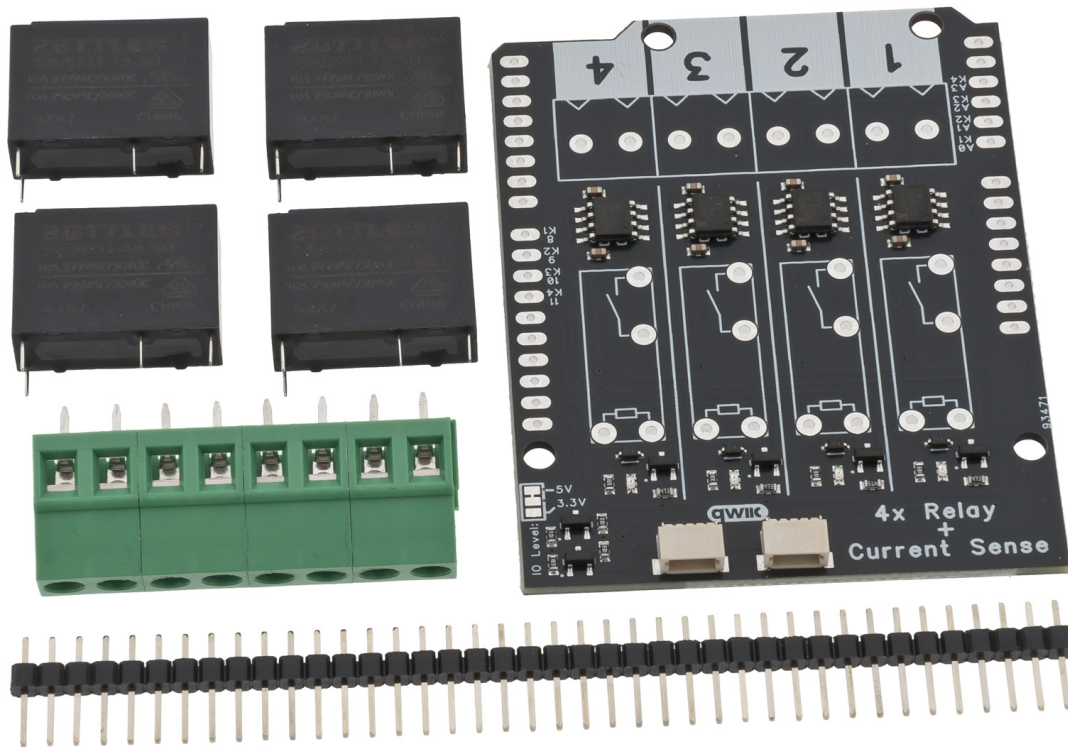


4x Relay Shield + Current Sense for Arduino UNO

Part.no. 41033167



EKM028 is a module designed for simplifying smart home conversion of appliances and machinery or any other application where isolated control over heavy loads is required and the current draw needs to be monitored.

The board contains four high-quality 10A relays from Zettler and isolated, bidirectional current sensing for each relay. The module is designed in the UNO shield form factor and will work with any Arduino UNO compatible board.

To make connecting auxillary devices easier, the board also features two QWIIC connectors for plug-and-play hookup to any I2C modules compatible with the QWIIC ecosystem.

No configuration is required for use with 5V logic level microcontrollers. To use the QWIIC connectors with a 3.3V system, change the IOLEVEL solder jumper from 5V to 3.3V.

Please note that this module is sold as a partially assembled kit. All SMD components are mounted, while relays and connectors are included but unsoldered.

