OPEN

Industry Standard, Flexible Architecture

GREEN

Less Heat, Less Power Consumption

STABLE

Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

EPC612D8A-TB
EPC612D8A
EPC612D8

User Manual

English

Version 1.1
Published October 2016
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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"

ASRock Rack's Website: www.ASRockRack.com

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 ***EPC612D8 Series*** 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 EPC612D8 / EPC612D8A / EPC612D8A-TB Motherboard (ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
- Support CD
- User Manual
- 4 x SATA3 Cables (50cm)
- 2 x SATA3 Cables (60cm)
- 1 x I/O Shield

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

English

1.2 Specifications

EPC612D8A / EPC612D8A-TB / EPC612D8	
MB Physical Status	
Form Factor	ATX
Dimension	12" x 9.6" (30.5 cm x 24.4 cm)
Processor System	
CPU	Intel® Xeon processor E5-1600/2600 v3/v4 series
Socket	Single Socket LGA 2011 R3
Chipset	Intel® C612
System Memory	
Capacity	8 DIMM slots
Type	- Quad Channel memory technology *(see Caution 3)* - Supports DDR4 2400*/2133/1866/1600 RDIMM and LRDIMM **Only E5-2600 V4 CPUs support DDR4 2400.*
Voltage	1.2V
DIMM Sizes	RDIMM: 32GB, 16GB, 8GB, 4GB LRDIMM: 64GB, 32GB
Expansion Slot *(Slot 7 is the closest to the CPU)*	
Slot 7	ME x16, EE x16 (x16/x0 or x8/x8 with slot 5)
Slot 6	ME x8, EE x8 (x8 if slot 4 mini PCIe is disabled)
Slot 5	ME x16, EE x8
Slot 4	mini PCIe x4 to support M.2 (Full and Half size support) **The M.2 slot shares lanes with PCIe Slot 6.*
Slot 3	ME x16, EE x16 (x16/x0 or x8/x8 with slot 1)
Slot 2	N/A
Slot 1	ME x16, EE x8
Storage	
SATA Controller	Intel® C612 : 6 x SATA3 6.0Gb/s; 4 x sSATA3 6.0Gb/s; support RAID 0, 1, 5, 10 (1 x SATA DOM)
Additional SATA Controller	Marvell 9172: 2 x SATA3 6Gbps
Ethernet	
Interface	1000 /100 /10 Mbps
LAN Controller	2 x RJ45 by Intel® i210 + Intel® i217 1 x RJ45 Dedicated IPMI LAN port - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports PXE

Management	
BMC Controller	ASPEED AST2400
IPMI Dedicated GLAN	- 1 x Realtek RTL8211E for dedicated management GLAN
Features	- Watch Dog - NMI
Gracphics	
Controller	ASPEED AST2400
VRAM	DDR3 16MB
Audio	
Audio code	***EPC612D8A-TB / EPC612D8A:*** Realtek ALC1150 ***EPC612D8:*** N/A
Rear Panel I/O	
VGA Port	1 x D-Sub
USB 2.0 Port	2
USB 3.0 Port	2
Lan Port	- 2 + 1 (IPMI) Lan port (RJ45) - LAN Ports with LED (ACT/LINK LED and SPEED LED)
Serial Port	1 (COM1)
ThunderBolt	***EPC612D8A-TB:*** 1 with DP_IN **The onboard Thunderbolt port is only supported on Windows 8.1 / 8 / 7.* ***EPC612D8A / EPC612D8:*** N/A
Audio Jack	***EPC612D8A-TB / EPC612D8A:*** 3 Jack ***EPC612D8:*** N/A
Internal Connector	
Auxiliary Panel Header	1 (include chassis intrusion , location button & LED , front LAN LED , system fault LED)
TPM Header	1
IPMB Header	1
Buzzer	1
Fan Header	1x CPU Fan, 4x system Fan (4-pin)
ATX Power	1 (24-pin) + 1 (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 2.0 Port	1
Front Panel	1

4 pin 5V box Connector	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	- CPU Temperature Sensing - System Temperature Sensing
Fan	- CPU/Rear/Front Fan Tachometer - CPU Quiet Fan (Allow Chassis Fan Speed Auto-Adjust by CPU Temperature) - CPU/Rear/Front Fan Multi-Speed Control
Voltage	Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore, DRAM, 1.05V_PCH, +BAT, 3VSB, 5VSB
Support OS	
OS	Microsoft® Windows® - Windows® 7 (32 / 64 bit) - Windows® 8 (32 / 64 bit) - Windows® 8.1 (32 / 64 bit) - Windows® 10 (64 bit) - Server 2008 R2 SP1 (64 bit) - Server 2012 (64 bit) - Server 2012 R2 (64 bit) Linux® - RedHat Enterprise Linux Server 6.5 (32 / 64 bit) - CentOS 5.10 / 6.5 (32 / 64 bit) - SUSE Enterprise Linux Server 11 SP3 (32 / 64 bit) - FreeBSD 9.2 (32 / 64 bit) - Fedora core 19 (64 bit) - Ubuntu 12.04.2 (64 bit) / 12.10 (64 bit) Virtual - VMWare® ESXi 5.5 *(not supported for Marvell 9172)* * Please refer to our website for the latest OS support list.
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 > 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, Marvell SATA utility or Realtek HD audio driver, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If you install the drivers only, it will pass the WHQL tests.

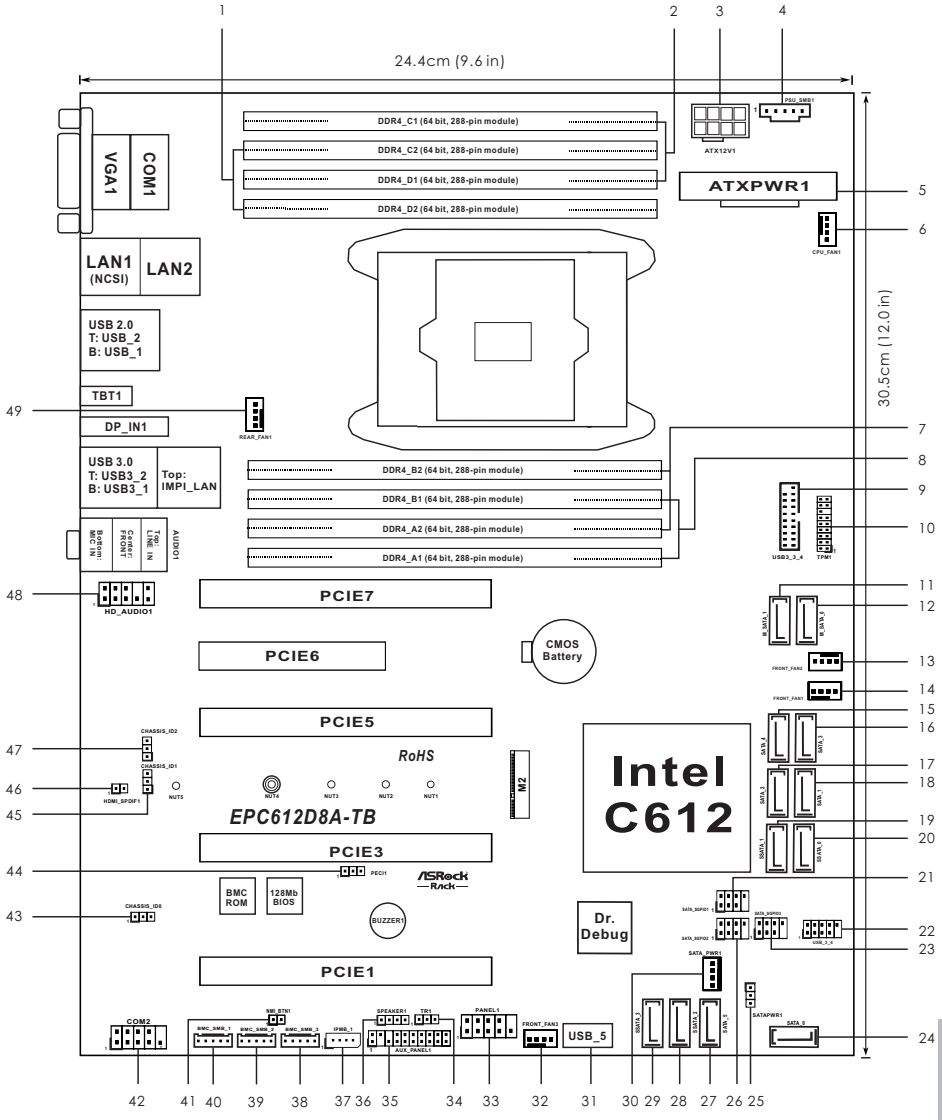
1. *About the setting of "Hyper Threading Technology", please check page 55.*
2. *Due to Intel® CPU spec definition, please install the memory modules on DDR4_A1, DDR4_B1, DDR4_C1 and DDR4_D1 for the first priority. If above four DDR4 DIMM slots are fully installed, and you want to use more than four memory modules, please install the other memory modules from left to right (from DDR4_A2, DDR4_B2, DDR4_D2 to DDR4_C2.)*
3. *Before you implement Quad Channel Memory Technology, make sure to read the installation guide of memory modules on page 25 for proper installation.*

1.3 Unique Features

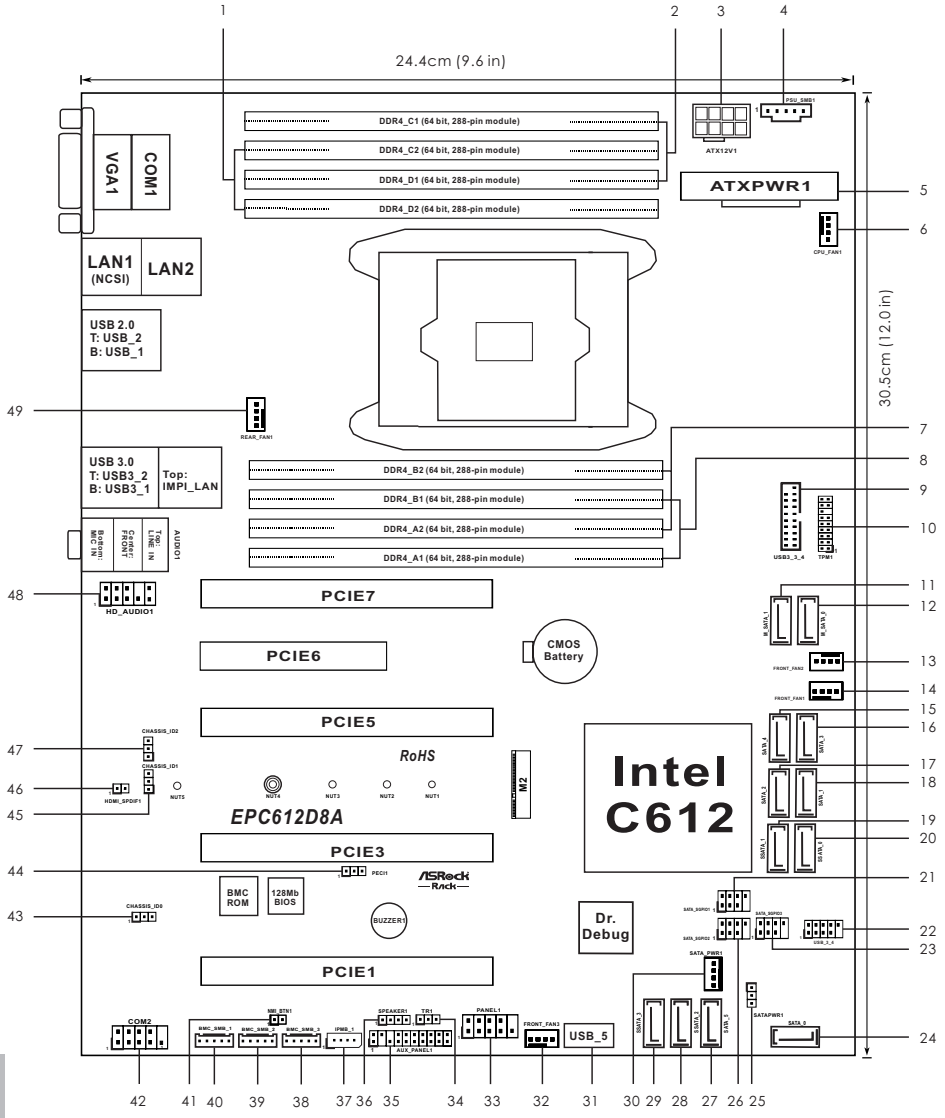
ASRock Rack Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, you can press the <F6> key during the POST or the <F2> key to enter into the 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.

