

GA-7PESE3

LGA1356 socket motherboard for Intel® Xeon® series processors

User's Manual

Rev. 1001

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Documentation Classifications

In order to assist in the use of this product, GIGABYTE provides the following types of documentations:

- For detailed product information, carefully read the User's Manual.

For product-related information, check on our website at:

<http://www.gigabyte.com>

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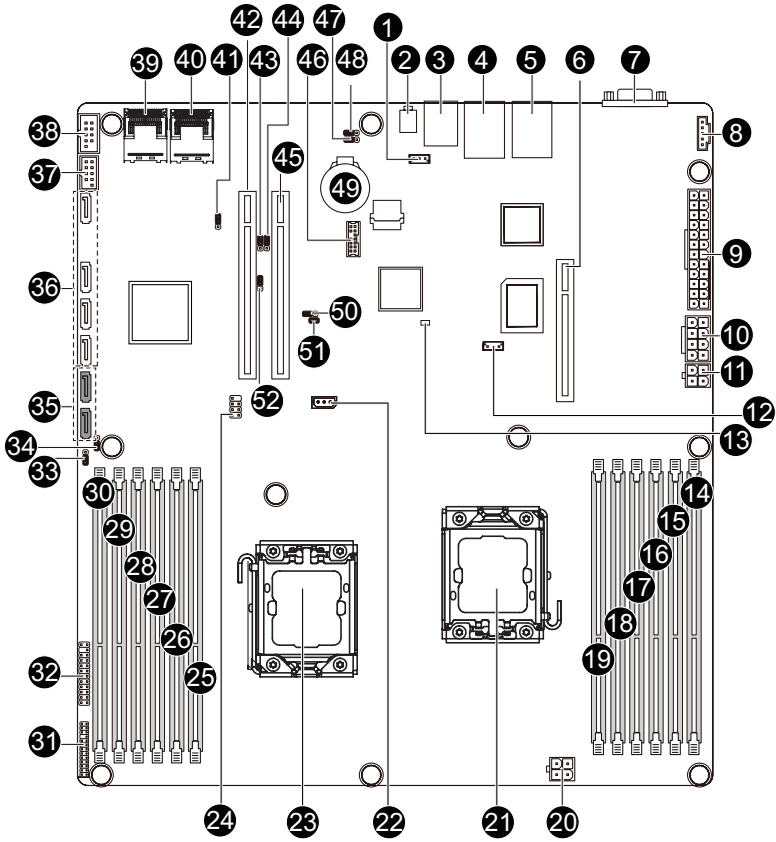
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Box Contents

- GA-7ESE3 motherboard
- Driver CD
- Two SATA cables
- I/O Shield
- Power Cable

- The box contents above are for reference only and the actual items shall depend on the product package you obtain. The box contents are subject to change without notice.
- The motherboard image is for reference only.

GA-7PESE3 Motherboard Layout



Item	Code	Description
1	RAID_KEY_1	RAID Select connector
2	ID_SW	ID switch
3	MLAN	KVM Server Management 10/100 LAN Port
4	USB_LAN1	LAN1 port (top) / USB ports (bottom)
5	USB_LAN2	LAN2 port (top) / USB ports (bottom)
6	PCIE_3	PCI-E slot 3 (x8 slot)
7	COM1_VGA1	Serial port (top)/VGA port (bottom)
8	PMBUS_CN_1	PMBus connector
9	ATX1	24 pin power connector
10	P12V_AUX2	8 pin power connector
11	P12V_AUX1	4 pin power connector
12	SKU_KEY1	Intel C600 series Upgrade Key
13	BMC_LED1	BMC firmware readiness LED
14	DDR3_P1_D0	Channel 1 slot 0 (for secondary CPU)
15	DDR3_P1_D1	Channel 1 slot 1 (for secondary CPU)
16	DDR3_P1_E0	Channel 2 slot 0 (for secondary CPU)
17	DDR3_P1_E1	Channel 2 slot 1 (for secondary CPU)
18	DDR3_P1_F0	Channel 3 slot 0 (for secondary CPU)
19	DDR3_P1_F1	Channel 3 slot 1 (for secondary CPU)
20	P12V_CPU0	4 pin power connector
21	CPU1	Intel LGA1356 socket (Secondary CPU)
22	IPMB1	IPMB connector
23	CPU0	Intel LGA1356 socket (Primary CPU)
24	SATA_SGPI0	SATA SGPIO connector
25	DDR3_P0_C1	Channel 3 slot 1 (for primary CPU)
26	DDR3_P0_C0	Channel 3 slot 0 (for primary CPU)
27	DDR3_P0_B1	Channel 2 slot 1 (for primary CPU)
28	DDR3_P0_B0	Channel 2 slot 0 (for primary CPU)
29	DDR3_P0_A1	Channel 1 slot 1 (for primary CPU)
30	DDR3_P0_A0	Channel 1 slot 0 (for primary CPU)
31	BP_1	HDD back plane connector
32	FP_1	Front panel connector
33	SATA_DOM1	SATA port1 DOM support jumper
34	SATA_DOM0	SATA port0 DOM support jumper
35	SATA0/1	SATA 6Gb/s connectors
36	SATA2/3/4/5	SATA 3Gb/s connectors
37	F_USB1	Front USB connector
38	COM2	Serial port connector
39	MINI_CN2	Mini SAS connector #2 (SATA signal)
40	MINI_CN1	Mini SAS connector #1 (SATA signal)
41	SSB_ME2	ME flash jumper
42	PCIE_1	PCI-E slot 1 (x16 slot)
43	BIOS_RVCR1	BIOS recovery jumper
44	CLR_CMOS1	Clear CMOS jumper
45	PCIE_2	PCI-E slot 2 (x16 slot)

Item	Code	Description
46	TPM_MEZZ1	TPM module connector
47	PASSWORD5	Clear password jumper
48	SSB_ME1	ME recovery jumper
49	BAT	Battery socket
50	BMC_FRB3	Force to Stop FRB3 Timer Jumper
51	S3_MASK	S3 Power On Select jumper
52	BIOS_WP	BIOS write protect jumper



CAUTION! If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Default setting), in order to reduce any risk of hard disk damage. Please refer to Page 34 for SATA_DOM0 and SATA_DOM1 jumper setting instruction.










Chapter 1 Hardware Installation






1-1 Installation Precautions

The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user's manual and follow these procedures:

- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

1-2 Product Specifications

	CPU	<ul style="list-style-type: none"> ◆ Support for Dual Intel® Xeon® Sandy-bridge-EN processors in 1356 socket ◆ Intel® Xeon® Quad/Eight Core in LGA 1356 socket ◆ Supports QuickPath Interconnect up to 8GT/s ◆ Enhanced Intel SpeedStep Technology (EIST) & Demand BasedSwitch (DBS) ◆ Enhanced Intel SpeedStep Technology (EIST) ◆ Support Intel Virtualization Technology (VT)
	Chipset	<ul style="list-style-type: none"> ◆ Intel® C602 (Patsburg) Chipset
	Memory	<ul style="list-style-type: none"> ◆ 12 x 1.5V DDR3 DIMM sockets supporting up to 384 GB of systemmemory ◆ 12 x 1.35V DDR3L DIMM sockets supporting up to 384 GB of system memory ◆ 3 channel memory architecture ◆ Support for 1066/1333/1600 memory modules ◆ Support for ECC RDIMM/ UDIMM memory modules
	LAN	<ul style="list-style-type: none"> ◆ Intel® I350 supports 10/100/1000 Mbps ◆ 1 x KVM management LAN port
	Expansion Slots	<ul style="list-style-type: none"> ◆ 2 x PCIe x16 slots (Gen3 x16 bus) ◆ 1 x PCIe x8 slot (Gen3 x8 bus)
	Onboard Graphics	<ul style="list-style-type: none"> ◆ ASPEED® AST2300 supports 16MB VRAM
	Storage Interface	<ul style="list-style-type: none"> ◆ Intel® C602 controller ◆ 2 x SATA 6Gb/s connectors (SATA0/SATA1) ◆ 4 x SATA 3Gb/s connectors (SATA2/SATA3/SATA4/SATA5) ◆ 2 x Mini SAS connector (8 SATA/SAS ports (3Gb/s) via SCU) ◆ Support for Intel RSTe SATA RAID 0, RAID 1
	USB	<ul style="list-style-type: none"> ◆ Up to 6 USB 2.0/1.1 ports (4 on the back panel, 2 via the USB brackets connected to the internal USB headers)
	Internal Connectors	<ul style="list-style-type: none"> ◆ 1 x 24-pin ATX main power connector ◆ 1 x 8-pin ATX 12V power connector ◆ 2 x 4-pin ATX 12V power connectors ◆ 2 x SATA 6Gb/s connectors (SATA0/1) ◆ 4 x SATA 3Gb/s connectors (SATA2/3/4/5) ◆ 2 x Mini SAS connector (8 SATA/SAS ports (3Gb/s) via SCU) ◆ 1 x PMBus connector ◆ 1 x Front panel header ◆ 1 x Back plance header ◆ 1 x SCU Key header ◆ 1 x IPMI connector ◆ 1 x TPM connector ◆ 1 x USB 2.0/1.1 connector ◆ 1 x Serial port connector ◆ 1 x SPGPIO header

	Rear Panel I/O	<ul style="list-style-type: none"> ◆ 4 x USB 2.0/1.1 ports ◆ 3 x RJ-45 port (1 x 10/100 dedicated management LAN port/ 2 x 10/100/1000 LAN ports) ◆ 1 x COM port ◆ 1 x VGA port ◆ 1 x ID Switch button
	I/O Controller	<ul style="list-style-type: none"> ◆ ASPEED® AST2300 BMC chip
	Hardware Monitor	<ul style="list-style-type: none"> ◆ System voltage detection ◆ CPU/System temperature detection ◆ CPU/System fan speed detection ◆ CPU/System fan speed control <p style="margin-left: 40px;">* Whether the CPU/system fan speed control function is supported will depend on the CPU/system cooler you install.</p>
	BIOS	<ul style="list-style-type: none"> ◆ 1 x 64 Mbit flash ◆ AMI BIOS
	Form Factor	<ul style="list-style-type: none"> ◆ EATX Form Factor; 12 inch x 12.9 inch, 10 layers PCB

* GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.

1-3 Installing the CPU and CPU Cooler

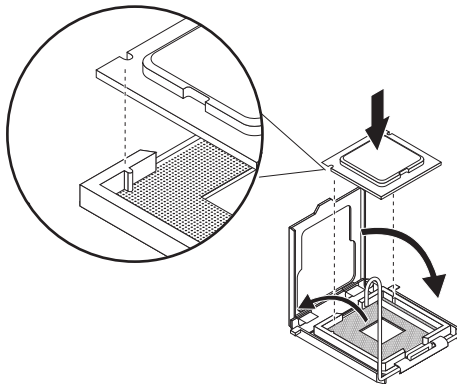


Read the following guidelines before you begin to install the CPU:

- Make sure that the motherboard supports the CPU.
(Go to GIGABYTE's website for the latest CPU support list.)
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

1-3-1 Installing the CPU

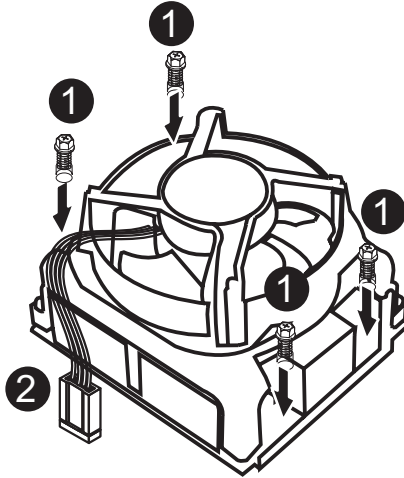
- Step 1. Raise the metal locking lever on the socket.
- Step 2. Remove the plastic covering on the CPU socket.
- Step 3. Lift the metal cover.
- Step 4. Insert the CPU with the correct orientation. The CPU only fits in one orientation.
- Step 5. Please replace the metal cover and push the metal lever back into locked position.



1-3-2 Installing the CPU Cooler

Follow the steps below to correctly install the CPU cooler on the motherboard.

- Step 1. Attach the heat sink clip to the processor socket.
- Step 2. Secure the cooling fan with screws..
- Step 3. Connect processor fan can cable to the processor fan connector.



Use extreme care when removing the CPU cooler because the thermal grease/tape between the CPU cooler and CPU may adhere to the CPU. Inadequately removing the CPU cooler may damage the CPU.

