

# Keysight Infiniium Z-Series Oscilloscopes

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## Safety Notices

### CAUTION

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### WARNING

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See also [Appendix A](#), “Safety Information,” starting on page 55.

# Infiniium Z-Series Oscilloscopes—At a Glance



**Table 1** Z-Series Oscilloscope Band widths, Sample Rates, and Memory Depths

|          | Band width |           | Sample rate |           | Memory depth |         |
|----------|------------|-----------|-------------|-----------|--------------|---------|
|          | 2 channel  | 4 channel | 2 channel   | 4 channel | Standard     | Maximum |
| DSAZ634A | 63 GHz     | 33 GHz    | 160 GS/s    | 80 GS/s   | 50 Mpts      | 2 Gpts  |
| DSOZ634A | 63 GHz     | 33 GHz    | 160 GS/s    | 80 GS/s   | 20 Mpts      | 2 Gpts  |
| DSAZ504A | 50 GHz     | 33 GHz    | 160 GS/s    | 80 GS/s   | 50 Mpts      | 2 Gpts  |
| DSOZ504A | 50 GHz     | 33 GHz    | 160 GS/s    | 80 GS/s   | 20 Mpts      | 2 Gpts  |
| DSAZ334A | 33 GHz     | 33 GHz    | 80 GS/s     | 80 GS/s   | 50 Mpts      | 2 Gpts  |
| DSOZ334A | 33 GHz     | 33 GHz    | 80 GS/s     | 80 GS/s   | 20 Mpts      | 2 Gpts  |
| DSAZ254A | 25 GHz     | 25 GHz    | 80 GS/s     | 80 GS/s   | 50 Mpts      | 2 Gpts  |
| DSOZ254A | 25 GHz     | 25 GHz    | 80 GS/s     | 80 GS/s   | 20 Mpts      | 2 Gpts  |
| DSAZ204A | 20 GHz     | 20 GHz    | 80 GS/s     | 80 GS/s   | 50 Mpts      | 2 Gpts  |
| DSOZ204A | 20 GHz     | 20 GHz    | 80 GS/s     | 80 GS/s   | 20 Mpts      | 2 Gpts  |

## Ease of use with high performance

The Infiniium Z-Series oscilloscopes combine unprecedented ease of use with high-performance digitizing oscilloscope functionality to simplify your design and analysis measurement tasks.

- Traditional oscilloscope front-panel interface provides direct access to the controls needed for most troubleshooting tasks.
- User interface with menus, windows, dialog boxes, and toolbars provides easy access to dozens of configuration and analysis tools, ensuring you can set up and make the most complex measurements.
- All models offer 80 GSa/s sampling rate on all four channels. RealEdge models offer 160 GSa/s on two channels.
- Models with bandwidths from 20 GHz to 63 GHz.

## Display shows waveforms and user interface

- User interface allows direct interaction with waveforms, including drag-and-drop positioning and instant waveform zoom.
- Large capacitive touch screen with multi-touch (gestures), handles, and resizing allows oscilloscope operation without an external pointing device.
- Waveforms are displayed in color, making correlation easy.
- Current configuration parameters displayed near the waveform display area are color-coded to make identification easy.
- Menus and toolbars simplify complex measurement setups.

## Horizontal controls set sweep speed and position

- Zoom box on main sweep window makes it easy to see what will appear in the zoom window.

## Acquisition and general controls start and stop the oscilloscope and do basic setup

- Run, stop, and single controls for continuous or single acquisitions.
- Clear display before one or more acquisitions.
- Default setup and Autoscale set initial configuration.

## Removable solid-state drive and USB 2.0 and 3.0 ports for saving and restoring setups and measurement results

- Store measurement displays for inclusion in reports and test setup guides.
- Store oscilloscope setups to repeat tests another time.
- Hard disk stores oscilloscope operating system.

## Trigger setup controls set mode and basic parameters

- Select Edge, Glitch, or Advanced Modes.
- Choose input source and slope.

- Use auxiliary trigger to increase triggering flexibility.

Vertical controls set attenuation and position

- Color-coded knobs make it easy to find the controls that affect each waveform.

Marker and quick measurements help measure waveform parameters

- Use waveform markers 1 and 2 to check voltage or  $\Delta$ -time at any point on the displayed waveform.

## In This Guide

This guide provides the information you need to begin using the Infiniium Z-Series oscilloscopes.

**Chapter 1**, “Setting Up the Oscilloscope,” starting on page 11 includes power and air flow requirements, plus other setup information.

**Chapter 2**, “Using the Oscilloscope,” starting on page 25 gives an overview of the front and back panel inputs and outputs, front-panel controls, and user interface, and tells you how to perform basic operations with the oscilloscope.

**Chapter 3**, “Online Help and Other Information,” starting on page 51 describes the Infiniium oscilloscope application’s online help contents and online demos. The online help describes how to use the Infiniium oscilloscope application in detail.

Appendix A provides safety information in English and French.

Appendix B provides recommendations for working comfortably and safely while operating the Infiniium oscilloscope.

### For More Information




- For detailed information on how the oscilloscope makes measurements and how to use the oscilloscope, see the Infiniium oscilloscope application’s online help.
- For information on controlling the oscilloscope from a remote computer, see the *Oscilloscopes Programmer’s Reference* found in the Infiniium oscilloscope application’s online help.
- For information on testing and servicing the oscilloscope, see the *Service Guide* found in the Infiniium oscilloscope application’s online help.

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# 1 Setting Up the Oscilloscope

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This chapter shows how to set up your Infiniium oscilloscope, connect power and accessories, and verify general operation.

### Inspecting Package Contents

- ✓ Inspect the shipping container for damage.
  - Keep the shipping container or cushioning material until you have inspected the contents of the shipment for completeness and have checked the oscilloscope mechanically and electrically.
  - If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier and your Keysight Technologies Sales Office. Keep the shipping materials for the carrier's inspection. The Keysight Technologies Sales Office will arrange for repair or replacement at Keysight's option without waiting for claim settlement.

- ✓ Inspect the oscilloscope.

If there is mechanical damage or a defect, or if the oscilloscope does not operate properly or does not pass performance tests, notify your Keysight Technologies Sales Office.

- ✓ Verify that you received the following items in the Infiniium oscilloscope packaging.
  - Infiniium oscilloscope
  - Power cord
  - Keyboard
  - Mouse (USB optical)
  - Front panel cover
  - Calibration cable (the 50 GHz and 63 GHz bandwidth models include a second calibration cable for the RealEdge inputs)
  - Connector savers (quantity of 5 for 20 GHz, 25 GHz, and 33 GHz bandwidth models; additional 2 for 50 GHz and 63 GHz bandwidth models)
  - ESD wrist strap
  - Quick Start poster

If anything is missing, contact your nearest Keysight Technologies Sales Office.

- ✓ Verify that you received the options and accessories you ordered and that none were damaged.

For a complete list of options and accessories available for the Z-Series oscilloscopes, see the *Infiniium Z-Series Oscilloscopes Data Sheet*.

## Environmental Characteristics

**Table 2** Z-Series Oscilloscope Environmental Characteristics

|                                    |   |
|------------------------------------|---|
| Environment                        | Indoor use only.  |
| Ambient Temperature                | Operating: 5 °C to + 40 °C<br>Non-operating: -40°C to +65 °C  |
| Humidity                           | Operating: up to 95% relative humidity (non-condensing) at +40 °C<br>Non-operating: up to 90% relative humidity at +65 °C |
| Altitude                           | Operating: up to 4,000 meters (12,000 feet)<br>Non-operating: up to 15,300 meters (50,000 feet)                           |
| Installation/ Measurement Category | Installation category: 2<br>Measurement category: 1   |
| Weight                             | 71 lbs  |
| Dimensions                         | 20 in. wide (50.8 cm), 13.3 in. tall (33.8 cm), and 19.4 in. deep (49.3 cm)   |
| Safety                             | CAN/CSA-C22.2 No. 61010-1-04<br>UL Std. No. 61010-1 (2nd Edition)   |
| Voltage Fluctuations               | Note that the main supply voltage fluctuations are not to exceed $\pm 10\%$ of the nominal supply voltage.                |
| Pollution Degree                   | The Infiniium Z-Series oscilloscopes may be operated in environments of Pollution Degree 2.                               |

|                              |  |
|------------------------------|--|
| Pollution Degree Definitions | <p>Pollution Degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. Example: A clean room or climate controlled office environment.</p> <p>Pollution Degree 2. Normally only dry non-conductive pollution occurs. Occasionally a temporary conductivity caused by condensation may occur. Example: General indoor environment.</p> <p>Pollution Degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. Example: Sheltered outdoor environment.</p> |
|------------------------------|--|

## Positioning for Proper Airflow

- 1 Position the oscilloscope where it will have sufficient clearance for airflow around the back and sides. If you plan to connect multiple Infiniium oscilloscopes together, refer to the *Keysight MultiScope Hardware Configuration Guide* for airflow requirements.

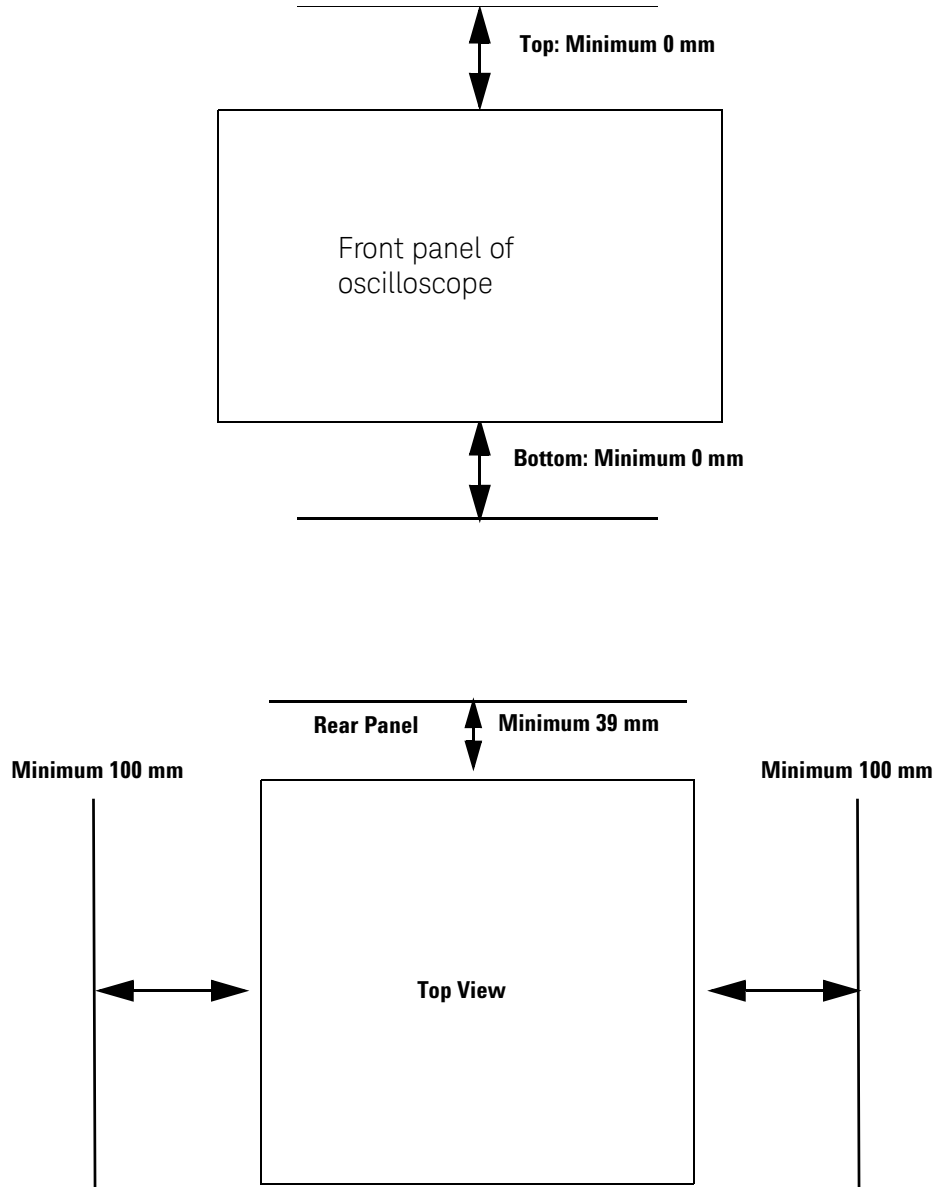


Figure 1 Positioning the Z-Series Oscilloscope with Sufficient Clearance

**CAUTION**

Do not place the oscilloscope side-by-side with other instruments blowing warm air.