1.4 Motherboard Layout

EPC612D8A-TB



EPC612D8A



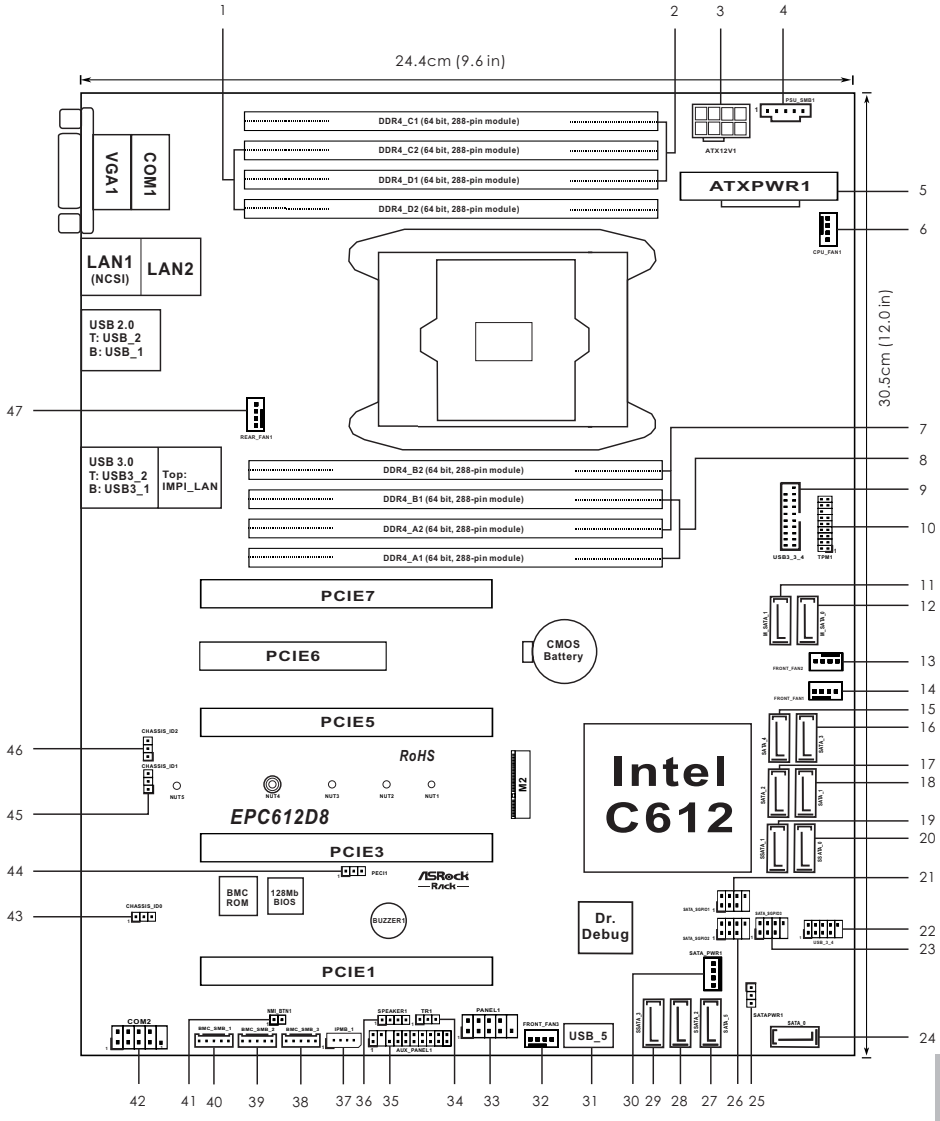
English

No.	Description
1	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)
2	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)
3	ATX 12V Power Connector (ATX12V1)
4	PSU SMBus (PSU_SMB1)
5	ATX Power Connector (ATXPWR1)
6	CPU Fan Connector (CPU_FAN1)
7	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
8	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
9	USB 3.0 Header (USB3_3_4)
10	TPM Header (TPM1)
11	SATA3 Connector (M_SATA_1), White
12	SATA3 Connector (M_SATA_0), White
13	Front Fan Connector (FRONT_FAN2)
14	Front Fan Connector (FRONT_FAN1)
15	SATA3 Connector (SATA_4), White
16	SATA3 Connector (SATA_3), White
17	SATA3 Connector (SATA_2), White
18	SATA3 Connector (SATA_1), White
19	SATA3 Connector (SSATA_1), White
20	SATA3 Connector (SSATA_0), White
21	SATA SGPIO Connector (SATA_SGPIO1)
22	USB 2.0 Header (USB_3_4)
23	SATA SGPIO Connector (SATA_SGPIO3)
24	SATA3 DOM Connector (SATA_0), Red
25	SATA DOM Power Jumper (SATAPWR1)
26	SATA SGPIO Connector (SATA_SGPIO2)
27	SATA3 Connector (SATA_5), White
28	SATA3 Connector (SSATA_2), White (Marvell 9172)
29	SATA3 Connector (SSATA_3), White (Marvell 9172)
30	SATA DOM Power Header (SATA_PWR1)
31	Vertical Type A USB 2.0 (USB_5)
32	Front Fan Connector (FRONT_FAN3)
33	System Panel Header (PANEL1)

No.	Description
34	Thermal Sensor header (TR1)
35	Auxiliary Panel Header (AUX_PANEL1)
36	Speaker Header (SPEAKER1)
37	Intelligent Platform Management Bus header (IPMB_1)
38	BMC SMBus Header (BMC_SMB_3)
39	BMC SMBus Header (BMC_SMB_2)
40	BMC SMBus Header (BMC_SMB_1)
41	Non Maskable Interrupt Button (NMI_BTN1)
42	COM Port Header (COM2)
43	Chassis ID0 Jumper (Chassis ID0)
44	CPU PECI Jumper (PECI1)
45	Chassis ID0 Jumper (Chassis ID1)
46	HDMI_SPDIF Header (HDMI_SPDIF1)
47	Chassis ID0 Jumper (Chassis ID2)
48	Front Panel Audio Header (HD_AUDIO1)
49	Rear Fan Connector (REAR_FAN1)

**The onboard Thunderbolt port is only supported on Windows 8.1 / 8 / 7.*

EPC612D8



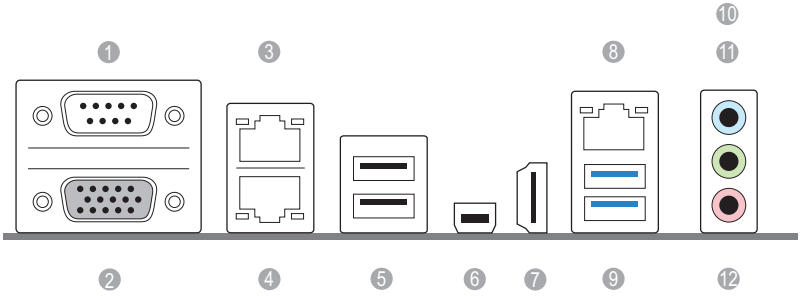
English

No.	Description
1	2 x 288-pin DDR4 DIMM Slots (DDR4_C2, DDR4_D2, White)
2	2 x 288-pin DDR4 DIMM Slots (DDR4_C1, DDR4_D1, Blue)
3	ATX 12V Power Connector (ATX12V1)
4	PSU SMBus (PSU_SMB1)
5	ATX Power Connector (ATXPWR1)
6	CPU Fan Connector (CPU_FAN1)
7	2 x 288-pin DDR4 DIMM Slots (DDR4_A2, DDR4_B2, White)
8	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1, Blue)
9	USB 3.0 Header (USB3_3_4)
10	TPM Header (TPM1)
11	SATA3 Connector (M_SATA_1), White
12	SATA3 Connector (M_SATA_0), White
13	Front Fan Connector (FRONT_FAN2)
14	Front Fan Connector (FRONT_FAN1)
15	SATA3 Connector (SATA_4), White
16	SATA3 Connector (SATA_3), White
17	SATA3 Connector (SATA_2), White
18	SATA3 Connector (SATA_1), White
19	SATA3 Connector (SSATA_1), White
20	SATA3 Connector (SSATA_0), White
21	SATA SGPIO Connector (SATA_SGPIO1)
22	USB 2.0 Header (USB_3_4)
23	SATA SGPIO Connector (SATA_SGPIO3)
24	SATA3 DOM Connector (SATA_0), Red
25	SATA DOM Power Jumper (SATAPWR1)
26	SATA SGPIO Connector (SATA_SGPIO2)
27	SATA3 Connector (SATA_5), White
28	SATA3 Connector (SSATA_2), White (Marvell 9172)
29	SATA3 Connector (SSATA_3), White (Marvell 9172)
30	SATA DOM Power Header (SATA_PWR1)
31	Vertical Type A USB 2.0 (USB_5)
32	Front Fan Connector (FRONT_FAN3)
33	System Panel Header (PANEL1)

No.	Description
34	Thermal Sensor header (TR1)
35	Auxiliary Panel Header (AUX_PANEL1)
36	Speaker Header (SPEAKER1)
37	Intelligent Platform Management Bus header (IPMB_1)
38	BMC SMBus Header (BMC_SMB_3)
39	BMC SMBus Header (BMC_SMB_2)
40	BMC SMBus Header (BMC_SMB_1)
41	Non Maskable Interrupt Button (NMI_BTN1)
42	COM Port Header (COM2)
43	Chassis ID0 Jumper (Chassis ID0)
44	CPU PECI Jumper (PECI1)
45	Chassis ID0 Jumper (Chassis ID1)
46	Chassis ID0 Jumper (Chassis ID2)
47	Rear Fan Connector (REAR_FAN1)

1.5 I/O Panel

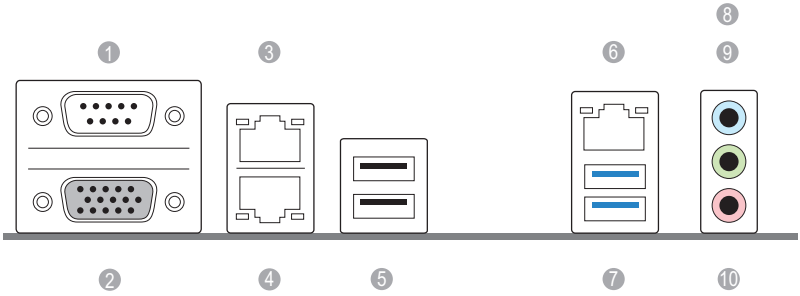
EPC612D8A-TB



No.	Description	No.	Description
1	Serial Port (COM1)	7	Display Port Input (DP_IN1)
2	VGA Port (VGA1)	8	LAN RJ-45 Port (IPMI_LAN)**
3	LAN RJ-45 Port (LAN2)*	9	USB 3.0 Ports (USB3_1-2)
4	LAN RJ-45 Port (LAN1)* (NCSI)	10	Front Speaker (Lime)
5	USB 2.0 Ports (USB_1_2)	11	Microphone (Pink)
6	Thunderbolt Port (TBT1)	12	Line In (Light Blue)

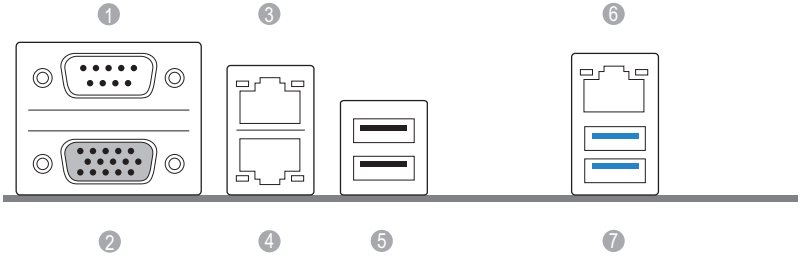
**The onboard Thunderbolt port is only supported on Windows 8.1 / 8 / 7.*

EPC612D8A



No.	Description	No.	Description
1	Serial Port (COM1)	6	LAN RJ-45 Port (IPMI_LAN)**
2	VGA Port (VGA1)	7	USB 3.0 Ports (USB3_1-2)
3	LAN RJ-45 Port (LAN2)*	8	Front Speaker (Lime)
4	LAN RJ-45 Port (LAN1)* (NCSI)	9	Microphone (Pink)
5	USB 2.0 Ports (USB_1_2)	10	Line In (Light Blue)

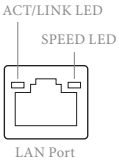
EPC612D8



No.	Description	No.	Description
1	Serial Port (COM1)	5	USB 2.0 Ports (USB_1_2)
2	VGA Port (VGA1)	6	LAN RJ-45 Port (IPMI_LAN)**
3	LAN RJ-45 Port (LAN2)*	7	USB 3.0 Ports (USB3_1-2)
4	LAN RJ-45 Port (LAN1)* (NCSI)		

LAN Port LED Indications

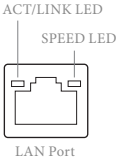
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity (100Mbps)	Orange	100Mbps 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.

