EC900-QCS

Ultra Small Size Embedded System

User's Manual

Copyright

Trademarks

FCC and DOC Statement on Class A

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 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 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.

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 EC900-QCS system unit

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.

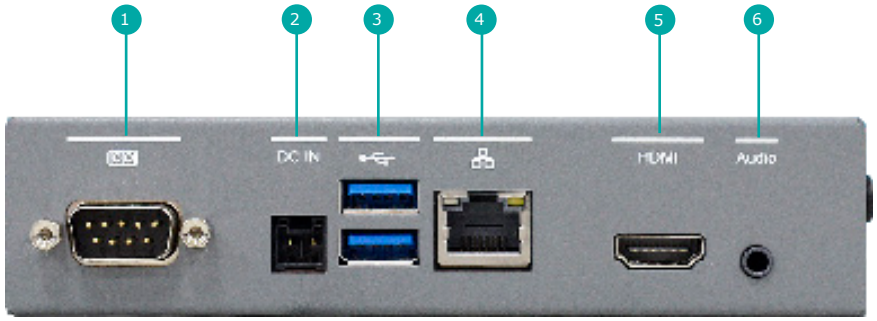
The system may burn fingers while running.

Wait for 30 minutes to handle electronic parts after power off.

Chapter 1 - Introduction

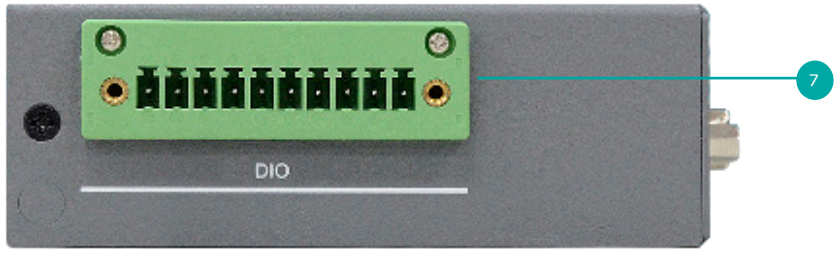
▶ Overview

Front View

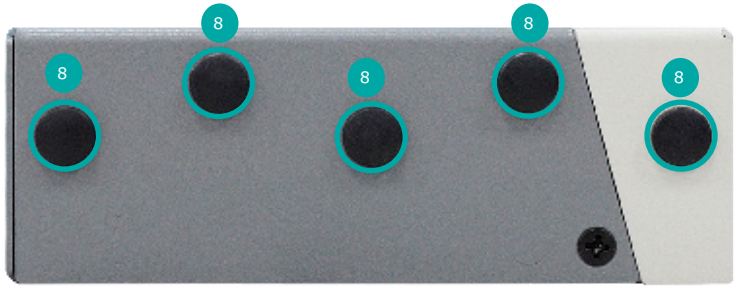


1	1 x COM (RS232)
2	2-pin Power Jack
3	2 x USB 3.1 Gen1 Type A
4	1 x GbE (RJ-45)
5	1 x HDMI
6	Audio

