Creltek RJ11 Sensor Breakout v1.2   Top View

P1 GND
P2 VCC
P3 Output
P4 GND

P0 P1 P2 P3 P4 P5
NC   NC

RJ11 6P4C Jack
Pinout Detail
Front View

114.3

7.75   48

7.75

3

3.81

3.81

S8 S7 S6 S5   S4 S3 S2 S1

17.78   25.4

VCC
GND
S7 / S8
S5 / S6
S3 / S4
S1 / S2

S8 S7 S6 S5   S8 S7 S6 S5 S4 S3 S2 S1   S4 S3 S2 S1

3.4
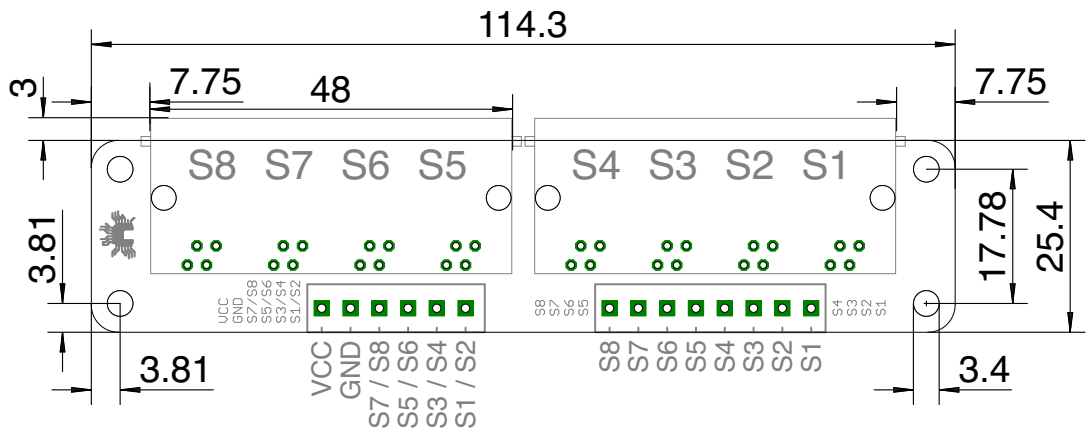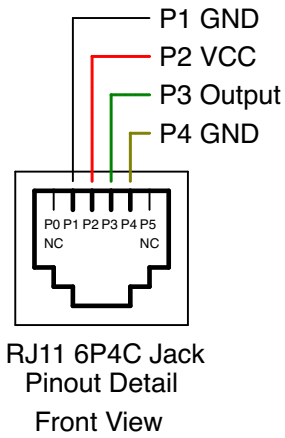
All dimensions in millimeters. Tolerance ±0.5 mm.
Specifications subject to change without notice.   © 2015-2016 Creltek

The Creltek RJ11 Sensor Breakout board provides connections for up to eight Creltek Limit Sensors. Each jack provides power, ground, and signal lines to the sensor along with proper signal termination. Miniature screw terminal blocks provide connections back to your motion control system for each sensor. "Active Low" outputs are compatible with most popular motion control systems. An optional on-board voltage regulator provides 3.3v power to the sensors, allowing the use of 4v to 12v power supplies. The breakout board can be mounted behind a panel if desired, and features four mounting holes suitable for M3 screws.

Usage

Along the front of the board are eight RJ11 jacks, supporting the connection of up to eight Creltek Limit Sensors. These jacks are labeled, from left to right, S8, S7, S6, S5, S4, S3, S2, and S1. Creltek limit sensors use a four-wire connection, which is illustrated in the pinout detail above. (Although RJ11 jacks can support up to six pins, only the center four positions are used.) Looking at the front of the jack, the pin assignments using standard four-conductor flat modular telephone cord are as follows:

Wire Color		Description	Function
Black	=	Power Ground (GND): [-] connection (0v)	Power Supply to Sensor
Red	=	Power Supply (VCC): [+] connection (3v to 6v)*	Power Supply to Sensor
Green	=	Sensor Signal, Active Low: 3.3v="normal", 0v="triggered"	Signal Return from Sensor
Yellow	=	Signal Ground (internally connected to GND)	Signal Ground

*The Creltek RJ11 Sensor Breakout board supplies 3.3v to each sensor on the VCC pin when using the on-board voltage regulator. See section on Power Supply below.

