LogicStudio Training Guide

July 2, 2012

Summary

This guide provides step by step instructions explaining how to use the LogicStudio software.

LogicStudio can operate in demo mode providing full access to all controls and features even when the hardware or demo board is not available.

This training guide uses the WS-100 demo board which is available from LeCroy.

The LogicStudio software provides tools for viewing, measuring and analyzing digital, serial and analog waveforms. This guide will explain how to use the various tools built-in to LogicStudio such as cursors, waveform magnifier, history mode, serial trigger/decode and viewing analog waveforms from the WaveJet.

The LogicStudio software can be downloaded at:
http://www.lecroy.com/logicstudio/

1. Download and install the LogicStudio software appropriate for your computer from the LeCroy website including the instrument drivers.

2. Connect the LogicStudio module to the computer using the USB cable.

3. Launch the LogicStudio software.

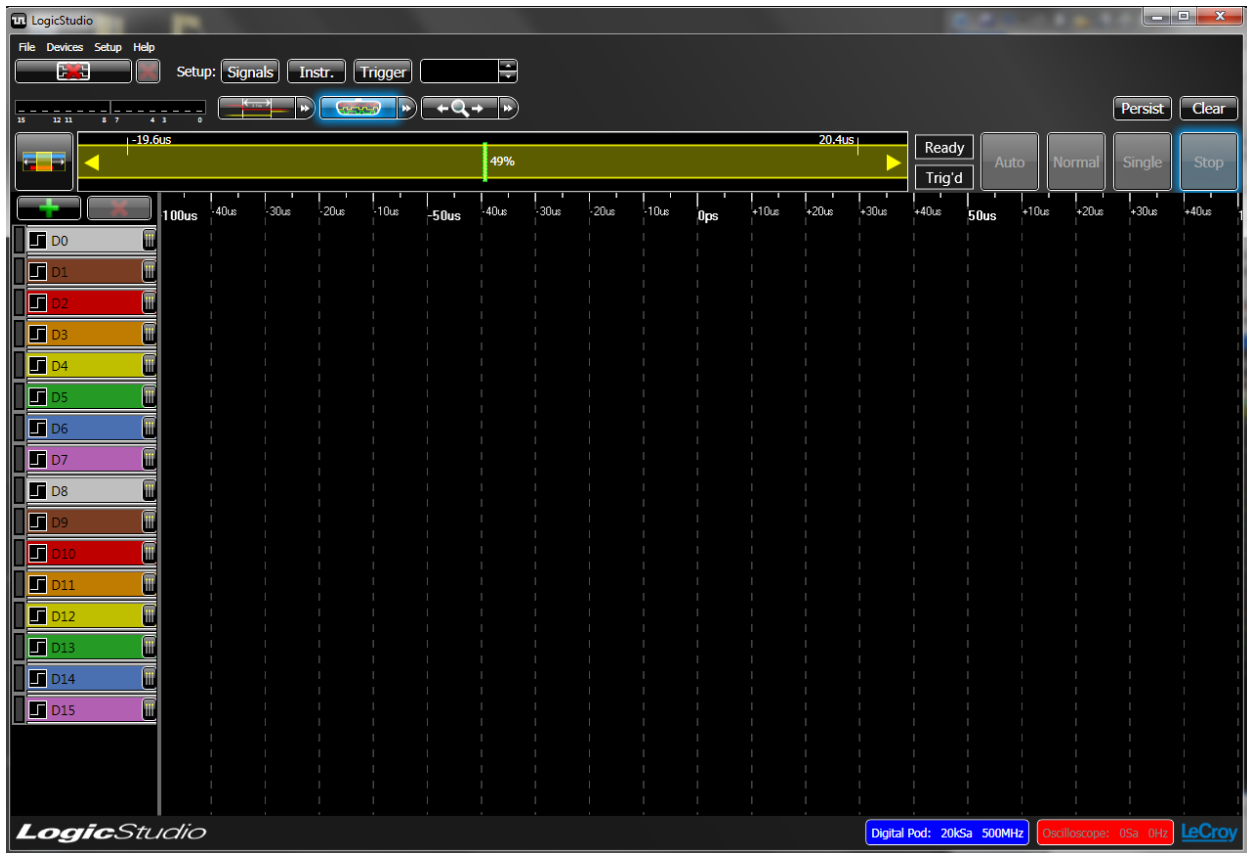4. Your computer screen should be similar to Figure 1.

Figure 1 - Initial LogicStudio Setup

5. Use the file pull down in the LogicStudio software to load the Default Setup.

6. Click on Devices – Device Finder pull down menu or click on the Open Device Finder button in the top left of the screen. This will open the Device Finder Window as shown in Figure 2.

Figure 2 - Device Finder Window

7. Click on the LogicStudio 16 device listed and click the next button.

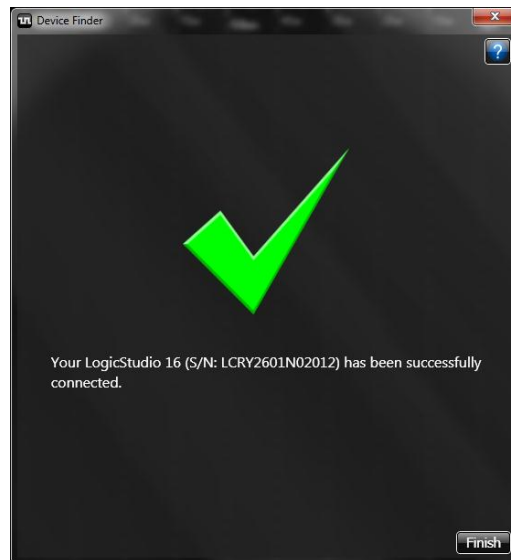8. Click on the Finish button on the Device Finder window.

Figure 3 - Successfully Connected

9. Connect the LeCroy WS-100 demo board to an available USB port. If a new hardware found message appears press the Cancel button and continue. The WS-100 only uses the USB port for power.

10. Connect logic pod leads D0 through D4 to the output pins marked D0 through D4, respectively, on the WS-100 demo board using the micrograbber adaptors on the logic pod leads.
(Note do not push the logic pod leads directly over the square pins on the WS-100 digital outputs as they are too large for the pod sockets and will spread them.)

11. Point and click the Setup: Signals button on the LogicStudio software. This will open the signal definitions pop up which allows you to define the type of signals and the signal name associated with each of the available inputs. Select D15 and remove it using the red "X" at the top of the pop up. Similarly remove the lines labeled D14 through D5. To escape from the Setup:Signals function, click the red X on the right hand side of the screen just above the D0 trace.

12. Press the Auto trigger button in the upper right corner of the LogicStudio software display. The device should begin to acquire signals which will appear to be untriggered.

