

# M8MP553

3.5" SBC Motherboard  
User's Manual

## Copyright

This publication contains information that is protected by copyright. No part of it may be reproduced in any form or by any means or used to make any transformation/adaptation without the prior written permission from the copyright holders.

This publication is provided for informational purposes only. The manufacturer makes no representations or warranties with respect to the contents or use of this manual and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. The user will assume the entire risk of the use or the results of the use of this document. Further, the manufacturer reserves the right to revise this publication and make changes to its contents at any time, without obligation to notify any person or entity of such revisions or changes.

Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

© 2021. All Rights Reserved.

## Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

## FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

## Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

# Table of Contents

Chapter 1 - Introduction.....	6
Specifications .....	6
Block Diagram .....	8
Chapter 2 - Hardware Installation.....	9
Board Layout.....	9
Installing the Heat Sink .....	10
Jumper Settings .....	11
Boot-CNFG (JP1) .....	11
LED Backlight (BLJP1) .....	11
External I/O Ports.....	12
9~36V DC-in (CN14) .....	12
USB 2.0/3.1 & Micro USB (UBCN2 / UBCN1 & UBCN3).....	13
LAN1 / LAN2 (ETCN1 / ETCN2).....	13
COM 3 (TSCN1) .....	14
HDMI (DPCN1).....	14
uSD Slot (SDCN1).....	15
Internal I/O Connectors .....	16
USB2_3/4 (UBJ1).....	16
Debug Port (COM2, J10).....	16
Audio (AUJP1) .....	17
I2C (TPJP1).....	17
DIO (IOJP1).....	18
Front Panel (FPJP1) .....	18
COM1 / COM4 (TSJP1).....	19
I2C / Touch (TPJ1).....	19
LCD Backlight (BLJ1) .....	20
CAN1 & CAN2 (CBCN1 & CBCN2) .....	20
FAN (SFJ1).....	21
SPI (SPJP1).....	21
LCD LVDS (DPJ1).....	22
JTAG (J1).....	23
Battery (BTJ1) .....	23
Expansion Slots.....	24
Installing the M.2 Module .....	24
Chapter 3 - Software User Guide.....	25
Flash Yocto Images to eMMC using UUU tool - V1.1 .....	25
Flash Yocto Images to SD using UUU tool - V1.1.....	28
Flash Android Images to eMMC/SD using UUU tool - V1.1 .....	31
Software Feature .....	34
General Support List.....	34
Linux AP/API Support List .....	34
Yocto Support List.....	34
Android Support List .....	35

## About this Manual

This manual can be downloaded from the website.

The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

## Warranty

1. Warranty does not cover damages or failures that arise from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

## Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



### Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

## Safety Measures

- To avoid damage to the system, use the correct AC input voltage range.
- To reduce the risk of electric shock, unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

## About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 M8MP553 board
- 1 Terminal block for RS485 (COM3) 342-361021-000G
- 1 Heatsink (Height: 21mm) A71-008168-000G

Note: The items are subject to change in the developing stage.

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

## Before Using the System Board

When installing the system board in a new system, you will need at least the following internal components.

- Power adapter

External system peripherals may also be required for navigation and display, including at least a keyboard, a mouse and a video display monitor.

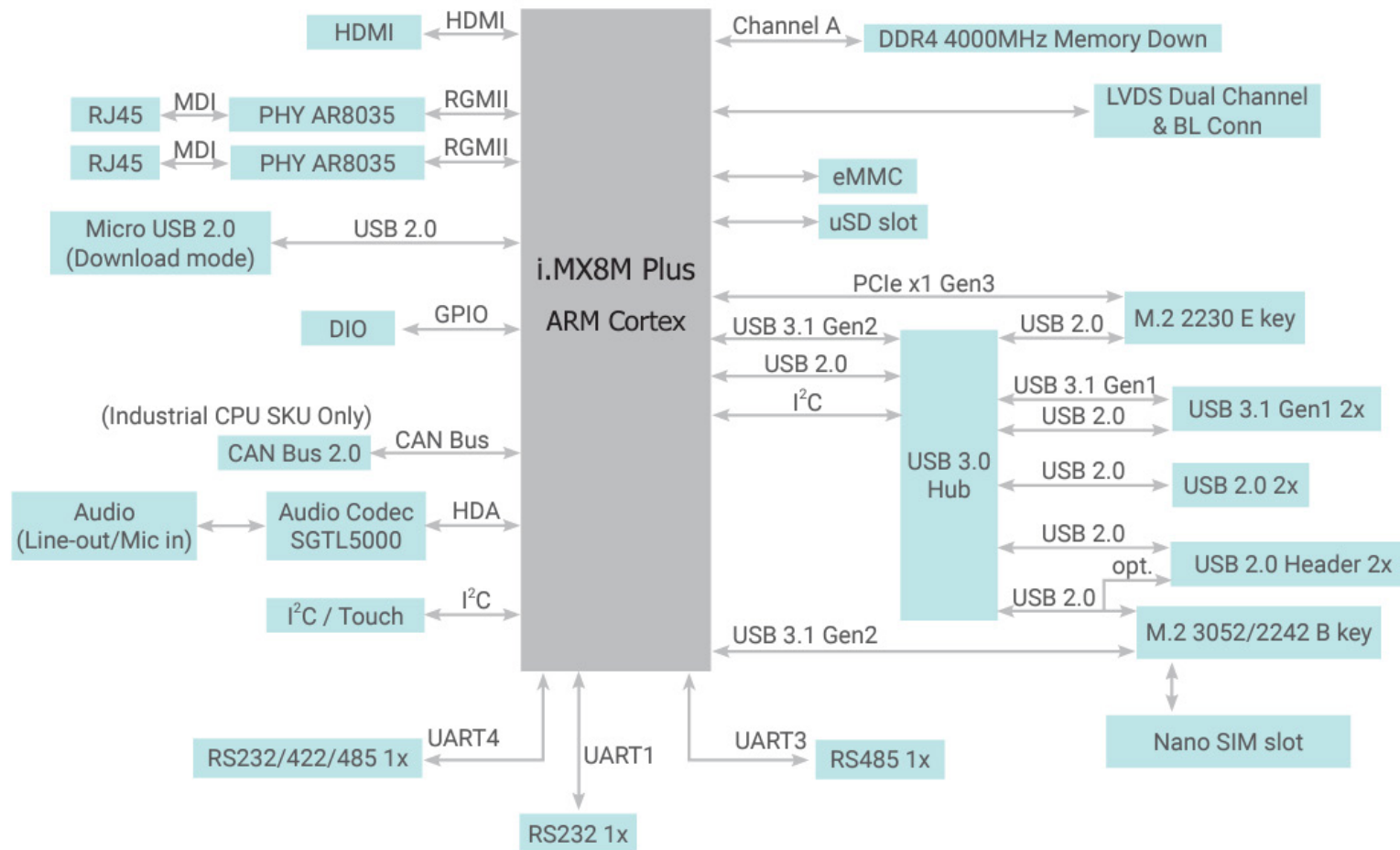
## Chapter 1 - Introduction

### ► Specifications

<b>System</b>	<b>Processor</b>	i.MX 8M plus applications processors MIMX8ML6CVNKZAB (Industrial), Quad 1.6GHz, VPU/ISP/CAN FD, -40~105°C MIMX8ML3CVNKZAB (Industrial), Dual 1.6GHz, VPU/ML/ISP/CAN FD, -40~105°C	
	<b>Memory</b>	2GB/4GB/8GB LPDDR4 Memory Down	
<b>Graphics</b>	<b>Controller</b>	GC7000UL	
	<b>Feature</b>	HW Decode: 1080p60 H.265,H.264, VP9, VP8 HW Endcode: 1080p60 H.265,H.264	
	<b>Display</b>	1 x HDMI	HDMI: resolution up to 1920x1080@60Hz
		1 x LVDS	LVDS: resolution up to 1920x1200 @60Hz
<b>Dual Display</b>	LVDS + HDMI	Android:support single output	
<b>Expansion</b>	<b>Interface</b>	1 x M.2 B key 3052/2242 (USB 3.1 Gen2/USB 2.0) 1 x M.2 E key 2230 (PCIe x1/USB 2.0) 1 x Nano SIM slot	
<b>Audio</b>	<b>Audio Codec</b>	Audio codec SGTL5000	
<b>Ethernet</b>	<b>Phy</b>	AR8035	
<b>Rear I/O</b>	<b>Ethernet</b>	2 x GbE (RJ-45)	
	<b>Serial</b>	1 x RS485 (2-wire)	
	<b>USB</b>	2 x USB 3.1 Gen1 2 x USB 2.0	
	<b>Display</b>	1 x HDMI	
<b>Internal I/O</b>	<b>Serial</b>	1 x RS232 1 x RS232/422/485 (2.0mm pitch)	
		<b>USB</b> 2 x USB 2.0 (2.00mm pitch, the 2nd USB is shared with M.2 B-key by default) 1 x Micro USB 2.0 (Download mode)	
	<b>Display</b>	1 x LVDS LCD Panel connector 1 x LCD/Inverter Power	
	<b>Audio</b>	1 x Audio (Line-out/Mic-in)	
	<b>SD</b>	1 x uSD card	
	<b>DIO</b>	1 x 8-bit DIO	
	<b>I<sup>2</sup>C</b>	1 x I <sup>2</sup> C / Touch	
	<b>CANBus</b>	2 x CAN bus 2.0b on Industrial CPU sku	
<b>Storage</b>	<b>eMMC</b>	1 x eMMC 5.1 with default 16GB (up to 64GB)	
<b>Watchdog Timer</b>	<b>Output &amp; Interval</b>	System Reset, Programmable via Software from 1 to 255 Seconds	

<b>Power</b>	<b>Type</b>	Wide Range 9~36VDC <b>Note1: Support 9V~24VDC in -30~80 °C operating temperature.</b> <b>Note2: Support 36VDC within 70 °C operating temperature.</b>	
	<b>Connector</b>	2-pole terminal block (default) Co-lay 4-pin vertical power connector	
	<b>Consumption</b>	Typical: i.MX 8M Plus Quad, 12V, 3.6Watt Max.: i.MX 8M Plus Quad, 12V, 5.28Watt	
	<b>RTC Battery</b>	CR2032 Coin Cell	
<b>OS Support</b>	<b>Microsoft/Linux</b>	Linux Yocto 3.0 (default) Android 10	
<b>Environment</b>	<b>Temperature</b>	Operating: -30 to 80 °C	Storage: -40 to 85°C
	<b>Humidity</b>	Operating: 5 to 90% RH	Storage: 5 to 90% RH
	<b>MTBF</b>	i.MX 8M Plus Quad (Industrial): 632,710 hrs @ 25°C; 386,370 hrs @ 45°C ; 252,204 hrs @ 60°C; 138,544 hrs @ 80°C Calculation model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled	
<b>Mechanism</b>	<b>Dimensions</b>	3.5" SBC Form Factor	146mm (5.75") x 102mm (4.02")
	<b>Height</b>	PCB: 1.6mm	
		Top Side: 15mm Bottom Side: 4mm	
<b>Standards and Certifications</b>	<b>Certifications</b>	CE, FCC, RoHS	

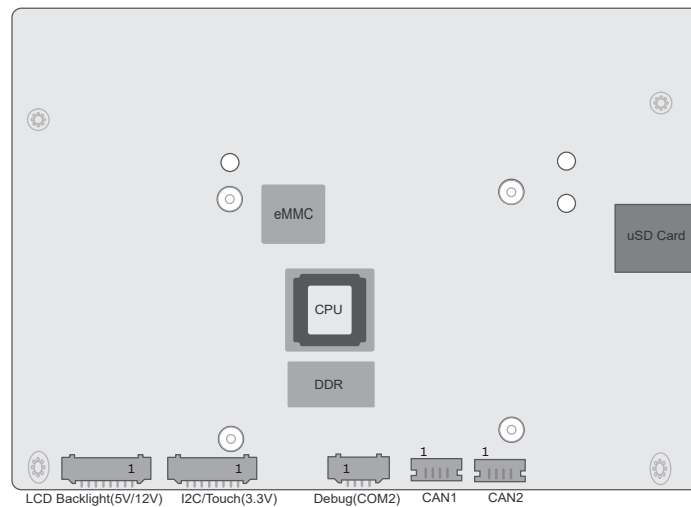
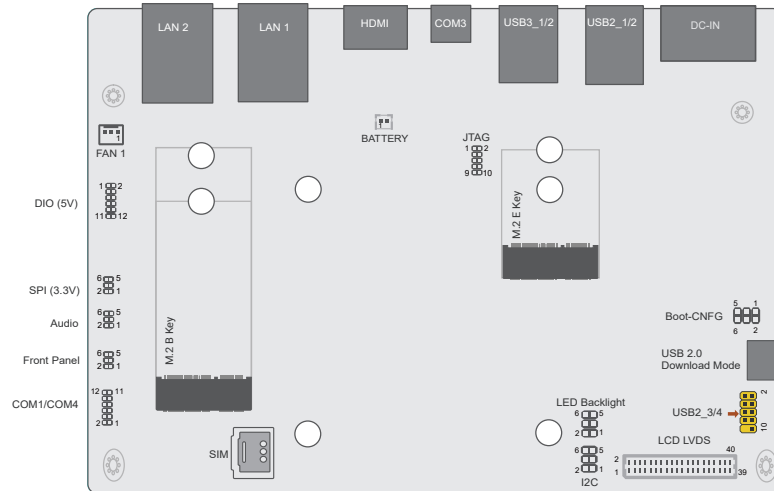
► Block Diagram





## Chapter 2 - Hardware Installation

### ► Board Layout



**Note:**

Some components are optional and only available upon request.



**Important:**

Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

► CPU

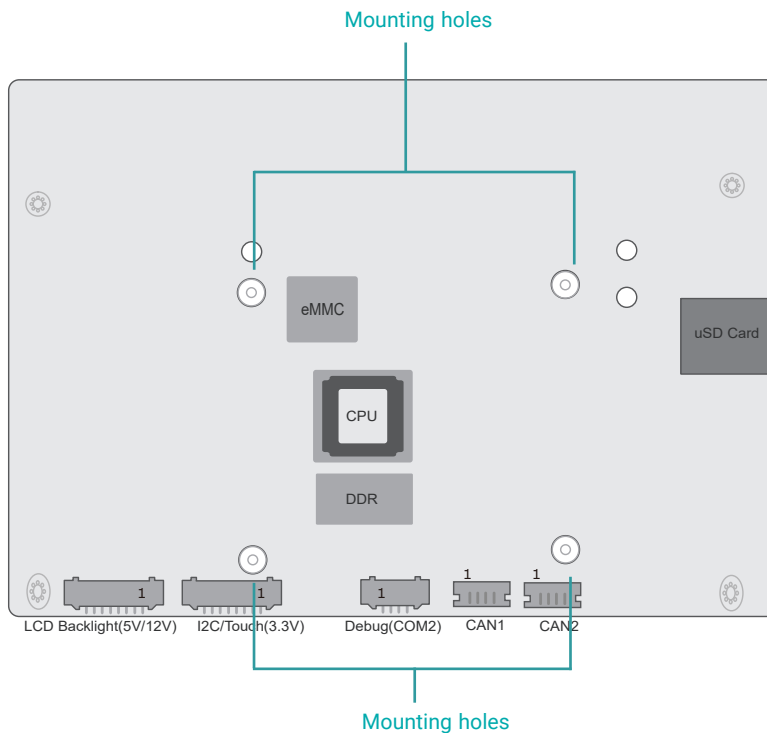
### Installing the Heat Sink

The CPU must be kept cool by using a heat sink, otherwise the CPU will overheat damaging both the CPU and system board.

1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

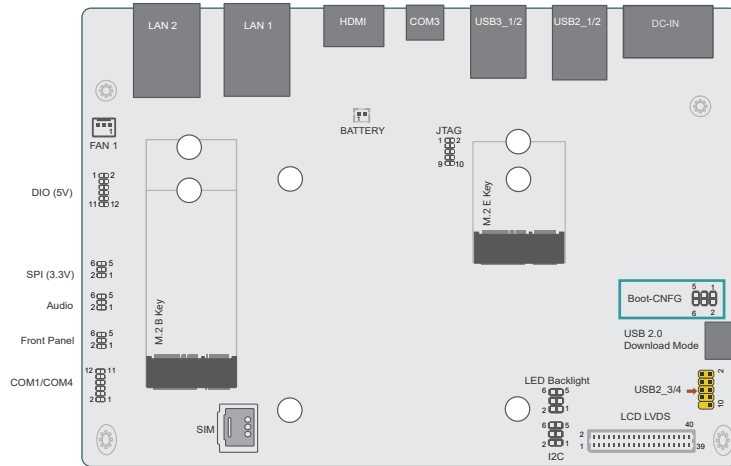
Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

2. Place the heat sink on top of the CPU. The 4 spring screws around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the board.
3. Screw tight two of the spring screws at opposite corners into the mounting holes. And then proceed with the other two spring screws.



► Jumper Settings

Boot-CNFG (JP1)



The JP1 is used to determine the boot configuration.

\* Pin #3, #4 is NC.

Boot Mode



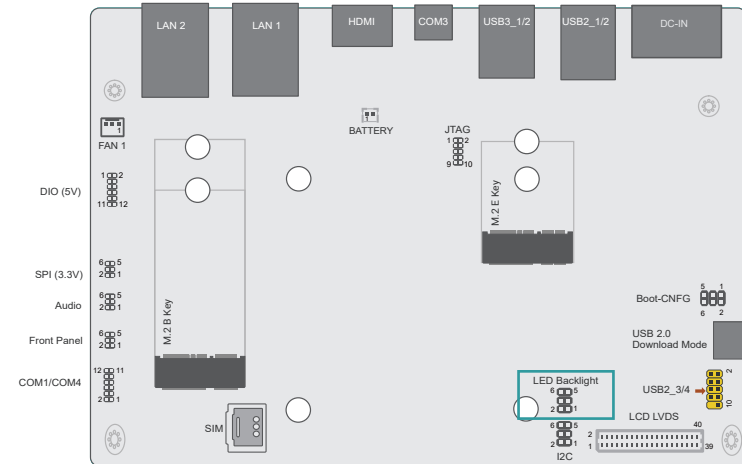
- 1-2 Off: Internal Boot (default)
- 1-2 On: Serial Downloader

Boot Device



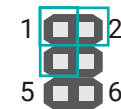
- 5-6 Off: EMMC (default)
- 5-6 On: uSD

LED Backlight (BLJP1)



This jumper is used to select the voltage level and power level of LED Backlight: +5V or +3.3V for voltage and +12V or +5V for power.

Control Signal Voltage



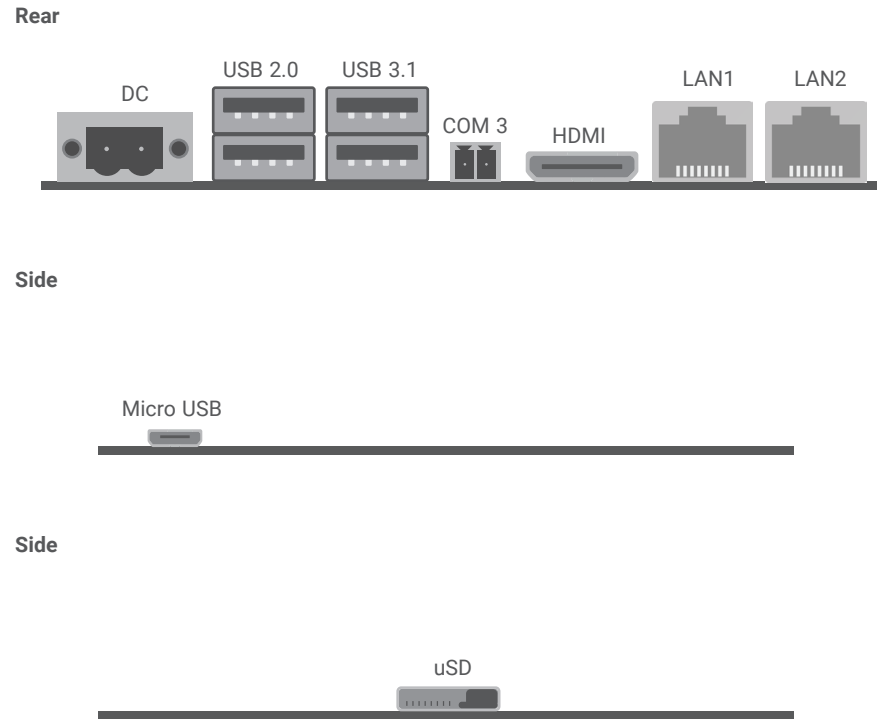
- 1-2 On: 3.3V (Default)
- 1-3 On: 5V

Backlight Power



- 5-6 On: Backlight Power 12V (default)
- 4-6 On: Backlight Power 5V

► External I/O Ports

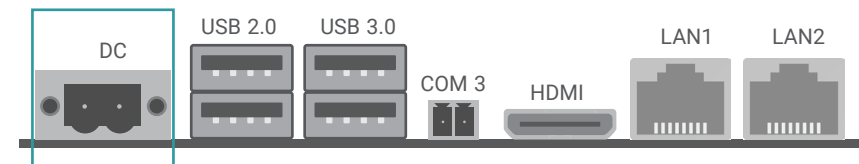
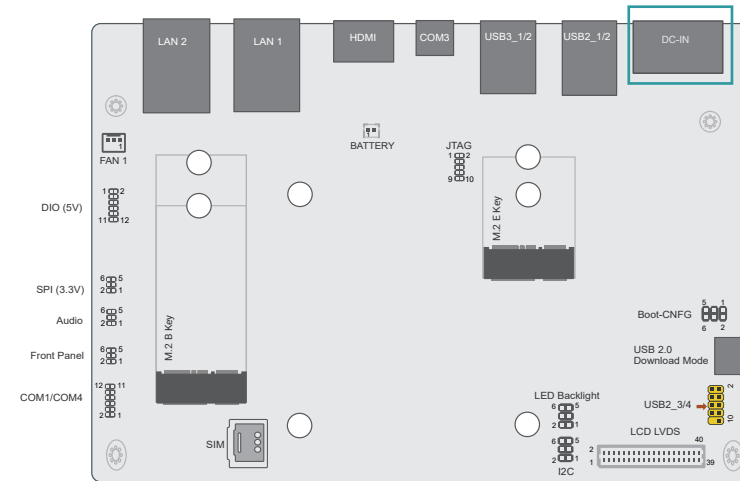


The external I/O ports consist of the following:

- 1 DC-in 2-poles Terminal Block
- 2 USB 3.1
- 2 USB 2.0
- 2 LAN
- 1 COM 3
- 1 HDMI
- Micro USB
- uSD

► External I/O Ports

9~36V DC-in (CN14)



This 2-poles terminal block is considered a low power solution. Connect a DC power cord to this terminal block. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

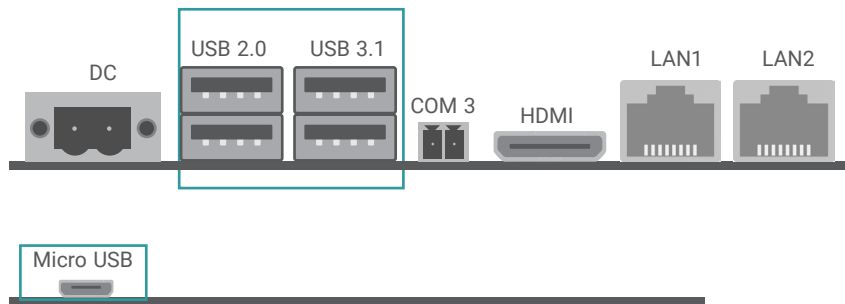
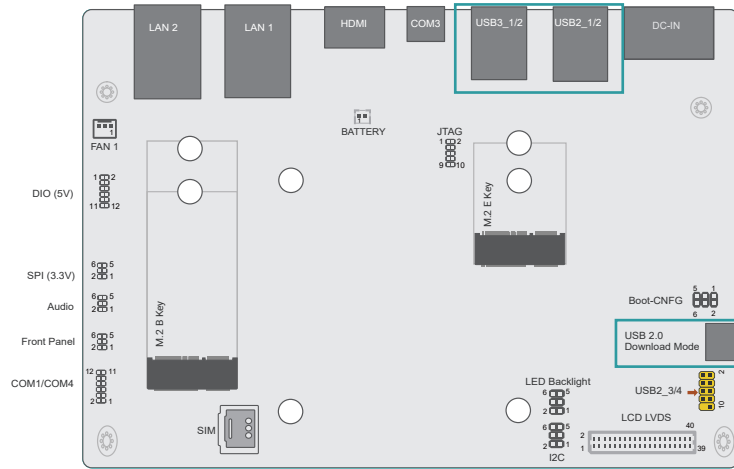


**Important:**

4 pin vertical power connector is available upon request.

► External I/O Ports

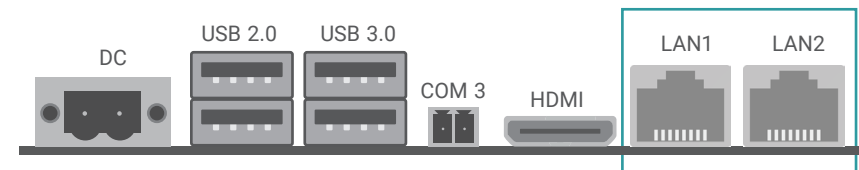
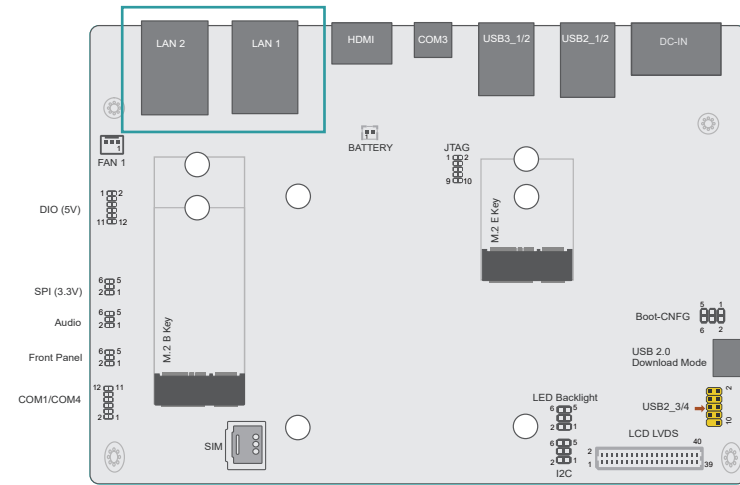
USB 2.0/3.1 & Micro USB (UBCN2 / UBCN1 & UBCN3)



USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

► External I/O Ports

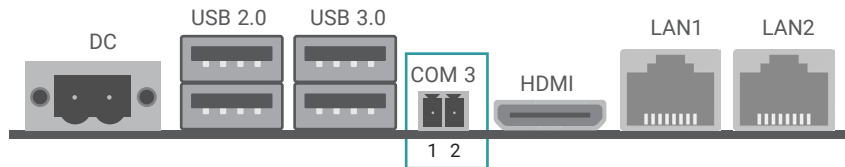
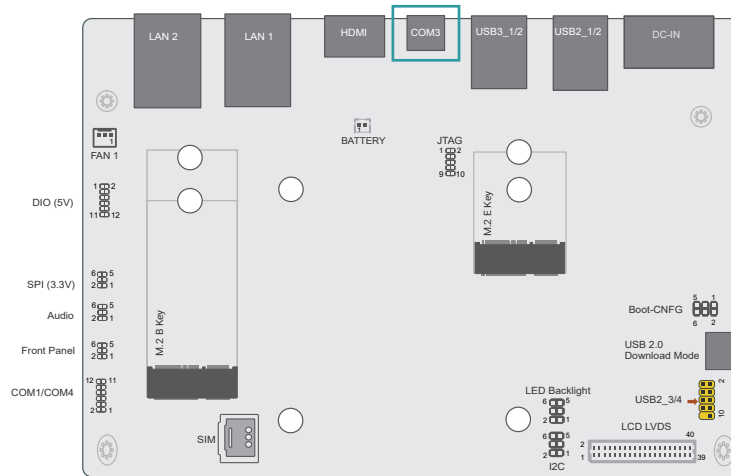
LAN1 / LAN2 (ETCN1 / ETCN2)



The onboard RJ45 LAN port allows the system board to connect to network by ethernet.

► External I/O Ports

**COM 3 (TSCN1)**

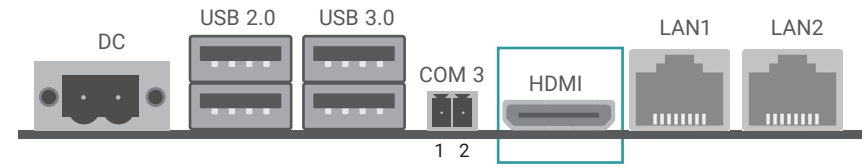
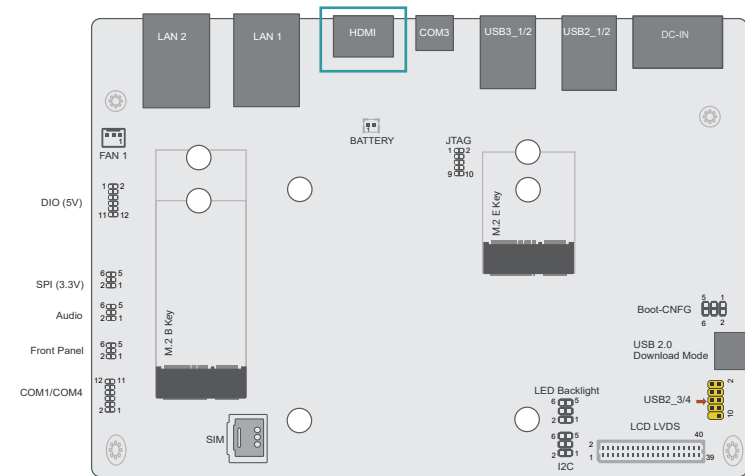


The COM 3 port provides 2-wire RS485 communication with support for auto flow control.

Pin	Assignment
1	DATA-_RS485
2	DATA+_RS485

► External I/O Ports

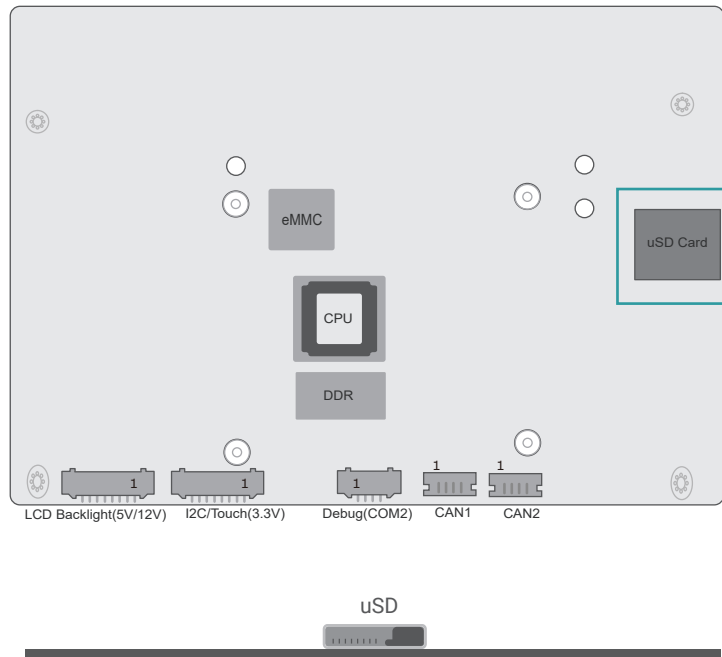
**HDMI (DPCN1)**



The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV.

► External I/O Ports

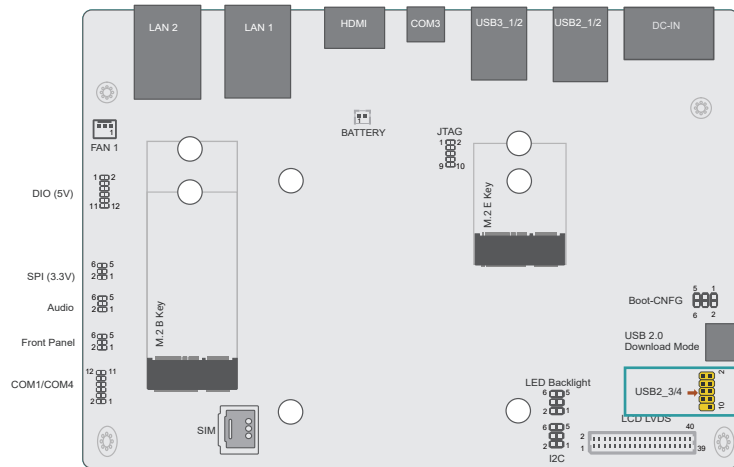
uSD Slot (SDCN1)



This slot is for a MicroSD card.

► **Internal I/O Connectors**

USB2\_3/4 (UBJ1)



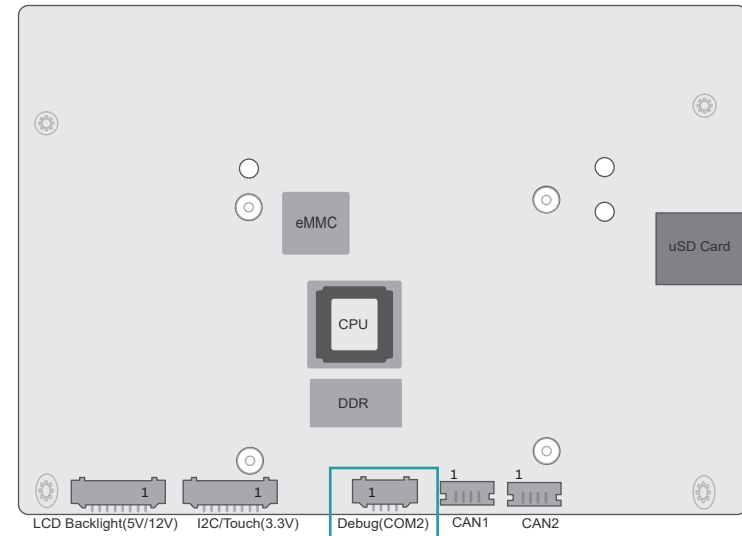
The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The internal USB pin headers may be connected to a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

Pin	Assignment	Pin	Assignment
1	VCC	2	VCC
3	DATA -	4	DATA -
5	DATA+	6	DATA+
7	GND	8	GND
9	---	10	---

► **Internal I/O Connectors**

Debug Port (COM2, J10)



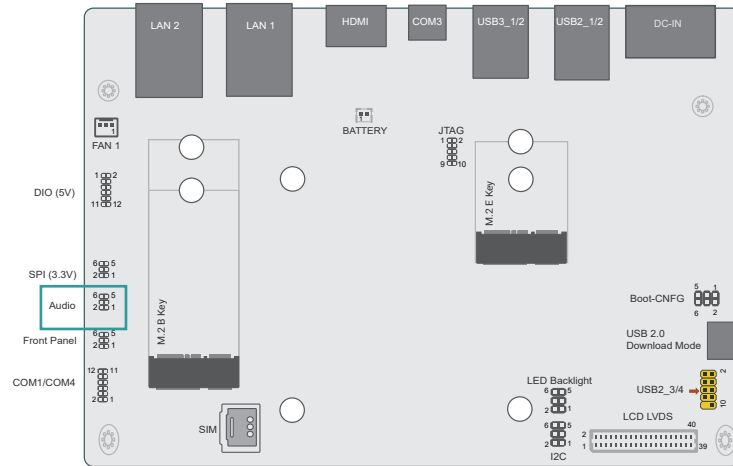
The debug port is used for debugging purposes.

Pin	Assignment
1	+3.3V
2	UART2_RX
3	UART2_TX
4	GND



► Internal I/O Connectors

Audio (AUJP1)

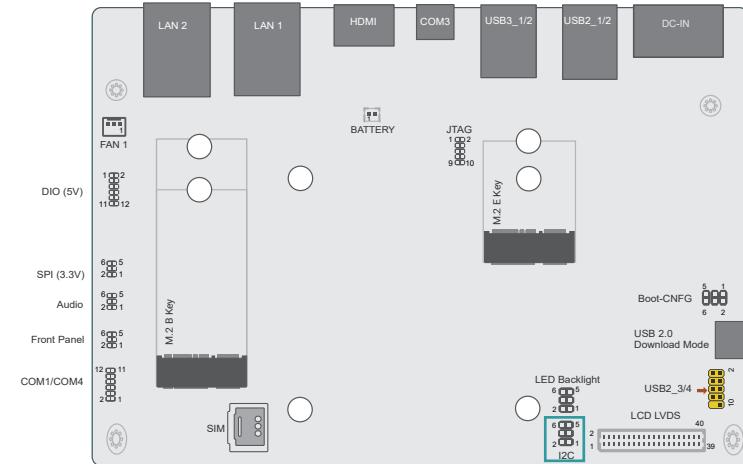


The AUJP1 is used for inputting / outputting Audio signal.

Pin	Assignment	Pin	Assignment
1	MIC_IN	2	GND
3	GND	4	R-CH
5	GND	6	L-CH

► Internal I/O Connectors

I2C (TPJP1)

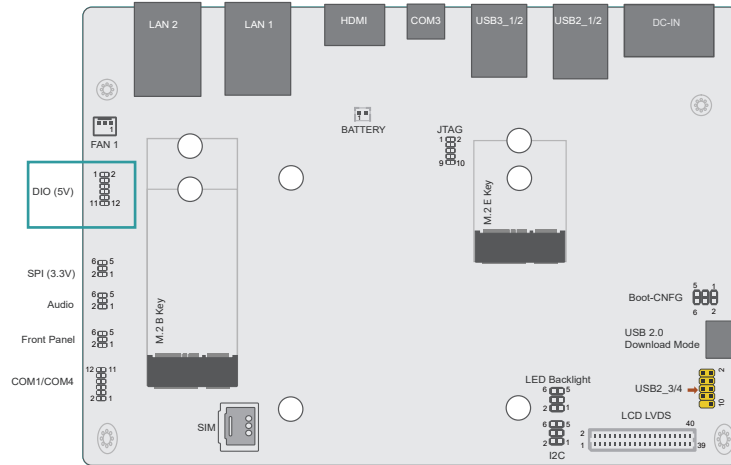


The I2C connector is used to monitor or communicate with system components.

Pin	Assignment	Pin	Assignment
1	+3.3V_TP	2	GND
3	TP_SCL	4	TP_ALT#
5	TP_SDA	6	TP_RST#

Internal I/O Connectors

DIO (IOJP1)

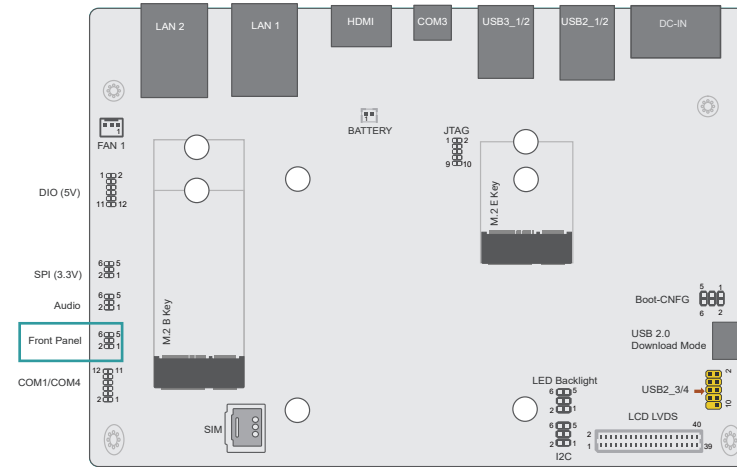


The Digital I/O connector supports 8-bit digital input/output signals to provide the signal control of the connected devices.

Pin	Assignment	Pin	Assignment
1	GND	2	PWM
3	GND	4	+5V_DIO
5	DIO0	6	DIO1
7	DIO2	8	DIO3
9	DIO4	10	DIO5
11	DIO6	12	DIO7

Internal I/O Connectors

Front Panel (FPJP1)



The front panel pins link to these functions below:

**Power Button**

This switch is used for powering on or off the system.

**Reset Button**

This switch allows you to reboot the system.

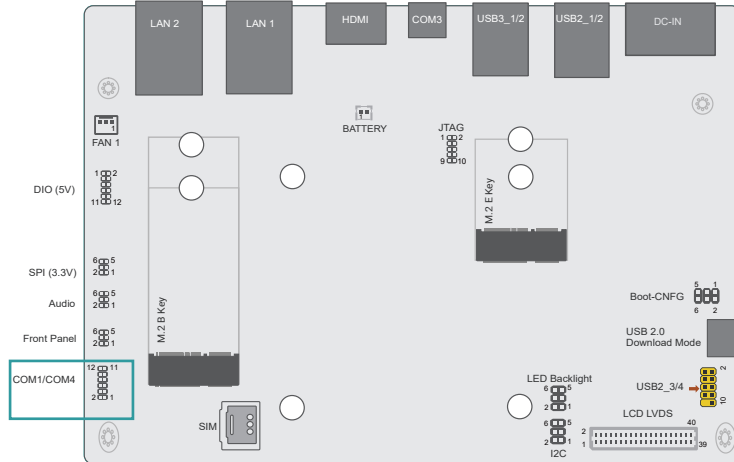
**Power\_LED**

This LED indicates power status.

Pin	Assignment	Pin	Assignment
1	ONOFF_BTN#	2	FP_LED
3	GND	4	FP_PWM
5	RST#	6	RSV_BTN#

► Internal I/O Connectors

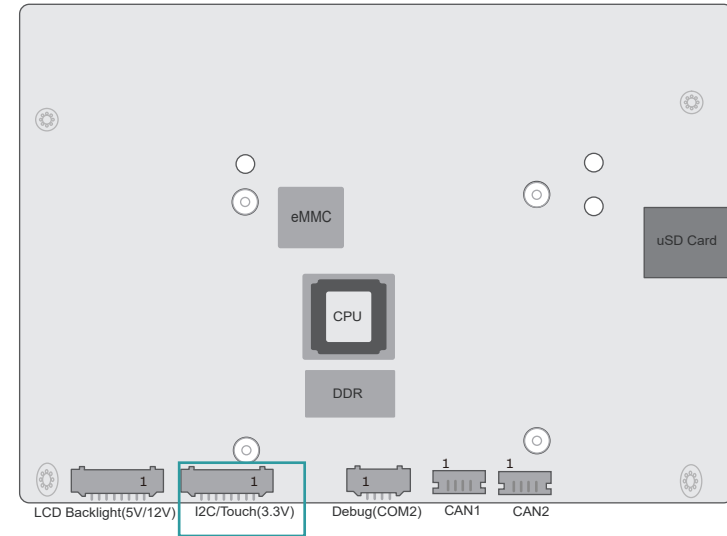
COM1 / COM4 (TSJP1)



Pin	Assignment	Pin	Assignment
1	SINN1	2	RTSN1
3	SOUTN1	4	CTSN1
5	GND	6	GND
7	DCDN4	8	SINN4
9	RTSN4	10	SOUTN4
11	CTSN4	12	DTRN4

► Internal I/O Connectors

I2C / Touch (TPJ1)

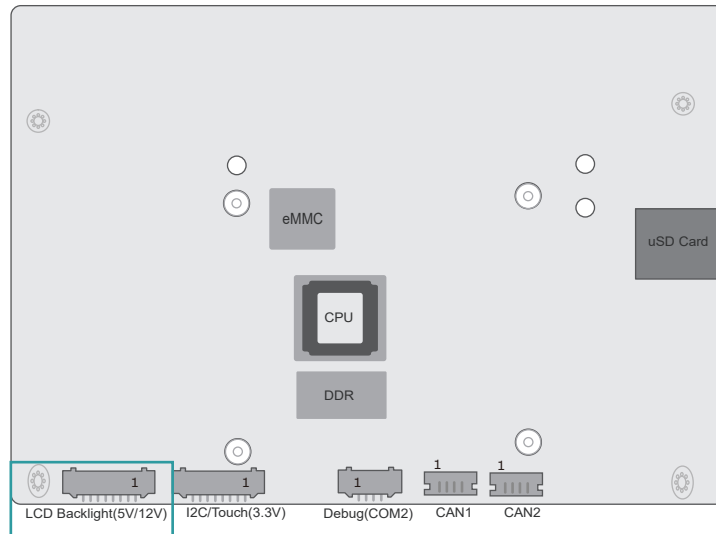


The I2C connector is used to monitor or communicate with system components.

Pin	Function
1	NC
2	NC
3	TP_RST#
4	TP_ALT#
5	+VTP_3V3
6	TP_SCL
7	TP_SDA
8	GND

► Internal I/O Connectors

LCD Backlight (BLJ1)

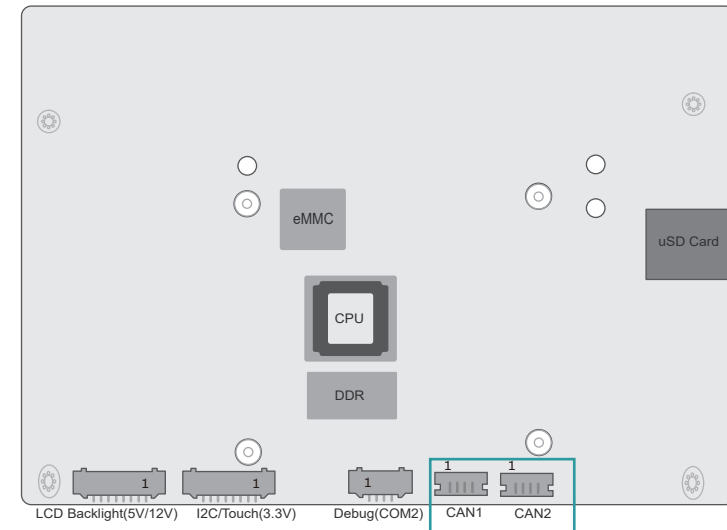


The LCD Backlight connector is to control the backlight of the LCD panel.

Pin	Function
1	VLED_12V / 5V
2	VLED_12V / 5V
3	VLED_12V / 5V
4	GND
5	GND
6	Backlight On / Off
7	GND
8	Backlight Dimming

► Internal I/O Connectors

CAN1 & CAN2 (CBCN1 & CBCN2)



The CAN bus (Controller Area Network) connector is used for interconnecting electronic control units (ECUs).

■ CAN1

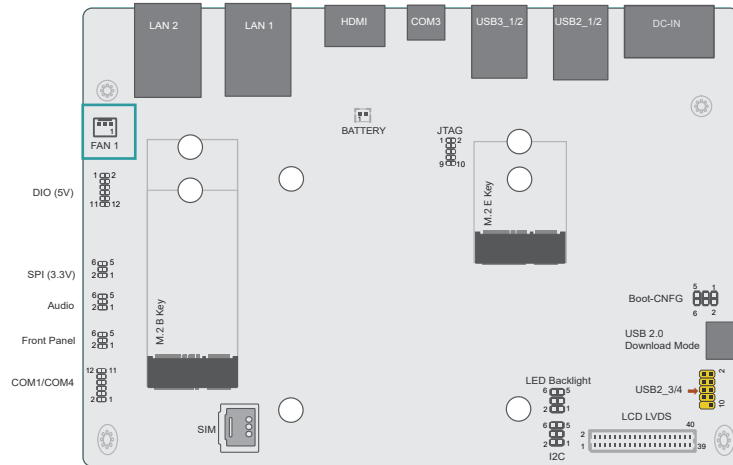
Pin	Function
1	+5V
2	CAN1H
3	CAN1L
4	GND

■ CAN2

Pin	Function
1	+5V
2	CAN2H
3	CAN2L
4	GND

Internal I/O Connectors

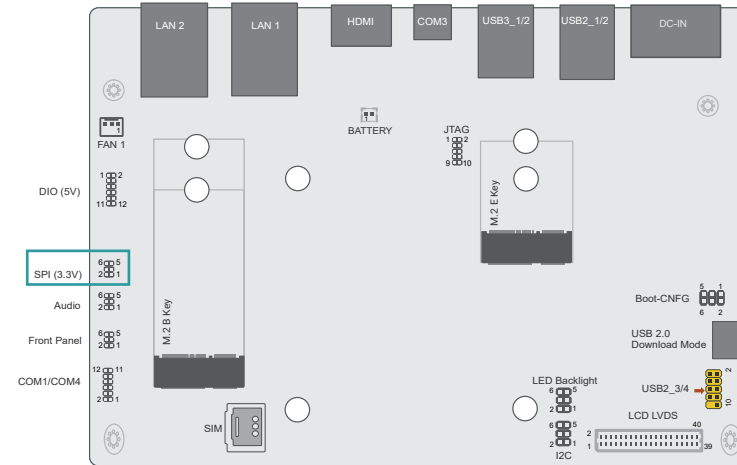
FAN (SFJ1)



Pin	Function
1	GND
2	PWM_FAN
3	TACH_FAN

Internal I/O Connectors

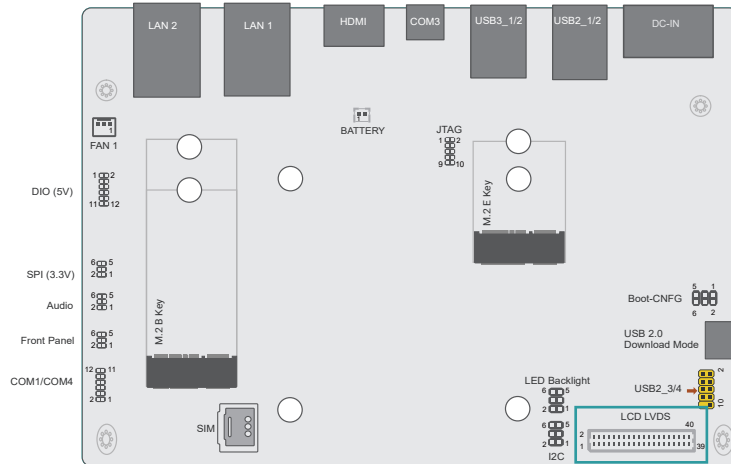
SPI (SPJP1)



Pin	Function	Pin	Function
1	SPI_CLK	2	+3.3V
3	SPI_MISO	4	SPI_SS0
5	SPI_MOSI	6	GND

► Internal I/O Connectors

LCD LVDS (DPJ1)



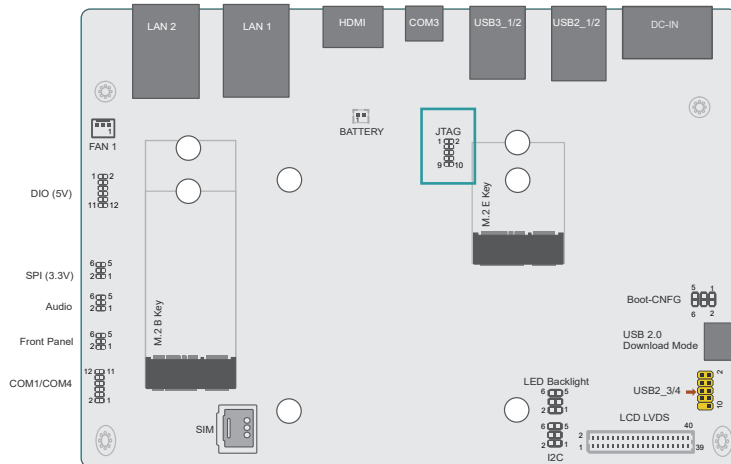
Pin	Function	Pin	Function
1	GND	2	GND
3	LVDS_A2-	4	LVDS_B3+
5	LVDS_A2+	6	LVDS_B3-
7	GND	8	GND
9	LVDS_A3-	10	LVDS_B2+
11	LVDS_A3+	12	LVDS_B2-
13	GND	14	GND
15	LVDS_A0-	16	LVDS_B1+
17	LVDS_A0+	18	LVDS_B1-
19	GND	20	GND
21	LVDS_A1-	22	LVDS_B0+
23	LVDS_A1+	24	LVDS_B0-
25	GND	26	GND
27	LVDS_A_CLK-	28	LVDS_B_CLK-
29	LVDS_A_CLK+	30	LVDS_B_CLK+
31	GND	32	GND
33	GND	34	GND
35	+VDD_3.3V	36	+VDD_5V
37	+VDD_3.3V	38	+VDD_5V
39	+VDD_3.3V	40	+VDD_5V

The system board allows you to connect a LCD Display Panel by means of the LVDS LCD panel connector and the LCD/Inverter power connector. These connectors transmit video signals and power from the system board to the LCD Display Panel.

Refer to the next page for the pin functions of these connectors.

Internal I/O Connectors

JTAG (J1)

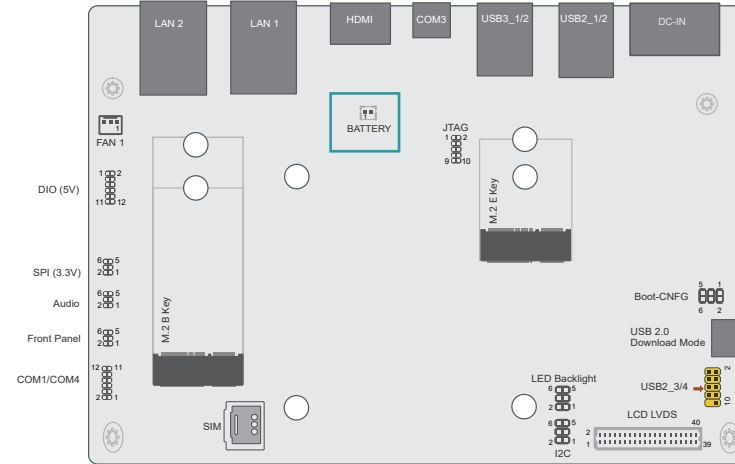


The JTAG port is used for debugging purpose.

Pin	Function	Pin	Function
1	MVDD_3V3	2	JTAG_TMS
3	GND	4	JTAG_TCK
5	GND	6	JTAG_TDO
7	GND	8	JTAG_TDI
9	GND	10	JTAG_RST#

Internal I/O Connectors

Battery (BTJ1)



The external lithium ion battery supplies power to the real-time clock and CMOS memory as an auxiliary source of power when the main power is shut off.

Safety Measures

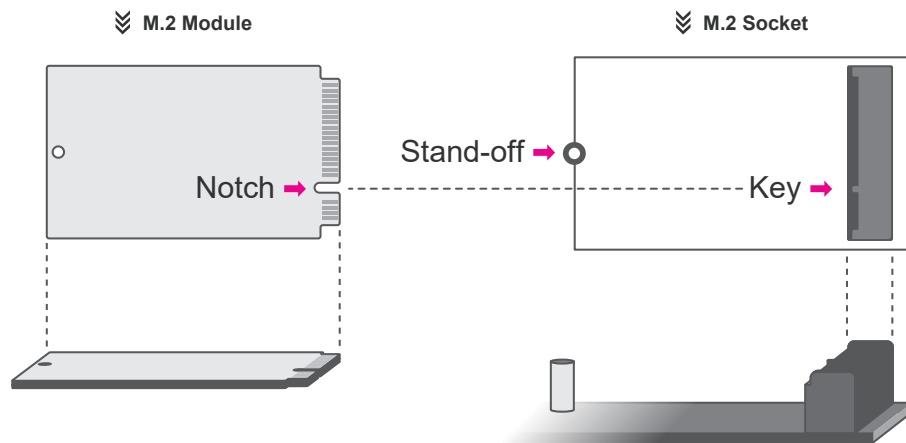
- There exists explosion hazard if the battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to local ordinances.

## ► Expansion Slots

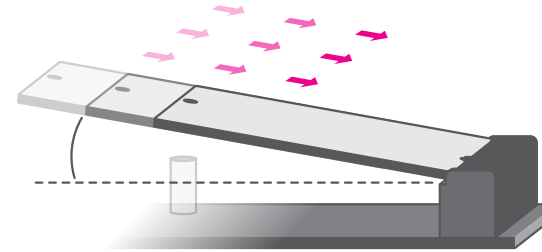
### Installing the M.2 Module

Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.

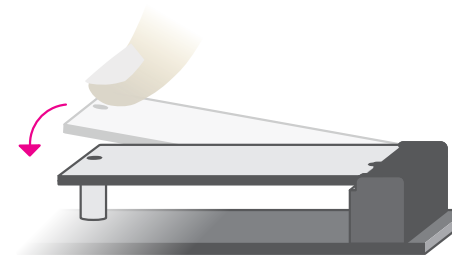


Please follow the steps below to install the card into the socket.



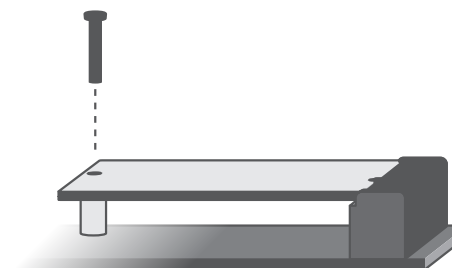
#### Step 1:

Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.



#### Step 2:

Press the end of the card far from the socket down until the gap between the card and the stand-off closes up.



#### Step 3:

Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.



# Chapter 3 - Software User Guide

## ► Flash Yocto Images to eMMC using UUU tool - V1.1

### How to flash images

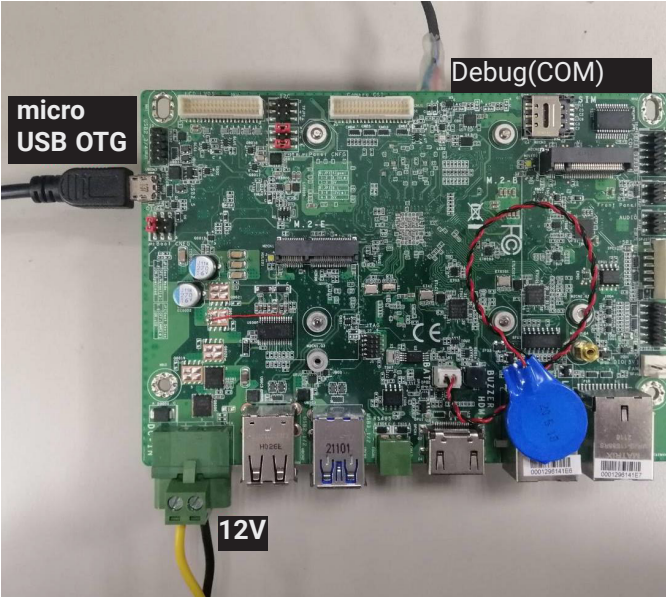
Files within the image folder are listed below:

```

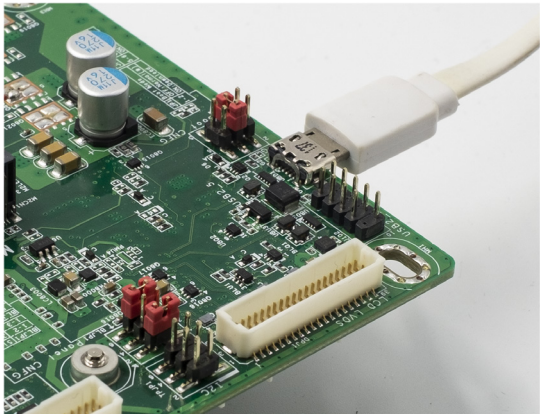
M8MP553_VQ_0_0_0000_20210910_0003_YC30_4GB
├── HW_V011_Update_Script
│   ├── Linux
│   │   ├── update_all.sh
│   │   └── update_uboot_kernel.sh
│   └── Windows
│       ├── SD_update_all.bat
│       ├── SD_update_uboot_kernel.bat
│       ├── update_all.bat
│       └── update_uboot_kernel.bat
├── uuu_script
│   ├── emmc_all.uuu
│   ├── emmc_uboot_kernel.uuu
│   └── fsl-image-mfgtool-initramfs-imx_mfgtools.cpio.gz.u-boot
├── m8mp553_files
│   ├── Image
│   │   ├── imx8mp-m8mp553.dtb
│   │   ├── imx-boot
│   │   ├── rootfs.tar.bz2
│   │   └── update_process.sh
│   ├── sd_all.uuu
│   ├── sd_uboot_kernel.uuu
│   ├── uuu
│   └── uuu.exe
└── 5 directories, 18 files
    
```

→ Windows batch for updating eMMC  
 → Windows batch for updating bootloader and kernel  
 → For eMMC to update ALL images  
 → For eMMC to update bootloader and kernel image only  
 → Linux kernel Image  
 → DeviceTree blob  
 → bootloader  
 → RootFS file  
 → Linux update script  
 → Linux update tool  
 → Windows update tool

Connect M8MP553 to PC via UART-USB debug board and USB cable for showing debug log at the terminal (option).



Please ensure that usb cable is connected to the microUSB slot.



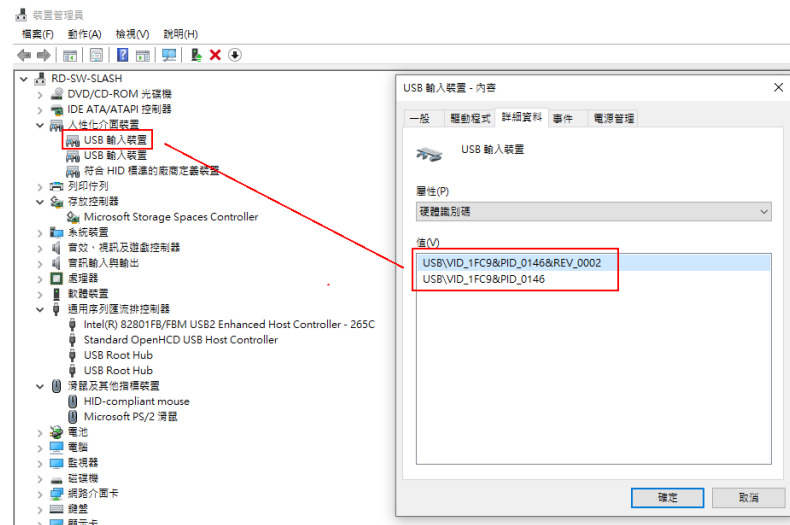
Please ensure that JP1 Boot jumper is switched to 1-2 ON for Download mode.



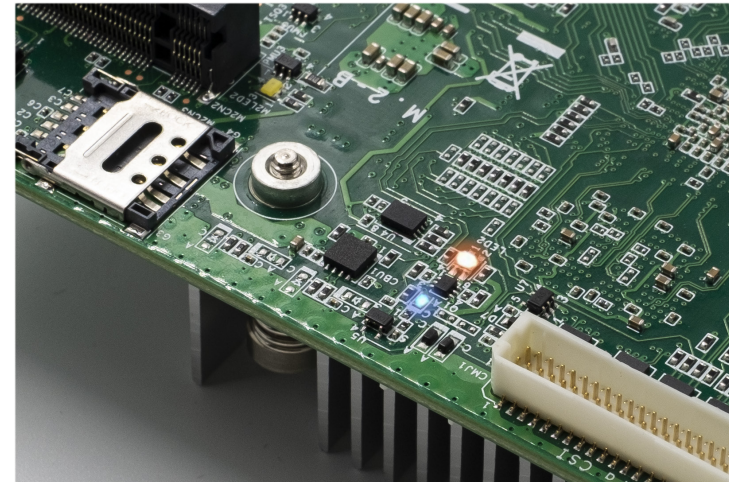
Power on M8MP553 (The adaptor output voltage is 12V).

**Option 1: Start to flash images on Windows**

After plugging the USB cable, ensure that it appears in the device manager.

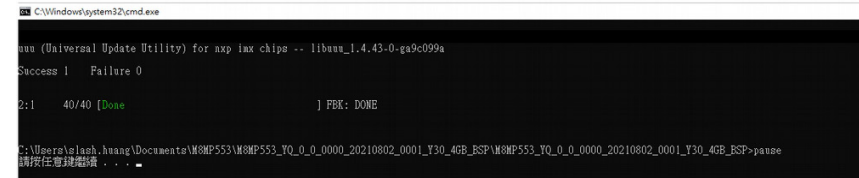
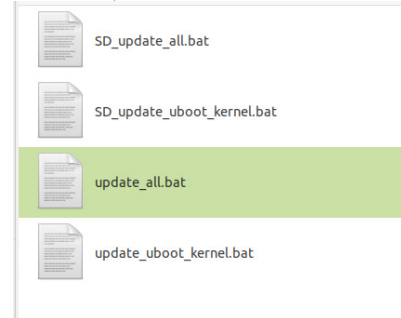


During the flashing process, the red light and blue light are active.

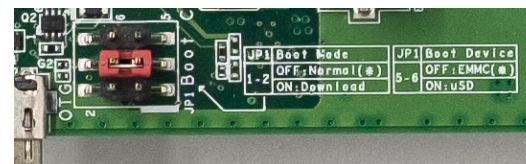


If the text in green "Done" appears, the process is finished.

Execute "update\_all.bat" with administrator privileges.

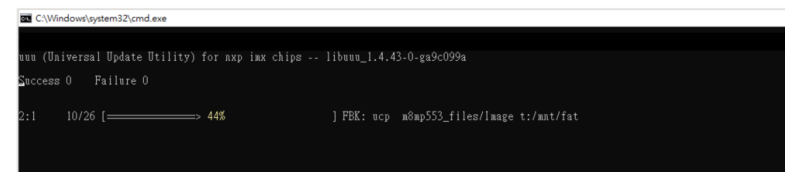


After the process is done, please switch JP1 back to 1-2/5-6 OFF to boot from eMMC.



Then the update process will be starting, please wait it to be finished.

The command line windows appears while flashing:

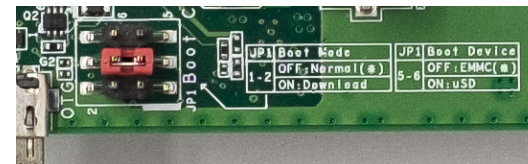


**Option 2: Start to flash images on Linux**

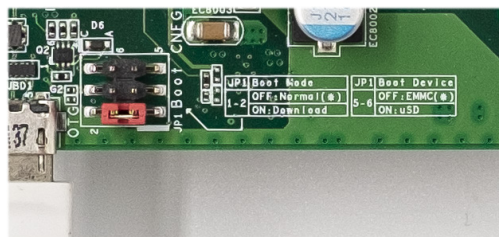
After plugging the USB cable, ensure that it appears in the list after typing "lsusb" in terminal.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ lsusb
Bus 002 Device 002: ID 8087:8000 Intel Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:8008 Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 118: ID 0461:4e84 Primax Electronics, Ltd
Bus 003 Device 117: ID 1ddd:1130
Bus 003 Device 116: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 003 Device 030: ID 1fc9:0146 NXP Semiconductors
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$
```

Remember to switch JP1 back to 1-2 / 5-6 OFF to boot from eMMC.



Switch JP1 Boot jumper to 1-2 ON for Download mode.



Enter the "Linux" directory and type "./update\_all.sh" in terminal.

```
/home/slash/work/for_DFI/imx8/M8MP553/M8MP553_YQ_0_0_0000_20210910_0003_YC30_4GB/HW_V011_Update_Script/Linux
slash@slash-ThlnkPad-E14-Gen-2:Linux$ ./update_all.sh
```

Then the update process will begin with information in the terminal that indicates progress.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ sudo ./uuu ./emmc_all.uuu
[sudo] password for slash:
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.4.43-0-ga9c099a

Success 0 Failure 0

3:1 27/40 [ 2% ] FBK: ucp m8mp553_files/rootfs.tar.bz2 t:-
```

If the text in green "Done" appears, the process is finished.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ sudo ./uuu ./emmc_all.uuu
[sudo] password for slash:
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.4.43-0-ga9c099a

Success 1 Failure 0

3:1 40/40 [Done] FBK: DONE
```

## ► Flash Yocto Images to SD using UUU tool - V1.1

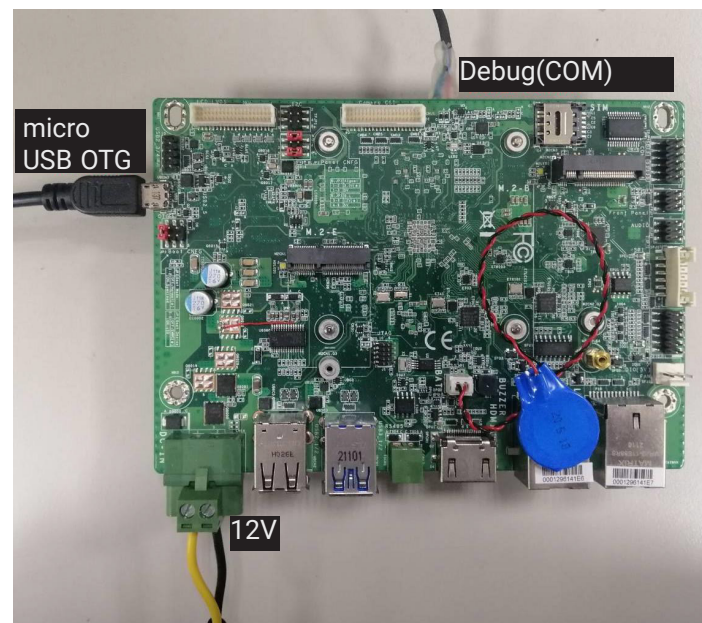
### How to flash images

Files within the image folder are listed below:

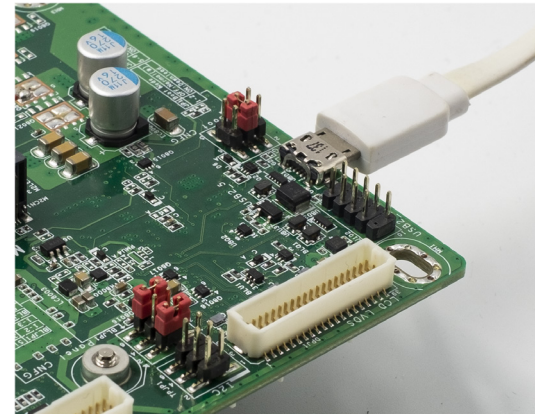
<code>M8MP553_YO_0_0_0001_20220127_0013_Y30</code>	
<code>m8mp553_y30_update_folder</code>	
<code>  HH_V020_Update_Script</code>	
<code>    linux</code>	
<code>sd_update_all.sh</code>	
<code>sd_update_uboot_kernel.sh</code>	
<code>update_all.sh</code>	
<code>update_uboot_kernel.sh</code>	
Windows	
<code>sd_update_all.bat</code>	Windows batch for updating SD
<code>sd_update_uboot_kernel.bat</code>	Windows batch for updating bootloader and kernel to SD
<code>update_all.bat</code>	
<code>update_uboot_kernel.bat</code>	
.uuu_script	
<code>emmc_all.uuu</code>	
<code>emmc_uboot_kernel.uuu</code>	
<code>fst-image-mfgtool-lnttrnfrs-lmx_mfgtools.cpio.gz.u-boot</code>	
<code>lvds_panel_type</code>	
<code>m8mp553_files</code>	
<code>dfi-image-qt-m8mp553.tar.bz2</code>	Yocto 3.0 Root File System
<code>Image</code>	Linux kernel Image
<code>lmx8mp-m8mp553-lvdsam1024.dtb</code>	Linux kernel Device-tree blob
<code>lmx8mp-m8mp553-lvdsq215hv.dtb</code>	Linux kernel Device-tree blob
<code>lmx-boot</code>	Boot-load
<code>update_process.sh</code>	Linux update script
<code>uuu</code>	
<code>sd_all.uuu</code>	For SD to update ALL images
<code>sd_uboot_kernel.uuu</code>	For SD to update bootloader and kernel image only
<code>uuu</code>	Linux update tool
<code>uuu.exe</code>	Windows update tool

### Put uSD card to M8MP553 board.

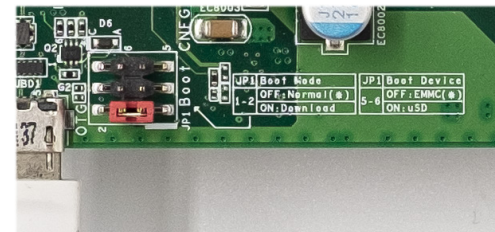
Connect M8MP553 to PC via UART-USB debug board and USB cable for showing debug log at the terminal (option).



Please ensure that usb cable is connected to the microUSB slot.



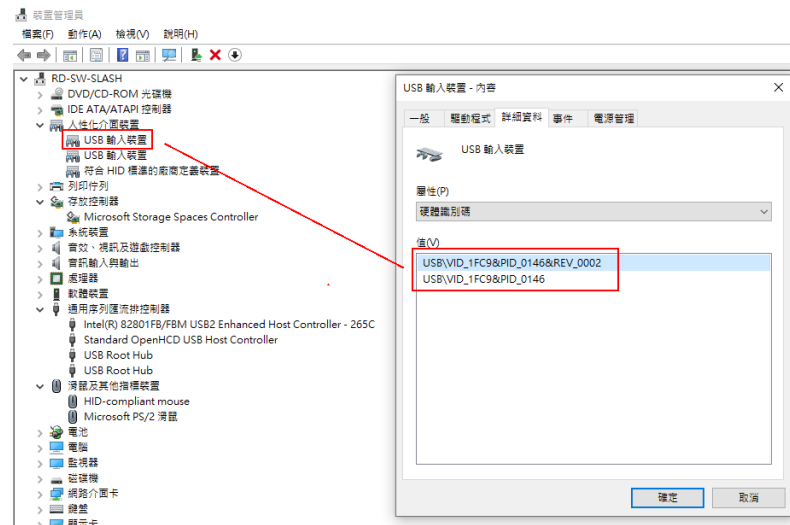
Please ensure that JP1 Boot jumper is switched to 1-2 ON for Download mode.



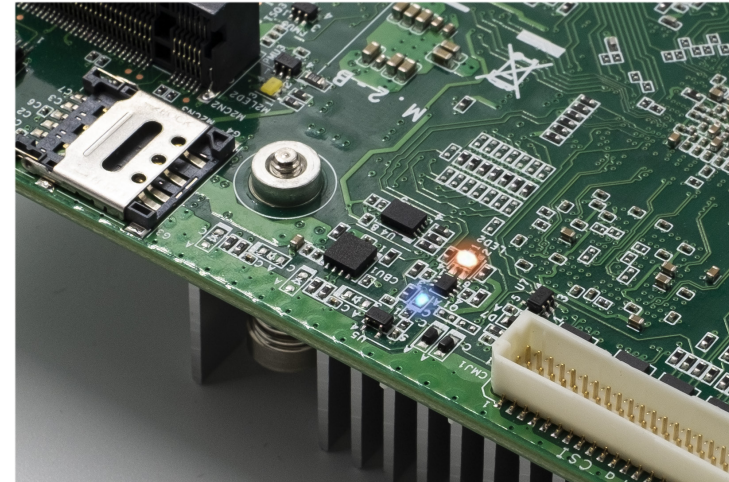
Power on M8MP553 (The adaptor output voltage is 12V).

**Option 1: Start to flash images on Windows**

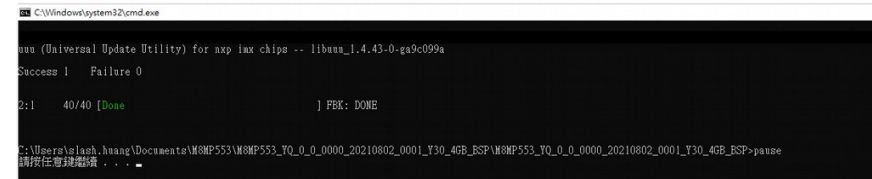
After plugging the USB cable, ensure that it appears in the device manager.



During the flashing process, the red light and blue light are active.



If the text in green "Done" appears, the process is finished.

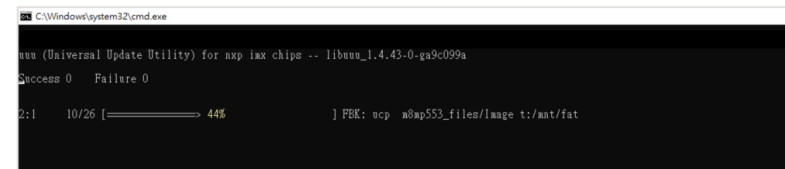


Execute "SD\_update\_all.bat" with administrator privileges.

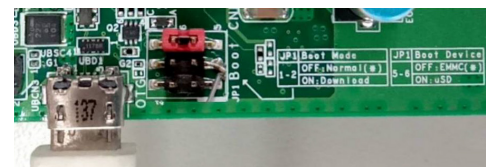


Then the update process will be starting, please wait it to be finished.

The command line windows appears while flashing:



After the process is done, please switch JP1 back to 1-2/3-4 OFF to boot from SD.

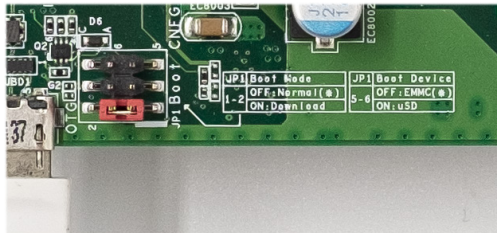


**Option 2: Start to flash images on Linux**

After plugging the USB cable, ensure that it appears in the list after typing "lsusb" in terminal.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ lsusb
Bus 002 Device 002: ID 8087:8000 Intel Corp.
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 8087:8008 Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 004 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 003 Device 118: ID 0461:4e84 Primax Electronics, Ltd
Bus 003 Device 117: ID 1ddd:1130
Bus 003 Device 116: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 003 Device 030: ID 1fc9:0146 NXP Semiconductors
Bus 003 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$
```

Switch JP1 Boot jumper to 1-2 ON for Download mode.



Enter the "Linux" directory and type "./sd\_update\_all.sh" in terminal.

```
HW_V011_Update_Script/
├── Linux
│   ├── sd_update_all.sh
│   ├── sd_update_uboot_kernel.sh
│   ├── update_all.sh
│   └── update_uboot_kernel.sh
└── Windows
    ├── SD_update_all.bat
    ├── SD_update_uboot_kernel.bat
    ├── update_all.bat
    └── update_uboot_kernel.bat
```

Then the update process will begin with information in the terminal that indicates progress.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ sudo ./uuu ./emmc_all.uuu
[sudo] password for slash:
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.4.43-0-ga9c099a

Success 0 Failure 0

3:1 27/40 [ 2% ] FBK: ucp m8mp553_files/rootfs.tar.bz2 t:-
```

If the text in green "Done" appears, the process is finished.

```
slash@slash-HD631-Q87CRM:M8MP553_YQ_0_0_0000_20210802_0001_Y30_4GB_BSP$ sudo ./uuu ./emmc_all.uuu
[sudo] password for slash:
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.4.43-0-ga9c099a

Success 1 Failure 0

3:1 40/40 [Done] FBK: DONE
```

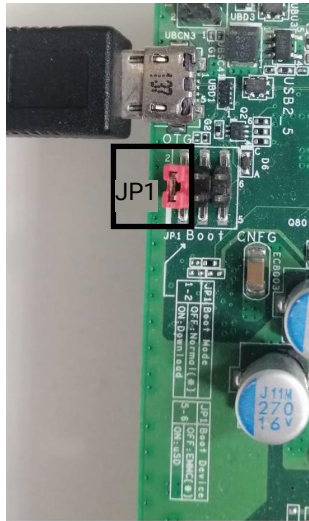
Remember to switch JP1 back to 1-2 / 3-4 OFF to boot from SD.



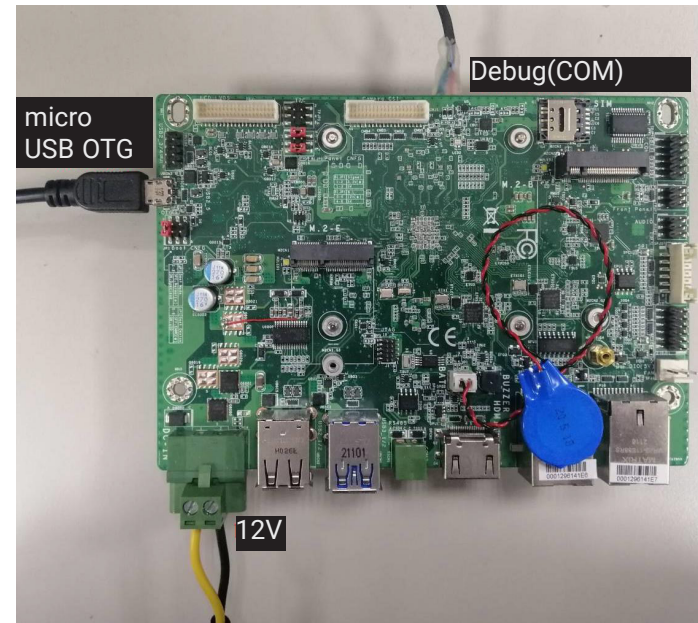
## ► Flash Android Images to eMMC/SD using UUU tool - V1.1

### How to flash images

1. Before flashing images into M8MP553 device via UUU tool, user must configure BOOTCNFG to BOOT Type, also alleged Serial Download mode by plugging one jumper into JP1 shorting pin1 and pin2 (eMMC boot, pin5 & pin6 off).
2. See the pictures showed as below :



3.
  - Connect M8MP553 to PC via UART-USB debug board and USB cable for showing debug log at terminal (option)
  - Connect M8MP553 to PC via Micro USB cable for flashing image.
  - Power on M8MP553 (The adapter output voltage is 12V).



4.
  - Open the Terminal in Ubuntu after necessary preparations are done.
  - Enter image release folder.
  - Execute the following command then wait for process complete.

#### For Ubuntu:

```
$ chmod 777 uuu_imx_android_flash.sh
$ chmod 777 uuu_imx_android_flash_hdmi.sh
$ chmod 777 uuu
$ sudo ./uuu_imx_android_flash.sh -f imx8mp -a -e (Update image LVDS dual display)
$ sudo ./uuu_imx_android_flash_hdmi.sh -f imx8mp -a -e (Update image HDMI output only)
```

#### For Windows 10:

```
>uuu_imx_android_flash.bat -f imx8mp -a -e (Update image LVDS dual display)
>uuu_imx_android_flash_hdmi.bat -f imx8mp -a -e (Update image HDMI output only)
```

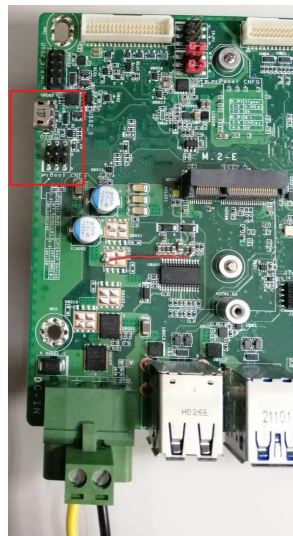
```
C:\tmp\M8MP553_UUU_MFGTOOL_220114_15>uuu_imx_android_flash.bat -f imx8mp -a -e
This script is validated with uuu 1.3.124 version, it is recommended to align with this version.
dtbo is supported
dual slot is supported
dynamic partition is supported
generate lines to flash u-boot-imx8mp.img to the partition of bootloader0
generate lines to flash partition-table.img to the partition of gpt
generate lines to flash dtbo-imx8mp.img to the partition of dtbo_a
generate lines to flash boot.img to the partition of boot_a
generate lines to flash vbmeta-imx8mp.img to the partition of vbmeta_a
lpmake.exe | 01-14 15:29:36 15676 840 builder.cpp:937] [liblp]Partition system_a will resize from 0 bytes to 909824000 bytes
lpmake.exe | 01-14 15:29:36 15676 840 builder.cpp:937] [liblp]Partition vendor_a will resize from 0 bytes to 564174843 bytes
lpmake.exe | 01-14 15:29:36 15676 840 builder.cpp:937] [liblp]Partition product_a will resize from 0 bytes to 332734464 bytes
generate lines to flash super.img to the partition of super
uuu script generated, start to invoke uuu with the generated uuu script
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.4.43-0-ga9c099a
Success 1 Failure 0

2:1 21/21 [Done] ] FB: done
```

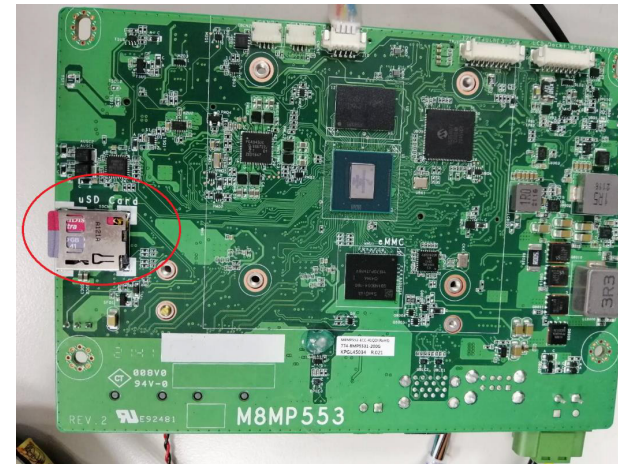
P.S. M8MP553 UUU MFGTool must be put on local disk not network disk.

5.

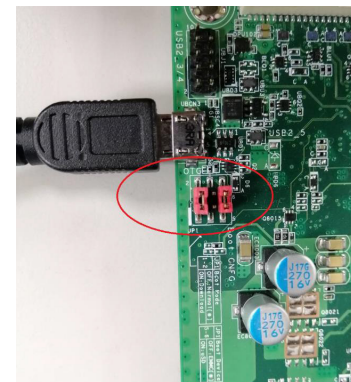
- Turn off the device after flashing process complete.
- Switch BOOTCNFG to BOOT Device, also alleged Normal mode (eMMC boot), by removing all jumpers from JP1.



6. Turn on the device (eMMC boot)
7. **Flash image into SD card**
  - Insert SD card to device.



- Connect JP1 as below picture and power on device to force device enter SD card download mode.



- SD card flash commands

**For Ubuntu:**

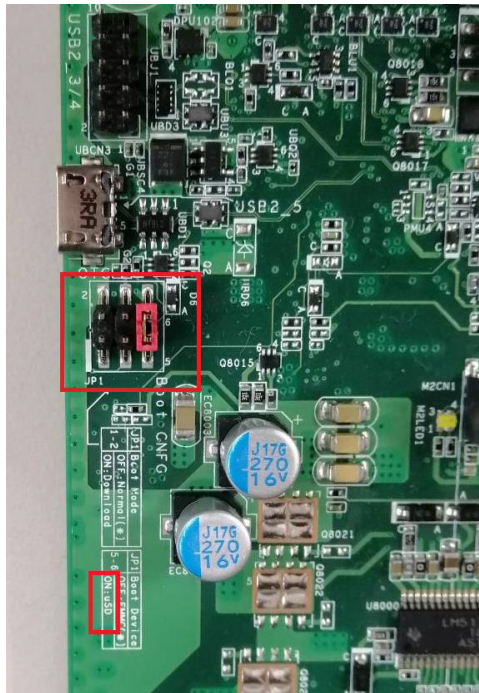
```
$ sudo ./uuu_imx_android_flash.sh -f imx8mp -a -e -t sd (Update image LVDS dual display)
$ sudo ./uuu_imx_android_flash_hdmi.sh -f imx8mp -a -e -t sd (Update image HDMI output only)
```

**For Windows 10:**

```
>uuu_imx_android_flash.bat -f imx8mp -a -e -t sd (Update image LVDS dual display)
>uuu_imx_android_flash_hdmi.bat -f imx8mp -a -e -t sd (Update image HDMI output only)
```

- Turn off the device after flashing process complete. Switch BOOTCNFG to BOOT Device. See the pictures showed as below (SD Normal mode).





- Turn on the device (SD boot)

## ► Software Feature

### General Support List

(\*) is depended on the NXP support.

Component	Name	Base-Line Feature
<b>General</b>	OS Support	Yocto 3.0 (Default Preloaded on eMMC), Kernel 5.4.70-2.3.0 Android 10.0, Kernel 5.4.70
<b>Misc</b>	Firmware Upgrade (*)	UUU firmware update tool
	Utilities (*)	Hardware diagnostic utilities

### Linux AP/API Support List

(\*) is depended on the NXP support.

Component	Description	Detail	Release Schedule
<b>Linux</b>	Yocto 3.0 - Kernel 5.4.70-2.3.0	It's an open-source project that delivers a set of tools that create operating system images for embedded Linux systems. Support wayland weston graphics Demo Image Only (*).	2022, Q1
<b>Linux AP/API</b>	NXP iMX8MPlus Yocto 3.0 BSP Support Wayland Window Support BitBake build tool	All library and utility should support (*). Source code package (support by request).	2022, Q1
	Support I2C, Watchdog, GPIO, LVDS brightness control	Provide support console for i.MX8MPlus platform.	2022, Q1
<b>Android</b>	Android 10.0.0 - Kernel 5.4.70	Support Demo image.	2022, Q2
<b>Android AP/API</b>	NXP iMX8MPlus Android 10.0 NXP BSP Support Android AOSP launcher Support Android ADB shell Support Android APK install	1. All library, utility and Android apk should support (*). 2. Source code package (support by request).	2022, Q2
	Support GPIO, LVDS brightness control	Provide support console for i.MX8M platform.	2022, Q2

### Yocto Support List

(\*) is depended on the NXP support.

Component	Support Status
<b>Yocto Version</b>	3.0
<b>Kernel Version</b>	5.4.70-2.3.0
<b>Window System</b>	Wayland without QT5 build
<b>eMMC</b>	Support eMMC boot by default, eMMC v5.1, Linux EXT4 file system
<b>Ethernet LAN1/2</b>	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP, writable MAC address store in eMMC.
<b>USB</b>	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem.
<b>USB OTG</b>	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem. 3. Support connect to PC to update image by NXP i.MX uuu update firmware tool .
<b>HDMI Video</b>	Support HDMI+LVDS dual display with extend mode. Support max display resolution of 1080p60.
<b>LVDS Panel</b>	Support Panel: 1920x1080 dual channel (G215HVN01.0) Support Panel: 1024x600 (AM-1024600DTZQW) Support HDMI+LVDS dual display with extend mode.
<b>LVDS Backlight</b>	Support PWM backlight control by Linux device node, level value 0~100.
<b>Touch</b>	1. Support Touch: ILI2301S+ILIM2V 2. Support single touch function.
<b>Micro SD Card(uSD card slot)</b>	1. Support SD card boot, support SD storage by "mount" console command, FAT filesystem. 2. Support SD boot (select by boot switch). 3. Not support SDIO module.
<b>M.2 B key</b>	Support "lspci" console command for check PCIe card status. LTE module : Quectel EM06.
<b>M.2 2230 E key</b>	Support "lspci" console command for check PCIe card status. WiFi module : AW-CB375NF (AZUREWAVE, CHIPSET: RTL8822CE)
<b>COM Port (RS232/RS485/RS422)</b>	Support Loopback test, (need DFI Linux user space utility).

<b>GPIO</b>	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.
<b>I2C</b>	Support "i2cdetect" console command for detect I2C device.
<b>SPI</b>	Support read/write data by NXP utility spidev_test. (Winbond 25Q128JV)
<b>PWM-DIO</b>	Support control by Linux device node.
<b>FAN</b>	Support control by Linux device node.
<b>Buzzer</b>	Support Buzzer control by Linux device node.
<b>Debug serial port</b>	Support read Linux kernel debug message by serial port, use PC serial terminal tool (ex. PuTTY), BR 115200.
<b>Play Video</b>	Support play MPEG4, H.264 file (play by NXP gstreamer tool).
<b>Watch Dog</b>	Support NXP utility "wdt_driver_test.out"(*) to test Watch Dog reboot function.
<b>CAN Bus</b>	CAN Bus Support "cansend", "candump" console commands for test send/read data.
<b>RTC</b>	Support Linux "date -s" and "hwclock -w" console commands to set system time.
<b>Audio</b>	<ol style="list-style-type: none"> <li>1. Support system sound output to LINE OUT Connector.</li> <li>2. Support Music app for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality).</li> <li>3. Support sound recorder for test recording PCM file with Mono MIC_IN audio, file store to eMMC.</li> </ol>
<b>Camera</b>	Not support.
<b>Power saving feature (suspend/resume)*</b>	Not support.

M8MP553 Yotco3.0 BSP base on <https://github.com/nxp-imx/imx-manifest/>, imx\_5.4.70\_2.3.0 branch, fsl-image-full build (Builds Wayland weston graphics with Qt5 image). Refer from imx-yocto-L5.4.70\_2.3.0 i.MX\_Yocto\_Project\_User's\_Guide.pdf.

## Android Support List

(\*) is depended on the NXP support.

Component	Support Status
<b>Android Version</b>	10.0.0
<b>Kernel version</b>	5.4.70
<b>eMMC</b>	Support eMMC boot , eMMC v5.1, Linux ext4 file system.
<b>Ethernet LAN1/2</b>	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP Support fixed MAC address (In eMMC).
<b>USB</b>	<ol style="list-style-type: none"> <li>1. Support USB HID Keyboard and Mouse Device.</li> <li>2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT file system.</li> </ol>
<b>USB OTG</b>	<ol style="list-style-type: none"> <li>1. Support USB HID Keyboard and Mouse Device.</li> <li>2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT file system.</li> <li>3. Support connect to PC to update image by NXP i.MX uuu update firmware tool.</li> </ol>
<b>HDMI Video</b>	<ol style="list-style-type: none"> <li>1. Default support LVDS+HDMI dual display function, HDMI is slave output, resolution 1024x600 (base on LVDS resolution).</li> <li>2. For Android standard product, We enable dual display function by default.</li> </ol>
<b>LVDS Panel</b>	<ol style="list-style-type: none"> <li>1. Support LVDS+HDMI dual display function, LVDS is main output, resolution 1024x600, (Support Panel: AM-1024600DTZQW).</li> <li>2. For Android standard product, We enable dual display function by default.</li> </ol>
<b>LVDS Backlight</b>	Support control by Linux device node, level value 0~100.
<b>Touch</b>	<ol style="list-style-type: none"> <li>1. Support Touch: ILI2301S+ILIM2V.</li> <li>2. Support single touch function.</li> </ol>
<b>Micro SD Card(uSD card slot)</b>	<ol style="list-style-type: none"> <li>1. Support SD card boot, support SD storage by "mount" console command, FAT file system.</li> <li>2. Support SD boot (select by boot switch).</li> <li>3. Not support SDIO module.</li> </ol>
<b>I2S-Audio</b>	<ol style="list-style-type: none"> <li>1. Support system sound output to LINE OUT Connector.</li> <li>2. Support adjusts sound volume by OS setting UI.</li> <li>3. Support Music app for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality).</li> <li>4. Support sound recorder for test recording PCM file with Mono MIC_IN audio, file store to eMMC.</li> </ol>
<b>M.2 B key</b>	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. 4GLTE module: Quectel EM06
<b>M.2 E key</b>	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. WiFi module: AW-CB375NF (AZUREWAVE, CHIPSET: RTL8822CE)

<b>UART1 - RS232 (Debug serial port)</b>	Support output Linux kernel debug log, use PC serial terminal tool read log (ex. PuTTY), BR 115200.
<b>COM Port(RS232/RS485/RS422)</b>	Support DTE mode, BR 115200 loopback test (need DFI Android test utility).
<b>I2C</b>	Support "i2cdetect" console command for detect I2C device.
<b>GPIO</b>	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.
<b>DIO-PWM</b>	Support control by Linux device node.
<b>FAN</b>	Support control by Linux device node.
<b>Buzzer</b>	Support Buzzer control by Linux device node.
<b>CAN Bus</b>	Support "cansend", "candump" console commands for test send/read data.
<b>Reset / Power on Key</b>	HW control.
<b>I2C-RTC</b>	Support Linux "date -s" and "hwclock -w" console commands to set system time.
<b>I2C-Thermal sensor</b>	Support read device temperature (degrees C) by Linux device node.
<b>Play Video</b>	Support play MPEG4 H.264 file.
<b>Wifi /BT</b>	<ol style="list-style-type: none"> <li>1. Support RTL8822CE WiFi/BT module(Option by requirement)</li> <li>2. RTL8822CE WIFI: <ol style="list-style-type: none"> <li>(1) Support Wifi STA Mode (connect Wifi AP) by Android UI to enable/disable it.</li> <li>(2) Support Soft AP Mode (enable DHCP/IPv4 routing) by Android UI to enable/disable it.</li> <li>(3) Support Android UI to set up Soft AP information.</li> <li>(4) Support Android Airplane mode to disable Wi-Fi function.</li> <li>(5) Not support STA mode and Soft AP mode enable at same time.</li> <li>(6) Not support other Wifi modes, ex: Wi-Fi Direct, Miracast, Wi-Fi TimeSync ...etc.</li> <li>(7) STA mode limitation: When plug-in wired LAN, STA mode will disconnect automatically by Android network framework limitation.</li> </ol> </li> <li>3. RTL8822CE BT: <ol style="list-style-type: none"> <li>(1) Support BT connected and enable/disable by Android UI.</li> <li>(2) Support BT files transfer by OPP profile using "Bluetooth File Transfer" tool.</li> <li>(3) Support OPP profile only.</li> <li>(4) Not support other BT profiles which are not listed on above.</li> </ol> </li> </ol>
<b>LTE and SIM slot</b>	<ol style="list-style-type: none"> <li>1. Support Quectel EM06 module.</li> <li>2. Support data-link only.</li> </ol>
<b>Android Build Type</b>	ENG Build without SELinux.

<b>Android ADB</b>	Support
<b>Android Factory Reset</b>	Support
<b>Android Fastboot</b>	Support
<b>Android OTA</b>	No support
<b>Android CTS</b>	No support
<b>Android GMS/GTS</b>	No support
<b>Android Suspend</b>	No support suspend, set never to suspend by default.
<b>Preload Android APPs</b>	Not support.
<b>Image Size</b>	<ol style="list-style-type: none"> <li>1. u-boot image: Around 1308 KB</li> <li>2. boot image: Around 67 MB</li> <li>3. super image: Around 3.6 GB</li> <li>4. system image: Around 906 MB</li> </ol>
<b>Free storage size</b>	<ol style="list-style-type: none"> <li>1. Data partition: Around 5.6 GB free space</li> <li>2. System partition: Around 2.4GB free space</li> </ol>
<b>Component</b>	Support Status

M8MP553 Android BSP base on <https://source.codeaurora.org/external/imx/imx-manifest>, Android 10.0.0\_2.6.0 branch, Please refer Android Q10.0.0\_2.6.0, Android\_User's\_Guide.pdf from NXP website.