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## Software



## Hardware

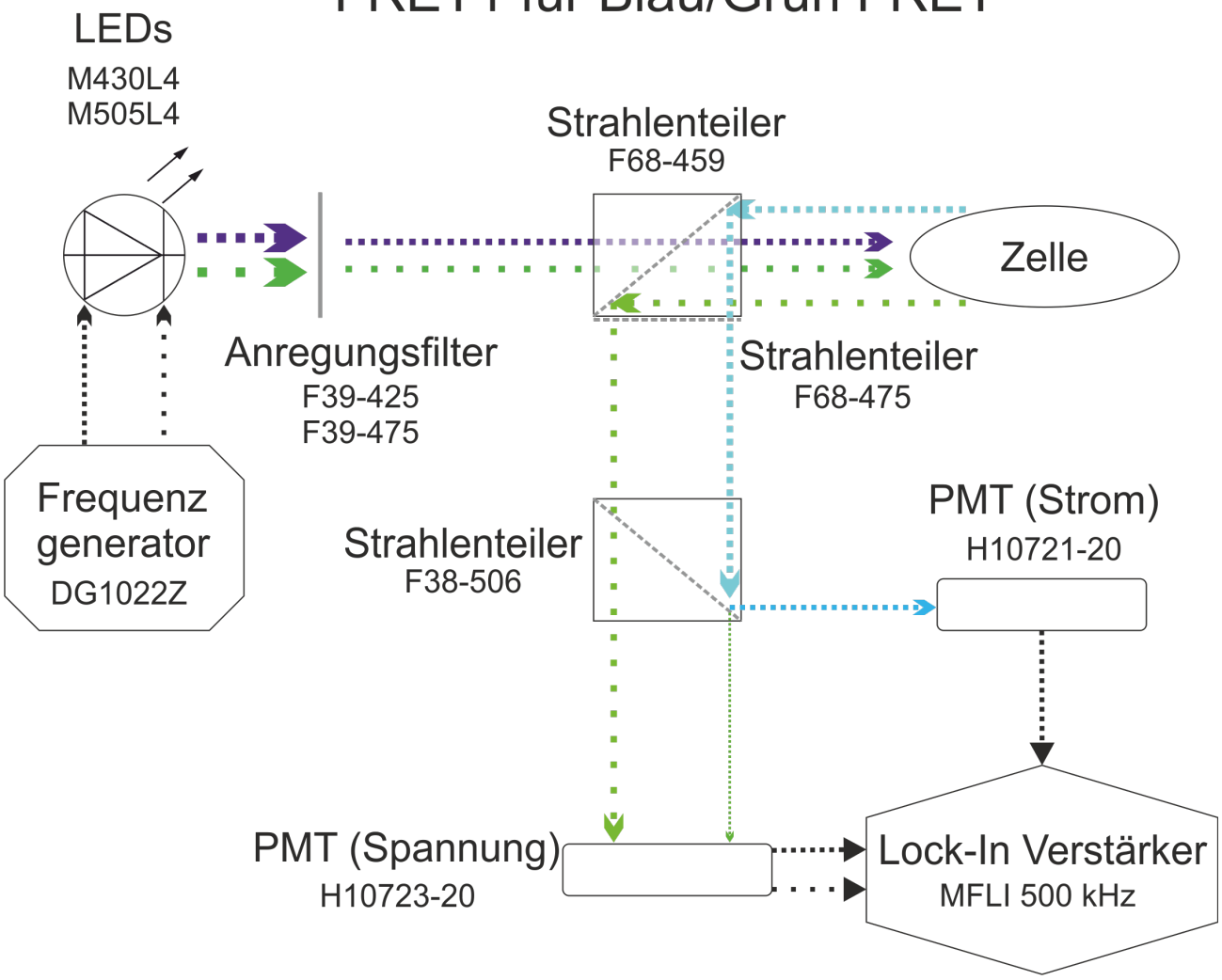


## General



# Beam-paths.md

# FRET1 für Blau/Grün FRET



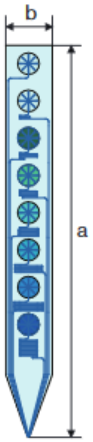
# Biozone6.md

## Infos

Manufacturer Brochure

### Tip specifications

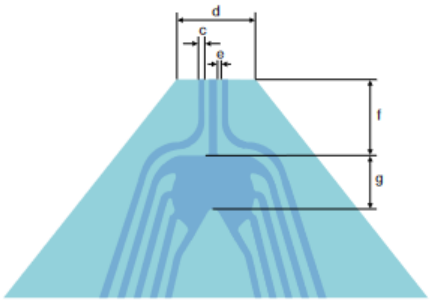
| | |
|---|---|
| **Tip length** | 65 mm (a) |
| **Tip width** | 10 mm (b) |
| **No deliverable solutions** | 6 |
| **Reservoir volume** | 30 µL |
| **Tip-width** | 500 µm (d) |

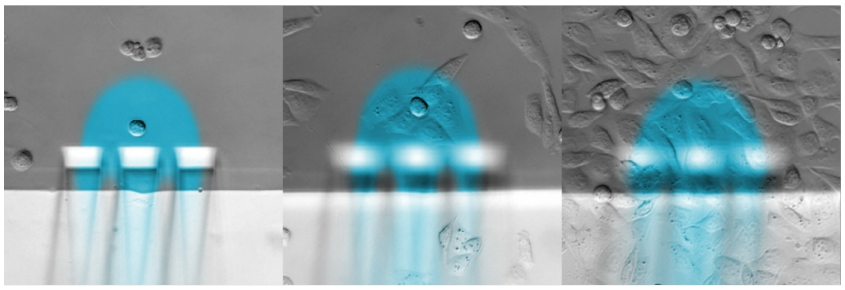


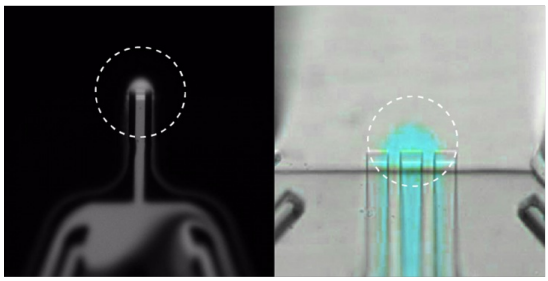

### Channel specifications

| | |
|---|---|
| **Channel size** | 30 × 30 µm (c) |
| **Channel-channel separation*** | 20 µm (e) |
| **Channel-bottom separation*** | 15 µm |
| **Switching point distance*** | 350 µm (f) |
| **Switching point length** | 230 µm (g) |

