ETH zürich ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Wearable Ultra-Low-Power Ultrasound Probe

Graphical User Interface Overview

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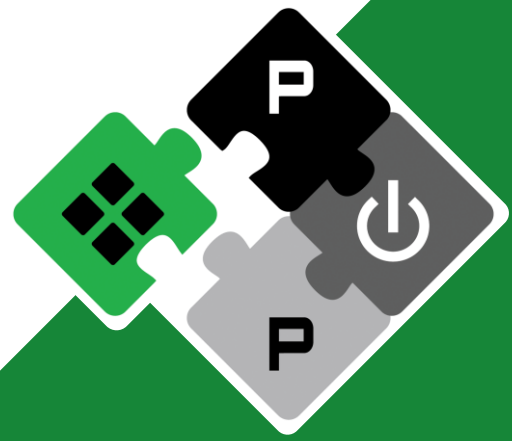


@pulp_platform

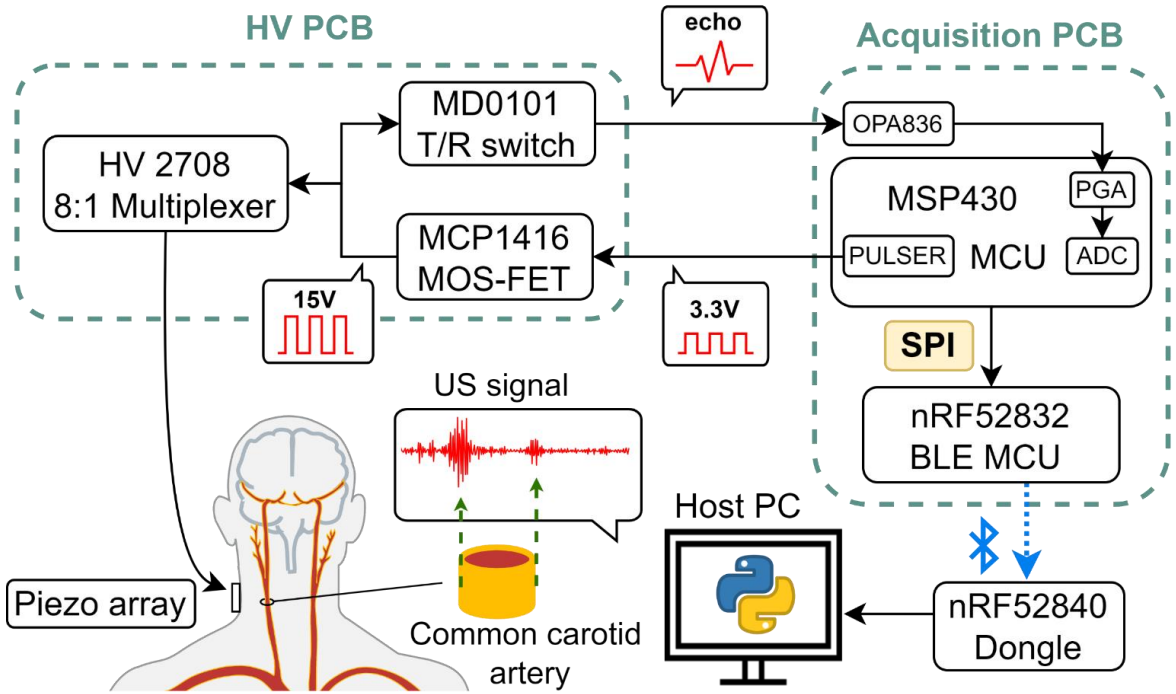
pulp-platform.org

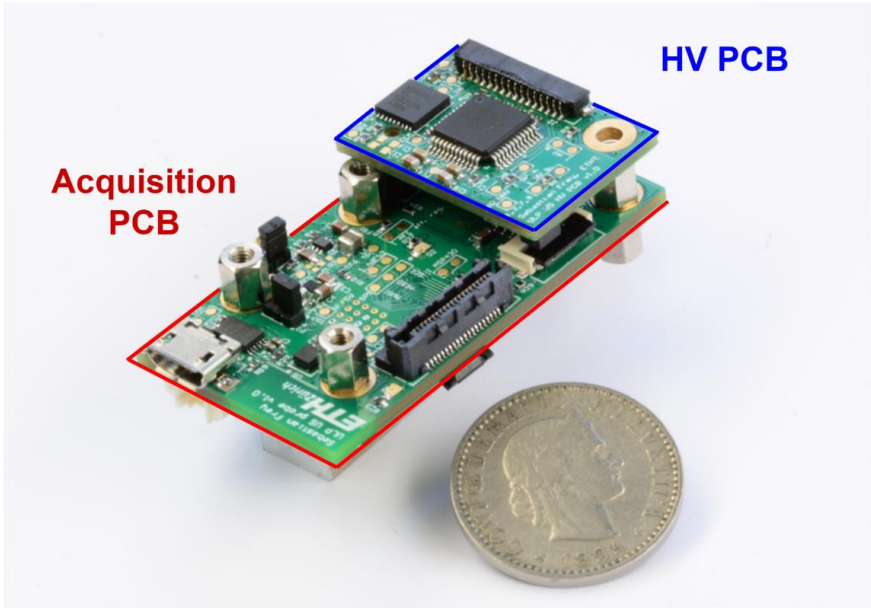
youtube.com/pulp_platform

PULP Platform

Open Source Hardware, the way it should be!

WULPUS Probe



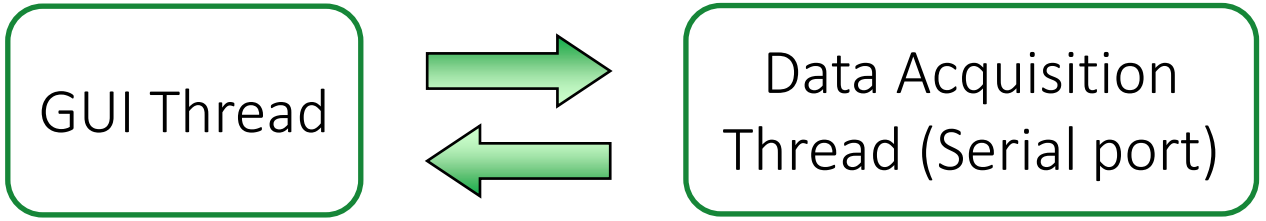


46 x 25 mm footprint

WULPUS GUI: Technology Overview

Key technologies used:

- **Python** 3.9
- Interactive **Jupyter Notebook**
- **Matplotlib** visualization library
- **Ipympl** backend for interactive Matplotlib features and widgets
- **Pyserial** for serial communication
- **Scipy** for data processing
- Multithreading



WULPUS GUI: Requirements Installation

1. Install Anaconda package manager
   https://docs.conda.io/en/latest/miniconda.html
2. Download WULPUS repository
3. Find ***requirements.yaml*** file in ***sw*** folder.
4. Open terminal (Windows: Anaconda Prompt) in ***sw*** folder.
5. Execute the following command to create environment:
   conda env create -f requirements.yml
6. In a new terminal launch ***conda activate wulpus_env***
   and then run *jupyter notebook* or launch it from Start Menu on Windows:
   Start -> Anaconda3 -> Jupyter Notebook (wupus_env)
7. The command above opens a webpage. Navigate to ***sw*** folder and click on ***wulpus_gui.ipynb.*** Follow the instructions in the Notebook.

