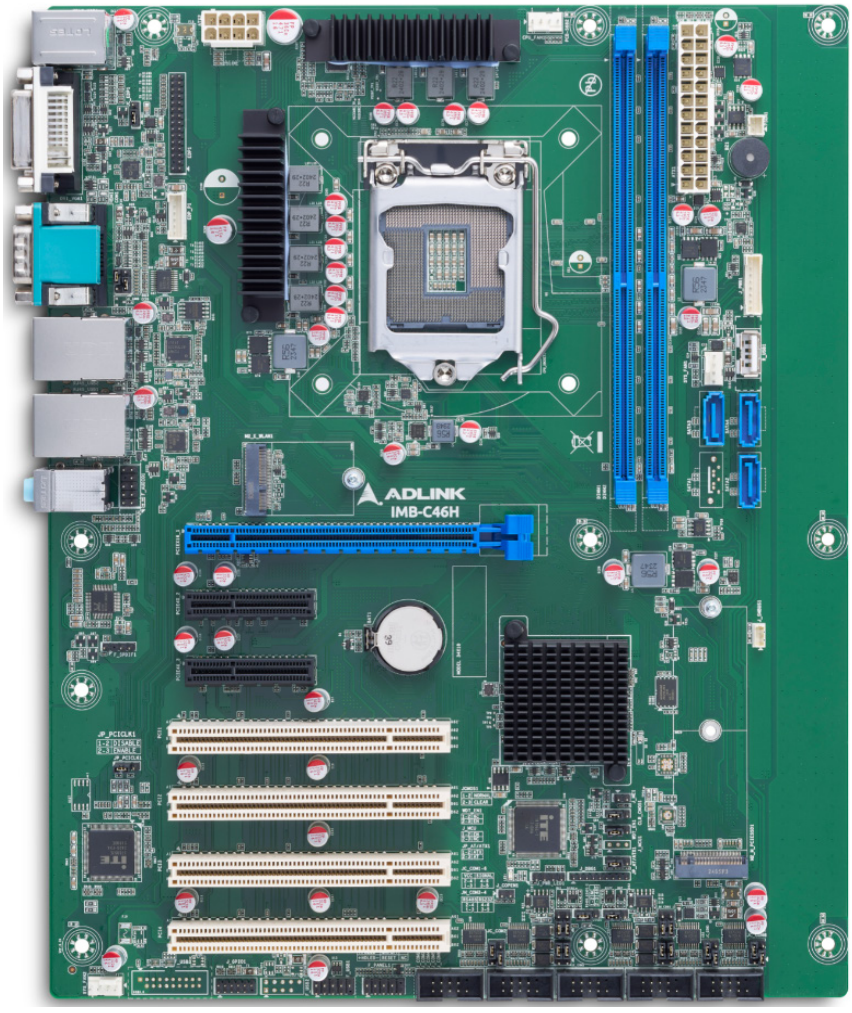
IMB-C46H

User's Manual

ATX Motherboard with 10th Gen Intel® Core™ i9/i7/i5/i3 Processors and Intel® H420E Chipset



Manual Rev.:	Rev. 1.1
Revision Date:	July 28, 2025
Part Number:	50M-13018-1010

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Leading EDGE COMPUTING

Preface

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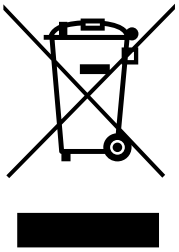
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Revision History

Revision	Description	Date	By
1.0	Initial release	2024-10-08	AL
1.1	Connector pinouts updated	2025-10-08	AL

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1 Introduction

ADLINK IMB-C46H ATX is an industrial motherboard supporting 10th Generation Intel® Core™ i9/i7/i5/i3 desktop processors, an Intel® H420E Chipset, and 3 PCIe expansion slots to provide a cost-competitive embedded computing solution. It includes high-speed data transfer interfaces such as PCIe 3.0, USB 3.0, and SATA 6 Gb/s (SATA III), and dual-channel DDR4 2400/2666/2933 MHz RAM for industrial automation applications. With industrial-grade I/O port design, the IMB-C46H offers a significant competitive advantage for embedded computing applications in terms of device compatibility, durable connectivity, and extreme environment readiness.

1.1 Packing List

- IMB-C46H ATX motherboard
- Rear I/O shield
- 1pc. SATA cable
- 1pc. COM cable (1port)

1.2 Optional Accessories

- CPU cooler for 65W CPU, Part Number: 32-20495-0000
- CPU cooler for 35W CPU, Part Number: 32-20530-0010
- COM Cable(2port), Part Number: 30-25003-3000
- USB2.0 Cable(2port), Part Number: 30-25010-3010
- USB2.0 Cable(4port), Part Number: 30-25009-3000
- SATA Cable, Part Number: 30-10057-7000

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2 Specifications

2.1 Core System

- **CPU:**
  - Intel® Core™ i9-10900E, 4.7GHz, 10 Core, 20M Cache, DDR4 2933MHz support, 65W
  - Intel® Core™ i9-10900TE, 4.5GHz, 10 Core, 20M Cache, DDR4 2933MHz support, 35W
  - Intel® Core™ i7-10700E, 4.5GHz, 8 Core, 16M Cache, DDR4 2933MHz support, 65W
  - Intel® Core™ i7-10700TE, 4.4GHz, 8 Core, 16M Cache, DDR4 2933MHz support, 35W
  - Intel® Core™ i5-10500E, 4.2GHz, 6 Core, 12M Cache, DDR4 2666MHz support, 65W
  - Intel® Core™ i5-10500TE, 3.7GHz, 6 Core, 12M Cache, DDR4 2666MHz support, 35W
  - Intel® Core™ i3-10100E, 3.8GHz, 4 Core, 6M Cache, DDR4 2666MHz support, 65W
  - Intel® Core™ i3-10100TE, 3.6GHz, 4 Core, 6M Cache, DDR4 2666MHz support, 35W
  - Intel® Pentium® Gold G6400, 3.2GHz, 2 Core, 4M Cache, DDR4 2400MHz support, 35W
  - Intel® Pentium® Gold G6400, 3.8GHz, 2 Core, 4M Cache, DDR4 2400MHz support, 58W
  - Intel® Celeron® Processor G5900TE, 3.0GHz, 2M Cache, DDR4 2666MHz support, 35W
  - Intel® Celeron® Processor G5900E, 3.2GHz, 2M Cache, DDR4 2666MHz support, 58W
- **Chipset:** Intel® H420E Express Chipset
- **Memory:** 2x 288-pin Non-ECC U-DIMM slot, DDR4 2400/2666/2933 MHz, up to 64 GB
- **BIOS:** AMI® UEFI BIOS, 256 Mb SPI Flash Memory
- **Hardware Monitor:** CPU voltage
  - +3.3V voltage
  - +5V voltage
  - +12V voltage
  - CPU temperature
  - System temperature
  - CPU fan speed
  - System fan speed

2.2 I/O Interface

- **Expansion slots:**
  - 1x PCIe Gen3 x16
  - 1x PCIe x4 slot (PCIe Gen3 x2, co-lay with M.2 M-key 2242/2280)
  - 1x PCIe x4 slot (PCIe Gen3 x2, share PCIe x1 with M.2 E key 2230 by BOM change)
  - 4xPCI
- **SATA:** 3x SATA 6.0 Gb/s connectors
- **USB:**
  - 6x USB 3.0 (rear I/O)
  - 2x USB 2.0 (pin header)
  - 1x USB 2.0 (Vertical TYEP-A, Internal)

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- **COM:**
  - 1x RS-232 (COM1, rear I/O)
  - 3x RS-232 (COM2/5/6, by internal header)
  - 2x RS-232/RS485 (COM3/4, by internal header)
- **PS/2 Combo Port:** 1x PS/2 keyboard/mouse
- **DIO:** 8-bit GPIO
- **M.2 connectors:**
  - 1x M.2 E-Key 2230 (PCIe Gen3 x1, USB 2.0)
  - 1x M.2 M-Key 2242/2280 (PCIe 2x/SATA, default)

2.3 Video

- **Interfaces:** Supports two independent displays
  - 1x DVI: Support DVI-D, max resolution up to 1920x1200@60Hz
  - 1x HDMI 1.4b (TYPE-A): up to 4096x2160@30Hz
  - 1x VGA (DB15/F): max resolution up to 1920x1200@60Hz
  - 1x eDP (Header): max resolution up to 4096x2304@60Hz

2.4 Audio

- **Audio Codec:** Realtek® ALC897
- **Interfaces**: 1x Mic-in, 1x Line-in, and 1x Line-out connectors (rear)

2.5 LAN

- **LAN1:** Intel® I219-V via RJ45 connector
- **LAN2:** Intel® I226-V via RJ45 connector

2.6 Temperatures

- **Operating Temperature:** 0°C to 60°C
- **Storage Temperature:** -20°C to 75°C

2.7 Humidity

- 60° C at 95% RH, non-condensing

2.8 Certificate (EMC)

- CE/FCC Class A

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2.9 Form Factor

- **ATX**: 305 mm x 244 mm (W x L)

2.10 Operating Systems

- Microsoft® Windows® 10, 64-bit

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2.11 Functional Block Diagram