13. Press the Setup:Trigger button at the top of the LogicStudio software display. The trigger setup pop up will appear. Set up an edge trigger on the positive going edge of signal D4. Press OK and the signal display of Logic Studio will now appear stable as shown in Figure 4. On the default timescale it may appear that the trigger occurs on both positive and negative edges. Hold down the right mouse button and scroll the mouse across the display to expand the timebase. At 1 us/div it will be clear that LogicStudio is only triggering on the rising edge of D4.
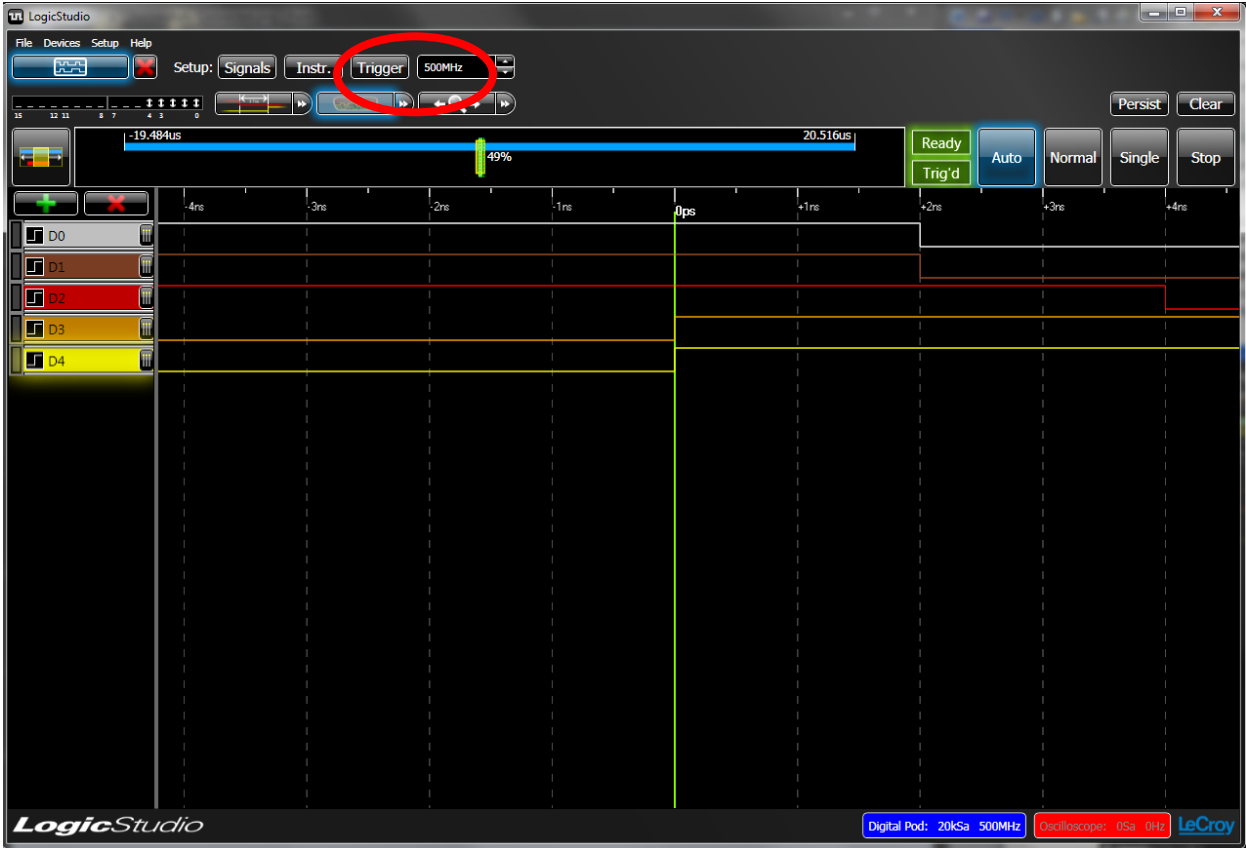

Figure 4 - Logic Studio triggered on positive going edge of D4

14. Investigate the effect of changing the Setup:sampling frequency control (Circled in Figure 4).

15. Press the Magnifier button, shown in figure 5; it will be highlighted in blue. Move your cursor into the signal display. This tool provides a quick magnified view to see details in the signal display window. Click the Magnify button again to close the magnifier window.
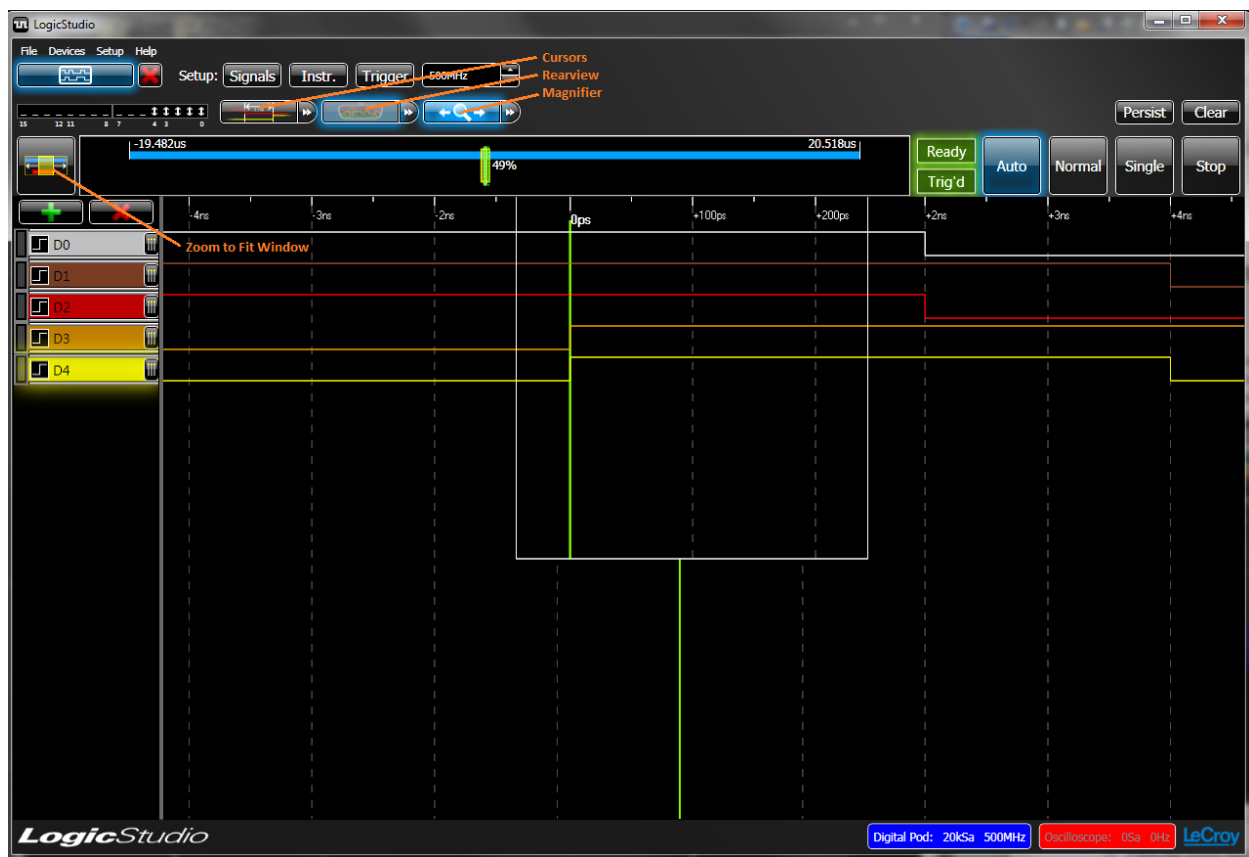
Figure 5: The Cursors, Rearview, Magnifier, and Zoom to Window icons

16. Press the cursor tool. It will be highlighted in blue. Click in the signal display, a vertical cursor will appear. Click on the cursor line and drag your mouse horizontally from the cursor, this will cause a dotted line with the time between the cursor line and the mouse position to be displayed. Right click to establish a 2nd vertical line. The time difference between the cursor line and the mouse cursor is shown above the line and the reciprocal of the time difference (frequency) appears below the dotted line.

17. Click on the double arrow symbol on the right hand side of the cursor tool. A pop up box will allow you to define a total of 4 cursors. Exercise this feature so that you are familiar with cursor operations. Measure the frequency of signal D0. When done turn off all the cursors.

18. Press the Single button. The Logic Studio will take a single sweep and then stop, indicated by the Stop button being highlighted in blue. The RearView button should also be highlighted in blue. Press the double arrow on the RearView button. A pop up slide control will appear. Moving the slider allows you to display the history of data acquisitions. Close the slider and return to Normal trigger.

19. Select signal D4 in the signals control panel, press the red "X" to remove D4. Do the same for D3-D1.

20. Click on the signal D0 in the signals control panel. You should see a signal definition box at the bottom of the LogicStudio software display. Change the signal type to Digital Bus, Radix – Hex, Name: Bus, and change the color to orange. Check the Data boxes 0-4.

21. Press the Expand signal button (+) on the Bus label in the signal control panel. You should see the bus view of the signal along with the five signals making up the bus (Figure 6). Use the magnifier to expand

the display of the bus so you can see the bus values in hex. Use the zoom control (hold down the right mouse button) to expand the signal display so the bus values are visible without the magnifier.

