Arduino XY-Stage Controller

# Wiring Guide

## Wiring – Power supplies

Note that the power supplies listed are for AC of 110V and may differ for a 220V variant. Wiring of the high voltage wire should only be done by a trained professional and improper wiring may lead to damage to the system and personnel injury. Proceed with caution when wiring.

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Figure 1. Wiring of Power Supplies

## Wiring – XY stage

Figure 1 shows the wiring of the Arduino to the stepper motor drivers (Signal) and the 4 end stops (S1-S4). Wiring to the specific pins is important for the Arduino program to work, if you want to switch the pins, ensure the pins in the Arduino code are switched as well.

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Figure 1. Wiring of the Arduino to TB6600 Stepper motor drivers, ends stops (S1-S4) and relay (S5)

## Wiring – Bottom optical module

The camera is the only electrical components on the bottom optical module. Simply plug in the camera link cable and the Hirose plug from the power supply into the camera.

## Wiring – Top optical module

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# Software Installation

## Computer programs

Please ensure that the following programs are installed into the computer:

Arduino, Python 2.7, and BitFlow SDK (6.20 minimum)

Next please ensure the following packages are installed in python:

Tkinter, pytwain, pySerial, threading, pillow and tifffile.

Once everything is installed, place the camera file into the installed BITFLOW SDK folder.

Load the Arduino file into the Arduino UNO using the Arduino program. Ensure that all GPIO pins are in the correct location.

Now the “hc\_imager\_gui.pwy” file can be run and the GUI window should pop up.

# XY Stage Serial Commands

Set up a serial connect with 9600 Baud Rate.

Serial commands are sent in the following format:

xccdddd;

Where x is the axis, 0 or 1; cc is the command; and dddd is a value; each command is terminated with a semicolon (;). Multiple commands can be sent and the Arduino will wait for a new line (\n\r) to start processing the commands.

## Home

To home or zero the motors to the negative direction, send the command “0or”. **Example**: 0or; will zero the device.

## Move (Relative)

Moving relative requires an axis, the command pr and the magnitude that can be either positive or negative. The magnitude should be passed in millimeters. **Example:** 0pr10; will move the x axis 10 mm, 1pr-20.5 will move the y axis 20.5 mm in the negative direction.

## LED Light

Light is turned on with a relay. Use 0lo0 to turn off the light and 0lo1 to turn on the light.