



EMB-8MP-20

User's Guide

ARM-based Edge AI Computing System

NXP i.MX8M Plus ARM Cortex-A53 Processor, Rugged, Compact Box Computer

User Guide Rev. 1.0

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EMB-8MP-20 USER GUIDE

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CAUTION

Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Please follow the "General Safety Instructions" supplied with the system.

NOTICE

You find the most recent version of the "General Safety Instructions" online in the download area of this product.

Revision History

Revision	Brief Description of Changes	Date of Issue	Author
1.0	Initial Issue	2023-September-01	ykl

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Symbols

The following symbols may be used in this manual



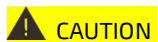
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



NOTICE indicates a property damage message.



CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title inform that the electronic box computers and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



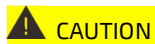
This symbol indicates general information about the product and the user guide. This symbol also indicates detail information about the specific product configuration.

For Your Safety

Your new Embedian product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Embedian product, you are requested to conform with the following guidelines.

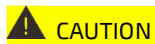
High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.



Warning

All operations on this product must be carried out by sufficiently skilled personnel only.



Electric Shock!



Before installing a non hot-swappable Embedian product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Special Handling and Unpacking Instruction

NOTICE

ESD Sensitive Device!

Electronic box computers and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.



Danger of explosion if the battery is replaced incorrectly.

- Replace only with same or equivalent battery type recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer's instructions.

General Instructions on Usage

In order to maintain Embedian's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Embedian and described in this user guide or received from Embedian Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific box computer version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Embedian aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements.

Disposal and Recycling

Embedian's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- Reduce waste arising from electrical and electronic equipment (EEE)
- Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- Improve the environmental performance of all those involved during the lifecycle of EEE



Environmental protection is a high priority with Embedian.

Embedian follows the WEEE directive

You are encouraged to return our products for proper disposal.

Declaration of Conformity

FCC

This equipment has been tested and found to comply with the limits for a Class A 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 commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

The products described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Packing List

Your product package should include the items listed below.

If any of the items below is missing, contact the seller from whom you have purchased the product.

Packing List
1 x EMB-8MP-20 Box Computer
1 x 12V 42W AC/DC WALL MOUNT ADAPTER

NOTICE

All most update user's manual and software source codes can be downloaded from Embedian's website. No printed or digital CD will be included.

Ordering Information

Part Number	Description
EMB-8MP-20	Box Computer, NXP i.MX 8M Plus Quad Core Arm Cortex-A53 processor, LPDDR4 4GB RAM, eMMC 16GB, 2 GigE LAN (with 1 TSN support), 3 USB3.0, 1 USB 2.0, 3 RS232, 1 RS422/485, 2 CAN FD, 1 HDMI, 1 Micro SD, 1 Nano SIM Socket, DC-IN 12V, with Yocto (Default) or Debian, 0~60° C
EMB-8MP-20-I	Box Computer, NXP i.MX 8M Plus Quad Core Arm Cortex-A53 processor, LPDDR4 4GB RAM, eMMC 16GB, 2 GigE LAN (with 1 TSN support), 3 USB3.0, 1 USB 2.0, 3 RS232, 1 RS422/485, 2 CAN FD, 1 HDMI, 1 Micro SD, 1 Nano SIM Socket, DC-IN 12V, with Yocto (Default) or Debian, -40°C~85° C
EMB-8MP-20-WIFI	EMB-8MP-20 with a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.3 and Antenna
EMB-8MP-20-I-WIFI	EMB-8MP-20-I with a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.3 and Antenna, -30°C-70°C
EMB-8MP-20-LTE	EMB-8MP-20 with 4G LTE and Antenna
EMB-8MP-20-I-LTE	EMB-8MP-20-I with 4G LTE and Antenna, -40°C-80°C

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Chapter 1

General Information

The information provided in this chapter includes:

- Introduction
- Features and Functionality
- Product View
- Product Variants
- Block Diagram
- Mechanical Drawing
- Software Installation and Support

Chapter 1 General Information

1.1 Introduction

This manual describes the EMB-8MP-20 quad-core ARM Cortex-A53 Edge AI box computing system. Powered by industrial-grade NXP i.MX8M Plus processor integrated with NPU (Neural Processing Unit), Embedian EMB-8MP-20 delivers powerful AI inferencing capabilities while allowing low power consumption, making it a perfect fit for Base Transceiver Stations, Irrigation Solutions, Smart Manufacturing and any AIoT/Industry 4.0 applications.

The EMB-8MP-20 is equipped with extensive I/O interfaces including 3 USB 3.0, 1 USB2.0, 2 GigE LAN, 3 RS232, 1 RS422/485, 1 mini USB, 1 Nano SIM card sockets, 2 antenna and optional GPIO and 2 CAN Bus for data acquisition and communication. Featuring small footprint dimensions (177.25mmx109.78mmx36.35mm), the EMB-8MP-20 is easy to integrate into space-limited applications.

To meet the challenges of IoT applications in fields, the EMB-8MP-20 supports fanless, -45°C to 85°C wide range operating temperature, and vibration and humidity resistance. The EMB-8MP-20 delivers industrial-grade reliability and is capable of withstanding harsh environments.

