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IPC Solution

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Multi LAN System

FR9100 User's Manual

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If you have problems or difficulties in using the system or setting up the relevant devices, and software that are not explained in this manual, please contact our service engineer for service, or send email to support@fabiatech.com

Returning Your Board for Service & Technical Support

If your board requires servicing, contact the dealer from whom you purchased the product for service information. You can help assure efficient servicing of your product by following these guidelines:

- ❑ A list of your name, address, telephone, facsimile number, or email address where you may be reached during the day
- ❑ Description of you peripheral attachments
- ❑ Description of your software (operating system, version, application software, etc.) and BIOS configuration
- ❑ Description of the symptoms (Extract wording any message)

For updated BIOS, drivers, manuals, or product information, please visit us at www.fabiatech.com.

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Chapter 1 Introducing the FR9100 System

Overview

The FR9100 is a 1U rack-mount embedded system with Intel® low-power CPU board inside. This user's manual provides information on the physical features, installation, and BIOS setup of the FR9100.

Built to unleash the total potential of the Intel® Celeron® or Core™ 2 Duo Processor, Able to supports optional 1.9GHz or 2.53GHz CPU, this system supports six PCI-e 10/100/1000 Base-TX LAN ports, four SATA II ports, DDRIII memory up to 8GB of two SODIMM slots ,one expansion PCI slot, six USB-2.0 ports, and one VGA Connector.

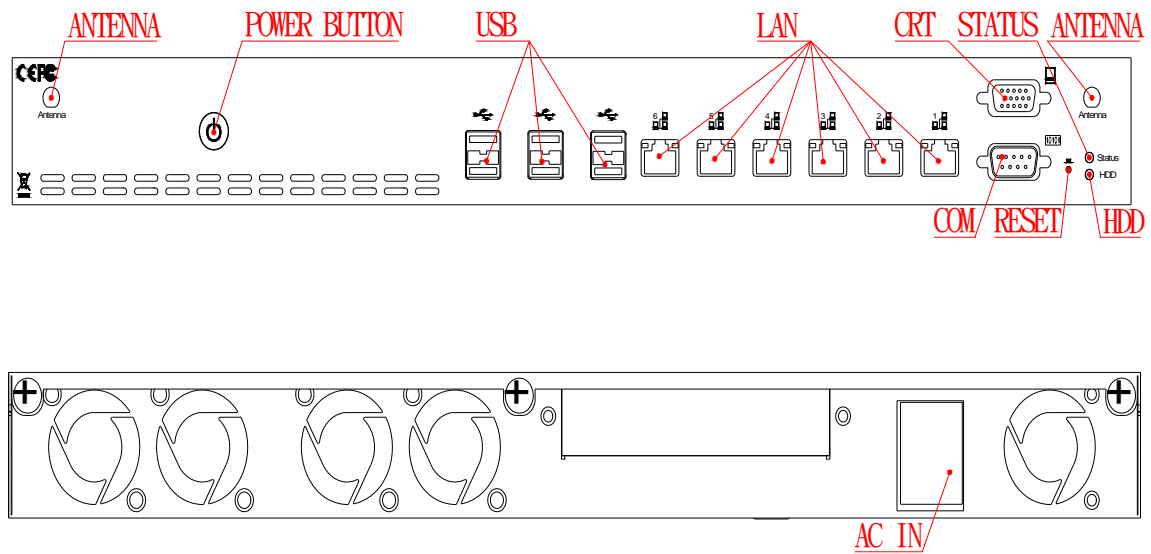
Each FR9100 has one RS232 port for console communications.

The FR9100 is perfect for Internet Router, VPN Gateway, Mail Server, and firewall control. The unit is only 325 mm (D) X 430 mm (W) X 44mm (H).

Series Comparison Table

Model	FR9100		
Processor Intel® CPU (Optional) mPGA-479M Socket	Celeron® T3100 1.9GHz	Core™ 2 Duo P8400 2.26GHz	Core™ 2 Duo T9400 2.53GHz
<i>N+S-Chipset</i>	<i>GM45+NH82801IBME(ICH9M-E)</i>		
<i>Memory</i> <i>204 Pin-SODIMM*2(Max.)</i>	<i>DDR3 800/1066</i> <i>2GB/4GB/8GB</i>		
<i>Storage Space</i>	<i>Two 3.5" HDD or Three 2.5" HDD</i>		
<i>Watchdog Timer</i>	<i>Yes</i>		
<i>Console I/O</i>	<i>One RS-232</i>		
<i>USB 2.0</i>	<i>Six USB ports</i>		
<i>RJ45 Giga LAN port</i>	<i>Six Intel® 82574L 10/100/1000Mbps</i>		
<i>PCI Bus Expansion</i>	<i>One</i>		
Operating Temperature	0~+40°C (32~104°F)		
Storage Temperature	-20~+70°C (4~158°F)		
Dimensions (Unit: mm)	325 (D) X 430 (W) X 44 (H)		

Layout



Specifications

❑ *Processor Board –*

Supports Intel® T9400-Core™ 2Duo2.53GHz/P8400-Core™ 2Duo2.26GHz
/T3100- Celeron® 1.9GHz /Celeron® 575 2.0GHz

Two 204-pin SoDIMM socket support DDRIII 800/1066 RAM up to 8GB.

❑ *I/O Outlets –*

Six PCIe Interface 10/100/1000 Base-TX Ethernet ports.

Six USB ports (V2.0), One RS232 Port, and one VGA Port.

One AC-In plug connector with power button switch and one reset button.

One power LED, One HDD access LED, one User defined status LED.

❑ *Storage Bay-*

Three 2.5" SATA or two 3.5" SATA hard disk space.
(Supports RAID 0/1, the SATA 4 port does not support RAID function).

❑ *Smart FAN-*

Supports 2 FAN for CPU and 2 FAN for system.

❑ *Power requirement –*

AC100~AC240 /50Hz~60Hz, VAC Input, 87VA maximum with Intel® T9400-
Core™ 2Duo2.53GHz full loading.(Celeron® 575 2.0GHz/69VA maximum)

❑ *Dimensions -*

325mm (D) x 430mm (W) x 44mm (H)

Packing List

Upon receiving the package, verify the following things. Should any of the mentioned happens, contact us for immediate service.

- Unpack and inspect the FR9100 package for possible damage that may occur during the delivery process.
- Verify the accessories in the package according to the packing list and see if there is anything missing or incorrect package is included.
- If the cable(s) you use to install the FR9100 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FR9100 system.

Note: after you install the FR9100, it is recommended that you keep the diskette or CD that contains drivers and document files, and keep the document copies, or unused cables in the carton for future use.

The following lists the accessories that may be included in your FR9100 package. Some accessories are optional items that are only shipped upon order.

- One FR9100 embedded system.
- One AC power cord.
- Two pack of 2.5" and 3.5" SATA hard disk installation kit with fixed screws.
- One pair Aluminum Rack-Mount handles kit and 6 screws.
- One CPU Thermal Pad material 15mmx15mm size.
- One compact disc includes software utility.

Optional:

- FR9100K1- FB4720 PCI Rise card. (PN:0606010025G)
- CPU: Intel® T9400-Core™ 2Duo2.53GHz/P8400-Core™2Duo2.26GHz /T3100-Celeron® 1.9GHz /Celeron® 575 2.0GHz
- DDRIII 800/1066 RAM: 1GB/2GB/4GB
- SATA DOM: 2GB/4GB/8GB

Chapter 2 Hardware Installation

This chapter introduces the system connectors & jumper settings, and guides you to apply them for field application.

Before Installation

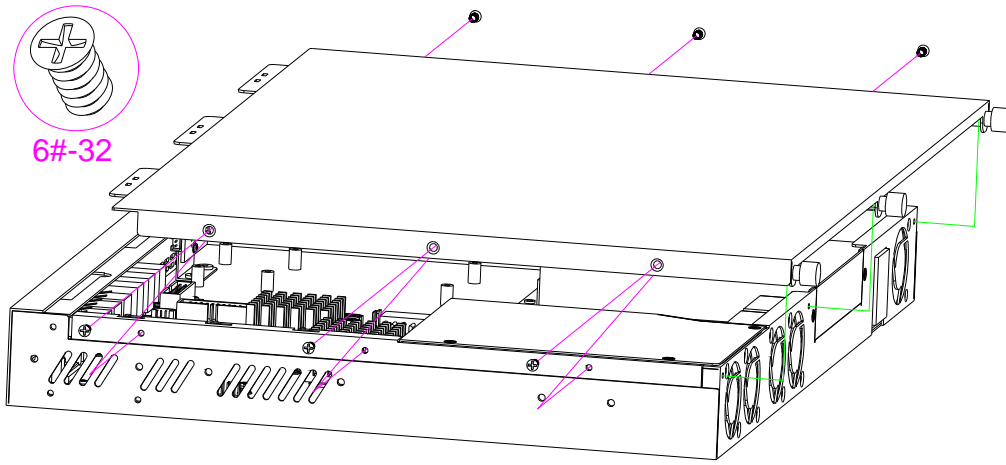
Before you install the system, make sure you follow the following descriptions.

1. Before removing the cover, shut down the operation System and disconnect the power cords.
2. Install or unplug any connector, CPU, PCI Card, Disk On Module and hard disk be sure that the power cable is disconnected the system. If not, this may damage the system.
3. Installing a heat sink is necessary for heat dissipation from your CPU. If heat sink is not mounted, this may cause the CPU fail due to over-heating problem.
4. The ESD (Electricity Static Discharge) may be created from human body that touches the board. It may do damage to the board circuit.

❑ Removing Covers –Installing Hardware

If you are installing hardware option, you can remove the top cover. The following figure will guide you how to install SATA 2.5" or SATA 3.5" HDD inside, and DDRIII-RAM module the FR9100 and how to install the FR9100 fixers. (Please see the spots circled.)

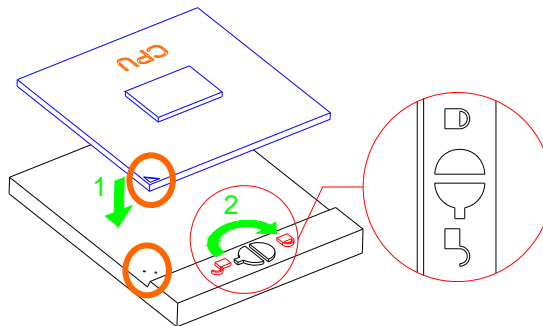
❑ a. Unscrew Top cover



❑ b. Installing CPU and Heat Sink

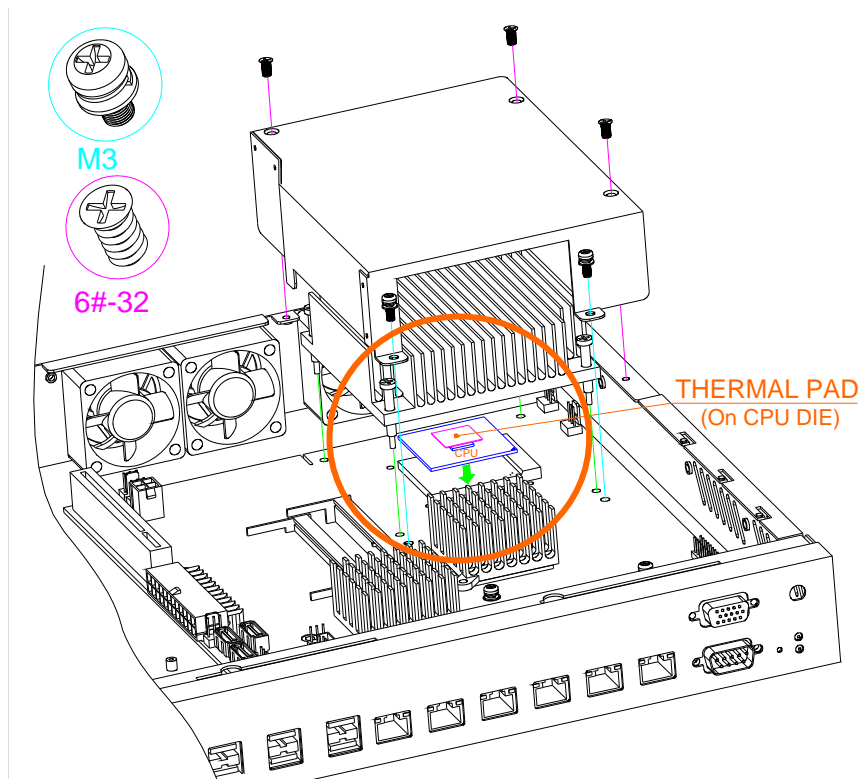
The FR9100 system supports Intel T9400/P8400/Celeron CPU's in mPGA-479M Socket, when you install CPU, make sure the CPU into the CPU socket and lock heat sink attached on the top to prevent from overheating.

✧ b1. Installing CPU to CPU Socket



Note: 1. Be careful with the pin orientation when installing CPU, be sure that align gold arrow on CPU with arrow key (1) has to insert into the mPGA479M socket. And use I-Type screwdriver to twist the lock key (2).
2. The System power must be turned off – to disconnect the power cord.

✧ b2. Installing CPU Heat Sink on CPU

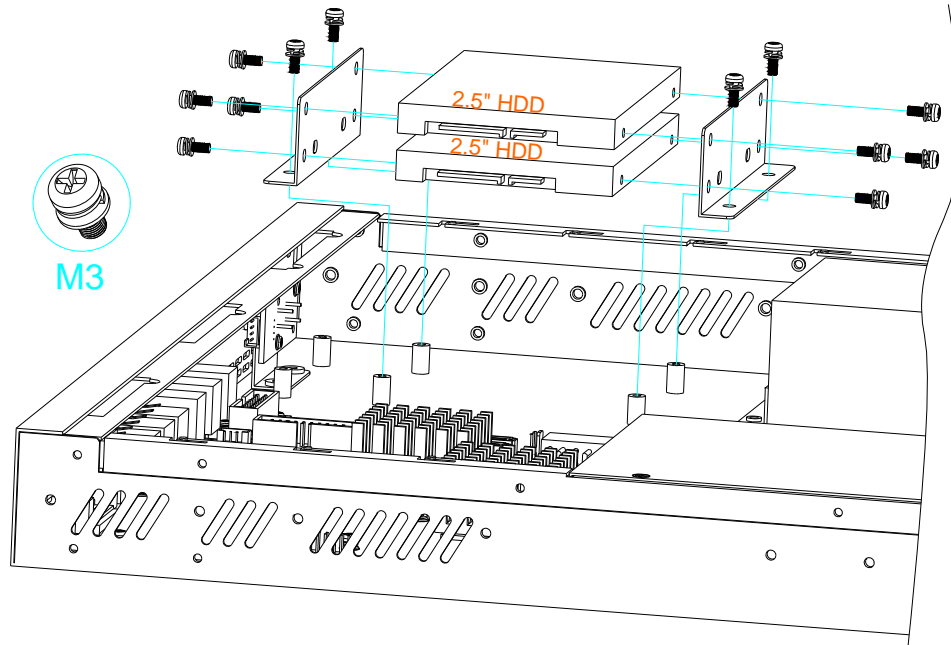


Note: When installing CPU, make sure heat sink paste (thermal pad) to stand between CPU DIE and heat sink in order to protect CPU and enhance heat dissipation.

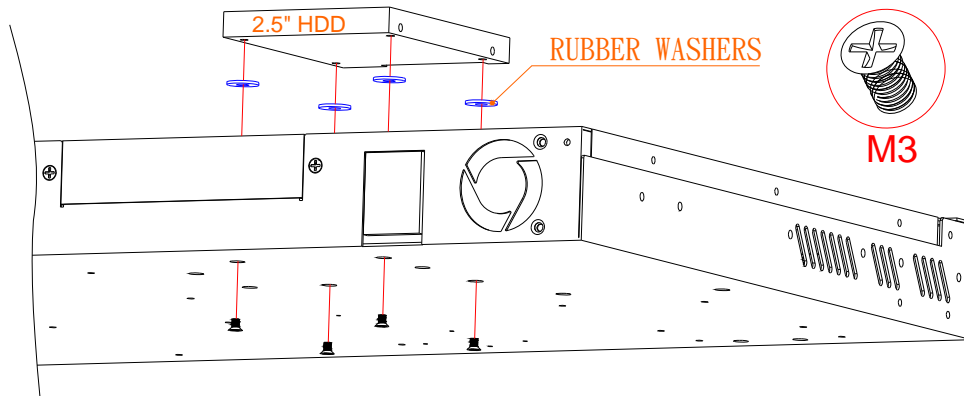
❑ c. Installing SATA Hard Disk and SATA Disk On Module

The FR9100 system supports three 2.5" SATA HDD or two 3.5" SATA HDD space., If a PCI card is added onto the system, the HDD space can supports two 2.5" SATA HDD or one 3.5" SATA HDD only.

