LeCroy

Quick Reference Guide

WaveRunner® 6 Zi Oscilloscope

To get started quickly, take a few moments to read through this guide.

Additional information can be found in the Getting Started Manual.

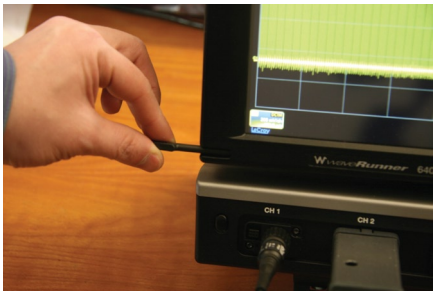
On-line help also contains more information on using the instrument.

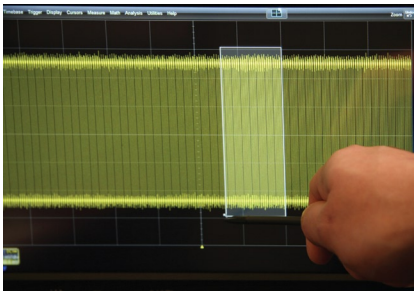
919596-00revA

User Interface

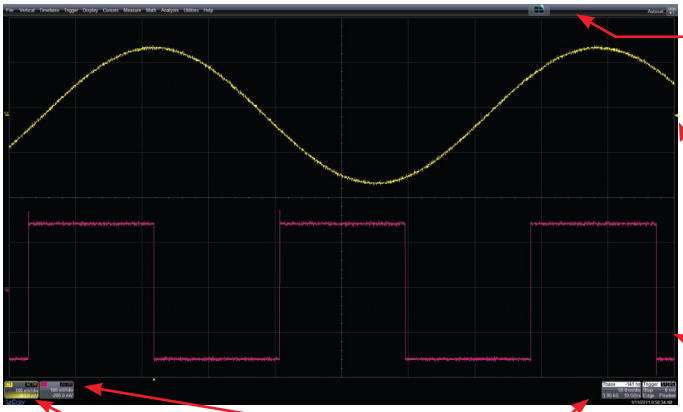
Touch Screen with Stylus

Touch Screen with Built-in Stylus Holder
Just pull the stylus out of the built-in holder and use it with the touch screen graphical user interface.





Understanding Display Information



Top Menu Bar
One way of accessing the setup menus.

Trigger Level Indicator
Color coded to the triggered signal.

Grid Area
Similar to many other oscilloscopes.

Descriptor Labels
Touch sensitive. One is provided for each channel, zoom, math, or memory that is on. Touch for quick access to the setup menu.

Trigger Position Indicator
Color coded to the triggered signal. Zero is center of display.

Timebase and Trigger Descriptor Labels
Touch sensitive. These are always displayed, and provide information on status. Touch for quick access to the setup menu.

Trigger Delay (Position)

Horizontal Descriptor Label

Time/div

 # Samples

Sample Rate

Sampling Mode
(blank when in real-time mode)

Pre-Processing Summary Listing
(summarizes changes from default states)

Coupling

Gain Setting

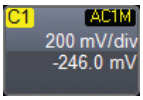
Offset

Averaging Sweeps Count

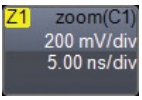
Channel Abbreviation

Shortcuts

Shortcuts to Channel, Math, and Memory Menus
are provided to make it easy to access common functions. Touch the descriptor box to display the menu.

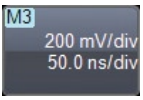


Channel Descriptor Box



Zoom Descriptor Box

Math Descriptor Box



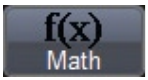
Memory Descriptor Box

Toolbar Shortcuts to Channel, Math, and Memory Menus

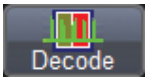
These shortcuts are available from the channel, zoom, math, and memory menus. They can save you valuable setup time by predefining sources; and they provide additional features (such as labeling of traces).

Opens a Measurement selection pop-up menu. You can then select up to 6 parameters (measurements) for the active channel from this menu without leaving the Channel Setup menu.

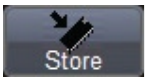
Creates a zoom trace of the channel signal. The zoom trace becomes active, and you can use the Math and Zoom controls to modify its scale and position.