## Connecting a Mouse, Keyboard, and LAN Cable

A mouse and keyboard can be plugged into the USB host ports. Four host ports are on the rear panel, with two more on the front panel.

Connect your LAN cable to the RJ-45 connector on the back panel of the oscilloscope.

### NOTE

After you have connected to the LAN card, you must set up the network. Exit the oscilloscope application before you start setting up your network.

If you do not know how to set up a network in the Windows 7 operating system, see your network administrator or use the Windows 7 operating system's online help.

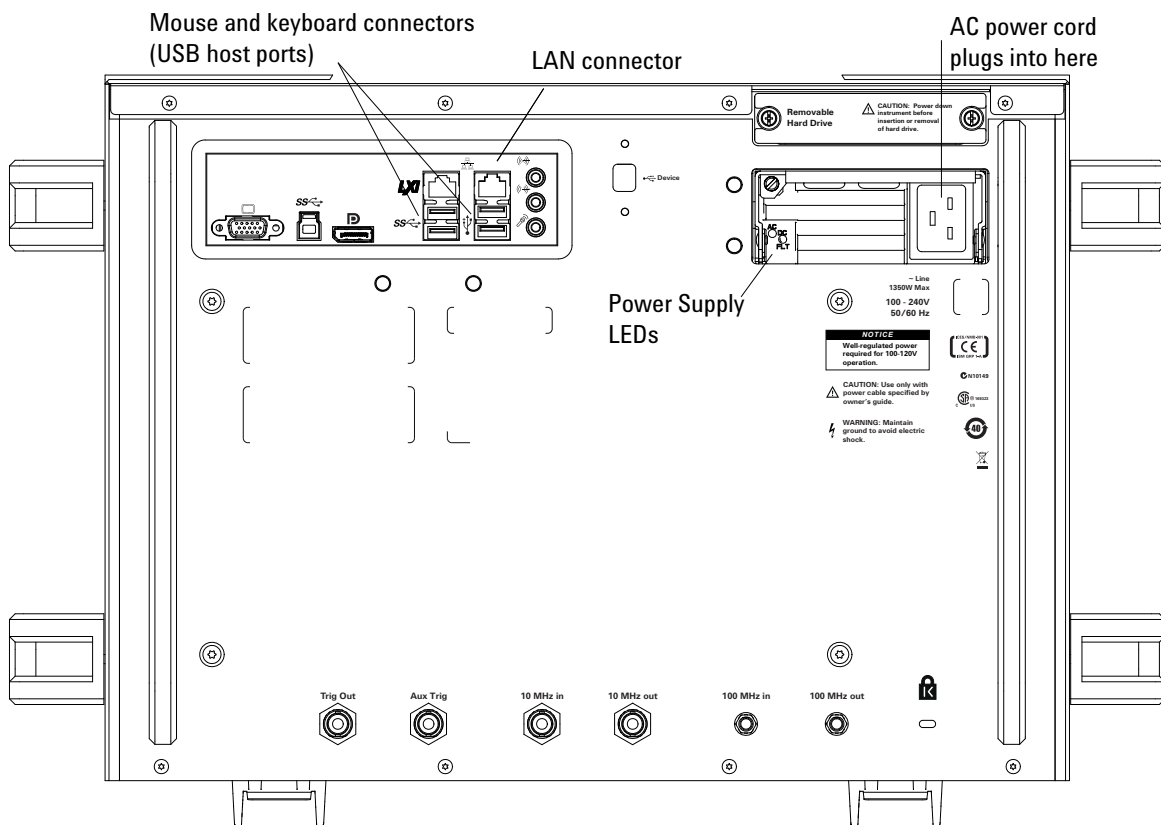


Figure 2 Back Panel

### Connecting Power

**Table 3** Power Requirements

---

|       |  |
|-------|--|
| Power | 100 - 240 VAC $\pm$ 10% at 50/60 Hz<br>Maximum input power: 1350 Watts<br>Well-regulated power is required for 100-120 VAC operation |
|-------|--|

---

- 1 Connect the power cord to the rear of the oscilloscope, then to a suitable AC voltage source.

#### CAUTION

##### **Use Supplied Power Cord**

Use only power cords designed for your oscilloscope.

The power cord provided is matched to the country of origin of the order.

---

#### WARNING

##### **Properly Ground the Oscilloscope**

**To avoid electric shock, be sure the oscilloscope is properly grounded.**

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#### NOTE

Note that the oscilloscope's power supply has a built-in safety feature that, after the oscilloscope is turned off, requires the oscilloscope to remain off for about 10 seconds before it is turned back on.

---



## Power Supply Protection Features

The Z-Series oscilloscope's power supply has built-in protection features for over-voltage, over-current, and over-temperature fault conditions. **Figure 2** identifies the power supply LEDs and **Table 4** describes their conditions.

**Table 4** Power Supply LED Meanings

| AC LED | DC/FLT (Fault) LED | Condition               |
|--------|--------------------|-------------------------|
| Green  | Green              | Normal operation        |
| Off    | Red                | Low or NO AC            |
| Green  | Red                | Over-Voltage Protection |
| Green  | Red                | Over Current            |
| Green  | Orange             | Thermo Alarm Warning    |
| Green  | Red                | Fault Over-Temp         |
| Green  | Red                | Remote On/Off           |

When the over-voltage fault occurs (and the power supply shuts down), you must unplug the power cord, wait 30 seconds, and plug the power cord back in to reset the protection latch and allow the oscilloscope to be powered-on again.

When the over-temperature fault occurs, the temperature must drop below 110 °C before you can power-on the oscilloscope again.

## Connecting Oscilloscope Probes

### CAUTION

#### Maximum Input Voltage

Do not exceed the maximum input voltage rating. Oscilloscope channels 1-4, 1R, and 3R are rated for maximum input of  $\pm 5V$  including transients.

The Infiniium Z-Series oscilloscope channel 1-4 inputs have:

- 3.5 mm threaded RF connectors (like Keysight sampling oscilloscopes) to ensure the most reliable signal integrity.
- A convenient automatic torque mechanism that ensures a consistent 8 in-lbs connection.
- An AutoProbe II interface connector with pins that provide probe power, identification, and other communication signals.

## 1 Setting Up the Oscilloscope



**Figure 3** Z-Series Oscilloscope Probe Connectors

The AutoProbe II interface works with the InfiniiMax III probing system. There are four different InfiniiMax III probe amplifiers ranging from 16 to 30 GHz. For more information, see [Keysight InfiniiMax III Probing System Data Sheet](#).

Before using the InfiniiMax III probes, review the *InfiniiMax III Probe Handling Guide* included with the probes. These probes are ESD sensitive devices and there is a proper order for connecting probe amplifiers to the oscilloscope, probe heads to the device under test (DUT), and probe heads to the amplifier. You can also find the *InfiniiMax III Probe Handling Guide* on the Keysight web site ([www.keysight.com](http://www.keysight.com)) or with other Keysight oscilloscope probes documentation in the Probe Resource Center ([www.keysight.com/find/prc](http://www.keysight.com/find/prc)).

The N5442A Precision BNC 50  $\Omega$  adapter lets you use an InfiniiMax I or II active probe with the Z-Series oscilloscopes.

## Connecting Threaded RF Cables

You can connect threaded RF cables to the Infiniium Z-Series oscilloscope inputs.

For input channels 1 through 4, you can connect 3.5 mm threaded RF cables using the automatic torque “clutch” mechanism to ensure a consistent 8 in.-lbs. connection.

The **Aux Out** and **Cal Out** connectors also work with 3.5 mm threaded RF cables.

For RealEdge input channels 1R and 3R (on the 50 GHz and 63 GHz bandwidth models), you can connect 1.85 mm threaded RF cables using a torque wrench to apply the necessary 8 in.-lbs. of torque.

## Tilting the Oscilloscope for Easier Viewing

Tabs under the front feet of the oscilloscope can be flipped out to tilt the oscilloscope.

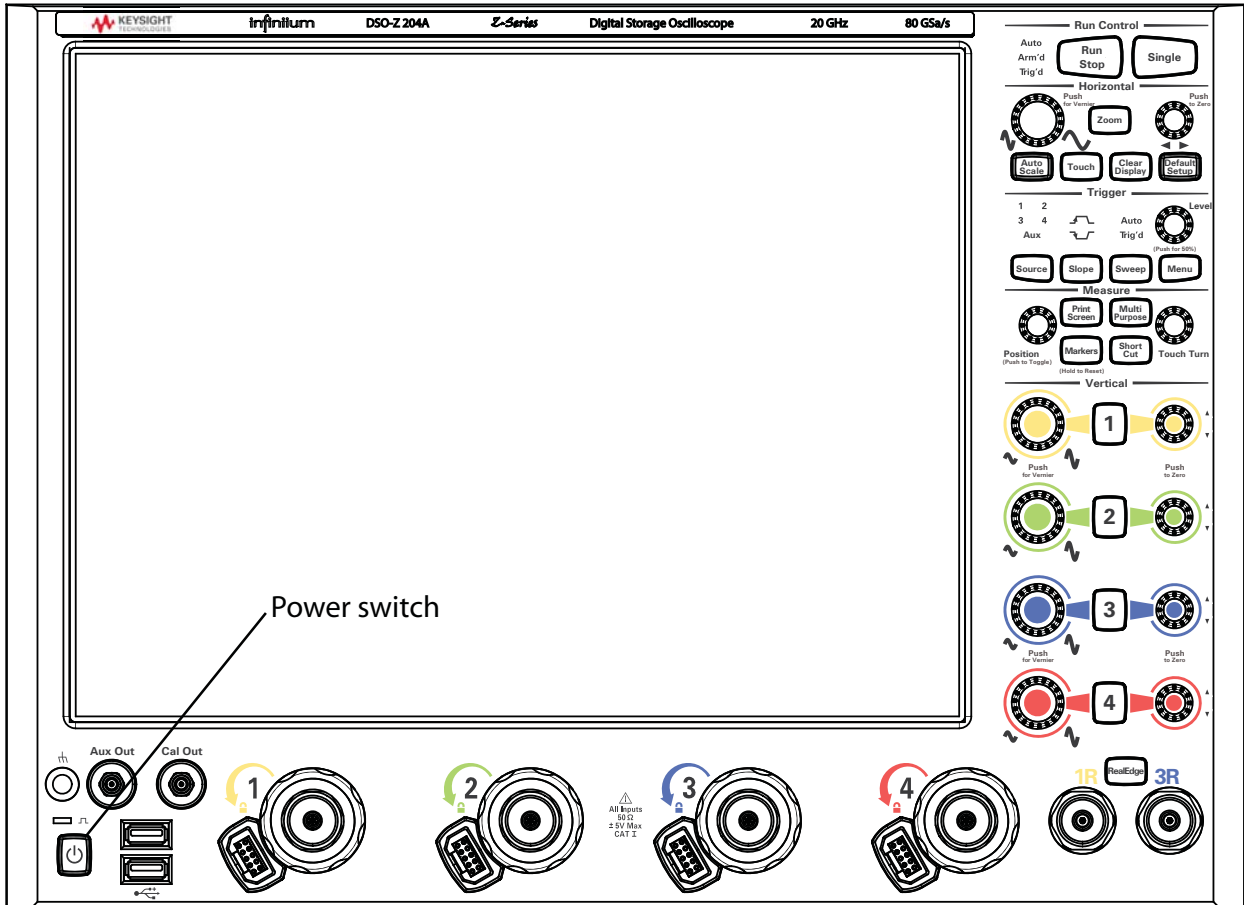


**Figure 4** Flip-Out Tabs Under Front Feet

# 1 Setting Up the Oscilloscope

## Turning On the Oscilloscope

- 1 Press the power switch in the lower left corner of the oscilloscope front panel.



