DFI

CB-2617

Micro-ATX Industrial Motherboard
User's 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.

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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 CB-2617 motherboard
- 1 I/O shield

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.

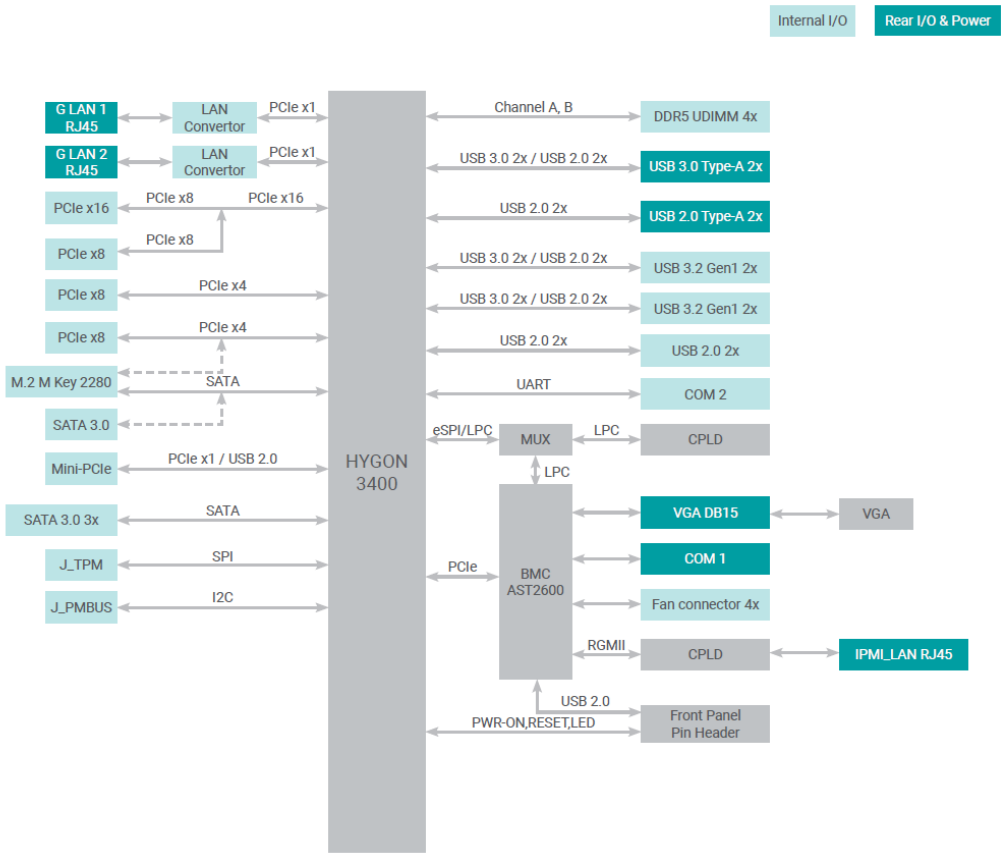
Chapter 1 - Introduction

▶ Specifications

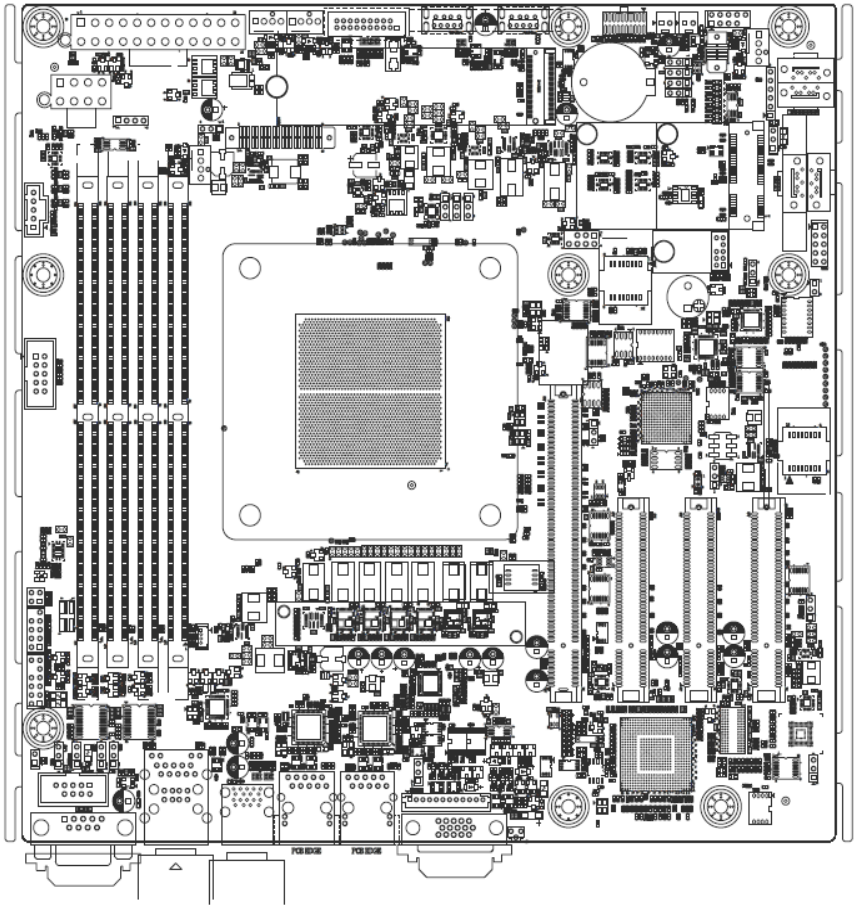
SYSTEM	Processor	HYGON C86-4G 3490 Processor Series
	Memory	Four UDIMM up to 128GB Dual Channel DDR5 up to 5200 MHz
	BIOS	Byosoft BIOS
	BMC	ASPEED AST2600 (IPMI 2.0 support)
GRAPHICS	Display	1 x VGA (DB15) 1 x VGA (opt. pin header share Rear IO VGA) VGA: resolution up to 1920x1200 @ 60Hz
EXPANSION	Interface	1 x PCIe x16 (Gen 4) (1 x16 signals or 1 x8 signals) 1 x PCIe x8 (Gen 4) (N/A or 1 x8 signals) --Support PCIE1/PCIE2 : single at x16(PCIE1)/NA(PCIE4) --Support PCIE1/PCIE4 : dual at x8(PCIE1)/x8(PCIE4) 2 x PCIe x8 (Gen 4) (2 x4 signals)
		1 x M.2 2280 M key (SATA or PCIe Gen4 x4 support) (SATA signal share M.2, PCIE x4 signal share PCIE#3 x8 slot)
		1 x MINI-PCIE (PCIe/USB 2.0/WIFI/Bluetooth support)
ETHERNET	Controller	1 x Realtek® RTL8211FS (IPMI support) 2 x Intel® I210AT
REAR I/O	Ethernet	2 x 1GbE (RJ-45) 1 x IPMI LAN (RJ-45)
	Serial	1 x COM1 RS232 (DB9)
	USB	2 x USB 3.2 Gen1 2 x USB 2.0
	Display	1 x VGA (DB15)
INTERNAL I/O	Serial	1 x COM2 RS232 Header
	USB	4 x USB 3.2 Gen1 2 x USB 2.0
	SATA	3 x SATA 3.0 (up to 6Gb/s) 1 x M.2 (opt.)
	DIO	8, GPIO
	LED	1 x BMC LED 1 x System power LED 1 x Power button LED
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	TPM 2.0

POWER	Type	ATX
	Connector	8-pin ATX 12V power 24-pin ATX power
	RTC Battery	CR2032 Coin Cell
OS SUPPORT	Microsoft	Windows 10/11 64bit Kylin OS
	Linux	Linux
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -20 to 75°C
	Humidity	Operating: 5 to 95% RH (No condensation)
MECHANISM	Dimensions	microATX Form Factor 243.8mm x 243.8mm
	Height	PCB: 1.6mm Top Side: < 19.0mm Bottom Side: < 4.0mm

▶ Block Diagram



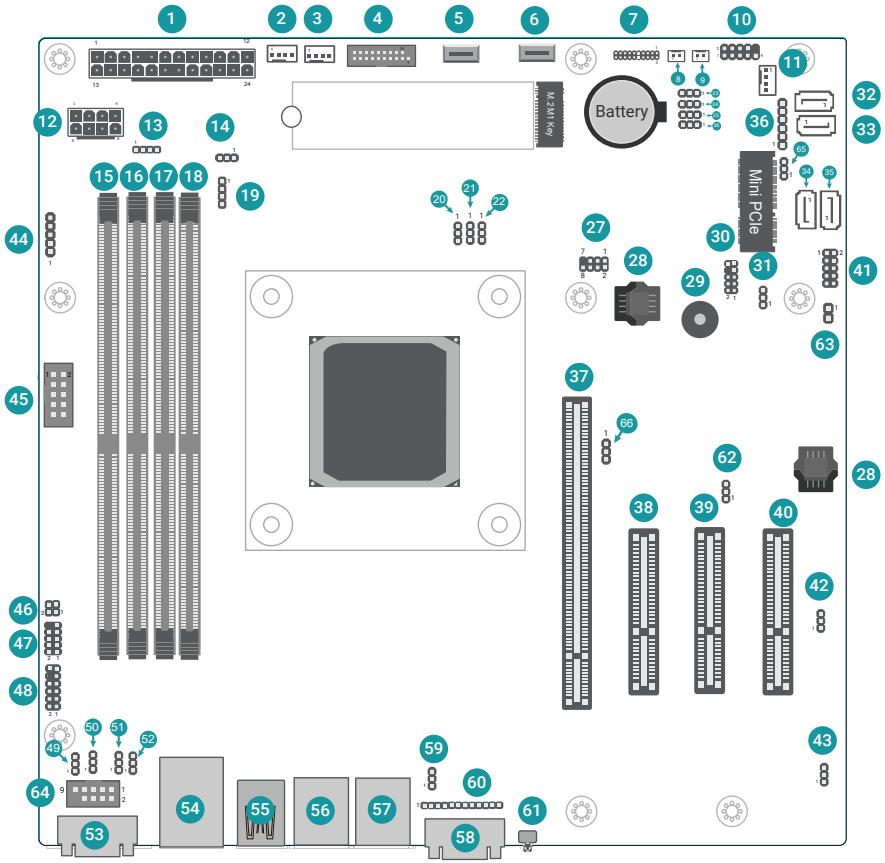
▶ Dimension



Chapter 2 - Hardware Installation

▶ Board Layout

Top View



1 ATX Power
2 System Fan1
3 System Fan2
4 USB3.0
5 USB 3.0 Type A
6 USB 3.0 Type A
7 CPU Debugging
8 Power On
9 Reset
10 USB2.0
11 System Fan1
12 +12V Power
13 CPU Temperature Monitor
14 CPU NTEST
15 DIMM1
16 DIMM2
17 DIMM3
18 DIMM4
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20 CPU I2C
21 CPU I2C
22 CPU I2C
23 Clear CMOS
24 LPC/ESPI Mode Select
25 CPU Test
26 CPU Test
27 BIOS ROM
28 SPI Flash BIOS
29 Buzzer
30 TPM
31 UART
32 SATA3
33 SATA4
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36 CPU Clock Drive
37 PCIE Gen4 x16 or PCIE Gen4 x8
38 PCIE Gen4 x4
39 PCIE Gen4 x4
40 PCIE Gen4 x8

41 JTAG CPLD

42 UART Debug

43 UART Debug

44 SMBus

45 CPU Test

46 LAN LED

47 Front Panel

48 GPIO

49 COM2

50 UART Debug

51 COM1

52 COM1

53 COM1 DB9

54 ▲LAN
▼USB2.0

55 USB3.0

56 LAN1

57 LAN2

58 VGA

59 UART Debug

60 VGA

61 Power Button

62 BMC Select

63 Chassis Anti-theft

64 COM2

65 SATA DOM Select

66 CPU I2C

▶ Installing the heat sink

Installing the Heat Sink

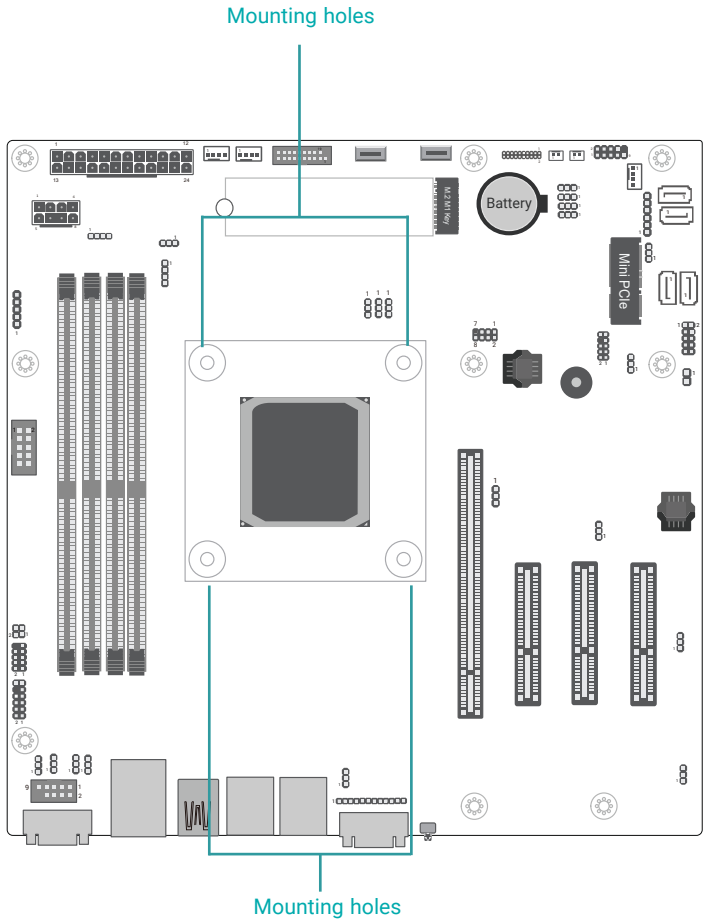
The CPU must be kept cool by using a heat sink, otherwise the CPU will overheat damaging both the CPU and system board.

1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

   Some heat sinks come with a patch of preapplied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

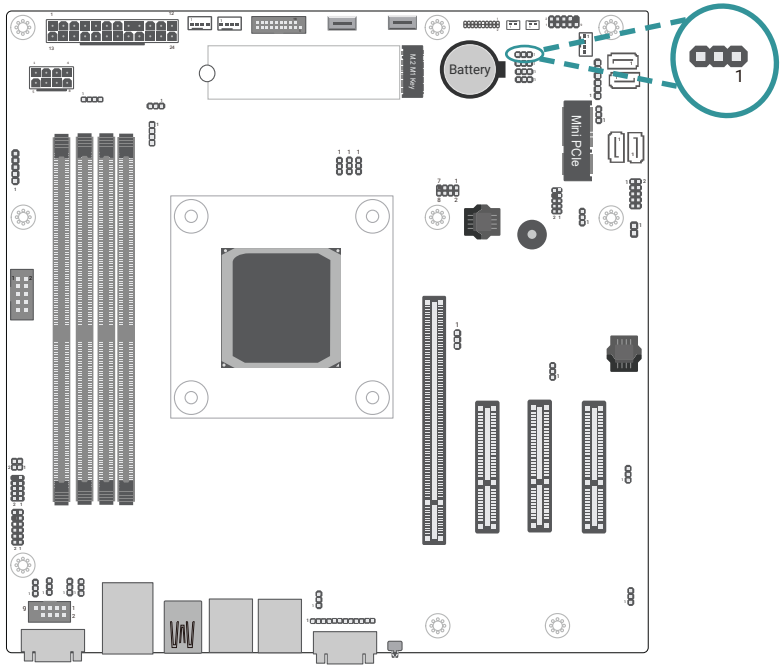
2. Place the heat sink on top of the CPU. The 4 spring screws around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the board.

3. Screw tight two of the spring screws at opposite corners into the mounting holes. And then proceed with the other two spring screws.



▶ Jumper Settings

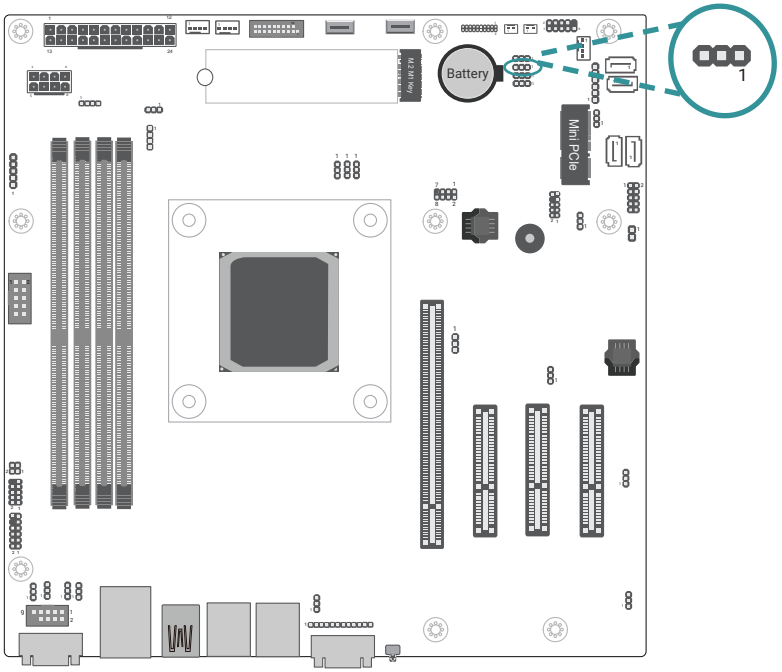
LPC/ESPI Mode Select (J61)



■ 1-2 On: LPC (Default)

■ 2-3 On: ESPI

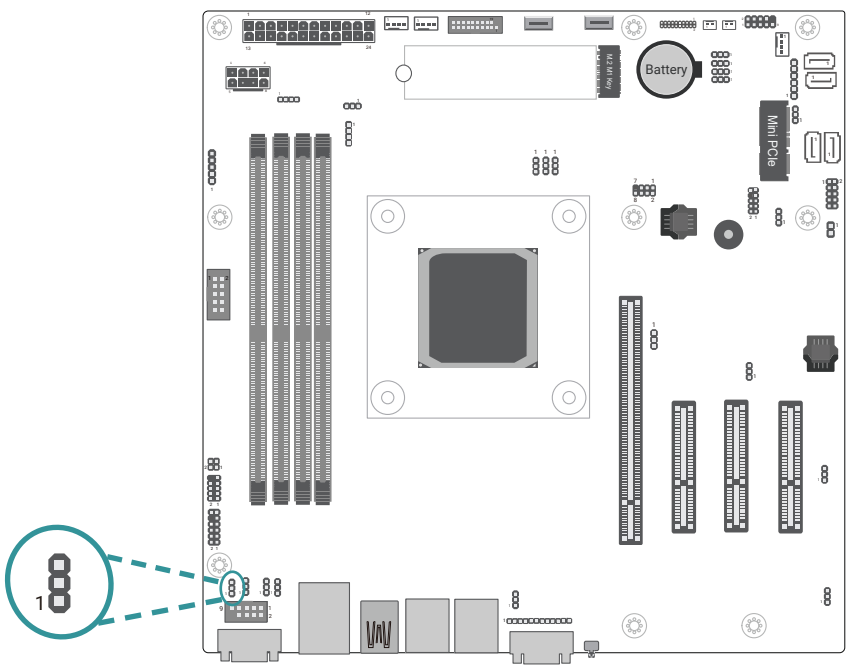
Clear CMOS (J6)



■ 1-2 On: Normal (Default)

■ 2-3 On: Clear CMOS Data

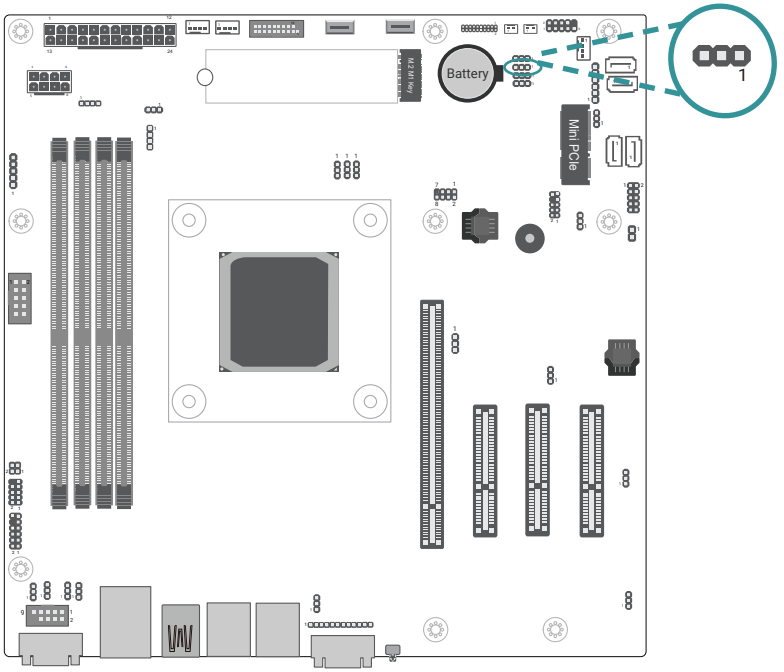
COM2 (J73)



■ 1-2 Off

■ 2-3 On (Default)

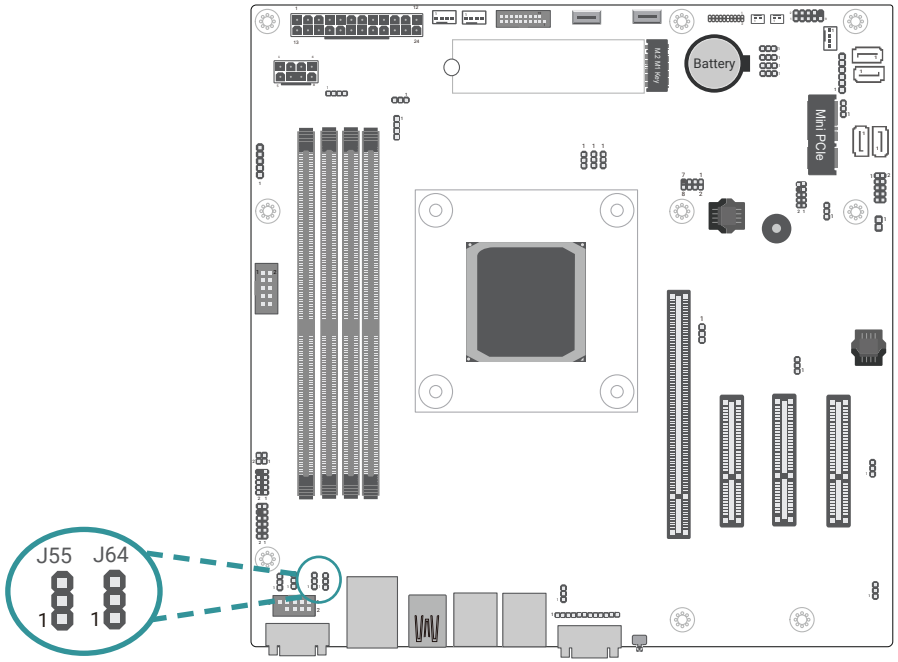
Clear CMOS (J6)



■ 1-2 On: Normal (Default)

■ 2-3 On: Clear CMOS Data

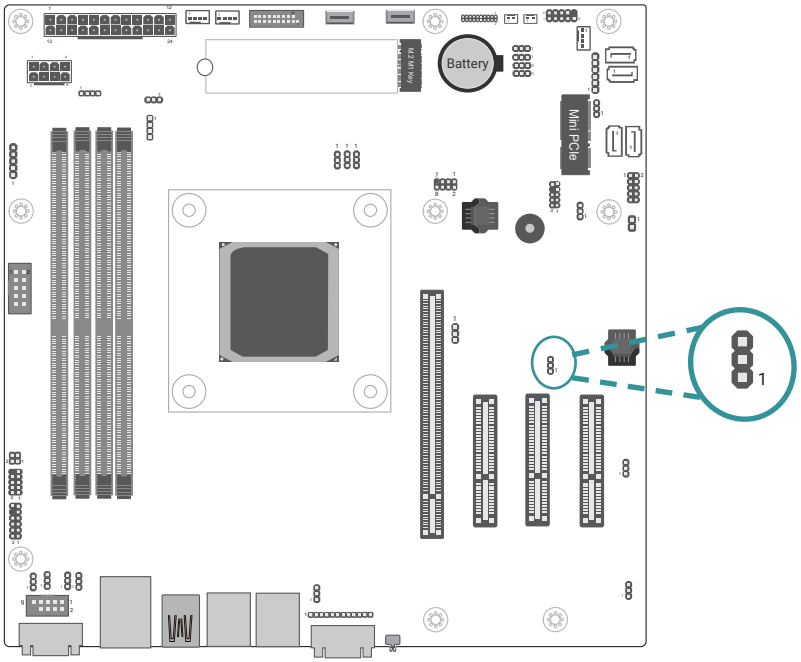
COM1 (J55 & J64)



■ 1-2 Off

■ 2-3 On (Default)

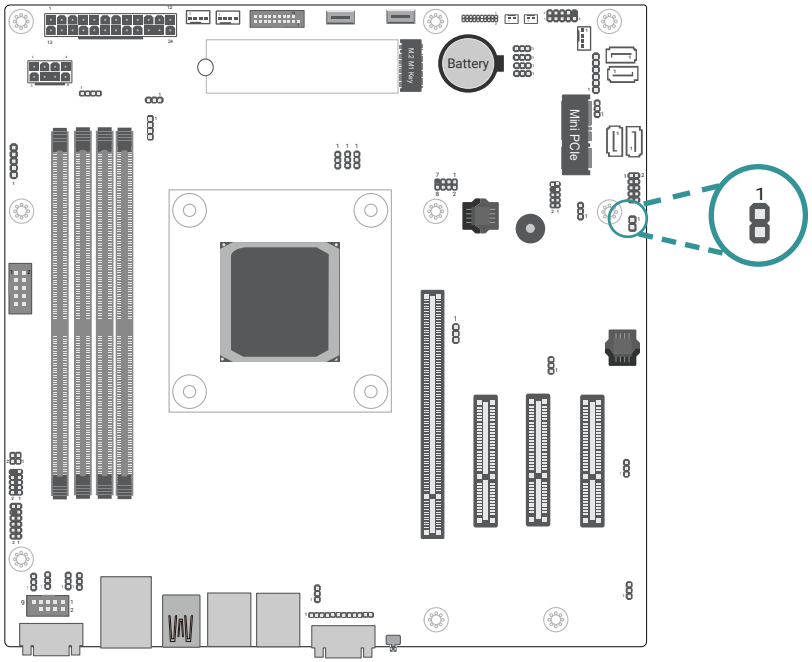
BMC Select (J46)



■ 1-2 On: On (Default)

■ 2-3 On: Off

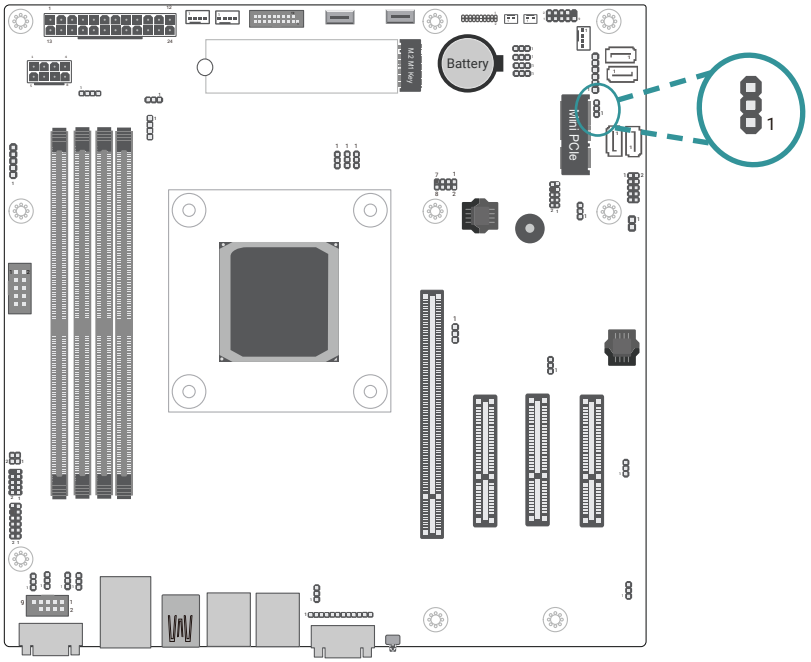
Chassis Anti-theft (J42)



■ 1-2 Off: Connected

■ 1-2 On: Disconnected

SATA DOM Select (J_DOM1)

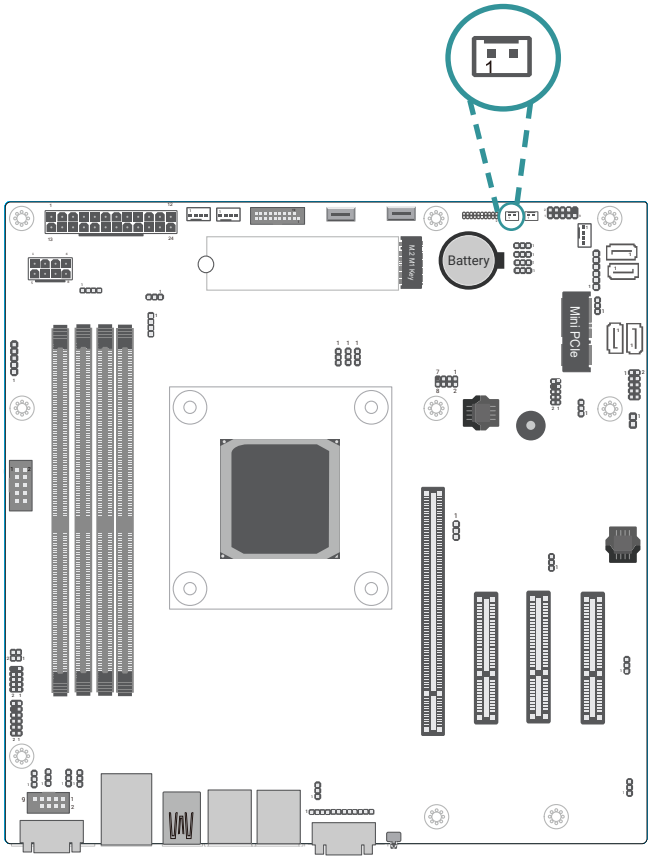


■ 1-2 On

■ 2-3 Off

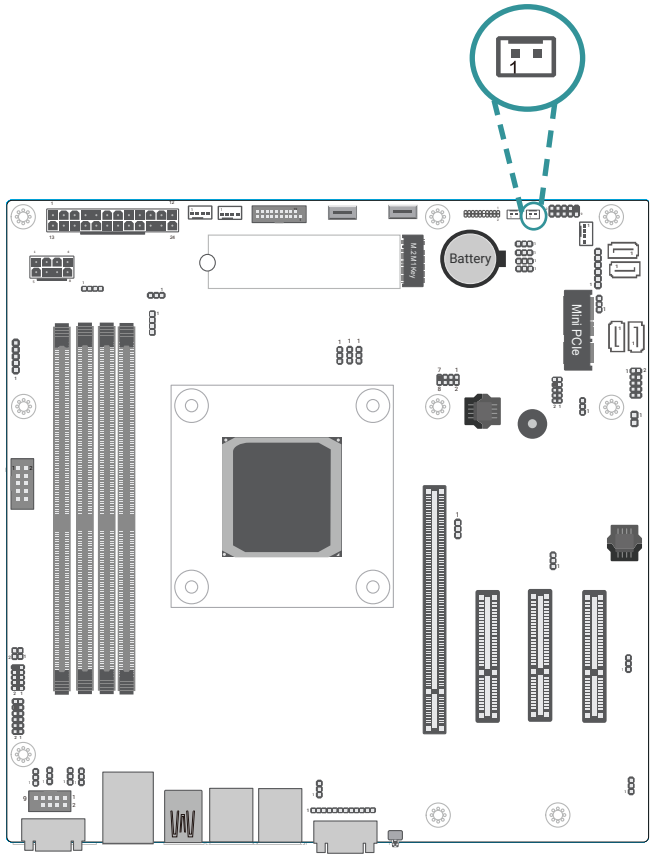
▶ Pin Assignment

Power On (J_PB1)



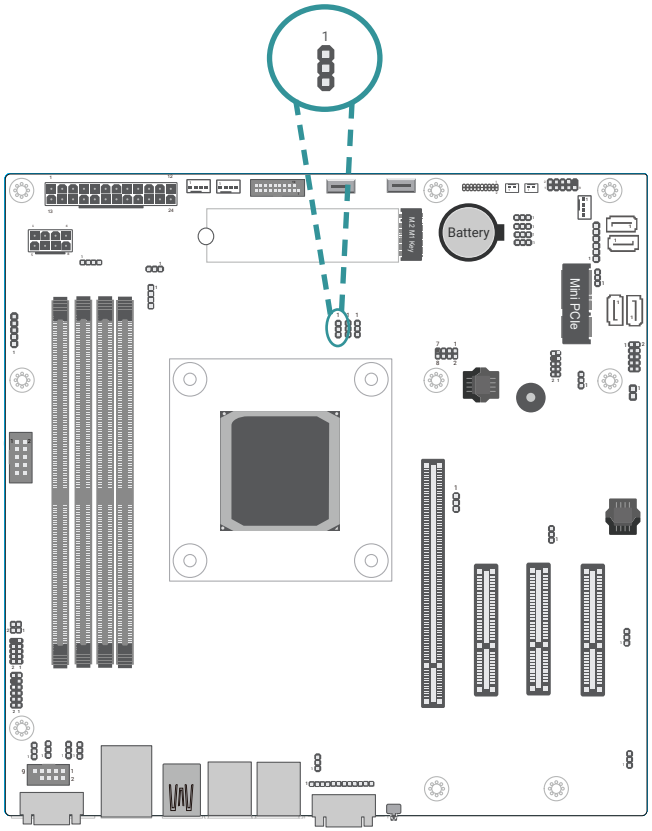
Pin	Assignment
1	Power On+
2	Power On-

Reset (J_RST1)



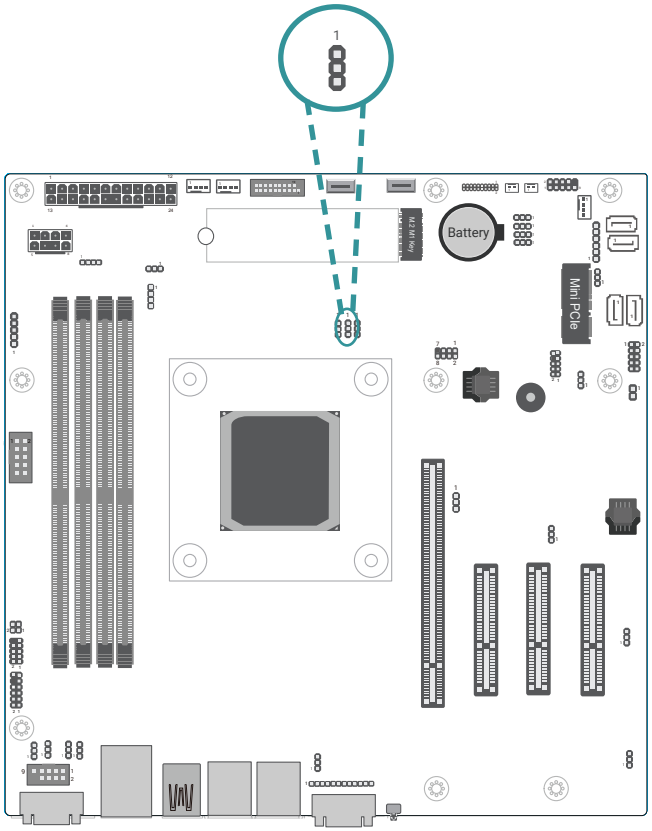
Pin	Assignment
1	Reset+
2	PWM

CPU I2C (J52)



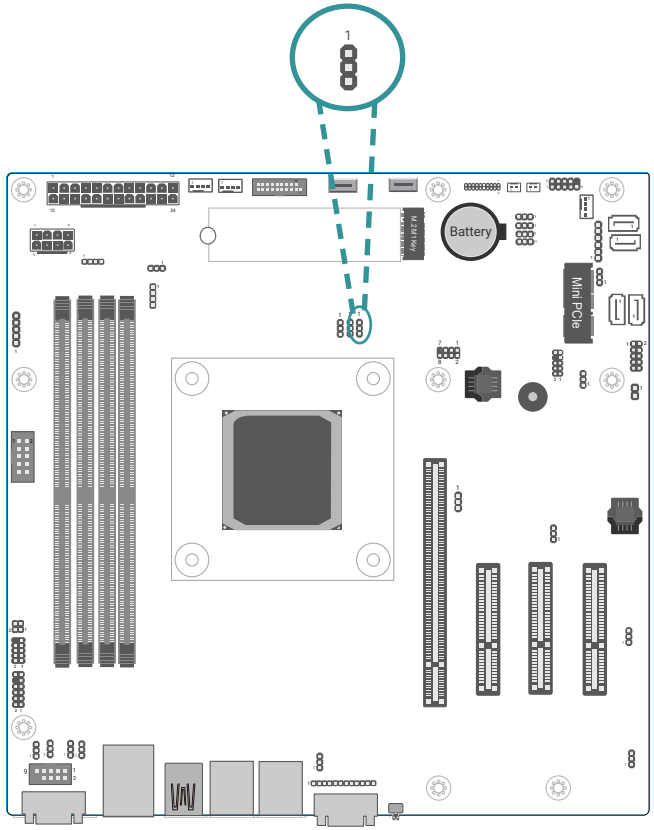
Pin	Assignment
1	SCL
2	SDA
3	GND

CPU I2C (J67)



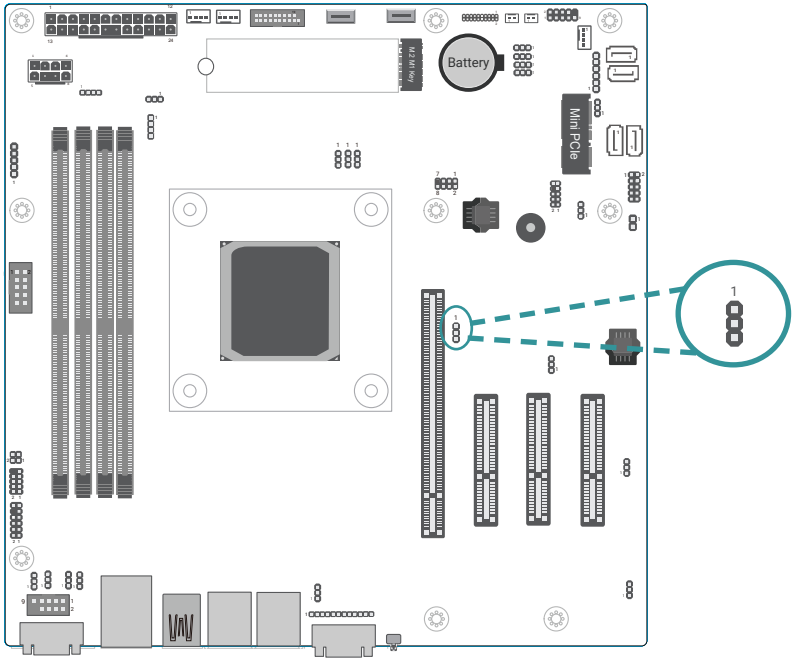
Pin	Assignment
1	SCL
2	SDA
3	GND

CPU I2C (J65)



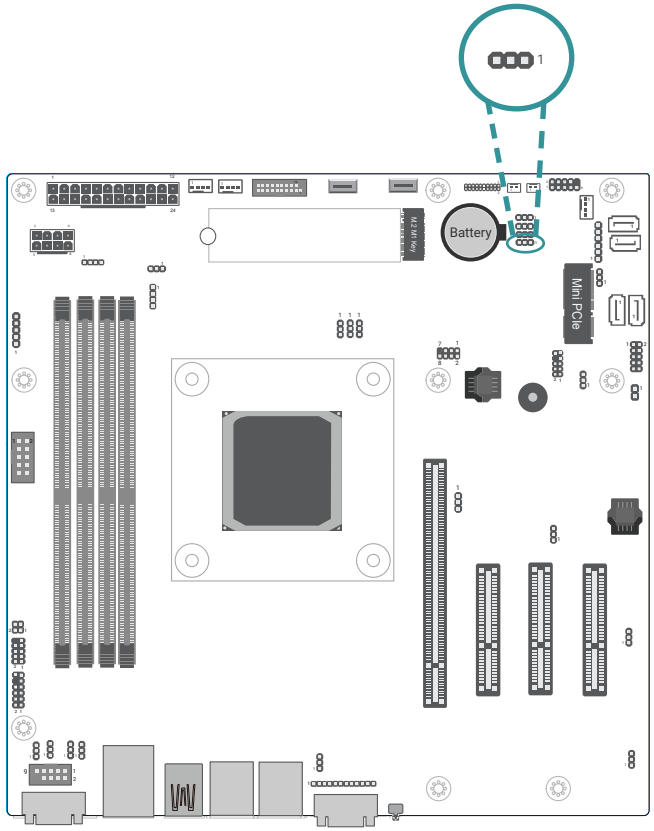
Pin	Assignment
1	SCL
2	SDA
3	GND

CPU I2C (J66)



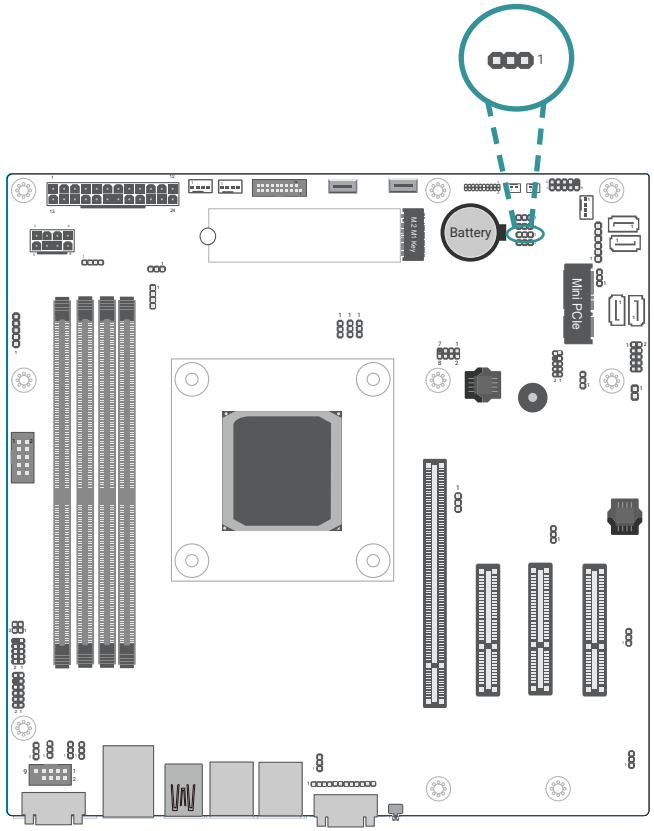
Pin	Assignment
1	SCL
2	SDA
3	GND

CPU Test (J70)



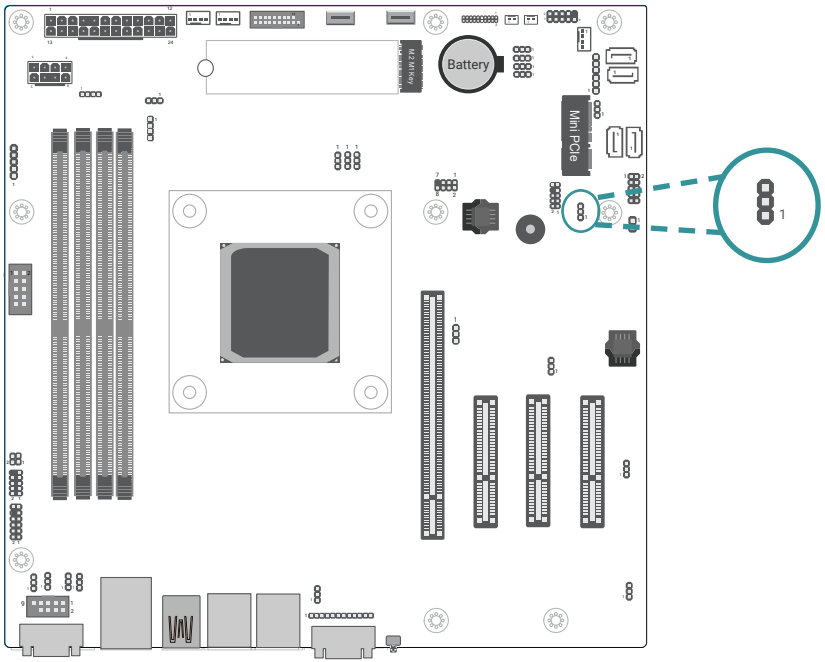
Pin	Assignment
1	FM_MFG_MODE_N
2	I2C_P0_PDCTL_INT
3	GND

CPU Test (J36)



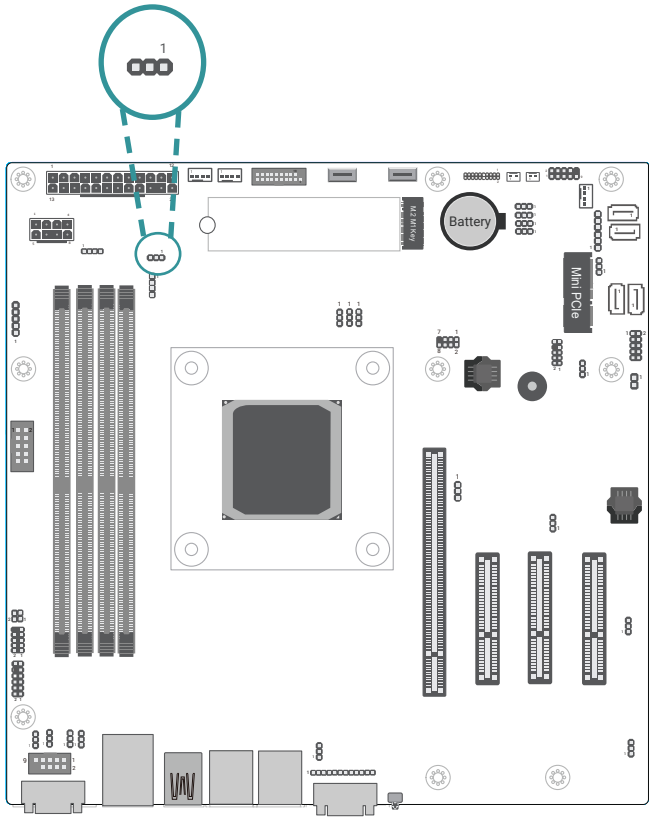
Pin	Assignment
1	SCL
2	SDA
3	GND

UART (J51)



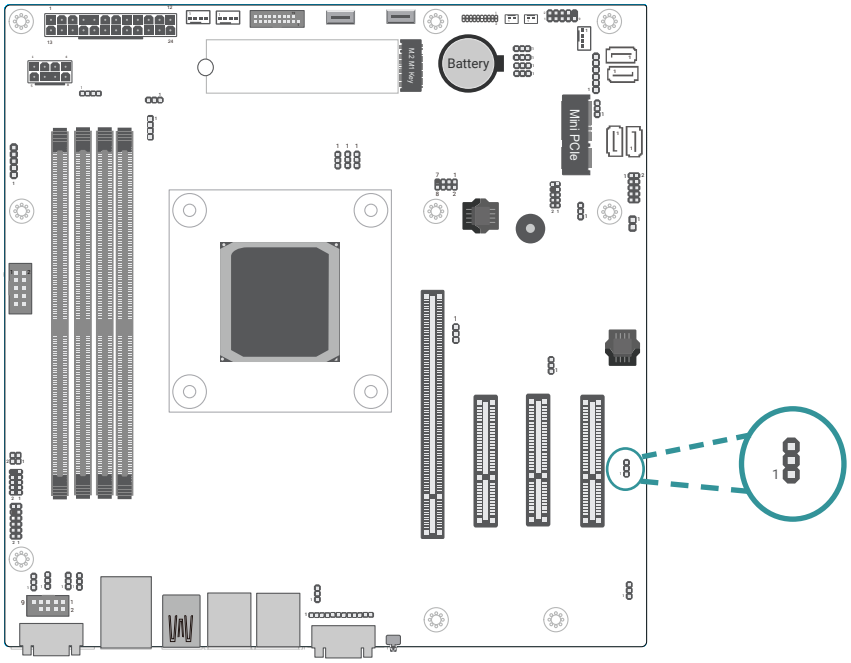
Pin	Assignment
1	UART0_RTS
2	UART0_CTS
3	GND

CPU NTEST (J38)



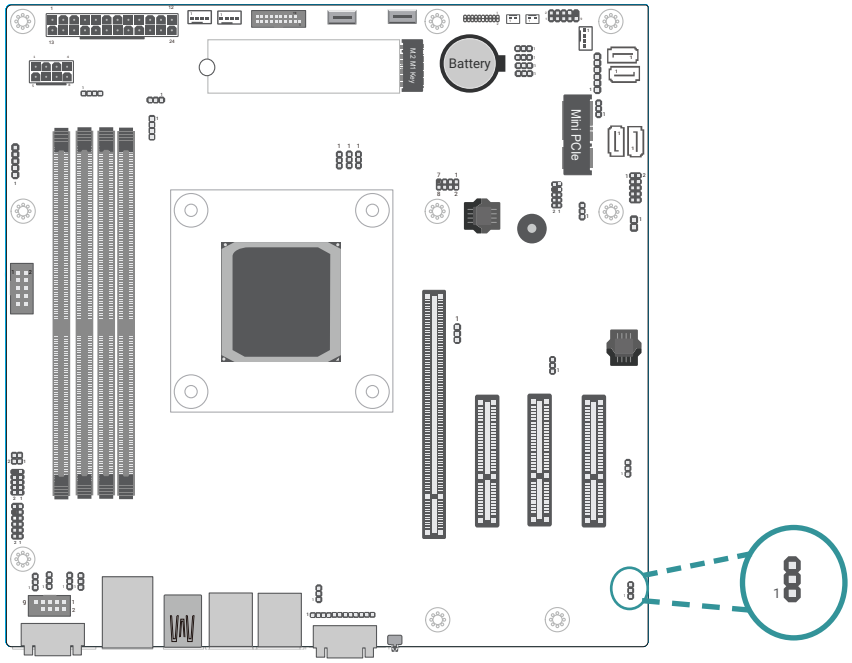
Pin	Assignment
1	NTEST_TXD
2	NTEST_RXD
3	GND

UART Debug (J44)



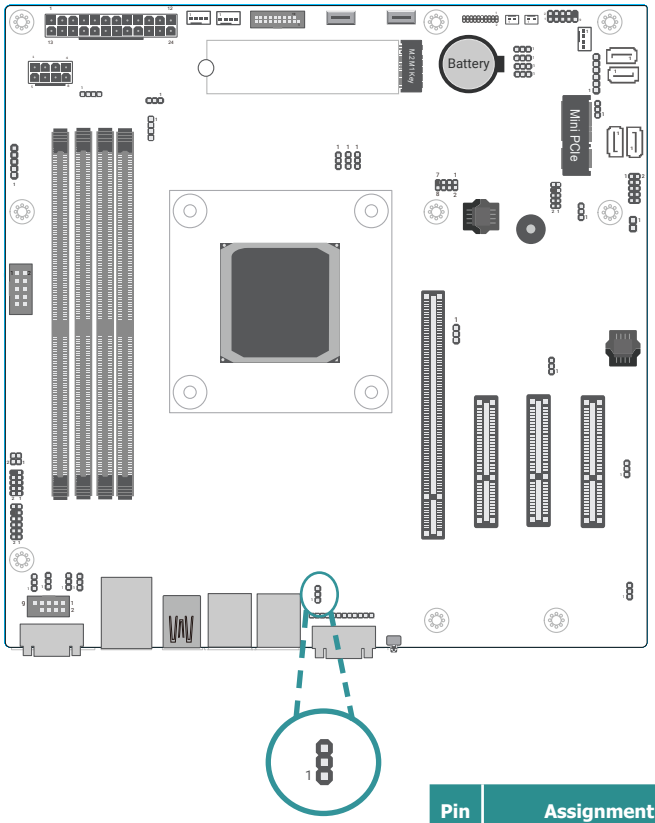
Pin	Assignment
1	UART_BMC_HDR_TXD
2	UART_BMC_HDR_RXD
3	GND

UART Debug (J8)



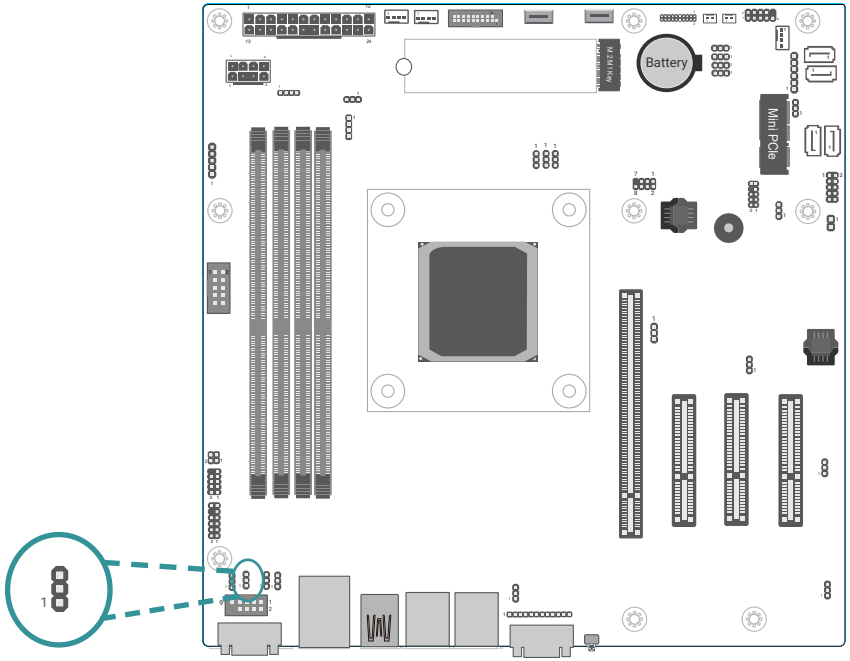
Pin	Assignment
1	UART_COM_TXD
2	UART_COM_RXD
3	GND

UART Debug (J63)



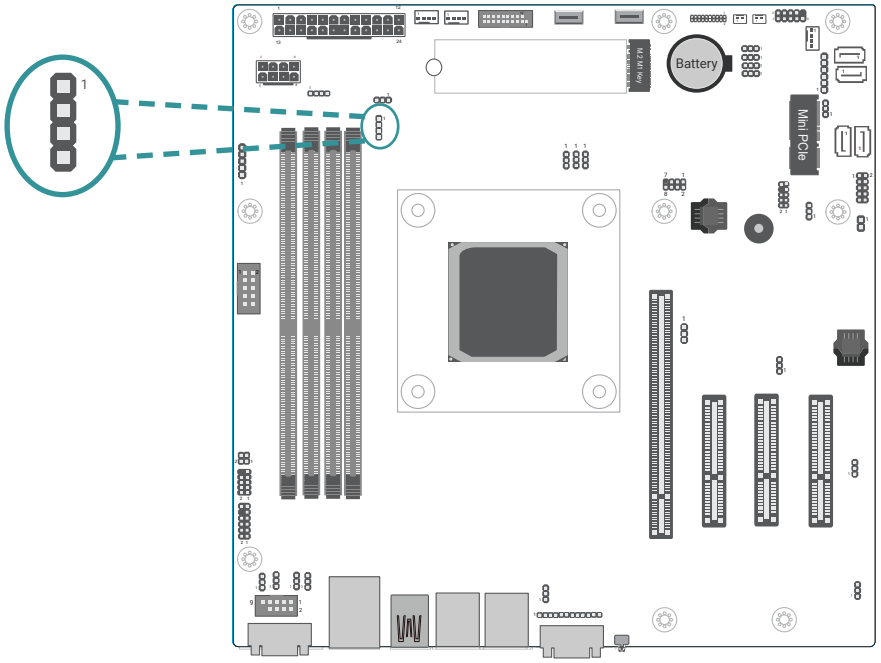
Pin	Assignment
1	CPU_UART_DEBUG_TXD
2	CPU_UART_DEBUG_RXD
3	GND

UART Debug (J50)



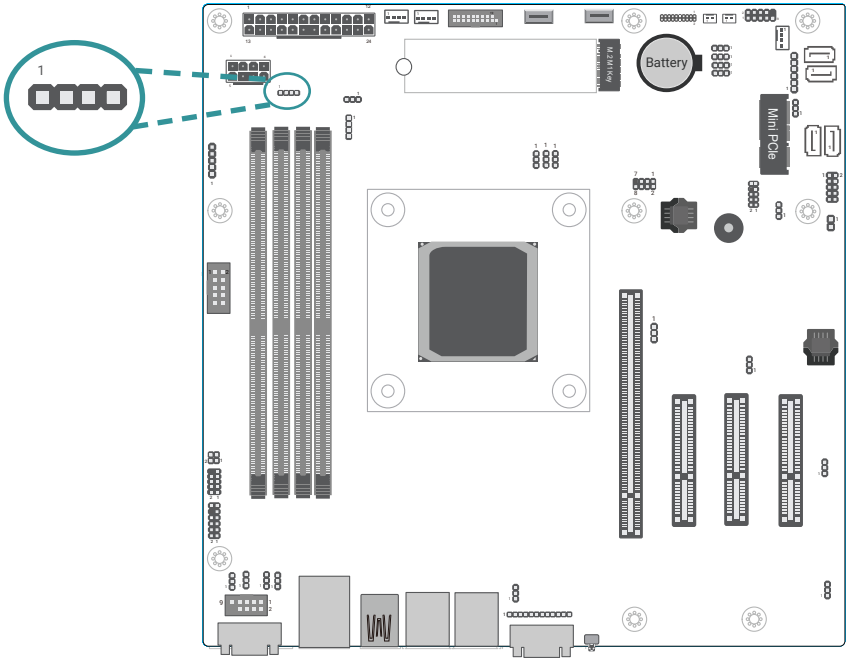
Pin	Assignment
1	UART1_CTS
2	UART1_RTS
3	GND

CPU Fan (J54)



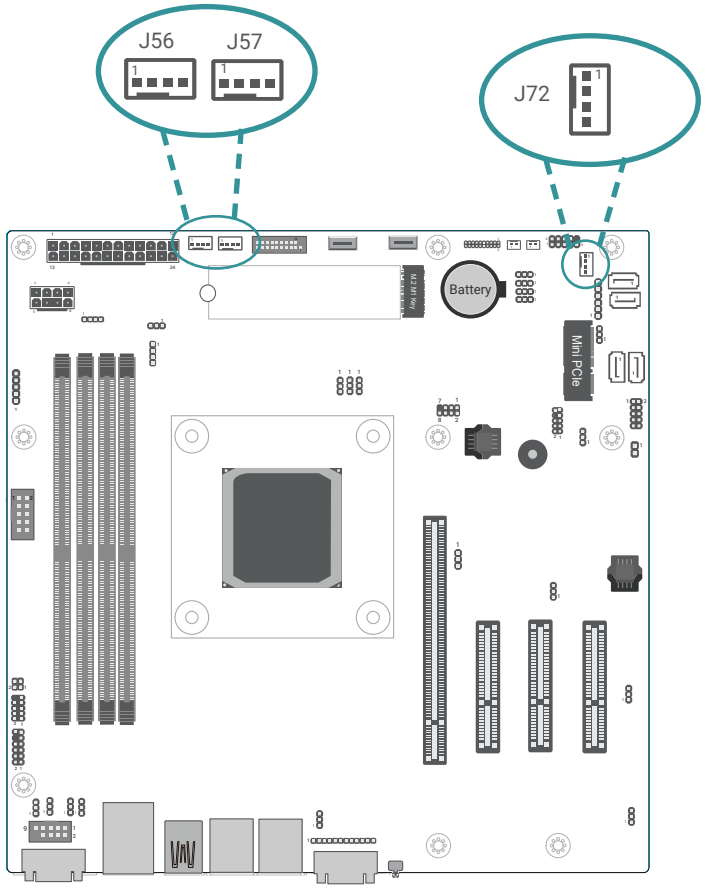
Pin	Assignment
1	GND
2	VCC12
3	FAN Speed Detection
4	FAN Speed Control

CPU Temperature Monitor (J35)



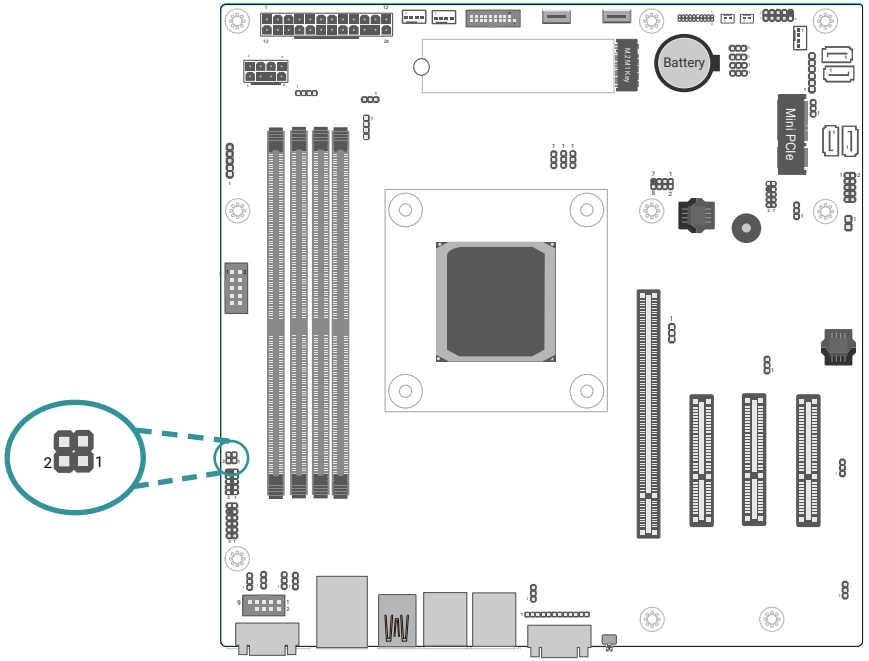
Pin	Assignment
1	OVERTEMP
2	CPU_TEMP_MON_SCL
3	CPU_TEMP_MON_SDA
4	GND

System Fan1~3 (J56/J57/J72)



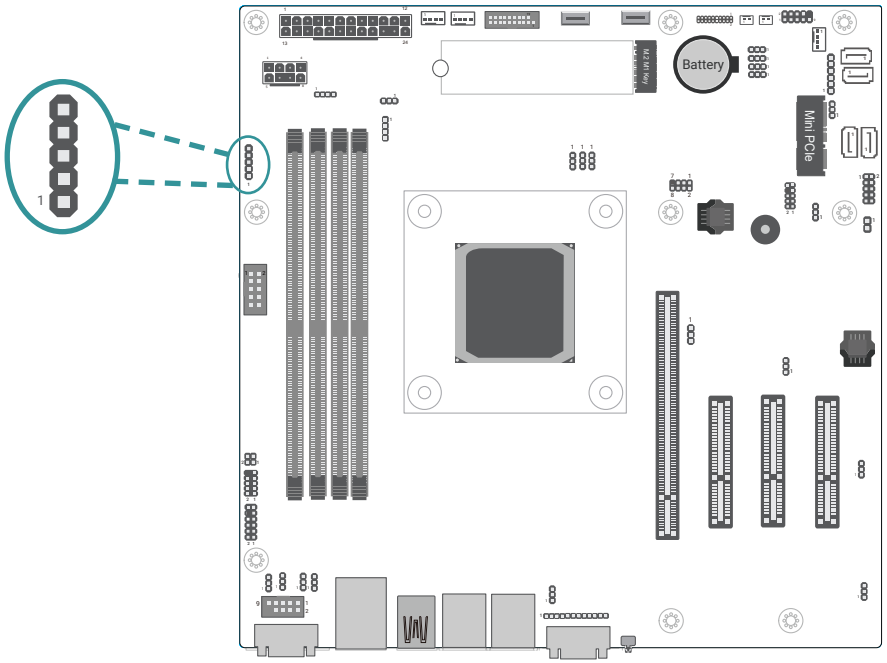
Pin	Assignment
1	GND
2	VCC12
3	FAN Speed Detection
4	FAN Speed Control

LAN LED (J_LAN_LED1)



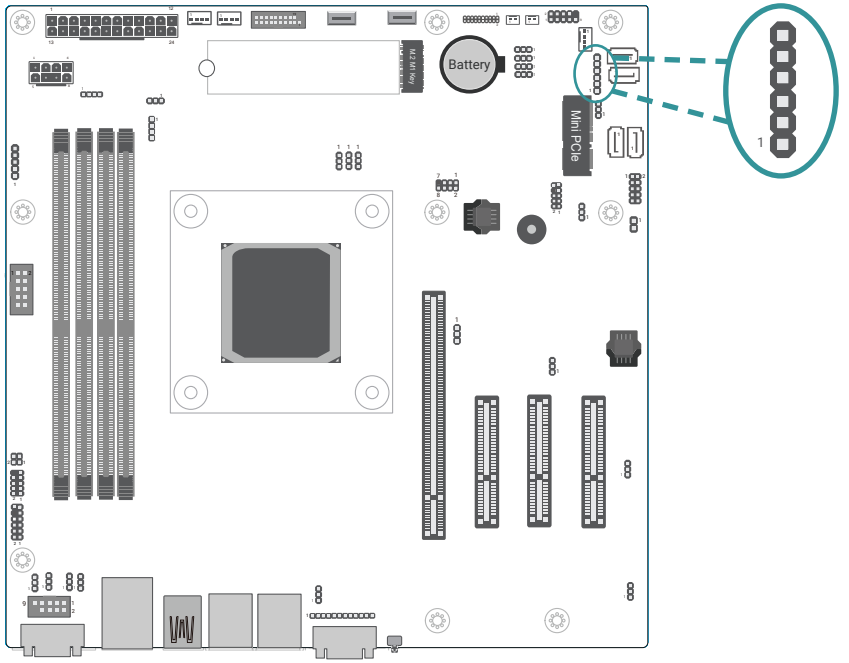
Pin	Assignment	Pin	Assignment
1	P3V3_AUX	2	LKACT#_LAN2
3	P3V3_AUX	4	LKACT#_LAN3

SMBus (J_PMB1)



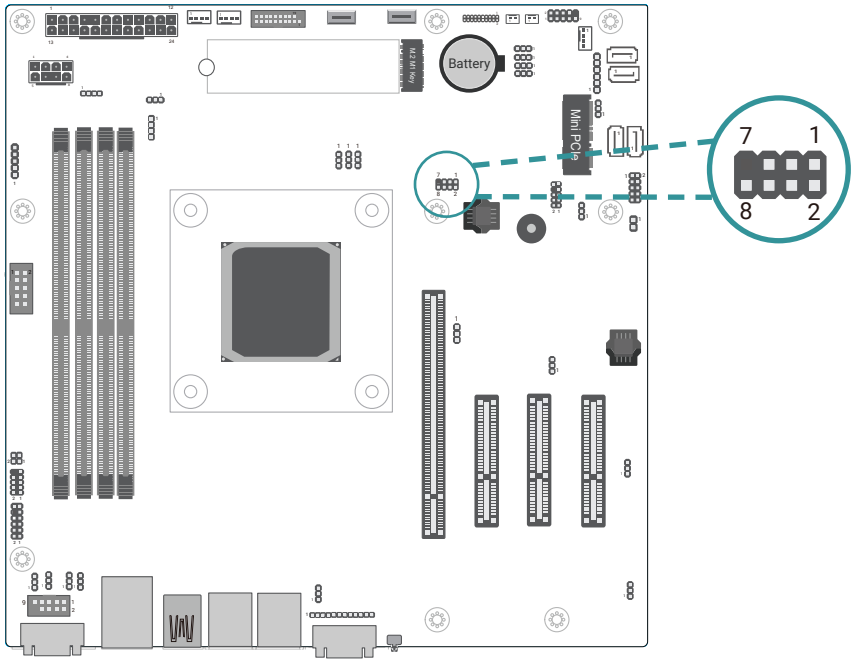
Pin	Assignment
1	SCL
2	SDA
3	ALERT
4	GND
5	VCC3.3

CPU Clock Drive (J60)



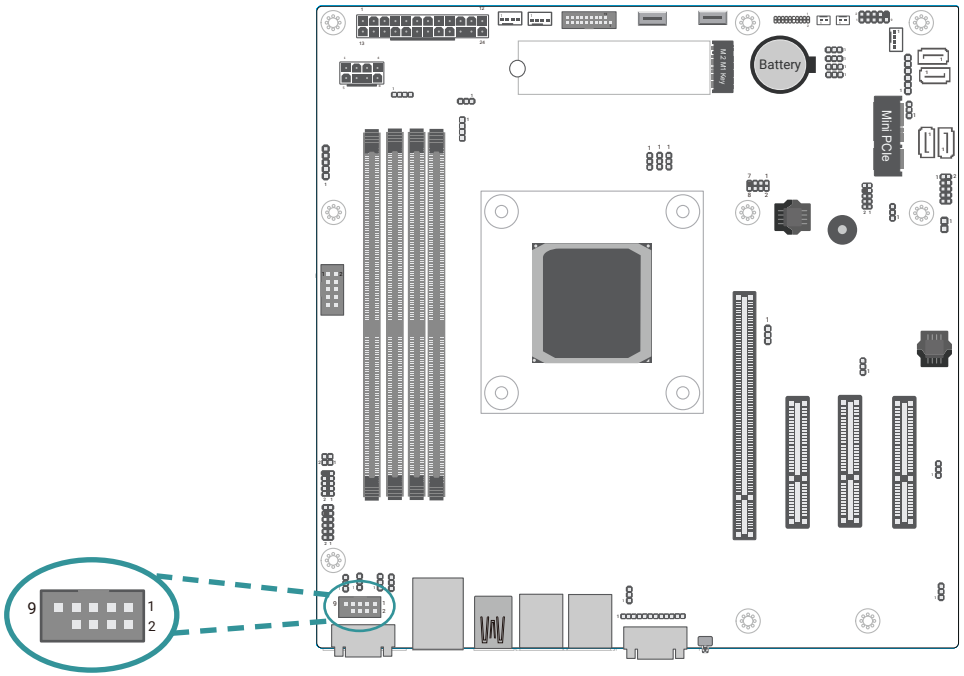
Pin	Assignment
1	SCL
2	SDA
3	P0_VDD_33_S5
4	CPLD_SLT_THERMTRIP-
5	N/C
6	GND

BIOS ROM (J59)



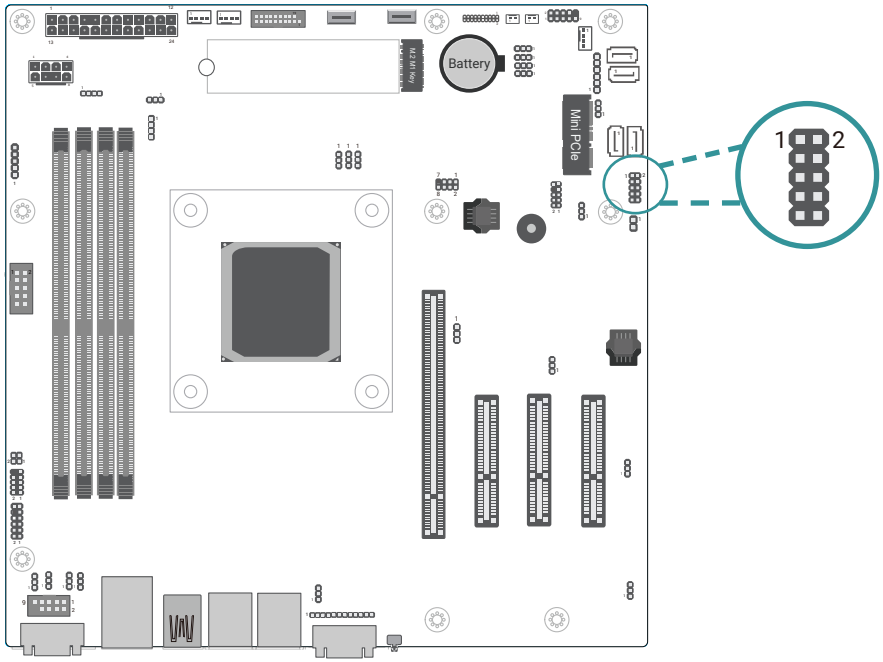
Pin	Assignment	Pin	Assignment
1	VCC1.8	2	GND
3	SPI_BIOS_ROM_CS_N	4	SPI_BIOS_ROM_CLK
5	SPI_BIOS_ROM_DI	6	SPI_BIOS_ROM_DO
7	NC	8	R_SPI_FLASH_RST_N

COM2 (COM2)



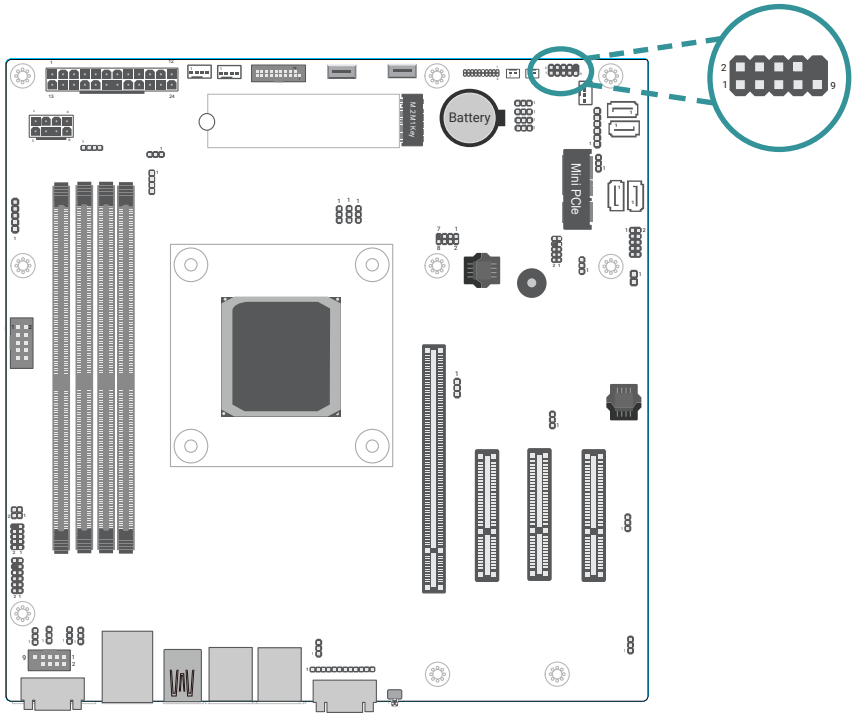
Pin	Assignment	Pin	Assignment
1	VCC5	2	N/C
3	RXD	4	RTS
5	TXD	6	CTS
7	N/C	8	N/C
9	GND	10	---

JTAG CPLD (J43)



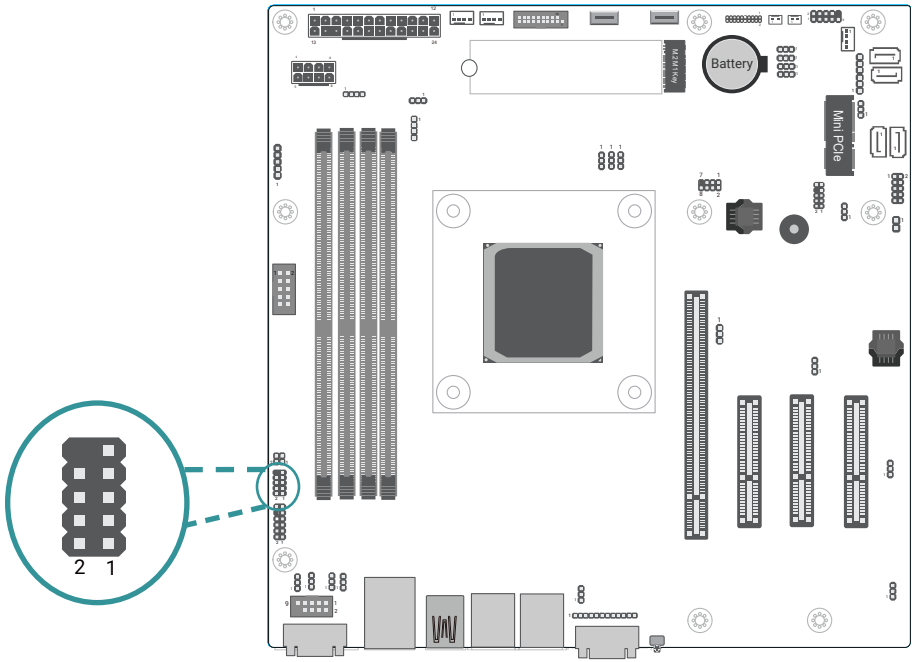
Pin	Assignment	Pin	Assignment
1	TCK	2	N/C
3	TMS	4	GND
5	TDI	6	VCC3.3
7	TDO	8	N/C
9	N/C	10	VCC3.3

USB2.0 (F_USB2_1)



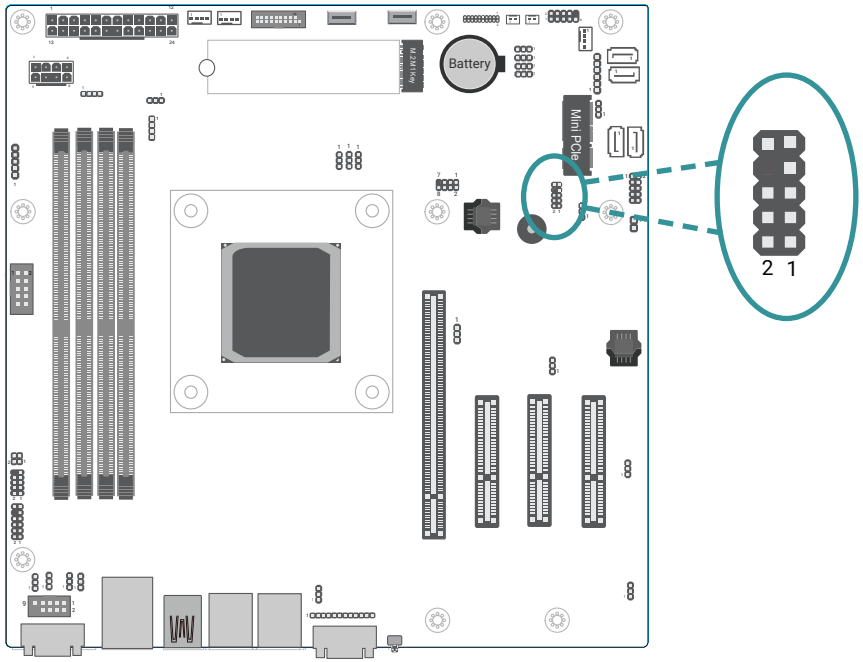
Pin	Assignment	Pin	Assignment
1	VCC5	2	VCC5
3	USB2.0_1-	4	USB2.0_2-
5	USB2.0_1+	6	USB2.0_2+
7	GND	8	GND
9	---	10	N/C

Front Panel (F_PANEL1)



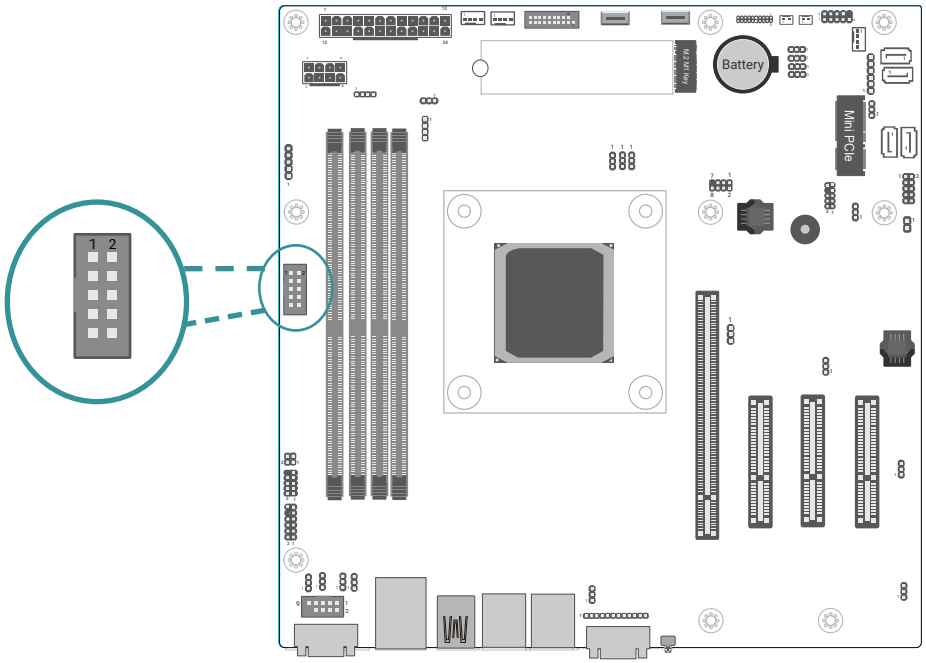
Pin	Assignment	Pin	Assignment
1	HDD LED+	2	Power LED+
3	HDD LED-	4	Power LED-
5	Reset-	6	Power ON+
7	Reset+	8	Power ON-
9	N/C	10	---

TPM (J_TPM1)



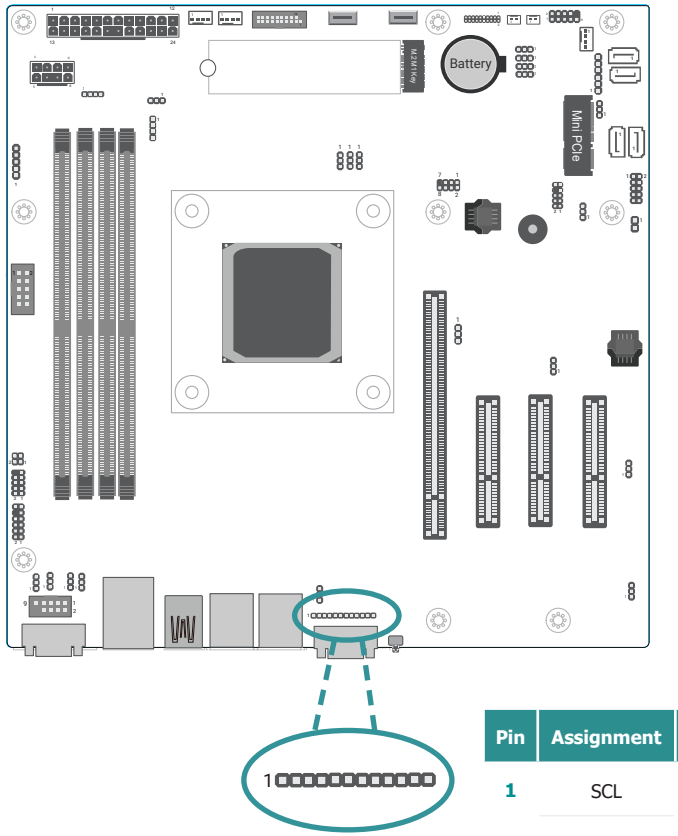
Pin	Assignment	Pin	Assignment
1	VCC3.3	2	SPI_CS2
3	TPM_PLT_RST	4	SPI_MISO_TPM
5	SPI_CLK_TPM	6	GND
7	SPI_MOSI_TPM	8	---
9	N/C	10	SPI_TPM_RIRQ

CPU Test (J10)



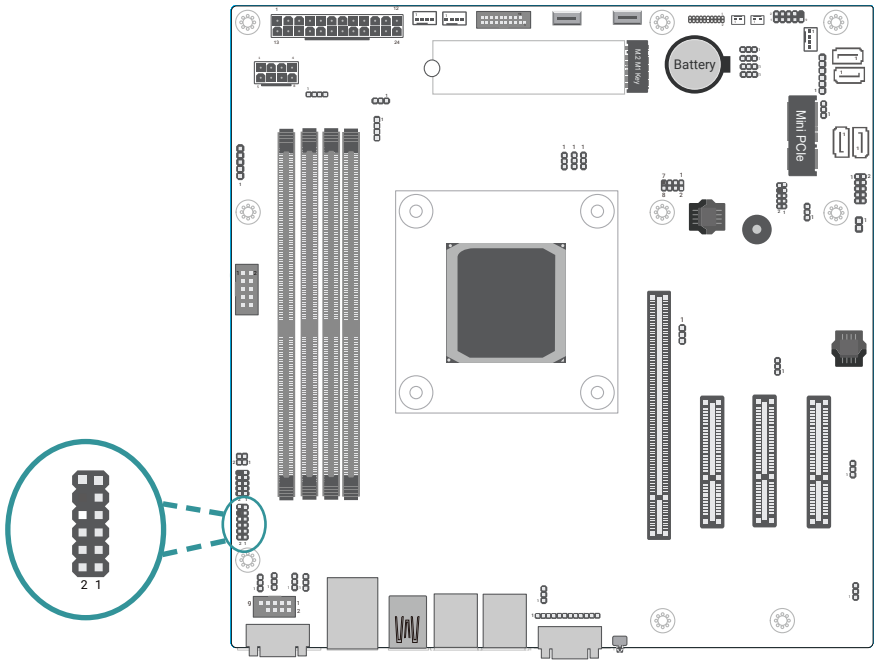
Pin	Assignment	Pin	Assignment
1	CPU_BP4	2	CPU_BP0
3	CPU_BP5	4	CPU_BP1
5	CPU_BP6	6	CPU_BP2
7	N/C	8	N/C
9	N/C	10	N/C

VGA (J_VGA1)



Pin	Assignment	Pin	Assignment
1	SCL	7	GND
2	SDA	8	RED
3	GND	9	GND
4	BLUE	10	HSYNC
5	GND	11	VSYNC
6	GREEN	12	ON

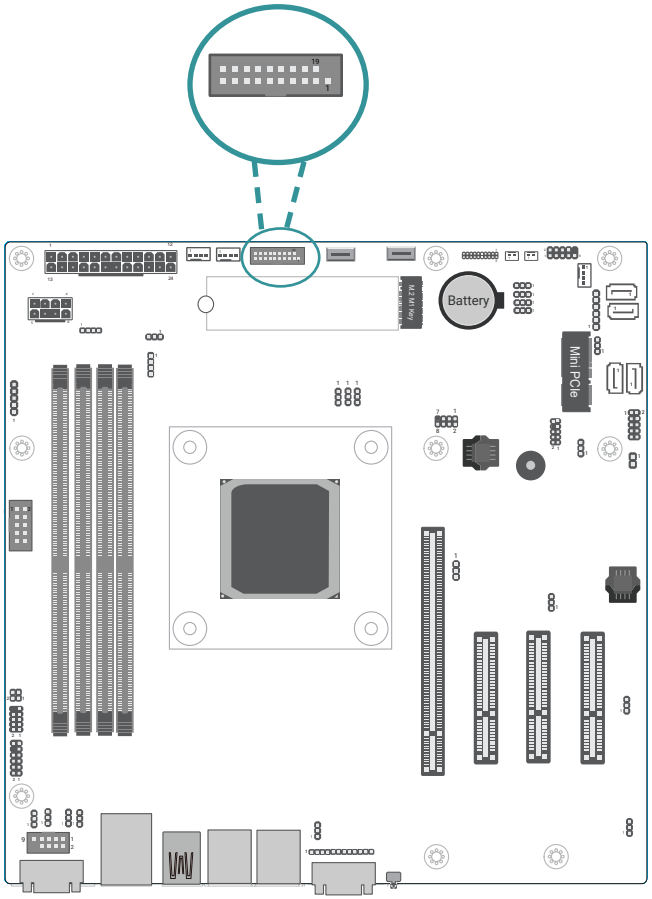
GPIO (J_GPIO1)



Pin	Assignment	Pin	Assignment
1	VCC_GPIO [note]	2	GPIO_R_4
3	GPIO_R_0	4	GPIO_R_5
5	GPIO_R_1	6	GPIO_R_6
7	GPIO_R_2	8	GPIO_R_7
9	GPIO_R_3	10	----
11	GND	12	GND

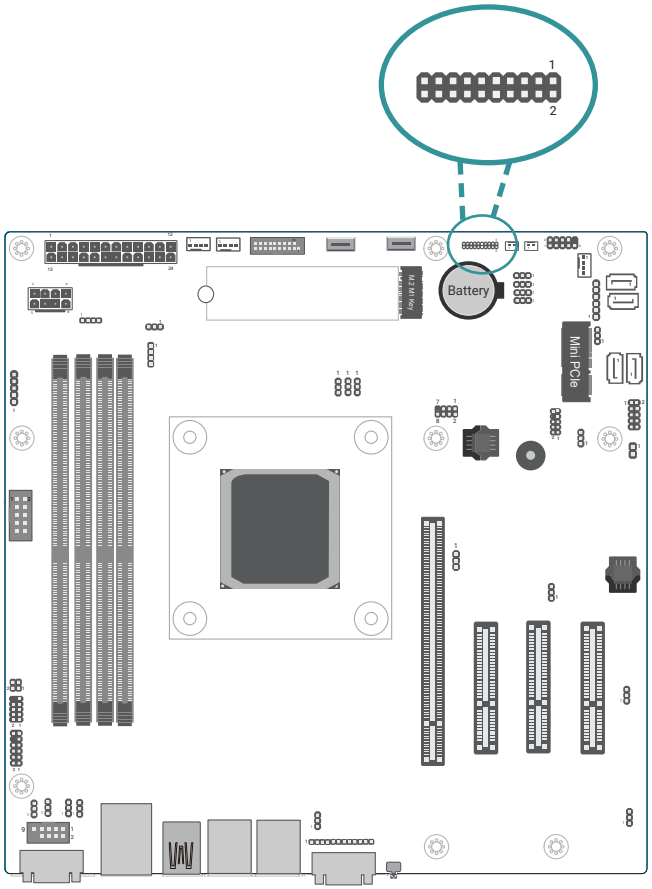
Notes:
Power on this Pin is 5V by default, 3.3V is available if specified. (resistor selectable)

USB3.0 (F_USB3_1)



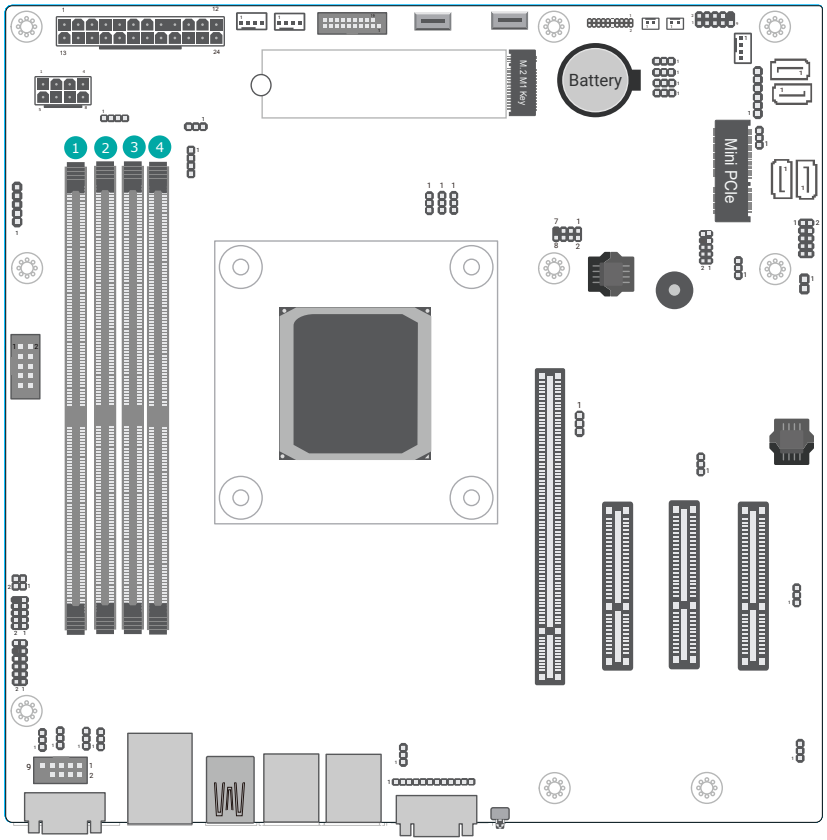
Pin	Assignment	Pin	Assignment
1	VCC5	11	USB2.0_2+
2	USB3.0_RX1-	12	USB2.0_2-
3	USB3.0_RX1+	13	GND
4	GND	14	USB3.0_TX2+
5	USB3.0_TX1-	15	USB3.0_TX2-
6	USB3.0_TX1+	16	GND
7	GND	17	USB3.0_RX2+
8	USB2.0_1-	18	USB3.0_RX2-
9	USB2.0_1+	19	GND
10	N/C	20	----

CPU Debugging (J9)



Pin	Assignment	Pin	Assignment
1	P0_VDD_18_S5	2	TCK
3	GND	4	TMS
5	GND	6	TDI
7	GND	8	TDO
9	HDT_HDR_TRST_R_N	10	PWROK
11	N/C	12	RESET_N
13	N/C	14	N/C
15	N/C	16	DBREQ_R_N
17	HDT_PRESENT_N	18	N/C
19	P0_VDD_18_S5	20	N/C

▶ System Memory

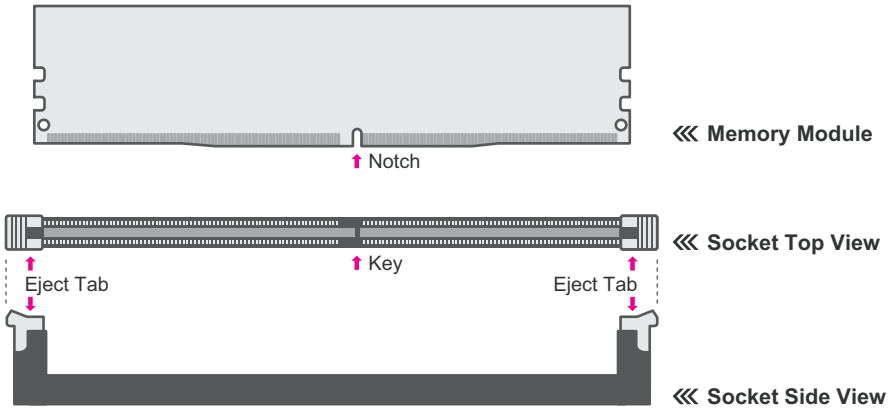


1. DIMM1
2. DIMM2
3. DIMM3
4. DIMM4

Installing the SO-DIMM Module

Before installing the memory module, 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 SO-DIMM socket on the system board
4. Make sure the notch on memory card is aligned to the key on the socket.

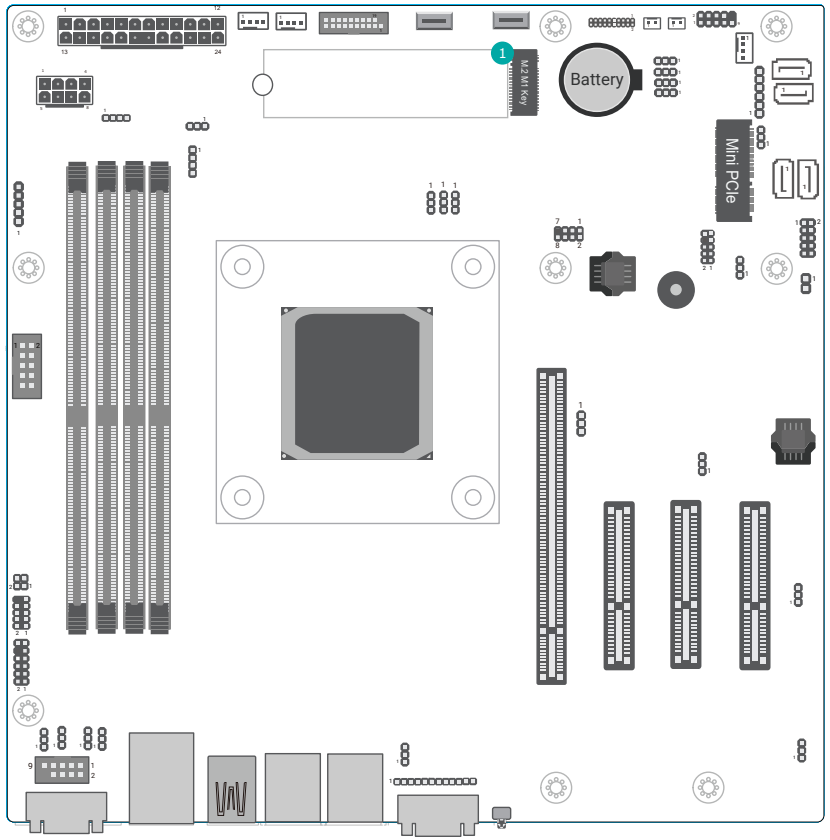


The system board supports the following memory interface.

Single Channel (SC)
Data will be accessed in chunks of 64 bits from the memory channels. DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.

Dual Channel (DC)
Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

▶ Expansion Slots

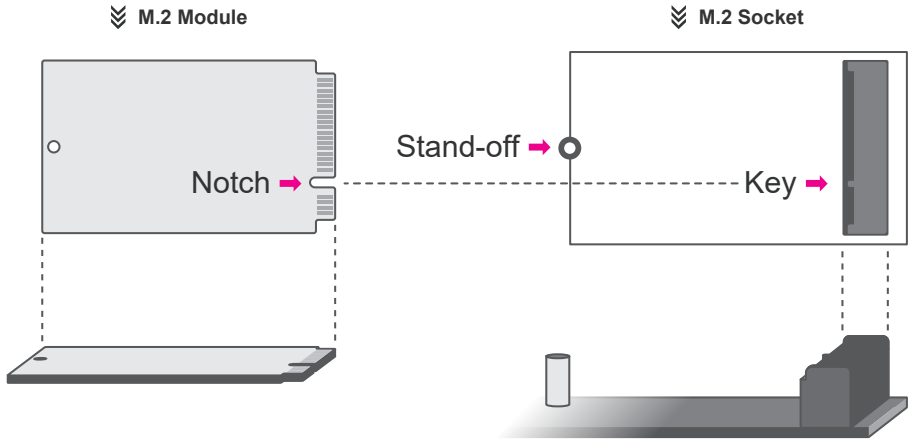


1 M.2 M1-Key

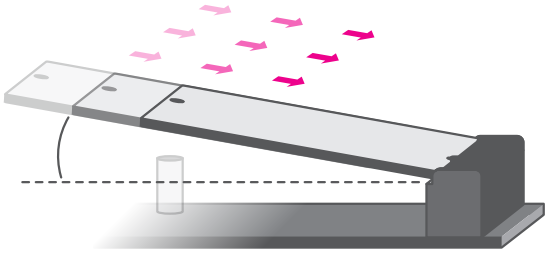
Installing the M.2 Module

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

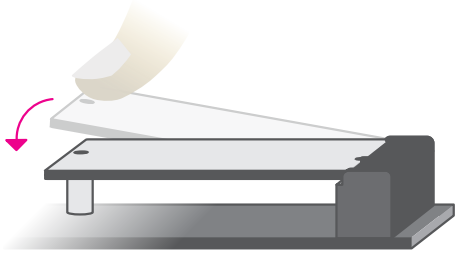
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



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.