Opens a Math selection pop-up menu. You can then select a math function for the active channel from this menu without leaving the Channel Setup menu.

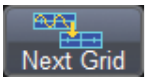


Opens the serial decode menu. Options are then provided to select and configure a particular protocol for decoding.



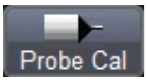
Copies the channel trace into its corresponding Memory (Reference Waveform) location. For instance, C1 is loaded into M1, C2 is loaded into M2, etc.

Automatically performs a vertical scaling that fits the waveform into the grid.



When multigrid is enabled, this button moves the current channel waveform into the next grid.

Opens a Labeling pop-up menu that allows user-defined labels tied to the waveform.

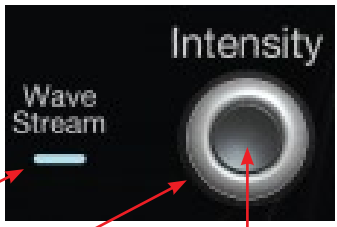


Opens a probe calibration menu. From there, the probe can be calibrated automatically or the gain, offset, and skew can be set manually.

WaveStream™ Fast Viewing Mode

Overview

WaveRunner contains WaveStream™ technology that closely simulates the look and feel of a lively, analog display by providing a fast display update rate. You may adjust the intensity of the trace(s), and sample at the full scope sampling rate while in WaveStream mode, which significantly enhances glitch finding capability.



WaveStream Indicator Light
is lighted when WaveStream fast viewing mode is ON.

Turn Knob
to adjust intensity in either WaveStream fast viewing mode or real-time sampling mode.

Press Knob
to toggle at any time between real-time sampling and WaveStream fast viewing mode.

Math and Measure in WaveStream Mode

WaveStream traces comprise many overlayed traces. While in WaveStream mode, math and measurements are applied only to the last trace in the WaveStream acquisition. A math trace will not have the same appearance as a channel does in WaveStream mode, and measurements will accumulate more slowly compared to real-time sampling mode.

Zooming in WaveStream Mode

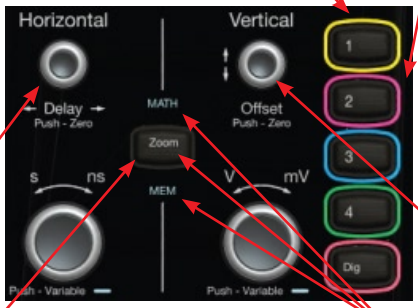
WaveStream data is pixilated data with 256 different intensity levels. If you zoom a WaveStream trace, you will zoom pixilated data. Therefore, it is recommended that you toggle to real-time sampling mode for most zooming.

Horizontal and Vertical Controls

Light OFF
Channel may or may not be displayed. Vertical controls will not adjust that channel (channel is "inactive").

Press Knob
to toggle between a zero horizontal delay and the previous value.

Quick Zoom
Press to zoom onto the active channel. Press again to unzoom.



Light ON
Indicates that the vertical controls will adjust that channel (channel is considered "active").

Press Knob
to toggle between zero offset and the previous value.

Math, Zoom, and Memory Indicators
Illuminates when a math, zoom, or memory channel is active, allowing for the use of the horizontal and vertical controls.

Vertical Controls are always "active" for one of the Channels. The coloring on the descriptor labels indicates "active." Note that only one channel can be active at a time. If a channel is active, then it's corresponding descriptor box is colored. If it is inactive, then its descriptor box is gray colored.

Inactive
Vertical controls will not work for these

Active
Vertical controls will work for these.

Trigger Control

Sets the trigger level — push to set to 50%.

Is lighted when the trigger is armed.

Is lighted and stays lit after a trigger.

Press to open the trigger setup menu.

Triggers even if the trigger conditions are not met.

Triggers whenever the trigger conditions are met.

Triggers once (single-shot acquisition) when the trigger conditions are met.

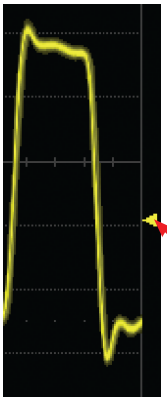
Cancels the acquisition in Auto, Normal, or Single trigger mode.

