DFI

ERX810

5th/4th Gen Intel® Xeon® Scalable Family
User's Manual

Copyright

Trademarks

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

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.

- ERX810-C741 Motherboard
- 1 M.2 Screw
- 1 M.2 Standoff
- 1 IO Shield
- 1 Serial ATA data cable (Length: 500mm)
- 2 Cooler carrier

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

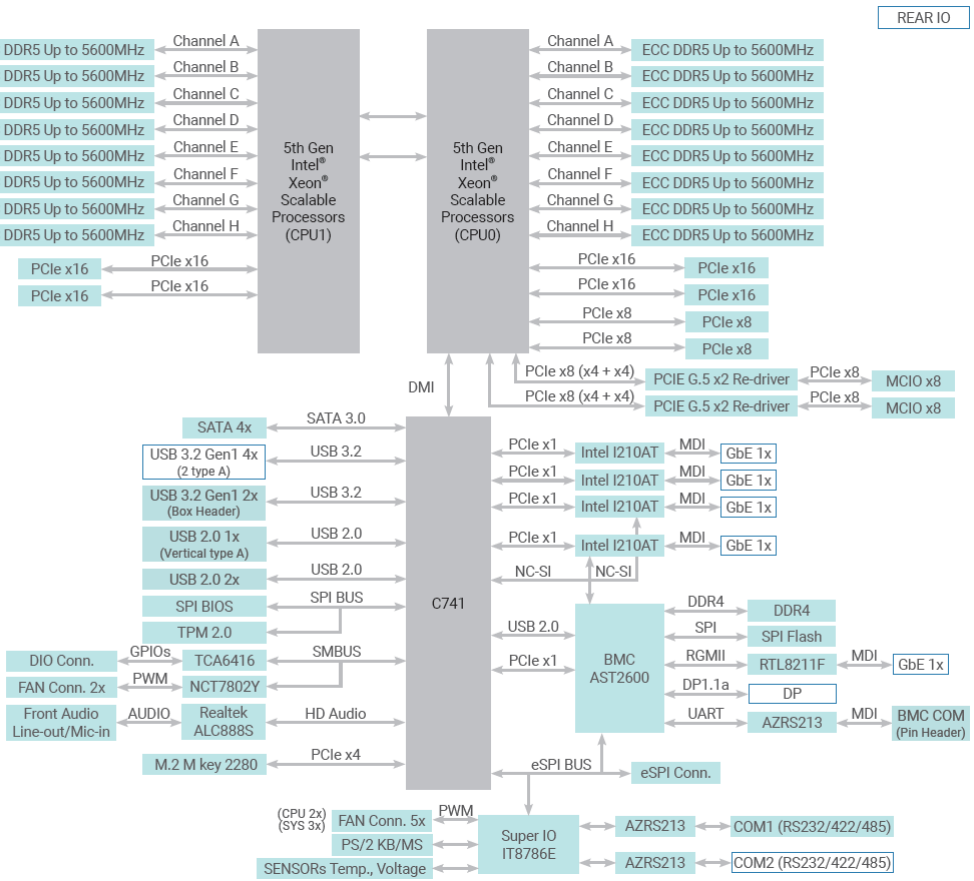
SYSTEM	Processor	5th/4th Gen Intel® Xeon® Scalable Family Socket: Dual LGA4677 Max. Speed: up to 4.1GHz (Turbo) TDP: up to 270W Cache: up to 60MB
	Chipset	Intel® C741 Chipset
	Memory	16 x ECC-RDIMM up to 1024GB DDR5 Max. 5600MHz
	BIOS	Insyde
GRAPHICS	Controller	BMC AST2600
	Display	1 x DP9
	Single Display	DP
EXPANSION	Interface	4 x PCIe x16 (Gen 5) 2 x PCIe x8 (Gen5) 1 x M.2 M key 2280
AUDIO	Audio Codec	Realtek ALC888S
ETHERNET	Controller	4 x Intel® I210 IPMI: RTL8211F
REAR I/O	Serial	1 x RS-232/422/485 (DB-9)
	Ethernet	4 x GbE 1 x Dedicated IPMI LAN
	USB	4 x USB 3.2 Gen1
	Display	1 x DP
	PS/2	1 x PS/2
INTERNAL I/O	Serial	1 x RS-232/422/485
	USB	2 x USB 3.2 Gen1 2 x USB 2.0 1 x Vertical USB 2.0
	Audio	1 x Front Audio
	DIO	16-bit DIO
	LPC	1 x LPC
	SATA	4 x SATA 3.0 RAID 0/1/5/10
	SMBus	1 x SMBus
	MCIO	2 x MCIO

SECURITY	TPM	TPM 2.0
POWER	Type	ATX
ENVIRONMENT	Temperature	Operating: 0 to 60°C
MECHANISM	Dimensions	305 x 365 mm
	Height	PCB: TBD Top Side: TBD Bottom Side: TBD

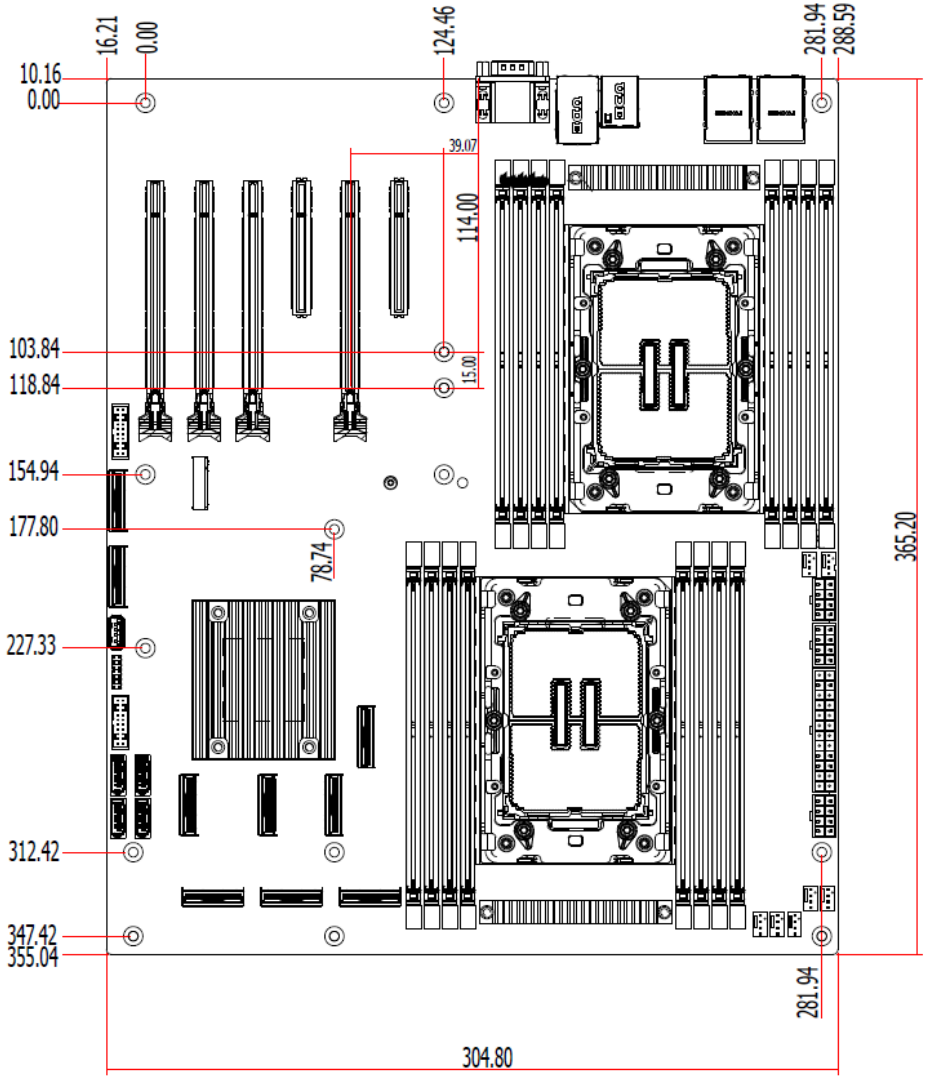
▶ DIMM Configuration with Dual CPU

ERX810		CPU0								CPU1							
		A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H
		DIMM configuration with dual CPU															
Channel		DIMMCON1	DIMMCON2	DIMMCON3	DIMMCON4	DIMMCON5	DIMMCON6	DIMMCON7	DIMMCON8	DIMMCON9	DIMMCON10	DIMMCON11	DIMMCON12	DIMMCON13	DIMMCON14	DIMMCON15	DIMMCON16
Quantity of memory installed	2	V								V							
	2		V								V						
	2					V								V			
	2						V								V		
	4	V						V		V						V	
	4			V		V						V		V			
	8	V		V		V		V		V		V		V		V	
	12	V		V	V	V	V	V		V		V	V	V	V	V	
	12	V	V	V		V		V	V	V	V	V		V		V	V
	12		V	V	V	V	V		V		V	V	V	V	V		V
	12	V	V		V		V	V	V	V	V		V		V	V	V
	16	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

▶ Block Diagram

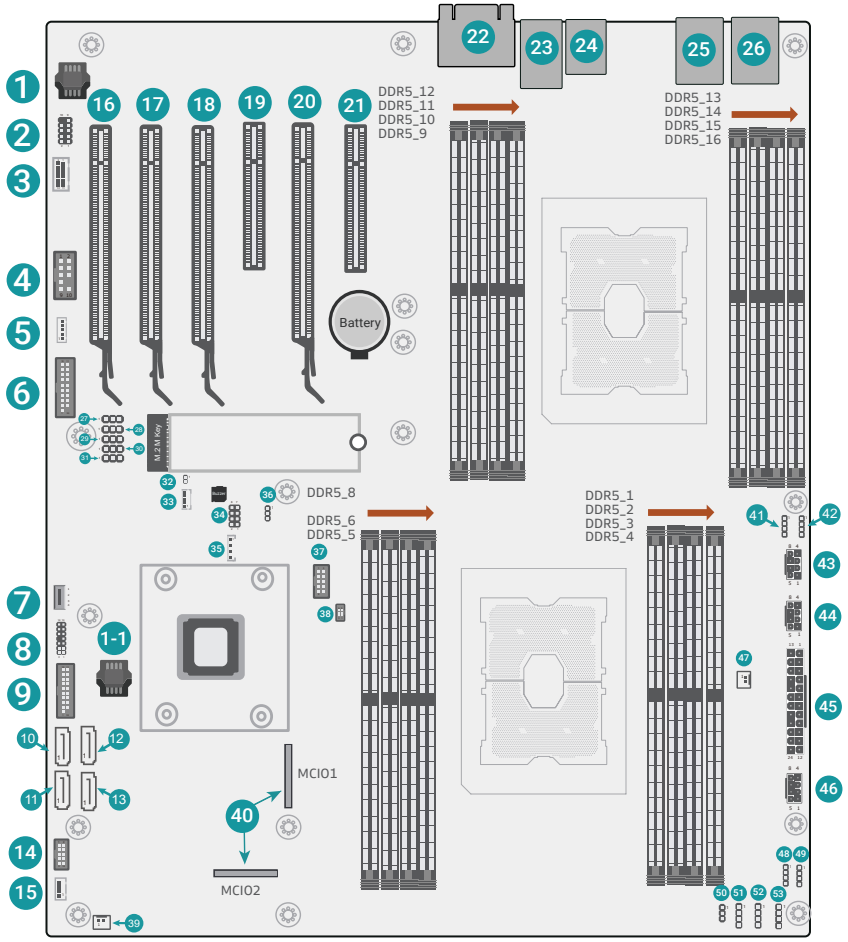


▶ Dimension



Chapter 2 - Hardware Installation

▶ Board Layout



1. BMC Flash
1-1. BIOS Flash
2. BMC COM
3. Front Panel
4. COM2
5. DIO Power
6. DIO
7. USB 2.0_P9
8. ESPI Header
9. USB 3.0_P5/P6
10. SATA1
11. SATA0
12. SATA2
13. SATA3
14. Front Audio
15. LINE-IN Connector
16. PCIE6
17. PCIE5
18. PCIE4
19. PCIE3
20. PCIE2
21. PCIE1
22. ▲COM1
▼DP
23. ▲LAN3
▼LAN4
24. MGMT Port
25. ▲LAN2
▼USB2_3/4
USB3_3/4
26. ▲LAN1
▼USB2_1/2
USB3_1/2
27. DIO 4-7 Power Select
28. DIO 8-11 Power Select
29. DIO 12-15 Power Select
30. DIO 0-3 Power Select
31. DIO Power
32. Case Open
33. OOB I2C
34. CPLD JTAG
35. IntelR VROC Hardware Key
36. Clear CMOS Data
37. USB2.0_P10/P11
38. SMBus
39. RTC Battery
40. MCIO
41. CPU Fan2
42. CPU Fan1
43. 12V Power Connector
44. 12V Power Connector
45. ATX Power Connector
46. 12V Power Connector
47. 5VSB Header
48. System Fan2
49. System Fan1
50. CPU Power Update
51. System Fan5
52. System Fan4
53. System Fan3

▶ Installing the heat sink

Installing the Heat Sink

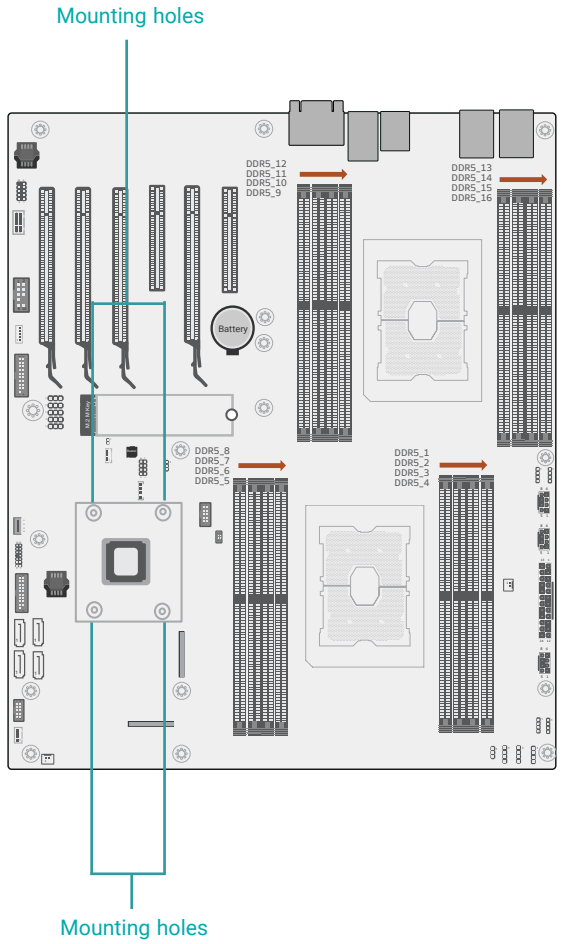
The CPU must be kept cool by using a heat sink, otherwise the CPU will overheat damaging both the CPU and system board.

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.

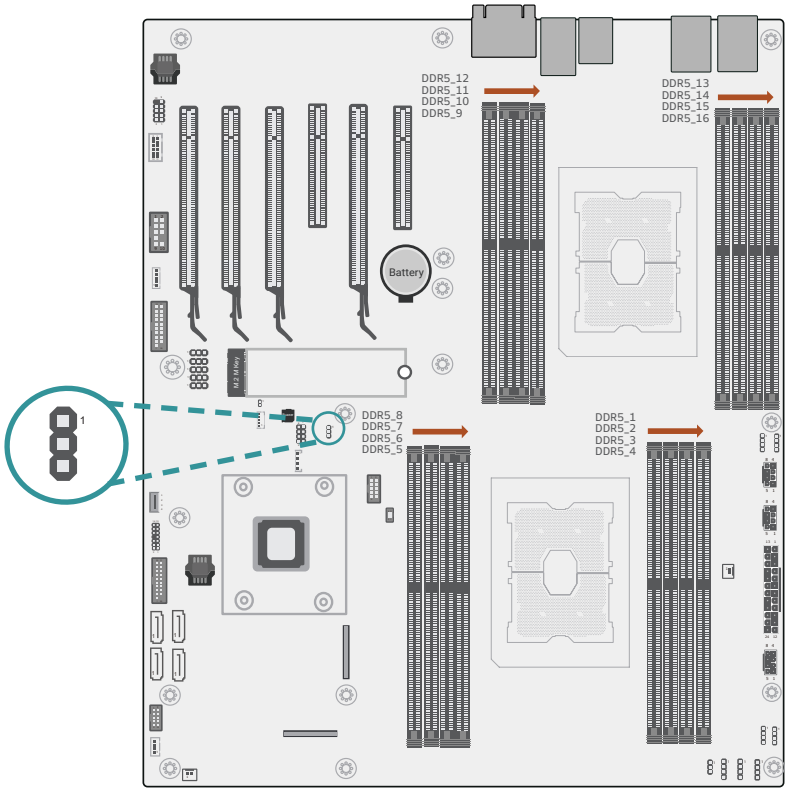
2. Place the heat sink on top of the CPU. The 4 spring screws around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the board.

