



OPEN

Industry Standard, Flexible Architecture

GREEN

Less Heat, Less Power Consumption

STABLE

Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation

Motherboard

D1541D4U-2T8R

D1541D4U-208R

D1541D4U-2L+

D1521D4U-2L+

User Manual



Version 1.1

Published April 2016

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- (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 **D1541D4U 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 D1521D4U-2L+ / D1541D4U-2L+ / D1541D4U-2T8R / D1541D4U-2O8R Motherboard
(uATX Form Factor: 9.6-in x 9.6-in, 24.4 cm x 24.4 cm)
- Support CD
- User Manual
- 4 x Serial ATA (SATA)3 Cables (50cm)
- 2 x Serial ATA (SATA)3 Cables (60cm)
- 1 x Mini SAS HD (12G) to 4SATA Cable (60cm)*
**For D1541D4U-2T8R / D1541D4U-2O8R motherboard only*
- 1 x I/O Shield
- 2 x Screws for M.2 Sockets



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

1.2 Specifications

D1521D4U-2L+ / D1541D4U-2L+ / D1541D4U-2O8R / D1541D4U-2T8R	
MB Physical Status	
Form Factor	uATX
Dimension	9.6' x 9.6" (24.4 cm x 24.4 cm)
Processor System	
CPU	D1521D4U-2L+: Support Intel® Xeon® D1521 Processors D1541D4U-2L+ / D1541D4U-2T8R / D1541D4U-2O8R: Support Intel® Xeon® D1541 Processors
Chipset	Soc
System Memory	
Capacity	- 4x DDR4 DIMM slots - Supports up to 128GB DDR4 ECC RDIMM - Supports up to 64GB DDR4 ECC/non-ECC UDIMM
DIMM Sizes and Type per DIMM	- Non-ECC UDIMM :4GB, 8GB, 16GB - ECC UDIMM : 4GB, 8GB, 16GB - RDIMM : 4GB, 8GB, 16GB,32GB
Frequency	D1521D4U-2L+: - Non-ECC UDIMM : 1600, 1866, 2133MHz - ECC UDIMM : 1600, 1866, 2133MHz - RDIMM : 1600, 1866, 2133MHz D1541D4U-2L+ / D1541D4U-2T8R / D1541D4U-2O8R: - Non-ECC UDIMM : 1600, 1866, 2133MHz, 2400MHz - ECC UDIMM : 1600, 1866, 2133MHz, 2400MHz - RDIMM : 1600, 1866, 2133MHz, 2400MHz
Voltage	1.2V
Expansion Slot	
PCIe 3.0 x16	D1521D4U-2L+ / D1541D4U-2L+: 1 slot (x16) D1541D4U-2T8R / D1541D4U-2O8R: 1 slot (x8)
PCIe 3.0 x8	1 slot (x8)
Storage	
SATA Controller	D1541/D1521: 6 x SATA3 6Gb/s
Additional Storage Controller	- LSI3008 support 8 x SAS3 12Gbps by mini SAS HD connector(switch with slot 7) - Marvell 9172 for 2 ports to M.2
Ethernet	
Interface	1000 /100 /10 Mbps
LAN Controller	D1521D4U-2L+ / D1541D4U-2L+: - 2 x RJ45 GLAN by Intel® i350 D1541D4U-2T8R: - 2 x RJ45 GLAN by Intel® X540

	D1541D4U-2O8R: - 2 x 10G fiber, SFP+ by CS4227 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports Dual LAN with Teaming function - Supports PXE
Management	
BMC Controller	ASPEED AST2400
IPMI Dedicated GLAN	1 x Realtek RTL8211E for dedicated management GLAN
Features	- Watch Dog - NMI - IPMI (Intelligent Platform Management Interface) v.2.0 - Virtual media over LAN function - KVM over LAN function
Graphics	
Controller	ASPEED AST2400
VRAM	DDR3 16MB SDRAM
Output	Supports D-Sub with max. resolution up to 1920x1200 @ 60Hz
Rear Panel I/O	
VGA Port	1 x D-Sub
USB 3.0 Port	2
LAN Port	D1521D4U-2L+ / D1541D4U-2L+: - RJ45: 2x GLAN(by Intel i350) D1541D4U-2T8R: - RJ45: 2x 10G-BaseT LAN(by Intel X540) D1541D4U-2O8R: - RJ45: 2x 10G SFP+ Optical Fiber (CS4227) - LAN Ports with LED (ACT/LINK LED and SPEED LED)
UID Button/UID LED	1
Serial port	COM x1
Internal Connector	
Auxiliary Panel Header	1 (includes chassis intrusion, location button & LED, front LAN LED, and system fault LED)
TPM Header	1
IPMB Header	1
COM Header	1
ME/SPS Recovery	1
Buzzer	1
PWR_SMB	1
SGPIO	2
Smbus from BMC	1

Fan Header	6(1CPU/4Front/1Rear)
ATX Power	1x (24-pin) + 1x (8-pin)
USB 3.0 Header	1
Type A USB 3.0 Port	1
System BIOS	
BIOS Type	128Mb AMI UEFI Legal BIOS
BIOS Features	<ul style="list-style-type: none"> - Plug and Play (PnP) - ACPI 1.1 Compliance Wake Up Events - SMBIOS 2.8.0 Support - ASRock Rack Instant Flash
Hardware Monitor	
Temperature	<ul style="list-style-type: none"> - CPU Temperature Sensing - System Temperature Sensing - System Inlet Temperature Sensing
Fan	<ul style="list-style-type: none"> - 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	<p>Microsoft® Windows®</p> <ul style="list-style-type: none"> - Server 2008 R2 SP1 (64 bit) - Server 2012 (64 bit) - Server 2012 R2 (64 bit) <p>Linux®</p> <ul style="list-style-type: none"> - CentOS 6.6 (32 / 64 bit) / 7.0 (64 bit) (only supports AHCI mode) - SUSE Enterprise Linux Server 11 SP3 (32 / 64 bit) / 12 (64 bit) - FreeBSD 10.1 (32 / 64 bit) - Fedora Core 22 (64 bit) - Ubuntu 15.04 (64 bit) / 15.10 (64 bit) (AHCI mode) - RedHat Enterprise Linux Server 6.6 (32 / 64 bit) / 7.0 (64 bit) <p>Virtual:</p> <ul style="list-style-type: none"> - VMWare ESXi 5.5/ ESXi 6.0 <p>* Please refer to our website for the latest OS support list.</p>
Environment	
Temperature	Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C

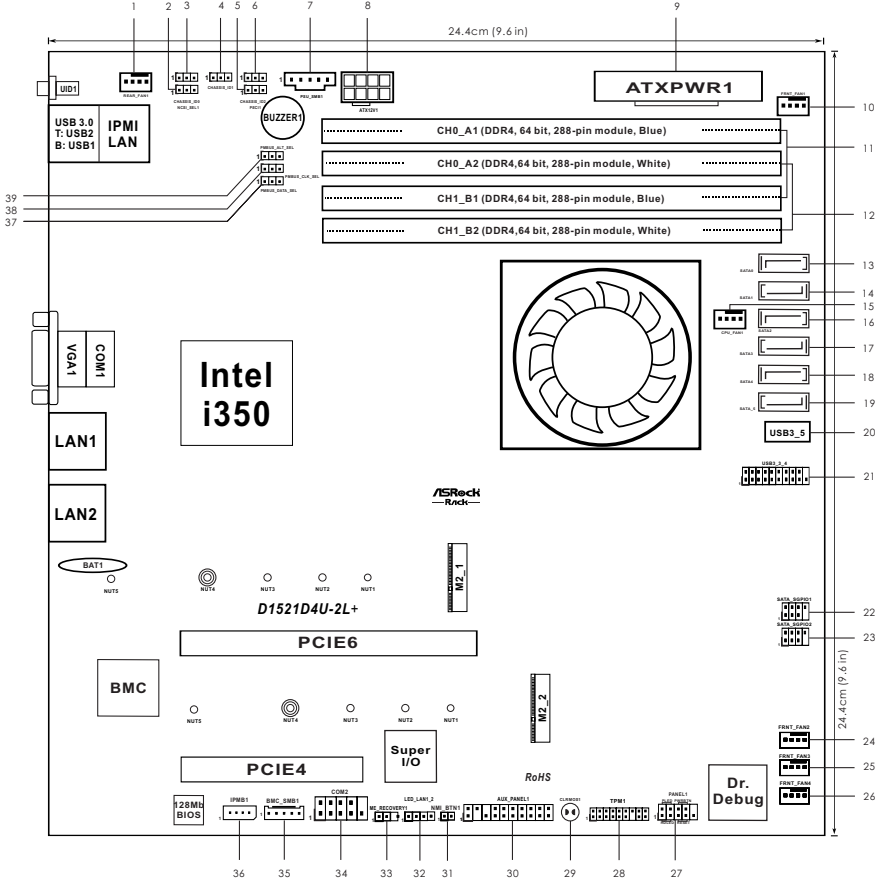
* For detailed product information, please visit our website: <http://www.asrockrack.com>

