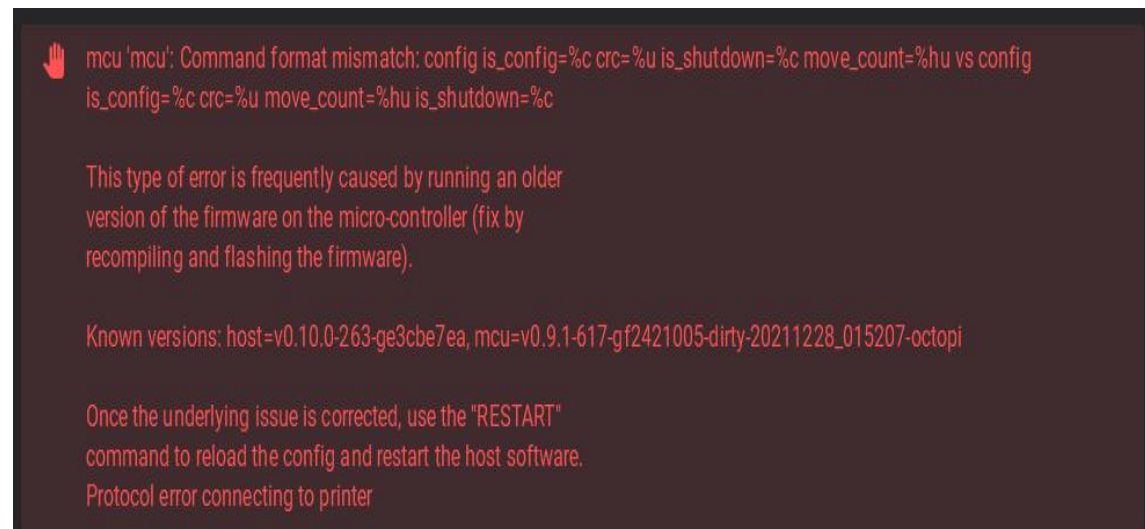# MKS motherboard Raspberry Pi system and Klipper firmware upgrade guide

When the following error appears on the fluidd interface, you need to upgrade the Raspberry Pi system and klipper firmware

1. Upgrade the Raspberry Pi system

Open a shell and enter in the shell:

sudo apt-get update && sudo apt-get upgrade -y

Then wait for the upgrade to succeed, the upgrade is successful as shown in the figure below, and then enter **sudo reboot** to restart the Raspberry Pi

```
Linux fluiddpi 5.10.63-v7+ #1496 SMP Wed Dec 1 15:58:11 GMT 2021 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Feb 15 03:05:37 2022 from 192.168.2.2

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set a new pas

pi@fluiddpi:~ $  sudo apt-get update && sudo apt-get upgrade -y
Hit:1 http://archive.raspberrypi.org/debian buster InRelease
Hit:2 http://raspbian.raspberrypi.org/raspbian buster InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  python-colorzero
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
pi@fluiddpi:~ $ 
```

2. Upgrade klipper

Enter cd ~/**klipper && git pull** in the shell

The upgrade is successful in about 1-2 minutes, and the upgrade is

successful as shown in the following figure

```
create mode 100644 klippy/extras/sdcard_loop.py
rename klippy/extras/{rpi_temperature.py => temperature_host.py} (67%)
create mode 100644 klippy/kinematics/hybrid_corexy.py
create mode 100644 klippy/kinematics/hybrid_corexz.py
create mode 100644 lib/fatfs/LICENSE.txt
create mode 100644 lib/fatfs/diskio.h
create mode 100644 lib/fatfs/ff.c
create mode 100644 lib/fatfs/ff.h
create mode 100644 lib/fatfs/ffconf.h
create mode 100644 lib/fatfs/ffsystem.c
create mode 100644 lib/fatfs/ffunicode.c
create mode 100644 scripts/canbus_query.py
create mode 100755 scripts/flash-sdcard.sh
create mode 100644 scripts/spi_flash/board_defs.py
create mode 100644 scripts/spi_flash/fatfs_api.c
create mode 100644 scripts/spi_flash/fatfs_api.h
create mode 100644 scripts/spi_flash/fatfs_lib.py
create mode 100644 scripts/spi_flash/spi_flash.py
create mode 100644 src/generic/canbus.c
create mode 100644 src/generic/canbus.h
create mode 100644 src/linux/sensor_ds18b20.c
create mode 100644 src/lpc176x/hard_pwm.c
create mode 100644 src/pulse_counter.c
delete mode 100644 src/stm32/can.h
create mode 100644 src/stm32/hard_pwm.c
create mode 100644 src/trsync.c
create mode 100644 src/trsync.h
create mode 100644 test/configs/samd51p20.config
create mode 100644 test/configs/stm32f031.config
create mode 100644 test/configs/stm32f429.config
create mode 100644 test/klippy/sdcard_loop.cfg
create mode 100644 test/klippy/sdcard_loop.test
create mode 100644 test/klippy/sdcard_loop/big.gcode
pi@fluiddpi:~/klipper $ cd ~/klipper && git pull
Already up to date.
pi@fluiddpi:~/klipper $
```
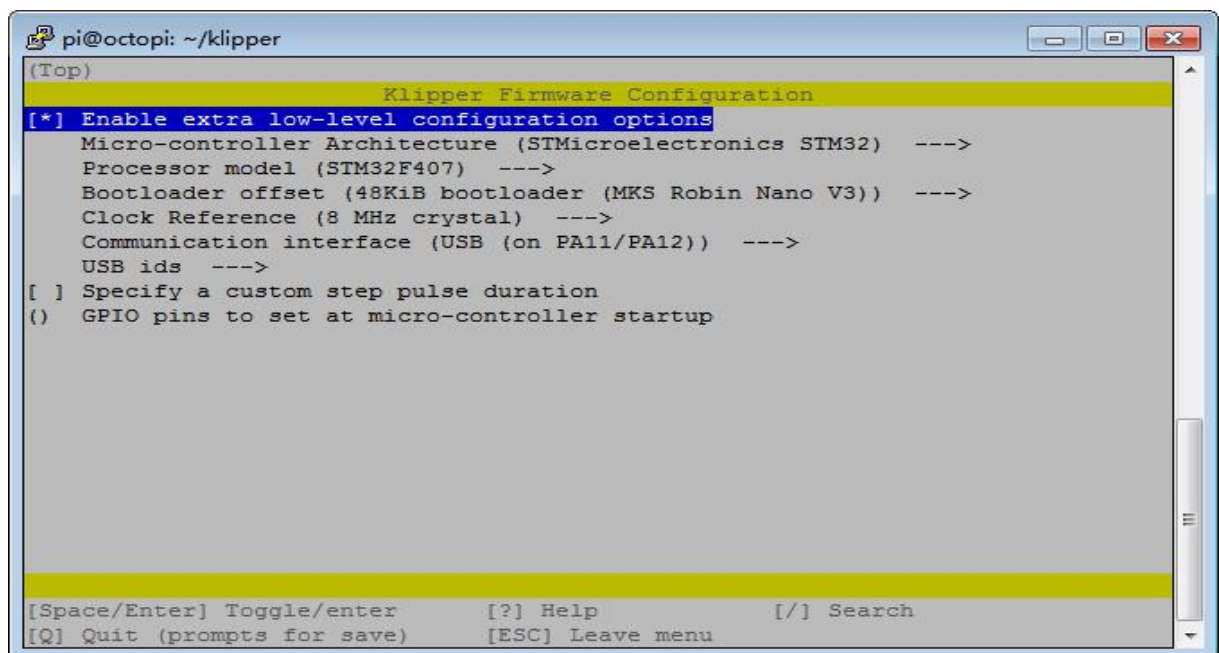
3. Mainboard parameter configuration

