

Guide to Silicon Lab Hardware Connection

1) Introduction

TL;DR:

- 1) Follow the photos
- 2) Recall saved setup 3 on scope
- 3) Follow TL;DR on Guide to running Silicon Lab Software

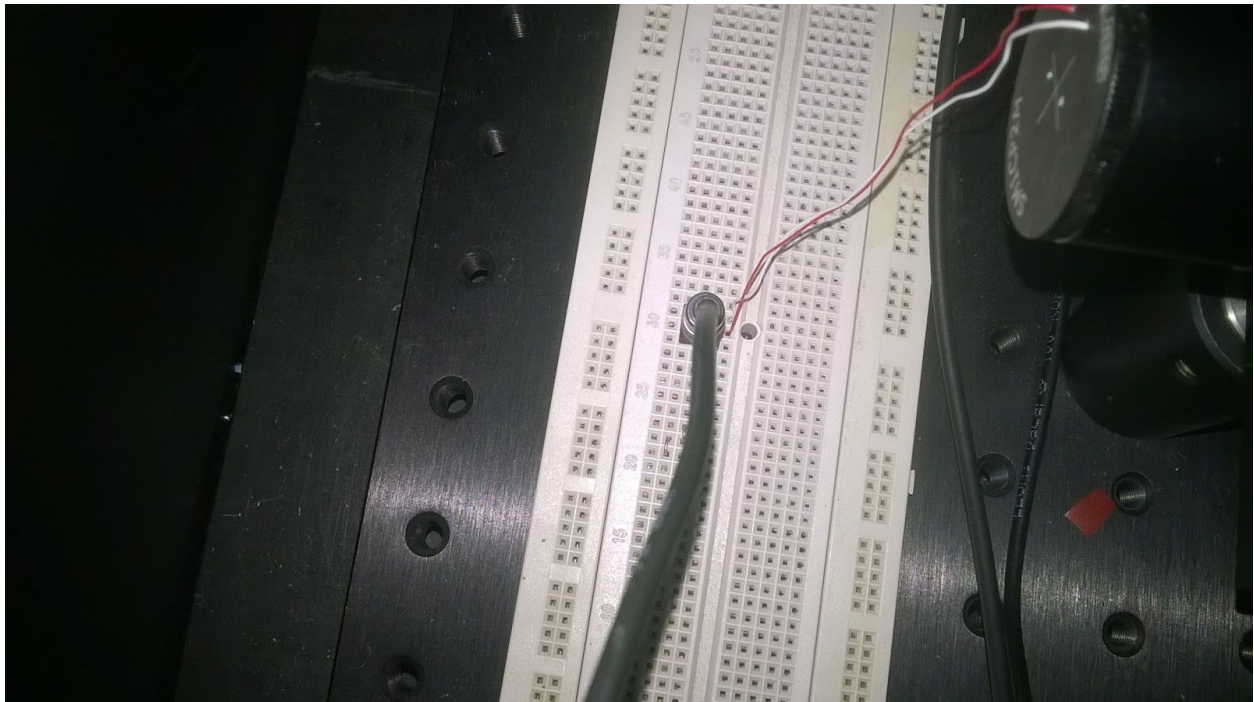
Here is the guide on how to connect different components together of the SiPM lab. One first connects the calibrated diode to the picoam readout, which is very simple. Then one connects the SiPM to scope readout, which requires the PACTA board and 2 power supplies: 1 to power the PACTA and 1 to bias the SiPM. After that one connects the laser and its external trigger to the scope. Then one recall a saved setup 3 that I've saved in the scope to tune into the signal range of the SiPM.

