

# STM32MP13 Mini PC **USER GUIDE**

**26/11/2025**

# KIWI MINI ARM PC

SOM STM32MP13xxAE Cortex-A7

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# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

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### Revision History

| Date       | Version | Description               |
|------------|---------|---------------------------|
| 26/11/2025 | 1.0     | Initial version published |

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# 1 About This Guide

## 1.1 Purpose

The Kiwi mini ARM PC V1.0 development board user manual consists of the following four parts:

- A brief introduction to the features and hardware resources of the development board
- An introduction to the hardware circuits functions, circuit, and pinout
- Considerations for the use of the development board
- Introduction to the use of the MPU development software.

## 1.2 Related Documents

The latest user guides are available on the Onekiwi Website. You can find the related documents at <https://onekiwi.com.vn/>

- <https://onekiwi.com.vn/wp-content/uploads/2023/11/stm32mp13-mimi-pc-1.pdf> : Schematic for Reference design.
- <http://linuxbsp.onekiwi.com.vn/> : BSP download
- [http://linuxbsp.onekiwi.com.vn/SOM\\_MP13/cross\\_compiler\\_sdk/](http://linuxbsp.onekiwi.com.vn/SOM_MP13/cross_compiler_sdk/) : SDK
- [https://wiki.st.com/stm32mpu/wiki/STM32MP13\\_microprocessor](https://wiki.st.com/stm32mpu/wiki/STM32MP13_microprocessor) : ST Wiki page

## 1.3 Abbreviations and Terminology

| Abbreviations | Full Name                                   |
|---------------|---------------------------------------------|
| SOM           | System On Module                            |
| MPU           | Microprocessor Unit                         |
| DDR3L         | Double Data Rate 3 Low-voltage SDRAM        |
| eMMC          | Embedded Multi-Media Card                   |
| QSPI          | Quad Serial Peripheral Interface            |
| OTG           | On-The-Go USB                               |
| I2C           | Inter-Integrated Circuit                    |
| I2S           | Integrated Interchip Sound                  |
| SAI           | Serial Audio Interface                      |
| SPI           | Serial Peripheral Interface                 |
| UART          | Universal Asynchronous Receiver/Transmitter |
| GPIO          | General Purpose Input/Output                |
| LTDC          | LCD-TFT Display Controller                  |
| DCMI          | Digital Camera Memory Interface             |

| Abbreviations | Full Name                                 |
|---------------|-------------------------------------------|
| RMII          | Reduced Media Independent Interface       |
| DFU           | Device Firmware Update                    |
| PMIC          | Power Management IC                       |
| LDO           | Low Dropout Regulator                     |
| eFUSE         | Electronic Fuse (Over-current protection) |
| ADC           | Analog-to-Digital Converter               |
| DAC           | Digital-to-Analog Converter               |

*Table 1 Table Of abbreviations and terminology*

## 1.4 Support and Feedback

Onekiwi Technology provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly using the information provided below.

- Website: <https://onekiwi.com.vn/>
- Email: [support@ontech.com.vn](mailto:support@ontech.com.vn)

## 2 Development Board Description

### 2.1 Overview



Figure 2-1 Front view of SOM

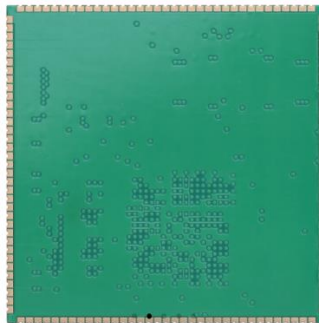


Figure 2-2 Back view of SOM



Figure 2-3 Front view of EVK

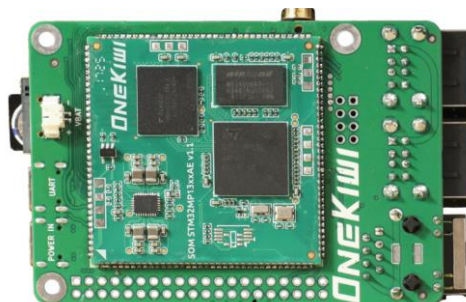


Figure 2-4 Back view of EVK

# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

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The **OneKiwi STM32MP13 Mini PC** is a compact ARM-based industrial embedded computer built around the **STM32MP13xxAE Cortex-A7 SOM**. The board is designed for rapid development, edge computing, and industrial applications requiring rich I/O connectivity, secure authentication, and stable .

The system integrates essential interfaces such as dual USB-A ports, Ethernet via the CH336U USB-Hub + ETH controller, microSD storage, 40-pin Raspberry-Pi-compatible GPIO header, audio output, and multiple expansion headers. It also includes hardware security components like the ChipDNA SHA-3 DS2477 and SHA-3 Authentication IC DS28E50, ensuring secure device identity and trusted communication.

Additional features include USB-to-UART (CH340N), USB-OTG DFU, on-board QSPI Flash (W25Q128), RTC VBAT connector, OLED I2C header, and a robust eFUSE power protection module (STEF05S). These make the Mini PC a versatile platform for multimedia, control systems, AIoT, and secure embedded solutions.

## 2.2 A Development Board Suite

A development board suite includes the following items:

- KIWI SOM STM32 Mini PC and Evaluation Kit for KIWI SOM board
- USB type C
- SD card

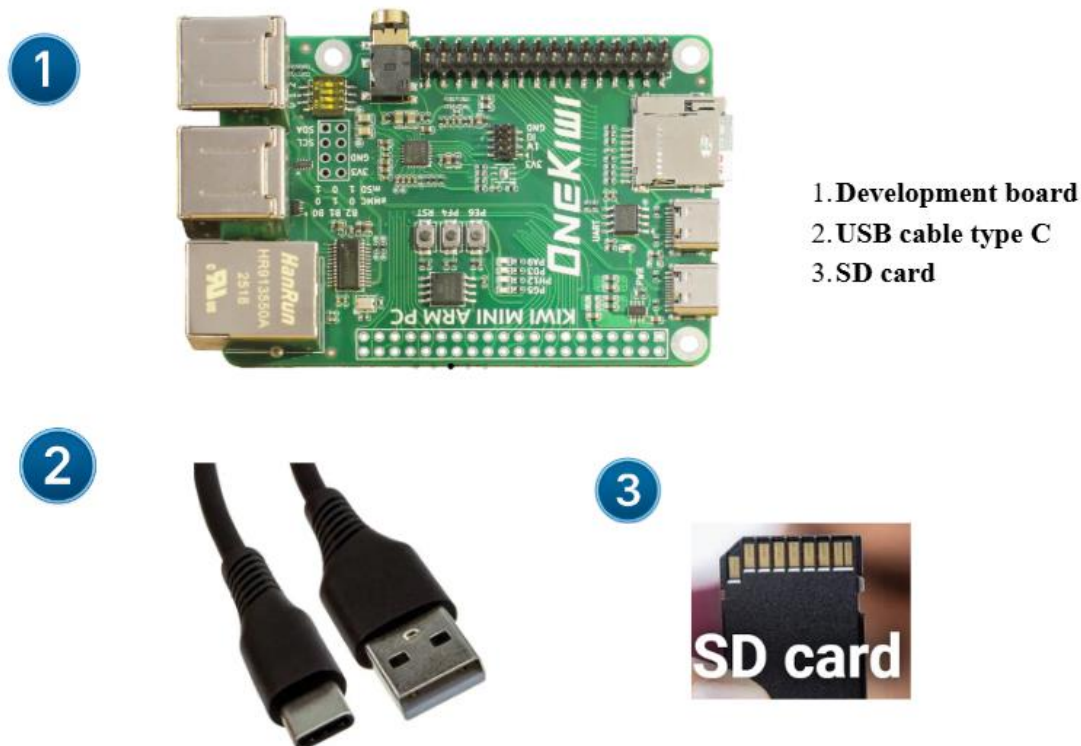


Figure 2-5 A development board suite

2.3 PCB components

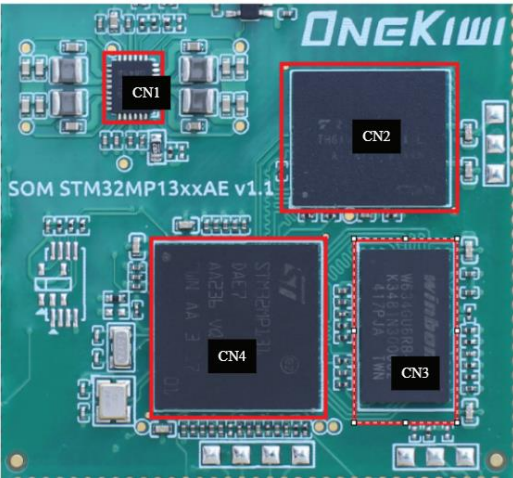


Figure 2-6 SoM STM32MP13 Components

| CN  | Name                   |
|-----|------------------------|
| CN1 | PMIC MP5479            |
| CN2 | 8GB EMMC flash         |
| CN3 | 512MB DDR3L            |
| CN4 | SM32MP13xxAE Cortex A7 |

Table 2 SoM components

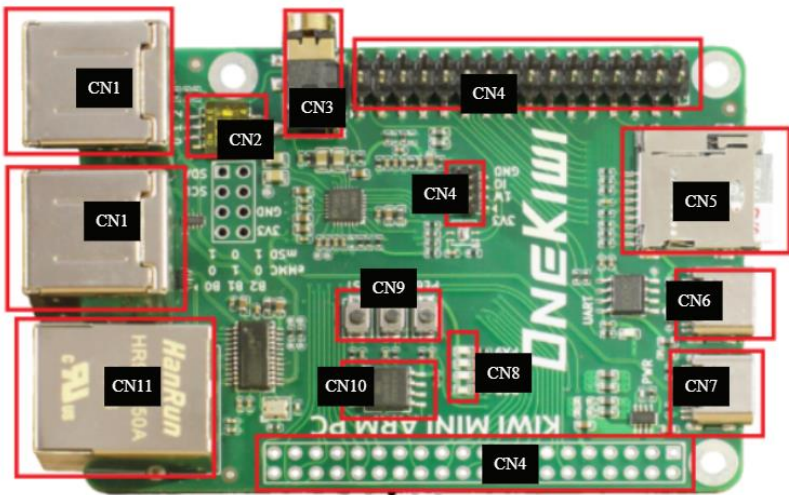


Figure 2-7 EVK components

| CN  | Name   |
|-----|--------|
| CN1 | USB2.0 |

# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

|      |                        |
|------|------------------------|
| CN2  | DIP-SWITCH 4           |
| CN3  | Audio                  |
| CN4  | GPIOs Headers          |
| CN5  | SD card                |
| CN6  | USB type C UART        |
| CN7  | USB type C Power/debug |
| CN8  | LED                    |
| CN9  | BUTTON                 |
| CN10 | SPI FLASH              |
| CN11 | ETHERNET               |

Table 3 EVK components

## 2.4 System Architecture

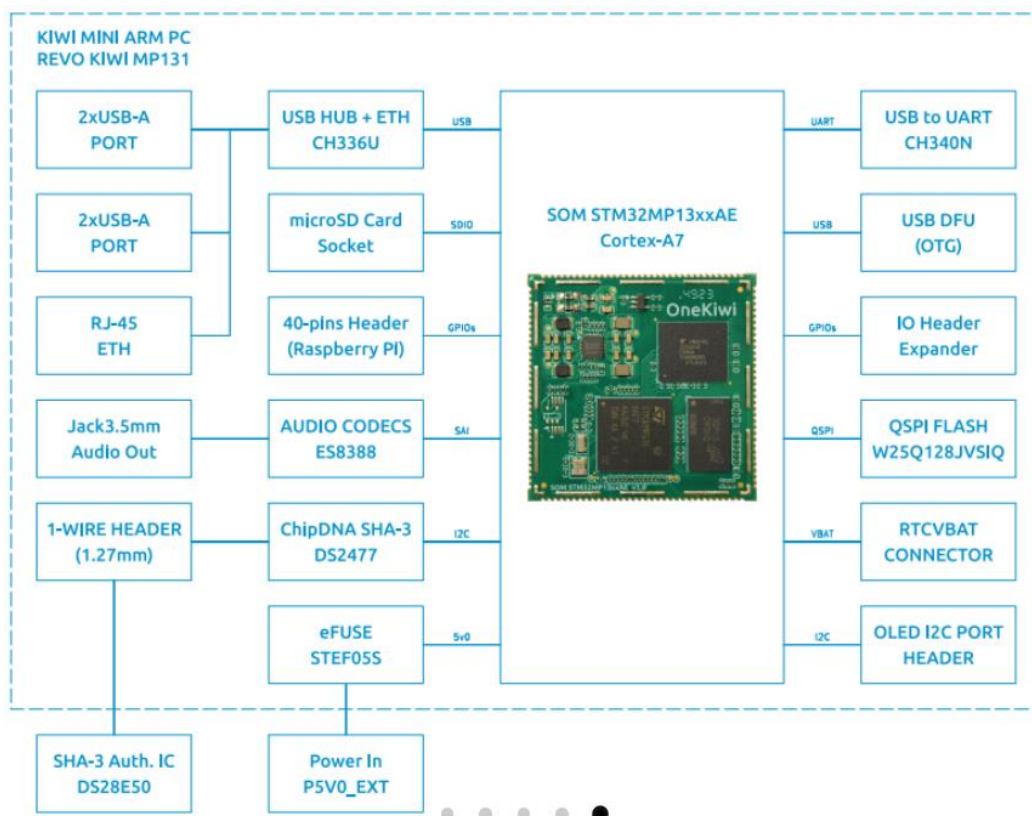


Figure 2-8 SOM STM32MP13 block diagram

# KIWI MINI ARM PC

SOM STM32MP13xxAE Cortex-A7

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## 2.5 Features

- **SOM STM32 CORE**
  - STM32MP131 Arm cortex-A7
  - Emmc 8GB
  - DDR3L 512MB
  - GPIOs
- 
- **POWER SYSTEM**
  - 5V Input
  - 3.3V (I/O, interface)
- 
- **Peripherals and Signals Routed to Pins**
  - 4 x Serial ports
  - 4 x I2C
  - 2 x SPI
  - 1 x SAI
  - 1 x I2S
  - 2 x USB 2.0
  - 2 x SDIO
  - 1 x QSPI
  - 1 x MIPI-DSI
  - 3 x Button
  - 5 x Led
    - Power
    - 4× User
- 
- **OS Support**
  - Yocto Linux
  - Debian 13

# 3 SOM MP13 EVK circuit

## 3.1 SOM MP13 Module

### 3.1.1 Overview

For the resource of SOM products : [Index of /SOM MP13/](#)  
For the package, and pinout information, see  
:<https://onekiwi.com.vn/wp-content/uploads/2023/11/stm32mp13-mimi-pc-1.pdf> for  
more details.

## 3.2 Power Supply

### 3.2.1 Overview

The 5V input power interface has overcurrent and inverse current protection. The overcurrent limit is 2A.

The MP5479 power supply chip is used to step down voltage from 5V to 3.3V. The power supply can support up to 2A, which can meet the power demand of the development board.

In EVK, we use efuse for input voltage.

### 3.2.2 Power System Distribution

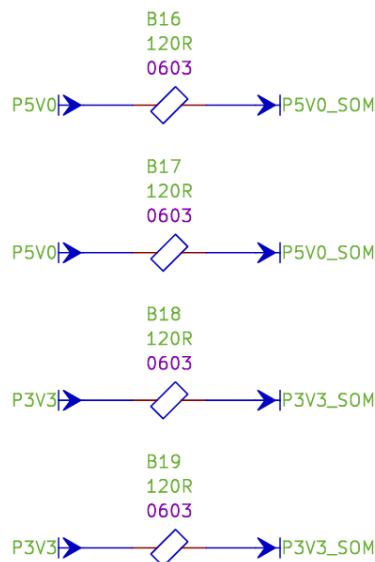


Figure 3-1 Power

## 3.3 SPI flash

### 3.3.1 Schematic

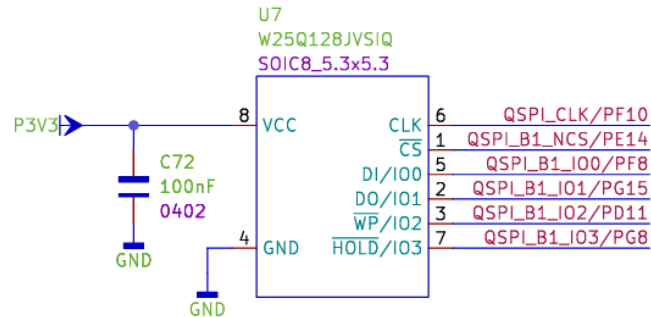


Figure 3-2 SPI flash circuit

### 3.3.2 Pinout

| Signal Name | Pin No. | I/O  |
|-------------|---------|------|
| QSPI_CLK    | PF10    | 3.3V |
| QSPI_B1_NCS | PE14    | 3.3V |
| QSPI_B1_I00 | PF8     | 3.3V |
| QSPI_B1_I01 | PG15    | 3.3V |
| QSPI_B1_I02 | PD11    | 3.3V |
| QSPI_B1_I03 | PG8     | 3.3V |

Table 4 Pinout Clock

## 3.4 LED

### 3.4.1 LED Circuit

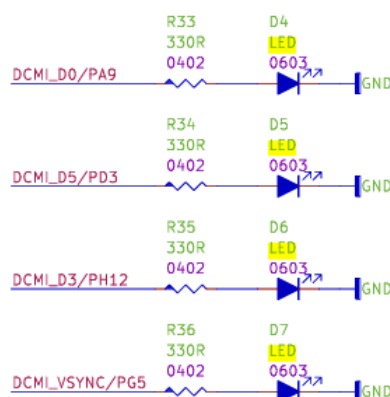


Figure 3-3 Led circuit

## 3.4.2 Pinout

| Signal Name | Pin No. | I/O  |
|-------------|---------|------|
| DCMI_D0     | PA9     | 3.3V |
| DCMI_D5     | PD3     | 3.3V |
| DCMI_D3     | PH12    | 3.3V |
| DCMI_VSYNC  | PG5     | 3.3V |

Table 5 Led pinout

## 3.5 Key

### 3.5.1 Key Circuit

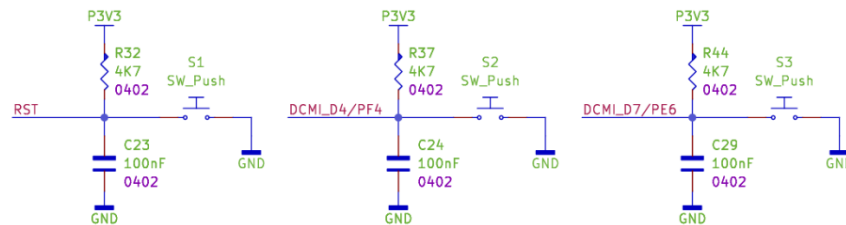


Figure 3-4 Key circuit

### 3.5.2 Pinout

| Signal Name | Pin No. | I/O  |
|-------------|---------|------|
| RST         |         |      |
| DCMI_D4     | PF4     | 3.3V |
| DCMI_D7     | PE6     | 3.3V |

Table 6 Key pinout

## 3.6 SD card

SD card is used for booting image.

### 3.6.1 SD card circuit

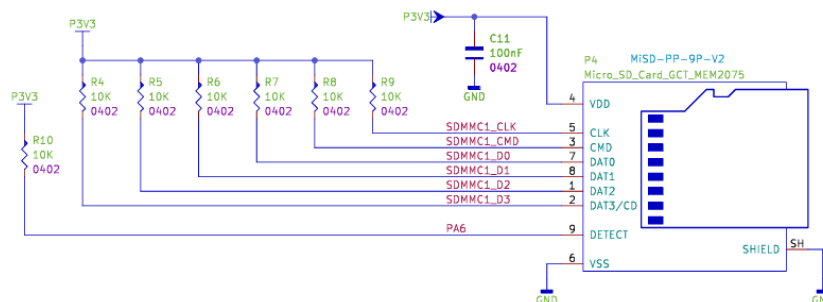


Figure 3-5 micro SD card circuit

## 3.7 USB

In the design we use CH336 IC to create:

- USB HUB (expand 1 USB to 4 USB ports)
- USB to Ethernet controller

### 3.7.1 USB Hub Circuit

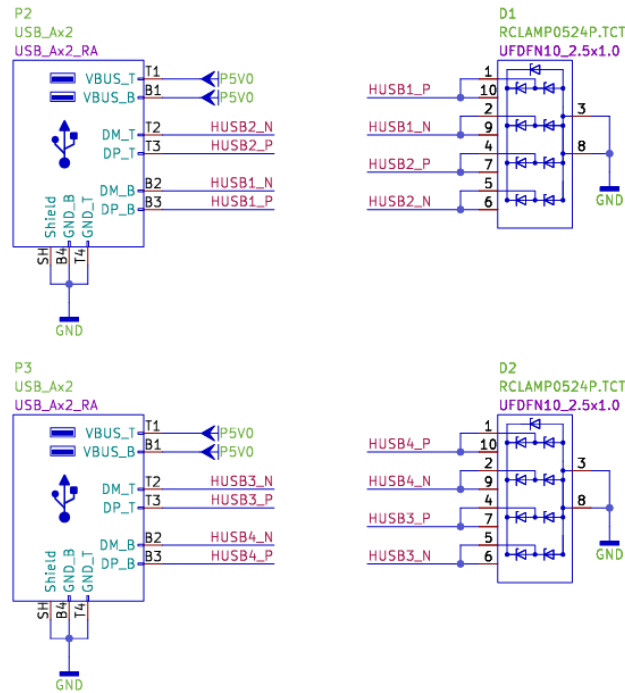


Figure 3-6 USB Hub circuit

### 3.7.2 Ethernet circuit

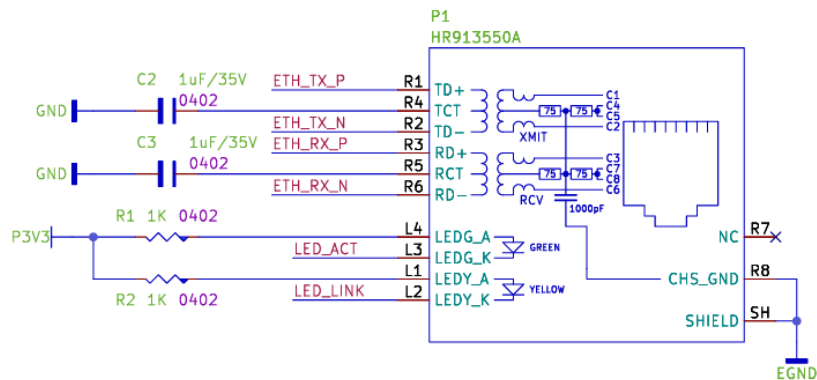


Figure 3-7 Ethernet circuit

## 3.7.3 CH336U circuit

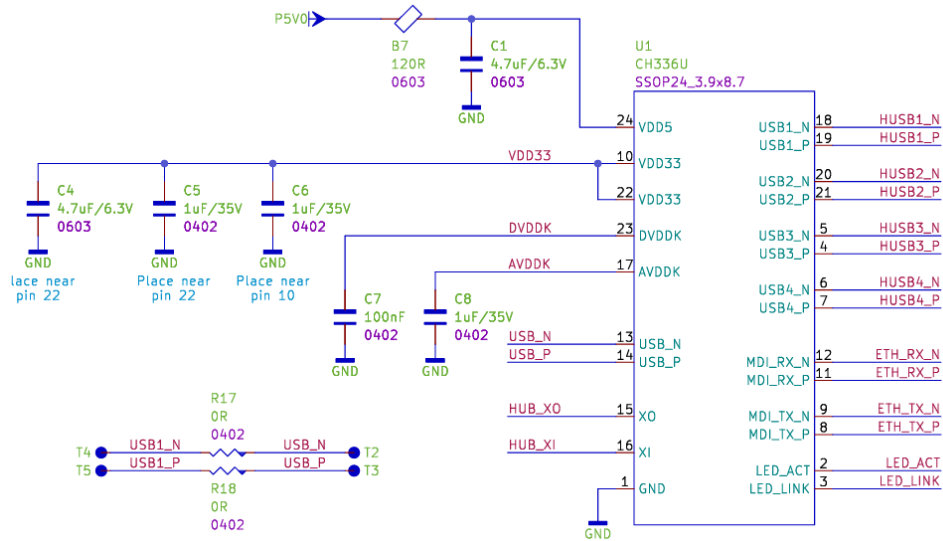


Figure 3-8 CH336 Circuit

## 3.7.4 Pinout

| Signal Name  | Pin No. | I/O |
|--------------|---------|-----|
| ETH1_MDINT   | 22      | 3V3 |
| ETH1_TX_EN   | 21      | 3V3 |
| ETH1_MDIO    | 17      | 3V3 |
| ETH1_MDC     | 19      | 3V3 |
| ETH1_REF_CLK | 20      | 3V3 |
| ETH1_CLK     | 18      | 3V3 |
| ETH1_TXD0    | 16      | 3V3 |
| ETH1_RXD1    | 23      | 3V3 |
| ETH1_RXD0    | 33      | 3V3 |
| ETH1_CRS_DV  | 39      | 3V3 |
| ETH1_TXD1    | 40      | 3V3 |

Table 7 Ethernet pinout

## 3.8 USB TO UART

### 3.8.1 USB TO UART Circuit

# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

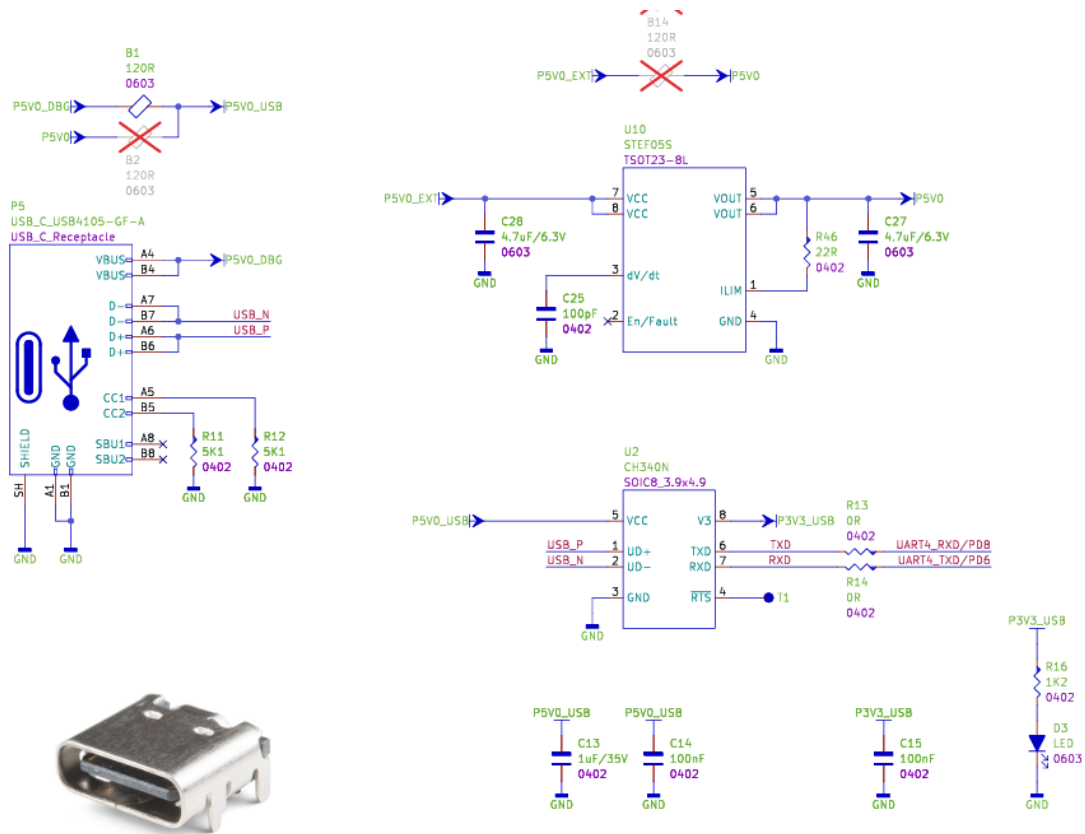


Figure 3-9 GPIO circuit

### 3.8.2 Pinout

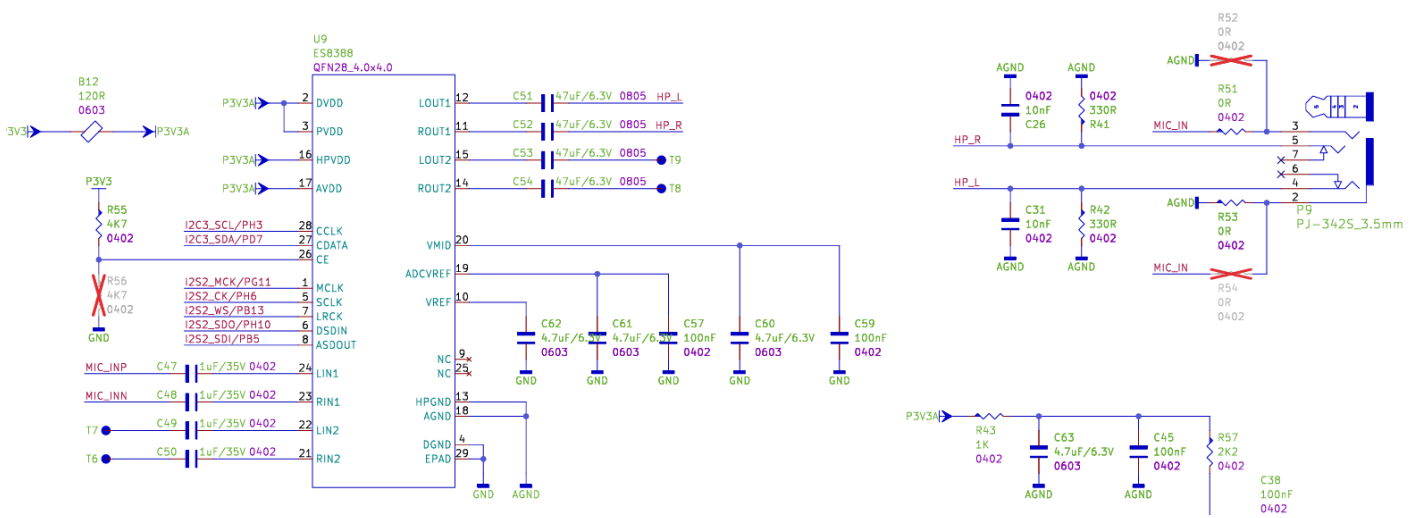
| Signal Name | Pin No. | I/O |
|-------------|---------|-----|
| UART4_RXD   | PD8     | 3V3 |
| UART4_TXD   | PD6     | 3V3 |

Table 8 UART pinout

## 3.9 Audio Codec

### 3.9.1 Audio circuit

## SOM STM32MP13xxAE Cortex-A7



*Figure 3-10 Audio circuit*

### 3.9.2 Audio Pinout

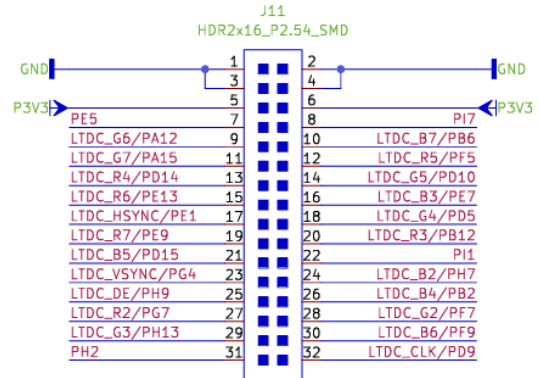
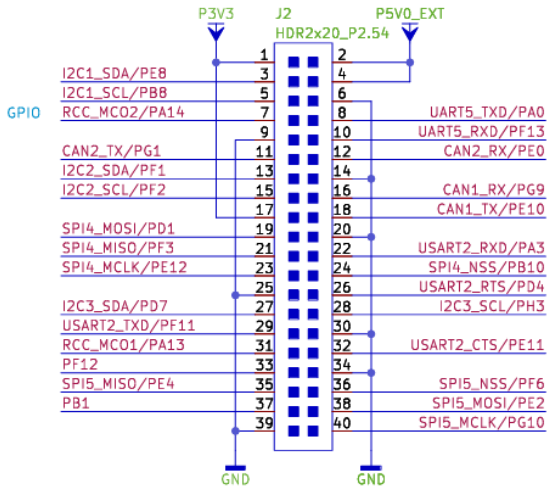
| Signal Name | Pin No. | I/O |
|-------------|---------|-----|
| I2C3_SCL    | PH3     | 3V3 |
| I2C3_SDA    | PD7     | 3V3 |
| I2S2_MCK    | PG11    | 3V3 |
| I2S2_CK     | PH6     | 3V3 |
| I2S2_WS     | PB13    | 3V3 |
| I2S2_SDO    | PH10    | 3V3 |
| I2S2 SDI    | PB5     | 3V3 |

# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

### 3.10 GPIOs Header

#### 3.10.1 GPIO circuit and Pinout



# 4 Booting guide

## 4.1 Preparation

### 4.1.1 Hardware

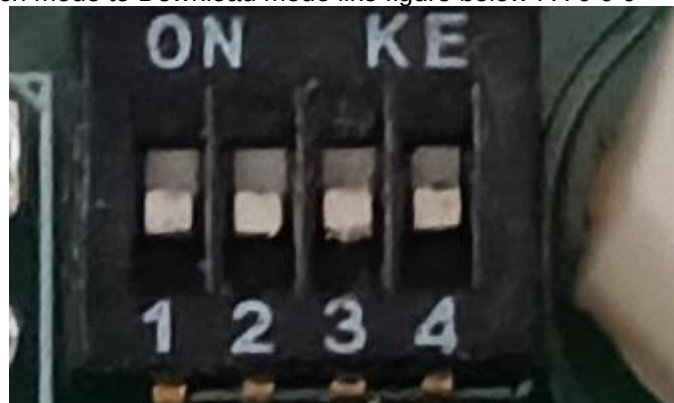
- Two wires USB type C
- Board EVK SOM STM32MP131 MINI PC

### 4.1.2 Software

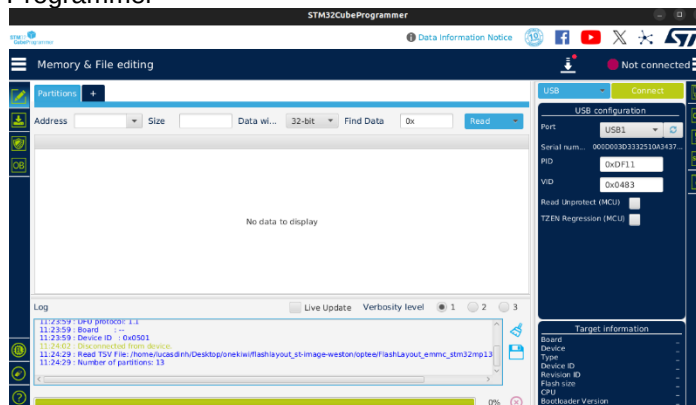
- Windows
  - STM32CUBE Programmer
  - Mobaxterm
- Linux(Ubuntu)
  - STM32CUBE Programmer
  - Picocom

## 4.2 Download Mode

- Change the DIP switch mode to Download mode like figure below : X 0 0 0



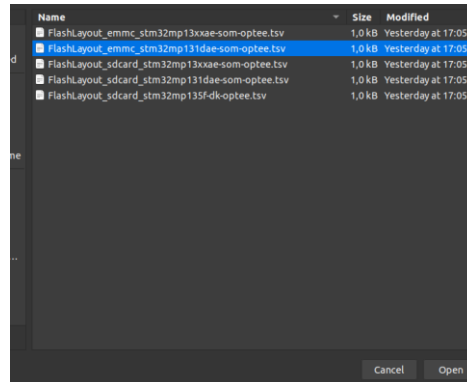
- Connect the two wires SB type C to Power In and UART EVK and PC.
- Open STM32CUBE Programmer



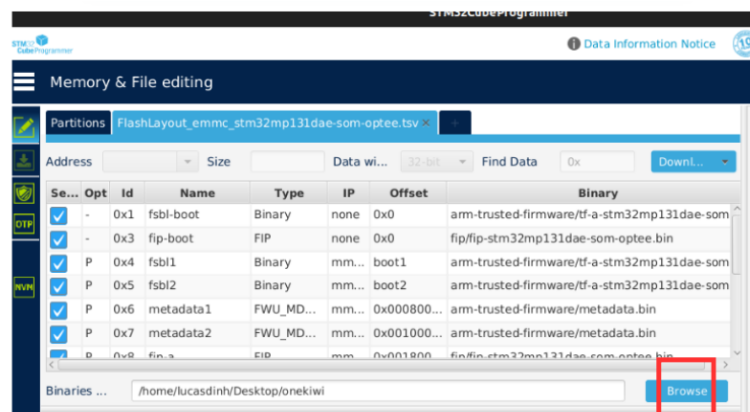
# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7

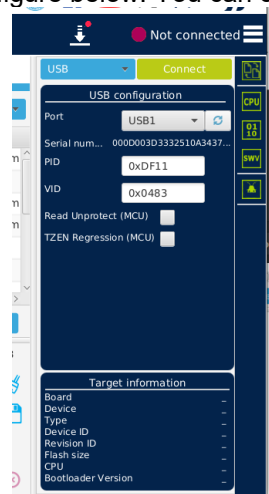
- Then choose the symbol near Partitions “+” then Open file”FlashLayout\_emmc\_stm32mp131dae-som-optee.tsv” and click Open



- Then choose browse like figure below and choose the path to folder that contains all images flash layout,open st linux ,arm-trusted-firmware,...



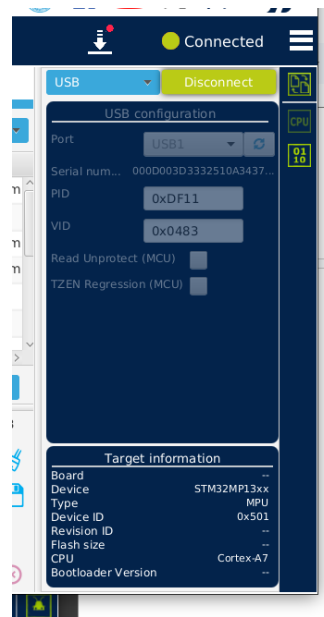
- Then Check the USB connection like figure below. You can click the icon “refresh” in the Port row.



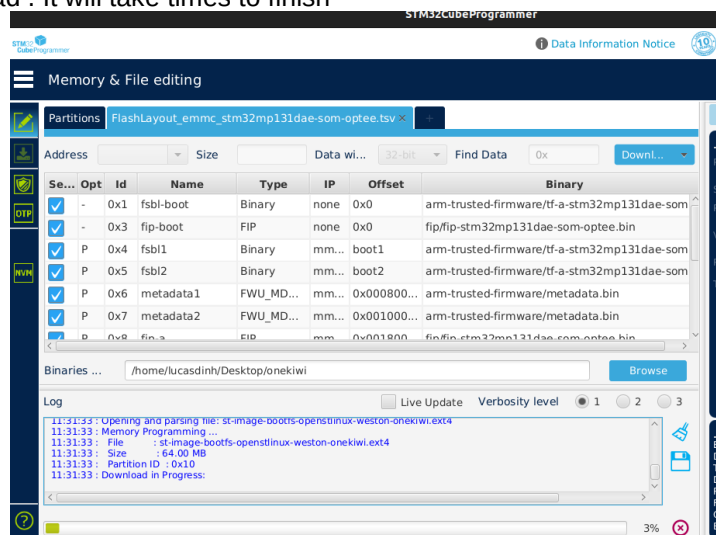
- Then click Connect

# KIWI MINI ARM PC

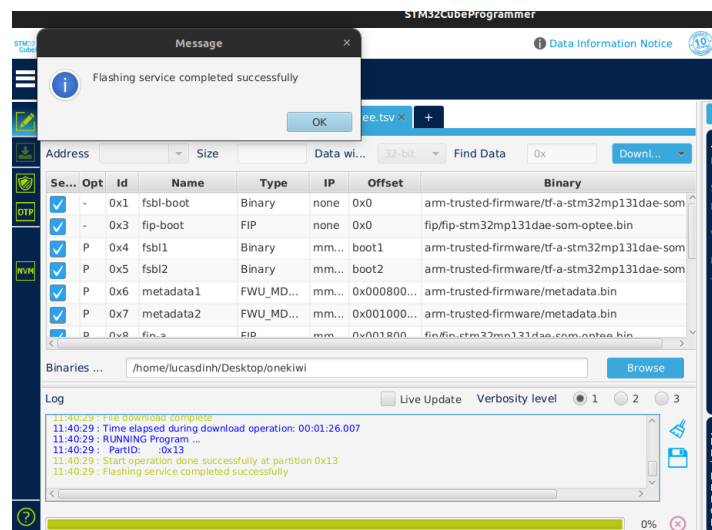
## SOM STM32MP13xxAE Cortex-A7



- Then click Download . It will take times to finish



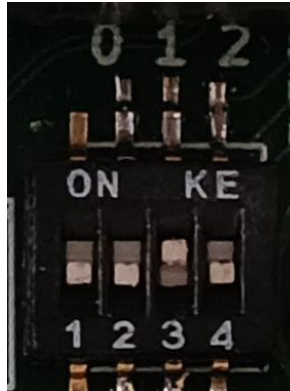
- Then when finish you will see



## 4.3 Booting eMMC

### 4.3.1 Setting EVK

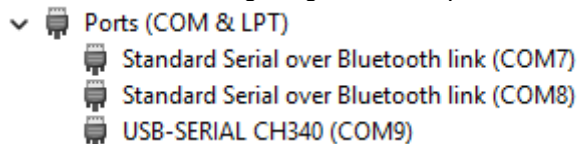
- Change the DIP Switch to : X 0 1 0



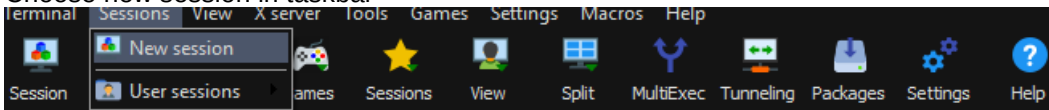
- Connect two USB type C to board and computer. Then you will choose next step base on your OS

### 4.3.2 Windows

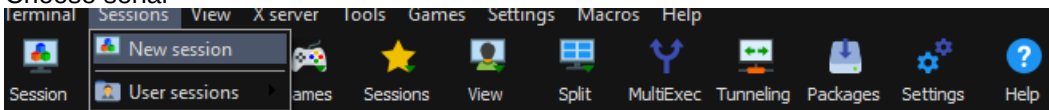
- Check Device manager , go to COM port



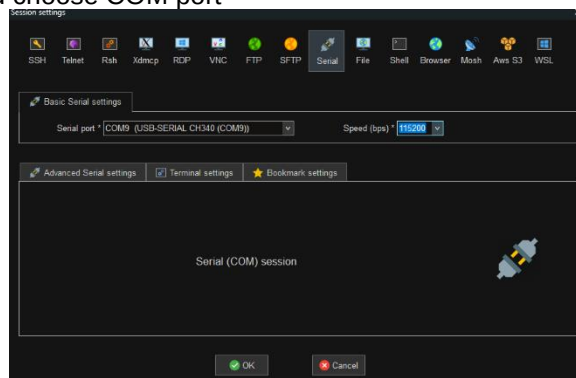
- The COM port we use for boot is COM9. Next open MobaXterm
- Choose new session in taskbar



- Choose serial



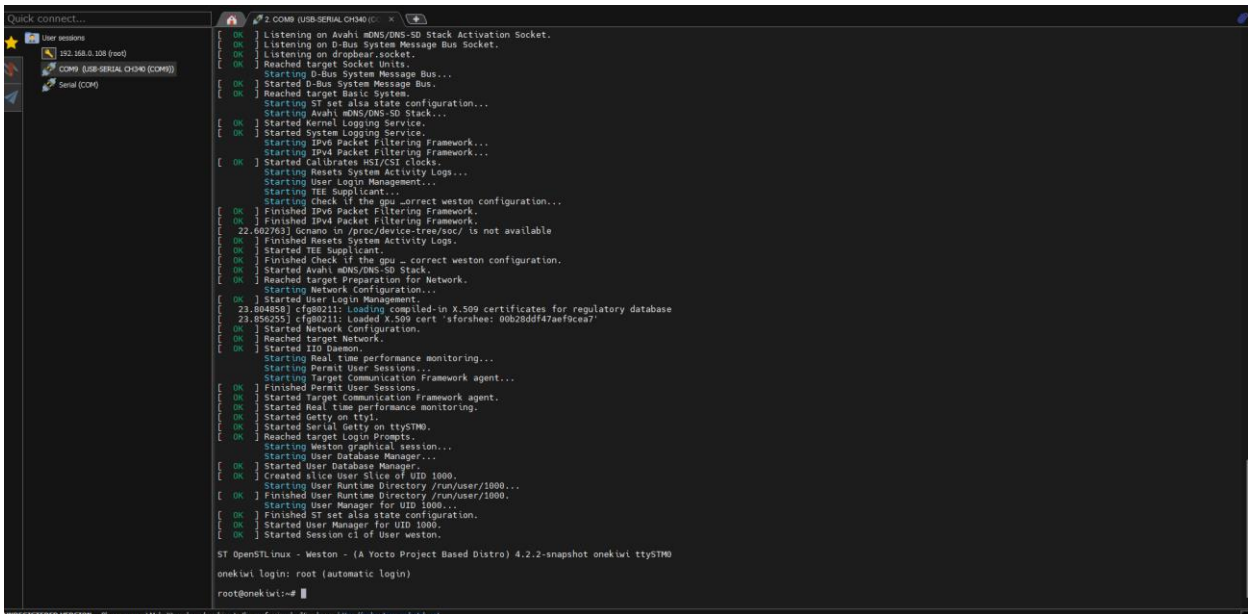
- Set speed to 115200 and choose COM port



- Click OK , you will see the programming.

# KIWI MINI ARM PC

## SOM STM32MP13xxAE Cortex-A7



### 4.3.3 Ubuntu(Linux)

- Run the command for install picocom  
sudo apt update  
sudo apt install picocom
- Check your USB connect by running  
ls /dev/tty\*
- Normally you will see the ttyUSB0 or may be ttyUSB1
- Then run picocom  
sudo picocom /dev/ttyUSB0 -b 115200
- You will see the terminal login. Then plug out and plug in the USB type C comport in the power in port in the computer (Or you can push the reset button).
- You will see the program running