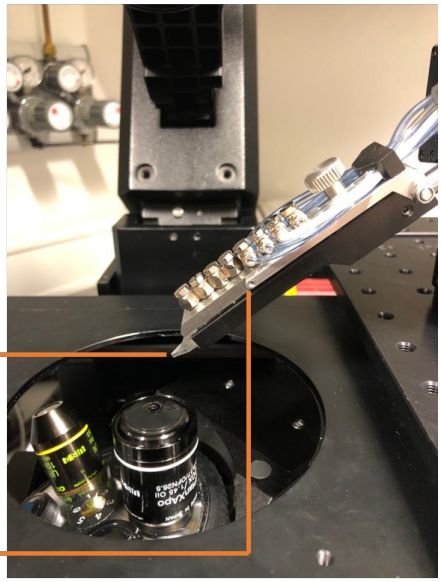
*Measured at the tip



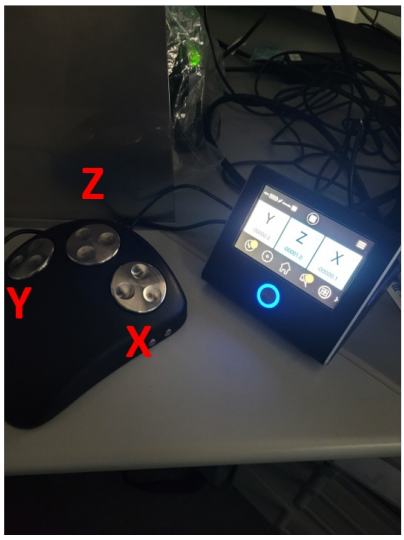



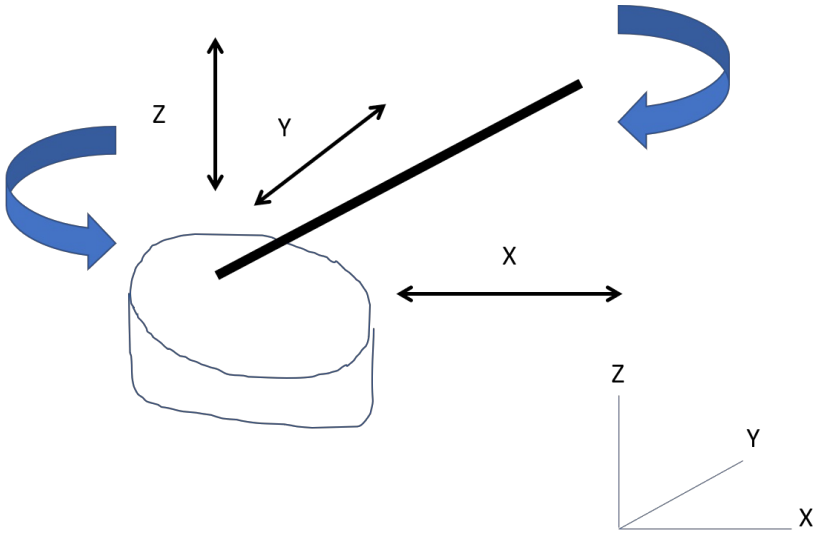


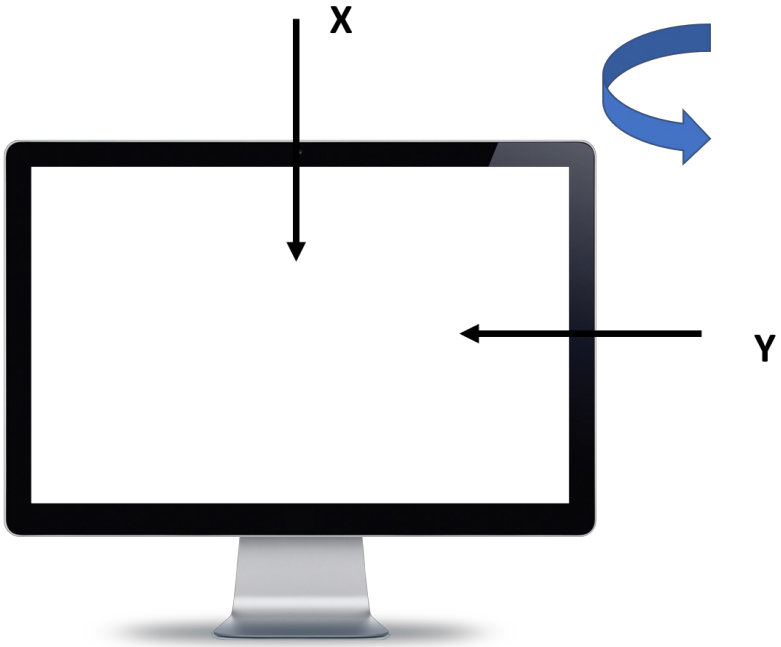
## Setup

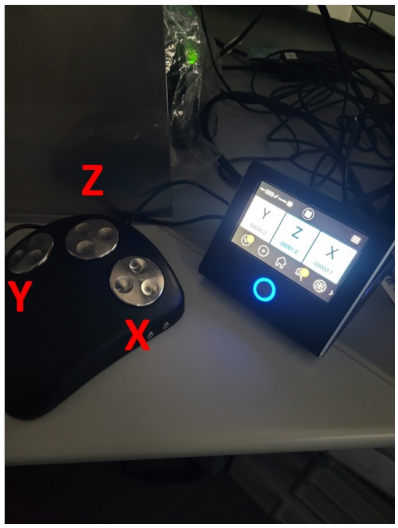




## Micromanipulator axes



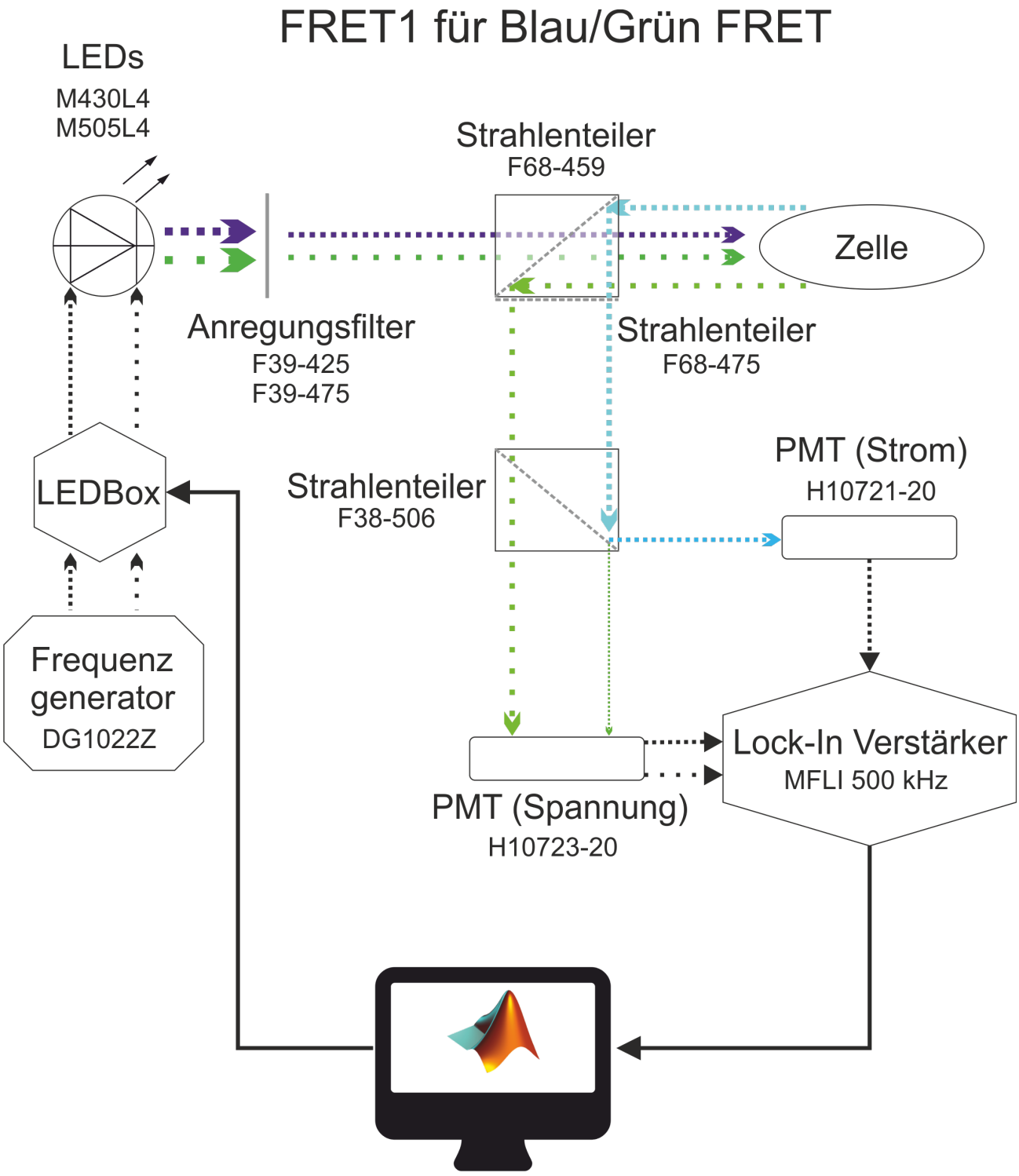




X
Y

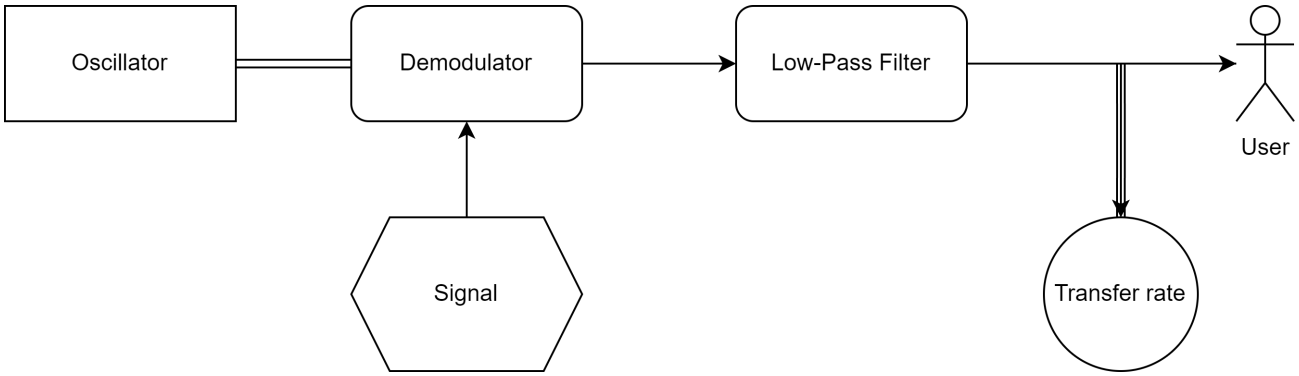

Z
Y
X

# Layout-diagram.md

## General Setup




## Demodulators



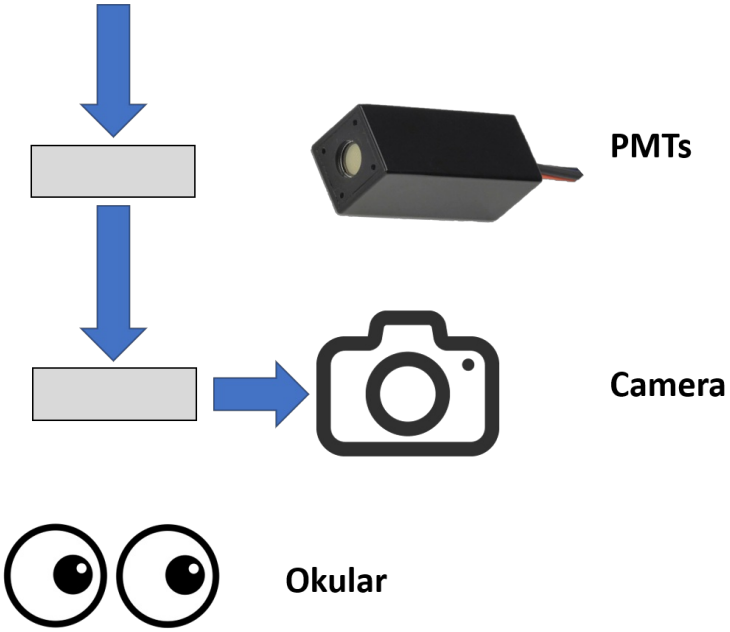

# MFLI-Lock-in-Amplifier.md

https://www.zhinst.com/europe/de/products/mfli-lock-in-amplifier

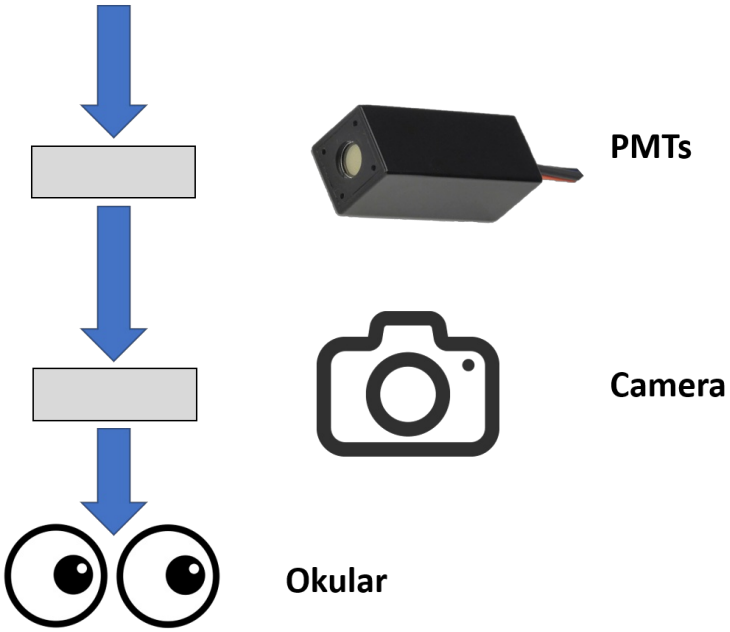
# Microscope.md

## Settings

### Camera view

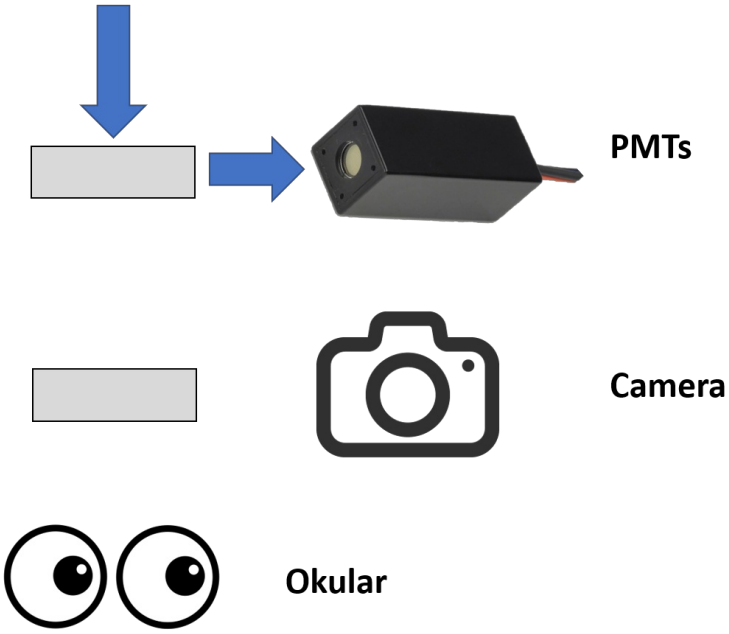



### Ocular view

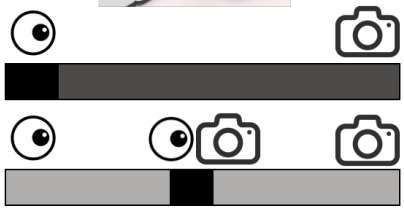


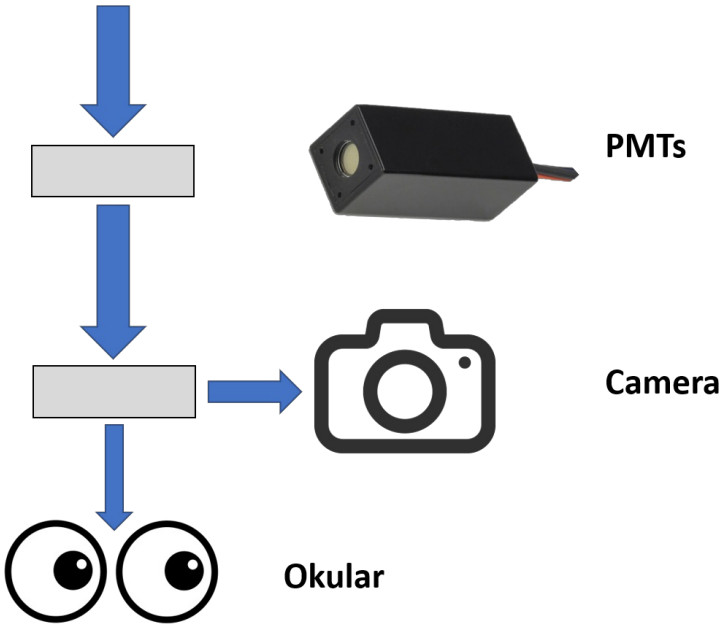

### PMT view



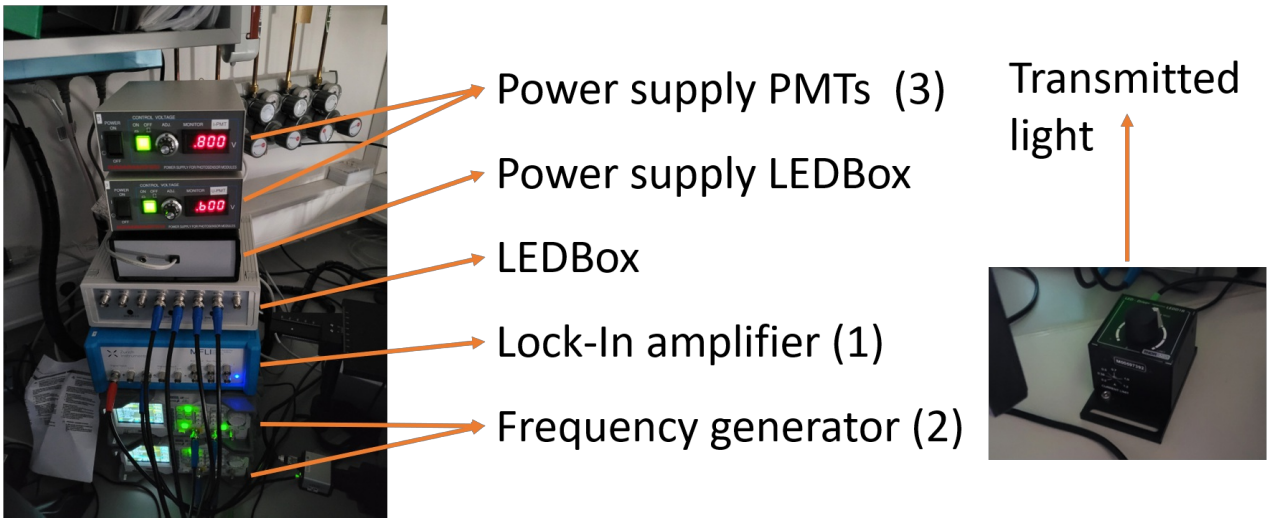



Camera & Ocular view





# Other_devices.md



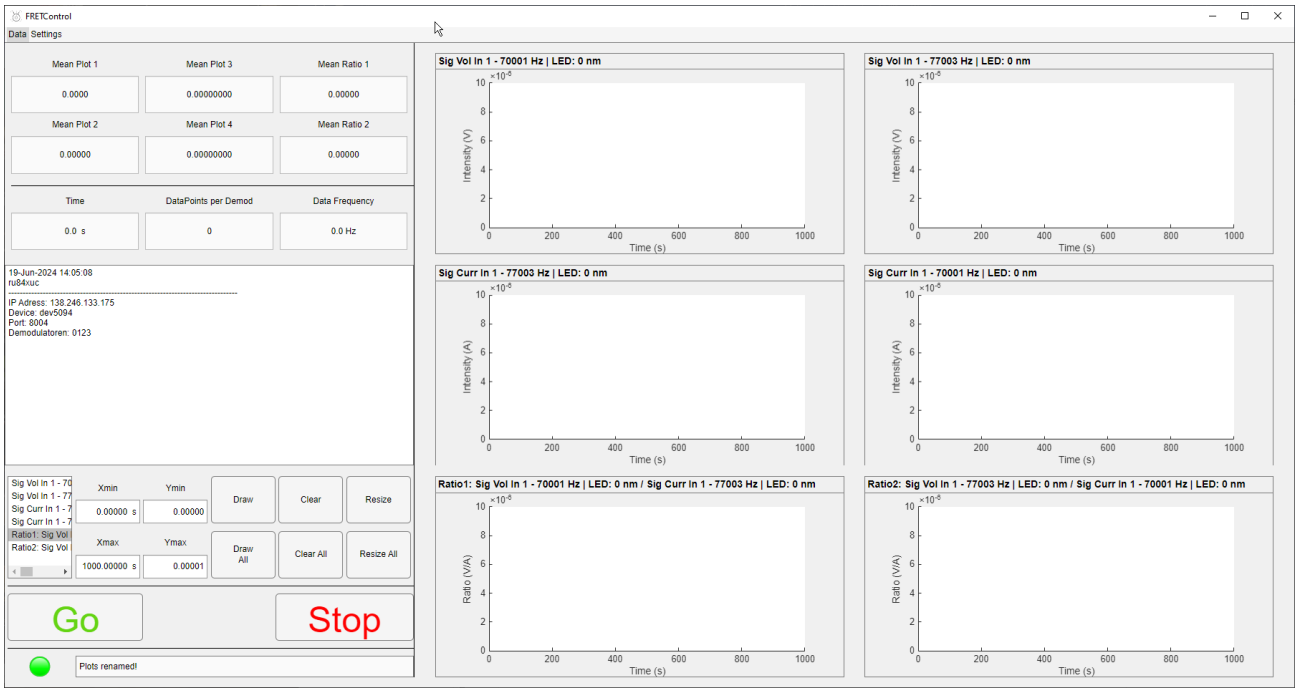

## Signal generators

Two RIGOL DG1022Z signal generators are used to modulate the illumination through LEDs. A rectangular signal oscillating