



AP5C/P

User's Guide

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FCC Class B Radio Frequency Interference Statement

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables, if any, must be used in order to comply with emission limits.

About this Manual

Purpose and Scope

This manual tells how to install and configure the system board.

Organization

This manual consists of three chapters and one appendix.

Chapter 1, **Features**, covers the specifications, layout and components of the system board.

Chapter 2, **Hardware Setup**, tells how to set the jumpers, upgrade the CPU and the system memory, install the system board and add expansion cards.

Chapter 3, **AMI BIOS**, explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Appendix A, **Jumper Summary**, gives you a tabular summary of the jumper settings discussed in Chapter 2. It also gives a list of the onboard connectors.

About this Manual

Conventions

The following conventions are used in this manual:

Text entered by user,
default settings

message displayed

a, e, s, etc



Represent text input by the user, default
settings and recommended selections

Denotes actual messages that appear on
screen

Represent the actual keys that you have to
press on the keyboard.

NOTE

Gives bits and pieces of additional
information related to the current topic.

WARNING

Alerts you to any damage that might result
from not following directions.

CAUTION

Suggests precautionary measures to avoid
potential hardware or software problems.

IMPORTANT

Reminds you to take specific action
relevant to the accomplishment of the
procedure at hand.

TIP

Tells how to accomplish a procedure
through little shortcuts.

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Appendix A Jumper Summary

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Notice to User

To run Windows NT operating system using the Pentium 75/90/120/150 CPU, you must install the driver that comes with the board. Refer to **README.NT** text file for the driver installation procedure.

Features 1

The AP5C/P is a Pentium[®]-based system board that utilizes the PCI/ISA architecture. It has three PCI slots, three ISA-AT slots and one PCI-/ISA-shared slot. The board integrates the Intel 82437FX, 82438FX and 82371FB application-specific integrated circuit (ASIC) chipsets that enable the System Management Mode (SMM) function of the Pentium chip. It also includes the Green power management feature that extends energy conservation from system components to the display monitor.

The system memory is expandable to 128 MB by adding single in-line memory modules (SIMMs). The second-level cache is also upgradable to 512 KB and supports the write-back mode. The board may also come with an onboard cache module slot and a separate cache module that supports the pipeline-burst cache.

A super I/O controller and a PCI mode 4 enhanced-IDE controller with bus master support are also incorporated in the design to further enhance system performance. The board measures 220 mm x 330 mm (full baby-AT size).

Features

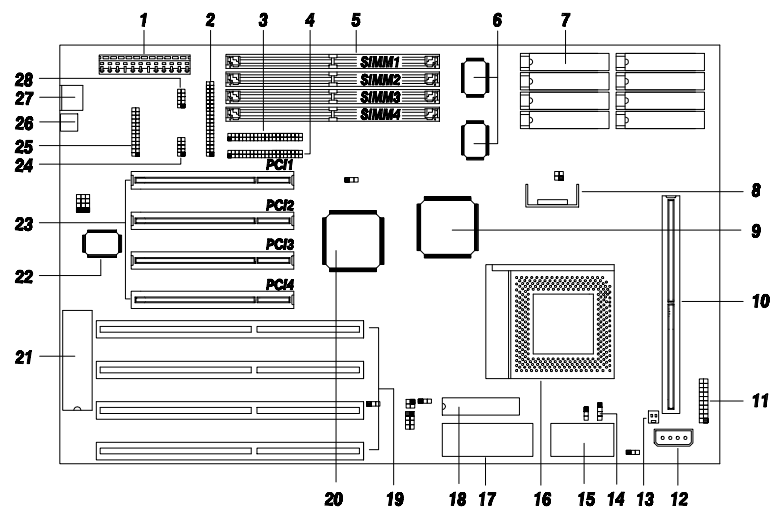
Specifications

Microprocessor	Intel Pentium (3.3V) Processor 75/90/100/120/133/150/166/200 MHz Cyrix 6x86 - P120+
Memory	128 MB
SIMM Sockets	Four 72-pin, 32-bit
ASICs	Intel 82437FX Intel 82438FX Intel 82371FB
I/O Chip	SMC 37C665GT, SMC MC1665IR or UMC 8669F
Bus Architecture	PCI, ISA
Expansion Slots	Three PCI slots Three ISA-AT slots One PCI-/ISA-shared slot
Ports	One parallel port (SPP/ECP/EPP) Two serial ports (UART 16C550) Two-channel PCI mode 4 enhanced IDE One floppy-disk connector
Secondary Cache	256 KB/512 KB
BIOS	AMI Plug-and-Play WinBIOS
RTC	Dallas DS12887A
Board Size	220 mm x 330 mm (full baby-AT)

Features

Board Layout

1. Power connector
2. FDC connector
3. IDE2 connector
4. IDE1 connector
5. SIMM sockets
6. 82438 ASIC
7. Asynchronous cache
8. Voltage regulator
9. 82437 ASIC
10. Pipeline-burst cache slot
11. Multifunction connector
12. 4-pin fan connector
13. 2-pin fan connector
14. Hard disk LED connector
15. CPU socket
16. System BIOS
17. Real-time clock/battery
18. TAG SRAM
19. ISA slots
20. 82371 ASIC
21. Keyboard controller
22. System I/O chip
23. PCI slots
24. COM1 connector
25. Printer connector
26. PS/2 mouse connector (option)
27. AT-keyboard connector
28. COM2 connector



Features

System Board Parts

Microprocessor

The AP5C/P system board uses an Intel Pentium (3.3V) Processor running at 75, 90, 100, 120, 133, 150, 166, or 200 MHz. It can also support a Cyrix 6x86 - P120+ running at 100 MHz. Chapter 2 tells how to upgrade the processor.

ASICs

The ASICs onboard are the 82437FX, 82438FX and 82371FB. The 82437 serves as the system memory controller and PCI bus interface. The two 82438FX ASICs function as PCI local-bus data paths that offer 64-bit DRAM and 32-bit PCI bus interfaces to support the 64-bit Pentium processor data bus. The 82371FB acts as the PCI-/ISA-bus bridge that translates the PCI bus cycles into ISA bus cycles or vice-versa. It also functions as the PCI fast-IDE interface and the SMM controller.

AMI BIOS

The AMI BIOS (basic input-output system) resides in the flash ROM chip. This contains the program that performs the power-on self-tests (POST) upon booting. During POST, this program activates the peripheral devices, tests onboard memory, and prepares the system for operation. Chapter 3 gives more information on the AMI BIOS.

Expansion Slots

The board expansion slots consist of three PCI slots, three ISA-AT slots and one PCI-/ISA-shared slot. These expansion slots are the parallel bars on the system board. There are rows of golden pins inside each slot that serve as a clutch to secure the contacts of expansion boards. Chapter 2 tells how to install expansion boards.

DRAM Sockets

The system board has four 72-pin DRAM sockets that expand system memory to a maximum of 128 MB. These sockets accept single- and

Features

double-density SIMMs. Chapter 2 tells how to install memory modules and the different memory configurations available.

Two-channel PCI Mode 4 Enhanced-IDE Controller

The board integrates a two-channel PCI mode 4 enhanced-integrated drive electronics (E-IDE) controller that improves data transfer rate and supports bus master IDE. It also has E-IDE interfaces that allow the system to support four E-IDE devices, including hard disks with more than 528-MB capacity. This feature offers users increased data storage capacity.

Super I/O Controller

The onboard super I/O controller chip supports two UART 16450/16550-compatible serial ports and a parallel port (SPP, EPP, ECP)¹. It also accommodates 1.2-/1.44-/2.88-MB disk drives allowing full-range access to 5.25-inch drives with 360-KB or 1.2-MB format and 3.5-inch drives with 720-KB, 1.44-MB or 2.88-MB format.

Keyboard Connector

The keyboard connector at the rear of the system board allows you to connect any AT-compatible keyboard. PS/2 keyboard and mouse connectors are optional.

SRAM

The system board comes either with a 256-KB asynchronous cache upgradable to 512 KB, or a cache module slot that supports a 256-KB pipeline-burst cache. See Chapter 2 for instructions on how to upgrade the cache.

Power Management

The AP5C/P features a system power-management mode that conforms to the power-saving standards of the U.S. Environmental Protection Agency

¹ SPP: Standard Parallel Port
EPP: Enhanced Parallel Port (IEEE 1284 compliant)
ECP: Extended Capabilities Port (IEEE 1284 compliant)

Features

(EPA) Energy Star program. See Chapter 3 for more information on the power-management mode.

Hardware Setup 2

This chapter tells how to set jumpers, upgrade system memory, add expansion boards, and install the system board.

Install the CPU, memory, and set the jumpers before you install the board inside a housing. You may add the other components after installing the board. Read this chapter to learn about the components before you install them.

ESD Precautions

Electrostatic discharge (ESD) can damage your CPU, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

Hardware Setup

Installing a Microprocessor

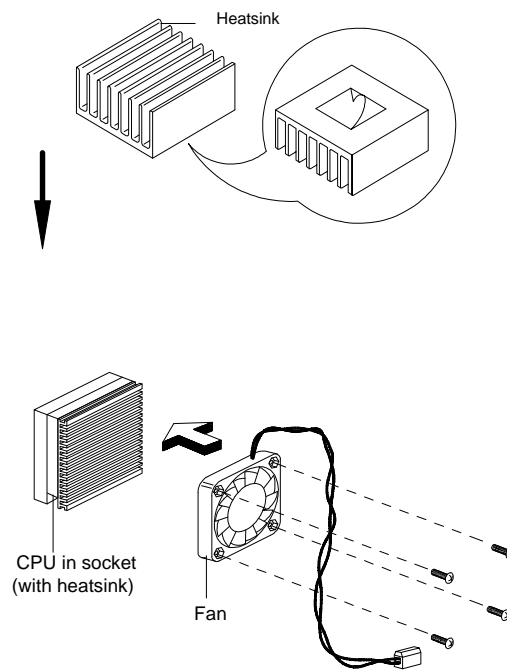
The motherboard has a zero-insertion force microprocessor socket that allows you to install a CPU without using any tools.

Follow these steps to install a CPU in a ZIF-type upgrade socket:



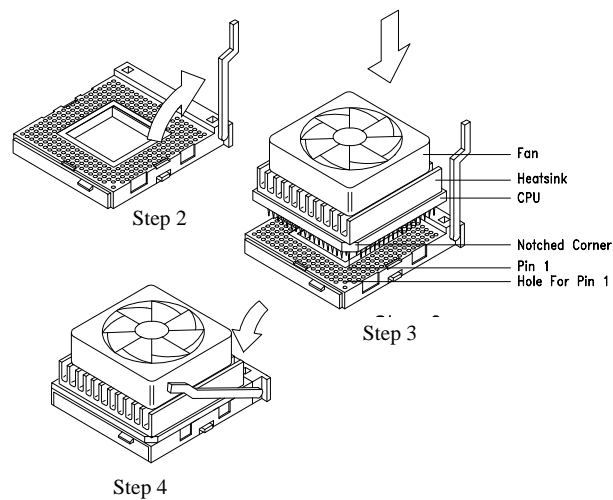
Make sure that the system power is OFF before installing a component.

1. Attach the heatsink and the fan to the CPU.



Hardware Setup

2. Pull up the socket lever.
3. Insert the CPU with the attached heatsink and fan. Make sure that pin 1 of the CPU aligns with the hole 1 of the socket. The notched corner on the CPU indicates pin 1.
4. Pull down the socket lever to lock the CPU into the socket.



5. Plug the fan cable into the fan connector. The board has one 2-pin and one 4-pin fan connector. See the section *Connectors* for details on the fan connectors.
6. Set the jumpers accordingly. See the following sections for the correct jumper settings.

Hardware Setup

Upgrading the Microprocessor

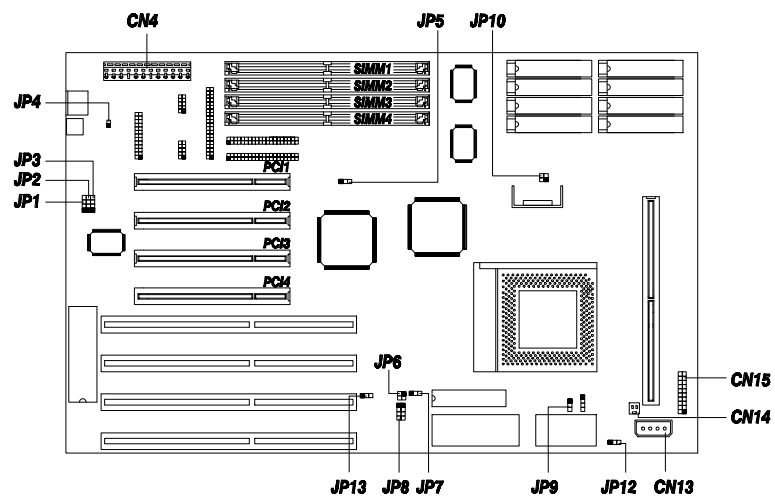
Follow these steps to upgrade the CPU:

1. Turn off the system power and remove the housing cover.
2. Locate the CPU socket on the system board.
3. Pull up the socket lever.
4. Remove the installed CPU.
5. Install the upgrade CPU. Refer to the section *Installing a Microprocessor* for instructions on how to install a CPU.

Hardware Setup

Jumper Settings

You have to change the jumper settings when you reconfigure the system. This section tells how to set the jumpers. The figure below shows the jumper locations.



Optional jumper:

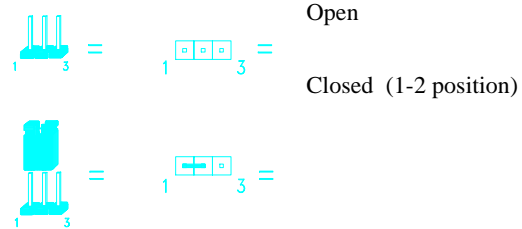
JP4 - for PS/2 mouse function

Hardware Setup

Set a jumper switch as follows:

- To close a jumper, insert the plastic jumper cap over two pins of a jumper.
- To open a jumper, remove the jumper cap.

The following conventions are used to represent the proper jumper settings.



Hardware Setup

Selecting the CPU Type

The jumpers **JP5**, **JP6** and **JP8** let you select the CPU type. The available settings are as follows:

CPU TYPE	JP5	JP6	JP8
P54C-75			
P54C-90			
P54C-100			
P54C -120			
P54C -133			
P54C -150			
P54C -166			
P54C - 200			
Cyrix 6x86 - P120+			

Hardware Setup

Setting the Cache Size

The system board may have either a 256-KB asynchronous cache or pipeline-burst cache. If your board comes with a pipeline-burst cache, see the section *Cache Module* for information on pipeline-burst cache module. A system board with asynchronous cache allows you to upgrade the second-level cache from 256 KB to 512 KB. The table below lists the possible cache configurations.

Cache Size	TAG SRAM (U25)	Data SRAM (U27, U28, U29, U30, U34, U35, U36, U37)
256 KB	16 Kb x 8 x 1 pc or 32 Kb x 8 x 1 pc	32 Kb x 8 x 8 pcs
512 KB	16 Kb x 8 x 1 pc or 32 Kb x 8 x 1 pc	64 Kb x 8 x 8 pcs

You must reset the 3-pin jumper **JP7** when you upgrade the cache. See the figure below for the correct settings.

CACHE SIZE JP7

256 KB



512 KB

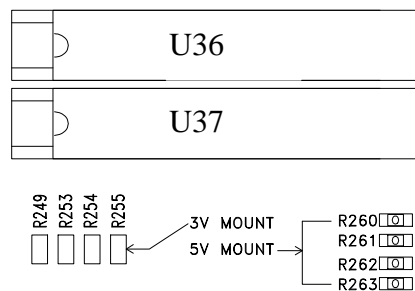


Asynchronous Cache

The board supports both 3.3V and 3.3V/5V Mix Mode asynchronous cache. However, before upgrading the cache, you need to check the location of the resistor chips on the board. Normally, the board comes with the resistor chips located at R260, R261, R262 and R263 enabling you to install 3.3V/5V Mix Mode SRAMs. To upgrade the asynchronous cache by installing 3.3V SRAMs, you need to install zero-ohm resistor chips at

Hardware Setup

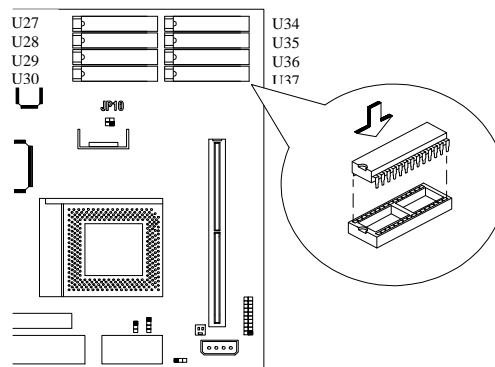
locations R249, R253, R254 and R255. See the following figure for the location of the resistor chips.



Installing the SRAM

Follow these steps to install SRAMs:

1. Locate the cache sockets on the system board. See the section *Board Layout*.
2. Insert the SRAM chip into the socket. Align the straight edge of the chip with the straight edge of the socket. Also, make sure that the cut edge of the chip corresponds to the cut edge of the cache socket. See the following figure.



Hardware Setup



Press the SRAM chip gently but firmly into place. Be careful not to bend the pins.

Selecting the Flash ROM Type

Set the 3-pin jumper **JP9** according to the Flash ROM type. If you use 5V Flash ROM, you must close pins 1-2 of JP9. For a 12V Flash ROM, the required setting is 2-3. The default setting is 1-2.

Flash ROM

JP9

5V



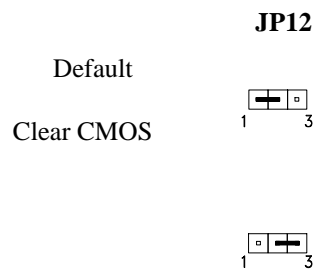
12V



Hardware Setup

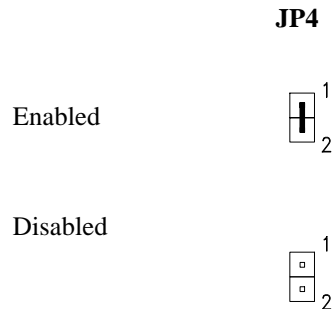
Clearing the CMOS

The 3-pin jumper **JP12** clears the values in the CMOS. You need to clear the CMOS if you forget your system password. To do this, shut off the system power and short pins 2-3 of JP12 for a few seconds. Reset the jumper to the normal setting by shorting pins 1-2 with a jumper cap. Enter Setup to specify a new password.



Enabling the PS/2 Mouse (Optional)

The 2-pin jumper **JP4** lets you enable or disable the PS/2 mouse. To enable, simply close both pins of the jumper. To disable, leave the jumper open.

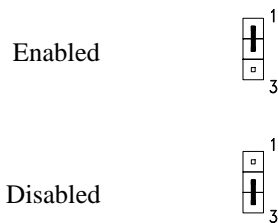


Hardware Setup

Enabling the Onboard Super I/O Controller

The jumper **JP3** on the system board allows you to enable or disable the onboard I/O controller. To enable, set the jumper to 1-2. To disable, reset the jumper to 2-3.

JP3



Selecting the ECP DMA Channel

The 3-pin jumpers **JP1** and **JP2** let you select the DMA channel for ECP function. The available channels are DMA 1 and DMA 3.



Hardware Setup

Memory Configuration

The system board supports a maximum memory of 128 MB. The four 72-pin SIMM sockets accommodate 4- and 16-MB single-density SIMMs, and 8- and 32-MB double-density SIMMs - with or without the Extended Data Output (EDO) function. The EDO feature expands data transfer cycle, thus improves memory performance. All SIMMs support a DRAM speed of 70/60 ns (or less). Refer to the section *Board Layout* and see the figure for the location of the SIMMs.

The table below lists the SIMM types and their corresponding capacities.

SIMM Type	Capacity
1 Mb x 32/36	4 MB
2 Mb x 32/36	8 MB
4 Mb x 32/36	16 MB
8 Mb x 32/36	32 MB

Hardware Setup

The following are the possible SIMM configurations:

Total Memory	SIMM 1/2	SIMM 3/4
8 MB	4 MB x 2	
16 MB	4 MB x 2	4 MB x 2
16 MB	8 MB x 2	
24 MB	8 MB x 2	4 MB x 2
32 MB	8 MB x 2	8 MB x 2
32 MB	16 MB x 2	
40 MB	16 MB x 2	4 MB x 2
48 MB	16 MB x 2	8 MB x 2
64 MB	16 MB x 2	16 MB x 2
64 MB	32 MB x 2	
72 MB	32 MB x 2	4 MB x 2
80 MB	32 MB x 2	8 MB x 2
96 MB	32 MB x 2	16 MB x 2
128 MB	32 MB x 2	32 MB x 2

Hardware Setup

Installing a SIMM



Observe the ESD precautions when installing components.

Follow these steps to install a SIMM:

1. Slip a SIMM at a 45° angle into a socket with the component side facing down.

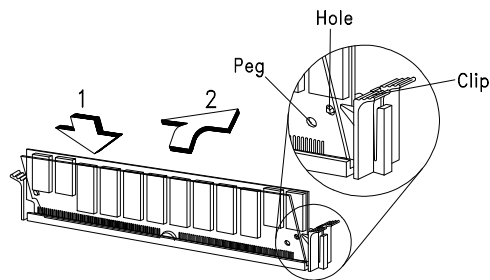


Be careful when inserting or removing SIMMs. Forcing a SIMM in or out of a socket can damage the socket or the SIMM (or both).

2. Gently push the SIMM up until the pegs of the socket slip into the holes on the SIMM and the holding clips lock the SIMM into a vertical position.



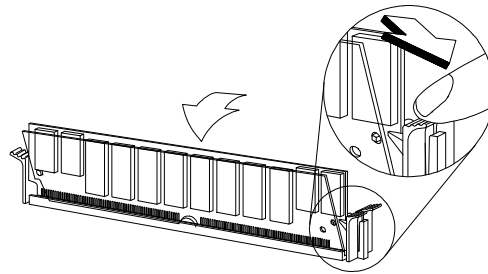
The SIMM should be at a 90° angle when installed.



Hardware Setup

Removing a SIMM

1. Press the holding clips on both sides of the SIMM outward to release it.
2. Press the SIMM downward to about a 45° angle.
3. Gently pull the SIMM out of the socket.



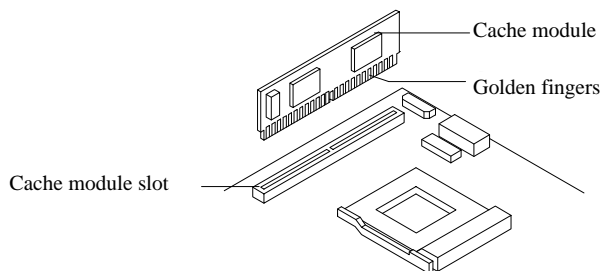
Hardware Setup

Cache Module (Optional)

A system board that supports pipeline-burst cache does not have onboard DIP-type SRAMs and a TAG RAM. Instead, it comes with a separate cache module in an anti-static package.

Here's how to install a cache module:

1. Observe the ESD precautions before you remove the cache module from its protective packaging.
2. Remove the board from its protective packaging.
3. Locate the cache module slot on the system board. See the board layout figure in Chapter 1.
4. Gently insert the golden fingers of the cache module into the slot and press it into place. Make sure the module is properly seated.



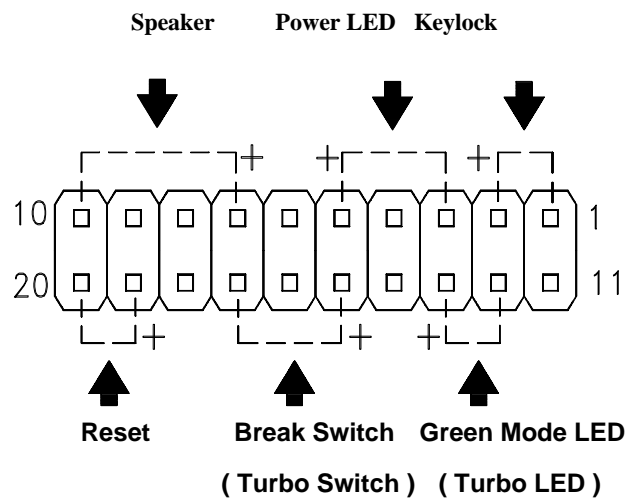
Do not replace the cache module that comes with the motherboard. Installing cache modules manufactured by other vendors may cause hardware failure.

Hardware Setup

Connectors

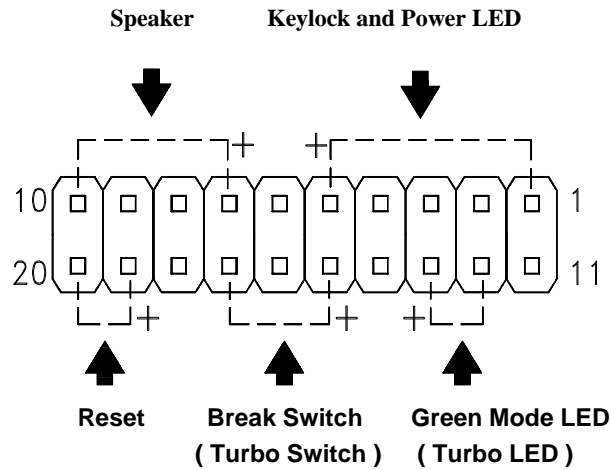
Multifunction Connector

This 20-pin connector is marked **CN15** on the system board. It supports a number of system functions: green mode LED, break switch, keylock, and speaker. Attach the front panel connectors to the corresponding pins as in the illustration below.

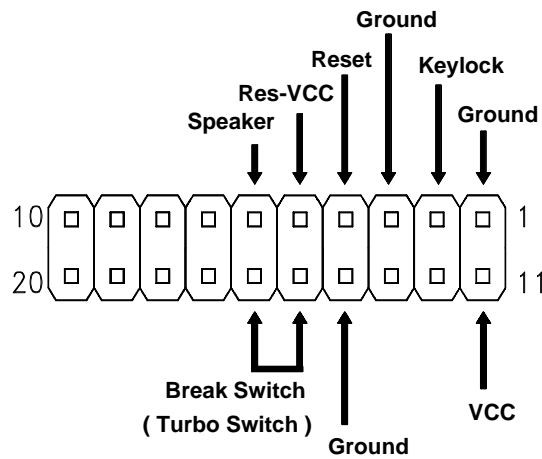


Some housings have a five-pin connector for the keylock and power LED. See the following illustration.

Hardware Setup



Other housings may have a 12-pin connector. If your housing has this type of connector, plug it into CN15 as shown in the following figure. Make sure that the red wire of the connector connects to pin 11.



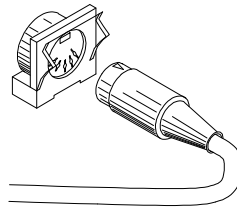
Hardware Setup

Break Switch

The break switch gives the user the option to directly enter the system suspend mode by setting the switch to the on position. To set, simply press the switch. Make sure that the break switch is in the off position before you set it to the on position. To set it to the off position, simply press the switch to release it from the on position.

Keyboard Connector

The keyboard connector is a 5-pin, AT-compatible connector. The following figure shows how to connect a keyboard.

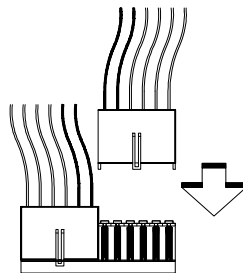


The PS/2 keyboard connector is optional.

Hardware Setup

Power Connector

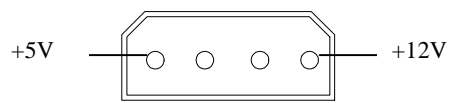
A standard power supply has two cables with six wires each. Attach these cables to the power connector on the board in such a way that all the black wires are in the center. The power connector is marked **CN4** on the system board.



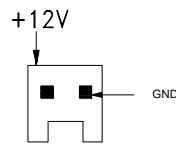
Hardware Setup

Fan Connectors

The board has one 4-pin and one 2-pin fan connector. The 4-pin fan connector is marked **CN13** on the system board and the 2-pin is marked **CN14**. Figure below shows the pin configuration of each connector.



4-PIN FAN CONNECTOR (CN13)



2-PIN FAN CONNECTOR (CN14)

Hardware Setup

Installation

The full baby-AT size of the AP5C/P system board easily fits most housings. It has mounting holes that conform to the standard system housing. Some housings may differ slightly in design, requiring additional steps to install the board. Read the documentation that comes with the housing.



Make sure that you have already installed the system board components like the CPU and memory, and have set the appropriate jumpers before you proceed.

Installing the System Board

1. Open the system housing.
2. Use the screws that come with the housing to secure the board.
3. Attach the power supply cables to the power connector and the front panel connectors to the multifunction connector. See the section *Connectors*.
4. Install any additional components that you have not yet installed.

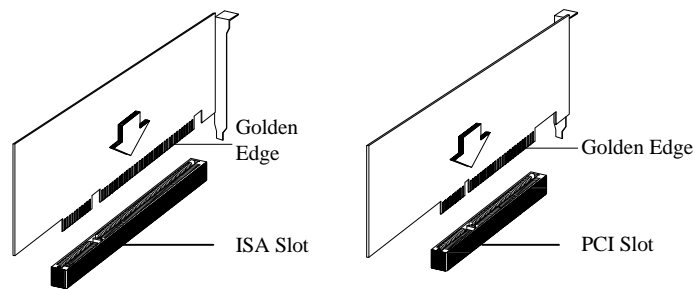
Hardware Setup

Installing Expansion Boards

Install any expansion boards after you have secured the system board in the housing.

Follow these steps to install an expansion board.

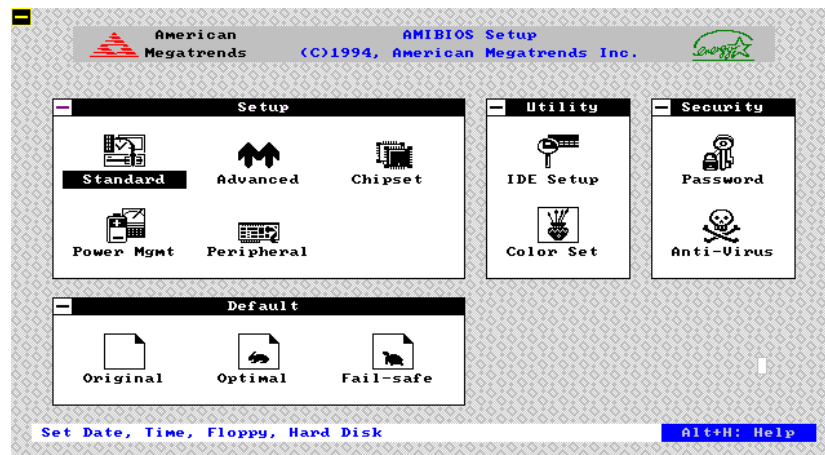
1. Observe the ESD precautions before removing the expansion card from its protective packaging.
2. Remove the bracket opposite the slot that you want to use. Save the cover for future use. Save the screw to secure the expansion board.
3. Remove the board from its protective packaging.
4. Gently insert the golden edge of the board into the slot until it fits into place.



5. Secure the board bracket with the screw.

AMI BIOS Setup Main Menu

The AMI BIOS Setup Main Menu appears below. Press **C** to enter the system menu.



The AMI BIOS is in Windows form. You can use either the keyboard or a mouse to move between the items. To select among the Setup groups, use **V** to highlight the selected group or simply click on the icon of the selected Setup menu.

To select among the options, you can either use the arrow keys to move the highlight bar or simply click on the icon of the desired option.

After selecting, press **e** or double-click on the icon to open the menu.



*You can press **h** to enter the BIOS Setup screen. This also enables you to do the following:*

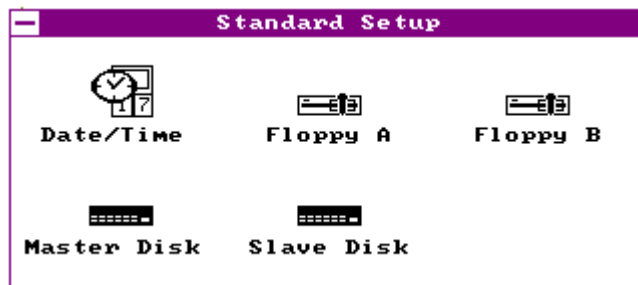
- *Resolve an address conflict due to an IRQ address assigned to multiple slots. For more information on IRQ assignment, see the section Chipset Features Setup.*
- *Return to the BIOS default settings if the PnP*

AMI BIOS

BIOS does not recognize the hardware modifications under Windows 95.

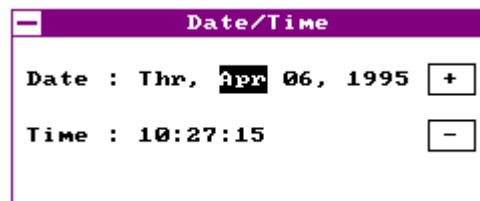
Standard CMOS Setup

Highlight **Setup** using **V** or simply click on the Setup icon. Select **Standard** to input configuration values such as the date, time, and disk types. The Standard CMOS Setup pop-up window appears below:



Date/Time

To set the date and time, highlight **Date/Time** and press **E** or double-click on the Date/Time icon. The following screen appears:



Use the arrow keys to move among the items. Press the **+** and **-** keys or click the **+** and **-** icons to set the current date and time. Close the window by pressing **E** or double-clicking the Control menu box in the upper-left corner of the window.

AMI BIOS

Floppy Drives A and B

To configure the floppy drive, select Floppy A. The following values appear on the screen:

Floppy A	
<input type="checkbox"/>	Not Installed
<input type="checkbox"/>	360 KB 5 1/4"
<input type="checkbox"/>	1.2 MB 5 1/4"
<input type="checkbox"/>	720 KB 3 1/2"
<input checked="" type="checkbox"/>	1.44 MB 3 1/2"
<input type="checkbox"/>	2.88 MB 3 1/2"

After selecting the proper setting, press **⌘** or double-click the Control menu box to close the window.

Select Floppy B and follow the same procedure to configure the second floppy drive, if present.

Hard Disk Drives

Select Master Hard Disk to configure the first hard disk. The following values appear on the screen:

Type	Cyl	Hd	WP	LZ	Sec	Size (MB)
Not Installed						
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	31
4	940	8	512	940	17	62
5	940	6	512	940	17	47
6	615	4	65535	615	17	20
7	462	8	256	511	17	31

AMI BIOS

If you cannot find your hard disk drive type on the list, select **User** and enter the disk parameters. You can also select **Utility Setup**. This automatically configures your hard disk. Refer to the section *Utility Setup* for more information.

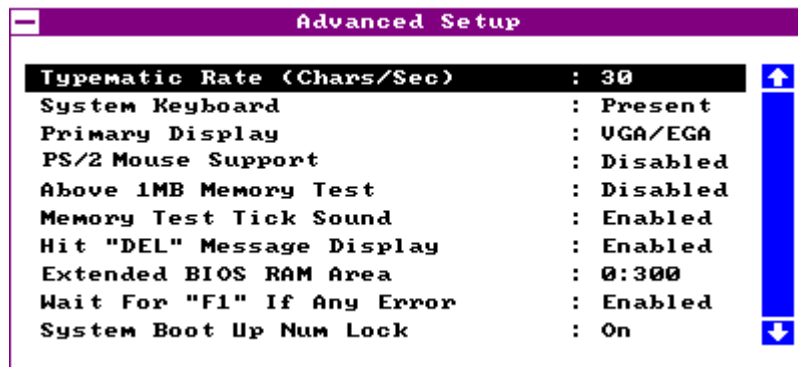
Select **ESDI** or **SCSI** depending the device installed.

If you have two hard disks installed, select **Slave Disk** and follow the same procedure to configure the second hard disk.

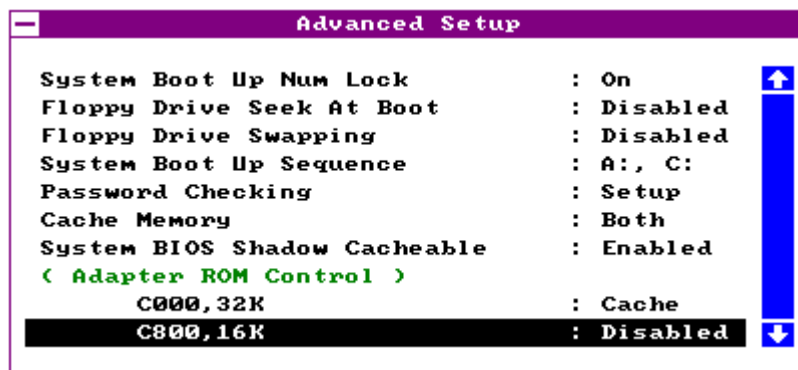
AMI BIOS

Advanced CMOS Setup

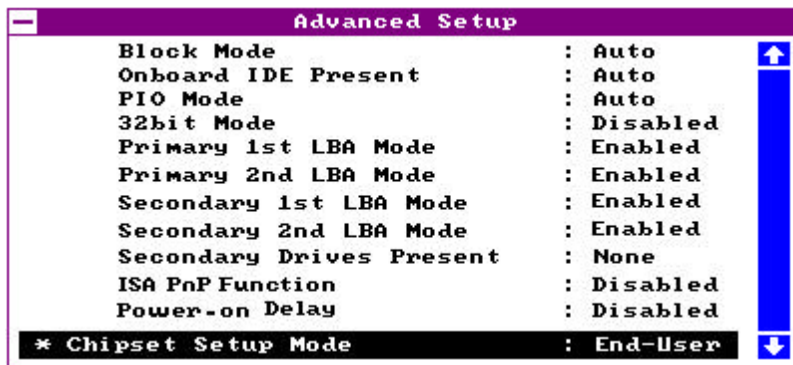
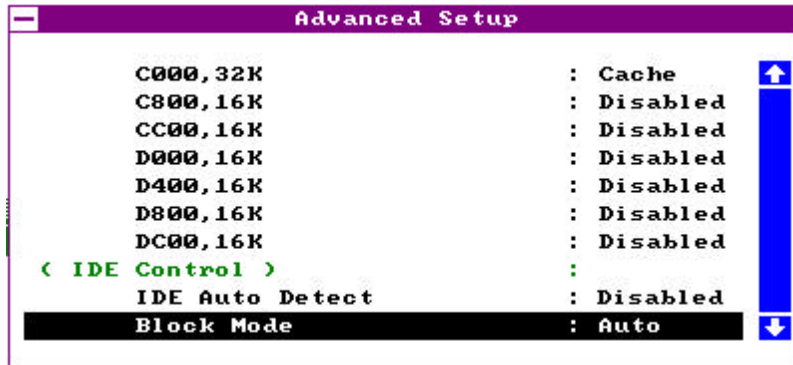
The window below appears if you select the Advanced option.



The screen above does not show all the parameters of the Advanced Configuration menu. Use w or y to highlight the desired parameter. Press } to view the rest of the parameters. The following screens appear:



AMI BIOS



Typematic Rate (Chars./Sec.)

This parameter determines the typematic rate. The typematic rate settings are 15, 20, 30 and Disabled. The default setting is 30. Select Disabled to disregard the rate setting.

System Keyboard

Set this parameter to Present if there is a keyboard connected to the system. However, some servers may not have keyboards. Select Absent if there is no keyboard present.

AMI BIOS

Primary Display

This function detects the type of VGA in use. The settings are VGA/EGA, CGA 40 x 25, CGA 80 x 25, Mono, and Absent. The default setting is VGA/EGA.

PS/2 Mouse Support

Setting this parameter to Enabled lets you support a PS/2 mouse. However, if you enable this function, you need to short the onboard jumper JP4. Disable the parameter to disregard the function. The default setting is Disabled.

Above 1 MB Memory Test

This parameter allows your system to check all available memory. Therefore, setting this parameter to Enabled slows down the power-on self-test. The default setting is Disabled.

Memory Test Tick Sound

Enabling this parameter lets you hear the tick sound during the memory test. Disable the parameter to bypass the function.

Hit "Del" Message Display

This option lets you enable or disable the Hit if you want Setup message from appearing when the system boots. The default setting is Enabled.

Extended BIOS RAM Area

This function allows you to relocate the BIOS from ROM to RAM. Relocating to RAM enhances system performance as information access is faster than ROM. The parameter settings are 0:300 and DOS 1K. The default address is 0:300.

AMI BIOS

Wait for F1 If Any Error

If this option is enabled, the BIOS waits for the end user to press I before continuing. If this option is disabled, the BIOS continues the boot process without waiting for I to be pressed. The default setting is *Enabled*.

System Boot-up Num Lock

Setting this parameter to *On* enables the numeric function of the numeric keypad. Set this parameter to *Off* to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control. The default setting is *On*.

Floppy Drive Seek at Boot

When enabled, the BIOS detects whether there is a floppy disk drive installed. Disable the parameter to bypass the function. The default setting is *Disabled*.

Floppy Drive Swapping

This parameter allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa. Disable the parameter to bypass the function. The default is *Disabled*.

System Boot-up Sequence

The settings are *C:*, *A:* and *A:, C:* to specify the system search sequence. The default setting is *A:, C:*.

Password Checking

The settings are *Setup* and *Always*. The *Setup* setting allows the system to boot and use the password only to protect the Setup Utility Configuration settings from being tampered with. The *Always* setting requires you to enter the password everytime you boot the system. The default setting is *Setup*.

AMI BIOS

Cache Memory

The available selections for this parameter are **Internal**, **Both** and **Disabled**. Select **Internal** if you want to enable the internal cache memory. Select **Both** if you want to use both the internal and external cache memories. Select **Disabled** to disregard the internal and external cache features.

System BIOS Shadow Cacheable

The default setting for this parameter is **Enabled**. This enhances the system performance. Disabling the parameter prevents the system BIOS from being cached.

Adapter ROM Control

C000, 32 K

This address is for shadowing video ROMs. Select **Shadow** to assign the address for shadowing expansion video card with ROM. Select **Cache** to assign them for cache. The default setting is **Cache**.

C800 ~ DC00, 16 K

These addresses are for shadowing other expansion card ROMs. The default setting for these areas is **Disabled**. Set the addresses to **Shadow** if you want to use them for shadowing expansion cards with ROM. Set the addresses to **Cache** to assign them for cache.



The F000 and E000 addresses are exclusively shadowed for BIOS.

IDE Control

IDE Auto-detect

There are cases wherein the HDD parameters that you entered and those detected by the auto-detection function are mismatched. This causes the system not to boot. If this happens, we recommend that you set this

AMI BIOS

parameter to `Disabled` to bypass the auto-detection function. The default setting is `Disabled`.

Block Mode

This function enhances disk performance depending on the hard disk in use. This parameter is normally set to `Auto`. This setting allows data transfer in block (multiple sectors) by increasing the data transfer rate. The other selections for this parameter are `2 S/B`, `4 S/B`, `8 S/B`, `16 S/B`, `32 S/B`, `64 S/B` and `Disabled`. Disable the parameter if your hard disk does not support this feature.

Onboard IDE Present

The settings for this function are `Auto`, `Enabled` and `Disabled`. Select `Enabled` if you have an onboard PCI IDE. Select `Auto` to automatically detect the presence of PCI IDE. Select `Disabled` to disregard the PCI IDE function.

PIO Mode

This parameter lets you set the PIO mode that your onboard PCI IDE supports. The selections are from `Mode 0` to `Mode 4`, `Auto` and `Disabled`. Set this parameter either by entering the PIO mode manually or selecting `Auto` to automatically detect the supported PIO mode. Disable the parameter to bypass the feature.

32-bit Mode

Enabling this function improves the hard disk performance by increasing the data transfer rate from 16-bit to 32-bit.

Primary 1st LBA Mode

This enhanced IDE feature allows you to use a hard disk with a capacity higher than 528 MB. This is made possible through the Logical Block Address (LBA) mode translation. This parameter affects the primary IDE hard disk drive connected to the IDE 1 connector. The default setting is `Enabled`.

AMI BIOS

Primary 2nd LBA Mode

This enhanced IDE feature allows you to use a hard disk with a capacity higher than 528 MB. This is made possible through the Logical Block Address (LBA) mode translation. This parameter affects the secondary IDE hard disk drive connected to the IDE 1 connector. The default setting is *Enabled*.

Secondary 1st LBA Mode

This enhanced IDE feature allows you to use a hard disk with a capacity higher than 528 MB. This is made possible through the Logical Block Address (LBA) mode translation. This parameter affects the primary IDE hard disk drive connected to the IDE 2 connector. The default setting is *Enabled*.

Secondary 2nd LBA Mode

This enhanced IDE feature allows you to use a hard disk with a capacity higher than 528 MB. This is made possible through the Logical Block Address (LBA) mode translation. This parameter affects the secondary IDE hard disk drive connected to the IDE 2 connector. The default setting is *Enabled*.

Secondary Drives Present

This parameter lets you install up to two IDE hard disks in the secondary channel. Select *None* if you do not have any.

ISA PnP Function

This parameter lets you enable or disable the Plug-and-Play feature. The default setting is *Disabled*. If you are using Windows 95, we recommend you to select *Enabled*.

Power-on Delay

This parameter lets you set the POST waiting time for the HDD motor to stabilize before boot up. The available settings are from 1 to 15 sec and *Disabled*. The default is *Disabled*.

AMI BIOS

Chipset Setup Mode

This function allows you to change the Chipset Setup DRAM control parameters according to the end-user type. The available settings are End-user and Engineer. We recommend that you select End-user. See the following section for more details on Chipset Features Setup.

Chipset Features Setup

The Chipset Features Setup controls the board's chipset settings. The controls for this menu are the same as for the previous screen.

The Chipset Setup DRAM control parameters differ depending on the Chipset Setup Mode setting in the Advanced CMOS Setup. This screen appears if you select the Chipset option from the Setup menu and if the Chipset Setup Mode parameter setting is End-user .



The following screen appears if your Chipset Setup Mode parameter setting is Engineer. Take note of the DRAM control parameters.

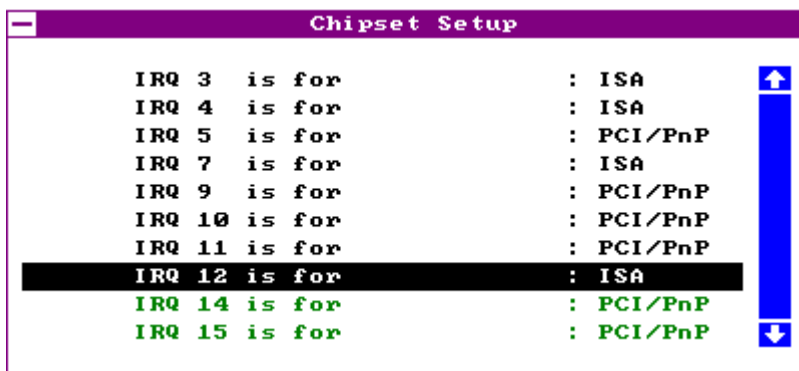
AMI BIOS



Both screens do not show all the parameters of the Chipset Setup menu. Use w or y to highlight the desired parameter. Press } to view the rest of the parameters. The following screens appear regardless of the end-user type or the Chipset Setup Mode parameter setting:



AMI BIOS



SRAM Type

This parameter allows the user to select the transmission mode that your SRAM supports. The selections are Asyn, Burst and Pipeline. The Asyn or asynchronous mode is also known as the start-stop-bit transmission, wherein the transmission of data is only one-way and per character. This is the most common form of data transmission. The Burst mode supports the simultaneous transmission of data in fixed blocks. The Pipeline-burst mode allows simultaneous transmission of data in four continuous clocks (no recovery time within each clock). The default setting is Asyn.

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DRAM Control

Read/Write Leadoff*

Before data can be accessed, the core logic must issue the memory address signal, the column address strobe (CAS) signal and the row address strobe (RAS) signal to the DRAM. However, these signals are not issued at the same time. The time difference between the issuance of these signals is called the lead-off time.

The lead-off time for read and write actions varies depending on the DRAM type. Some DRAMs may even require a longer delay to access data. This parameter allows you to set the lead-off time. The default setting is 8 T / 6T.

Read Burst Timing*

This parameter adjusts the read wait state between the L2 and the DRAM cache. Everytime the CPU reads a L2 cache miss, it reads four continuous addresses from the DRAM cache.

The available settings are X-4-4-4, X-3-3-3 and X-2-2-2. The value of X depends on the DRAM Lead-off Timing parameter setting. Faster DRAMs require shorter wait states. The default setting is X-4-4-4.

Write Burst Timing*

This parameter adjusts the write wait state between the L2 and the DRAM cache. Each cache write process consists of four continuous cache cycles and therefore, this function has four numbers to adjust. The selections are X-4-4-4, X-3-3-3 and X-2-2-2. The value of X depends on the DRAM Lead-off Timing parameter setting. Faster DRAMs require shorter wait states. The default setting is X-4-4-4.

RAS to CAS Delay*

This function allows you to set the wait state between the RAS and CAS signals. The available settings are 3T and 2T. The default setting 3T.

* This parameter appears only if the Chipset Setup Mode parameter in the Advanced Setup screen is set to `Engineer`.

* This parameter appears only if the Chipset Setup Mode parameter in the Advanced Setup screen is set to `Engineer`.

AMI BIOS

RAS Precharge*

This function lets you set the RAS precharge time. The RAS Precharge time refers to the period it takes for the core logic to charge the RAS signal before issuance. Some DRAMs require shorter time to charge RAS signals.

The selections for this parameter are 3T and 4T. The default setting is 3T.

Speed

This DRAM control parameter lets you set the DRAM speed. The speed settings are 60 ns and 70 ns. The default setting is 70 ns.

Memory Hole

This option lets you set the system memory area that you need to avoid memory conflicts. The settings are 512 ~ 640 K, 15 ~ 16 M and Disabled.

ISA Control

8-bit I/O Recovery Time

This parameter allows you to set the response time of the 8-bit I/O connected to your system. The range is from 1~7 SYSCLK. The default setting is 4 SYSCLK.

16-bit I/O Recovery Time

This parameter allows you to set the response time of the 16-bit I/O connected to your system. The range is from 1~4 SYSCLK. The default setting is 1 SYSCLK.

PCI Control

PCI VGA Palette Snooping

PCI devices support the “palette snooping” technique that enables the device to control access to their palette registers.

* This parameter appears only if the Chipset Setup Mode parameter in the Advanced Setup screen is set to Engineer.

AMI BIOS

Set this parameter to `Enabled` to activate the palette snooping function in the PCI VGA devices installed in your system.

PCI-IDE Card Selection

This parameter allows you to select the PCI-IDE card that you want to enable. The board can support a maximum of four PCI-IDE cards. The available selections are `Slot 1`, `Slot 2`, `Slot 3`, `Slot 4`, and `Absent`. Select `Absent` if you do not have any PCI card installed.

PCI Primary IDE INT# Line

This parameter lets you assign an INT for the IDE device connected to your primary IDE connector. The settings are `INT A`, `INT B`, `INT C`, `INT D`, `Absent` and `Not Used`. If you do not have any PCI IDE card installed in your system and your PCI IDE Card Selection parameter setting is `Absent`, this parameter becomes non-configurable.

PCI Secondary IDE INT# Line

This parameter lets you assign an INT for the IDE device connected to your secondary IDE connector. The settings are `INT A`, `INT B`, `INT C`, `INT D`, `Absent` and `Not Used`. If you do not have any PCI IDE card installed in your system and your PCI IDE Card Selection parameter setting is `Absent`, this parameter becomes non-configurable.

PCI Slot 1, 2, 3, and 4

These functions allow you to assign an IRQ for each PCI slot in use. The selections are `IRQs 3, 4, 5, 7, 10, 11, 12, Auto` and `None`. Selecting `Auto` enables the BIOS to automatically assign an available IRQ for the selected PCI slot. Select `None` if the PCI slot is not in use or to disregard the slot. The default setting is `Auto`.

IRQ Allocated

IRQ 3, 4, 5, 7, 9, 10, 11, 14, 15 is for...

These lines allow you to assign the available IRQs to either ISA or PCI/PnP device.

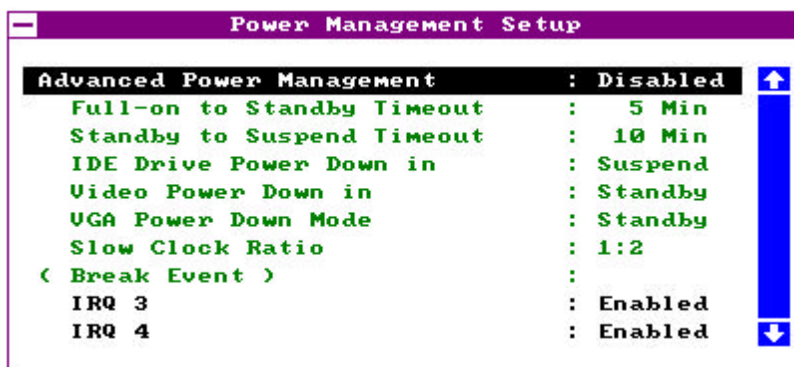
AMI BIOS



If the same IRQ address is assigned to multiple slots, an address conflict occurs. To resolve this, press h during boot-up. This enables the BIOS to reassign the IRQ addresses.

Power Management Setup

To take advantage of the power management features, select Power Management from the Setup menu. To select, highlight Power Mgmt and press e or double-click on the Power Management icon. The following screen appears:



The screen above does not show all the parameters of the Power Management Setup menu. Use w or y to highlight the desired parameter. Press } to view the rest of the parameters. The following screens appear:

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Power Management Setup		
IRQ 5	: Enabled	↑
IRQ 6	: Enabled	
IRQ 7	: Enabled	
IRQ 9	: Enabled	
IRQ 10	: Enabled	
IRQ 11	: Enabled	
IRQ 12	: Disabled	
IRQ 13	: Enabled	
IRQ 14	: Enabled	
IRQ 15	: Enabled	↓

Advanced Power Management

Set this parameter to **Enabled** to take advantage of the power-saving feature. Disable the parameter to bypass the feature.

Full-on to Standby Timeout

This function lets you set when to put the system into standby mode. In standby mode, the CPU clock slows down and the video signal is suspended. Full power returns when an event is detected. The settings range from 1~255 Min and Disabled.

Standby to Suspend Timeout

This function lets you set when to put the system into suspend mode. In suspend mode, the CPU clock stops, the IDE hard disk spins down and the video signal is suspended. This mode conserves the most energy. Full power returns when an event is detected. The settings range from 1~255 Min and Disabled.

IDE Drive Power Down in

This option allows you to set the mode when to "spin down" your IDE hard disk. The disk returns to full speed once the system resumes to normal mode. The settings are Standby, Suspend and Disabled.

AMI BIOS

Video Power Down in

This option allows you to set the mode when to power down your video monitor. The video monitor returns to full power once the system resumes to normal mode. The settings are Standby, Suspend and Disabled.

VGA Power Down Mode

This option lets you choose the VGA power down mode. The settings are Standby, Suspend and Off.

Slow Clock Ratio

When the system enters the standby mode, the CPU clock starts to slow down. This parameter lets you set the “slow-down” clock ratio. The settings are 1:2, 1:4, 1:8, 1:16, 1:32, 1:64, and 1:128.

Break Event (IRQ 3~7, 9~15)

Enabling these parameters allow your system to monitor the IRQ activities. Any activity detected resets the power-management timers and resumes the system to normal mode.

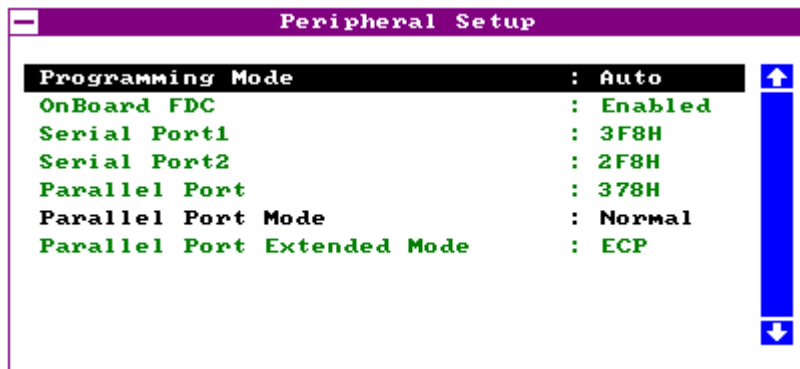


*You must enable at least one IRQ activity.
Otherwise, the system stays in suspend mode.*

AMI BIOS

Peripheral Setup

This screen appears if you select `Peripherals` or double-click on the Peripheral Setup icon from the Setup menu. The Peripheral Setup screen allows you to set up your system peripherals.



Programming Mode

The settings for this option are `Auto` and `Manual`. The `Manual` setting allows you to set up the screen items manually. The `Auto` setting sets up all the items automatically except for the `Parallel Port Mode` parameter.

Onboard FDC

Enabling this function allows you to use the onboard floppy disk controller (FDC). The default setting is `Enabled`.

Serial Port 1

This parameter allows you to set the base address of serial port 1. The available settings are `3F8H`, `2F8H`, `3E8H`, `2E8H` and `Disabled`.

AMI BIOS

Serial Port 2

This parameter allows you to set the base address of serial port 2. The available settings are 3F8H, 2F8H, 3E8H, 2E8H and Disabled.

Parallel Port

This parameter allows you to set the base address of the parallel port. The available settings are 3BCH, 378H, 278H and Disabled..

Parallel Port Mode

This option lets you set the parallel port mode. The settings are Normal or Extended.

Parallel Port Extended Mode

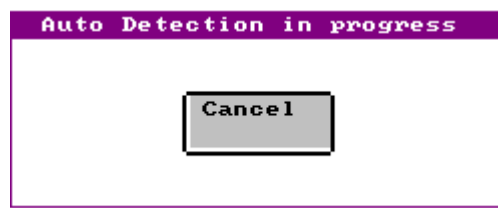
This parameter is configurable only if the Parallel Port Mode parameter is set to `Extended`. This enables the extended mode functions of the parallel port. The selections are EPP, ECP, and ECP & EPP. The EPP setting allows the parallel port to operate in bidirectional mode at maximum speed. The ECP setting allows the parallel port to operate in bidirectional mode and at a speed higher than maximum data transfer rate. The ECP & EPP setting enables the parallel port to support both features. The default setting is ECP.

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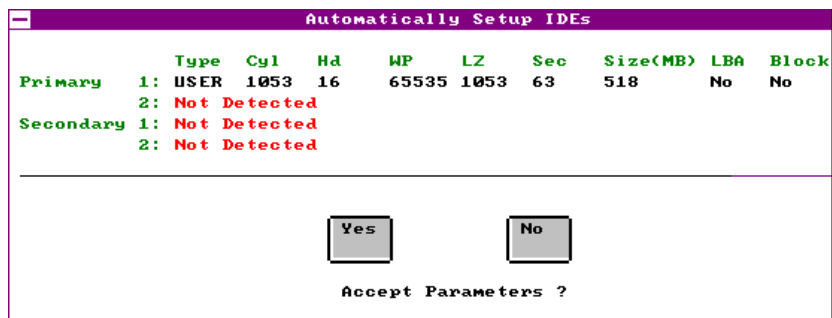
Utility Setup

IDE Setup

This function allows your system to automatically configure your IDE hard disk(s). This screen appears if you select IDE Setup.



After a few seconds, the screen below appears showing your disk(s) parameters. Select YES to accept the values.



AMI BIOS

Color Set

This pop-up window appears if you select **Color Set** from the **Utility Setup** menu.



Color Set lets you select the color of your windows background. The selections are **LCD**, **Army**, **Pastel**, and **Sky**.

Default Setup

Select this option to automatically set your system configuration parameters. To select, highlight **Default** and press **e**.

Original

This option loads the values that you saved before shutting off the system. The following prompt appears if you choose **Original** from the **Default Setup** menu. Select **Yes** to load the original values.



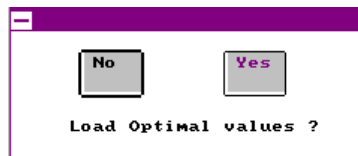
Optimal

Choose this option and the BIOS configures the system using the best-case values to optimize system performance. However, these values may not be applicable to your system. If your system does not boot after choosing this

AMI BIOS

setting, reconfigure it using the Fail-safe settings. Refer to the following section.

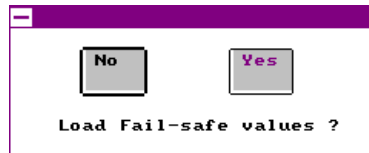
The screen below appears if you choose `Optimal` from the `Default Setup` menu. Select `Yes` to load the optimum values.



Fail-safe

Choose this option and the BIOS automatically configures the system using the most stable settings. These settings are not necessarily the best settings for system performance, but safe and stable enough to guarantee you that your system will boot. This is useful if you are having problems with your current system configuration and need to determine the cause.

A prompt appears if you choose `Fail-safe` from the `Default Setup` menu. Select `Yes` to load the fail-safe values.



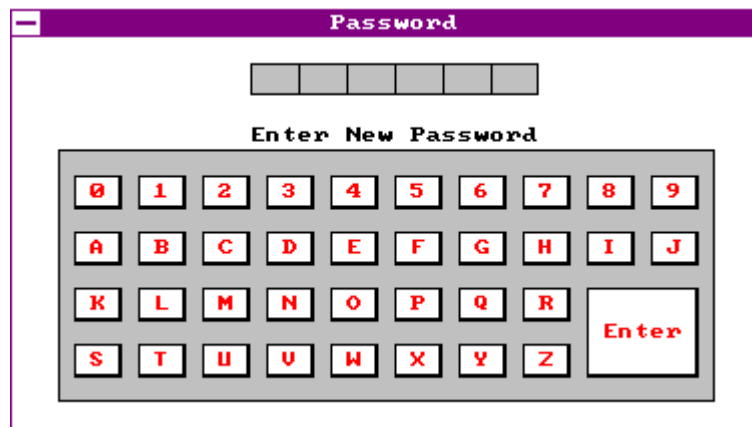
Security Setup

Password

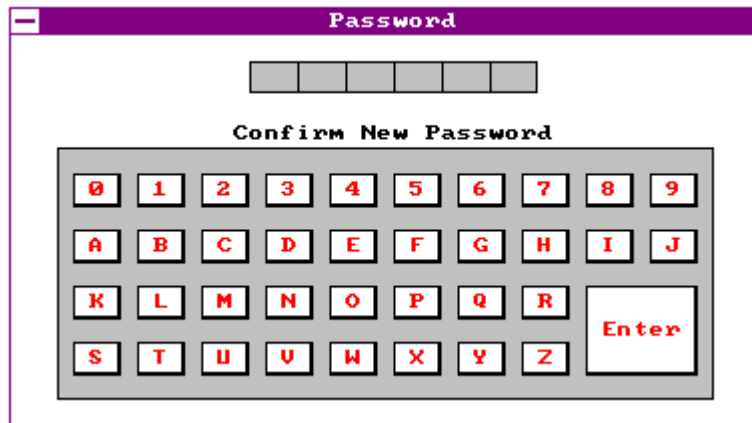
The system password prevents unauthorized use of your computer. If you enabled the password feature, it is impossible to boot the computer without entering the password.

AMI BIOS

To set a password, highlight **Password** or simply double-click the **Password** icon. The following screen appears:



Your password can consist of up to six characters. The password does not appear on the screen. WinBIOS prompts you to retype the password. The following screen appears.



If you forget your password, you must clear the CMOS RAM and reconfigure the system.

AMI BIOS

To disable the password, press **e** when prompted for your password. Press **e** again when prompted to retype the password.

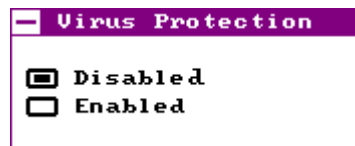


AMI BIOS

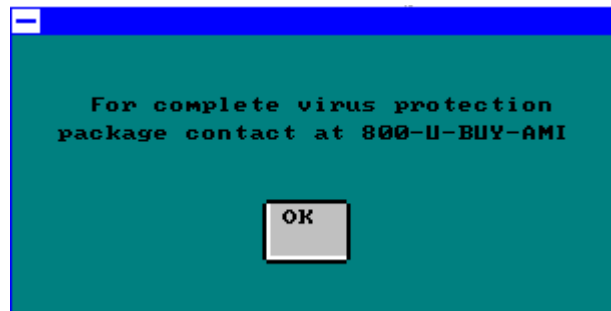
Anti-virus

Set this parameter to **Enabled** to protect the boot sector and partition table of your hard disk from virus intrusion. Set it to **Disabled** to bypass the feature.

A prompt appears when you select **Anti-virus** from the Security Setup menu:



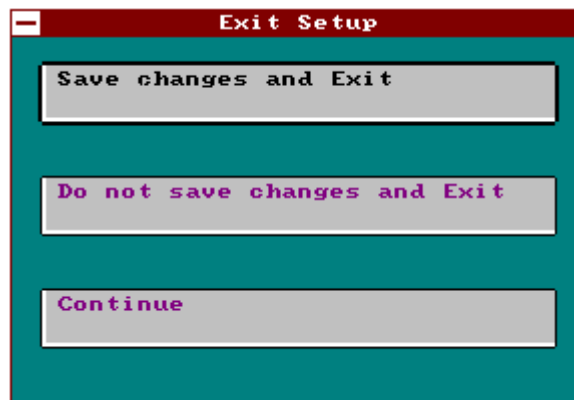
Select **Enabled** and the screen below appears:



AMI BIOS

Exit Setup

To exit Setup, you can either double-click on the Control menu box or simply press **^**. A dialog box appears on the screen.



If you select **Save Changes and Exit**, the BIOS automatically saves all CMOS values before leaving Setup. Select **Do Not Save Changes and Exit** to exit Setup without saving the CMOS values. Select **Continue** to return to Setup if you want to reconfigure your system.

AMI BIOS

NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides on the same flash memory chip as the system BIOS. To use the onboard NCR BIOS, you need to install an NCR 53C810 SCSI controller card in your system.

All SCSI devices that you install in your system require software drivers. The NCR SCSI BIOS directly supports SCSI hard disks under DOS, Windows and OS/2. It also uses DOS-format and SCO UNIX-format support floppy disk device drivers that come with the NCR 53C810 SCSI controller card. The DOS-format device drivers are for SCSI devices used with DOS, Windows NT, Novell NetWare and OS/2. The SCO UNIX-format device drivers are for SCSI devices used with SCO UNIX. These drivers offer higher performance than the direct BIOS support.

To use the device drivers, you must install them in your system hard disk drive and add them to your system configuration files. For detailed installation instructions, see the README files that come with the drivers.



The system board also supports the AMI Flash Memory Writer Utility that allows you to upgrade the system BIOS. For more information on this utility, contact your local distributor.

Jumper Summary **A**

CPU Type

CPU Type	JP5	JP6	JP8
P54C-75	1-2	1-2, 3-4	1-2, 3-4
P54C-90	2-3	1-2	1-2, 3-4
P54C-100	2-3	3-4	1-2, 3-4
P54C-120	2-3	1-2	3-4, 5-6
P54C-133	2-3	3-4	3-4, 5-6
P54C-150	2-3	1-2	5-6, 7-8
P54C-166	2-3	3-4	5-6, 7-8
P54C-200	2-3	3-4	1-2, 7-8
Cyrix 6x86 - P120+	1-2	1-2, 3-4	Open

Cache and Size

Cache Size	JP7
256 KB	1-2
512 KB	2-3

Flash ROM Type

Flash ROM	JP9
5V	1-2
12V	2-3

CMOS

Function	JP12
Default (Normal)	1-2
Clear CMOS	2-3

PS/2 Mouse (Optional)

Function	JP4
Enabled	Closed
Disabled	Open

Jumper Summary

Onboard Super I/O Controller

Function	JP3
Enabled	1-2
Disabled	2-3

ECP DMA Channel

ECP DMA Channel	JP1	JP2
DMA 3	1-2	1-2
DMA 1	2-3	2-3

Onboard Connectors

Connector	Function
CN1	AT-keyboard connector
CN2	PS/2 keyboard connector (optional)
CN3	PS/2 mouse connector (optional)
CN4	Power connector
CN5	Parallel port connector
CN6	COM 2 connector
CN7	COM 1 connector
CN8	FDC connector
CN9	IDE 2 connector
CN10	IDE 1 connector
CN11	VRM
CN12	HDD LED connector
CN13	4-pin fan connector
CN14	2-pin fan connector
CN15	Multifunction connector

Notice



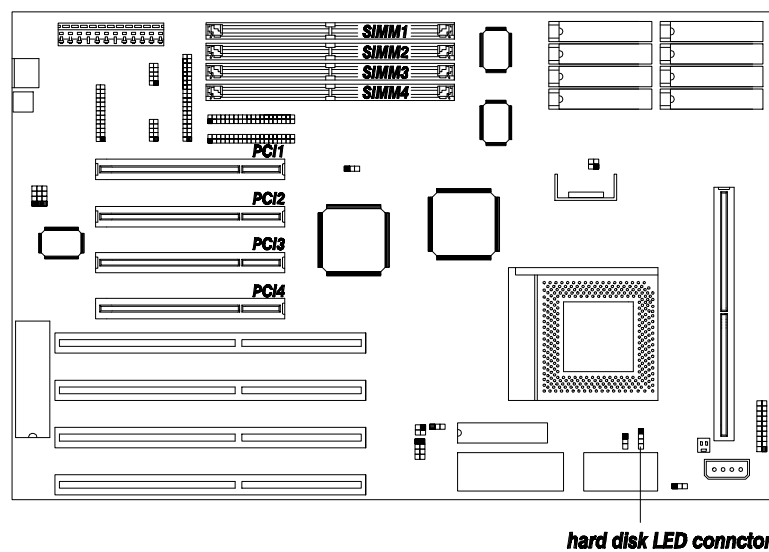
For motherboards with onboard asynchronous cache:

If you want to upgrade your second-level cache to pipelined-burst cache, contact the board manufacturer. DO NOT install cache modules manufactured by other vendors. These cache modules are NOT compatible with the board and therefore may cause hardware failure.

Notice

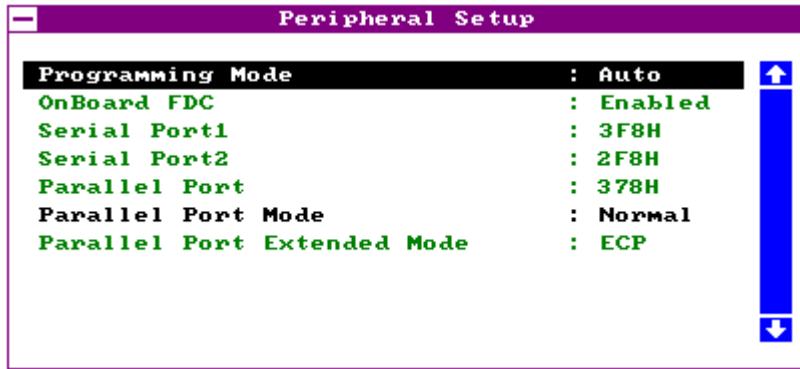
Refer to this page for the updated information regarding the AP5C/P motherboard.

The figure below shows the location of the hard disk LED connector on the motherboard.



The board may come either with a SMC 665/669 or a UMC 8669F system I/O controller. Due to this hardware modification, the BIOS has also been modified. The IRQ Active parameter (refer to the Peripheral Setup screen in the user's guide) has been deleted and a new parameter (Parallel Port Extended Mode) has been added. The following screen shows the new Peripheral Setup menu.

Notice



Parallel Port Extended Mode

This parameter is configurable only if the Parallel Port Mode parameter is set to **Extended**. This enables the extended mode functions of the parallel port. The selections are **EPP**, **ECP**, and **ECP & EPP**. The **EPP** setting allows the parallel port to operate in bidirectional mode at maximum speed. The **ECP** setting allows the parallel port to operate in bidirectional mode and at a speed higher than maximum data transfer rate. The **ECP & EPP** setting enables the parallel port to support both features. The default setting is **ECP**.