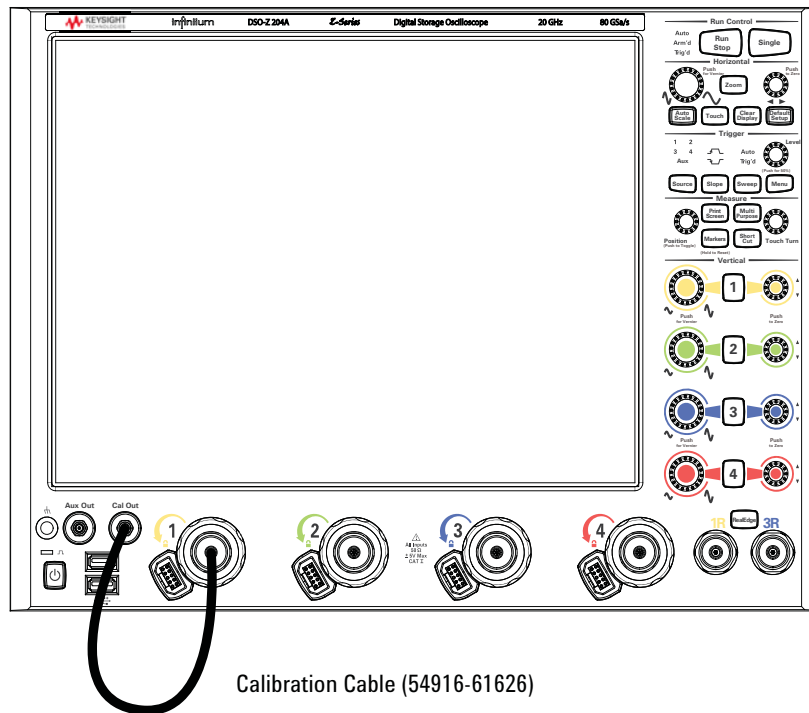
**Figure 5** Turning On the Oscilloscope

After a short initialization period, the oscilloscope display appears. The oscilloscope is ready to use.

- 2 You can connect and disconnect probes and cables while the oscilloscope is turned on.

## Verifying Basic Oscilloscope Operation

- 1 Install the supplied connector savers to each channel input. Keysight recommends using the connector savers to protect the input connectors.
- 2 Connect one end of the 54916-61626 calibration cable to oscilloscope input channel 1.
- 3 Connect the other end of the calibration cable to the **Cal Out** connector on the front panel.



**Figure 6** Verifying Basic Oscilloscope Operation

- 4 Press [**Default Setup**] on the front panel.

The display will pause momentarily while the oscilloscope is configured to its default settings.

- 5 Press [**Auto Scale**] on the front panel.

The display will pause momentarily while the oscilloscope adjusts the time/div setting and vertical scale. You should then see a square wave with about four cycles on screen and a peak-to-peak amplitude of approximately five divisions.

## 1 Setting Up the Oscilloscope

If you do not see the waveform, make sure your power source is adequate, the oscilloscope is properly powered on, and the cable is connected securely to the channel input and to the calibration output.

- 6 Move the mouse around the mouse surface and verify that the on-screen pointer follows the mouse movement.
- 7 Press the **[Touch]** key on the front panel to turn on the touch screen. Press and hold your finger to the screen. A right-click menu appears, which verifies that the touch screen is working properly.

## Installing Application Programs on Infiniium

Infiniium has an open Windows operating system, which lets you install your own application software. Any application that runs on Microsoft Windows 7 Embedded and uses 8 GB of RAM or less may be installed on your Infiniium oscilloscope.

### NOTE

Exit the oscilloscope application before installing any software.

### CAUTION

Installing an application that does not meet these requirements may break the oscilloscope application and require a hard drive recovery.

## Changing Windows Operating System Settings

**NOTE**

Exit the oscilloscope application before changing any Windows operating system settings outside of the oscilloscope application.

---

Many Windows operating system settings can be changed to suit your own personal preferences. However, some operating system settings should not be changed because doing so would interfere with the proper operation of the oscilloscope.

- Do not change the Power Options.
- Do not change the Language settings.
- Do not remove Fonts.
- Do not change the screen resolution from 1024 by 768 pixels.
- Do not use the Administrative Tools to enable or disable Internet Information Services. Use the Infiniium SCPI Server dialog box (**Utilities > Remote...**) to enable or disable the Web Server.
- Do not delete or modify the Infiniium Administrator user account.

## 1 Setting Up the Oscilloscope

### Turning Off the Oscilloscope

- 1 Press the power switch at the lower left corner of the oscilloscope front panel. The oscilloscope will go through a normal Windows operating system shutdown process.

### Cleaning the Oscilloscope

Clean the oscilloscope with a soft cloth dampened with a mild soap and water solution.

#### **CAUTION**

Do not use too much liquid in cleaning the oscilloscope. Water can enter the Infiniium panels, damaging sensitive electronic components.

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## 2 Using the Oscilloscope

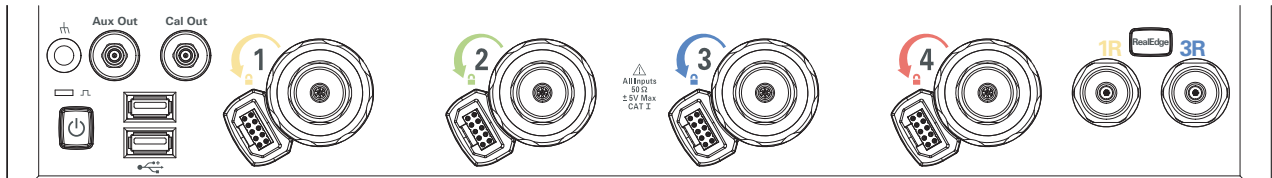
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This chapter describes how to use the Infiniium Z-Series oscilloscope's inputs and outputs, front panel controls, and user interface.

- The familiar front-panel oscilloscope interface with knobs and keys is optimized for common tasks and basic measurements.
- The Infiniium oscilloscope application's user interface with menus, windows, dialog boxes, and toolbars provides easy logical access to dozens of configuration and analysis tools, making it easy for you to set up and make complex measurements.
- You have the option of using either the front panel controls or the user interface for many common tasks.

### Front Panel Inputs and Outputs

On the Infiniium Z-Series oscilloscopes, the channel inputs and the **Aux Out** and **Cal Out** outputs appear on the lower part of the front panel. The ground plug, probe compensation terminal, and two USB host ports are also located here.



**Figure 7** Infiniium Z-Series Oscilloscope Front Panel I/O

### Channel 1-4 Inputs

The channel 1-4 inputs have:

- 3.5 mm threaded RF connectors
- A convenient automatic torque mechanism
- An AutoProbe II interface connector with pins that provide probe power, identification, and other communication signals

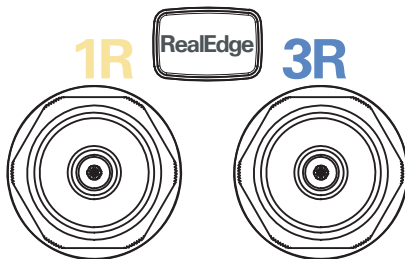
The AutoProbe II interface works with the InfiniiMax III probing system. See [“Connecting Oscilloscope Probes”](#) on page 17.

You can also connect 3.5 mm threaded RF cables to the channel 1-4 inputs.

### RealEdge 1R, 3R Channel Inputs

The **[RealEdge]** key and 1R and 3R channel inputs appear on 50 GHz and 63 GHz bandwidth models.

Pressing the **[RealEdge]** key enables or disables the RealEdge 1R and 3R channel inputs. The **[RealEdge]** key is lit when enabled.



**Figure 8** RealEdge Channel Inputs and **[RealEdge]** Key

When enabled, the RealEdge 1R and 3R channel inputs take over the standard channels 1-4, except for the trigger circuitry on channels 2 and 4. When RealEdge is enabled, you can still trigger on signals connected to the channel 2 and 4 inputs (but you cannot capture or display data from these signals).

You can connect 1.85 mm threaded RF cables to the RealEdge 1R and 3R channel inputs.

## Ground

The ground plug is convenient for ESD wrist straps.

## Aux Out

This output signal is selected by the Infiniium oscilloscope application's Calibration Output dialog box (**Utilities > Calibration Output...**). It can be a DC level, the probe compensation signal (a square wave used to adjust compensated passive probes), the trigger out signal, or a demo signal.

## Cal Out

This calibration output is used when performing a user calibration on the oscilloscope.

A calibration cable is included with the oscilloscope. The 50 GHz and 63 GHz bandwidth models include a second calibration cable for the RealEdge channel inputs.

You can also use the Infiniium oscilloscope application's Calibration Output dialog box (**Utilities > Calibration Output...**) to select other output signals, just like you can for the **Aux Out** output.

## Probe Compensation Terminal

This terminal has a square wave signal that is used to adjust compensated passive probes.

You can also output a DC level on this terminal using the Infiniium oscilloscope application's Calibration Output dialog box.

## USB Host Ports

Two USB host ports are located on the front panel, next to the power switch, for connecting peripherals.

## 2 Using the Oscilloscope

### Front or Back Panel Inputs and Outputs

Trig Out and Aux Trig appear on the back panel in 50 GHz and 63 GHz bandwidth models of Z-Series oscilloscopes, and on models that have the optional sync port. They appear on the front panel in 20 GHz, 25 GHz, and 33 GHz bandwidth models.

#### Trig Out

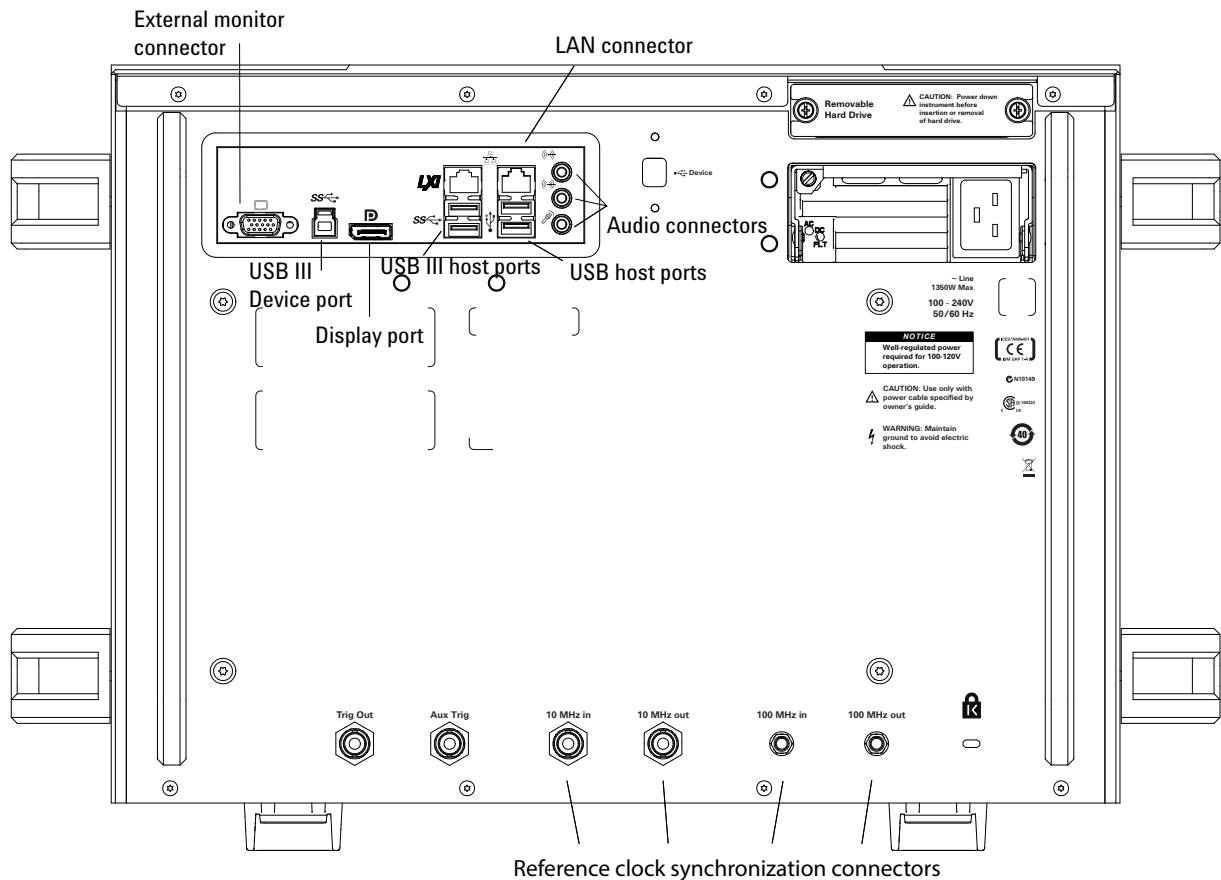
Pulses corresponding to oscilloscope triggers can be sent to this BNC output.

