

8MM053

NXP® i.MX 8M mini Series
User's Manual

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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.

Table of Contents

Chapter 1 - Introduction.....	6
Specifications	6
Block Diagram	8
Dimension	8
Chapter 2 - Hardware Installation.....	9
Board Layout.....	9
Top View.....	9
Bottom View.....	9
Jumper Settings	10
DIO Power Select (5V_DIO) (IOJP1).....	10
Pin Assignment	11
Battery (BTJ1)	11
I ² C (TSJ5)	11
UART Debug (TSJ4)	12
USB2.0 (UBJ1)	12
CAN (CBCN1).....	13
Front Panel (FPJP1)	13
COM1 (TSJ2)	14
COM2 (TSJ3)	14
DIO/COM1 (TSJ1).....	15
COM1-RS-232 (TSJ1)	15
COM1-RS-422 (TSJ1)	15
COM1-RS-485 (TSJ1)	15
Expansion Slots.....	16
Installing the M.2 Module	16

About this Manual

This manual can be downloaded 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 occur 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.

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 Measures

- To avoid damage to the system, use the correct AC input voltage range.
- To reduce the risk of electric shock, unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the 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 8MM053 Motherboard
- Heat Spreader
- 2-Pole Terminal Block for RS-485

The board 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.

Before Using the System Board

When installing the system board in a new system, you will need at least the following internal components.

- Memory module
- Storage device such as a hard disk drive.
- Power supply

External system peripherals may also be required for navigation and display, including at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

► Specifications

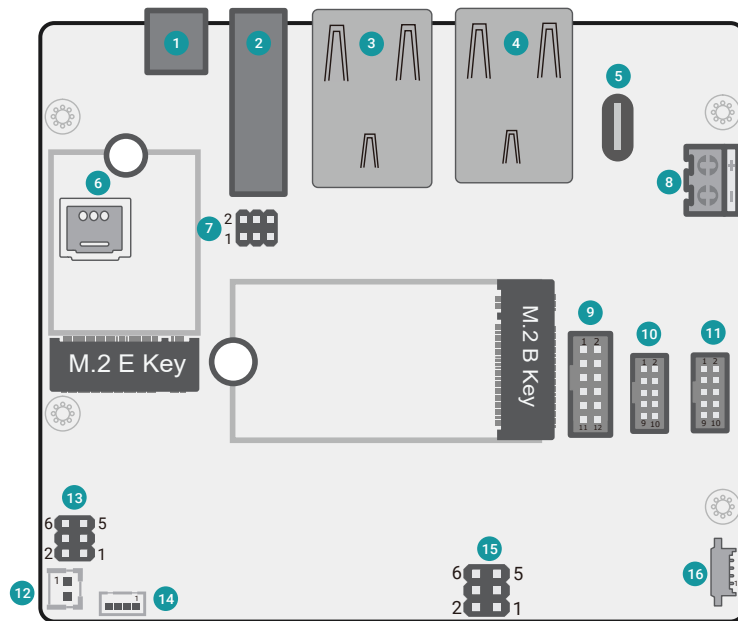
SYSTEM	Processor	NXP i.MX 8M mini applications processors NXP i.MX 8M mini Quad Cortex-A53 1.8GHz (Consumer) NXP i.MX 8M mini Quad Cortex-A53 1.6GHz (Industrial)
	Memory	4GB Memory Down (1GB/2GB by project support) Single Channel LPDDR4
GRAPHICS	Controller	2D-GC320 3D-GC NanoULTRA
	Feature	OpenGL® ES 2.1 VPU Decode: 1080p60 HEVC, H.264, VP9, VP8 VPU Encode: 1080p60 H.264, VP8
	Display	1 x HDMI (default) HDMI: resolution up to 1920x1080 @60Hz
	Single Display	HDMI
EXPENSION	Interface	1 x M.2 B key 3042/2242 (USB 2.0), Nano SIM slot support 1 x M.2 E key 2230 (USB 2.0)
ETHERNET	Controller	1 x RTL8211 Ethernet (10/100/1000Mbps)
REAR I/O	Ethernet	2 x GbE (RJ-45)
	Serial	1 x RS-485(2 poles terminal block)
	USB	2 x USB 2.0 1 x Reset Button
	Display	1 x HDMI
INTERNAL I/O	Serial	2 x RS-232 (2 x 5 header, 2mm pitch)
	USB	1 x USB 2.0 (2mm pitch)
	DIO and RS-422	DIO (4 DIO/PWR/GND) and RS-422(4pin) (2 x 6 header, 2mm pitch)
	SD	1 x Micro SD Slot
	I ² C	1 x I ² C (1.25mm pitch)
	eMMC	Support eMMC 5.1 8GB on board (default) Support up to 64GB (opt.)
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds

POWER	Type	DC 9V to 36V
	Connector	2-poles Terminal Block (default)
	RTC Battery	CR2032 with cable
OS SUPPORT	OS Support	Yocto 3.3 on eMMC (default)
ENVIRONMENT	Temperature	Operating: -5°C~65°C, -40°C~80°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
MECHANISM	Dimensions	100mm (3.94") x 85mm (3.35")
	Height	PCB: 1.6mm Top Side: 22.64mm, Bottom Side: 4mm
STANDARDS AND CERTIFICATIONS	Certifications	CE, FCC Class A, RoHS

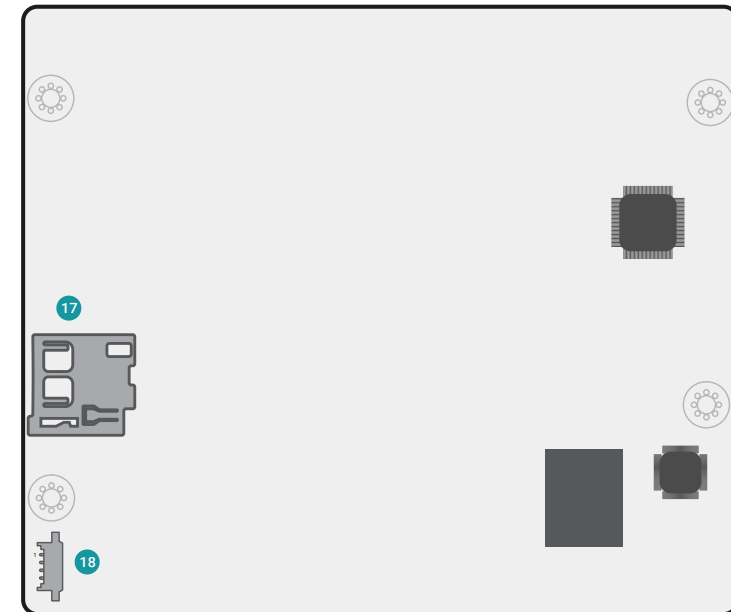
Chapter 2 - Hardware Installation

► Board Layout

Top View



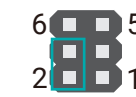
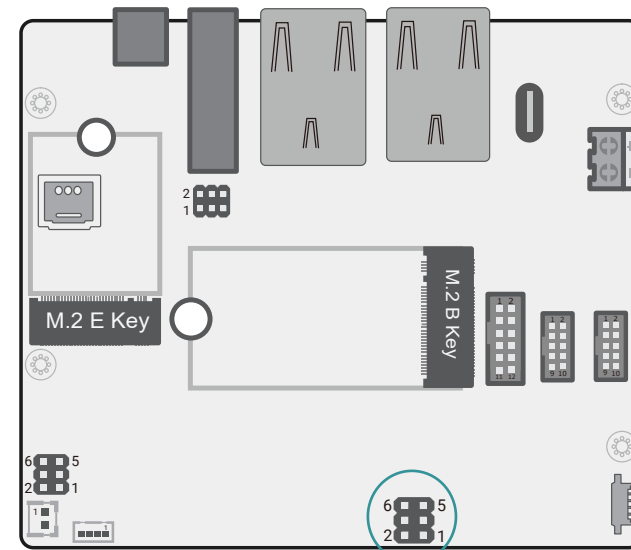
Bottom View



► Jumper Settings

DIO Power Select (5V_DIO) (IOJP1)

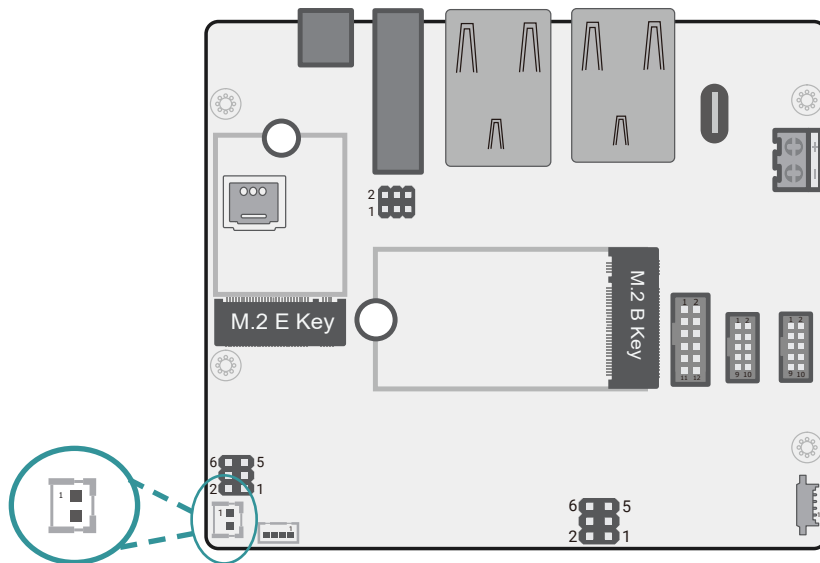
- | | |
|----------------------|------------------------------|
| 1 RS-485 | 10 COM2 |
| 2 HDMI | 11 COM1 |
| 3 ▲ LAN2
▼ USB2.0 | 12 Battery |
| 4 ▲ LAN1
▼ USB2.0 | 13 Front Panel |
| 5 OTG USB | 14 CAN |
| 6 Nano SIM Slot | 15 DIO Power Select (5V_DIO) |
| 7 USB2.0 | 16 UART Debug |
| 8 DC-in | 17 uSD Slot |
| 9 DIO/COM1 | 18 I ² C |



- 1-3 On: 3V3 (default)
- 2-4 On: DIO_PWR_SEL1 (default)
- 3-5 On: 5V

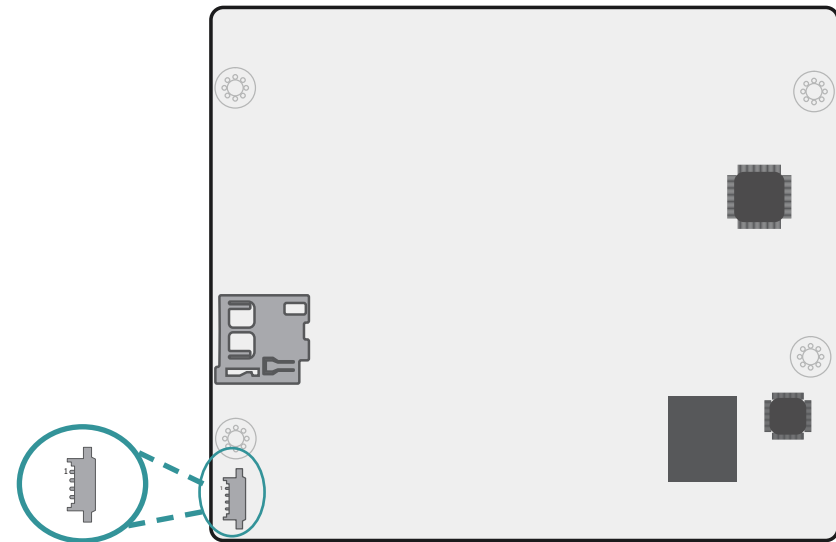
► **Pin Assignment**

Battery (BTJ1)



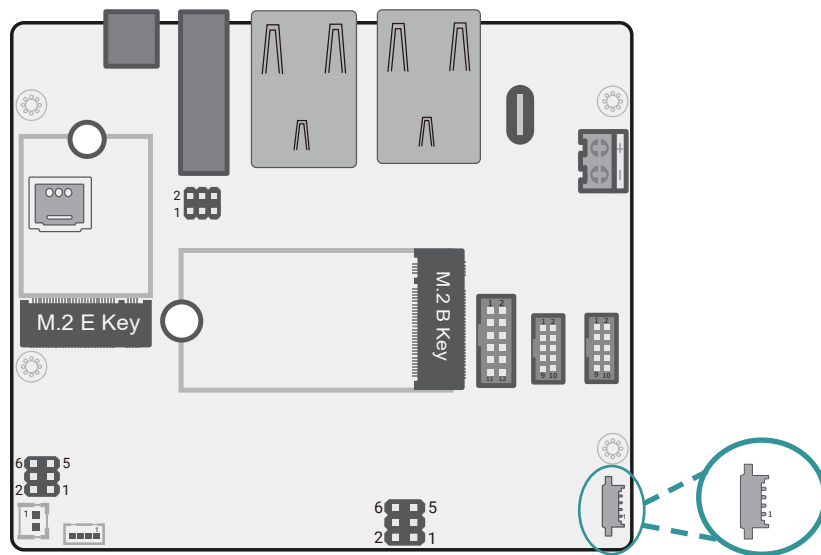
Pin	Assignment
1	+VBAT
2	GND

I²C (TSJ5)



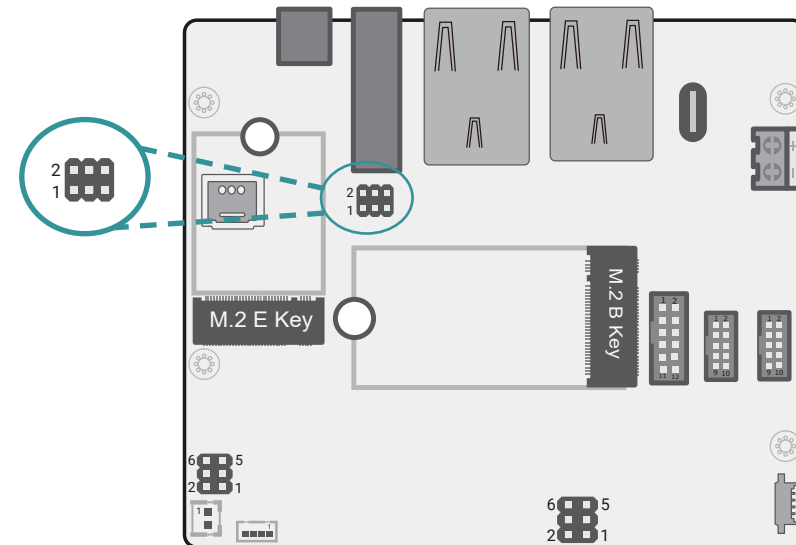
Pin	Assignment
1	3V3
2	SCL
3	SDA
4	GND

UART Debug (TSJ4)



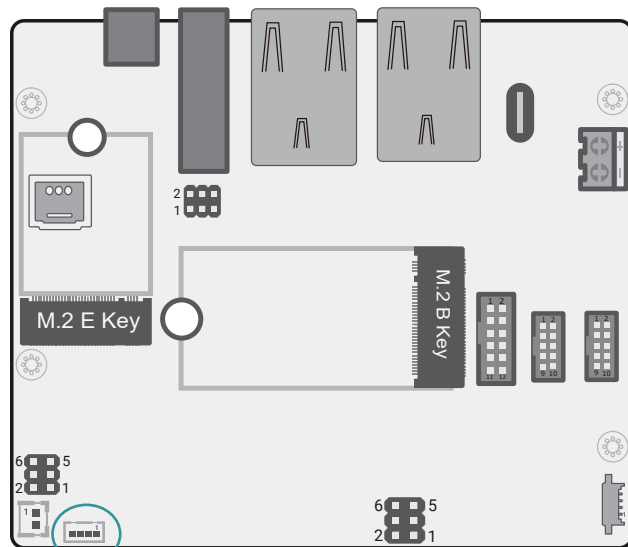
Pin	Assignment
1	3V3
2	UART2_RXD
3	UART2_TXD
4	GND

USB2.0 (UBJ1)



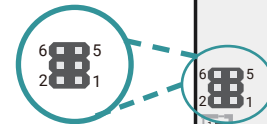
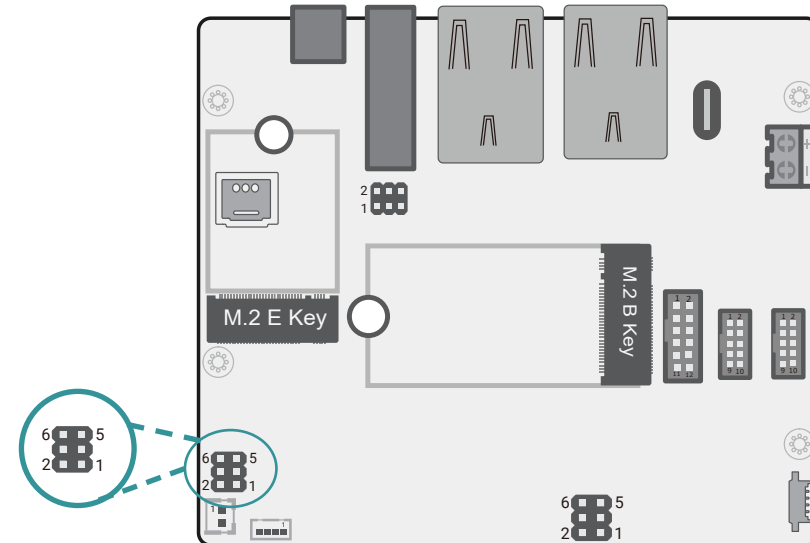
Pin	Assignment	Pin	Assignment
1	5V	2	DP
3	DN	4	DIO2
5	GND	6	CUT

CAN (CBCN1)



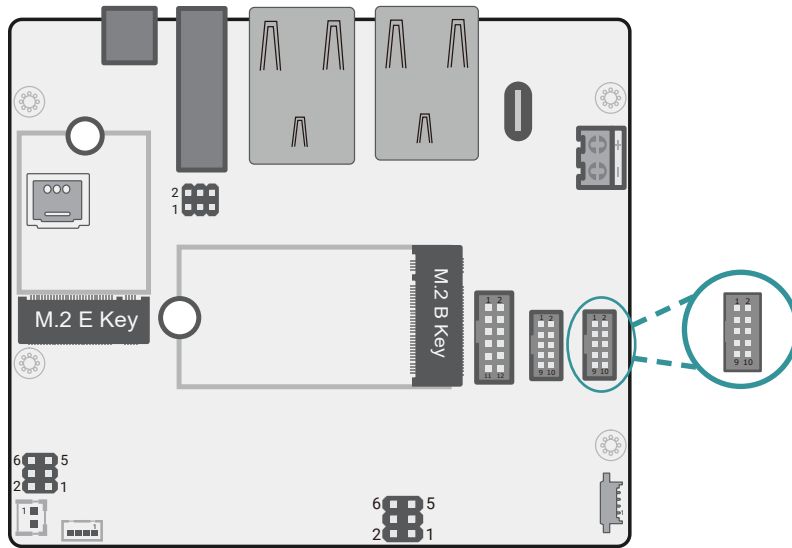
Pin	Assignment
1	3V3
2	CANH
3	CANL
4	GND

Front Panel (FPJP1)



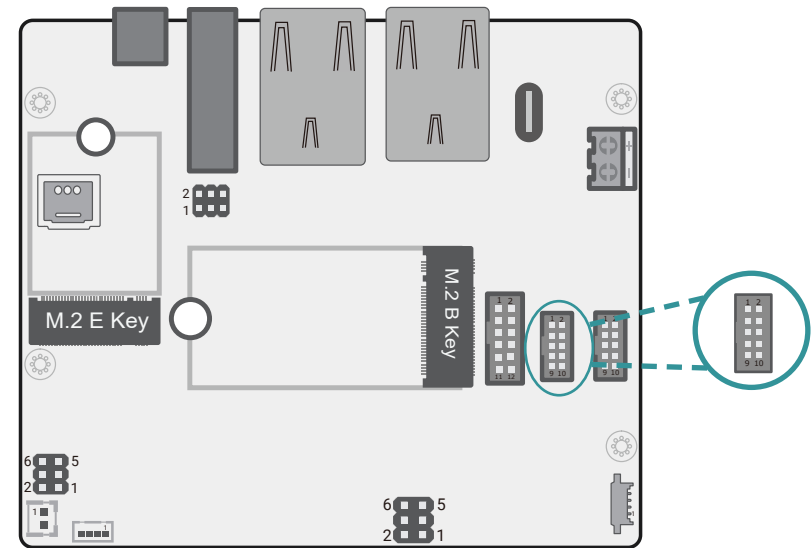
Pin	Assignment	Pin	Assignment
1	ONOFF	2	3V3
3	GND	4	SYS_LED
5	SYS_RST#	6	SYS_ON#

COM1 (TSJ2)



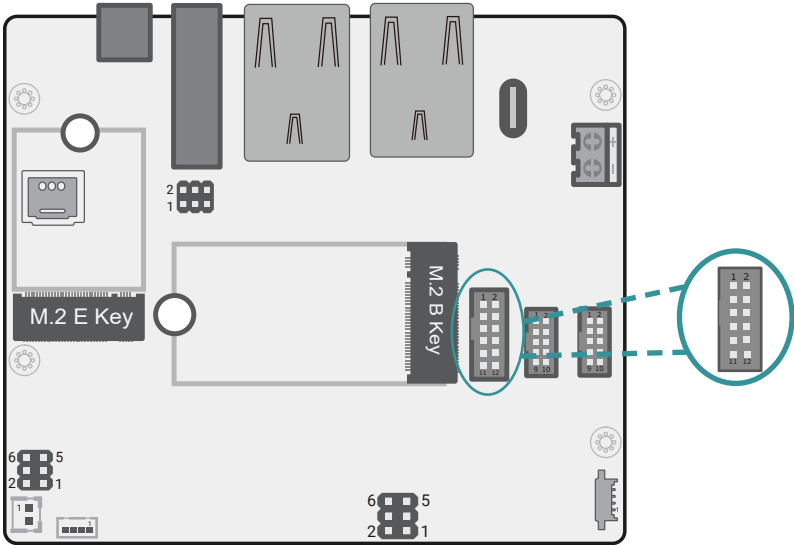
Pin	Assignment	Pin	Assignment
1	MDCD-	2	MSIN-
3	MSO-	4	MDTR-
5	GND	6	MDSR-
7	MRTS-	8	MCTS-
9	MRI-	10	----

COM2 (TSJ3)



Pin	Assignment	Pin	Assignment
1	MDCD-	2	MSIN-
3	MSO-	4	MDTR-
5	GND	6	MDSR-
7	MRTS-	8	MCTS-
9	MRI-	10	----

DIO/COM1 (TSJ1)



Pin	Assignment	Pin	Assignment
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	GND	6	VCCP
7	DCD	8	RX
9	RTS	10	TX
11	CTS	12	NC

COM1-RS-232 (TSJ1)

Pin	Assignment	Pin	Assignment
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	GND	6	VCCP
7	NC	8	RX
9	RTS	10	TX
11	CTS	12	NC

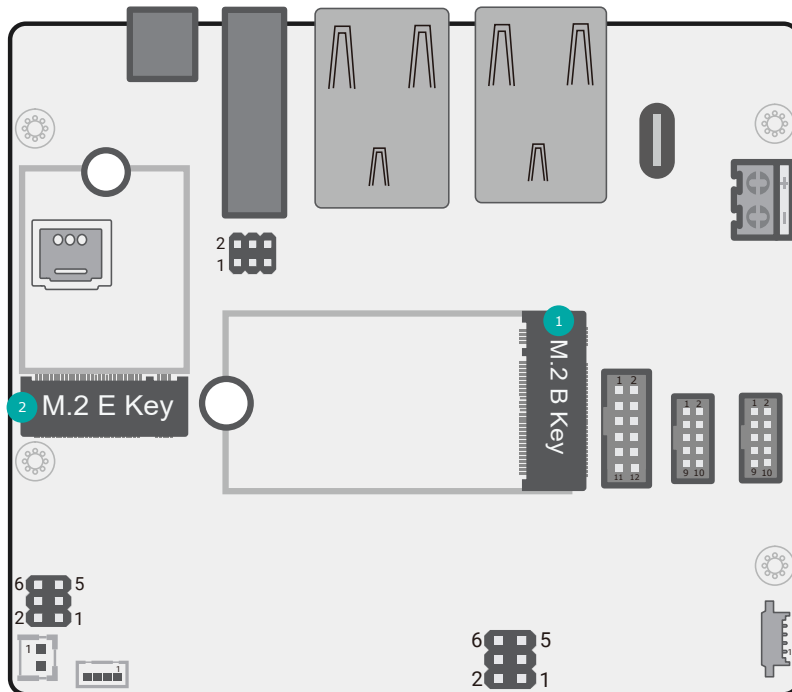
COM1-RS-422 (TSJ1)

Pin	Assignment	Pin	Assignment
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	GND	6	VCCP
7	TX-	8	TX+
9	NC	10	RX+
11	NC	12	RX-

COM1-RS-485 (TSJ1)

Pin	Assignment	Pin	Assignment
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	GND	6	VCCP
7	DATA-	8	DATA+
9	RTS	10	TX
11	CTS	12	NC

► Expansion Slots



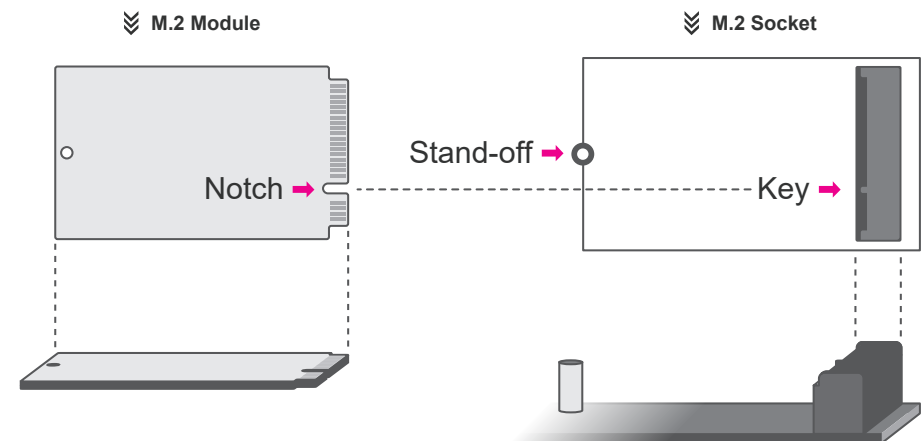
1 M.2 B-Key

2 M.2 E-Key

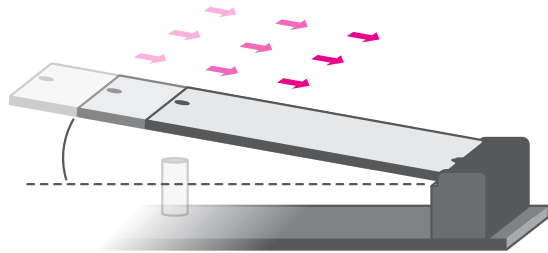
Installing the M.2 Module

Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

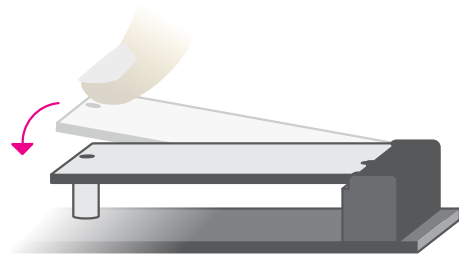
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



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.