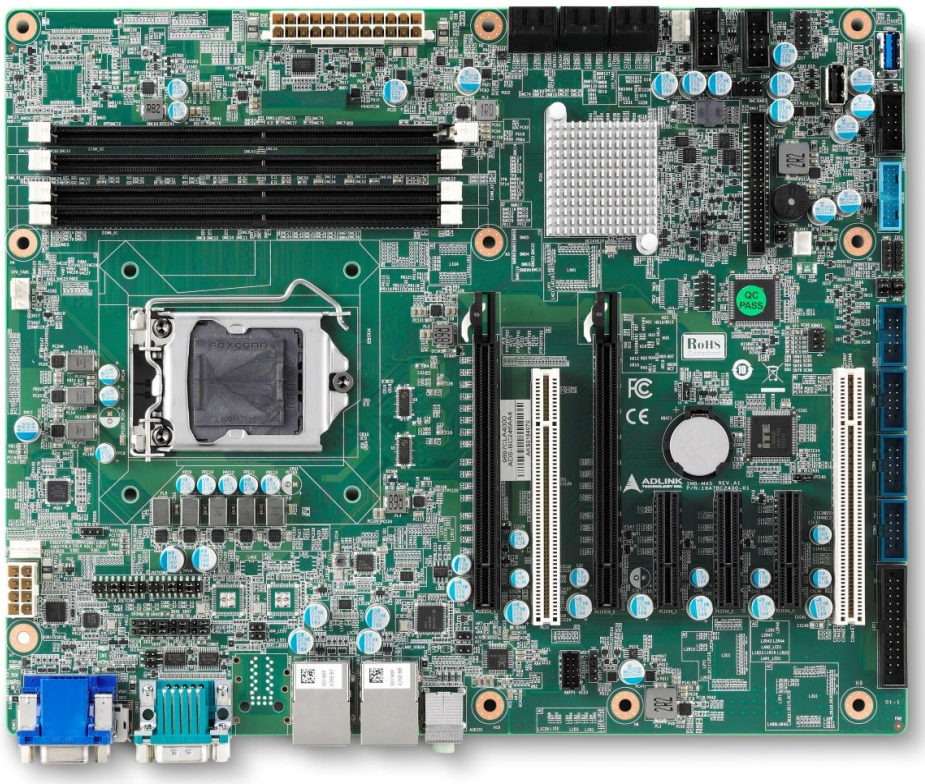
IMB-M45

User's Manual

ATX Motherboard with 8th/9th Gen Intel® Core™ i7/i5/i3 Processors or Xeon™ E Processors and Intel® C246 Chipset



Manual Rev.: 1.1

Revision Date: March 7, 2022

Part Number: 50M-00067-1010

Leading **EDGE COMPUTING**

Preface

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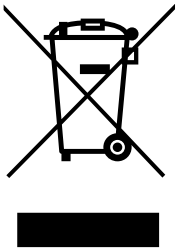

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Revision History

Revision	Description	Date	By
1.0	Initial release	2021-01-24	RA
1.1	Update COM connector pin definitions; update addresses	2022-03-07	CC

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1 Introduction

The IMB-M45 is an ATX motherboard supporting Intel® Xeon™ E workstation and 8th and 9th Generation Intel® Core™ i7/i5/i3 desktop processors, an Intel® C246 Chipset, and 5 PCIe expansion slots to provide a cost-competitive embedded computing solution. With high-speed data transfer interfaces such as PCIe 3.0/2.0, USB 3.1 Gen2, and SATA 6 Gb/s (SATA III), dual-channel DDR4 memory up to 128 GB in four DIMM slots for industrial automation applications, the IMB-M45 offers a significant competitive advantage for embedded computing applications. The rugged I/O design enhances system flexibility with robust device compatibility, durable connectivity, and extreme environment readiness.

1.1 Packing List

- IMB-M45 ATX motherboard
- Rear I/O shield

1.2 Optional Accessories

- 2-port USB 2.0 cable with bracket (Part Number: 30-25010-3010)
- 4-port USB 2.0 cable with bracket (Part Number: 30-25009-3000)
- 2-port USB 3.0 cable with bracket (Part Number: 30-25046-0100)
- 1-port LPT cable with bracket (Part Number: 30-25019-2000)
- 2-port COM cable with bracket (Part Number: 30-25003-3000)
- PS/2 keyboard/mouse cable with bracket from 6P pin-header (Part Number: 30-01019-2010)
- 1-port SATA cable (Part Number: 30-10057-7000)
- CPU cooler for <=65W and 35W CPU (Part Number: 32-20113-2000, including CPU cooler backplane)
- CPU cooler for >65W CPU (Part Number: 32-20831-0000-A0, Backplane Part Number: 32-50031-0000-A0)

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2 Specifications

2.1 Core System

- **CPU:** Intel® Xeon™ E or 8th/9th Generation Intel® Core™ i7/i5/i3 Desktop Processor, LGA1151 socket
  - Intel® Xeon™ E-2278GE, 3.3GHz, 16M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (8C/16T)
  - Intel® Xeon™ E-2226GE, 3.4GHz, 12M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (6C/6T)
  - Intel® Xeon™ E-2176G, 3.7GHz, 12M Cache, 80W TDP, LGA1151, DDR4 2666MHz support, (6C/12T)
  - Intel® Xeon™ E-2124G, 3.4GHz, 8M Cache, 71W TDP, LGA1151, DDR4 2666MHz support, (4C/4T)
  - Intel® Core™ i7-8700, 3.2GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support, (6C/12T)
  - Intel® Core™ i7-8700T, 2.4GHz 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support, (6C/12T)
  - Intel® Core™ i5-8500, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support, (6C/6T)
  - Intel® Core™ i5-8500T, 2.1GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support, (6C/6T)
  - Intel® Core™ i3-8100, 3.6GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2400MHz support, (4C/4T)
  - Intel® Core™ i3-8100T, 3.1GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2400MHz support, (4C/4T)
  - Intel® Pentium® G5400, 3.7GHz, 4M Cache, 58W TDP, LGA1151, DDR4 2400MHz support, (2C/4T)
  - Intel® Pentium® G5400T, 3.1GHz, 4M Cache, 35W TDP, LGA1151, DDR4 2400MHz support, (2C/4T)
  - Intel® Celeron® G4900, 3.1GHz, 2M Cache, 54W TDP, LGA1151, DDR4 2400MHz support, (2C/2T)
  - Intel® Celeron® G4900T, 2.9GHz, 2M Cache, 35W TDP, LGA1151, DDR4 2400MHz support, (2C/2T)
  - Intel® Core™ i7-9700E, 2.6GHz, 12M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
  - Intel® Core™ i7-9700TE, 1.8GHz, 12M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (8C/8T)
  - Intel® Core™ i5-9500E, 3.0GHz, 9M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
  - Intel® Core™ i5-9500TE, 2.2GHz, 9M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (6C/6T)
  - Intel® Core™ i3-9100E, 3.1GHz, 6M Cache, 65W TDP, LGA1151, DDR4 2666MHz support (4C/4T)
  - Intel® Core™ i3-9100TE, 2.2GHz, 6M Cache, 35W TDP, LGA1151, DDR4 2666MHz support (4C/4T)
- **Chipset:** Intel® C246 Chipset
- **Memory:** 4x 288-pin DDR4 ECC or NON ECC socket dual-channel DDR4 2400/2666 MHz, up to 128 GB (based on CPU)
- **BIOS:** AMI® UEFI BIOS, 256 Mb SPI Flash Memory

2.2 I/O Interface

- **Expansion slots:**
  - **Signals**
    - If PEG2 is occupied, PEG1 is PCIe x8 Gen3, PEG2 is PCIe x8 Gen3
    - If PEG2 is not occupied, PEG1 is PCIe x16 Gen3, and PEG2 has no signal
    - PCIe1: PCIe x4 Gen3, PCIe2: PCIe x4 Gen3, PCIe3: PCIe x4 Gen3
    - PCI1/ PCI2: PCI 2.2
  - **Physical Slots**
    - PEG1: PCIe x16 slot, PCI1: PCI slot, PEG2: PCIe x16 slot, PCIe1: PCIe x4 slot, PCIe2: PCIe x4 slot, PCIe3: PCIe x4 slot, PCI2: PCI slot

- **LAN:** LAN1: Intel® I219-LM via RJ45 connector (rear), LAN2: Intel® I210-AT via RJ45 connector (rear)
- **SATA:** 6x SATA 6.0 Gb/s connectors, Intel® software RAID 0/1/5/10 support
- **USB:** 4x USB 3.1 Gen2 connectors (rear), 2x USB 3.1 Gen1 pin headers, 6x USB 2.0 pin headers,1x USB 3.1 Gen1 (vertical Type-A connector), 1x USB 2.0 (vertical Type-A connector)
- **COM**: 2x RS-232/422/485 with auto flow control connector (rear), 4x RS-232 pin headers
- **Parallel Port:** 1x LPT pin header
- **PS/2 Combo Port:** 1x PS/2 keyboard/mouse pin header
- **DIO:** 2x 20-pin/2.0mm GPIO pin header: 16 in and 16 out, one ground pin and one power pin