#### Aux Trig

You can set up the oscilloscope to trigger on the auxiliary trigger signal connected to this BNC input.

## Back Panel Inputs and Outputs

The Infiniium Z-Series oscilloscope's back panel has the motherboard I/O connectors and reference clock synchronization connectors.



**Figure 9** Infiniium Z-Series Oscilloscope Back Panel I/O

### Motherboard I/O

The motherboard provides these inputs/outputs/ports in the oscilloscope: four USB ports for peripherals, an external monitor connector, USB III device port (for remote control of the oscilloscope from a PC), LAN port, and speaker and microphone connectors.

## 2 Using the Oscilloscope

### 10 MHz In, 10 MHz Out

The 10 MHz In BNC connector is used to synchronize the oscilloscope's horizontal timebase system to a reference clock that you provide. The clock that you provide must meet the following specifications:

- Amplitude: 178 mV peak to 1 V peak
- Frequency: 10 MHz  $\pm$ 5 ppm high-quality sine wave or square wave

To use a 10 MHz external reference clock, connect the external clock to the 10 MHz In BNC connector; then, in the Infiniium oscilloscope application's Horizontal dialog box (**Setup > Horizontal...**), enable the 10 MHz External Reference Clock.

You can use the 10 MHz Out BNC connector to send the oscilloscope's 10 MHz reference clock output signal to another instrument's reference clock input.

### 100 MHz In, 100 MHz Out

The 100 MHz IN SMA connector is used to synchronize the oscilloscope's horizontal timebase system to a reference clock that you provide. The clock you provide must meet the following specifications:

- Amplitude: 178 mV peak to 1 V peak
- Frequency: 100 MHz  $\pm$ 5 ppm high-quality sine wave or square wave

To use a 100 MHz external reference clock, connect the external clock to the 100 MHz In SMA connector; then, in the Infiniium oscilloscope application's Horizontal dialog box (**Setup > Horizontal...**), enable the 100 MHz External Reference Clock.

You can use the 100 MHz Out SMA connector to send the oscilloscope's 100 MHz reference clock output signal to another instrument's reference clock input.

## Front Panel Controls (Keys and Knobs) Overview

The Infiniium Z-Series oscilloscope front panel gives you direct access to the functions needed to perform the most common measurements, using a traditional oscilloscope interface. Knobs and keys let you directly set vertical and horizontal parameters. The front panel also has a set of LED indicators; by using these and the display, you see the oscilloscope's configuration at a glance.

The oscilloscope uses color consistently throughout the front panel and user interface. For example, the color of the knob for channel 1 is the same color as the waveform for channel 1. All the configuration items and values related to channel 1 are displayed in the same color.

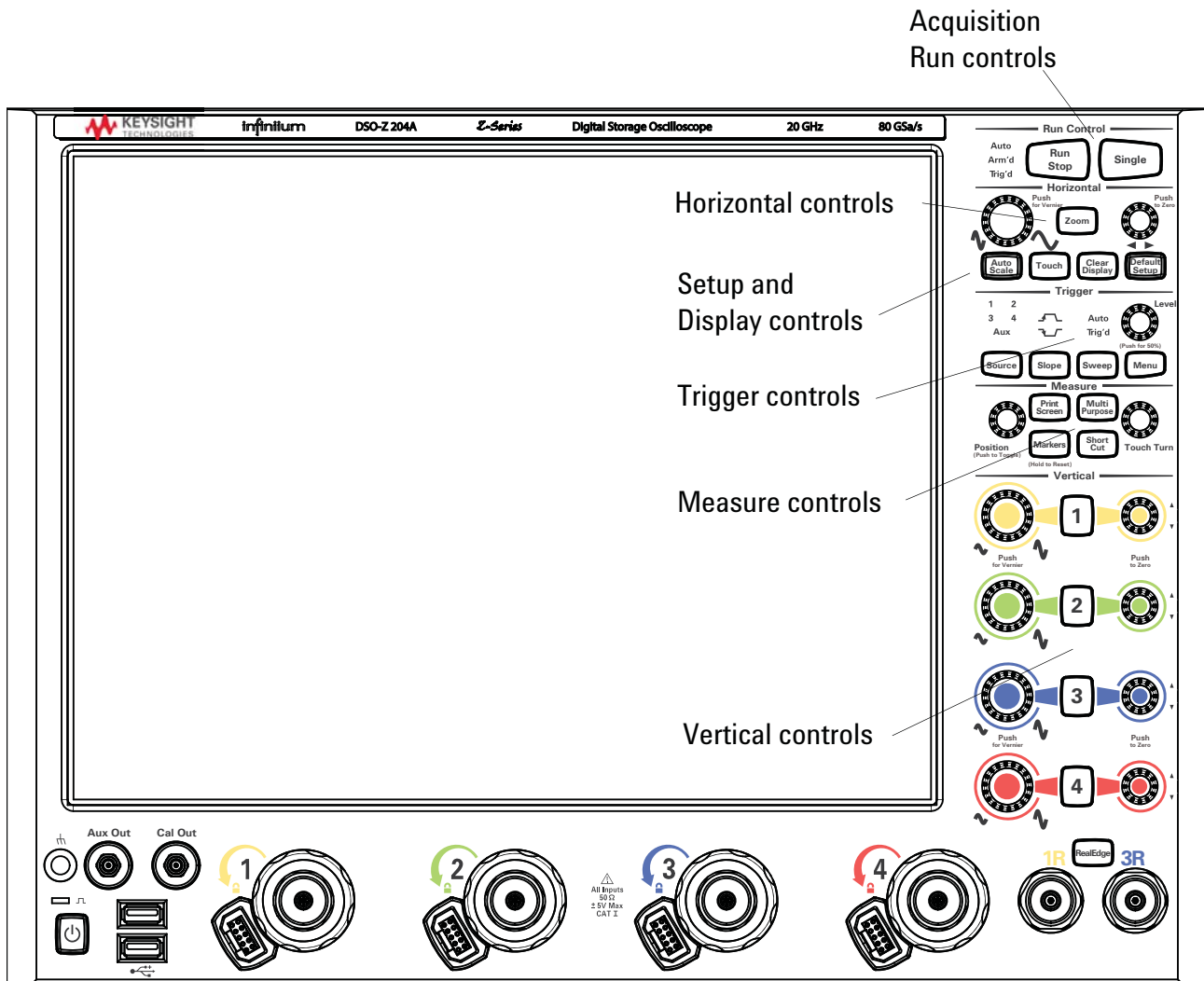


Figure 10 Infiniium Z-Series Oscilloscope Front Panel

## 2 Using the Oscilloscope

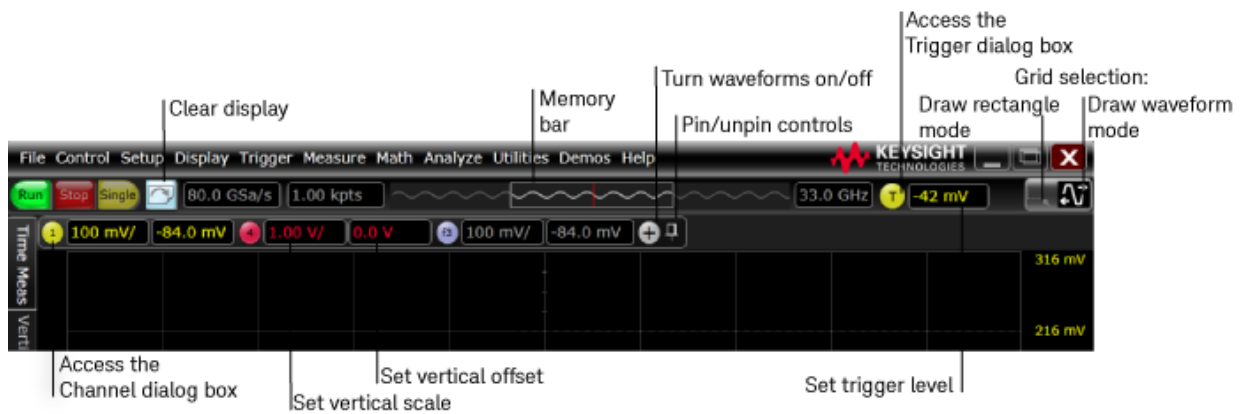
### User Interface Overview

With the user interface for the Infiniium oscilloscope, you can access all the configuration and measurement features of the oscilloscope through an easy-to-use system of windows, menus, toolbars, dialog boxes, icons, wizards, and buttons.

The user interface is arranged so the most common functions affecting the waveform display are located around the edge of the waveform display area.

Context-sensitive menus are available when you right-click something in the waveform display area, such as the grid, a signal, a bookmark, or a measurement. You can mouse over or touch other areas, such as the drag & drop measurements area and horizontal and acquisition control regions, to find more information about those areas or to enter data.

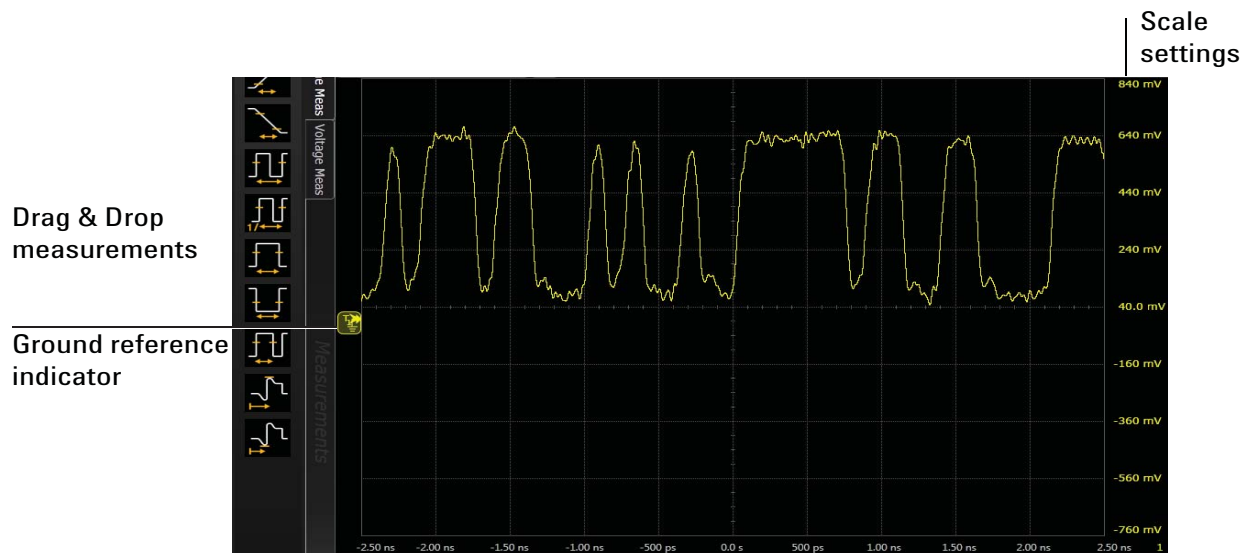
The following figures call out the areas and controls of the user interface.



**Figure 11** Infiniium Oscilloscope Top of Display

The selected grid mode in the upper right corner determines whether you draw a selection box or drag a waveform horizontally when you touch the screen.





**Figure 12** Infiniium Oscilloscope Waveform Display Area

The waveform display area shows up to eight waveform areas. Several display options are available, such as grids or horizontal and vertical scales.