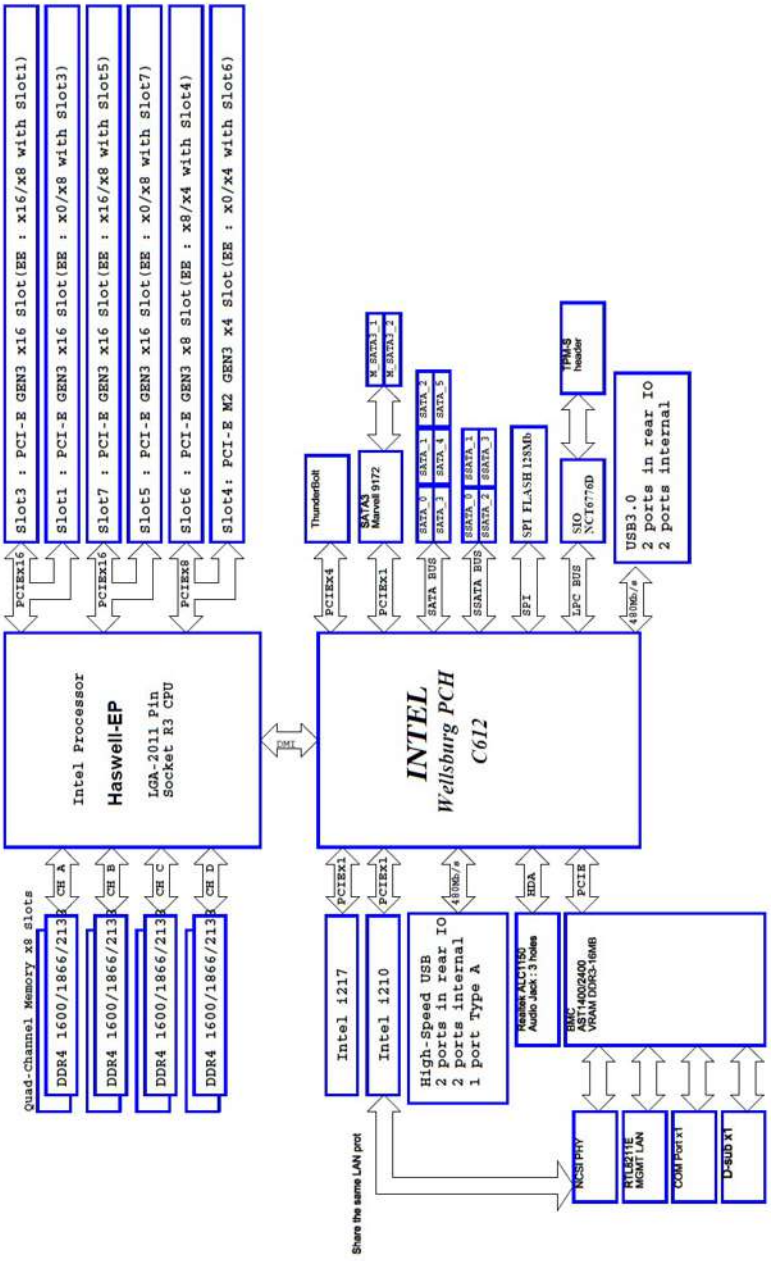


LAN Port (LAN1, LAN2) LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

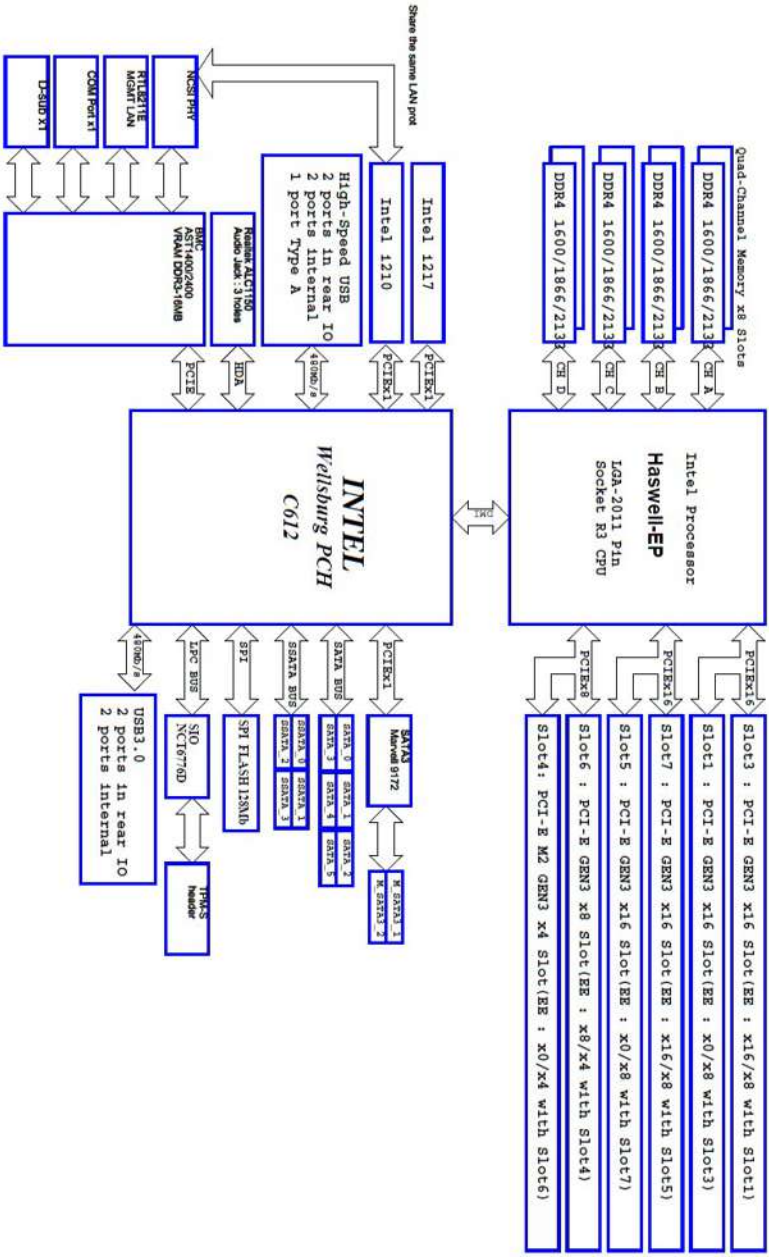
1.6 Block Diagram

EPC612D8A-TB

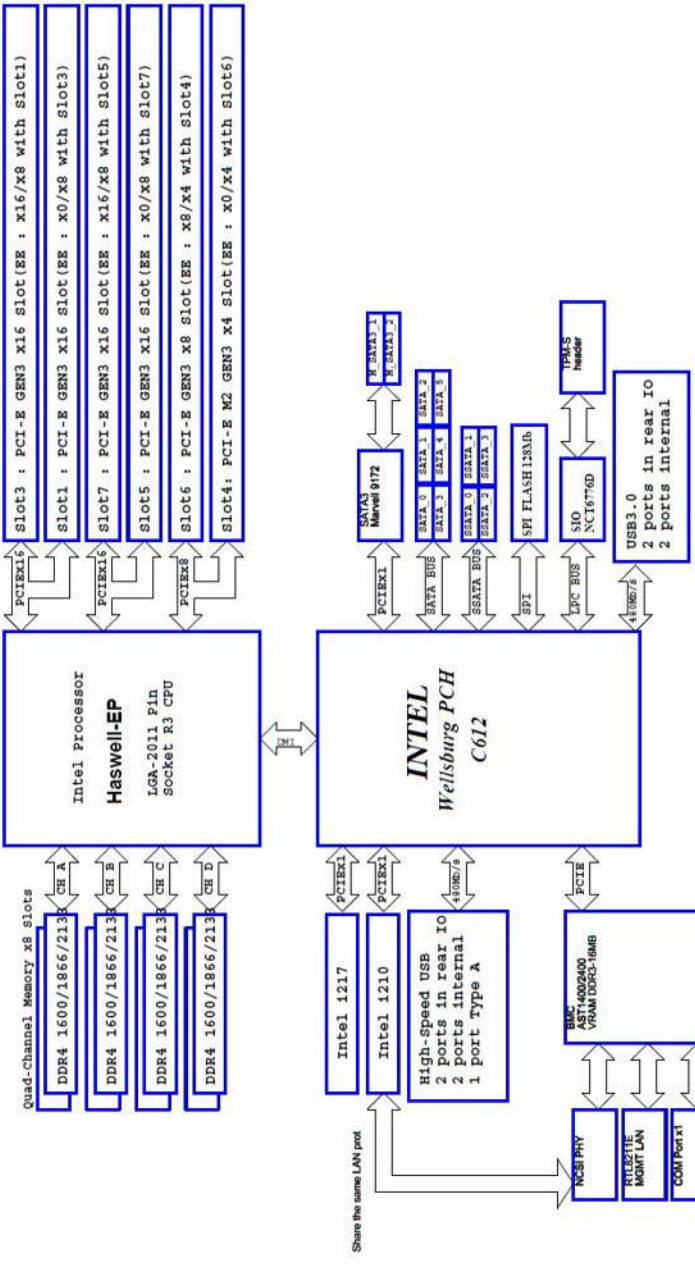


English

EPC612D8A


Quad-Channel Memory x8 Slots
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
CH A
CH B
CH C
CH D
Intel Processor
Haswell-EP
LGA-2011 Pin
Socket R3 CPU
DMI
PCIEx16
PCIEx16
PCIEx8
PCIEx8
Slot3 : PCI-E GEN3 x16 Slot(EE : x16/x8 with Slot1)
Slot1 : PCI-E GEN3 x16 Slot(EE : x0/x8 with Slot3)
Slot7 : PCI-E GEN3 x16 Slot(EE : x16/x8 with Slot5)
Slot5 : PCI-E GEN3 x16 Slot(EE : x0/x8 with Slot7)
Slot6 : PCI-E GEN3 x8 Slot(EE : x8/x4 with Slot4)
Slot4: PCI-E M2 GEN3 x4 Slot(EE : x0/x4 with Slot6)
INTEL
Wellsburg PCH
C612
PCIE
HDA
480MB/s
PCIEx1
PCIEx1
PCIEx1
SATA BUS
SATA 0
SATA 1
SATA 2
SATA 3
SATA 4
SATA 5
SSATA BUS
SSATA 0
SSATA 1
SSATA 2
SSATA 3
SPI
LPC BUS
4*5GB/s
SATA3
Marvell 9172
M.SATA 1
M.SATA 2
SPI FLASH 128Mb
SIO
NCT6776D
TPM-S
header
USB3.0
2 ports in rear IO
2 ports internal
Share the same LAN port
Intel 1217
Intel 1210
High-Speed USB
2 ports in rear IO
2 ports internal
1 port Type A
Realtek ALC1150
Audio Jack: 3 holes
BMC
AST1400/2400
VRAM DDR3-16MB
NCSI PHY
RTL8211E
MGMT LAN
COM Port x1
USB x1

EPC612D8


Slot3 : PCI-E GEN3 x16 slot(EE : x16/x8 with Slot1)
Slot1 : PCI-E GEN3 x16 slot(EE : x0/x8 with Slot3)
Slot7 : PCI-E GEN3 x16 slot(EE : x16/x8 with Slot5)
Slot5 : PCI-E GEN3 x16 slot(EE : x0/x8 with Slot7)
Slot6 : PCI-E GEN3 x8 slot(EE : x8/x4 with Slot4)
Slot4: PCI-E M2 GEN3 x4 slot(EE : x0/x4 with Slot6)
PCIEx16
PCIEx16
PCIEx8
Intel Processor
Haswell-EP
LGA-2011 Pin
Socket R3 CPU
DMI
INTEL
Wellsburg PCH
C612
Quad-Channel Memory x8 slots
CH A
CH B
CH C
CH D
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
DDR4 1600/1866/2133
PCIEx1
PCIEx1
4 USB2.0
PCIE
Intel 1217
Intel 1210
High-Speed USB
2 ports in rear IO
2 ports internal
1 port Type A
Share the same LAN port
BMC
AST1400/2400
VRAM DDR3-16MB
NCSI PHY
RTL8211E
MGMT LAN
COM Port x1
D-SUB X1
PCIEx1
SATA BUS
SSATA BUS
SPI
LPC BUS
4 USB2.0
SATA3
Marvell 9172
M_SATA3_1
M_SATA3_2
SATA_0
SATA_1
SATA_2
SATA_3
SATA_4
SATA_5
SSATA_0
SSATA_1
SSATA_2
SSATA_3
SPI FLASH 128Mb
SIO
NCT6776D
TPM-S
header
USB3.0
2 ports in rear IO
2 ports internal

Chapter 2 Installation

This is an ATX form factor (12" x 9.6", 30.5 cm x 24.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

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.

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

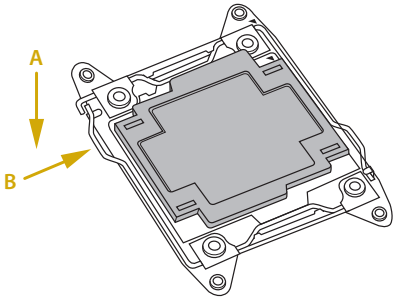
6. *Before you insert the 2011-3-Pin CPU into the socket, please check if the PnP cap is on the socket, if the CPU surface is unclean, or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*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

CAUTION:

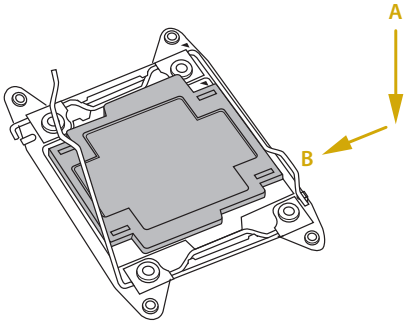
Please note that C612 platform is only compatible with the LGA 2011-3 socket, which is incompatible with the LGA 2011 socket.

Socket Type: Narrow ILM Socket

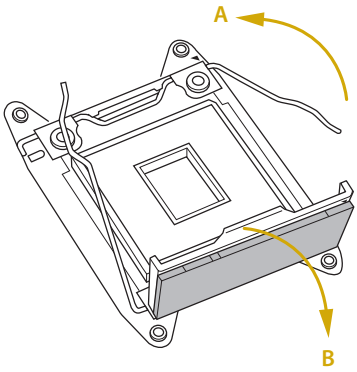
1



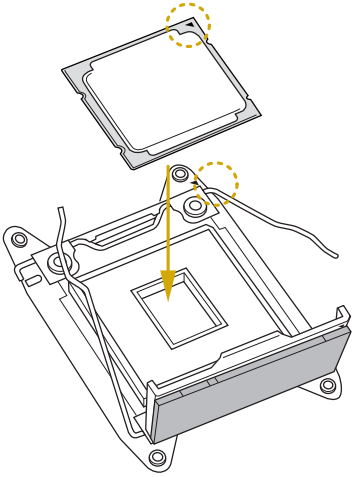
2



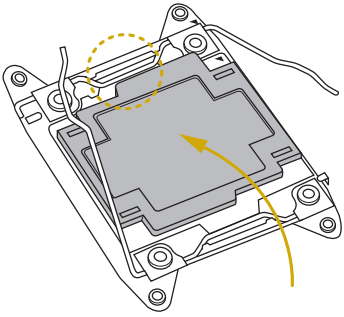
3



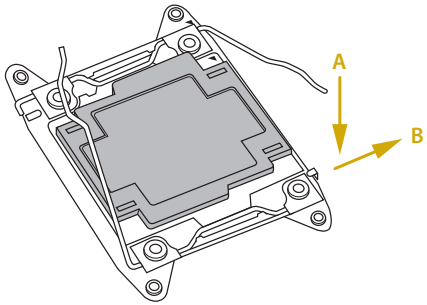
4



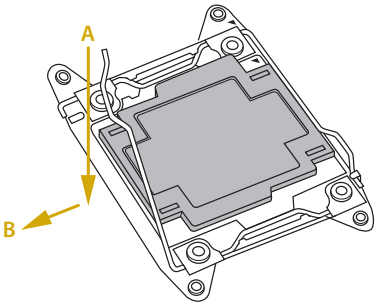
5



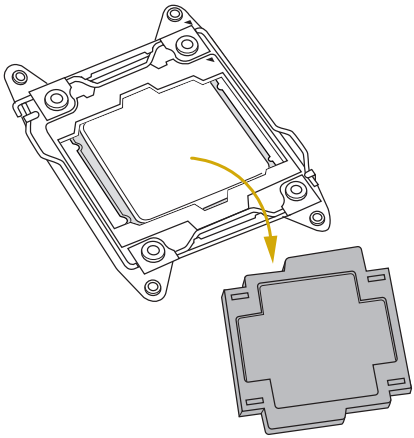
6



7



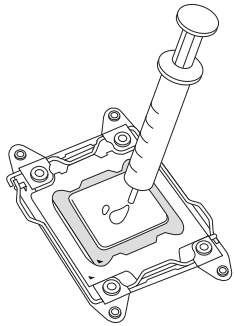
8

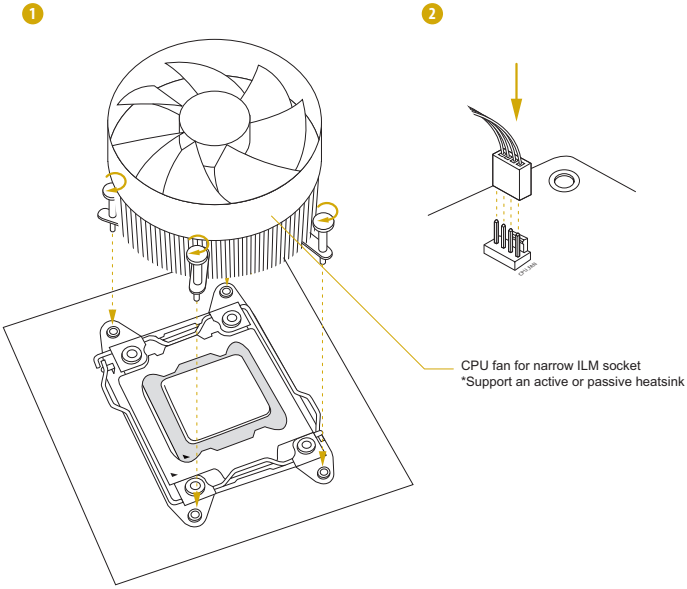


The cover must be placed if returning the motherboard for after service.

