USER MANUAL

VIA VAB-3000

Fanless low-power platform for Edge AI applications with MediaTek Genio 350 quad-core processor

1.02-21032024

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Regulatory Compliance

FCC-A Radio Frequency Interference Statement

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 not installed and used in accordance with the instruction manual, 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 personal expense.

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.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.

Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Battery Recycling and Disposal

- Only use the appropriate battery specified for this product.
- Do not re-use, recharge, or reheat an old battery.
- Do not attempt to force open the battery.
- Do not discard used batteries with regular trash.
- Discard used batteries according to local regulations.

Safety Precautions

- Always read the safety instructions carefully.
- Keep this User's Manual for future reference.
- All cautions and warnings on the equipment should be noted.
- Keep this equipment away from humidity.
- Put this equipment on a reliable flat surface before setting it up.
- Check the voltage of the power source and adjust to 110/220V before connecting the equipment to the power inlet.
- Do not place the power cord where people will step on it.
- Always unplug the power cord before inserting any add-on card or board.
- If any of the following situations arise, get the equipment checked by authorized service personnel:
  - The power cord or plug is damaged.
  - Liquid has entered into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment is faulty or you cannot get it work according to User's Manual.
  - The equipment has been dropped and damaged.
  - The equipment has an obvious sign of breakage.
- Do not leave this equipment in extreme temperatures or in a storage temperature above 60°C (140°F). The equipment may be damaged.
- Do not leave this equipment in direct sunlight.
- Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- Do not place anything over the power cord.
- Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating.

Ordering Information

Part Number	SoC Frequency	Description
10GPE20G20020A0	MediaTek Genio 350 Quad-Core SoC @ 2.0GHz	VAB-3000 3.5" board and SOM board with 2.0GHz MediaTek Genio 350 Cortex-A53 quad-core SoC, 16GB eMMC, 2GB LPDDR4 SDRAM, HDMI, CSI, DSI, 2 USB 2.0, Micro USB 2.0 OTG, DIO, COM, 10/100Mbps Ethernet, Wi-Fi 5 + Bluetooth 5.0, miniPCIe, SIM card slot, Micro SD card slot, 12V DC-in

Optional Accessories

Wireless Module Option

Part Number	Description
EMIO-2575-00A0	4G LTE mobile broadband miniPCIe module with two antennas and assembly (Japan only)

Development Option

Part Number	Description
VAB-3000-1D00A0	Development kit including USB to UART debug board and 4-pin FFC cable

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1. Product Overview

Accelerate your time-to-market for groundbreaking Edge AI devices with the VIA VAB-3000 Edge AI board. Driven by the high performance and power-efficient MediaTek Genio 350 Edge AI platform, the board combines advanced AI technology for display, object recognition, and voice with rich wireless and I/O connectivity features.

The VIA VAB-3000 board's multimedia capabilities include high-speed graphics processing, hardware-accelerated H.265/H.264 Full HD video decoding, and support for MIPI/HDMI/touch panel displays and cameras – making it the ideal solution for an unlimited array of home, commercial, industrial, and educational applications.

The VIA VAB-3000 board harnesses the power of the MediaTek Genio 350 Edge AI platform to deliver blistering edge processing and multimedia performance. Besides quad-core ARM Cortex-A53 processors, the Genio 350 platform also features an integrated AI processor for deep learning, neural network acceleration, and computer vision applications, including facial recognition, object identification, and OCR.

Based on the 3.5" SBC 14.6cm x 10.2cm form factor, the VIA VAB-3000 board offers a wealth of network connectivity options, including an integrated SIM card slot for 4G LTE, dual-band 802.11ac Wi-Fi, a 10/100Mbps Ethernet port, and Bluetooth 5.0. The board also features a USB 2.0 port, a Micro USB 2.0 OTG port, as well as HDMI, MIPI DSI display, MIPI CSI camera, and touch panel support with multi-function pins for I²C, SPI and GPIO connectivity. On-board storage is provided by 16GB eMMC 5.1 flash memory.

1.1 Key Features

- Compact 3.5" SBC form factor
- High-performance quad-core MediaTek Genio 350 processor
- Integrated AI processor for Edge AI applications
- Full HD hardware accelerated H.265/H.264 video decoding
- Dual-band 802.11a/b/g/n/ac Wi-Fi with Bluetooth 5.0 and on-board SIM card slot
- 16GB onboard eMMC Flash memory
- MIPI DSI/HDMI/touch panel display and MIPI CSI camera support
- Supports Android 12 and Yocto 3.1 operating systems
- Fanless and low power consumption

1.2 Product Specifications

Processor

- MediaTek Genio 350 Quad-Core Cortex A53 @ 2.0 GHz

System Memory

- 2GB LPDDR4 SDRAM

Storage

- 16GB eMMC 5.1 flash memory

Graphics

- ARM Mali-G52 3EE MC1 GPU
- 3D graphics accelerator capable of processing 1600M pixel/sec @ 800MHz
- Supports OpenGL® ES 3.0, OpenCL ES 1.1, and Vulkan 1.1
- Supports H.265 and H.264 video decoding up to 1080p@60fps
- Supports Cadence Tensilica Vision P6 and HiFi4

Wireless Connectivity

- MediaTek MT6631
  - Dual band (2.4GHz & 5GHz) single stream Wi-Fi 802.11 a/b/g/n/ac RF
  - Bluetooth 5.0

Audio

- MediaTek MT6357/MT6390

Onboard I/O

- 2 x MIPI CSI 4-lane connectors (1st for front camera, 2nd for rear camera by ODM request)
- 1 x MIPI DSI 4-lane LCD connector
- 1 x 30-pin capacitive touch panel connector
- 1 x I/O expansion connector (supports GPIO x 5, I2C x1, UART x1, SPI x1, PWM x 2, ADC x 1 from SOM-3000, and GPIO x 11 from Expander IC)
- 1 x UART connector (for debugging)
- 1 x miniPCIe slot for 4G with GNSS
- 1 x SIM card slot
- 1 x RTC battery connector
- 1 x Battery charger connector
- 2 x Speaker connectors and 1 Mic connector
- 1 x MCU upgrade connector
- 1 x Download button

Front Panel I/O

- 1 x Micro SD card slot
- 1 x Micro USB 2.0 OTG port
- 1 x DIO port supporting 10 GPIO with 3.3V power
- 2 x Audio jacks: Line-out and Mic-in
- 1 x Power LED
- 1 x Power button

Back Panel I/O

- 1 x HDMI port
- 2 x USB 2.0 ports
- 1 x COM port for RS-232 (TX/RX)
- 1 x 10/100Mbps Ethernet port
- 1 x IR receiver
- 1 x DC-in jack

Power Supply

- 1 x 12V DC-in (supports 9V~15V)
- 1 x 2-cell 8.4V Li-on battery (optional)

Operating System

- Android 12
- Yocto 3.1

Operating Temperature

- 0°C ~ 60°C

Operating Humidity

- 0% ~ 95% (relative humidity ; non-condensing)

Form Factor

- 3.5" SBC, 14.6cm x 10.2cm (5.75" x 4.02")

Compliance

- CE, FCC, TELEC, UKCA

Notes:

1. As the operating temperature provided in the specifications is a result of testing performed in a testing chamber, a number of variables can influence this result. Please note that the working temperature may vary depending on the actual situation and environment. It is highly recommended to execute a solid testing program and take all variables into consideration when building the system. Please ensure that the system is stable under the required operating temperature in terms of the target application.

2. Please note that the lifespan of the onboard eMMC memory chip may vary depending on the amount of access. More frequent and larger data access on the eMMC memory will shorten its lifespan. It is highly recommended to use a replaceable external storage (e.g., MicroSD card) for large data access.

