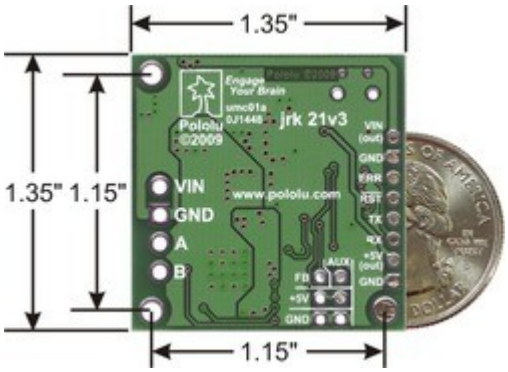
RB-Pol-128
Pololu Jrk 21v3 USB Motor Controller w/ Feedback

The jrk 21v3 motor controller is a highly configurable brushed DC motor controller that supports four interface modes: USB, logic-level serial, analog voltage, and hobby radio control (RC). The controller can be used with feedback for closed-loop speed or position control, or it can be used without feedback as an open-loop speed control. The continuous output current is approximately 3 A in the recommended operating range of 8–28 V, with derated performance down to 5 V and transient protection to 40 V. The board ships with connectors installed as shown (no soldering required).

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 7, Vista, or Windows XP) 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. Hobby 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 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.

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 14×1 straight 0.100" 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.

General specifications

Motor driver:	MC33926
Motor channels:	1
Control interface:	USB; non-inverted TTL serial; RC servo pulses; analog voltage1
Minimum operating voltage:	5 V
Maximum operating voltage:	28 V
Continuous output current per channel:	3 A
Peak output current per channel:	5 A
Current sense:	0.5 V/A2
Maximum PWM frequency:	20 kHz
Minimum logic voltage:	4 V3
Maximum logic voltage:	5 V
Reverse voltage protection?:	Y
Partial kit?:	N

Notes:

1. Autodetects baud rates between 300 and 115,200 bps, or can be set to any fixed baud rate in this range.

2. Current readings are converted to a digital number from 0-255.

3. In RC mode, the pulses can be as low as 2V.