

FabiaTech Corporation

IPC Solution

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

Email: support@fabiatech.com

Small Cube System
Fanless Series
FX5202 User' Manual

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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 FX5202 System

Overview

The FX5202 is a 1U embedded system with AMD Geode™ LX-800 processor board inside. This user's manual provides information on the physical features, installation, and BIOS setup of the FX5202.

Built to unleash the total potential of the AMD Geode™ Processor, Able to support 500 MHz CPU, this system support 10/100M interface network port, audio, 1 So-DIMM socket with 256MB DDR RAM, Two USB2.0 ports, and a VGA controller.

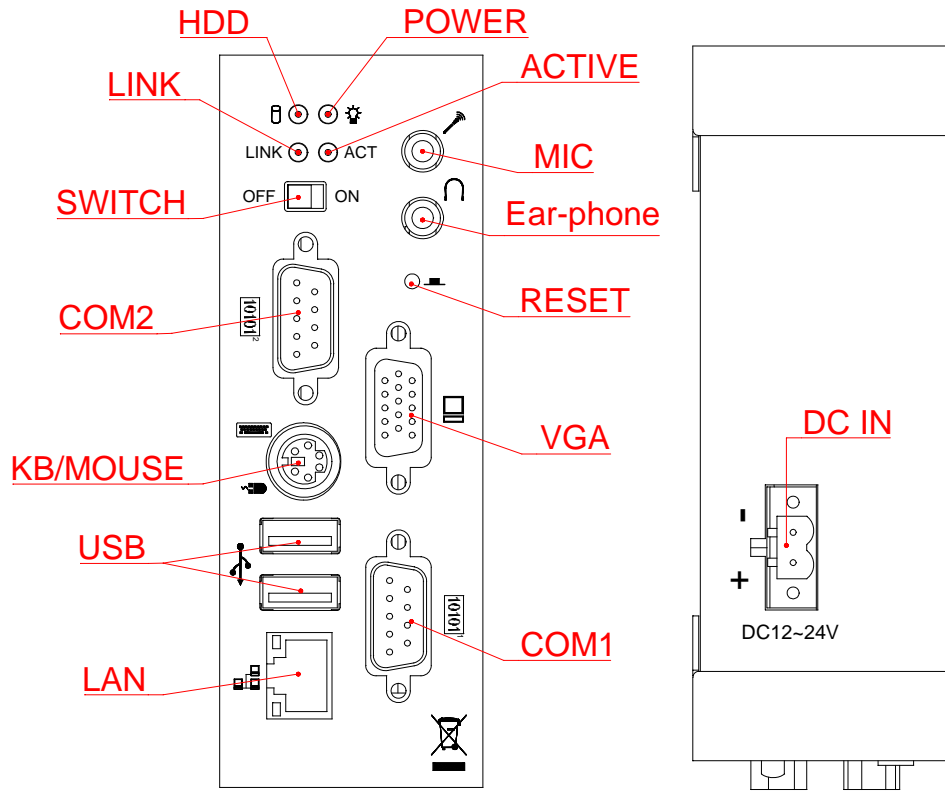
Each FX5202 has two ports for I/O communications. Two RS-232C ports are available.

The FX5202 is perfect for Internet Router, VPN Gateway, firewall, Mail Server, WBT, and small Embedded Control. The unit is only 120.0mm(D) x 44.2mm(W) x 123.0mm(H), offering unparalleled performance in a very small footprint.

Series Comparison Table

Model	FX5202
Processor	AMD Geode™ LX800 (500MHz)
Chipset	AMD Geode™ CS5536
1 200 Pin-DIMM (Max.)	256MB/1GB
CRT VGA	Yes
Watchdog Timer	Yes
Multi I/O	Two RS232C
Enhanced IDE	One
CF (Compact Flash Socket)	One
USB2.0	Two
Audio	MIC-In/Out
RJ45 Ethernet (10/100M Base-TX)	One
Dimensions (Unit: mm)	120.0 (D) x 44.2 (W) x123.0 (H)

Layout



Specifications

❑ ***Processor Board –***

AMD Geode™ LX800 (500MHz) CPU with 256MB DDR RAM.

❑ ***I/O Outlets –***

One 10/ 100M Ethernet with RJ-45 ports.

Two RS-232 serial ports and two USB ports (V2.0).

One CRT and one PS/2 compatible keyboard and mouse interfaces.

Audio function supports MIC-In, Line -Out connector.

One Terminal block for DC power Input with power switch.

One power LED and hard disk/ Compact Flash access LED, and two LED's with access and link for LAN.

One push button reset switch

❑ ***Storage Bay-***

One Compact Flash slot for Compare Flash Module or Micro Drivers

One 2.5" hard disk space with HDD clamp holder.

❑ ***Power requirement –***

+12 ~ +24V DC with 15% tolerance, 11VA maximum with 2.5" HDD and 24V input voltage.

❑ ***Dimensions (1U height)-***

120.0mm(D) x 44.2mm(W) x 123.0mm(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 FX5202 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 FX5202 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5202 system.

Note: after you install the FX5202, 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 FX5202 package. Some accessories are optional items that are only shipped upon order.

- One FX5202 embedded system.
- One 44-pin flat cable and 4 screws for fixing and connecting a 2.5" HDD driver.
- One Y-type (3-terminal) PS/2 keyboard plus mouse port adapter cable.
- One 2-pin apartable terminal block.
- One DIN Rail mounting kit with 3 screws.
- 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.

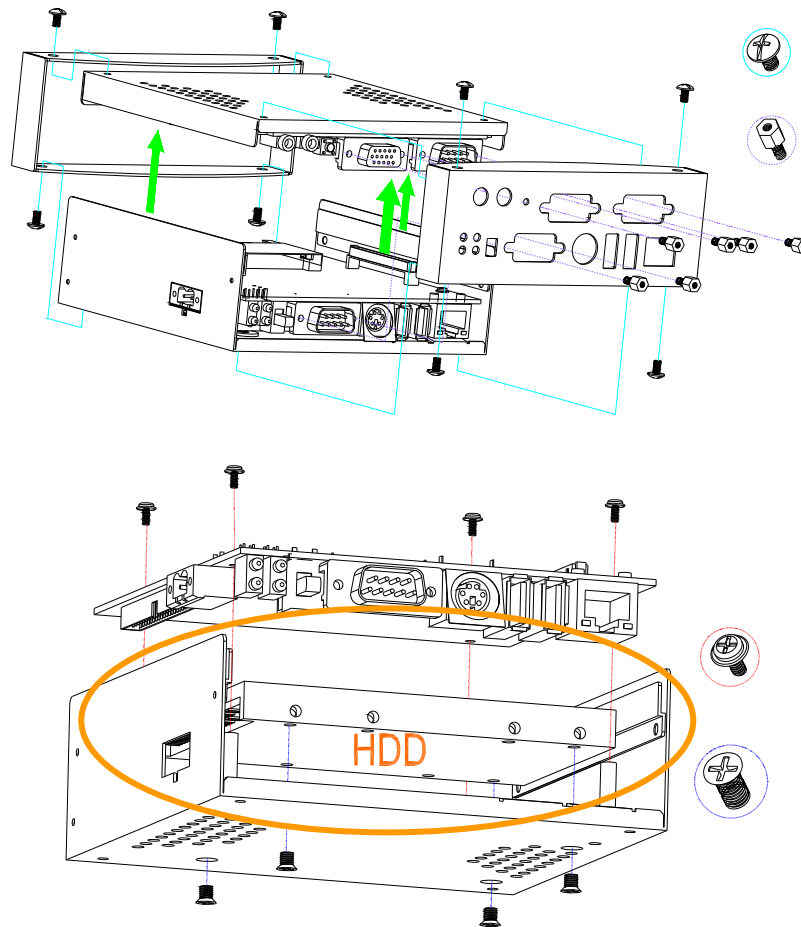
Before Installation

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 HDD or Compact Flash**

If you are installing hardware option, you can remove the rear panel and bottom cover. The following figure will guide you how to install 2.5" HDD inside the FX5202 and how to install the FX5202 fixers.

