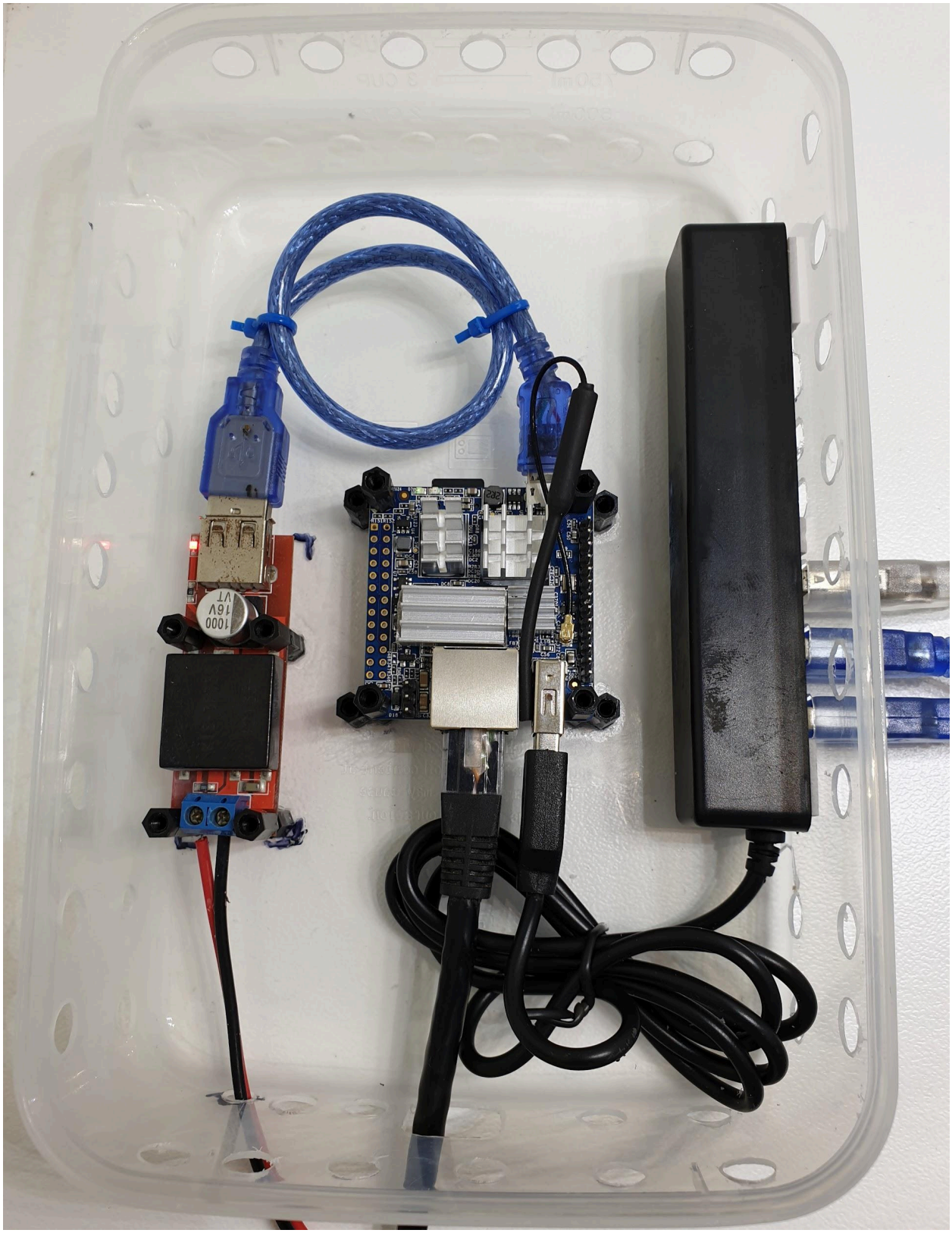
GreenSense Systems

Working Devices

The following devices are working and can be used as part of GreenSense systems.

Garden Computer

The garden computer allows connected devices to be monitored and controlled via the system user interface, or remotely by a tablet/phone via the internet.



- Left: Voltage regulator/power supply
- Center: Single board computer (Orange Pi Zero)

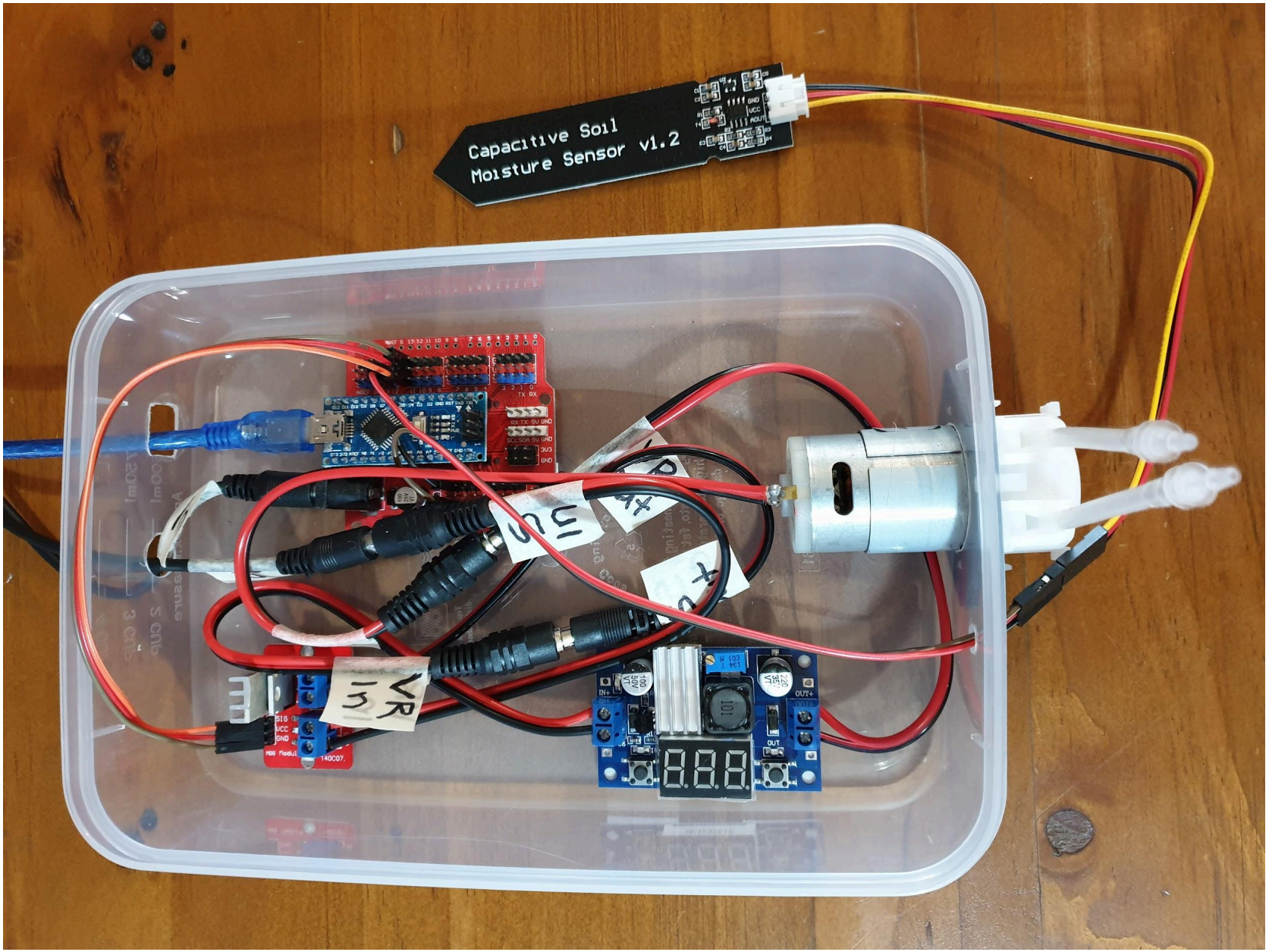
- Right: 6 port USB hub allowing up to 6 devices to be connected

System User Interface

The system user interface provides a small, low cost way for users to monitor and control all devices connected to the garden computer. It can also control devices on other garden computers.

Irrigator

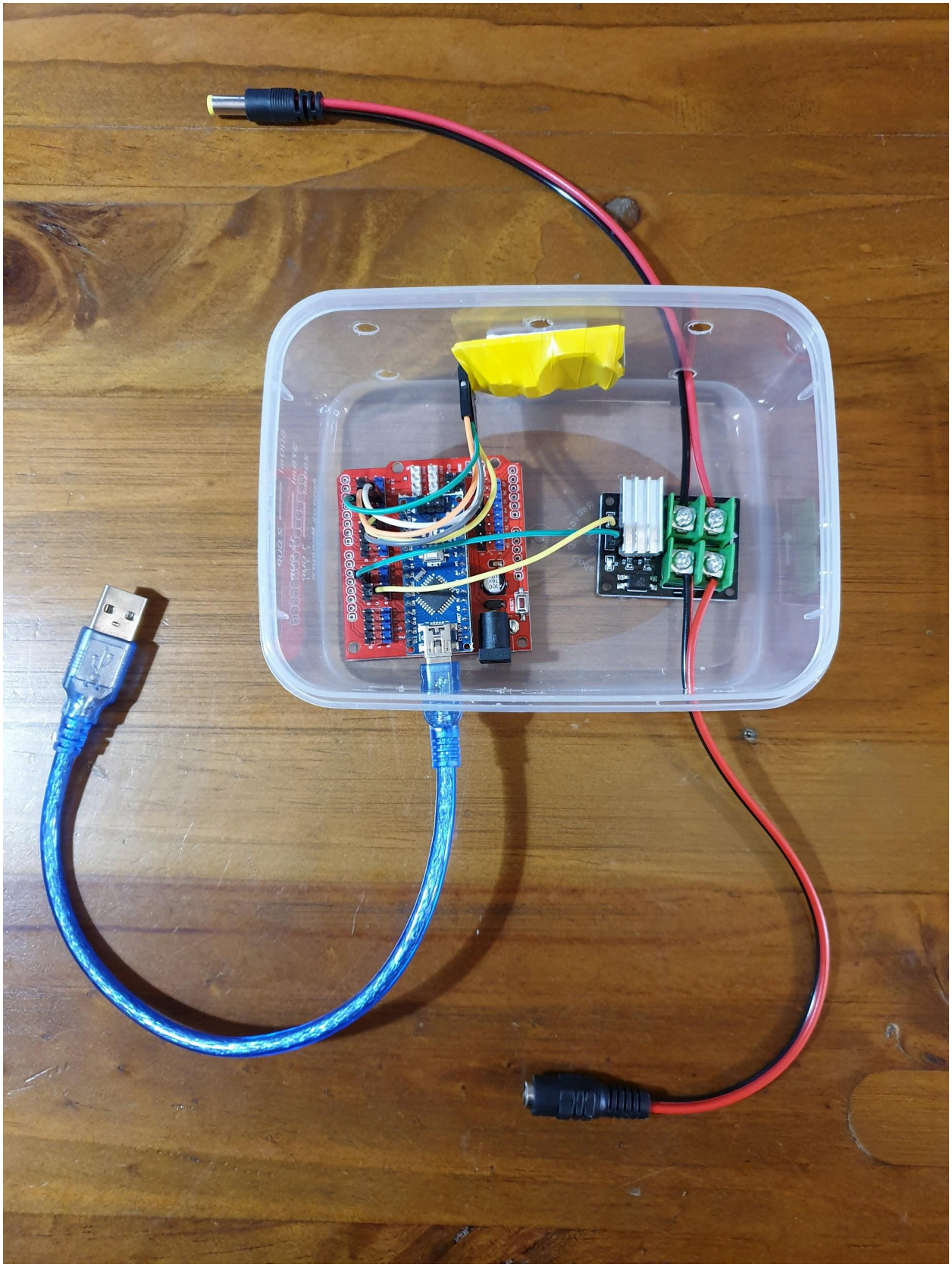
The irrigator waters plants when the soil moisture levels drop below a specified level.
It can be used with either a pump or a valve.


Capacitive Soil
Moisture Sensor v1.2
VCC
AOUT
GND
TX RX
SCL SDA 5V GND
3V3
GND
IN+
IN-
OUT+
OUT-
VCC
GND

Illuminator

The illuminator controls lighting based on:

- Timer: Turns the light on and off at specified times.
- Sensor: Turns the light on and off when light levels are either above or below a specified level



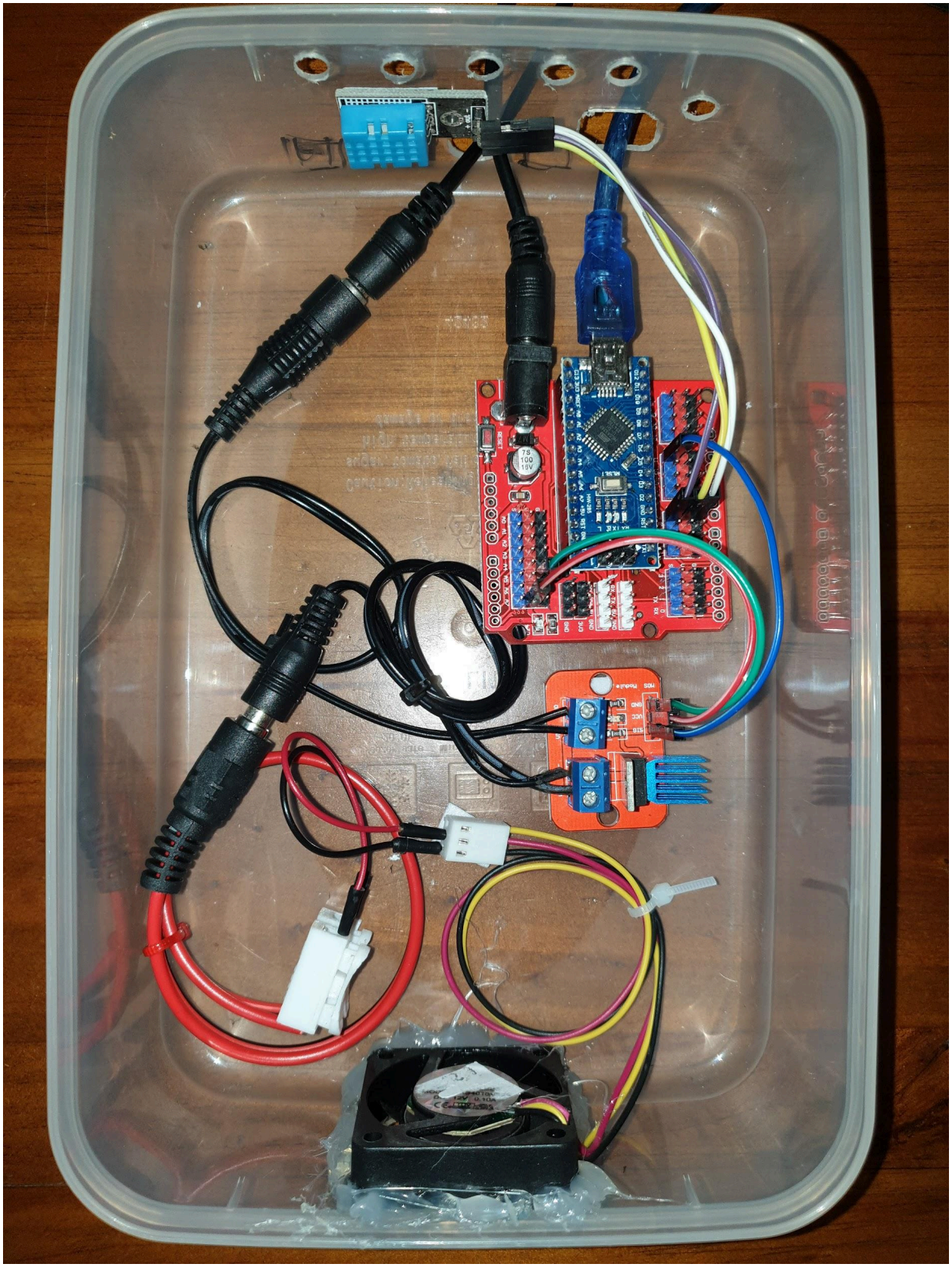
- Left: Arduino and expansion board

    - The brain of the device. Controlling the MOSFET (and therefore the light) based on the timer.
- Top: Real-time clock module
    - Keeps track of the time so the light can turn on/off and specified times
- Right: High power MOSFET module
    - Switches on/off high power lights, based on a signal from the arduino

Note: This illuminator doesn't have a light sensor because it is configured for timer mode only. But a light sensor can be added to control the light based on ambient light levels.

Ventilator

The ventilator keeps temperature and humidity within a specified range by turning on a fan if the temperature or humidity readings fall outside the specified values.



- Top (blue module): DHT Temperature/Humidity Sensor

    - Provides temperature and humidity readings to the arduino.
- Middle/top (red and blue)
    - Arduino nano in expansion board. The arduino is the brain of the device, which takes readings and controls the fan.
- Middle/bottom (red):
    - MOSFET module. Allows the arduino to switch higher power devices such as a fan.
- Bottom (black)
    - Fan. Controlled by the arduino via the MOSFET module, based on the temperature and humidity.

Demo Systems

Self Irrigating Pot

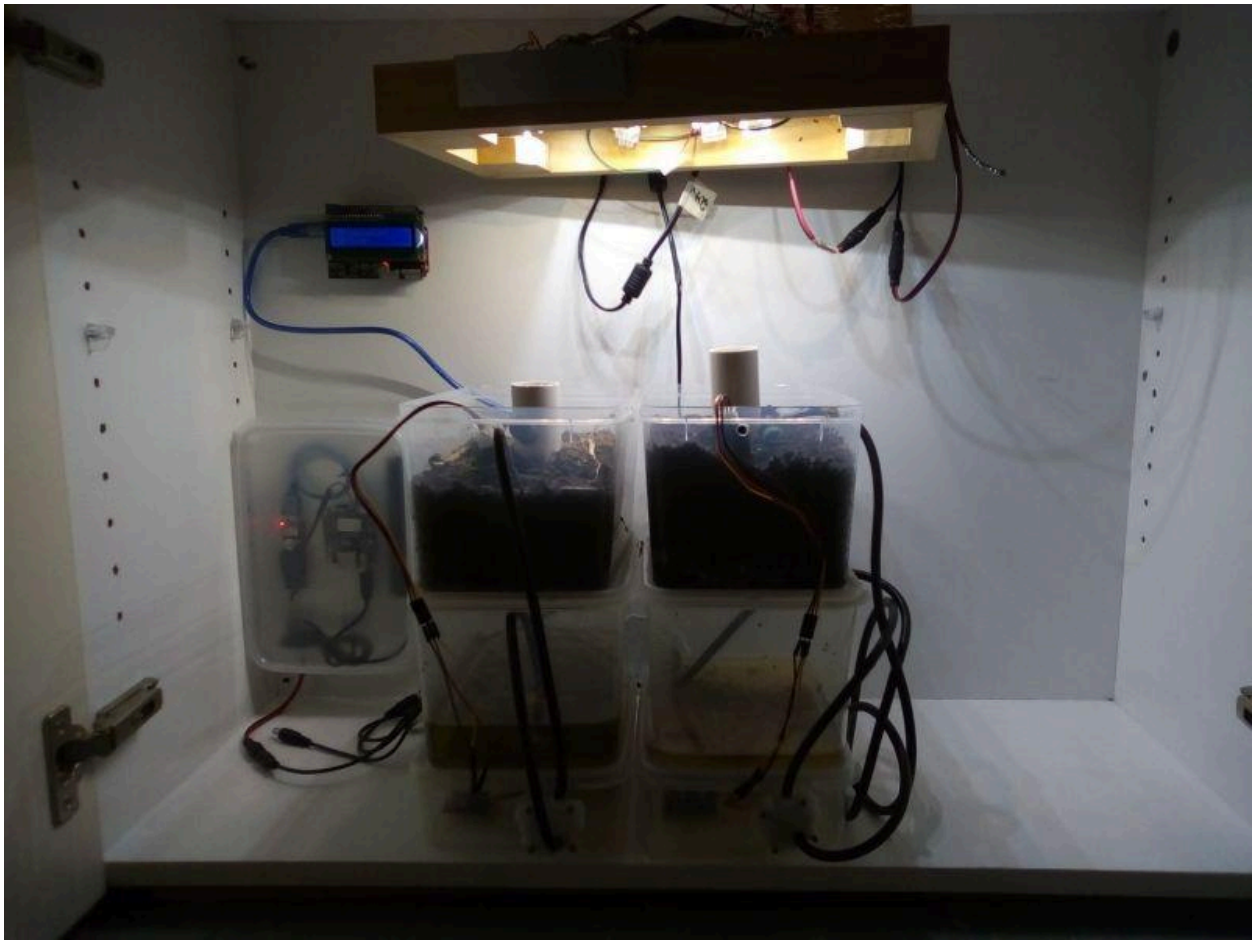
The soil in the top container is automatically watered when the soil moisture level drops too low. Excess water flows back down into the water reservoir below.

Green Wall

The beginning of a automated green wall implemented into a bookcase.

Green Cupboard

The first (rather crude) prototype of a green cupboard, which can be closed so it looks like a normal cupboard.



A complete overhaul/upgrade of this green cupboard is being planned to maximise growth, and space for plants, including:

- A larger and tidier light which fills the entire space and provides more light, while being thinner so it takes up less vertical space. This light is way too small but it was a prototype I had already built so it's being used in the meantime.
- An external water supply, and larger containers for more plants, so the water containers aren't taking up valuable space inside the cupboard.
- Ventilation (using the ventilator) so that even when the doors are closed the temperature and humidity inside the cupboard are kept within an ideal range for the plants.
- Moving the garden computer (on the left) outside the cupboard so it isn't taking up valuable space.