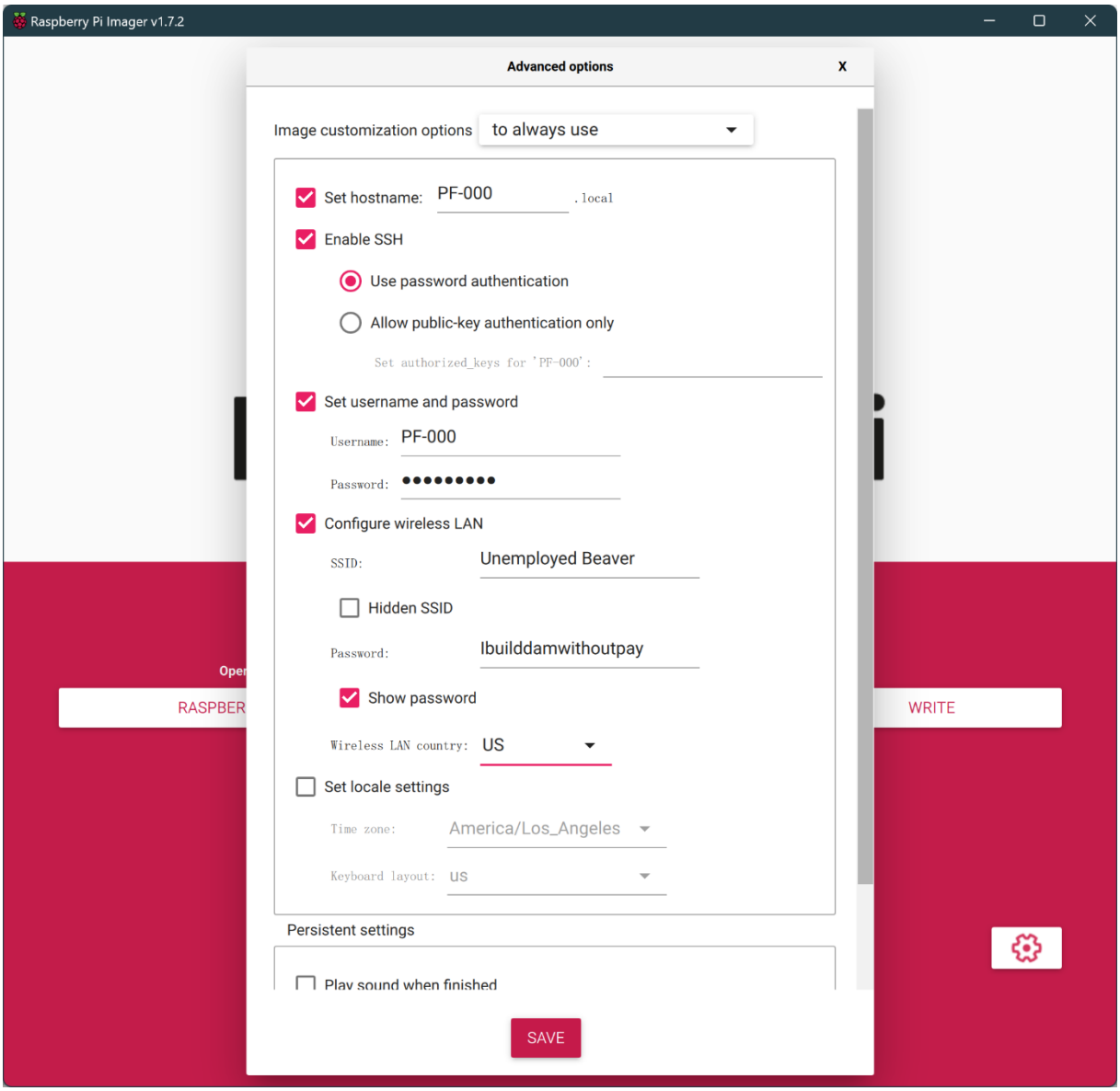
Firmware Setup

It’s a good idea to flash the firmware for Pi and MCU BEFORE you follow the part 4 video and install them on the machine.

Option 1: Klipper – Standalone Pi + Compatible MCU

Raspberry setup

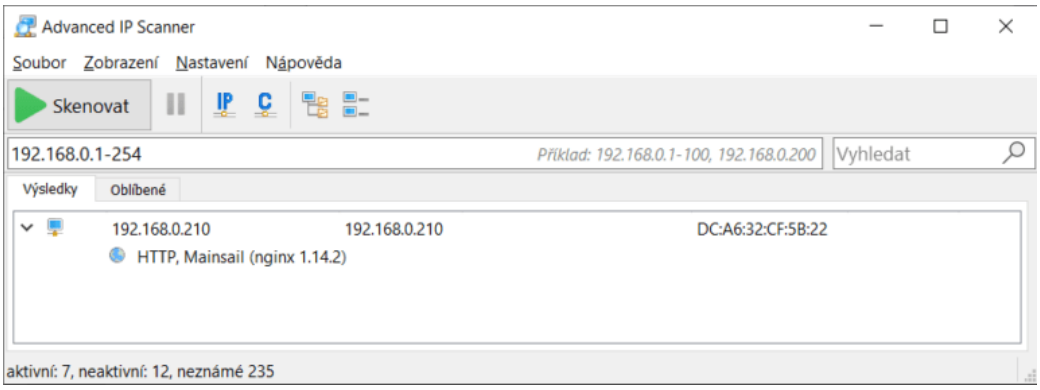
- Insert SD card into your PC, download and install PiOS on the SD card. [Download PiOS here.]
- Before you install the OS, please configure your pi's username, password, and network in the settings (SSIDs are upper case sensitive!!!).
- It takes some time if the Pi is first time booting up upon an install. Please be patient for 5 minutes and 5 minutes only.



