

## Looking for short intermittent interferences?

Trendplot™ and ScopeRecord make it easier.

### Application Note

In our daily life we are frequently faced with a phenomenon called short intermittent interferences which can be present on our power lines. Although the owners of national power grids do their best to supply interference free mains, they are unfortunately faced with switching devices that all leave their marks behind on the grid coming to our houses. These interferences can also be generated in-house by flipping switches. Photo 1 shows a conventional power plant.

In general these switching devices leave their traces behind, sometimes called glitches, on the mains. These glitches can be extremely short and of high energy, which makes them catastrophic to domestic appliances when the voltage peaks are too high.

### Investigating such a signal

To conduct a detailed study of short intermittent interferences, a measuring device that can record (mains) signals over long periods of time is required. Using a Digital MultiMeter (DMM) is not sufficient enough because it is not equipped with an internal signal recorder utility. However, a ScopeMeter 190 Series II portable oscilloscope is the perfect tool for such a study.

The ScopeMeter 190 Series II portable oscilloscope (Photo 2) offers a range of standard options such as Trendplot and ScopeRecord, which help to make anomalies visible and traceable. All options offer the possibility to read-out a time stamp, which makes it easier to trace the exact moment of an interruption.



Photo 1

### Choose an option

#### **TrendPlot**

TrendPlot offers the possibility to record the trend in signal behavior, which enables an easier visualization of deviations over time. The measured data is electronically stored in the scope's memory, allowing for paperless recording up to 22 days. Using this feature, unexpected short irregularities can easily be spotted. TrendPlot also offers the important advantage of accurate time stamping with a resolution of 0.2 seconds. The accurate time stamp allows the user to pinpoint the exact date and time of the occurrence.



Photo 2

While TrendPlot is running, the ScopeMeter portable oscilloscope operates unattended, continuously recording the required data while dynamically setting the vertical amplitude scale to display the maximum, and automatically compressing the time scale to show the complete trend. The plot can work with a time indication “from start” or “time of day”. Figure 1 shows a typical example of a Trendplot.

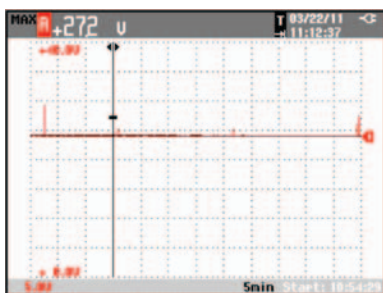


Figure 1

**ScopeRecord**

This is a continuous sampling mode in which the ScopeMeter test tool records points “as is” at a rate of 125 MS/s. With a 30,000 point deep memory it can record continuously in this mode for up to 48 hours enabling to capture glitches as short as 8 ns. The recorder function can be set to trigger on specific trigger functions such as single sweep, continuous trigger or start /stop on a trigger signal.

**Zoom function in combination with cursor settings**

In both recording modes it is possible to select the zoom function, which makes the smallest details visible, such as the shape of an individual power cycle. Figure 2 shows what happens when an UPS switches over from inverter to mains supply. Although the switchover would not be visible with a normal display of 200 ms/div, captured with ScopeRecord the switchover is clearly visible using the zoom function. While zooming in, the zoom factor is displayed on the screen. The time base (time/div) changes accordingly.

In this case, it can be seen that no interruption in supply has occurred while the mains voltage is connected and in phase within just a few milliseconds.

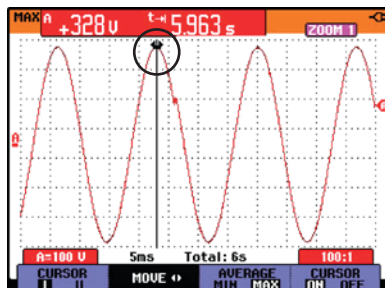


Figure 2

**Using the cursors**

To know more about the signal under investigation the cursor function plays an important role. It is possible to use vertical and/or horizontal cursors. With the horizontal cursors it is possible to read the time between the cursors and the frequency. Using the horizontal cursors it is possible to read the amplitude of the signal.

The screenshot in Figure 3 shows a specific signal behavior. Using the cursors offers the possibility to study the time interval in a given period set by the position of the cursors. The cursors can be moved horizontally and independent of each other, enabling the study of a specific area where the momentary time interval is displayed. Horizontal cursors can be used to indicate amplitudes.

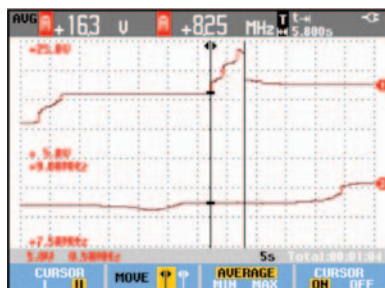


Figure 3

**Conclusion**

Recording multiple-signals, either by means of TrendPlot or ScopeRecord, over a long period of time offers an excellent opportunity to find distortions such

as short term irregularities, which could not be seen when carrying out a “one shot” measurement. The cursor and zoom function enhances these capabilities as small details can be revealed.

As discussed TrendPlot and ScopeRecord store all data offering the possibility to use the data long after an event has taken place e.g. in a remote area that is not frequently visited.

The ScopeMeter Series II portable oscilloscope is equipped with a battery pack, enabling it to be used in an environment where there is no power supply, for a period of up to seven hours. It is designed to operate in dirty, unsafe and harsh environments—anywhere you need to be.



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