Synchronizing Multiple Outputs Using Burst Mode with Multiple Generators

Date: 03.07.2014

Solution: Some applications require more than 2 outputs to be synchronized in time. This application note describes the method that provides the most control using Rigol DG series arbitrary waveform generators.

We will source 4 synchronized square wave outputs and use the Burst delay setting to align the pulse leading edges.

Setup:

Qty 2 DG series Arbitrary Waveform Generators (DG4000's used in this example)
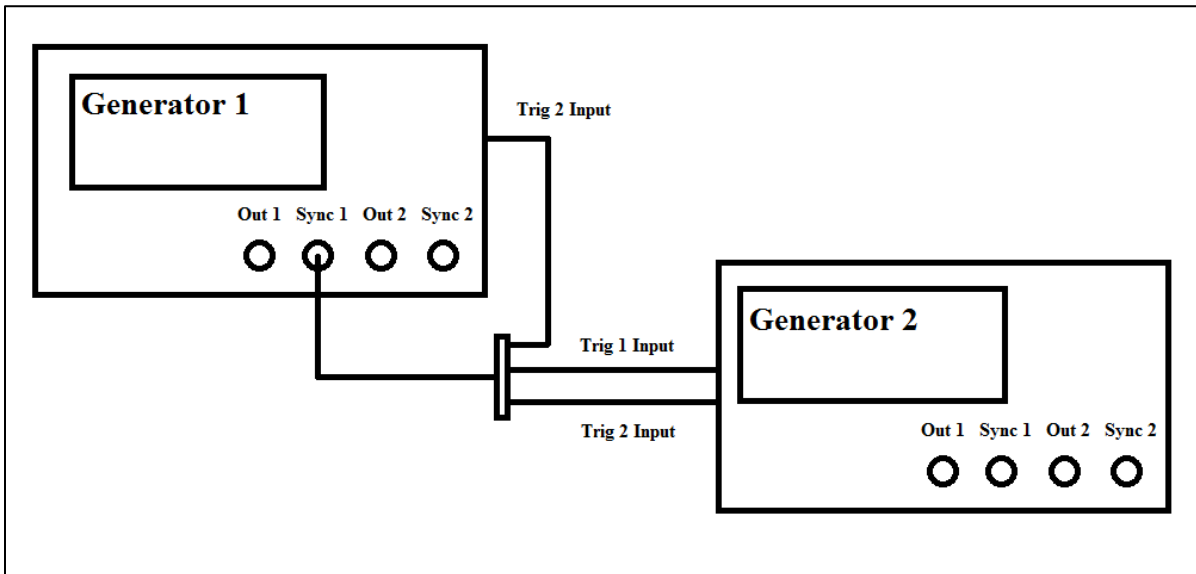
Qty 4 BNC-to-BNC cables (Connect Generator outputs to Scope inputs)

Qty 1 4 Channel Scope (DS1104Z used in this example)

Qty 1 1-to-3 output breakout cable or box (Connect Sync signal to Generator Triggers)

- Select one of the generators as the controlling instrument. One of the output channels of the controlling instrument will be used as the controlling channel. All of the other channels on all the other instruments will be synchronized to the controlling channel.

- Connect BNC cables from the outputs to the DUTs or circuit. In this example, we are connected directly to a 4 channel oscilloscope. This can be helpful to verify that the output waveforms are synchronization and they meet the required specifications of the application.

- Connect the Channel 1 Sync Output of the controlling generator to the 1-to-3 BNC cable/breakout. One lead should be connected to controlling generator Trig 2 input. The other two should connect to the other generator Trigger Inputs as in Figure 1 below.

Generator 1

Trig 2 Input

Out 1 Sync 1 Out 2 Sync 2

Trig 1 Input

Generator 2

Trig 2 Input

Out 1 Sync 1 Out 2 Sync 2

Figure 1: Trigger sync connections. When Output 1 on Generator 1 is active, the sync 1 output will send a signal to the trigger inputs for Channel 2 on Generator 2 and Trigger inputs 1 and 2 on Generator 2.

- Set all channel amplitudes, waveform type, and frequencies. In this example, all amplitudes are 5V, type is Square, and frequency is 1MHz.

- Set each for Burst control by pressing the Channel button you wish to control and then press the Burst button.

