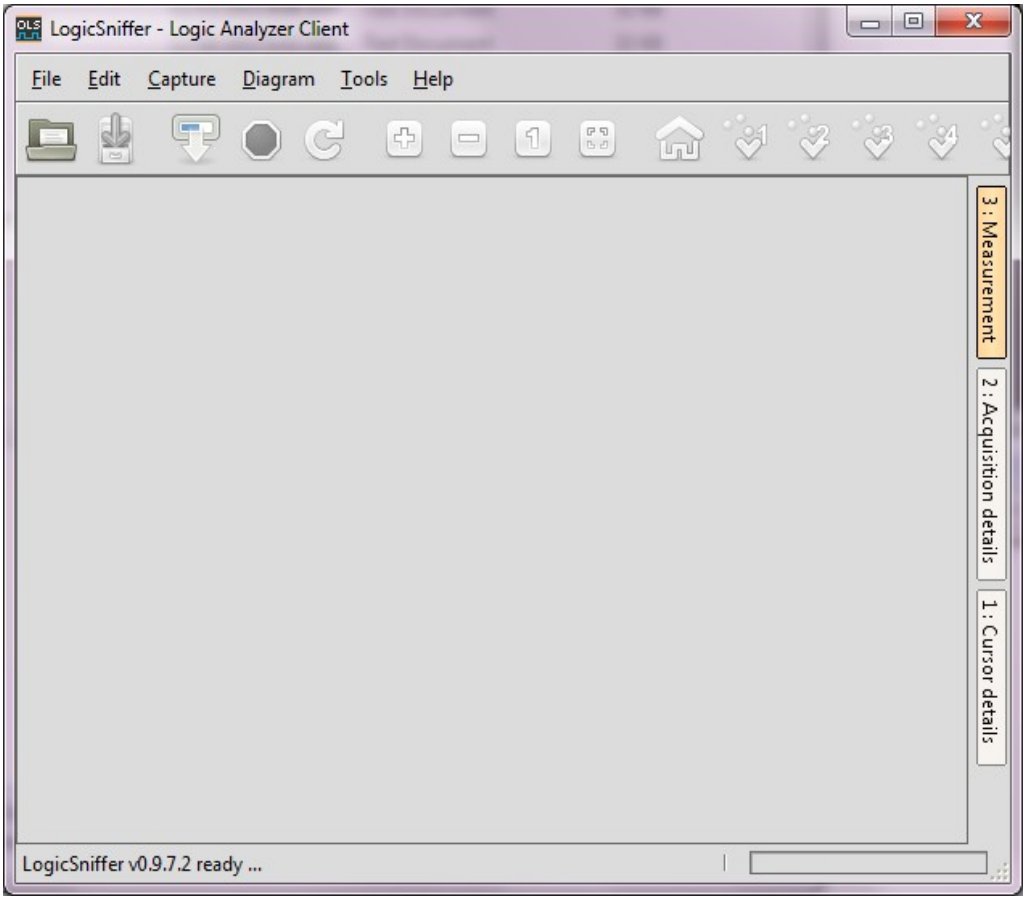
Teensy Logic Analyzer User's Guide
1/2/2016

OLS user interface (PC client)

The Teensy communicates with the PC via a SUMP application. The SUMP protocol is a standard for sending logic analyzer data. This document uses the OpenBench Logic Sniffer PC client for these examples. It runs under Windows/Linux/OSX and is available for download at www.lxtreme.nl/ols. See installation.md for instructions on installing all applications.