The use of this Users Guide implies a basic knowledge of PC hardware. This manual is focused on describing the EMB-8MP-20 box computer's special features and is not intended to be a standard PC textbook.

New users are recommended to study the hardware configurations stated in the last chapter before switching-on the power. Latest revision of this manual, datasheet, BSPs (Board Support Packages) can be downloaded from Embedian Web Page. All IO mappings to i.MX8M Plus that are especially usefully for software engineers are also described in this manual.

1.2 Features and Functionality

This box computer is based on the NXP's quad core ARM Cortex-A53 i.MX8M Plus processor. Board key features are:

- Processor: NXP i.MX8M Plus Quad ARM Core Cortex-A53 (Up to 1.8GHz)
- Memory:
 - Capacity and Technology: 4GB LPDDR4 4000MT/s (2GB or 6GB optional)
 - Flash: 16GB eMMC
 - EEPROM: 4M (to store box computer part number, revision number, serial number and MAC address)
- NPU: 2.3 TOPS Neural Network performance
- Display:
 - HDMI: 1 x HDMI 2.0a, up to 3840 x 2160 at 30Hz
- Graphic Engine
 - GC7000UL with 2D/3D Graphic Acceleration supporting 1G Pixel/s
 - OpenVG 1.1, OpenGL ES3.1, Vulkan, and OpenCL 1.2 FP
- H/W Video Codec:
 - Decoder: 1080p60 HEVC/H.265 Main, VP9 Profile 0/2, VP8, AVC/H.264 Baseline/Main/High
 - Encoder: 1080p60 AVC/H.264, HEVC/H.265
- 2 x Ethernet (RJ-45):
 - Chipset: NXP i.MX8M Plus integrated RGMII
 - One supports QoS with TSN
 - Speed: 10/100/1000 Mbps
 - PHY: Realtek RTL8211FD(I)-CG
- Watchdog Timer:
 - Chipset: TI TPS3828-33DBVR
 - 200ms timeout timer

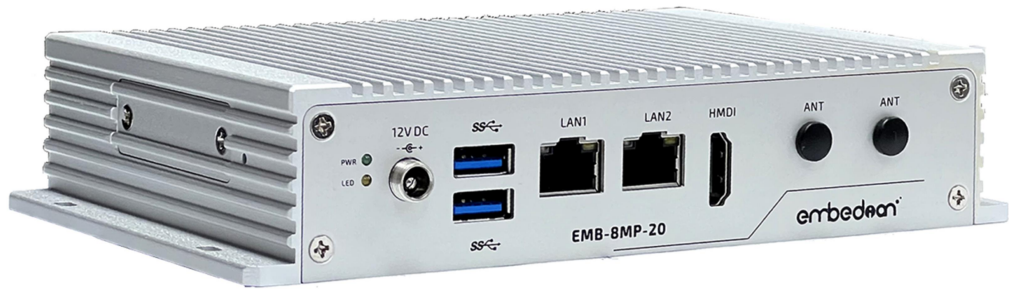
(Continued)

- TPM: TPM2.0 (ST33HTPH2X32AHE1)
- RTC: RTC Backup Battery

- Reset: 1 Reset Button
- IO:
 - USB: 3 x USB 3.1 Gen 1 Host (Type A), 1x USB client (Mini Type B), 1 x USB 2.0 Host (Type A)
 - Debug: 1 x UART as debug console (inside box)
 - 6 x GPIOs
 - 2 x CAN-FD
 - 3 x RS232s
 - 1 x RS422/485 (can be configured as RS232 as well)
 - SD Socket: 1 x Micro SD Card Socket
 - SIM Slot: 1 x Nano SIM Card Slot
- LED:
 - 1 x Green Power LED
 - 1 x Yellow User Programmable LED
- Power:
 - Power Supply Voltage: 12V DC-IN by lockable DC Jack
 - Power Consumption: 7.21 W
- Environment:
 - Operational Temperature: 0° ~ 60° C (Commercial) / -40° ~ 85° C (Industrial)
 - Operating Humidity: 5% ~ 95% Relatively Humidity, non-condensing
- Mechanical:
 - Dimensions: 177.25mmx109.78mmx36.35mm
 - Weight: 1.0Kg
- Operating System: Yocto, Debian and Android
- Certifications: CE/ FCC Class B

1.3 Product View

Figure 1: EMB-8MP-20 Product View (Front View)



(WiFi)

Figure 2: EMB-8MP-20 Product View (Rear View)



1.4 Product Variants

Embedian offers the EMB-8MP-20 in five different configurations.

Part Number	Description
EMB-8MP-20	Box Computer, NXP i.MX 8M Plus Quad Core Arm Cortex-A53 processor, LPDDR4 4GB RAM, eMMC 16GB, 2 GigE LAN (with 1 TSN support), 3 USB3.0, 1 USB 2.0, 3 RS232, 1 RS422/485, 2 CAN FD, 1 HDMI, 1 Micro SD, 1 Nano SIM Socket, DC-IN 12V, with Yocto (Default) or Debian, 0~60°C
EMB-8MP-20-I	Box Computer, NXP i.MX 8M Plus Quad Core Arm Cortex-A53 processor, LPDDR4 4GB RAM, eMMC 16GB, 2 GigE LAN (with 1 TSN support), 3 USB3.0, 1 USB 2.0, 3 RS232, 1 RS422/485, 2 CAN FD, 1 HDMI, 1 Micro SD, 1 Nano SIM Socket, DC-IN 12V, with Yocto (Default) or Debian, -40°C~85°C
EMB-8MP-20-WIFI	EMB-8MP-20 with a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.3 and Antenna
EMB-8MP-20-I-WIFI	EMB-8MP-20-I with a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.3 and Antenna, -30°C~70°C
EMB-8MP-20-LTE	EMB-8MP-20 with 4G LTE and Antenna
EMB-8MP-20-I-LTE	EMB-8MP-20-I with 4G LTE and Antenna, -40°C~80°C



Please contact Embedian sales person if you need other memory and flash configurations.

1.5 Mechanical Drawing

Overall system mechanical drawings are shown in the following figures.

Figure 3: Mechanical Drawing (Top View)

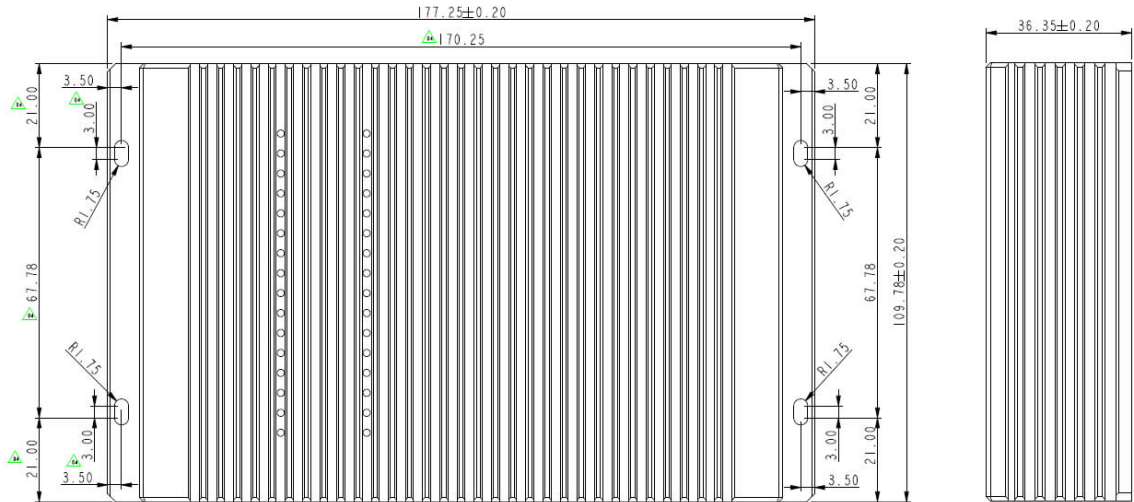


Figure 4: Mechanical Drawing (Bottom Cover)

