

Photocell Usage Guide

October 2021 - Soma Mizobuchi

Setup

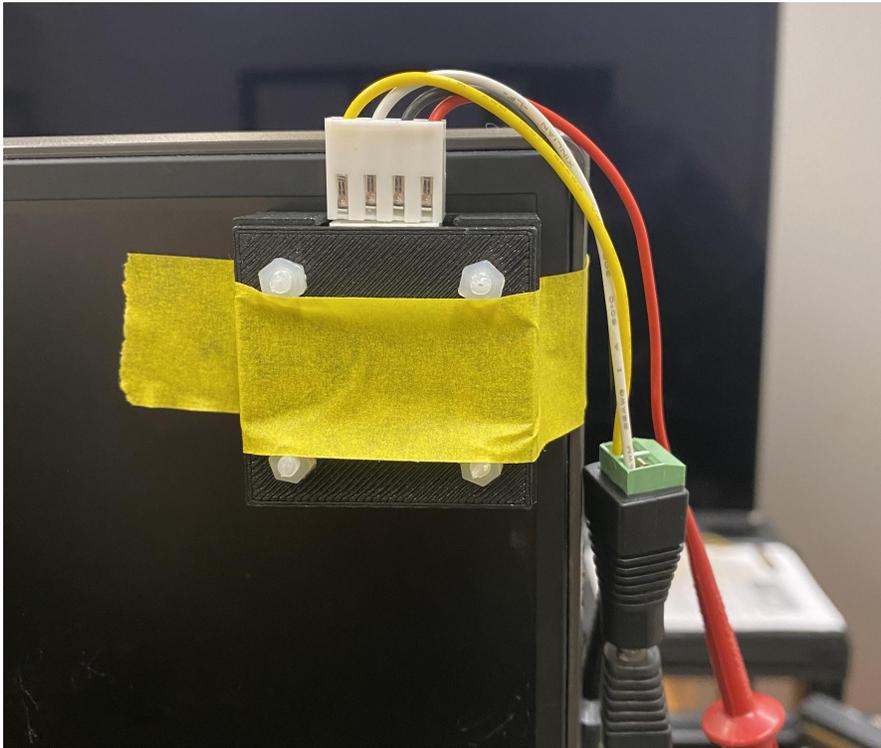
1. Connect the 5V source to the photocell using the barrel connector



2. Use the BNC male-to-male cable to link Analog Channel 0 on the IO Box to the BNC female on the photocell



3. Using masking tape, attach the photocell to the top-right corner of the screen



Software Configurations

1. Start the analog acquisition board driver by entering the following in the command line:

```
gs16aiss16ao2_start
```

2. In Insight, ensure that the `gs_16aiss16ao2` source is connected to the `Monitor Stream` in the configuration tab



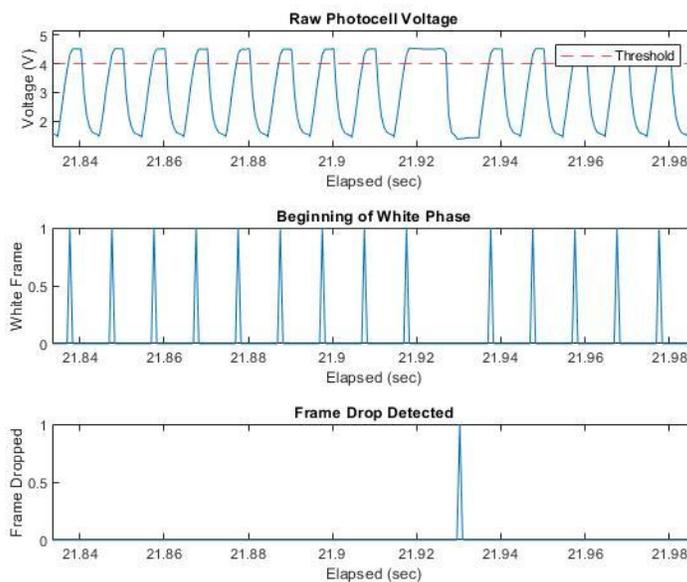
Data

Experiment File Structure:

eis_data.analog_data.monitor		
Field Name	Type	Description
photocell_connected	logical	The voltage recorded exceeds the minimum threshold to be considered a signal and indicates that the photocell is connected
white_frame	logical	The voltage recorded exceeds the minimum threshold to be considered a white frame on the screen
frame_dropped	logical	The duration between two consecutive white frames exceeds the allowed period determined by: $T_{allowed} = 2 \cdot \frac{1}{f_{refresh}} \cdot 1000 + t_{tolerance} \quad (ms)$
timing	struct	Information about the timing of the data. Use `elapsed` field to align with experiment time.

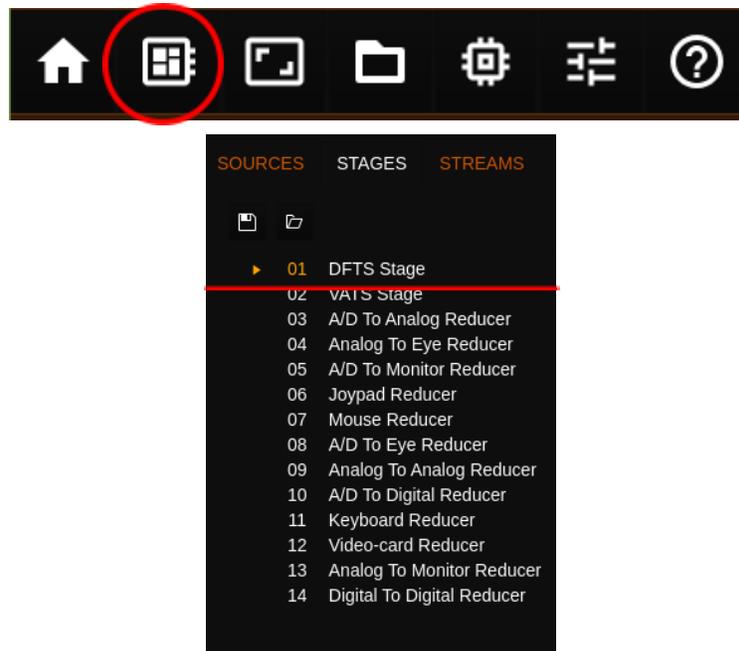
Performance

Expected output:



Additional Configurations

In Insight, navigate to Protocol > Stages > DFTS Stage

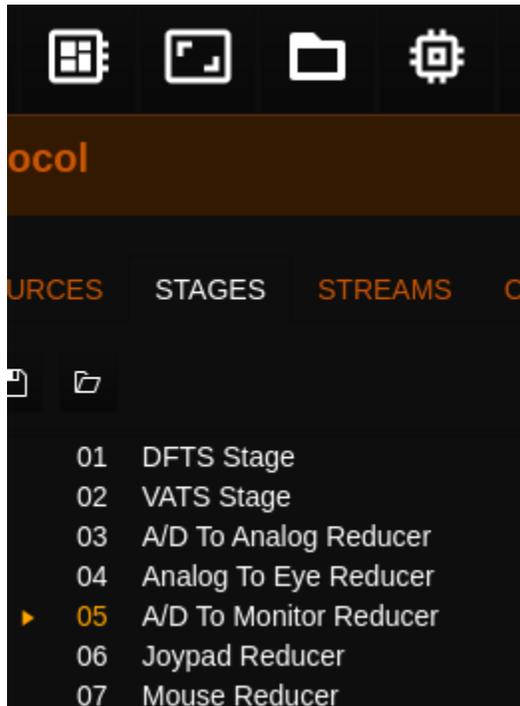


The following parameters can be changed:

DFTS Stage Configuration		
Field Name	Type	Description
debounce_frames	Unsigned integer	The number of frames to capture before evaluating whether photocell is connected
presence_threshold	Float	The minimum voltage considered to indicate that the photocell is connected
tolerance	Unsigned integer	The number of milliseconds to added to the hard deadline of the refresh period
white_threshold	Float	The minimum voltage considered to indicate a white frame

Changing the Analog Channel

When changing the analog channel, first disconnect the BNC male attached to the IO Box and connect it to the corresponding channel. Next, navigate to the Protocol > Stages > A/D to Monitor Reducer in Insight.



Set the "intensity_channel" field to the corresponding analog channel that is being used. Keep in mind that the numbering for the channels starts at 0.