Figure 6: The bus view setup

22. Remove the data bus from the signals control panel. Press the "+" sign and add a signal. Define it as "Type" I2C decode, RADIX:ASCII, Name I2C, Data assigned to 15, Clock assigned to 14. Connect the D15 logic pod lead to the CH1 test point on the WS-100 demo board. Similarly, connect the D14 line to the CH2 test point on the WS100. Push the selection button on the WS-100 until the LED marker S2 is flashing. This will output signals from the WS-100.

23. Setup the trigger on the LogicStudio to trigger on the positive edge of the clock signal.

24. Change the sampling rate to 10 MHz as shown in Figure 7 then use the zoom control to expand the I2C signal until the decoded data is visible.

Figure 7: The I2C decode display with the data table pop up

25. Press the single trigger button, then the open data table button on the I2C signal label. The data table will be shown as a pop up (see Figure 7). The data table summarizes the data content seen on the I2C bus.

26. Delete the I2C bus signal and setup the LogicStudio to view D0 through D4 as done earlier and trigger on the positive going edge of D4.

27. Connect the rear panel USB port of a WaveAce or WaveJet oscilloscope to the computer's USB port. Connect a coaxial cable from the Trig Out connector on the LogicStudio module to the EXT input of the oscilloscope. Turn on the oscilloscope and use the utilities menu to set it for remote control via USBTMC (for WaveAce) or USB (for WaveJet).

28. Connect a passive probe between Channel 1 of the oscilloscope and the Probe Cal.

29. Use the Devices pull down menu to open the Device Finder (or click the Open Device Finder button).

30. Click on the center button at the top of the screen as shown in Figure 8.

Figure 8 - Device Finder Window for MSO

31. Select the LogicStudio 16 Device from the Digital Pod selection box and select the oscilloscope that you have connected to you PC in the Oscilloscope Selection box. Click on the next button.

32. You will then see the connection diagram for connecting your oscilloscope, LogicStudio and PC together. Click Next after you have made the necessary connections.
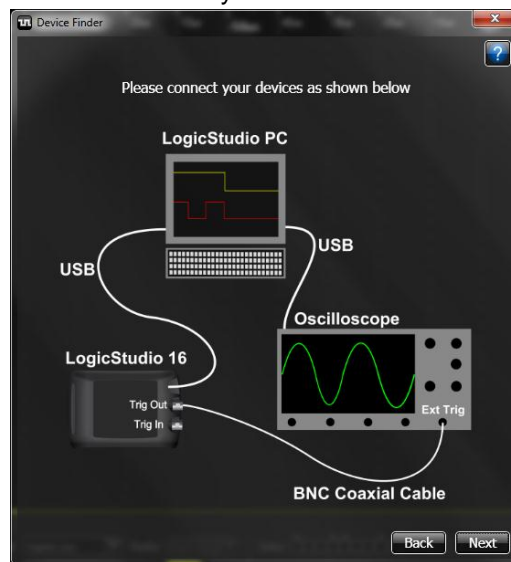

Figure 9 - Connection Diagram

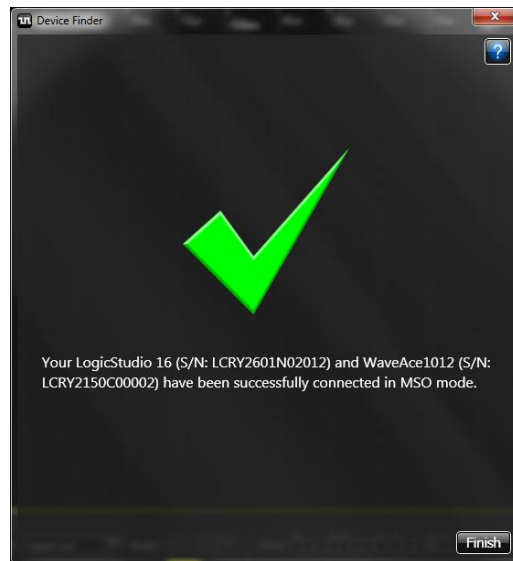33. Click on the Finish button on the Device Finder window.