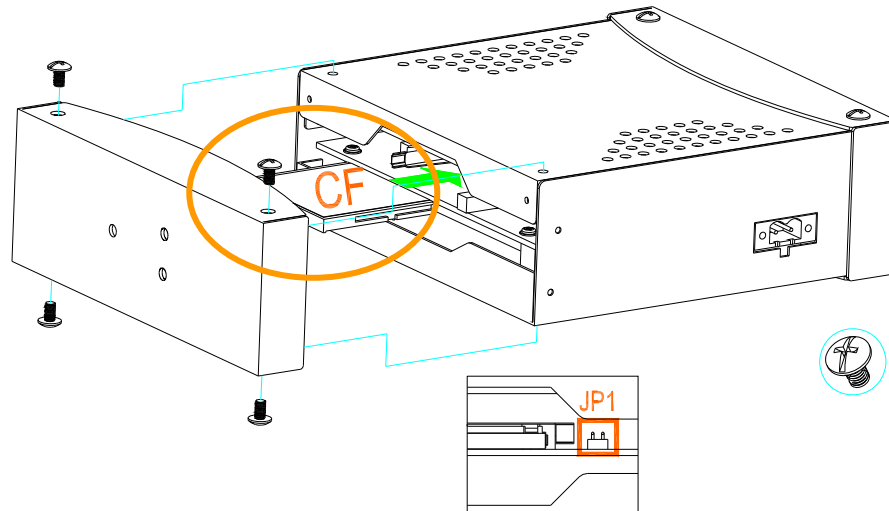


Note: Use caution when handling the hard disk to prevent damage to IDE connector as you insert hard disk.

Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your hard disk. CN3 is used to connect a 2.5" HDD with included 44-pin flat-cable.

◆ Installing Compact Flash

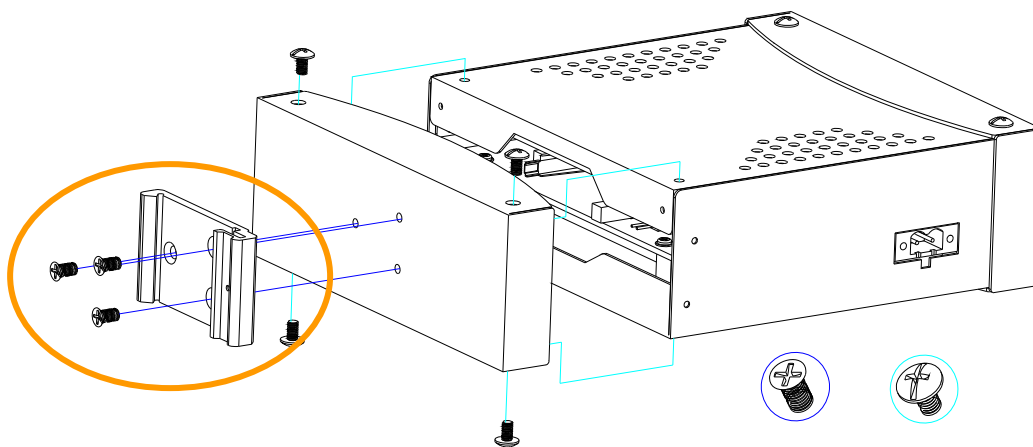
If you are installing Compact Flash modules you need to remove a front side cover. (Please see the spots circled.)



Note: The Compact Flash socket supports 3.3V Compact Flash and Micro Drives. The JP1 is used to select master/slave device of this socket and default is slave (close). Be sure to avoid the same master/slave setting with which connects to IDE connector, if you use CF and IDE hard disk simultaneous.

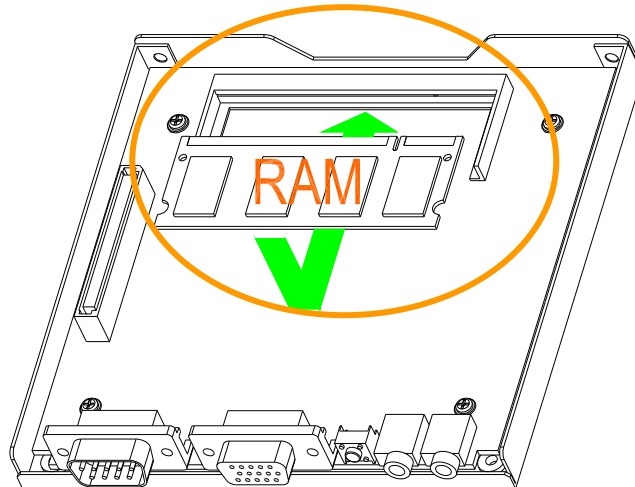
□ Installing the DIN Rail Adapter on FX5202

Please refer to the left side figure for installing the FX5202 with DIN Rail adapter.



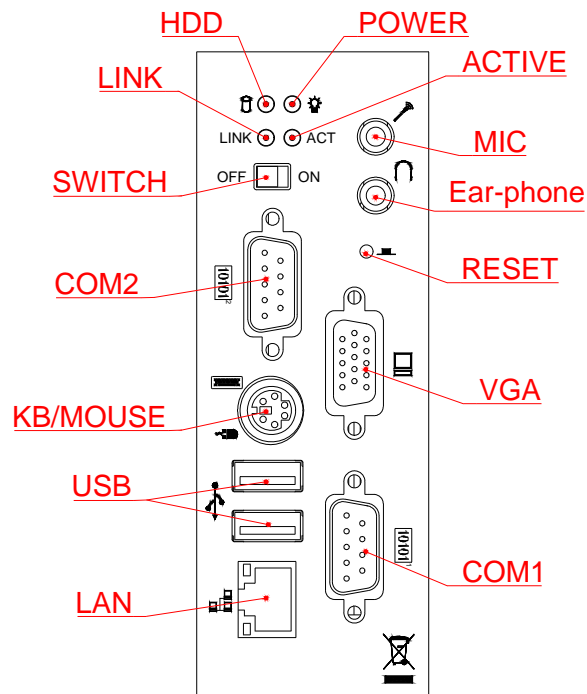
□ **Installing Memory: SO-DIMM Socket for DDR Modules**

You may extend additional memory to FX5202 by removing the bottom cover, See as following figure and rear pictures. The SO-DIMM socket supports 128MB to 1GB of DDR RAM modules.

