Hooklet3D  
Odin One Development

Monticello, MN 55362

**MEMORANDUM**

**Date:** March 27, 2017

**To:** Community

**From:** Hooklet Development Team

**Subject:** Stepper Tuning

**Summary**:

The drivers for the stepper motors must be tuned to provide the correct output amperage to the stepper motors. The Odin One uses DRV8825 Stepper Drivers; these stepper drivers produce a max output of 2.2amps per coil.

The output is adjusted using a potentiometer located on the top of the Stepper Driver. Using a multimeter you can read the stepper driver’s reference voltage by placing the meters positive probe on the potentiometer. **Be sure the black probe is grounded prior to doing this; not doing so will destroy the stepper driver.**

The conversion for DRV8825 reference voltage to output amps is simple; the reference voltage is equal to half the output amps.

So, if the reference voltage reads at .50v, the output amperage is 1amp.

The Odin One’s stepper motors are rated at a max of 1.2amps.

So, to tune the drivers to produce at the maximum rated capacity of the stepper motors, we would want to set the reference voltage to .60v.

The Z axis has two motors sharing a single driver, this driver must be set to produce twice the output amperage.

*Note: The max output of the DRV8825 is 2.2amps, so we cannot produce the max load of the combined Z motors @2.4amps instead we operate at the upper limit of the driver.*

**Setting VRef:**

Using the tip of the multimeter **(while grounded)** gently turn the potentiometer observing the voltage as you go. The target values for each axis are outlined below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Axis** | Operational Range | Max Setting | Output Amps |
| X | 0.40 - 0.60v | 0.62v | 1.2amps @0.6v |
| Y | 0.40 - 0.60v | 0.62v | 1.2amps @0.6v |
| Z | 1.00 - 1.10v | 1.10v | 2.2amps @1.1v |
| E | 0.50 - 0.60v | 0.62v | 1.2amps @0.6v |

We can account for a .05 margin of error on all axis, however, running a higher rates increases the risk of thermal failure and may limit the life of the stepper driver.