# 5AX

# USER'S MANUAL

- **Support Intel Pentium, MMX, Cyrix/IBM 6x86MX, MII, AMD K5, K6, K6-2 & IDT C6 CPUs.**
- **Support auto detect CPU Voltage.**
- **Support Parity check or Ecc Function.**
- **Support Fully AGP 1.0 Specification.**
- **Support switching mode Voltage regulator on Board.**
- **Support 66/75/83/95 MHz and 100MHz are optional.**
- **Support Modem Ring On (COM B).**
- **Support Wake on Lan(The ATX power supply supports larger than 600 mA).**
- **Support Keyboard Power ON/OFF function.**
- **Thermal Protection**

**Pentium ® Processor PCI - ISA BUS MAINBOARD**
**REV. 3.0 Second Edition**

R-30-02-080805

The author assumes no responsibility for any errors or omissions which may appear in this document nor does it make a commitment to update the information contained herein.

❋THIRD-PARTY BRANDS AND NAMES ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS.

Aug 5, 1998 Taipei, Taiwan

## I. CPU Jumper Setting Table:

♦ SW: CPU INT./ EXT. FREQ. RATIO

| O | ON |
|---|---|
| X | OFF |

| SW | 2 | 3 | 8 |
|---|---|---|---|
| x 1.5 | X | X | X |
| x 2 | O | X | X |
| x 2.5 | O | O | X |
| x 3 | X | O | X |
| x 3.5 | X | X | X |
| x 4 | O | X | O |
| x 4.5 | O | O | O |
| x 5 | X | O | O |
| x 5.5 | X | X | O |

| SW | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| AUTO | X | X | X | O |
| 2.0 V | X | X | X | X |
| 2.1 V | X | X | O | X |
| 2.2 V | X | O | X | X |
| 2.3 V | X | O | O | X |
| 2.4 V | O | X | X | X |
| 2.5 V | O | X | O | X |
| 2.6 V | O | O | X | X |
| 2.7 V | O | O | O | X |
| 2.8 V | X | X | X | O |
| 2.9 V | X | X | O | O |
| 3.0 V | X | O | X | O |
| 3.1 V | X | O | O | O |
| 3.2 V | O | X | X | O |
| 3.3 V | O | X | O | O |
| 3.4 V | O | O | X | O |
| 3.5 V | O | O | O | O |

| CPU | AGP | SW1 | JP7 | JP8 | JP9 |
|---|---|---|---|---|---|
| 100 | 66 | OFF | 1-2 | 1-2 | 2-3 |
| 95 | 63 | ON | 1-2 | 1-2 | 2-3 |
| 83 | 66 | OFF | 1-2 | 2-3 | 2-3 |
| 75 | 75 | OFF | 2-3 | 1-2 | 2-3 |
| 75 | 60 | ON | 1-2 | 2-3 | 2-3 |
| 66 | 66 | OFF | 2-3 | 2-3 | 2-3 |

**The default setting is 100*3 at 2.2V for AMD K6/300 and AMD K6-2/300**

| CPU | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | JP7 | JP8 | JP9 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AMD-K6/300 (100*3 2.2V)<br>AMD-K6-2/300 (100*3 2.2V) | OFF | OFF | ON | OFF | ON | OFF | OFF | OFF | 1-2 | 1-2 | 2-3 |

## II. Quick Installation Guide:

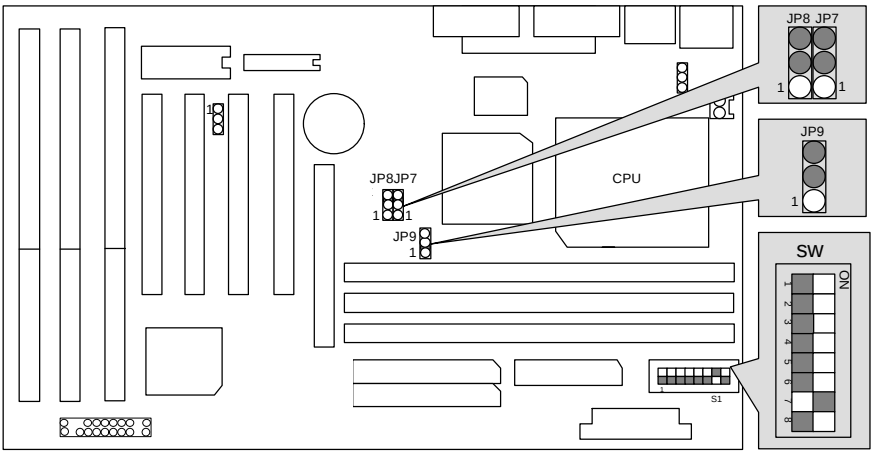
| CPU | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | JP7 | JP8 | JP9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Pentium® Processor 100 MHz | OFF | OFF | OFF | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 2. Pentium® Processor 133 MHz | OFF | ON | OFF | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 3. Pentium® Processor 166 MHz | OFF | ON | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 4. Pentium® Processor 200 MHz | OFF | OFF | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 5. Intel MMX-166MHz | OFF | ON | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 6. Intel MMX-200MHz | OFF | OFF | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 7. Intel MMX-233MHz | OFF | OFF | OFF | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 8. P54CT-166 MHz | OFF | ON | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 9. P54CTB-166 MHz | OFF | ON | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 10. P54CTB-200 MHz | OFF | OFF | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 11. AMDK5-PR133 | OFF | ON | OFF | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 12. AMDK5-PR166 | OFF | ON | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 13. AMD-K6/166 (2.9V) | OFF | ON | ON | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 14. AMD-K6/200 (2.9V) | OFF | OFF | ON | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 15. AMD-K6/233 (3.2V) | OFF | OFF | OFF | ON | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 16. AMD-K6/266 (66*4 2.2V)<br>AMD-K6-2/266 (66*4 2.2V) | OFF | ON | OFF | OFF | ON | OFF | OFF | ON | 2-3 | 2-3 | 2-3 |
| 17. AMD-K6/250 (100*2.5 2.2V) | OFF | ON | ON | OFF | ON | OFF | OFF | OFF | 1-2 | 1-2 | 2-3 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18. AMD-K6/300 (66*4.5 2.2V) | OFF | ON | ON | OFF | ON | OFF | OFF | ON | 2-3 | 2-3 | 2-3 |
| 19. AMD-K6/300 (100*3 2.2V) AMD-K6-2/300 (100*3 2.2V) | OFF | OFF | ON | OFF | ON | OFF | OFF | OFF | 1-2 | 1-2 | 2-3 |
| CPU | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 | JP7 | JP8 | JP9 |
| 20. AMD-K6-2/333 (95*3.5 2.2V) | ON | OFF | OFF | OFF | ON | OFF | OFF | OFF | 1-2 | 1-2 | 2-3 |
| 21. Cyrix/IBM 6x86-150MHz-PR200+ (75*2) | ON | ON | OFF | OFF | OFF | OFF | ON | OFF | 1-2 | 2-3 | 2-3 |
| 22. Cyrix/IBM 6x86L-PR166+ (2.8V) | OFF | ON | OFF | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |
| 23. Cyrix/IBM 6x86MX-PR200+ (75*2 2.9V) | ON | ON | OFF | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 24. Cyrix/IBM 6x86MX-PR166 (66*2 2.9V) | OFF | ON | OFF | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 25. Cyrix/IBM 6x86MX-PR200 (66*2.5 2.9V) | OFF | ON | ON | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 26. Cyrix/IBM 6x86MX-PR200 (75*2 2.9V) | ON | ON | OFF | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 27. Cyrix/IBM 6x86MX-PR233 (66*3 2.9V) | OFF | OFF | ON | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 28. Cyrix/IBM 6x86MX-PR233 (75*2.5 2.9V) | ON | ON | ON | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 29. Cyrix/IBM 6x86MX-PR233 (83*2 2.9V) | OFF | ON | OFF | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 30. Cyrix/IBM 6x86MX-PR266 (66*3.5 2.9V) | OFF | OFF | OFF | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 31. Cyrix/IBM 6x86MX-PR266 (75*3 2.9V) | ON | OFF | ON | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 32. Cyrix/IBM 6x86MX-PR266 (83*2.5 2.9V) | OFF | ON | ON | OFF | OFF | ON | ON | OFF | 1-2 | 2-3 | 2-3 |
| 33. Cyrix M -PR300 (66*3.5 2.9V) | OFF | OFF | OFF | OFF | OFF | ON | ON | OFF | 2-3 | 2-3 | 2-3 |
| 34. IDT C6-200 (66*3 3.52V) | OFF | OFF | ON | OFF | OFF | OFF | ON | OFF | 2-3 | 2-3 | 2-3 |

