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STABLE Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation

Motherboard

EP2C612D16FM
EP2C612D16FM-N

User Manual

English



Version 1.2

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

“Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate”

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Contact Information

If you need to contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at www.ASRockRack.com; or you may contact your dealer for further information.

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Chapter 1 Introduction

Thank you for purchasing ASRock Rack **EP2C612D16FM / EP2C612D16FM-N** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

In this manual, chapter 1 and 2 contains introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contains the configuration guide to BIOS setup and information of the Support CD.



Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock Rack website without further notice. You may find the latest memory and CPU support lists on ASRock Rack website as well. ASRock Rack's Website: www.ASRockRack.com

*If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
<http://www.asrockrack.com/support/>*

1.1 Package Contents

- ASRock Rack EP2C612D16FM / EP2C612D16FM-N Motherboard
(SSI CEB Form Factor: 12.0-in x 10.5-in, 30.5 cm x 26.7 cm)
- Support CD
- User Manual
- 4 x SATA3 Cables (50cm)
- 2 x MiniSAS Cables(6G) (60cm)
- 1 x I/O Shield



If any items are missing or appear damaged, contact your authorized dealer.

1.2 Specifications

EP2C612D16FM / EP2C612D16FM-N	
MB Physical Status	
Form Factor	SSI CEB
Dimension	12" x 10.5" (30.5 cm x 26.7 cm)
Processor System	
CPU	Intel® Xeon® processor E5-2600 v3/v4*series <i>*BIOS version 2.0 or above is required.</i>
Socket	Dual Socket LGA 2011 R3
Chipset	Intel® C612
System Memory	
Capacity	16 DIMM slots
Type	- Quad Channel memory technology - Supports DDR4 2400*/2133/1866/1600 RDIMM and LRDIMM <i>*Only E5-2600 V4 CPUs support DDR4 2400.</i>
Voltage	1.2V
DIMM Sizes	RDIMM: 32GB, 16GB, 8GB, 4GB LRDIMM: 64GB, 32GB
Expansion Slot	
Additional PCIe switch	EP2C612D16FM: Front Right Angle 2 x16 from each CPU to Midplane, total 4 x16 (need to bundle with ASRock Rack system board) EP2C612D16FM-N: N/A
Storage	
SATA Controller	Intel® C612 : 10 x SATA3 6.0 Gb/s (8 from 2 mini SAS connector + 2x SATA3 connector), support RAID 0, 1, 5, 10
Additional SATA Controller	Marvell 9172: 2 x SATA3 6Gbps
Ethernet	
Interface	1000 /100 /10 Mbps
LAN	2 x RJ45 by Intel® i210 1 x RJ45 Dedicated IPMI LAN port - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE - LAN1 supports NCSI

Mezzanine	x8 Mezzanine slot supports mezzanine card with 2 x10G Ethernet or 2 xGLAN (2 x 10G Base-T by Intel X540 or 2 x SFP+ by Intel 82599ES or 2 x GLAN by Intel i350) - Supports NCSI
Management	
BMC Controller	ASPEED AST2400
IPMI Dedicated GLAN	- 1 x Realtek RTL8211E for dedicated management GLAN
Features	- Watch Dog - NMI
Graphics	
Controller	ASPEED AST2400
VRAM	DDR3 16MB
Rear Panel I/O	
VGA Port	1 x D-Sub
USB 3.0 Port	2
USB 2.0 Port	2
Lan Port	2 + 1 (IPMI) Lan port (RJ45) LAN Ports with LED (ACT/LINK LED and SPEED LED)
Serial Port	1 (COM1)
UID Button/ LED	1
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, front LAN LED and system event LED)
TPM Header	1
IPMB Header	1
Fan Header	2x CPU Fan, 4x system Fan (4-pin)
ATX Power	1 (24-pin) + 2 (8-pin)
USB 3.0 Header	1 (support 2 USB 3.0)
USB 2.0 Header	1 (support 2 USB 2.0)
Type A USB 3.0 Port	1
Front Panel	1
Mezzanine slot	1 (from CPU 1)
System BIOS	
BIOS Type	128Mb AMI UEFI Legal BIOS
BIOS Features	- Plug and Play (PnP) - ACPI 2.0 Compliance Wake Up Events - SMBIOS 2.8 Support - ASRock Rack Instant Flash

Hardware Monitor	
Temperature	<ul style="list-style-type: none"> - CPU Temperature Sensing - MB Temperature Sensing - Card-side Temperature Sensing
Fan	<ul style="list-style-type: none"> - CPU/Rear/Front Fan Tachometer - CPU Quiet Fan (Allow CPU Fan Speed Auto-Adjust by CPU Temperature) - CPU/Rear/Front Fan Multi-Speed Control
Voltage	Voltage Monitoring: CPU1/2, VCCM_AB/CD/EF/GH, +1.50_PCH, 3V/5V/ 12V, +1.05V_PCH, +BAT, 3VSB, 5VSB
Support OS	
OS	<p>Microsoft® Windows®</p> <ul style="list-style-type: none"> - Server 2008 R2 SP1 (64 bit) - Server 2012 (64 bit) - Server 2012 R2 (64 bit) - Server 2016 (64 bit) <p>Linux®</p> <ul style="list-style-type: none"> - RedHat Enterprise Linux Server 6.4 (32 / 64 bit) - CentOS 5.9 / 6.4 (32 / 64 bit) - SUSE Enterprise Linux Server 11 SP3 (32 / 64 bit) - FreeBSD 9.1 (32 / 64 bit) - Fedora core 19 (64 bit) - Ubuntu 12.04.2 (64 bit) / 12.10 (64 bit) <p>Virtual</p> <ul style="list-style-type: none"> - VMWare® ESXi 5.5 (<i>not supported for Marvell 9172</i>) <p>* Please refer to our website for the latest OS support list.</p>
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C



This motherboard supports Wake from on Board LAN. To use this function, please make sure that the "Wake on Magic Packet from power off state" is enabled in Device Manager > Intel® Ethernet Connection I210 > Power Management. And the "PCI Devices Power On" is enabled in UEFI SETUP UTILITY > Advanced > ACPI Configuration. After that, onboard LAN1&2 can wake up S5 under OS.



If you install Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

1.3 Unique Features

ASRock Rack Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows[®]. With this utility, you can press the <F6> key during the POST or the <F2> key to enter into the BIOS setup menu to access ASRock Rack Instant Flash. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.

EP2C612D16FM



No.	Description
1	Intelligent Platform Management Bus header (IPMB_1)
2	ATX Power Connector (ATXPWR1)
3	Rear Fan Connector (REAR_FAN1)
4	2 x 288-pin DDR4 DIMM Slots (DDR4_H1, DDR4_G1, Blue)
5	2 x 288-pin DDR4 DIMM Slots (DDR4_H2, DDR4_G2, White)
6	Front Fan Connector (FRONT_FAN1)
7	CPU 2 Fan Connector (CPU2_FAN1)
8	PCIE Switch Board Connector (CON30) (CPU2)
9	LGA 2011 CPU Socket (CPU2)
10	PCIE Switch Board Connector (CON31) (CPU2)
11	PCIE Switch Board Connector (CON28) (CPU1)
12	LGA 2011 CPU Socket (CPU1)
13	PCIE Switch Board Connector (CON29)(CPU1)
14	CPU 1 Fan Connector (CPU1_FAN1)
15	Front Fan Connector (FRONT_FAN2)
16	CPU PECI Jumper (PECI1)
17	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
18	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
19	SATA3 Connector (M_SATA_1), White
20	System Panel Header (PANEL1)
21	Auxiliary Panel Header (AUX_PANEL1)
22	Speaker Header (SPEAKER1)
23	TPM Header (TPM1)
24	Front Lan LED Connector (FRNT_LAN34)(For Mezzanine Card)
25	ME Recovery Jumper (ME_RECOVERY1)
26	Non Maskable Interrupt Button (NMI_BTN1)
27	SATA3 Connector (M_SATA_0), White
28	SATA3 Connector (SATA5), White
29	SATA3 Connector (SATA4), White
30	Vertical Type A USB 3.0 (USB3_5)
31	USB 2.0 Header (USB_3_4)
32	mini SAS Connector (SATA0-3)
33	mini SAS Connector (sSATA0-3)

No.	Description
34	SATA SGPIO Connector (SATA_SGPIO2)
35	USB 3.0 Header (USB3_3_4)
36	ATX 12V Power Connector (ATX12V2)
37	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)
38	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)
39	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_F1, Blue)
40	2 x 288-pin DDR4 DIMM Slots (DDR4_E2, DDR4_F2, White)
41	Chassis ID0 Jumper (Chassis ID0)
42	NCSI Mode Jumper (NCSI_SEL1)
43	Chassis ID1 Jumper (Chassis ID1)
44	Chassis ID2 Jumper (Chassis ID2)
45	Rear Fan Connector (REAR_FAN2)
46	PMBUS Mode Jumper (PMBUS_SEL_ALT1)
47	PMBUS Mode Jumper (PMBUS_SEL_DAT1)
48	ATX 12V Power Connector (ATX12V3)
49	PMBUS Mode Jumper (PMBUS_SEL_CLK1)
50	PSU SMBus (PSU_SMB1)
51	BMC SMBus Header (BMC_SMB_1)

**For DIMM installation and configuration instructions, please see p.19 (Installation of Memory Modules (DIMM)) for more details.*

The diagram illustrates the layout of the EP2C61/2D16FM-N board, showing various components and their dimensions. The board is 26.7cm (10.5 in) wide and 30.5cm (12.0 in) high.

Dimensions:

- Width: 26.7cm (10.5 in)
- Height: 30.5cm (12.0 in)

Components and Features:

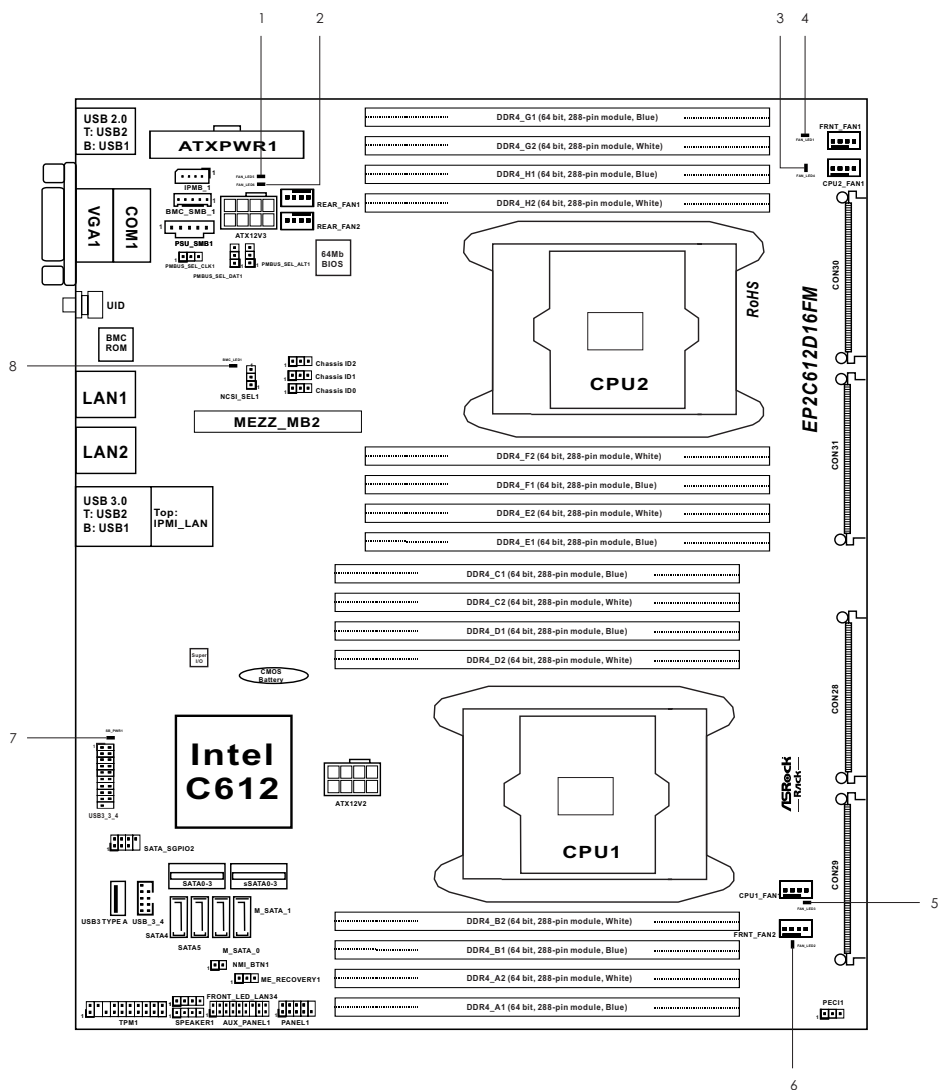
- CPUs:** CPU1 and CPU2 (Intel C612).
- Memory:** DDR4 modules (DDR4_C1, DDR4_C2, DDR4_C3, DDR4_C4, DDR4_C5, DDR4_C6, DDR4_C7, DDR4_C8, DDR4_C9, DDR4_C10, DDR4_C11, DDR4_C12, DDR4_C13, DDR4_C14, DDR4_C15, DDR4_C16, DDR4_C17, DDR4_C18, DDR4_C19, DDR4_C20, DDR4_C21, DDR4_C22, DDR4_C23, DDR4_C24, DDR4_C25, DDR4_C26, DDR4_C27, DDR4_C28, DDR4_C29, DDR4_C30, DDR4_C31, DDR4_C32, DDR4_C33, DDR4_C34, DDR4_C35, DDR4_C36, DDR4_C37, DDR4_C38, DDR4_C39, DDR4_C40, DDR4_C41, DDR4_C42, DDR4_C43, DDR4_C44, DDR4_C45, DDR4_C46, DDR4_C47, DDR4_C48, DDR4_C49, DDR4_C50, DDR4_C51, DDR4_C52, DDR4_C53, DDR4_C54, DDR4_C55, DDR4_C56, DDR4_C57, DDR4_C58, DDR4_C59, DDR4_C60, DDR4_C61, DDR4_C62, DDR4_C63, DDR4_C64, DDR4_C65, DDR4_C66, DDR4_C67, DDR4_C68, DDR4_C69, DDR4_C70, DDR4_C71, DDR4_C72, DDR4_C73, DDR4_C74, DDR4_C75, DDR4_C76, DDR4_C77, DDR4_C78, DDR4_C79, DDR4_C80, DDR4_C81, DDR4_C82, DDR4_C83, DDR4_C84, DDR4_C85, DDR4_C86, DDR4_C87, DDR4_C88, DDR4_C89, DDR4_C90, DDR4_C91, DDR4_C92, DDR4_C93, DDR4_C94, DDR4_C95, DDR4_C96, DDR4_C97, DDR4_C98, DDR4_C99, DDR4_C100).
- Power Management:** ATXPWR1, ATX12V2, ATX12V3, ATX12V4, ATX12V5, ATX12V6, ATX12V7, ATX12V8, ATX12V9, ATX12V10, ATX12V11, ATX12V12, ATX12V13, ATX12V14, ATX12V15, ATX12V16, ATX12V17, ATX12V18, ATX12V19, ATX12V20, ATX12V21, ATX12V22, ATX12V23, ATX12V24, ATX12V25, ATX12V26, ATX12V27, ATX12V28, ATX12V29, ATX12V30, ATX12V31, ATX12V32, ATX12V33, ATX12V34, ATX12V35, ATX12V36, ATX12V37, ATX12V38, ATX12V39, ATX12V40, ATX12V41, ATX12V42, ATX12V43, ATX12V44, ATX12V45, ATX12V46, ATX12V47, ATX12V48, ATX12V49, ATX12V50, ATX12V51, ATX12V52, ATX12V53, ATX12V54, ATX12V55, ATX12V56, ATX12V57, ATX12V58, ATX12V59, ATX12V60, ATX12V61, ATX12V62, ATX12V63, ATX12V64, ATX12V65, ATX12V66, ATX12V67, ATX12V68, ATX12V69, ATX12V70, ATX12V71, ATX12V72, ATX12V73, ATX12V74, ATX12V75, ATX12V76, ATX12V77, ATX12V78, ATX12V79, ATX12V80, ATX12V81, ATX12V82, ATX12V83, ATX12V84, ATX12V85, ATX12V86, ATX12V87, ATX12V88, ATX12V89, ATX12V90, ATX12V91, ATX12V92, ATX12V93, ATX12V94, ATX12V95, ATX12V96, ATX12V97, ATX12V98, ATX12V99, ATX12V100).
- Storage:** SATA0, SATA1, SATA2, SATA3, SATA4, SATA5, SATA6, SATA7, SATA8, SATA9, SATA10, SATA11, SATA12, SATA13, SATA14, SATA15, SATA16, SATA17, SATA18, SATA19, SATA20, SATA21, SATA22, SATA23, SATA24, SATA25, SATA26, SATA27, SATA28, SATA29, SATA30, SATA31, SATA32, SATA33, SATA34, SATA35, SATA36, SATA37, SATA38, SATA39, SATA40, SATA41, SATA42, SATA43, SATA44, SATA45, SATA46, SATA47, SATA48, SATA49, SATA50, SATA51, SATA52, SATA53, SATA54, SATA55, SATA56, SATA57, SATA58, SATA59, SATA60, SATA61, SATA62, SATA63, SATA64, SATA65, SATA66, SATA67, SATA68, SATA69, SATA70, SATA71, SATA72, SATA73, SATA74, SATA75, SATA76, SATA77, SATA78, SATA79, SATA80, SATA81, SATA82, SATA83, SATA84, SATA85, SATA86, SATA87, SATA88, SATA89, SATA90, SATA91, SATA92, SATA93, SATA94, SATA95, SATA96, SATA97, SATA98, SATA99, SATA100).
- Connectivity:** USB 2.0, USB 3.0, USB 3.1, USB 3.2, USB 3.3, USB 3.4, USB 3.5, USB 3.6, USB 3.7, USB 3.8, USB 3.9, USB 3.10, USB 3.11, USB 3.12, USB 3.13, USB 3.14, USB 3.15, USB 3.16, USB 3.17, USB 3.18, USB 3.19, USB 3.20, USB 3.21, USB 3.22, USB 3.23, USB 3.24, USB 3.25, USB 3.26, USB 3.27, USB 3.28, USB 3.29, USB 3.30, USB 3.31, USB 3.32, USB 3.33, USB 3.34, USB 3.35, USB 3.36, USB 3.37, USB 3.38, USB 3.39, USB 3.40, USB 3.41, USB 3.42, USB 3.43, USB 3.44, USB 3.45, USB 3.46, USB 3.47, USB 3.48, USB 3.49, USB 3.50, USB 3.51, USB 3.52, USB 3.53, USB 3.54, USB 3.55, USB 3.56, USB 3.57, USB 3.58, USB 3.59, USB 3.60, USB 3.61, USB 3.62, USB 3.63, USB 3.64, USB 3.65, USB 3.66, USB 3.67, USB 3.68, USB 3.69, USB 3.70, USB 3.71, USB 3.72, USB 3.73, USB 3.74, USB 3.75, USB 3.76, USB 3.77, USB 3.78, USB 3.79, USB 3.80, USB 3.81, USB 3.82, USB 3.83, USB 3.84, USB 3.85, USB 3.86, USB 3.87, USB 3.88, USB 3.89, USB 3.90, USB 3.91, USB 3.92, USB 3.93, USB 3.94, USB 3.95, USB 3.96, USB 3.97, USB 3.98, USB 3.99, USB 4.00).
- Other:** BMC, BMC ROW, LAN1, LAN2, MEZZ_MB2, RoHS, CPU1_FAN1, CPU1_FAN2, CPU2_FAN1, CPU2_FAN2, CPU1_LED, CPU2_LED, CPU1_PANEL1, CPU2_PANEL1, CPU1_PANEL2, CPU2_PANEL2, CPU1_PANEL3, CPU2_PANEL3, CPU1_PANEL4, CPU2_PANEL4, CPU1_PANEL5, CPU2_PANEL5, CPU1_PANEL6, CPU2_PANEL6, CPU1_PANEL7, CPU2_PANEL7, CPU1_PANEL8, CPU2_PANEL8, CPU1_PANEL9, CPU2_PANEL9, CPU1_PANEL10, CPU2_PANEL10, CPU1_PANEL11, CPU2_PANEL11, CPU1_PANEL12, CPU2_PANEL12, CPU1_PANEL13, CPU2_PANEL13, CPU1_PANEL14, CPU2_PANEL14, CPU1_PANEL15, CPU2_PANEL15, CPU1_PANEL16, CPU2_PANEL16, CPU1_PANEL17, CPU2_PANEL17, CPU1_PANEL18, CPU2_PANEL18, CPU1_PANEL19, CPU2_PANEL19, CPU1_PANEL20, CPU2_PANEL20, CPU1_PANEL21, CPU2_PANEL21, CPU1_PANEL22, CPU2_PANEL22, CPU1_PANEL23, CPU2_PANEL23, CPU1_PANEL24, CPU2_PANEL24, CPU1_PANEL25, CPU2_PANEL25, CPU1_PANEL26, CPU2_PANEL26, CPU1_PANEL27, CPU2_PANEL27, CPU1_PANEL28, CPU2_PANEL28, CPU1_PANEL29, CPU2_PANEL29, CPU1_PANEL30, CPU2_PANEL30, CPU1_PANEL31, CPU2_PANEL31, CPU1_PANEL32, CPU2_PANEL32, CPU1_PANEL33, CPU2_PANEL33, CPU1_PANEL34, CPU2_PANEL34, CPU1_PANEL35, CPU2_PANEL35, CPU1_PANEL36, CPU2_PANEL36, CPU1_PANEL37, CPU2_PANEL37, CPU1_PANEL38, CPU2_PANEL38, CPU1_PANEL39, CPU2_PANEL39, CPU1_PANEL40, CPU2_PANEL40, CPU1_PANEL41, CPU2_PANEL41, CPU1_PANEL42, CPU2_PANEL42, CPU1_PANEL43, CPU2_PANEL43, CPU1_PANEL44, CPU2_PANEL44, CPU1_PANEL45, CPU2_PANEL45, CPU1_PANEL46, CPU2_PANEL46, CPU1_PANEL47, CPU2_PANEL47, CPU1_PANEL48, CPU2_PANEL48, CPU1_PANEL49, CPU2_PANEL49, CPU1_PANEL50, CPU2_PANEL50, CPU1_PANEL51, CPU2_PANEL51, CPU1_PANEL52, CPU2_PANEL52, CPU1_PANEL53, CPU2_PANEL53, CPU1_PANEL54, CPU2_PANEL54, CPU1_PANEL55, CPU2_PANEL55, CPU1_PANEL56, CPU2_PANEL56, CPU1_PANEL57, CPU2_PANEL57, CPU1_PANEL58, CPU2_PANEL58, CPU1_PANEL59, CPU2_PANEL59, CPU1_PANEL60, CPU2_PANEL60, CPU1_PANEL61, CPU2_PANEL61, CPU1_PANEL62, CPU2_PANEL62, CPU1_PANEL63, CPU2_PANEL63, CPU1_PANEL64, CPU2_PANEL64, CPU1_PANEL65, CPU2_PANEL65, CPU1_PANEL66, CPU2_PANEL66, CPU1_PANEL67, CPU2_PANEL67, CPU1_PANEL68, CPU2_PANEL68, CPU1_PANEL69, CPU2_PANEL69, CPU1_PANEL70, CPU2_PANEL70, CPU1_PANEL71, CPU2_PANEL71, CPU1_PANEL72, CPU2_PANEL72, CPU1_PANEL73, CPU2_PANEL73, CPU1_PANEL74, CPU2_PANEL74, CPU1_PANEL75, CPU2_PANEL75, CPU1_PANEL76, CPU2_PANEL76, CPU1_PANEL77, CPU2_PANEL77, CPU1_PANEL78, CPU2_PANEL78, CPU1_PANEL79, CPU2_PANEL79, CPU1_PANEL80, CPU2_PANEL80, CPU1_PANEL81, CPU2_PANEL81, CPU1_PANEL82, CPU2_PANEL82, CPU1_PANEL83, CPU2_PANEL83, CPU1_PANEL84, CPU2_PANEL84, CPU1_PANEL85, CPU2_PANEL85, CPU1_PANEL86, CPU2_PANEL86, CPU1_PANEL87, CPU2_PANEL87, CPU1_PANEL88, CPU2_PANEL88, CPU1_PANEL89, CPU2_PANEL89, CPU1_PANEL90, CPU2_PANEL90, CPU1_PANEL91, CPU2_PANEL91, CPU1_PANEL92, CPU2_PANEL92, CPU1_PANEL93, CPU2_PANEL93, CPU1_PANEL94, CPU2_PANEL94, CPU1_PANEL95, CPU2_PANEL95, CPU1_PANEL96, CPU2_PANEL96, CPU1_PANEL97, CPU2_PANEL97, CPU1_PANEL98, CPU2_PANEL98, CPU1_PANEL99, CPU2_PANEL99, CPU1_PANEL100, CPU2_PANEL100).

No.	Description
1	Intelligent Platform Management Bus header (IPMB_1)
2	ATX Power Connector (ATXPWR1)
3	Rear Fan Connector (REAR_FAN1)
4	2 x 288-pin DDR4 DIMM Slots (DDR4_H1, DDR4_G1, Blue)
5	2 x 288-pin DDR4 DIMM Slots (DDR4_H2, DDR4_G2, White)
6	Front Fan Connector (FRONT_FAN1)
7	CPU 2 Fan Connector (CPU2_FAN1)
8	LGA 2011 CPU Socket (CPU2)
9	LGA 2011 CPU Socket (CPU1)
10	CPU 1 Fan Connector (CPU1_FAN1)
11	Front Fan Connector (FRONT_FAN2)
12	CPU PECI Jumper (PECI1)
13	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
14	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
15	SATA3 Connector (M_SATA_1), White
16	System Panel Header (PANEL1)
17	Auxiliary Panel Header (AUX_PANEL1)
18	Speaker Header (SPEAKER1)
19	TPM Header (TPM1)
20	Front Lan LED Connector (FRNT_LAN34)(For Mezzanine Card)
21	ME Recovery Jumper (ME_RECOVERY1)
22	Non Maskable Interrupt Button (NMI_BTN1)
23	SATA3 Connector (M_SATA_0), White
24	SATA3 Connector (SATA5), White
25	SATA3 Connector (SATA4), White
26	Vertical Type A USB 3.0 (USB3_5)
27	USB 2.0 Header (USB_3_4)
28	mini SAS Connector (SATA0-3)
29	mini SAS Connector (sSATA0-3)
30	SATA SGPIO Connector (SATA_SGPIO2)
31	USB 3.0 Header (USB3_3_4)
32	ATX 12V Power Connector (ATX12V2)
33	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)

No.	Description
34	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)
35	2 x 288-pin DDR4 DIMM Slots (DDR4_E1, DDR4_F1, Blue)
36	2 x 288-pin DDR4 DIMM Slots (DDR4_E2, DDR4_F2, White)
37	Chassis ID0 Jumper (Chassis ID0)
38	NCSI Mode Jumper (NCSI_SEL1)
39	Chassis ID1 Jumper (Chassis ID1)
40	Chassis ID2 Jumper (Chassis ID2)
41	Rear Fan Connector (REAR_FAN2)
42	PMBUS Mode Jumper (PMBUS_SEL_ALT1)
43	PMBUS Mode Jumper (PMBUS_SEL_DAT1)
44	ATX 12V Power Connector (ATX12V3)
45	PMBUS Mode Jumper (PMBUS_SEL_CLK1)
46	PSU SMBus (PSU_SMB1)
47	BMC SMBus Header (BMC_SMB_1)

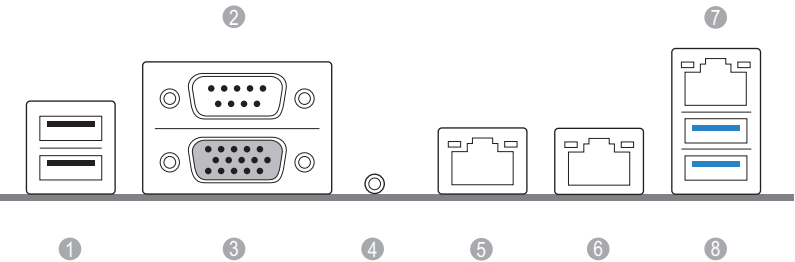
**For DIMM installation and configuration instructions, please see p.19 (Installation of Memory Modules (DIMM)) for more details.*

1.5 Onboard LED Indicators



No.	Status	Description
1	Amber	Rear_FAN1 failed
2	Amber	Rear_FAN2 failed
3	Amber	CPU2_FAN1 failed
4	Amber	Front_FAN1 failed
5	Amber	CPU1_FAN1 failed
6	Amber	Front_FAN2 failed
7	Green	STB PWR ready
8	Green	BMC heartbeat LED

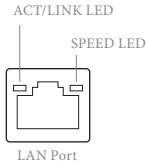
1.6 I/O Panel



No.	Description	No.	Description
1	USB 2.0 Ports (USB_1_2)	5	LAN RJ-45 Port (LAN1)**
2	Serial Port (COM1)	6	LAN RJ-45 Port (LAN2)**
3	VGA Port (VGA1)	7	LAN RJ-45 Port (IPMI_LAN)*
4	UID Switch (UID)	8	USB 3.0 Ports (USB3_1_2)

LAN Port LED Indications

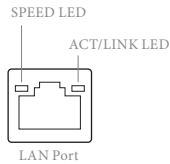
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10M bps connection or no link
Blinking Yellow	Data Activity	Yellow	100M bps connection
On	Link	Green	1Gbps connection

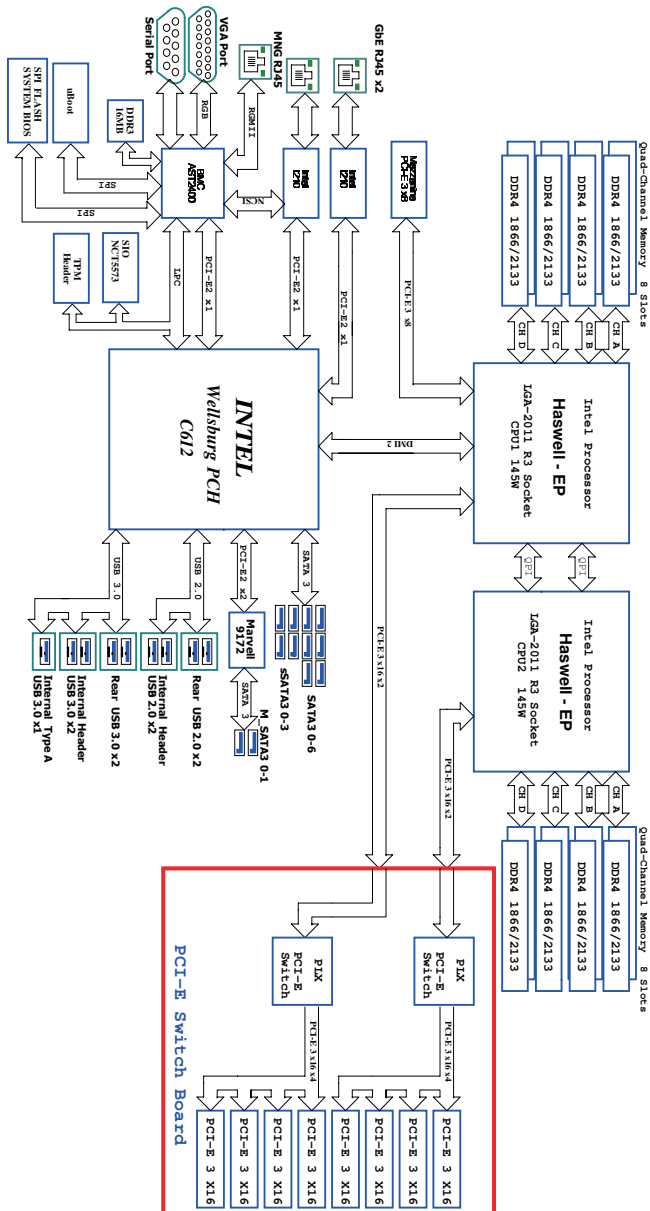
**There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