Functions

- 4x Zettler AZ9371T relays
- 5mm pitch screw terminals (0.5-2.5mm²)
- 4x ACS724 Current sensor
- QWIIIC connectors for I2C peripherals
- LED indicators for relay status

Specifications

- Supported IO levels: 3.3V / 5V
 - Max current draw: 217mA (39mA no relay active)
 - Relay specifications: SPST-NO, 277VAC / 10A, 30VDC / 10A
 - Current sense range: $\pm 10A \pm 0.2\%$ (200mV/A)
 - Current sense resistance: 1.2mOhm
 - Current sense bandwidth: 250kHz
 - Dimensions: 68.6 × 53.4 mm
-

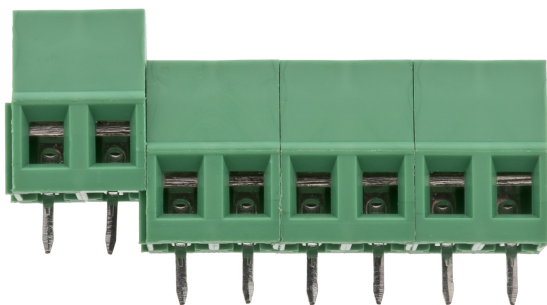
Assembly

To use the shield with an Arduino board, you need to solder the relays, screw terminals and pin headers. The best order to install the parts are screw terminals first, then relays and pin headers last.

Step 1: Screw terminals

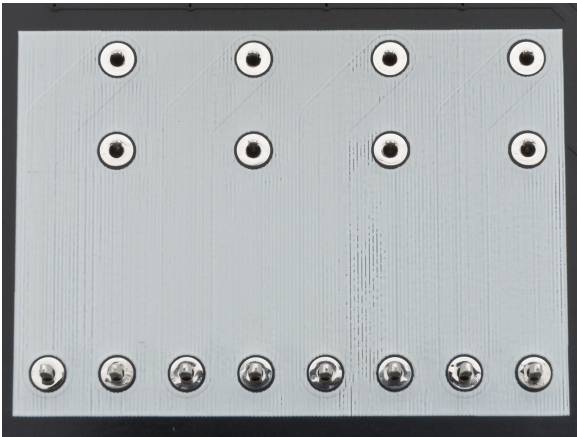
Start by connecting the four 2-pin terminals together using the small hooks on the sides.

Install the terminals in the holes near "1 2 3 4". Flip the board and solder one pin. Check to see if the terminals are still flat against the board. If not, re-heat the solder joint while pressing down on the terminal from the top. Proceed by soldering the other 7 pins.



Step 2: Relays

Solder the relays using the same technique as the screw terminals. Solder one pin on each relay first. Check if they are flat against the board. Re-heat and adjust if necessary, then solder the rest of the pins.



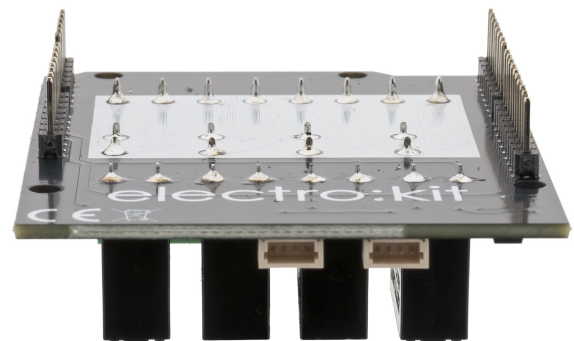
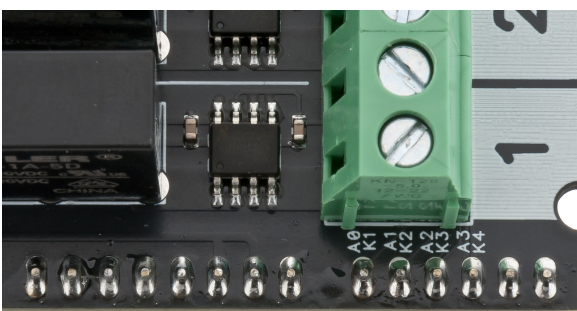
Step 3: Pin headers

Cut the long pin header into smaller pieces that corresponds with the number of holes on each side. Cut the 40 pins into: 1× 6-pin, 1× 10-pin, 2× 8-pin.