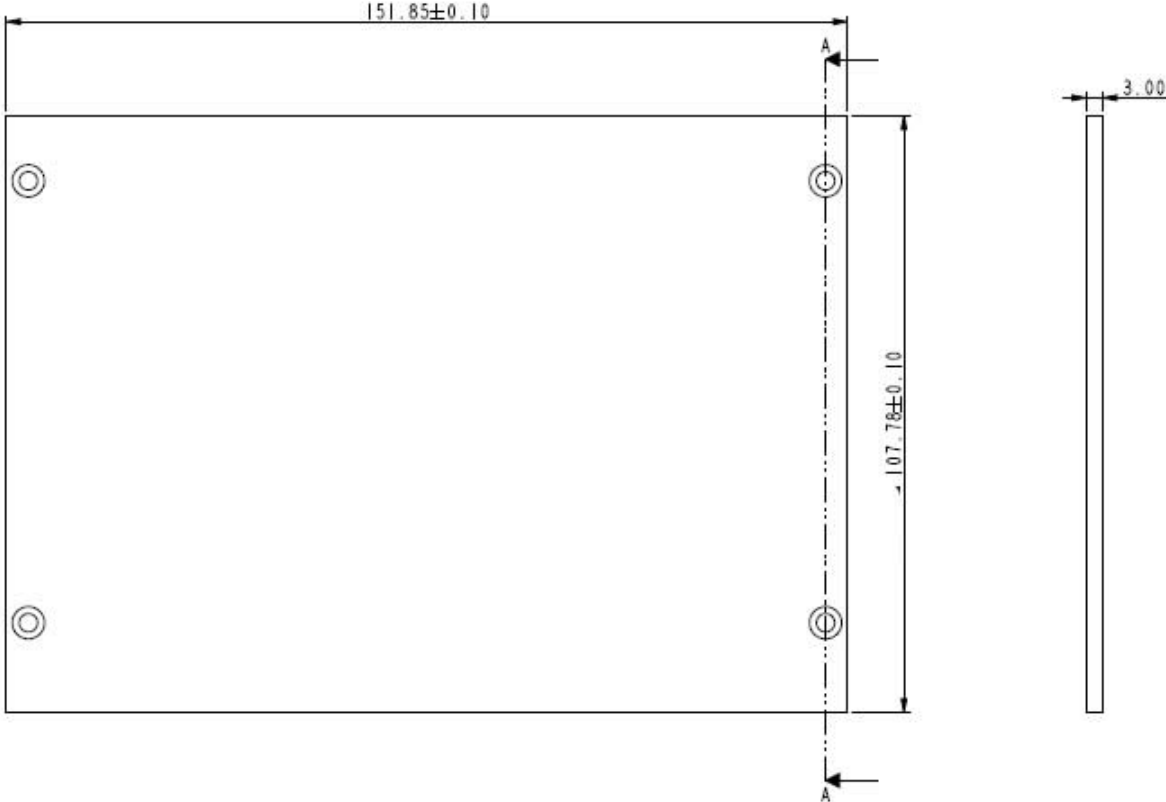


Figure 5: Mechanical Drawing (Front Bezel)

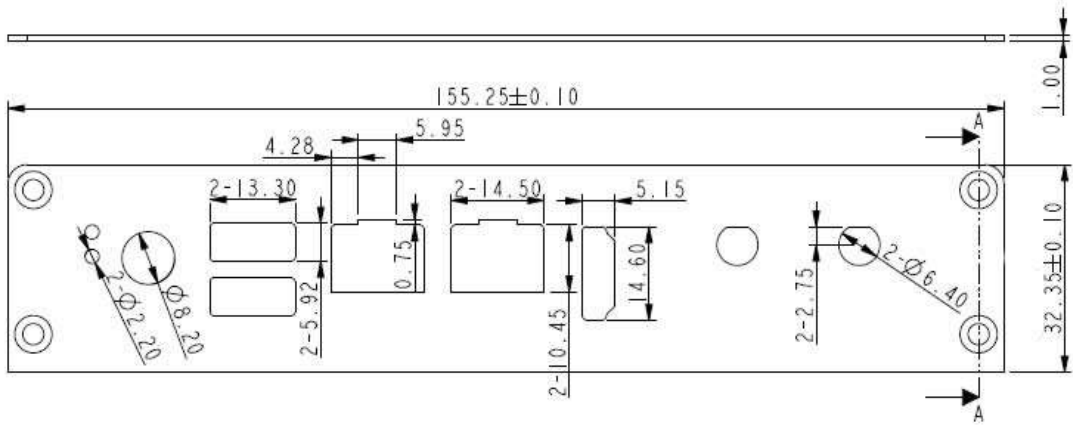
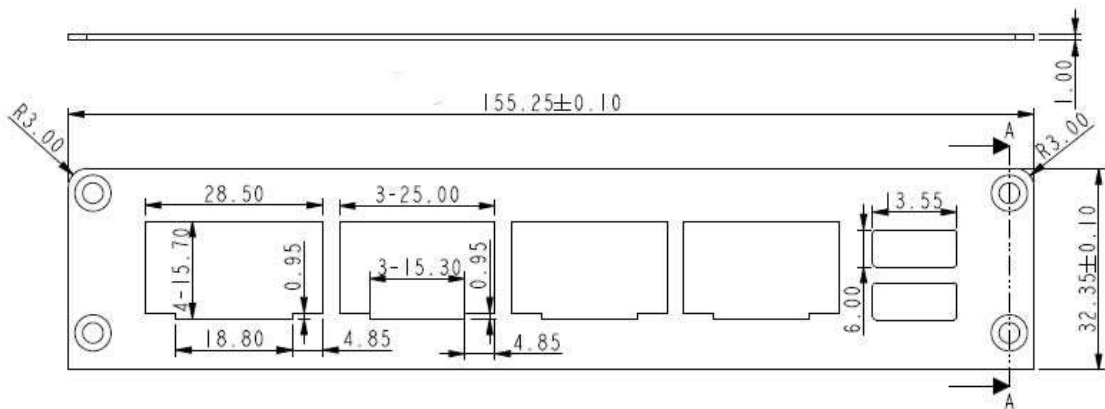


Figure 6: Mechanical Drawing (Back Bezel)



Embedian accepts customization if users need different IOs on back bezel for larger orders.

1.6 Software Installation and Support

Embedian supports and keeps updating the most recent BSP from NXP. All most update software source codes, build and installation instructions can be found at the development center on Embedian's website. Please also contact the sales person for the technical support windows.

Chapter 2

Coastline I/O Connectors and Functions

This Chapter gives coastline I/O connectors detail information. Section includes:

- Front Panel I/O Connectors and Functions
- Rear Panel I/O Connectors and Functions
- Side I/O Connectors and Functions

Chapter 2 Coastline I/O Connectors and Functions

Coast line panel I/O connectors of EMB-8MP-20 are described in this section.

2.1 Front Panel I/O Connectors and Functions

Most of the general connections to computer devices, such as Power, USB, LAN, HDMI display and LED indicators are placed on the front panel.

2.1.1 +12V Power Connector (12VDC)

Figure 7 +12V Power Connector

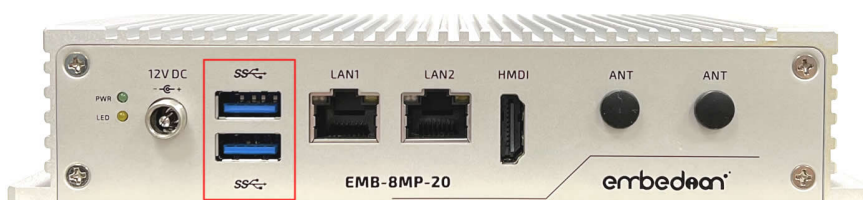


The EMB-8MP-20 operates with a 12 V DC +/- 10% power supply by a lockable 2.5mm DC Jack.

2.1.2 USB

EMB-8MP-20 box computer supports a dual-stacked USB3.0 type-A connector on front side. Both ports can reach 5 Gbps speed (Super Speed).

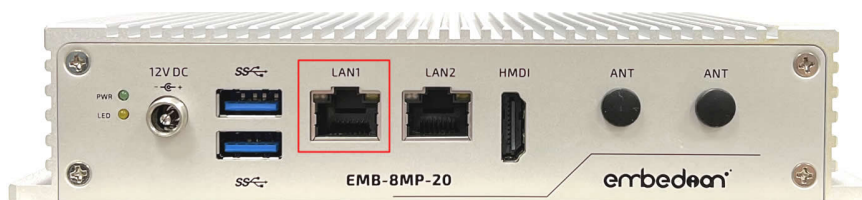
Figure 8 Dual-Stacked USB 3.0 Connector



2.1.3 LAN1 (Ethernet eth0)

LAN1 supports 10/100/1000 Mbit/s.

Figure 9 LAN1 Ethernet Connector RJ-45 Jack



2.1.3.1 LAN1 LEDs

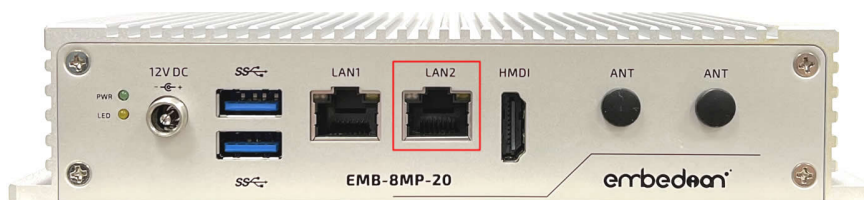
The LAN1 LED signals are described as follows.

	Description
Green	Off = no receive or transmit activities On = receive or transmit activity
Orange	Off = no link, 10/100Base-T Link On = 1000Base-T Link

2.1.4 LAN2 (Ethernet eth1)

LAN2 also supports 10/100/1000 Mbit/s. In addition to that, LAN2 also supports QoS with TSN.

Figure 10 LAN2 Ethernet Connector RJ-45 Jack



2.1.4.1 LAN2 LEDs

The LAN2 LED signals are described as follows.

	Description
Green	Off = no receive or transmit activities On = receive or transmit activity
Orange	Off = no link, 10/100Base-T Link On = 1000Base-T Link

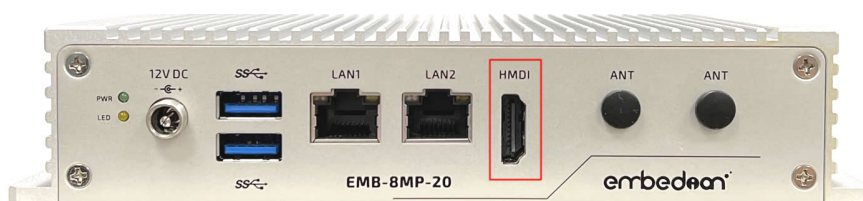
NOTICE

LAN2 also supports QoS with TSN. NXP offers sample codes and examples to support this feature.

2.1.5 HDMI

EMB-8MP-20 supports one HDMI instance. The HDMI is implemented directly from HDMI interface from NXP i.MX8M Plus processor.

Figure 11 HDMI Connector

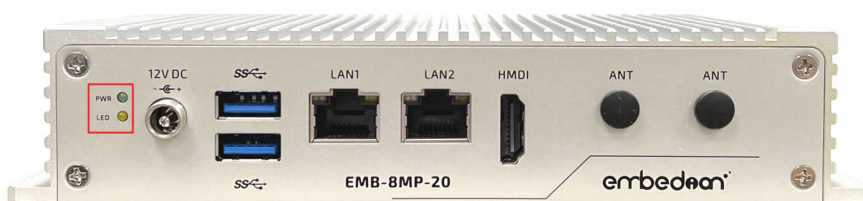


2.1.6 LED

The EMB-8MP-20 implements a bi-level yellow/green LEDs. One (green) indicates the power status and the other (yellow) is free for use by user defined. The default function of yellow LED is set "heartbeat".

2.1.6.1 LED Location

Figure 12 LED Location



2.1.6.2 LED Settings

The following tables describe the LED configurations. It is useful for software programmers.

LED				Description
Green				Show power status
Yellow	NXP i.MX8M Plus Processor			User Programmable
	Ball	Mode	Pin Name	
	AD8	ALT5	I2C4_SDA__GPIO5_IO21	

2.2 Rear Panel I/O Connectors and Functions

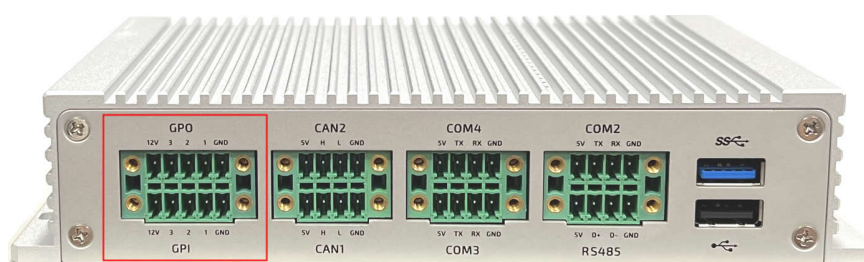
On the Rear panel side, there are GPIO, 2 CAN, RS232 and RS485 terminal blocks and one dual-stacked USB3.0/USB2.0 type-A connector.

2.2.1 (GPI+GPO)

(GPI + GPO) detail information is described in this section. A 5 Pos 3.5mm terminal block is used. The mating plug is Phoenix Contact P/N FMC15/5-STF-35 or compatible.

The GPIOs are designed in opposite polarity and are designed as an open drain (Note: not push pull). This means the pull-ups should be on client side. When served as input pins, 2.5V-24V will be treated as one state and -24V-1V will be treated as the other state. If input voltage between 1-2.5V, it will be treated as unknown state. When served as output pin, the working voltages are [3.3V-24V@20mA](#) and sink rate is 24V 20mA. A pull-up is necessary at the device side when serve as output function (open-drain without pull-up).

Figure 13 (GPI + GPO) Connector

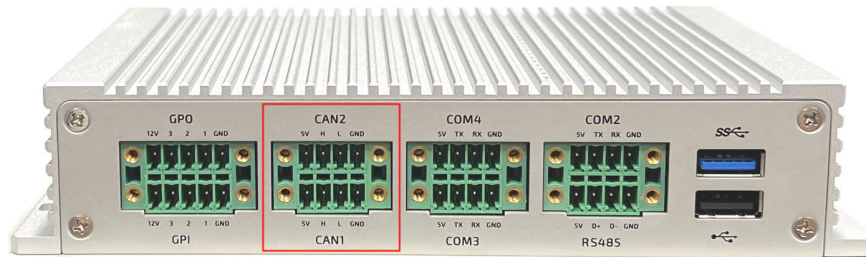


pin	GPI				pin	GPO			
	Signal	NXP i.MX8M Plus Processor				Signal	NXP i.MX8M Plus Processor		
		Ball	Mode	Pin Name			Ball	Mode	Pin Name
1	GND				2	GND			
3	EXT_IN1#	F6	ALTO	GPIO1_I007__ GPIO1_I007	4	EXT_OUT1#	A7	ALTO	GPIO1_I000__ GPIO1_I000
5	EXT_IN2#	A8	ALTO	GPIO1_I008__ GPIO1_I008	6	EXT_OUT2#	E8	ALTO	GPIO1_I001__ GPIO1_I001
7	EXT_IN3#	B8	ALTO	GPIO1_I009__ GPIO1_I009	8	EXT_OUT3#	A3	ALTO	GPIO1_I006__ GPIO1_I006
9	+V12_DIO				10	+V12_DIO			

2.2.2 (CAN1+CAN2)

(CAN1 + CAN2) detail information is described in this section. A 4 Pos 3.5mm terminal block is used. The mating plug is Phoenix Contact P/N FMC15/4-STF-35 or compatible.

Figure 14 (CAN1+CAN2) Connector

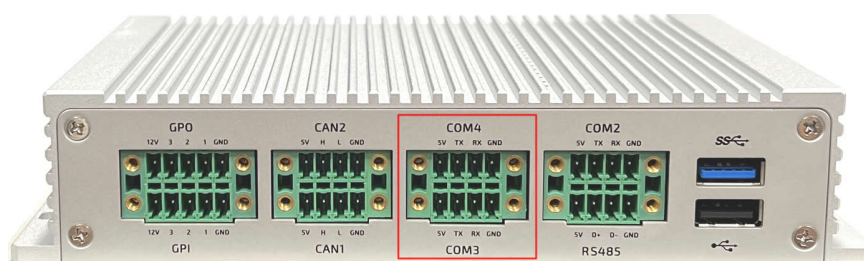


pin	CAN1		pin	CAN2	
	Signal	Description		Signal	Description
1	GND	Ground Power	2	GND	Ground Power
3	CAN1_D-	CAN1 Signal Low	4	CAN2_D-	CAN2 Signal Low
5	CAN1_D+	CAN1 Signal High	6	CAN2_D+	CAN2 Signal High
7	+V5_OUT	5V Power	8	+V5_OUT	5V Power

2.2.3 (COM3+COM4)

(COM3 + COM4) detail information is described in this section. A 4 Pos 3.5mm terminal block is used. The mating plug is Phoenix Contact P/N FMC15/4-STF-35 or compatible.

Figure 15 (COM3+COM4) Connector



pin	COM3 (RS232)		pin	COM4 (RS232)	
	Signal	Description		Signal	Description
1	GND	Ground Power	2	GND	Ground Power
3	COM3_RXD	COM3 Receive Data	4	COM4_RXD	COM4 Receive Data
5	COM3_TXD	COM3 Transmit Data	6	COM4_TXD	COM4 Transmit Data
7	+V5_OUT	5V Power	8	+V5_OUT	5V Power

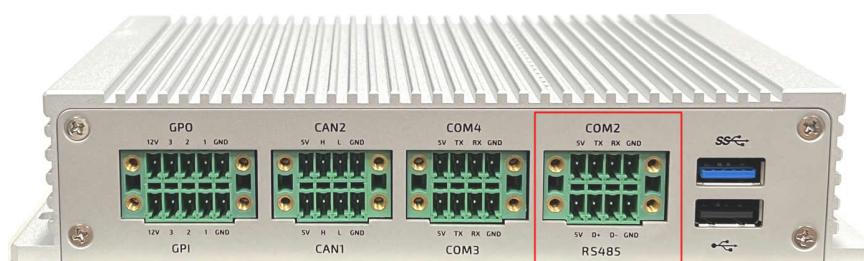
NOTICE

The device descriptor for COM3 is /dev/ttyUSB0 and for COM4 is /dev/ttyUSB1. They are implemented by an USB 2.0 to dual UARTs bridge from FDTI FT2232HQ.

2.2.4 (RS485+COM2)

(RS485 + COM2) detail information is described in this section. A 4 Pos 3.5mm terminal block is used. The mating plug is Phoenix Contact P/N FMC15/4-STF-35 or compatible.

Figure 16 (RS485+COM2) Connector



pin	RS485		pin	COM2 (RS232)	
	Signal	Description		Signal	Description
1	GND	Ground Power	2	GND	Ground Power
3	RS485_D-	RS485 Data-	4	COM2_RXD	COM2 Receive Data
5	RS485_D+	RS485 Data+	6	COM2_TXD	COM2 Transmit Data
7	+V5_OUT	5V Power	8	+V5_OUT	5V Power

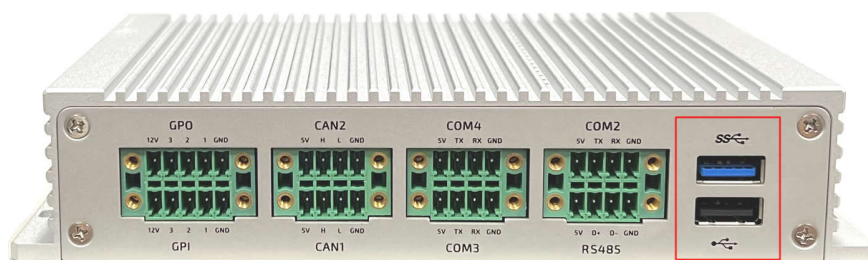
NOTICE

The device descriptor for RS485 is `/dev/ttymx1` and for COM1 is `/dev/ttymx2`.

2.2.5 (USB3.0+2.0 dual-stacked type A)

EMB-8MP-20 box computer supports one dual-stacked USB3.0+2.0 type A connector.

Figure 17 Dual-Stacked USB 3.0+2.0 Type A Connector



2.3 Side I/O Connectors and Functions

Reset button, USB client, nano SIM card and microSD card holders are designed at the side. To prevent from users can easily access USB client port, nano SIM and microSD cards, a cover needs to be taken off to access them.

2.3.1 Reset Button

Press reset button for three seconds and release it will reset the EMB-8MP-20 box computer.

Figure 18 Reset Button



2.3.2 Nano SIM Card Holder

A push-push nano SIM card holder is illustrated in the following figure. User need to remove the side cover first.

Figure 19 Take off the side cover



Figure 20 Nano SIM Card Holder



2.3.3 MicroSD Card Holder

A push-push microSD card holder is illustrated in the following figure. User need to remove the side cover first.

Figure 21 MicroSD Card holder



2.3.4 USB Client


EMB-8MP-20 box computer supports one USB mini Type B client port. It is especially useful if your OS is Android.

Figure 22 USB client



NOTICE

USB client port is shared with the rear panel USB3.0 host port. Only one function can be used. Default is set to rear panel USB 3.0 host. Details will be described in next chapter.

A graphic for Chapter 3, featuring the word "Chapter" in a bold, black, sans-serif font at the top, and a large, white, stylized number "3" centered below it. The entire graphic is set against a light gray rectangular background.

Chapter 3

Hardware Configuartions

This Chapter gives important information for developers. Section includes:

- Console
- Switches

Chapter 3 Hardware Configurations

This Chapter gives information for developers. Users need to remove the bottom cover first.