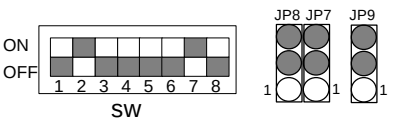
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35. IDT C6-225 (75*3 3.52V) | ON | OFF | ON | OFF | OFF | OFF | ON | OFF | 1-2 | 2-3 | 2-3 |
| 36. IDT C6-266 (66*4 3.52V) | OFF | ON | OFF | OFF | OFF | OFF | ON | ON | 2-3 | 2-3 | 2-3 |

✶Note: If Cyrix 6x86 is being used, please check the CPU Date Code after 605.

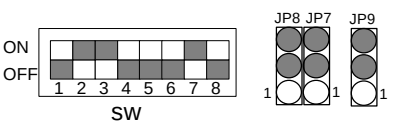
## 1. Pentium® Processor 100 MHz



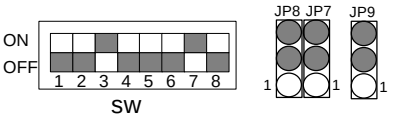

## 2. Pentium® Processor 133 MHz



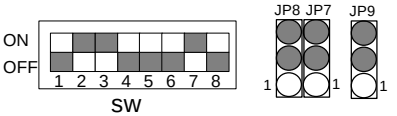

## 3. Pentium® Processor 166 MHz



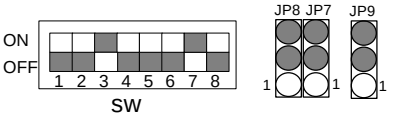
## 4. Pentium® Processor 200 MHz



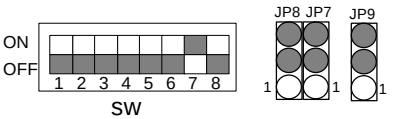
5. Intel MMX-166 MHz



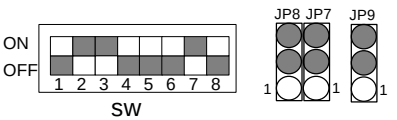

6. Intel MMX-200 MHz



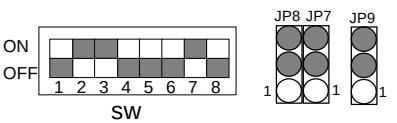

7. Intel MMX-233 MHz



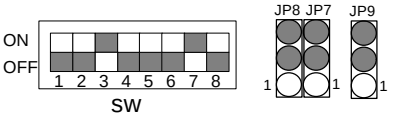

8. P54CT-166 MHz



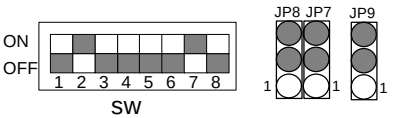

9. P54CTB-166 MHz



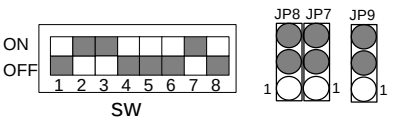
10. P54CTB-200 MHz



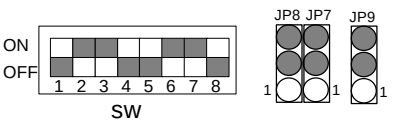

11. AMDK5-PR133



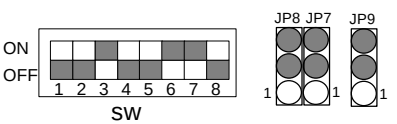

12. AMDK5-PR166



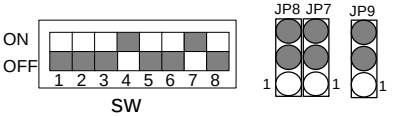

13. AMD-K6/166 (2.9V)



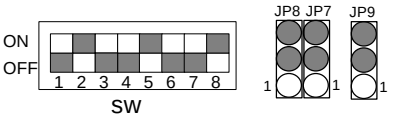

14. AMD-K6/200 (2.9V)



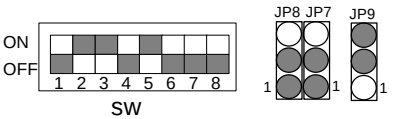
15. AMD-K6/233 (3.2V)



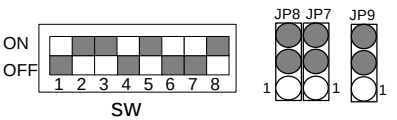

16. AMD-K6/266 (2.2V 66*4); AMD-K6-2 266 (2.2V 66*4)



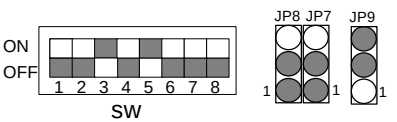

17. AMD-K6/250 (2.2V 100*2.5)



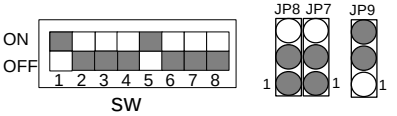

18. AMD-K6/300 (2.2V 66*4.5)



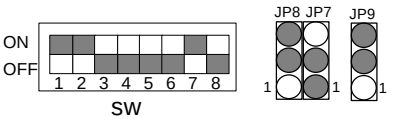

19. AMD-K6/300 (2.2V 100*3); AMD-K6-2 300 (2.2V 100*3)



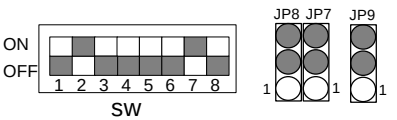
20. AMD-K6/333 (95*3.5 2.2V)



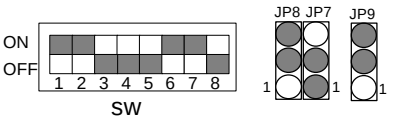

21. Cyrix /IBM 6x86-150 MHz-PR200+ (75*2)



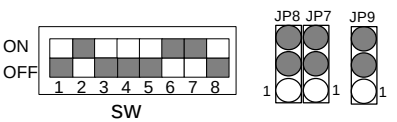

22. Cyrix / IBM 6x86L-PR166+ (2.8V)



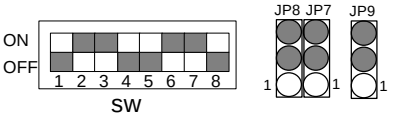

23. Cyrix / IBM 6x86L-PR200+ (75*2 2.9V)



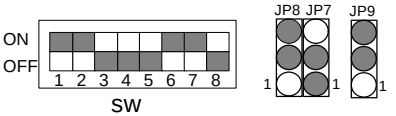

24. Cyrix / IBM 6x86MX-PR166 (66x2 2.9V)



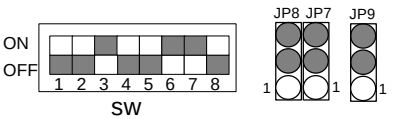
25. Cyrix / IBM 6x86MX-PR200 (66x2.5 2.9V)



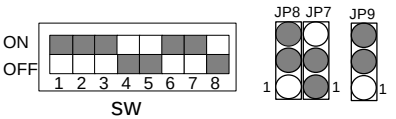

26. Cyrix / IBM 6x86MX-PR200 (75x2 2.9V)



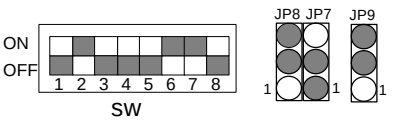

27. Cyrix / IBM 6x86MX-PR200 (66x3 2.9V)



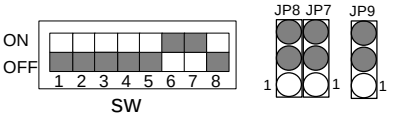

28. Cyrix / IBM 6x86MX-PR233 (75x2.5 2.9V)



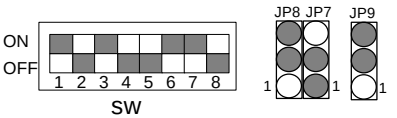

29. Cyrix / IBM 6x86MX-PR233 (83x2 2.9V)



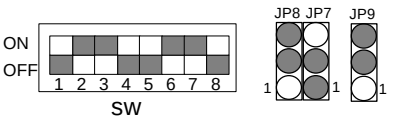
30. Cyrix / IBM 6x86MX-PR266 (66x3.5 2.9V)



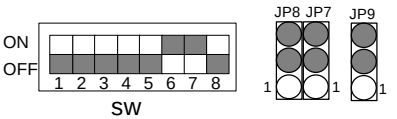

31. Cyrix / IBM 6x86MX-PR266 (75x3 2.9V)



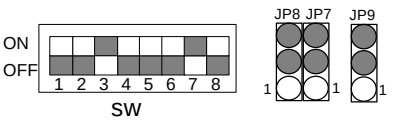

32. Cyrix / IBM 6x86MX-PR266 (83x2.5 2.9V)



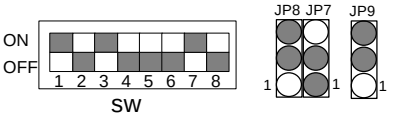

33. Cyrix M2-PR300 (66x3.5 2.9V)



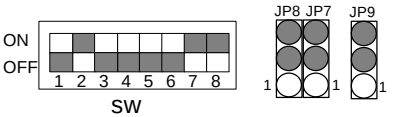

34. IDT C6-200 (66x3 3.52V)



35. IDT C6-225 (75x3 3.52V)

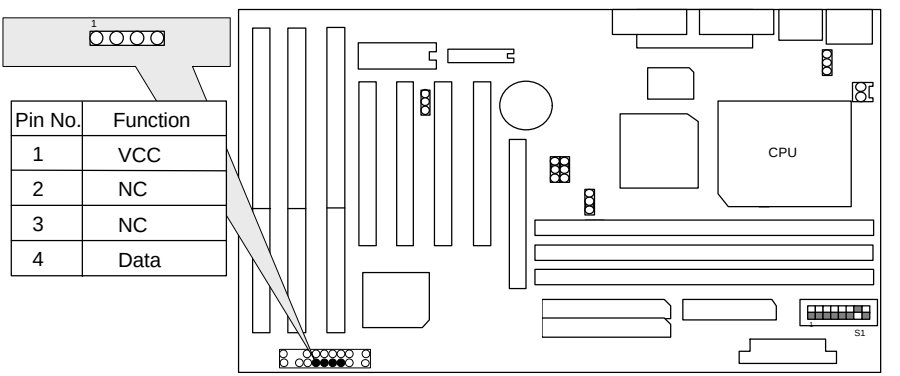



36. IDT C6-266 (66x4 3.52V)

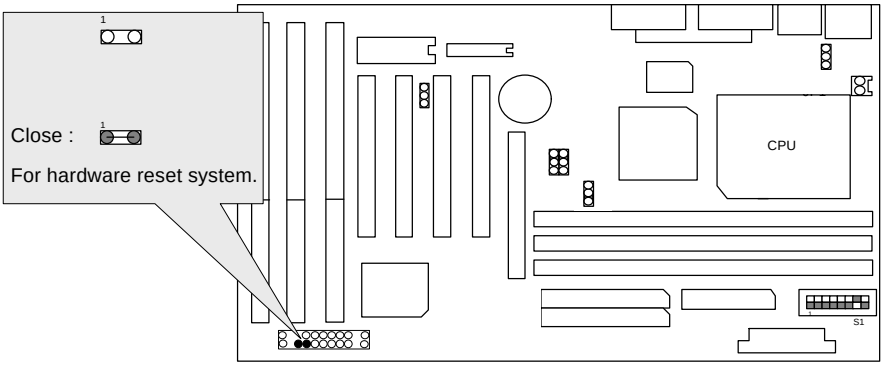



**III. Quick Installation Guide of Jumper setting:**

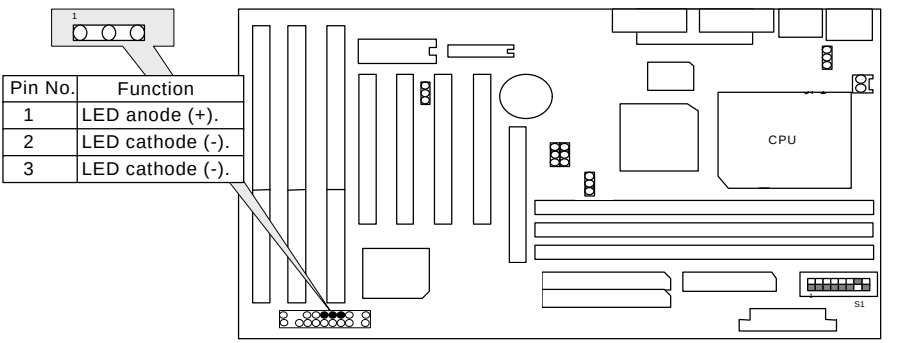
SPK : Speaker Connector



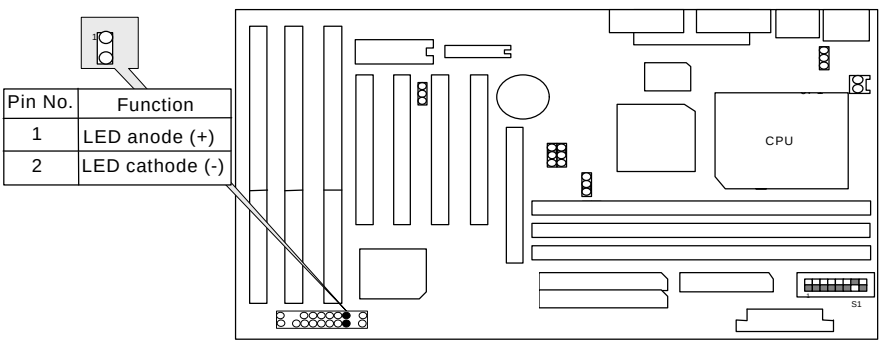
## RST : Reset Switch



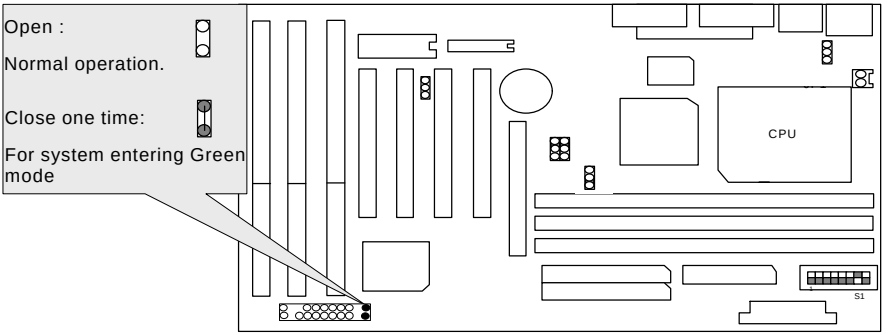

## PWR LED : Power LED (As a 3 steps ACPI LED)



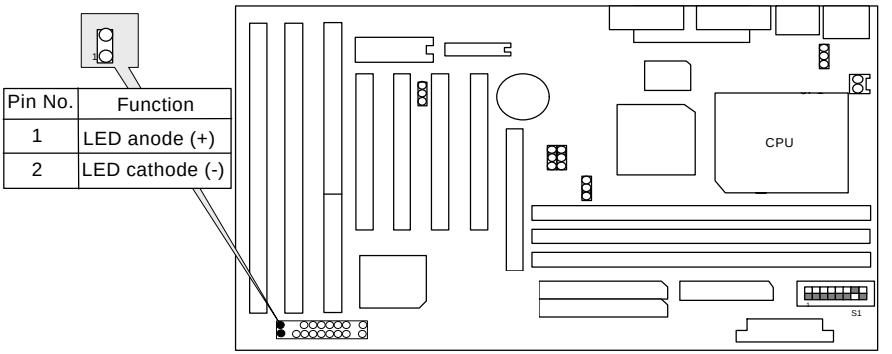

## HD : IDE Hard Disk Active LED



## GN : Green Function Switch

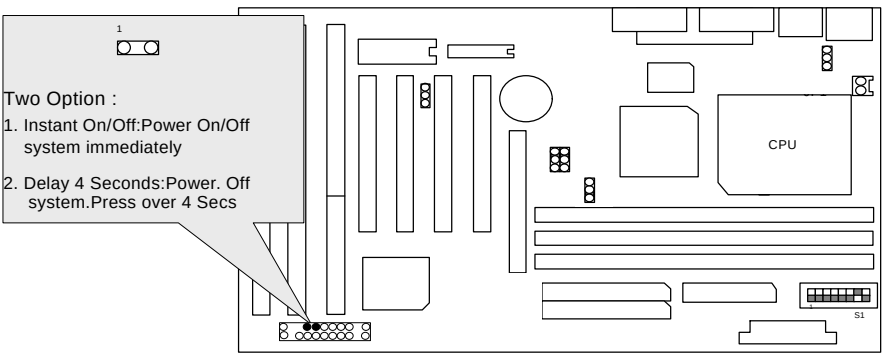



## GD : Green LED

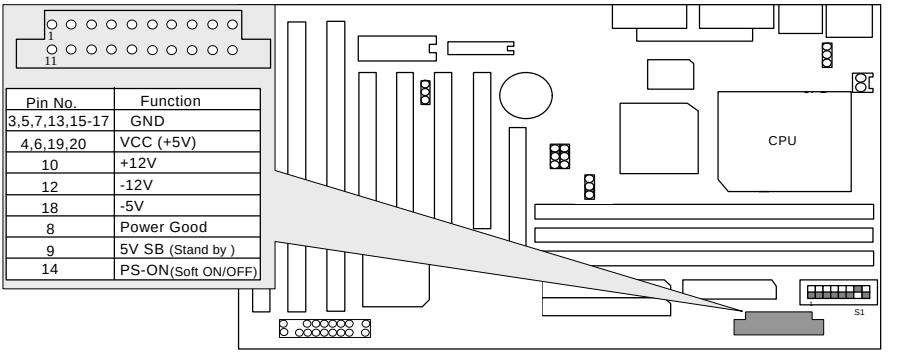



| Pin No. | Function |
|---|---|
| 1 | LED anode (+) |
| 2 | LED cathode (-) |

## SOFT PWR : Power On/Off Switch

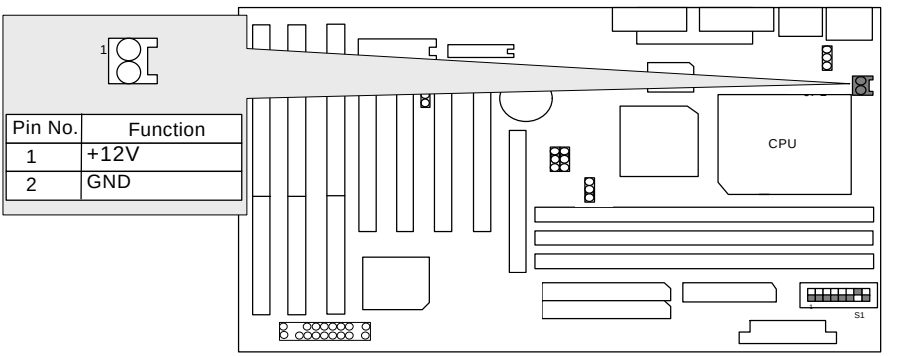


## ATX Power Connector



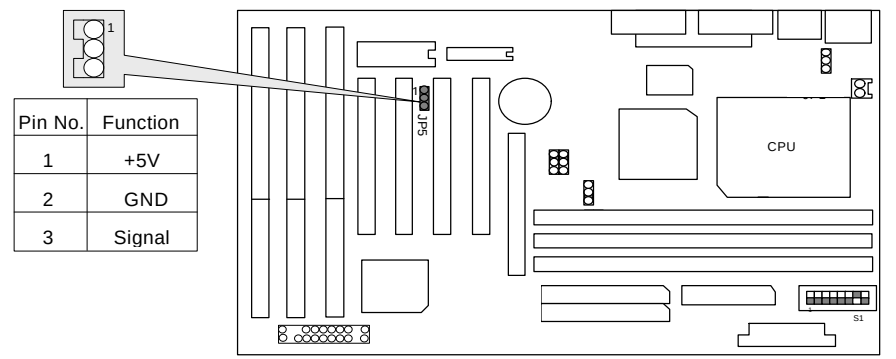

| Pin No. | Function |
|---|---|
| 3,5,7,13,15-17 | GND |
| 4,6,19,20 | VCC (+5V) |
| 10 | +12V |
| 12 | -12V |
| 18 | -5V |
| 8 | Power Good |
| 9 | 5V SB (Stand by ) |
| 14 | PS-ON(Soft ON/OFF) |

## JP1 : CPU Cooling Fan Power Connector



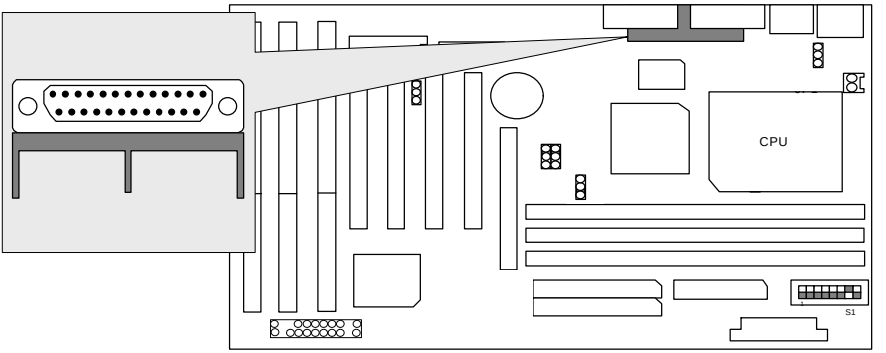

| Pin No. | Function |
|---|---|
| 1 | +12V |
| 2 | GND |

## JP5: Wake On Lan

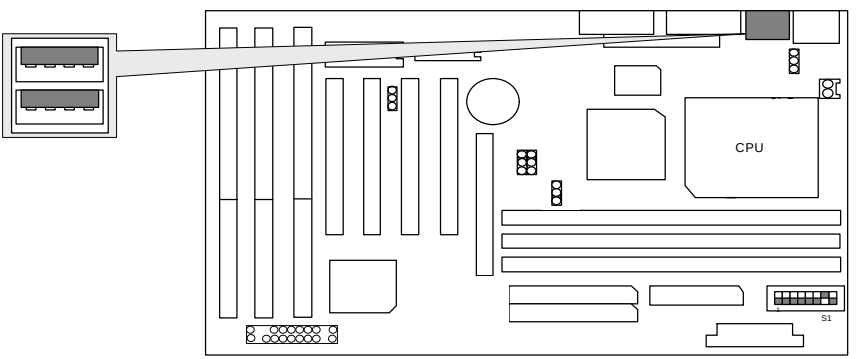



| Pin No. | Function |
|---|---|
| 1 | +5V |
| 2 | GND |
| 3 | Signal |

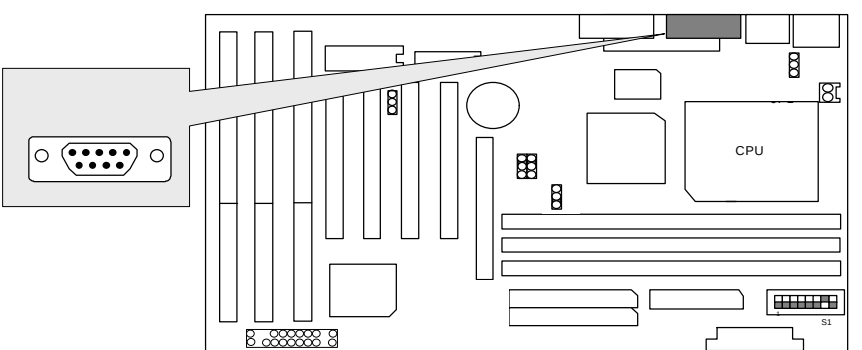
LPT : LPT PORT



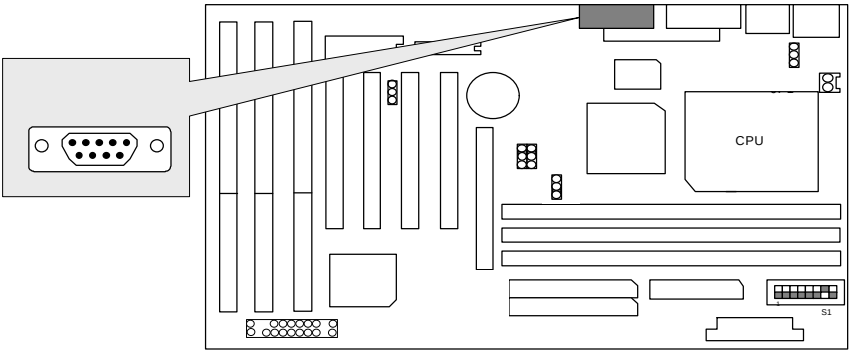

USB: USB Port



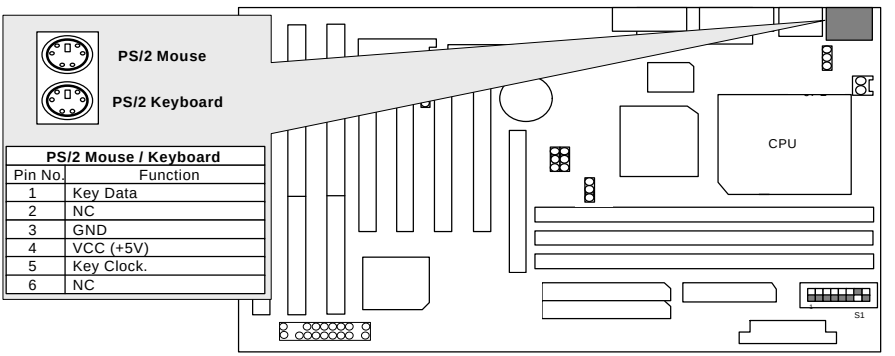

COM B : COM B PORT



## COM A : COM A PORT

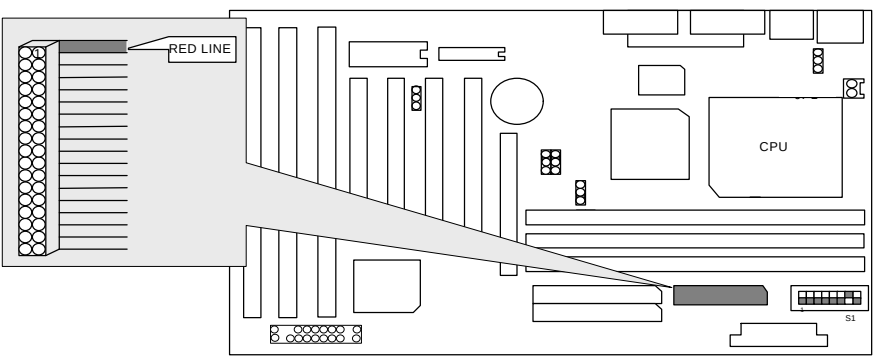



## M.S. / K.B. : PS/2 Mouse / Keyboard Connector

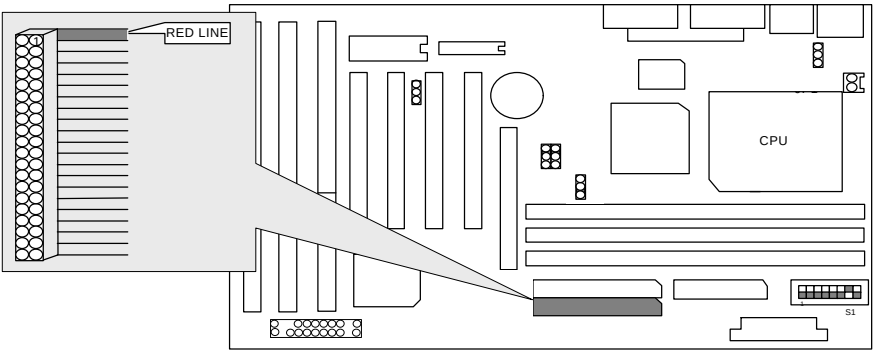



| PS/2 Mouse / Keyboard | |
|---|---|
| Pin No. | Function |
| 1 | Key Data |
| 2 | NC |
| 3 | GND |
| 4 | VCC (+5V) |
| 5 | Key Clock. |
| 6 | NC |

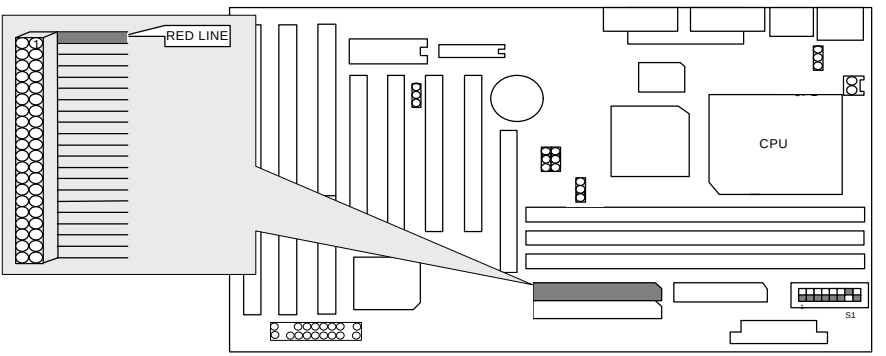
## FLOPPY : FLOPPY PORT



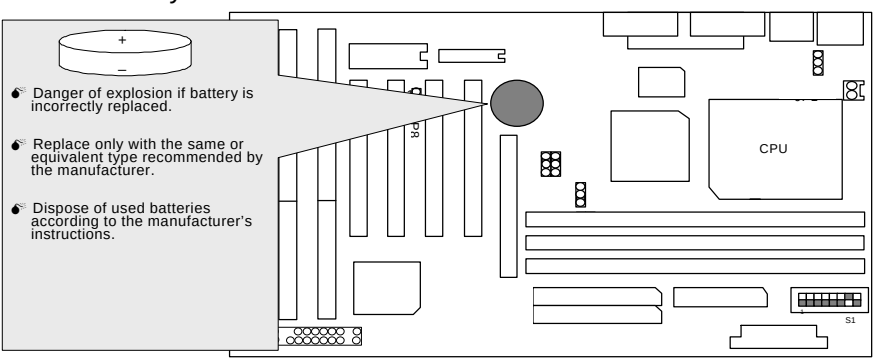
IDE1 : For Primary IDE port



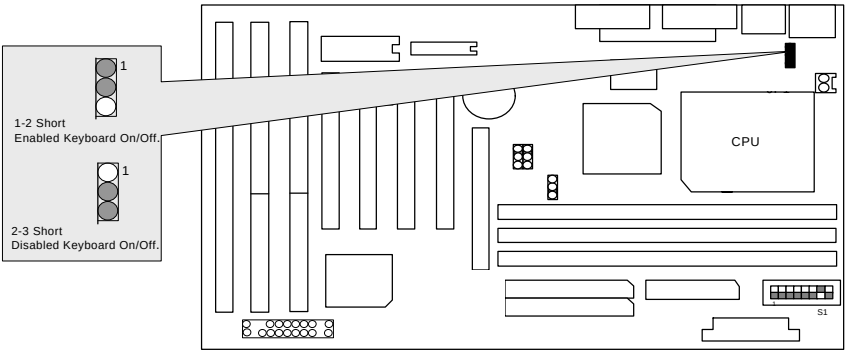

IDE2 : For Secondary IDE port




BT1 : For Battry

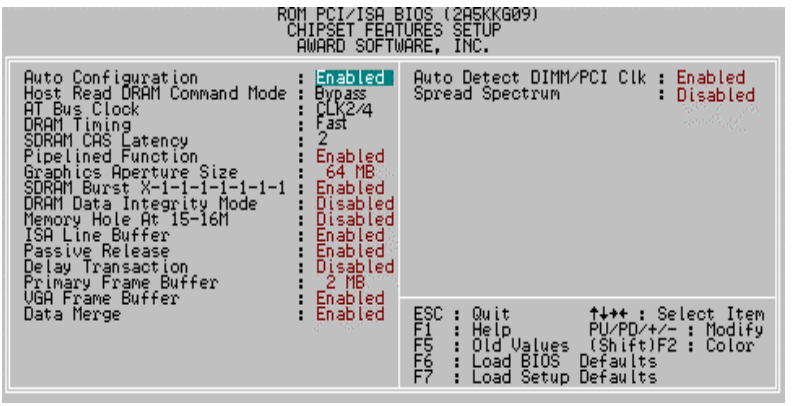


JP3 : Keyboard Power On/Off




## III. Top Performance Test Setting:

Users have to modify the value for each item in chipset features as follow




for top performance setting.

** Each value of items as above depends on your hardware configuration : CPU , SDRAM , Cards , etc.
Please modify each value of items If your system does not work properly.

## PERFORMANCE LIST

The following list of performance data is the testing results of some popular benchmark testing programs.

These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU — Pentium® Processor MMX-233 MHz , Cyrix 6x86M2-PR300 , AMD K6-2 300
- DRAM — (128 × 1) MB SDRAM (LGS GM72N66841CT7J)
- CACHE SIZE — 512 KB
- DISPLAY — GA-600 (4MB SGRAM)
- STORAGE — Onboard IDE (IBM DHEA-36451)
- O.S. — Windows® NT 4.0
- DRIVER — Display Driver at 1024 x 768 x 256 colors x 75Hz.
  ALi Bus Master IDE Driver

| Processor | Intel-MMX 233MHz (66x3.5) | AMD K6-2 300 (100x3) | Cyrix M-2 PR300 (66x3.5 ) |
|---|---|---|---|
| Winbench98 CPU mark32 | 467 | 756 | 478 |
| FPU Winmark | 912 | 979 | 534 |
| Business Disk | 1760 | 1840 | 1820 |
| Hi-End Disk | 4160 | 4550 | 4450 |
| Business Graphics | 105 | 153 | 139 |
| Hi-End Graphics | 109 | 156 | 150 |
| Winstone98 Business | 22.5 | 29.1 | 25.9 |
| Hi-End | 23.8 | 29.6 | 26.7 |

# TABLE OF CONTENTS


**1. INTRODUCTION**

1.1. PREFACE ..... 1-1

1.2. KEY FEATURES ..... 1-1

1.3. PERFORMANCE LIST ..... 1-3

1.4. BLOCK DIAGRAM ..... 1-4

1.5. INTRODUCE THE PCI - BUS ..... 1-5

1.6. FEATURES ..... 1-5

1.7. What is AGP ..... 1-6

**2. SPECIFICATION**

2.1. HARDWARE ..... 2-1

2.2. SOFTWARE ..... 2-2

2.3. ENVIRONMENT ..... 2-2

**3. HARDWARE INSTALLATION**

3.1. UNPACKING ..... 3-1

3.2. MAINBOARD LAYOUT ..... 3-2

3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS ..... 3-2

3.4. SRAM INSTALLATION DRAM INSTALLATION ..... 3-4

3.5. DRAM INSTALLATION ..... 3-5

3.6. CPU INSTALLATION AND JUMPERS SETUP ..... 3-5

3.7. CMOS RTC & ISA CFG CMOS SRAM ..... 3-7

3.8. SPEAKER CONNECTOR INSTALLATION ..... 3-8

3.9. ACPI LED CONNECTOR INSTALLATION ..... 3-8

3.10. HARDWARE RESET SWITCH CONNECTOR INSTALLATION. 3-8

3.11. GREEN FUNCTION INSTALLATION ..... 3-8
3.12. PERIPHERAL DEVICE INSTALLATION..... 3-8
**4. BIOS CONFIGURATION**
4.1. ENTERING SETUP ..... 4-1
4.2. CONTROL KEYS ..... 4-2
4.3. GETTING HELP ..... 4-3
4.3.1. Main Menu ..... 4-3
4.3.2. Status Page Setup Menu / Option Page Setup Menu ..... 4-3
4.4. THE MAIN MENU ..... 4-3
4.5. STANDARD CMOS SETUP MENU ..... 4-5
4.6. BIOS FEATURES SETUP ..... 4-10
4.7. CHIPSET FEATURES SETUP ..... 4-14
4.8. POWER MANAGEMENT SETUP ..... 4-17
4.9. PNP/PCI CONFIGURATION..... 4-21
4.10. LOAD BIOS DEFAULTS ..... 4-25
4.11. LOAD SETUP DEFAULTS ..... 4-26
4.12. INTEGRATED PERIPHERALS ..... 4-27
4.13. SUPERVISOR / USER PASSWORD ..... 4-33
4.14. IDE HDD AUTO DETECTION ..... 4-34
4.15. SAVE & EXIT SETUP ..... 4-35
4.16. EXIT WITHOUT SAVING ..... 4-36
A.Trobuleshooting ..... 5-1

# 1. INTRODUCTION

## 1.1. PREFACE

Welcome to use the **5AX** motherboard. The motherboard is a Pipeline 512 KB CACHE Pentium® Processor based PC / AT compatible system with ISA bus and PCI Local Bus, and has been designed to be the fastest PC / AT system. There are some new features allow you to operate the system with the performance you want.

This manual also explains how to install the motherboard for operation, and how to set up your CMOS CONFIGURATION with BIOS SETUP program.

## 1.2. KEY FEATURES

- ❑ Pentium® Processor based PC / AT compatible mainboard with PCI / ISA / AGP Bus.
- ❑ 4 PCI Bus slots, 3 ISA Bus slots, 1 AGP slot.
- ❑ Supports :
  - • Pentium® Processor :100-200 MHz; P54CT (166); MMX (166 / 200 / 233), P54CTB (166 / 200)
  - • AMD :K5-(PR133 / PR166); K6-(166 / 200(2.9V) /233(3.2V)/266/300(2.2V); K6-2(266/300/333 (95*3.5)(2.2V))
  - • Cyrix/IBM :6x86(133(PR166+));6x86L(133PR166+(2.8V)) ; 6x86MX (PR200 (66x2.5(2.9V) / (75x2(2.9V) / PR233 (66x3(2.9V) / (75x2.5 2.9V)) / PR266 (66x3.5 2.9V) (75x3 2.9V) (83x2.5 2.9V)); M -PR300(66x3.5 2.9V)
  - • IDT :C6-(200; 225; 266)
- ❑ Supports true 64 bits CACHE and DRAM access mode.
- ❑ Supports 321 Pins (Socket 7) ZIF white socket on board.
- ❑ Supports 512 KB Pipeline Burst Sync. 2nd Level Cache.

- CPU L1 / L2 Write-Back cache operation.
- Supports 8 - 768 MB DRAM memory on board.
- Supports 3*168 pin 64/72 Bit DIMM module.
- Supports 2-channel Enhanced PCI IDE ports for 4 IDE Devices.
- Supports 2*COM (16550), 1*LPT (EPP / ECP), 1*1.44MB Floppy port.
- Supports Green function, Plug & Play function.
- Licensed AWARD BIOS, FLASH RAM for BIOS update.
- 30.5cm*17cm, ATX Form factor.
- Supports USB port & PS/2 Mouse and K/B port.
- Supports Keyboard Power On/Off.
- Supports 3 steps ACPI LED.

## 1.3. PERFORMANCE LIST

The following list of performance data is the testing results of some popular benchmark testing programs.