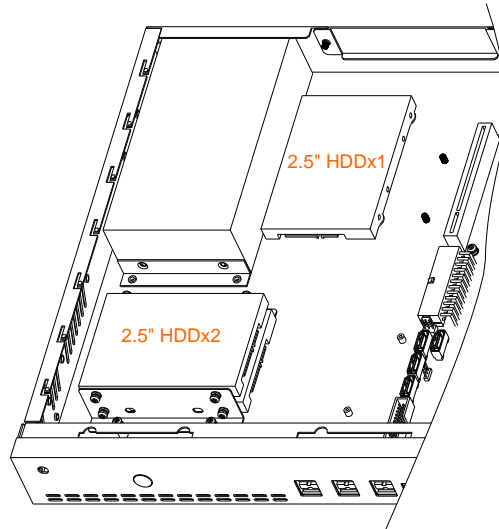
✧ c1. Installing 2.5" SATA Hard Disk Metal kit



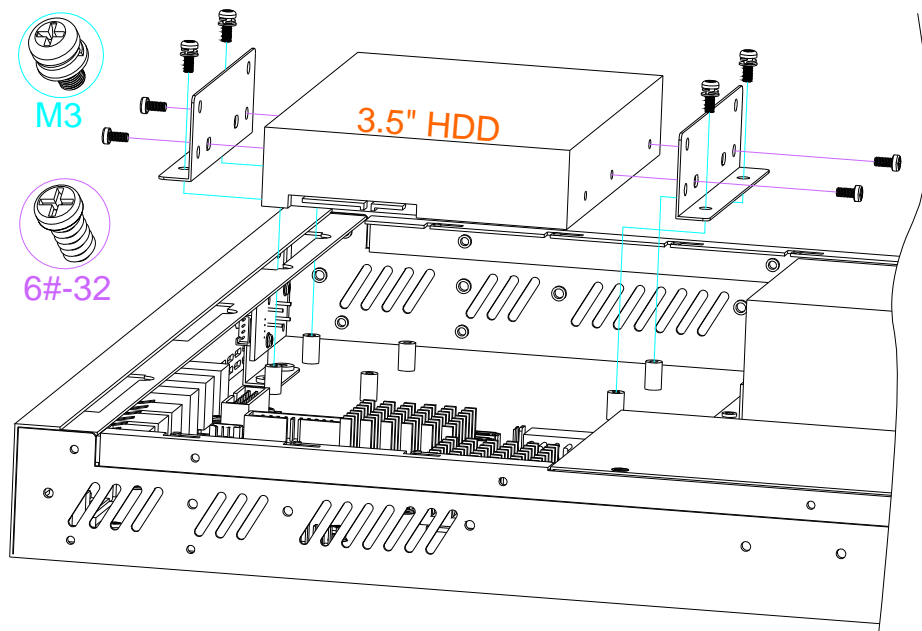
◆ c1-1. Installing 2.5" SATA Hard Disk



◆ *c1-2. 2.5" SATA Hard Disk Space*



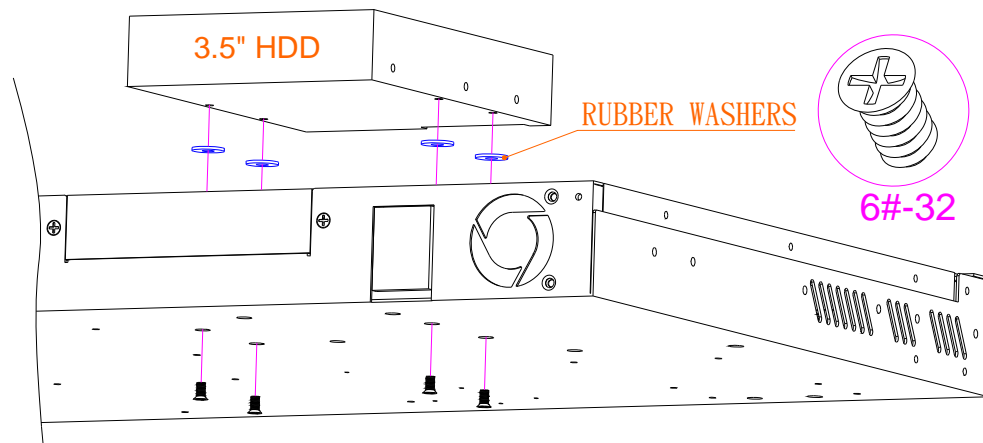
◇ *c2. Installing 3.5" SATA Hard Disk with SATA mount kit*



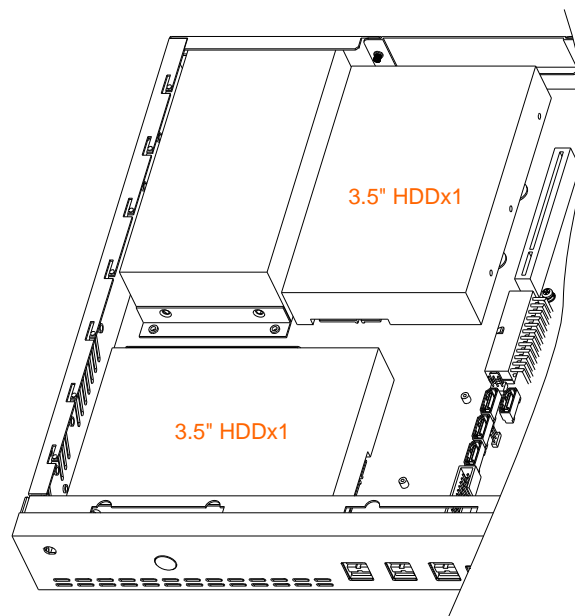
Note: Use caution when handling the hard disk to prevent damage to SATA connector as you insert hard disk.

1. Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your hard disk.
2. The System power must be off – Disconnect the power cord.

◆ *c2-1. Installing 3.5" SATA Hard Disk*

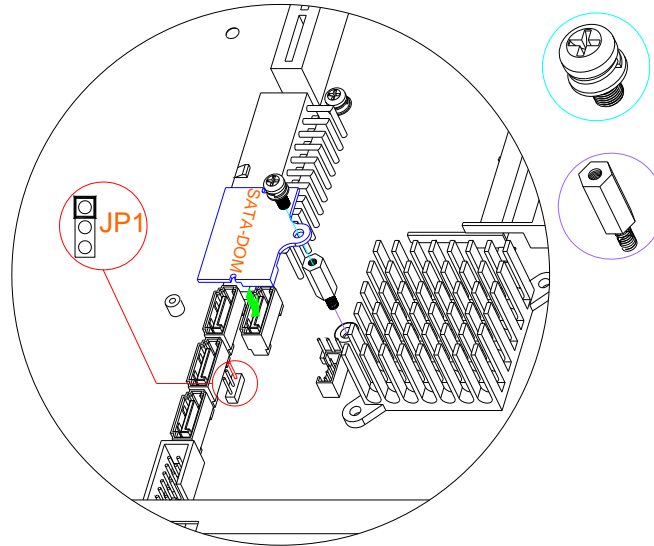


◆ *c2-2. 3.5" SATA Hard Disk Space*

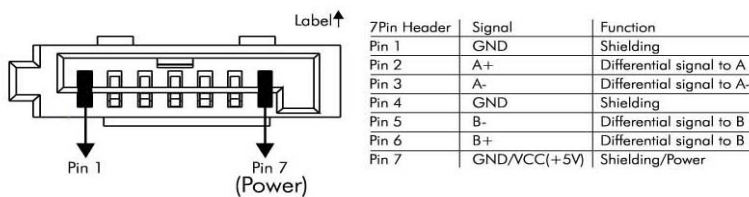


✧ c3. Installing SATA DOM

When installing the SATA DOM on SATA4 port connector, must set to 1, 2 close by JP1. (Defaulted 2, 3 closed for SATA HDD or SATA CDROM.)

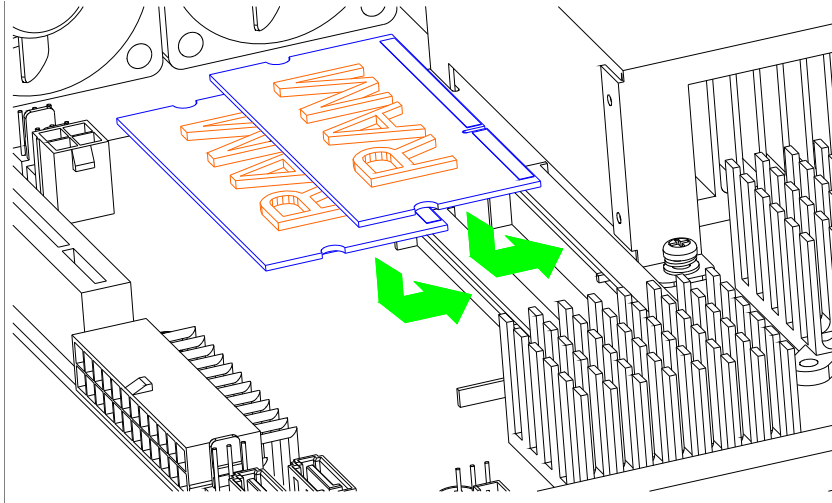


Note: 1. Use caution when handling the SATA Disk On Module to prevent damage to SATA connector as you inserted DOM. Be careful with the orientation when installing connectors.
2. The SATA DOM socket **PIN 7 is VCC+5V**. (Don't connect to the other SATA device. Like SATA CDROM or SATA HDD.)The pin assignment is below picture.



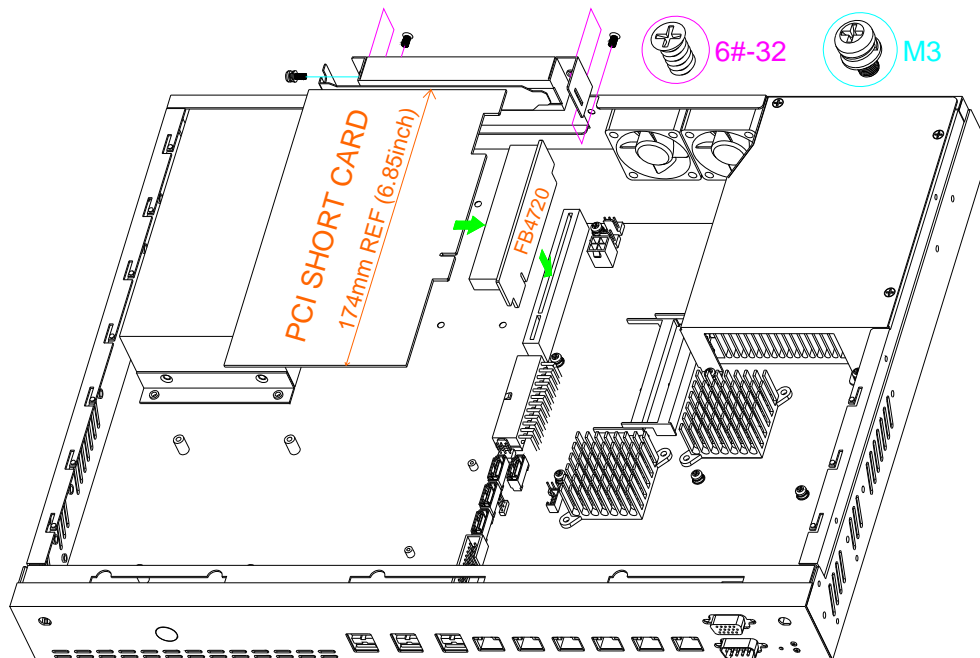
❑ **d. Installing Memory: So-DIMM Socket For DDRIII Modules**

You may extend additional memory to system, See as following figure and rear pictures. The So-DIMM socket supports 1GB, 2GB or 4GB of DDRIII 800/1066 RAM modules is memory maximum up to 8GB.



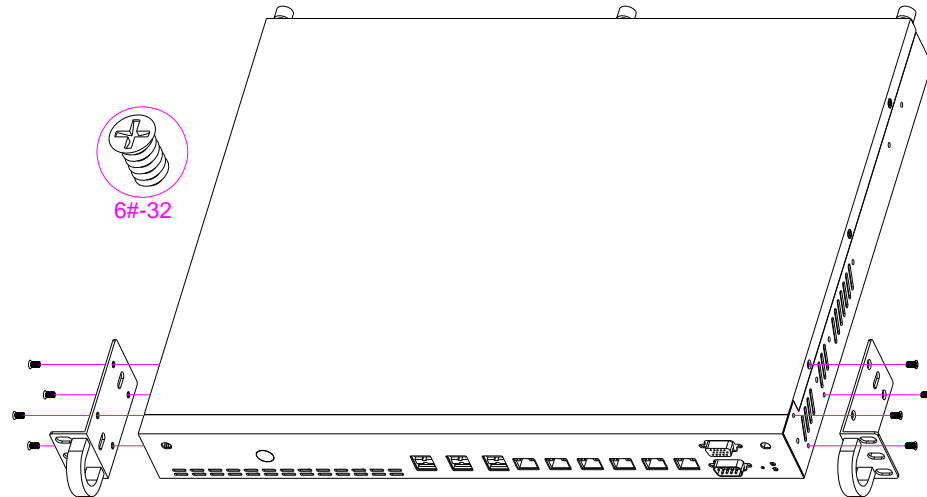
❑ **e. Installing Expansion PCI Card (FR9100K1-FB4720 PCI Rise Card is Optional)**

If you are installing Expansion PCI hardware, you can remove the top side cover. The following figure will guide you how to install PCI interface card inside the system.



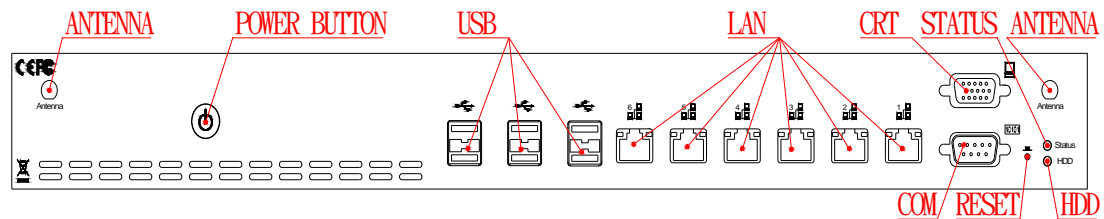
□ f. Installing the Rack-Mount handle kit on FR9100

Please refer to the down side figure for installing the FR9100 with rack-mount handle fixers.



□ LED Indicators (On the Front Panel)

The Power LED (with power Button), HDD LED and Status LED's have two distinctive statuses: Off for inactive operation and blinking light for activity. And the LAN LED's for LAN ports. The left side LED (Orange) indicates data is being accessed and the right side LED's (Green) indicates on-line status. (On indicates on-line and off indicates off-line)



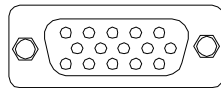
Note: Please refer to the section of the "Status LED Programming" in the Chapter 4 "Software Installation" for the detail description of the Status LED register.

Bit Location	Bit 6	Bit 7
Light	0	0
Blinking	0	1
Flash	1	1
Not Active	1	0

□ I/O Peripheral Connectors

View from the front and back side, If you are connecting the monitor, LAN, audio, COM and USB to the FR9100. See following figure and a side pictures.

1. Connection VGA port

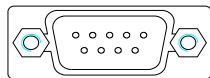


CRT

DB15	Signal
1	Red
2	Green
3	Blue
13	Hsync
14	Vsync
12	DDC Data
15	DDC Clock
5 & 10	Digital Ground
6,7,8	Analog Ground
Others	Not Used

2. Console Connecting COM Port

The DB9 (COM1) is standard serials port connector. The following tables show the signal connection of DB-9 connector.

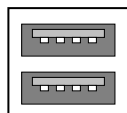


COM

DB-9	RS-232 Signal
1	-DCD
6	-DSR
2	RXD
7	-RTS
3	-TXD
8	-CTS
4	-DTR
9	-RI
5	Ground
Case	Case Ground

3. Connecting USB Ports

The FR9100 supports a six port USB connector. Any USB device can be attached to USB ports with plug-and-play supported.

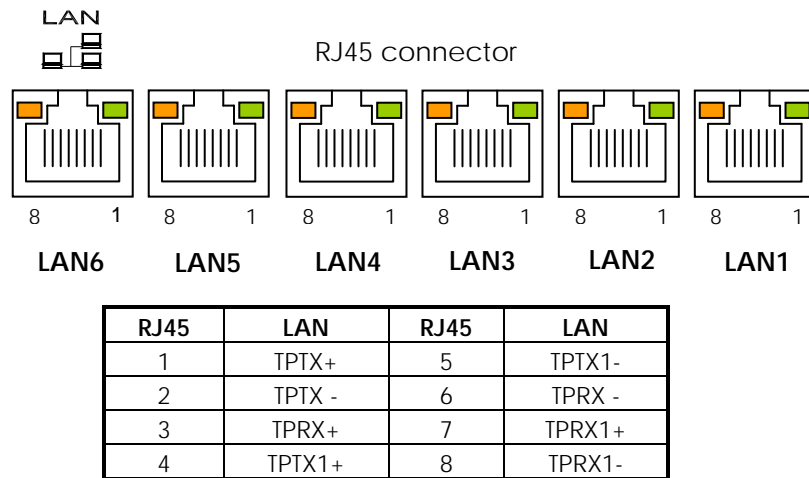


USB

USB	Signal
1	USBV
2	USBD-
3	USBD+
4	USBG

4. Connecting the LAN Ports

The LAN ports are RJ45 connectors with 2 LEDs. The right side LED (orange) indicates data is accessing and the left side LED (green) indicates on-line status. (When lighted indicates on-line and off indicates off-line). The LAN1 ~ LAN6 is the 10/100/1000 base-TX ports. The following lists the pin assignment and signals of RJ45.



□ Connecting the Power Inlet and Power Button

Power is supplied through AC power cable. Plug its power into a power outlet then push power button, when you final installed system hardware device.

AC/110V~240V

AC-Power: Use AC power cord

□ Power Button and Reset Button (Front Panel)

Pushing the Power button once will switch the FR9100 on and off, And Reset push button is switcher for system reset; Push and release the button will cause hard ware reset of FR9100 and restart system booting.



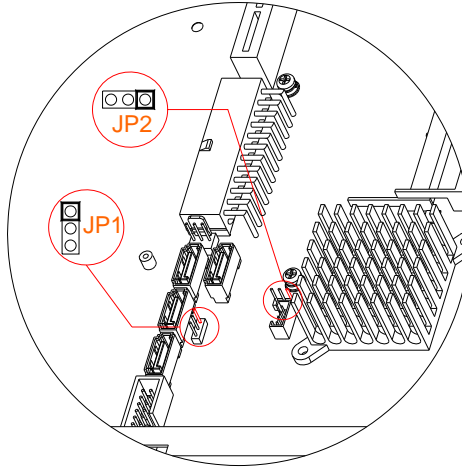
Power button: On/Off



Reset Push Button: Restart

□ Jumper Setting

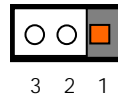
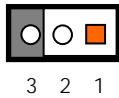
The JP2 of CPU board is used to clear CMOS data and JP1 for SATA 4 socket connector select SATA Hard-Disk or SATA DOM (Disk On Module).



□ JP2: Clear CMOS Setting

The JP2 is used to select clear CMOS data. The CMOS stores information like system date, time, boot up device, password, IRQ... which are set up with the BIOS, set JP2 to 2-3 and then return to 1-2 before system powers is off.

JP2



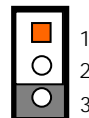
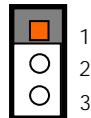
Normal Operation
Factory Preset

Clear CMOS Data

□ JP1: Select SATA Hard-Disk or SATA Disk On Module

When installing the SATA DOM on SATA4 socket connector, must set to 1, 2 close by JP1. (Defaulted 2, 3 closed for SATA HDD or SATA CDROM.)

JP1



SATA-Hard-Disk
Factory Preset

SATA-Disk On Module

Chapter 3 BIOS Setup

This chapter describes the BIOS setup.

Overview

BIOS are a program located on a Flash memory chip on a circuit board. It is used to initialize and set up the I/O peripherals and interface cards of the system, which includes time, date, hard disk drive, and connected devices such as the video display, diskette drive, and the keyboard. This program will not be lost when you turn off the system.

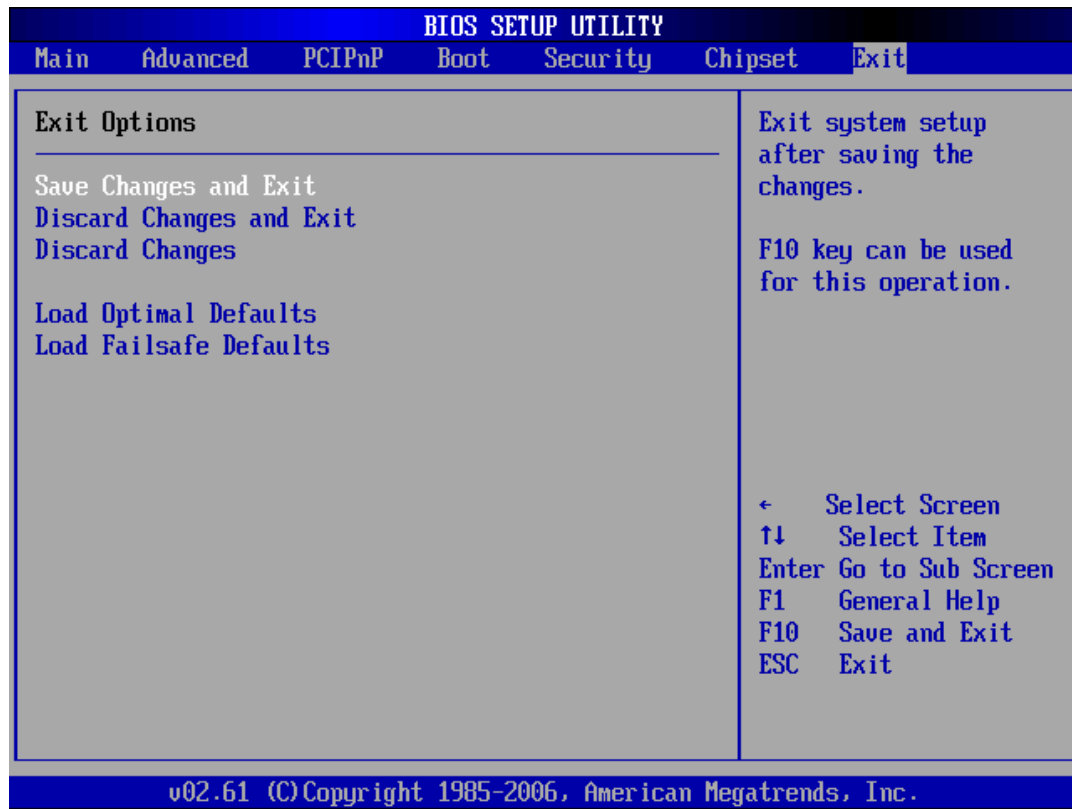
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

The BIOS default values ensure that the system will function at its normal capability. In the worst situation the user may have corrupted the original settings set by the manufacturer.

All the changes you make will be saved in the system RAM and will not be lost after power-off.

When you start the system, the BIOS will perform a self-diagnostics test called Power On Self Test (POST) for all the attached devices, accessories, and the system. Press the [Del] key to enter the BIOS Setup program, and then the main menu will show on the screen.

Note: Change the parameters when you fully understand their functions and subsequence.



□ BIOS Functions

On the menu, you can perform the following functions

1. Main
2. Advanced
 - CPU Configuration
 - IDE Configuration
 - SuperIO Configuration
 - Hardware Health Configuration
 - NCT702 Hardware Health Configuration
 - ACPI Function
 - AHCI Configuration
 - PCI Express Configuration
 - Remote Access Configuration
 - USB Configuration
3. PCIPnP
4. Boot
 - Boot Settings Configuration
 - Boot Device Priority
 - Hard Disk Drives
5. Security
 - Change Supervisor
 - Change User Password
 - Clear User Password
 - Boot Sector Virus Protection

6. Chipset
 - North Bridge Configuration
 - South Bridge Configuration
7. Power
8. Exit
 - Save Changes and Exit: Exit system setup after saving the changes. F10 key can be used for this operation.
 - Discard Changes and Exit: Exit system setup without saving any changes. ESC key can be used for this operation.
 - Discard Changes: Discard changes down so far any of the set questions. F7 key can be used this operation.
 - Load Optimized Default: to auto configure the system according to optimal setting with pre-defined values. This is also the factory default setting of the system when you receive the board.
 - Load Fail-Safe Default: to configure the system in fail-safe mode with predefined values.

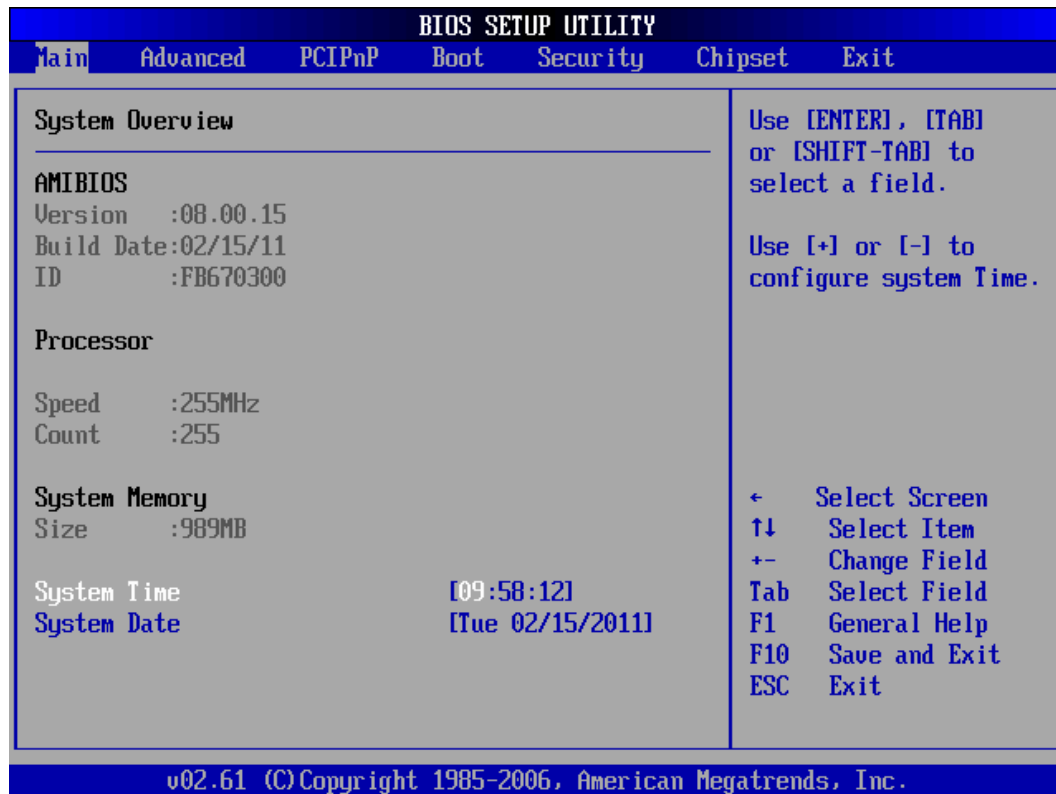
□ Keyboard Convention

On the BIOS, the following keys can be used to operate and manage the menu:

Item	Function
ESC	To exit the current menu or message
Page Up/Page Down	To select a parameter
F1	To display the help menu if you do not know the purpose or function of the item you are going to configure
F8	Fail-Safe Default
F9	Optimized Default
F10	Save and exit
UP/Down Arrow Keys	To go upward or downward to the desired item

Main Setup

This section describes basic system hardware configuration, system clock setup and BIOS version information. If the CPU board is already installed in a working system, you will not need to select this option anymore.



□ System Memory

This option is display-only which is determined by POST (Power On Self Test) of the BIOS.

□ System Date & Time Setup

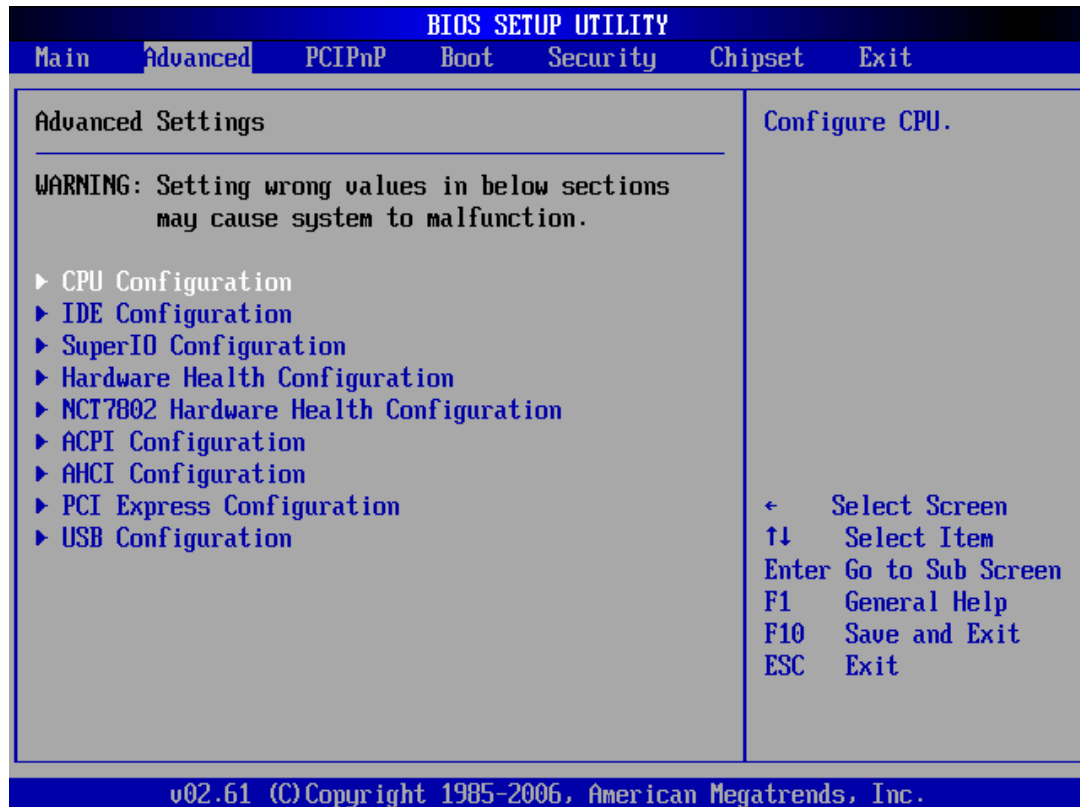
Highlight the <Date> field and then press the [Page Up] / [Page Down] or [+] / [-] keys to set the current date. Follow the month, day and year format.

Highlight the <Time> field and then press the [Page Up] / [Page Down] or [+] / [-] keys to set the current date. Follow the hour, minute and second format.

The user can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

Advanced Setup

Select the *Advanced* tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages



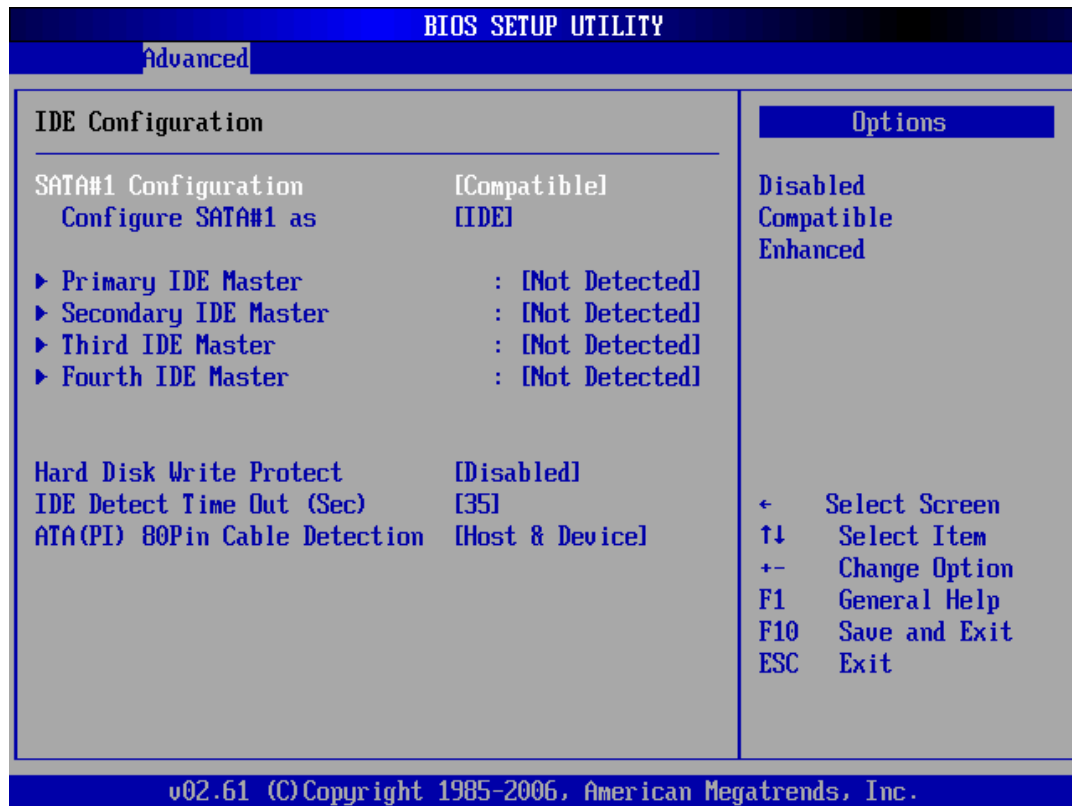
□ CPU Configuration

You can use this screen to select options for the CPU information. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

Note: The CPU Configuration setup screen varies depending on the installed processor.

□ IDE Configuration

You can use this screen to select options for the ATA/IDE Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the *IDE Configuration* screen is shown below.



□ SATA#1 Configuration

This item specifies the ATA/IDE channels used by the onboard PATA/SATA IDE controller depend on the operation system (OS) that installed. When installed DOS, WIN95/98/ME Will can set to compatible mode. And set to Enhanced mode if you are using native OS, like Windows-XP/2k

Available Options: Disable, Compatible, and Enhanced

Default setting: Compatible

■ *Configure SATA as (ICH8ME- Support RAID 0/1)*

This field is when set to Enhanced mode; you can select the IDE, RAID or AHCI.

Available Options: IDE, RAID, and AHCI

Default setting: IDE

❑ IDE Primary/Secondary Master/Slave

IDE hard drive controllers can support up to two separate hard drives. These drives have a master/slave relationship, which is determined by the cabling configuration used to attach them to the controller. Your system supports one IDE controller – a primary and a secondary – so you have the ability to install up to four separate hard disks.

Hard Disk Type

The BIOS supports various types for user settings, The BIOS supports <Pri Master>, <Pri Slave>, so the user can install up to two hard disks. For the master and slave jumpers, please refer to the hard disk's installation descriptions and the hard disk jumper settings.

You can select <AUTO> under the <TYPE> and <MODE> fields. This will Enabled auto detection of your IDE drives during boot up. This will allow you to change your hard drives (with the power off) and then power on without having to reconfigure your hard drive type. If you use older hard disk drives, which do not support this feature, then you must configure the hard disk drive in the standard method as described above by the <USER> option.

PIO MODE

PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to affect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by them. This is simpler and more efficient (and faster). Your system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

BLOCK Mode

This option allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

S.M.A.R.T

This field is used to activate the S.M.A.R.T (System Management and Reporting Technologies) function for S.M.A.R.T HDD drives. This function requires an application that can give S.M.A.R.T message.

❑ Hard Disk Write Protect

Set this option to protect the hard disk drive from being overwritten. The Optimal and Fail-Safe default setting is *Disabled*.

Available Options: Disabled, Enabled

Default setting: Disabled

❑ **IDE Detect Time Out (Sec.)**

Set this option to stop the AMIBIOS from searching for IDE devices within the specified number of seconds. Basically, this allows you to fine-tune the settings to allow for faster boot times. Adjust this setting until a suitable timing that can detect all IDE disk drives attached is found.

Available Options: 0, 5, 10, 15, 20, 25, 30, and 35

Default setting: 35

❑ **ATA (PI) 80 Pin Cable Detection**

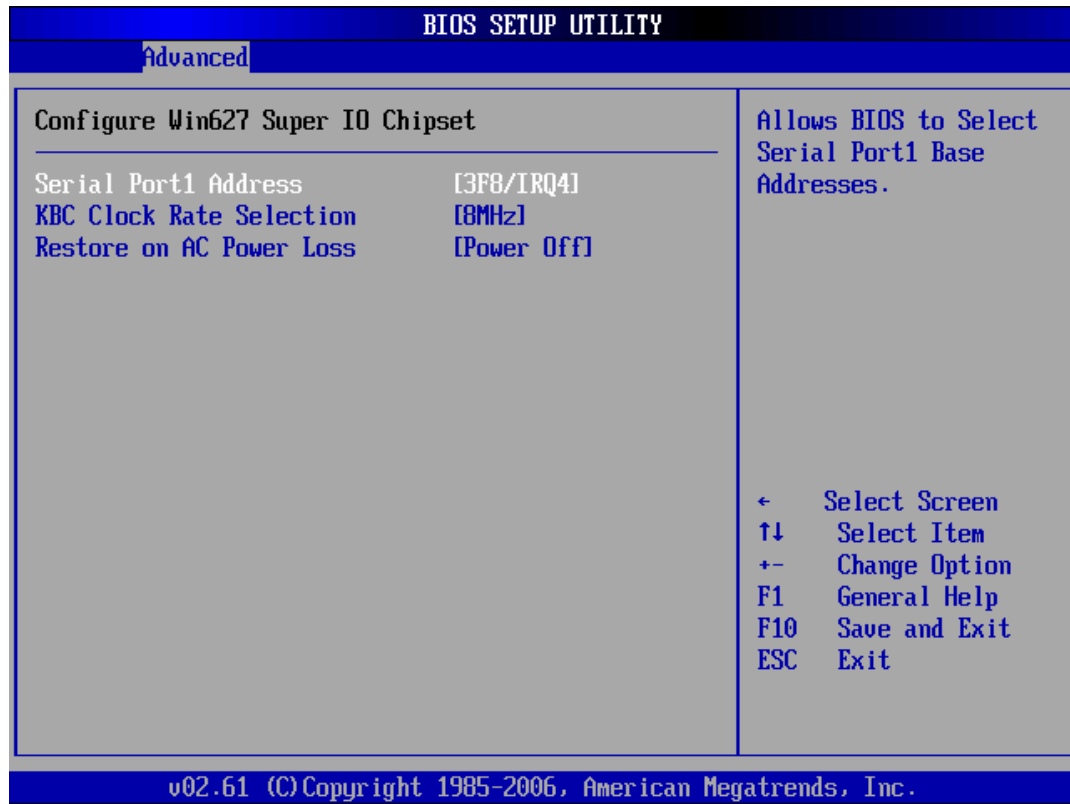
Set this option to select the method used to detect the ATA (PI) 80 pin cable. The use of an 80-conductor ATA cable is mandatory for running Ultra ATA/66, Ultra ATA/100 and Ultra ATA/133 IDE hard disk drives. The standard 40-conductor ATA cable cannot handle the higher speeds.

Available options: Host & Device, Host, and Device

Default setting: Host & Device

❑ SuperIO Configuration

This section describes the function of Super I/O settings.



❑ Serial Port 1 Address

These fields select the I/O port address for each Serial port.

Available Options: Disabled, 3F8H/COM1, 3E8H/COM3, and 2E8H/COM4.

Default setting: 3F8H/COM1

❑ KBC Clock Rate Selection

This field is select Keyboard clock rate selecting 6MHz/8MHz/12MHz/16MHz Controller.

Available Options: 6MHz, 8MHz, 12MHz, and 16MHz

Default setting: 8MHz

❑ Restore On AC Power Lose

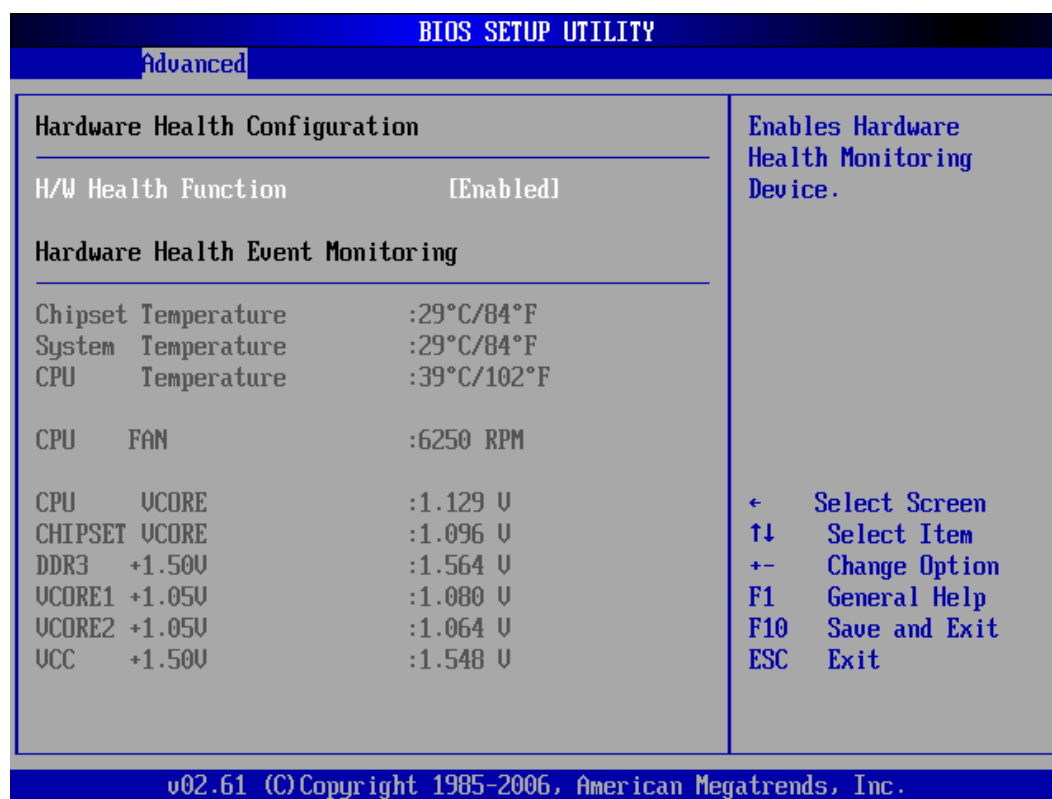
This field specifies the option controls how the PC will behave once power is restored following a power outage (or other unexpected or ungraceful shutdown). The "Last State" option returns the PC to the state in effect at the time the power outage or shutdown occurred. Assign this option the "Power On" value to reboot automatically; assign the "Power Off" value to leave the machine powered down.

Available Options: Power Off, Power On, and Last State

Default setting: Power On

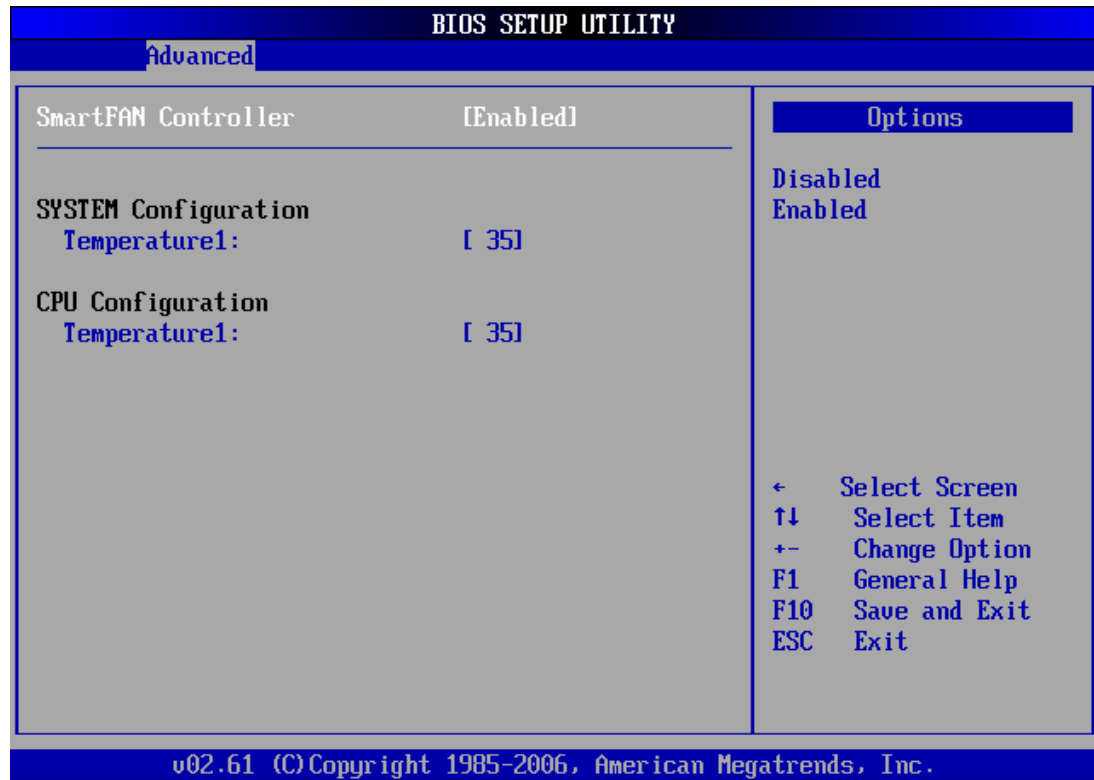
❑ Hardware Health Configuration

On the Hardware Monitor Setup screen, you can monitor the system temperature, CPU voltage, and CPU fan speed...



❑ NCT702 Hardware Health Configuration

On the NCT702 Hardware Health Setup screen, you can select the CPU/System Smart FAN controller temperature.



❑ Smart FAN Controller

This field is select Enabled or Disabled the Smart FAN controller. If select to Disabled, the FAN is full speed.

Available Options: Disabled, and Enabled

Default setting: Enabled

■ *SYSTEM/CPU Configuration > Temperature1/2*

This field is adjusting CPU/ System target temperature Controller Range: 0 ~ 40C. And if temperature of CPU/System up to adjusted setting, the CPU/System will automatically increase the CPU/System FAN speed to cool down the overheated CPU and System.

Temperature1: 35

❑ **Advanced ACPI Settings**

This field specifies allow you set this value to utilize the ACPI (Advanced Configuration and Power Interface) specification.



❑ **Advanced ACPI Configuration**

■ **ACPI Version Feature**

Set this value to allow or prevent the system to be compliant with the ACPI Specification.

Available Options: ACPIv1.0, ACPIv2.0, and ACPIv3.0

Default setting: ACPIv1.0

■ **ACPI Version Feature**

Allow you to enable or disable the ACPI APIC table pointer to RSDT point list.

Available Options: Enabled, and Disabled

Default setting: Enabled

■ ***AMI OEMB Table***

Set this value to allow the ACPI BIOS to add a pointer to an OEMB table in the Root System Description Table (RSDT) table.

Available Options: Enabled, and Disabled

Default setting: Enabled

□ **Chipset ACPI Configuration**

■ ***APIC ACPI SCI IRQ***

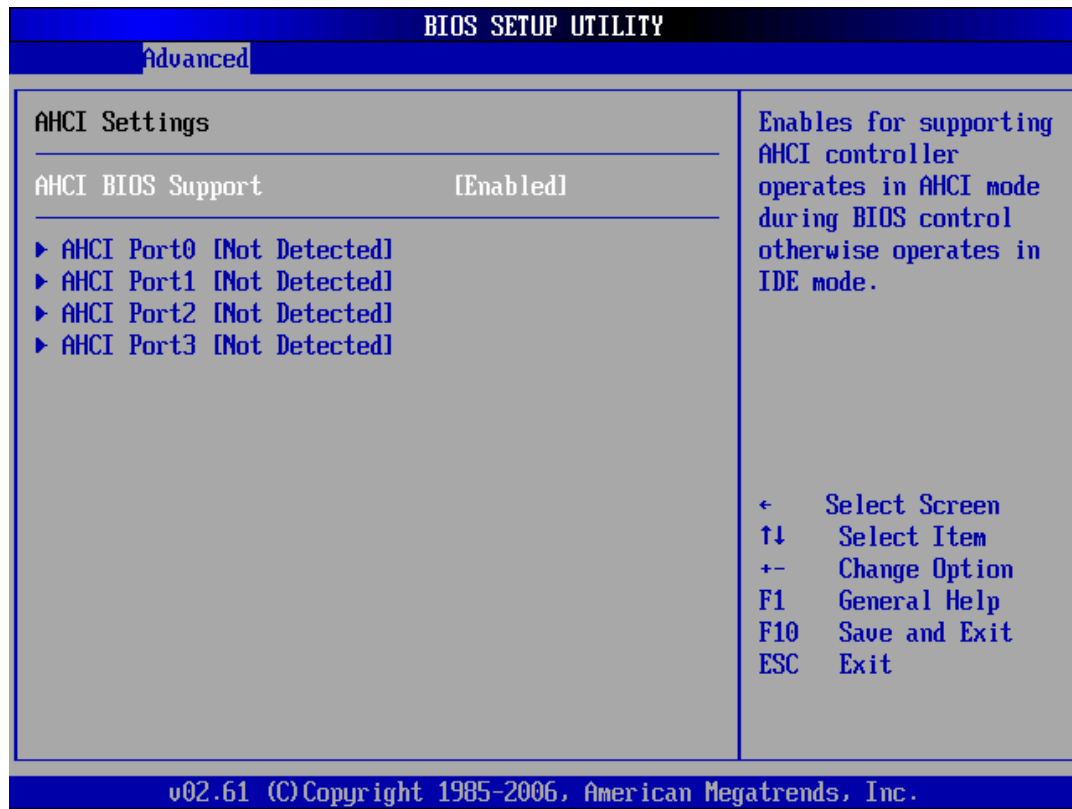
Allows you to enable or disable the internal I/O APIC and Multiprocessor Tables. (Disable the APIC ACPI SCI IRQ may require the O.S. to be reinstalled)

Available Options: Disabled, and Enabled

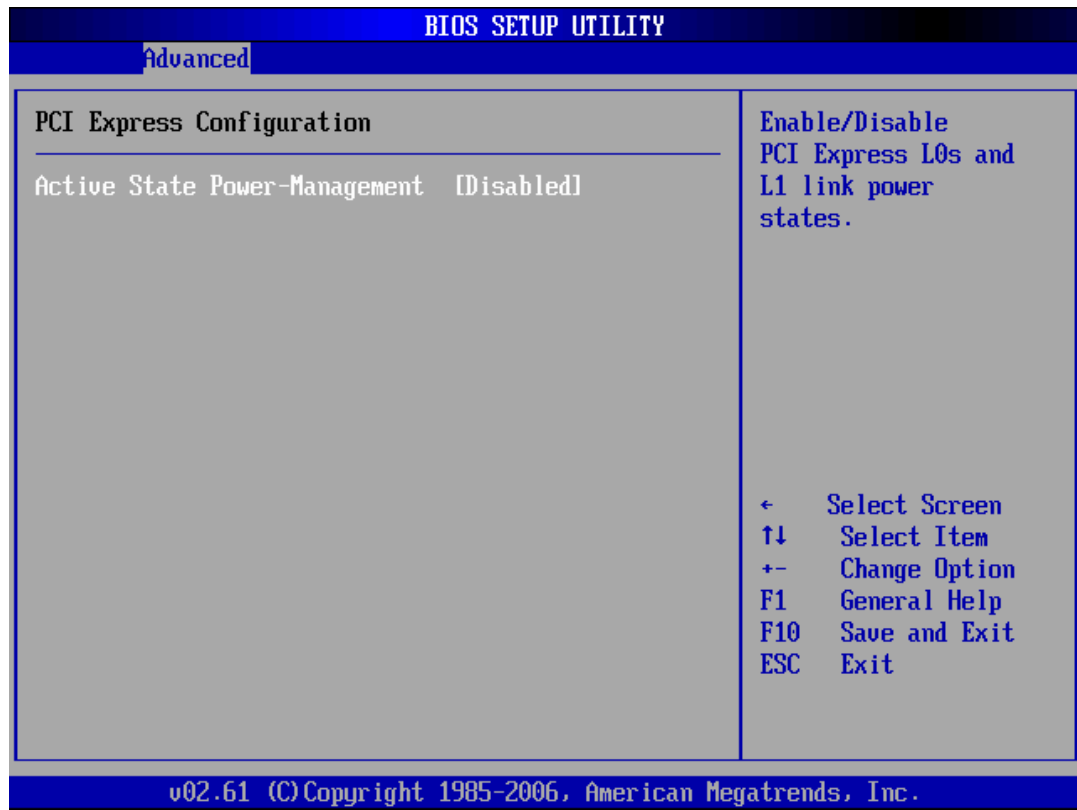
Default setting: Disabled

□ **AHCI Configuration**

This field is when SATA is set to AHCI mode, you can use this screen to select options for the AHCI SATA port Settings.



❑ **PCI Express Configuration**



❑ **Active State Power-Management**

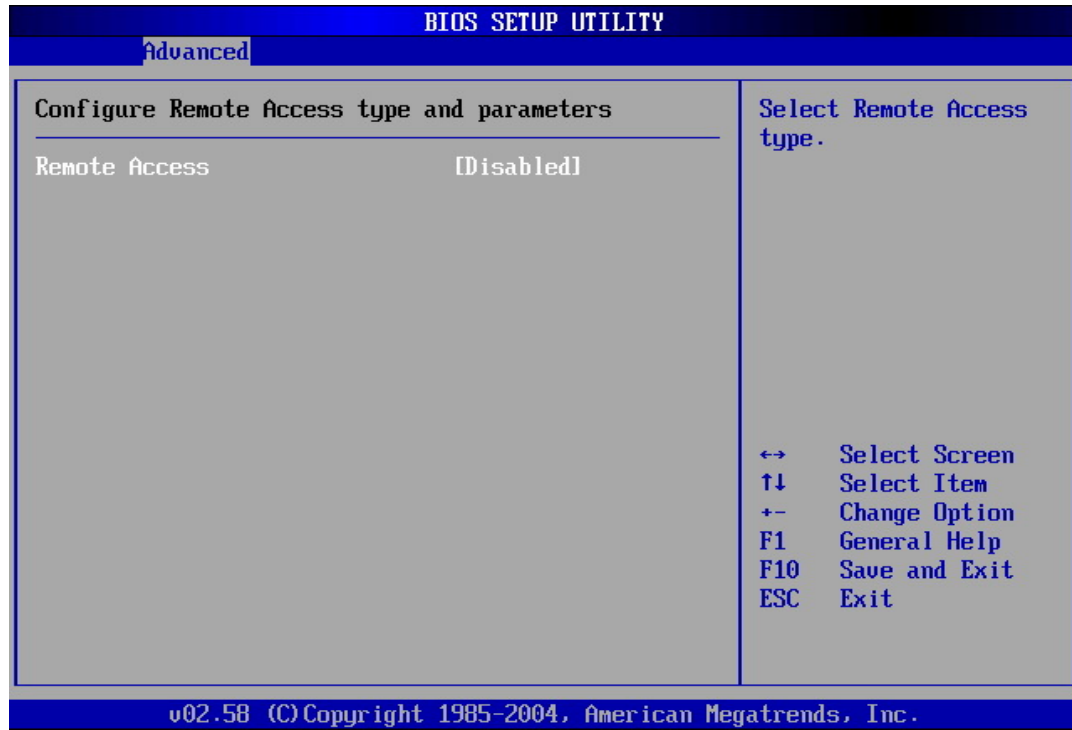
This field is select Enable or Disable PCI Express L0s and L1 link power states.

Available Options: Enabled and Disabled

Default setting: Disabled

☐ **Remote Access Configuration**

This option turns on remote access support in the BIOS and is the default setting. The remote access feature requires the use of the serial port1 connector located at the front panel of the FR9100.



☐ **Remote Access**

This field is select remote access type.

Available Options: Enabled and Disable

Default setting: Enabled

☐ **Serial Port number**

This field is the Serial port1 for console redirection. Make sure the port is Enabled.

Available Options: COM1

Default setting: COM1

☒ **Base Address, IRQ**

This field is the I/O port address and Interrupt.

Available Options: 3F8, 4

Default setting: 3F8, 4

☐ **Serial Port Mode**

This field is select Serial port1 can use any mode. Just keep in mind that the bits per second, data bits, parity, and stop bits must match terminal setting.

Available Options: 115200 8,n,1/57600 8,n,1/38400,8,n,1/19200,8,n,1/09600,8,n,1

Default setting: 09600, 8, n, 1

☐ **Flow Control**

This field is Serial port1 can use flow control for console redirection.

Available Options: None, Hardware and Software

Default setting: None

☐ **Redirection After BIOS Post**

These fields is select redirection is active during post and during boot loader or always active or off active. (Some Oss may not work if set to Always)

Available Options: Disabled, Boot Loader and Always

Default setting: Always

☐ **Terminal Type**

This field is selecting the target terminal type.

Available Options: ANSI, VT100 and VT-UTFB

Default setting: ANSI

☐ **VT-UTF8 Combo Key Support**

This field is select VT-UTF8 combination key support for ANSI/VT100 terminals.

Available Options: Enabled and Disabled

Default setting: Enabled

☐ **Sredir Memory Display Delay**

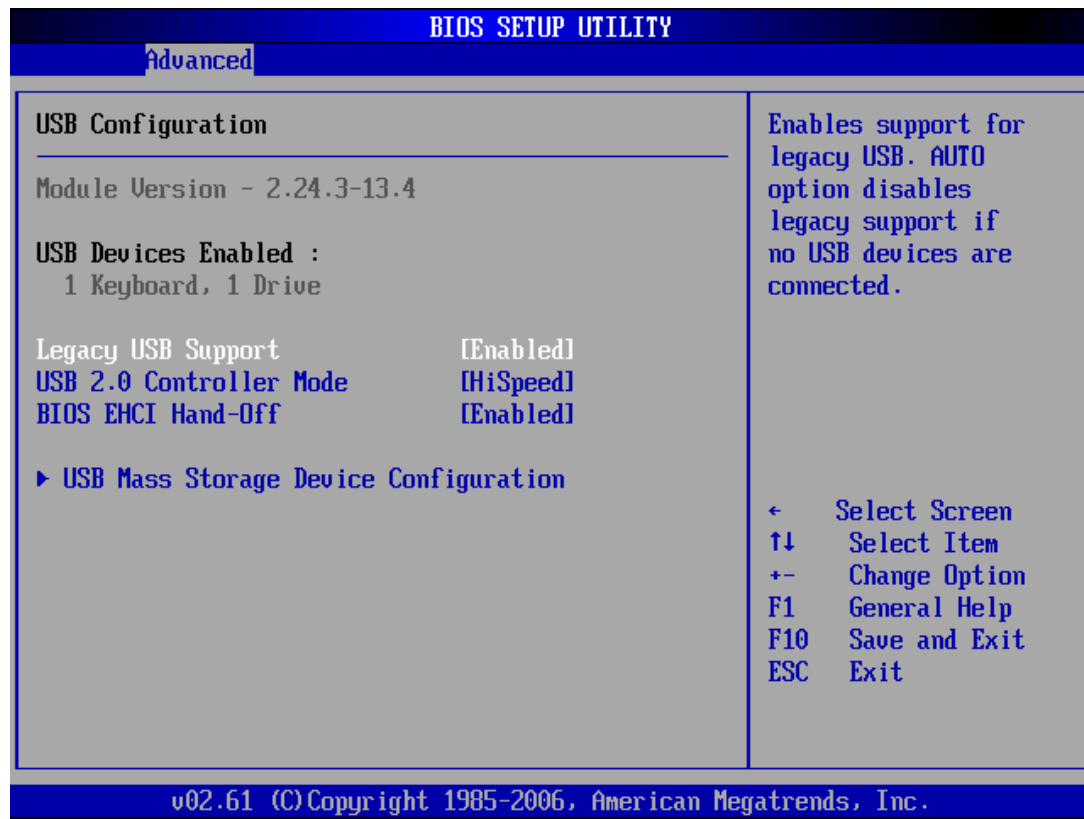
This field is gives the delay in seconds to display memory information.

Available Options: No Delay, Delay 1 Sec, Delay 2 Sec and Delay 4 Sec

Default setting: No Delay

□ USB Configuration

You can use this screen to select options for the USB Configuration.



□ Legacy USB Support

Legacy USB Support refers to the USB mouse and USB keyboard support. Normally if this option is not Enabled; any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is Enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB drivers loaded on the system. Set this value to Enabled or disable the Legacy USB Support.

Available Options: Disabled, Enabled

Default setting: Enabled

□ USB 2.0 Controller Mode

This field is configured the USB 2.0 controllers in High speed (480Mbps) or Full speed (12Mbps).

Available Options: HiSpeed and FullSpeed

Default setting: HiSpeed

❑ **BIOS ECHI Hand-Off**

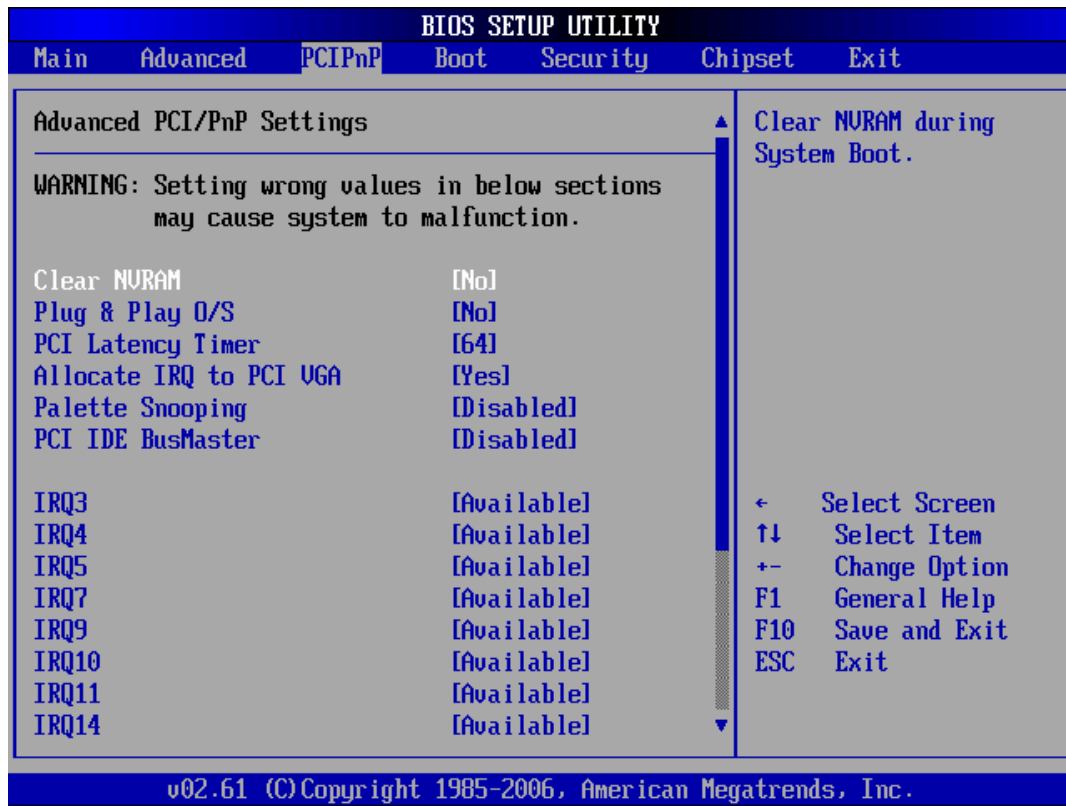
This is a workaround for OS without ECHI Hand-Off support. The ECHI ownership change should claim by ECHI driver.

Available Options: Enabled and Disabled

Default setting: Disabled

PCIPnP Setup

Select the *PCI/PnP* tab from the setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.



❑ Plug and Plug Aware O/S

Set to Yes to inform BIOS that the operating system can handle Plug and Play (PnP) devices.

Available Options: Yes, No

Default setting: No

❑ PCI Latency Timer

This field specifies the latency timings (in PCI clock) PCI devices installed in the PCI expansion bus.

Available Options: 32, 64, 96, 128, 160, 192, 224, and 248

Default setting: 64

☐ **PCI IDE BusMaster**

This option is to specify that the IDE controller on the PCI local bus have bus-mastering capability.

Available Options: Enabled, Disabled

Default setting: Disabled

☐ **IRQ 3 –15**

When I/O resources are controlled manually, you can assign each system interrupt as one of the following types, based on the type of device using the interrupt:

ISA/EISA devices comply with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ5 for COM1).

PnP (PCI/ISA) devices: comply with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

☐ **DMA Channel 0 – 7**

When I/O resources are controlled manually, you can assign each system DMA as one of the following types, based on the type of device using the interrupt:

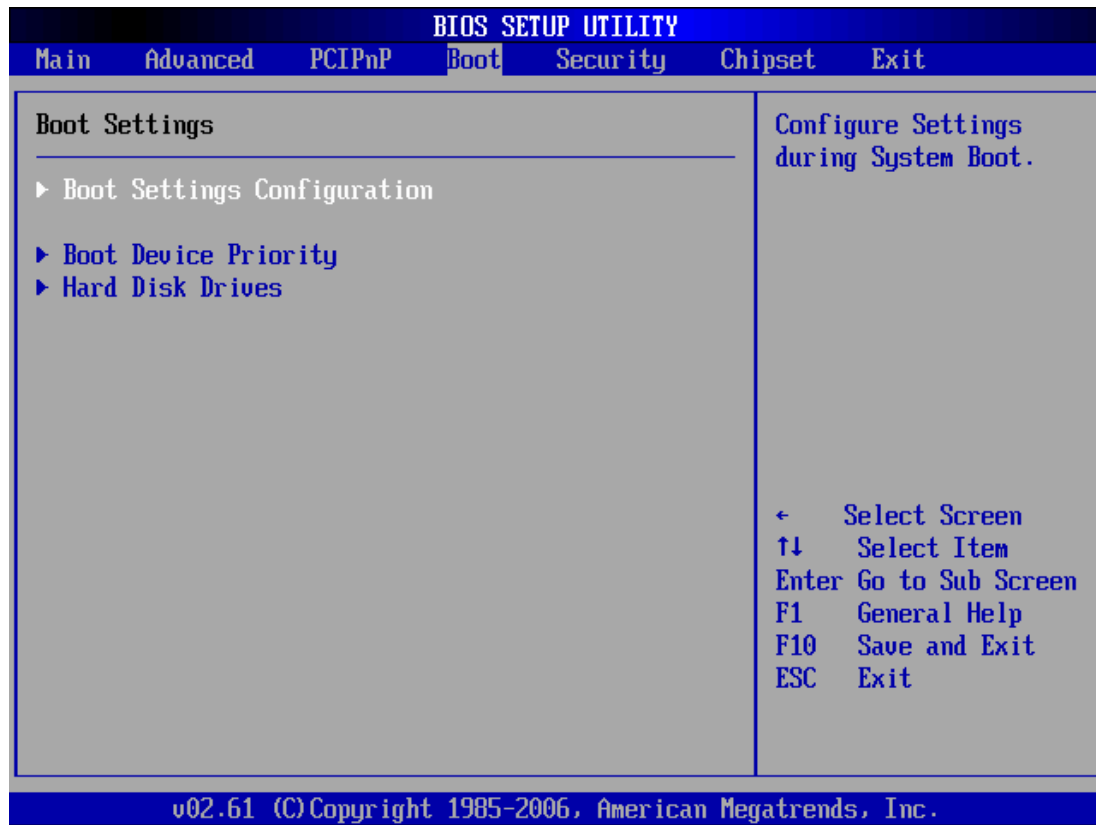
ISA/EISA devices comply with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ5 for COM1).

PnP (PCI/ISA) devices: comply with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

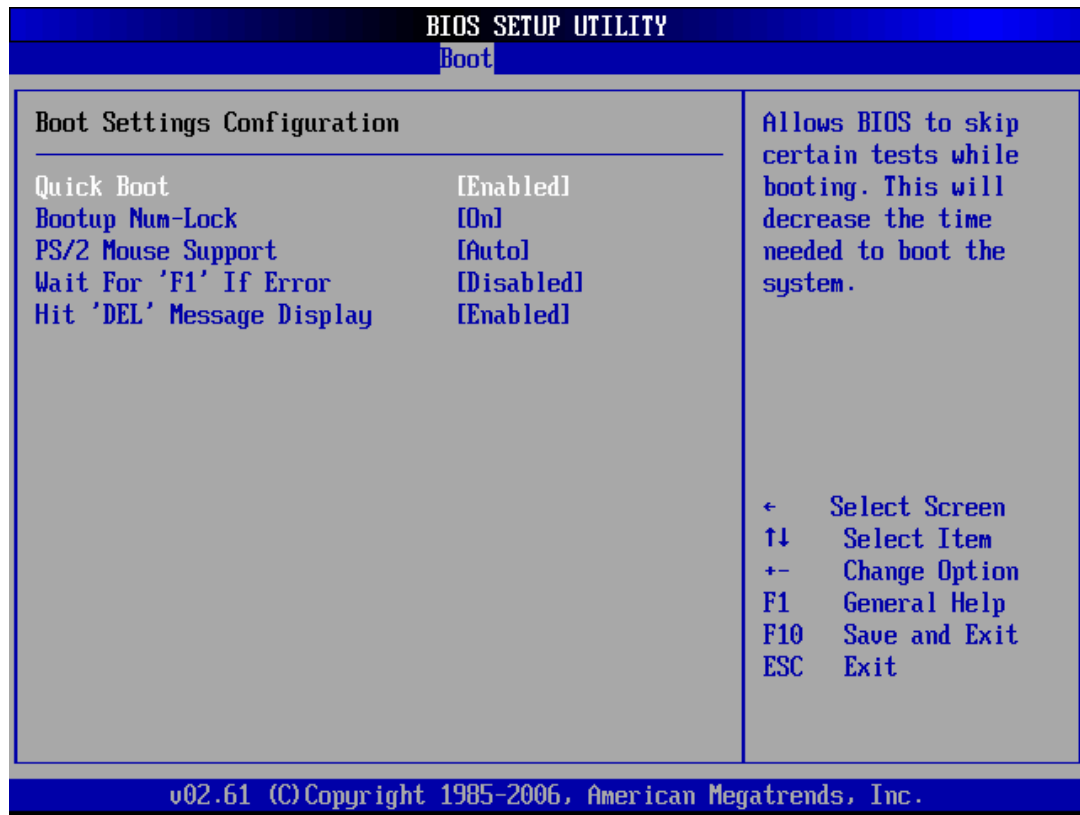
Boot Setup

Select the *Boot* tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the <Arrow> keys. All Boot Setup options are described in this section. Select an item on the Boot Setup screen to access the sub menu for:

- BIOS Setting Configuration
- Boot Device Priority
- Hard disk drives



□ Boot Setting Configuration



□ Quick Boot

This field is used to activate the quick boot function of the system. When set to Enabled,

1. BIOS will not wait for up to 40 seconds if a Ready signal is not received from the IDE drive, and will not configure its drive.
2. BIOS will not wait for 0.5 seconds after sending a RESET signal to the IDE drive.
3. You cannot run BIOS Setup at system boot since there is no delay for the Hit, Del. To run Setup message.

Available Options: Disabled, Enabled

Default setting: Enabled

□ Boot Up Num-Lock

This field is used to activate the Num Lock function upon system boot. If the setting is on, after a boot, the Num Lock light is lit, and user can use the number key.

Available Options: On, Off

Default setting: On

❑ **PS/2 Mouse Support**

The setting of **Auto** or **Enabled** allows the system to detect a PS/2 mouse on boot up. If detected, IRQ12 will be used for the PS/2 mouse. IRQ 12 will be reserved for expansion cards if a PS/2 mouse is not detected. **Disabled** will reserve IRQ12 for expansion cards and therefore the PS/2 mouse will not function.

Available Options: Auto, Disabled and Enabled

Default setting: Auto

❑ **Hit 'DEL' Message Display**

Set this field to **Disabled** to prevent the message as follows:

Hit 'DEL' if you want to run setup

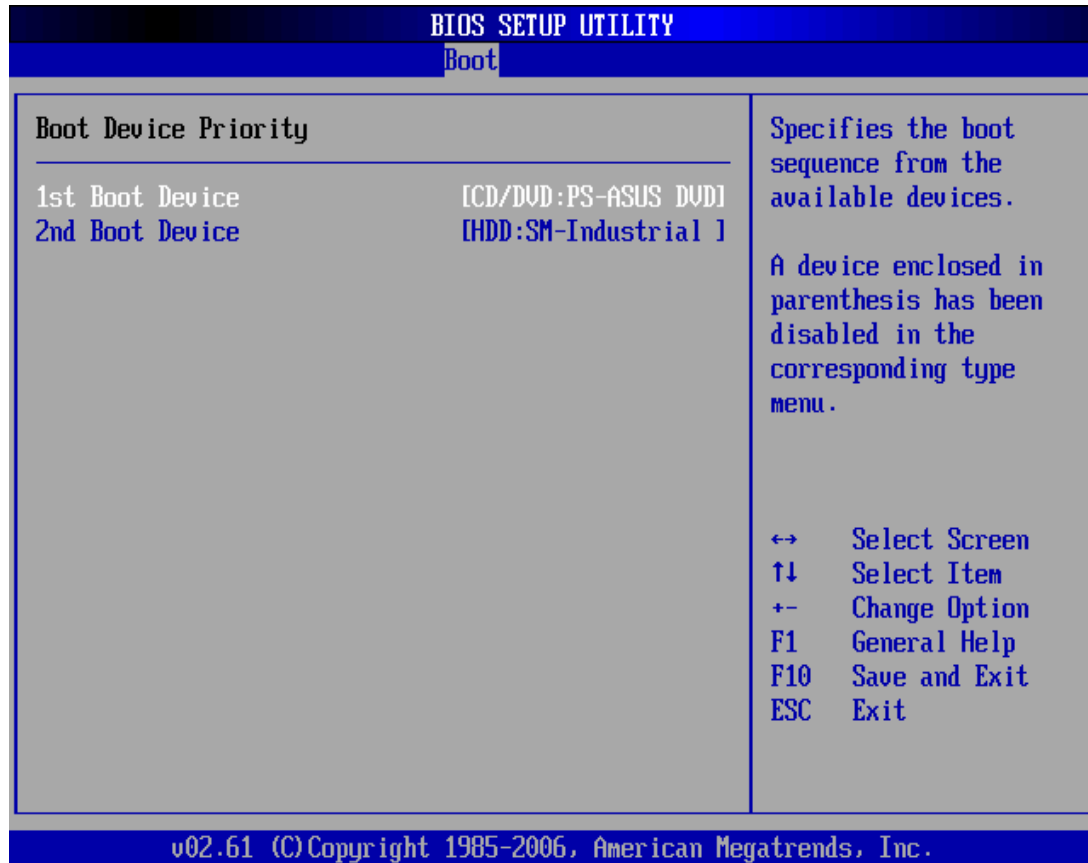
It will prevent the message from appearing on the first BIOS screen when the computer boots.

Available Options: Disabled, Enabled

Default setting: Enabled

□ Boot Device

Use this screen to specify the order in which the system checks for the device to boot from. To access this screen, select Boot Device Priority on the Boot Setup screen and press <Enter>.



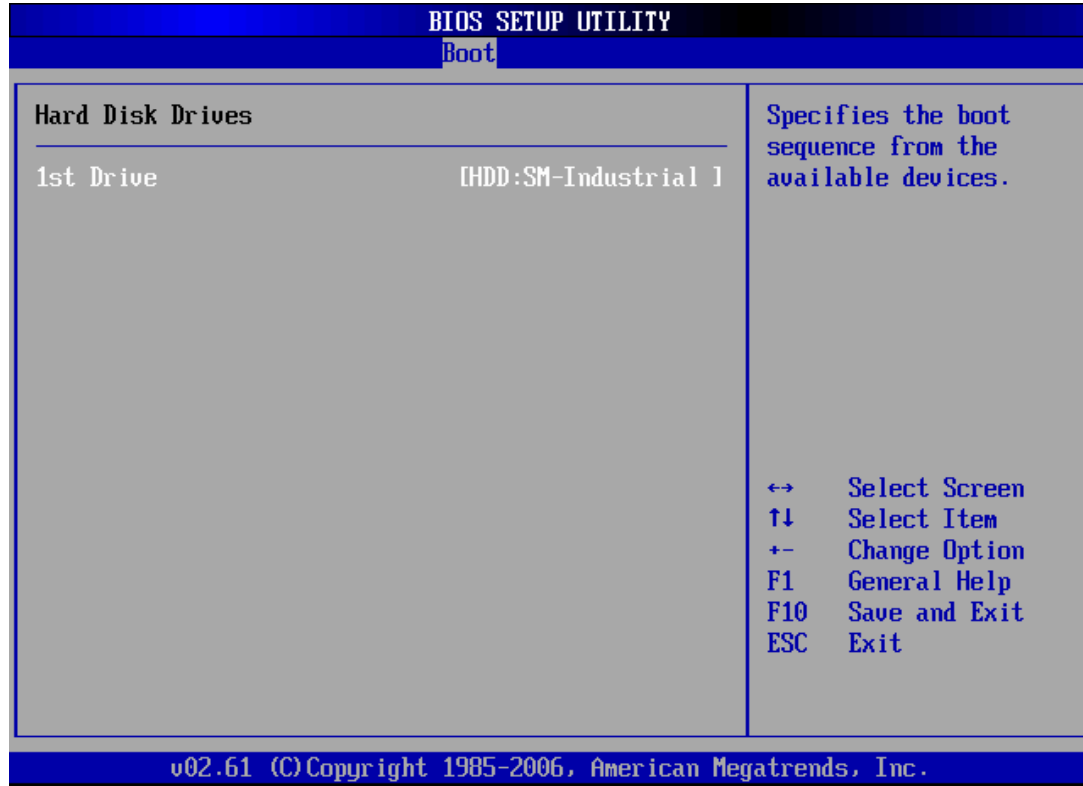
□ First /Second /Third Hard Disk Boot Device

Set the boot device options to determine the sequence in which the computer checks which device to boot from. The settings are *Removable Dev.*, *Hard Drive*, or *ATAPI CDROM*.

Note: When you select a boot category from the boot menu, a list of devices in that category appears. For example, if the system has three hard disk drives connected, then the list will show all three hard disk drives attached

□ **Hard Disk Drives**

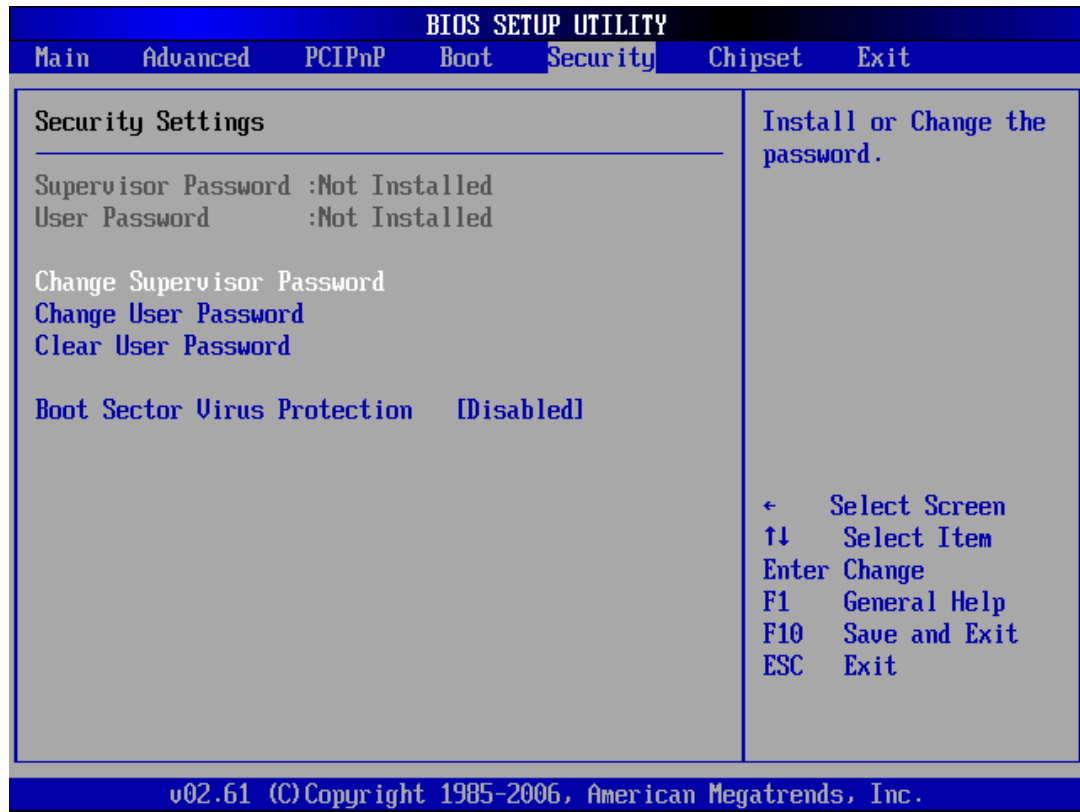
Use this screen to view the hard disk drives in the system. To access this screen, select Hard disk drives on the Boot Setup screen and press <Enter>.



Security setup

There are two security passwords: Supervisor and User. Supervisor is a privileged person that can change the User password from the BIOS. According to the default setting, both access passwords are not set up and are only valid after you set the password from the BIOS.

- Change Supervisor Password
- Change User Password
- Clear User Password
- Boot Sector Virus Protection



To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.
2. Type the desired password (up to 6 character length) when you see the message, "Enter New Supervisor Password."
3. Then you can go on to set a user password (up to 6 character length) if required. Note that you cannot configure the User password until the Supervisor password is set up.
4. Enter Advanced BIOS Features screen and point to the Security Option field.
5. Select System or Setup.

- ✧ **Always:** a visitor who attempts to enter BIOS or operating system will be prompted for password.
 - ✧ **Setup:** a visitor who attempts to the operating system will be prompted for user password. You can enter either User password or Supervisor password.
6. Point to **Save Settings and Exit** and press Enter.
 7. Press Y when you see the message, "Save Current Settings and Exit (Y/N)?"

Note: it is suggested that you write down the password in a safe place to avoid that password may be forgotten or missing.

❑ **Clean User Password**

Select Clear User Password from the Security Setup menu and press <Enter>. Clear New Password > [Ok] [Cancel] appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>.

❑ **Password Check**

This field enabled password checking every time the computer is powered on or every time the BIOS Setup is executed. If **Always** is chosen, a user password prompt appears every time and the BIOS Setup Program executes and the computer is turned on. If **Setup** is chosen, the password prompt appears if the BIOS executed.

Available Options: Setup, Always

Default setting: Setup

❑ **Boot Sector Virus Protection**

This option is near the bottom of the Security Setup screen. The Optimal and Fail-Safe default setting is *Disabled*

Enabled: Set this value to prevent the Boot Sector Virus Protection.

Disable: Select Enabled to Enabled boot sector protection. displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. If Enabled, the following appears when a write is attempted to the boot sector. You may have to type N several times to prevent the boot sector write. Boot Sector Write!

Possible VIRUS: Continue (Y/N)? _

The following appears after any attempt to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard disk drive Service:

Format!!!

Possible VIRUS: Continue (Y/N)?

Chipset Setup

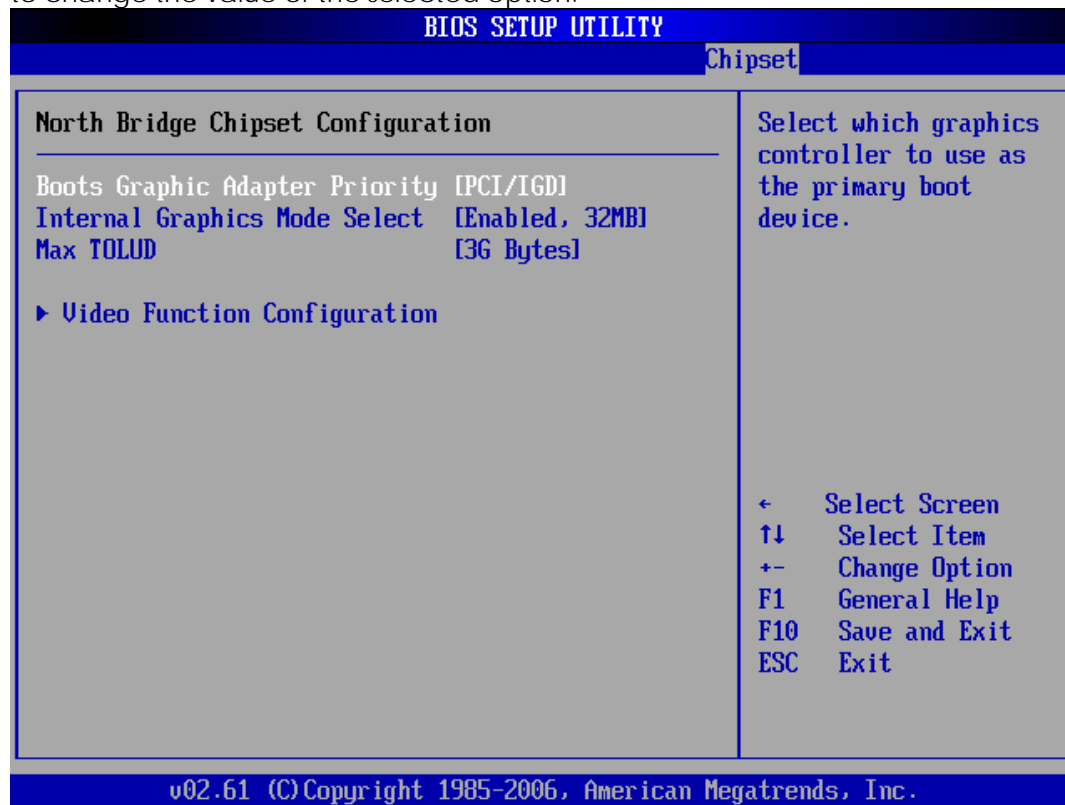
This section describes the configuration of the board's chipset features.

- NorthBridge Configuration
- SouthBridge Configuration



❑ North Bridge Configuration

You can use this screen to select options for the North Bridge Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



❑ Boots Graphic Adapter Priority

This field is select which graphics controller to use as the primary boot device.

Available Options: IGD, and PCI/IGD

Default setting: PCI/IGD

❑ Internal Graphics Mode Select

This field is share memory architecture (SMA) for frame buffer memory. SMA allows system memory to be efficiently share by the host CPU and allocated depending on user preference, application requirements, and total size of system memory.

Available Options: Disabled, Enabled 32MB, Enabled 64MB, and Enabled 128MB

Default setting: Enabled 32MB

❑ **Max TOLUD**

This specifies the Maximum Value of Top Of Low Usable DRAM (TOLUD).

Available Options: 2GB, 2.5GB, and 3GBHz

Default setting: 3GB

❑ **Video Function Configuration**

■ ***DVMT Mode Select***

This field is the *DVMT mode* is memory that is dynamically allocated based on memory requests made by application and are released back to the system once the requesting application has been terminated. *Fixed mode* is non-contiguous page locked memory allocated during driver initialization to provide a static amount of memory.

Available Options: Disabled, Fixed Mode, Combo Mode and DVMT Mode

Default setting: DVMT Mode

■ ***DVMT/FIXED Memory***

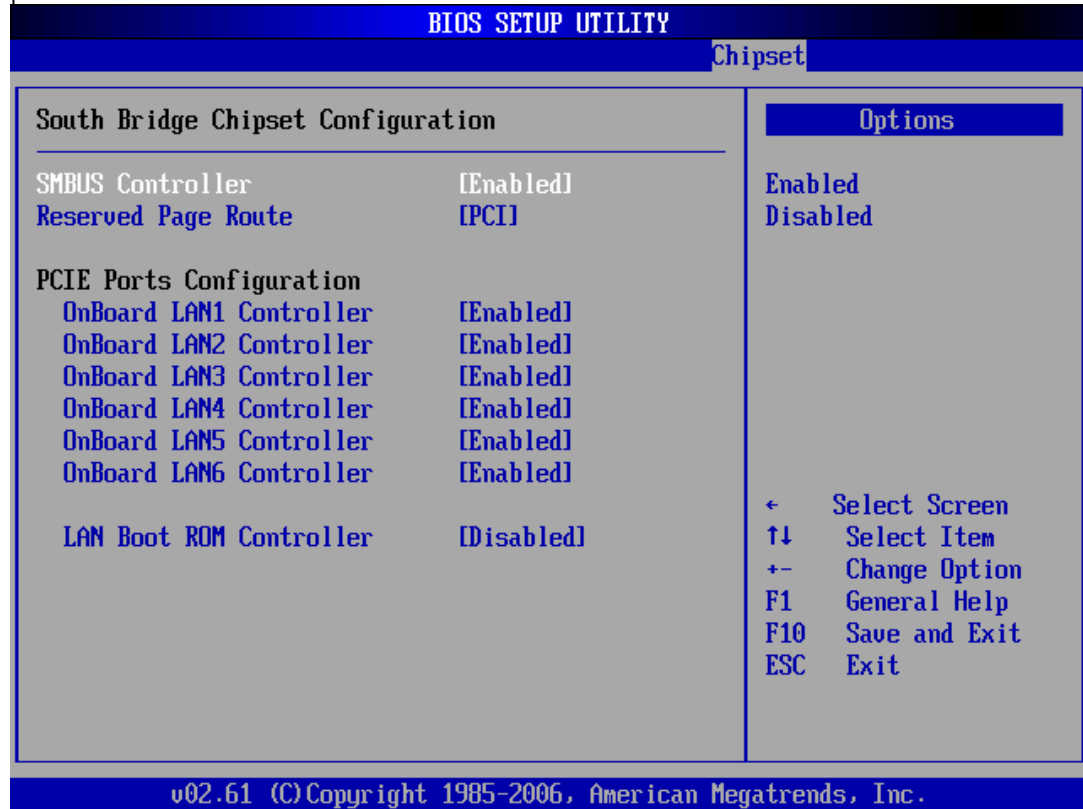
This field specifies allows you to select the maximum amount of graphics memory to be shared with the system memory.

Available Options: 32MB, 64MB, 128MB and Maximum DVMT

Default setting: DVMT Mode

❑ South Bridge Configuration

You can use this screen to select options for the South Bridge Configuration. South Bridge is a chipset on the motherboard that controls the basic I/O functions, LAN port function.



❑ SMBUS Controller

This field is select Enabled or Disable the SMBUS controllers

Available Options: Disabled, Enabled

Default setting: Enabled

❑ Reserved Page Route

The field is determines where to send the reserved page registers, there address are sent to PCI or LPC for the purpose of general POST (80H, 84H~86H, 88H, 8CH~8EH) codes.

Available Options: LPC, PCI

Default setting: PCI

❑ **PCIE Ports Configuration**

■ ***On Board LAN1~LAN6 Controller***

This field specifies the Enabled or Disable of the onboard (G) LAN1~ (G) LAN6 chip.

Available Options: Disabled, Enabled

Default setting: Enabled

■ ***LAN Boot ROM Controller***

This field specifies the PXE boot ROM of the onboard LAN chip.

Available Options: Disabled, Enabled

Default setting: Disabled

Chapter 4 Software Installation

The enclosed diskette includes FR9100 VGA, AHCI, RAID, System and LAN driver. To install and configure you FR9100 system, you need to perform the following steps.

System Driver

Windows XP/S2003/S2008/7- X32/X64 System Driver

Installs ICH9M Chipset, Core PCI, PCIe, SATA, USB, ISAPnP and IDE/ATA Device Drive.

- Step 1: To install the GM45 driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>ICH9M.
- Step 2: Execute SETUP.exe file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

VGA Driver

WIN XP/Vista/7- X32/X64 VGA Driver

- Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>GM45.
- Step 2: Execute SETUP.EXE file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

- Step 5: In the WINDOWS XP/7, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.
- Step 6: Adjust the <Refresh Rate>, and <Resolution>.

Note: When install VGA driver on Windows XP of system before need the install Microsoft.net 3.0 Framework.

LAN Driver

Windows XP/S2003/S2008/7- X32/X64 LAN Driver

- 1 To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>W82574L>Windows. If your system is not equipped with a CD ROM device, copy the LAN driver from the CD ROM to CF.
- 2 Execute PROWIN32.EXE or PROWIN64.EXE

AHCI & RAID Driver

Windows XP-SP3/S2003/S2008/7-X32/X64 AHCI&RAID Driver

- 1 To install the RAID utility OR AHCI driver, insert the CD ROM into the CD ROM device, and enter DRIVER>IDE>RST. If your system is not equipped with a CD ROM device, copy the AHCI&RAID driver from the CD ROM to CF.
- 2 Execute IATA_CD.EXE

Note: 1. If your install Windows XP is early version (SP1/SP2), copy the AHCI driver from the CD ROM to Floppy Disk and insert to USB floppy device. In the IDE > AHCI AHCI>F6_RST directory, a README.TXT is included to provide installation and setup RAID Option ROM information.
2. When BIOS CMOS setting SATA as AHCI or RAID mode, need the install the AHCI & RAID device driver.

BIOS Flash Utility

In the <UTILITY> directory, there is the AFU409.EXE file.

Step 1: Use the AFU438.EXE program to update the BIOS setting.

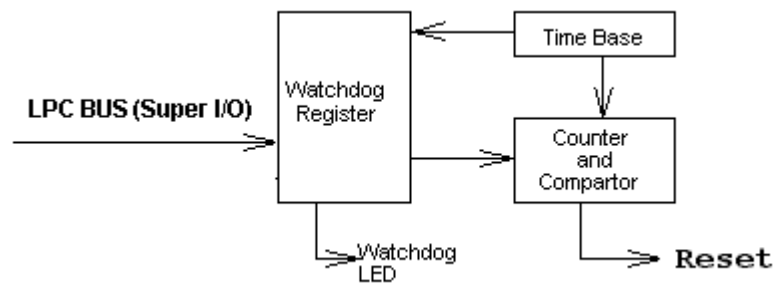
Step 2: And then refer to the chapter "BIOS Setup", as the steps to modify BIOS.

Step 3: Now the CPU board's BIOS loaded with are the newest program; user can use it to modify BIOS function in the future, when the BIOS add some functions.

Watchdog Timer

This section describes how to use the Watchdog Timer, including disabled, enabled, and trigger functions.

The FR9100 is equipped with a programmable time-out period watchdog timer. You can use your own program to Enable the watchdog timer. Once you have Enable the watchdog timer, the program should trigger the I/O every time before the timer times out. If your program fails to trigger or disable this timer before it times out, e.g. because of a system hang-up, it will generate a reset signal to reset the system. The time-out period can be programmed to be set from 1 to 255 seconds or minutes.



Watchdog Timer Setting

The watchdog timer is a circuit that may be used from your program software to detect system crashes or hang-ups. The Watch/Power LED on front panel is the watchdog timer indicator, which is located at left side on the front panel.

Whenever the watchdog timer is enabling, the Power/Watchdog LED will blink to indicate that the timer is counting. The watchdog timer is automatically disabled after reset.

Once you have Enable the watchdog timer, your program must trigger the watchdog timer every time before it times out. After you trigger the watchdog timer, it will be set to non-zero value to watchdog counter and start to count down again. If your program fails to trigger the watchdog timer before time-out, it will generate a reset pulse to reset the system.

The factor of the watchdog timer time-out constant is approximately 1 second. The period for the watchdog timer time-out is between 1 to FF timer factors.

If you want to reset your system when watchdog times out, the following table listed the relation of timer factors between time-out periods.

Time Factor	Time-Out Period (Seconds)	Time-Out Period (Minutes)
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
"	"	"
"	"	"
"	"	"
FF	FF	FF

Watchdog Timer Enabled

To Enabled the watchdog timer, you have to output a byte of timer factor to the watchdog register whose address is 2Eh and data port is 2fH. The following is an Assemble program, which demonstrates how to Enabled the watchdog timer and set the time-out period at 28 seconds.

```

;-----
; Enter the extended function mode, interruptible double-write
;-----
Mov     dx, 2eh           ; Enter to extended function mode
Mov     al, 87h
Out     dx, al
Out     dx, al
Mov     al, 07h
Out     dx, al
;-----
; Logical device 8, configuration register CRF5 Bit 3, CRF6 Bit 0~7
;-----
Mov     dx, 2fh
Mov     al, 08h           ; Select Logical Device 8 of watchdog timer
Out     dx, al
Mov     dx, 2eh
Mov     al, 0f5h          ; Set second as counting unit
Out     dx, al
Mov     dx, 2fh
In      al, dx
Or      al, c0             ; Trigger P/W LED.
And     al, not c8h        ; Set Second.
; And     al, c8h          ; Set Minute.
Out     dx, al
Mov     dx, 2eh
Mov     al, 0f6h
Out     dx, al
Mov     dx, 2fh
Mov     al, 28h           ; Set timeout interval as 28seconds and start counting
Out     dx, al
;-----
; Exit extended function mode
;-----
Mov     dx, 2eh
Mov     al, 0aah
Out     dx, al

```

Watchdog Timer Trigger

After you enable the watchdog timer, your program must write the same factor as enabling to the watchdog register at least once every time-out period to its previous setting. You can change the time-out period by writing another timer factor to the watchdog register at any time, and you must trigger the watchdog before the new time-out period in next trigger.

Watchdog Timer Disabled

To disable the watchdog timer, simply write a 00H to the watchdog register.

```

;-----
; Enter the extended function mode, interruptible double-write
;-----
Mov     dx,2eh           ; Enter to extended function mode
Mov     al,87h
Out     dx,al
Out     dx,al
;-----
; Logical device 8, configuration register CRF5 Bit 3(Sec./Min.), CRF6 Bit 0~7 (Count.)
;-----
Mov     al,07h
Out     dx,al
Mov     dx,2fh
Mov     al,08h           ; Select Logical Device 8 of watchdog timer
Out     dx,al
Mov     dx,2eh
Mov     al,0f5h          ;Set second as counting unit
Out     dx,al
Mov     dx,2fh
In      al,dx
And     al,not c8h       ;Set Second or Minute.
Out     dx,al
Mov     dx,2eh
Mov     al,0f6h
Out     dx,al
Mov     dx,2fh
Mov     al,00h           ; Set Watchdog Timer Disabled
Out     dx,al
;-----
; Exit extended function mode
;-----
Mov     dx,2eh           ;Exit the extended function mode
Mov     al,0aah
Out     dx,al

```

Status LED Programming

The FR9100 can define the Status LED to Light/Blinking. When I/O Port 2Eh/2Fh, device 9, index F3 Bit 6 & bit7 is set to 0 the Status LED is active, if bit 6 set to 1 the status LED is not active. The following describes the programming procedure:

To disable status LED, simply write a 40H to the Status LED register.

```

;-----
; Enter the extended function mode, interruptible double-write
;-----
Mov     dx,2eh      ; Enter to extended function mode
Mov     al,87h
Out     dx,al
Out     dx,al
;-----
; Logical device 9, configuration registers CRF3 Bit6 & Bit7 (Not active/Active)
;-----
Mov     al,07h
Out     dx,al
Mov     dx,2fh
Mov     al,09h      ; Select Logical Device 9 of State LED
Out     dx,al
Mov     dx,2eh
Mov     al,0f3h     ;Set CRF3 unit
Out     dx,al
Mov     dx,2fh
Mov     al,40h      ;Set bit 6 & bit to 1 the State LED is not active .
; Mov    al,80h      ;LED is a 1 second blinking
; Mov    al,c0h      ;LED is a 4 second blinking
Out     dx,al
;-----
; Exit extended function mode
;-----
Mov     dx,2eh      ;Exit the extended function mode
Mov     al,0aah
Out     dx,al

```

Chapter 5 Technical Reference

This section outlines the errors that may occur when you operate the system, and also gives you the suggestions on solving the problems.

Topic include:

- Trouble Shooting for Error Messages
- Technical Reference

Trouble Shooting for Post Beep and Error Messages

The following information informs the Post Beep & error messages. Please adjust your systems according to the messages below. Make sure all the components and connectors are in proper position and firmly attached. If the errors still exist, please contact with your distributor for maintenance.

❑ POST BEEP

Currently there are two kinds of beep codes in BIOS setup.

- One indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by three short beeps.
- The other indicates that an error has occurred in your DRAM. This beep code consists of a constant single long beep.

❑ CMOS BATTERY FAILURE

When the CMOS battery is out of work or has run out, the user has to replace it with a new battery.

❑ **CMOS CHECKSUM ERROR**

This error informs that the CMOS has corrupted. When the battery runs weak, this situation might happen. Please check the battery and change a new one when necessary.

❑ **DISK BOOT FAILURE**

When you can't find the boot device, insert a system disk into Drive A and press < Enter >. Make sure both the controller and cables are all in proper positions, and also make sure the disk is formatted. Then reboot the system.

❑ **DISKETTE DRIVES OR TYPES MISMATCH ERROR**

When the diskette drive type is different from CMOS, please run setup or configure the drive again.

❑ **ERROR ENCOUNTERED INITIALIZING HARD DRIVE**

When you can't initialize the hard drive, ensure the following things:

1. The adapter is installed correctly
2. All cables are correctly and firmly attached
3. The correct hard drive type is selected in BIOS Setup

❑ **ERROR INITIALIZING HARD DISK CONTROLLER**

When this error occurs, ensure the following things:

1. The cord is exactly installed in the bus.
2. The correct hard drive type is selected in BIOS Setup
3. Whether all of the jumpers are set correctly in the hard drive

❑ **KEYBOARD ERROR OR NO KEYBOARD PRESENT**

When this situation happens, please check keyboard attachment and no keys being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in BIOS Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot procedure.

❑ **MEMORY ADDRESS ERROR**

When the memory address indicates error, you can use this location along with the memory map for your system to find and replace the bad memory chips.

❑ **MEMORY SIZE HAS CHANGED**

Memory has been added or removed since last boot. In EISA mode, use Configuration Utility to re-configure the memory configuration. In ISA mode enter BIOS Setup and enter the new memory size in the memory fields.

❑ **MEMORY VERIFYING ERROR**

It indicates an error verifying a value is already written to memory. Use the location along with your system's memory map to locate the bad chip.

❑ **OFFENDING ADDRESS MISSING**

This message is used in connection with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

❑ **REBOOT ERROR**

When this error occurs that requires you to reboot. Press any key and the system will reboot.

❑ **SYSTEM HALTED**

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Technical Reference

Physical and Environmental

Temperature: Operating 0°C ~ 40°C

Relative humidity 5 % to 95 % non-condensing

Input AC Voltage Range: 100V~240V/4A, 50Hz ~60Hz

Output DC Voltage: +12V/6A,+5V/17A,+3.3V/14A,-12V/0.8A,+5Vsb/2A

Real-Time Clock and Non-Volatile RAM

The FR9100 contains a real-time clock compartment that maintains the date and time in addition to storing configuration information about the computer system. It contains 14 bytes of clock and control registers and 114 bytes of general purpose RAM. Because of the use of CMOS technology, it consumes very little power and can be maintained for long periods of time using an internal Lithium battery. The contents of each byte in the CMOS RAM are listed below:

Address	Description
00	Seconds
01	Second alarm
02	Minutes
03	Minute alarm
04	Hours
05	Hour alarm
06	Day of week
07	Date of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown status byte

Address	Description
10	Diskette drive type byte, drive A and B
11	Fixed disk type byte, drive C
12	Fixed disk type byte, drive D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	Low actual expansion memory byte
31	High actual expansion memory byte
32	Date century byte
33	Information flags (set during power on)
34-7F	Reserved for system BIOS

CMOS RAM Map

Register	Description
00h -10h	Standard AT-compatible RTC and Status and Status Register data definitions
11h – 13h	Varies
14h	<p>Equipment</p> <p>Bits 7-6 Number of Floppy Drives</p> <p>00 1 Drive</p> <p>01 2 Drives</p> <p>Bits 5-4 Monitor Type</p> <p>00 Not CGA or MDA 01 40x25 CGA</p> <p>01 2 Drives 80x25 CGA</p> <p>Bits 3 Display Enabled</p> <p>0 Disabled</p> <p>1 Enabled</p> <p>Bit 2 Keyboard Enabled</p> <p>00 Not CGA or MDA 01 40x25 CGA</p> <p>01 2 Drives 80x25 CGA</p> <p>Bit 1 Math Coprocessor Installed</p> <p>0 Absent</p> <p>1 Present</p> <p>Bit 0 Floppy Drive Installed</p> <p>0 Disabled</p> <p>1 Enabled</p>
15h	Base Memory (in 1KB increments), Low Byte
16h	Base Memory (in 1KB increments), High Byte
17h	IBM-compatible memory (in 1KB increments), Low Byte
18h	IBM-compatible memory (in 1KB increments), High Byte (max 15 MB)
19h-2Dh	Varies
2Eh	Standard CMOS RAM checksum, high byte
2Fh	Standard CMOS RAM checksum, low byte
30h	IBM-compatible Extended Memory, Low Byte (POST) in KB
31h	IBM-compatible Extended Memory, High Byte (POST) in KB
32h	Century Byte
33h	Reserved. Do not use
34h	Reserved. Do not use
35h	Low byte of extended memory (POST) in 64 KB
36h	High byte of extended memory (POST) in 64 KB
37h-3Dh	Varies
3Eh	Extended CMOS Checksum, Low Byte (including 34h-3Dh)
3Fh	Extended CMOS Checksum, High Byte (including 34h-3Dh)

I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses, which also becomes the identity of the device. There is a total of 1K-port address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

Address	Device Description
000h – 00Fh	DMA Controller #1
020h – 021h	Interrupt Controller #1
040h – 043h	System Timer
060h – 064h	Keyboard Controller
070h – 073h	Real Time Clock
080h – 090h	DMA Page Register
0A0h – 0A1h	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	Primary IDE Interface
376h	Secondary IDE Controller
3B0 – 3DFh	VGA Adapter
3F7h	Primary Controller
3F8h - 3FFh	Serial Port #1 (COM1)
400h – 45Fh	ACPI I/O Space
CF8h – CFFh	PCI Configuration Port

Interrupt Request Lines (IRQ)

There are a total of 15 IRQ lines available on the Industrial CPU Card. Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Industrial CPU Card.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	USB #4
IRQ4	Serial Port #1
IRQ5	LAN#1/LAN#6
IRQ6	PCI Bridge#1#2
IRQ7	PCI Bridge#3#4
IRQ8	Real Time Clock
IRQ9	PCI Bridge#5#6
IRQ10	LAN#2/LAN#5/USB#2
IRQ11	LAN#4/USB#1#6
IRQ12	PS2 Mouse
IRQ13	FPU
IRQ14	USB#5#8
IRQ15	RAID/USB#3#7/LAN#3

Serial Ports

The ACEs (Asynchronous Communication Elements ACE1 to ACE2) are used to convert parallel data to a serial format on the transmit side and convert serial data to parallel on the receiver side. The serial format, in order of transmission and reception, is a start bit, followed by five to eight data bits, a parity bit (if programmed) and one, one and half (five-bit format only) or two stop bits. The ACEs are capable of handling divisors of 1 to 65535, and produce a 16x clock for driving the internal transmitter logic.

Provisions are also included to use this 16x clock to drive the receiver logic, also included in the ACE a completed MODEM control capability, and a processor interrupt system that may be software tailored to the computing time required to handle the communications link.

The following table is a summary of each ACE accessible register

DLAB	Port Address	Register
0	Base + 0	Receiver buffer (read)
		Transmitter holding register (write)
0	Base + 1	Interrupt Enabled
X	Base + 2	Interrupt identification (read only)
X	Base + 3	Line control
X	Base + 4	MODEM control
X	Base + 5	Line status
X	Base + 6	MODEM status
X	Base + 7	Scratched register
1	Base + 0	Divisor latch (least significant byte)
1	Base + 1	Divisor latch (most significant byte)

❑ Receiver Buffer Register (RBR)

Bit 0-7: Received data byte (Read Only)

❑ Transmitter Holding Register (THR)

Bit 0-7: Transmitter holding data byte (Write Only)

❑ Interrupt Enabled Register (IER)

Bit 0: Enabled Received Data Available Interrupt (ERBFI)

Bit 1: Enabled Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enabled Receiver Line Status Interrupt (ELSI)

Bit 3: Enabled MODEM Status Interrupt (EDSSI)

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

❑ **Interrupt Identification Register (IIR)**

Bit 0: "0" if Interrupt Pending

Bit 1: Interrupt ID Bit 0

Bit 2: Interrupt ID Bit 1

Bit 3: Must be 0

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

❑ **Line Control Register (LCR)**

Bit 0: Word Length Select Bit 0 (WLS0)

Bit 1: Word Length Select Bit 1 (WLS1)

WLS1	WLS0	Word Length
0	0	5 Bits
0	1	6 Bits
1	0	7 Bits
1	1	8 Bits

Bit 2: Number of Stop Bit (STB)

Bit 3: Parity Enabled (PEN)

Bit 4: Even Parity Select (EPS)

Bit 5: Stick Parity

Bit 6: Set Break

Bit 7: Divisor Latch Access Bit (DLAB)

❑ **MODEM Control Register (MCR)**

Bit 0: Data Terminal Ready (DTR)

Bit 1: Request to Send (RTS)

Bit 2: Out 1 (OUT 1)

Bit 3: Out 2 (OUT 2)

Bit 4: Loop

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

❑ **Line Status Register (LSR)**

Bit 0: Data Ready (DR)

Bit 1: Overrun Error (OR)

Bit 2: Parity Error (PE)

Bit 3: Framing Error (FE)

Bit 4: Break Interrupt (BI)

Bit 5: Transmitter Holding Register Empty (THRE)

Bit 6: Transmitter Shift Register Empty (TSRE)

Bit 7: Must be 0

❑ **MODEM Status Register (MSR)**

Bit 0: Delta Clear to Send (DCTS)

Bit 1: Delta Data Set Ready (DDSR)

Bit 2: Training Edge Ring Indicator (TERI)

Bit 3: Delta Receive Line Signal Detect (DSLSD)

Bit 4: Clear to Send (CTS)

Bit 5: Data Set Ready (DSR)

Bit 6: Ring Indicator (RI)

Bit 7: Received Line Signal Detect (RSLD)

□ **Divisor Latch (LS, MS)**

	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

Desired Baud Rate	Divisor Used to Generate 16x Clock
300	384
600	192
1200	96
1800	64
2400	48
3600	32
4800	24
9600	12
14400	8
19200	6
28800	4
38400	3
57600	2
115200	1

Dimension

a. FR9100