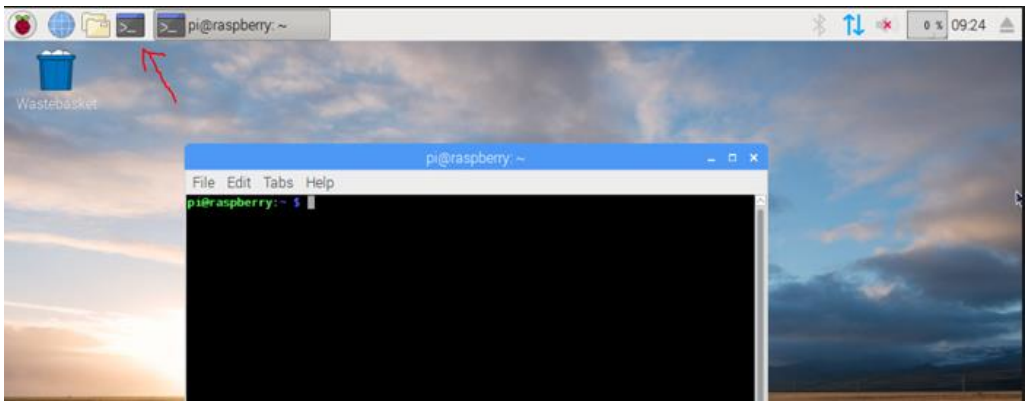
Klipper installation on Raspberry

First, you'll need a SSH client such as PuTTY or use your PC's terminal. We'll use it to connect our PC to the Raspberry.

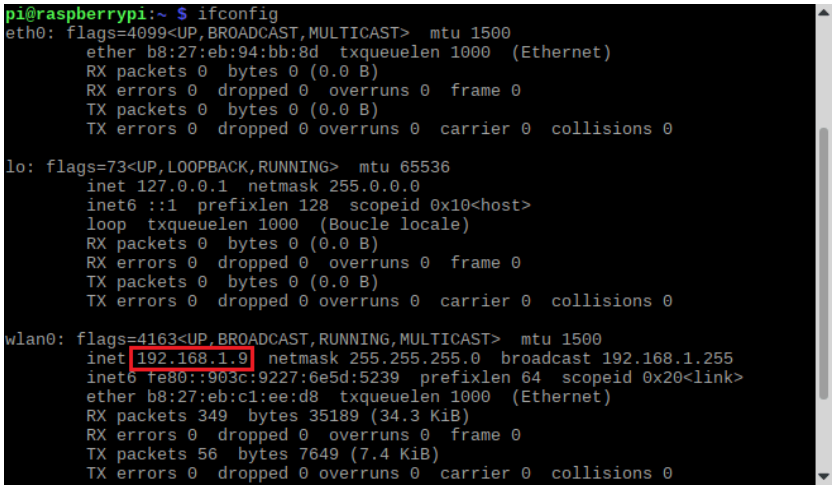
- Start with locating Raspberry in your local network.
    - You can use Advanced IP Scanner to find it.