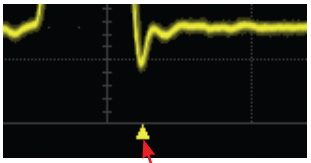
Press to select the type of coupling desired.

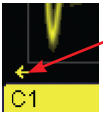
Selects the trigger scan feature.

Select the channel to trigger.

Select whether to trigger on the rising edge, falling edge, or either. More options are available in the trigger setup menu.





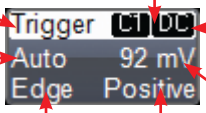


Post Trigger Indicator

Trigger Position Indicator

Trigger Level Indicator

Touch to access the trigger setup menu.



Trigger Source

Trigger Coupling

Trigger Status

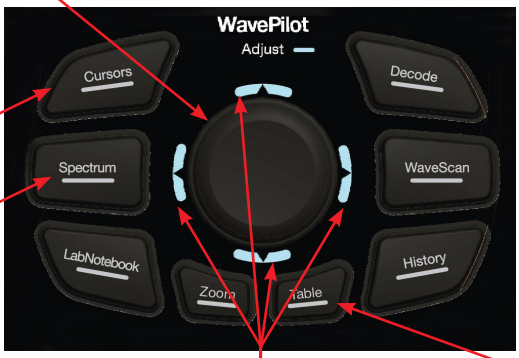
Trigger Level

Trigger Mode

Trigger Slope

WavePilot

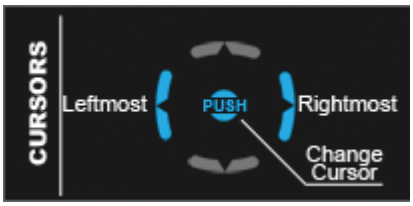
SuperKnob:
Can be rotated to change the value of a selected field and can be toggled left, right, up, down, or inwards.



Press to select a desired function. Buttons will illuminate when selected. Press again to cycle through additional options or to disable the function.

These will light up to indicate the direction in which the SuperKnob can be toggled after a function has been selected.

This will illuminate when a selected field can be adjusted by rotating the SuperKnob.



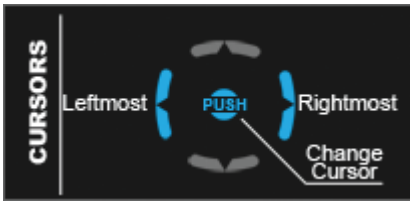
Flyout Menu:
This menu will appear when a function is selected. The lit portions indicate the direction in which the SuperKnob can be toggled and its corresponding behavior. Additionally, the SuperKnob will illuminate identically to the Flyout menu.

Using Cursors

The WavePilot feature on the WaveRunner makes using cursors easy. All common cursor features can be accessed from the front panel controls. There is no need to open menus to use cursors on WaveRunner.

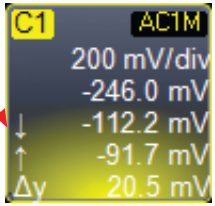
The absolute cursor does not have any additional options, as indicated by its lack of lighting.

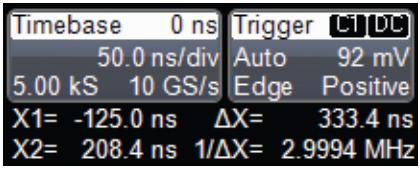
Cycling through the Cursors key on the Wavepilot enables the cursor function in the following order: Horizontal Absolute, Horizontal Relative, Vertical Absolute, Vertical Relative.



With the Horizontal Relative cursor selected, press the Superknob to the right to select the leftmost cursor. Toggle the Superknob to the right to select the rightmost cursor. Rotate the SuperKnob to position the cursor to the desired location. Pushing the SuperKnob inwards cycles between the leftmost and rightmost cursor and between locking in their relative position.

Cursor Readout
Vertical (Y) information is located in the descriptor labels.

