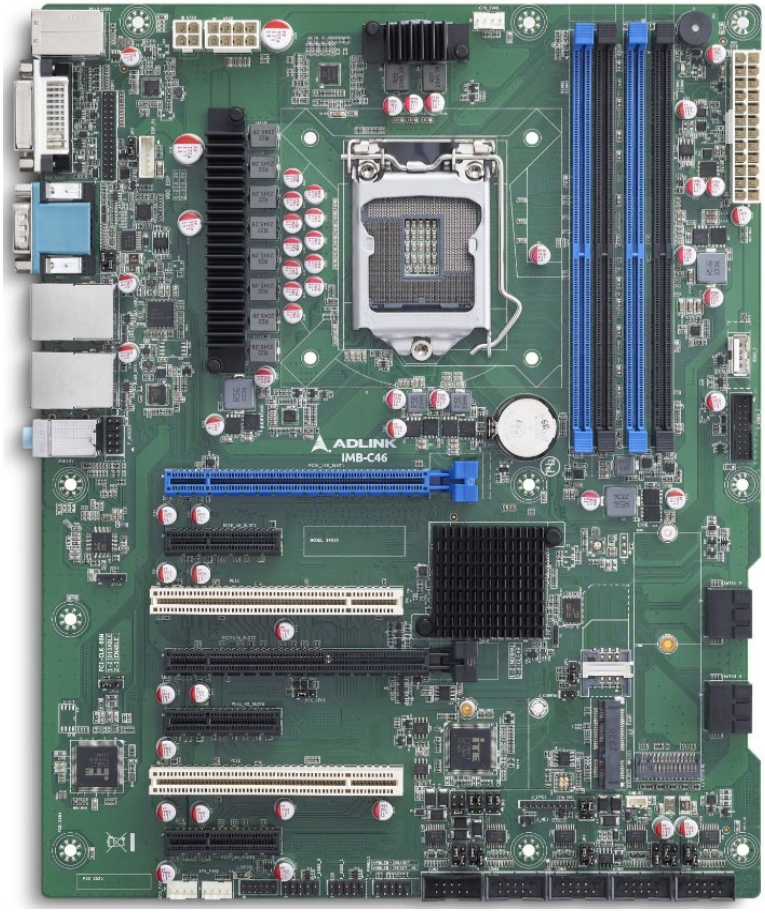
IMB-C46

User's Manual

ATX Motherboard with 10th/11th Gen Intel® Core™ i9/i7/i5/i3 Processors and Intel® Q470 Chipset



Manual Rev.: 0.5 Preliminary
Revision Date: October 8, 2024
Part Number: 50M-13017-1000

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Preface

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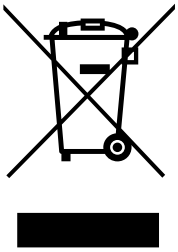

Battery Labels (for products with battery)

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Revision History

Revision	Description	Date	By
0.1	Preliminary release	2024-07-03	AL
0.2	Specs updated	2024-08-16	AL
0.3	IO panel and onboard connector images and tables updated	2024-09-04	AL
0.4	Specifications and connector pinouts updated	2024-10-04	AL
0.5	Connector pinouts images added	2024-10-08	AL

Table of Contents

List of Figures

List of Tables

1 Introduction

ADLINK IMB-C46 ATX is an industrial motherboard supporting 10th/11th Generation Intel® Core™ i9/i7/i5/i3 desktop processors, an Intel® Q470 Chipset, and 5 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 quad-channel DDR4 2400/2666/2933 MHz RAM for industrial automation applications. With industrial-grade I/O port design, the IMB-C46 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-C46 ATX motherboard
- Rear I/O shield
- M.2 screws kits
- 1pcs SATA cable
- 1pcs 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
- USB3.0 Cable(2port), Part Number: 30-25046-0100
- SATA Cable, Part Number: 30-10057-700

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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® Q470 Express Chipset
- **Memory:** 4x 288-pin Non-ECC U-DIMM slot, DDR4 2400/2666/2933 MHz, up to 128 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 (or 2x PCIe Gen3 x8)
  - 3x PCIe x4 Gen3
  - 2xPCI
- **SATA:** 4x SATA 6.0 Gb/s connectors, Intel® software RAID 0/1/5/10 support
- **USB:**
  - 4x USB 3.0 (rear I/O)
  - 2x USB 2.0 (rear I/O)
  - 2x USB 3.0 (by pin header)
  - 4x USB 2.0 (by pin header)
  - 1x USB 2.0 (Vertical TYEP-A, Internal)

- **COM:**
  - 1x RS-232/422/485 (by pin header)
  - 1x RS-232/485 (by pin header)
  - 4x RS-232 (COM1 by DB9, others by pin headers)
- **PS/2 Combo Port:** 1x PS/2 keyboard/mouse pin header
- **DIO:** 8-bit GPIO
- **Mini-PCIe slot:** 1x Mini PCI-E Slot (WIFI+4G/3G, with 1x Full-Size SIM Card Slot)
- **M.2 connectors:**
  - 1x M.2 M-Key, 2242/2280 (PCIe Gen3 x4 NVMe / SATA SSD, Auto Detect)

2.3 Video

- **Interfaces:** Supports three 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-LM GbE, via RJ45 connector
- **LAN2:** Intel® I210-AT GbE, 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

