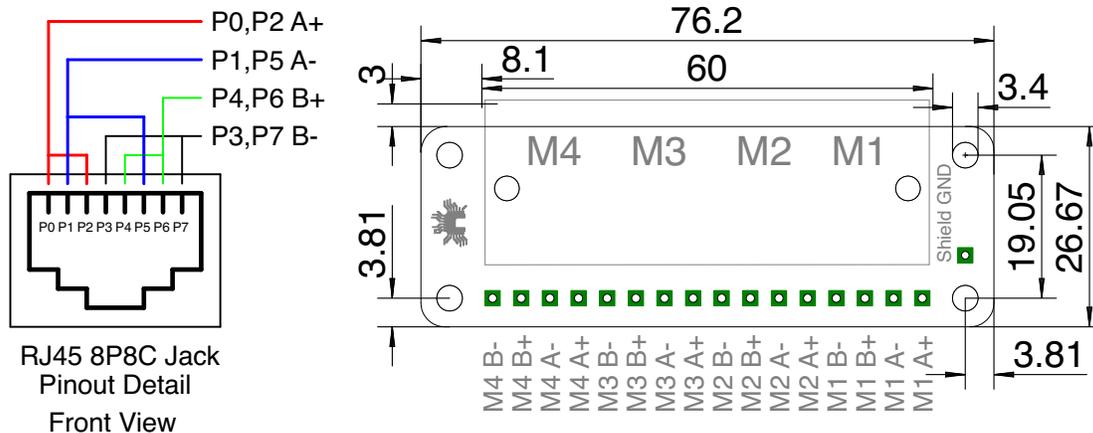


# Creltek RJ45 Stepper Breakout v1.1

Top View



All dimensions in millimeters. Tolerance  $\pm 0.5$  mm.

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The Creltek RJ45 Stepper Breakout board provides RJ45 jacks for up to four stepper motors. Each jack provides four motor drive signals on specially selected differential pairs within the cable, allowing twice the drive current compared to conventional stepper wiring and cutting power loss by half, while reducing EMI and crosstalk within the cable. The result is a cleaner drive signal that causes less noise and heating in both your motors and your drive controller, and less electrical interference. The use of shielded CAT6 connectors and cable enables a low-cost, flexible, highly reliable, and readily available wiring solution. The breakout board can be mounted behind a panel if desired, and features four mounting holes suitable for M3 screws, along with a solder terminal for a lead to earth ground, to enhance EMI shielding (labeled “Shield GND” above).

## Usage

Along the front of the board are four shielded RJ45 jacks, supporting drive signals for up to four stepper motors. This board is designed for stepper motors using four wires per motor. These wires are conventionally labeled A+, A-, B+, and B-. The A+ and A- wires are the positive and negative signals for coil “A” within the motor, and B+ and B- are the positive and negative signals for coil “B”. **NOTE:** The direction of a stepper motor can be easily reversed by swapping either A+ and A-, or B+ and B- at any connection point.

Although there are eight pins in each RJ45 jack (and eight signal wires in each CAT6 cable), only four motor signals are carried, using wires in pairs. This arrangement can be seen in the pinout detail above. By using two physical wires for each motor signal, twice the drive current can be carried (power loss within the cable is reduced by one half). It also increases system reliability in the case of a faulty connection or wire breakage.

Along the back of the board are a set screw terminal blocks with a total of 16 connections. These are grouped into sets of four. Each set of four terminals is connected to the jack immediately to the front (the closest jack). The correspondence between screw terminals and RJ45 jacks is detailed in the drawing above. “M1 A+” refers to the A+ signal for jack M1, “M2 A-” refers to the A- signal for jack M2, etc.

There are a variety of different wire color-coding schemes for four-wire stepper motors. One popular scheme is “Red, Blue, Green, Black”, and the usual correspondence is:

<u>Stepper Wire</u>	<u>Function</u>	<u>CAT6 (TIA-568B) Wires</u>
Red	= A+ (positive lead for motor winding “A”)	Orange-White and Green-White
Blue	= A- (negative or “inverted” lead for motor winding “A”)	Orange and Green
Green	= B+ (positive lead for motor winding “B”)	Blue-White and Brown-White
Black	= B- (negative or “inverted” lead for motor winding “B”)	Blue and Brown

**NOTE:** Please refer to the documentation for your particular stepper motors, as they may differ. The actual colors of the wires and the names associated with them do not really matter. It is only recommended that A+ and A- be used as the positive and negative terminals for one motor winding, and B+ and B- be used as the positive and negative terminals for the other, and all motors be wired consistently.