Figure 23 Remove four M3x6 screws from the bottom side



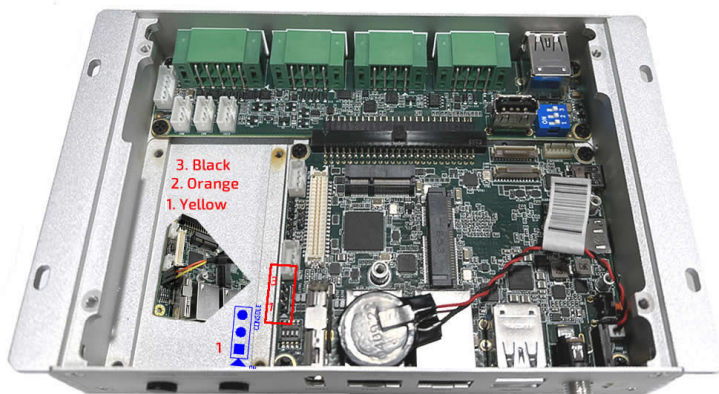
3.1 Console

EMB-8MP-20 uses 3-pin 2.54mm header as a debug port. This is the same Raspberry Pi. User can get the debug cable (P/N: TTL-232R-RPi) from Digikey or Mouser.

Figure 24 Console Debug Cable



Figure 25 CONSOL HEADER



CONSOLE: Debug UART Console Connector (3-pin 2.54mm Header)

pin	Signal	NXP i.MX8M Plus Processor			Description
		Ball	Mode	Pin Name	
1	UART4_TXD	AH5	ALT0	UART4_TXD__UART4_DCE_TX	UART Transmit Data
2	UART4_RXD	AJ5	ATL0	UART4_RXD__UART4_DCE_RX	UART Receive Data
3	GND				Ground

NOTICE

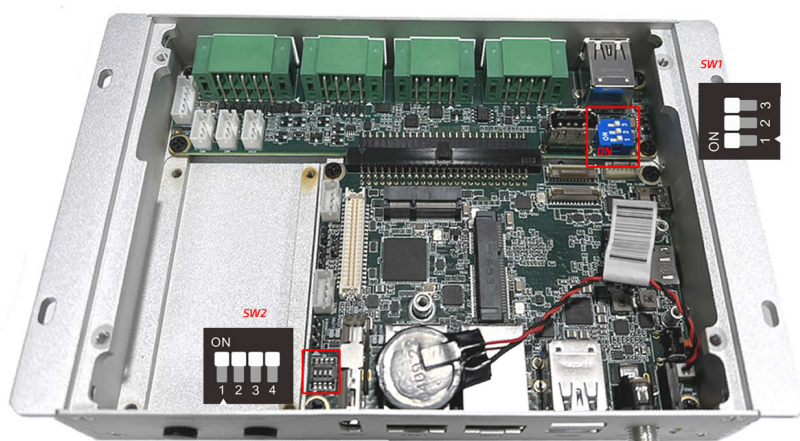
The mapping between the console header and console cable is as follows.

1. Yellow
2. Orange
3. Black

3.2 Switches

There are two switches inside EMB-8MP-20.

Figure 26 Switches




3.2.1 SW1

SW1 offers 120 ohm termination for RS485, CAN1 and CAN2 when switch to ON. Defaults are set to ON. Switch to OFF if users do not need terminations.

port	Function	ON/OFF	Description
1	RS485	ON	120 ohm termination
2	CAN1	ON	120 ohm termination
3	CAN2	ON	120 ohm termination

3.2.2. SW2

The following tables describe the switch configurations.


SW2	Setting			Function
Port 1-3	1	2	3	Boot Select
	ON	ON	ON	Boot from Micro SD card
	OFF	ON	OFF	Boot from eMMC flash (Default)

NOTICE

The first stage bootloader in the CPU ROM will read port 1 and port 2 configurations and decide where to load the second stage bootloader (u-boot). If (port 1, port 2) is set (ON, ON), it will load from micro SD card. If (port 1, port 2) is set (OFF ON), it will load from eMMC flash.

Once the second stage bootloader (u-boot) is loaded, it will read port 3 configuration and decide where to load the Linux kernel. If port 3 is set high, the u-boot will load Linux kernel from micro SD card. Otherwise, it will load Linux kernel from eMMC flash.

Default Yocto OS will be pre-installed in eMMC and port 1-3 is set to eMMC boot up. It is recommended to set to microSD boot up at development stage. Once everything is done, users can setup eMMC from microSD. (See Embedian development guide on site.) Embedian can also flash custom image at factory default with extra labor charge.

SW2	Setting	Function
Port 4	4	USB_ID
	ON	USB1_ID is low. Signals will go to USB3.0 on rear panel. (Default)
	OFF	USB1_ID is high. Signals will go to USB client on side panel.

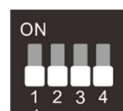
NOTICE

When port 4 of SW2 is set ON, the Linux device tree `dr_mode` of this node need to set as "host" (default). When port4 of SW2 is set to OFF, the Linux device tree `dr_mode` of this node need to set as "peripheral".

3.2.2.1 Setting Switches

You configure your board to match the needs of your application by setting switches.

The diagram in the left shows switches off.



The diagram in the left shows switches on.