GUI Tour: Default Screen

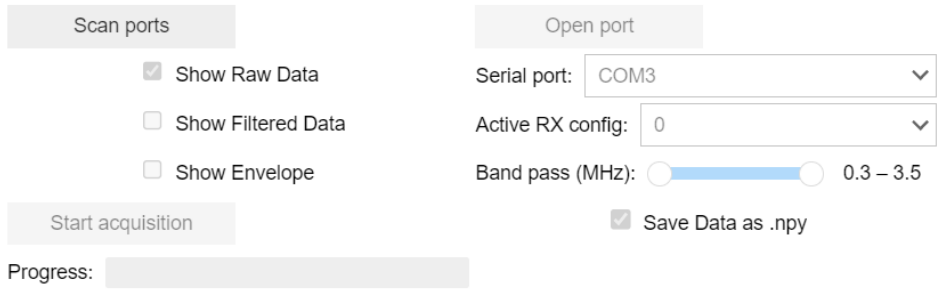
COM port settings

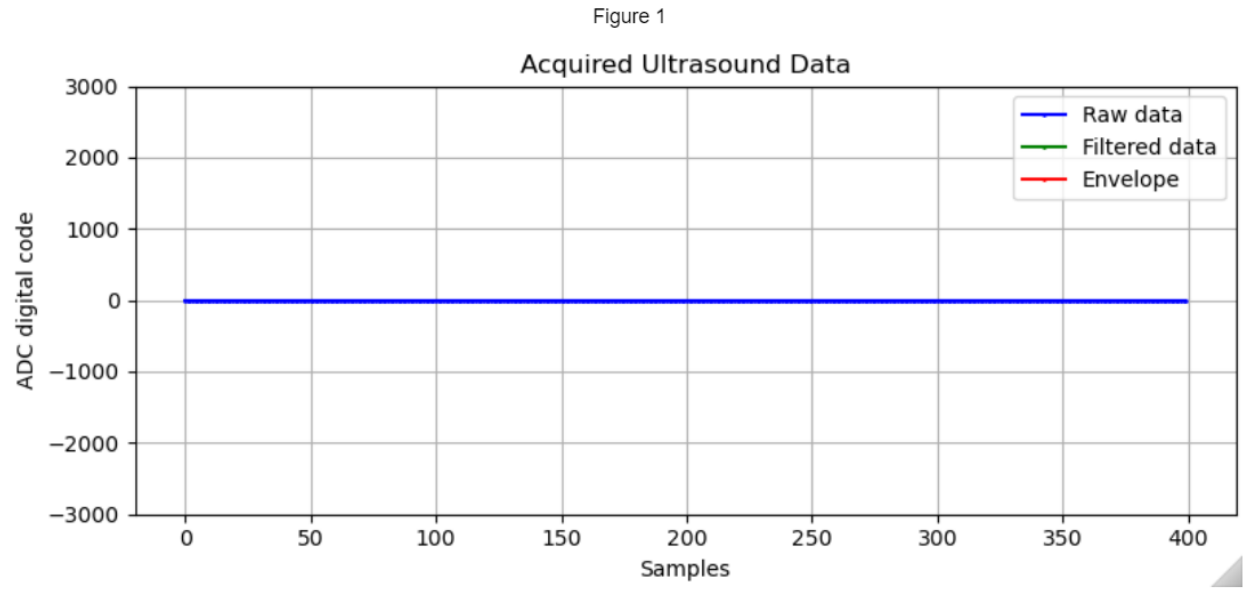
Visualization Options 1

Visualization Options 2

Progress bar and start button

Figure to visualize raw data



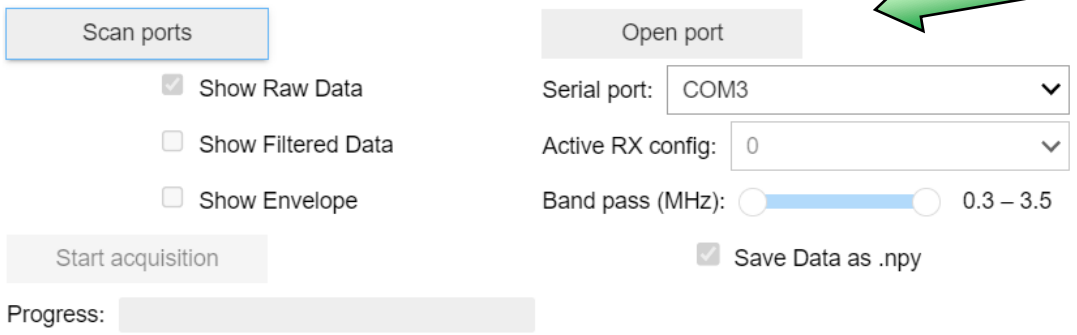