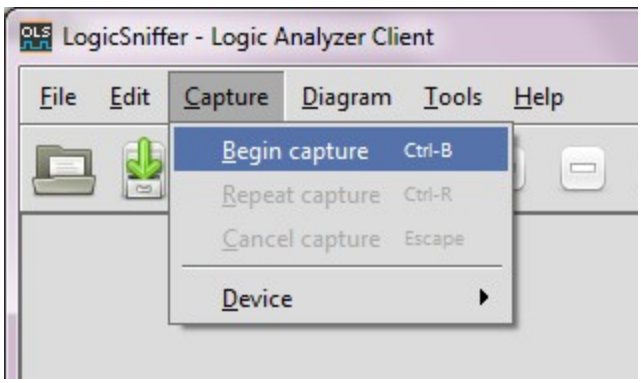
Setting up OLS

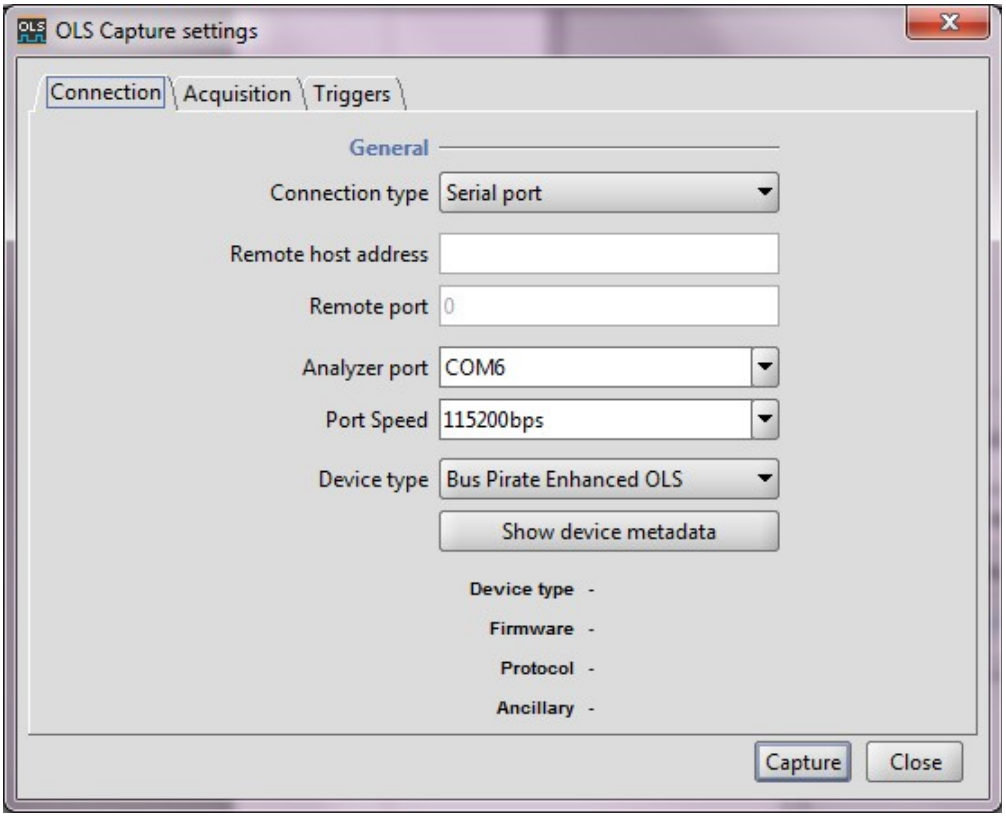
OLS will remember the settings between runs. But the first time you must set up a few items.