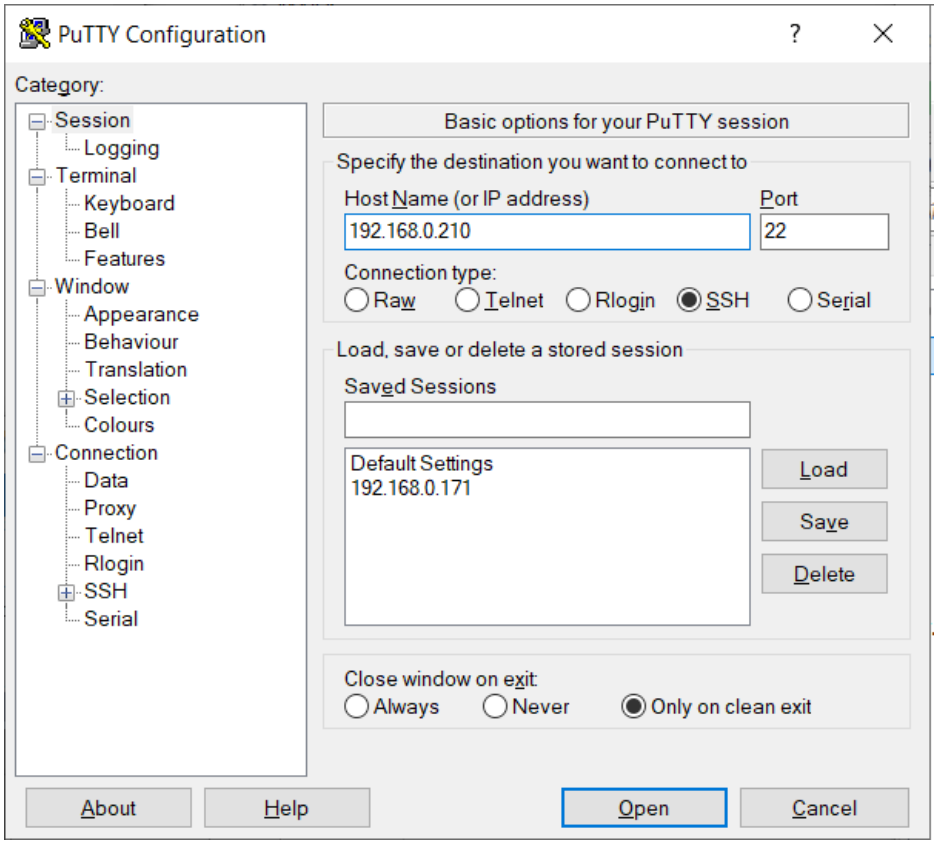
    - Or if you can plug a keyboard, a mouse, and a screen to your Raspberry:
        - Once plugged, turn the Raspberry on and wait until the main screen appears
        - Click on the terminal icon on the task bar



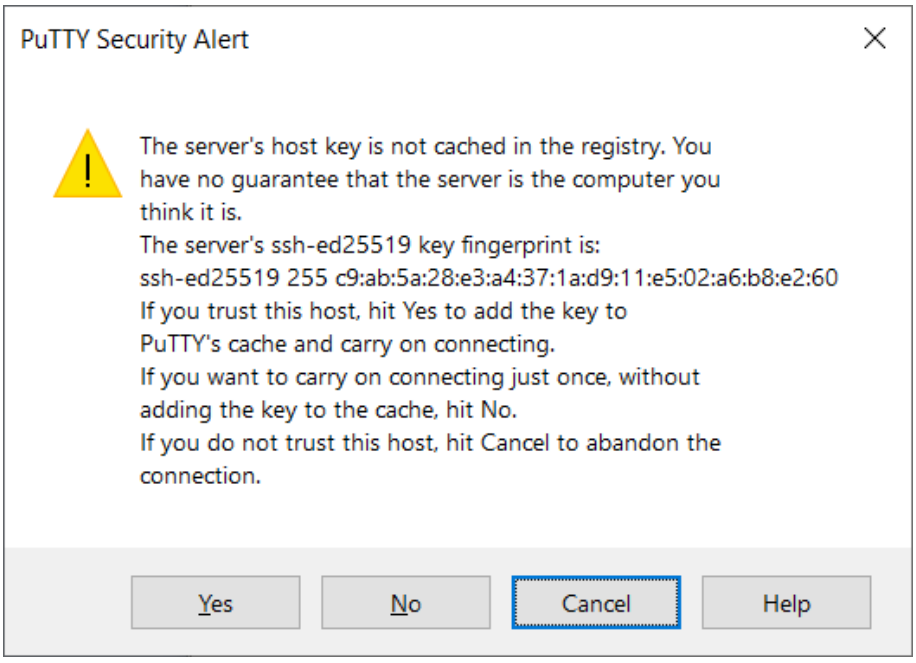
        - Type 'ifconfig' and find the IP address between 192.168.0.1-254 or 192.168.1.1-254



- SSH connection
    - If you chose PuTTY, paste the copied IP from the previous step. Click on Open.



