

Orbiter v2.0 firmware configuration

Basic Configuration:

- Steps: 690 steps/mm @ 16 micro-stepping
 - Max. instantaneous speed change (jerk): 600mm/min(RRF), 10mm/s (Marlin) (recommended 300/5)
 - Pressure advance: 0.02~0.03s - to be calibrated
 - Retraction: 1~1.5mm - to be calibrated
 - Retraction speed: 120mm/s
 - Motor current: 1.2A Peak or 0.85A RMS (LDO-36STH20-1004AHG)
 - Acceleration: 10000 mm/s² *
 - Normal motor operating temperature: 60-75°C
- * The extruder itself without filament can handle acceleration up to 25000mm/s². Adding weight of the filament it drags along its recommended to have acceleration limit set not above 10000mm/s².

Reprap Firmware Configuration:

M350 E16 I1 ;micro stepping set to 16 with interpolation
M92 E690 ;steps/mm - you may need to finetune it
M203 E7200 ;max speed mm/min
M566 E300 ;instantaneous speed change mm/min
M201 E10000 ;acceleration mm/s²
M906 E1200 I10 ;motor current 1.2A idle current 10%
M572 D0 S0.02 ;pressure advance – to be calibrated
M207 S1.5 F7200 Z0.2 ;firmware retraction

Klipper Configuration:

```
[extruder]
microsteps: 16
full_steps_per_rotation: 200
rotation_distance: 4.637
nozzle_diameter: 0.400 #set your nozzle diameter
filament_diameter: 1.750
max_extrude_only_distance: 500
max_extrude_only_velocity: 120
```

```

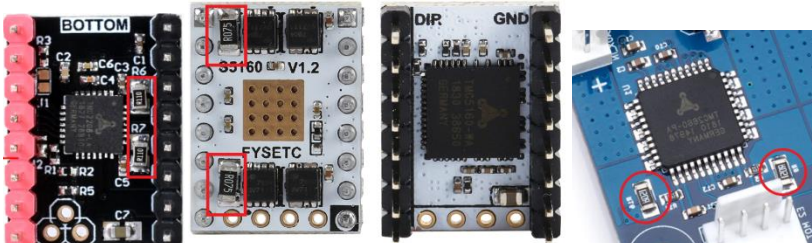
pressure_advance: 0.025          #to be calibrated
pressure_advance_smooth_time: 0.03 #to be calibrated
[tmc2208 extruder]
interpolate: true
run_current: 0.85 #**
hold_current: 0.100
sense_resistor: 0.11 #**
stealthchop_threshold: 0
driver_TBL: 0
driver_HEND: 6
driver_HSTRT: 7
driver_TOFF: 4

```

****Very important note!!!** Please make sure the sense resistor is set according to what you have on board. TMC2208 and TMS2209 usually have **0.11** ohm, TMC2660 have 0.051 Ohm and TMC5160 have usually 0.075 ohm.

As an example if you set by mistake the sense resistor to 0.11 instead of 0.051 the real current of the motor will be more than double, and the power injected in the motor more than four times higher, yes you read it correctly **FOUR** - AKA **4** times higher. 0.85A shall give a power loss of about 3W doubling the current will lead to 12W - this will melt all the plastic gasket before you notice something is wrong.

How can you identify the sense resistor? It's pretty easy, look for two identical resistors which are bigger than all the others onboard or around the stepper driver. See the examples in the next pictures.



Marlin Configuration:

- First send configuration commands and save them to EEPROM.

- Second edit the marlin configuration files edit Configuration.h and Configuration_adv.h recompile and reflash your microcontroller firmware.
- Send the following commands via USB:

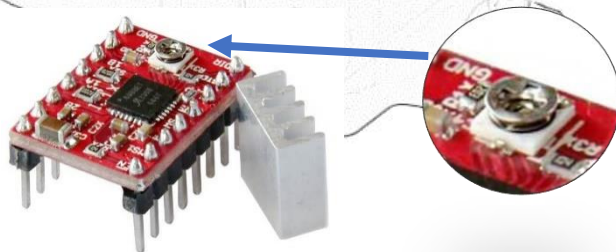

```

M350 E16           ;micro stepping set to 16
M92 E690          ;steps/mm - you may need to finetune it
M201 E10000       ;acceleration mm/s2
M203 E120         ;max speed mm/s
M205 E5           ;E jerk mm/s
M906 T0 E850      ;TMC motor RMS current in mA
M900 T0 K0.22 L0.04 ;linear advance values to be calibrated
M207 S1.5 F7200 Z0.2 ;firmware retraction
M500              ;save settings to EEPROM
      
```

Motor current configuration using reference voltage

- Adjust Vref by the trimmer resistor to voltage corresponding to 1.2A Peak. Current. You will need to use a digital multimeter.
- For most drivers the shunt is 0.1Ω, adjust the voltage at the trimmer middle pin to 1.2V.
- Be aware some drivers have different shunt configuration and you have to set different voltage please check your driver documentation.
- Setting to high current will overheat the stepper and potentially damage the extruder!
- - Settings for ****TMC2209**** - Vref =1.2V

Warning: Please check if your driver has a trimmer or not. If yes, most probably firmware configurations of the motor current have no effect. Some TMC drivers even if they have onboard trimmer but the motor current can be set via UART as well like the TMC2208.



**Thanks your order for ORIGINAL LDO ORBITER V2.0
EXTRUDER, your continued support is highly
appreciated.**