1.3 Unique Features

ASRock 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

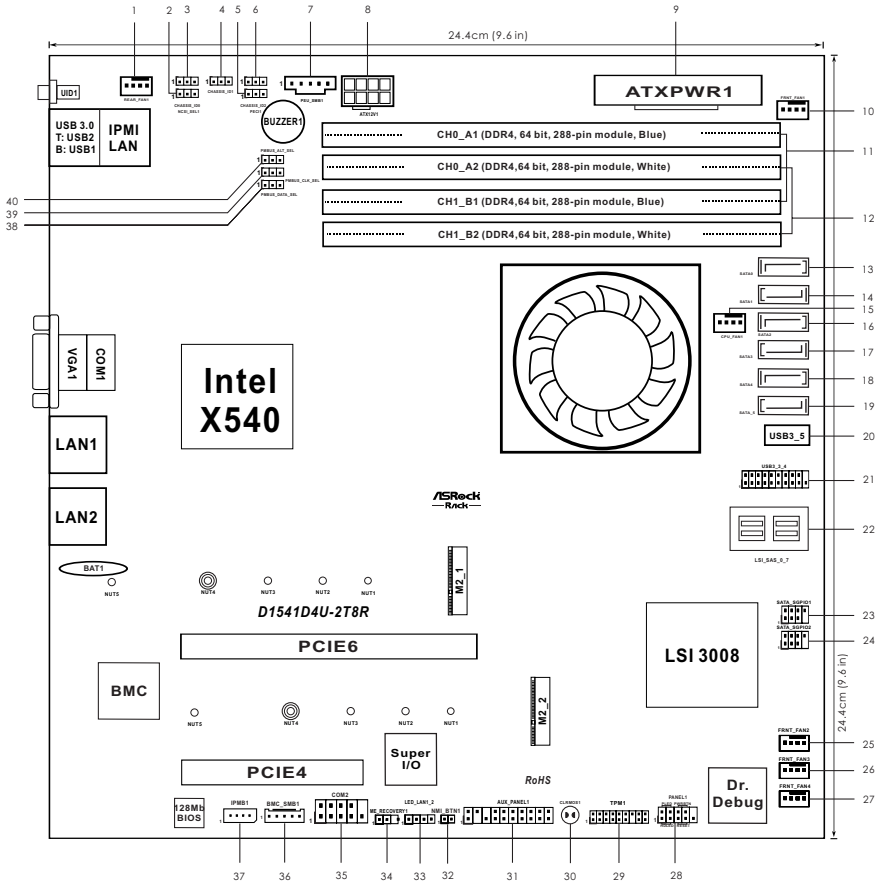
D1521D4U-2L+



No.	Description
1	Rear Fan Connector (REAR_FAN1)
2	NCSI Mode Jumper (NCSI_SEL1)
3	Chassis ID0 Jumper (CHASSIS_ID0)
4	Chassis ID1 Jumper (CHASSIS_ID1)
5	CPU PECI Mode Jumper (PECI1)
6	Chassis ID2 Jumper (CHASSIS_ID2)
7	PSU SMBus (PSU_SMB1)
8	ATX 12V Power Connector (ATX12V1)
9	ATX Power Connector (ATXPWR1)
10	Front Fan Connector (FRNT_FAN1)
11	2 x 288-pin DDR4 DIMM Slots (CH0_A1, CH1_B1)
12	2 x 288-pin DDR4 DIMM Slots (CH0_A2, CH1_B2)
13	SATA3 Connector (SATA0)
14	SATA3 Connector (SATA1)
15	CPU Fan Connector (CPU_FAN1)
16	SATA3 Connector (SATA2)
17	SATA3 Connector (SATA3)
18	SATA3 Connector (SATA4)
19	SATA3 Connector (SATA5)
20	Intelligent Platform Management Bus header (IPMB_1)
21	COM Port Header (COM1)
22	SATA SGPIO Connector (SATA_SGPIO1)
23	SATA SGPIO Connector (SATA_SGPIO2)
24	Front Fan Connector (FRNT_FAN2)
25	Front Fan Connector (FRNT_FAN3)
26	Front Fan Connector (FRNT_FAN4)
27	System Panel Header (PANEL1)
28	TPM Header (TPM1)
29	Clear CMOS Pad (CLRMOSE1)
30	Auxiliary Panel Header (AUX_PANEL1)
31	Non Maskable Interrupt Button (NMI_BTN1)
32	LAN LED Connector (LED_LAN1_2)
33	ME Recovery Jumper (ME_RECOVERY1)

No.	Description
34	COM Port Header (COM2)
35	BMC SMB Header (BMC_SMB1)
36	Intelligent Platform Management Bus Header (IPMB1)
37	PMBUS Mode Jumper (PMBUS_ALT_SEL)
38	PMBUS Mode Jumper (PMBUS_CLK_SEL)
39	PMBUS Mode Jumper (PMBUS_DATA_SEL)

D1541D4U-2T8R



No.	Description
1	Rear Fan Connector (REAR_FAN1)
2	NCSI Mode Jumper (NCSI_SEL1)
3	Chassis ID0 Jumper (CHASSIS_ID0)
4	Chassis ID1 Jumper (CHASSIS_ID1)
5	CPU PECI Mode Jumper (PECI1)
6	Chassis ID2 Jumper (CHASSIS_ID2)
7	PSU SMBus (PSU_SMB1)
8	ATX 12V Power Connector (ATX12V1)
9	ATX Power Connector (ATXPWR1)
10	Front Fan Connector (FRNT_FAN1)
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13	SATA3 Connector (SATA0)
14	SATA3 Connector (SATA1)
15	CPU Fan Connector (CPU_FAN1)
16	SATA3 Connector (SATA2)
17	SATA3 Connector (SATA3)
18	SATA3 Connector (SATA4)
19	SATA3 Connector (SATA5)
20	Intelligent Platform Management Bus header (IPMB_1)
21	COM Port Header (COM1)
22	LSI SAS Connector (LSI_SAS_0_7)
23	SATA SGPIO Connector (SATA_SGPIO1)
24	SATA SGPIO Connector (SATA_SGPIO2)
25	Front Fan Connector (FRNT_FAN2)
26	Front Fan Connector (FRNT_FAN3)
27	Front Fan Connector (FRNT_FAN4)
28	System Panel Header (PANEL1)
29	TPM Header (TPM1)
30	Clear CMOS Pad (CLRMOSE1)
31	Auxiliary Panel Header (AUX_PANEL1)
32	Non Maskable Interrupt Button (NMI_BTN1)
33	LAN LED Connector (LED_LAN1_2)

No.	Description
34	ME Recovery Jumper (ME_RECOVERY1)
35	COM Port Header (COM2)
36	BMC SMB Header (BMC_SMB1)
37	Intelligent Platform Management Bus Header (IPMB1)
38	PMBUS Mode Jumper (PMBUS_ALT_SEL)
39	PMBUS Mode Jumper (PMBUS_CLK_SEL)
40	PMBUS Mode Jumper (PMBUS_DATA_SEL)

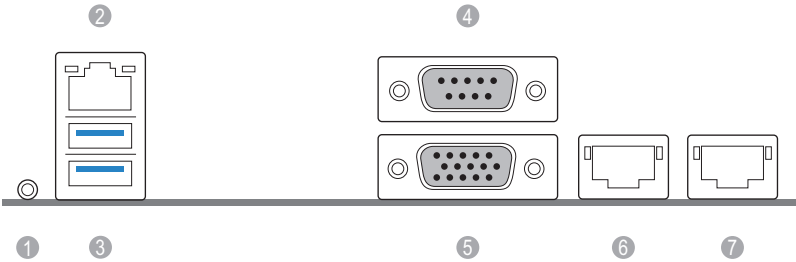
No.	Description
1	Rear Fan Connector (REAR_FAN1)
2	NCSI Mode Jumper (NCSI_SEL1)
3	Chassis ID0 Jumper (CHASSIS_ID0)
4	Chassis ID1 Jumper (CHASSIS_ID1)
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13	SATA3 Connector (SATA0)
14	SATA3 Connector (SATA1)
15	CPU Fan Connector (CPU_FAN1)
16	SATA3 Connector (SATA2)
17	SATA3 Connector (SATA3)
18	SATA3 Connector (SATA4)
19	SATA3 Connector (SATA5)
20	Intelligent Platform Management Bus header (IPMB_1)
21	COM Port Header (COM1)
22	LSI SAS Connector (LSI_SAS_0_7)
23	SATA SGPIO Connector (SATA_SGPIO1)
24	SATA SGPIO Connector (SATA_SGPIO2)
25	Front Fan Connector (FRNT_FAN2)
26	Front Fan Connector (FRNT_FAN3)
27	Front Fan Connector (FRNT_FAN4)
28	System Panel Header (PANEL1)
29	TPM Header (TPM1)
30	Clear CMOS Pad (CLRMOSE1)
31	Auxiliary Panel Header (AUX_PANEL1)
32	Non Maskable Interrupt Button (NMI_BTN1)
33	ME Recovery Jumper (ME_RECOVERY1)

No.	Description
34	COM Port Header (COM2)
35	BMC SMB Header (BMC_SMB1)
36	Intelligent Platform Management Bus Header (IPMB1)
37	PMBUS Mode Jumper (PMBUS_ALT_SEL)
38	PMBUS Mode Jumper (PMBUS_CLK_SEL)
39	PMBUS Mode Jumper (PMBUS_DATA_SEL)

No.	Status	Description
1	Amber	REAR_FAN1 failed
2	Amber	FRNT_FAN1 failed
3	Amber	CPU_FAN1 failed
4	Amber	FRNT_FAN2 failed
5	Amber	FRNT_FAN3 failed
6	Amber	FRNT_FAN4 failed
7	Green	LSI heartbeat LED
8	Green	BMC heartbeat LED
9	Green	STB PWR ready