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

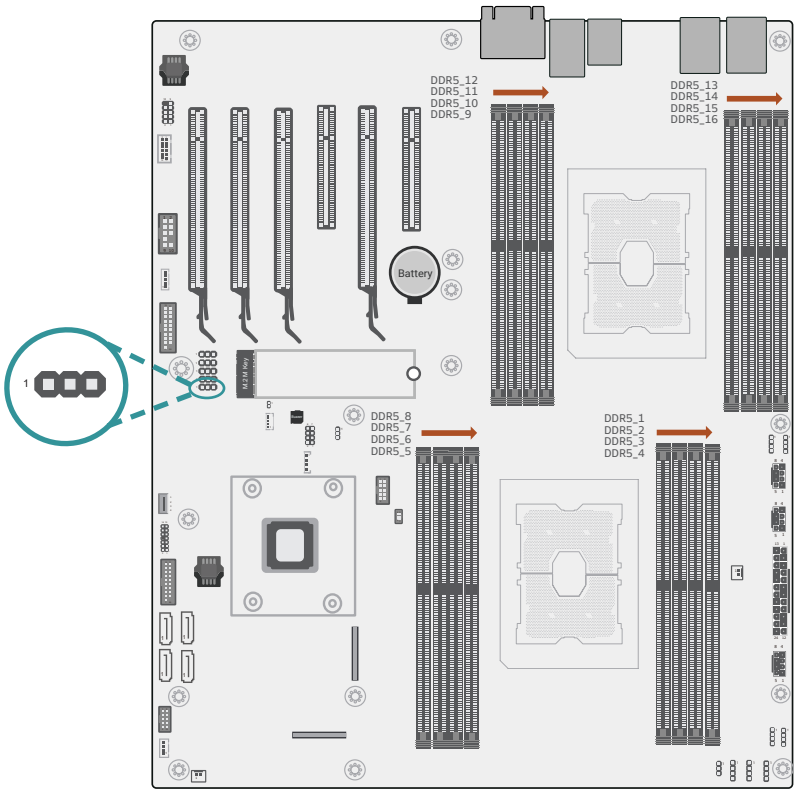
Clear CMOS Data (JP15)



■ 1-2 On: Normal (default)

■ 2-3 On: Clear RTC Registers

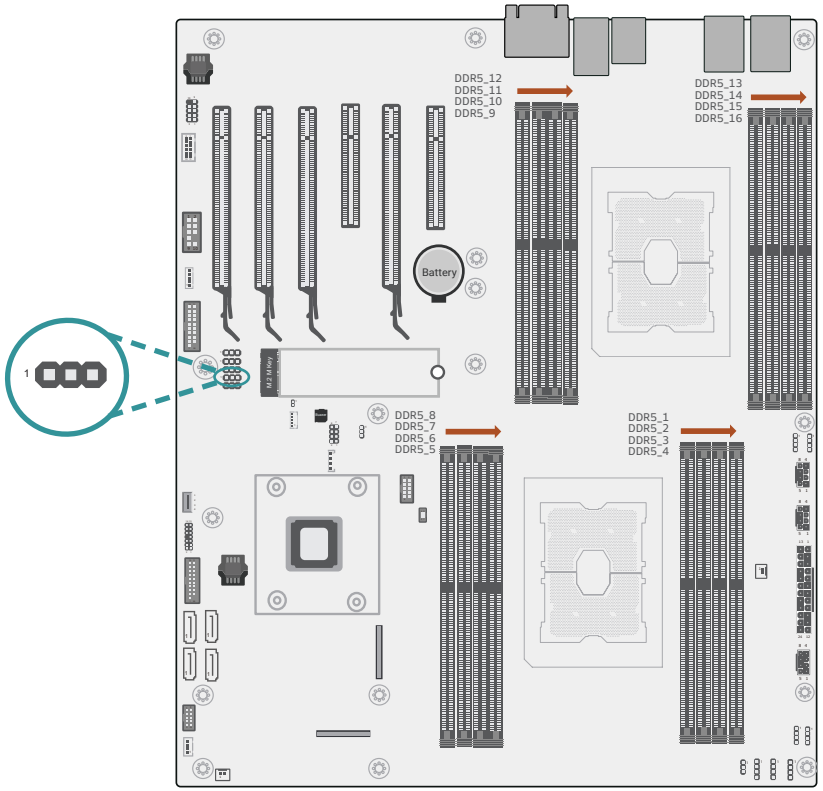
DIO Power (JP3)



■ 1-2 On: 5VSB (default)

■ 2-3 On: 5V

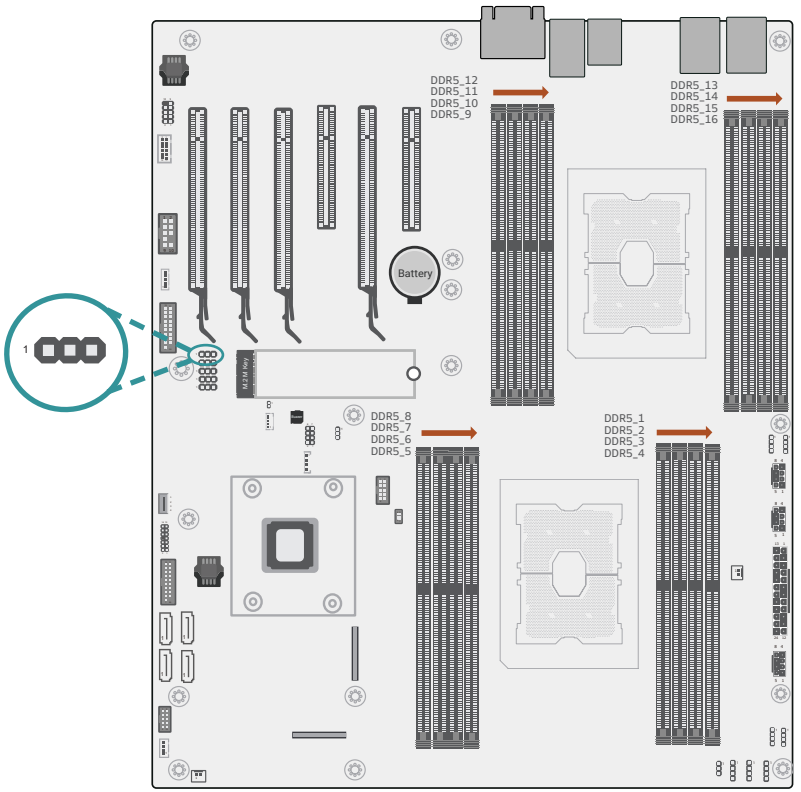
DIO 0-3 Power Select (JP2)



■ 1-2 On: DIO PWR (default)

■ 2-3 On: GND

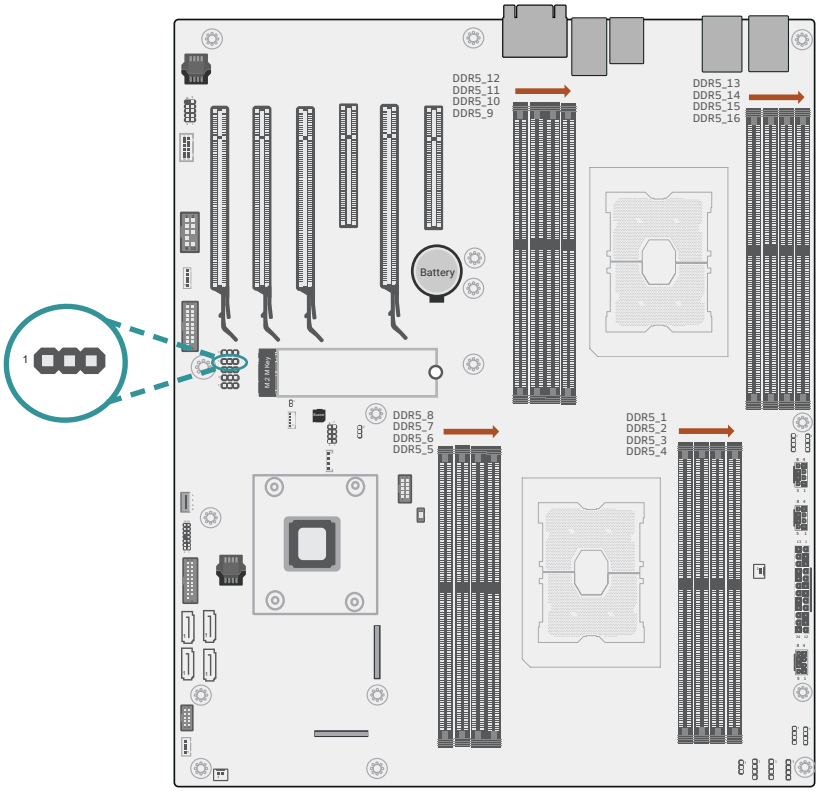
DIO 4-7 Power Select (JP4)



■ 1-2 On: DIO PWR (default)

■ 2-3 On: GND

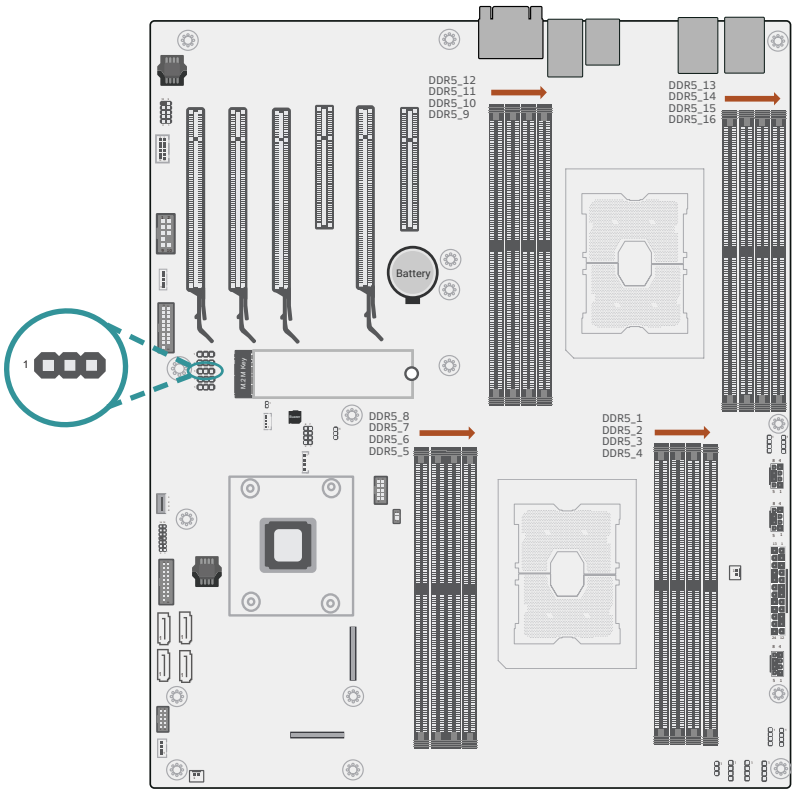
DIO 8-11 Power Select (JP5)



■ 1-2 On: DIO PWR (default)

■ 2-3 On: GND

DIO 12-15 Power Select (JP6)

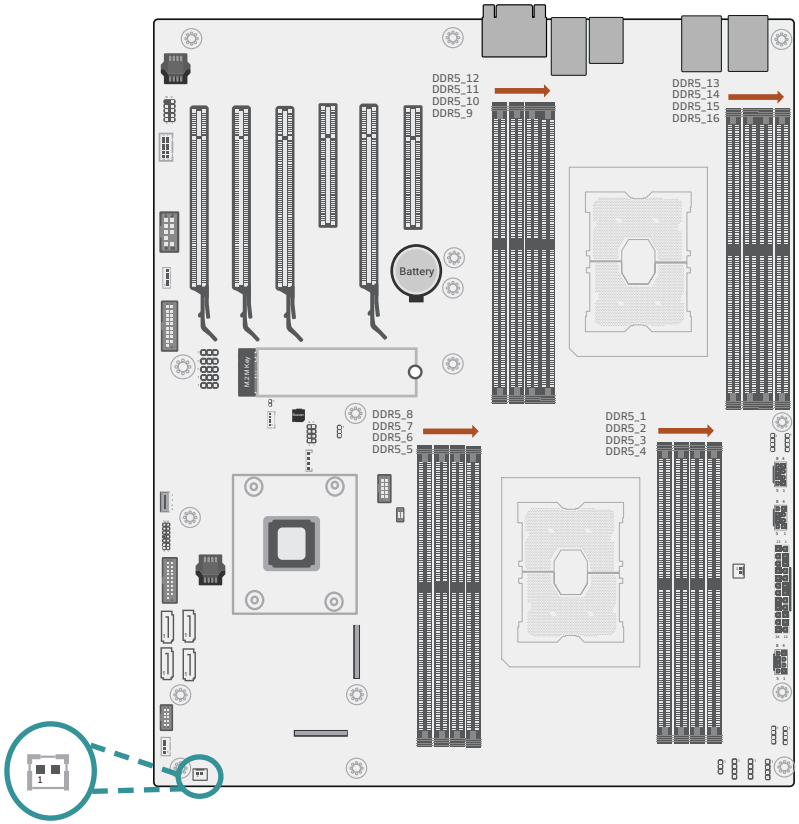


■ 1-2 On: 3V3 (default)

■ 2-3 On: 3V3DU

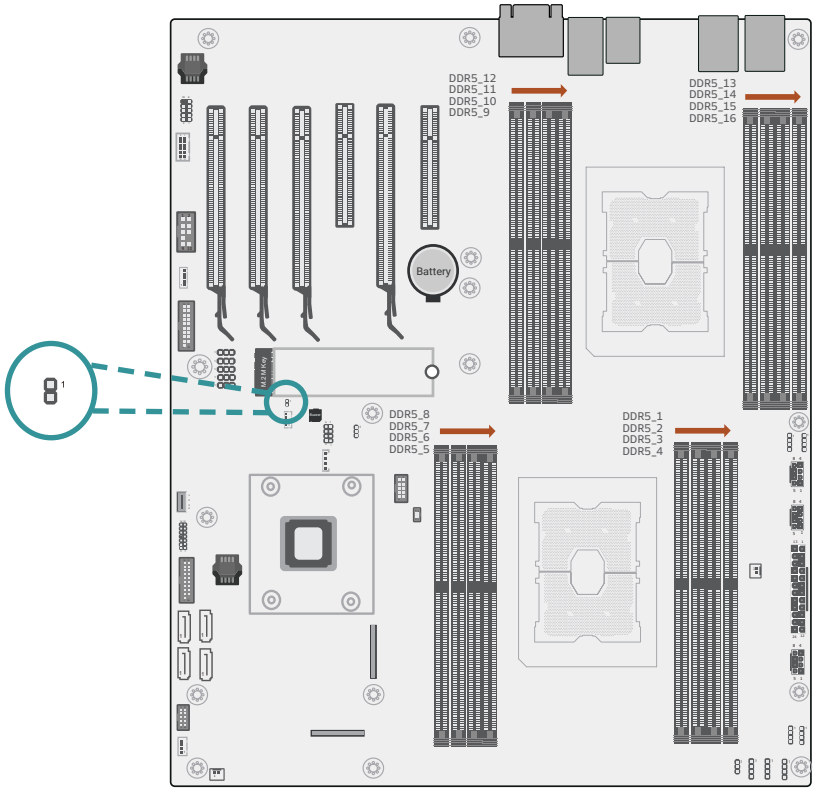
▶ Pin Assignment

RTC Battery (J2)



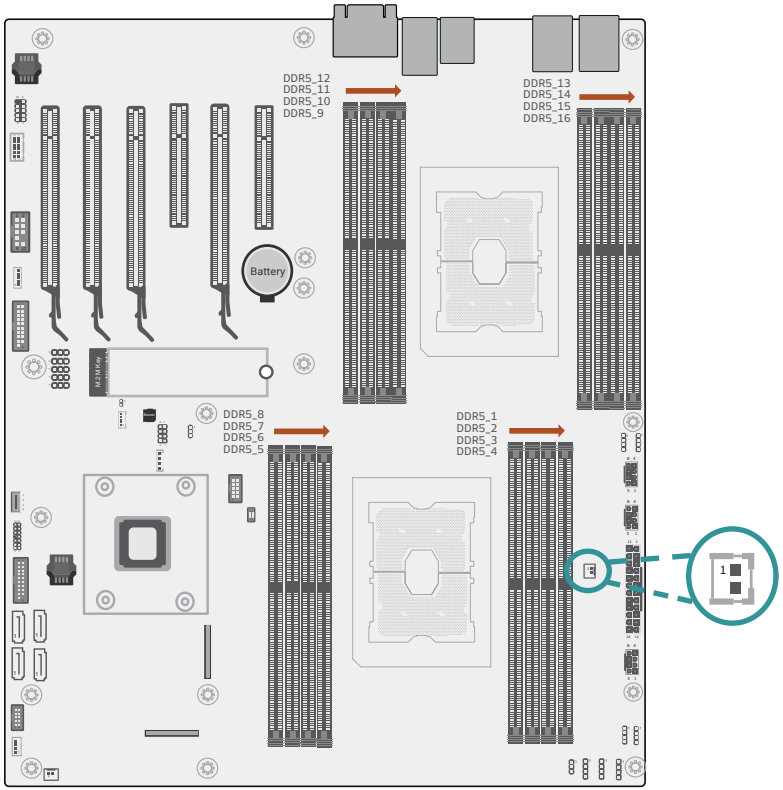
Pin	Assignment
1	P3V_BAT
2	GND

Case Open (SOJ1)



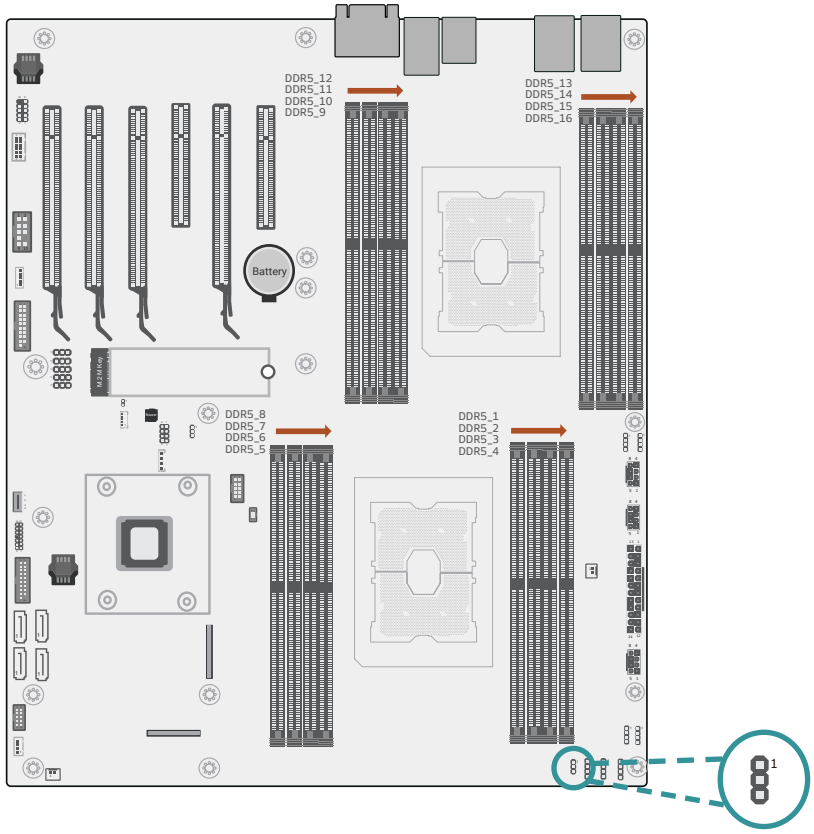
Pin	Assignment
1	CASEOPEN#
2	GND

5VSB Header (J7)



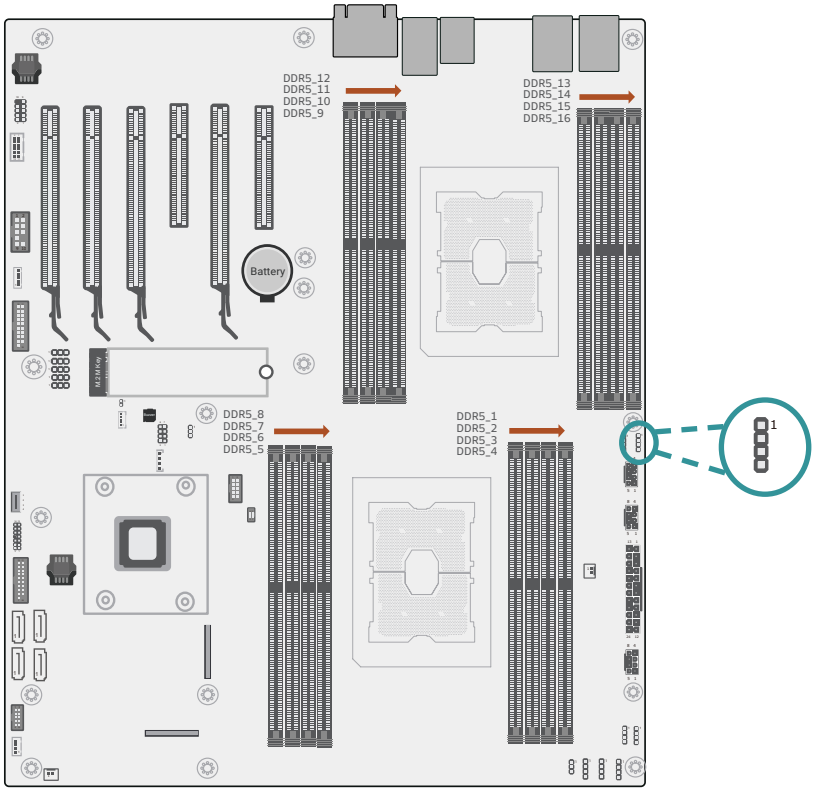
Pin	Assignment
1	5VSB_CONN
2	GND

CPU Power Update (J8000)