Initial Screen

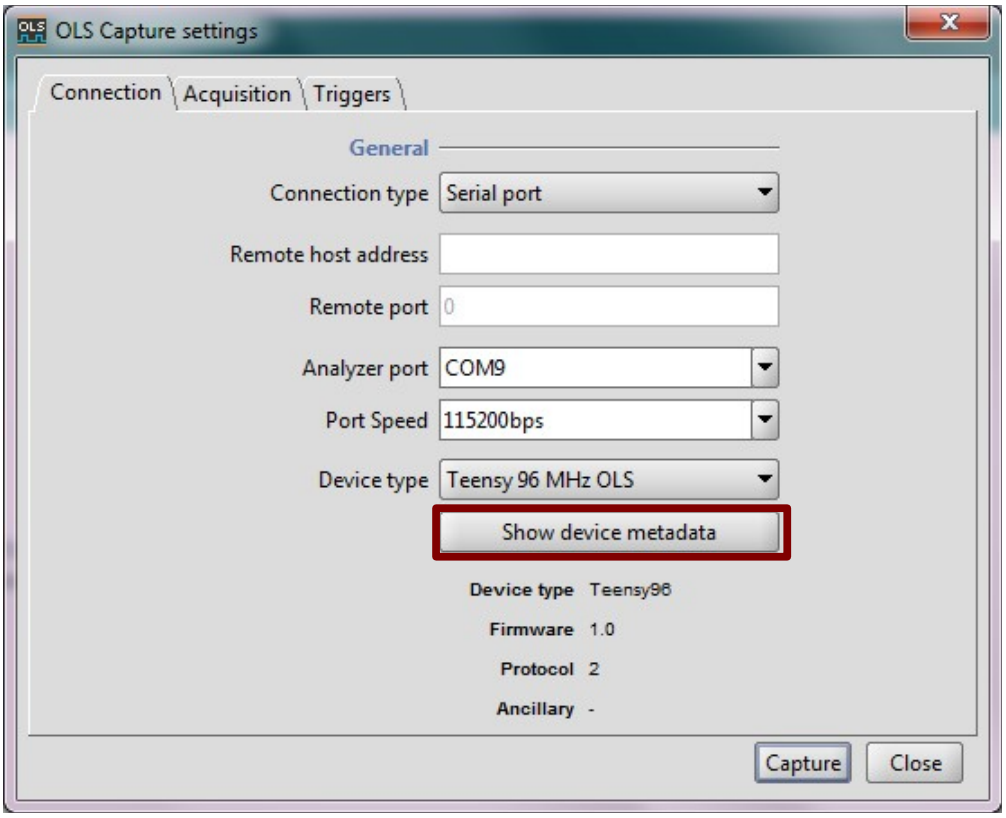
Select Capture → Begin capture:





Select Analyzer port if necessary.

First time - select 'Show device metadata' (this resets all parameters, so only use it if you are not sure of the device type, and check Acquisition and Triggers tabs after selecting).

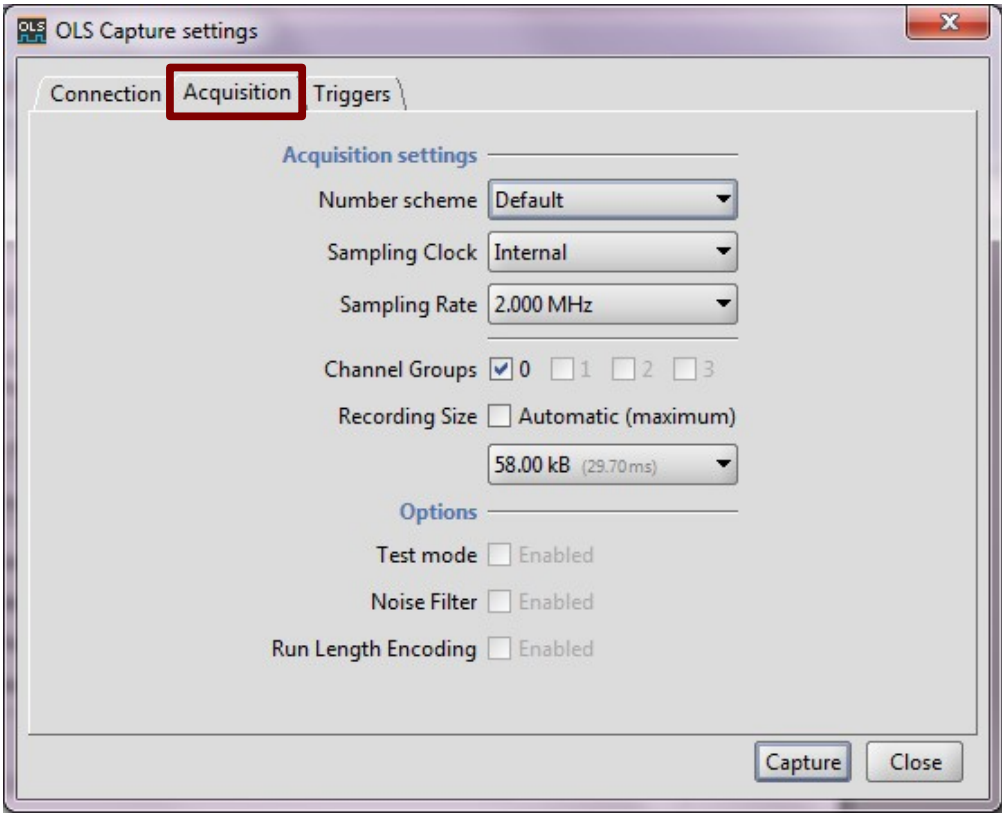


Device type lists various configurations that the Teensy can be built for. Default for Teensy 3.1/3.2 is Teensy96, and default for Teensy LC is Teensy48.

Firmware is the version of the Teensy software.

Protocol is the SUMP protocol and is always 2.

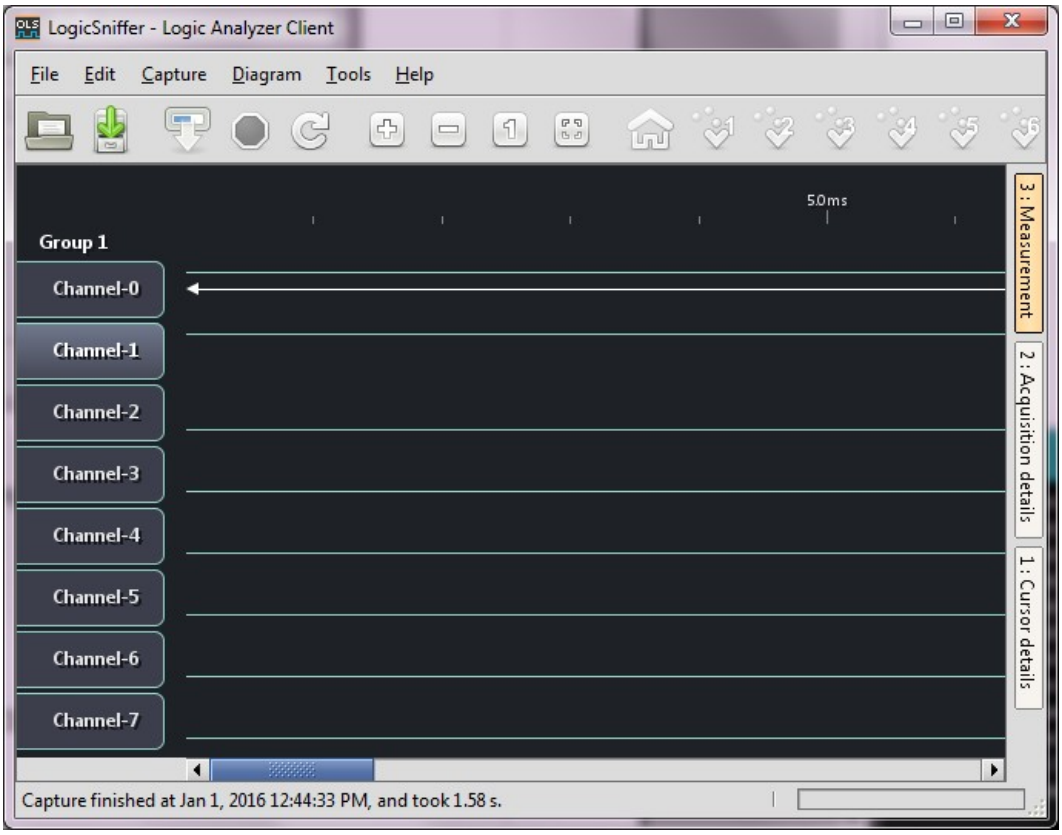
Select the Acquisition tab.



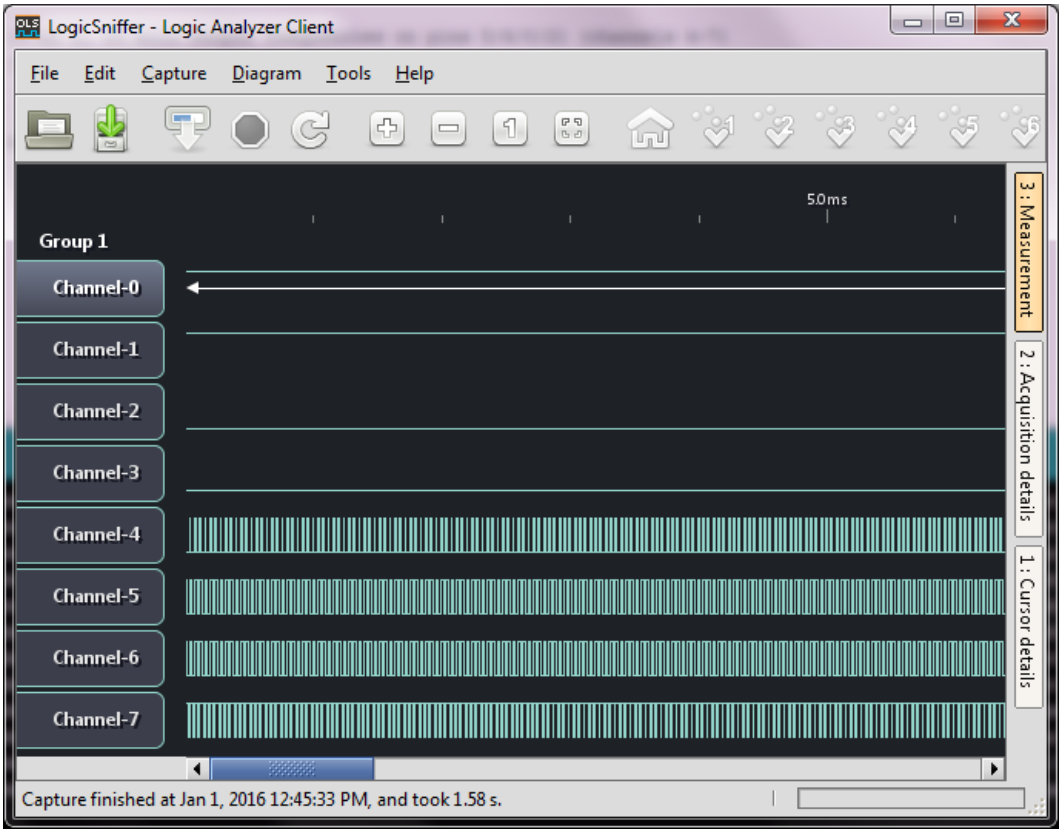
For the basic Teensy 3.1 configuration, the defaults are Sampling Rate of 2 MHz and Recording Size of 58k samples.

Select Capture to start recording.

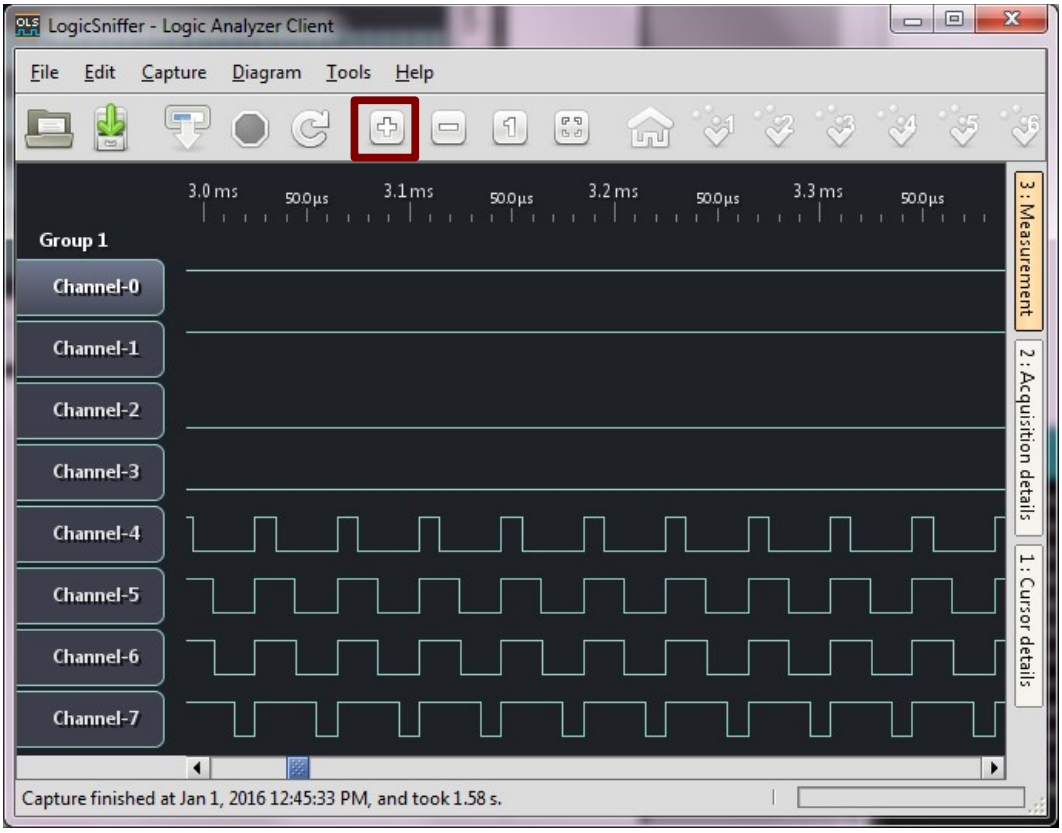
No inputs:



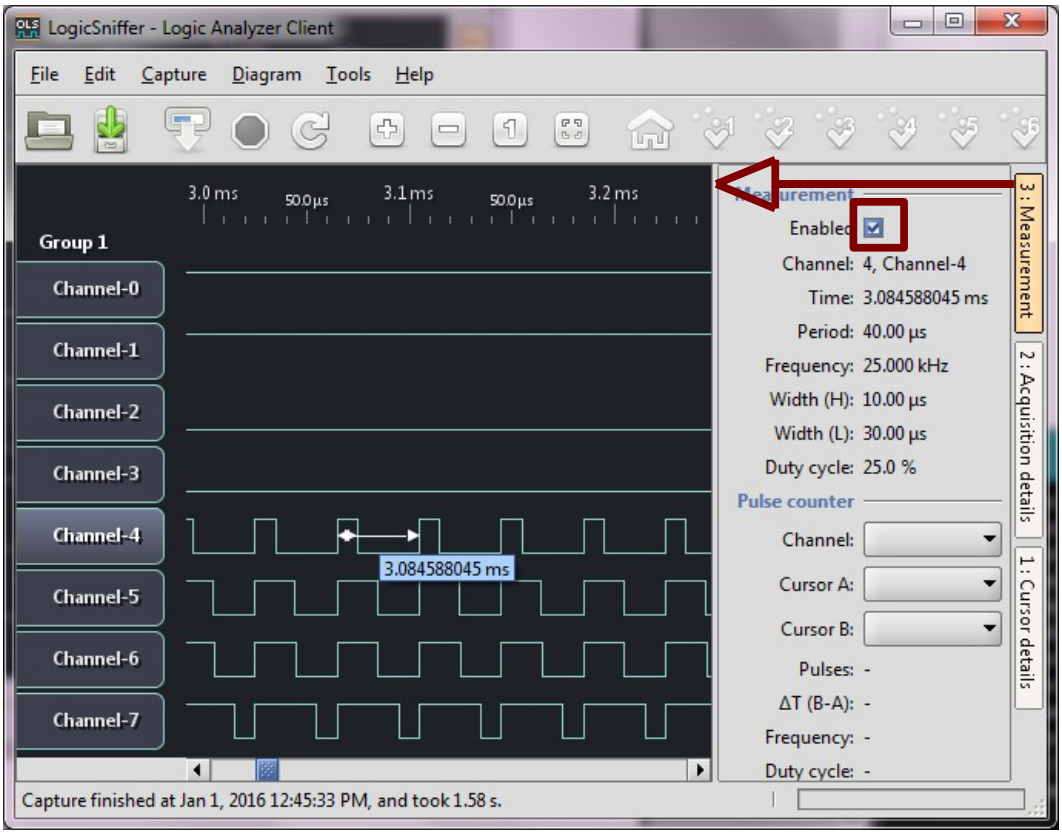
If you compile with #define CREATE_TEST_FREQUENCIES 1, you will see capture data like this:



Zoomed in:

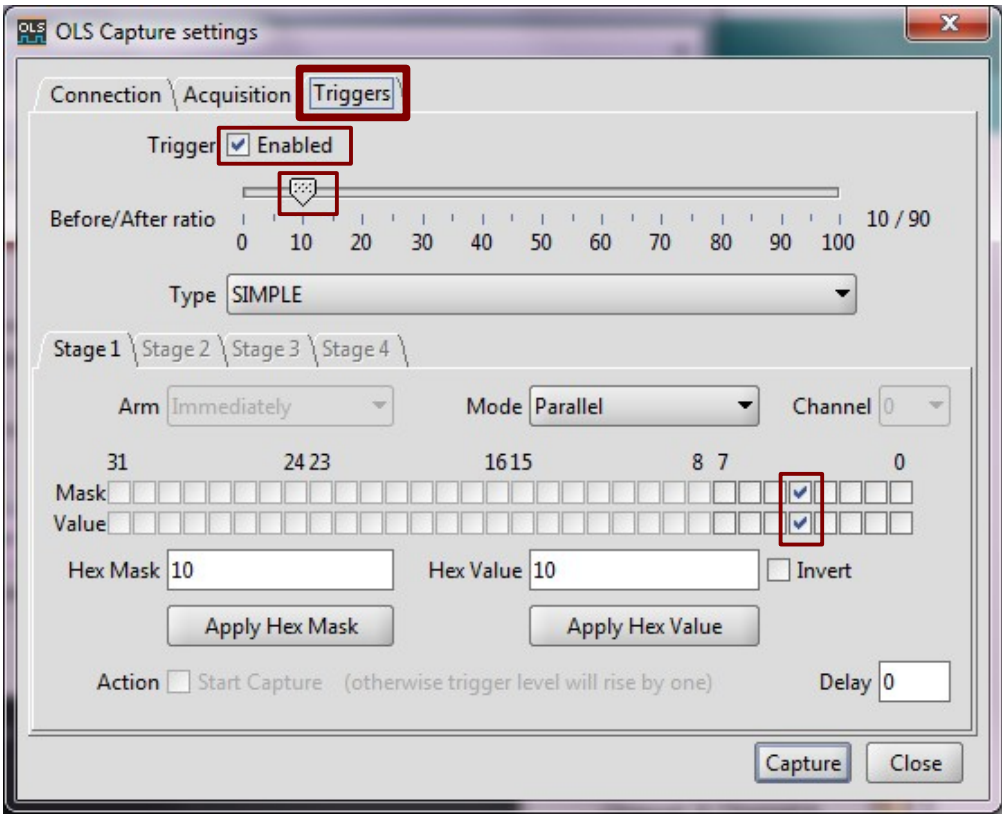


Time measurement – drag right border to the left:

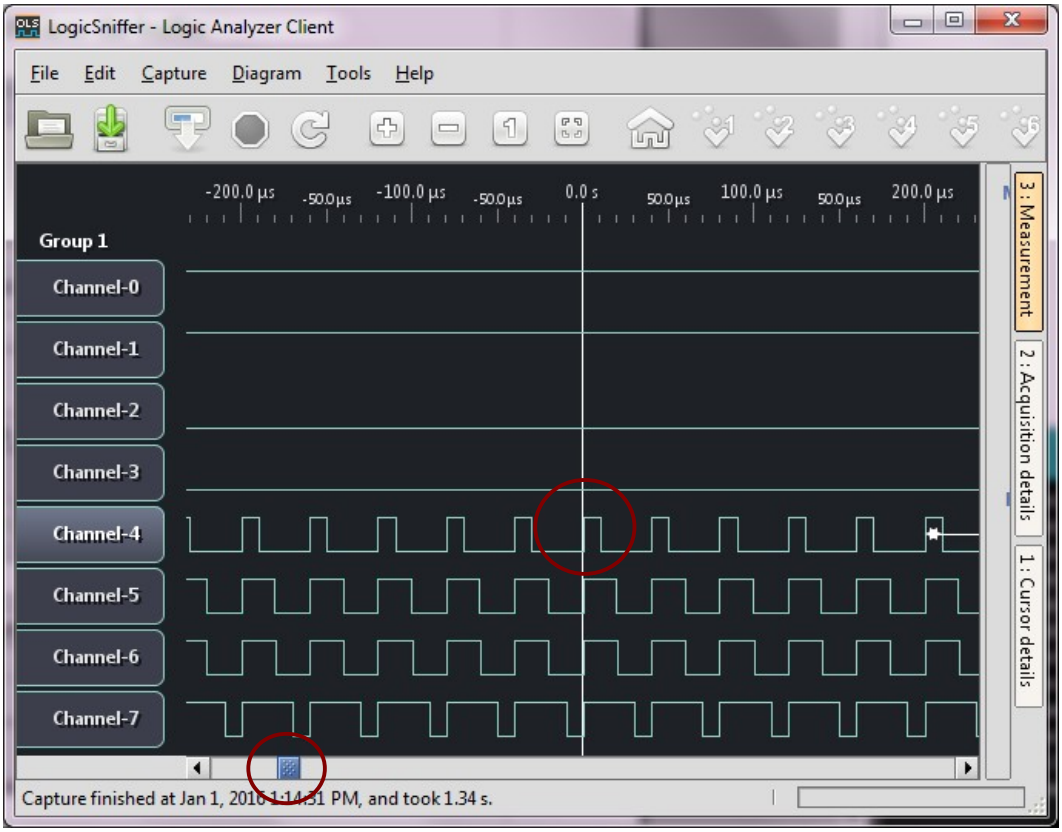


Trigger setup:

This example sets up a trigger on channel 4 being high at 10% into the buffer.



Capture looks like this:



While the logic analyzer is waiting for a trigger, the red Stop button is enabled. To halt the analyzer when no trigger is received, press the button. No data will be sent back from the Teensy.

LED

The LED on the Teensy works as follows:

Blinking every 2 seconds – idle (not recording)
On – recording, waiting for a trigger
Quick flashes – receiving commands from the PC client.

Advanced Configurations

Once you are comfortable with the basic configuration, you can try the advanced configuration to get higher speeds and/or more samples. To use it, compile with

#define ADVANCED_CONFIGURATION 1

and select Device type as Teensy 96 MHz OLS Advanced pr Teensy LC 48 MHz OLS Advanced.

There is also a 120 MHz Advanced configuration file. It is the same as below, but 25% faster.

However, all combinations of speed and samples are not valid in Advanced configuration. See tables below. When a combination cannot be met, the display will have alternating 1's and 0's in the invalid sections (an entire channel, or a portion of time, or both).

Teensy 3.1/3.2	2 MHz and below	12 MHz	19.2 MHz
58k samples and below	8 channels	8 channels (Note 1)	8 channels (Notes 1, 3)
116k samples	4 channels	Note 2	Note 2
232k samples	2 channels	Note 2	Note 2
464k samples	1 channel	Note 2	Note 2

Note 1: Timing data is valid up to about 28k samples, then is 10% too fast (upper SRAM?)
Note 2: Limited to 58k samples. No advantage over 58k setting.
Note 3: Trigger Before/After Ratio is not used. Trigger, if selected, is always at the beginning.

Teensy LC	1 MHz and below	8 MHz
4k samples and below	8 channels	8 channels (Note 1)
8k samples	4 channels	Note 2
16k samples	2 channels	Note 2
32k samples	1 channel	Note 2

Note 1: Trigger Before/After Ratio is not used. Trigger, if selected, is always at the beginning.
Note 2: Limited to 4k samples. No advantage over 4k setting.