2.9 Form Factor

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

2.10 Operating Systems

- Microsoft® Windows® 10, 64-bit

2.11 Functional Block Diagram

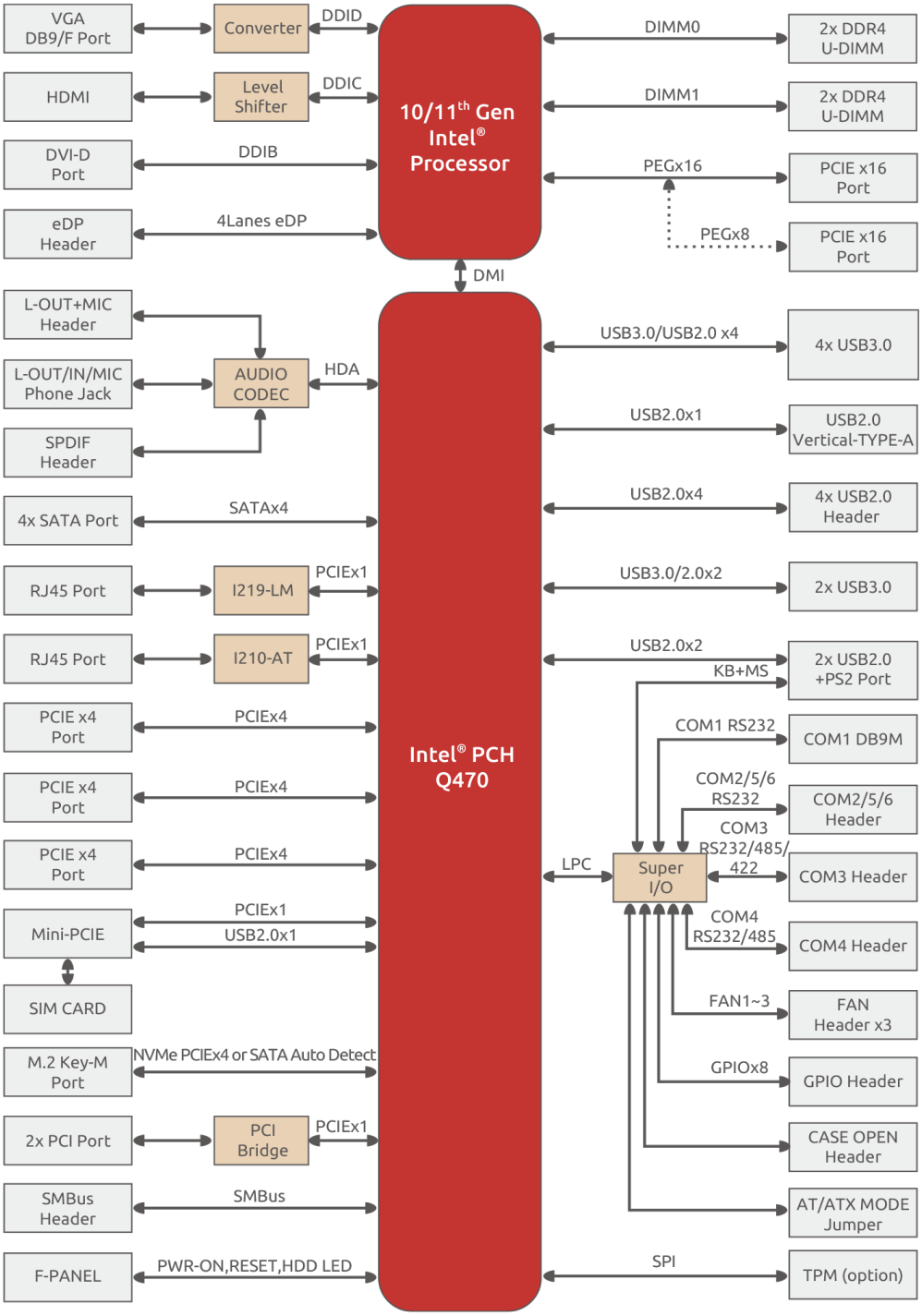


Figure 1: Functional Block Diagram

- RJ45_USB1 (RJ45) I219-LM supports Intel AMT 12.0 and Intel vPro competent. RJ45_USB2 (RJ45) supports I210 by default.
- PCIEX16_SLOT1-2 slot support PCIE 16x or dual PCIE 8x is selected by 'PCI-E Signal Select Jumper' (J_PEG_CFG1).

3 Mechanical Layout

3.1 IO Panel Connector Locations

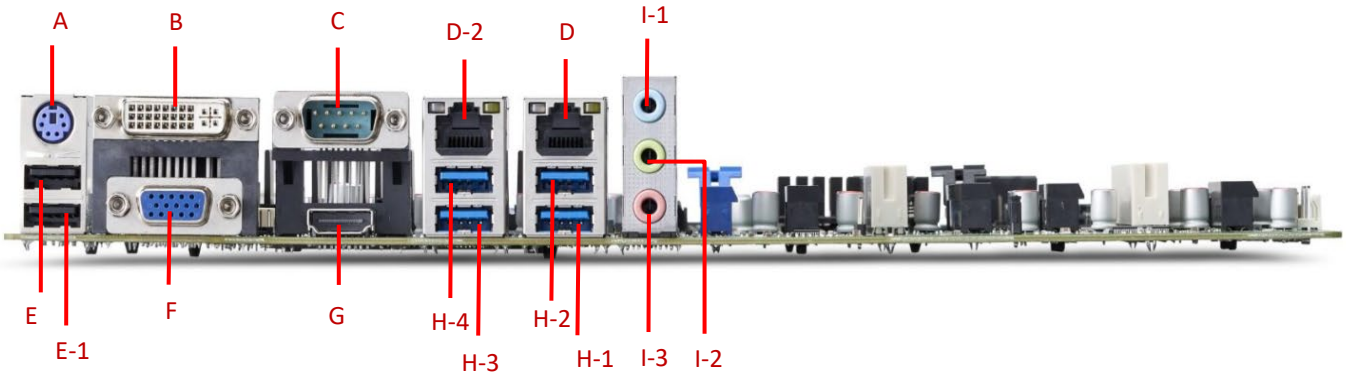


Figure 2: IO Panel Connector Locations

Table 1:IO Panel Connector Definitions

Item	Location	Description
A	PS/2_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	PS/2_USB1 (USB1)	USB2.0 TYPE-A Connector
E-2	PS/2_USB1 (USB2)	USB2.0 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