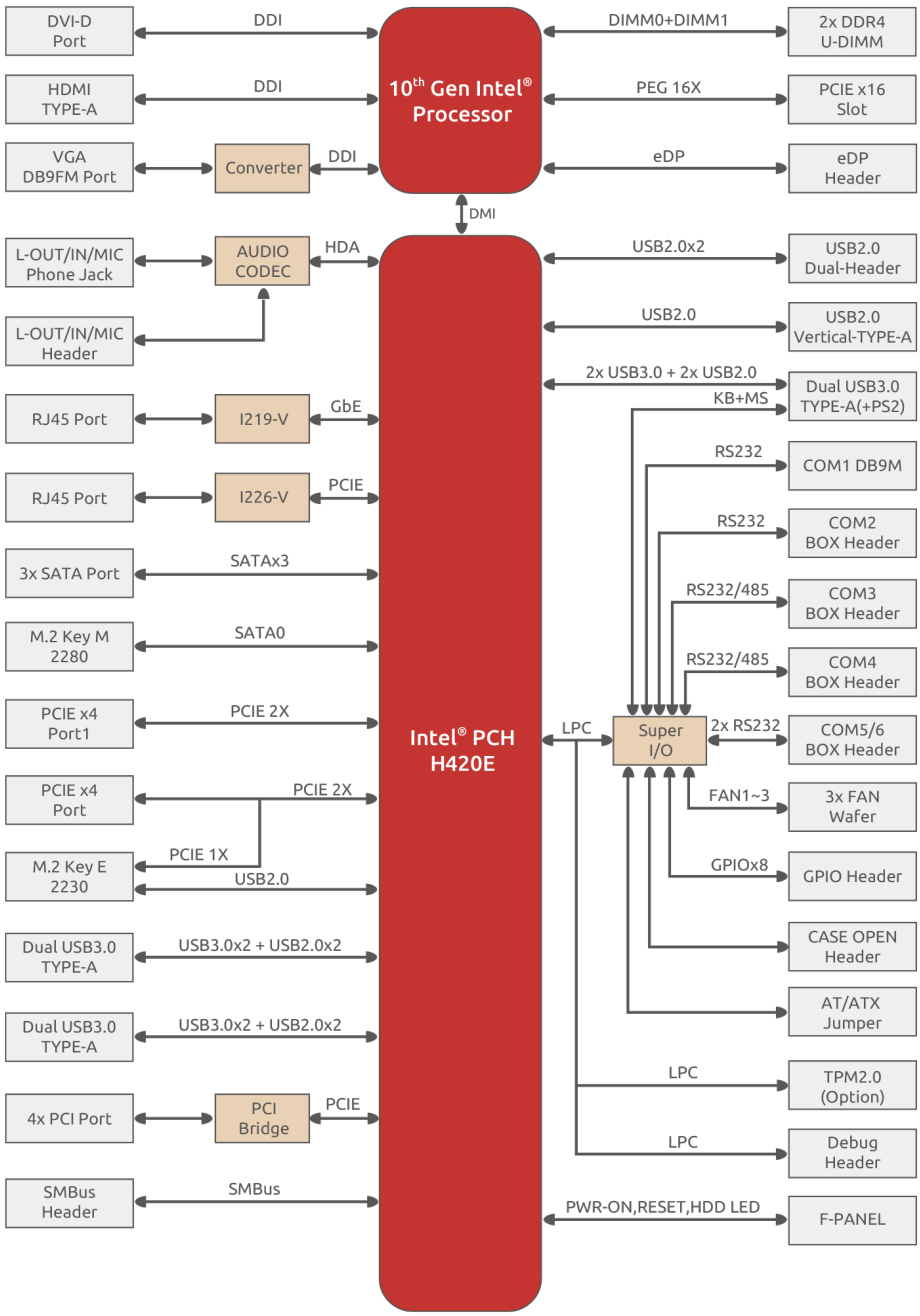


Figure 1: Functional Block Diagram

- PCIE4X_2 and M2_E_WLAN1 share PCIE signal (support M2_E_WLAN1 by default)

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3 Mechanical Layout

3.1 IO Panel Connector Locations

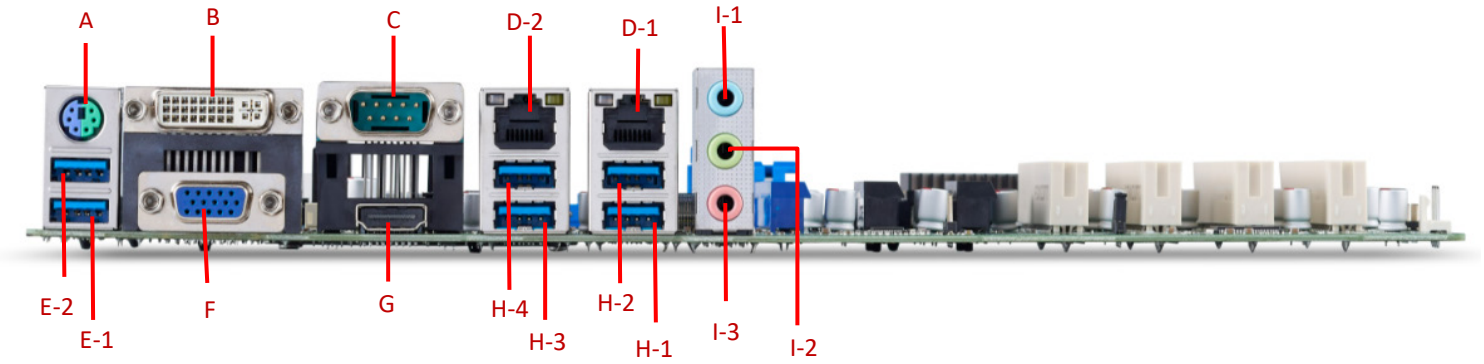


Figure 2: IO Panel Connector Locations

Table 1: IO Panel Connector Locations

Item	Location	Description
A	KBMS_USB1 (PS/2)	PS/2 Connector (Keyboard & Mouse)
B	DVI_VGA1 (DVI-D)	DVI-I 24+4P/F Connector (Support DVI-D)
C	COM1	COM1 DB9/M Connector
D-1	RJ45_USB1 (LAN1)	GBE LAN RJ45 Connector1
D-2	RJ45_USB2 (LAN2)	GBE LAN RJ45 Connector2
E-1	KBMS_USB1 (USB1)	USB3.0 TYPE-A Connector
E-2	KBMS_USB1 (USB2)	USB3.0 TYPE-A Connector
F	DVI_VGA1 (VGA)	VGA DB15/F Connector
G	HDMI1	HDMI TYPE-A Connector
H-1	RJ45_USB1 (USB1)	USB3.0 TYPE-A Connector
H-2	RJ45_USB1 (USB2)	USB3.0 TYPE-A Connector
H-3	RJ45_USB2 (USB3)	USB3.0 TYPE-A Connector
H-4	RJ45_USB2 (USB4)	USB3.0 TYPE-A Connector
I-1	AUDIO1 (BLUE)	Line-In 3.5mm Jack
I-2	AUDIO1 (GREEN)	Line-Out 3.5mm Jack
I-3	AUDIO1 (PINK)	MIC-In 3.5mm Jack

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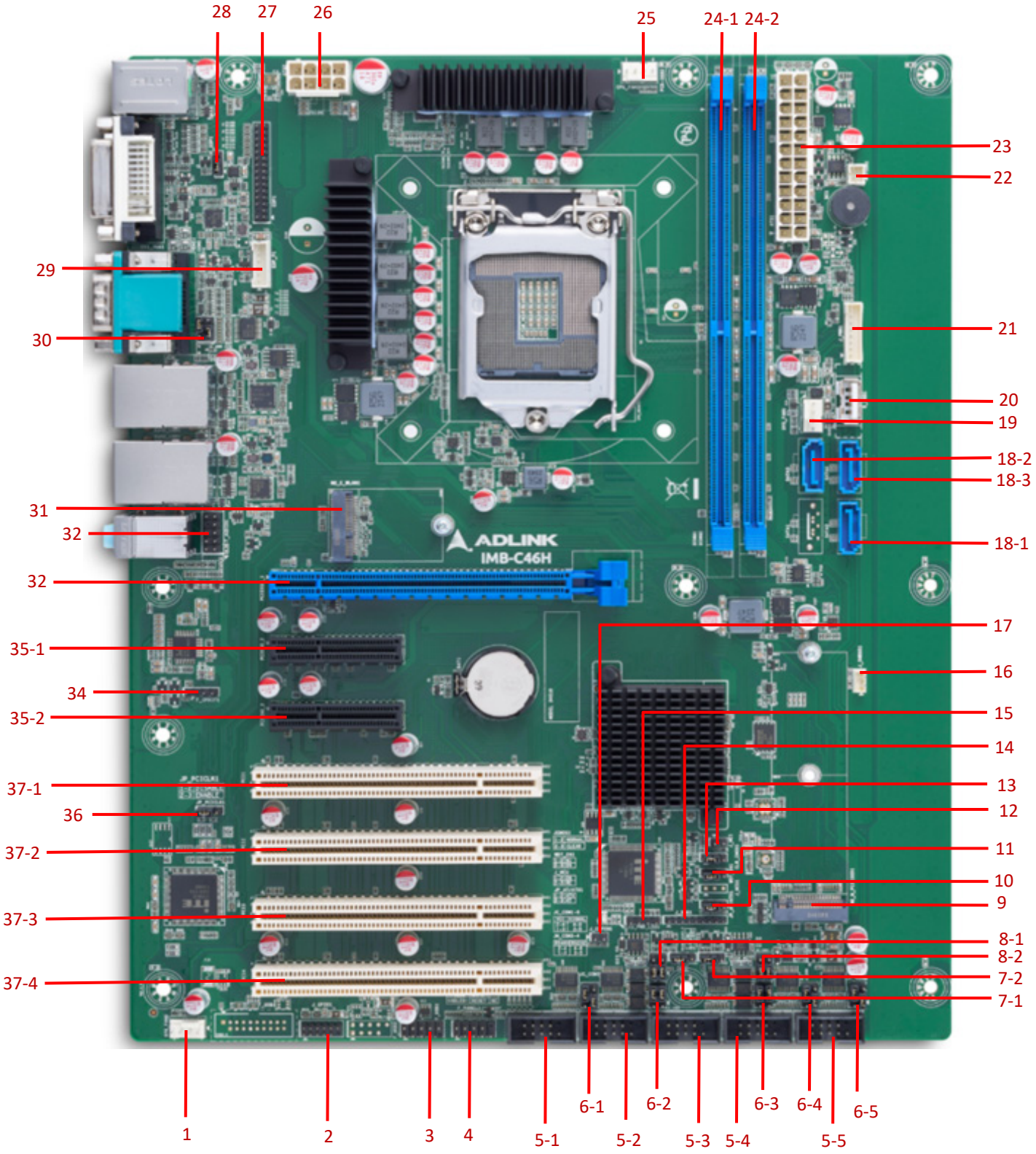