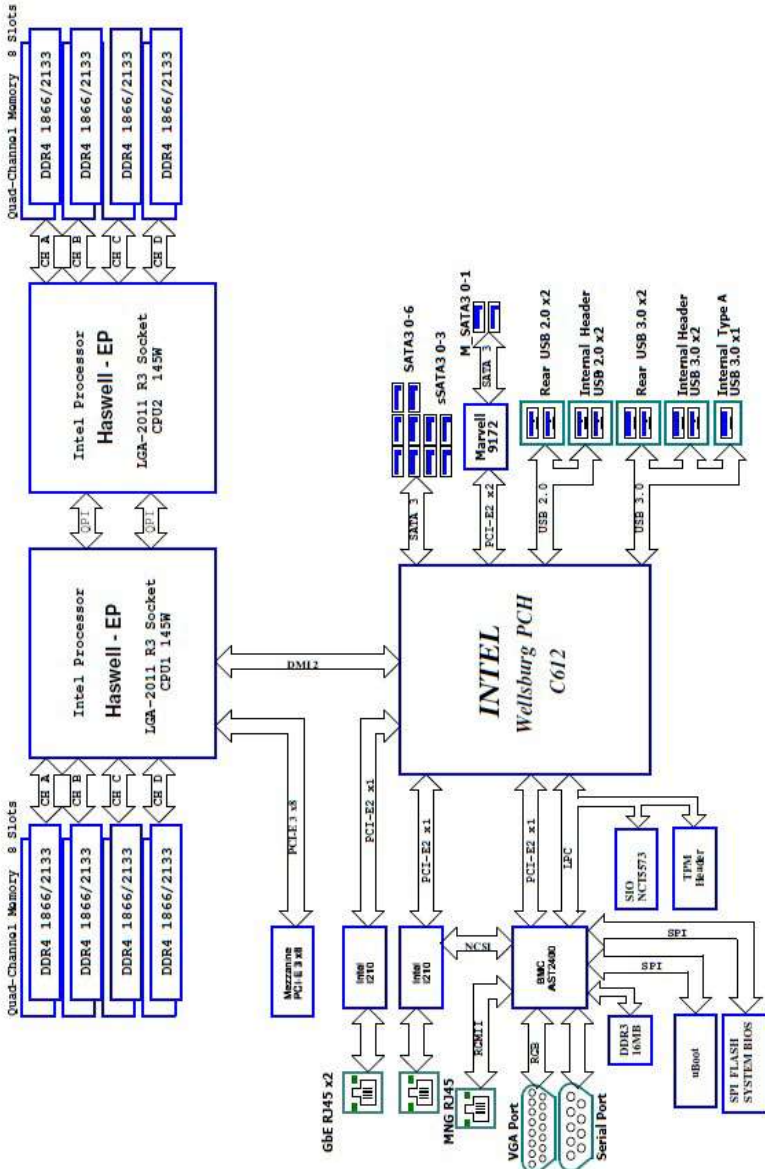
LAN Port (LAN1, LAN2) LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10M/100Mbps connection or no link
Blinking Yellow	Data Activity	Green	1Gbps connection
On	Link		

EP2C612D16FM



EP2C612D16FM-N



Chapter 2 Installation

This is a CEB form factor (12" x 10.5", 30.5 cm x 26.7 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

EP2C612 Series are dual socket motherboards that support Intel® Xeon® E5-2600 v3 Series Processors. Please install a primary processor (BootStrap Processor) into “CPU1” socket and then install a non-Primary Processor (Application Processors) into “CPU2” socket. *For a single CPU, please install it into “CPU1” socket (framed by a square).



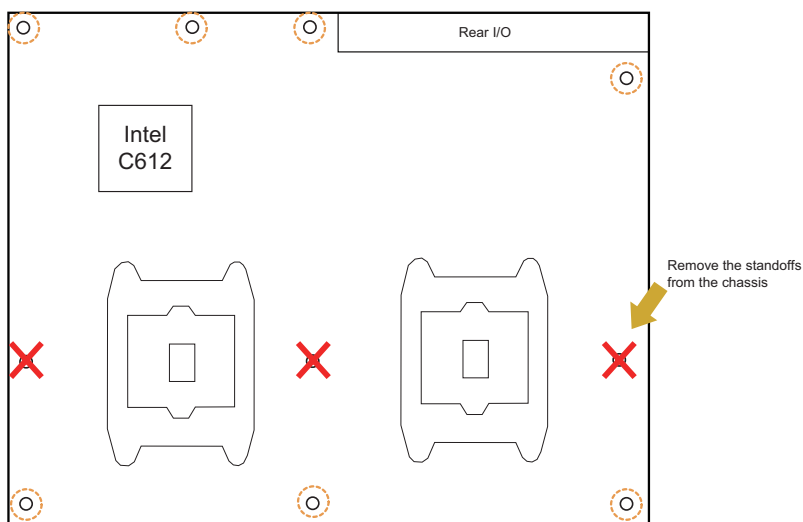
Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.



Attention! Before installing this motherboard, be sure to unscrew and remove the three standoffs at the marked location, under the motherboard, from the chassis, in order to avoid electrical short circuit and damage to your motherboard.





Do not over-tighten the screws! Doing so may damage the motherboard.

2.2 Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.



Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Installing the CPU



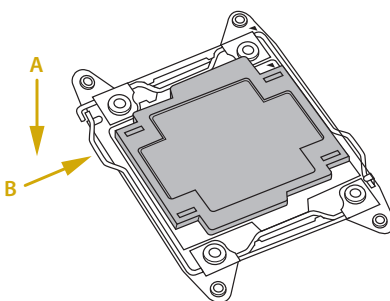
1. Before you insert the 2011-3-Pin CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.
2. Unplug all power cables before installing the CPU.

CAUTION:

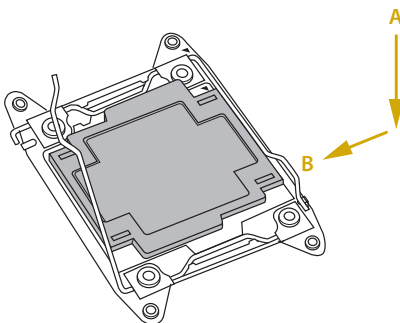
Please note that C612 platform is only compatible with the LGA 2011-3 socket, which is incompatible with the LGA 2011 socket

Socket Type: Narrow ILM Socket

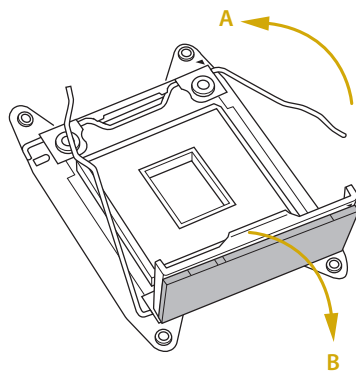
1



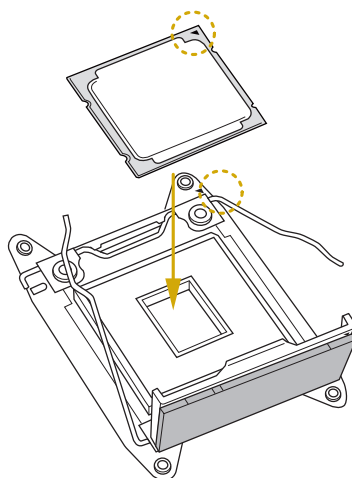
2



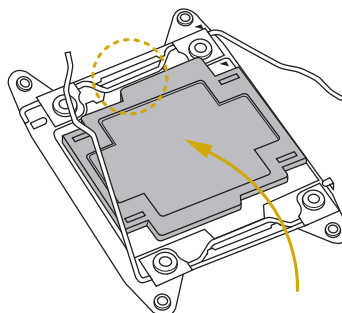
3



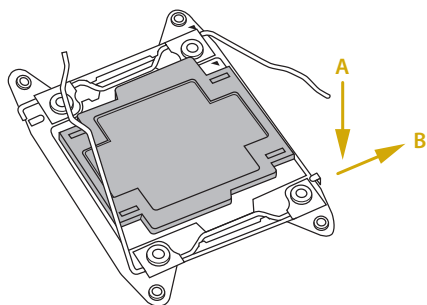
4



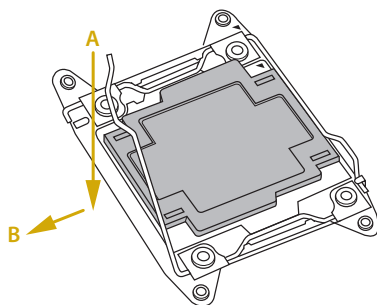
5



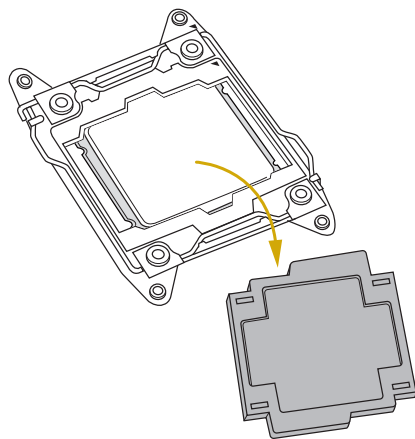
6



7



8



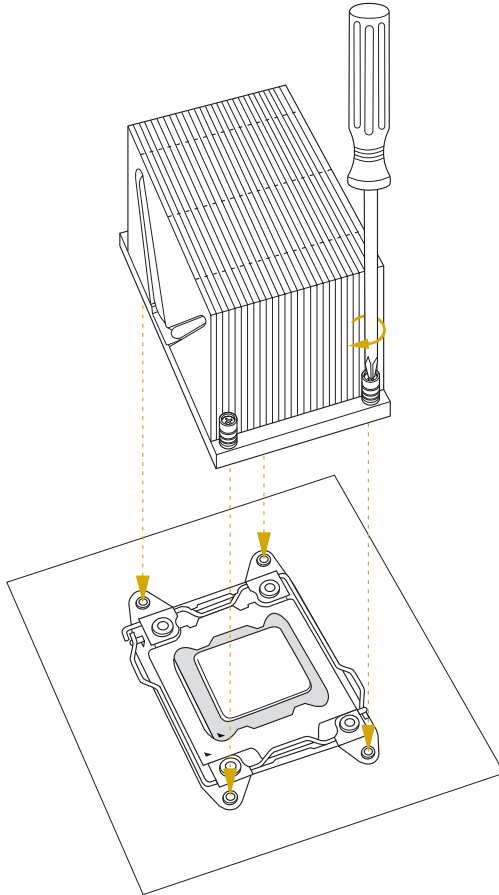
The cover must be placed if returning the motherboard for after service.

2.4 Installing the CPU Fan and Heatsink

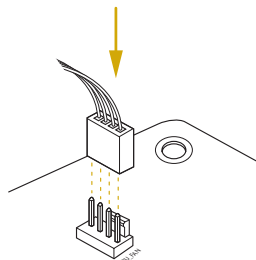


Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation.

1



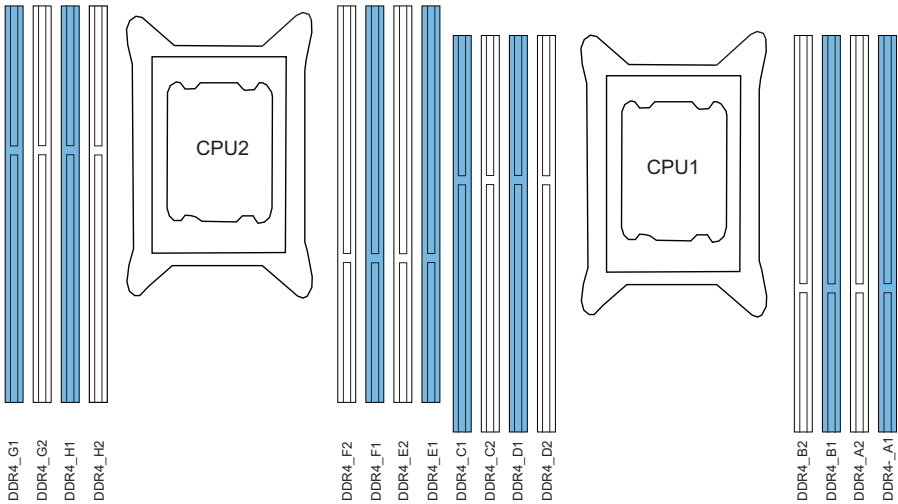
2



2.5 Installation of Memory Modules (DIMM)

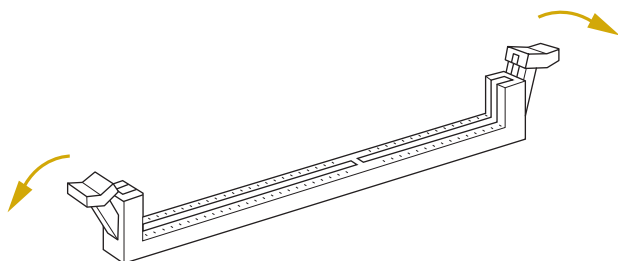
This motherboard provides sixteen 288-pin DDR4 (Double Data Rate 4) DIMM slots in two groups, and supports Dual Channel Memory Technology.

Capacity	CPU1	CPU2
256GB /	DDR4_A1, B1, C1, D1 (Blue)	DDR4_E1, F1, G1, H1 (Blue)
512GB	DDR4_A2, B2, C2, D2 (White)	DDR4_E2, F2, G2, H2 (White)

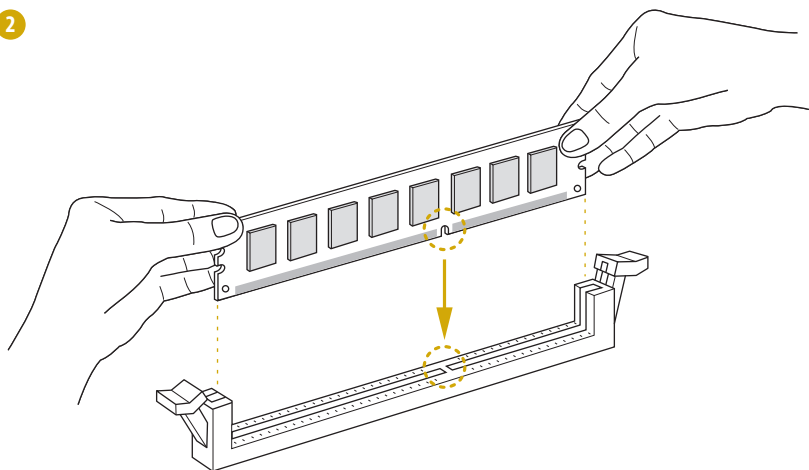


1. It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and DIMM may be damaged.
2. For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.
3. It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.
4. Some DDR4 1GB double-sided DIMMs with 16 chips may not work on this motherboard. It is not recommended to install them on this motherboard.