- The controlling channel should have the Burst Source set to Internal. The other channel Burst Sources are all set to External.
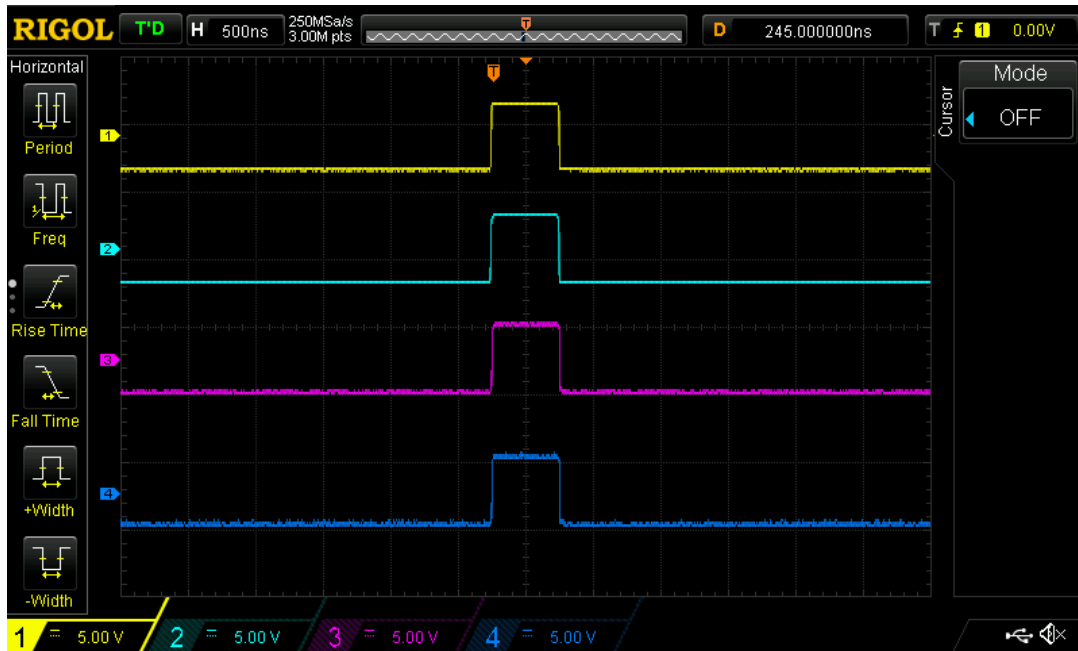
- Enable all of the outputs and observe the waveforms on an oscilloscope. You can use the scopes measurement capabilities to determine the delay you may need to apply to the sources.
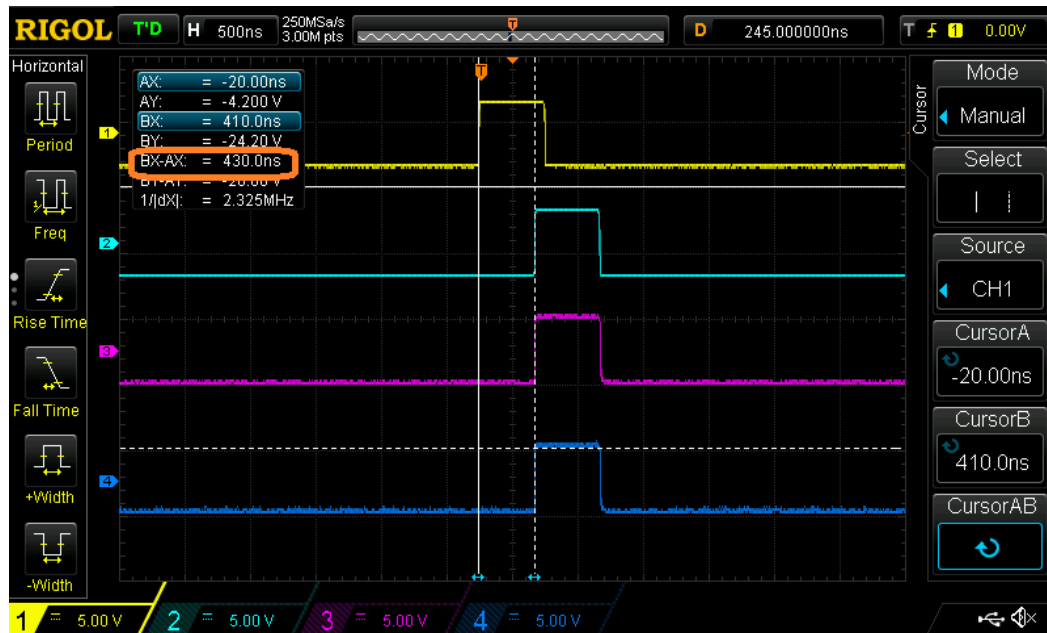
- Use the Burst Delay setting of the controlling channel to align the rising edges of the waveforms.

Headquarters

RIGOL TECHNOLOGIES, INC.

No.156,Cai He Village,

Sha He Town,

Chang Ping District, Beijing,

102206 P.R.China

Tel:+86-10-80706688

Fax:+86-10-80705070

Email: support@rigol.com

USA

RIGOL TECHNOLOGIES,USA INC.

7401 First Place, Suite N

Oakwood Village

OH 44164, USA

Toll free: 877-4-RIGOL-1

Office: (440) 232-4488

Fax: (216)-754-8107

Email: info@rigol.com

EUROPE

RIGOL TECHNOLOGIES GmbH

Lindbergh str. 4

82178 Puchheim

Germany

Tel: 0049- 89/89418950

Email: info-europe@rigoltech.com