1-4 Installing the Memory



Read the following guidelines before you begin to install the memory:

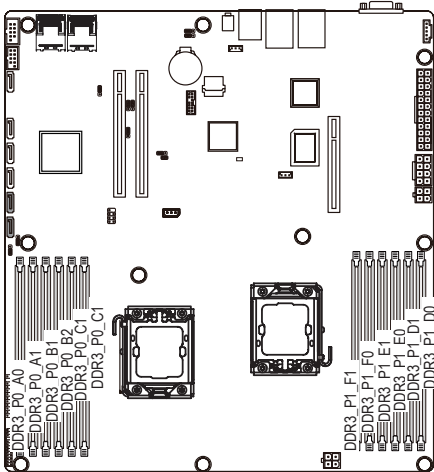
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

1-4-1 Three Channel Memory Configuration

The system provides 12 DDR3 memory sockets for per CPU and supports Three Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Three Channel memory mode will be triple of the original memory bandwidth.

The six DDR3 memory sockets are divided into three channels each channel has two memory sockets as following:

- Channel 1: DDR3_P0_A0, DDR3_P0_A1 (For primary CPU)
 DDR3_P1_D0, DDR3_P1_D1 (For secondary CPU)
- Channel 2: DDR3_P0_B0, DDR3_P0_B1 (For primary CPU)
 DDR3_P1_E0, DDR3_P1_E1 (For secondary CPU)
- Channel 3: DDR3_P0_C0, DDR3_P0_C1 (For primary CPU)
 DDR3_P1_F0, DDR3_P1_F1 (For secondary CPU)



	Channel 1	Channel 2	Channel 3
R-DIMM	DDR3_P0_A0	DDR3_P0_B0	DDR3_P0_C0
	DDR3_P0_A1	DDR3_P0_B1	DDR3_P0_C1
	DDR3_P1_D0	DDR3_P1_E0	DDR3_P1_F0
	DDR3_P1_D1	DDR3_P1_E1	DDR3_P1_F1
	Single-Rank	Single-Rank	Single-Rank
Dual-Rank	Dual-Rank	Dual-Rank	
Quad-Rank	Quad-Rank	Quad-Rank	

	Channel 1	Channel 2	Channel 3
U-DIMM	DDR3_P0_A0	DDR3_P0_B0	DDR3_P0_C0
	DDR3_P0_A1	DDR3_P0_B1	DDR3_P0_C1
	DDR3_P1_D0	DDR3_P1_E0	DDR3_P1_F0
	DDR3_P1_D1	DDR3_P1_E1	DDR3_P1_F1
	Single-Rank	Single-Rank	Single-Rank
Dual-Rank	Dual-Rank	Dual-Rank	

Due to CPU limitation, read the following guidelines before installing the memory in Dual or 3 Channel mode.

3 Channel--

1. 3 Channel mode cannot be enabled if only one or two DDR3 memory modules are installed.
2. When enabling 3 Channel mode with three, four or six modules, it is recommended that memory of the same capacity, brand, speed, and chips be used. When enabling 3 Channel mode with three memory modules, be sure to install them in the DDR3_P0_A0, DDR3_P0_B0 and DDR3_P0_C0 sockets for primary CPU; install DDR3_P1_D0, DDR3_P1_E0, DDR3_P1_F0 for secondary CPU.

1-4-2 Installing a Memory



Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.

Be sure to install DDR3 DIMMs on this motherboard.

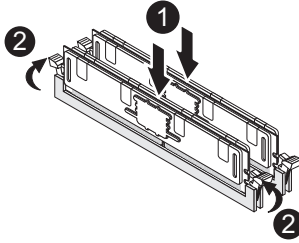
Installation Step:

Step 1. Insert the DIMM memory module vertically into the DIMM slot, and push it down.

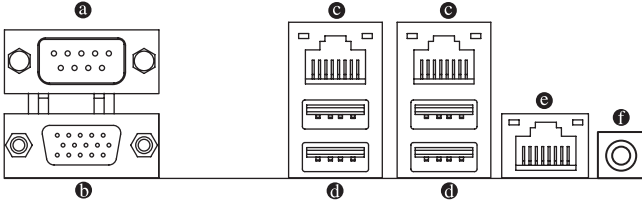
Step 2. Close the plastic clip at both edges of the DIMM slots to lock the DIMM module.

Note: For dual-channel operation, DIMMs must be installed in matched pairs.

Step 3. Reverse the installation steps when you wish to remove the DIMM module.



1-5 Back Panel Connectors



a Serial Port

Connects to serial-based mouse or data processing devices.

b Video Port

The video in port allows connect to video in, which can also apply to video loop thru function.

c RJ-45 LAN Ports (Gigabit Ethernet LAN Ports)

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. The following describes the states of the LAN port LEDs.

d USB 2.0/1.1 Port

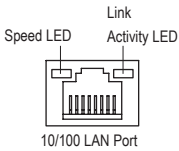
The USB port supports the USB 2.0/1.1 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc.

e KVM Server Management 10/100 LAN Port

The LAN port provides Internet connection with data transfer speeds of 10/100Mbps.

f ID Switch Button

This button provide the selected unit identification function.

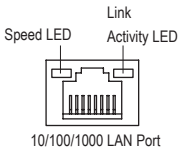


MLAN Speed LED:

State	Description
Green On	100 Mbps data rate
Green Blink	10 Mbps or 100 Mbps data rate
Off	10 Mbps data rate

Link/Activity LED:

State	Description
On	Link between system and network or no access
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



I350 Speed LED:

State	Description
Yellow On	1 Gbps data rate
Green On	100 Mbps data rate
Green Blink	Identify 100 Mbps data rate
Off	10 Mbps data rate

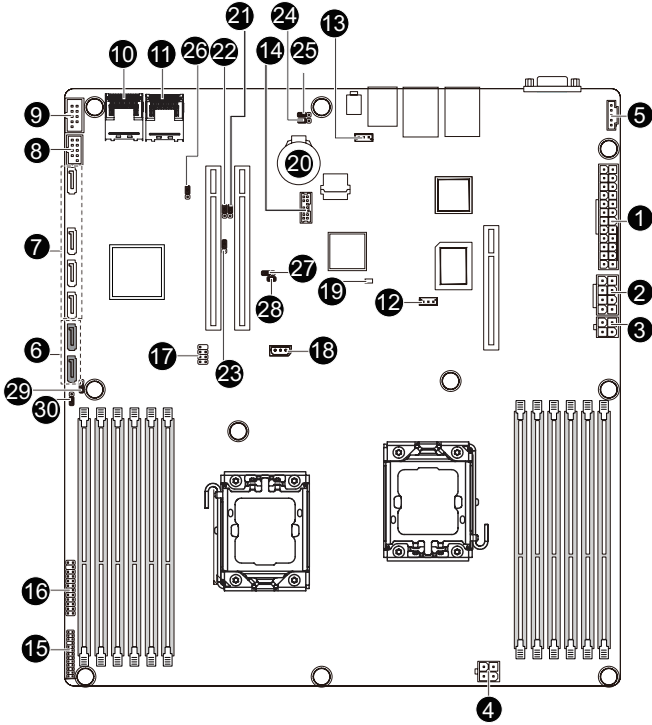
Link/Activity LED:

State	Description
On	Link between system and network or no access
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



- When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard.
- When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector.

1-6 Internal Connectors



1) ATX1	16) FP_1
2) P12V_AUX2	17) SATA_SGPIO
3) P12V_AUX1	18) IPMB1
4) P12V_CPU0	19) BMC_LED1
5) PMBUS_CN1	20) BAT
6) SATA0/SATA1	21) CLR_CMOS1
7) SATA2/SATA3/SATA4/SATA5	22) BIOS_RVCR1
8) F_USB1	23) BIOS_WP
9) COM2	24) PASSWORD5
10) MINI_CN2	25) SSB_ME1
11) MINI_CN1	26) SSB_ME2
12) SKU_KEY1	27) BMC_FRB3
13) RAID_KEY1	28) S3_MASK
14) TPM_MEZZ1	29) SATA_DOM0
15) BP_1	30) SATA_DOM1



Read the following guidelines before connecting external devices:

- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard.

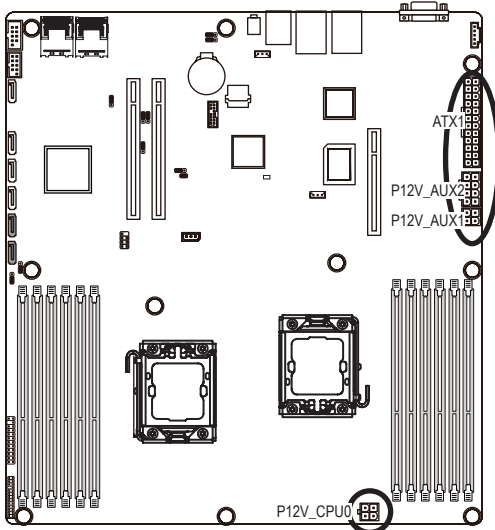
1/2/3/4) ATX1/P12V_AUX2/P12V_AUX1/P12V_CPU0

(2x4 12V Power Connector and 2x12 Main Power Connector)

With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design. Connect the power supply cable to the power connector in the correct orientation. The 12V power connector mainly supplies power to the CPU. If the 12V power connector is not connected, the computer will not start.



To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.

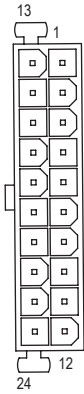


P12V_AUX2		Pin No.	Definition
	1	1	GND
	2	2	GND
	3	3	GND
	4	4	GND
	5	5	P12V_DDR3_CPU1
	6	6	P12V_DDR3_CPU1
	7	7	P12V_CPU1
	8	8	P12V_CPU1

P12V_AUX1		Pin No.	Definition
	1	1	GND
	2	2	GND
	3	3	P12V_DDR3_CPU0
	4	4	P12V_DDR3_CPU0

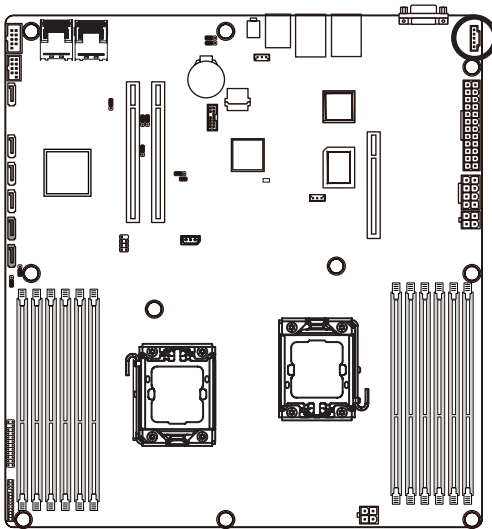
P12V_CPU0		Pin No.	Definition
	1	1	GND
	2	2	GND
	3	3	P12V_CPU0
	4	4	P12V_CPU0

ATX1



Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON (soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V (Only for 2x12-pin ATX)	23	+5V (Only for 2x12-pin ATX)
12	3.3V (Only for 2x12-pin ATX)	24	GND (Only for 2x12-pin ATX)

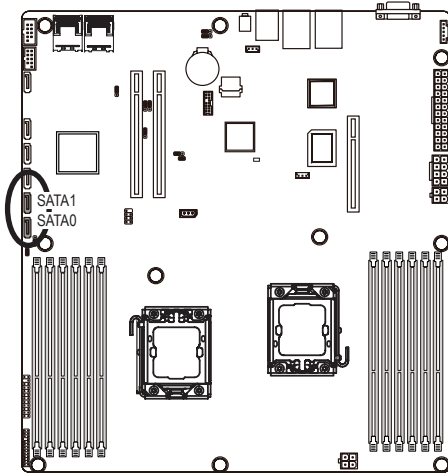
5) PMBUS_CN1 (PMBus connector)



Pin No.	Definition
1	SMB CLK
2	SMB DATA
3	SMB Alert
4	GND
5	3.3V Sense

6) SATA0/1 (SATA 6Gb/s Connectors)

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s standard. Each SATA connector supports a single SATA device.



When SATA_DOM1/2 jumper are set to **Normal Mode**:

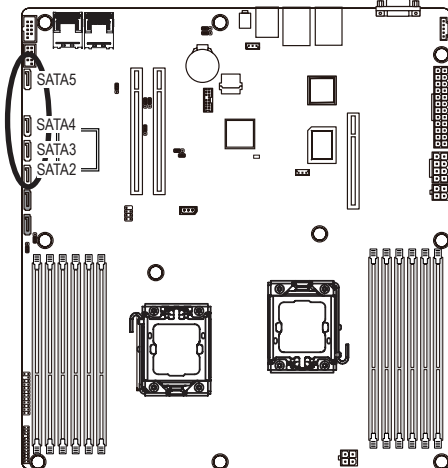
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

When SATA_DOM1/2 Jumper are set to **1-2 pin**:

Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	P5V

7) SATA2/SATA3/SATA4/SATA5 (SATA 3Gb/s Connectors)

The SATA connectors conform to SATA 3Gb/s standard and are compatible with SATA 1.5 Gb/s standard. Each SATA connector supports a single SATA device.



Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

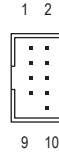
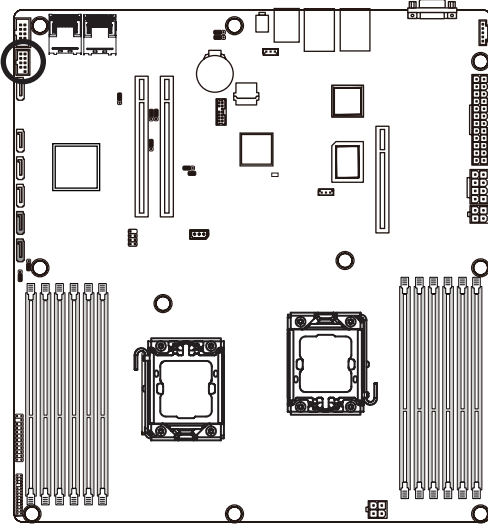


- A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are configured, the total number of hard drives must be an even number.
- A RAID 10 configuration requires four hard drives.

(Note) When a RAID configuration is built across the SATA 3Gb/s channels, the system performance of the RAID configuration may vary depends on the devices are connected.

8) F_USB1 (USB Headers)

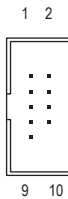
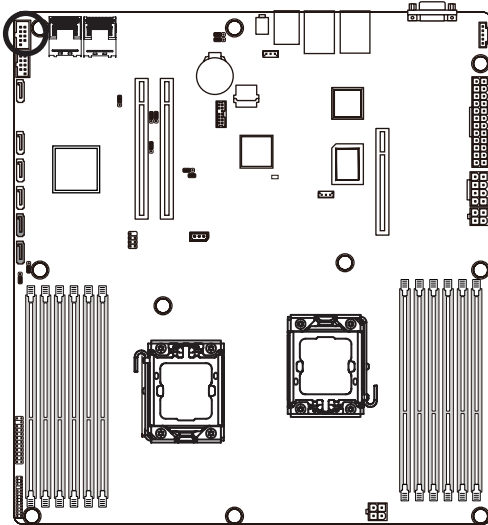
The headers conform to USB 2.0/1.1 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.



Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	NC

9) COM2 (Serial Port Header)

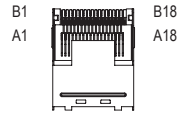
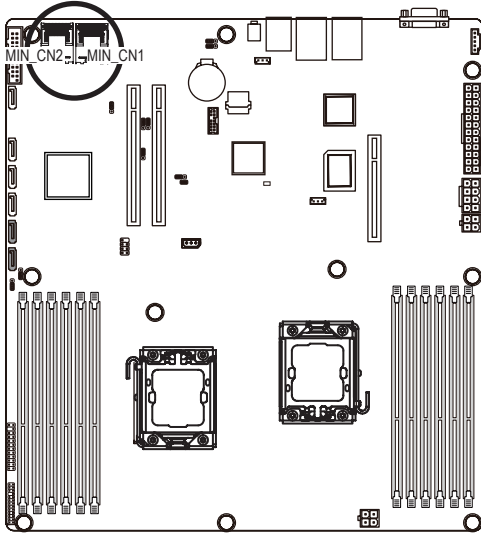
The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.



Pin No.	Definition
1	NDCD-
2	NDSR-
3	NSIN
4	NRTS-
5	NSOUT
6	NCTS-
7	NDTR-
8	NRI-
9	GND
10	No Pin

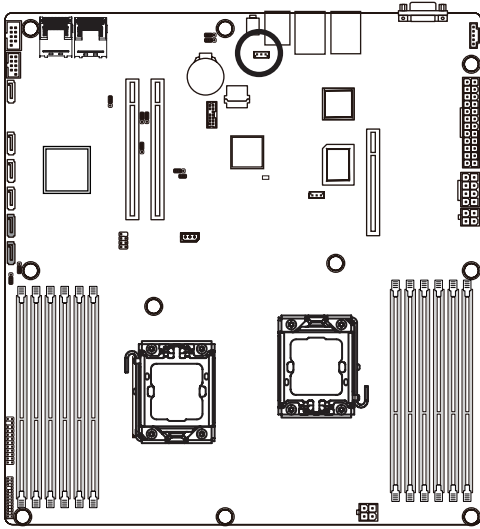
10/11) MINI_CN2/MINI_CN1 (Mini SAS cable connector with SATA 3Gb/s signal)

The SATA connectors conform to SATA 3Gb/s standard and are compatible with SATA 1.5Gb/s standard. Each SATA connector supports two SATA device.



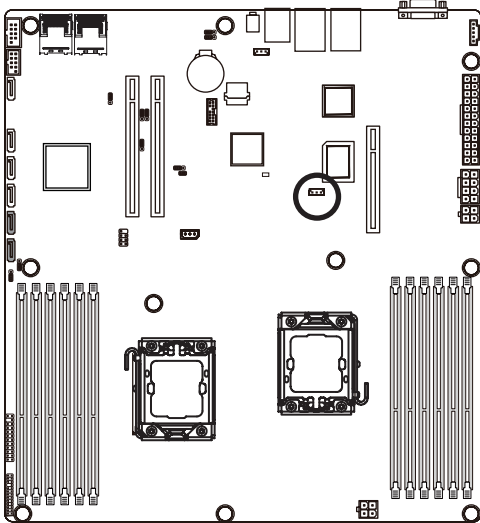
Pin No.	Definition	Pin No.	Definition
A1	GND	B1	GND
A2	RX0+	B2	TX0+
A3	RX0-	B3	TX0-
A4	GND	B4	GND
A5	RX1+	B5	TX1+
A6	RX1-	B6	TX1-
A7	GND	B7	GND
A8	SIB7	B8	SIB0
A9	SIB3	B9	SIB1
A10	SIB4	B10	SIB2
A11	SIB5	B11	SIB6
A12	GND	B12	GND
A13	RX2+	B13	TX2+
A14	RX2-	B14	TX2-
A15	GND	B15	GND
A16	RX3+	B16	TX3+
A17	RX3-	B17	TX3-
A18	GND	A18	GND

12) SKU_KEY1 (PCH Upgrade ROM Connector)



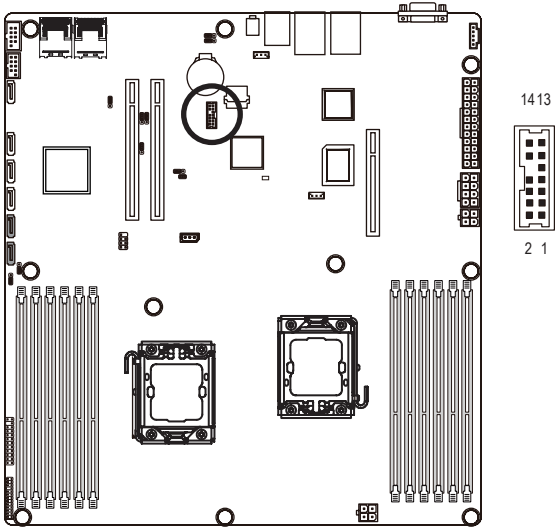
Pin No.	Definition
1	GND
2	SKU_KEY
3	GND

13) RAID_KEY1 (RAID Select Connector)



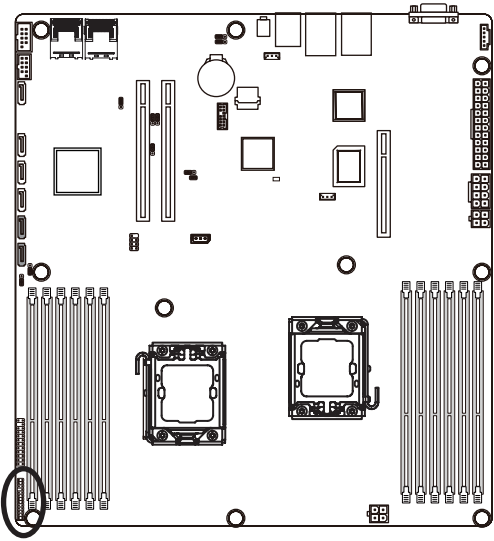
Pin No.	Definition
1	P3V3_AUX
2	FM_SSB_SAS_SATA_RAID_KEY
3	GND

14) TPM_MEZZ1 (TPM Module Connector)



Pin No.	Definition
1	CLK_33M_TPM
2	P_3V3_AUX
3	LPC_RST_DEBUG
4	P3V3
5	LPC_LAD0
6	IRQ_SERIAL
7	LPC_LAD1
8	TPM_DET_N
9	LPC_LAD2
10	NC
11	LPC_LAD3
12	GND
13	LPC_FRAME_N
14	GND

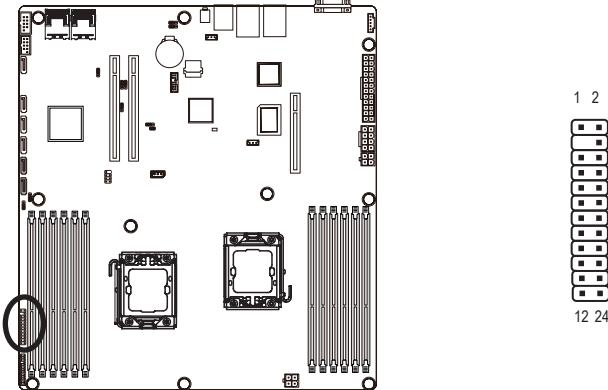
15) BP_1 (Back Plane Board Header)



Pin No.	Definition	Pin No.	Definition
1	AST2300_SGCLK	14	ASSESS#_LED_BPB
2	FM_THROTTLE_AND_N	15	GND
3	AST2300_SGLD	16	SMB_BPB1_DATA
4	IQO_FAN_12v_GATE_N	17	GND
5	AST2300_SGDOUT	18	SMB_BPB1_CLK
6	GND	19	P3V3_AUX
7	KEY	20	BP_HDD_TYPE
8	RresetL_BRB	21	P_3V3_AUX
9	GND	22	FAN_TYPE
10	BP_ALED_N	23	GND
11	BP_LED_G_N	24	KEY
12	GND	25	BP_PRESENSE
13	AST2300_SGDIN	26	GND

16) FP_1 (Front Panel Headers)

Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor 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.



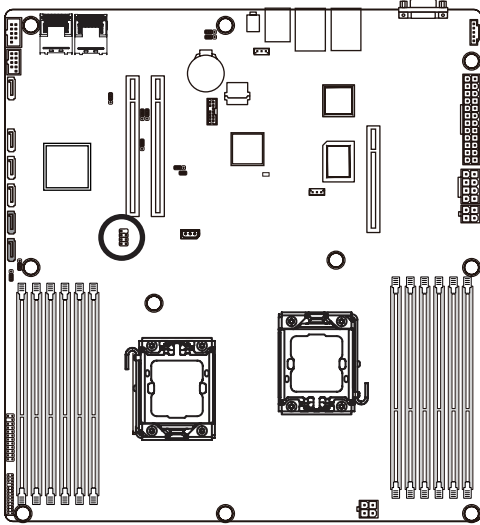
Pin No.	Signal Name	Definition
1	PWLED+	Power LED Signal anode (+)
2	5VSB	5V Standby Power
3	NC	No Pin
4	ID_LED+	ID LED Signal anode (+)
5	PWLED-	Power LED Signal cathode(-)
6	ID_LED-	ID LED Signal cathode(-)
7	HD+	Hard Disk LED Signal anode (+)
8	F_SYSRDY	System Front board LED Signal
9	HD-	Hard Disk LED Signal cathode(-)
10	SYS_STATUS-	System Status LED Signal cathode(-)
11	PWB+	Power Button Signal anode (+)
12	L1_ACT	LAN1 active LED Signal
13	PWB+_GND	Ground
14	L1_LINK-	LAN1 Link LED Signal cathode(-)
15	RST_BTN+	Reset button Signal anode (+)
16	SENSOR_SDA	SMBus Data Signal
17	RST_BTN_GND	Ground
18	SENSOR_SCL	SMBus Clock Signal
19	ID_SW+	ID Switch Signal anode (+)
20	CASE_OPEN-	Chassis intrusion Signal cathode(-)
21	ID_SW (GND)	Ground
22	L2_ACT	LAN2 active LED Signal
23	NMI_SW-	NMI switch Signal cathode(-)
24	L2_LINK-	LAN2 Link LED Signal cathode(-)



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.

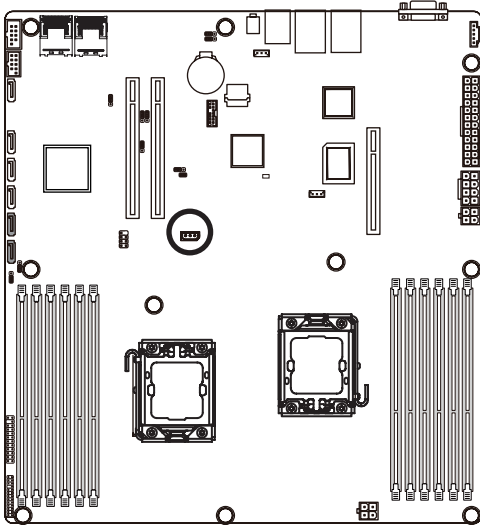
17) SATA_SGPIO (SATA SGPIO Header)

SGPIO stands for Serial General Purpose Input/Output which is a 4-signal (or 4-wire) bus used between a Host Bus Adapter (HBA) and a backplane. Out of the 4 signals, 3 are driven by the HBA and 1 is driven by the backplane. Typically, the HBA is a storage controller located inside a server, desktop, rack or workstation computer that interfaces with Hard disk drives (HDDs) to store and retrieve data.



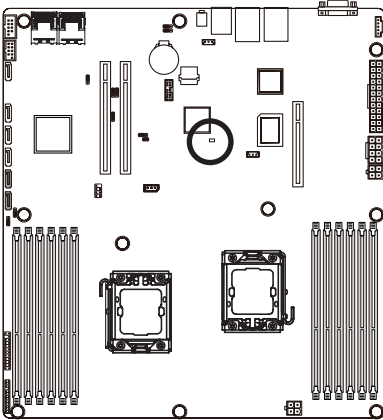
Pin No.	Definition
1	SGPIO_SAS1_DATAIN
2	No Pin
3	SGPIO_SAS1_DATAOUT
4	GND
5	GND
6	SGPIO_SAS1_LOAD
7	NC
8	SGPIO_SAS1_CLOCK

18) IPMB1 (IPMB connector)



Pin No.	Definition
1	SCL
2	GND
3	SDA

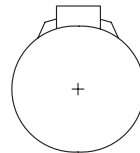
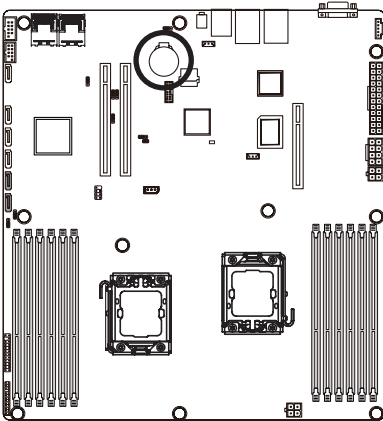
19) BMC_LED1 (BMC Firmware Readiness LED)



State	Description
On	BMC firmware is initial
Blinking	BMC firmware is ready
Off	System AC is powered off

20) BAT (Battery)

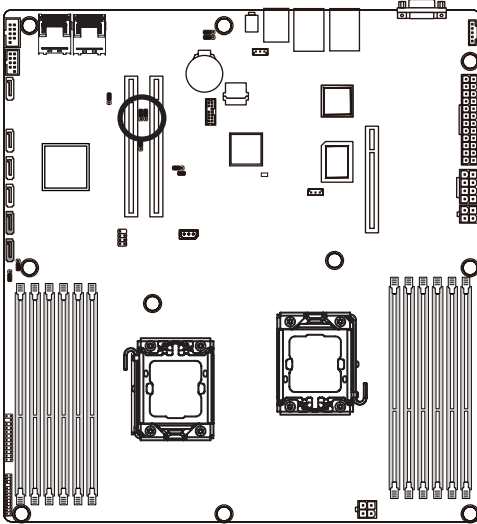
The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.




- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- When installing the battery, note the orientation of the positive side (+) and the negative side (-) of the battery (the positive side should face up).
- Used batteries must be handled in accordance with local environmental regulations.

21) CLR_CMOS1 (Clearing CMOS Jumper)

Use this jumper to clear the CMOS values (e.g. date information and BIOS configurations) and reset the CMOS values to factory defaults. To clear the CMOS values, place a jumper cap on the two pins or temporarily short the two pins or use a metal object like a screwdriver to touch the two pins for a few seconds.



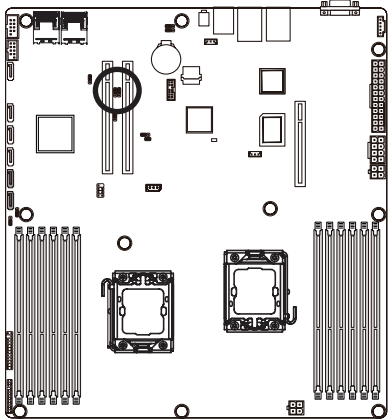
1  1-2 Close: Normal operation (Default setting)



1  2-3 Close: Clear CMOS data.



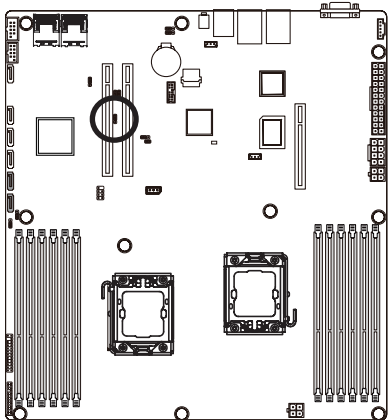
- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After clearing the CMOS values and before turning on your computer, be sure to remove the jumper cap from the jumper. Failure to do so may cause damage to the motherboard.
- After system restart, go to BIOS Setup Exit menu and load factory defaults (select **Load Setup Default**) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations).



22) BIOS_RVCR1 (BIOS Recovery Jumper)



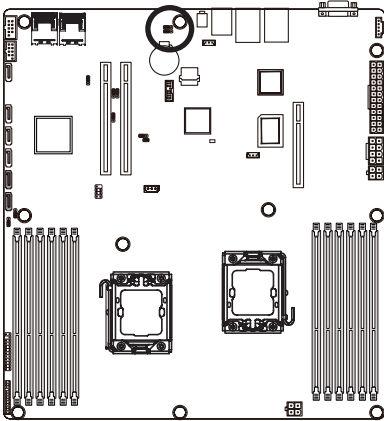
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: BIOS recovery mode.



23) BIOS_WP1 (BIOS Write Protect Jumper)



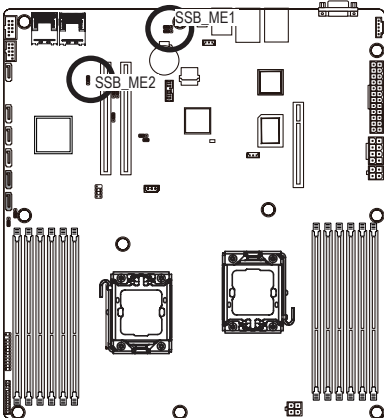
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: Enable BIOS write protect function.





24) PASSWORD5 (Clearing Supervisor Password Jumper)



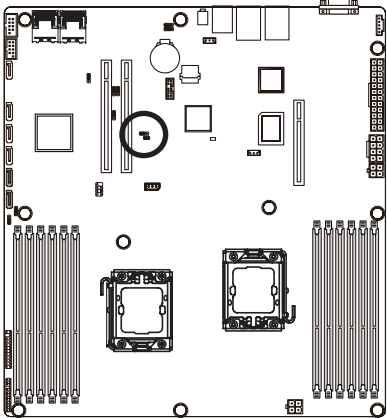
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: Clear supervisor password.



25/26) SSB_ME1/SSB_ME2 (ME Recovery/Flash Jumper)



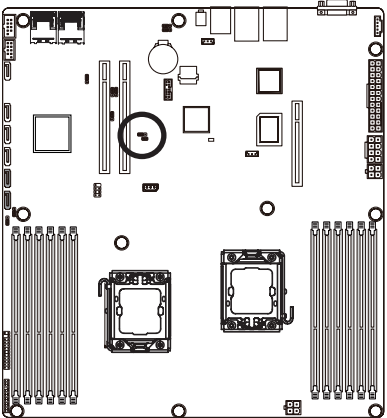
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: Enable ME recovery mode.
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: In Flash ME mode.



27) BMC_FRB3 (Force to Stop FRB3 Timer Jumper)



- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: Force to Stop FRB3 Timer

28) S3_MASK (S3 Power On Select Jumper)



-  Open: Stop an initial power on when BMC is not ready. (Default setting)
-  Close: Keep initial power on.

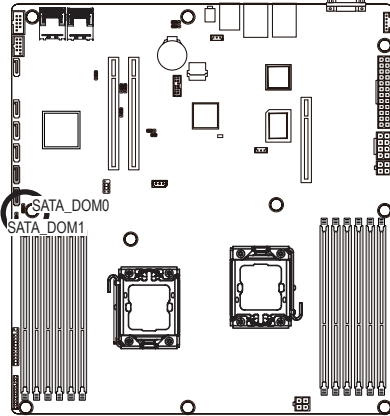
29/30) SATA_DOM2/SATA_DOM1 (SATA DOM Jumpers)



CAUTION!

- If the SATA DOM power is supplied by the motherboard, set the jumper to pin 1-2.
- If the SATA DOM power is supplied by external power, set the jumper to pin 2-3.
- If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Default setting), in order to reduce any risk of hard disk damage.

Please refer to the pin definition table in the following.



For SATA_DOM0

Pin No.	Definition
1	P5V
2	SATA_DOM_0
3	GND



For SATA_DOM1

Pin No.	Definition
1	P5V
2	SATA_DOM_1
3	GND

Chapter 2 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the EFI on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features. When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <F2> key during the POST when the power is turned on.



- BIOS flashing is potentially risky, if you do not encounter problems of using the current BIOS version, it is recommended that you don't flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
- It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the "Load Optimized Defaults" section in this chapter or introductions of the battery/clearing CMOS jumper in Chapter 1 for how to clear the CMOS values.)

BIOS Setup Program Function Keys

<<-><->>	Move the selection bar to select the screen
<↑><↓>	Move the selection bar to select an item
<Enter>	Execute command or enter the submenu
<Esc>	Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu
<F1>	Show descriptions of general help
<F3>	Restore the previous BIOS settings for the current submenu
<F9>	Load the Optimized BIOS default settings for the current submenu
<F10>	Save all the changes and exit the BIOS Setup program

■ **Main**

This setup page includes all the items in standard compatible BIOS.

■ **Advanced**

This setup page includes all the items of AMI BIOS special enhanced features.

(ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)

■ **Chipset**

This setup page includes all the submenu options for configuring the function of North Bridge and South Bridge.

(ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)

■ **Security**

Change, set, or disable administrator and user password. Configuration administrator password allows you to restrict access to the system and BIOS Setup.

An administrator password allows you to make changes in BIOS Setup.

A user password only allows you to view the BIOS settings but not to make changes.

■ **Server Management**

Server additional features enabled/disabled setup menus.

■ **Boot Options**

This setup page provides items for configuration of boot sequence.

■ **Boot Manager**

This setup page provides configuration of boot up devices.

■ **Exit**

Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. (Pressing <F10> can also carry out this task.)

Abandon all changes and the previous settings remain in effect. Pressing <Y> to the confirmation message will exit BIOS Setup. (Pressing <Esc> can also carry out this task.)

2-1 The Main Menu

Once you enter the BIOS Setup program, the Main Menu (as shown below) appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter other sub-menu.

Main Menu Help

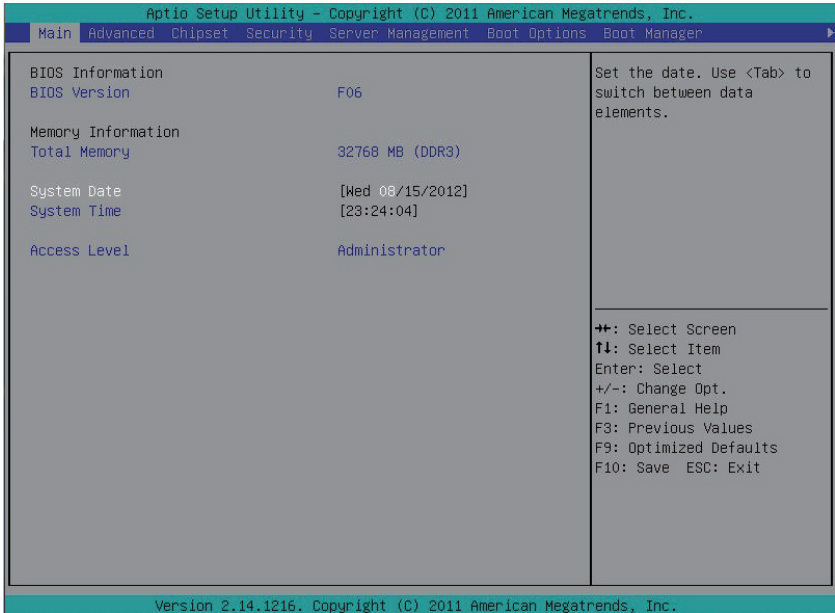
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

While in a submenu, press <F1> to display a help screen (General Help) of function keys available for the menu. Press <Esc> to exit the help screen. Help for each item is in the Item Help block on the right side of the submenu.



- When the system is not stable as usual, select the **Load Default Values** item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.



☞ **BIOS Information**

☞ **BIOS Version**

Display version number of the BIOS setup utility.

☞ **Memory Information**

☞ **Total Memory**

Determines how much total memory is present during the POST.

☞ **System Date**

Set the date following the weekday-month-day- year format.

☞ **System Time**

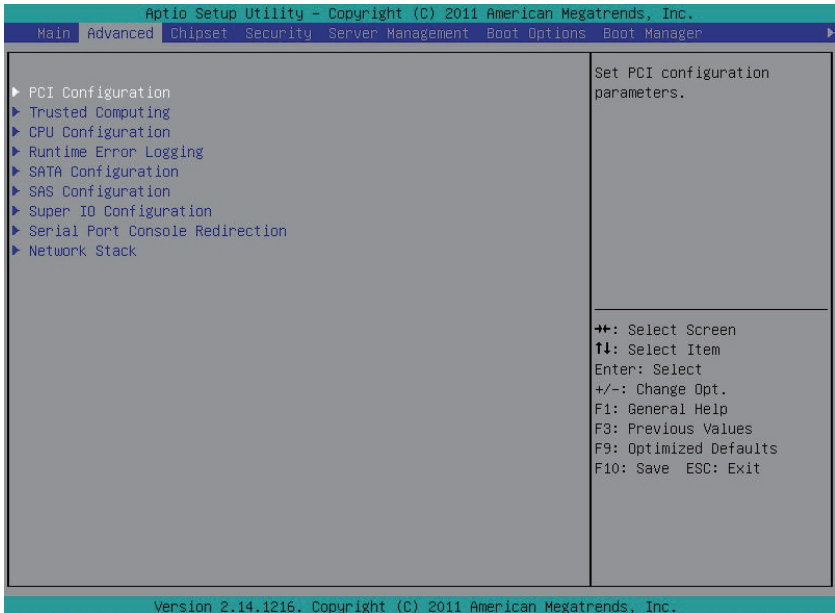
Set the system time following the hour-minute- second format.

☞ **Access Level**

Display the current accessing level information.

2-2 Advanced Menu

The Advanced menu display submenu options for configuring the function of various hardware components. Select a submenu item, then press Enter to access the related submenu screen.



2-2-1 PCI Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.			
Advanced			
PCI Express Slot #1 Option ROM	[Disabled]	Enable/Disable PCI/PCI-Express slot #1 Option ROM.	
PCI Express Slot #2 Option ROM	[Disabled]		
PCI Express Slot #3 Option ROM	[Disabled]		
PCI Express Slot #4 Option ROM	[Disabled]		
Onboard LAN #1 Controller	[Enabled]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit	
Onboard LAN #2 Controller	[Disabled]		
Onboard LAN #1 Option ROM	[Disabled]		
PERR# Generation	[Disabled]		
SERR# Generation	[Disabled]		
Maximum Payload	[Auto]		
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.			

☞ PCI Express Slot #1/2/3/4 Option ROM

When enabled, This setting will initialize the device expansion ROM for the related PCI-E slot.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Onboard LAN1/2 Controller

Enable/Disable Onboard LAN controller .

Options available: Enabled/Disabled.

Default setting for Onboard LAN1 Controller is **Enabled**.

Default setting for Onboard LAN2 Controller is **Enabled**.

☞ Onboard LAN1/2 Option ROM

Enable/Disable onboard LAN1/2 device and initialize device expansion ROM.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ PERR Generation

When this item is set to enabled, PCI bus parity error (PERR) is generated and is routed to NMI.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ SERR Generation

When this item is set to enabled, PCI bus system error (SERR) is generated and is routed to NMI.

Options available: Enabled/Disabled. Default setting is **Disabled**.

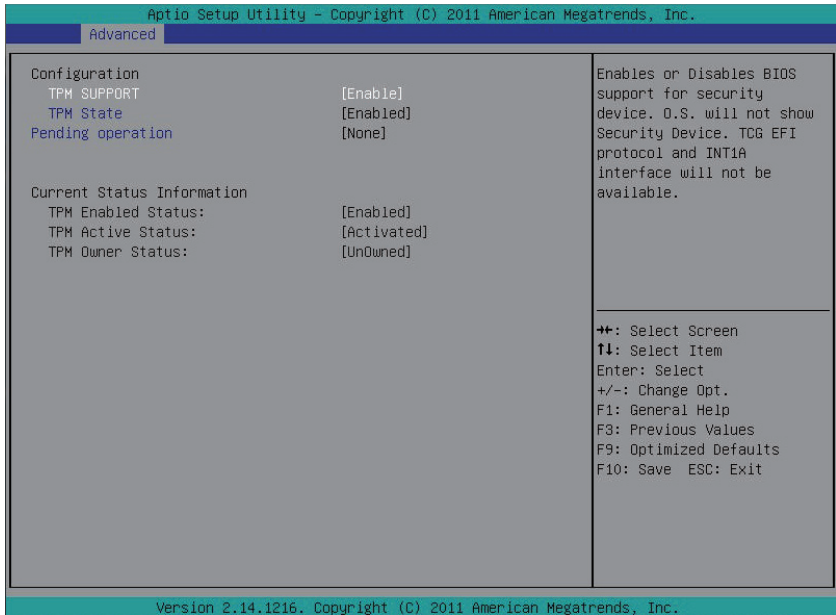
☞ Maximum Payload

Set maximum payload for PCI Express Device or allow system BIOS to select the value.

Options available: Auto/128 Bytes/256 Bytes/512 Bytes/1024 Bytes/2048 Bytes/4096 Bytes.

Default setting is **Auto**.

2-2-2 Trusted Computing



☞ TPM Support

Select Enabled to activate TPM support feature.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ TPM State

Select Enabled to activate TPM State function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Pending Operation

Determine the action when operation is pending.

Options available: None. Default setting is **None**.

☞ Current Status Information

Display current related TPM status information.

2-2-3 CPU Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<p>CPU Configuration</p> <ul style="list-style-type: none"> ▶ Socket 0 CPU Information ▶ Socket 1 CPU Information <p>CPU Speed 64-bit Supported</p> <p>Hyper-threading [Enabled]</p> <p>Limit CPUID Maximum [Disabled]</p> <p>Execute Disable Bit [Disabled]</p> <p>Intel Virtualization Technology [Disabled]</p> <p>Energy Performance [Performance]</p> <ul style="list-style-type: none"> ▶ CPU Power Management Configuration 	<p>Socket specific CPU Information</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </p>
---	---

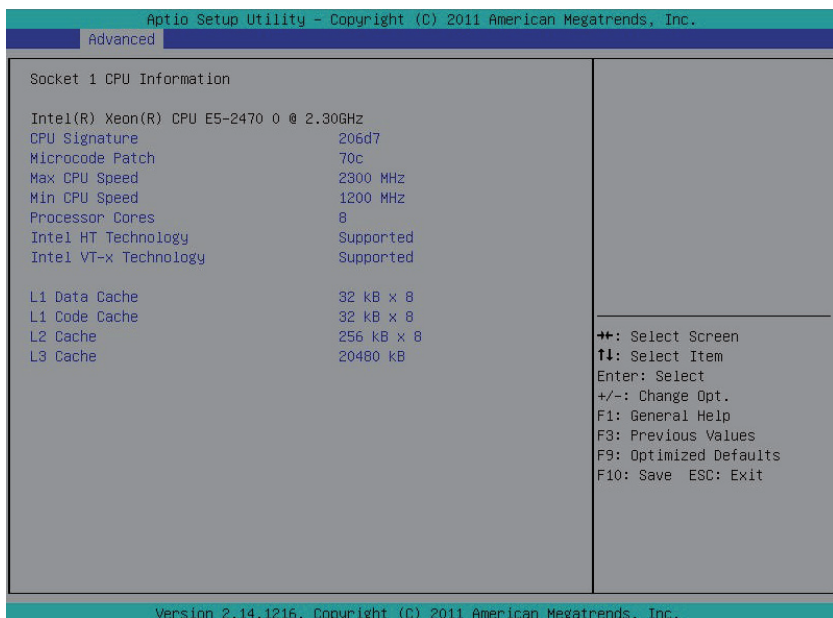
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<p>Socket 0 CPU Information</p> <p>Intel(R) Xeon(R) CPU E5-2470 0 @ 2.30GHz</p> <p>CPU Signature 206d7</p> <p>Microcode Patch 70c</p> <p>Max CPU Speed 2300 MHz</p> <p>Min CPU Speed 1200 MHz</p> <p>Processor Cores 8</p> <p>Intel HT Technology Supported</p> <p>Intel VT-x Technology Supported</p> <p>L1 Data Cache 32 kB x 8</p> <p>L1 Code Cache 32 kB x 8</p> <p>L2 Cache 256 kB x 8</p> <p>L3 Cache 20480 kB</p>	<hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </p>
---	--

Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.



☞ **Socket 0/1 Information**

☞ **CPU Signature**

Displays the processor ID information.

☞ **Microcode Patch**

Display Microcode patch.

☞ **Max CPU Speed**

Display the maximum processor speed.

☞ **Min CPU Speed**

Display the minimum processor speed.

☞ **Processor Cores**

Display the information of the processor core.

☞ **Intel HT Technology**

Display Intel Hyper Threading Technology function support information.

☞ **Intel VT-x Technology**

Display Intel Virtualization Technology function support information.

☞ **Cache Information**

☞ **L1 Data Cache**

Display the information of L1 Data Cache.

☞ **L1 Code Cache**

Display the information of L1 Code Cache.

☞ **L2 Cache**

Display the information of L2 Cache per Core.

☞ **L3 Cache**

Display the information of total L3 Cache per socket.

☞ **CPU Speed**

Display the current installed CPU speed.

☞ **64-bit**

Display the supported information of installed CPU.

☞ **Hyper-threading**

The Intel Hyper Threading Technology allows a single processor to execute two or more separate threads concurrently. When hyper-threading is enabled, multi-threaded software applications can execute their threads, thereby improving performance.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Limit CPUID Maximum**

When enabled, the processor will limit the maximum CPUID input values to 03h when queried, even if the processor supports a higher CPUID input value.

When disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Execute Disable Bit**

When enabled, the processor prevents the execution of code in data-only memory pages. This provides some protection against buffer overflow attacks.

When disabled, the processor will not restrict code execution in any memory area. This makes the processor more vulnerable to buffer overflow attacks.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Intel Virtualization Technology**

Select whether to enable the Intel Virtualization Technology function. VT allows a single platform to run multiple operating systems in independent partitions.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Energy Performance**

Energy Performance Bias is Intel CPU function.

The larger value in MSR_ENERGY_PERFORMANCE_BIAS register, CPU will save more power but lose more performance.

Note: This register will be changed by OS too if OS support it like Windows 2008 or newer Linux.

Options available:

Performance : Write value 0 into MSR_ENERGY_PERFORMANCE_BIAS

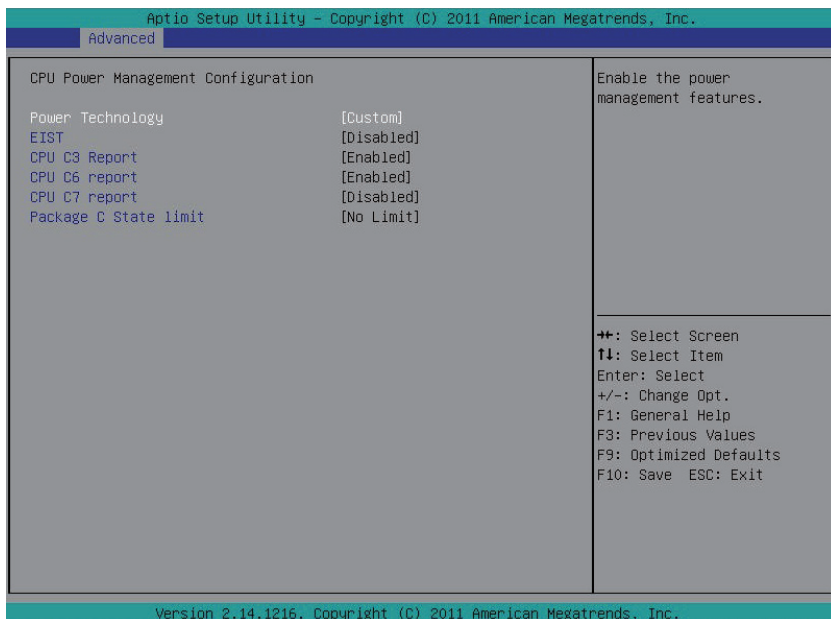
Balanced Performance: Write value 7 into MSR_ENERGY_PERFORMANCE_BIAS

Balanced Energy: Write value 11 into MSR_ENERGY_PERFORMANCE_BIAS

Energy Efficient: Write value 15 into MSR_ENERGY_PERFORMANCE_BIAS

Default setting is **Performance**.

2-2-3-1 CPU Power Management Configuration



☞ CPU Power Management Configuration

☞ Power Technology

Configure the power management features.

Options available: Disable/Energy Efficient/Custom. Default setting is **Custom**.

☞ EIST (Enhanced Intel SpeedStep Technology)

Conventional Intel SpeedStep Technology switches both voltage and frequency in tandem between high and low levels in response to processor load.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ CPU C3/C6 Report^(Note)

Allows you to determine whether to let the CPU enter C3/C6 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3/C6 state is a more enhanced power-saving state than C1.

Options available for C3 Report: ACPI C2/ACPI C3/Disabled. Default setting is **Enabled**.

Options available for C6 Report: Enabled/Disabled. Default setting is **Enabled**.

☞ CPU C7 Report^(Note)

Allows you to enable or disable the CPU C7 (ACPI C3) report.

Options available: Enabled/Disabled. Default setting is **Enabled**.

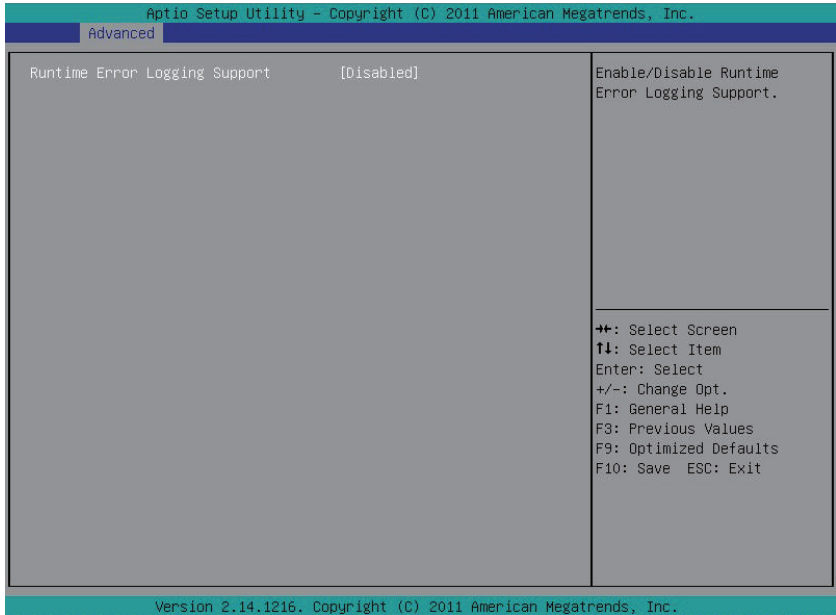
☞ Package C State Limit

Configure state for the C-State package limit.

Options available: C0/C1/C6/C7/No Limit. Default setting is **No Limit**.

(Note) This item is present only if you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

2-2-4 Runtime Error Logging

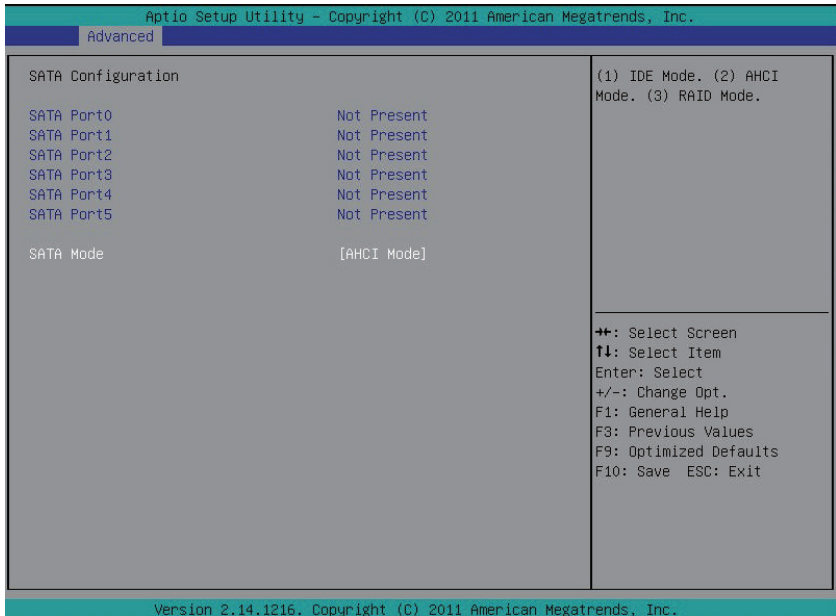


Runtime Error Logging Support

Enable/Disable Runtime error logging support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

2-2-5 SATA Configuration



☞ SATA Port 0/1/2/3/4/5 (Note)

Press [Enter] to view the installed HDD devices.

☞ SATA Mode

Select the on chip SATA type.

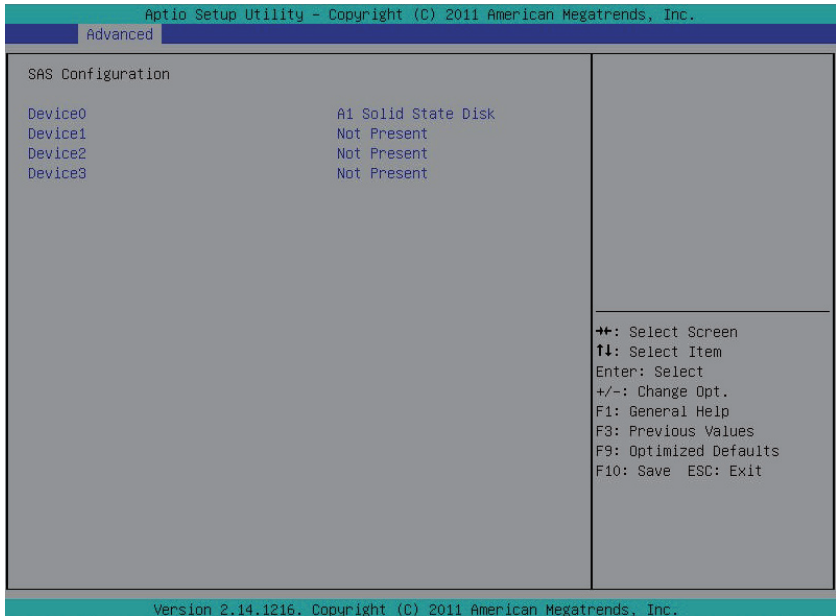
RAID Mode: When set to RAID, the SATA controller enables both its RAID and AHCI functions. You will be able to access the RAID setup utility at boot time.

AHCI Mode: When set to AHCI, the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be accessed in the RAID setup utility at boot time.

Options available: RAID/AHCI/Disabled. Default setting is **AHCI Mode**.

(Note) This item will not appear when the SATA mode is set to RAID mode.

2-2-6 SAS Configuration



☞ **Device 0/1/2/3** (Note)

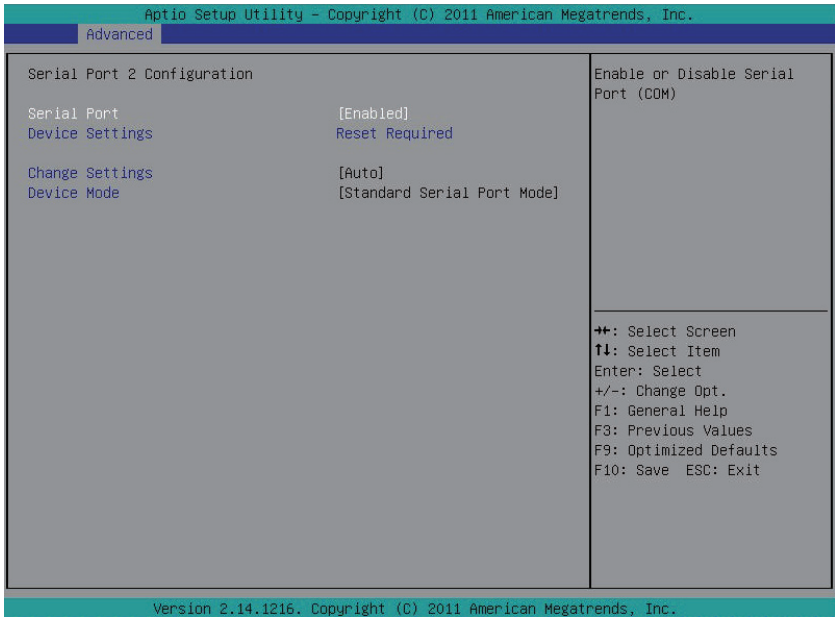
Press [Enter] to view the installed HDD devices.

(Note) The number of SATA and SAS devices depends of the PCH SKU.

2-2-7 Super IO Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Super IO Configuration	Set Parameters of Serial Port 1 (COM1)
Super IO Chip IT8728	
▶ Serial Port 1 Configuration	
▶ Serial Port 2 Configuration	
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit	
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.	

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Serial Port 1 Configuration	Enable or Disable Serial Port (COM)
Serial Port [Enabled]	
Device Settings [Reset Required]	
Change Settings [Auto]	
Device Mode [Standard Serial Port Mode]	
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit	
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.	



☞ **Super IO Chip**

Display the model name of super IO chipset.

☞ **Serial Port 1/2 Configuration^(Note)**

When enabled allows you to configure the serial port settings. When set to Disabled, displays no configuration for the serial port.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Device Settings**

Displays the Serial Port 1/2 base I/O address and IRQ.

☞ **Change Settings**

Change Serial Port 1/2 device settings. When set to Auto allows the server's BIOS or OS to select a configuration.

Options available: Auto/I/O=3F8; IRQ=4/I/O=3F8h; IRQ=3,4,5,6,7,10,11,12/

I/O=2F8h; IRQ=3,4,5,6,7,10,11,12 /I/O=3E8h; IRQ=3,4,5,6,7,10,11,12/I/O=2E8h; IRQ=3,4,5,6,7,10,11,12.

(Note) Advanced items prompt when this item is set to Enabled.

2-2-8 Serial Port Console Redirection

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<pre> COM1 Console Redirection Port Is Disabled COM2 Console Redirection Port Is Disabled Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS) Console Redirection [Enabled] ▶ Console Redirection Settings BMC SBL Serial Port Switch [Disabled] </pre>	<p>Console Redirection Enable or Disable.</p> <hr/> <pre> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </pre>
---	--

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Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<pre> Out-of-Band Mgmt Port [COM1] Terminal Type [VT-UTF8] Bits per second [115200] Flow Control [None] Data Bits 8 Parity None Stop Bits 1 </pre>	<p>Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.</p> <hr/> <pre> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </pre>
---	--

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☞ **Console Redirection** ^(Note)

Select whether to enable console redirection for specified device. Console redirection enables users to manage the system from a remote location.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Console Redirection Settings**

☞ **Out-of-Band Mgmt Port**

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

Options available: COM1

☞ **Terminal Type**

Select a terminal type to be used for console redirection.

Options available: VT100/VT100+/ANSI /VT-UTF8.

☞ **Bits per second**

Select the baud rate for console redirection.

Options available: 9600/19200/57600/115200.

☞ **Flow Control**

Flow control can 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 re-start the flow. Hardware flow control uses two wires to send start/stop signals.

Options available: None/Hardware RTS/CTS.

☞ **Data Bits**

Select the data bits for console redirection.

Options available: 7/8.

☞ **Parity**

A parity bit can be sent with the data bits to detect some transmission errors.

Even: parity bit is 0 if the num of 1's in the data bits is even.

Odd: parity bit is 0 if num of 1's the data bits is odd.

Mark: parity bit is always 1. Space: Parity bit is always 0.

Mark and Space Parity do not allow for error detection.

Options available: None/Even/Odd/Mark/Space.

☞ **Stop Bits**

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

Options available: 1/2.

☞ **BMC SOL Serial Port Switch**

Enabled: COM1 Switch to AST2300 SOL UART.

Disabled: COM1 Switch to IT8728 SOL UART1.

Options available: Enabled/Disabled. Default setting is **Disabled**.

(Note) Advanced items prompt when this item is defined.

