



MODEL:

TANK-XM81 Series

Internal Expansion Modules for TANK-XM81 Series

M.2 Slot Expansion Module / 2.5G LAN Module

User Manual

Revision

Date	Version	Changes
May 9, 2023	1.00	Initial release

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Manual Conventions

**WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

**CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

**NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

**HOT SURFACE**

This symbol indicates a hot surface that should not be touched without taking care.

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Chapter

1

Introduction

1.1 Overview

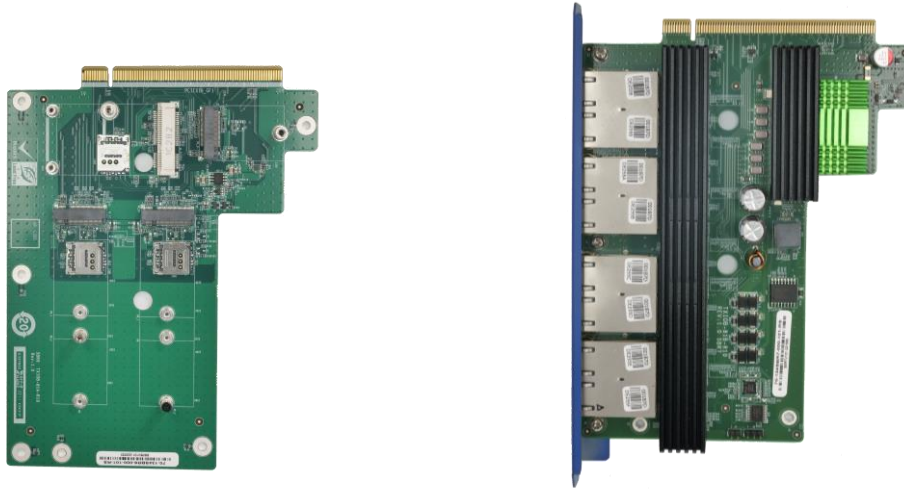


Figure 1-1: TANK-XM81 Internal Expansion Modules

The TANK-XM81 Series Products allows you to add various functionality through internal IO expansion modules. The internal IO expansions can support up to 8 PCIe x1 and 5 USB 2.0, and is compatible with various combinations, for example, multiple network cards and M.2 B key modules, giving users more flexibility for solution integration.

1.2 Model Variations

The model variations of the TANK-XM811 Series External expansioninternal expansion modules are listed below.

Model No.	Description
TXIOB-XM81-A-R10	M.2 slot expansion module with 2 x M.2 B key, 1 x M.2 A key, 1 x PCIe Mini
GPOE-XM81-8P-R10	2.5G LAN module with 8 x 2.5G LAN with PoE

Table 1-1: TANK-XM811 Series External expansionInternal Expansion Modules

Internal expansion products

1.3 Technical Specifications

The technical specifications of the GPOE-XM81-8P are listed below.

Specifications	
Interface	8 x PCI Express® x1
Ethernet	8 x Intel® I225-V controller
PoE	PoE capability
	IEEE 802.3at with 30W / 52V per port (total power: 60W)
Operating Temperature	0°C ~ 60°C
Operating Humidity	5% ~ 95%, non-condensing
Safety/EMC	CE/FCC compliant
Dimensions (LxW) (mm)	131.22 x 170.94

Table 1-2: GPOE-XM81-8P Technical Specifications

The technical specifications of the TXIOB-XM81-A are listed below.

Specifications	
Interface	8 x PCI Express® x1
Expansion Slot	1 x Full-size PCIe Mini (PCIe x1 & USB 2.0) with SIM slot
	1 x M.2 2230 A key (PCIe x1 & USB 2.0)
	1 x M.2 3042/52/80 B key (PCIe x1 & USB 3.2) with SIM slot
	1 x M.2 3042/52/80 B key (PCIe x2) with SIM slot
Operating Temperature	0°C ~ 60°C
Operating Humidity	5% ~ 95%, non-condensing
Safety/EMC	CE/FCC compliant
Dimensions (LxW) (mm)	131.22 x 170.94

Table 1-3: TXIOB-XM81-A Technical Specifications

1.4 Physical Dimensions

The physical dimensions of the GPOE-XM81-8P are shown below.

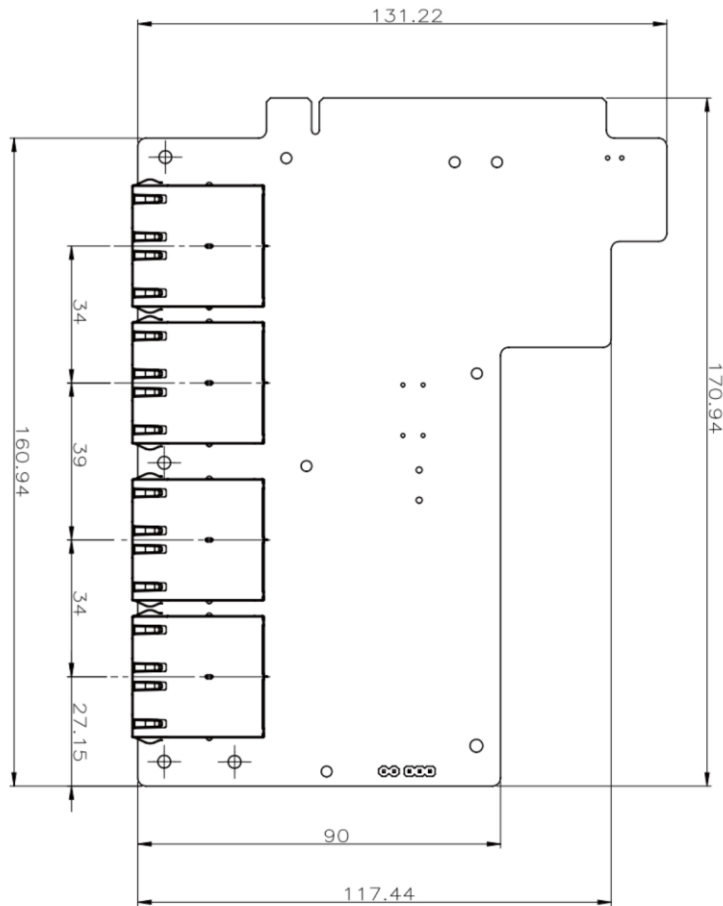


Figure 1-2: GPOE-XM81-8P Physical Dimensions

Internal expansion products

The physical dimensions of the TXIOB-XM81-A are shown in

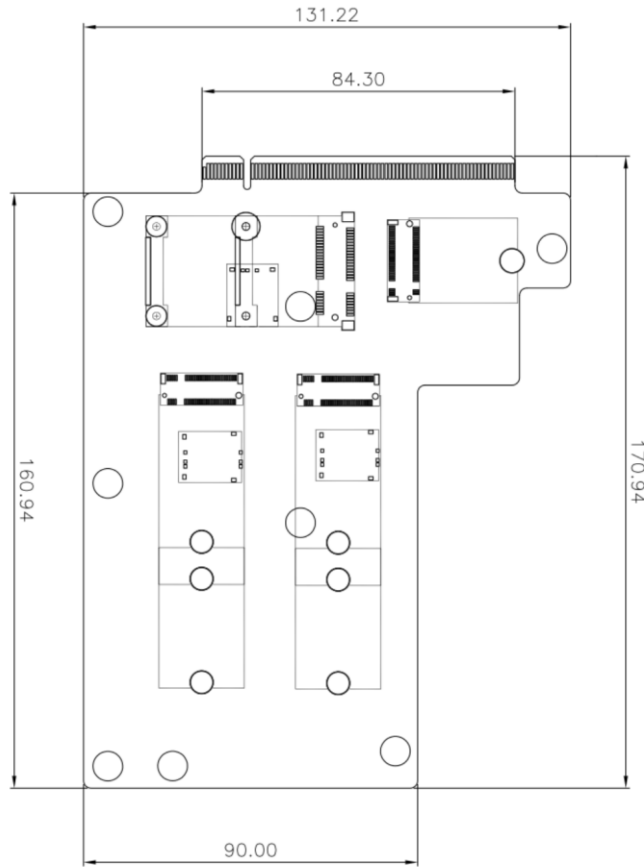


Figure 1-3: TXIOB-XM81-A Physical Dimensions

Chapter

2

Unpacking

1.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the TANK-XM811 Series External expansion and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the TANK-XM811 Series External expansion. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the TANK-XM811 Series External expansion or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband:** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- **Self-grounding:** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad:** When configuring the TANK-XM811 Series External expansion, place it on an anti-static pad. This reduces the possibility of ESD damaging the TANK-XM811 Series External expansion.

1.2 Unpacking Precautions

When the TANK-XM811 Series External expansion is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 1.1**.
- Make sure the packing box is facing upwards so the TANK-XM811 Series External expansion does not fall out of the box.
- Make sure all the components shown in **Section 1.2** are present.



1.3 Unpacking Checklist





NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the TANK-XM811 Series External expansion from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The TXIOB-XM81-A-R10 is shipped with the following components:

Quantity	Item and Part Number	Image
Standard		
1	TXIOB-XM81-A-R10	
1	Screw pack	

The GPOE-XM81-8P-R10 is shipped with the following components:

Quantity	Item and Part Number	Image
Standard		
1	GPOE-XM81-8P-R10	
1	Screw pack	

Chapter

3

Installation

3.1 Installation Precautions

**CAUTION:**

The TANK-XM811 Series External expansion has more than one power supply connection point.

To reduce the risk of electric shock, disconnect all power sources before installing or servicing the TANK-XM811 Series External expansion.

During installation, be aware of the precautions below:

- **Read the user manual:** The user manual provides a complete description of the TANK-XM811 Series External expansion, installation instructions and configuration options.
- **DANGER! Disconnect Power:** Power to the TANK-XM811 Series External expansion must be disconnected during the installation process, or before any attempt is made to access the rear panel. Electric shock and personal injury might occur if the rear panel of the TANK-XM811 Series External expansion is opened while the power cord is still connected to an electrical outlet.
- **Qualified Personnel:** The TANK-XM811 Series External expansion must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.
- **Air Circulation:** Make sure there is sufficient air circulation when installing the TANK-XM811 Series External expansion. The TANK-XM811 Series External expansion's cooling vents must not be obstructed by any objects. Leave at least 5 cm of clearance around the TANK-XM811 Series External expansion to prevent overheating.
- **Grounding:** The TANK-XM811 Series External expansion should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the TANK-XM811 Series External expansion.

Internal expansion products

3.2 Back Cover Removal

Before installing or maintaining the internal components, the bottom cover must be removed from the TANK-XM81 Series Products. Follow the steps below to complete the task.

Step 1: Turn the TANK-XM81 Series Products over and remove the 6 screws on the bottom cover.

Step 2: Take off the bottom cover (Figure 3-1).

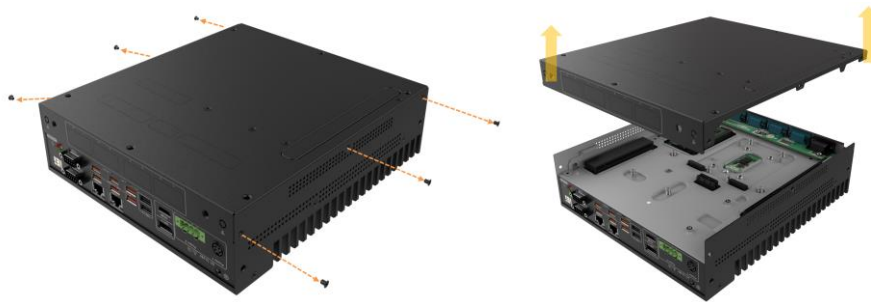


Figure 3-1: Remove the Cover

3.3 TXIOB-XM81-A Installation

Follow the steps below to install the TXIOB-XM81-A.

Step 1: Insert the golden finger of the TXIOB-XM81-A into the PCIe x16 slot (Figure 3-2).



Figure 3-2: TXIOB-XM81-A Installation

Step 2: Secure the module with 2 screws (Figure 3-3).

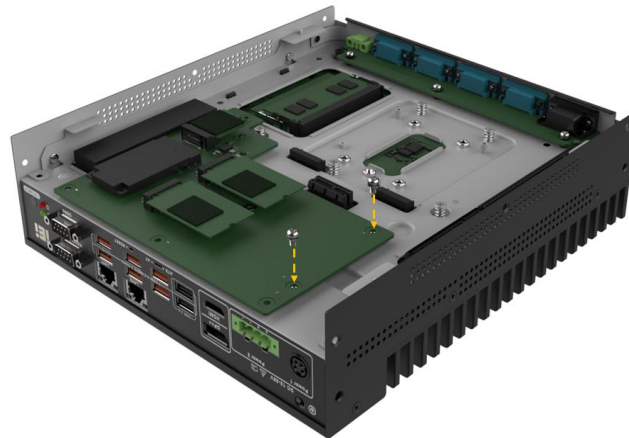


Figure 3-3: Securing TXCBP-XM81-2A

- Step 3:** Install M.2 / PCIe Mini expansion cards onto the TXCBP-XM81-2A. Close the bottom cover and secure it using the screws removed previously (see **Section 3.5**).

3.4 GPOE-XM81-8P Installation

Follow the steps below to install the GPOE-XM81-8P.

- Step 1:** Insert the golden finger of the GPOE-XM81-8P module into the PCIe x16 slot (Figure 3-4).

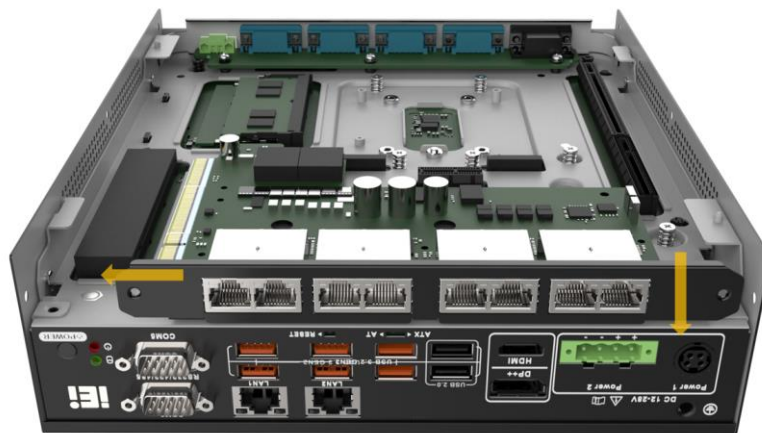


Figure 3-4: GPOE-XM81-8P Installation

- Step 2:** Secure the module with 2 screws (Figure 3-5).

Internal expansion products

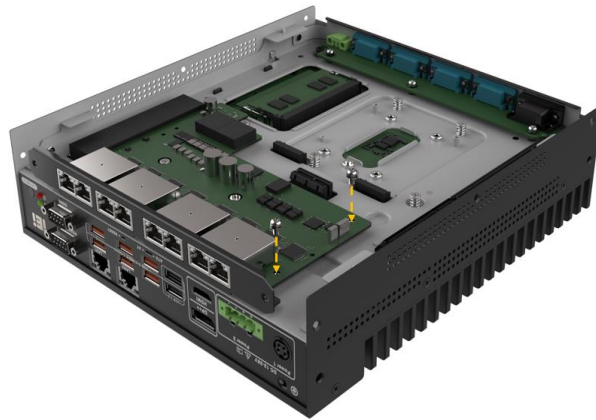


Figure 3-5: Securing the GPOE-XM81-8P

- Step 3:** Remove the knockouts from the bottom cover, four on the side for LAN ports and four on the top for heat sinks (Figure 3-6).

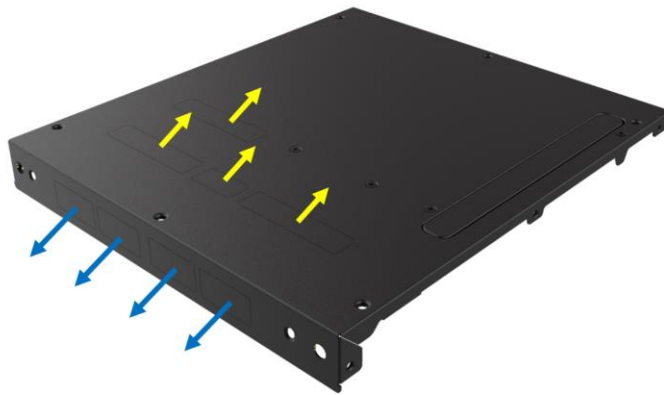


Figure 3-6: Remove the Knockout

- Step 4:** Close the bottom cover and secure it using the screws removed previously (see Section 3.5).

3.5 Back Cover Installation

To re-install the bottom cover follow the steps below.

Internal expansion products

- Step 1:** [Optional] Install an external antenna if necessary. You need to remove the knockouts first, and then install the antenna connectors into the knockout holes (Figure 3-7).

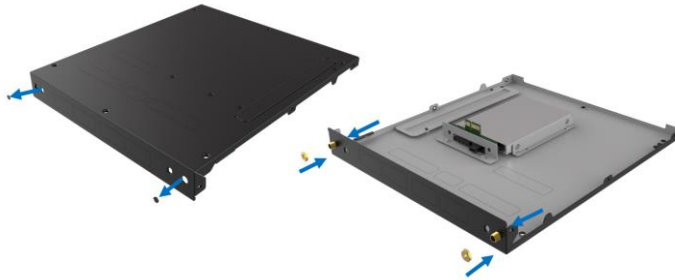


Figure 3-7: Install External Antenna Connector

- Step 2:** Install the bottom cover and secure it with 6 or 8 screws on the sides (Figure 3-8).



Figure 3-8: Back Cover Installation

- Step 3:** [Optional] Install the external antennas if necessary (Figure 3-9).

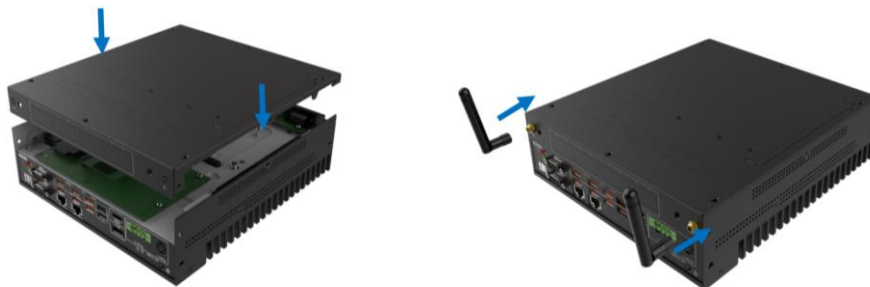


Figure 3-9: External Antenna Installation

Chapter

4

System Motherboard

4.1 TXCBP-XM81-A

4.1.1 Layout

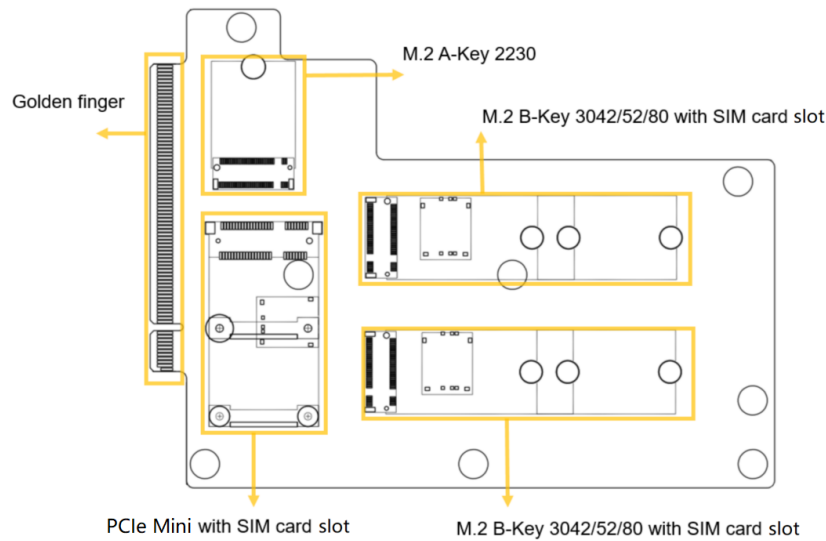


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
M.2 A-key slot	M.2 A-key slot	M2_A1
M.2 B-key slot	M.2 B-key slot	M2_B1 M2_B2
SIM slot	7-pin SIM holder	SIM1, SIM2, SIM3
PCIE Mini slot	PCIE Mini slot	M-PCIE1

Table 4-1: Peripheral Interface Connectors

Internal expansion products

4.1.3 M.2 A-Key Slot

- CN Label:** M.2_A1
- CN Type:** M.2 A-Key slot
- CN Location:** See **Figure 4-2**
- CN Pinouts:** See **Table 4-2**

The M.2 A-key slot supports PCIe x1 and USB 2.0 interfaces.

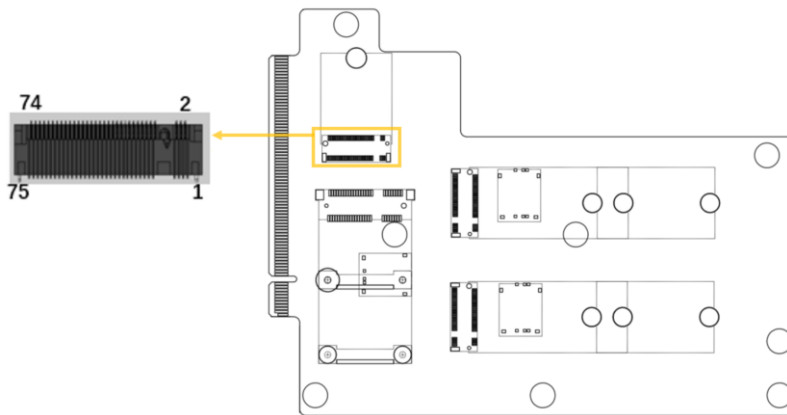


Figure 4-2: M.2 A-key Slot Location

Pin	Description	Pin	Description
1	GND	2	+V3.3A
3	USB+	4	+V3.3A
5	USB-	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	GND	24	GND
25	NC	26	NC

Internal expansion products

Pin	Description	Pin	Description
27	NC	28	NC
29	GND	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX+	36	GND
37	PCIE_TX-	38	NC
39	GND	40	NC
41	PCIE_RX+	42	NC
43	PCIE_RX-	44	NC
45	GND	46	NC
47	CLK_M2_A+	48	NC
49	CLK_M2_A-	50	NC
51	GND	52	WLAN_PERST#
53	NC	54	+V3.3A_WLAN
55	+V3.3A_WLAN	56	+V3.3A_WLAN
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+V3.3A
73	NC	74	+V3.3A
75	GND		

Table 4-2: M.2 A-Key Slot Pinouts

Internal expansion products

4.1.4 M.2 B-Key Slot

- CN Label:** M2_B1
- CN Type:** M.2 B-key slot
- CN Location:** See **Figure 4-3**
- CN Pinouts:** See **Table 4-3**

The M.2 B-Key slot supports PCIe x1 and USB 3.2 interfaces.

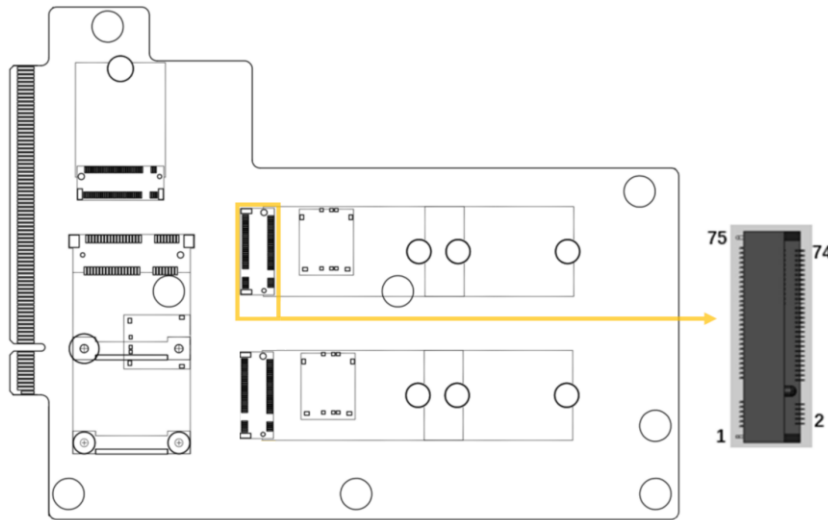


Figure 4-3: M.2 B-key Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	WWAN_CONFIG3	2	+3.3V_WWAN
3	GND	4	+3.3V_WWAN
5	GND	6	WWAN_FCP_OFF
7	USB_D+	8	WWAN_DISABLE
9	USB_D-	10	NC
11	GND	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	Module Key
17	Module Key	18	Module Key
19	Module Key	20	PSE_I2S1_SCLK
21	WWAN_CONFIG0	22	PSE_I2S1_TXD

Internal expansion products

23	PCIE_WAKE#	24	PSE_I2S1_RXD
25	SAR_DPR_WWAN	26	GNSS_DISABLE_N
27	GND	28	NC
29	USB_RXN	30	WWAN_UIM_RST
31	USB_RXP	32	WWAN_UIM_CLK
33	GND	34	WWAN_UIM_DATA
35	USB_TXN	36	UIM_PWR
37	USB_TXP	38	SSD_DEVSLP
39	GND	40	NC
41	PCIE_RXN	42	NC
43	PCIE_RXP	44	NC
45	GND	46	NC
47	PCIE_TXN	48	NC
49	PCIE_TXP	50	WWAN_PERST#
51	GND	52	N/C
53	CLK_M2_B_N	54	WWAN_WAKE#
55	CLK_M2_B_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	WWAN_SIM1_DET
67	WWAN_RST	68	WWAN_SUSCLK
69	DET_OS-PCIE/ GND-SATA	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	WWAN_CONFIG2		

Table 4-3: M.2 B-key Slot Pinouts

Internal expansion products

4.1.5 M.2 B-Key Slot

- CN Label:** M2_B2
- CN Type:** M.2 B-key slot
- CN Location:** See **Figure 4-4**
- CN Pinouts:** See **Table 4-4**

The M.2 B-Key slot supports PCIe x2 interface.

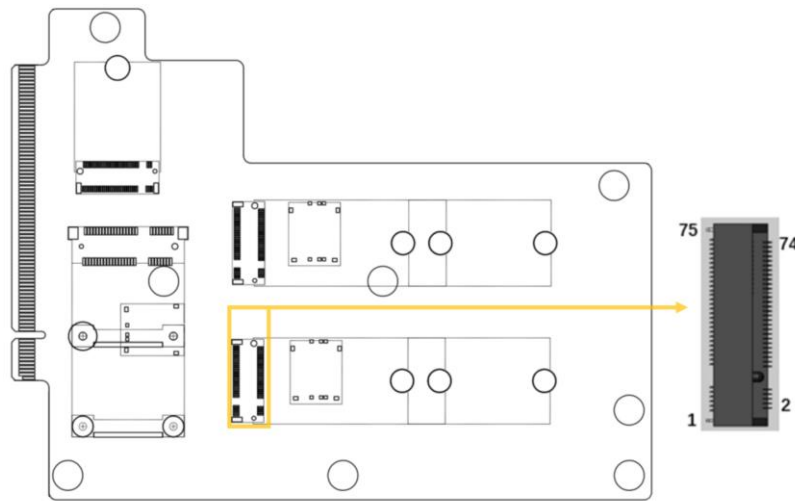


Figure 4-4: M.2 B-key Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	WWAN_CONFIG3	2	+3.3V_WWAN
3	GND	4	+3.3V_WWAN
5	GND	6	WWAN_FCP_OFF
7	USB_D+	8	WWAN_DISABLE
9	USB_D-	10	NC
11	GND	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	Module Key
17	Module Key	18	Module Key
19	Module Key	20	PSE_I2S1_SCLK
21	WWAN_CONFIG0	22	PSE_I2S1_TXD

Internal expansion products

23	PCIE_WAKE#	24	PSE_I2S1_RXD
25	SAR_DPR_WWAN	26	GNSS_DISABLE_N
27	GND	28	NC
29	PCIE_RXN	30	WWAN_UIM_RST
31	PCIE_RXP	32	WWAN_UIM_CLK
33	GND	34	WWAN_UIM_DATA
35	PCIE_TXN	36	UIM_PWR
37	PCIE_TXP	38	SSD_DEVSLP
39	GND	40	NC
41	PCIE_RXN	42	NC
43	PCIE_RXP	44	NC
45	GND	46	NC
47	PCIE_TXN	48	NC
49	PCIE_TXP	50	WWAN_PERST#
51	GND	52	N/C
53	CLK_M2_B_N	54	WWAN_WAKE#
55	CLK_M2_B_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	WWAN_SIM1_DET
67	WWAN_RST	68	WWAN_SUSCLK
69	DET_OS-PCIE/ GND-SATA	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	WWAN_CONFIG2		

Table 4-4: M.2 B-key Slot Pinouts

Internal expansion products

4.1.6 PCIe Mini Slot

CN Label:	M_PCIE1
CN Type:	PCIe Mini slot
CN Location:	See Figure 4-5
CN Pinouts:	See Table 4-5

The PCIe Mini card slot is for installing PCIe Mini expansion cards.

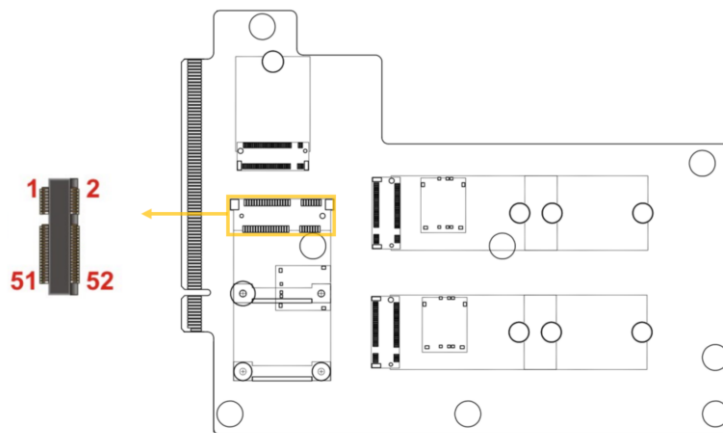


Figure 4-5: PCIe Mini Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	WWAN_CONFIG3	2	+3.3V_WWAN
3	GND	4	+3.3V_WWAN
5	GND	6	WWAN_FCP_OFF
7	USB_D+	8	WWAN_DISABLE
9	USB_D-	10	NC
11	GND	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	Module Key
17	Module Key	18	Module Key
19	Module Key	20	PSE_I2S1_SCLK
21	WWAN_CONFIG0	22	PSE_I2S1_TXD
23	PCIE_WAKE#	24	PSE_I2S1_RXD
25	SAR_DPR_WWAN	26	GNSS_DISABLE_N

Internal expansion products

27	GND	28	NC
29	PCIE_RXN5	30	WWAN_UIM_RST
31	PCIE_RXP5	32	WWAN_UIM_CLK
33	GND	34	WWAN_UIM_DATA
35	PCIE_TXN5	36	UIM_PWR
37	PCIE_TXP5	38	SSD_DEVSLP
39	GND	40	NC
41	PCIE_RXN4	42	NC
43	PCIE_RXP4	44	NC
45	GND	46	NC
47	PCIE_TXN4	48	NC
49	PCIE_TXP4	50	WWAN_PERST#
51	GND	52	N/C
53	CLK_M2_B_N	54	WWAN_WAKE#
55	CLK_M2_B_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	WWAN_SIM1_DET
67	WWAN_RST	68	WWAN_SUSCLK
69	DET_OS-PCIE/ GND-SATA	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	WWAN_CONFIG2		

Table 4-5: PCIe Mini Slot Pinouts

Internal expansion products

4.1.7 SIM Card Slot

CN Label: SIM1, SIM2, SIM3

CN Type: 7-PIN SIM holder

CN Location: See Figure 4-6

CN Pinouts: See Table 4-6

The SIM card slot accepts a SIM card for 3G network communication.



NOTE:

A WWAN module must be installed in the corresponding M.2 or PCIe Mini slot to provide WWAN communication.

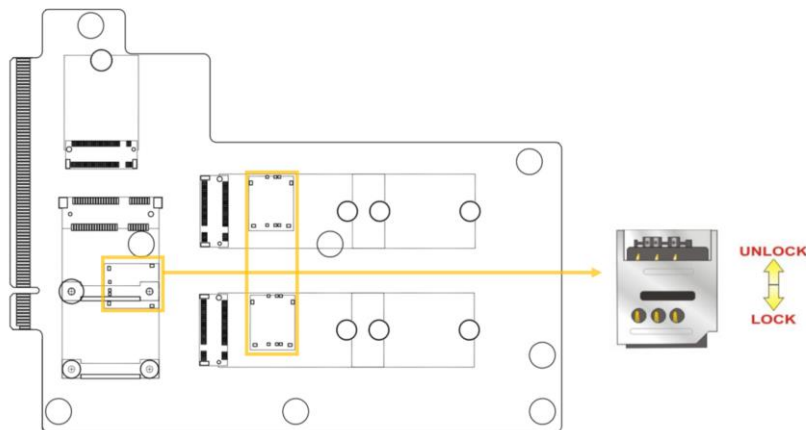


Figure 4-6: SIM Card Slot Location

PIN NO.	DESCRIPTION
C1	SIM_VCC
C2	SIM_RST
C3	SIM_Clock
C5	GND
C6	NC
C7	SIM_DATA

Table 4-6: SIM Card Slot Pinouts

4.2 GPOE-XM81-8P

4.2.1 Layout

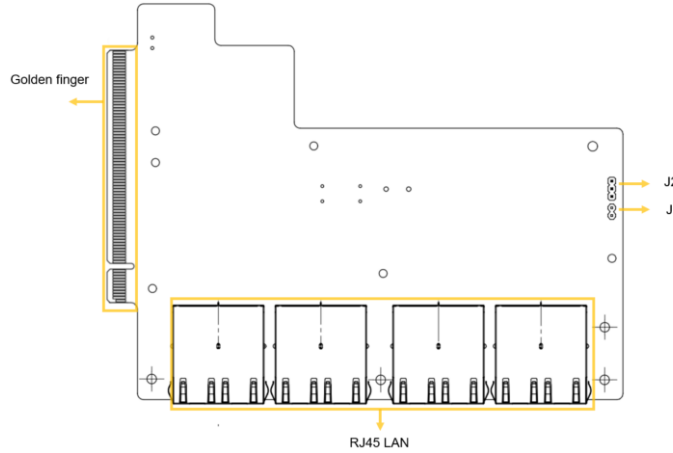


Figure 4-7: Connector and Jumper Locations

4.2.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
2.5G LAN Connector	RJ45	LAN1, LAN2, LAN3, LAN4
MCU programming connector	3-pin header, p=2.54 mm	J2
MCU programming connector	2-pin header, p=2.54 mm	J1

Table 4-7: Peripheral Interface Connectors

Internal expansion products

4.2.3 2.5GbE Connector

CN Label: LAN1, LAN2, LAN3, LAN4

CN Type: RJ45

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-8** and **Table 4-9**

The 2.5GbE connector attaches to the board

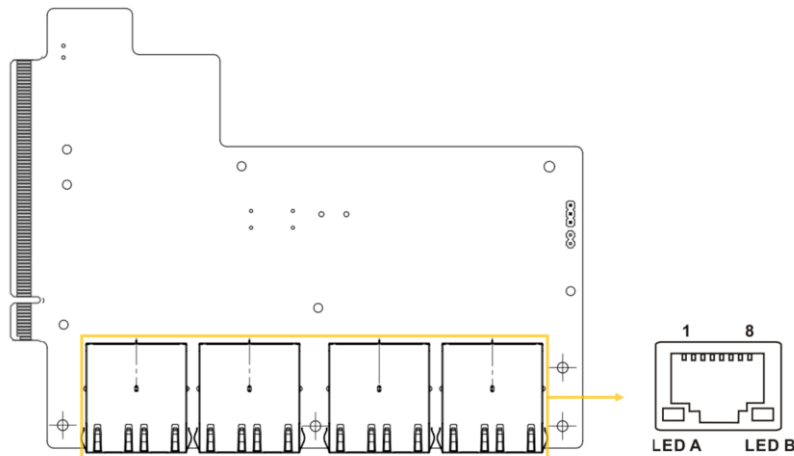


Figure 4-8: 2.5GbE Connector Location

Pin	Description	Pin	Description
1	MDIA0+	5	MDIA2+
2	MDIA0-	6	MDIA1-
3	MDIA1+	7	MDIA3+
4	MDIA2-	8	MDIA3-

Table 4-8: LAN Pinouts

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 100 Mb/s orange: 1000 Mb/s green: 2500 Mb/s

Table 4-9: LAN Connector LEDs