2.3 Video

- **Graphics Engine:** Integrated Intel® HD Graphics series (based on CPU)
- **Interfaces:** 1x VGA connector (rear), resolution up to 1920 x 1200 at 60 Hz, 1x HDMI connector (rear) resolution up to 3840 x 2160 at 30 Hz, 1x DP connector (rear), resolution up to 3840 x 2160 at 60 Hz

2.4 Audio

- **Audio Codec:** Realtek® ALC892-CG or ALC888S
- **Interfaces**: 1x Mic-in and 1x Line-out connector (rear)

2.5 LAN

- **LAN1:** Intel® I219-LM via RJ45 connector (rear)
- **LAN2:** Intel® I210-AT via RJ45 connector (rear)

2.6 Temperatures

- **Operating Temperature:** 0°C to 60°C
- **Storage Temperature:** -40°C to 85°C

2.7 Humidity

- 60° C at 95% RH, non-condensing

2.8 Certificate (EMC)

- CE/FCC Class B

2.9 Form Factor

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

2.10 Operating Systems

- Microsoft® Windows® 10, 64-bit
- Microsoft® Windows® Server 2016, 64-bit
- OpenSUSE Leap 15.1, 64-bit
- Fedora 30, 64-bit
- Ubuntu 18.10, 64 bit

2.11 Functional Block Diagram

One PCIe Gen3 x16 or Two PCIe Gen3 x8

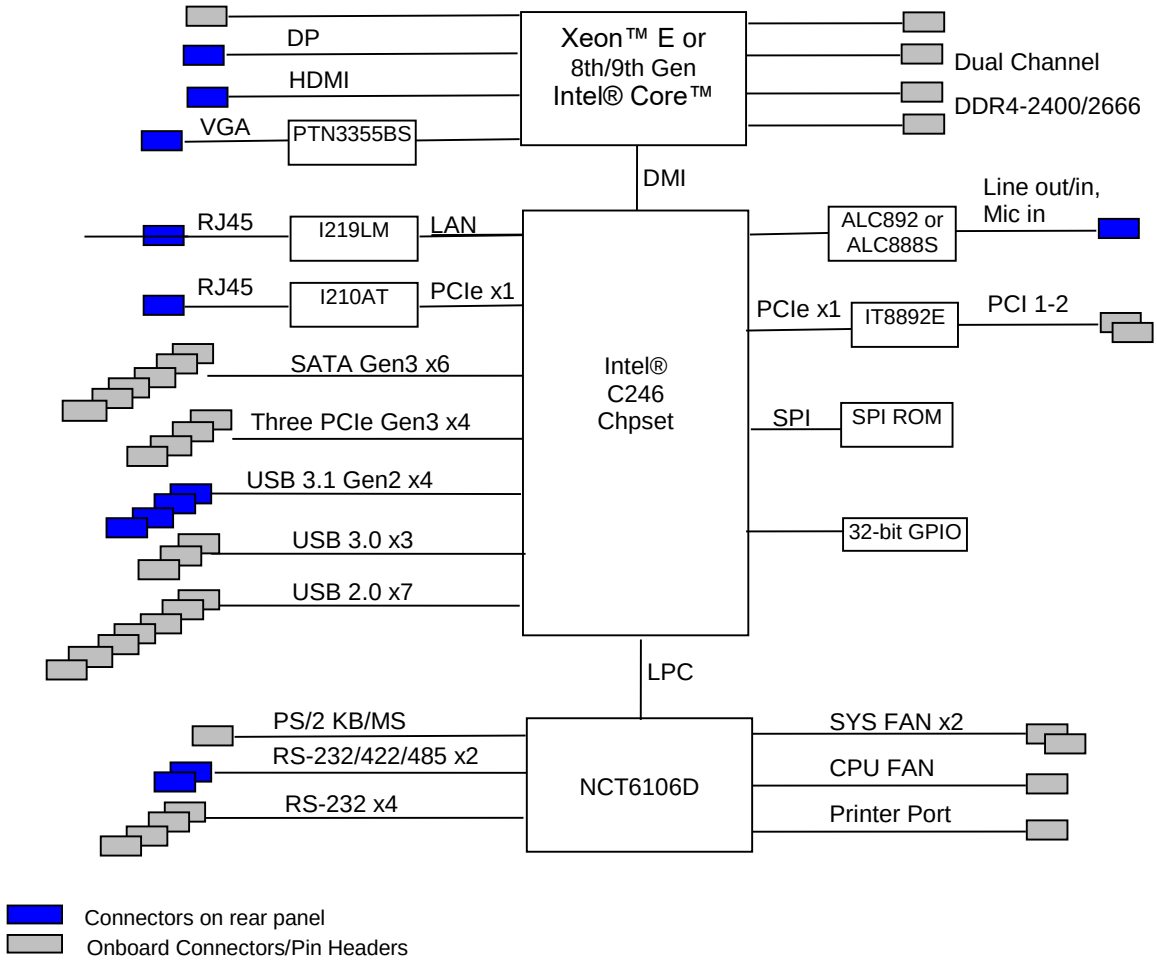


Figure 1: Functional Block Diagram

3 Mechanical Layout

3.1 Connector Locations

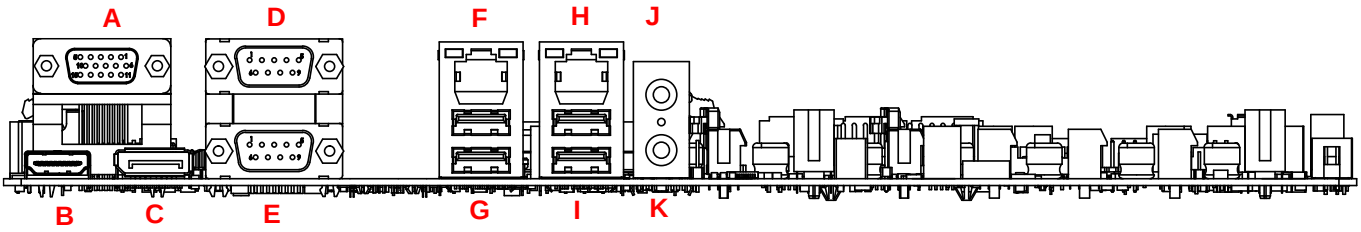


Figure 2: IO Panel Connector Locations

Table 1: IO Panel Connector Definitions

IO Panel Connectors	
Item	**Description**
A	VGA Port
B	HDMI Port
C	Display Port
D	COM1 RS-232/422/485, RI pin with Power Jumper Select
E	COM2 RS-232/422/485
F	LAN1
G	2x USB3.1 Gen2 port
H	LAN2
I	2x USB3.1 Gen2 port
J	Headphone out
K	Mic in