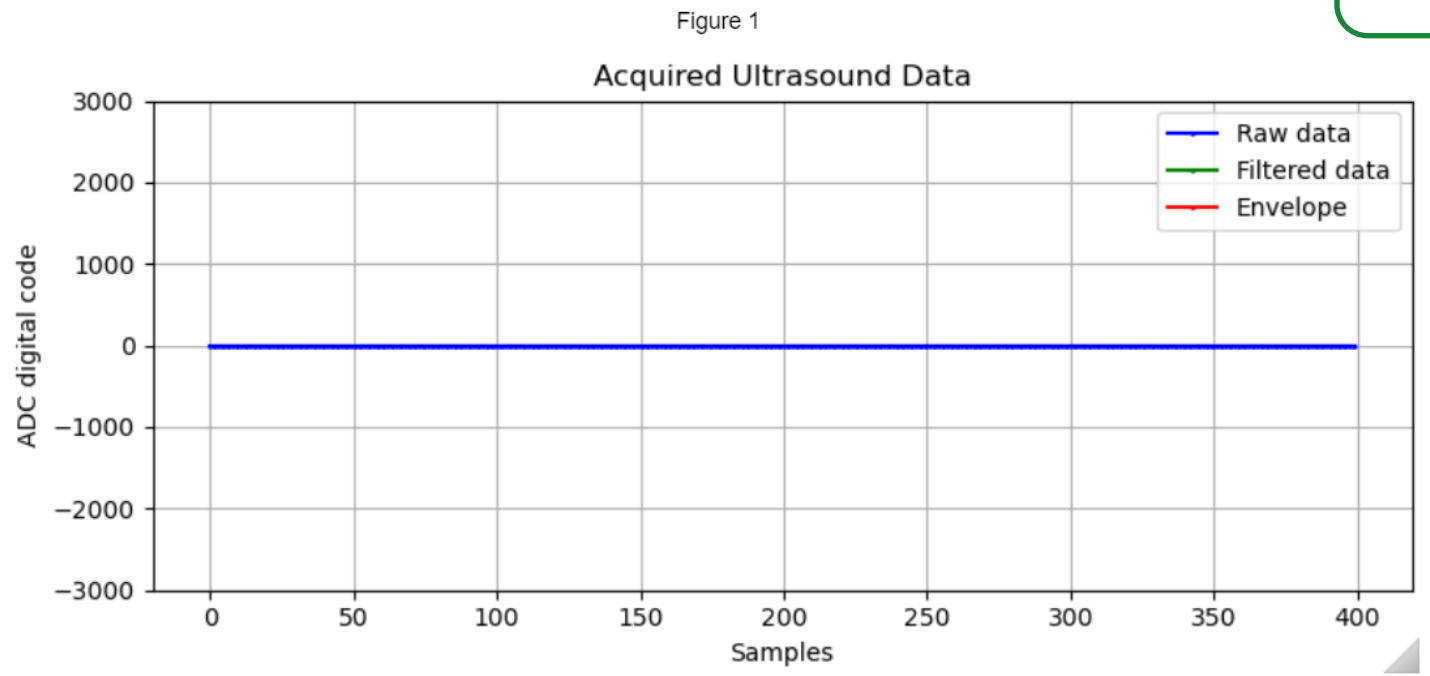
GUI Tour: COM Port Selection

(III) Open port

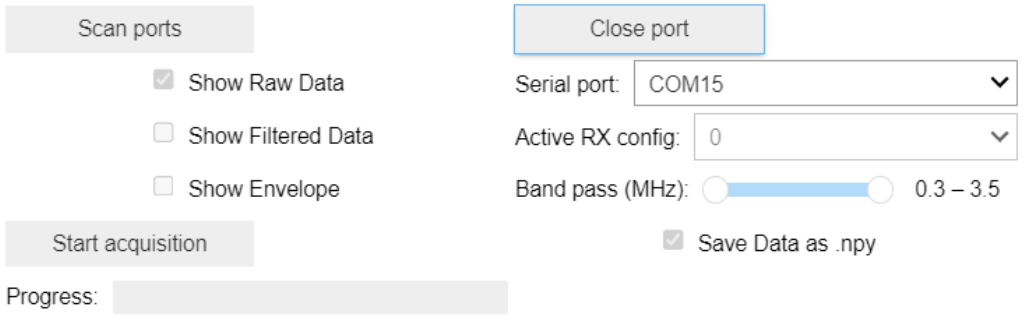
(II) Select port from drop down menu

(I) Press "Scan ports" (dongle disconnected). Check the dropdown menu. Scan again after connecting the dongle.

