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FX5200 Embedded Computer User's Manual

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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 FX5200 System Board

Overview

The FX5200 is an embedded system with low-power Pentium CPU module inside T. This user's manual provides information on the physical features, installation, and BIOS setup of the FX5200.

Built to unleash the total potential of the Pentium Processor, Able to support 300 MHz CPUs, this system supports one 10/100M interface network port, 1 So-DIMM socket for up to 256MB PC-100 SDRAM, and a 4MB PCI-VGA controller and storage space can use a compact Flash, 2.5 " hard-disk or Disk On Modules.

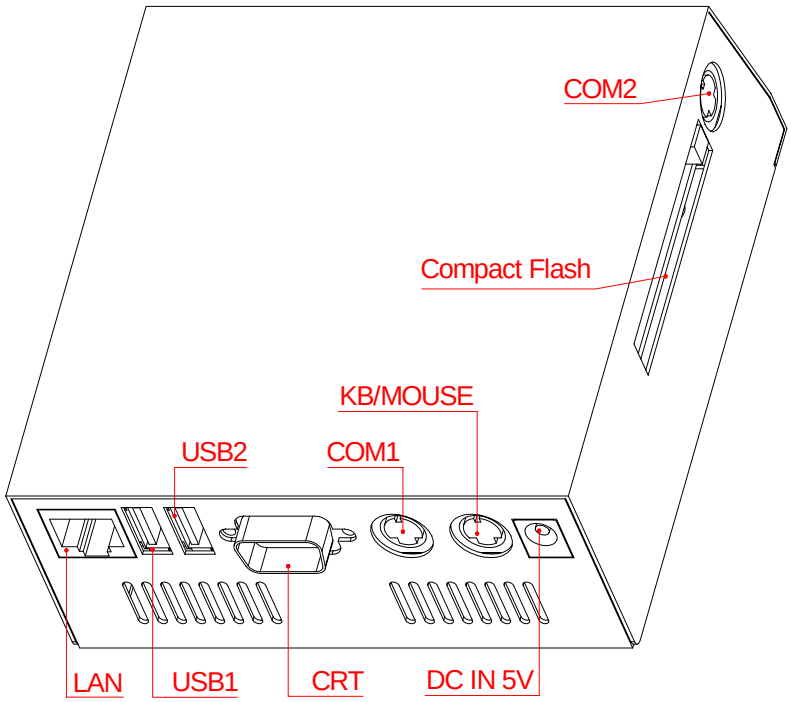
Each FX5200 has two ports for I/O communications. Two RS-232 ports are available.

The FX5200 is perfect for e-Server and Home Automation Appliances and embedded controller. The unit is only 135mm (L) X125mm (W) X 44mm(H), offering unparalleled performance in a very small footprint.

Series Comparison Table

Model	FX5200
Processor	GX1-300Mhz
Chipset	CS5530A
1 So-DIMM Socket (Max. SDRAM)	256MB
VGA CRT	Yes
Watchdog Timer	Yes
Multi I/O Chip	RS232X2
Enhanced IDE or CF	One
USB	Two
RJ45 Ethernet (10/100Mbps)	One
Dimensions (Unit: mm)	135(L) X 125(W) X 44(H)

Layout



Specifications

- ***Processor Board –***

  FB2510 inside, 300 MHz low-power Pentium CPU with 64MB SDRAM.

- ***I/O Outlets –***

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

  Two Serials RS-232 ports with 9-pin mini DIN.

  PS/2 compatible keyboard and mouse.

  Two USB ports.

  One DC-In plug connector

  One Push bottom reset switch.

  One power LED and 1 hard disk/ Compact Flash access LED.

- ***Storage Bay-***

  One Compact Flash slot with plug-in aperture and cover.

  One 44-pin DiskOnModule space.

  One 2.5" hard disk space with housing kit. (FX5200K1, Optional).

- ***Power requirement –***

  +5V DC with 5% tolerance, 1.5A maximum.

- ***Dimensions (1U height)-***

  FX5200:120.0mm(D) x 118.1mm(W) x 44.0mm(H) **(1U height**, w/o fixers**)**

  FX5200K1: 120.0mm(D) x 118.1mm(W) x 15.8mm(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 FX5200 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 FX5200 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FX5200 system board.

Note: after you install the FX5200 series, 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 FX5200 package. Some accessories are optional items that are only shipped upon order.

- One FX5200 embedded system.
- One AC to DC24V power adapter and 1 AC power code
- One serial port adapter cable. (The second cable is optional)
- Y-type (3-terminal) PS/2 keyboard plus mouse port adapter cable (Optional).
- Two L-type universal fixers and 5 screws.
- 6 stamp pads for this enclosure.
- One compact disk includes software utility.

Chapter 2 Hardware Installation

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

Before Installation

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

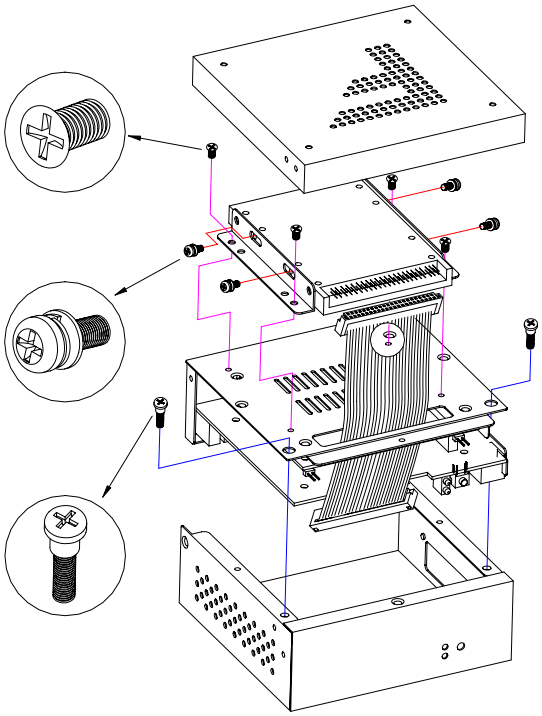
1. Before removing the cover, shut down the operation System and disconnect power switch to off and unplug AC-to DC Adapter cable.

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.

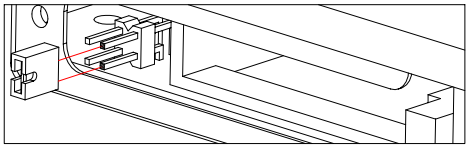
3. The ESD (Electricity Static Discharge) may be created from human body that touches the board. It may do damage to the board circuit.

□ Removing Covers –Installing HDD or Compact Flash

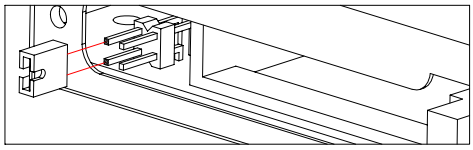
If you are installing hardware option, you can remove the top cover or left side cover. The following figure will guide you how to install 2.5" HDD inside the FX5401 and how to install the FX5401 fixers.



If you are only installing Compact Flash modules, you don't need to remove top cover. The following figure will guide you select JP (open or close) are all use to select Master or Slave device on IDE



Master (Close right 2 pins, Factory Preset**)**

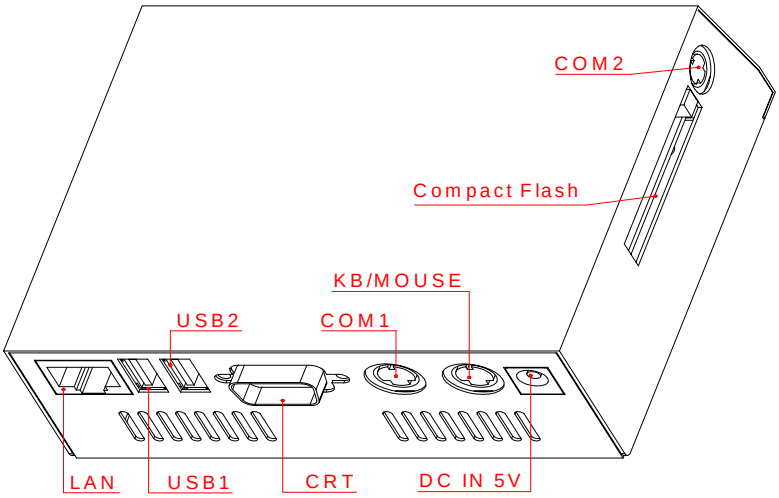


Slave (Close left 2 pins**)**

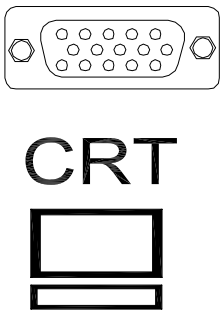
□ Connecting the Monitor, Keyboard, Mouse

To connector the peripheral control devices and monitor to the FX5401, refer to the following procedure.

1. Connector the monitor, keyboard and mouse to the FX5401 using the connections provided on the rear of the chassis. See following figure and rear pictures.

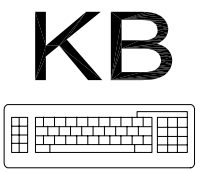


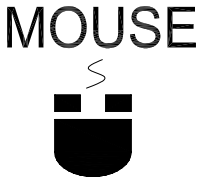
A VGA connector is provided for CRT display



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

The connector use 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.

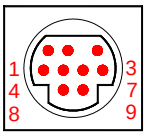




Pin 1	Mouse Data
Pin 2	Keyboard Data
Pin 3	Ground
Pin 4	VCC
Pin 5	Mouse Clock
Pin 6	Keyboard Clock

□ Connecting the COM ports and Parallel Port

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



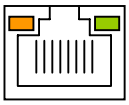
(Front View)

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

□ Connecting the LAN ports and USB Ports

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

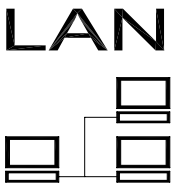
RJ45 connector



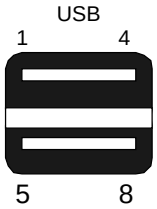
1 8
(Front View)

The following lists the pin assignment of RJ45.

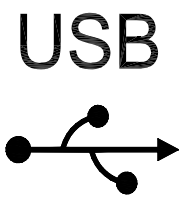
LAN1/LAN2	Signal	LAN1/LAN2	Signal
1	TPTX+	5	FBG1
2	TPTX -	6	TPRX -
3	TPRX+	7	FBG2
4	FBG1	8	FBG2



The FX5200 supports a dual port USB connector. Any USB device can be attached to USB ports with plug-and-play supported. The up side port is USB #1 and the down side port is USB #2



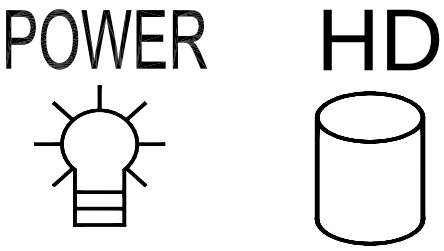
USB#1/#2	Signal	USB#1/#2	Signal
Pin 1	USBV0	Pin5	USBV1
Pin 2	USBD0-	Pin6	USBD1-
Pin 3	USBD0+	Pin7	USBD1+
Pin 4	USBG0	Pin8	USBG1



□ System Reset header and Power /HDD LED

The FX5200 has a push bottom switcher for system reset; Push and release the bottom will cause hardware reset of FX5200 and restart system booting.

The Power, Watchdog and HDD LED has two distinctive status: Off for inactive operation and blinking light for activity.



Front View

Hard Disk Access LED (Red)

Power LED (Green) & Watchdog LED

□ Connecting the DC Power Jack 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.

DC +24V, 25% tolerance

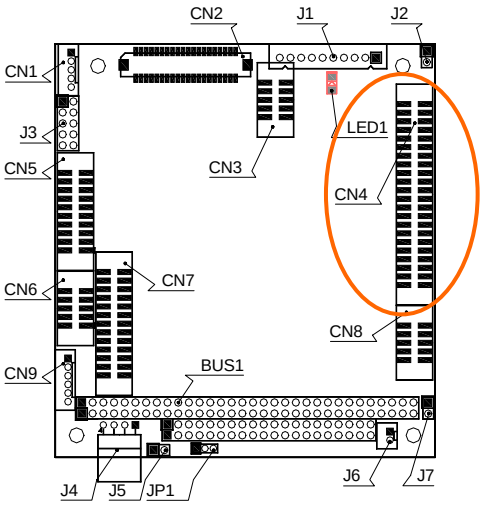
0.8A minimum

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.

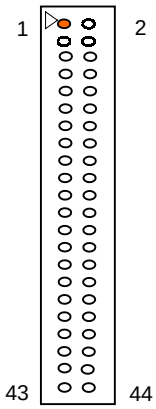
1 : Power On
O: Power Off

□ CN4: IDE hard Disk Connectors

CN4 is 44-pin 2.0mm IDC connectors. Use the included hard disk cables to attach up to two 2.5" hard disk drives.



CN4 – Hard disk connector

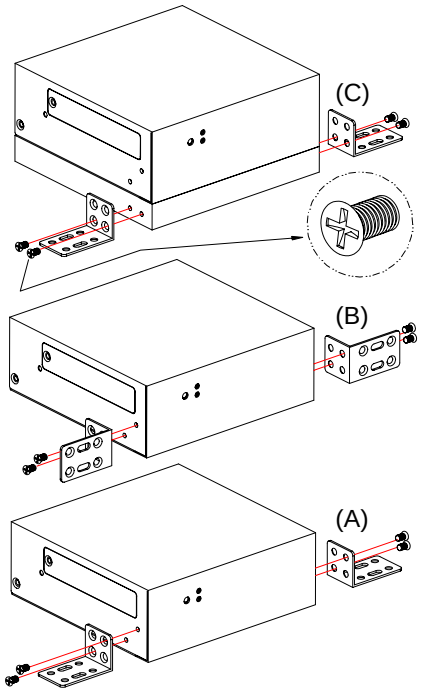


The following table lists the pin description of CN4.

Pin	Description	Pin	Description
1	-RESET	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	NOT USED
21	IDEDREQ	22	GROUND
23	-IOW A	24	GROUND
25	-IOR A	26	GROUND
27	IDEIORDYA	28	GROUND
29	-DACKA	30	GROUND
31	AINT	32	GROUND
33	SA 1	34	Not Used
35	SA 0	36	SA 2
37	CS 0	38	CS 1
39	HD LED A	40	GROUND
41	VCC	42	VCC
43	GROUND	44	Not Used

□ Installing the Fixers to FX5200 (FX5200K1)

The following figure illustrates 3 methods for you to install the FX5200 fixers.



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.

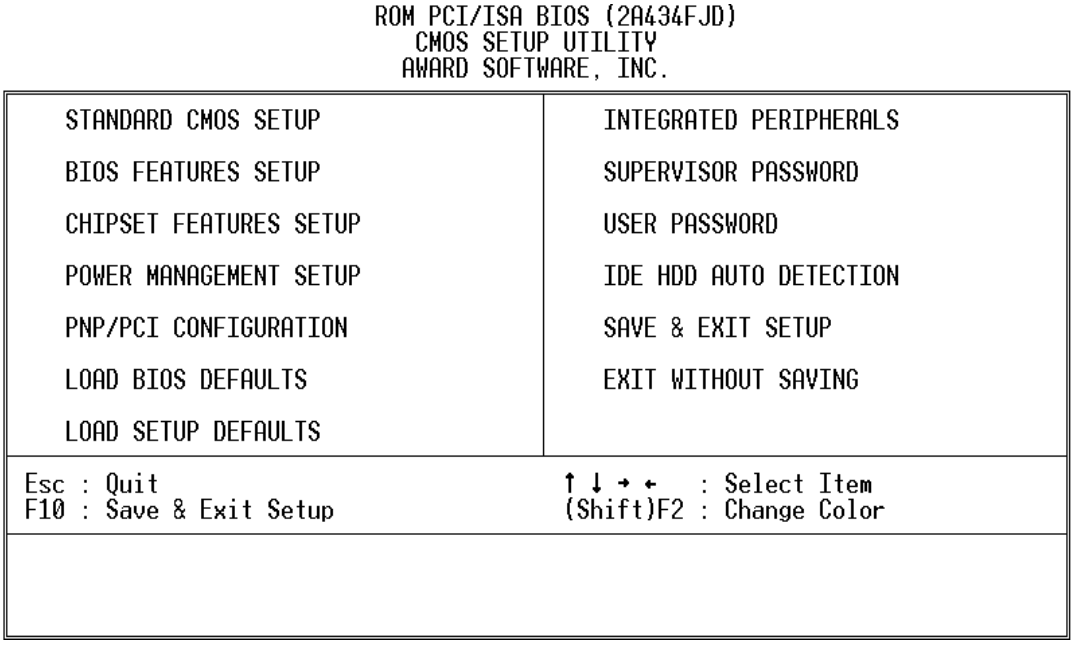
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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