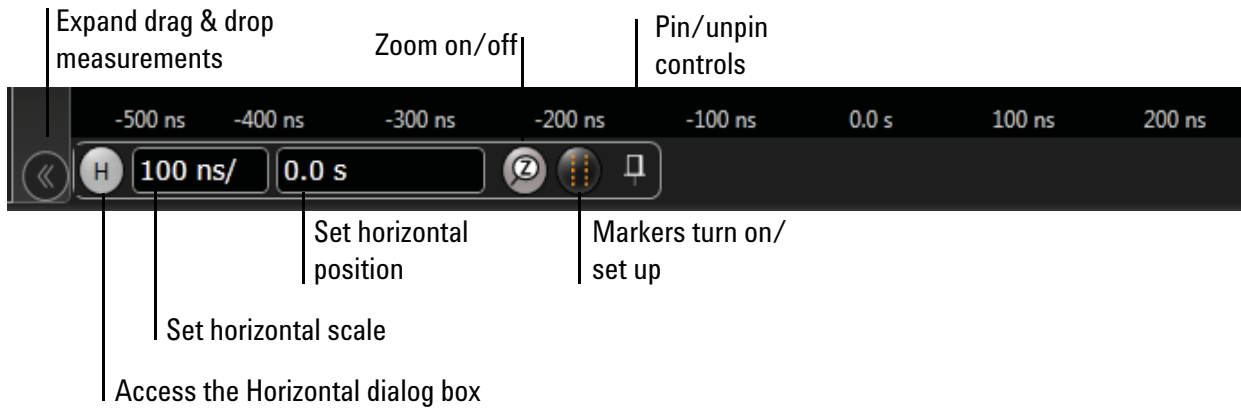
#### NOTE

#### Avoid Overdriving Vertical Input Amplifiers

When zooming on a waveform with the oscilloscope running, be careful to keep the signal within the screen vertically to avoid overdriving the vertical input amplifiers. Overdriving causes waveform distortion and erroneous measurement results.

Ground reference indicators appear for each displayed channel, waveform memory, or math function waveform. The symbol represents the ground reference point for each waveform; it moves when you change the vertical offset. You can also drag this symbol up and down to change the vertical offset for that waveform.

## 2 Using the Oscilloscope



**Figure 13** Infiniium Oscilloscope Bottom of Display

A Results pane is visible at the very bottom of the display when you do something that requires it, such as take a measurement. When it is not needed, the Results pane is not visible.

The Results pane displays a table of measurement data. The table has columns for Measurement, Current, Mean, Min, Max, Range (Max-Min), Std Dev, and Count. Two measurements are listed: '+ Width(1)' and 'V p-p(f2)'. The 'V p-p(f2)' measurement shows a value of 0.0 V and a count of 93.

| Measurement | Current | Mean  | Min   | Max   | Range (Max-Min) | Std Dev | Count |
|-------------|---------|-------|-------|-------|-----------------|---------|-------|
| + Width(1)  | Edge?   | Edge? | Edge? | Edge? | Edge?           | Edge?   | ----- |
| V p-p(f2)   | 0.0 V   | 0.0 V | 0.0 V | 0.0 V | 0.0 V           | 0.0 V   | 93    |

**Figure 14** Results Pane

### Menu Overview

You can use menus to perform defined operations, set up measurement parameters, and access every function the oscilloscope provides.

Take a few minutes to look through the menus to get an overview of the many features and capabilities of your Infiniium oscilloscope.


The menu selections will vary slightly, depending on which licenses are installed.

## Using the Setup and Display Controls

You can set the oscilloscope to a known starting condition and set the display to suit your preferences.



**Figure 15** Setup and Display Control Keys

- To automatically configure the oscilloscope for the current input signal(s), press **[Auto Scale]** or click **Control > Autoscale** from the main menu.
- To enable or disable the touch screen, press the **[Touch]** key. Or, click **Utilities > User Preferences...** to open the User Preferences dialog box, and click the Enable Touch Screen check box.
- To remove acquisition data from the display, press the **[Clear Display]** key or click the Clear Display button .

The oscilloscope clears acquired waveform data from the display in preparation for another acquisition. If the oscilloscope is in Run mode and is receiving triggers, it will update the display as it collects new waveform data.

Clearing the waveform display also resets measurements, averaging, infinite persistence, color grade persistence, histograms, and the mask testing database.

- To reset the oscilloscope to its default setup, press **[Default Setup]** or click **Control > Default Setup**.

You can click **Control > Undo Default Setup** to return the oscilloscope to its original configuration.

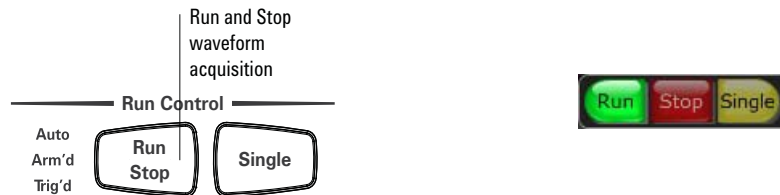
### NOTE

#### Save the Current Oscilloscope Configuration

Before using the default setup, you may want to save the current oscilloscope configuration for later use. See the online help (described in chapter 3) for instructions on saving and recalling setups, and for information on the exact configuration that is set when you use the default setup.

### Starting and Stopping Waveform Acquisitions

Use the acquisition run controls to run and stop acquisitions or make a single acquisition. The boxed area of the memory bar above the waveform display area shows which portion of the channel's acquisition memory you are viewing.



**Figure 16** Acquisition Run Control Keys and Buttons

The **[Run/Stop]** key is lit green and the green Run button is highlighted when the oscilloscope is running (acquiring data). The **[Run/Stop]** key is red and the Stop button is highlighted when the acquisition is stopped.

- To start waveform acquisition, press the **[Run/Stop]** key or click the Run button.

The oscilloscope begins acquiring data. When it receives a trigger signal, it finishes acquiring data, updates the display, and then starts another acquisition cycle if it is in Trig'd or Auto trigger mode.

- To stop waveform acquisition, press the **[Run/Stop]** key or click the Stop button.

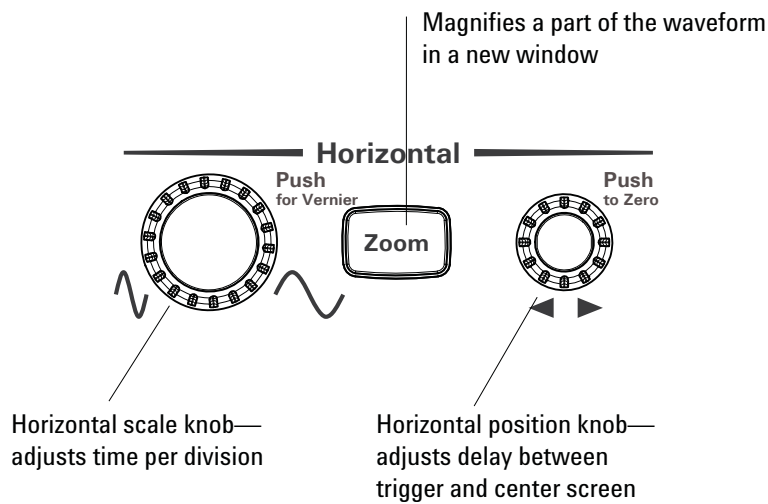
The oscilloscope stops acquiring data. Whatever data was last acquired remains on the screen.

- To make a single acquisition, press the **[Single]** key or click the Single button.
- You can also choose the Run, Run Single, and Stop commands from the Control menu.
- To set up how you want the signals to be sampled, such as sampling rate and mode, click **Setup > Acquisition....**

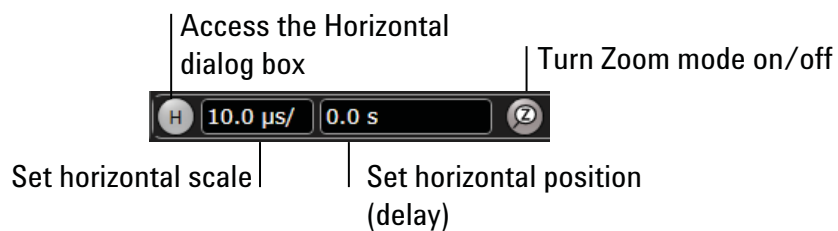
## Adjusting the Horizontal Time Scale and Trigger Position

Use the horizontal controls to configure the oscilloscope's horizontal scale (time per division) and horizontal position of the waveform. You can view a magnified section of the waveform using the zoom window.

Use gestures on the touch screen to adjust the waveform horizontal scale and position. You can also use the horizontal knobs, the horizontal controls, or the Horizontal dialog box.



**Figure 17** Front Panel Horizontal Scale and Position Knobs, [Zoom] key



**Figure 18** User Interface Horizontal Controls

### Adjusting the horizontal scale

The horizontal scale knob is the larger of the two horizontal control knobs, marked with a set of sine wave symbols.

- To stretch the waveform horizontally, turn the horizontal scale knob clockwise. To shrink it horizontally, turn the knob counter-clockwise.

Stretching the waveform means fewer seconds are displayed per division. Shrinking it means more seconds are displayed per division.

- Push and turn the horizontal scale knob to change the scaling in finer (Vernier) increments.
- Use the multi-touch gesture capability to stretch or shrink the waveform.
- You can also use the controls in the horizontal toolbar to adjust the horizontal scale. Mouse over or touch the horizontal scale field and use the resulting controls to set an exact horizontal scale. You can click the **Scale** field to enter an exact value, or click the “narrower” or “wider” buttons.

### Adjusting the horizontal trigger position (delay)

The horizontal position knob is the smaller of the two horizontal control knobs, marked with a set of arrows.

- To move the waveform to the right, turn the horizontal position knob clockwise. To move it to the left, turn the knob counter-clockwise.

Moving the waveform to the right shows more of the pre-trigger data (data acquired before the trigger event). Moving the waveform to the left shows more of the post-trigger data.

When you click and drag the desired waveform, the horizontal position will change for all channels and functions on the display. Waveform memories will also move if you check the Tie to Timebase box in the Waveform Memories dialog box.

- You can also use the controls in the horizontal toolbar to adjust the horizontal position. Mouse over the horizontal position field and use the resulting controls to set a particular horizontal position (time relative to the trigger at the highlighted horizontal reference point).

### Magnifying a part of the waveform using Zoom

- To turn on zoom, press the  key or click the Zoom button.


The waveform display area splits into two regions. The top one is the main timebase. The bottom is the zoomed timebase, which represents an expansion of the acquired waveform data. A section of the waveform in the main timebase window is highlighted to indicate the part shown in the zoomed timebase window.

The horizontal scale and horizontal position controls now change how the waveform is shown in the zoomed timebase window. The horizontal scale will change the amount of magnification, while the position will change the part of the waveform in the main window that is shown in the zoomed window.

- Press the  key or click the Zoom button again to turn off Zoom.

### Setting the scale, position, and timebase reference

You can use the Horizontal dialog box to set scale, position, and timebase reference. You can also set up the zoomed timebase window.

- To access the Horizontal dialog box, click the  in the horizontal toolbar, or click **Setup > Horizontal...** from the menu bar.
- The Timebase Reference control is a slider from 0 to 100% of the screen. The center of the screen is at 50%. The slider correlates to the orange triangle at the bottom of the grid.

## Adjusting the Vertical Settings

Use the vertical controls to set the vertical scaling (volts per division) and vertical offset. You can also turn the display on or off for a particular channel.