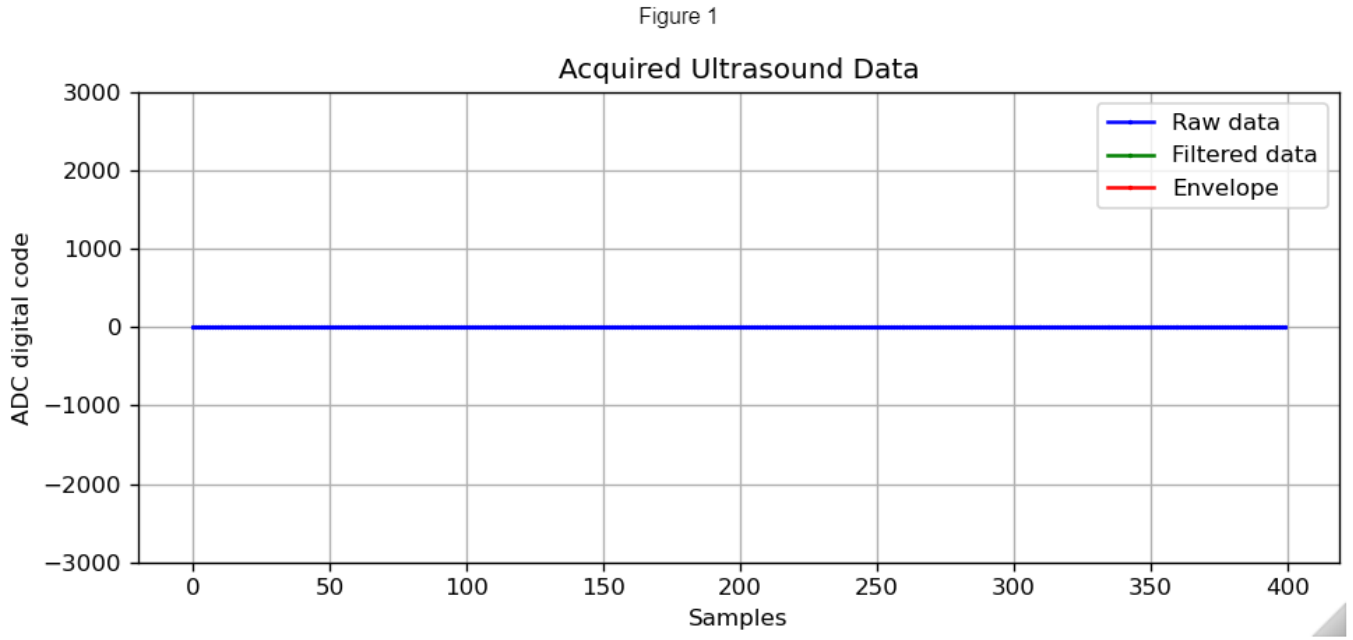




GUI Tour: Start Acquisition



"Start Acquisition" button is ready. Press it.

