DFI EC900-8MM NXP i.MX8M Mini Processor Ruggedized Fanless Embedded System User Manual

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

provide the most updated information.

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.

About this Manual

This manual can be retrieved 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.

Contents

Warranty

1. Warranty does not cover damages or failures that arises 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.

About this 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 System unit
- 1 10-Pole Terminal Block for RS-422/4-bit DIO
- 1 2-Pole Terminal Block for RS-485
- 2-Pole Terminal Block for Power Input
- DIN Rail Bracket/Screw Pack
- Quick Installation Guide

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

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 Precautions

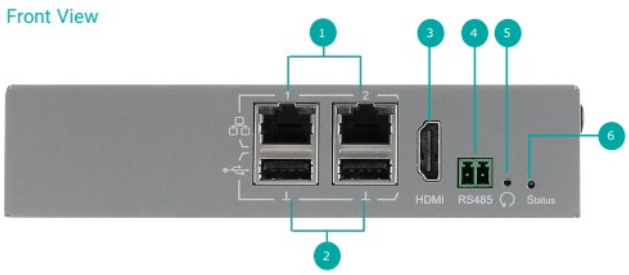
- Use the correct DC / AC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging in the power cord.
- There is danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent specifications of batteries recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humid environments.
- Make sure the system is placed or mounted correctly and stably to prevent the chance of dropping or falling may cause damage.
- The openings on the system shall not be blocked and shall be kept in distance from other objects to make sure of proper air ventilation to protect the system from overheating.
- Dress the cables, especially the power cord, so they will not be stepped on, in contact with high temperature surfaces, or cause any tripping hazards.
- Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and is compliant with the voltage and current ranges required by the system's electrical specifications.
- If the system is to be unused or stored for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the system.
    - The system has been exposed to moisture.
    - The system is not working properly.
    - The system is physically damaged.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the electricity outlet before cleaning. Use a damp cloth for cleaning the surface. Do not use liquid or spray detergents for cleaning.
- Before connecting, make sure that the power supply voltage is correct. The device is connected to a power outlet which should be grounded connection.

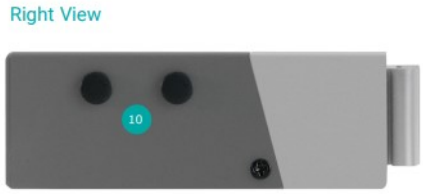
The system may burn fingers while running.
Wait for 30 minutes to handle electronic parts after power off.

Introduction

Overview

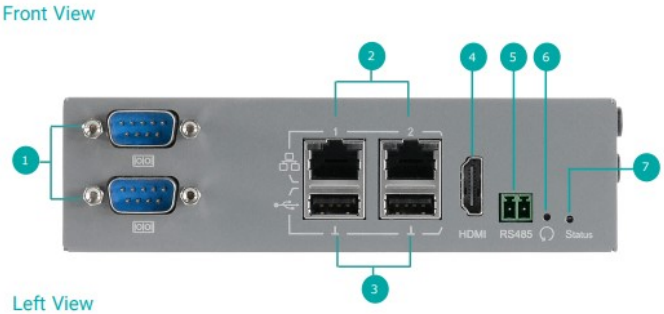
EC900-8MM

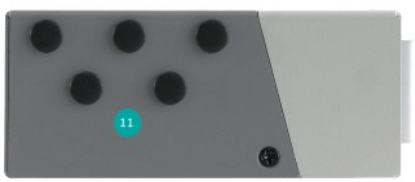




1. LAN 1 & LAN
2. USB 2.0
3. HDMI
4. COM (RS485)
5. Reset Button
6. Status LED
7. A terminal block:
   RS422 (4-pin)
   Digital IO (4-pin)
   Power (1-pin)
   Ground (1-pin)
8. DC IN
9. DIN-rail Mount
10. Antenna Hole

EC910-8MM





1. COM

2. LAN 1 & LAN
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10. DIN-rail Mount
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Specifications (EC900-8MM & EC910-8MM

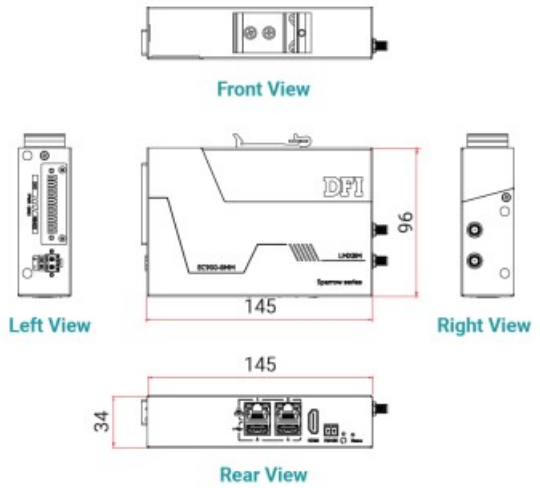
SYSTEM	Processor	I.MX8M mini Quad core, VPU/HDR10/GPU,1.6/1.8Ghz, Commercial temp
	Memory	LPDDR4 die size, up to 8GB (Default 1GB)
DISPLAY	Display	1 x HDMI HDMI: resolution up to 1920×1080 @ 60 Hz
	Single Display	HDMI
STORAGE	External / Internal	eMMC up to 64GB (Default 8GB) Micro-SD Card Socket
EXPANSION	Interface	1 x M.2, E key 2230 (PCIe/USB) 1 x M.2, B key 3052/2242(PCIe/USB) 1 x Nano SIM slot
ETHERNET	Controller	1 x ATHEROS Ethernet Controller RTL8211 (10/100/1000Mbps) 1 x Ethernet Controller (10/100/1000Mbps)
LED	Indicators	1 x Status LED
	Ethernet	2 x GbE (RJ-45)
		EC900-8MM : 1 x RS-485 (2-pole terminal block) 1 x RS-422 (10-pole terminal block)

I/O	Serial	EC910-8MM : 1 x RS-485 (2-pole terminal block) 1 x RS-422 (10-pole terminal block) 2 x RS-232 (DB9)
	USB	2 x USB 2.0 (type A)
	Display	1 x HDMI
	Button	1 x Power Reset Button
	Wi-Fi Antenna	2 x Antenna Hole
	DIO	4-bit DIO (10-pole terminal block)
INTERNAL I/O	USB	1 x USB 2.0 1 x OTG USB Type C
	Serial	EC910-8MM : 2 x RS-232
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
POWER	Type	Wide Range 9~36V
	Connector	2-Pole Terminal Block
OS SUPPORT	OS Support	Yocto 3.3, Kernel 5.10.72

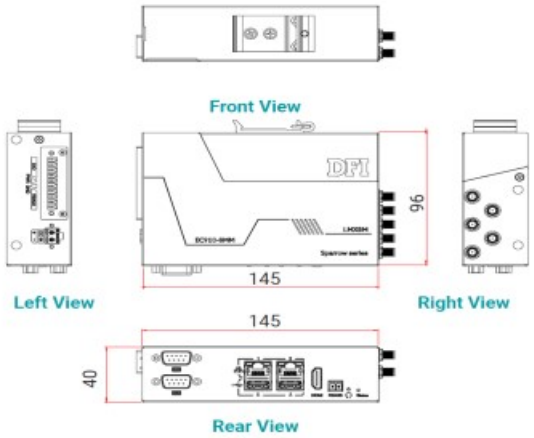
MECHANISM	Construction	I.MX8M mini Quad core, VPU/HDR10/GPU,1.6/1.8Ghz, Commercial temp
	Mounting	LPDDR4 die size, up to 8GB (Default 1GB)
	Dimensions (WxHxD)	EC900-8MM : 145mm x 34mm x 96.4mm EC910-8MM : 145mm x 40mm x 96mm
	Weight	EC900-8MM : 0.45kg EC910-8MM : 0.55kg
ENVIRONMENT	Operating Temperature	-20 to 60°C -40 to 70°C (available upon request)
	Storage Tem-perature	-40 to 85°C
	Relative Humidity	10 to 95% RH (non-condensing)
STANDARDS AND CERTIFICA-TIONS	Shock	Operating: 3G, 11ms Non-Operating: 5G, 11ms
	Vibration	Operating: Random 5~500Hz, IEC68-2-64 (3G) Non-Operating: Sine 10~500Hz, IEC68-2-6 (3G)
	Certifications	CE, FCC class A

Dimensions

EC900-8MM



EC910-8MM



Key Features

NXP i.MX8M Mini Platform:
Quad Core Max.1.8GHz

High Speed Memory Down:
LPDDR4 3200MHz

Multiple Expansions:
M.2 support, WiFi/BT, LTE, 5G

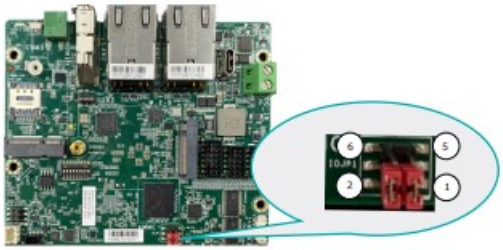
Rich I/O:
2 GbE LAN, 2 USB, 4bit DIO,RS422, RS485

Wide Voltage:
Support 9~36VDC

System Settings

Jumper Settings

IOJP1

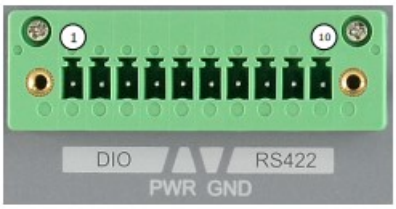


- 2-4 On: VCCP 5V
- 3-5 On: DIO 5V

- 1-3 On: DIO 3V3 (Default)
- 2-4 On: VCCP 3V3 (Default)

PIN Assignment

Digital I/O Connector

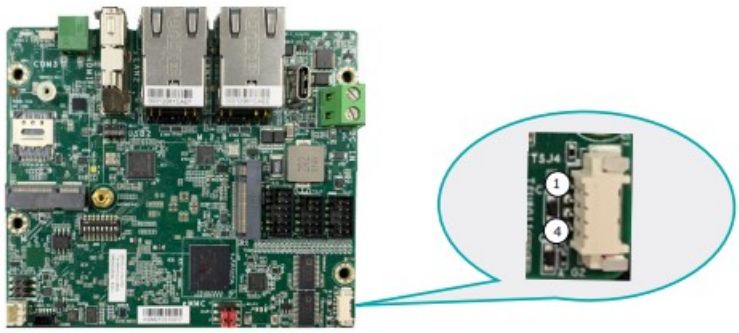


Pin	Assignment
1	D_IOA0
2	D_IOA1
3	D_IOA2
4	D_IOA3
5	RFU_PWR (3V3)
6	GND
7	TX-
8	TX+
9	RX+
10	RX-

COM (For EC910-8MM)

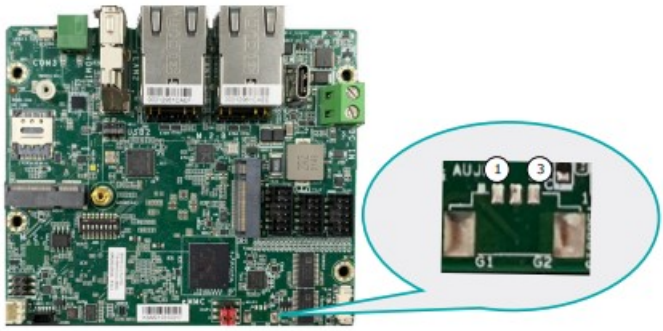
Pin	Assignment
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

12 RXTSJ4 Debug



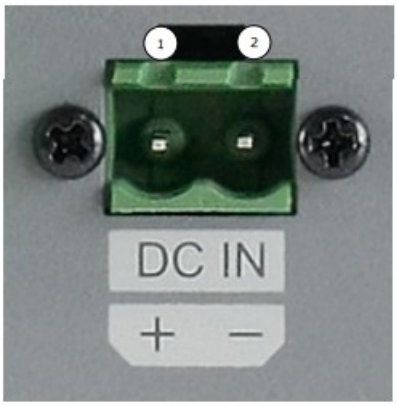
Pin	Assignment
1	3.3V
2	RX
3	TX
4	GND

AUJP1



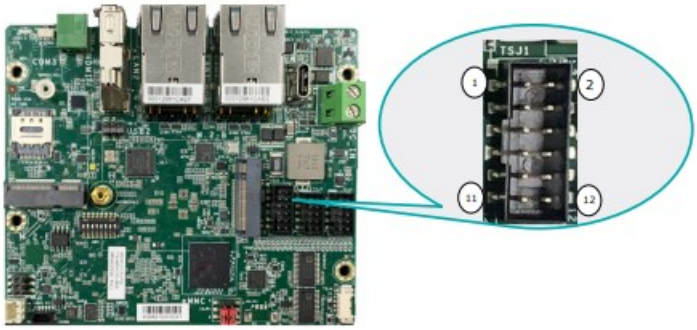
Pin	Assignment
1	LINE_OUTR
2	GND
3	LINE_OUTL

DCN1/DC Jack



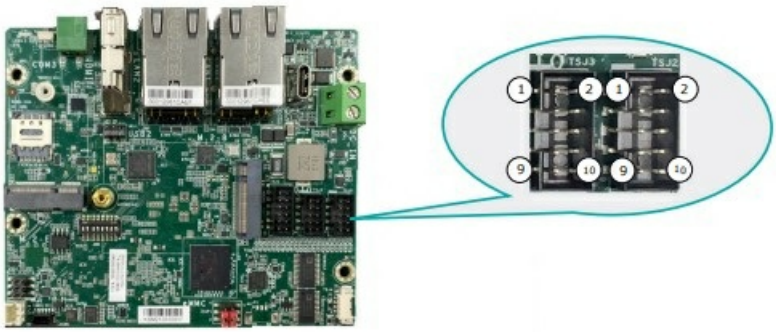
Pin	Assignment
1	**PWR**
2	**GND**

TSJ1/DIO



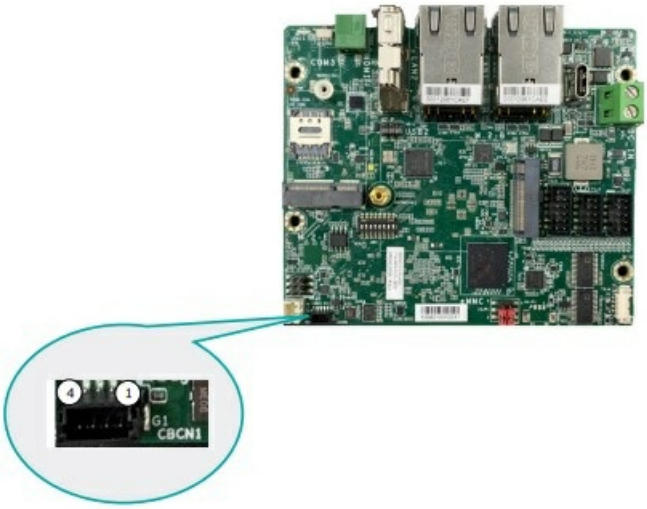
Pin	Assignment
1	DIO0
2	DUO1
3	DIO2
4	DIO3
5	GND
6	3V3
7	TX-
8	TX
9	RTS
10	RX+
11	CTS
12	RX-

TSJ2 & TSJ3 -RS232



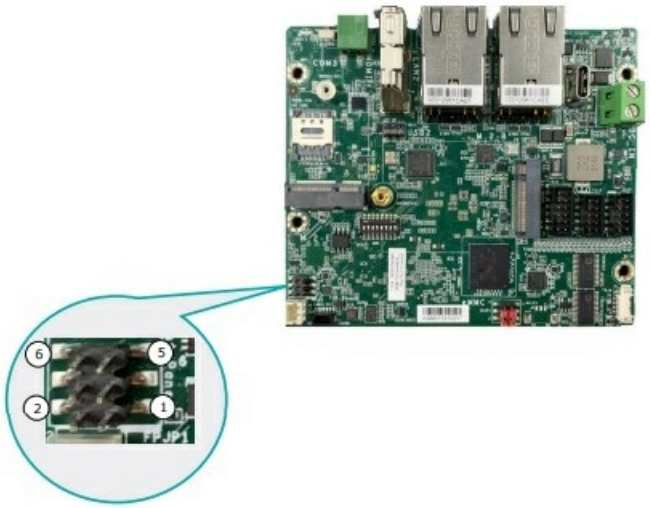
Pin	Assignment
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
10	NC

CBCN1/CAN



Pin	Assignment
1	3.3V
2	CANH
3	CANL
4	GND

FPJP1



Pin	Assignment
1	PSON
2	FP_LED_3.3V
3	GND
4	SYS_LED#
5	SYS_RST
6	SYS_ON/RSV_BTN

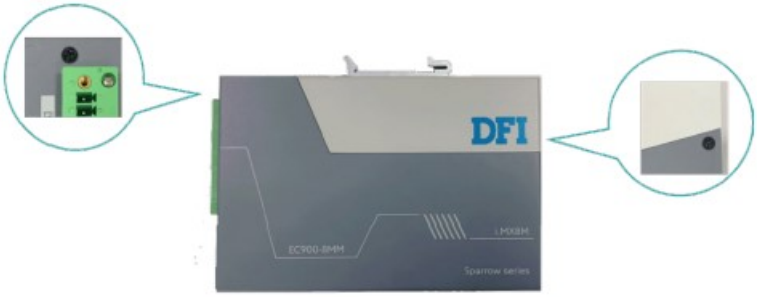
Hardware Installation

Removing the Chassis Cove

Please observe the following guidelines and follow the instructions to open the system.

1. Make sure the system and all other peripheral devices connected to it have been powered off.
2. Disconnect all power cords and cables.

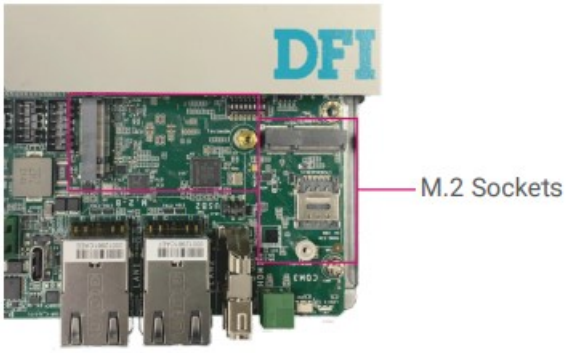
Step 1:
The 2 screws on the both sides of the system are used to secure the cover to the chassis.
Remove the screws and put them in a safe place for later use.



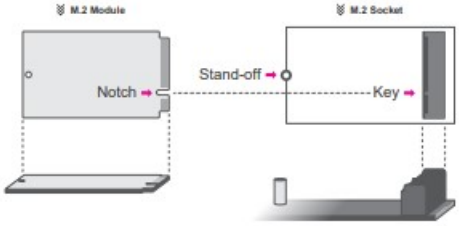
Step 2:
Slide the cover to open the system

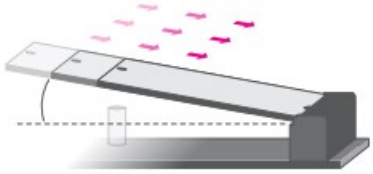
Installing an M.2 Card

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

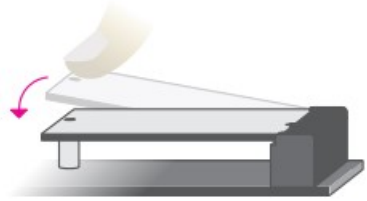


Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.





Step 2:
Press the end of the card far from the socket down until against the stand-off.



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.

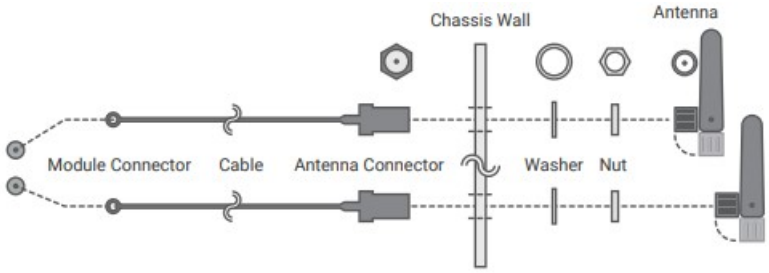
Installing an Antenna

Before installing the antenna, please make sure that the following safety cautions are wellattended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.

Step 1:
There are antenna holes reserved on the right side of the system and by default covered by rubber plugs. Please remove the plug prior to installing an antenna.

Step 2:
Connect the internal cable to the board's antenna connector, screw the antenna connector through the antenna hole with washers and nuts, and screw on the antenna as illustrated below.



Mounting Options

The system features DIN-rail mount chassis that facilitates fast installation of the EC900- 8MM/EC910-8MM to a DIN rail.

The DIN Rail mount kit includes the following:

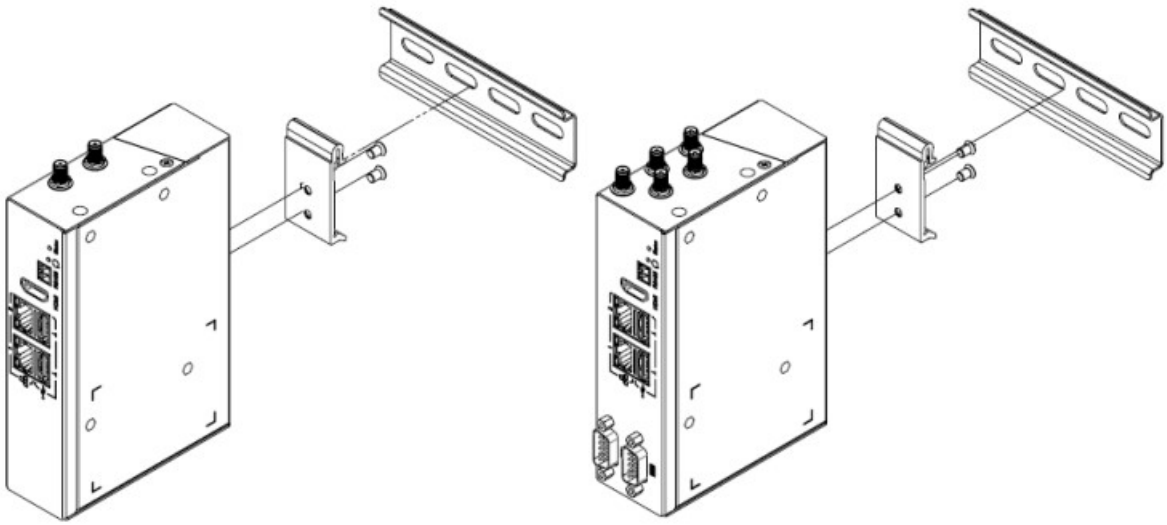
- Din-rail mount bracket
- 2 screws

Step 1:
Use the provided mounting screws to attach the din-rail mount bracket to the top side of the system.

Step 2:
Install the sytem onto the rail.

EC900-8MM

EC910-8MM



Documents / Resources

	DFI EC900-8MM NXP i.MX8M Mini Processor Ruggedized Fanless Embedded System [pdf] User Manual EC900-8MM NXP i.MX8M Mini Processor Ruggedized Fanless Embedded System, EC900-8M M, NXP i.MX8M Mini Processor Ruggedized Fanless Embedded System, Ruggedized Fanless Embedded System, Fanless Embedded System