

GA-7PESL GA-7PESLX GA-7PESLN

Dual LGA1356 sockets 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 quick set-up of the product, read the Quick Installation Guide included with the product.
- 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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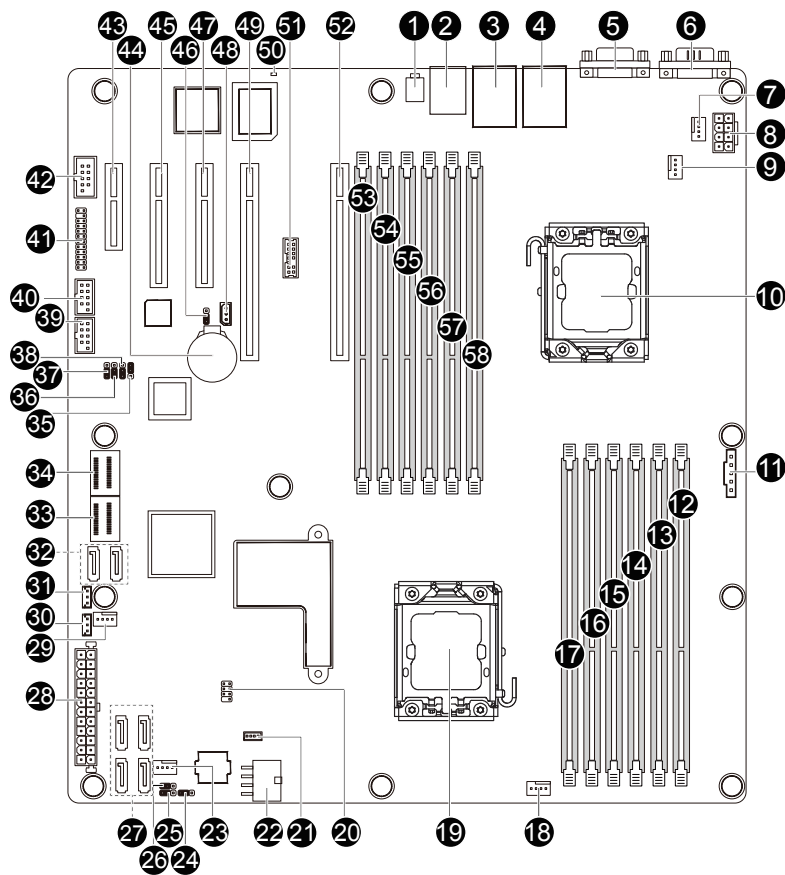
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Box Contents

- ☒ Motherboard
- ☒ Driver CD
- ☒ Two SATA cables
- ☒ I/O Shield

- 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-7PESL Motherboard Layout



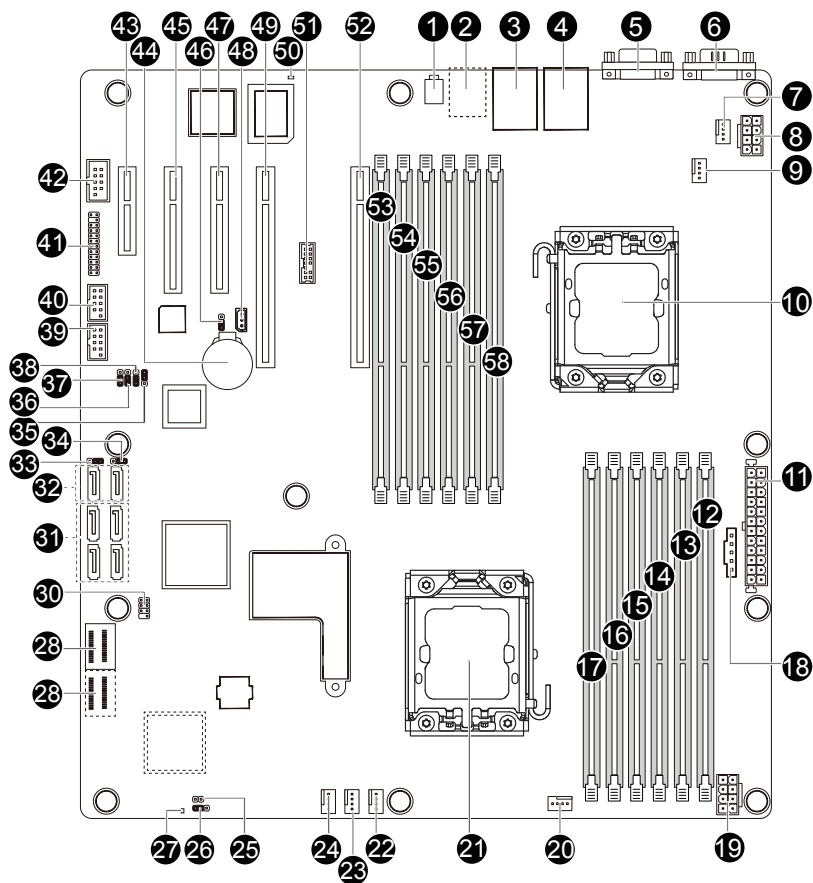
Item	Code	Description
1	ID_SW	ID switch
2	MLAN	BMC Management LAN port
3	USB_LANB1	LAN1 port (top) / USB ports (bottom)
4	USB_LANB2	LAN2 port (top) / USB ports (bottom)
5	VGA_1	VGA port
6	COM1	Serial port
7	SYS_FAN3	System fan connector
8	P12V_AUX2	8 pin power connector
9	CPU1_FAN	CPU1 fan connector
10	CPU1	Intel LGA1356 socket (Secondary CPU)
11	PMBUS_CN_1	PM Bus connector
12	DDR3_P0_A0	Channel 1 slot 0 (for primary CPU)
13	DDR3_P0_A1	Channel 1 slot 1 (for primary CPU)
14	DDR3_P0_B0	Channel 2 slot 0 (for primary CPU)
15	DDR3_P0_B1	Channel 2 slot 1 (for primary CPU)
16	DDR3_P0_C0	Channel 3 slot 0 (for primary CPU)
17	DDR3_P0_C1	Channel 3 slot 1 (for primary CPU)
18	CPU0_FAN	CPU0 fan connector
19	CPU0	Intel LGA1356 socket (Primary CPU)
20	SATA_SGPIO	SATA SGPIO connector
21	SYS_FAN1	System fan connector
22	P12V_AUX1	8 pin power connector
23	SYS_FAN2	System fan connector
24	BIOS_WP	BIOS write protect jumper
25	SATA3_D	SATA3 port DOM support jumper
26	SATA2_D	SATA2 port DOM support jumper
27	SATA2/3/4/5	SATA 3Gb/s connectors
28	ATX1	24-pin power connector
29	SYS_FAN4	System fan connector
30	SKU_KEY1	Intel C600 series Upgrade Key
31	RAID_KEY1	RAID Select connector
32	SATA0/1	SATA 6Gb/s connectors
33	MINI_CN2	Mini SAS connector
34	MINI_CN1	Mini SAS connector
35	SSB_ME1	ME enable/disable jumper
36	BIOS_RVCR	BIOS recovery jumper
37	PASSWORD	Clear password jumper
38	ROMST_FRB3	Force to Stop FRB3 Timer jumper
39	F_USB1	Front USB connector
40	F_USB2	Front USB connector
41	FP_1	Front panel connector
42	COM2	Serial port connector
43	PCIE_5	PCI-E slot 5 (x4 slot / x1 signal)
44	BAT	Battery socket

45	PCIE_4	PCI-E slot 4 (x8 slot / x4 signal)
46	CLR_CMOS	Clear CMOS jumper
47	PCIE_3	PCI-E slot 3 (x8 slot / x4 signal)
48	IPMB	IPMB connector
49	PCIE_2	PCI-E slot 2 (x16 slot / x16 signal)
50	BMC_LED1	BMC firmware readiness LED
51	TPM_MEZZ1	TPM connector
52	PCIE_1	PCI-E slot 1 (x16 slot / x16 signal/From secondary CPU)
53	DDR3_P1_D0	Channel 1 slot 0 (for secondary CPU)
54	DDR3_P1_D1	Channel 1 slot 1 (for secondary CPU)
55	DDR3_P1_E0	Channel 2 slot 0 (for secondary CPU)
56	DDR3_P1_E1	Channel 2 slot 1 (for secondary CPU)
57	DDR3_P1_F0	Channel 3 slot 0 (for secondary CPU)
58	DDR3_P1_F1	Channel 3 slot 1 (for secondary CPU)



CAUTION! If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Normal mode), in order to reduce any risk of hard disk damage. Please refer to Page 48 for SATA2_D and SATA3_D jumper setting instruction.

GA-7PESLX/GA-7PESLN Motherboard Layout



Item	Code	Description
1	ID_SW	ID switch
2	MLAN	BMC Management LAN port (GA-7PESL/GA-7PESLX)
3	USB_LANB1	LAN1 port (top) / USB ports (bottom)
4	USB_LANB2	LAN2 port (top) / USB ports (bottom)
5	VGA_1	VGA port
6	COM1	Serial port
7	SYS_FAN3	System fan connector
8	P12V_AUX2	8 pin power connector
9	CPU1_FAN	CPU1 fan connector
10	CPU1	Intel LGA1356 socket (Secondary CPU)
11	ATX1	24-pin power connector
12	DDR3_P0_A0	Channel 1 slot 0 (for primary CPU)
13	DDR3_P0_A1	Channel 1 slot 1 (for primary CPU)
14	DDR3_P0_B0	Channel 2 slot 0 (for primary CPU)
15	DDR3_P0_B1	Channel 2 slot 1 (for primary CPU)
16	DDR3_P0_C0	Channel 3 slot 0 (for primary CPU)
17	DDR3_P0_C1	Channel 3 slot 1 (for primary CPU)
18	PMBUS_CN_1	PM Bus connector
19	P12V_AUX1	8 pin power connector
20	CPU0_FAN	CPU0 fan connector
21	CPU0	Intel LGA1356 socket (Primary CPU)
22	SYS_FAN1	System fan connector
23	SYS_FAN2	System fan connector
24	SYS_FAN4	System fan connector
25	RAID_KEY2	LSI RAID Select connector (GA-7PESLX only)
26	BIOS_WP	BIOS write protect jumper
27	LED2	LSI Firmware Readiness LED
28	MINI_CN2	Mini SAS connector (GA-7PESLX only)
29	MINI_CN1	Mini SAS connector Mini SAS connector (SATA signal/GA-7PESLN)
30	SATA_SGPIO	SATA SGPIO connector
31	SATA2/3/4/5	SATA 3Gb/s connectors
32	SATA0/1	SATA 6Gb/s connectors
33	SATA3_D	SATA3 port DOM support jumper
34	SATA2_D	SATA2 port DOM support jumper
35	SSB_ME1	ME enable/disable jumper
36	BIOS_RVCR	BIOS recovery jumper
37	PASSWORD	Clear password jumper
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39	F_USB1	Front USB connector
40	F_USB2	Front USB connector
41	FP_1	Front panel connector
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55	DDR3_P1_E0	Channel 2 slot 0 (for secondary CPU)
56	DDR3_P1_E1	Channel 2 slot 1 (for secondary CPU)
57	DDR3_P1_F0	Channel 3 slot 0 (for secondary CPU)
58	DDR3_P1_F1	Channel 3 slot 1 (for secondary CPU)



CAUTION! If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Normal mode), in order to reduce any risk of hard disk damage. Please refer to Page 48 for SATA2_D and SATA3_D 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 2S processors in 1356 socket Intel® Xeon® Quad Core in LGA 1356 socket Supports QuickPath Interconnect up to 8GT/s Enhanced Intel SpeedStep Technology (EIST) & Demand BasedSwitch (DBS) Support Intel Virtualization Technology (VT)
 Chipset	<ul style="list-style-type: none"> Intel® C600 (Patsburg) Chipset
 Memory	<ul style="list-style-type: none"> 12 x 1.5V DDR3 DIMM sockets supporting up to 384 GB of system memory 12 x 1.35V DDR3L DIMM sockets supporting up to 384 GB of system memory 3 channel memory architecture Support for 800/1066/1333/1600 memory modules Support for ECC RDIMM/ UDIMM memory modules
 LAN	<ul style="list-style-type: none"> 2 x Intel® 82574L supports 10/100/1000 Mbps
 Expansion Slots	<ul style="list-style-type: none"> 1 x PCI Express x16 slot, running at x16 (Gen3/PCIE_1) 1 x PCI Express x16 slot, running at x16 (Gen3/PCIE_2) 1 x PCI Express x8 slot, running at x4 (Gen3/PCIE_3) 1 x PCI Express x8 slot, running at x4 (Gen2/PCIE_4/GA-7PESL) 1 x PCI Express x8 slot, running at x4 (Gen3/PCIE_4/GA-7PESLX/GA-7PESLN) 1 x PCI Express x4 slot, running at x1 (Gen2/PCIE_5)
 Onboard Graphics	<ul style="list-style-type: none"> ASPEED® AST2300 supports 128MB VRAM (GA-7PESL/GA-7PESLX) ASPEED® AST1300 supports 128MB VRAM (GA-7PESLN)
 Storage Interface	<ul style="list-style-type: none"> Intel® C600 controller 2 x SATA 6Gb/s connectors (SATA0/1) 4 x SATA 3Gb/s connectors (SATA2/3/4/5) 1 x SAS connector (4 SATA ports (3Gb/s) via SCU/GA-7PESLN) 2 x SAS connectors (4 SATA ports (3Gb/s) via SCU/GA-7PESL) 2 x SAS connectors (8 SAS ports (6Gb/s)/GA-7PESLX) Support for LSI IR SAS RAID 0, RAID 1, RAID 10 Support for LSI IMR SAS RAID 5 with RAID Key attached
 USB	<ul style="list-style-type: none"> Up to 8 USB 2.0/1.1 ports (4 on the back panel, 4 additional ports via the USB brackets connected to the internal USB headers)

Intel C600 Upgrade ROM SKUs:

Upgrade ROM SKU#	SCU Ports	Protocol Enabled	Intel RSTe SAS RAID 5
Patsburg-A; no upgrade ROM	4 ports	SATA Only	SATA RAID 5
1	4 ports	SATA/SAS	No
2	4 ports	SATA/SAS	Yes
5	8 ports	SATA/SAS	No
6	8 ports	SATA/SAS	Yes
9	8 ports	SATA Only	SATA RAID 5

	Internal Connectors	<ul style="list-style-type: none"> ♦ 1 x 24-pin ATX main power connector ♦ 2 x 8-pin ATX 12V power connector ♦ 2 x Mini SAS connectors ♦ 2 x SATA 6Gb/s connectors ♦ 4 x SATA 3Gb/s connectors ♦ 1 x PMBus header ♦ 2 x CPU fan header ♦ 4 x System fan header ♦ 1 x Front panel header ♦ 2 x USB 2.0/1.1 header ♦ 1 x TPM header ♦ 1 x SKU KEY header (GA-7PESL) ♦ 1 x RAID KEY header ♦ 1 x Serial port header ♦ 1 x IPMB header ♦ 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 (GA-7PESL/GA-7PESLX) ♦ 2 x RJ-45 port (GA-7PESLN) ♦ 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 (GA-7PESL/GA-7PESLX) ♦ ASPEED® AST1300 BMC chip (GA-7PESLN)
	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 <ul style="list-style-type: none"> * Whether the CPU/system fan speed control function is supported will depend on the CPU/system cooler you install.
	BIOS	<ul style="list-style-type: none"> ♦ 1 x 64 Mbit flash ♦ AMI BIOS
	Form Factor	<ul style="list-style-type: none"> ♦ GA-7PESL: EEB Form Factor; 12 inch x 13 inch, 6 layers PCB ♦ GA-7PESLX: EEB Form Factor; 12 inch x 13 inch, 8 layers PCB ♦ GA-7PESLN: EEB Form Factor; 12 inch x 13 inch, 8 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

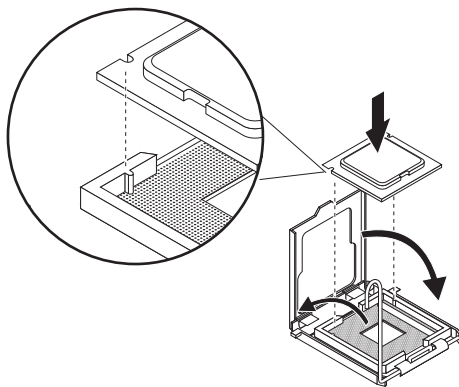


Read the following guidelines before you begin to install the CPU:

- 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.



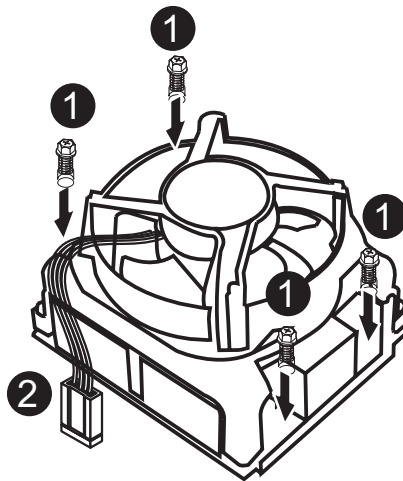
1-3-2 Installing the CPU Cooler

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:

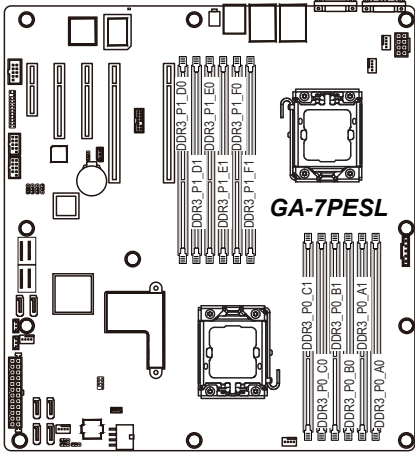
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
(Go to GIGABYTE's website for the latest supported memory speeds and memory modules.)
- Always turn off the computer and unplug the power cord from the power outlet 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

This motherboard provides six 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 limitations, read the following guidelines before installing the memory in Three Channel mode.

1. Three Channel mode cannot be enabled if only one DDR3 memory module is installed.
2. When enabling Three Channel mode with two memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used for optimum performance.

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.

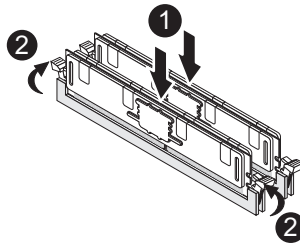
Installation Step:

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

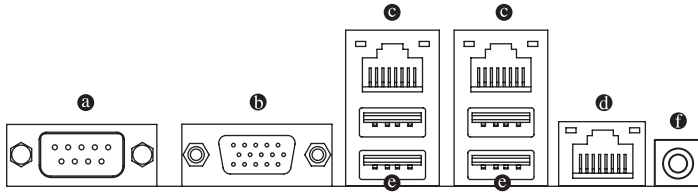
Step 2. Close the plastic clip at both edges of the DIMM slots to lock the DIMM module.

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 Port (Gigabit Ethernet LAN Port)

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 KVM Server Management 10/100 LAN Port (GA-7PESL/GA-7PESLX)

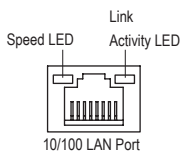
The LAN port provides Internet connection with data transfer speeds of 10/100Mbps.

e 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.

f ID Switch Button

This button provide the selected unit identification function.

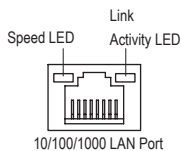


MLAN Speed LED:

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



1Gbps Speed LED:

State	Description
Yellow On	1 Gbps data rate
Yellow Blink	Identify 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:

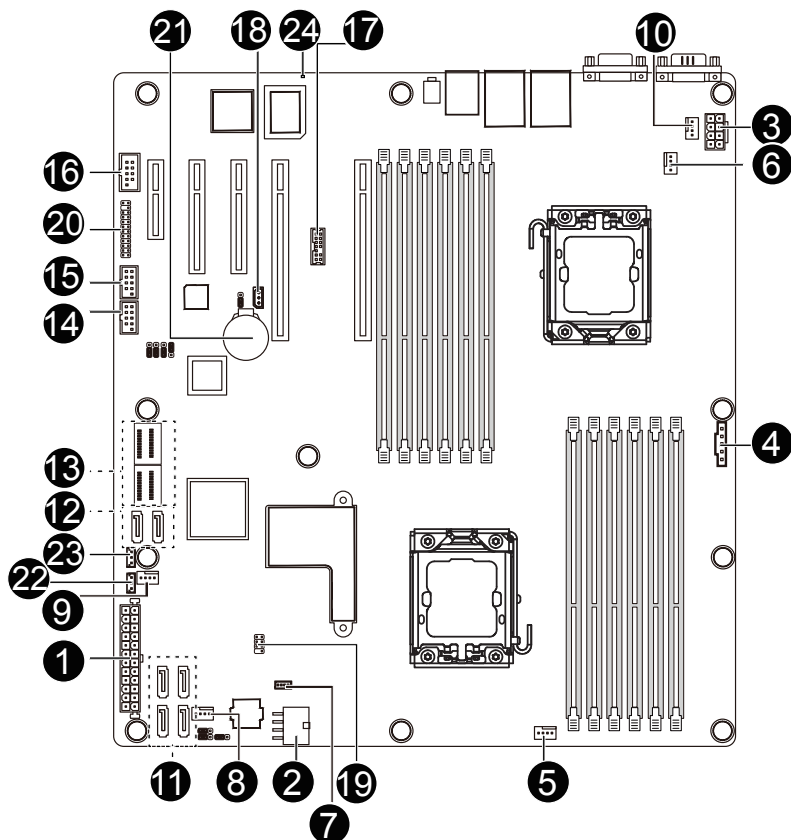
State	Description
On	Link between system and network or no access
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



- 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.

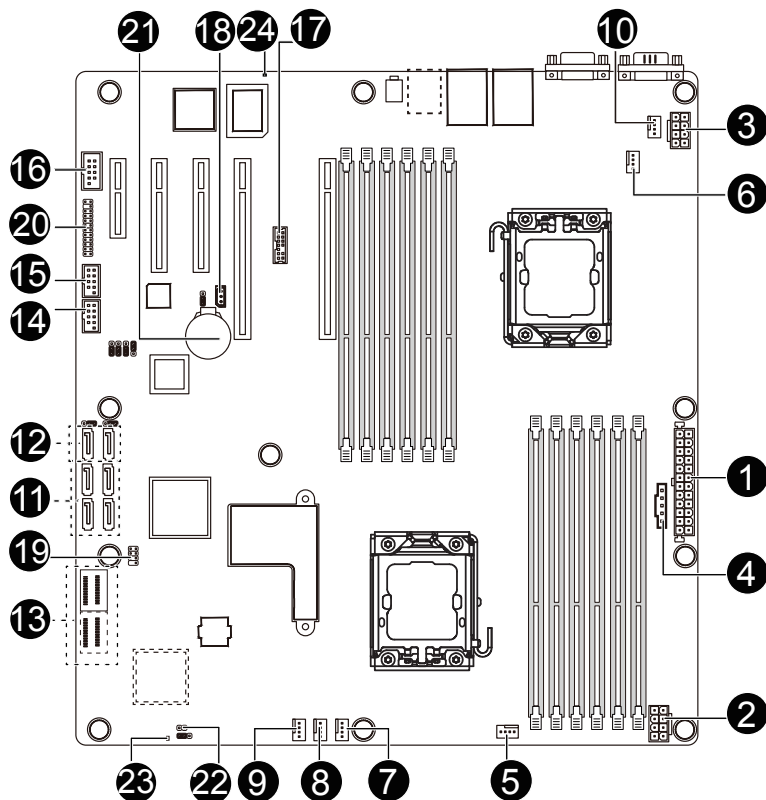
1-6 Internal Connectors

GA-7PESL



1) ATX1	13) MINII_CN1/MINII_CN2
2) P12V_AUX1	14) F_USB1
3) P12V_AUX2	15) F_USB2
4) PMBUS_CN_1	16) COM2
5) CPU0_FAN (for primary CPU)	17) TPM_MEZZ1
6) CPU1_FAN (for secondary CPU)	18) IPMB
7) SYS_FAN1 (System Fan)	19) SATA_SGPIO
8) SYS_FAN2 (System Fan)	20) FP_1
9) SYS_FAN4 (System Fan)	21) BAT
10) SYS_FAN3 (System Fan)	22) SKU_KEY1
11) SATA2/3/4/5	23) RAID_KEY1
12) SATA0/1	24) BMC_LED1

GA-7PESLX/GA-7PESLN



1) ATX1	14) F_USB1
2) P12V_AUX1	15) F_USB2
3) P12V_AUX2	16) COM2
4) PMBUS_CN_1	17) TPM_MEZZ1
5) CPU0_FAN (for primary CPU)	18) IPMB
6) CPU1_FAN (for secondary CPU)	19) SATA_SGPIO
7) SYS_FAN1 (System Fan)	20) FP_1
8) SYS_FAN2 (System Fan)	21) BAT
9) SYS_FAN4 (System Fan)	22) RAID_KEY2 (GA-7PESLX only)
10) SYS_FAN3 (System Fan)	23) LED2 (GA-7PESLX only)
11) SATA2/3/4/5	24) BMC_LED1 (GA-7PESLX only)
12) SATA0/1	
13) MIN_CN1/ MINII_CN2 (GA-7PESLX only)	



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.

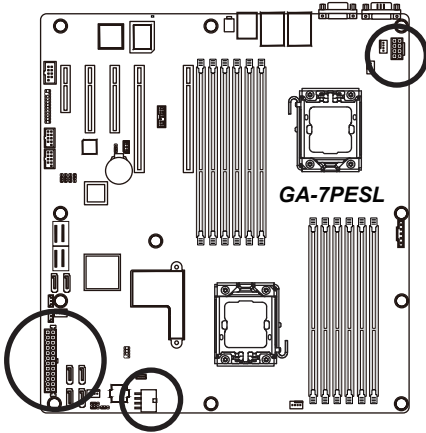
1/2/3) ATX1/P12V_AUX2/P12V_AUX1

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

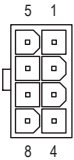
With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design. 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.



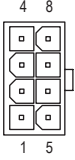
To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.



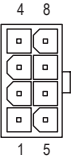
P12V_AUX1
(GA-7PEXSL)



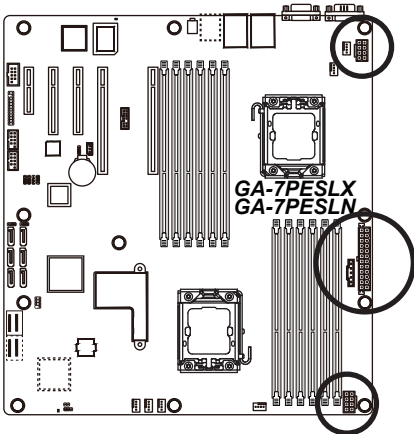
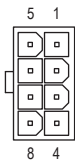
P12V_AUX1
(GA-7PEXSLX)
(GA-7PESLN)



P12V_AUX2
(GA-7PEXSL)

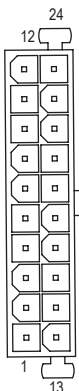


P12V_AUX1
(GA-7PEXSLX)
(GA-7PESLN)

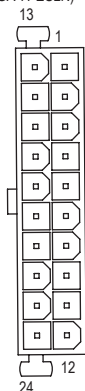


Pin No.	Definition
1	GND
2	GND
3	GND
4	GND
5	+12V
6	+12V
7	+12V
8	+12V

ATX1
(GA-7PESL)

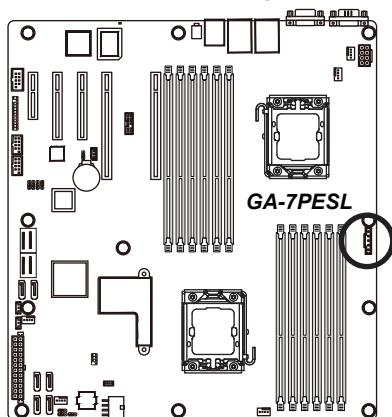


ATX1
(GA-7PESLX)
(GA-7PESLN)

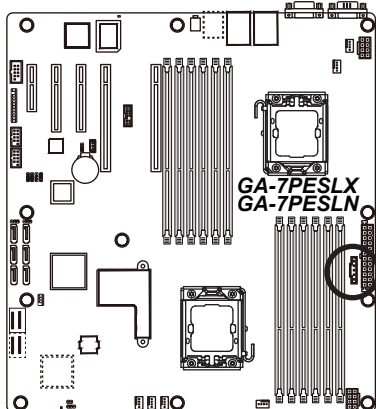


Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

4) PMBUS_CN_1 (Power management connector)



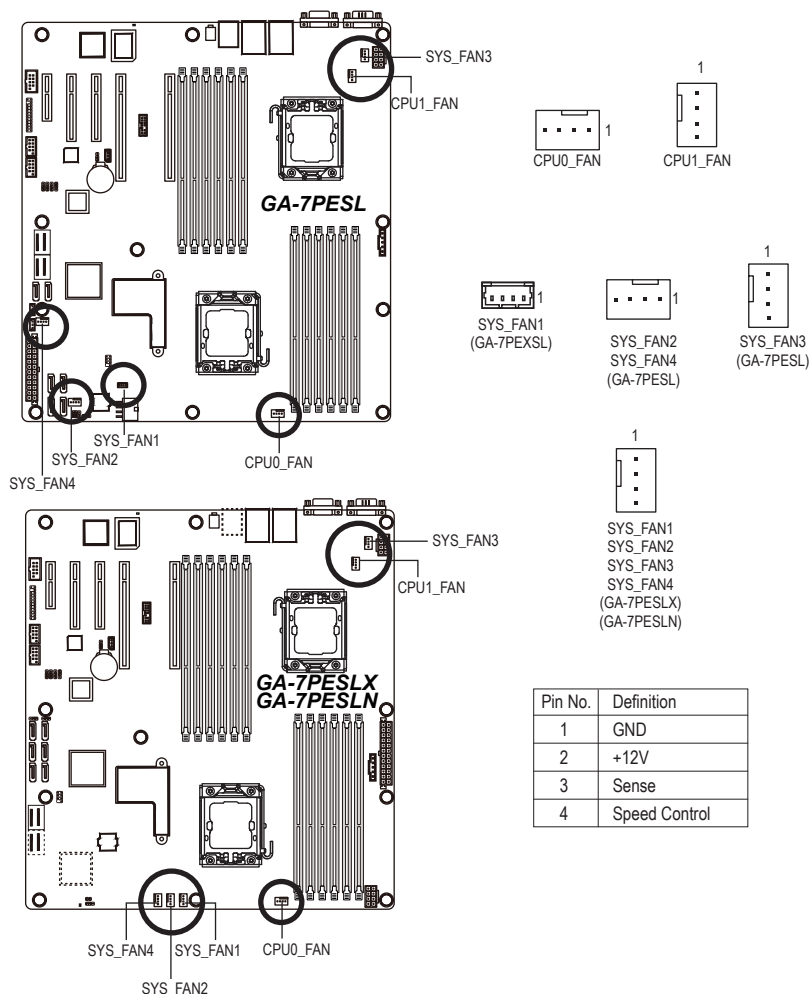
Pin No.	Definition
1	SMB CLK
2	SMB DATA
3	SMB Alert
4	GND
5	3.3V Sense



5/6/7/8/9/10) CPU0_FAN/CPU1_FAN/SYS_FAN1/SYS_FAN2//SYS_FAN3

(CPU Fan/System Fan Headers)

The motherboard has a 4-pin CPU fan header (CPU_FAN1/2), a 4-pin (FAN4) system fan headers. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The motherboard supports CPU fan speed control, which requires the use of a CPU fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis.

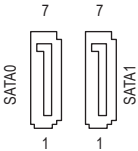
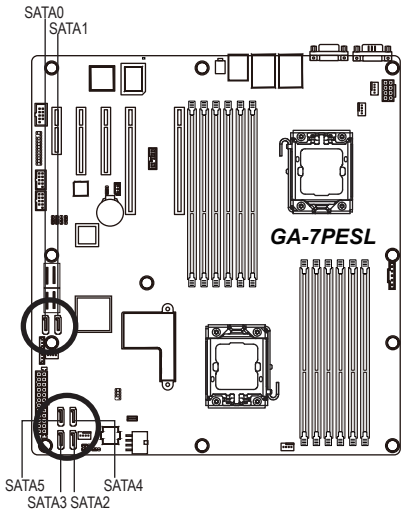


- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.

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

12) SATA0/SATA1 (SATA 6Gb/s Connectors)

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and 1.5Gb/s standard. Each SATA connector supports a single SATA device.

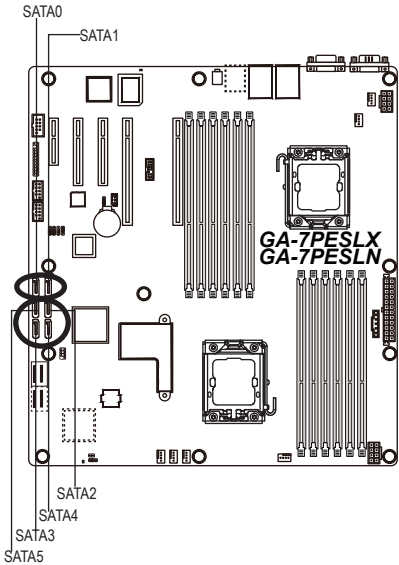


When SATA_DOM1/2 jumper are set to **Normal Mode**:

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

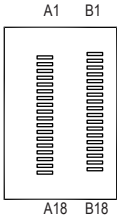
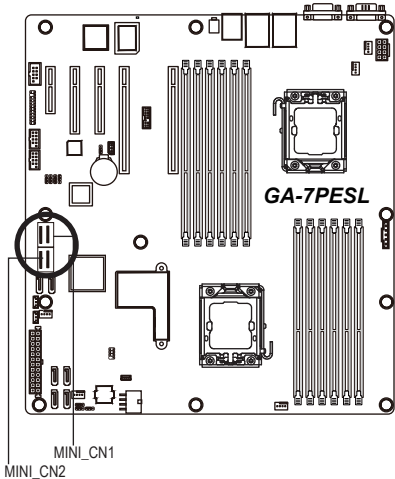


- A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are configured, the total number of hard drives must be an even number.
- A RAID 10 configuration requires four hard drives.

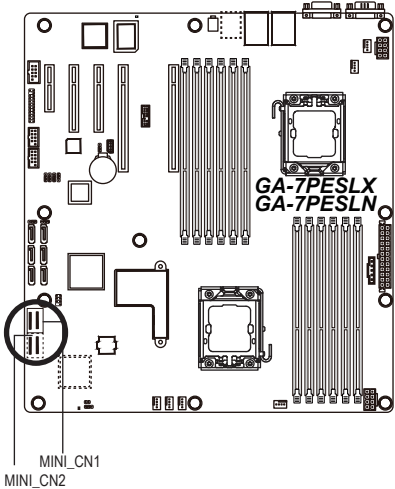
(Note) When a RAID configuration is built across the SATA 6Gb/s channels, the system performance of the RAID configuration may vary depends on the devices are connected.

13) MINI_CN1/MIN_CN2 (Mini SAS connectors)

	MINI_CN1	MINI_CN2	SAS/SATA
GA-7PESL	Yes	Yes	SATA
GA-7PESLX	Yes	Yes	SAS
GA-7PESLN	Yes	No	SATA

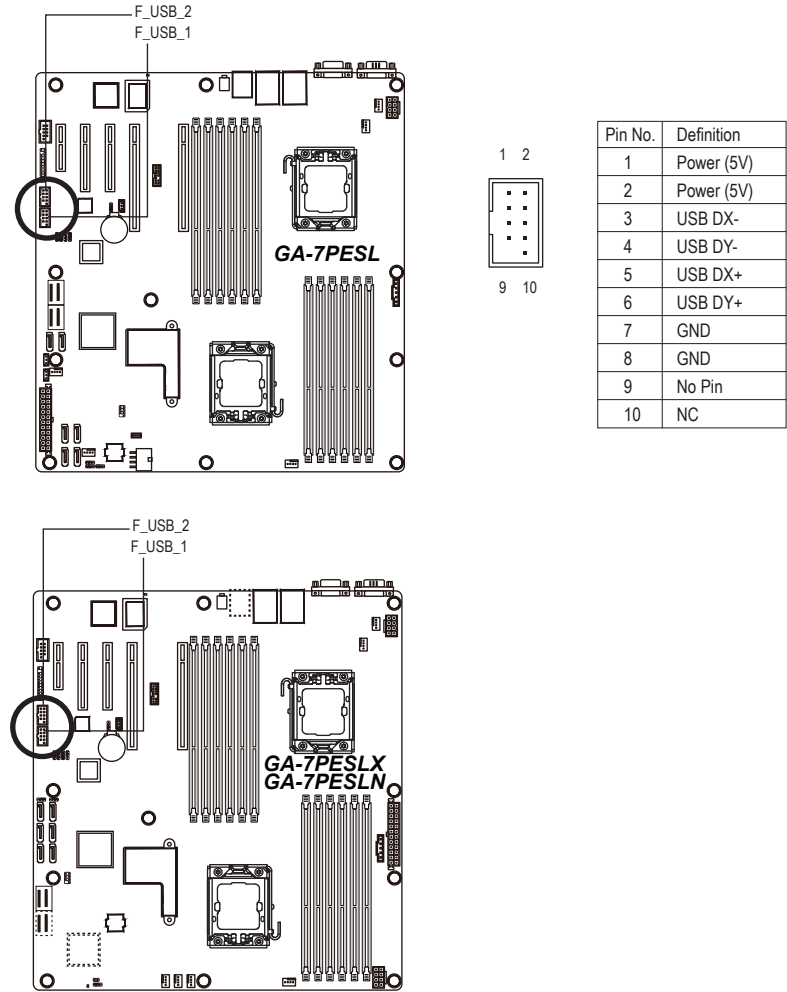


Pin No.	Definition	Pin No.	Definition
A1	GND	B1	GND
A2	RX0+	B2	TX0+
A3	RX0-	B3	TX0-
A4	GND	B4	GND
A5	RX1+	B5	TX1+
A6	RX1-	B6	TX1-
A7	GND	B7	GND
A8	SIB7	B8	SIB0
A9	SIB3	B9	SIB1
A10	SIB4	B10	SIB2
A11	SIB5	B11	SIB6
A12	GND	B12	GND
A13	RX2+	B13	TX2+
A14	RX2-	B14	TX2-
A15	GND	B15	GND
A16	RX3+	B16	TX3+
A17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



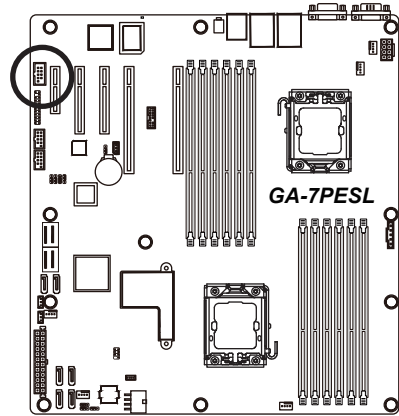
14/15) F_USB1/F_USB2 (Front USB Headers)

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.

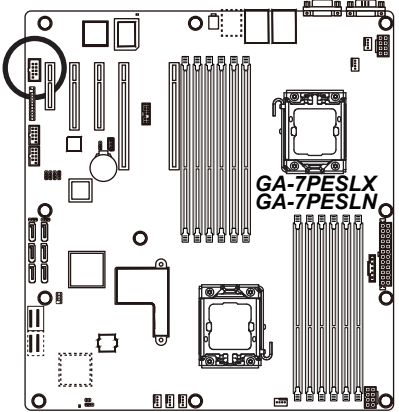


16) COM2 (Serial Port Header)

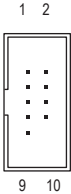
The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.



GA-7PESL



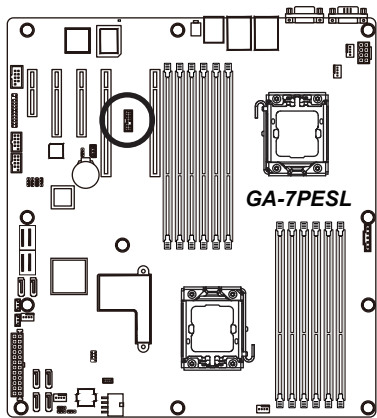
GA-7PESLX
GA-7PESLN



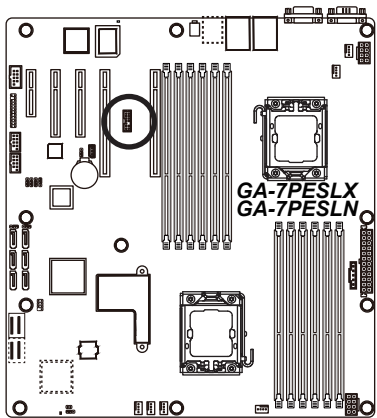
1 2
9 10

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

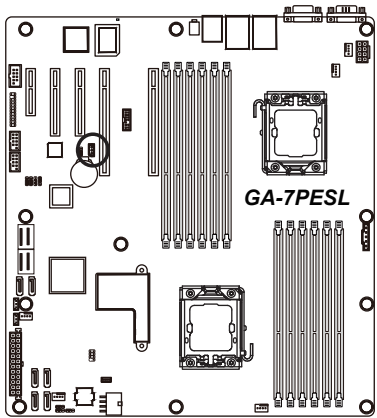
17) TPM_MEZZ1 (TPM Module Connector)



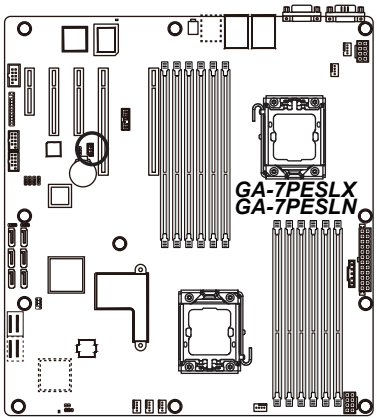
Pin No.	Definition
1	CLK_33M_TPM
2	P_3V3_AUX
3	LPC_RST_DEBUG
4	P3V3
5	LPC_LAD0
6	IRQ_SERIAL
7	LPC_LAD1
8	TPM_DET_N
9	LPC_LAD2
10	NC
11	LPC_LAD3
12	GND
13	LPC_FRAME_N
14	GND



18) IPMB (IPMB connector)

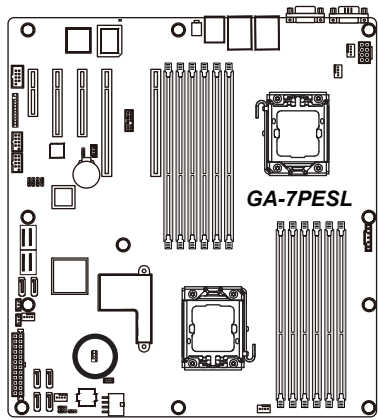


Pin No.	Definition
1	SCL
2	GND
3	SDA




19) **SATA_SGPIO (SATA SGPIO Header)**

SGPIO is 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.

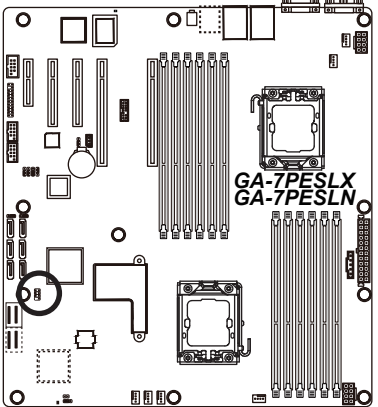


GA-7PESL



8 7
2 1

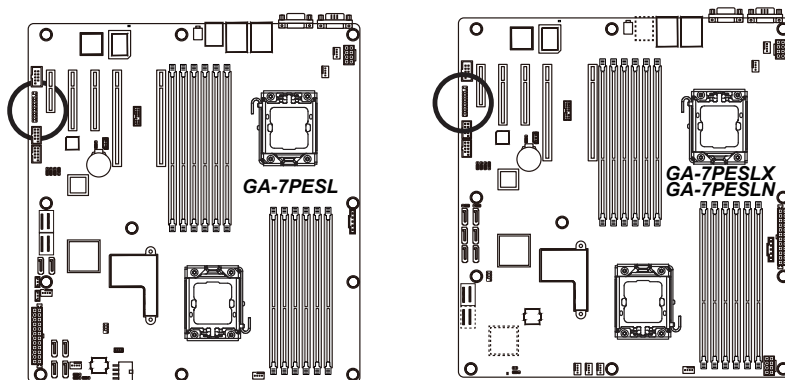
Pin No.	Definition
1	SGPIO_SATA_DATAOUT1
2	No Pin
3	SGPIO_SATA_DATAOUT0
4	GND
5	GND
6	SGPIO_SATA_LOAD
7	NC
8	SGPIO_SATA_CLOCK



GA-7PESLX
GA-7PESLN

20) FP_1 (Front Panel Header)

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.



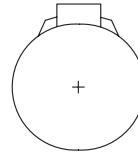
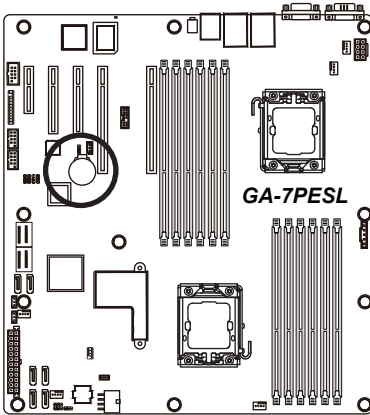
Pin No.	Signal Name	Definition
1	PWLED+	Power LED Signal anode (+)
2	5VSB	5V Standby Power
3	NC	No Pin
4	ID_LED+	ID LED Signal anode (+)
5	PWLED-	Power LED Signal cathode(-)
6	ID_LED-	ID LED Signal cathode(-)
7	HD+	Hard Disk LED Signal anode (+)
8	F_SYSRDY	System Front board LED Signal
9	HD-	Hard Disk 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.

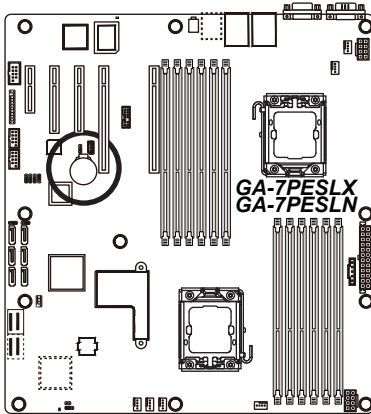
21) BAT (Battery)

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.



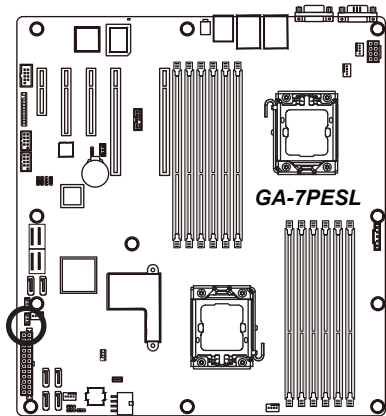
You may clear the CMOS values by removing the battery:

1. Turn off your computer and unplug the power cord.
2. Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.)
3. Replace the battery.
4. Plug in the power cord and restart your computer.



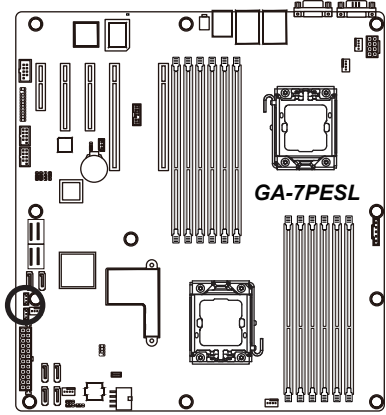
- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself 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.

22) SKU_KEY1 (Patsburg Upgrade ROM Header/GA-7PESL)



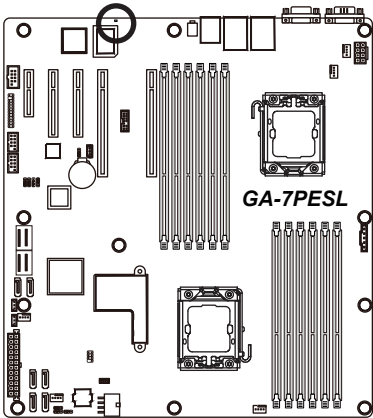
Pin No.	Definition
1	GND
2	FM_PBG_DYN_SKU_KEY
3	GND

23) RAID_KEY1 (RAID Selection Header/GA-7PESL)



Pin No.	Definition
1	GND
2	FM_SSB_SAS_SATA_RAID_KEY
3	GND

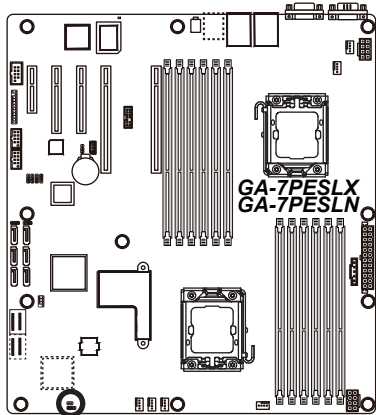
24) BMC_LED1 (BMC Firmware Readiness LED/GA-7PESL)



Link/Activity:

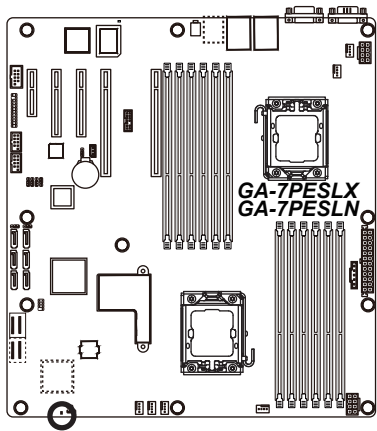
State	Description
On	BMC firmware is initial
Blinking	BMC firmware is ready
Off	System is powered off

22) RAID_KEY2 (RAID Select Header/GA-7PESLX Only)



Pin No.	Definition
1	GPIO
2	GND

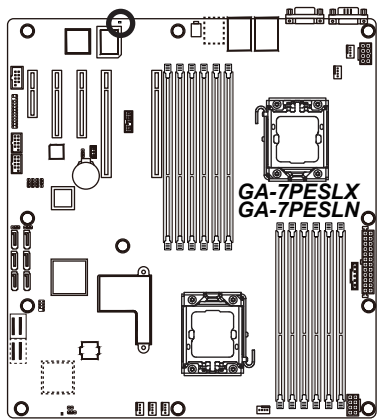
23) LED2 (LSI Firmware Readiness LED/GA-7PESLX Only)



LED2 Link/Activity:

State	Description
Blinking	LSI firmware is ready
Off	LSI firmware is not ready

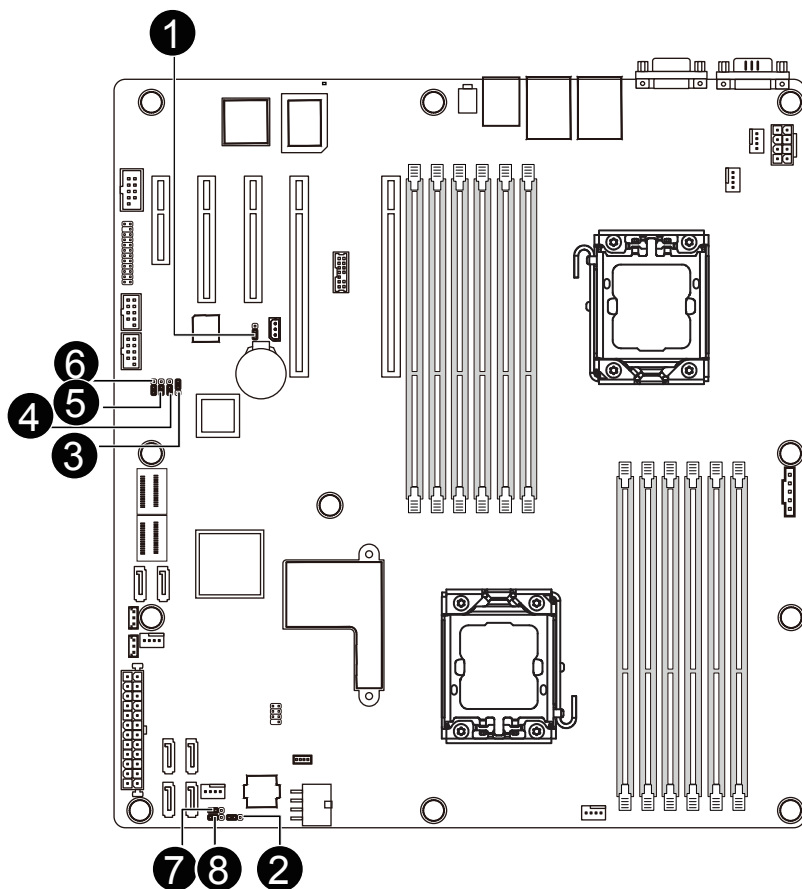
24) BMC_LED1 (BMC Firmware Readiness LED/GA-7PESLX Only)



Link/Activity:

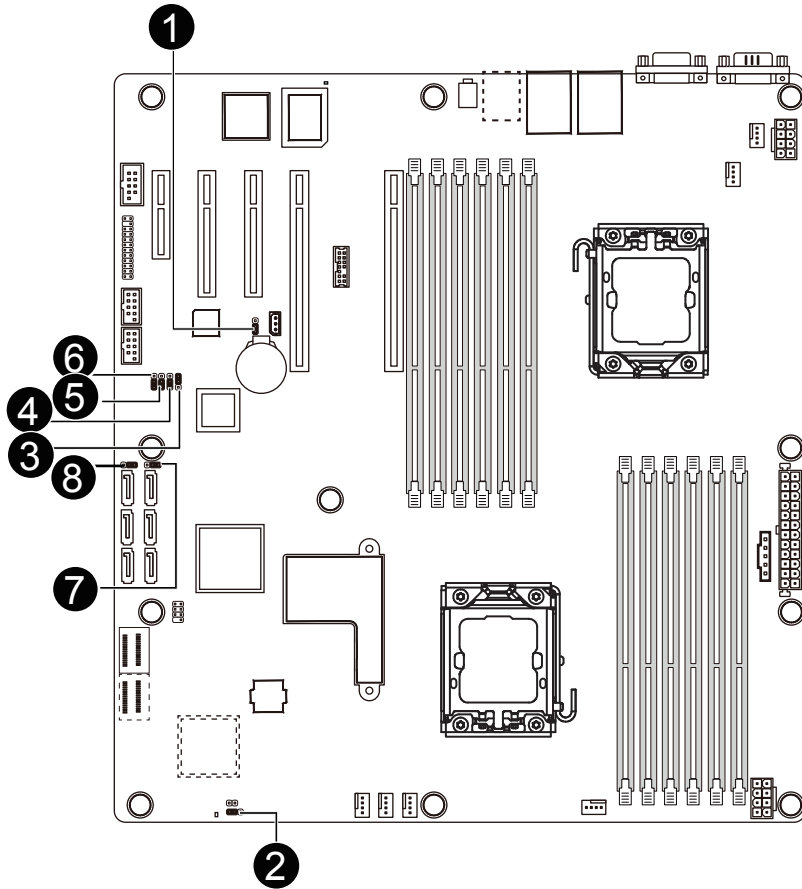
State	Description
On	BMC firmware is initial
Blinking	BMC firmware is ready
Off	System is powered off

1-7 Jumper Setting GA-7PESL



1) CLR_CMOS	5) BIOS_RCVR
2) BIOS_WP	6) PASSWORD
3) SSB_ME1	7) SATA2_D
4) ROMST_FRB3 (GA-7PESLX Only)	8) SATA3_D

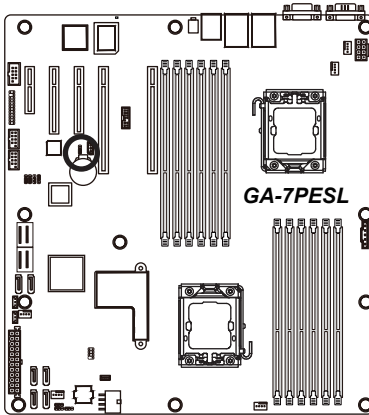
GA-7PESLX/GA-7PESLN





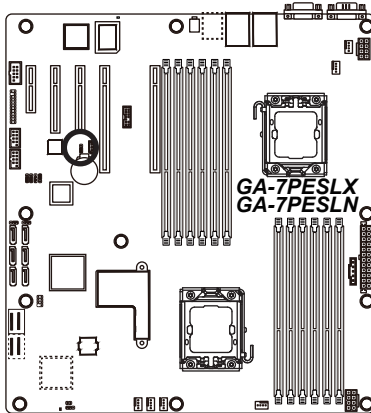
1) CLR_CMOS	5) BIOS_RCVR
2) BIOS_WP	6) PASSWORD
3) SSB_ME1	7) SATA2_D
4) ROMST_FRB3	8) SATA3_D

1) CLR_CMOS (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 to temporarily short the two pins or use a metal object like a screwdriver to touch the two pins for a few seconds.

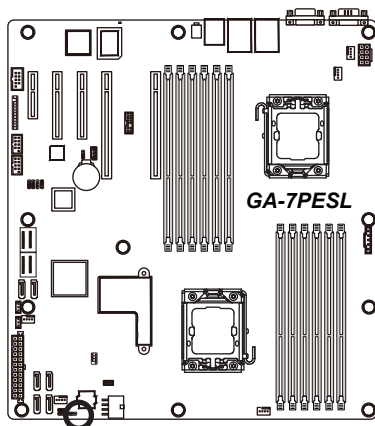


- 1  1-2 Close: Normal operation (Default setting)
- 1  2-3 Close: Clear CMOS data.



- 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 Default Values**) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations).

2) BIOS_WP (BIOS Write Protect Jumper)




GA-7PESL

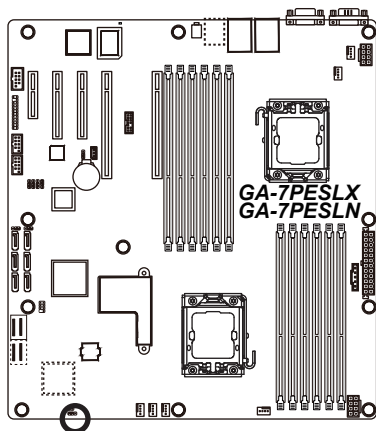
1  1-2 Close: Normal operation. (Default setting)

1  2-3 Close: Enable BIOS write protect function.

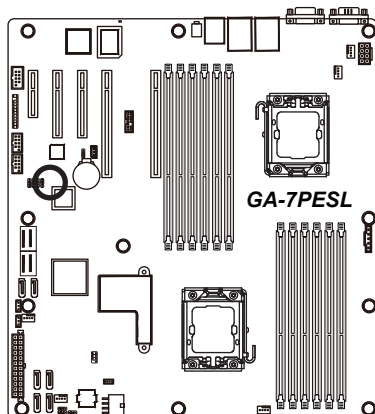
GA-7PESLX/GA-7PESLN



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

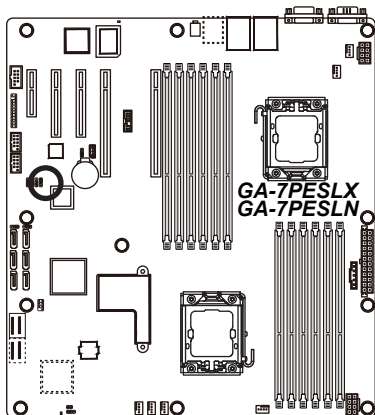
 1 2-3 Close: Enable BIOS write protect function.



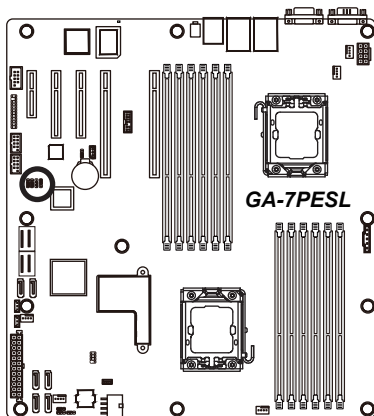
3) SSB_ME1 (ME enable/disable Jumper)





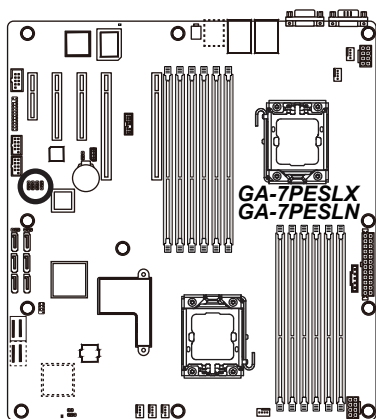
- 1  1-2 Close: Disable ME function.
- 1  2-3 Close: Normal operation. (Default setting)



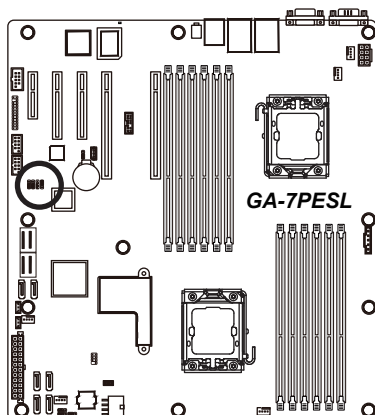
4) RMOST_FRB3 (Force to Stop FRB3 Timer Jumper/GA-7PESL/GA-7PESLX)





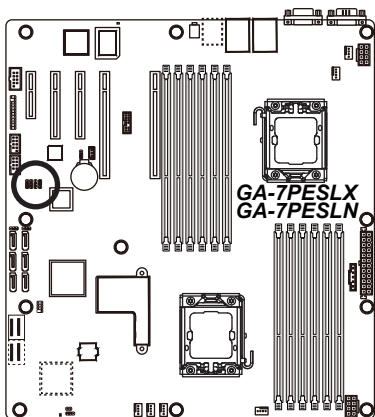
- 1  1-2 Close: Normal operation. (Default setting)
- 1  2-3 Close: Force to Stop FRB3 Timer



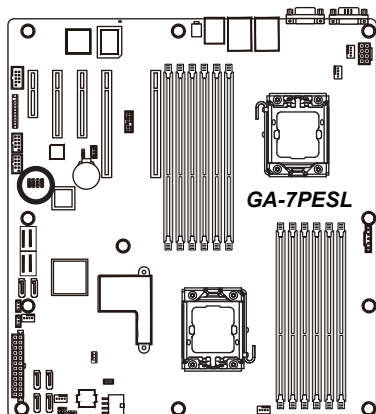
5) BIOS_RVCR (BIOS Recovery Jumper)





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

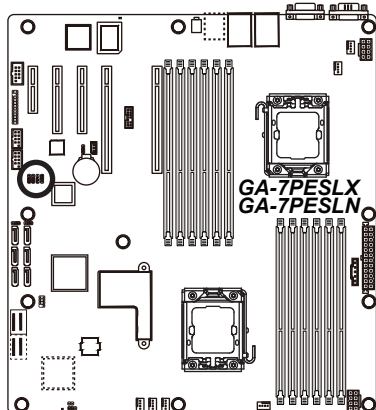


6) PASSWORD (Skip Supervisor Password Jumper)



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

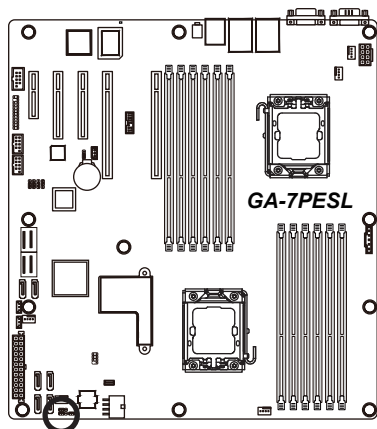
1  2-3 Close: Skip supervisor password.



7/8) SATA2_D/SATA_D_3 (SATA DOM Jumper)

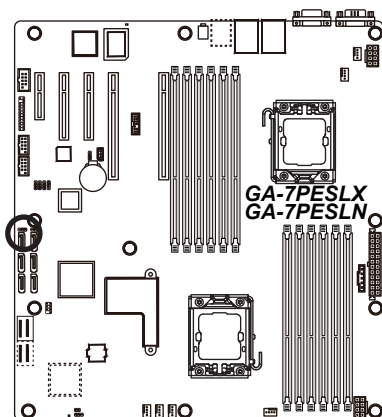


CAUTION! If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Normal mode), in order to reduce any risk of hard disk damage.



1  1-2 Close: Enable SATA0/SATA1 port DOM support.

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



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 submenus
<F9>	Load the Optimized BIOS default settings for the current submenus
<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 supervisor and user password. Configuration supervisor password allows you to restrict access to the system and BIOS Setup.

A supervisor 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 (GA-7PESL/GA-7PESLX)**

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

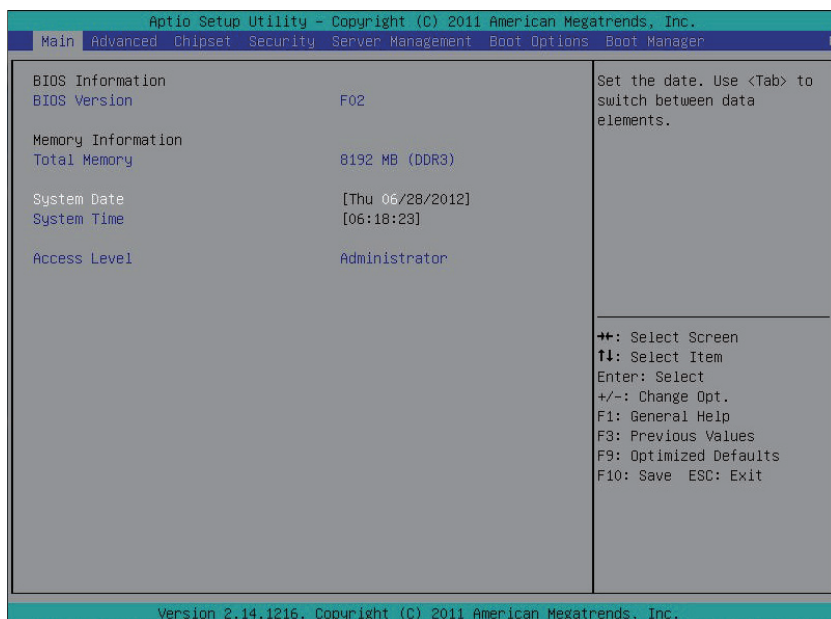
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

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.

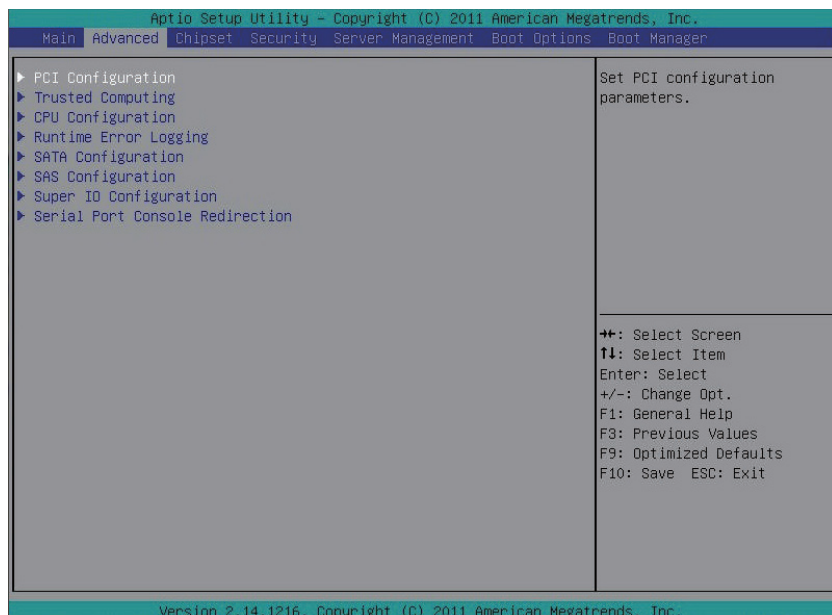
☞ **Access Level**

Display the current accessing level information.

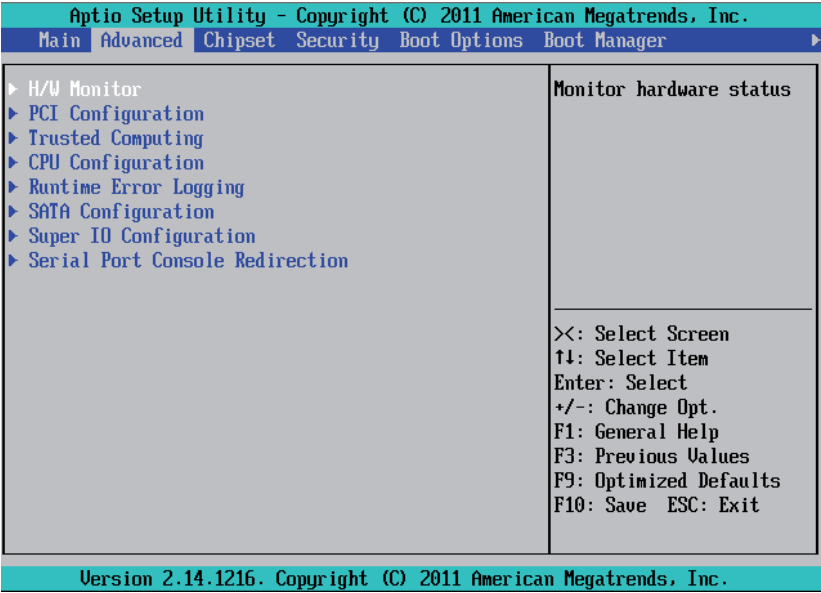
2-2 Advanced Menu

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.

GA-7PESL/GA-7PESLX



GA-7PESLN



2-2-1 H/W Monitor (GA-7PESLN)

Press Enter to view the Hardware Monitor screen which displays a real-time record of the CPU/system temperature, fan speed, and voltage. Items on this window are non-configurable.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Pc Health Status	
CPU0 Temp	: N/A
CPU1 Temp	: N/A
SIO Temp0	: +45 C
SIO Temp2	: +30 C
CPU0 Fan Speed	: 4176 RPM
CPU1 Fan Speed	: N/A
SYS Fan1 Speed	: N/A
SYS Fan2 Speed	: N/A
SYS Fan3 Speed	: N/A
SYS Fan4 Speed	: N/A
P12V	: +12.310 V
P5V	: +5.098 V
P3.3	: +3.423 V
P5STB	: +5.146 V
P1.1	: +1.157 V
CPU0 UCC	: +0.993 V
CPU1 UCC	: +0.53
<div>><: Select Screen F1: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit</div>	

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Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
SIO Temp0	
SIO Temp0	: +45 C
SIO Temp2	: +30 C
CPU0 Fan Speed	: 4176 RPM
CPU1 Fan Speed	: N/A
SYS Fan1 Speed	: N/A
SYS Fan2 Speed	: N/A
SYS Fan3 Speed	: N/A
SYS Fan4 Speed	: N/A
P12V	: +12.310 V
P5V	: +5.104 V
P3.3	: +3.423 V
P5STB	: +5.158 V
P1.1	: +1.159 V
CPU0 UCC	: +0.996 V
CPU1 UCC	: +0.53
PVDDQ_ABC	: +1.376 V
PVDDQ_DEF	: +0.36
PLL CPU0	: +1.831 V
PLL CPU1	: +0.29
<div>><: Select Screen F1: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save ESC: Exit</div>	

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2-2-2 PCI Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Advanced		
PCI Express Slot #1 I/O ROM	[Enabled]	Enable/Disable PCI-Express slot #1 I/O ROM.
PCI Express Slot #2 I/O ROM	[Enabled]	
PCI Express Slot #3 I/O ROM	[Enabled]	
PCI Express Slot #4 I/O ROM	[Enabled]	
PCI Express Slot #5 I/O ROM	[Enabled]	
Onboard LAN #1 Controller	[Enabled]	
Onboard LAN #2 Controller	[Enabled]	
Onboard LAN1 I/O ROM	[Disabled]	
Onboard LAN2 I/O ROM	[Disabled]	
PERR# Generation	[Disabled]	
SERR# Generation	[Disabled]	
		++: 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.		

PCI Express Slot 1/2/3/4/5 I/O 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 is **Enabled**.

LAN1/2 Option ROM

Enable/Disable onboard LAN1 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**.

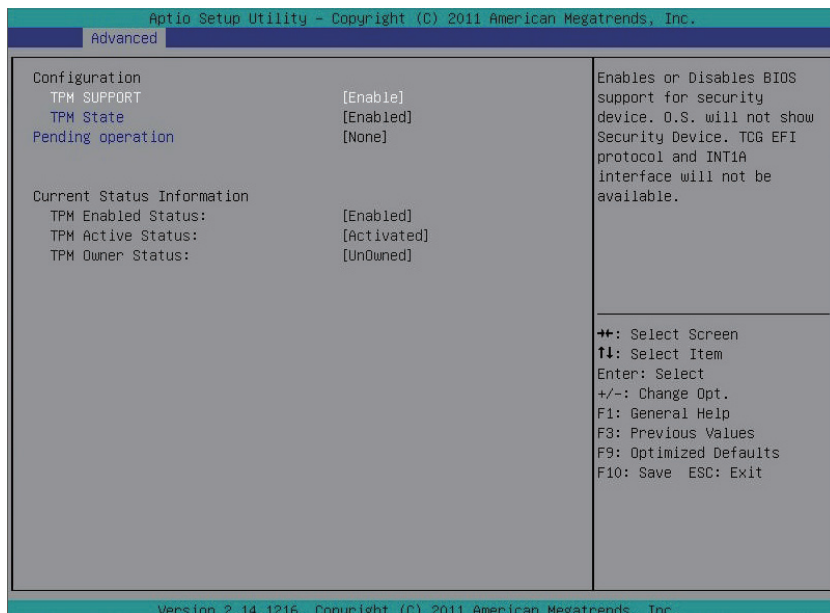
Maximum Payload

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 **4096 Bytes**.

2-2-3 Trusted Computing



☞ TPM Support

Select Enabled to activate TPM support feature.

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

☞ TPM State ^(Note)

Select Enabled to activate TPM State function.

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

☞ Pending Operation ^(Note)

Determine the action when operation is pending.

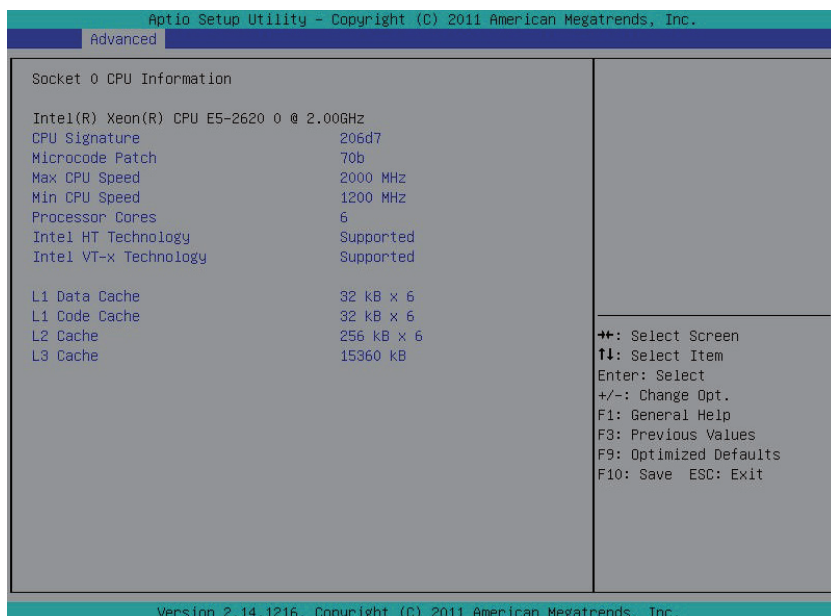
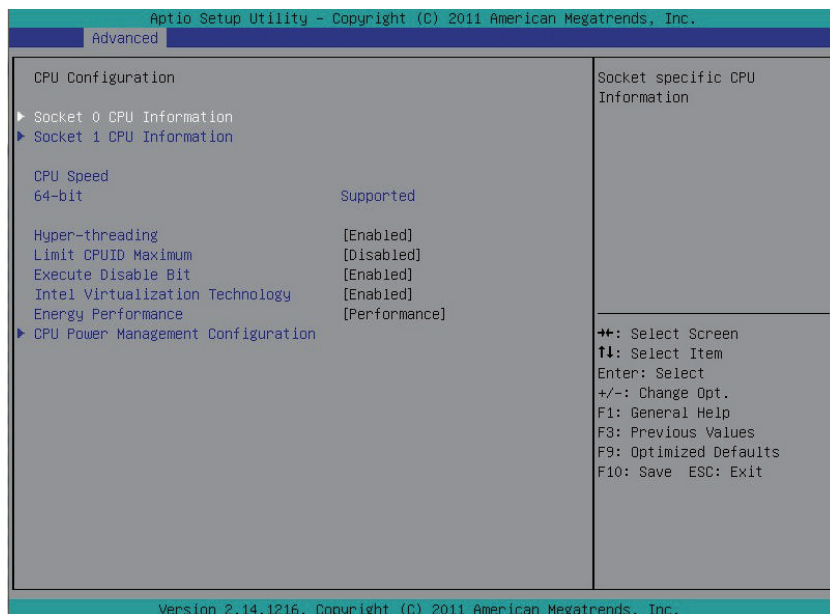
Options available: None. Default setting is **None**.

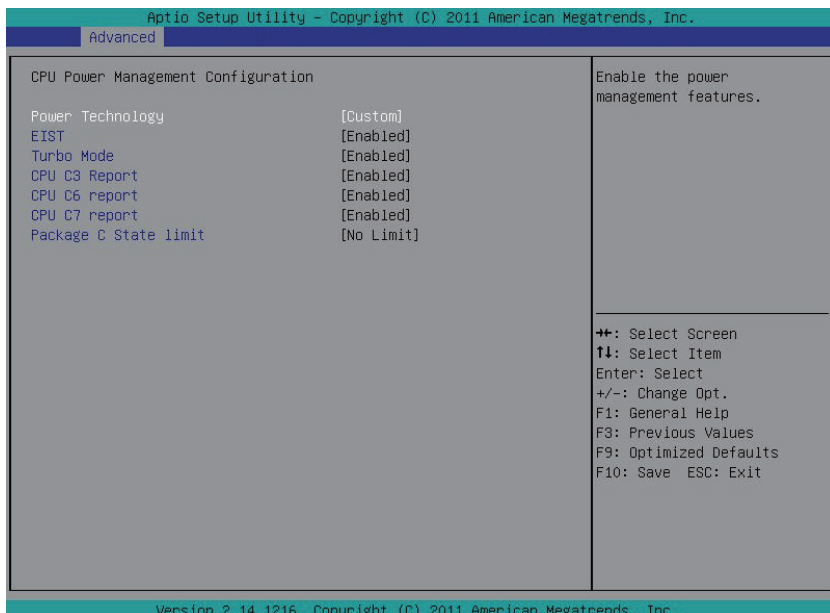
☞ Current Status Information

Display current TPM status information.

(Note) This item appears when the TPM module is attached.

2-2-4 CPU Configuration





☞ **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 **Enabled**.

☞ **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 **Enabled**.

☞ **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 **Enabled**.

☞ **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**.

☞ **CPU Management**

☞ **Power Technology**

Configure the power management features.

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

(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.

☞ **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 **Enabled**.

☞ **Turbo Mode**

When this feature is enabled, the processor can dynamically overclock one or two of its four processing cores to improve performance with applications that are not multi-threaded or optimized for quad-core processors.

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

☞ **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 **Disabled**.

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.

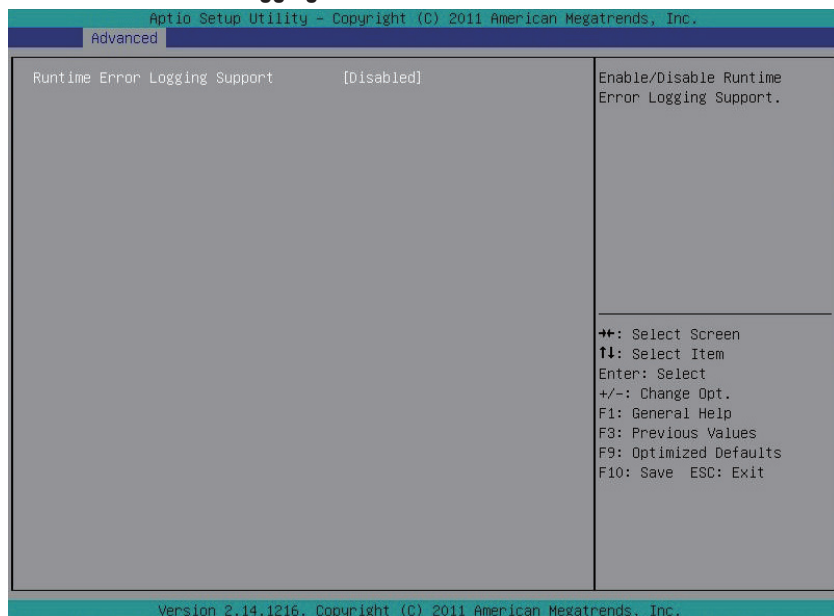
Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **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**.

2-2-5 Runtime Error Logging

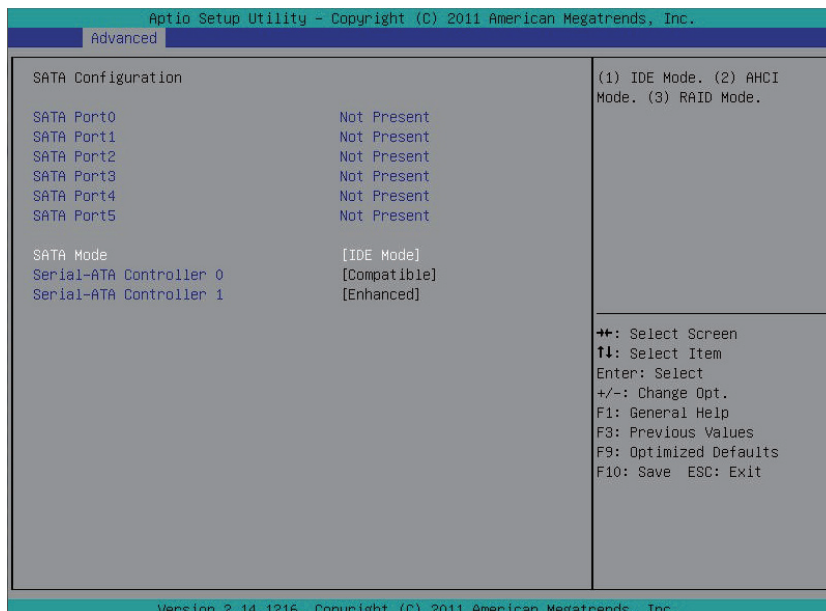


Runtime Error Logging Support

Enable/Disable Runtime error logging support.

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

2-2-6 SATA Configuration



☞ **SATA Port 0/1/2/3/4/5** (Note)

Displays the installed HDD devices information.

☞ **SATA Mode**

Select the on chip SATA type.

IDE Mode: When set to IDE, the SATA controller disables its RAID and AHCI functions and runs in the IDE emulation mode. This is not allowed to access RAID setup utility.

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

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

☞ **Serial ATA Controller 0/1**

Determine the onboard SATA controller mode.

Compatible: SATA and PATA drives are auto-detected and placed in Legacy mode.

Enhanced: SATA and PATA drives are auto-detected and placed in Native mode.

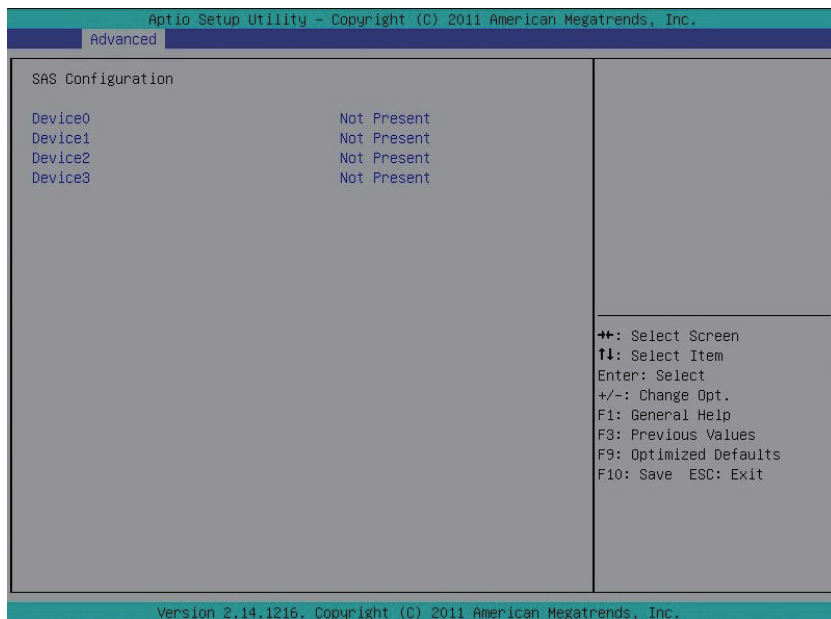
Options available: Disabled/Enhanced/Compatible.

Default setting for Serial ATA 0 is **Compatible**.

Default setting for Serial ATA 1 is **Enhanced**.

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

2-2-7 SAS Configuration (GA-7PESLX)



⏏ SAS Configuration ^(Note)

⏏ Device 0/1/2/3

Displays the installed HDD devices information.

(Note) This item only applied for GA-7PESLX.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
Super IO Configuration Super IO Chip IT8728 ▶ Serial Port 1 Configuration ▶ Serial Port 2 Configuration	Set Parameters of Serial Port 1 (COMA) ++: 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.	

Advanced		
Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
Device Mode	[Normal]	
		++: 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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☞ **Serial Port 1/2 Configuration**

☞ **Serial Port Configuration**

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/IO=3F8; IRQ=4/IO=3F8h; IRQ=3,4,5,6,7,10,11,12/

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

☞ **Device Mode**

Change the Serial Port mode.

Options available: Standard Serial Port Mode (Normal Mode)/IrDA 1.0 (HP SIR) Mode (High Speed)/ASKIRfdgdg Mode.

2-2-9 Serial Port Console Redirection (GA-7PESLN)

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
COM1 Console Redirection [Enabled] ▶ Console Redirection Settings	Console Redirection Enable or Disable.
COM2 Console Redirection [Disabled] ▶ Console Redirection Settings	
Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS) Console Redirection [Enabled] ▶ Console Redirection Settings_	><: 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.	

☞ 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

Press [Enter] to enter advanced menu for console redirection settings.

☞ 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.

☞ 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.

☞ **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.

☞ **VT-UTF8 Combo Key Support**

Enable/Disable VT-UTF8 Combo Key Support.

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

☞ **Recorder Mode**

When this mode enabled, only text will be send. This is to capture Terminal data.

Options available: Enabled/Disabled.

☞ **Resolution 100x31**

Enables or disables extended terminal resolution.

Options available: Enabled/Disabled.

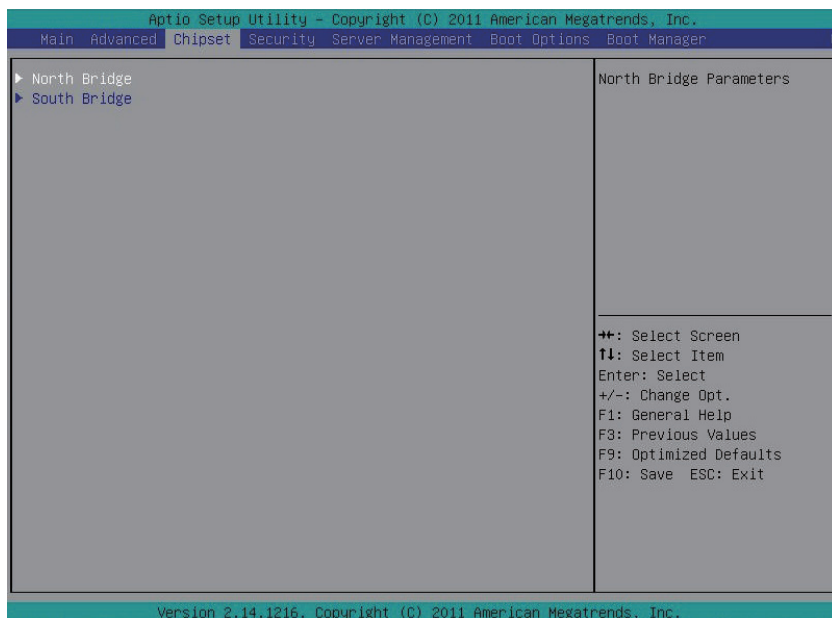
☞ **Legacy OS Redirection Resolution**

On Legacy OS, the number of Rows and Columns supported redirection.

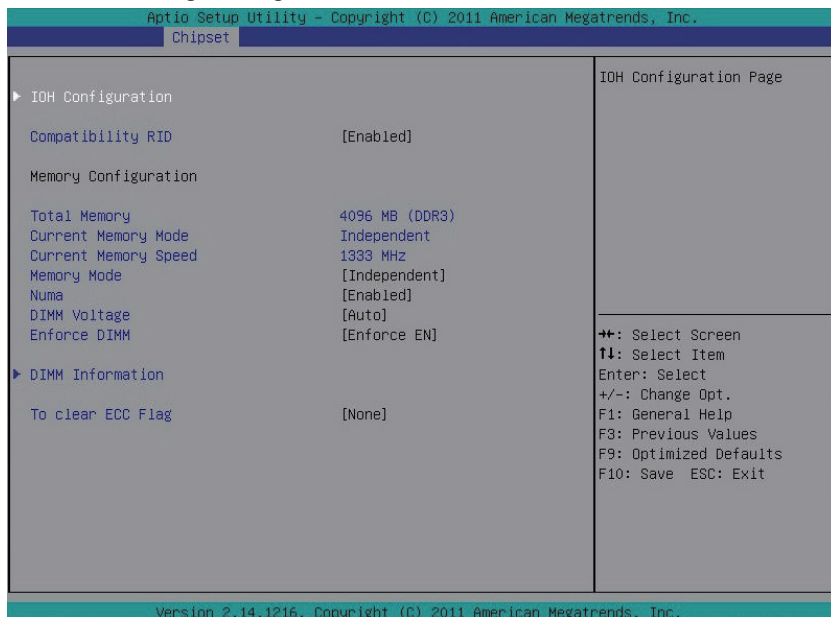
Options available: 80x24/80X25.

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



☞ 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/Sparing.

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 EN**.

To clear ECC Flag

To clear ECC flag function.

Options available: None. 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>Intel(R) I/OAT [Disabled] DCA Support [Enabled] VGA Priority [Offboard] TargetVGA Vga From CPU 0 Gen3 Equalization WA's [Disabled]</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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Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
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>
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.	

☞ **IOH Configuration**

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

☞ **Intel(R) I/OAT**

Enable/Disable Intel OAT Technology function.

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

☞ **DCA Support**

Enable/Disable Direct Cache Access Support function.

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

☞ **VGA Priority**

Define the display device priority.

☞ **Target VGA**

Displays the information of Target VGA.

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**.

☞ **Intel(R) VT-d**

Enable/Disable Intel VT-d Technology function.

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

2-3-1-2 DIMM Information

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.																									
Chipset																									
<p>CPU Socket 0 DIMM Information</p> <table> <tr><td>DDR3_P0_A0</td><td>Present 2048 MB (DDR3)</td></tr> <tr><td>DDR3_P0_A1</td><td>Not Present</td></tr> <tr><td>DDR3_P0_B0</td><td>Not Present</td></tr> <tr><td>DDR3_P0_B1</td><td>Not Present</td></tr> <tr><td>DDR3_P0_C0</td><td>Not Present</td></tr> <tr><td>DDR3_P0_C1</td><td>Not Present</td></tr> </table> <p>CPU Socket 1 DIMM Information</p> <table> <tr><td>DDR3_P1_D0</td><td>Present 2048 MB (DDR3)</td></tr> <tr><td>DDR3_P1_D1</td><td>Not Present</td></tr> <tr><td>DDR3_P1_E0</td><td>Not Present</td></tr> <tr><td>DDR3_P1_E1</td><td>Not Present</td></tr> <tr><td>DDR3_P1_F0</td><td>Not Present</td></tr> <tr><td>DDR3_P1_F1</td><td>Not Present</td></tr> </table>		DDR3_P0_A0	Present 2048 MB (DDR3)	DDR3_P0_A1	Not Present	DDR3_P0_B0	Not Present	DDR3_P0_B1	Not Present	DDR3_P0_C0	Not Present	DDR3_P0_C1	Not Present	DDR3_P1_D0	Present 2048 MB (DDR3)	DDR3_P1_D1	Not Present	DDR3_P1_E0	Not Present	DDR3_P1_E1	Not Present	DDR3_P1_F0	Not Present	DDR3_P1_F1	Not Present
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⏏ DIMM Information:

⏏ DIMM Group: CPU Socket 0/1 DIMM Information

CPU Socket 0:

DDR3_P0_A0/DDR3_P0_A1/DDR3_P0_B0/DDR3_P0_B1/DDR3_P0_C0/DDR3_P0_C1

Status

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

CPU Socket 1:

DDR3_P0_E0/DDR3_P0_E1/DDR3_P0_F0/DDR3_P0_F1/DDR3_P0_F0/DDR3_P0_F1

Status

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

2-3-2 South Bridge Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
PCH Information		Support for PCH Compatibility Revision ID (CRID) Functionality.
Name	Patsburg	
Stepping	06	
SB Chipset Configuration		
PCH Compatibility RID	[Disabled]	
Restore AC Power Loss	[Last State]	
Onboard SAS Oprom	[Disabled]	
Onboard SATA RAID Oprom	[Enabled]	
		++: 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.		

☞ 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 sys- tem 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.

☞ Onboard SAS oprom

Enable/Disable onboard SAS option ROM.

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

☞ Onboard SATA RAID oprom

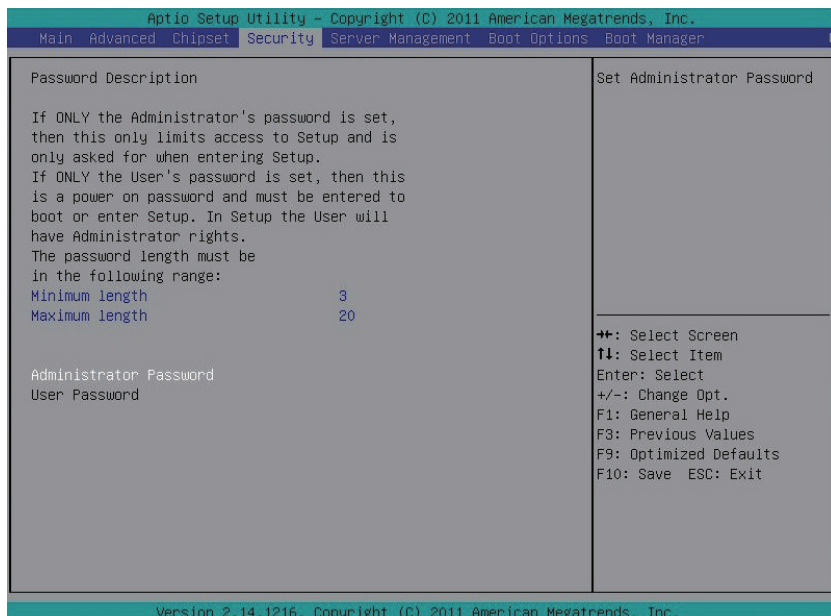
Enable/Disable onboard SATA RAID option ROM.

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

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

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.

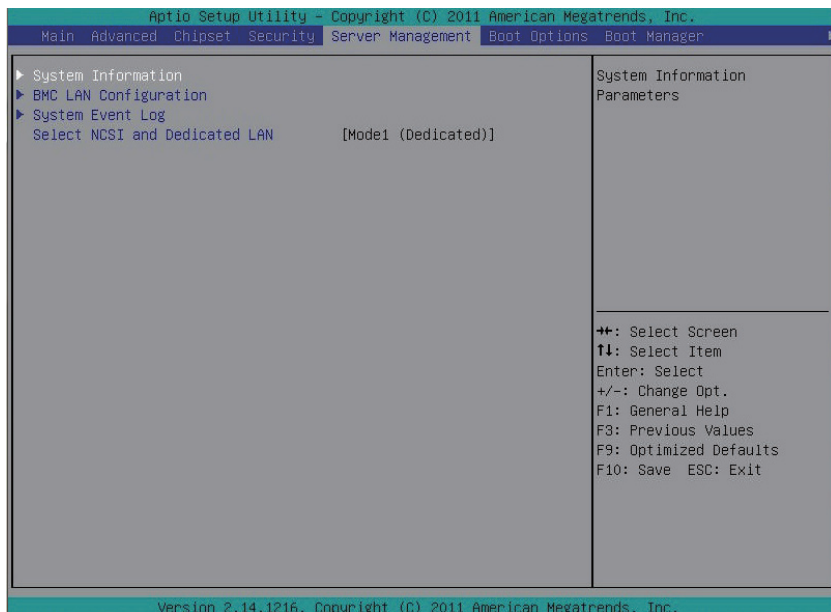
⌵ Administrator Password

Press Enter to configure the Administrator password.

⌵ User Password

Press Enter to configure the user password.

2-5 Server Management Menu (GA-7PEXL/GA-7PESLX)



☞ **System Information**

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

☞ **BMC LAN Configuration**

BMC LAN Configuration. Press Enter to access the related submenu.

☞ **System Event Log**

Press Enter to access the related system event log.

☞ **Select NCSI and Dedicated LAN**

Switch NCSI and dedicated LAN and send KCS command.

Options available: Mode2(NCSI)/ Mode1 (Dedicated).

2-5-1 System Information

The System Management submenu is a simple display page for basic system ID information, as well as System product information. Items on this window are non-configurable.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Server Management	
BMC Information	
BMC Firmware Version	01.01
SDR Version	00.14
FRU Version	00.02
++: 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.	

2-5-2 BMC LAN Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Server Management		
Lan Channel 1		
Configuration Source	[Do Nothing]	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 F1 : Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Defaults F10: Save ESC: Exit
Version 2.14.1216. Copyright (C) 2011 American Megatrends, Inc.		

☞ 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.

2-5-3 System Event Log

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Server Management		
Enabling/Disabling Options		Change this to enable or disable all features of System Event Logging during boot.
SEL Components	[Disabled]	
Erasing Settings		
Erase SEL	[No]	
NOTE: All values changed here do not take effect until computer is restarted.		
		++: 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.		

SEL Components

Enable/Disable all features fo system event logging during system boot.

Options available: Enabled/Disabled.

Erase SEL

Choose this option for erasing Smbios Event Log is done prior to any logging activation during reset.

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.



☞ Boot Priority Order

☞ Boot Option

Press Enter to configure the boot priority.

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

1. UEFI device.
2. Hard drive.
3. Network device.

☞ Bootup Configuration

☞ 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 **Disabled**.

☞ Option ROM Message

Set display mode for option ROM..

Options available: Force BIOS/Keep Current. Default setting is **Force BIOS**.

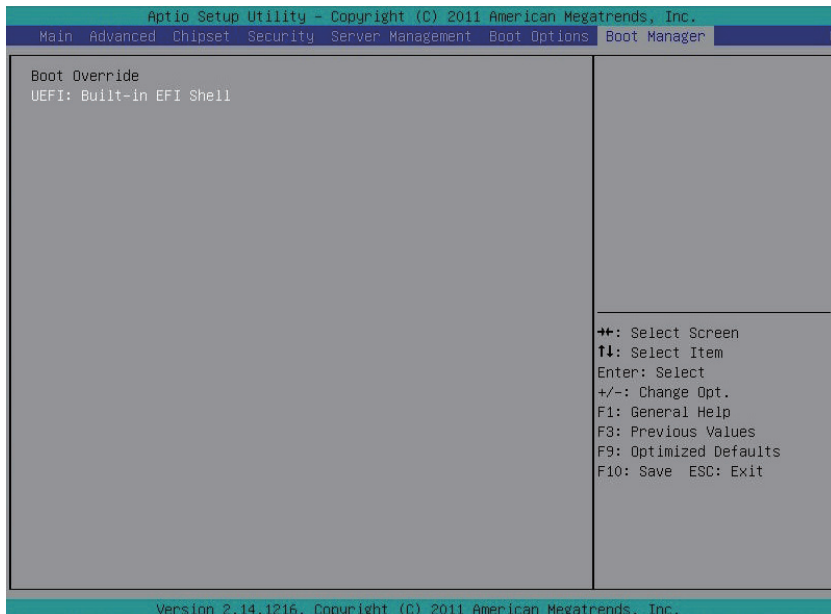
Interrupt 19 Capture

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.



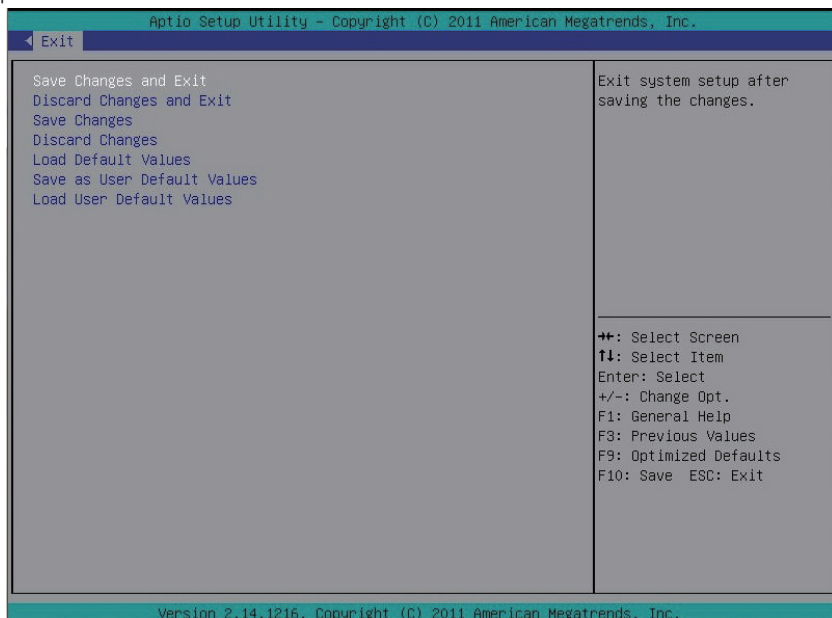
⏏ Boot Override

⏏ 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.