Figure 3: Onboard Connectors - Header and Jumper Locations

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Table 2: OnboardConnectors – Header and Jumper Definitions

Item	Description	Remarks
1	SYS_FAN2	System FAN2 Headers
2	J_GPIO1	GPIO Header
3	F_USB1	Front USB2.0 Header
4	F_PANEL1	Front Panel Header
5-1	J_COM2	COM2 Headers
5-2	J_COM3	COM3 Headers
5-3	J_COM4	COM4 Headers
5-4	J_COM5	COM5 Headers
5-5	J_COM6	COM6 Headers
6-1	JC_COM2	COM2 DCD/5V+ RI/12V Select Jumper
6-2	JC_COM3	COM3 DCD/5V+ RI/12V Select Jumper
6-3	JC_COM4	COM4 DCD/5V+ RI/12V Select Jumper
6-4	JC_COM5	COM5 DCD/5V+ RI/12V Select Jumper
6-5	JC_COM6	COM6 DCD/5V+ RI/12V Select Jumper
7-1	RS485_LOAD1	COM3 RS485 Signal 120Ω Resistive Termination Select Jumper
7-2	RS485_LOAD2	COM4 RS485 Signal 120Ω Resistive Termination Select Jumper
8-1	JM_COM3	COM3 RS232/RS485 Select Jumpers
8-2	JM_COM4	COM4 RS232/RS485 Select Jumpers
9	M2_M_PCIESSD1	M.2 Key-M Slot (PCIE 2x/SATA, Default SATA, Support SATA SSD, 2242/2280)
10	JP_AT/ATX1	AT or ATX Select Jumper
11	WDT_EN1	Watch Dog Reset Enable/Disable Select Jumper
12	J_ME1	ME Flash Header
13	CLR_CMOS1	CMOS Clear Select Jumper
14	J_DBG1	LPC Debug Header
15	J_PWR_LED1	Power LED Header
16	J_SMBUS1	SMBus Wafer
17	J_COPEN1	Case Open Header
18-1	SATA2	SATA3.0 Connector2
18-2	SATA3	SATA3.0 Connector3
18-3	SATA4	SATA3.0 Connector4
19	SYS_FAN1	System FAN1 Headers
20	R_USB1	USB2.0 TYPE-A Up-right Connector
21	J_PWR1	Power Expand Wafer
22	PSON1	Power On Wafer
23	ATX1	ATX 24P Power Input Connector
24-1	DIMM1	DDR4 CHA DIMM Slot
24-2	DIMM2	DDR4 CHB DIMM Slot

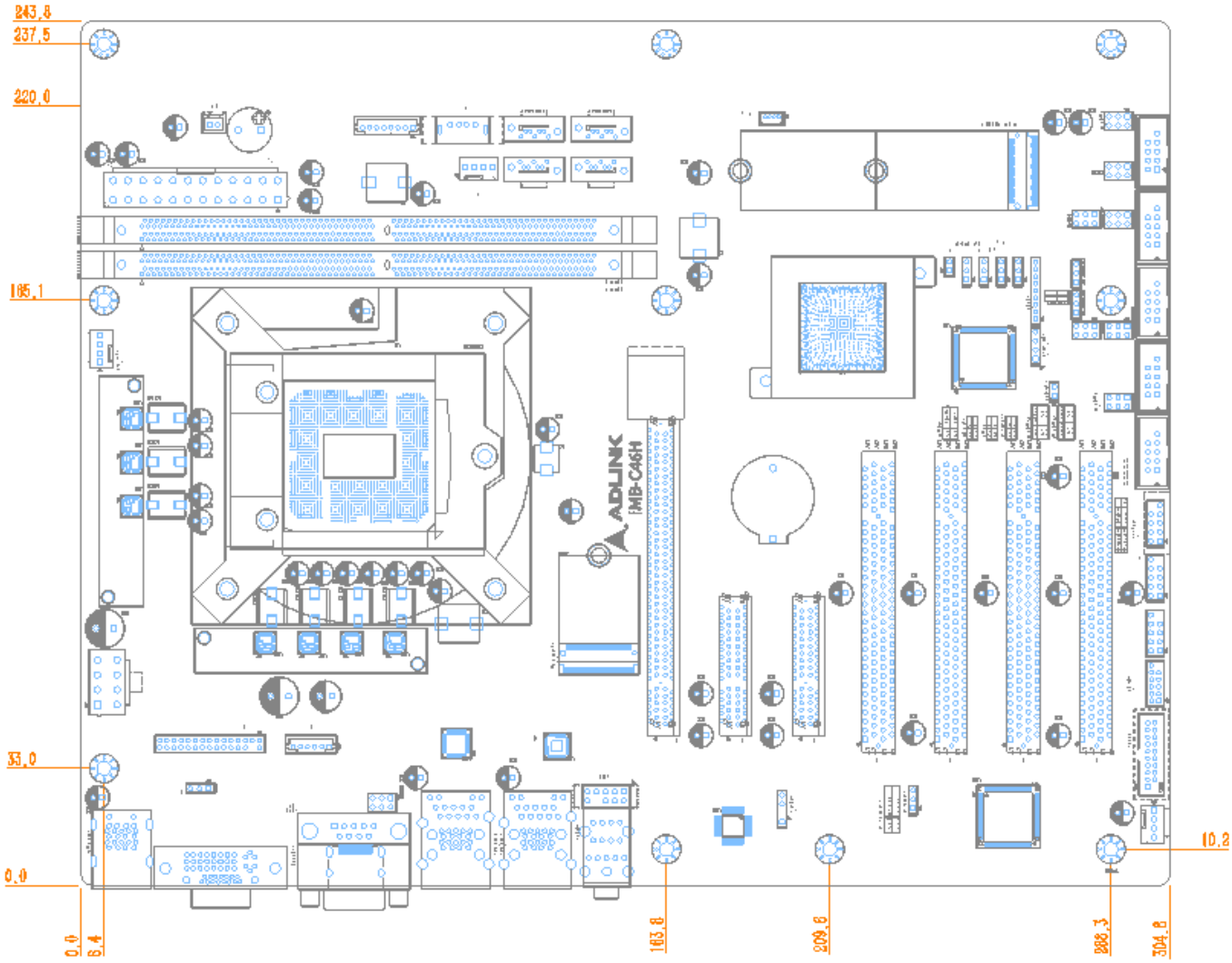
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25	CPU_FAN1	CPU Fan Wafer
26	ATX2	ATX 8P CPU Power Input Connector
27	EDP1	EDP Signal Header
28	JC_EDP1	eDP VDD Select Jumper
29	EDP_P1	eDP Backlight Control Header
30	JC_COM1	COM1 DCD/5V+ RI/12V Select Jumper
31	M2_E_WLAN1	M.2 Key-E Slot (PCIE+USB2.0, Support WIFI+ BlueTooth, 2230)
32	F_AUDIO1	Front Audio Header
33	PCIEX16_1	PCI-E 16x Slot
34	F_SPDIF1	SPDIF Out Header
35-1	PCIE4X_2	PCIE4X Slot1
35-2	PCIE4X_3	PCIE4X Slot2
36	JP_PCICLK1	PCI CLK 66MHz Disable/ Enable Select Jumper
37-1	PCI1	PCI Slot1
37-2	PCI2	PCI Slot2
37-3	PCI3	PCI Slot3
37-4	PCI4	PCI Slot4

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3.2 Mechanical Dimensions

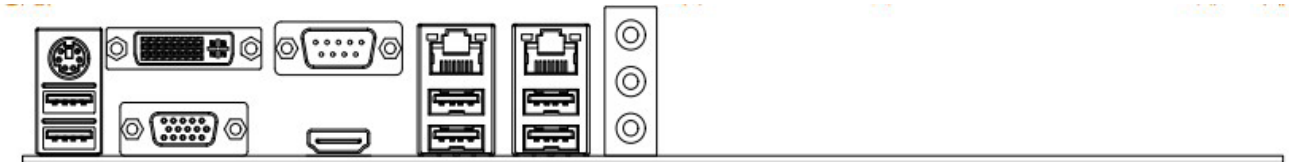
Top View



Dimensions: mm

Figure 4: Mechanical Dimensions

Side View



Dimensions: mm

Figure 5: Mechanical Dimensions - IO Panel

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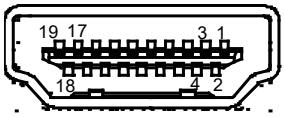
4 Connector Pinouts

See 3.1 Connector Locations on page 7 for connector locations.