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.





2.5 Installation of Memory Modules (DIMM)

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

1. *For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.*
2. *It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.*
3. *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.*

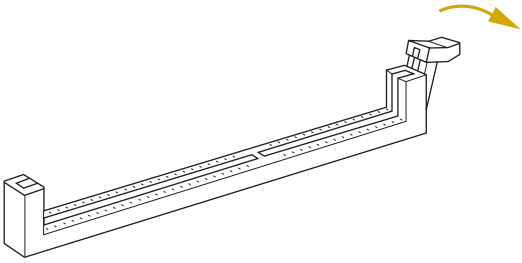
Dual Channel Memory Configuration

Priority	DDR4_A1	DDR4_A2	DDR4_B1	DDR4_B2
1	Populated		Populated	
2	Populated	Populated	Populated	Populated

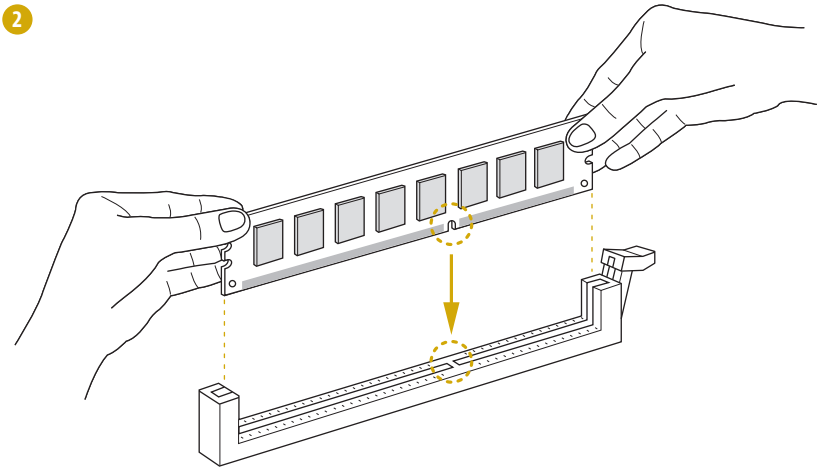
Priority	DDR4_C1	DDR4_C2	DDR4_D1	DDR4_D2
1	Populated		Populated	
2	Populated	Populated	Populated	Populated

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.

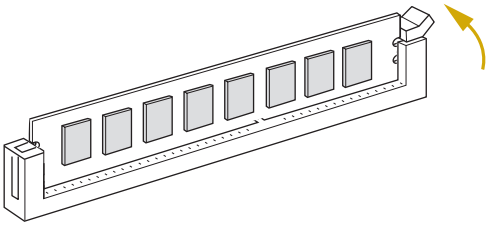
1



2



3



English

2.6 Expansion Slots (PCI and PCI Express Slots)

There are 5 PCI Express slots on this motherboard.

PCIE slot:

PCIE6 (PCIE 3.0 x8 slot, from CPU) is used for PCI Express x8 lane width cards.
PCIE1 and PCIE5 (PCIE 3.0 x16 slot, from CPU) are used for PCI Express x8 lane width cards.
PCIE3 and PCIE7 (PCIE 3.0 x16 slot, from CPU) are used for PCI Express x16 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIE 7	3.0	x16	x16	CPU
PCIE 6	3.0	x8	x8	CPU
PCIE 5	3.0	x16	x8	CPU
PCIE 3	3.0	x16	x16	CPU
PCIE 1	3.0	x16	x8	CPU

**The M.2 slot shares lanes with PCIe Slot 6 . When Slot 4 PCIe M.2 is populated, Slot 4 runs at x4.*

PCI Express Slot Configuration

No.	PCIE 7	PCIE 3
Single PCIE Card	x16	x0
Two PCIE Cards	x8	x8

PCIe Slot Configurations (For CPU with 40 PCIe lanes)

	PCIE1	PCIE3	PCIE5	PCIE6	PCIE7
Single Graphics Card	N/A	N/A	N/A	N/A	x16
Two Graphics Cards in CrossFireX™ Mode	N/A	x16	N/A	N/A	x16
Three Graphics Cards in 3-Way CrossFireX™ Mode	N/A	x16	x8	N/A	x8

PCIe Slot Configurations (For CPU with 28 PCIe lanes)

	PCIE1	PCIE3	PCIE7
Single Graphics Card	N/A	x16	N/A
Two Graphics Cards in CrossFireX™ Mode	N/A	x16	x8
Three Graphics Cards in 3-Way CrossFireX™ Mode	x8	x8	x8

If you install CPU with 28 lanes, PCIE5 and PCIE6 will be disabled and PCIE7 will run at x8.

Installing an expansion card

Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

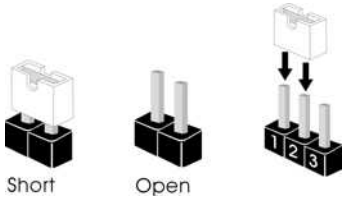
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

2.7 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.



SATA DOM Power Jumper* (3-pin SATAPWR1) (No. 25)	1_2 SATA DOM	2_3 SATA Cable (Default)

*SATAPWR1 allows you to select the internal voltage source for the SATA DOM connected on the SATA_0 connector (No.24).

CPU PECI Mode Jumper (3-pin PECI1) (No. 44)	1_2 Reserved Only	2_3 CPU PECI connect to BMC (Default)

Descriptor Security Override Jumper (see p.7, No. 43)		
Chassis ID0 Jumper (3-pin Chassis ID0) (see p.7, No. 43)		
Chassis ID1 Jumper (3-pin Chassis ID1) (see p.7, No. 45)		
Chassis ID2 Jumper (3-pin Chassis ID2) (see p.7, No. 47)	Board Level SKU (Default)	Reserved for system level use

Chassis ID0 Jumper (3-pin Chassis ID0) (see p.7, No. 43)		
Chassis ID1 Jumper (3-pin Chassis ID1) (see p.7, No. 45)		
Chassis ID2 Jumper (3-pin Chassis ID2) (see p.7, No. 47)	 Reserved for system level use	 Reserved for system level use

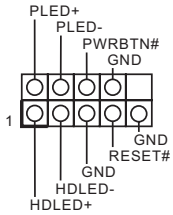
Chassis ID0 Jumper (3-pin Chassis ID0) (see p.7, No. 43)		
Chassis ID1 Jumper (3-pin Chassis ID1) (see p.7, No. 45)		
Chassis ID2 Jumper (3-pin Chassis ID2) (see p.7, No. 47)	 Reserved for system level use	 Reserved for system level use

Chassis ID0 Jumper (3-pin Chassis ID0) (see p.7, No. 43)		
Chassis ID1 Jumper (3-pin Chassis ID1) (see p.7, No. 45)		
Chassis ID2 Jumper (3-pin Chassis ID2) (see p.7, No. 47)	 Reserved for system level use	 Reserved for system level use

2.8 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)
(No. 33)



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. 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.

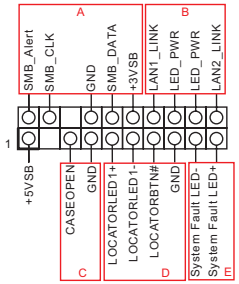
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

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 keeps blinking when the system is in S1/S3 sleep state. 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)
(No. 35)



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.

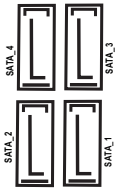
B. Internet status indicator (2-pin LAN1_LED, LAN2_LED)
These two 2-pin headers allow you to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

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.

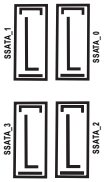
E. System Fault LED (2-pin LED)
This header is for the Fault LED on the system.

Serial ATA3 Connectors
(White)
(SATA_1)
(No. 18)
(SATA_2)
(No. 17)
(SATA_3)
(No. 16)
(SATA_4)
(No. 15)
(SATA_5)
(No. 27)



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

(SSATA_0)
(No. 20)
(SSATA_1)
(No. 19)
(SSATA_2)
(No. 28)
(SSATA_3)
(No. 29)



(M_SATA_0)
(No. 12)
(M_SATA_1)
(No. 11)

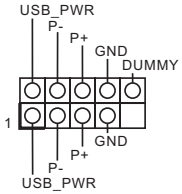
Serial ATA3 DOM Connector
(SATA_0)
(No. 24)

The SATA3 DOM connector supports both a SATA DOM (Disk-On-Module) and a SATA data cable for internal storage device.

When connecting to a SATA DOM, no additional power cable is required. Use SATA DOM Power jumper (SATAPWR1)(No. 25) to select voltage source for SATA DOM.

English

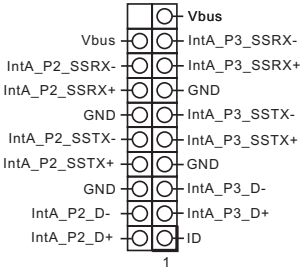
USB 2.0 Header
(9-pin USB_3_4)
(No. 22)



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.

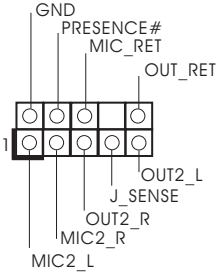
USB 2.0 Connector
(USB_5)
(No. 31)

USB 3.0 Header
(19-pin USB3_3_4)
(No. 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.

Front Panel Audio Header
(9-pin HD_AUDIO1)
(No. 48)
**Not supported for EPC612D8T motherboard*



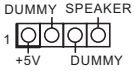
This is an interface for the front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.

2. If you use AC'97 audio panel, please install it to the front panel audio header as below:

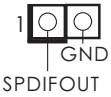
A. Connect Mic_IN (MIC) to MIC2_L.
B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
C. Connect Ground (GND) to Ground (GND).
D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.

Chassis Speaker Header
(4-pin SPEAKER1)
(No. 36)



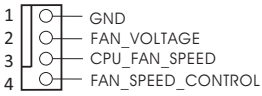
Please connect the chassis speaker to this header.

HDMI_SPDIF Header
(2-pin HDMI_SPDIF1)
(No. 46)
**Not supported for EPC612D8T motherboard*

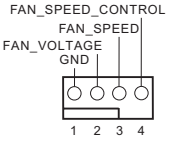
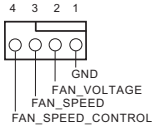
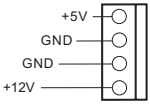
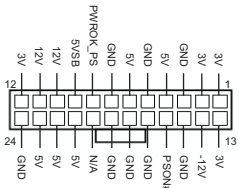
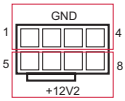


HDMI_SPDIF header, providing SPDIF audio output to HDMI VGA card, allows the system to connect HDMI Digital TV/projector/LCD devices. Please connect the HDMI connector of HDMI VGA card to this header.

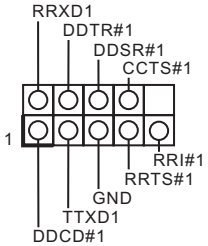
CPU Fan Connector
(4-pin CPU_FAN1)
(No. 6)



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

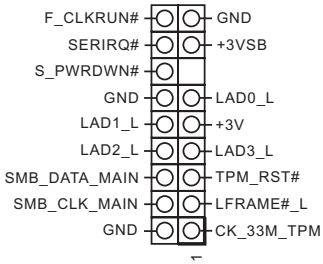
Front and Rear Fan Connectors (4-pin FRONT_FAN1) (No. 14) (4-pin FRONT_FAN2) (No. 13) (4-pin FRONT_FAN3) (No. 32)		Please connect fan cables to the fan connectors and match the black wire to the ground pin. All fans support Fan Control.
(4-pin REAR_FAN1) (see p.8 , No. 49) (see p.11, No. 47)		
SATA Power Connectors (4-pin SATA_PWR1) (No. 30)		Please connect a SATA power cable.
ATX Power Connector (24-pin ATXPWR1) (No. 5)		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 Connector (8-pin ATX12V1) (No. 3)		This motherboard provides a 8-pin ATX 12V power connector.

Serial Port Header
(9-pin COM2)
(No. 42)



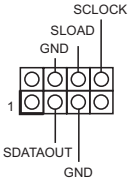
This COM2 header supports a serial port module.