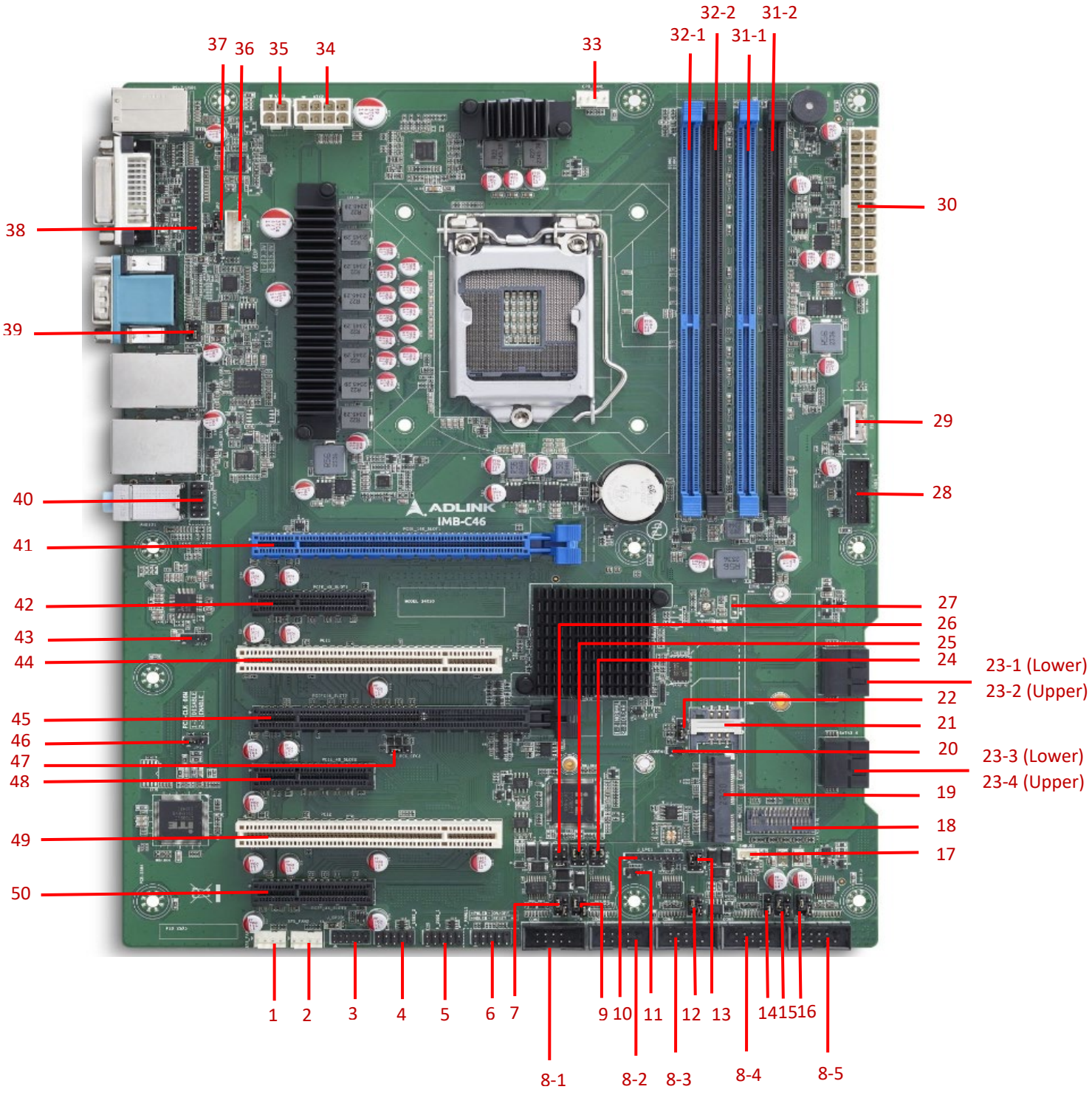


Figure 3: Onboard Connector – Header and Jumper Locations

Table 2: Onboard Connector Definitions – Header and Jumper Definitions

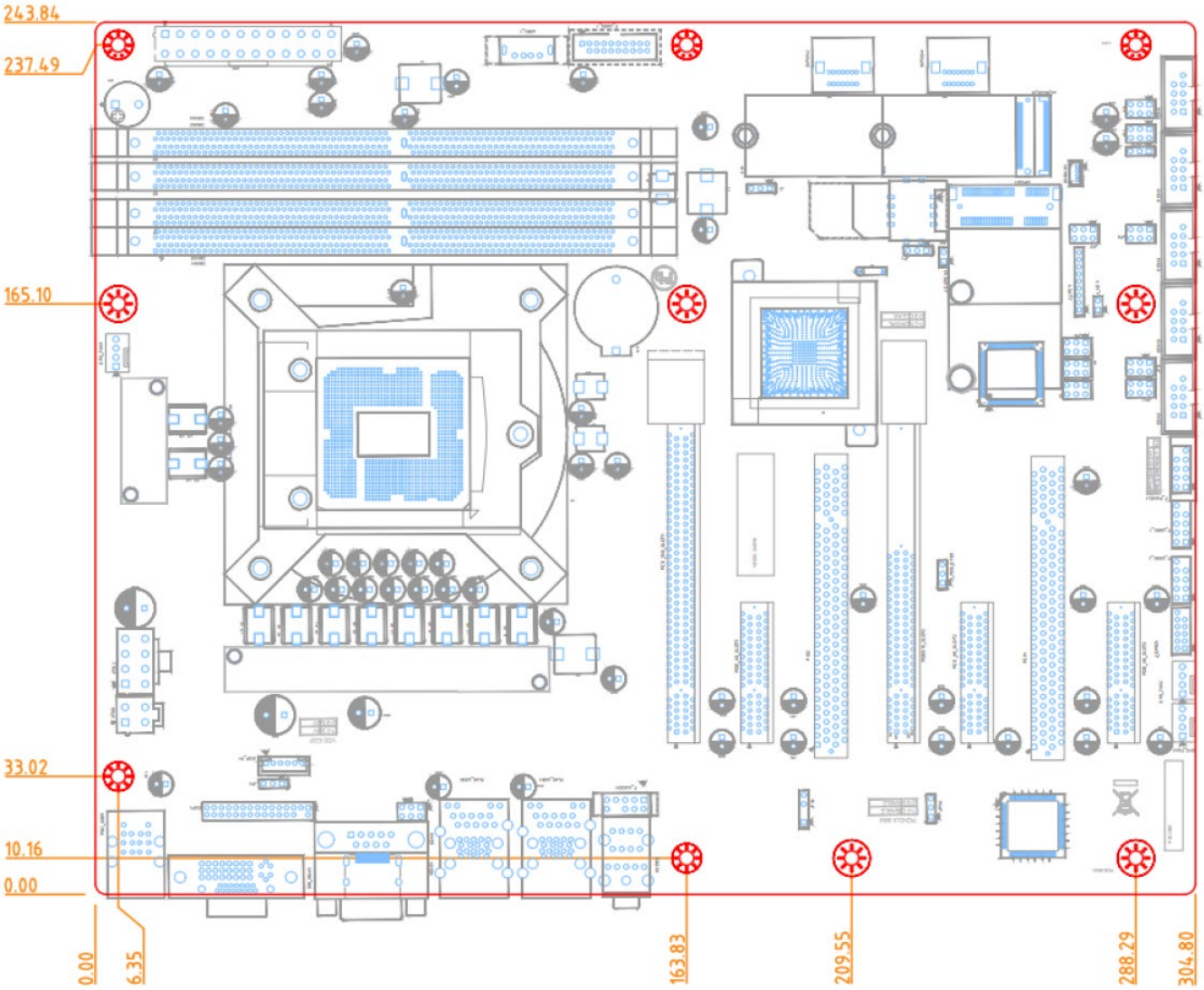
Item	Description	Remarks
1	SYS_FAN1	System FAN Header1
2	SYS_FAN2	System FAN Header2
3	J_GPIO1	GPIO Header
4	F_USB2_2	Front USB2.0 Header2
5	F_USB2_1	Front USB2.0 Header1
6	F_PANEL1	Front Panel Header
7	JP12	COM2 DCD/RI Select Jumper
8-1	COM2	COM2 Header
8-2	COM3	COM3 Header
8-3	COM4	COM4 Header
8-4	COM5	COM5 Header
8-5	COM6	COM6 Header
9	JP8	COM3 DCD/RI Select Jumper
10	J_LPC1	Port80 Debug Header
11	J_ME1	ME Flash Jumper
12	JP9	COM4 DCD/RI Select Jumper
13	JP7	COM4 RS232/485 Select Jumper
14	J_AT/ATX1	AT or ATX Select Jumper
15	JP10	COM5 DCD/RI Select Jumper
16	JP11	COM6 DCD/RI Select Jumper
17	SMBUS1	SMBUS Header
18	M.2_PCIESSD_M1	M.2 (NGFF) Key-M Slot (PCIe x4 NVMe/SATA SSD, 2242/2280)
19	MPCIE1	Mini PCI-E Slot (WIFI+4G/3G)
20	J_COPEN1	Case Open Header
21	SIM1	Full-Size SIM Card Slot
22	JP1	CMOS Clear Jumper
23-1	SATA1	SATA3.0 7P Upright Connector
23-2	SATA2	SATA3.0 7P Upright Connector
23-3	SATA3	SATA3.0 7P Upright Connector
23-4	SATA4	SATA3.0 7P Upright Connector
24	JP6	COM3 RS232/422/485 Select Jumper3
25	JP5	COM3 RS232/422/485 Select Jumper2
26	JP4	COM3 RS232/422/485 Select Jumper1
27	J2	Data Burning Header
28	F_USB3_1	Front USB3.0 Header
29	USB2_1	USB2.0 Internal Vertical TYPE-A Connector
30	ATX1	ATX 24P Power Input Connector

31-1	DIMM2	DDR4 CHB DIMM Slot2
31-2	DIMM4	DDR4 CHB DIMM Slot4
32-1	DIMM1	DDR4 CHA DIMM Slot1
32-2	DIMM3	DDR4 CHA DIMM Slot3
33	CPU_FAN1	CPU FAN Header
34	ATX2	ATX 8P CPU Power Input Connector
35	ATX3	ATX 4P CPU Power Input Connector
36	EDP_P1	eDP Backlight Control Header
37	JP2	eDP VDD Select Jumper
38	EDP1	eDP Signal Header
39	JP3	COM1 DCD/RI Select Jumper
40	F_AUDIO1	Front Audio Header (Line-Out + MIC)
41	PCIE_16X_SLOT1	PCI-E 16x Slot1 (PCIe 16X GEN3) **[1]**
42	PCIE_4X_SLOT1	PCI-E 4x Slot1 (PCIe 4X GEN3)
43	JP13	SPDIF Out Header
44	PCI1	PCI Slot1
45	PCIEX16_SLOT2	PCI-E 16x Slot2 (PCIe 8X GEN3) **[1]**
46	JP14	PCI CLK 66MHz Enable/Disable Select Jumper
47	J_PEG_CFG1	PCI-E Signal Select Jumper
48	PCIE_4X_SLOT2	PCI-E 4x Slot2 (PCIe 4X GEN3)
49	PCI2	PCI Slot2
50	PCIE_4X_SLOT3	PCI-E 4x Slot3 (PCIe 4X GEN3)

Note: [1] When PCIEX16_SLOT2 accesses the device, PCIE_16X_SLOT1 will automatically switch to PCIe 8X (Auto detected). This configuration can also be enforced by the ‘PCI-E Signal Select Jumper’ (J_PEG_CFG1).

3.2 Mechanical Dimensions

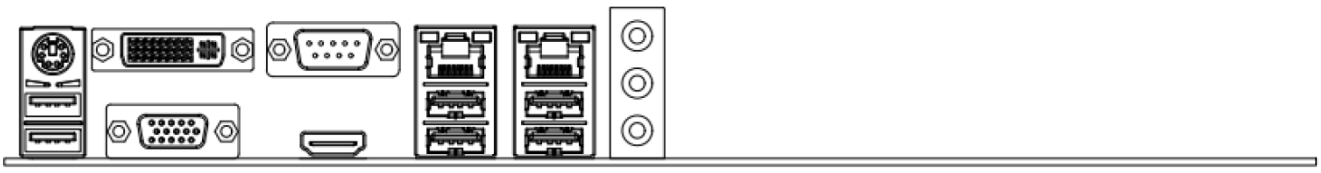
Top View



Dimensions: mm

Figure 4: Mechanical Dimensions

Side View



Dimensions: mm

Figure 5: Mechanical Dimensions - IO Panel

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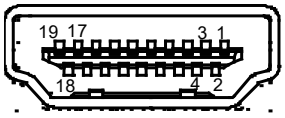
4 Connector Pinouts

See 3.1 Connector Locations on page 7 for connector locations.

4.1 Rear IO Connectors

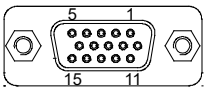
4.1.1 HDMI

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		



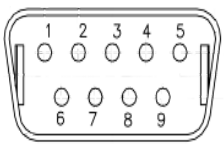
4.1.2 VGA Connector

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		

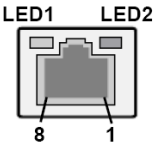


Note: PIN1 of COM1 can be DCD (default) /5V and Pin9 of COM1 can be RI(Default) / 12V, selectable by “COM1 DCD/RI Select Jumper”. (JP3)

4.1.4 Ethernet Connectors (LAN1, LAN2)

RJ45_USB2 (RJ45) * (GBE LAN RJ45 Connector2 8Pin)

Pin	Signal		Pin	Signal	
1	MDI0_2+		5	MDI2_2+	
2	MDI0_2-		6	MDI2_2-	
3	MDI1_2+		7	MDI3_2+	
4	MDI1_2-		8	MDI3_2-	
LED1	Speed LED	1000M: Turn Orange	LED2	Active LED	ACT: Blinking Yellow
		100M: Turn Green			Only LINK: Lights On
		10M: Lights Off			Stop: Lights Off



Note: RJ45_USB2(RJ45) can support Wake-On-LAN.

RJ45_USB1 (RJ45) * (GBE LAN RJ45 Connector1 8Pin)

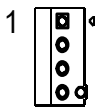
Pin	Signal		Pin	Signal	
1	MDI0_1+		5	MDI2_1+	
2	MDI0_1-		6	MDI2_1-	
3	MDI1_1+		7	MDI3_1+	
4	MDI1_1-		8	MDI3_1-	
LED1	Speed LED	1000M: Turn Orange	LED2	Active LED	ACT: Blinking Yellow
		100M: Turn Green			Only LINK: Lights On
		10M: Lights Off			Stop: Lights Off

Note: RJ45_USB1(RJ45) can support AMT and Wake-On-LAN.

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

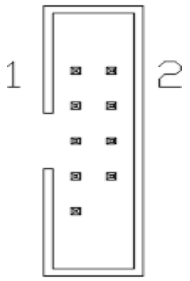


4.2.2 Front Panel Header (F_PANEL1)

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		

4.2.3 COM Header (COM 2/3/4/5/6)

	Pin	Signal	Pin	Signal
COM2 RS232	1	COM2_DCD **[1]**	2	COM2_DSR
	3	COM2_RXD	4	COM2_RTS
	5	COM2_TXD	6	COM2_CTS
	7	COM2_DTR	8	COM2_RI **[1]**
	9	GND		



Note: PIN1 of COM2 can be DCD (default) /5V, and Pin8 of COM2 can be RI (Default) / 12V, selectable by the “COM2 DCD/RI Select Jumper”. (JP12)

	Pin	Signal	Pin	Signal
COM3 RS232 [2]	1	COM3_DCD **[1]**	2	COM3_DSR
	3	COM3_RXD	4	COM3_RTS
	5	COM3_TXD	6	COM3_CTS
	7	COM3_DTR	8	COM3_RI **[1]**
	9	GND		
COM3 RS422 [2]	1	RS422_TX-	2	N/C
	3	RS422_TX+	4	N/C
	5	RS422_RX+	6	N/C
	7	RS422_RX-	8	N/C
	9	N/C		

COM3 RS485 [2]	1	RS485-	2	N/C
	3	RS485+	4	N/C
	5	N/C	6	N/C
	7	N/C	8	N/C
	9	N/C		

Note:

[1] : When COM3 is RS232, PIN1 of COM3 can be DCD (default) /5V and Pin8 of COM3 can be RI(Default) /12V, selectable by “COM3 DCD/RI Select Jumper”. (JP8).

[2]: COM3 can be RS232 (default) / RS422 / RS485 by selecting JP4, JP5, JP6.

	Pin	Signal	Pin	Signal
COM4 RS232 [2]	1	COM4_DCD [1]	2	COM4_DSR
	3	COM4_RXD	4	COM4_RTS
	5	COM4_TXD	6	COM4_CTS
	7	COM4_DTR	8	COM4_RI [1]
	9	GND		
COM4 RS485 [2]	1	RS485-	2	N/C
	3	RS485+	4	N/C
	5	N/C	6	N/C
	7	N/C	8	N/C
	9	N/C		

Note:

[1]: When COM4 is RS232, COM4 can be RS232 (default) / RS485 selecting by “COM4 RS232/RS485 Select Jumper”. (JP7).

[2]: PIN1 of COM4 can be DCD (default) /5V and Pin8 of COM4 can be RI(Default) / 12V, selectable by “COM4 DCD/RI Select Jumper”. (JP9).

	Pin	Signal	Pin	Signal
COM5 RS232	1	COM5_DCD [1]	2	COM5_DSR
	3	COM5_RXD	4	COM5_RTS
	5	COM5_TXD	6	COM5_CTS
	7	COM5_DTR	8	COM5_RI [1]
	9	GND		

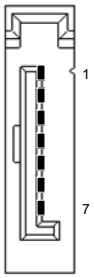
Note: PIN1 of COM5 can be DCD (default) /5V and Pin8 of COM5 can be RI(Default) / 12V, selectable by “COM5 DCD/RI Select Jumper”. (JP10)

	Pin	Definition	Pin	Definition
COM6 RS232	1	COM6_DCD [1]	2	COM6_DSR
	3	COM6_RXD	4	COM6_RTS
	5	COM6_TXD	6	COM6_CTS
	7	COM6_DTR	8	COM6_RI [1]
	9	GND		

Note: PIN1 of COM6 can be DCD (default) /5V and Pin8 of COM6 can be RI(Default) / 12V, selectable by “COM6 DCD/RI Select Jumper”. (JP11)

4.2.4 SATA Connector (SATA 1-2/3-4)

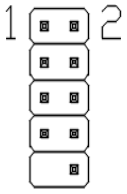
Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	5	RXN	Receive diff data – negative
2	TXP	Transmit diff data – positive	6	RXP	Receive diff data – positive
3	TXN	Transmit diff data – negative	7	GND	Ground
4	GND	Ground			



4.2.5 USB Connectors

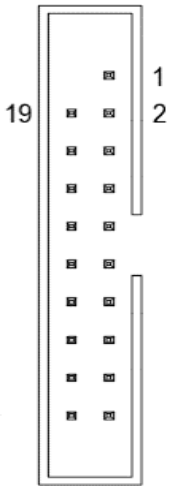
USB 2.0 Header (F_USB2_1, F_USB2_2)

Pin	Signal	Pin	Signal
1	+ 5V	2	+ 5V
3	USB2_P-	4	USB2_P-
5	USB2_P+	6	USB2_P+
7	GND	8	GND
		10	DUMMY



USB 3.0 Header (F_USB3_1)

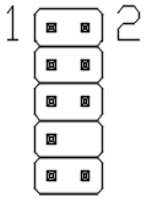
Pin	Signal	Pin	Signal
		1	+ 5V
19	+ 5V	2	USB3_RXD5-
18	USB3_RXD6-	3	USB3_RXD5+
17	USB3_RXD6+	4	GND
16	GND	5	USB3_TXD5-
15	USB3_TXD6-	6	USB3_TXD5+
14	USB3_TXD6+	7	GND
13	GND	8	USB2_11-
12	USB2_10-	9	USB2_11+



Pin	Signal	Pin	Signal
11	USB2_10+	10	N/C

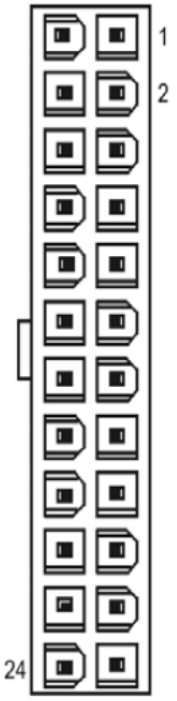
4.2.6 Front Panel Audio Header (F_AUDIO1)

Pin	Signal	Pin	Signal
1	MIC_IN2_L	2	GND_AUD
3	MIC_IN2_R	4	+ 3.3V
5	LINE_OUT2_R	6	MIC2_RET
7	GND_AUD		
9	LINE_OUT2_L	10	LINE_OUT2_RET



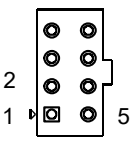
4.2.7 ATX1

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



4.2.8 ATX2

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

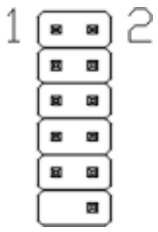


4.2.9 ATX3

Pin	Signal
1	Ground
2	Ground
3	+12V
4	+12V

4.2.10 GPIO Header (J_GPIO1)

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



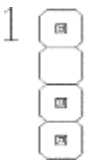
Note: “H” or “L” means the default voltage is High or Low level. (5V GPIO).

4.2.11 Port80 Debug Header (J_LPC1)

Pin	Signal	Pin	Signal
1	LFRAME_N	6	GND
2	LPC_AD3	7	SIO_PCIRST1_N
3	LPC_AD2	8	CLK_LPC0
4	LPC_AD1	9	+ 3.3V
5	LPC_AD0		

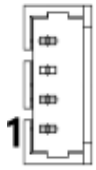
4.2.12 SPDIF Header (JP13)

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



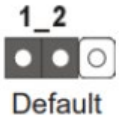
4.2.13 SMBUS Header (SMBUS1)

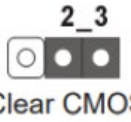
Pin	Signal	Pin	Signal
1	+ 5V **[1]**	3	SMB_DATA_MAIN
2	SMB_CLK_MAIN	4	GND



4.3 Jumper and Switch Settings

4.3.1 Clear CMOS Jumper (JP1)





1-2 : Normal
2-3 : Clear CMOS

4.3.2 COM1 DCD/RI Select Jumper (JP3)

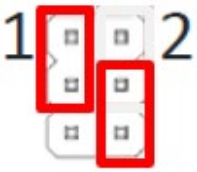
Setting	Function
3-5, 2-4	COM1_PIN1: DCD COM1_PIN9: + 12V
1-3, 4-6(Default)	COM1_PIN1: + 5V COM1_PIN9: RI

4.3.3 COM2 DCD/RI Select Jumper (JP12)

Setting	Function
3-5, 2-4	COM2_PIN1: DCD COM2_PIN8: + 12V
1-3, 4-6(Default)	COM2_PIN1: + 5V COM2_PIN8: RI

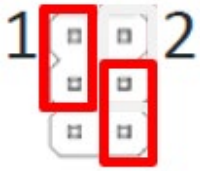
4.3.4 COM3 DCD/RI Select Jumper (JP8)

Setting	Function
3-5, 2-4	COM3_PIN1: DCD COM3_PIN8: + 12V
1-3, 4-6(Default)	COM3_PIN1: + 5V COM3_PIN8: RI



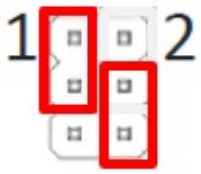
4.3.5 COM4 DCD/RI Select Jumper (JP9)

Setting	Function
3-5, 2-4	COM4_PIN1: DCD COM4_PIN8: + 12V
1-3, 4-6(Default)	COM4_PIN1: + 5V COM4_PIN8: RI



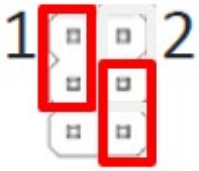
4.3.6 COM5 DCD/RI Select Jumper (JP10)

Setting	Function
3-5, 2-4	COM5_PIN1: DCD COM5_PIN8: + 12V
1-3, 4-6(Default)	COM5_PIN1: + 5V COM5_PIN8: RI



4.3.7 COM6 DCD/RI Select Jumper (JP11)

Setting	Function
3-5, 2-4	COM6_PIN1: DCD COM6_PIN8: + 12V
1-3, 4-6(Default)	COM6_PIN1: + 5V COM6_PIN8: RI

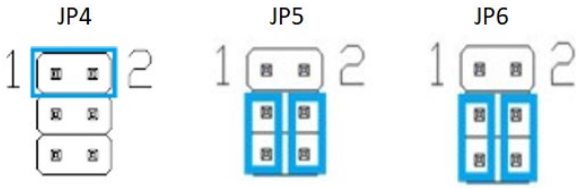


4.3.8 COM4 RS232/485 Select Jumper (JP7)

Setting	Function
1-3, 2-4	COM4: RS485 (COM4_PIN1: RS485- COM4_PIN3: RS485+)
3-5, 4-6(Default)	COM4: RS232 (COM4_PIN1: DCD COM4_PIN3: RXD)

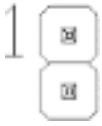
4.3.9 COM3 RS232/485 Select Jumpers (JP4/JP5/JP6)

Setting	Function
JP4 (1-2, Default) JP5 (3-5, 4-6, Default) JP6 (3-5, 4-6, Default)	COM3: RS232 (COM3_PIN1: DCD COM3_PIN3: RXD COM3_PIN5: TXD COM3_PIN7: DTR)
JP4 (3-4) JP5 (1-3, 2-4) JP6 (1-3, 2-4)	COM3: RS422 (COM3_PIN1: RS422_TX- COM3_PIN3: RS422_TX+ COM3_PIN5: RS422_RX+ COM3_PIN7: RS422_RX-)
JP4 (5-6) JP5(1-3, 2-4) JP6 (No Effect)	COM3: RS485 (COM3_PIN1: RS485- COM3_PIN3: RS485+)



4.3.10 ME Flash Jumper (J_ME1)

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

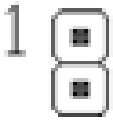


4.3.11 AT or ATX Select Jumper (J_AT/ATX1)

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

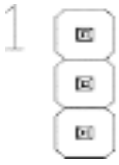
4.3.12 Case Open Header (J_COPEN1)

Setting	Function
1-2: Connected	Active Case Open
1-2: Open	Normal



4.3.13 Data Burning Header (J2)

Pin	Signal	Pin	Signal
1	GP3.0_RXD	3	GND
2	GP3.1_TXD		

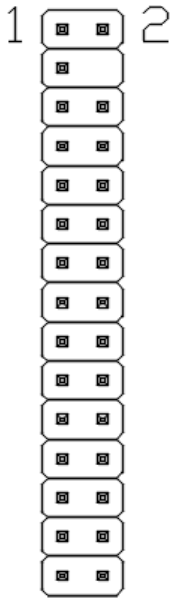


4.3.14 eDP Backlight Control Header (EDP_P1)

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

4.3.15 eDP Signal Header (EDP1)

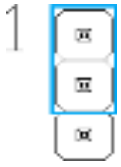
Pin	Signal	Pin	Signal
1	VDD_PANEL **[1]**	2	VDD_PANEL **[1]**
3	VDD_PANEL **[1]**		
5	GND	6	EDP_HPD
7	N/C	8	N/C
9	N/C	10	N/C
11	N/C	12	N/C
13	GND	14	GND
15	N/C	16	N/C
17	N/C	18	N/C
19	EDP_TX0-	20	EDP_TX0+
21	EDP_TX1-	22	EDP_TX1+
23	EDP_TX2-	24	EDP_TX2+
25	GND	26	GND
27	EDP_TX3-	28	EDP_TX3+
29	EDP_AUX-	30	EDP_AUX+



Note: Panel Power VDD can be 3.3V (default) /5V selectable by eDP VDD Select Jumper” (JP2).

4.3.16 PCI CLK 66MHz Enable/Disable Select Jumper (JP14)

Setting	Function
1-2 (Default)	Disable PCI CLK 66MHz
2-3	Enable PCI CLK 66MHz



4.3.17 PCIE Signal Select Jumper (J_PEG_CFG1)

Setting	Function
1-2 (Default)	PCIE_16X_SLOT1: PCIe 16X PCIE_16X_SLOT2: No resources
2-3	Enable PCI CLK 66MHz

4.4 Expansion Slots

There are 5 PCI Express slots, 2 PCI slots, 1 M.2 sockets, 1 mini-PCIe slot, and 1 SIM socket on this motherboard.

PCIe and PCI slots:

	Slot 1 (PCIe1)	Slot 2 (PCIe2)	Slot 3 (PCI1)	Slot 4 (PCIe3)	Slot 5 (PCIe4)	Slot 6 (PCI2)	Slot 7 (PCIe5)
Source	CPU	PCH	PCI bridge	CPU	PCH	PCI bridge	PCH
Bandwidth	PCIe 3.0	PCIe 3.0	PCI	PCIe 3.0	PCIe 3.0	PCI	PCIe 3.0
Lane Config 1	X16	X4	PCI	N/A	X4	PCI	X4
Lane Config 2	X8			X8			

SIM socket: 1 x SIM socket connected to Mini PCIe

M.2 sockets:

- 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	DEVSLP	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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5 Driver Installation

Download the requisite drivers for your system from the IMB-C46 product page at:

https://www.adlinktech.com/Products/Industrial_Motherboards_SBCs/ATXMotherboards/IMB-C46

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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 forthe contents of the UEFI 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 ▶ OEM Flavor ▶ 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 - Default Options - Restore Defaults - Save as User Defaults - Restore User Defaults - Boot Override - BIOS: Built-in EFI shell -

6.2 Main Menu

Upon entering the UEFI 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-C46_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

6.3.2 Power and Performance

Power and performance option.

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.
Intel(R) adaptive Boost technology	Enables or disables IABT to improve performance by allowing higher multi-core turbo frequencies.
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.
Turbo Mode	Enables or disables processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
▶ **View/Configure Turbo options**	View/Configure Turbo options.
Config TDP Configurations	Config TDP Configurations.
▶ **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. If this option is disabled, BIOS will leave the default values for Power Limit 4.
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.
Timed MWAIT	Enables or disables Timed MWAIT Support.
▶ **Custom P-state Table**	Adds Custom P-state Table.
Energy Performance Gain	Enables or disables Energy Performance Gain.
EPG DIMM Idd3N	Displays EPG DIMM Idd3N.
EPG DIMM Idd3P	Displays EPG DIMM Idd3P.
▶ **Power Limit 3 Settings**	Power Limit 3 Settings.
▶ **CPU Lock Configuration**	CPU Lock Configuration.
Dual Tau Boost	Enables 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 Core0 (TRLC)	Turbo Ratio Limit Core0. This Turbo Ratio Limit Core0 must be less than the Turbo Ratio Limit Core1.
Turbo Ratio Limit Core1 (TRLC)	Turbo Ratio Limit Core1. This Turbo Ratio Limit Core1 must be less than the Turbo Ratio Limit Core2.
Turbo Ratio Limit Core2 (TRLC)	Turbo Ratio Limit Core2. This Turbo Ratio Limit Core2 must be less than the Turbo Ratio Limit Core3.
Turbo Ratio Limit Core3 (TRLC)	Turbo Ratio Limit Core3. This Turbo Ratio Limit Core3 must be less than the Turbo Ratio Limit Core4.
Turbo Ratio Limit Core4 (TRLC)	Turbo Ratio Limit Core4. This Turbo Ratio Limit Core4 must be less than the Turbo Ratio Limit Core5.

Turbo Ratio Limit Core5 (TRLC)	Turbo Ratio Limit Core5. This Turbo Ratio Limit Core5 must be less than Turbo Ratio Limit Core6.
Turbo Ratio Limit Core6 (TRLC)	Turbo Ratio Limit Core6. This Turbo Ratio Limit Core6 must be less than Turbo Ratio Limit Core7.
Turbo Ratio Limit Core7 (TRLC)	Turbo Ratio Limit Core7. This Turbo Ratio Limit Core7 must be the greatest of all Turbo Ratio Limits.
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 (TRLR)	Turbo Ratio Limit Ratio2 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 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.
Turbo Ratio Limit Ratio6 (TRLR)	Turbo Ratio Limit Ratio6 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 Limit6 is paired with Turbo Ratio NumCores6 and must be less than or equal to Core Ratio Limit0.
Turbo Ratio Limit Ratio7 (TRLR)	Turbo Ratio Limit Ratio7 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 Limit7 is paired with Turbo Ratio NumCores7 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. It is recommended to disable it only in overclocking situations where the turbo frequency must remain constant. Otherwise, leave it 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, the 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 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 Regulator 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. Range 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 Regulator 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.

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 State	When disabled, ME will be put into ME Temporarily disabled Mode.
Firmware Update Configuration	Configure Management

6.3.3.1 Firmware Update Configuration

Feature	Description
ME FW Image Re-Flash	Enables or disables ME FW Image Re-Flash function.
FW Update	Enables or disables ME FW Update function.

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 State of Security Device.
Platform Hierarchy	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enables or disables Endorsement Hierarchy.
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 (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

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.
CHASSIS OPEN	Enable or disable CHASSIS OPEN Function.

Set Up Chassis Open Detection：

1. Select “Advanced – Super IO Configuration - 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 it when closed.

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

Clear Chassis Open Status：

In the BIOS Setup Utility, press the F3 key and then the Enter key to load the optimized default value. After that, save and exit to clear the out-of-box status record.

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.
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.

Set Up Fan Control:

1. Select “Advanced - Hard Monitor - Fan Function” (This menu shows only that 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, and Manual Mode.
3. After selecting the manual mode and manual speed mode, the Manual PWM Setting inputs PWM value (sets the range from 0 to 255) to specify the fan speed.
4. After selecting Automatic Mode, there will have options to set up fan off temperature limit, fan start temperature limit, fan start PWM, and PWM SLOPE SETTING.

Generally, due to differences in fan performance, the actual performance of smart fans may vary from the set value. It is generally recommended to set the PWM SLOPE SETTING to 8PWM to ensure that the fan speed adjusts appropriately with temperature changes.

6.3.8 OEM Flavor

PXE boot LAN select.

Feature	Description
PXE Boot Lan Select	PXE Boot LAN Select.
PCIE OOR FIXED Enabled	Enables or disables PCIE OOR FIXED.

6.3.9 Power Control

Power button control settings.**Feature**	**Description**
PowerOn After PowerFail	Specify what state to go to when 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.

Set Up Power-on Self:

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

6.3.10 S5 RTC Wake Settings

Enable the system to wake from S5 using 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).

Set Up Timed Power On:

1. Select “Advanced - S5 RTC Wake Settings - Wake system from S5.”
2. Change it from Disabled to Fixed Time.
3. Set the time for customizing the boot settings in “Wake up day, Wake up hour, Wake up minute, 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.

6.3.11 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.

6.3.12 Network Stack Configuration

Network Stack Settings

Feature	Description
Network Stack	Enables or disables UEFI Network Stack

Open UEFI PXE:

1. Please select "Advanced - Network Stack Configuration."
2. Set Network Stack or UEFI PXE to Enable.

6.3.13 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/UEFI 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.

6.3.14 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.

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 Thermal Configuration**	Memory Thermal Configuration Options.
▶ **Memory Training Algorithms**	Enables or disables Memory Training Algorithms.
Memory Configuration	Memory Configuration Parameters.
MRC ULT Safe Config	MRC ULT Safe Config for PO.
Safe Mode Support	Safe Mode enable support. Option will be used for changes/WAs that may affect a stable MRC.
Memory Test on Warm Boot	Enable or disable Base Memory Test Run on Warm Boot.
Maximum Memory Frequency	Maximum Memory Frequency Selections in MHz. Valid values should match the refclk, i.e. divide by 133 or 100.
HOB Buffer Size	Size to set HOB Buffer.
ECC Support	Enables or disables DDR Ecc Support.
Max TOLUD	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on the largest MMIO length of the installed graphic controller.
DDR Speed Control	DDR Frequency and Gear1 / Gear2 control for all SAGV points.
Retrain on Fast Fail	Restart MRC in Cold mode if SW MemTest fails during Fast flow. Default = Enabled.
RMT on Fast	Runs RMT on Fast flow.
BER Support	Enables or disables the Rank Margin Tool interpolation/extrapolation.
Enable RH Prevention	Actively prevent Row Hammer.

Row Hammer Solution	Type of method used to prevent Row Hammer.
RH Activation Probability	Used to adjust MC for Hardware RHP.
Refresh Watermarks	Sets Refresh Panic Watermark and Refresh High-Profile Watermark to HIGH or LOW values.
Exit On Failure (MRC)	Exit On Failure for MRC training steps.
Probeless Trace	Enables or disables capacity to activate Probeless Trace feature.
Enable or disable IED (Intel Enhanced Debug)	Intel Enhanced Debug requires 4MB Runtime memory.
Ch Hash Support	Enables or disables Channel Hash Support. 0 is Default (Auto) value - programs 2 in HASH_LSB_MASK, HASK_MASK value of 0x2094 for LPDDR4 and 0x30CC for NON-LPDDR4. NOTE: ONLY if Memory interleaved Mode.
Ch Hash Mask	Set the BIT(s) to be included in the XOR function. NOTE BIT mask corresponds to BITS [19:6].
Ch Hash Interleaved Bit	Select the BIT to be used for Channel Interleaved mode. NOTE: BIT7 will interleave the channels at a 2 cacheline granularity, BIT8 at 4 and BIT9 at 8.
Per Bank Refresh	Enable and disable the per bank refresh. This only impacts memory technologies that support PBR: LPDDR3, LPDDR4.
Strong Weak Leaker	Value for StrongWkLeaker.
Memory Scrambler	Enable or disable Memory Scrambler support.
Force ColdReset	Force ColdReset OR Choose MrcColdBoot mode, when Coldboot is required during MRC execution. Note: If ME 5.0MB is present, ForceColdReset is required.
Channel A DIMM Control	Channel A DIMM Control Support - Enable or Disable Dimms on Channel A.
Channel B DIMM Control	Channel B DIMM Control Support - Enable or Disable Dimms on Channel B.
Force Single Rank	When enabled, only Rank 0 will be used in each DIMM.
Memory Remap	Enables or disables Memory Remap above 4GB.
Time Measure	Enables or disables printing of the time it takes to execute MRC.
DLL Weak Lock Support	Enables or disables Dll Weaklock support.
Pwr Down Idle Timer	The minimum value should = to the worst case Roundtrip delay + Burst_Length. 0 means AUTO: 64 for ULX/ULT, 128 for DT/Halo.
Fast Boot	Enables or disables fast path thru the MRC.
Train On Warm boot	Enables or disables training on warm boot.
Rank Margin Tool Per Task	Enables or disables RMT running at every major training step.
Training Tracing	Enables or disables printing of the current trained state at every major training step.
Lpddr Mem WL Set	Only applicable to LPDDR, Memory Write Latency Set selection (A is default, B will be used if memory devices support it).
BDAT ACPI Table Support	Enables support for the BDAT ACPI table.
BDAT Memory Test Type	Indicates the type of Memory Training data to populate into the BDAT ACPI table.
Rank Margin Tool Loop Count	Specifies the Loop Count to be used during Rank Margin Tool Testing. 0 - AUTO.