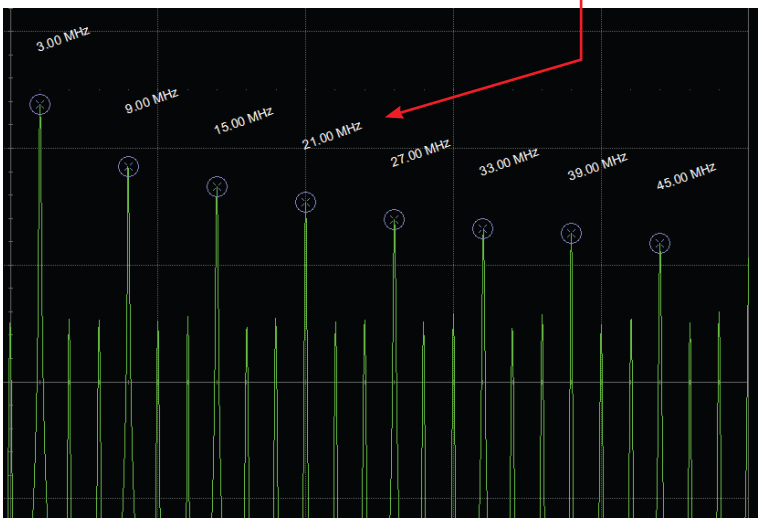




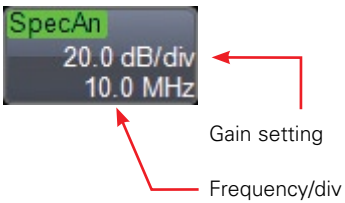
Horizontal (X) information is located underneath the Timebase and Trigger Descriptor Labels.

Spectrum Analyzer

The optional spectrum analyzer feature provides a frequency domain representation of the input signal. The SuperKnob allows for quick and easy control of the center frequency location and the span.



Spectrum Analyzer Setup:
Press the Spectrum button from the WavePilot controls and choose your input source. Adjust the center frequency and span to the desired values. A particular window function can also be selected.



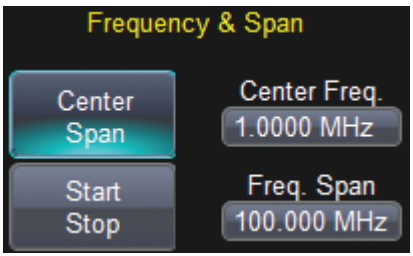


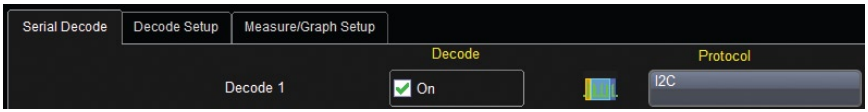
Table Mode:
The spectrum analyzer function can be switched between table mode and zoom. In table mode, you can toggle the SuperKnob up or down to navigate quickly through the table of results. Rotate the SuperKnob to scroll line-by-line through the table.

Pea...	Freq.	Amplitude
1	3.000 MHz	7.5 dBm
2	9.000 MHz	-3.1 dBm
3	15.000 MHz	-6.6 dBm
4	21.000 MHz	-9.3 dBm
5	27.000 MHz	-12.2 dBm
6	33.000 MHz	-13.7 dBm
7	39.000 MHz	-14.6 dBm
8	45.000 MHz	-16.3 dBm

Zoom Mode:
Rotate the SuperKnob to adjust the Frequency span. A smaller span will provide a zoomed in view of the spectrum.

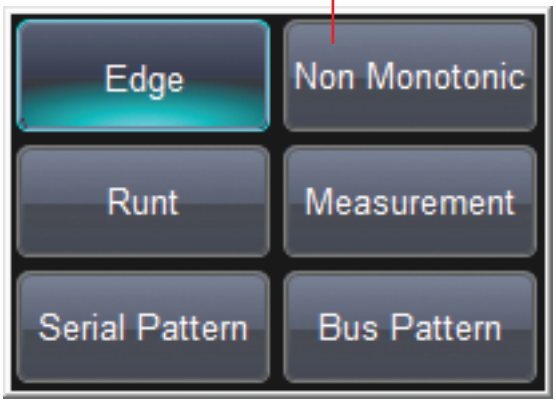
Setting Up Serial Decoding

To enable serial decoding, press the **Decode** button on the front panel. Select the desired protocol and turn it on. In the **decode setup** tab, continue configuring the protocol selected. Table, zoom and pan modes are available under the decode function.



WaveScan

WaveScan is a powerful feature that allows users to find anomalies or a pattern in a signal source and to trigger on them. Several scan modes are included and a filter wizard provides a quick and easy method for setting the range of values.



Communicate and Document

WaveRunner makes it easy to store, transfer and print your files and images. Refer to the Getting Started Manual for complete details.

Saving Screen Images

You can save a screen image as a file, send it as an email, print it, or store it on the clipboard. Define in Utilities, Utilities Setup, Hardcopy Menu.

Print Button

Can be defined to perform any of the above functions with one button push.

LabNotebook™ button

A dedicated button is available in the WavePilot control area to bring up the labnotebook menu

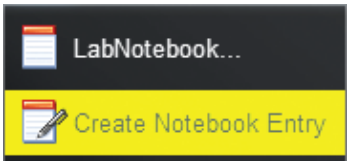
LabNotebook

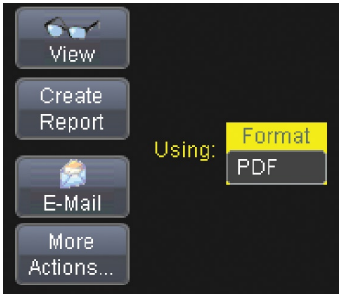
Saving Work and Documenting Results

The WaveRunner LabNotebook feature simplifies the way important waveforms, screen captures, and oscilloscope setup files are saved and documented. LabNotebook also provides an easy way to recall your settings with the Flashback feature. And it lets you create reports, showing your screen images, in pdf, html, or rtf output formats.

Creating a LabNotebook Entry

LabNotebook entries are easily created by selecting LabNotebook from the File menu, then clicking the Create button. Several annotation tools and colors then are put at your disposal to mark up your waveform. When you click Done, your mark-ups and scope settings are saved together in a database resident on the oscilloscope.

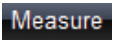


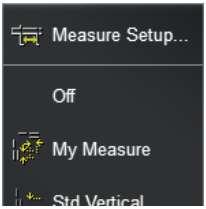


Click the Create Report button to generate a hardcopy format that you can save to a network drive or external media. Or click the E-mail button to send the report to another location. Use the Flashback feature at any time to recall a Notebook entry, including scope setup, for further study.

Setting Up Measurements
Viewing Statistics

Measure Setup
Touch Measure in the top menu and then touch Measure Setup (or use the shortcut in the channel, math, or memory menu).

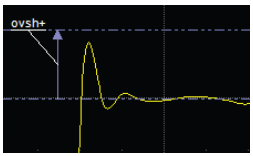




If Measurements Don't Appear
make sure that the Show Table checkbox is checked.

Choose Your Measurement and Source
Touch on a parameter number (Px) and select a measurement. Select the source in the Px tab, as required.

Help Markers
indicate how the measurement is being performed. Select a type and check if you want them to be "always on."



Measurement Display

Value
Last value measured in the acquisition.

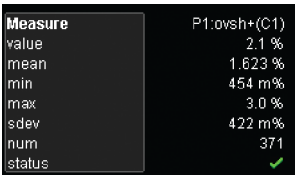
Status Indicator
Good measurement. (Refer to the manual for a complete listing of indicator icons).

Source

Measurement (Parameter) Number

Measurement Name

Turn statistics on to see complete information



Graphing and Viewing Parameters

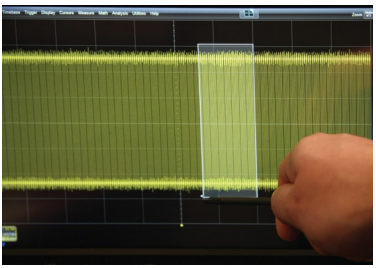
View Statistics as Histicons
Simply check the box in the measure menu and a histicon will show you statistical distribution.

More Advanced Measurement Views
can be obtained with the use of Histograms, Tracks, and Trends. Setup is simple — just touch the icon to create the view. (Note: Track is an optional capability)

Zoom your Signals

There are three ways to zoom with the WaveRunner.
Use whichever method feels best.

1 QuickZoom Button
Press the button and all channels displayed will be zoomed in separate grids. Will also UNDO any zooms.

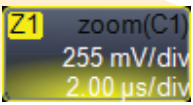


2 Draw a Zoom Box
Using the stylus, outline the area you wish to zoom.

3 Horizontal Adjust
Stop your acquisition, and use the delay and horizontal adjust knobs to position a subset of your acquisition.

Zoomed Area is Shown

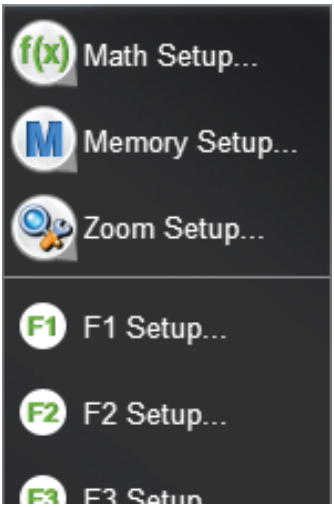
Zoom Descriptor Label
shows zoom scaling.



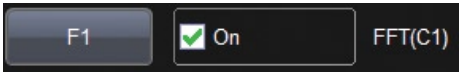
Use Horizontal and Vertical Controls
to adjust zoom scale and position (if desired).

Setting Up Math

Math Setup
Touch Math in the top menu and then touch Math Setup.

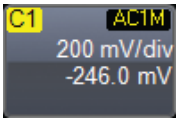


Choose Your Math Function and Source in the math setup menu. Touch on a function number (Fx) and select a math function. Select the source in the Fx tab, as required.



Make Setup Adjustments
using the right-hand menu. Touch the Zoom tab and adjust zoom, or use the front panel Horizontal and Vertical Controls to adjust position and scale.

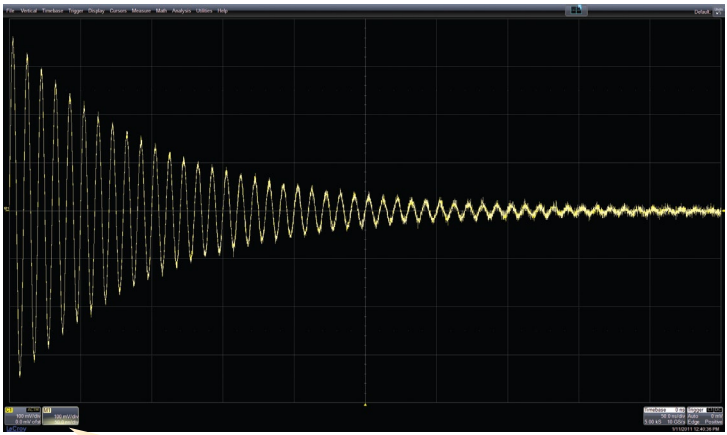
Setting Up Memories (Reference Waveforms)



1 **Touch the Descriptor Label** of the trace that you want to create a memory of (if it's not active, you'll have to touch it twice).

2 **Touch the Store Button** in the toolbar area of the channel setup menu.

Memory Trace Automatically Appears on the Grid.



Memory Descriptor Label shows memory scaling.

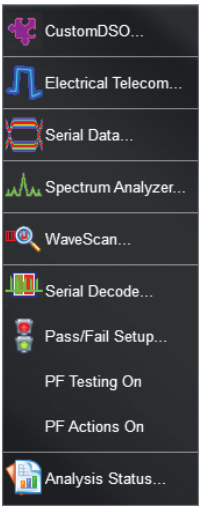
Use Horizontal and Vertical Controls to adjust memory scale and position (if desired).

Integrated Analysis

WaveRunner has the best selection of optional software analysis tools and application packages. All of these tools are completely integrated into the scope to allow powerful analysis capability and easy, seamless operation.

Software Options add capability into the existing Math and Measure menus. Reference the section on setting up Math and Measurements to learn how to access this capability. Here, you can see additional Histogram measurement capability added into the standard measurement selector pop-up menu.

Application Packages such as MS-250/500 (Mixed Signal Option), PMA2 (Power Measure Analysis), and a large selection of serial triggers and decoders—more than 14—available to provide a total system view, with application specific user interfaces that are accessed from the Analysis pull-down menu or Vertical pull-down menu (for MS-250/500). Any additional math or measure capability they provide is also included in the standard math and measure pop-up menus.



Thank You for Purchasing a WaveRunner Oscilloscope.

To offer comments or suggestions about the product, please feel free to email the Product Manager at WaveRunner@lecroy.com

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