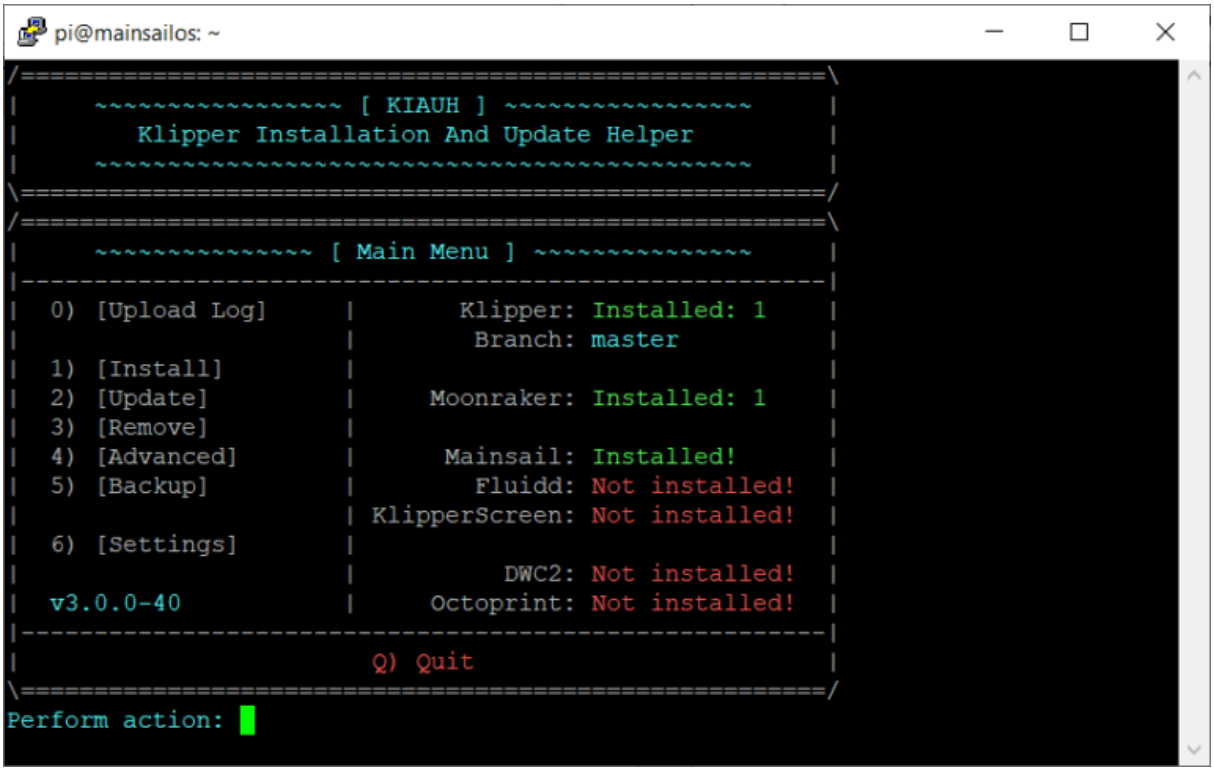
    - This window may appear, click on Yes



    - Then login in the terminal with the username you set on Raspberry Setup and the password.

- Else, if you chose to use your PC's terminal, type 'ssh pi@192.168.0.210' (replace pi by the username you set on Raspberry Setup and the IP by the one you found on the previous step) and type your password.

- GIT installation
  - Type 'sudo apt-get install git -y' on the terminal (you might be asked for your password).
  - Once the installation is complete, do the following commands:
    cd ~
    git clone https://github.com/th33xitus/kiauh.git
    ./kiauh/kiauh.sh
  - This window will show up

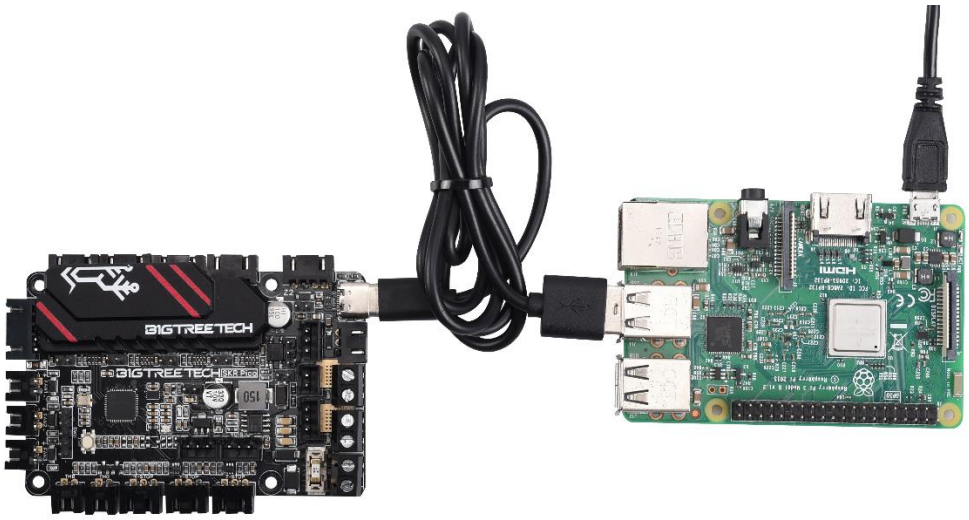


  - Use the interface to install Klipper, Moonraker and Mainsail

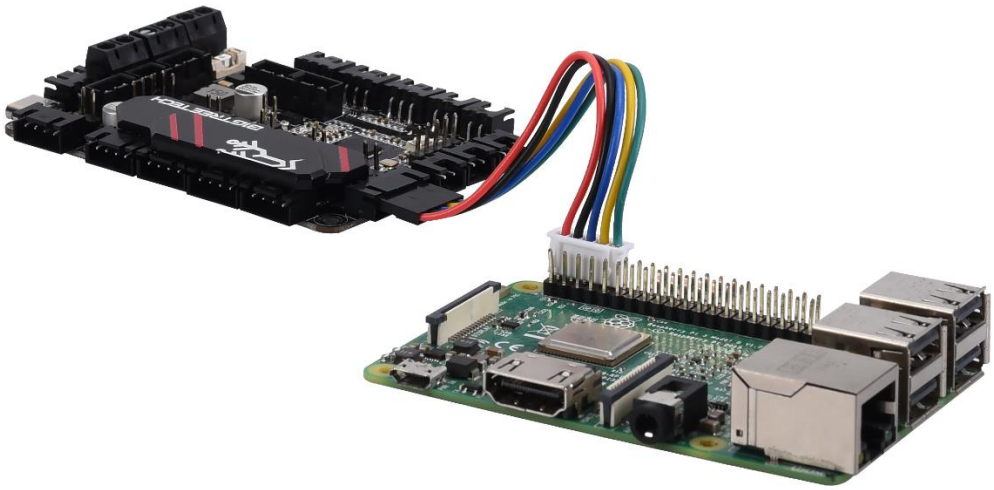
Klipper installation on SKR Pico

If you can't get Klipper working with the UART in Option 2, try the USB which should be easier.

- Option 1: USB setup

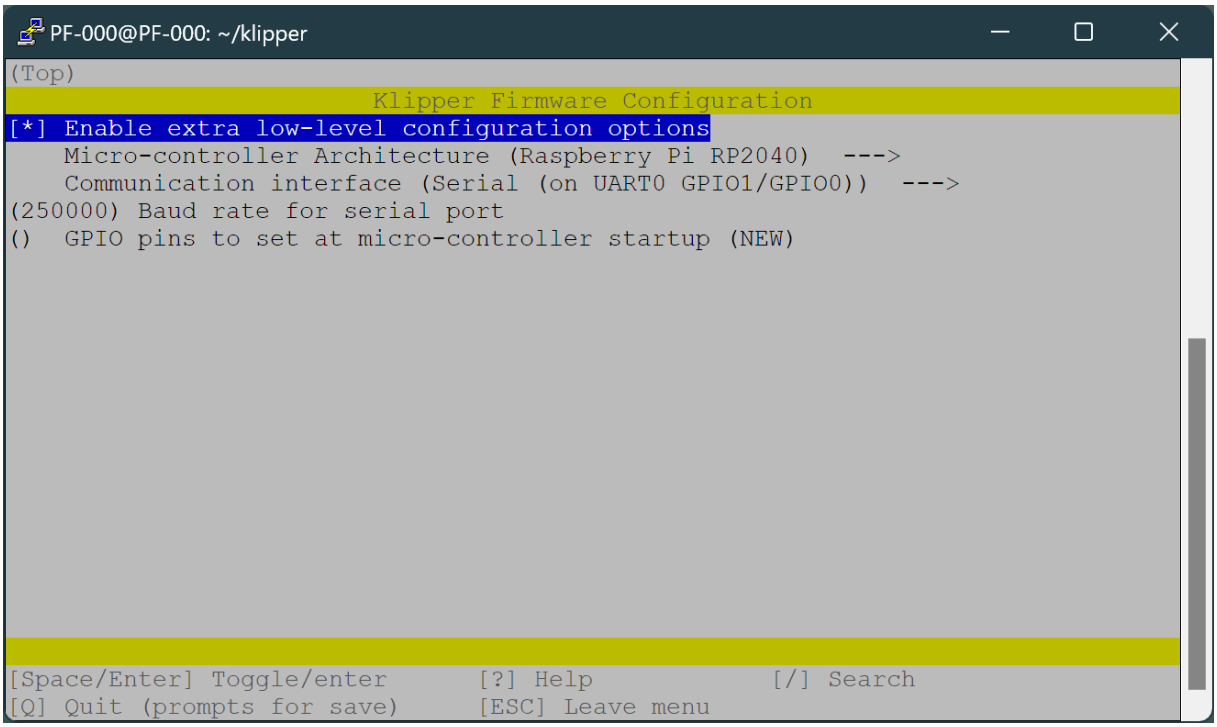


- Option 2: UART setup



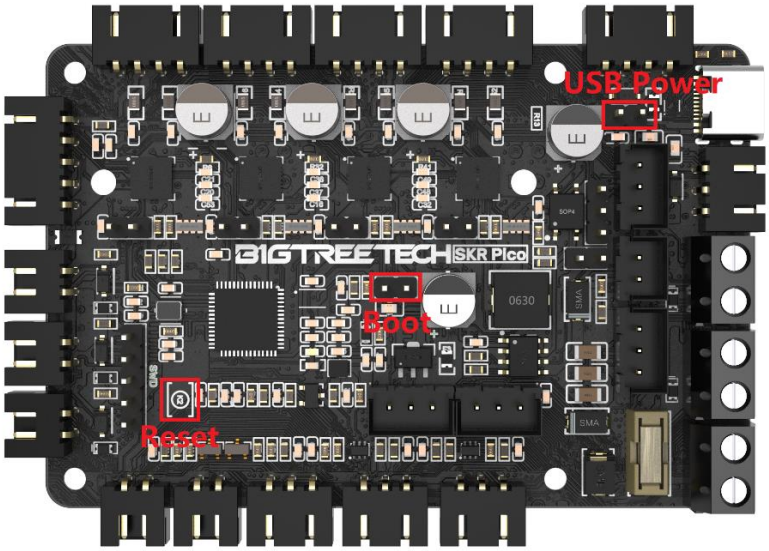
- Build firmware image
    - Open terminal and type:
      cd ~
      git clone https://github.com/Klipper3d/klipper
      ./klipper/scripts/install-octopi.sh
      cd ~/klipper/
      make menuconfig

- This interface should show up



  - Enable extra low-level configuration options
    - If you use Option 1: Communication interface must be USB.
    - Else: Communication interface must be UART (as on the picture above).
  - Press q to quit and type ‘make’ in the terminal
  - When the command is complete, you must find a ‘klipper.uf2’ file in ‘home/pi/klipper/out’
  - Copy this file from the raspberry to your PC
    - Type

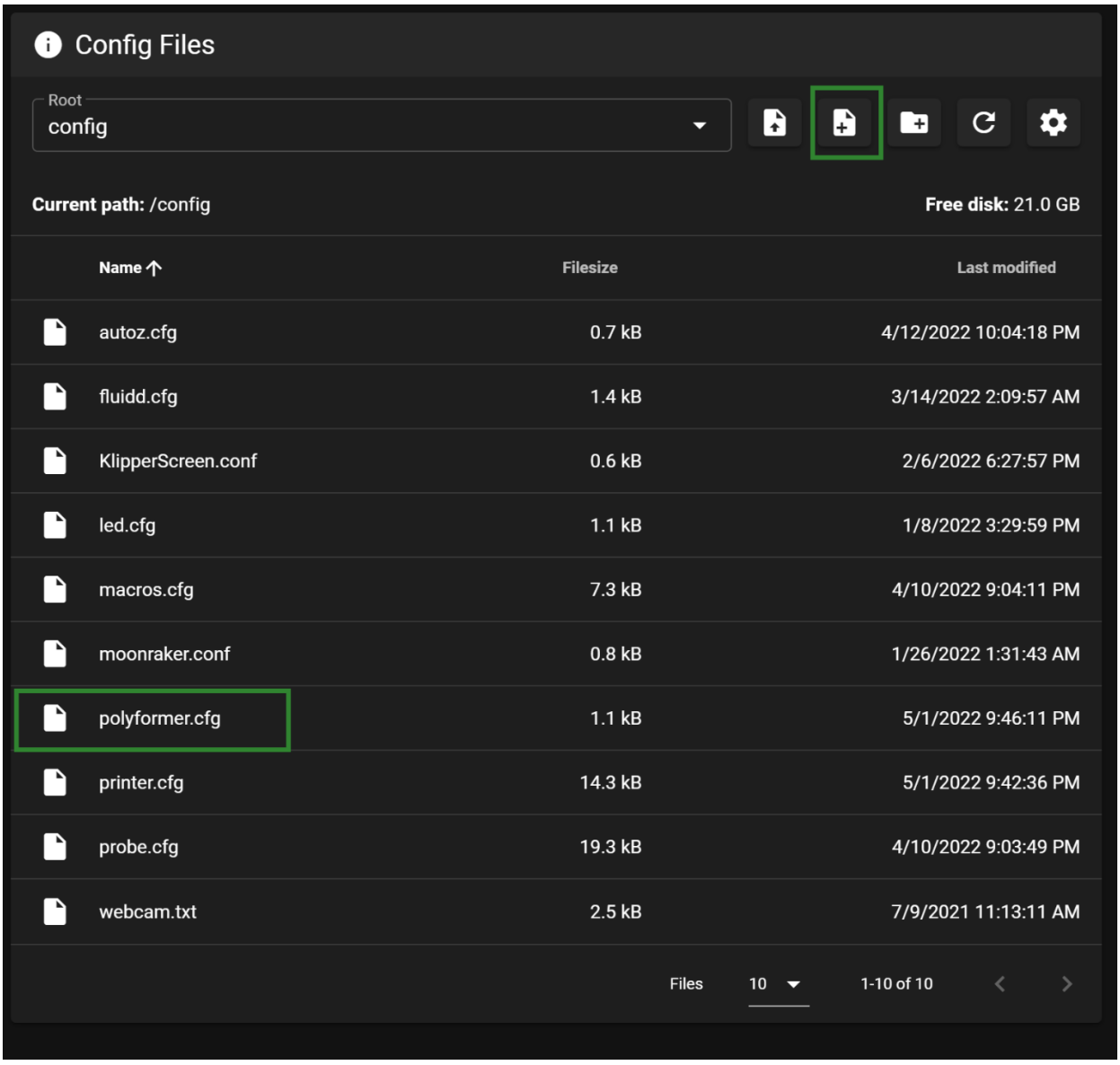
      pscp -C pi@192.168.0.101:/home/pi/klipper/out/klipper.uf2 c:\klipper.uf2
  - You must now find the klipper.uf2 in your C: on your PC.
- Firmware installation
  - Insert a jumper on the boot pins of the motherboard and press the Reset button
    - If you chose the USB setup, insert one on the USB Power too



