Install Klipper+KlipperScreen on Ender 5+

Version 1.0 20231007 Jacques De Jonghe

1. Assumptions

1.1 A working Ender 5+ with an installed BigTreeTech SKR Mini E3 V3.0

1.2 A compatible 3.5” RPI LCD screen

1.3 A Raspberry PI (RPI) zero 2W without headers and a suitable micro-SD card

1.4 A micro SD card formatted as FAT32/4096 bytes in order to flash Klipper on the SKR Mini

1.5 WinSCP on your computer

1.6 A printed bezel for the 3.5” RPI LCD screen

1.7 A printed support for the RPI zero 2W

1.8 Two Dupont 4 pins connectors (or one 4 pins and one 5 pins) and related cables

1.9 Four M2x6 bolts

1.10 One header 1 row straight, one header 1 row 90 degrees and one header 2 rows straight

1.11 Download the files from github on your computer

2. Install Klipper-Moonraker-Mainsail RPI Software

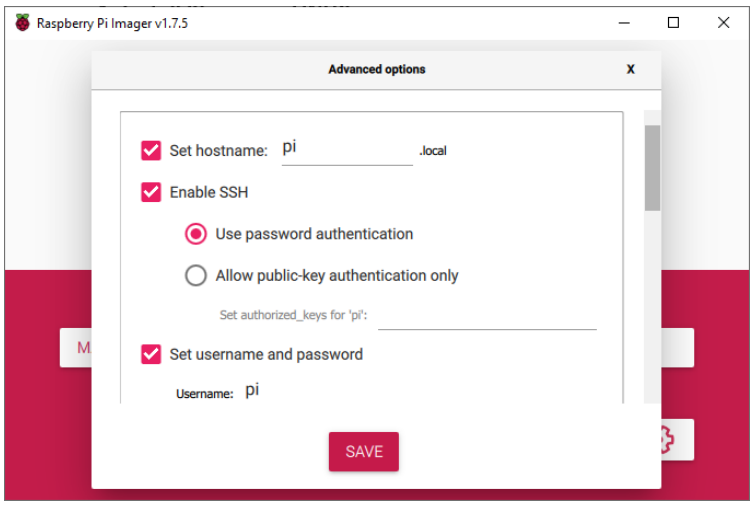
2.1 Insert in the computer the micro-SD card that you will use on the RPI

1.1 Download the Raspberry Pi Imager from https://www.raspberrypi.com/software/ and execute it.

1.2 Choose **Mainsail OS 32-Bit** as Operating System in the 3D Printing Operating Systems:

1.3 Choose your micro-SD card location in the MASS STORAGE option

1.4 In the settings, set the HOST name, enable SSH, the username and password, configure the wireless lan with your local WIFI network and SAVE these settings:



1.5 Click on the WRITE button in order to install the RPI Software in the micro-SD card. That will take something like 20 minutes.

1.6 When finished, remove the Micro-SD card from the computer and install it in the RPI slot **with the RPI without power supply**.

3. Prepare the RPI zero 2W

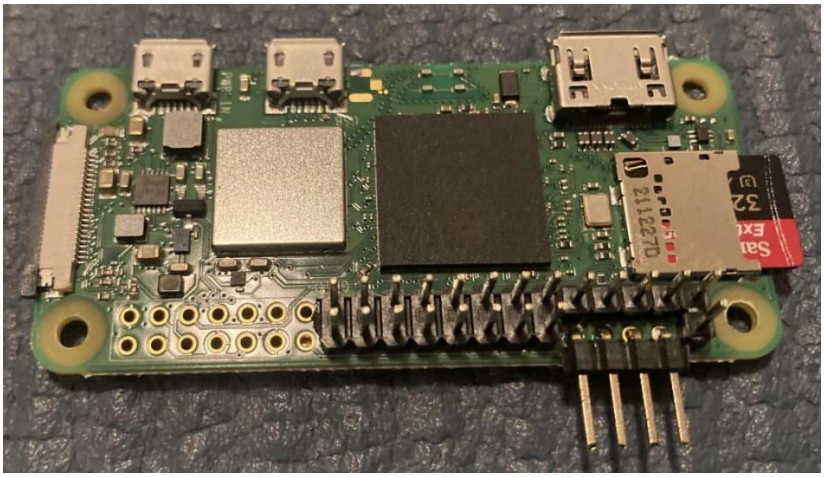
3.1 Cut 2 pins from the header 1 row straight.