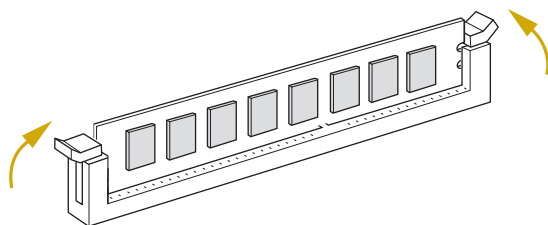
1



2



3



The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

Recommended Memory Configurations

A single memory module should be installed in the BLUE socket.

If you install only one CPU (CPU1) on the motherboard, make sure to install DIMMs into DDR4_A, DDR4_B, DDR4_C, or DDR4_D slot(s).



Memory can speed up to 2133 MHz for 1 DIMM per channel. For two DIMMs per channel, memory speed should be 1866MHz.

1 CPU Configuration

	CPU1							
	A1	A2	B1	B2	C1	C2	D1	D2
1 DIMM	#							
2 DIMMS	#		#					
4 DIMMS	#		#		#		#	
8 DIMMS	#	#	#	#	#	#	#	#

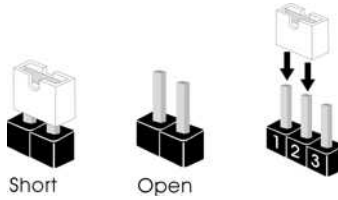
2 CPU Configuration

	CPU1							
	A1	A2	B1	B2	C1	C2	D1	D2
1 DIMM	#							
2 DIMMS	#		#					
4 DIMMS	#		#		#		#	
8 DIMMS	#		#		#		#	
12 DIMMS	#	#	#	#	#	#	#	#
16 DIMMS	#	#	#	#	#	#	#	#

	CPU2							
	E1	E2	F1	F2	G1	G2	H1	H2
1 DIMM								
2 DIMMS								
4 DIMMS								
8 DIMMS	#		#		#		#	
12 DIMMS	#		#		#		#	
16 DIMMS	#	#	#	#	#	#	#	#

2.6 Jumper Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.



ME Recovery Jumper (3-pin ME_RECOVERY1) (see p.6 or p.9)	1_2 	2_3
	Normal Mode (Default)	ME Recovery Mode
CPU PECI Mode Jumper (3-pin PECI1) (see p.6 or p.9)	1_2 	2_3
	CPU PECI connect to PCH	CPU PECI connect to BMC (Default)
PMBUS Mode Jumper (3-pin PMBUS_SEL_DAT1) (see p.6 or p.9) (3-pin PMBUS_SEL_CLK1) (see p.6 or p.9) (3-pin PMBUS_SEL_ALT1) (see p.6 or p.9)	1_2 	2_3
	PMBus connected to BMC (Default)	PMBus connected to PCH
NCSI Mode Jumper (3-pin NCSI_SEL1) (see p.6 or p.9)	1_2 	2_3
	NCSI is set to onboard LAN1 (Default)	NCSI is set to Mezzanine Card

Chassis ID0 Jumper

(3-pin Chassis ID0)

(see p.6 or p.9)

Chassis ID1 Jumper

(3-pin Chassis ID1)

(see p.6 or p.9)

Chassis ID2 Jumper

(3-pin Chassis ID2)

(see p.6 or p.9)



Board Level SKU (Default)

For 3U8G system, passive
GPGPU

Chassis ID0 Jumper

(3-pin Chassis ID0)

(see p.6 or p.9)

Chassis ID1 Jumper

(3-pin Chassis ID1)

(see p.6 or p.9)

Chassis ID2 Jumper

(3-pin Chassis ID2)

(see p.6 or p.9)



For 3U8G system, active
GPGPU

Reserved for system level
use

Chassis ID0 Jumper

(3-pin Chassis ID0)

(see p.6 or p.9)

Chassis ID1 Jumper

(3-pin Chassis ID1)

(see p.6 or p.9)

Chassis ID2 Jumper

(3-pin Chassis ID2)

(see p.6 or p.9)



Reserved for system level
use

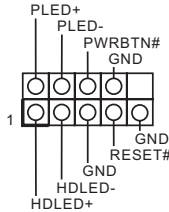
Reserved for system level
use

2.7 Onboard Headers and Connectors



Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

System Panel Header
(9-pin PANEL1)
(see p.6 or p.9)



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments. Particularly note the positive and negative pins before connecting the cables.



PWRBTN (Power Switch):

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch):

Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):

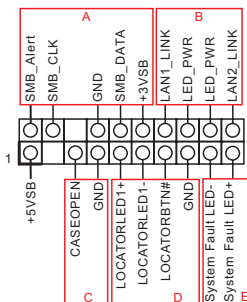
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED):

Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

Auxiliary Panel Header (18-pin AUX PANEL_1) (see p.6 or p.9)



This header supports multiple functions on the front panel, including the front panel SMB, internet status indicator and chassis intrusion pin.



A. Front panel SMBus connecting pin (6-1 pin FPSMB)

This header allows you to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)

These two 2-pin headers allow you to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

C. Chassis intrusion pin (2-pin CHASSIS)

This header is provided for host computer chassis with chassis intrusion detection designs. In addition, it must also work with external detection equipment, such as a chassis intrusion detection sensor or a microswitch. When this function is activated, if any chassis component movement occurs, the sensor will immediately detect it and send a signal to this header, and the system will then record this chassis intrusion event. The default setting is set to the CASEOPEN and GND pin; this function is off.

D. Locator LED (4-pin LOCATOR)

This header is for the locator switch and LED on the front panel.

E. System Fault LED (2-pin LOCATOR)

This header is for the Fault LED on the system.

Serial ATA3 Connectors

(SATA_4)

(see p.6 or p.9)

(SATA_5)

(see p.6 or p.9)

(M_SATA_0)

((see p.6 or p.9)

(M_SATA_1)

(see p.6 or p.9)



These four SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

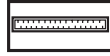
mini SAS Connectors

(SATA0-3)

(see p.6 or p.9)

(sSATA0-3)

(see p.6 or p.9)

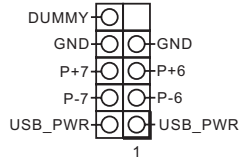


These connectors are used to connect the SATA port on the backplane.

USB 2.0 Header

(9-pin USB_3_4)

(see p.6 or p.9)



Besides two USB 2.0 ports on the I/O panel, there is one header on this motherboard. Each USB 2.0 header can support two ports.

USB 3.0 Connector

(USB3_5)

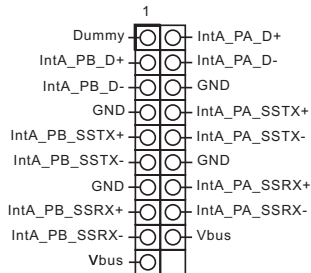
(see p.6 or p.9)



USB 3.0 Header

(19-pin USB3_2_3)

(see p.6 or p.9)

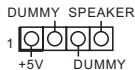


Besides two default USB 3.0 ports on the I/O panel, there is one USB 3.0 header on this motherboard. This USB 3.0 header can support two USB 3.0 ports.

Chassis Speaker Header

(4-pin SPEAKER1)

(see p.6 or p.9)



Please connect the chassis speaker to this header.

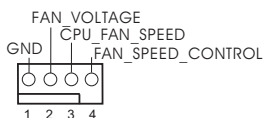
CPU Fan Connectors

(4-pin CPU_FAN1)

(see p.6 or p.9)

(4-pin CPU_FAN2)

(see p.6 or p.9, No. 7)



This motherboard provides two 4-Pin CPU fan (Quiet Fan) connectors. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

**For more details, please refer to the Cooler QVL list on the ASRock Rack website.*

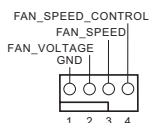
Front and Rear Fan Connectors

(4-pin FRNT_FAN1)

(see p.6 or p.9, No. 6)

(4-pin FRNT_FAN2)

(see p.6 or p.9)



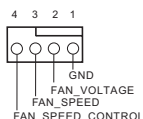
Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.

(4-pin REAR_FAN1)

(see p.6 or p.9, No. 3)

(4-pin REAR_FAN2)

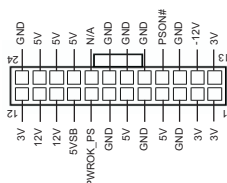
(see p.6 or p.9)



ATX Power Connector

(24-pin ATXPWR1)

(see p.6 or p.9, No. 2)



This motherboard provides a 24-pin ATX power connector.

To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

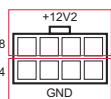
ATX 12V Power Connectors

(8-pin ATX12V2)

(see p.6 or p.9)

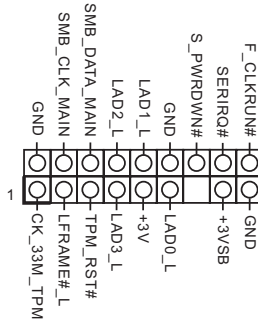
(8-pin ATX12V3)

(see p.6 or p.9)



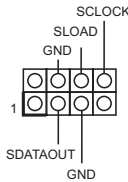
This motherboard provides two 8-pin ATX 12V power connectors.

TPM Header
(17-pin TPM1)
(see p.6 or p.9)



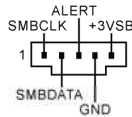
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Serial General Purpose
Input/Output Headers
(7-pin SATA_SGPIO2)
(see p.6 or p.9)



This header supports Serial Link interface for onboard SATA connections.

PSU SMBus
(PSU_SMB1)
(see p.6 or p.9)



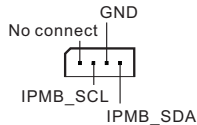
PSU SMBus monitors the status of the power supply, fan and system temperature.

Non Maskable Interrupt
Button Header
(NMI_BTN1)
(see p.6 or p.9)



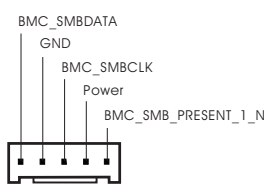
Please connect a NMI device to this header.

Intelligent Platform
Management Bus header
(4-pin IPMB_1)
(see p.6 or p.9, No. 1)



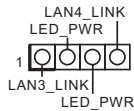
This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Baseboard Management
Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.6 or p.9)



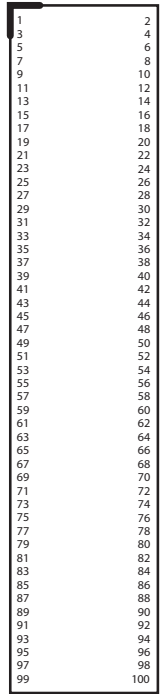
This header is used for the SM
BUS devices.

Front Lan LED Connector
(FRONT_LED_LAN34)
(see p.6 or p.9)



This 4-pin connector is used
for the front LAN status
indicator.

PCIE Switch Board Con-
nectors
**Only supported for EPC612D-
16FM motherboard*
(100-pin CON28)
(see p.6, No. 11)
(100-pin CON30)
(see p.6, No. 8)



These four connectors are
used for PCIE Switch Board
connections.

(120-pin CON29)

(see p.6, No. 13)

(120-pin CON31)

(see p.6, No. 10)

1	2
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109	110
111	112
113	114
115	116
117	118
119	120



1. CON31: SAMTEC/ERF8-050-01-L-D-RA-TR mates with SAMTEC/ERM8-050(vertical), SAMTEC/ERM8-050-01-L-D-RA(R/A)
2. CON32: SAMTEC/ERF8-060-01-L-D-RA-TR mates with SAMTEC/ERM8-060(vertical), SAMTEC/ERM8-060-01-L-D-RA(R/A)
3. CON28: SAMTEC/ERF8-050-01-L-D-RA-TR mates with SAMTEC/ERM8-050(vertical), SAMTEC/ERM8-050-01-L-D-RA(R/A)
4. CON29: SAMTEC/ERF8-060-01-L-D-RA-TR mates with SAMTEC/ERM8-060(vertical), SAMTEC/ERM8-060-01-L-D-RA(R/A)

100-pin Con28

Pin	Definition	Pin	Definition
1	CPU1_PE3D_TX_C_DP15	2	CPU1_PE3D_RX_DP15
3	CPU1_PE3D_TX_C_DN15	4	CPU1_PE3D_RX_DN15
5	GND	6	GND
7	CPU1_PE3D_TX_C_DP14	8	CPU1_PE3D_RX_DP14
9	CPU1_PE3D_TX_C_DN14	10	CPU1_PE3D_RX_DN14
11	GND	12	GND
13	CPU1_PE3D_TX_C_DP13	14	CPU1_PE3D_RX_DP13
15	CPU1_PE3D_TX_C_DN13	16	CPU1_PE3D_RX_DN13
17	GND	18	GND
19	CPU1_PE3D_TX_C_DP12	20	CPU1_PE3D_RX_DP12
21	CPU1_PE3D_TX_C_DN12	22	CPU1_PE3D_RX_DN12
23	GND	24	GND
25	CPU1_PE3C_TX_C_DP11	26	CPU1_PE3C_RX_DP11
27	CPU1_PE3C_TX_C_DN11	28	CPU1_PE3C_RX_DN11
29	GND	30	GND
31	CPU1_PE3C_TX_C_DP10	32	CPU1_PE3C_RX_DP10
33	CPU1_PE3C_TX_C_DN10	34	CPU1_PE3C_RX_DN10
35	GND	36	GND
37	CPU1_PE3C_TX_C_DP9	38	CPU1_PE3C_RX_DP9
39	CPU1_PE3C_TX_C_DN9	40	CPU1_PE3C_RX_DN9
41	GND	42	GND
43	CPU1_PE3C_TX_C_DP8	44	CPU1_PE3C_RX_DP8
45	CPU1_PE3C_TX_C_DN8	46	CPU1_PE3C_RX_DN8
47	GND	48	GND
49	CPU1_PE3B_TX_C_DP7	50	CPU1_PE3B_RX_DP7
51	CPU1_PE3B_TX_C_DN7	52	CPU1_PE3B_RX_DN7
53	GND	54	GND
55	CPU1_PE3B_TX_C_DP6	56	CPU1_PE3B_RX_DP6
57	CPU1_PE3B_TX_C_DN6	58	CPU1_PE3B_RX_DN6
59	GND	60	GND
61	CPU1_PE3B_TX_C_DP5	62	CPU1_PE3B_RX_DP5
63	CPU1_PE3B_TX_C_DN5	64	CPU1_PE3B_RX_DN5
65	GND	66	GND
67	CPU1_PE3B_TX_C_DP4	68	CPU1_PE3B_RX_DP4
69	CPU1_PE3B_TX_C_DN4	70	CPU1_PE3B_RX_DN4
71	GND	72	GND
73	CPU1_PE3A_TX_C_DP3	74	CPU1_PE3A_RX_DP3
75	CPU1_PE3A_TX_C_DN3	76	CPU1_PE3A_RX_DN3
77	GND	78	GND
79	CPU1_PE3A_TX_C_DP2	80	CPU1_PE3A_RX_DP2
81	CPU1_PE3A_TX_C_DN2	82	CPU1_PE3A_RX_DN2