BIOS Functions

On the menu, you can perform the following functions

1. Standard CMOS Setup-
2. BIOS Features Setup
3. Chipset Features Setup
4. Advanced Chipset Setup
5. Power Management Setup
6. PNP/PCI Configuration
7. Load BIOS Defaults
8. Load Setup Default
9. Integrated Peripherals Setup
10. User Password
11. IDE Auto Detect
12. Save & Exit Setup
13. Exit Without Saving

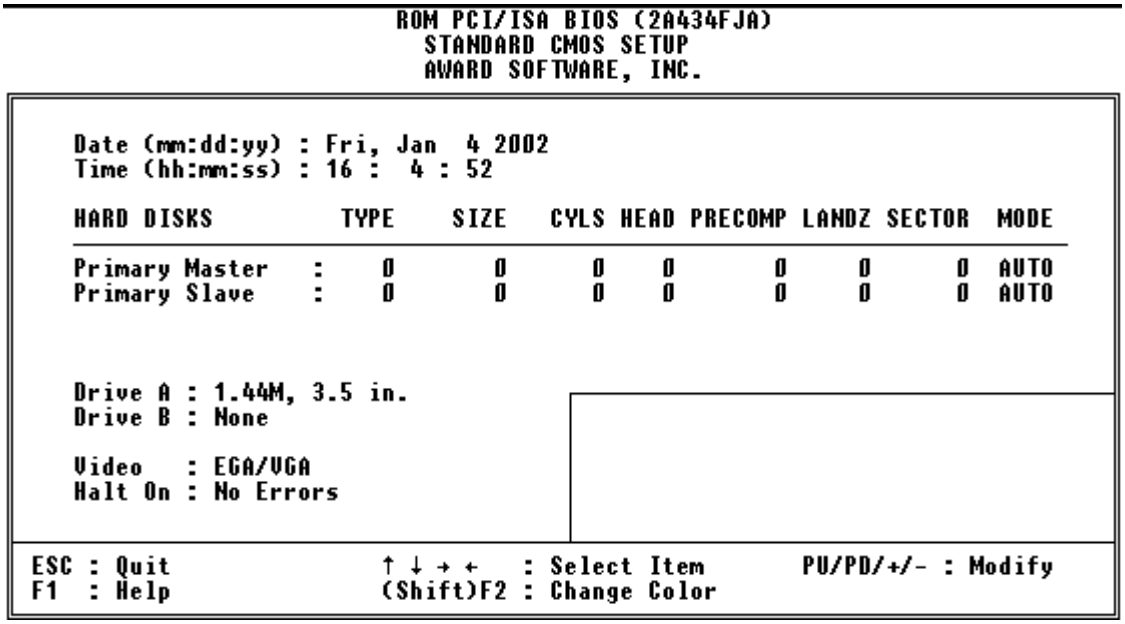
Keyboard Convention

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
F2/F3	To change the color of the menu display. F2 is to go forward and F3 to go backward
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.

- **Floppy Setup**

The <Standard CMOS Setup> option records the types of floppy disk drives installed in the system.

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the left-or right-arrow key.

- **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 four 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".

□ **Error Halt**

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**

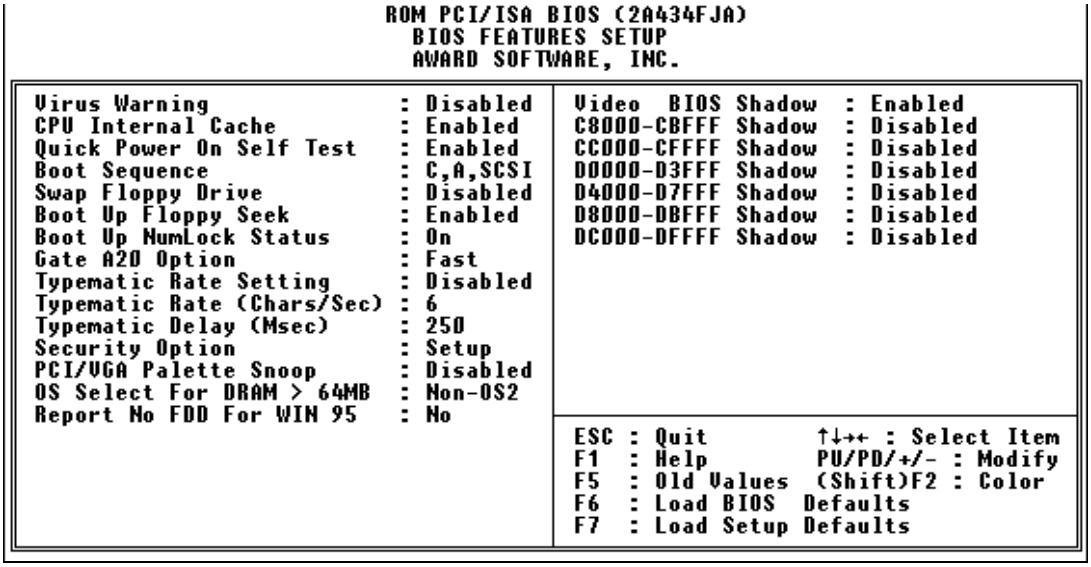
This refers to the memory located in the 640K to 1024K-address space. This is memory that can be used for different applications. DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

- **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 FB2510 GXM Cyrix 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

- **Boot Sequence**

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

Default setting: C, CDROM, A

- **Swap Floppy Drive**

The field reverses the drive letter assignments of your floppy disk drives in the Swap A, B setting, otherwise leave on the default setting of ***Disabled*** (No Swap). This works separately from the BIOS Features floppy disk swap feature. It is functionally the same as physically interchanging the connectors of the floppy disk drives. When the function's setting is <***Enabled***>, the BIOS swapped floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A under DOS.

Available options: Disabled, Enabled

Default setting: Disabled

- **Boot Up Floppy Seek**

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K types are 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS cannot tell from 720K, 1.2M or 1.44M drive type, as they are all 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning message if the drive installed is 360K.

- **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

□ **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

□ **OS Select for DRAM > 64MB**

This segment is specifically created for OS/2 when DRAM is large than 64MB,if you operating system is OS/2 and DRAM used is large 64MB, You have to select "OS/2" OTHERWISE (under non –OS/2), default is NON OS/2.

Available options: Non-OS/2, OS/2

Default setting: Non-OS/2

□ **Report No FDD for Win95**

This option allows Windows 95 to share IRQ6 (assigned to a floppy disk drive) with other peripherals in case the driver does not exist.

Available options: Enable, Disable

Default setting: Disable

□ **Video, 16k Shadow C000 - DC00, 16k shadow**

These fields control the location of the contents of the 16KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are:

1. **Disabled:** The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.

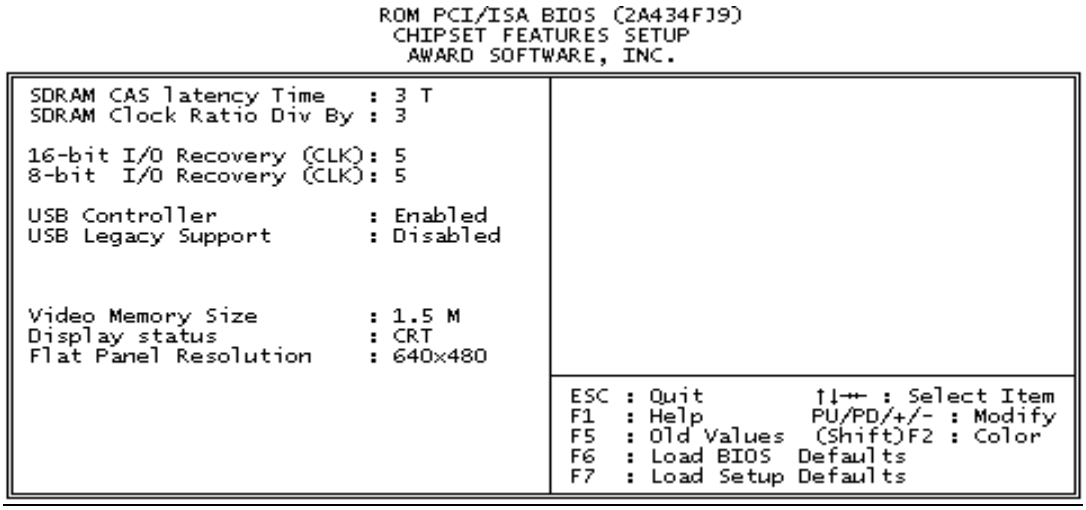
2. **Enabled:** The contents of C000h - CFFFF are written to the same address in system memory (RAM) for faster execution.

Available options: Disabled, Enabled,

Default setting: Disable (Video shadow is Enable)

Chipset Features Setup

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



- **SDRAM CAS AUTO Latency Time**

This field specifies the latency for the Synchronous DRAM system memory signals.

Available Options: 3T, 2T

Default setting: 3 T

- **SDRAM Clock Ration Div by**

When 100 MHz external frequency runs the system, the system will run at 3 cycle clocks. When 66 MHz runs the system, the system will run at 4 cycle clocks. Selecting Auto, the system will be auto adaptive depending on the SDRAM clock that is installed.

Available Options: 4T, 3T

Default setting: 3 T

- **8bit I/O Recovery Time**

The recovery time is the length of time, measured in CPU clocks, which the system will delay after achieving an input/output request. This delay takes place to wait for the I/O to complete the request. This field specifies the recovery time for 8bit I/O.

Available Options: Disabled, 1 –8 Sysclk

Default setting: 5 Sysclk

- **16Bit I/O Recovery Time**

  This field specifies the recovery time for 16Bit I/O.

  Available Options: Disabled, 1 –8 Sysclk

  Default setting: 5 Sysclk

- **USB Controller**

  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 Legacy Support**

  Select Enabled if you system contains a USB controller and you have USB keyboard and mouse. If Disabled are selected, the system will not be able to use a USB device under DOS.

  Available Options: Disabled, Enabled

  Default setting: Disable

- **Video Memory**

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

  Available Options: 1.5MB, 2.5MB, and 4MB

  Default setting: 1.5MB

- **Display state**

  This field specifies which VGA display will be used when the system is boot. You can select either the LCD or the CRT booting on the VGA.

  Available Options: Both, LCD, and CRT

  Default setting: CRT

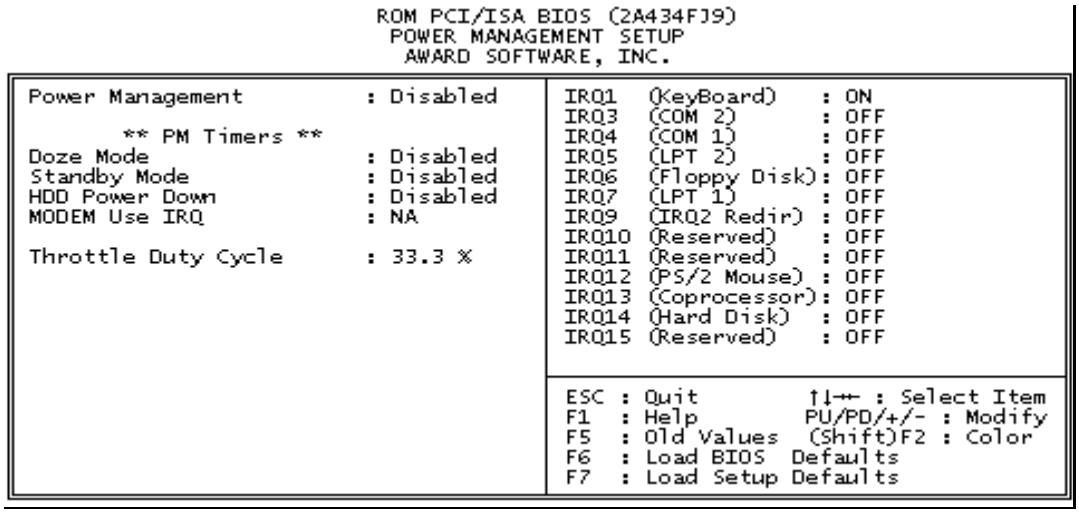
- **Flat Panel Resolution**

  When use the LCD the field specifies which select display resolution for different TFT LCD display type.

Available Options: 640x480, 800x600 and 1024x768

Default setting: 640X480

Power Management



- **Power Management**

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

- **Doze Mode**

  This field defines the continuous idle time before the system enters Doze Mode.

- **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.

- **HDD Power Down**

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

  Available Options: Disabled, Standby, Suspend

  Default setting: Disabled

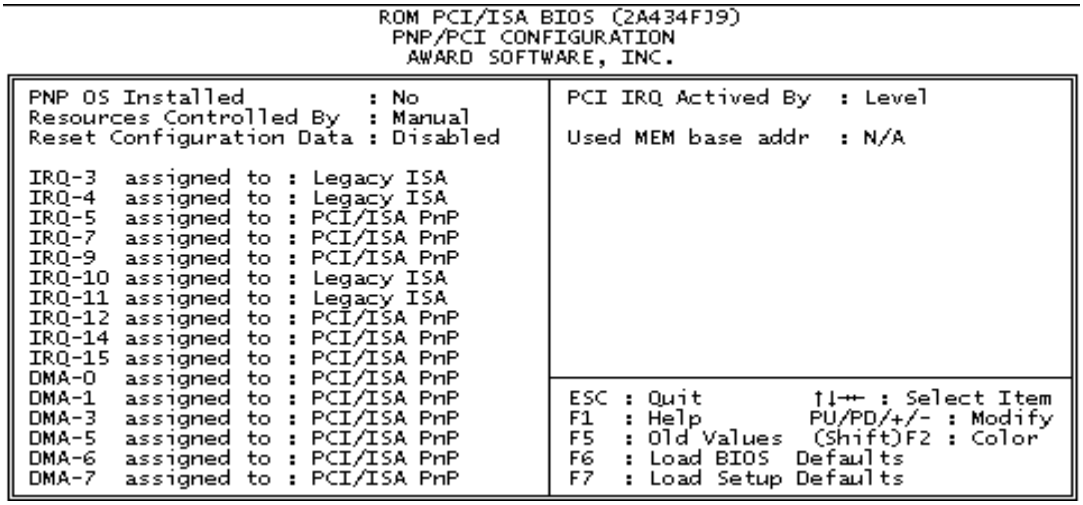
- **Modem Use IRQ**

  This field specifies the IRQ of the modem.

- **IRQ**

  These options enable event monitoring. When the computer is in a power saving mode, activity on the named interrupt request line is monitored by BIOS. When any activity occurs, the computer enters Full On mode.

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

- **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 then. The default value is "Manual ".

  Available Options: Auto. , Manual

  Default setting: Manual

- **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

- **IRQ-n/DMA-n Assigned:** PCI/ISA PnP, Legacy ISA

  The resources are controlled manually.

  1. Legacy ISA 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/ISA PnP Devices compliant with Plug and play standard, whether designed for PCI or ISA bus.

- **Use MEM base addr. : Resources Controlled By:** Auto, Manual

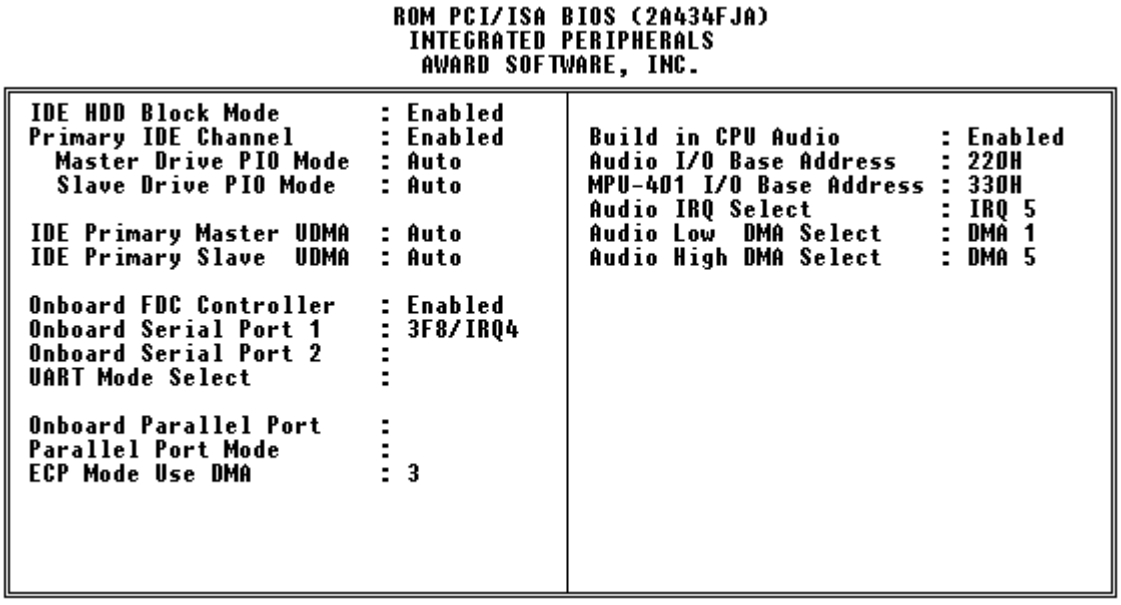
  Select a base address for the memory area used by any peripheral that requires high memory.

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

  Default setting: N/A

Peripheral Setup

This section describes the function of peripheral features.



- **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).

- **IDE PIO**

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.

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.

- **OnBoard FDC**

This field enables the floppy drive controller on the FB2530.

Available Options: Auto, Disabled, Enabled

Default setting: Auto

- **OnBoard Serial Port 1**

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

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

  Default setting: 3F8H/IRQ4

- **OnBoard Serial Port 2**

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

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

  Default setting: 2F8H/IRQ3

- **UART Mode Select**

  The second serial port offers these infrared interface modes.

  Available Options: Normal, IrDA, and ASKIR

  Default setting: Normal

- **OnBoard Parallel Port 1**

  This field selects the I/O port address for parallel port.

  Available Options: Disabled, 378H/IRQ7, 278H/IRQ5, 3BCH/IRQ7

  Default setting: 378H/IRQ7

- **Parallel Port Mode**

  This field specifies the parallel port mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications.

  Available Options: Printer, EPP1.7+SPP, EPP1.7+ ECP, EPP1.9, EPP, and ECP

  Default setting: Printer

- **ECP Mode Use DMA**

  This field is read-only and cannot be configured.

  Available Options: 0, 1, and 3

  Default setting: ECP for DMA3

- **Build In CPU Audio**

  This field specifies the internal Audio Control.

  Available Options: Disable, Enable

  Default setting: Enable

- **Audio Base I/O Address**

  These fields select the I/O port address for Audio.

  Available Options: 220H, 240H, 260H and 280H

  Default setting: 220H

- **Audio IRQ Select**

  This field specifies the IRQ for the Audio.

  Available Options: Disable, 5,7 and 10

  Default setting: 5

- **Audio Low DMA Select**

  This field specifies the DMA for internal Audio Control.

  Available Options: Disable, 0, 1 and 3

  Default setting: 1

- **Audio High DMA Select**

  This field specifies the DMA for internal Audio Control.

  Available Options: Disable, 5, 6 and 7

  Default setting: 5

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 FX5200 VGA and LAN driver. To install and configure you FX5401 system, you need to perform the following steps.

Installation WIN 95/98

1 Copy completely Window 98 and required drivers to the Hard drive execute this step on the normal PC, not on the FX5401 system.

2 Install the Hard drive to the FX5401 system.

3 Execute the installation procedure of Win98 Setup.

4 The rest steps please follow the Win 98 installation guide

5 The method of driver installation, please refer to the contents of installed drive

VGA Drivers

WIN98/WIN95 Driver

1 To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>NS5530>WIN98. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44" diskette.

2 Execute CYRIXM~1.exe file.

3 The screen shows the SETUP type. Press any key to enter the main menu.

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.

5 In the WINDOWS98/ME, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.

6 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. If your system is not equipped with a CD ROM device, copy the LAN VGA driver from the CD ROM to a 1.44" diskette.

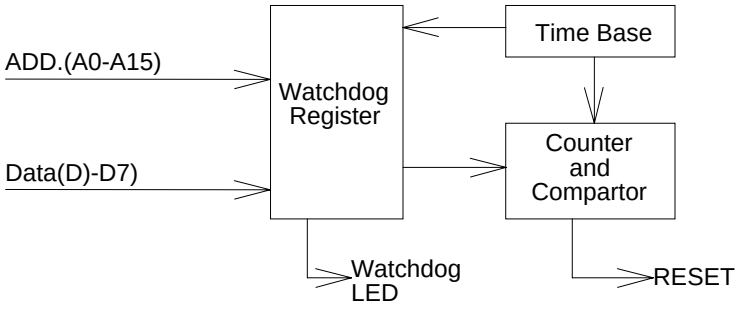
2 Execute install.exe file.

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

Watchdog Timer

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

The FX5200 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 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. LED1 on this CPU board is the watchdog timer indicator, which is located at the upper-right corner above the USB connector. 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 seconds. 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=ox6;

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=ox6;

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

Watchdog Timer Disabled

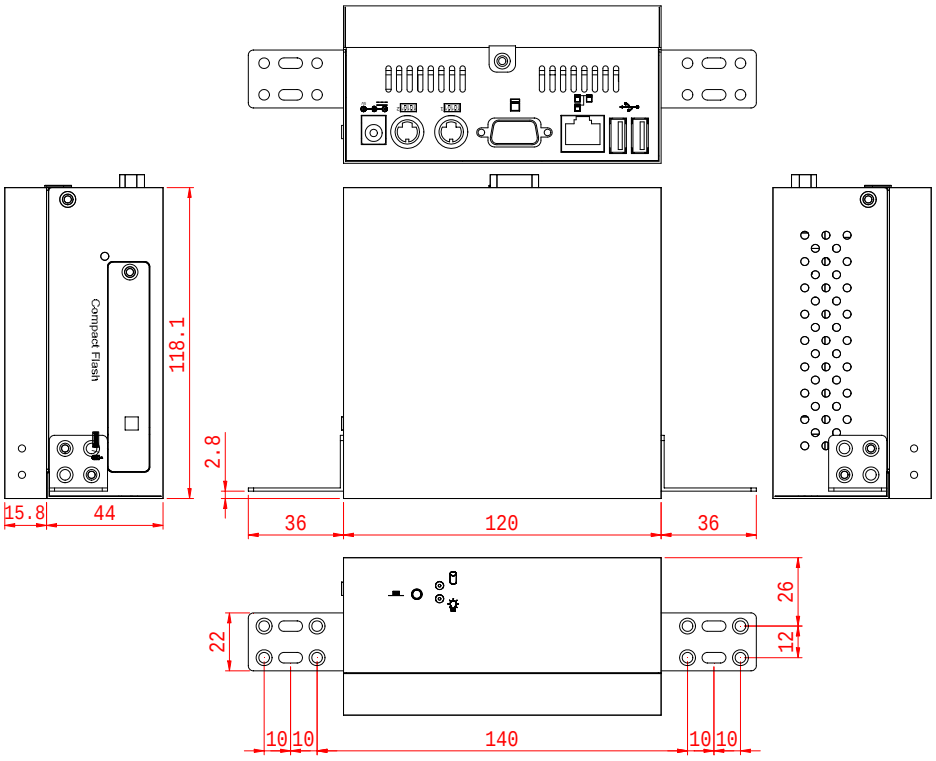
To disable the watchdog timer, simply write a 00H to the watchdog register.

```
#include “stdio.H”
#include “WDLIB.H”

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

Appendix

Dimension



Technical Reference

Physical and Environmental

DC Inputs: 5V/0.8A Minimal

Temperature: Operating 0°C ~ 45°C

Relative humidity 5 % to 95 % non-condensing

DC-AC adapter

Input AC Voltage Range: 100V~240V/1A, 50Hz ~60Hz

Output DC Voltage: 5V/4A Maximal

Real-Time Clock and Non-Volatile RAM

The FX5200 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

Address	Description
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	Vaires
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
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(COM4)
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(COM3)
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	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Ethernet
IRQ11	Reserved
IRQ12	PS2-Mouse
IRQ13	FPU
IRQ14	Primary IDE
IRQ15	Reserved

DMA Channel Map

The equivalent of two 8237A DMA controllers are implemented in the FX5200 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 speeding 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 ACE4) 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

Parallel Ports

□ **Register Address**

Port Address	Read/Write	Register
Base + 0	Write	Output data
Base + 0	Read	Input data
Base + 1	Read	Printer status buffer
Base + 2	Write	Printer control latch

□ **Printer Interface Logic**

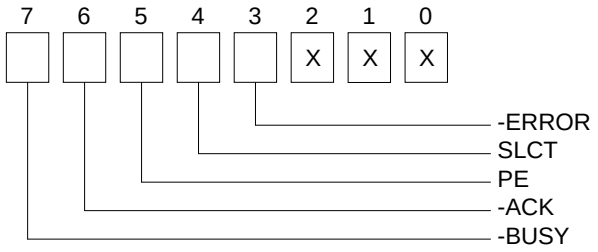
The parallel portion of the SMC37C669 makes the attachment of various devices that accept eight bits of parallel data at standard TTL level.

□ **Data Swapper**

The system microprocessor can read the contents of the printer's Data Latch through the Data Swapper by reading the Data Swapper address

□ **Printer Status Buffer**

The system microprocessor can read the printer status by reading the address of the Printer Status Buffer. The bit definitions are described below:



NOTE: X represents not used.

Bit 7: This signal may become active during data entry, when the printer is off-line during printing, or when the print head is changing position or in an error state. When Bit 7 is active, the printer is busy and cannot accept data.

Bit 6: This bit represents the current state of the printer's ACK signal. A 0 means the printer has received the character and is ready to accept another. Normally, this signal will be active for approximately 5 microseconds before receiving a BUSY message stops.

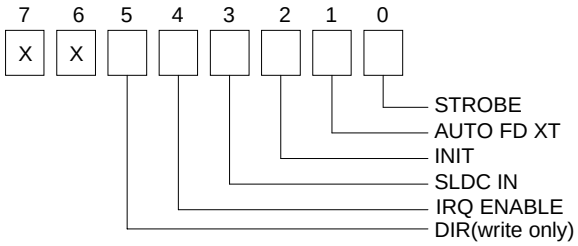
Bit 5: A 1 means the printer has detected the end of the paper.

Bit 4: A 1 means the printer is selected.

Bit 3: A 0 means the printer has encountered an error condition.

□ **Printer Control Latch & Printer Control Swapper**

The system microprocessor can read the contents of the printer control latch by reading the address of printer control swapper. Bit definitions are as follows:



NOTE: X represents not used.

Bit 5: Direction control bit. When logic 1, the output buffers in the parallel port are disabled allowing data driven from external sources to be read; when logic 0, they work as a printer port. This bit is write-only.

Bit 4: A 1 in this position allows an interrupt to occur when ACK changes from low state to high state.

Bit 3: A 1 in this bit position selects the printer.

Bit 2: A 0 starts the printer (50 microseconds pulse, minimum).

Bit 1: A 1 causes the printer to line-feed after a line is printed.

Bit 0: A 0.5 microsecond minimum highly active pulse clocks data into the printer. Valid data must be present for a minimum of 0.5 microseconds before and after the strobe pulse.