3.2 Cut 4 pins from the header 1 row straight.

3.3 Cut 4 pins from the header 1 row 90 degrees.

3.4 Cut 8x2 pins from the 2 rows header straight.

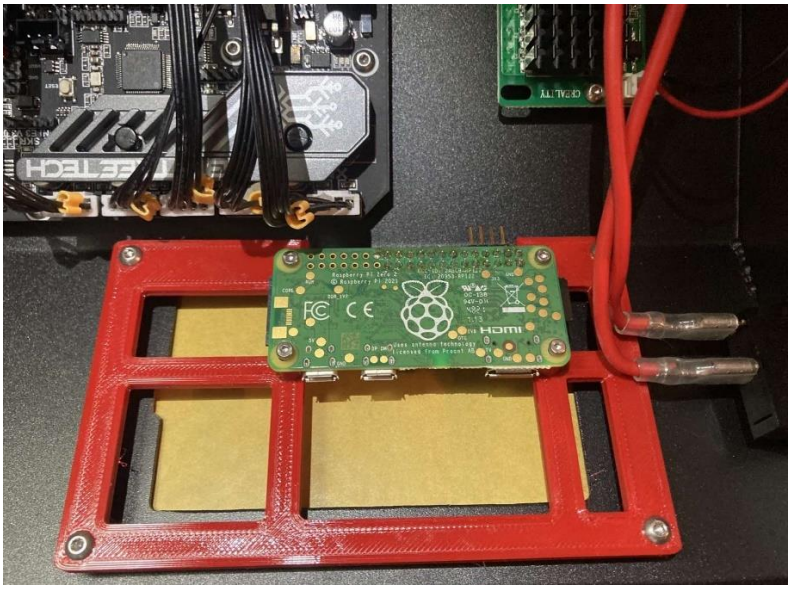
3.5 Solder these pins on the RPI according to the following picture:



3.6 Install the RPI on his support with the M2x6 bolts. **Ensure that the bolts are not fully tightened.**

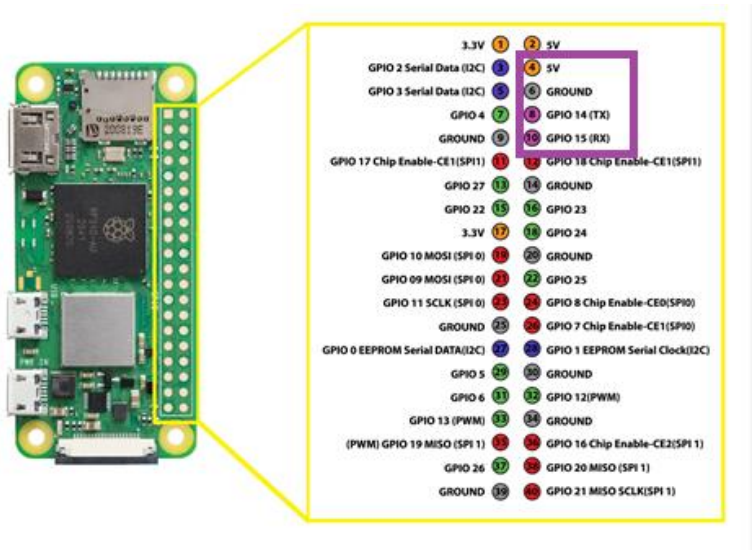
3.7 Remove the original screen of the Ender 5+.

