



Installing and Configuring DRV8825 Stepper Drivers

by [dintid](#) on June 8, 2015

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Intro: Installing and Configuring DRV8825 Stepper Drivers

I recently bought 2 of the new Silent Step Sticks which I wrote an instructable about: [Install and configure SilentStepStick in RAMPS - TMC2100 Schrittmotortreiber](#) - They really impressed me, and wanted to trade up my last two A4988 drivers for a pair of DRV8825 Sticks.

So, you might ask, why didn't I either just buy two more of the TMC2100 or keep the A4988 I had? Fair questions.

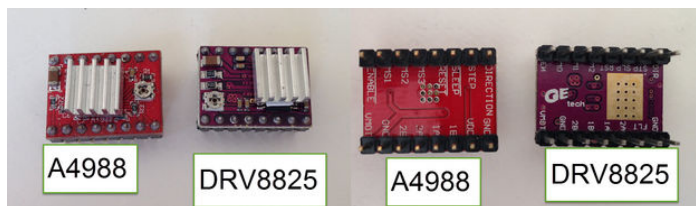
First answer is that the TMC2100 are rather expensive at 10 Euros or so a piece. At least it is expensive compared to it being a completely non-essential upgrade. I also weren't sure I would really get anything from my Z-axis. Not like it moves around a lot.

The Extruder on the other hand is moving A LOT, but I was afraid I had to crank up the power a lot on the TMC2100 and thus negate any positive effect on the noise I might have hoped for.

And here enters the DRV8825 Sticks. They go natively 1/32 at the same jumper settings the A4988 runs 1/16, which directly translates into a more silent running (potentially). They also have a heck of a lot of amperage headroom. More than I'm going to use on my small printer. Especially since I run a geared Extruder and have a very efficient Nema 17 motor that doesn't require much to put out a lot of torque.

I found two of these for 3 Euros, including freight on eBay. Even came with heatpads and fine heatsinks, which you want.

So, what I hope to achieve here is less noise and enough power to go by :)



Step 1: Preparing, Installing and configuring on RAMPS

Not much to it, but the small steps are important.

Preparations

Clean up the chip and heatsink with some Isopropyl-alcohol, attach the heatpad and heatsink. Carefull not to put sticky fingers on them.

I ran my old A4988 at 1/16 and I want to take advantage of the 1/32, so I'll just leave all three jumpers in place under each stepper.

Then install the new steppers with the potentiometer pointing the opposite way of the A4988 (see images).

That means the driver is installed with the potentiometer close to the Ramps power plug.

Configuring Vref

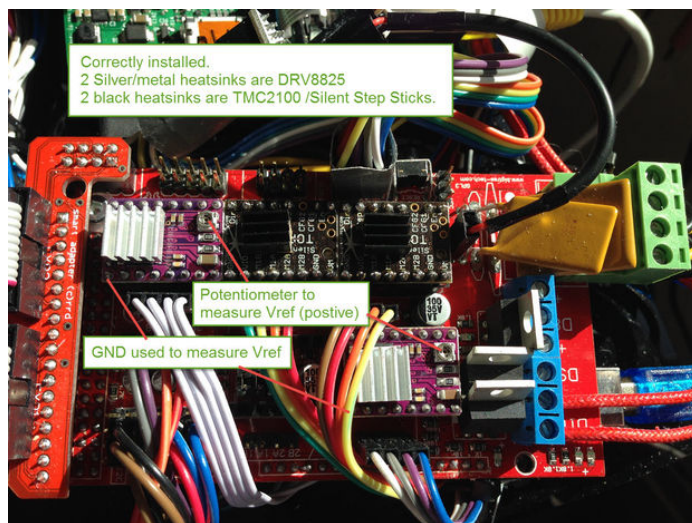
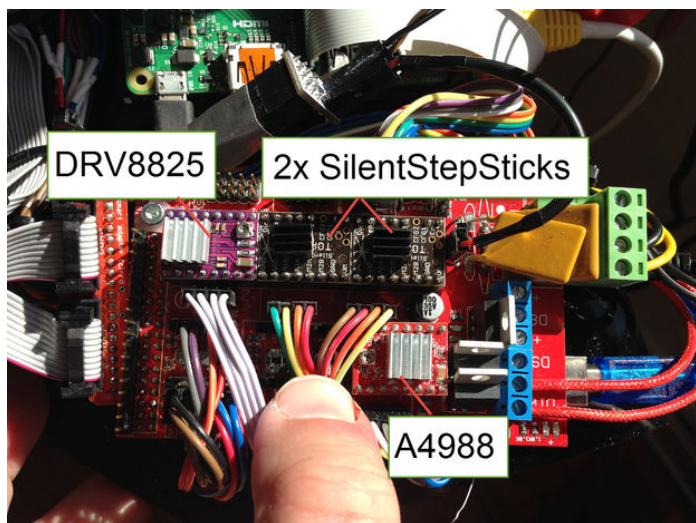
In order to measure Vref you first need to turn on your printer as you normally would. If you only connect using USB, but not external power, you get a wrong reading.

You need to turn on your multimeter and set it at 2v. Put the red one on the potentiometer and the Black one on the Gnd pin. Both are marked on the images here.

Before starting this I read they come with a very high vref setting, and it is recommended to start around 0.5v Vref. After measuring mine, I can confirm they come with a very high initial setting. Mine both came at 1,65v or so! - Yours might be different, which just underlines the importance of doing this.

Contrary to normal potentiometer usage, the ones on DRV8825 are lowered by turning clock-wise, so that is what we will do, to we hit 0,5v on each. - A quarter of a full turn lowered it to 0,7v, - after that it goes very, very rapidly down, so aim for the quarter of a turn + a tiny tad more.

After fiddling alot I had mine around 0,6v and will give it a go before spending more time on this.



Step 2: Modifying the firmware and final words

Modifying firmware

We also need to double the steps we have listed for the motors we just changed the Stepper Drivers on.

Fire up your Arduino IDE, open the Marlin firmware and open the **Configuration.h** sketch*

* Each document is called a sketch, and is selected by clicking the different tabs.

Hit CTRL+F and write **movement settings** (be sure to have marked the "ignore case", or write with all capitals)

I'll recommend you save the original info on a new line with a preceding double // to mark it as a comment. You can see I have comments on all my axes.

I assume you ran 1/16 on the affected axes, so you just simply need to double that number. Notice I kept comments on both the old and new one as I might want to change back at a later point, and because it is nice to know why my settings are as they are now.

I pointed out my resolution as well. As you can see it is very high, and I'm really never going to use that high resolution, but the noise should be lower, higher microstep-setting.

After you have entered the new values and written any comments you like, hit the Upload button (arrow pointing to the right).

I have seen some other guides which tells you to flip the wires, but that is really not needed. I do not know why they say that.

Further reading

If you want to read more on this subject, you can go here: http://reprap.org/wiki/Pololu_stepper_driver_boar...

Links to the original Pololu pages:

DRV8825 Stepper Motor Driver Carrier, High Current

Old version: md20a: <https://www.pololu.com/product/2132>

New version: md20b: <https://www.pololu.com/product/2133>

Final Words

My printer is now doing its first print, and I must say I can't really tell the difference. Both the Z-axis and the Extruder motor is doing a great job at the 0.6v vref.

One thing about the DRV8825 is that they are supposed to run way cooler. Seeing as I have DRV8825 and TMC2100 Stepper Drivers only now, I can safely remove my actively cooling solution.

```
570 /**
571  * MOVEMENT SETTINGS
572  */
573
574 #define HOMING_FEEDRATE (20*60, 20*60, 10*60, 0) // set the homing speeds (mm/min)
575 // M52 g-code can set the steps per mm in real time. Here is an example with your result for X axis.
576 // M52 X30.00
577 // Z axis: 118 steps (200 pr revolution). Screw pitch 8. 1/16 - 1mm/400 steps - 0.0025mm
578 // Z axis: 1.8 steps (200 pr revolution). Screw pitch 8. 1/16(1/32 DRV8825) - 1mm/800 steps - 0.00125mm
579 // X and Y with 20/36 gears - 1/16 stepping - 1mm/144 steps = 0.006944mm.
580 // Extruder using my large bit: 93.7821
581 // Extruder using NPS 145.5-152
582 // Extruder Geared 47/9 = (200*16) * (47/9) / (7 * 3.14159) = 30090.3184023972 -> 808,4067429812794
583 // Extruder Geared 47/9 = (200*32 DRV8825) * (47/9) / (7 * 3.14159) = 1519,8046768809764 -> 1616,813485962547
584 // 200 steps, 1/16(1/32 DRV8825) microstepping. Large gear, Small Gear. Hobbed bolt. Gear ratio diameter. Pi
585 #define DEFAULT_AXIS_STEPS_PER_UNIT {144,144,800,1616,813485962547} // default (60,60,4000,500)
586 #define DEFAULT_MAX_FEEDRATE {200, 200, 100, 50} // 100,100,50,25(mm/sec) // default (300, 300, 5, 25)
587 #define DEFAULT_MAX_ACCELERATION {3000,3000,100,1000} // 1000.1000.100.1000 (3000,3000,100,10000)X, Y, Z, E max
588 // default (3000,3000,100,10000)
```

Z axis resolution

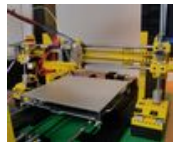
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Comments

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dintid says:

Jun 8, 2015, 11:53 PM [REPLY](#)

Please let me know about your experiences with these and other stepper drivers. I haven't used mine a lot, but they seem to be more quiet than the A4988's. I have heard from some people who complain about a very loud whine, which mine doesn't do, luckily. But the whine might easily come down to the motor used or the person listening to it, or both.
