Quick and efficient troubleshooting with the R&S®Scope Rider

Signal faults and anomalies can cause electrical and electronic systems to fail. Especially in the field, these errors can lead to system downtimes and produce high costs. Consequently, finding them quickly and efficiently as well as identifying their source are crucial.

The R&S®Scope Rider offers powerful debugging functionality for troubleshooting in the field as well as in a lab environment when portability or isolated channels are needed.

Your task
A typical use case when debugging electronic systems is capturing and analyzing rare signal faults and anomalies. Such events, for example sporadic sensor faults or rare glitches in a power supply, can cause complex system failures without any obvious indication of the root cause. Because their nature is unknown, it is usually a challenge to detect such anomalies. Examples include glitches, spikes, intermittent interferences, amplitude and frequency changes or changes in duty cycle.

Modern benchtop oscilloscopes offer an impressive number of debugging tools. Nevertheless, when portability is needed or when measurements are to be performed safely on high-voltage electronics (in the field or in a lab environment), a different solution is required.

T&M solution
The R&S®Scope Rider handheld digital oscilloscope combines the advantages of isolated channels up to CAT IV 600 V with the advanced functionalities of modern benchtop oscilloscopes in a portable design.

It is available in bandwidths up to 500 MHz, offers a maximum real-time sampling rate of 5 Gsample/s and provides 500 ksample of acquisition memory – extraordinary performance parameters for a handheld oscilloscope.

Available for the first time in a handheld instrument, the acquisition rate of 50 000 waveforms/s and a very precise digital trigger system offering a variety of advanced trigger modes enable the engineer to find intermittent signal faults quickly. Analysis functions, including 33 automatic measurements, the history function and the data logger, help find the cause of errors.

The R&S®Scope Rider additionally features logic analyzer and protocol analyzer capabilities made possible by eight digital channels (MSO) and various protocol trigger and decoding options (e.g. I^{2}C or SPI). In combination with the isolated channels for operating on dangerous voltage signals, this makes the R&S®Scope Rider the tool of choice for debugging embedded power designs.

Application
Finding rare signal faults quickly
The acquisition cycle of a digital oscilloscope consists of two steps:
- The oscilloscope samples the signal and stores the samples
- The oscilloscope processes these samples and displays the waveform on the screen. During this period, the oscilloscope is "blind" to the signal. Signal faults that occur during this blind time remain hidden to the user
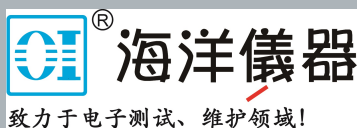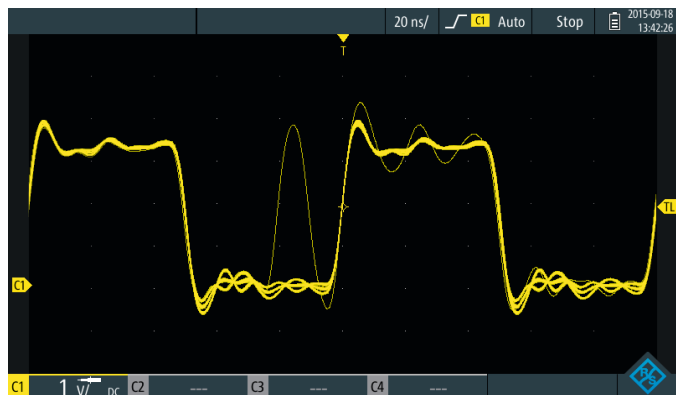
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With an acquisition rate of up to 50 000 waveforms/s – more than 1000 times faster than conventional handheld oscilloscopes – the R&S®Scope Rider sees signals other scopes miss. Rare faults in signals can be reliably captured and analyzed, effectively shortening debugging time.

Due to the high acquisition rate, the R&S®Scope Rider finds rare signal faults very quickly.

Precise fault detection with a powerful trigger system

The high acquisition rate of the R&S®Scope Rider helps discover signal anomalies. The engineer can then use the 14 different trigger types to precisely isolate the relevant signal events for further analysis.

In addition to simple trigger conditions such as edge and pulse width, advanced modes such as runt or video trigger are supported.

Furthermore, the R&S®Scope Rider provides the best trigger sensitivity available in a handheld oscilloscope. This is due to the unique Rohde & Schwarz digital trigger system. It determines whether the trigger condition has been met by directly analyzing the digitized signal.

History function: looking back in time

Finding the real cause of a problem is often possible only by looking at the past of a signal sequence. This option is provided by the history mode. The R&S®Scope Rider automatically stores up to 5000 waveforms in a separate history buffer. At any point in time, acquisition can be stopped and users can immediately analyze the past measurement data using the full oscilloscope functionality. One timestamp per waveform clearly identifies when events took place.

Mask tests for revealing signal deviations

Due to the large number of possible signal anomalies, it is sometimes difficult to define a suitable trigger condition. The solution in such cases is to perform mask tests. They quickly reveal whether a specific signal lies within defined tolerance limits, and they use statistical pass/fail evaluation to assess the quality and stability of a device under test. Signal anomalies and unexpected results are easy to identify by stopping the measurement if the mask is violated.

Creating masks is very easy and flexible with the R&S®Scope Rider. With just a few keystrokes, the user can generate a mask from a reference signal and define the corresponding tolerance limits.

Data logger: long-term debugging power

The data logger feature of the R&S®Scope Rider is used specifically for occasions requiring relatively long-term monitoring. It allows up to four measurements to be monitored at a speed of 1, 2 or 5 measurements/s to locate causes of intermittent problems that might occur only once an hour or once a week, e.g. voltage variations on the mains or rare glitches in a power supply. The large memory of 2 Msample per channel allows up to 23 days of logging. The statistics display additionally provides information about minimum and maximum values with exact timing information. The deep zoom functionality can be used for detailed analysis of selected segments of the recorded data.
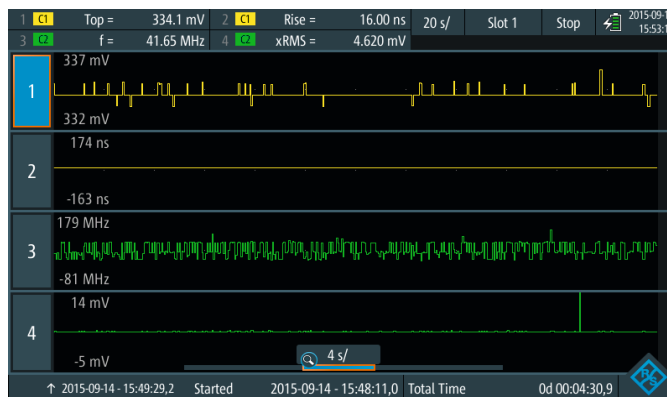
The data logger of the R&S®Scope Rider is used for long-term monitoring of measurement values.

Summary

The R&S®Scope Rider is a handheld oscilloscope that features superior performance at the highest safety standards, combined with the debugging functionalities of a benchtop oscilloscope.