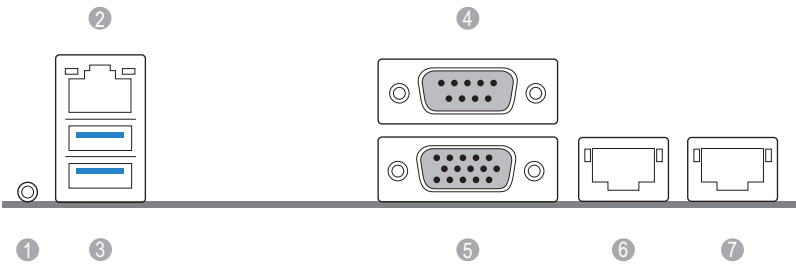
1.6 I/O Panel

D1521D4U-2L+ / D1541D4U-2L+



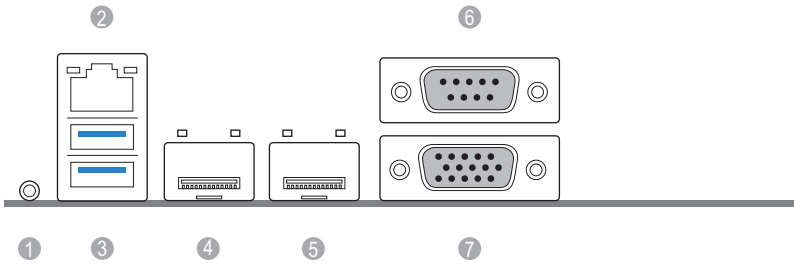
No.	Description	No.	Description
1	UID Switch/LED (UID1)	5	Serial Port (COM1)
2	Dedicated IPMI LAN Port*	6	1G LAN RJ-45 Port (LAN1)**
3	USB 3.0 Ports (USB3_12)	7	1G LAN RJ-45 Port (LAN2)**
4	VGA Port (VGA1)		

D1541D4U-2T8R



No.	Description	No.	Description
1	UID Switch/LED (UID1)	5	Serial Port (COM1)
2	Dedicated IPMI LAN Port*	6	10G LAN RJ-45 Port (LAN1)**
3	USB 3.0 Ports (USB3_12)	7	10G LAN RJ-45 Port (LAN2)**
4	VGA Port (VGA1)		

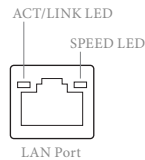
D1541D4U-2O8R



No.	Description	No.	Description
1	UID Switch/LED (UID1)	5	SFP+ Port (Fiber) (SFP+_2)
2	Dedicated IPMI LAN Port*	6	VGA Port (VGA1)
3	USB 3.0 Ports (USB3_12)	7	Serial Port (COM1)
4	SFP+ Port (Fiber) (SFP+_1)		

LAN Port LED Indications

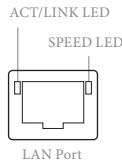
*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

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

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



LAN Port (LAN3, LAN4) LED Indications

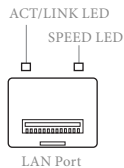
1G For D1521D4U-2L+ / D1541D4U-2L+

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

10G For D1541D4U-2T8R

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

LAN Port (LAN1, LAN2) LED Indications

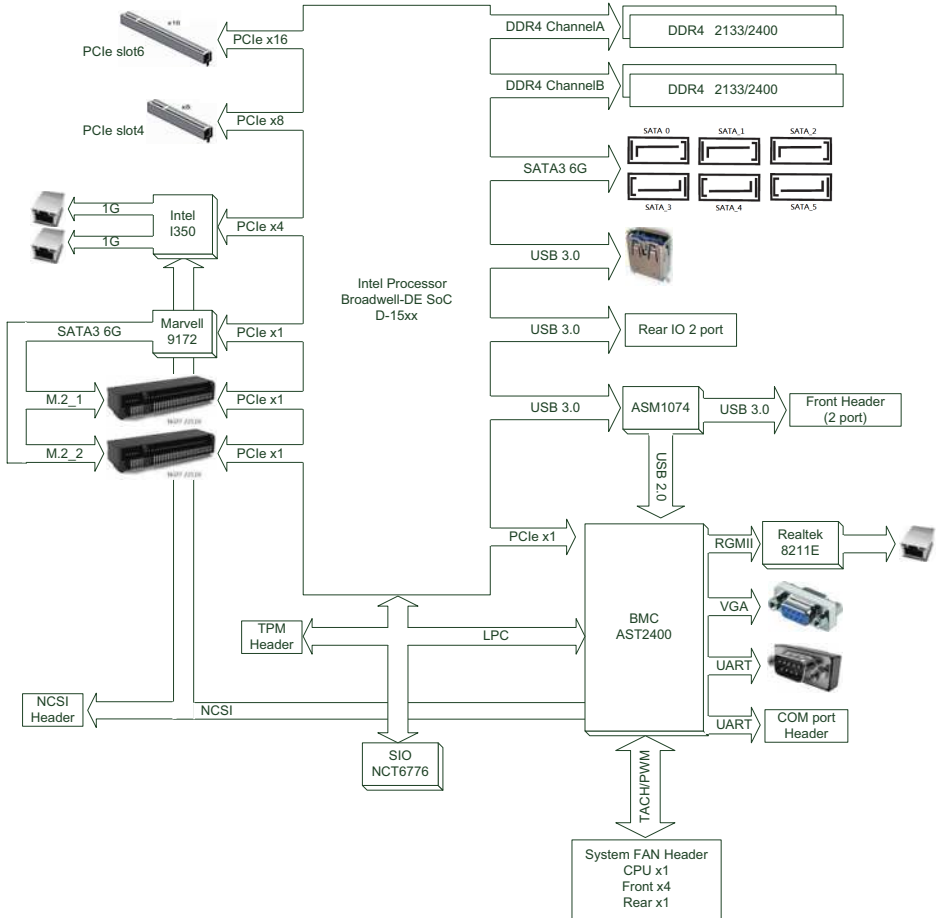


1G For D1521D4U-2L+ / D1541D4U-2L+

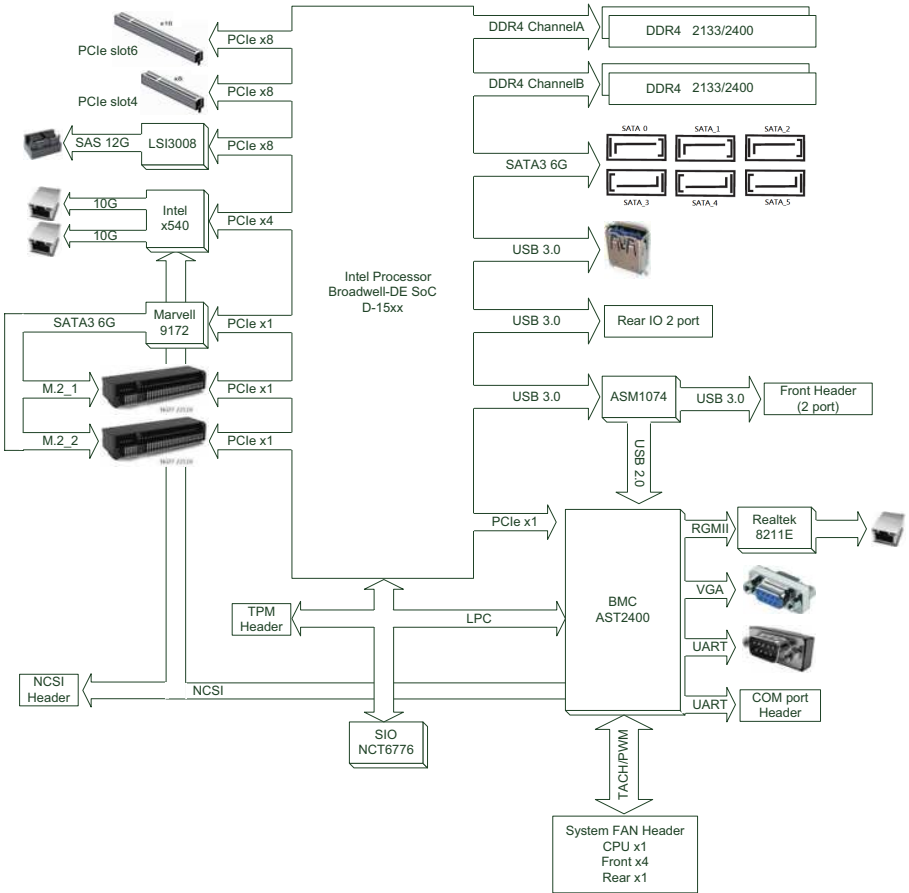
Speed LED		Activity / Link LED	
Status	Description	Status	Description
Off	10Mbps connection or no link	Off	No Link
Orange	100Mbps connection	Blinking Green	Data Activity
Green	1Gbps connection	On	Link

1.7 Block Diagram

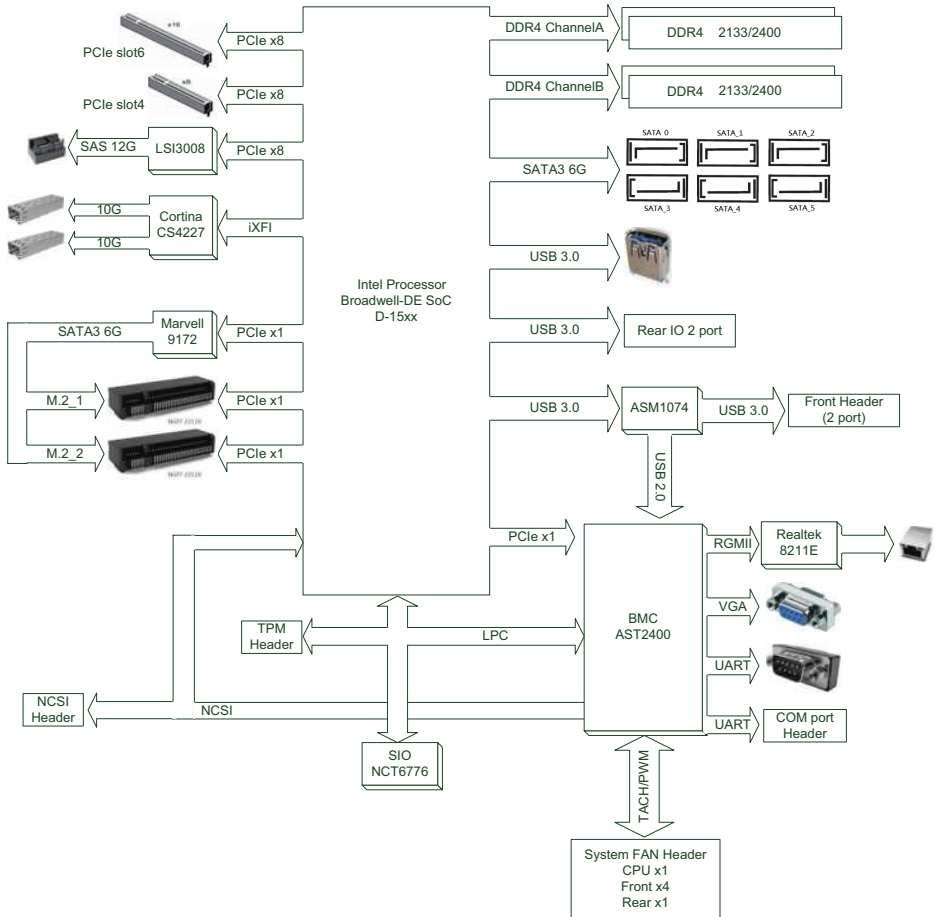
D1521D4U-2L+ / D1541D4U-2L+



D1541D4U-2T8R



D1541D4U-2O8R



Chapter 2 Installation

This is an uATX form factor (9.6" x 9.6", 24.4 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 Installation of Memory Modules (DIMM)

This motherboard provides four 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 not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and DIMM may be damaged.
3. Please install the memory module on CH0_A1 for the first priority.
4. To activate Dual Channel Memory Technology, please follow the "Dual Channel Memory Configuration" table below.

Dual Channel Memory Configuration

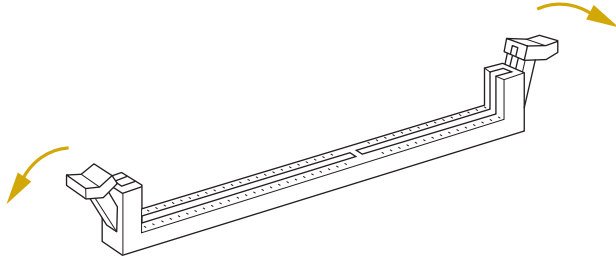
Priority	CH0_A1 (Blue)	CH0_A2 (White)	CH1_B1 (Blue)	CH1_B2 (White)
1	Populated		Populated	
2	Populated	Populated	Populated	Populated

**Since installing three memory modules is NOT supported on this motherboard, we suggest not using this configuration.*

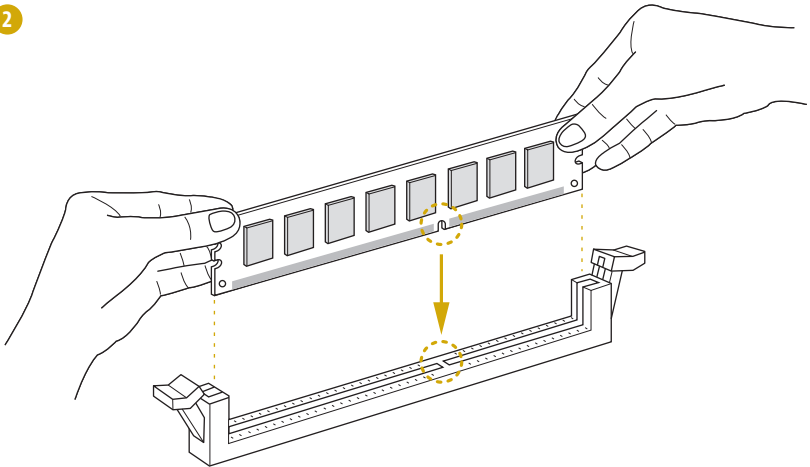


The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

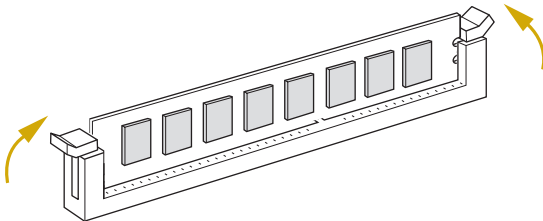
1



2



3



2.4 Expansion Slots

There are 2 PCI Express slots on this motherboard.

PCIe slot:

D1521D4U-2L+ / D1541D4U-2L+:

PCIe4 (PCIe 3.0 x8 slot) is used for PCI Express x8 lane width cards.

PCIe6 (PCIe 3.0 x16 slot) is used for PCI Express x16 lane width cards.

D1541D4U-2T8R / D1541D4U-2O8R:

PCIe4 (PCIe 3.0 x8 slot) is used for PCI Express x8 lane width cards.

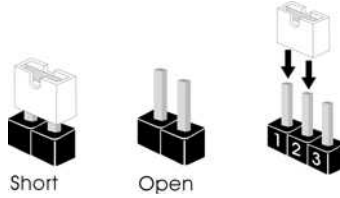
PCIe6 (PCIe 3.0 x16 slot) is used for PCI Express x8 lane width cards.

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.

2.5 Jumper Setup

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



ME Recovery Jumper (3-pin ME_RECOVERY1) (See p.6, 7, 10 or 13)	1_2 	2_3
	Normal Mode (Default)	ME Recovery Mode
CPU PECI Mode Jumper (3-pin PECI1) (See p.6, 7, 10 or 13)	1_2 	2_3
	CPU PECI connected to PCH	CPU PECI connected to BMC (Default)
NCSI Mode Jumper (3-pin NCSI_SEL1) (See p.6, 7, 10 or 13)	1_2 	2_3
	NCSI is set to onboard LAN1 (Default)	NCSI is set to Mezzanine Card
PMBUS Mode Jumper (3-pin PMBUS_ALT_SEL) (3-pin PMBUS_CLK_SEL) (3-pin PMBUS_SATA_SEL) (See p.6, 7, 10 or 13)	1_2 	2_3
	PMBus connected to BMC (Default)	PMBus connected to PCH

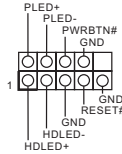
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (See p.6, 7, 10 or 13)	1_2 	1_2 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (See p.6, 7, 10 or 13)	1_2 	1_2 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (See p.6, 7, 10 or 13)	1_2 	2_3 
	Board Level SKU (Default)	For 3U8G system, passive GPGPU
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (See p.6, 7, 10 or 13)	1_2 	1_2 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (See p.6, 7, 10 or 13)	2_3 	2_3 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (See p.6, 7, 10 or 13)	2_3 	1_2 
	For 3U8G system, active GPGPU	Reserved for system level use
Chassis ID0 Jumper (3-pin CHASSIS_ID0) (See p.6, 7, 10 or 13)	2_3 	2_3 
Chassis ID1 Jumper (3-pin CHASSIS_ID1) (See p.6, 7, 10 or 13)	1_2 	1_2 
Chassis ID2 Jumper (3-pin CHASSIS_ID2) (See p.6, 7, 10 or 13)	1_2 	2_3 
	Reserved for system level use	Reserved for system level use

2.6 Onboard Headers and Connectors



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

System Panel Header
(9-pin PANEL1)
(See p.6, 7, 10 or 13)



This header accommodates several system front panel functions.



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):

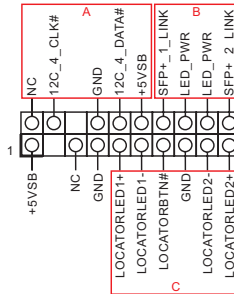
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

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_PANEL1)
(See p.6, 7, 10 or 13)



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



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 SFP+_1_LED, SFP+_2_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. Locator LED (6-pin LOCATOR)

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

Serial ATA3 Connectors

(SATA0)

(See p.6, 7, 10 or 13)

(SATA1)

(See p.6, 7, 10 or 13)

(SATA2)

(See p.6, 7, 10 or 13)

(SATA3)

(See p.6, 7, 10 or 13)

(SATA4)

(See p.6, 7, 10 or 13)

(SATA5)

(See p.6, 7, 10 or 13)



SATA0



SATA1



SATA2



SATA3



SATA4



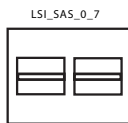
SATA5

These six Serial ATA3 (SATA3) connectors support SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate.

Mini SAS HD
Connectors*

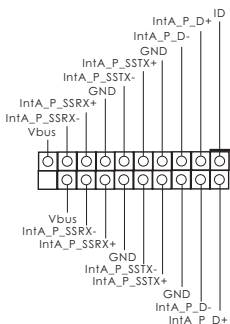
(LSI_SAS_0_7)
(See p.10 or 13)

**For D1541D4U-2T8R and
D1541D4U-2O8R only*



This Mini SAS HD connector supports SAS/SATA data cables for internal storage devices. The current SAS3/SATA3 interface allows up to 12.0 Gb/s data transfer rate. For connecting SAS HDDs, please contact SAS data cable dealers.

USB 3.0 Header
(19-pin USB3_3_4)
(See p.6, 7, 10 or 13)

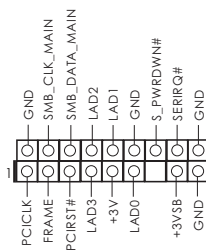


Besides two USB 3.0 ports on the I/O panel, there is one header on this motherboard. This USB 3.0 header can support two ports.

USB 3.0 Connector
(USB3_5)
(See p.6, 7, 10 or 13)

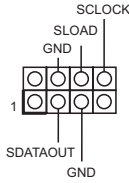


TPM Header
(17-pin TPM1)
(See p.6, 7, 10 or 13)



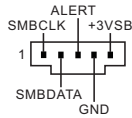
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Serial General Purpose
Input/Output Headers
(7-pin SATA_SGPIO1)
(See p.6, 7, 10 or 13)
(7-pin SATA_SGPIO2)
(See p.6, 7, 10 or 13)



These headers support Serial Link interface for onboard SATA connections.

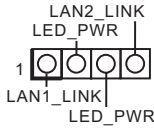
PSU SMBus
(PSU_SMB1)
(See p.6, 7, 10 or 13)



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

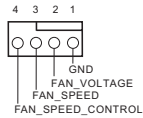
LAN LED Connector
(LED_LAN1_2)
(See p.6, 7 or 10)

**For D1521D4U-2L+,
D1541D4U-2L+ and D1541D4U-
2T8R only*



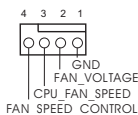
This 4-pin connector is used for the front LAN status indicator.

Front and Rear
Fan Connectors
(4-pin FRNT_FAN1)
(See p.6, 7, 10 or 13)
(4-pin FRNT_FAN2)
(See p.6, 7, 10 or 13)
(4-pin FRNT_FAN3)
(See p.6, 7, 10 or 13)
(4-pin FRNT_FAN4)
(See p.6, 7, 10 or 13)
(4-pin REAR_FAN1)
(See p.6, 7, 10 or 13)



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

CPU Fan Connectors
(4-pin CPU_FAN1)
(See p.6, 7, 10 or 13)

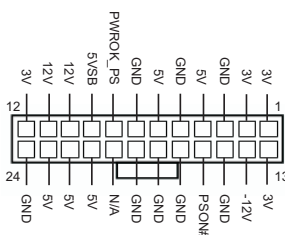


Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

Though this motherboard provides a 4-Pin CPU fan (Quiet Fan) connector, 3-Pin CPU fans can still work successfully even without the fan speed control function. If you plan to connect a 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

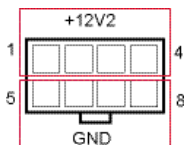
**For more details, please refer to the Cooler QVL list on the ASRock Rack website.*

ATX Power Connector
(24-pin ATXPWR1)
(See p.6, 7, 10 or 13)



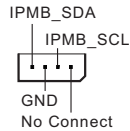
Please connect an ATX power supply to this connector. Though this motherboard provides a 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use a 20-pin ATX power supply, please plug your power supply along Pin 1 and Pin 13.

ATX 12V Power Connectors
(8-pin ATX12V1)
(See p.6, 7, 10 or 13)



This motherboard provides one 8-pin ATX 12V power connector.

Intelligent Platform
Management Bus header
(4-pin IPMB_1)
(See p.6, 7, 10 or 13)



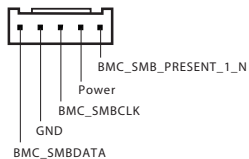
This 4-pin connector is used to provide a cabled baseboard or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.

Non Maskable Interrupt
Button Header
(2-pin NMI_BTN1)
(See p.6, 7, 10 or 13)



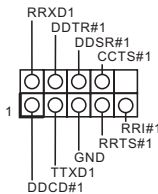
Please connect a NMI device to this header.

BMC SMB Headers
(5-pin BMC_SMB_1)
(See p.6, 7, 10 or 13)



This header is used for the SMBUS devices.

Serial Port Header
(9-pin COM2)
(See p.6, 7, 10 or 13)



This COM header supports a serial port module.

Clear CMOS Pad
(CLRMOS1)
(See p.6, 7, 10 or 13)



CLRMOS1 allows you to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.

2.7 Unit Identification purpose LED/Switch

With the UID button, You are able to locate the server you're working on from behind a rack of servers.

Unit Identification
purpose LED/Switch
(UID1)



When the UID button on the front or rear panel is pressed, the front/rear UID blue LED indicator will be turned on. Press the UID button again to turn off the indicator.

2.8 Driver Installation Guide

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

2.9 Dual LAN and Teaming Operation Guide

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



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

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

Step 1

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

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

Step 4

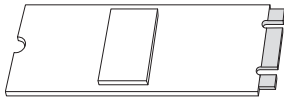
Select the adapter you want to be the primary adapter and click the **Set Primary** button.

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

2.10 M.2_SSD (NGFF) Module Installation Guide

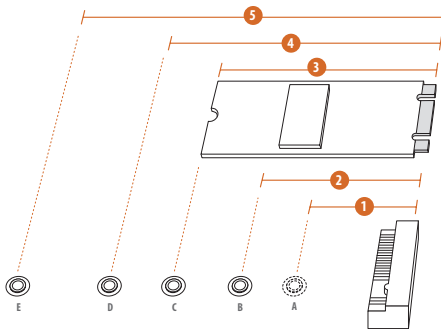
The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2_SSD (NGFF) Socket 3 can accommodate either a M.2 SATA3 6.0 Gb/s module or a M.2 PCI Express module up to Gen3 x4 (32 Gb/s).

Installing the M.2_SSD (NGFF) Module



Step 1

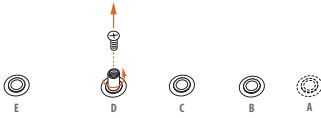
Prepare a M.2_SSD (NGFF) module and the screw.



Step 2

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

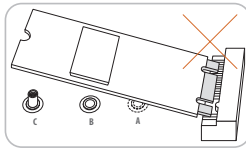
No.	1	2	3	4	5
Nut Location	A	B	C	D	E
PCB Length	3cm	4.2cm	6cm	8cm	11cm
Module Type	Type2230	Type 2242	Type2260	Type 2280	Type 22110

Step 3

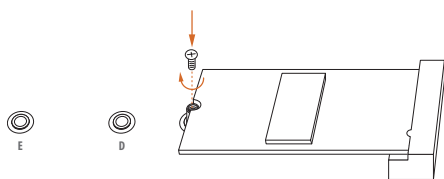
Move the standoff based on the module type and length. The standoff is placed at the nut location D by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.

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.

M.2_SSD (NGFF) Module Support List

Vendor	Size	Interface	Length	P/N
ADATA	128GB	SATA3	2280	AXNS381E-128GM-B
ADATA	256GB	SATA3	2280	AXNS381E-256GM-B
ADATA	32GB	SATA3	2230	AXNS330E-32GM-B
Crucial	120GB	SATA3	2280	CT120M500SSD4
Crucial	240GB	SATA3	2280	CT240M500SSD4
Intel	80GB	SATA3	2280	Intel SSDSCKGW080A401/80G
Kingston	120GB	SATA3	2280	SM2280S3
Kingston	480GB	PCIe2 x4	2280	SH2280S3/480G
Plextor	256GB	PCIe	2280	PX-G256M6e
Plextor	512GB	PCIe	2280	PX-G512M6e
Samsung	256GB	PCIe3 x4	2280	SM951 (MZHPV256HDGL)
Samsung	512GB	PCIe3 x4	2280	SM951 (MZHPV512HDGL)
Samsung	512GB	PCIe x4	2280	XP941-512G (MZHPU512HCGL)
SanDisk	128GB	PCIe	2260	SD6PP4M-128G
SanDisk	256GB	PCIe	2260	SD6PP4M-256G
Team	128GB	SATA3	2242	TM4PS4128GMC105
Team	128GB	SATA3	2280	TM8PS4128GMC105
Team	256GB	SATA3	2280	TM8PS4256GMC105
Team	256GB	SATA3	2242	TM4PS4256GMC105
Transcend	256GB	SATA3	2242	TS256GMTS400
Transcend	512GB	SATA3	2280	TS512GMTS800
Transcend	512GB	SATA3	2260	TS512GMTS600

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

Chapter 3 UEFI Setup Utility

3.1 Introduction

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

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



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

3.1.1 UEFI Menu Bar

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

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

Use <←→> key or <→> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen.

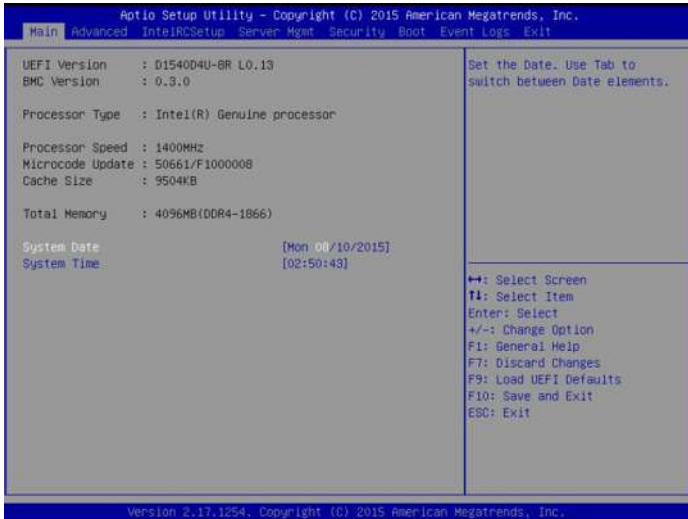
3.1.2 Navigation Keys

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

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

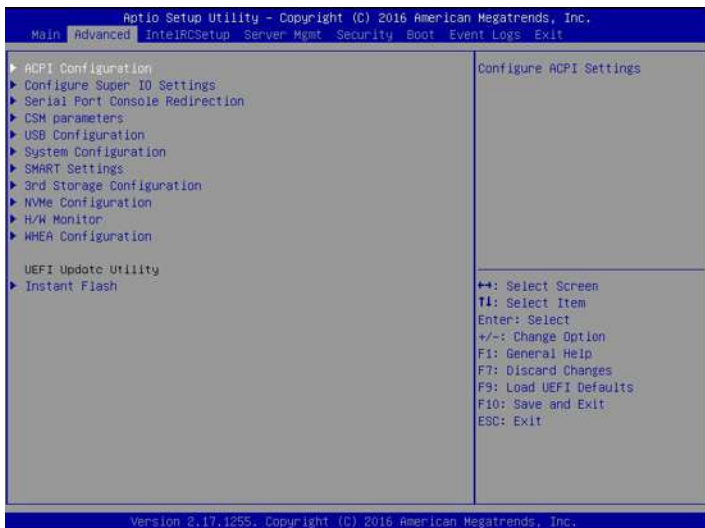
3.2 Main Screen

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



3.3 Advanced Screen

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



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

3.3.1 ACPI Configuration



PCIe Devices Power On

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

Ring-In Power On

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

RTC Alarm Power On

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

3.3.2 Configure Super IO Settings



Serial Port 1 Configuration

Use this item to configure the onboard serial port 1.

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

Serial Port

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

Serial Port Address

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

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

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

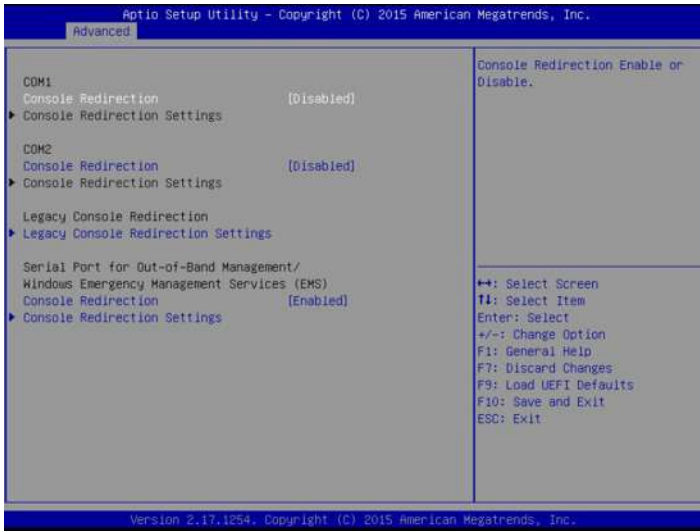
Serial Port Address

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

Serial Port Mode

Use this item to select the Serial Port Mode.

3.3.3 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], [38400], [57600] and [115200].

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty Keypad

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

Redirection After BIOS POST

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

Legacy Console Redirection

Legacy Console Redirection Settings

Use this option to configure Legacy Console Redirection Settings.

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

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

Terminal Type

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

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

Bits Per Second

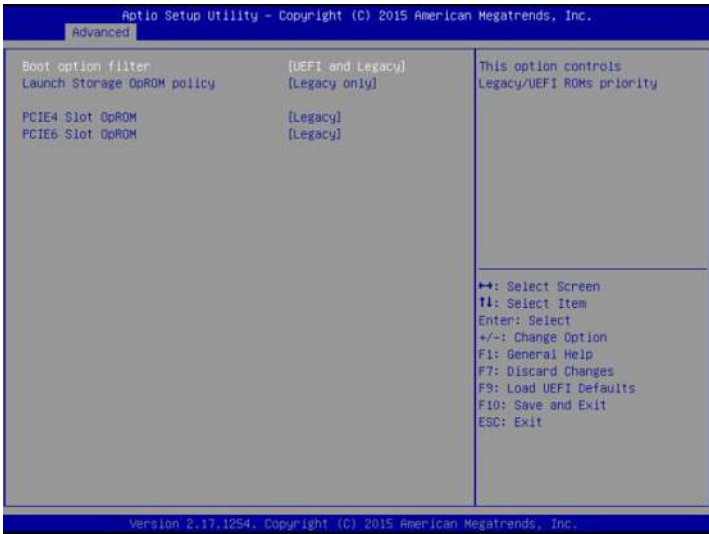
Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [57600] and [115200].

Flow Control

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

Data Bits**Parity****Stop Bits**

3.3.4 CSM Configuration



Boot Option Filter

This option controls Legacy/UEFI ROMs priority.

Launch Storage OpROM Policy

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

PCIe4 Slot OpROM

Use this item to select PCIe4 Option ROM policy.

PCIe6 Slot OpROM

Use this item to select PCIe6 Option ROM policy.

3.3.5 USB Configuration



Intel USB3.0 Mode

Use this item to select the mode of operation of Intel USB 3.0 controller. Configuration options: [Enabled], [Disabled], [Auto] and [Smart Auto]. If [Auto] is selected, all USB ports work as USB3.0 after boot to OS. If [Smart Auto] is selected, all USB ports work as USB3.0 after boot to OS and work as USB2.0 in deep sleep stages.

Legacy USB 3.0 Support

Use this option to enable or disable legacy support for USB devices. The default value is [Enabled].

3.3.6 System Configuration



Primary Graphics Adapter

Use this item to select the type and primary VGA in case of multiple video controllers.

Onboard VGA

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

SFP+ 1 & SFP+ 2 *(For D1541D4U-208R)*

This allows you to enable or disable the SFP+ 1 & SFP+ 2 features.

LAN1 & LAN2 *(For D1521D4U-2L+ / D1541D4U-2L+ / D1541D4U-2T8R)*

This allows you to enable or disable the LAN1 & LAN2 features.

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).

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

Enable or disable the onboard Dr. Debug LED.

SR-IOV Support

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

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



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].

3.3.8 3rd Storage Configuration



In this section, you may set the configurations or see the information of the connected 3rd storage device.

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] and [AHCI Mode]. The default value is [AHCI Mode].

Bootable Marvell 9172 SATA3

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

Bootable LSI 3008 Controller

Use this item to enable or disable Bootable LSI Controller.

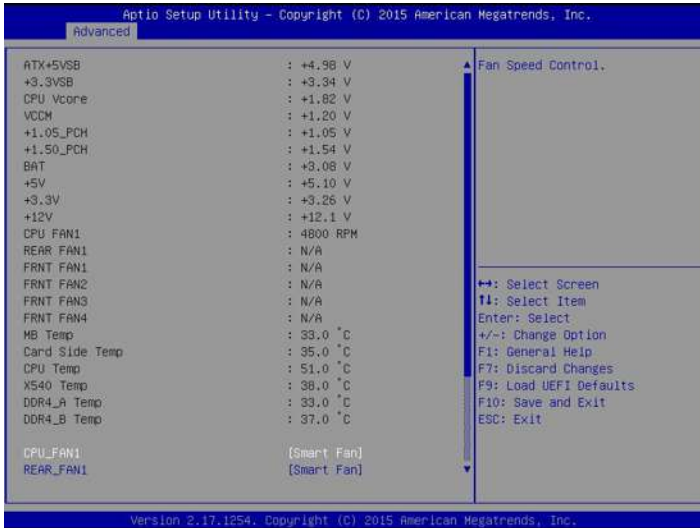
3.3.9 NVMe Configuration



The NVMe Configuration displays the NVMe controller and Drive information.

3.3.10 H/W Monitor

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



CPU_FAN1

This allows you to set the CPU fan1's speed. The default value is [Smart Fan].

REAR_FAN1

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

FRNT_FAN1

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

FRNT_FAN2

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

FRNT_FAN3

This allows you to set the front fan 3's speed. The default value is [Smart Fan].

FRNT_FAN4

This allows you to set the front fan 4's speed. The default value is [Smart Fan].

Smart Fan Control

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

Smart Fan Duty Control

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

This allows you to set duty cycle for each stage.

Smart Fan Temp Control

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

This allows you to set temperature for each stage.

Watch Dog Timer

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

3.3.11 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.

Memory Error

Memory enabling and logging setup option.

Correctable Error Threshold

Correctable Error Threshold (1 - 32767) used for sparing, tagging, and leaky bucket.

PCIe Error

PCIe enabling and logging setup option.

Corrected Error Enable

Use this item to enable or disable PCIe Correctable errors.

Uncorrected Error Enable

Use this item to enable or disable PCIe Uncorrectable errors.

Fatal Error Enable

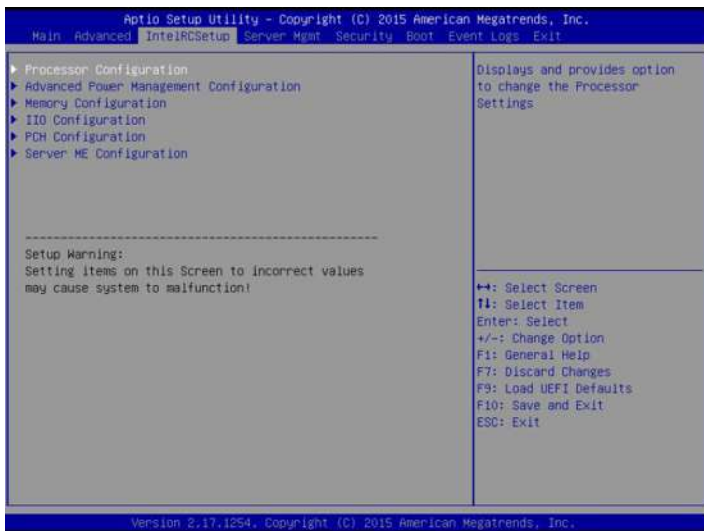
Use this item to enable or disable PCIe Fatal errors.

3.3.12 Instant Flash

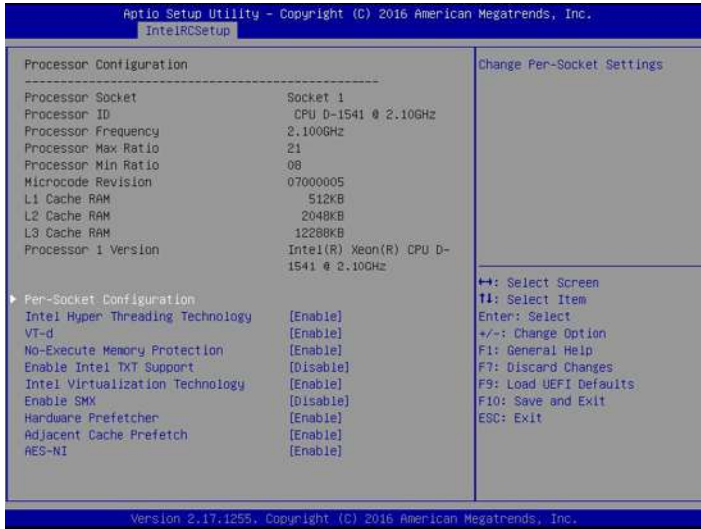
Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows[®]. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then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

3.4 IntelRCSetup

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



3.4.1 Processor Configuration



Per-Socket Configuration

Change Per-Socket Settings.

CPU Socket 1 Configuration

Active Processor Cores

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

Intel Hyper Threading Technology

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

VT-d

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

No-Execute Memory Protection

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

Enable Intel TXT Support

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

Intel Virtualization Technology

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

Enable SMX

Use this item to enable Safer Mode Extensions.

Hardware Prefetcher

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

Adjacent Cache Prefetch

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

AES-NI

Use this item to enable or disable AES-NI support.

3.4.2 CPU Power Management Configuration



Intel SpeedStep Technology

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



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

Intel Turbo Boost Technology

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

Package C State Support

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

CPU C3 State Support

Enable C3 sleep state for lower power consumption.

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

CPU Thermal Throttling

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

3.4.3 Memory 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

Use this item to enable or disable DDR ECC Support.

Memory Information

Displays memory topology with DIMM population information.

Memory Map

Set memory mapping settings.

Channel Interleaving

Select to configure Channel Interleaving settings.

Rank Interleaving

Select to configure Rank Interleaving settings.

3.4.4 IIO Configuration



PCIE4 Link Speed

This allows you to select PCIE4 Link Speed. The default value is [Auto].

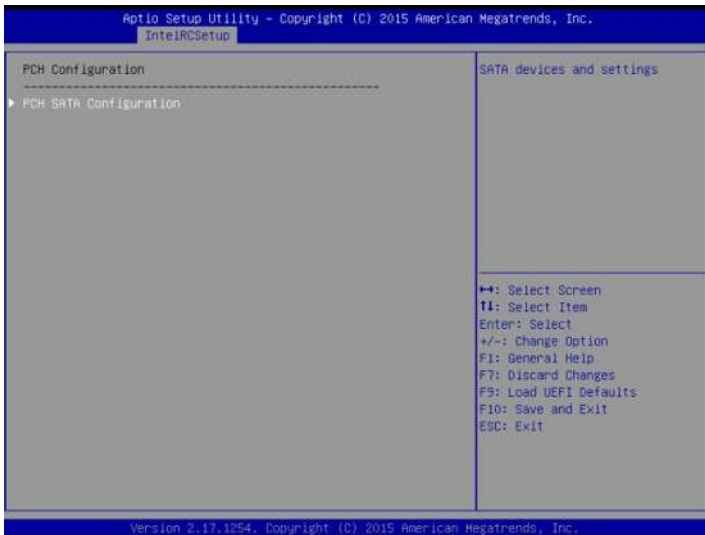
PCIE6 Link Speed

This allows you to select PCIE6 Link Speed. The default value is [Auto].

PCI-E ASPM Support

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

3.4.5 PCH Configuration



PCH SATA Configuration

SATA devices and settings

SATA Controller

Use this item to enable or disable SATA Controller.

SATA Mode Selection

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

Support Aggressive Link Power Mgmt

Use this item to enable or disable SALP.

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

Hot Plug

Designates this port as Hot Pluggable.

Configuration as External SATA

Use this item to configure port as External SATA (eSATA).

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.

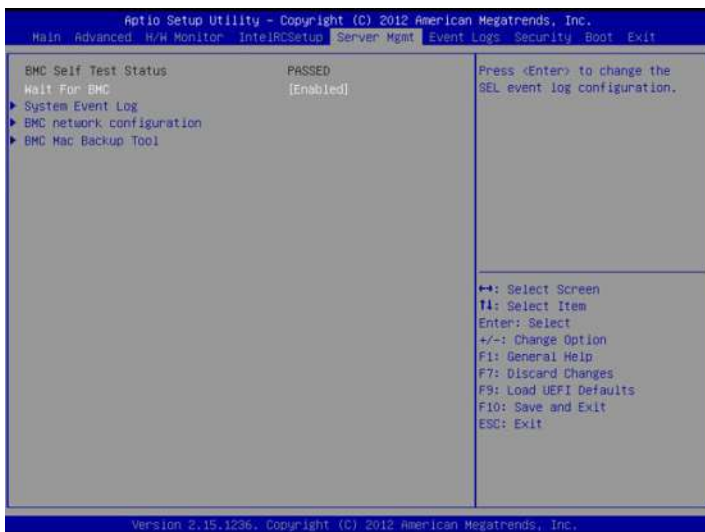
3.4.6 Server ME Configuration



Spread Spectrum

Use this item to select spread spectrum mode.

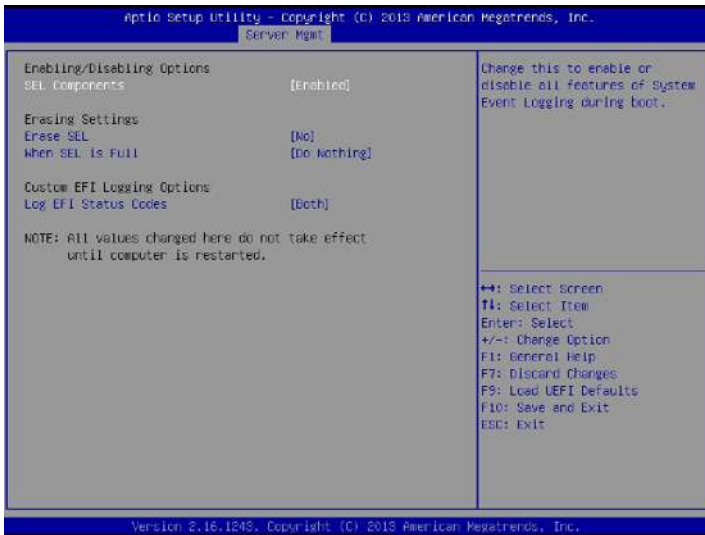
3.5 Server Mgmt



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 or disable all features of System Event Logging during boot.

Erase SEL

Use this to choose options for erasing SEL.

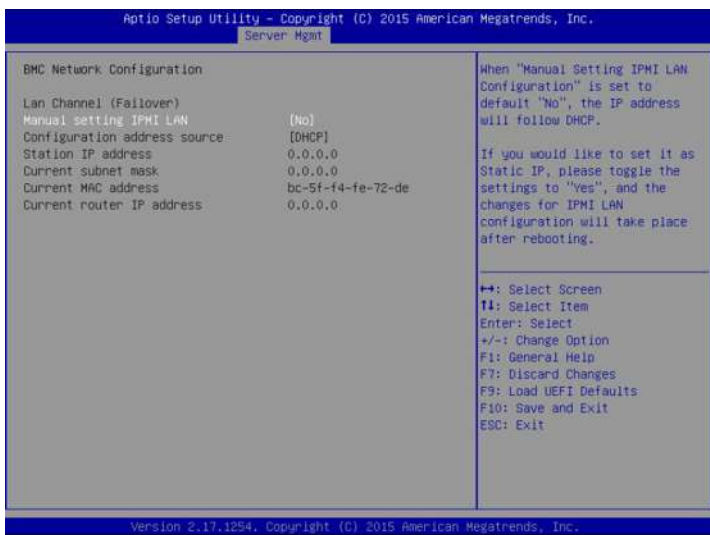
When SEL is Full

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

Log EFI Status Codes

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

3.5.2 BMC Network Configuration



Lan Channel (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

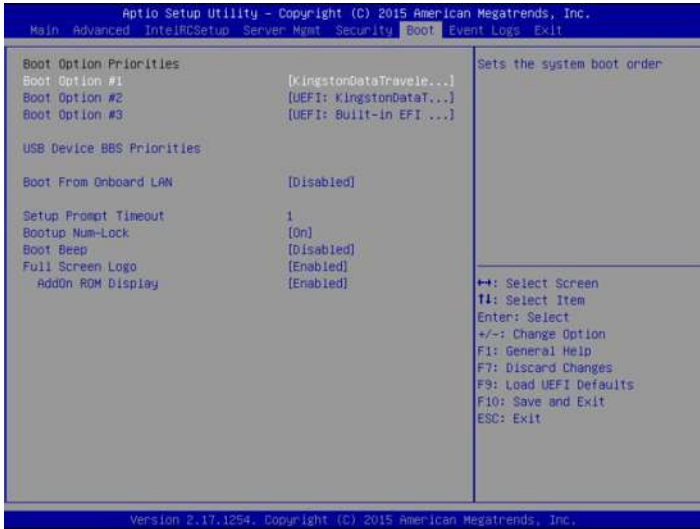
Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

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.

3.7 Boot Screen

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



Boot Option #1

Use this item to set the system boot order.

Boot Option #2

Use this item to set the system boot order.

Boot Option #3

Use this item to set the system boot order.

USB Device BBS Priorities

Use this item to set the system boot order from USB devices.

Boot From Onboard LAN

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

Setup Prompt Timeout

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

Bootup Num-Lock

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

Boot Beep

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

PCI ROM Priority

Use this item to adjust PCI ROM Priority. The default value is [LegacyROM]

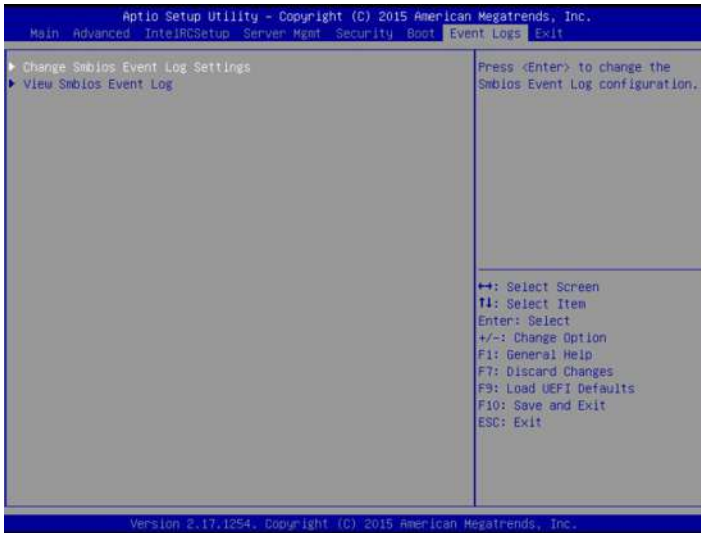
Full Screen Logo

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

AddOn ROM Display

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

3.8 Event Logs



Change Smbios Event Log Settings

This allows you to configure the Smbios Event Log Settings.

View Smbios Event Log

This allows you to view the Smbios Event Log.

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.

Chapter 4 Software Support

4.1 Install Operating System

This motherboard supports Microsoft® Windows® Server 2008 R2 SP1 (64 bit) / 2012 (64 bit) / Linux compliant. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer 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 2400/2133 RDIMM, ECC, non-ECC UDIMM memory.
3. If you have installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

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

Other problems...

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

5.2 Technical Support Procedures

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

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

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

5.3 Returning Merchandise for Service

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

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

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

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

Chapter 6: Net Framework Installation Guide

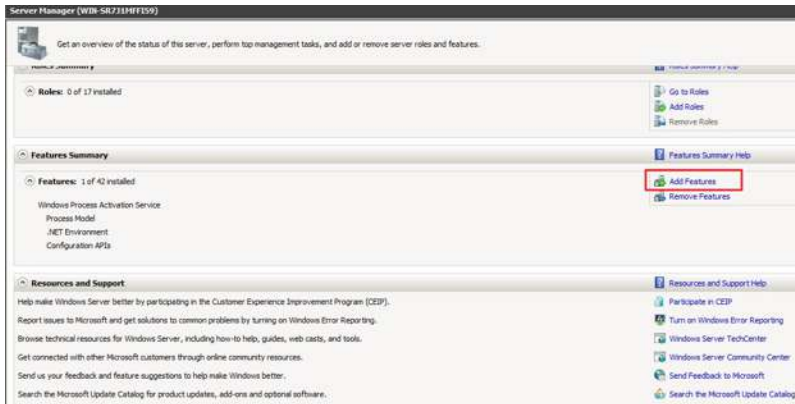
To let Intel® RSTe works properly, it is required to install Net Framework. Please follow the steps below to enable “.Net Framework” feature on Microsoft® Windows® Server 2008 R2.

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

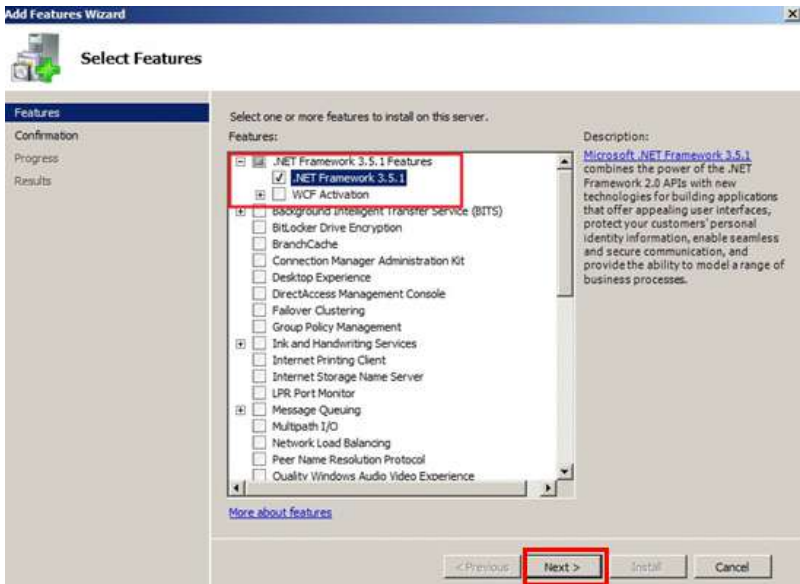
1. Double-click the Server Manager icon in the Windows system tray.



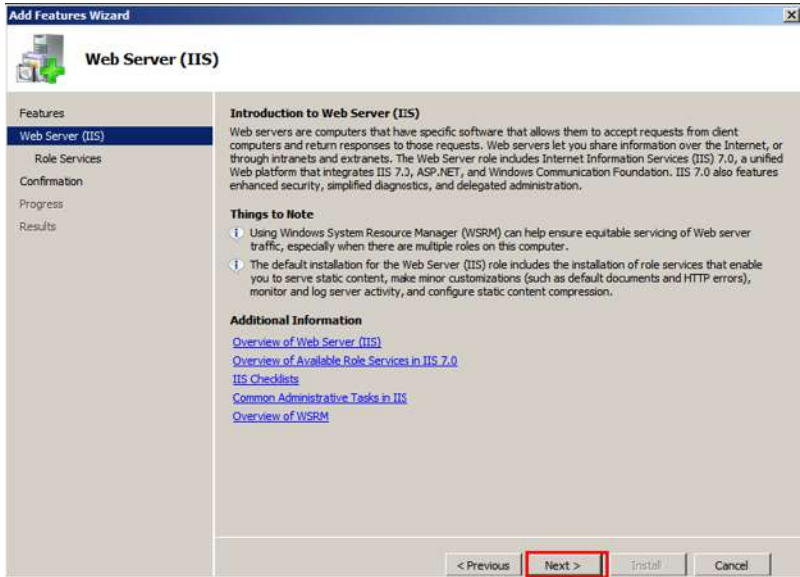
2. Click Add Features in the right hand pane.



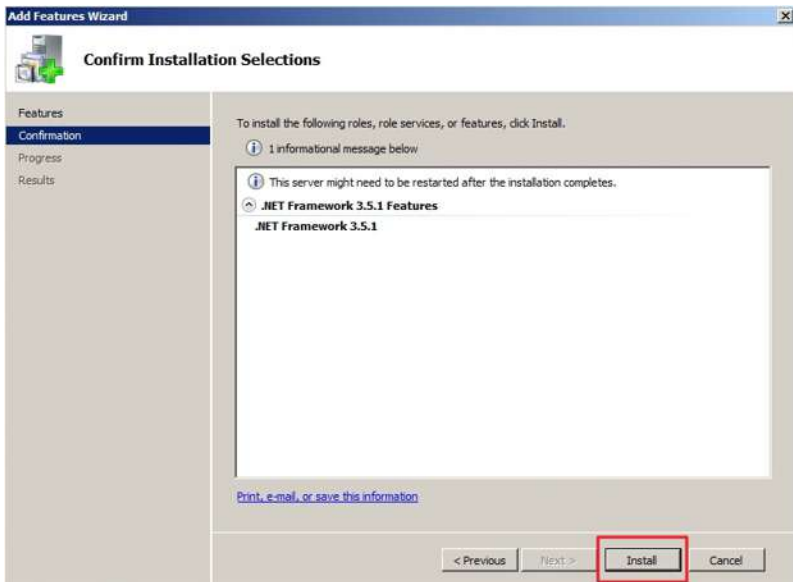
3. Check the box next to .Net Framework 3.5.1 and then click Next.



4. Click Next to continue.



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



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

