Pump Probe Automatization. Owners Manual

Guillermo De Arana Schoebel, Research Assistant

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1 Introduction

This user manual aims to first and foremost explain how to set up an experiment with the software developed for the X-WaveS pump and probe experiment, additionally an effort was made to transfer as much of my knowledge acquired when setting up the hardware side of the experiment.

2 Theory of detection

2.1 Lockin detection

2.2 Photodiode measurement

2.3 Measuring with an oscilloscope

3 How to use the software

This section explains how to use the software to set-up an experiment as well as some quirks that the user might find useful

3.1 Downloading and Installing the software

3.2 Initialization

Upon booting the software the user is welcomed with a screen prompting them to "Initialize devices", pressing this button initializes a series of steps where the computer connects to the delay stage and lockin and configures them to an "experiment ready" state. The user **does not** need to leave the software idle while initializing and can immediately continue setting up the experiment parameters (*see section 3.3*) there is only one functionality locked until initialization is established which is launching an experiment.

The steps taken by the software during initialization are logged on a secondary window, this serves the purpose of informing the user of the state that the delay stage and lockin are configured to, (*more in section 3.3*).

The values present on the initialization screen are only for information purposes, however there is one hack to edit them if needed which is described in section 3.5 at **Lockin not in COM5**.

3.3 Setting up an experiment

At any moment thorughout the process the user may change screens from Initialization screen to Experiment screen through the menu on the top left

Manually changing the state of the lockin

3.4 Saved data

3.5 Errors

Lockin not in COM5 The user has verified that the lockin **is** recognized by the PC in device manager but it is not recognized at the default port `COM5` and is instead showing at some other port like for instance `COM3`, to change the default port to the new port (*or any of the default configuration parameters*) go to the installation folder and open the following file with a text editor like VSC or Notepad++

```
"C:\...\Pump_Probe_Measurement_Automatization\Utils\default_config.json"
```

this file is a JSON (*see JSON python docs*) and it contains the default parameters to initialize the devices, editing any of the parameters from their default

```
"USBPort": "COM5",
```

To something else

```
"USBPort": "COM3",
```

Will change the default parameters. **Warning:** Changing default parameters like Acceleration and Maxvelocity can in some cases harm the delay stage, edit these parameters at your own risk.

4 Software structure