



WaveJet Touch Getting Started Guide



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WaveJet Touch

Oscilloscopes

Getting Started Guide

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August, 2014

Welcome

Thank you for buying a Teledyne LeCroy product. We're certain you'll be pleased with the detailed features unique to our instruments. This Getting Started Guide is designed to cover important safety and installation information for your oscilloscope, along with some basic operating procedures so you're quickly working with waveforms.

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INTRODUCTION

WaveJet Touch Oscilloscopes

About the WaveJet Touch Oscilloscopes

The WaveJet Touch provides the banner specifications, feature set, and user interface to simplify how you work and shorten debug time. The portable design features a 7.5" touch screen display, providing the convenience of performing all operations by directly touching the display. With up to 5 Mpts of memory and 2 GS/s, the WaveJet Touch allows you to easily capture and see every detail of your waveform. Mask and Pass/Fail testing enable you to dig deeper and perform characterization and validation with ease. Replay mode lets you go back in time to view and analyze rare events. Altogether, these capabilities make the WaveJet Touch the right oscilloscope for maximum value with minimum investment.

Long Capture Time

The 2.5 Mpts/Ch memory eliminates the tradeoff between long capture and high sample rate by providing long capture at full 2 GS/s sample rate. The long memory makes the WaveJet Touch a great tool for viewing signals that have low frequency and/or high frequency components.

Replay Mode

The fast update rate shows runts and glitches as they occur, but it is hard to tell exactly when they occurred. Replay mode lets you go back in time to isolate those anomalies, measure them with parameters or cursors, and quickly find the source of the problem.

Specifications

Detailed specifications are maintained on the product Datasheet, which can be accessed through: teledynelecroy.com/oscilloscopes/

Key Specifications	
Bandwidth	350 MHz–500 MHz
Channels	4
Sample Rate (all channels)	1 GS/s
Sample Rate (interleaved)	2 GS/s
Memory (per channel)	2.5 Mpts/ch
Memory (interleaved)	5 Mpts/ch

Materials List

Check that you have all the parts listed here. Contact Teledyne LeCroy immediately if any part is missing.

- 1 oscilloscope
- 4 passive probes
- 1 AC power cord (rated for country)
- 1 protective front cover
- 1 Getting Started Guide
- 1 Oscilloscope Security Certificate
- 1 Oscilloscope Registration Card
- 1 Calibration Document

General Safety Information

This section contains instructions that must be observed to keep the instrument 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 instrument is the responsibility of the assembler of the system.**

Symbols

These symbols appear on the instrument's front or rear panels and in its documentation to alert you to important safety considerations.



CAUTION of damage to instrument, or **WARNING** of hazard to health. Attend to the accompanying information to protect against personal injury or damage. Do not proceed until conditions are fully understood and met.



WARNING. Risk of electric shock.



Measurement ground connection.



Alternating Current.



On/Standby power.

Precautions

- **Use proper power cord.** Use only the power cord shipped with this instrument and certified for the country of use.
- **Maintain ground.** This product is grounded through the power cord grounding conductor. To avoid electric shock, connect only to a grounded mating outlet.
- **Connect and disconnect properly.** Do not connect/disconnect probes or test leads while they are connected to a voltage source.
- **Observe all terminal ratings.** Do not apply a voltage to any input (CH1, CH2, CH3, CH4, or EXT) that exceeds the maximum rating of that input. Refer to the front of the oscilloscope for maximum input ratings.
- **Use only within operational environment listed.** Do not use in wet or explosive atmospheres.
- **Use indoors only.**
- **Keep product surfaces clean and dry.**
- **Do not block the cooling vents.** Leave a minimum six-inch gap between the instrument and the nearest object. Keep the underside clear of papers and other objects.
- **Do not remove the covers or inside parts.** Refer all maintenance to qualified service personnel.
- **Do not operate with suspected failures.** Inspect all parts regularly and do not use the product if any part is damaged. Cease operation immediately and sequester the instrument from inadvertent use.

INTRODUCTION

Operational Environment

Temperature: 0° to 40° C

Humidity: Maximum RH 80% for temperatures up to 30° C decreasing linearly to RH 55% at 40° C, no dew condensation allowed.

Altitudes: up to 3,000 m (at < 25° C)

Power and Ground Connections

The instrument operates from a single-phase, 100-240 Vrms ($\pm 10\%$) AC power source at 50/60 Hz ($\pm 5\%$), or a 100-120 Vrms ($\pm 10\%$) AC power source at 400 Hz ($\pm 5\%$). The instrument automatically adapts to the line voltage. Manual voltage selection is not required.

The AC inlet ground is connected directly to the frame of the instrument. For adequate protection against electric shock, connect to a mating outlet with a safety ground contact.



WARNING. Interrupting the protective conductor inside or outside the oscilloscope, or disconnecting the safety ground terminal, creates a hazardous situation. Intentional interruption is prohibited.

Maximum power consumption with all accessories installed (e.g., probes, USB peripherals) is 50 W (85 VA). Power consumption in standby mode is 2 W.

Cleaning

Clean only the exterior of the oscilloscope using a damp, soft cloth. Do not use harsh chemicals or abrasive elements. Under no circumstances submerge the instrument or allow moisture to penetrate it. Avoid electric shock by unplugging the power cord from the AC outlet before cleaning.



CAUTION. Do not attempt to clean internal parts.

Calibration

The oscilloscope has automatic and self calibration routines. When Auto calibration is enabled, a recalibration will automatically occur whenever there is a 5° C temperature change since the last power-on or auto calibration. Self calibration enables you to perform a calibration on demand. The Self calibration requires about one minute to complete.

We recommend returning the oscilloscope for factory calibration once per year. See the instructions on p. 30 for returning a product for service.

Support

Online Documentation

Online Help for using the oscilloscope is available by pressing the Help button on the front panel.

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.

The *WaveJet Touch Oscilloscopes Operator's Manual* can be downloaded from teledynelecroy.com/support/techlib/productmanuals.

This .PDF document contains more extensive procedures for operating your oscilloscope than are found here.

