FabiaTech Corporation

IPC Solution

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Small Cube System

Fanless Series

FX5321 User's Manual

MAR 2010
Version: 1.1
Part Number: FX5321

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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 FX5321 System

Overview

The FX5321 is an embedded system with Intel® Atom™ N270 low-power CPU module inside. This user's manual provides information on the physical features, installation, and BIOS setup of the FX5321.

Built to unleash the total potential of the Intel® Atom™ N270 Processor, Able to support 1.6 GHz CPU, this unit supports 10/100/1000 Base –TX LAN ports, audio, 4 USB ports, and 1 So-DIMM socket supports up to 2GB DDR2 RAM, and a VGA controller.

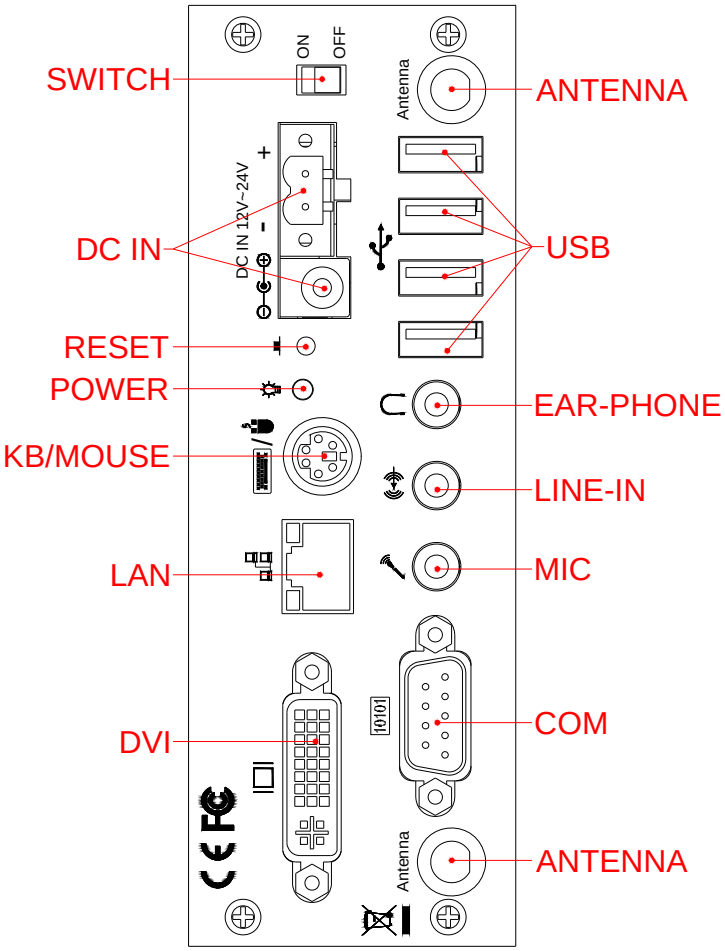
Each FX5321 has one port for I/O communications. One RS-232C port is available.

The FX5321 is perfect for ATM machines, KIOSK, point-of-sales/point-of- information, gaming and infotainment, measurement technology, lotteries, and banking and small Embedded Control. The unit is only 102 mm (D) X50.4 mm (W) X145 mm (H).

Series Comparison Table

Model	FX5321
System Processor	Intel ® Atom™ N270 1.6GHZ
N+S Chipset	Intel 945GSE+ 8280GBM(ICH7M)
Memory *1-200Pin So-DIMM (Max.)*	*DDR2/533* *1GB/2GB*
Display	*DVI-I*
Watchdog Timer	*Yes*
Multi I/O	*One RS232/RS422/RS485*
Storage	*One SATA HDD and CF*
USB 2.0	*Four*
Audio	*Ear-Phone/Line-In And MIC-In*
RJ45 LAN port *(10/100/1000 Mbps)*	*One Realtek RTL8111C*
Operating Temperature	0~+ 50℃ (32~122℉)
Storage Temperature	-20~+60℃(4~140℉)
Dimensions (Unit: mm)	102(D) x 50.4 (W) X 145 (H)

Layout


SWITCH
ON
OFF
ANTENNA
Antenna
DC IN 12V~24V
+
-
DC IN
USB
RESET
POWER
EAR-PHONE
KB/MOUSE
LINE-IN
LAN
MIC
DVI
COM
10101
ANTENNA
Antenna

Specifications

- ***Processor Board –***

  Intel ® Atom™ N270 1.6GHZ Low Power Processor with 1GB DDR2-RAM.

- ***I/O Outlets –***

  One 10/100/1000 base-TX Ethernet LAN port with RJ45.

  One DVI-I and one PS/2 compatible keyboard and mouse interfaces.

  Four USB ports (2.0) and one RS-232/RS422/RS485 port with DB9.

  Three Audio connectors for Earphone-out and Line-In/Microphone-In.

  One PCIe Mini card socket modules, especially for WLAN/GPRS module.

  One DC-In plug connector and one terminal block with power switch.

  One push button reset switch.

- ***Storage Bay-***

  One Compact Flash socket for Compact Flash modules.

  One SATA 2.5" hard disk space.

- ***Power requirement –***

  +12~+24V DC, 1.65A maximum (0.86A typical) with DC 19V input.

- ***Dimensions -***

  102.0mm (D) x 145.0mm (W) x 50.4mm (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 FX5321 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 FX5321 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5321 system.

Note: after you install the FX5321, 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 FX5321 package. Some accessories are optional items that are only shipped upon order.

- One FX5321 embedded system.
- One pack of 2.5" SATA hard disk installation kit with fixed screws.
- One 2-pin apartable terminal block.
- DVI-I to CRT adaptor kit.
- One DIN Rail mounting kit with 3 screws.
- One compact disc includes software utility and manual.

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 power switch to off and unplug AC-to DC Adapter cable.

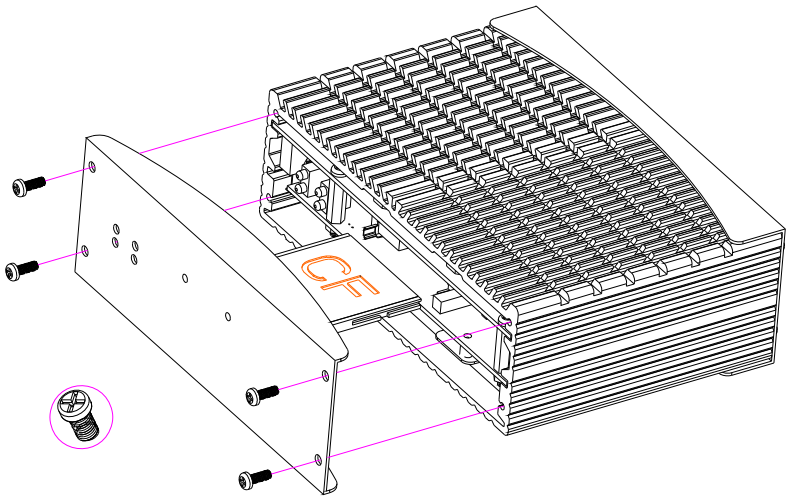
2. Install any connector, Compact Flash, and hard disk is sure that the power is disconnected or power switch to off from the system. If not, this may damage the system.

3. The ESD (Electricity Static Discharge) may be created from human body that touches the board. It may do damage to the board circuit.

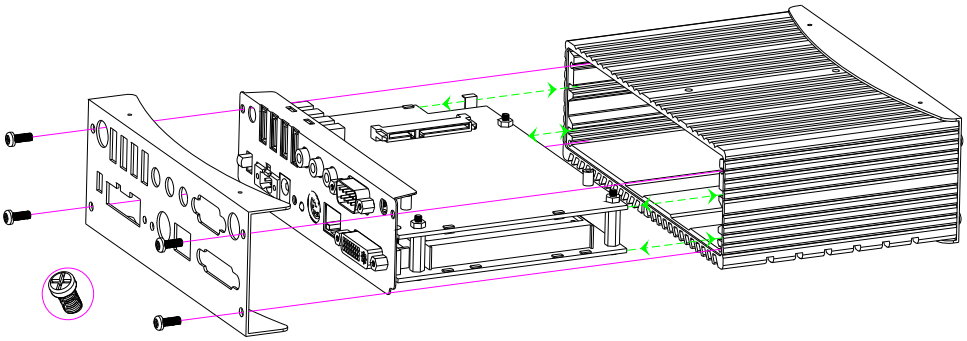
□ Removing Covers –Installing Hardware

If you are installing hardware option, you can remove the front and back cover. The following figure will guide you how to install 2.5" HDD inside, Compact Flash modules, and DDR2-RAM module the FX5321 and how to install the FX5321 fixers. (Please see the spots circled.)

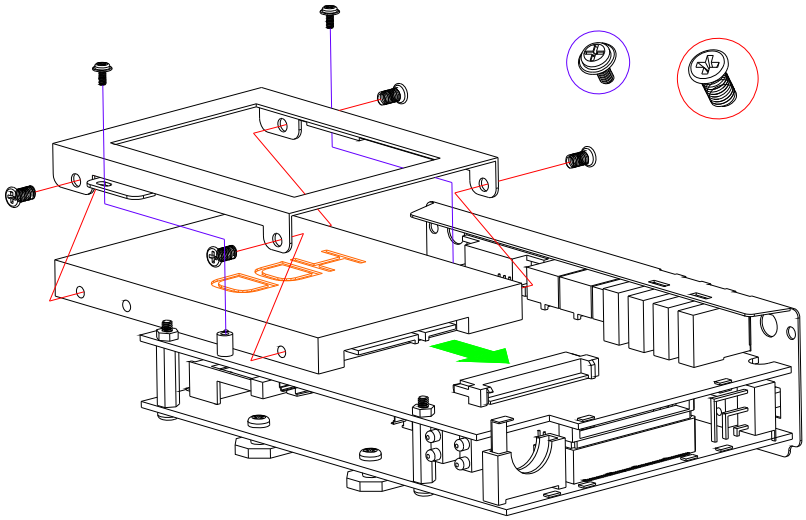
a. Unscrew front cover and Installing Compact Flash



b. Unscrew back cover and Installing Hard Disk



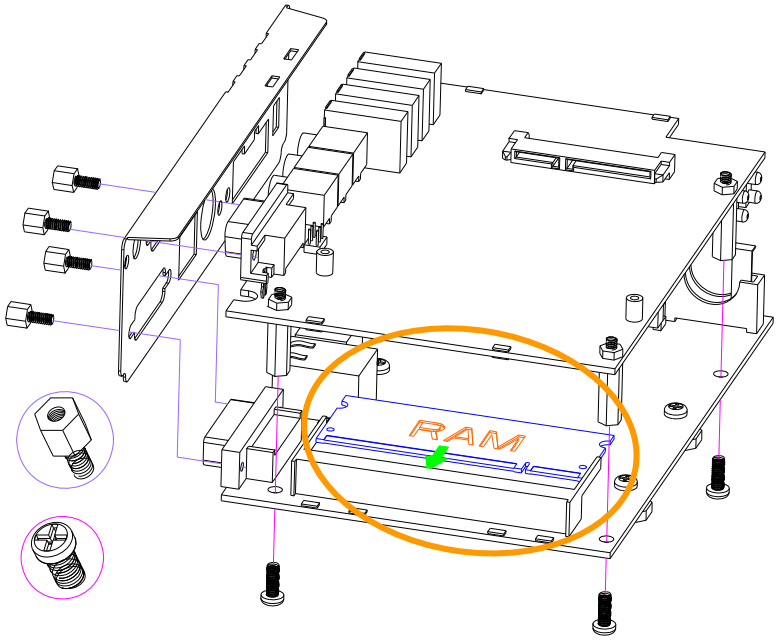
✧ ***b1. Installing Hard Disk***



Note: Use caution when handling the hard disk to prevent damage to SATA connector as you inserted hard disk. Be careful with the orientation when installing connectors.