Insert the headers into the holes. The fit is tighter than the other components. This makes it a bit more difficult to insert the pins, but they'll sit straight and will be easier to solder.

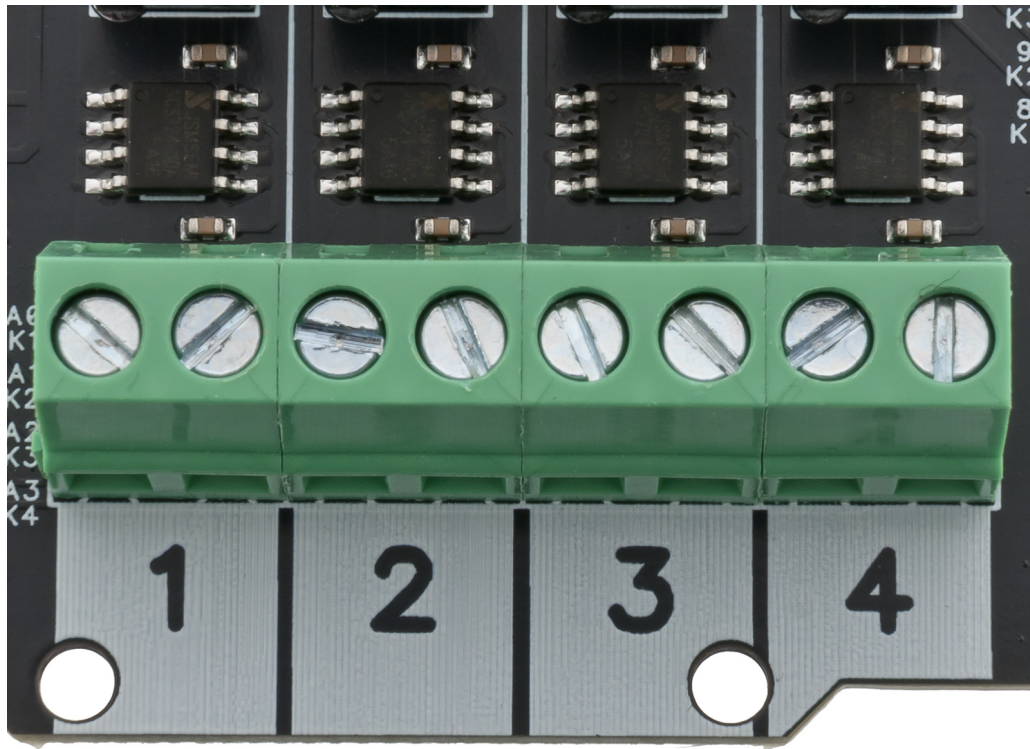
Make sure the headers are inserted all the way and that all pins are equal in height.

Solder each pin. Take care not to bridge any adjacent pins!



Connections

Relay contacts:



The large screw terminals are connected to each relay via a current sensor. The relay contacts are normally open (disconnected when powered off) and shorted when active. To use the relay in an application, simply wire the device in series with the relay. If the measured current is negative, simply flip the wires around.

Make sure that no strands from any inserted wires are exposed.

The screw terminals are made to fit wires from 0.5mm² to 2.5mm² (AWG 20 - 12).

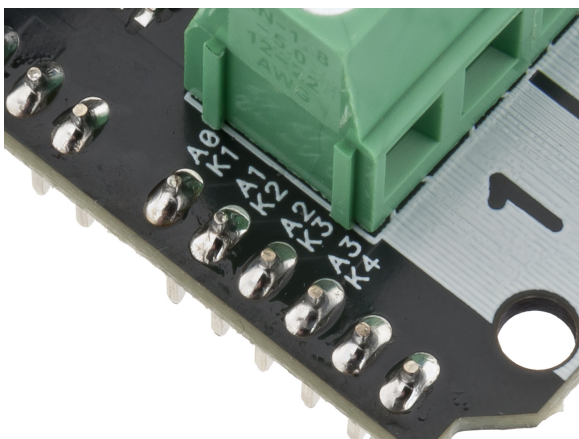
An LED next to each relay will be on when the relay is powered and the contact is closed.

