ROBO-8914VG2AR

Single Board Computer

User's Manual

Version 1.0

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How to Use This Manual

The manual describes how to configure your ROBO-8914VG2AR system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get ROBO-8914VG2AR running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Portwell** may make supplement or change in the products described in this document at any time.

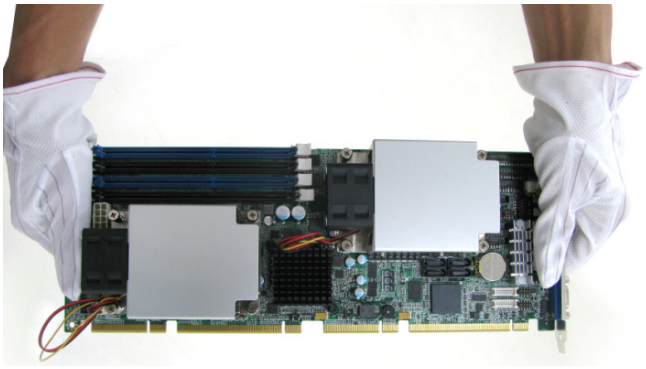
Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.portwell.com.tw/.

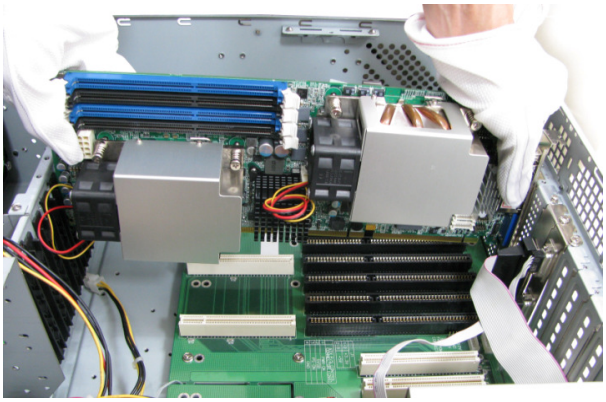
Notice
SBC Handling and Installation Notice

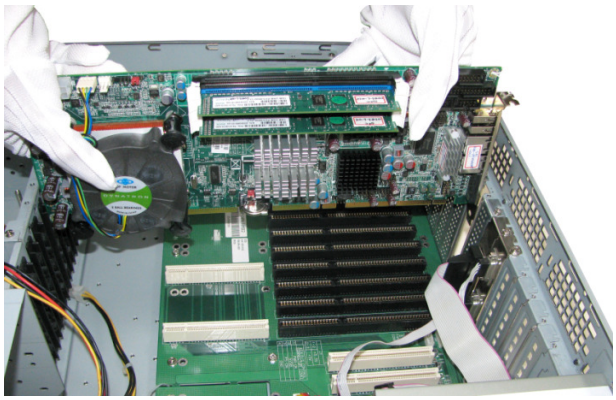
- Handling and Installing SBC

Caution: Do not just hold any single side of the SBC; hold evenly on both sides!

- Heavy processor cooler may bend the SBC when SBC being held just on one side.
- The bending may cause soldering or components damaged.







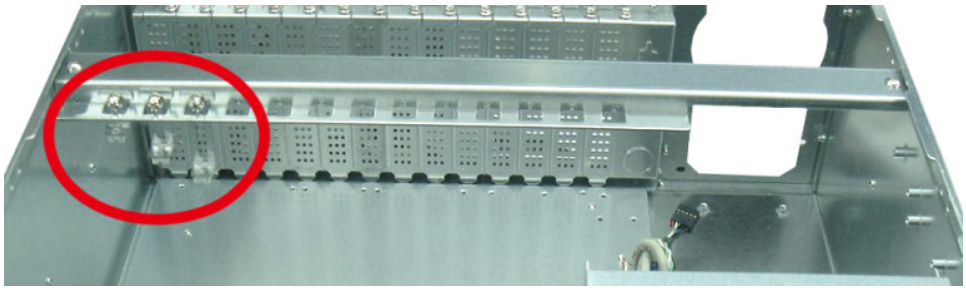
■ Fix your SBC in System

Caution: Suggest your S.I or vendor to use a metal bracket to hold/fix the desktop or server grade SBC to avoid the vibration damage during transportation. Heavy processor cooler may bend the SBC when systems are during transportation without any holder.

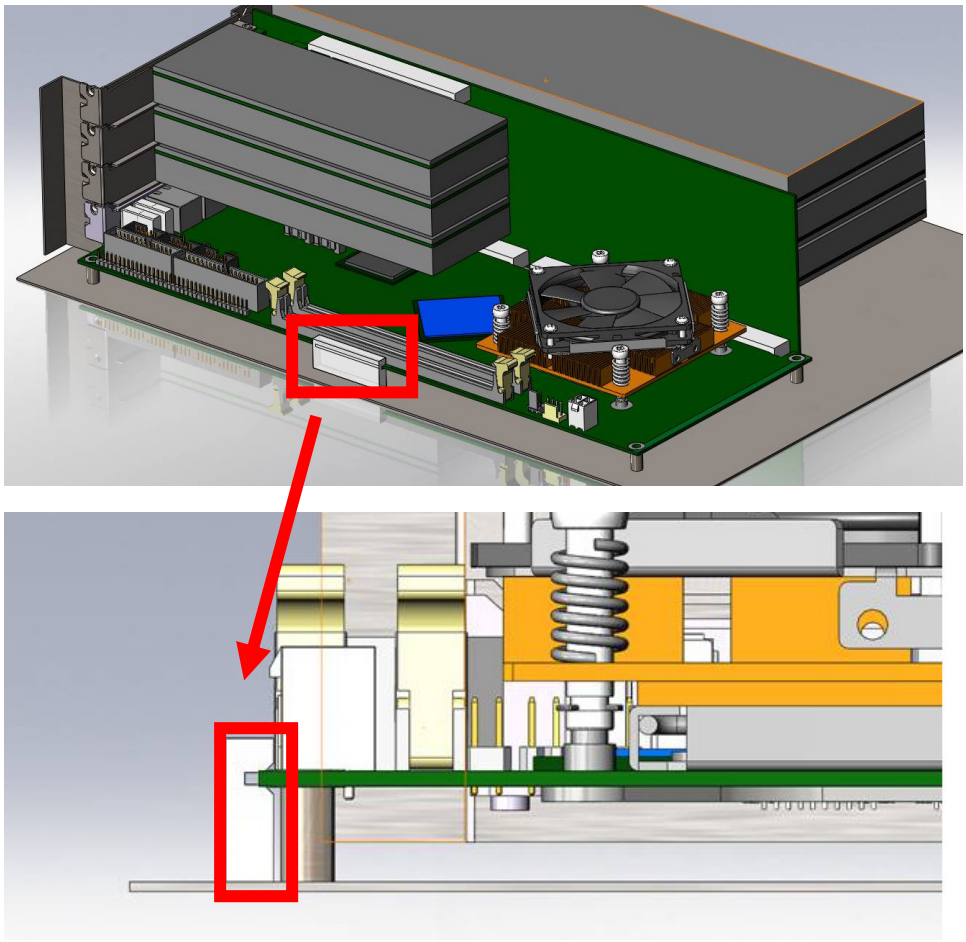
Example:

- 4U chassis :

  ➔ Use L type mental or plastic or rubber bracket to hold SBC.



- 2U or 1U chassis: a mental bracket on the bottom of chassis to balance and support SBC from bending.



Chapter 1
System Overview

1.1 Introduction

ROBO-8914VG2AR, the PICMG 1.3 SHB (Single Host Board) combined with either the Intel® Core 2 Quad processor, and with support 45nm Intel® Core 2 processor family. The attractive Core 2 Duo processor does not only posses amazing parallel computing power but also generates 65W TDP (Thermal Design Power). That makes the system more powerful and reliable with dual-core processor with smaller and quieter cooling fan.

The SHB adopted Intel® Q45 & ICH10DO chipset. The Q45 embedded Graphics Media Accelerator 4500 is the 5th generation Intel integrated graphics controller that supports DirectX 10, Shader model 4.0, and OpenGL 2.1. More than that, user could utilize even higher-end, the latest PCI Express x16 interface graphics card via backplane.

ROBO-8914VG2AR built with dual Intel® Gigabit Ethernet. Four DDR3 long DIMM sockets support system memory up to 8GB. Six SATA 300 ports (dual ports via backplane) support RAID 0, 1, 5, 10.

To meet bandwidth of storage and expansion cards requirement, the ROBO-8914VG2AR was designed flexible with four PCI Express lanes via backplane. Those four PCI Express lanes could be four PCI Express x1 links or one PCI Express x4 link. Four PCI Express x1 links configuration can support more PCI Express x1 devices via backplane and one PCI Express x4 link configuration can support RAID card or special add-on cards such as image processing board. In addition, the flexible configuration can be leveraged with bridge on backplane to support more PCI or PCI-X slots that benefits industries with legacy support.

Advanced Management Technology (AMT) 5.0 is feature that ROBO-8914VG2AR equipped. This technology provides remote access capability via Intel® Gigabit Ethernet controller. The new technology is a hardware-based solution that uses out-of-band communication for system management access to client systems. Beside that, the hardware and software information can be gathering by 3rd party software then storage in SPI interface EEPROM. Therefore, asset management could be done at the same time. ROBO-8914VG2AR also supports iTPM (Intel Trusted Platform Module) function for applications.

ROBO-8914VG2AR features:

- Support Intel® Core 2 Quad, Core 2 Duo, Celeron processor in an LGA775 socket with 1333/1066/800MHz Front Side Bus
- Four 240-pin DDR3 SDRAM DIMM socket, support for DDR3 1066/800 DIMMs, up to 8GB system memory
- Intel® Q45 integrated GMA 4500 that supports MPEG-2 Decode, DirectX 10, OpenGL 2.1 and Shader Model 4.0
- Equipped dual Intel Gigabit Ethernet ports
- Support iAMT 5.0 and iTPM function
- One PCI Express x16 external expansion, one PCI Express x4 link (can be configured as four PCI Express x1) and four PCI devices via backplane

The PICMG 1.3 SHB is the best solution of applications such like flight simulation, image processing, broadcasting and so on that need performance of display and storage.

1.2 Check List

The ROBO-8914VG2AR package should cover the following basic items:

- ✓ One ROBO-8914VG2AR single host board
- ✓ One dual Serial ports cable kit
- ✓ One single Parallel port cable kit
- ✓ One FDD cable
- ✓ Two 7-pin SATA signal cables
- ✓ One Installation Resources CD-Title

Optional: One bracket with PS/2 keyboard and mouse

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

- **Main processor**
  - Intel® Core 2 Quad / Core 2 Duo/Celeron Processor
  - FSB: 1,333/1066/800MHz
- **BIOS**
  AMI system BIOS with SPI Serial CMOS EEPROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible
- **Main Memory**
  - Support dual-channel DDR3 memory interface
  - Non-ECC, non-buffered DIMMs only
  - Four DIMM sockets support 1066/800 DDR3-SDRAM up to 8GB System Memory
- **L2 Cache Memory**
  Built-in Processor
- **Chipset**
  Intel® Q45 GMCH and ICH10DO chipset
- **Bus Interface**
  - Follow PICMG 1.3 Rev 1.0 standard (PCI Express and PCI)
  - Support four PCI Express x1 (can be aggregated as one PCI Express x4) through backplane
  - Support four PCI devices through backplane
- **SATA**
  - Four SATA 300 ports on-board and dual SATA 300 ports via backplane
  - Support Intel® Matrix Storage Technology based on Intel® ICH10DO
- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD
- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes
- **USB Interface**
  Support twelve USB (Universal Serial Bus) ports (two USB ports on bracket that dedicated to keyboard & mouse; six USB ports on-board and four USB ports via backplane) for high-speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  Support one 10-pin header for external PS/2 keyboard/mouse connection
- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock and HDD active LED, etc

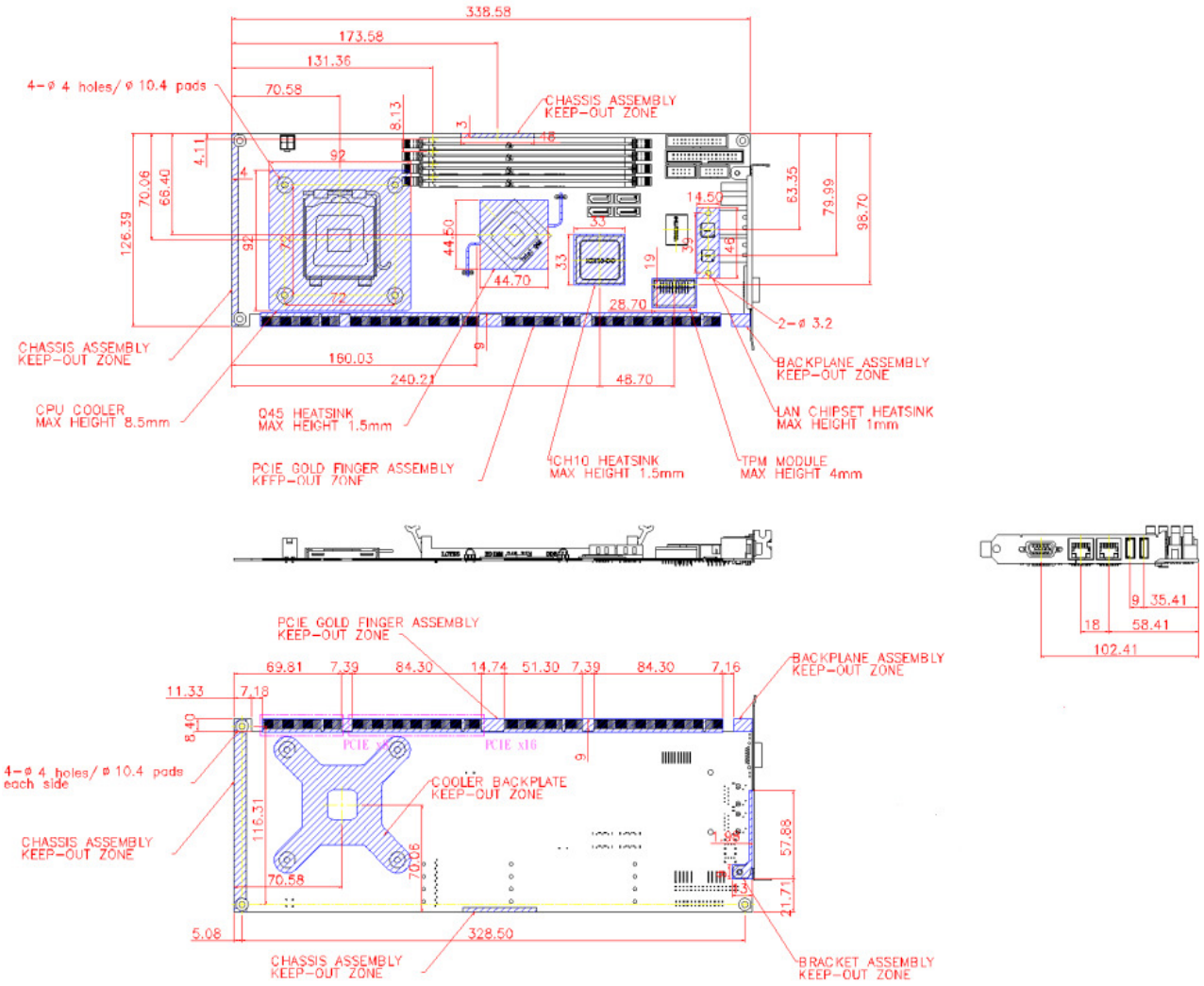
- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **On-board VGA**
  GMCH integrated graphics, 400MHz core frequency; share system memory up to 1GB for system with greater than or equal to 192MB of system memory
- **On-board Ethernet LAN**
  Dual Intel® PCI Express x1 interface based Gigabit Ethernet to support RJ-45 connector
- **High Driving GPIO**
  Support 8 programmable high driving GPIO
- **Cooling Fans**
  Support one 4-pin power connector for CPU fan and one 3-pin power connector for system fan
- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc.
- **Bracket**
  Support dual Ethernet port with 2 indicators, dual USB ports and one CRT port
- **Outline Dimension (L X W)**
  338.5mm (13.33") X 126.39mm (4.98")
- **Power Requirements**
  - +12V (CPU)@ 3.86A
  - +12V (System)@ 0.22A
  - +5V @ 6.44A
  - Test Programs: BurnIn Test V5.3
  - Run Time: Full loading
  - Test configuration:

System Configuration	
CPU Type	Intel® Core™ 2 Quad CPU Q9400 @2.66GHz L2:6144k FSB:1333MHz
SBC BIOS	Portwell,Inc. ROBO-8914 BIOS Rev.:R1.00.E0 (05072010)
Memory	Apacer DDR3 1066 2GB (ELPIDA J1108BDBG)*4
VGA Card	Onboard Intel® Q45 Express Chipset
VGA Driver	Intel® Q45/Q43 Express Chipset Version 6.14.10.5248
LAN Card	Onboard Intel® 82567LM-3 Gigabit Network Connection

LAN Driver	Intel® 82567LM-3 Gigabit Network Connection Version 10.3.39.0
LAN Card	Onboard Intel® 82574L Gigabit Network Connection
LAN Driver	Intel® 82574L Gigabit Network Connection Version 10.3.42.0
Audio Card	Onboard Realtek ALC662 Audio
Audio Driver	Realtek High Definition Audio Version 5.10.0.5735
Chip Driver	Intel® Chipset Device Software Version 9.1.1.1025
USB2.0 Driver	Intel® ICH10 Family USB Enhanced Host Version 9.0.0.1005
SCSI Card	Adaptec 29160LP
SCSI HDD	Seagate ST39173W 19GB
SATA HDD	Seagate ST3802110AS 80GB
CDROM	LITE-ON LH20A1S DVD-ROM
Power Supply	FSP350-60GLC
Back plane	PBPE-12A9 100

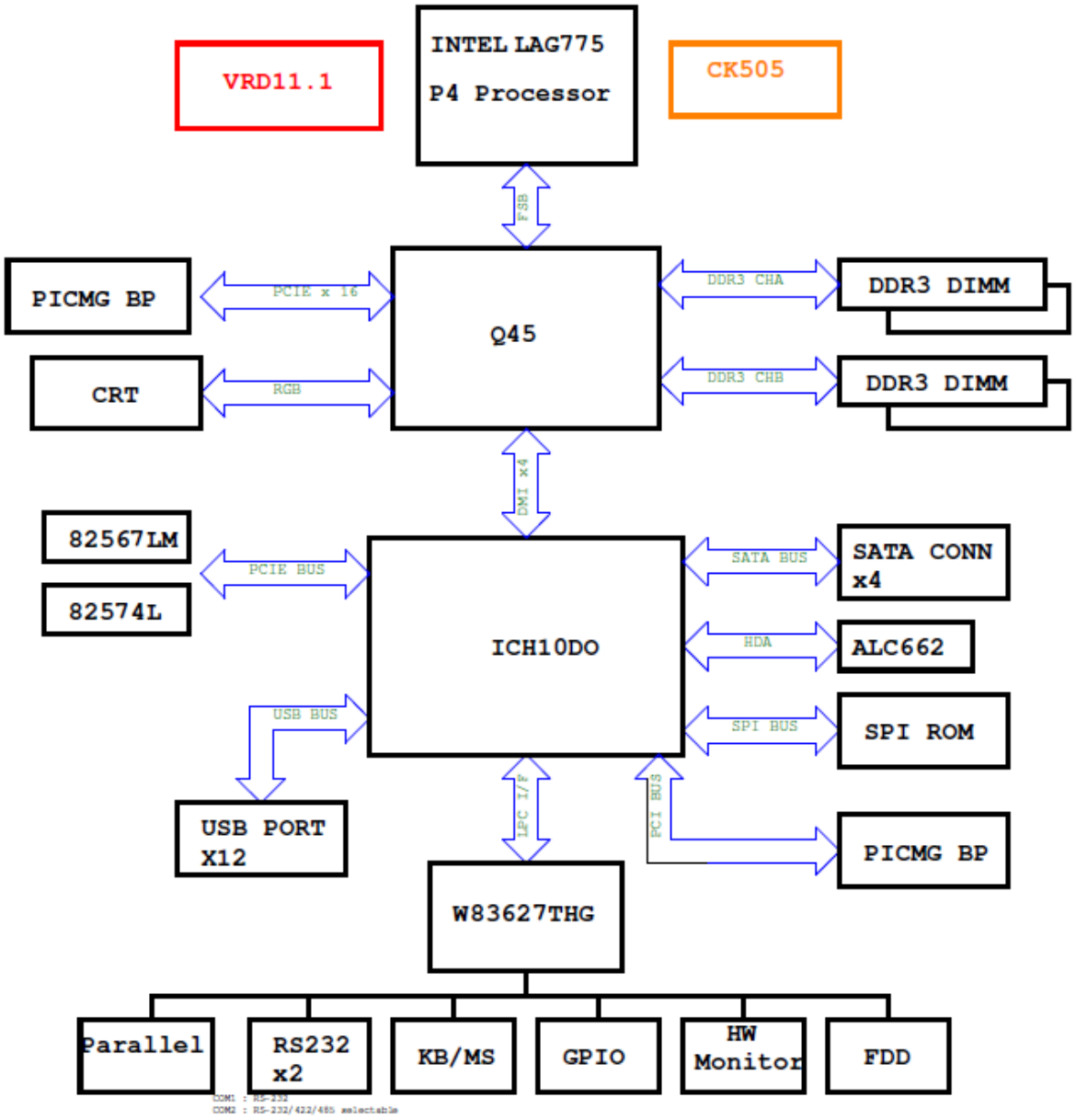
- **Operating Temperature:**
  0°C ~ 60°C (23°F ~ 140°F)
- **Storage Temperature**
  -20°C ~ 80°C
- **Relative Humidity**
  5% ~ 90%, non-condensing

1.3.1 Mechanical Drawing



1.4 System Architecture

All of details operating relations are shown in ROBO-8914VG2AR series System Block Diagram.



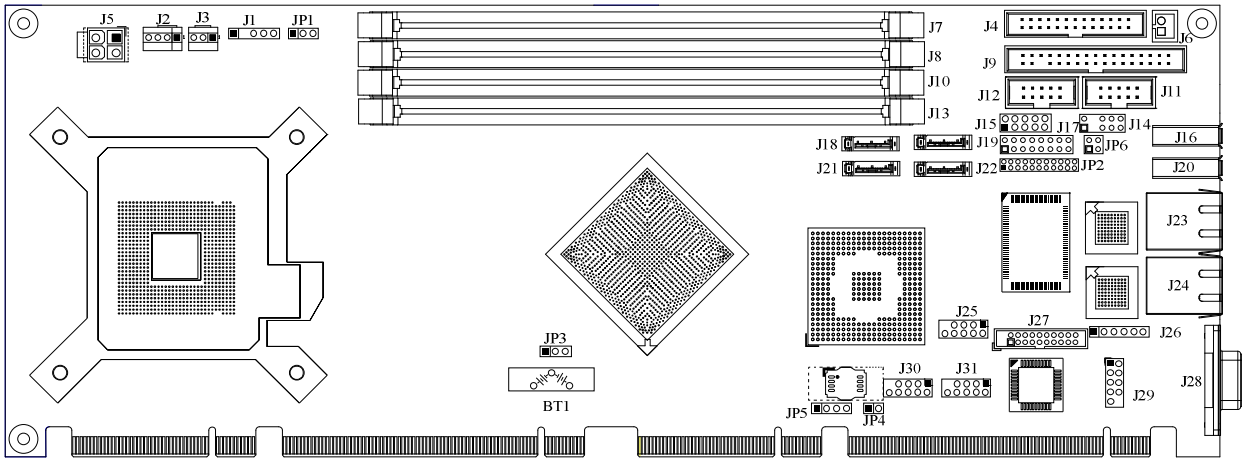
ROBO-8914VG2AR System Block Diagram

Chapter 2
Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on ROBO-8914VG2AR are in the proper position. The default settings shipped from factory are marked with an asterisk (★).

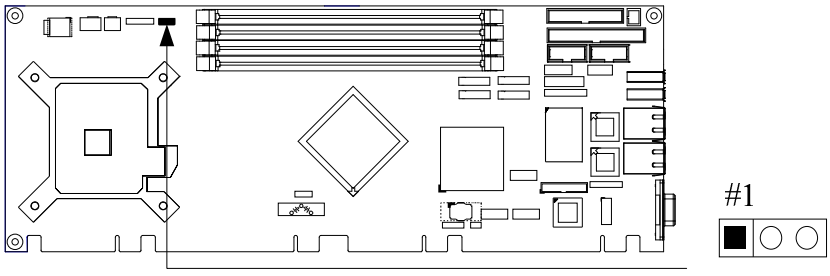
2.1 Jumpers

In general, jumpers on the single board computer are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here NC stands for "Not Connect".



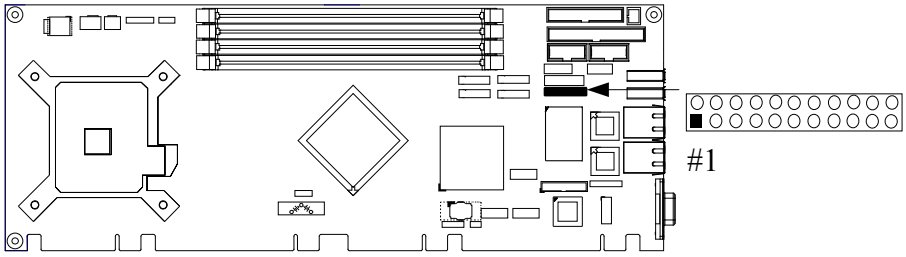
JP1: ADD2/PGE Selection

JP1	Function
1-2 Short	PEG ★
2-3 Short	ADD2



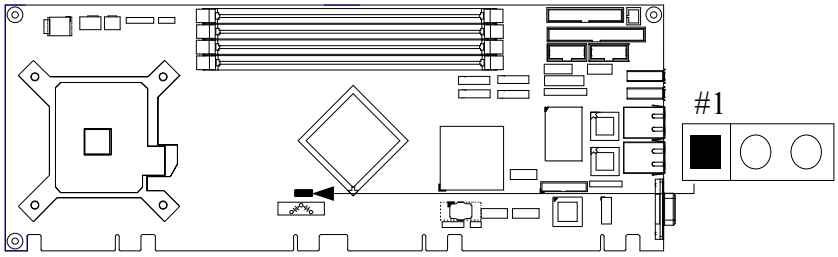
JP2: COM2 Interface Selection

JP2	Function
5-6, 9-11, 10-12, 15-17, 16-18 Short	RS-232 ★
3-4, 7-9, 8-10, 13-15, 14-16, 21-22 Short	RS-422
1-2, 7-9, 8-10, 19-20 Short	RS-485



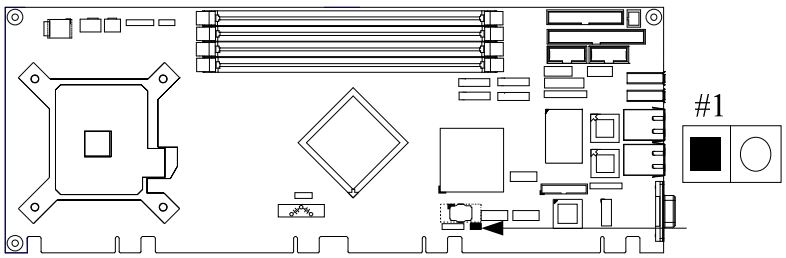
JP3: CMOS Clear

JP3	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents



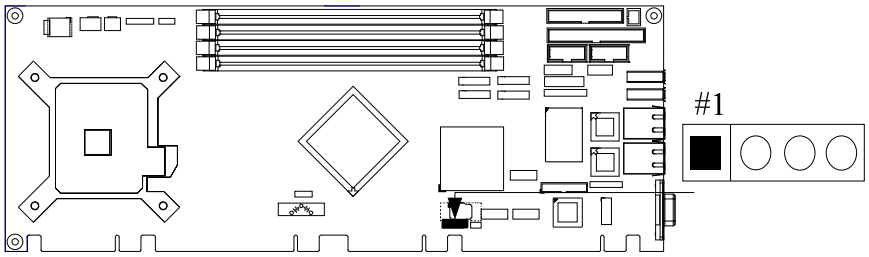
JP4: ME Selection

JP4	Function
Short	Disable
Open	Enable ★



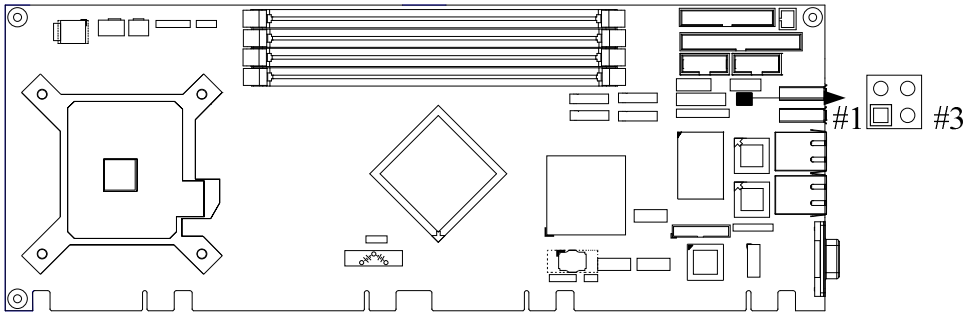
JP5: PCI-E X1,X4 Interface Selection

JP5	Function
Short (1-2, 3-4)	PCI-E X4 (Support one slot)
Open	PCI-E X1 (Support four slot) ★



JP6: WDT ,ATX emulation AT mode Selection

JP5	Function
Short (1-2)	WDT Enable
Open (1-2)	WDT Disable ★
Short (3-4)	ATX emulation AT Enable
Open (3-4)	ATX emulation AT Enable ★



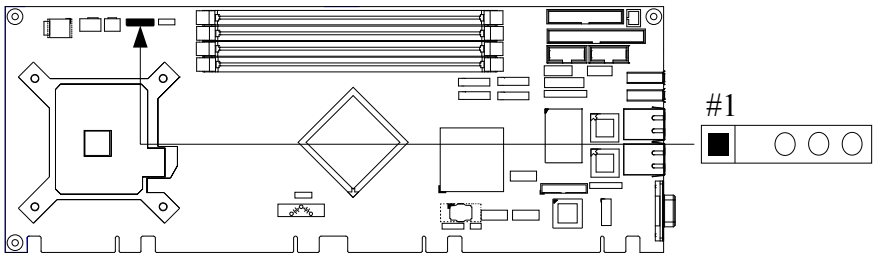
2.2 Connectors

I/O peripheral devices and Flash disk will be connected to these interface connectors

Connector	Function	Remark
J1	SMBUS Connector	5x1 pin header
J2	FAN 1 (CPU FAN) Power Connector	
J3	FAN 2 (SYSTEN FAN) Power Connector	
J4	Parallel Port Connector	
J5	+12V Power Connector	Connect to CPU
J6	CASEOPEN#	Reserved
J7J8/J10/J13	DDR3 SLOT	
J9	Floppy Connector	
J11	COM1 Serial Port 1 Connector	
J12	COM2 Serial Port 2 Connector	
J14	External PS/2 Keyboard/Mouse Connector	
J15	General Purpose I/O Connector	
J16/J20	Internal USB Connector	
J17	Front Panel Pin HDR	
J18/J19/J21/J22	SATA Connector	
J23	Ethernet RJ-45 Connector (LAN 1)82567LM	
J24	Ethernet RJ-45 Connector (LAN 2) 82574L	
J25/J30/J31	External USB Connector	
J26	IrDA Connector	6x1 pin header
J27	TPM Connector	Reserved
J28	VGA D-SUB Connector	
J29	Audio Connector	

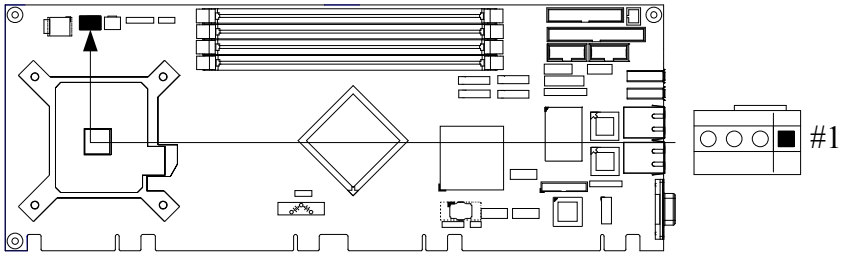
J1: SMBUS Connector

PIN No.	Signal Description
1	SMB_CLK
2	N/C
3	Ground
4	SMB_DAT
5	+5V



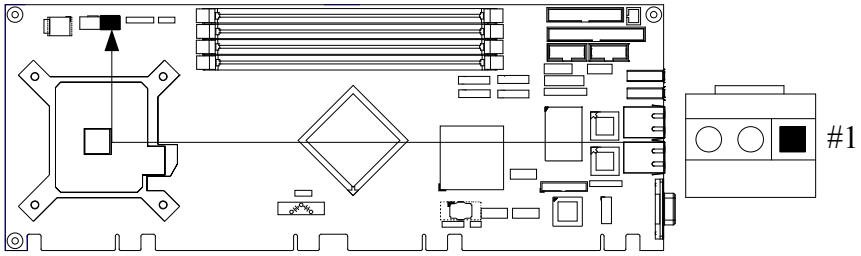
J2: CPU Fan Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Fan on/off output
4	Fan Speed control



J3: System Fan Connector

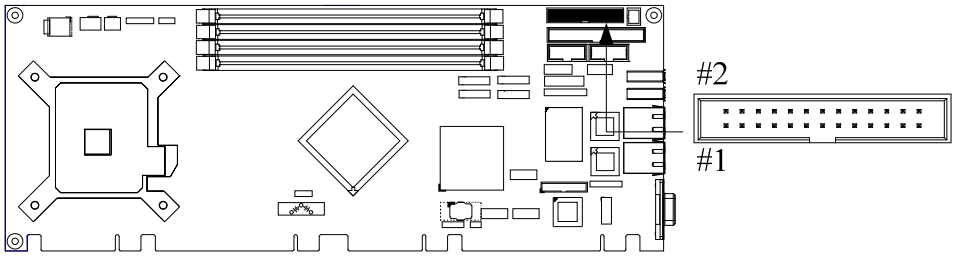
PIN No.	Signal Description
1	Ground
2	Fan speed control
3	Fan on/off output



J4: Parallel Port Connector

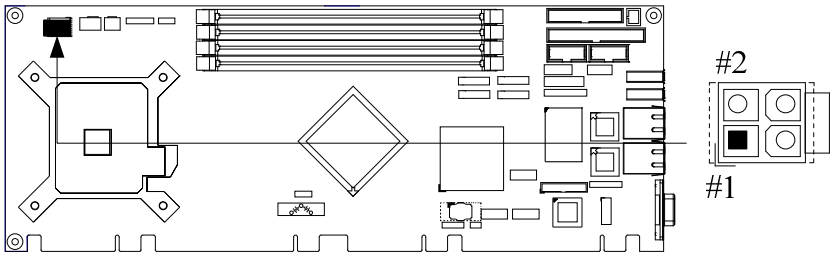
PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data0	15	Error#
3	Data1	16	Initialization#
4	Data2	17	Printer Select IN#
5	Data3	18	Ground
6	Data4	19	Ground
7	Data5	20	Ground
8	Data6	21	Ground
9	Data7	22	Ground
10	Acknowledge#	23	Ground

11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	NC



J5: +12V POWER Connector

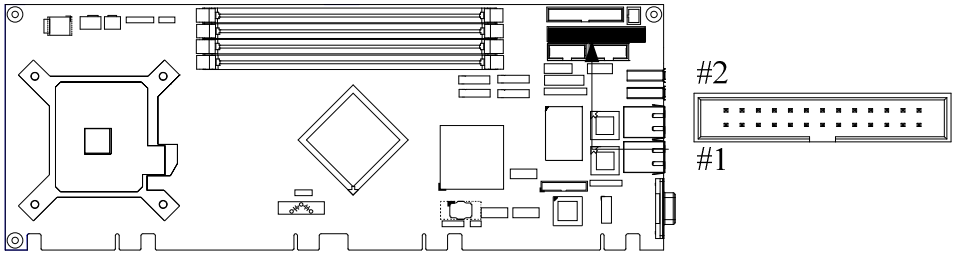
PIN No.	Signal Description
1	Ground
2	Ground
3	+12V
4	+12V



J9: Floppy Interface

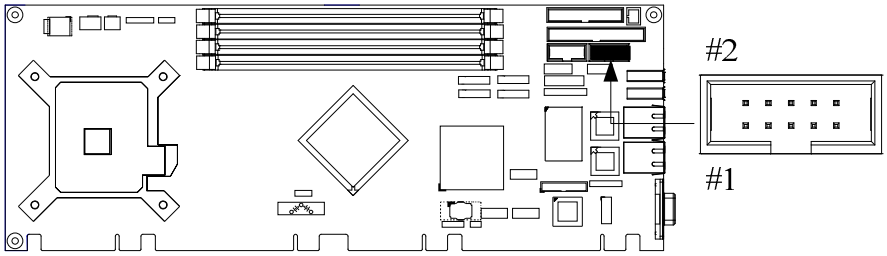
PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select
3	Ground	4	N/C
5	Ground	6	DRVEN1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#

29	Ground	30	Read Data#
31	Ground	32	Head Select#
33	Ground	34	Disk Change#



J11: COM1 Serial Port

PIN No.	Signal Description
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	Ground
10	N/C

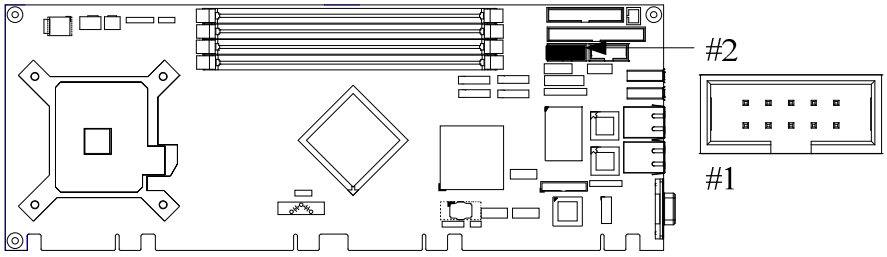


J12 : COM2 Serial Port 2 Connector

PIN No.	Signal Description		
	RS-232	**RS-422**	**RS-485**
1	DCD (Data Carrier Detect)	TX-	DATA-
2	DSR (Data Set Ready)	N/C	N/C
3	RXD (Receive Data)	TX+	DATA+
4	RTS (Request to Send)	N/C	N/C
5	TXD (Transmit Data)	RX+	N/C
6	CTS (Clear to Send)	N/C	N/C
7	DTR (Data Terminal Ready)	RX-	N/C

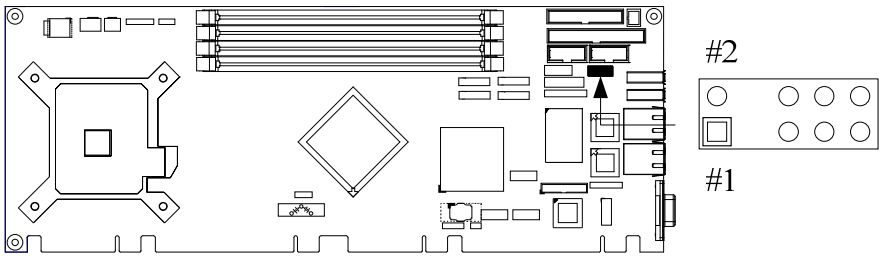
8	RI (Ring Indicator)	N/C	N/C
9	GND (Ground)	GND	GND
10	N/C	N/C	N/C

Note:
J12 (COM2) could be configurable as RS-232/422/485 with jumper JP2.



J14: External PS/2 Keyboard/Mouse Connector

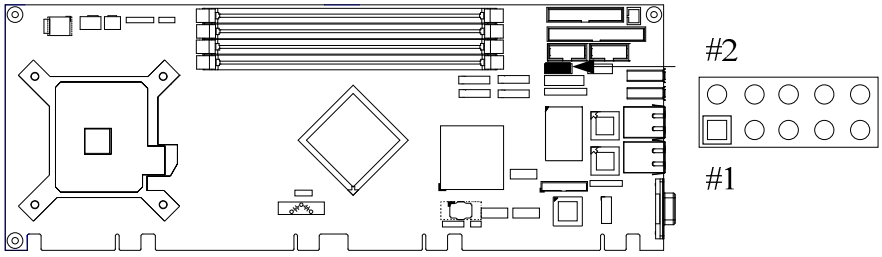
PIN No.	Signal Description	PIN No.	Signal Description
1	Mouse Data	2	Keyboard Data
3	N/C	4	N/C
5	Ground	6	Ground
7	PS2 Power	8	PS2 Power
9	Mouse Clock	10	Keyboard Clock



J15: General Purpose I/O Connector

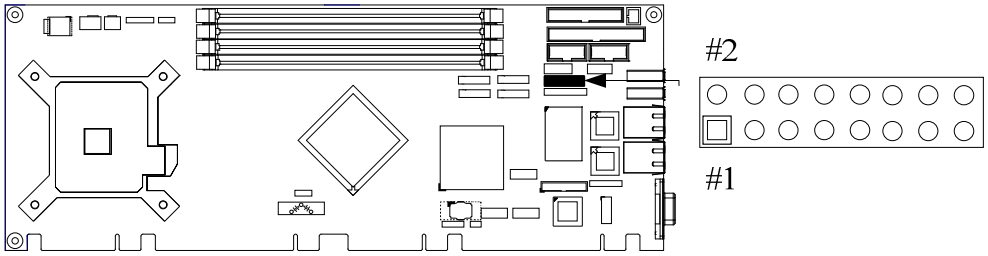
PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	Ground	10	+5V

Note:
All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each Fan.



J17: Front Panel Pin HDR

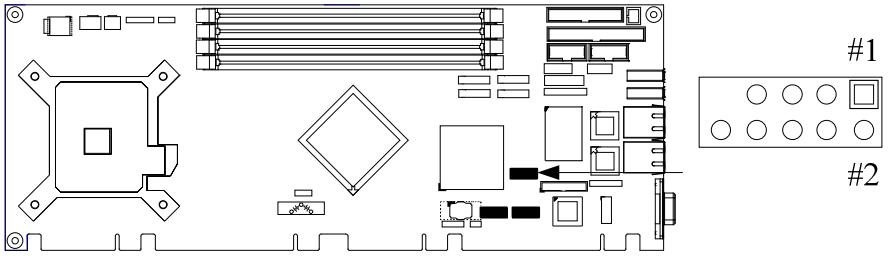
PIN No.	Signal Description	PIN No.	Signal Description
1	PWR_LED(+)	2	Speaker(+)
3	PWR_LED(-)	4	N/C
5	LAN1_ACT	6	N/C
7	LAN1_LINK	8	Speaker(-)
9	LAN2_LINK	10	NC
11	LAN2_ACT	12	NC
13	HDD_LED(+)	14	NC
15	HDD_LED(-)	16	NC



J25/J30/J31: External USB Connector

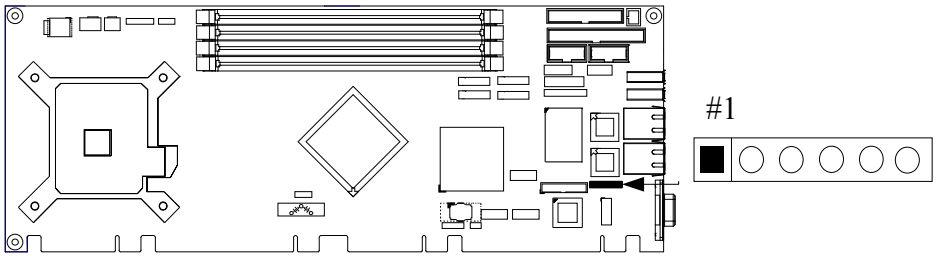
PIN No.	Signal Description	PIN No.	Signal Description
1	5V Dual	2	5V Dual
3	USB-	4	USB-
5	USB+	6	USB+
7	Ground	8	Ground
	Key(no pin)	10	N/C

Note:
5V Dual is always available. It's supplied by either 5V VCC power source in normal operation mode or 5V standby power source in standby mode.



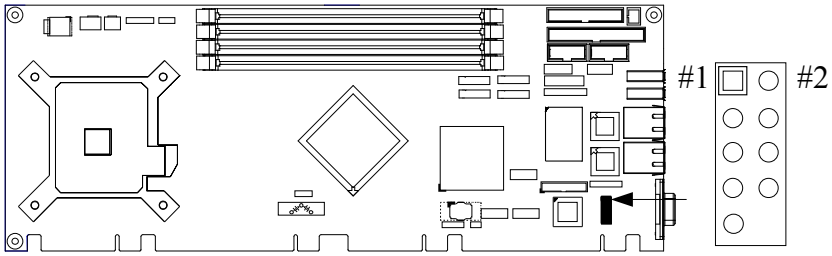
J26: IrDA Connector

PIN No.	Signal Description
1	+5V
2	N/C
3	IRRX
4	IRTX
5	Ground
6	N/C



J29: Audio MIC/Line-in/Line-out Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	MIC with Reference Voltage	2	Analog Ground
3	Line-in Left Channel	4	Analog Ground
5	Line-in Right Channel	6	Analog Ground
7	Line-out Left Channel	8	Analog Ground
9	Line-out Right Channel	10	N/C



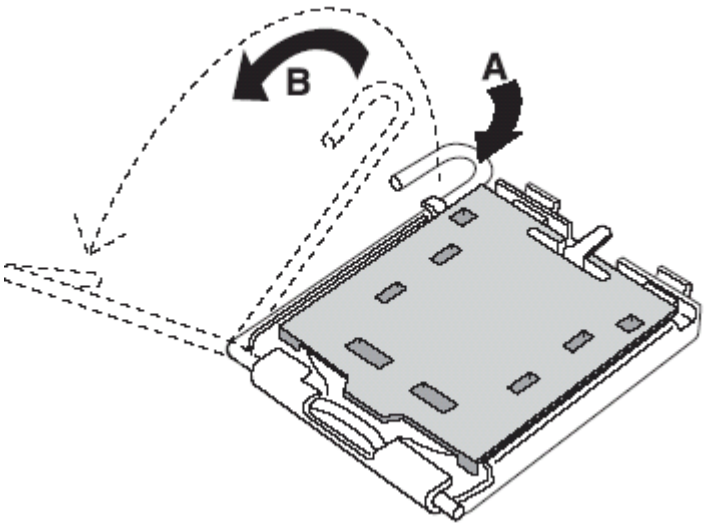
Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle Watch Dog Timer (WDT) and operation of GPIO in software programming.

3.1 Intel® LGA 775 Processor

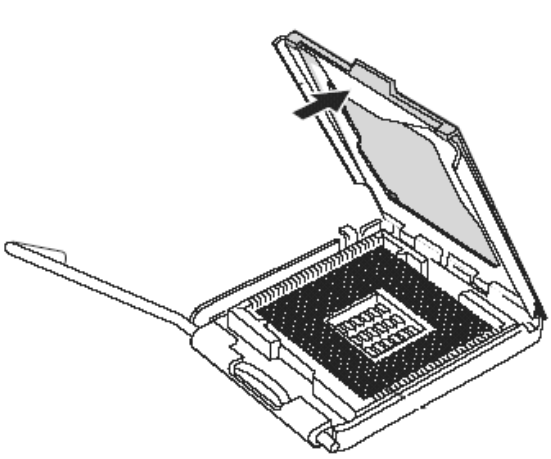
Installing LGA 775 CPU

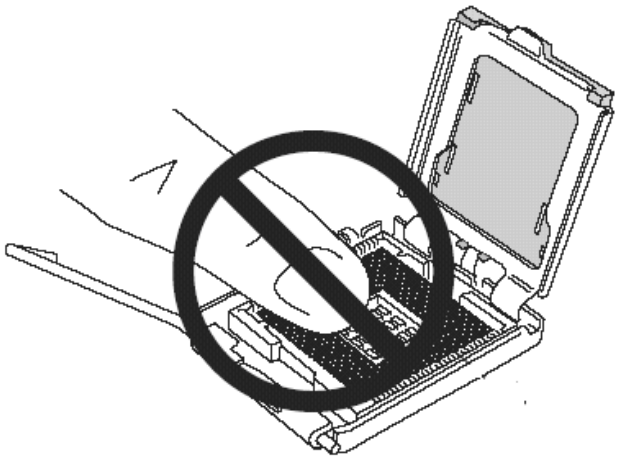
1) Lift the handling lever of CPU socket outwards and upwards to the other end.



2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place . If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

Triangle mark is meaning first pin position; kindly assemble and take aim at notch of top and bottom between CPU and socket.





Note:
Don't touch directly by your hand or impacts internal align balls of CPU socket to avoid motherboard destruction, it is a precise actuator.

3) Push down the lever to lock processor chip into the socket once CPU fits.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the LGA 775 socket.

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

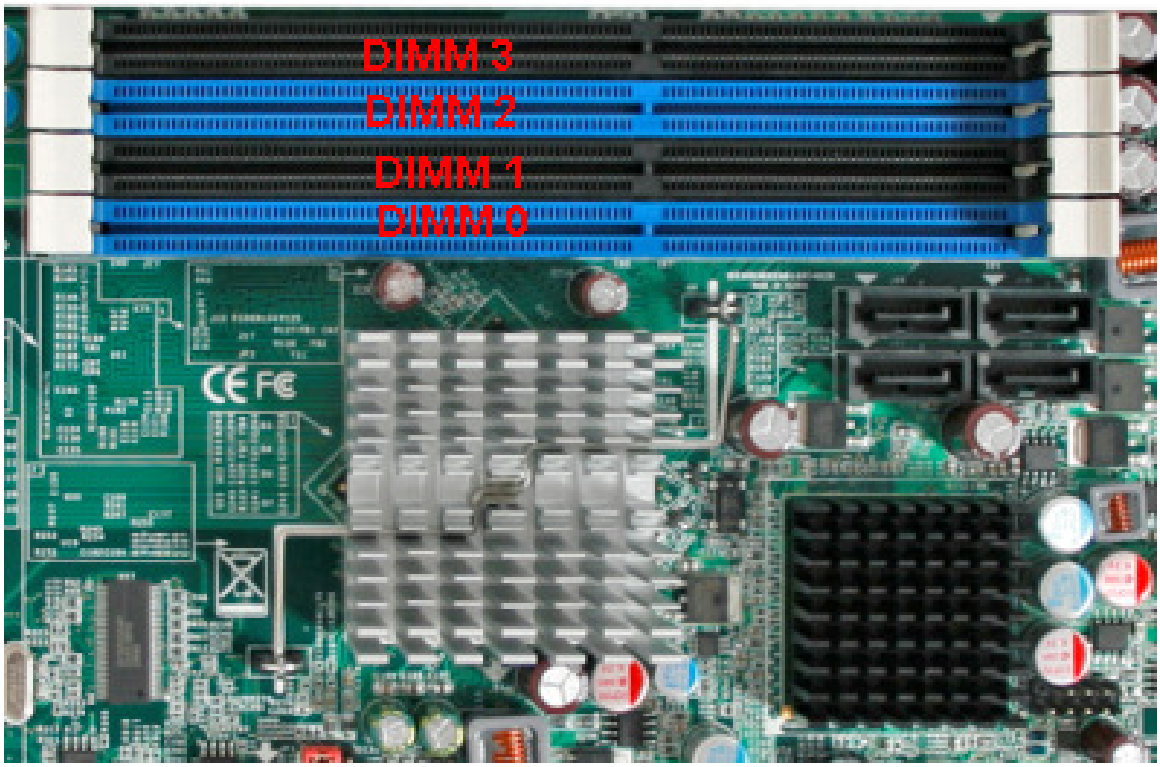
Configuring System Bus

ROBO-8914VG2AR will automatically detect the CPU FSB 800/1066/1333 MHz used. CPU speed of Intel Core 2 Duo and Intel Core 2 Quad Processor can be detected automatically.

Inserting Memory Module

We suggest you to insert the memory from DIMM0 to DIMM3 sequentially when you have one more memory for using. When you use only one memory in system, we suggest to insert in DIMM 0. If you want to use the channel A- slot 2, you must use channel A- slot 1 first. Otherwise, the system can't boot. The Channel B has the same rule.

DIMM3	non-ECC DDR3 DIMM channel B - slot 2
DIMM2	non-ECC DDR3 DIMM channel B - slot 1
DIMM1	non-ECC DDR3 DIMM channel A - slot 2
DIMM0	non-ECC DDR3 DIMM channel A - slot 1



3.2 Main Memory

ROBO-8914VG2AR provide 4 x 240-pin DIMM sockets which supports 800/1066 DDR3 SDRAM as main memory, Non-ECC (Error Checking and Correcting), non-register functions. The maximum memory size can be up to 8GB capacity.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be either one double-sided DIMM in either one DIMM socket or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Dual Channel DDR3 DIMM

Dual Channel DDR3 memory technology doubles the bandwidth of memory bus. Adequate or higher bandwidth of memory than processor would increase system performance. To enable Dual Channel DDR3 memory technology, you have to install dual identical memory modules in both memory sockets. Following tables show bandwidth information of different processor and memory configurations.

CPU FSB	Bandwidth
1066MHz	8.5GB/s
800MHz	6.4GB/s

Memory Frequency	Dual Channel DDR Bandwidth	Single Channel DDR Bandwidth
1066MHz	17GB/s	8.5GB/s
800MHz	12.8GB/s	6.4GB/s

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade system performance without acquiring technical information.

3.3 Installing the Single Board Computer

To install your ROBO-8914VG2AR into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place ROBO-8914VG2AR into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING
Please ensure that SBC is properly inserted and fixed by mechanism.

Note:
Please refer to section 3.3.1 to 3.3.7 to install INF/VGA/LAN/Audio/Raid/AMT & TPM drivers.

3.3.1 Chipset Component Driver

The chipset on ROBO-8914VG2AR is a new chipset that a few old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows XP, please install its INF before any of other Drivers are installed. You can select the Intel Chipset driver from the ROBO-8914VG2AR CD-title.

3.3.2 Intel Integrated Graphics GMCH Chip

ROBO-8914VG2AR comes with the Intel® GMA 4500 graphics supporting DVMT 5.0 display memory up to 287 MB. Shared 32 accompany it to 1GB system Memory with Total Graphics Memory. This combination makes ROBO-8914VG2AR an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI-Express by 16 VGA card can take over the system display.

Drivers Support
Please select Intel Graphic driver from the ROBO-8914VG2AR Driver CD-title. Driver supports Windows XP.

3.3.3 On-board Fast Ethernet Controllers

Drivers Support

Please select Intel Ethernet driver from the ROBO-8914VG2AR Driver CD-title to install those two integrated Intel® 82567LM Gigabit Ethernet PHY for iAMT 5.0 function & Intel® 82574L Gigabit Ethernet controller drivers. Those two drivers support Windows XP.

LED Indicator (for LAN status)

This provides two LED indicators to report Intel 82567LM & 82574L Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

<table>
<tr><th rowspan="2">82567LM &82574L</th><th rowspan="2">Color</th><th rowspan="2">Name of LED</th><th colspan="3">Operation of Ethernet Port</th></tr>
<tr><th colspan="2">Linked</th><th>Active</th></tr>
<tr><td>Status LED</td><td>Orange</td><td>LAN Linked & Active LED</td><td colspan="2">On</td><td>Blinking</td></tr>
<tr><td rowspan="2">Speed LED</td><td>Orange</td><td rowspan="2">LAN speed LED</td><td>Giga Mbps</td><td>100 Mbps</td><td>10 Mbps</td></tr>
<tr><td>Green</td><td>Orange</td><td>Green</td><td>Off</td></tr>
</table>

3.3.4 On-board High Definition Audio Controller

Drivers Support

Please select the Realtek High Definition Codec Audio driver form ROBO-8914VG2AR Driver CD-title. The driver supports Windows XP.

3.3.5 Intel Matrix Storage Manager Device

Drivers Support

Please find utility tool for Intel ICH10DO of ROBO-8914VG2AR CD-title. The drivers support Windows XP.

Installing Serial ATA hard disks

The ROBO-8914VG2AR supports Four Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:
1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

Intel RAID configurations

This ROBO-8914VG2AR supports RAID 0, RAID 1, RAID 5, RAID (1+0) and Intel® Matrix Storage configurations for Serial ATA hard disks drives through the Intel ICH10DO Southbridge chip.

RAID configurations

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Intel Matrix Storage Manager. The Intel® Matrix Storage technology supported by the ICH10DO chip allows you to create a RAID 0 and a RAID 1 set using only two identical hard disk drives. The Intel® Matrix Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.

3.3.6 AMT Function Installation

A major barrier to greater IT efficiency has been removed by Intel® Active Management Technology (Intel® AMT) a feature on Intel® vPro™ technology. Using built-in platform capabilities and popular third-party management and security applications, Intel AMT allows IT to better Discover, Heal, and protects their networked computing assets.

Drivers Support

Installing ME (Management Engine) Drivers (which includes HECI Driver and LMS_SOL Driver) and operating PCI serial port and PCI simple communications controller. Driver supports Windows XP.

3.3.7 Intel Trusted Platform Module

The Trusted Platform Module (TPM) can securely store keys, digital certificates, passwords and data.

Drivers Support

Please select the TPM Driver form ROBO-8914VG2AR Driver CD-title. Driver supports Windows XP.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.

JP3: CMOS Clear

JP3	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

ROBO-8914VG2AR allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627THG data sheet.

There are two PNP I/O port addresses that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
//Step1. Enter W83627THG configuration registers mode:
outportb(0x2E, 0x87);
outportb(0x2E, 0x87);

//* Step2. Pin89 to be WDTO
outportb(0x2E, 0x2b);
outportb(0x2E + 1, 0x04);

//* Step3. Select logic device 8:
outportb(0x2E, 0x07);
outportb(0x2E + 1, 0x08);
```

```
//* Step4. Config WDT using second to be unit:
outportb(0x2E, 0xf5);
outportb(0x2E + 1, 0x00);

//* Step5. Set WDT time-out time:
outportb(0x2E, 0xf6);
outportb(0x2E + 1, time_out);

//* Step6. Exit configuration registers mode:
outportb(0x2E, 0xaa);
```

3.6 GPIO

The ROBO-8914VG2AR provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

3.6.1 Pin assignment

J15 : General Purpose I/O Connector

PIN No.	Signal Description
1	General Purpose I/O Port 0 (GPIO0)
2	General Purpose I/O Port 4 (GPIO4)
3	General Purpose I/O Port 1 (GPIO1)
4	General Purpose I/O Port 5 (GPIO5)
5	General Purpose I/O Port 2 (GPIO2)
6	General Purpose I/O Port 6 (GPIO6)
7	General Purpose I/O Port 3 (GPIO3)
8	General Purpose I/O Port 7 (GPIO7)
9	Ground
10	+5V

All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each source sink capacity up to 12mA.

3.6.2 ROBO-8914VG2AR GPIO Programming Guide

There are 8 GPIO pins on ROBO-8914VG2AR. These GPIO pins are from SUPER I/O (W83627THG) GPIO pins, and can be programmed as Input or Output direction.

J15 pin header is for 8 GPIO pins and its pin assignment as following :

J15_Pin1=GPIO0:from SUPER I/O_GPIO10 with Ext. 4.7K PH
J15_Pin2=GPIO4:from SUPER I/O_GPIO14 with Ext. 4.7K PH
J15_Pin3=GPIO1:from SUPER I/O_GPIO11 with Ext. 4.7K PH
J15_Pin4=GPIO5:from SUPER I/O_GPIO15 with Ext. 4.7K PH
J15_Pin5=GPIO2:from SUPER I/O_GPIO12 with Ext. 4.7K PH
J15_Pin6=GPIO6:from SUPER I/O_GPIO16 with Ext. 4.7K PH
J15_Pin7=GPIO3:from SUPER I/O_GPIO13 with Ext. 4.7K PH
J15_Pin8=GPIO7:from SUPER I/O_GPIO17 with Ext. 4.7K PH
<<<<< Be careful Pin9=GND , Pin10=VCC >>>>>

There are several Configuration Registers (CR) of W83627THG needed to be programmed to control the GPIO direction, and status(GPI)/value(GPO). CR00h ~ CR2F are common (global) registers to all Logical Devices (LD) in W83627THG. CR07h contains the Logical Device Number that can be changed to access the LD as needed. LD7 contains the GPIO10~17 registers.

Programming Guide:

Step1: CR2A_Bit [7.2]. P [1,1,1,1,1,1]; to select multiplexed pins as GPIO10~17 pins
Step2: LD7_CR07h.P [07h]; Point to LD7
Step3: LD7_CR30h_Bit0.P1; Enable LD7
Step4: Select GPIO direction, Get Status or output value.

LD7_CRF0h; GPIO17 ~ 10 direction, 1 = input, 0 = output pin
LD7_CRF2h.P [00h]; Let CRF1 (GPIO data port) non-invert to prevent from confusion
LD7_CRF1h; GPIO17~10 data port, for input pin, get status from the related bit, for output pin, write value to the related bit.

For example,

LD7_CRF0h_Bit4.P0; Let GPIO14 as output pin
LD7_CRF2h_Bit4.P0; Let CRF1_Bit4 non-inverted
LD7_CRF1h_Bit4.P0; Output "0" to GPIO14 pin (J15_Pin2)

LD7_CRF0h_Bit0.P1; Let GPIO10 as input pin
LD7_CRF2h_Bit0.P0; Let CRF1_Bit0 non-inverted
Read LD7_CRF1h_Bit0; Read the status from GPIO10 pin (J15_Pin1)

How to access W83627THG CR?

In ROBO-8914VG2AR, the EFER = 002Eh, and EFDR = 002Fh.
EFER and EFDR are 2 IO ports needed to access W83627THG CR.
EFER is the Index Port, EFDR is the Data Port.
CR index number needs to be written into EFER first,
Then the data will be read/written from/to EFDR.

To R/W W83627THG CR, it is needed to Enter/Enable Configuration Mode first. When completing the programming, it is suggested to Exit/Disable Configuration Mode.

Enter Configuration Mode: Write 87h to IO port EFER twice.
Exit Configuration Mode: Write AAh to IO port EFER.

3.6.3 Example

```
void enter_Superio2_CFG(void)
{
      outportb(0x2E, 0x87);
      outportb(0x2E, 0x87);
}


void exit_Superio2_CFG(void)
{
      outportb(0x2E, 0xAA);
}


void Set_CFG2(unsigned char Addr2,unsigned char Value2)
{
   unsigned char d2;
      outportb(0x2E, Addr2);
      delay(2);
      outportb(0x2E +1, Value2);
      delay(2);
}
```

```
unsigned char Get_CFG2(unsigned char Addr2)
{
   unsigned char d2;
      outportb(0x2E, Addr2);
      delay(2);
      d2 = inportb(0x2E +1);
      delay(2);
      return(d2);
}

int main(void)
{

      unsigned char d2;


      enter_Superio2_CFG();
      /* CR2A B7 = 1 selet GPIO Port 1*/
      d2 = Get_CFG2(0x2A);
      d2 = (d2 & 0x7F) | 0x80;
      Set_CFG2(0x2A, d2);

      /* IO test loop 1 */
      /* Set GPIO Port 1 of Superio 2 Enable */

      Set_CFG2(0x07, 0x07);        /* Select logic device 07 of Superio2*/
      Set_CFG2(0x30, 0x01);        /* Enable GPIO Port 1 of Superio2*/



      /* IO test loop 1 */

      /* Set GPIO Port 1 of Superio2 Enable */
      Set_CFG2(0x07, 0x07);        /* Select logic device 07*/
      Set_CFG2(0xF0, 0x0F);       /* GPIO Port 1 of Superio2 is [ooooiiii], o: output,
i:input */
      Set_CFG2(0xF2, 0x00);         /* GPIO Port 1 of Superio2 is non-inversed*/
```

```
Set_CFG2(0x07, 0x07);       /* Select logic device 07*/
Set_CFG2(0xF1, 0xFF);       /* Initial back all GPIO Port1 of Superio 2 to hi */

Set_CFG2(0x07, 0x07);       /* Select logic device 07*/
Set_CFG2(0xF1, 0xEF);       /* GP14 of Superio2 -> ~GP10 of Superio2 */
Set_CFG2(0x07, 0x07);       /* Select logic device 07 of Superio2*/
d2 = Get_CFG2(0xF1);        /* get GPIO Port 2 data */

if (d2 == 0xEE )

   printf("\n GPIO14->10 test ok");
else
   printf("\n GPIO14->10 test fail ");
```

Chapter 4
BIOS Setup Information

ROBO-8914VG2AR is equipped with the AMI BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, ROBO-8914VG2AR communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up

4.1 Entering Setup -- Launch System Setup

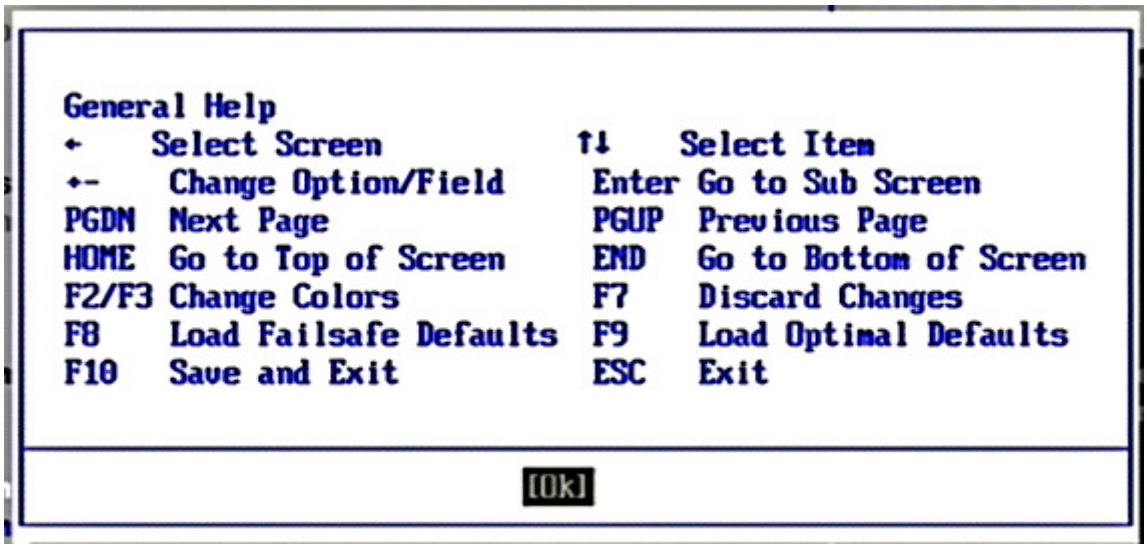
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key to enter Setup.

Press <Del> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

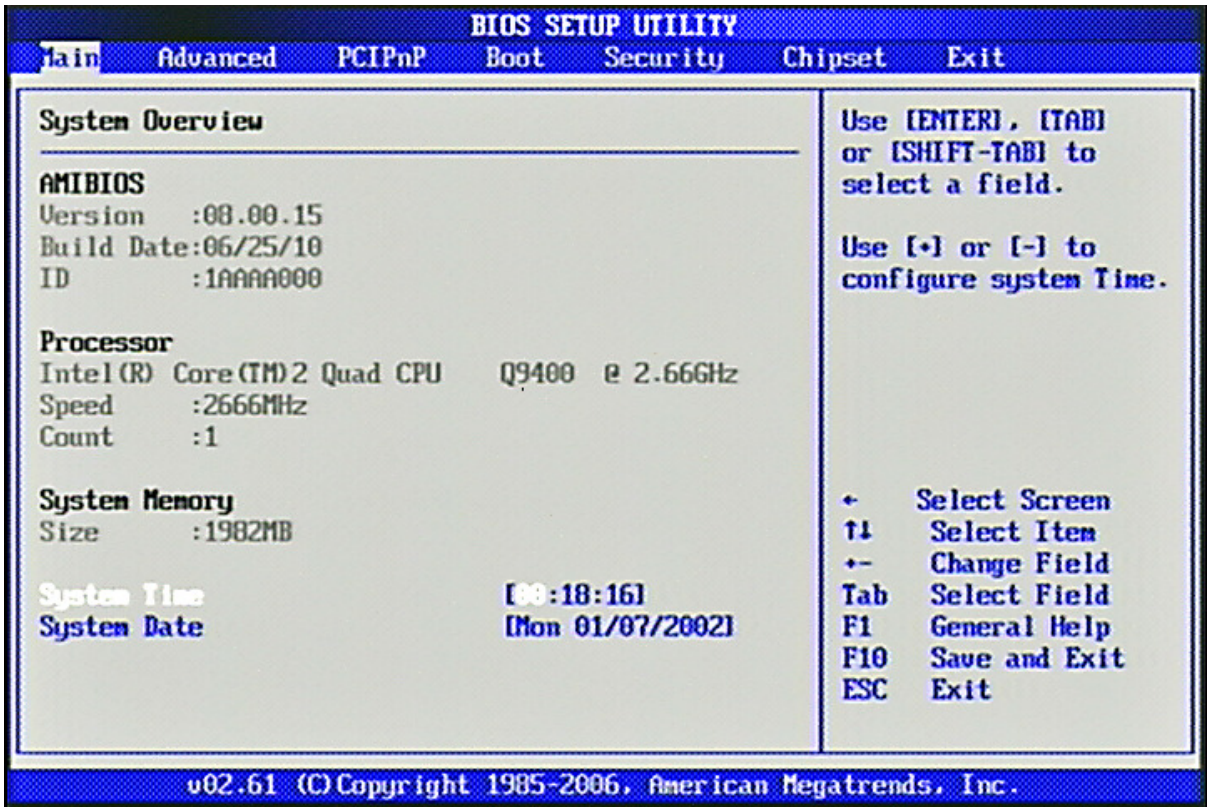
Press <F1> to Run SETUP or Resume

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.



4.2 Main Menu

Use this menu for basic system configurations, such as time, date etc.
Standard BIOS Features



AMI BIOS, Processor, System Memory

These items show the firmware and hardware specifications of your system. Read only.

System Time

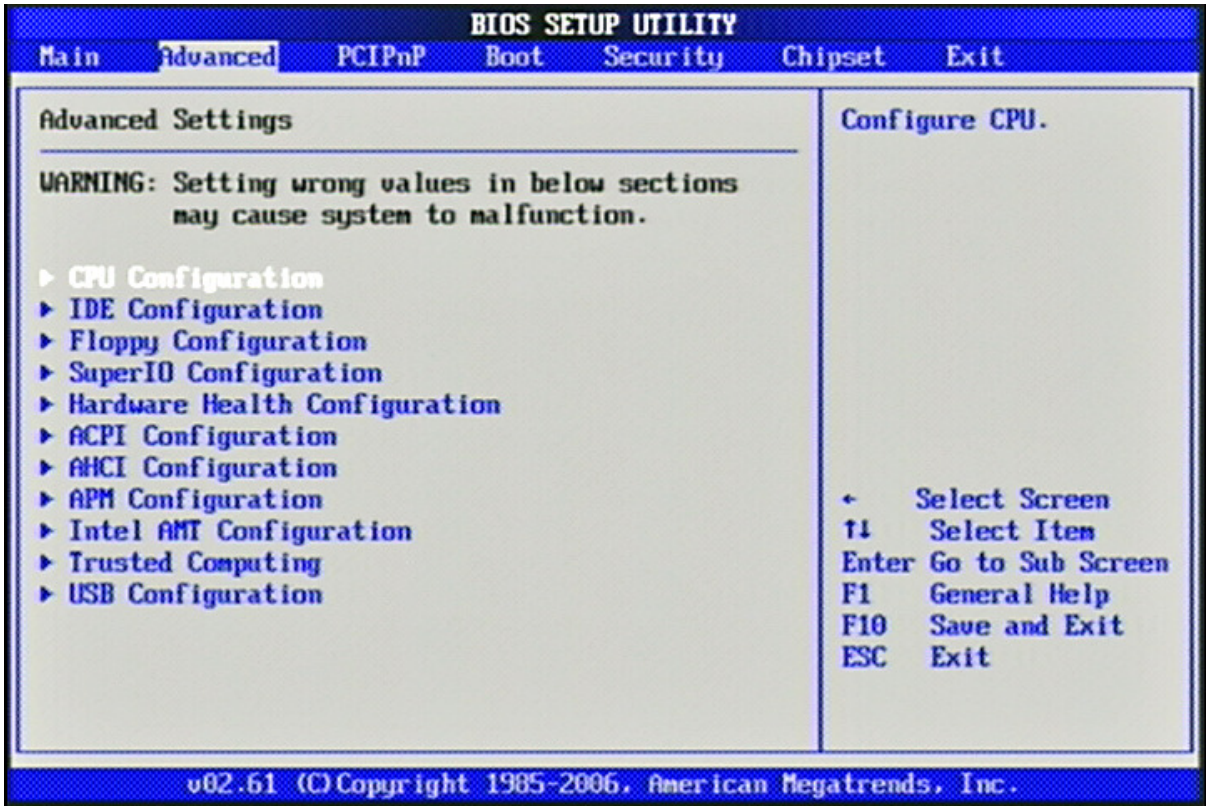
The time format is <Hour> <Minute> <Second>. Use [+] or [−] to configure system Time.

System Date

The date format is <Day>, <Month> <Date> <Year>. Use [+] or [−] to configure system Date.

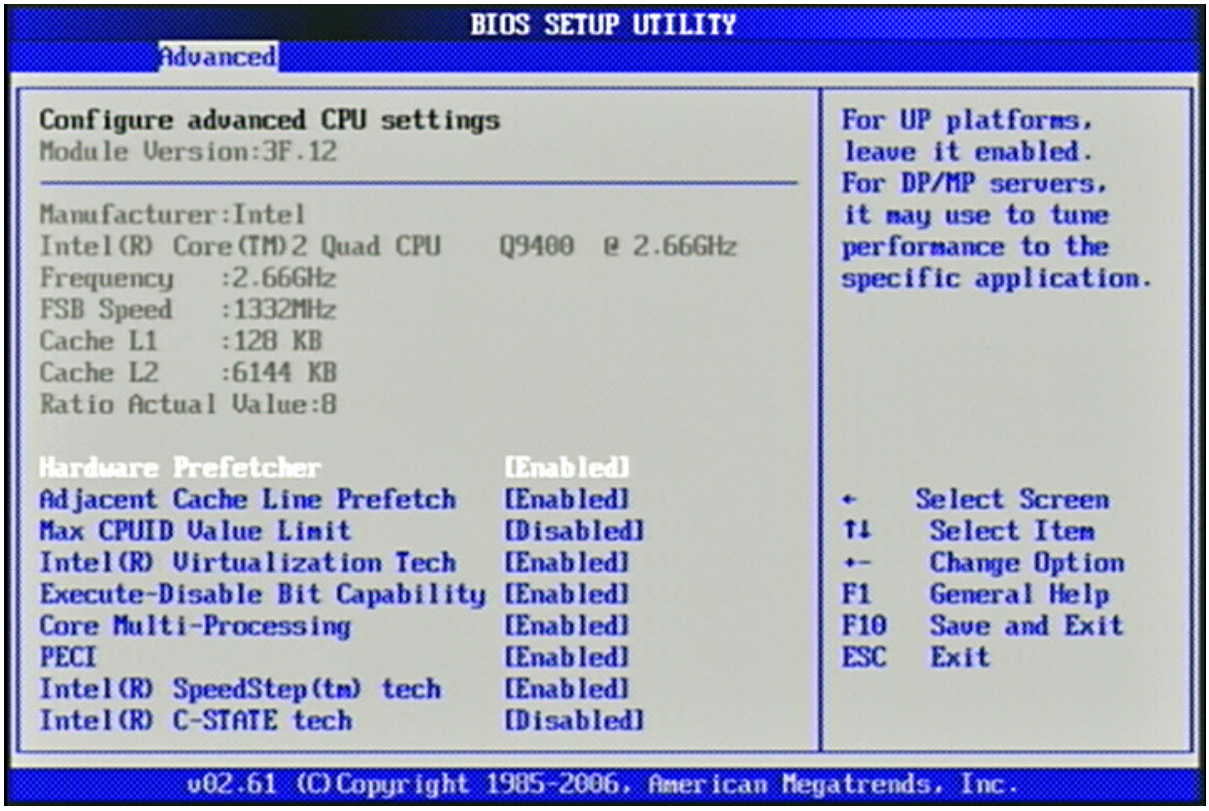
4.3 Advanced BIOS Features

Use this menu to set up the items of special enhanced features.



CPU Configuration

These items show the advanced specifications of your CPU. Read only.



Hardware Prefetcher

For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance the specific application.

The choice: Disabled, Enabled.

Adjacent Cache Line Prefetch

For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance the specific application.

The choice: Disabled, Enabled.

Max CPUID Value Limit

Disabled for Windows XP

The choice: Disabled, Enabled.

Intel(R) Virtualization Tech

A VMM can utilize the additional HW Caps, provided by Intel(R) Virtualization Tech.

Note: A full reset is required to change the setting.
The choice: Disabled, Enabled.

Execute-Disable Bit capability

When disabled, force the XD feature flag to always return 0

The choice: Disabled, Enabled.

Core Multi-Processing

When disabled, disable one execution core of each CPU die.

The choice: Disabled, Enabled.

PECI

When enabled, enables PECI interface.

The choice: Disabled, Enabled.

Intel(R) Speed Step (tm) Tech

Disable: Disable GV3.
Enable: Enable GV3.

The choice: Disabled, Enabled.

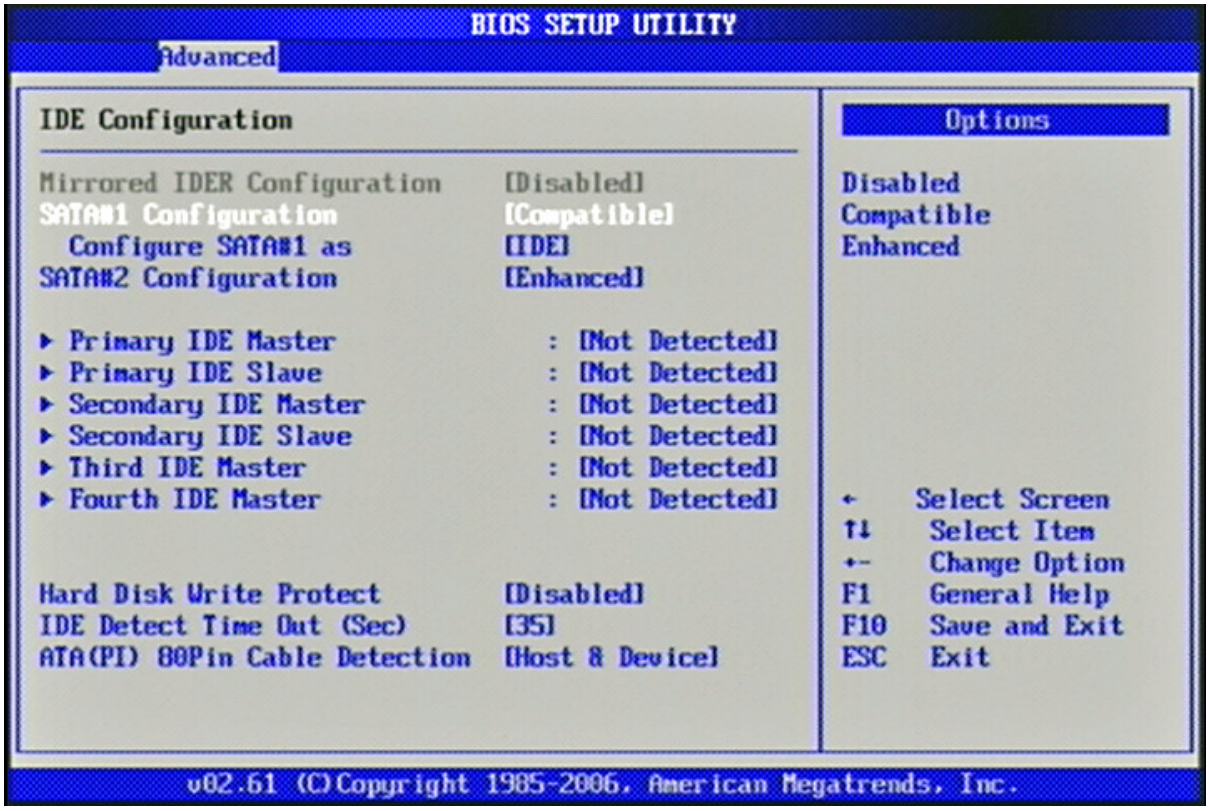
Intel(R) C-STATE Tech

CPU idle is set to C2, C3, C4 State.

The choice: Disabled, Enabled.

IDE Configuration

The IDE Configuration the IDE devices, such as hard disk drive or CD-ROM drive. It uses a separate sub menu to configure each hard disk drive (Master and Slave).



Mirrored IDER Configuration

The choice: Disabled, Enabled.

SATA#1 Configuration

The choice: Compatible, Enhanced.

SATA#2 Configuration

The choice: Disabled, Enhanced

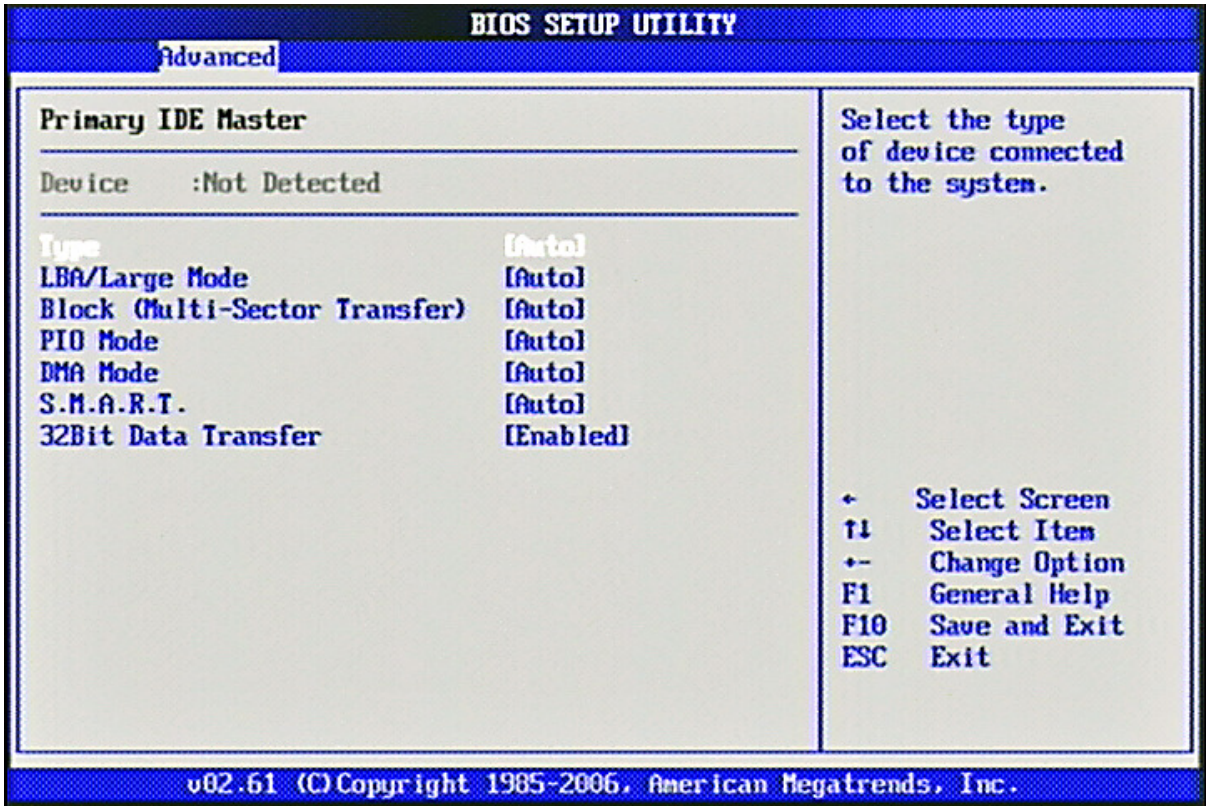
Configure SATA#1 as

This setting specifies the function of the on-chip SATA#1 controller.

The choice: IDE, RAID, AHCI.

Primary/Secondary IDE Master / Slave

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.



[Type] Press PgUp/<+> or PgDn/<—> to select [Manual], [None] or [Auto] type. You can use [Manual] to define your own drive type manually.

[LBA/Large Mode] Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads and Sectors.

[Block (Multi-Sector Transfer)] Any selection except Disabled determines the number of sectors transferred per block.

[PIO Mode] Indicates the type of PIO (Programmed Input/Output)

[DMA Mode] Indicates the type of Ultra DMA

[S.M.A.R.T.] This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S. M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.

[32 Bit Data Transfer] Enable/Disable 32-bit Data Transfer.

Hard Disk Write Protect

Disabled/Enabled device write protection, this will be effective only if device is accessed through BIOS.

The choice: Disabled, Enabled.

IDE Detect Time Out (Sec)

Select the time out value for detecting ATA/ATAPI device (s).

The choice: 0, 5, 10, 15, 20, 25, 30, 35.

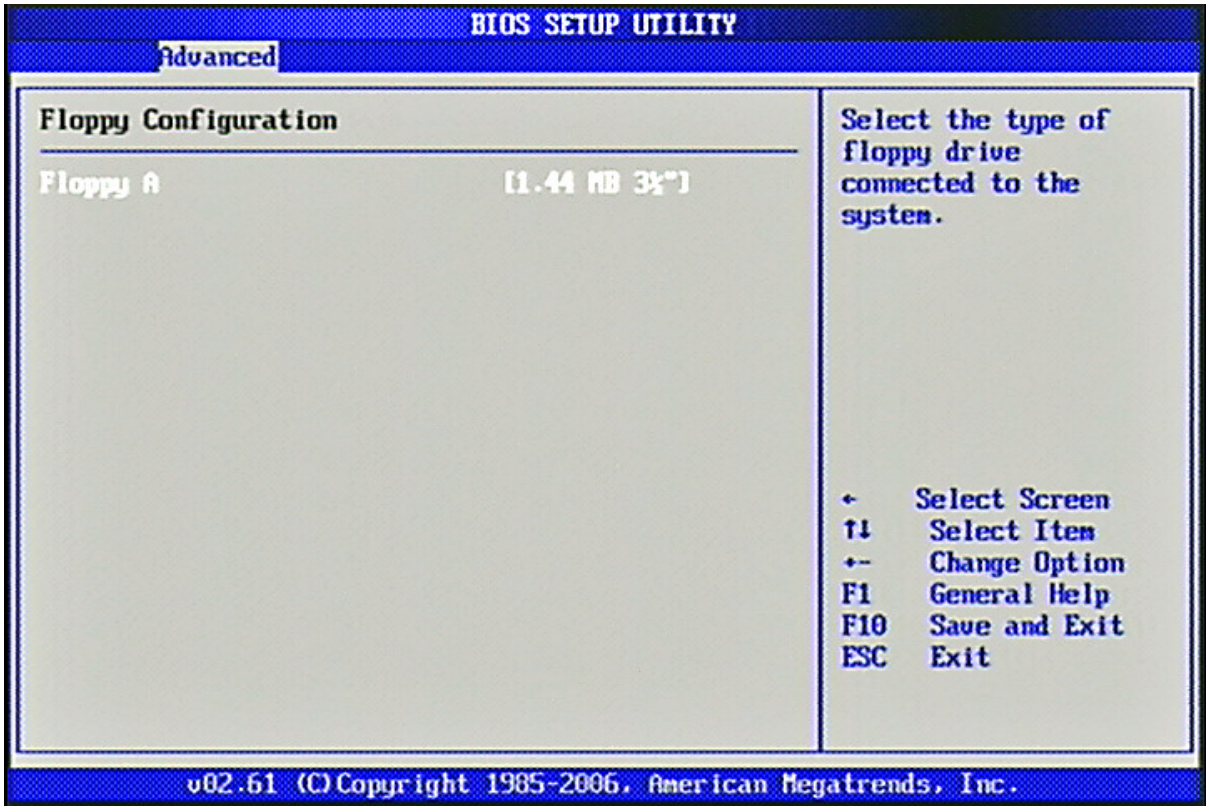
ATA(PI) 80Pin Cable Detection

Select the mechanism for detecting 80Pin ATA (PI) cable.

The choice: Host & Device, Host, Device.

Floppy Configuration

This Sub-Menu contains Setup Items which control configuration of the Internal Graphics Display Device.



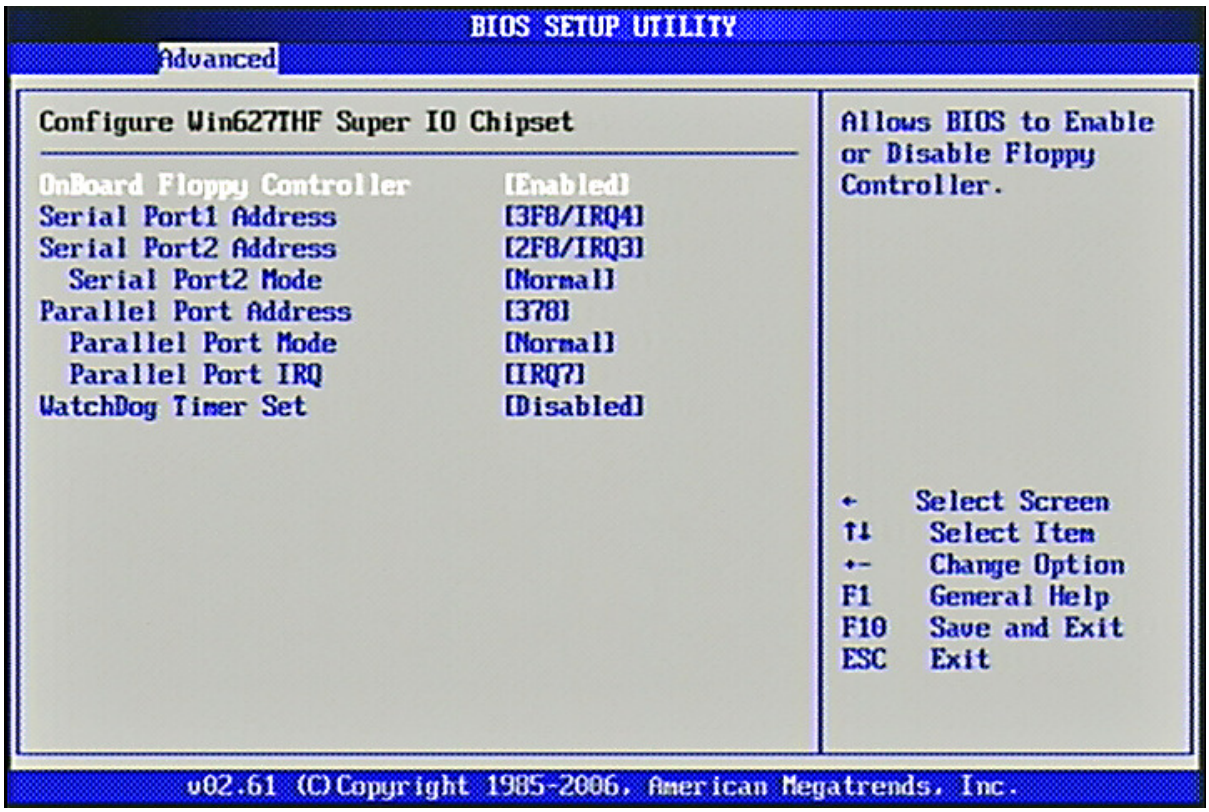
Floppy A

Select the type of floppy drive connected to the system.

The choice: None, 360KB 5 1/4", 1.2MB 5 1/4", 720KB 3 1/2", 1.44MB 3 1/2", 2.88MB 3 1/2".

Super IO Configuration

Configure Win627DHG Super IO Chipset.



OnBoard Floppy Controller

This item allows enable/disable onboard Floppy disk controller.

The choice: Disabled, Enabled.

Serial Port 1 Address

Allows BIOS to Select Serial Port1 Base Addresses.

The choice: Disabled, 3F8/IRQ4, 3E8/IRQ4

Serial Port 2 Address

Allows BIOS to Select Serial Port2 Base Addresses.

The choice: Disabled, 2F8/IRQ3, 2E8/IRQ3.

Serial Port 2 Mode

This item allows users to select Infrared transmission mode.

The choice: Normal, IrDA, ASK IR.

Parallel Port Address

This item allows you to configuring I/O of the onboard parallel port.

The choice: Disabled, 378, 278, 3BC.

Parallel Port Mode

There are five different modes for the onboard parallel port:

Normal	Switch to Normal mode
Bi-Directional	Switch to Bi-Directional mode
ECP	Switch to ECP mode
EPP	Switch to EPP mode
ECP & EPP	Switch to ECP & EPP mode

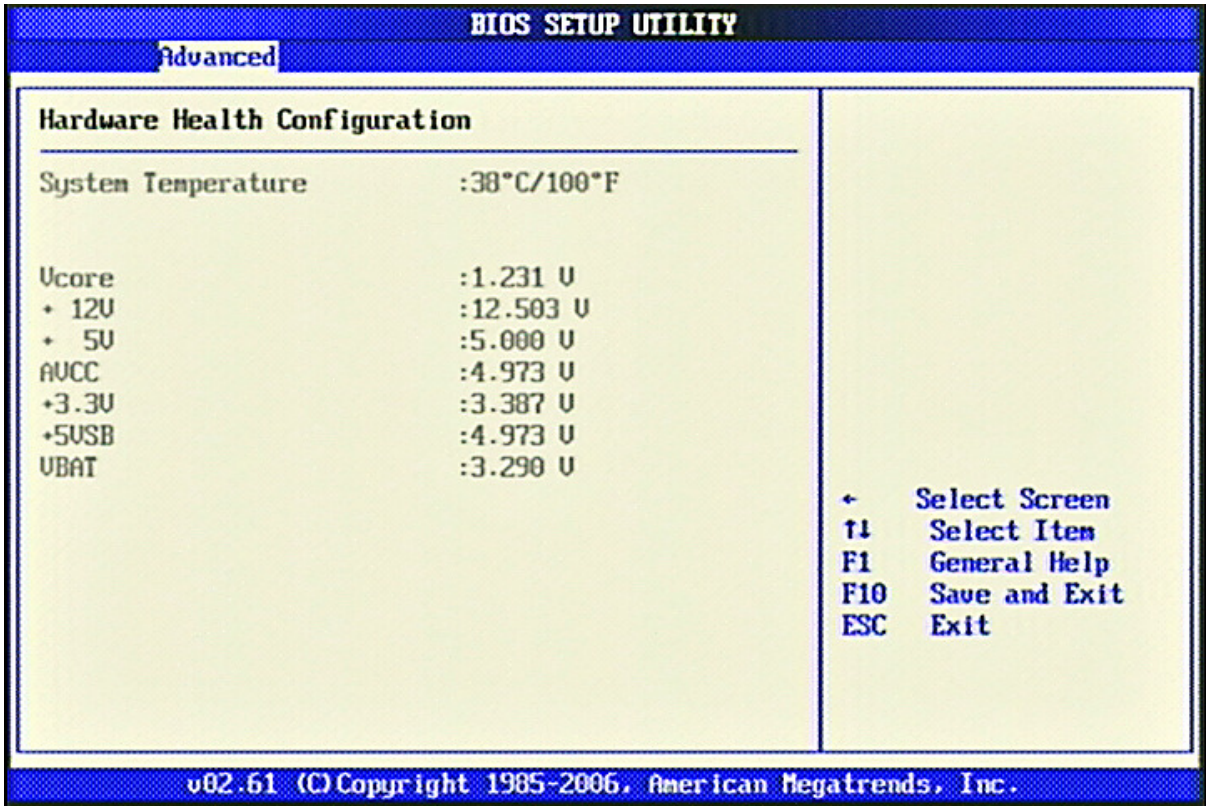
Watch Dog Timer set

This BIOS testing option is able to reset the system according to the selected table.

The Choice: Disabled, 30, 60, 90, 120, 150, 180, 210 sec.

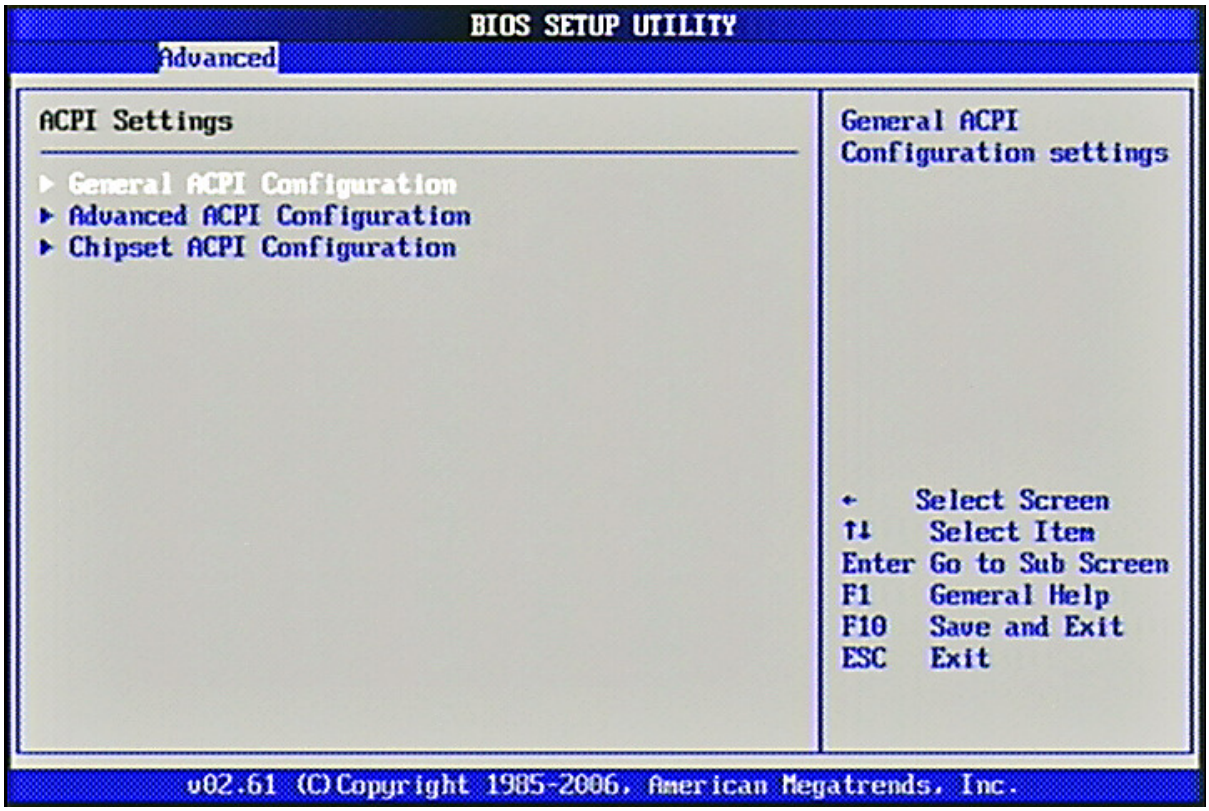
Hardware Health Configure

Configuration / Monitor the Hardware Health. Read only.

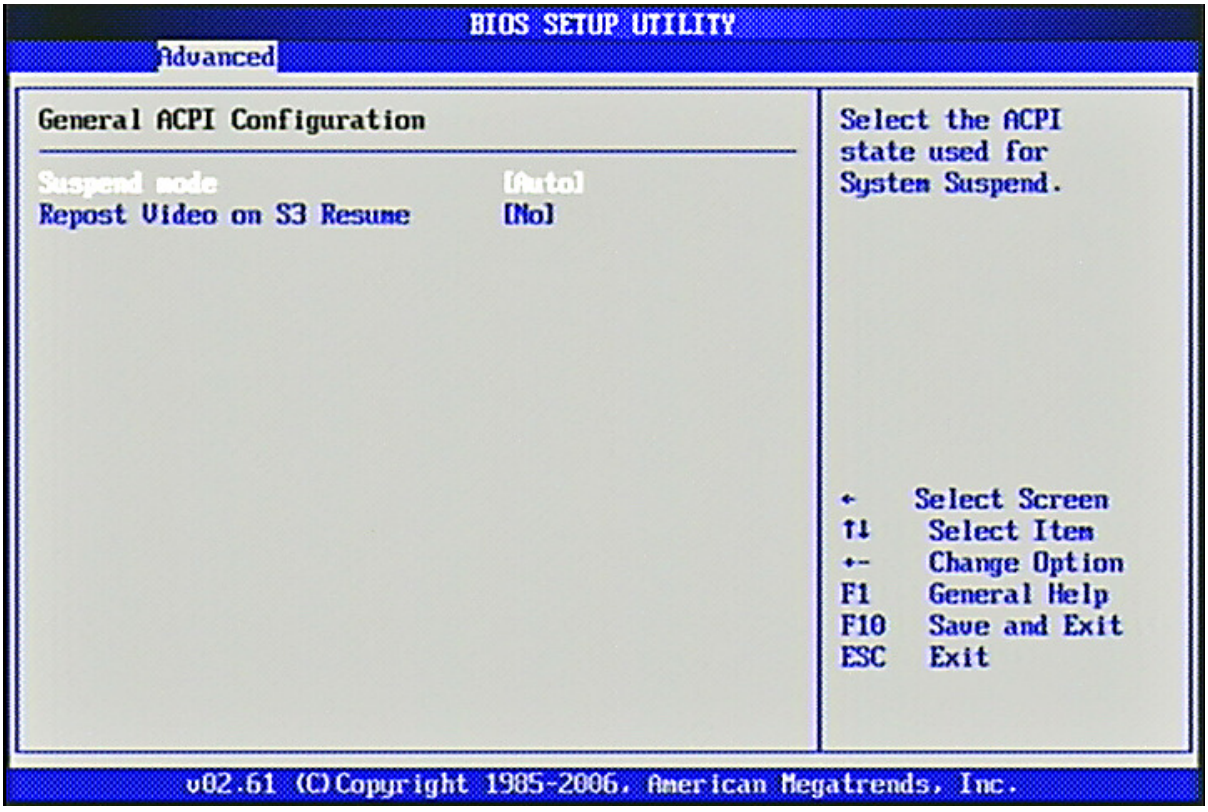


ACPI Configuration

AHCI Settings



General ACPI Configuration



Suspend mode

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

[S1 (POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system contexts.

[S3 (STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/ files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

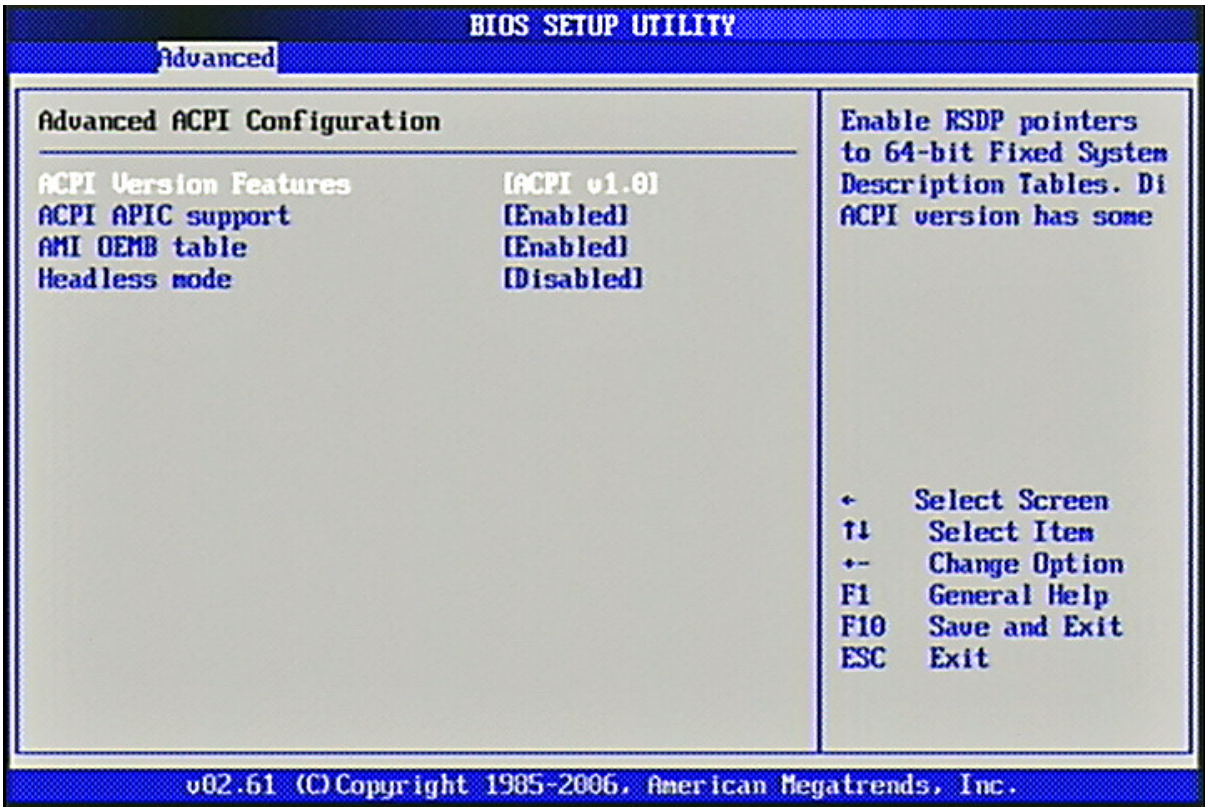
Repost Video on S3 Resume

Determines whether to invoke VGA BIOS post on S3/STR resume.

The choice: No, Yes

Advanced ACPI Configuration

Advanced ACPI Configuration settings, Use this section to configure additional ACPI options.



ACPI Version Features

Enable RSDP pointers to 64-bit Fixed System Description Tables.

The choice: ACPI v1.0 / ACPI v2.0 / ACPI v3.0.

ACPI APIC support

Include ACPI APIC table pointer to RSDT pointer list.

The choice: Disabled, Enabled.

AMI OEMB table

Include OEMB table pointer to R(X) SDT pointer list.

The choice: Disabled, Enabled.

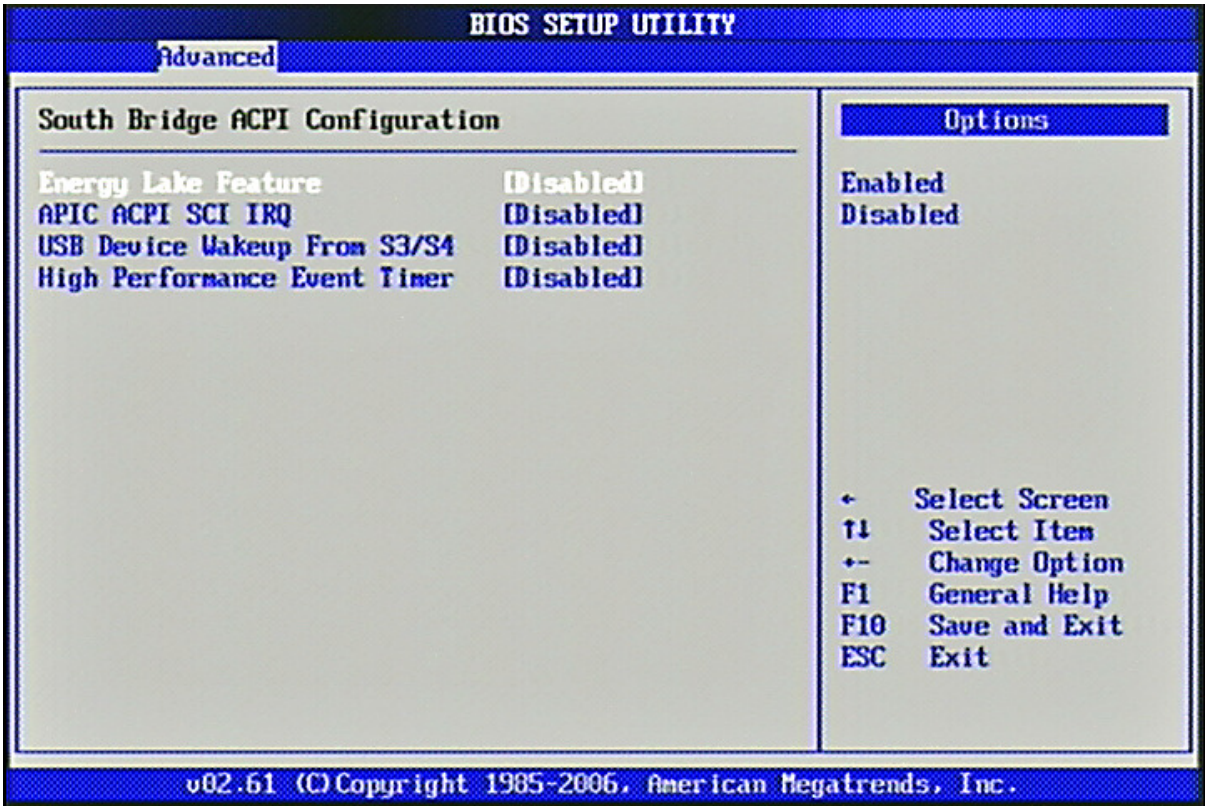
Headless mode

Enable / Disable Headless operation mode through ACPI.

The choice: Disabled, Enabled.

South Bridge ACPI Configuration

The South Bridge ACPI related Configuration settings, Use this section to configure additional ACPI options.



Energy Lake Feature

Select the ACPI state used for System Suspend.

The choice: Disabled, Enabled.

APIC ACPI SCI IRQ

Enable / Disable APIC ACPI SCI IRQ.

The choice: Disabled, Enabled.

USB Device Wakeup From S3/S4

Enable / Disable USB device Wake from S3/S4 mode.

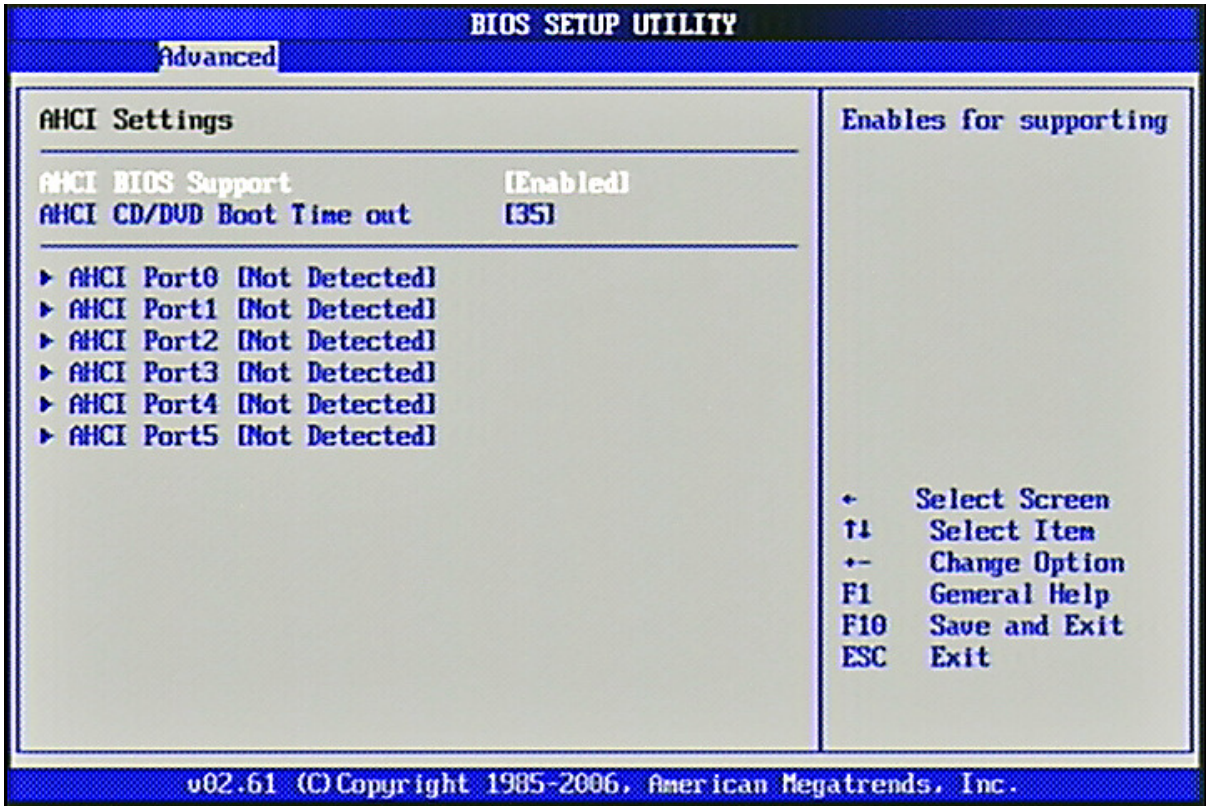
The choice: Disabled, Enabled.

High Performance Event Timer

The choice: Disabled, Enabled.

AHCI Configuration

Select for AHCI Configuration.



AHCI BIOS Support

Enables for supporting

The choice: Disabled, Enabled.

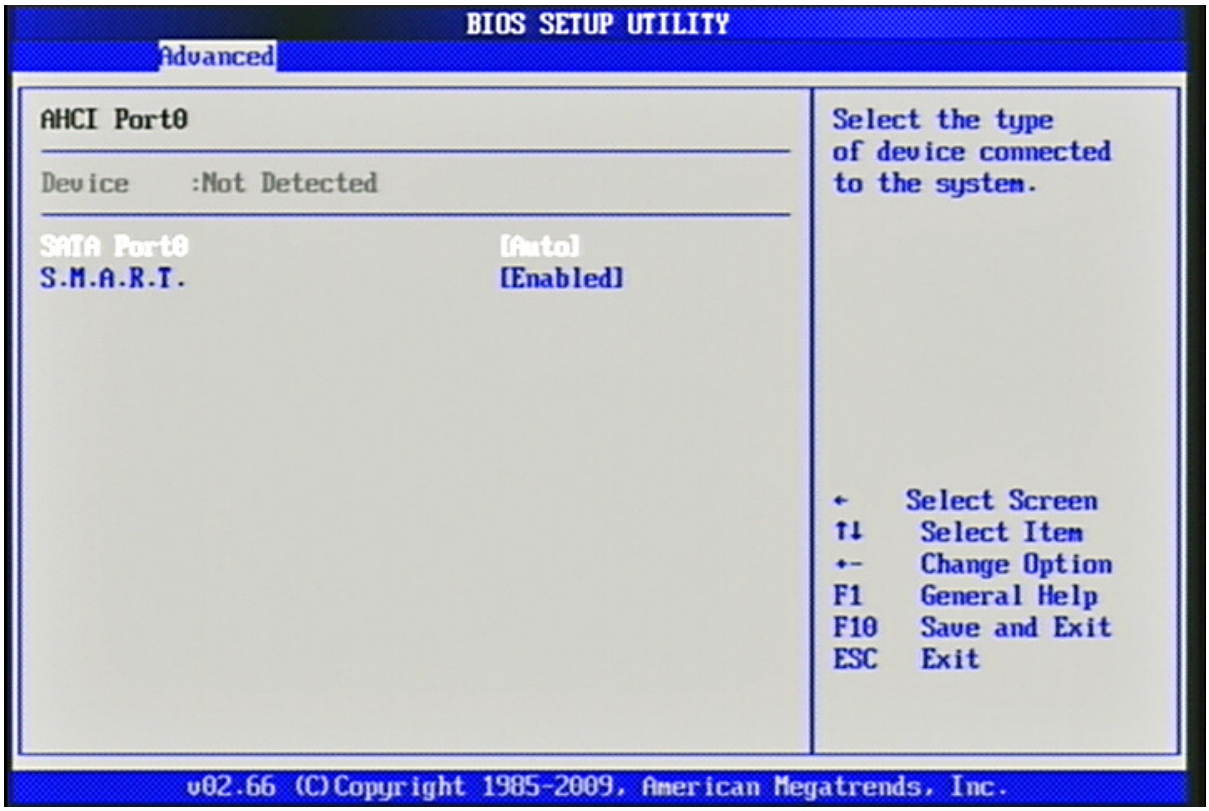
AHCI CD/DVD Boot Time out

Some SATA CD/DVD in AHCI mode need to wait ready longer.

The choice: 0, 5, 10, 15, 20, 25, 30, 35.

AHCI Port0 ~ Port5

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.



SATA Port0 ~ Port5

Select the type of device connected to the system.

The choice: Auto, Not Installed.

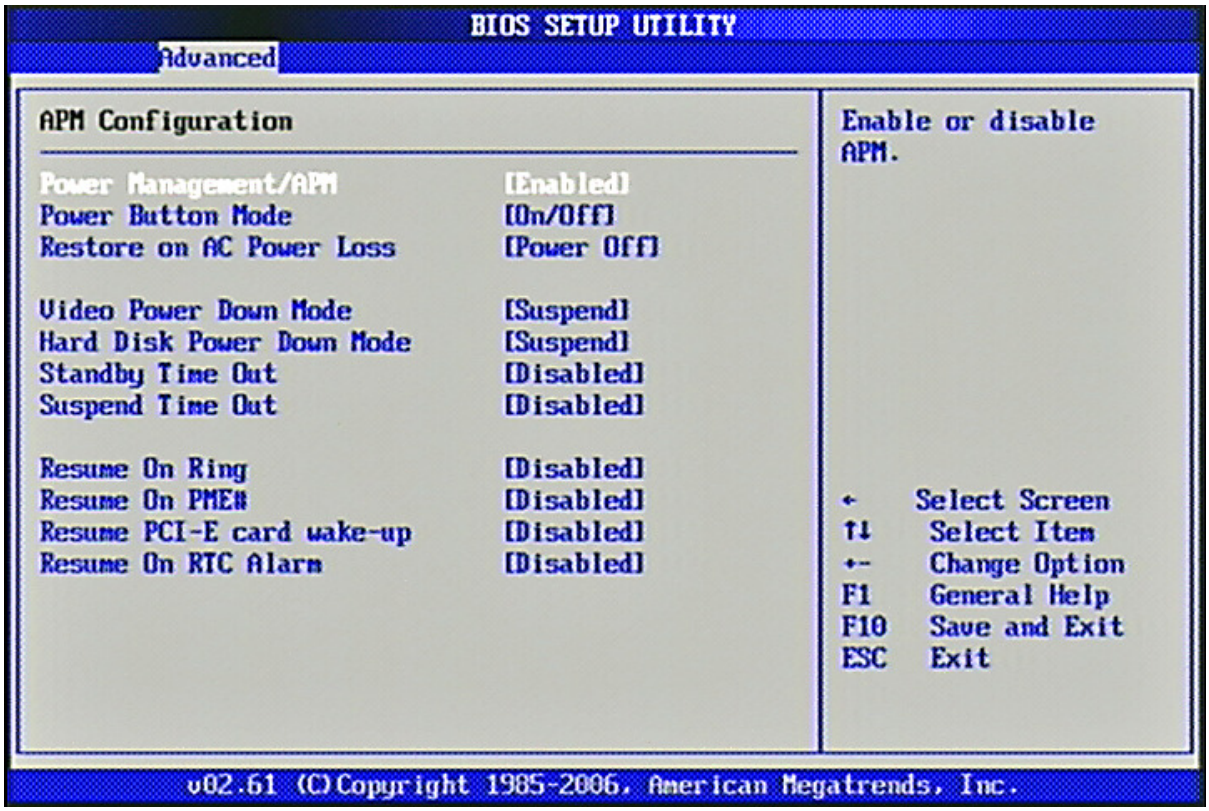
S.M.A.R.T

This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S. M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.

The choice: Disabled, Enabled.

APM Configuration

Select for APM Configuration.



Power Management/APM

Enables for Power Management.

The choice: Disabled, Enabled.

Power Button Mode

Go into On/Off or Suspend when Power button is pressed.

The choice: On/Off, Suspend.

Restore on AC Power loss

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

The choice: Power Off, Power On, Last state.

Video Power Down Mode

Power Down video in Suspend or Standby mode.

The choice: Disable, Standby, Suspend.

Hard Disk Power Down Mode

Power Down Hard Disk in Suspend or Standby mode.

The choice: Disable, Standby, Suspend.

Standby Time out

Go into Standby in the specified Time.

The choice: Disable. 1 Min, 2 Min, 4 Min, 8 Min, 10 Min, 20 Min, 30 Min, 40 Min, 50 Min, 60 Min.

Suspend Time out

Go into Suspend in the specified Time.

The choice: Disable. 1 Min, 2 Min, 4 Min, 8 Min, 10 Min, 20 Min, 30 Min, 40 Min, 50 Min, 60 Min.

Resume On Ring

The choice: Disabled, Enabled.

Resume On PME#

The choice: Disabled, Enabled.

Resume PCI-E card wake-up

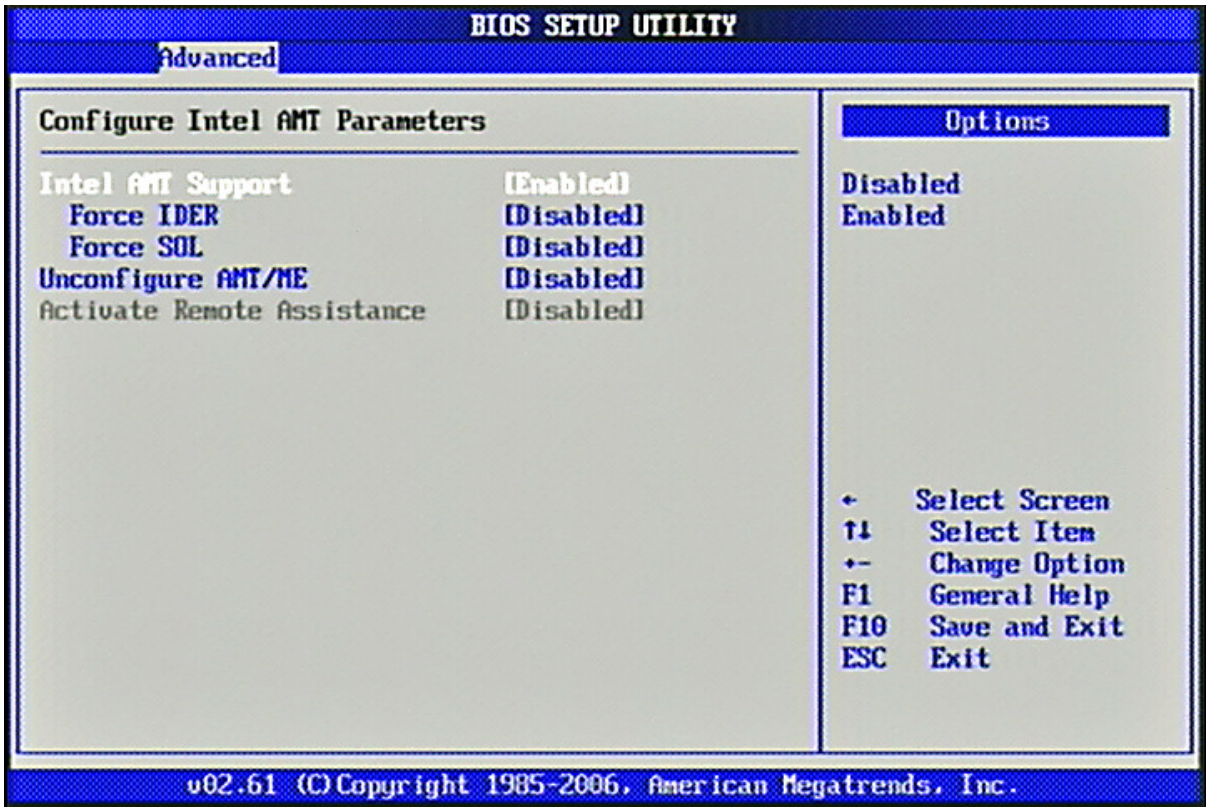
For J24 Ethernet RJ-45 Connector (LAN 2) 82574L

The choice: Disabled, Enabled.

Resume On RTC Alarm

The choice: Disabled, Enabled.

Intel AMT Configuration



Intel AMT Support

The choice: Disabled, Enabled.

Force IDER

The choice: Disabled, IDER Pri. Master, IDER Pri. Slave, IDER Sec. Master, IDER Sec. Slave

Force SOL

The choice: Disabled, Enabled.

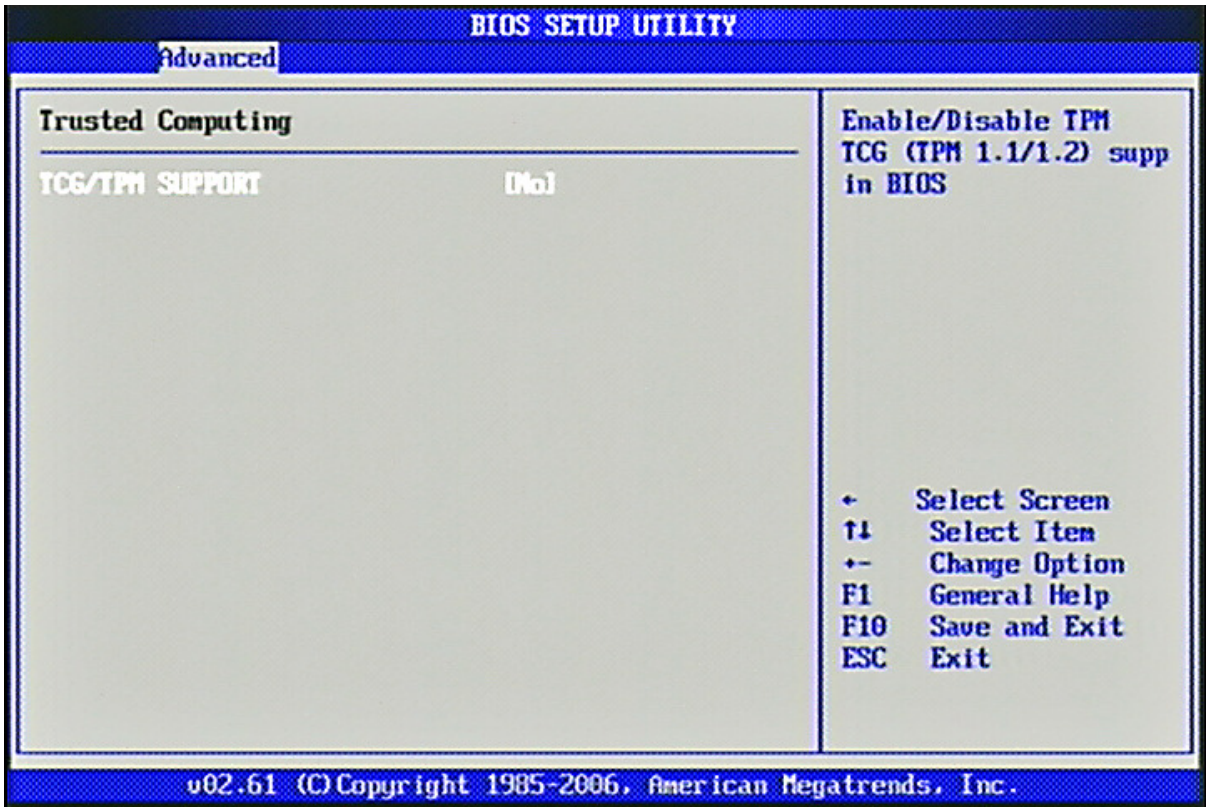
Unconfigure AMT/ME

The choice: Disabled, Enabled.

Activate Remote Assistance

The choice: Disabled, Enabled.

Trusted Computing

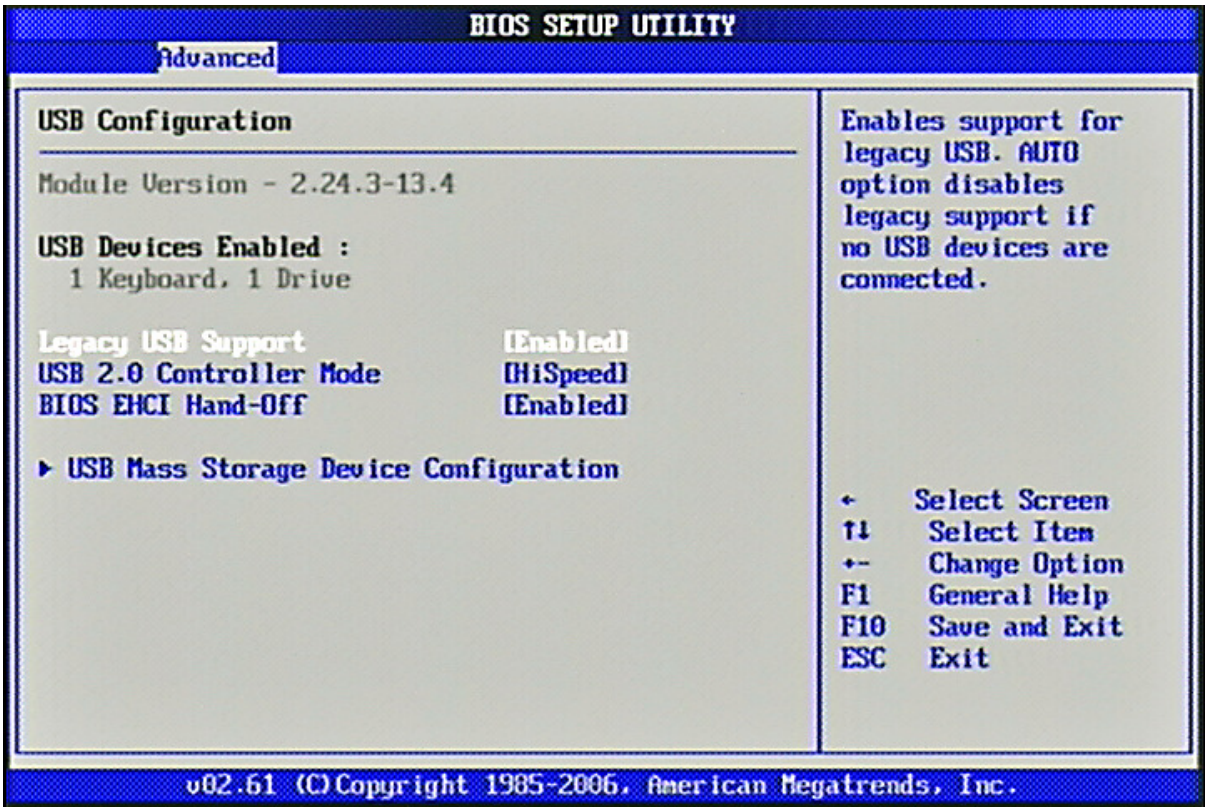


TCG/TPM SUPPORT

Enabled/Disable TPM TCG (TPM 1.1/1.2) supp in BIOS.

The choice: No, Yes.

USB Configuration



Legacy USB Support

Set to [Enabled] if you need to use any USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix.

The choice: Disabled, Enabled, Auto.

USB 2.0 Controller Mode

This setting specifies the operation mode of the onboard USB 2.0 controller.

The choice: FullSpeed, HiSpeed.

BIOS EHCI Hand-Off

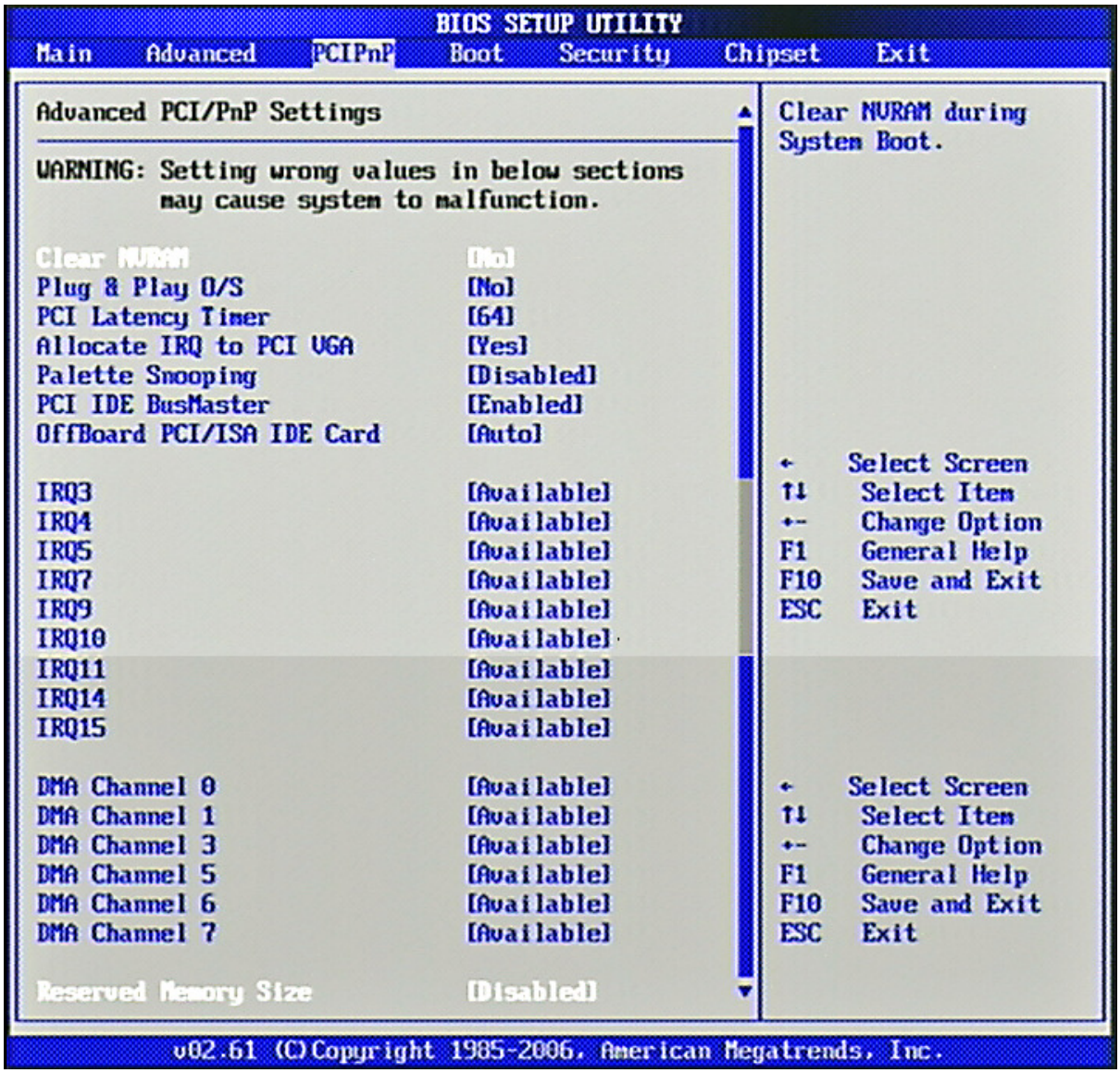
This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.

The choice: Disabled, Enabled.

4.4 PCI/PNP Resource Management

Advanced PCI/PnP setting wrong values in below sections may cause system to malfunction.

Advanced PCI/PnP Settings



Clear NVRAM

Clear NVRAM during System Boot.

The choice: No, Yes.

Plug & Play O/S

No: lets the BIOS configure all the devices in the system.
Yes: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.

The choice: No, Yes.

PCI Latency Timer

Select value in units of PCI clocks for PCI device latency timer register.

The choice: 32, 64, 96, 128, 160, 192, 224, 248.

Allocate IRQ to PCI VGA

Yes: Assigns IRQ to PCI VGA card if card requests an IRQ.
No: Does not assign IRQ to PCI VGA card even if card requests an IRQ.

The choice: No, Yes.

Palette Snooping

Enabled: informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.

The choice: Disabled, Enabled.

PCI IDE BusMaster

Enabled: Uses PCI bus mastering for reading / writing to IDE drives.

The choice: Disabled, Enabled.

OffBoard PCI/ISA IDE Card

Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card. AUTO: Works for most PCI IDE cards

The choice: Auto, PCI Slot1, PCI Slot2, PCI Slot3, PCI Slot4, PCI Slot5, PCI Slot6.

IRQ 3 / IRQ 4 / IRQ5 / IRQ7 / IRQ 9 / IRQ 10 / IRQ 11 / IRQ 14 / IRQ 15

Available: Specified IRQ is available to be used by PCI/PnP devices.
Reserved: Specified IRQ is reserved for used by Legacy ISA devices.

The choice: Available, Reserved.

DMA Channel 0 / DMA Channel 1 / DMA Channel 3 / DMA Channel 5 / DMA Channel 6 / DMA Channel 7

Available: Specified DMA is available to be used by PCI/PnP devices.
Reserved: Specified DMA is reserved for use by Legacy ISA devices.

The choice: Available, Reserved.

Reserved Memory Size

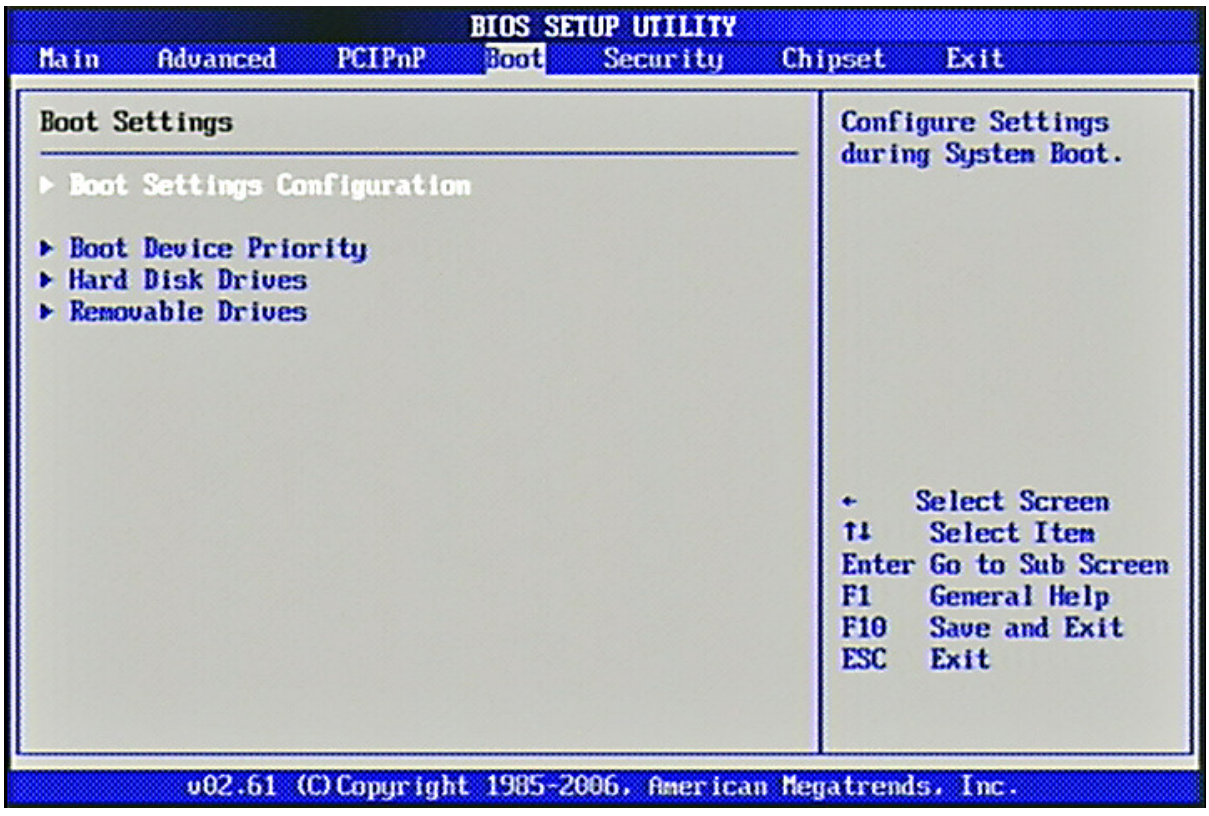
Select Size of memory block to reserve for legacy ISA devices.

The choice: Disabled, 16K, 32K, 64K.

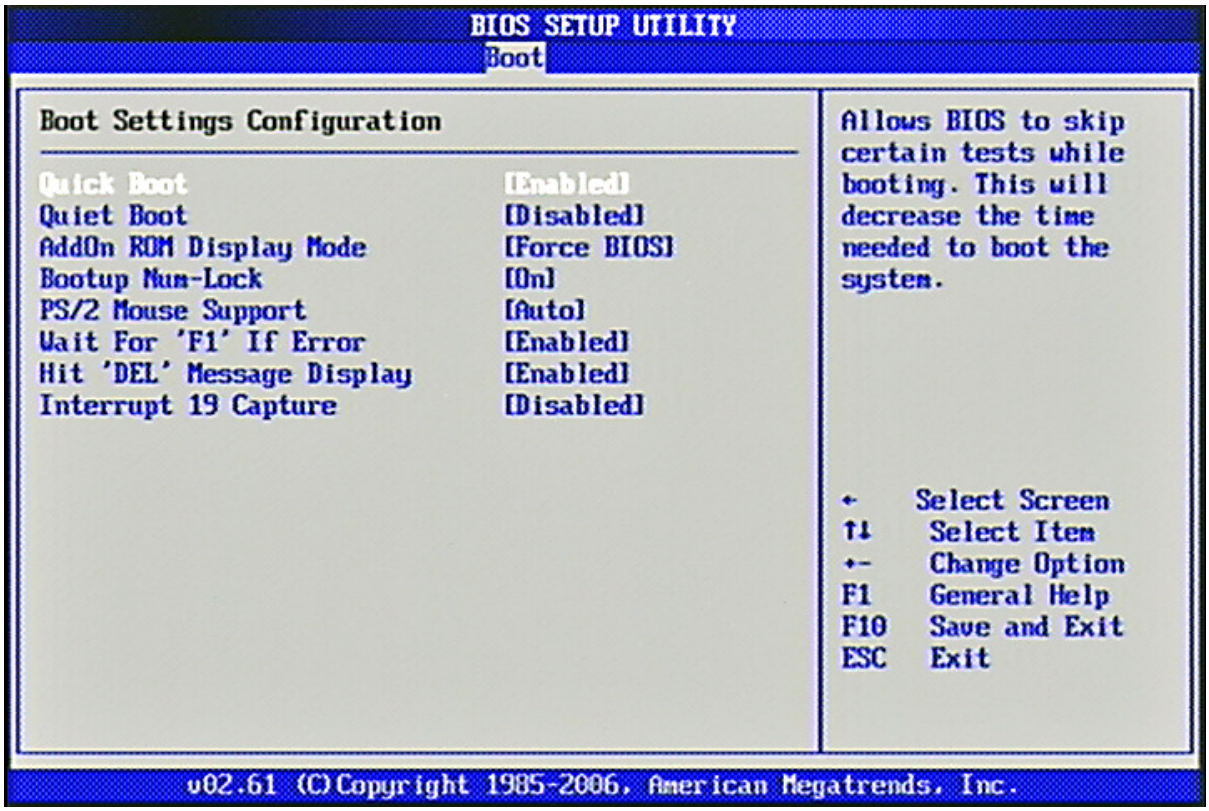
4.5 Boot Configuration Features

Use this menu to specify the priority of boot devices.

Boot Setttings



Boot Setttings Configuration



Quick Boot

Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

The choice: Disabled, Enabled.

Quiet Boot

Disabled: Displays normal POST messages.
Enabled: Displays OEM Logo instead of POST messages.

The choice: Disabled, Enabled.

AddOn ROM Display Mode

Set display mode for Option ROM.

This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.

The choice: Force BIOS, Keep Current.

Bootup Num-Lock

Select Power-on state for Numlock.

This setting is to set the Num Lock status when the system is powered on.
Setting to [On] will turn on the Num Lock key when the system is powered on.
Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

The choice: Off, On.

PS/2 Mouse support

Select support for PS/2 Mouse.
Select [Enabled] if you need to use a PS/2-interfaced mouse in the operating system.

The choice: Disabled, Enabled, Auto.

Wait For 'F1' If Error

When this setting is set to [Enabled] and the boot sequence encounters an error, it asks you to press F1. If disabled, the system continues to boot without waiting for you to press any keys.

The choice: Disabled, Enabled.

Hit 'DEL' Message Display

Set this option to [Disabled] to prevent the message as follows:

Hit Del if you want to run setup

It will prevent the message from appearing on the first BIOS screen when the computer boots. Set it to [Enabled] when you want to run the BIOS Setup Utility.

The choice: Disabled, Enabled.

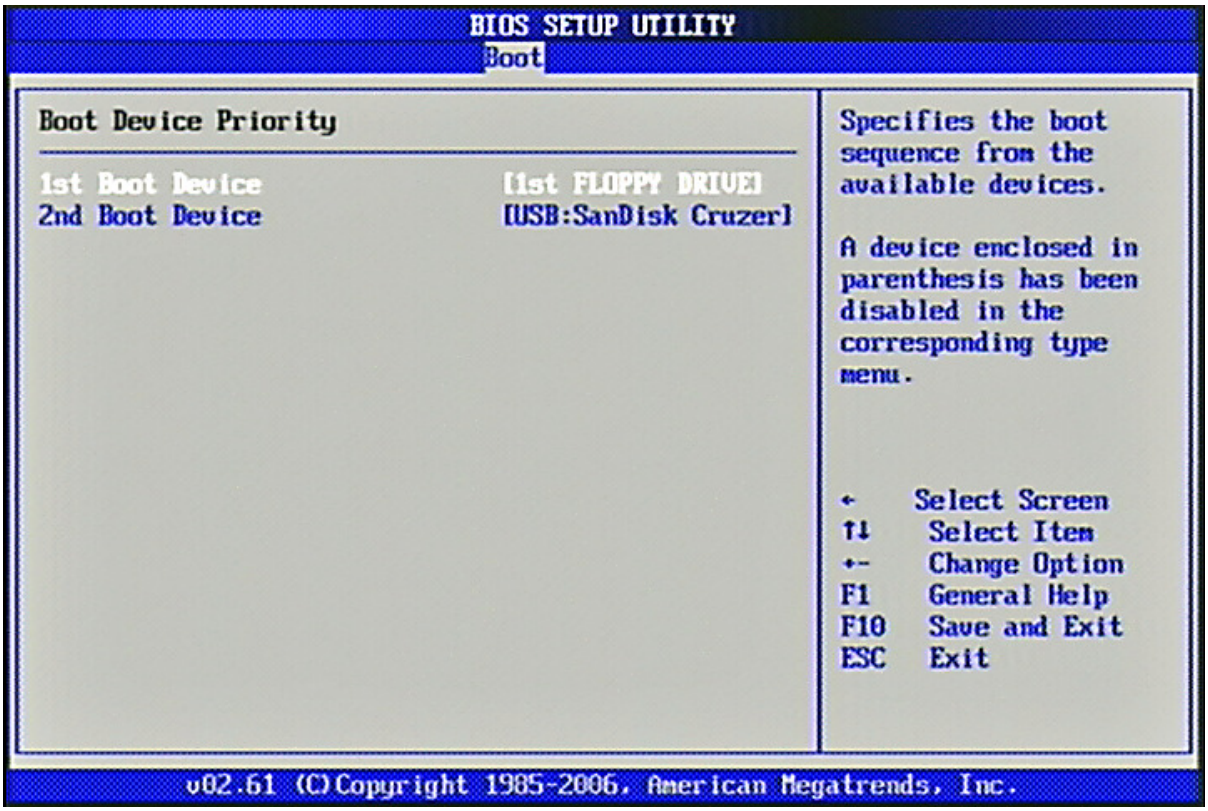
Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When enabled, this BIOS feature allows the ROM BIOS of these host adaptors to "capture" Interrupt 19 during the boot process so that drives attached to these adaptors can function as bootable disks. In addition, it allows you to gain access to the host adaptor's ROM setup utility, if one is available.

When disabled, the ROM BIOS of these host adaptors will not be able to "cap ture" Interrupt 19. Therefore, you will not be able to boot operating systems from any bootable disks attached to these host adaptors. Nor will you be able to gain access to their ROM setup utilities.

The choice: Disabled, Enabled.

Boot Device Priority

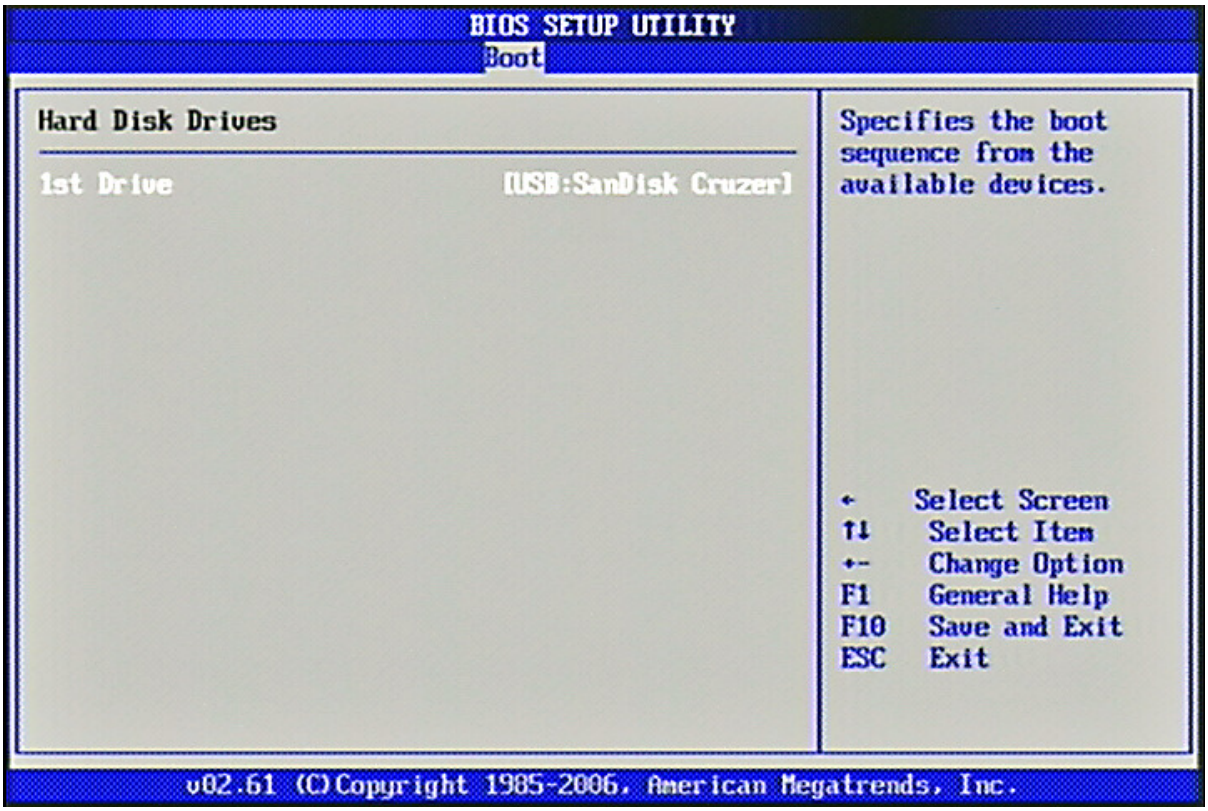


1st Boot Device

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑ ↓) to select the desired device, then press <+>, <—> or <PageUp>, <PageDown> key to move it up/down in the priority list.

The choice: (Network: IBA GE Slot 00C8 v1324), Disabled.

Hard Disk Drives



1st Drive

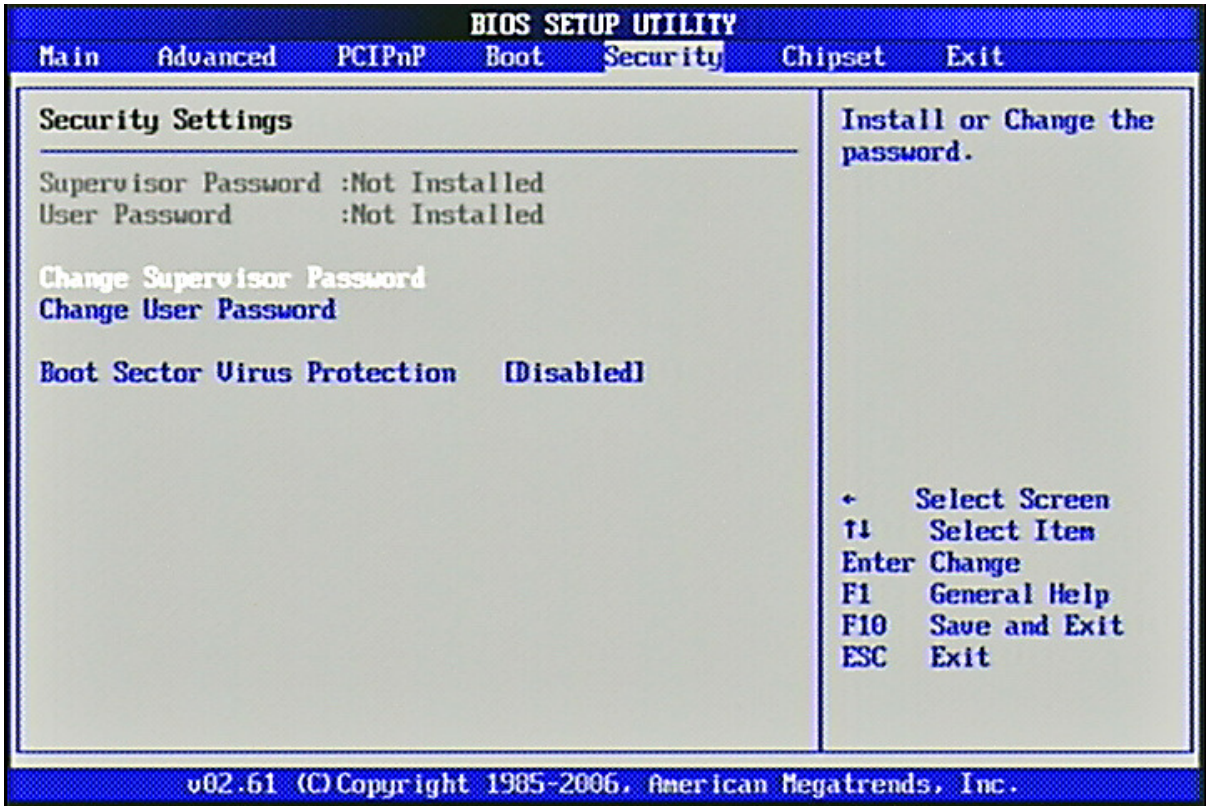
This setting allows users to set the priority of the removable devices. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑ ↓) to select the desired device, then press <+>, <—> or <PageUp>, <PageDown> key to move it up/down in the priority list.

4.6 BIOS Security Features

Use this menu to set supervisor and user passwords.

Security Settings

Install or Change the password.



Supervisor Password / Change Supervisor Password

Supervisor Password controls access to the BIOS Setup utility. These settings allow you to set or change the supervisor password. Please press "Enter" to key-in.

User Password / Change User Password

User Password controls access to the system at boot. These settings allow you to set or change the user password.

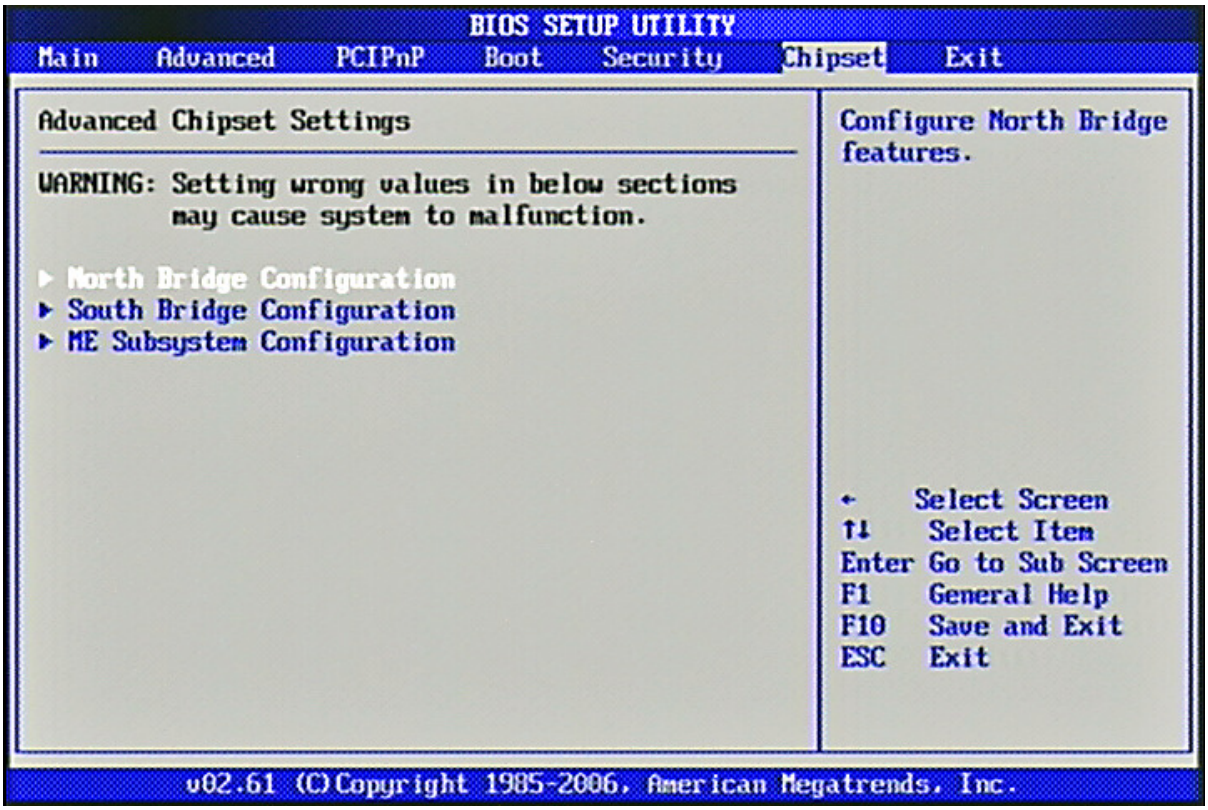
Boot Sector Virus Protection

Boot Sector Virus Protection.

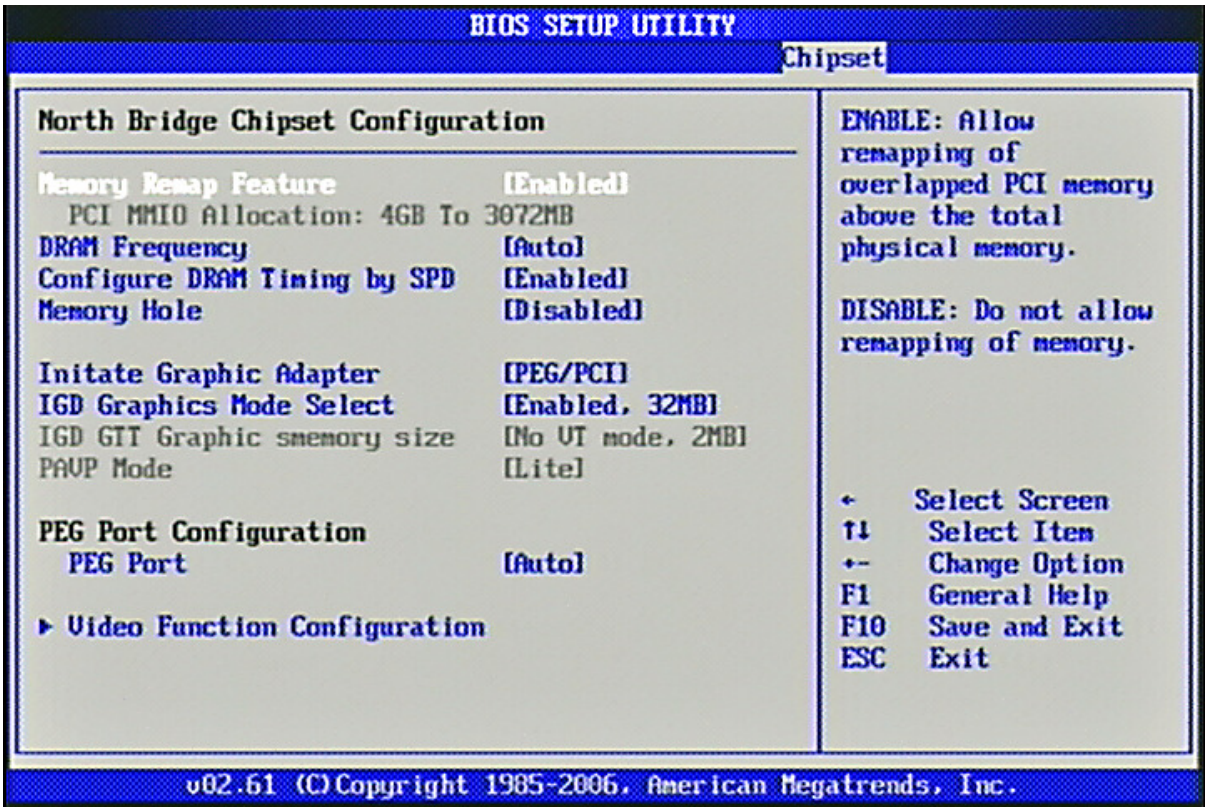
The choice: Disabled, Enabled.

4.7 Advanced Chipset Features

This menu controls the advanced features of the onboard Northbridge and Southbridge.



North Bridge Chipset Configuration



Memory Remap Feature

ENABLE: Allow remapping of overlapped PCI memory above the total physical memory. DISBALE: Do not allow remapping of memory.

The choice: Disabled, Enabled.

PCI MMIO Allocation

4GB To 3072MB. (Read Only)

DRAM Frequency

Users are recommended to use Auto for memory frequency selection.

The choice: Auto, 533, 667, 800, 1067 MHz.

Configure DRAM Timing by SPD

This option provides DRAM plug-and-play support by serial presence detect (SPD) mechanism via the system management bus (SMBUS) interface.

The choice: Disabled, Enabled.

Memory Hole

In order to improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB.

The choice: Disabled, 15MB-16MB.

Initate Graphic Adapter

Select which graphics controller to use as the primary boot device.

The choice: IGD, PCI/IGD, PCI/PEG, PEG/IGD, PEG/PCI.

Internal Graphics Mode Select

Select the amount of system memory used by the internal graphics device.

The choice: Enabled, 32MB, Enabled, 64MB, Enabled, 128MB.

IGD GTT Graphic smemory size

No VT mode, 2MB. (Read Only)

PAVP Mode

GMCH Protected Audio Video Path (PAVP) BIOS Support.

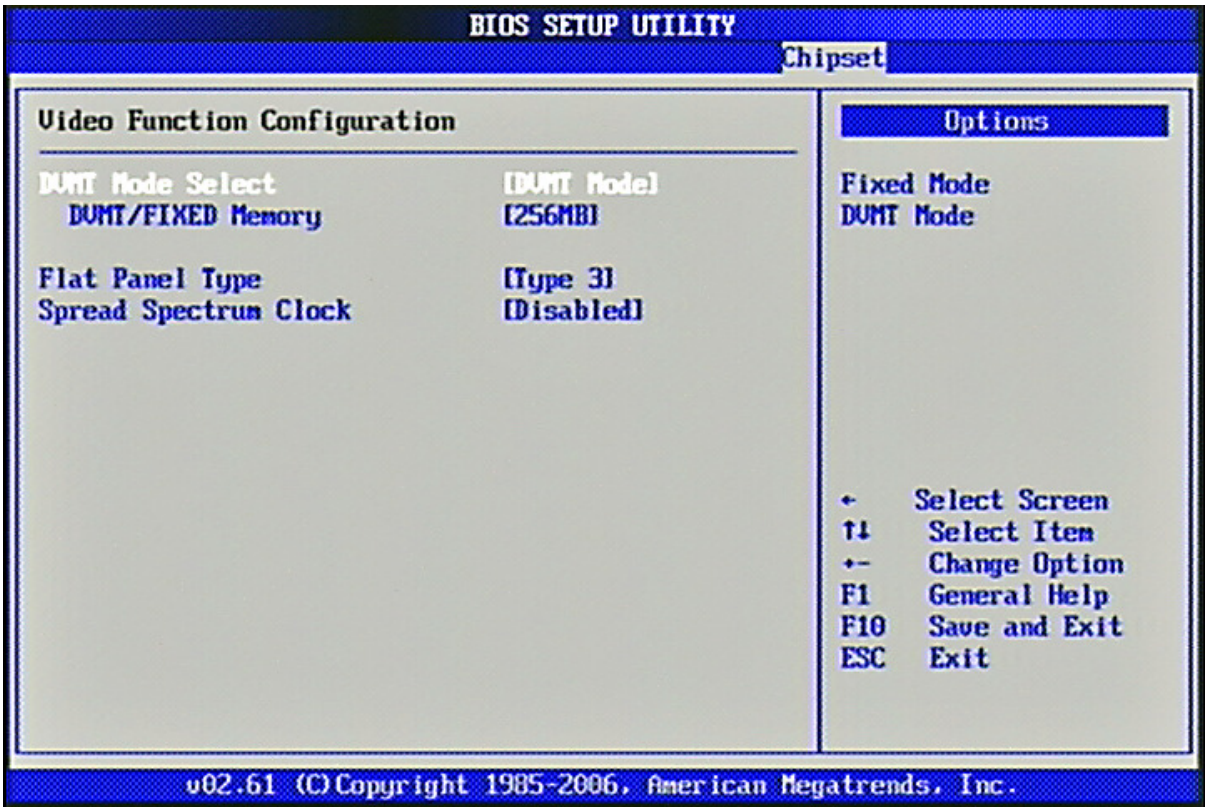
The choice: Disabled, Lite, High.

PEG Port

This setting allows you to select whether to use the on-chip graphics processor or the PCI Express card. When set to [Auto], the BIOS checks to see if a PCI Express graphics card is installed. If it detects that a PCI Express graphics card is present, the motherboard boots up using that card. Otherwise, it defaults to the onboard graphics processor.

The choice: Auto, Disabled.

Video Function Configuration



DVMT Mode Select

Intel's Dynamic Video Memory Technology (DVMT) allows the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.

It is recommended that you set this BIOS feature to DVMT Mode for maximum performance. Setting it to DVMT Mode ensures that system memory is dynamically allocated for optimal balance between graphics and system performance.

The choice: Fixed Mode, DVMT Mode.

DVMT/FIXED Memory

When set to DVMT/FIXED Mode, the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

The choice: 128MB, 256MB.

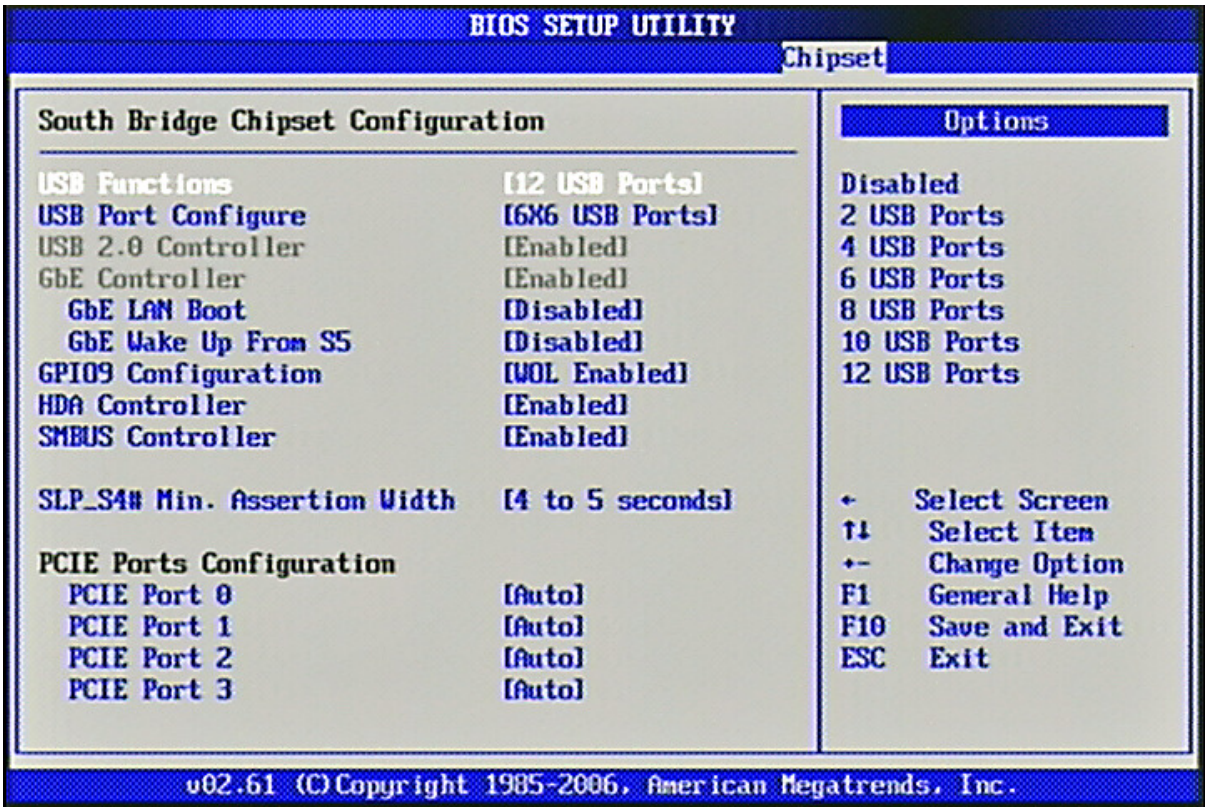
Flat Panel Type

The choice: 640x480 18 bit, 800x600 18 bit, 1024x768 18 bit, 1280x1024 18bit, 1400x1050 18 bit, 1600x1200 18bit, 800x600 24 bit, 1024x768 24 bit, 1280x1024 24 bit.

Spread Spectrum Clock

The choice: Disabled, Enabled.

South Bridge Configuration



USB Functions

This setting specifies the function of the onboard USB controller.

The choice: Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports.

USB Port Configure

The choice: 6x6 USB Ports, 8x4 USB Ports.

USB 2.0 Controller

Set to [Enabled] if you need to use any USB 2.0 device in the operating system that does not support or have any USB 2.0 driver installed, such as DOS and SCO Unix.

GbE LAN Boot

When [Enabled], the BIOS attempts to boot from a LAN boot image before it attempts to boot from a local storage device.

The choice: Enabled, Disabled.

GbE Wake Up From S5

This field specifies whether the system will be awakened from the S5 power saving mode when activity or input signal of onboard LAN For J23 Ethernet RJ-45 Connector (LAN 1)82567LM is detected.

The choice: Enabled, Disabled.

GPI09 Configuration

The choice: WOL Enabled, High, Low.

HDA Controller

This setting controls the High Definition Audio interface integrated in the Southbridge.

The choice: Enabled, Disabled.

SMBUS Controller

The choice: Enabled, Disabled.

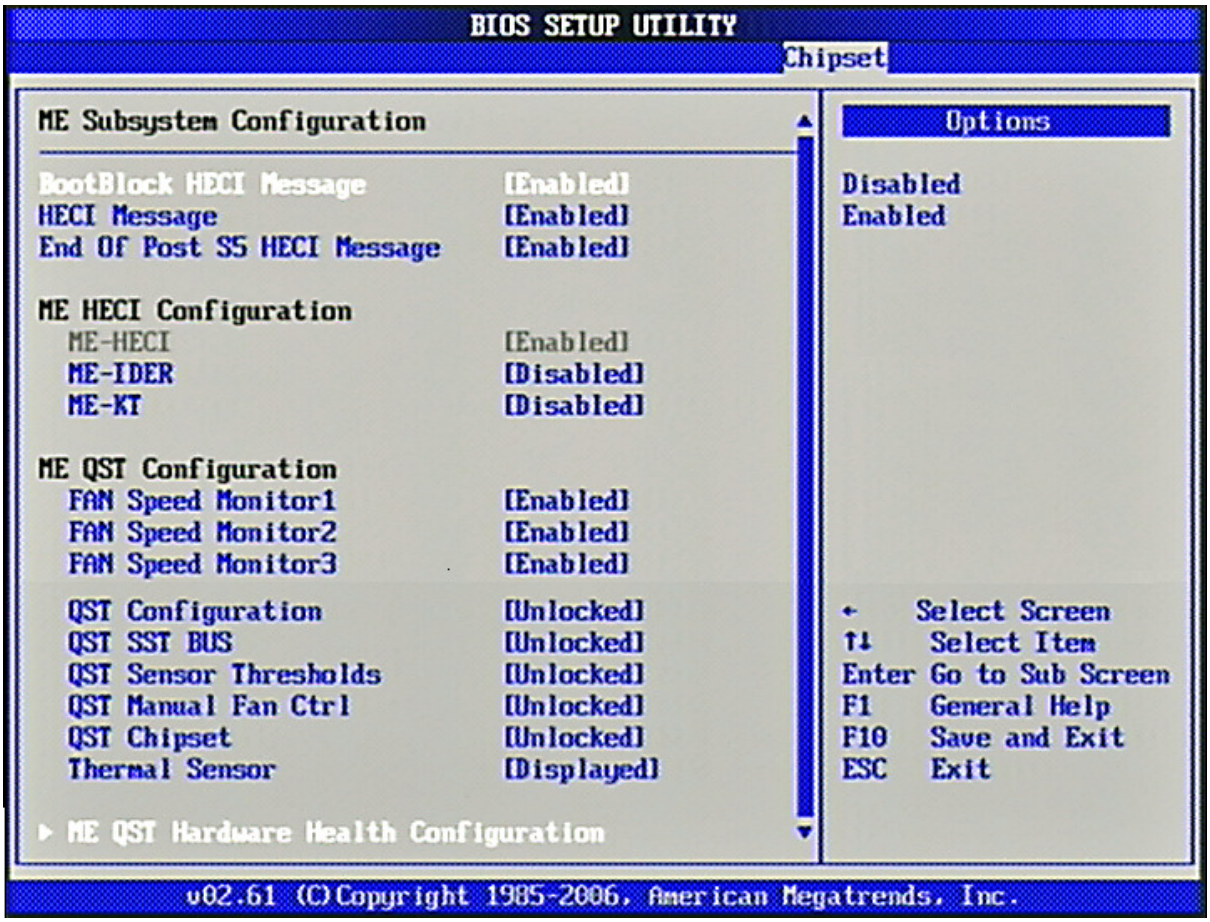
SLP_S4# Min. Assertion Width

The choice: 4 to 5 seconds, 3 to 4 seconds, 2 to 3 seconds, 1 to 2 seconds.

PCIE Port 0/ Port 1/ Port 2/ Port 3/ Port 4

The choice: Auto, Enabled, Disabled.

ME Subsystem Configuration



BootBlock HECI Message

The choice: Disabled, Enabled.

HECI Message

The choice: Disabled, Enabled.

End Of Post S5 HECI Message

The choice: Disabled, Enabled.

ME HECI Configuration

Enable/Disable ME-HECI, ME-IDER, ME-KT.

ME-HECI (Read Only)

This setting Enable the ME-HECI.

ME-IDER

The choice: Disabled, Enabled.

ME-KT

The choice: Disabled, Enabled.

ME QST Configuration

Enable/Disable FAN Speed Monitor1, 2, 3.

FAN Speed Monitor1

The choice: Disabled, Enabled.

FAN Speed Monitor2

The choice: Disabled, Enabled.

FAN Speed Monitor3

The choice: Disabled, Enabled.

QST Configuration

The choice: Unlocked, Locked.

QST SST BUS

The choice: Unlocked, Locked.

QST Sensor Thresholds

The choice: Unlocked, Locked.

QST Manual Fan Ctrl

The choice: Unlocked, Locked.

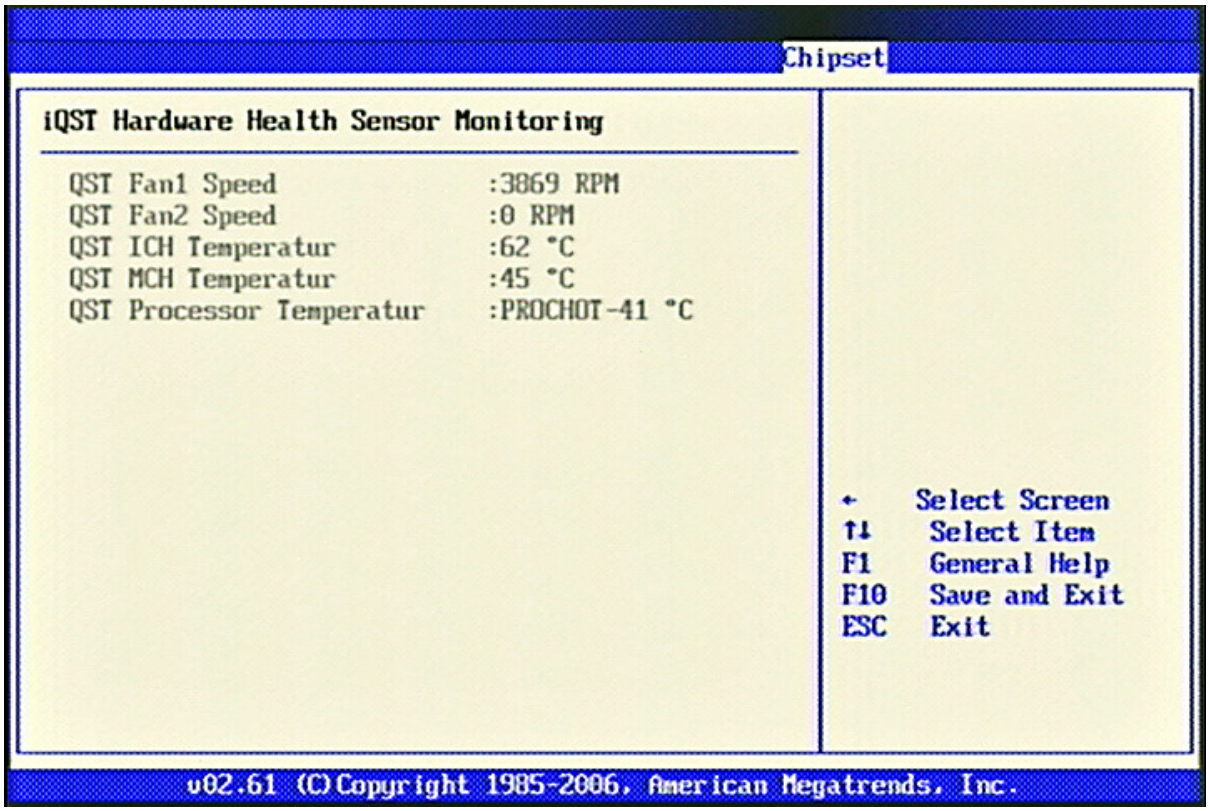
QST Chipset

The choice: Unlocked, Locked.

Thermal Sensor

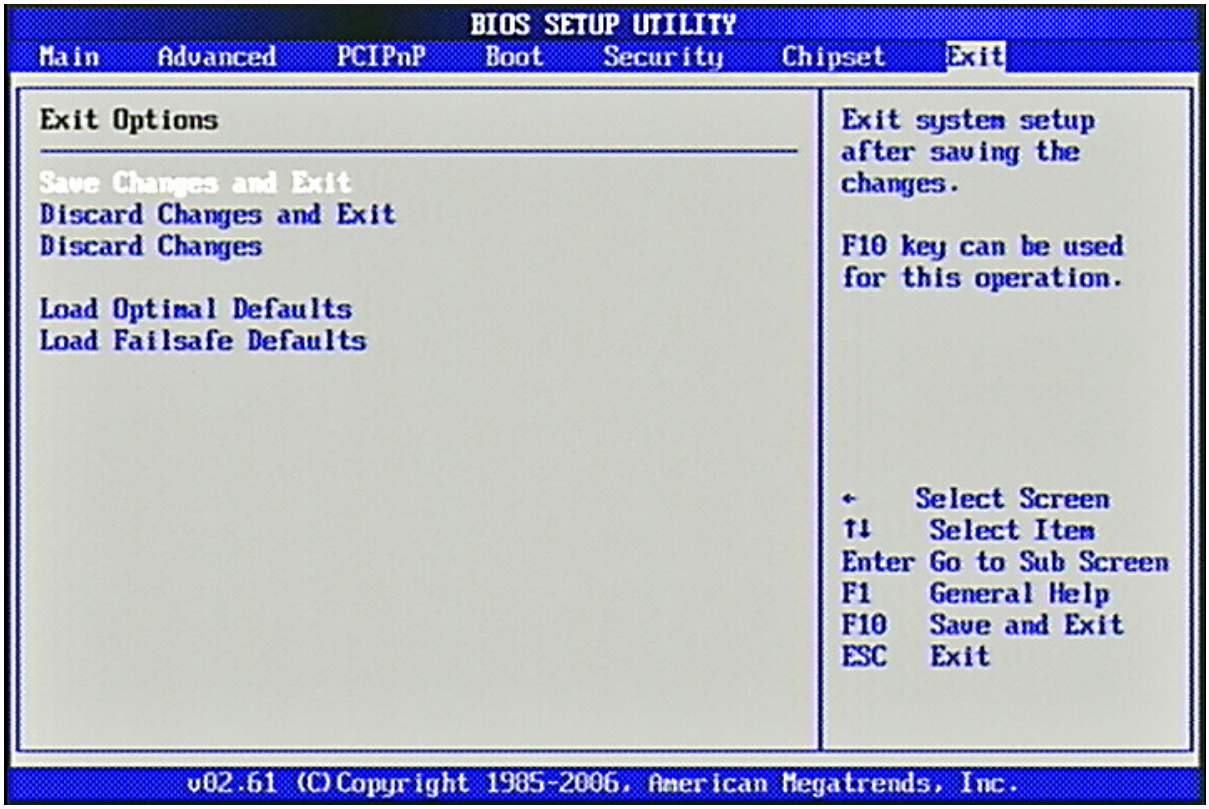
The choice: Displayed, Hidden.

iQST Hardware Health Sensor Monitoring (Read Only)



4.8 Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.



Exit Saving Changes

Exit System Setup and save your changes to CMOS. Pressing <Enter> on this item asks for confirmation: Save changes to CMOS and exit the Setup Utility.

Discard Changes and Exit

Abandon all changes and exit the Setup Utility.

Discard Changes

Abandon all changes and continue with the Setup Utility.

Load Optimal Defaults

Use this menu to load the default values set by the SBC manufacturer specifically for optimal performance of the SBC.

Load Failsafe Defaults

Use this menu to load the default values set by the BIOS vendor for stable system performance.

Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get ROBO-8914VG2AR running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

ATX Power Setting

Unlike other Single board computer, ROBO-8914VG2AR supports ATX only. Therefore, there is no other setting that really needs to be set up. However, there are only two connectors that must be connected—PWR2 (24 pins Power Connector) and PWR1.

Serial ATA Hard Disk Setting for IDE/RAID/AHCI

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, SATA1~4 port. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to operate IDE, RAID (0/1) and AHCI application for system, please follow up setting guide in BIOS programming (Table 5-1).

Detect sequence: SATA1 → SATA2 → SATA3 → SATA4
SATA1 -- Primary IDE Master
SATA2 -- Secondary IDE Master
SATA3 -- Primary IDE Slave
SATA4 -- Secondary IDE Slave

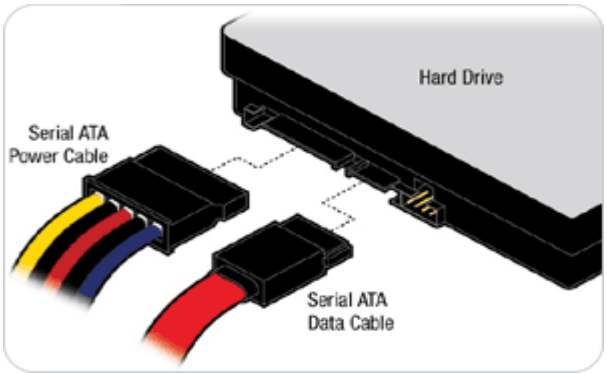


Table. 5-1 SATA Mode setting guide

5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 240-pin DDR3 SDRAM, keyboard, mouse, floppy drive, SATA hard disk, DVI-I connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with ROBO-8914VG2AR, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the COM1/ COM2 ports, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

Disable COM1 serial port to release IRQ #4
Disable COM2 serial port to release IRQ #3

Etc…

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Timer
IRQ #1	Keyboard Event
IRQ #2	Usable IRQ
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Usable IRQ
IRQ #6	Diskette Event
IRQ #7	Usable IRQ
IRQ #8	Real-Time Clock
IRQ #9	Usable IRQ
IRQ #10	Usable IRQ
IRQ #11	Usable IRQ
IRQ #12	IBM Mouse Event
IRQ #13	Coprocessor Error
IRQ #14	Hard Disk Event
IRQ #15	Usable IRQ

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

5.3 FAQ

Installation Problem

Question:I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on JP3 to clean your password.

Note:
Please visit our technical web site at
http://www.portwell.com.tw
For additional technical information, which is not covered in this manual, you can mail to tsd@mail.portwell.com.tw or you can also send mail to our sales, they wull be very delighted to forward them to us.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0700-0483	16K	DOS
0484-053F	2.9K	Program Area
0540-9EFE	614K	[Available]
9EFE-9EFE	0.1K	Unused
= Conventional memory ends at 640K =		
9F00-9FBF	3K	Extended BIOS Area
9FC0-9FFF	1K	Unused
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CAFF	44K	Video ROM
CB00-CC49	5.2K	Unused
CC4A-CFFF	14K	High RAM
D000-DFFF	64K	Page Frame
E000-EEFF	60K	Unused
EF00-EFFF	4K	ROM
F000-FFFF	64K	System ROM
HMA	64K	First 64K Extended

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	[Unassigned]	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	[Unassigned]	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	[Unassigned]	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	[Unassigned]	Usable IRQ
IRQ 10	[Unassigned]	Usable IRQ
IRQ 11	[Unassigned]	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	IDE	Usable IRQ