S5512

Version 1.1

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About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This guide contains the following parts:

Chapter1: Instruction
This chapter describes the features of the motherboard and the new technology it supports.

Chapter2: Board Installation
This chapter lists the hardware setup procedures that you need to abide by when installing system components. It includes description of the jumpers and connectors on the motherboard.

Chapter3: BIOS Setup
This chapter tells how to change system settings through the BIOS setup menu. Detailed descriptions of the BIOS parameters are also provided.

Chapter4: Diagnostics
This chapter introduces some BIOS codes and technical terms to provide better service for the customers.

Appendix: Fan and Temp Sensors
This section aims to help readers identify the locations of some specific Fan and Temp Sensors on the motherboard. A table of BIOS Temp sensor name explanation is also included for readers' reference.

Contents

Before you begin…

Check the box contents!

The retail motherboard package should contain the following:

	1x S5512 Motherboard
	6 x Serial ATA Cable or 8 x Serial ATA Cable
	1 x USB2.0 Cable
	1 x I/O shield
	1 x I/O shield Installation Guide
	1 x S5512 User's manual
	1 x S5512 Quick reference guide
	1 x TYAN® Driver CD

If any of these items are missing, please contact your vendor/dealer for replacement before continuing with the installation process.

Chapter 1: Instruction

1.1 - Congratulations

You have purchased one of the most powerful server solutions. Based on the Intel® Cougar Point PCH chipset, the TYAN® S5512 series motherboard is designed to support Single Intel® Xeon E3-1200 series, E3-1200 v2 series or Intel® 2nd Gen/3rd Gen i3 series processor. It is up to 32GB Un-buffered DDR3 with ECC. The memory interface supports speed up to 1600 MHz. There are also 2 channels with 4 DDR3 DIMMs, providing a rich feature set and incredible performance. Leveraging the advanced technology from Intel®, the TYAN® S5512 series is capable of offering a scalable 32 and 64-bit computing environment with high-bandwidth memory design and lightning-fast PCI-E Gen2/3 bus implementation.
The S5512 not only empowers you in today's demanding IT environment but also offers a smooth path for future application upgradeability. All of these rich feature sets provides the S5512 with the power and flexibility to meet demanding requirements for today's IT environments.

The TYAN S5512 series is designed around several different configurations which are detailed in the following 1.2 Hardware Specification section:

1.2 - Hardware Specifications

TYAN S5512 (S5512GM2NR)

Processor	**Supported CPU Series**	Intel Xeon E3-1200, i3-2100 (32nm / 22nm) series processors
	Socket Type / Q'ty	LGA 1155/ (1)
	Thermal Design Power (TDP) wattage	Max up to 95W
Chipset	**PCH**	Intel C204
	Super I/O	Nuvoton 5577D
Memory	**Supported DIMM Qty**	(4) DIMM slots
	DIMM Type / Speed	Unbuffered ECC DDR3 1600/1333
	Capacity	Up to 32GB
	Memory channel	2 Channels
	Memory voltage	1.5V
Expansion Slots	**PCI-E**	(1) PCI-E Gen.2 x8 slot (w/ x4 link) / (2) PCI-E Gen.2 x1 slots / (1) PCI-E Gen.3 x16 slot (w/ x8 link) / (1) PCI-E x8 Gen.3 slot(w/ x8 link)
	Note:	PCI-E Gen.2 x16 slot (w/ x8 link) can be x16 link for customized purpose
	PCI	(1) PCI 32-bit slot

LAN	**Port Q'ty**		(2)
	Controller		Intel 82574L
Storage	**SATA**	**Connector**	(6) SATA
		Controller	Intel C204
		Speed	(2) 6.0 Gb/s (blue color), (4) 3.0 Gb/s (black color)
		RAID	RAID 0/1/10/5 (Intel RST)
Graphic	**Connector type**		D-Sub 15-pin
	Resolution		Up to 1600x1200@60Hz
	Chipset		Aspeed AST2150
Input /Output	**USB**		(10) USB2.0 ports (4 at rear, 4 via cable, 2 vertical onboard)
	COM		(2) ports (1 at rear, 1 via cable)
	VGA		(1) D-Sub 15-pin VGA port
	RJ-45		(2) GbE ports
	Power		SSI/ATX 24-pin + 8-pin power connectors
	Front Panel		(1) 2x12-pin SSI front panel header
	SATA		(4) SATA-II and (2) SATA-III connectors
System Monitoring	**Chipset**		Nuvoton 5577D
	Voltage		Monitors voltage for CPU, memory, chipset & power supply
	Fan		Total (5) 4-pin headers & (5)8-pin headers
	Temperature		Monitors temperature for CPU & system environment
	LED		Fan fail LED indicator / Over temperature warning indicator / Fan & PSU fail LED indicator
	Others		Chassis intrusion detection / Watchdog timer support
Server Management	**Onboard Chipset**		Onboard Aspeed AST2150
	AST2150 IPMI Feature		IPMI 2.0 compliant baseboard management controller (BMC) / Supports storage over IP and remote platform-flash / USB 2.0 virtual hub
	AST2150 iKVM Feature		24-bit high quality video compression / Dual 10/100 Mb/s MAC interfaces
BIOS	**Brand / ROM size**		8MB / AMI
	Feature		Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring / Auto-configurable of hard disk types
Physical Dimension	**Form Factor**		ATX
	Board Dimension		12"x9.6" (305x243.8mm)
Operating System	**OS supported list**		Please refer to our OS supported list.
Regulation	**FCC (DoC)**		Class B
	CE (DoC)		Yes
Operating Environment	**Operating Temp.**		10° C ~ 35° C (50° F~ 95° F)
	Non-operating Temp.		- 40° C ~ 70° C (-40° F ~ 158° F)

	In/Non-operating Humidity		90%, non-condensing at 35° C
RoHS	RoHS 6/6 Compliant		Yes
Package Contains	Motherboard		(1) S5512 Motherboard
	Manual		(1) User's manual / (1) Quick Ref. Guide
	Installation CD		(1) TYAN installation CD
	I/O Shield		(1) I/O Shield
	Cable	SATA	(6) SATA signal cables

TYAN S5512 (S5512WGM2NR)

Processor	Supported CPU Series		Intel Xeon E3-1200, i3-2100 (32nm / 22nm) series processors
	Socket Type / Q'ty		LGA 1155/ (1)
	Thermal Design Power (TDP) wattage		Max up to 95W
Chipset	PCH		Intel C204
	Super I/O		Nuvoton 5577D
Memory	Supported DIMM Qty		(4) DIMM slots
	DIMM Type / Speed		Unbuffered ECC DDR3 1600/1333
	Capacity		Up to 32GB
	Memory channel		2 Channels
	Memory voltage		1.5V
Expansion Slots	PCI-E		(2) PCI-E Gen.2 x1 slots / (1) PCI-E Gen.3 x16 slot (w/ x8 link) / (1) PCI-E x8 Gen.3 slot(w/ x8 link)
	Note:		PCI-E Gen.2 x16 slot (w/ x8 link) can be x16 link for customized purpose
	PCI		(1) PCI 32-bit slot
LAN	Port Q'ty		(2)
	Controller		Intel 82574L
Storage	SAS	Connector	(8) SAS
		Controller	LSI SAS2008
		Speed	6.0 Gb/s
		RAID	RAID 0/1/1E/10 (LSI Integrated RAID)
	SATA	Connector	(6) SATA
		Controller	Intel C204
		Speed	(2) 6.0 Gb/s (blue color), (4) 3.0 Gb/s (black color)
		RAID	RAID 0/1/10/5 (Intel RST)
Graphic	Connector type		D-Sub 15-pin
	Resolution		Up to 1600x1200@60Hz
	Chipset		Aspeed AST2150

Input /Output	USB	(10) USB2.0 ports (4 at rear, 4 via cable, 2 vertical onboard)
	COM	(2) ports (1 at rear, 1 via cable)
	VGA	(1) D-Sub 15-pin VGA port
	RJ-45	(2) GbE ports
	Power	SSI/ATX 24-pin + 8-pin power connectors
	Front Panel	(1) 2x12-pin SSI front panel header
	SATA	(4) SATA-II and (2) SATA-III connectors
System Monitoring	Chipset	Nuvoton 5577D
	Voltage	Monitors voltage for CPU, memory, chipset & power supply
	Fan	Total (5) 4-pin headers & (5)8-pin headers
	Temperature	Monitors temperature for CPU & system environment
	LED	Fan fail LED indicator / Over temperature warning indicator / Fan & PSU fail LED indicator
	Others	Chassis intrusion detection / Watchdog timer support
Server Management	Onboard Chipset	Onboard Aspeed AST2150
	AST2150 IPMI Feature	IPMI 2.0 compliant baseboard management controller (BMC) / Supports storage over IP and remote platform-flash / USB 2.0 virtual hub
	AST2150 iKVM Feature	24-bit high quality video compression / Dual 10/100 Mb/s MAC interfaces
BIOS	Brand / ROM size	8MB / AMI
	Feature	Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring / Auto-configurable of hard disk types
Physical Dimension	Form Factor	ATX
	Board Dimension	12"x9.6" (305x243.8mm)
Operating System	OS supported list	Please refer to our OS supported list.
Regulation	FCC (DoC)	Class B
	CE (DoC)	Yes
Operating Environment	Operating Temp.	10° C ~ 35° C (50° F~ 95° F)
	Non-operating Temp.	- 40° C ~ 70° C (-40° F ~ 158° F)
	In/Non-operating Humidity	90%, non-condensing at 35° C
RoHS	RoHS 6/6 Compliant	Yes
Package Contains	Motherboard	(1) S5512 Motherboard
	Manual	(1) User's manual / (1) Quick Ref. Guide
	Installation CD	(1) TYAN installation CD
	I/O Shield	(1) I/O Shield
	Cable SAS/SATA	(8) SAS/SATA signal cables

TYAN S5512 (S5512GM4NR)

Processor	**Supported CPU Series**		Intel Xeon E3-1200, i3-2100 (32nm / 22nm) series processors
	Socket Type / Q'ty		LGA 1155/ (1)
	Thermal Design Power (TDP) wattage		Max up to 95W
Chipset	**PCH**		Intel C204
	Super I/O		Nuvoton 5577D
Memory	**Supported DIMM Qty**		(4) DIMM slots
	DIMM Type / Speed		Unbuffered ECC DDR3 1600/1333
	Capacity		Up to 32GB
	Memory channel		2 Channels
	Memory voltage		1.5V
Expansion Slots	**PCI-E**		(1) PCI-E Gen.2 x8 slot (w/ x4 link) / (2) PCI-E Gen.2 x1 slots / (1) PCI-E Gen.3 x16 slot (w/ x8 link) / (1) PCI-E x8 Gen.3 slot(w/ x8 link)
	Note:		PCI-E Gen.2 x16 slot (w/ x8 link) can be x16 link for customized purpose
	PCI		(2) PCI 32-bit slots
LAN	**Port Q'ty**		(4)
	Controller		Intel 82574L
Storage	**SATA**	**Connector**	(6) SATA
		Controller	Intel C204
		Speed	(2) 6.0 Gb/s (blue color), (4) 3.0 Gb/s (black color)
		RAID	RAID 0/1/10/5 (Intel RST)
Graphic	**Connector type**		D-Sub 15-pin
	Resolution		Up to 1600x1200@60Hz
	Chipset		Aspeed AST2150
Input /Output	**USB**		(10) USB2.0 ports (4 at rear, 4 via cable, 2 vertical onboard)
	COM		(2) ports (1 at rear, 1 via cable)
	VGA		(1) D-Sub 15-pin VGA port
	RJ-45		(4) GbE ports
	Power		SSI/ATX 24-pin + 8-pin power connectors
	Front Panel		(1) 2x12-pin SSI front panel header
	SATA		(4) SATA-II and (2) SATA-III connectors
System Monitoring	**Chipset**		Nuvoton 5577D
	Voltage		Monitors voltage for CPU, memory, chipset & power supply
	Fan		Total (5) 4-pin headers & (5)8-pin headers
	Temperature		Monitors temperature for CPU & system environment

	LED	Fan fail LED indicator / Over temperature warning indicator / Fan & PSU fail LED indicator
	Others	Chassis intrusion detection / Watchdog timer support
Server Management	**Onboard Chipset**	Onboard Aspeed AST2150
	AST2150 IPMI Feature	IPMI 2.0 compliant baseboard management controller (BMC) / Supports storage over IP and remote platform-flash / USB 2.0 virtual hub
	AST2150 iKVM Feature	24-bit high quality video compression / Dual 10/100 Mb/s MAC interfaces
BIOS	**Brand / ROM size**	8MB / AMI
	Feature	Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring / Auto-configurable of hard disk types
Physical Dimension	**Form Factor**	ATX
	Board Dimension	12"x9.6" (305x243.8mm)
Operating System	**OS supported list**	Please refer to our OS supported list.
Regulation	**FCC (DoC)**	Class B
	CE (DoC)	Yes
Operating Environment	**Operating Temp.**	10° C ~ 35° C (50° F~ 95° F)
	Non-operating Temp.	- 40° C ~ 70° C (-40° F ~ 158° F)
	In/Non-operating Humidity	90%, non-condensing at 35° C
RoHS	**RoHS 6/6 Compliant**	Yes
Package Contains	**Motherboard**	(1) S5512 Motherboard
	Manual	(1) User's manual / (1) Quick Ref. Guide
	Installation CD	(1) TYAN installation CD
	I/O Shield	(1) I/O Shield
	Cable SATA	(6) SATA signal cables

TYAN S5512-HE (S5512G2NR-HE)

Processor	**Supported CPU Series**	Intel Xeon E3-1200, i3-2100 (32nm / 22nm) series processors
	Socket Type / Q'ty	LGA 1155/ (1)
	Thermal Design Power (TDP) wattage	Max up to 95W
Chipset	**PCH**	Intel C206
	Super I/O	Nuvoton 5577D
Memory	**Supported DIMM Qty**	(4) DIMM slots
	DIMM Type / Speed	Unbuffered ECC DDR3 1600/1333

	Capacity		Up to 32GB
	Memory channel		2 Channels
	Memory voltage		1.5V
Expansion Slots	**PCI-E**		(1) PCI-E Gen.2 x8 slot (w/ x4 link) / (2) PCI-E Gen.2 x1 slots / (1) PCI-E Gen.3 x16 slot (w/ x8 link) / (1) PCI-E x8 Gen.3 slot(w/ x8 link)
	Note:		use Intel Ivy Bridge CPU to support PCI-E Gen.3
	PCI		(1) PCI 32-bit slot
LAN	**Port Q'ty**		(2)
	Controller		Intel 82574L
Storage	**SATA**	**Connector**	(6) SATA
		Controller	Intel C206
		Speed	(2) 6.0 Gb/s (blue color), (4) 3.0 Gb/s (black color)
		RAID	RAID 0/1/10/5 (Intel RST)
Graphic	**Connector type**		D-Sub 15-pin
	Resolution		Up to 1600x1200@60Hz
	Chipset		Aspeed AST2150-GP-V
Input /Output	**USB**		(9) USB2.0 ports (4 at rear, 4 via cable, 1 type A onboard)
	COM		(1) port (rear)
	VGA		(1) D-Sub 15-pin VGA port
	RJ-45		(2) GbE ports
	Power		SSI/ATX 24-pin + 8-pin power connectors
	Front Panel		(1) 2x12-pin SSI front panel header
	SATA		(4) SATA-II and (2) SATA-III connectors
System Monitoring	**Chipset**		Nuvoton 5577D
	Voltage		Monitors voltage for CPU, memory, chipset & power supply
	Fan		Total (5) 4-pin headers & (5)8-pin headers
	Temperature		Monitors temperature for CPU & system environment
	LED		Fan fail LED indicator / Over temperature warning indicator / Fan & PSU fail LED indicator
	Others		Chassis intrusion detection / Watchdog timer support
BIOS	**Brand / ROM size**		8MB / AMI
	Feature		Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring / Auto-configurable of hard disk types
Physical Dimension	**Form Factor**		ATX
	Board Dimension		12"x9.6" (305x243.8mm)
Operating System	**OS supported list**		Please refer to our OS supported list.
Regulation	**FCC (DoC)**		Class B
	CE (DoC)		Yes

Operating Environment	Operating Temp.		0° C ~ 55° C (32° F~ 131° F)
	Non-operating Temp.		- 40° C ~ 70° C (-40° F ~ 158° F)
	In/Non-operating Humidity		90%, non-condensing at 35° C
RoHS	RoHS 6/6 Compliant		Yes
Package Contains	Motherboard		(1) S5512 Motherboard
	Manual		(1) User's manual / (1) Quick Ref. Guide
	Installation CD		(1) TYAN installation CD
	I/O Shield		(1) I/O Shield
	Cable	SATA	(6) SATA signal cables

TYAN S5512-LE (S5512G2NR-LE)

Processor	Supported CPU Series		Intel Xeon E3-1200, i3-2100 (32nm / 22nm) series processors
	Socket Type / Q'ty		LGA 1155/ (1)
	Thermal Design Power (TDP) wattage		Max up to 95W
Chipset	PCH		Intel C202
	Super I/O		Nuvoton 5577D
Memory	Supported DIMM Qty		(4) DIMM slots
	DIMM Type / Speed		Unbuffered ECC DDR3 1600/1333
	Capacity		Up to 32GB
	Memory channel		2 Channels
	Memory voltage		1.5V
Expansion Slots	PCI-E		(2) PCI-E Gen.2 x1 slots / (1) PCI-E Gen.3 x16 slot (w/ x8 link) / (1) PCI-E x8 Gen.3 slot(w/ x8 link)
	Note:		use Intel Ivy Bridge to support PCI-E Gen.3
	PCI		(1) PCI 32-bit slot
LAN	Port Q'ty		(2)
	Controller		Intel 82574L
Storage	SATA	Connector	(6) SATA
		Controller	Intel C202
		Speed	3.0 Gb/s
		RAID	RAID 0/1/10/5 (Intel RST)
Graphic	Connector type		D-Sub 15-pin
	Resolution		Up to 1600x1200@60Hz
	Chipset		Aspeed AST2150-GP-V

Input /Output	USB	(8) USB2.0 ports (4 at rear, 4 via cable)
	COM	(1) port (rear)
	VGA	(1) D-Sub 15-pin VGA port
	RJ-45	(2) GbE ports
	Power	SSI/ATX 24-pin + 8-pin power connectors
	Front Panel	(1) 2x12-pin SSI front panel header
	SATA	(6) SATA-II connectors
System Monitoring	Chipset	Nuvoton 5577D
	Voltage	Monitors voltage for CPU, memory, chipset & power supply
	Fan	Total (5) 4-pin headers
	Temperature	Monitors temperature for CPU & system environment
	LED	Fan fail LED indicator / Over temperature warning indicator / Fan & PSU fail LED indicator
	Others	Chassis intrusion detection / Watchdog timer support
BIOS	Brand / ROM size	8MB / AMI
	Feature	Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring / Auto-configurable of hard disk types
Physical Dimension	Form Factor	ATX
	Board Dimension	12"x9.6" (305x243.8mm)
Operating System	OS supported list	Please refer to our OS supported list.
Regulation	FCC (DoC)	Class B
	CE (DoC)	Yes
Operating Environment	Operating Temp.	10° C ~ 35° C (50° F~ 95° F)
	Non-operating Temp.	- 40° C ~ 70° C (-40° F ~ 158° F)
	In/Non-operating Humidity	90%, non-condensing at 35° C
RoHS	RoHS 6/6 Compliant	Yes
Package Contains	Motherboard	(1) S5512 Motherboard
	Manual	(1) User's manual / (1) Quick Ref. Guide
	Installation CD	(1) TYAN installation CD
	I/O Shield	(1) I/O Shield
	Cable SATA	(6) SATA signal cables

S5512 SKU Comparison Table

Part Number	BMC	Cougar Point / PCH	Expand. slot / X16/X8 /X1/PCI	SAS 6 Gb/s	SATA 6 Gb/s	SATA 3 Gb/s	LAN port	IPMI port
S5512GM2NR	Yes	Standard (C204)	1 / 2 / 2 / 1	No	2	4	2	1
S5512GM4NR	Yes	Standard (C204)	1 / 2 / 2 / 1	No	2	4	4	1
S5512WGM2NR	Yes	Standard (C204)	1 / 1 / 2 / 1	Yes	2	4	2	1
S5512G2NR-LE	No	Essential (C202)	1 / 1 / 2 / 1	No	0	6	2	0
S5512G2NR-HE(BTO)	No	Advance (C206)	1 / 2 / 2 / 1	No	2	4	2	0

1.3 - Software Specifications

For OS (operation system) support, please check the TYAN® website for the latest information.

1.4 - AST2150 User Guide

Remember to visit TYAN®'s Website at http://www.TYAN.com for AST2150 updated user guide.

Chapter 2: Board Installation

You are now ready to install your motherboard.

How to install our products right… the first time

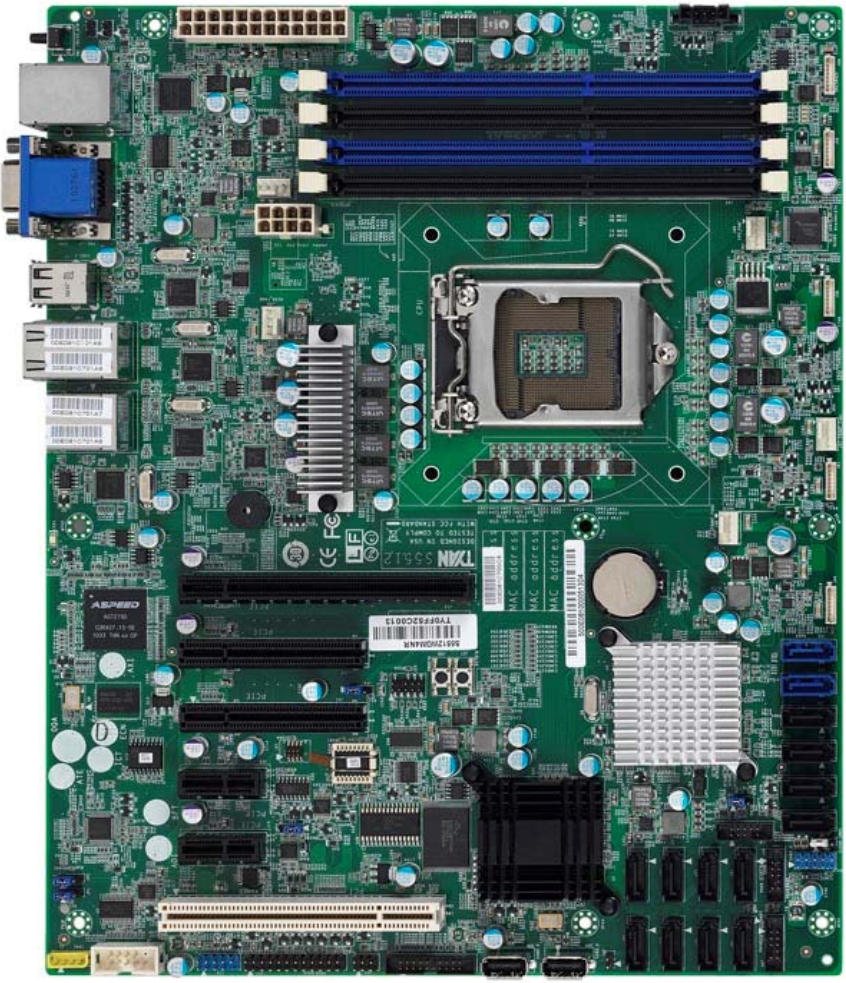
The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN® recommends wearing a static safety wrist strap.
(2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
(3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
(4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
(5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

DO NOT apply power to the board if it has been damaged.

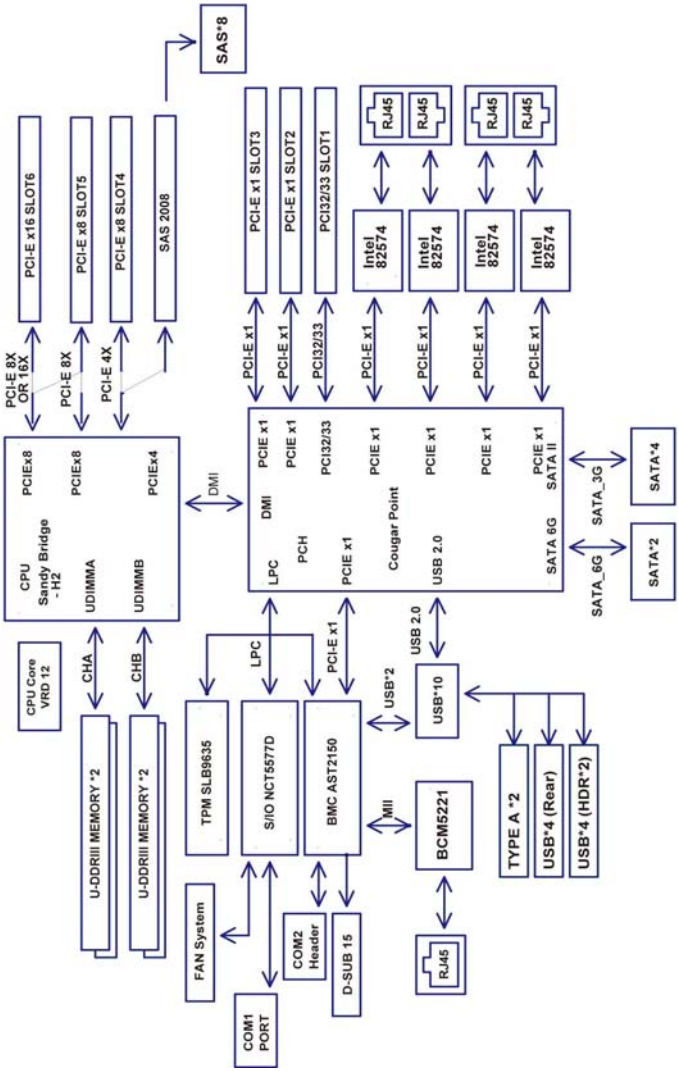
2.1 - Board Image



S5512

This diagram is representative of the latest motherboard revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

2.2 - Block Diagram



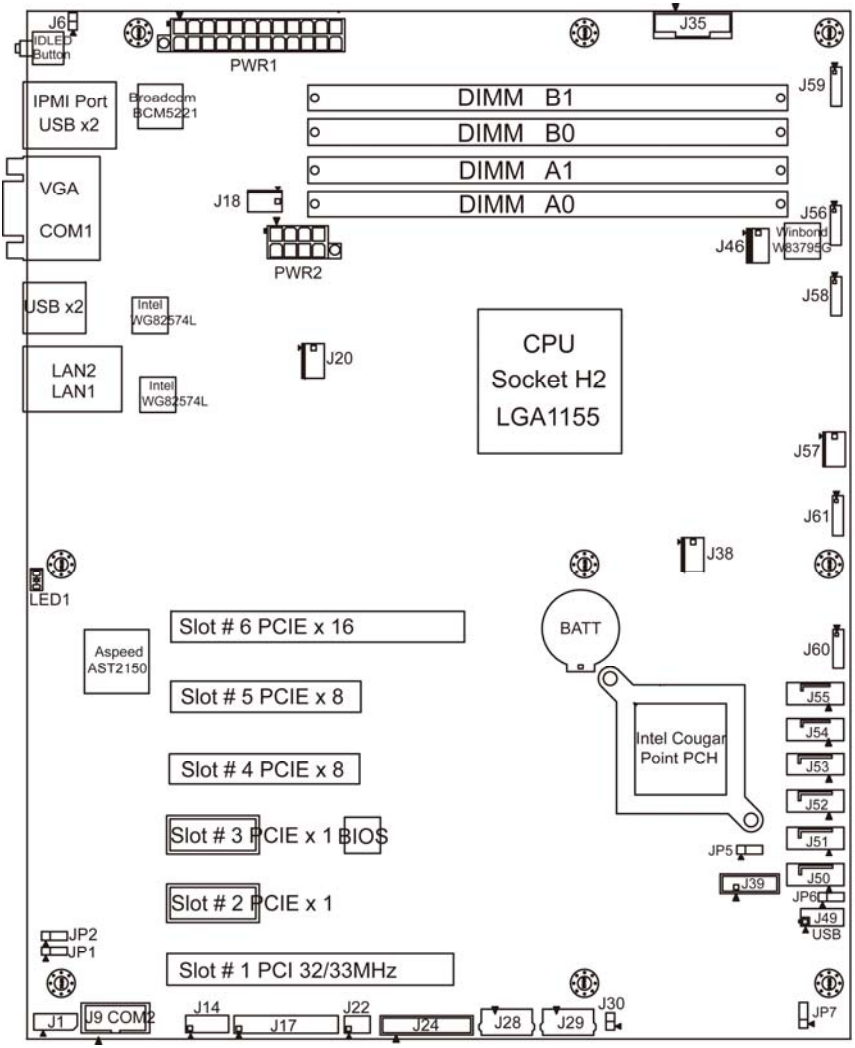
S5512 Block Diagram

2.3 - Board Parts, Jumpers and Connectors

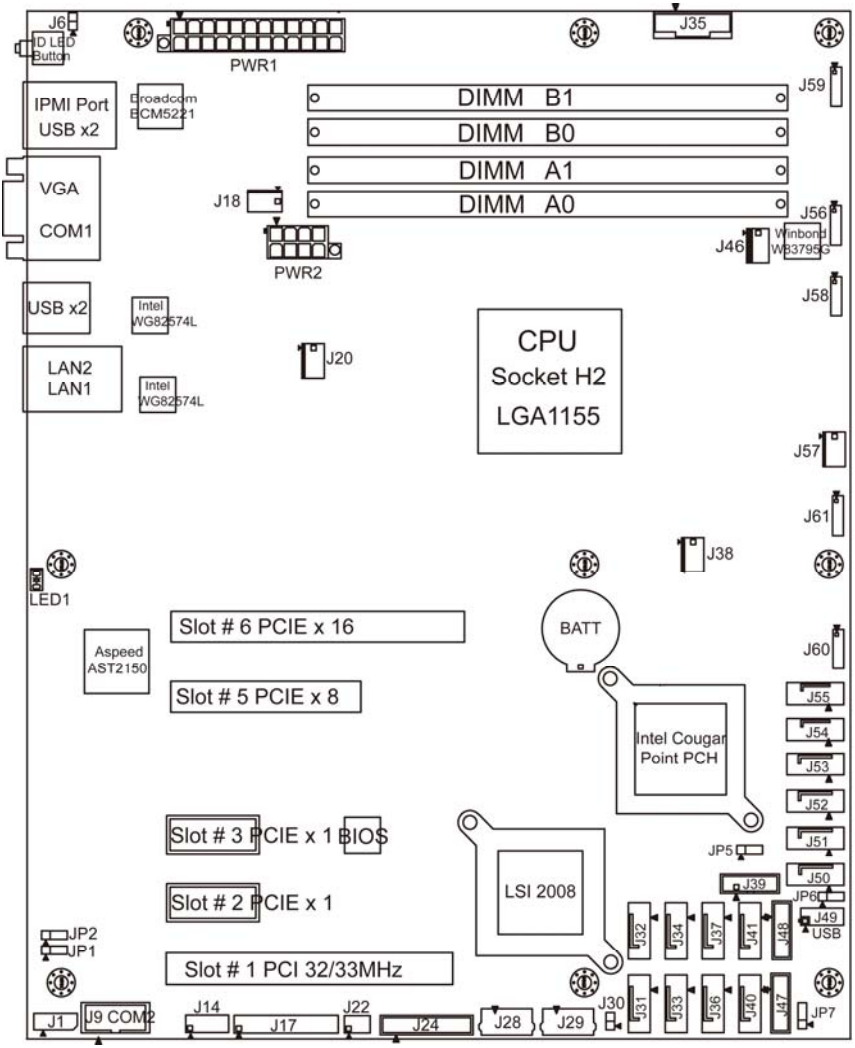
S5512 SKU Comparison Table II

S5512 series jumper and connector		Support SKUs				
Jumper/Connector	**Function**	**GM 2NR**	**GM 4NR**	**WGM 2NR**	**G2NR-HE**	**G2NR-LE**
J18/J20/J38/J46/J57	4-Pin Fan Connectors	YES	YES	YES	YES	YES
J56/J58/J59/J60/J61	8-Pin Fan Connectors	YES	YES	YES	YES	NO
SW1	ID LED Switch Button	YES	YES	YES	NO	NO
J1	IPMB Connector	YES	YES	YES	NO	NO
J6	Front Panel IDLED Switch 2Pin Header	YES	YES	YES	YES	YES
J9	COM2 Header	YES	YES	YES	NO	NO
J14/J49	Dual USB2.0 Header	YES	YES	YES	YES	YES
J17	Front Panel Header	YES	YES	YES	YES	YES
J22	LAN ACTIVE LED Header	YES	YES	YES	YES	YES
J24	Fan Front Header	YES	YES	YES	YES	YES
J28	USB 2.0 Type-A Connector	YES	YES	YES	NO	NO
J29	USB 2.0 Type-A Connector	YES	YES	YES	YES	NO
J30	Intrusion Switch 2Pin Headers	YES	YES	YES	YES	YES
J35	PSMI Connector	YES	YES	YES	YES	YES
J39	SGPIO Header	YES	YES	YES	YES	YES
J47/J48	SGPIO Header	NO	NO	YES	NO	NO
J31/J32/J33/J34	SAS(Port7/Port3/ Port6/Port2)	NO	NO	YES	NO	NO
J36/J37/J40/J41	SAS (Port5/Port1/ Port4/Port0)	NO	NO	YES	NO	NO
JP5	ME recovery function set	YES	YES	YES	YES	YES
JP6	RTC Clear CMOS set	YES	YES	YES	YES	YES
JP7	ME update function set	YES	YES	YES	YES	YES

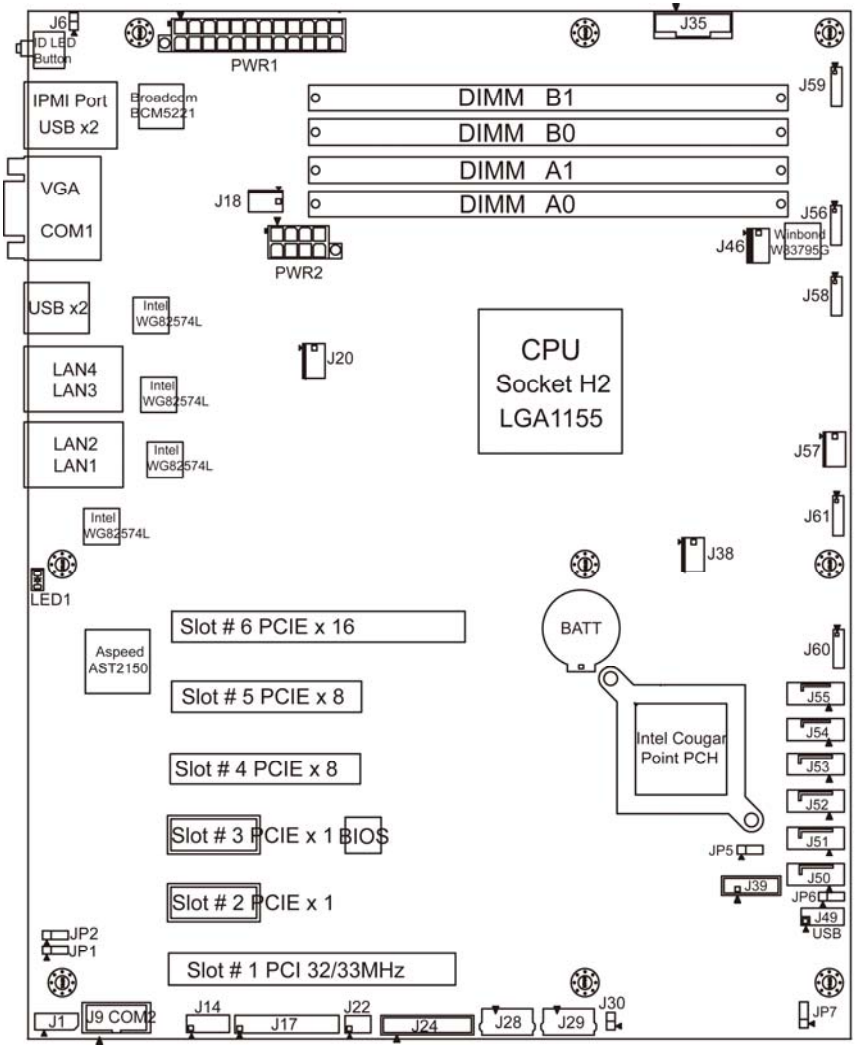
NOTE: ▲in the image indicates pin 1. There are five SKUs of S5512 motherboard.



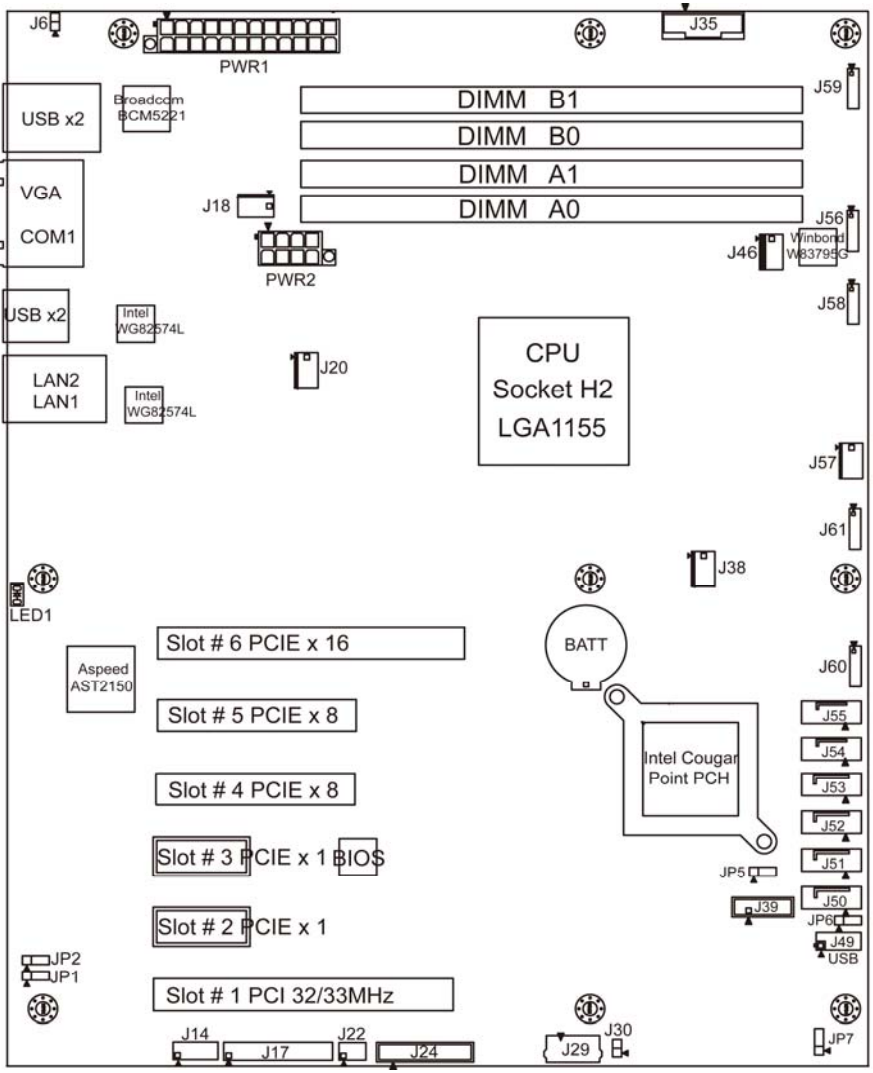
S5512GM2NR



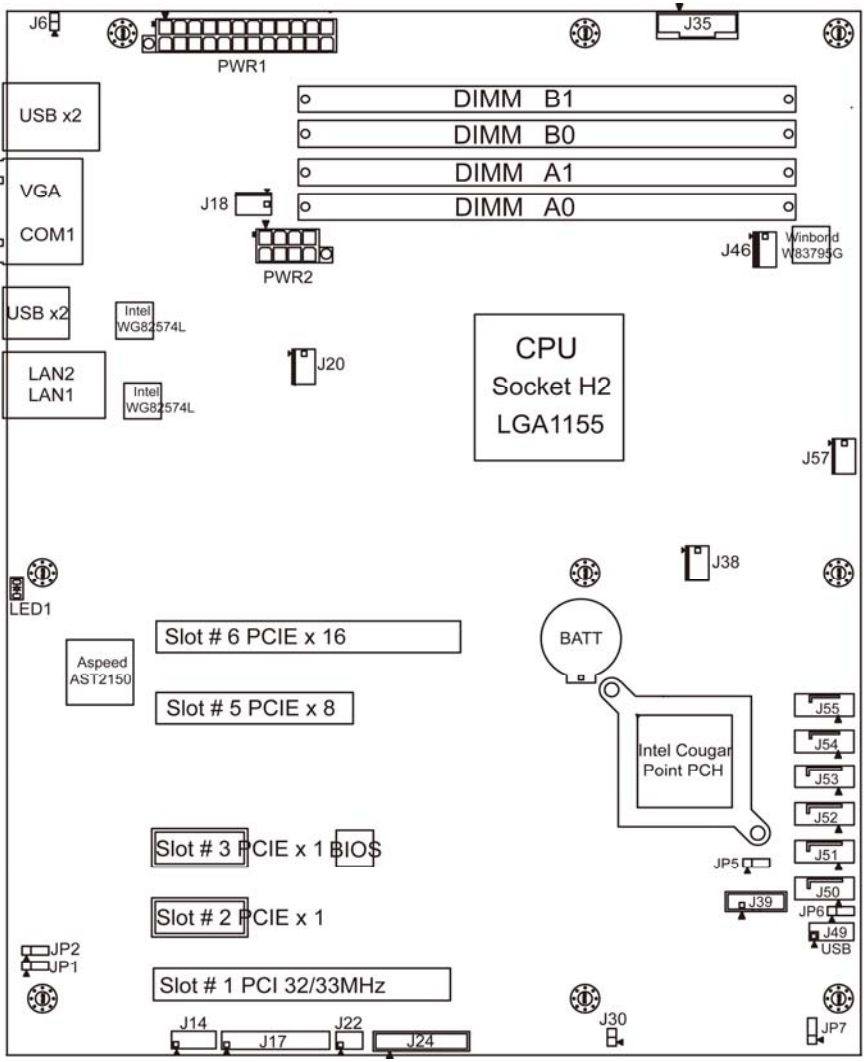
S5512WGM2NR


J6
ID LED
Button
PWR1
J35
J59
IPMI Port
USB x2
Broadcom
BCM5221
DIMM B1
DIMM B0
DIMM A1
DIMM A0
VGA
COM1
J18
PWR2
J56
J46
Winbond
W83795G
USB x2
Intel
WG82574L
J58
J20
CPU
Socket H2
LGA1155
LAN4
LAN3
LAN2
LAN1
J57
J61
J38
LED1
Slot # 6 PCIE x 16
Aspeed
AST2150
BATT
J60
Slot # 5 PCIE x 8
J55
J54
Intel Cougar
Point PCH
J53
Slot # 4 PCIE x 8
J52
Slot # 3 PCIE x 1
BIOS
J51
JP5
J39
J50
JP6
J49
USB
JP2
JP1
Slot # 2 PCIE x 1
Slot # 1 PCI 32/33MHz
J1
J9 COM2
J14
J17
J22
J24
J28
J29
J30
JP7

S5512GM4NR



S5512G2NR-HE



S5512G2NR-LE

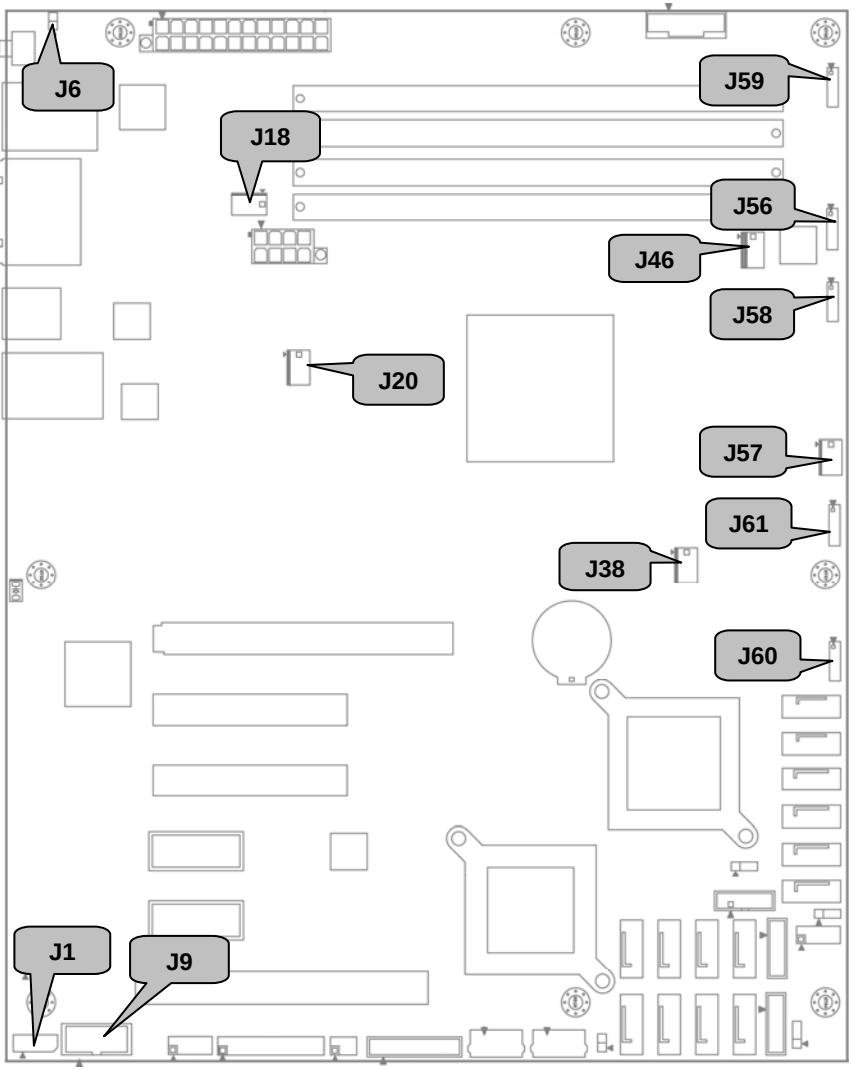
Jumpers & Connectors

Jumper/Connector	Function
J56/J58/J59/J60/J61	8-Pin Fan Header (For Barebone)
J18/J20/J38/J46/J57	4-Pin Fan Connector
J1	IPMB Connector
J6	Front Panel IDLED Switch 2 Pin Header
J9	COM2 Header
J14/J49	Dual USB2.0 Header
J17	Front Panel Header
J22	LAN ACTIVE LED Header
J24	Fan Front Header
J28	USB 2.0 Type-A Connector
J29	USB 2.0 Type-A Connector
J30	Intrusion Switch 2Pin Headers
J35	PSMI Connector
J39	SGPIO Header
J47/J48	SGPIO Header
J31/J32/J33/J34	SAS (Port7/Port3/Port6/Port2)
J36/J37/J40/J41	SAS (Port5/Port1/Port4/Port0)
J50/J51/J52/J53	SATA2.0 (Port5/Port4/Port3/Port2)
J54/J55	SATA3.0 (Port1/Port0)
JP5	ME recovery function set
JP6	RTC Clear CMOS set
JP7	ME update function set

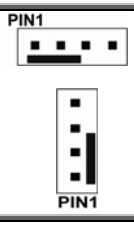
Jumper Legend

	**OPEN - Jumper OFF**	Without jumper cover
	**CLOSED - Jumper ON**	With jumper cover

Jumper Placement



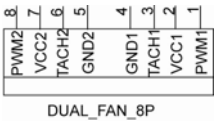
J18/J20/J38/J46/J57: 4-Pin FAN Connector



Pin	1	2	3	4
Signal	GND	VCC	Tachometer	PWM

NOTE:
Use this header to connect the cooling fan to your motherboard to keep the system stable and reliable.

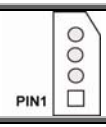
J56/J58/J59/J60/J61: 8-Pin FAN Connector



Pin	Signal
1	PWM1
2	VCC1
3	Tachometer1
4	GND1
5	GND2
6	Tachometer2
7	VCC2
8	PWM2

NOTE:
Do not mix 8-pin Fan headers with 4-pin Fan headers. Mixing these fan headers will cause problems to the system. These connectors are only for the barebone.

J1: IPMB Connector

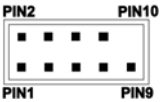


Pin	1	2	3	4
Signal	IPMB DATA	GND	IPMB CLK	NC

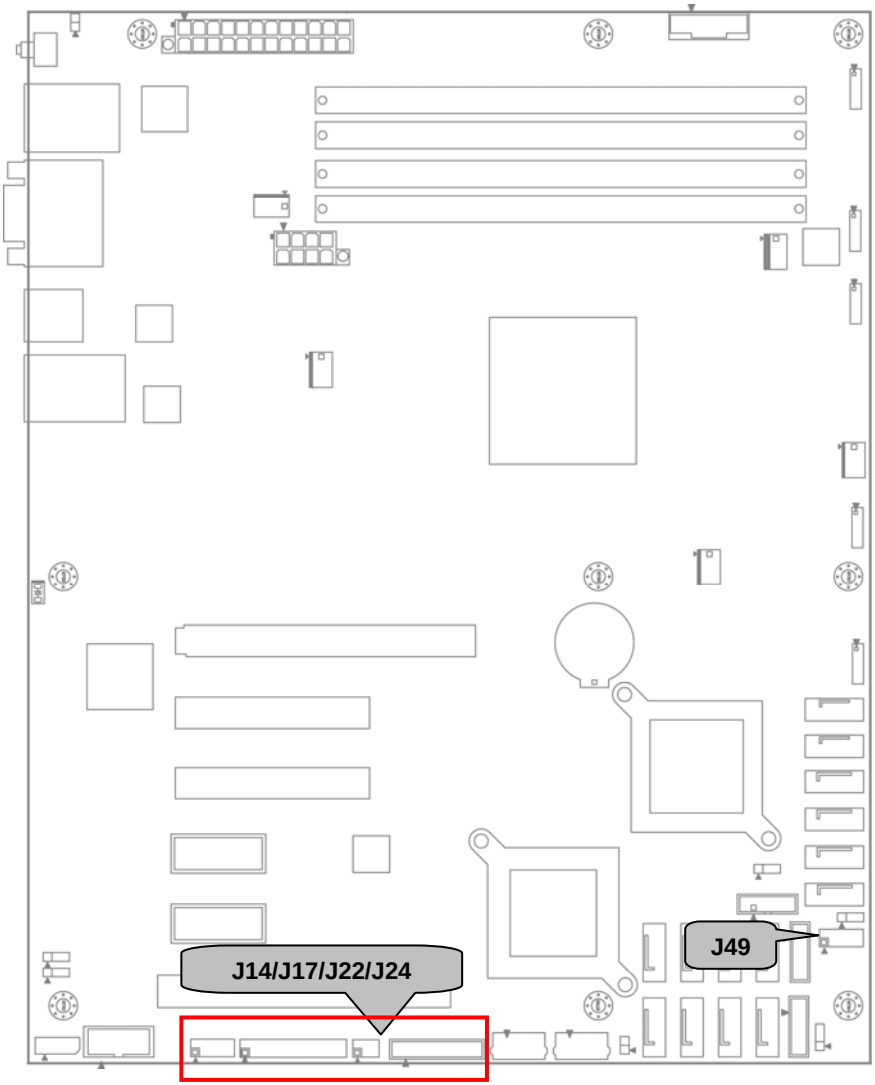
J6: Front Panel IDLED Switch2 Pin Header

Pin	1	2
Signal	FP IDLED Switch	FP IDLED Switch (GND)

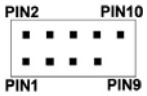
J9: COM2 Header



Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	KEY

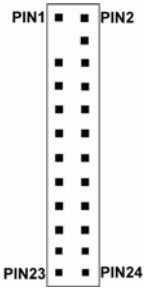

J14/J17/J22/J24
J49

J14：Dual USB2.0 Header (Port4/Port5)/J49：Dual USB2.0 Header (Port2/Port3)



Pin	Signal	Pin	Signal
1	USB 5V Power	2	USB 5V Power
3	USB Data-	4	USB Data-
5	USB Data+	6	USB Data+
7	GND	8	GND
9	KEY	10	NC

J17: Front Panel Header

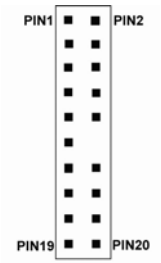


Pin	Signal	Pin	Signal
1	PWRLED+	2	FP Power (3.3V)
3	KEY	4	ID_LED+
5	PWRLED-(GND)	6	ID_LED-(GND)
7	HD_LED+	8	Fault LED1-
9	HD_LED-	10	Fault LED2-
11	Power Switch+	12	LAN1_ACTIVE_LED+
13	GND	14	LAN1_ACTIVE_LED-
15	Reset Switch+	16	SMB_DATA
17	GND	18	SMB_CLK
19	ID Switch+	20	INTRUSION#
21	TBMP Sensor	22	LAN2_ACTIVE_LED+
23	NMI Switch#	24	LAN2_ACTIVE_LED-

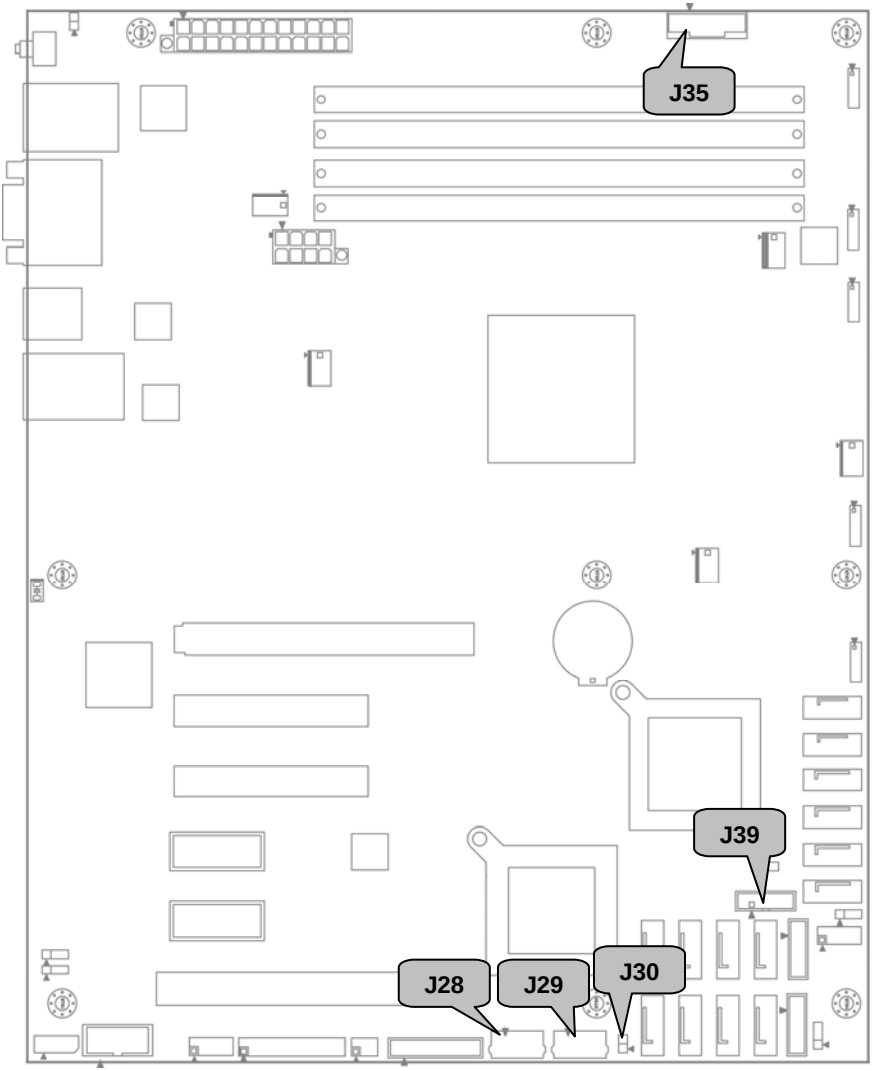
J22: LAN ACTIVE LED Header

Pin	Signal
1	LAN3_ACTIVE_LED +
2	LAN3_ACTIVE_LED-(GND)

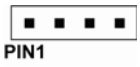
J24: FAN Front Header



Pin	Signal	Pin	Signal
1	SYSFAN_TACH1	2	SYSFAN_TACH6
3	SYSFAN_TACH2	4	SYSFAN_TACH7
5	SYSFAN_TACH3	6	SYSFAN_TACH8
7	SYSFAN_TACH4	8	SYSFAN_TACH9
9	SYSFAN_TACH5	10	SYSFAN_TACH10
11	GND	12	KEY
13	SYSFAN_PWM5	14	SYSFAN_PWM4
15	NC	16	SMB_FRU_SDA
17	NC	18	SMB_FRU_SCL
19	V3AUX	20	SYSFAN_PWM6


J35
J39
J28
J29
J30

J28/J29：USB 2.0 Type-A Connector



Pin	1	2	3	4
Signal	USB 5V power	USB Data-	USB Data+	GND

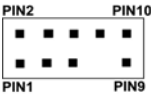
J30: Intrusion Switch 2Pin Header

Pin	Signal
1	INTRUSION switch
2	INTRUSION switch(GND)

J35: PSMI Connector

Pin	1	2	3	4	5
Signal	PSMI Clock	PSMI Data	PSU Alert#	GND	3.3V Standby

J39/J47/J48: SGPIO Header



Pin	Signal	Pin	Signal
1	SMB SCL	2	SGPIO Data1
3	SMB SDA	4	SGPIO Data0
5	GND	6	SGPIO LOAD
7	KEY	8	SGPIO Clock
9	3.3V standby	10	BP HDD FAULT

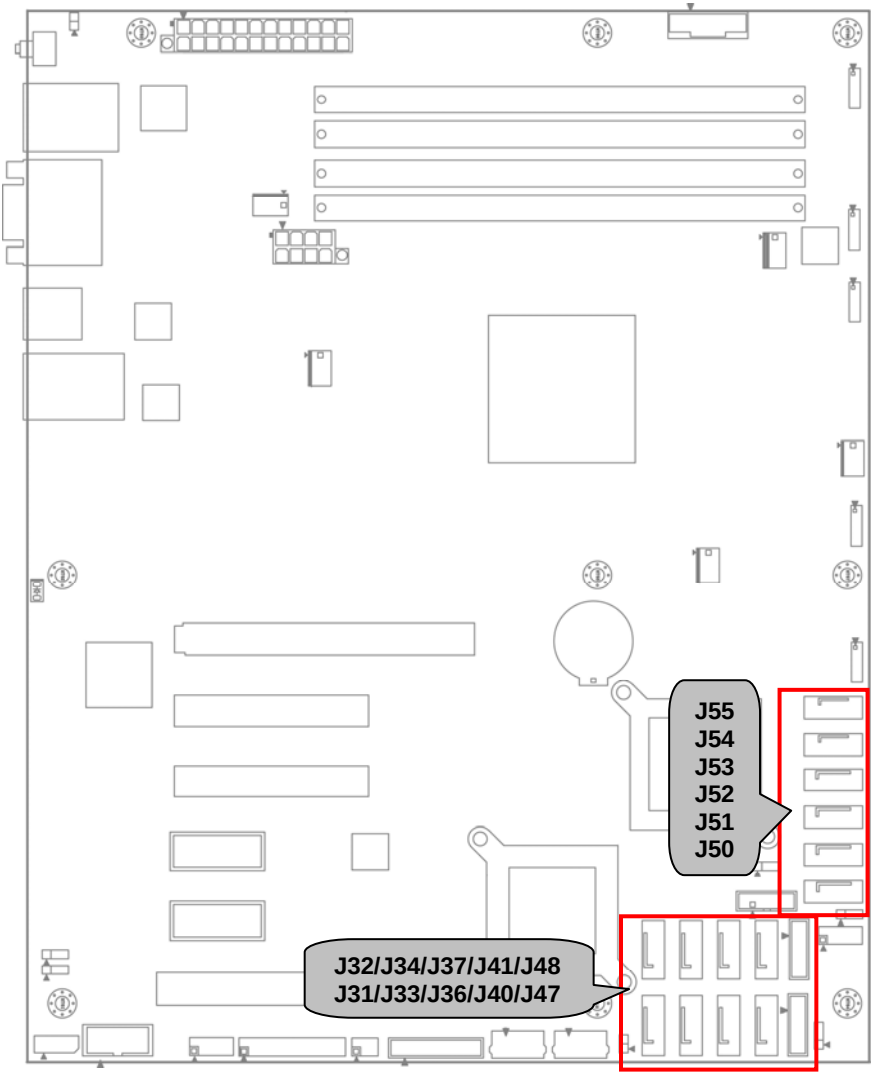
ID_LED: ID LED

Pin	Signal	
+	V3AUX	
-	GND	
State	**Color**	**Description**
On	Blue	System identified
Off	Off	System not identified

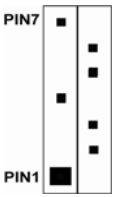
NOTE: The ID LED can be activated remotely using IPMI.
Please visit the TYAN Web Site at **http://www.tyan.com** to download the latest IPMI Configuration Guide for more details.

JP7：ME update function set

	**Pin1-Pin2: NORMAL (Default)**
	**Pin2-Pin3: CLOSE (ME update function)**


J55
J54
J53
J52
J51
J50
J32/J34/J37/J41/J48
J31/J33/J36/J40/J47

J31/J32/J33/J34/J36/J37/J40/J41: SAS Connector

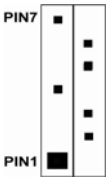


7	GND
6	SATA RX DP
5	SATA RX DN
4	GND
3	SATA TX DN
2	SATA TX DP
1	GND

Connects to the SATA ready drives via the SATA cable.

SAS0: **J41** SAS1: **J37**
SAS2: **J34** SAS3: **J32**
SAS4: **J40** SAS5: **J36**
SAS6: **J33** SAS7: **J31**

J50/J51/J52/J53/J54/J55: SATA Connector



7	GND
6	SATA RX DP
5	SATA RX DN
4	GND
3	SATA TX DN
2	SATA TX DP
1	GND

Connects to the Serial ATA ready drives via the Serial ATA cable.

SATA0: J55 SATA1: J54
Support to SATAIII

SATA2: J53 SATA3: J52
SATA4: J51 SATA5: J50
Support to SATAII

JP5：ME recovery function set

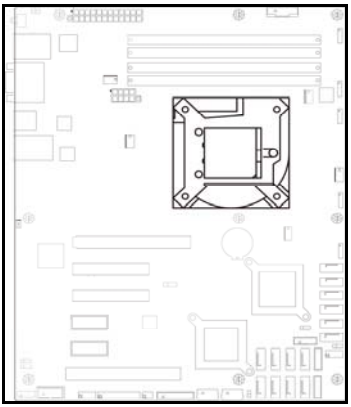
	Pin1-Pin2：NORMAL (Default)
	Pin2-Pin3： CLOSE (ME force update)

JP6：RTC Clear CMOS set

 Normal (Default)	You can reset the CMOS settings by using this jumper if you have forgotten your system/setup password or need to clear system BIOS setting. - 1.Power off system and disconnect both power connectors from the motherboard - 2.Put jumper cap back to Pin_1 and Pin_2 (default setting) - 3.Use jumper cap to close Pin_2 and Pin_3 for several seconds to Clear CMOS - 4.Reconnect power & power on system
 Clear CMOS	

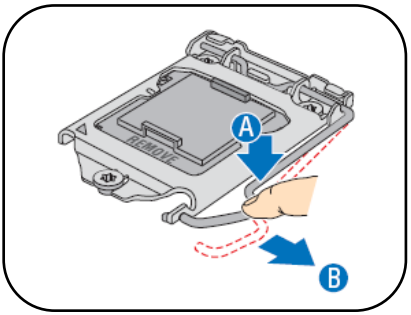
2.4 - Installing the Processor

Your brand new S5512, Only Intel® "Sandy-Bridge-DT series" processors are certified and supported with this motherboard. Check our website for latest processor support. **http://www.tyan.com**
NOTE: TYAN® is not liable for damage as a result of operating an unsupported configuration.
Locate the CPU socket (LGA1155) on the motherboard:

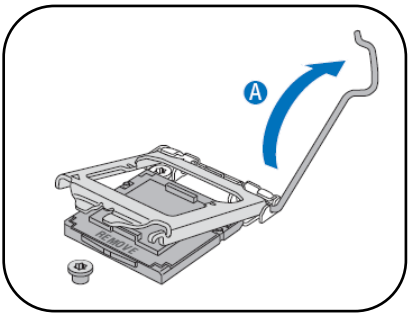


To install a CPU:

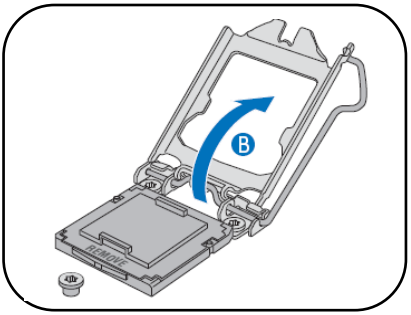
1. Press the load lever with your thumb (A),and then move it to the right(B)until it is released from the retention tab.



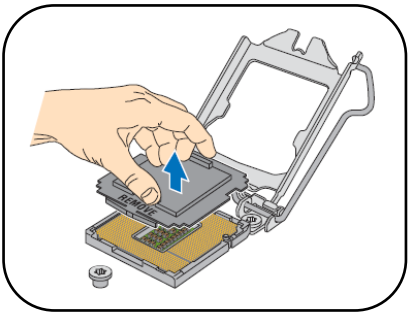
2. Lift the load lever in the direction of the arrow until the load plate is completely lifted.
   (A) ------load lever
   (B) ------load plate



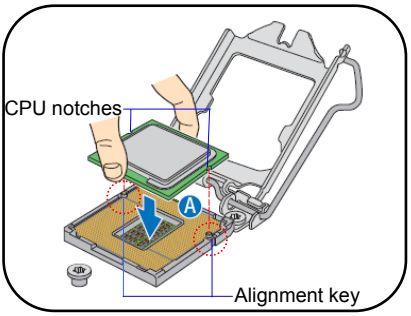
3. Please refer to the image.



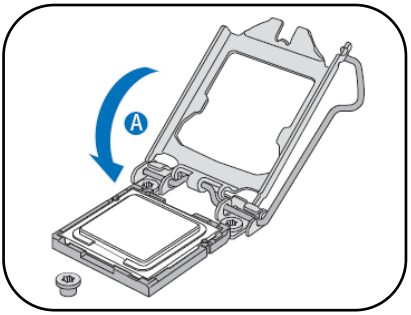
4. Remove the PnP cap from the CPU socket.



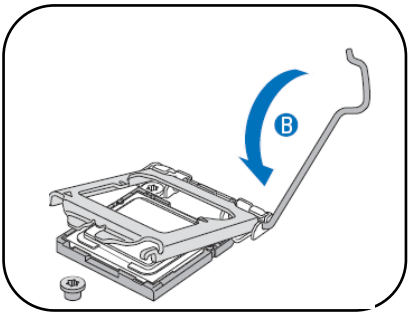
5. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment keys into the CPU notches.



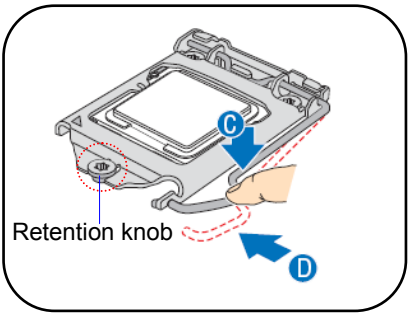
The CPU fits in only one correct orientation. Do not force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.



6. Close the load plate(A), and then push down the load lever(B) ensuring that the front edge of the load plate slides under the retention knob



7. Insert the load lever under the retention tab.



For the safest method of installation and information on choosing the appropriate heat sink, using heat sinks validated by Intel®. Please refer to Intel®s website at www.Intel.com

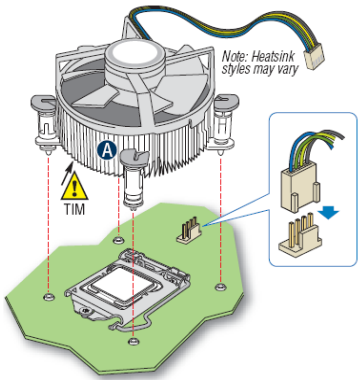
2.5 - Installing the Heatsink

Heatsink Installation

After installing the processor, you should proceed to install the heat sink. The CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

For the safest method of installation and information on choosing the appropriate heat sink, using heat sinks validated by Intel®. Please refer to Intel' ®s website at www.Intel.com.

The following diagram illustrates how to install heat sink onto the CPU of S5512.



2U Reference Heatsink Assembly

1. If a protective film covers the thermal interface material (TIM) on the underside of the heatsink, remove the protective film.

2. Align heatsink fins to the front and back of the chassis for correct airflow. Airflow goes from front-to-back of chassis.

3. Each heatsink has four captive fasteners and should be tightened as shown

4. Using a #2 Phillips* screwdriver, finger-tighten each fastener diagonally, according to the white-circled numbers.

5. Securely re-tighten each fastener again in the same order as performed in Step 4.

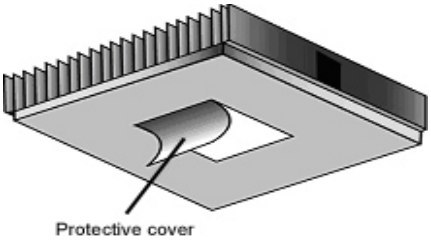
6. Attach fan power cable to server board as shown.

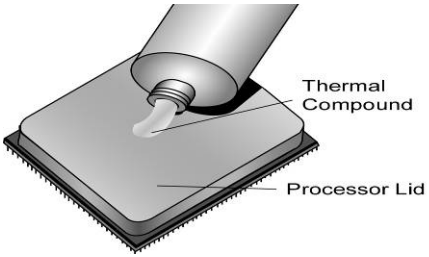
7. Reinstall and reconnect any parts you removed or disconnected to reach the processor sockets.

8. Replace the server's cover and reconnect the AC power cord. Refer to the documentation that came with your server chassis for instructions on installing the server's cover.

	CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

2.6 - Thermal Interface Material





There are two types of thermal interface materials designed for use with the processors.

The most common material comes as a small pad attached to the heat sink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heat sink on the processor.

The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

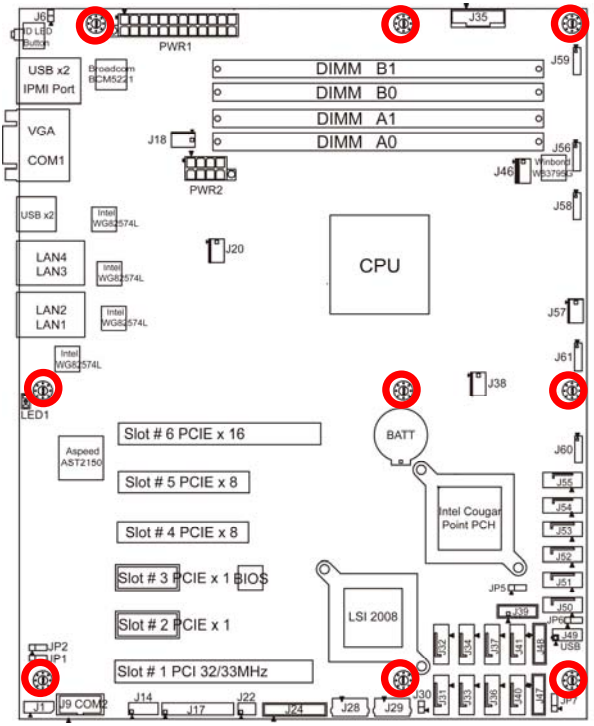
Always check with the manufacturer of the heat sink & processor to ensure the thermal Interface material is compatible with the processor and meets the manufacturer's warranty requirements.

2.7 - Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs.

Screw holes

If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case.
Place 9 screws into the holes indicated by circles to secure the mother board to the chassis.

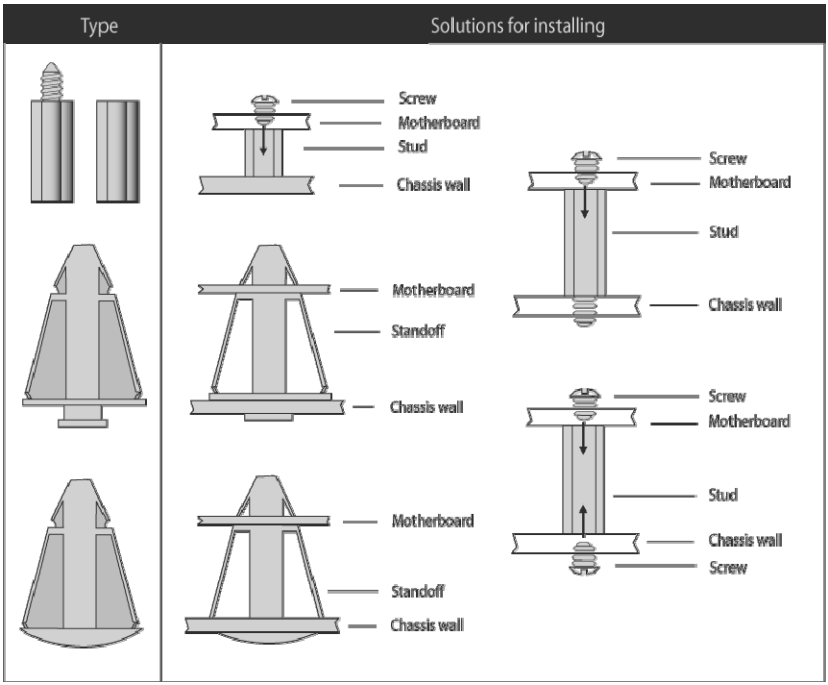


DO NOT overtighten the screws! Doing so can damage the motherboard.

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN® recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard



2.8 - Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor.

Overview

The motherboard comes with four Double Data Rate 3（DDR3）Dual Inline Memory Modules （DIMM）sockets.

- TYAN® S5512 series support up to 32GB of unbuffered (UDIMM) DDR3 ECC **1333/1066 MHz** in 4 memory slot.
- All installed memory will automatically be detected and no jumpers or settings need changing.
- All memory must be of the same type and density.
- Always populate the memory starting from DIMM A0 first.

Check the TYAN® Web site at: **www.TYAN.com** for details of the type of memory recommended for your motherboard.

Recommended Memory Population Table

To achieve the best performance, TYAN® strongly recommended memory installation configuration as listed below:

S5512UDIMM population		One DIMM per Channel		Two DIMM per Channel	
Single Rank Memory	DIMM B1 (J32)		X	X	
	DIMM B0 (J31)	X		X	
	DIMM A1 (J30)		X	X	
	DIMM A0 (J29)	X		X	
Dual Rank Memory	DIMM B1 (J32)		X	X	
	DIMM B0 (J31)	X		X	
	DIMM A1 (J30)		X	X	
	DIMM A0 (J29)	X		X	

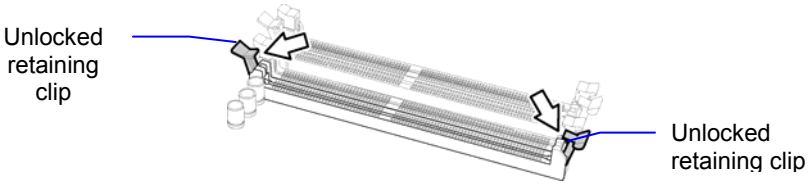
NOTE:
Max Memory Combination
Single Rank Unbuffered DIMMs ECC
16GB(4x4GB DIMMs)
Dual Rank Unbuffered DIMMs ECC
32GB(4x8GB DIMMs)
"X" indicates a populated DIMM slot.

Intel® Xeon® Processor E3-1200 Memory Support* table		
Intel® C202 Chipset (Cougar Point Essential Server) & C204 Chipset (Cougar Point Standard Server)		
DIMM Configuration		
UDIMM Non-ECC	UDIMM ECC	UDIMM Mix ECC with Non-ECC
Platform		
Intel® Xeon® processor E3-1200 product family		
Not Supported	Supported	Not Supported
Intel® CoreTM i3 processor series		
Not Supported	Supported	Not Supported
Intel® CoreTM i5-2400/2500 and i7-2600 processor series		
Not Supported	Not Supported	Not Supported

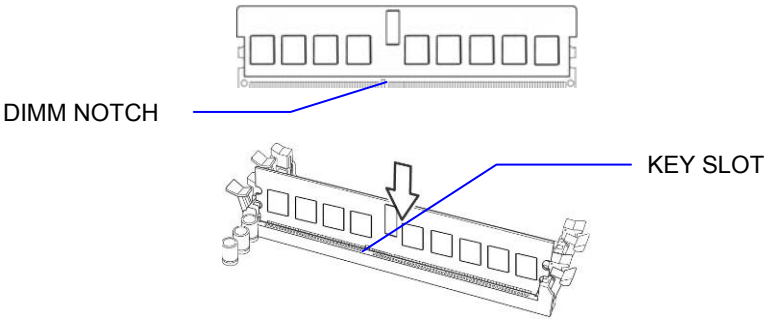
Memory Installation Procedure

Follow these instructions to install memory modules into the S5512.
NOTE: Ensure to unplug the power supply before adding or removing DIMMs or other system components, Failure to do so may cause severe damage to both the motherboard and the components.

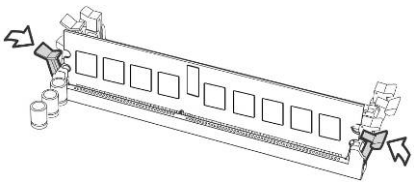
1. Unlock a DIMM socket by Press the retaining clip outwardly in the following illustration.



2. Align the memory module with the socket，such that the DIMM NOTCH match the KEY SLOT on the socket.



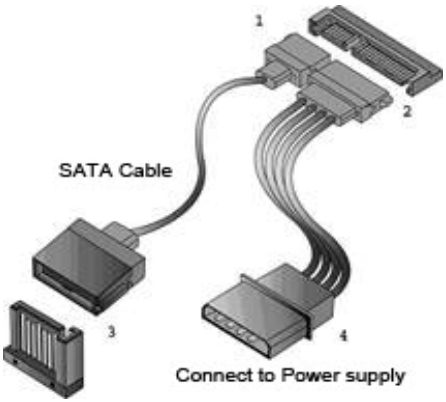
3. Hold the DIMM by both of its ends. Insert the module vertically into the socket . Apply force to both ends of the DIMM simultaneously until the retaining clip pop up into place. And the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM。



2.9 - Attaching Drive Cables

Attaching Serial ATA Cables
S5512 is equipped with **6** Serial ATA (SATA) channels. Connections for the drives are very simple.
There is no need to set Master/Slave jumpers on SATA drives.
If you are in need of SATA/SAS cables or power adapters please contact your place of purchase.

The following pictures illustrate how to connect an SATA drive



1. SATA drive cable connection

2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

2.10 - Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that may appear on your motherboard.

PCI-E x 16 slot (w/x8 link) x1

PCI-E x 8 slot (w/x4 link/ w/x8 link) x2

PCI-E x 1 slot x2

PCI 32bit slot x1

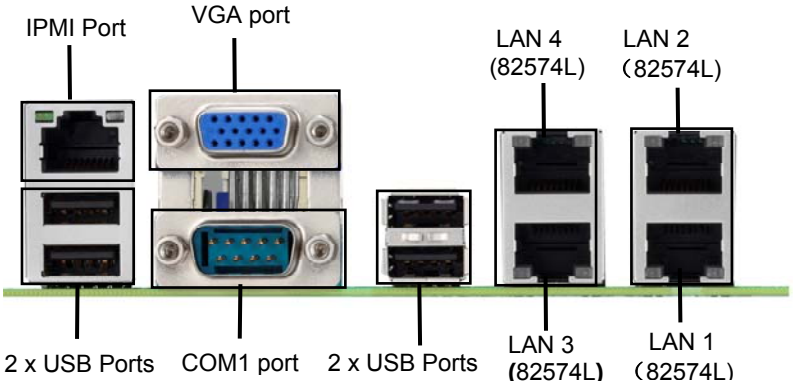
Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

TIP: It's good practice to install add-in cards in a staggered manner rather than making them directly adjacent to each other. Doing so allows air to circulate within the chassis more easily, thus improving cooling for all installed devices.

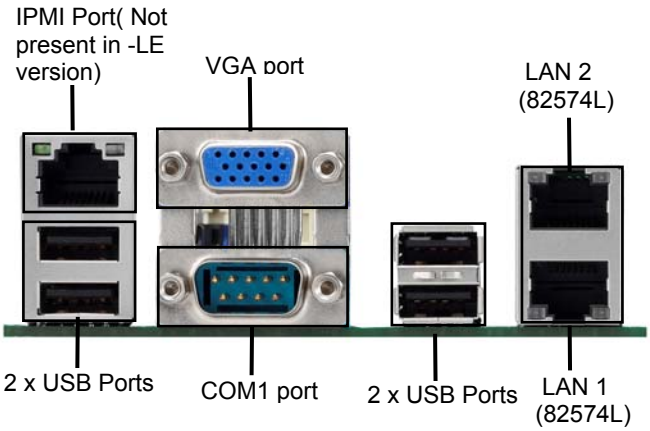
YOU MUST ALWAYS unplug the power connector to the motherboard before performing system hardware changes to avoid damaging the board or expansion device.

2.11 - Connecting External Devices

Your motherboard supports a number of different interfaces through connecting peripherals. See the following diagrams for the details.



Only for S5512GM4NR



Only for S5512WGM2NR/ S5512GM2NR/S5512G2NR-LE/ S5512G2NR-HE

Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

Onboard LAN LED Color Definition

The four onboard Ethernet ports have green and Amber LEDs to indicate LAN status. The chart below illustrates the different LED states.

10/100/1000 Mbps LAN Link/Activity LED Scheme			
		**Left LED**	**Right LED**
10 Mbps	**Link**	Green	Off
	Active	Blinking Green	Off
100 Mbps	**Link**	Green	Green
	Active	Blinking Green	Green
1000 Mbps	**Link**	Green	Amber
	Active	Blinking Green	Amber

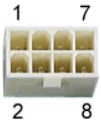
2.12 - Installing the Power Supply

There are **two** power connectors on your S5512. It is required that you have an EPS12V power supply which has one 24-pin and one 8-pin connectors.

PWR1: 24-Pin 12V main PWR Connector (Input)

Pin	Signal	Pin	Signal
1	+3.3V	2	+3.3V
3	GND	4	+5V
5	GND	6	+5V
7	GND	8	PWR OK
9	5VSB	10	+12V
11	+12V	12	+3.3V
13	+3.3V	14	-12V
15	GND	16	PS_ON#
17	GND	18	GND
19	GND	20	Reserve
21	+5V	22	+5V
23	+5V	24	GND

PWR 2: 8-Pin PWR Connector



Pin	Signal	Pin	Signal
1	GND	2	GND
3	GND	4	GND
5	+12V	6	+12V
7	+12V	8	+12V

Apply power to the motherboard:

1.Connect to the EPS12V 8 pin Power Connector
2.Connect to the EPS12V 24 pin Power Connector
3.Connect power cable to Power Supply and power outlet.
Look to the **www.TYAN.com** website for further information.

YOU MUST unplug the power supply before plugging the power cables to motherboard connectors.

2.13 - Finishing Up

Congratulations on making it this far! You're finished setting up the hardware aspects of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially power cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly. In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by calling your vendor's support line.

Chapter 3: BIOS Setup

3.1 - About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print and are subject to change, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information even when the power is turned off.

To start the BIOS setup utility:

1. Turn on or reboot your system.
2. Press <Del> during POST (<Tab> on remote console) to start the BIOS setup utility.

3.2 - Setup Basics

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
<F1>	General help window
<ESC>	Exit current menu
← → arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up/down
<Tab> / <Shift-Tab>	Cycle cursor up/down
<Home> / <End>	Move cursor to top/bottom of the window
<PgUp> / <PgDn>	Move cursor to next/previous page
<->	Select the previous value/setting of the field
<+>	Select the next value/setting of the field
<F8>	Load Fail Safe default configuration values of the menu
<F3>	Load the Optimal default configuration values of the menu
<F4>	Save and exit
<Enter>	Execute command or select submenu
<Del>、<F2>	Into BIOS setup menu
<F11>	BBS POPUP
<F12>	Boot from the network

3.3 - Getting Help

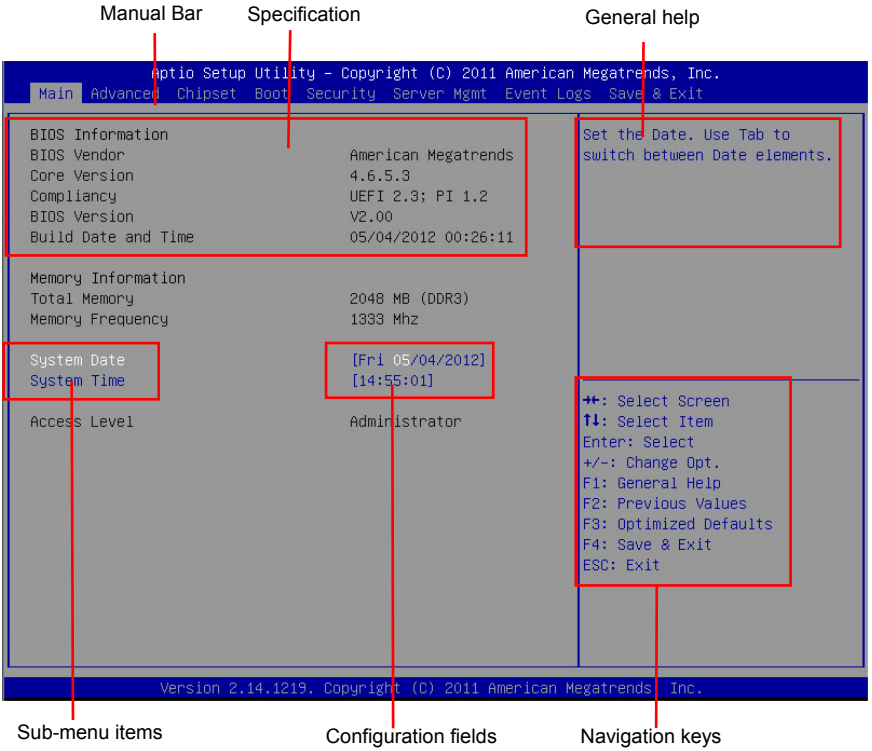
Pressing [**F1**] will display a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**].

3.4 - In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS. The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by TYAN® or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

The following pages provide the details of BIOS menu. Please be noticed that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated when this manual is written. Please visit TYAN®'s website at http://www.tyan.com for the information of BIOS updating.

3.5 - BIOS Main Menu



BIOS Information
Displays BIOS related information.

Memory Information
Displays total memory size.

System Date (Day mm/dd/yyyy)
System Time (hh:mm:ss)

Allow user to set system time and date.

The Time is displayed in 24 hours format.
The Date can be set from January 1st, 2005 to December 31, 2099
The values set in these two fields take effect immediately.

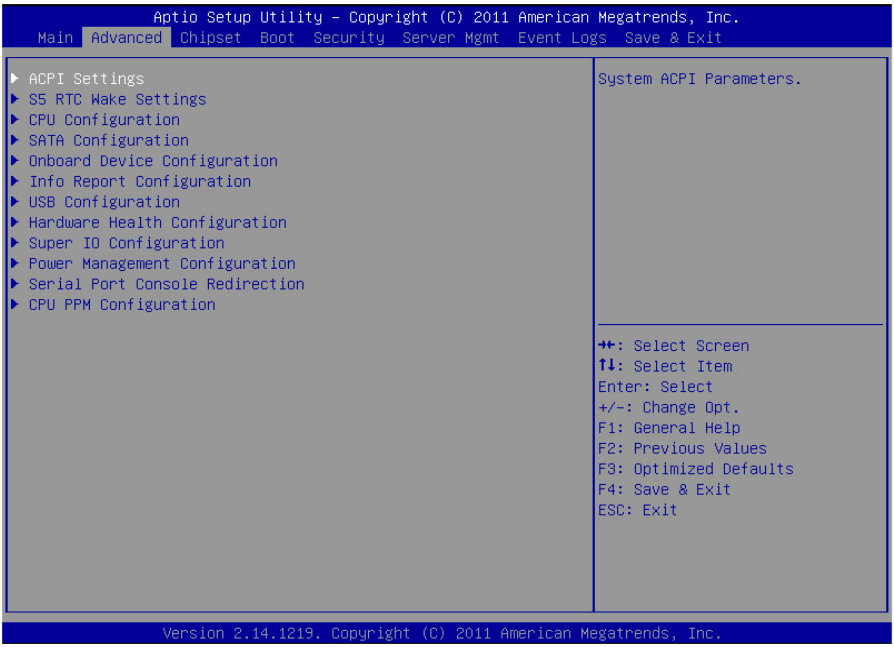
3.5.1 Manual Bars

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Chipset	For customize the Intel chipset function
Boot	For changing the system boot configuration
Security	For setting the Supervisor and User passwords
Server Mgmt	For changing the server management **Does not exist in –HE and –LE SKU)**
Event Logs	For record the system Event Logs **Does not exist in –HE and –LE SKU)**
Save & Exit	For selecting the exit options and loading default settings

The Main BIOS Menu is the first screen that you can navigate which has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured, options in blue can be changed. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany with it.

3.6 - BIOS Advanced Menu

This section facilitates configuring advanced BIOS options for your system.



ACPI Settings
Selection for Advanced ACPI Configuration.

S5 RTC Wake Settings
Configure S5 RTC Wake

CPU Configuration
Configure CPU

SATA Configuration
This menu helps you to set up or change the SATA Configuration.

Onboard Device Configuration
Configure Onboard Devices

Info Report Configuration
Info report configure

USB Configuration
Configure the USB support

Hardware Health Configuration
IPMI configuration including server monitoring and event log

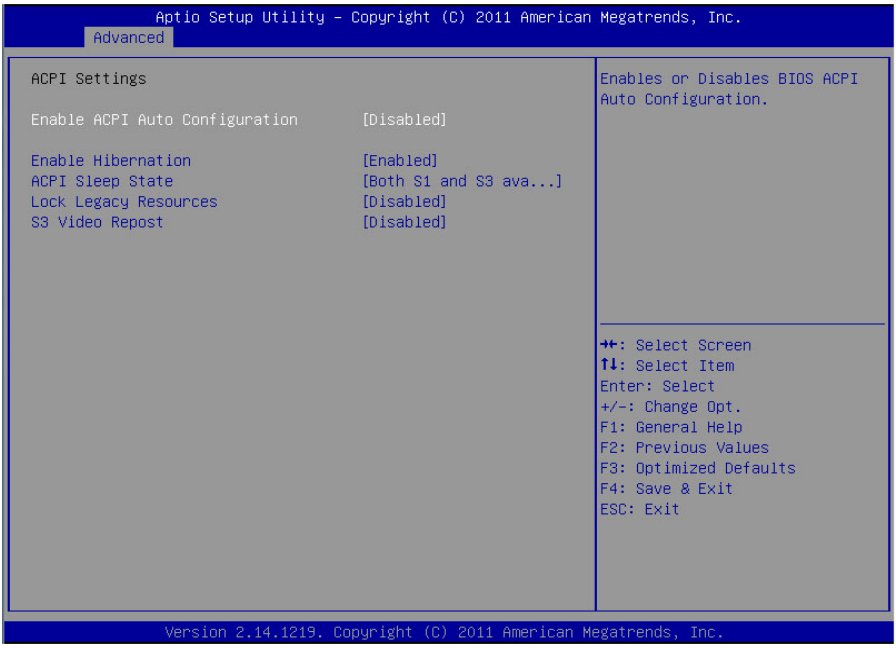
Super IO Configuration
Configures Super IO

Power Management Configuration
Configure the Power Management

Serial Port Console Redirection
Redirect Serial Port Console

CPU PPW Configuration
Configure the CPU PPW

3.6.1 - ACPI Setting



Enable ACPI Auto Configuration
Enables or Disables BIOS ACPI Auto Configuration
[Disabled] / [Enabled]
Default is [Disabled]

Enable Hibernation
Enables or Disables System ability to Hibernate OS/S4 Sleep State).This option may not be effective with some OS.
[Disabled] / [Enabled]
Default is [Disabled]

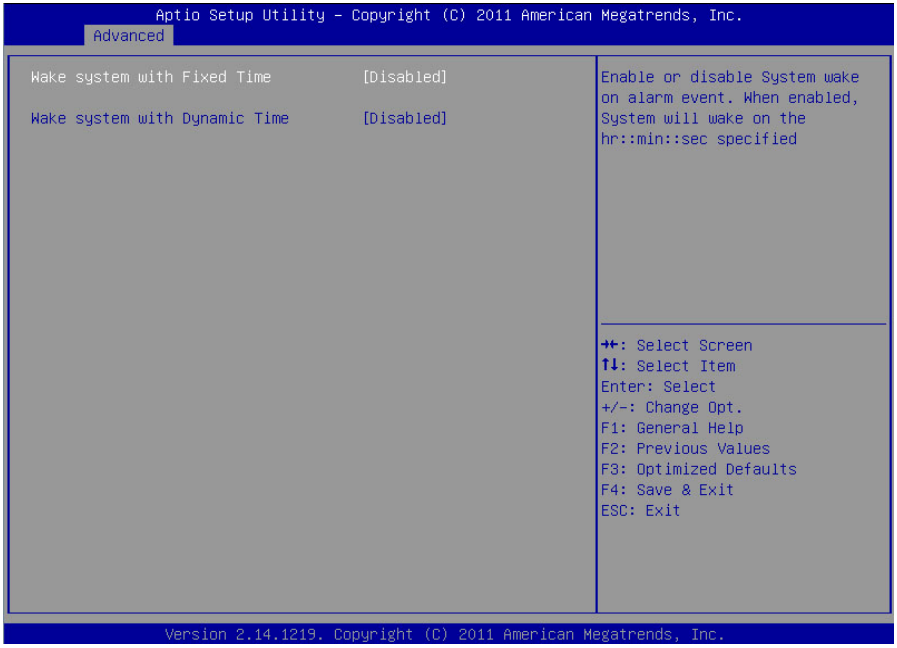
ACPI Sleep State
[Suspend Disabled] / [S1 only (CPU Stop Clock)] / [S3 only (Suspend to RAM)] / [Both S1 and S3 available for OS to choose from]
Default is [Both S1 and S3 available for OS to choose from]

Lock Legacy Resources
Enables or Disables Lock of Legacy Resources.
[Enabled] / [Disabled]
Default is [Disabled]

S3 Video Repost

Enable or Disable S3 video repost.
[Enabled] / [Disabled]
Default is [Disabled]

3.6.2 – S5 RTC Wake Configuration

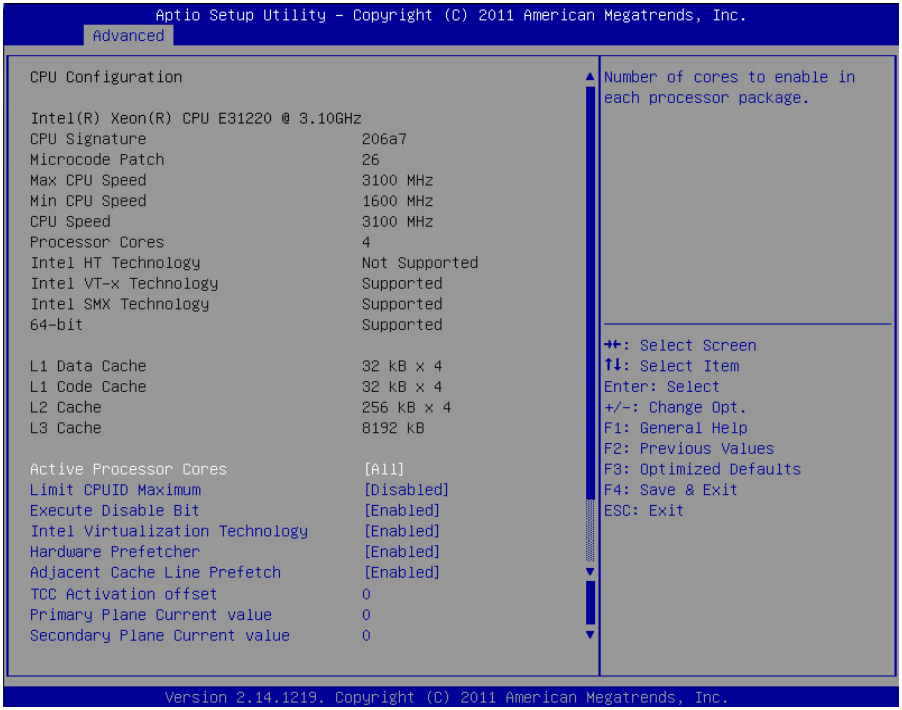


Wake system with Fixed Time
Enable or Disable system wake on alarm event. When enabled, System will wake on the hr::min::sec specified.
[Enabled] / [Disabled]
Default is [Disabled]

Wake system with Dynamic Time
Enable or Disable system wake on alarm event. When enabled, System will wake on the current time+ increase minutes.
[Enabled] / [Disabled]
Default is [Disabled]

3.6.3 - CPU Configuration

This section allows you to fine-tune the processor options.



Active Processor Cores
[All] / [Enabled]
Default is [All]

Limit CPUID Maximum
[Disabled] / [Enabled]
Default is [Disabled]

Execute Disable Bit
[Disabled] / [Enabled]
Default is [Enabled]

Intel Virtualization Technology
[Disabled] / [Enabled]
Default is [Enabled]

Hardware Prefetcher
To turn on/off the Mid level Cache (L2) streamer prefetcher.
[Disabled] / [Enabled]
Default is [Enabled]

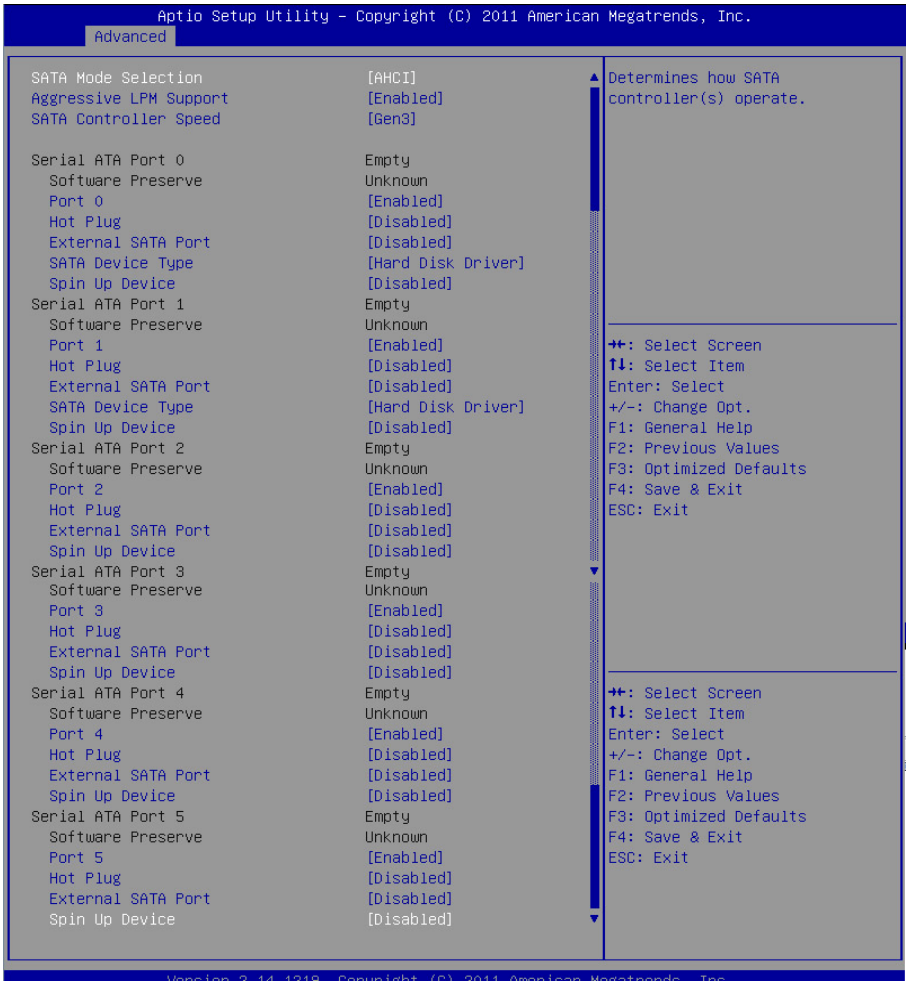
Adjacent Cache Line Prefetch
To turn on/off prefetching of adjacent cache lines.
[Disabled] / [Enabled]
Default is [Enabled]

TCC Activation offset
Offset from the factory TCC activation temperature.

Primary Plane Current Value
The maximum instantaneous current allow for Primary Plane.

Secondary Plane Current Value
The maximum instantaneous current allow for Plane.

3.6.4 - SATA Configuration



SATA Mode Selection
Determines how SATA controllers operate.
[IDE] / [AHCI]/ [RAID]
Default is [AHCI]

Aggressive LPM Support
Enable PCH to aggressively enter link power state.
[Disabled] / [Enabled]
Default is [Enabled]

SATA Controller Speed
Indicates the maximum speed the SATA controller can support.
[Gen1] / [Gen2] / [Gen3]
Default is [Gen3]

Serial-ATA Controller 0
Software preserve

Port 0
Enable or disable SATA Port
[Disabled] / [Enabled]
Default is [Enabled]

Hotplug
Designates this port as hot pluggable
[Disabled] / [Enabled]
Default is [Disabled]

External SATA Port
External SATA support
[Disabled] / [Enabled]
Default is [Disabled]

SATA Device Type
Indentify the SATA port is connected to Solid State Drive or Hard Disk Drive
[Hard Disk Driver] / [Solid State Drive]
Default is [Hard Disk Driver]

Spin up Device
On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.
[Enabled] / [Disabled]
Default is [Disabled]

Serial-ATA Controller 1
Software preserve

Port 1
Enable or disable SATA Port
[Disable]/[Enabled]
Default is [Enabled]

Hotplug
Designates this port as hot pluggable
[Disabled] / [Enabled]
Default is [Disabled]

External SATA Port
External SATA support
[Disabled] / [Enabled]
Default is [Disabled]

SATA Device Type
Indentify the SATA port is connected to Solid State Drive or Hard Disk Drive
[Hard Disk Driver] / [Solid State Drive]
Default is [Hard Disk Driver]

Spin up Device
On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.
[Enabled] / [Disabled]
Default is [Disabled]

Serial-ATA Controller 2/3/4/5
Software preserve

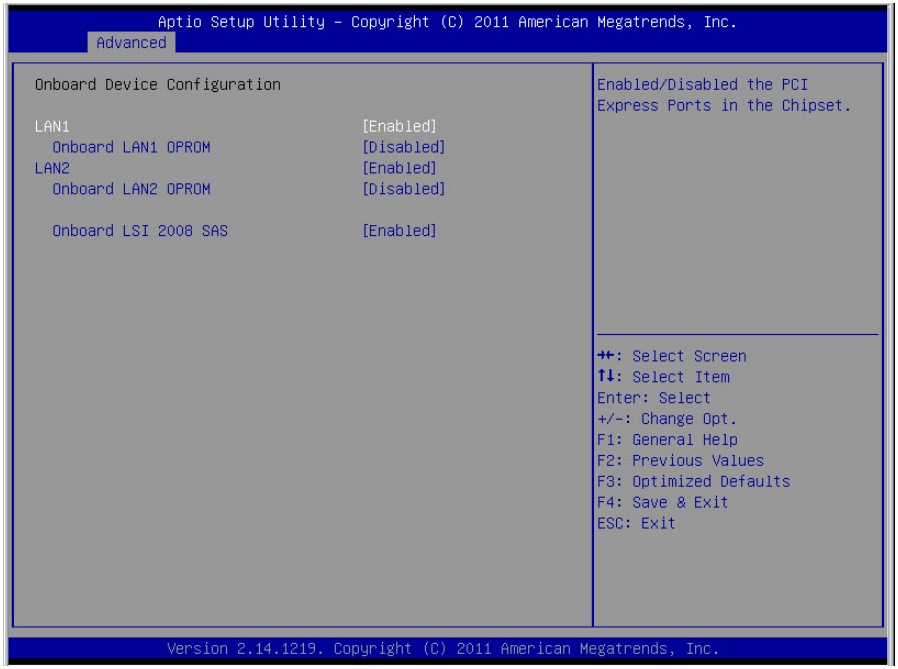
Port 2/3/4/5
Enable or disable SATA Port
[Disable]/[Enabled]
Default is [Enabled]

Hotplug
Designates this port as hot pluggable
[Disabled] / [Enabled]
Default is [Disabled]

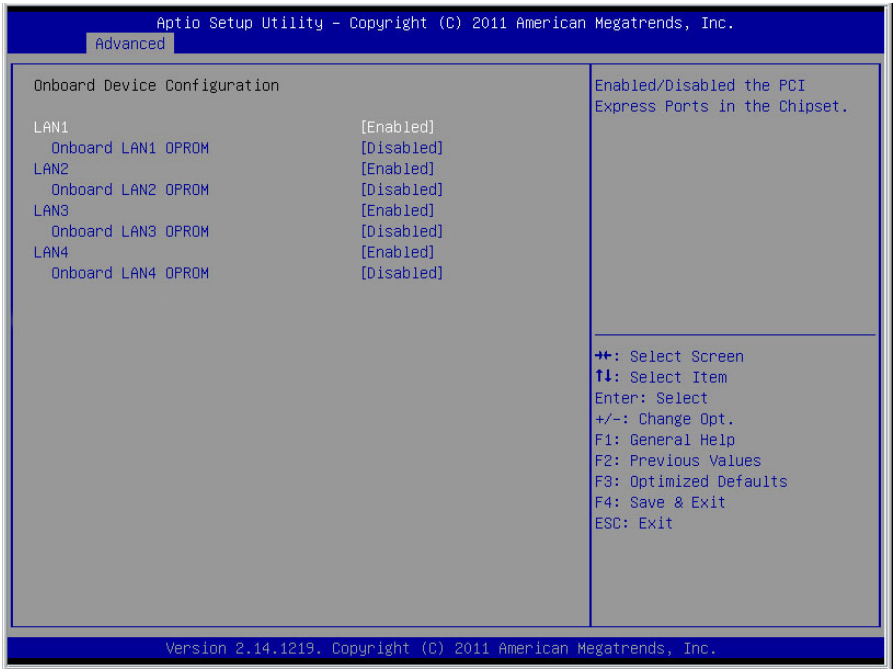
External SATA Port
External SATA support
[Disabled] / [Enabled]
Default is [Disabled]

Spin up Device
On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.
[Enabled] / [Disabled]
Default is [Disabled]

3.6.5 Onboard Device Configuration



S5512WGM2NR



S5512GM4NR

S5512GM2NR/S5512G2NR-LE/S5512G2NR-HE (BTO)

LAN1/LAN2
Enabled / Disabled the PCI Express Ports in the chipset.
[Disabled] / [Enabled]
Default is [Enabled]

Onboard LAN1/LAN2 OPROM
Enabled / Disabled the LAN Option ROM in the chipset.
[PXE] / [iSCSI]/ [Disabled]
Default is [Disabled]

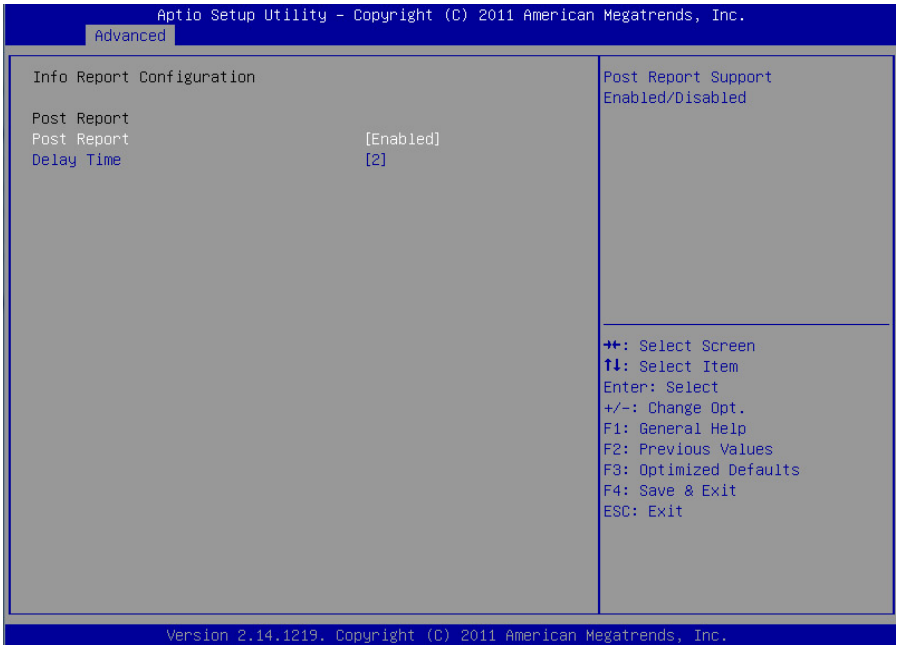
Onboard LAN1/LAN2 OPROM
Enabled / Disabled the LAN Option ROM in the chipset.
[PXE] / [Disabled]
Default is [Disabled]

LAN3/LAN4 (For S5512GM4NR SKU)
Enabled / Disabled the PCI Express Ports in the chipset.
[Disabled] / [Enabled]
Default is [Enabled]

Onboard/LAN3/LAN4 OPROM (For S5512GM4NR SKU)
Enabled / Disabled the LAN Option ROM in the chipset.
[PXE] / [iSCSI]/ [Disabled]
Default is [Disabled]

Onboard LSI 2008 SAS (For S5512WGM2NR SKU)
Enabled / Disabled the Onboard LSI 2008 SAS.
[Disabled] / [Enabled]
Default is [Enabled]

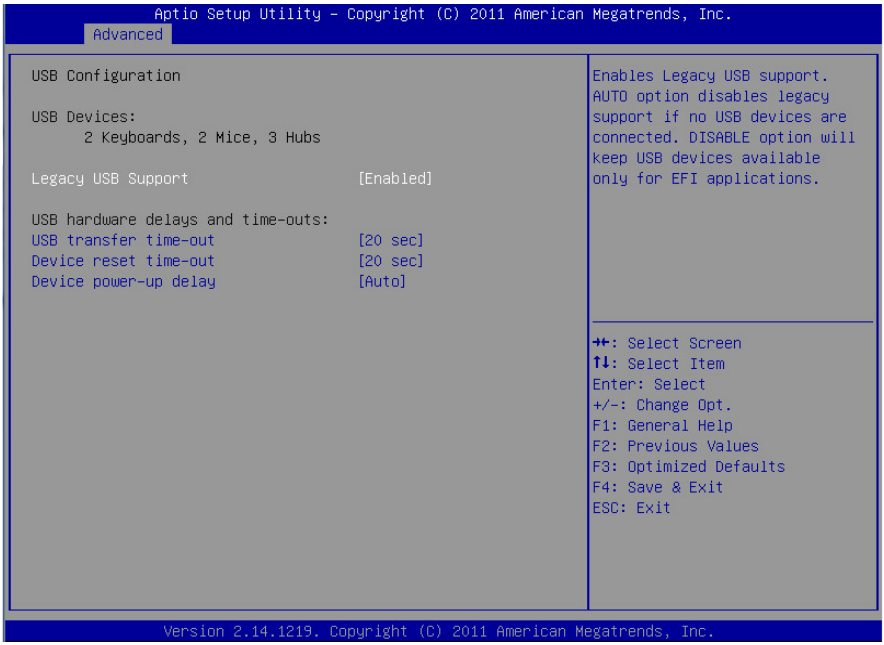
3.6.6 Info Report Configuration



Post Report
Post Report support Enabled / Disabled
[Disabled] / [Enabled]
Default is [Enabled]

Delay Time
Post Report Support Enabled / Disabled
[0] / [1] / [2] / [3] / [4] / [5] / [6] / [7] / [8] / [9] / [10] / [Until Press ESC]
Default is [2]

3.6.7 USB Configuration



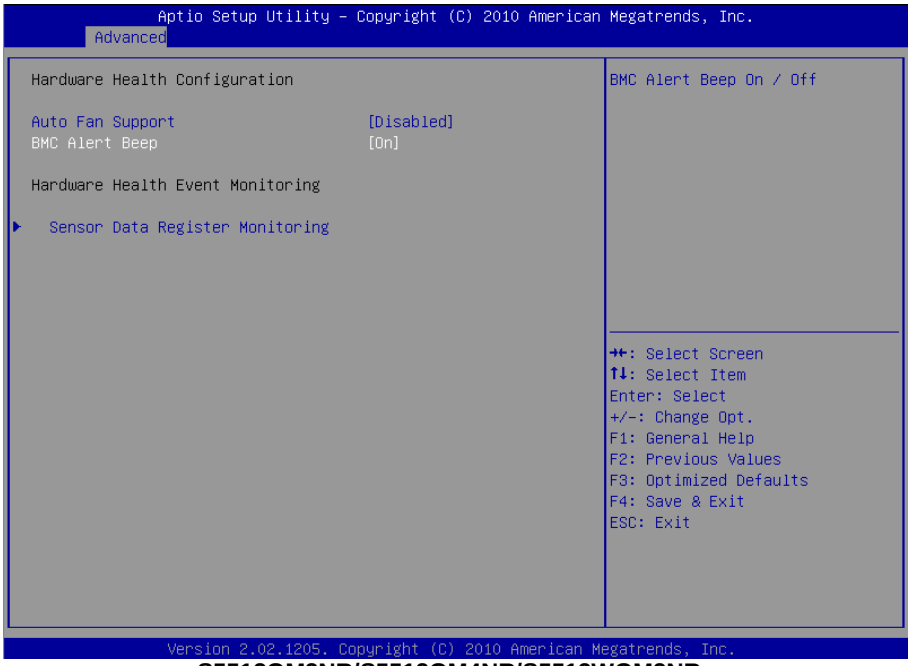
Legacy USB Support
Enables legacy USB support, Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI application.
[Disabled] / [Enabled] / [Auto]
Default is [Enabled]

USB transfer time-out
[1 sec] /[5 sec]/[10 sec]/ [20 sec]
Default is [20 sec]

Device reset time-out
[10 sec]/[20 sec]/[30 sec]/ [40 sec]
Default is [20 sec]

Device Power-up delay
Maximum time the device will take before it properly reports itself to the host controller. 'Auto' uses default value; for a root port it is 100ms,for a Hub port the delay is taken from Hub description.
[Auto] / [Manual]
Default is [Auto]

3.6.8 – Hardware Health Configuration

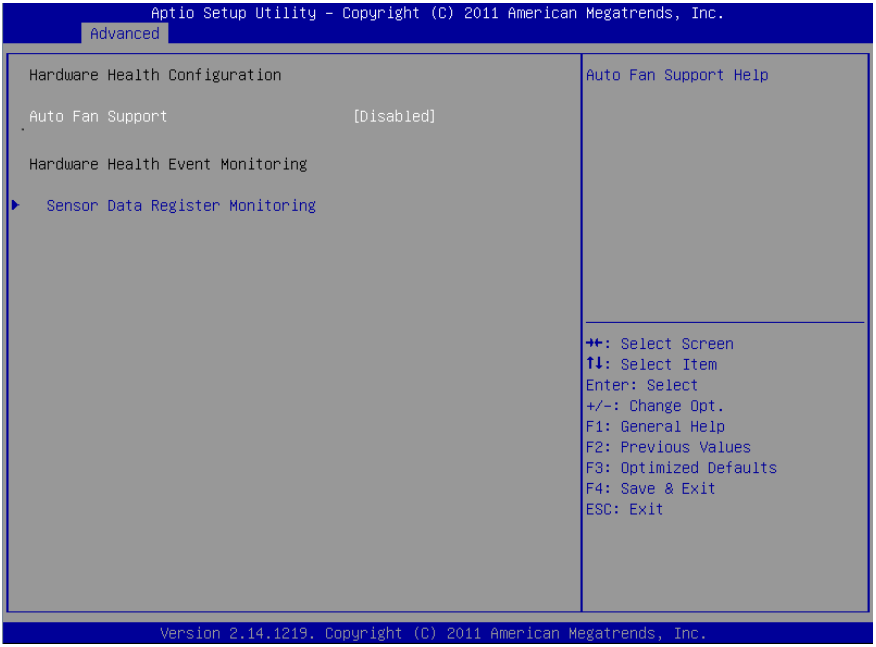


S5512GM2NR/S5512GM4NR/S5512WGM2NR

Auto Fan Support
[Disabled] / [Enabled]
Default is [Disabled]
The disable meaning is FAN Speed running FULL ON

BMC Alert Beep
[On] / [Off]
Default is [On]

PWM Minimal Duty Cycle
[30% Duty Cycle] / [45% Duty Cycle] / [60% Duty Cycle]
Default is [30% Duty Cycle]
*This item need set Auto Fan support to Enabled



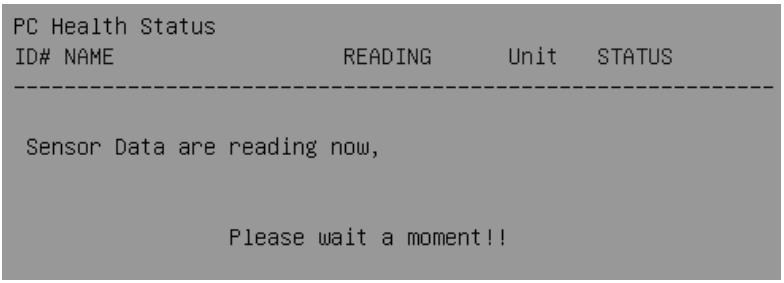
S5512G2NR-LE/S5512G2NR-HE(BTO)

Auto Fan Support
[Disabled] / [Enabled]
Default is [Disabled]
The disable meaning is FAN Speed running FULL ON

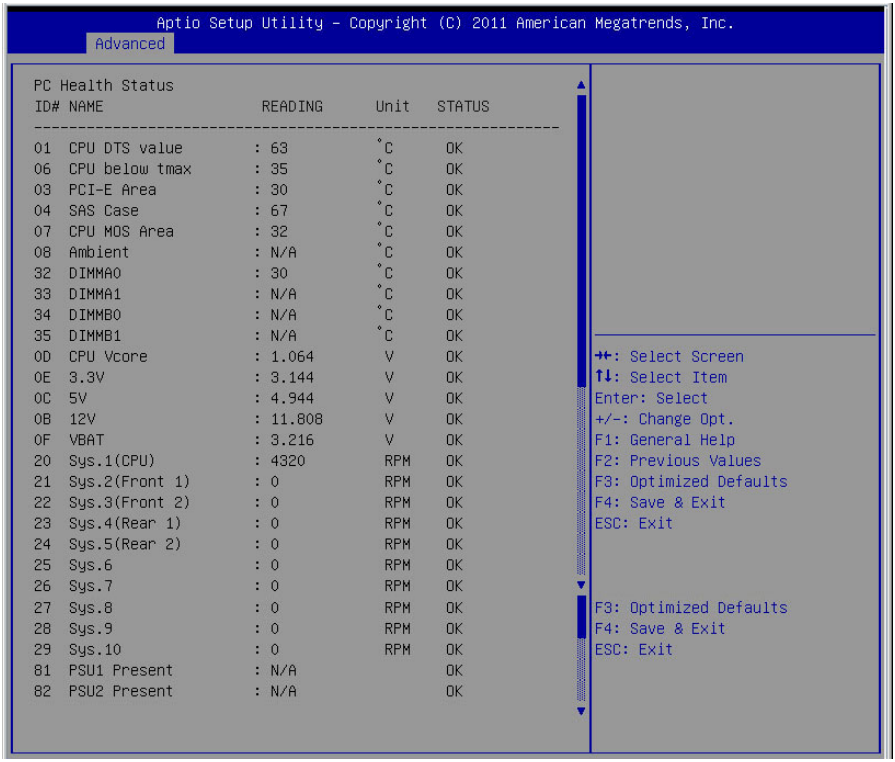
PWM Minimal Duty Cycle
[30% Duty Cycle] / [45% Duty Cycle] / [60% Duty Cycle]
Default is [30% Duty Cycle]
*This item need set Auto Fan support to Enabled

3.6.8.1 – Sensor Data Register Monitoring

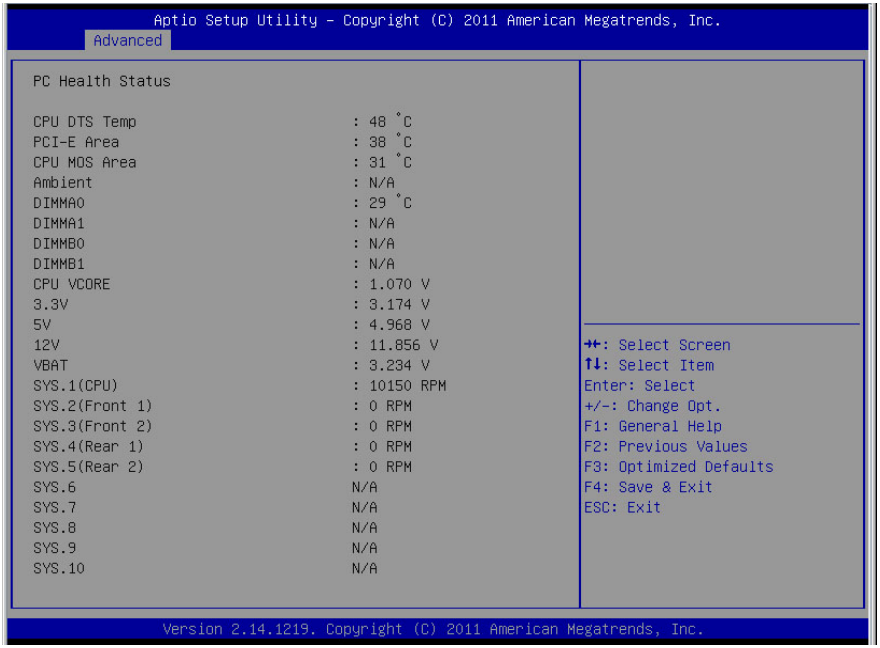
IF you logo in the SDR Page fist, you will see message “Sensor Data are reading Now, Please wait a moment !!” ,this time BIOS gets some SDR form BMC ,please wait about 8~10 second.



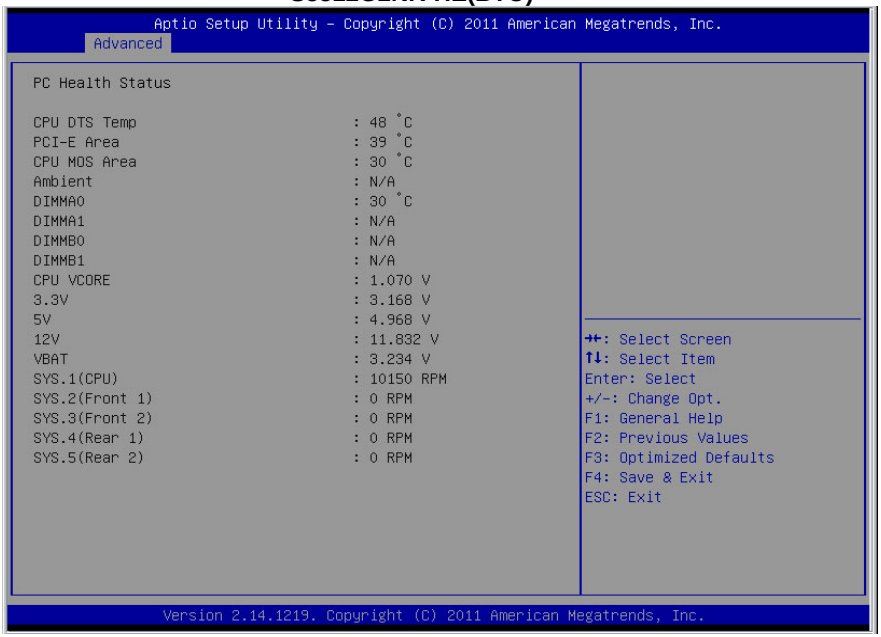
SDR can read FAN, temperature of PCH, CPU, DIMM, Ambient and CPU CMOS Area, Voltage and PSU status. Please see below picture.



S5512GM2NR/S5512GM4NR/S5512WGM2NR

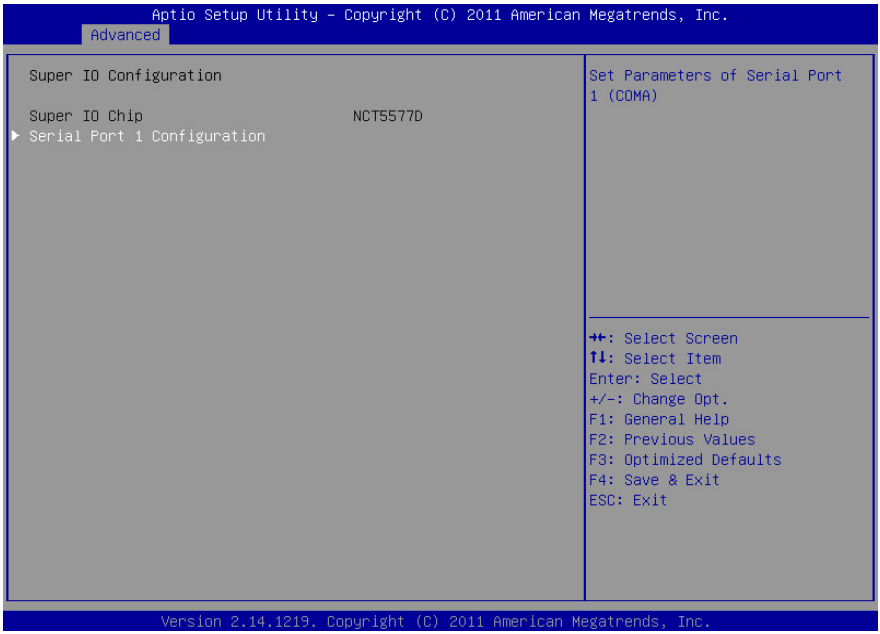


S5512G2NR-HE(BTO)



S5512G2NR-LE

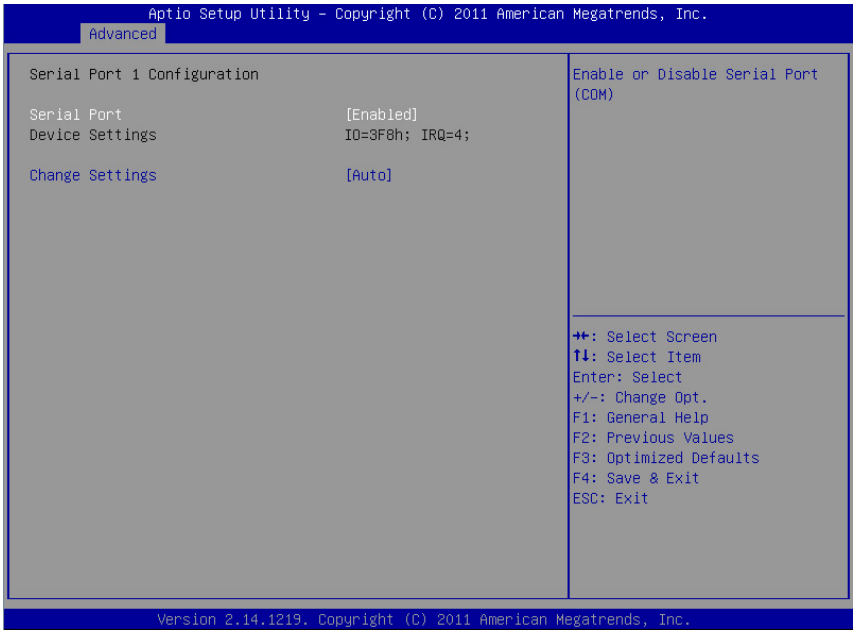
3.6.9 Super I/O Configuration



Super IO Chip

Read Only

3.6.9.1 Serial Port 1 Configuration

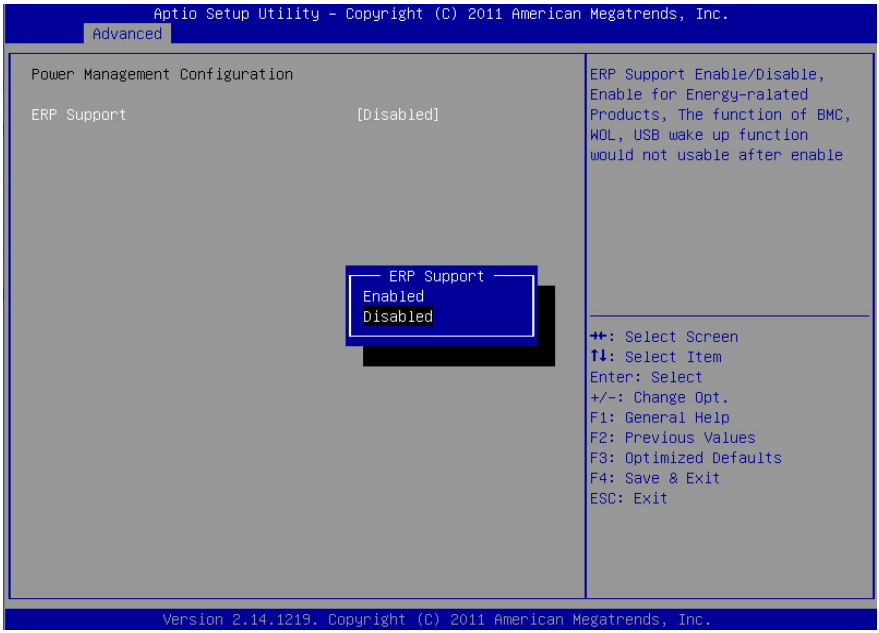


Serial Port 1 Configuration
Serial Port
Enable or Disable Serial Port (COM).
[Enabled] / [Disabled]
Default is [Enabled]

Device Settings
Read only.

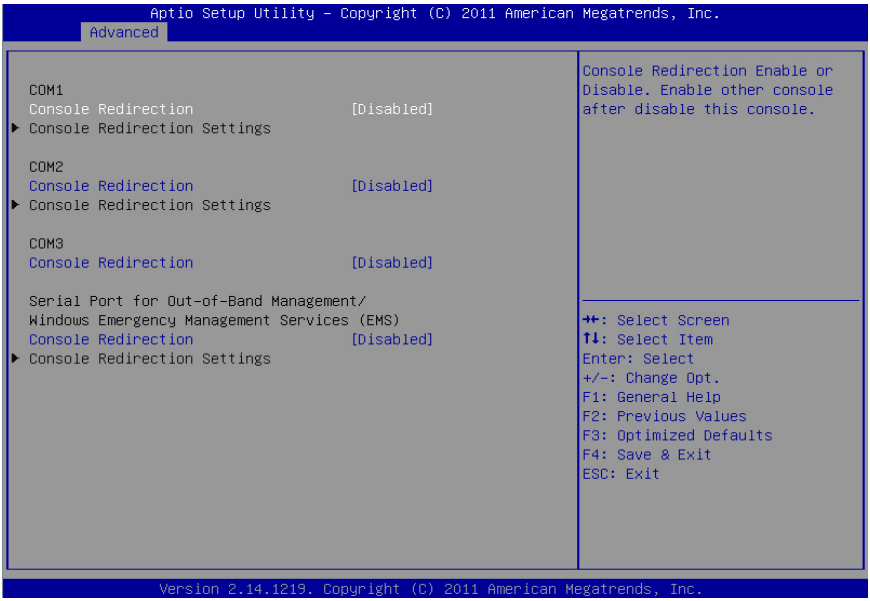
Change / Setting
Read only. It can not be modified in user mode.
[Auto]
[IO=3F8h; IRQ=4;] , [IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;]
[IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;]
[IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;]
[IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;]
Default is [Auto]

3.6.10 Power Management Configuration

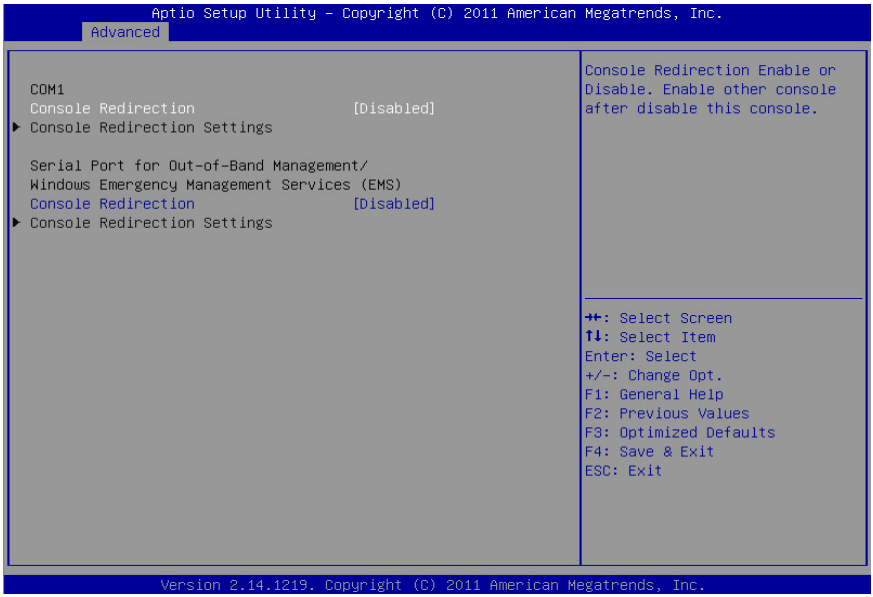


ERP Support
Enable or disable ERP support.
[Enable] / [Disabled]
Default is [Disabled]

3.6.11 Serial Port Console Redirection



S5512GM2NR/S5512GM4NR/S5512WGM2NR



S5512G2NR-LE/S5512G2NR-HE(BTO)

COM1 Console Redirection
Console redirection Enable or Disable. Enable other console after disable this console.
[Enabled] / [Disabled]
Default is [Disabled]

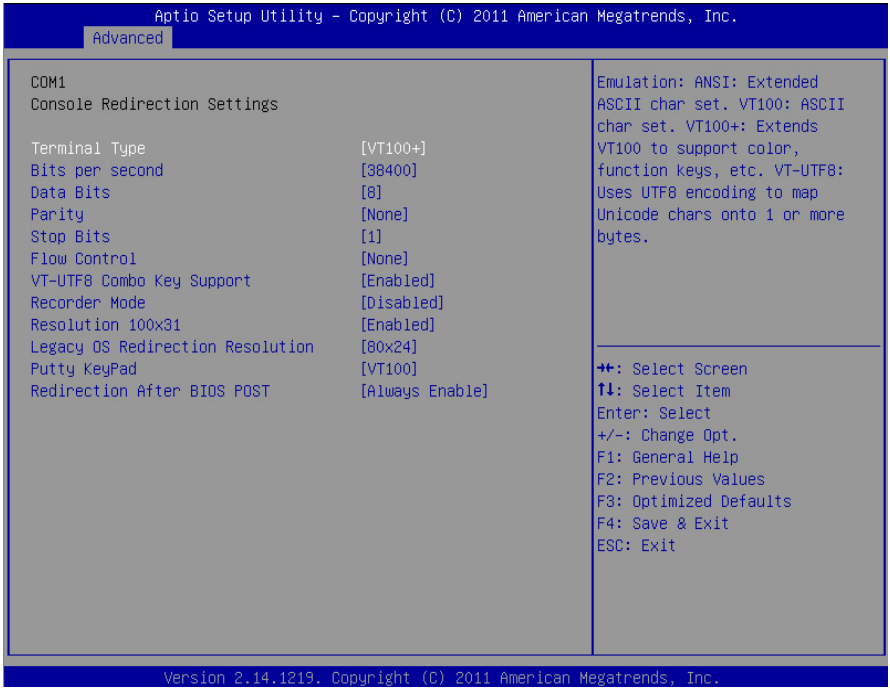
COM2 Console Redirection
Console redirection Enable or Disable. Enable other console after disable this console. **(For S5512GM2NR/S5512GM4NR/S5512WGM2NR SKU)**
[Enabled] / [Disabled]
Default is [Disabled]

COM3 Console Redirection
Console redirection Enable or Disable. Enable other console after disable this console. **(For S5512GM2NR/S5512GM4NR/S5512WGM2NR SKU)**
[Enabled] / [Disabled]
Default is [Disabled]

Serial Port for Out-Of-Band Management/Windows Emergency Services (EMS)
Console Redirection
Console redirection enable or disable.
[Disabled] **/** [Enabled]
Default is [Disabled]

Console Redirection Settings
The settings specify how the host computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

3.6.11.1 Console Redirection Settings



S5512GM2NR/S5512GM4NR/S5512WGM2NR

Terminal Type
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
[VT-UTF8] **/** [VT100] / [VT100+] / [ANSI]
Default is [VT100+]

Bits per Second
Select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
[38400] **/** [9600] / [19200] / [115200] / [57600]
Default is [38400]

Data Bits
[8] **/** [7]
Default is [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 the num of 1's in 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.
[None] **/** [Even] / [Odd] / [Mark] / [Space]
Default is [None]

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.
[1] **/** [2]
Default is [1]

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 restart the flow. Hardware flow control uses two wires to send start/stop signal.
[None] **/** [Hardware RTS] / [CTS]
Default is [None]

VT-UTF8 Combo Key Support
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
[Enabled] **/** [Disabled]
Default is [Enabled]

Recorder Mode
With this mode enabled only text will be sent. This is to capture Terminal data.
[Disabled] **/** [Enabled]
Default is [Disabled]

Resolution 100x31
Enable or disable extended terminal resolution.
[Disabled] **/** [Enabled]
Default is [Enabled]

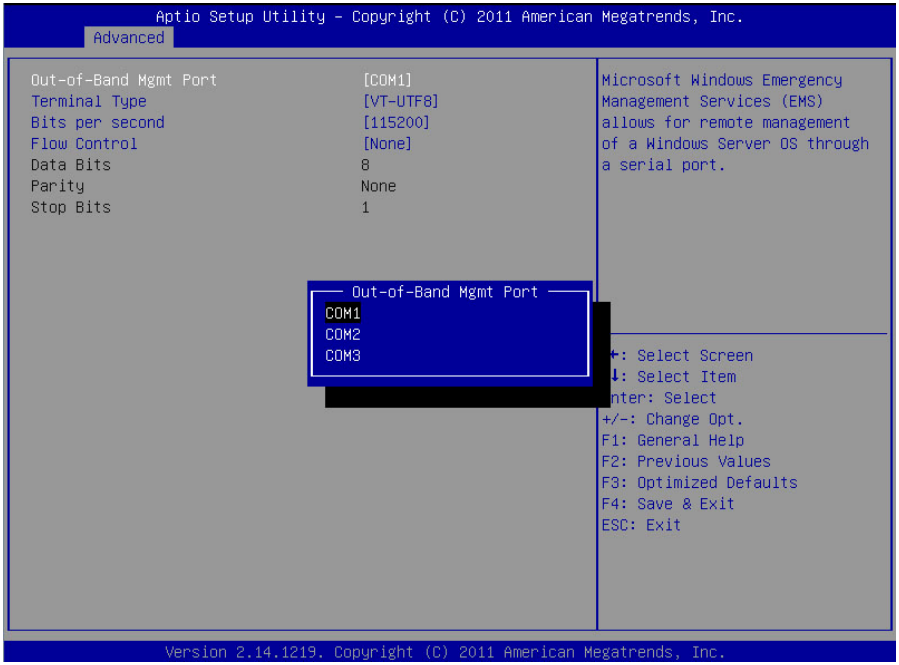
Legacy OS Redirection Resolution
On Legacy OS, the number of rows and columns supported redirection.
[80x24] **/** [80x25]
Default is [80x24]

Putty KeyPad
Select FunctionKey and KeyPad on Putty.
[VT100] / [LINUX] / [XTERMR6] / [SCO] / [ESCN] / [VT400]
Default is [VT100]

Redirection After BIOS POST
Legacy console redirection is disabled before booting to legacy OS. Default value is always Enable which means Legacy console Redirection is enabled for legacy OS
[Always enable] / [LINUX]
Default is [Always enable]

Redirection After BIOS POST
Legacy console redirection is disabled before booting to legacy OS. Default value is always Enable which means Legacy console Redirection is enabled for legacy OS (For-LE & -HE SKU)
[Always enable] / [BootLoader]
Default is [Always enable]

3.6.11.2 Serial Port for Out-Of-Band Management/Windows Emergency Services (EMS) Console Redirection Settings



Out-of Band Mgmt Port
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
[COM1] / [COM2] / [COM3]
Default is [COM1]

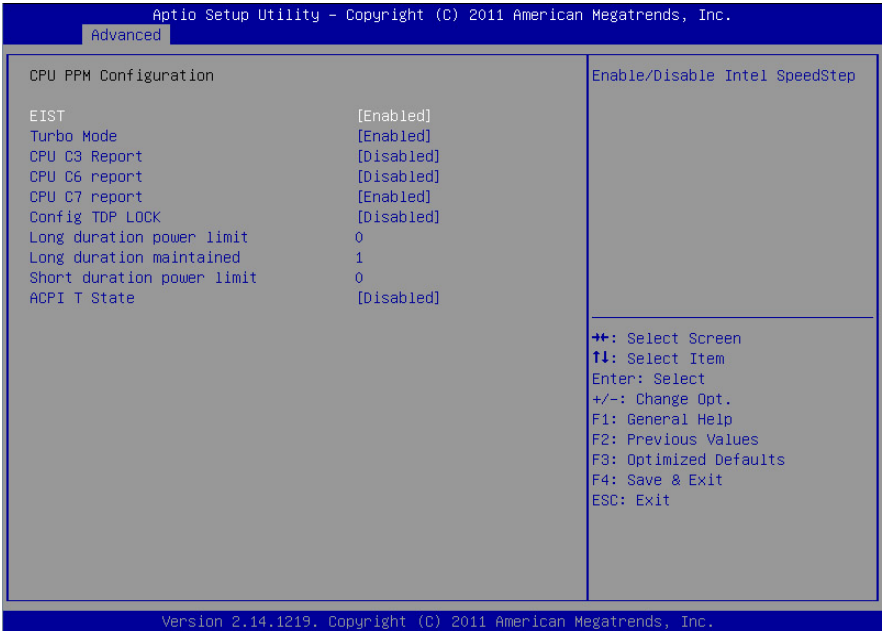
Terminal Type
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
[VT-UTF8] **/** [VT100] / [VT100+] / [ANSI]
Default is [VT-UTF8]

Bits per Second
Select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
[115200] **/** [9600] / [19200] / [38400] / [57600]
Default is [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 restart the flow. Hardware flow control uses two wires to send start/stop signal.
[None] **/** [Hardware RTS/CTS] / [Software Xon/Xoff]
Default is [None]

Data Bits / Parity / Stop Bits
Read only.

3.6.12 CPU PPW Configuration



EIST
Enable/Disable Intel StepSpeed.
[Disabled] **/** [Enabled]
Default is [Enabled]

Turbo Mode
Enable/Disable Turbo Mode.
[Disabled] **/** [Enabled]
Default is [Enabled]

CPU C3 Report
Enable/Disable CPU C3 (ACPI C2) report to OS.
[Enabled] **/** [Disabled]
Default is [**Disabled**]

CPU C6 Report
Enable/Disable CPU C6 (ACPI C3) report to OS.
[Enabled] **/** [Disabled]
Default is [**Disabled**]

CPU C7 Report
Enable/Disable CPU C7 report to OS.
[Enabled] / [Disabled]
Default is [**Enabled**]

Config TDP LOCK
Lock and Config TDP Control register
[Enabled] / [Disabled]
Default is [**Disabled**]

Long Duration Power Limit
Long duration power limit in Watts.

Long Duration Maintained
Time window which the long duration power is maintained.

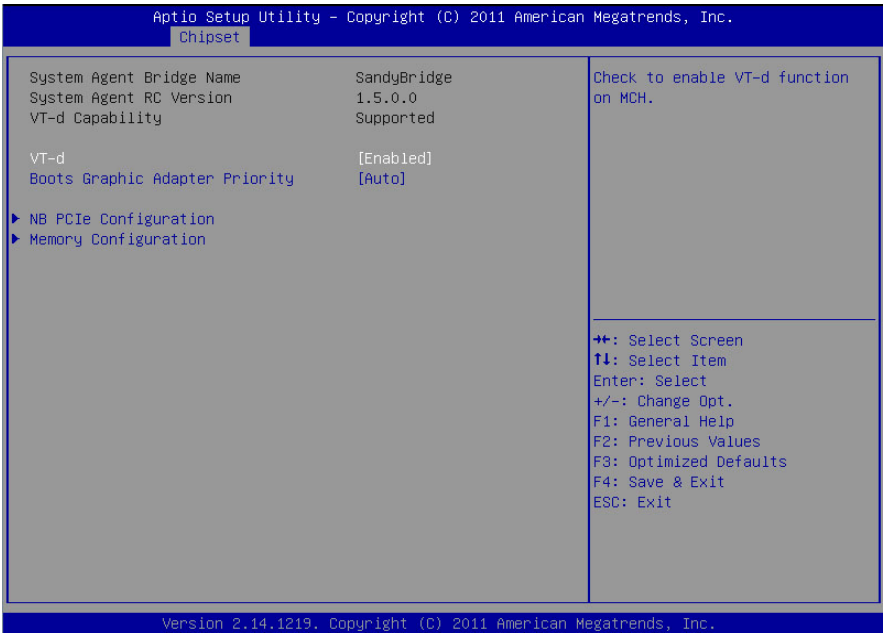
Short duration power limit
Short duration power limit in Watts.

ACPI T State
Enable/Disable ACPI T state support
[Enabled] / [Disabled]
Default is [**Disabled**]

3.7 - Chipset Menu

Allows you to change North Bridge, South Bridge, and WatchDog Timer Configuration

3.7.1 – North Bridge Chipset Configuration Sub- Menu

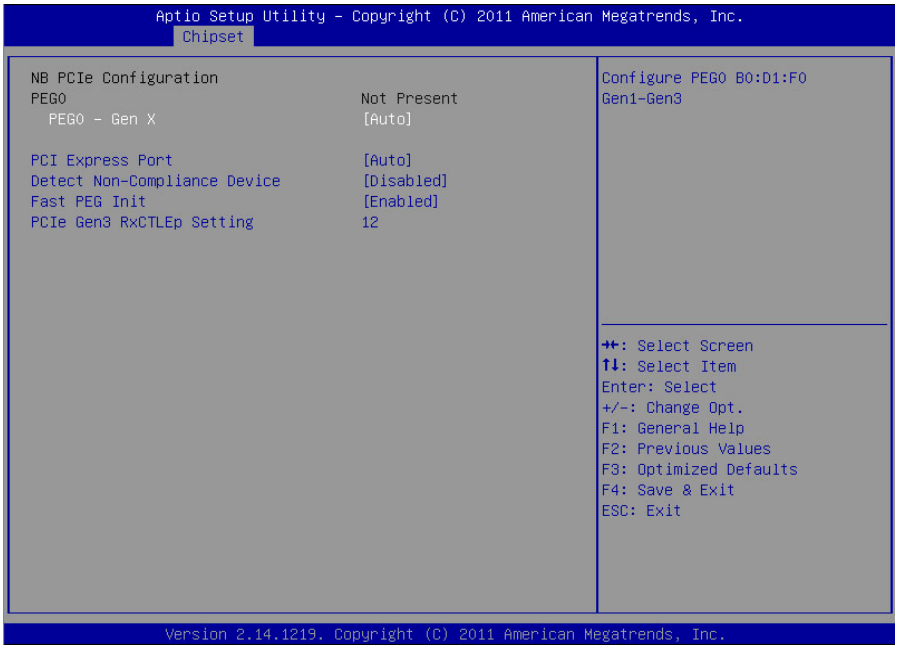


System Agent Bridge Name / System Agent RC Version / VT-d Capability
Read only

VT-d
Check to enable VT-d function on MCH
[Enabled] / [Disabled]
Default is [**Enabled**]

Boots Graphic Adapter Priority
Select which graphics controller to use as the primary boot device.
[Auto] / [Onboard VGA]
Default is [**Auto**]

3.7.1.1 NB PCIe Configuration Submenu



PEG0- GenX
[Auto] / [Gen1] / [Gen2] / [Gen3]
Default is [Auto]

PCI Express Port
[Auto] / [Disabled] / [Enabled]
Default is [Auto]

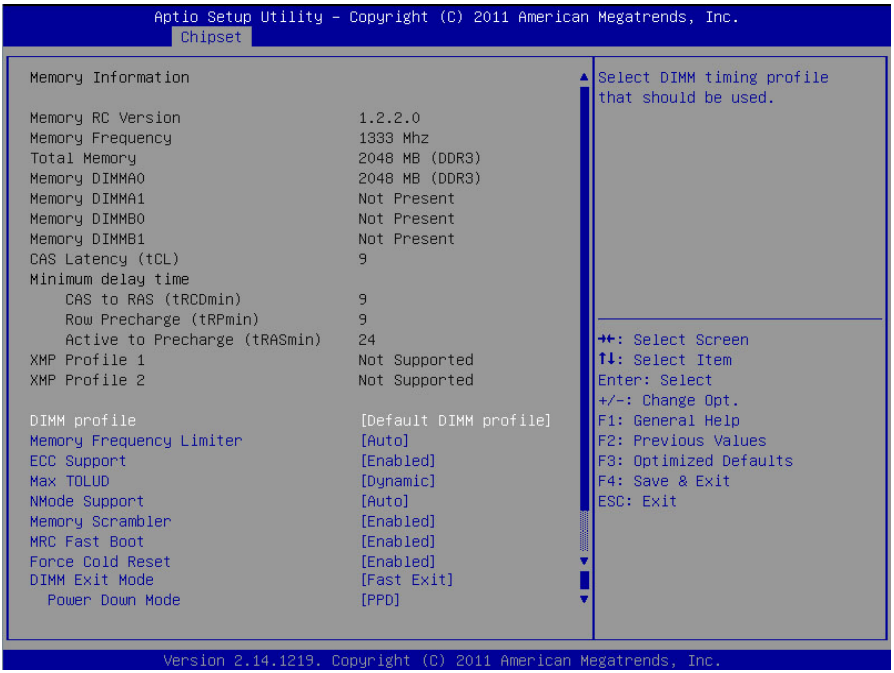
Detect Non-Compliance Device
Configure PEG0 B0:D1:F0 Gen1-Gen3
[Enabled] / [Disabled]
Default is [Disabled]

Fast PEG Init
Enable or disable fast PEG Init, some Optimization if no PEG devices present in cold boot.
[Enabled] / [Disabled]
Default is [Enabled]

PCIe Gen3 RxCtLEp setting

The range of the setting is (0~15).This setting has to be specified basing on platform design and following the guideline.

3.7.1.2 DIMM Information Submenu



DIMM profile
Select DIMM timing profile that should be used.
[Default DIMM profile] / [Custom Profile] / [XMP Profile1] / [XMP Profile2]
Default is [Default DIMM profile]

Memory Frequency Limiter
Maximum Memory Frequency Selections in Mhz
[Auto] / [1067] / [1333] / [1600] / [1867] / [2133] / [2400] /[2667]
Default is [Auto]

ECC Support
Enable or disable DDR ECC support
[Enabled] / [Disabled]
Default is [Enabled]

Max TOLUD
Maximum value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller
[Dynamic] / [1GB] / [1.25GB] / [1.5GB] / [1.75GB] / [2GB] / [2.25GB] / [2.5GB] / [2.75GB] / [3GB] / [3.25GB]
Default is [Auto]

NMode Support
[Auto] / [1N Mode] / [2N Mode]
Default is [Auto]

Memory Scrambler
Enable or disable Memory Scrambler support
[Enabled] / [Disabled]
Default is [Enabled]

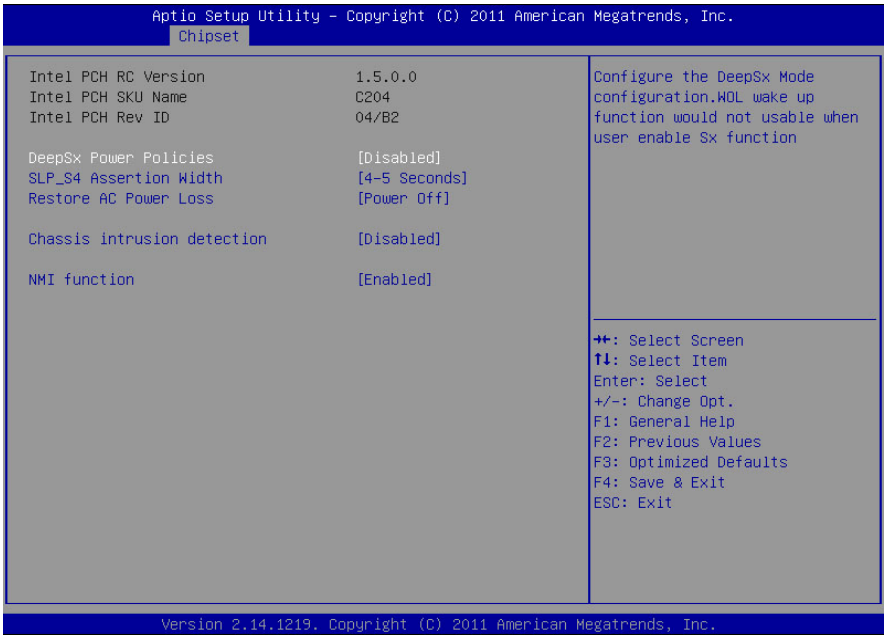
MRC Fast Boot
Enable or disable MRC fast boot
[Enabled] / [Disabled]
Default is [Enabled]

Force Cold Reset
Force cold reset or choose MRC cold reset mode, when cold boot is required during MRC execution. Note: If ME5.0MB is present, Force cold reset is required!
[Enabled] / [Disabled]
Default is [Enabled]

DIMM Exit Mode
DIMM Exit Mode Control
[Auto] / [Slow Exit] / [Fast Exit]
Default is [Fast Exit]

Power Down Mode
Power down mode control
[Auto] / [APD] / [PPD] / [APD-PPD]
Default is [PPD]

3.7.2 – South Bridge Configuration Sub-Menu



DeepSx Power Policies
Configure the DeepSx Mode configuration MOL wake up function would not usable when user enable Sx function
[Disabled] / [Enabled in S5] / [Enabled in S4-S5]
Default is [Disabled]

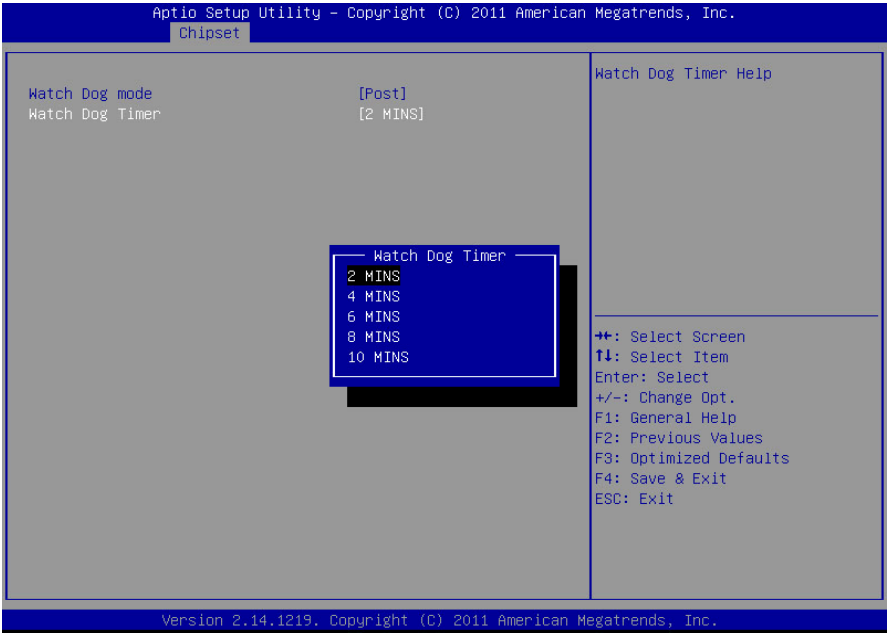
SLP_S4 Assertion Width
Select a minimum assertion width of the SLP_S4# signal
[Disabled] / [1-2 Seconds] / [2-3 Seconds] / [3-4 Seconds] / [4-5 Seconds]
Default is [4-5 Seconds]

Restore AC Power Loss
Select AC power state when power is re-applied after a power failure
[Power Off]/[Power On]/ [Last State]
Default is [Power Off]

Chassis Intrusion Detection
ENABLED: When a chassis open event is detected, the BIOS will record the event.
[Enabled] / [Disabled]
Default is [Disabled]

NMI Function
ENABLED: When a NMI function is support
[Enabled] / [Disabled]
Default is [Enabled]

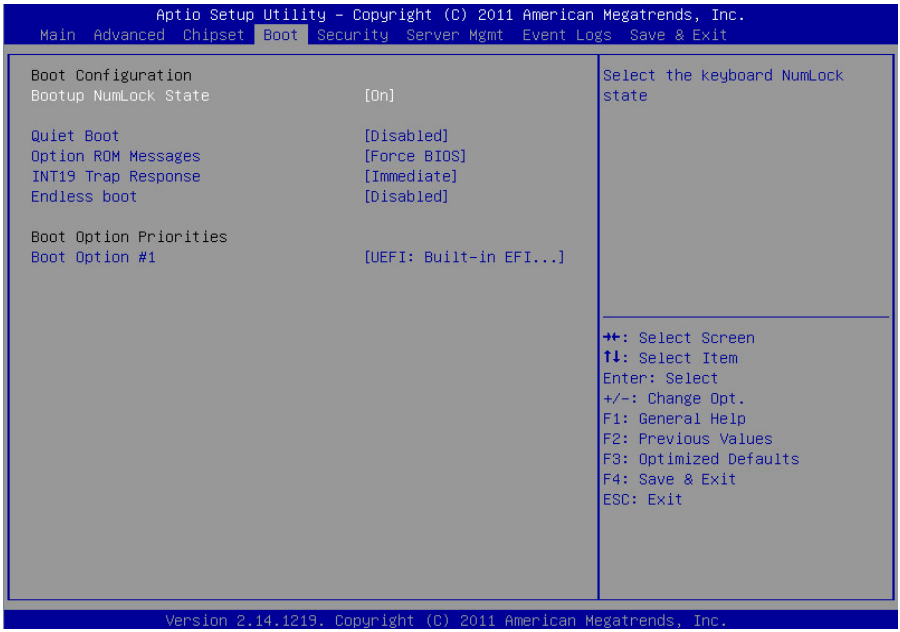
3.7.3 – Watch Dog mode Sub- Menu



Watch Dog mode
[Disabled] / [Post]/ [OS]/ [Power ON]
Default is [Disabled]

Watch Dog Timer
Watch dog Timer help
[2MINS] / [4MINS] / [6MINS] / [8MINS] / [10MINS]
Default is [2MINS]
This item need set **Watch Dog Mode** to [**Post**]

3.8 - Boot Configuration



Bootup Numlock State
Select the keyboard Numlock state
[On] / [Off]
Default is [On]

Quiet Boot
Enables or disables Quiet boot option
[Disabled] / [Enabled]
Default is [Disabled]

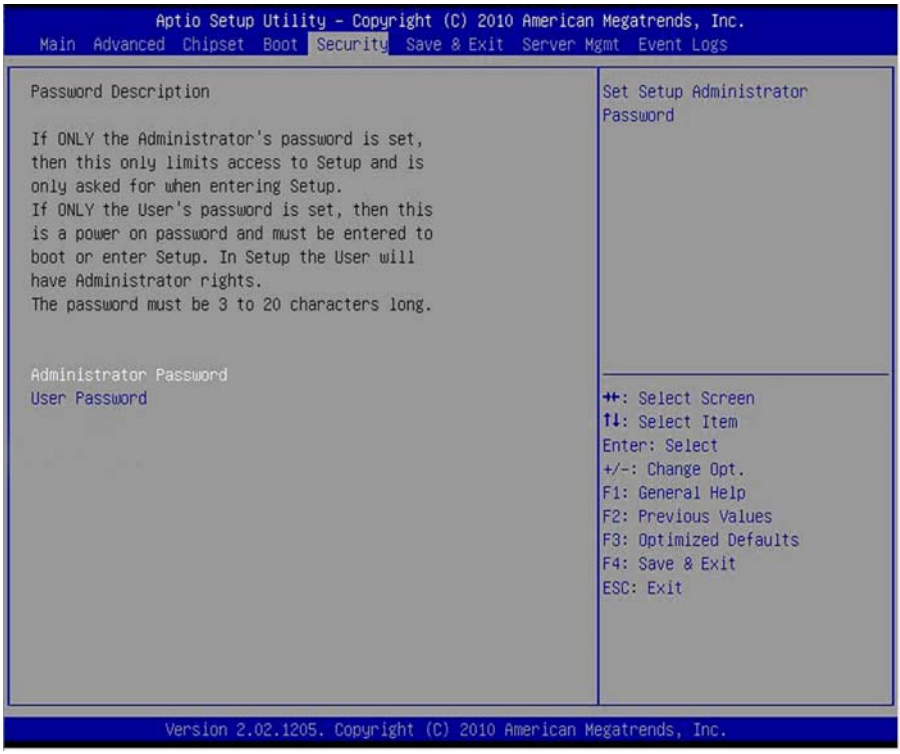
Option ROM Messages
Set display mode for Option ROM
[Force BIOS] / [Keep Current]
Default is [Force BIOS]

INT19 Trap Response
BIOS reaction on INT19 trapping by option ROM: IMMEDIATE-execute the trap right away; POSTPONED-execute the trap during legacy boot.
[Immediate]/[Poseponed]
Default is [Immediate]

Endless Boot
Enabled or disabled endless boot option
[Disabled] / [Enabled]
Default is [Disabled]

Boot Option #1/#2/#3
Select the first boot device.
[Device Name]**/**[Disabled]
Default is [Device Name]

3.9 - Security Menu



Password Description
Read only.

Administrator Password
Install or change the password.

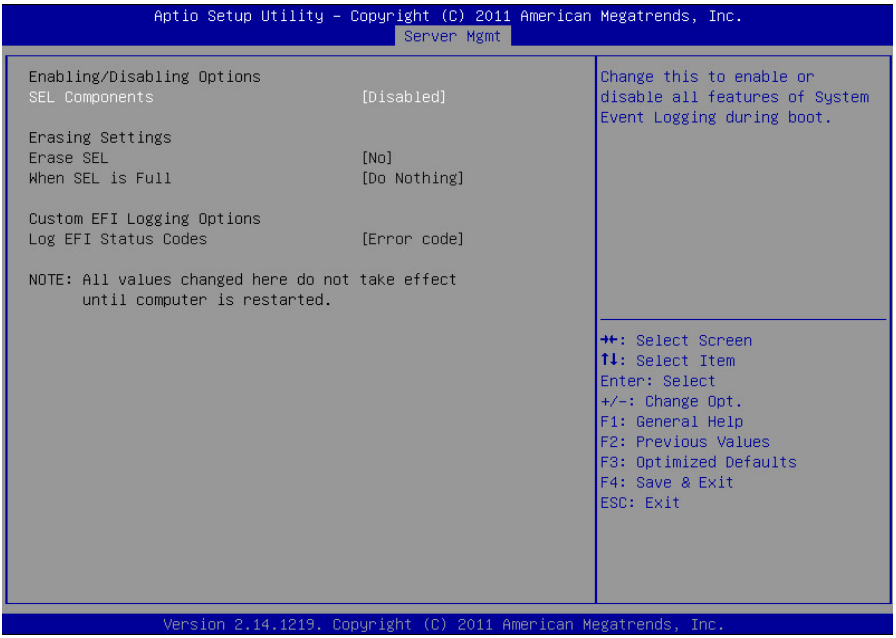
User Password
Install or change the password.

3.10 - Server Mgmt Menu

S5512GM2NR/S5512GM4NR/S5512WGM2NR

Press <Enter> to change the SEL event log configuration.
Enable/Disable interfaces to communicate with BMC.

3.10.1 - System Event Log Sub-Menu



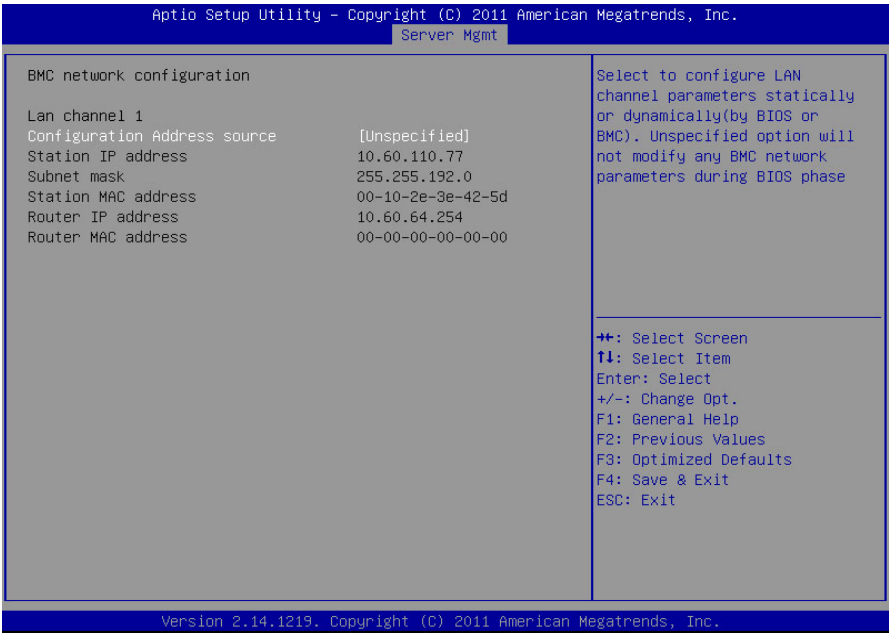
SEL Components
Change this to enable or disable all features of System Event Logging during boot.
[Disabled] **/** [Enabled]
Default is [Disabled]

Erase SEL
Choose options for erasing SEL.
[No] **/** [Yes, on next reset] / [No, on every reset]
Default is [No]

When SEL is Full
Choose options for reactions to a full SEL.
[Do Nothing] **/** [Erase Immediately]
Default is [Do Nothing]

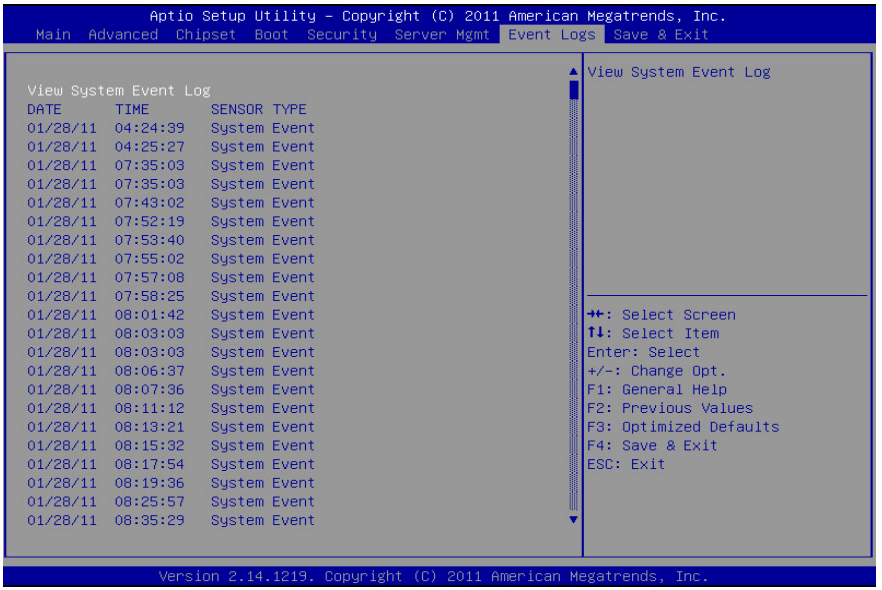
Log EFI Status Codes
Disable the logging of EFI Status Codes or log only error code or only progress code or both.
Both **/** Disabled / Error Code / Progress Code
Default is [Error Code]

3.10.2 - BMC Network Configuration Sub-Menu

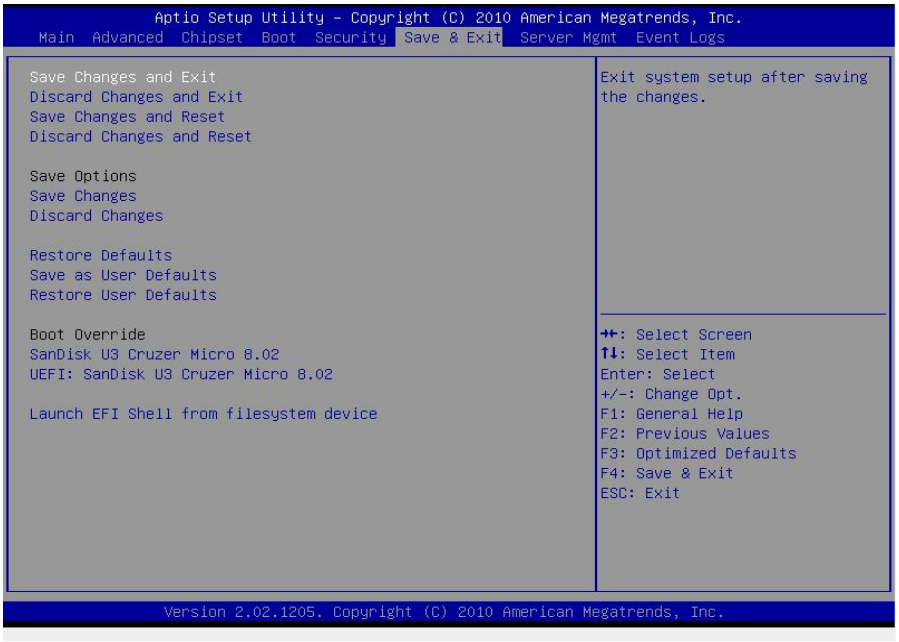


Configuration source
Select to configure LAN channel Parameters statically or dynamically (by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phrase
[Static] \ [Dynamic] \ [Unspecified]
Default is [Unspecified]

3.11 - Event Logs



3.12 - Save & Exit Menu



Save Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are stored into CMOS.
System will use the new settings to boot up.

Discard Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are not stored into CMOS.
System will use the old settings to boot up.

Save Changes and Reset
Use this option to save all new setup values that you have made and reset.

Discard Changes and Reset
Use this option to discard all new setup values that you have made and reset.

Save Changes
Use this option to save all new setup values that you have made

Discard Changes

Use this option to load all default failsafe setup values.

Restore Defaults
Use this option to restore defaults

Save as user Defaults
Use this option to save the user defaults

Restore user Defaults
Use this option to restore the user defaults.

Chapter 4: Diagnostics

If you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN® website at: http://**www.tyan.com**.

4.1 - Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN® web site:

http://www.tyan.com/

NOTE: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

4.2 - AMIBIOS Post Code (Aptio)

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint Ranges

Status Code Range	Description
0x01 – 0x0B	SEC execution
0x0C – 0x0F	Sec errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0x8F	DXE execution up to BDS
0x90 – 0xCF	BDS execution
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

Standard Checkpoints

SEC Phase

Status Code	Description
0x00	Note used
Progress Codes	
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization

SEC Error Codes	
0x0C – 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not found

SEC Beep Codes
None

PEI Phase

Status Code	Description
Progress Codes	
0x10	PCI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-Memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-Memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other)
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started.
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode(SMM) initialization
0x37	Post-Memory North Bridge initialization is started.

Status Code	Description
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F – 0x4E	OEM post memory initialization codes
0x4F	DXE PIL is started
PCI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU microcode is not found or microcode update is failed.
0x5A	Internal CPU error
0x5B	Reset PPI is not available.
0x5C – 0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL).
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4 – 0xE7	Reserved for future AMI progress codes
S3 Resume Error Codes	
0xE8	S3 Resume failed
0xE9	S3 Resume PPI not found
0xEA	S3 Resume Boot Script error
0xEB	S3 OS wake error
0xEC – 0xEF	Reserved for future AMI error codes

Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found.
0xF4	Recovery firmware image is loaded.
0xF5 – 0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available.
0xF9	Recovery capsule is not found.
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

# of Beeps	Description
1 (repeatedly)	Memory not installed
1	Memory was installed twice (installPEIMemory routine in PEI Core called twice).
2	Recovery started
3	DXEIPL was not found.
3	DXE Core Firmware Volume was not found.
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available.

DXE Phase

Status Code	Description
0x60	DXE Core is started.
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started.
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started.
0x6A	North Bridge DXE SMM initialization is started.

Status Code	Description
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started.
0x71	South Bridge DXE SMM initialization is started.
0x72	South Bridge devices initialization
0x73	South Bridge DXE initialization (South Bridge module specific)
0x74	South Bridge DXE initialization (South Bridge module specific)
0x75	South Bridge DXE initialization (South Bridge module specific)
0x76	South Bridge DXE initialization (South Bridge module specific)
0x77	South Bridge DXE initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller initialization
0x94	PCI Bus Enumeration
0x95	PCI BUS Request Resources
0x96	PCI Bus Assign Resources
0x97	Console output devices connect
0x98	Console Input devices connect
0x99	Super IO initialization
0x9A	USB initialization is started.
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E -0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect

Status Code	Description
0xA3	IDE Enable
0xA4	SCSI initialization is started.
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found.
0xD7	No Console Input Devices are found.
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error).

Status Code	Description
0xDB	Flash update is failed.
0xDC	Reset protocol is not available.

DXE Beep Codes

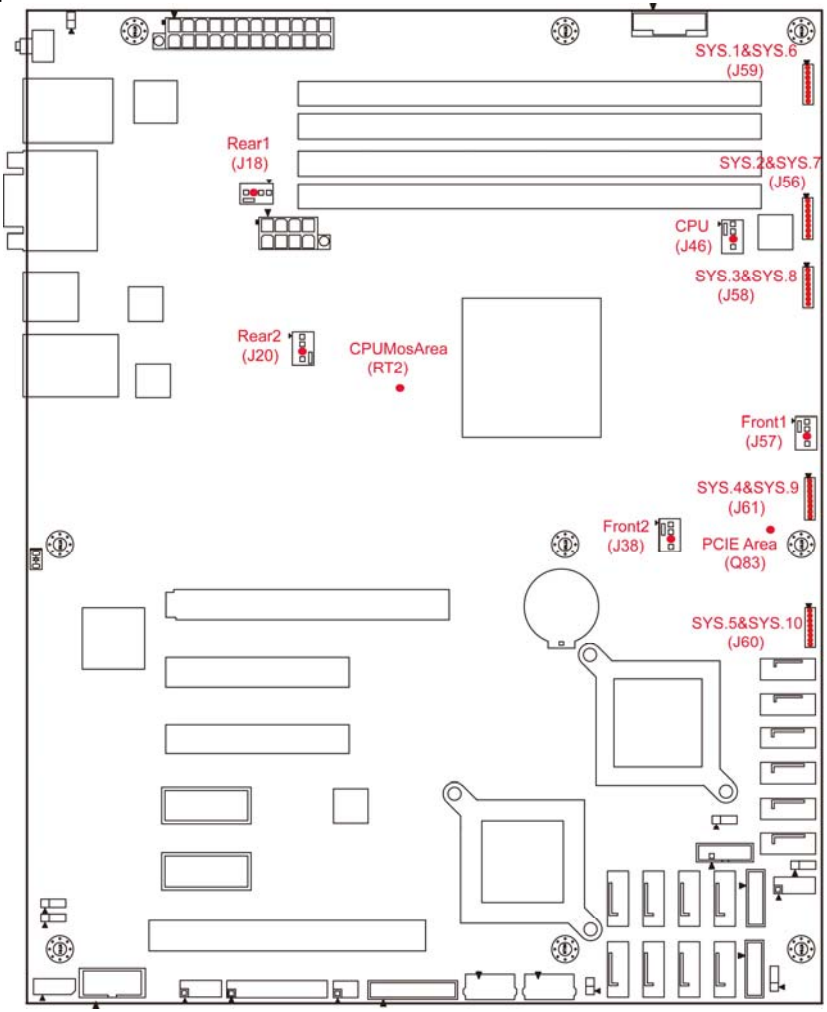
# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available.
5	No Console Output Devices are found.
5	No Console Input Devices are found.
6	Flash update is failed.
7	Reset protocol is not available.
8	Platform PCI resource requirements cannot be met.

ACPI/ASL Checkpoints

Status Code	Description
0x01	System is entering S1 sleep state.
0x02	System is entering S2 sleep state.
0x03	System is entering S3 sleep state.
0x04	System is entering S4 sleep state.
0x05	System is entering S5 sleep state.
0x10	System is waking up from the S1 sleep state.
0x20	System is waking up from the S2 sleep state.
0x30	System is waking up from the S3 sleep state.
0x40	System is waking up from the S4 sleep state.
0xAC	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

Appendix: Fan and Temp Sensors

This section aims to help readers identify the locations of some specific FAN and Temp Sensors on the motherboard. A table of BIOS Temp sensor name explanation is also included for readers' reference.



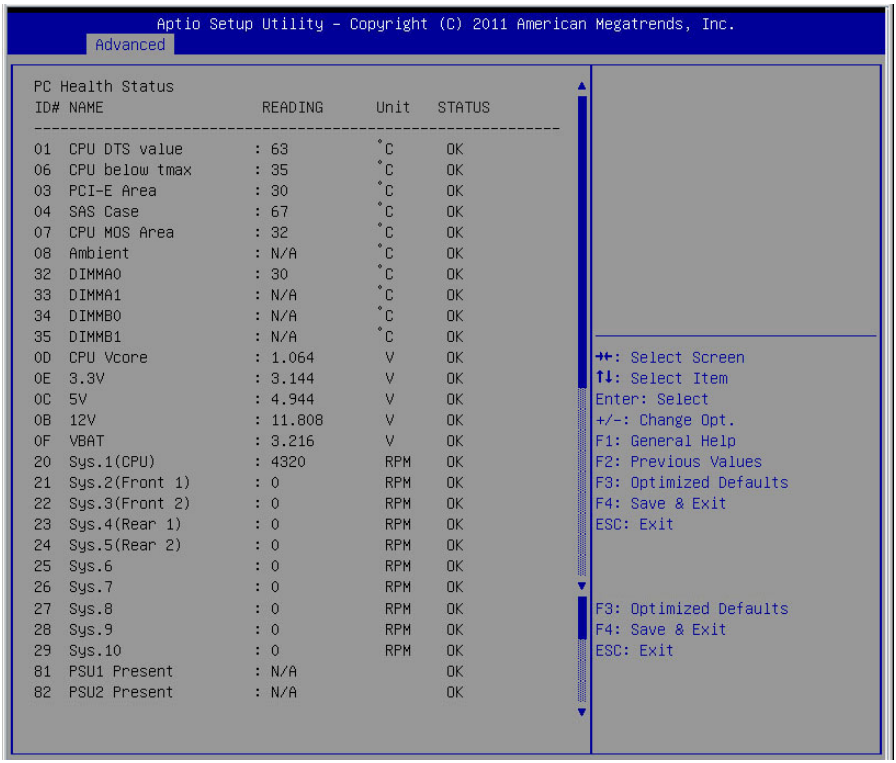
NOTE: The red dot indicates the sensor.

Fan and Temp Sensor Location:

1. Fan Sensor: It is located in the third pin of the fan connector, which detects the fan speed (rpm)

2. Temp Sensor: CPU_MOS_Area(RT2), PCIE_Area(Q83). They detect the system temperature around.
   NOTE: The system temperature is measured in a scale defined by **Intel**, not in Fahrenheit or Celsius.

BIOS Temp Sensor Name Explanation:



BIOS Temp Sensor	Name Explanation
CPU_DTS_Temp	Temperature of the CPU Digital Temperature Sensor
PCI-E_Area	Temperature of the PCIE_Area
SAS Case	Temperature of the SAS chip
CPU_MOS_Area	Temperature of the CPU_MOS_Area
DIMMA0	Temperature of DIMM A0 Slot
DIMMA1	Temperature of DIMM A1 Slot
DIMMB0	Temperature of DIMM B0 Slot
DIMMB1	Temperature of DIMM B1 Slot
SYS.1(CPU)	Fan Speed of CPU_Fan (J46)
SYS.2(Front 1)	Fan Speed of Front_Fan (J57)
SYS.3(Front 2)	Fan Speed of Front_Fan (J38)
SYS.4(Rear 1)	Fan Speed of Rear_Fan (J18)
SYS.5(Rear 2)	Fan Speed of Rear_Fan (J20)
SYSFAN6	Fan Speed of SYS_Fan6(J59)
SYSFAN7	Fan Speed of SYS_Fan7(J56)
SYSFAN8	Fan Speed of SYS_Fan8(J58)
SYSFAN9	Fan Speed of SYS_Fan9(J61)
SYSFAN10	Fan Speed of SYS_Fan10(J60)

NOTE

Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs only at 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path can carry. Greater bandwidth results in greater speed.

BBS (BIOS Boot Specification): a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, which provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data; usually from an application though it is also used when printing and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it to a disk drive. While this improves system performance (reading to or writing from a disk drive a single time is much faster than doing so repeatedly) there is the possibility of losing your data should the system crash. Information in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM socket because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels which are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, it is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN®'s BIOS updates can be found at http://www.tyan.com

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

HyperTransport™: a high speed, low latency, scalable point-to-point link for interconnecting ICs on boards. It can be significantly faster than a PCI bus for an equivalent number of pins. It provides the bandwidth and flexibility critical for today's networking and computing platforms while retaining the fundamental programming model of PCI.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

IDE INT (IDE Interrupt): a hardware interrupt signal that goes to the IDE.

I/O (Input/Output): the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one

device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

Parallel port: transmits the bits of a byte on eight different wires at the same time.

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI Bridge: allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM: a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

PXE (Preboot Execution Environment): one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was designed to define a standard set of preboot protocol services within a client with the goal of allowing networked-based booting to boot using industry standard protocols.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly and multiple hard drives will appear as a single drive

to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: RAID I/O Steering (Intel)

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data and is often referred to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SCSI Interrupt Steering Logic (SISL): Architecture that allows a RAID controller, such as AcceleRAID 150, 200 or 250, to implement RAID on a system board-embedded SCSI bus or a set of SCSI busses. SISL: SCSI Interrupt Steering Logic (LSI) (only on LSI SCSI boards)

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SDRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SLI (Scalable Link Interface): NVIDIA SLI technology links two graphics cards together to provide scalability and increased performance. NVIDIA SLI takes advantage of the increased bandwidth of the PCI Express bus architecture, and features hardware and software innovations within NVIDIA GPUs (graphics processing units) and NVIDIA MCPs (media and communications processors). Depending on the application, NVIDIA SLI can deliver as much as two times the performance of a single GPU configuration.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

ZCR (Zero Channel RAID): PCI card that allows a RAID card to use the onboard SCSI chip, thus lowering cost of RAID solution

ZIF Socket (Zero Insertion Force socket): these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shifts the processor over and down, guiding it into the board and locking it into place.

Technical Support

If a problem arises with your system, you should first turn to your dealer for direct support. Your system has most likely been configured or designed by them and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assistance for you. Furthermore, if you purchased your system from a dealer near you, take the system to them directly to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

If these options are not available for you then TYAN® Computer Corporation can help. Besides designing innovative and quality products for over a decade, TYAN® has continuously offered customers service beyond their expectations. TYAN®'s website (**www.TYAN.com**) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest software and operating system components to keep their systems running as powerful and productive as possible. TYAN® also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, TYAN® serves multiple market segments with the industry's most competitive services to support them.

"TYAN's tech support is some of the most impressive we've seen, with great response time and exceptional organization in general"

----Anandtech.com

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN® website for FAQ's, bulletins, driver updates, and other information: **http://www.TYAN.com**
3. Contact your dealer for help BEFORE calling TYAN®.
4. Check the TYAN® user group:
   alt.comp.periphs.mainboard.TYAN

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

NOTE: A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number Should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN® will pay to have the board shipped back to you.

Notice for the USA

Compliance Information Statement (Declaration of Conformity Procedure) DoC

FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

·This device must not cause harmful interference.

·This device must accept any interference received, including interference that may cause undesirable operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notice for Canada

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

Notice for Europe (CE Mark)

This product is in conformity with the Council Directive 2004/108/EC.

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. There will be danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

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