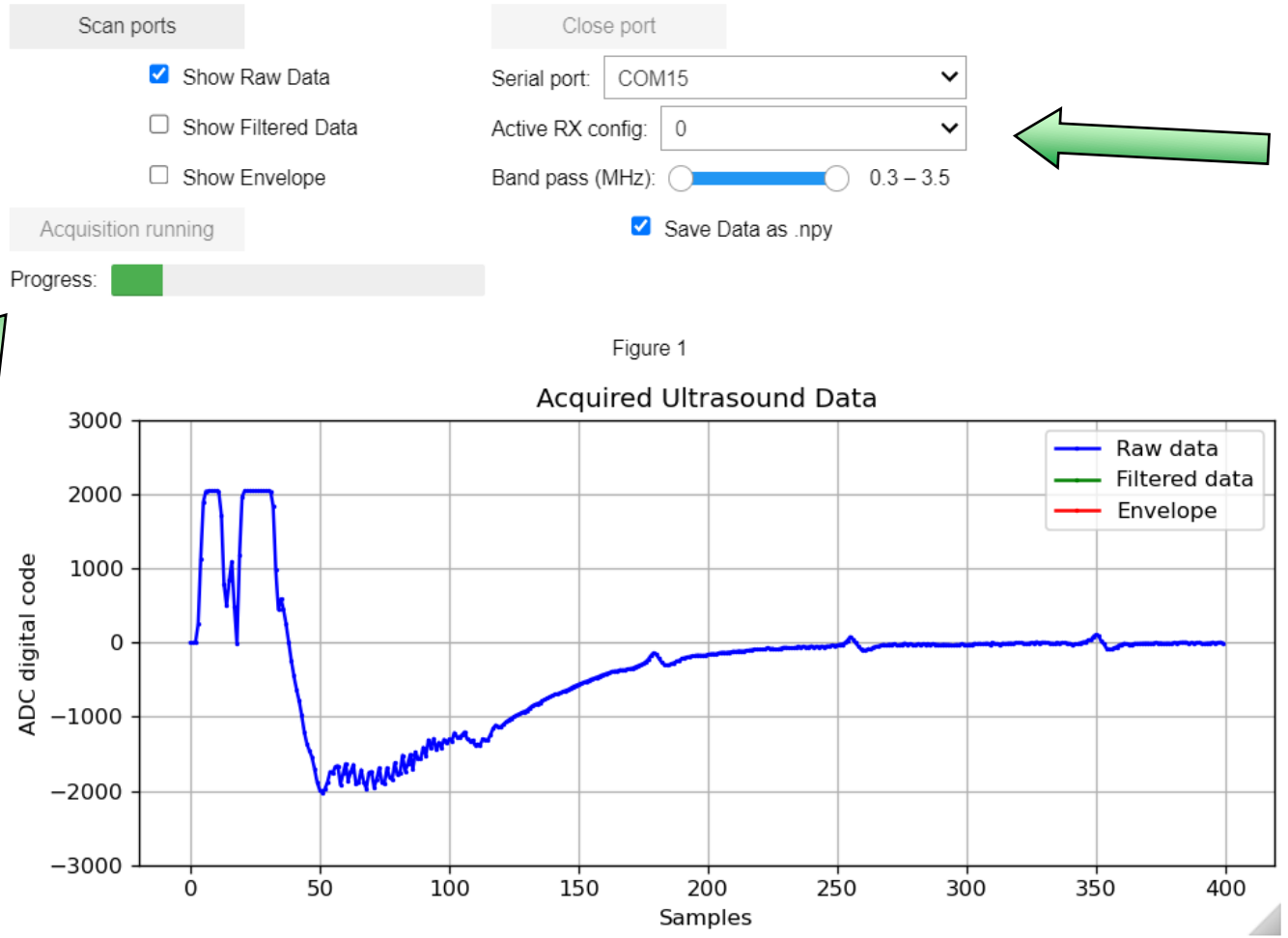


GUI Tour: During Acquisition

User waits for acquisition to be completed

Progress bar is active

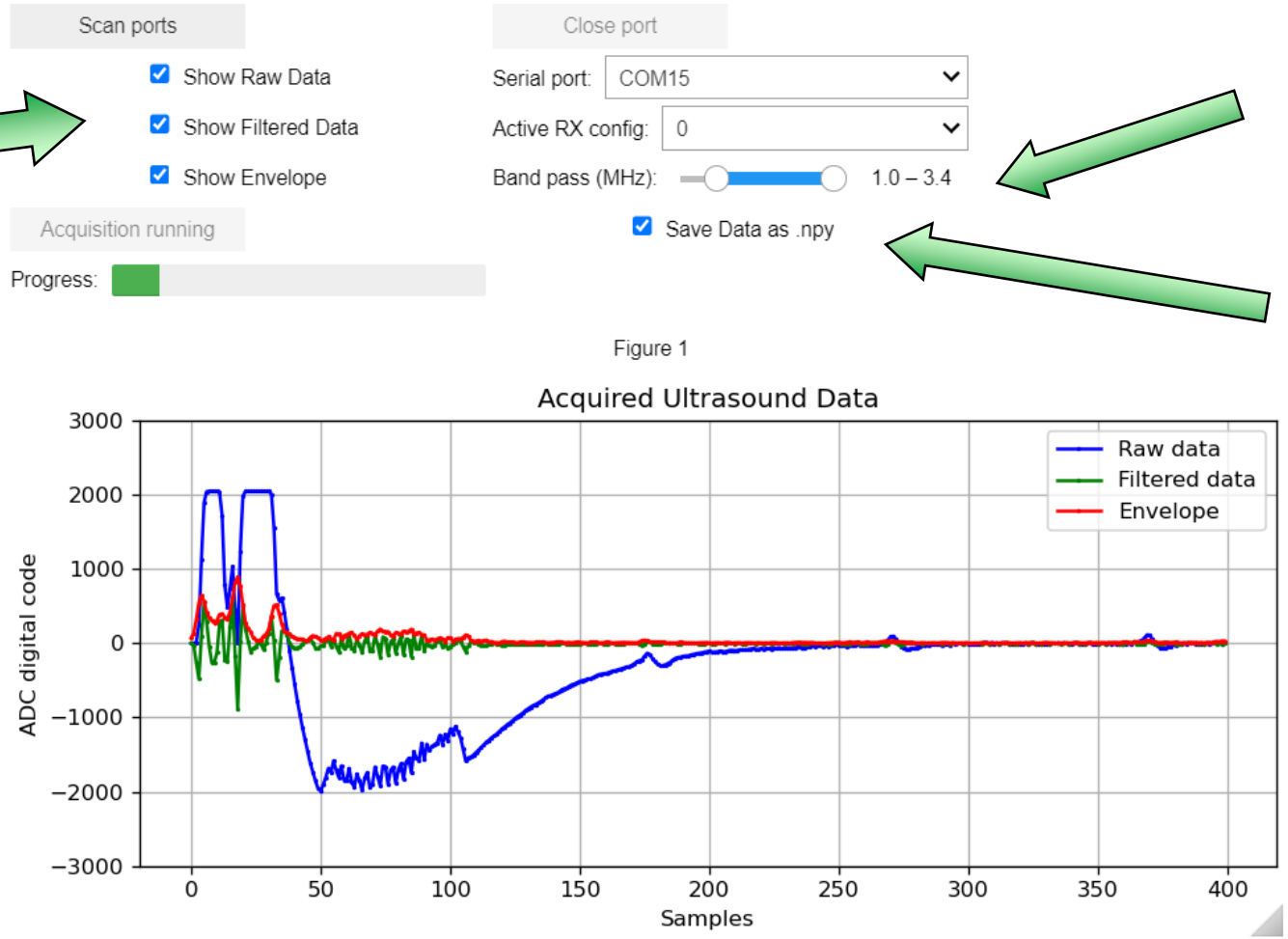
GUI plots raw data In real-time



User can select an active RX config to visualize

GUI Tour: During Acquisition

User can select what to visualize (raw data, filtered or envelope)



