SilentStepStick_v10

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Sheet: 1/1

IC1 TMC2100_QFN36

CFG6/En
GND   -> Driver enabled
Vio   -> Driver disabled
Open -> Driver enabled with ramp down from 100% to 34% after about 3s

| CFG2	CFG1	Steps	Interpolation	Chopper Mode
GND	GND	1	No	spreadCycle
GND	Vio	2	No	spreadCycle
GND	Open	2	Yes to 256	spreadCycle
Vio	GND	2	No	spreadCycle
Vio	Vio	16	No	spreadCycle
Vio	Open	4	Yes to 256	spreadCycle
Open	GND	16	Yes to 256	spreadCycle
Open	Vio	4	Yes to 256	stealthChop
Open	Open	16	Yes to 256	stealthChop

Component Side View
(Bottom)

Dir

Step

nc

nc

CFG3

CFG2

CFG1

En/CFG6

VRef DIAG0 DIAG1

GND

Vio - 3.3-5V

Motor Coil 1-B

Motor Coil 1-A

Motor Coil 2-A

Motor Coil 2-B

GND

Vm - 5-45V
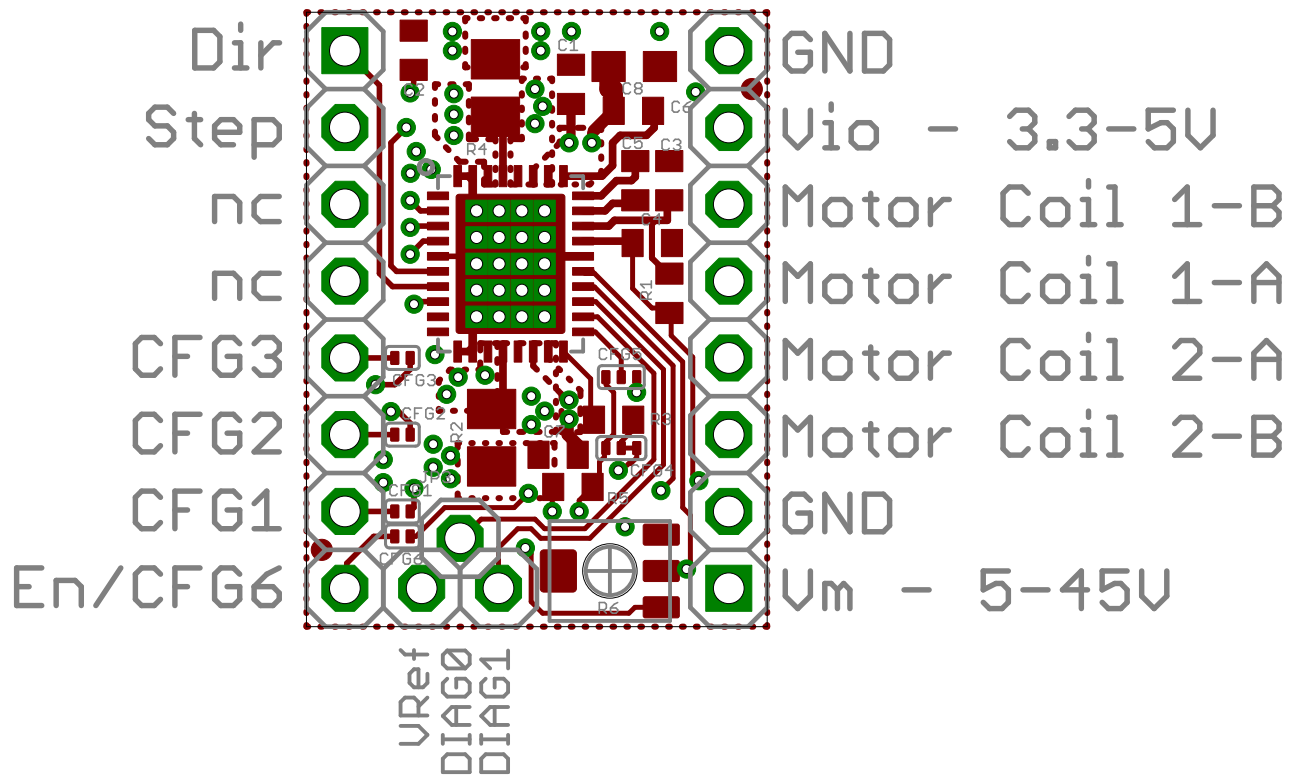
SilentStepStick

1. Pin out
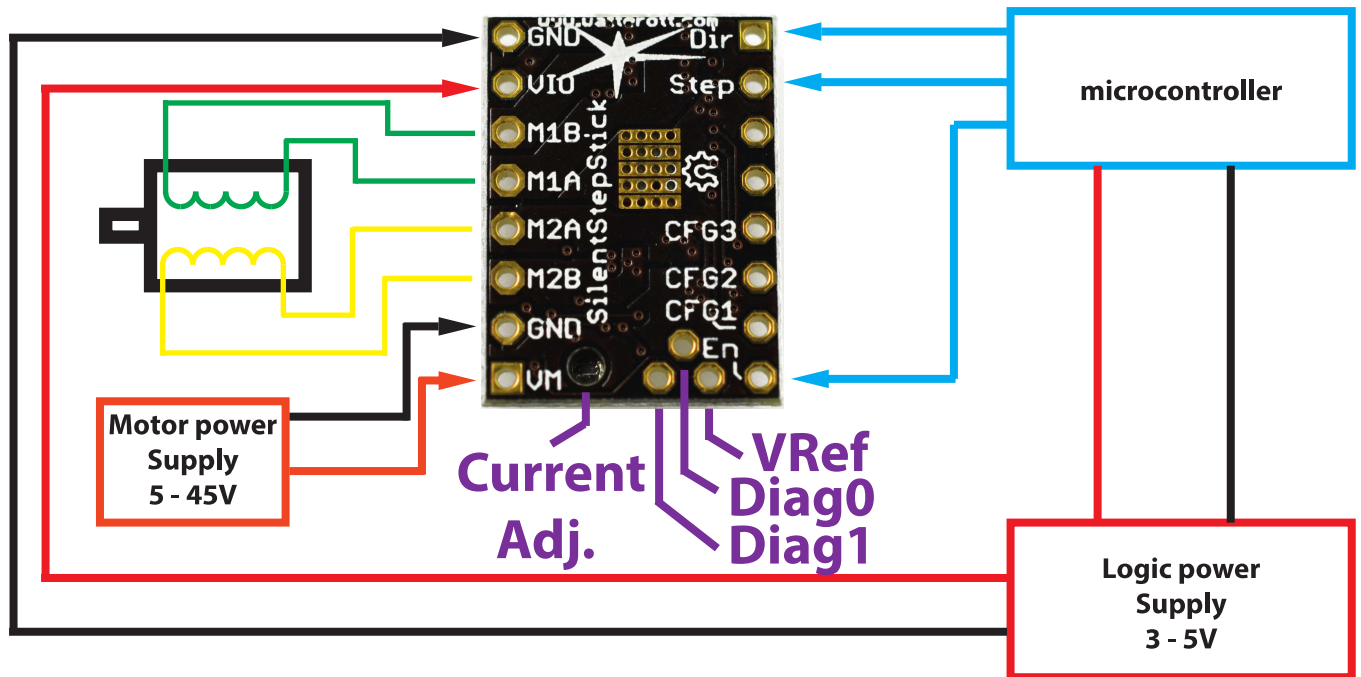
GND · Dir
VIO · Step
M1B
M1A
M2A · CFG3
M2B · CFG2
GND · CFG1
VM · En

Current Adj.
VRef
Diag0
Diag1

Motor power Supply 5 - 45V

microcontroller

Logic power Supply 3 - 5V

2. Jumper settings

CFG3
CFG2
CFG1
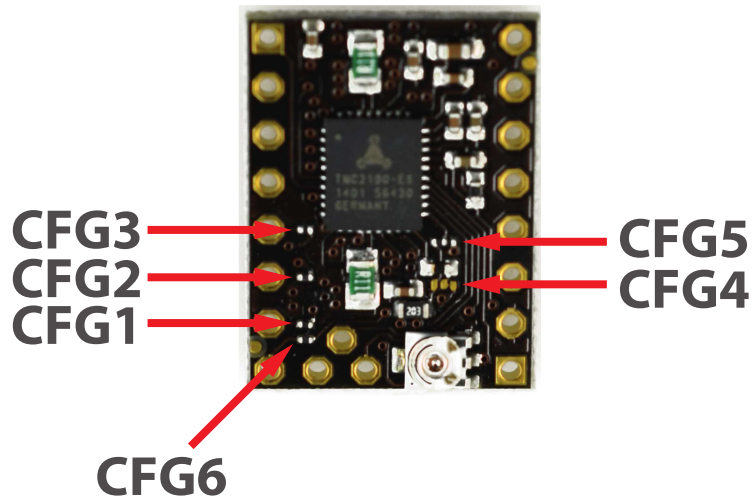
CFG5
CFG4

CFG6

Jumper	Default
CFG1	Closed
CFG2	Closed
CFG3	Open
CFG4	GND
CFG5	VCC
CFG6	Closed

3. Pin configuration

CFG0 - Chopper off time
The jumper is set to GND / 140 TCLK (recommended, most universal choice)

CFG1 & CFG2 - microstep settings for the step input

CFG1	CFG2	microsteps	Interpolation	Chopper Mode
GND	GND	1 (Full-step)	None	
VCC	GND	2 (Half-step)	None	
Open	GND	2 (Half-step)	Yes - 256µSteps	spreadCycle
GND	VCC	4 (Quarter-step)	None	
VCC	VCC	16 (µ-Steps)	None	
Open	VCC	4 (Quarter-step)	Yes - 256µSteps	
GND	Open	16 (µ-Steps)	Yes - 256µSteps	
VCC	Open	4 (Quarter-step)	Yes - 256µSteps	stealthChop
Open	Open	16 (µ-Steps)	Yes - 256µSteps	

stealthChop - for quiet operation and smooth motion
spreadCycle - highly dynamic motor control chopper

CFG3 - current setting
CFG3 is left open, so the current is set by the sense resistor (R_{Sense}) and it can be scaled via Vref (0-2,5V)

Current adjustment
The best way to set the motor current is by measuring the voltage on the Vref pin and adjusting the voltage with the potentiometer.
The max. motor current (I_{RMS}) is set by R_{Sense} (0,11 Ohm), on the board it is 1,77A.

$$I_{RMS} = \frac{V_{FS}}{R_{Sende} + 20mOhm} * \frac{1}{\sqrt{2}} = \frac{0,325V}{0,11\Omega + 0,02\Omega} * \frac{1}{\sqrt{2}} = 1,77A$$

Adjust the current:

$$I_{RMS}´ = \frac{Vref * I_{RMS\,(max)}}{2,5V}$$

Example:

$$I_{RMS}´ = \frac{1V * 1,77A}{2,5V} = 0,71A$$

A voltage from 1,0V on Vref pin sets the motor current to 0,71A

External current control
You can control the currrent also with an analog voltage from 0 - 2,5V. You only have to connect the voltage to the VRef pin and set the potentiometer to max (2,5V).

CFG4 - Chopper Hysteresis

CFG4 is set to GND, so the hysteresis is set to 4% of the full scale current it is the most common choice

CFG5- Chopper blank time

CFG5 is set to VIO, so the blank time is set to 24 clock cycles, it is the most common choice

CFG6 - Enable

GND   -> Driver enabled

Vio   -> Driver disabled

Open -> Driver enabled with ramp down from 100% to 34% after about 3s