Pin	Definition	Pin	Definition
83	GND	84	GND
85	CPU1_PE3A_TX_C_DP1	86	CPU1_PE3A_RX_DP1
87	CPU1_PE3A_TX_C_DN1	88	CPU1_PE3A_RX_DN1
89	GND	90	GND
91	CPU1_PE3A_TX_C_DP0	92	CPU1_PE3A_RX_DP0
93	CPU1_PE3A_TX_C_DN0	94	CPU1_PE3A_RX_DN0
95	GND	96	GND
97	CPU1_PE_HP_SCL	98	CPU_VIO
99	CPU1_PE_HP_SDA	100	CPU_VIO

120-pin Con29

Pin	Definition	Pin	Definition
1	PWM_FRONT2_SWB	2	GND
3	PWM_FRONT1_SWB	4	CLK_100M_PLX_CLK1_R_DP
5	TACH_SWB_FAN1	6	CLK_100M_PLX_CLK1_R_DN
7	TACH_SWB_FAN3	8	GND
9	TACH_SWB_FAN5	10	CLK_100M_DB1900_CLK_R_DP
11	TACH_SWB_FAN6	12	CLK_100M_DB1900_CLK_R_DN
13	TACH_SWB_FAN8	14	GND
15	PWM_CPU1_SWB	16	CLK_100M_PLX_CLK3_R_DP
17	SWB_PRESENT_N	18	CLK_100M_PLX_CLK3_R_DN
19	GND	20	GND
21	CLK_100M_PLX_CLK2_R_DP	22	CLK_100M_PLX_CLK4_R_DP
23	CLK_100M_PLX_CLK2_R_DN	24	CLK_100M_PLX_CLK4_R_DN
25	GND	26	GND
27	CPU1_PE2D_TX_C_DP15	28	CPU1_PE2D_RX_DP15
29	CPU1_PE2D_TX_C_DN15	30	CPU1_PE2D_RX_DN15
31	GND	32	GND
33	CPU1_PE2D_TX_C_DP14	34	CPU1_PE2D_RX_DP14
35	CPU1_PE2D_TX_C_DN14	36	CPU1_PE2D_RX_DN14
37	GND	38	GND
39	CPU1_PE2D_TX_C_DP13	40	CPU1_PE2D_RX_DP13
41	CPU1_PE2D_TX_C_DN13	42	CPU1_PE2D_RX_DN13
43	GND	44	GND
45	CPU1_PE2D_TX_C_DP12	46	CPU1_PE2D_RX_DP12
47	CPU1_PE2D_TX_C_DN12	48	CPU1_PE2D_RX_DN12
49	GND	50	GND
51	CPU1_PE2C_TX_C_DP11	52	CPU1_PE2C_RX_DP11
53	CPU1_PE2C_TX_C_DN11	54	CPU1_PE2C_RX_DN11
55	GND	56	GND
57	CPU1_PE2C_TX_C_DP10	58	CPU1_PE2C_RX_DP10
59	CPU1_PE2C_TX_C_DN10	60	CPU1_PE2C_RX_DN10
61	GND	62	GND
63	CPU1_PE2C_TX_C_DP9	64	CPU1_PE2C_RX_DP9
65	CPU1_PE2C_TX_C_DN9	66	CPU1_PE2C_RX_DN9
67	GND	68	GND
69	CPU1_PE2C_TX_C_DP8	70	CPU1_PE2C_RX_DP8
71	CPU1_PE2C_TX_C_DN8	72	CPU1_PE2C_RX_DN8
73	GND	74	GND
75	CPU1_PE2B_TX_C_DP7	76	CPU1_PE2B_RX_DP7
77	CPU1_PE2B_TX_C_DN7	78	CPU1_PE2B_RX_DN7
79	GND	80	GND
81	CPU1_PE2B_TX_C_DP6	82	CPU1_PE2B_RX_DP6

Pin	Definition	Pin	Definition
83	CPU1_PE2B_TX_C_DN6	84	CPU1_PE2B_RX_DN6
85	GND	86	GND
87	CPU1_PE2B_TX_C_DP5	88	CPU1_PE2B_RX_DP5
89	CPU1_PE2B_TX_C_DN5	90	CPU1_PE2B_RX_DN5
91	GND	92	GND
93	CPU1_PE2B_TX_C_DP4	94	CPU1_PE2B_RX_DP4
95	CPU1_PE2B_TX_C_DN4	96	CPU1_PE2B_RX_DN4
97	GND	98	GND
99	CPU1_PE2A_TX_C_DP3	100	CPU1_PE2A_RX_DP3
101	CPU1_PE2A_TX_C_DN3	102	CPU1_PE2A_RX_DN3
103	GND	104	GND
105	CPU1_PE2A_TX_C_DP2	106	CPU1_PE2A_RX_DP2
107	CPU1_PE2A_TX_C_DN2	108	CPU1_PE2A_RX_DN2
109	GND	110	GND
111	CPU1_PE2A_TX_C_DP1	112	CPU1_PE2A_RX_DP1
113	CPU1_PE2A_TX_C_DN1	114	CPU1_PE2A_RX_DN1
115	GND	116	GND
117	CPU1_PE2A_TX_C_DP0	118	CPU1_PE2A_RX_DP0
119	CPU1_PE2A_TX_C_DN0	120	CPU1_PE2A_RX_DN0

100-pin Con30

Pin	Definition	Pin	Definition
1	CPU2_PE3D_TX_C_DP15	2	CPU2_PE3D_RX_DP15
3	CPU2_PE3D_TX_C_DN15	4	CPU2_PE3D_RX_DN15
5	GND	6	GND
7	CPU2_PE3D_TX_C_DP14	8	CPU2_PE3D_RX_DP14
9	CPU2_PE3D_TX_C_DN14	10	CPU2_PE3D_RX_DN14
11	GND	12	GND
13	CPU2_PE3D_TX_C_DP13	14	CPU2_PE3D_RX_DP13
15	CPU2_PE3D_TX_C_DN13	16	CPU2_PE3D_RX_DN13
17	GND	18	GND
19	CPU2_PE3D_TX_C_DP12	20	CPU2_PE3D_RX_DP12
21	CPU2_PE3D_TX_C_DN12	22	CPU2_PE3D_RX_DN12
23	GND	24	GND
25	CPU2_PE3C_TX_C_DP11	26	CPU2_PE3C_RX_DP11
27	CPU2_PE3C_TX_C_DN11	28	CPU2_PE3C_RX_DN11
29	GND	30	GND
31	CPU2_PE3C_TX_C_DP10	32	CPU2_PE3C_RX_DP10
33	CPU2_PE3C_TX_C_DN10	34	CPU2_PE3C_RX_DN10
35	GND	36	GND
37	CPU2_PE3C_TX_C_DP9	38	CPU2_PE3C_RX_DP9
39	CPU2_PE3C_TX_C_DN9	40	CPU2_PE3C_RX_DN9
41	GND	42	GND
43	CPU2_PE3C_TX_C_DP8	44	CPU2_PE3C_RX_DP8
45	CPU2_PE3C_TX_C_DN8	46	CPU2_PE3C_RX_DN8
47	GND	48	GND
49	CPU2_PE3B_TX_C_DP7	50	CPU2_PE3B_RX_DP7
51	CPU2_PE3B_TX_C_DN7	52	CPU2_PE3B_RX_DN7
53	GND	54	GND
55	CPU2_PE3B_TX_C_DP6	56	CPU2_PE3B_RX_DP6
57	CPU2_PE3B_TX_C_DN6	58	CPU2_PE3B_RX_DN6
59	GND	60	GND
61	CPU2_PE3B_TX_C_DP5	62	CPU2_PE3B_RX_DP5
63	CPU2_PE3B_TX_C_DN5	64	CPU2_PE3B_RX_DN5
65	GND	66	GND
67	CPU2_PE3B_TX_C_DP4	68	CPU2_PE3B_RX_DP4
69	CPU2_PE3B_TX_C_DN4	70	CPU2_PE3B_RX_DN4
71	GND	72	GND
73	CPU2_PE3A_TX_C_DP3	74	CPU2_PE3A_RX_DP3
75	CPU2_PE3A_TX_C_DN3	76	CPU2_PE3A_RX_DN3
77	GND	78	GND
79	CPU2_PE3A_TX_C_DP2	80	CPU2_PE3A_RX_DP2
81	CPU2_PE3A_TX_C_DN2	82	CPU2_PE3A_RX_DN2

Pin	Definition	Pin	Definition
83	GND	84	GND
85	CPU2_PE3A_TX_C_DP1	86	CPU2_PE3A_RX_DP1
87	CPU2_PE3A_TX_C_DN1	88	CPU2_PE3A_RX_DN1
89	GND	90	GND
91	CPU2_PE3A_TX_C_DP0	92	CPU2_PE3A_RX_DP0
93	CPU2_PE3A_TX_C_DN0	94	CPU2_PE3A_RX_DN0
95	GND	96	GND
97	CPU2_PE_HP_SCL	98	TACH_SWB_FAN2
99	CPU2_PE_HP_SDA	100	PWM_CPU2_SWB

120-pin Con31

Pin	Definition	Pin	Definition
1	TPC20t T29	2	T27 TPC20t
3	CPU2_SKTOCC#	4	T28 TPC20t
5	TACH_SWB_FAN4	6	BMC_ALERT3
7	TACH_SWB_FAN7	8	BMC_SMB_PMB_CLK
9	GND	10	BMC_SMB_PMB_DATA
11	PCIE_RST#	12	GND
13	WAKE#	14	SMB_CLK_PCI
15	PWROK_PS	16	SMB_DATA_PCI
17	SWB_PWROK	18	GND
19	GND	20	BMC_ALERT1
21	SWB_ID1	22	BMC_SMBCLK1
23	SWB_ID2	24	BMC_SMBDATA1
25	GND	26	GND
27	CPU2_PE2D_TX_C_DP15	28	CPU2_PE2D_RX_DP15
29	CPU2_PE2D_TX_C_DN15	30	CPU2_PE2D_RX_DN15
31	GND	32	GND
33	CPU2_PE2D_TX_C_DP14	34	CPU2_PE2D_RX_DP14
35	CPU2_PE2D_TX_C_DN14	36	CPU2_PE2D_RX_DN14
37	GND	38	GND
39	CPU2_PE2D_TX_C_DP13	40	CPU2_PE2D_RX_DP13
41	CPU2_PE2D_TX_C_DN13	42	CPU2_PE2D_RX_DN13
43	GND	44	GND
45	CPU2_PE2D_TX_C_DP12	46	CPU2_PE2D_RX_DP12
47	CPU2_PE2D_TX_C_DN12	48	CPU2_PE2D_RX_DN12
49	GND	50	GND
51	CPU2_PE2C_TX_C_DP11	52	CPU2_PE2C_RX_DP11
53	CPU2_PE2C_TX_C_DN11	54	CPU2_PE2C_RX_DN11
55	GND	56	GND
57	CPU2_PE2C_TX_C_DP10	58	CPU2_PE2C_RX_DP10
59	CPU2_PE2C_TX_C_DN10	60	CPU2_PE2C_RX_DN10
61	GND	62	GND
63	CPU2_PE2C_TX_C_DP9	64	CPU2_PE2C_RX_DP9
65	CPU2_PE2C_TX_C_DN9	66	CPU2_PE2C_RX_DN9
67	GND	68	GND
69	CPU2_PE2C_TX_C_DP8	70	CPU2_PE2C_RX_DP8
71	CPU2_PE2C_TX_C_DN8	72	CPU2_PE2C_RX_DN8
73	GND	74	GND
75	CPU2_PE2B_TX_C_DP7	76	CPU2_PE2B_RX_DP7
77	CPU2_PE2B_TX_C_DN7	78	CPU2_PE2B_RX_DN7
79	GND	80	GND
81	CPU2_PE2B_TX_C_DP6	82	CPU2_PE2B_RX_DP6

Pin	Definition	Pin	Definition
83	CPU2_PE2B_TX_C_DN6	84	CPU2_PE2B_RX_DN6
85	GND	86	GND
87	CPU2_PE2B_TX_C_DP5	88	CPU2_PE2B_RX_DP5
89	CPU2_PE2B_TX_C_DN5	90	CPU2_PE2B_RX_DN5
91	GND	92	GND
93	CPU2_PE2B_TX_C_DP4	94	CPU2_PE2B_RX_DP4
95	CPU2_PE2B_TX_C_DN4	96	CPU2_PE2B_RX_DN4
97	GND	98	GND
99	CPU2_PE2A_TX_C_DP3	100	CPU2_PE2A_RX_DP3
101	CPU2_PE2A_TX_C_DN3	102	CPU2_PE2A_RX_DN3
103	GND	104	GND
105	CPU2_PE2A_TX_C_DP2	106	CPU2_PE2A_RX_DP2
107	CPU2_PE2A_TX_C_DN2	108	CPU2_PE2A_RX_DN2
109	GND	110	GND
111	CPU2_PE2A_TX_C_DP1	112	CPU2_PE2A_RX_DP1
113	CPU2_PE2A_TX_C_DN1	114	CPU2_PE2A_RX_DN1
115	GND	116	GND
117	CPU2_PE2A_TX_C_DP0	118	CPU2_PE2A_RX_DP0
119	CPU2_PE2A_TX_C_DN0	120	CPU2_PE2A_RX_DN0

2.8 Driver Installation Guide

To install the drivers to your system, please insert the support CD to your optical drive first. Then, the drivers compatible to your system can be auto-detected and listed on the support CD driver page. Please follow the order from top to bottom to install those required drivers. Therefore, the drivers you install can work properly.

2.9 Dual LAN and Teaming Operation Guide

Dual LAN with Teaming enabled on this motherboard allows two single connections to act as one single connection for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.



The speed of transmission is subject to the actual network environment or status even with Teaming enabled.

Before setting up Teaming, please make sure whether your Switch (or Router) supports Teaming (IEEE 802.3ad Link Aggregation). You can specify a preferred adapter in Intel PROSet. Under normal conditions, the Primary adapter handles all non-TCP/IP traffic. The Secondary adapter will receive fallback traffic if the primary fails. If the Preferred Primary adapter fails, but is later restored to an active status, control is automatically switched back to the Preferred Primary adapter.

Step 1

From **Device Manager**, open the properties of a team.

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

Select the adapter you want to be the primary adapter and click the **Set Primary** button.

If you do not specify a preferred primary adapter, the software will choose an adapter of the highest capability (model and speed) to act as the default primary. If a failover occurs, another adapter becomes the primary. The adapter will, however, rejoin the team as a non-primary.

Chapter 3 UEFI Setup Utility

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY; otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Item	Description
Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
IntelRCSetup	For Intel CPU and chipset settings
Server Mgmt	To manage the server
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Event Logs	For event log configuration
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use <←→> key or <→> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Tab>	Switch to next function
<Enter>	To bring up the selected screen
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the UEFI SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

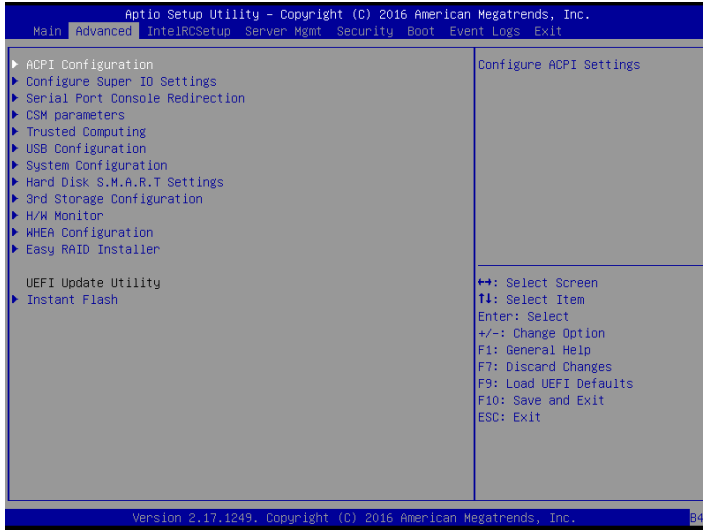
3.2 Main Screen

Once you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. The Main screen provides system overview information and allows you to set the system time and date.



