uStepper

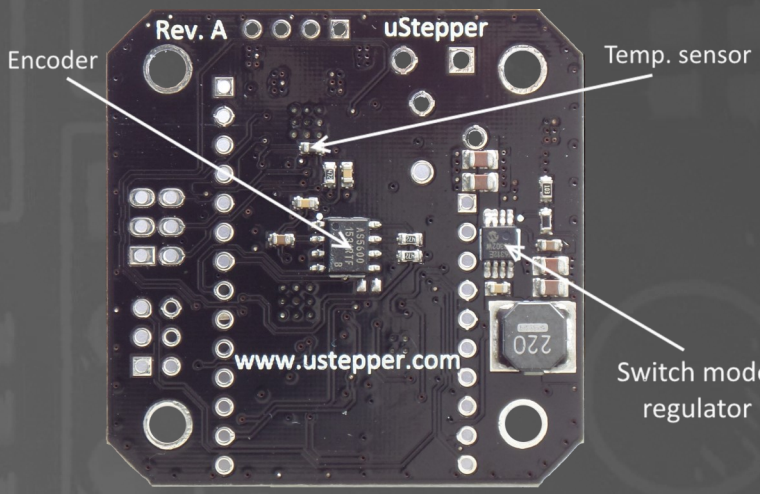
product description

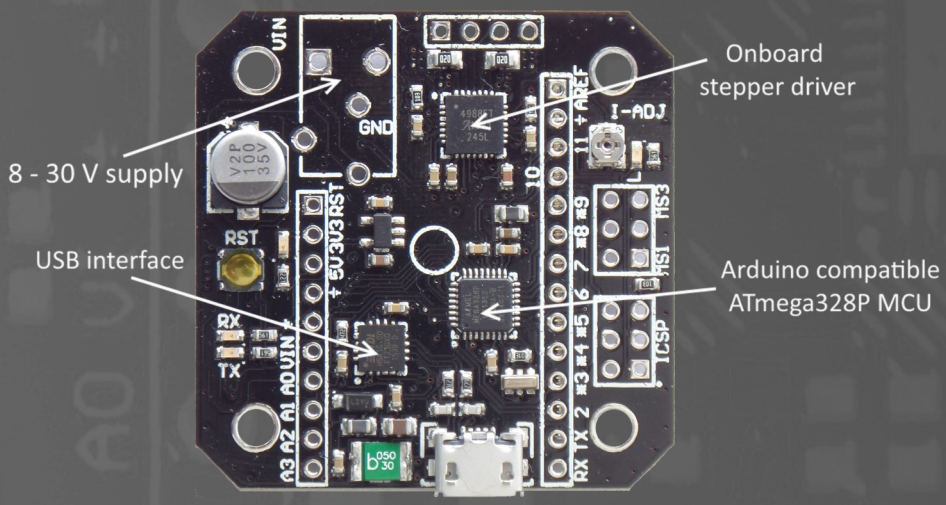
Microcontroller, stepper driver and encoder in an ultra-compact design!

By ON Development IVS

Features & technical specifications

uStepper is an ultra-compact Arduino compatible board, with integrated stepper driver and 12-bit rotary encoder, enabling the uStepper to be mounted directly on the back of a NEMA 17 size stepper motor. This makes it possible to develop applications using a stepper motor, without the need for long and messy wiring to an external Arduino/stepper shield. Furthermore the 12-bit rotary encoder ensures that the absolute position of the motor shaft can be tracked, enabling the uStepper to detect any loss of steps.





Microcontroller	ATmega328P (16 MHz)
I/O Voltage	5 V
Input Voltage (recommended)	8 - 24 V
Input Voltage (max)	8 - 30 V
Digital I/O pins	12 (6 of which provide PWM)
Analog I/O pins	4
DC Current per I/O Pin (max)	40 mA (max 200 mA total I/O draw)
DC Current for 5 V Pin (max)	800 mA (not on USB power)
DC Current for 3.3 V Pin (max)	50 mA
Stepper drive current	Up to 2A (adjustable)
Microstepping	Up to 16x (selectable)
Encoder resolution	12 bit
Dimensions	41.8 x 41.8 x 14.5 mm
Weight	~13g

The 5 V switch mode regulator makes it possible to supply uStepper with up to 30 V (24 V recommended). This would be impossible with a linear regulator design.

A temperature sensor is located near the stepper driver, allowing you to continuously monitor the temperature and take action, should the temperature get too high.

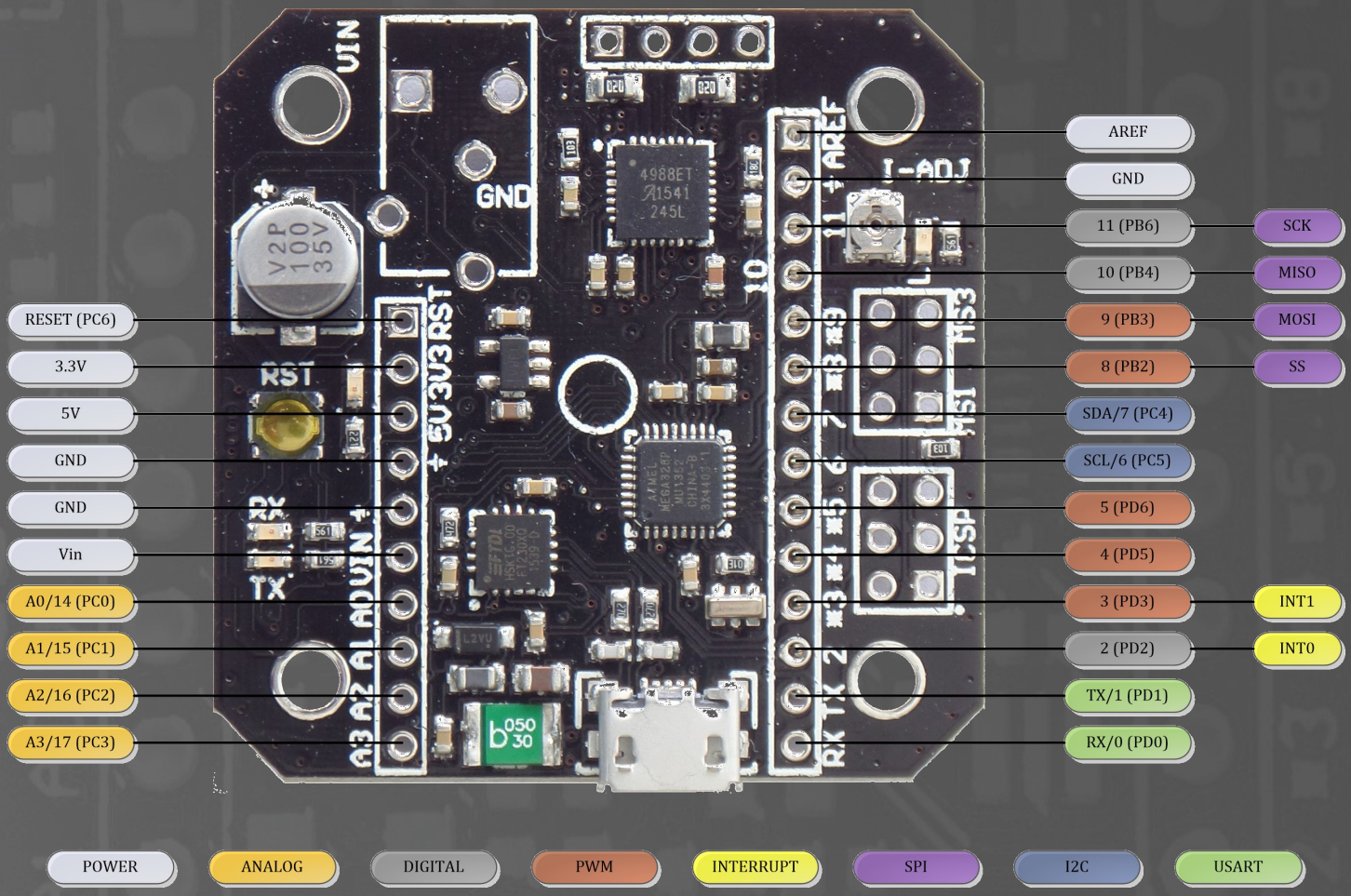
Microstepping is selected by jumpers MS1 to MS3 (it is also possible to solder them on the back of the board for permanent microstep setting). Current limit is adjusted using the on-board potentiometer.

Microstep setting	MS1	MS2	MS3
Full step	No	No	No
1/2 step	Yes	No	No
1/4 step	No	Yes	No
1/8 step	Yes	Yes	No
1/16 step	Yes	Yes	Yes

Current Limit = 6.25 x Vref

Where Vref is measured on the potentiometer screw and can be between 0 and 313 mV, resulting in 0 - 2 A current limit.

uStepper PIN mapping



As it can be seen from the PIN mapping above, uStepper offers a vast amount of GPIO's from it's ATmega328P MCU. This makes the uStepper capable of interacting with various sensors, actuators, communication modules etc. - Besides functioning as a stepper driver with feedback capability.

Applications

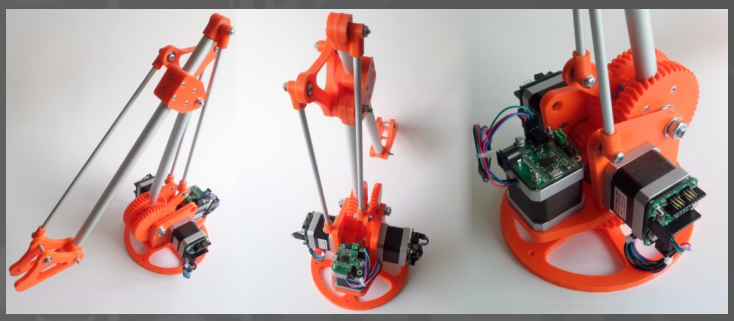
Because of low cost and reliability stepper motors are favored over servo drives in a variety of applications, as for example robots, CNC machines, 3D-printers etc. With added feedback uStepper can add a new dimension to stepper operation utilizing closed loop control or correction of missed steps - making the stepper even more appealing than a more costly servo drive. With the numerous features and the vast amount of I/O's (including various busses), uStepper is the choice for DIY hobbyists when in need of a reliable, precise and compact actuator for almost any application.

Almost unlimited applications and ease of programming using the Arduino IDE also makes uStepper well suited for educational purposes.

"After all, learning just gets a bit more fun when there's movement involved!"

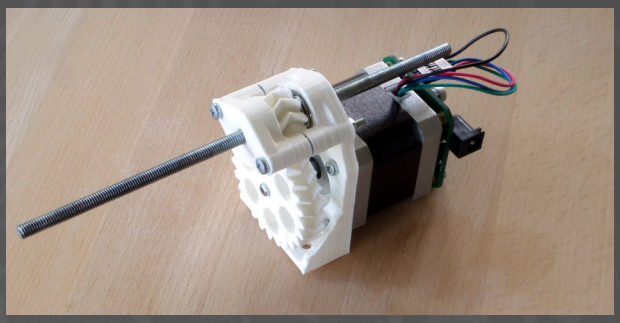
Application examples

Robotic arm using 3 uSteppers



The preliminary uStepper robotic arm design is a good example of how 3 uSteppers can be put to use in an exciting and educational application. If you are eager to learn about kinematics, or just want to have your own cool robot arm at home, this could be a good candidate.

Multi purpose linear actuator



The linear actuator is fitted tightly on a NEMA 17 sized stepper motor. The ultra compact uStepper fitted on the stepper gives precise control with possibility for feedback – giving the opportunity to compensate for lost steps if needed.

Detailed description, design files and more examples can be found on www.uStepper.com

Contact

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