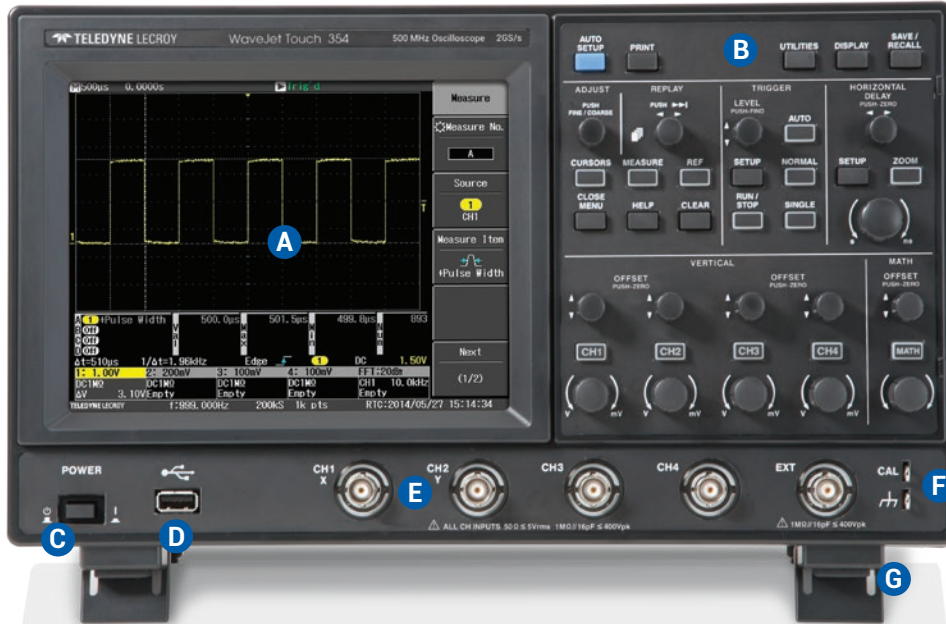
The Datasheet published on the product page contains the detailed product specifications.

Technical Support

Registered users can contact their local Teledyne LeCroy service center at the number listed in this guide to make Technical Support requests by phone or email. You can also submit Technical Support requests via the website at teledynelecroy.com/support/techhelp.

SET UP

The Front of Your Oscilloscope



- A** Touch Screen Display
- B** Front Panel
- C** Power Button
- D** USB Port
- E** BNC Connectors for CH1-CH4 and EXT
- F** Ground and Calibration Output Terminals
- G** Tilting Feet

The **touch screen display** is the principal viewing center of the oscilloscope. See “Touch Screen Display” for an overview of its components.

The **front panel** houses buttons and knobs that control different oscilloscope settings. Operate the instrument using front panel controls, touch screen controls, or a mix of both that is convenient.



Many front panel knobs have multiple modes of operation: pressing them invokes one action and turning them another. The bottom label tells you what happens when you “push” instead of turn.



The **Power button** turns on/off the oscilloscope. See “Powering On/Off” on page 9 for more information.

Front mounted host USB ports can be used for transferring data.

Ground and calibration output terminals are used to compensate passive probes.

BNC connectors are signal inputs for CH1-CH4. EXT can be used to input an external trigger.

The **tilting feet** enable the oscilloscope to be angled for easier bench top viewing.



SET UP

The Back of Your Oscilloscope



- A** Built-in Carrying Handle
- B** GPIB Connector for remote control
- C** USB Port for remote control or printer
- D** Ethernet Port for remote control
- E** Kensington Lock
- F** Aux Out connector can be configured to send trigger or pass/fail output
- G** AC Power Inlet for the AC line cord

Carrying

The oscilloscope's case contains a **built-in carrying handle**. Always unplug the instrument from the power source before lifting and carrying it.

Powering On/Off

Connect the line cord rated for your country to the AC power inlet on the back of the instrument, then plug it into a grounded AC power outlet. (See Power and Ground Connections in "General Safety Information.")

The **Power button** controls the operational state of the oscilloscope. Press the button to switch on the instrument; press it again to switch "off" (Standby power).



CAUTION. Do not power on or calibrate the oscilloscope with a signal attached.

The Power button does not disconnect the oscilloscope from the AC power supply; some "housekeeping" circuitry continues to draw power. The only way to fully power down the instrument is unplug the AC line cord from the outlet.



CAUTION. Do not place the instrument so that it is difficult to reach the power cord in case you need to disconnect from power.

We recommend unplugging the instrument if it will remain unused for a long period of time and at least once every six months to inspect and clean the plug.

Connecting

After start up, configure connections from the oscilloscope using the Utilities menu options listed below. See the *WaveJet Touch Oscilloscopes Operator's Manual* for more detailed instructions.

External Controller

The WaveJet Touch supports remote control via GPIB, USB, or TCP/IP (LAN) connection.

Connect a cable from the appropriate port on the back of the instrument to the controller. Press the front panel **Utilities** button and from the touchscreen choose **Next > Remote**. Turn the **Interface On** and select the connection type.

Other Auxiliary Device

The Aux Out connector can be configured to send a pulse to another device when a trigger event occurs or using pass/fail criteria.

Connect a BNC cable from Aux Out on the back of the instrument to the other device. Press the front panel **Utilities** button and from the touchscreen choose **Next > AUX OUT**. Select the signal type.

Printer

WaveJet Touch supports PictBridge-compliant printers. Connect the printer to the USB port on the back of the instrument. Press the **Utilities** button and from the touchscreen choose **Print > Device**. Select Printer.

Probes

WaveJet Touch Oscilloscopes are compatible with the included passive probes. See our website for other compatible probes. Probe specifications and documentation are available at: teledynelecroy.com/probes.

Firmware Updates

Free firmware updates are available periodically from the Teledyne LeCroy website at teledynelecroy.com/support/softwaredownload. Registered users will receive email notification when a new update is released. To download and install the update:

1. From a remote PC, visit our download page and click the link to Oscilloscope Downloads > Firmware Upgrades.
2. Select your oscilloscope series and model number.
3. Enter your registration login information, or create a new account.
4. Click the download link, and choose to Save the installer to a USB storage device.
5. Insert the USB device into the port on the front of the oscilloscope.
6. Press the front panel UTILITIES button and from the touch screen choose Status & Update > Update > OK.
7. When installation is complete, power cycle the instrument.



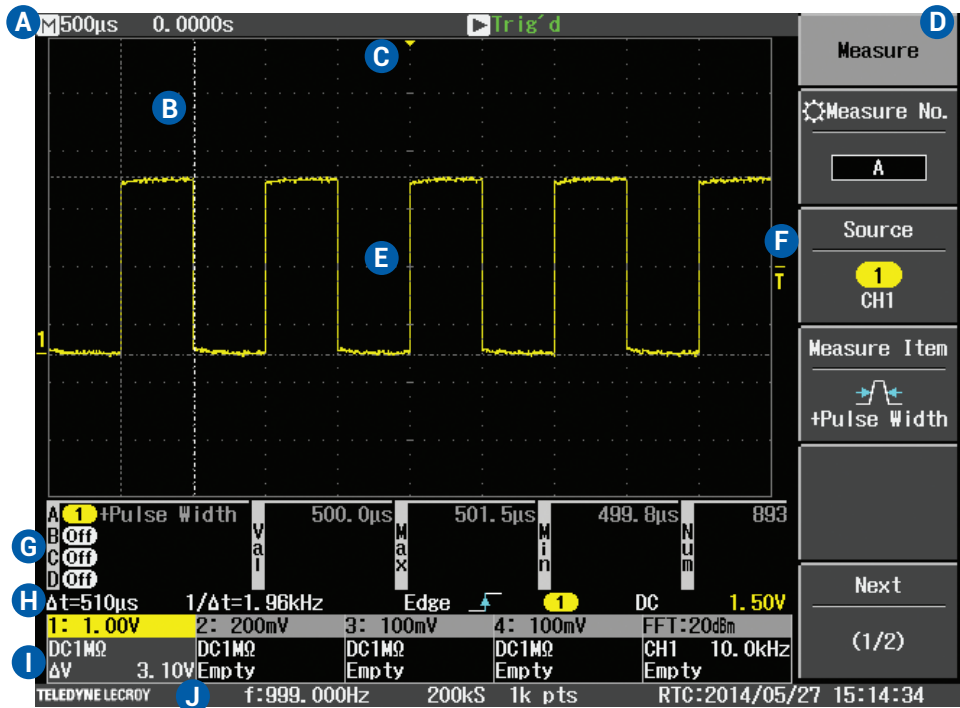
CAUTION. The installation may take several minutes, depending on the length of time since your last update. Do not power down the oscilloscope at any point during the installation process.

USER INTERFACE

WaveJet Touch Oscilloscopes

Touch Screen Display

The touch screen displays waveform traces and current setups through a series of status bars and descriptor boxes arranged around the grid. Menus to the right of the touch screen and a row of descriptor boxes along the bottom are touch activated. Use them along with the front panel controls to operate the oscilloscope.



- A** Acquisition Status Bar
- B** Cursor Marker
- C** Trigger Position Indicator
- D** Touch Menus
- E** Grid Area
- F** Trigger Level Indicator
- G** Measurement Readout
- H** Trigger Status Bar
- I** Descriptor Boxes
- J** Message Bar

The **Acquisition status bar** appears above the grid. It shows information related to timebase, trigger mode (which determines if the acquisition is running or stopped), and sweeps count.

The **grid area** displays the waveform traces. Each trace is color-coded to the channel and marked with the channel number. You can adjust the brightness (intensity) of the display to make trace lines more visible.

Cursor lines show where measurement points have been set. These white, dotted lines appear bold when they are selected. Turn the Adjust knob to reposition an active cursor.

Trigger level (vertical axis) and **trigger position** (horizontal axis) indicators appear on the grid when a trigger is set, color-coded to match the input.

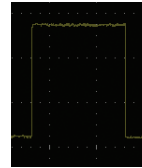
Other **measurement readouts** appear in a table below the grid when measurements have been applied to a trace.

The **Trigger status bar** appears immediately below the grid (or readout table if measurements are on) and shows the current trigger setup. It also shows cursor readouts when time cursors are applied.

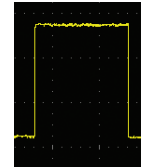
Channel (1-4), and Math (M) **descriptor boxes** appear below the Trigger status bar and summarize current setups for each trace, as well as cursor readouts when amplitude cursors are applied. They are color-coded to the trace when the trace is on. Touch the descriptor box to open the corresponding set up menu.

A **Message** bar appears along the bottom of the screen. Any error or processing messages appear here, along with input and acquisition memory information and the timestamp.

Display Intensity



Intensity 20%



Intensity 80%

Trigger Indicators



Level



Position

Descriptor Box

Pre-Processing Summary

Gain Setting

Channel Number

Coupling

Offset

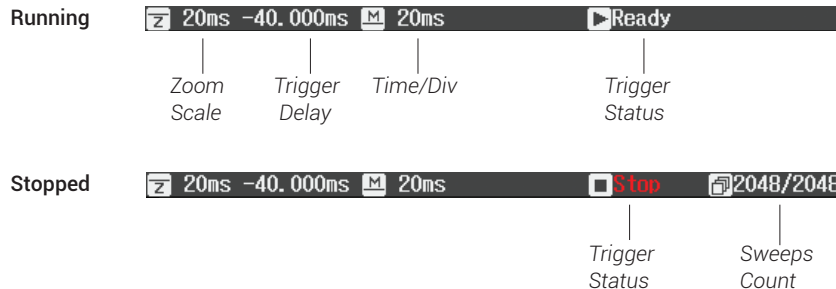
1: 1.00V BW
DC1MΩ
ofs -2.32V

Trace On

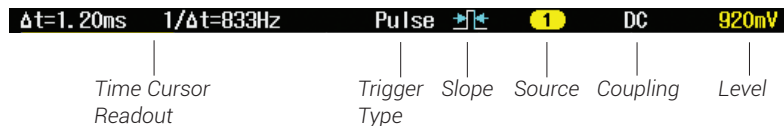
2: 100mV
DC1MΩ
Empty

Trace Off

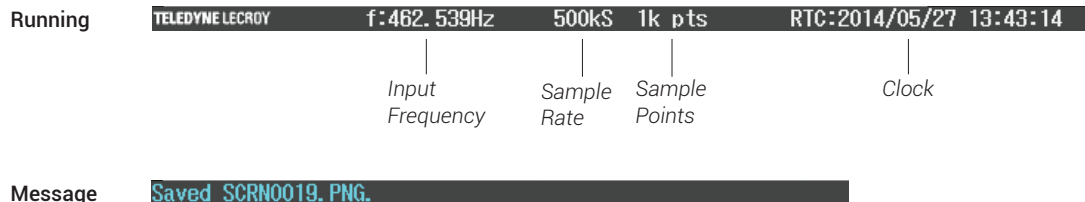
Acquisition Status Bar



Trigger Status Bar




Message Bar



Touch Menus

While basic acquisition settings can be made from the front panel, more detailed setup requires the use of the touch menus. Press the front panel button to open the menu, then make your selections on the touch screen.



Config. — The top cell is the menu name. Channel and Math setup menus are color-coded to the trace. Touch it to close the menu.

Beep

— The appearance of menu options indicates what type of entry is required. Icons or words set in a black box indicate a toggle. Continue touching the cell until the correct choice is selected. A white box surrounds the selected option.


Panel Lock

Graticule

— Labels like this indicate a sub-menu will open on top of the primary menu for further selection.

Grid

Grid Intensity

— The gear symbol  indicates the Adjust knob can be used to change the value.