Figure 10 - Successfully Connected MSO

34. Add another signal and select Type: Analog Channel, Name: Channel 1 and associate it with channel 1 of the oscilloscope. By clicking and dragging the Signal 1 box you can resize the analog data.

35. Make sure LogicStudio is in Normal trigger mode.

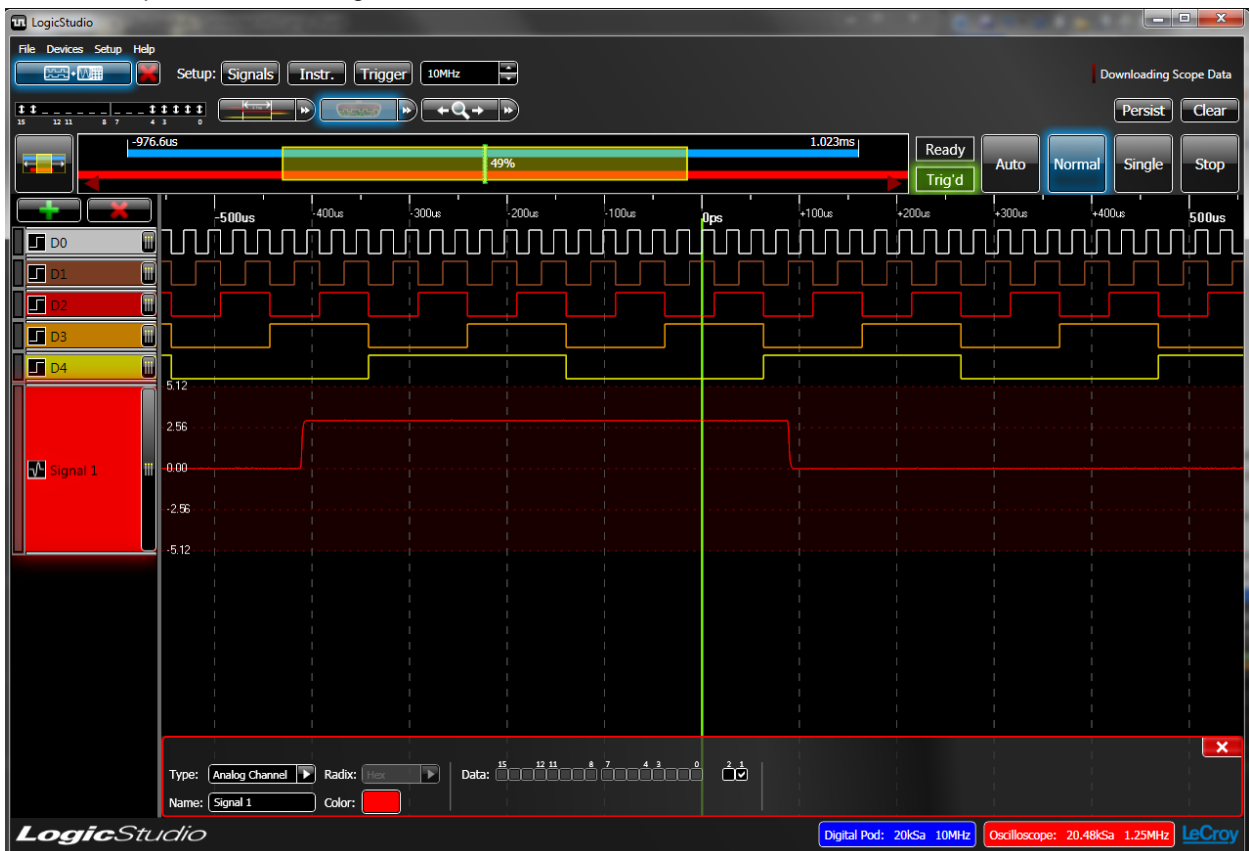36. You should now observe both the digital lines as well as the analog signal from channel 1 of the oscilloscope as shown in Figure 11.

Figure 11 - Analog and Digital Capture