Along the back of the board are two screw terminal blocks. The leftmost block has six connections, and they are, from left to right:

Pin Label		Description	Function
VCC	=	Power Supply: [+] connection (3.3v or 4v to 12v)*	Power Supply to Board
GND	=	Power Ground: [-] connection (0v)	Common Ground
S7 / S8	=	Combined S7 and S8 Sensor Signal, Active Low	Sensor Output
S5 / S6	=	Combined S5 and S6 Sensor Signal, Active Low	Sensor Output
S3 / S4	=	Combined S3 and S4 Sensor Signal, Active Low	Sensor Output
S1 / S2	=	Combined S1 and S2 Sensor Signal, Active Low	Sensor Output

Power Supply

VCC and GND are the positive [+] and negative [-] power supply connections to the breakout board, respectively. GND also functions as a common ground between your power supply, the sensor breakout board, and your motion control device. The on-board voltage regulator accepts power between 4v and 12v DC, and provides 3.3v power to the Limit Sensors. **NOTE: Do not exceed 12v on the VCC connection.**

The on-board voltage regulator can be bypassed if you have 3.3v power directly available, or intend to operate the sensors themselves on a 5v supply. To bypass or enable the on-board regulator, bridge the appropriate solder jumper on the bottom of the board as shown:
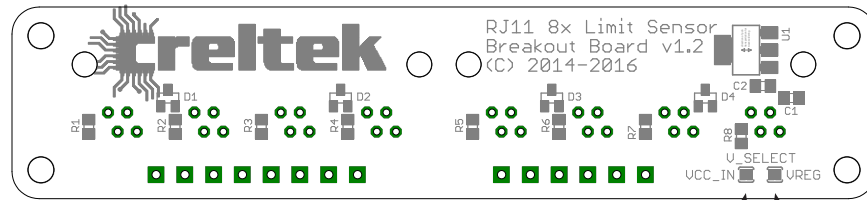
Bridge this solder jumper to *bypass* the on-board regulator.

Bridge this solder jumper to *enable* the on-board regulator.

When the VCC_IN jumper is bridged, supply power from the VCC terminal will be passed on directly to the attached sensors; Creltek Limit Sensors are designed to support power supplies between 3v and 6v. Alternatively, when the VREG jumper is bridged, the on-board regulator will supply 3.3v power to the attached sensors, as long as VCC power between 4v and 12v is supplied to the breakout board. **NOTE:** *Do not bridge both jumpers at the same time.*

NOTE: A solder jumper can be bridged by applying a small "ball" of solder to the jumper pads with a soldering iron, and dragging the iron across the two pads until a solder bridge is left between them. An existing bridge can easily be removed by applying a small amount of rosin-based flux to the bridge, and then removing the solder by swiping across it with a clean soldering iron.

Sensor Outputs

The remaining four terminals on the leftmost terminal block, labeled "S7 / S8", "S5 / S6", "S3 / S4", and "S1 / S2" are "combined" sensor output terminals for up to eight limit sensors. The outputs from two sensors in an adjacent pair are combined into a single output to support motion control systems that have a small number of limit switch inputs (e.g. a single input for each axis).

Some motion control systems have only a single limit switch input for each axis. In such a system, if the user desires both a "maximum" and "minimum" limit switch on the same axis, two "normally open" switches would be wired in parallel so that the closure of either switch will trigger a single input. The Creltek RJ11 Sensor Breakout board provides these four "combined" outputs to support a similar configuration.

For example, limits sensors attached to jacks S1 and S2 provide a single "combined" output signal on terminal "S1 / S2". When both sensors are "untriggered", the combined output "S1 / S2" will be "High" (3.3v). If *either one* of the sensors is "triggered", the combined output "S1 / S2" will be "Low" (0v). Although the motion control device will be unable to know which of the two sensors was triggered, it will know that *one* of the two was. By connecting a "X minimum" sensor to jack S1 and an "X maximum" sensor to jack S2, the combined output "S1 / S2" will indicate a limit trigger on the X axis. In the same way, jacks S3, S4, S5, and S6 can be used for "Y minimum", "Y maximum", "Z minimum", and "Z maximum" respectively, providing a combined Y axis trigger output on terminal "S3 / S4", and a combined Z axis trigger output on terminal "S5 / S6". Jacks S7 and S8 can be spare or used for rotational ("A axis") sensors as needed.

The individual ("uncombined") outputs from all sensors are available on the rightmost terminal block, which has eight connections. These connections are, from left to right: S8, S7, S6, S5, S4, S3, S2, and S1. Each terminal corresponds to a single sensor attached to the jack with the same label. These outputs are independent of the "combined" outputs and both sets of outputs can be used simultaneously, if desired.

When using the on-board voltage regulator, a "High" output (which corresponds to an "untriggered" sensor state) is nominally 3.3v. A "Low" output (which corresponds to a "triggered" sensor state) is nominally 0v. The output terminals of the breakout board are designed for connection to digital inputs on your motion controller, and are capable of sourcing or sinking a maximum of 5 mA each. If higher current handling is required, please use an appropriate buffer circuit. The 3.3v output voltage is compatible with both 5v and 3.3v CMOS or TTL logic levels. Your motion controller inputs should be biased with weak (10k to 20k) pull-up resistors (most controllers include this). For the "combined" outputs, this pull-up bias is required.