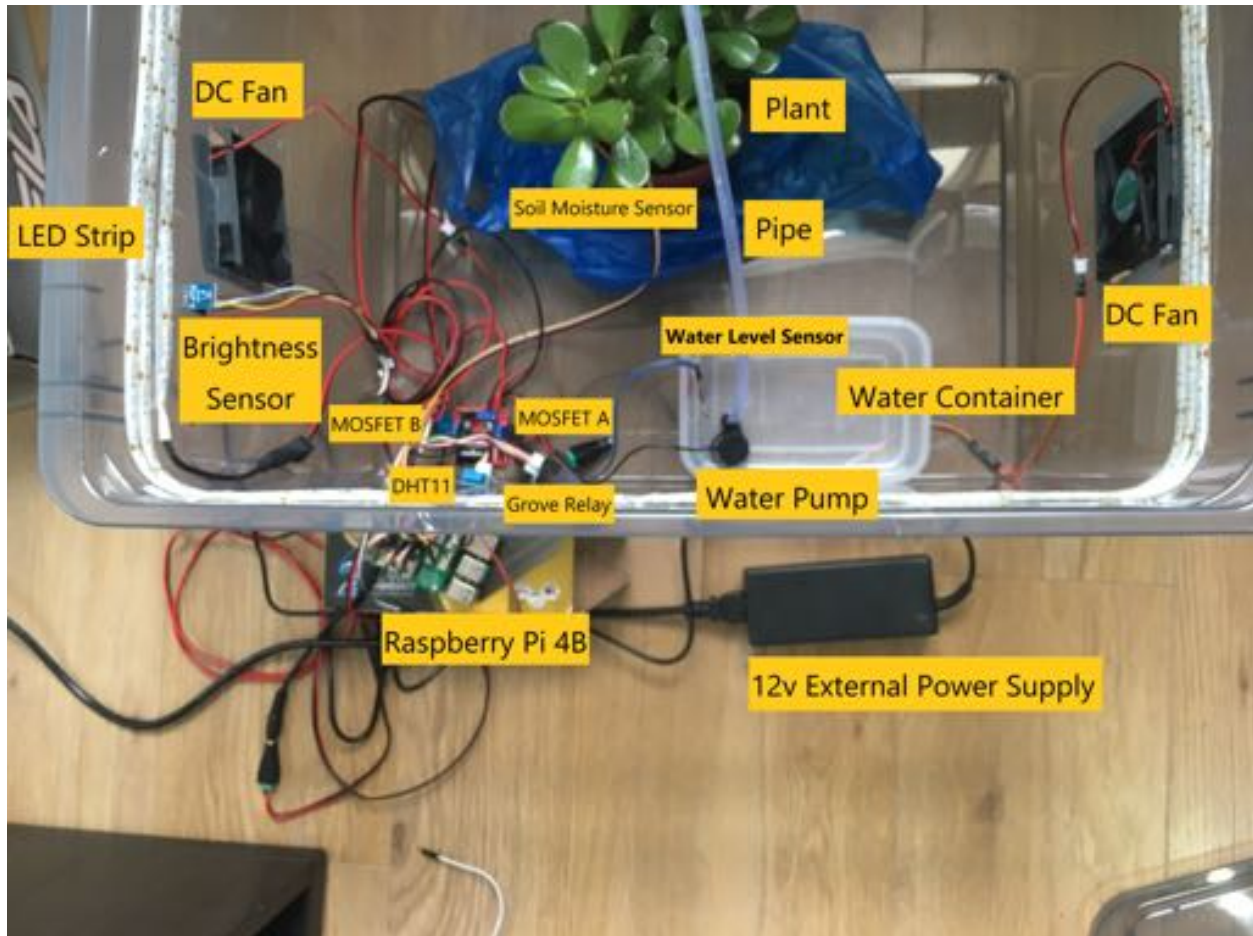


Edge device deployment manual

Hardware handbook



Step 1: Plug hat into raspberry pi

Step 2: Plug Soil Moisture Sensor into raspberry pi hat [pin 0]

Step 3: Plug DHT11 Humidity and Temperature Sensor into raspberry pi hat [pin 16]

Step 4: Plug Brightness Sensor into raspberry pi hat [I2C port]

Step 5: Plug Water Level Sensor into raspberry pi hat [pin 2]

Step 6: Connect A MOSFET to [pin 13/26], B MOSFET to [pin 12] port and Grove Relay to [pin 18]

Step 7: Plug external 12v power supply to wall and connect to MOSFET power input.

Step 8: Connect 2 DC fans to A MOSFET, Connect LED strip to B MOSFET, Connect water pump to Grove Relay.

Step 9: Mount the raspberry pi on bottom of plastic box.

Step 10: Mount 2 fans facing same direction.

Step 11: Mount LED strip on upper edge of plastic box.

Step 12: Put plant in and stick soil moisture sensor in soil.

Step 13: Mount brightness sensor 5cm below LED strip.

Step 14: Put in water container with pump and water level sensor in it.

Step 15: Manage water pipe for pump, Manage cables to avoid any unwanted problem.

Raspberry Pi Handbook:

Step 1: Insert a microSD card into your computer. Your card should be 8GB or larger.

Step 2: Download, install and run Raspberry Pi Imager. [raspberrypi.com/software/](https://www.raspberrypi.com/software/)

Step 3: Click the Choose OS button and Choose Raspberry Pi OS(32-bit). Click write to burn to your SD card.



Step 4: Write an empty file named "ssh" to root direction of SD card. This will enable ssh to connect to raspberry pi. (This file don't have a extention.)

<input checked="" type="checkbox"/>	ssh	2022/4/13 13:47	文件	0 KB
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Step 5: Connect raspberry pi to wifi by creating a file called wpa_supplicant.conf, and place it in the root directory of the microSD card. You will need to edit the file using any text editter and include following content:

```
country=GB
ctrl_interface=DIR=/var/run/wpa_supplicant Group=netdev
update_config=1

network={
  scan_ssid=1
  ssid="your_wifi_ssid"
  psk="your_wifi_password"
}
```

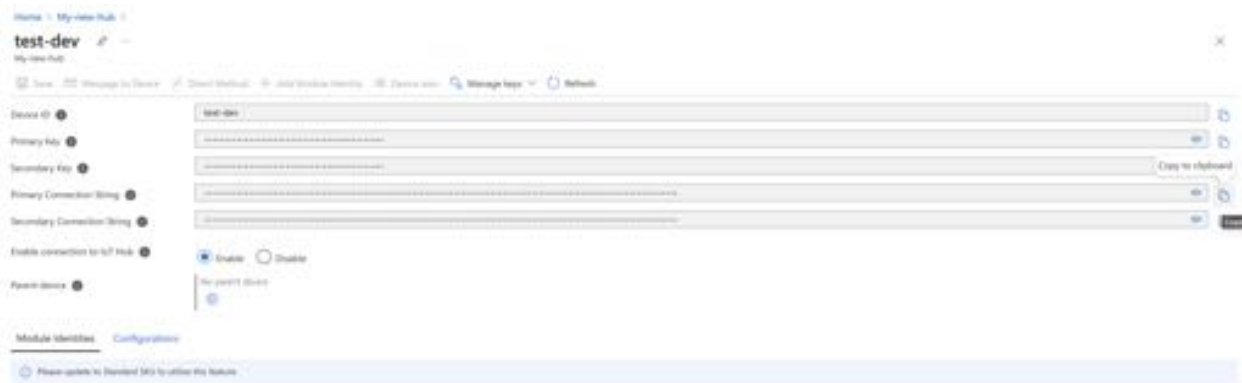
You will need to change the country to your country. e.g. US for United State of America

You will need to replace the place holder with your wifi ssid and password.

Step 6: connect to raspberry pi using `ssh raspberrypi@rasp` in powershell or any other usable command line interface from your computer. You will be able to set a password for the system when you connect, similar to other linux system command line interface.

Step 7: Clone and copy project file into a directory you want on SD card.

Final step: Cd into directory: `cd ~/comp0016-farmbeats/src/data_streamer`, and create an empty `.env` file: `touch .env`. Copy the connection string from Azure for your IoT Hub:



And run the following command, replacing `[YOUR_CONNECTION_STRING]` with the copied string: `echo 'IOTHUB_DEVICE_CONNECTION_STRING="[YOUR_CONNECTION_STRING]"' > ./env`

Step 8: As we are using Linux drivers for hardware PWM, we need to manually enable them as per https://github.com/Pioreactor/rpi_hardware_pwm. To do so, run the following command: `echo "dtoverlay=pwm-2chan,pin=12,func=4,pin2=13,func2=4" >> /boot/config.txt`. Afterwards, reboot the Pi using `sudo reboot`. After reconnecting, check the drivers have been properly installed by running `smode | grep pwm` and look for `pwm_bcm2835`.

Step 9: Install dependencies: `cd comp0016-farmbeats/src` and run `pip install -r requirements.txt`.

Step 10: Install external dependency: grove.py, follow the guide here: <https://github.com/Seeed-Studio/grove.py>.

Step 11: Run project code using: `python your/dir/comp0016-farmbeats/src/main.py`