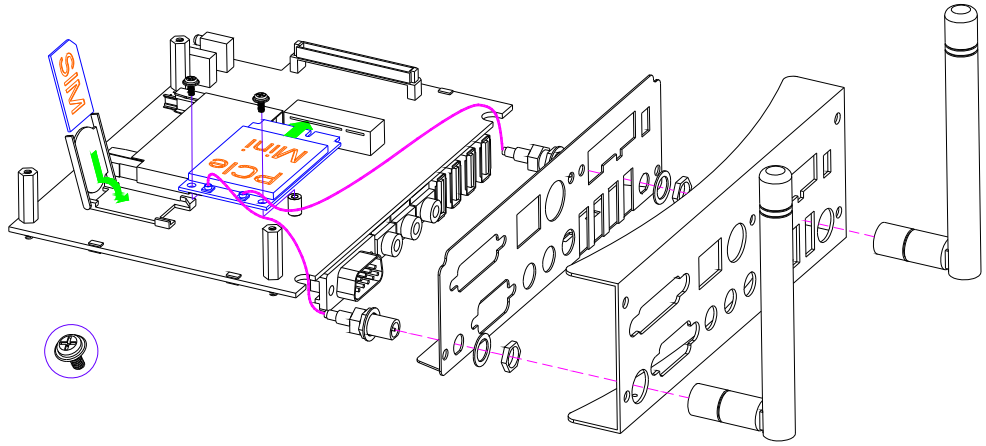
c. Installing Memory: So-DIMM Socket for DDR2 RAM Modules

You may extend additional memory to FX5321, See as following figure and rear pictures. The So-DIMM socket supports 512MB to 2GB of DDR2 RAM modules.



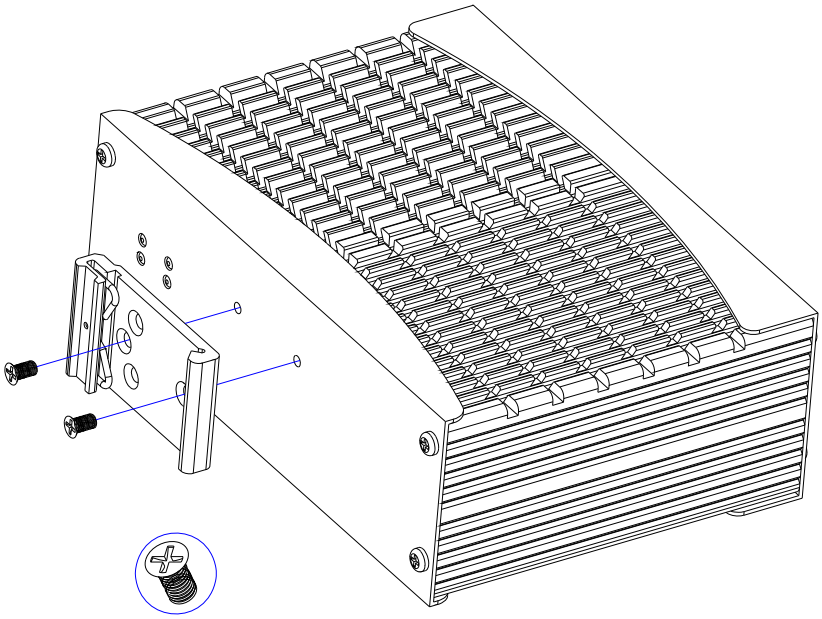
d. Installing PCIe Mini Card Module –Daughter Board

You may extend additional PCIe mini card module and SIM card to FX5321. Connect the antenna cable from backside antenna hole to GPRS module and installing the SIM card to SIM socket. See as following figure.



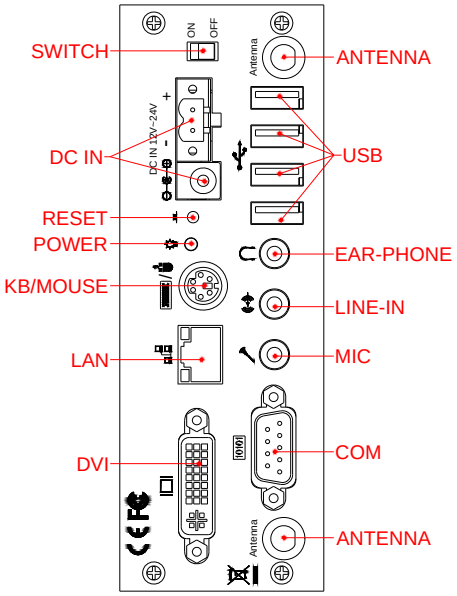
e. Installing the DIN-Rail fixers or universal fixers on FX5321

Please refer to the down side figure for installing the FX5321 with DIN Rail adapter.

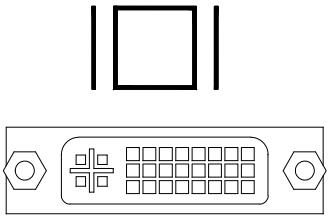


□ I/O Peripheral Connectors

View from the back side, If you are connecting the monitor, keyboard, mouse, LAN, audio, COM and USB to the FX5321. See following figure and a side pictures.

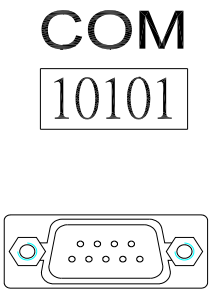


1. A female DVI-I socket is provided DVI (Single: TMDS Data Link 0, Link 1) + CRT signals.



2. Connecting the COM port

The DB9 (COM1) is standard serials port connector. The following tables show the signal connections of these connectors.

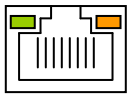


DB-9	RS-232 Signal
1	-DCD
6	-DSR
2	RXD
7	-RTS
3	-TXD
8	-CTS
4	-DTR
9	-RI
5	Ground
Case	Case Ground

3. Connecting the LAN port

The RJ45 connector with 2 LED's for LAN. The right LED (orange) indicates data is being accessed and the left side LED (green) indicates on-line status. (On indicates on-line and off indicates off-line)

RJ45 connector

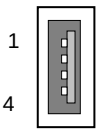


(Front View)

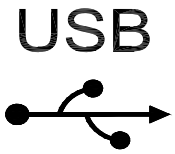
RJ45	LAN	RJ45	LAN
1	TPTX+	5	FBG
2	TPTX -	6	TPRX -
3	TPRX+	7	FBG
4	FBG	8	FBG

4. Connecting the USB Ports

The FX5321 supports a four port USB connector. Any USB device can be attached to USB ports with plug-and-play supported.

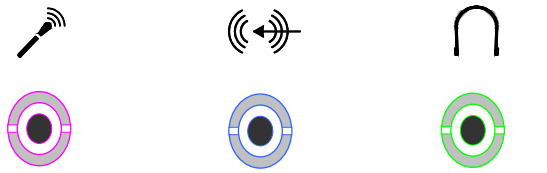


(Front View)



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

5. Connecting the Audio Microphone In, Line-in, Earphone-out

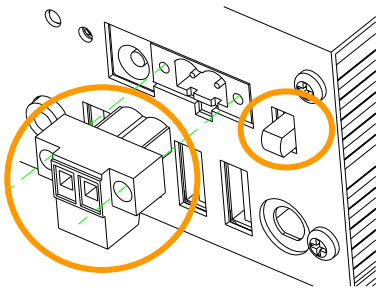


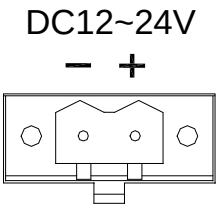
Mic-In Line-In EAR-Phone

□ Connecting the DC Power and Power Switch

Power is supplied through a power DC In or external AC/DC power adapter. Check the technical specification section for information about DC power input voltage. See following figure and a side pictures.

1. DC Power Connector: Use external 2-pin apart able terminal block. (Please see the spots circled.)

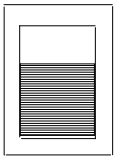




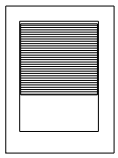
Terminal Block

DC +12V~+24V, 40VA minimum

Since the switch does include a power switch, plugging its power adapter into a power outlet or DC into DC power connector then switch power to on, when you final installed system hardware device.

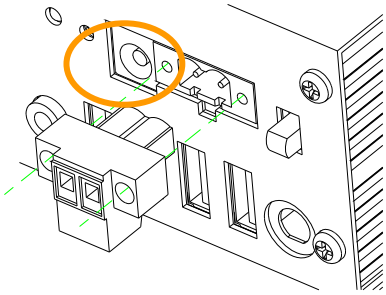


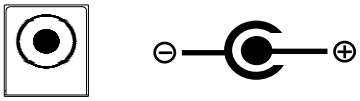
Off: Power Off



On: Power On

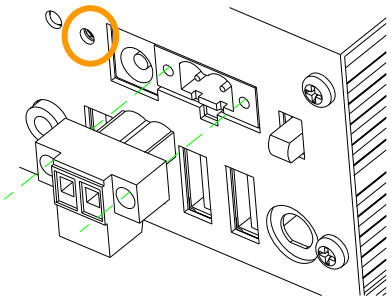
2. DC DC-Power Jack: Use External AC/DC power adapter. (Please see the spots circled.)

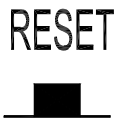




3. Reset Push Button

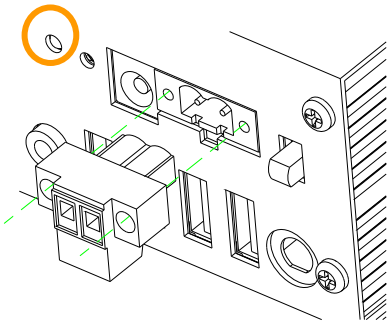
The FX5321 has a push button switcher for system reset; Push and release the button will cause hardware reset of FX5321 and restart system booting.





□ **Power LED Indicator**

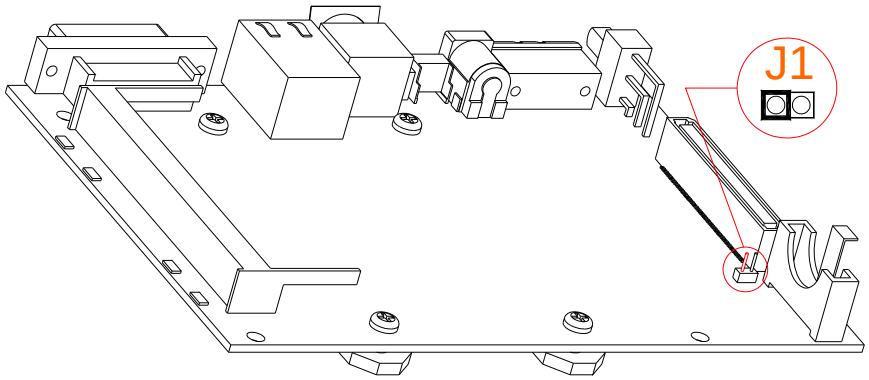
The Power LED has two status: Off for inactive operation and light for activity when power switch to ON.



□ **Jumper Setting**

The COM1 is designed for multiple proposes, Use JP1 of the transfer board selects RS-232, RS422 or RS-485 of COM1 (Please see the **b. transfer board** spots circled.), and J1 of CPU board is used to select clear CMOS data.

a. CPU board



a1. J1: Clear CMOS Setting

You can use J1 to clear CMOS data. The CMOS stores information like system date, time, boot up device, password, IRQ... which are set up with the BIOS. To clear the CMOS, set J1 to 1-2 closed and wait 3~5 sec then return to open before system powers off. The default setting is opened.

J1

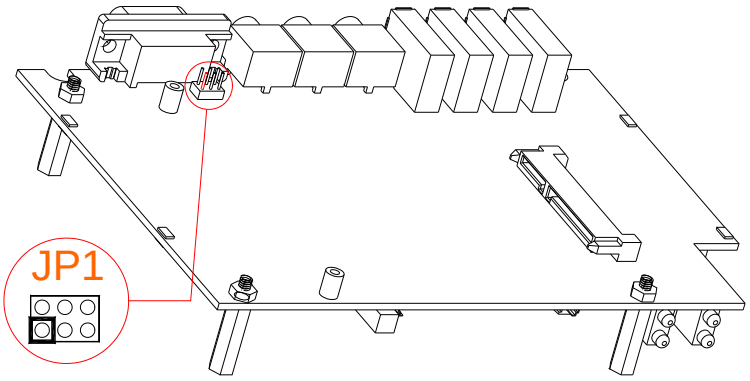
2 1

Factory Preset

2 1

Clear CMOS Data

b. Transfer board

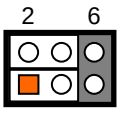


b1. COM1:- R232/422/485 Selection

The DB9-COM1 is standard serial port connector. The following tables show the signal connections of DB9 and serial port 1 is designed for multiple proposes. Use JP1 selects the RS-232, RS-422 or RS-485.

DB-9	RS-232	RS-422	RS-485
1	-DCD		
6	-DSR		
2	RXD	RX-	485-
7	-RTS	TX-	
3	-TXD	RX+	485+
8	-CTS	TX+	
4	-DTR		
9	-RI		
5	Ground		
Metal	Case Ground		

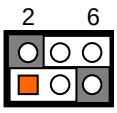
JP1



2 6

1 5

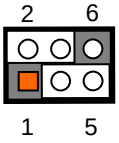
RS-232



2 6

1 5

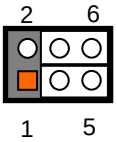
RS-485



2 6

1 5

RS-422



2 6

1 5

BIOS Control

Factory Preset

*Note: Changing the setting in BIOS setup program

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, the ISA bus 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.

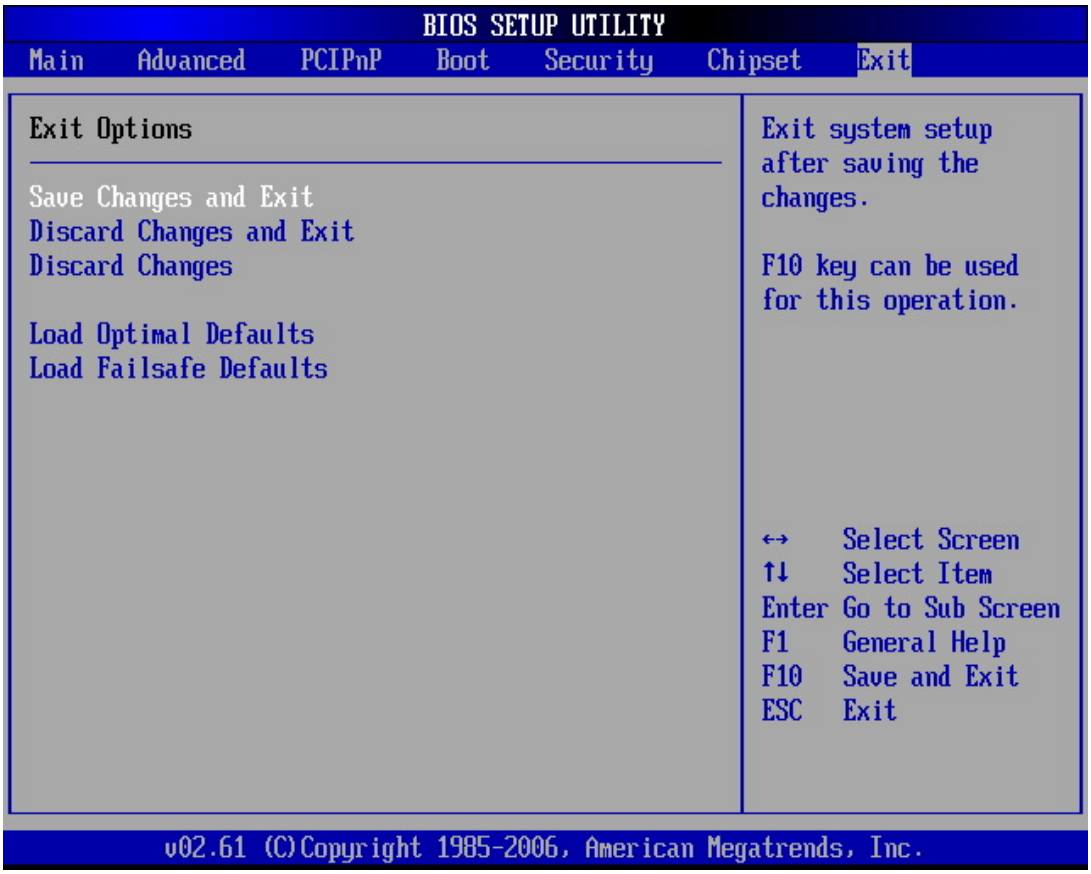
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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
   - APM Configuration
   - USB Configuration
3. PCIPnP
4. Boot
   - Boot Settings Configuration
   - Boot Device Priority
   - Hard Disk Drives
   - CD/DVD Drivers
5. Security
   - Change Supervisor Password
   - Change User Password
   - Clear User Password
   - Boot Sector Virus Protection
6. Chipset

- North Bridge Configuration
- South Bridge Configuration

7. 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.

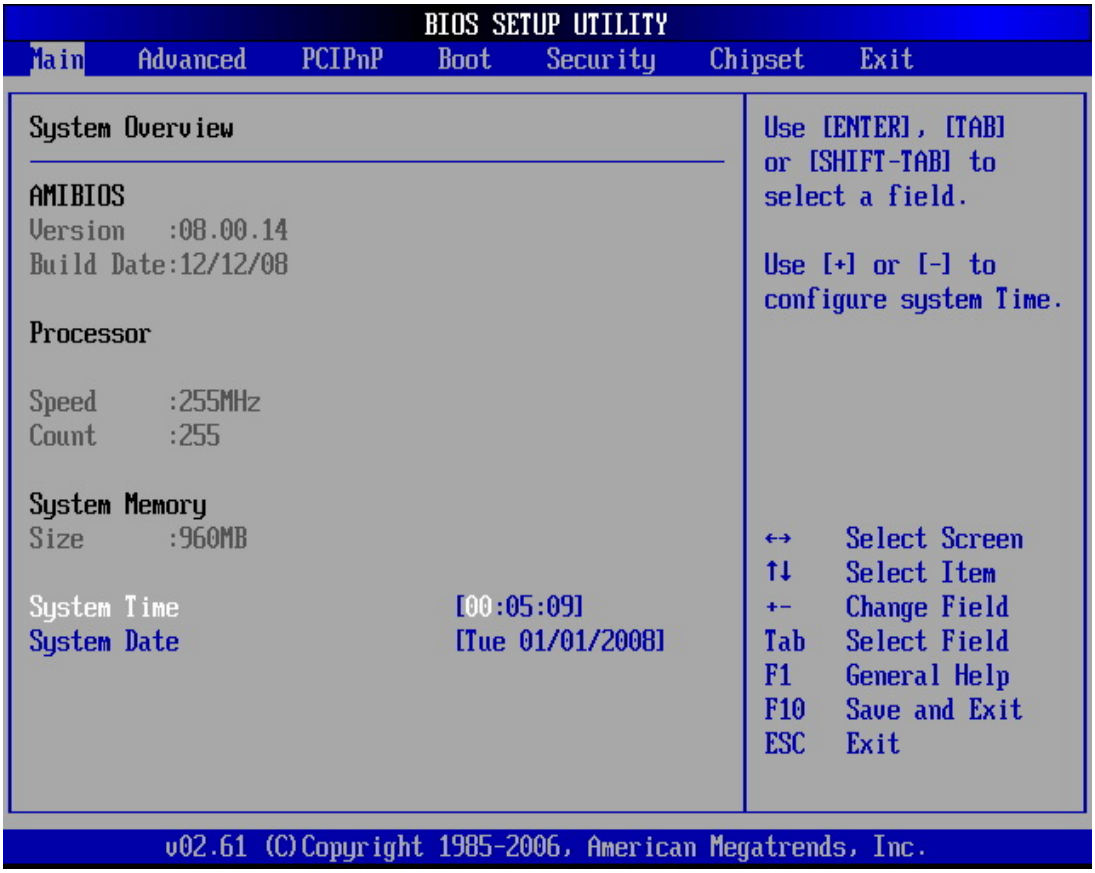
Keyboard Convention

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

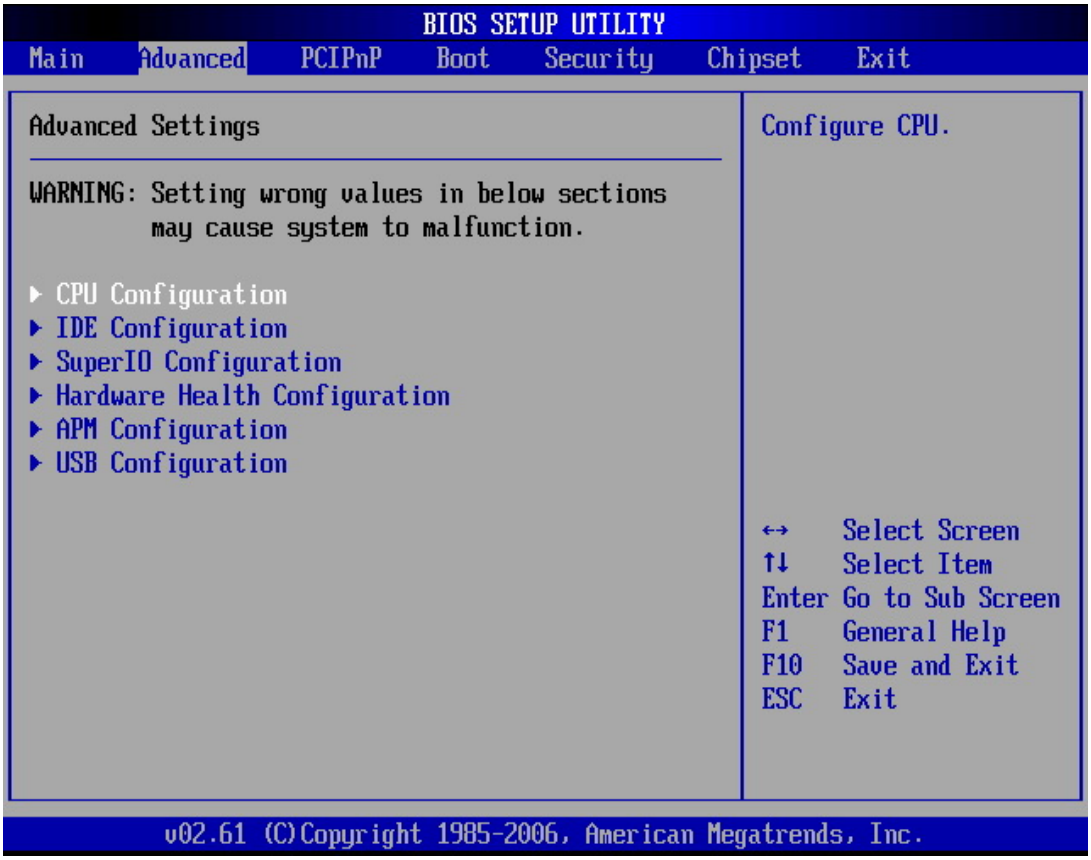
Highlight the <Date> field and then press the [Page Up] / [Page Down] or [+]/ [-] keys to set the current date. Follow the month, day and year format.

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



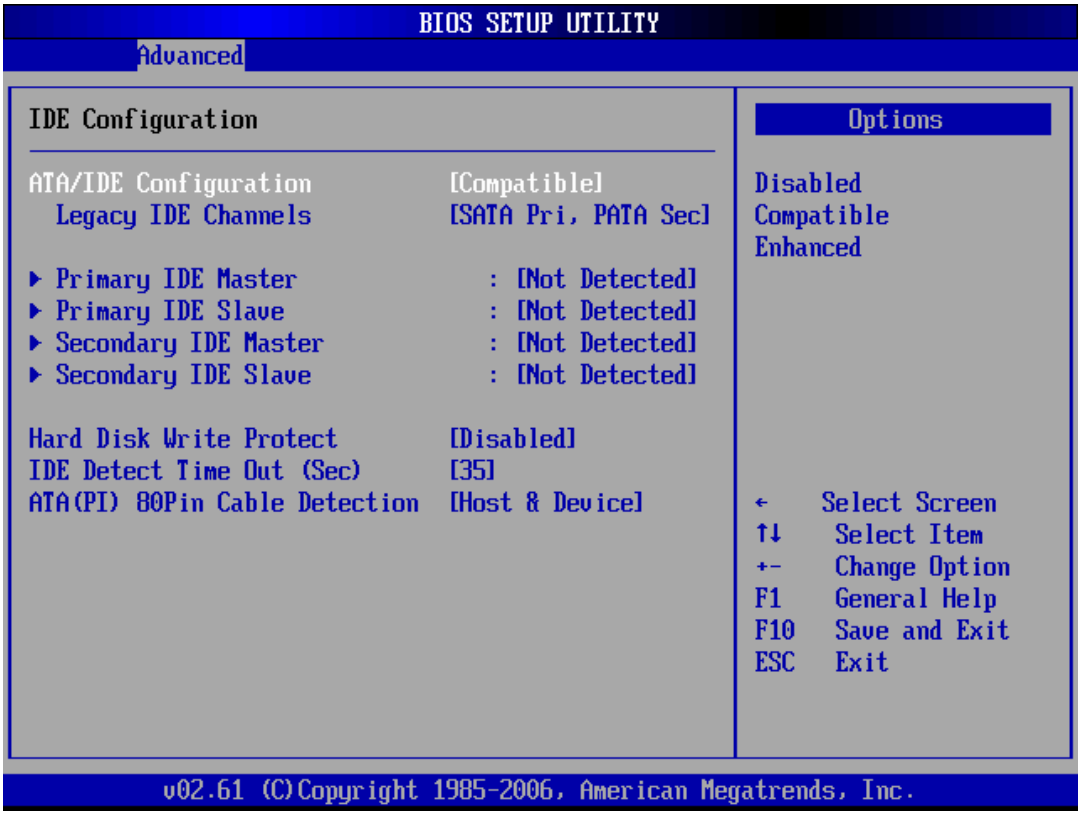
➢ **CPU Configuration**

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 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.



ATA/IDE 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: Disabled, Compatible, and Enhanced

Default setting: Compatible

■ ***Legacy IDE Channels***

This field is when set to Compatible mode; you can select the SATA Only,SATA Pri_ PATA Sec or PATA Only.

Available Options: STAT Only, SATA Pri, PATA_Sec, and PATA Only

Default setting: SATA Pri, PATA_Sec

Primary/Secondary IDE 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 – so you have the ability to install up to two separate hard disks.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB. The Optimal and Fail-Safe default setting is *Auto*

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 (Multi-Sector Transfer)

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.

32 Bit Data Transfer

This option sets the 32-bit data transfer option. The Optimal and Fail-Safe default setting is e*nabled*.

Hard Disk Write Protect

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

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

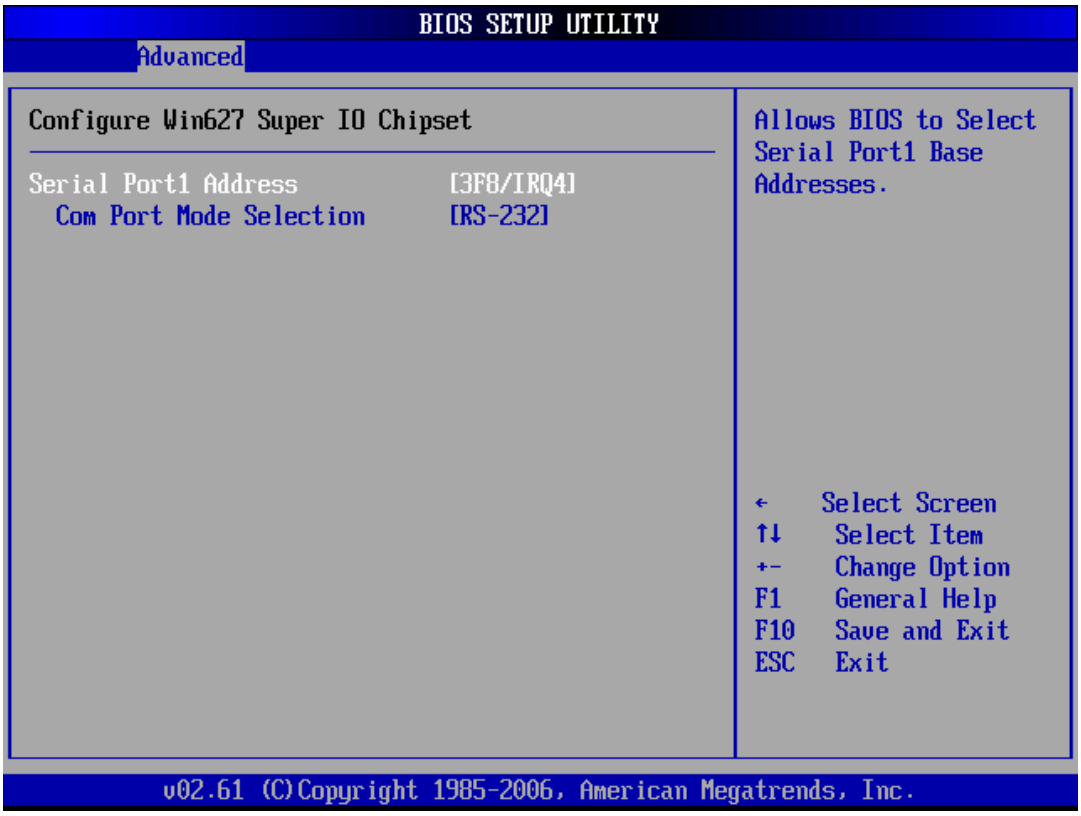
Set this option to select the method used to detect the ATA (PI) 80 pin cable. The use of an 80-conductor ATA cable is mandatory for running Ultra ATA/66, Ultra ATA/100 and Ultra ATA/133 IDE hard disk drives. The standard 40-conductor ATA cable cannot handle the higher speeds.

Available options: Host & Device, Host, and Device

Default setting: Host & Device

➢ **SuperIO Chipset - Configuration Win627 Super IO Chipset**

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/IRQ4, 3E8H/IRQ4, 2F8H/IRQ4 and 2E8H/IRQ3.

Default setting: 3F8H/IRQ4

■ ***COM Port Mode Selection***

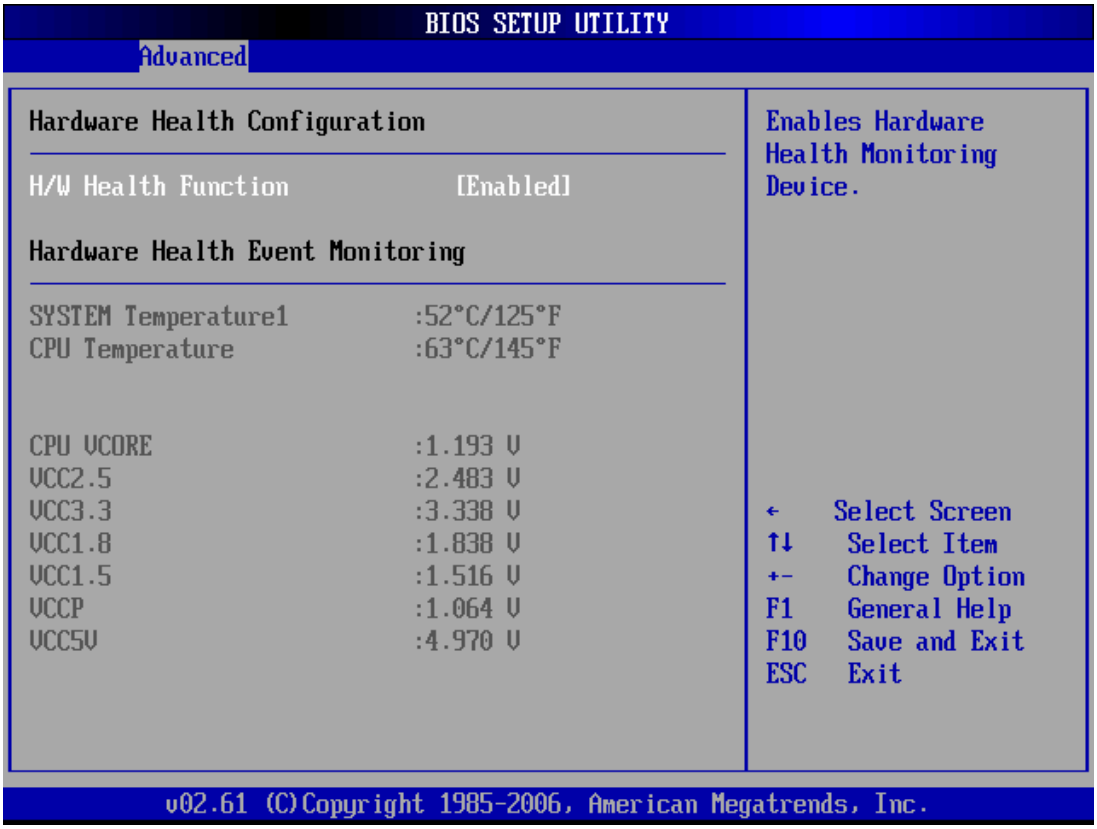
These fields item can select RS-232, RS-422 and RS-485 of select port 1.

Available Options: RS-232, RS-422 and RS485

Default setting: RS-232

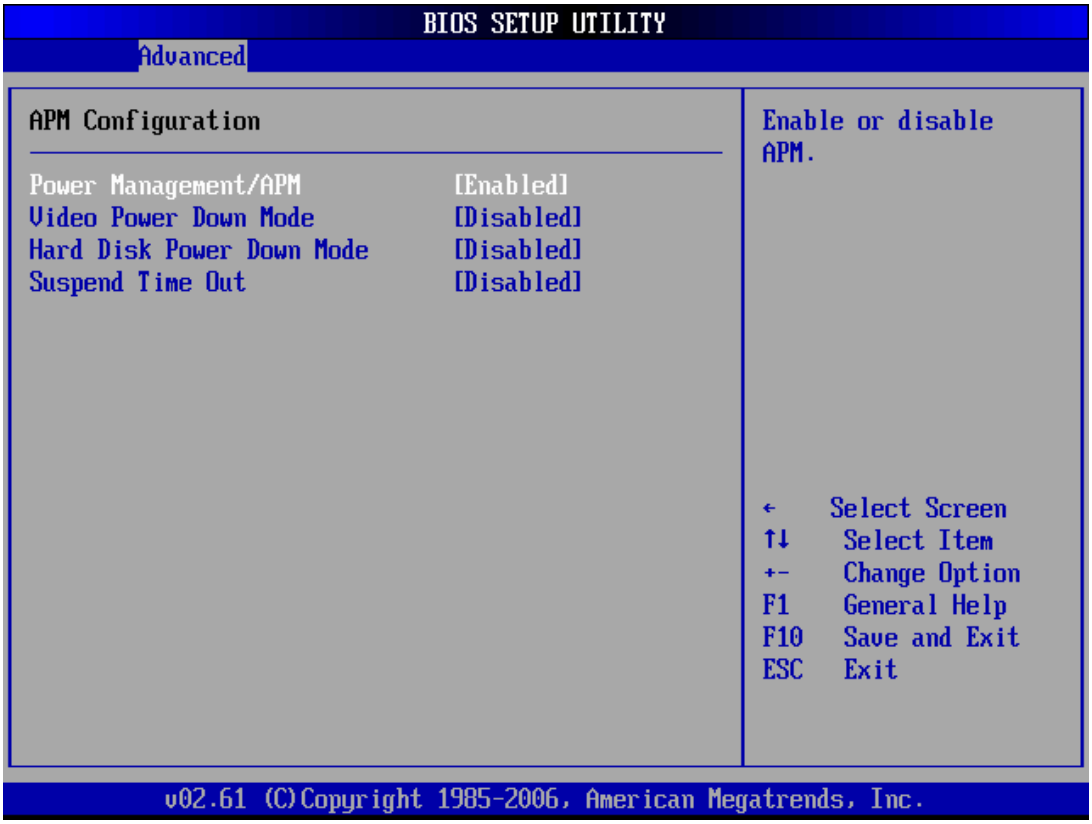
➢ Hardware Health Configuration

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



➢ **APM Configuration**

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



Power Manager /APM

Select Enabled to activate the chipset Power Management and APM (Advanced Power Management) features.

Available Options: Disabled, and Enabled

Default setting: Enabled

Video Power Down Mode

This field specifies the power conserving state that video subsystem enters after the specified period of display inactivity has expired.

Available Options: Disabled, and Suspend

Default setting: Disabled

Hard Disk Power Down Mode

This field specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.

Available Options: Disabled, and Suspend

Default setting: Disabled

Suspend Time Out

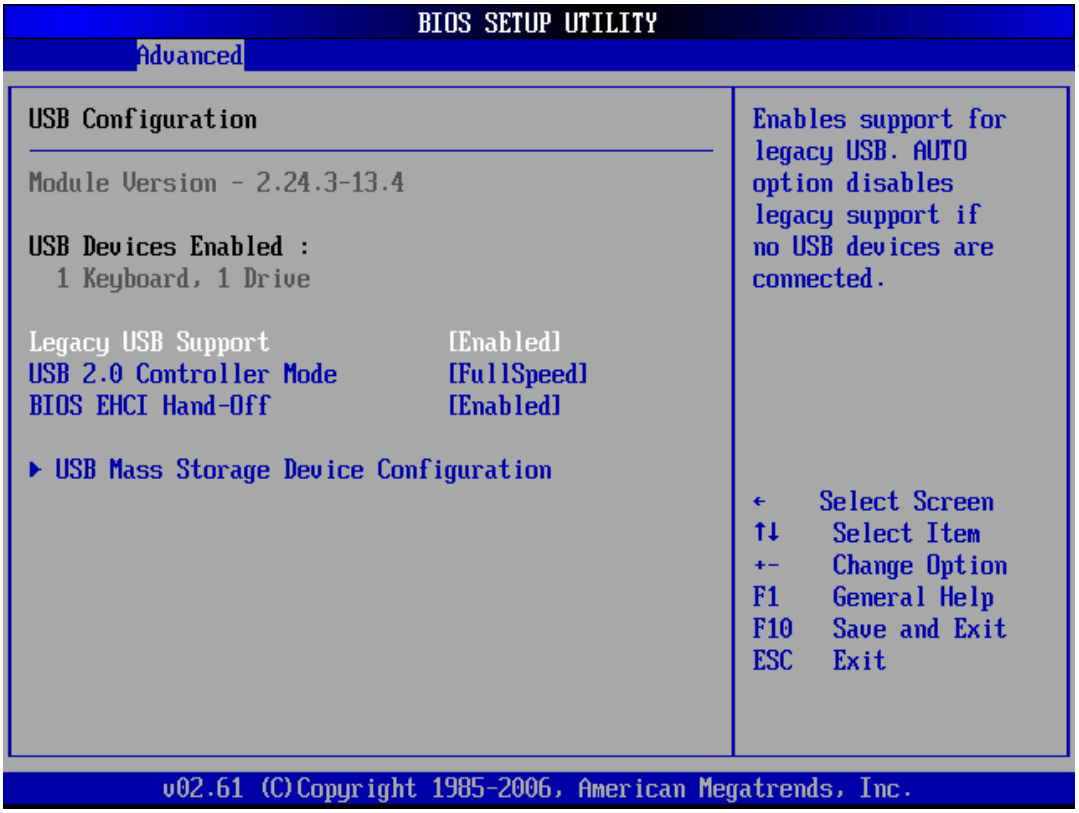
This field specifies the length of time the system waits before it enters suspend mode.

Available Options: Disabled, 1 Minute, 2 Minute, 4 Minute, and 8 Minute, up to 60 Minute.

Default setting: Disabled

➢ **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 Disabled the Legacy USB Support.

Available Options: Disabled, Auto, and Enabled

Default setting: Enabled

USB 2.0 Controller Mode

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

Available Options: HiSpeed, and FullSpeed

Default setting: FullSpeed

BIOS ECHI Hand-Off

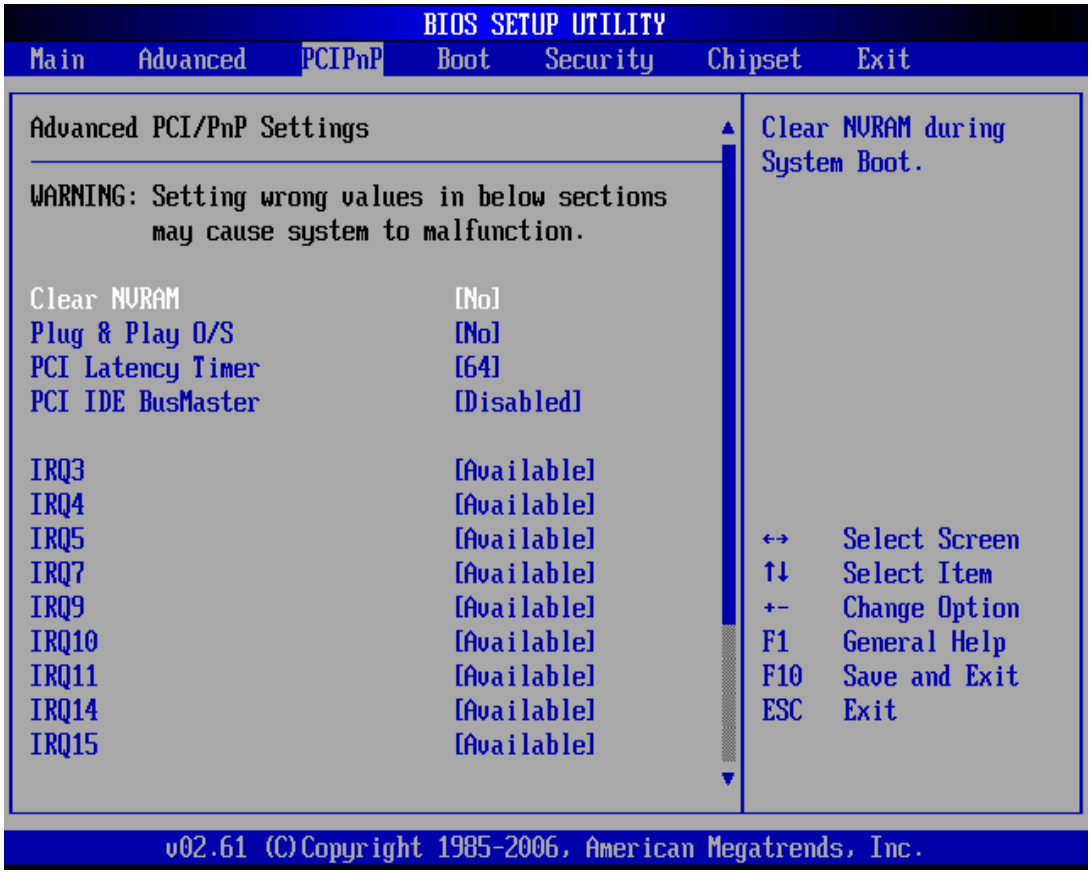
This is a workaround for OS without ECHI Hand-Off support. The ECHI ownership change should claim by ECHI driver.

Available Options: Enabled, and Disabled

Default setting: Enabled

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.



Clear NVRAM

Clear NVRAM during system boot.

Available Options: Yes, No

Default setting: No

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:

Available: Specified IRQ is available to the used by PCI/PnP devices.

Reserved: Specified IRQ is reserved for used by Legacy ISA devices.

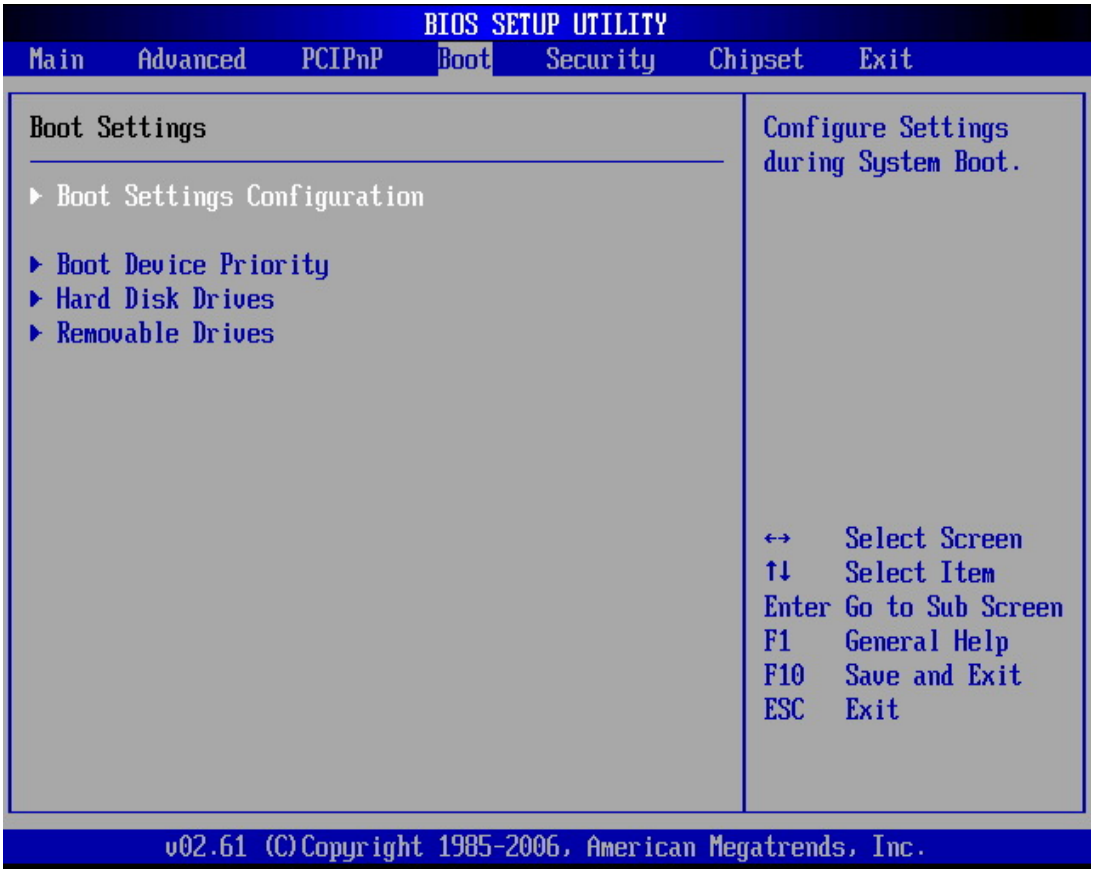
Available Options: Available and Reserved

Default setting: Available

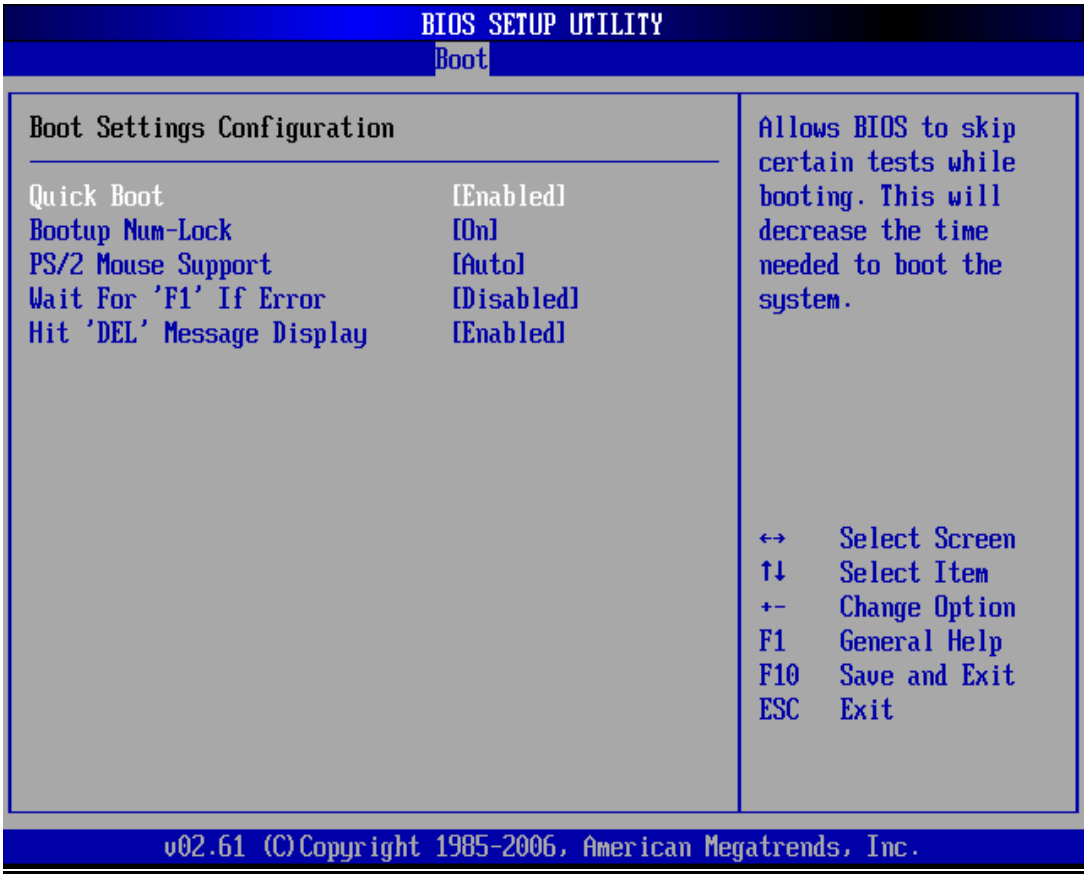
Boot Setup

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:

- Boot Setting Configuration
- Boot Device Priority
- Hard disk drives
- Removable Drivers



➢ **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 PS/2 mouse function is optional. Before you configure this field, make sure your system board supports this feature. The setting of ***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: Disabled, Enabled and Auto

Default setting: Auto

Wait for 'F1' If Error

AMIBIOS POST error messages are followed by:

Press <F1> to continue

If this field is set to ***Disabled***, the AMIBIOS does not wait for you to press the <F1> key after an error message.

Available options: Disabled, Enabled

Default setting: Disabled

Hit 'DEL' Message Display

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

Hit 'DEL' if you want to run setup

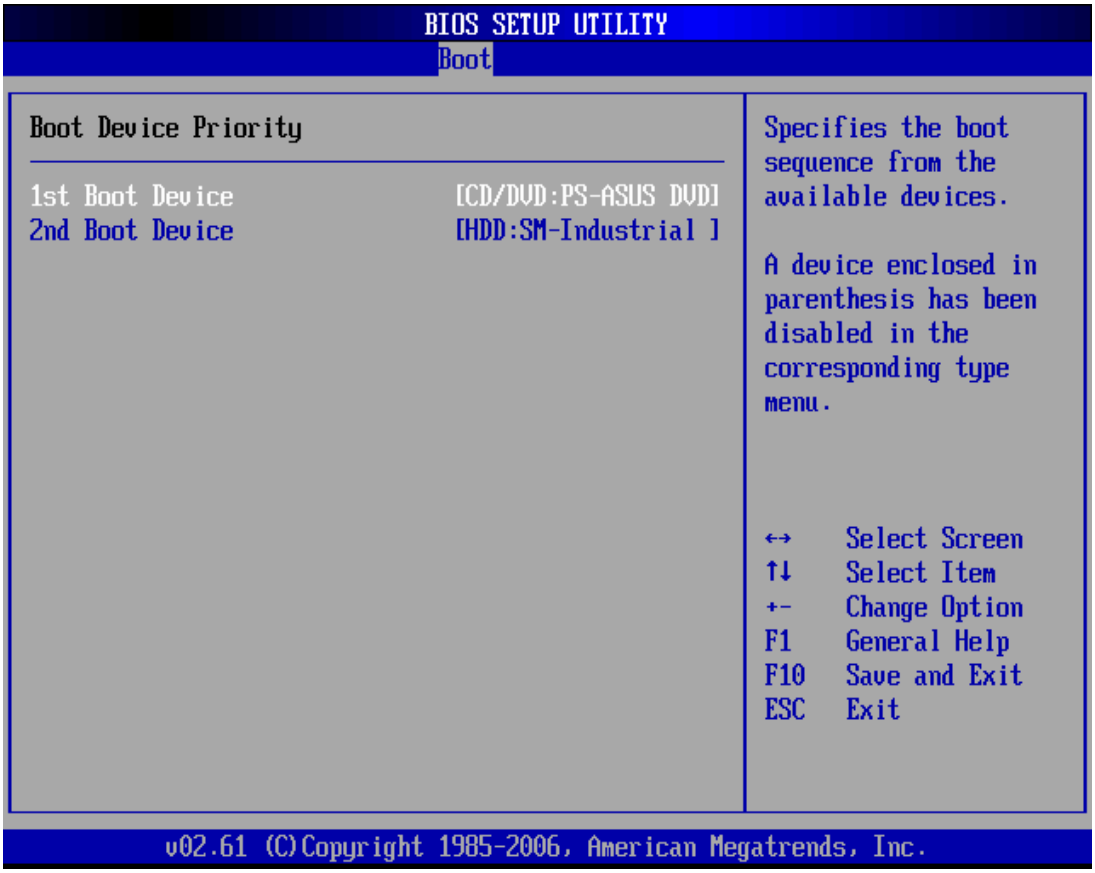
It will prevent the message from appearing on the first BIOS screen when the computer boots.

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>.



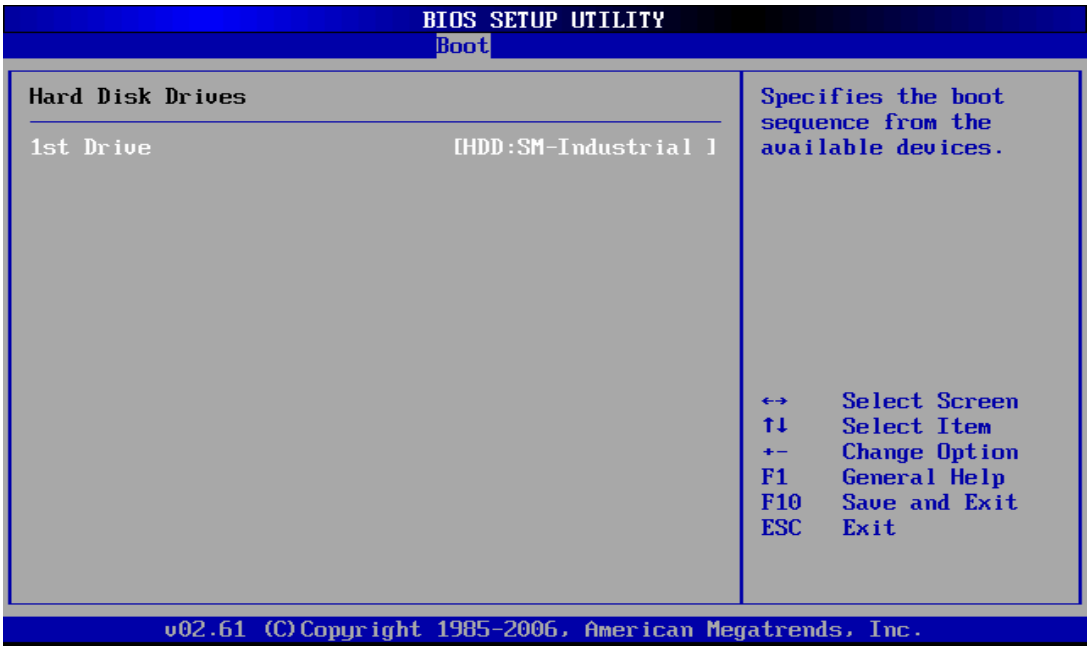
First /Second /Third Hard Disk Boot Device

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

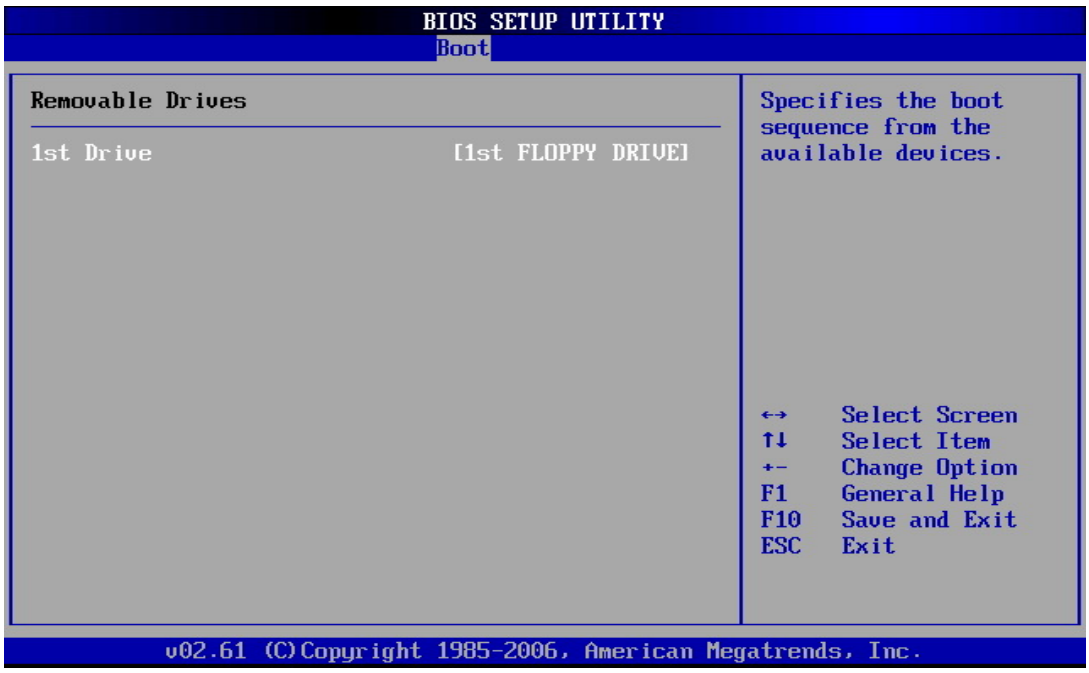
➢ Hard Disk Drives

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>.



➢ Removable Drives

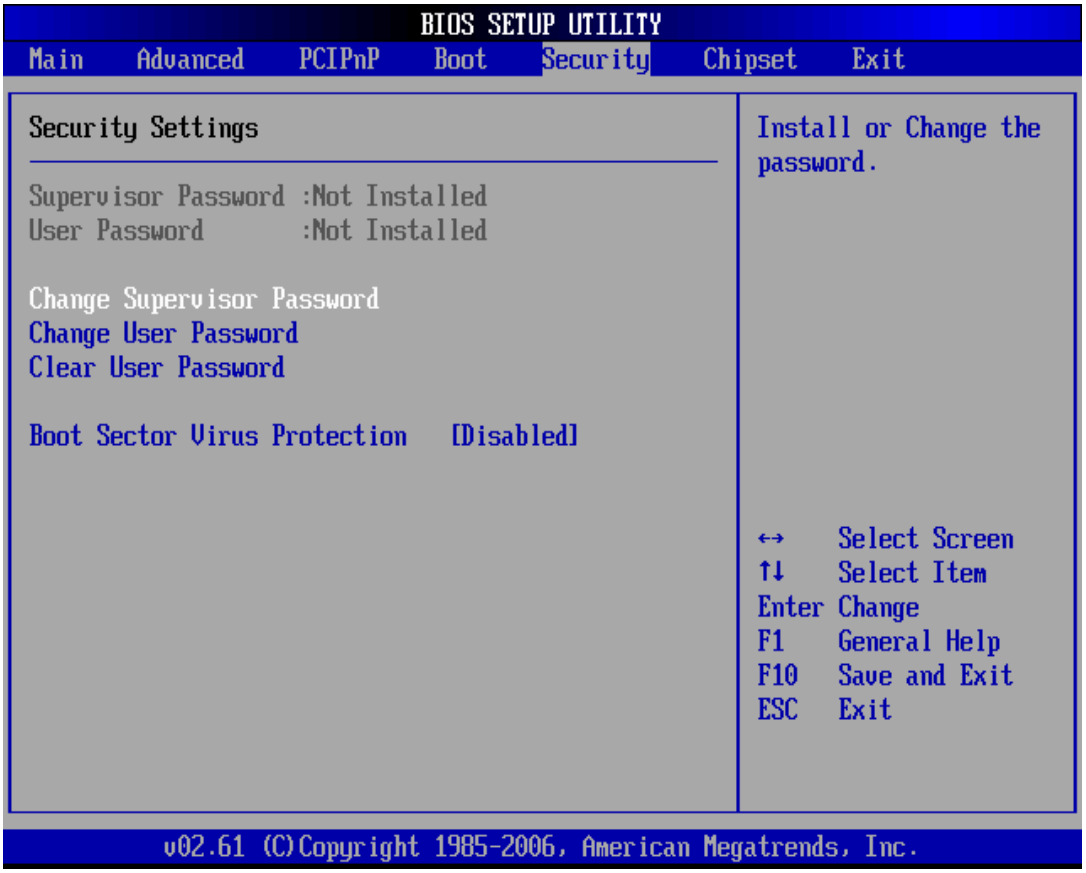
Use this screen to view the removable drives in the system. To access this screen, select removable drives on the Boot Setup screen and press <Enter>.



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.

Clear 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 enables 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. This is the default setting.
Disabled: Select Enabled to enable 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)?

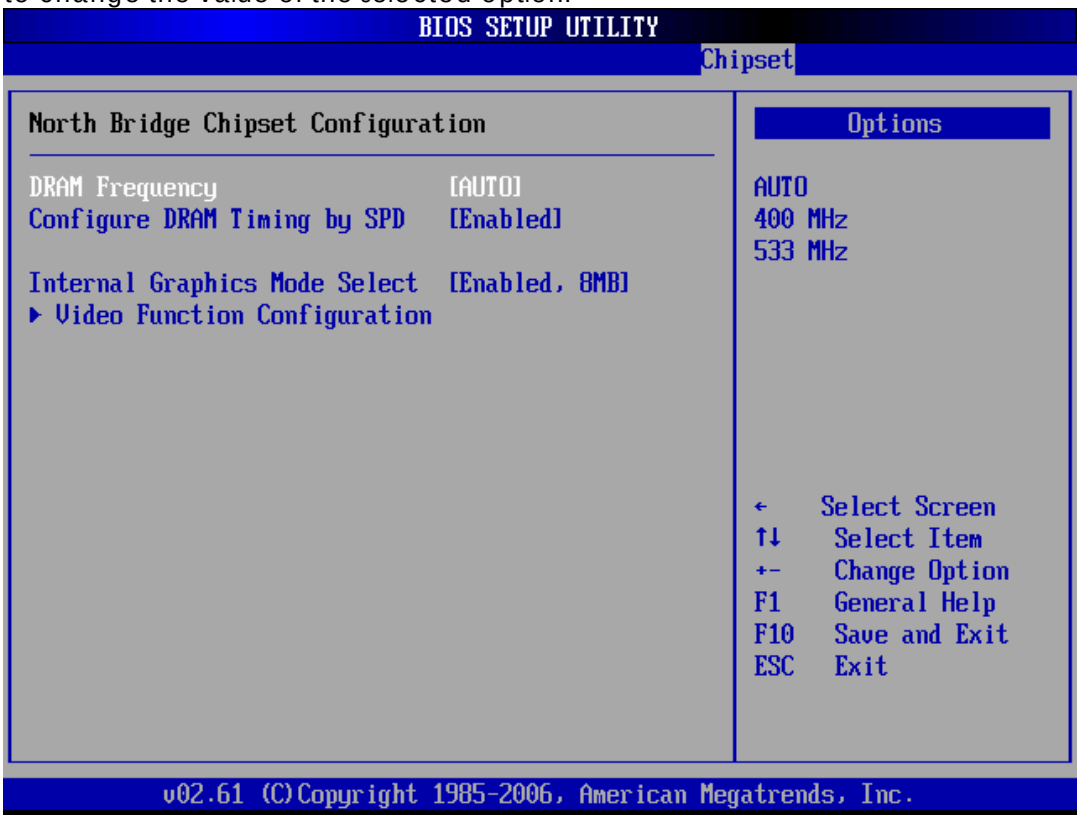
Chipset Setup

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

- North Bridge Configuration
- South Bridge 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.



DRAM Frequency

This specifies the SDRAM memory clock frequency.

Available Options: Auto, 400MHz, and 533MHz

Default setting: Auto

Configure DRAM Timing by SPD

SPD represents Serial Presence Detect. It is an 8-bit, 2048 bits EEPROM, built on the SDRAM for 100 MHz frequencies. If the installed SDRAM supports SPD function, select SPD. If not, you can select based on other access time of the SDRAM.

Available Options: Disabled and Enabled

Default setting: Enabled

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, 1MB, and 8MB

Default setting: 8MB

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: 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: 64MB, 128MB and Maximum DVMT

Default setting: DVMT Mode

- ***Boot Display Device***

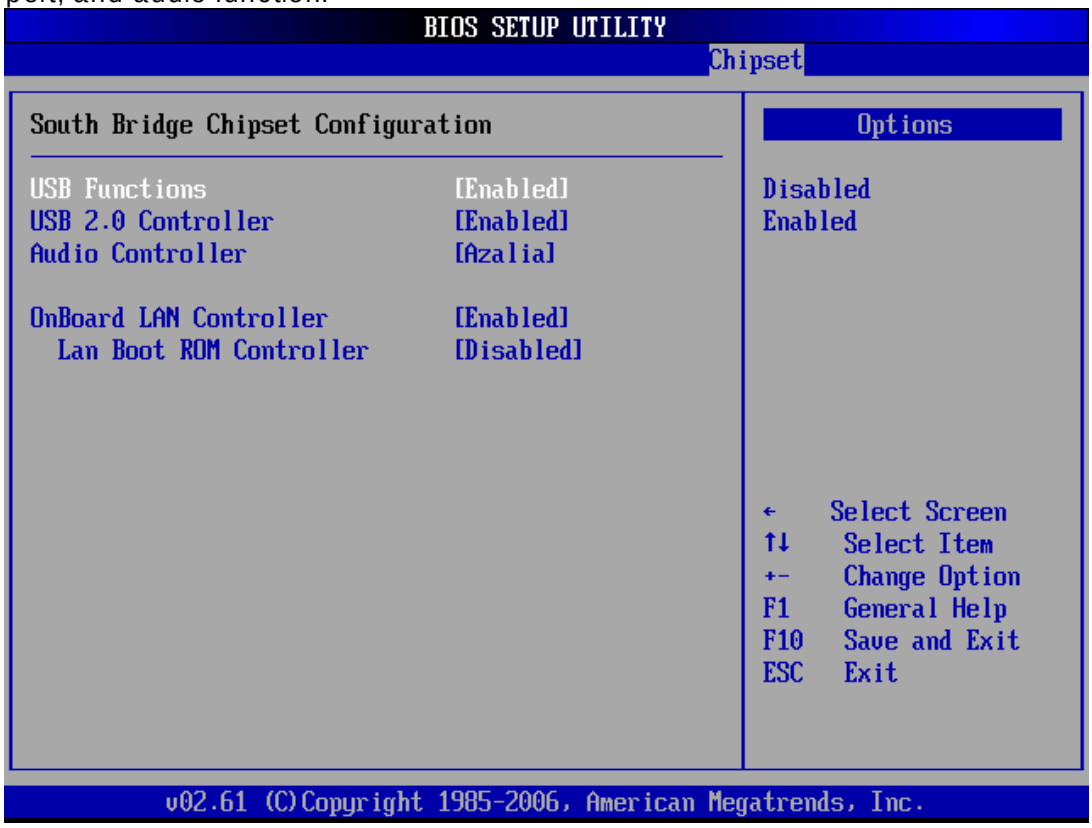
This field specifies which VGA display will be used when the system is boot. You can select either the EFP(DVI) or the CRT + LFP booting on the VGA and TV Display.

Available Options: CRT, EFP, and CRT+EFP

Default setting: CRT+EFP

➢ **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, and audio function.



USB Function

Select Enabled, if a USB device is installed to the system. If Disabled are selected, the system will not be able to use a USB device.

Available Options: Disabled, and Enabled

Default setting: Enabled

USB 2.0 Controller

This field is select Enabled or Disabled the USB 2.0 controllers

Available Options: Disabled, and Enabled

Default setting: Enabled

Audio Controller

This field specifies the internal Audio Control.

Available Options: Disabled ,and Azalia

Default setting: Azalia

On Board LAN Controller

This field specifies the Enabled or Disabled of the onboard LAN chip.

Available Options: Disabled, and Enabled

Default setting: Enabled

- ***LAN Boot ROM Controller***

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

Available Options: Disabled, and Enabled

Default setting: Disabled

Chapter 4 Software Installation

The enclosed CD diskette includes FX5321 VGA, Audio, System, and LAN driver. To install and configure you FX5321 system, you need to perform the following steps.

System Driver

WIN 2000/XP Driver

Installs 945GSE Chipset, IRQ Routing, USB, AGP Driver and ISA IDE Bus Master Drive.

Step 1: To install the 945GSE driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>ICH7.

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.

Note: In the Syschip>ICH7 directory, a Readme.txt file is included to provide installation information.

VGA Driver

WIN 2000/XP Driver

Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>945GSE>WIN2K_XP.

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 WINDOWS2000/XP, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.

Step 6: Adjust the <Refresh Rate>, <Font size> and <Resolution>.

Note: In the DRIVER>VGA>945GSE>WIN2K_XP directory, a Readme.txt file is included to provide installation information.

Audio Driver

WIN 2000/XP Driver

Step 1: To install the AUDIO driver, insert the CD ROM into the CD ROM device, and enter DRIVER>AUDIO>ALC888>WIN2K&XP.

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.

Note: In the DRIVER>AUDIO>ALC888> WIN2K&XP directory, a Readme.txt file is included to provide installation information.

LAN Driver (RTL 8111C)

WIN 2000/XP Driver

Step 1: To install the LAN driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8111C. If your system is not equipped with a CD ROM device, copy the LAN driver from the CD ROM to CF.

Step 2: Execute setup.exe file.

BIOS Flash Utility

In the <UTILITY> directory, there is the Afu409.EXE file.

Step 1: Use the Afu409.EXE program to update the BIOS setting.

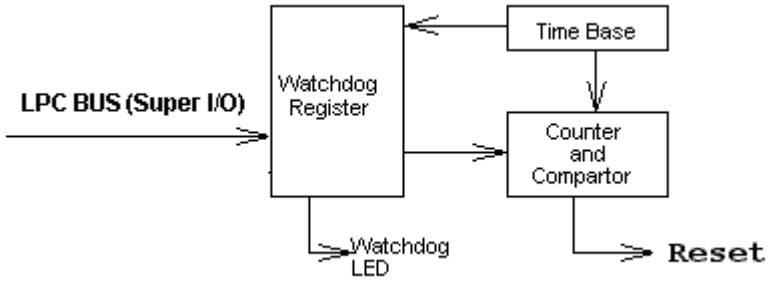
Step 2: And then refer to the chapter "BIOS Setup", as the steps to modify BIOS.

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 system is equipped with a programmable time-out period watchdog timer. You can use your own program to enable the watchdog timer. Once you have enabled 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 watchdog timer is automatically disabled after reset.

Once you have enabled 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 enable 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 enable 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
```

Programming RS-485

The majority communicative operation of the RS-485 is in the same of the RS-232. When the RS-485 precedes the transmission, which needs control the TXC signal, and the installing, steps are as follows:

Step 1: Enable TXC

Step 2: Send out data

Step 3: Waiting for data empty

Step 4: Disable TXC

Note: Please refer to the section of the "Serial Ports" in the Chapter 5 "Technical Reference" for the detail description of the COM port's register.

Initialize COM port

Step 1: Initialize COM port in the receiver interrupt mode, and /or transmitter interrupt mode. (All of the communication protocol buses of the RS-485 are in the same.)

Step 2: Disable TXC (transmitter control), the bit 0 of the address of offset+4 just sets "0".

NOTE: Control the system "DTR" signal to the RS-485 TXC communication.

Send out one character (Transmit)

Step 1: Enabled TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write this character to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

Send out one block data (Transmit – the data more than two characters)

Step 1: Enabled TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write all data to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

Receive data

The RS-485's operation of receiving data is in the same of the RS-232's.

Basic Language Example

a. Initial 86C450 UART

```
10      OPEN "COM1:9600,m,8,1"AS #1 LEN=1
20      REM Reset DTR
30      OUT &H3FC, (INP(%H3FC) AND &HFA)
```

```
40      RETURN
```

b. Send out one character to COM1

```
10      REM Enabled transmitter by setting DTR ON
20      OUT &H3FC, (INP(&H3FC) OR &H01)
30      REM Send out one character
40      PRINT #1, OUTCHR$
50      REM Check transmitter holding register and shift register
60      IF ((INP(&H3FD) AND &H60) >0) THEN 60
70      REM Disabled transmitter by resetting DTR
80      OUT &H3FC, (INP(&H3FC) AND &HEF)
90      RETURN
```

c. Receive one character from COM1

```
10      REM Check COM1: receiver buffer
20      IF LOF(1)<256 THEN 70
30      REM Receiver buffer is empty
40      INPSTR$"
50      RETURN
60      REM Read one character from COM1: buffer
70      INPSTR$=INPUT$(1,#1)
80      RETURN
```

NOTE: The RS-485 of the FX5321 uses COM1. If you want to program it and hardware setup, please refer to the BIOS Setup for COM1 address setup and Chapter 2 “Hardware Installation”: Jumper Setting.

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 Post Beep & 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 initializes 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

FLOPPY DISK CONTROLLER ERROR OR NO CONTROLLER PRESENT

When you cannot find or initialize the floppy drive controller, please ensure the controller is in proper BIOS Setup. If there is no floppy drive installed, ensure the Diskette Drive selection in Setup is set to NONE.

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 ~ 50°C

Relative humidity 5 % to 95 % non-condensing

Surface Temperature of Chassis：

5°C to 45°C (W/HDD)/0°C to 50°C (W/CF card only)

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 enable
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 Enable Register (IER)

Bit 0: Enable Received Data Available Interrupt (ERBFI)

Bit 1: Enable Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enable Receiver Line Status Interrupt (ELSI)

Bit 3: Enable 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 Enable (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)

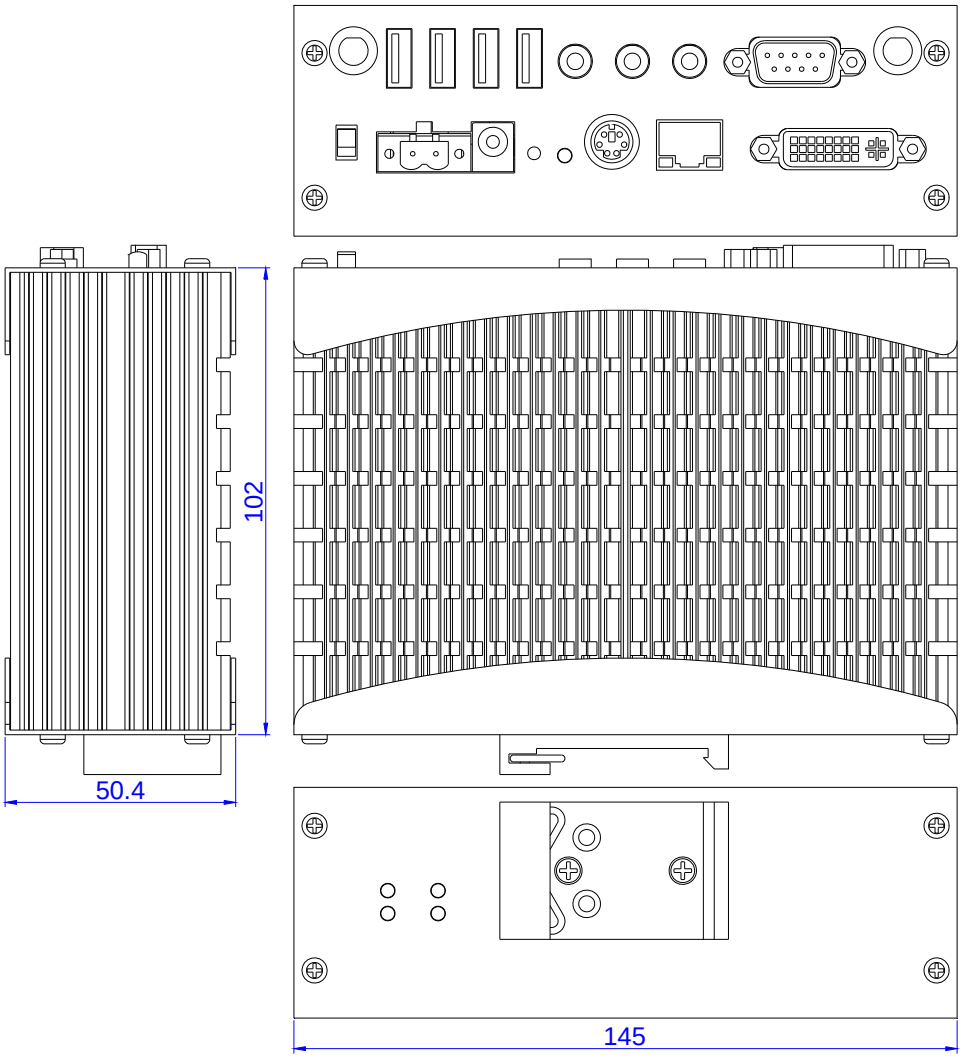
	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

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

Appendix

Dimension

a. FX5321



b. FX5321- DIN-Rail