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Home.md

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Hardware

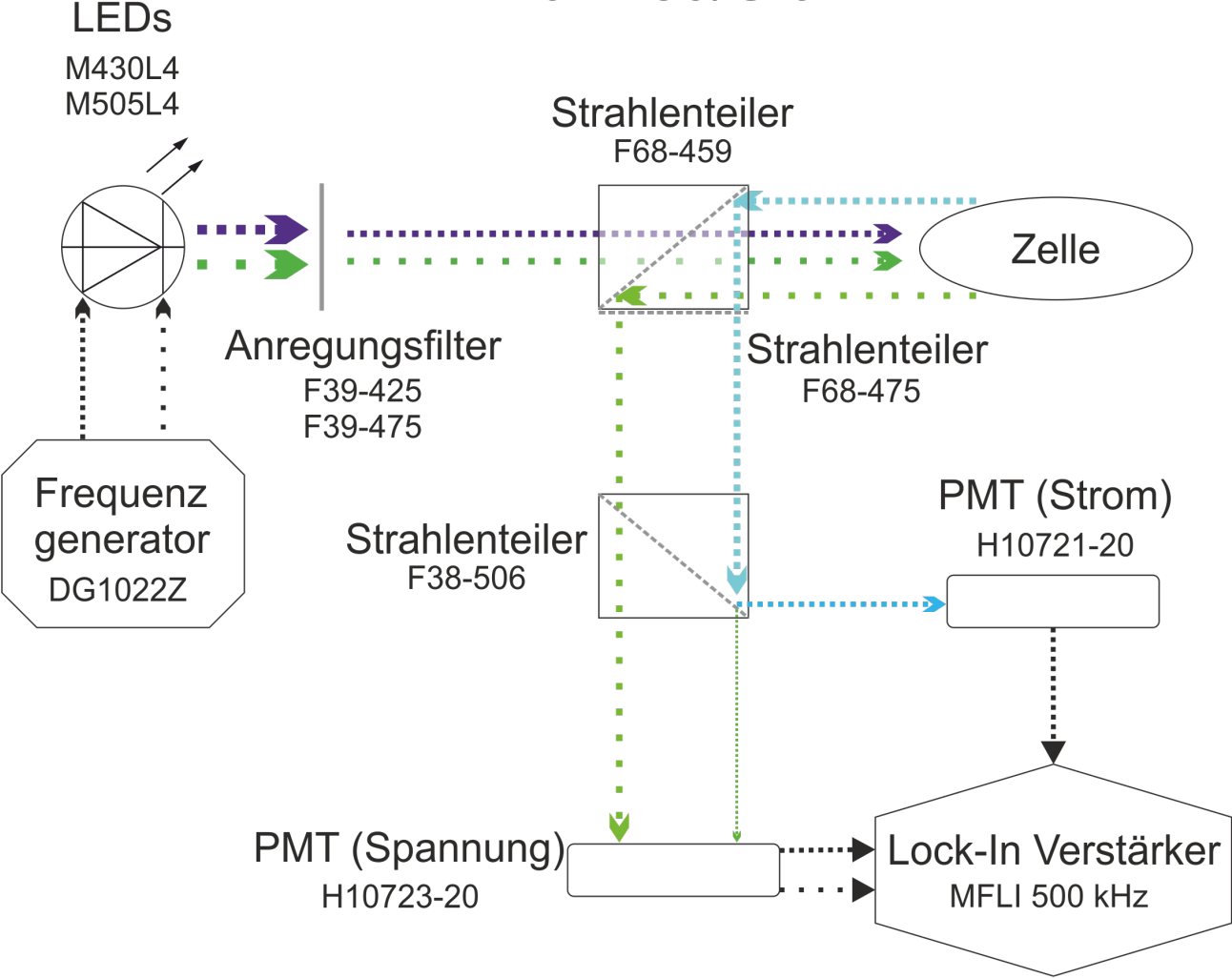
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General

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Beam-paths.md

FRET1 für Blau/Grün FRET



Biozone6.md

Infos

Manufacturer Brochure

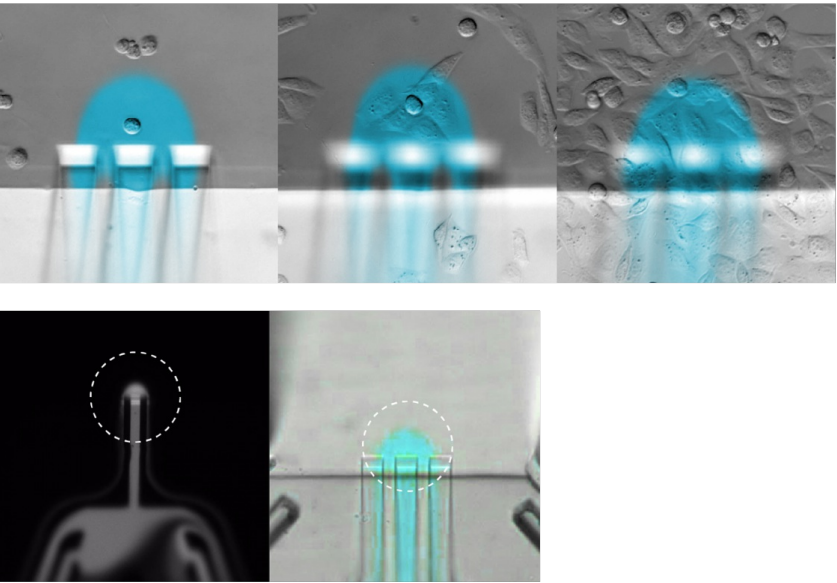
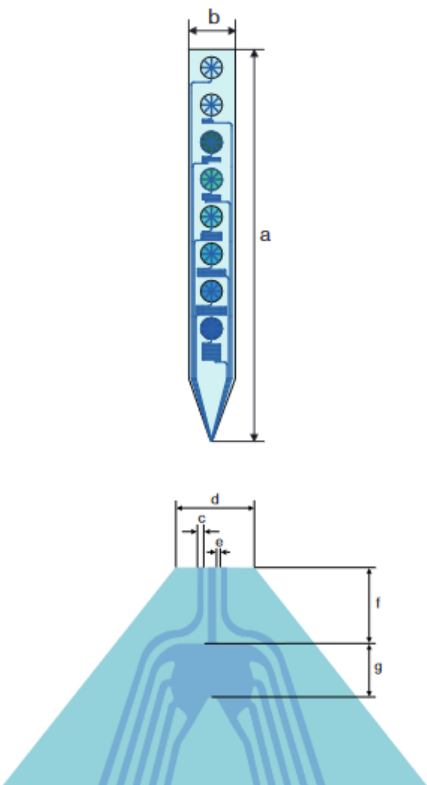
Tip specifications

Tip length	65 mm (a)
Tip width	10 mm (b)
No deliverable solutions	6
Reservoir volume	30 μ L
Tip-width	500 μ m (d)

Channel specifications

Channel size	30 \times 30 μ m (c)
Channel-channel separation*	20 μ m (e)
Channel-bottom separation*	15 μ m
Switching point distance*	350 μ m (f)
Switching point length	230 μ m (g)

*Measured at the tip



Setup

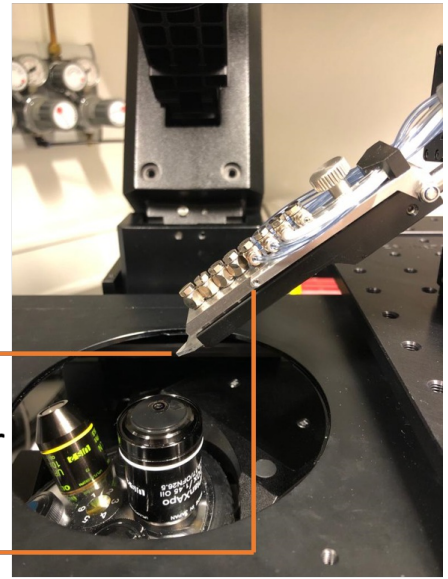


Tip Primer

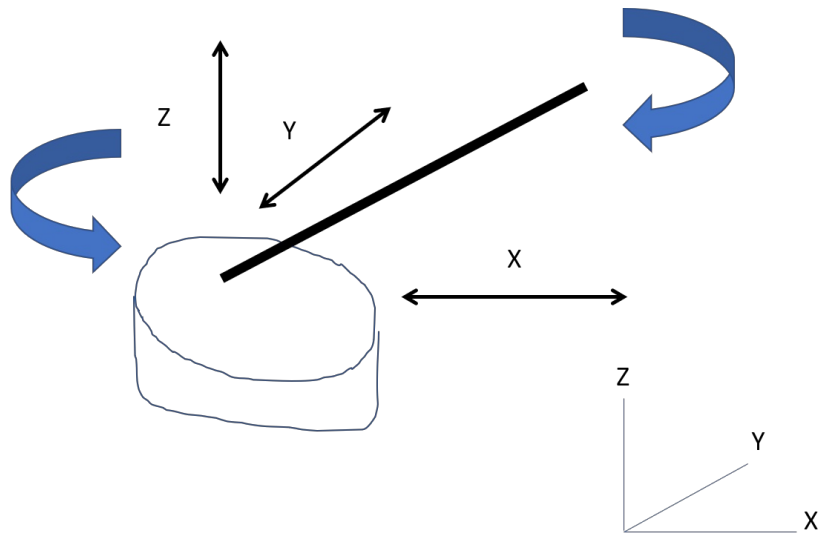
Biozone Tip

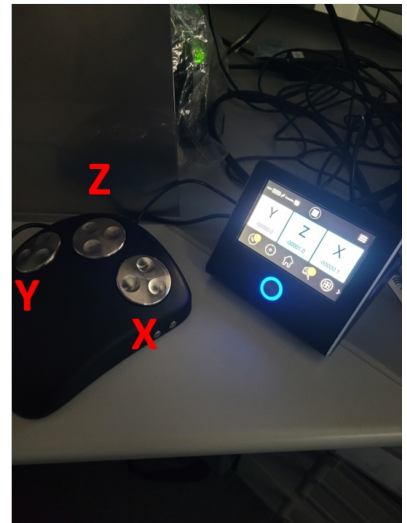
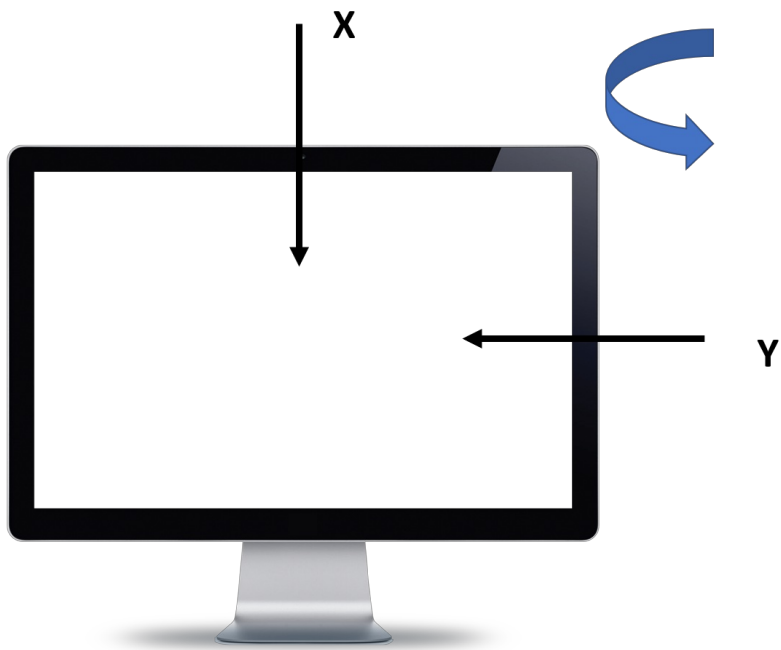
Pressure Controller

Biozone



Micromanipulator axes

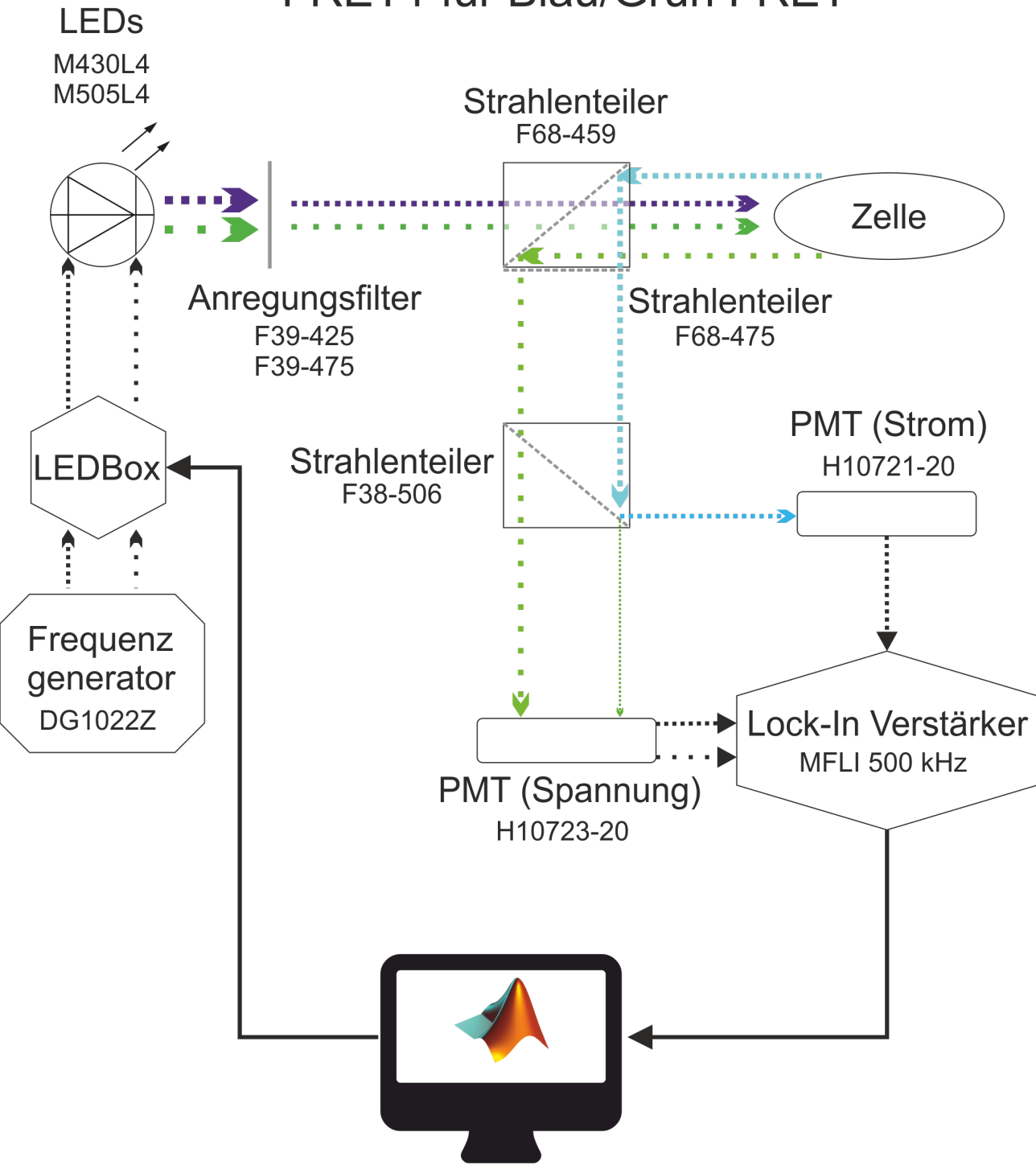




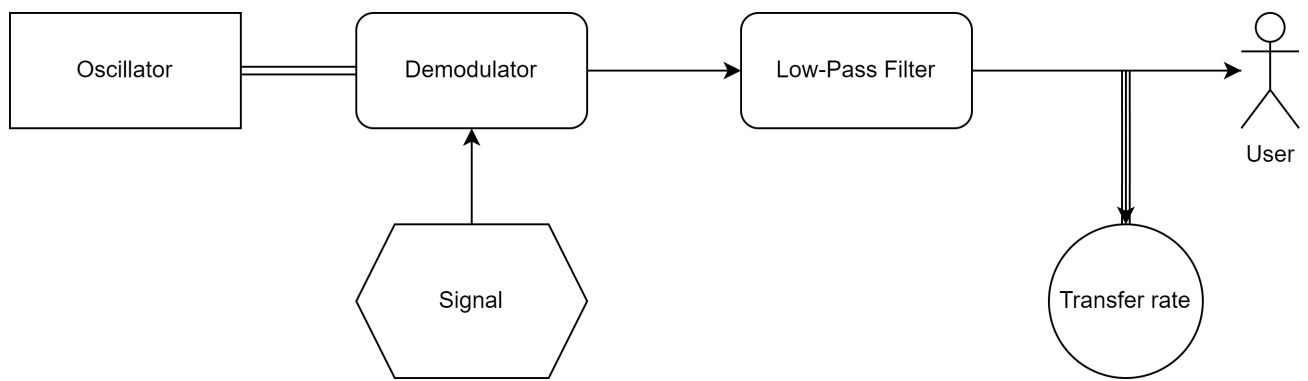
Layout-diagram.md

General Setup

FRET1 für Blau/Grün FRET



Demodulators



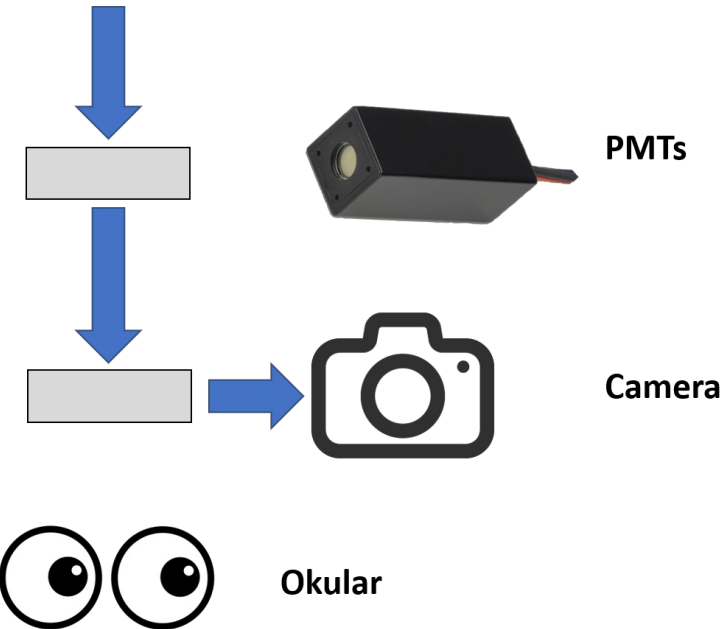
MFLI-Lock-in-Amplifier.md

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

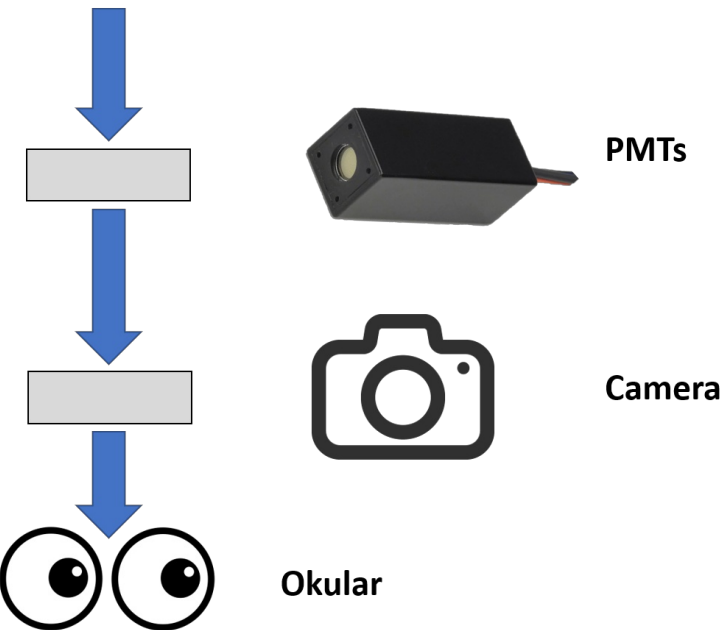
Microscope.md

Settings

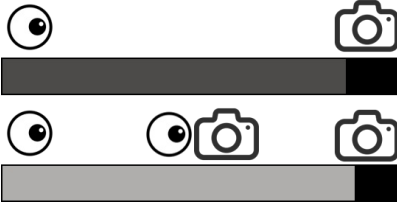
Camera view



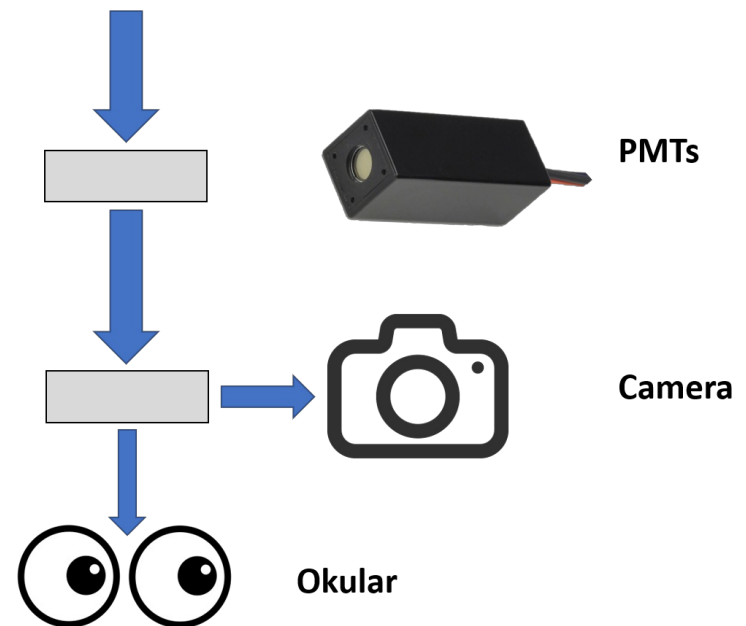
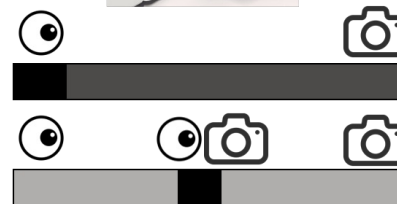
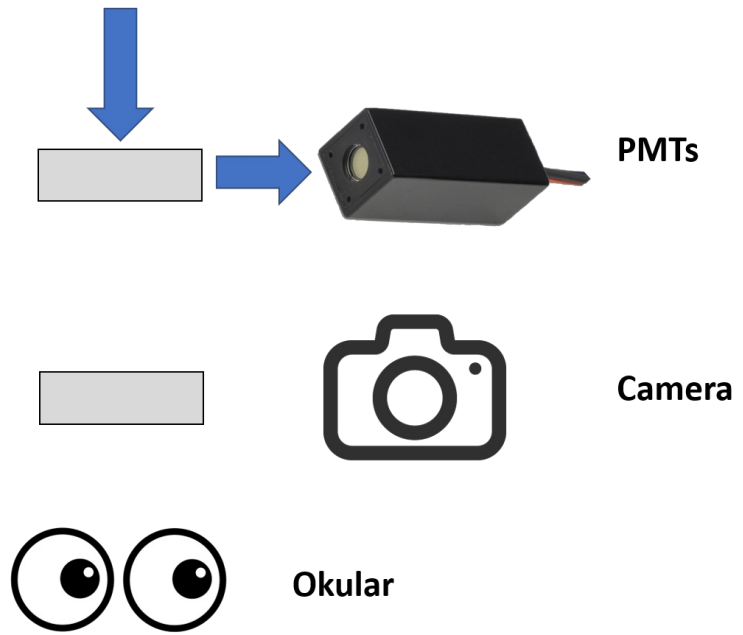
Ocular view



PMT view



Camera & Ocular view



Other_devices.md



Power supply PMTs (3)

Power supply LEDBox

LEDBox

Lock-In amplifier (1)

Frequency generator (2)

Transmitted
light



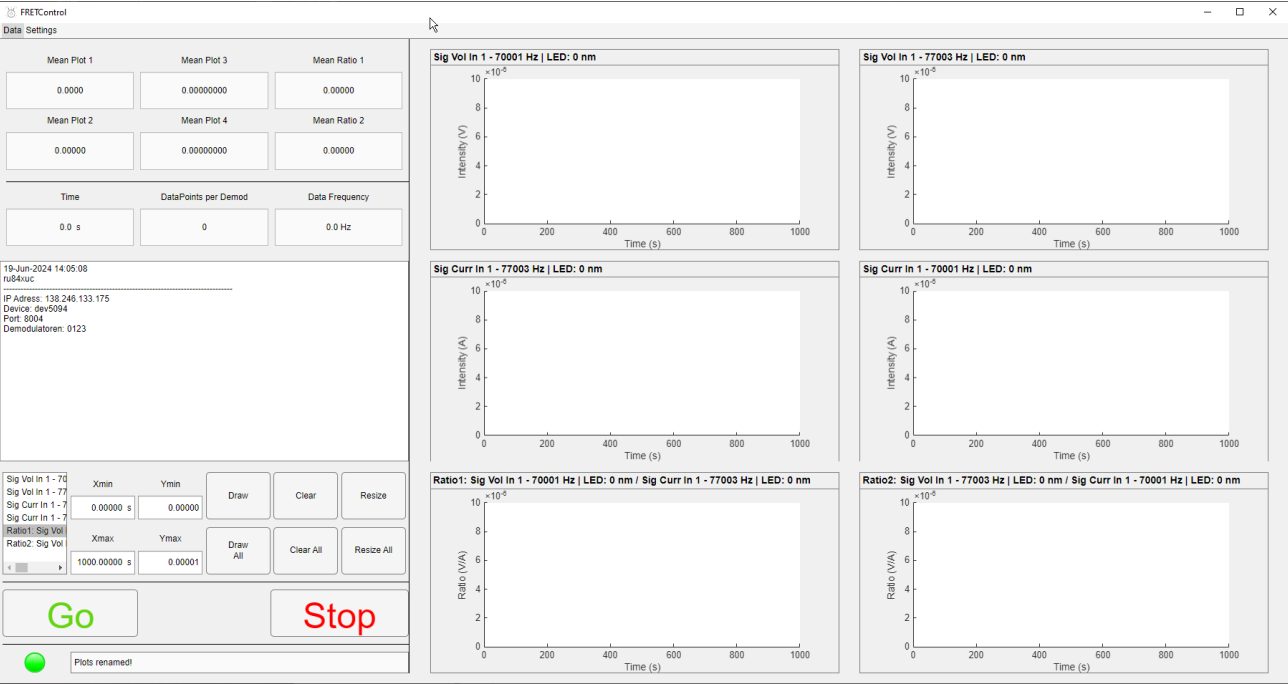
Signal generators

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 around 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.

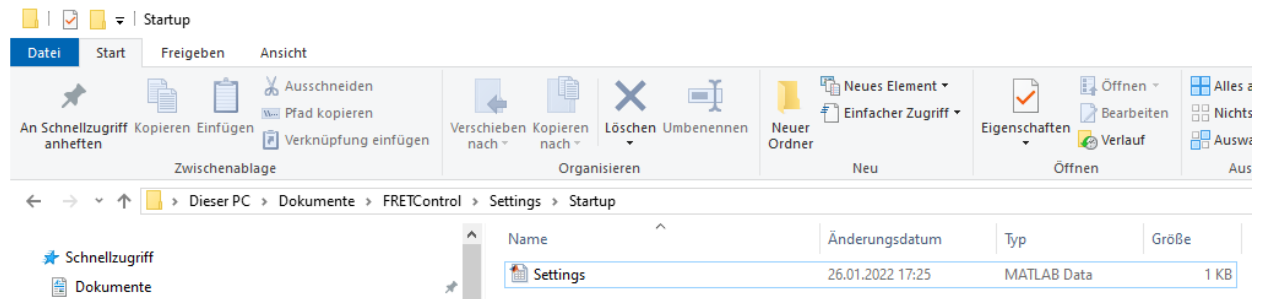
Matlab R2024 or Matlab Runtime 2024 needs to be installed.

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

MATLAB App

MFLI Lock-in Amplifier Connection | MFLI Lock-in Amplifier | Plots | Other

IP Address: 138.246.133.175

Device ID: dev5094

Port: 8004

API Level: 6

Demodulators: 1234

Size data array: 1e+05

Check Connection

OK | Save as file | Load | Cancel

- 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.

Config | Device | Aux | Log

Web Server | About | Docs

Version: 24.04.57831

Host: 127.0.0.1

Port: 8006

Data Server

Version: 24.04.57831

Host: 10.173.128.48

Port: 8004

Connectivity: From Everywhere ▼

File Upload

Drop settings file(s) here

- 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

MFLI Lock-in Amplifier			
Frequency Oscillator 1	56999.0 Hz	Low-Pass Filter 1	100.0 dB 3
Frequency Oscillator 2	63029.0 Hz	Low-Pass Filter 2	100.0 dB 3
Frequency Oscillator 3	70001.0 Hz	Low-Pass Filter 3	100.0 dB 3
Frequency Oscillator 4	77003.0 Hz	Low-Pass Filter 4	100.0 dB 3
Transfer Rate 1	30000.0	Demodulator 1 Input	SignalIn 1
Transfer Rate 2	30000.0	Demodulator 2 Input	SignalIn 1
Transfer Rate 3	30000.0	Demodulator 3 Input	CurrentIn 1
Transfer Rate 4	30000.0	Demodulator 4 Input	CurrentIn 1
Wavelength LED 1	0 nm	Demodulator Oscillator 1	Oscillator 3
Wavelength LED 2	0 nm	Demodulator Oscillator 2	Oscillator 4
Wavelength LED 3	0 nm	Demodulator Oscillator 3	Oscillator 4
Wavelength LED 4	0 nm	Demodulator Oscillator 4	Oscillator 3

OK Save as file Load Cancel

- 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

MATLAB App

MFLI Lock-in Amplifier Connection

MFLI Lock-in Amplifier

Plots

Other

Plot 1 Axis Limits	X ▼	0.00000	1000.00000	Plot 1 Color	0 0 0
Plot 2 Axis Limits	X ▼	0.00000	1000.00000	Plot 2 Color	0 0.45 0.74
Plot 3 Axis Limits	X ▼	0.00000	1000.00000	Plot 3 Color	0.85 0.33 0.1
Plot 4 Axis Limits	X ▼	0.00000	1000.00000	Plot 4 Color	0.93 0.69 0.1
Plot 5 Axis Limits	X ▼	0.00000	1000.00000	Plot 5 Color	0.49 0.18 0.5
Plot 6 Axis Limits	X ▼	0.00000	1000.00000	Plot 6 Color	0.47 0.67 0.1

Ratio 1

Demodulator 1 ▼

Demodulator 3 ▼

Ratio 2

Demodulator 2 ▼

Demodulator 4 ▼

OK

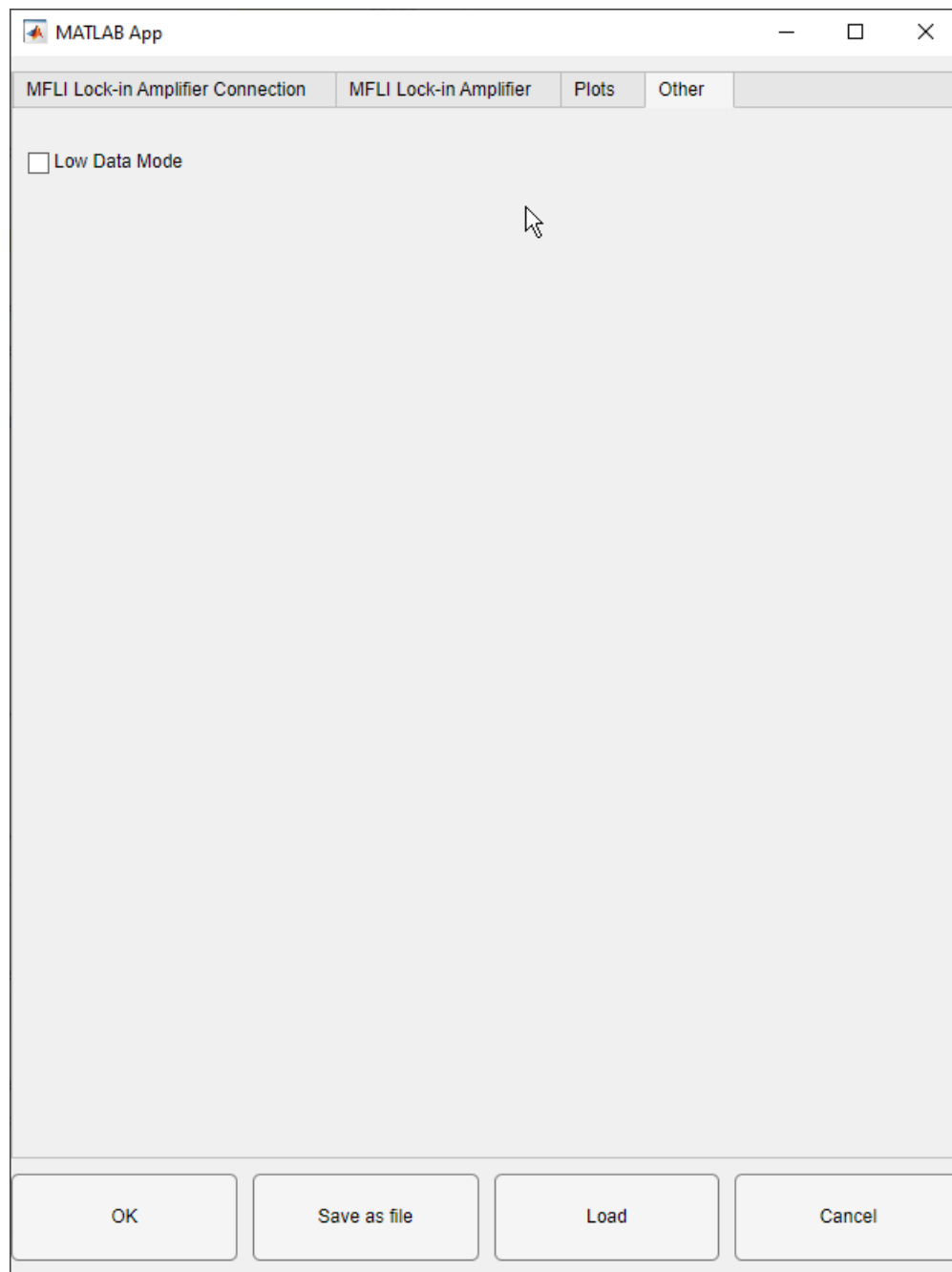
Save as file

Load

Cancel

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

Other



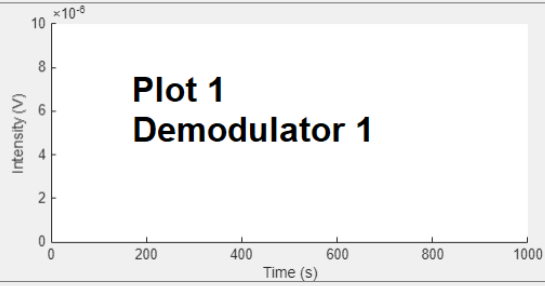
- Use low data mode to limit stored data to the bare minimum and save space

Set Y-Axis

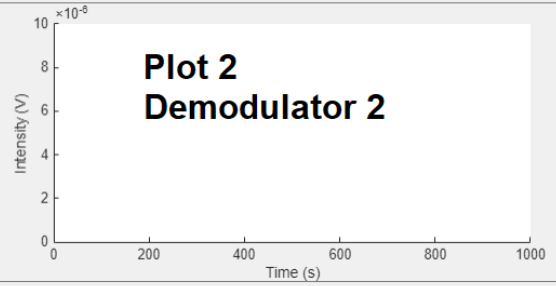
- Captures data for a few seconds and calculates the Y-axis limits to ensure that the data is visible in the plots.

Plots and demodulators

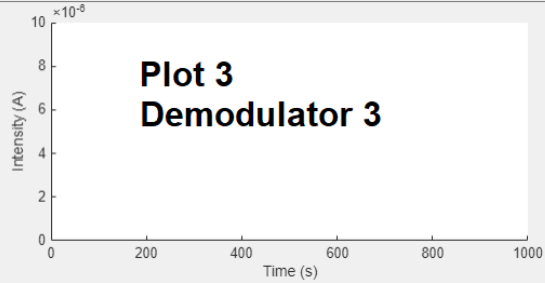
Sig Vol In 1 - 70001 Hz | LED: 0 nm



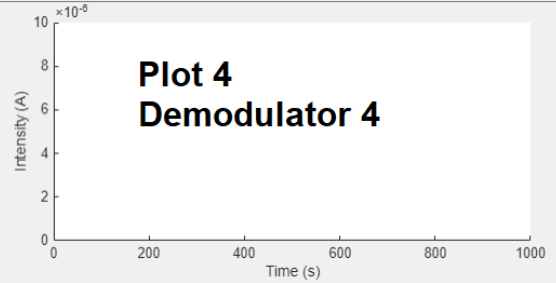
Sig Vol In 1 - 77003 Hz | LED: 0 nm



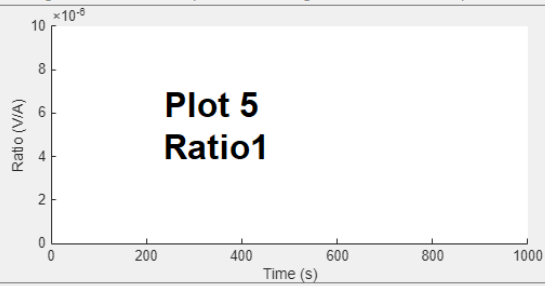
Sig Curr In 1 - 77003 Hz | LED: 0 nm



Sig Curr In 1 - 70001 Hz | LED: 0 nm



Ratio1: Sig Vol In 1 - 70001 Hz | LED: 0 nm / Sig Curr In 1 - 77003 Hz | LED: 0 nm



Ratio2: Sig Vol In 1 - 77003 Hz | LED: 0 nm / Sig Curr In 1 - 70001 Hz | LED: 0 nm