2) Connection instruction

a) PIN diode

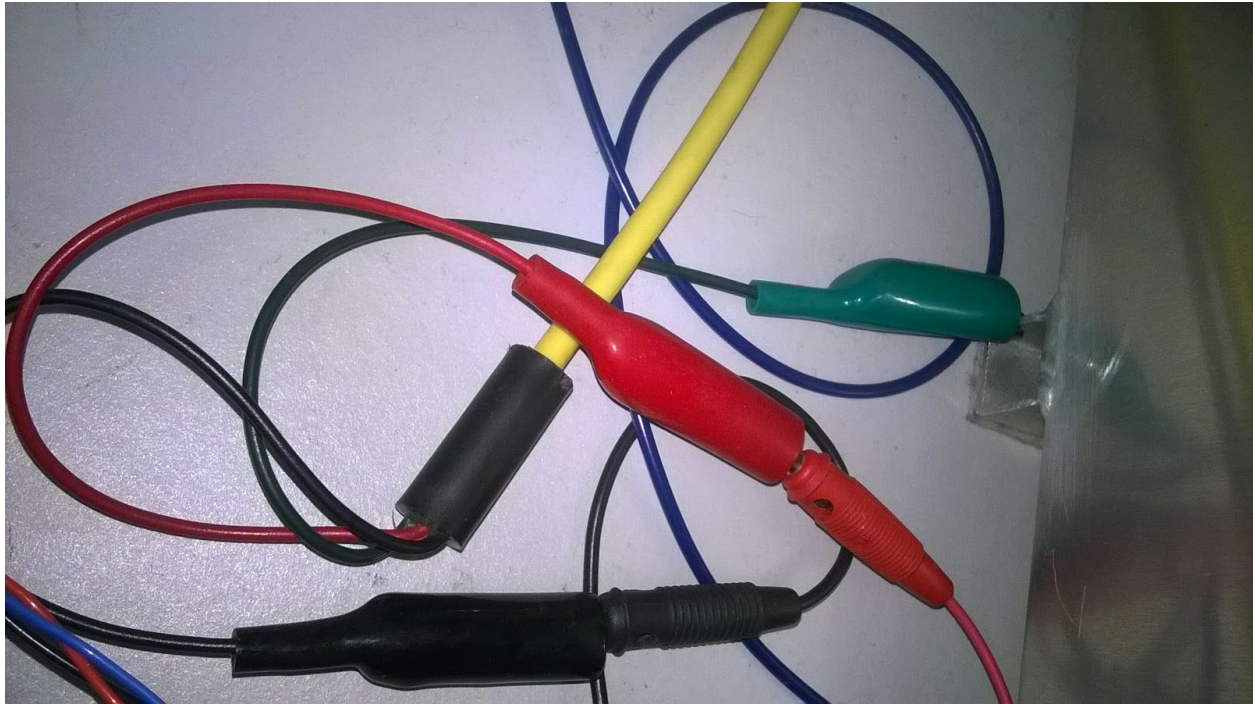
Step 1: Connecting the PIN diode to lemo

Anode (Red) to the center pin and cathode (black) to the ground.



Step 2: Connecting the lemo to triax BNC

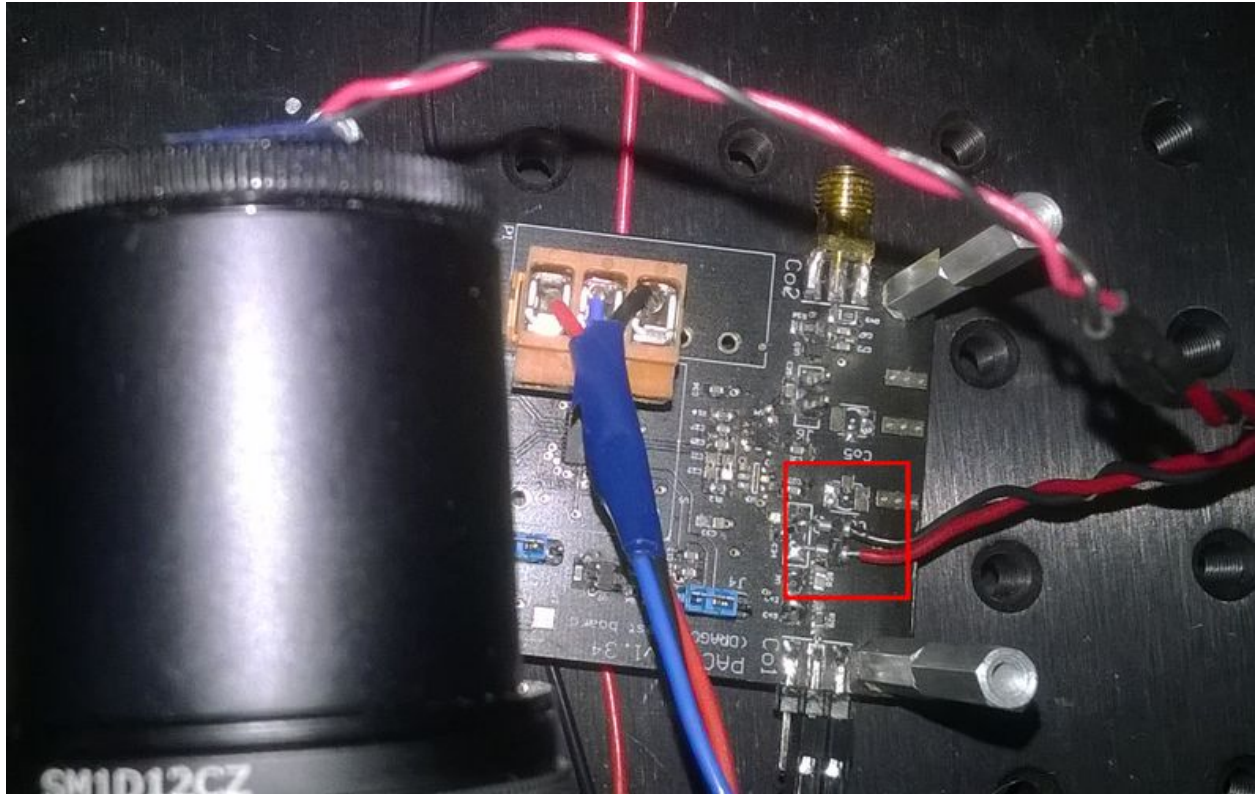
Basically the same colors with the crocodile clips. The green one clips to the dark box for ground.