Left View

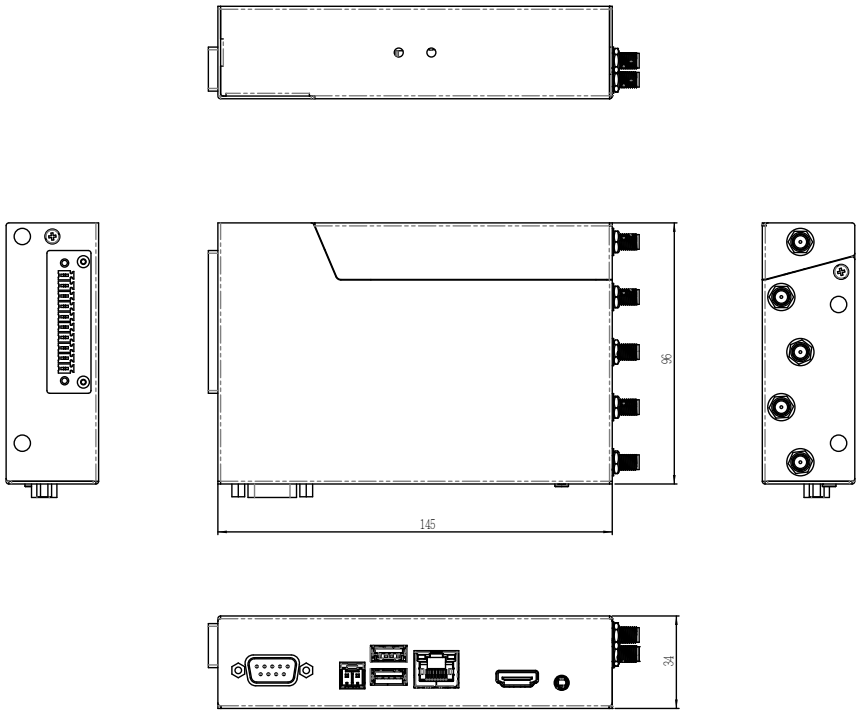


Right View



7	1 x DIO
8	5 x Antenna Holes

▶ Dimensions



▶ Key Features

Qualcomm:
Qualcomm QCS6490 high-level platform

High Speed Memory Down:
LPDDR5x on board memory up to 8G

Multiple Expansions:
1 M.2 E key 2230, 1 M.2 B key 3052

Rich I/O:
2 USB 3.1, 1 GbE LAN, 1 HDMI, 1 Audio Jack, 1 COM, 8 bit DIO

AMR:
Target on AMR, box PC application

▶ Specifications

PLATFORM	Platform	ARM
SYSTEM	Processor	QCS6490 Qualcomm® Kryo™ 670, 8 cores, up to 2.7 GHz, 12 TOPS (INT8)
	Memory	LPDDR5x, 4/8GB
GRAPHICS	Display	1 x HDMI Type A, w/audio. 1080P support on Linux.
	Single Display	HDMI
STORAGE	External / Internal	Support UFS 3.1, default 128GB 1 x uSD3.0 card
EXPANSION	Interface	1 x M.2 B key 3052 (USB 3.1/ Opt. USB 2.0) 1 x M.2 E key 2230 (PCIe x1) 1 x Nano SIM slot
ETHERNET	Controller	AX88179A USB3 to GbE controller
LED	Indicators	1 x Status LED
I/O	Ethernet	1 x GbE (RJ-45)
	Serial	1 x RS-232
	USB	2 x USB 3.1 Gen1 Type A
	Display	1 x HDMI 1.4
	WiFi/LTE Antenna	3 x Antenna Holes
	DIO	8 bit DIO (Via Terminal block, Default 6 DIO)
INTERNAL I/O	USB	3 x USB 2.0 (UBJ1/2/4, 1x4P/1.25mm), UBJ4 could option to M.2 B key 1 x USB Type C (Download only)
	Serial	2 x RS-232
POWER	Type	5VDC
	Connector	2 pin Power Jack
	Consumption	**Typical**: QCS6490: 5V @ 0.6A (3.0Watt) **Max.**: QCS6490: 5V @ 1.45A (7.25Watt)

OS SUPPORT	Os Support	Default: Yocto (Linux Kernel 6.6.x) Upon request: Ubuntu 20.04 (Linux Kernel 5.4.x)
MECHANISM	Construction	Sheet Metal
	Mounting	DIN Rail Mount
	Dimensions (W x H x D)	145mm x 34mm x 96mm
	Weight	TBD
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C
	Relative Humidity	10 to 95% RH (non-condensing)
STANDARDS AND CERTIFICATIONS	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)
	Certification	CE, FCC Class A, UKCA, RoHS

Chapter 2 - Hardware Installations

▶ Removing the Chassis Cover

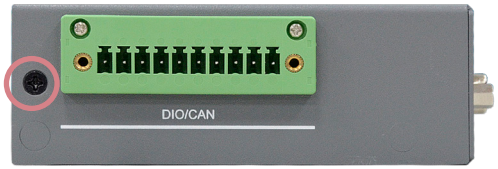
Please observe the following guidelines and follow the instructions to open the system.

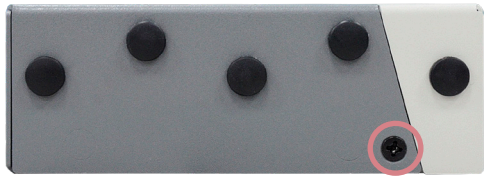
1. Make sure the system and all other peripheral devices connected to it have been powered off.

2. Disconnect all power cords and cables.

Step 1:

Using a suitable screwdriver, remove the screws located on both sides of the system, as shown in the figure. Keep the removed screws in a safe place for reassembly.



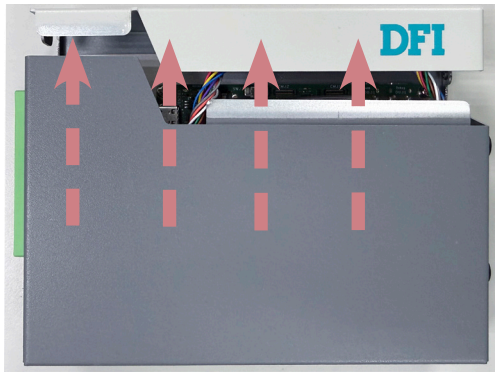


Step 2:

Slide the top cover upward along the guide rails to open the enclosure.

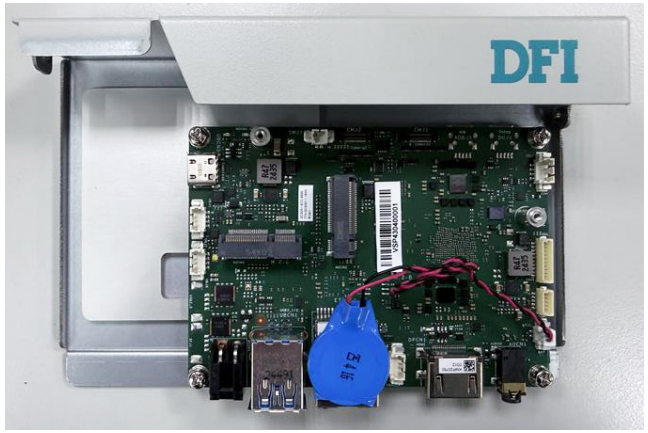
Do not pull the top and bottom covers apart completely.
The covers remain connected by internal cables attached to the PCB.

Carefully open the system to a position that allows access to the internal components without straining the cables.



Step 3:

The board can be easily accessed after the chassis cover is removed.



▶ Installing an M.2 Card

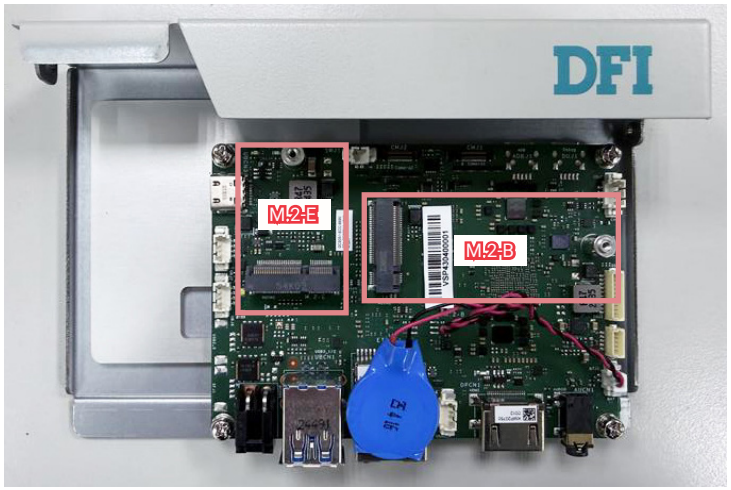
Please observe the following guidelines and follow the instructions to open the system.

1. Make sure the system and all other peripheral devices connected to it have been powered off.

2. Disconnect all power cords and cables.

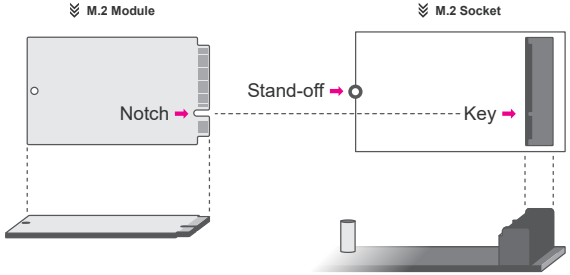
Step 1:

M.2 card slots can be easily accessed after the chassis cover is removed.
Please follow the steps below to install the card into the socket.



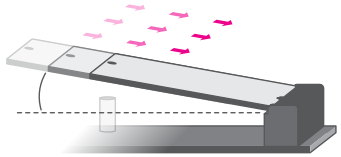
Step 2:

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



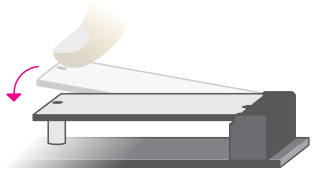
Step 3:

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



Step 4:

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.



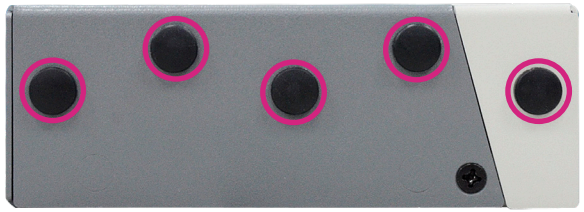
▶ Installing an Antenna

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.

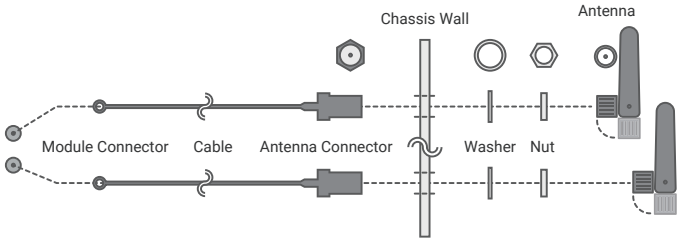
Step 1:

There are antenna holes reserved on the side of the system and 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

DIN Rail Mount

The system features DIN-rail mount chassis that facilitates fast installation of the EC900-QCS to a DIN rail.

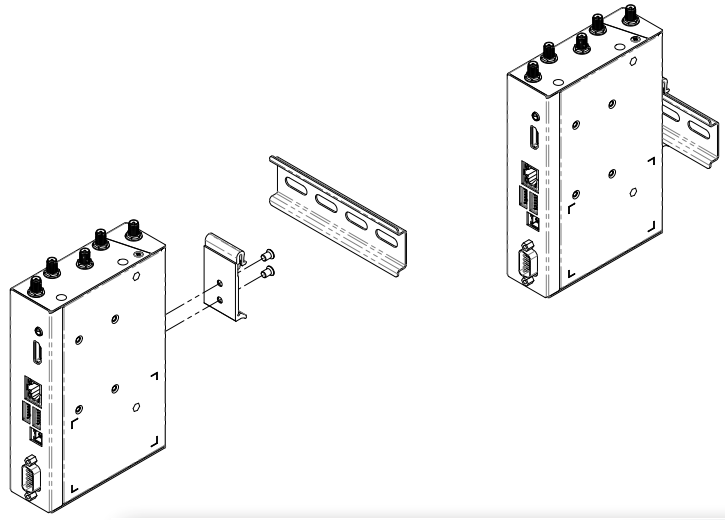
The DIN Rail mount kit includes the following:
• Din-rail mount bracket
• 2 screws

Step 1:

Attach the DIN-Rail Mounting Bracket
Place the system on a flat surface with the top side facing upward.
Align the DIN-rail mounting bracket with the mounting holes on the top side of the system.
Insert the provided mounting screws through the bracket into the system.
Using a screwdriver, tighten the screws securely to fix the bracket in place.
Ensure the bracket is firmly attached and does not move.

Step 2:

Mount the System onto the DIN Rail
Hold the system with both hands and position the DIN-rail bracket against the DIN rail.
Hook the upper edge of the mounting bracket onto the top side of the DIN rail.
Push the lower part of the system inward until the bracket snaps or locks onto the rail.
Gently pull the system to confirm that it is securely mounted and properly seated on the DIN rail.

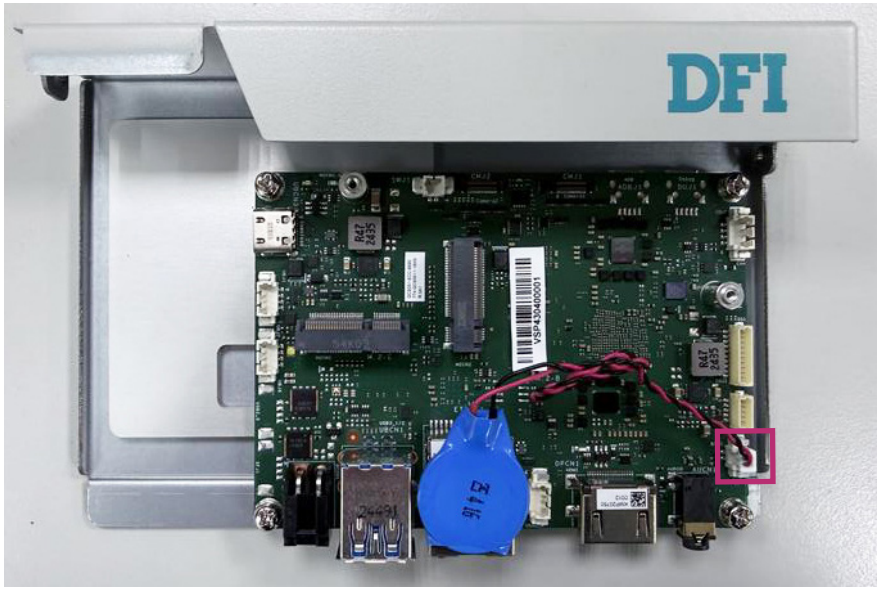


CAUTION:
1.Ensure the system is firmly locked onto the DIN rail before releasing it.
2. Improper installation may cause the system to fall or become unstable.

Chapter 3 - System Settings

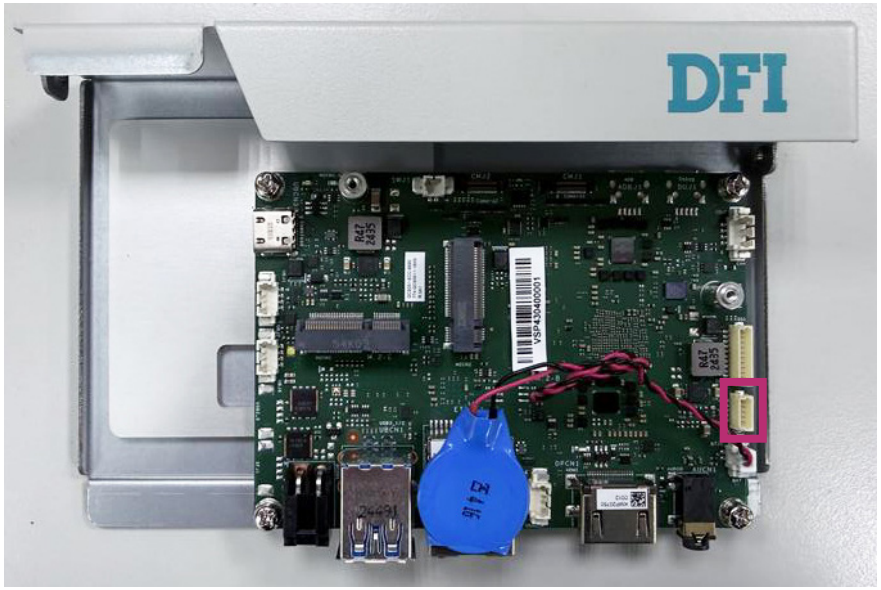
▶ Pin Assignment

Battery (BTJ1)



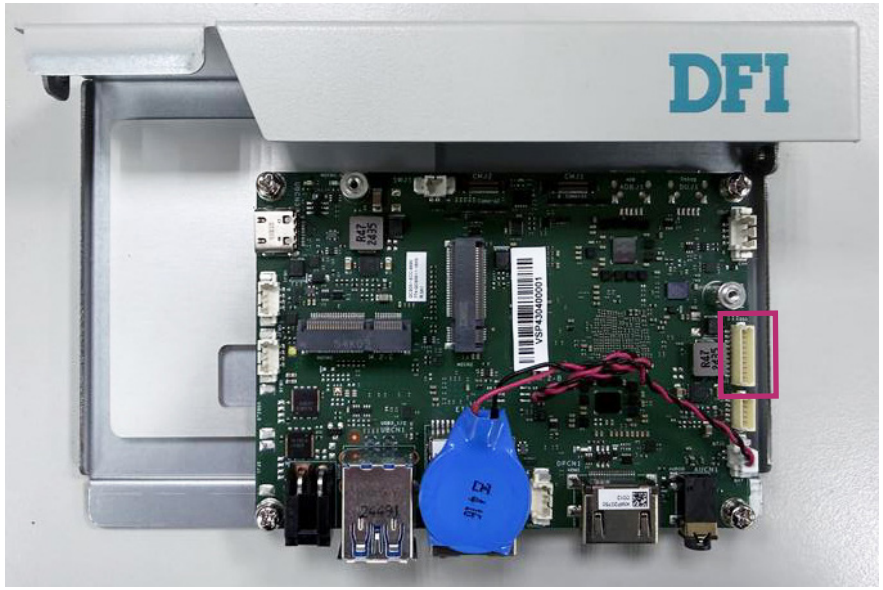
Pin	Assignment
1	+VBAT
2	GND

COM1 (TSJ1)



Pin	Assignment
1	COM1_RX
2	COM1_TX
3	COM1_CTS
4	COM1_RTS
5	GND

DIO 8-bits (IOJ1)



Pin	Assignment
1	DIO0
2	DIO1
3	DIO2
4	DIO3
5	DIO4
6	DIO5
7	DIO6
8	DIO7
9	+VPWR_3.3V
10	GND