- Connect the USB-C to your PC, you'll see a USB flash drive. Copy the klipper.uf2 on it. The motherboard will automatically reboot and update the firmware, the computer will re-identify this USB flash drive means the firmware update is complete. Unplug the Boot jumper, and the USB-C from your PC, plug the motherboard to the Raspberry by the option you chose and click the Reset button to enter normal mode.
- You must be able to type 'ls /dev/serial/by-id/*' and have an output like '/dev/serial/by-id/usb-1a86_USB2.0-Serial-if00-port0'
- On your PC, open a web browser and go to the IP address we gained for SSH within the same network to access Mainsail.
- Modify the printer.cfg file from the mainsail interface by this one.
- Update the serial part under [mcu] by the path you gained earlier.
- Follow the wiring guide.

Option 2: Klipper – Voron printer + Compatible MCU

- Plug the SKR Pico to the Raspberry via USB on your printer, and add the polyformer.cfg into your printer's configuration as below.



- Then include the polyformer.cfg in your main printer.cfg as below

printer.cfg *

```
## Micron Dual SKR Mini E3 V2.0 TMC2209 UART config
[include polyformer.cfg]
[include fluidd.cfg]
[include autoz.cfg]
[include probe.cfg]
#[include led.cfg]
[include macros.cfg]
# This file contains common pin mappings for the BigTreeTech Octopus V1.
# To use this config, the firmware should be compiled for the STM32F446 with a "32KiB bootloader"
# Enable "extra low-level configuration options" and select the "12MHz crystal" as clock reference

# after running "make", copy the generated "klipper/out/klipper.bin" file to a
# file named "firmware.bin" on an SD card and then restart the OctoPus with that SD card.

# See docs/Config_Reference.md for a description of parameters.

## Voron Design VORON2 250/300/350mm BigTreeTech OctoPus V1 TMC2209 UART config

## *** THINGS TO CHANGE/CHECK: ***
## MCU paths                            [mcu] section
## Thermistor types                     [extruder] and [heater_bed] sections - See 'sensor types' list at end of file
## Z Endstop Switch location            [safe_z_home] section
## Homing end position                  [gcode_macro G32] section
## Z Endstop Switch  offset for Z0      [stepper_z] section
## Probe points                         [quad_gantry_level] section
## Min & Max gantry corner postions     [quad_gantry_level] section
## PID tune                             [extruder] and [heater_bed] sections
## Thermistor types                     [extruder] and [heater_bed] sections
## Probe pin                            [probe] section
## Fine tune E steps                    [extruder] section

[mcu]
serial: /dev/serial/by-id/usb-Klipper_stm32f446xx_0C002B000B50534841313020-if00
restart_method: command

[mcu rpi]
serial: /tmp/klipper_host_mcu

[temperature_sensor RPI]
sensor_type: temperature_host

[temperature_sensor OCTO]
sensor_type: temperature_mcu
```

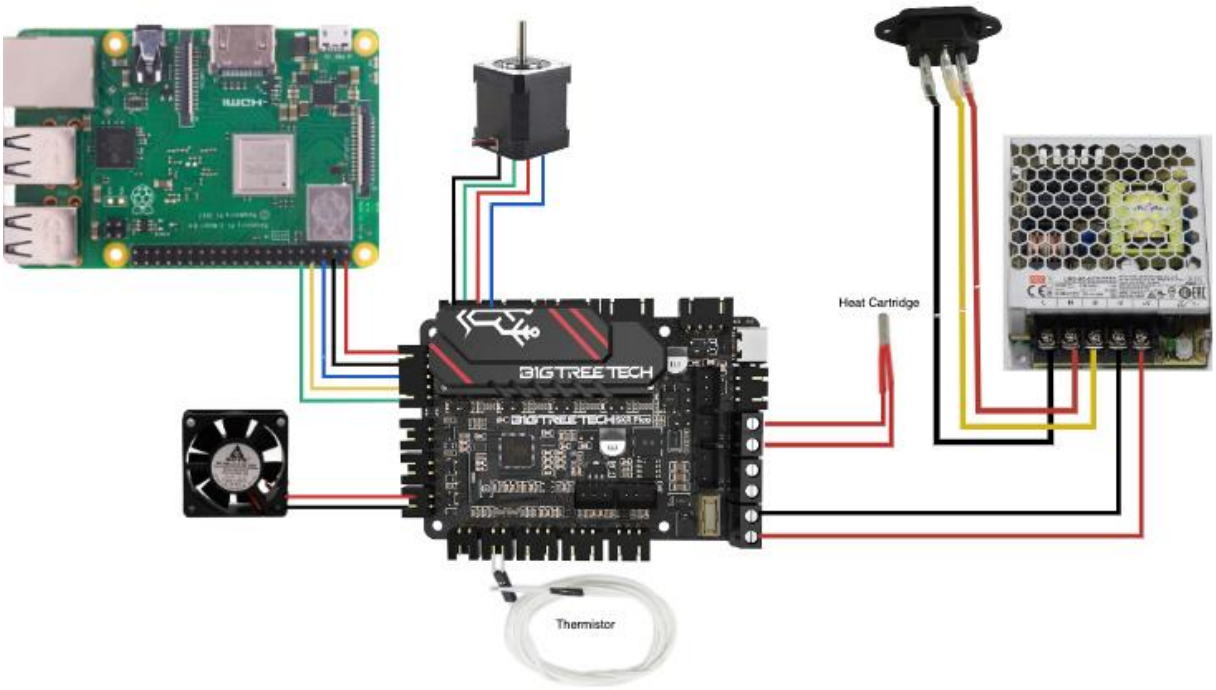
- Follow the SKR Pico installation guide.

Option 3: Marlin – Compatible MCU + Screen

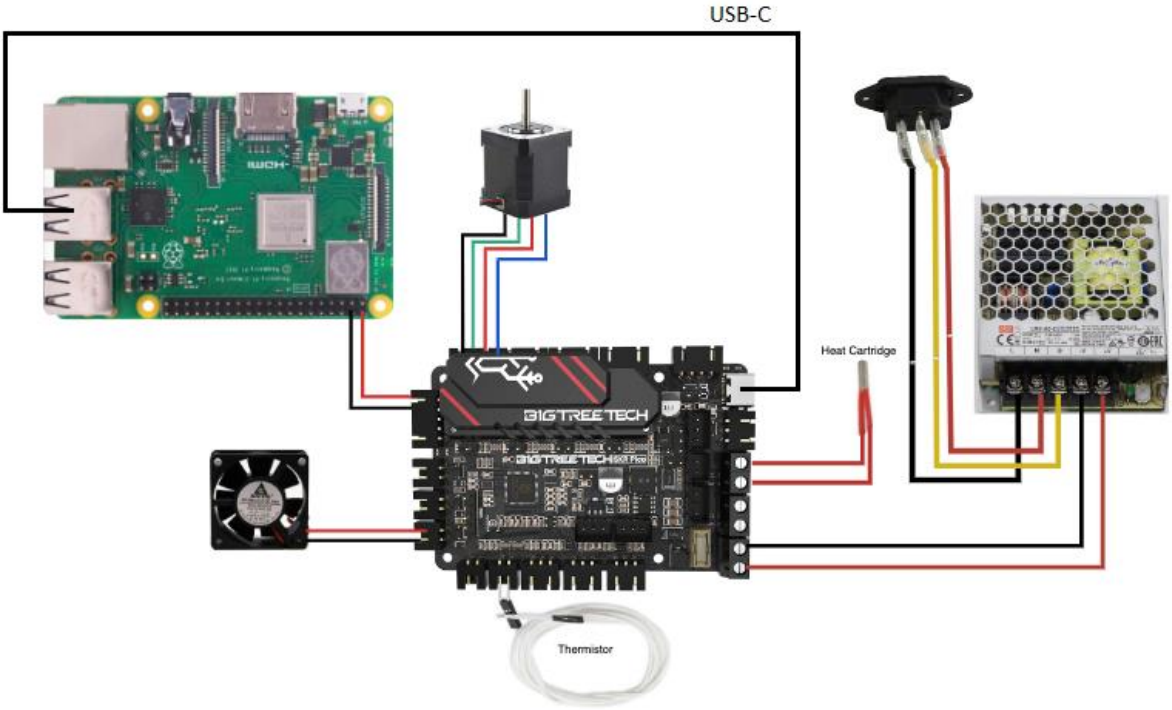
Guide in progress, please ask in the discord.

Wiring guide

- UART setup:



- USB setup:



PID Calibration Procedure

This procedure is for calibrating the heater cartridge.

- Bigtree SKR Pico v1.0 + RPi setup
- Basic Klipper Configuration
- Mainsail
- Installing MainsailOS
- Klipper3D

Pre reqs

The following instructions assume the following:

- Your hardware setup matches the wiring guide
- Your Raspberry Pi has been configured for UART or USB integration.
- MainsailOS (Mainsail, Klipper and Moonraker) are installed and running on the Raspberry
- Your SKR Pico control board has been flashed with the latest stable firmware and has UART or USB support.
- You are using the attached Klipper configuration
- Mainsail and web UI is accessible and there are no errors reported by Klipper on the Mainsail dashboard.

IMPORTANT: ALL the pre-reqs must be satisfied to proceed.

Instructions

- Open a web browser and go to the Mainsail website that is running on your Raspberry Pi
- Open the G-Code console on the Mainsail web UI
- Run the following command to calibrate. This will take about 5 minutes to complete.
  PID_CALIBRATE HEATER=extruder TARGET=210
- Run this command to save the PID calibration coeffs to the 'printer.cfg' file.
  SAVE_CONFIG
- Click the Save and Restart button to reconfigure Klipper
- Verify temperature stability