TPM Header
(17-pin TPM1)
(No. 10)



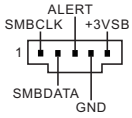
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Serial General Purpose
Input/Output Headers
(7-pin SATA_SGPIO1)
(No. 21)
(7-pin SATA_SGPIO2)
(No. 26)
(7-pin SATA_SGPIO3)
(No. 23)



These headers support Serial Link interface for onboard SATA connections.

PSU SMBus
(PSU_SMB1)
(No. 4)

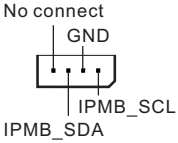
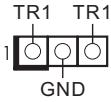
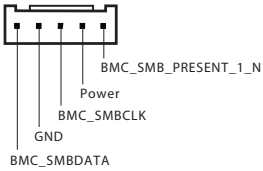


PSU SMBus monitors the status of the power supply, fan and system temperature.

Non Maskable Interrupt
Button Header
(NMI_BTN1)
(No. 41)

Please connect a NMI device to this header.

English

Intelligent Platform Management Bus header (4-pin IPMB_1) (No. 37)		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.
Thermal Sensor Header (3-pin TR1) (No. 34)		Please connect the thermal sensor cable to either pin 1-2 or pin 2-3 and the other end to the device which you wish to monitor its temperature.
Baseboard Management Controller SMBus Headers (5-pin BMC_SMB_1) (No. 40) (5-pin BMC_SMB_2) (No. 39) (5-pin BMC_SMB_3) (No. 38)		These headers are used for the SM BUS devices.

2.9 Dr. Debug

Dr. Debug is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Dr. Debug codes.

Code	Description
00	Please check if the CPU is installed correctly and then clear CMOS.
0d	Problem related to memory, VGA card or other devices. Please clear CMOS, re-install the memory and VGA card, and remove other USB, PCI devices.
01 - 54 (except 0d), 5A- 60	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
55	The Memory could not be detected. Please re-install the memory and CPU. If the problem still exists, please install only one memory module or try using other memory modules.
61 - 91	Chipset initialization error. Please press reset or clear CMOS.
92 - 99	Problem related to PCI-E devices. Please re-install PCI-E devices or try installing them in other slots. If the problem still exists, please remove all PCI-E devices or try using another VGA card.
A0 - A7	Problem related to IDE or SATA devices. Please re-install IDE and SATA devices. If the problem still exists, please clear CMOS and try removing all SATA devices.
b0	Problem related to memory. Please re-install the CPU and memory. If the problem still exists, please install only one memory module or try using other memory modules.
b4	Problem related to USB devices. Please try removing all USB devices.
b7	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
d6	The VGA could not be recognized. Please clear CMOS and try re-installing the VGA card. If the problem still exists, please try installing the VGA card in other slots or use other VGA cards.
d7	The Keyboard and mouse could not be recognized. Please try re-installing the keyboard and mouse.
d8	Invalid Password.
FF	Please check if the CPU is installed correctly and then clear CMOS.

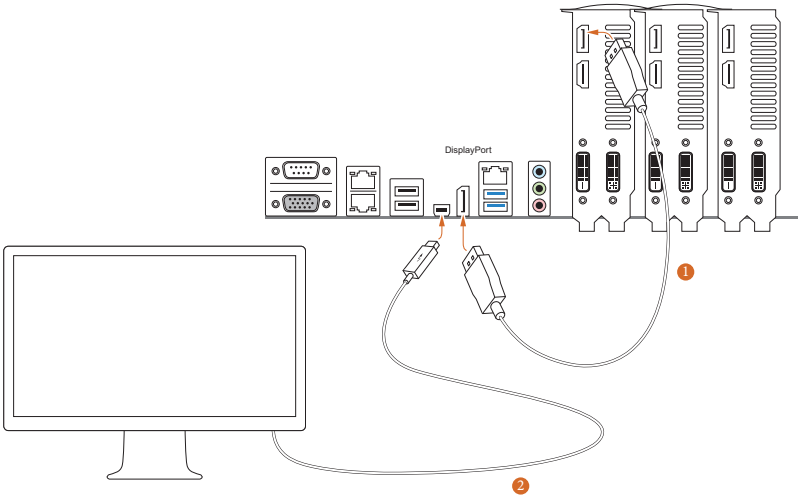
2.10 Driver Installation Guide

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.

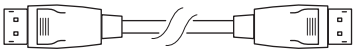
2.12 DisplayPort Input

The DisplayPort Input on the motherboard allows you to utilize the power of discrete graphics with a Thunderbolt™ display connected.

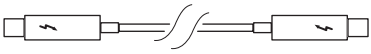
Connection Diagram (Using Graphics card with DisplayPort)



1. Connect one end of the DisplayPort Cable to the **DisplayPort** of the graphics card. Then connect the other end of the cable to the **DisplayPort Input** on the rear I/O panel.

DisplayPort Cable 

2. Connect your Thunderbolt™ 2 display to the **Thunderbolt™ 2 Port (TBT1)** on the rear I/O panel using a Thunderbolt™ cable.

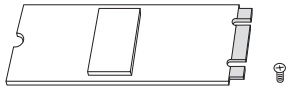
Thunderbolt™ cable 

2.11 M.2_SSD (NGFF) Module Installation Guide

The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2_SSD (NGFF) Socket 3 can accommodate either a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen 2 x2 (10 Gb/s). Please be noted that the M.2_SSD (NGFF) Socket 3 is shared with the SATA Express connector; you can only choose either the M.2_SSD (NGFF) Socket 3 or the SATA Express connector to use.

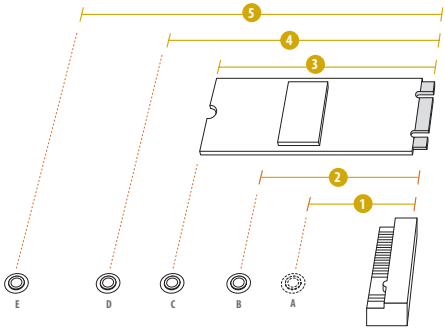
*The M.2_SSD (NGFF) Socket 3 supports SSD drives. Please note that the WiFi or other non-SSD M.2 modules are not supported.

Installing the M.2_SSD (NGFF) Module



Step 1

Prepare a M.2_SSD (NGFF) module and the screw.

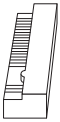


Step 2

Depending on the PCB type and length of your M.2_SSD (NGFF) module, find the corresponding nut location to be used.

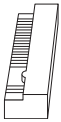
No.	1	2	3	4	5
Nut Location	A	B	C	D	E
PCB Length	3cm	4.2cm	6cm	8cm	11cm
Module Type	Type2230	Type 2242	Type2260	Type 2280	Type 22110

Step 3

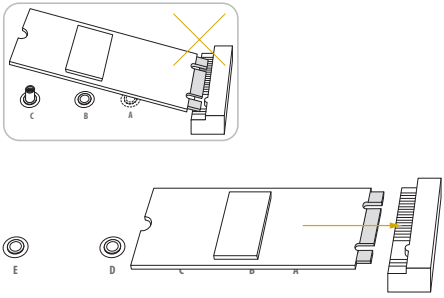


Move the standoff based on the module type and length.
The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

Step 4

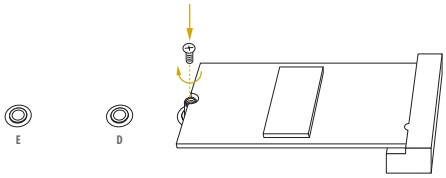


Peel off the yellow protective film on the nut to be used. Hand tighten the standoff into the desired nut location on the motherboard.



Step 5

Align and gently insert the M.2 (NGFF) SSD module into the M.2 slot. Please be aware that the M.2 (NGFF) SSD module only fits in one orientation.



Step 6

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

For the latest updates of M.2_SSD (NFGG) module support list, please visit our website for details: http://www.asrockrack.com

English

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 <Del> 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
OC Tweaker	For overclocking configurations
Advanced	To set up the advanced UEFI features
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.

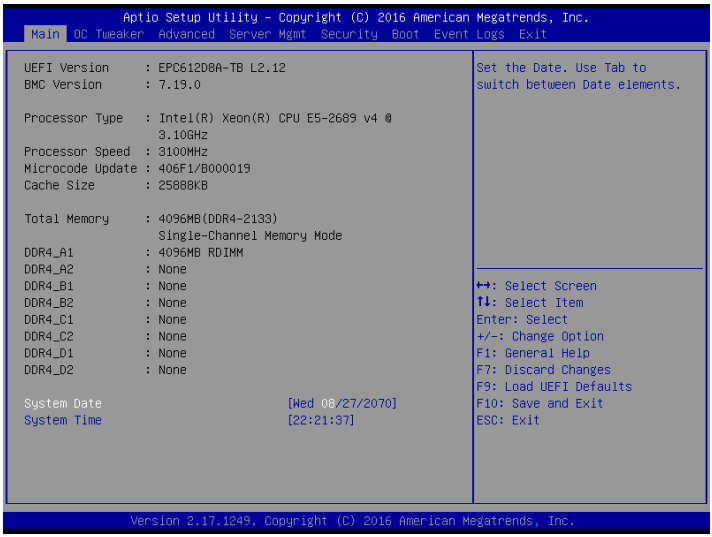
3.1.2 Navigation Keys

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

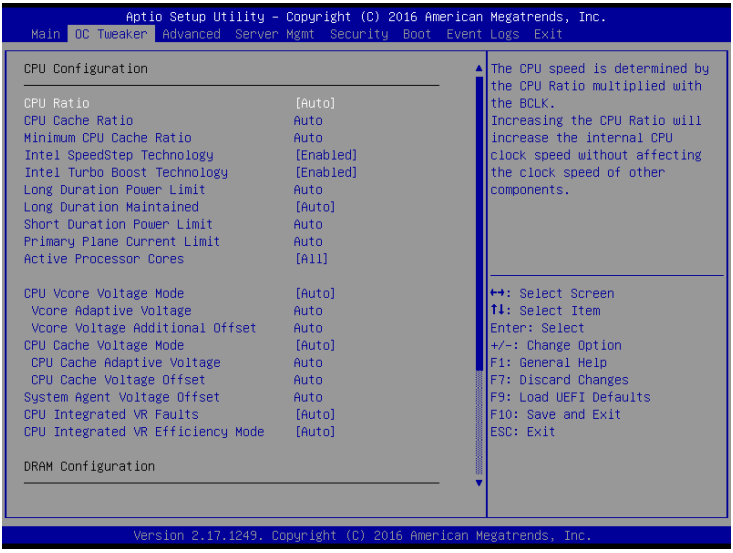
3.2 Main Screen

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 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.



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.

CPU Ratio

The CPU speed is determined by the CPU Ratio multiplied with the BCLK. Increasing the CPU Ratio will increase the internal CPU clock speed without affecting the clock speed of other components.

CPU Cache Ratio

The CPU Internal Bus Speed Ratio. The maximum should be the same as the CPU Ratio.

Minimum CPU Cache Ratio

Use this item to configure the minimum CPU Cache Ratio.

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Long Duration Power Limit

Configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Long Duration Maintained

Configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

Short Duration Power Limit

Configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Primary Plane Current Limit

Configure the current limit of the CPU under Turbo Mode in ampere. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Active Processor Cores

Select the number of cores to enable in each processor package.

CPU Vcore Voltage Mode

Confiure the amount of voltage fed to the cores of the processor. Increase the voltage when increasing CPU Core Frequency.

Vcore Adaptive Voltage

Configure the voltage added to the CPU when the system is under heavy load.

Vcore Voltage Additional Offset

Configure the dynamic Vcore voltage added to the Vcore.

CPU Cache Voltage Mode

Configure the amount of voltage fed to the UNCores of the processor including its cache. Increase the voltage when increasing CPU Cache Frequency.

CPU Cache Adaptive Voltage

Configure the voltage added to the CPU Cache when the system is under heavy load.

CPU Cache Voltage Offset

Configure the voltage for the CPU Cache. Setting the voltage higher may increase system stability when overclocking.

System Agent Voltage Offset

Configure the voltage for the System Agent. Setting the voltage higher may increase system stability when overclocking.

CPU Intergrated VR Faults

Disable FIVR Faults to raise the threshold to trigger CPU over current protection and over voltage protection for better overclocking capbilities.

CPU Intergrated Efficiency Mode

Enable FIVR Efficienct Management for power saving. Disable for better performance and overclocking caoabilities.

DRAM Configuration

Enforce POR

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

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

Save User Default

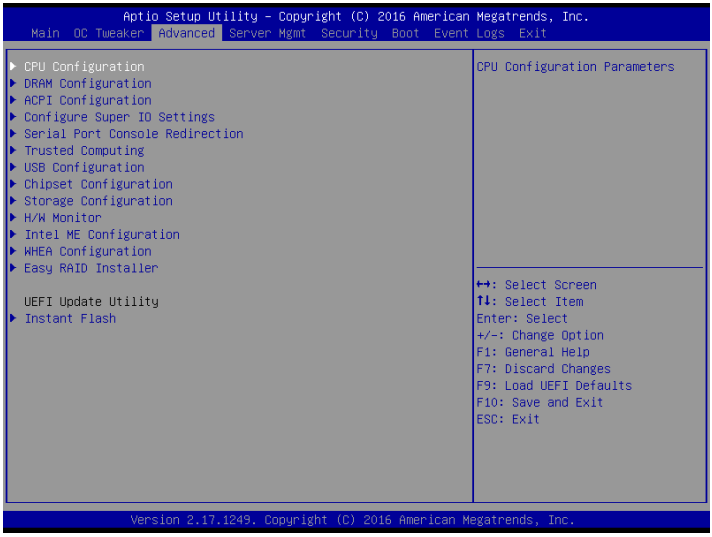
Type a profile name and press enter to save your settings as user default.

Load User Default

Load previously saved user defaults.