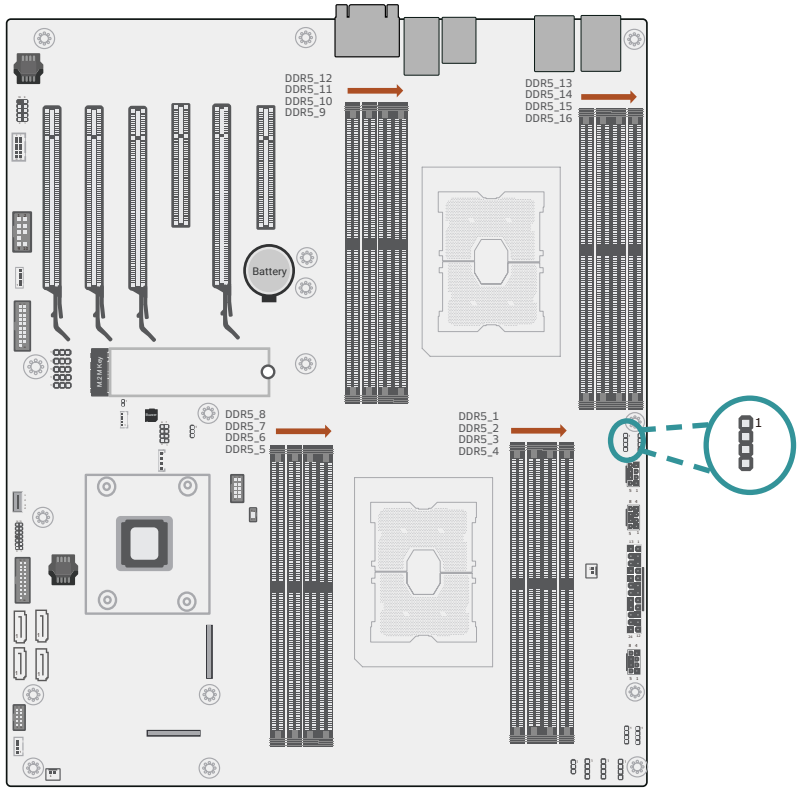
Pin	Assignment
1	DEBUG_UART_TX
2	DEBUG_UART_RX
3	GND

CPU Fan1 (J10)



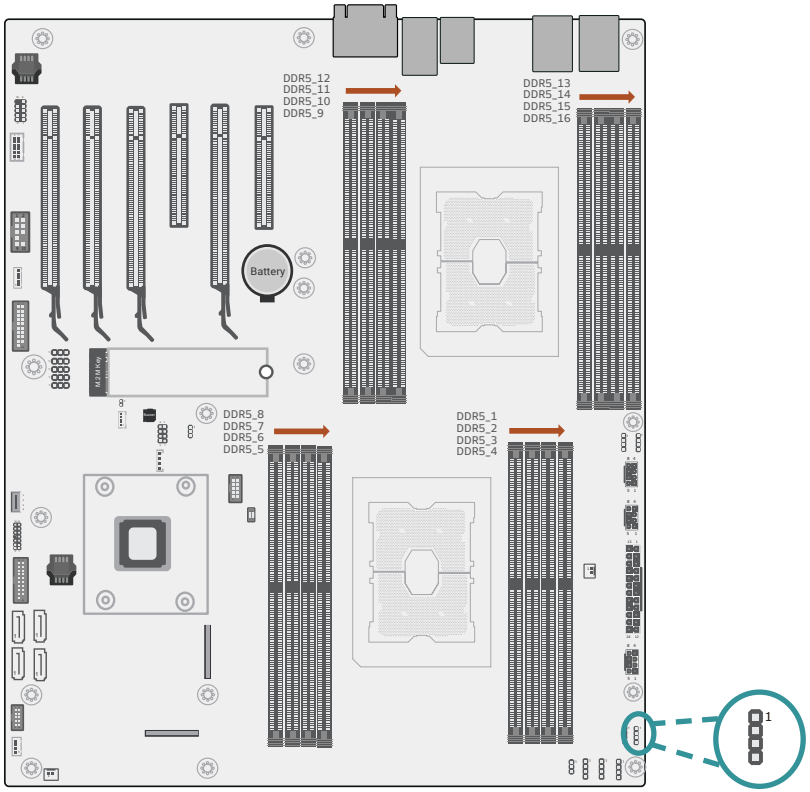
Pin	Assignment
1	GND
2	+12V
3	FAN_TACH_IN_CPU0
4	FAN_PWM_OUT_CPU0

CPU Fan2 (J9)



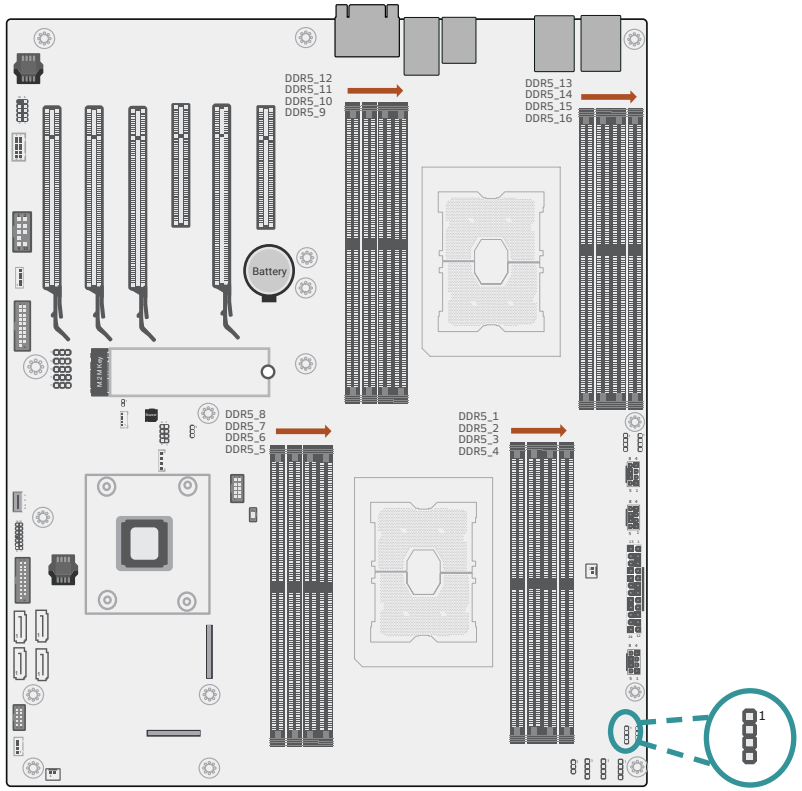
Pin	Assignment
1	GND
2	+12V
3	FAN_TACH_IN_CPU1
4	FAN_PWM_OUT_CPU1

System Fan1 (J11)



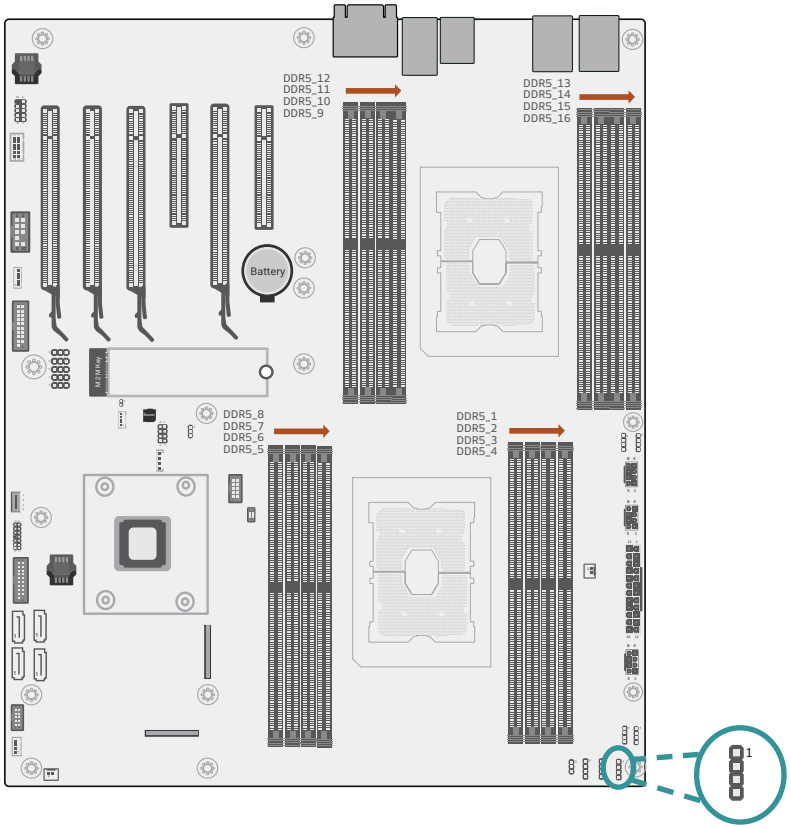
Pin	Assignment
1	GND
2	+12V
3	FAN_TACH_IN_SYS1
4	FAN_PWM_OUT_SYS1

System Fan2 (J13)



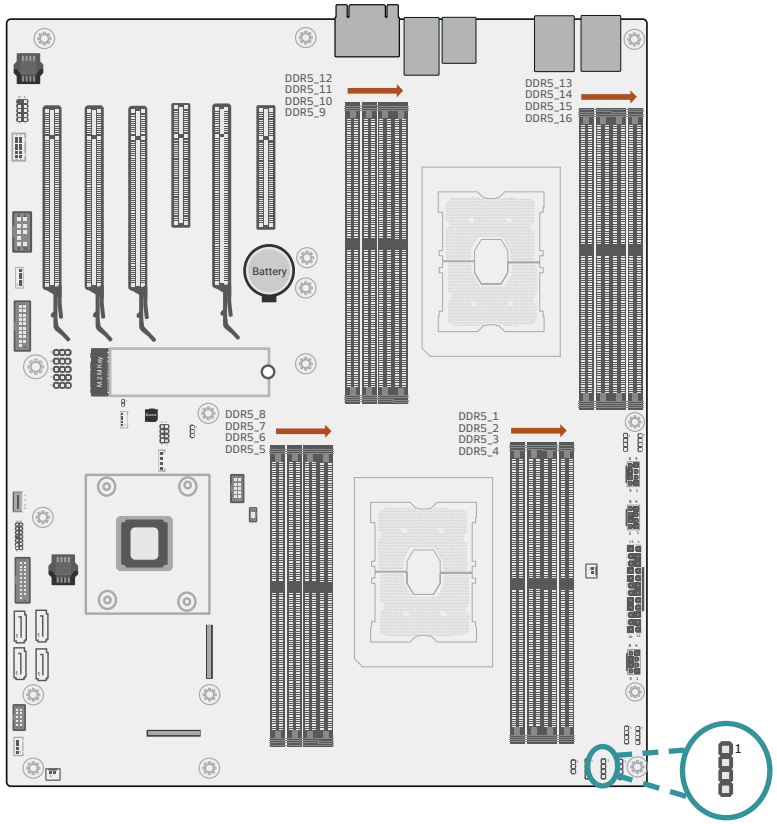
Pin	Assignment
1	GND
2	+12V
3	FAN_TACH_IN_SYS2
4	FAN_PWM_OUT_SYS2

System Fan3 (J12)



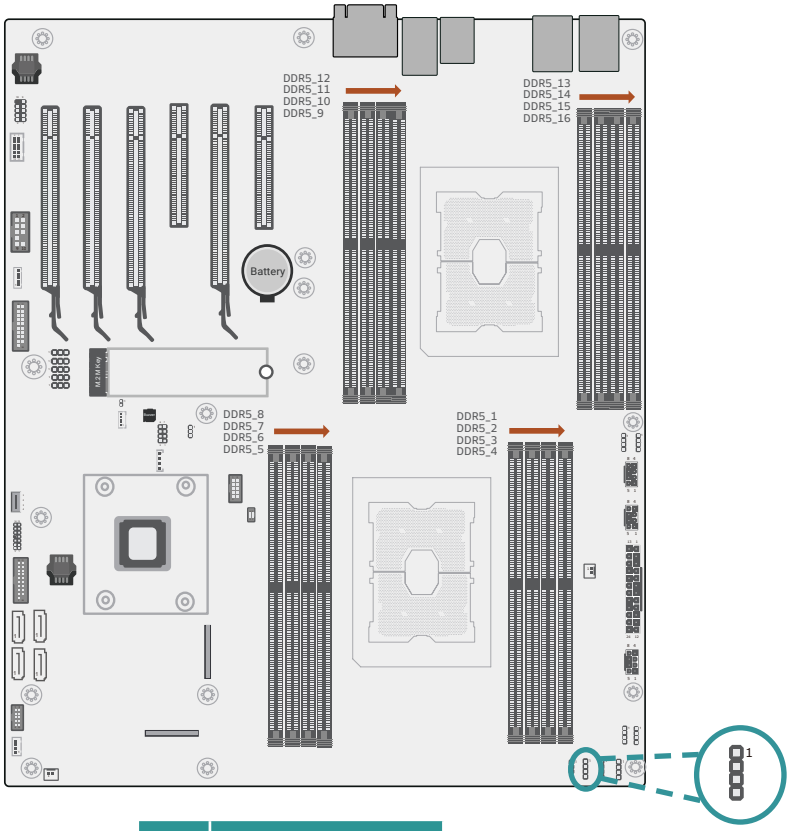
Pin	Assignment
1	GND
2	12V
3	FAN_TACH_IN_SYS3
4	FAN_PWM_OUT_SYS3

System Fan4 (J14)



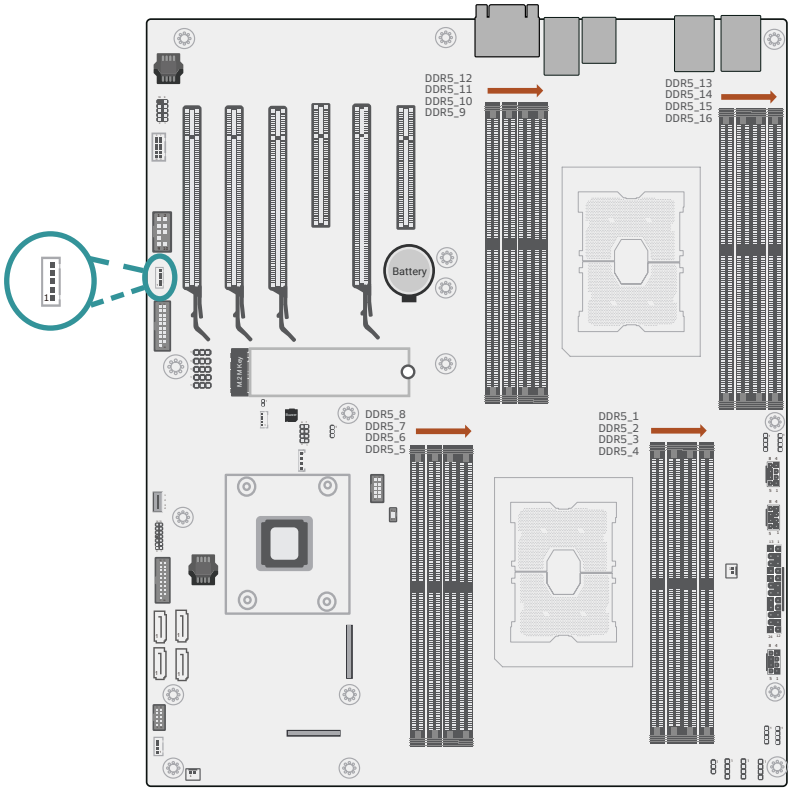
Pin	Assignment
1	GND
2	12V
3	FAN_TACH_IN_SYS4
4	FAN_PWM_OUT_SYS4

System Fan5 (J23)



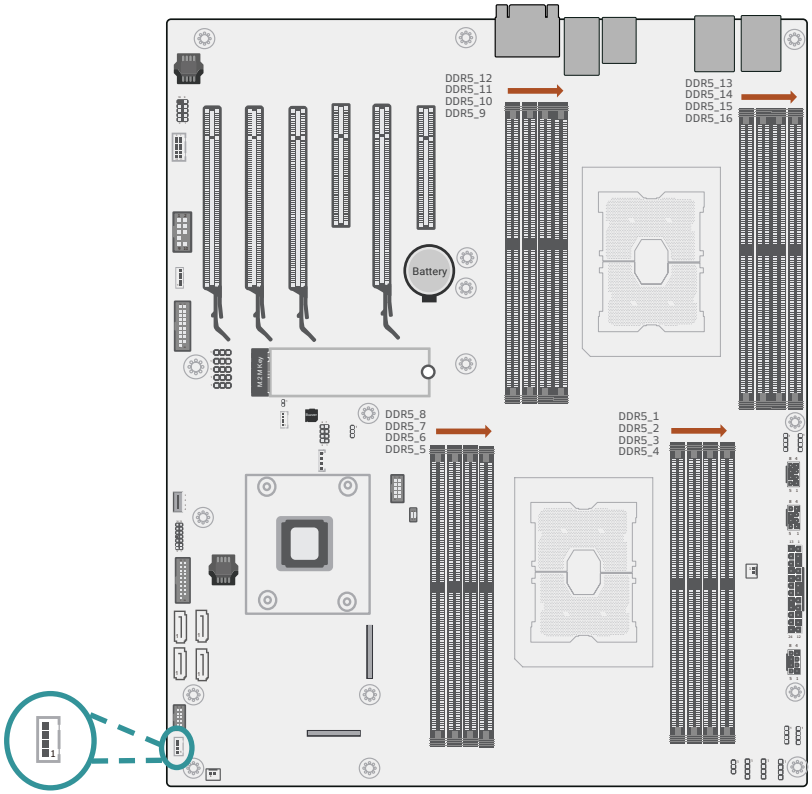
Pin	Assignment
1	GND
2	12V
3	FAN_TACH_IN_SYS5
4	FAN_PWM_OUT_SYS5

DIO Power (J20)



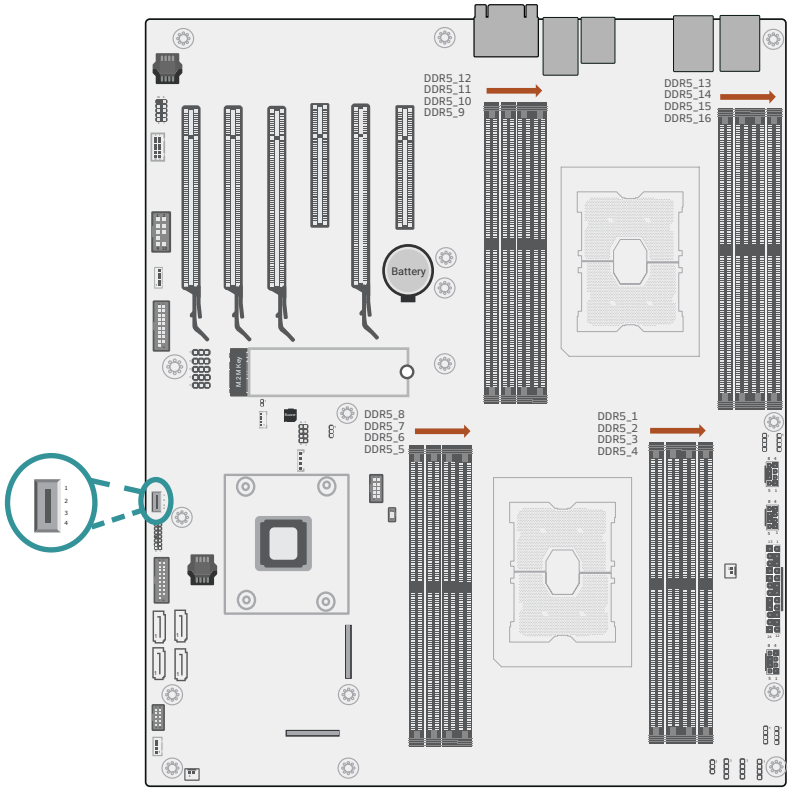
Pin	Assignment
1	12V
2	GND
3	5VSB
4	5V

LINE-IN Connector (AUJ3)



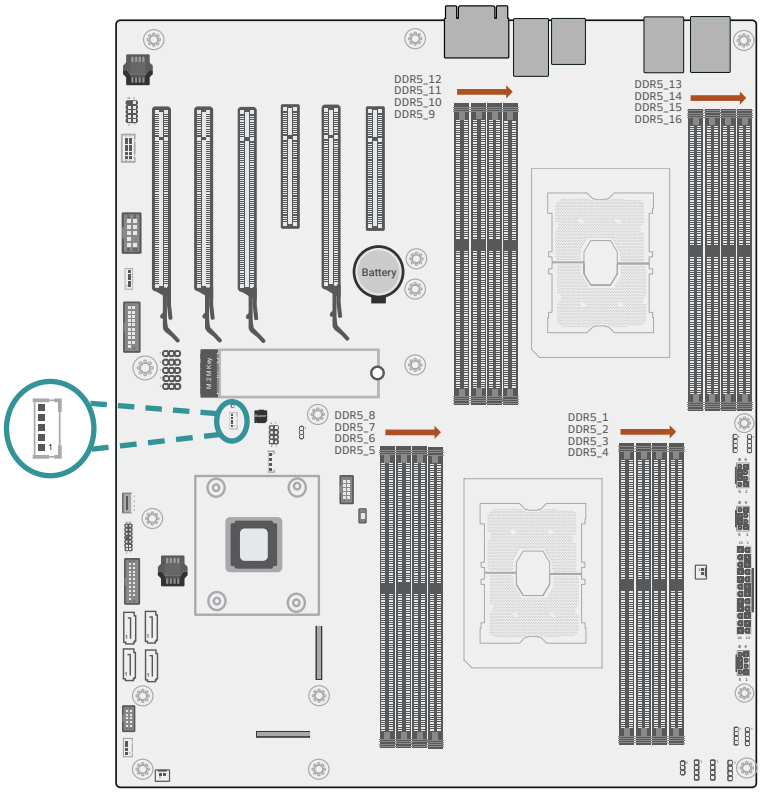
Pin	Assignment
1	LINE1-R
2	LINE1-JD
3	LINE1-L
4	GND

USB 2.0_P9 (UBCN4)



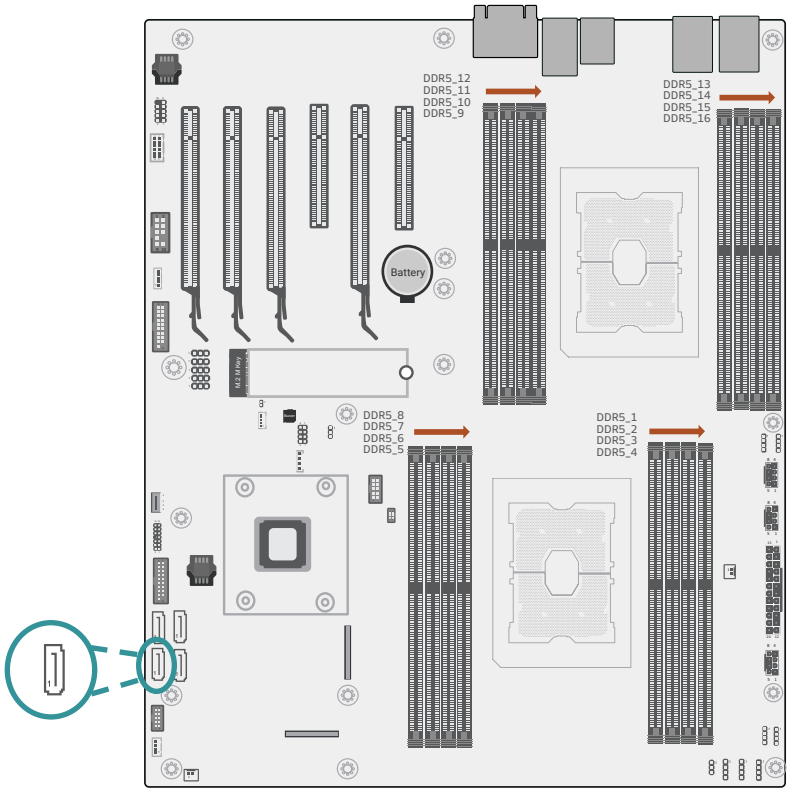
Pin	Assignment
1	V5USB2_P9
2	USB2_VER_USB_P9_R_N
3	USB2_VER_USB_P9_R_P
4	GND

OOB I2C (J5)



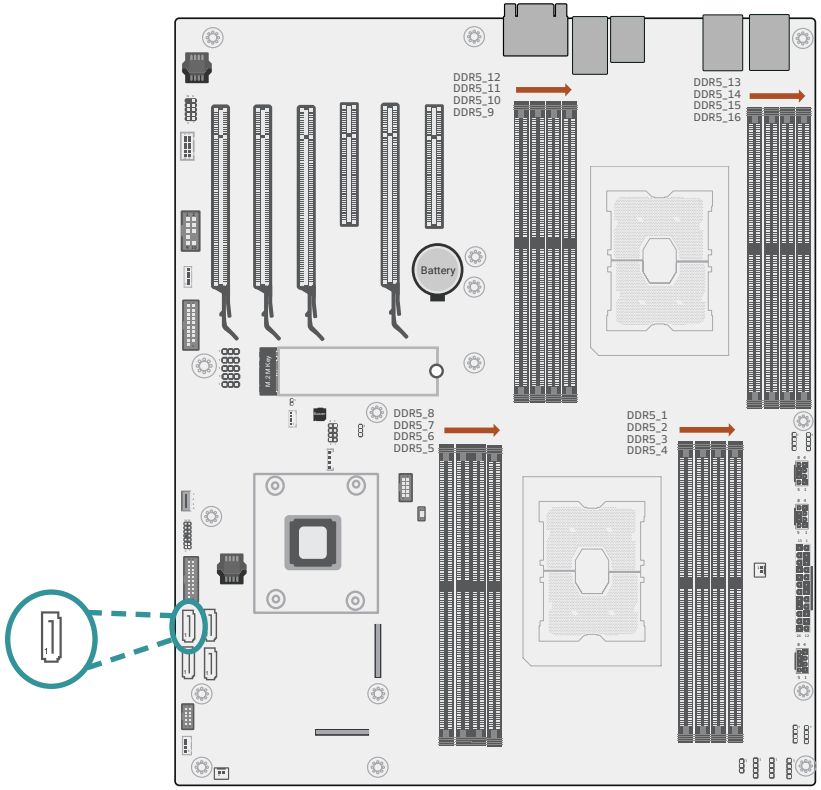
Pin	Assignment
1	NC
2	GND
3	SIO_SCL
4	SIO_SDA
5	NC

SATA0 (J16)



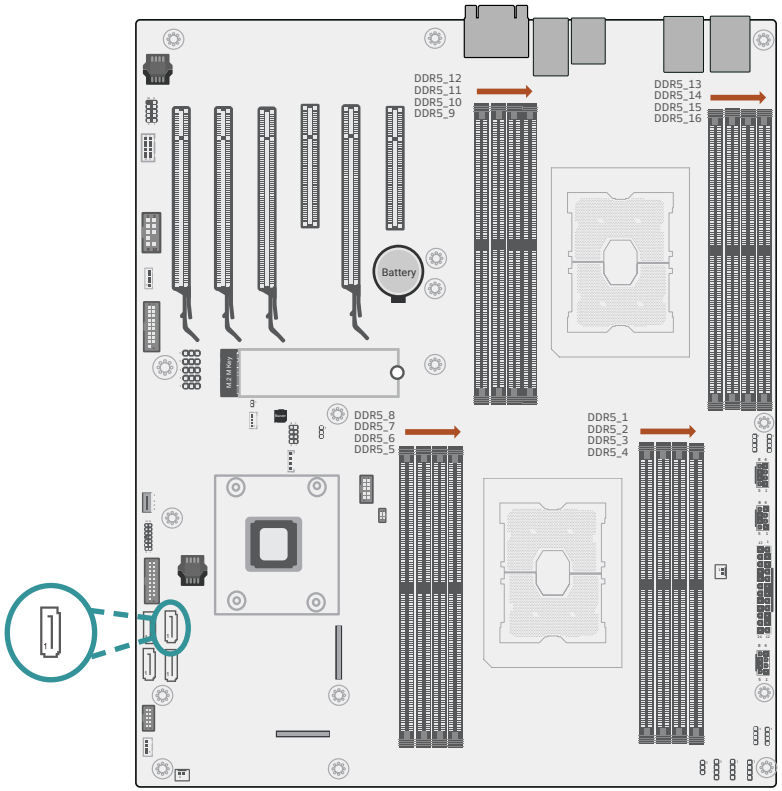
Pin	Assignment
1	GND
2	SATA_PCH_TO_CON1_P
3	SATA_PCH_TO_CON1_N
4	GND
5	SATA_CON1_TO_PCH_C_N
6	SATA_CON1_TO_PCH_C_P
7	GND

SATA1 (J17)



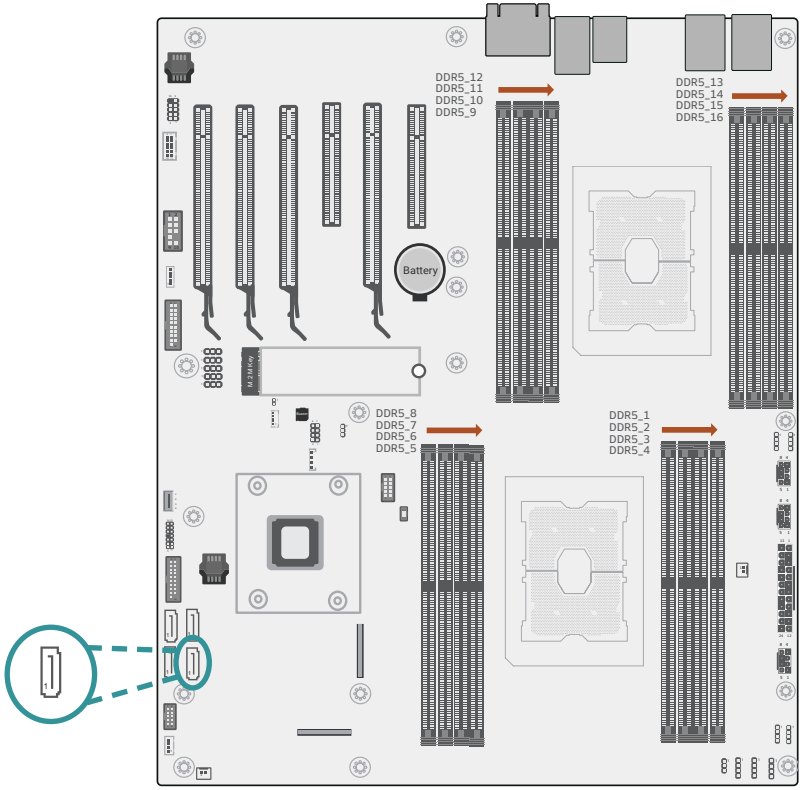
Pin	Assignment
1	GND
2	SATA_PCH_TO_CON2_P
3	SATA_PCH_TO_CON2_N
4	GND
5	SATA_CON2_TO_PCH_C_N
6	SATA_CON2_TO_PCH_C_P
7	GND

SATA2 (J18)



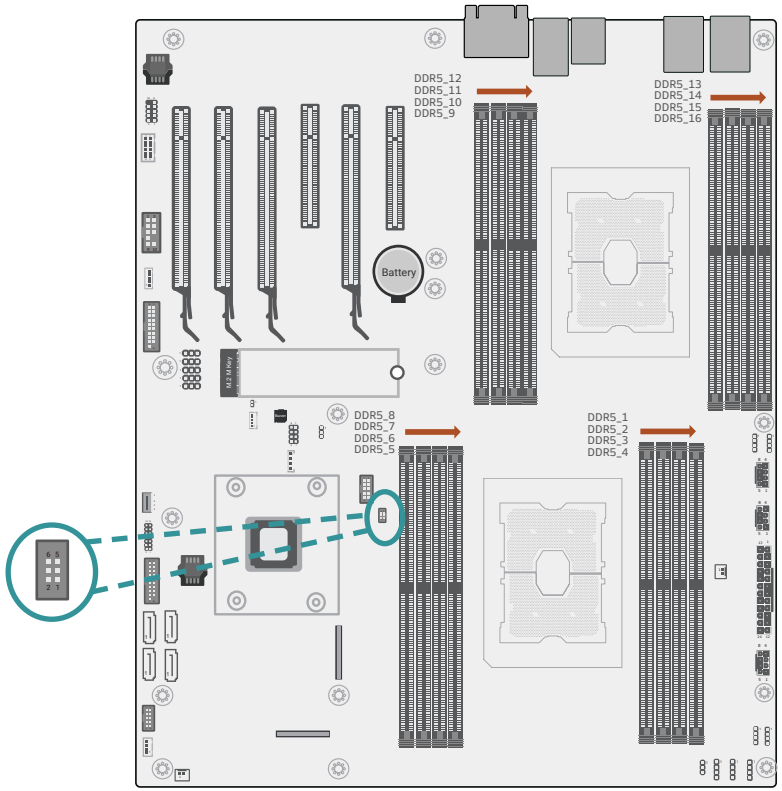
Pin	Assignment
1	GND
2	SATA_PCH_TO_CON3_P
3	SATA_PCH_TO_CON3_N
4	GND
5	SATA_CON3_TO_PCH_C_N
6	SATA_CON3_TO_PCH_C_P
7	GND

SATA3 (J19)



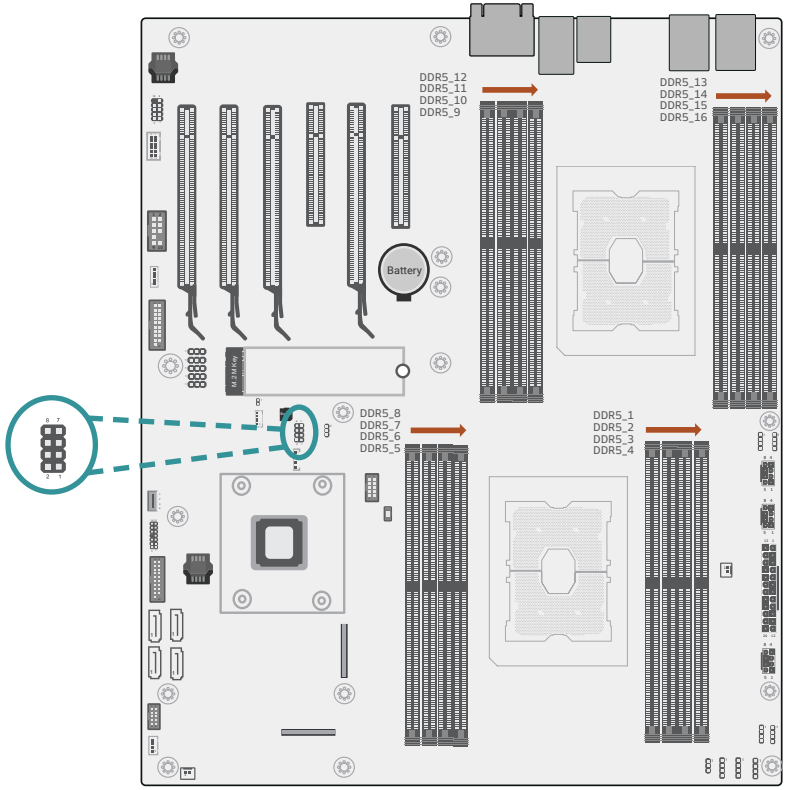
Pin	Assignment
1	GND
2	SATA_PCH_TO_CON4_P
3	SATA_PCH_TO_CON4_N
4	GND
5	SATA_CON4_TO_PCH_C_N
6	SATA_CON4_TO_PCH_C_P
7	GND

SMBus (J22)



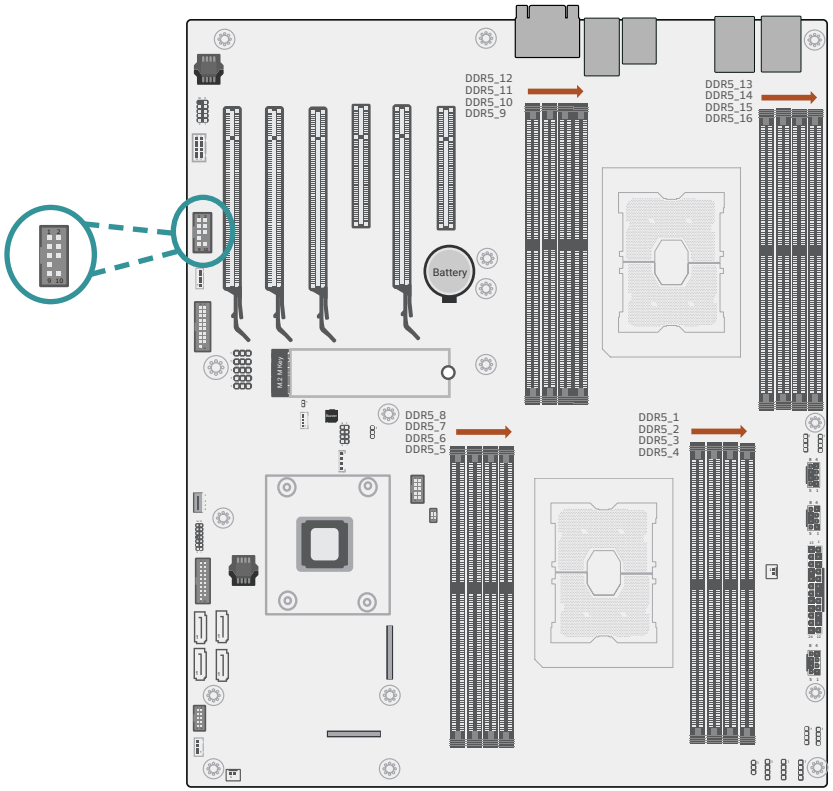
Pin	Assignment	Pin	Assignment
1	3V3_AUX	2	GND
3	SMB_SMLINK0_ STBY_LVC3_R_SCL	4	SMB_SMLINK0_STBY_ LVC3_R_SDA
5	PU_PCH_TLS_ ENABLE_STRAP		

CPLD JTAG (J3)



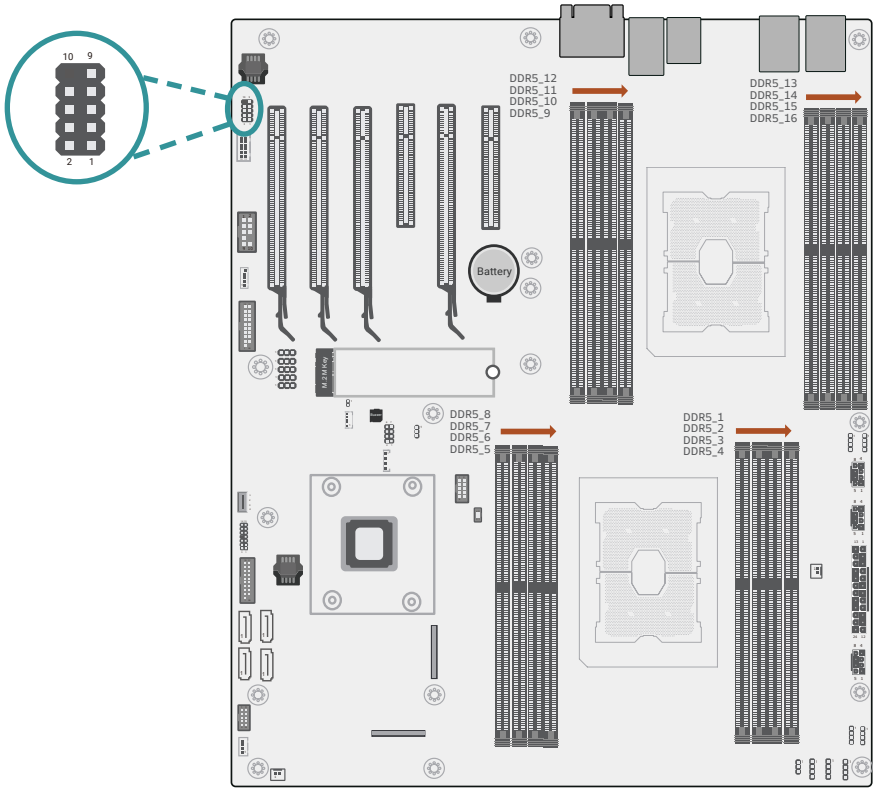
Pin	Assignment	Pin	Assignment
1	3V3SB	2	JTAG_PLD_TDO
3	JTAG_PLD_TDI	4	JTAG_PLD_EN_N
5	JTAG_PLD_RST_N	6	JTAG_PLD_TMS
7	GND	8	JTAG_PLD_TCK

COM2 (TSJ1)



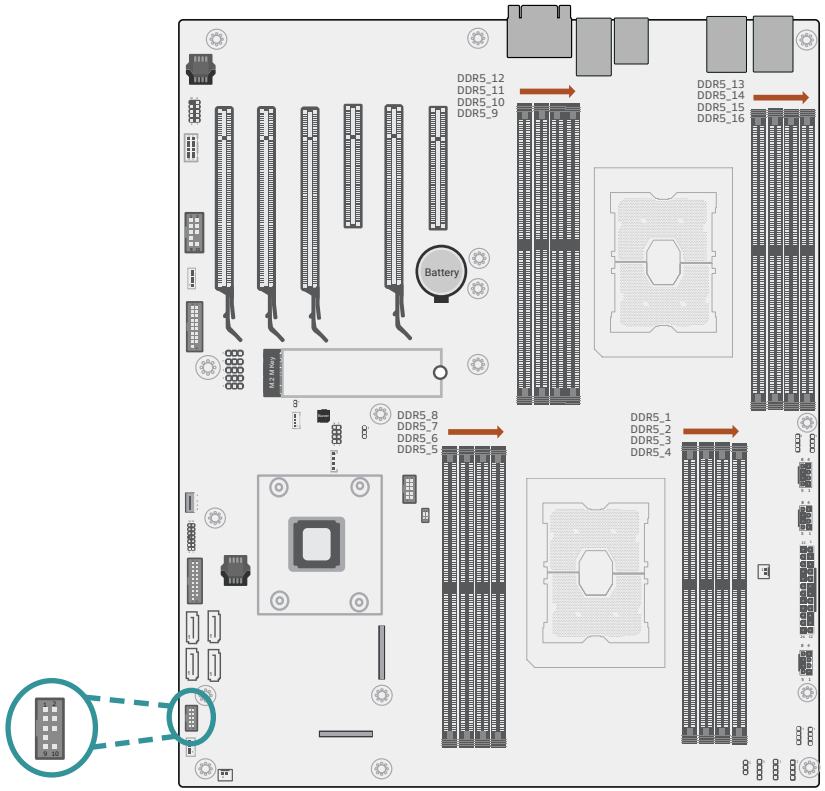
Pin	Assignment	Pin	Assignment
1	MDCD2-	2	MSIN2
3	MSO2	4	MDTR2-
5	GND	6	MDSR2-
7	MRTS2-	8	---
9	5V_12V_COM2	10	MCTS2-

BMC COM (J15)



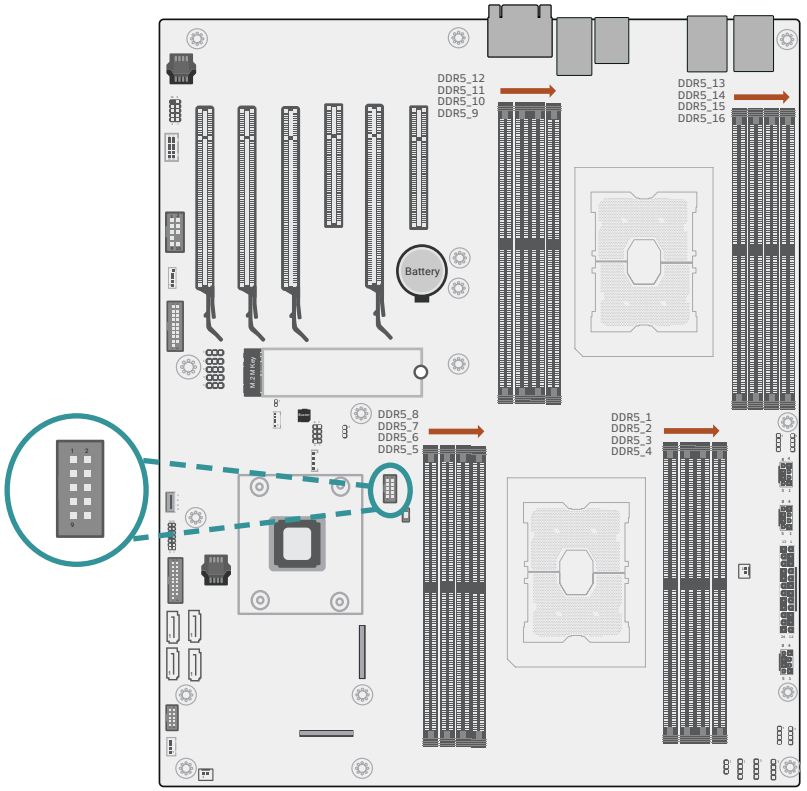
Pin	Assignment	Pin	Assignment
1	MDCD1-	2	MRD1
3	MTD1	4	MDTR1-
5	GND	6	MDSR1-
7	MRTS1-	8	MCTS1-
9	MRI1-	10	----

Front Audio (AUJ2)



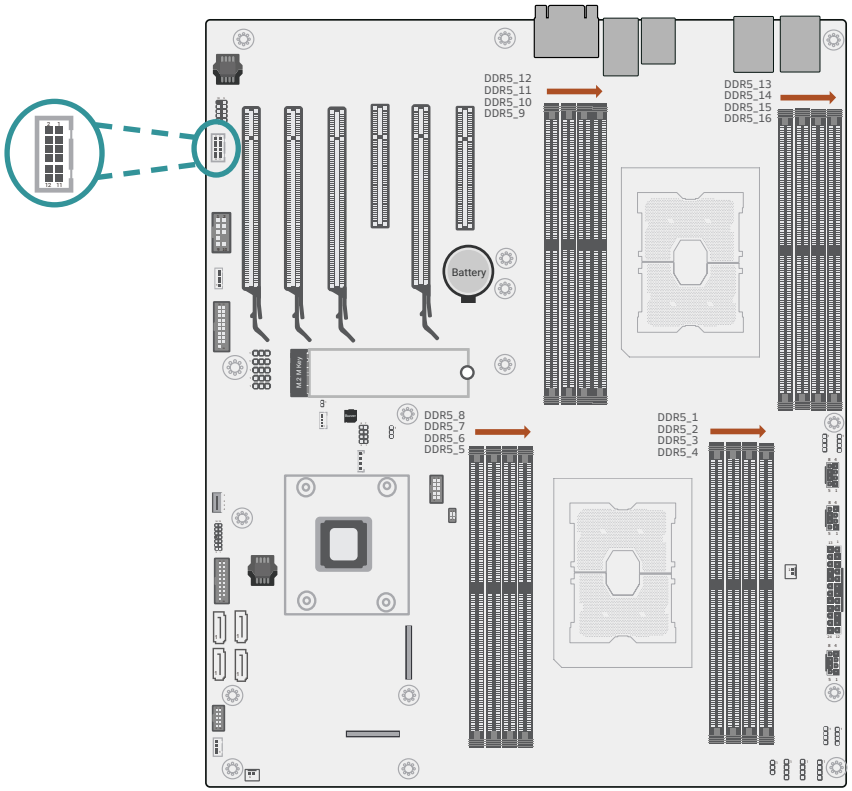
Pin	Assignment	Pin	Assignment
1	GND	2	MIC2-L_HEADER
3	NC	4	MIC2-R_HEADER
5	MIC2-JD	6	LINE2-R_HEADER
7	NC	8	AUD_GND_HEADER
9	LINE2-JD	10	LINE2-L_HEADER

USB2.0_P10/P11 (UBJ3)



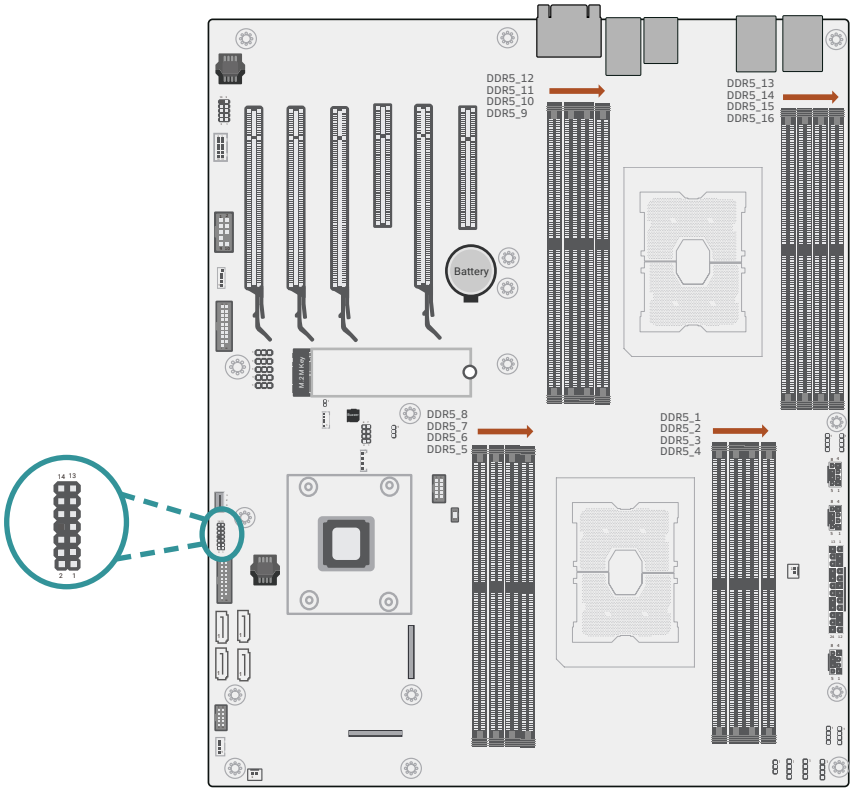
Pin	Assignment	Pin	Assignment
1	V5USB2_P1011	2	V5USB2_P1011
3	USB2_HR_USB1_P10_R_N	4	USB2_HR_USB2_P11_R_N
5	USB2_HR_USB1_P10_R_P	6	USB2_HR_USB2_P11_R_P
7	GND	8	GND
9	GND	10	GND

Front Panel (J8)



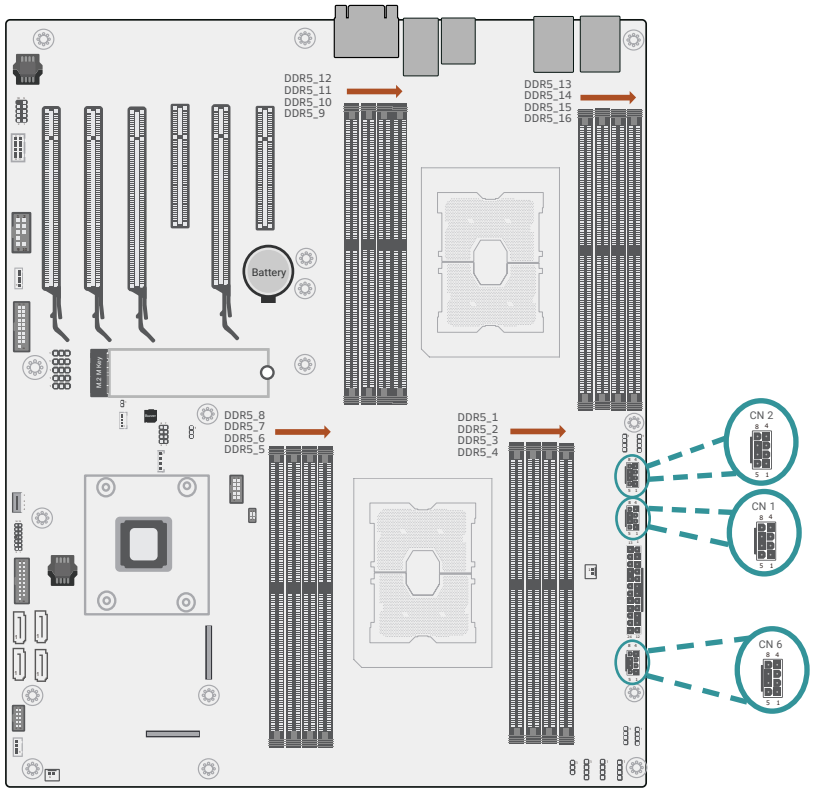
Pin	Assignment	Pin	Assignment
1	NC	2	3V3SB
3	3V3	4	3V3SB
5	LED_PCH_SATA_HDD_N	6	FP_PWR_LED_N
7	GND	8	GND
9	FP_SYSRST_BTN_N	10	FP_PWR_BTN_IN_N
11	NC	12	---

eSPI Header (J6)



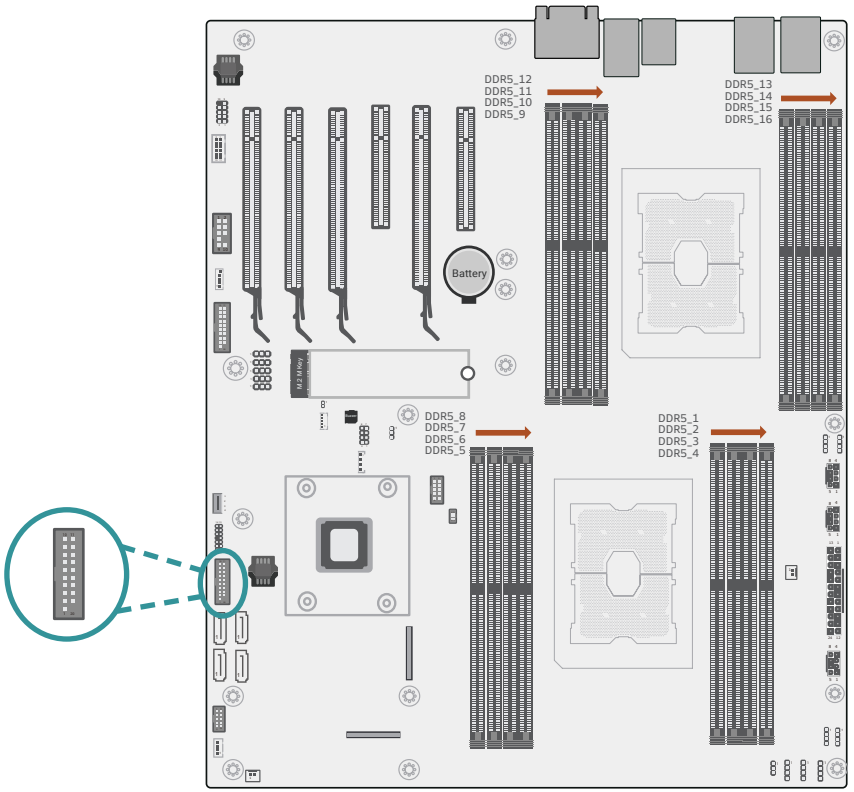
Pin	Assignment	Pin	Assignment
1	3V3SB	2	CLK_24M_66M_ESPI_P80
3	RST_ESPI_RESET_N	4	GND
5	ESPI_ALERT1_N_RCIN_N	6	GND
7	ESPI_IO0_LAD0	8	---
9	ESPI_IO0_LAD1	10	ESPI_CS0_N_LFRAME_N
11	ESPI_IO0_LAD2	12	3V3SB
13	ESPI_IO0_LAD3	14	3V3SB

12V Power (CN1, CN2, CN6)



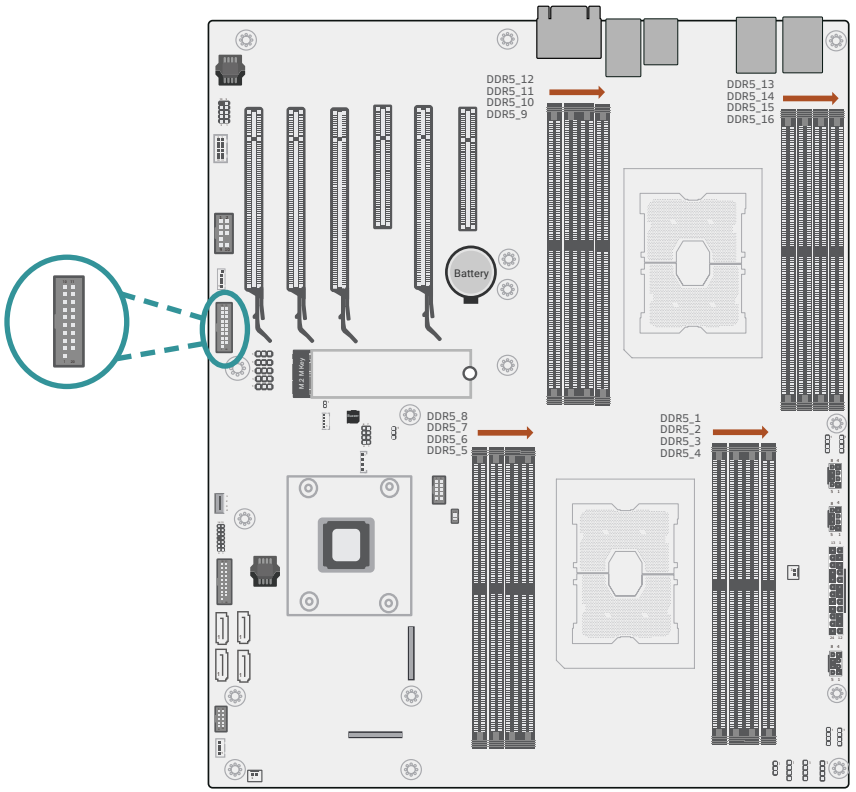
Pin	Assignment	Pin	Assignment
1	GND	5	12V
2	GND	6	12V
3	GND	7	12V
4	GND	8	12V

USB 3.0_P5/P6 (UBJ1)



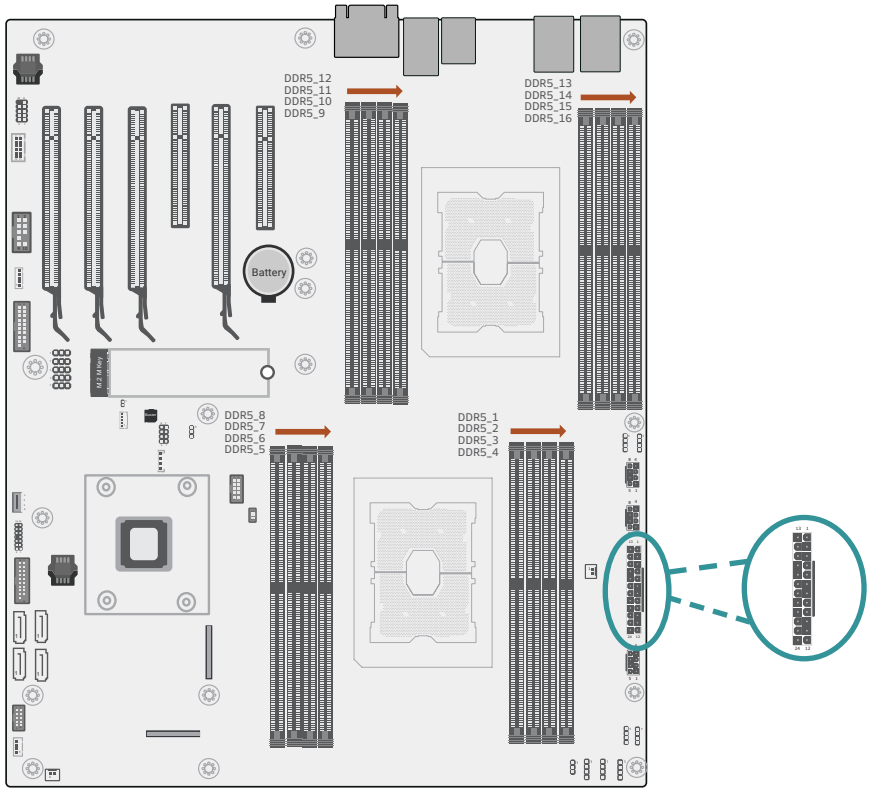
Pin	Assignment	Pin	Assignment
1	V5USB3_P78	11	USB2_P8_R_P
2	USB3_P5_RX_R_N	12	USB2_P8_R_N
3	USB3_P5_RX_R_P	13	USB2_VER_USB_P9_R_P
4	GND	14	GND
5	USB3_P5_TX_C_R_N	15	USB3_P6_TX_C_R_P
6	USB3_P5_TX_C_R_P	16	USB3_P6_TX_C_R_N
7	GND	17	GND
8	USB2_P7_R_N	18	USB3_P6_RX_R_P
9	USB2_P7_R_P	19	USB3_P6_RX_R_N
10	NC	20	V5USB3_P78

DIO (J21)



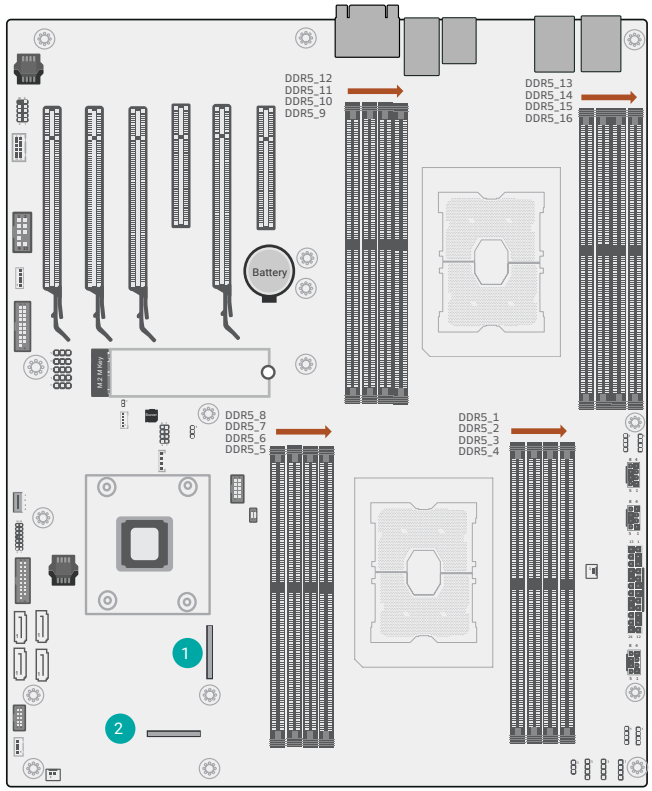
Pin	Assignment	Pin	Assignment
1	GND	11	D_IOA8_C
2	GND	12	D_IOA9_C
3	D_IOA7_C	13	D_IOA10_C
4	D_IOA6_C	14	D_IOA11_C
5	D_IOA5_C	15	D_IOA12_C
6	D_IOA4_C	16	D_IOA13_C
7	D_IOA3_C	17	D_IOA14_C
8	D_IOA2_C	18	D_IOA15_C
9	D_IOA1_C	19	GND
10	D_IOA0_C	20	---

ATX Power (CN3)



Pin	Assignment	Pin	Assignment
1	3V3	13	3V3
2	3V3	14	-12V
3	GND	15	GND
4	5V	16	ATX_PCTL_N
5	GND	17	GND
6	5V	18	GND
7	GND	19	GND
8	PWRGD_PS	20	NC
9	5VSB	21	5V
10	12V	22	5V
11	12V	23	5V
12	3V3	24	GND

MCIO



1. MCIO1
2. MCIO2

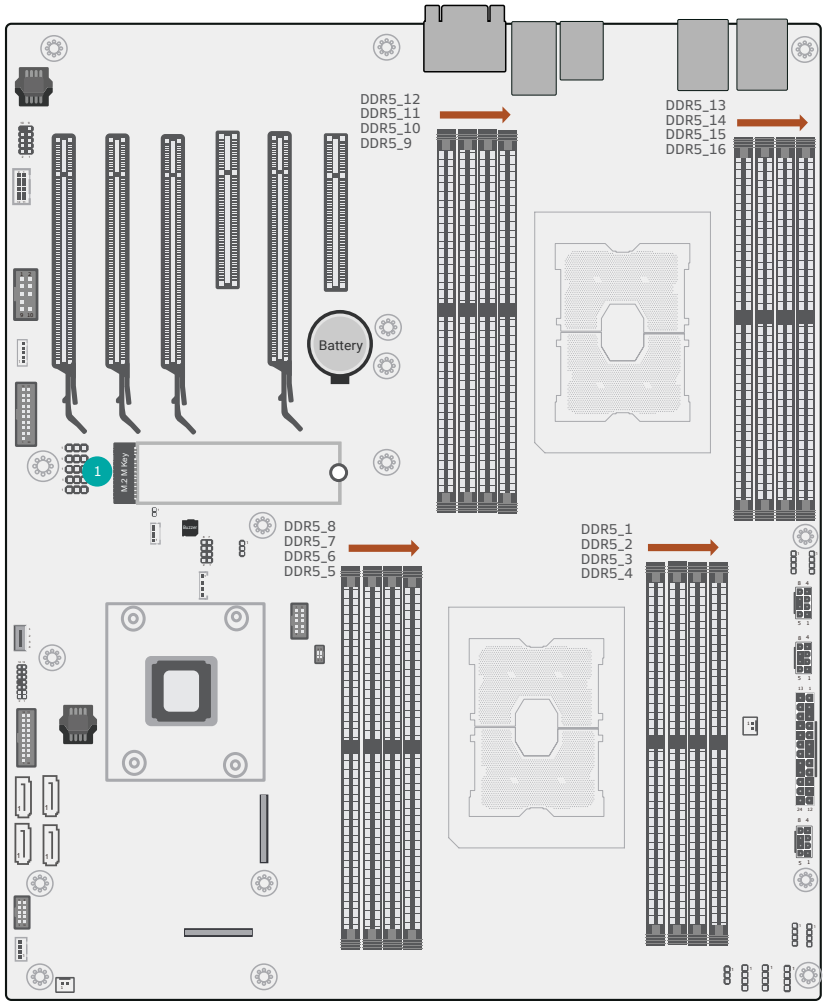
MCIO ► MCIO1 (MCCON1)

Pin	Assignment	Pin	Assignment
A1	GND	B1	GND
A2	CPU0_PE3_MCIO1_RX_DN<4>	B2	CPU0_PE3_MCIO1_TX_DN<4>
A3	CPU0_PE3_MCIO1_RX_DP<4>	B3	CPU0_PE3_MCIO1_TX_DP<4>
A4	GND	B4	GND
A5	CPU0_PE3_MCIO1_RX_DN<5>	B5	CPU0_PE3_MCIO1_TX_DN<5>
A6	CPU0_PE3_MCIO1_RX_DP<5>	B6	CPU0_PE3_MCIO1_TX_DP<5>
A7	GND	B7	GND
A8	CPU0_PEHP_ALERT_N	B8	CPU0_PE3_MCIO1_SCL
A9	CPU0_PE3_PWR_BRAKE_N	B9	CPU0_PE3_MCIO1_SDA
A10	GND	B10	GND
A11	CLK_100M_CPU0_PE3_MCIO1_NVME1_P	B11	CPLD_MCIO1_PERST_N
A12	CLK_100M_CPU0_PE3_MCIO1_NVME1_N	B12	CPU0_PE3_MCIO1_PRSNT_N
A13	GND	B13	GND
A14	CPU0_PE3_MCIO1_RX_DN<6>	B14	CPU0_PE3_MCIO1_TX_DN<6>
A15	CPU0_PE3_MCIO1_RX_DP<6>	B15	CPU0_PE3_MCIO1_TX_DP<6>
A16	GND	B16	GND
A17	CPU0_PE3_MCIO1_RX_DN<7>	B17	CPU0_PE3_MCIO1_TX_DN<7>
A18	CPU0_PE3_MCIO1_RX_DP<7>	B18	CPU0_PE3_MCIO1_TX_DP<7>
A19	GND	B19	GND
A20	CPU0_PE3_MCIO1_RX_DN<0>	B20	CPU0_PE3_MCIO1_TX_DN<0>
A21	CPU0_PE3_MCIO1_RX_DP<0>	B21	CPU0_PE3_MCIO1_TX_DP<0>
A22	GND	B22	GND
A23	CPU0_PE3_MCIO1_RX_DN<1>	B23	CPU0_PE3_MCIO1_TX_DN<1>
A24	CPU0_PE3_MCIO1_RX_DP<1>	B24	CPU0_PE3_MCIO1_TX_DP<1>
A25	GND	B25	GND
A26	CPU0_PEHP_ALERT_N	B26	CPU0_PE3_MCIO1_1_SCL
A27	SGPIO_SATA0_DATAOUT_R	B27	CPU0_PE3_MCIO1_1_SDA
A28	GND	B28	GND
A29	CLK_100M_CPU0_PE3_MCIO1_NVME0_P	B29	CPLD_MCIO1_1_PERST_N
A30	CLK_100M_CPU0_PE3_MCIO1_NVME0_N	B30	CPU0_PE3_MCIO1_1_PRSNT_N
A31	GND	B31	GND
A32	CPU0_PE3_MCIO1_RX_DN<2>	B32	CPU0_PE3_MCIO1_TX_DN<2>
A33	CPU0_PE3_MCIO1_RX_DP<2>	B33	CPU0_PE3_MCIO1_TX_DP<2>
A34	GND	B34	GND
A35	CPU0_PE3_MCIO1_RX_DN<3>	B35	CPU0_PE3_MCIO1_TX_DN<3>
A36	CPU0_PE3_MCIO1_RX_DP<3>	B36	CPU0_PE3_MCIO1_TX_DP<3>
A37	GND	B37	GND

MCIO ► MCIO2 (MCCON2)

Pin	Assignment	Pin	Assignment
A1	GND	B1	GND
A2	CPU0_PE3_MCIO2_RX_DN<4>	B2	CPU0_PE3_MCIO2_TX_DN<4>
A3	CPU0_PE3_MCIO2_RX_DP<4>	B3	CPU0_PE3_MCIO2_TX_DP<4>
A4	GND	B4	GND
A5	CPU0_PE3_MCIO2_RX_DN<5>	B5	CPU0_PE3_MCIO2_TX_DN<5>
A6	CPU0_PE3_MCIO2_RX_DP<5>	B6	CPU0_PE3_MCIO2_TX_DP<5>
A7	GND	B7	GND
A8	CPU0_PEHP_ALERT_N	B8	CPU0_PE3_MCIO2_SCL
A9	SGPIO_SATA0_LOAD_R	B9	CPU0_PE3_MCIO2_SDA
A10	GND	B10	GND
A11	CLK_100M_CPU0_PE3_MCIO2_NVME1_P	B11	CPLD_MCIO2_PERST_N
A12	CLK_100M_CPU0_PE3_MCIO2_NVME1_N	B12	CPU0_PE3_MCIO2_PRSNT_N
A13	GND	B13	GND
A14	CPU0_PE3_MCIO2_RX_DN<6>	B14	CPU0_PE3_MCIO2_TX_DN<6>
A15	CPU0_PE3_MCIO2_RX_DP<6>	B15	CPU0_PE3_MCIO2_TX_DP<6>
A16	GND	B16	GND
A17	CPU0_PE3_MCIO2_RX_DN<7>	B17	CPU0_PE3_MCIO2_TX_DN<7>
A18	CPU0_PE3_MCIO2_RX_DP<7>	B18	CPU0_PE3_MCIO2_TX_DP<7>
A19	GND	B19	GND
A20	CPU0_PE3_MCIO2_RX_DN<0>	B20	CPU0_PE3_MCIO2_TX_DN<0>
A21	CPU0_PE3_MCIO2_RX_DP<0>	B21	CPU0_PE3_MCIO2_TX_DP<0>
A22	GND	B22	GND
A23	CPU0_PE3_MCIO2_RX_DN<1>	B23	CPU0_PE3_MCIO2_TX_DN<1>
A24	CPU0_PE3_MCIO2_RX_DP<1>	B24	CPU0_PE3_MCIO2_TX_DP<1>
A25	GND	B25	GND
A26	CPU0_PEHP_ALERT_N	B26	CPU0_PE3_MCIO2_1_SCL
A27	SGPIO_SATA0_CLOCK_R	B27	CPU0_PE3_MCIO2_1_SDA
A28	GND	B28	GND
A29	CLK_100M_CPU0_PE3_MCIO2_NVME0_P	B29	CPLD_MCIO2_1_PERST_N
A30	CLK_100M_CPU0_PE3_MCIO2_NVME0_N	B30	CPU0_PE3_MCIO2_1_PRSNT_N
A31	GND	B31	GND
A32	CPU0_PE3_MCIO2_RX_DN<2>	B32	CPU0_PE3_MCIO2_TX_DN<2>
A33	CPU0_PE3_MCIO2_RX_DP<2>	B33	CPU0_PE3_MCIO2_TX_DP<2>
A34	GND	B34	GND
A35	CPU0_PE3_MCIO2_RX_DN<3>	B35	CPU0_PE3_MCIO2_TX_DN<3>
A36	CPU0_PE3_MCIO2_RX_DP<3>	B36	CPU0_PE3_MCIO2_TX_DP<3>
A37	GND	B37	GND

▶ Expansion Slots

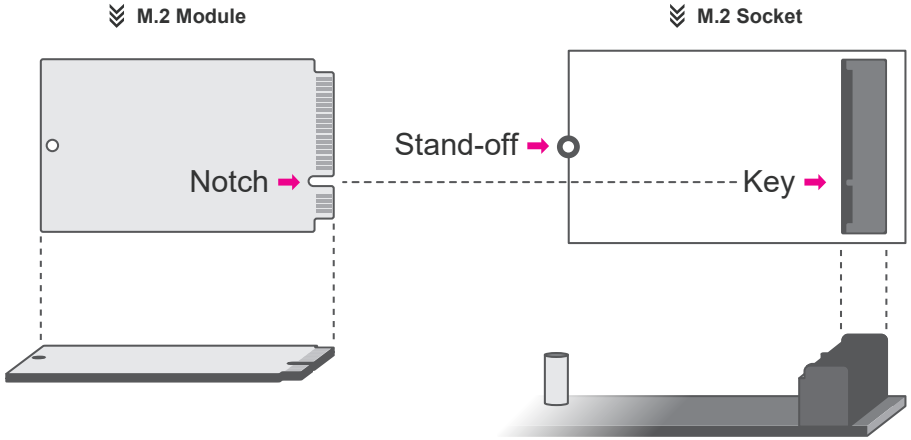


1 M.2 M-Key

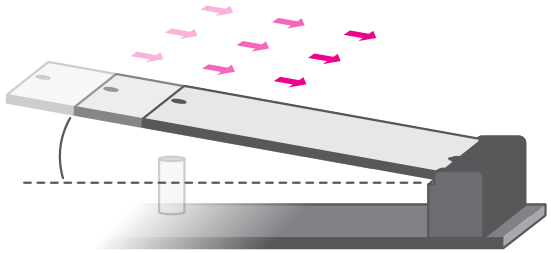
Installing the M.2 Module

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

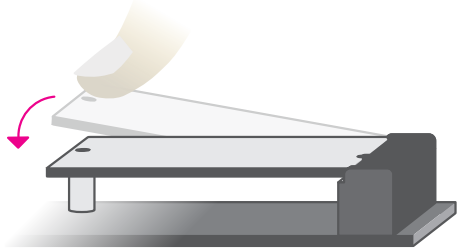
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



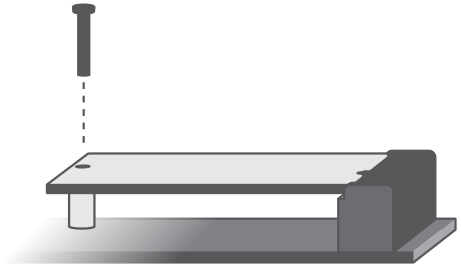
Please follow the steps below to install the card into the socket.



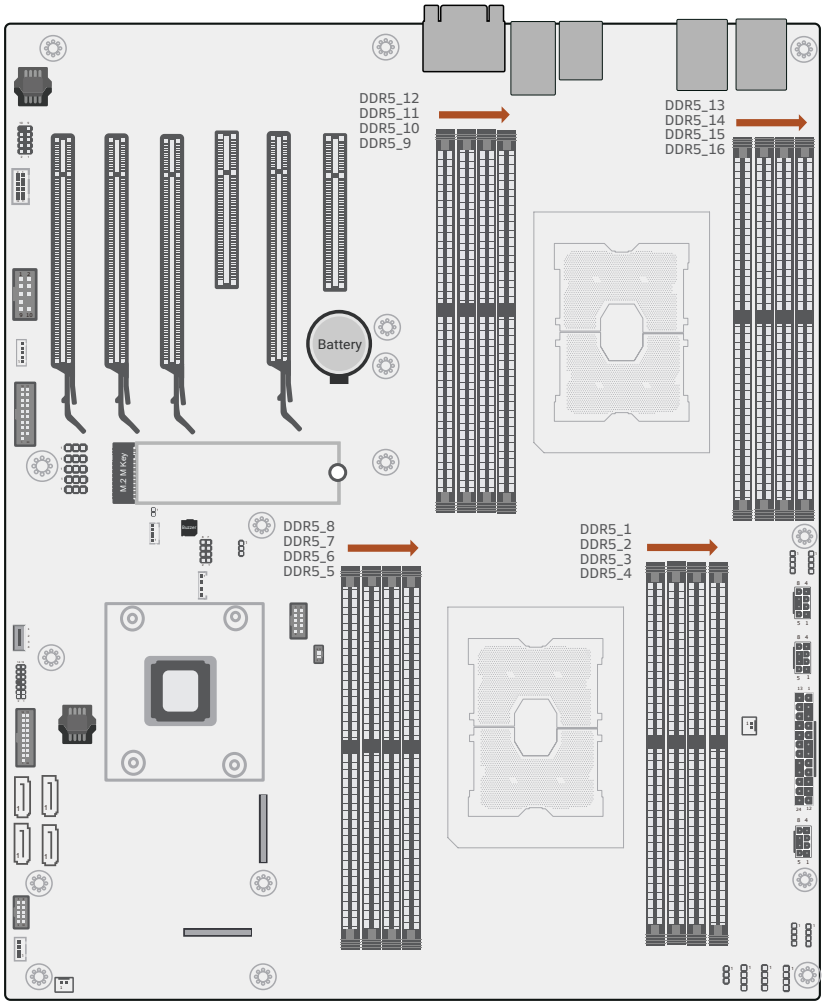
Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.



Step 2:
Press the end of the card far from the socket down until against the stand-off.



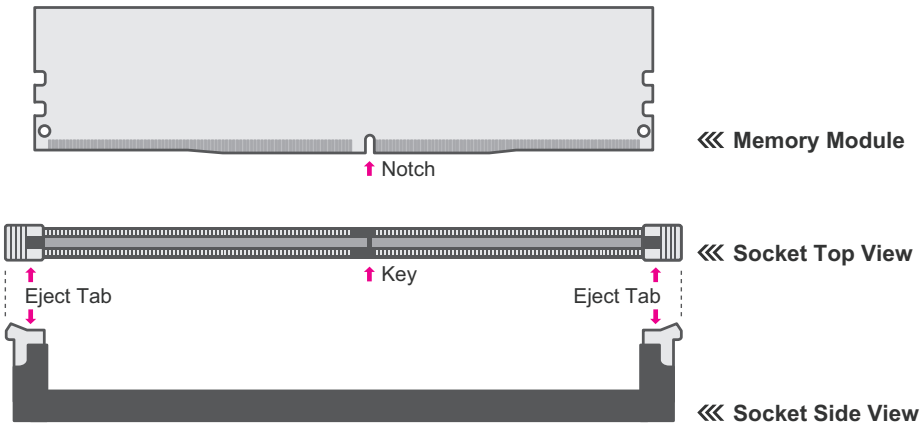
Step 3:
Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.



Installing the 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 DIMM socket on the system board
4. Make sure the notch on memory card is aligned to the key on the socket.

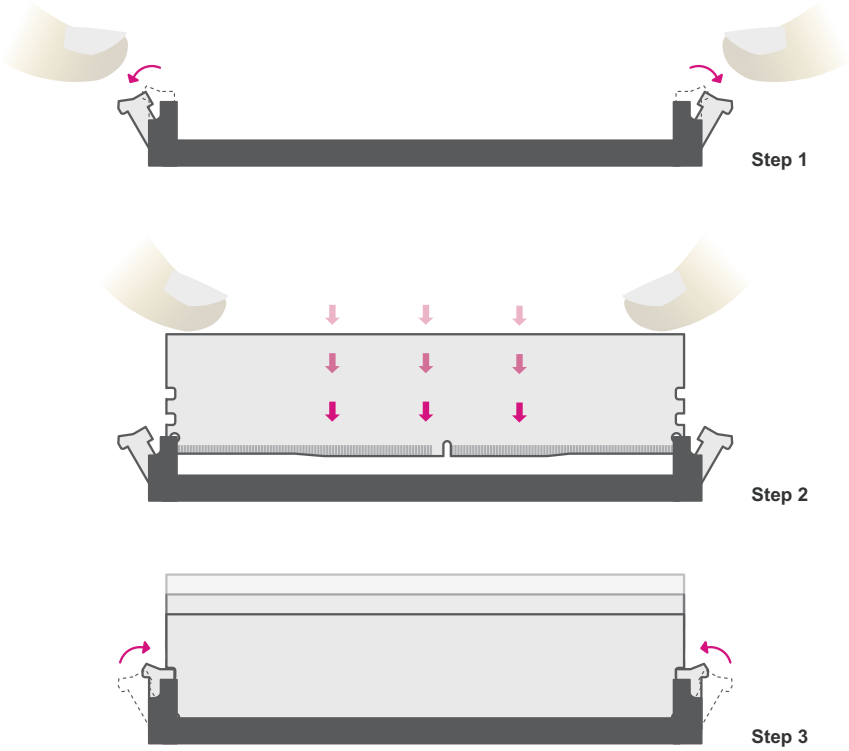


Please follow the steps below to install the memory card into the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
Insert the memory card into the slot while making sure the notch and the key are aligned. Press the card down firmly with fingers while applying and maintaining even pressure on both ends.

Step 3:
The tabs snap automatically to the edges of the card and lock the card in place.



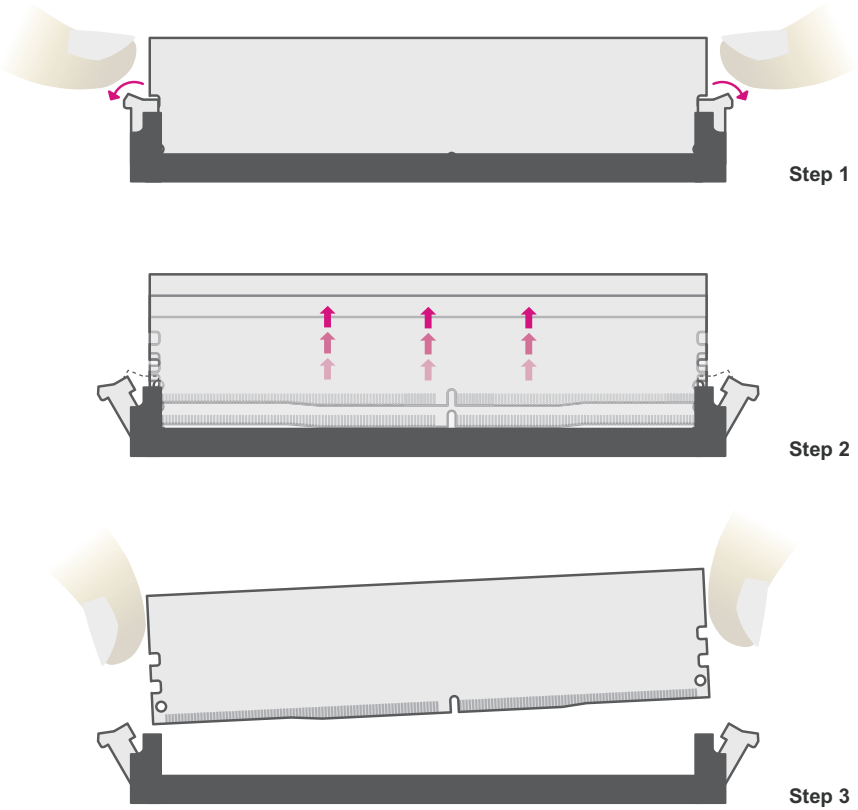
Removing the DIMM Module

Please follow the steps below to remove the memory card from the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
The memory card ejects from the slot automatically.

Step 3:
Hold the card by its edges and remove it from the slot.



Chapter 3 - BIOS Settings

▶ Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board.

The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message “Press DEL to run setup” will appear on the screen. If the message disappears before you respond, restart the system or press the “Reset” button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

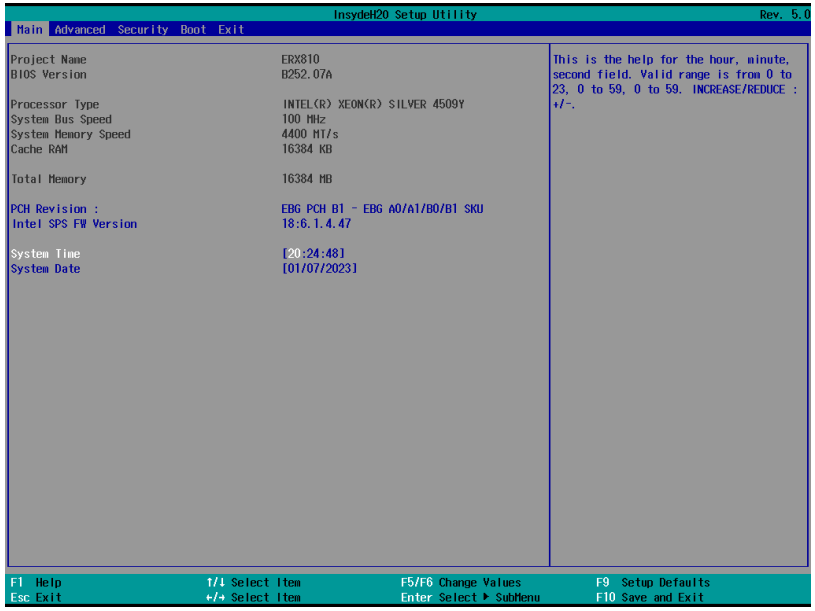
Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu
When “▶” appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

▶ Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

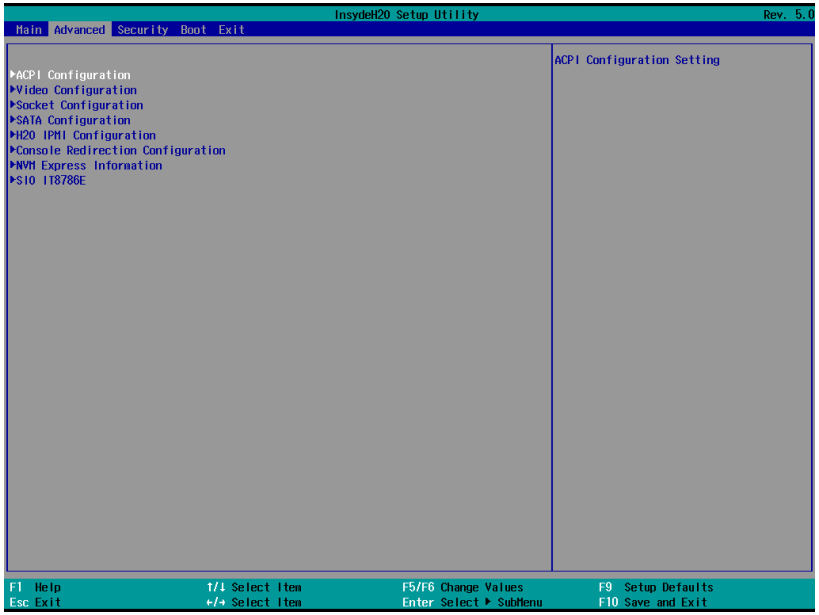
System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

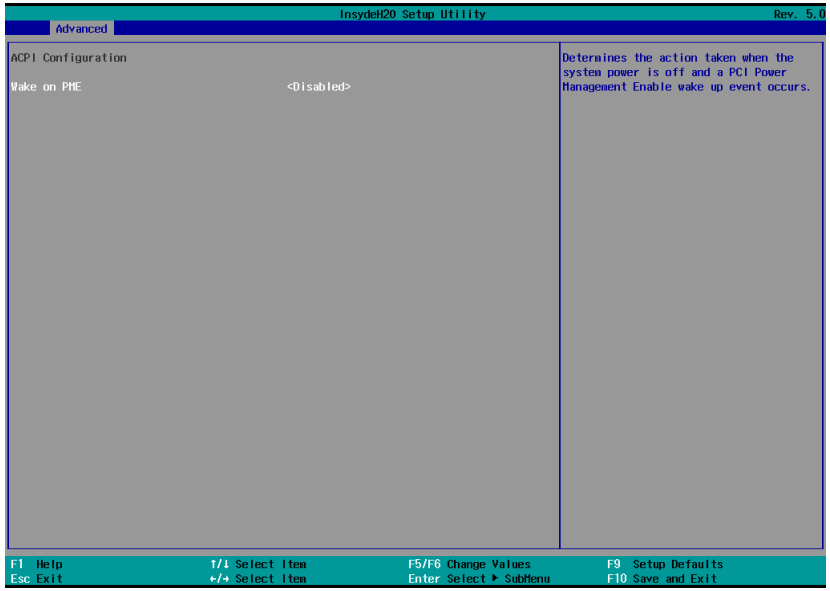
▶ Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.



ACPI Configuration



Wake on PME

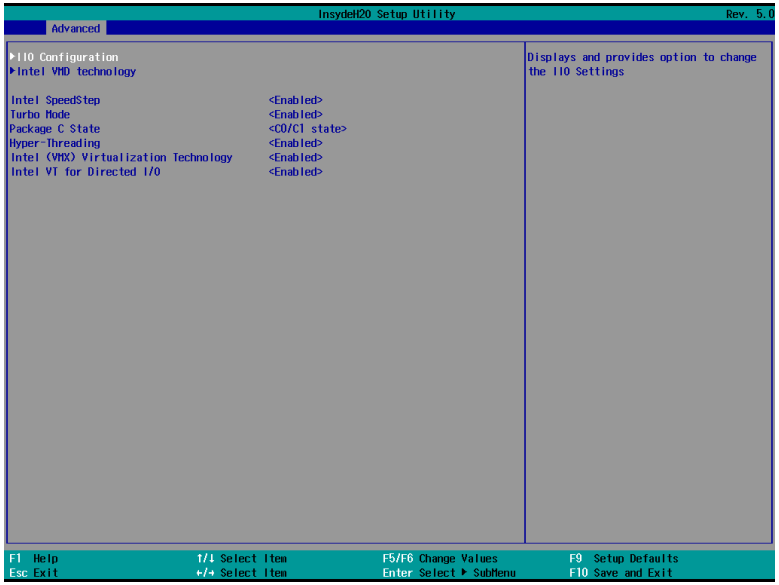
This field determines the action taken when the system power is off and a PCI Power Management Enable wake up event occurs.

Video Configuration

Display Mode

Select among On Board First and Plug In First to specify the display I/O source.

CPU Configuration



Intel Speed Step

This field is used to enable or disable the Enhanced Intel SpeedStep® Technology (EIST), which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, EIST features can then be enabled via the operating system's power man-agement.

Turbo Mode

Enable or disable turbo mode of the processor. This field will only be displayed when "Intel Speed Step" is enabled. This field is not available when the equipped CPU does not support Turbo Mode.

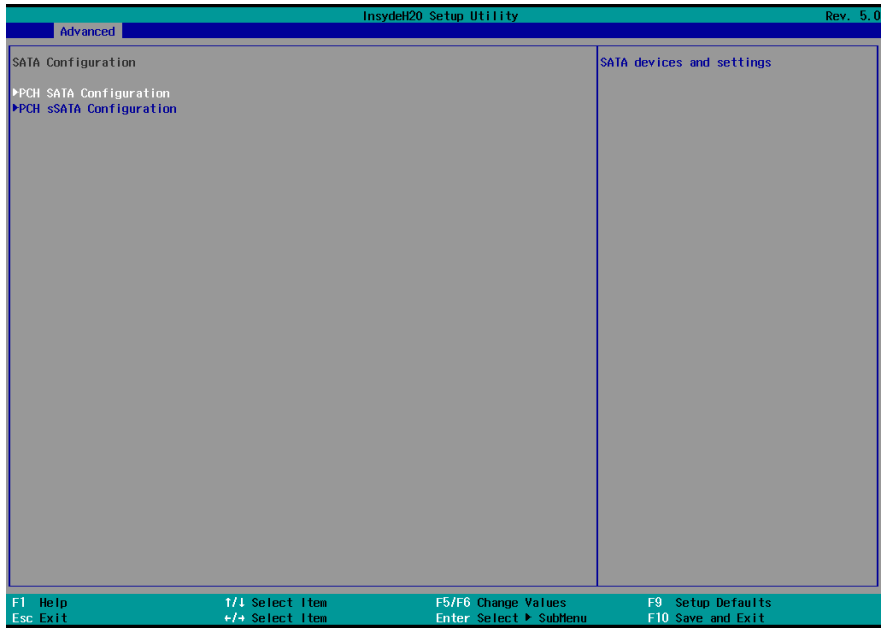
Hyper-threading

Enable or disable Hyper-threading. When it is enabled, a physical core will perform as two logical processors, and the user may experience better computational efficiency of the system. Please make sure that the OS operating on your system is optimized for Hyper-Threading, e.g. Windows and Linux. This field is not available when the equipped CPU does not support Hyper-threading.

Intel (VMX) Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

SATA Configuration



PCH SATA Configuration

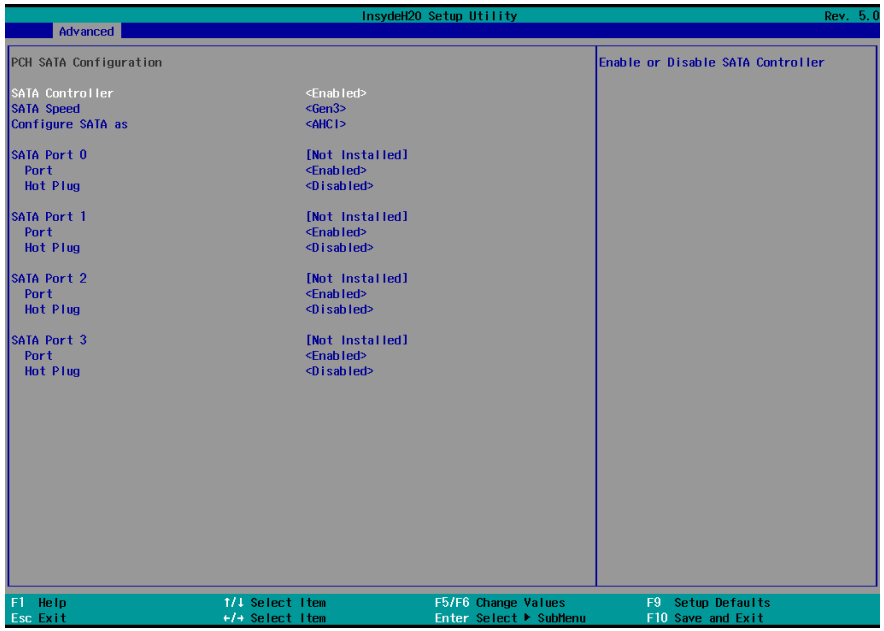
Press Enter to enter the sub-menu and configure on-board SATA 3.0 controllers.

PCH sSATA Configuration

Press Enter to enter the sub-menu and configure the M.2 SATA storage device.

▶ Advanced

SATA Configuration ▶ PCH SATA Configuration



SATA Controller(s)

Enable or disable the Serial ATA controller. This following fields will only be displayed when this field is enabled.

SATA Speed

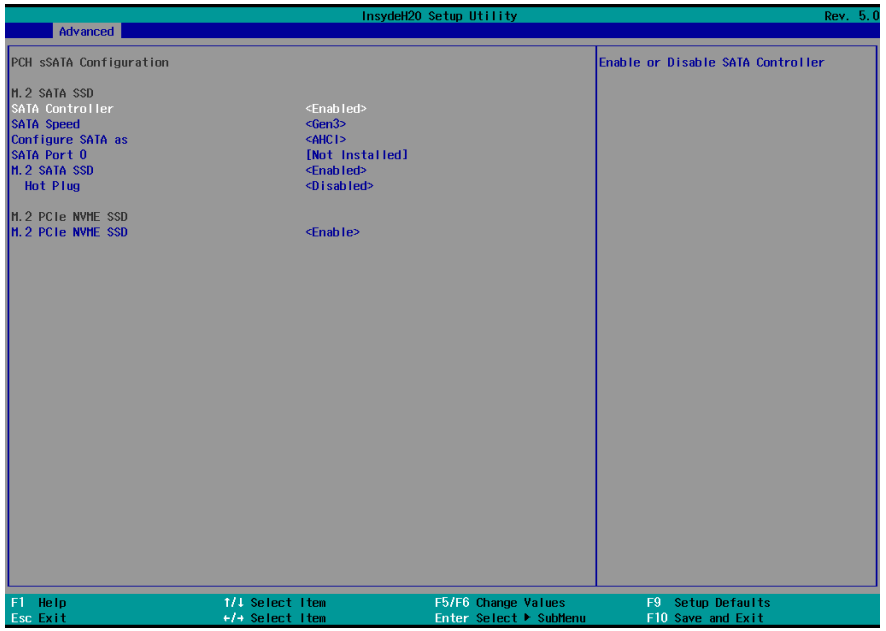
Select Serial ATA controller(s) speed — Auto, Gen1 (1.5 Gbit/s), Gen2 (3 Gbit/s) or Gen 3 (6 Gbit/s).

SATA Port 0-3/Hot Plug

Enable or disable each Serial ATA port and its hot plug function.

▶ Advanced

SATA Configuration ▶ PCH sSATA Configuration



SATA Controller(s)

Enable or disable the Serial ATA controller. This following fields will only be displayed when this field is enabled.

SATA Speed

Select Serial ATA controller(s) speed — Auto, Gen1 (1.5 Gbit/s), Gen2 (3 Gbit/s) or Gen 3 (6 Gbit/s).