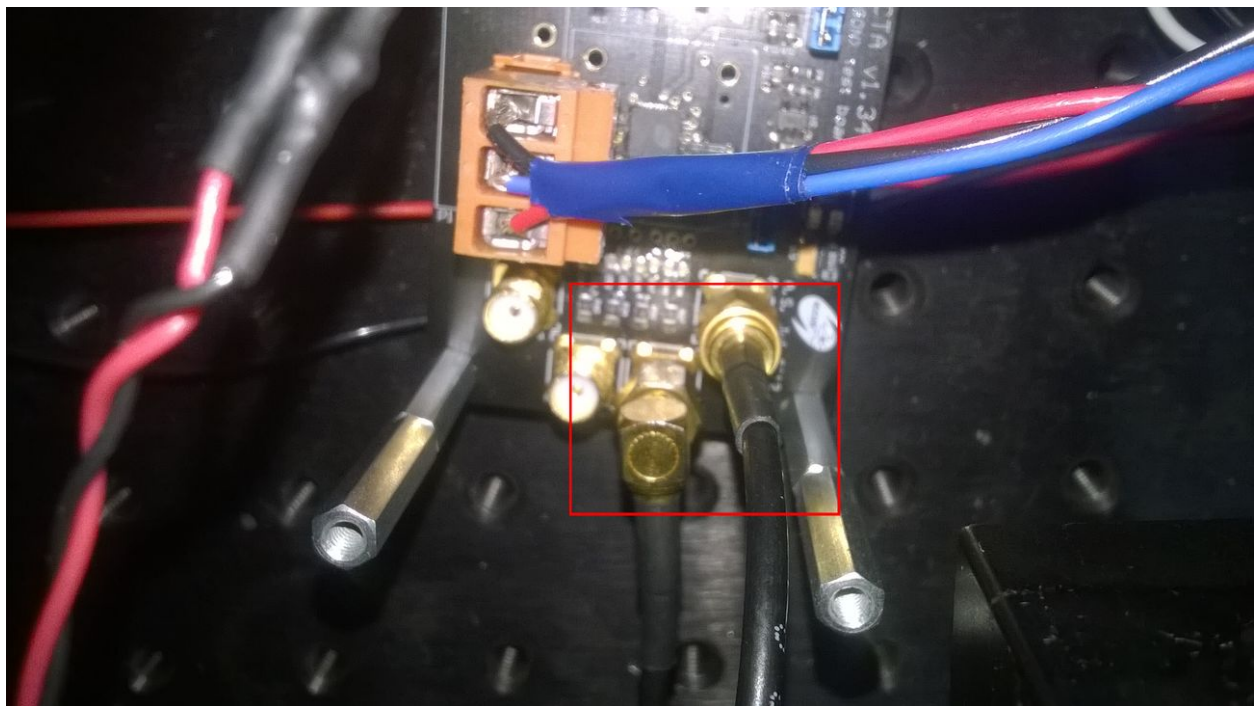
b) SiPM connection

Step 1: Connecting the SiPM to PACTA

Anode (red) on the left and cathode (black) on the right.



