DFI

M8M051

2.5" Pico-ITX Motherboard
User's Manual

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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

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 M8M051 board

- 1 Terminal block for RS485 (COM3)

- Heat spreader (Height: 11mm)

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

SYSTEM	Processor	i.MX 8M applications processors NXP i.MX 8M Quad Cortex-A53, 1.5GHz (Commercial) NXP i.MX 8M Dual Cortex-A53, 1.5GHz (Commercial) NXP i.MX 8M Quad Cortex-A53, 1.3GHz (Industrial) NXP i.MX 8M Dual Cortex-A53, 1.3GHz (Industrial)
	Memory	2GB/4GB Memory Down Single Channel LPDDR4 up to 3200 MHz
GRAPHICS	Controller	GC7000 Lite
	Feature	OpenVG 1.1, OGL ES 3.1, Vulkan, OCL 1.2 FP VPU Decode: 4Kp60 HEVC H.265, VP9, 4Kp60 H.264
	Display	1 x HDM (default) 1 x LVDS HDMI: resolution up to 4096x2160 @60Hz LVDS: resolution up to 1920x1080 @60Hz
	Single Display	HDMI or LVDS
EXPANSION	Interface	1 x M.2 B key 3042/2242 (USB 3.1 Gen1) Nano SIM slot support (available upon request) 1 x M.2 E key 2230 (PCIe x1/USB 2.0)
AUDIO	Audio Codec	SGTL5000
ETHERNET	Controller	1 x AR8035 Ethernet (10/100/1000Mbps)
External I/O	Ethernet	1 x GbE (RJ-45)
	Serial	1 x RS485
	USB	2 x USB 3.1 Gen1 1 x Micro USB 2.0 (Download mode)
	Display	1 x HDMI
INTERNAL I/O	Serial	1 x RS232 1 x RS-232/422/485 (2 x 6 pin header, 1.27mm pitch)
	USB	2 x USB 2.0 (1.27mm pitch)
	Display	1 x LVDS LCD Panel Connector 1 x Backlight Power
	Audio	1 x Audio (Line-out/Mic-in, 2.00mm pitch)
	eMMC	Support eMMC 5.1 16GB on board (default) Support up to 64GB (opt.)
	SD	1 x Micro SD Slot
	DIO	1 x 8-bit DIO (2 x 6 header, 1.27mm pitch)
	I²C	1 x I²C (1.27mm pitch)
	CANBus	1 x CANBus 2.0

WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
POWER	Type	Single 12V +/-10% DC
	Connector	2-poles Terminal Block (default) DC Jack (available upon request)
	Consumption	Typical: Quad:12V @ 0.2A (2.4Watt) Max.: Quad:12V @ 0.38A (4.56Watt)
	RTC Battery	CR2032 Coin Cell
OS SUPPORT	OS Support	Yocto 2.5 on eMMC (default) Android 9.0 (optional)
ENVIRONMENT	Temperature	Operating: -5 to 65°C, -30 to 80°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
	MTBF	i.MX 8MQuad: 1,311,832 hrs @ 25°C; 637,427 hrs @ 45°C; 374,475 hrs @ 60°C; 189,510 hrs @ 80°C Calculation model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled
Mechanism	Dimensions	2.5" SBC Form Factor 100mm (3.94") x 72mm (2.83")
	Height	PCB: 1.6mm Top Side: 15mm, Bottom Side: 4mm
Standards and Certifications	Certifications	CE, FCC, RoHS
Country of Origin	Country of Origin	Taiwan

▶ Features

Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

DDR4

DDR4 delivers increased system bandwidth and improves performance. The advantages of DDR4 provide an extended battery life and improve the performance at a lower power than DDR3/DDR2.

Graphics

The integrated GC7000 Lite graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications.

Gigabit LAN

The Gigabit Ethernet Controller supports data transmission at 1Gbps.

Audio

The audio codec provides High Definition audio output.

Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting "Standby" when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating session will resume exactly where you left off the next time you power-on the system.

Power Failure Recovery

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.
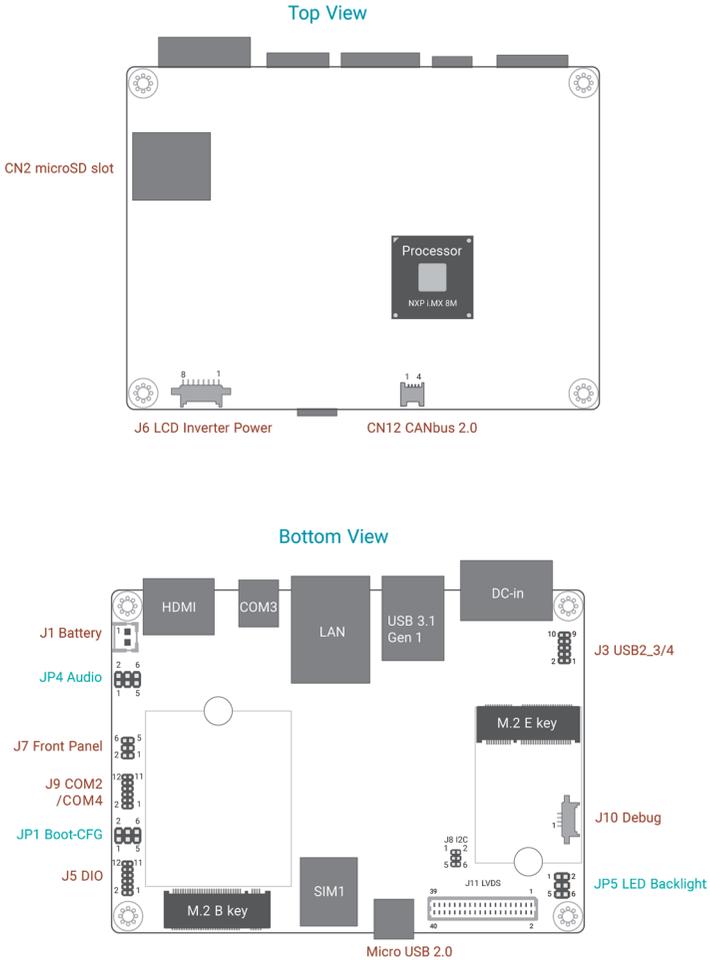
USB

The system board supports the new USB 3.1 Gen 1. It is capable of running at a maximum transmission speed of up to 5 Gbit/s, or 625 MB/s. USB 3.1 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

RTC Timer

The Real Time Clock (RTC) installed on the system board allows your system to automatically power-on on the set date and time.

Chapter 2 - Hardware Installation

▶ **Board Layout**

Top View

- CN2 microSD slot
- Processor — NXP i.MX 8M
- J6 LCD Inverter Power
- CN12 CANbus 2.0

Bottom View

- J1 Battery
- JP4 Audio
- J7 Front Panel
- J9 COM2 /COM4
- JP1 Boot-CFG
- J5 DIO
- HDMI
- COM3
- LAN
- USB 3.1 Gen 1
- DC-in
- J3 USB2_3/4
- M.2 E key
- J10 Debug
- J8 I2C
- JP5 LED Backlight
- J11 LVDS
- M.2 B key
- SIM1
- Micro USB 2.0

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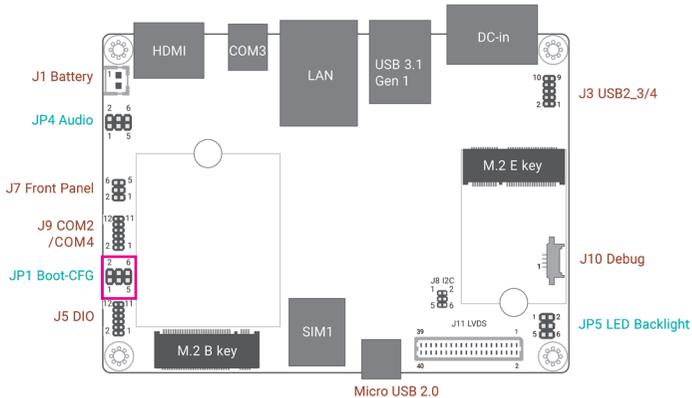
    Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

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.

Mounting holes

CN2 microSD slot

Processor

NXP i.MX 8M

8   1

1   4

J6 LCD Inverter Power   CN12 CANbus 2.0
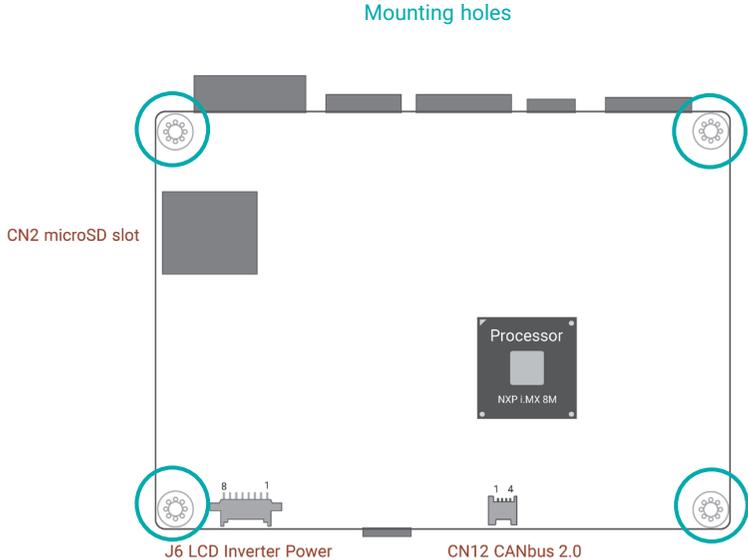
▶ **Jumper Settings**

Boot-CFG (JP1)

The JP1 is used to determine the Boot-CFG

Audio (JP4)

The JP4 is used to determine the Audio

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

- 5-6 Off: EMMC@eSDHC (default)
- 5-6 On: uSD@eSDHC2

- 1: Mic Input
- 4: R-CH

- 2/3/5: GND
- 6: L-CH

LED Backlight (JP5)

The JP5 is used to select the voltage level and power level of LED Blacklight: +5V or +3.3V for voltage and +12V or +5V for power.

Control Signal Voltage

1 2
5 6

- 1-3 On: 5V
- 1-2 On: 3.3V

Backlight Power

1 2
5 6

- 5-6 On: 12V
- 4-6 On: 5V
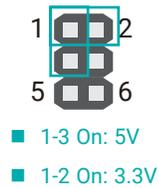
▶ **External I/O Ports**
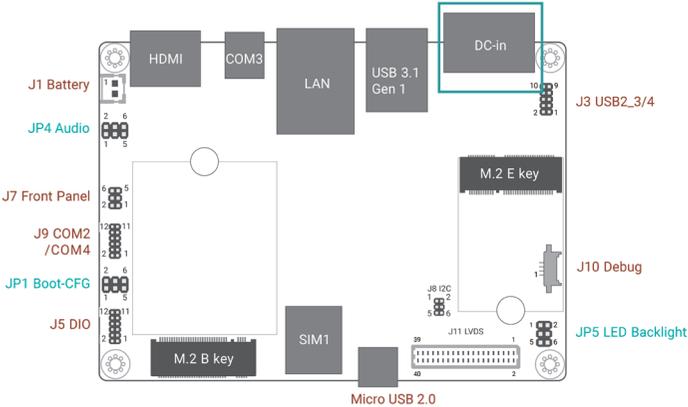
Rear

Front

The external I/O ports consist of the following:

- · 1 DC-in 2-poles Terminal Block

- · 2 USB 3.1 Gen1

- · 1 LAN

- · 1 COM 3

- · 1 HDMI

- · Micro USB 2.0

+12V DC-in

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.

Use a power adapter with 12V DC output voltage. Using a
voltage higher than the recommended one may fail to boot the system or cause damage to the system board.

> **Important:**
>
> DC Jack is available upon request.

▶ **External I/O Ports**

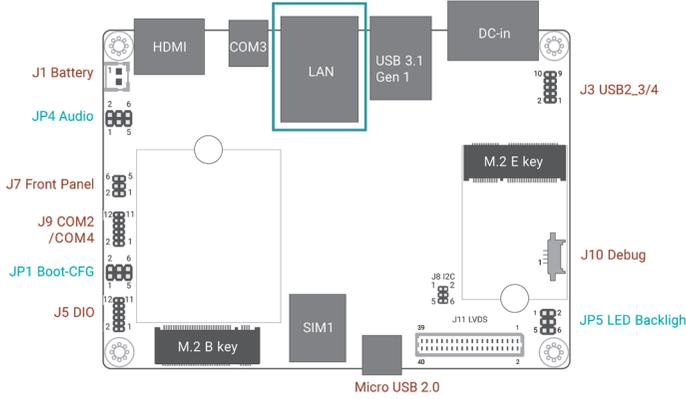## USB 3.1 Gen 1 & Micro USB 2.0
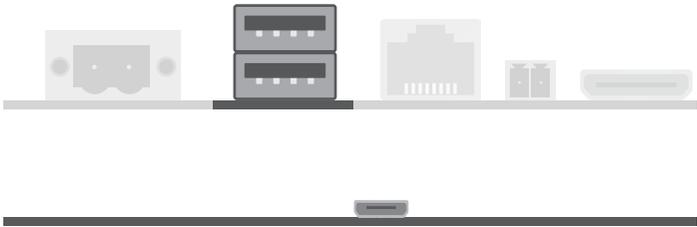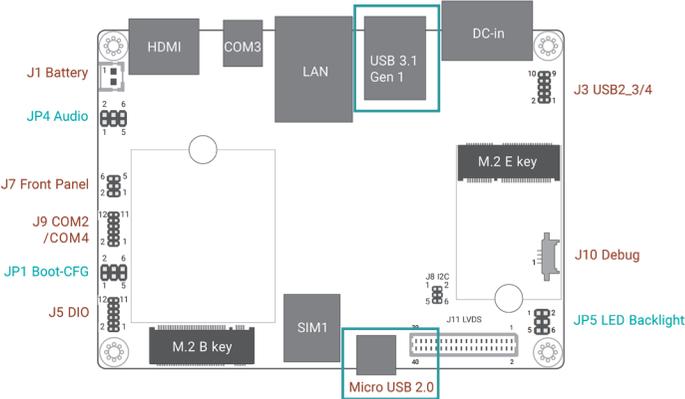
USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The system board is equipped with multiple USB Type - two USB 3.1 ports and 1 micro USB 2.0.

▶ **External I/O Ports**

LAN (RJ-45)

LAN (RJ-45)

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

▶ **External I/O Ports**

COM 3 (RS485)
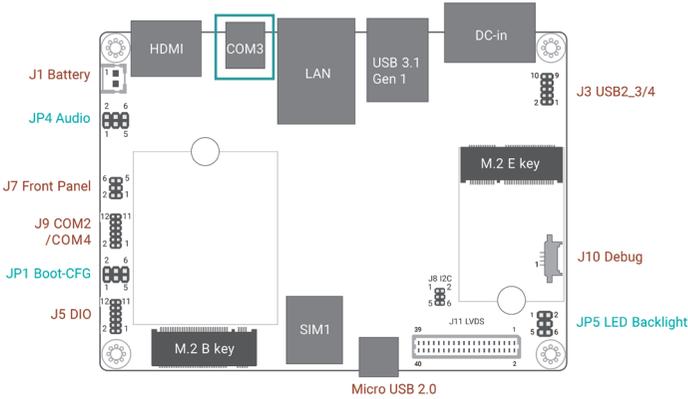
COM 3 (RS485)

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**

Graphics Display

HDMI

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

▶ **Internal I/O Connectors**

J3 USB 2.0 Headers (3/4)

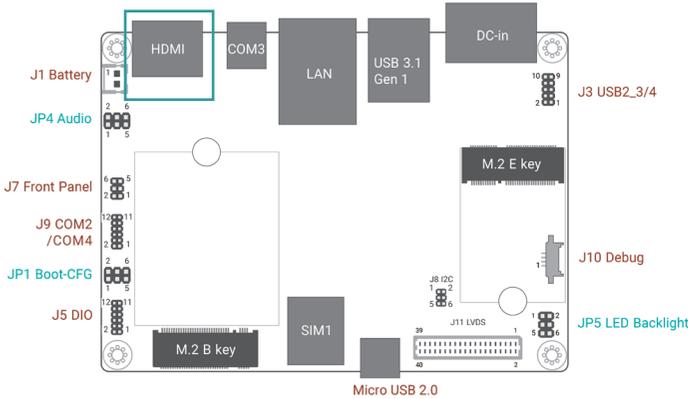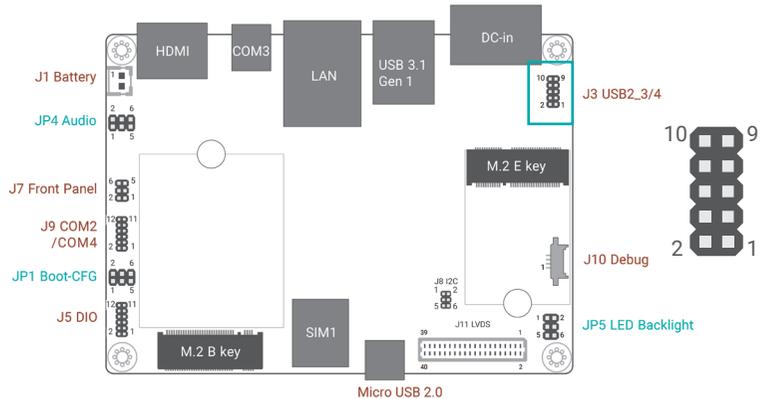The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

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.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or a USB mouse to wake up the system from the S state(s).

■ **J3 USB 2.0 Headers (3/4)**

Pin	Assignment	Pin	Assignment
1	+5VUSBHDR	2	+5VUSBHDR
3	USBH_DN_HDR1	4	USBH_DN_HDR2
5	USBH_DP_HDR1	6	USBH_DP_HDR2
7	GND	8	GND
9	---	10	---
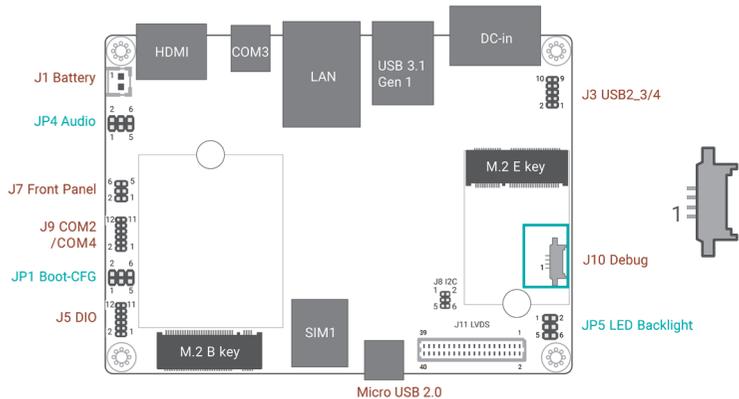
J10 Debug(COM1)

The debug connectors are used for debugging purposes.

■ **J10 Debug(COM1)**

Pin	Assignment
1	VDD_3V3
2	DEBUG_UART1_RXD
3	DEBUG_UART1_TXD
4	GND
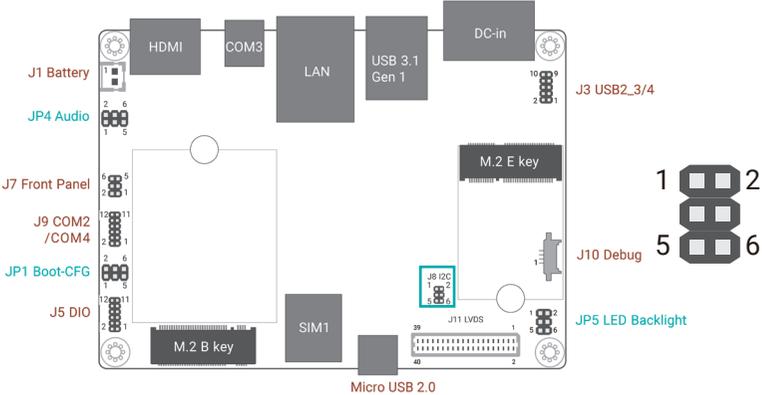
J8 I²C

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

■ J8 I²C

Pin	Function	Pin	Function
1	VDD_3v3/+VTP_3V3	2	GND
3	TP_SCL	4	TP_ALT#
5	TP_SDA	6	TP_RST#
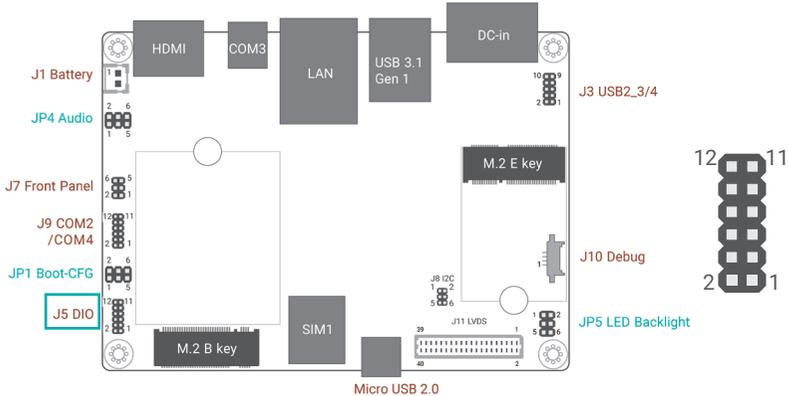
J5 DIO

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

■ J5 DIO

Pin	Function	Pin	Function
1	GND	2	PWM_OUT
3	GND	4	+5V_DIO
5	DIO0_C	6	DIO1_C
7	DIO2_C	8	DIO3_C
9	DIO4_C	10	DIO5_C
11	DIO6_C	12	DIO7_C

▶ **Internal I/O Connectors**

J11 LVDS

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.

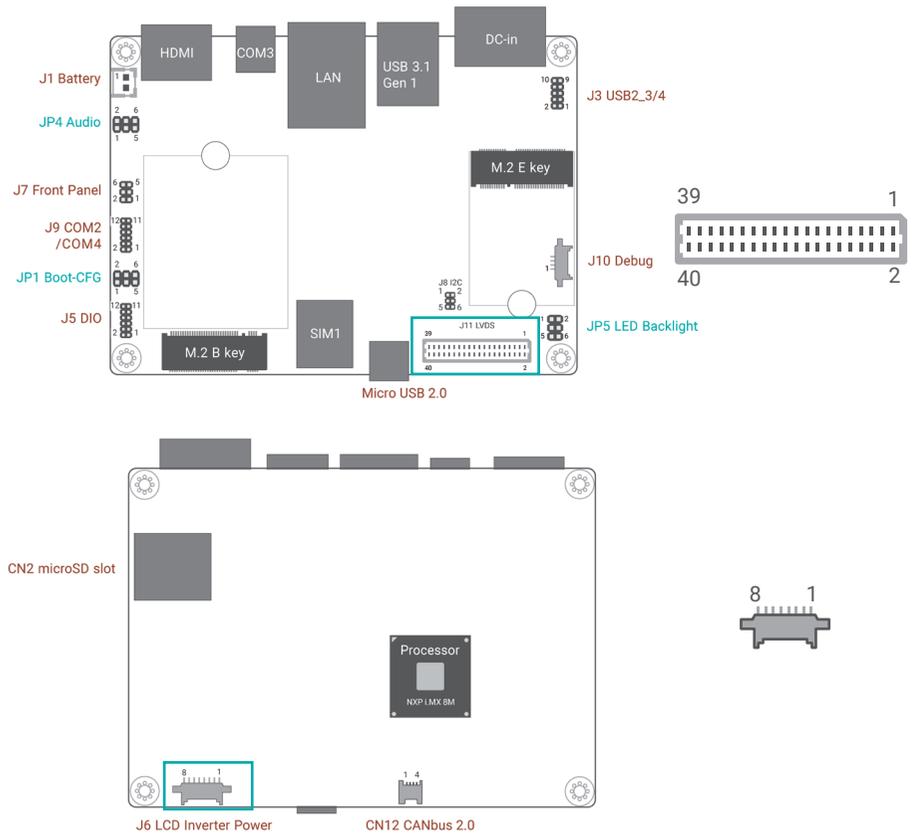Refer to the next page for the pin functions of these connectors.

■ **J11 LVDS**

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_Panel_3V3	36	+VDD_Panel_5V
37	+VDD_Panel_3V3	38	+VDD_Panel_5V
39	+VDD_Panel_3V3	40	+VDD_Panel_5V

■ **J6 LED Backlight Driving**

Pin	Function
1	VLED_12V / 5V (JP5 Switch)
2	VLED_12V / 5V (JP5 Switch)
3	VLED_12V / 5V (JP5 Switch)
4	GND
5	GND
6	Backlight On / Off
7	GND
8	Backlight Dimming
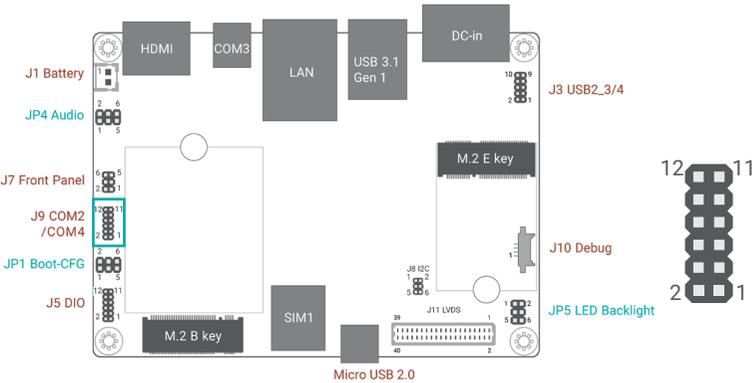
J9 COM2 / COM4

■ J9 COM2 / COM4

Pin	Function	Pin	Function
1	SINN2	**2**	RTSN2
3	SOUTN2	**4**	CTSN2
5	GND	**6**	GND
7	DCDN4	**8**	SINN4
9	RTSN4	**10**	SOUTN4
11	CTSN4	**12**	DTRN4

▶ **Internal I/O Connectors**

J7 Front Panel
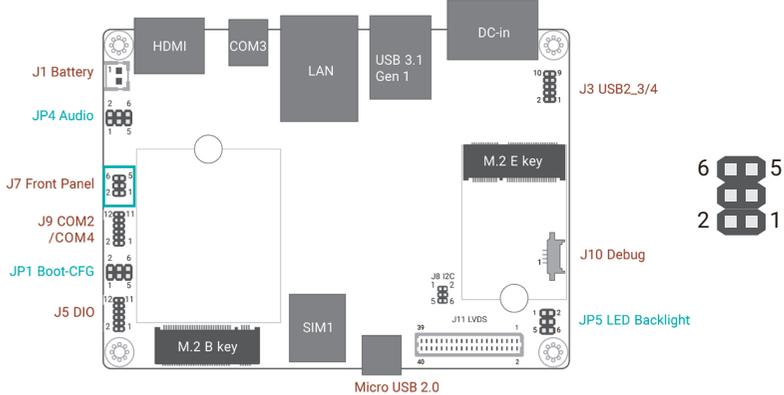
The front panel pin links to these functions below:

Power Button

This switch is used to power on or off the system.

Reset Button

This switch allows you to reboot without having to power off the system.

Power_LED

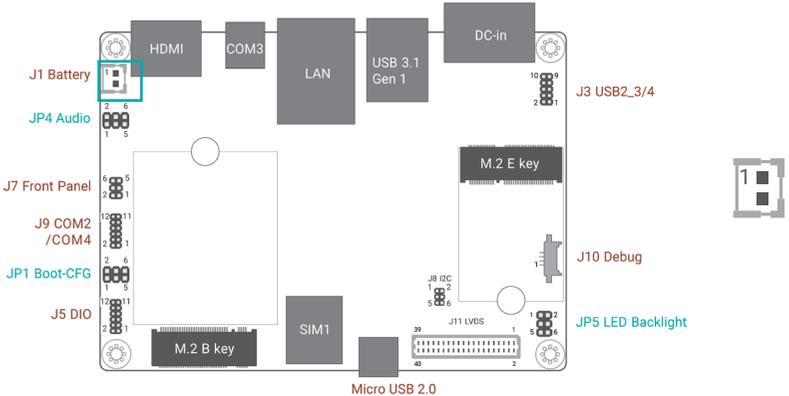This LED indicates power status.

■ J7 Front Panel

Pin	Function	Pin	Function
1	ONOFF_BTN#	**2**	FP_LED_3.3V
3	GND	**4**	FP_PWM_3.3V
5	SYS_nRST	**6**	FP_RSV_BTN#

J1 Battery

The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

•   Danger of explosion if battery incorrectly replaced.

•   Replace only with the same or equivalent type recommend by the manufacturer.

•   Dispose of used batteries according to local ordinance.

•   The adhesive tape on the battery is used for flexible positioning. Its lifetime may be shrunk if exposed to high temperature.

Connect to the
battery connector

■ J1 Battery

Pin	Function	Pin	Function
1	+VBAT	2	GND
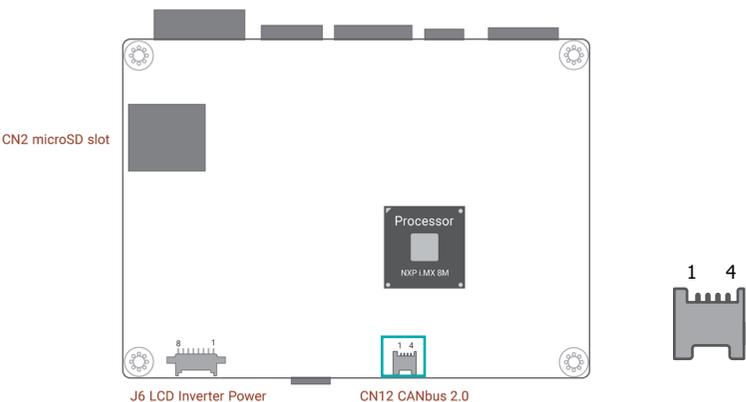
CN12 CANbus 2.0
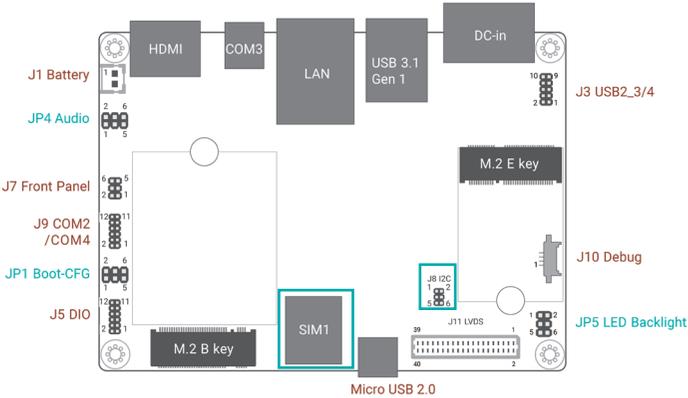

The CAN bus (Controller Area Network) connector is used for interconnecting electronic control units (ECUs).

■ CN12 CANbus

Pin	Function
1	+VDD_CAN
2	CAN1H
3	CAN1L
4	GND

▶ **Expansion Slots**

SIM Slot / I2C Connector

SIM Slot

The SIM slot on the system board is used to insert a SIM card and can be used in conjunction with the Mini PCI Express slot to provide mobile communication capability.

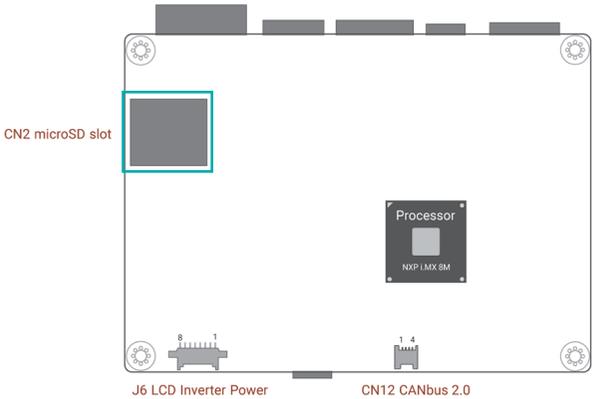### I2C Connector

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

■ I2C Connector

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

microSD Socket



The microSD socket allows you to install a microSD card for the expansion of available storage.

Chapter 3 - Software User Guide

▶ Yocto OS - Flash Images into eMMC/SD card using UUU tool

1. **Must install necessary Windows drivers first** before flashing images by UUU tool.

• Unzip M8M051_YQ_x_y_nnn_yymmdd_0000_LPDDR4GB.zip image package

• See Quick Note in this file (UUU_Flash_Image_Guide_Yocto25_M8M051_Vn.m.docx)

2. Before flashing images into M8M051 device via UUU tool, user must configure BOOTCNFG to BOOT Type as Serial Download mode by plugging one jumper into JP1 shorting pin1 and pin2.

3. See the pictures shown as below.
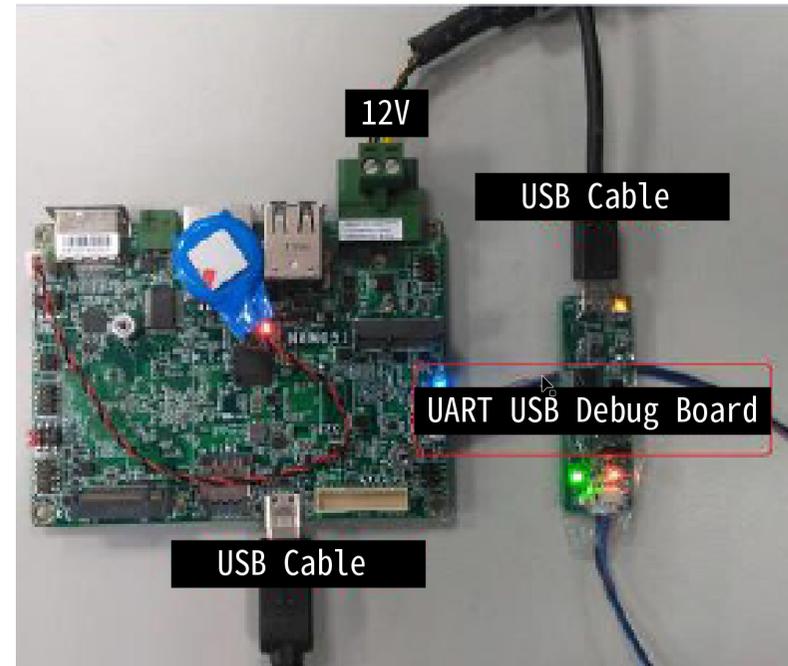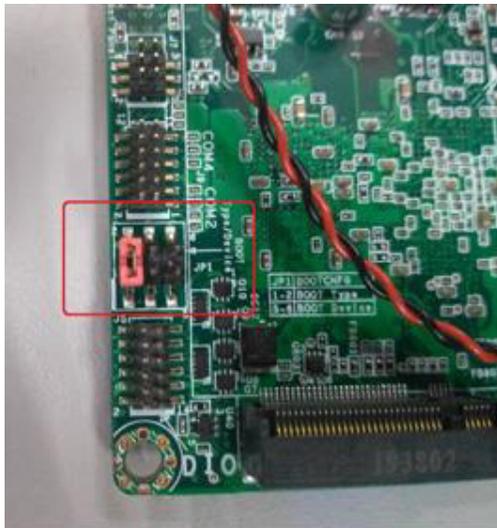
4. Connect M8M051 with PC via UART-USB debug board and USB cable for showing debug log at the terminal
• Connect M8M051 with PC via MicroUSB cable for flashing image
• Power on M8M051 (The adapter output voltage is 12V)

5.
• Open the Command Prompt in Windows, or open the Terminal in Ubuntu after necessary preparations are done
• Enter image release folder
• Execute the following command, then wait for process complete

For Windows:
Flash all images into eMMC

>uuu uuu_emmc_M8M051_uboot-kernel-rootfs.uuu
Flash necessary images except rootfs image into eMMC
>uuu uuu_emmc_M8M051_uboot-kernel.uuu

Flashing tool logs in Windows:
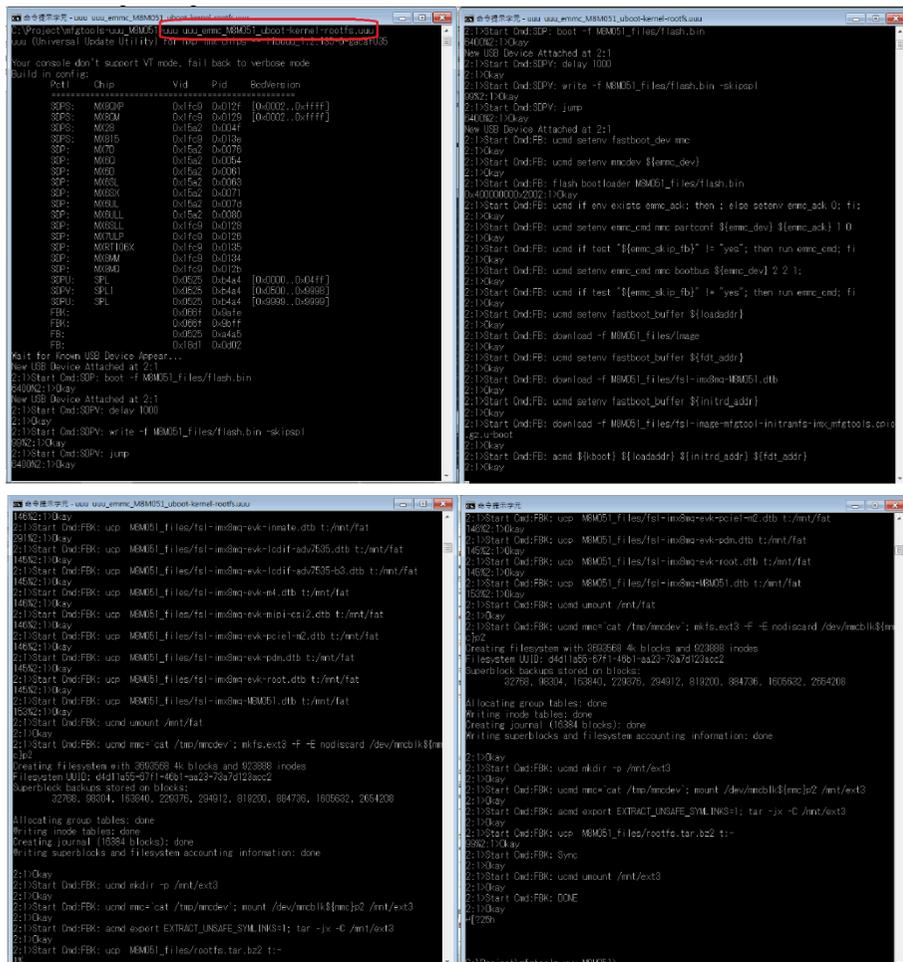
Sometimes, UUU flashing process might FAIL, because Windows are runtime installing necessary drivers. User can see the following processes be executed when flashing images into M8M051 device.

User must make sure necessary Windows drivers are installed, then the processes can complete automatically, or user can't flash images via UUU tool successfully.

- Execute UUU flashing process again after each following driver installation process completes.

For Ubuntu:
$ sudo ./uuu uuu_emmc_M8M051_uboot-kernel-rootfs.uuu
$ sudo ./uuu uuu_emmc_M8M051_uboot-kernel.uuu

6.
- Turn off the device after flashing process completes
- Switch BOOTCNFG to BOOT Device, also alleged Normal mode, by removing all jumpers from JP1

7. Turn on the device

[Quick Note]
From UUU.pdf (M8M051_YQ_x_y_nnn_yymmdd_00000_LPDDR4GB.zip\mfg-tools-uuu_M8M051\)

▶ Windows winusb driver install for Windows UUU tool

7.1 Background (Mandatory to flash image in Windows)

Find necessary files in the image release folder (\mfgtools-uuu_M8M051\)

7.2 Install updated winusb inf file (Mandatory to flash image in Windows)

- Unzip winusb.zip to \mfgtools-uuu_M8M051\
- Run install.bat with administrator permission
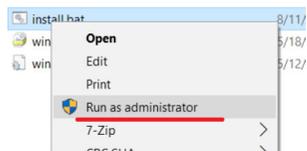
- Wait for the success message to show.
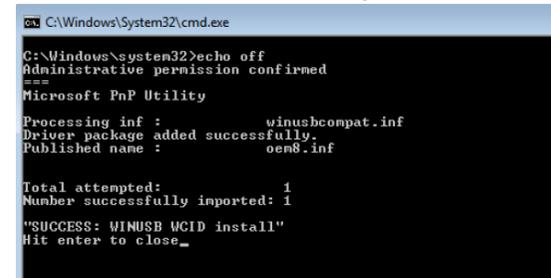
7.3 Use zadig to install winusb driver (Mandatory to flash image in Windows)

Following method can be applied if above methods failed.

- Run \mfgtools-uuu_M8M051\zadig-2.4.exe and click Install WCID Driver.
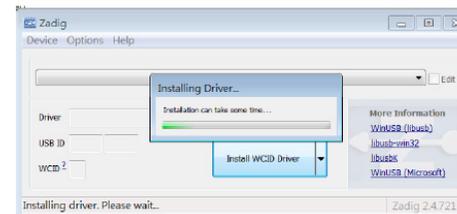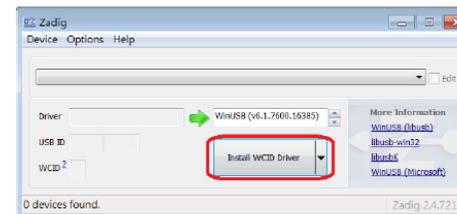
- Reboot Windows after drivers installed, windows will install necessary USB download gadget driver.

▶ Flash image into SD card

8.1 Insert SD card to device

8.2 SD boot mode configuration change

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

8.3 SD card flash commands in Ubuntu:

Flash u-boot/kernel/rootfs images:

$ sudo ./uuu uuu_sdcard_M8M051_uboot-kernel-rootfs.uuu

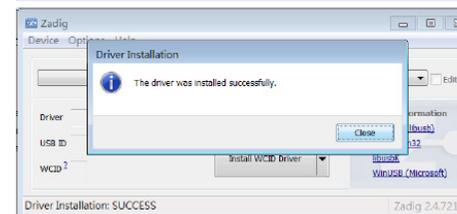Flash u-boot/kernel images:

$ sudo ./uuu uuu_sdcard_M8M051_uboot-kernel.uuu

8.4 SD card flash commands in windows:

Flash u-boot/kernel/rootfs images:

> uuu uuu_sdcard_M8M051_uboot-kernel-rootfs.uuu

Flash u-boot/kernel images:

> uuu uuu_sdcard_M8M051_uboot-kernel.uuu

8.5 SD boot mode configuration change

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

▶ **Android OS - Flash Images into eMMC/SD card using UUU tool**

1. Before flashing images into M8M051 device via UUU tool, user must configure BOOTCNFG to BOOT Type as Serial Download mode by plugging one jumper into JP1 shorting pin1 and pin2
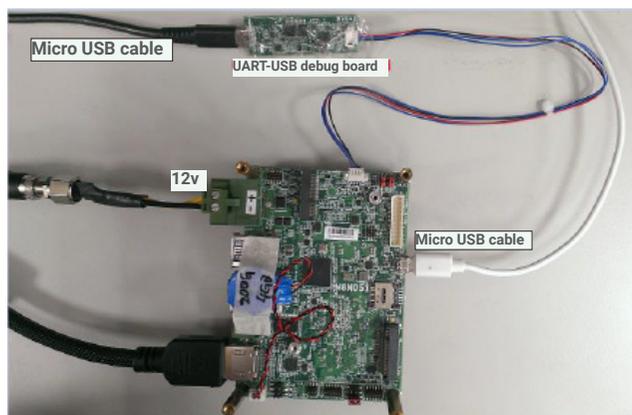
2. See the pictures shown as below

3. • Connect M8M051 with PC via UART-USB debug board and USB cable for showing debug log at the terminal
   • Connect M8M051 with PC via MicroUSB cable for flashing image
   • Power on M8M051 (The adapter output voltage is 12V)

4. • Open the Command Prompt in Windows, or 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
$ sudo ./uuu_imx_android_flash_hdmi.sh -f imx8mq -a –e (for HDMI panel image) $ sudo ./uuu_imx_android_flash_lvds.sh -f imx8mq -a –e (for LVDS panel image)

For Windows:

>uuu_imx_android_flash_hdmi.bat -f imx8mq -a –e (for HDMI panel image)
>uuu_imx_android_flash_lvds.bat -f imx8mq -a –e (for LVDS panel image)

P.S. M8M051 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, by removing all jumper from JP1

6. Turn off the device

▶ Software Features

General Support List

(*) is depended on the NXP support.

Component	Name	Base-Line Feature
General	OS Support	Yocto 2.5 (Default Preloaded on eMMC), Kernel 4.14.98 Android 9.0, Kernel 4.14.98
Misc	Firmware Upgrade (*)	NXP uuu firmware update tool
	Utilities (*)	Hardware diagnostic utilities

Linux AP/API Support List

(*) is depended on the NXP support.

Component	Description	Detail	Release Schedule
Linux	Yocto 2.5 Kernel 4.14.98	It's an open-source project that delivers a set of tools that create operating system images for embedded Linux systems. Support Wayland demo image only (*).	2021, Q1
Linux AP/API	NXP iMX8M Yocto 2.5 BSP Support Wayland Window Support BitBake build tool	1. All library and utility should support (*). 2. Source code package (support by request).	2021, Q1
	Support I2C, Watchdog, GPIO, LVDS brightness control	Provide support console for i.MX8M platform.	2021, Q1
Android	Android 9.0 - Kernel 4.14.98	Support Demo image.	2021, Q3
Android AP/API	NXP iMX8M Android 9.0 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).	2021, Q3
	Support GPIO, LVDS brightness control	Provide support console for i.MX8M platform.	2021, Q3

Yocto Support List

(*) is depended on the NXP support.

Component	Support Status
Yocto Version	2.5
Kernel Version	4.14.98
Window System	Wayland without QT5 build
eMMC	Support eMMC boot , eMMC v5.1, Linux ext4 file system
HDMI Video output	Support single display function, need to plug in HDMI cable before power on, resolution 4K@60. Support single display function.
LVDS Panel	Support Panel: AM-1024600DTZQW Support single display function.
LVDS Backlight (PWM)	Support control by Linux device node, level value 0~100.
I2C Touch	Support Touch: ILI2301S+ILIM2V.
Ethernet LAN1	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP. Support writeable MAC address (In eMMC). Support Iperf3 bandwidth test tool (Not build-in).
Micro USB 2.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem.
Micro USB 2.0 Device	1. Support connects to PC to update image by NXP iMX.8M uuu tool.
TYPE A USB 3.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage by "mount" console command, EXT3/EXT4/FAT filesystem.
I2S-Audio	1. Support system sound output to LINE OUT Connector. 2. Support adjusts sound volume by console command. 3. Support audio plays console command for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality. 4. Support audio recording console command for test recording WAV file with Mono MIC_IN audio, file store to eMMC.
M.2 2242/3042 B key	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. 4GLTE module: Quectel EM06

M.2 2230 E key	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. WiFi/BT module: RTL8822CE
UART1 - RS232 (Debug serial port)	Support output Linux Uboot and kernel debug log, use PC serial terminal tool read log (ex. PuTTY), BR 115200.
UART2 - RS232	For M.2 Support DTE mode, BR 115200 with CTS/RTS follow control loopback test, BR 115200 (need DFI Linux user space utility).
UART3 - RS485	Support Loopback test, BR 115200 (need DFI Linux user space utility).
UART4 - RS232	Support DTE mode, BR 115200 with CTS/RTS follow control loopback test, BR 115200 (need DFI Linux user space utility).
UART4 - RS422	Support Loopback test, BR 115200 (need DFI Linux user space utility).
UART4 - RS485	Support Loopback test, BR 115200 (need DFI Linux user space utility).
DIO	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.
DIO-PWM	Support control by Linux device node.
CAN Bus	Support "cansend", "candump" console commands for test send/read data.
Micro SD Card (SD slot)	Support SD card boot, support SD storage, EXT4/EXT3/FAT filesystem. (Support Kingston, micro SDHC 4GB class 4, 4GB/16GB). For standard product, We don't porting any SDIO module.
Reset / Power on Key	HW control.
I2C-RTC	Support Linux "date -s"and "hwclock -w" console commands to set system time.
I2C-Thermal sensor	Support read device temperature (degrees C) by Linux device node.
Play Video	Support play 4K MPEG4 H.264 and H.265 file (use NXP gstreamer tool).
Watch Dog	Support NXP utility "wdt_driver_test.out"(*) to test Watch Dog reboot function.
Secure Boot	Support(Option)
OS Suspend	Not support suspend.
Package manager	N/A, For standard product, We didn't build in package manager.

Wifi /BT	Support WiFi/BT module: RTL8822CE 1. RTL8822CE WiFi: Support Wifi STA Mode (connect Wifi AP), use ifconfig, wpa_supplicant console commands, use ping console commands verify WiFi function. Soft AP Mode option. 2. RTL8822CE BT: Support files transfer protocol only (BT OBEX protocol), use obexctl console commands.
LTE and SIM slot	Support 4GLTE module: Quectel EM06 Support data-link only, use ping console commands verify function.
Image Size	1. flash.bin : Around 1.05 MB 2. Image: Around 25.1 MB 3. rootfs.tar.bz2: compressed: Around 481 MB
Free storage size	Around 11.7 GB free space (eMMC size 16GB, around 2.3GB used of 14GB file system size, /dev/root)

Android Support List

(*) is depended on the NXP support.

Component	Support Status
Android Version	9.0
Kernel Version	4.14.98
eMMC	Support eMMC boot , eMMC v5.1, Linux ext4 file system
HDMI Video output	Support single display function, need to plug in HDMI cable before power on, resolution 4K@60. Support single display function.
LVDS Panel	Support Panel: AM-1024600DTZQW Support single display function.
LVDS Backlight (PWM)	Support control by Linux device node, level value 0~100.
I2C Touch	Support Touch: ILI2301S+ILIM2V.
Ethernet LAN1	Support "ping", "ifconfig" console commands verify, static IP/DHCP Dynamic IP. Support fixed MAC address (In eMMC). Support Iperf3 app (Not build-in).
Micro USB 2.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage with FAT32/Ext3/Ext4 filesystem.
Micro USB 2.0 Device	1. Support connects to PC to update image by NXP iMX.8M uuu tool.
TYPE A USB 3.0 HOST	1. Support USB HID Keyboard and Mouse Device. 2. Support USB Mass Storage with FAT32/Ext3/Ext4 filesystem.
I2S-Audio	1. Support system sound output to LINE OUT Connector. 2. Support adjusts sound volume by OS setting UI. 3. Support Music app for test play MP3/WAV file (16 bit, 44.1 kHz sample rate, CD quality. 4. Support sound recorder for test recording PCM file with Mono MIC_IN audio, file store to eMMC.
M.2 2242/3042 B key	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. 4GLTE module: Quectel EM06

Component	Support Status
M.2 2230 E key	Support "lspci" console command for check PCIe card status. Support "lsusb" console command for check PCIe card status. WiFi/BT module: RTL8822CE
UART1 - RS232 (Debug serial port)	Support output Linux kernel debug log, use PC serial terminal tool read log (ex. PuTTY), BR 115200.
UART2 - RS232	For M.2 Support DTE mode, BR 115200 with CTS/RTS follow control loopback test (need DFI Android test utility).
UART3 - RS485	Support Loopback test, BR 115200 (need DFI Android test utility).
UART4 - RS232	Support DTE mode, BR 115200 with CTS/RTS follow control loopback test (need DFI Android test utility).
UART4 - RS422	Support Loopback test, BR 115200 (need DFI Android test utility).
UART4 - RS485	Support Loopback test, BR 115200 (need DFI Android test utility).
DIO	Support read input high/low status, set output voltage high/low status, control by Linux device node, 8 pins.
DIO-PWM	Support control by Linux device node.
CAN Bus	Support "cansend", "candump" console commands for test send/read data.
Micro SD Card (SD slot)	Support SD storage with FAT32/Ext3/Ext4 filesystem. (Support Kingston, micro SDHC 4GB class 4, 4GB/16GB). For standard product, We don't port any SDIO module.
Reset / Power on Key	HW control.
I2C-RTC	Support Linux "date -s"and "hwclock -w" console commands to set system time.
I2C-Thermal sensor	Support read device temperature (degrees C) by Linux device node.
Secure Boot	Not Support
Wifi /BT	Support WiFi/BT module: RTL8822CE 1.RTL8822CE WiFi: Support Wifi STA and AP Mode 2.RTL8822CE BT: Support Bluetooth Tethering mode
LTE and SIM slot	Support 4GLTE module: Quectel EM06 Support data-link only.
Android Build Type	ENG Build without SELinux.
Android ADB	Support

Android Factory Reset	Support
Android Fastboot	Support
Android OTA	No Support
Android CTS	No Support
Android GMS/ GTS	No Support
Android Suspend	No support suspend, set never to suspend by default.
UART4 - RS485	Support Loopback test, BR 115200 (need DFI Android test utility).
Preload Android APPs	1. AOSP WebView Browser Tester: Browser APP. 2. AOSP Calculator: Calculator APP. 3. AOSP Calendar: Calendar APP. 4. AOSP Clock: Clock APP, support alarm wake-up. 5. AOSP Contacts: Function not ready. 6. AOSP Email: E-Mail APP. 7. AOSP Gallery: Gallery APP (JPEG). 8. AOSP Music: Play music APP (MP3). 9. AOSP Phone: Function not ready. 10. AOSP Settings: Android Settings APP. 11. AOSP Sound Recorder: Sound Recorder APP. Function not ready, preload for AOSP Audio module test in the future. 12. NXP Ethernet (*): Ethernet settings APP. 13. AOSP Files APP. 14. Cactus Player APP. 15. Camera APP. 16. Search APP.
Image Size	1. u-boot image: Around 1188 KB 2. boot image: Around 50 MB 3. recovery image: Around 7.5 MB 4. system image: Around 1195 MB
Free storage size	1. Data partition: Around 6.98 GB free space 2. System partition: Around 1410 MB free space 3. Cache partition: Around 2238 MB free space