3.4 Advanced Screen

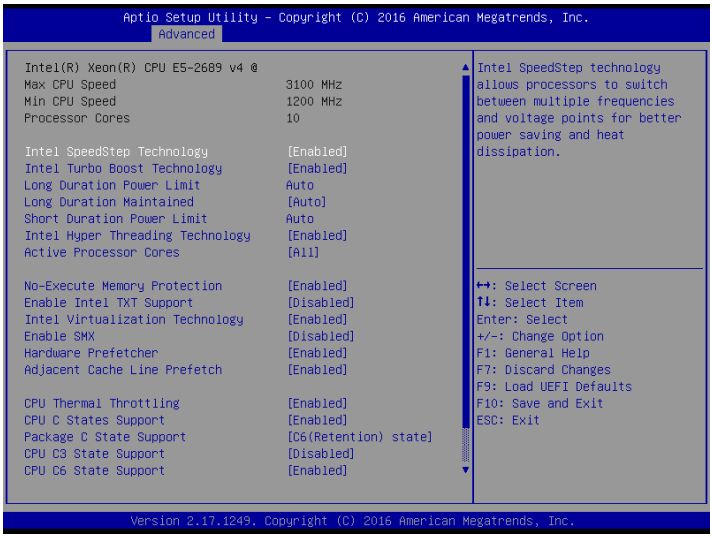
In this section, you may set the configurations for the following items: CPU Configuration, DRAM Configuration, ACPI Configuration, Configure Super IO Settings, Serial Port Console Redirection, Trusted Computing, USB Configuration, Chipset Configuration, Storage Configuration, H/W Monitor, Intel ME Configuration, Easy RAID Installer and Instant Flash.



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

English

3.4.1 CPU Configuration



Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Long Duration Power Limit

Configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Long Duration Maintained

Configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

Short Duration Power Limit

Configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

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.

Active Processor Cores

Use this item to select the number of cores to enable in each processor package.

No-Execute Memory Protection

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

Enable Intel TXT Support

Enable Intel Trusted Execution Technology configuration. Please disable “EX DFX 60 English Features” when TXT is enabled.

Intel Virtualization Technology

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

Enable SMX

Use this item to enable Safer Mode Extensions.

Hardware Prefetcher

Use this item to automatically prefetch data and code for the processor. Enable for better performance.

Adjacent Cache Line Prefetch

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

CPU Thermal Throttling

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

CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C3 and C6 enabled for better power saving.

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.

Enhanced Halt State(C1E)

Enable Enhanced Halt State (C1E) for lower power consumption.

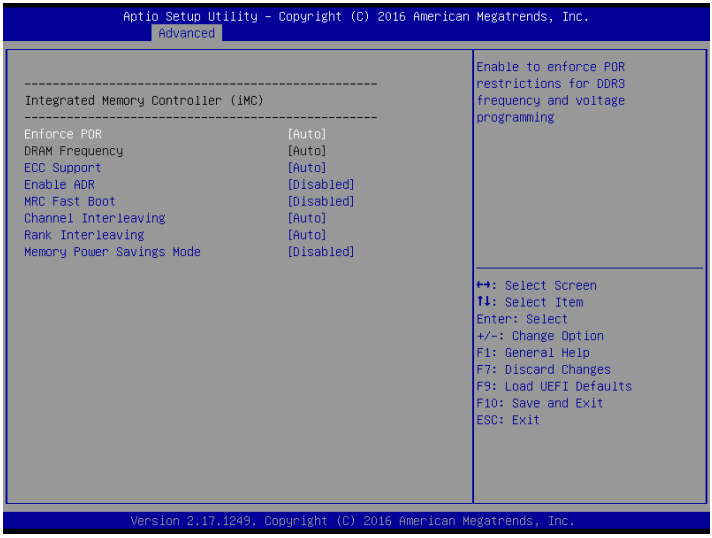
Enhanced CPU HWPM

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.

3.4.2 DRAM Configuration



Enforce POR

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

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

ECC Support

This allows you to enable or disable the DDR ECC support feature.

Enable ADR

Use this item to enable the detecting and enabling of ADR.

MRC Fast Boot

When enabled, portions of memory reference code will be skipped when possible to increase boot speed.

Channel Interleaving

Use this item to select Channel Interleaving setting.

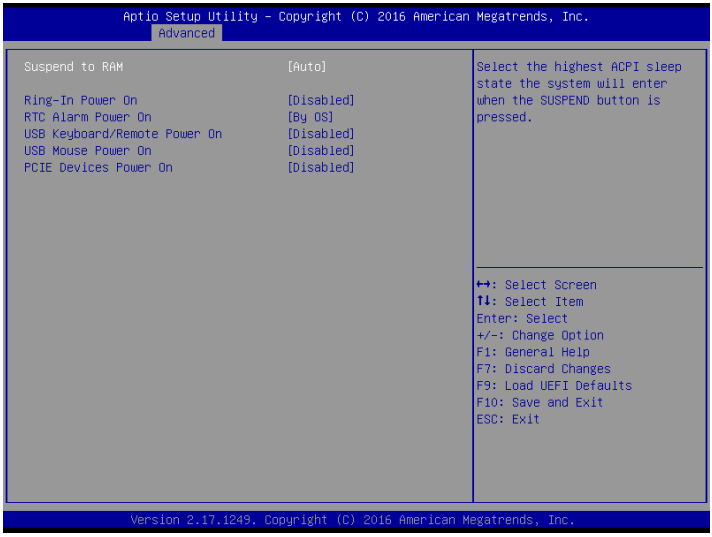
Rank Interleaving

Use this item to select Rank Interleaving setting.

Memory Power Savings Mode

Configure CKE and related memory power savings features.

3.4.3 ACPI Configuration



Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Selecting [Auto] will enable this feature if the OS supports it.

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.

USB Keyboard/Remote Power On

Use this item to enable or disable USB Keyboard/Remote to turn on the system from the power-soft-off mode.

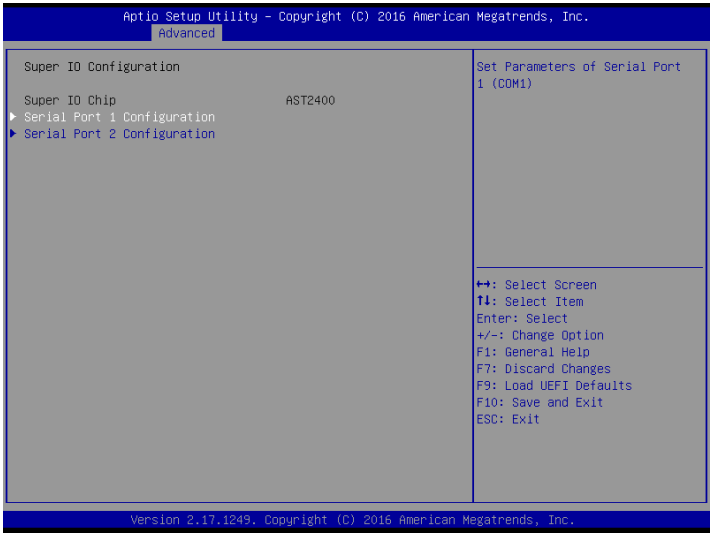
USB Mouse Power On

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

PCIE Devices Power On

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

3.4.4 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 (COM).

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

Serial Port 2 Configuration

Use this item to configure the onboard serial port 2.

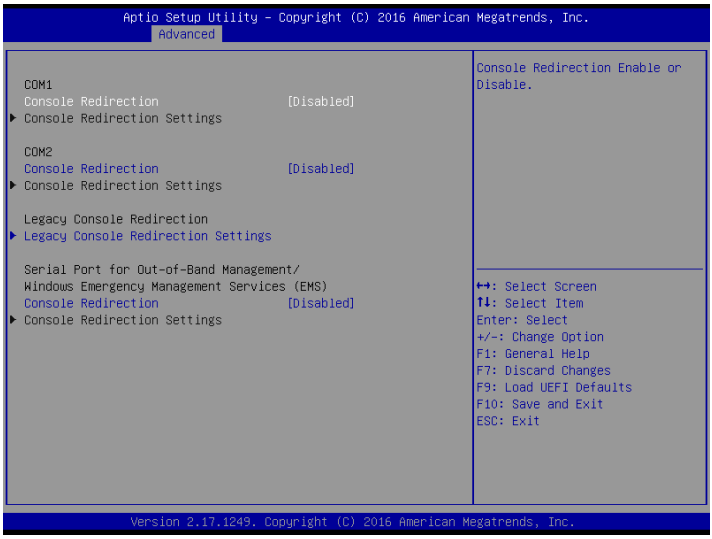
Select and enter the "Serial Port 2 Configuration" and you will see the followings:

Serial Port 2 Configuration
Use this item to enable or disable the onboard serial port 2 (COM2).

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

Serial Port Mode
Use this item to select Serial Over LAN or COM mode.

3.4.5 Serial Port Console Redirection



COM1 / COM2

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], [Hardware RTS/CTS], and [Software Xon/Xoff].

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

Legacy Console Redirection Settings

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

Legacy Serial Redirection Port
Use this item to 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
Microsof t 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].

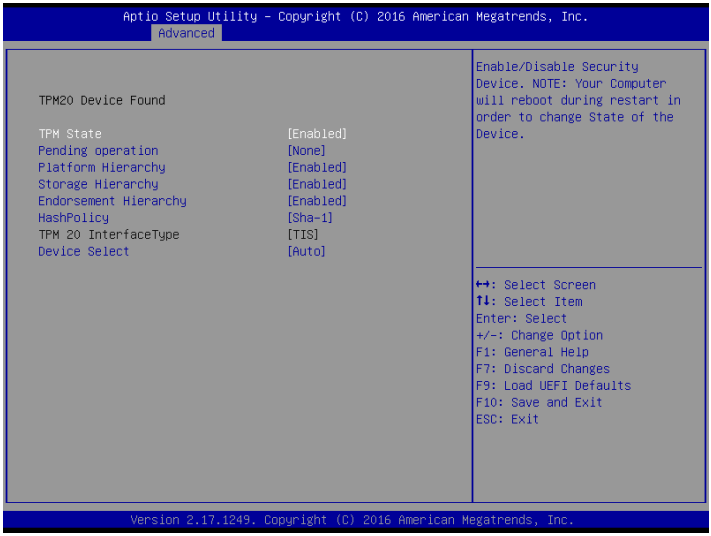
Flow Control
Use this item to set the flow control to prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow uses two wires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

Data Bits

Parity

Stop Bits

3.3.6 Trusted Computing



NOTE: Options vary depending on the version of your connected TPM module.

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.

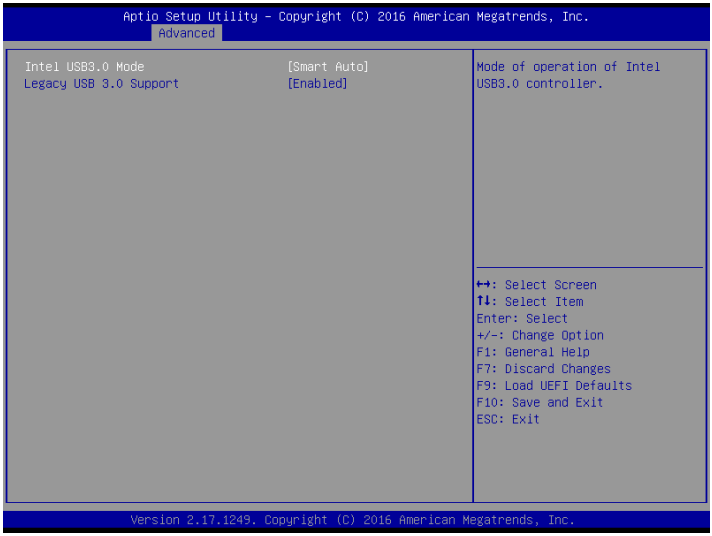
Hash Policy

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.

3.4.7 USB Configuration



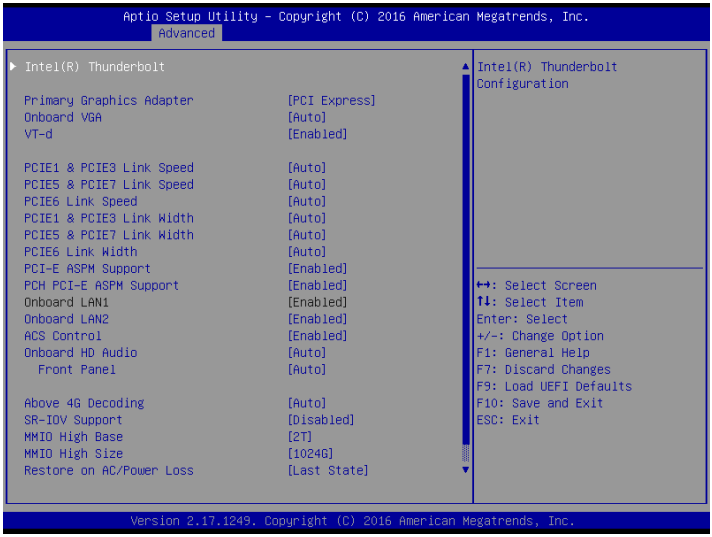
Intel USB3.0 Mode

Use this item to select the mode of operation of Intel USB3.0 controller.

Legacy USB 3.0 Support

Use this item to enable or disable Legacy OS Support for USB 3.0 devices.

3.4.8 Chipset Configuration



Intel(R) Thunderbolt *(Only for EPC612D8A-TB motherboard)*

Intel Thunderbolt™ Technology

Enable or disable the Intel® Thunderbolt™ function.

Security Level

Select Legacy to skip the Windows certification checking process for Thunderbolt™devices. Select Unique ID for checking the Windows certification, and showwarning messages if the devices aren't certified. Or select DP++ to support DP 1.2.

TBT Device IO resource Support

Enable IO Resource Support if your older Thunderbolt devices have trouble working properly.

Thunderbolt™ PCIe Cache-line Size

Configure the cache-line size of the Thunderbolt PCIe subtree.

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 VGA

Use this to enable or disable the Onboard VGA function. The default value is [Auto].

**This item is not available when the Primary Graphic Adapter is set to [Onboard].*

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.

PCIE 1 & PCIE 3 Link Speed

This allows you to select PCIE 1 & PCIE 3 Link Speed. The default value is [Auto].

PCIE 5 & PCIE 7 Link Speed

This allows you to select PCIE 5 & PCIE 7 Link Speed. The default value is [Auto].

PCIE 6 Link Speed

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

PCIE 1 & PCIE 3 Link Width

This allows you to select PCIE 1 & PCIE 3 Link Width. The default value is [Auto].

PCIE 5 & PCIE 7 Link Width

This allows you to select PCIE 3 & PCIE 4 Link Width. The default value is [Auto].

PCIE 6 Link Width

This allows you to select PCIE 6 Link Width. The default value is [Auto].

PCIE ASPM Support

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

PCH PCIE ASPM Support

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

Onboard LAN1 *(This item is disabled.)*

Onboard LAN2

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

ACS Control

Enable: Programs ACS only to Chipset PCIe Root Ports Bridges

Disable: Programs ACS to all PCIe bridges

Onboard HD Audio *(Only for EPC612D8A-TB / EPC612D8A motherboard)*

Use this item to automatically enable or disable onboard HD audio. Set to Auto to enable

onboard HD audio and automatically disable it when a sound card is installed.

Front Panel *(Only for EPC612D8A-TB / EPC612D8A motherboard)*

Use this item to set front panel HD audio to Auto or Disabled.

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.

MMIO High Base

Use this item to select MMIO High Base.

MMIO High Size

Use this item to select MMIO High Size.

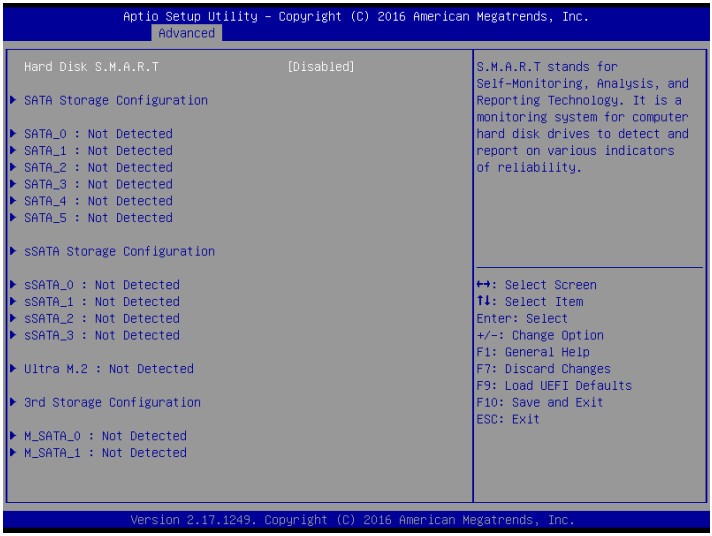
Restore on AC/Power Loss

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. If [Last State] is selected, it will recover to the state before AC/power loss.

Onboard Debug Port LED

Use this item to turn on or off Onboard Debug Port LED.

3.4.9 Storage Configuration



Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].

SATA Storage Configuration

SATA Controller

Use this item to enable or disable SATA Controller.

SATA Mode Selection

Use this to select SATA mode. Configuration options: [Disabled], [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

SATA Aggressive Link Power Mgmt

Use this item to configure SATA Aggressive Link Power Management.

SATA Port 0 / 1 / 2 / 3 / 4 / 5

Depending on how many SATA ports you have, you will see SATA_x (x means number) listed on the screen, with its status indicated as SATA device [(Model Name)] or [Not Detected].

External SATA

Use this item to enable SATA safe removal notifications. Please note that the SATA device will be downgraded to SATA2.

Hot Plug

Designates this port as Hot Plugglable.

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 SATA DTLE DATA Values (0-15).

SATA Device Type

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

sSATA Storage Configuration

sSATA Controller

Use this item to enable or disable sSATA Controller.

sSATA Mode Selection

Use this to select sSATA mode. Configuration options: [Disabled], [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

sSATA Aggressive Link Power Mgnt

Use this item to configure sSATA Aggressive Link Power Management.

sSATA Port 0 / 1 / 2 / 3

Depending on how many sSATA ports you have, you will see sSATA_x (x means number) listed on the screen, with its status indicated as SATA device [(Model Name)] or [Not

Detected].

External sSATA

Use this item to enable SATA safe removal notifications. Please note that the SATA device will be downgraded to SATA2.

Hot Plug

Designates this port as Hot Plugglable.

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 SATA DTLE DATA Values (0-15).

SATA Device Type

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

Ultra M.2

3rd Storage Configuration

Marvell 9172 Controller

Enable or disable Marvell 9172 Controller.

Marvell 9172 Operation Mode

This item is for M_SATA ports. Use this to select Marvell SATA operation mode. Configuration options: [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is [AHCI Mode]. Press <Ctrl-M> to enter RAID ROM during UEFI POST process.

Bootable Marvell 9172 SATA3

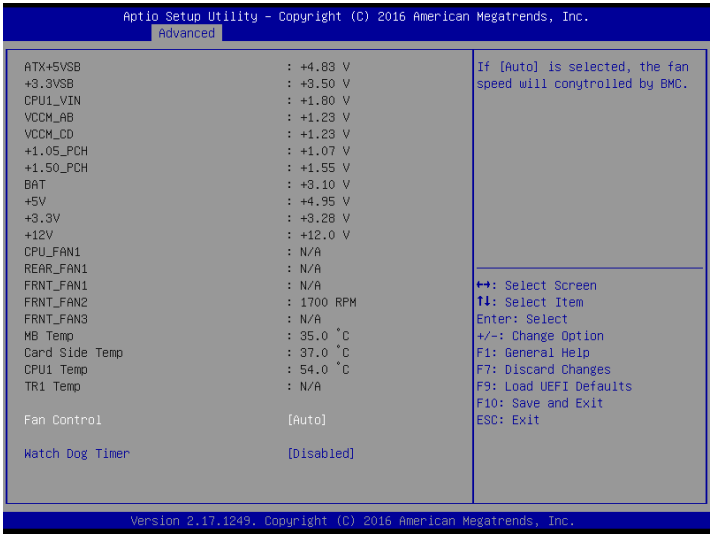
We recommend to use Intel SATA ports (Port 0~5) for your bootable devices. This will minimize your boot time and get the best performance. If you still want to boot from Marvell SATA3 controller, please set this item to [Yes].

M_SATA_0 / M_SATA_1

Depending on how many M_SATA ports you have, you will see M_SATA_x (x means number) listed on the screen, with its status indicated as SATA device [(Model Name)] or [Not Detected].

3.4.10 H/W Monitor Screen

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.



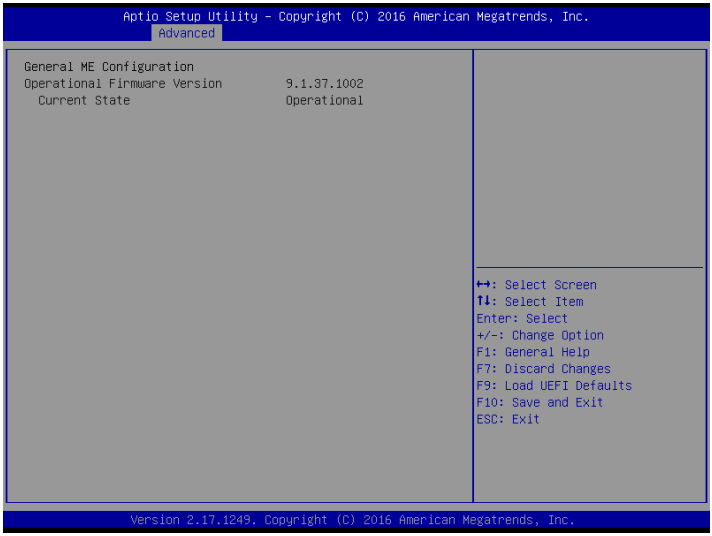
Fan Control

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

Watch Dog Timer

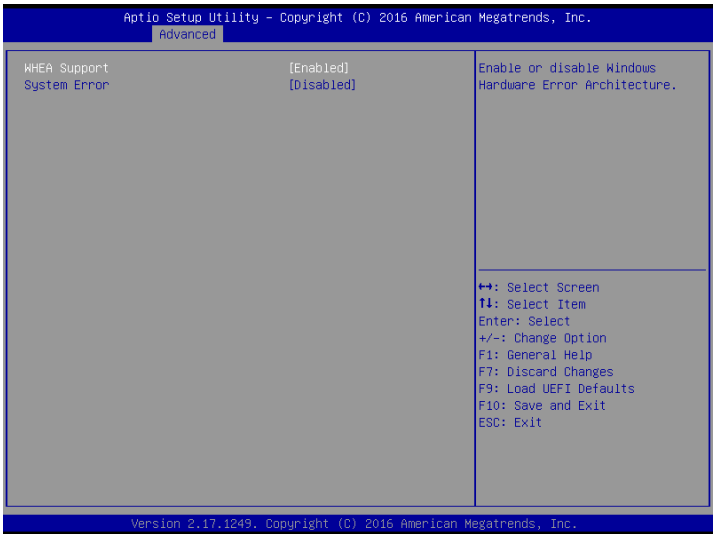
This allows you to enable or disable the Watch Dog Timer. The default value is [Disabled].

3.4.11 Intel ME Configuration



ME Subsystem screen displays the Intel ME Subsystem Configuration information, such as Operational Firmware Version, ME Firmware, ME Firmware Type, ME Firmware SKU and ME File System Integrity Vaalue.

3.4.12 WHEA Configuration



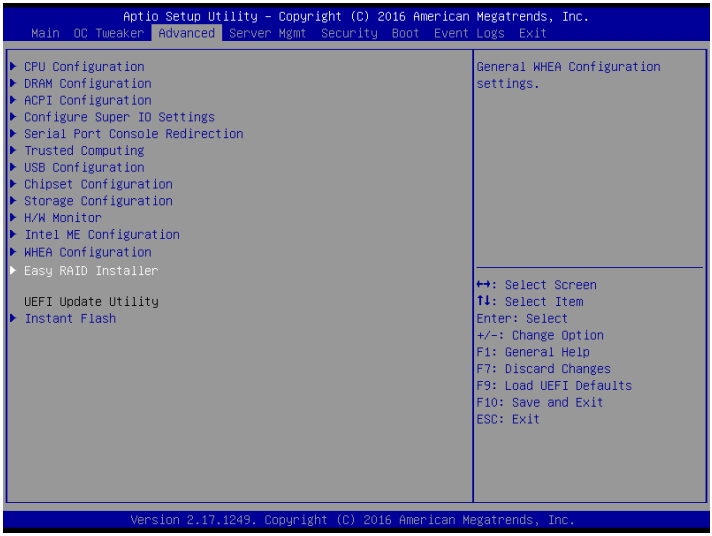
WHEA Support

Use this item to enable or disable Windows Hardware Error Architecture.

System Error

Use this item to enable or disable System Error feature. When it is set to [Enabled], you can configure Memory Error and PCIE Error log features.

3.4.13 Easy RAID Installer

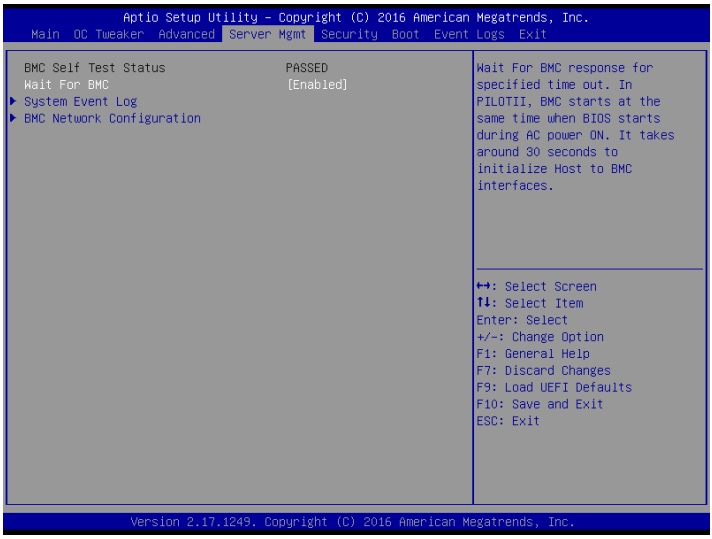


Easy RAID Installer can help you to copy the RAID driver from a support CD to your USB storage device. After copying the RAID driver to your USB storage device, please change "SATA Mode" to "RAID", then you can start installing the OS in RAID mode.

3.4.14 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.

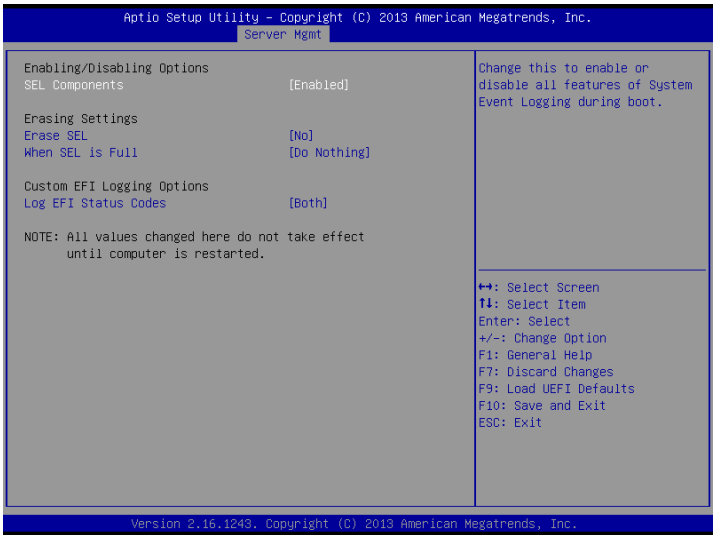
3.5 Server Mgmt



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.

3.5.1 System Event Log



SEL Components

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

Erase SEL

Use this to choose options for earsing 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.

3.5.2 BMC Network Configuration

Lan Channel 1 (Failover)

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.

When [DHCP] or [Static] is selected, do NOT modify the BMC network settings on the IPMI web page.