between 0 and 5 volts is recommended for this purpose. The generator can be set either manually or via the Rigol software. Attention: the clock signal of the frequency generators comes from the MFLI amplifier. Make sure the signal is set to external source. Press Utility => System => Clk Src and select “Ext”.

User guide

Programming guide

# Software_General.md




## Functionality

- Draw/Draw all: Changes the axes limits as entered and redraws the selected plot. (This needs to be done when loading data!)
- Clear/Clear all: Clear the selected plot.
- Resize/ Resize all: Resizes the axes arround the plot.

### Workflow

- Setup Microscope, LEDs, frequency generators etc.
- Set Y Axis through the Settings menu.
- Press GO and start the measurement.
- Press Stop to stop the measurement.
- Save the data through the Data menu.

# Software_Installation.md

## Requirements

### Hardware

About 20 MB of free space.

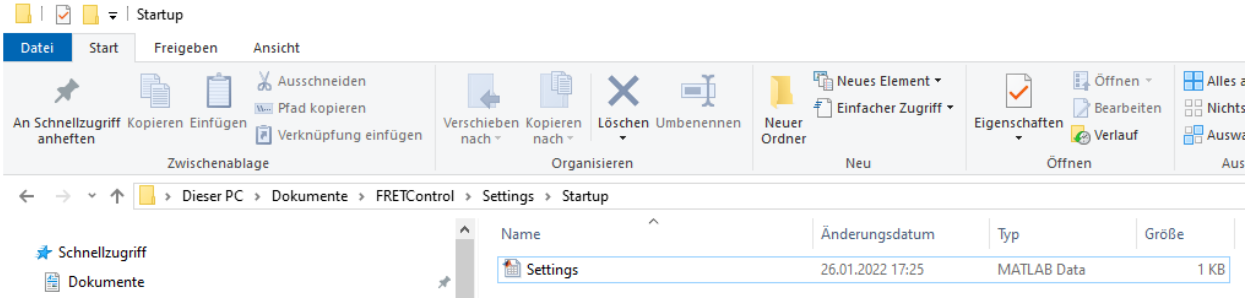
### Software

Zurich Instruments Lab One needs to be installed.
Matlab R2024 or Matlab Runtime 2024 needs to be installed.

# Software_Settings.md

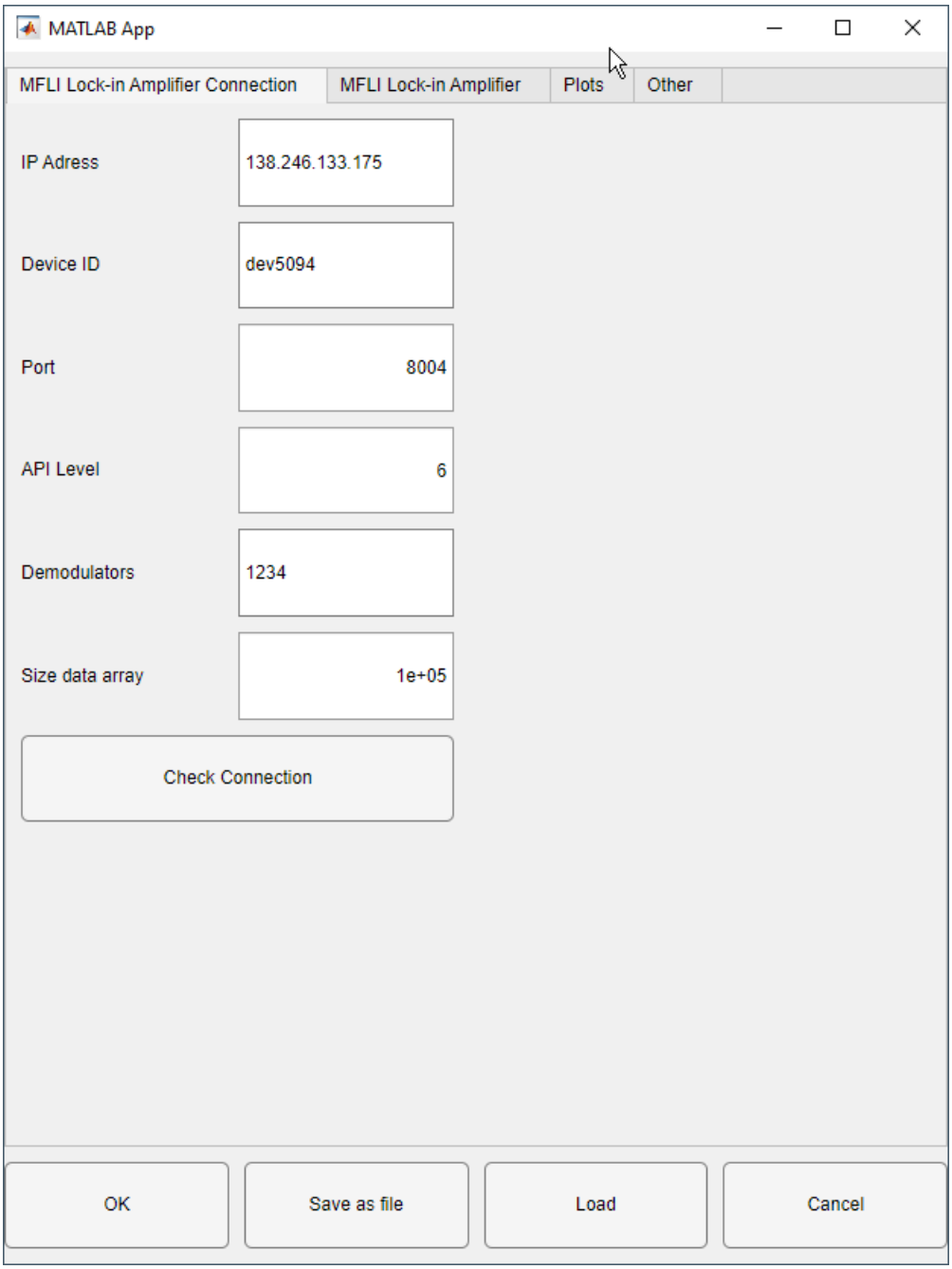
## General

- The settings can be saved as a .mat file and loaded either manually or automatically at startup.
- To load the settings automatically on startup, the .mat file must be named "Settings.mat" and saved in the following directory
  C:\Users[User]\Documents\FRETControl\Settings\Startup

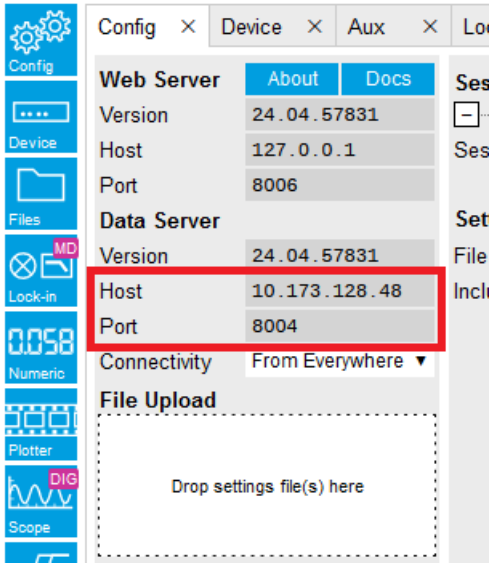



- Nearly all settings can be checked and changed through the Labone Software.

## MFLI Lock-in Amplifier Connection



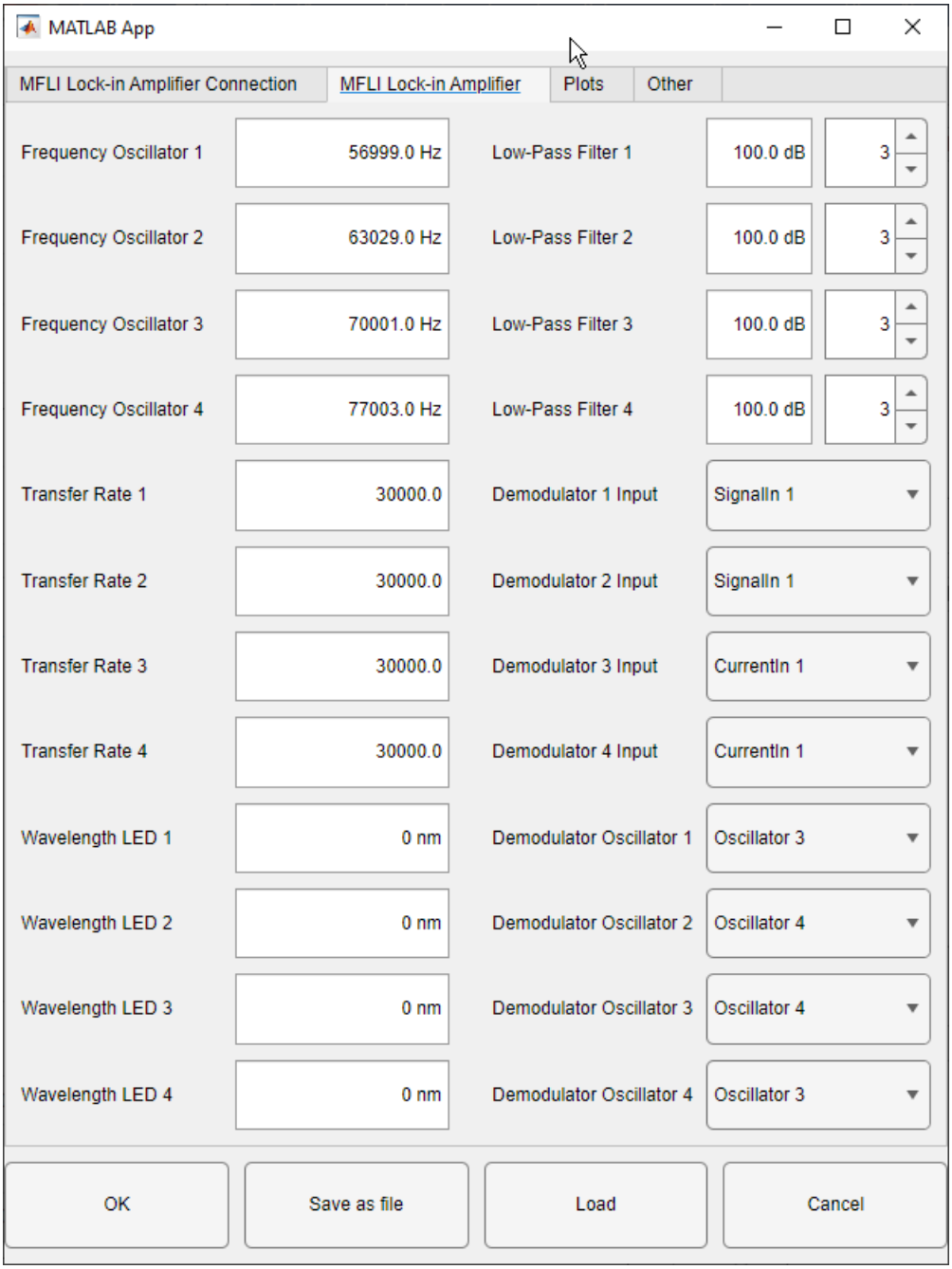

- IP Address: The IP address is needed to connect to the MFLI lock-in amplifier. Sometimes the IP changes due to network changes. The current IP can be viewed in the LabOne software.




- Device ID: The serial number of the amplifier. Do not change this unless you are changing the amplifier.

- Port: Port of the amplifier. Do not change this value. The current port can be seen in the LabOne software.
- API Level: The API level required to communicate with the amplifier. Do not change.
- Demodulators: The various demodulators that will be used. Do not change unless you know what you are doing.
- Size data array: The size of the preallocated data array. Do not change this unless you know what you are doing.
- Check Connection: Test if FRETControl is able to connect to the MFLI Lock-In amplifier with the current settings.

## MFLI Lock-in Amplifier



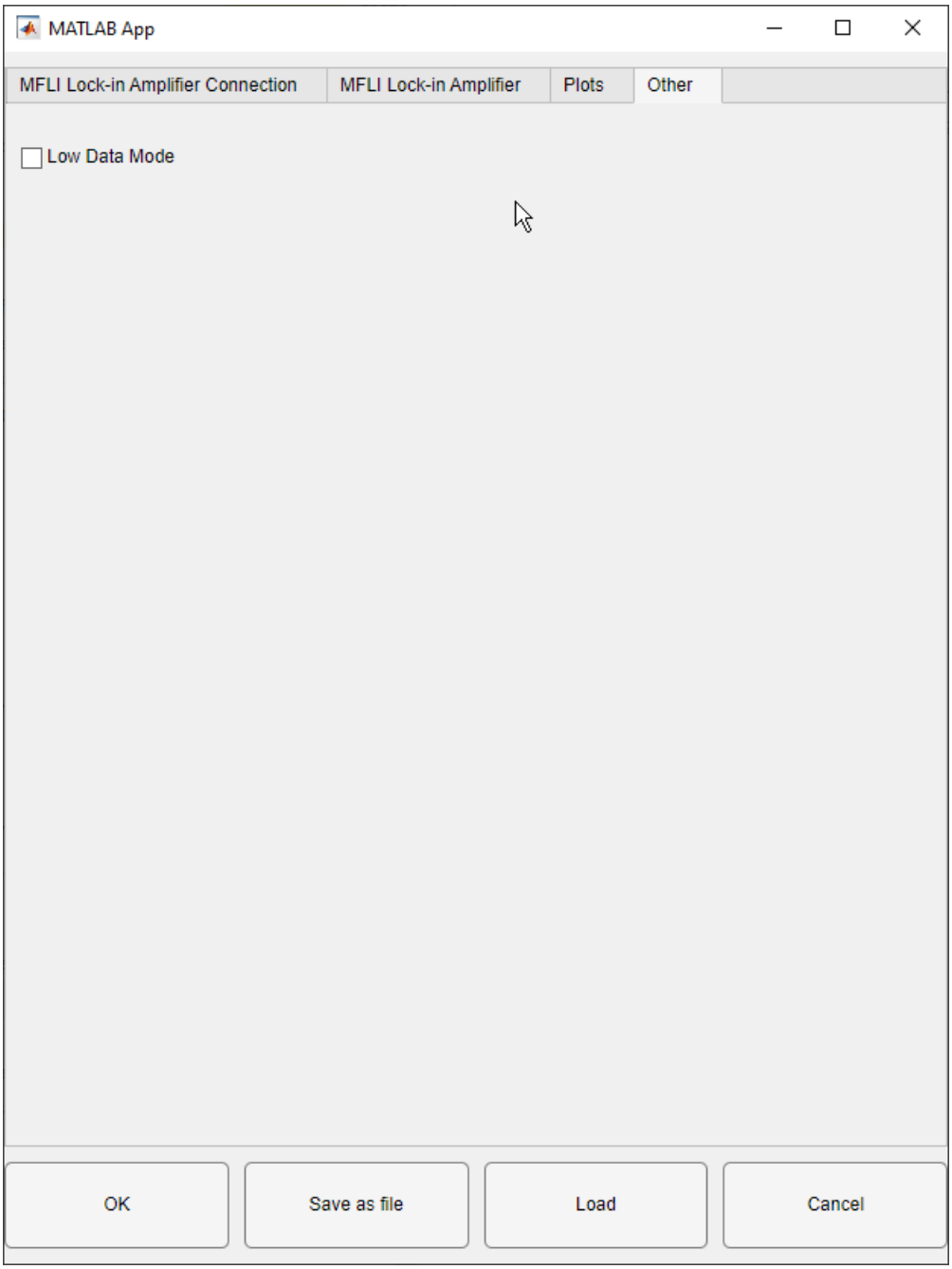

- Frequency Oscillator 1-4: The frequency for the internal oscillators of the MFLI amplifier. These frequencies are used for demodulation, so they should be the same as the lighting frequency.
- Transfer Rate 1-4: The data transfer rate from the amplifier to the computer in Sa/s. 7-10 times higher than the low pass filter bandwidth is recommended.
- LED Wavelength 1-4: The wavelengths of the LEDs with the same lighting frequency as the frequency of the oscillator 1-4. This setting is purely cosmetic and serves as an orientation for the graphs.
- Low Pass Filter 1-4: Low-pass filters for the demodulated data from each oscillator.
- Demodulator 1-4 Input: The input stream for each demodulator. Can be SignalIn 1 (voltage) or CurrentIn 1 (current).

- Demodulator Oscillator 1-4: Selects which oscillator is used to demodulate the data in each demodulator.

## Plots


- Set the default values for each plot axis and line color.
- Specify how the ratios are calculated.

## Other

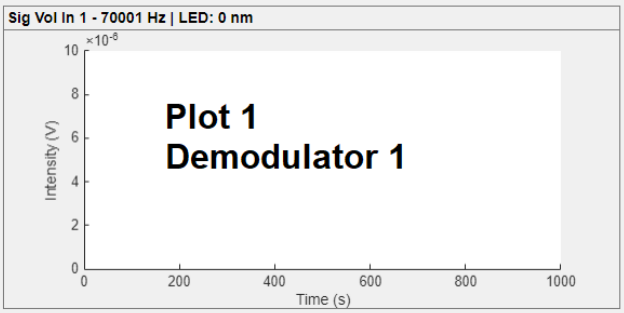


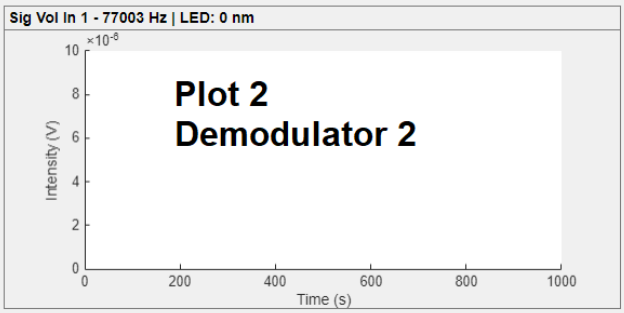

- Use low data mode to limit stored data to the bare minimum and save space

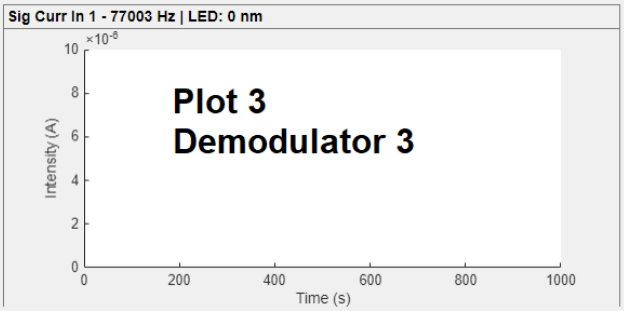
## Set Y-Axis

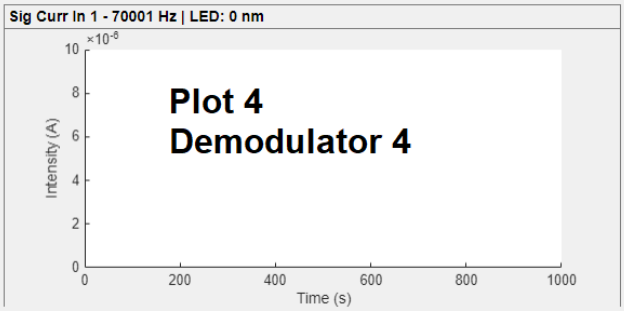
- Captures data for a few seconds and calculates the Y-axis limits to ensure that the data is visible in the plots.

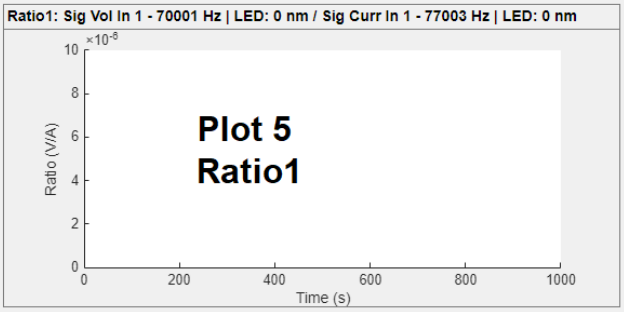
## Plots and demodulators

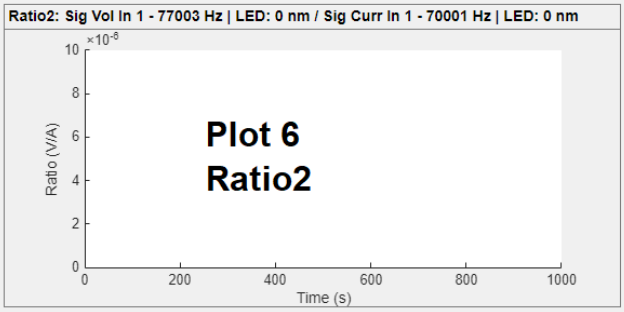

Sig Vol In 1 - 70001 Hz | LED: 0 nm
Plot 1
Demodulator 1
Intensity (V)
Time (s)


Sig Vol In 1 - 77003 Hz | LED: 0 nm
Plot 2
Demodulator 2
Intensity (V)
Time (s)


Sig Curr In 1 - 77003 Hz | LED: 0 nm
Plot 3
Demodulator 3
Intensity (A)
Time (s)


Sig Curr In 1 - 70001 Hz | LED: 0 nm
Plot 4
Demodulator 4
Intensity (A)
Time (s)


Ratio1: Sig Vol In 1 - 70001 Hz | LED: 0 nm / Sig Curr In 1 - 77003 Hz | LED: 0 nm
Plot 5
Ratio1
Ratio (V/A)
Time (s)


Ratio2: Sig Vol In 1 - 77003 Hz | LED: 0 nm / Sig Curr In 1 - 70001 Hz | LED: 0 nm
Plot 6
Ratio2
Ratio (V/A)
Time (s)