3.3 Advanced Screen

In this section, you may set the configurations for the following items: ACPI Configuration, Configure Super IO Settings, Serial Port Console Redirection, CSM Configuration, Trusted Computing, USB Configuration, System Configuration, Hard Disk S.M.A.R.T. Settings, 3rd Storage Configuration, H/W Monitor, WHEA Configuration, Easy RAID Installer and Instant Flash.



Setting wrong values in this section may cause the system to malfunction.

3.3.1 ACPI Configuration



PCI Devices Power On

Use this item to enable or disable PCI devices to turn on the system from the power-soft-off mode.

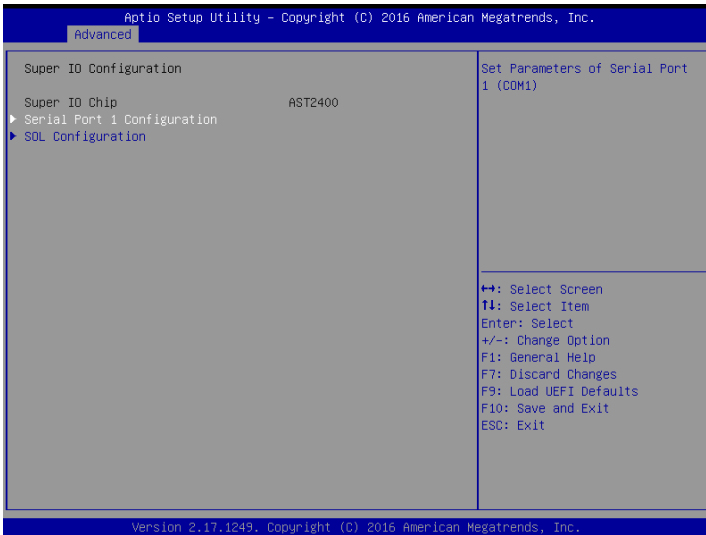
Ring-In Power On

Use this item to enable or disable Ring-In signals to turn on the system from the power-soft-off mode.

RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

3.3.2 Configure Super IO Settings



Serial Port 1 Configuration

Use this item to configure the onboard serial port 1.

Select and enter the "Serial Port 1 Configuration" and you will see the followings:

Serial Port

Use this item to enable or disable the onboard serial port.

Serial Port Address

Use this item to select an optimal setting for Super IO device.

SOL Configuration

Use this item to configure the onboard serial port 2.

Select and enter the "Serial Port 2 Configuration" and you will see the followings:

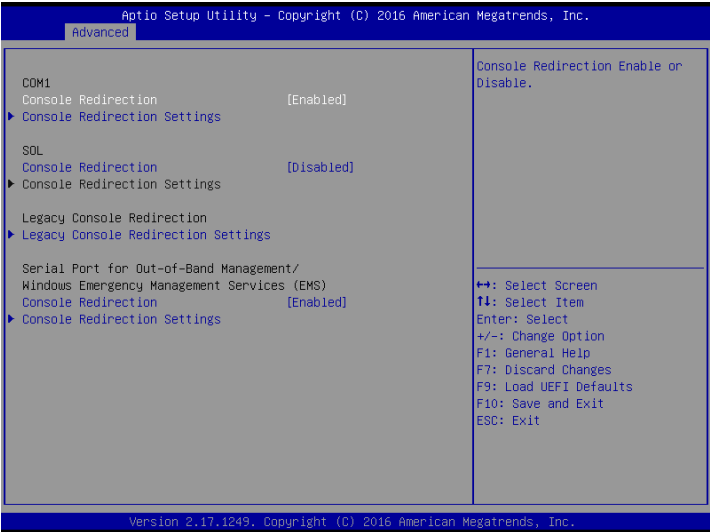
Serial Port

Use this item to enable or disable the onboard serial port.

Serial Port Address

Use this item to select an optimal setting for Super IO device.

3.3.3 Serial Port Console Redirection



COM1 / SOL

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, you can select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [57600] and [115200].

Data Bits

Use this item to set the data transmission size. The options include [7] and [8] (Bits).

Parity

Use this item to select the parity bit. The options include [None], [Even], [Odd], [Mark] and [Space].

Stop Bits

The item indicates the end of a serial data packet. The standard setting is [1] Stop Bit. Select [2] Stop Bits for slower devices.

Flow Control

Use this item to set the flow control to prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None] and [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable or disable the VT-UTF8 Combo Key Support for ANSI/VT100 terminals.

Recorder Mode

Use this item to enable or disable Recorder Mode to capture terminal data and send it as text messages.

Resolution 100x31

Use this item to enable or disable extended terminal resolution support.

Legacy OS Redirection Resolution

Use this item to select the number of rows and columns used in legacy OS redirection.

Putty Keypad

Use this item to select Function Key and Keypad on Putty.

Redirection After BIOS POST

If the [LoadBooster] is selected, legacy console redirection is disabled before booting to legacy OS. If [Always Enabled] is selected, legacy console redirection is enabled for legacy OS. The default value is [Always Enabled].

Legacy Console Redirection Settings**Legacy Serial Redirection Port**

Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, you can select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how your computer and the host computer to which you are connected exchange information.

Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [57600] and [115200].

Flow Control

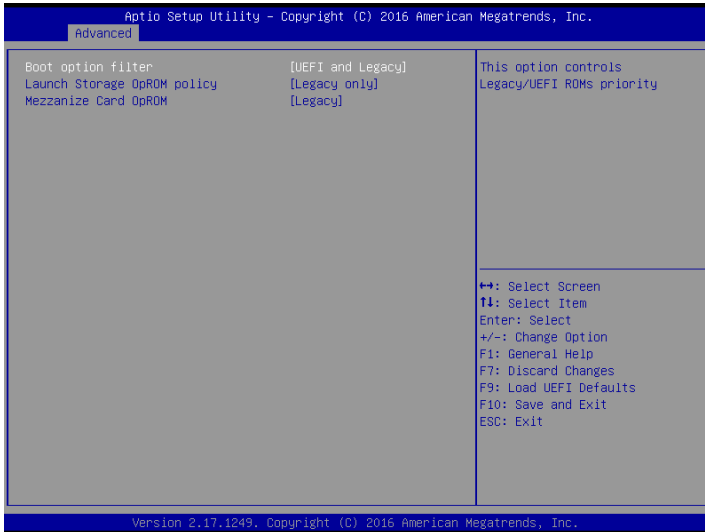
Use this item to set the flow control to prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None], [Hardware RTS/CTS], and [Software Xon/Xoff].

Data Bits

Parity

Stop Bits

3.3.4 CSM Configuration



Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

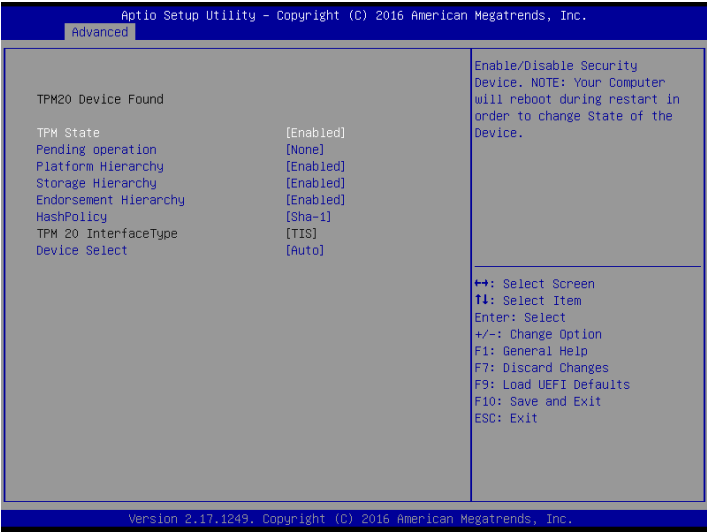
Launch Storage OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.

Mezzanine Card OpROM

This option controls Legacy/UEFI ROMs priority.

3.3.5 Trusted Computing



NOTE: Options vary depending on the version of your connected TPM module. Here is an example of TPM2.0.

TPM State

Use this item to enable or disable Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Pending Operation

Schedule an Operation for the Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Platform Hierarchy

Use this item to enable or disable Platform Hierarchy.

Storage Hierarchy

Use this item to enable or disable Storage Hierarchy.

Endorsement Hierarchy

Use this item to enable or disable Endorsement Hierarchy.

Hash Policy

Select the Hash policy to use. SHA-2 is most secure but might not be supported by all Operating Systems.

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 TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

3.3.6 USB Configuration



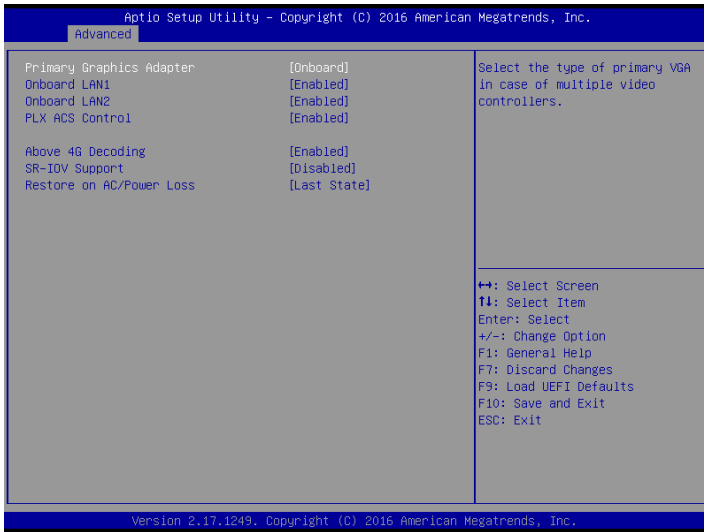
Intel USB3.0 Mode

Enable or disable all the USB 3.0 ports.

Legacy USB 3.0 Support

Enable or disable support for legacy USB devices.

3.3.7 System Configuration



Primary Graphics Adapter

If PCI Express graphics card is installed on the motherboard, you may use this option to select PCI Express or Onboard as the primary graphics adapter.

Onboard LAN1

This allows you to enable or disable the Onboard LAN 1 feature.

Onboard LAN2

This allows you to enable or disable the Onboard LAN 2 feature.

PLX ACS Control

This allows you to enable or disable the PLX ACS.

Above 4G Decoding

Enable or disable 64bit capable Devices to be decoded in Above 4G Address Space (only if the system supports 64 bit PCI decoding).

SR-IOV Support

If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

Restore on AC/Power Loss

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers.

3.3.8 3rd Storage Configuration



Marvell 9172 Controller

Enable or disable Marvell 9172 Controller.

Marvell 9172 Operation Mode

This item is for eSATA ports. Use this to select Marvell SATA operation mode.

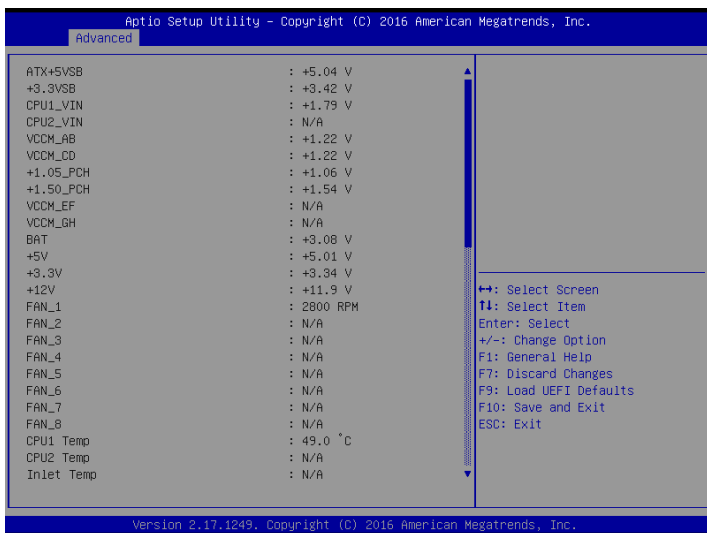
Configuration options: [Disabled], [IDE Mode], [AHCI Mode], and [RAID Mode]. The default value is [AHCI Mode].

Bootable Marvell 9172 SATA3

We recommend to use Intel SATA ports (Port 0~5) for your bootable devices. This will minimize your boot time and get the best performance. If you still want to boot from Marvell SATA3 controller, please set this item to Yes.

3.3.9 H/W Monitor

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



Fan Control

If [Auto] is selected, the fan speed will be controlled by BMC.

If [Manual] is selected, configure the items below.

CPU1_FAN 1

This allows you to set the CPU 1 fan 1's speed. The default value is [Smart Fan].

CPU2_FAN 1

This allows you to set the CPU 2 fan 1's speed. The default value is [Smart Fan].

REAR_FAN 1

This allows you to set the rear fan 1's speed. The default value is [Smart Fan].

FRNT_FAN 1

This allows you to set the front fan 1's speed. The default value is [Smart Fan].

FRNT_FAN 2

This allows you to set the front fan 2's speed. The default value is [Smart Fan].

Smart Fan Control

This allows you to set the Smart fan's level speed.

Smart Fan Duty Control

Smart Fan Duty x (x means 1 to 11 stage)

This allows you to set duty cycle for each stage.

Smart Fan Temp Control

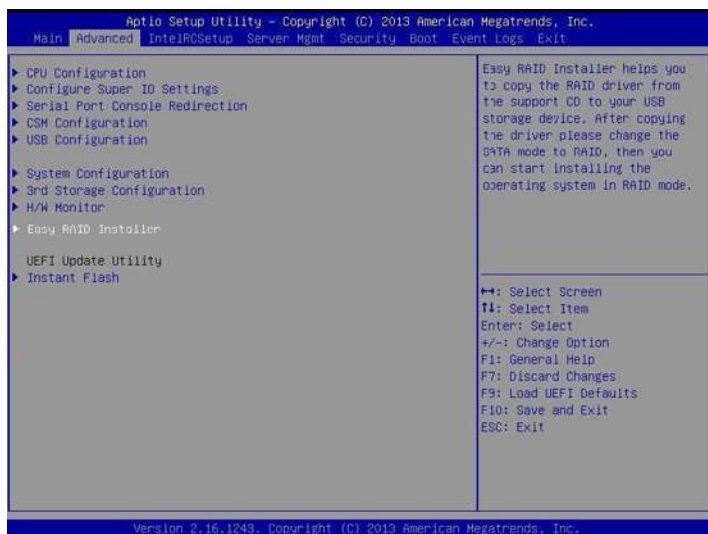
Smart Fan Temp x (x means 1 to 11 stage)

This allows you to set temperature for each stage.

Watch Dog Timer

This allows you to enable or disable the Watch Dog Timer. The default value is [Disabled].