Enter **cd ~/klipper && make menuconfig** in the shell to enter the configuration interface


```
(Top) → Micro-controller Architecture
                          Klipper Firmware Configuration
(X) Atmega AVR
( ) SAM3/SAM4 (Due and Duet)
( ) SAMD21/SAMD51
( ) LPC176x (Smoothieboard)
( ) STMicroelectronics STM32
( ) Raspberry Pi RP2040
( ) Beaglebone PRU
( ) Linux process
( ) Host simulator




[Space/Enter] Toggle/enter   [?] Help      [/] Search
[Q] Quit (prompts for save)  [ESC] Leave menu
```

Then operate " ↑ ", " ↓ ", "enter" on the keyboard to configure the configuration items.

The parameters of MKS series motherboards are configured as follows:
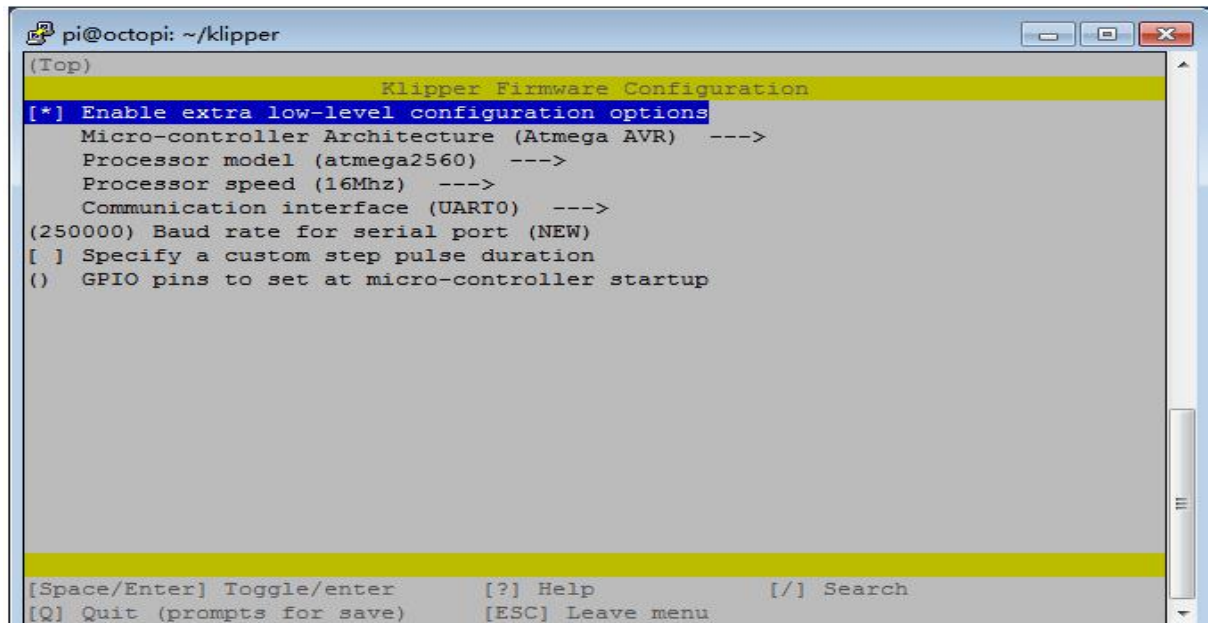
3.1 MKS Robin nano V3.0 、 Robin nano V3.1、 MKS eagle、MKS monster8 V1.0
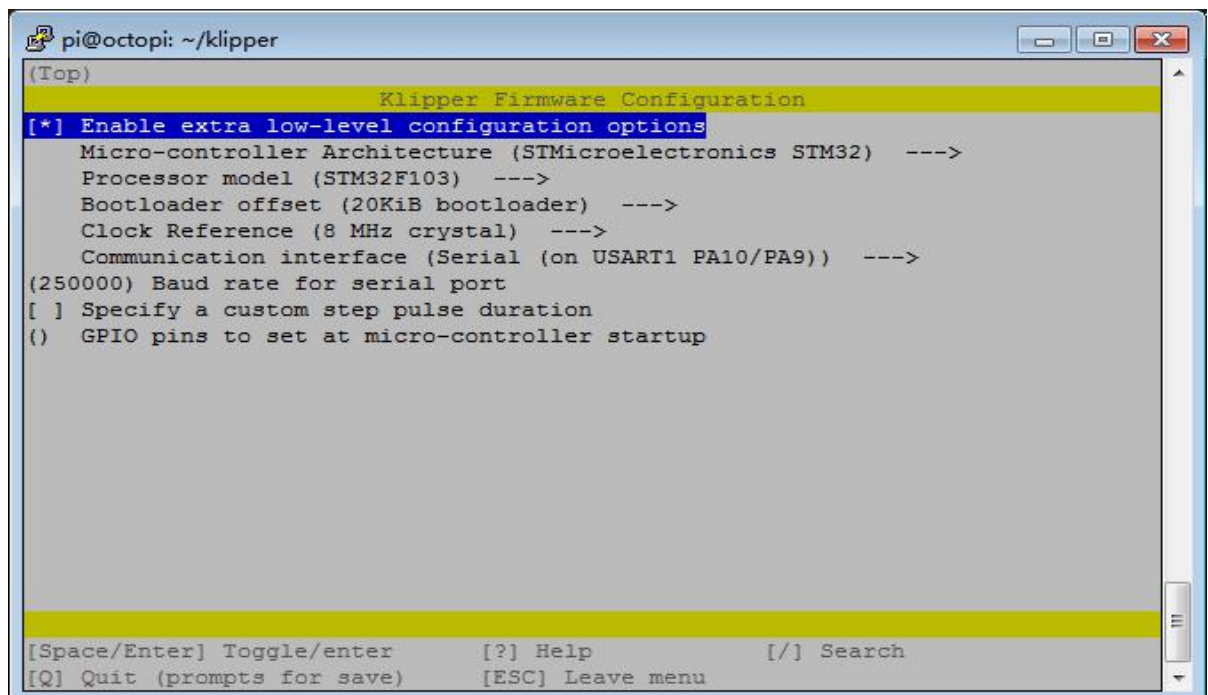
3.2 MKS GEN_L V1.0、GEN_L V2.0/V2.1