QWIIC:



Two QWIIC connectors are installed on the relay shield and can be used to connect peripheral I2C devices, such as displays, sensors or IO-expanders. The QWIIC connector is a JST-SH 1.0mm pin header.

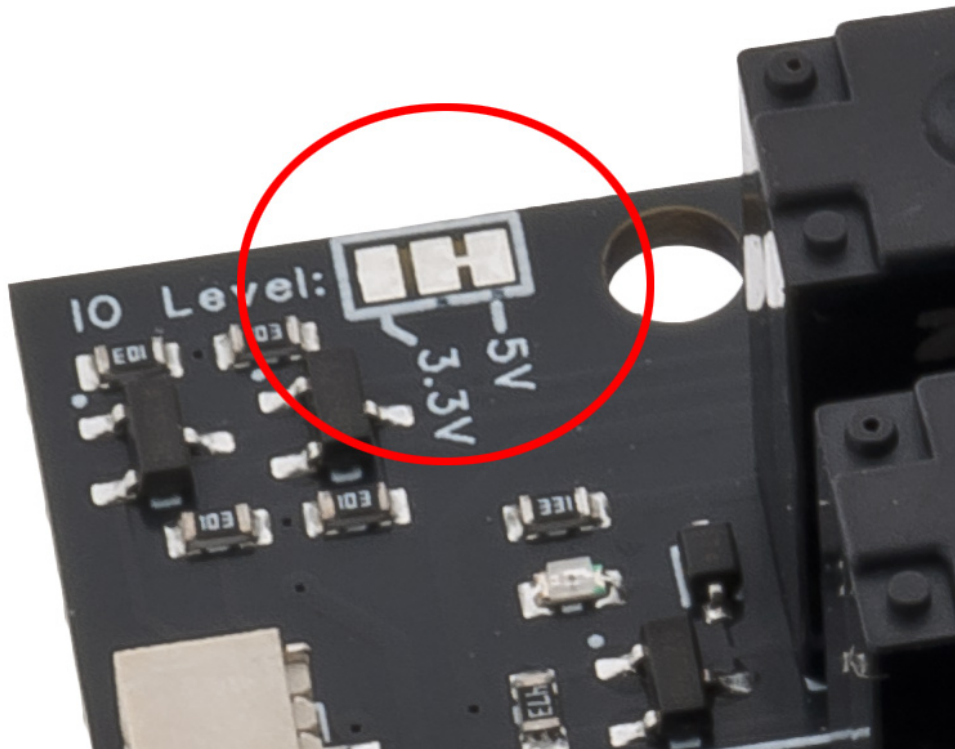
Arduino pins:



The shield uses four digital pins (8, 9, 10, 11) and four analog pins (A0, A1, A2, A3). The digital pins are outputs that control each relay, while the analog pins are inputs from the current sensors.

These pins cannot be changed and must be used exclusively for this shield.

IO level voltage selector:



The shield is pre-configured to be used with 5V systems, such as Arduino UNO. To use it with 3.3V systems, the solder jumper must be changed from 5V to 3.3V. Simply cut the trace between the center pad and 5V. Then solder a small bridge between the center and 3.3V.

Please note that only the I2C signal levels will be altered. The analog output from the current sensors can still output up to 4V (at 10A loads), take precautions not to exceed this voltage when using the shield with 3.3V systems or change the code to clamp or scale the voltage.

Arduino Examples

Toggle relays using serial monitor

Toggle relays using serial monitor and display current readings on 128×32px I2C OLED

Example code available at electrokit.com

Mechanical dimensions