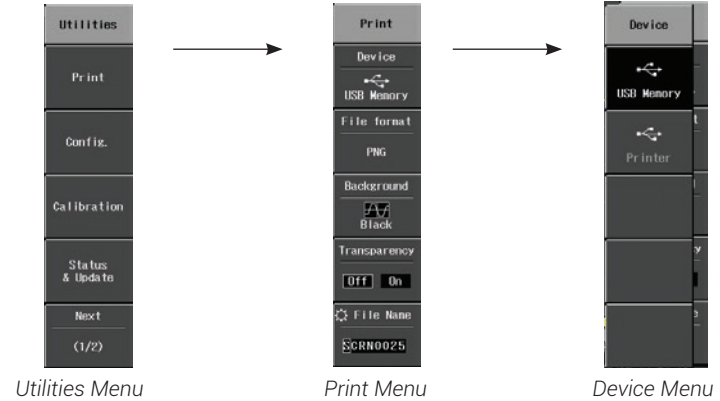
60%

Next

— Menus with Next (#/#) in the bottom cell have additional pages of options not yet displayed. Press Next to see the next page of options. Continue pressing Next to return to the top page.

(2/3)

Sub-menus may appear stacked directly over the primary menu or slightly off to the side. The progression of menus can look like this:



Make a selection from the sub-menu to return to the previous menu in the stack. If the sub-menu remains open, touch the top cell or press the Close Menu button on the front panel.

Language Selection

To change the language that appears on the display, press the front panel **Utilities button** and choose **Config > Language**. Make your **Language** selection.

Front Panel

Most front panel controls are described in the Basics section with the function they perform. Below are a few special front panel controls.

Auto Setup automatically sets the vertical scale, timebase, and trigger condition based on the input signals. When you touch Undo, the oscilloscope is restored to the setups in use immediately prior to Auto Setup.


The **Print** button captures the entire screen and processes it according to your Print setting.

The **Close Menu** button closes the last open touch menu. When menus are stacked, continue pressing the button until all menus are closed.

The **Help** button opens WaveJet Touch Online Help. Press Help, then press the control for which you want help. Touch any other control to close Help.

The **Clear** button clears sweeps and measurement counters.

Some front panel buttons light to indicate the function is active (e.g., channel on, cursors on).

Many touch menu settings allow you to enter a numeric value. Active entry fields are marked with the  icon. Turning the **Adjust knob** changes the value in marked fields. Pushing the Adjust knob toggles between making coarse (large increment) or fine (small increment) adjustments.

Other knobs on the front panel also function one way if turned and another if pushed like a button. If a knob is “multiplexed,” the top label describes its principal “turn” action, and the bottom label describes its “push” action.



BASICS

WaveJet Touch Oscilloscopes

Turning On/Off Traces

Press the corresponding **Channel button (CH1–CH4)** to turn on a trace. As long as the acquisition system is not stopped, a waveform pattern appears on the grid. To turn off a trace, press the Channel button again.

When a trace appears on the grid, the Channel descriptor box is color-coded to match. This box always displays the current Vertical settings for the trace and is labeled 1–4. The front panel Channel button also lights to show the trace is on.

1: 1.00V BW	2: 100mV
DC1MΩ	DC1MΩ
ofs -2.32V	Empty

Trace On

Trace Off

Math, Reference and Zoom Traces

In addition to the channel traces, you can view a zoom (close-up portion) of a trace, a trace stored to the oscilloscope's internal memory (REF1-REF5), or a trace that displays the result of a math function applied to another trace (M).


Press the front panel **MATH** button to turn on a math trace. Adjust the trace by using the Math setup menu and front panel controls.

Use the **REF** button to open the Reference Waveform menu and recall the reference from memory.

Use the **ZOOM** button to create zooms of active traces. If multiple traces are on when you press ZOOM, zooms are created for each trace. Use the Horizontal knobs to adjust zooms.

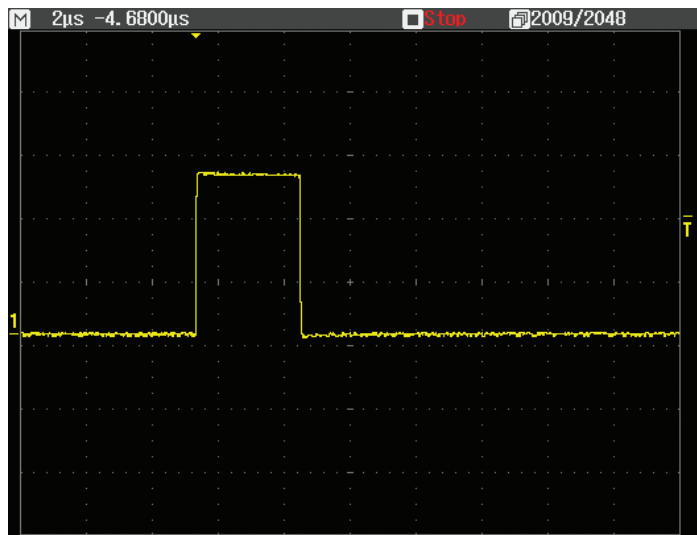
Replaying Traces



When acquisition is stopped, the Replay indicator  lights to show that there are records available in memory to display—up to 2048 sweeps.

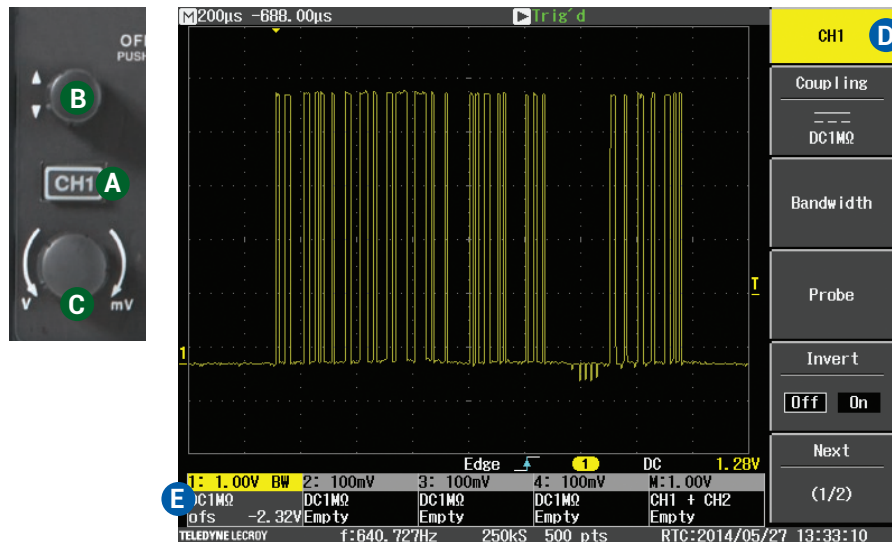
Turn the Replay knob to step back or forward one sweep at a time, “replaying” the acquisition. Press the knob to skip to the end of the acquisition.

The number of the sweep (out of 2048) is displayed at the far right of the Acquisition status bar.



Vertical

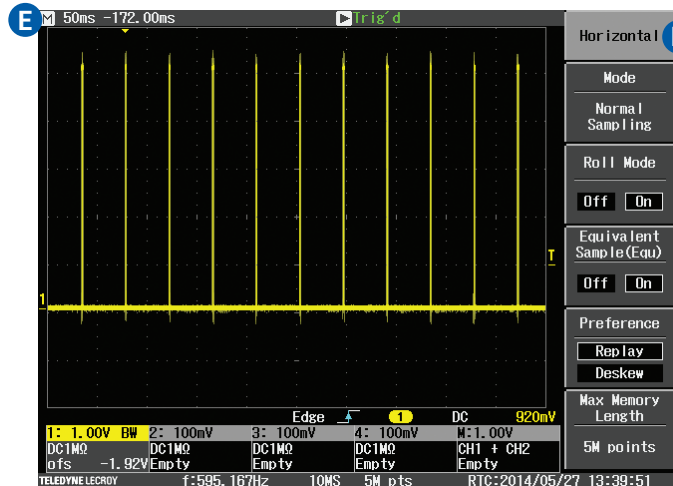
These controls adjust the channel trace along the Y axis.



- A** Press to turn on trace.
- B** Turn to raise or lower Offset. Push to return to zero.
- C** Turn to raise or lower Vertical Scale (V/div).
- D** Use touch menu to apply other Vertical settings to the trace, such as Coupling or Bandwidth Limiting.
- E** Current Vertical settings appear in the Channel descriptor box whenever the channel is on.

Horizontal (Timebase)

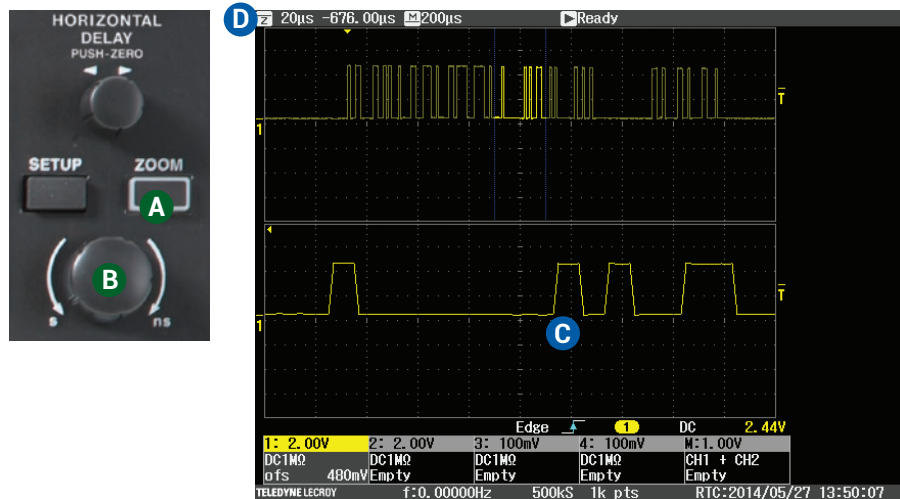
These controls adjust the trace along the X axis.



- A** Turn to raise or lower trigger Delay. Push to return Delay to zero.
- B** Turn to raise or lower Horizontal Scale (Time/div).
- C** Press to open Horizontal setup menu.
- D** Use touch menu to make other acquisition settings, such as Sampling Mode and Memory Length.
- E** Left edge of Acquisition status bar shows current timebase settings.

Zoom

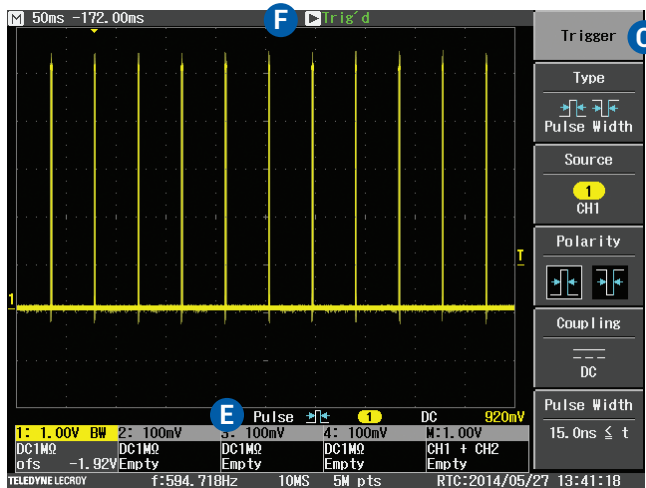
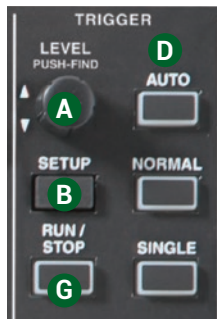
Zoom magnifies the active traces.



- A** Press the ZOOM button to turn on zooms.
- B** Use Horizontal knobs to adjust zoom scale and offset.
- C** Zoom opens in a second grid for every active trace. Blue markers surround the portion of the original trace that is now zoomed to fit the width of the grid.
- D** Zoom scale appears at the far left of the Acquisition status bar. All zooms share the same offset and scale.

Triggers

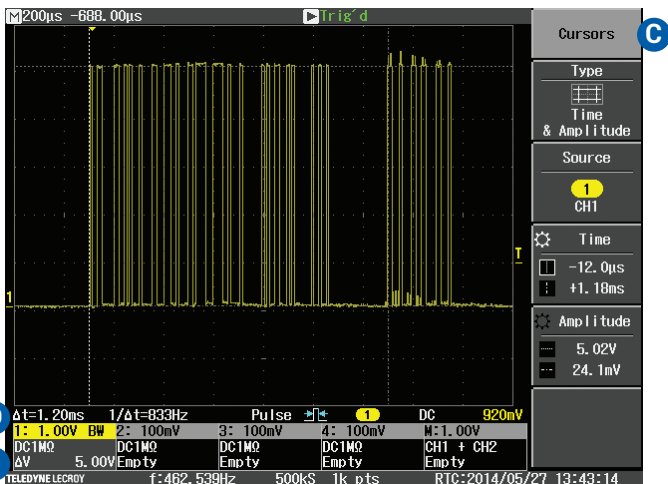
Triggers tell the oscilloscope when to perform an acquisition. Available trigger types are described at more length in the *WaveJet Touch Oscilloscopes Operator's Manual*.



- A** Turn to raise or lower trigger Level (V). Push to automatically find the level based on the signal mean.
- B** Press SETUP to open the Trigger setup menu.
- C** Use touch menu to choose the trigger type and source channel.
- D** Choose a trigger mode to start the acquisition:
 - AUTO triggers repeatedly when there is a valid trigger or after a preset period when there is no valid trigger.
 - NORMAL triggers repeatedly whenever all conditions are met.
 - SINGLE triggers once when all conditions are met.
- E** Trigger type and level settings appear on the Trigger status bar.
- F** Trigger status appears in the Acquisition status bar.
- G** Press RUN/STOP to stop and restart the acquisition.

Cursors

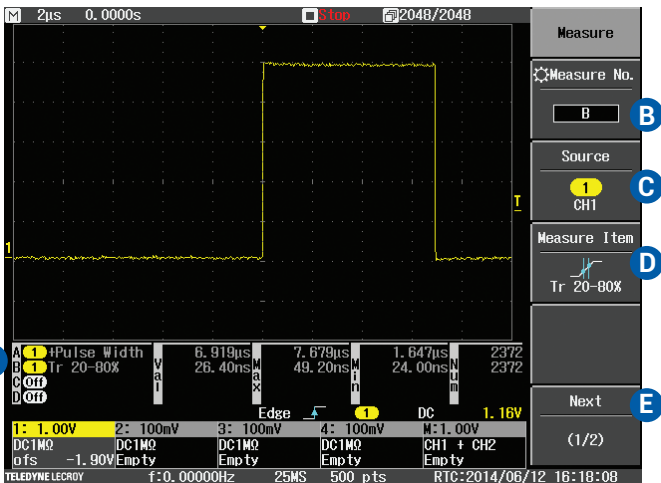
Cursors set measurement points on a trace. There are four preset cursor types, each with a unique appearance on the display: Time, Amplitude, Time+Amplitude, and Value at Cursor. These are described in more detail in the *WaveJet Touch Oscilloscopes Operator's Manual*.



- A** Press CURSORS to apply cursor. Continue pressing to cycle through all cursor types.
- B** Turn to adjust cursor position. Push to select different cursor lines to adjust. The active line appears bold.
- C** Use touch menu to switch cursor readout to a different source trace.
- D** Time cursor readout appears at left edge of Trigger status bar.
- E** Amplitude and Value cursor readouts appears on descriptor boxes.

Measurements & Statistics

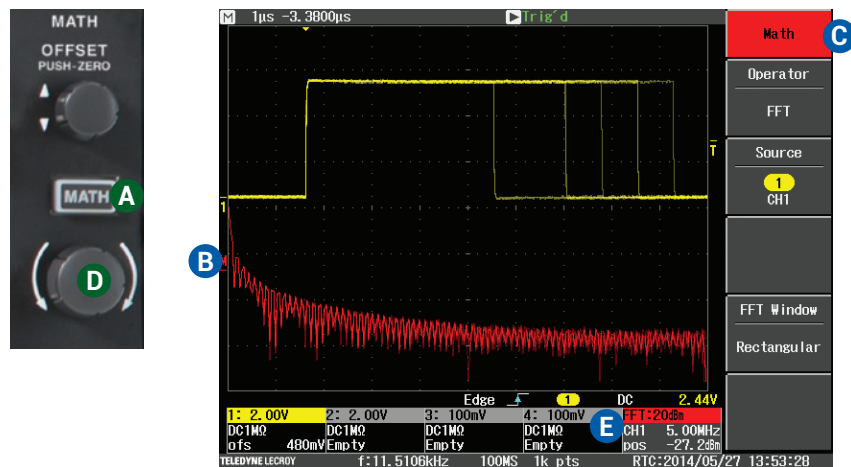
Measurements are waveform parameters that can be expressed as numerical values, such as amplitude or frequency. You can set up-to-four simultaneous measurements on one or more traces and view the active readout in a table. Statistical measurements can be added to the readout table. Pass/Fail conditions can be set on measurement results; see the *WaveJet Touch Operator's Manual* for instructions.



- A** Press MEASURE to open the Measure setup menu.
- B** Select the measurement number (A-D).
- C** Touch to choose source channel.
- D** Touch to choose parameter.
- E** To add statistics to the readout, touch Next to go to page 2 and turn Min/Max On.
- F** Measurement readout appears in a table below the grid.

Math

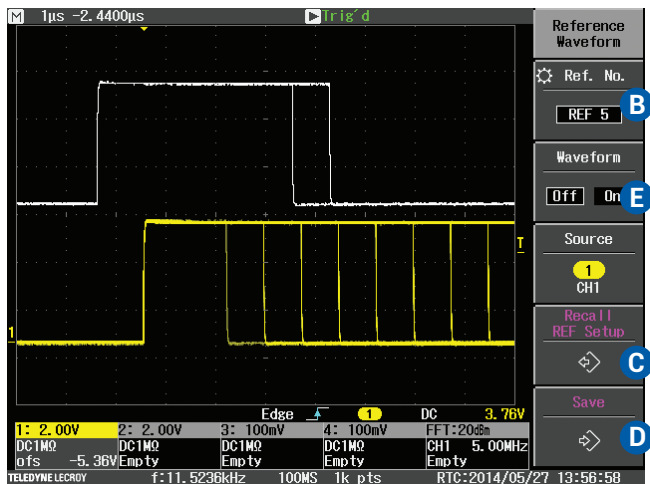
Math traces display the result of applying a mathematical function (e.g., FFT) to one or more channel traces. One important distinction between math functions and measurement parameters is that the result of math is always another waveform, whereas the result of measurement is a number.



- A** Press MATH to open Math setup menu.
- B** Math trace (M) opens on grid.
- C** Use touch menu to select Operator and Source channel(s).
- D** Turn Math offset and scale knobs to adjust math trace.
- E** Math descriptor box shows math trace scale and offset.

Reference Waveforms (Memories)

Reference waveforms are setups and waveform data stored in internal memory. They can be later recalled to the display for comparison with other traces. You can store up-to-five references (REF1-REF5). After that, new references will overwrite previously stored data. To store setups or waveforms indefinitely, choose SAVE/RECALL from the front panel and save to a USB drive.



- A** Press REF to open the Reference Waveform setup menu.
- B** Use the touch menu to select the Ref. No. slot.
- C** To recall the waveform and setups already stored in that slot, touch Recall REF Setup.
- D** To save a waveform and setups to that reference slot, select the Source trace then touch Save.
- E** To display the reference now, turn Waveform On. A white reference trace appears on the grid along with the other active traces.

Print

The PRINT button captures the entire visible screen as an image and either sends it to a printer or saves it as an image file on a connected USB drive. Images printed to a USB drive can be saved in .tiff, .bmp, or .png format. By default, image files are named "SCRN####," and the oscilloscope automatically increments the number with each capture.

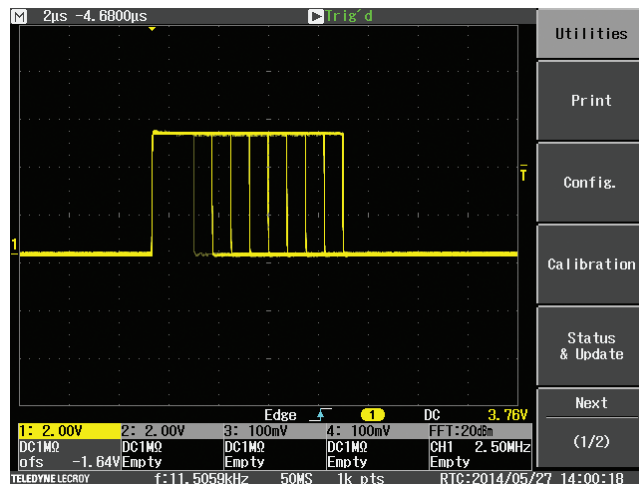
To configure how PRINT works, press UTILITIES and choose Print from the Utilities menu. To make a print, just press PRINT.



Utilities

Most oscilloscope properties settings can be found on the Utilities menus. Press the UTILITIES button to display them. Menus include:

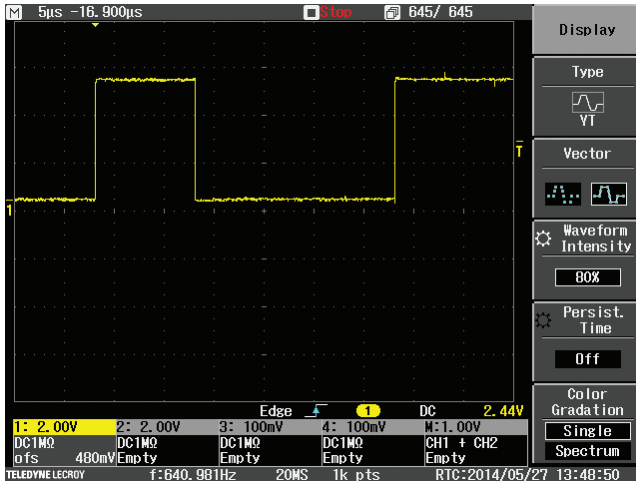
- **Print** setup
- **Config** (uration) of oscilloscope Language, Date & Time, Offset Setting units, Delay Setting units, Beep (sound/mute), Panel Lock, grid Graticule, Grid Intensity, Trigger Counter, and Power Management
- **Calibration** setup
- **Status & Update** of oscilloscope hardware and firmware
- **Remote** control setup
- **Aux Out** connector setup



Display

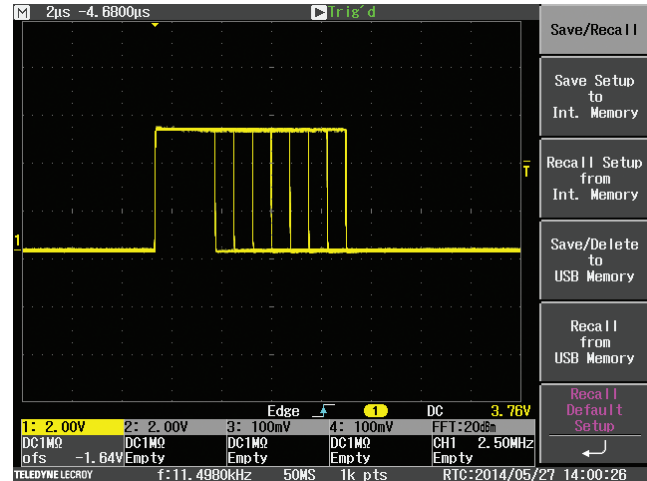
Display allows you to configure the appearance of channel traces on the grid. You can display input signals as XY or VT traces, change the line vector from continuous to individual sample points, increase/decrease trace intensity (brightness), apply persistence decay time, or modify trace color. Press the DISPLAY button and select from the menu.

Note: Use the Utilities menu to change the style (Graticule) and brightness (Intensity) of the grid itself.



Save/Recall

Save/Recall allows you to save channel setups and waveform data to either internal memory (reference waveform) or external USB drive, then later recall them to the oscilloscope display. Data can be saved in several formats, including binary, ASCII and Mathcad. Save/Recall also restores the oscilloscope to the factory default setup. Press the SAVE/RECALL button and select from the menus.



REFERENCE

WaveJet Touch Oscilloscopes

Service

Contact your local Teledyne LeCroy service center for calibration or other service.

Returning a Product

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 you're returning for at least the replacement cost.

Follow these steps for a smooth product return.

1. Remove all accessories from the device. Do not include the manual.
2. Pack the product 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
 - Product model and serial number
 - Description of failure or requisite service
4. Pack the product 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 Teledyne LeCroy>
 - FRAGILE

6. If returning a product 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 about the reason for shipment. Duties may have to be paid on the value of the service.

Service Plans

Extended warranty, calibration, and upgrade plans are available for purchase. Contact your Teledyne LeCroy sales representative or customersupport@teledynelecroy.com to purchase a service plan.

Teledyne LeCroy Service Centers

<p>United States and Canada World Wide Corporate Office</p> <p>Teledyne LeCroy 700 Chestnut Ridge Road Chestnut Ridge, NY, 10977-6499 Ph: 800-553-2769 / 845-425-2000 Fax: 845-578-5985 teledynelecroy.com</p> <p>Support: contact.corp@teledynelecroy.com</p> <p>Sales: customersupport@teledynelecroy.com</p>	<p>US Protocol Solutions Group</p> <p>Teledyne LeCroy 3385 Scott Boulevard Santa Clara, CA, 95054 teledynelecroy.com</p> <p>Sales and Service: Ph: 800-909-7211 / 408-727-6600 Fax: 408-727-0800 contact.corp@teledynelecroy.com</p> <p>Support: Ph: 800-909-7112/408-653-1260 pgsupport@teledynelecroy.com</p>	<p>Europe</p> <p>Teledyne LeCroy SA 4, Rue Moise Marcinhes Case postale 341 1217 Meyrin 1 Geneva, Switzerland Ph: +41 22 719 2228 / 2323 / 2277 Fax: +41 22 719 2233 contact.sales@teledynelecroy.com applications.indirect@teledynelecroy.com teledynelecroy.com/europe</p> <p>Protocol Analyzers: Ph: +44 12 765 0397 1</p>	<p>Singapore</p> <p>Oscilloscopes: Teledyne LeCroy Singapore Pte Ltd. Blk 750C Chai Chee Road #02-08 Singapore 469003 Ph: ++ 65 64424880 Fax: ++ 65 64427811</p> <p>Protocol Analyzers: Genetron Singapore Pte Ltd. 37 Kallang Pudding Road, #08-08 Tong Lee Building Block B Singapore 349315 Ph: ++ 65 9760-4682</p>
<p>Taiwan</p> <p>LeColn Technology Co Ltd. Far East Century Park, C3, 9F No. 2, Chien-8th Road Chung-Ho Dist., New Taipei City, Taiwan Ph: ++ 886 2 8226 1366 Fax: ++ 886 2 8226 1368 sales_twn@teledynelecroy.com</p>	<p>Korea</p> <p>Teledyne LeCroy Korea 10th fl. Ildong Bldg. 968-5 Daechi-dong, Gangnam-gu Seoul 135-280, Korea Ph: ++82 2 3452 0400 Fax: ++82 2 3452 0490</p>	<p>China</p> <p>Teledyne LeCroy Beijing Rm. 2001 Unit A, Horizon Plaza No. 6 Zhichun Rd., Haidian Dist. Beijing 100088, China Ph: ++86 10 8280 0318 / 0319 / 0320 Fax: ++86 10 8280 0316</p> <p>Service: Rm. 2002 Ph: ++86 10 8280 0245</p>	<p>Japan</p> <p>Teledyne LeCroy Japan Hobunsha Funchu Bldg, 3F 3-11-5, Midori-cho, Fuchu-Shi Tokyo, 183-0006 Japan Ph: ++ 81 4 2402 9400 Fax: ++ 81 4 2402 9586 teledynelecroy.com/japan</p>

Certifications

This section certifies the instrument's Electromagnetic Compatibility (EMC), Safety and Environmental compliance.

EMC Compliance

EC DECLARATION OF CONFORMITY - EMC

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

EN 61326-1:2013, EN 61326-2-1:2013 EMC requirements for electrical equipment for measurement, control, and laboratory use. ¹

Electromagnetic Emissions:

EN 55011:2010, Radiated and Conducted Emissions Group 1, Class A ^{2 3}

Electromagnetic Immunity:

EN 61000-4-2:2009 Electrostatic Discharge, 4 kV contact, 8 kV air, 4 kV vertical/horizontal coupling planes ⁴

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

EN 61000-4-4/A1:2010 Electrical Fast Transient/Burst, 1 kV on power supply lines, 0.5 kV on I/O signal data and control lines ⁴

EN 61000-4-5:2006 Power line Surge, 1 kV AC Mains, L-N, L-PE, N-PE ⁴

EN 61000-4-6:2009 RF Conducted Electromagnetic Field, 3 Vrms, 0.15 MHz - 80 MHz

EN 61000-4-11:2004 Mains Dips and Interruptions, 0%/1 cycle, 70%/25 cycles, 0%/250 cycles ^{4 5}

¹ To ensure compliance with all applicable EMC standards, high quality shielded interface cables should be used.

² Emissions which exceed the levels required by this standard may occur when the oscilloscope is connected to a test object.

³ This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

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

⁵ Performance Criteria "C" applied for 70%/25 cycle voltage dips and for 0%/250 cycle voltage interruption test levels per EN61000-4-11.

European Contact:

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

AUSTRALIA & NEW ZEALAND DECLARATION OF CONFORMITY – EMC

Oscilloscope 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):

EN 55011:2010 Radiated and Conducted Emissions, Group 1, Class A, in accordance with EN61326-1:2013 and EN61326-2-1:2013.

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 oscilloscope 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 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

EN 61010-2:030:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for testing and measuring circuits

The design of the instrument has been verified to conform to the following limits put forth by these standards:

- Mains Supply Connector: CAT II local distribution level, equipment connected to the mains supply (AC power source).

Measuring Terminals: CAT 0 signal level, equipment measuring terminals connected to source circuits where measures are taken to limit transient voltages to an appropriately low level.

- Unit: Pollution Degree 2, operating environment where normally only dry, non-conductive pollution occurs. Conductivity caused by temporary condensation should be expected.
- Unit: Protection Class I, grounded equipment in which protection against electric shock is achieved by Basic Insulation and a connection to the protective ground conductor in the building wiring.

U.S. NATIONALLY RECOGNIZED AGENCY CERTIFICATION

The oscilloscope has been certified by Underwriters Laboratories (UL) to conform to the following safety standard and bears UL Listing Mark:

UL 61010-1 Third Edition – Safety standard for electrical measuring and test equipment.

CANADIAN CERTIFICATION

The oscilloscope has been certified by Underwriters Laboratories (UL) to conform to the following safety standard and bears cUL Listing Mark:

CAN/CSA-C22.2 No. 61010-1-12. Safety requirements for electrical equipment for measurement, control and laboratory use.

Environmental Compliance

END-OF-LIFE HANDLING



The instrument 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 instrument 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 instrument and its accessories conform to the 2011/65/EU RoHS2 Directive, as it has been classified as Industrial Monitoring and Control Equipment (per Article 3, Paragraph 24) and is exempt from RoHS compliance until 22 July 2017 (per Article 4, Paragraph 3).

ISO Certification

Manufactured under an ISO 9000 Registered Quality Management System.

Warranty

THE WARRANTY BELOW REPLACES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. TELEDYNE LECROY SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT OR OTHERWISE. THE CUSTOMER IS 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 TRANSPORT PREPAID.

The oscilloscope is warranted for normal use and operation, within specifications, for a period of three years from shipment. Teledyne LeCroy will either repair or, at our option, replace any product returned to one of our authorized service centers within this period. However, in order to do this we must first examine the product and find that it is defective due to workmanship or materials and not due to misuse, neglect, accident, or abnormal conditions or operation.

Teledyne LeCroy shall not be responsible for any defect, damage, or failure caused by any of the following: a) attempted repairs or installations by personnel other than Teledyne LeCroy representatives or b) improper connection to incompatible equipment, or c) for any damage or malfunction caused by the use of non-Teledyne LeCroy supplies. Furthermore, Teledyne LeCroy shall not be obligated to service a product that has been modified or integrated where the modification or integration increases the task duration or difficulty of servicing the oscilloscope. Spare and replacement parts, and repairs, all have a 90-day warranty.

The oscilloscope's firmware has been thoroughly tested and is presumed to be functional. Nevertheless, it is supplied without warranty of any kind covering detailed performance. Products not made by Teledyne LeCroy are covered solely by the warranty of the original equipment manufacturer.