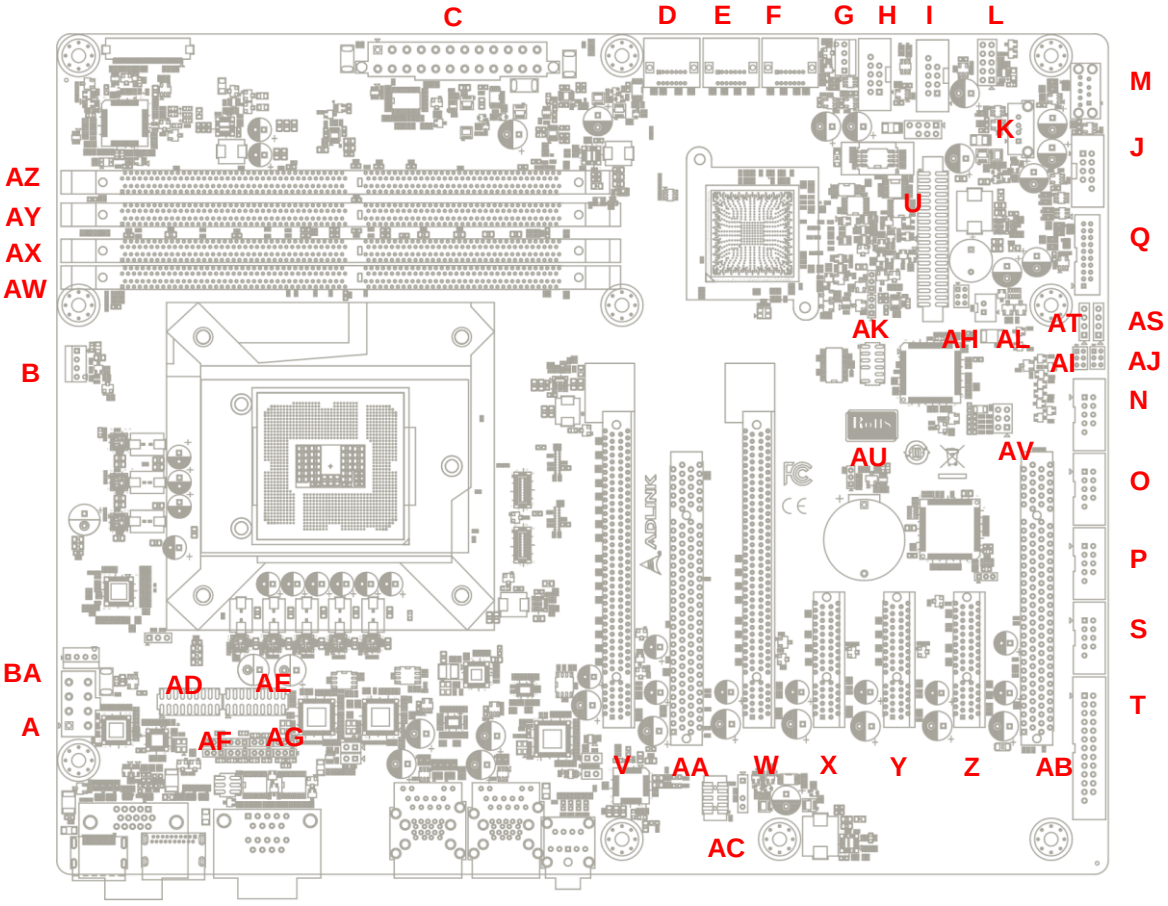


Figure 3: Onboard Connector Locations

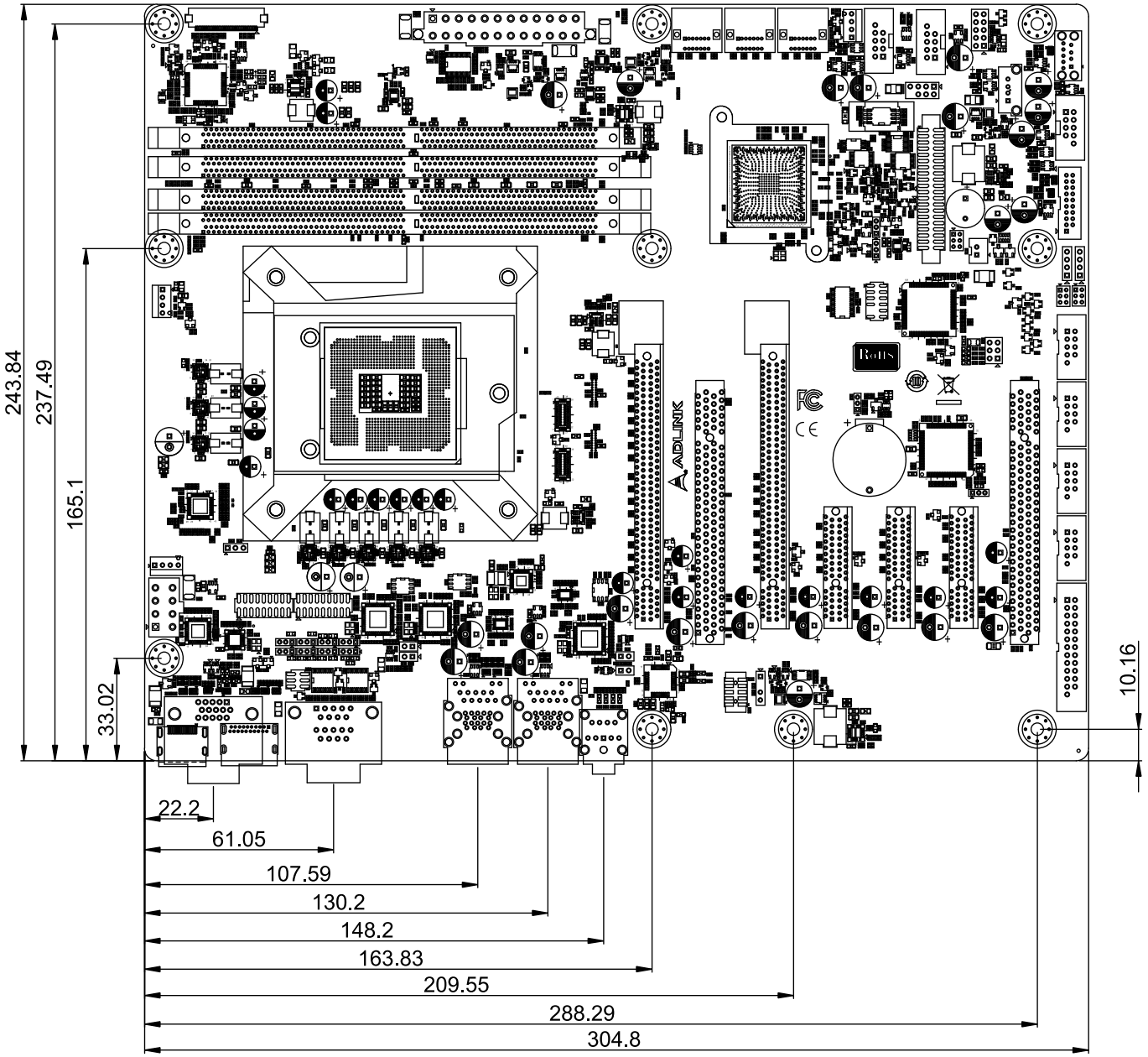
Table 2: Onboard Connector Definitions

Onboard Connectors		
Item	Description	Remarks
A	ATX POWER 8-pin	ATX12V1
B	CPU_FAN	CPU_FAN1
C	ATX POWER 24-pin	EATXPWR1
D	SATA12	SATA1 (TOP) and SATA2
E	SATA34	SATA3 (TOP) and SATA4
F	SATA56	SATA5 (TOP) and SATA6
G	SYS_FAN1	SYS_FAN1
H	USB1314	USB1314
I	USB1112	USB1112
J	USB910	USB910
K	USB2.0	USB8
L	Front Panel	F_PANEL1
M	USB3.0	USB7
N	COM6	COM6
O	COM5	COM5

Onboard Connectors		
P	COM4	COM4
Q	USB3.0 pin header	USB56
S	COM3	COM3
T	PRINT PORT	LPT1
U	GPIO	JDIO1
V	PEG1	PCIEx16_1
W	PEG2	PCIEx16_2
X	PCIEx4	PCIEx4_1
Y	PCIEx4	PCIEx4_2
Z	PCIEx4	PCIEx4_3
AA	PCI1	PCI1
AB	PCI2	PCI2
AC	FP_AUDIO1	AAFP1
AD	COM1 RS-232/422/485 select	JSETCOM1
AE	COM2 RS-232/422/485 select	JSETCOM2
AF	COM1 master/slave and terminal select	COM1_S1~4
AG	COM2 master/slave and terminal select	COM2_S1~4
AH	DIO no power/+5V/+12V select	JPW2
AI	SMBUS no power/+3.3V/+5V select	JPW1
AJ	I^2C no power/+3.3V/+5V select	JPW3
AK	AT/ATX mode header	JPSON1
AL	Case open alarm	JCASE1
AS	I^2C header	JI2C1
AT	SMBUS header	JSMB1
AU	Clear CMOS	JCMOS1
AV	KB/MS	KBMS1
AW	DIMM_A1	DIMM_A1
AX	DIMM_A2	DIMM_A2
AY	DIMM_B1	DIMM_B1
AZ	DIMM_B2	DIMM_B2
BA	SYS_FAN2	SYS_FAN2

3.2 Mechanical Dimensions

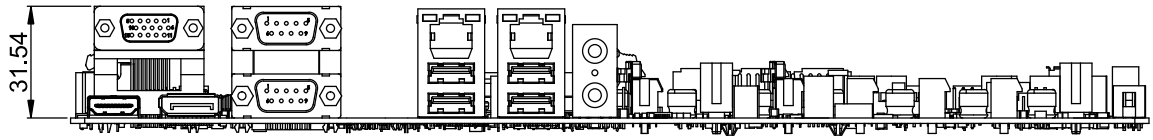
Top View



Dimensions: mm

Figure 4: Mechanical Dimensions

Side View



Dimensions: mm

Figure 5: Mechanical Dimensions - IO Panel

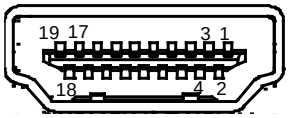
4 Connector Pinouts

See 3.1 Connector Locations on page 7 for connector locations.

