayed scale factor and measurement values are automatically adjusted.

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 5 V/div.

Auto Zero Operation

The scope software includes a feature to null the probe's residual offset voltage. The probe should be disconnected from any signal and the Auto Zero button on the probe menu pressed. This will measure any residual offset in the probe and remove it from the measurement.



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 ZD200 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 ZD200 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 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.

Returning a Probe for Calibration or Service

Return a probe for calibration or service by contacting your local Teledyne 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 Teledyne LeCroy sales office, representative or the North America Customer Care Center.

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

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

Follow these steps for a smooth product return.

1. Contact your local Teledyne 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 Teledyne LeCroy representative; be sure to add the following:
    - ATTN: <RMA assigned by the Teledyne LeCroy representative>
    - FRAGILE
7. Insure the item for the replacement cost of the probe.
8. **If returning a probe to a different country, also**:
    - 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 service cost in the value column and the replacement value of the probe 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
Accessory Kit	PACC-ZD007
Y-Lead Adapter	PACC-ZD008

Performance Verification

Performance Verification Overview

This procedure can be used to verify the warranted characteristics of the ZD200 High Impedance Active Probe.

The recommended calibration interval for the model ZD200 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. There are no adjustments.

This procedure tests 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 ZD200 Probe.

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.

List of Required Test Equipment.

Description	Minimum Requirement	Test Equipment Examples
Digital Oscilloscope	ProBus Interface Windows-based with software version 6.4.1.5 or later	Teledyne LeCroy WaveRunner Xi, WavePro 7 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 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 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 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

Preliminary Procedure

1. Connect the ZD200 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 ZD200 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 ZD200 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 ZD200 controls requires software version 6.4.1.5 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 Teledyne LeCroy representative or visit teledynelecroy.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 (ZD200) is displayed as a dialog tab.

Verification Procedure

LF Attenuation Accuracy

1. Install the BNC to 2 banana plug into the DMM voltage inputs.
2. Connect the signal generator output to the to 2 banana plug on the DMM.
3. Set the DMM to read AC volt and set the range to AUTO.
4. Set the signal generator to output a 100 Hz sine wave with amplitude 2 Vrms.
5. Read the AC voltage measured by the DMM and record on the test data sheet.
6. Divide this value by 10 and record on the test data sheet.
7. Remove the BNC cable and BNC to 2 banana adapter from the signal generator and DMM.
8. Install the precision 50Ω termination on the DMM voltage inputs.
9. Connect the PROBUS-CF01 BNC male output (the probe end) to the precision 50Ω termination BNC input. The probe should remain powered.
10. Install the straight tips on the ZD200 inputs.

11. Connect the signal generator output to the ZD200 inputs using the BNC to mini-grabber cable.
12. Read the voltage from the DMM and record this value on the test data sheet.
13. Record the calculated error to two decimal places (±0.xx%) as "Gain Error" in the test record.
14. Verify that the error is less than ±1.0 %.

This completes the Performance Verification of the ZD200. Complete and file the Test Record, as required to support your internal calibration procedure.

Apply suitable calibration label to the ZD200 housing as required.

Performance Verification Test Record

This record can be used to record the results of measurements made during the performance verification of the ZD200 Probe. 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
ZD200			

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, LF Attenuation Accuracy

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

Reference Material

Specifications

NOTE: Specifications are subject to change without notice.

Please refer to the Teledyne LeCroy website at teledynelecroy.com for detailed specification information.

Certifications

This section contains the ZD200 probe's Electromagnetic Compatibility (EMC), Safety and Environmental certifications.

EMC Compliance

EC DECLARATION OF CONFORMITY - EMC

The probe meets intent of EC Directive 2004/108/EC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61326-1:2006, EN 61326-2-1:2006 EMC requirements for electrical equipment for measurement, control, and laboratory use.

European Contact:

Teledyne LeCroy Europe GmbH
Waldhofer Str 104
D-69123 Heidelberg
Germany
Tel: (49) 6221 82700

AUSTRALIA & NEW ZEALAND DECLARATION OF CONFORMITY—EMC

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

CISPR 11:2003 Radiated and Conducted Emissions, Group 1, Class A, in accordance with EN61326-1:2006 and EN61326-2-1:2006.

Australia / New Zealand Contacts:

Vicom Australia Ltd.
1064 Centre Road
Oakleigh, South Victoria 3167
Australia

Vicom New Zealand Ltd.
60 Grafton Road
Auckland
New Zealand

Safety Compliance

EC DECLARATION OF CONFORMITY – LOW VOLTAGE

The probe meets intent of EC Directive 2006/95/EC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61010-031/A1:2008 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test.

- Measurement Category I (CAT I), for measurements performed on circuits not directly connected to a mains supply.
- Pollution Degree 2, operating environment where normally only dry non-conductive pollution occurs. Conductivity caused by temporary condensation should be expected.

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 2002/96/EC and 2006/66/EC 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, please visit teledynelecroy.com/recycle.

RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS)

This product has been classified as Industrial Monitoring and Control Equipment, and is outside the scope of the 2011/65/EU RoHS Directive (Exempt until July 2017, per Article 4).

ISO Certification

Manufactured under an ISO 9000 Registered Quality Management System. Visit teledynelecroy.com to view the certificate.

Contact Teledyne LeCroy

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