



Titan Aero Smoothieware Configuration


Set up your Smoothieware Firmware to support your new Titan Aero

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Step 1 — Download Smoothieware



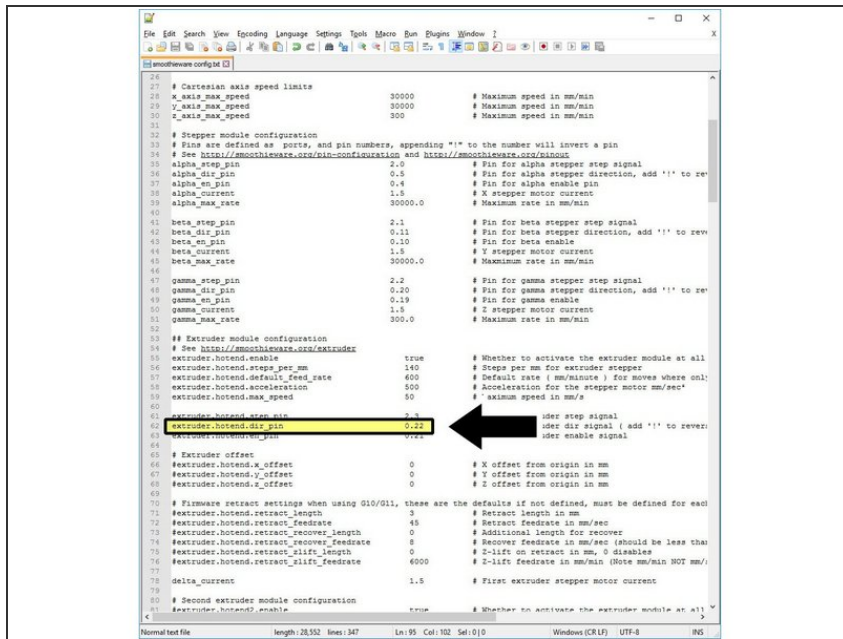
- First things first: you're going to need a copy of Smoothieware.
 - If you are upgrading an existing 3D printer to use a Titan, you should try to get a copy of your current firmware from your printer's manufacturer.
 - If you're building a new printer, or simply want to upgrade to the latest version of Marlin, download it at <http://smoothieware.org/getting-smoothie>
-  If you download a fresh version of Smoothieware you'll have to configure more settings than the ones mentioned in this guide so that it will work well with your printer.

Step 2 — Download Arduino



- Unzip Smoothieware from the zip file you downloaded and put the resulting folder anywhere on your computer for safe keeping.
- You will be working with the config file.

Step 3 — Extruder Direction



```

26
27 # Cartesian axis speed limits
28 x_axis_max_speed      30000      # Maximum speed in mm/min
29 y_axis_max_speed      30000      # Maximum speed in mm/min
30 z_axis_max_speed      300        # Maximum speed in mm/min
31
32 # Stepper module configuration
33 # Pins are defined as: ports, and pin numbers, appending '!' to the number will invert a pin
34 # See http://smoothieware.org/pin-configuration and http://smoothieware.org/psoc4010
35 alpha_step_pin        2.0        # Pin for alpha stepper step signal
36 alpha_dir_pin         0.5        # Pin for alpha stepper direction, add '!' to reverse
37 alpha_en_pin          0.4        # Pin for alpha enable pin
38 alpha_current         1.5        # X stepper motor current
39 alpha_max_rate        30000.0    # Maximum rate in mm/min
40
41 beta_step_pin         2.1        # Pin for beta stepper step signal
42 beta_dir_pin          0.11       # Pin for beta stepper direction, add '!' to reverse
43 beta_en_pin           0.10       # Pin for beta enable
44 beta_current          1.5        # Y stepper motor current
45 beta_max_rate         30000.0    # Maximum rate in mm/min
46
47 gamma_step_pin        2.2        # Pin for gamma stepper step signal
48 gamma_dir_pin         0.20       # Pin for gamma stepper direction, add '!' to reverse
49 gamma_en_pin          0.19       # Pin for gamma enable
50 gamma_current         1.5        # Z stepper motor current
51 gamma_max_rate        3000.0     # Maximum rate in mm/min
52
53 # Extruder module configuration
54 # See http://smoothieware.org/extruder
55 extruder.hotend.enable true      # Whether to activate the extruder module at all
56 extruder.hotend.steps_per_mm 140  # Steps per mm for extruder stepper
57 extruder.hotend.default_feed_rate 600 # Default rate ( mm/minute ) for moves where accel is not defined
58 extruder.hotend.acceleration 1000 # Acceleration for the stepper motor mm/sec^2
59 extruder.hotend.max_speed 50     # Maximum speed in mm/s
60
61 extruder.hotend.step_pin 2.3      # X stepper step signal
62 extruder.hotend.dir_pin 0.22     # X stepper dir signal ( add '!' to reverse )
63 extruder.hotend.en_pin 0.22      # X stepper enable signal
64
65 # Extruder offset
66 extruder.hotend.x_offset 0        # X offset from origin in mm
67 extruder.hotend.y_offset 0        # Y offset from origin in mm
68 extruder.hotend.z_offset 0        # Z offset from origin in mm
69
70 # Firmware retract settings when using G10/G11, these are the defaults if not defined, must be defined for each stepper
71 extruder.hotend.retract_length 3   # Retract length in mm
72 extruder.hotend.retract_feedrate 45 # Retract feedrate in mm/sec
73 extruder.hotend.retract_recover_length 0 # Additional length for recover
74 extruder.hotend.retract_recover_feedrate 0 # Recover feedrate in mm/sec (should be less than retract feedrate)
75 extruder.hotend.retract_lift_length 0 # Z-lift on retract in mm, 0 disables
76 extruder.hotend.retract_lift_feedrate 6000 # Z-lift feedrate in mm/min (Note mm/min NOT mm/s)
77
78 delta_current         1.5        # First extruder stepper motor current
79
80 # Second extruder module configuration
81 extruder.hotend2.enable true     # Whether to activate the extruder module at all

```

- If your old extruder was ungeared, you'll notice that your new Titan extrudes backwards!
- Add or remove a ! from the number after the following line: `extruder.hotend.dir_pin`.

Step 4 — Extruder Steps-per-mm 1

$$\text{E-Steps-per-MM} = \frac{\text{Motor Steps} * \text{Micro-stepping} * \text{Gear Ratio}}{(\text{Hobb Diameter} * \pi)}$$

- Standard motor steps / rev = 400
- Standard micro-stepping = 16x
- Gear Ratio = 3
- Hobb Diameter (Effective) = 7.3

$$400 * 16 * 3 / (7.3 * 3.142) = \mathbf{837 \text{ E-steps-per-mm}}$$

(For the motor sold with the Titan)

- The next thing we'll have to update is your printer's E-steps-per-mm.
- ⓘ Your slicer will generate G-Code for your printer, which will tell it to extrude a certain length (in millimeters) of filament. Your printer takes those lengths of filament and calculates how much it should rotate your Titan's stepper motor to push out the expected amount filament. This number is used to make that conversion
- First, we'll start with a ball-park estimate of your E-steps-per-mm, and then we'll fine-tune it.
- If you're using the standard Titan Slimline motor, start with 837 Steps-per-mm

Step 5 — Update E-Steps

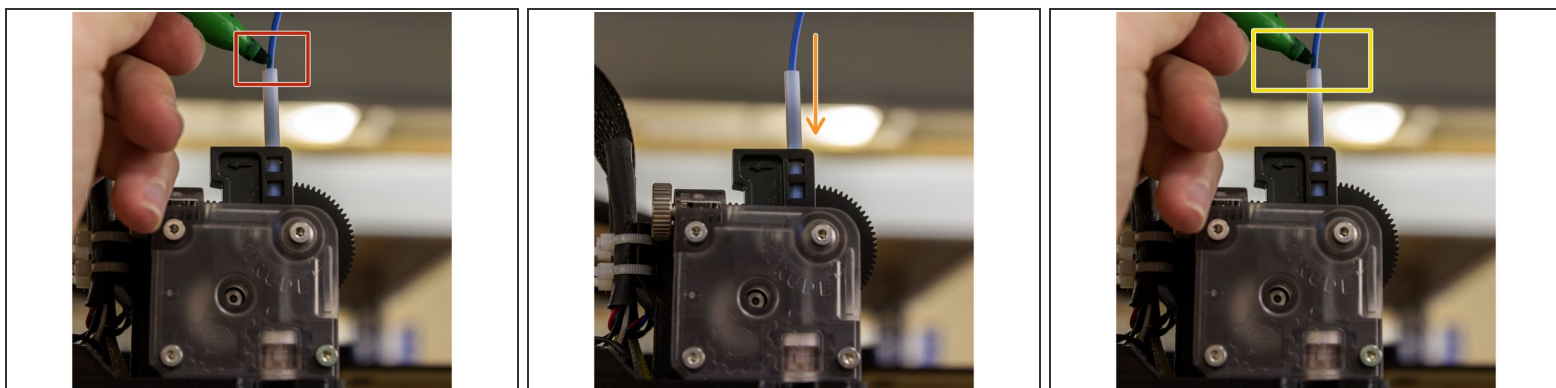
```

26
27 # Cartesian axis speed limits
28 x_axis_max_speed      30000      # Maximum speed in mm/min
29 y_axis_max_speed      30000      # Maximum speed in mm/min
30 z_axis_max_speed      300        # Maximum speed in mm/min
31
32 # Stepper module configuration
33 # Pins are defined as: ports, and pin numbers, appending '*' to the number will invert a pin
34 # See http://smoothieware.org/pin-configuration and http://smoothieware.org/stepper
35 alpha_step_pin        2.0        # Pin for alpha stepper step signal
36 alpha_dir_pin         0.5        # Pin for alpha stepper direction, add '*' to reverse
37 alpha_en_pin          0.4        # Pin for alpha enable pin
38 alpha_current         1.5        # X stepper motor current
39 alpha_max_rate        30000.0    # Maximum rate in mm/min
40
41 beta_step_pin         2.1        # Pin for beta stepper step signal
42 beta_dir_pin         0.11       # Pin for beta stepper direction, add '*' to reverse
43 beta_en_pin          0.10       # Pin for beta enable
44 beta_current         1.5        # Y stepper motor current
45 beta_max_rate        30000.0    # Maximum rate in mm/min
46
47 gamma_step_pin       2.2        # Pin for gamma stepper step signal
48 gamma_dir_pin       0.20       # Pin for gamma stepper direction, add '*' to reverse
49 gamma_en_pin        0.19       # Pin for gamma enable
50 gamma_current       1.5        # Z stepper motor current
51 gamma_max_rate      300.0      # Maximum rate in mm/min
52
53 # Extruder module configuration
54 # See http://smoothieware.org/extruder
55 extruder.hotend.enable  true     # Activate the extruder module at all
56 extruder.hotend.steps_per_mm 100   # Steps per mm for extruder stepper
57 extruder.hotend.retract_feed_rate 100 # (mm/minute) for moves where only
58 extruder.hotend.acceleration 1000 # acceleration for the stepper motor mm/sec^2
59 extruder.hotend.max_speed 50     # Maximum speed in mm/s
60
61 extruder.hotend.step_pin 2.3     # Pin for extruder step signal
62 extruder.hotend.dir_pin 0.22    # Pin for extruder dir signal ( add '*' to reverse)
63 extruder.hotend.en_pin 0.21     # Pin for extruder enable signal
64
65 # Extruder offset
66 extruder.hotend.x_offset 0       # X offset from origin in mm
67 extruder.hotend.y_offset 0       # Y offset from origin in mm
68 extruder.hotend.z_offset 0       # Z offset from origin in mm
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70 # Firmware retract settings when using G10/G11, these are the defaults if not defined, must be defined for each
71 extruder.hotend.retract_length 3  # Retract length in mm
72 extruder.hotend.retract_feedrate 45 # Retract feedrate in mm/sec
73 extruder.hotend.retract_recover_length 0 # Additional length for recover
74 extruder.hotend.retract_recover_feedrate 0 # Recover feedrate in mm/sec (should be less than
75 extruder.hotend.retract_lift_length 0 # Z-lift on retract in mm, 0 disables
76 extruder.hotend.retract_lift_feedrate 6000 # Z-lift feedrate in mm/min (Note mm/min NOT mm/s)
77
78
79 delta_current 1.5              # First extruder stepper motor current
80
81 # Second extruder module configuration
82 extruder.hotend2.enable true   # Whether to activate the extruder module at all

```

- Over USB Connection
 - Use a printer control software to connect to your printer. Send the command M92 E<your number here> to your printer.
 - Then, send M500 to store your settings
- Update your config file manually:
 - Update the following line with your new number: `extruder.hotend.steps_per_mm`. Upload your firmware as normal.

Step 6 — Extruder Steps-per-mm Tune



- i** To get a more exact value for your E-steps-per-mm, measure the exact amount of filament that is pushed out of your extruder.

 - Load filament into your extruder, just until it is gripped by the drive shaft (you can't pull it out without moving the large gear turning)
 - Mark your filament at the top of the idler arm or PTFE tubing with a pen or permanent marker .
 - Tell your printer to extrude 100mm of filament. Use your printer's LCD screen, or send it: `G92 E0`, then `G1 E100` via your printer control software.
- i** You may need to heat your HotEnd before your printer allows you to extrude filament. You can use [M302](#) command to get around that.

 - Mark your filament again at the top of your idler arm or PTFE tubing
 - Eject your filament.

line:
temperature_control.hotend.thermist
or Semitec

Step 9 — Upload Firmware



- Save the firmware to your SD card as you normally would. If you're having issues, check with your printer's manufacturer.
- If you're unsure of how to update your printer's firmware, check with its manufacturer.

You're all done. Enjoy your new Titan!

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