DS1000E Series Oscilloscopes

Programming the Alternating Trigger Mode

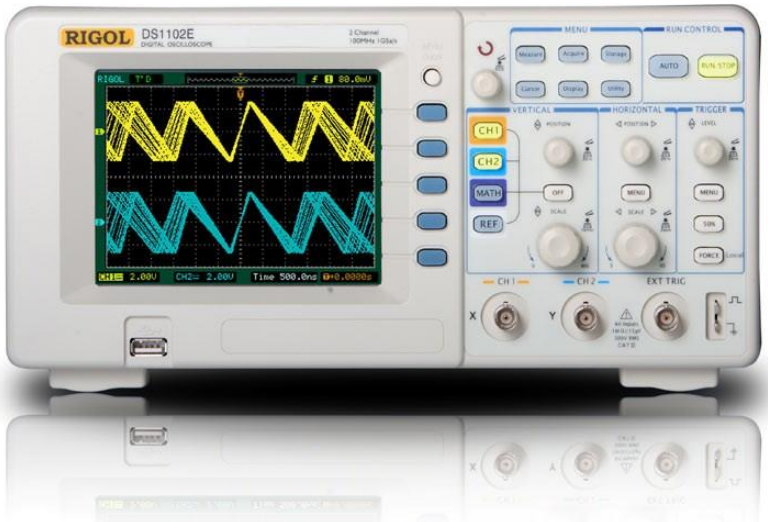

Figure 1: Rigol DS1000E Series Oscilloscope

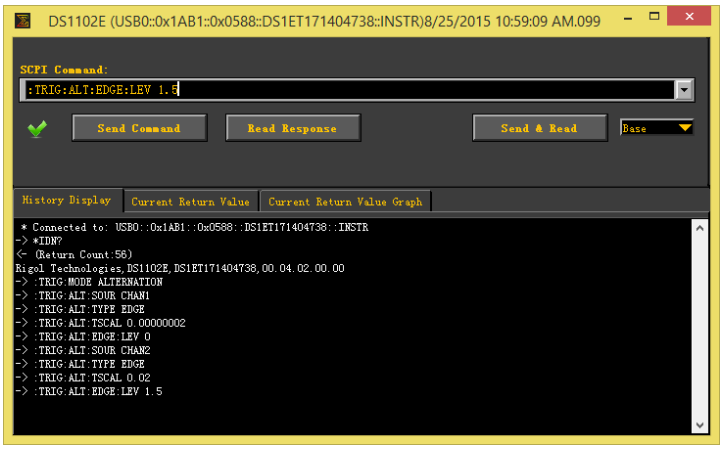

Figure 2:UltraSigma SCPI Panel Control

Introduction to Alternating Triggers

Alternating triggers on an oscilloscope can be used to view and analyze two asynchronous signals at once. This is very useful in cases where you need to monitor multiple signals that are not coordinated in time, but you would still like to view them on the same screen concurrently. Signals can also be viewed in this way when their frequencies are very different. For instance, on channel can be set to view a 10 Hz signal while the other channel is setup to monitor a 10 MHz signal. Extra care must be taken when using this mode because the signals on the display are not time coordinated.

To programmatically setup alternating trigger mode you need a DS1000E series oscilloscope with up to date firmware. You also need a PC with UltraSigma communication software installed as well as a USB cable.

To get started power on the oscilloscope and connect the 2 asynchronous signals to be used for testing. We are using a 10 MHz sine wave on channel 1 and a 10 Hz square wave on channel 2 in this example.

First, in the storage menu select FACTORY settings and push LOAD. This will reset the instrument to the initial state. Then, to complete the setup, connect the DS1000E series scope to your computer over USB and open UltraSigma on the PC.

Setting up alternating triggers

Use UltraSigma to send these commands to setup alternating trigger. Right click on the Online Resource in UltraSigma that matches the instrument we want to program and select SCPI Panel Control from the pop up menu. This opens the window in Figure 2. Now we are ready to program the instrument. First, leave the *IDN? Command in the text line and click SEND & READ. In the window below you should see the instrument's response. Then, send these commands in order clicking SEND COMMAND after each one:

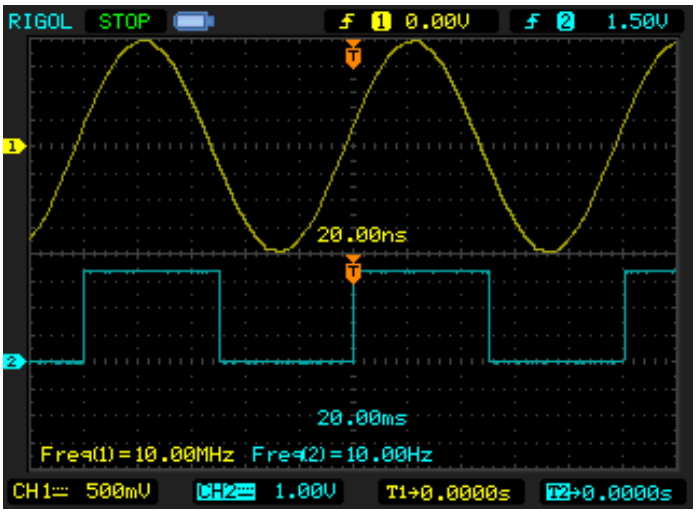

Figure 3: DS1000E screen image of alternating trigger mode.

:TRIG:MODE ALTERNATION

:TRIG:ALT:SOUR CHAN1

:TRIG:ALT:TYPE EDGE

:TRIG:ALT:TSCAL 0.00000002

:TRIG:ALT:EDGE:LEV 0

:TRIG:ALT:SOUR CHAN2

:TRIG:ALT:TYPE EDGE

:TRIG:ALT:TSCAL 0.02

:TRIG:ALT:EDGE:LEV 1.5

Note that you can set different time scales, trigger levels, and trigger modes for each channel. Alternating trigger does not have a true normal mode. There must be an occurring trigger on at least 1 of the channels else it will switch to an auto mode.

You can add measurements on the front panel as we did in **Figure 3** or request them over the bus using these commands:

:MEAS:SOUR CHAN1

:MEAS:FREQ?

1.00e+07

After the first command click SEND COMMAND. After the command that ends in a "?" click SEND & READ. In this case the instrument responds with a value (1E7 = 10 MHz).

Find more information online

DS1000E Family Information page

For more information on our waveform generators or other products please go to **rigolna.com** or contact us directly at applications***@rigoltech.com*** or call us toll free at:

877-4-RIGOL**-1.**

Rigol Technologies USA

10200 SW Allen Blvd, Suite C
Beaverton, OR 97005
877.474.4651