4.1 Rear IO Connectors

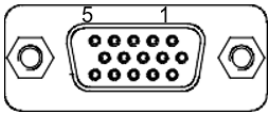
4.1.1 HDMI

Pin	Signal	Pin	Signal
1	HDMI1_CON_DP2	2	GND
3	HDMI1_CON_DN2	4	HDMI1_CON_DP1
5	GND	6	HDMI1_CON_DN1
7	HDMI1_CON_DP0	8	GND
9	HDMI1_CON_DN0	10	HDMI1_CON_CKP
11	GND	12	HDMI1_CON_CKN
13	NC	14	NC
15	HDMI1_DDC_CLK	16	HDMI1_DDC_DATA
17	GND	18	+5V_HDMI
19	HDMI1_CON_HPD		



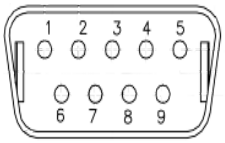
4.1.2 VGA Connector

Pin	Signal	Pin	Signal
1	VGA_CON_RED	2	VGA_CON_GREEN
3	VGA_CON_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V_HDMI	10	GND
11	NC	12	VGA_DDCDAT
13	VGA_CON_HS	14	VGA_CON_VS
15	VGA_DDCCLK		



4.1.3 COM 1 (COM1 DB9/M Connector)

Pin	Signal	Pin	Signal
1	COM1_PIN1 **[1]**	6	COM1_DSR
2	COM1_RXD	7	COM1_RTS
3	COM1_TXD	8	COM1_CTS
4	COM1_DTR	9	COM1_PIN9 **[1]**
5	GND		



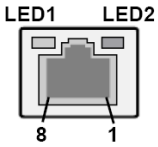
Note: PIN1 of COM1 can be DCD (default) /5V and Pin9 of COM1 can be RI(Default) / 12V, selectable by “COM1 DCD/5V+RI/12V Select Jumper”. (JC_COM1)

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4.1.4 Ethernet Connectors (LAN1, LAN2)

RJ45_USB1-2 (LAN) * (GBE LAN RJ45 Connector1-2)

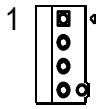
Pin	Signal		Pin	Signal	
1	MDI_0+		5	MDI2_2+	
2	MDI_0-		6	MDI2_2-	
3	MDI_1+		7	MDI3_2+	
4	MDI_1-		8	MDI3_3-	
LED1	Speed LED	1000M: Turn Orange	LED2	Active LED	ACT: Twinkling Yellow
		100M: Turn Green			Only LINK: Lights On
		10M: Lights Off			Stop: Lights Off



4.2 Onboard Headers / Connectors

4.2.1 FAN Header (CPU_FAN1, SYS_FAN1, SYS_FAN2)

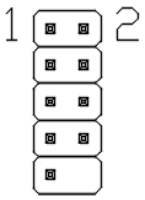
Pin	Signal	Description
1	GND	Ground
2	+12 V	FAN Power
3	Tach	FAN Tachometer
4	PWM	FAN PWM



Fan Header 4*1 Pin 2.54mm

4.2.2 Front Panel Header (F_PANEL1)

Pin	Signal	Pin	Signal
1	HDD 3.3V LED+	2	POWER 3.3V LED+
3	HDD 3.3V LED-	4	POWER 3.3V LED-
5	RESET-	6	POWER+
7	RESET+	8	POWER-
9	N/C		

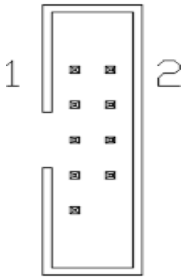


Fan Header 5*2 Pin 2.54mm

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4.2.3 COM Header (J_COM 2-6)

	Pin	Signal	Pin	Signal
J_COM2	1	COM2_PIN1	2	COM2_DSR#
	3	COM2_RXD	4	COM2_RTS#
	5	COM2_TXD	6	COM2_CTS#
	7	COM2_DTR#	8	COM2_PIN8
	9	GND		
J_COM3	1	COM3_PIN1	2	COM3_DSR#
	3	COM3_PIN3	4	COM3_RTS#
	5	COM3_TXD	6	COM3_CTS#
	7	COM3_DTR#	8	COM3_PIN8
	9	GND		
J_COM4	1	COM4_PIN1	2	COM4_DSR#
	3	COM4_PIN3	4	COM4_RTS#
	5	COM4_TXD	6	COM4_CTS#
	7	COM4_DTR#	8	COM4_PIN8
	9	GND		
J_COM5	1	COM5_PIN1	2	COM5_DSR#
	3	COM5_RXD	4	COM5_RTS#
	5	COM5_TXD	6	COM5_CTS#
	7	COM5_DTR#	8	COM5_PIN8
	9	GND		
J_COM6	1	COM6_PIN1	2	COM6_DSR#
	3	COM6_RXD	4	COM6_RTS#
	5	COM6_TXD	6	COM6_CTS#
	7	COM6_DTR#	8	COM6_PIN8
	9	GND		



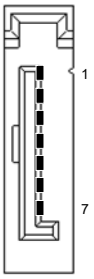
Pin Headers 5*2 Pin 2.54mm

Note:
[1]: COM3 can be RS232 / RS485(default) selecting by “COM3 RS232/RS485 Select Jumper”. (JM_COM3).

[2]: COM4 can be RS232 / RS485(default) selecting by “COM4 RS232/RS485 Select Jumper”. (JM_COM4).

4.2.4 SATA Connector (SATA 2-4)

Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	5	RXN	Receive diff data – negative
2	TXP	Transmit diff data – positive	6	RXP	Receive diff data – positive
3	TXN	Transmit diff data – negative	7	GND	Ground
4	GND	Ground			

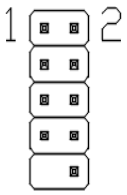


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4.2.5 USB Connectors

USB 2.0 Header (F_USB1)

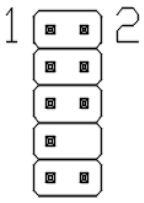
Pin	Signal	Pin	Signal
1	VCC5	2	VCC5
3	USB2.0_1-	4	USB2.0_2-
5	USB2.0_1+	6	USB2.0_2+
7	GND	8	GND
		10	N/C



Pin Header 5*2 Pin 2.54mm

4.2.6 Front Panel Audio Header (F_AUDIO1)

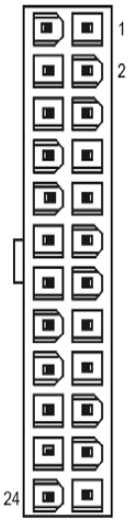
Pin	Signal	Pin	Signal
1	MIC_IN_L	2	GND
3	MIC_IN_R	4	VCC3.3
5	LINE_OUT_R	6	MIC_RET
7	GND		
9	LINE_OUT_L	10	LINE_OUT_RET



Pin Header 5*2 Pin 2.54

4.2.7 ATX1

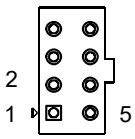
Pin	Signal	Pin	Signal
1	+3.3 V	13	+3.3 V
2	+3.3 V	14	-12 V
3	Ground	15	Ground
4	+5 V	16	PS-ON# (power supply remote on/off)
5	Ground	17	Ground
6	+5 V	18	Ground
7	Ground	19	Ground
8	PWRGD (Power Good)	20	No connect
9	+5 V (Standby)	21	+5 V
10	+12 V	22	+5 V
11	+12 V	23	+5 V
12	3.3V	24	Ground



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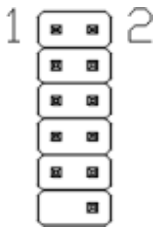
4.2.8 ATX2

Pin	Signal	Pin	Signal
1	Ground	5	+12V
2	Ground	6	+12V
3	Ground	7	+12V
4	Ground	8	+12V



4.2.9 GPIO Header (J_GPIO1)

Pin	Signal	Pin	Signal
1	SIO_GPI70 (0xA06 Bit0, H [1])	2	SIO_GPI71 (0xA06 Bit1, H [1])
3	SIO_GPI72 (0xA06 Bit2, H [1])	4	SIO_GPI73 (0xA06 Bit3, H [1])
5	GND	6	SIO_GPO74 (0xA06 Bit4, H [1])
7	SIO_GPO75 (0xA06 Bit5, H [1])	8	SIO_GPO76 (0xA06 Bit6, H [1])
9	SIO_GPO77 (0xA06 Bit7, H [1])	10	VCC5
		12	N/C



Pin Header 6*2 Pin 2.00mm

Note: “H” or “L” means the default voltage is on high or low level. (5V GPIO).

4.2.10 LPC Debug Header (J_LPC1)

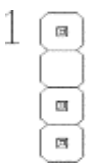
Pin	Signal	Pin	Signal
1	LFRAME_N	6	GND
2	LPC_DATA3	7	N/C
3	LPC_ DATA 2	8	LPC_CLK
4	LPC_ DATA 1	9	VCC3.3
5	LPC_ DATA 0		



Pin Header 9*1 Pin 2.00mm

4.2.11 SPDIF Header (F_SPDIF1)

Pin	Signal	Pin	Signal
1	+ 5V	3	SPDIF_OUT
		4	GND

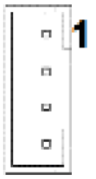


Pin Header 4*1 Pin 2.54mm

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4.2.12 SMBUS Header (J_SMBUS1)

Pin	Signal	Pin	Signal
1	GND	3	SMB_CLK
2	SMB_DATA	4	VCC5 **[1]**



SMB Header 4*1 Pin 1.25mm

Note: The power on this Pin is 5V by default, 3.3V is available if specified. (resistor selectable)

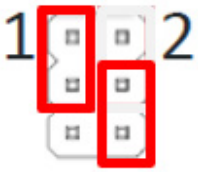
4.3 Jumper and Switch Settings

4.3.1 Clear CMOS Jumper (CLR_CMOS1)



4.3.2 COM1 DCD/5V+ RI/12V Select Jumper (JC_COM1)

Setting	Function
3-5, 2-4	COM1_PIN1: DCD COM1_PIN8: + 12V
1-3, 4-6(Default)	COM1_PIN1: + 5V COM1_PIN8: RI

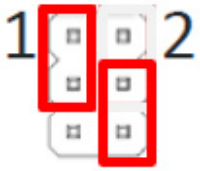


Jumper 3*2 Pin 2.54mm

Note: Jumper 1-3/3-5 select the PIN1 signal. Jumper 2-4/4-6 select the PIN8 signal.

4.3.3 COM2-6 DCD/5V+ RI/12V Select Jumper (JC_COM2-6)

Setting	Function
3-5, 2-4	PIN1: DCD PIN8: + 12V
1-3, 4-6(Default)	PIN1: + 5V PIN8: RI



Jumper 3*2 Pin 2.54mm

Note: Jumper 1-3/3-5 select the PIN1 signal. Jumper 2-4/4-6 select the PIN8 signal.

4.3.4 COM3 /4 RS232/RS485 Select Jumpers (JM_COM3-4)

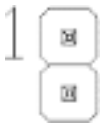
Setting	Function
1-3, 2-4(Default)	RS485 (PIN1: RS485- PIN3: RS485+)
3-5, 4-6	RS232 (PIN1: DCD PIN3: RXD)



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4.3.5 ME Flash Jumper (J_ME1)

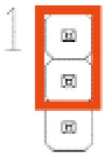
Setting	Function
1-2: Open (Default)	ME Protect Enable
1-2: Connected	ME Protect Disable



Header 2*1 Pin 2.54mm

4.3.6 COM3-4 RS485 Signal 120Ω Resistive Termination Select Jumper (RS485_LOAD1-2)

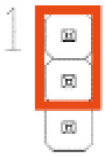
Setting	Function
1-2 (Default)	Disable
2-3	Enable



Header 3*1 Pin 2.54mm

4.3.7 AT or ATX Select Jumper (JP_AT/ATX1)

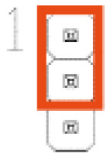
Setting	Function
1-2 (Default)	ATX Mode
2-3	AT Mode



Header 3*2 Pin 2.54mm

4.3.8 Watchdog Reset Enable/Disable Select Jumper (WDT_EN1)

Pin	Signal
1-2 (Default)	Disable
2-3	Enable



Header 3*1 Pin 2.54mm

4.3.9 Power LED Header (J_PWR_LED1)

Pin	Signal
1	VCC3.3
2	PWR_LED_N [1]
3	GPIO_R
4	GND



Header 4*1 Pin 2.54 mm
Note: PWR_LED is controlled by SIO_GPIOSB.

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4.3.10 Power Expand Wafer (J_PWR1)

Pin	Signal	Pin	Signal
1	VCC5A	5	VCC5S
2	GND	6	VCC3.3S
3	GND	7	VCC12_N
4	VCC5N_S	8	VCC12S

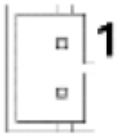
Wafer 8*1 Pin 2.00mm



4.3.11 Power on Wafer (P_SON1)

Pin	Signal
1	PSON_N
2	GND

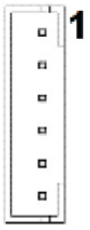
Wafer 2*1 Pin 2.54mm



4.3.12 eDP Backlight Control Wafer (EDP_P1)

Pin	Signal	Pin	Signal
1	GND	4	EDP_BKLT_EN
2	GND	5	+ 12V
3	EDP_BKLT_CTL	6	+ 12V

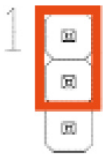
Wafer 6*1 Pin 2.00mm



4.3.13 eDP VDD Select Jumper (JC_EDP1)

Setting	Signal
1-2 (Default)	+ 3.3V
2-3	+ 5V

Jumper 3*1 Pin 2.54mm

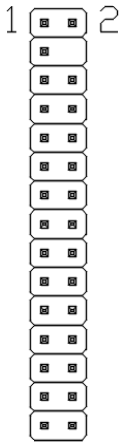


4.3.14 eDP Signal Header (EDP1)

Pin	Signal	Pin	Signal
1	VDD_PANEL [1]	2	VDD_PANEL [1]
3	VDD_PANEL [1]		
5	EDP_HPD	6	EDP_HPD
7	N/C	8	N/C
9	N/C	10	N/C
11	N/C	12	N/C

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Pin	Signal	Pin	Signal
13	GND	14	GND
15	N/C	16	N/C
17	EDP_TX3-	18	EDP_TX3+
19	EDP_TX0-	20	EDP_TX0+
21	EDP_TX1-	22	EDP_TX1+
23	EDP_TX2-	24	EDP_TX2+
25	GND	26	GND
27	N/C	28	N/C
29	EDP_AUX-	30	EDP_AUX+

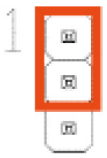


Header 15*2 Pin 2.00mm

Note: Panel Power VDD can be 3.3V (default) /5V selectable by eDP VDD Select Jumper" (JC_EDP1).

4.3.15 PCI CLK 66MHz Enable/Disable Select Jumper (JP_PCICLK1)

Setting	Function
1-2 (Default)	PCI CLK is 66MHz
2-3	PCI CLK is 33MHz



Jumper 3*1 Pin 2.54mm

4.4 Expansion Slots

There are 3 PCI Express slots, 4 PCI slots, 2 M.2 sockets on this motherboard.

PCIe and PCI slots:

	Slot 1 (PCIe1)	Slot 2 (PCIe2)	Slot 3 (PCIe3)	Slot 4 (PCI1)	Slot 5 (PCI2)	Slot 6 (PCI3)	Slot 7 (PCI4)
Source	CPU	PCH	PCH	PCI bridge	PCI bridge	PCI bridge	PCI bridge
Bandwidth	PCIe 3.0	PCIe 3.0	PCIe 3.0	PCI	PCI	PCI	PCI
Lane Config	X16	x2	x1	PCI	PCI	PCI	PCI

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4.4.1 M.2 sockets:

4.4.1.1 M.2 Key-M (M_2_PCIESSD_M1)

Pin	Signal	Signal	Pin
1	GND	+3.3V	2
3	GND	+3.3V	4
5	PERn3	NA	6
7	PERp3	NA	8
9	GND	SATA_LED	10
11	PETn3	+3.3V	12
13	PETp3	+3.3V	14
15	GND	+3.3V	16
17	PERn2	+3.3V	18
19	PERp2	NA	20
21	GND	NA	22
23	PETn2	NA	24
25	PETp2	NA	26
27	GND	NA	28
29	PERn1	NA	30
31	PERp1	NA	32
33	GND	NA	34
35	PETn1	NA	36
37	PETp1	DEV5LP	38
39	GND	SMB_CLK	40
41	PERn0/ SATA-B+	SMB_DATA	42
43	PERp0/ SATA-B-	NA	44
45	GND	NA	46
47	PETn0/ SATA-A-	NA	48
49	PETP0/ SATA-A+	PERST#	50
51	GND	CLKREQ#	52
53	PEFCLKn	WAKE#	54
55	PEFCLKp	NA	56
57	GND	NA	58
67	NA	NA	68
69	PEDET	+3.3V	70
71	GND	+3.3V	72
73	GND	+3.3V	74
75	GND		

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4.4.1.2 M.2 Key-E (M2_E_WLAN1)

Pin	Signal	Signal	Pin
1	GND	+3.3V	2
3	USB_D+	+3.3V	4
5	USB_D-	NA	6
7	GND	NA	8
9	CNV_WGR_D1-	CNV_RF_RESET	10
11	CNV_WGR_D1+	NA	12
13	GND	MODEM_CLKREQ	14
15	CNV_WGR_D0-	NA	16
17	CNV_WGR_D0+	GND	18
19	GND	NA	20
21	CNV_WGR_CLK-	CNV_BRI_RSP	22
23	CNV_WGR_CLK+		
33	GND	CNV_BGI_DT	32
35	PETp	CNV_RGI_RSP	34
37	PETn	CNV_BRI_DT	36
39	GND	NA	38
41	PERp	NA	40
43	PERn	NA	42
45	GND	NA	44
47	PEFCLKp	NA	46
49	PEFCLKn	NA	48
51	GND	SUSCLK	50
53	CLKREQ#	PERST0#	52
55	WAKE#	W_DISABLE1#	54
57	GND	W_DISABLE2#	56
59	CNV_WT_D1-	SMB_DATA	58
61	CNV_WT_D1+	SMB_CLK	60
63	GND	NA	62
65	CNV_WT_D0-	CLKIN_XTAL_LCP	64
67	CNV_WT_D0+	NA	66
69	GND	NA	68
71	CNV_WT_CLK-	NA	70
73	CNV_WT_CLK+	+3.3V	72
75	GND	+3.3V	74

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5 Driver Installation

Download the requisite drivers for your system from the IMB-C46H product page at:

https://www.adlinktech.com/Products/Industrial_Motherboards_SBCs/ATXMotherboards/IMB-C46H

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6 BIOS Setup

6.1 Menu Structure

This section presents the primary menus of the BIOS (UEFI) Setup Utility. Use the following table as a quick reference for the contents of the BIOS Setup Utility. The subsections describe the submenus and options for each menu item.

Options to enter BIOS Setup Utility:

- Press [F2] or [Del] during POST (Power-On-Self-Test)
- Press [Ctl] + [Alt] + [Del] after POST

Main	**Advanced**	**Chipset**
Sets up the system time/date and displays the system information: - BIOS Information - Memory Information - System Date - System Time	Contains advanced system configurations, including: ▶ CPU Configuration ▶ Power and Performance ▶ PCH-FW Configuration ▶ Trusted Computing ▶ ACPI Settings ▶ Super IO Configuration ▶ Hardware Monitor ▶ Power Control ▶ S5 RTC Wake Settings ▶ USC Configuration ▶ Network Stack Configuration ▶ CSM Configuration ▶ NVME Configuration	Displays Hardware Status info, including: ▶ System Agent (SA) Configuration ▶ PCH-IO Configuration
Security	**Boot**	**Save & Exit**
Changes or clears the supervisor/user password for the system: - Administrator Password - User Password ▶ Secure Boot	Configures the boot settings and boot priority for available devices: - Setup Prompt Timeout - Bootup Num Lock State - Full Screen Logo - Fast Boot - Boot Mode Select - Boot Option #X	Exits the BIOS Setup Utility while saving or discard the changes made: - Save/Discard Changes and Exit - Save/Discard Changes and Reset - Save/Discard Changes - Restore Defaults - Save as User Defaults - Restore User Defaults - BIOS: Built-in EFI shell - Launch EFI Shell from a filesystem device

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6.2 Main Menu

Upon entering the BIOS Setup Utility, the Main Menu is displayed, providing read-only information about your system and also allows you to set the system date and time. Refer to the screenshots and tables below for details of the submenus and settings.

Feature	Options
BIOS Information	
BIOS Vendor	Info only
Core Version	Info only
Compliancy	Info only
Project Version	IMB-C46H_xxxxx
Build Date and Time	Info only
Access Level	Info only
Memory Information	
Total Memory	Info only
Memory Frequency	Info only
System Date	xxx mm/dd/yyyy
System Time	hh:mm:ss

6.3 Advanced

This menu contains the following information:

Feature	
▶ CPU Configuration	▶ OEM Flavor
▶ Power & Performance	▶ Power Control
▶ PCH-FW Configuration	▶ S5 RTC Wake Settings
▶ Trusted Computing	▶ USB Configuration
▶ ACPI Settings	▶ Network Stack Configuration
▶ Super IO Configuration	▶ CSM Configuration
▶ Hardware Monitor	▶ NVME Configuration

6.3.1 CPU Configuration

Feature	Description
Type	Displays the Processor Type.
ID	Displays the Processor ID.
Speed	Displays the Processor Speed.
L1 Data Cache	Displays the Processor L1 Data Cache size.
L1 Instruction Cache	Displays the Processor L1 Instruction Cache size.
L2 Cache	Displays the Processor L2 Data Cache size.
L3 Cache	Displays the Processor L3 Data Cache size.
L4 Cache	Displays the Processor L4 Data Cache size.
VMX	VMX Supported or Not.
SMX/TXT	SMX/TXT Supported or Not.
Turbo Mode	Enable or disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled)
Intel (VWX) Virtualization Technology	When enabled, a VWX can utilize the additional hardware capabilities provided by Vanderpool Technology

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6.3.2 Power and Performance

Power and performance options.

Feature	Description
▶ **CPU - Power Management Control**	CPU - Power Management Control Options.
▶ **GT - Power Management Control**	GT - Power Management Control Options.

6.3.2.1 CPU-Power Management Control

Feature	Description
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) Speed Step(tm)	Allows more than two frequency ranges to be supported.
Race To Halt (RTH)	Enables or disables Race to Halt feature. RTH will dynamically increase CPU frequency to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20).
Intel(R) Speed Shift technology	Enables or disables Intel(R) Speed Shift technology support. Enabling will expose the CPPC v2 interface to allow for hardware-controlled P-states.
Per Core P State OS control mode	For RKL only. Enables or disables Per Core P state OS control mode. Disabling will set Bit 31 = 1 command 0x06. When set, the highest core request is used for all other core requests.
HwP Autonomous Per Core P State	For RKL only. Disables Autonomous PCPS (Bit 30 = 1, command 0x11). Autonomous will request the same value for all cores all the time. Enables PCPS (default Bit 30 = 0, command 0x11).
HwP Autonomous EPP Grouping	For RKL only. Enables EPP grouping (default Bit 29=0, command 0x11). Autonomous will request the same value for all cores with same EPP. Disables EPP grouping (Bit 29 = 1, command 0x11). Autonomous will not necessarily request same values for all cores with same EPP.
EPB override over PECI	For RKL only. Enables or disables EPB override over PECI. Enabled by sending pcode command 0x2b, subcommand 0x3 to 1. This will allow 00B EPB PECI override control.
Hwp Fast MSR Support	For RKL only. Enables or disables Hwp Fast MSR Support for IA32_HWP_REQUEST MSR.
HDC Control	This option allows HDC configuration: Disabled: Disables HDC. Enabled: Can be enabled by OS if OS native support is available.
▶ **View/Configure Turbo options**	View/Configure Turbo options.
▶ **CPU VR Settings**	CPU VR Settings.
Platform PL1 Enable	Enables or disables Platform Power Limit 1 programming. If this option is enabled, it activates the PL1 value to be used by the processor to limit the average power of a given time window.
Platform PL2 Enable	Enables or disables Platform Power Limit 2 programming. If this option is disabled, BIOS will program the default values for Platform Power Limit 2.
Power Limit 4 override	Enables or disables Power Limit 4 override.

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	If this option is disabled, BIOS will leave the default values for Power Limit 4.
Power Limit 4	Power Limit 4 in Milli Watts. BIOS will round to the nearest 1/8W when programming. For 12.50W, enter 12500. If the value is 0, BIOS leaves default value.
Power Limit 4 Lock	Power Limit 4 MSR 601h Lock. When enabled PL4 configurations are locked during OS. When disabled PL4 configuration can be changed during OS.
C states	Enables or disables CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Thermal Monitor	Enables or disables Thermal Monitor.
Interrupt Redirection Mode Selection	Interrupt Redirection Mode Select for Logical Interrupts.
Timed MWAIT	Enable or disable Timed MWAIT Support.
▶ **Custom P-state Table**	Add Custom P-state Table.
Energy Performance Gain	Enable or disable Energy Performance Gain.
EPG DIMM Idd3N	Display EPG DIMM Idd3N.
EPG DIMM Idd3P	Display EPG DIMM Idd3P.
▶ **Power Limit 3 Settings**	Power Limit 3 Settings.
▶ **CPU Lock Configuration**	CPU Lock Configuration.
Dual Tau Boost	Enable Dual Tau Boost feature. This is only applicable for CMLS 35W/65W/125W SKU. When DPTF is enabled, this feature is ignored.

6.3.2.1.1 View/Configuration Turbo Options

Feature	Description
Energy Efficient P-state	Enable or disable the Energy Efficient P-state feature. When set to 0, access to ENERGY_PERFORMANCE_BIAS MSR is disabled, and CPUID Function 6 ECX[3] will read 0, indicating no support for Energy Efficient policy setting. When set to 1, access to ENERGY_PERFORMANCE_BIAS MSR 1B0h is enabled, and CPUID function 6 ECX[3] will read 1, indicating Energy Efficient policy setting is supported.
Package Power Limit MSR Lock	Enable or disable locking of Package Power limit settings. When enabled, PACKAGE_POWER_LIMIT MSR will be locked, and a reset will be required to unlock the register.
Power Limit 1 Override	Enable or disable Power Limit 1 override. If this option is disabled, the BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.
Power Limit 2 Override	Enable or disable Power Limit 2 override. If this option is disabled, the BIOS will program the default values for Power Limit 2.
Power Limit 2	The Power Limit 2 value is in milliwatts. The BIOS will round it to the nearest 1/8W during programming. If the value is 0, the BIOS will program this value as 1.25 * TDP. For 12.50W, enter 12500. The processor applies control policies to ensure that the package power does not exceed this limit.
Turbo Ratio Limit Ratio0 (TRLR)	Turbo Ratio Limit Ratio0 (TRLR) with a range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio. Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit0 is paired with Turbo Ratio NumCores0 and must be greater than or equal to all other ratio values. If this value is invalid, then set all other active cores to minimum. Otherwise, align the Ratio Limit to 0. Please check each active core.
Turbo Ratio Limit Ratio1 (TRLR)	Turbo Ratio Limit Ratio1 with a range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio, Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit1 is paired with Turbo Ratio NumCores1 and must be less than or equal to Core Ratio Limit0.
Turbo Ratio Limit Ratio2	Turbo Ratio Limit Ratio2 with a range of (Max Non-Turbo Ratio - 255). Min = Max

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(TRLR)	Non-Turbo Ratio, Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit2 is paired with Turbo Ratio NumCores2 and must be less than or equal to Core Ratio Limit0.
Turbo Ratio Limit Ratio3 (TRLR)	Turbo Ratio Limit Ratio3 with a range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio, Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit3 is paired with Turbo Ratio NumCores3 and must be less than or equal to Core Ratio Limit0.
Turbo Ratio Limit Ratio4 (TRLR)	Turbo Ratio Limit Ratio4 with a range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio, Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit4 is paired with Turbo Ratio NumCores4 and must be less than or equal to Core Ratio Limit0.
Turbo Ratio Limit Ratio5 (TRLR)	Turbo Ratio Limit Ratio5 with a range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio, Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking. This Core Ratio Limit5 is paired with Turbo Ratio NumCores5 and must be less than or equal to Core Ratio Limit0.
Energy Efficient Turbo	Enable or disable the Energy Efficient Turbo feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled.

6.3.2.1.2 CPU VR Settings

Feature	Description
VR Power Delivery Design	Specifies the CML-S board design used for the VR settings override values. By default, BIOS will override the default CML-S VR settings based on the board design. A value of AUTO (0) will use the board ID to determine the board design. Any other value will override the board ID logic to provide a custom VR Power Delivery Design value. This feature is intended primarily for validation.
PSYS Slope	PSYS Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x9.
PSYS Offset	PSYS Offset defined in 1/4 increments. Range is 0-255. For an offset of 25, enter 100. Uses BIOS VR mailbox command 0x9.
PSYS PMax Power	PSYS PMax power, defined in 1/8 Watt increments. Range 0-8192. For a PMax of 125W, enter 1000. 0 = AUTO. Uses BIOS VR mailbox command 0xB.
▶ **Acoustic Noise Setting**	Configure Acoustic Noise Settings for IA, GT, and SA domains.
▶ **Core/IA VR Settings**	Core/IA VR Settings.
▶ **GT VR Settings**	GT VR Settings.
Intersil VR Command	VR Mailbox command to fix Intersil VR C-state issues. Disabled- No Mailbox command sent. Default is Disabled.

6.3.2.1.2.1 Acoustic Noise Settings

Feature	Description
Acoustic Noise Mitigation	Enabling this option will help mitigate acoustic noise on certain SKUs when the CPU is in deeper C state. This needs to be enabled to program PreWake, Ramp Up, and Ramp Down times.

6.3.2.1.2.2 Core/IA VR Settings

Feature	Description
VR Config Enable	VR Config Enable
AC Loadline	AC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
DC Loadline	DC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
PS3 Enable	Enable or Disable PS3. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command

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	0x3.
PS4 Enable	Enable or Disable PS4. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.
IMON Slope	IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x4.
IMON Offset	IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x4.
IMON Prefix	Sets the offset value as positive or negative.
VR Current Limit	Voltage Regulator Current Limit (Icc Max). This value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4 A increments. A value of 400 = 100A. 0 means AUTO. Uses the BIOS VR mailbox command 0x6.
VR Voltage Limit	VR Voltage Limit, defined in mV. Range is 0-7999mV. For a Voltage Limit of 1.25V, enter 1250. 0 = AUTO. Uses BIOS VR mailbox command 0x6.
TDC Enable	TDC Enable. 0- Disable, 1 – Enable.
TDC Current Limit	TDC Current Limit, defined in 1/8A increments. Range 0-32767. For a TDC Current Limit of 125A, enter 1000. 0 = Auto/Intel Default. Uses the BIOS VR mailbox command 0x1A.
TDC Time Window	TDC Time Window, value in milliseconds. 1ms is default. The range is from 1ms to 10ms, except for 9ms. 9ms has no valid encoding in the MSR definition.
TDC Lock	Enabled or Disabled TDC Lock.

6.3.2.1.2.3 GT VR Settings

Feature	Description
VR Config Enable	VR Config Enable.
AC Loadline	AC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
DC Loadline	DC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
PS3 Enable	Enable or Disable PS3. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.
PS4 Enable	Enable or Disable PS4. 0 - Disabled, 1 - Enabled. It uses the BIOS VR mailbox command 0x3.
IMON Slope	IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. It uses the BIOS VR mailbox command 0x4.
IMON Offset	IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x4.
IMON Prefix	Sets the offset value as positive or negative.
VR Current Limit	Voltage Regulator Current limit (Icc Max). This value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4 A increments. A value of 400 = 100A. 0 means AUTO. It uses the BIOS VR mailbox command 0x6.
VR Voltage Limit	VR Voltage Limit, defined in mV. Range is 0-7999mV. For a Voltage Limit of 1.25V, enter 1250. 0 = AUTO. It uses the BIOS VR mailbox command 0x6.
TDC Enable	TDC Enable. 0 - Disable, 1 - Enable.
TDC Current Limit	TDC Current Limit, defined in 1/8A increments. Range 0-32767. For a TDC Current Limit of 125A, enter 1000. 0 = Auto/Intel Default. It uses the BIOS VR mailbox command 0x1A.
TDC Time Window	TDC Time Window, value in milliseconds. 1ms is default. Range from 1ms to 10ms, except for 9ms. 9ms has no valid encoding in the MSR definition.
TDC Lock	Enabled or Disabled TDC Lock.

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6.3.2.1.3 Custom P-State Table Settings

Feature	Description
Number of P states	Sets the number of custom P-states. At least 2 states must be present.

6.3.2.1.4 Power Limit 3 Settings

Feature	Description
Power Limit 3 Override	Enable or disable Power Limit 3 Override. If this option is disabled, BIOS will leave the hardware default values for Power Limit 3 and Power Limit 3 Time Window.

6.3.2.1.5 CPU Lock Configuration Settings

Feature	Description
CFG Lock	Configure MSR 0xE2[15], CFG Lock bit.
Overclocking Lock	Enable or Disable Overclocking Lock (BIT 20) in FLEX_RATIO (194) MSR.

6.3.2.2 GT-Power Management Control

Feature	Description
RC6 (Render Standby)	Check to enable render standby support.
Maximum GT frequency	Maximum GT frequency limited by the user. Choose between 350MHz (RPN) and 1200MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU.
Disable Turbo GT frequency	Enabled: Disables Turbo GT frequency. Disable: GT frequency is not limited.

6.3.3 PCH-FW Configuration

Configure management engine technology parameters.

Feature	Description
ME Firmware	Display ME Firmware information.

6.3.4 Trusted Computing

Trusted computing settings

Feature	Description
Firmware Version	Displays TPM Firmware Version.
Vendor	Displays TPM Vendor.
Security Device Support	Enables or disables Security Device. Note: Your computer will reboot during restart in order to change state of the device.
Active PCR Banks	Displays Active PCR banks.
Available PCR Banks	Displays Available PCR banks.
SHA256 PCR Bank	Enables or disables SHA256 PCR Bank.
Pending Operation	Schedule an Operation for the Security Device. Note: Your computer will reboot during restart in order to change the state of the security device.
Platform Hierarchy	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enables or disables Endorsement Hierarchy.

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Physical Presence Spec Version	Select to inform the O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
TPM 2.0 Interface Type	Selects the Communication Interface to TPM 2.0 device.
Device Select	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

6.3.5 ACPI Settings

Set ACPI the (Advanced Configuration and Power Management Interface) parameters.

Feature	Description
Enable ACPI Auto Configuration	Enables or disables BIOS ACPI Auto Configuration.
Enable Hibernation	Enables or disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Select the highest ACPI sleep state that the system will enter when the SUSPEND button is pressed.

6.3.6 Super IO Configuration

System Super IO Chip parameters.

Feature	Description
COM1-6	Set Parameters of Serial Port 1-6. The options after entering the interface settings above are as follows. • Serial Port: Enables or Disables Serial Port (COM). • Device Settings: Displays the Current Device Settings. • Change Settings: If the board supported, this menu shows. Select an optimal setting for Super IO Device.

6.3.7 Hardware Monitor

Monitor the hardware status.

Feature	Description
► **Fan function**	FAN1 Mode: FAN1 Mode Select. Full on Mode; Automatic Mode; Manual Mode.
CHASSIS OPEN	Enable or disable CHASSIS OPEN Function.
LED S3 Function	Enable or disable LED S3 Blink function.
CPU Temp	Displays CPU Temperature.
SYS Temp	Displays System Temperature.
CPU_FAN1	Displays CPU FAN Speed.
SYS_FAN1	Displays System FAN1 Speed.
SYS_FAN2	Displays System FAN2 Speed.
VCC_CPU	Displays CPU Core Voltage Value.
VCC_DDR	Displays Memory Voltage Value.
+12	Displays +12 Voltage Value.
+5	Displays +5 Voltage Value.
+3.3	Displays +3.3 Voltage Value.

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Set Up Chassis Open Detection:

1. Select “Advanced - Hard Monitor – CHASSIS OPEN” (This menu shows only that this function is supported).
2. Set the item to “Enabled.”
   Sound the alarm if the chassis is opened; stop if it’s closed.

When the open-box detection cap is shorted, the chassis is considered to have been compromised. The post interface will prompt intrusion alarms and the status record need to be cleared to stop the alarm.

Clear Chassis Open Status:

1) In the BIOS Setup Utility, press the F3 key and the enter key to load the optimization default value. Save & exit to clear the out-of-box status record.

Set Up Fan Control:

1) Select “Advanced - Hard Monitor - Fan Function” item (This menu shows only this function is supported);

2) Select the fan to set up, such as “CPU_FAN1 Mode”. Select the operating mode for this fan: full on mode, automatic mode, manual mode.