2-2-9 Network Stack

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

Network stack	[Disable]	Enable/Disable the network stack(Pxe and UEFI)
		→ : Select Screen ↑↓ : Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit

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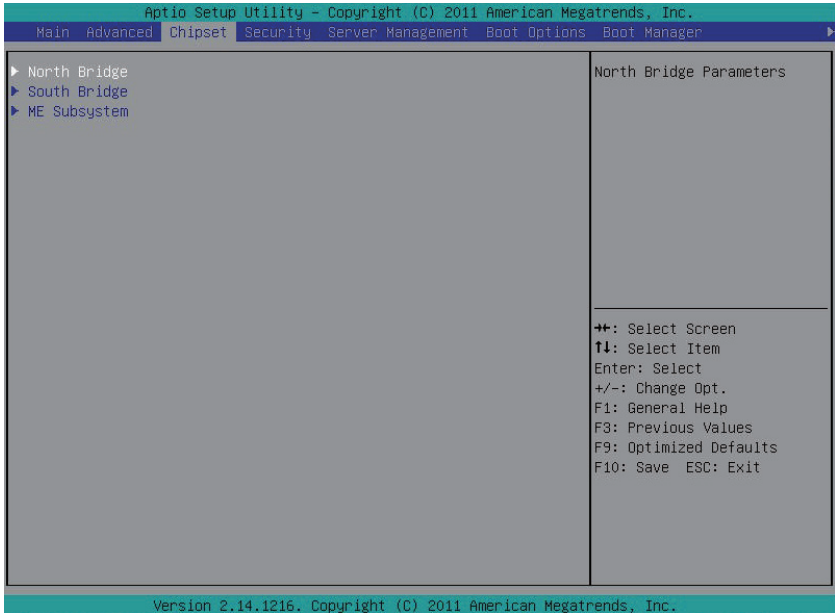
🔗 Network Stack

Enable/Disable the network stack (PXE and UEFI)

Options available: Enabled/Disabled. Default setting is **Disabled**.

2-3 Chipset Menu

The Chipset menu display submenu options for configuring the function of North Bridge and South Bridge. Select a submenu item, then press Enter to access the related submenu screen.



2-3-1 North Bridge Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Chipset

IOH Configuration		IOH Configuration Page
Compatibility RID	[Enabled]	
Memory Configuration		
Total Memory	32768 MB (DDR3)	
Current Memory Mode	Independent	
Current Memory Speed	1600 MHz	
Memory Mode	[Independent]	
Numa	[Enabled]	
Thermal Throttling	[CLTT]	
DIMM Voltage	[Force 1.35v]	
Enforce DIMM	[Enforce DIS]	
DIMM Information		
To clear ECC Flag	[None]	

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Previous Values
F9: Optimized Defaults
F10: Save ESC: Exit

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☞ Compatibility RID

Enable/Disable Compatibility RID function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Memory Configuration

☞ Total Memory

Determines how much total memory is present during the POST.

☞ Current Memory Mode

Displays the current memory mode. Memory mode can be determined in **Memory Mode** item.

☞ Current Memory Speed

Displays the current memory speed.

☞ Memory Mode

Determine the memory mode.

When set to Independent mode, all DIMMs are available to the operation system.

When set to Mirroring mode, the motherboard maintains two identical (redundant) copies of all data in memory.

When set to Lockstep mode, the motherboard uses two areas of memory to run the same set of operations in parallel.

When set to Sparing mode, a preset threshold of correctable errors is used to trigger fail-over.

The spare memory is put online and used as active memory in place of the failed memory.

Options available: Independent/Mirroring/ Lockstep/Sparring.

Default setting is **Independent**.

☞ **Numa**

Enable/Disable Non Uniform Memory Access (NUMA) function.
Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Thermal Throtting**

Options available: CLTT/OLTT. Default setting is **CLTT**.

☞ **DIMM Voltage**

Configure the DIMM voltage.
Options available: Auto/ Force 1.5v/Force 1.35v. Default setting is **Auto**.

☞ **Enforce DIMM**

To enforce POR function. When disabled, the system will enforce 1600MHz LRDIMM.
Options available: Enforce EN/Stretch EN/Enforce DIS. Default setting is **Enforce DIS**.

☞ **To clear ECC Flag**

When DDR3 Channel is maskoff after ECC multibit errors, it is required to clear ECC flag to make masked off channels be available.
Options available: None/To clear ECC Flag when save and exit. Default setting is **None**.

2-3-1-1 IOH Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Chipset

<p>▶ Intel(R) VT for Directed I/O Configuration</p> <p>VGA Priority [Offboard] Gen3 Equalization WA's [Disabled]</p> <p>IOH 0 PCIe port Bifurcation Control</p> <p>PCIe Slot1 Speed [GEN2] PCIe Slot2 Speed [GEN2]</p> <p>IOH 1 PCIe port Bifurcation Control</p> <p>PCIe Slot4 Speed [GEN1] PCIe Slot3 Speed [GEN2]</p>	<p>Intel(R) VT for Directed I/O Configuration</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </p>
--	--

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Chipset

<p>Intel(R) VT-d [Disabled]</p>	<p>Enable/Disable Intel(R) Virtualization Technology for Directed I/O.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit </p>
---------------------------------	---

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☞ **IOH Configuration**

☞ **Intel(R) VT for Directed I/O Configuration**

☞ **Intel(R) VT-d**

Enable/Disable Intel VT-d Technology function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **VGA Priority**

Define the display device priority.

Options available: Onboard/Offboard. Default setting is **Offboard**.

☞ **Gen3 Equalization WA's**

Enable/Disable the support for Gen3 Equalization Workaround.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **PCIE Slot1 Speed**

Select PCIe slot 1 speed.

Options available: GEN1/GEN2/GEN3. Default setting is **GEN2**.

☞ **PCIE Slot 2 Speed**

Select PCIe slot 2 speed.

Options available: GEN1/GEN2/GEN3. Default setting is **GEN2**.

☞ **IOH 1 PCIe port Bifurcation Control**

☞ **PCIE Slot 4 Speed**

Select PCIe slot 4 speed.

Options available: GEN1/GEN2/GEN3. Default setting is **GEN1**.

☞ **PCIE Slot 3 Speed**

Select PCIe slot 3 speed.

Options available: GEN1/GEN2/GEN3. Default setting is **GEN2**.

2-3-1-2 DIMM Information

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Chipset

CPU Socket 0 DIMM Information	
DDR3_P0_A0	Present 8192 MB (DDR3)
DDR3_P0_A1	Not Present
DDR3_P0_B0	Present 8192 MB (DDR3)
DDR3_P0_B1	Not Present
DDR3_P0_C0	Not Present
DDR3_P0_C1	Not Present
CPU Socket 1 DIMM Information	
DDR3_P1_D0	Present 8192 MB (DDR3)
DDR3_P1_D1	Not Present
DDR3_P1_E0	Present 8192 MB (DDR3)
DDR3_P1_E1	Not Present
DDR3_P1_F0	Not Present
DDR3_P1_F1	Not Present

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Previous Values
F9: Optimized Defaults
F10: Save ESC: Exit

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☞ DIMM Information:

☞ DIMM Group: CPU Socket 0 DIMM Information

CPU Socket 0: DDR3_P0_A0/DDR3_P0_A1/DDR3_P0_B0/DDR3_P0_B1/

DDR3_P0_C0/DDR3_P0_C1 Status

CPU Socket 1: DDR3_P1_D0/DDR3_P1_D1/DDR3_P1_E0/DDR3_P1_E1/

DDR3_P1_F0/DDR3_P1_F1 Status

The size of memory installed on each of the DDR3 slots.



☞ **PCH Information:**

☞ **Name/Stepping Information**

Displays the name and stepping information of the south bridge.

☞ **SB Chipset Configuration**

☞ **PCH Compatibility RID**

Enable/Disable PCH Compatibility RID support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Restore on AC Power Loss** ^(Note)

Defines the power state to resume to after a system shutdown that is due to an interruption in AC power. When set to Last State, the system will return to the active power state prior to shutdown. When set to Stay Off, the system remains off after power shutdown.

Options available: Last State/Stay Off/Power On. The default setting depends on the BMC setting.

☞ **Deep Power off Mode**

Enable/Disable Deep Power off Mode.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Onboard SAS oprom**

Enable/Disable onboard SAS option ROM.

Options available: Enabled/Disabled. Default setting is **Enabled**.

(Note) When the power policy is controlled by BMC, please wait for 15-20seconds for BMC to save the last power state.

2-3-3 ME Subsystem

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Chipset

Intel ME Subsystem Configuration		ME Subsystem Help
ME Subsystem	[Enabled]	
ME BIOS Interface Version	1.2	
ME Version	2.1.5.73	
ME FW Status Value	: 0xf0345	
ME FW State	: SPS ME FW Active	
ME FW Operation State	: M0 without UMA	
ME FW Error Code	: No Error	++: Select Screen
ME Ext FW Status Value	: 0x39002301	↑↓: Select Item
BIOS Booting Mode	: Performance Optimized mode	Enter: Select
Cores Disabled	: 0	+/-: Change Opt.
ME FW SKU Information	: SiEn NM	F1: General Help
		F3: Previous Values
		F9: Optimized Defaults
		F10: Save ESC: Exit

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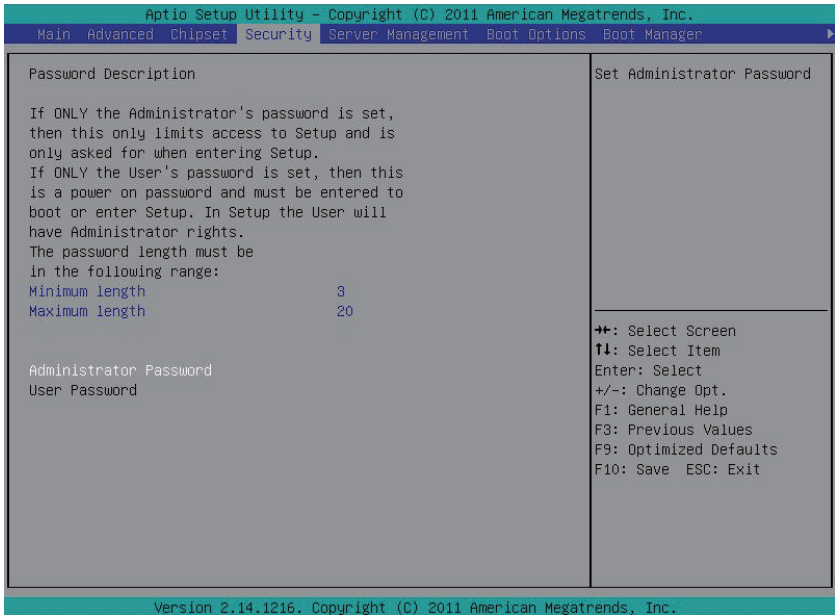
Intel ME Subsystem Configuration

Enable/Disable ME subsystem configuration.

Options available: Enabled/Disabled. Default setting is **Enabled**.

2-4 Security Menu

The Security menu allows you to safeguard and protect the system from unauthorized use by setting up access passwords.



There are two types of passwords that you can set:

- **Administrator Password**
Entering this password will allow the user to access and change all settings in the Setup Utility.
- **User Password**
Entering this password will restrict a user's access to the Setup menus. To enable or disable this field, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

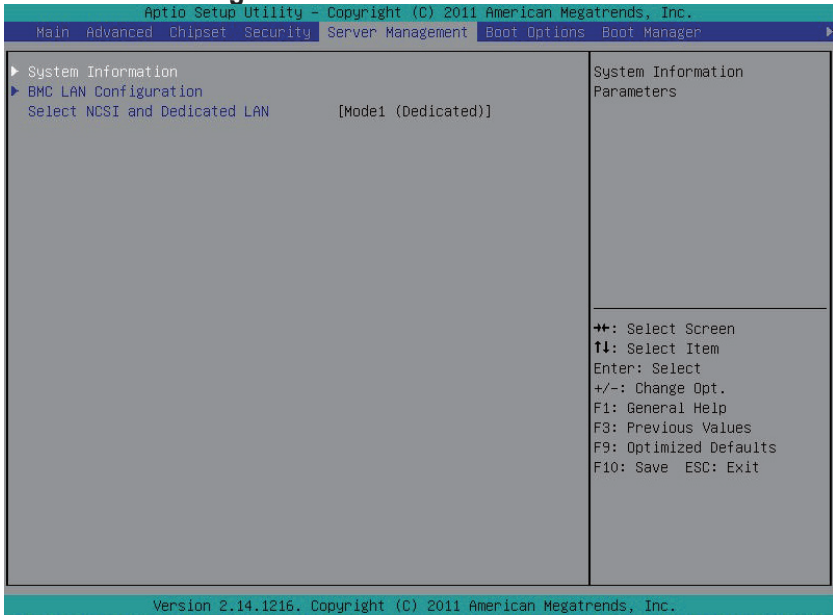
⌂ Administrator Password

Press Enter to configure the Administrator password.

⌂ User Password

Press Enter to configure the user password.

2-5 Server Management Menu



System Information

Displays basic system ID information, as well as BIOS version. Press Enter to access the related sub-menu.

BMC LAN Configuration

BMC LAN Configuration. Press Enter to access the related sub-menu.

Select NCSI and Dedicated LAN

Switch NCSI and dedicated LAN and send KCS command.

Options available: Mode2(NCSI)/Mode1 (Dedicated). Default setting is **Mode1 (Dedicated)**.

2-5-1 System Information

The System Management submenu is a simple display page for basic system ID and BMC information. Items on this window are non-configurable.

The screenshot shows the Aptio Setup Utility interface. At the top, a teal bar contains the text "Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.". Below this is a dark blue bar with "Server Management" in white. The main area is a grey rectangle with a black border. On the left side of this area, the following text is displayed: "BMC Information", "BMC Firmware Version 01.06", "SDR Version 00.17", and "FRU Version 00.02". On the right side, a list of keyboard shortcuts is shown: "++: Select Screen", "↑↓: Select Item", "Enter: Select", "+/-: Change Opt.", "F1: General Help", "F8: Previous Values", "F9: Optimized Defaults", and "F10: Save ESC: Exit". At the bottom of the screen, a teal bar contains the text "Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.".

BMC Information	
BMC Firmware Version	01.06
SDR Version	00.17
FRU Version	00.02

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Defaults
F10: Save ESC: Exit

2-5-2 BMC LAN Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Server Management	
Lan Channel 1	
Configuration Source	[Dynamic]
IP Address	010.001.111.046
Subnet Mask	255.255.255.000
Default Gateway Address	010.001.111.253
	Select to configure LAN channel parameters statically or dynamically(DHCP). Do nothing option will not modify any BMC network parameters during BIOS phase
	++: Select Screen F4: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit

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☞ Configuration Source

Select to configure LAN channel parameters statically or dynamically (DHCP). Do nothing option will not modify any BMC network parameters during BIOS phase.

Options available: Static/Dynamic/Do Nothing.

☞ IP Address

Display IP Address information.

☞ Subnet Mask

Display Subnet Mask information.

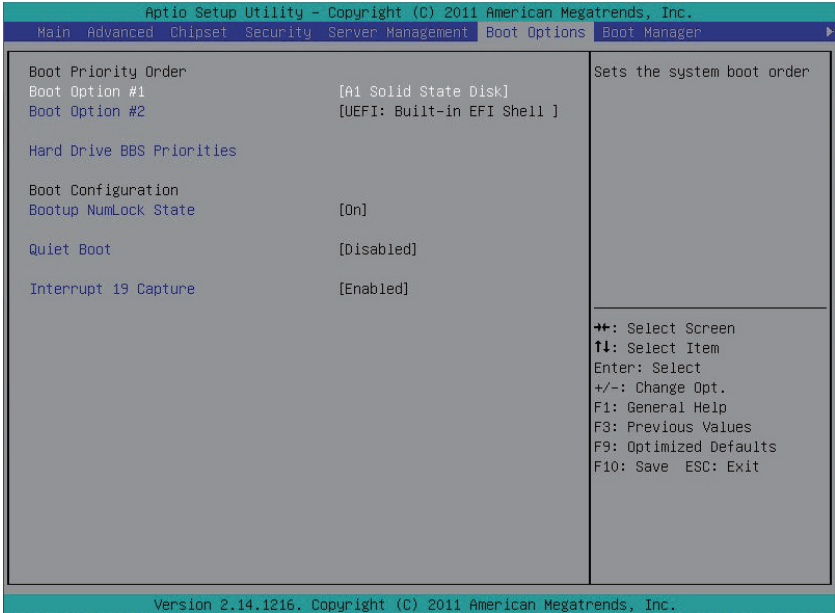
Please note that the IP address must be in three digitals, for example, 192.168.000.001.

☞ Default Gateway Address

Display Default Gateway Address information.

2-6 Boot Option Menu

The Boot menu allows you to set the drive priority during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.



By default, the server searches for boot devices in the following sequence:

1. UEFI device.
2. Hard drive.

⌂ **Bootup NumLock State**

Enable or Disable Bootup NumLock function.
Options available: On/Off. Default setting is **On**.

⌂ **Quiet Boot**

Enables or disables showing the logo during POST.
Options available: Enabled/Disabled. Default setting is **Enabled**.

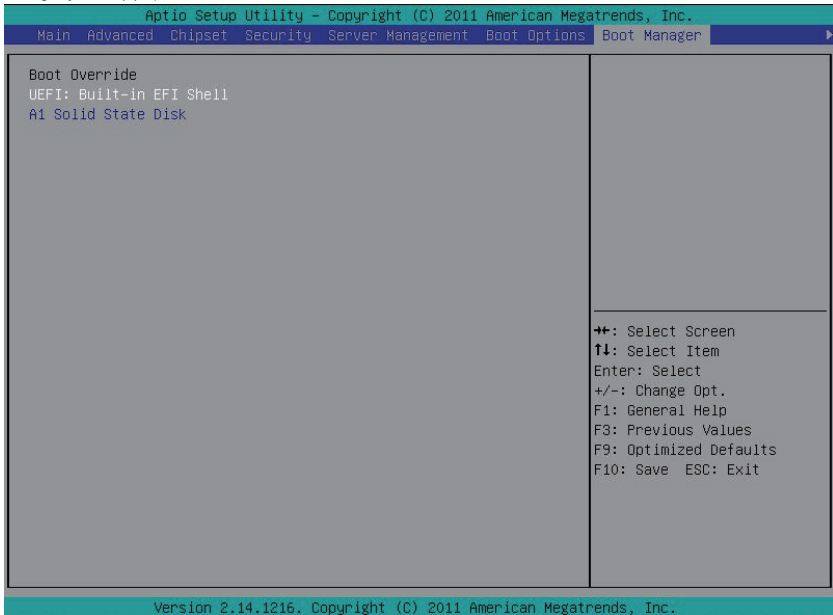
⌂ **Interrupt 19 Capture**

Interrupt 19 is the software interrupt that handles the boot disk function. When enabled, this BIOS feature allows the ROM BIOS of those host adaptors to "capture" Interrupt 19 during the boot process so that drives attached to these adaptors can function as bootable disks.

Options available: Enabled/Disabled. Default setting is **Enabled**.

2-7 Boot Manager

The Boot manager menu allows you to specify the boot-up drive. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.

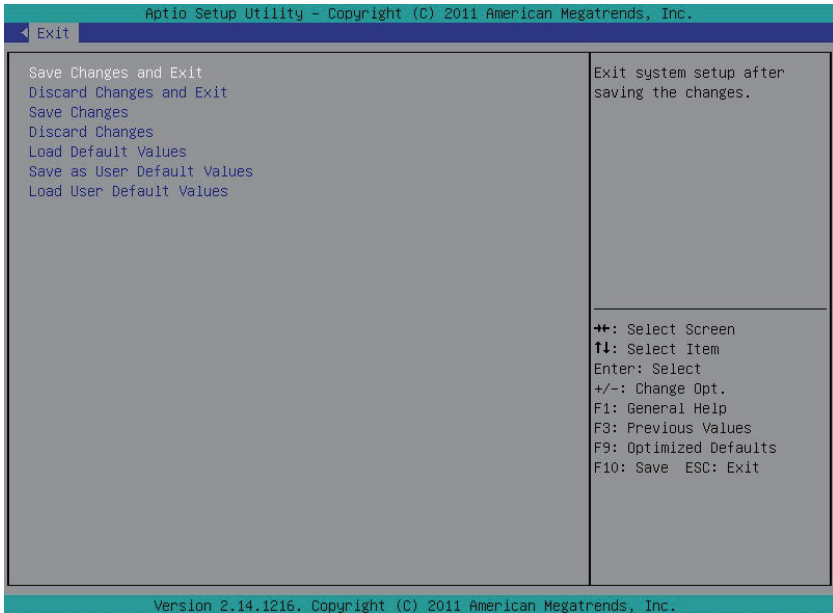


UEFI: Built-in EFI Shell

Press Enter to configure the device as the boot-up drive.

2-8 Exit Menu

The Exit menu displays the various options to quit from the BIOS setup. Highlight any of the exit options then press **Enter**.



☞ **Save Changes and Exit**

Saves changes made and close the BIOS setup.

Options available: Yes/No.

☞ **Discard Changes and Exit**

Discards changes made and close the BIOS setup.

Options available: Yes/No.

☞ **Save Changes**

Saves changes made in the BIOS setup.

Options available: Yes/No.

☞ **Discard Changes**

Discards all changes made in the BIOS setup.

Options available: Yes/No.

☞ **Load Default Values**

Loads the default settings for all BIOS setup parameters. Setup Defaults are quite demanding in terms of resources consumption. If you are using low-speed memory chips or other kinds of low-performance components and you choose to load these settings, the system might not function properly.

Options available: Yes/No.

☞ **Save as User Default Values**

Saves as user default and close the BIOS setup.

Options available: Yes/No.

☞ **Load User Default Values**

Loads the user default settings for all BIOS setup parameters.

Options available: Yes/No.

2-9 BIOS Beep Codes

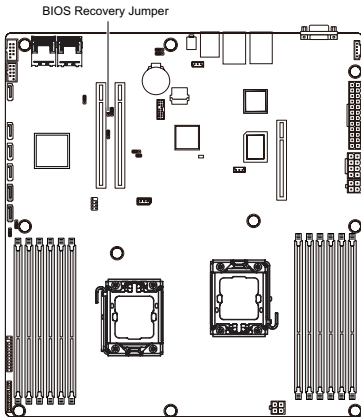
# of Beeps	Description
1	Invalid password
2	Recovery started
4	S3 Resume failed
4	DXE IPL was not found
5	No Console Input/Output Devices are found
6	Flash update is failed

2-10 BIOS Recovery Instruction

The system has an embedded recovery technique. In the event that the BIOS becomes corrupt the boot block can be used to restore the BIOS to a working state. To restore your BIOS, please follow the instructions listed below:

Recovery Instruction:

1. Change xxx.ROM to amiboot.rom.
2. Copy amiboot.rom and AFUDOS.exe to USB diskette.
3. Setting BIOS Recovery jump to enabled status.



4. Boot into BIOS recovery.
5. Run Proceed with flash update.

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
< Exit
-----
WARNING! BIOS Recovery mode has been detected      |Set this option to
Flash Update Parameters                             |reset NVRAM to default
Reset NVRAM [Enabled]                               |values
-----
> Proceed with flash update
-----
|
|><: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F3: Previous Values
|F9: Optimized Defaults
|F10: Save  ESC: Exit
-----
Version 2.14.1216, Copyright (C) 2011 American Megatrends, Inc.
```

6. BIOS update.

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
-----
WARNING! System firmware is being updated.
Keyboard is locked.
DO NOT TURN THE POWER OFF !!!
Once firmware update is completed
press any key to reboot the system

Flash update progress  completed.

                                     |><: Select Screen
                                     |^v: Select Item
                                     |Enter: Select
                                     |+/-: Change Opt.
                                     |F1: General Help
                                     |F3: Previous Values
                                     |F9: Optimized Defaults
                                     |F10: Save  ESC: Exit
-----
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.
```


Chapter 3 Appendix

3-1 Regulatory Statements

Regulatory Notices

This document must not be copied without our written permission, and the contents there of must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. We believe that the information contained herein was accurate in all respects at the time of printing. GIGABYTE cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by GIGABYTE.

Our Commitment to Preserving the Environment

In addition to high-efficiency performance, all GIGABYTE motherboards fulfill European Union regulations for RoHS (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) environmental directives, as well as most major worldwide safety requirements. To prevent releases of harmful substances into the environment and to maximize the use of our natural resources, GIGABYTE provides the following information on how you can responsibly recycle or reuse most of the materials in your "end of life" product.

Restriction of Hazardous Substances (RoHS) Directive Statement

GIGABYTE products have not intended to add and safe from hazardous substances (Cd, Pb, Hg, Cr+6, PBDE and PBB). The parts and components have been carefully selected to meet RoHS requirement. Moreover, we at GIGABYTE are continuing our efforts to develop products that do not use internationally banned toxic chemicals.

Waste Electrical & Electronic Equipment (WEEE) Directive Statement

GIGABYTE will fulfill the national laws as interpreted from the 2002/96/EC WEEE (Waste Electrical and Electronic Equipment) directive. The WEEE Directive specifies the treatment, collection, recycling and disposal of electric and electronic devices and their components. Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

WEEE Symbol Statement



The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.

The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local government office, your household waste disposal service or where you purchased the product for details of environmentally safe recycling.

- ◆ When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.
- ◆ If you need further assistance in recycling, reusing in your "end of life" product, you may contact us at the Customer Care number listed in your product's user's manual and we will be glad to help you with your effort.

Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly. With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly.