

FabiaTech Corporation

IPC Solution

Website: <http://www.fabiatech.com>

Email: [support@fabiatech.com](mailto:support@fabiatech.com)

**Small Cube System**  
**Fanless Series**  
**FX5624 User's Manual**

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- ❑ 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](http://www.fabiatech.com).

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## Chapter 1 Introducing the FX5624 System

### Overview

The FX5624 is a compact size 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 FX5624.

Built to unleash the total potential of the Intel Celeron-M Processor, Able to support 600MHz CPU, this system supports four 10/100M Base-TX and two 10/100/1000 Base-TX LAN ports (supports LAN3/LAN4 Bypass), 1GB DDR2 RAM, mini PCI socket , Two USB2.0 ports, one RS-232C port, and a VGA controller.

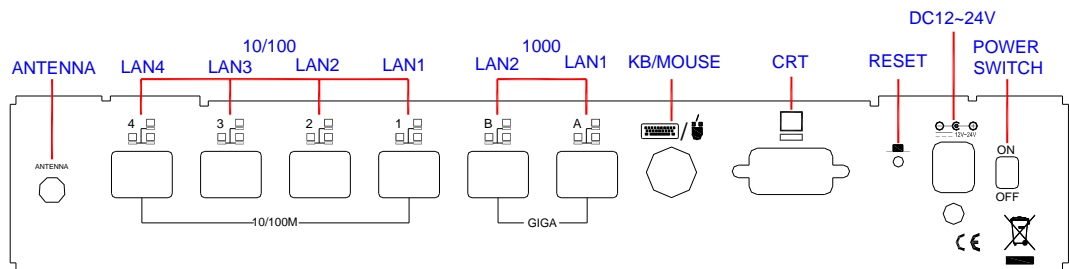
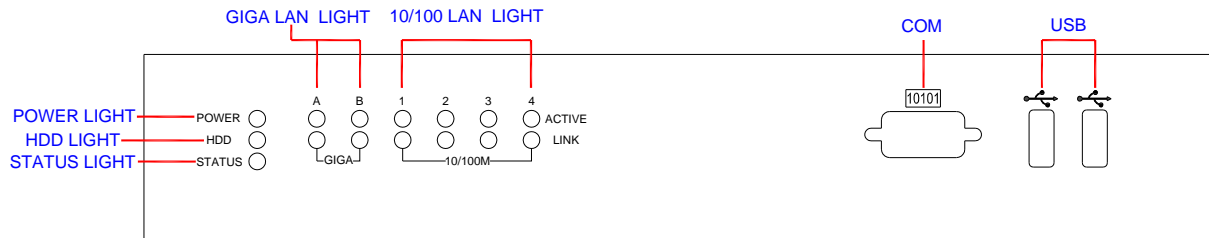
LAN Bypass functionality for two ports (LAN3 and LAN4), FX5624 allows LAN connection to work continuously even when system faults which is required for certain Internet security applications.

FX5624 is perfect for Internet Router, VPN Gateway, firewall, Mail Server, and small Embedded Control. The unit is only 158 mm (D) X 256 mm (W) X 44 mm (H).

## Series Comparison Table

Model	FX5624
Processor	Intel Celeron-M 600MHz
Chipset	Intel 82910GML E
Memory 240 Pin-DIMM (Max.)	DDR2 400MHz/533MHz 1GB/2GB
Watchdog Timer	Yes
Multi I/O	One RS232
Storage	One SATA or ATA HDD and CF
USB 2.0	Two USB Ports
RJ45 ports (1Gbps)	Realtek RTL8111C(PCI-e)*2
RJ45 Ports (100Mbps)	Realtek RTL8100C*4
* LAN Bypass Function	LAN3/LAN4
Mini-PCI Socket	One
Operating Temperature	0~+ 50°C (32~122°F)
Dimensions (Unit: mm)	158(D) x 256(W) X 44(H)

## Layout





## Specifications

❑ ***Processor Board –***

Intel Celeron-M 600 MHz CPU with 1GB DDR2 RAM.

❑ ***I/O Outlets –***

Four 10/100 base-TX and Two 10/100/1000 Base-TX Ethernet ports.

Two USB ports (V2.0) and One RS232 Port.

One Mini PCI Socket for mini-PCI I/O modules.

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

One power LED, One HDD/CF access LED, One User defined status LED and twelve LAN LED's.

❑ ***Storage Bay-***

One Compact Flash Socket.

One 2.5" SATA or PATA hard disk space.

❑ ***Power Requirement –***

+12V~+24V DC, 1.64A maximum (1.29A typical) with 19V DC input.

❑ ***Dimensions -***

158 mm (D) x 256 mm (W) x 44 mm (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 FX5624 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 FX5624 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5624 system.

**Note:** after you install the FX5624, 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 FX5624 package. Some accessories are optional items that are only shipped upon order.

- One FX5624 embedded system.
- One AC to DC power adapter and 1 AC power code cable.
- One pack of 2.5" SATA hard disk installation kit with fixed screws.
- One FX5501k1 or one FX5504K1 universal fixers and 6 screws. (Optional)
- One FX5622K1 1U Rack-Mount kit and 6 screws. (Optional )
- One compact disc includes software utility.



## Chapter 2 Hardware Installation

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

### Before Installation

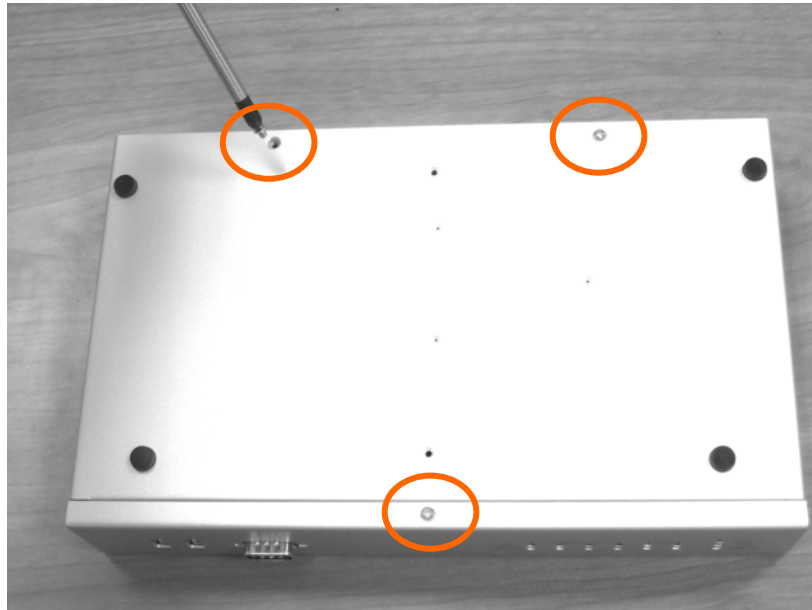
Before you install the system, make sure you follow the following descriptions.

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 or unplug any connector, Compact Flash, and hard disk be 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.

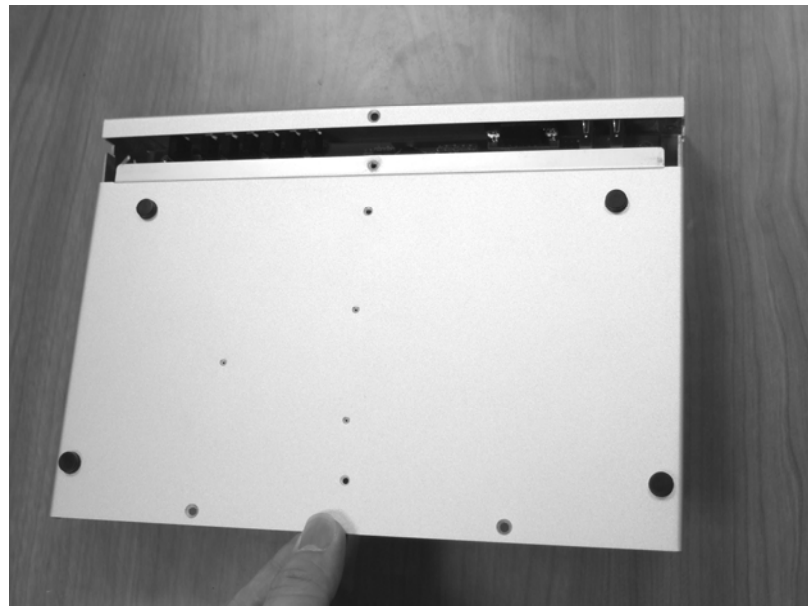
□ **Removing Covers -Installing Hardware**

If you are installing hardware option, you can remove the bottom cover. The following figure will guide you how to install SATA or PATA 2.5" HDD inside, Compact Flash modules, mini PCI WLAN module and DDR-RAM module the FX5624 and how to install the FX5624 fixers. (Please see the spots circled.)