4.1 Rear IO Connectors

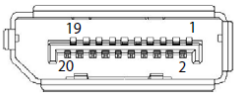
4.1.1 HDMI

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		



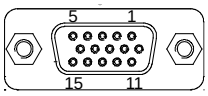
4.1.2 Display Port

Pin	Signal	Pin	Signal
1	CN_DDPx0+	2	GND
3	CN_DDPx0-	4	CN_DDPx1+
5	GND	6	CN_DDPx1-
7	CN_DDPx2+	8	GND
9	CN_DDPx2-	10	CN_DDPx3+
11	GND	12	CN_DDPx3-
13	CN_DDPx_AUX_SEL	14	CN_DDPx_CONFIG2
15	CN_DDPx_AUX+	16	GND
17	CN_DDPx_AUX-	18	CN_DDPx_HPD
19	GND	20	+V3.3_DDPx_PWR_CN



4.1.3 VGA Connector

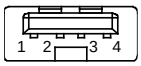
Pin	Signal	Pin	Signal
1	VGA_CON_RED	2	VGA_CON_GREEN
3	VGA_CON_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V_HDMI	10	GND
11	NC	12	VGA_DDCDAT
13	VGA_CON_HS	14	VGA_CON_VS
15	VGA_DDCCLK		



4.1.4 USB Connectors

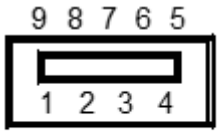
USB 3.1 Gen2, USB 3.0, USB 2.0

Pin	Signal
1	+5 VDC
2	USB D-
3	USB D+
4	GND



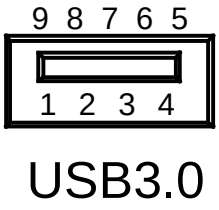
USB2.0

Pin	Signal
1	StdA_SSRX-
2	StdA_SSRX+
3	GND_DRAIN
4	StdA_SSTX-
5	StdA_SSTX+
6	VUSB
7	D-
8	D+
9	GND



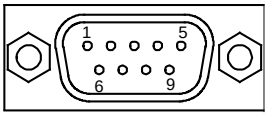
USB 3.1 Gen2

Pin	Signal
1	+5V_USB12
2	USB_CM_N1
3	USB_CM_P1
4	GND
5	USB3_RX_CM_N1
6	USB3_RX_CM_P1
7	GND
8	USB3_TX_CM_N1
9	USB3_TX_CM_P1



4.1.5 COM 1-2 Connector Stack (Top connector COM1, Bottom connector COM2)

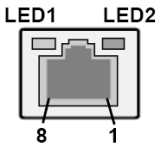
Pin	Signal		
	RS-232	RS-422	RS-485
1	DCD#	Tx-	Tx/Rx-
2	RxD	Tx+	Tx/Rx+
3	TxD	Rx+	N /A
4	DTR#	Rx-	N /A
5	GND	GND	GND
6	DSR#	N /A	N /A
7	RTS#	N /A	N /A
8	CTS#	N /A	N /A
9	RI#	N /A	N /A



4.1.6 Ethernet Connectors (LAN1, LAN2)

Dual 10/100/1000Mbit/s LAN Ethernet controllers based on Intel® i219LM/i210AT, support PXE and WOL over both LANs.In BIOS menu only LAN 1 have wake on LAN option

Pin	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	LAN_MDI0+
2	TX-	LAN_MDI0-
3	RX+	LAN_MDI1+
4	--	LAN_MDI2+
5	--	LAN_MDI2-
6	RX-	LAN_MDI1-
7	--	LAN_MDI3+
8	--	LAN_MDI3-

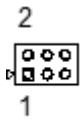


LED1 (Speed)		LED2 (Link/Activity)	
Status	Description	Status	Description
Off	10 Mb connection	Off	No Link
Green	100 Mb connection	Green	Linked
Orange	1 Gb connection	Blinking	Data Activity

4.2 Internal Connectors

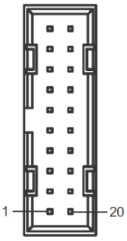
4.2.1 PS2 Combo connector

Pin	Signal
1	KB_DAT
2	KB_CLK
3	MS_DAT
4	MS_CLK
5	+5V_DUAL
6	GND



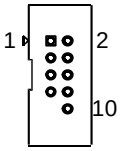
4.2.2 USB5,6

Pin	Signal	Pin	Signal
1	+5 VDC	2	Port1_RX-
3	Port1_RX+	4	GND
5	Port1_TX-	6	Port1_TX+
7	GND	8	Port1_D -
9	Port1_D +	10	NC
11	Port2_D +	12	Port2_D -
13	GND	14	Port2_TX+
15	Port2_TX-	16	GND
17	Port2_RX+	18	Port2_RX-
19	+5 VDC	20	KEY (no pin)



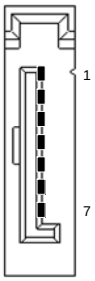
4.2.3 USB 9,10, USB11,12, USB13,14

Pin	Signal	Pin	Signal
1	VDC	2	VDC
3	D5 -	4	D6 -
5	D5 +	6	D6 +
7	Ground	8	Ground
9	KEY (no pin)	10	No Connect/ OC



4.2.4 SATA1, SATA2, SATA3, SATA4, SATA5, SATA6

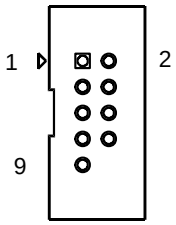
Pin	Signal	Description
1	GND	Ground
2	TXP	Transmit diff data – positive
3	TXN	Transmit diff data – negative
4	GND	Ground
5	RXN	Receive diff data – negative
6	RXP	Receive diff data – positive
7	GND	Ground



4.2.5 COM3, COM4, COM5, COM6

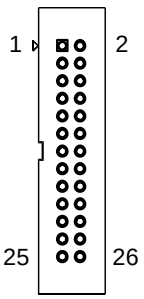
Serial Port is over-current protected.

Pin	Signal	Description	Pin	Signal	Description
1	DCD#	Data Carrier Detect	2	DSR#	Data Set Ready
3	RXD	Receive Data	4	RTS#	Request To Send
5	TXD#	Transmit Data	6	CTS#	Clear To Send
7	DTR#	Data Terminal Ready	8	RI#	Ring Indicator
9	GND	GND	10	KEY	No Pin



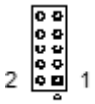
4.2.6 LPT1

Pin	Signal	Pin	Signal
1	STB#	2	AFD#
3	DATA0	4	ERR#
5	DATA1	6	INIT#
7	DATA2	8	SLIN#
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC



4.2.7 FP_AUDIO1

Pin	Signal	Pin	Signal
1	[Port 2] SENSE_RETURN_B	2	NC
3	Line-In Port2 Left	4	NC
5	Line-In Port2 Right	6	GND_A
7	MIC-In Port2 Left	8	SIDE OUT Right
9	MIC-In Port2 Right	10	SIDE OUT Left



4.2.8 JCASE1

Pin	Signal	Description
1	GND	Ground
2	SIO_CASEOPEN#	Case open signal

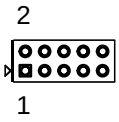
4.2.9 CPU_FAN1, SYS_FAN1, SYS_FAN2

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

The fan header supports +12 V at 1 A maximum

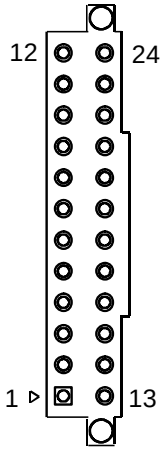
4.2.10 F_PANEL1

Pin	Signal	In/Out	Description	Pin	Signal	In/Out	Description
HDD Activity LED				**Power LED**			
1	HDD_LED+	Out	Hard disk LED pull-up to +3.3 V	2	PLED_PWR	Out	Power LED pull-up to +3.3_DUAL
3	HDD_LED#	Out	Hard disk active LED	4	SUPLED	Out	Front panel active LED
5	Ground		Ground	6	PANSWIN#	In	Power switch
7	FP_RESET#	In	Reset switch	8	Ground		Ground
9	NC			10	NC		



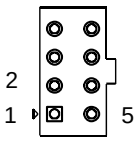
4.2.11 EATXPWR1

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



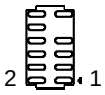
4.2.12 ATX12V1

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



4.2.13 JLPC1

Pin	Signal	Pin	Signal
1	NC	2	VCC3
3	LPC_AD3	4	PLTRST
5	LPC_AD1	6	LPC_AD2
7	LPC_FRAME#	8	LPC_AD0
9	KEY	10	GND
11	CLK33M	12	GND