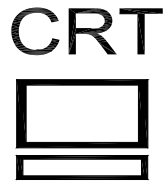
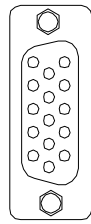


□ **Connecting the Monitor, Keyboard, Mouse**

To connector the peripheral control devices and monitor to the FX5202, refer to the following procedure.

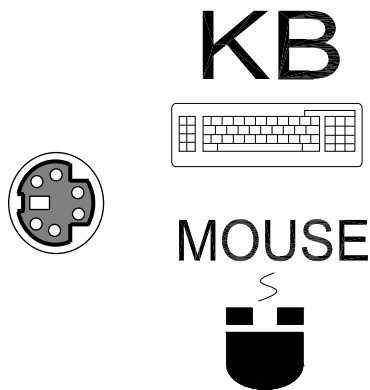


1. A VGA connector is provided for CRT display



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

2. 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.



Pin	Description
1	Mouse Data
2	Keyboard Data
3	Ground
4	VCC
5	Mouse Clock
6	Keyboard Clock

□ **Connecting the COM ports**

The DB9 (COM1/2) is standard serials port connector. The following tables show the signal connections of these connectors.



DB-9	RS-232 Signal
1	-DCD2
6	-DSR2
2	RXD2
7	-RTS2
3	-TXD2
8	-CTS2
4	-DTR2
9	-RI2
5	Ground
Case	Case Ground

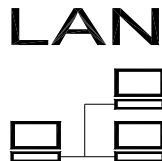
□ **Connecting the LAN ports and USB Ports**

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

RJ45 connector



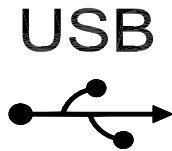
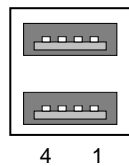
(Front View)



The following lists the pin assignment of RJ45

LAN	Signal	LAN	Signal
1	TPTX+	5	FBG1
2	TPTX -	6	TPRX -
3	TPRX+	7	FBG2
4	FBG1	8	FBG2

The FX5202 supports a two port USB connector. Any USB device can be attached to USB ports with plug-and-play supported.



The following lists the pin assignment of USB port

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

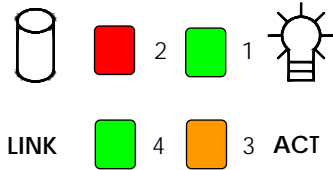
□ **System Reset button**

The FX5202 has a push button switcher for system reset; Push and release the button will cause hardware reset of FX5202 and restart system booting.



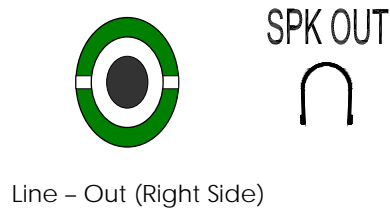
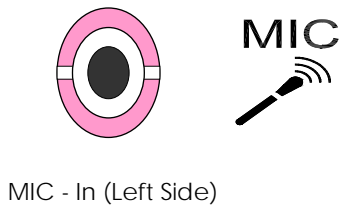
□ **LED Indicators**

The Power and HDD LED's has two distinctive statuses: Off for inactive operation and blinking light for activity. And the 2 LED's for LAN ports. The up side LED's (Green) indicate on-line, and down side LED (Orange) access status of LAN.



- LED1: POWER LED (Green)
- LED2: HDD LED (Red)
- LED3: LAN Access LED (Orange)
- LED4: LAN LINK LED (Green)

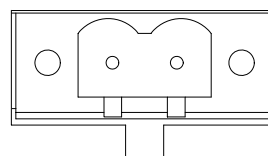
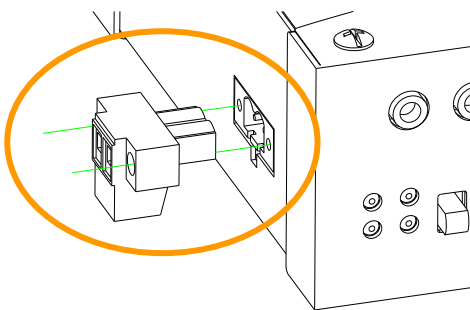
□ **Connecting the Audio Microphone In/ Line Out**



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

Power is supplied through an external power DC In. See following figure and a side pictures.

- DC Power Connector: Use external 2-pin apartable terminal block.

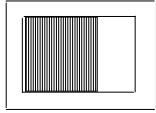


- +
DC12~24V

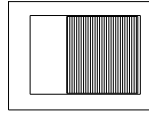
DC +12~+24V, 15% tolerance

20VA minimum

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



Off: Power Off



On: Power On

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.

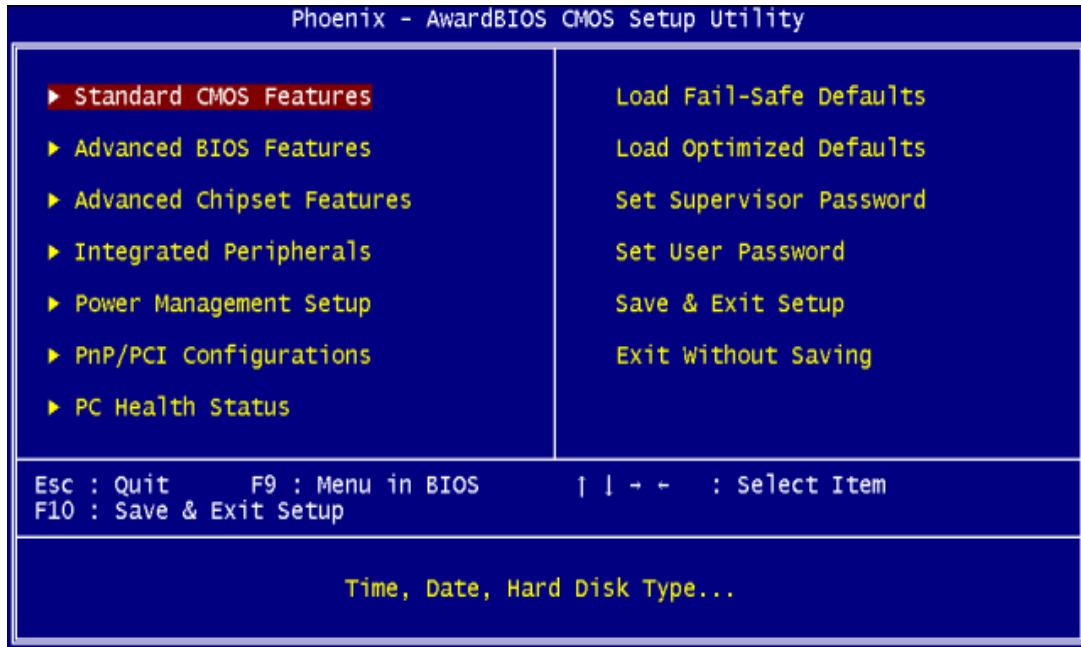
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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. Standard CMOS Features
2. Advanced BIOS Features
3. Advanced Chipset Features
4. Integrated Peripherals
5. Power Management Setup
6. PnP/PCI Configuration
7. PC Health States
8. Frequency/Voltage Control
9. Set Supervisor Password
10. Set User Password
11. 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.
12. Load Fail-Safe Default: to configure the system in fail-safe mode with predefined values.
13. Save Settings and Exit: perform this function when you change the setting and exit the BIOS Setup program.
14. Exit without saving: perform this function when you want to exit the program and do not save the change.

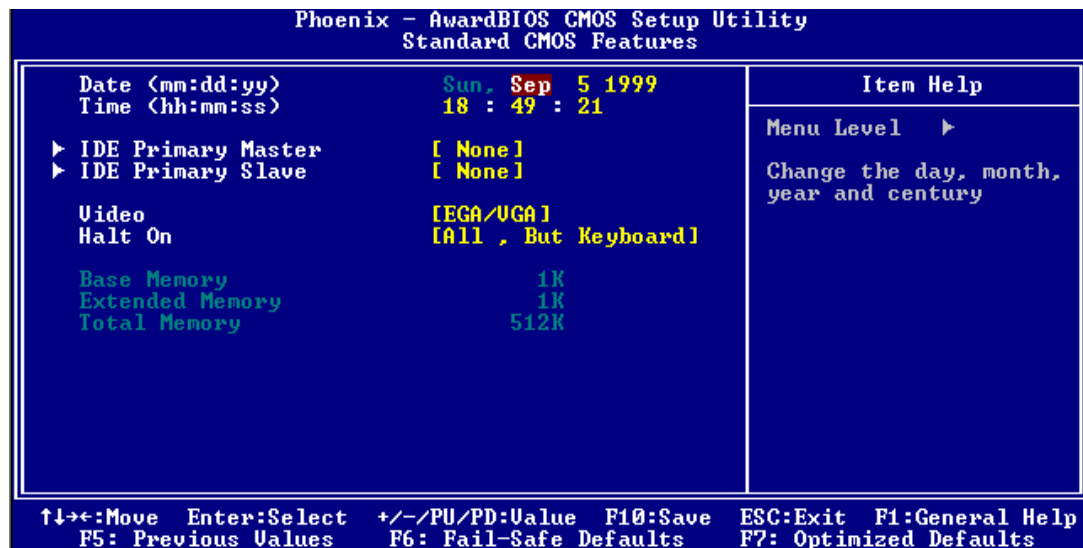
➤ **Keyboard Convention**

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
F10	Save and exit
F1	General Help
F2	Item Help
F5	Previous Values
F6	Fail-Safe Defaults
F7	Optimized Defaults
F9	Menu in BIOS
UP/Down Arrow Keys	To go upward or downward to the desired item

Standard CMOS Setup

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



➤ 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.

➤ Hard Disk Setup

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.

➤ **Video**

This option selects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in Setup.

You have two ways to boot up the system:

When VGA set as primary and monochrome set as secondary, the selection of the video type is "VGA Mode".

When monochrome set as primary and VGA set as secondary, the selection of the video type is "Monochrome Mode".

➤ **Halt On**

This option determines whether the computer will stop if an error is detected during power up.

No errors	The system boot will not be stopped for any error that may be detected.
All errors	Whenever the BIOS detect a non-fatal error the system will be stopped and you will be prompted.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

➤ **Memory**

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

➤ **Base Memory**

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memories installed on the motherboard, or 640K for systems with 640K or more memory installed on the motherboard.

➤ **Extended Memory**

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

➤ **Other Memory**

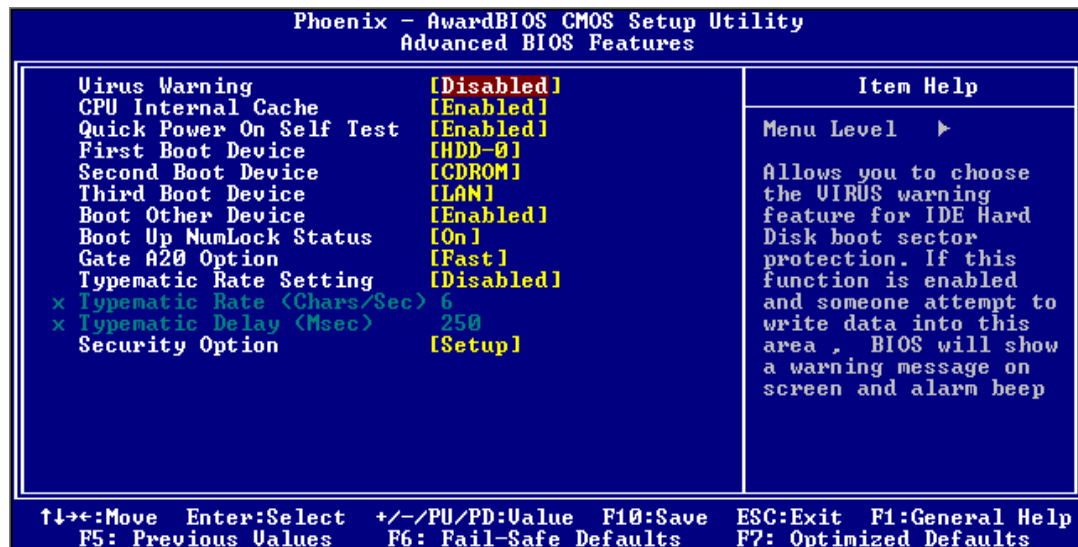
This refers to the memory located in the 640K to 1024K-address space. This is memory that can be used for different applications. DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

➤ **Total Memory**

System total memory is the sum of basic memory, extended memory, and other memory.

BIOS Features Setup

This section describes the configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries here are required by the CPU board's design to remain in their default settings.



➤ Virus Warning

This option may flash on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will appear, in the mean time, you can run an anti-virus program to locate the problem.

Available Options: Disabled, Enabled

Default setting: Disable

➤ CPU Internal Cache

This functions speeds up memory access. The CPU has an internal cache.

Available options: Disabled, Enabled

Default setting: Enabled

◆ Quick Power On Self Test

This option speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some items' checks during POST.

Available options: Disabled, Enabled

Default setting: Enable

➤ **First /Second /Third/Boot Other Device/ Boot Device**

This field specifies which device the system looks first upon power on.

Available options: LS120, Hard Disk, ZIP100, USB-ZIP, USB-CDROM, USB-HDD, LAN and Disable

Default setting: Hard Disk, CDROM, LAN

➤ **Boot Up Numlock status**

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

➤ **Gate A20 Option**

This item is chosen as <Normal>, the A20 signal is controlled by keyboard controller or chipset hardware. The selection is "Fast" Port 92 or a chipset specific method controls means the A20 signal

Available options: Normal, Fast

Default setting: Normal

➤ **Typematic rate Setting**

This function specifies the keystroke repeat rate when a key is pressed and held down.

Available options: Disable, Enable

Default setting: Disable

◆ **Typematic Rate (Chars/Sec)**

Typematic Rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

Available options: 6, 8, 10, 12, 15, 20, 24, or 30 characters per second

Default setting: 6

◆ **Typematic Delay (Msec)**

The number selected indicates the time period between two identical characters appearing on screen.

Available options: 250,500 750 and 1000

Default setting: 250

➤ **Security Option**

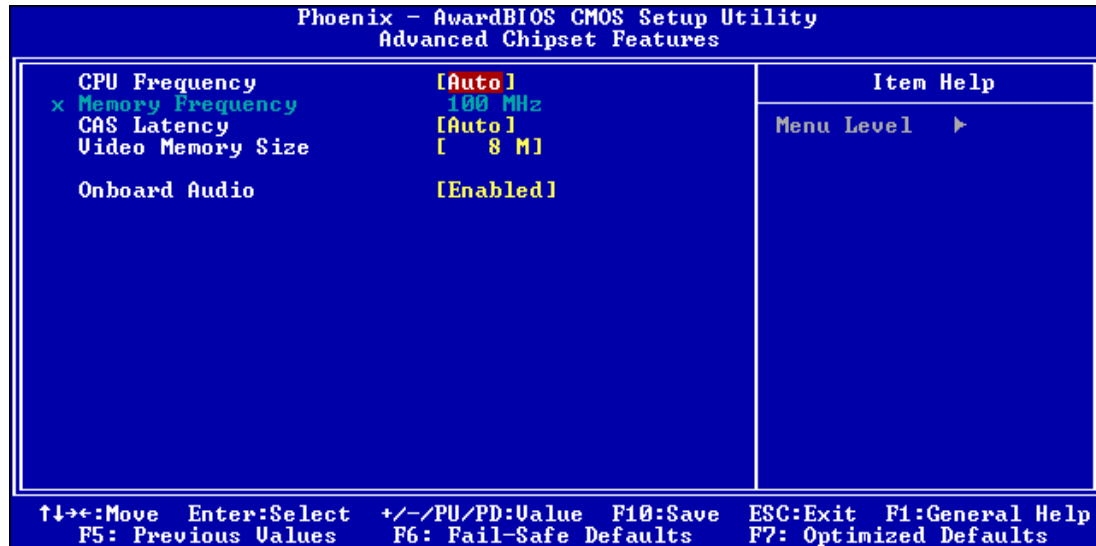
This field enables password checking every time the computer is powered on or every time the BIOS Setup is executed. If ***Always*** is chosen, a user password prompt appears every time and the BIOS Setup Program executes and the computer is turned on. If ***Setup*** is chosen, the password prompt appears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

Available options: Setup, Always

Default setting: Setup

Chipset Features Setup

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



➤ CPU Frequency

This display sent by the CPU host clock and DDR-RAM memory clock

Available Options: Auto, 200 MHz, 300 MHz, 400 MHz, and 500 MHz

Default setting: Auto

◆ Memory Frequency

This Select equates are used for determining the DDR-RAM Memory Clock frequency. SPD represents Serial Presence Detect. It is an 8-bit, 2048 bits EEPROM, built on the SDRAM for different frequencies.

Available Options: Auto, 100 MHz, 133 MHz, 166 MHz and 200 MHz

Default setting: 100MHz

➤ CAS Latency

This field specifies the latency for the DDR RAM system memory signals.

Available Options: Auto, 1.5, 2.0, 2.5, 3.0 and 3.5

Default setting: Auto

➤ **Video Memory Size**

This field specifies which VGA display memory. You can select either Video memory on the VGA. There are setting share onboard memory.

Available Options: None M, 8MB, 16MB, 32MB, 64MB,128MB and 254MB

Default setting: 8MB

➤ **Onboard Audio**

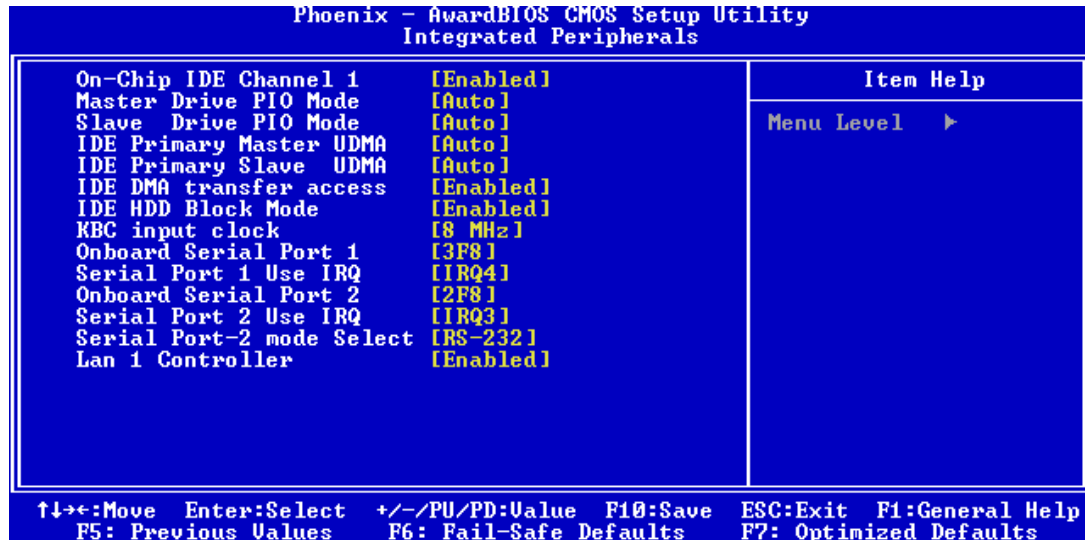
This field specifies the internal Audio Control.

Available Options: Disable, Enable

Default setting: Enable

Peripheral Setup

This section describes the function of peripheral features.



➤ OnChip Primary IDE Channel 1

This field specifies the IDE channel that can be applied when using IDE hard disk connector.

Available Options: Disabled, Enable

Default setting: Enable

➤ Master /Slave Drive PIO mode

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.

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.

➤ IDE Primary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If you hard drive and your system software both support Ultra DMA/33, select Auto to enable This option allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

➤ **IDE HDD 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).

➤ **OnBoard UART/IRQ Port 1/2**

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

Available Options: Disabled, 3F8H/IRQ4, 2F8H/IRQ3, and 3E8H/IRQ4, 2E8H/IRQ3.

Default setting: 3F8/IRQ4, 2F8H/IRQ3, and 3E8H/IRQ4, 2E8H/IRQ3.

➤ **Serial Port 2 Mode Select**

These fields item can select RS-232, RS-422 and RS-485 of select port 2.

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

Default setting: RS-232

Note: Referenced the Chapter_5 "RS485 and RS422 Hardware Setup"

➤ **LAN1 Controller**

This field specifies the Enable or Disable of the onboard LAN chip.

Available Options: Disabled, Enable

Default setting: Enable

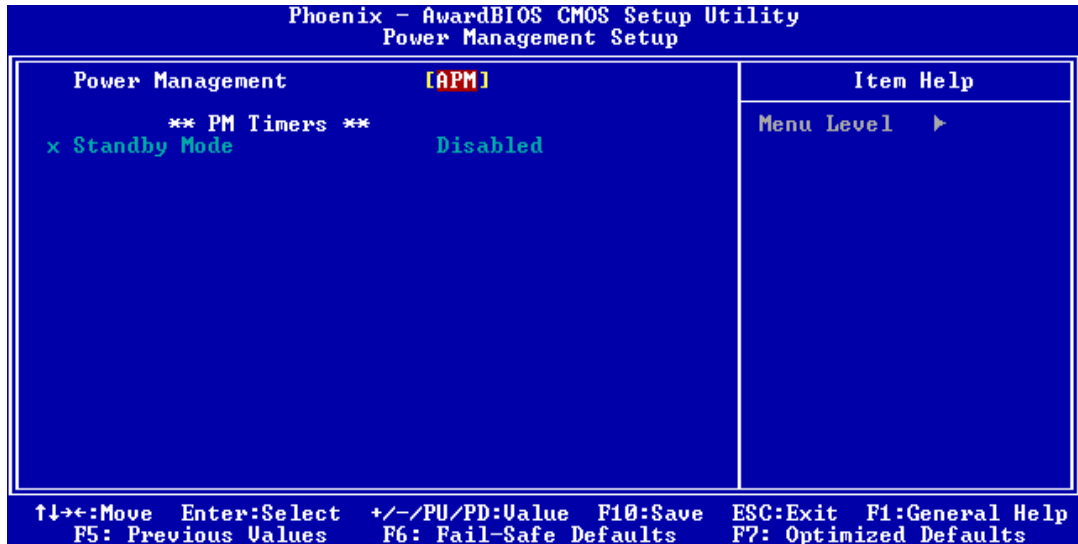
➤ **Onboard LAN Boot ROM**

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

Available Options: Disabled, Enable

Default setting: Disable

Power Management



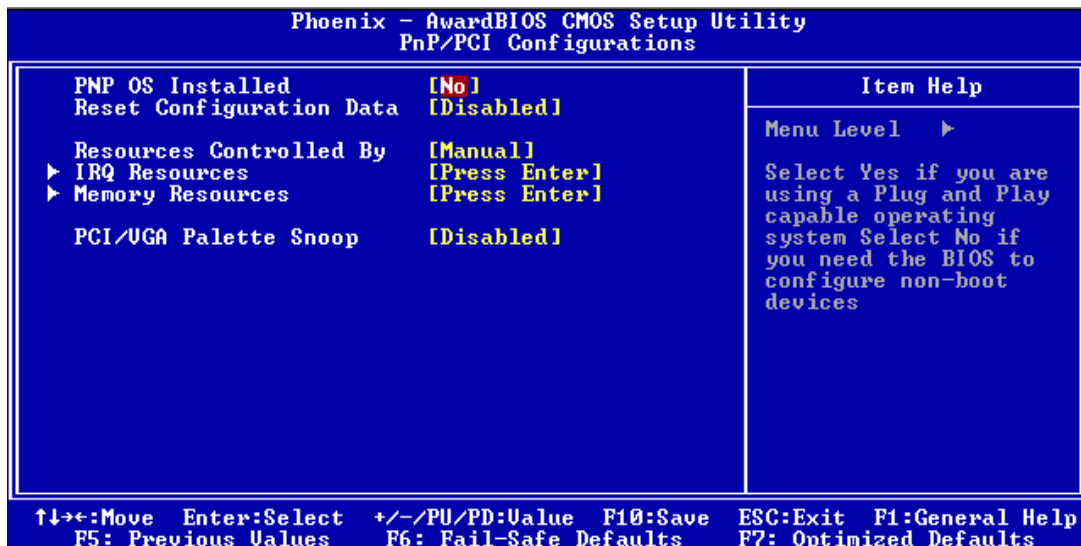
➤ Power Management

The field determines how much power consumption is needed for the system after selecting the below items.

◆ Standby Mode

This field defines the continuous idle time before the system enters Standby Mode. If any item defined is enabled & active Standby timer will be reloaded.

PCI/Plug and Play



➤ **PNP O/S Installed**

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

Available Options: Yes, No

Default setting: No

➤ **Reset Configuration Data: Enable, Disable**

If you select Enable to reset Extended System Configuration Data (ESCD) when you exit setup is you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operation operating system cannot boot.

Available Options: Enable, Disable

Default setting: Disable

➤ **Resources Controlled By: Auto, Manual**

If you select Auto, all the interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns them. The default value is "Manual".

Available Options: Auto, Manual

Default setting: Manual

◆ **IRQ-n/DMA-n Assigned: PCI/Reserved PnP**

The resources are controlled manually.

1. Reserved Devices compliant with the original PC AT bus specification, requiring a specific interrupt/DMA (such as IRQ4, IRQ3 for serial port 1 and 2).
2. PCI/Reserved PnP Devices compliant with Plug and play standard, whether designed for PCI or Reserved.

◆ **Memory Source: Resources Controlled By: Auto, Manual**

Select a base address for the memory area used by any peripheral that requires high memory.

Available Options: N/A, C800, CC00, D000, D400, D800 and DC00

Default setting: N/A

➤ **PCI/VGA Palette Snoop**

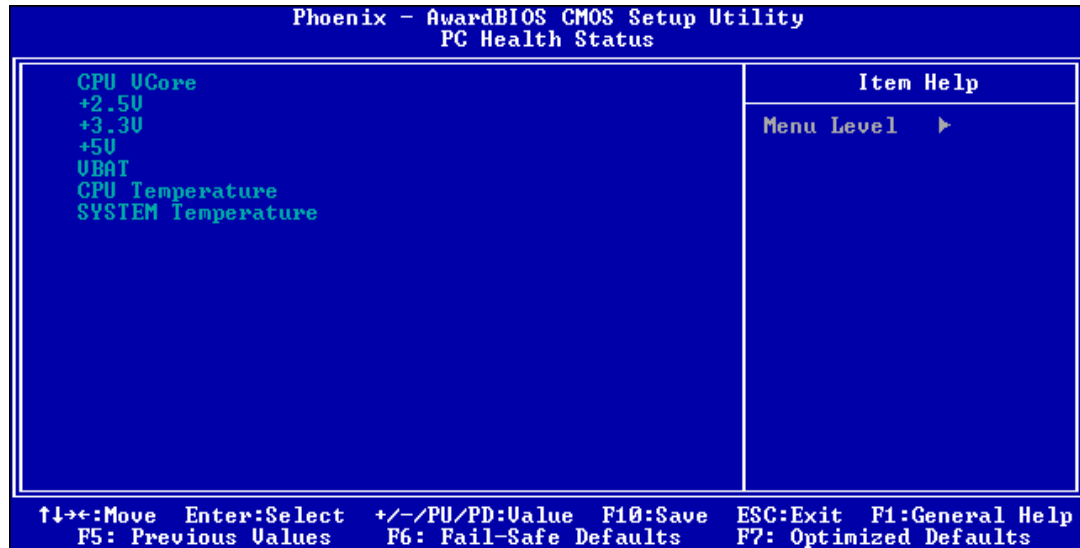
This option must be set to Enabled if any ISA adapter card installed in the computer requires VGA palette snooping.

Available options: Enable, Disable

Default setting: Disable

PC Health Status

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



➤ System Hardware Monitor

In this field, you can monitor or detect the followings items. These items are view-only and cannot be changed.

- CPU VCORE
- +2.500V
- +3.300V
- +5.0000V
- VBAT (V)
- CPU Temperature.
- System Temperature.

VBAT (On board Battery)

Password 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.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.
2. Type the desired password (up to 8 character length) when you see the message, "Enter New Supervisor Password."
3. Then you can go on to set a user password (up to 8 character length) if required. Note that you cannot configure the User password until the Supervisor password is set up.
4. Enter Advanced CMOS Setup screen and point to the Password Checkup field.
5. Select Always 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.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.
2. Press Enter instead of entering any character when you see the message, "Enter New Supervisor Password."
3. Thus you can disable the password.

Chapter 4 Software Installation

The enclosed diskette includes FX5202 VGA, AUDIO driver and LAN driver. To install and configure you FX5202 system, you need to perform the following steps.

VGA Drivers

➤ **WINDOWS XP Driver**

- 1 To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>Geode_LX>WINXP. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a CF.
- 2 Open Control Panel. [Start->Settings->Control Panel].
- 3 Click on System button> Select Hardware >click on Device Manager.
- 4 Click on Video Controller (VGA Compatible) >Update Driver> Select Specify a location > **Browse** > Select "IX_win" file from CF.
- 5 Click on OK >Next >Yes >Finish
- 6 In the WINDOWS-XP, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.
- 7 Adjust the <Resolution> and <Color>.

LAN Utility & Driver

- 1 To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8139C>DIAG. If your system is not equipped with a CD ROM device, copy the LAN driver from the CD ROM to CF.
- 2 Execute install.exe file.

Note: In the RTL8139C directory, a HELPME.EXE file is included to provide installation information.

Audio Drivers

➤ WINDOWS XP Driver

- 1 To install the Audio driver, insert the CD ROM into the CD ROM device, and enter DRIVER>AUDIO>CS5536>WINXP. If your system is not equipped with a CD ROM device, copy the Audio driver from the CD ROM to a CF.
- 2 Open Control Panel. [Start->Settings->Control Panel].
- 3 Click on System button> Select Hardware >click on Device Manager.
- 4 Click on Multimedia Audio Controller >Update Driver> Select Specify a location > **Browse** > Select "IxWDMAu" file from CF.
- 5 Click on OK >Next >Yes >Finish

AES Drivers

➤ WINDOWS XP Driver

- 1 To install the SysChip driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>GeodeLX_XP_AES. If your system is not equipped with a CD ROM device, copy the AES driver from the CD ROM to a CF.
- 2 On the target LX processor computer running Windows XP, open the device manager
- 3 Find the question mark on "Entertainment Encryption/Decryption Device" in Other Devices.
- 4 Pick "Install from a list or specific location" and click next.
Pick "Don't search. I will choose the driver to install." and click next.
Pick "Show All Devices", wait, pick "Have Disk".
- 5 It will come back with "Geode LX AES Crypto Driver", click Next.
Click yes to the warning box that comes up.

BIOS Flash Utility

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

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

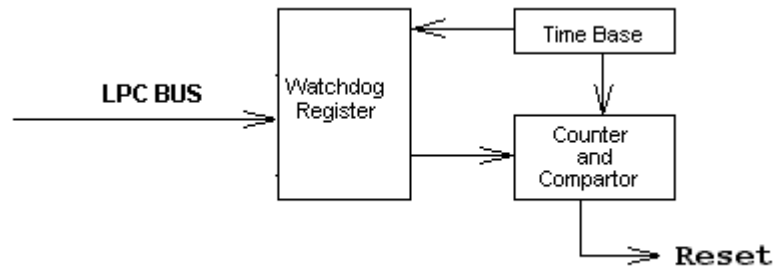
Step 2: And then refer to the chapter "BIOS Setup", as the steps to modify BIOS.

Step 3: Now the CPU board's BIOS loaded with is 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 FX5202 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.



The CD –ROM includes a Watch Dog demo file. In the file, there are 3 execution programs written in different forms. The sub-directories of the file are:

1. WATCHDOG/ASSEMBLE: Library and Test Program written in Assembly Language
2. WATCHDOG/TURBOC: Library and Test Program written in Turbo C++

The WATCHDOG includes a demonstration program established for users who would like to configure the Watchdog timer by themselves.

Note: In the WATCHDOG/ITE8712 directory, README.TXT file is included to provide demo program information.

➤ **Watchdog Timer Setting**

The watchdog timer is a circuit that may be used from your program software to detect system crashes or hang-ups. LED on the Front side is the watchdog timer indicator. Whenever the watchdog timer is enabled, the 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 Enabled**

To enable the watchdog timer, you have to output a byte of timer factor to the watchdog. The following is a Turbo C++ program, which demonstrates how to enable the watchdog timer and set the time-out period at 6 seconds.

```
#include "stdio.H"
#include "WDLIB.H"

main()
{
char WD_TIME=0x6;

InitWD(equWdUnitS);
printf ("Enable watchdog");
//Trigger watchdog Timer Output is 6 seconds
EnWD(WD_TIME);
}
```

➤ **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 the next trigger. Below is a Turbo C++ program, which demonstrates how to trigger the watchdog timer:

```
#include "stdio.H"
#include "WDLIB.H"

main()
{
char WD_TIME=0x6;

InitWD(equWdUnitS);
printf ("Enable watchdog");
//Trigger watchdog Timer Output is 6 seconds
EnWD(WD_TIME);
}
```

➤ **Watchdog Timer Disabled**

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

```
#include "stdio.H"
#include "WDLIB.H"

main()
{
    InitWD(equWdUnitS);
    printf ("Disable Watch Dog");
    //Disable watch dog
    DisWD(WD_TIME);
}
```

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 FX5202 system "DTR" signal to the RS-485 TXC communication.

➤ **Send out one character (Transmit)**

Step 1: Enable 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: Enable 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 Enable 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 Disable 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 example of the above program is based on COM1 (I/O Address 3F8h). The RS-485 of the FX5202 uses COM2. If you want to program it and hardware setup, please refer to the BIOS Setup for COM2 address setup and Chapter 5 "Technical Reference": RS485 and RS422 Hardware Setup.

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
- RS485 and RS422 Hardware Setup

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.

➤ **Error Message**

◆ **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

◆ **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)

➤ Real-Time Clock and Non-Volatile RAM

The FX5202 contains a real-time clock compartment that maintains the date and time in addition to storing configuration information about the computer system. It contains 14 bytes of clock and control registers and 114 bytes of general purpose RAM. Because of the use of CMOS technology, it consumes very little power and can be maintained for long periods of time using an internal Lithium battery. The contents of each byte in the CMOS RAM are listed below:

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

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

➤ **CMOS RAM Map**

Register	Description
00h -10h	Standard AT-compatible RTC and Status and Status Register data definitions
11h – 13h	Varies
14h	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, NMI
078h - 07Bh	TTL I/O
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
2E8h - 2EFh	Serial Port #4
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
3E8h - 3EFh	Serial Port #3
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	Serial Port #2
IRQ4	Serial Port #1
IRQ5	USB
IRQ6	Reserved
IRQ7	Reserved
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Display Control
IRQ11	LAN / Audio
IRQ12	PS2 Mouse
IRQ13	FPU
IRQ14	Primary IDE
IRQ15	Reserved

➤ **DMA Channel Map**

The equivalent of two 8237A DMA controllers is implemented in the FX5202 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)**

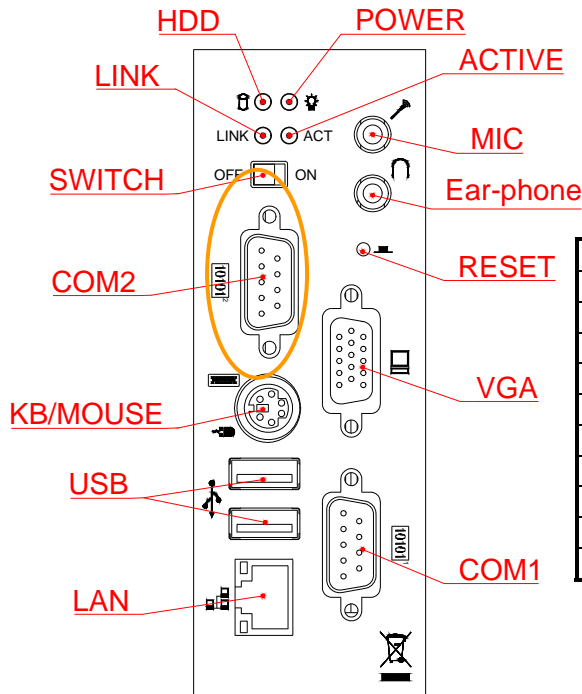
	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

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

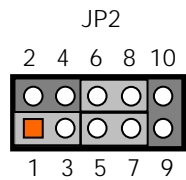
RS485 and RS422 Hardware Setup

The serial port 2 is designed for multiple purposes. Use BIOS setting or JP2 selects the RS-232, RS422 or RS-485, and provides terminator select of RS-485 mode.

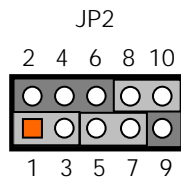
- JP2: RS485 Terminal Select and RS422 or RS485 Port Selected



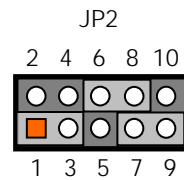
DB-9	RS-232	RS-422	RS-485
1	-DCD		
6	-DSR		
2	RXD	RX-	485-
7	-RTS	TX-	
3	-TXD	RX+	485+
8	-CTS	TX+	
4	-DTR		
9	-RI		
5	Ground		
Metal	Case Ground		



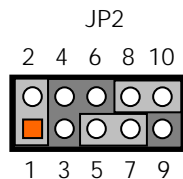
RS-232
Factory Preset



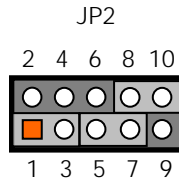
RS-485



RS-422



Pin 1,2 Close:
Terminator
Enabled
RS-485

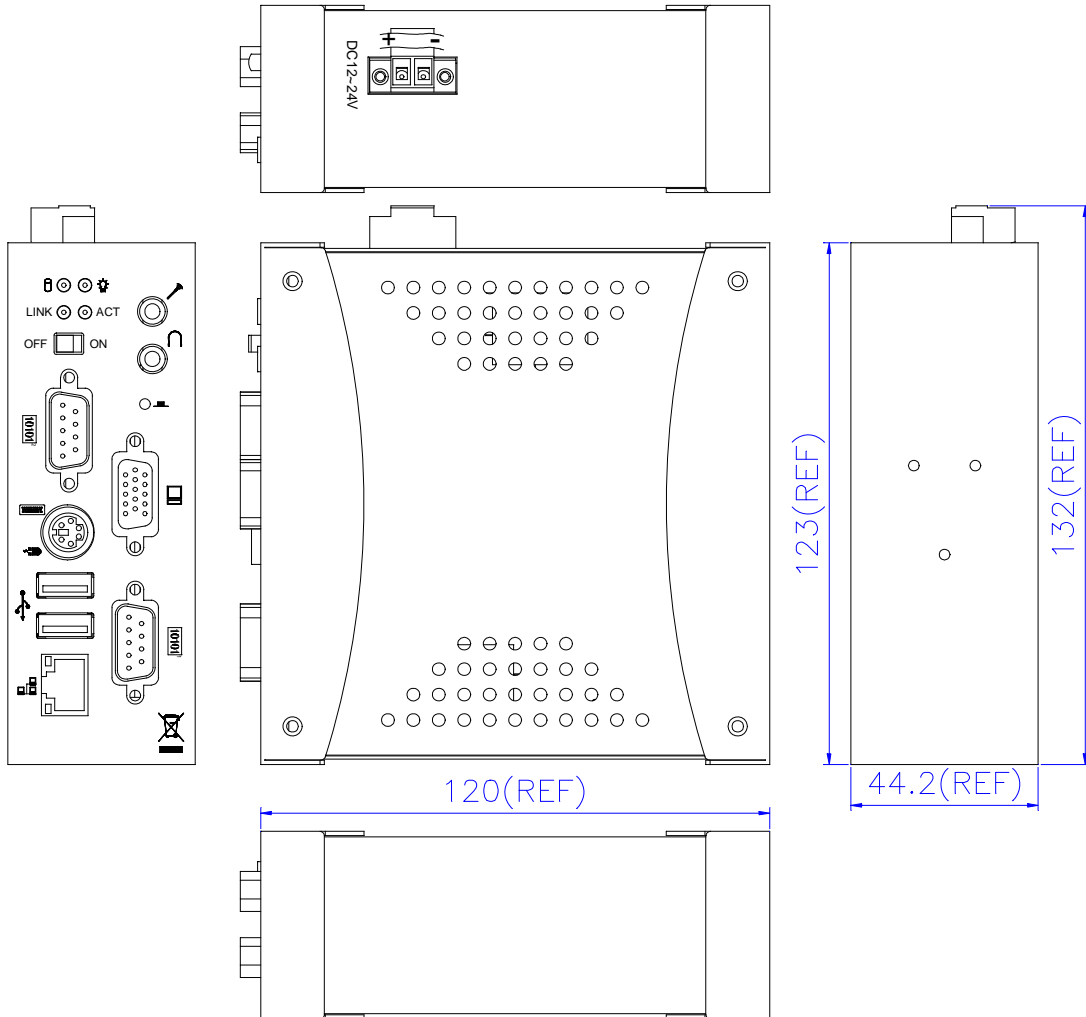


Pin 1,3 Close:
Terminator
Disable
Default
RS-485

*Note: Changing the setting
in BIOS setup program

Appendix

Dimension A



Dimension B

