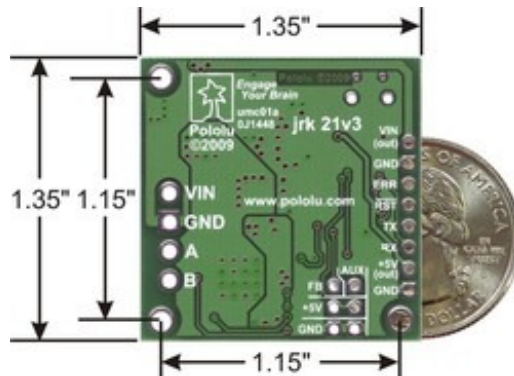Pololu Jrk 21v3 USB Motor Controller with Feedback
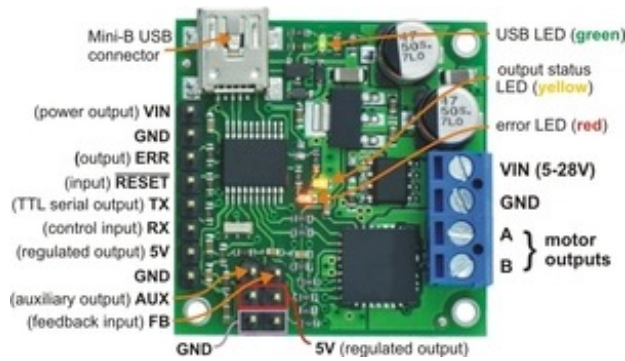
Overview

The jrk 21v3 is a versatile, general-purpose motor controller that supports a variety of interfaces, including USB. The broad operating range from 5 V to 28 V and continuous output current of 3 A (5 A peak) allow this board to control most small DC brushed motors. Analog voltage and tachometer (frequency) feedback options allow quick implementation of closed-loop servo systems, and a free configuration utility (for Windows) allows easy calibration and configuration through the USB port.

Key improvements over competing products and earlier Pololu motor controllers with feedback include:
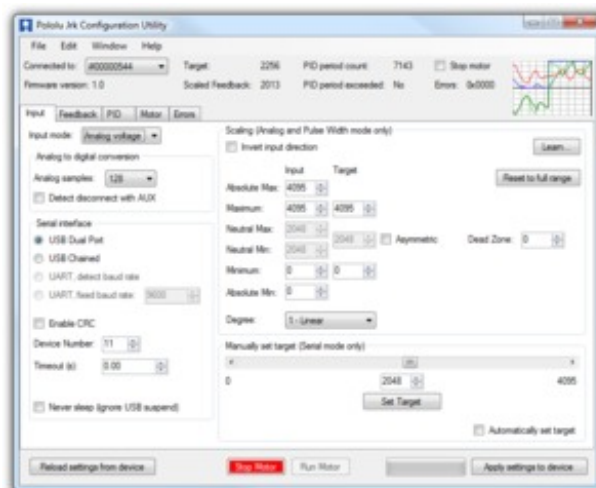
- **USB connectivity with emulated serial (COM) port allows direct motor control from a PC.**

- **Ultrasonic PWM to eliminate switching-induced motor shaft hum or whine.**

- **Robust, high-speed communication protocol with user-configurable error condition response.**

- **High internal resolution (12 bits) for smooth and flexible calibration to various input and feedback devices.**

- **Current sensing and limiting.**

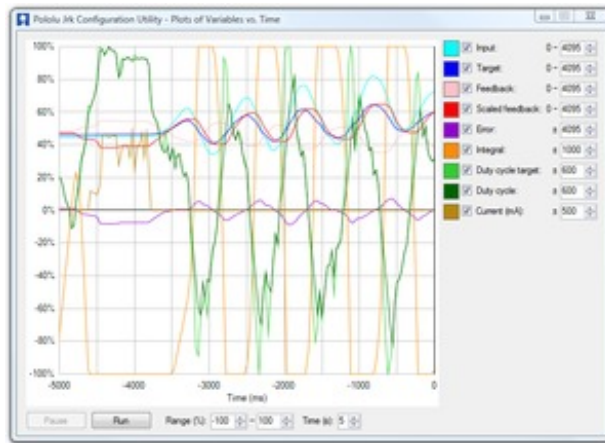- **Reversed power protection.**

- **Field-upgradeable firmware.**

Note: A USB A to mini-B cable (not included) is required to connect this controller to a computer.

Main Features of the Jrk 21v3

- **Simple bidirectional control of one DC brush motor.**

- **5 V to 28 V operating supply range.**

- **3 A maximum continuous current output (5 A peak).**

- **Four communication or control options:**
  1. USB interface for direct connection to a PC.

  2. Full-duplex, TTL-level asynchronous serial interface for direct connection to microcontrollers or other embedded controllers.

  3. Hoy radio control (RC) pulse width interface for direct connection to an RC receiver or RC servo controller.

  4. 0–5 V analog voltage interface for direct connection to potentiometers and analog joysticks.

- **Two closed-loop feedback options:**
  1. 0–5 V analog voltage.

  2. Frequency/tachometer digital input up to 2 MHz with 1 ms PID period. (Open-loop control with no feedback also available.)

- **Simple configuration and calibration over USB with free configuration program (Windows 8, Windows 7, Vista, and Windows XP compatible).**

- **Configurable parameters include:**
  - **PID period and PID constants (feedback tuning parameters).**
  - **Maximum current.**
  - **Maximum duty cycle.**
  - **Maximum acceleration.**
  - **Error response.**
  - **Input calibration (learning) for analog and RC control.**

- **Optional CRC error detection eliminates communication errors caused by noise or software faults.**

- **Reversed power protection.**

- **Field-upgradeable firmware.**

- **Optional feedback potentiometer disconnect detection.**
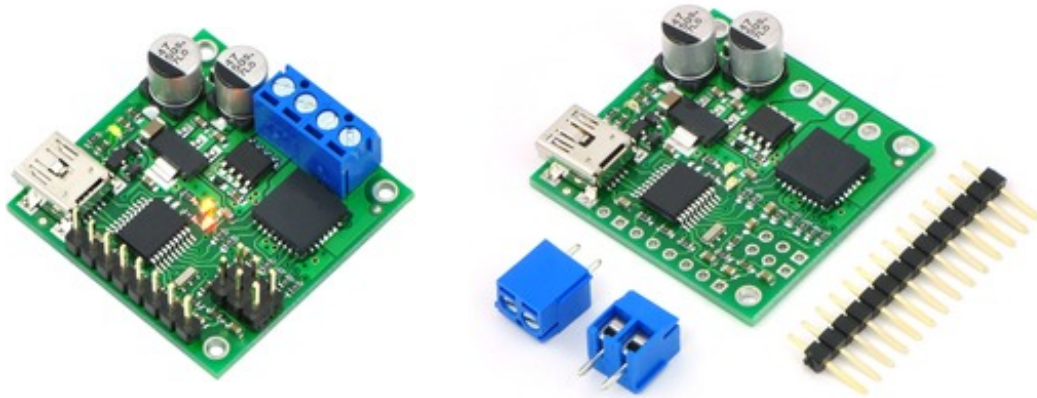
- **Comprehensive user's guide.**

Specifications

Motor channels:	1
Operating voltage:	5 – 28 V
Continuous output current:	3 A
Peak output current:	5 A
Auto-detect baud rate range:	300 – 115,200 bps
Available fixed baud rates:	300 – 115,200 bps
Available PWM frequencies:	20 kHz, 5 kHz
Reverse voltage protection?:	Yes
USB connector style:	USB Mini-B

The jrk 21v3 is the smaller of two jrk motor controllers. For a higher-power version, see the jrk
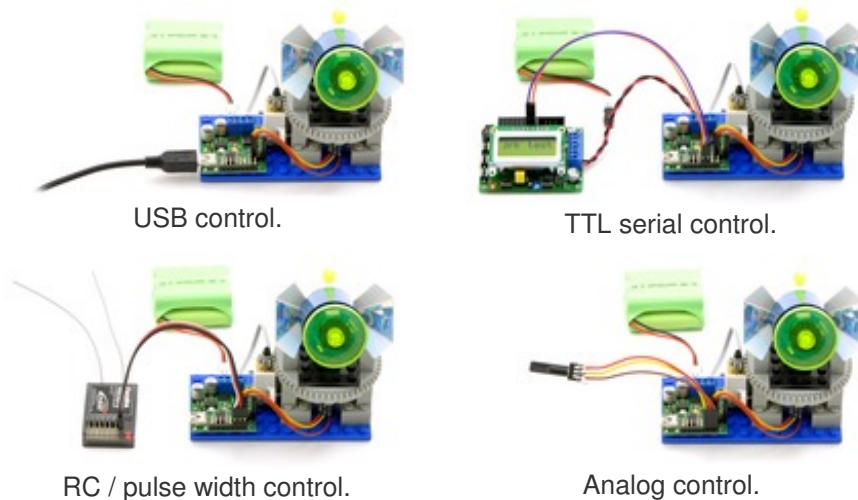
12v12.

Included Hardware

The jrk 21v3 is available in two versions: "fully assembled" with terminal blocks and 0.1″ male header pins pre-installed (left picture above), and connector-free (right picture above). The connector-free version includes a straight 0.1″ breakaway male header strip and two 3.5mm, 2-pin terminal blocks, but these parts are not soldered to the board, which allows for custom installations.

The three mounting holes are intended for use with #2 screws (not included).

Example Feedback System – 4 Methods of Control

USB control.

TTL serial control.

RC / pulse width control.

Analog control.

Documentation on producer website.

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