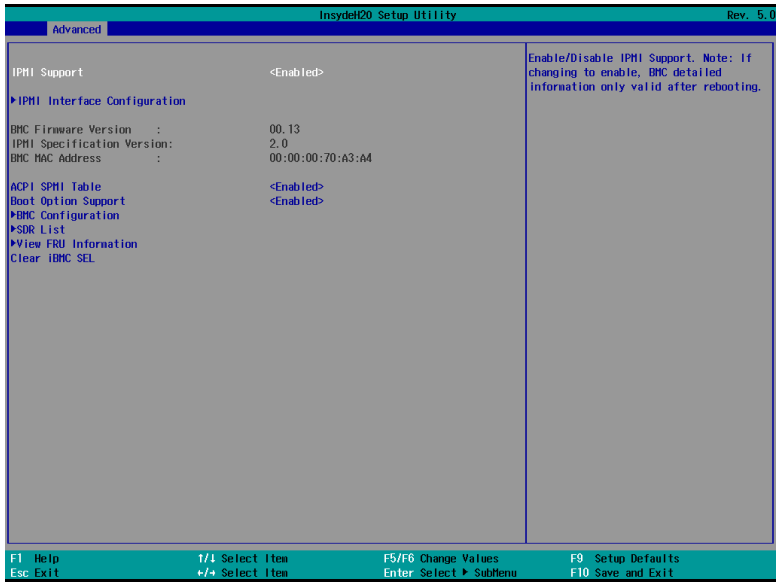
M.2 SATA Port / Hot Plug

Enable or disable each Serial ATA port and its hot plug function.

▶ Advanced

H2O IPMI Configuration

Configure IPMI settings in the submenu.



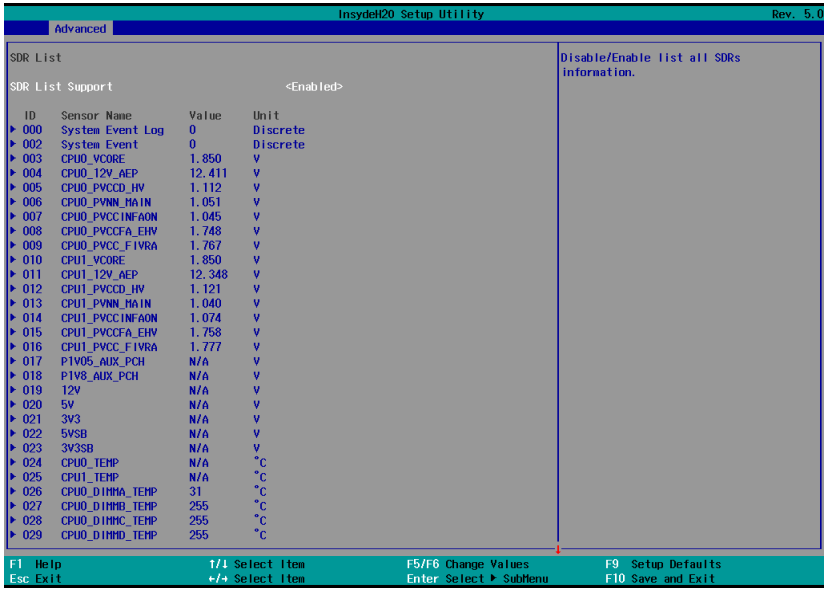
IPMI Support

Enable/Disable IPMI Support.

Note: If changing to enable, BMC detailed information only valid after rebooting.

▶ Advanced

H2O IPMI Configuration ▶ SDR List



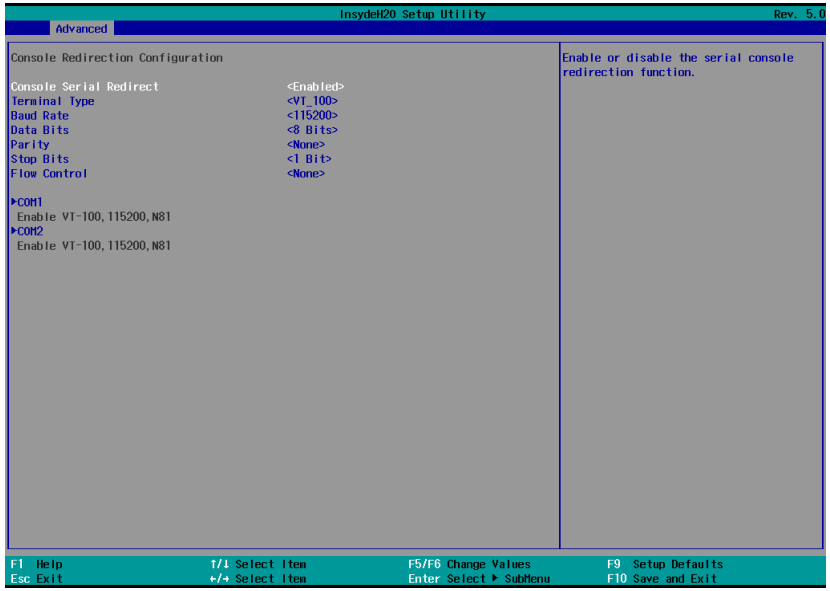
SDR List

Enable/Disable all SDRs information.

▶ Advanced

Console Redirection

Configure COM port serial settings in the submenu.



Console Serial Redirect

Enable/Disable the serial console redirection function.

Terminal Type

Select terminal type — VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate — 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data Bits

Select data bits — 7 bits or 8 bits.

Parity

Select parity bits — none, even or odd.

Stop Bits

Select stop bits — 1 bit or 2 bits.

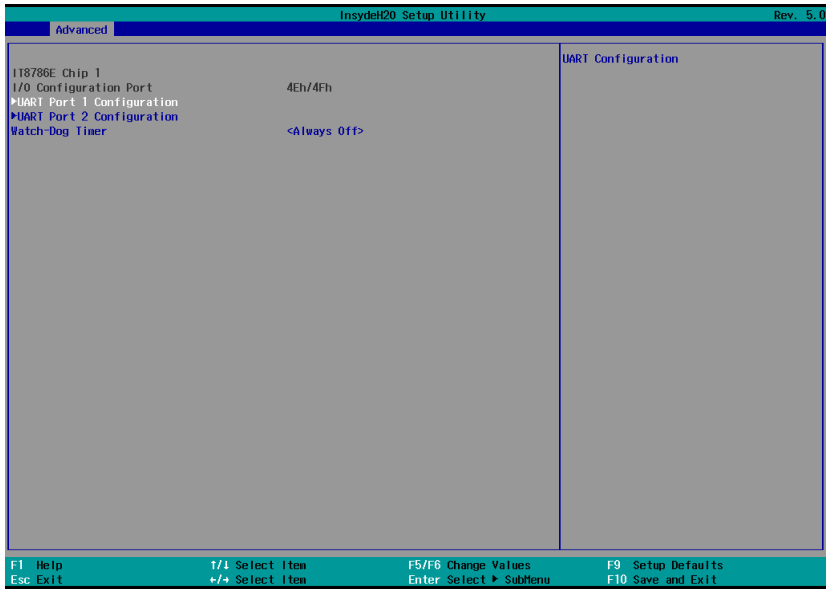
Flow Control

Select flow control type — none, RTS/CTS or XON/XOFF.

▶ Advanced

SIO IT8786E

Configure Super I/O settings in this submenu. Scroll by moving the cursor up or down to reveal more options.



COM1

Enables or disables the serial ports (COM). The following bracketed fields will only appear when the port is enabled.

WDT

Enable or disable the Watchdog Timer (WDT) function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

WDT = [Enable]

Counter

Set the timeout value of the WDT — 1-255 seconds.

Case Open Alert

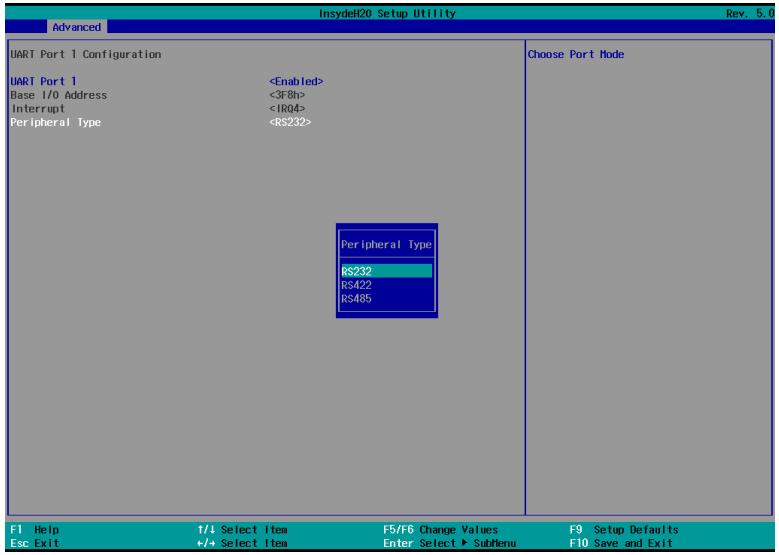
Enable or disable case open alert.

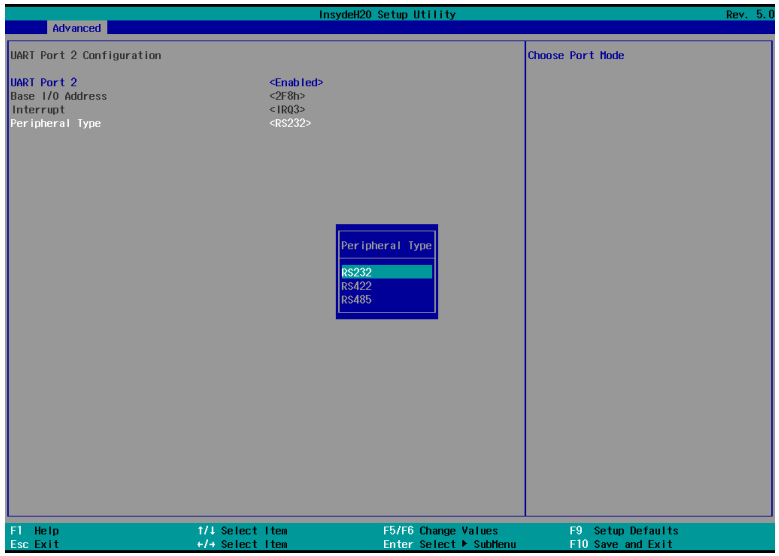
Clean Case Open Status

Clean current case open status including alert.

▶ Advanced

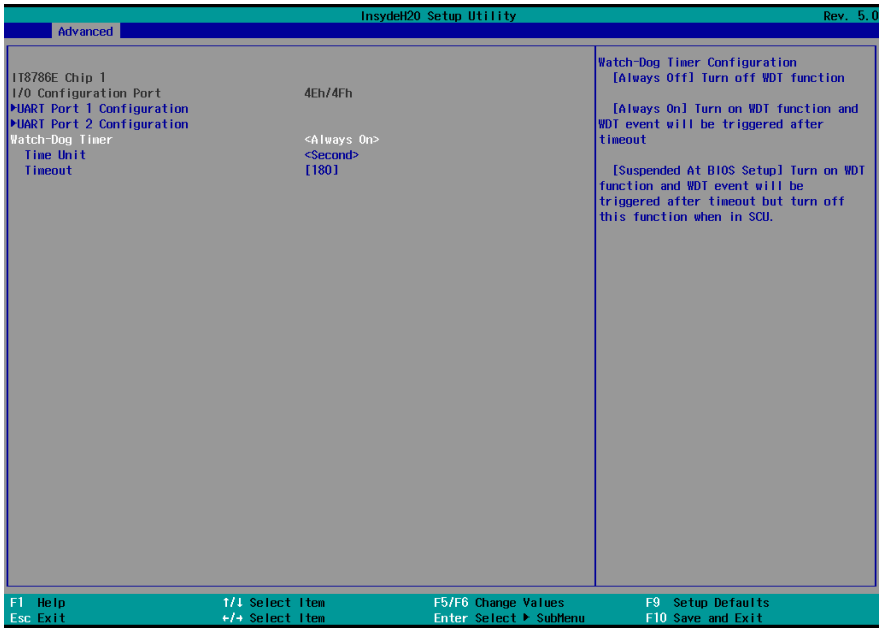
SIO IT8786E ► UART Port 1 / 2 Configuration





▶ Advanced

SIO IT8786E ► Watch-Dog Timer



Watch-Dog Timer

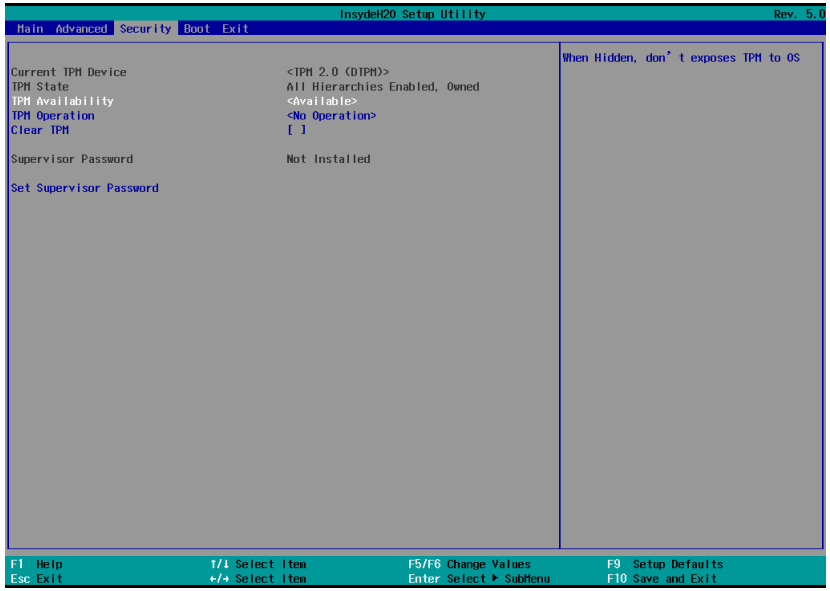
Watch-Dog Timer Configuration

[Always Off] Turn off WDT function

[Always On] Turn on HDT function and WDT event will be triggered after timeout

[Suspended At BIOS Setup]
Turn on HDT function and WDT event will be triggered after timeout but turn off this function when in SCu.

▶ Security



TPM Availability

Show or hide the TPM availability and its configurations.

TPM Operation

Select one of the supported operation to change TPM2 state — No Operation, Enable, or Disable.

Clear TPM

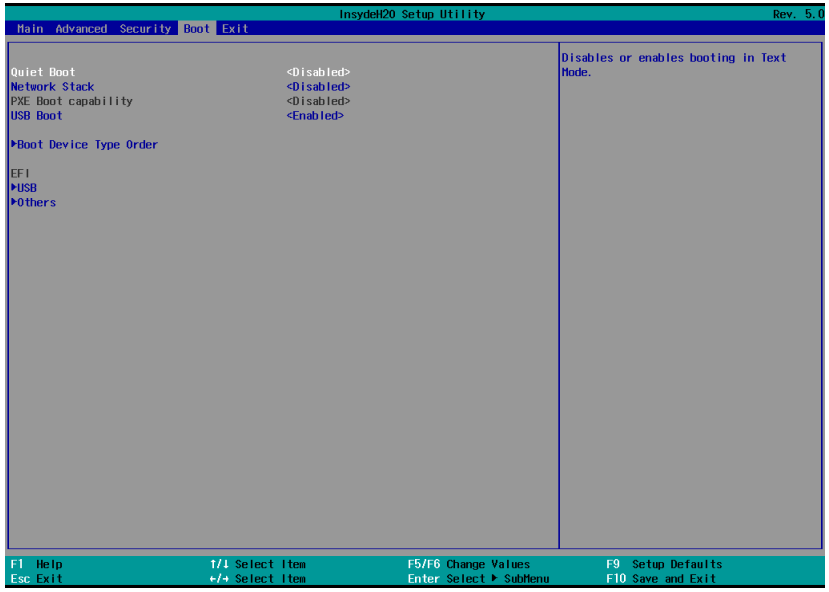
Remove all TPM context associated with a specific Owner.

Set Supervisor Password

Set the supervisor's password. The length of the password must be greater than one character.

Note:
The devices shown here are based on a carrier board that may not resemble your actual carrier board. The actual I/O devices depend entirely on those present on your actual carrier board.

▶ Boot



Network Stack

This field is used to enable or disable network stacks, i.e. IPv4 or IPv6 network protocols.

USB Boot

Enable or disable booting to USB boot devices.

Quiet Boot

Enable or disable booting in text mode.

▶ Exit

Exit Saving Changes

Select Yes and press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select YES and press <Enter> to load optimal defaults.

Discard Changes

Select YES and press <Enter> to exit the system setup without saving your changes.

▶ Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility.

▶ Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:

a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.

b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

c. After updating unique MAC Address from manufacturing, NVM will be protected immediately after power cycle.
Users cannot update NVM or MAC address.

Appendix A- Mating Connectors

▶ The Mating Connectors List

Please refer to the following list of the mating connectors.

Function	Location	Connector information
MCIO1	MCCON1	
MCIO2	MCCON2	
MCIO3	MCCON3	
MCIO4	MCCON4	
MCIO5	MCCON5	(HS)MINI COOL EDGE IO(MCIO) CONN, PCIE GEN4 & GEN5, 74P, F, 180D, 30u", BLACK, SMD, 8.95H, LDG2743-24N34-9H(FOXCONN)RoHS
MCIO6	MCCON6	
MCIO7	MCCON7	
MCIO9	MCCON9	
MCIO10	MCCON10	
BMC COM	J15	PIN PLUG 2*5-1(K10)/2.0mm SMD W/cap,222-97-05GBEA(R)(PINREX),RoHS
Front Panel	J8	BOX HEADER, 2*6P/2mm, F, WHITE, 180D, DIP, WFN-02121-2P(TENGGUAM)RoHS
COM2	TSJ1	BOX HEADER 2*5-1P(K8)/2.54mm, M, GOLD, BLACK, 180D, SMD, 512-90-10GBEP(PINREX) ,RoHS
DIO Power	J20	WAFER 1*4,2.0mm,M,H=6.2mm,180D,DIP,WHITE,88323-041N-3(ACES)RoHS
DIO	J21	BOX HEADER 2*10-1(K20),2.0mm,M,H=6.3mm,180D,DIP,BLACK,52X-80-20GB52(PINREX)RoHS
eSPI Header	J6	PIN PLUG, 2*7P-1(K8)/2.0mm, M, G/F, BLACK, 180D, DIP, 220-97-07GB18(PINREX)RoHS
USB 3.0_P5/P6	UBJ1	BOX HEADER 2*10-1(K20),2.0mm,M,H=6.3mm,180D,DIP,BLACK,52X-80-20GB52(PINREX)RoHS
Front Audio	AUJ2	BOX HEADER,2x5/1.27mm,M,180D,BLACK,SMD,Reel,53C-90-10GBE0(PINREX)RoHS
OOB I2C	J5	BOX HEADER, 1*5P/1.0mm, F, NATURAL, 180D, SMT, BM05B-SRSS-TB1(LF)(SN)(JST)RoHS
CPLD JTAG	J3	PIN PLUG 2*4,2.54mm,M,H=8.6mm,180D,DIP,210-92-04GB01(PINREX)RoHS
IntelR VROC hardware key box header	J24	BOX HEADER, 1*4P/1.25mm, F, WHITE, 180D, SMT, 712-73-045WE0(PINREX)RoHS
USB2.0_P10/P11	UBJ3	BOX HEADER, 2*5P/2mm, F, G/F, BLACK, 180D, SMT, 52M-90-10GBE1(PINREX)RoHS

Function	Location	Connector information
RTC Battery	J2	WAFER 1*2,2.0mm,M,H=6.1mm,180D,DIP,WHITE,721-81-02TW00(PINREX)RoHS
System Fan2	J13	BOX HEADER 1*4,2.54mm,M,H=10.05mm,180D,DIP,NATURE,W/POST,744-81-04TW11(PINREX)RoHS
SMBus	J22	BOX HEADER,2x3/1.27mm,M,180D,BLACK,SMD,327A06MAGL-1R(YIMTEX)RoHS