3.8 And install the RPI on its support in the Ender 5+:

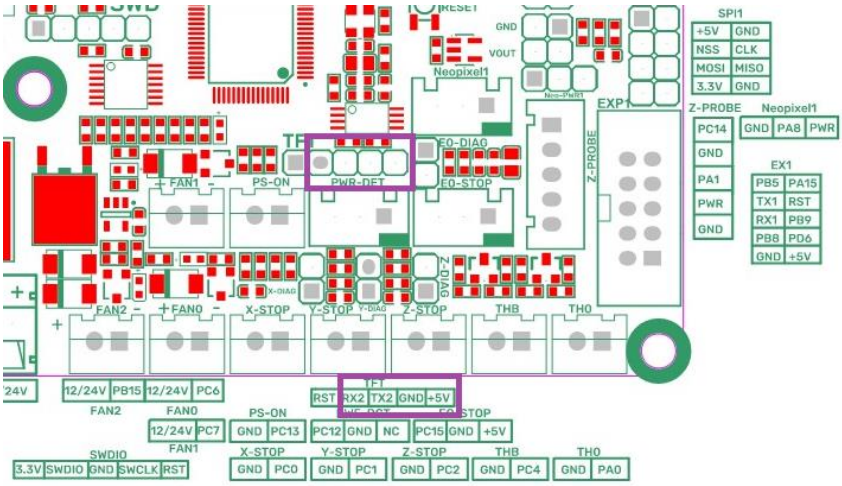


4. Prepare the Dupont cable

4.1 Connections to the RPI:



4.2 Connections to the SKR Mini E3:



1.7 Picture of the cable finalised: attention, **TX and RX should be crossed** between the RPI and the SKR Mini E3.

5. Install the 3.5” LCD screen

5.1 Install the LCD screen in his bezel.

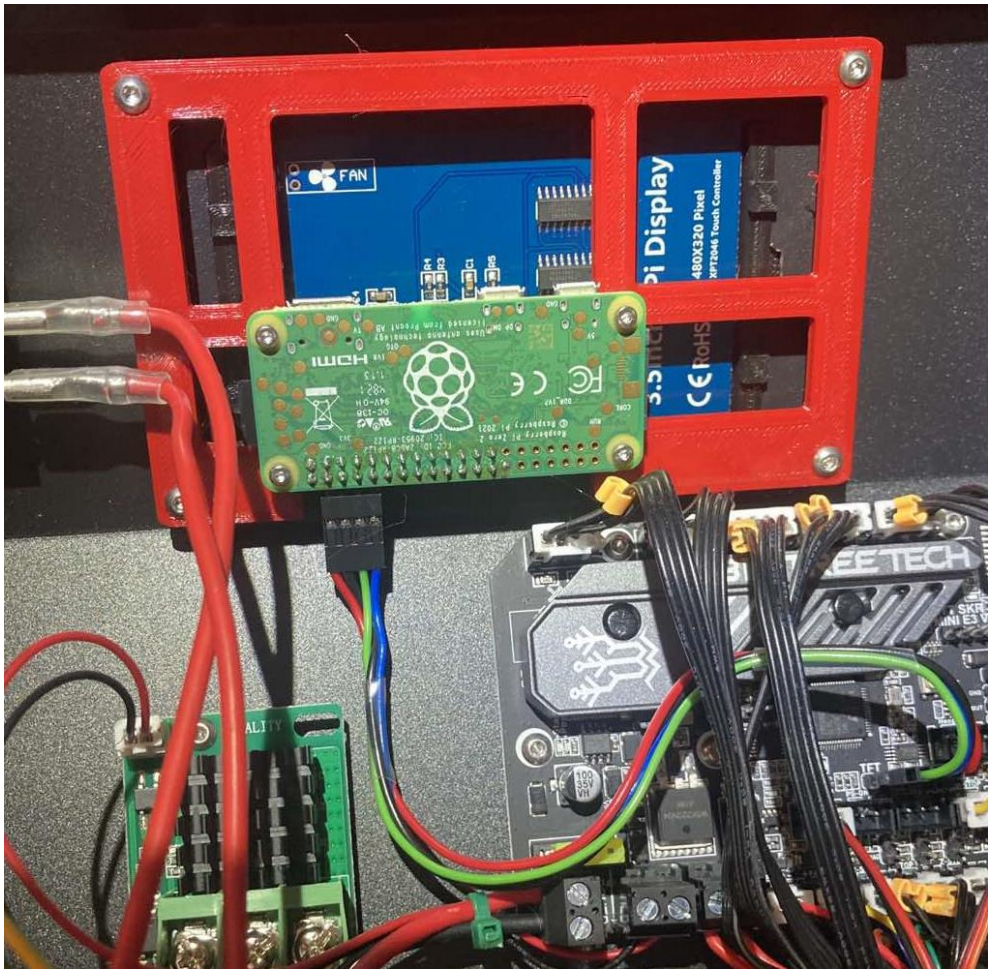
5.2 Connect the LCD screen to the RPI by inserting the LCD and his bezel in the hole of the original screen. **Be very gentle when inserting the LCD connector into the RPI.**

5.3 Check if the LCD screen and the RPI connections are well aligned (no pins outside of the LCD connector).

5.4 Tighten the 4 screws of the RPI (be gentle as you are screwing into plastic).

5.5 Connect the RPI to the TFT port of the SKR Mini E3. **Ensure correct orientation of the connectors**.

5.6 The complete assembly should look like:



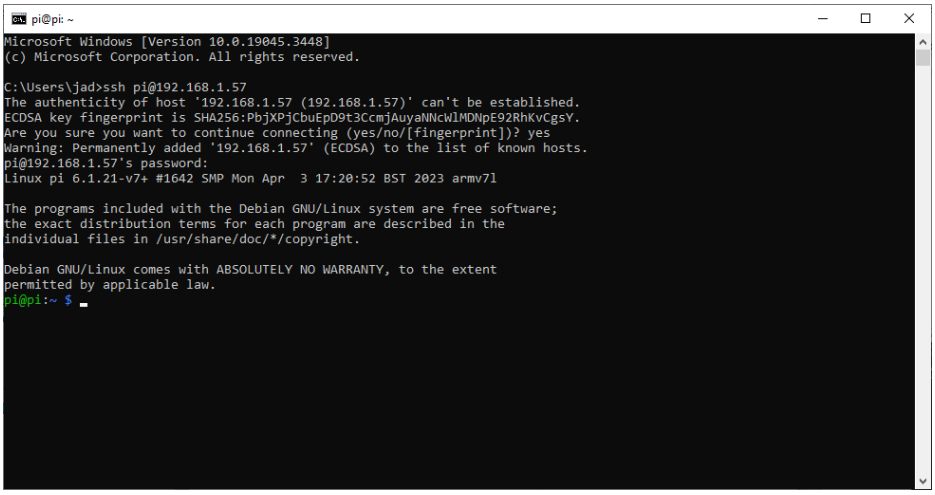
6. Finalise the RPI initial configuration

6.1 Power on the RPI and the printer. You should see a white and then a black screen. Wait 5 minutes in order to have the RPI configured initially.

6.2 Find out the IP address of the RPI on your router (192.168.1.57 in my case).

6.3 Start a console on your computer (cmd on Windows).

1.8 Access your RPI via **ssh pi@192.168.1.57**
pi being the Username. You can also use pi@pi.local with pi.local being the HOST name.



1.9 Enter the following commands in order to upgrade the operating system to the latest status: **sudo apt update && sudo apt full-upgrade && sudo apt clean**
That will take some time depending on the latest upgrade status of the RPI image and the speed of your internet connection

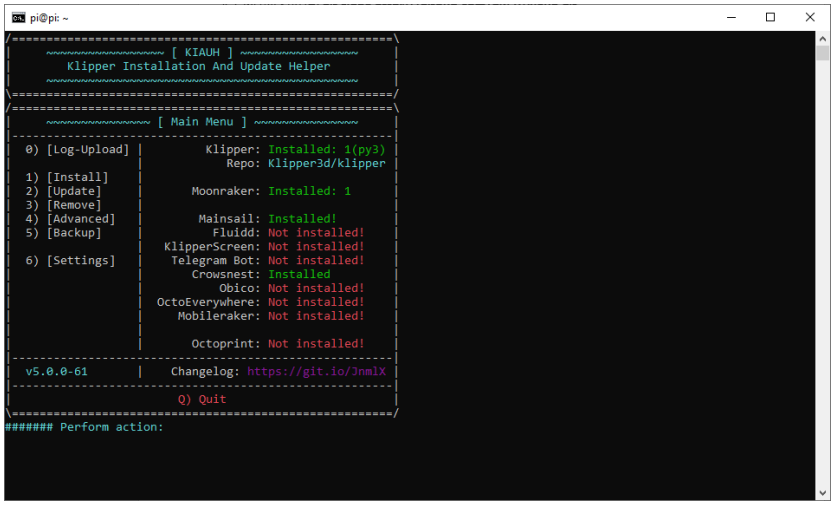
1.10 Reboot the RPI by entering: **sudo reboot**

1.11 Reconnect via ssh to the RPI: **ssh pi@192.168.1.57**

7. Install Kiauh on the RPI

1.12 Install KIAUH: **git clone https://github.com/dw-0/kiauh.git**

1.13 Start Kiauh: **kiauh/kiauh.sh**



1.14 Install KlipperScreen: **1**) for Install, **5**) for KlipperScreen. That will take some minutes. Then come back to the main menu **B**) and quit Kiauh **Q**).