3) After selecting the manual mode, the manual PWM setting input (set range 0-255) specifies the fan speed.

4) After selecting the automatic mode, there will be a fan off temperature limit, fan start temperature limit, fan start PWM, and PWM SLOPE SETTING options to set up.

Generally, due to the differences in fan performance, the actual performance of smart fans will differ from the set value. It is recommended to set the PWM SLOPE SETTING to 8PWM to ensure that the fan speed increases with the temperature.

6.3.8 Power Control

Power button control settings.

Feature	Description
PowerOn After PowerFail	Specify what state to go to when the power is re-applied after a power failure (G3 state).
Soft-Off by PWR-BTTN	Soft-Off by PWR-BTTN.
ME Function Ctrl	ME Function Ctrl.
RJ45_USB1 Power Ctrl	Select USB power control mode.
PCIE OOR FIXED Enabled	Enable or disable PCIE OOR FIXED.

Set Up Power-on Self:

1. Select “Advanced - Power Control - PowerOn After PowerFail.”
2. Change “PowerOn After Power Fail” value: Power Off, Power On, Last State.

6.3.9 S5 RTC Wake Settings

Enable the system to wake from S5 using the RTC alarm.

Feature	Description
Wake system from S5	Enables or disables the system wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s). Fixed Time: 1. Select “Advanced - S5 RTC Wake Settings - Wake system from S5”.

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	2. Change it from disabled status to fixed time; 3. Set the point in time to customize the boot settings in the “wake up day, wake up hour, wake up minute, and wake up second” that appears. For example, setting day: 2, hour: 13, minute:0, second:0 means the system will boot on the 2nd of each month at 13:00. Setting day as 0 means that the system is will boot at the given specified time every day.

Set Up Timed Power On:

1. Select “Advanced - S5 RTC Wake Settings - Wake system from S5.”
2. Change it from disabled status to fixed time.
3. Set the time for customizing the boot settings in “wake up day, wake up hour, wake up minute, and wake up second”. For example, setting day: 2, hour: 13, minute:0, second:0 means the system will boot on the 2nd of each month at 13:00. Setting day as 0 means that the system is will boot at the given specified time every day.

6.3.10 USB Configuration

USB configuration parameters.

Feature	Description
USB Configuration	Displays USB Configuration.
Legacy USB Support	Enables Legacy USB Support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-Off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables or disables USB Mass Storage Driver Support.
USB Transfer Time-Out	The time-out value for Control, Bulk, and Interrupt transfers.
Device Reset Time-Out	USB mass storage device Start Unit command time-out.
Device Power-Up Delay	Maximum time the device will take before it properly reports itself to the Host Controller. ‘Auto’ uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

6.3.11 Network Stack Configuration

Network Stack Settings

Feature	Description
Network Stack	Enables or disables UEFI Network Stack
IPv4 PXE Support	Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv6 PXE Support	Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
Pxe Boot Lan Select	Enable or disable Pxe Boot Lan select.

Open UEFI PXE:

1. Please select “Advanced - Network Stack Configuration.”
2. Set Network Stack or UEFI PXE to Enabled.

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6.3.12 CSM Configuration

CSM (Compatibility Support Module) configuration: Enable/disable, option ROM execution settings, etc.

Feature	Description
CSM Support	Enables or Disables CSM Support.
CSM16 Module Version	CSM16 Module Version.
GateA20 Active	UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
INT19 Trap Response	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.
HDD Connection Order	Some OS require HDD handled to be adjusted, i.e., OS is installed on drive 80h.
Boot Option Filter	This option controls Legacy/BIOS ROMs priority.
Network	Controls the execution of UEFI and Legacy Network OpROM.
Storage	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI Devices	Determines OpROM execution policy for devices other than network, storage, or video.

Open Legacy PXE:

1) Please select “Advanced - CSM configuration”.
2) Change network item to legacy.

6.3.13 NVMe Configuration

NVMe device option settings.

Feature	Description
NVMe Devices	Displays information about NVMe devices.
Self-Test Option	Select either short or extended self-test. Short option will take a couple of minutes and extended option will take several minutes to complete.
Self-Test Action	Select either to test controller alone or controller and namespace. Selecting controller and namespace option will take longer to complete the test.
Run Device Self-Test	Perform device self-test for the corresponding option and action selected by user. Pressing ‘ESC’ key will abort the test. Result shown below is the recent result logged in the device.

6.4 Chipset

This menu contains the following information:

Feature	Description
▶ **System Agent (SA) Configuration**	System Agent (SA) Parameters.
▶ **PCH-IO Configuration**	PCH Parameters.

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6.4.1 System Agent (SA) Configuration

Feature	Description
▶ **Memory Configuration**	Memory Configuration Parameters.
▶ **Graphics Configuration**	Graphics Configuration.

6.4.1.1 Memory Configuration Parameters

Feature	Description
Memory Configuration	Memory Configuration Parameters.

6.4.1.2 Graphics Configuration

Feature	Description
Primary Display	Select which of the IGFX/PEG/PCI Graphics devices should be the primary display or select SG for Switchable Gfx.
Internal Graphics	Keep IGFX enabled based on the setup options.
GTT Size	Select the GTT Size.
Aperture Size	Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
DVMT Pre-Allocated	Select DVMT5.0 Pre-Allocated (Fixed) Graphic Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

6.4.2 PCH-IO Configuration

Feature	Description
▶ **PCI Express Configuration**	PCI Express Configuration settings.
▶ **SATA And RST Configuration**	SATA Device Options Settings.
▶ **USB Configuration**	USB Configuration Settings.
▶ **HD Audio Configuration**	HD Audio Configuration Settings.

6.4.2.1 PCI Express Configuration

Feature	Description
PCIE Port	PCI Express Root Port Settings

6.4.2.2 SATA and RST Configuration

Feature	Description
SATA Controller(s)	Enables or disables SATA device.
SATA Mode Selection	Determines how SATA controller(s) operate.
Serial ATA Port X	Port X: Enables or disables SATA port.

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6.4.2.3 USB Configuration

Feature	Description
XHCI Compliance Mode	Option to enable Compliance mode. Default is to disable Compliance mode. Change to enabled for Compliance Mode testing.
USB Port Disable Override	Selectively enables or disables the corresponding USB port from reporting a device connection to the controller.

6.4.2.4 HD Audio Configuration

Feature	Description
HD Audio	Control detection of the HD-audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.

6.5 Security

This menu contains the following information:

Feature	Description
Administrator Password	Set Administrator Password.
User Password	Set User Password.
► **Secure Boot**	Secure Boot configuration.

6.5.1 Secure Boot

Feature	Description
Secure Boot	Secure Boot feature is active if Secure Boot is enabled, Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform reset.
Secure Boot mode	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

When setting up an administrator password, it is recommended to enter it when accessing the BIOS setup program to avoid some BIOS information or settings that are unavailable due to user rights are insufficient (no password is entered as a user).

When setting a user password, you must use the user password to access the BIOS setup program, which means that you need to enter the user password when booting the operating system (using the BIOS boot feature).

Set/Change the Administrator Password:

1. Select “Security - Administrator Password.”
2. Enter the desired password in the “Create New Password” window and press Enter. You will need to confirm by entering current password before accessing the “Create New Password” window.
3. Re-enter the new password to ensure it is entered correctly.

To delete an administrator password, press the Carriage Return in the “Create New Password” window.

Set/Change the User Password:

1) Select “Security - User Password.”

2) Enter the password you want to set in the “Create New Password” window and press Enter. You will need to confirm by entering the current password before accessing the “Create New Password” window.

3) Re-enter the new password to ensure it is entered correctly.

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To delete a user password, press the carriage return in the “Create New Password” window.

6.6 Boot

This menu contains the following information:

Feature	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup Num Lock State	Select the keyboard Num Lock state.
Full Screen Logo	Enables or disables Full Screen Logo option.
Fast Boot	Enabled or disabled boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot option.
Boot mode Select	Select Boot mode LEGACY/BIOS.
Boot Option #X	Sets the system boot order.

Set Boot Sequence:

1) Select “Boot” in the menu page.

2) Change “Boot Option #1” to the desired device.

3) If there are more than one similar device, example, more than one hard drive, enter “Hard Disk Drive BBS Priorities” and change the boot order priority between the drives first.

When the Boot page has the Boot Mode option, it is recommended to set it to “dual” so that both Legacy and BIOS boot projects can be booted. UEFI boot items will be filtered when selected for Legacy, and legacy boot items will be filtered when selected as BIOS.

6.7 Save & Exit

Feature	Description
Save Changes and Exit	Exit system setup after saving the changes.
Discard Changes and Exit	Exit system setup without saving any changes.
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Reset	Reset system setup without saving any changes.
Save Changes	Save changes done so far to any of the setup options.
Discard Changes	Discard changes done so far to any of the setup options.
Default Options	Default Options.
Restore Defaults	Restore/Load default values for all the setup options.
Save as User Defaults	Save the changes done so far as User Defaults.
Restore User Defaults	Restore the User Defaults to all the setup options.
Boot Override	Boot Override.
BIOS: Built-in EFI shell	Launch BIOS Built-in UEFI Shell.
Launch EFI Shell from filesystem device	Attempts to launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

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Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User‘s Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources.
  - Keep equipment away from high heat or high humidity.
  - Keep equipment properly ventilated (do not block or cover ventilation openings).
  - Make sure to use recommended voltage and power source settings.
  - Always install and operate equipment near an easily accessible electrical socket-outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

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Getting Services

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