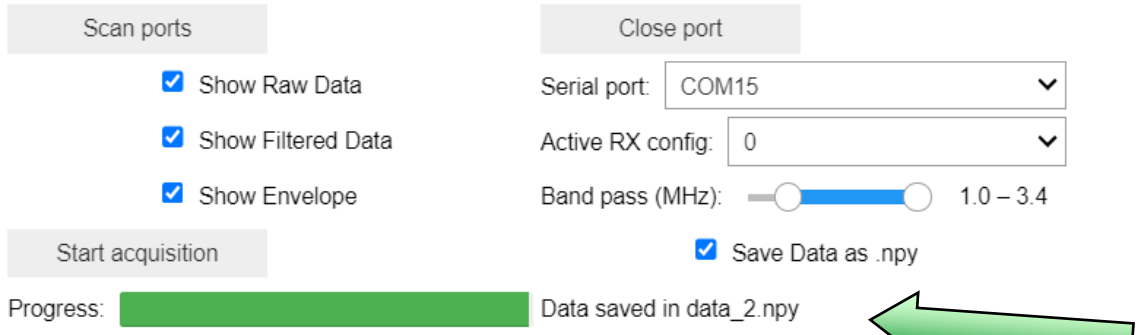
User can tune band pass filter

User can indicate to save the data in a file in the end of acquisition

GUI plots raw data, filtered data and envelop

GUI Tour: Acquisition Completed

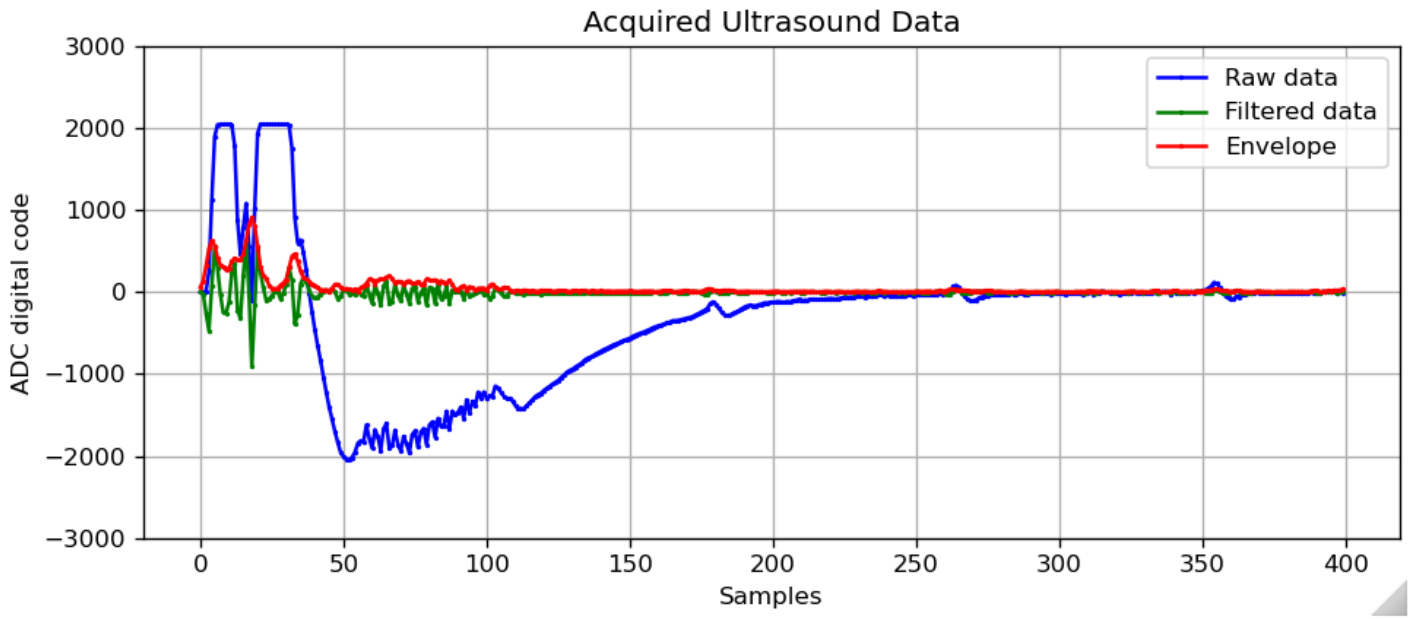
"Start acquisition" button is active again



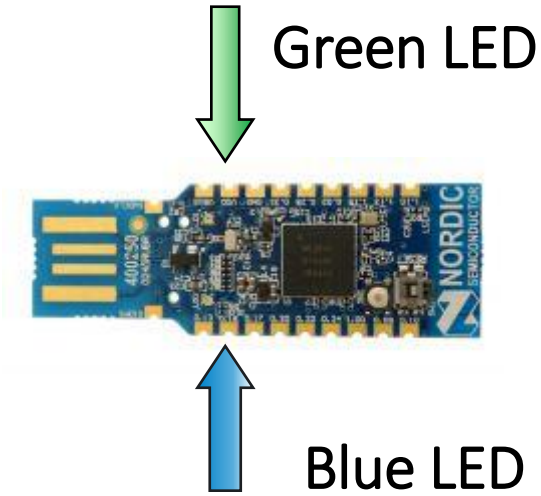
The field right to the progress bar indicates the file with acquired data

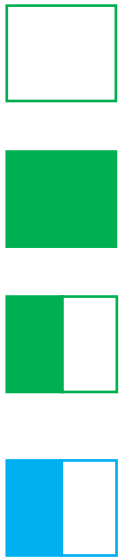
The figure freezes

Figure 1



nRF Dongle Indication





State	Description
Green LED off	WULPUS is disconnected
Green LED on	WULPUS is connected
Green LED blinking	Ultrasound data transmission
Blue LED changes state	Configuration package or restart command received from a PC

Contacts

- Contact point:
  - **Sergei Vostrikov**
    vsergei@iis.ee.ethz.ch

More instructions are coming on the official **Github page:**

`github.com/pulp-bio/wulpus`