6.4.1.1.1 Memory Thermal Configuration

Feature	Description
▶ **Memory Power and Thermal Throttling**	Memory Power and Thermal Throttling Configuration
Memory Thermal Management	Enable or disable Memory Thermal Management.
PECI Injected Temperature	Enable or disable memory temperatures to be injected to the processor via PECI.
EXTT# via TS-on-Board	Enable or disable routing TS-on-Board's ALERT# and THERM# to EXTTS# pins on the PCH.
EXTT# via TS-on-DIMM	Enable or disable routing TS-on-DIMM's ALERT# to EXTTS# pin on the PCH.

6.4.1.1.1.1 Memory Power and Thermal Throttling

Feature	Description
DDR PowerDown and idle counter	BIOS: BIOS is in control of DDR CKE mode and idle timer value. PCODE: pcode will manage the modes.
For LPDDR Only: DDR PowerDown and idle counter	For LPDDR Only: BIOS is in control of DDR CKE mode and idle timer value. PCODE: pcode will manage the modes.
REFRESH_2X_MODE	0- Disabled, 1- iMC enables 2xRef when Warm and Hot, 2- iMC enables 2xRef when Hot.
LPDDR Thermal Sensor	When enabled, MC uses MR4 to read LPDDR thermal sensors.
SelfRefresh Enable	Enable, disable (Enable= Def).
SelfRefresh IdleTimer	Self Refresh idle timer in nCK units: 0 = Auto (default), or value in range [512 .. 65535].
Throttler CKEMin Defeature	Enable or disable Throttler CKEMin Defeature.
Throttler CKEMin Timer	Timer value for CKEMin, range [255;0]. Required min of SC_ROUND_T + BYTE_LENGTH (4).
▶ **Dram Power Meter**	Dram Power Meter Configuration
▶ **Memory Thermal Reporting**	Memory Thermal Reporting Configuration
▶ **Memory RAPL**	Memory RAPL Configuration

6.4.1.1.1.1.1 DRAM Power Meter

Feature	Description
Use user provided power weights, scale factor, and channel power floor values	Enabled: User provided power weights, scale factor, and channel power floor values are used. Disabled: BIOS sets power weights, scale factor, and channel power floor values based on the DIMMs present in the system.

6.4.1.1.1.1.2 Memory Thermal Reporting

Feature	Description
Lock Thermal Management Registers	Enabled: lock several PCU registers related to DDR power/thermal management
Extern Therm Status	Enabled: The value from EXTTS is used; Disabled: Pcode ignores the EXTTS.
Closed Loop Therm Manage	Enabled: CLTM pcode algorithm will be used. Note: CLTM will precede OLTM.
Open Loop Therm Manage	Enabled: OLTM pcode algorithm will be used. Note: CLTM will precede OLTM.
Warm/Hot Threshold/Budget Ch0/1 Dimm0/1	range [255;0] = [31.875;0] in W for OLTM, [127.5;0] in C for CLTM.

6.4.1.1.1.1.3 Memory RAPL

Feature	Description
RAPL PL Lock	Enable = lock Rapl Limit register, Disable (Disable = Default)
RAPL PL 1/2 Enable	Enable = enable, Disable (Disable = Default)
RAPL PL 1/2 Power	range [0; 2^14-1] = [2047.875; 0] in W, (0 = Default)
RAPL PL 1/2 WindowX	Power PL 1/2 time window X value, (1/1024) * (1 + (x/4)) * (2^y) (0 = Default)
RAPL PL 1/2 WindowY	Power PL 1/2 time window Y value, (1/1024) * (1 + (x/4)) * (2^y) (0 = Default)

6.4.1.1.2 Memory Training Algorithms

Feature	Description
Early Command Training	Early Command Training.
SenseAmp Offset Training	SenseAmp Offset Training.
Early ReadMPR Timing Centering 2D	Enabled or disabled Early ReadMPR Timing.
Read MPR Training	Read MPR Training.
Receive Enable Training	Receive Enable Training.
Jedec Write Leveling	Jedec Write Leveling.
LPDDR4 Write DQ DQS Retraining	LPDDR4 Write DQ DQS Retraining.
Early Write Time Centering 2D	Early Write Time Centering 2D.
Early Read Time Centering 2D	Early Read Time Centering 2D.
Write Timing Centering 1D	Write Timing Centering 1D.
Write Voltage Centering 1D	Write Voltage Centering 1D.
Read Timing Centering 1D	Read Timing Centering 1D.
Dimm ODT Training	Dimm On-Die Termination Training.
DIMM RON Training	DIMM RON Training.
Write Drive Strength/Equalization 2D	Enabled or disabled Write Drive Strength/Equalization 2D.
Write Slew Rate Training	Write Slew Rate Training.
Read ODT Training	Read On-Die Termination Training.
Read Equalization Training	Read Equalization Training.
Read Amplifier Training	Read Amplifier Training.
Write Timing Centering 2D	Write Dq-Dqs Timing Centering 2D.
Read Timing Centering 2D	Read Dq-Dqs Timing Centering 2D.
Command Voltage Centering	Command Voltage Centering.
Write Voltage Centering 2D	Write Voltage Centering 2D.
Read Voltage Centering 2D	Read Voltage Centering 2D.
Late Command Training	Late Command Training.
Round Trip Latency	Round Trip Latency Training.
Turn Around Timing Training	Turn Around Timing Training.
Rank Margin Tool	Rank Margin Tool Training.
Margin Check Limit	Checks Margin to Limit to see if next boot memory needs to be retrained.
Memory Test	Memory Test Training.
DIMM SPD Alias Test	Test to determine if the SPD has been corrupted to cause memory aliasing.
Receive Enable Centering 1D	Receive Enable Centering 1D.
Retrain Margin Check	Retrain Margin Check.
Write Drive Strength Up/Dn independently	Write Drive Strength Up/Dn independently.
Command Drive Strength and Equalization	Command Drive Strength and Equalization.

Command Normalization	Command Normalization.
Early DQ Write Drive Strength and Equalization Training	Early DQ Write Drive Strength and Equalization Training.
Read Voltage Centering 1D	Read Voltage Centering 1D.
Dimm ODT CA Training	Dimm ODT CA Training.
Duty Cycle Correction	Duty Cycle Correction.
DQ DFE Training	DQ DFE Training.

6.4.1.2 Graphics Configuration

Feature	Description
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
SG Delay After Power Enable	Delay in milliseconds after power enable.
SG Delay After Hold Reset	Delay in milliseconds after hold reset.
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.
GOP Config Driver Enable	Enables or disables GOP Config Driver.

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_4X_SLOTX: PCI Express Root Port Settings	PCIE_4X_SLOTX: Control the PCI Express Root Port

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.

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.

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

6.6 Boot

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/UEFI.
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.
UEFI: 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.

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.

Getting Services

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