4.2.14 SPI1

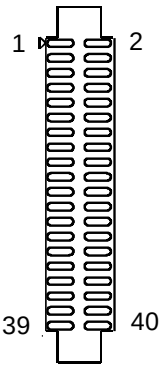
Pin	Signal	Pin	Signal
1	VCC3	2	GND
3	SPI_CS#	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	HOLD#	8	Key

4.2.15 JPSON1 (Default 2-3)

Pin	Signal	Description
1	PANSWIN#	Power switch signal
2	PSON_AT	AT mode signal
3	GND	

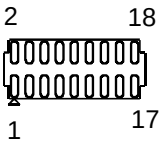
4.2.16 JDIO1 (TTL High:3.3V / TTL Low:0V)

Pin	Signal	Pin	Signal
1	DIO1	2	DIO17
3	DIO2	4	DIO18
5	DIO3	6	DIO19
7	DIO4	8	DIO20
9	DIO5	10	DIO21
11	DIO6	12	DIO22
13	DIO7	14	DIO23
15	DIO8	16	DIO24
17	DIO9	18	DIO25
19	DIO10	20	DIO26
21	DIO11	22	DIO27
23	DIO12	24	DIO28
25	DIO13	26	DIO29
27	DIO14	28	DIO30
29	DIO15	30	DIO31
31	DIO16	32	DIO32
33	NC	34	NC
35	NC	36	NC
37	NC	38	NC
39	GND	40	POWER



4.2.17 JSETCOM1, JSETCOM2

Pin	Signal	Pin	Signal
1	UART1_RXD	2	COM1_RXD485
3	UART1_RXD	4	COM1_RXD422
5	UART1_RXD	6	COM1_RXD232
7	COM1_DCD#	8	COM1_TX
9	COM1_CN_DCD#	10	COM1_CN_TX
11	TXD485#1	12	RXD485P1
13	COM1_RX	14	COM1_DTR#
15	COM1_CN_RX	16	COM1_CN_DTR#
17	TXD485P1	18	RXD485#1



4.2.18 JCMOS1 (Default 1-2)

Pin	Signal	Description
1	NC	
2	RTCRST#	Reset CMOS
3	GND	

4.2.19 JPW2 (Default: 3-4)

Pin	Signal	Pin	Signal
1	+5V	2	JDIO1. Pin40
3	NC	4	JDIO1. Pin40
5	+12V	6	JDIO1. Pin40

4.2.20 JPW3 (Default: 3-4)

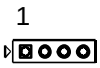
Pin	Signal	Pin	Signal
1	+5V	2	JI2C1 Pin1
3	NC	4	JI2C1 Pin1
5	+3.3V	6	JI2C1 Pin1

4.2.21 JPW1 (Default: 3-4)

Pin	Signal	Pin	Signal
1	+5V_DUAL	2	JSMB1 Pin1
3	NC	4	JSMB1 Pin1
5	+3.3V_DUAL	6	JSMB1 Pin1

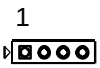
4.2.22 JSMB1

Pin	Signal	Description
1	NC	NC/+3.3V/+5V select
2	SMB_DATA	SMBUS data
3	SMB_CLK	SMBUS clock
4	GND	Ground



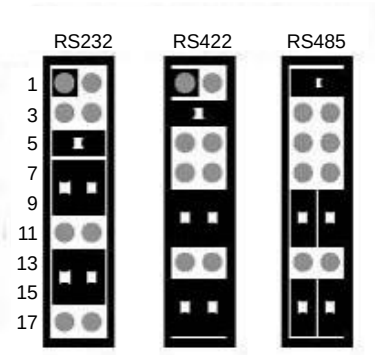
4.2.23 JI2C1

Pin	Signal	Description
1	NC	NC/+3.3V/+5V select
2	I2C_DATA	I2C data
3	I2C_CLK	I2C clock
4	GND	Ground



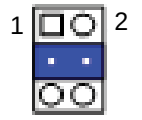
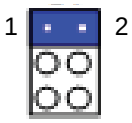
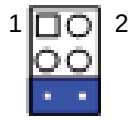
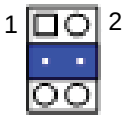
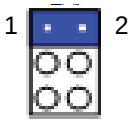
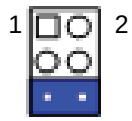
4.3 Jumper and Switch Settings

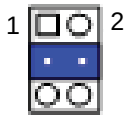
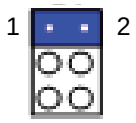
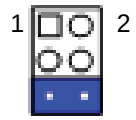
Table 3: Jumper and Switch Definitions

Jumper Block		
Item	Description	Remarks
JCMOS1	One 1x3 2.54mm pin header 1-2 (default) = Normal, 2-3 = Clear CMOS	Normal (Default) 1 Clear CMOS 1
JPSON1	One 1x3 2.54mm pin header 1-2 = AT Mode; 2-3 (default) = ATX mode	AT mode 1 ATX mode (Default) 1
JSETCOM1 JSETCOM2	One 2x9 2.0mm pin header RS232: 5-6, 7-9, 8-10, 13-15, 14-16 (default) RS422: 3-4, 9-11, 10-12, 15-17, 16-18 RS485: 1-2, 9-11, 10-12, 15-17, 16-18	

Jumper Block		
COM1_S1~S4 master/slave and terminal selection		(Default)
COM2_S1~S4 master/slave and terminal selection		(Default)

	S1	S2	S3	S4
RS-232	2-3	2-3	2-3	2-3
RS-485	1-2	1-2	2-3	2-3
RS-422	1-2	1-2	1-2	1-2

Jumper Block		
JPW2	One 2x3 2.0mm pin header NC (default)/+5V/+12V	NC (Default)  +5V  +12V 
JPW1	One 2X3 2.0mm pin header NC (default)/+5V/+3.3V	NC (Default)  +5V  +3.3V 

Jumper Block		
JPW3	One 2x3 2.0mm pin header NC (default)/+5V/+3.3V	NC (Default)  +5V  +3.3V 

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5 Driver Installation

Download the requisite drivers for your system from the IMB-M45 product page at:

https://www.adlinktech.com/Products/Industrial_Motherboards_SBCs/ATXMotherboards/IMB-M45

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6 System Resources

6.1 System Memory Map

Table 4: System Memory Map

Address Range	Address Range	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFF	1 MB	MSI Interrupts
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFF	1 MB	ISA Hole
1MB -15MB	100000 - EFFFFF	14MB	Main Memory
0K –1MB	00000 – FFFFFF	1MB	DOS Compatibility Memory

6.2 I/O Map

Table 5: IO Map

Hex Range	Device
0000-0CF7	PCI Express Root Complex
0D00-FFFF	PCI Express Root Complex
0020-0021	Programmable interrupt controller
0024-0025	Programmable interrupt controller
0028-0029	Programmable interrupt controller
002C-002D	Programmable interrupt controller
0030-0031	Programmable interrupt controller
0034-0035	Programmable interrupt controller
0038-0039	Programmable interrupt controller
003C-003D	Programmable interrupt controller
00A0-00A1	Programmable interrupt controller
00A4-00A5	Programmable interrupt controller
00A8-00A9	Programmable interrupt controller
00AC-00AD	Programmable interrupt controller
00B0-00B1	Programmable interrupt controller
00B4-00B5	Programmable interrupt controller
00B8-00B9	Programmable interrupt controller
00BC-00BD	Programmable interrupt controller
04D0-04D1	Programmable interrupt controller
04D0-04D1	Programmable interrupt controller
002E-002F	Motherboard resources
004E-004F	Motherboard resources
0061-0061	Motherboard resources

Hex Range	Device
0063-0063	Motherboard resources
0065-0065	Motherboard resources
0067-0067	Motherboard resources
0070-0070	Motherboard resources
0080-0080	Motherboard resources
0092-0092	Motherboard resources
00B2-00B3	Motherboard resources
0680-069F	Motherboard resources
FFFF-FFFF	Motherboard resources
1800-18FE	Motherboard resources
164E-164F	Motherboard resources
0040-0043	System timer
0050-0053	System timer
0070-0077	System CMOS/real time clock
00F0-00F0	Numeric data processor
02E0-02E7	COM5
02E8-02EF	COM4
02F8-02FF	COM2
0378-037F	Printer Port
03E0-03E7	COM6
03E8-03EF	COM3
03F8-03FF	COM1
E000-EFFF	Chipset PCI Express Root Port
E000-EFFF	PCI-to-PCI Bridge
F000-F03F	Intel HD Graphic 630
F040-F05F	SMBUS
F090-F097	Standard SATA AHCI Controller
F080-F083	Standard SATA AHCI Controller
F060-F07F	Standard SATA AHCI Controller

6.3 Interrupt Request (IRQ) Lines

6.3.1 IRQ Lines PIC Mode

Table 6: IRQ Lines PIC Mode

IRQ#	Device
0	System timer
3	COM2
4	COM1
5	COM3, COM4
8	System CMOS/real time clock
10	COM5, COM6
13	Numeric data processor
14	Intel Serial IO GPIO Host Controller
15	Intel Chipset Smbus
16	HD Audio Controller

Note: These IRQs can be used for PCI devices when onboard device is disabled.

6.3.2 IRQ Lines APIC Mode

Table 7 IRQ Lines APIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	System Counter	N/A	No
1	N/A	N/A	
2	N/A	N/A	
3	Serial Port 2 (COM2)	IRQ3 via SERIRQ / PIRQ	Note (1)
4	Serial Port 1 (COM1)	IRQ4 via SERIRQ / PIRQ	Note (1)
5	Serial Port3 (COM3)	IRQ5 via SERIRQ / PIRQ	Note (1)
5	Serial Port4 (COM4)	IRQ5 via SERIRQ / PIRQ	Note (1)
7	N/A	N/A	
8	Real-time clock	N/A	No
9	N/A	N/A	
10	Serial Port5 (COM5)	IRQ10 via SERIRQ / PIRQ	Note (1)
10	Serial Port6 (COM6)	IRQ10 via SERIRQ / PIRQ	Note (1)
12	N/A	N/A	
13	Math Processor	N/A	Note (1)
14	Intel IO GPIO Host Controller	N/A	Note (1)
16	High Definition Audio Controller	N/A	
54-511	Microsoft ACPI-Compliant System	N/A	Note (1)

Note: These IRQs can be used for PCI devices when onboard device is disabled.

6.4 PCI Features

6.4.1 PCI Configuration Space Map

Table 8 PCI Configuration Space Map

Bus Number	Device Number	Function Number	Routing	Description
00h	00h	00h	N/A	Intel Host Bridge
00h	02h	00h	Internal	Intel VGA Controller
00h	14h	00h	Internal	Intel USB 3.0 XHCI
00h	14h	02h	Internal	Intel Data acquisition/signal process
00h	16h	00h	Internal	Intel Communication device
00h	17h	00h	Internal	Intel AHCI 1.0 controller
00h	1Ch	00h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Ch	01h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Ch	02h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Ch	03h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Dh	00h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Dh	05h	Internal	Intel PCI-to-PCI bridge PCIe
00h	1Fh	00h	Internal	Intel ISA bridge
00h	1Fh	03h	Internal	Intel Multimedia
00h	1Fh	04h	Internal	Intel SMBU
00h	1Fh	05h	Internal	Intel Controller
00h	1Fh	06h	Internal	Intel Ethernet Controller
02h	00h	00h	Internal	ITE PCI toPCI Bridge
04h	00h	00h	Internal	Intel Ethernet Controller PCIe
05h	00h	00h	Internal	Intel Ethernet Controller PCIe
07h	00h	00h	Internal	Intel Ethernet Controller PCIe

Note: The bus number change if the PEG/PCIE port has a device.

6.4.2

Table 9 PCI Interrupt Routing Map

INT Line	LpcBridge	High Definition Audio	SMBus	PCIE Root Port #2 (IT8892)	PCIE Root Port #3 (LAN3)	PCIE Root Port #4 (LAN4)
Int0	INTA:16	INTA:16	INTA:16	INTB:17	INTC:18	INTD:19
Int1	INTB:17			INTC:18	INTD:19	INTA:16
Int2	INTC:18			INTD:19	INTA:16	INTB:17
Int3	INTD:19			INTA:16	INTB:17	INTC:18

INT Line	PCI Slot 1	PCI Slot 2	PCIE Root Port #5 (PCIex4)	PCIE Root Port #9 (PCIex4)	PCIE Root Port #13 (LAN1)	PCIE Root Port #14 (LAN2)
Int0	INTA:17	INTA:18	INTA:16	INTA:16	INTA:16	INTB:17
Int1	INTB:18	INTB:19	INTB:17	INTB:17	INTB:17	INTC:18
Int2	INTC:19	INTC:16	INTC:18	INTC:18	INTC:18	INTD:19
Int3	INTD:16	INTD:17	INTD:19	INTD:19	INTD:19	INTA:16

INT Line	PCIE Root Port #21 (PCIex4)
Int0	INTA:16
Int1	INTB:17
Int2	INTC:18
Int3	INTD:19

6.5 SMBus Slave Addresses

Table 10 SMBus Slave Addresses

Device	Address
DIMM_A1	A0h
DIMM_A2	A2h
DIMM_B1	A4h
DIMM_B2	A6h

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7 BIOS Setup

7.1 Menu Structure

This section presents the primary menus of the BIOS 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. The default options are presented in **bold**, and the function of each setting is described in the right hand column of the table.

Main	**Advanced**	**Chipset**
- BIOS Information - System Date - System Time	- CPU Configuration ► - PCH-FW Configuration ► - ACPI Settings ► - NCT6106D Super IO Configuration ► - NCT6106D HW Monitor ► - S5 RTC Wake Settings ► - Serial Port Console Redirection ► - Intel TXT Information ► - USB Configuration ► - CSM Configuration ► - NVME Configuration ► - Network Stack Configuration ►	- System Agent (SA) Configuration ► - PCH-IO Configuration ►
Security	**Boot**	**Save & Exit**
- Administrator Password Description - User Password	- Boot Configuration ► - Driver Option Priorities ► - Fixed Boot Oder Priorities ►	- Save & Exit ► - Default Options ► - Boot Override ►

Notes:

► indicates a submenu
Gray text indicates info only

7.2 Main Menu

The Main Menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below the screen shot of this menu for details of the submenus and settings.

7.2.1 Main > BIOS Information

Feature	Options	Description
BIOS Vendor	American Megatrends	
Core Version	x.xx	
Compliancy	UEFI x.x; PI x.x	
Project Version	IMB-M45 x.xx.xx	
Build Date and Time	mm/dd/yyyy hh:mm:ss	
Access Level	Administrator	
Memory Information		
Total Memory	xxxx MB	
Memory Frequency	xxxx MHz	
Power Type	[ATX Mode]	
System Date	mm/dd/yyyy	Sets the system date. Use <Tab> to switch between elements.
System Time	hh:mm:ss	Sets the system time. Use <Tab> to switch between elements.

7.3 Advanced Menu

This menu contains the settings for most of the user interfaces in the system.

7.3.1 Advanced > CPU Configuration

Feature	Options	Description
Type	Info Only	CPU type
ID	Info Only	CPU ID
Speed	Info Only	CPU Speed (xxxx MHz)
L1 Data Cache	Info Only	CPU L1 Data Cache
L1 Instruction Cache	Info Only	CPU L1 Instruction Cache
L2 Cache	Info Only	CPU L2 Cache
L3 Cache	Info Only	CPU L3 Cache
L4 Cache	Info Only	CPU L4 Cache
VMX	Info Only	CPU Virtual Machine Extension
SMX/TXT	Info Only	CPU Safer Mode Extension / Trusted Execution Technology
C6DRAM	Disabled **Enabled**	Enables or Disables moving of DRAM content to PRM memory wheb CPU is in C6 state
SW Guard Extensions (SGX)	**Software Controlled** Enabled Disabled	Sets Software Guard Extensions (SGX)
Select Owner EPOCH input type	**No Change in Owner ECOPHs** Change to NewRandom Owner ECOPHs Manual User Defined Owner OPCHs	There are three Owner EPOCH modes (Each EPOCH is 64bit):
Intel (VMX) Virtualization Technology	Disabled **Enabled**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	**All**/1/2/3/4/5	Number of cores to enable in each processor package.
Hyper-Threading	Disabled **Enabled**	Enables or Disables Hyper-Threading
Turbo Mode	Disabled **Enabled**	Enables or Disables Turbo Mode
Intel Trusted Execution Technology	Disabled **Enabled**	Enables or Disables utilization of additional hardware capabilities provided by Intel Trusted Execution Technology.
Intel(R) SpeedStep(tm)	Disabled **Enabled**	Allows more than two frequency ranges to be supported.
C states	**Disabled** Enabled	Enables or Disables CPU Power Management. Allows CPU to go to C States when it's not 100% utilized.
Enhanced C-state	**Disabled** Enabled	Enables or Disables C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

Feature	Options	Description
Package C state limit	**Auto** CPU Default C10 C9 C8 C7s C7 C6 C3 C2 C0/C1	Maximum Package C State Limit Setting. CPU Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C State Limit.

7.3.2 Advanced > PCH-FW Configuration

Feature	Options	Description
ME Firmware Version	Info Only	PCH Firmware Version
ME Firmware Mode	Info Only	PCH Firmware Mode
ME Firmware SKU	Info Only	PCH Firmware SKU
ME Firmware Status 1	Info Only	PCH Firmware Status
ME Firmware Status 2	Info Only	PCH Firmware Status
ME State	Disabled **Enabled**	When Disabled ME will be put into ME Temporarily Disabled Mode.
AMT BIOS Features	**Enabled**	
AMT Configuration		
ME Unlock Control	**Lock**	

7.3.3 Advanced > ACPI Settings

Feature	Options	Description
S3 Video Repost	**Disabled** Enabled	Enables or Disables S3 Video Repost
PCIE# Wake from S5	**Disabled** Enabled	Enables or Disables PCIE to wake the system from S5.
Enable Hibernation	Disabled **Enabled**	Enables or Disables Hibernation.
ACPI Sleep State	Suspend Disabled **S3 only** (Suspend to RAM)	Enables or Disables ACPI Sleep State
Wake on Ring	**Disabled** Enabled	Enables or Disables wake on ring function under ACPI S3/S4/S5.

7.3.4 Advanced > NCT6106D SuperIO Configuration

Feature	Options	Description
Serial Port 1 Configuration►	Submenu	Sets Parameters of Serial Port 1 (COMA)
Serial Port 2 Configuration►	Submenu	Sets Parameters of Serial Port 2 (COMB)
Serial Port 3 Configuration►	Submenu	Sets Parameters of Serial Port 3 (COMC)
Serial Port 4 Configuration►	Submenu	Sets Parameters of Serial Port 4 (COMD)
Serial Port 5 Configuration►	Submenu	Sets Parameters of Serial Port 5 (COME)
Serial Port 6 Configuration►	Submenu	Sets Parameters of Serial Port 6 (COMF)
Parallel Port Configuration►	Submenu	Sets Parameters of Parallel Port (LPT/LPTE)
WatchDog Count Mode	**Second** Minute	WatchDog Count Mode Selection
WatchDog TimeOut Value	**0**	WatchDog Timeout Value, 0 = disabled.
Chassis Opened Warning	**Disabled** Enabled	Enables or Disables chassis intrusion detection. Note: If chassis tamper occurs, you can only enter setup to clear this error.
ErP/EuP S5 Support	**Disabled** Enabled	Enables or Disables ErP/EuP S5 support

7.3.5 Advanced > NCT6106D SuperIO Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM)
Device Settings	IO=3F8h IRQ=4	Serial Port device settings
Change Settings	**Auto**	Selects optimal setting for Super IO Device
RS485 Auto Flow	**Disabled** Enabled	Enables or Disables RS485 Auto Flow Control Function (Make sure to set RS485 on the COM1 jumper header if this setting is enabled.)

7.3.6 Advanced > NCT6106D SuperIO Configuration > Serial Port 2 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables or Disables Serial Port (COM)
Device Settings	IO=2F8h IRQ=3	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device
RS485 Auto Flow	**Disabled** Enabled	Enables or Disables RS485 Auto Flow Control Function (Make sure to set RS485 on the COM2 jumper header if this setting is enabled.)

7.3.7 Advanced > NCT6106D SuperIO Configuration > Serial Port 3 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables or Disables Serial Port (COM)
Device Settings	IO=3E8h IRQ=5	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device

7.3.8 Advanced > NCT6106D SuperIO Configuration > Serial Port 4 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables or Disables Serial Port (COM)
Device Settings	IO=2E8h; IRQ=5	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device

7.3.9 Advanced > NCT6106D SuperIO Configuration > Serial Port 5 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables or Disables Serial Port (COM)
Device Settings	IO=2E0h; IRQ=10	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device

7.3.10 Advanced > NCT6106D SuperIO Configuration > Serial Port 6 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables or Disables Serial Port(COM)
Device Settings	IO=3E0h; IRQ=10	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device

7.3.11 Advanced > NCT6106D SuperIO Configuration > Parallel Port Configuration

Parallel Port	Options	Note
Parallel Port	Disabled **Enabled**	Enables or Disables Parallel Port (LPT/LPTE)
Device Settings	Info Only	Serial Port device settings
Change Settings	**Auto**	Selects optimal settings for Super IO Device
Device Mode	**STD Printer Mode** SPP Mode EPP-1.9 and SPP Mode EPP-1.7 and SPP Mode ECP mode ECP and EPP 1.9 mode ECP and EPP 1.7 mode	Changes the Printer Port mode.

7.3.12 Advanced > NCT6106D HW Monitor

Feature	Options	Description
Smart Fan	Info Only	Smart Fan Function Page
System temperature	Info Only	xx C
CPU temperature (PECI)	Info Only	xx C
SYS_Fan1 Speed	Info Only	xx RPM
CPU_Fan1 Speed	Info Only	xx RPM
SYS_Fan2 Speed	Info Only	xx RPM
VCORE	Info Only	x.xxxV
+12V	Info Only	x.xxxV
+5V	Info Only	x.xxxV
5V_Dual	Info Only	x.xxxV
AVCC	Info Only	x.xxxV
3VSB	Info Only	x.xxxV
3VCC	Info Only	x.xxxV
VBAT	Info Only	x.xxxV

7.3.13 Advanced > Smart Fan

Feature	Options	Description
Smart Fan Function	Disabled **Enabled**	Enables or Disables Smart Fan Function
Smart Fan Mode Configuration►	Submenu	Smart Fan Mode Configuration

7.3.14 Advanced > Smart Fan > Smart Fan Mode Configuration – Manual Mode

Feature	Options	Description
SYS Smart Fan1 Mode	**Manual Mode** Thermal Cruise Mode	SYS Smart Fan1 Mode
SYS expect PWM Output/DC Voltage	**255**	System FAN1 expect PWM Output/DC Voltage
CPU Smart Fan Mode	**Manual Mode** Thermal Cruise Mode	CPU Smart Fan Mode
CPU expect PWM Output/DC Voltage	**255**	CPU FAN expect PWM Output/DC Voltage
SYS Smart Fan2 Mode	**Manual Mode** Thermal Cruise Mode	SYS Smart Fan2 Mode
SYS expect PWM Output/DC Voltage	**255**	CHA FAN2 expect PWM Output/DC Voltage

7.3.15 Advanced > Smart Fan > Smart Fan Mode Configuration – Thermal Cruise Mode

Feature	Options	Description
xxxFAN Target Temperature	**50**	FAN Target Temperature
xxxFAN Tolerance of Target Temp	**5**	FAN Tolerance of Target Temperature
xxxFAN Step Up Time	**10**	FAN step up time, 1 step = 0.1 second
xxxFAN Step Down Time	**10**	FAN step down time, 1 step = 0.1 second
xxxFAN Start-Up Value	**127**	FAN Start-Up Value
xxxFAN Stop Value	**127**	FAN Stop Value

7.3.16 Advanced > S5 RTC Wake Setting

Feature	Options	Description
Wake System From S5	**Disabled** Enabled	Enables or Disables System wake on alarm event.

7.3.17 Advanced > Serial Port Console Redirection

Feature	Options	Description
COM1		
Console Redirection	**Disabled** Enabled	Enables or Disables Console Redirection
Console Redirection Settings►	Submenu	Show when Console Redirection is enabled

7.3.18 Advanced > Serial Port Console Redirection > Console Redirection Settings

Feature	Options	Description
Terminal Type	VY100 VT100+ VT-UTF8 **ANSI**	Type Select
Bits per second	9600 19200 38400 57600 **115200**	Select serial port transmission speed.
Data Bits	7 **8**	Data Bits
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission error.
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet.
Flow Control	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enables or Disables VT-UTF8 Combo Key
Recorder Mode	**Disabled** Enabled	With this mode enabled, only a test will be sent.
Resolution 100x31	**Disabled** Enabled	Enables or Disables extended terminal resolution.
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

7.3.19 Advanced > Intel TXT Information

Feature	Options	Description
Chipset	Info Only	
BIOS Acm	Info Only	
Chipset Txt	Info Only	
CPU Txt	Info Only	
Error Code	Info Only	
Class Code	Info Only	
Major Code	Info Only	
Minor Code	Info Only	

7.3.20 Advanced > Network Stack Configuration

Feature	Options	Note
Network Stack	**Disabled** Enabled	Enables or Disables UEFI Network Stack.

7.3.21 Advanced > CSM Configuration

Feature	Options	Description
CSM Support	Disabled **Enabled**	Enables or Disables CSM Support
CSM16 Module Version		
Option ROM execution		
Network	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI device	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy other device OpROM.

7.3.22 Advanced > NVMe Configuration

Feature	Options	Description
NVMe controller and Drive information	Info Only	NVMe Device Options Settings
Show device	Info Only	

7.3.23 Advanced > USB Configuration

Feature	Options	Description
USB Devices	Show current USB devices	
Legacy USB Support	**Enabled** Disabled Auto	Enables or Disables Legacy USB support.
XHCI Hand-Off	Disabled **Enabled**	This is a workaround for OSes without XHCI hand-off support.
USB Mass Storage Driver Support	Disabled **Enabled**	Enables or Disables USB Mass Storage Driver Support

7.4 Chipset Menu

This menu contains settings for other user interfaces in the system.

7.4.1 Chipset > System Agent (SA) Configuration

Feature	Options	Description
SA PCIe Code Version	Info Only	
VT-d Capability	Info Only	
Memory Configuration►	Submenu	Memory Configuration Parameters
Graphics Configuration►	Submenu	Graphics Configuration
PEG Port Configuration►	Submenu	PEG Port Options
VT-d	Disabled **Enabled**	VT-d capability

7.4.2 Chipset > System Agent (SA) Configuration > Memory Configuration

Feature	Options	Description
Memory RC Version	Info Only	
Memory Frequency	Info Only	
Memory Timings	Info Only	
DIMM_A1	Info Only	
DIMM_A2	Info Only	
DIMM_B1	Info Only	
DIMM_B2	Info Only	
Max TOULUD	**Dynamic**	Maximum value of TOULUD

7.4.3 Chipset > System Agent (SA) Configuration > Graphics Configuration

Feature	Options	Description
Primary Display	**Auto** IGFX PEG PCIE	Selects which of IGFX/PEG/PCIE Graphics device should be Primary Display
Internal Graphics	**Auto** Disabled Enabled	Keeps IGFX enabled based on the setup options
PSMI Support	**Disabled** Enabled	Enables or Disables PSMI Support
DVMT Pre-Allocated	0 **32** 64 4 8 12 16 20 24 28 32_F7 36 40 44 48 52 56 60 M	Selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device
DVMT Total Gfx Mem	**256M** 128M MAX	Selects DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.

7.4.4 Chipset > System Agent (SA) Configuration > PEG port Configuration

Feature	Options	Description
PEG 0:1:0		
Enable Root port	Disabled Enabled **Auto**	Enables or Disables the Root Port
Max Link Speed	**Auto** Gen1 Gen2 Gen3	Configures PEG 0:1:0 Max Speed
PEG 0:1:1		
Enable Root port	Disabled Enabled **Auto**	Enables or Disables the Root Port
Max Link Speed	**Auto** Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed
Detect Non-Compliance Device	**Disabled** Enabled	Detect Non-Compliance PCI Express Device in PEG
VT-d	Disabled **Enabled**	Enables or Disables VT-d capability

7.4.5 Chipset > PCH-IO Configuration

Feature	Options	Description
PCI Express Configuration►	Submenu	PCI Express Configuration settings
SATA And RST Configuration►	Submenu	SATA Device Options Settings
USB Configuration►	Submenu	USB Configuration settings
HD Audio Configuration►	Submenu	HD Audio Subsystem Configuration settings
Serial IO Configuration►	Submenu	Serial IO Configuration settings
LAN1 Controller	Disabled **Enabled**	Enables or Disables onboard NIC.
LAN Option-ROM	**Disabled** Enabled	Show if Network to Legacy
Wake on Lan Enable	Disabled **Enabled**	Enables or Disables integrated LAN to wake the system.
LAN2 Controller	Disabled **Enabled**	Enables or Disables onboard Lan2
LAN2 PXE OpROM	**Disabled** Enabled	Shows if Network to Legacy
LAN3 Controller	Disabled **Enabled**	Enables or Disables onboard Lan3
LAN3 PXE Option	**Disabled** Enabled	Shows if Network to Legacy
LAN4 Controller	Disabled **Enabled**	Enables or Disables onboard Lan4
LAN4 PXE Option	**Disabled** Enabled	Shows if Network to Legacy
Restore AC Power Loss	Power On/ **Power off/** Last State	Specifies what state to go to when power is reapplied after a power failure (G3 state)
GPIO Group Control	**Disabled** Enabled	Configures the digital GPIO pins

7.4.6 Chipset > PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
PCI Express Configuration	Info only	
PCI Express Root Port 3(LAN3)	N/A	
PCI Express Root Port 4(LAN4)	N/A	
PCIE Port 2 is assigned to IT8892	N/A	
PCI Express Root Port 5(x4, slot 4)►	Submenu	PCI Express Root Port 5 Settings.
PCI Express Root Port 9(x4, slot 5)►	Submenu	PCI Express Root Port 9 Settings.
PCI Express Root Port 13(LAN1)	N/A	
PCI Express Root Port 14(LAN2)	N/A	
PCI Express Root Port 21(x4, slot 6)►	Submenu	PCI Express Root Port 21 Settings.

7.4.7 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port 5/9/21

Feature	Options	Description
PCI Express Root Port 5	Disabled **Enabled**	Controls the PCI Express Root Port.
ASPM Support	Auto L0sL1 L1 L0s **Disabled**	Sets the ASPM Level: Force L0s – Force all link to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM
PCIe Speed	**Auto** Gen1 Gen2 Gen3	Configures PCIe Speed
Detect Non-Compliance Device	**Disabled** Enabled	Detects Non-Compliance PCI Express Device. If enabled, it will take more time at POST time.

7.4.8 Chipset > PCH-IO Configuration > SATA Configuration

SATA Configuration	Options	Note
SATA Controller(s)	Disabled **Enabled**	Enables or Disables SATA Device
SATA Mode	**AHCI** Intel RST Premium with Intel Optane System Acceleration	Determines how SATA controllers operate.
Serial ATA Port 1	Show device	
Software Preserve	Information	
Port 1	Disabled **Enabled**	Enables or Disables SATA Port
Serial ATA Port 2	Show device	
Software Preserve	Information	
Port 2	Disabled **Enabled**	Enables or Disables SATA Port
Serial ATA Port 3	Show device	
Software Preserve	Information	
Port 3	Disabled **Enabled**	Enables or Disables SATA Port
Serial ATA Port 4	Show device	
Software Preserve	Information	
Port 4	Disabled **Enabled**	Enables or Disables SATA Port
Serial ATA Port 5	Show device	
Software Preserve	Information	
Port 5	Disabled **Enabled**	Enables or Disables SATA Port
Serial ATA Port 6	Show device	
Software Preserve	Information	
Port 6	Disabled **Enabled**	Enables or Disables SATA Port

7.4.9 Chipset > PCH-IO Configuration > USB Configuration

Feature	Options	Description
XHCI Disable Compliance Mode	**Disabled** Enabled	Enables or Disables XHCI Disable Compliance Mode
USB12 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB34 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB56 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB78 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB910 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB1112 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power
USB1314 Standby Power Support	Disabled **Enabled**	Enables or Disables USB standby power

7.4.10 Chipset > PCH-IO Configuration > HD Audio Configuration

Feature	Options	Description
HD Audio	Disabled **Enabled**	Controls Detection of the HD-Audio device.

7.4.11 Chipset > PCH-IO Configuration > Serial IO Configuration

Feature	Options	Description
I2C0 Controller	Disabled **Enabled**	Enables or Disables Serial IO Controller

7.5 Security Menu

Feature	Options	Description
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password

7.6 Boot Menu

Feature	Options	Description
Boot Configuration	**Info Only**	
Setup Prompt Timeout	**1** (seconds)	Number of seconds to wait for setup activation key. 65535(0xFFFF) means infinite waiting.
Bootup NumLock State	**On** Off	Select the keyboard NumLock state.
Quiet Boot	Disabled **Enabled**	Enables or Disables Quiet Boot option
Support Native Resolution	Disabled **Enabled**	Enables or Disables native resolution support
Driver Option Priorities	**Info Only**	
Boot mode select	LEGACY **UEFI**	Selects Legacy or UEFI boot mode
FIXED BOOT ORDER Priorities	**Info Only**	
1st Boot	Hard Disk	Sets the system boot order.
2nd Boot	NVME	Sets the system boot order.
3rd Boot	CD/DVD	Sets the system boot order.
4th Boot	USB Hard Disk	Sets the system boot order.
5th Boot	USB CD/DVD	Sets the system boot order.
6th Boot	USB Key	Sets the system boot order.
7th Boot	USB Floppy	Sets the system boot order.
8th Boot	Network	Sets the system boot order.

7.7 Save & Exit Menu

Save & Exit	Options	Note
Save Changes and Exit	Yes No	Exits system setup after saving the changes.
Discard Changes and Exit	Yes No	Exits system setup without saving any changes.
Save Changes and Reset	Yes No	Resets the system after saving the changes.
Default Options	Yes No	
Restore Defaults	Yes No	Restores or Loads Default values for all Setup options.
Boot Override		
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.

Getting Service

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