The default login information for the IPMI web interface is:
Username: admin
Password: admin

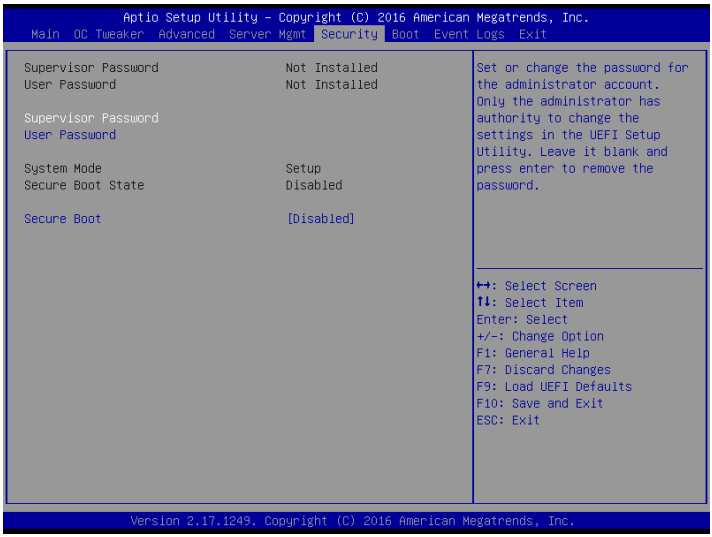
For more instructions on how to set up remote control environment and use the IPMI management platform, please refer to the IPMI Configuration User Guide or go to the Support website at: http://www.asrockrack.com/support/ipmi.asp

BMC Mac Backup Tool

Use this to restore BMC Mac from the backup.

3.6 Security Screen

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

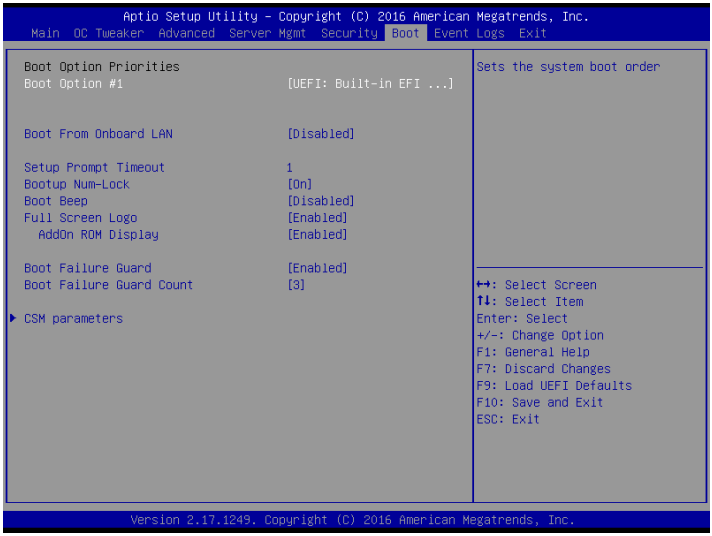
Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Use this to enable or disable Secure Boot Control. The default value is [Disabled].

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 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.

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].

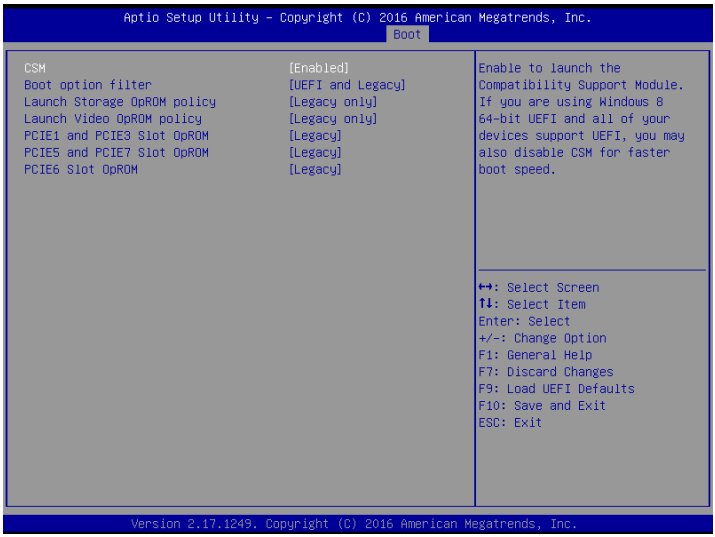
Boot Failure Guard

If the computer fails to boot for a number of times the system automatically restores the default settings.

Boot Failure Guard Count

Configure the number of attempts to boot until the system automatically restores the default settings.

3.7.1 CSM Parameters



CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows 8.1 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.

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.

Launch Video 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.

PCIE1 and PCIE3 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

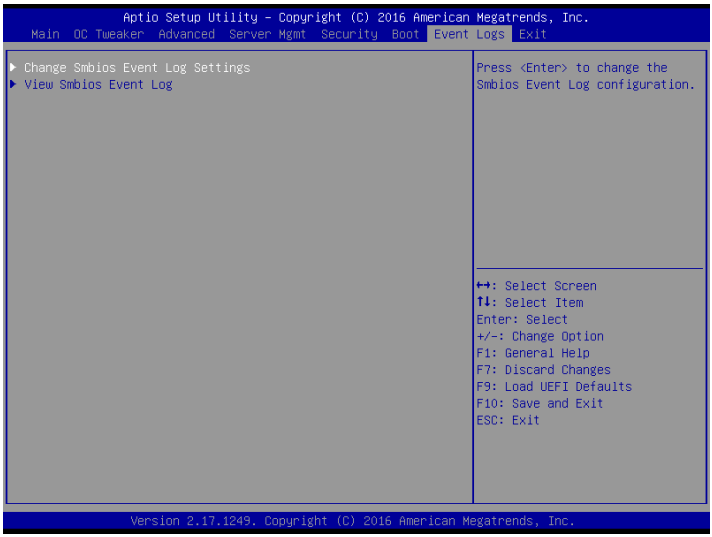
PCIE5 and PCIE7 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

PCIE6 Slot OpROM

This option controls Legacy/UEFI ROMs priority.

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 33.

METW (Multiple Event Time Window)
Use this item to specify the number of minutes which must pass between duplicate log

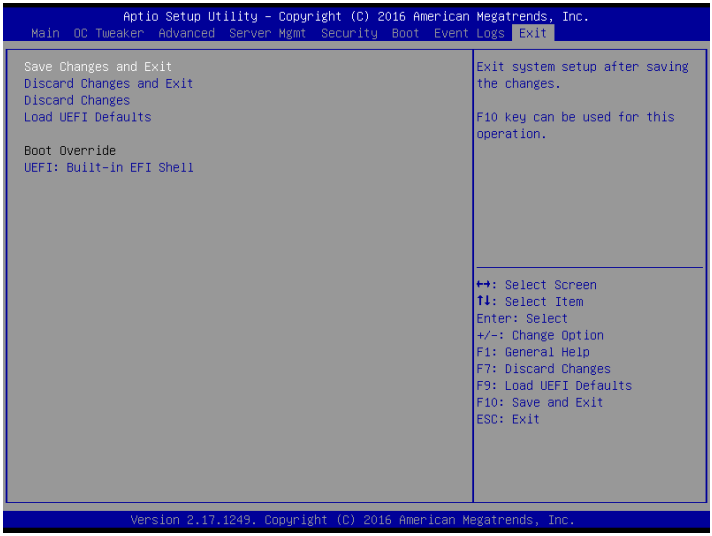
entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

View Smbios Event Log

This allows you 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® 7 / 8 / 8.1 / 10 / Server 2008 R2 SP1 / 2012 / 2012 R2 / 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 adaquate 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

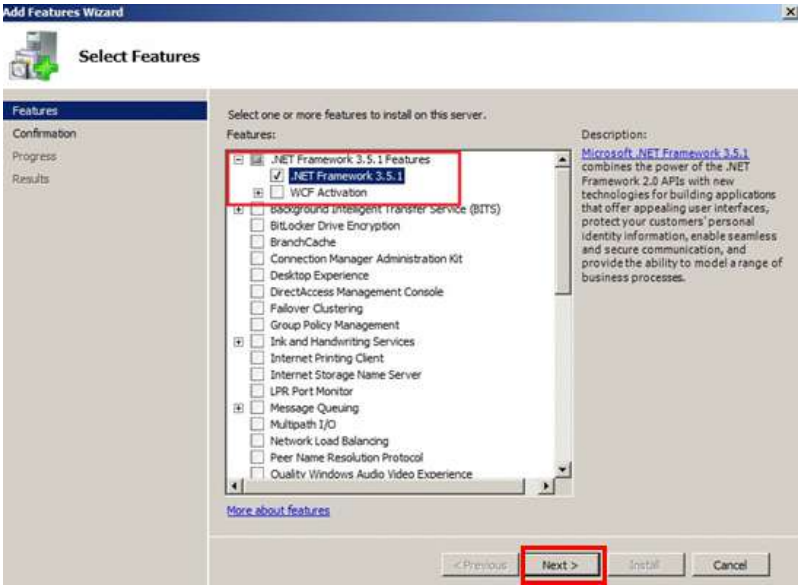
To let Intel® RSTe works properly, it is required to install Net Framework. Please follow the steps below to enable ".Net Framework" feature on Microsoft® Windows® Server 2008 R2.

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

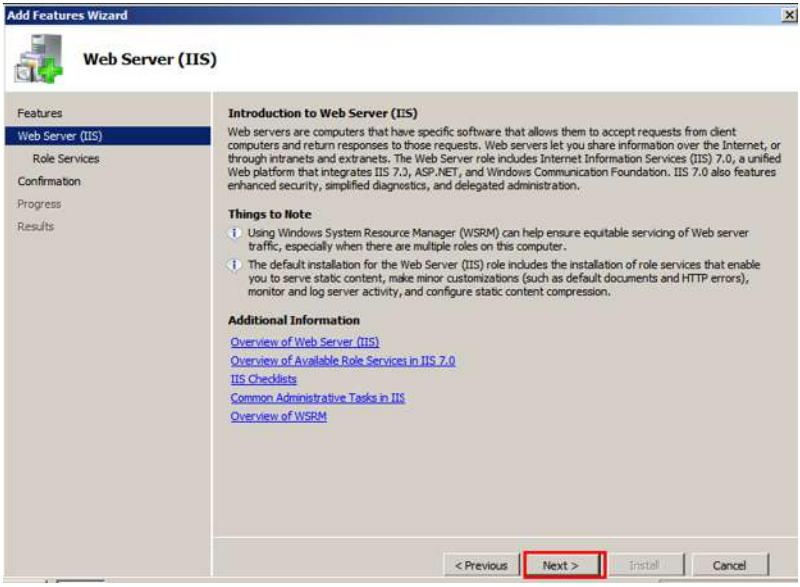
1. Double-click the Server Manager icon in the Windows system tray.

2. Click Add Features in the right hand pane.

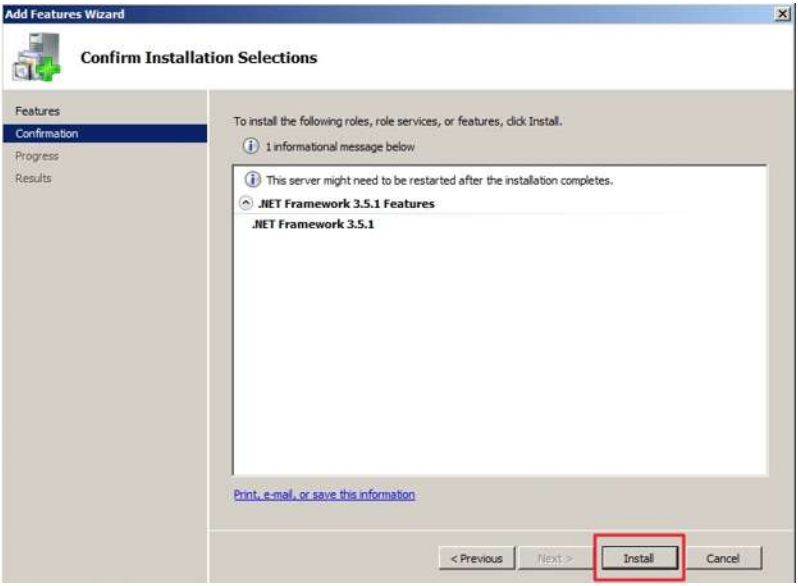
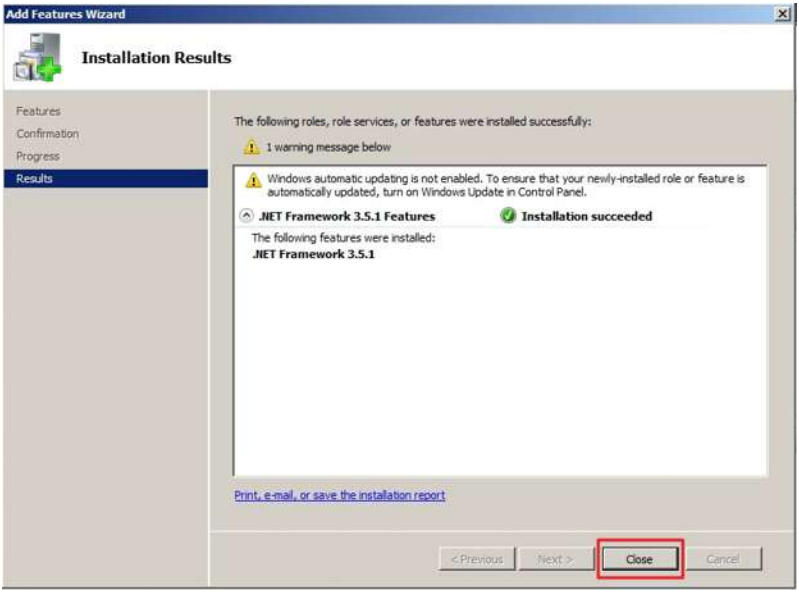
3. Check the box next to .Net Framework 3.5.1 and then click **Next.**



4. Click **Next** to continue.



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



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