Then connect PACT SAM connectors to the scope channels.



Step 2: Connections for PACTA power source

First make sure that the power supply are indeed 6V in both sources. The knobs are really sensitive and somebody might accidentally touch it, which might increase the voltage, which can destroy the PACTA board. It's useful to use a multimeter to check the voltage and its polarity.

Then plug in as photos below. The PACTA requires +6V and -6V. Red to +6V, Blue to -6V and Black to ground. Connect the power wires inside and outside the dark box:

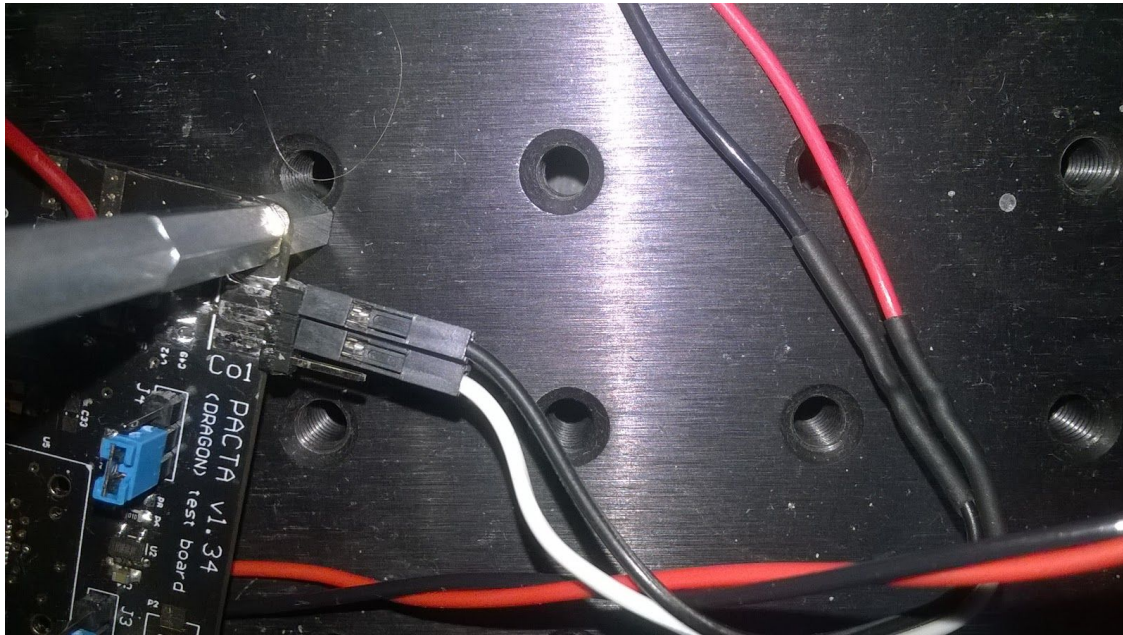


Step 3: Connections for SiPM power source

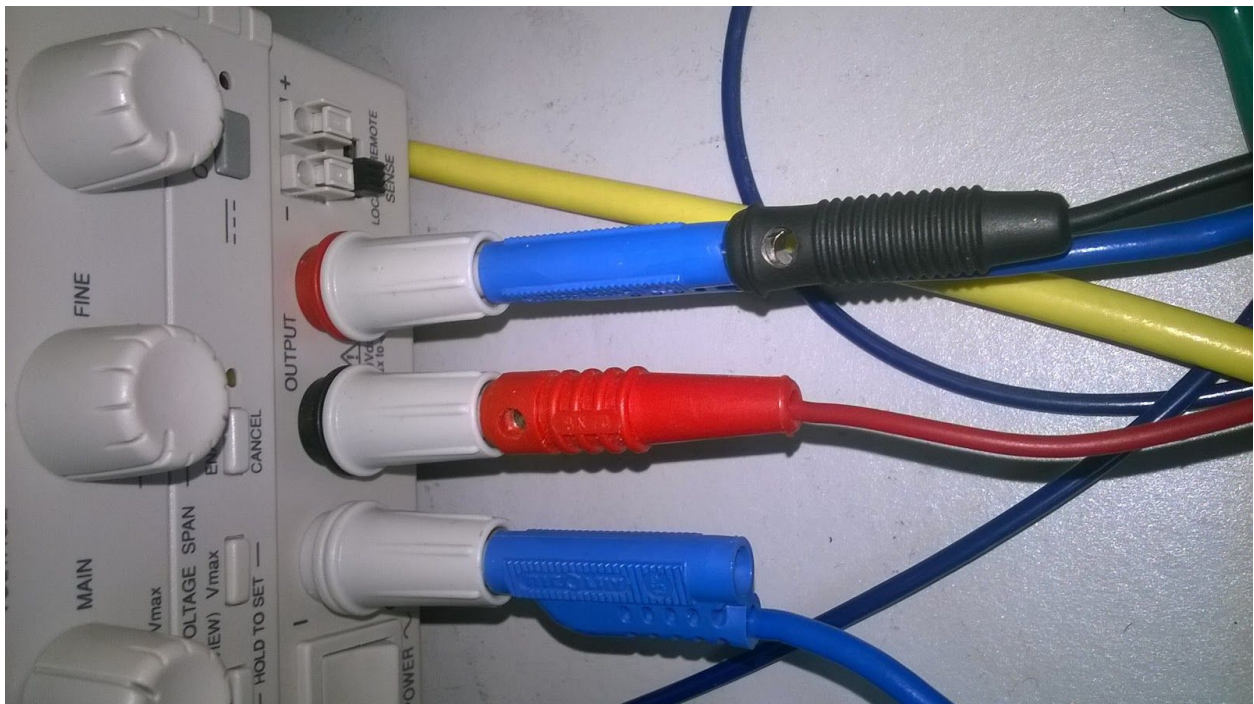
First power on the power supply but do not plug in the banana cables yet (power supply gives a spikes when first turn on). Then turn the voltage knobs to zero. Then plug in as the photo below.

The SiPM requires negative bias, which explains the opposite colors between the power supply and the banana connectors.

Inside the darkbox:



Outside the darkbox:



After connecting, press the OUTPUT button on the power supply (underneath the right knob)

c) Laser connection

Step 1: Optical fiber connection

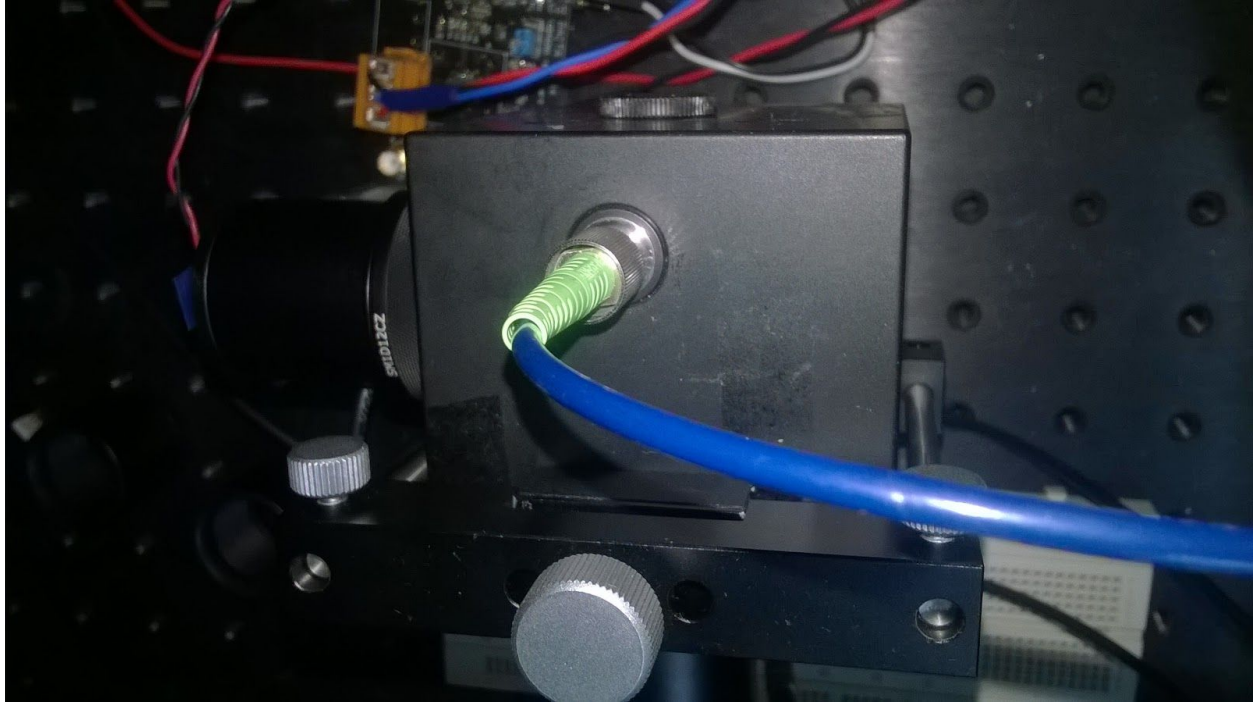
First make sure the laser is OFF, unless you want a free lazik surgery. The key should be in neutral position. The SOURCE toggle should be in OFF position. The light should be green.



