Infiniium
EXR and MXR-Series Oscilloscopes
Quickly Find and Identify Hidden Signal Errors

Save Time and Resources

An oscilloscope is critical for testing new designs, troubleshooting unexpected behavior, and making quality measurements against accepted standards and specifications. Keysight's Fault Hunter automatically searches for hidden signal anomalies and is a standard feature on the Keysight Infiniium EXR- and MXR-Series oscilloscopes. Using the Fault Hunter function saves critical test time with advanced and intuitive features so you can increase confidence in your designs via more comprehensive test results.

Fault hunting

Troubleshooting, testing design ideas, or performing quality assurance is time-consuming. If you do not know what you are looking for in a problematic signal, you could spend hours trying to find it.

The Infiniium EXR-Series oscilloscope learns the signal first to determine which sections of the signal are anomalies. Fault Hunter automatically determines what is typical of the signal under test based on measurements like pulse width, rise time, and fall time.

The following are six signal types that Fault Hunter may find:

- Glitch (positive or negative) is a pulse-width trigger that focuses on a pulse of a width that is thinner than normal pulses.
- Runt (positive or negative) is a pulse-width trigger that focuses on height rather than width. A trace that does not reach the expected height triggers on the runt or the smaller trace.
- Slow-rising or slow-falling edges are triggers related to the slew rate of the signal.

What is Fault Hunter?

Keysight's Fault Hunter is a new oscilloscope feature to quickly locate and identify electronic faults by automatically setting up advanced triggers.

Fault Hunter, once started, uses the first 30 seconds to learn a normal signal, then compares subsequent waveforms to catch up to six waveform anomalies.

Fault Hunter can compare waveforms for 1 to 2,880 minutes.

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If Fault Hunter finds an anomaly in the signal, it stops and saves the waveform for analysis. Fault Hunter enables you to examine the conditions around rare anomalies so you can quickly share it with others on your project team. You can take a screenshot of the Infiniium oscilloscope's display to use in your presentation for discussion in a design review or as evidence in a quality assurance (QA) audit.

Hunting for signal errors is tedious and time-consuming. Fault Hunter helps you find and resolve complex signal issues quickly. An intermittent problem can be challenging to locate if your oscilloscope does not capture it. Fault Hunter solves this problem by automatically applying advanced triggers to capture a normal signal for comparison.

Get more waveforms per second

An oscilloscope trigger acquires a snapshot of your signal with a frame of reference so that you can see the differences in the waveforms. Between acquisitions, there is "dead time" where data is not captured for an oscilloscope's display. As a result, it is challenging to see a rare signal anomaly riding the waveform; see Figure 1. For example, by default, Keysight's EXR-Series oscilloscopes capture more than 200,000 waveforms per second (wfm/s). The Infiniium EXR-Series can display a waveform over 200 times faster than most oscilloscopes in its class when not using special modes.
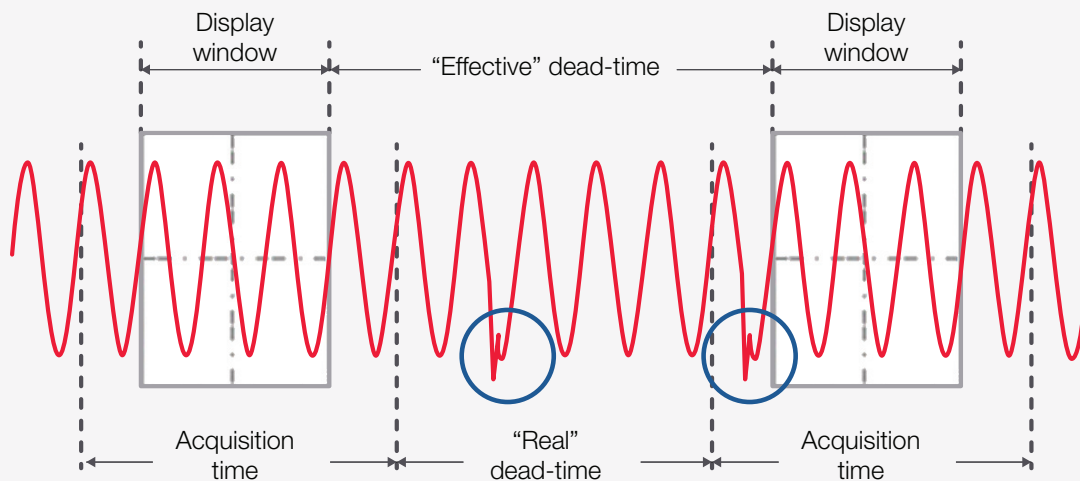

Figure 1. During this time delay between captures, an oscilloscope cannot see any signal activity that occurs within the mixed-signal design you are debugging

Getting Started

You will find using Fault Hunter is easy and intuitive by following these steps:

1. Start by pressing the Quick Fault Hunter key on the front panel; see Figure 2. Fault Hunter runs a quick 30-second statistical analysis on a normal signal to determine the mean and standard deviation of waveform measurements. Fault Hunter automatically locates problem signals by triggering and flagging a signal that falls outside the set thresholds before beginning the next test.

Figure 2. Using an EXR-Series oscilloscope, select Fault Hunter from the Analyze menu (at left) or use the front panel shortcut key (at right)

Fault Hunter runs on any channel you choose and begins the analysis process. The set-up screen displays Fault Hunter gathering a baseline of the mean and standard deviation of common measurements for the waveform's pulse width, rise time, fall time, and more. The system collects this information for about 30 seconds.

Figure 3. Any one channel can run Fault Hunter to produce a baseline of the mean and standard deviation of common measurements

Fault Hunter uses the mean and standard deviation values of recent measurements to determine outliers. After Fault Hunter finishes collecting a baseline, it starts running the tests you have chosen.
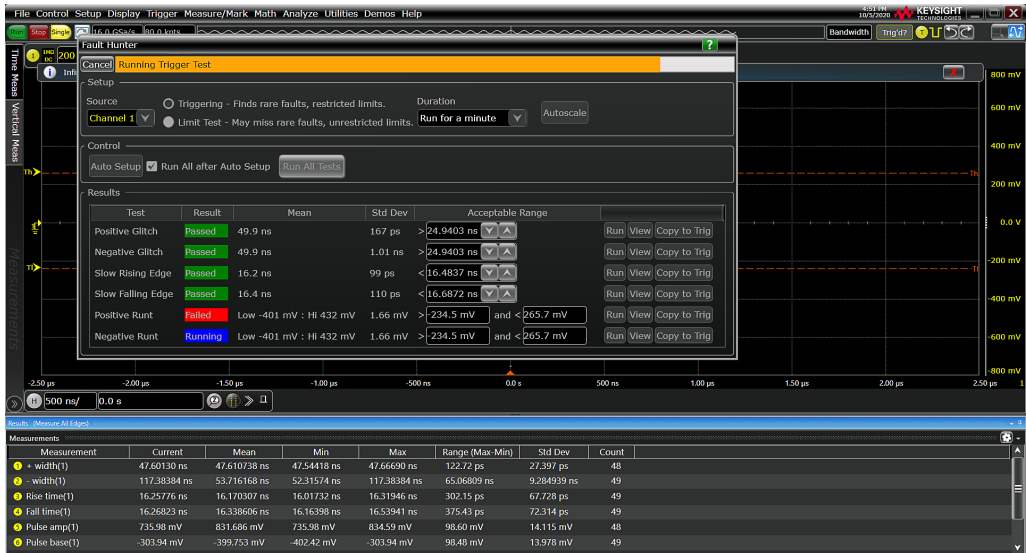

Figure 4. Fault Hunter is running six different tests for one minute; choices in the duration drop-down menu can extend to 48 hours

In Figure 4, Fault Hunter found a positive runt on *Channel 1* as designated by the red *Failed* indicator. Fault Hunter's results also show that all the tests have passed except one.
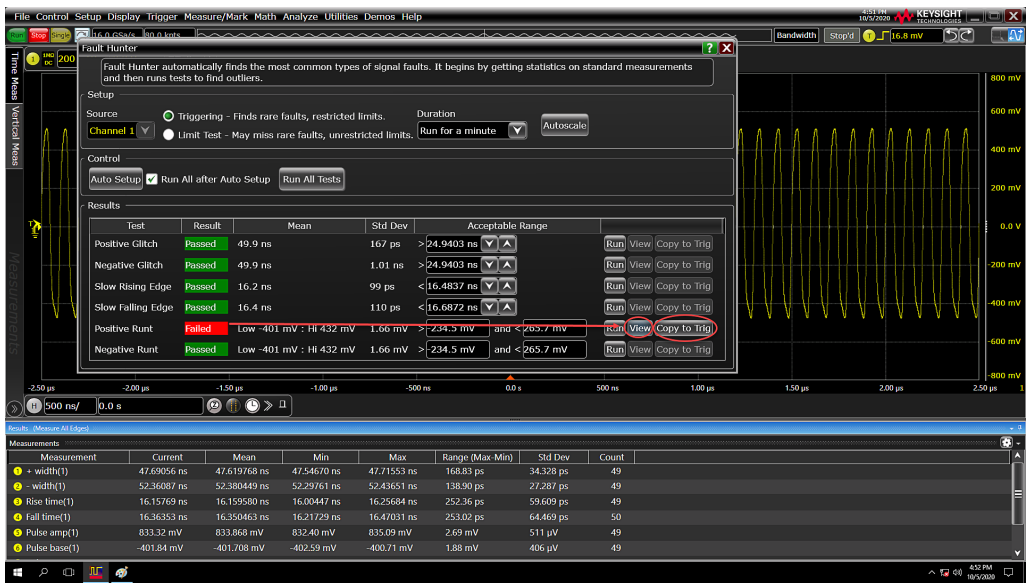

Figure 5. After Fault Hunter completes all six tests, click on the *View* button to see the anomaly. The *Copy to Trigger* button saves the type of trigger that located the anomaly.

3. Click on the View button; see Figure 5. Fault Hunter will take you to the signal waveform for detailed analysis; see Figure 6.

4. You can also copy the trigger that identified the fault once you have completed locating, visualizing, and documenting. Press Copy to Trig to automatically set up an advanced trigger to continue searching for faults in real-time; see Figure 5. Features like standard segmented memory, history mode, and counter can help you capture thousands of consecutive faults with timing information or find the fault's frequency to help you perform additional root cause analysis.

Figure 6. After clicking the view button, Fault Hunter will take you to the error it found

Summary

Finding an elusive signal anomaly early in the design validation process can save days or weeks of time. Fault Hunter incorporates advanced software algorithms to search for small deviations in otherwise standard signals. Discover the power of push-button insights, just one of many powerful capabilities that make the Keysight MXR and EXR oscilloscopes best in their class.

Discover how you can accelerate your innovations faster with Keysight Infiniium EXR- and MXR-series oscilloscopes at
http://www.keysight.com/find/EXR and **http://www.keysight.com/find/MXR**

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