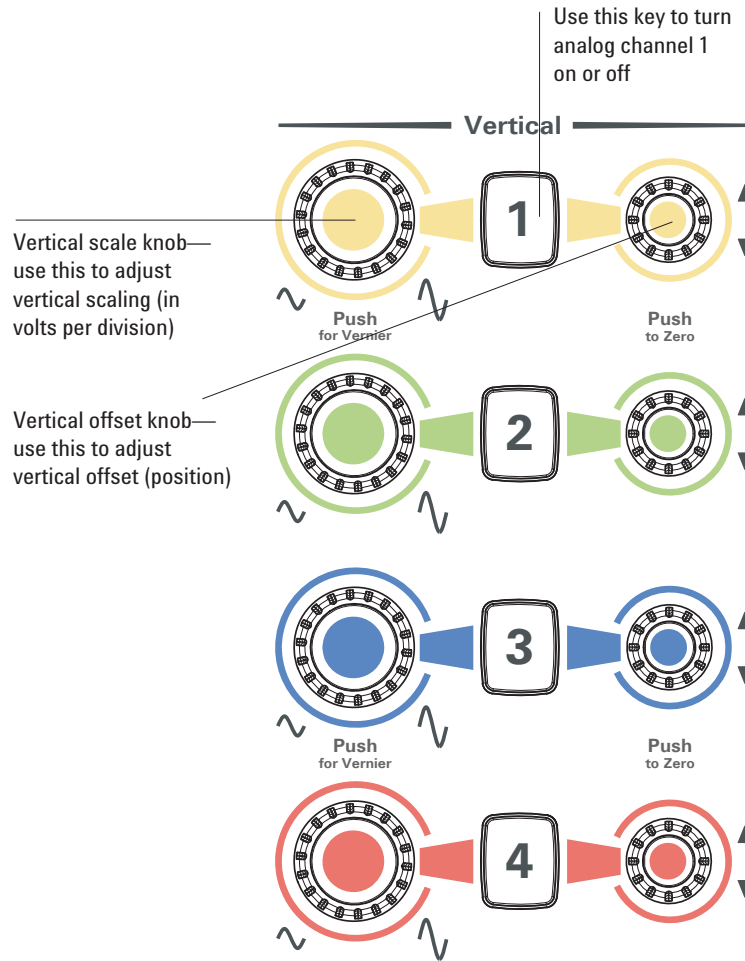


Figure 19 Front Panel Channel Keys and Vertical Scale and Offset Knobs

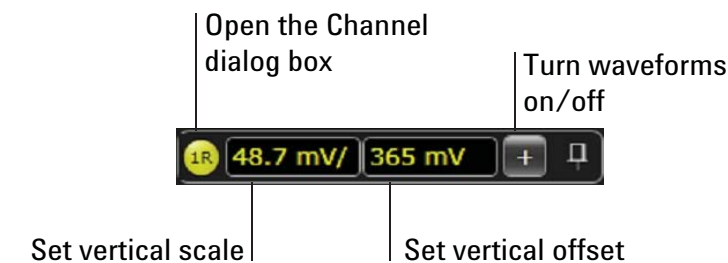



Figure 20 User Interface Vertical Controls



### Turning a channel on or off

- To turn channels 1 through 4 on or off, press the channel number key on the front panel or click the Additional Waveforms button  in the toolbar. When you turn off a channel, the current vertical scale and offset fields for that channel disappear.
- To change from 33 GHz inputs to 63 GHz inputs, press the RealEdge button on the front panel. Channels 1 and 3 become 1R and 3R. Channels 2 and 4 are not used in RealEdge mode.
- If you are not using a particular channel, you can turn it off to simplify the waveform display and increase the display update rate. Functions continue to run on a channel source that is turned off. Data acquisition continues for a channel if a function requires it.

#### NOTE

### Using a Channel as Trigger

Any channel can be used as a trigger source. If you need a trigger but do not need all channels, you can use a channel as a trigger without displaying it by turning the channel display off.

### Adjusting the channel's vertical scale and offset

You can use the vertical scale and offset knobs, the vertical user interface controls, or the Channel dialog box to adjust the vertical scale and offset.


The vertical scale knob is the larger of the two knobs for a channel. It is marked with a set of sine wave symbols.

- To make the waveform bigger (fewer volts per division), turn the vertical scale knob clockwise. To make it smaller (more volts per division), turn the knob counter-clockwise.

Decreasing the vertical scale makes the waveform bigger, and increasing it makes the waveform smaller.

- You can also mouse over or touch the vertical scaling field and use the resulting controls to set an exact value for the scaling.

The vertical offset knob is the smaller of the two knobs for a channel. It is marked with a set of arrows.

- To move the waveform toward the top of the display, turn the vertical offset knob clockwise. To move it toward the bottom of the display, turn the knob counter-clockwise.
- You can click and drag the waveform or its ground reference indicator to the desired vertical offset if the grid is in drag mode .
- Click **Setup > Channel N...** or click a channel number to open the Channel dialog box, in which you can set the vertical scale, offset, skew, and labels. You can also specify the characteristics of a probe, or perform a probe calibration.

## 2 Using the Oscilloscope

For Keysight Technologies probes that are compatible with AutoProbe II interfaces, the oscilloscope will automatically set these characteristics (except for skew) after identifying the probe when it is connected to the channel input.

## Setting Up Triggers

Use the trigger controls to set the conditions on which the oscilloscope will trigger and acquire an input signal. You can set up a variety of trigger conditions. Edge triggers and the parameters for edge triggering can be set up from the front panel.

Trigger configuration settings you make using the user interface are reflected in the front-panel status indicators, and will remain set unless you change them or press the **[Default Setup]** key.

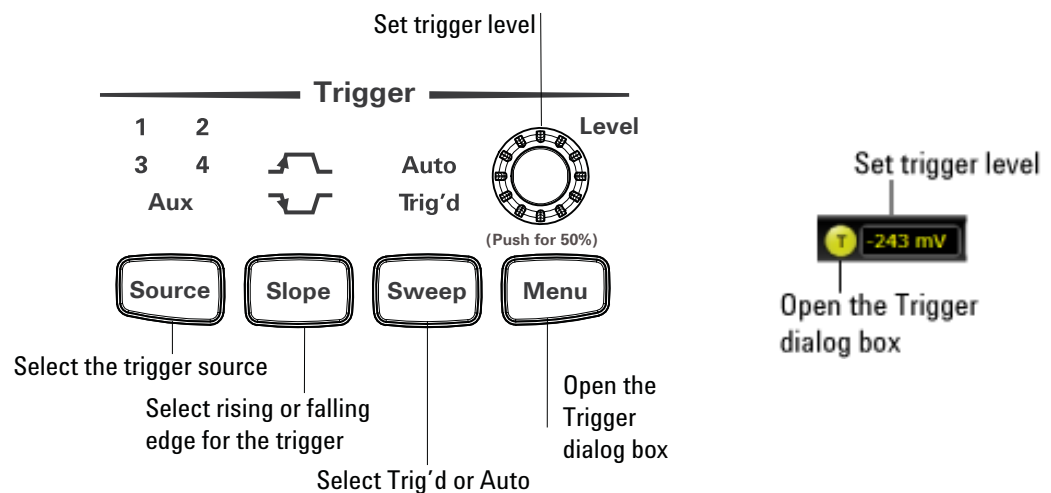


Figure 21 Trigger Controls and Indicators

### Setting the oscilloscope to trigger on an edge

- 1 Press the **[Source]** key until the desired source LED is lit.

You can choose any of the channels or the **Aux Trig** or **Line** input as the source for an edge trigger.

- 2 Press the **[Slope]** key until the desired slope LED is lit.

You can have an edge trigger on a rising or falling edge, or both.

- 3 Press the **[Sweep]** key until the desired LED is lit (Trig'd or Auto).

When Trig'd is selected, the oscilloscope must find the trigger before capturing and displaying data.

When Auto is selected, if a trigger does not occur within a certain amount of time, an acquisition is automatically saved and displayed. In Auto trigger mode, you are able to see your signals while setting up the desired trigger.

- 4 Turn the Level knob to adjust the voltage level at which the oscilloscope will trigger.

## 2 Using the Oscilloscope

Use the Trigger dialog box to select any of the different modes of triggering, the parameters and conditions for each trigger mode, and advanced configuration items.

You can also mouse over the Trigger Level field and use the resulting controls to set a particular trigger level when the scope is set for edge trigger on a particular channel. You can also drag the trigger reference indicator at the left side of the display.

## Using Markers and Making a Measurement

With the measurement controls you can display and adjust markers, define a key to perform automatic measurements or other quick actions, and make measurements.

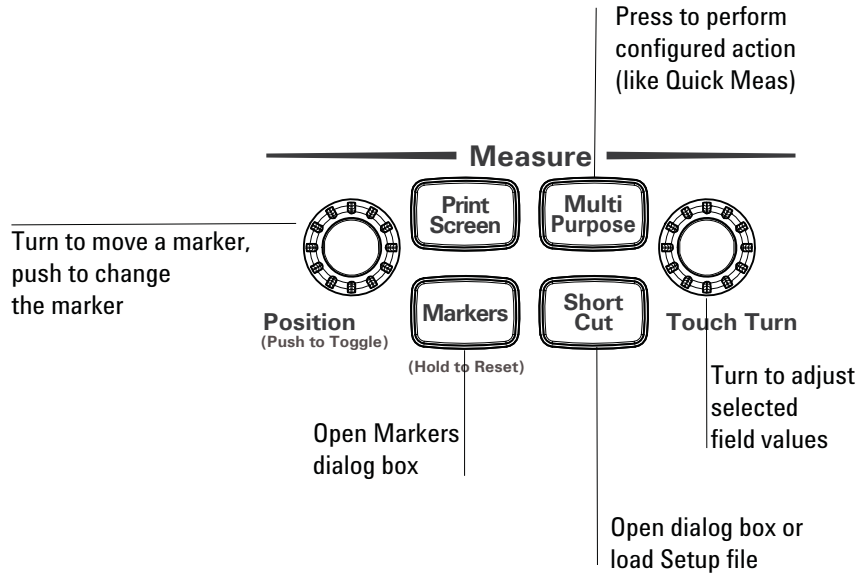


Figure 22 Front Panel Measure Controls

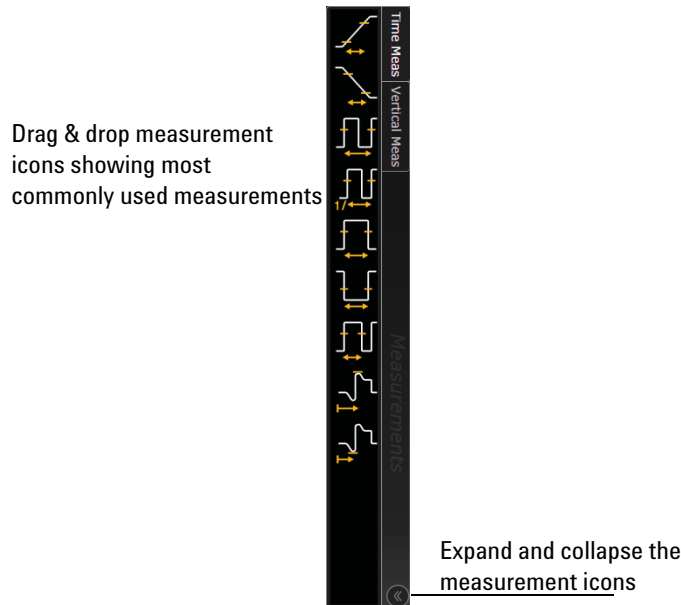


Figure 23 Drag & Drop Measurement Toolbar

### Making a measurement on a waveform

Click and drag a measurement icon to the waveform event you want to measure, or click a measurement icon and specify which source you want to measure in the dialog box that appears.

For measurements on waveform features, such as those that involve waveform edges, if you click the measurement icon and specify a source, the measurement defaults to using the feature closest to the horizontal reference point. When you make the measurement using drag-and-drop, the measurement uses the waveform feature closest to the point where you drop the icon.

The most commonly used measurements are available in the drag and drop area. Others are available by selecting them from the Add Measurement dialog box.

When you drag and drop a measurement icon on a waveform, the icon outline changes color to match the color of each waveform it touches so you can easily see which waveform will be measured.

For edge-sensitive measurements, when you drop the measurement icon on a waveform, a circled number appears in the waveform marker color. This number shows exactly where the measurement is being made. It is displayed next to the measurement readout in the Results area.

This feature helps you distinguish measurement results from each other when you make multiple measurements on the same waveform, but at different waveform features.

### Using quick measurements

- You can define the **[Multi Purpose]** key and **Utilities > Multipurpose** selection to perform one of these quick actions:
  - QuickMeas—performs automatic measurements
  - QuickPrint—prints the screen image to the default printer
  - QuickScreen—saves the screen image to a file
  - QuickSetup—loads a setup file
  - QuickWaveform—saves waveform data to a file
  - QuickEmail—sends an email of the current screen image
  - QuickExecute—runs an executable file
  - QuickControl—cycles through the possible front panel control sources

The action taken when the **[Multi Purpose]** key is pressed or **Utilities > Multipurpose** is clicked depends on the feature selected in the Customize Multipurpose dialog box (**Utilities > Customize Multipurpose...**). The default feature is QuickMeas.

- To turn on the quick measurement display, press the **[Multi Purpose]** key.

The 10 preset measurements defined in the Quick Measurement configuration are enabled and results are displayed on the screen for the first waveform source.

- To measure parameters for another waveform, press the **[Multi Purpose]** key until that waveform is the one shown in the measurement readout.

Continuing to press the **[Multi Purpose]** key cycles through each of the waveforms available.

- To turn off the quick measurement display, repeatedly press the **[Multi Purpose]** key until the measurements are turned off.

See the Infiniium oscilloscope application's online help for information on how to configure the quick measurement capability.

## Using markers

Markers make it easier to make precise measurements because the marker measurement readouts show exact voltage and time positions for the markers. The measurements are based on actual waveform data from the acquisition system, not on approximations based on the display position, so you can be sure the values are highly accurate.

Using the marker and measurement controls, you control two sets of markers within the oscilloscope grid.

Both time and voltage differences between the markers are updated continuously on the screen. By default, the markers track the source waveform. Voltage measurements from the markers are the value of the waveform at the time set with the marker arrow keys.

- To select the type of marker mode you want to use, press the **[Markers]** key.
- To turn on Marker 1 (X1), push the Position knob. Turn the knob to move the marker. Push the knob again to select Marker 1 (Y1).


Marker 1 (X1 and Y1) has a solid line pattern on the waveform display. It is associated with the first available source on the display.

- To turn on Marker 2 (X2), push the Position knob again.

Marker 2 has a dashed line pattern on the waveform display. It is associated with the first available source on the display.

- In Track Measurements mode, the marker position cannot be changed.

## Moving markers using the user interface

- 1 Turn on the markers by clicking **Measure > Markers...** and selecting a mode. You can also click the Markers button  to either turn on markers or bring up the Markers dialog box.
- 2 Drag one of the markers to the position you want on the waveform.

## 2 Using the Oscilloscope

Dragging a marker makes it easy to quickly move the marker to the desired waveform event. You can use the front-panel Position knob for fine adjustment, or click **Measure > Markers...** and set the marker position precisely.



## Saving and Printing Data

- Click **File > Save >** to save your composite, setup, waveform, screen image, or measurement data.
- Click **File > Copy Screen Image** to easily copy and paste a screen image into a document.
- Click **File > Print...** to print waveform and setup data to a specified file.
- You can customize the **[Multi Purpose]** key to perform a QuickPrint.

### Forcing a Default Setup

If your Infiniium oscilloscope is not working properly when you start it up, follow these steps to perform a default setup and return the Infiniium to normal operation.

- 1 Click **Control > Default Setup** or press the **[Default Setup]** key.
- 2 If the oscilloscope is still not working properly, click **Control > Factory Default** to return the oscilloscope to the default settings it had when it left the factory.
- 3 If the oscilloscope is still not working properly, turn it off.
- 4 Turn the oscilloscope back on. If it does not successfully restart, try recycling the power again.
- 5 As soon as the Windows 7 load screen disappears, press **[Default Setup]**. If the oscilloscope still does not successfully restart, follow the instructions for recovering the hard drive.

#### Infiniium hard drive recovery

Follow these steps to recover your Infiniium hard drive.

- 1 Turn off the oscilloscope.
- 2 Connect the keyboard to the keyboard connector on the rear panel of the oscilloscope.
- 3 Connect the mouse to the mouse connector on the rear panel of the oscilloscope.
- 4 Turn on the oscilloscope.
- 5 As soon as you see the message **press F2 to boot the Infiniium Recovery System**, press **[F2]** and follow the on-screen instructions.
- 6 Once the recovery process is finished and the oscilloscope is running, check in the About Infiniium dialog box under installed options to see if all of the options you ordered are installed. If the options are not installed, please install them using the license keys provided on the oscilloscope option license certificates you received, or refer to the rear panel of the oscilloscope.

## 3 Online Help and Other Information

Accessing the Online Help **51**

Navigating the Online Help **53**

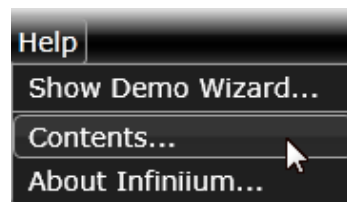
Using the Demo Wizard **53**

Most of the information about using the Infiniium oscilloscope effectively is included in the online help.

The online help is accessible from the menu bar and by clicking the question mark in the top right corner of dialog boxes.

### Accessing the Online Help

- Click **Help > Contents...**



**Figure 24** Help Menu

The Using the Oscilloscope topic appears on the home page. It looks like the following figure.

### 3 Online Help and Other Information

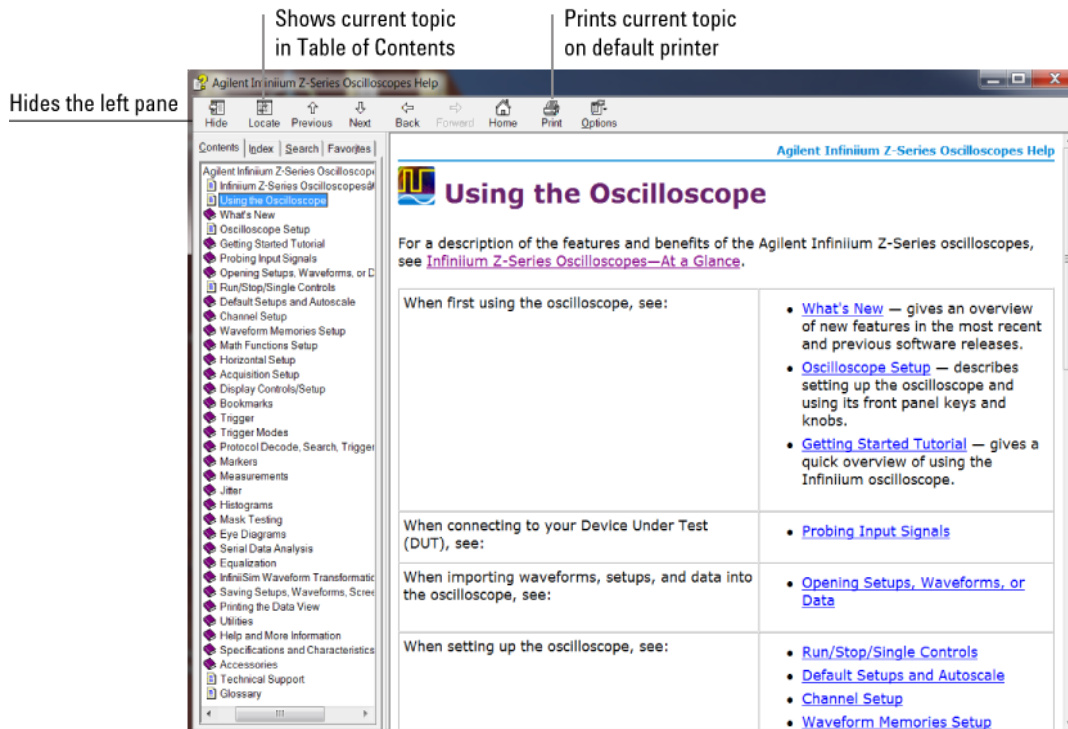


Figure 25 Online Help Home Page

#### NOTE

#### Viewing the Online Help Window

The online help window always stays on top of the interface display, so you can refer to it while working with the oscilloscope. You can move the window around the screen or resize it to make it easier to use.

- For information about items in a dialog box, click the Help button in that dialog box.



**Figure 26** Help Button for Dialog Box Help

## Navigating the Online Help

The online help provides several ways to find the information you need.

Use the Contents tab to browse topics in the help system by clicking topics in the left pane.

Use the Index tab to type in a keyword and search the index for that keyword or scroll through the list to find a topic.

Use the Search tab to type in a keyword and if that word exists in the online help, a list of topics containing the keyword appears.

Use the Favorites tab to add preferred help topics to a list for easy reference.

## Using the Demo Wizard

Your Z-Series oscilloscope comes with a built-in demo wizard that showcases many of the oscilloscope's capabilities. To see the demos, click **Help > Show Demo Wizard...** You can then select a specific demo, such as a particular protocol or a UI demo showing bookmarks.

For example, the following screen display shows the initial demo page for the FFT function. To experiment with the demo, click **Load Demo...**

### 3 Online Help and Other Information

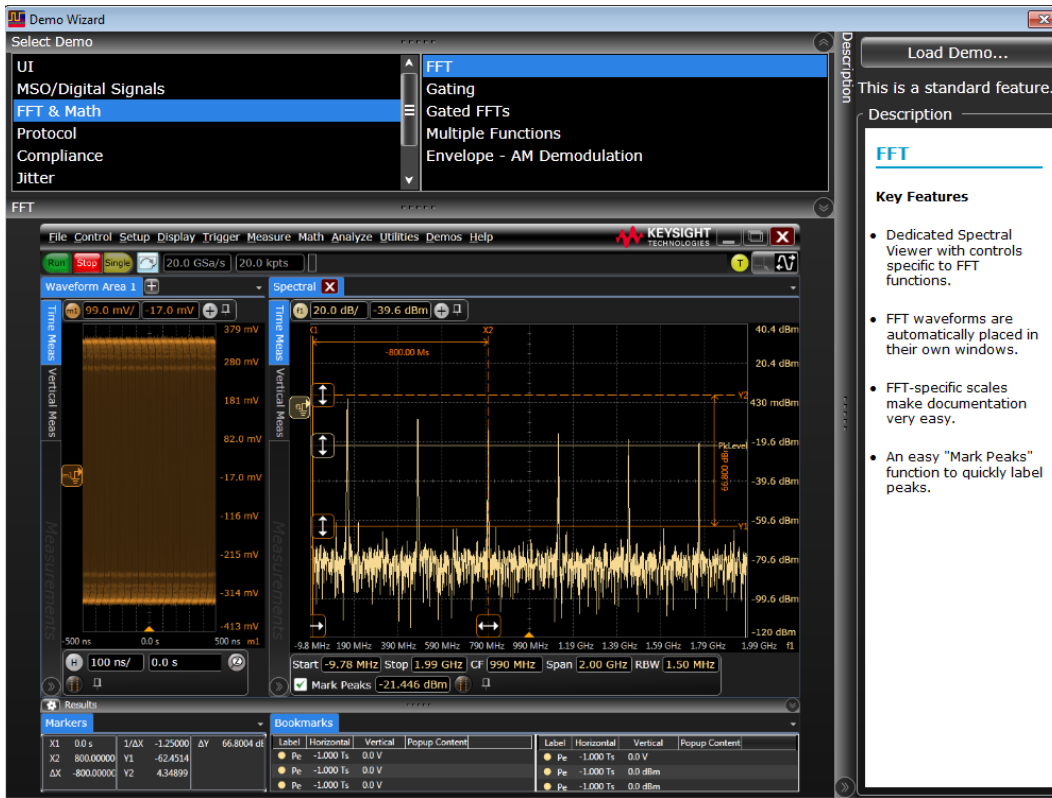


Figure 27 FFT Demo

# A Safety Information

## English

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or operating instructions in the product manuals violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements. Product manuals are provided with your instrument on CD-ROM and/or in printed form. Printed manuals are an option for many products. Manuals may also be available on the Web. Go to [www.keysight.com](http://www.keysight.com) and type in your product number in the Search field at the top of the page.

- |  |   |
|--|---|
| <b>General</b>                                   | Do not use this product in any manner not specified by the manufacturer. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.   |
| <b>Before Applying Power</b>                     | Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the instrument's external markings described in "Safety Symbols".  |
| <b>Ground the Instrument</b>                     | If your product is provided with a grounding type power plug, the instrument chassis and cover must be connected to an electrical ground to minimize shock hazard. The ground pin must be firmly connected to an electrical ground (safety ground) terminal at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. |
| <b>Fuses</b>                                     | See the user's guide or operator's manual for information about line-fuse replacement. Some instruments contain an internal fuse, which is not user accessible.   |
| <b>Do Not Operate in an Explosive Atmosphere</b> | Do not operate the instrument in the presence of flammable gases or fumes.  |
| <b>Do Not Remove the Instrument Cover</b>        | Only qualified, service-trained personnel who are aware of the hazards involved should remove instrument covers. Always disconnect the power cable and any external circuits before removing the instrument cover.  |
| <b>Cleaning</b>                                  | Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent or chemical solvents.   |

## A Safety Information

**Do Not Modify the Instrument** Do not install substitute parts or perform any unauthorized modification to the product. Return the product to an Keysight Sales and Service Office for service and repair to ensure that safety features are maintained.

**In Case of Damage** Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

### CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

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### WARNING
















A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

---









Safety Symbols

**Table 5** Description of Safety related symbols that may appear on a product (Sheet 1 of 2)

| Symbol  | Description  |
|---|--|
|    | Direct current   |
|    | Alternating current  |
|    | Both direct and alternating current  |
|    | Three phase alternating current  |
|    | Earth ground terminal  |
|    | Protective earth ground terminal   |
|    | Frame or chassis ground terminal   |
|   | Terminal is at earth potential   |
|  | Equipotentiality   |
| N   | Neutral conductor on permanently installed equipment   |
| L   | Line conductor on permanently installed equipment  |
|  | On (mains supply)  |
|  | Off (mains supply)   |
|  | Standby (mains supply). The instrument is not completely disconnected from the mains supply when the power switch is in the standby position |
|  | In position of a bi-stable push switch   |
|  | Out position of a bi-stable push switch  |
|  | Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION   |

## A Safety Information

**Table 5** Description of Safety related symbols that may appear on a product (Sheet 2 of 2)

| Symbol  | Description  |
|---|--|
|  | Caution, refer to accompanying documentation                               |
|  | Caution, risk of electric shock  |
|  | Do not apply around or remove from HAZARDOUS LIVE conductors               |
|  | Application around and removal from HAZARDOUS LIVE conductors is permitted |
|  | Caution, hot surface   |
|  | Ionizing radiation   |
| CAT I   | IEC Measurement Category I   |
| CAT II  | Measurement Category II  |
| CAT III   | Measurement Category III   |
| CAT IV  | Measurement Category IV  |

## French

Les consignes de sécurité générales présentées dans cette section doivent être appliquées au cours des différentes phases d'utilisation de cet appareil. Le non-respect de ces précautions ou des avertissements et consignes d'utilisation spécifiques mentionnés dans les manuels des produits constitue une violation des normes de sécurité relatives à la conception, à la fabrication et à l'usage normal de l'instrument. Keysight Technologies ne saurait être tenu responsable du non-respect de ces consignes. Les manuels des produits sont fournis avec votre instrument sur CD-ROM et/ou en version papier. Les versions papier des manuels sont en option pour de nombreux produits. Certains manuels sont également disponibles en ligne. Pour y accéder, allez sur le site [www.keysight.com](http://www.keysight.com) et saisissez la référence de votre produit dans le champ Rechercher qui se trouve en haut de la page.

|   |   |
|---|---|
| <b>Généralités</b>                              | Utilisez ce produit uniquement dans le cadre prévu par le fabricant. Si vous ne respectez pas les instructions d'utilisation, les fonctions de sécurité du produit risquent d'être inhibées.  |
| <b>Avant la mise sous tension</b>               | Vérifiez que vous avez bien respecté toutes les consignes de sécurité. Faites tous les branchements au niveau de l'appareil avant de mettre ce dernier sous tension. Tenez compte des marquages externes à l'instrument décrits à la section «Symboles de sécurité».  |
| <b>Mise à la terre de l'instrument</b>          | Si une prise de mise à la terre est fournie avec le produit, le châssis et le capot de l'instrument doivent être reliés à la terre afin de limiter les risques d'électrocution. Le contact à la terre doit être solidement connecté à une borne de terre (de sécurité) au niveau de la prise de courant. Toute interruption du conducteur de protection (mise à la terre) ou tout débranchement de la borne de terre de protection donne lieu à un risque d'électrocution pouvant entraîner des blessures graves. |
| <b>Fusibles</b>                                 | Pour obtenir des instructions sur le changement des fusibles de ligne, consultez le guide de l'utilisateur ou le manuel d'instructions. Certains instruments comportent un fusible interne inaccessible à l'utilisateur.  |
| <b>Ne pas utiliser en atmosphère explosive</b>  | N'utilisez pas l'instrument en présence de gaz ou de vapeurs inflammables.  |
| <b>Ne pas démonter le capot de l'instrument</b> | Seules des personnes qualifiées, formées à la maintenance et conscientes des risques d'électrocution encourus sont autorisées à démonter les capots de l'instrument. Débranchez toujours le cordon d'alimentation secteur et tous les circuits externes avant de démonter le capot de l'instrument.   |
| <b>Nettoyage</b>                                | Nettoyez la partie externe de l'instrument à l'aide d'un chiffon doux et non pelucheux, légèrement humidifié. N'utilisez pas de détergents ou de solvants chimiques.  |
| <b>Ne pas modifier l'instrument</b>             | N'installez pas de composants de remplacement et n'apportez aucune modification non autorisée à l'appareil. Pour toute opération de maintenance ou de réparation, renvoyez l'appareil à un bureau de vente et de service après-vente Keysight, afin d'être certain que les fonctions de sécurité seront maintenues.   |
| <b>En cas de dommages</b>                       | Les instruments endommagés ou défectueux doivent être désactivés et protégés contre toute utilisation involontaire jusqu'à ce qu'ils aient été réparés par une personne qualifiée.  |

## A Safety Information

### CAUTION











La mention ATTENTION indique un risque. Si la manoeuvre ou le procédé correspondant n'est pas exécuté correctement, il peut y avoir un risque de dommages à l'appareil ou de perte de données importantes. En présence de la mention ATTENTION, il convient de s'interrompre tant que les conditions indiquées n'ont pas été parfaitement comprises et respectées.

### WARNING












La mention AVERTISSEMENT signale un danger pour la sécurité de l'opérateur. Si la manoeuvre ou le procédé correspondant n'est pas exécuté correctement, il peut y avoir un risque pour la santé des personnes. En présence d'une mention AVERTISSEMENT, il convient de s'interrompre tant que les conditions indiquées n'ont pas été parfaitement comprises et respectées.

Symboles de sécurité:

**Table 6** Description des Symboles de Sécurité qui pourraient apparaître sur le produit. (Sheet 1 of 2)

| Symboles  | Description   |
|---|---|
|    | Courant continu.  |
|    | Courant alternatif.                                       |
|   | Courant continu et alternatif.                            |
|  | Courant alternative triphasé.                             |
|  | Borne de terre (masse).                                   |
|  | Borne de terre de protection.                             |
|  | Borne de terre reliée au cadre ou au châssis.             |
|  | Borne au potentiel de la terre.                           |
|  | Equipotentialité  |
| N   | Conducteur neutre sur un équipement installé à demeure    |
| L   | Conducteur de phase sur un équipement installé à demeure. |
|  | Alimentation en marche.                                   |

**Table 6** Description des Symboles de Sécurité qui pourraient apparaître sur le produit. (Sheet 2 of 2)

| Symboles  | Description   |
|---|---|
|    | Alimentation à l'arrêt.   |
|    | Alimentation en mode veille. Lorsque l'interrupteur est en mode veille, l'unité n'est pas complètement déconnectée de l'alimentation secteur. |
|    | Position Marche d'un interrupteur par bouton poussoir bi-stable.  |
|    | Position Arrêt d'un interrupteur par bouton poussoir bi-stable.   |
|    | Appareil entièrement protégé par DOUBLE ISOLATION ou ISOLATION RENFORCÉE  |
|    | Attention. Consultez la documentation fournie.  |
|   | Attention, danger d'électrocution.  |
|  | Ne pas appliquer ou enlever sur des conducteurs SOUS TENSION DANGEREUSE   |
|  | Application ou retrait autorisés sur les conducteurs SOUS TENSION DANGEREUSE  |
|  | Attention, surface chaude   |
|  | Rayonnement ionisant  |
| CAT I   | Appareil de mesure de catégorie I selon la norme CEI applicable   |
| CAT II  | Appareil de mesure de catégorie II selon la norme CEI applicable  |
| CAT III   | Appareil de mesure de catégorie III selon la norme CEI applicable   |
| CAT IV  | Appareil de mesure de catégorie IV selon la norme CEI applicable  |

## **A Safety Information**

## B Working in Comfort

About Repetitive Strain Injury 64

Mice and Other Input Devices 65

To optimize your comfort and productivity, it is important that you set up your work area correctly and use your Infiniium oscilloscope properly. With that in mind, we have developed some setup and use recommendations for you to follow based on established ergonomic principles.

Improper and prolonged use of keyboards and input devices are among those tasks that have been associated with repetitive strain injury (RSI) to soft tissues in the hands and arms. If you experience discomfort or pain while using the oscilloscope, discontinue use immediately and consult your physician as soon as possible. For more information on RSI, read the “About Repetitive Strain Injury” section, next.

Please study the recommendations offered here in this chapter. Included are references to relevant parts of international standards, regulations, and guidelines, such as ISO 9241 and the European Community Display Screen Equipment directive. You may also consult your employer's human resources department or other relevant departments for guidance specific to your company.

## About Repetitive Strain Injury

Because your comfort and safety are our primary concern, we strongly recommend that you use the Infiniium oscilloscope in accordance with established ergonomic principles and recommendations. Scientific literature suggests that there may be a relationship between injury to soft tissues—especially in the hands and arms—and prolonged improper use of keyboards or other equipment requiring repeated motions of the hands and forearms. This literature also suggests that many other risk factors may increase the chance of such injury, commonly called Repetitive Strain Injury.

### What is RSI?

Repetitive Strain Injury (RSI—also known as cumulative trauma disorder or repetitive motion injury) is a type of injury where soft tissues in the body, such as muscles, nerves, or tendons, become irritated or inflamed. RSI has been a reported problem for those who perform repetitive tasks such as assembly line work, meatpacking, sewing, playing musical instruments, and computer work. RSI also has been observed in those who frequently engage in activities such as carpentry, knitting, housework, gardening, tennis, windsurfing, and lifting children.

### What causes RSI?

The specific causes of RSI have not been established. Nevertheless, the incidence of RSI has been associated with a variety of risk factors, including:

- Too many uninterrupted repetitions of an activity or motion
- Performing an activity in an awkward or unnatural posture
- Maintaining static posture for prolonged periods
- Failing to take frequent short breaks
- Other environmental and psychosocial factors

In addition, there have been reports associating the occurrence of RSI with the use of keyboards, mice, and other input devices. Also, certain medical conditions, such as rheumatoid arthritis, obesity, and diabetes, may predispose some people to this type of injury.

### What if I experience discomfort?

If you are experiencing any discomfort, seek professional medical advice immediately. Typically, the earlier a problem is diagnosed and treated, the easier it is to resolve.



## Mice and Other Input Devices

Various aspects of using mice and other input devices may increase your risk of discomfort or injury. Observing the following recommendations may reduce that risk.

- Try to keep your hand, wrist, and forearm in a neutral position while using your mouse or other input device.
- If you use your thumb to rotate the ball on a trackball or spaceball, keep it in a relaxed, natural shape, and maintain a neutral posture in your hand, wrist, and forearm.
- Hold the mouse gently by draping your fingers over it. Keep your hand relaxed and fingers loose. Do not grip the mouse tightly.
- It takes very little pressure or force from your fingers to activate the buttons or scroll wheel on your mouse, scrolling mouse, trackball, or other input device. Using too much force can place unnecessary stress on the tendons and muscles in your hands, wrists, and forearms.
- If you are using a scrolling mouse, be sure to keep your fingers and hand in a relaxed, neutral position when activating the scroll wheel. Also, this type of mouse features software that can minimize the number of mouse movements or button clicks.
- When using a mouse, trackball, or other input device, position it as close to the keyboard as possible, and keep it at the same level so you do not have to stretch while using it.
- Be sure to keep your mouse and trackball clean. Regular removal of accumulated dust and dirt helps ensure proper tracking and reduces unnecessary hand and wrist motions.

## **B Working in Comfort**

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