**Basic Installation Instructions for OpenHAB and the basic telemetry system. Follow these instructions first. Use the stepwise walkthrough in case one of the steps fails (which might occur if a link is broken due to an update at that website).**

**Note- These instructions have been tested and verified on a Raspberry Pi 4. They will not work on a Raspberry Pi 5, as its GPIO interface is not compatible with pigpiod. It is possible that pigpiod will be rewritten to be compatible with a Raspberry Pi 5. In the meantime, be sure to procure Raspberry Pi 4 hardware (or earlier) to work with this software.** Also, this procedure was verified to work as of December 6, 2024. It is possible that updates to the software dependencies may require different configuration of some components.Please contact the authors to help with troubleshooting in this instance.

1. Your Pi should be configured with the username pi and password that you select. Download the current Raspberry Pi Bookworm image to your SD card, put the card in your Raspberry Pi and boot up the Pi. You will get a configuration screen. Follow the options for your region (language and location setting, wifi credentials, etc.). When prompted for a username and password, make sure the username is set to pi. Enter a secure password, and follow the directions to complete the setup. If the Pi asks whether you want to update the operating system to the current version, select “Yes”.
2. Open a command window. Type the following line:

sudo raspi-config

In the configuration screen, select “Interface Options”. Select “SSH” and enable the SSH server. Then select "Remote GPIO” from the same “Interface Options” menu and enable the remote GPIO server. Select Finish to get out of the configuration program.

1. Copy the Install directory to your home directory (/home/pi or ~).
2. Copy the installer program **installer.sh** to your home directory (/home/pi or ~).
3. Make installer.sh executable by typing sudo chmod +x installer.sh
4. Type ./installer.sh to run the installer program. You will be prompted at each stage of the installation to enter Y to continue or N to skip. Enter Y for each step. Monitor the installation to ensure all goes smoothly. The whole installation will take ca. 10 minutes, and your pi must be connected to the internet.
5. When CircuitPython is installing, you will be prompted to reboot for changes to take effect. Enter n to avoid the reboot and continue with the installer script. **This is the only place you will enter n to skip a step.**
6. Find out the IP address for your Raspberry Pi on your LAN (IP address assigned when you connected your Pi to your network as part of the configuration in step (1).
7. Open the web browser on your Pi. Access OpenHAB by typing YOUR.IP.ADDRESS:8080

YOUR.IP.ADDRESS is the IP address for your Pi (e.g. 192.168.1.38).

1. You will be prompted for a username and password for OpenHAB. These can be different credentials than those used to access your Pi. When asked if you want to set up OpenHAB, decline that option.
2. Reboot your Raspberry Pi by typing sudo reboot now in the command window.

**Openhab is now set up on your Pi. It will automatically start running after the reboot. Access it by typing the following into any connected web browser:**

YOUR.IP.ADDRESS:8080/basicui/app?sitemap=repeater

**Your OpenHAB dashboard will appear. Note: You MUST have two DHT11 sensors connected to the board in order for the other sensors to work – regardless of how you set the DIP switches below.** This requirement is due to the fact that the Python script that polls the sensors is not configured by the DIP switches, and it will hang up if it does not sense both DHT sensors.

**Configure the DIP switches as follows – based on the number of sensors you are using:**

|  |  |  |
| --- | --- | --- |
| **Number of Contact Sensors** | **DIP1** | **DIP2** |
| 1 | OFF | OFF |
| 2 | ON | OFF |
| 3 | OFF | ON |
| 4 | ON | ON |

|  |  |
| --- | --- |
| **Number of Climate Sensors** | **DIP3** |
| 1 | OFF |
| 2 | ON |

|  |  |  |
| --- | --- | --- |
| **Number of Voltage Sensors** | **DIP4** | **DIP5** |
| 1 | OFF | OFF |
| 2 | ON | OFF |
| 3 | OFF | ON |
| 4 | ON | ON |

**Your voltage sensors will be fairly accurate if you use resistance values for the voltage divider as specified in the schematic. If you wish to calibrate the ADC, you can do so as follows:**

1. You will be modifying the program **sensorscript.py** to calibrate the voltage sensor. This program is stored in your home directory (/home/pi). Use either the Nano or the Vi editor – or an editor on the Pi desktop. Open **sensorscript.py** and set the slopes for v1, v2, v3 and v4 to 1. Set the intercepts for each of these parameters to 0. Reboot the pi and go to your OpenHAB dashboard on a connected web browser. You will now be measuring unscaled voltage on each terminal.
2. Connect a variable voltage power supply to the voltage terminal you wish to calibrate. Voltage can be measured up to ca. 20 volts.
3. Set your variable voltage supply to an arbitrary value. Measure the voltage with an accurate voltmeter. Copy down the voltage reading for that sensor from the dashboard.
4. Take ca. 5 measurements using different applied voltages for step (3). Create a graph in Excel (or a similar tool) of applied voltage (Y axis) vs. dashboard reading (X axis)
5. Instruct Excel to show the trendline and its equation (linear trendline). Change the slope value in **sensorscript.py** for that terminal (e.g. v1\_slope) to the value from Excel. Do the same for the intercept value (e.g. v1\_intercept).
6. Repeat steps (2)-(5) for each terminal that you wish to calibrate.
7. Save **sensorscript.py** and reboot the Pi. Calibration is complete.

**If you wish to change the labels on the data displayed on your dashboard, do the following:**

1. Open a text editor and go to /etc/openhab/items on your Raspberry Pi
2. Open the file repeater.items file using a text editor (nano is recommended)

The contact items appear as String items – for example:

String contact1 “Sensor 1” <house>

The syntax of an item line is:

Item type Item name “Item Label” <Item Icon> (Item Group) {Item Configuration}

Note – not all fields are present for each item.

If you want to change the label from Sensor 1 to something else, replace what is in quotes with the label you wish to display on the dashboard.

The same process can be followed for the temperature sensors (S1Temp, S2Temp), humidity sensors (S1Hum, S2Hum) and voltage sensors (P1Vol, P2Vol, P3Vol and P4Vol).

**Be sure to only change the value in quotes (“ “) in the Item Label field next to the item name – otherwise you will corrupt the configuration file.** It is best to make a backup copy of the file before modifying it.

**Do not delete items. Visibility of items is managed through the DIP switch configuration shown above.**

1. Open the file repeater.sitemap using a text editor (nano is recommended)

Labels for items in the sitemap are denoted by the word label. Change what is in quotes to fit your needs.

For example:

Chart item=P1Vol label="Power Supply 1 Voltage" period=D refresh=6000 visibility=[Chart\_Period==1] legend=true

Change what is in quotes to make the label different from Power Supply 1 Voltage.