2. Install 3.5” LCD SPI drivers on the RPI

2.1 In the RPI console, enter the following commands:

git clone https://github.com/goodtft/LCD-show.git
chmod -R 755 LCD-show
cd LCD-show/
sudo ./LCD35-show

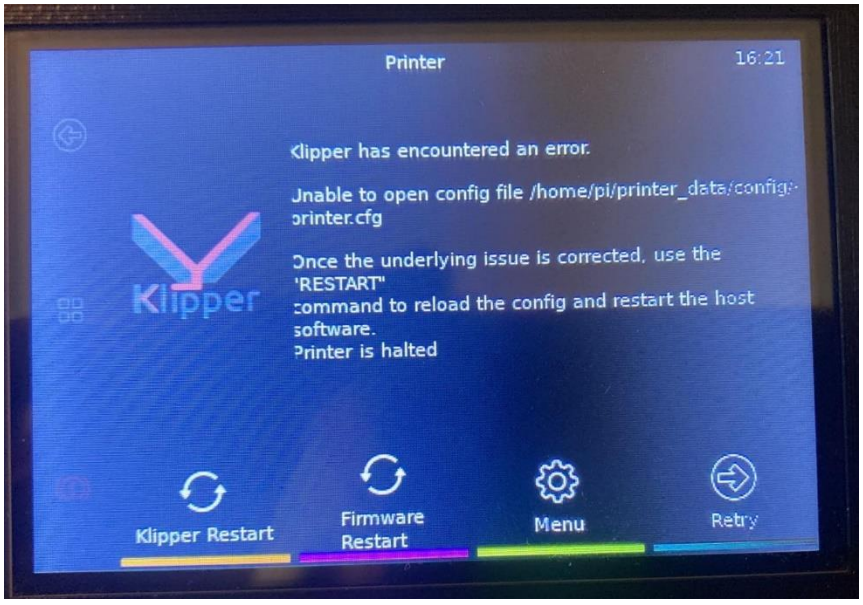
2.2 The RPI will reboot.

2.3 Reconnect via ssh to the RPI: **ssh pi@192.168.1.57**

2.4 In the RPI console, enter the following command:

sudo rm /usr/share/X11/xorg.conf.d/99-fbturbo.conf

2.5 The LCD should now show Klipper willing to start:



2.6 If KlipperScreen is not visible on the LCD, type in the RPI console:

sudo nano /boot/cmdline.txt

2.7 Remove any console command item and keep: **console=tty1**

2.8 Leave nano with **^X**) for Exit, **Y**) for saving the file and **Enter**

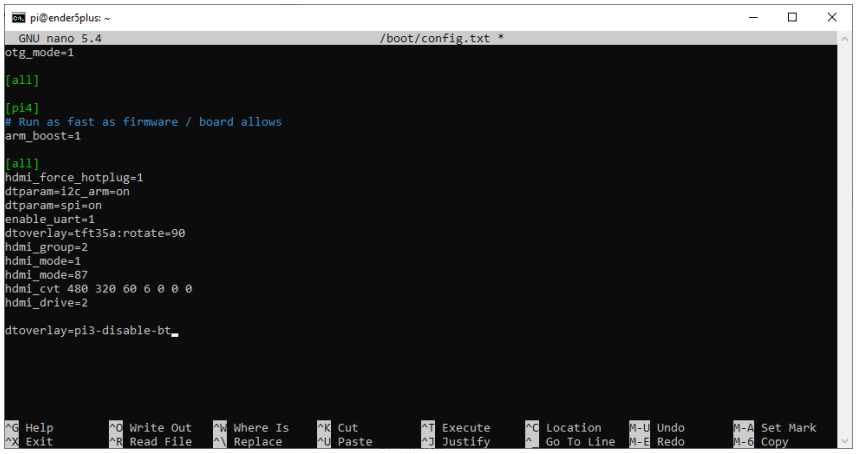
2.9 Reboot the RPI by entering: **sudo reboot**

2.10 Reconnect via ssh to the RPI: **ssh pi@192.168.1.57**

3. Install Klipper-Mainsail-Moonraker configuration files

3.1 In order to free up RD2/TD2 for the RPI connection via ttyAMA0 (name of the serial port), type in the RPI console: **sudo nano /boot/config/txt**

3.2 Add at the end: **dtoverlay=pi3-disable-bt**



3.3 Leave nano with **^X**) for Exit, **Y**) for saving the file and **Enter**

3.4 Start WinSCP and copy the following files from your computer to **/home/pi/printer_data/config** on the RPI:

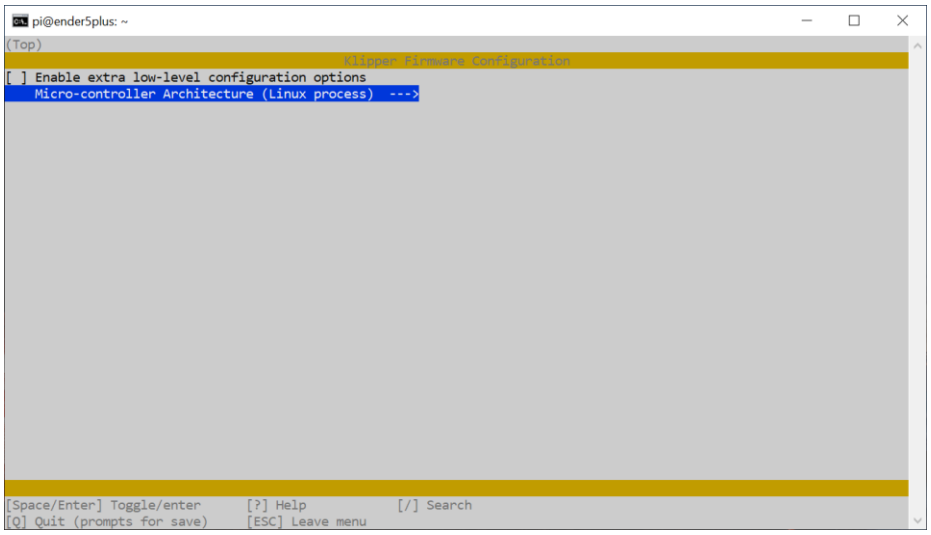
- **KlipperScreen.conf**
- **moonraker.conf**
- **printer.cfg**

4. Install Klipper on LINUX MCU

4.1 In the RPI console, start Kiauh: **kiauh/kiauh.sh**

4.2 Enter **4**) Advanced and **2**) Build Only

4.3 Select the following option:



4.4 Enter **Q**) and **Y**) in order to save the configuration and start the build process.

4.5 When klipper.elf is built, leave Kiauh with **B**) and **Q**).

4.6 In the RPI console, enter the following commands:

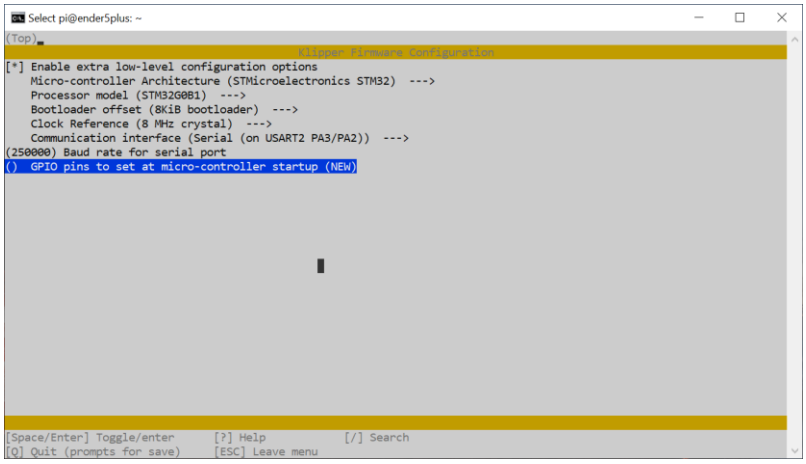
cd ~/klipper/
sudo cp ./scripts/klipper-mcu.service /etc/systemd/system/
sudo systemctl enable klipper-mcu.service
sudo service klipper stop
make flash
sudo service klipper start
cd

5. Install Klipper on the SKR Mini E3

5.1 In the RPI console, start Kiauh: kiauh/kiauh.sh

5.2 Enter **4**) Advanced and **2**) Build Only

5.3 Select the following options:



5.4 Enter **Q**) and **Y**) in order to save the configuration and start the build process.

5.5 When klipper.bin is built, start WinSCP on your computer

5.6 Copy **/home/pi/klipper/out/klipper.bin** to the micro SD card in order to flash Klipper on the SKR Mini.

5.7 Rename klipper.bin on the micro SD card as **firmware.bin**.

5.8 Eject the SD card from your computer, insert in the SKR Mini in the Ender 5+ and restart the Ender 5+.

5.9 You should now get Klipper and KlipperScreen starting: