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Chapter 1 Introduction of PD5N Features

The PD5N have been especially designed for File server, Workstation and Professional users. It can support a wide range of processors, including all Intel CPUs (P54C) and Intel CPUs with MMX (P55C), as well as all AMD-K5/K6 and Cyrix 6x86/6x86L/6x86MX CPUs. It also takes into account, as much as possible, all future CPUs.

The PD5N uses DIP switches or jumpers.

The PD5N uses SIS 5598 series chipsets, and has 512K Level-2 Pipeline Burst SRAM on board.

72-pin SIMM slots meet the requirements for all memory configurations required by high level computing. The 72-pin SIMM slots support traditional Fast Page and EDO DRAM as a memory standard for next generation 64-bit systems. The 72-pin SIMM slots have been reserved to meet requirements for both present and future upgrades.

The PD5N provides two Universal Serial Bus (USB) ports and meets the Concurrent PCI Rev. 2.1 standard. It also supports IDE interface for Fast HDD (Mode 0~4) and Ultra DMA/33, as well as IDE Bus Master. These features also meet present and future interface standards and needs.

The PD5N Built-in high-performance 64 bit GUI accelerator. High resolution modes including 1024 ¡ Ñ 768 ¡ Ñ 64K Hi colors and 1600 ¡ Ñ 1200 ¡ Ñ 256 colors. It also supports MPEG and live video playback.

System BIOS features include Plug-and-Play (PnP), Advanced Configuration Power Interface (ACPI), the newest Desktop Management Interface (DMI), as well as PD5N's unique CPU operating frequency and voltage setup feature in order to meet modern computing demands.

① Specifications

1. Support AT/ATX power supply

2. Adjustment for Frequency and Voltage
   Using DIP switch or jumper wires to adjust the frequency and voltage on the mainboard

3. Uses ZIF CPU Socket 7 for easy CPU installation
   - Support switching power for CPU to get more stable environment
   - Supports Intel Pentium® CPUs:75~200MHz and P55C CPUs with MMX (166~233MHz)
   - Supports all AMD sixth generation AMD-K5™ CPUs: 75~166MHz, AMD-K6™ CPUs:166MHz, 200MHz , 233MHz
   - Supports all Cyrix sixth generation 6x86™ CPUs: P120+, P133+, P150+, P166+, P166+L, P200+, P200+L and 6x86MX
   - Reserved circuitry supports future sixth generation CPUs

4. Chipset
   - SIS 5598 chipset
   - Supports standard version PCI 2.1

5. L2 Cache Memory
   - 256K or 512K of cache memory (Pipeline Burst SRAM)

6. System DRAM
   - **Four** 72-pin **SIMM** sockets: support FP and EDO DRAM
   - Up to 384MB memory configuration possible

7. System BIOS
   - AWARD BIOS
   - Supports Plug-and-Play (PnP)
   - Supports Advanced Configuration Power Interface (ACPI)
   - Supports Desktop Management Interface (DMI)

8.Graphic and video Accelerator
   - Built-in 64 bit GUI accelerator
   - Supports video scaling, overlap and color space conversion
   - Supports DDC1 and DDC2B Specification
   - Video memory: shared system memory

9. Multi I/O features

- Two Universal Serial Bus (USB) ports
- Four fast IDE channels (PIO mode 0~4, Ultra "DMA/33" and Bus Master)
- One EPP/ECP parallel port and two 16550A serial ports
- Two floppy disk drive connectors (FDD) (360K, 720K, 1.2M, 1.44M and 2.88M)
- Support PS/2 type mouse

10. Other features
    - Standard AT architecture dimensions
    - Four ISA bus slots and four PCI bus slots
    - Supports **3-MODE** for a special Japanese floppy disk drive
    - Supports two bootable hard disks--able to run two different operating systems
    - Supports IDE interface CDROM and LS-120 type floppy disk drive (Boot only)
    - PD5N is using DIP switch to configure mainboard , the RED DIP switch is using to setup the CPU voltage-VCORE and VIO. The BLUE DIP switch is using to setup the CPU Frequency and Rating.

Note: All brand names and trademarks are the property of their respective owners.

② Layout diagram

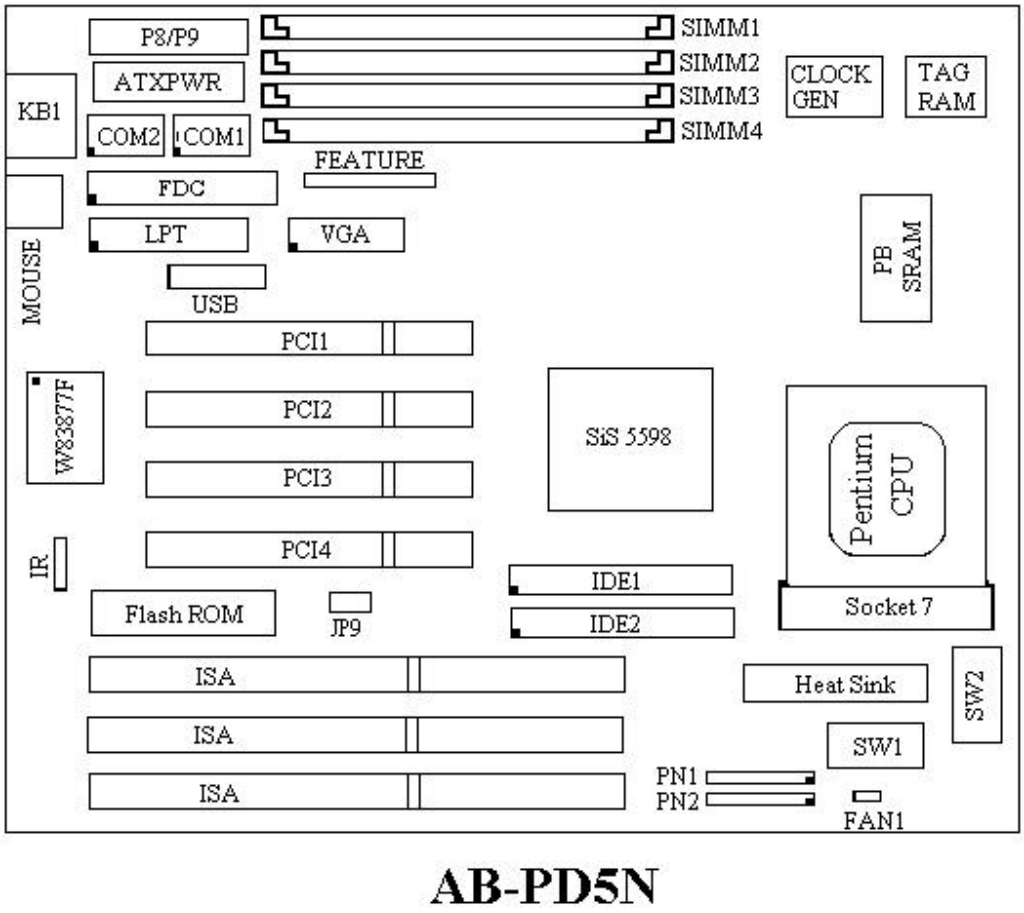


Fig 1-1 Layout diagram

③ System block diagram

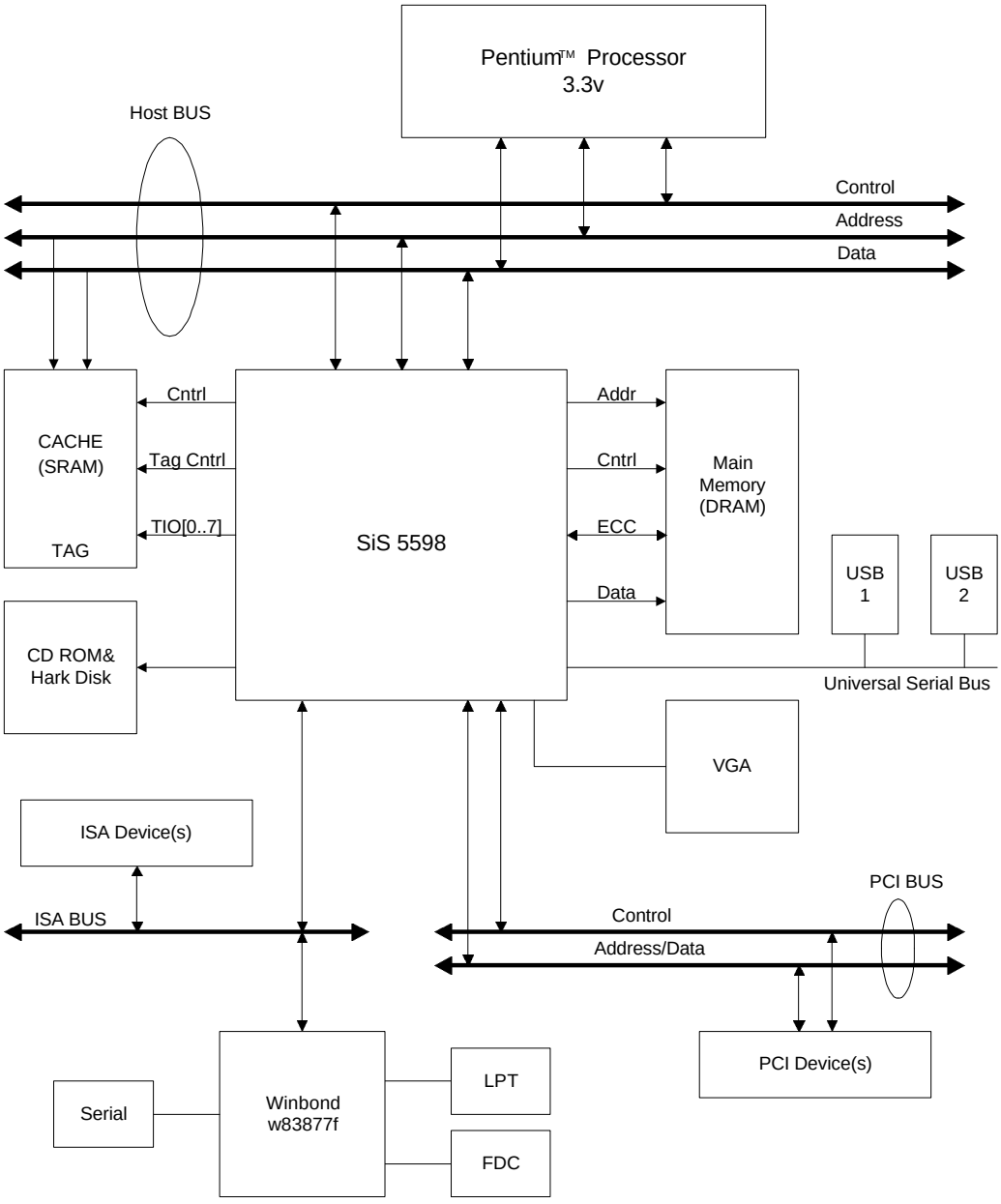


Fig. 1-4 System block diagram

Chapter 2 Installing the Mainboard

This PD5N mainboard not only provides all standard equipment for classic personal computers, but also provides great flexibility for meeting future upgrade demands. This chapter will introduce step by step all the standard equipment and will also present, as completely as possible future upgrade capabilities. This mainboard is able to support all Intel Pentium including P55C with MMX, Cyrix 6x86, 6x86L, 6x86MX and AMD-K5/K6 processors now on the market. (For details, see specifications in Chapter 1.) However, we cannot guarantee that the description given in this manual on the circuitry of your mainboard will work for processors not listed in Chapter 1. For example, the operating voltage of Cyrix's next generation CPUs is unknown at the present time. Thus we were not able to include these specifications in your motherboard. We will supply further information about CPU support when new CPUs arrive on the market.

This chapter is organized according the following features:

- ❶ Standard external connectors
- ❷ Jumpers and switches
- ❸ Presentation and Installing of the CPU.
- ❹ Installing the system memory.

Before proceeding with the installation

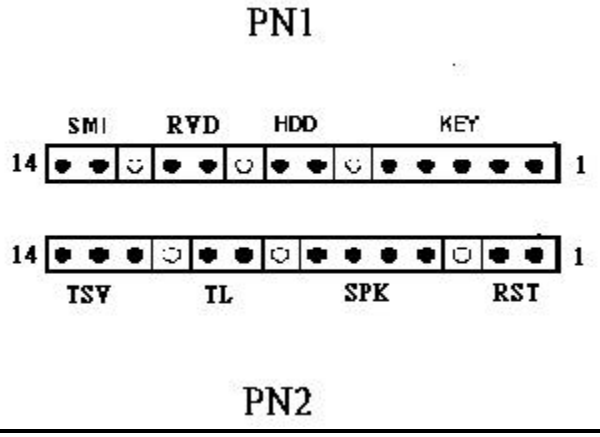
Before installing the mainboard please be sure to turn off or disconnect the power supply unit. Before making any modifications to the hardware configuration of the mainboard, the power supply to any areas of the mainboard you plan to modify should be turned off to avoid unnecessary damage to the hardware.

User friendly instructions

Our objective is to enable the novice computer user to perform the installation by themselves. We have attempted to write this document in a very clear, concise and descriptive manner to help overcome any obstacles you may face during installation. Please read our instructions carefully and follow them carefully step-by-step.

① Standard External Connectors

Inside the case of any computer several cables and plugs have to be connected. These cables and plugs are usually connected one-by-one to connectors located on the mainboard. You need to carefully pay attention to any connection orientation the cables may have and, if any, notice the position of the first pin of the connector. In the explanations that follow, we will describe the significance of the first pin.



PN1 - Keylock connector *Please pay attention to pin position and orientation*

LOOK

This connector has a specific orientation. Connect the five-thread keylock connector cable to the PN1 connector pins on the mainboard.

Pin number	Name or significance of signal
1	+5VDC
2	No connection
3	Ground
4	Keyboard inhibit Signal
5	Ground

Computer Knowledge

The "keylock switch" is used to lock the computer's keyboard. This disables the keyboard so that unauthorized persons cannot use it. When this function is in use, you will need to use the unlock key to activate the keyboard.

PN1 - Power ON/OFF switch

There is no specific orientation. Since most cases do not support this feature, most of you ignore this instruction.

Pin number	Name or significance of the signal
10	Power on/off
11	Ground

PN1 - SMI Switch

There is no specific orientation. Connect the two-thread cable to the PN1 connector pins on the mainboard. Since most cases do not support this feature, most of you ignore this instruction. Furthermore, this feature is not necessary as it is already a part of the mainboard.

Pin number	Name or significance of the signal
13	+5VDC
14	Ground

PN1 - HDD LED connector

This connector has a specific orientation. Connect the two-thread IDE LED connector cable attached to the case to the IDE LED connector on the mainboard.

Pin number	Name or significance of signal
7	LED's Cathode
8	LED's Anode

PN2 - Speaker connector

There is no specific orientation. Connect the four-thread speaker cable to the PN2 connector pins on the mainboard.

Pin number	Name or significance of signal
4	+5VDC
5	Ground
6	Ground
7	Sound Signal

PN2 - Hardware Reset connectors

There is no specific orientation. Connect the two-thread hardware reset cable to the PN2 connector pins on the mainboard.

Pin number	Name or significance of signal
1	Hardware reset signal
2	Ground

FAN1 - CPU Fan power connector

This has a specific orientation. Connect the three-threads CPU fan cable to the FAN1 connector.

Pin number	Name of the signal or signification
1	Ground
2	+12V
3	Ground

IR - Infrared remote Connectors (JP10)

Watch the pin number and the orientation.

This has a specific orientation. Your mainboard supports this feature, but you must buy the infrared remote device as an option.

Pin number	Name of the signal or signification
1	+5VDC
2	No connection
3	Receive data
4	Ground
5	Transmit data

ATXPWR - ATX Power input Connectors

These have a specific orientation. The three warning marks indicate that if you make a mistake in pin number or connection orientation, you could destroy your equipment. During installation, you just need to connect to the correct pins and

in the correct orientation, and to connect connector of the power supply unit to the connector on the mainboard.

Pin number	Name of the signal or signification	Pin number	Name of the signal or signification
1	+3.3VDC	11	+3.3VDC
2	+3.3VDC	12	-12VDC
3	Ground	13	Ground
4	+5VDC	14	PS_ON
5	Ground	15	Ground
6	+5VDC	16	Ground
7	Ground	17	Ground
8	POWERGOOD	18	-5VDC
9	+5VDC	19	+5VDC
10	+12VDC	20	+5VDC

P8/P9 - AT Power input Connectors

These have a specific orientation. The three warning marks indicate that if you make a mistake in pin number or connection orientation, you could destroy your equipment. During installation, you just need to connect to the correct pins and in the correct orientation, and to connect connectors P8 and P9 of the power supply unit to the connectors on the mainboard.

Pin number	Name of the signal or signification	Pin number	Name of the signal or signification
1	POWERGOOD	7	Ground
2	+5VDC	8	Ground
3	+12VDC	9	-5VDC
4	-12VDC	10	+5VDC
5	Ground	11	+5VDC
6	Ground	12	+5VDC

Mouse - PS/2 Mouse connector(J4)

Watch the pin number and the orientation

This has a specific orientation. Connect the six-threads PS/2 Mouse cable provided to the connector on the mainboard.

Pin number	Name of the signal or signification
1	Mouse data
2	No connection
3	Ground
4	+5VDC
-	Ground
	Mouse clock

Computer knowledge

The "PS/2 Mouse Port" is different from COM1 or COM2 serial ports to which you can also connect a Mouse. This mainboard features an extra PS/2 Mouse port, so when you buy a mouse, be sure that it is a PS/2 Mouse before connecting it to this port. But if you cannot find any PS/2 Mouse, you can still use COM1 or COM2 to connect a serial mouse to your computer.

KB1 - Keyboard Connector

This has an orientation pin. Connect your keyboard connector to the connector on the mainboard.

Pin number	Name of the signal or signification
1	Keyboard clock
2	Keyboard data
3	No connection
4	Ground
5	+5VDC

I/O Port connectors

Watch the pin number and the orientation

Connector name	Pin number	Name of the peripheral connected
IDE 1	40	IDE Channel 1

IDE 2	40	IDE Channel 2
FDC	34	Floppy Disk connector
LPT	26	Parallel port connector
COM1	10	Serial port COM1connector
COM2	10	Serial port COM2connector
VGA	16	VGA connector
Feature	26	FEATURE connector
USB	16	Universal Serial Bus connector

② Jumpers and Switches

CCMOS(JP9) : Delete the contents of the CMOS

This jumper is set on pins 1 and 2 at the factory, in order for the computer to function normally, so please do not change this setting. The main feature of this jumper is to solve situations where the computer crashes due to improper usage. For instance:

- You have forgotten the password you set.
- You have changed inappropriately the settings in the BIOS menu.
- You want to change the version of flash BIOS.

All these errors are very serious, you must avoid them. But if you have made one of these errors, this jumper can save your life. First turn off the power supply and open the computer case, than place the jumper on pins 2 and 3 in order to save your computer. But if you use your computer normally, you should not need to use this feature.

After you have deleted the CMOS information, the computer is saved, but you still have to go back to the BIOS Setup menu, and reset one by one all the specifications: CPU, date, hour, FDD and HDD parameters. etc., before your computer will get back into normal operation.

③ Presentation and Installation of the CPU

Since 1996, every two or three months, Intel adds new models to the Pentium CPU series. That is why the CPU market is filled with a lot of different models and brands. All CPUs have different electrical specifications. That's why installing a CPU is becoming more and more complex. You can't help that, because everybody wants to be able to upgrade its hardware. So, you have to take a bit of time to read this section, in order to be able to install a cheaper and better processor.

The PD5N mainboard does not only support all the CPUs listed in the specifications, but also has reserved several circuits in order to be able to support future processors. But before we go further in our presentation, we must clarify that "we have only tested the CPUs listed in Chapter 1", we cannot guarantee that this board will be able to support future products, because we cannot forecast future developments. But we will do our best to support any possible CPU.

Related terminology :

External clock

Also referred to as the external CPU clock, or "Bus clock", it is the input clock of the CPU. For instance, Intel Pentium P90, P120 and P150 all have a 60MHz external CPU clock, but have different internal clock multiplier factors.

Clock multiplier factor

The real operation clock within the CPU is the multiple of the external clock. We refer to this factor as the clock multiplier factor. The four factors possible are 1.5, 2, 2.5 and 3. The factor differs from one CPU to another. For instance, the Intel Pentium 166 CPU has a 66MHz external clock, with a multiplier factor of 2.5, so that the speed of the internal clock is 66MHz x 2.5.

Internal clock

Also referred to as the real internal CPU clock, it is the actual internal operating clock of the CPU. The Internal Clock is a multiple of the external clock and of the clock multiplier factor. For instance, the Intel Pentium 90 CPU has a 60MHz external clock and its clock multiplier factor is 1.5; the Intel Pentium P133 CPU has a 66MHz external clock and its clock multiplier factor is 2.

Internal CPU clock = clock multiplier factor * external CPU clock

AT Bus clock

Also referred to as ISA SPEED, or AT CLOCK, or even ISA Bus clock. Ten years ago, the original specification of AT Bus clock installed in the first generation PC/AT computers was 8MHz, this means that there are some interface cards which can only work at 8MHz. In order to guarantee compatibility with older hardware, we still support 8MHz AT Bus clock, but if your interface card is newer or faster, you can choose a higher speed for the AT Bus clock, in order to increase the transmission rate of the interface cards. But we recommend you not to be too ambitious. An 8MHz setup ensures maximum compatibility.

CPU Voltage - Vcore and Vio

From the voltage point of view, 586 series CPU can be divided into two categories: single voltage CPU and dual voltage CPUs. Single voltage CPUs include: Intel Pentium P54C series, AMD-K5 and Cyrix 6x86, etc.

Dual voltage CPUs include: Intel P55C with MMX, future AMD-K6 CPUs, Cyrix 6x86L and 6x86MX.

The voltage of dual voltage CPUs has two components: Vcore and Vio. Vcore provides all the power for internal processing, and its power consumption is quite important. Vio provides the power necessary for the external interface of the CPU.

P-Rating

The P-Rating was defined by some manufacturers other than Intel to rate the performance of their CPU in comparison with Intel Pentium CPUs. For instance, Cyrix 6x86 P166+ has a higher actual speed compared with Intel Pentium P166, its internal clock needs only 133MHz versus 166MHz for Intel's product. The main reason is that Cyrix has improved the internal architecture of the 6x86 CPU, which means that with the same internal clock speed, the actual clock speed will be different.

Having read the related terminology above, please refer to the information in appendices B, C or D for the type and specifications of your own CPU. We suggest that you note down these specifications, which will help you when you install the CPU.

Voltage and Frequency Setup

PD5N are using DIP switches to setup the CPU Frequency and voltage please make sure which kind of CPU and its frequency and voltage before you setup.

There are two DIP switches on the mainboard, one is using to setup CPU frequency (including external clock and rating parameter) which is called SW2, another one is SW1 which is using to setup the CPU voltage.

1.PD5N CPU frequency setting (SW2)

The following tables will present the adjustment for all serials of 586 CPU, Please setup the correct adjustment regarding the CPU type and brand.

Clock Chip:PLL52C61-01H

External Clock	DS6	DS7	DS8
50MHZ	ON	ON	OFF
55MHZ	OFF	OFF	OFF
60MHZ	ON	OFF	OFF
66MHZ	OFF	ON	OFF
75MHZ	ON	OFF	ON
83MHZ	OFF	ON	ON

Intel CPU

Intel Pentium / with MMX	External clock	Internal clock	External clock Factor			Reserve		External clock Frequency		
			DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8
P75	50MHz	75MHz	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
P90	60MHz	90MHz	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
P100	66MHz	100MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
P120	60MHz	120MHz	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
P133	66MHz	133MHz	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
P150	60MHz	150MHz	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
P166	66MHz	166MHz	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
P200	66MHz	200MHz	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
P233	66MHz	233MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF

AMD CPU

AMD K5/K6	External clock	Internal clock	External clock Factor			Reserve		External clock Frequency		
			DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8
K5-PR75	50MHz	75MHz	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
K5-PR90	60MHz	90MHz	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
K5-PR100	66MHz	100MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
K5-PR120	60MHz	90MHz	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
K5-PR133	66MHz	100MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
K5-PR150	60MHz	105MHz	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
K5-PR166	66MHz	117MHz	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
K6-166	66MHz	166MHz	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
K6-200	66MHz	200MHz	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
K6-233	66MHz	233MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF

Cyrix/IBM 6x86/6x86L CPU

Cyrix / IBM 6x86/6x86L	External clock	Internal clock	External clock Factor			Reserve		External clock Frequency		
			DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8
PR120+	50MHz	100MHz	ON	OFF	OFF	OFF	OFF	ON	ON	OFF
PR133+	55MHz	110MHz	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
PR150+	60MHz	120MHz	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
PR166+	66MHz	133MHz	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
PR200+	75MHz	150MHz	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
6x86MX										
PR166	66MHz	133MHz	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
	60MHz	150MHz	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
PR200	66MHz	166MHz	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
	75MHz	150MHz	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
PR233	66MHz	200MHz	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
	75MHz	188MHz	ON	ON	OFF	OFF	OFF	ON	OFF	ON
	83MHz	166MHz	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
PR266	66MHz	233MHz	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF

There are eight switches at SW2, DS1-DS3 is using to setup the rating parameter, DS6-DS8 is using to setup the external clock, the following table presents all of the adjustments for the setup combinations of CPU.

2.CPU Voltage and Setup (SW2)

For the voltage of 586 serials of CPU, there are two kinds of operation mode depend different CPUs, single voltage and dual voltage. Please make sure which kind of CPU and the working voltage that you used before you install. The following table presents all of the adjustments of voltage for all serials of 586 CPUs, Please setup the Vcore voltage if the CPU you are using is single voltage.

SW1 CPU Vcore / Vio settings

	VCORE					VIO		
Vcore/Vio	**VC1**	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
3.5/3.3	ON	ON	ON	ON	OFF	OFF	ON	OFF
3.4/3.3	ON	ON	ON	OFF	OFF	OFF	ON	OFF
3.3/3.3	ON	ON	OFF	ON	OFF	OFF	ON	OFF
3.2/3.38	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
2.9/3.38	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
2.8/3.38	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
2.7/3.38	OFF	ON	ON	ON	OFF	OFF	OFF	ON
2.6/3.38	OFF	ON	ON	OFF	OFF	OFF	OFF	ON

¡ i **Note** ¡ j The Vcore of CPU voltage is design using switching power supply, the Vio of CPU voltage is design using linear regulator power supply. That is Vcore can provide more current and voltage drop without occure more heat and high temperature. The linear power supply will occure more heat and temperature.
Please setup the Vio voltage smaller than Vcore voltage if the single voltage CPU is installed, it is using to make sure the CPU voltage is provided by Vcore (Switching Power Supply), and make the CPU more stable.

④ Installing System Memory ¡i DRAM Memory ¡j

When this mainboard was designed, we not only have taken into account the present needs, but we have also tried to care about demands for future upgrades:

2. 72-pin SIMM sockets:
   PD5N support four 72 pin SIMM sockets

3. Easy installation
   You just need to insert the modules, without the help of God. Isn't it great?

Besides the features mentioned above, you can use simultaneously 72-pin SIMM modules, but you will rarely encounter this kind of configuration. Before you proceed with installation, be patient, first read what follows:

1. **Factory default setting of the mainboard is for 60ns FP or EDO modules.**

   If your memory modules are faster than 60ns, say 45ns, you can modify the BIOS settings in order to speed up the operating speed of the system. But if you don't want to modify these settings, or if you don't know how to modify them, it's no big deal.

   But if you set the external CPU clock at 66MHz or more, we recommend you use 60ns or even faster DRAM modules.

2. **Memory error check and correction do not support this feature on this mainboard.**

   The SIS 5598 chipset does not support this feature, since the memory error check and correction feature may not be effective, and since you cannot easily find memory modules with memory check and correction feature, this mainboard does not support it.

3. Maximum memory capacity 384M bytes supported by this mainboard.

Computer knowledge

¡i Relationships between memory modules and Pentium CPUs ¡j

Pentium, Cyrix 6x86 and AMD-K5/K6 are all 64 bit CPUs, but 72-pin SIMM modules are only 32-bit. That's why they have to be used in pairs, because the CPU will always be only able to see 64 bits. This means that 72-pin SIMM modules have to be installed in pairs. For instance, SIMM1 and SIMM2 must form a pair, and SIMM3 and SIMM4 must form another pair. Of course, the two members of a pair must be of the same kind ¡i EDO or FP DRAM ¡j , and you cannot use pairs from different "species".

But the PD5N support different "pairs" and use different type of memory modules, notice:

- ¡i SIMM1 and SIMM2 ¡j must use the same memory type, as well as ¡i SIMM3 and SIMM4 ¡j .
- ¡i SIMM1 and SIMM2 ¡j use the same memory type, and ¡i SIMM3 and SIMM4 ¡j can use the same type, or a different type, in order to permit you to obtain the best speed configuration for each "single" pair, and to make the system work at its maximum capacity. If one memory pair is slower, it will have no influence on the pair whose speed is higher.

After installing the DRAM, the BIOS of the mainboard will automatically detect the size of the memory installed on the mainboard. Below is a list of all the possible situations:

You use 72-pin SIMM modules:

- The maximum memory size is 256M bytes.
- Support possible for single density or double density memory modules.
- Memory modules supported: 1Mx32 ¡i 4M ¡j , 2Mx32 ¡i 8M ¡j, 4Mx32 ¡i 16M ¡j, 8Mx32 ¡i 32M ¡j or 16Mx32 ¡i 64M ¡j .

- You can also directly refer to table 2-1.

Table 2-1 72-pin SIMM Module Installation

¡ i SIMM1, SIMM2 ¡ j	¡ i SIMM3, SIMM4 ¡ j	Total memory size
1st ¡ i 2nd pair ¡ j	2nd ¡ i 1st pair ¡ j	
NO MODULE INSERTED	1Mx32 ¡ i 4Mx2 ¡ j	8MB
	2Mx32 ¡ i 8Mx2 ¡ j	16MB
	4Mx32 ¡ i 16Mx2 ¡ j	32MB
	8Mx32 ¡ i 32Mx2 ¡ j	64MB
	16Mx32 ¡ i 64Mx2 ¡ j	128MB
Since the installation described above is valid for the first pair as well as for the second pair, it will not be repeated.		
1Mx32 ¡ i 4Mx2 ¡ j	1Mx32 ¡ i 4Mx2 ¡ j	16MB
	2Mx32 ¡ i 8Mx2 ¡ j	24MB
	4Mx32 ¡ i 16Mx2 ¡ j	40MB
	8Mx32 ¡ i 32Mx2 ¡ j	72MB
	16Mx32 ¡ i 64Mx2 ¡ j	136MB
2Mx32 ¡ i 8Mx2 ¡ j	1Mx32 ¡ i 4Mx2 ¡ j	24MB
	2Mx32 ¡ i 8Mx2 ¡ j	32MB
	4Mx32 ¡ i 16Mx2 ¡ j	48MB
	8Mx32 ¡ i 32Mx2 ¡ j	80MB
	16Mx32 ¡ i 64Mx2 ¡ j	144MB
4Mx32 ¡ i 16Mx2 ¡ j	1Mx32 ¡ i 4Mx2 ¡ j	40MB
	2Mx32 ¡ i 8Mx2 ¡ j	48MB
	4Mx32 ¡ i 16Mx2 ¡ j	64MB
	8Mx32 ¡ i 32Mx2 ¡ j	96MB
	16Mx32 ¡ i 64Mx2 ¡ j	160MB
8Mx32 ¡ i 32Mx2 ¡ j	1Mx32 ¡ i 4Mx2 ¡ j	72MB
	2Mx32 ¡ i 8Mx2 ¡ j	80MB
	4Mx32 ¡ i 16Mx2 ¡ j	96MB
	8Mx32 ¡ i 32Mx2 ¡ j	128MB
	16Mx32 ¡ i 64Mx2 ¡ j	192MB
16Mx32 ¡ i 64Mx2 ¡ j	1Mx32 ¡ i 4Mx2 ¡ j	136MB
	2Mx32 ¡ i 8Mx2 ¡ j	144MB
	4Mx32 ¡ i 16Mx2 ¡ j	160MB
	8Mx32 ¡ i 32Mx2 ¡ j	192MB
	16Mx32 ¡ i 64Mx2 ¡ j	256MB

Perhaps you have already found out the rules from the table above. This table, we belive, contains all possible configurations. In fact, you just need to insert two or four 72-pin SIMM modules in the socket to complete the installation.

Chapter 3 Introduction of BIOS

The BIOS is a program located on a Read-Only Memory chip on the mainboard. This program will not be lost when you turn the computer off. This program is also referred to as the boot program. It is the only channel for the hardware circuit to communicate with the operating system. Its main function is to manage the setup of the mainboard and interface cards parameters, including simple parameters such as time, date, hard disk drive, as well as more complex parameters such as hardware synchronization, device operating mode, CPU **SOFT MENU™** techniques, setup of CPU voltage and speed. The computer will operate normally, or will operate at its best, only if all these parameters are correctly configured through the BIOS.

Don't change the parameters inside the BIOS unless you know what you are doing

The parameters inside the BIOS are used to setup the hardware synchronization or the device operating mode. If the parameters are not correct, they will produce errors, the computer will crash, and sometimes you will even not be able to boot the computer after it has crashed. We recommend that you do not change the parameters inside the BIOS unless you are familiar with them. If you are not able to boot your computer anymore, please refer to the section "Erase CMOS data" in Chapter 2.

When you start the computer, it is controlled by the BIOS program. The BIOS first operates an auto-diagnostic for all the necessary hardware, configurates the parameters of the hardware synchronization, and detects all the hardware. Only when these tasks are completed does it give up control of the computer to the program of the next level, which is the operating system. Since the BIOS is the only channel for hardware and software to communicate, it will be the key factor to system stability, and to ensure that your system performs at its best. After the BIOS has achieved the auto-diagnostic and auto-detection operations, it will display the following message:

PRESS DEL TO ENTER SETUP

Three to five seconds after the message is displayed, if you press the **Del** key, or if you press simultaneously the **Ctrl Alt Esc** keys, you will access the BIOS Setup menu. At that moment, the BIOS will display the following message:

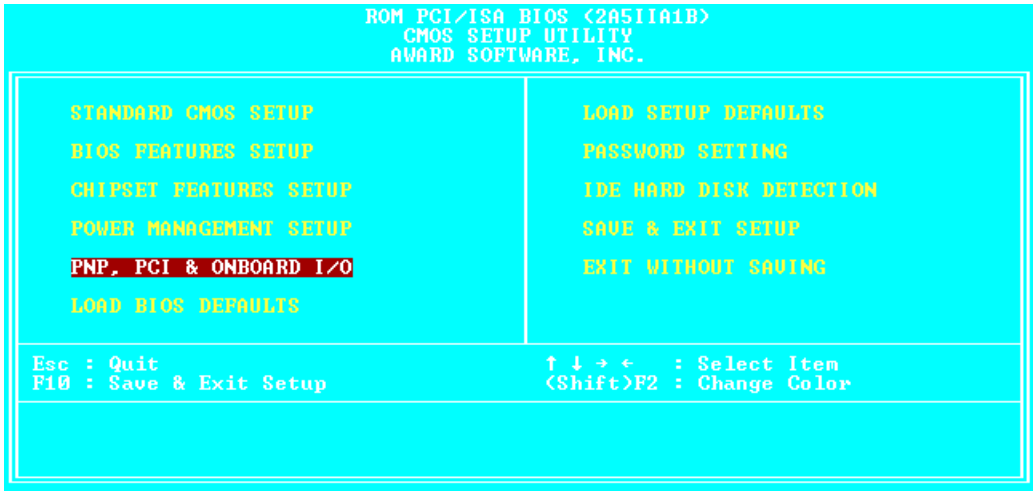


Fig 3 BIOS Setup main menu

In the BIOS Setup main menu of Figure 3, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press **Esc** to quit the BIOS Setup.
- Press ¡ ô ¡ õ ¡ ÷ ¡ ö (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press **F10** when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press Page Up/Page Down or +/- keys when you want to modify the BIOS parameters for the active option.

Computer knowledge

CMOS DATA

Maybe you have heard somebody saying that their CMOS DATA was lost. What is the CMOS? Is it important? The CMOS is the memory used to store the BIOS parameters that you have configured. This memory is passive. You can read its data, and you can also store data in it. But this memory has to be powered by a battery, in order to avoid any loss of its data when the computer is turned off. Since you may have to change the CMOS battery when it is out of power and indoing so, you will loose all CMOS data, therefore, we recommend that you write down all the parameters of your hardware, or to put a label with these parameters on your hard disk.

① Standard CMOS Setup Menu

It is the basic configuration parameters of the BIOS. These parameters include the settings of date, hour, VGA card, FDD and HDD.

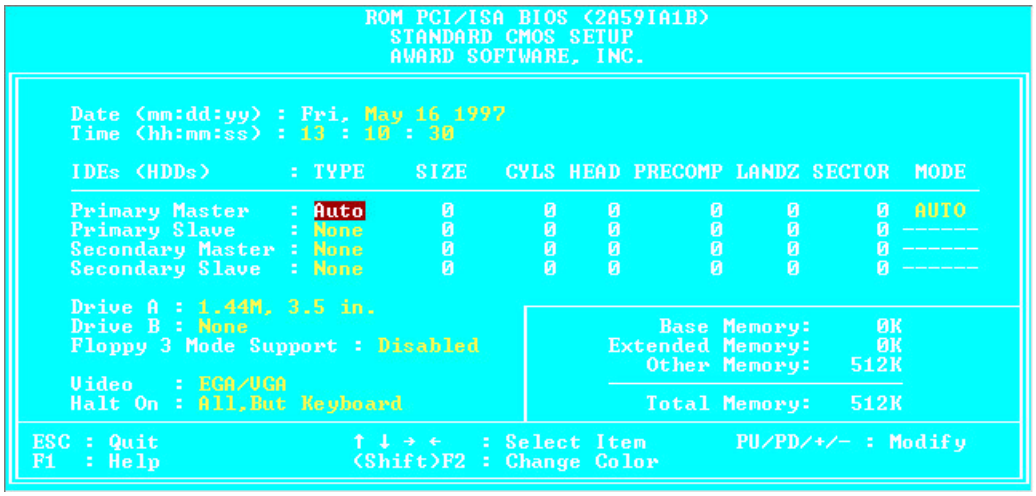


Fig 3-2 Standard CMOS Setup Menu

● Set up of HDD operating mode ¡i NORMAL, LBA, LARGE ¡j

Since old operating systems were only able to support HDD whose capacity was not bigger than 528MB, any hard disk with more than 528MB was unusable. AWARD BIOS features a solution to this problem: you can, according to your operating system, choose three operating modes: NORMAL, LBA or LARGE.

➢ **Normal mode:**

Standard normal mode supports hard disks of 528MB or less. This mode directly uses positions indicated by Cylinders (CYLS), Heads, and Sectors to access data.

➢ **LBA (Logical Block Addressing) mode:**

LBA mode supports hard disk drives up to 8.4Giga. This mode uses a different method to calculate the position of disk data to be accessed. It translates Cylinders (CYLS), Heads and Sectors into a logical address where data are located. The Cylinders, Heads, and Sectors displayed in this menu do not reflect the actual structure of the hard disk, they are just reference values used to calculate actual positions. Currently, all high capacity hard disks support this mode, that's why we recommend you use this mode. The HDD AUTODETECTION option in the Main Menu will automatically detect the parameters of your hard disk and the mode supported.

➢ **LARGE Mode:**

When the number of cylinders (CYLs) of the hard disk exceeds 1024 and DOS is not able to support it, or if your operating system does not support LBA mode, you should select this mode.

- ***FDD supporting 3 Mode:***

3 Mode floppy disk drives (FDD) are 3 1/2" drives used in Japanese computer systems. If you need to access data stored in this kind of floppy, you must select this mode, and of course you must have a 3 Mode floppy drive.

For further information about HDD installation, refer to Appendix E.

② BIOS Features Setup Menu

BIOS Features Setup Menu has already been set for maximum operation. If you do not really understand each of the options in this menu, we recommend you use default values.

In each item, you can press <F1> at any time to display all the options for this item.

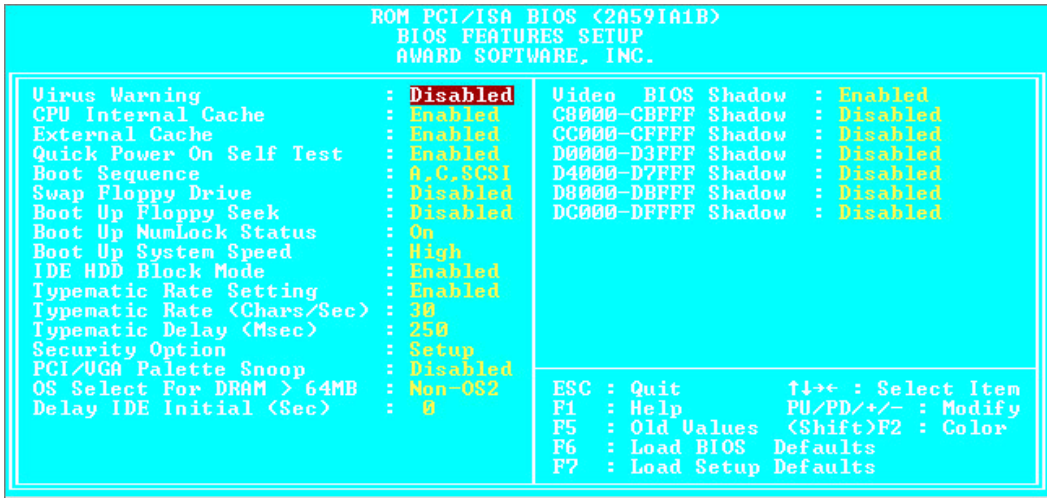


Fig 3-3 BIOS Features Setup

Virus Warning:

This item can be set as Enable or Disable.

When this feature is enabled, if there is any attempt from a software or an application to access the boot sector or the partition table, the BIOS will warn you that a boot virus is attempting to access to the hard disk.

CPU Internal Cache:

This item is used to Enable or to Disable the CPU internal cache. When the cache is set at Disable, it is much slower, so the default setting for this item is Enable. Some old and very bad programs will make the computer malfunction or crash if the system speed is to high. In that case, you should Disable this feature.

CPU External Cache:

This item is used to enable or to disable the CPU external cache. When the external cache is enabled, the system works faster. The default is Enable.

Quick power on self test:

After the computer has been powered on, the BIOS of the mainboard will run a series of tests in order to check the system and its peripherals. If the Quick power on self test feature is Enable, the BIOS will simplify the test procedures in order to speed up the boot process. The default is Enable.

Boot Sequence:

When the computer boots up, it can load the operating system from floppy drive A:, hard disk drive C:, SCSI disk drive or CD-ROM. There are many options for the boot sequence:

- A, C, SCSI
- C, A, SCSI
- C, CD-ROM, A
- CD-ROM, C, A
- D, A, SCSI (at least 2 IDE HDD can be used)
- E, A, SCSI (at least 3 IDE HDD can be used)
- F, A, SCSI (at least 4 IDE HDD can be used)
- SCSI, A, C
- SCSI, C, A
- A, SCSI, C
- LS120, C

Swap Floppy Drive:

This item can be set as Enable or Disable.

When this feature is enabled, you don't need to open the computer case to swap the position of floppy disk drive connectors. Drive A: can be set as drive B:, and drive B: can be set as drive A:.

Boot Up Floppy Seek:

When computer boots up, the BIOS detects if the system has FDD or not. When this item is enabled, if the BIOS detects no floppy drive, it will display a floppy disk drive error message. If this item is disabled, the BIOS will skip this test.

Boot Up NumLock Status:

- ➢ On: At boot up, the Numeric Keypad is in numeric mode.
- ➢ Off: At boot up, the Numeric Keypad is in cursor control mode.

IDE HDD Block Mode:

This item can be set as Enable or Disable.

Most of new hard disk drives (IDE drives) support multi-sector transfers. This feature speeds up hard disk drive access performance and reduces the time necessary to access data. When this item is enabled, the BIOS will automatically detect if your hard disk drive supports this feature or not, and will choose the right settings for you.

For further details about hard disk drive installation, refer to appendix E.

Typematic Rate Setting:

This item allows you to adjust the keystroke repeat rate. When enabled, you can set the two keyboard typematic control that follow (Typematic Rate and Typematic Rate Delay). If this item is disabled, the BIOS will use the default setting.

Typematic Rate (Chars/Sec):

When you press a key continuously, the keyboard will repeat the keystroke according to the rate you have set. (Unit: characters/second ¡ ^

Typematic Rate Delay (Msec):

When you press a key continuously, if you exceed the delay you have set here, the keyboard will automatically repeat the keystroke according a certain rate. (Unit: milliseconds)

Security Option:

This option can be set to System or to Setup.

After you have created a password through PASSWORD SETTING, this option will deny access to your system (System) or modification of computer setup (BIOS Setup) by unauthorized users.

- ➢ SYSTEM: When you choose System, a password is required each time the computer boots up. If the correct password is not given, the system will not start.
- ➢ SETUP: When you choose Setup, a password is required only when accessing the BIOS Setup. If you have not set a password in the PASSWORD SETTING option, this option is not available.

Notice: Don't forget your password. If you forget the password, you will have to open the computer case and clear all information in the CMOS before you can start up the system. But doing this, you have to reset all the options you had set up before.

PCI /VGA Palette Snoop:

This option allows the BIOS to preview VGA Status, and to modify the information delivered from the Feature Connector of the VGA card to the MPEG Card. This option can solve the display inversion to black after you have used the MPEG card.

Delay IDE Initial:

This item is using for support some old model or special type of hard disks or CDROMs . Because the BIOS may not detect those kinds of devices during system booting .

OS Select For DRAM > 64MB:

When the system memory is bigger than 64MB, the communication method between the BIOS and the operating system will differ from one operating system to another. If you use OS/2, select OS2; if you choose another operating system, select Non-OS2.

Video BIOS Shadow:

This option is used to define whether the BIOS on the video card uses shadow feature or not. You should set this option to Enable, otherwise the display performance of the system will greatly decrease.

Shadowing address ranges (C8000-CBFFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address C8000-CBFFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

Shadowing address ranges (CC000-CFFFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address CC000-CFFFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

Shadowing address ranges (D0000-D3FFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address D0000-D3FFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

Shadowing address ranges (D4000-D7FFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address D4000-D7FFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

Shadowing address ranges (D8000-DBFFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address D8000-DBFFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

Shadowing address ranges (DC000-DFFFF Shadow):

This option allows you to decide if the memory block (BIOS) of an interface card at the address DC000-DFFFF uses the shadow feature or not. If you have no interface card using this memory block, don't enable this option.

SHADOW

Computer knowledge

What is the SHADOW? The BIOS of standard video or interface cards is stored in ROM, and it is often very slow. With the Shadow feature, the CPU reads the BIOS on the VGA card and copies it into RAM. When the CPU runs this BIOS, the operation is speeded up.

③ Chipset Features Setup Menu

The Chipset Features Setup Menu is used to modify the contents of the buffers in the chipset on the mainboard. Since the parameters of the buffers are closely related to hardware, if the setup is not correct or false, the mainboard will become unstable or you will not be able to boot up. If you don't know the hardware very well, use default values (use the LOAD SETUP DEFAULTS option).

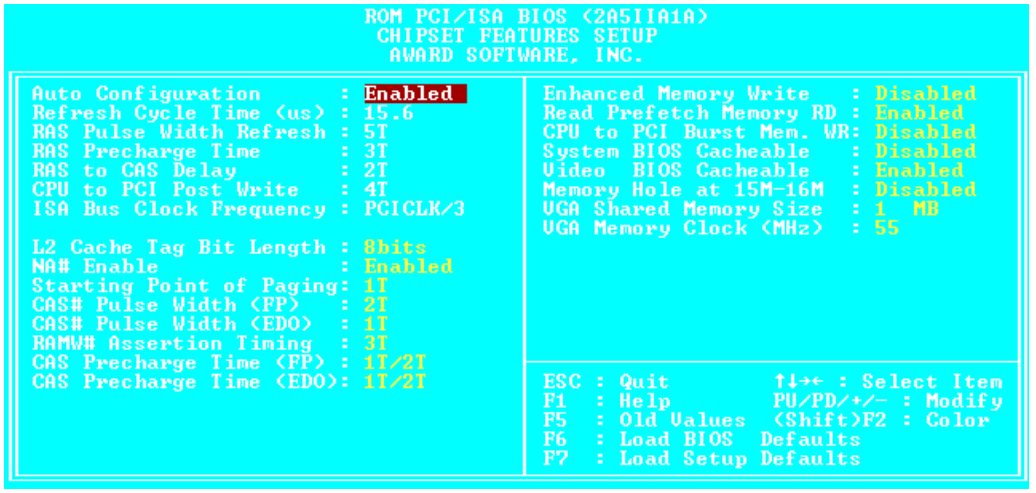


Fig 3-4 Chipset Features Setup

You can use the arrow keys to move between the items. Use "PgUP", "PgDn", "+" and "-" to change the values. When you have finished setting up the chipset, press "ESC" to go back to the main menu.

Auto Configuration:

This option allows (Enable) or prevents (Disable) the BIOS from using default values for Auto Configuration. The BIOS default is Enable.

- ➢ When you select Enable, the BIOS will automatically use the values related to DRAM. You will not be able to set up the following options.
- ➢ When you select Disable, you can manually set up DRAM options.

Attention: Unless you are very familiar with your computer and with the DRAM configuration and speed, we recommend you not change the DRAM options but enable this option.

DRAM settings:

The other DRAM settings are all closely related to hardware. If you do not understand this very well, don't make any changes. Our BIOS is able to autodetect the characteristics of your DRAM and to choose the best settings.

Memory Hole At 15M-16M:

This option is used to free up the 15M-16M memory block. Some special peripherals need to use a memory bloc located between 15M and 16M, and this memory block has a size of 1M. We recommend that you disable this option.

VGA Shared Memory Size:

This option is used to choose VGA Memory by shared system Memory and at least need 1MB Memory for showing higher resolution. The setting buffer allocated from 0.5/1/1.5/2/2.5/3/3.5/4MB.

There are small differences in the chipset feature setup according to different mainboard models, but this has no influence upon performance. Our default setup should be the best one. That is the reason why we do not describe all the features of this menu.

④ Power Management Setup Menu

The difference between Green PCs and traditional computers is that Green PCs have a power management feature. With this feature, when the computer is powered on but inactive, the power consumption is reduced in order to save energy. When the computer operates normally, it is in Normal mode. In this mode, the Power Management Program will control the access to video, parallel ports, serial ports and drives, and the operating status of the keyboard, mouse and other device. These are referred to as Power Management Events. In cases where none of these events occur, the system enters the power saving mode. When one of the controlled events occurs, the system immediately returns to normal mode and operates at its maximum speed. Power saving modes can be divided into three modes according to their power consumption: Doze Mode, Standby Mode , and Suspend Mode. The four modes proceed in the following sequence:

Normal Mode===> Doze Mode===> Standby Mode===> Suspend Mode

The system consumption is reduced according the following sequence:
Normal > Doze > Standby > Suspend

1. In the Main Menu, select "Power Management Setup" and press "Enter". The following screen is displayed:

```
                ROM PCI/ISA BIOS (2A5IIA1A)
                POWER MANAGEMENT SETUP
                AWARD SOFTWARE, INC.

Power Management    : User Define          IRQ3  (COM 2)       : Enabled
PM Control by APM   : No                   IRQ4  (COM 1)       : Enabled
Video Off Option    : Always On            IRQ5  (LPT 2)       : Enabled
Video Off Method    : DPMS Supported       IRQ6  (Floppy Disk) : Enabled
CPU Fan Off Option  : Always On            IRQ7  (LPT 1)       : Enabled
MODEM Use IRQ       : NA                   IRQ8  (RTC Alarm)   : Enabled
Hot Key Power Off   : Disabled             IRQ9  (IRQ2 Redir)  : Enabled
Power Up By Ring    : Disabled             IRQ10 (Reserved)    : Enabled
                                           IRQ11 (Reserved)    : Enabled
        ** PM Timers **                    IRQ12 (PS/2 Mouse)  : Enabled
HDD Off After       : Disable              IRQ13 (Coprocessor) : Enabled
Doze Mode           : Disable              IRQ14 (Hard Disk)   : Enabled
Standby Mode        : Disable              IRQ15 (Reserved)    : Enabled
Suspend Mode        : Disable

        ** PM Events **                    ESC : Quit          ↑↓→← : Select Item
Serial Port         : Disabled             F1  : Help          PU/PD/+/- : Modify
Parallel Port       : Disabled             F5  : Old Values    (Shift)F2 : Color
IDE Drive Port      : Disabled             F6  : Load BIOS  Defaults
VGA Activity        : Disabled             F7  : Load Setup Defaults
```

Fig 3-5 Power Management Setup Menu

2. Use arrow keys to go to the item you want to configure. To change the settings, use "PgUP", "PgDn", "+" and "-".

3. After you have configured the Power Management feature, press “Esc” to go

back to the Main Menu.

We are now going to briefly explain the options in this menu:

Power Management:

Four options:

- User Define
  User Define defines the delay for accessing the power modes.
- Disable
  Disable Power Management features.
- Min Saving
  When the three saving modes are enabled, the system is set up for minimum power savings.
  Doze = 40 minutes
  Standby = 40 minutes
  Suspend = 40 minutes
- Max Saving
  When the three saving modes are enabled, the system is set up for maximum power savings.
  Doze = 20 seconds
  Standby = 20 seconds
  Suspend = 20 seconds

PM Control by APM:

Power Management is completely controlled by the APM.
APM stands for Advanced Power Mangement, it is a power management standard set by Microsoft, Intel and other major manufacturers.

Video Off Method:

Three video off methods are available: "Blank", "V/H SYNC+Blank" and "DPMS".
If this setting does not shut off the screen, select “Blank”. If your monitor and video card support DMPS standard, select “DPMS”.

Video Off After:

Select the saving mode in which the video is switched off.

- ➢ Always On
  The video will never be switched off in no saving mode.
- ➢ All Modes Off
  The video will be switched off in all saving modes.
- ➢ Standby
  The video will only be switched off in Standby or Suspend mode.
- ➢ Suspend
  The video will only be switched off in Suspend mode.

CPU Fan Off In Suspend:

CPU fan can be turn off in suspend mode.

Power Up by Ring:

Special function supports by ATX power supply. To connect a external EODEM with the build-in serial port, the system will be turned on when telephone ring-up.

IDE HDD Power Down:

If the system has not accessed data on the hard disk drive during the specified time period, the engine of the HDD will stop in order to save electricity.

You can set 1 to 15 minutes or select Disable according to your use of the HDD.

Doze Mode:

When the setting selected for "Power Management" is "User Define", you can define for this mode any delay from 1 minute to 1 hour. If no power management event occurs during this time period, meaning that computer is inactive during this period, the system will enter the **Doze** power saving mode.

If this mode is disabled, the system will enter the next mode in the sequence (Standby or Suspend mode).

Standby Mode:

When the setting selected for "Power Management" is "User Define", you

can define for this mode any delay from 1 minute to 1 hour. If no power management event occurs during this time period, meaning the computer is inactive during this period, the system will enter the **Standby** power saving mode.

If this mode is disabled, the system will enter the next mode in the sequence (Suspend mode).

Suspend Mode:

When the setting selected for "Power Management" is "User Define", you can define for this mode any delay from 1 minute to 1 hour. If no power management event occurs during this time period, meaning the computer is inactive during this period, the system will enter the **Suspend** power saving mode. The CPU stops working completely.
If this mode is disabled, the system will not enter the Suspend mode.

Power Management Setup Menu

When one of the speficied occurs, the count down made for entry in power saving mode goes back to zero.

Since the computer will enter a power saving mode only after an inactivity delay specified (time speficied for Doze, Standby and Suspend modes) and after it has no activity, during this time period, any event will cause the computer to re-count the time elapsed. Resume events are operations or signals that cause the computer to resume time counting.

⑥ PnP, PCI & Onboard I/O Setup

In this menu, you can change the INT# and IRQ of the PCI bus and the onboard I/O device, I/O port address and other hardware settings.

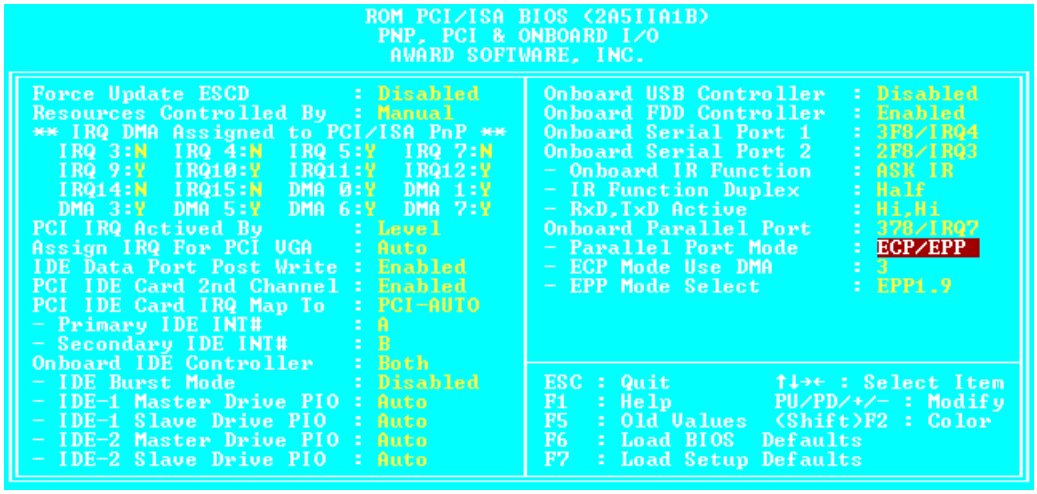


Fig 3-6 PCI & Onboard I/O Setup

Force Update ESCD:

If you want to clear ESCD data next time you boot up, and ask the BIOS to reset the settings for the Plug & Play ISA Card and the PCI Card, select Enabled. But the next time you boot up, this option will automatically be set as Disabled.

Computer Knowledge

ESCD (Extended System Configuration Data)

The ESCD contains the IRQ, DMA, I/O Port, Memory information of the system. This is a specification and a feature specific to Plug & Play BIOS.

Resources Controlled By:

When you select Auto, the BIOS will automatically assign the IRQ and DMA to PCI / ISA PnP . When this option is Manual, you can choose which IRQ or DMA can assign to PCI / ISA PnP .

PCI IDE Card 2nd Channel:

This option can be enabled or disabled. BIOS default is Enable.
Since this channel uses IRQ15, if you want to use this channel, you have to enable this option to make the BIOS assign IRQ15 to this channel.

PCI IDE Card IRQ Map to:

Three options are available for this item: PCI Auto, PCI-slotX and ISA.

- ➢ PCI-Auto: The onboard BIOS auto-detects which PCI slot has an IDE card inserted in.
- ➢ PCI-slotX: Some old PCI IDE cards cannot be detected by the BIOS. If the onboard BIOS cannot detect a PCE IDE card, you have to specify on which PCI slot the IDE card is inserted, to make the BIOS assign IRQ14 for use by the interrupt number (INT#) of this PCI slot.
- ➢ ISA: If you select ISA, it means that your PCI IDE card features a "paddleboard" and a cable that can be connected to IRQ on the ISA slot, because the BIOS will not assign any IRQ to this PCI slot.

Attention: Primary Channel and Secondary Channel : The BIOS needs two independent interrupt number (INT#) lines to be allocated to the PCI IDE card. Be careful not to choose twice the same interrupt number (INT#).

On Board FDD Controller:

This is to Enable or Disable the Onboard FDD Controller.

On board Serial Port 1:

This is used to specify the I/O address and IRQ of Serial Port 1. Five options are available: Disable, 3F8h/IRQ4, 2F8h/IRQ3, 3E8h/IRQ4 or 2E8h/IRQ3.

On board Serial Port 2:

This is used to specify the I/O address and IRQ of Serial Port 2. Five options are available: Disable, 3F8h/IRQ4, 2F8h/IRQ3, 3E8h/IRQ4 or 2E8h/IRQ3.

Attention: Do not select the same I/O address and IRQ for the two serial ports, otherwise the serial ports will not be able to operate normally.

✏ ***Onboard IR Function:***

Onboard serial port 2 can support IR (Infrared) function. Three options are available:

- ➢ Disable: No support for IR function.
- ➢ IrDA (HPSIR) mode.
- ➢ ASK IR (Amplitude Shift Keyed IR) mode.

✏ ***IR Function Duplex:***

Set the IR mode as Half or Full. Default is Half.

✏ ***RxD , TxD Active:***

Set IR transmission/reception polarity as High or Low.

On board parallel Port:

Set the I/O address and IRQ of the onboard parallel port. Four options are available: Disable, 3BCh/IRQ7, 278h/IRQ5 and 378h/IRQ7. Default is 378h/IRQ7.

✏ ***Parallel Port Mode:***

Can be set as ECP, ECP+EPP, or Normal (SPP) mode. Default is Normal (SPP) mode.

✏ ***ECP Mode Use DMA:***

When the mode selected for the onboard parallel port is ECP, the DMA channel selected can be Channel 1 or Channel 3.

✏ ***EPP Mode Select:***

When the mode selected for the onboard parallel port is EPP, two EPP version options are available: EPP1.7 or EPP1.9 .

On board IDE Controller:

Onboard PCI IDE controller can be set as IDE-1, IDE-2, Both or Disable.

✏ ***Master drive PIO Mode:***

- ➢ Auto: the BIOS can auto-detect the PIO mode of the HDD in order to set its data transfer rate. (Default)
- ➢ Mode 0~Mode 4: User can specify the PIO mode of the HDD in order to set its data transfer rate.

✏ ***Slave drive PIO Mode:***

- ➢ Auto: the BIOS can auto-detect the PIO mode of the HDD in order to set its data transfer rate. (Default)
- ➢ Mode 0~Mode 4: User can specify the PIO mode of the HDD in order to set its data transfer rate.

Computer knowledge

MODE 0~4 reflects the HDD data transfer rate. The higher the MODE value is, the better is the HDD data transfer rate. But it does not mean that you can select the highest MODE value just as you like, you first have to be sure that your HDD supports this MODE, otherwise the hard disk will not be able to operate normally.

For further information about HDD installation, refer to Appendix E.

⑥ Load BIOS Defaults

BIOS defaults are the reference settings that allow your system to work at a comparatively low performance. When you choose the option, the following message is displayed:

"Load BIOS Defaults (Y/N)? N"

If you want to use BIOS default values, press "Y", than <Enter>.

⑦ Load Setup Defaults

Setup defaults are the settings that allow your system to operate at its highest performance. When you choose this option, the following message is displayed:

"Load Setup Defaults (Y/N)? N"

If you want to use BIOS Setup default values, press "Y", than <Enter> to complete the loading of the settings for best performance.

You should first load the best settings, than enter the CPU Soft Menu to set up CPU parameters, otherwise the BIOS will replace set parameters by default parameters.

⑧ Password Setting

This option allows you to set a password required to start the system (System) or to access to the BIOS (Setup).

After you have set a password through the PASSWORD SETTING option, you can enter the Security Option in the "BIOS Features Setup Menu" to select the security level in order to prevent any unauthorized access.

Password setting procedure:
When you choose the Password setting option, the following message is displayed:

"**Enter Password:**"

Type your password. When complete, press <Enter>. The following message is displayed:

"**Confirm Password:**"

Type your password again. When complete, press <Enter>. The password setting is completed.

Password clearing procedure:
When you select the Password setting option, the following message is displayed:

"**Enter Password:**"

Press <Enter>, the message "Password Disable" is displayed. Press a key. The password clearing procedure is completed.

Notice: Do not forget your password. If you forget it, you will have to open the computer case, clear the contents of the CMOS, and boot the system up again. But doing this, you must reset all your settings.

⑨ IDE HDD Auto Detection

After you have installed the hard disk, in old systems, you had to know the hard disk specifications, such as the number of cylinders, heads and sectors, and to enter the relevant information into the hard disk information section. If the CMOS data were erased, and you had forgotten the hard disk specifications, it was a great problem. But now, you can use this option to autodetect the hard disk type and specifications, and the BIOS will automatically detect all the relevant information and place them in the Hard Disk data section of the Standard CMOS Setup Menu, in order to allow you to use your hard disk.

Chapter 4 VGA Driver Setup

DOS Utility

1.1. SVGAUTL.EXE

1.1.1 General Description

SVGAUTL.EXE is one of the utilities of PD5N. It supports three functions:

(1) Video Mode Setting
(2) Frame Rate Setting
(3) Power Saving Setting

You can use SVGAUTL.EXE to select the desired video mode. For 640x480, 800x600, 1024x768, and 1280x1024 resolutions, PD5N supports multiple frame rates. If your monitor could synchronize with these frame rates, you can use SVGAUTL.EXE to get advantage. PD5N also supports VESA DPMS Power Saving Modes. SVGAUTL.EXE can help you to set the capability.

1.1.2 How to Use?

To use SVGAUTL.EXE,

(1) Type "SVGAUTL" in the directory where it resides.
For example:
A:\> SVGAUTL <Enter> (suppose SVGAUTL.EXE resides in Diskette #1) or
D:\> MM\DOS\SVGAUTL <Enter> (suppose SVGAUTL.EXE resides in CD-ROM)
(2) The Main Menu would appear and direct you to configure PD5/PD5N.
(3) When you complete configuration, you may save your preferences to "AUTOEXEC.BAT" file and use it as your power-on (or hardware reset) default environment.

1.1.3 What the Parameters Stand for?

The meaning of parameters used by SVGAUTL.EXE are explained below:
Syntax:
>SVGAUTL [/D:mode_no] [/F0:n0] [/F1:n1] [/F2:n2] [/F3:n3] [/PA:ta] [/PB:tb]
where

/D: Set the Video Mode to be mode_no which is a hex number.
For example: Set 1024x768 256 color graphic mode.
>SVGAUTL /D:38 <Enter>

/F0: For 640x480, set frame rate to be n0 Hz.
Three available frame rates are 60, 72, and 75 Hz.
For example: Set 640x480 graphic mode with 60Hz frame rate
>SVGAUTL /F0:60 <Enter>

/F1: For 800x600, set frame rate to be n1 Hz.
Four available frame rates are 56, 60, 72, and 75 Hz.
For example: Set 800x600 graphic mode with 72Hz frame rate.
>SVGAUTL /F1:72 <Enter>

/F2: For 1024x768, set frame rate to be n2 Hz.
Four available frame rates are 87 (Interlace), 60, 70, and 75 Hz.
For example: Set 1024x768 graphic mode with 60Hz frame rate.
>SVGAUTL /F2:60 <Enter>

/F3: For 1280x1024, set frame rate to be n3 Hz.
Two available frame rates are 87 (Interlace) and 60 Hz.
For example: Set 1280x1024 graphic mode with 60Hz frame rate.
>SVGAUTL /F3:60 <Enter>

/PA: Set Standby Timer to be ta minutes. (0 < ta < 15 min.)
For example: Set Standby Timer be 5 minutes.
>SVGAUTL /PA:5 <Enter>

/PB: Set Suspend Timer to be tb minutes. (0 < tb < 15 min.)
For example: Set Suspend Timer be 5 minutes.
>SVGAUTL /PB:5 <Enter>

Note:

(1) Suspend Time would be "ta + tb". (i.e. standby time + suspend time)

(2) The timers will not be very accurate and would just be around the time.

1.2 Autodesk ADI 4.2 -Protected Mode

1.2.1.1 Unpack & Copy

To unpack and copy drivers to where they should resides, please follow the following procedures:

(1) Run "INSTDRV.EXE" where it resides.
For example,
A:\> INSTDRV **<Enter>** (suppose INSTDRV.EXE resides in Driver Disk #1) or
D:\> MM\DOS\INSTDRV **<Enter>** (suppose INSTDRV.EXE resides in CD-ROM)

(2) In "SiS Super VGA Drivers Installation" menu, select "A. ADI 4.2" to unpack and copy drivers.
(To select, type "A".)

(3) In "Unpack & Copy ADI 4.2 Drivers" screen,
keying the "drive:\directory" where these drivers would reside (default C:\ADI42).
Program would unpack & copy all related driver files to where you assign.

(4) After "unpack and copy" completed, exit the INSTDRV.EXE program.

(5) Refer to Sec. 1.2.2 to Sec. 1.2.5 for the real installation procedures for each program.

1.2.2 AutoCAD R11 Setup

(1) The following procedures assume that
1 - You have complete "unpack & copy" procedure.
2 - Your ADI 4.2 drivers are located in C:\ADI42.

(2) Add the following setting to your own batch file for AutoCAD R11 (say ACADR11.BAT) or to your "AUTOEXEC.BAT" file:
SET DSPADI=\ADI42\RCPSIS.EXP **<Enter>**

(3) Delete the configure file ACAD.CFG resides in \ACAD directory.

(4) Type
ACADR11 **<Enter>**
to configure your AutoCAD R11 system.

(5) In "Select Display Device:" item, choose "ADI P386 V4.0/4.1 display.".

(6) In "Select Display Resolution" screen, choose which display driver you want to use.

(7) Go through the whole instructions, and the system would start with the desired display setting.

1.2.3 AutoCAD R12 Setup

(1) The following procedures assume that
   1 - You have complete "unpack & copy" procedure.
   2 - Your SiS ADI 4.2 drivers are located in C:\ADI42.
   3 - Your AutoCAD R12 program is located in C:\ACADR12.
   4 - Your AutoCAD R12 default drivers are located in C:\ACADR12\DRV.
   5 - Your AutoCAD R12 configure file ACAD.CFG is located in C:\ACADR12.

(2) Copy the following driver file to C:\ACADR12\DRV:

   RCPSIS.EXP

   .

   You may complete this step by

   COPY C:\ADI42\RCPSIS.EXP C:\ACADR12\DRV

(3) Delete your original ACAD.CFG file.

   You may complete this step by

   DEL C:\ACADR12\ACAD.CFG

(4) Restart your AutoCAD R12 program as usual.

(5) AutoCAD R12 will ask you to complete the configuration procedures since it can't find the configure file ACAD.CFG.

(6) Follow the instructions of AutoCAD R12 to proceed configuration.

(7) In "Available Video Displays:" item, choose the "SiS Super VGA ADI V4.2 Display and Rendering driver" item.

(8) In "Select Display Resolution" screen, choose which display driver you want to use.

(9) Go through the whole instructions, and the system would start with the selected display setting.

1.2.4 AutoShade R2.0 Setup

(1) The following procedures assume that
   (a) You have complete "unpack & copy" procedure.
   (b) Your ADI 4.2 drivers are located in C:\ADI42.

(2) Add the following settings to your batch file for AutoShade R2.0 (say SHADE2.BAT) or to your "AUTOEXEC.BAT" file.
   (a) For display driver setting,
      SET DSPADI=\ADI42\RCPSIS.EXP
   (b) For rendering driver setting,
      SET RDPADI=\ADI42\RCPSIS.EXP

(3) Delete the configure file SHADE.CFG.

(4) Type
   SHADE2 <Enter>
   to re-configure the AutoShade.

(5) While prompting "Select display device:", choose "P386 AutoDesk Device Interface display driver.".

(6) While prompting "Select rendering display driver:", choose "P386 AutoDesk Device Interface rendering driver.".

(7) Go through all the instructions, the system would start with the desired display setting.

1.2.5 3D Studio Version 3.0 Setup

(1) The following procedures assume that
1 - You have complete "unpack & copy" procedure.
2 - Your ADI 4.2 drivers are located in C:\ADI42.

(2) Create your own **3D Studio V3.0 batch file (say 3DS3.BAT)** and add the following settings to it, or
add the following settings to your **"AUTOEXEC.BAT"** file.
1 - **SET RCPADI=C:\ADI42\RCPSIS.EXP**
2 - **SET RDPADI=C:\ADI42\RCPSIS.EXP**

(3) Execute the new 3DS batch file or reboot the computer using the new "AUTOEXEC.BAT" as to make the new settings effective.

(4) Change your current working directory to \3DS3 (where your 3D Studio V3.0 usually resides).

(5) Delete original configuration file "3DADI.CFG".

(6) Type
3DS VIBCFG<Enter>
to configure your display environment.

(7) After the "Company Register Screen" appears,
press **<Enter>**
to continue.

(8) The "Video Environment Configuration Screen" will appear.
Please follow the following procedures to configure your video display environment.

1 - In "Main-Display" item,
(a) Press **<Enter>**
The selection menu will appear.
(b) In selection menu,
move cursor to **"RCPADI"**.
Press **<Enter>** to select.

2 - In "Material-Display" item,
(a) Press **<Enter>**
The selection menu will appear.
(b) In selection menu,
move cursor to **"RCPADI"**.
Press **<Enter>**
to select.

3 - In "Render-Display" item,
(a) Press **<Enter>**
The selection menu will appear.
(b) In selection menu,

move cursor to **"RCPADI"** or **"RDPADI".**
Press **<Enter>**
to select.

4 - Complete the other selections and exit configuration.

(9) After exit configure,
3DS will boot automatically
using the environment you just select.

(10) If your previous configuration is OK, 3DS will ask you to make detail configuration for SiS 5597/5598 drivers.
If this didn't happen, please check your previous procedures or contact the technical support people.

(11) In the detail configuration for PD5N drivers,
just follow the instructions appear on the screen and make your own choice.
If you are confused in anything, contact the technical support people for solution.

(12) After detail configuration,
you will enter the 3DS main display screen and
you may begin your 3D Studio work
in the environment you make before.

(13) Once completing the detail configuration,
you may enter 3D Studio in the same configuration simply by type
\3DS3\3DS <Enter>
next time.

(14) If you want to change your video configuration,
just follow the procedures mentioned before to re-configure

2. Windows NT 3.5 & 3.51

2.1 Installation

(1) Select Control Panel from Main group.
(2) Select Display icon.
(3) Select Change Display Type from Display Settings.
(4) Select Change from Display Type.
(5) Select Other from Select Device.
(6) Place the Windows NT 3.51 Installation Disk (Diskette #1) into Floppy Drive
(7) When the "Install from Disk" dialog box appears, type the directory storing the drivers and click "OK".
The directory in Diskette #1 is at "A:\WINNT35".
The directory in CD-Title is at "D:\MM\WINNT\WINNT35".
(8) Select Install and click "Yes" when the "Installing Driver" dialog box appears.
(9) Select New when the "Windows NT Setup" dialog box appears.
(10) Click "Continue".

A message will appear stating that the drivers were successfully installed. Click "OK". You must now restart Windows NT 3.51.

2.2 Selecting resolution and color depth

(1) Select Control Panel from Main group.
(2) Select Display icon.
(3) Select Color Palette to change between 16 colors, 256 colors, 32768 colors, 65536 colors, and 16777216 colors.
(4) To select desktop resolution size, go to the Desktop area and use the slide bar to change resolution from 640x480, 800x600, 1024x768, and 1280x1024.
(5) Select Test to test the resolution.
If the display test screen was good then select "Yes" when the "Testing Mode" dialog box appears. If the display test screen was bad then select "No". Windows NT will give you an error message.
(6) If the display test screen was good and you select "Yes", Windows NT 3.51 will prompt you to restart Windows NT 3.51.

3. Windows NT 4.0

3.1 Installation

(1) Click "Start" menu and select Control Panel from Settings group.
(2) Select Display icon.
(3) Select Settings of Display Properties.
(4) Select Display Type.
(5) Select Change from the Adapter Type area.
(6) Select Have Disk of Change Display.
(7) Place the Windows NT 4.0 Installation Disk (Diskette #1) into Floppy Drive
(8) When the "Install from Disk" dialog box appears, type the directory storing the drivers and click "OK".
The directory in Diskette #1 is at "A:\WINNT40".
The directory in CD-Title is at "D:\MM\WINNT\WINNT40".
(9) When the "Change Display" dialog box appears, click "OK".
(10) When the "Third-party Drivers" dialog box appears, click "Yes".

A message will appear stating that the drivers were successfully installed. Click "OK". You must now restart Windows NT 4.0.

3.2 Selecting resolution and color depth

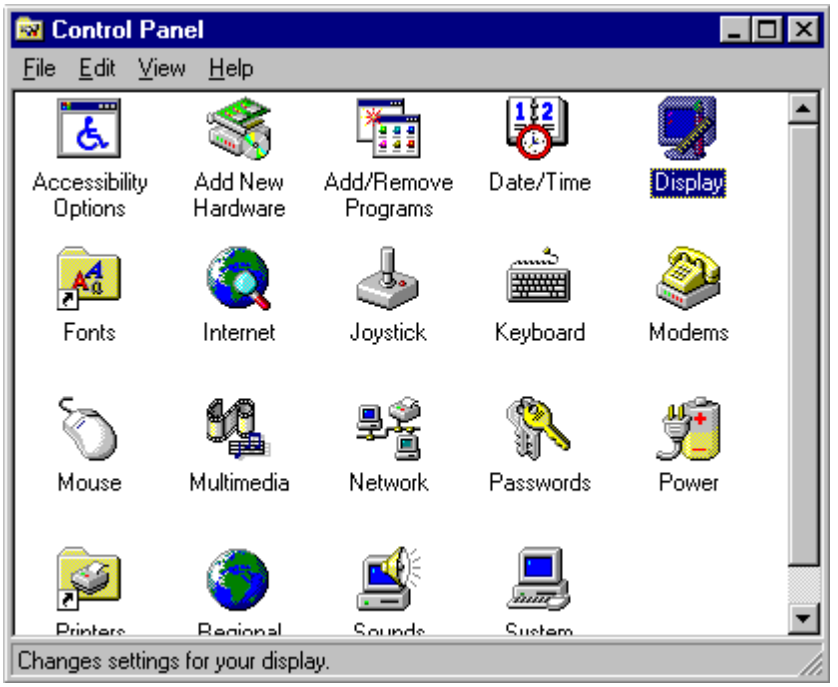
(1) Click "Start" menu and select Control Panel from Settings group.
(2) Select Display icon.
(3) Select Settings.
(4) Select Color Palette to change between 16 colors, 256 colors, 32768 colors, 65536 colors, and 16777216 colors.
(5) To select desktop resolution size, go to the Desktop area and use the slide bar to change resolution from 640x480, 800x600, 1024x768, and 1280x1024.
(6) Select Test to test the resolution. If the display test screen was good then select "Yes" when the
"Testing Mode" dialog box appears. If the display test screen was bad then select "No". Windows NT 4.0 will give you an error message.
(7) Click "OK". If the display test screen was good and you select "Yes", Windows NT 4.0 will change the mode without restarting Windows NT 4.0.

4. Windows 95

4.1 Installation

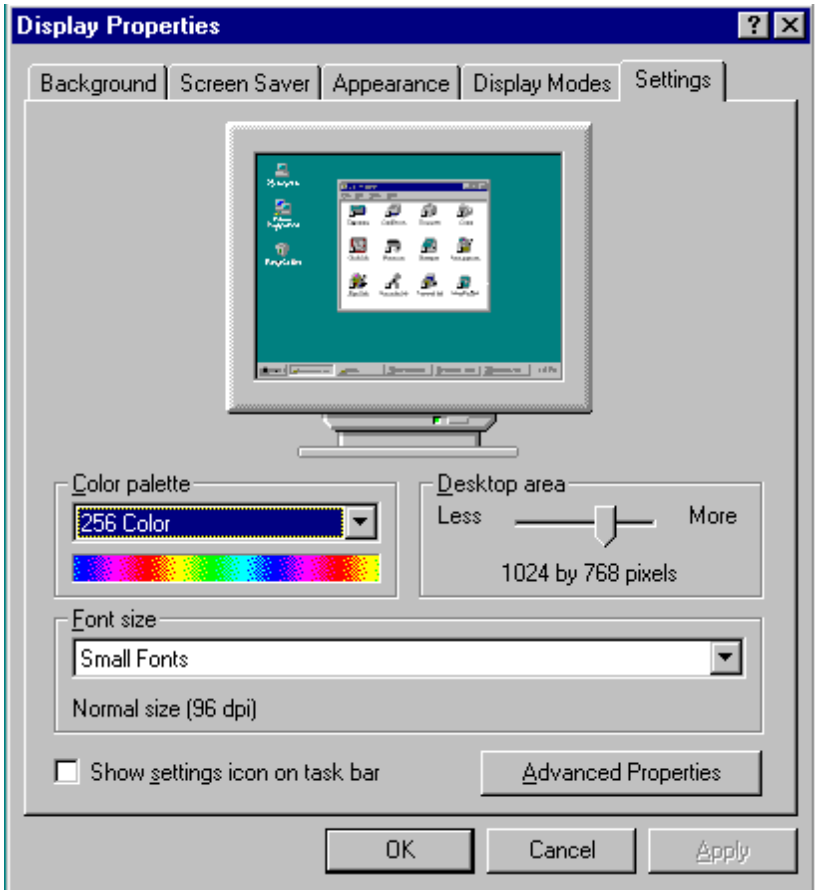
(1) Click "Start" menu and select Control Panel from Settings group.

(2) Select "Display" icon.

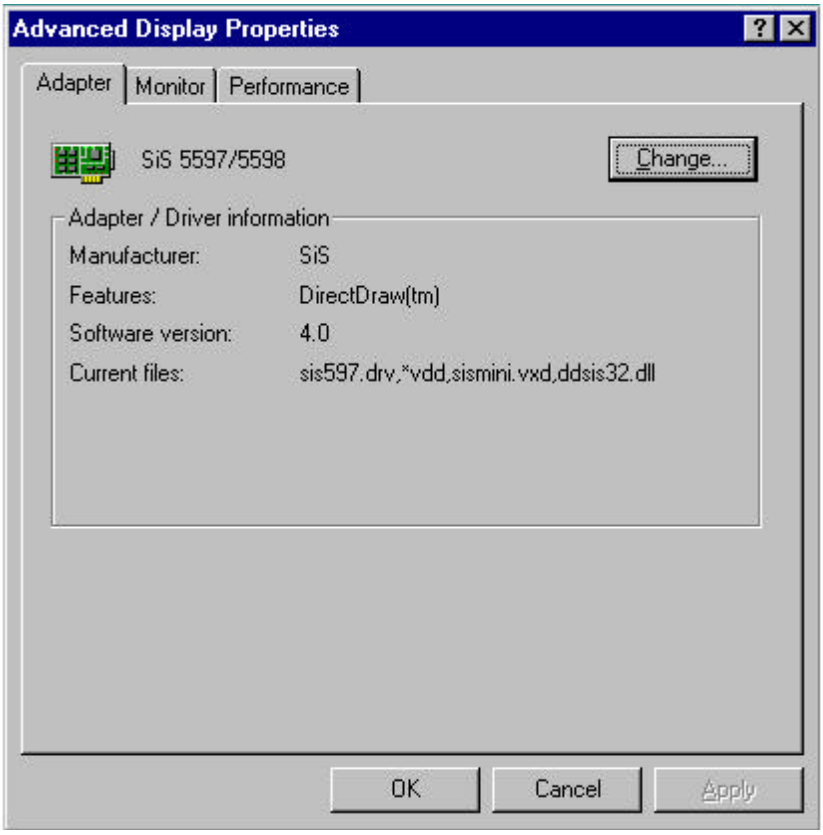


(3) Select "Settings" index in the display properties sheet.

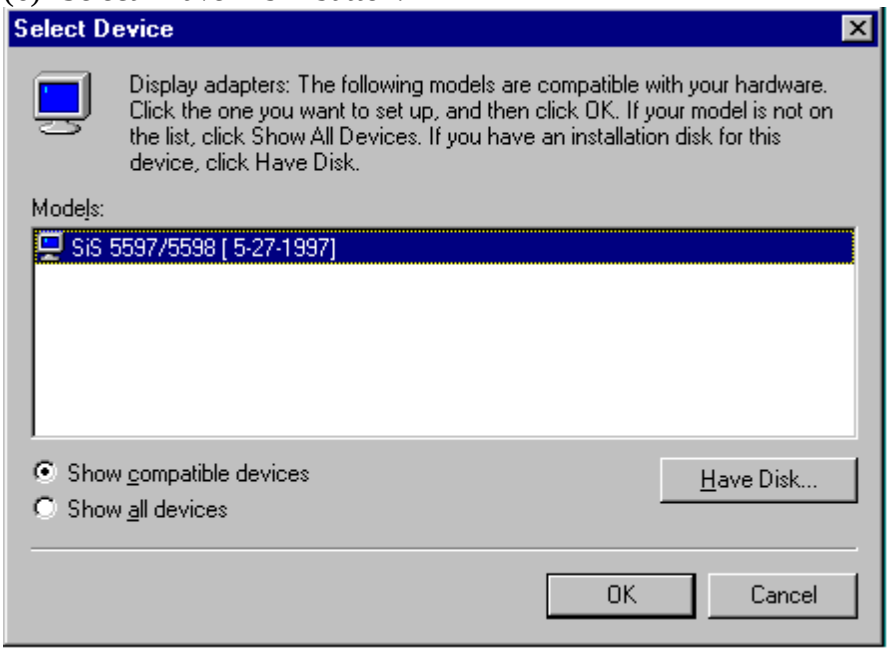
(4) Select "Advanced Properties" button.



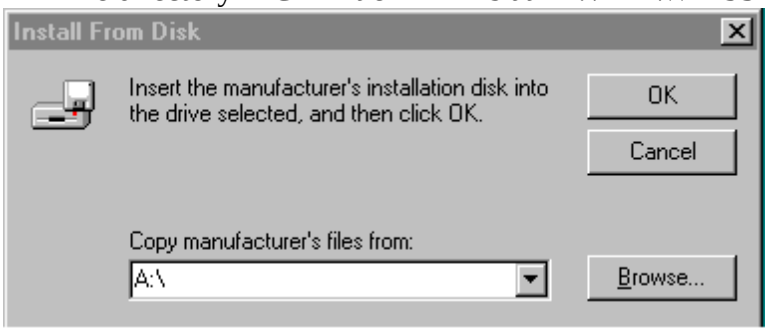
(5) Select "Change..." button in "Adapter Type" group.



(6) Select "Have Disk" button.



(7) Place the Windows 95 Installation Disk (Diskette #2) into Floppy Drive
The directory in CD-Title is at "D:\MM\WIN95".



(8) When the "Install from Disk" dialog box appears, type the directory storing the drivers and click "OK".
The directory in Diskette #2 is at "A:\".
(9) When the "Change Display" dialog box appears, click "Close".
(10) Select "Close" or "Apply" button from display properties sheet.
(11) A message will appear stating you must restart the windows 95 system, select "yes" to restart.
(12) After restarting, windows 95 will run on 640x480x256 color, 75NI.

4.2 Selecting resolution, color depth and refresh rate

(1) Click "Start" menu and select Control Panel from Settings group.
(2) Select Display icon.
(3) Select Settings.
(4) Select Color Palette to change between 16 color, 256 color, Hi color, and True color.
(5) To select desktop resolution size, go to the Desktop area and use the slide bar to change resolution from 640x480, 800x600, 1024x768, and 1280x1024.
(6) Select Refresh rate list box to change the screen refresh rate.
(7) Click "OK" or "Apply".

4.3 Utilities

(1) Place the Windows 95 Installation Disk into Floppy Drive or Place the PD5N CD-Title Disk into CD-ROM Drive.

(2) Click "Start" menu and select "Run..." menu item.

(3) In "Run" dialog, typing the source execution file then press "OK".
The execution file in Diskette #2 is at "A:\SETUP.EXE".
The execution file in CD-Title is at "D:\MM\WIN95\SETUP.EXE".

(4) Setup procedure will create a "SiS Multimedia Vx.xx" program group, there would be contained
3 items:
-- Multimedia Manager
-- SiS MMPlayer
-- Center Screen

(5) A setup successful dialog will appear when setup complete, user can choose restart system now or restart later.

5. Windows 3.1

5.1 Installation

5.1.1 Installation Procedures

(1) Click "File" menu and select "Run..." menu item.
(2) In "Run" dialog, typing the source execution file then press "OK".
The execution file in Diskette#5 is at "A:\SETUP.EXE".
The execution file in CD-Title is at "D:\MM\WIN31\SETUP.EXE".
(3) Follow the setup program's on-screen instructions.
(4) Setup procedure will create a "SiS Multimedia Vx.xx" program group, there would be contained
5 items:
-- Multimedia Manager
-- SiS MMPlayer
-- SVGA Setup
-- Center Screen
-- Uninstall
(5) A setup successful dialog will apear when setup complete, user can choose restart system now or restart later.

5.1.2 Graphics Setup

(1) In "SiS Multimedia Vx.xx" program group, choose "SVGA Setup" icon to enter "SiS VGA Configuration System" screen.
(2) In "SiS VGA Configuration System" Screen, choose which options you would like to use.
(3) After completing your selections, choose "OK" to make all your selections effective.
(4) Choose "Restart Windows" to re-boot Windows using new settings.
Or, choose "Continue" to continue your current Windows processes.
(But when you re-boot Windows, the new settings would take effect.)

5.2.3 Power Saving Setup in Windows

(1) In "SiS VGA Configuration System" screen, choose "power saver" item to enter "Power Saver" screen.
(2) In "Power Saver" Screen, choose which options you would like to use.
(3) After completing the selections, choose "OK" to make all your selections effective.
(4) After complete setup, the power_saver would take effect as you request when time up and you may continue your normal process.

5.1.4 Zoom_Key Setup

(1) In "SiS VGA Configuration System" screen, choose "zooming" item to define "hot keys" for zoom-in or zoom-out screen without entering setup program.
The operation principles of zoom-in and zoom-out are as follow:
1- The resolution change sequence for zoom-in is
1024x768 ===> 800x600 ===> 640x480 .
2- The resolution change sequence for zoom-out is
640x480 ===> 800x600 ===> 1024x768 .
3- But you must first be able to zoom-in before you may zoom-out, that means you can not get a resolution larger than that you setup.
To use this feature, please follow the following procedures.

(2) In "SiS VGA Configuration System" screen, choose "zooming" item to enter "Zooming Hotkey" screen.

(3) In "Zooming Hotkey" Screen, choose which "hot key" you would like to use and enable it.

(4) After completing the selections, choose "OK" to make all your selections effective.

(5) After complete setup, you may use your own defined hot key to zoom-in or zoom-out screen.

5.1.5 Notes

(1) The power saver's timer settings would be effective even exit Windows back to DOS.

5.2 Video Operations

5.2.1 DCI Function

SiS 5597/5598 supports DCI driver for software MPEG playback and other media player programs which could take advantage of DCI.
The SiS 5597/5598 DCI driver is automatically loaded during "Windows Driver Unpack & Copy" process. Therefore it should be transparent to the end-user and any media players could take advantage of it.

5.2.2 SiS MMPlay (SW MPEG)

To make SW MPEG playback more friendly than original SW MPEG player supplier provided, SiS provide an MMPlayer application program to provide an VCP-like (Video Cassette Player) interface.

To take advantage of the SiS MMPlayer, you must first install "SW MPEG Player". All the SiS provided is just an interface but not a SW MPEG Player at present. If the SW MPEG Player does not exist, the SiS MMPlayer will not work. (Xing or Mediamatics SW MPEG Player supported)

To use the SiS MMPlayer, you just follow the procedures below:

(1) In "SiS Multimedia Vx.xx" program group, choose "SiS MMPlayer" icon and SiS MMPlayer VCP-like icon would appear.
(2) Enjoy the SW MPEG playback as you like.

5.2.3 Note on DCI & MMPlay

MMPLAY.EXE Button Description

: Power On/Off

: Open File & Type Control

: Minimize This Application

: Eject CD Title(Not implemented yet.)

: Fast Backward

: Fast Forward

: Mark in

: Mark out

: Pause

: Play

: Stop

: End

: Home

: Volume increase(Not implemented yet.)

: Volume decrease(Not implemented yet.)

Appendix A Quick Installation

Appendix A will ***give you a simplified installation procedure,*** in order to allow you to install tour mainboard quickly and correctly.

If you need further information or if you need to change some other settings, read from Chapters 1.

Installing the CPU: Lift up the lever of the CPU socket, insert your CPU on the socket, and lower the lever back in position. Don't worry, if you don't respect the correct orientation, you will not be able to insert the CPU.

Adjusting CPU voltage and speed: .

Installing DRAM:

SIMM4 ~ SIMM1

Installing FDD: **FDC-** Connect one end of the 34-pin cable that comes with the drive to the FDD connector, and the other end of the cable to the FDC pin connector on the mainboard.

Note: Be sure that the red line on the cable connects to the first pin of the connectors.

Installing HDD: **IDE1-** Connect one end of the 40-pin cable that comes with the drive to the HDD connector, and the other end to IDE1 pin connector on the mainboard.

Note: Be sure that the red line on the cable connects to the first pin of the connectors.

Installing CD-ROM Drive: **IDE2-** Connect one end of the 40-pin cable that comes with the drive to the CD-ROM connector, and the other end to the IDE2 pin connector on the mainboard.

Note: Be sure that the red line on the cable connects to the first pin of the connectors.

Installing parallel port: **LPT-** Connect the 26-pin cable that comes with the hardware to the LPT connector on the mainboard.

Installing serial port: **COM1-** Connect the 10-pin cable that comes with the hardware to connector COM1 on the mainboard.

COM2- Connect the other 10-pin cable to connector COM2 on the mainboard.

Attach the bracket of Parallel Port, Serial Port and PS2 Mouse on the computer case.

Installing Keylock connector: *Watch the pin position and the orientation*

PN1 - There is a specific orientation for pin 1 to pin 5. Insert the five-threads keylock cable into correct pins of connector on the mainboard.

Pin number	Name of the signal or signification
1	+5VDC
2	No connection
3	Ground
4	Keyboard inhibit Signal
5	Ground

Installing HDD LED connector:

Watch the pin position and the orientation

PN1 - There is a specific orientation for pin 7 and pin 8. Connect the two-threads IDE LED connector to the connector on mainboard.

Pin number	Name of the signal or signification
7	HDD LED signal ¡ i LED Cathode ¡ j
8	HDD LED signal ¡ i LED Anode ¡ j

Installing Suspend and Power ON/OFF switch connector:

Watch the pin position and the orientation

PN1 - There is a specific orientation for pin 13 and pin 14. Connect the two-threads suspend switch connector of the computer case to correct pins of connector on the mainboard. You can ignore this connector since most of computer cases do not support this feature (the mainboard itself supports it).

Pin number	Name of the signal or signification
13	+5VDC
14	Ground

PN1 - There is a specific orientation for pin 10 and pin 11. Connect the two-threads Power on/off switch connector of the computer case to correct pins of connector on the mainboard. You can ignore this connector since most of computer cases do not support this feature (the mainboard itself supports it).

Pin number	Name of the signal or signification
10	Power on/off
11	Ground

Installing speaker connector:

PN2 - There is no specific orientation for pin 4 to pin 7. Connect the four-threads speaker cable to the PN2 connector pins on the mainboard.

Pin number	Name of the signal or signification
4	+5VDC
5	Ground
6	Ground
7	Sound Signal

Installing ATX Power input connector:

Watch the pin position and the orientation

ATXPWR - Connect the power supply unit to the correct connectors on the mainboard.

Pin number	Name of the signal or signification	Pin number	Name of the signal or signification
1	+3.3VDC	11	+3.3VDC
2	+3.3VDC	12	-12VDC
3	Ground	13	Ground
4	+5VDC	14	PS_ON
5	Ground	15	Ground
6	+5VDC	16	Ground
7	Ground	17	Ground
8	POWERGOOD	18	-5VDC
9	+5VDC	19	+5VDC
10	+12VDC	20	+5VDC

Installing AT Power input connector:

Watch the pin position and the orientation

Connect connectors P8 and P9 or the power supply unit to the correct connectors on the mainboard.

Pin number	Name of the signal or signification	Pin number	Name of the signal or signification
1	POWERGOOD	7	Ground
2	+5VDC	8	Ground
3	+12VDC	9	-5VDC
4	-12VDC	10	+5VDC
5	Ground	11	+5VDC
6	Ground	12	+5VDC

Installing Keyboard connector:

KB1 - There is an orientation pin. Connect your keyboard connector to connector on the mainboard.

Installing PS2 Mouse:

Mouse - Connect the six-threads PS/2 Mouse cable that comes with the hardware to the connector on the mainboard. Install the bracket located on the other end of the computer case. When you buy a Mouse, it has to be a PS/2 Mouse for it to be connected to this port.

Attach the bracket of Parallel Port, Serial Port and PS2 Mouse on the computer case.

Installing CPU Fan Power connector:

FAN1 - There is a specific orientation. Connect the three-threads CPU Fan power cable to the Fan connector on the mainboard.

FAN1	
Pin number	Name of the signal or signification
1	Ground
2	+12V
3	Ground

Adjusting other jumpers: Some jumpers are reserved for future functions or are not to be adjusted in normal operation. Adjust them according to the following recommendations.

CCMOS ¡G Put jumper on pin 1 and pin 2.

BIOS Setup: Parameters and CPU settings After you have followed the steps described above and completed the installation, when you power the computer on, you will see the following message displayed:

PRESS DEL TO ENTER SETUP

Press immediately Del key to enter BIOS Setup. Select Load Setup Defaults, than enter CPU Soft Menu to set CPU parameters.

Appendix B Intel Pentium CPUs

Pentium 75MHz

	CPU Speed	CPU Spec.	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CS	75 MHz	Q0649	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Sx753	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SX961	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SX969	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0700/S	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0749/S	75MHz	1.5	50MHz	STD		MD	Yes	
P54C		Q0837	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SY005	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0540	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0541	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0666	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SX961	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SZ977	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0700	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		Q0749	75MHz	1.5	50MHz	STD		MD	Yes	
P54C		SX998	75MHz	1.5	50MHz	STD		MD	Yes	
P54C		SZ994	75MHz	1.5	50MHz	STD		MD	Yes	
P54C		SU070	75MHz	1.5	50MHz	STD		MD	Yes	
P54C		Q0689	75MHz	1.5	50MHz	2.9V	3.3V		Yes	
P54C		SK091	75MHz	1.5	50MHz	2.9V	3.3V		Yes	
P54C		Q0851	75MHz	1.5	50MHz	2.9V	3.3V		Yes	
P54C		SK122	75MHz	1.5	50MHz	2.9V	3.3V		Yes	
P54C		SU097	75MHz	1.5	50MHz	STD		STD	Yes	
P54C		SU098	75MHz	1.5	50MHz	STD		STD	Yes	

Pentium 90MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54C		Sx653	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sx957	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0654	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Sx958	90MHz	1.5	60MHz	VR		STD	Yes	
P54C	90 MHz	Q0655	90MHz	1.5	60MHz	STD		MD	Yes	
P54C		Sx959	90MHz	1.5	60MHz	STD		MD	Yes	
P54C		Q0699/S	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sx968	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sx969	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0783	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sy006	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0542	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0613	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Q0543	90MHz	1.5	60MHz	STD		DP	Yes	
P54C		Sx879	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sx885	90MHz	1.5	60MHz	STD		MD	Yes	
P54C		Sx909	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Q0628	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0611	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0612	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Sx923	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sx922	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Sx921	90MHz	1.5	60MHz	STD		MD	Yes	
P54C		Sz951	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0653	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0654	90MHz	1.5	60MHz	VR		STD	Yes	
P54C		Sz978	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0699	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Sz995	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		SU031	90MHz	1.5	60MHz	STD		STD	Yes	
P54C		Q0695	90MHz	1.5	60MHz	2.9V	3.3V		Yes	
P54C		SK092	90MHz	1.5	60MHz	2.9V	3.3V		Yes	
P54C		Q0852	90MHz	1.5	60MHz	2.9V	3.3V		Yes	
P54C		SK123	90MHz	1.5	60MHz	2.9V	3.3V		Yes	

Pentium 100MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54C	100 MHz	Sx886	100MHz	1.5	66MHz	STD		MD	No	
P54C		Sx910	100MHz	1.5	66MHz	VR		MD	No	
P54C		Sx956	100MHz	1.5	66MHz	STD		STD	No	
P54C		Sx960	100MHz	1.5	66MHz	VRE		MD	No	
P54C		Q0657	100MHz	1.5	66MHz	VR		MD	No	
P54C		Q0658	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Sx962	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Q0698/S	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Q0697/S	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		Sx963	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		Sx970	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Q0784	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		SY007	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		Q0563	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		Q0587	100MHz	1.5	66MHz	VR		STD	Yes	
P54C		Q0614	100MHz	1.5	66MHz	VR		STD	Yes	
P54C		Q0677	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Q0656	100MHz	1.5	66MHz	STD		MD	Yes	
P54C		Q0698	100MHz	1.5	66MHz	VRE		MD	Yes	
P54C		Q0697	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		SZ996	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		SU032	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		Q0853	100MHz	1.5	66MHz	2.9V	3.3V	MD	Yes	
P54C		SK124	100MHz	1.5	66MHz	2.9V	3.3V	MD	Yes	
P54C		SY046	100MHz	1.5	66MHz				Yes	
P54C		Q0784	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		SU110	100MHz	1.5	66MHz	STD		STD	Yes	
P54C		SU099	100MHz	1.5	66MHz	STD		STD	Yes	

Pentium120MHz

	CPU Speed	CPU Spec.	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CQS		Q0708	120MHz	2	60MHz	STD		STD	Yes	
P54CQS	120 MHz	Q0711	120MHz	2	60MHz	VRE		MD	Yes	Convert to P54C
P54CQS		Q0730	120MHz	2	60MHz	STD		MD	Yes	
P54CQS		Sk084	120MHz	2	60MHz	STD		MD	Yes	
P54CQS		Sk086	120MHz	2	60MHz	VRE		MD	Yes	Convert to P54C
P54C		Sx994	120MHz	2	60MHz	VRE		MD	No	
P54C		Q0732/S	120MHz	2	60MHz	VRE		MD	No	
P54C		Q0785	120MHz	2	60MHz	VRE		STD	No	
P54C		SY008	120MHz	2	60MHz	VRE		STD	No	
P54C		SY033	120MHz	2	60MHz	STD		STD	No	
P54C		Q0707	120MHz	2	60MHz	VRE		STD	No	
P54C		Q0732	120MHz	2	60MHz	VRE		MD	No	
P54C		SU033	120MHz	2	60MHz	VRE		MD	No	
P54C		Q0776	120MHz	2	60MHz	STD			Yes	
P54C		SK110	120MHz	2	60MHz	STD			Yes	
P54C		Q0808	120MHz	2	60MHz	STD			Yes	
P54C		SX999	120MHz	2	60MHz	STD			Yes	
P54C		SY030	120MHz	2	60MHz	STD			Yes	
P54C		SU100	120MHz	2	60MHz	STD		STD	No	
P54CS		Q031	120MHz	2	60MHz	STD		KIT	Yes	
P54CS		SY062	120MHz	2	60MHz	STD		KIT	Yes	

Pentium 133MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CS		Q0772	133MHz	2	66MHz	STD		STD	Yes	
P54CS		Q0773	133MHz	2	66MHz	STD		Kit	Yes	
P54CS		Q0774	133MHz	2	66MHz	VRE		MD	Yes	
P54CS		Q0877	133MHz	2	66MHz	VRE		STD	Yes	
P54CS		Sk106	133MHz	2	66MHz	STD		STD	Yes	
P54CS		S106J	133MHz	2	66MHz	STD			Yes	
P54CS		Sk107	133MHz	2	66MHz	STD			Yes	
P54CS		Q0843	133MHz	2	66MHz	STD			Yes	
P54CS		SY022	133MHz	2	66MHz	STD			Yes	
P54CS		Q0844	133MHz	2	66MHz	STD			Yes	
P54CS		SY023	133MHz	2	66MHz	STD			Yes	
P54CS	133 MHz	SU038	133MHz	2	66MHz	STD			Yes	
P54CS		SU073	133MHz	2	66MHz	STD			Yes	
P54CS		Q0882	133MHz	2	66MHz				Yes	
P54CS		SY082	133MHz	2	66MHz				Yes	
P54CQS		Q0733	133MHz	2	66MHz	STD		MD	Yes	Convert to P54CS
P54CQS		Sk098	133MHz	2	66MHz	STD		MD	Yes	Convert to P54CS
P54CQS		Q0751	133MHz	2	66MHz	STD		MD	Yes	
P54CQS		Q0775	133MHz	2	66MHz	VRE		MD	Yes	Convert to P54CS

Pentium 150MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CS		Q0835	150MHz	2.5	60MHz	STD		STD	Yes	
P54CS		SY015	150MHz	2.5	60MHz	STD		STD	Yes	
P54CS		Q0878	150MHz	2.5	60MHz	STD		STD	Yes	PPGA
P54CS		SU071	150MHz	2.5	60MHz	STD		STD	Yes	
P55C	150 MHz	Q0939	150MHz	2.5	60MHz	2.9V	3.3V			CPGA
P55C		Q0941	150MHz	2.5	60MHz	2.9V	3.3V			PPGA
P55C		Q974	150MHz	2.5	60MHz	2.8V	3.3V			CPGA
P55C		Q977	150MHz	2.5	60MHz	2.8V	3.3V			PPGA

Pentium 166MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CS		SY016	166MHz	2.5	66MHz	VRE			Yes	
P54CS		Q0841	166MHz	2.5	66MHz	VRE			Yes	
P54CS		SY017	166MHz	2.5	66MHz	VRE			Yes	
P54CS		Q0949	166MHz	2.5	66MHz	VRE		Kit	No	PPGA up
P54CS		SY037	166MHz	2.5	66MHz	VRE			No	PPGA up
P54CS	166MHz	Q0951F	166MHz	2.5	66MHz	VRE		Kit	Yes	PPGA
P54CS		SY044	166MHz	2.5	66MHz	VRE		Kit	Yes	PPGA
P54CS		Q0836	166MHz	2.5	66MHz	VRE			Yes	
P54CS		Q0886	166MHz	2.5	66MHz	VRE			Yes	PPGA
P54CS		Q0890	166MHz	2.5	66MHz	VRE			Yes	PPGA
P54CS		SY072	166MHz	2.5	66MHz	VRE			Yes	
P55C		Q0940	166MHz	2.5	66MHz	2.9V	3.3V			CPGA
P55C		Q0942	166MHz	2.5	66MHz	2.9V	3.3V			PPGA
P55C		Q975	166MHz	2.5	66MHz	2.8V	3.3V			CPGA
P55C		Q978	166MHz	2.5	66MHz	2.8V	3.3V			PPGA
P55C		Q019	166MHz	2.5	66MHz	2.8V	3.3V			PPGA

Pentium 200MHz

	CPU Speed	CPU Spec	Internal Clock	Bus Factor	External Clock	Power		CPU Timing	DP Supp.	Note
						Vcore	VIO			
P54CS	200 MHz	Q0951	200MHz	3	66MHz	VRE			No	PPGA up
P54CS		SY045	200MHz	3	66MHz	VRE		Kit	No	PPGA up
P54CS		Q0951F	200MHz	3	66MHz	VRE		Kit	Yes	PPGA
P54CS		SY044	200MHz	3	66MHz	VRE			Yes	PPGA
P55C		Q018	200MHz	3	66MHz	2.8V	3.3V			PPGA

Pentium 233MHz

	CPU Speed	CPU Speed	Internal Clock	Bus Factor	External Cclock	Vcore	VIO	CPU Timing	DIP Supp	Note
P55C	200MHz	SY060	200MHz	3	66MHz	2.8V	3.3V			PPGA
P55C	233MHz	SL2BM	233MHz	3	66MHz	2.8V	3.3V			PPGA

✡ **Bus Factor**

Power	**STD**	3.15V~3.465V (Recommended voltage is 3.38V)
	VR	3.300V~3.465V (Recommended voltage is 3.38V)
	VRE	3.450V~3.6V (Recommended voltage is 3.52V)
Timing	**STD**	Standard Timing
	MD	Min. Delay (denoting shorter minimum valid delay AC timing for some signal)
	Kit	Supports timing for C55/C88 cache chipsets & design

P54C

1. Beginning with the P54C E-Step, standard timings have been replaced by existing Min Delay timing.

P54CS

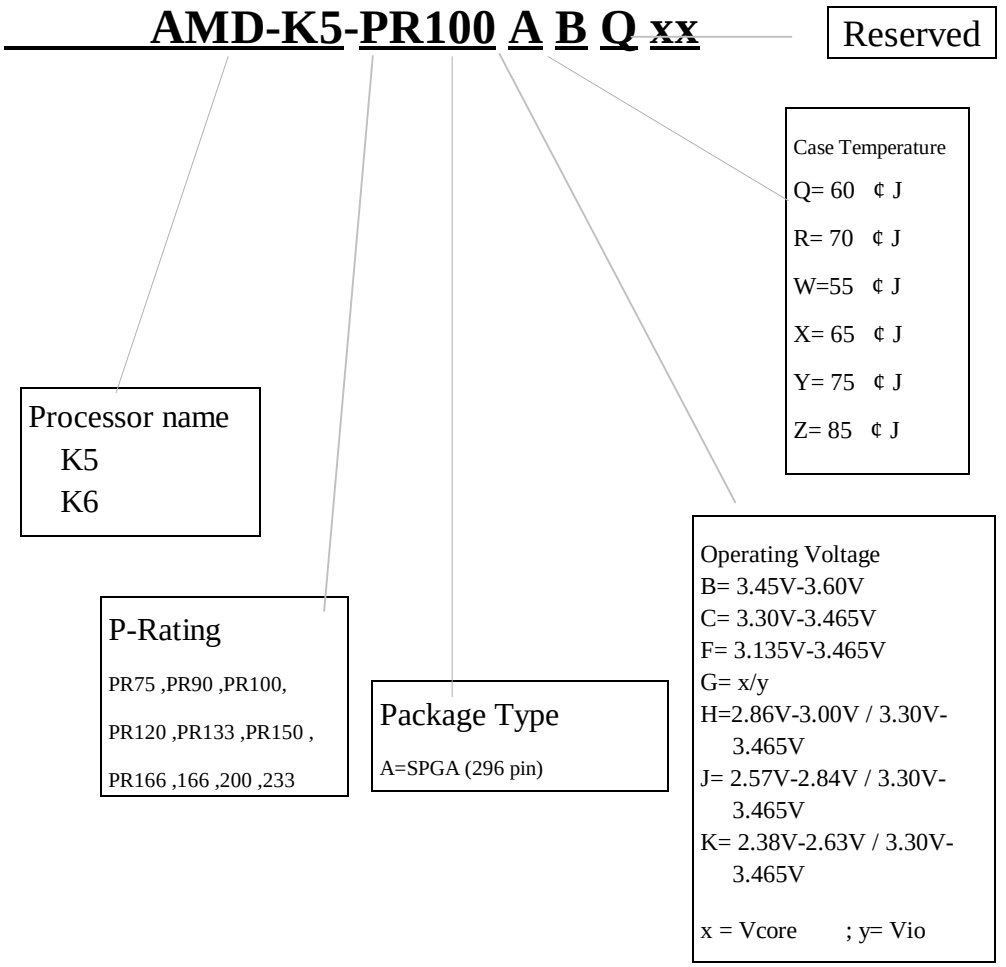
1. P54CS PPGA UP:No DP,No APIC,No FRC
2. Beginning with the P54C E-Step, standard timings have been replaced by existing Min Delay timing.

P55C

1. P55C A-Step is NOT production stepping
2. A-1 step: Vcc and timing on initial samples is 2.9V +/- 0.1V
3. A-2 Step and B step: Vcc and timing on production stepping is 2.8V +/- 0.1V

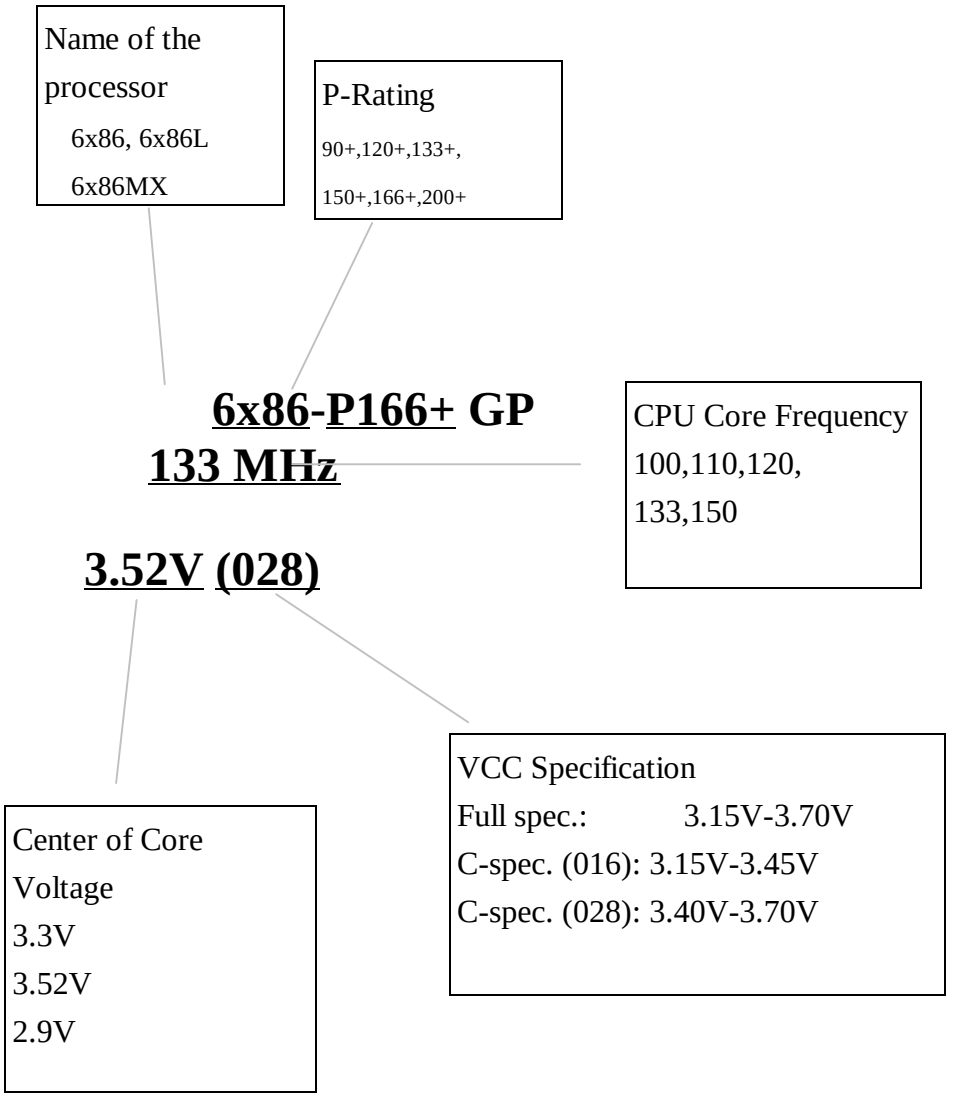
Appendix C AMD-K5 CPUs

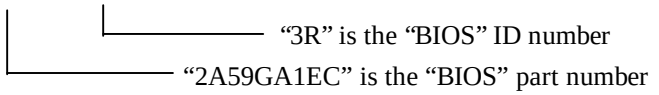
Recognizing AMD CPU speed, voltage and package:



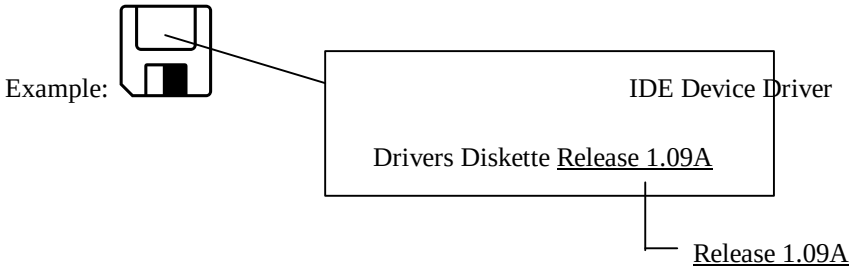
Appendix D Cyrix 6x86 CPUs

Recognizing Cyrix CPU speed and voltage:




“3R” is the “BIOS” ID number
“2A59GA1EC” is the “BIOS” part number

4. DRIVER REV: Note the driver version number indicated on the DEVICE DRIVER disk as "Release *.**".



***5. OS/APPLICATION:** Indicate what are the operating system and the applications your are running on the system.
Example: MS-DOS 6.22, Windows 3.1....

***6. CPU:** Indicate the brand and the speed (MHz) of your CPU.
Example: (A) In the "Brand" space, write "Intel", in the "Specifications" space, write "150MHz" ¡ C
(B) In the "Brand" space, write "Cyrix", in the "Specifications" space, write "P166+" ¡ C
(C) In the "Brand" space, write "AMD", in the "Specifications" space, write "P75".

7. HDD: Indicate the brand and specifications of your HDD(s), specify if the HDD is using ☐IDE1 or ☐IDE2. If you know the disk capacity, indicate it and check ("✓") "☐"; in case you give no indication, we will consider that your HDD is "☑IDE1" Master.
Example: In the "HDD" space, check the box, in the Brand space, write "Seagate", in the Specifications space, write "ST31621A (1.6GB)".

8. CD-ROM Drive: Indicate the brand and specifications of your CD-ROM drive, specify if it uses ☐ IDE1 or ☐IDE2 ¡ A and check ("✓") "☐"; in case you give no indication, we will consider that your CD-ROM is "☑IDE2" Master.
Example: In the "CD-ROM drive" space, check the box, in the Brand space, write "Mitsumi", in the Specifications space, write "FX-400D".

9. System Memory (DRAM): Indicate the brand and specifications (SIMM/DIMM) of your system memory.

Examples:

In the Brand space, write “Panasonic”, in the Specifications space, write “SIMM-FP DRAM 4MB-06”.

Or, in the Brand, write “NPNX”, in the Specifications space, write “SIMM-EDO DRAM 8MB-06”.

Or, in the Brand space, write “SEC”, in the Specifications space, write “DIMM-S DRAM 8MB-G12”.

10. COAST: Indicate the brand and specifications of your COAST.

Example: In the Brand space, write “Winbond”, in the Specifications space, write “256KB” or “W25P010AF-8” ¡ C

11. ADD-ON CARD: Indicate which add-on cards you are “absolutely sure” are related to the problem.

If you cannot identify the problem origin, indicate all the add-on cards inserted into your system.

Note: ***Items between the “*” are absolutely necessary.***

Technical Support Form

Company name: ☎ Phone #:

☺ Contact: Fax #:

Model	*	BIOS ID #	*
Mainboard model no.		DRIVER REV	
OS/Application	*		
Hardware name	Brand	Specifications	
C.P.U	*		
HDD ☐IDE1 ☐IDE2			
CD-ROM Drive ☐IDE1 ☐IDE2			
System Memory (DRAM)			
COAST			
ADD-ON CARD			

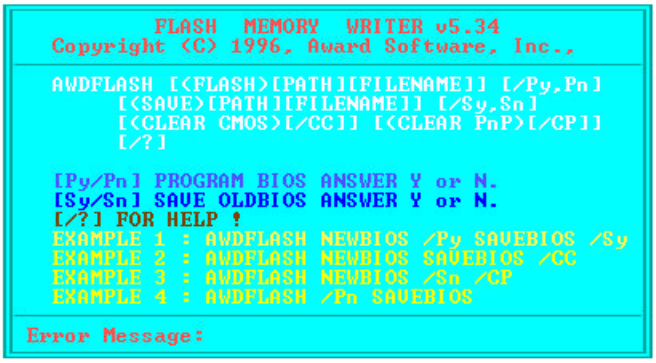
✍

Problem Description:_____

_____

_____

Appendix G Flash BIOS User Instructions



Example 1 To update BIOS and create a backup of the current system BIOS execute this command:

AWDFLASH NEWBIOS /Py SAVEBIOS /Sy

Example 2 To update BIOS, create a backup of current system BIOS, and clear the CMOS, execute this command:

AWDFLASH NEWBIOS SAVEBIOS /CC

Example 3 To update BIOS and clear PnP settings execute this command:

AWDFLASH NEWBIOS /Sn /CP

Example 4 To make a backup of the current system BIOS execute the following command:

AWDFLASH NEWBIOS /Pn SAVEBIOS

Notes: "NEWBIOS" indicates file name for the new BIOS which can be downloaded from our website at http://www.abit.com.tw (user can choose a different file name in place of NEWBIOS).
"SAVEBIOS" indicates the filename of the old system BIOS (user can choose a different file name in place of SAVEBIOS).

Explanation of parameter names:

/CC: Clears CMOS data
/CP: Clears PnP data

Remarks:

① When executing AWDFLASH.EXE, do not run HIMEM.SYS and EMM386.EXE in the CONFIG.SYS.

② Please take the following actions to solve problems caused by power shortage or other other unpreventable malfunctions during BIOS update that lead to update failure. First, it is strongly suggested that you format a disk that can boot your computer before you update your BIOS. If the above mentioned problem occurs during BIOS update you will be able to use this disk to automatically execute a BIOS update. The content of the disk should be the following:

a. Startup system files (COMMAND.COM, MSDOS.SYS, IO.SYS...)
b. AWDFLSH.EXE
c. The NEWBIOS file which can be downloaded from ABIT's website.
d. AUTOEXEC.BAT, which has the following content:
A:\AWDFLASH NEWBIOS /Py /Sn /CC

③ When a version of BIOS that is for the incorrect mainboard model the following message will appear:

"The program file's part number does not match with your system!"

Appendix H 5597/5598 Super VGA User's Manual

Appendix:

H1. Video Modes

H1.1 Standard VGA Modes

MODE	TYPE	DISPLAY SIZE	COLORS SHADES	ALPHA FORMAT	BUFFER START	BOX SIZE	MAX. PAGES
0	A/N	320x200	16	40x25	B800	8x8	8
0*	A/N	320x350	16	40x25	B800	8x14	8
0+	A/N	360x400	16	40x25	B800	9x16	8
1	A/N	320x200	16	40x25	B800	8x8	8
1*	A/N	320x350	16	40x25	B800	8x14	8
1+	A/N	360x400	16	40x25	B800	9x16	8
2	A/N	640x200	16	80x25	B800	8x8	8
2*	A/N	640x350	16	80x25	B800	8x14	8
2+	A/N	720x400	16	80x25	B800	9x16	8
3	A/N	640x200	16	80x25	B800	8x8	8
3*	A/N	640x350	16	80x25	B800	8x14	8
3+	A/N	720x400	16	80x25	B800	9x16	8
4	APA	320x200	4	40x25	B800	8x8	1
5	APA	320x200	4	40x25	B800	8x8	1
6	APA	640x200	2	80x25	B800	8x8	1
7	A/N	720x350	4	80x25	B000	9x14	8
7+	A/N	720x400	4	80x25	B000	9x16	8
0D	APA	320x200	16	40x25	A000	8x8	8
0E	APA	640x200	16	80x25	A000	8x8	4
0F	APA	640x350	2	80x25	B000	8x14	2
10	APA	640x350	16	80x25	A000	8x14	2
11	APA	640x480	2	80x30	A000	8x16	1
12	APA	640x480	16	80x30	A000	8x16	1
13	APA	320x200	256	40x25	A000	8x8	1

NOTE: 1. A/N: Alpha/Numeric

2. APA: All Point Addressable (Graphics)

MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
0	320x200	16	70	31.5 K	25.1 M
0*	320x350	16	70	31.5 K	25.1 M
0+	360x400	16	70	31.5 K	28.3 M
1	320x200	16	70	31.5 K	25.1 M
1*	320x350	16	70	31.5 K	25.1 M
1+	360x400	16	70	31.5 K	28.3 M
2	640x200	16	70	31.5 K	25.1 M
2*	640x350	16	70	31.5 K	25.1 M
2+	720x400	16	70	31.5 K	28.3 M
3	640x200	16	70	31.5 K	25.1 M
3*	640x350	16	70	31.5 K	25.1 M
3+	720x400	16	70	31.5 K	28.3 M
4	320x200	4	70	31.5 K	25.1 M
5	320x200	4	70	31.5 K	25.1 M
6	640x200	2	70	31.5 K	25.1 M
7*	720x350	4	70	31.5 K	28.3 M
7+	720x400	4	70	31.5 K	28.3 M
0D	320x200	16	70	31.5 K	25.1 M
0E	640x200	16	70	31.5 K	25.1 M
0F	640x350	2	70	31.5 K	25.1 M
10	640x350	16	70	31.5 K	25.1 M
11	640x480	2	60	31.5 K	25.1 M
12	640x480	16	60	31.5 K	25.1 M
13	320x200	256	70	31.5 K	25.1 M

NOTE: i - interlaced mode

n - noninterlaced mode

H1.2 Enhanced Video Modes

MODE	TYPE	DISPLAY SIZE	COLORS SHADES	ALPHA FORMAT	BUFFER START	BOX SIZE	MAX. PAGES
22	A/N	1056x352	16	132x44	B800	8x8	2
23	A/N	1056x350	16	132x25	B800	8x14	4
24	A/N	1056x364	16	132x28	B800	8x13	4
25	APA	640x480	16	80x60	A000	8x8	1
26	A/N	720x480	16	80x60	B800	9x8	3
29	APA	800x600	16	100x37	A000	8x16	1
2A	A/N	800x600	16	100x40	B800	8x15	4
2D	APA	640x350	256	80x25	A000	8x14	1
2E	APA	640x480	256	80x30	A000	8x16	1
2F	APA	640x400	256	80x25	A000	8x16	1
30	APA	800x600	256	100x37	A000	8x16	1
37	APA	1024x768	16	128x48	A000	8x16	1
38	APA	1024x768	256	128x48	A000	8x16	1
39	APA	1280x1024	16	160x64	A000	8x16	1
3A	APA	1280x1024	256	160x64	A000	8x16	1
40	APA	320x200	32K	40x25	A000	8x8	1
41	APA	320x200	64K	40x25	A000	8x8	1
42	APA	320x200	16.8M	40x25	A000	8x8	1
43	APA	640x480	32K	80x30	A000	8x16	1
44	APA	640x480	64K	80x30	A000	8x16	1
45	APA	640x480	16.8M	80x30	A000	8x16	1
46	APA	800x600	32K	100x37	A000	8x16	1
47	APA	800x600	64K	100x37	A000	8x16	1
48	APA	800x600	16.8M	100x37	A000	8x16	1
49	APA	1024x768	32K	128x48	A000	8x16	1
4A	APA	1024x768	64K	128x48	A000	8x16	1
4B	APA	1024x768	16.8M	128x48	A000	8x16	1
4C	APA	1280x1024	32K	160x64	A000	8x16	1
4D	APA	1280x1024	64K	160x64	A000	8x16	1

NOTE: 1. A/N: Alpha/Numeric

2. APA: All Point Addressable (Graphics)

MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
22	1056x352	16	70	30.5 K	40.0 M
23	1056x350	16	70	30.5 K	40.0 M
24	1056x364	16	70	30.5 K	40.0 M
25	640x480	16	60	31.5 K	25.1 M
26	720x480	16	60	31.5 K	25.1 M
29	800x600	16	56	35.1 K	30.0 M
29*	800x600	16	60	37.9 K	40.0 M
29+	800x600	16	72	48.0 K	50.0 M
29#	800x600	16	75	46.8 K	50.0 M
29##	800x600	16	85	53.7 K	56.3 M
2A	800x600	16	56	35.1 K	36.0 M
2D	640x350	256	70	31.5 K	25.1 M
2E	640x480	256	60	31.5 K	25.1 M
2E*	640x480	256	72	37.9 K	31.5 M
2E+	640x480	256	75	37.5 K	31.5 M
2E++	640x480	256	85	43.4 K	36.0 M
2F	640x400	256	70	31.5 K	25.1 M
30	800x600	256	56	35.1 K	36.0 M
30*	800x600	256	60	37.9 K	40.0 M
30+	800x600	256	72	48.0 K	50.0 M
30#	800x600	256	75	46.8 K	50.0 M
30##	800x600	256	85	53.7 K	56.3 M
37i	1024x768	16	87	35.5 K	44.9 M
37n	1024x768	16	60	48.4 K	65.0 M
37n+	1024x768	16	70	56.5 K	75.0 M
37n#	1024x768	16	75	60.2 K	80.0 M
37n##	1024x768	16	85	68.7 K	94.5 M
38i	1024x768	256	87	35.5 K	44.9 M
38n	1024x768	256	60	48.4 K	65.0 M
38n+	1024x768	256	70	56.5 K	75.0 M
38n#	1024x768	256	75	60.2 K	80.0 M
38n##	1024x768	256	85	68.7 K	94.5 M
39i	1280x1024	16	87	48.8 K	80.0 M
39n	1280x1024	16	60	65.0 K	110.0 M
39n+	1280x1024	16	75	80.0 K	135.0 M

MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
3Ai	1280x1024	256	87	48.8 K	80.0 M
3An	1280x1024	256	60	65.0 K	110.0 M
3An+	1280x1024	256	75	80.0 K	135.0 M
40	320x200	32K	70	31.5 K	25.1 M
41	320x200	64K	70	31.5 K	25.1 M
42	320x200	16.8M	70	31.5 K	25.1 M
43	640x480	32K	60	31.5 K	25.1 M
43*	640x480	32K	72	37.9 K	31.5 M
43+	640x480	32K	75	37.5 K	31.5 M
43++	640x480	32K	85	43.4 K	36.0 M
44	640x480	64K	60	31.5 K	25.1 M
44*	640x480	64K	72	37.9 K	31.5 M
44+	640x480	64K	75	37.5 K	31.5 M
44++	640x480	64K	85	43.4 K	36.0 M
45	640x480	16.8M	60	31.5 K	25.1 M
45*	640x480	16.8M	72	37.9 K	31.5 M
45+	640x480	16.8M	75	37.5 K	31.5 M
45++	640x480	16.8M	85	43.4 K	36.0 M
46	800x600	32K	56	35.1 K	36.0 M
46*	800x600	32K	60	37.9 K	40.0 M
46+	800x600	32K	72	48.0 K	50.0 M
46#	800x600	32K	75	46.8 K	50.0 M
46##	800x600	32K	85	53.7 K	56.3 M
47	800x600	64K	56	35.1 K	36.0 M
47*	800x600	64K	60	37.9 K	40.0 M
47+	800x600	64K	72	48.0 K	50.0 M
47#	800x600	64K	75	46.8 K	50.0 M
47##	800x600	64K	85	53.7 K	56.3 M
48	800x600	16.8M	56	35.1 K	36.0 M
48*	800x600	16.8M	60	37.9 K	40.0 M
48+	800x600	16.8M	72	48.0 K	50.0 M
48#	800x600	16.8M	75	46.8 K	50.0 M
48##	800x600	16.8M	85	53.7 K	56.3 M
49i	1024x768	32K	87	35.5 K	44.9 M
49n	1024x768	32K	60	48.4 K	65.0 M
49n+	1024x768	32K	70	56.5 K	75.0 M
49n#	1024x768	32K	75	60.2 K	80.0 M

MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
49n##	1024x768	32K	85	68.7 K	94.5 M
4Ai	1024x768	64K	87	35.5 K	44.9 M
4An	1024x768	64K	60	48.4 K	65.0 M
4An+	1024x768	64K	70	56.5 K	75.0 M
4An#	1024x768	64K	75	60.2 K	80.0 M
4An##	1024x768	64K	85	68.7 K	94.5 M
4Bi	1024x768	16.8M	87	35.5 K	44.9 M
4Bn	1024x768	16.8M	60	48.4 K	65.0 M
4Bn+	1024x768	16.8M	70	56.5 K	75.0 M
4Bn#	1024x768	16.8M	75	60.2 K	80.0 M
4Bn##	1024x768	16.8M	85	68.7 K	94.5 M
4Ci	1280x1024	32K	89	48.8 K	80.0 M
4Di	1280x1024	64K	89	48.8 K	80.0 M

NOTE: i - interlaced mode
n - noninterlaced mode

*** For the limitation of memory bandwidth in 1MB DRAM configuration, the following video modes is not supported in 1MB configuration: modes 45*, 45+, 46+, 46#, 47+, and 47#.**