1.3 Layout Diagram

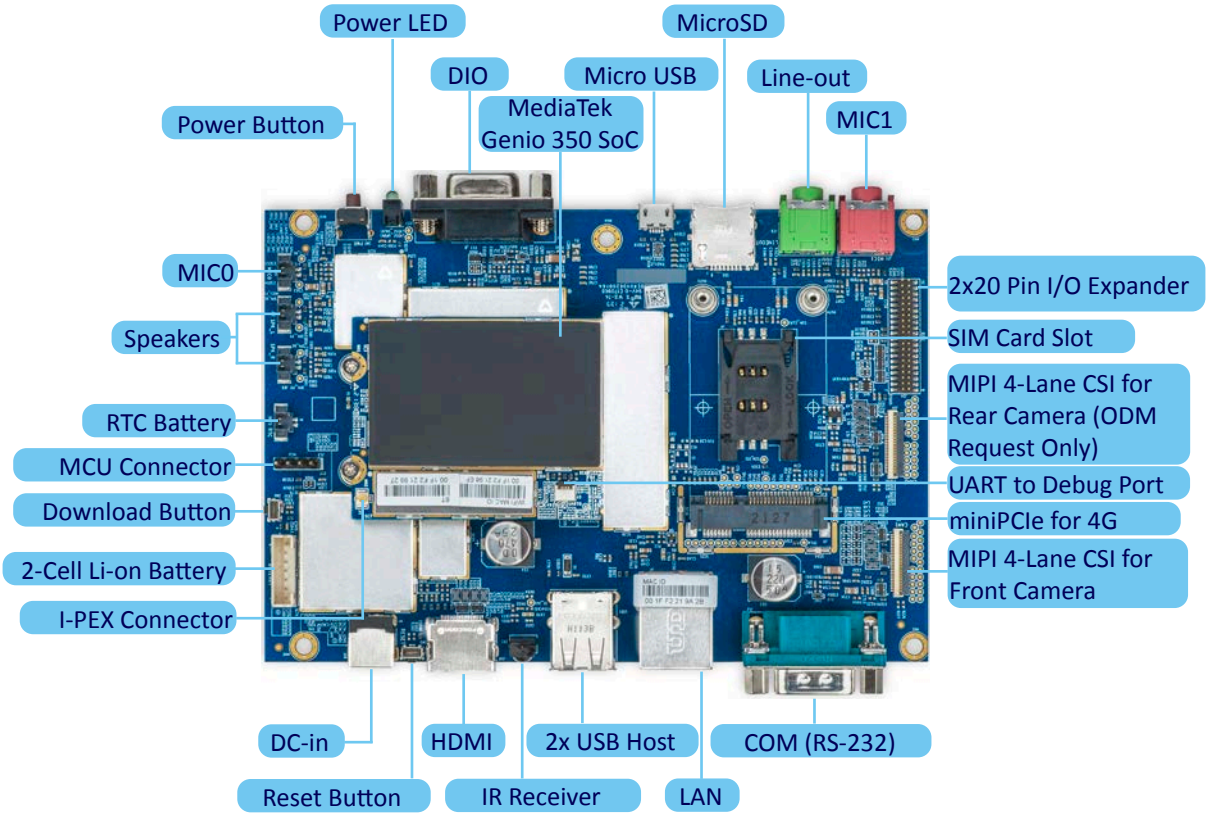

Figure 01: VIA VAB-3000 board layout (top view)

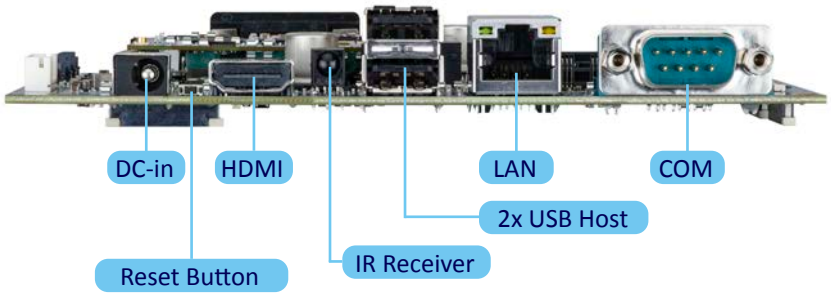

Figure 02: VIA VAB-3000 board front panel I/O

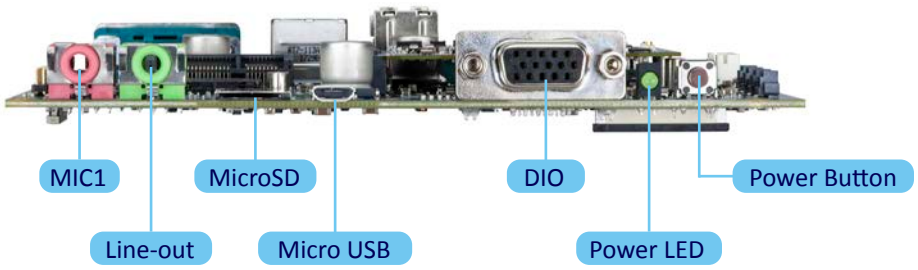

Figure 03: VIA VAB-3000 board rear panel I/O

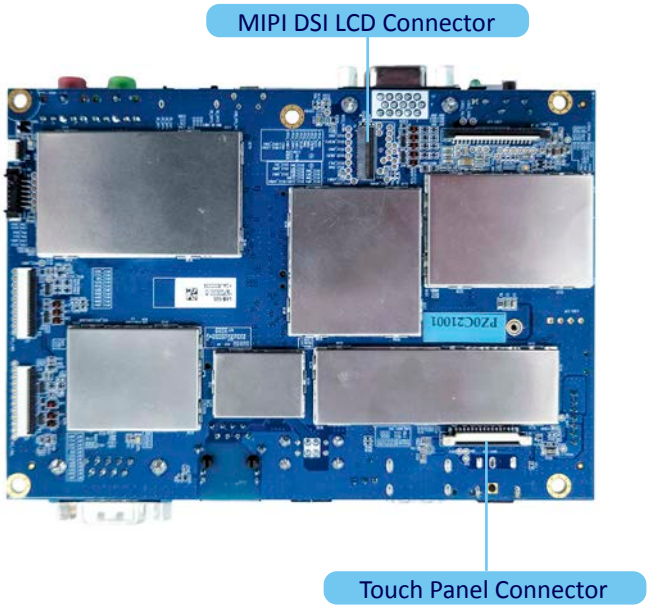

Figure 04: VIA VAB-3000 board layout (bottom view)

1.4 Product Dimensions

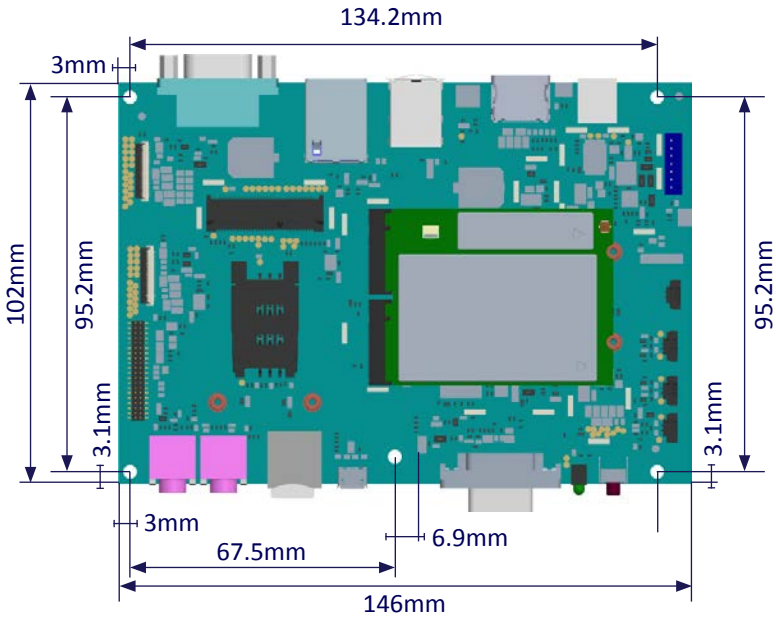

Figure 05: Dimensions of the VIA VAB-3000 board (top view)

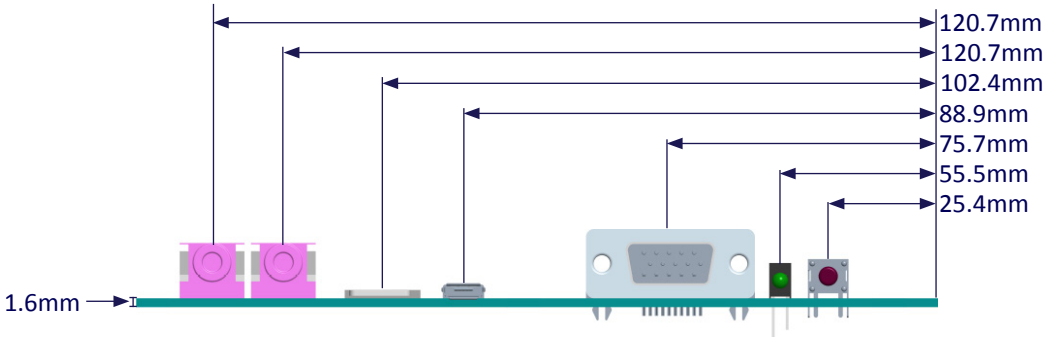

Figure 06: External I/O dimensions of the VIA VAB-3000 board (front panel)

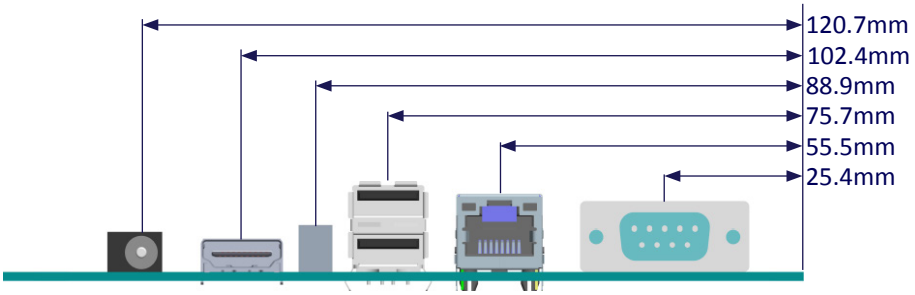

Figure 07: External I/O dimensions of the VIA VAB-3000 board (back panel)

1.5 Height Distribution

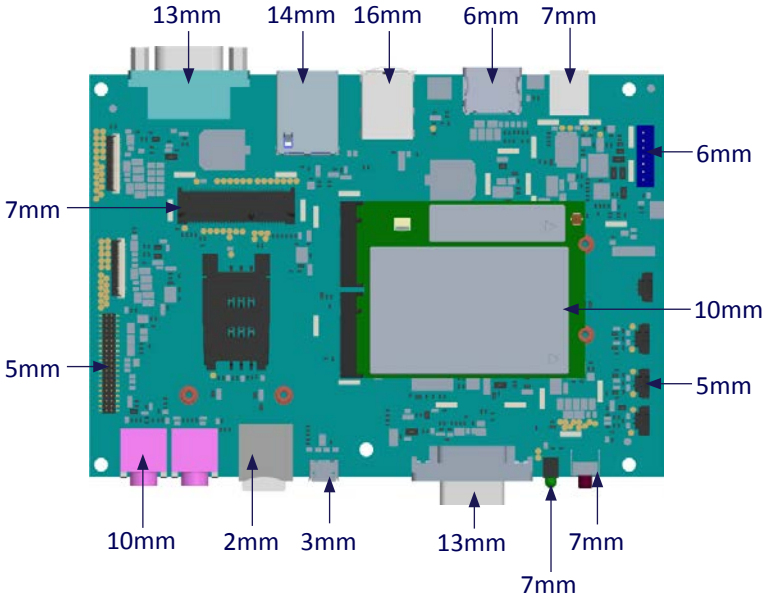

Figure 08: Height distribution of the VIA VAB-3000 board (top view)

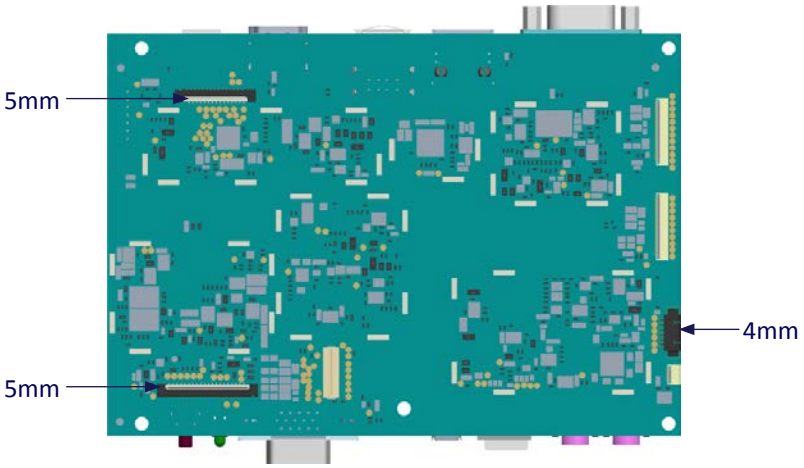

Figure 09: Height distribution of the VIA VAB-3000 board (bottom view)

2. External I/O Pin Descriptions and Functionality

2.1 HDMI® Port

The VIA VAB-3000 board is equipped with one HDMI port on the back panel. The HDMI port Type-A receptacle connector provides connection to High Definition video and digital audio using a single cable. The pinouts of the HDMI port are shown below.

Pin	Signal	Pin	Signal
1	D2+	11	GND
2	GND	12	CLK-
3	D2-	13	CEC
4	D1+	14	NC
5	GND	15	DDC_CLK
6	D1-	16	DDC_DATA
7	D0+	17	GND
8	GND	18	HDMI_5V
9	D0-	19	PLUG_DET
10	CLK+		

Table 01: HDMI port pinouts

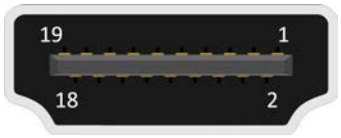

Figure 10: HDMI port

2.2 USB 2.0 Port

The VIA VAB-3000 board is equipped with teo USB 2.0 ports on the back panel. The USB 2.0 ports provide complete Plug and Play and hot swap capabilities for external devices. The pinouts of the USB 2.0 ports are shown below.

Pin	Signal
1	VCC
2	USB data -
3	USB data+
4	GND

Table 02: USB 2.0 port pinouts

Figure 11: USB 2.0 port

2.3 10/100Mbps Ethernet Port

The VIA VAB-3000 board comes with a 10/100Mbps Ethernet port on the back panel which uses an 8 Position and 8 Contact (8P8C) receptacle connector commonly known as RJ-45. It is fully compliant with the IEEE 802.3 (10BASE-T) and 802.3u (100BASE-TX) standards. The pinouts of the 10/100Mbps Ethernet port are shown below.

LAN	
Pin	**Signal**
1	TD+
2	TD-
3	RD+
4	NC
5	NC
6	RD-
7	NC
8	NC

Table 03: 10/100Mbps Ethernet port pinouts

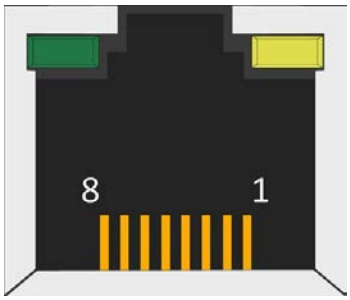

Figure 12: 10/100Mbps Ethernet port

The 10/100Mbps Ethernet port has two individual LED indicators located on the front side to show its Active/ Link and Speed status.

	Link LED (Left LED on RJ-45 port)	Active LED (Right LED on RJ-45 port)
Link off	LED is off	LED is off
Speed_10Mbit	LED is off	Orange flash
Speed_100Mbit	Green is on	Orange flash

Table 04: 10/100Mbps Ethernet port LED color definitions

2.4 COM Port

The VIA VAB-3000 board is equipped with a COM (RS-232) port on the back panel. The COM port supports RS-232 (TX/RX) mode and is used to control peripheral equipment. The pinouts of the COM port are shown below.

Pin	Signal	Pin	Signal
1	NC	6	NC
2	RXD	7	NC -
3	TXD	8	NC
4	NC	9	MCU_RESET
5	GND		

Table 05: COM port pinouts

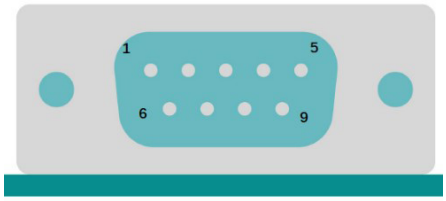

Figure 13: COM port

2.5 IR Receiver

The VIA VAB-3000 board comes with an IR receiver located on the rear I/O panel. The IR receiver is used for receiving IR signals from infrared remote controllers. The diagram of the IR receiver is shown below.

Figure 14: IR receiver

2.6 DC Jack

The VIA VAB-3000 board comes with a DC Jack located on the rear I/O panel. The DC Jack is used for suppling 12V-DC power from a compliant adapter. The diagram of the DC Jack is shown below.

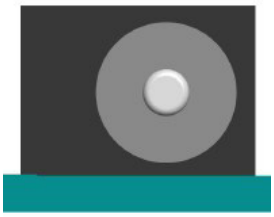

Figure 15: DC jack

2.7 Reset Button & Reset Pin

The VIA VAB-3000 board comes with a reset button on the back I/O panel labeled ‘SW3’, which allows users to reboot or reset the system forcibly. The VIA VAB-3000 board also comes with an MCU reset pin located in the COM connector 'J12' pin-9. The system will power down when the 'J12' pin-5 & pin-9 are shorted. The diagram of the reset button and reset pin are shown below.

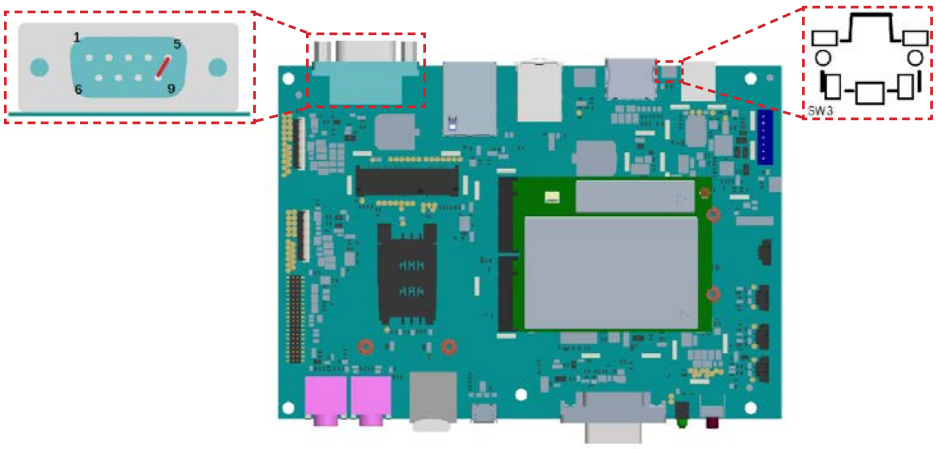

Figure 16: Reset button & pin

2.8 Micro USB 2.0 Port

The VIA VAB-3000 board is equipped with a Micro USB 2.0 port on the front panel. The Micro USB 2.0 port is used for downloading the OS image. The pinouts of the Micro USB 2.0 port are shown below.

Pin	Signal
1	VBUS
2	D-
3	D+
4	ID
5	GND

Table 06: Micro USB 2.0 port pinouts

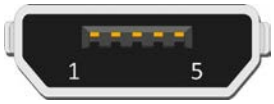

Figure 17: Micro USB 2.0 port

2.9 Headphone Jack

The VIA VAB-3000 board comes with a 3.5mm headphone jack located on the front side panel. The headphone jack is used for connecting to external speakers or headphones. The diagram of the headphone jack is shown below.

Figure 18: Headphone jack

2.10 Microphone Jack

The VIA VAB-3000 board comes with a 3.5mm microphone jack located on the front I/O panel. The microphone jack is used for connecting to external microphones. The diagram of the microphone jack is shown below.

Figure 19: Microphone jack

2.11 Power Button

The VIA VAB-3000 board comes with a power button located on the front I/O panel. The power button can support two functions: Power On/Off and System Suspend/Resume. The diagram of the power button is shown below.

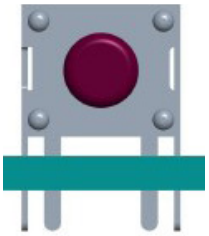

Figure 20: Power button

Power Button Behavior	
Power On/Off	Press and hold the button for more than 2 seconds to power on. To power off, press and hold the button for more than 4 seconds.
System Suspend/Resume	Quickly press the power button once to suspend the system. While in suspend mode, quickly press the button once to resume.

Table 07: Power button behavior description

2.12 MicroSD Slot

The VIA VAB-3000 board is equipped with a MicroSD Slot on the front I/O panel. The MicroSD Slot is used for storage data, pictures, video, audio, documents and so on. The pinouts of the MicroSD Slot are shown below.

Pin	Signal
1	DAT2
2	DAT3
3	CMD
4	VCC
5	CLK
6	GND
7	DAT0
8	DAT1
9	Card detect

Table 08: MicroSD card slot pinouts

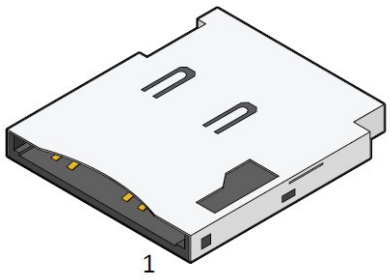

Figure 21: MicroSD card slot

2.13 Power LED

The VIA VAB-3000 board is equipped with a Power LED on the front I/O panel. The Power LED is used to indicate power status. The diagram of the Power LED is shown below.

Power LED Behavior	
Power On	ON
System Suspend/Power Off	OFF

Table 09: Power LED behavior

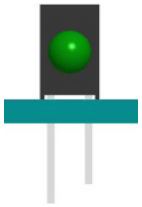

Figure 22: Power button

2.14 DIO Port

The VIA VAB-3000 board is equipped with a DIO port on the front I/O panel. The DIO port is used for digital input/output control. The pinouts of the DIO port are shown below.

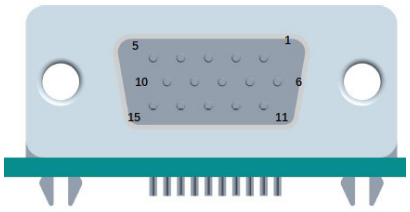

Figure 23: DIO port

Pin	Signal	Pin	Signal	Pin	Signal
1	DIO_GPIO1	6	DIO_GPIO6	11	DIO_GPIO9
2	DIO_GPIO2	7	DIO_GPIO7	12	DIO_GPIO10
3	DIO_GPIO3	8	GND	13	3.3V power
4	DIO_GPIO4	9	Download Key	14	3.3V power
5	DIO_GPIO5	10	DIO_GPIO8	15	GND

Table 10: DIO port pinouts

3. On-Board I/O

3.1 UART Debug Connector

The VIA VAB-3000 board is equipped with a UART debug connector labeled ‘J3’. The pinouts of UART debug connector are shown below.

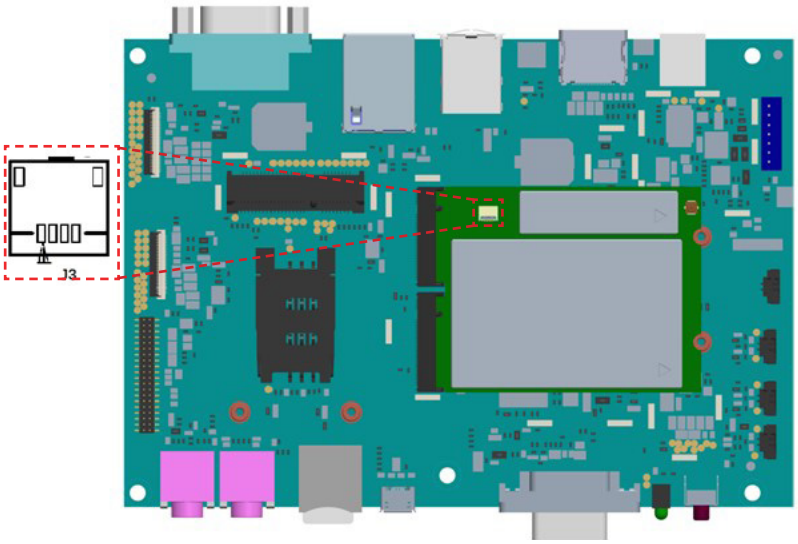

Figure 24: UART debug connector

J3	
Pin	**Signal**
1	GND
2	UTXD0
3	URXD0
4	VCC_1V8

Table 11: UART debug connector pinouts

3.2 I-PEX Connector

The VIA VAB-3000 board comes with an I-PEX connector labeled 'J1' which is used for connecting the Bluetooth and Wi-Fi antenna. The diagram of the I-PEX connector is shown below.

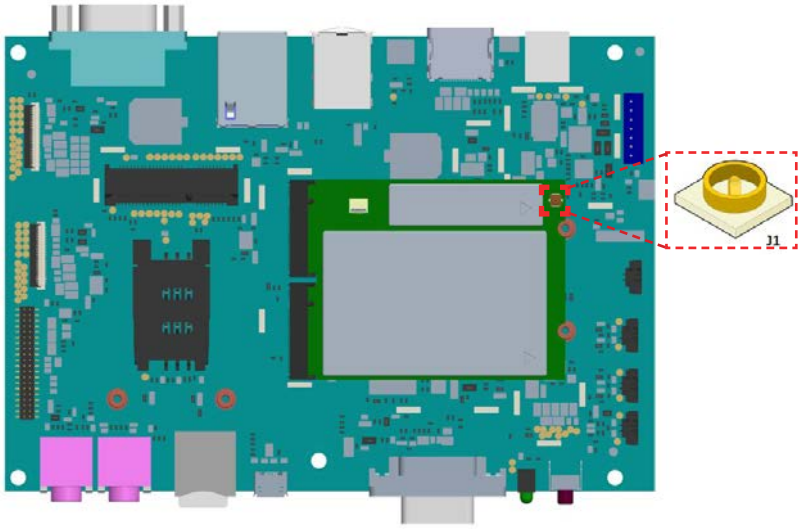

Figure 25: I-PEX connector

3.3 miniPCIe Slot

The VIA VAB-3000 board is equipped with a miniPCIe slot labeled 'J3' for wireless networking options such as a 4G board (EC-20/EC-25). The pinouts of the miniPCIe slot are shown below.

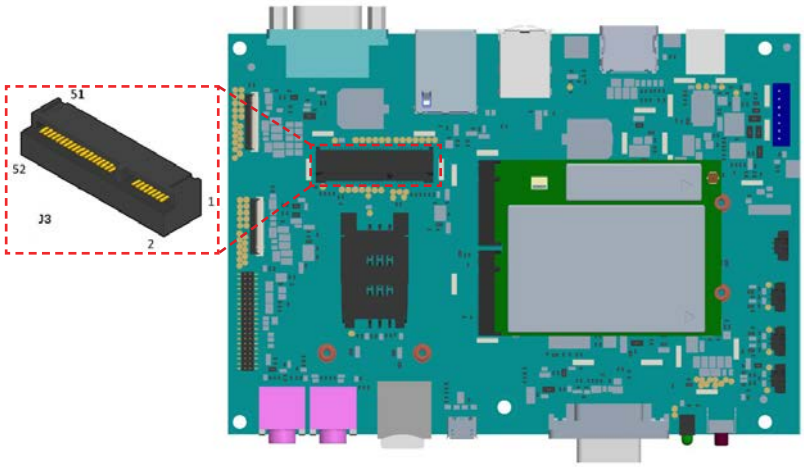

Figure 26: miniPCIe slot

Pin	Signal	Pin	Signal		Pin	Signal	Pin	Signal
1	Reserved	14	USIM_RST		27	GND	40	GND
2	VDD3V3_MPCIE	15	GND		28	Reserved	41	VDD3V3_MPCIE
3	Reserved	16	Reserved		29	GND	42	WWAN_LED-
4	GND	17	Reserved		30	Reserved	43	GND
5	Reserved	18	GND		31	Reserved	44	USIM_PRESENT
6	Reserved	19	Reserved		32	Reserved	45	Reserved
7	Reserved	20	MPCIE_W_DISABLE		33	MPCIE_RST_N	46	Reserved
8	USIM_VCC	21	GND		34	GND	47	Reserved
9	GND	22	MPCIE_RST_N		35	GND	48	VDD1V5
10	USIM_DATA	23	Reserved		36	MINI_PCIE_USB_DM	49	Reserved
11	Reserved	24	VDD3V3_MPCIE		37	GND	50	GND
12	USIM_CLK	25	Reserved		38	MINI_PCIE_USB_DP	51	Reserved
13	Reserved	26	GND		39	VDD3V3_MPCIE	52	VDD3V3_MPCIE

Table 12: miniPCIe slot pinouts

3.4 SIM Card Slot

The VIA VAB-3000 board comes with a SIM card slot that supports 4G SIM cards. SIM card usage requires that a 4G board is installed in the miniPCIe slot, otherwise the SIM card slot will be disabled. The SIM card slot is designed for use with 4G boards that do not support built-in SIM card slots. The pinouts of the SIM card slot are shown below.

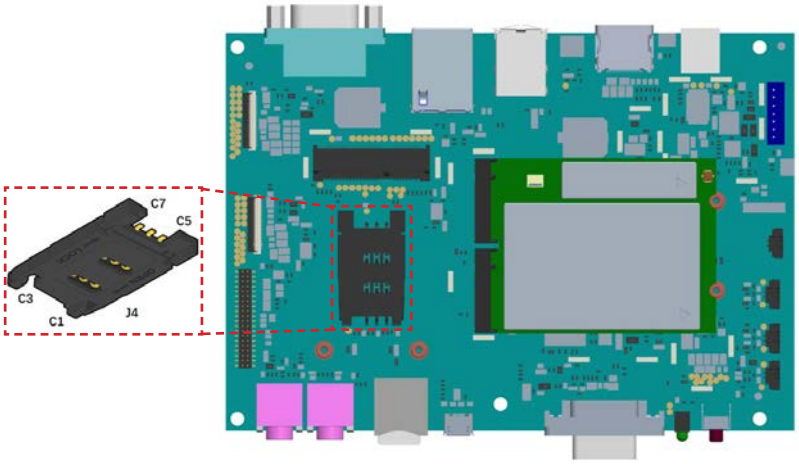

Figure 27: SIM card slot

Pin	Signal
C1	SIM_VCC
C2	SIM_RST
C3	SIM_CLK
C5	GND
C6	SIM_VPP
C7	SIM_DATA

Table 13: SIM card slot pinouts

3.5 Battery Charger Connector

The VIA VAB-3000 board is equipped with a battery charger connector labeled 'J17' which is used for charging the rechargeable lithium-ion polymer battery and powering the board. The pinouts of the battery charger connector are shown below.

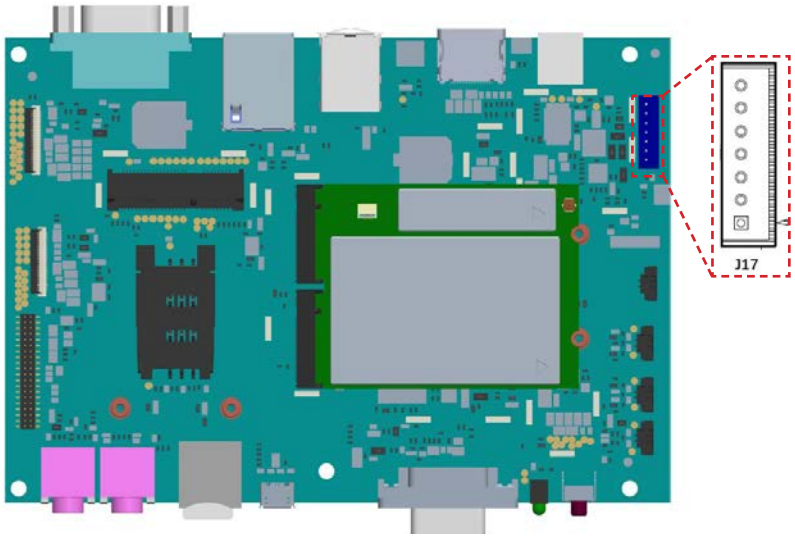

Figure 28: Battery charger connector

Pin	Signal
1	BAT+
2	BAT+
3	BAT+
4	TH
5	BAT-
6	BAT-
7	BAT-

Table 14: Battery charger connector pinouts

3.6 RTC Battery Connector

The VIA VAB-3000 board comes with an RTC battery connector labeled 'BAT1', and supports 3.0V 240mAh dioxide lithium batteries. It provides power to the MCU to maintain the real time clock while the DC adapter and lithium-ion polymer battery are both absent. The pinouts of the RTC battery connector are shown below.

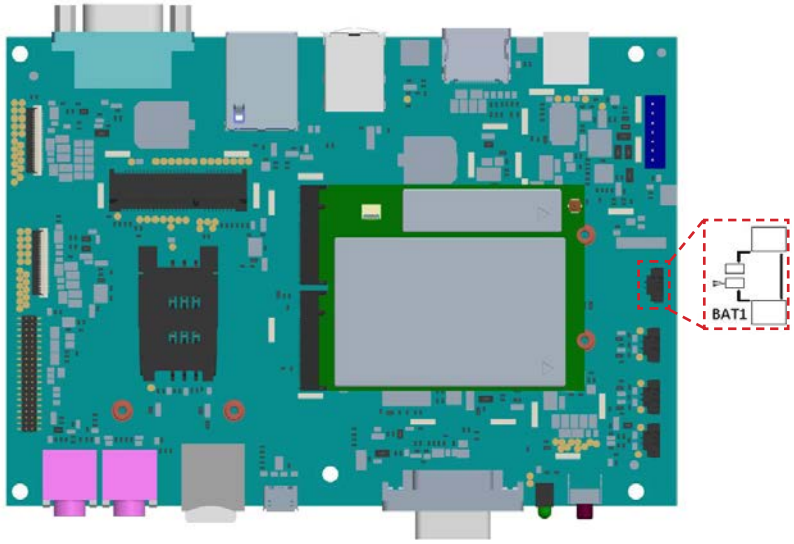

Figure 29: RTC battery connector

Pin	Signal
1	BAT_RTC
2	GND

Table 15: RTC battery connector pinouts

3.7 Speaker Connectors

The VIA VAB-3000 board is equipped with two mono speaker-out connectors labeled 'J22', 'J23' which are used for connecting the mono speakers. The pinouts of the speaker connectors are shown below.

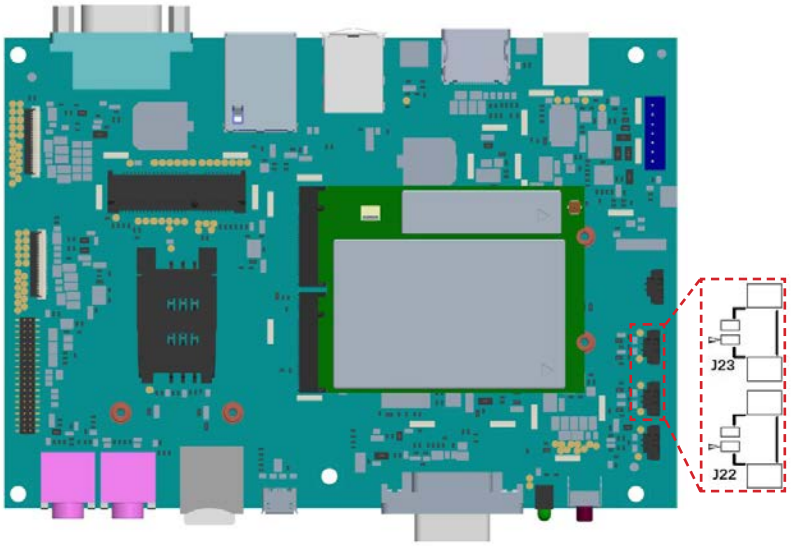

Figure 30: Speaker connectors

J22		J23	
Pin	Signal	Pin	Signal
1	SPK_LN	1	SPK_RN
2	SPK_LP	2	SPK_RP

Table 16: Speaker connector pinouts

3.8 On-Board MIC Connector

The VIA VAB-3000 board is equipped with an on-board MIC connector labeled 'J20' which is used for collecting the peripheral audio signal. The pinouts of the on-board MIC connector are shown below.

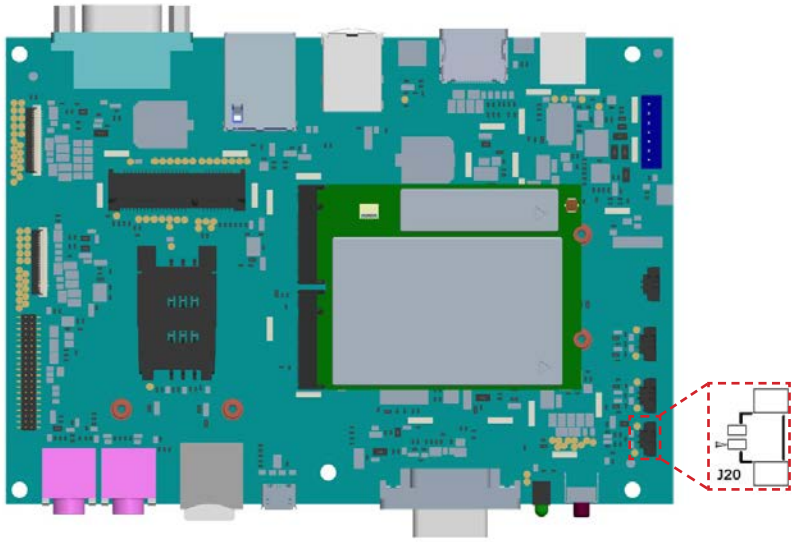

Figure 31: On-board MIC connector

Pin	Signal
1	MIC0_N
2	MIC0_P

Table 17: On-board MIC connector pinouts

3.9 MCU Upgrade Pin Header

The VIA VAB-3000 board is equipped with an MCU upgrade pin header which is used for flashing the MCU firmware on the management IC. The MCU upgrade pin header is labeled as 'J13'. The pinouts of the MCU upgrade pin header are shown below.

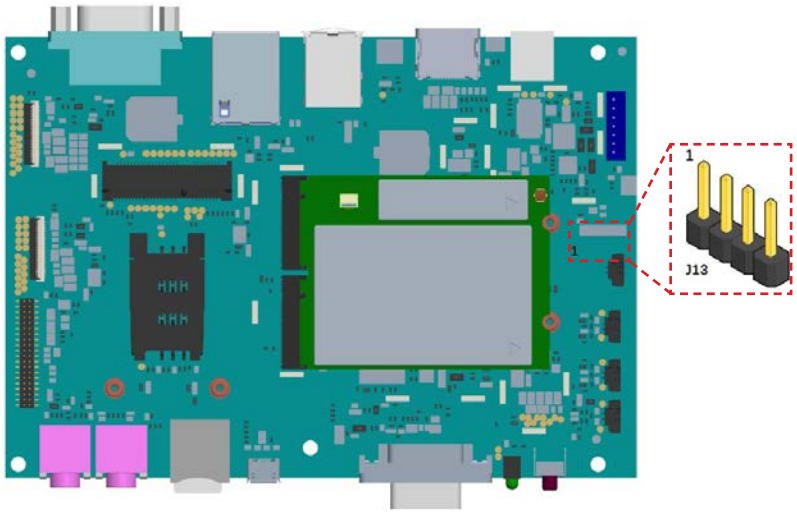

Figure 32: MCU upgrade pin header

Pin	Signal
1	VCC_RTC_1V8
2	STM_SWIM
3	GND
4	STM_RESET

Table 18: MCU upgrade pin header pinouts

Note:
Before flashing the MCU, the 12V DC power should be supplied by an adaptor to the DC-in Jack.

3.10 MIPI CSI 4-Lane Connectors

The VIA VAB-3000 board is equipped with two MIPI CSI 4-lane connectors labeled 'J15', 'J26'. The 'J15' is used for connecting the front camera while 'J26' is used for connecting the rear camera (ODM request). The pinouts of the MIPI CSI 4-lane connectors are shown below.

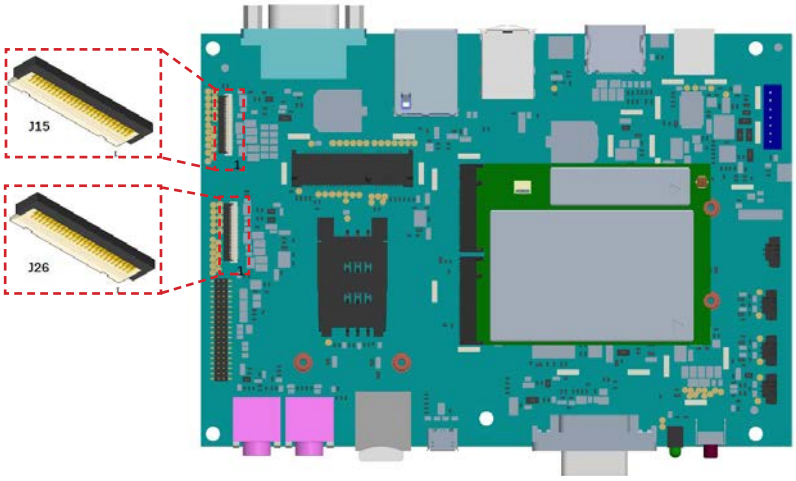

Figure 33: MIPI CSI 4-lane connectors

J15					J26			
Pin	Signal	Pin	Signal		Pin	Signal	Pin	Signal
1	RDN3	14	RDP0		1	RDN3	14	RDP0
2	RDP3	15	GND		2	RDP3	15	GND
3	GND	16	DOVDD_1.8V		3	GND	16	DOVDD_1.8V
4	RDN2	17	AVDD_2.7V		4	RDN2	17	AVDD_2.7V
5	RDP2	18	NC		5	RDP2	18	NC
6	GND	19	DVDD_1.05V		6	GND	19	DVDD_1.05V
7	CLKN	20	NC		7	CLKN	20	NC
8	CLKP	21	I2C_DATA		8	CLKP	21	I2C_DATA
9	GND	22	I2C_CLK		9	GND	22	I2C_CLK
10	RDN1	23	GND		10	RDN1	23	GND
11	RDP1	24	CLK of sensor		11	RDP1	24	CLK of sensor
12	GND	25	Power down N		12	GND	25	Power down N
13	RDN0	26	Reset		13	RDN0	26	Reset

Table 19: MIPI CSI 4-lane connectors pinouts

Note:
The MIPI CSI 4-lane connectors are bottom contact type.

3.11 Download Button & Pin

The VIA VAB-3000 board comes with a download button, and a download pin which is contained within the DIO connector. These are used to enter the firmware download mode. The download button is labeled as ‘SW6’ and the download pin in DIO connector 'J11' is pin-9.

To enter the firmware download mode, connect the USB OTG to a PC, press the button 'SW6', or short 'J11' pin-8 & pin-9, then press the power button for more than 2 seconds. The diagram of the download button and download pin in DIO connector J11 are shown below.

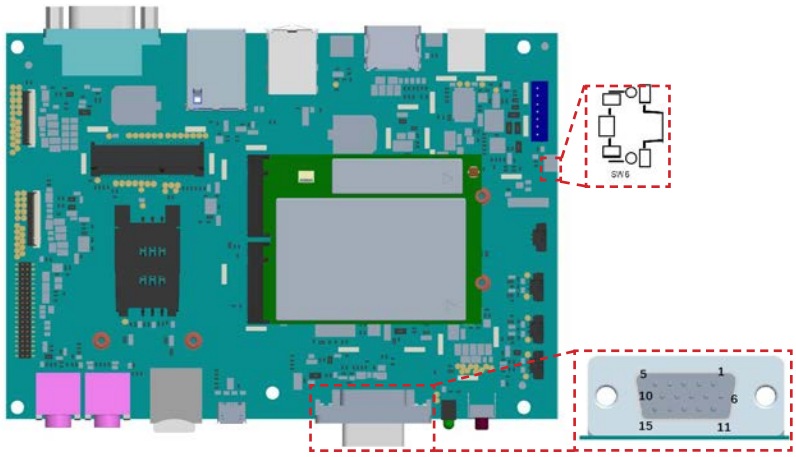

Figure 34: Download button & pin

3.12 I/O Expansion Header

The VIA VAB-3000 board comes with an I/O expansion header labeled as ‘J24’ which is used for connecting the I²C, SPI, UART, PWM, ADC, and 5 CPU GPIO +11 I/O expander GPIO devices. The I/O expansion header is compatible with the Raspberry Pi 40-pin connector. The pinouts of the I/O expansion pin header are shown below.

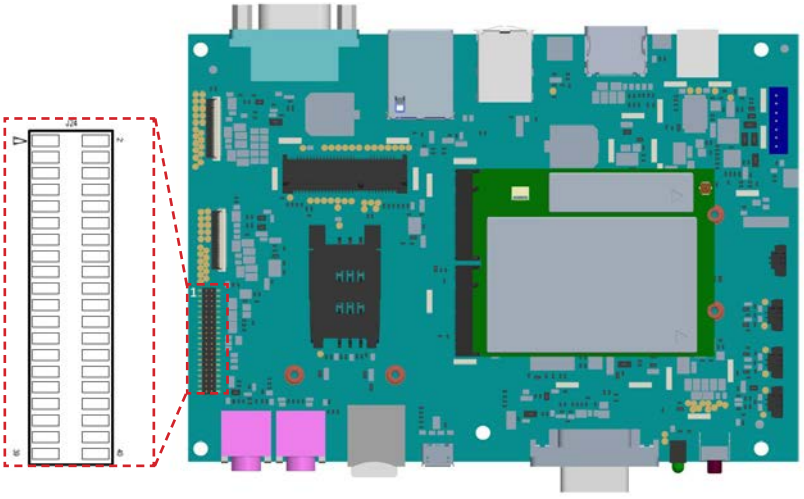

Figure 35: I/O expansion header

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	3V3_VCC	2	5V0_VCC	21	SPI_MISO	22	CPU_EXT_GPIO2
3	I2C0_SDA	4	5V0_VCC	23	SPI_CLK	24	SPI_XCS
5	I2C0_SCL	6	GND	25	GND	26	NC
7	CPU_EXT_INT2	8	UART2_TXD	27	RPI_GPIO13	28	RPI_GPIO11
9	GND	10	UART2_RXD	29	RPI_GPIO10	30	GND
11	RPI_GPIO2	12	RPI_GPIO3	31	RPI_GPIO12	32	PWM0
13	ADC2_RPI	14	GND	33	PWM1	34	GND
15	CPU_EXT_INT1	16	CPU_EXT_GPIO1	35	RPI_GPIO15	36	RPI_GPIO14
17	3V3_VCC	18	CPU_EXT_GPIO3	37	RPI_GPIO17	38	RPI_GPIO16
19	SPI_MOSI	20	GND	39	GND	40	RPI_GPIO18

Table 20: I/O expansion header pinouts

Note:
The standard EVK and BSP software only supports the GPIO feature for the I/O expansion header. Other features can be supported by request only.

3.13 MIPI DSI 4-Lane Connector

The VIA VAB-3000 board is equipped with a MIPI DSI 4-lane connector labeled 'J7' which is used for connecting the MIPI LCD display. 'J7' is placed on the bottom layer of the carrier board. The pinouts of the MIPI DSI connector are shown below.

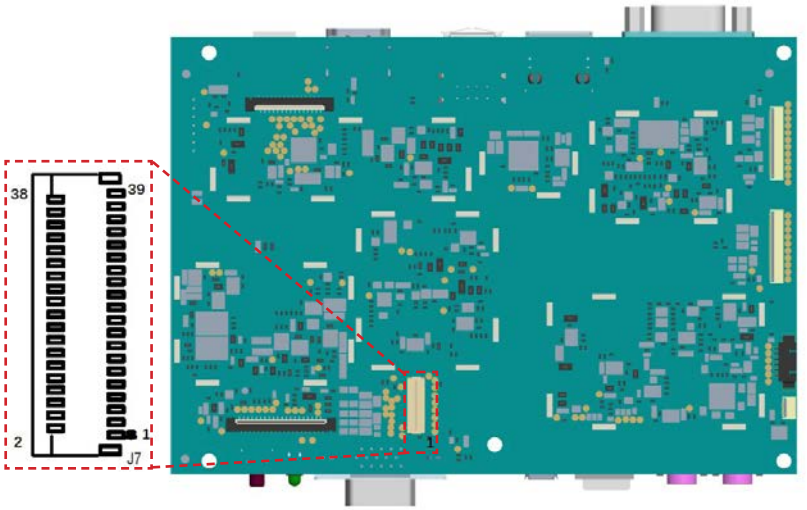

Figure 36: MIPI DSI 4-lane connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	VCOM_3.15V	2	VDDIO_1.8V	21	NC	22	MIPI_CLKP
3	VDDIO_1.8V	4	ID	23	GND	24	MIPI_D3N
5	RESET	6	STBYB	25	NC	26	MIPI_D3P
7	GND	8	MIPI_D0N	27	GND	28	NC
9	NC	10	MIPI_D0P	29	NC	30	AVDD_9.6V
11	GND	12	MIPI_D1N	31	SHLR	32	UPDN
13	NC	14	MIPI_D1P	33	VGL_-6V	34	GND
15	GND	16	MIPI_D2N	35	VGH_18V	36	LEDK
17	NC	18	MIPI_D2P	37	LEDK	38	LEDA
19	GND	20	MIPI_CLKN	39	LEDA		

Table 21: MIPI DSI 4-lane connector pinouts

Note:
The MIPI DSI 4-lane connector is a top contact type.

3.14 Touch Panel Connector

The VIA VAB-3000 board is equipped with a touch panel connector labeled 'J9' which is used to connect the Touch panel. The pinouts of the touch panel connector are shown below.

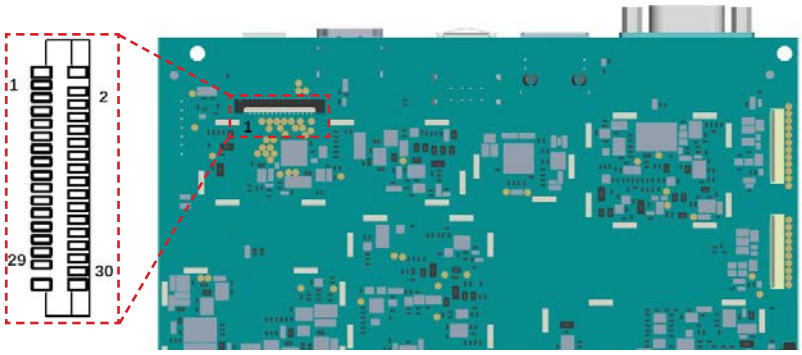

Figure 37: Touch panel connector

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	SENSE09	17	DRIVE12	18	DRIVE11
3	SENSE08	4	SENSE07	19	DRIVE10	20	DRIVE09
5	SENSE06	6	SENSE05	21	DRIVE08	22	DRIVE07
7	SENSE04	8	SENSE03	23	DRIVE06	24	DRIVE05
9	SENSE02	10	SENSE01	25	DRIVE04	26	DRIVE03
11	SENSE00	12	GND	27	DRIVE02	28	DRIVE01
13	GND	14	GND	29	DRIVE00	30	GND
15	DRIVE14	16	DRIVE13				

Table 22: Touch panel connector pinouts

Note:
The Touch panel FFC cable's golden finger faces inward to the carrier board.

4. Software and Technical Support

4.1 Android and Yocto Support

The VIA VAB-3000 features a complete software evaluation image featuring the Android 12 and Yocto 3.1 operating systems.

4.2 Technical Support and Assistance

- For utilities downloads and the latest documentation and information about the VIA VAB-3000, please visit our website at https://www.viatech.com/en/edge/VAB-3000/.
- For technical support and additional assistance, always contact your local sales representative or board distributor, or go to https://www.viatech.com/en/support/drivers/ for technical support.
- For OEM clients and system integrators developing a product for long-term production, other code and resources may also be made available. Please visit our website at https://www.viatech.com/en/contact/ to submit a request.

Appendix A Optional Accessories

A.1 4G LTE Wireless Module

The optional 4G LTE wireless module includes a 4G miniPCIe module, two antennas, and an M2*5mm screw pack to add data connectivity to the VIA VAB-3000 board (SIM card not included).

Follow the steps below to install the miniPCIe module into the miniPCIe slot on the VIA VAB-3000 board:

Note:
It is recommended to use a grounded wrist strap before handling computer components. Electrostatic discharge (ESD) can damage some components.

Step 1

Align the notch on the miniPCIe module with its counterpart on the miniPCIe slot on the VIA VAB-3000 board. Then insert the board at a 30° angle.

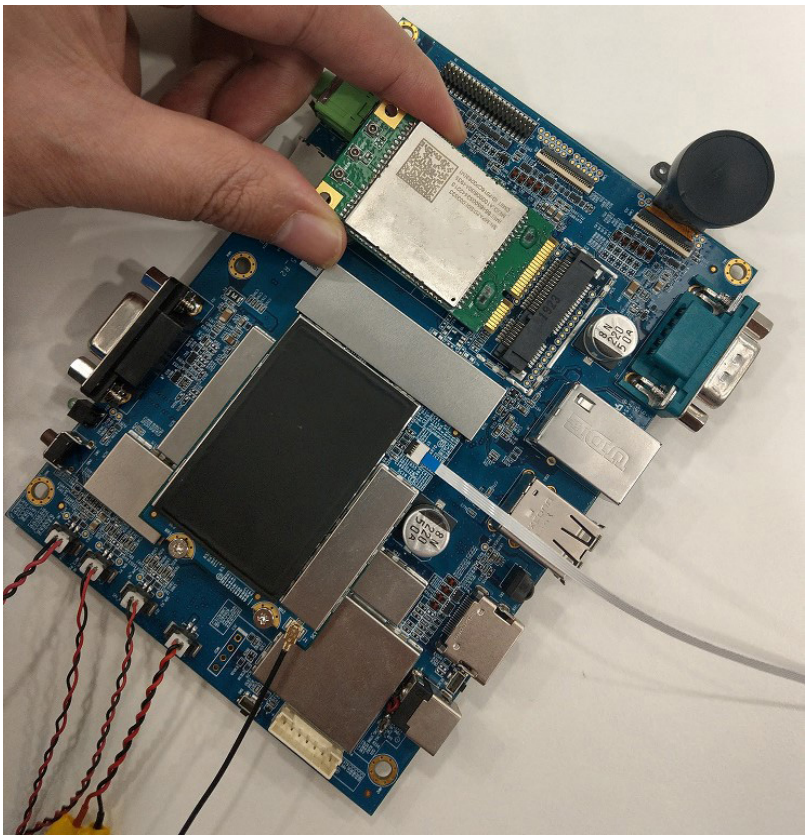

Figure 38: Installing a miniPCIe module

Step 2

Once the miniPCIe module has been fully inserted, push down the board until the screw holes align with the standoff holes, and then secure the board with the two screws and washers provided.

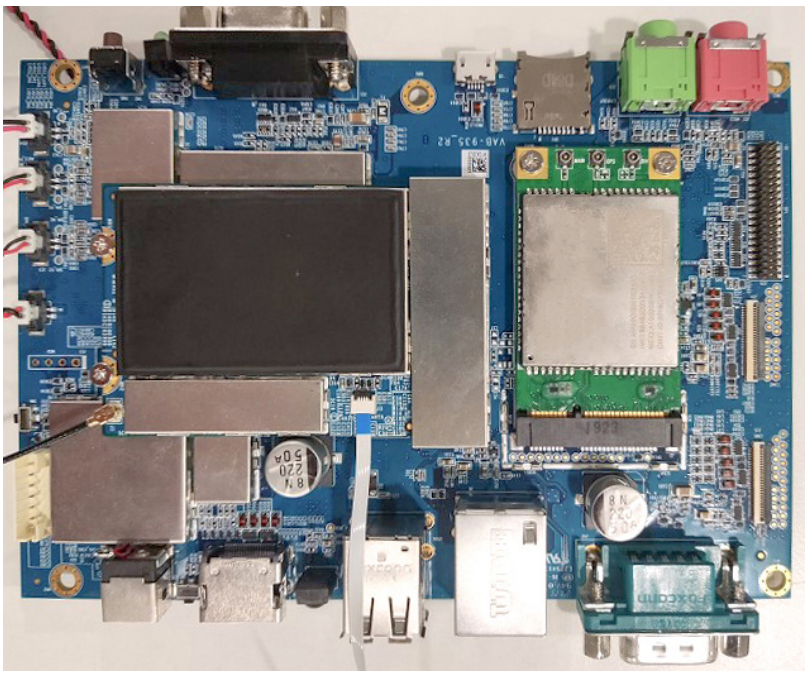

Figure 39: Securing the miniPCIe module

A.2 Development Kit

The optional development kit includes a USB to UART debug board and 4-pin FFC cable to connect the VIA VAB-3000 device to a host PC for debugging.

A.2.1 Debug Board Power Jumpers

Jumper Description

A jumper consists of a pair of conductive pins used to close in or bypass an electronic circuit to set up or configure a particular feature using a jumper cap. The jumper cap is a small metal clip covered by plastic. It performs like a connecting bridge to short (connect) the pair of pins. The usual colors of the jumper cap are black/red/blue/white/yellow.

There are two settings of the jumper pin: 'Short' and 'Open'. The pins are 'Short' when a jumper cap is placed on the pair of pins. The pins are 'Open' if the jumper cap is removed.

Power Jumper Settings

The debug board has a power source jumper "BRD/DEV" (the debug board or the VIA VAB-3000 device) and a voltage jumper "3.3V/1.8V". Both power jumpers have three pins each, and are arranged in series.

The power jumper settings are as shown below. Short pins 2 and 3 of the power source and voltage jumpers to set the VIA VAB-3000 device as the power source, and 1.8V as the voltage. It is recommended to use a long-nose plier for installing and removing a jumper cap.

Caution:
Make sure to install the jumper cap on the correct pins. Installing it on the wrong pins might cause damage and malfunction.

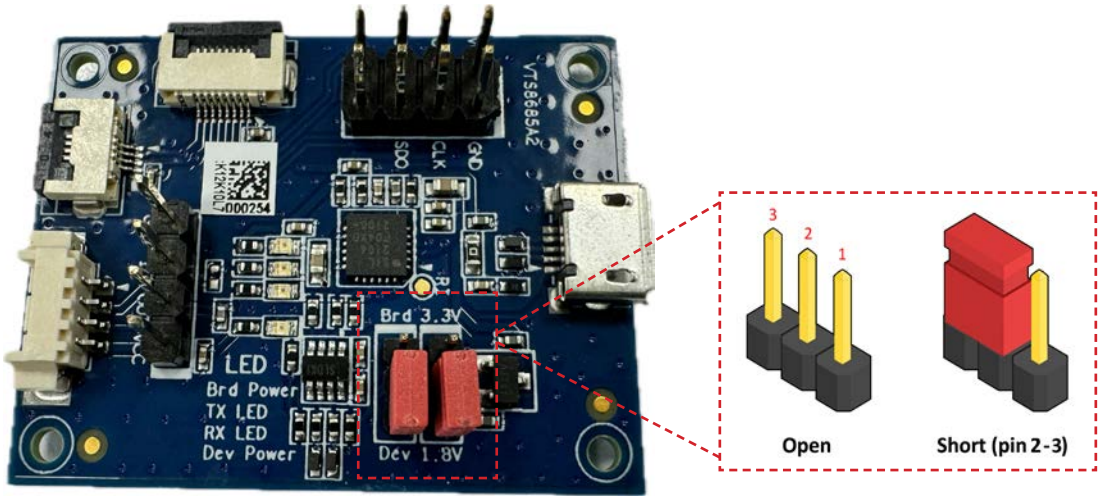

Figure 40: Debug board power jumper diagram

Settings	Pin 1	Pin 2	Pin 3
Debug board	Short	Short	Open
VIA VAB-3000	Open	Short	Short

Table 23: Power source jumper settings

Settings	Pin 1	Pin 2	Pin 3
3.3V	Short	Short	Open
1.8V	Open	Short	Short

Table 24: Voltage jumper settings

A.2.2 Installation

Install the development kit as described in the steps below:

Step 1

Insert one end of the 4-pin FFC cable into the UART debug connector labeled ‘J3’ on the VIA VAB-3000 board.

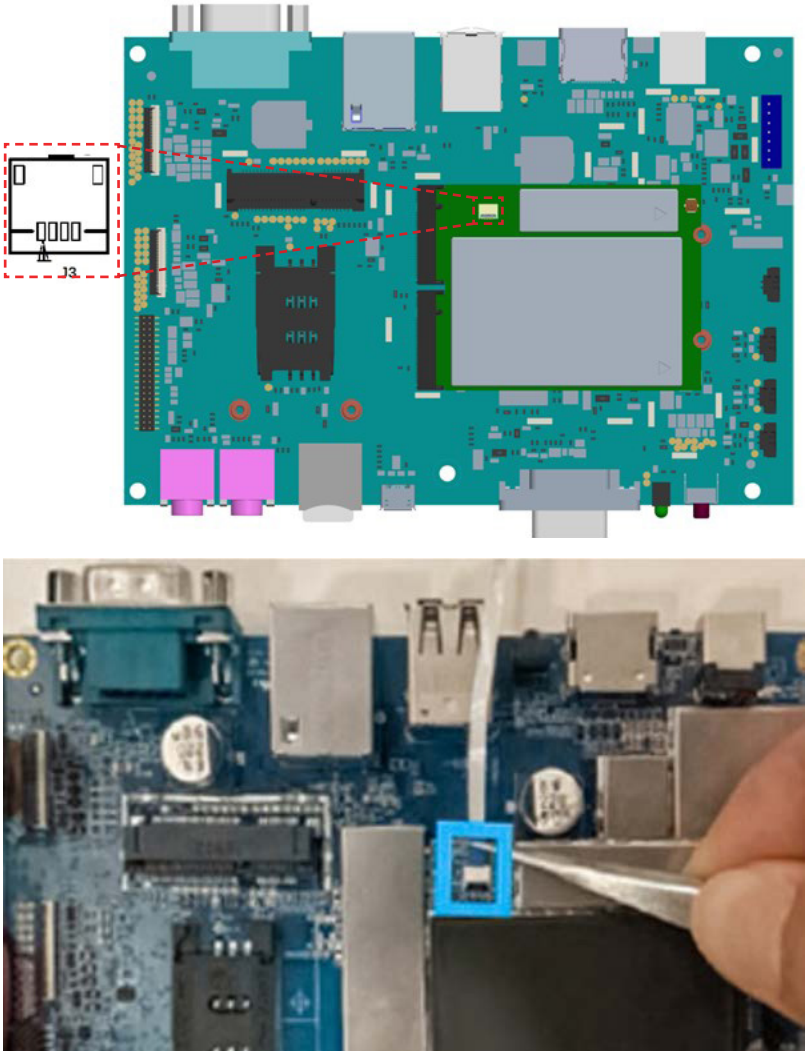

Figure 41: Connecting the 4-pin FFC cable to the VIA VAB-3000 board

Step 2

Insert the opposite end of the 4-pin FFC cable to the 4-pin FFC port located on the debug board, ensuring that the golden finger on the FFC cable faces downwards.

Step 3

Ensure that the power jumpers are set correctly on the debug board as described previously in Appendix section A.2.1.

Step 4

Connect one end of a micro USB cable (not provided) to the micro USB port located on the debug board, and connect the opposite end of the micro USB cable to the host PC.

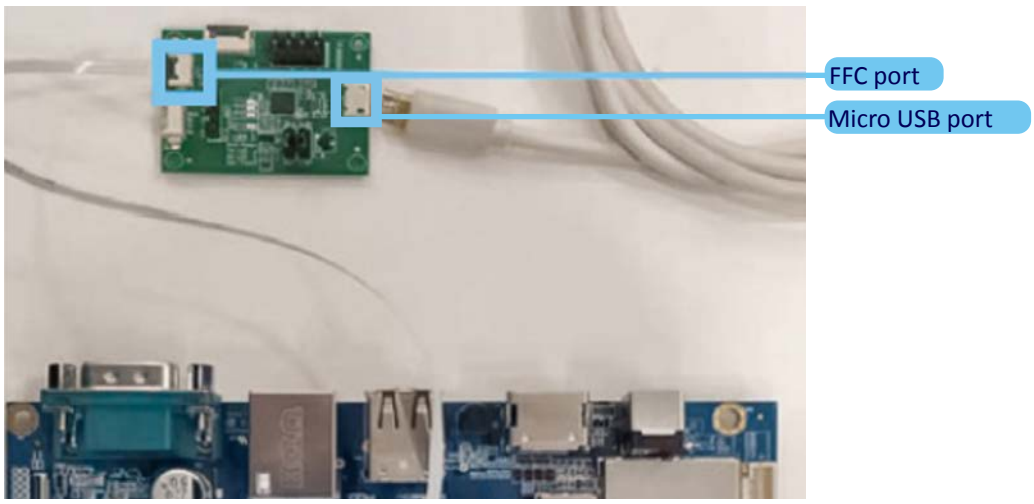

Figure 42: Connecting the 4-pin FFC cable to the debug board and the debug board to a PC

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