3.3.10 Easy RAID Installer



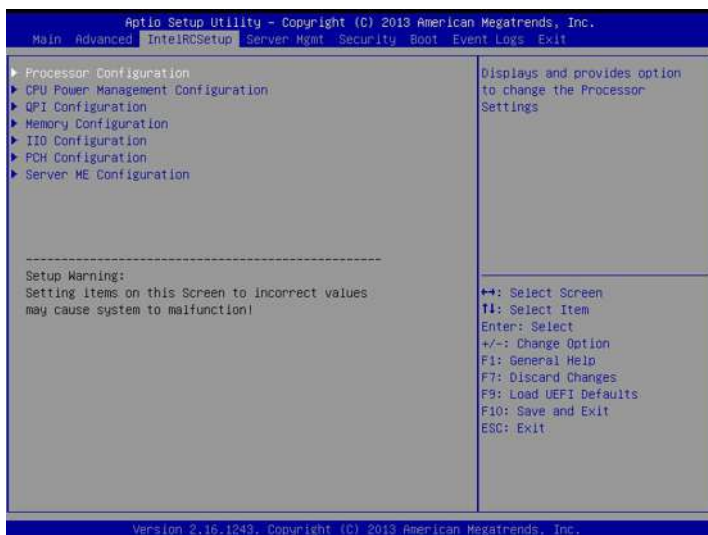
Easy RAID Installer can help you to copy the RAID driver from a support CD to your USB storage device. After copying the RAID driver to your USB storage device, please change "SATA Mode" to "RAID", then you can start installing the OS in RAID mode.

3.3.11 Instant Flash

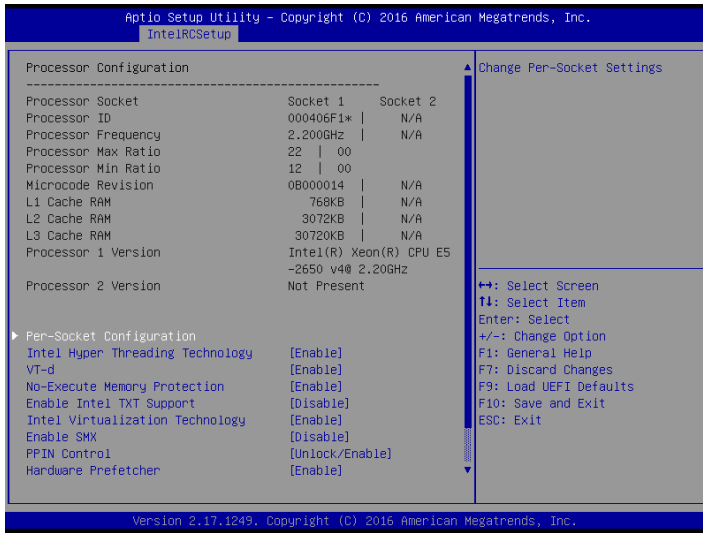
Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows[®]. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed.

3.4 IntelRCSetup

In this section, you may set the configurations for the following items: Processor Configuration, CPU Power Management Configuration, QPI Configuration, Memory Configuration, IIO Configuration, PCH Configuration and Server ME Configuration.



3.4.1 Processor Configuration



Per-Socket Configuration

Change Per-Socket Settings.

CPU Socket 1 Configuration

Active Processor Cores

Enter the number of cores to be enabled. 0 means all cores. 12 cores are available.

CPU Socket 2 Configuration

Active Processor Cores

Enter the number of cores to be enabled. 0 means all cores. 12 cores are available.

Intel Hyper Threading Technology

Intel Hyper Threading Technology allows multiple threads to run on each core, so that the overall performance on threaded software is improved.

VT-d

Intel Virtualization Technology for Directed I/O helps your virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

No-Execute Memory Protection

Processors with No-Execution Memory Protection Technology may prevent certain classes of malicious buffer overflow attacks.

Enable Intel TXT Support

Enable Intel Trusted Execution Technology configuration. Please disable "EX DFX Features" when TXT is enabled.

Intel Virtualization Technology

Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.

Enable SMX

Use this item to enable Safer Mode Extensions.

PPIN Control

Use this item to unlock and Enable/Disable PPIN Control.

Hardware Prefetcher

Automatically prefetch data and code for the processor. Enable for better performance.

Adjacent Cache Prefetch

Automatically prefetch the subsequent cache line while retrieving the currently requested cache line. Enable for better performance.

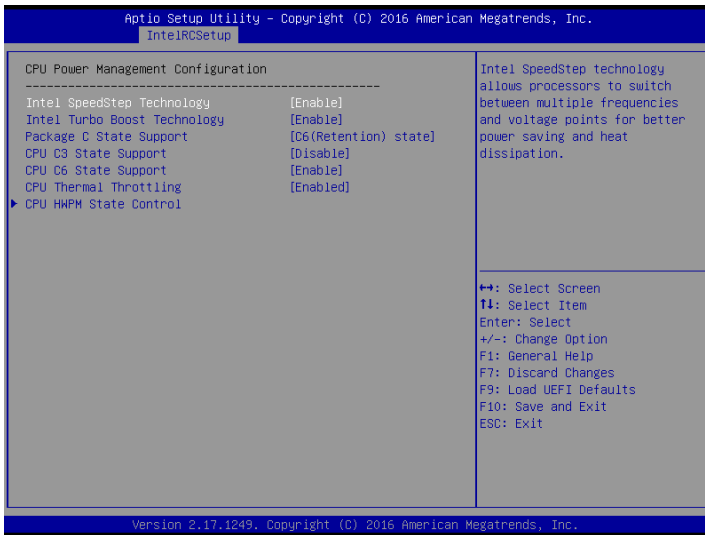
DCU Streamer Prefetcher

DCU streamer prefetcher is an L1 data cache prefetcher (MSR 1A4h [2]).

DCU IP Prefetcher

DCU IP prefetcher is an L1 data cache prefetcher (MSR 1A4h [3]).

3.4.2 CPU Power Management Configuration



Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® Vista™ / 7 / 8 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel(R) SpeedStep technology.



Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Use this item to enable or disable Intel Turbo Boost Technology. Turbo Boost allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

Package C State Support

Enable CPU, PCIe, Memory, Graphics C State Support for power saving.

CPU C3 State Support

Enable C3 sleep state for lower power consumption.

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

CPU Thermal Throttling

Enable CPU internal thermal control mechanisms to keep the CPU from overheating.

CPU HWPM State Control

CPU HWPM State Control controls configuration sub menu, includes Native and 00B nd etc.

Enable CPU HWPM

Enable CPU HWPM for CPU for better Energy performance.

Enable CPU Autonomous Cstate

Enable CPU Autonomous Cstate which is CPU converts HALT instruction to MWAIT.

3.4.3 QPI Configuration



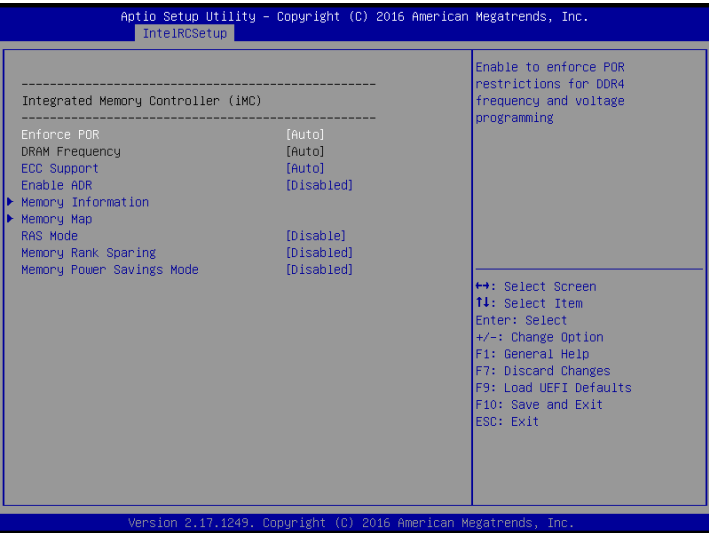
Link Speed Mode

Select the QPI link speed as either the POR speed (Fast) or default speed (Slow).

Link Frequency Select

Allows for selecting the QPI Link Frequency.

3.4.4 Memory Configuration



Enforce POR

Enable to enforce POR restrictions for DDR4 frequency and voltage programming.

DRAM Frequency

ECC Support

Use this item to enable or disable DDR ECC Support.

Enable ADR

Use this item to enable the ADR.

Memory Information

Displays memory topology with DIMM population information.

Memory Map

Set memory mapping settings.

Channel Interleaving

Select to configure Channel Interleaving settings.

Rank Interleaving

Select to configure Rank Interleaving settings.

RAS Mode

Enable or disable RAS modes. Enabling Sparing and Mirroring is not supported. If enabled, Sparing will be selected.

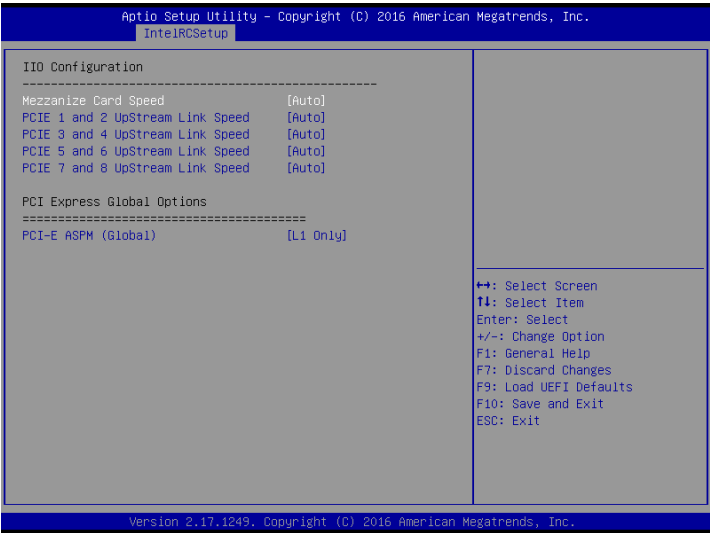
Memory Rank Sparing

Enable or disable Memory Rank Sparing.

Memory Power Savings Mode

Use this item to configure CKE and related Memory Power Savings Features.

3.4.5 IIO Configuration



Mezzanine Card Speed

This allows you to select Mezzanine Card Speed. The default value is [Auto].

PCIE 1 and PCIE 2 Upstream Link Speed *(only for the EP2C612D16FM motherboard)*

This allows you to select PCIE 1 and PCIE 2 Upstream Link Speed. The default value is [Auto].

PCIE 3 and PCIE 4 Upstream Link Speed *(only for the EP2C612D16FM motherboard)*

This allows you to select PCIE 3 and PCIE 4 Upstream Link Speed. The default value is [Auto].

PCIE 5 and PCIE 6 Upstream Link Speed *(only for the EP2C612D16FM motherboard)*

This allows you to select PCIE 5 and PCIE 6 Upstream Link Speed. The default value is [Auto].

PCIE 7 and PCIE 8 Upstream Link Speed *(only for the EP2C612D16FM motherboard)*

This allows you to select PCIE 7 and PCIE 8 Upstream Link Speed. The default value is [Auto].

PCI-E ASPM (Global)

This option enables or disables the ASPM support for all downstream devices.

3.4.6 PCH Configuration



PCI-E ASPM Support (Global)

This option enables or disables the ASPM support for all downstream devices.

PCH sSATA Configuration

sSATA devices and settings

sSATA Controller

Use this item to enable or disable SATA Controller.

sSATA Mode Selection

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.

sSATA AHCI LPM

Use this item to enable or disable Link Power Management.

sSATA Aggressive Link Power Mgmt

Use this item to enable or disable SALP.

*This item is not available when the sSATA AHCI LPM is set to [Disabled].

sSATA_0 / 1 / 2 / 3

Hot Plug

Designates this port as Hot Plugglable.

External SATA

External SATA configuration.

Spin Up Device

If enabled for any of ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

sSATA Rx Setting

Adjust sSATA DTLE DATA Values (0-15).

sSATA Device Type

Identify the SATA port connected to Solid State Drive or Hard Disk Drive.

PCH SATA Configuration

SATA devices and settings

SATA Controller

Use this item to enable or disable SATA Controller.

SATA Mode Selection

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. Press <Ctrl+I> to enter RAID ROM during UEFI POST process.

SATA AHCI LPM

Use this item to enable or disable Link Power Management.

SATA Aggressive Link Power Mgmt

Use this item to enable or disable SALP.

*This item is not available when the SATA AHCI LPM is set to [Disabled].

SATA_0 / 1 / 2 / 3

Hot Plug

Designates this port as Hot Plugglable.

External SATA

External SATA configuration.

Spin Up Device

If enabled for any of ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

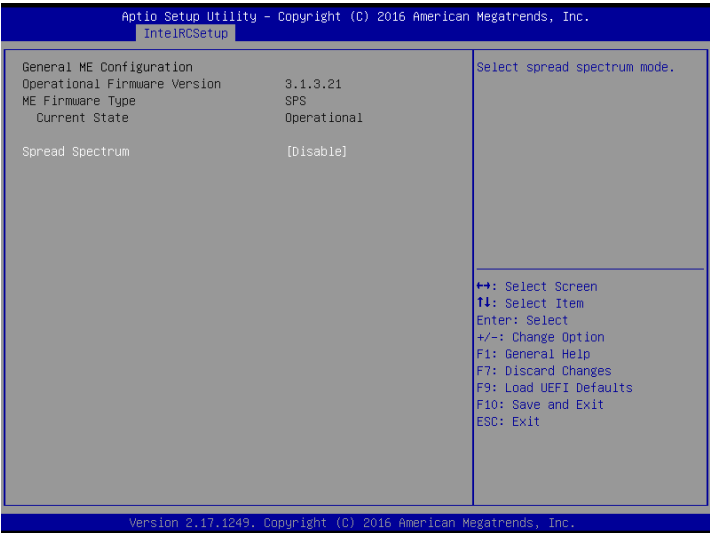
SATA Rx Setting

Adjust sSATA DTLE DATA Values (0-15).

SATA Device Type

Identify the SATA port connected to Solid State Drive or Hard Disk Drive.

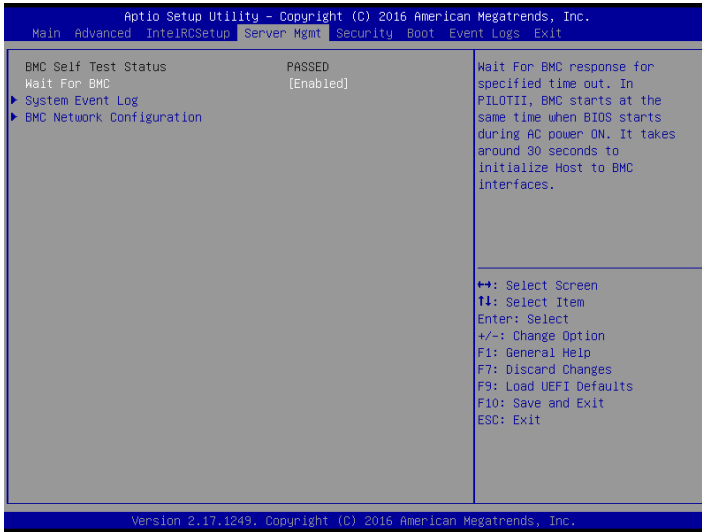
3.4.7 Server ME Configuration



Spread Spectrum

Use this item to enable or disable spread spectrum.

3.5 Server Mgmt



Wait For BMC

Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.

SEL Components

Change this to enable or disable all features of System Event Logging during boot.

Erase SEL

Use this to choose options for erasing SEL.

When SEL is Full

Use this to choose options for reactions to a full SEL.

Log EFI Status Codes

Use this item to disable the logging of EFI Status Codes or log only error code or only progress or both.

NCSI (eth0) / IPMI (eth1)

Manual setting IPMI LAN

If [No] is selected, the IP address is assigned by DHCP. If you prefer using a static IP address, toggle to [Yes], and the changes take effect after the system reboots. The default value is [No].

Configuration Address Source

Select to configure BMC network parameters statically or dynamically (by BIOS or BMC). Configuration options: [Static] and [DHCP].

Static: Manually enter the IP Address, Subnet Mask and Gateway Address in the BIOS for BMC LAN channel configuration.

DHCP: IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server.



The default login information for the IPMI web interface is:

Username: admin

Password: admin

For more instructions on how to set up remote control environment and use the IPMI management platform, please refer to the IPMI Configuration User Guide or go to the Support website at: <http://www.asrockrack.com/support/ipmi.asp>



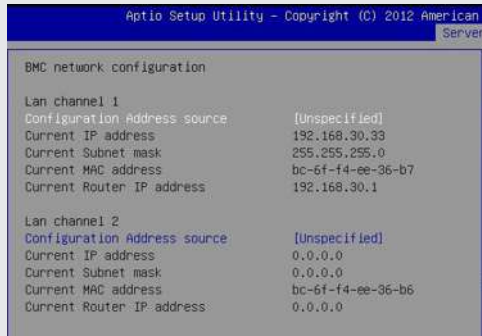
Please refer to the table below for the LAN interface mapping to check the MAC address through either BIOS or Web interface.

BMC LAN Interface Mapping Table

I/O Panel	BIOS Menu	IPMI Web Page
LAN1 Port (NCSI)	Lan Channel 1	eth0
IPMI Port	Lan Channel 2	eth1

BIOS Menu

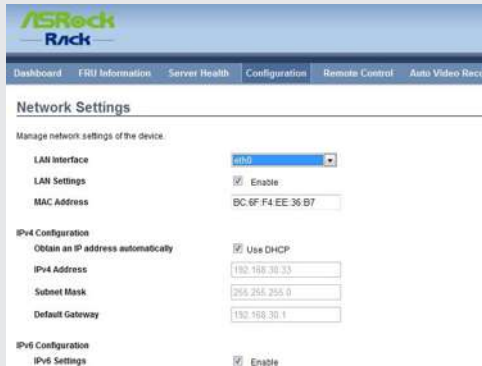
Server Mgmt
tab



(Example image only)

IPMI Web Page

Configuration
> Network
Settings



(Example image only)

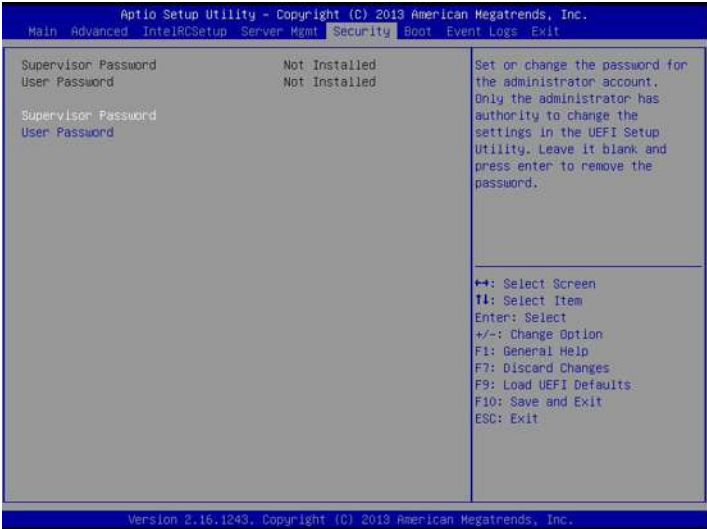
For more instructions on how to set up remote control environment and use the IPMI management platform, please refer to the IPMI Configuration User Guide or go to the Support website at: <http://www.asrockrack.com/support/ipmi.asp>

BMC Mac Backup Tool

Use this to restore BMC Mac from the backup.

3.6 Security

In this section, you may set or change the supervisor/user password for the system. For the user password, you may also clear it.



Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

3.7 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



Boot Option #1

Use this item to set the system boot order.

Boot Option #2

Use this item to set the system boot order.

Boot Option #3

Use this item to set the system boot order.

USB Device BBS Priorities

Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Boot Beep

Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Enabled].

AddOn ROM Display

Use this option to adjust AddOn ROM Display. If you enable the option “Full Screen Logo” but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

3.8 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

When entering the item, you will see the followings:

Smbios Event Log

Use this item to enable or disable all features of the SMBIOS Event Logging during system boot.

Erase Event Log

The options include [No], [Yes, Next reset] and [Yes, Every reset]. If Yes is selected, all logged events will be erased.

When Log is Full

Use this item to choose options for reactions to a full Smbios Event Log. The options include [Do Nothing] and [Erase Immediately].

MECI (Multiple Event Count Increment)

Use this item to enter the increment value for the multiple event counter. The valid range is from 1 to 255.

METW (Multiple Event Time Window)

Use this item to specify the number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

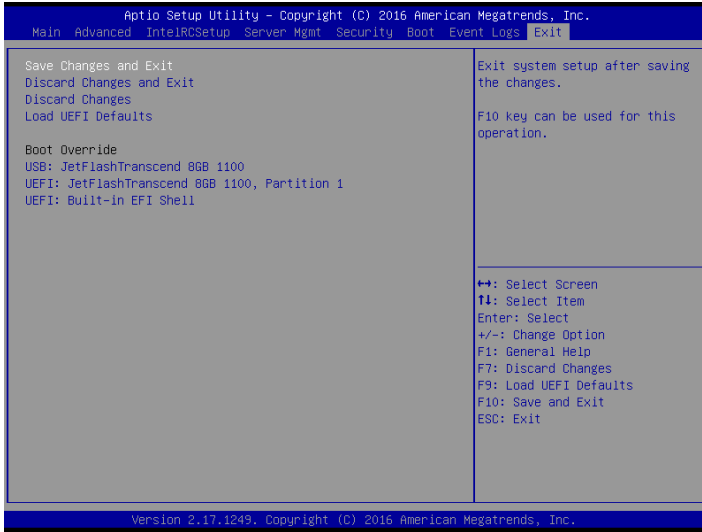
View Smbios Event Log

Press <Enter> to view the Smbios Event Log records.



All values changed here do not take effect until computer is restarted.

3.9 Exit Screen



Save Changes and Exit

When you select this option, the following message “Save configuration changes and exit setup?” will pop-out. Select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option, the following message “Discard changes and exit setup?” will pop-out. Select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, the following message “Discard changes?” will pop-out. Select [Yes] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Boot Override

These items displays the available devices. Select an item to start booting from the selected device.

Chapter 4 Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® Server 2008 R2 SP1 / 2012 / 2012 R2 / 2016 / Linux compliant. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASRSetup.exe" from the root folder in the Support CD to display the menu.

4.2.2 Drivers Menu

The Drivers Menu shows the available device's drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

4.2.3 Utilities Menu

The Utilities Menu shows the application softwares that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

4.2.4 Contact Information

If you need to contact ASRock Rack or want to know more about ASRock Rack, welcome to visit ASRock Rack's website at <http://www.ASRockRack.com>; or you may contact your dealer for further information.

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot your system.



Always unplug the power cord before adding, removing or changing any hardware components. Failure to do so may cause physical injuries to you and damages to motherboard components.

1. Disconnect the power cable and check whether the PWR LED is off.
2. Unplug all cables, connectors and remove all add-on cards from the motherboard.
Make sure that the jumpers are set to default settings.
3. Confirm that there are no short circuits between the motherboard and the chassis.
4. Install a CPU and fan on the motherboard, then connect the chassis speaker and power LED.

If there is no power...

1. Confirm that there are no short circuits between the motherboard and the chassis.
2. Make sure that the jumpers are set to default settings.
3. Check the settings of the 115V/230V switch on the power supply.
4. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.

If there is no video...

1. Try replugging the monitor cables and power cord.
2. Check for memory errors.

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR4 2133 R-DIMMs.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

1. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.
2. Confirm whether your power supply provides adequate and stable power.

Other problems...

1. Try searching keywords related to your problem on ASRock Rack's FAQ page:
<http://www.asrockrack.com/support>

5.2 Technical Support Procedures

If you have tried the troubleshooting procedures mentioned above and the problems are still unsolved, please contact ASRock Rack's technical support with the following information:

1. Your contact information
2. Model name, BIOS version and problem type.
3. System configuration.
4. Problem description.

You may contact ASRock Rack's technical support at:
<http://www.asrockrack.com/support/tsd.asp>

5.3 Returning Merchandise for Service

For warranty service, the receipt or a copy of your invoice marked with the date of purchase is required. By calling your vendor or going to our RMA website (<http://event.asrockrack.com/tsd.asp>) you may obtain a Returned Merchandise Authorization (RMA) number.

The RMA number should be displayed on the outside of the shipping carton which is mailed prepaid or hand-carried when you return the motherboard to the manufacturer. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty does not cover damages incurred in shipping or from failure due to alteration, misuse, abuse or improper maintenance of products.

Contact your distributor first for any product related problems during the warranty period.

Chapter 6 Net Framework Installation Guide

To let Intel® RSTe works properly, it is required to install Net Framework. Please follow the steps below to enable “.Net Framework” feature on Microsoft® Windows® Server 2008 R2.

6.1 Installing .Net Framework 3.5.1 (For Server 2008 R2)

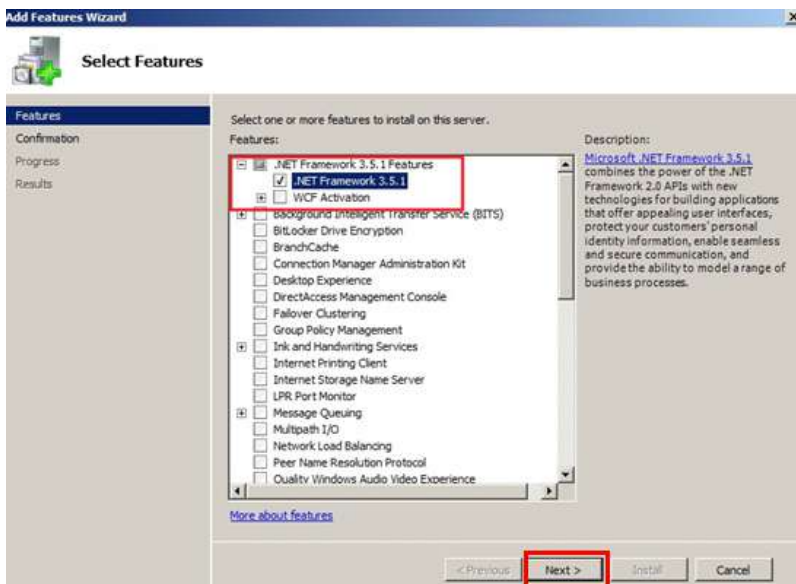
1. Double-click the Server Manager icon in the Windows system tray.



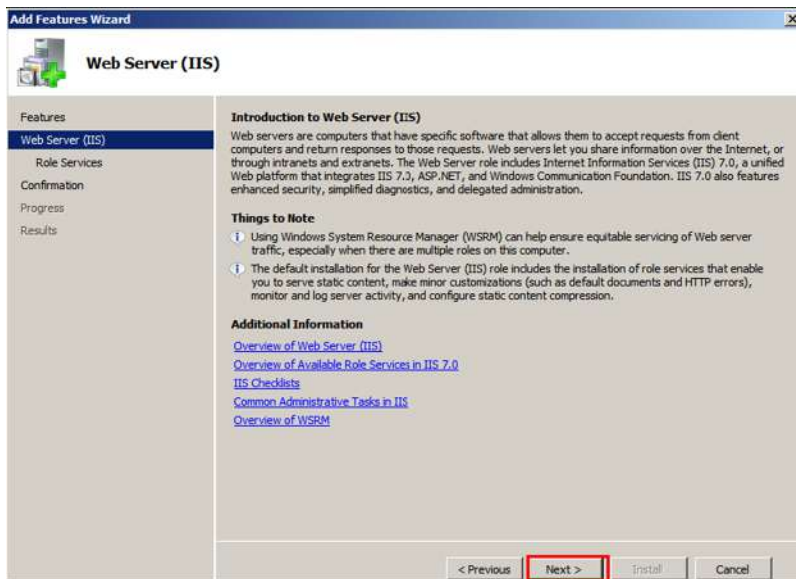
2. Click Add Features in the right hand pane.



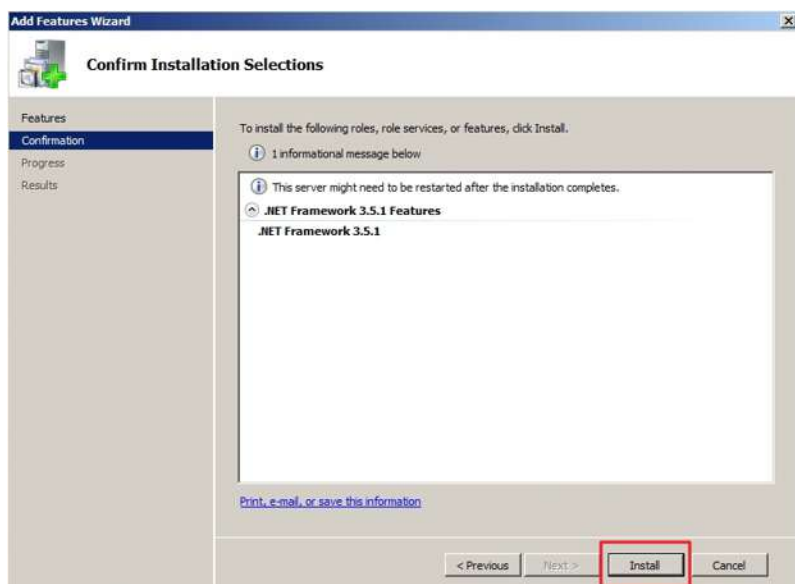
3. Check the box next to .Net Framework 3.5.1 and then click **Next**.



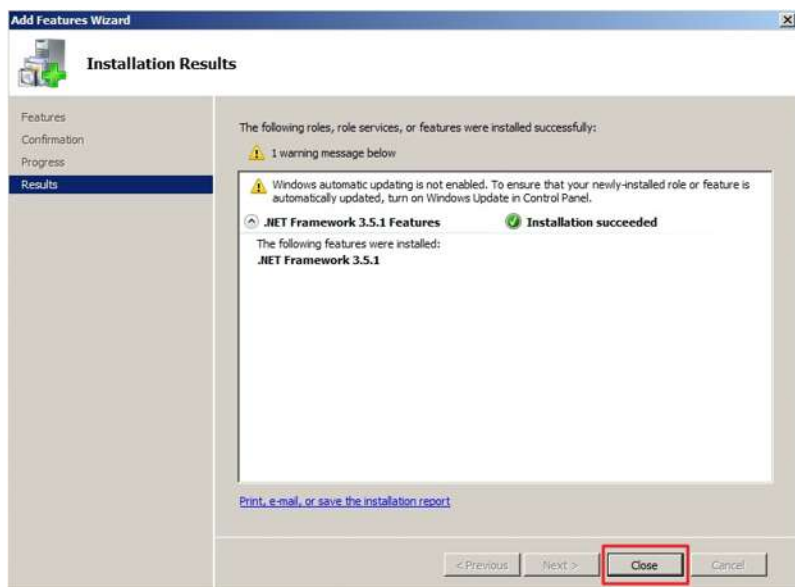
4. Click **Next** to continue.



5. Click **Install** to start installing .Net Framework 3.5.1.



6. After the installation completes, click **Close**.



Appendix Mezzanine Card Support List

This motherboard supports the following ASRock Rack mezzanine cards.

Mezz Card Type	Mezz Slot Type	Model
LAN Card	Mezz Type A	M350
LAN Card	Mezz Type A	M540
LAN Card	Mezz Type A	M599
LAN Card	Mezz Type A	M710
Storage Card	Mezz Type A	M3008S

**Please refer to our website for the latest support list.*

**Due to mechanical limits, use one type of the mezzanine card at a time.*