3.3MKS Robin E3/E3D V1.0、MKS Robin E3/E3D V1.1、Robin mini V2.0

3.4 MKS Robin nano V1.2/V2.0、Robin nano E3P

```
pi@octopi: ~/klipper                                              ─  □  ✕
(Top)
                    Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32)  --->
    Processor model (STM32F103)  --->
    Bootloader offset (28KiB bootloader)  --->
    Clock Reference (8 MHz crystal)  --->
    Communication interface (Serial (on USART3 PB11/PB10))  --->
(250000) Baud rate for serial port (NEW)
[ ] Specify a custom step pulse duration
()  GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter        [?] Help            [/] Search
[Q] Quit (prompts for save)       [ESC] Leave menu
```
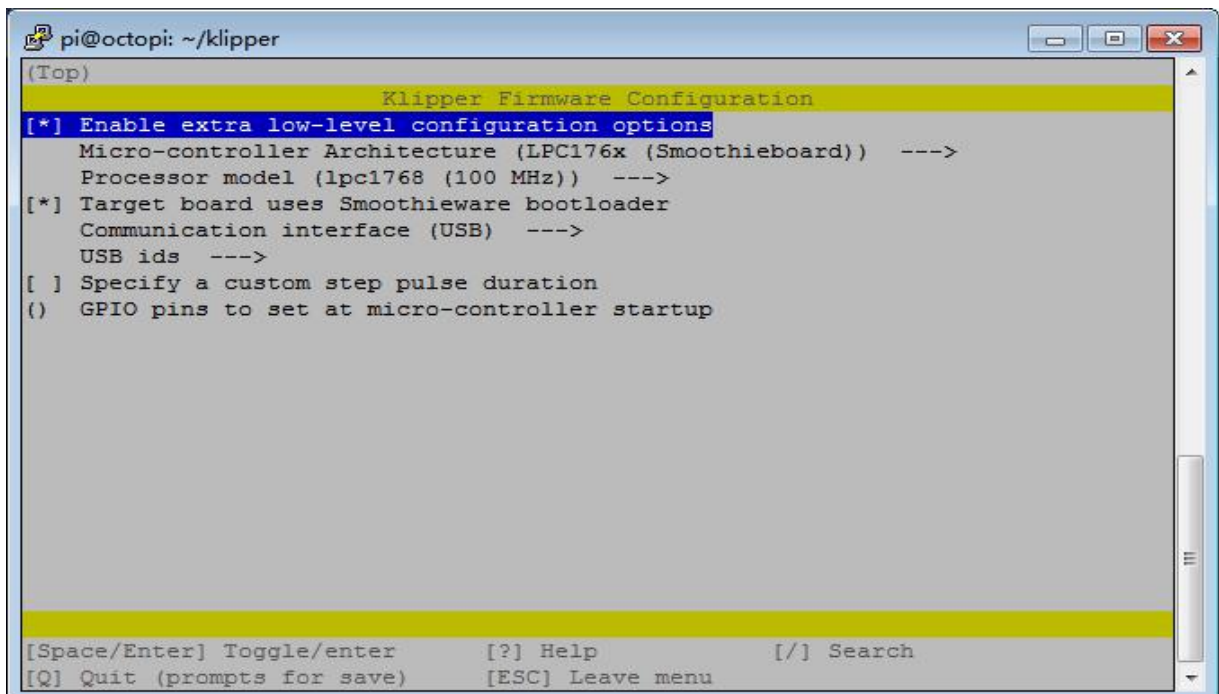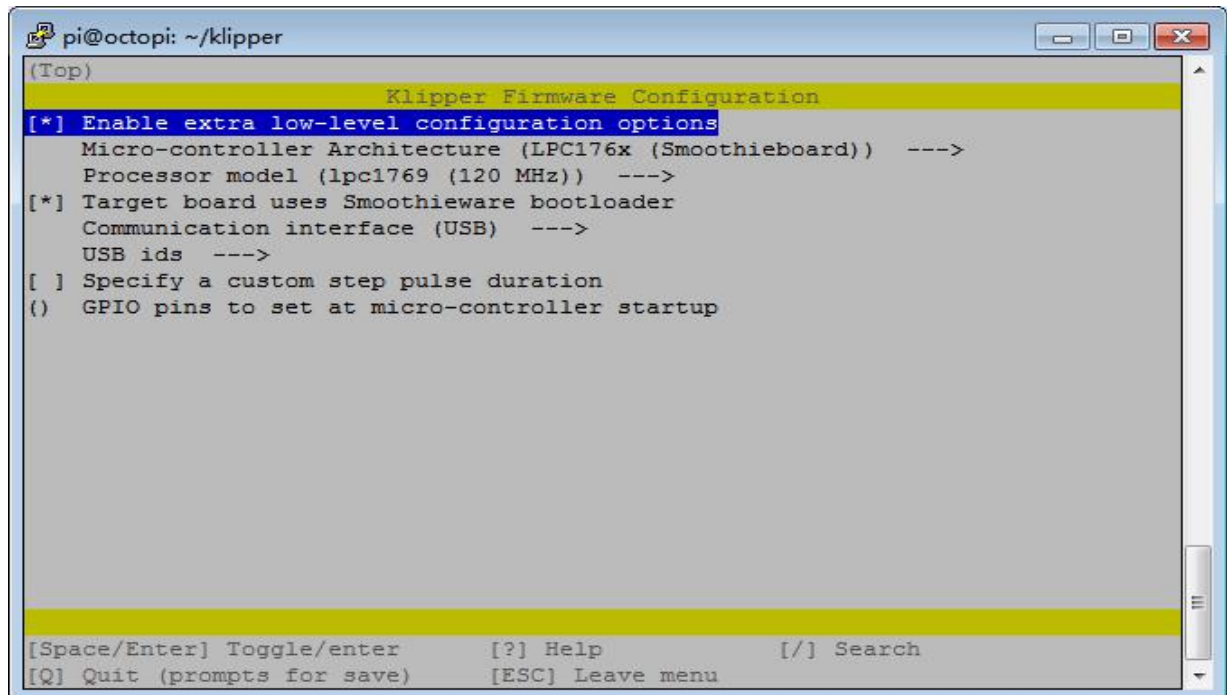
3.5 MKS Sgen_I V1.0

```
pi@octopi: ~/klipper                                              ─  □  ✕
(Top)
                    Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (LPC176x (Smoothieboard))  --->
    Processor model (lpc1768 (100 MHz))  --->
[*] Target board uses Smoothieware bootloader
    Communication interface (USB)  --->
    USB ids  --->
[ ] Specify a custom step pulse duration
()  GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter        [?] Help            [/] Search
[Q] Quit (prompts for save)       [ESC] Leave menu
```
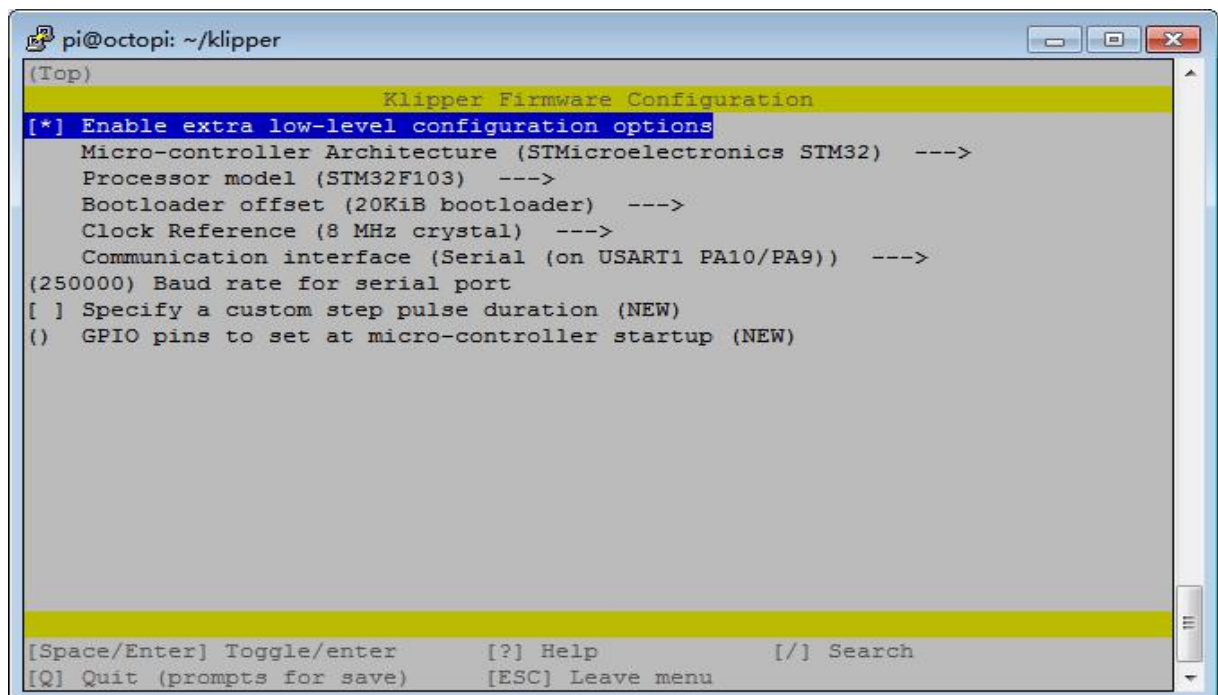
3.6 MKS Sgen_L V2.0

```
pi@octopi: ~/klipper                                          □ ▣ ✖

(Top)
                     Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (LPC176x (Smoothieboard))  --->
    Processor model (lpc1769 (120 MHz))  --->
[*] Target board uses Smoothieware bootloader
    Communication interface (USB)  --->
    USB ids  --->
[ ] Specify a custom step pulse duration
()  GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter         [?] Help            [/] Search
[Q] Quit (prompts for save)        [ESC] Leave menu
```

3.7 MKS Robin lite V1.1

```
pi@octopi: ~/klipper                                          □ ▣ ✖

(Top)
                     Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32)  --->
    Processor model (STM32F103)  --->
    Bootloader offset (20KiB bootloader)  --->
    Clock Reference (8 MHz crystal)  --->
    Communication interface (Serial (on USART1 PA10/PA9))  --->
(250000) Baud rate for serial port
[ ] Specify a custom step pulse duration (NEW)
()  GPIO pins to set at micro-controller startup (NEW)




[Space/Enter] Toggle/enter         [?] Help            [/] Search
[Q] Quit (prompts for save)        [ESC] Leave menu
```

3.8 MKS Robin


```
pi@octopi: ~/klipper
(Top)
                    Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32)  --->
    Processor model (STM32F103)  --->
    Bootloader offset (28KiB bootloader)  --->
    Clock Reference (8 MHz crystal)  --->
    Communication interface (Serial (on USART3 PB11/PB10))  --->
(250000) Baud rate for serial port
[ ] Specify a custom step pulse duration
()  GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter        [?] Help            [/] Search
[Q] Quit (prompts for save)       [ESC] Leave menu
```

3.9 MKS Robin2


```
pi@octopi: ~/klipper
(Top)
                    Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32)  --->
    Processor model (STM32F407)  --->
    Bootloader offset (48KiB bootloader (MKS Robin Nano V3))  --->
    Clock Reference (8 MHz crystal)  --->
    Communication interface (Serial (on USART3 PB11/PB10))  --->
(250000) Baud rate for serial port
[ ] Specify a custom step pulse duration
()  GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter        [?] Help            [/] Search
[Q] Quit (prompts for save)       [ESC] Leave menu
```
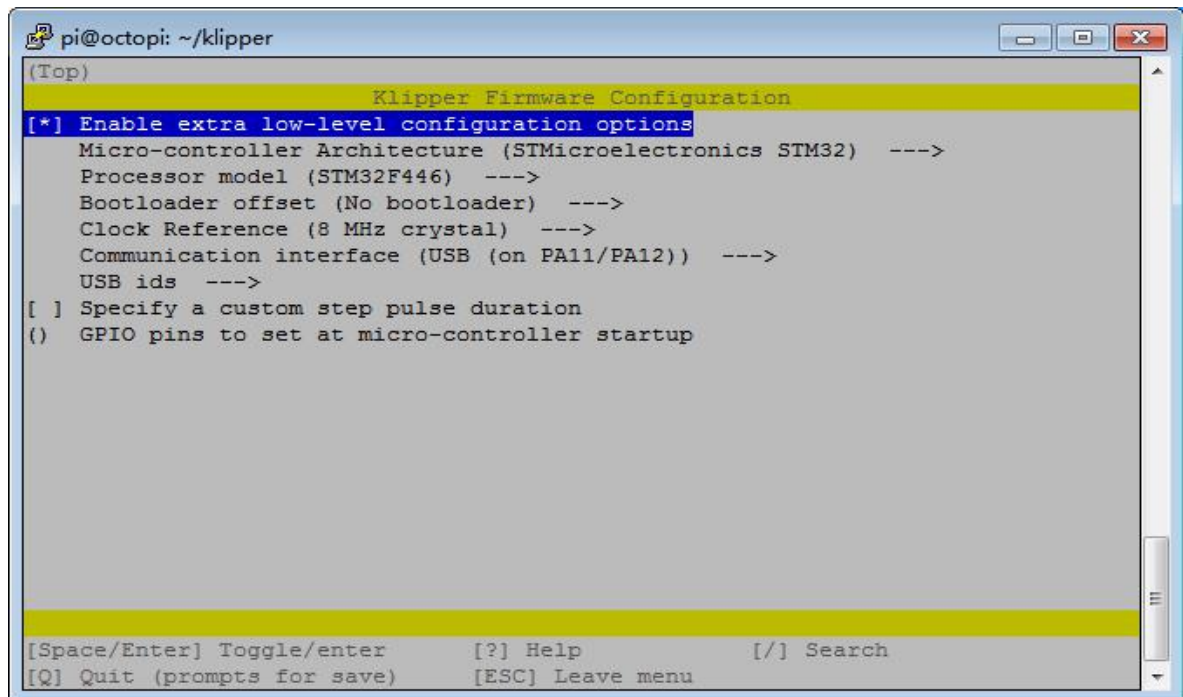
3.10 MKS Rumba32


```
pi@octopi: ~/klipper
(Top)
               Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32)  --->
    Processor model (STM32F446)  --->
    Bootloader offset (No bootloader)  --->
    Clock Reference (8 MHz crystal)  --->
    Communication interface (USB (on PA11/PA12))  --->
    USB ids  --->
[ ] Specify a custom step pulse duration
() GPIO pins to set at micro-controller startup




[Space/Enter] Toggle/enter        [?] Help              [/] Search
[Q] Quit (prompts for save)       [ESC] Leave menu
```

4. Firmware compilation

After the main board parameter configuration is completed, press "Q" and "Y" on the keyboard successively to exit and save the parameters.
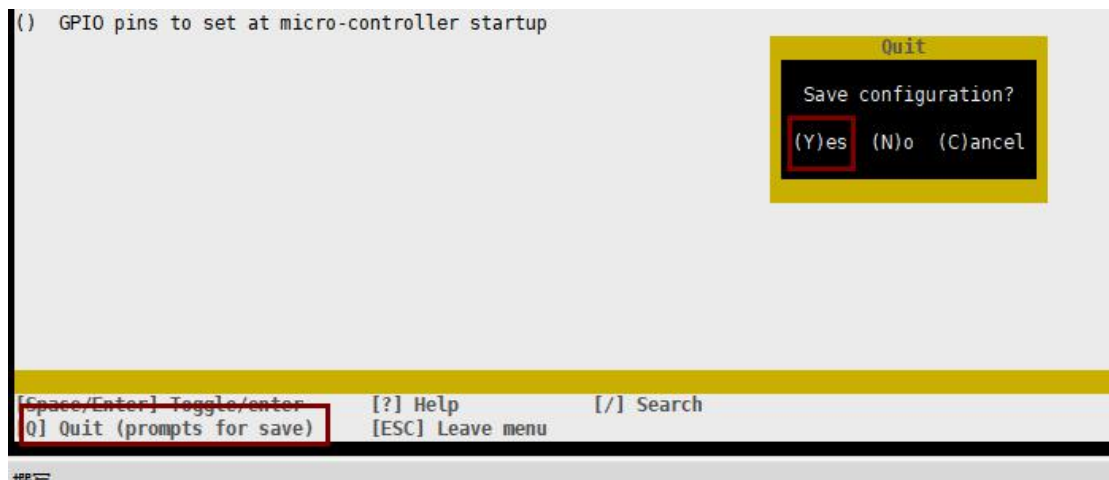
Then enter **make clean** in the shell to clear the object file generated by the previous compilation.

Then enter **make** in the shell, and the system starts compiling the firmware until it finishes. After the compilation is complete, the version number of the current klipper will be displayed.
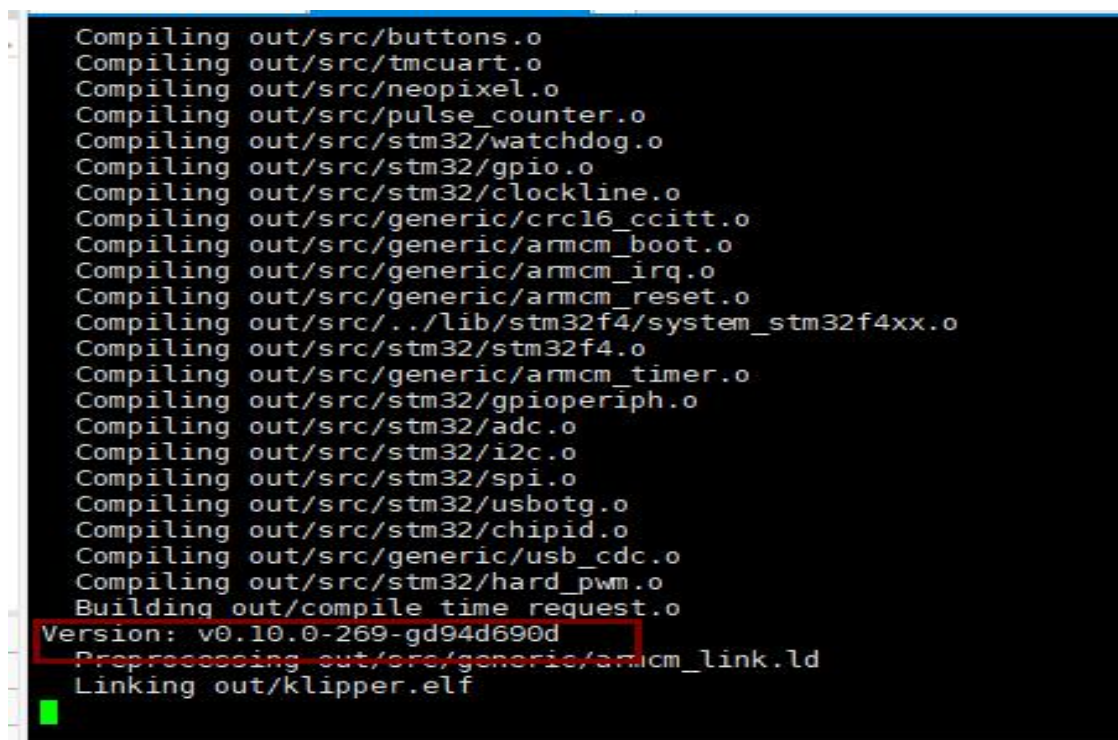
The name of the generated firmware is klipper.bin (the firmware name of Gen_LV1.0 and Gen_L V2.1 is firmware.hex), which is stored in the **~/klipper/out**
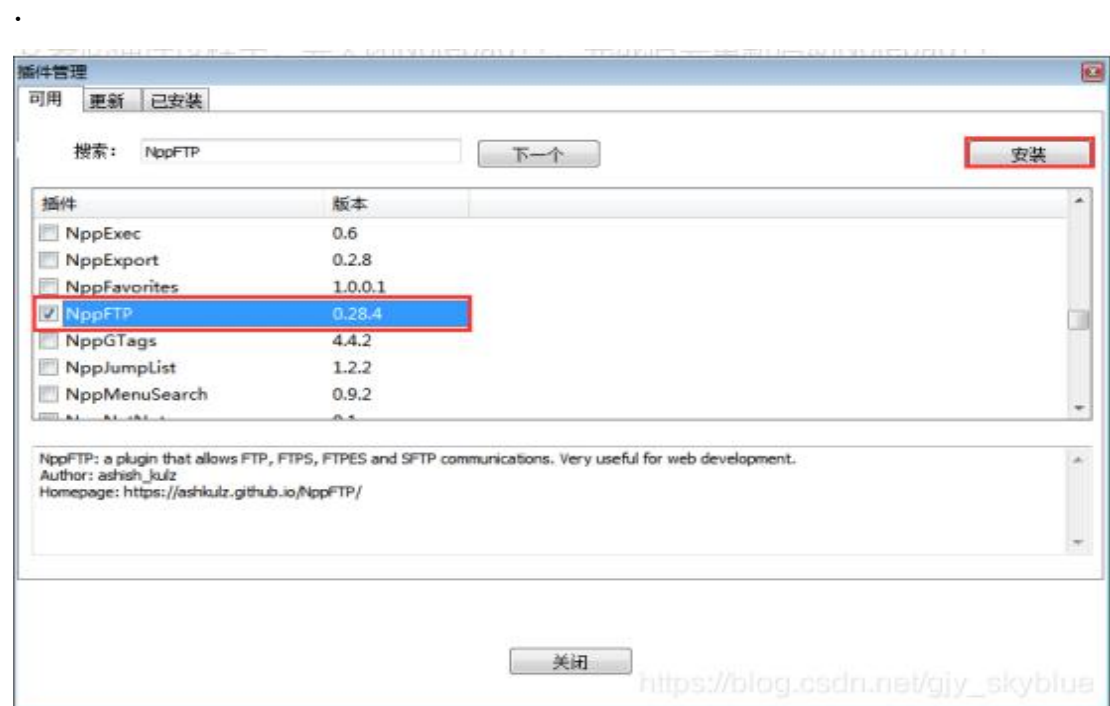
5. Firmware update

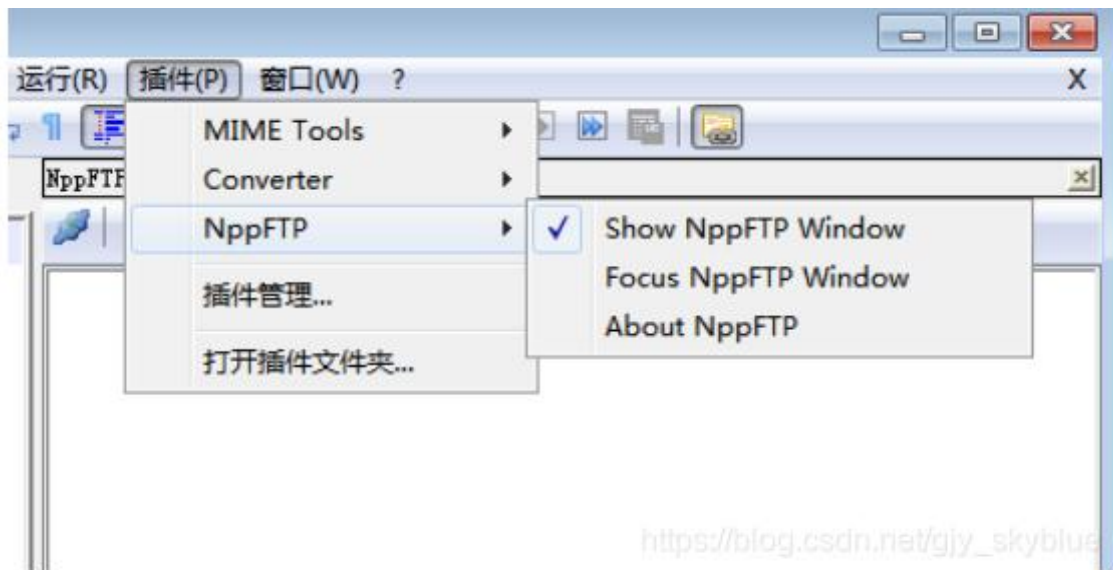To export the compiled firmware, Notepad++ needs to be installed.

Notepad++ latest version download address:

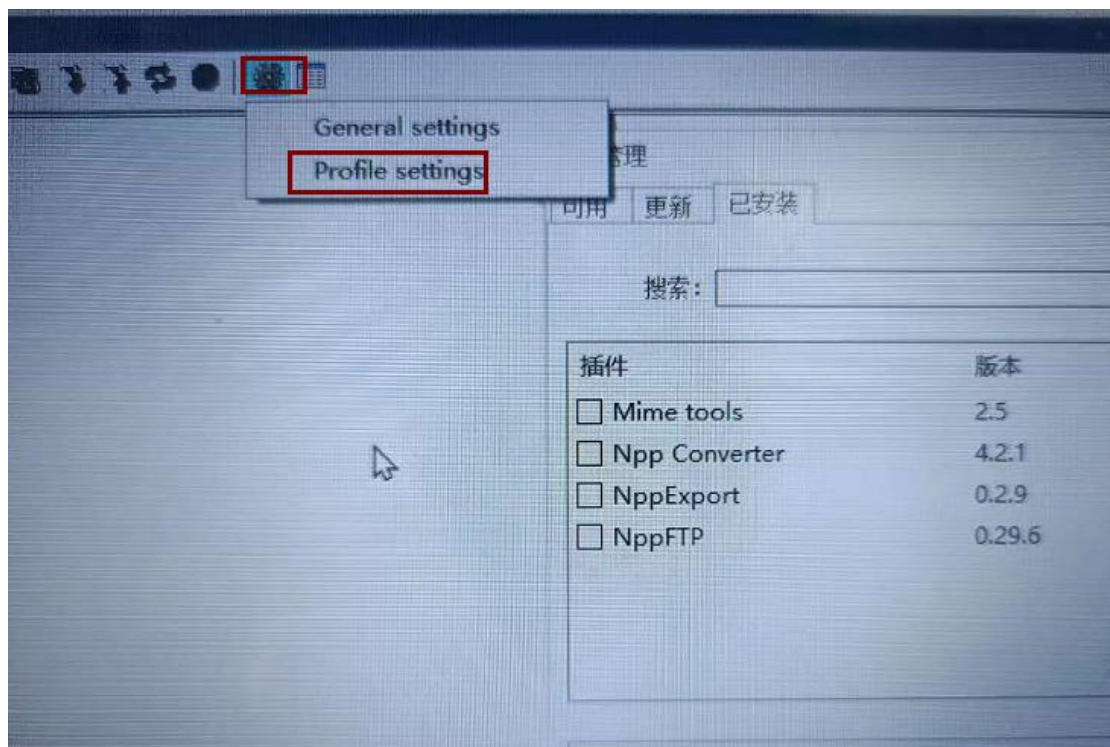https://notepad-plus.en.softonic.com/

After downloading and installing Notepad++, you need to install the NttFTP plugin
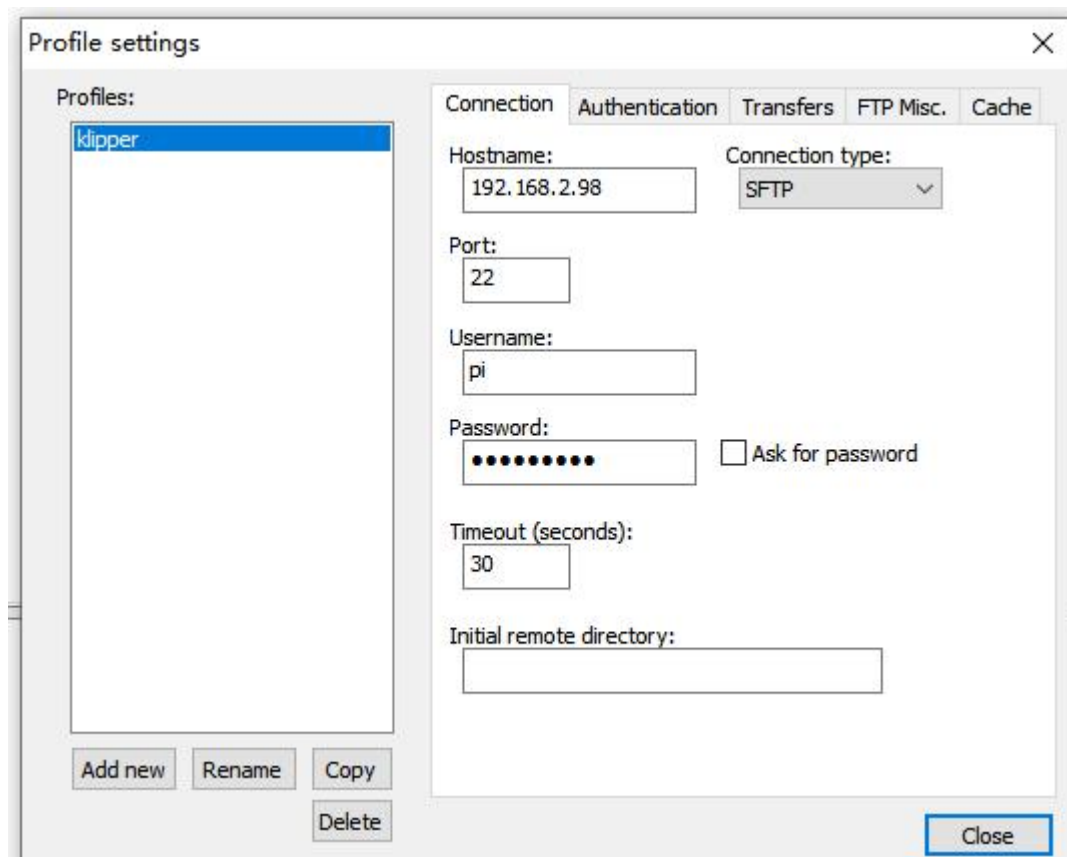
During the installation of this plugin, Notepad++ will be closed, and Notepad++ will be restarted after completion.
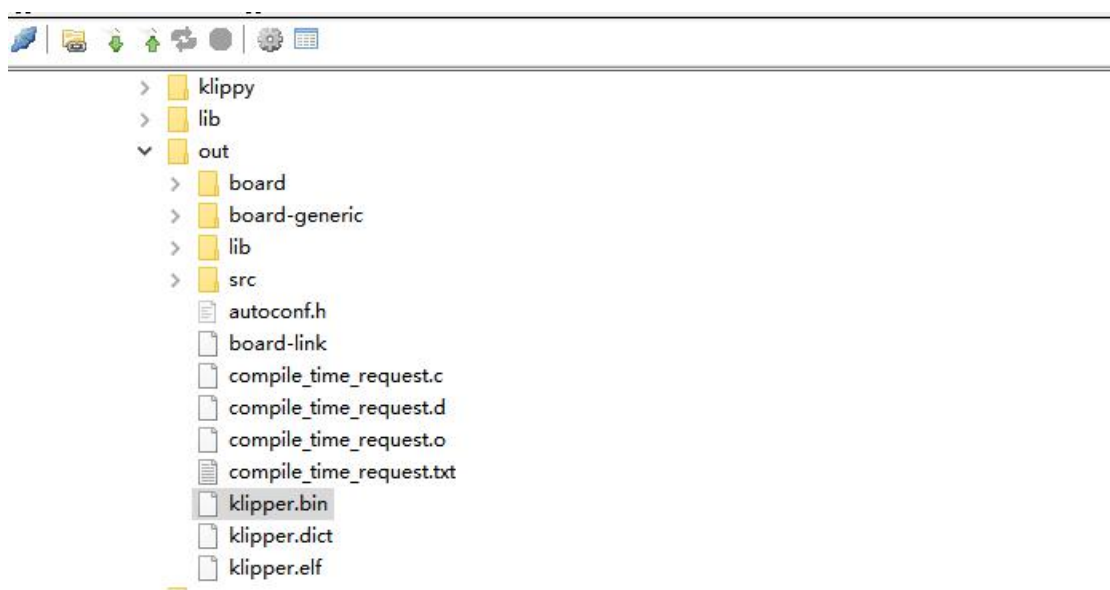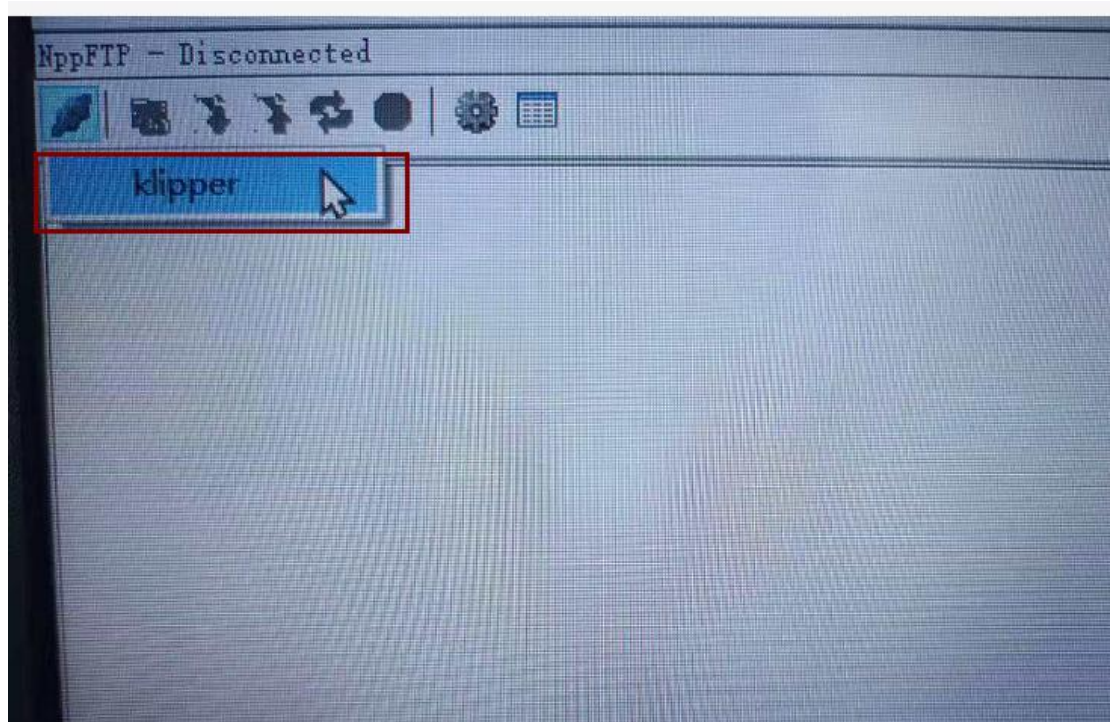
.

Configure Notepad++ and connect to the Raspberry Pi (IP address is set according to your own actual settings)
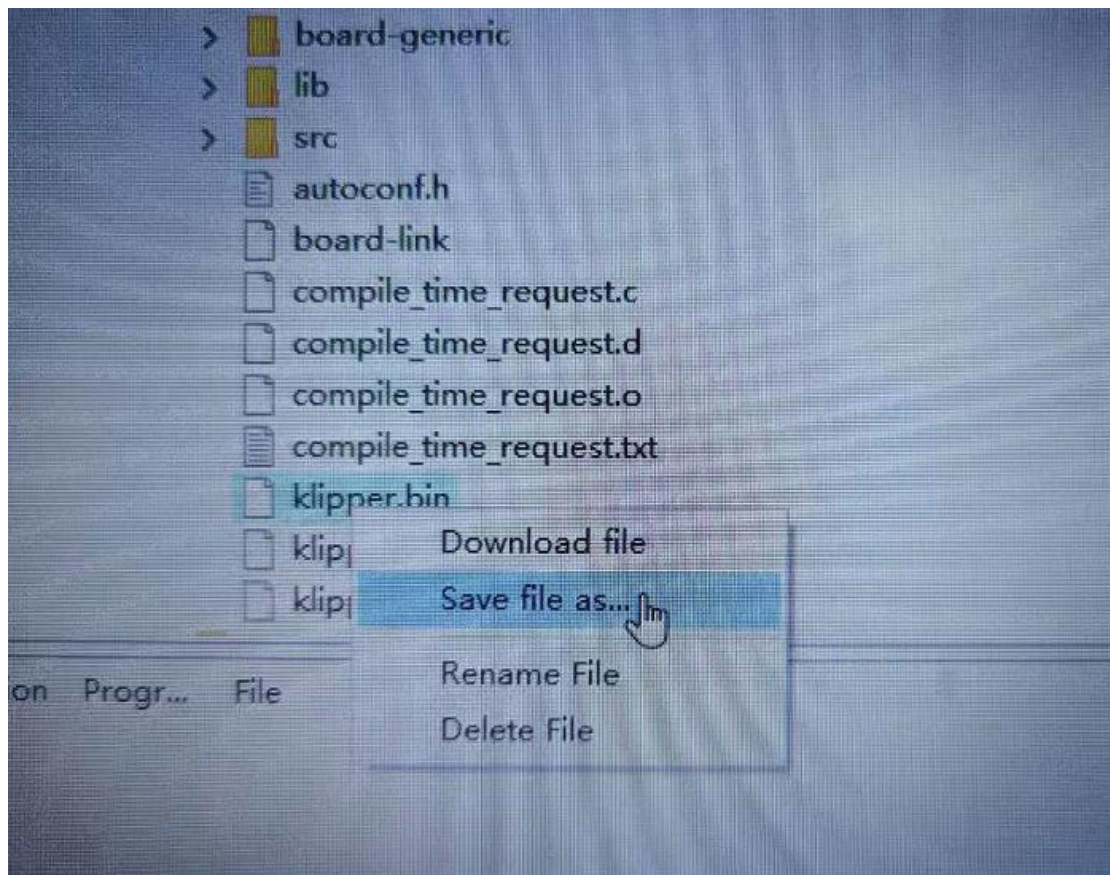
Click Configure to enter the directory where the firmware is saved. The name of the generated firmware is klipper.bin (the firmware name for Gen_LV1.0 and Gen_L V2.1 is firmware.hex), which is stored in the ~/klipper/out directory.

Then right click to save the firmware to your computer

Note: The firmware names of different motherboards are different, you need to modify the firmware name according to your own motherboard.

MKS series motherboard firmware name:

1. Gen_L V1.0, Gen_L V2.0, Gen_L V2.1 can directly use the firmware.hex file, and need to use Xloader software to upgrade the firmware.

2. For Robin nano V3.0 and Robin nano V 3.1, the firmware name is Robin_nano_V3.bin, you need to change klipper.bin to Robin_nano_V3.bin, and use TF card to upgrade the firmware.

3. MKS Eagle V1.0, the firmware name is mks_eagle.bin, you need to change klipper.bin to mks_eagle.bin, and use TF card to upgrade the firmware.

4. The firmware name of MKS Robin E3/E3D V1.0 and MKS Robin E3/E3D V1.1 is Robin_e3.bin. Use TF card to upgrade the firmware.

5. The firmware name of MKS Robin nano V1.2 and MKS Robi nano V2.0 is Robin_nano35.bin, use TF to upgrade the firmware

6. The name of MKS Robin E3P firmware is Robin_e3p.bin, use TF card to upgrade the firmware.

7. The firmware name of MKS Sgen_L V1.0 and MKS Sgen_L V2.0 is firmware.bin, use TF card to upgrade the firmware.

8. The firmware name of MKS Robin is Robin.bin, and the firmware is upgraded with SD card.

9. The firmware name of MKS Robin2 is Robin2.bin, use SD card to upgrade the firmware.

10. The firmware name of MKS Robin lite V1.1 is Robin_lite.bin, use TF card to upgrade the firmware.