Then connect as in the photos below. Outside the dark box:



Inside the dark box:



Step 2: External trigger to the scope

1 end of the BNC at SYNC OUT



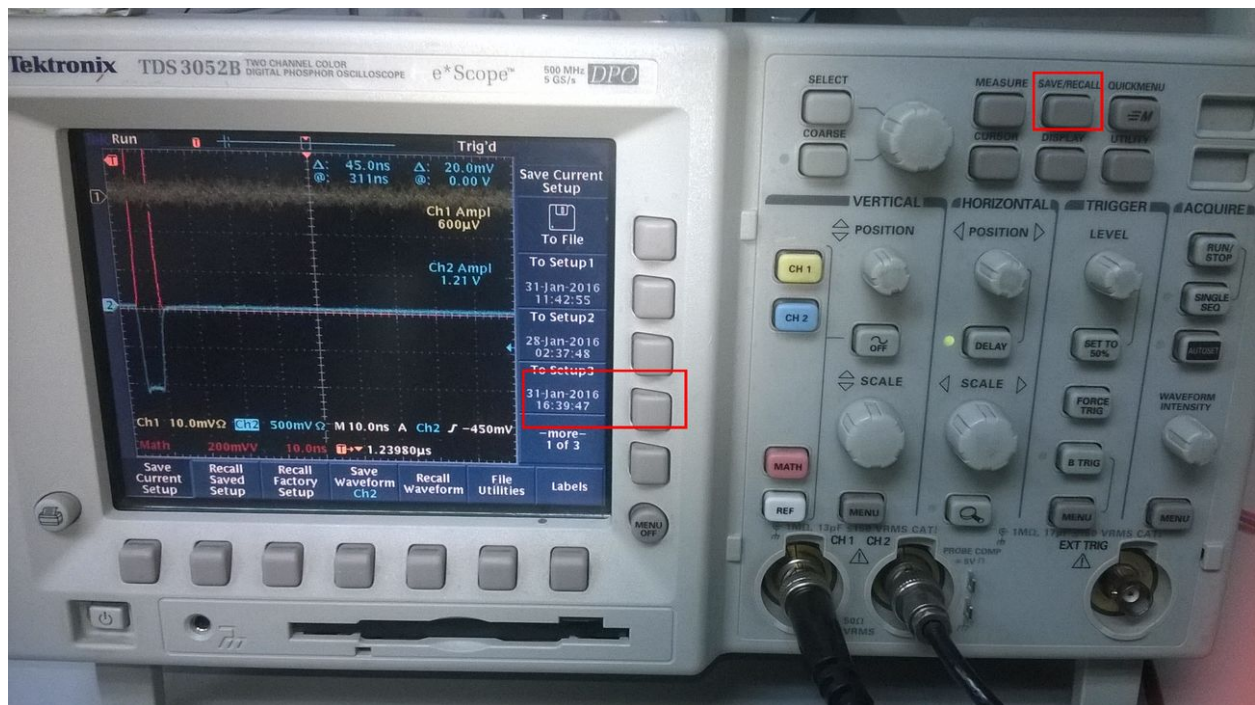
The other at either CH2 or EXT on the scope



3) Recall scope saved setup

The time division of the scope should be 10~20ns, and the voltage should be in the range of 10mV. Next, depending on the trigger line, one should set the scope to trigger on either CH1, CH2 or EXT.

For lazy purposes, I connected the external trigger from the laser to channel 2, and saved the working setup to SAVED 3 on the scope.



You can see how the SiPM is detecting 1 photon 30ns after the trigger:

