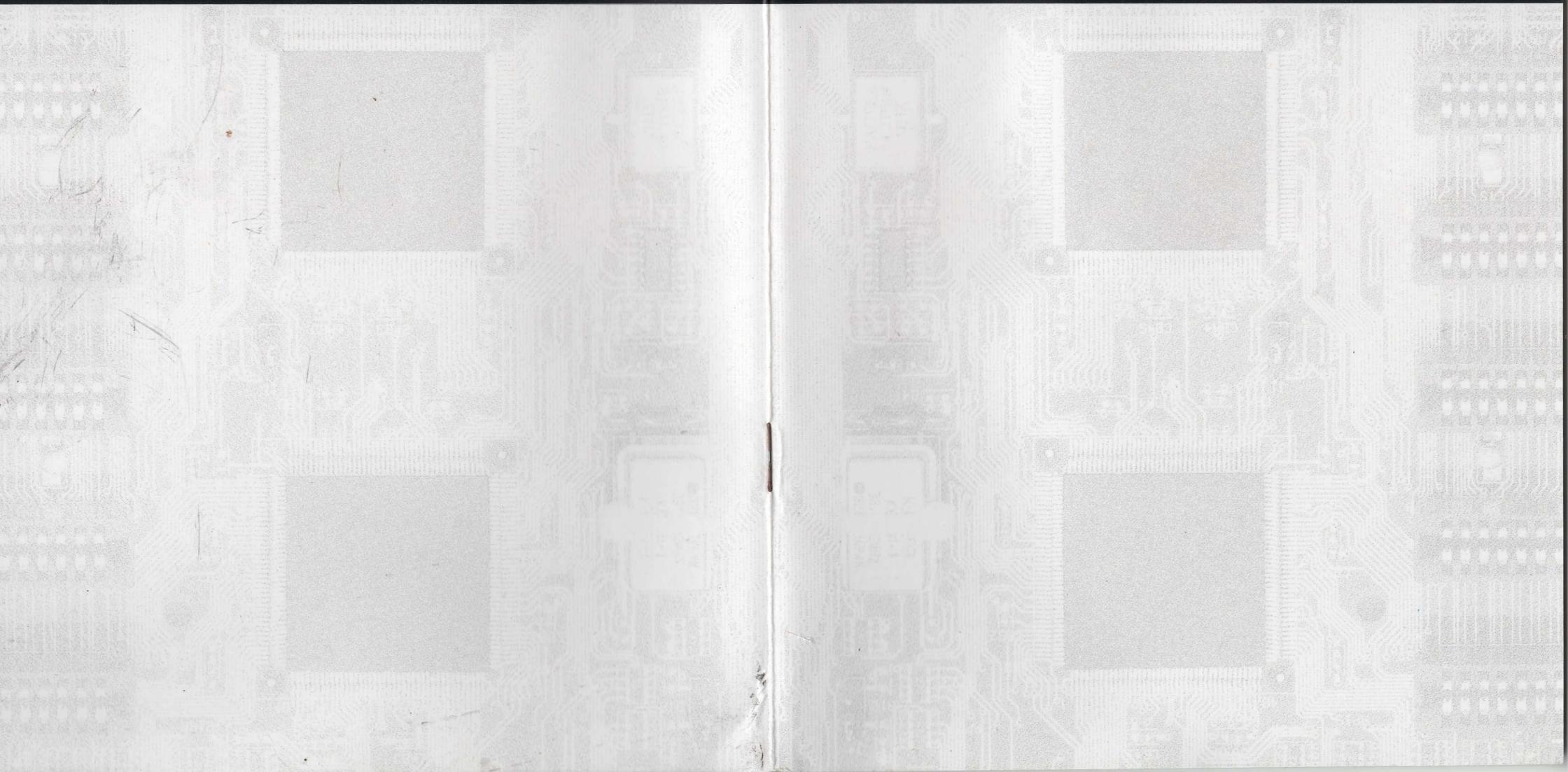


**PN-6210**  
**MAIN BOARD**  
**MANUAL**



# PN-6210

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## MAINBOARD MANUAL

DOC No. : 15389

Rev. : A1

Date. : 10, 1996

Part No. : 25-10528-01



## Handling Precautions

### Warning :

1. Static electricity may cause damage to the integrated circuits on the mainboard.  
Before handling any mainboard outside of its protective packaging, ensure that there is no static electric charge in your body.
2. Danger of explosion if battery is incorrectly replaced.  
Replace only with the same or equivalent type recommended by the manufacturer.
3. Discard used batteries according to the manufacturer's instructions.

Observe any or all of these basic precautions when handling the mainboard or other computer components:

- Wear a static wrist strap which fits around your wrist and is connected to a natural earth ground.
- Touch a grounded or anti-static surface or a metal fixture such as a water pipe.
- Avoid contacting with the components on add-on cards, boards and modules and with the "gold finger" connectors plugged into the expansion slot. It is best to handle system components by their mounting bracket.

Above methods either prevent static build-up or cause it to be discharged properly.

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## Overview

Combining the advanced capabilities of the Intel 440FX PCIset with support for a choice of single and dual Intel Pentium® Pro processors, the PN-6210 provides the ideal platform for a complete range of high-performance workstation and server applications.

This highly-flexible mainboard features two integrated 387-ZIF (Zero Insertion Force) sockets that allow the easy installation of a full range of single and dual Pentium Pro processors. The processor's advanced performance is completed by a built-in Level II cache of 256/512KB and up to 512MB main memory. The main memory is installed using the board's four 72-pin SIMM sockets that accept Fast Page Mode and high speed EDO DRAM.

Based on a versatile ATX form factor, the PN-6210 provides ample room for expansion with its three 16-bit ISA slots and four 32-bit PCI slots. The PN-6210 comes with a full set of I/O features onboard, including two 16550A UART compatible serial ports, one EPP/ECP capable parallel port and two USB connectors, which for optimum ease of configuration are integrated on a single rear I/O panel. Other features include a built-in Enhanced IDE controller that provides convenient high-speed PCI Bus Master connections to up to four IDE devices and IrDA support.

This chapter gives you a brief overview of the PN-6210 mainboard. In addition to basic information on the board's main components and features, it also provides advice on how to upgrade and expand it. For the very latest information and manual updates, please visit FIC's home page at: <http://www.fic.com.tw>.

Congratulations on your decision to adapt PN-6210 mainboard. With its leading-edge features and performance, the PN-6210 provides the perfect platform for state-of-the-art single and dual Pentium Pro workstations and servers.

## Main Features

The PN-6210 mainboard comes with the following features:

- **Easy Installation**  
AMI BIOS with support for power management, Plug and Play and Enhanced IDE PCI Configuration & Password features; and is 100% MS Windows 95 and Windows NT compatible.
- **Multi-Processor Support**  
Supports single or dual Intel Pentium Pro 150/166/180/200 MHz processors (upgradable to P6T) with two 387-pin ZIF sockets.
- **Leading Edge Chipset**  
Intel 440FX PCIset, including a CPU interface controller, integrated DRAM controller, synchronous ISA bus controller, PCI local bus interface, integrated power management unit.
- **Versatile Main Memory Support**  
Takes up to 512MB RAM in two banks using 72-pin SIMM modules of 4, 8, 16, 32, 64, or 128MB, with support for Fast Page Mode and EDO memory.
- **ISA & PCI Expansion Slots**  
Three 16-bit ISA and four 32-bit PCI expansion slots provide all the room you need to install a full range of add-on cards.
- **USB Support**  
Two Universal Serial Bus connectors integrated into rear I/O panel.
- **Enhanced PCI Bus Master IDE Controller**  
Integrated Enhanced PCI local bus IDE controller with two connectors supports up to four IDE devices such as Hard Disk, CD-ROM or Tape Backup drives.
- **Super Multi I/O**  
Integrated NS 87334/336 Multi I/O chipset features two 16550A UART compatible serial ports, one EPP/ECP capable parallel port, one IR port, and one Floppy Disk Drive connector.

## This User Manual

This manual is designed to guide you and facilitate your use of the PN-6210 mainboard. It contains a description of the design and features of the mainboard, and also includes useful information for changing the configuration of the board and the system it is installed in. The manual is divided into three chapters:

- **Chapter 1 - Overview**  
gives an overview of the mainboard and describes its major components and features.
- **Chapter 2 - Installation Procedures**  
gives instructions on how to set up the mainboard, including jumper settings and CPU installation guides.
- **Chapter 3 - AMI BIOS Setup**  
briefly explains the mainboard's BIOS system setup in general and tells you how to run it and change the system configuration settings.

**NOTE :** The material in this manual is for information only and is subject to change without notice. We reserve the right to make changes in the product design without reservation and without notification to its users. We shall not be liable for technical or editorial omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

## Something Interesting

This section provides useful information that you will need to know should you decide to modify or upgrade the configuration of the mainboard and the system it is installed in. If you do not have the confidence to upgrade the mainboard yourself, we advise that you consult a qualified service technician for assistance.

## The BIOS Setup Utility

The BIOS (Basic Input Output System) is the basic firmware that instructs the computer how to operate. For the BIOS to work properly, a record of the computer's hardware and configuration settings exist to refer to. This record is created using the Setup Utility, a program that is stored permanently in the BIOS ROM chip on the mainboard.

The system configuration record created by the Setup Utility is also stored on the mainboard, but not permanently. This section of the memory is stored in the NVRAM.

When you buy your computer, the system configuration record will already be set and may in some cases differ from the basic defaults. The first time you use your computer or when you need to re-configure your system, you should run the Setup Utility and write down the settings. Please see Chapter 3 for an explanation on how to run the Setup Utility.

## IRQ Functionality

As you read through this manual, you will see the term IRQ on a number of occasions. It is important for you to know what this term means, particularly if you intend to upgrade your system.

IRQ stands for Interrupt Request, the process in which an input or output device tells the processor to temporarily interrupt its current task and immediately process something from the source of the interrupt. When it has completed this, the processor returns to the task it was already processing. Devices that need an IRQ line to operate sometimes need to have exclusive use of that line.

A large number of add-on cards, such as sound cards and LAN cards, require the use of an IRQ line to function. There is a total of 14 IRQs (0-15, no 2,8) available in a system, although some of them may already be in use by components in the system such as the keyboard and mouse. Add-on cards that need to use an IRQ draw from the unused group of IRQs. When installing a card that uses an IRQ, it will have a default IRQ setting which you might have to change if that IRQ is already in use and cannot be shared.

Both ISA and PCI add-on cards may need to use IRQs. System IRQs are available to add-on cards installed on the ISA bus first; the remaining ones can be used by cards installed on the PCI bus. There are two categories of ISA add-on cards: so-called Legacy ISA cards, which need to be configured manually and then installed in any available ISA slot; and Plug and Play (PnP) ISA cards, which are configured automatically by the system. As a result, when you install Legacy ISA cards, you have to carefully configure the system to ensure that the installed cards do not conflict with each other by having the same IRQ. With PnP cards, on the other hand, IRQs are assigned automatically from the ones available in the system. In the case of PCI add-on cards, the BIOS automatically assigns an IRQ card to the PCI slot the card is installed in. For further details on this topic, please see Chapter 3 of this manual.

## DMA Channels of ISA Cards

Some Legacy and PnP ISA add-on cards may also need to use a Direct Memory Access (DMA) channel. DMA assignments for this mainboard are handled in the same way as the IRQ assignment process outlined above. For more information, please refer to Chapter 3 of this manual.

## Enhanced IDE

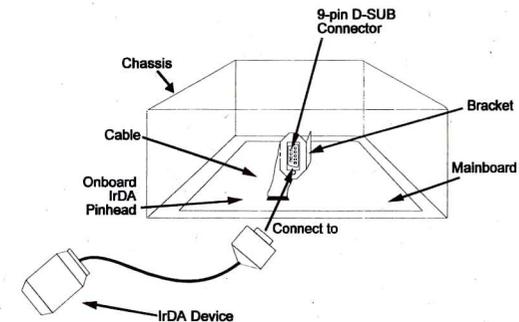
This mainboard features an integrated Enhanced IDE controller that provides convenient, high-speed connections with up to four IDE devices, such as Hard Disk, CD-ROM and Tape Backup Drives. Enhanced IDE is an upgrade of the original IDE specification and provides increased capabilities and performance in a number of areas, including support for Hard Disk Drives of over 1.2 GB and faster data transfer rates utilizing the PIO Mode 4 timing scheme.

With the integrated IDE controller you can connect up to four IDE peripheral devices to your system. All devices are categorized in the same way that IDE Hard Disks were configured in the past, with one device set as the Master device and the other as the Slave device. We recommend that Hard Disk Drives use the Primary IDE connector and that CD-ROM drives utilize the Secondary IDE connector for improved system performance.

## Serial Infrared (SIR) Connections

This mainboard features support for highly-sophisticated SIR technology, which allows bi-directional and cordless data transactions with other IrDA compliant computers and peripheral devices using infrared as a medium. This transmission is carried out in either Full Duplex Mode or Half Duplex Mode. The former allows simultaneous data transmission and reception, while the latter disables the reception when transmission occurs. The SIR becomes active at a speed of 3/16 bauds or 16ns.

The I/O chipset on this mainboard features a SIR interface that is fully compliant with the IrDA standard. An IrDA device can be installed via a 9-pin D-SUB connector in the rear panel of the computer, which is linked via a cable to the onboard IrDA pinhead, as shown in the illustration below.

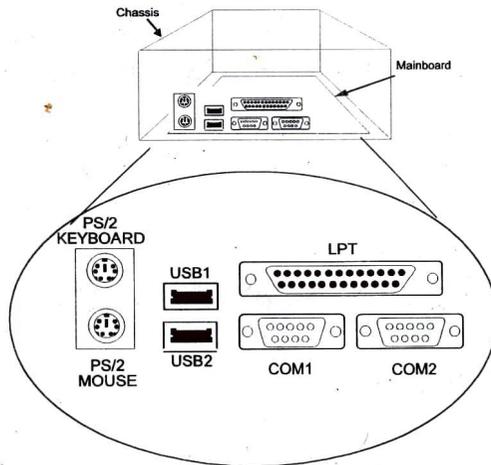


The serial port COM2 on this mainboard is designed to be an SIR compliant port. If you wish to install the SIR connection feature, please refer to Page 3-10 in this manual to adjust the BIOS option for high-speed performance.

## Highly Convenient Integrated I/O Connectors

This mainboard features an integrated rear I/O panel that incorporates a full set of I/O ports to allow simple and convenient connections to a complete selection of external peripheral devices.

In addition to two 16550A UART compatible serial ports and one EPP/ECP capable parallel port, the panel features two USB connectors that provide high speed connection to the next generation of USB devices. PS/2 keyboard and PS/2 mouse connectors provide additional I/O connectivity.



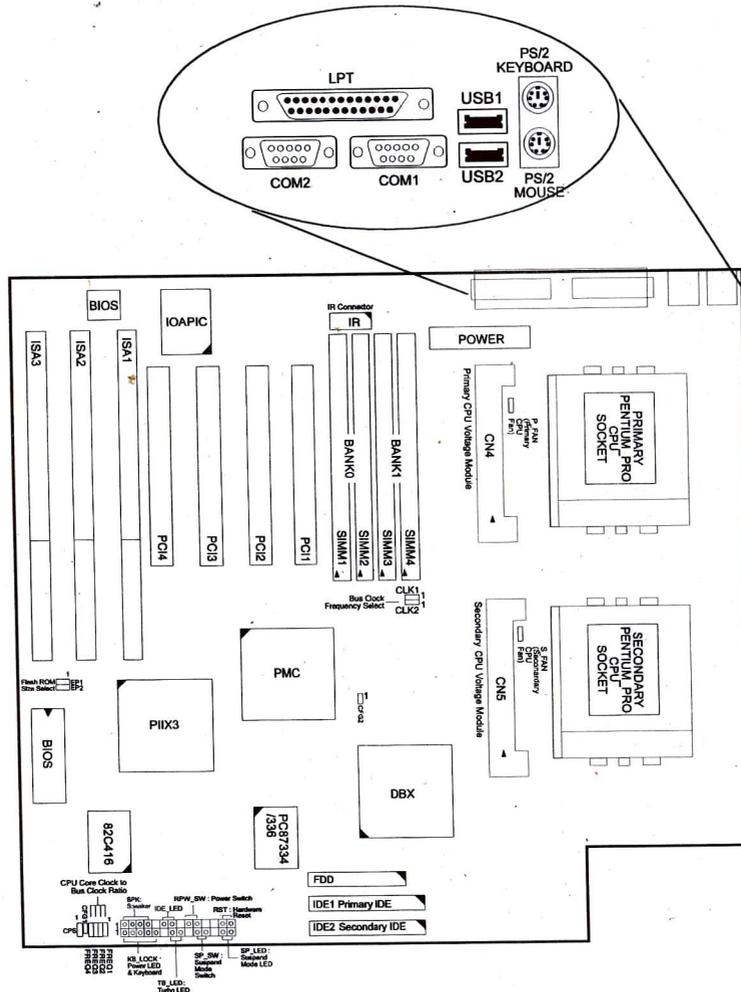
## Installation Procedures

The PN-6210 has several user-adjustable jumpers on the board that allow you to configure your system to suit your requirements. This chapter contains information on the various jumper settings on your mainboard.

To set up your computer, you should follow these installation steps:

- Step 1 -  
Set system jumpers
- Step 2 -  
Install DRAM modules
- Step 3 -  
Install the CPU
- Step 4 -  
Install expansion cards
- Step 5 -  
Connect cables and power supply
- Step 6 -  
Set up BIOS feature (Please read Chapter Three.)

## Mainboard Layout



### JUMPERS

CPS	P12	2-pin male	clear password
CLK1, 2	P19	3-pin male	set the external frequency of the CPU
EP1, 2	P13	3-pin male	select the flash ROM type
FREQ1, 2, 3, 4	P19	2-pin male	set the internal frequency of the CPU

### SLOTS

ISA	P21	a 16-bit ISA bus expansion slot
PCI	P21	a 32-bit PCI bus expansion slot
SIMM	P16	DRAM expansion slot

### CONNECTORS

CN4, 5	P17	40-pin block	<i>connect to...</i> the primary and secondary CPU voltage module sockets
COM1, 2	P23	9-pin D-Sub	the serial port devices
P_FAN	P23	2-pin male	the primary CPU fan
S_FAN	P23	2-pin male	the secondary CPU fan
FLOPPY	P24	34-pin block	the floppy diskette drive
IR	P24	10-pin male	the serial infrared device
F_PNL	P25	28-pin block	power indicator, keyboard lock, system speed indicator, suspend mode switch, suspend mode indicator, speaker, IDE HDD I/O indicator, remote power switch, hardware reset IDE HDD
PRIMARY, SECONDARY	P26	40-pin block	
POWER	P27	20-pin block	the power supply
PRINTER	P27	26-pin male	the printer
PS2_KB	P28	6-pin female	the PS/2 keyboard
PS2_MS	P28	6-pin female	the PS/2 mouse
USB1, 2	P29		the USB hub
CFG1, CFG2			manufacturing use

## 1). Set System Jumpers

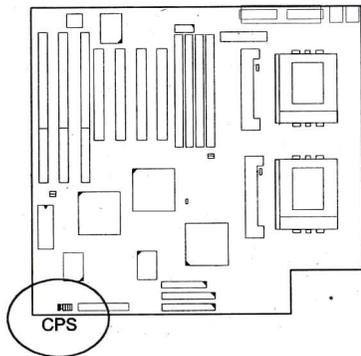
### Jumpers

Jumpers are used to select the operation modes for your system. Some jumpers on the board have three metal pins with each pin representing a different function. To "set" a jumper, a black cap containing metal contacts is placed over the jumper pin/s according to the required configuration. A jumper is said to be "shorted" when the black cap has been placed on two of its pins.

**NOTE :** Users are not encouraged to change the jumper settings not listed in this manual. Changing the jumper settings improperly may adversely affect system performance.

### Clear Password: CPS

The password clear jumper lets you set the password configuration to "Enabled" or "Disabled". You may need to enable password clear if you forget your password.



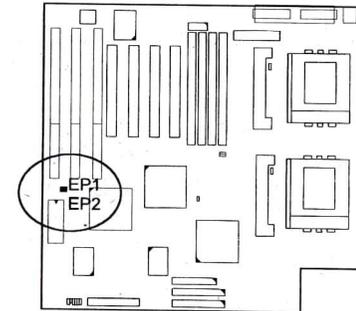
Enabled



Disabled (Default)

### Flash EPROM Type Selection: EP1 and EP2

These two jumpers allow you to select the flash EPROM mode under different sizes, 1MB and 2MB. The default settings are SST rows in both tables below.



#### EPROM Size is 1MB :

	EP1	EP2
AMD	1	1
Intel/MIXC	1	1
ATMEL	1	1
SST	1	1

#### EPROM Size is 2MB :

	EP1	EP2
AMD	1	1
Intel/MIXC	1	1
ATMEL	1	1
SST	1	1

## 2). Install DRAM Modules

### DRAM Memory

The working space of the computer is the Random Access Memory. The system cannot act upon data unless it is loaded into RAM. A system RAM is comprised of industry-standard 72-pin Single In-line Memory Modules (SIMMs).

Occasionally, the system must break apart data files because the entire file does not fit into the RAM area. Consequently, when the system needs data that is not in RAM, it must access the disk where the balance of the data is stored. Compared to the lightening speed access the system has to RAM, accessing a mechanical disk drive is a slow process.

Extended Data Out (EDO) memory is the a high-speed DRAM chip designs that performs a lot better than the fast page mode DRAM type. With EDO memory, CPU access to memory is 10% to 15% faster.

When more RAM is added, the working area of the computer is larger, thereby increasing total performance. You should verify the type and speed of the RAM currently installed from your dealer. Mixtures of RAM types, other than those described in this manual, will have unpredictable results.

The PN-6210 is able to support standard FPM and EDO DRAM; and can accommodate onboard memory from 8 to 512MB using SIMMs (Single In-line Memory Modules). The mainboard has two memory banks - Bank 0 and Bank 1. Each bank has two SIMM sockets which can accept either a pair of 4MB, 8MB, 16MB, 32MB, 64MB, or 128MB SIMMs.

Banks 0 and 1 can use different types of SIMMs (e.g. 4 or 16MB). However, you must populate each memory bank with the same type of SIMM. For example, Bank 0 may contain two 4MB SIMMs and Bank 1 may contain two 16MB SIMMs.

### DRAM Configuration

DRAM modules can be installed in a variety of configurations as shown below:

TOTAL MEMORY	BANK 0 (72-PIN X 2)	BANK 1 (72-PIN X 2)
8MB	4MB & 4MB	
16MB	8MB & 8MB	
	4MB & 4MB	4MB & 4MB
24MB	8MB & 8MB	4MB & 4MB
32MB	8MB & 8MB	8MB & 8MB
	16MB & 16MB	
40MB	16MB & 16MB	4MB & 4MB
48MB	16MB & 16MB	8MB & 8MB
64MB	16MB & 16MB	16MB & 16MB
	32MB & 32MB	
72MB	32MB & 32MB	4MB & 4MB
80MB	32MB & 32MB	8MB & 8MB
96MB	32MB & 32MB	16MB & 16MB
128MB	32MB & 32MB	32MB & 32MB
	64MB & 64MB	
256MB	64MB & 64MB	64MB & 64MB
512MB	128MB & 128MB*	128MB & 128MB*

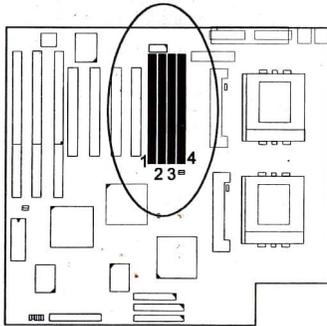
#### NOTE :

1. All memory banks use 72-pin memory modules.
2. \* A SIMM of this size was not available yet for testing when this manual was printed.

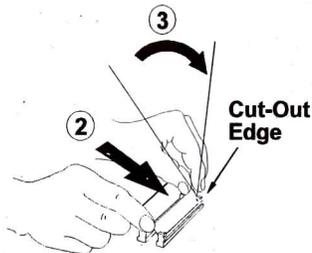
### Installation Instructions

**NOTE :** Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.

1. Locate the SIMM banks on the mainboard.



1. Carefully fit a SIMM at a 45 degree angle into each of the empty sockets to be populated. All the SIMMs should be facing the same direction.
3. Swing each SIMM into its upright, locked position. When locking a SIMM in place, push on each end of the SIMM - do not push in the middle.



### Remove SIMMs

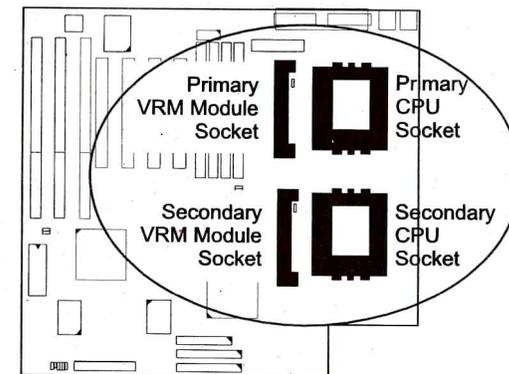
To remove the SIMMs, pull the retaining latch on both ends of the socket and reverse the procedure above.

### Cache Memory

The PN-6210 utilizes the built-in Level 2 cache of 256KB/512KB in the processor. Every time the processor wants to write data to the external memory, if the location in SRAM is a "hit", it writes this data to the cache SRAM directly, not to the DRAM, thereby enhances system performance.

### 3). Install the CPUs

The PN-6210 accommodates two Pentium Pro processors for leading-edge server performance. The CPU modules reside in the Zero Insertion Force (ZIF) sockets on the mainboard.



#### CAUTION :

1. Always turn the system power off before installing or removing any device.
2. Always observe static electricity precautions.
3. Inserting the CPU chip incorrectly may damage the chip.

To install the CPUs and VRM modules, do the following:

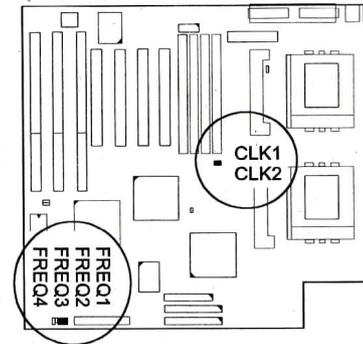
1. Lift the lever on the side of the Primary CPU socket.
2. Handle the chip by its edges and try not to touch any of the pins.
3. Place the CPU in the socket. The chip has a notch to correctly orientate the chip. Align the notch with pin one of the socket. Pin one locates around the triangular blank area. Do not force the chip. The CPU should slide easily into the socket.
4. Swing the lever to the down position to lock the CPU in place.
5. See the following section for information on the CPU jumper settings.
6. Install the VRM module into the respective VRM module socket. That is, if the primary CPU is installed, the VRM module should be installed into the primary VRM module socket; if the secondary CPU is installed, the VRM module should be installed into the secondary VRM module socket. When the VRM module resides in the VRM module socket, the clips at both ends of the socket will close up to affix the module firmly in the socket.
7. Similarly, install the secondary CPU and the secondary VRM module if needed.

To remove the CPUs and VRM modules, simply reverse the procedures introduced above.

**NOTE :** There is no jumper setting or BIOS feature configuration needed if two CPU are onboard. The BIOS detects and configures this case automatically.

**CPU External Clock (Bus) Frequency: CLK1 and CLK2**

The table below shows the jumper settings for the different CPU speed configurations. Set the corresponding External Clock and CPU Clock Rate jumpers according to the CPU speed of the system by following the tables below.



External (CPU/CLK)	CLK1	CLK2
66 MHz		
60 MHz		
50 MHz		

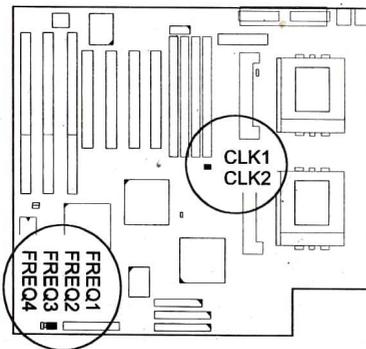
**CPU to Bus Frequency Ratio: FREQ1, FREQ2, FREQ3, and FREQ4**

These four jumpers, in combinations, are used to decide the ratio of the internal frequency of the CPU to the bus clock.

Internal	CPU Clock Rate			
	FREQ1	FREQ2	FREQ3	FREQ4
4 x Ext.				
3.5 x Ext.				
3 x Ext.				
2.5 x Ext.				
2 x Ext.				

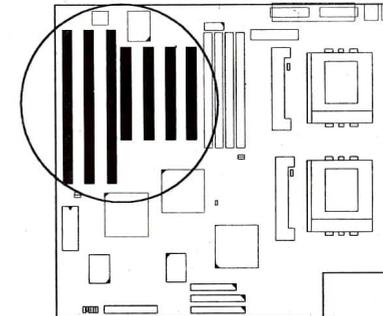
**Intel Pentium Pro Processors**

CPU Speed	External (CPU/CLK)	CLK1	CLK2	CPU Clock Rate				
				Internal	FREQ1	FREQ2	FREQ3	FREQ4
200 MHz	66 MHz			3 x Ext.				
200 MHz	50 MHz			4 x Ext.				
180 MHz	60 MHz			3 x Ext.				
166 MHz	66 MHz			2.5 x Ext.				
150 MHz	60 MHz			2.5 x Ext.				
150 MHz	50 MHz			3 x Ext.				



**4). Install Expansion Cards**

Your PN-6210 features three 16-bit ISA Bus and four 32-bit PCI Bus expansion slots.

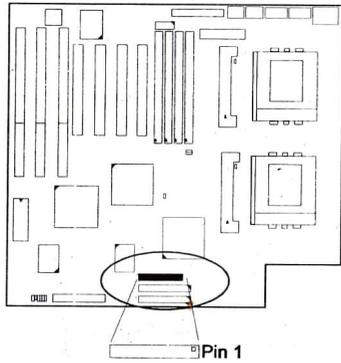


This section describes how to install an expansion card to one of your system's expansion slots. Expansion cards are printed circuit boards that, when connected to the mainboard, increase the capabilities of your system. For example, expansion cards can provide video and sound capabilities.

- CAUTION :**
1. Always turn the system power off before installing or removing any device.
  2. Always observe static electricity precautions.  
See "Handling Precautions" at the start of this manual.

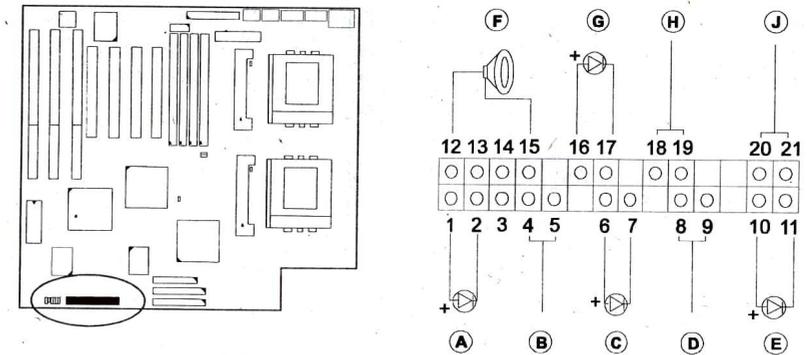
**Floppy Diskette Drive Connector: FLOPPY**

This 34-pin block connector is linked to your floppy diskette drive (FDD) using the cable that is provided with this mainboard.



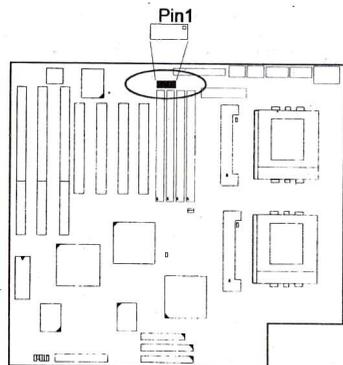
**Front Panel I/O Block Connector: F\_PNL**

This block connector includes: PW\_LED, KB\_LOCK, TB\_LED, SP\_SW, SP\_LED, SPK, IDE\_LED, RPW\_SW, RST connectors.



**Infrared Connector: IR**

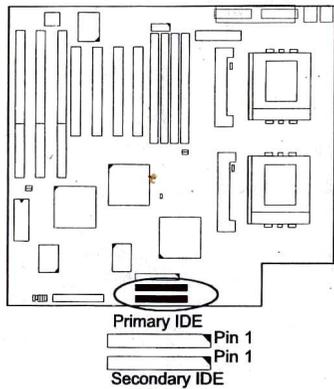
This 10-pin male connector is used for connecting to the serial infrared (SIR) port and allows transmission of data to another system which also supports the SIR feature.



Item	Connector	Pin Type	Feature
A	PW_LED	2-pin male	indicates the system power status
B	KB_LOCK	2-pin male	allows the keyboard to access the system
C	TB_LED	2-pin male	indicates the system speed is in normal or turbo speed
D	SP_SW	2-pin male	Suspend Mode switch
E	SP_LED	2-pin male	indicates the system into Suspend Mode when LED lit
F	SPK	4-pin male	connects to speaker
G	IDE_LED	2-pin male	indicates the IDE HDD I/O access LED lit
H	RPW_SW	2-pin male	Remote Power switch
I	RST	2-pin male	allows you to reset the system

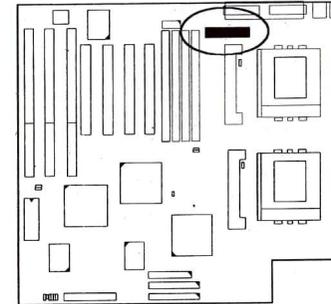
**IDE HDD Device Connectors: PRIMARY and SECONDARY**

These two 40-pin block connectors are used for your IDE hard disk drives. If you have one IDE hard disk, connect it to the PRIMARY connector. The BIOS automatic detection sets it to be a "Primary Master" hard disk drive. If you want to install another IDE hard disk drive or CD-ROM, please use the SECONDARY connector. If two hard disk drives are connected to the PRIMARY connector via the same flat ribbon cable, one of them is the Master Drive, the other is the Slave Drive. You may need to configure some jumpers for the Slave Drive; refer to the respective HDD manual for details.



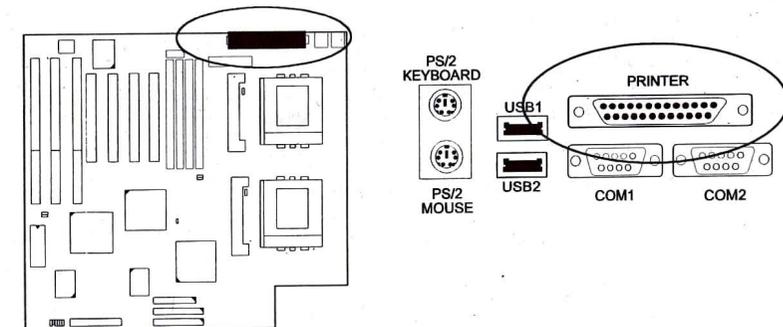
**ATX Power Connector: POWER**

This 20-pin male block connector is used for connecting to your ATX power supply.



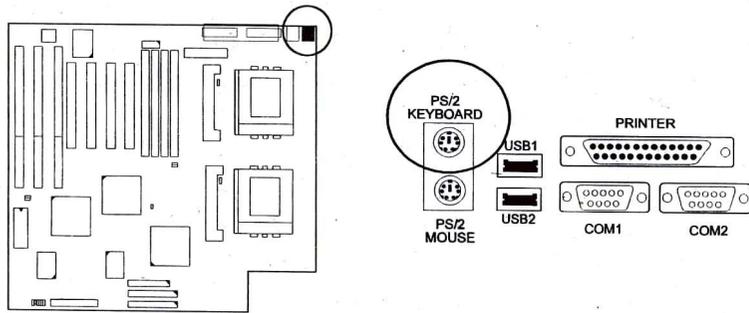
**Printer Block Connector: PRINTER**

This 26-pin male block connector is attached to your printer via the printer cable.



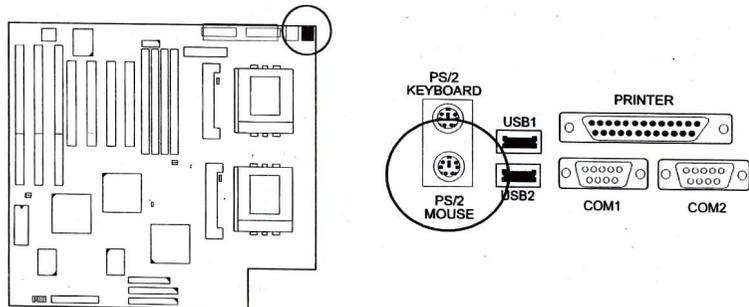
**PS/2 Keyboard Connector: PS2\_KB**

This 8-pin female connector is used for your PS/2 keyboard.



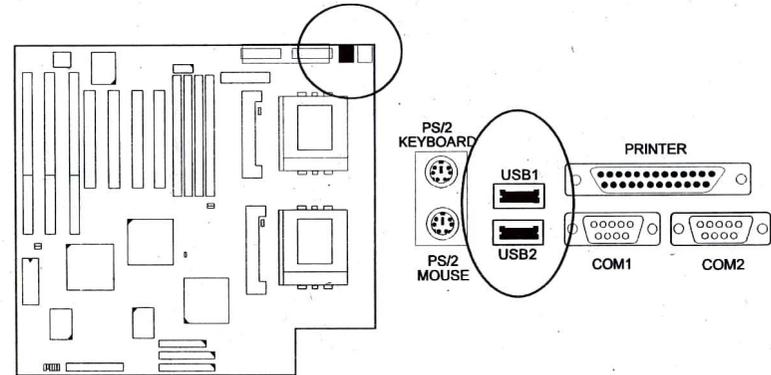
**PS/2 Mouse Connector: PS2\_MS**

This 8-pin female connector is used for your PS/2 mouse.



**Universal Serial Bus Connectors: USB1 and USB2**

These two connectors are connected to the port that allows you to attach a USB hub.



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## **AMI BIOS Setup**

The PN-6210 comes with the AMI BIOS chip that contains the ROM Setup information of your system. This chip serves as an interface between the processor and the rest of the mainboard's components. This chapter explains the information contained in the Setup program and tells you how to modify the settings according to your system configuration.

### **CMOS Setup Utility**

A Setup program, built into the system BIOS, is stored in the CMOS RAM that allows the configuration settings to be changed. This program is executed when the user changes system configuration; the user changes system backup battery; or the system detects a configuration error and asks the user to run the Setup program. As power-on RAM testing, the message Hit DEL if you want to run SETUP appears. Use the arrow keys to select and press Enter to run the selected program.

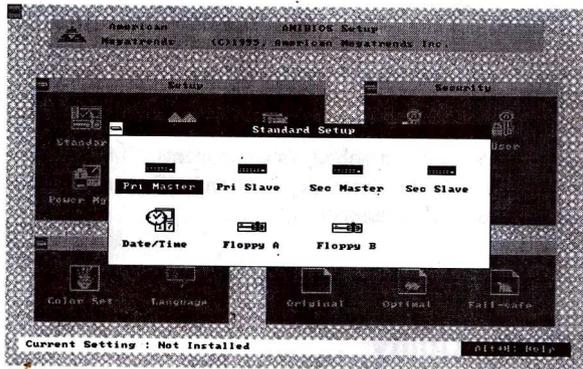
Use the Tab key to select a windows group, and the left and right arrow keys to choose an item, then press Enter. Use the up and down arrows keys to modify an item and select values, then press Enter. After completing your changes, press Esc to leave the current operation and return to the previous level.

You also may use a mouse to point at an item in a Windows group that you wish to modify and double-click the left mouse button. When the items that you wish to modify appears, use the cursor to select the values and then press the left mouse button to complete the changes.

Use the cursor to press the exit box in the Windows group's upper left corner to leave the current operation and return to the previous level.

Press Alt+H for Help.

## Standard Setup



Standard Setup options are displayed by choosing the Standard icon from the AMI BIOS Setup menu. All Standard Setup options are described below.

### Date/Time

Select the Date/Time option to change the date or time. The current date and time are displayed. Enter new values through the displayed window.

### Floppy Drive A, B

Choose the Floppy Drive A or B icon to specify the floppy drive type. The options are 360 KB 5.25"; 1.2 MB 5.25"; 720 KB 3.5"; 1.44 MB 3.5"; or 2.88 MB 3.5".

### Hard Disk Configurations

Choose these icons to configure the hard disk drive named in the option. When you click on an icon, the following parameters are listed: Type, LBA/Large Mode, Block Mode, 32Bit Mode, and PIO Mode. All parameters relate to IDE drives except Type.

### User-Defined Drive

If you are configuring a SCSI drive or an MFM, RLL, ARLL, or ESDI drive with drive parameters that do not match drive types 1-46, you must select User in the Type field. You must then enter the drive parameters on the screen that appears.

## Parameter Description

### Type :

The number for a drive with certain identification parameters.

### Cylinders :

The number of cylinders in the disk drive.

### Heads :

The number of heads.

### Write Precompensation :

The size of a sector gets progressively smaller as the track diameter diminishes. Yet each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number where write precompensation begins.

### Sectors :

The number of sectors per track. MFM drives have 17 sectors per track. RLL drives have 26 sectors per track. ESDI drives have 34 sectors per track. SCSI and IDE drives have more sectors per track.

### Capacity :

The formatted capacity of the drive is (Number of heads) x (Number of cylinders) x (Number of sectors per track) x (512 bytes per sector).

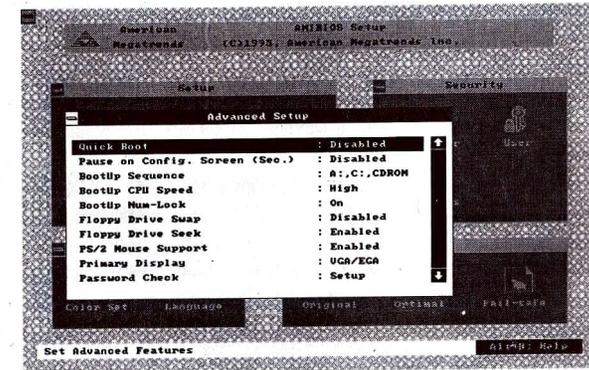
**Configuring IDE Drives :**

If the hard disk drive to be configured is an IDE drive, select the appropriate drive icon (Pri Master, Pri Slave, Sec Master, or Sec Slave). Choose the Type parameter and select Auto. AMI BIOS automatically detects the IDE drive parameters and displays them. Click on the OK button to accept these parameters. Click on LBA/Large Mode and choose On to enable support for IDE drives with capacities greater than 528 MB. Click on Block Mode and choose On to support IDE drives that use Block Mode. Click on 32Bit Mode and click on On to support IDE drives that permit 32-bit accesses. Click on PIO Mode to select the IDE Programmed I/O mode.

The settings are Auto, 0, 1, 2, 3, 4, or 5. Click on Auto to allow AMI BIOS to automatically choose the PIO mode that the IDE drive being configured uses. If you select 0-5 you must make absolutely certain that you are selecting the PIO mode supported by the IDE drive being configured.

**Configuring a CD-ROM Drive :**

Select the appropriate drive icon (Pri Master, Pri Slave, Sec Master, or Sec Slave). Choose the Type parameter and select CDROM. You can boot the computer from a CD-ROM drive.

**Advanced Setup****Quick Boot**

Set this option to Enabled to instruct AMI BIOS to boot quickly when the computer is powered on. This option replaces the old Above 1 MB Memory Test Advanced Setup option.

The settings are Disabled or Enabled. The default setting is Disabled.

**Pause on Config. Screen (Sec.)**

This option specifies the length of the period of the configuration screen when the system boots up.

The settings are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 (seconds), or Disabled. The default setting is Disabled.

**BootUp Sequence**

This option sets the sequence of boot drives (floppy drive A:, hard disk drive C:, or a CD-ROM drive) that the AMI BIOS attempts to boot from after AMI BIOS POST completes.

The settings are A:, C:, CDROM; C:, A:, CDROM; CDROM, C:, A:.

The default setting is A:, C:, CDROM.

**BootUp CPU Speed**

This option lets you specify the CPU speed at system boot.  
The settings are Low or High. The default setting is High.

**BootUp Num-Lock**

Set this option to Off to turn the Num Lock key off when the computer is booted so you can use the arrow keys on both the numeric keypad and the keyboard.

The settings are On or Off. The default setting is On.

**Floppy Drive Swap**

Set this option to Enabled to permit drives A: and B: to be swapped.  
The settings are Disabled or Enabled. The default setting is Disabled.

**Floppy Drive Seek**

Set this option to Enabled to specify that floppy drive A: will perform a Seek operation at system boot.

The settings are Disabled or Enabled. The default setting is Enabled.

**PS/2 Mouse Support**

When this option is set to Enabled, AMI BIOS supports a PS/2-type mouse.  
The settings are Enabled or Disabled. The default setting is Enabled.

**Primary Display**

This option specifies the type of display monitor and adapter in the computer.

The settings are Mono, VGA/EGA, CGA40x25, CGA80x25, or Absent. The default setting is VGA/EGA.

**Password Check**

This option enables password checking every time the computer is powered on or every time AMI BIOS Setup is executed. If Always is chosen, a user password prompt appears every time the computer is turned on. If Setup is chosen, the password prompt appears if AMI BIOS is executed.

The settings are Setup and Always. The default setting is Setup.

**OS/2 Compatible Mode**

If DRAM size is over 64MB, set this option to Enabled to permit AMI BIOS to run with IBM OS/2.

The settings are Enabled or Disabled. The default setting is Disabled.

**Internal Cache**

This option specifies the caching algorithm used for L1+L2 internal cache memory. If Disabled is selected, L1+L2 is disabled. If WriteThru is selected, use the write-through caching algorithm. If WriteBack is selected, use the write-back caching algorithm.

The settings are Disabled, WriteBack, or WriteThru. The default setting is WriteBack.

**System BIOS Shadow Cacheable**

When this option is set to Enabled, the contents of the F0000h system memory segment can be read from or written to L2 cache memory. The contents of the F0000h memory segment are always copied from the BIOS ROM to system RAM for faster execution.

The settings are Enabled or Disabled. The default setting is Enabled.

C000,16K Shadow; C400,16K Shadow;  
C800,16K Shadow; CC00,16K Shadow;  
D000,16K Shadow; D400,16K Shadow;  
D800,16K Shadow; DC00,16K Shadow

These options 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.

[Enabled]

The contents of the named ROM are written to the same address in system memory (RAM) for faster execution.

[Cached]

The contents of the named ROM area are written to the same address in system memory (RAM) for faster execution, if an adapter ROM will be using the named ROM area. Also, the contents of the RAM area can be read from and written to cache memory.

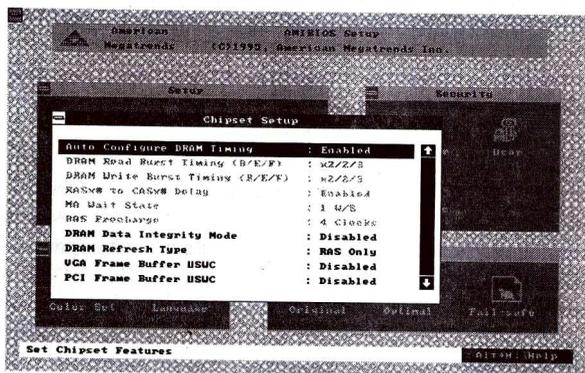
[Disabled]

The ROM is not copied to RAM. The contents of the ROM cannot be read from or written to cache memory.

The default settings of C000 and C400 are Cached.

The default settings of C800, CC00, D000, D400, D800, and DC00 are Disabled.

## Chipset Setup



### Auto Configure DRAM Timing

When set at Disabled, it allows you to configure the features that from the second one (DRAM Read Burst Timing) to the sixth one (RAS Precharge). The settings are Disabled, Enabled. The default setting is Enabled.

### DRAM Read Burst Timing (E/F)

When Auto Configure DRAM Timing set at Disabled, allows you to define the DRAM read burst timing. The settings are  $x/4/4$ ,  $x/3/4$ ,  $x/2/3$ , or  $x/2/3$ . The default setting is  $x/2/3$ , depends on the CPU frequency and DRAM type.

### DRAM Write Burst Timing (E/F)

When Auto Configure DRAM Timing set at Disabled, allows you to define the DRAM write burst timing. The settings are  $x/4/4$ ,  $x/3/4$ ,  $x/3/3$ , or  $x/2/3$ . The default setting is  $x/2/3$ , depends on the CPU frequency and DRAM type.

### RAS# to CAS# Delay

When Auto Configure DRAM Timing set at Disabled, allows you to define the delay time that from the DRAM RAS# active to CAS# active. The settings are Disabled or Enabled. The default setting is Enabled, depends on the CPU frequency and DRAM type.

### MA Wait State

Allows you to select the memory address wait state. The settings are 0 W/S, or 1W/S. The default setting is 1 W/S.

### RAS Precharge

Allows you to select the DRAM RAS# Precharge Time. The settings are 4 Clocks, or 3 Clocks, . The default setting is 4 Clocks.

### DRAM Data Integrity Mode

Allows you to select the DRAM data integrity mode: ECC (Error checking /generation and correction) or Parity (Parity generation and checking). The settings are Disabled, Parity, or ECC. The default setting is Disabled.

### DRAM Refresh Type

Allows you to select the DRAM refresh type: RAS only or CAS before RAS. The settings are CAS/RAS or RAS Only. The default setting is RAS Only.

### VGA Frame Buffer USWC

Allows you to enable or disable the VGA frame buffer cacheable. When set at Enabled, the VGA frame buffer A000-BFFF will set to USWC cache type and improve VGA performance. The settings are Enabled or Disabled. The default setting is Disabled.

### PCI Frame Buffer USWC

Allows you to enabled or disable PCI VGA frame buffer cacheable. When set at Enabled, the PCI frame buffer address got from PCI configuration space (offset 10h) will set the USWC cache type and improve VGA performance. The settings are Enabled or Disabled. The default setting is Disabled.

### Fixed Memory Hole

When enabled, the memory hole at 15MB address will be relocated to the 15~16MB address range of the ISA cycle when the processor accesses the 15~16MB address area.

When Disabled, the memory hole at the 15MB address will be treated as a DRAM cycle when the processor accesses the 15~16MB address area. The settings are Disabled, 512KB-640KB, or 15MB-16MB. The default setting is Disabled.

**PCI Burst Write Combine**

When enabled, allows the PCI cycle to achieve a higher performance.  
The settings are Disabled or Enabled. The default setting is Disabled.

**8-Bit I/O Recovery Times**

This option specifies the length the delay (in SYSCLKs) inserted between consecutive 8-bit I/O operations.

The settings are Disabled, 1, 2, 3, 4, 5, 6, 7, 8. The default setting is 1 SYSCLK.

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

This option specifies the length the delay (in SYSCLKs) inserted between consecutive 16-bit I/O operations.

The settings are Disabled, 1, 2, 3, 4. The default setting is 1 SYSCLK.

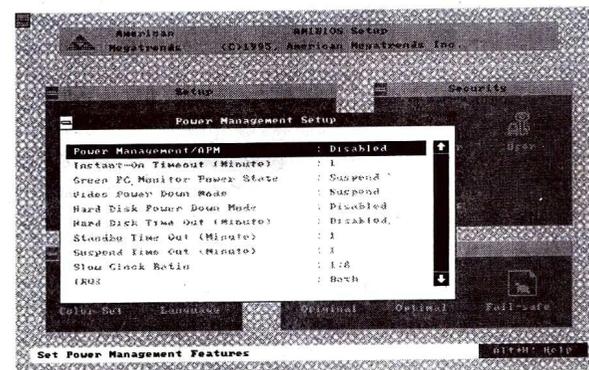
**Universal Serial Bus**

This option allows you to enable the Universal Serial Bus (USB) feature.  
The settings are Disabled or Enabled. The default setting is Disabled.

**USB Keyboard Support**

If you use USB keyboard, set at Enabled. Otherwise, keep it disabled. When enabled, allows the BIOS to detect and initiate the USB keyboard for making the keyfunctions of POST work.

The settings are Disabled or Enabled. The default setting is Disabled.

**Power Management Setup**

Power Management Setup options are displayed by choosing the Power Management from the Setup main menu. All Power Management Setup options are described in this section.

**Power Management/APM**

Set this option to Enabled to enable the power management and APM (Advanced Power Management) features.

The settings are Enabled, Inst-On, or Disabled. The default setting is Disabled.

**Instant-On Timeout (Minute)**

Set this option to allow the computer to go to full power on mode when leaving a power-conserving state. This option is only available if supported by the computer hardware. AMI BIOS uses the RTC Alarm function to wake the computer at a pre-specified time.

The settings are Disabled, 1 Min (minutes), and all one minute intervals up to and including 15 Min. The default setting is 1 Min.

**Green PC Monitor Power State**

Specifies the power management state that the Green PC-compliant video monitor enters after the specified period of display inactivity has expired. The settings are Suspend, Off, Blank, or Standby. The default setting is Suspend.

**Video Power Down Mode**

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

The settings are Disabled, Standby, or Suspend. The default setting is Suspend.

**Hard Disk Power Down Mode**

This option specifies the power management state that the hard disk drive enters after the specified period of display inactivity has expired.

The settings are Disabled, Standby, or Suspend. The default setting is Disabled.

**Hard Disk Time Out (Minute)**

This option specifies the length of a period of hard disk inactivity. When this period expires, the hard disk drive enters the power-conserving mode specified in the Hard Disk Power Down Mode option described above.

The settings are Disabled, 1 Min (minutes), and all one minute intervals up to and including 15 Min. The default setting is Disabled.

**Standby Time Out (Minute)**

This option specifies the length of the period of system inactivity when the computer is in Full-On mode before the computer is placed in Standby mode. In Standby mode, some power use is curtailed.

The settings are Disabled, 1 Min, 2 Min, and all one minute intervals up to and including 15 Min. The default setting is 1 Min.

**Suspend Time Out (Minute)**

This option specifies the length of the period of system inactivity when the computer is already in Standby mode before the computer is placed in Suspend mode. In Suspend mode, nearly all power use is curtailed.

The settings are Disabled, 1 Min, 2 Min, and all one minute intervals up to and including 15 Min. The default setting is 1 Min.

**Slow Clock Ratio**

This option specifies the speed at which the system clock runs in power saving modes. The settings are expressed as a ratio between the normal clock speed and the power down clock speed.

The settings are 1:1, 1:2 (half as fast as normal), 1:4 (the normal clock speed), 1:8, 1:16, 1:32, 1:64, or 1:128. The default setting is 1:8.

**IRQ 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15**

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

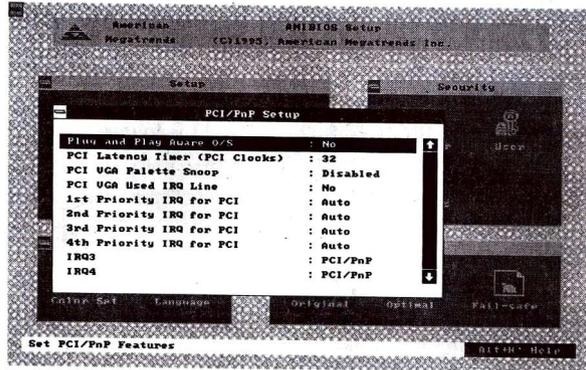
Each of these options can be set to Monitor or Ignore.

The settings are Ignore, Monitor, Wakeup, or Both.

The default settings for IRQ 3, 4, 12, 14, 15 is Both.

The default setting for IRQ 5, 7, 8, 9, 10, 11, 13 is Ignore.

## PCI / PnP Setup



PCI/PnP Setup options are displayed by choosing the PCI/PnP Setup icon from the AMI BIOS Setup main menu. All PCI/PnP Setup options are described in this section

### Plug and Play Aware O/S

Set this option to Yes if the operating system installed in the computer is Plug and Play-aware. AMI BIOS only detects and enables PnP ISA adapter cards that are required for system boot. The Windows 95 operating system detects and enables all other PnP-aware adapter cards. Windows 95 is PnP-aware. Set this option to No if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP. You must set this option correctly or PnP-aware adapter cards installed in your computer will not be configured properly.

The settings are No or Yes. The default setting is No.

### PCI Latency Timer (PCI Clocks)

This option sets latency of all PCI devices on the PCI bus. The settings are in units equal to PCI clocks.

The settings are 32, 64, 96, 128, 160, 192, 224, or 248. The default setting is 32.

### PCI VGA Palette Snoop

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

The settings are Disabled or Enabled. The default setting is Disabled.

### PCI VGA Used IRQ Line

When set at Yes, allows you to assign an IRQ to PCI VGA.

The settings are Yes or No. The default setting is No.

### Used ESCD Information

When set at Yes, allows the system to keep the ESCD (Extended System Configuration Data).

The settings are Yes or No. The default setting is No.

### 1<sup>st</sup> Priority IRQ for PCI, 2<sup>nd</sup> Priority IRQ for PCI, 3<sup>rd</sup> Priority IRQ for PCI, 4<sup>th</sup> Priority IRQ for PCI,

This option allows you to specify the IRQs for PCI add-on cards.

The settings are Auto, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15. The default setting is Auto.

### IRQ3; 4, 5, 7, 9, 10, 11, 12, 14, 15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify IRQs for use by legacy ISA adapter cards. These options determine if AMI BIOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these PCI/PnP Setup options to remove the IRQ by assigning the option to the ISA/EISA setting. Onboard I/O is configurable by AMI BIOS. The IRQs used by onboard I/O are configured as PCI/PnP.

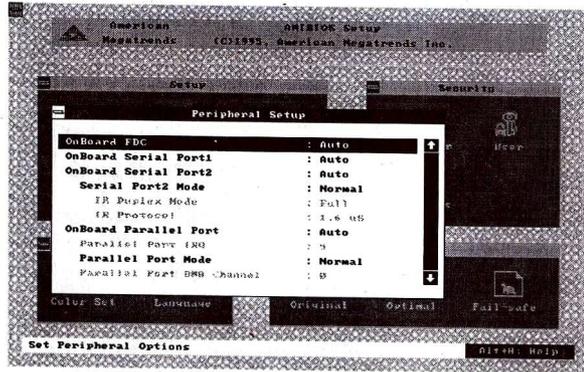
The settings are PCI/PnP or ISA/EISA. The default setting is PCI/PnP, except that the default setting for IRQ12 is ISA/EISA.

### DMA Channel 0, 1, 2, 3, 5, 6, 7

This option allows you to specify the bus type that the named DMA channels are used on.

The settings are PCI/PnP or ISA/EISA. The default setting is PCI/PnP.

## Peripheral Setup



Peripheral Setup options are displayed by choosing the Peripheral Setup icon from the AMI BIOS Setup main menu. All Peripheral Setup options are described in this section.

### Onboard FDC

This option enables the floppy drive controller on the mainboard. The settings are Auto, Enabled, or Disabled. The default setting is Auto.

### Onboard Serial Port1

This option enables serial port 1 on the mainboard and specifies the base I/O port address for serial port 1. The settings are 3F8h, 2F8h, 3E8h, 2E8h, Auto, or Disabled. The default setting is Auto.

### Onboard Serial Port2

This option enables serial port 2 on the mainboard and specifies the base I/O port address for serial port 2. The settings are 3F8h, 2F8h, 3E8h, 2E8h, Auto, or Disabled. The default setting is Auto.

### Serial Port 2 Mode

This option enables serial port 2 on the mainboard and specifies the base I/O port address for serial port 2. The settings are Normal or IR. The default setting is Normal.

### IR Duplex Mode

This options allow you to select the IR transmission modes. The settings are Full or Half. The default setting is Half.

### IR Protocol

Allows you to select the IR protocol. The settings are 1.6us or 3/16. The default setting is 3/16.

### Onboard Parallel Port

This option enables the parallel port on the mainboard and specifies the parallel port base I/O port address. The settings are 378h, 278h, 3BCh, Auto, or Disabled. The default setting is Auto.

### Parallel Port IRQ

This option allows you to select the IRQ of the parallel port. The settings are 5 or 7. The default setting is 7.

### Parallel Port Mode

This option allows you to select the mode of the parallel port. The settings are Normal, Bi-Dir, EPP, or ECP. The default setting is Normal.

### Parallel Port DMA Channel

This option allows you to select the DMA channel of the parallel port. The settings are 0, 1, or 3. The default setting is 3.

### I/O Chip Address Select

This options allows you to select the I/O chip address. The options are Auto, 26Eh, 398h, 3F0h. The default setting is Auto.

### OnBoard IDE

This option allows you to enable the primary and secondary onboard IDE features. The settings are Disabled, Primary, Secondary, or Both. The default setting is Both.

### PCI IDE BusMaster

Set this option to Enabled to specify that the IDE controller on the PCI local bus has bus mastering capability. The settings are Disabled or Enabled. The default setting is Disabled.

**OffBoard PCI IDE Card**

The option specifies if an offboard PCI IDE controller adapter card is used in the computer. You must also specify the PCI slot on the mainboard where the offboard PCI IDE controller card is installed. If an offboard PCI IDE controller is used, the onboard IDE controller on the mainboard is automatically disabled.

The settings are Disabled, Auto, Slot1, Slot2, Slot3, or Slot4. The default setting is Auto.

If Auto is selected, AMI BIOS automatically determines the correct setting for this option.

**OffBoard PCI IDE Primary IRQ**

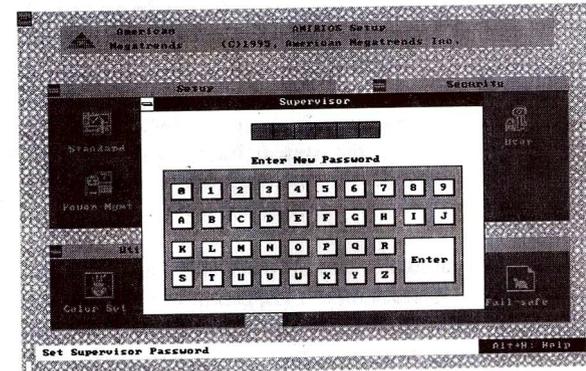
This options allow you to select the IRQs if you use an offboard primary PCI IDE card.

The settings are Disabled, INTA, INTB, INTC, INTD, Hardwired. The default setting is INTA.

**OffBoard PCI IDE Secondary IRQ**

This options allow you to select the IRQs if you use an offboard secondary PCI IDE card.

The settings are Disabled, INTA, INTB, INTC, INTD, Hardwired. The default setting is INTB.

**Security**

The system can be configured so that all users must enter a password every time the system boots or when AMI BIOS Setup is executed. You can set either a Supervisor password or a User password. If you do not use a password, Just press Enter when the password prompt appears.

The password check option is enabled in Advanced Setup by choosing either Always (the password prompt appears every time the system is powered on) or Setup (the password prompt appears only when AMI BIOS is run). The password is stored in CMOS RAM. The above screen appears when you select the supervisor icon from the security window.

You can enter a password by: typing the password on the keyboard, selecting each letter via the mouse, or selecting each letter via the pen stylus. Pen access must be customized for each specific hardware platform. When you select Supervisor or User, AMI BIOS prompts for a password. You must set the Supervisor password before you can set the User password. Enter a 1 to 6 character password. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain CMOS RAM and reconfigure the system.

### Changing a Password

Select the appropriate password icon (Supervisor or User) from the Security section of the AMI BIOS Setup main menu. Enter the password and press Enter. The screen does not display the characters entered. After the new password is entered, retype the new password as prompted and press Enter. If the password confirmation is incorrect, an error message appears. If the new password is entered without error, press Enter to return to the AMI BIOS Main Menu. The password is stored in CMOS RAM after AMI BIOS completes. The next time the system boots, you are prompted for the password if the password function is present and is enabled.

### Clear Password

If you forget your password, turn off the system power first and remove the system unit cover. Locate Jumper CPS, cap it and boot the system up once. Remove Jumper CPS and reset the system. At this point, you will not be asked for the password to enter Setup.

### Anti-Virus

Double-click this icon and a list box appears, allowing you to enable or disable the Virus Protection feature. When Enabled the BIOS issues a warning when any program or virus sends a Disk Format command or tries to write the boot sector of a hard disk drive.

The settings are Disabled or Enabled. The default setting is Disabled.

## Utility

The following icons appear in this section: Color Set and Language.

### Color Set

Color Set sets the AMI BIOS Setup screen colors: LCD, Army, Pastel, Sky.

### Language

Language allows you to select English language screen prompts and messages.

## Default Window

The Default windows has three icons that represent different BIOS default settings.

### Original

Double-click this icon to recall your last set of previous settings. This option is convenient if you change settings and decide you wish to return to the previous settings.

### Optimal

Double-click this icon for settings provide the best performance characteristics.

### Fail-safe

Double-click this icon for settings that provide a more efficient computer. If the computer will not boot, select this option and try to diagnose the problem after the computer boots. These settings do not give optimal performance.

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