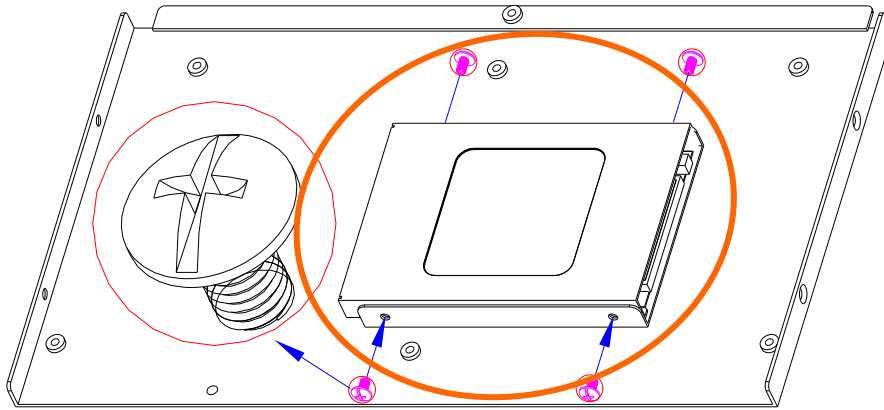
**a. Unscrew Bottom cover**



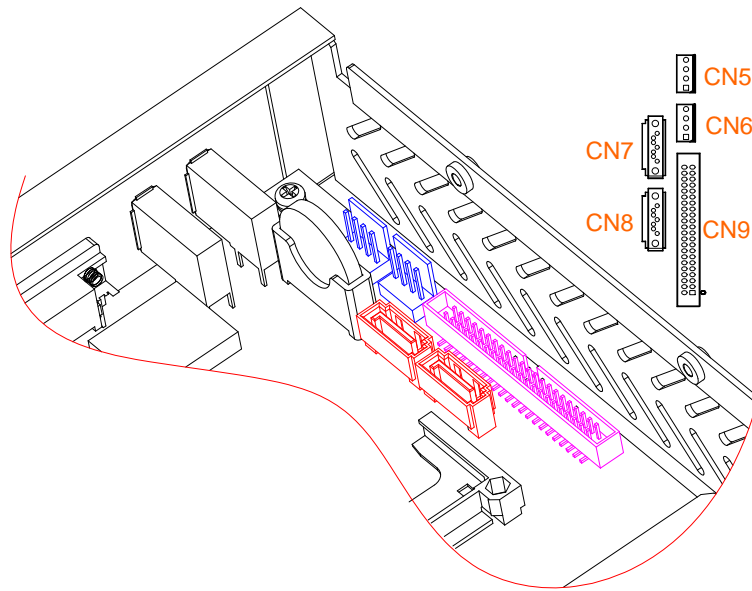
◇ *a1. Remove Bottom Cover*



## b. Installation Hard Disk



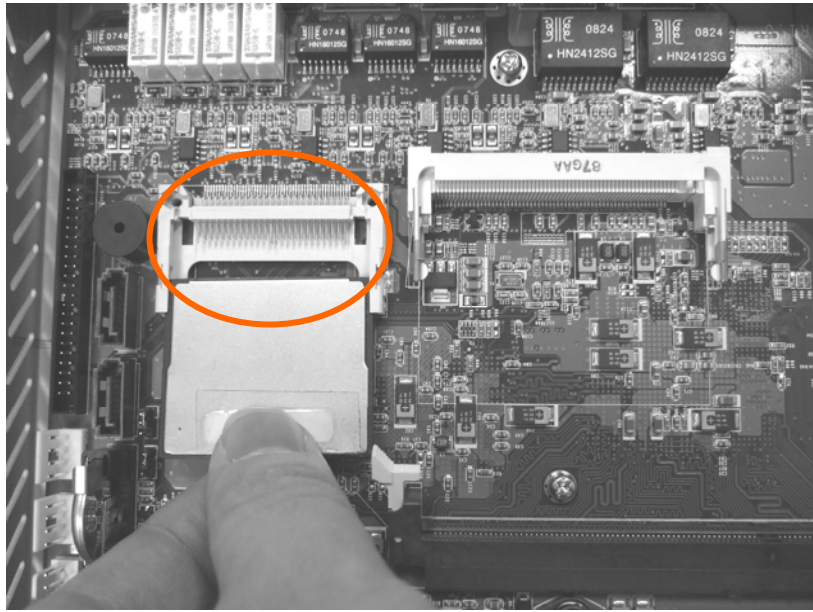
### ✧ b1. Installing PATA or SATA Cable



**Note:** Use caution when handling the hard disk to prevent damage to IDE 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. CN9 is used to connect a 2.5" HDD with 44-pin flat-cable or 44-pin DiskOnModule directly.
2. CN7 and CN8 are used to connect a SATA 2.5" HDD with included SATA cable, and CN5, CN6 is for SATA power connector. (The CN5 & CN6 support +5V Voltage only)

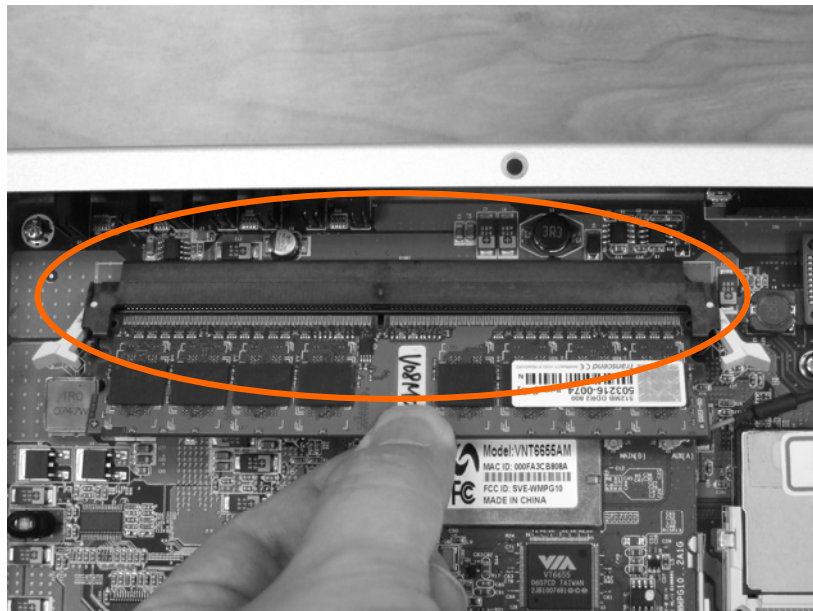
### c. Installing Compact Flash



**Note:** The Compact Flash socket (on the FX5624) supports 3.3V Compact Flash and Micro Drives.

### d. Installing Memory: DIMM Socket For DDR2 RAM Modules

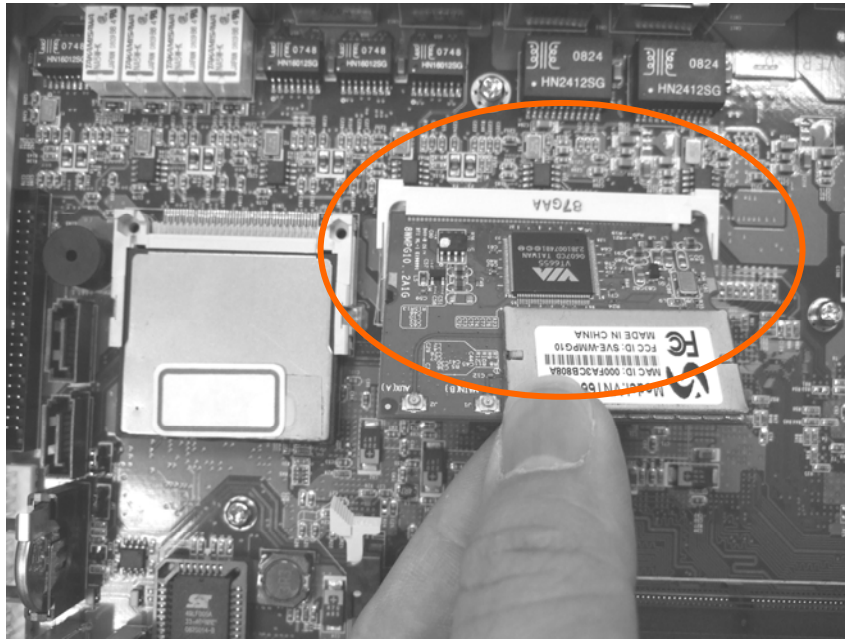
You may extend additional memory to FX5624, See as following figure and rear pictures. The DIMM socket supports 512MB to 2GB of DDR2 RAM modules.



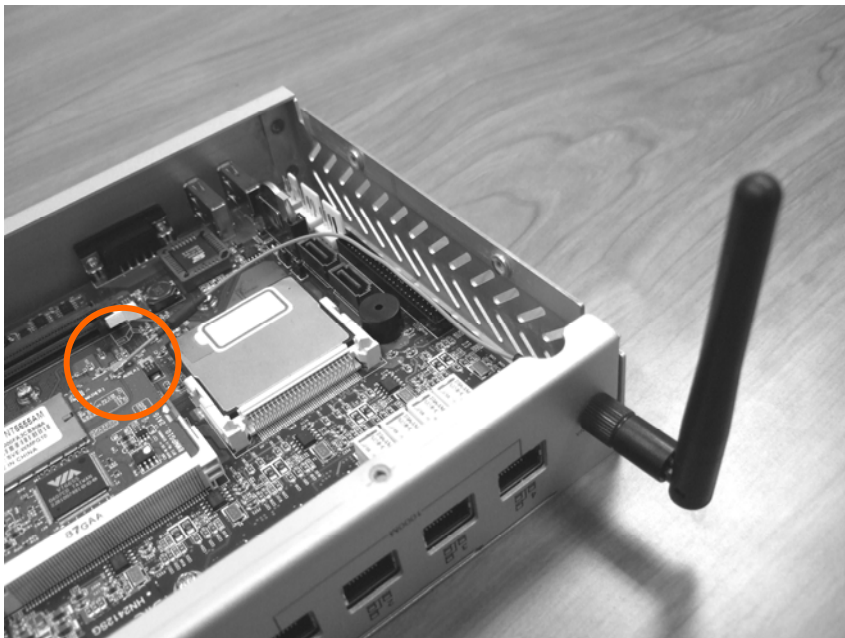
### e. Installing Mini PCI Card: Mini PCI Socket for WLAN Modules

You may extend additional mini PCI WLAN module to FX5624 by removing the bottom cover. Connect the antenna cable from backside antenna hole to Mini PCI WLAN (the auxiliary board). (Please see the spots circled.)

#### ❖ e1. Add on Mini-PCI WLAN module



#### ❖ e2. Connect to the WLAN module and Screw Antenna

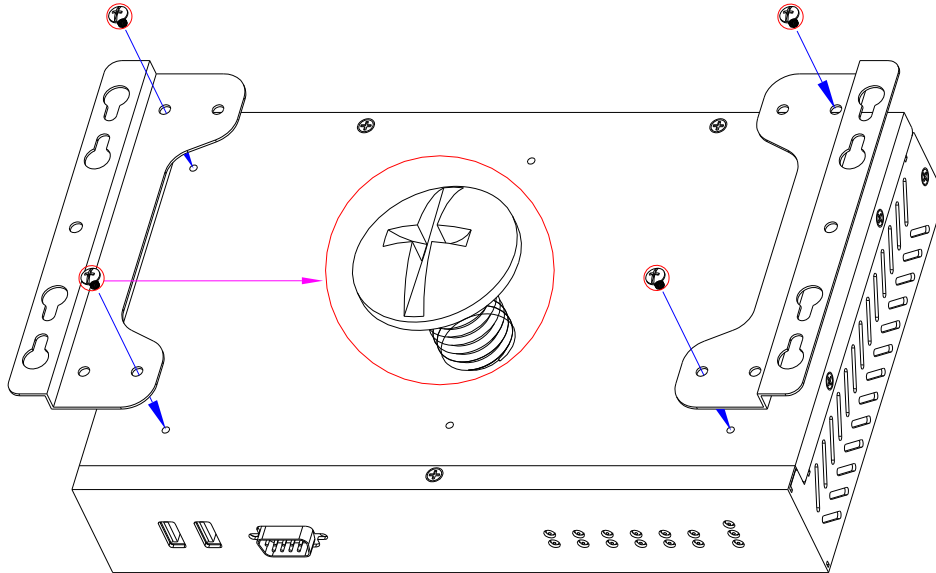




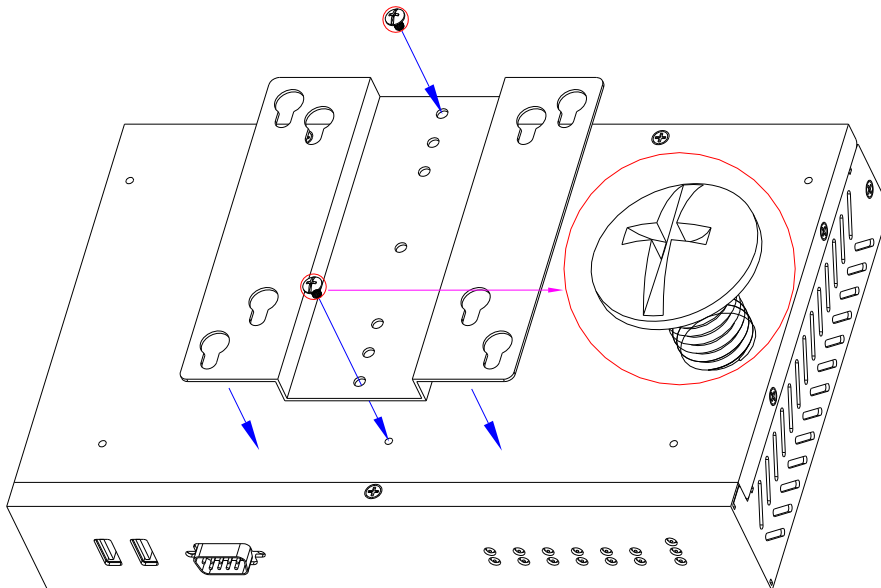
**f. Installing the universal fixers on FX5624**

Please refer to the down side figure for installing the FX5624 with universal fixers.

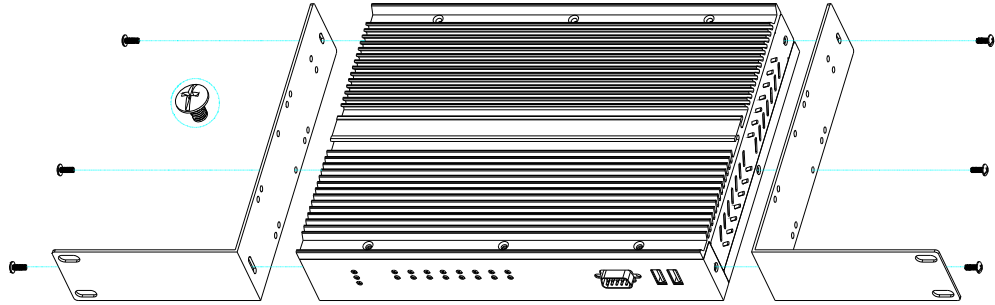
e1. FX5501K1 universal fixers



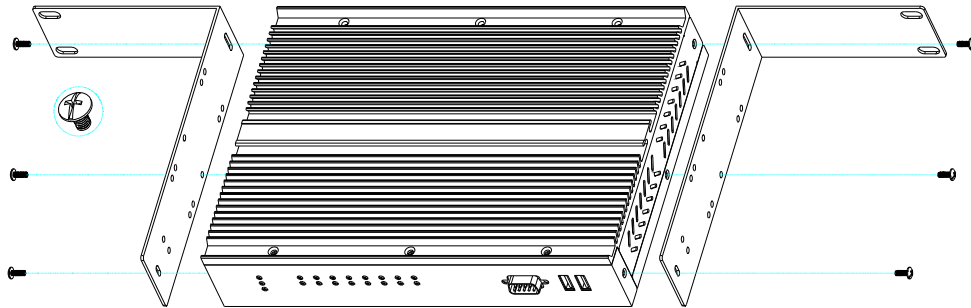
e2. FX5504K1 universal fixers



e3. FX5622K1 Rack-Mount Kit.

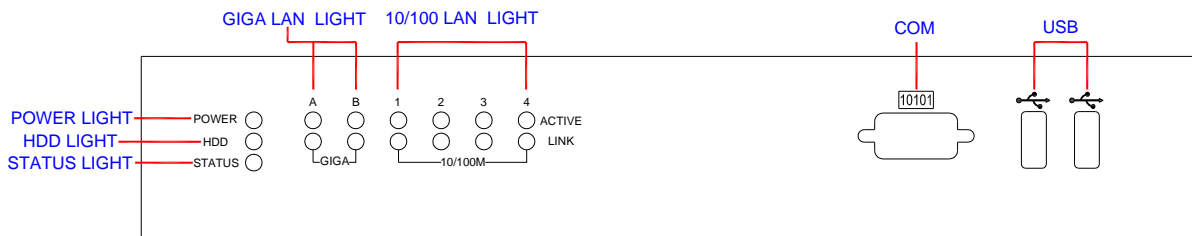


e3-1. FX5622K1



□ **LED Indicators**

The Power/Watchdog LED, HDD LED and Status LED's have two distinctive statuses: Off for inactive operation and blinking light for activity. And the 12 LED's for LAN ports. The down side LED (Orange) indicates data is being accessed and the up side LED's (Green) indicates on-line status. (On indicates on-line and off indicates off-line)

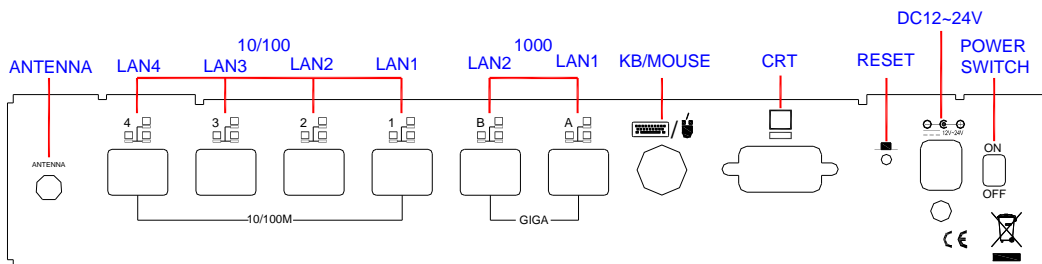


**Note:** Please refer to the section of the "Status LED Programming" in the Chapter 4 "Software Installation" for the detail description of the Status LED register.

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

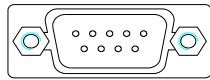
□ **I/O Peripheral Connectors**

View from the front and back side, If you are connecting the monitor, keyboard, mouse, LAN, COM and USB to the FX5624. See following figure and a side pictures.



### 1. Connecting COM Port

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



**COM**

10101

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

### 2. Connecting the PS2-Keybaord and Mouse

The connector uses the included adapter cable you can attach standard PS/2 type keyboard and mouse. Standard PS/2 keyboard can be plugged into this connector without any adapter cable. If PS/2 keyboard and mouse will be used simultaneously, a Y-type (3-terminal) adapter cable is needed.

**KB**



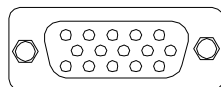
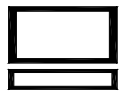
**MOUSE**



KB/MS	Description
1	Mouse Data
2	Keyboard Data
3	Ground
4	VCC
5	Mouse Clock
6	Keyboard Clock

### 3. A CRT connector is provided for VGA signals.

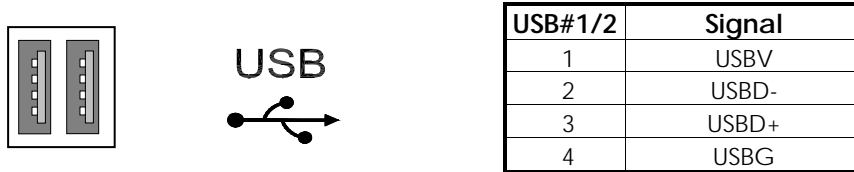
**CRT**



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

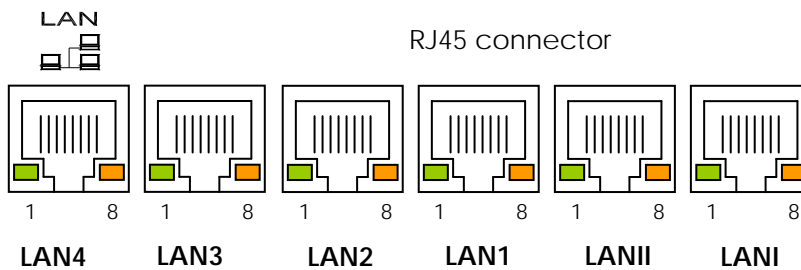
#### 4. Connecting USB Ports

The FX5624 supports a dual port USB connector. Any USB device can be attached to USB ports with plug-and-play supported. The left side port is USB #1 and the right side port is USB #2



#### 5. 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 LANI ~ LANII is the 10/100/1000 base-TX port and others are 10/100 base-TX ports.



The following lists the pin assignment and signals of RJ45.

RJ45	LAN1~LAN4	LANI~II	RJ45	LAN1~LAN4	LANI~II
1	TPTX+	TPTX+	5	FBG1	TPTX1-
2	TPTX -	TPTX -	6	TPRX -	TPRX -
3	TPRX+	TPRX+	7	FBG2	TPRX1+
4	FBG1	TPTX1+	8	FBG2	TPRX1-

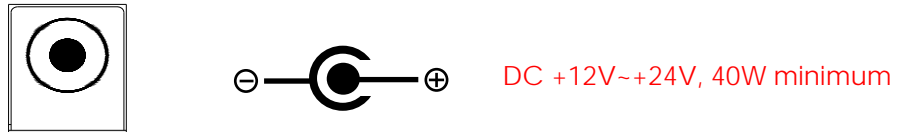
**Note:** 1. Please refer to the section of the “LAN By-Pass Programming” in the Chapter 4 “Software Installation” for the detail description of the By-Pass register.

2. The bypass function on FX5624 is used to link (or short) two independent Ethernet (LAN3 & LAN4) ports when user’s application software halts or **when power is off.**

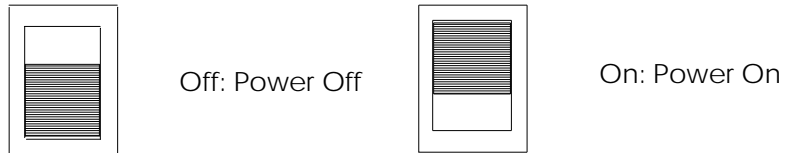
□ **Connecting the DC Power and Power Switch**

Power is supplied through an external AC/DC power adapter. Check the technical specification section for information about AC/DC power input voltage.

1. DC-Power Jack: Use External AC/DC power adapter



Since the switch does include a power switch, plugging its power adapter into a power outlet then switch power to on (1), when you final installed system hardware device.



2. Reset Push Button

The Reset push button is switcher for system reset; Push and release the button will cause hard ware reset of FX5624 and restart system booting.



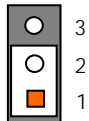
Reset Push Button: Restart

□ **Jumper Setting**

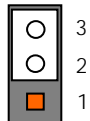
The JP2 is used to select master/slave device of this Compact Flash. And use JP1 to clear CMOS data, to clear the CMOS, set JP1 to 2-3 and then return to 1-2 before system powers off. The default setting is 1-2.



JP1

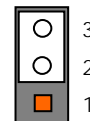


Normal Operation  
Default

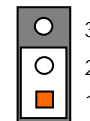


Clear CMOS Data

JP2



Slave



Master  
Default

## 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.

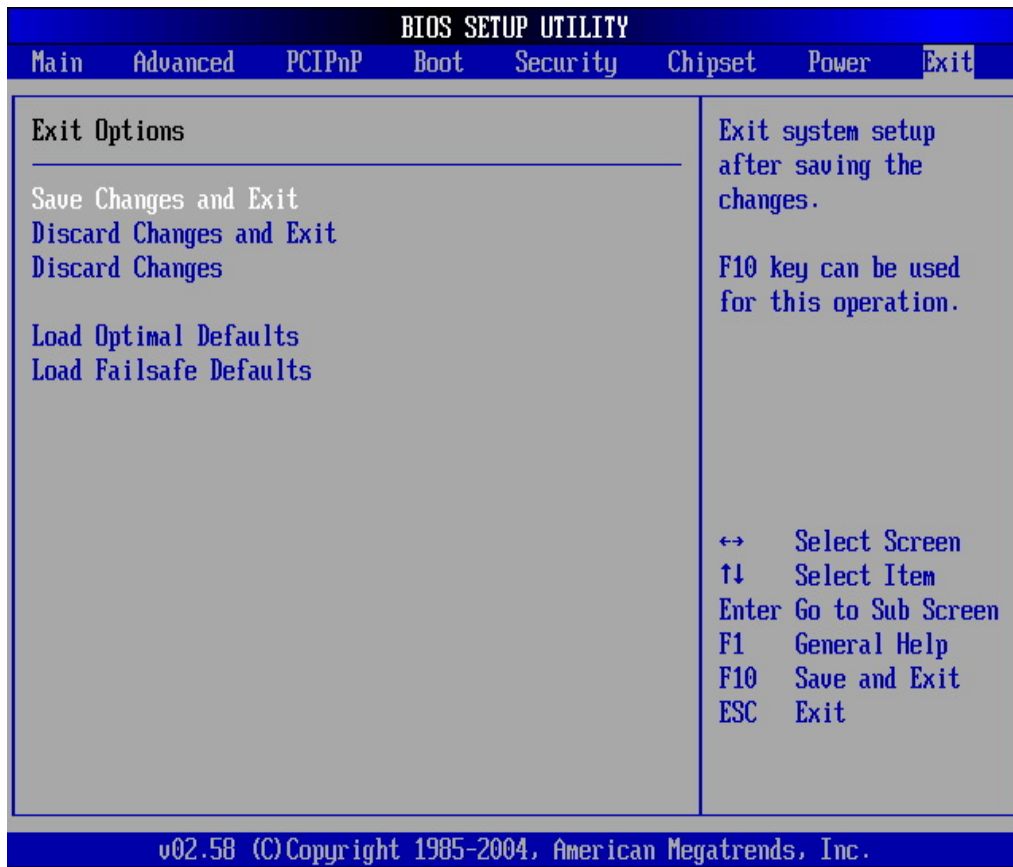
The BIOS default values ensure that the system will function at its normal capability. In the worst situation the user may have corrupted the original settings set by the manufacturer.

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
  - 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.

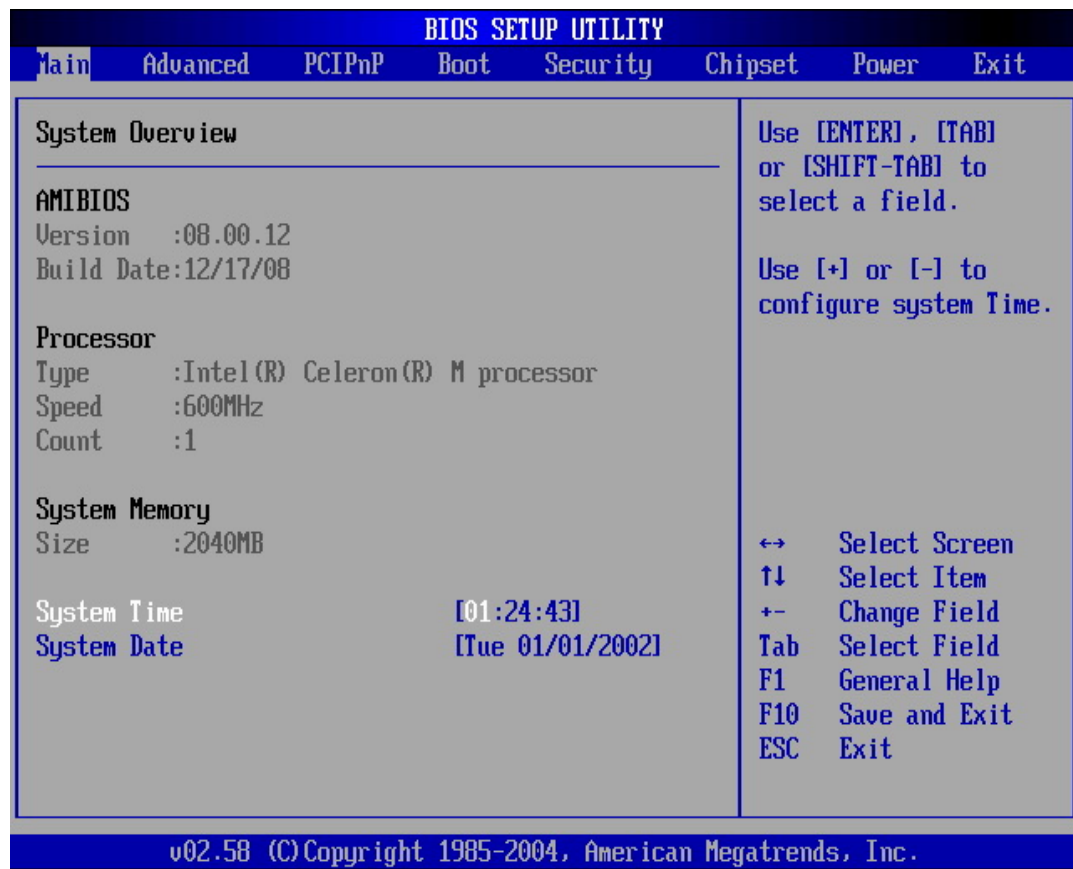
□ **Keyboard Convention**

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

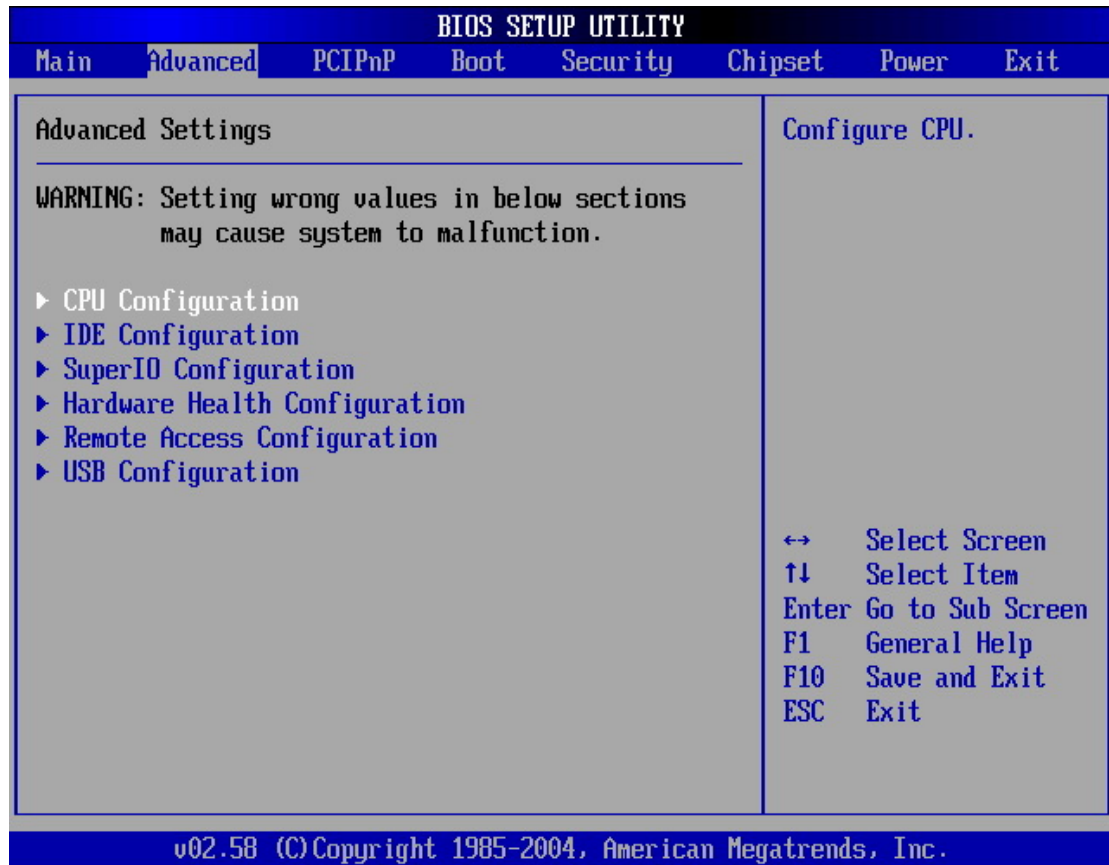
Highlight the <Date> field and then press the [Page Up] / [Page Down] or [+]/ [-] keys to set the current date. Follow the month, day and year format.

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



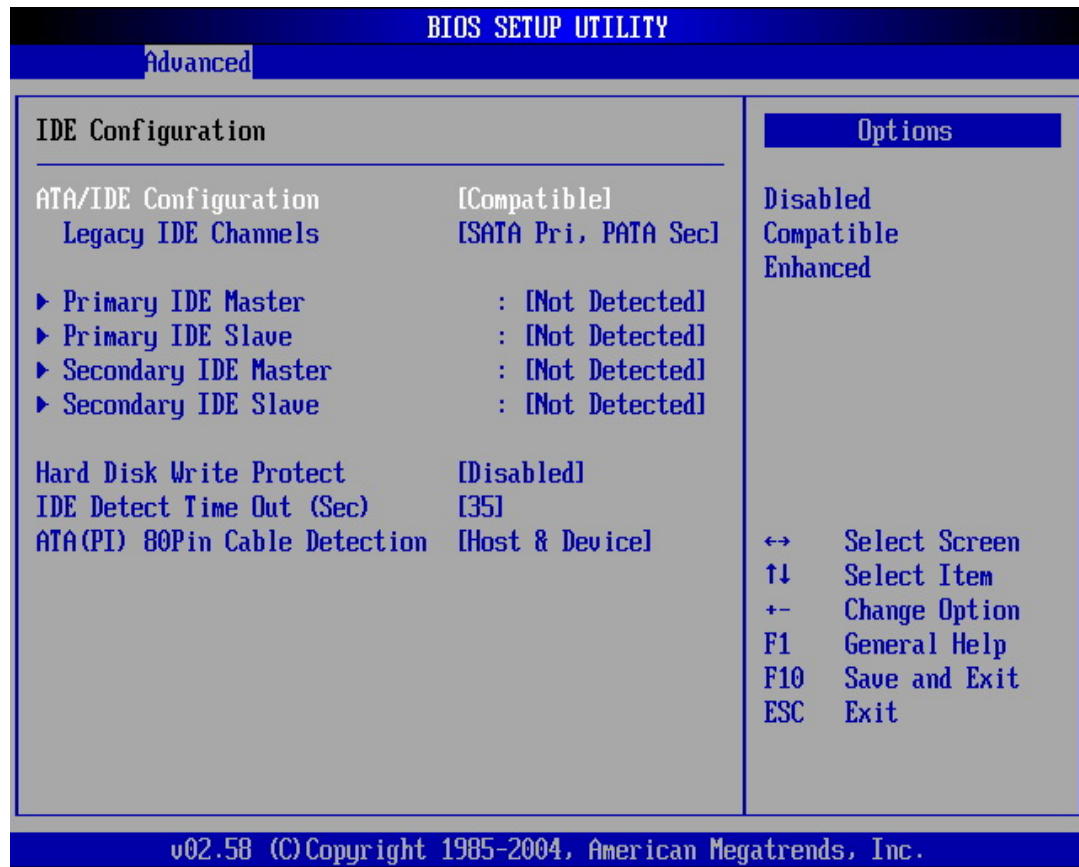
### □ CPU Configuration

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.



**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:** SATA Only, SATA Pri, PATA\_Sec, and PATA Only

**Default setting:** SATA Pri, PATA\_Sec

■ ***Configure SATA as***

This field is when set to PATA Only mode; you can select the RAID.

**Available Options:** RAID, and Disabled

**Default setting:** Disabled

**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 enable 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.)**

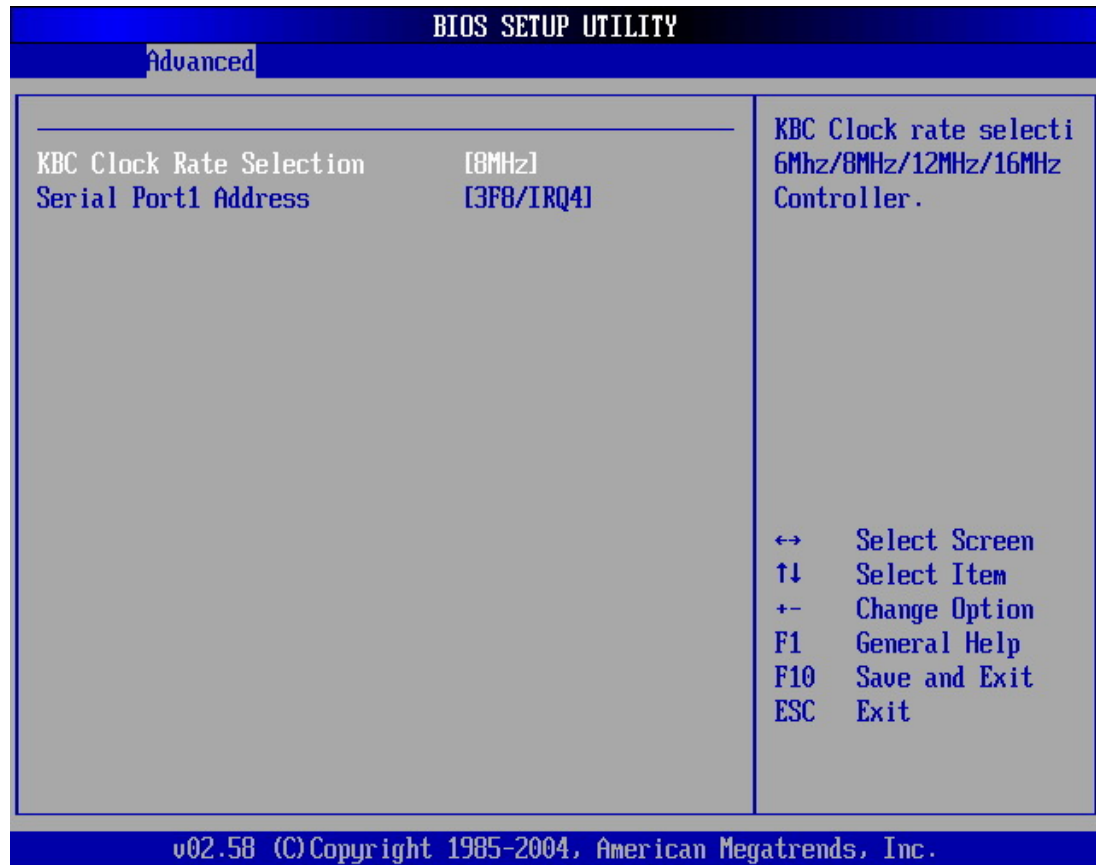
Set this option to stop the AMIBIOS from searching for IDE devices within the specified number of seconds. Basically, this allows you to fine-tune the settings to allow for faster boot times. Adjust this setting until a suitable timing that can detect all IDE disk drives attached is found.

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

**Default setting:** 35

**SuperIO Configuration**

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



### 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

### 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

### Hardware Health Configuration

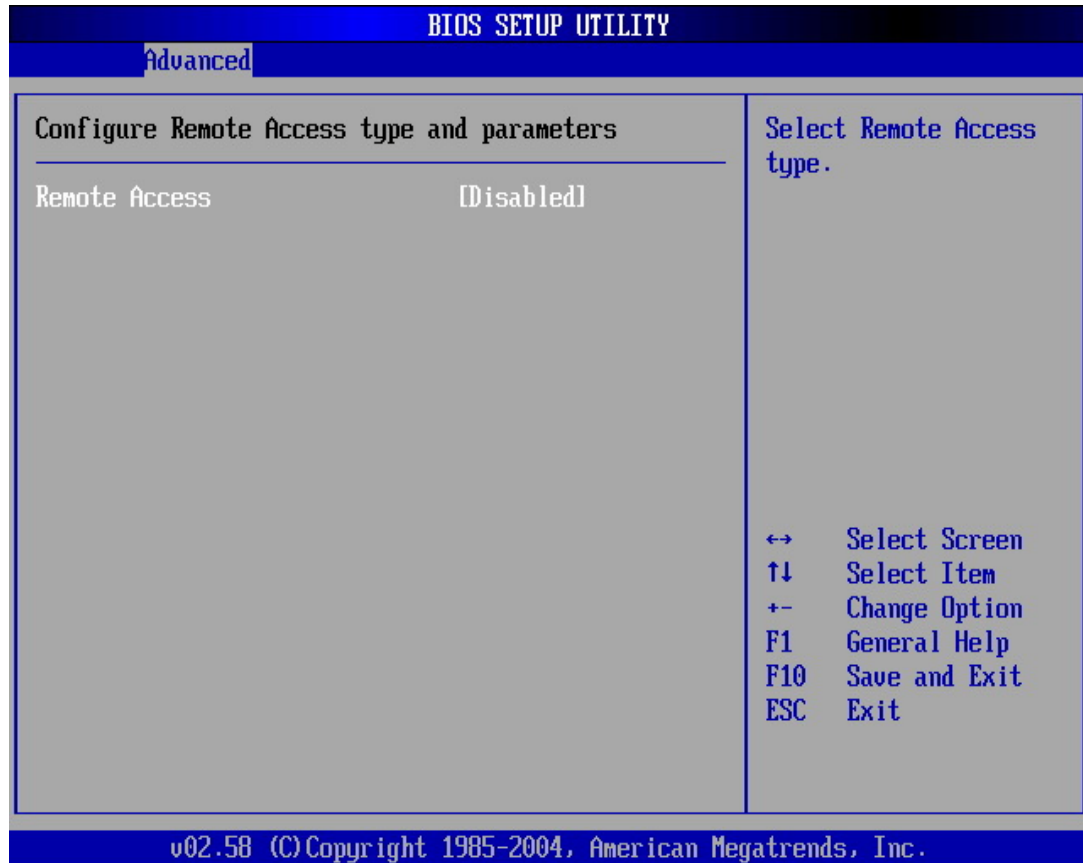
On the Hardware Monitor Setup screen, you can monitor the system temperature, CPU voltage, and VBAT voltage...

BIOS SETUP UTILITY	
Advanced	
<b>Hardware Health Configuration</b>	
H/W Health Function	[Enabled]
<b>Hardware Health Event Monitoring</b>	
SYSTEM 1 Temperature	:48°C/118°F
SYSTEM 2 Temperature	:46°C/114°F
CPU Temperature	:53°C/127°F
CPU CORE	:0.983 V
GMCH CORE	:1.064 V
VCC3.3	:3.306 V
VCC	:5.053 V
VCC1.5	:1.564 V
VCC1.8	:1.822 V
VBAT	:3.290 V
↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
v02.58 (C) Copyright 1985-2004, American Megatrends, Inc.	



□ **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 FX5624.



**Remote Access**

This field is select remote access type.

**Available Options:** Enabled and Disabled

**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:** Disabled, and Enabled

**Default setting:** Enabled

#### **Sredir Memory Display Delay**

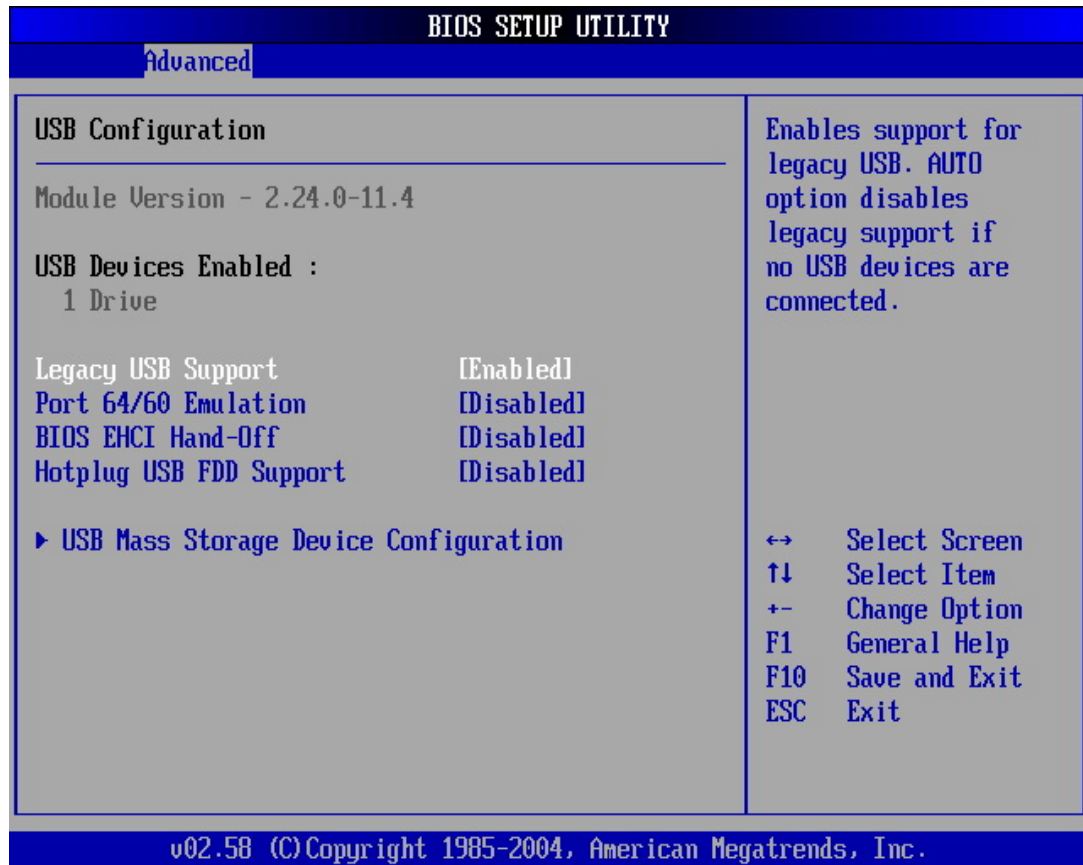
This field is gives the delay in seconds to display memory information.

**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 Disabled the Legacy USB Support.

**Available Options:** Disabled, Enabled

**Default setting:** Enabled

**Port 64/60 Emulation**

This field is for complete USB keyboard legacy support for non-USB aware OSes.

**Available Options:** Disabled, Enabled

**Default setting:** Disabled

### **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:** 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:** Disabled

### **Hotplug USB FDD Support**

This field is a dummy FDD device is created that will be associated with the hot plugged FDD latter Auto Option creates this dummy device only if there is no USB FDD present.

**Available Options:** Auto, Enabled and Disabled

**Default setting:** Disabled

### **USB Mass Storage Device Configuration**

This field is when using USB devices on FX5624 its mass USB devices, you can Enabled this item, and set the *USB Mass Storage Reset Delay*.

**Available Options:** Disabled, Enabled

**Default setting:** Disabled

#### ■ ***USB Mass Storage Reset Delay***

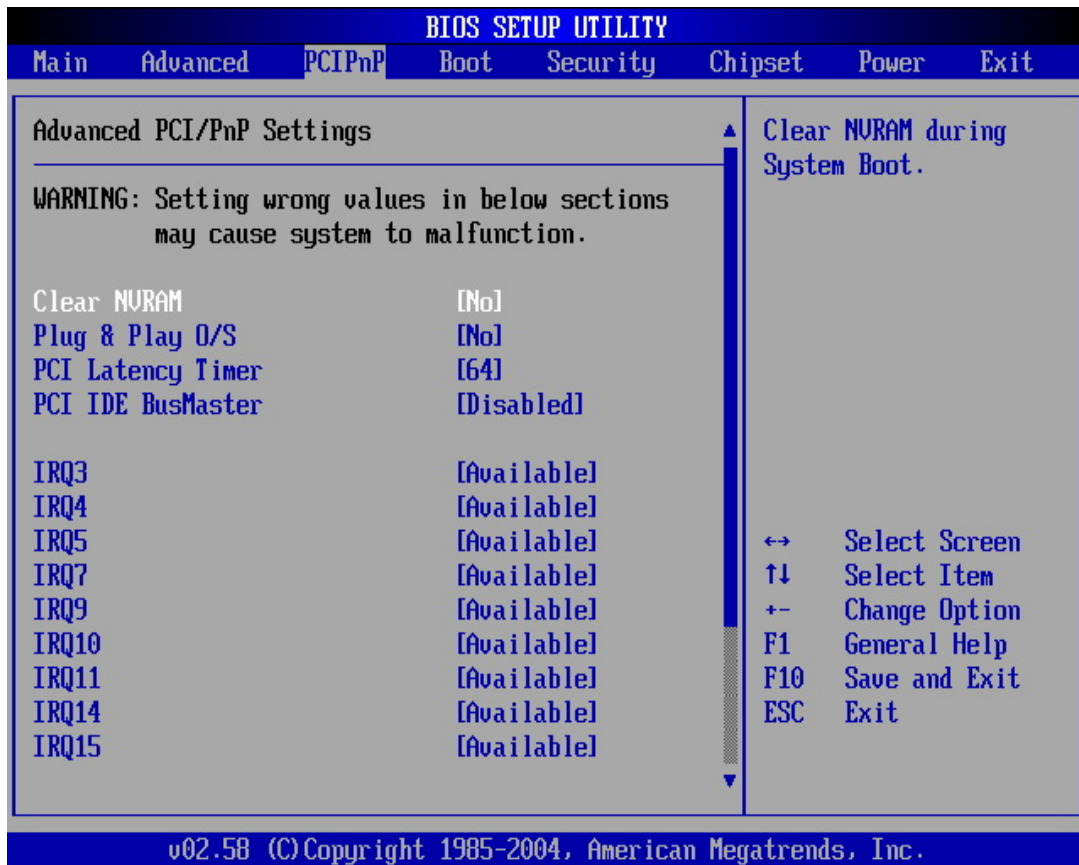
This field is when you plug USB devices the POST waits for the USB mass storage device after start unit command.

**Available Options:** 10 Sec, 20 Sec, 30 Sec, and 40 Sec

**Default setting:** 20 Sec

## 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:

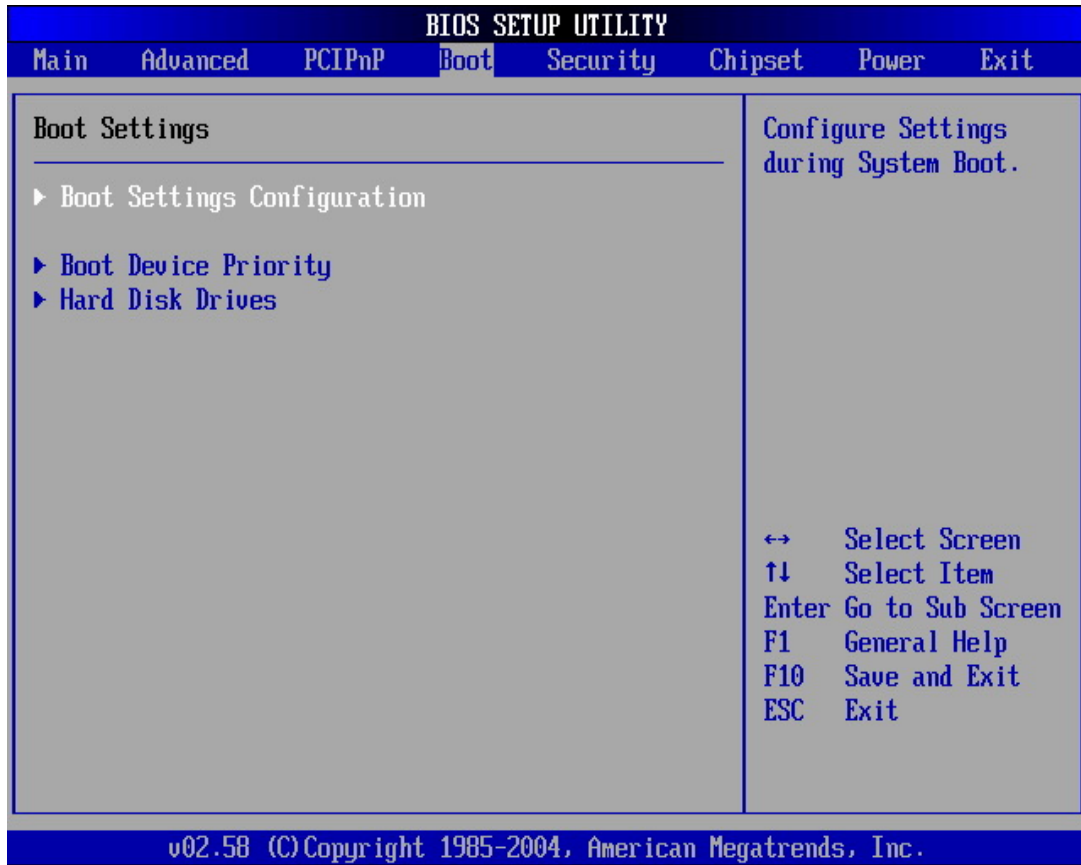
ISA/EISA devices comply with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ5 for COM1).

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

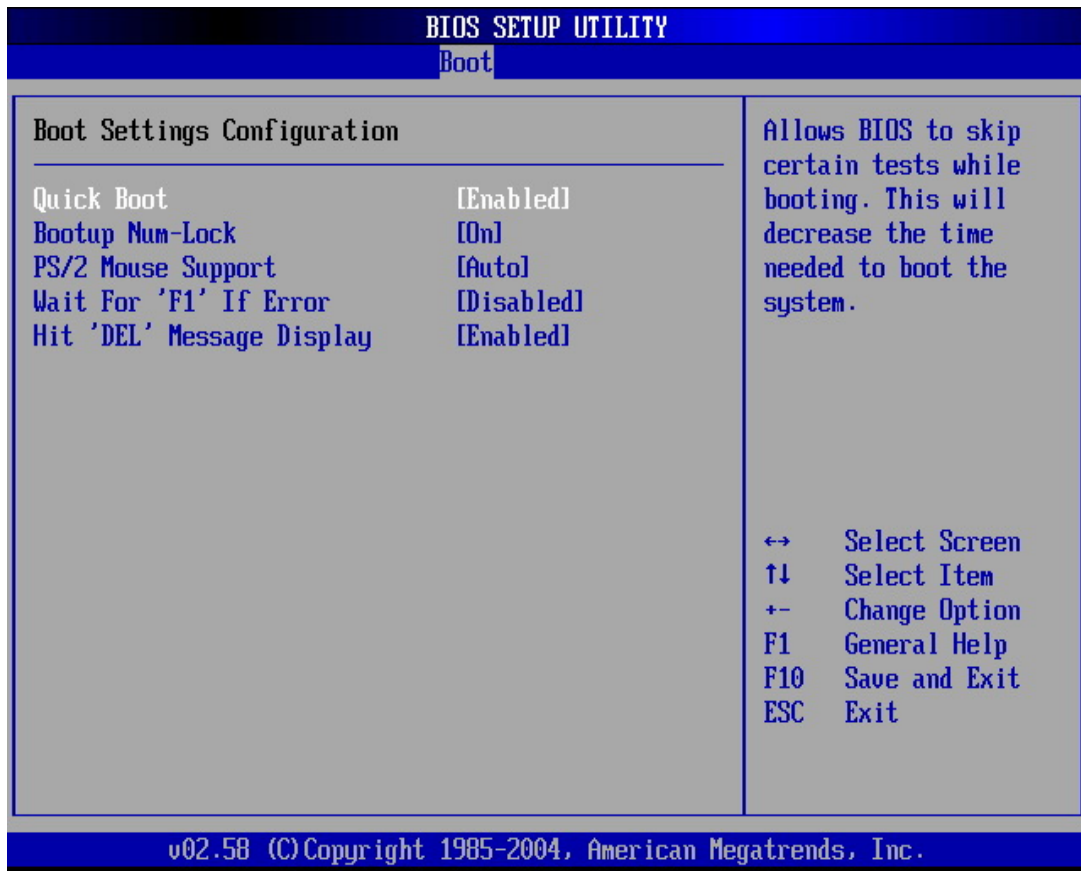
## Boot Setup

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

### 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

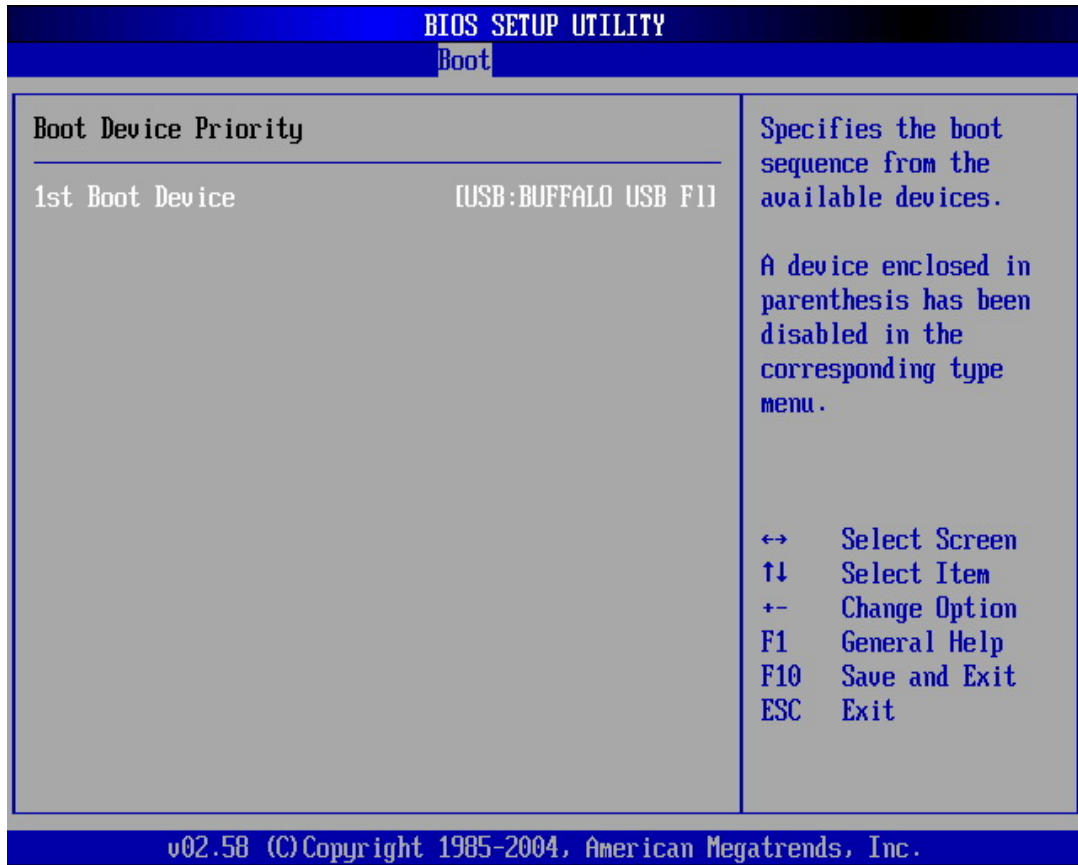
It will prevent the message from appearing on the first BIOS screen when the computer boots.

**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>.



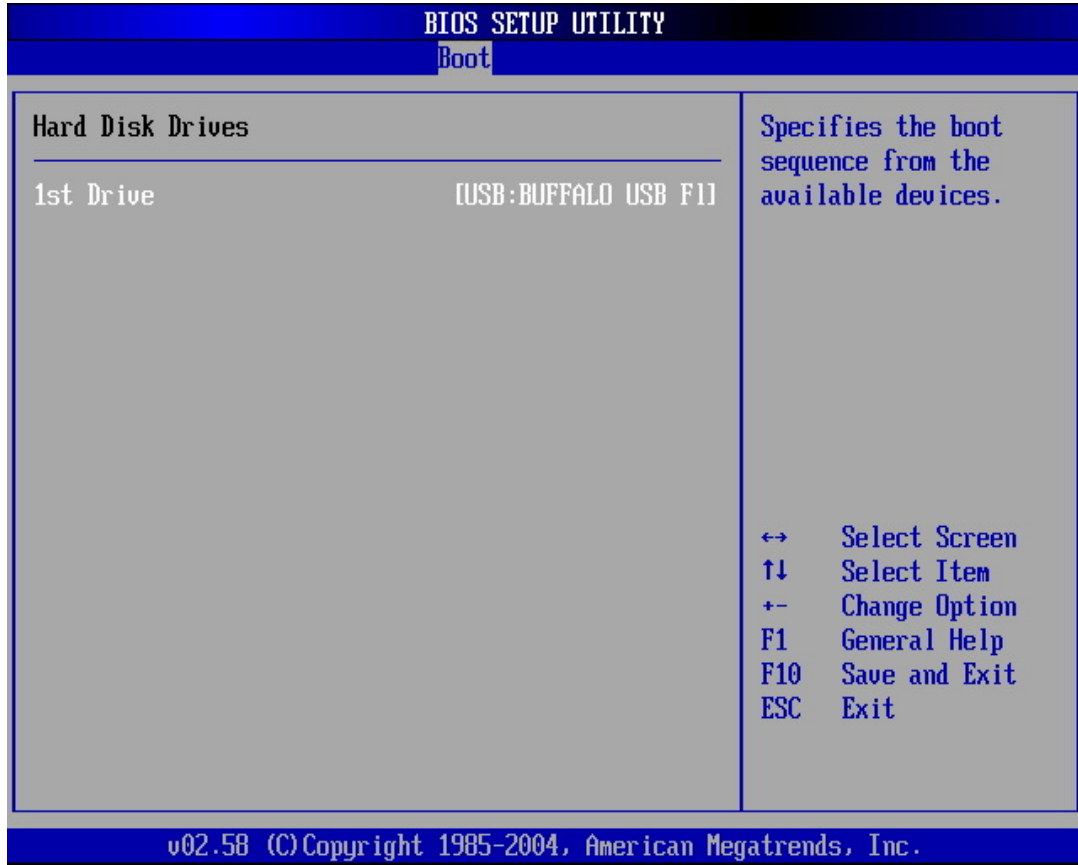
**First /Second /Third Hard Disk Boot Device**

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>.



## 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 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.

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:

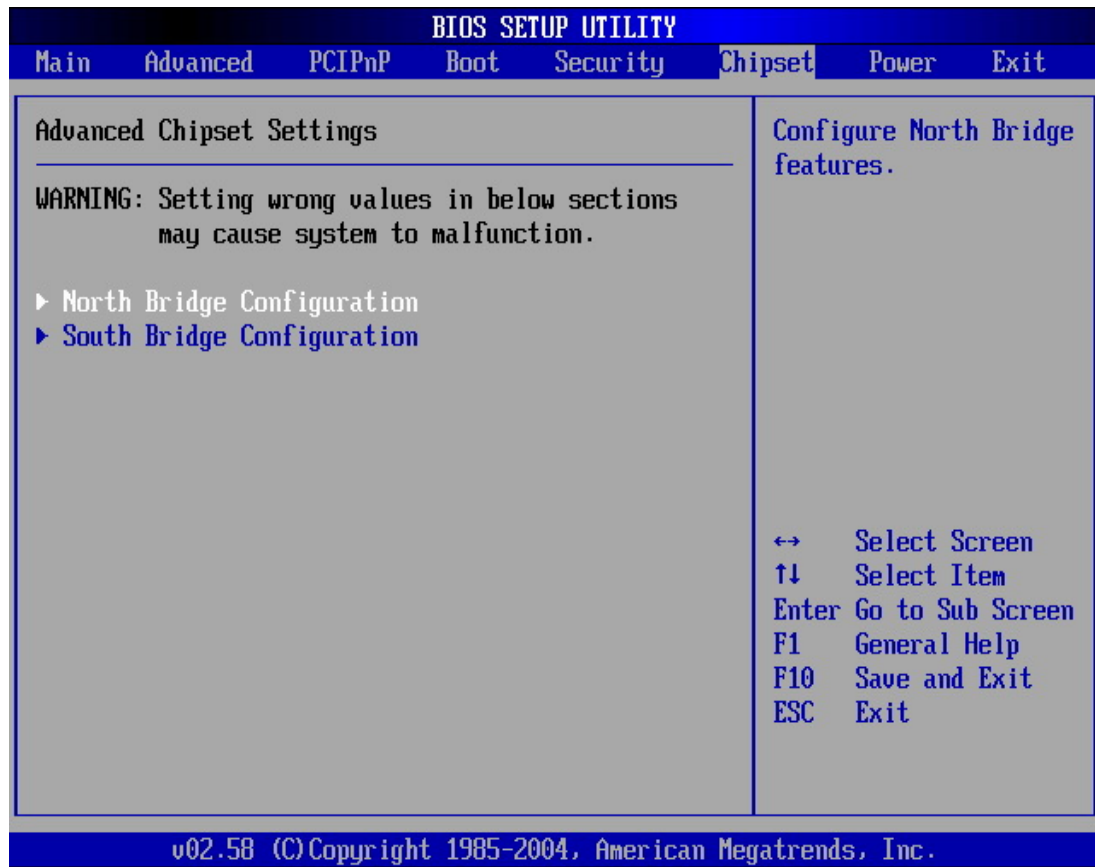
Format!!!

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

## Configuration DRAM Timing by SPD

### ■ *DRAM Timing*

If the installed SDRAM supports SPD function, select Enabled. If not, you can select based on other access time of the SDRAM.

**Available Options:** Enabled and Disabled

**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, Enabled 1MB, and Enabled 8MB

**Default setting:** Enabled 8MB

### □ **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.

#### **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, Enabled

**Default setting:** Enabled

#### **USB 2.0 Controller**

This field is select Enabled or Disabled the USB 2.0 controllers

**Available Options:** Disabled, Enabled

**Default setting:** Enabled

#### **On Board LAN1~LAN4 (GLAN1~GLAN2) Controller**

This field specifies the Enabled or Disabled of the onboard LAN1~LAN4 (GLAN1~GLAN2) chip.

**Available Options:** Disabled, Enabled

**Default setting:** Enabled

**LAN Boot ROM1/ROM2 Controller**

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

**Available Options:** Disabled, Enabled

**Default setting:** Disabled

□ **Power Manager**



**Power Management/APM**

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

**Available Options:** Disabled, and Enabled

**Default setting:** Enabled





## Chapter 4 Software Installation

The enclosed diskette includes FX5624 VGA, System and LAN driver. To install and configure you FX5624 system, you need to perform the following steps.

### System Driver

#### WIN 2000/XP Driver

Installs 915GME or 910GMLE Chipset, IRQ Routing, USB, AGP Driver and ISA IDE Bus Master Drive.

- Step 1: To install the 915GME driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>915GME>2KXP.
- Step 2: Execute 915GME.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 for WIN2000/XP

Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>915GME>2KXP.

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>.

## LAN Driver (RTL8100C & RTL-8111C)

- 1 To install the LAN driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN> RTL8139C and DRIVER>LAN>RTL8111C.
- 2 Execute Setup.exe.

**Note:** In the LAN>RTL8139C and LAN>RTL8111C README directory, a HELPME.EXE/ SETUP.HTML is included to provide installation information.

## 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.

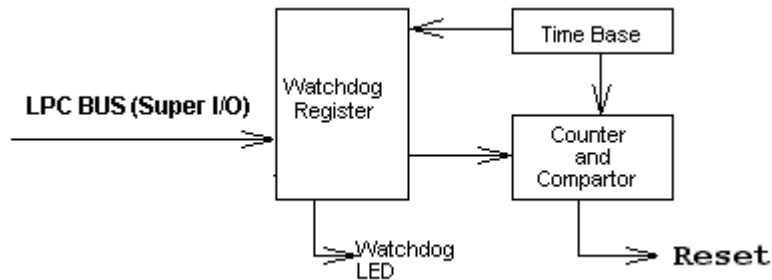
Step 2: And then refer to the chapter "BIOS Setup", as the steps to modify BIOS.

Step 3: Now the System 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 FX5624 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 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 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 Enable

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 Disable

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
```



## LAN By-pass Programming

The FX5624 can define the normal or by-pass function of LAN3 & LAN4. When I/O Port 2Eh/2Fh, device 8, index F1 Bit 0 is set to 1 is normal mode, the LAN3 & LAN4 is active. When I/O port 2Eh/2Fh, device 8, index F1 Bit 0 set to 0 is by-pass mode, the LAN3 & LAN4 is not active. The following describes the programming procedure:

To enable the By-Pass, simply write a 00H to the By-Pass 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 registers CRF1 Bit 0(Normal/Bypass)  
-----  
Mov     al,07h  
Out     dx,al  
Mov     dx,2fh  
Mov     al,08h      ; Select Logical Device 8 of Bypass  
Out     dx,al  
Mov     dx,2eh  
Mov     al,0f1h     ;Set CRF1 unit  
Out     dx,al  
Mov     dx,2fh  
Mov     al,00h      ;Set bit 0 to 0 the LAN By-Pass mode of LAN3 and LAN4,  
Out     dx,al      ;If Set bit 0 to 1 the LAN Normal mode of LAN3 and LAN4 .  
-----  
; Exit extended function mode  
-----  
Mov     dx,2eh      ;Exit the extended function mode  
Mov     al,0aah  
Out     dx,al
```

## Status LED Programming

The FX5624 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 States 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 ~ 50°C

Relative humidity 5 % to 95 % non-condensing

DC-AC adapter

Input AC Voltage Range: 100V~240V/1.5A, 50Hz ~60Hz

Output DC Voltage: 19V/3.42A Maximal

Surface Temperature of Chassis :

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

### Real-Time Clock and Non-Volatile RAM

The FX5624 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

Address	Description
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown status byte
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	Equipment Bits 7-6 Number of Floppy Drives 00 1 Drive 01 2 Drives Bits 5-4 Monitor Type 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bits 3 Display Enabled 0 Disabled 1 Enabled Bit 2 Keyboard Enabled 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bit 1 Math Coprocessor Installed 0 Absent 1 Present Bit 0 Floppy Drive Installed 0 Disabled 1 Enabled
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 - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 071h	Real Time Clock
076h	Watchdog
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

### 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	Reserved
IRQ4	Serial Port #1
IRQ5	LAN#4/USB
IRQ6	Reserved
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	LAN#3/Audio
IRQ10	LAN#1/LAN#5
IRQ11	LAN#2/LAN#6
IRQ12	PS2 Mouse
IRQ13	FPU
IRQ14	Primary IDE
IRQ15	Secondary IDE

### DMA Channel Map

The equivalent of two 8237A DMA controllers is implemented in the FX5624 board. Each controller is a four-channel DMA device that will generate the memory addresses and control signals necessary to transfer information directly between a peripheral device and memory. This allows high speed information transfer with less CPU intervention. The two DMA controllers are internally cascaded to provide four DMA channels for transfers to 8-bit peripherals (DMA1) and three channels for transfers to 16-bit peripherals (DMA2). DMA2 channel 0 provides the cascade interconnection between the two DMA devices, thereby maintaining IBM PC/AT compatibility.

The following is the system information of DMA channels:

DMA Controller 1	DMA Controller 2
Channel 0: Spare	Channel 4: Cascade for controller 1
Channel 1: Reserved for IBM SDLC	Channel 5: Spare
Channel 2: Diskette adapter	Channel 6: Spare
Channel 3: Spare	Channel 7: Spare

## 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)**

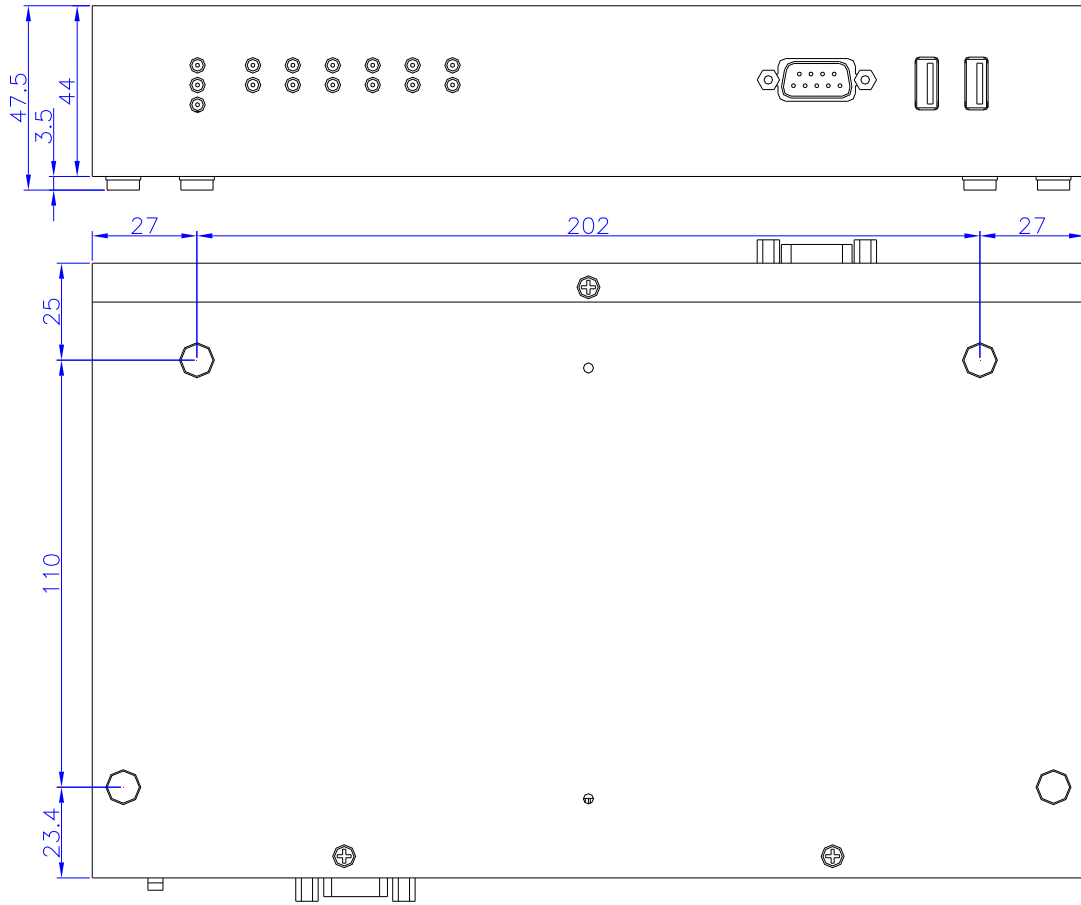
	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

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

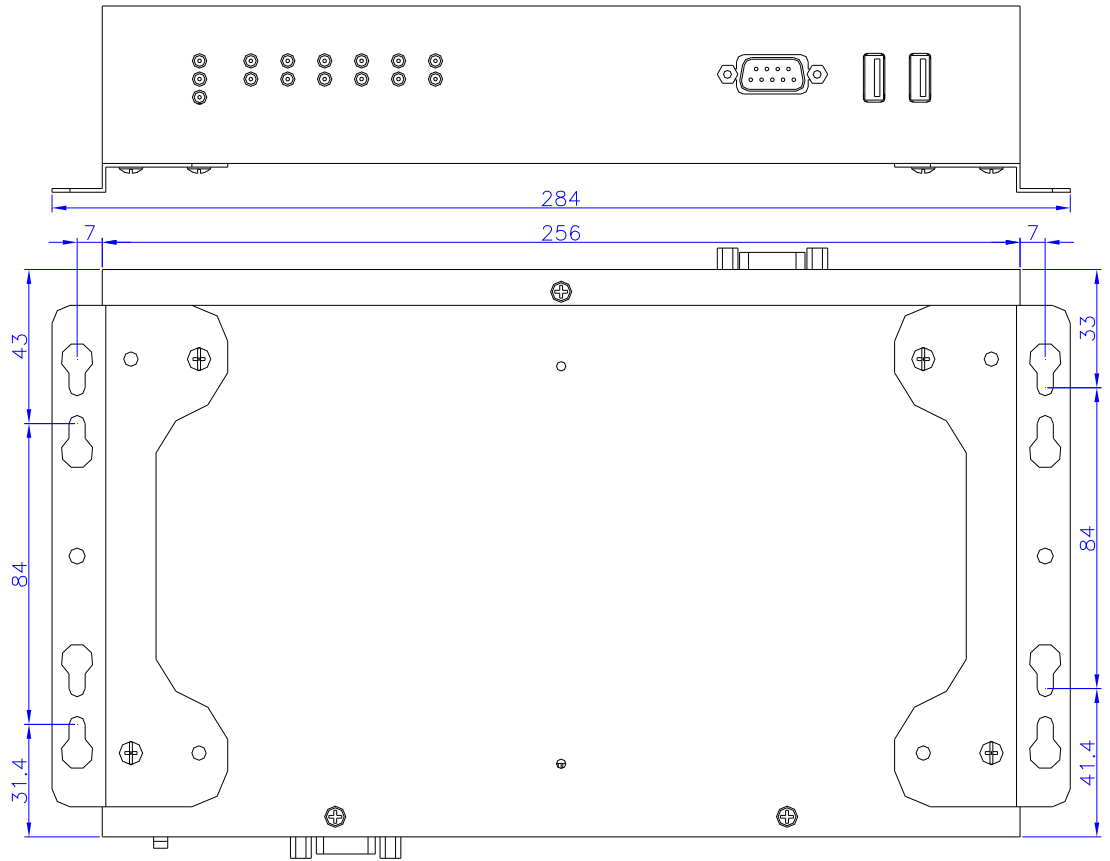


## Dimension

### a. FX5624



**b. FX5501K1**



c. FX5504K1 universal fixers

