



# User Guide for the KAPtery Mini Pearl Logger Kit

Assembly and use tips: <http://kaptery.com/guides/>

This kit includes all the parts to build a data logger based on an Arduino Pro Mini microcontroller. Connections among the Pro Mini and two other electronic modules, a microSD board and real-time clock (RTC) board, must be soldered using the included wires.

## Parts List:

- Arduino Pro Mini compatible microcontroller (3.3v)
- MicroSD card board (3.3v)
- 128MB microSD card
- Real time clock (DS3231) board (3.3v or 5v)
- CR2025 coin cell battery for RTC
- Common cathode RGB LED
- Resistor for LED (ca. 0.5k $\Omega$  to 1k $\Omega$ )
- Case for three AAA batteries (has switch and leads)
- Loose headers for Pro Mini
- A bunch of 24AWG stranded wire of different colors

This kit does not include any sensors other than the temperature sensor built into the real-time clock. A sketch (program) to log temperature data from the RTC is loaded onto the Arduino Pro Mini and is available here: <http://kaptery.com/guides/>. Many types of external sensors will work with the Mini Pearl Logger. It is easy to add multiple I2C sensors like the ones on this page: <http://kaptery.com/product/addon-sensors-etc>. These sensors must operate at 3.3 volts. The sketch must be modified to operate each different type of sensor. Install the free Arduino IDE from here: <https://www.arduino.cc/en/Main/Software>.

Soldering the components according to the wiring diagram will produce a device which will log data on small batteries for a few days to weeks. Additional modifications to the components and sketch will allow the logger to collect data for many months. Lots of information about these modifications is available at; <https://edwardmallon.wordpress.com/2015/10/24/diy-arduino-logger-build-instructions-part-1/> and <https://publiclab.org/tag/mini-pearl-logger>.

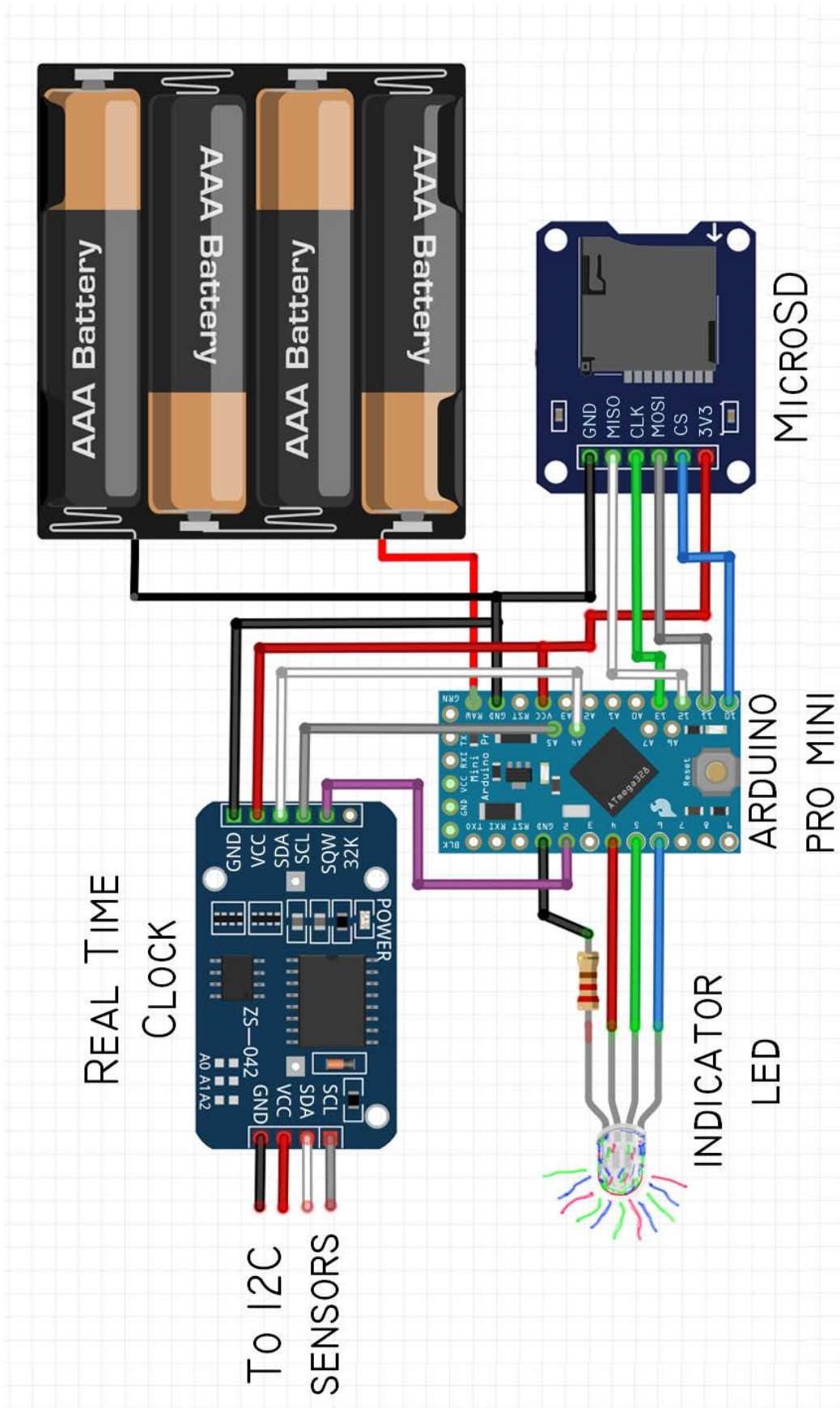
The Arduino Pro Mini does not have a USB port (that's why it can last so long on batteries), so programming the Arduino requires an FTDI module (e.g., TTL Level Serial Converter Cable) which is not included in the kit. See details here: <https://www.arduino.cc/en/Guide/ArduinoProMini>.

The included (common cathode) RGB LED is not required, but can be programmed to flash red, green, or blue when the sketch completes certain tasks. This is intended for use during programming (e.g., debugging) and for confirming that the logger is working just before field deployment. If all looks good, the LED can be disconnected so it does not use battery power. The LED is especially helpful if you remove the LEDs on the Pro Mini and RTC to extend battery life.

## Tools and supplies you must supply:

- soldering iron
- solder
- wire cutter/stripper
- heat shrink tubing (optional)
- connectors (optional)
- sensors
- cables for sensors
- FTDI converter for programming
- weatherproof enclosure for field use
- batteries

Wiring diagram:



For more information, clearer images, alternate wiring schemes, and technical support see: <http://kaptery.com/product/mini-pearl-logger-kit> or research notes about the Mini Pearl Logger at Public Lab: <https://publiclab.org/tag/mini-pearl-logger>.