These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

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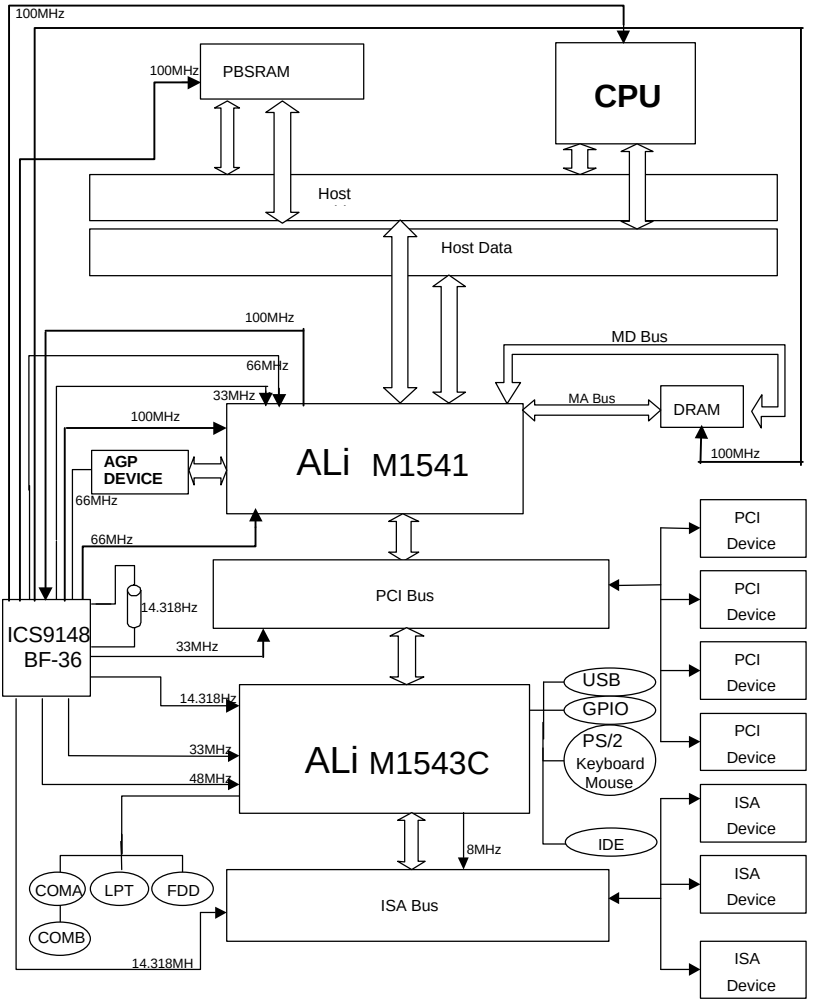
| Winstone98 Business | 22.5 | 29.1 | 25.9 |
| Hi-End | 23.8 | 29.6 | 26.7 |

## 1.4. BLOCK DIAGRAM



## 1.5. INTRODUCE THE PCI - BUS

Connecting devices to a CPU local bus can dramatically increase the speed of I/O-bound peripherals with only a slight increase in cost over traditional systems.

This price / Performance point has created a vast market potential for local bus products.

The main barrier to this market has been the lack of an accepted standard for local bus peripherals.

Many mainboard and chipset manufactures developed their own local bus implementations, but they are incompatible with each other.

The VL (Video Electronics Standards Association) local bus and PCI (Peripheral Component Interconnect) bus specification was created to end this confusion.

The PCI - bus standard, under development since Jun. 1992, which is designed to bring workstation-level performance to standard PC platform. The PCI - bus removes many of the bottlenecks that have hampered PC for several years.

On the PCI - bus, peripherals operate at the native speed of the computer system, thus enabling data transfer between peripherals and the system at maximum speed.

This performance is critical for bandwidth-constrained devices such as video, multimedia, mass storage, and networking adapters.

PCI - bus standard provides end-users with a low-cost, extendible and portable local bus design, which will allow system and peripherals from different manufactures to work together.

## 1.6. FEATURES

- 32 bits bus transfer mode.
- Bus Master or Slave access.
- Memory burst transfer to 132 MB/sec.
- 33 MHz operation speed.
- 10 device loading ability.
- CPU independent.

## 1.7. What is AGP

The Accelerated Graphics Port (AGP) is a new port on the Host-To-PCI bridge device that supports an AGP port. The main purpose of the AGP port is to provide fast access to system memory.

The AGP port can be used either as fast PCI port (32-bits at 66MHz vs. 32-bits at 33MHz) or as an AGP port which supports 2x data-rate, a read queue, and side band addressing. When the 2x-data rate is used the port can transmit data at 533Mb/sec (66.6*2*4). The read-queue can be used to pipeline reads – removing the effects of the reads-latency. Side band addressing can be used to transmit the data address on a separate line in order to further speed the transaction.

# 2. SPECIFICATION

## 2.1. HARDWARE

- CPU
  - Pentium® Processor 100 - 200 MHz, MMX, P54CT, P54CTB, AMDK5(PR133 / PR166), AMD-K6 (166 / 200 (2.9V) / 233 (3.2V) / 266 (2.2V) / 300 (2.2V) ), AMD-K6-2 (266 / 300 /333 (95*3.5)(2.2V)) ), Cyrix / IBM 6x86 (PR166+ / PR200+), Cyrix / IBM 6x86L (PR166+/ PR200+( 2.8V)), Cyrix / IBM 6x86MX ( PR200 (66x2.5 2.9V) (75x2 2.9V) / PR233 (66x3 2.9V) (75x2.5 2.9V) (83x2) / PR266 (66x3.5) (75x3) (83x2.5), Cyrix M (300(2.9V)), IDT C6-(200, 225, 266)
  - 321 pins (socket 7) ZIF white socket on board.
  - 3.52V / 2.0V-3.5V Dual Power Ready.
- COPROCESSOR
  - Included in processor.
- SPEED
  - 66 / 75 / 83 / 95 /100MHz system speed.
  - 66 MHz AGP-Bus speed.
  - 33 MHz PCI-Bus speed.
  - 8 MHz AT bus speed.
- DRAM MEMORY
  - 3 banks 168 pins DIMM module socket on board.
  - Use 8 / 16 / 32 / 64 / 128 / 256 MB 50~60 ns DIMM module DRAM.
  - 8 ~ 768 MB DRAM size.
  - Supports 3.3V SDRAM / EDO type DRAM.
  - Supports ECC or Non-ECC type DRAM.
- CACHE MEMORY
  - 16 / 24 / 32 / 64KB L1cache included in CPU.
  - 512 KB 2nd Level cache on board.
  - Supports Write Back cache function for both CPU & on board cache.
- I/O BUS SLOTS
  - 4 xMaster / Slave PCI-BUS Slots.
  - 3 x16 bits ISA BUS Slots.
  - 1 xAGP Slot.

| | |
|---|---|
| • IDE PORTS | – 2-channel Enhanced IDE port on board.(Using IRQ14,15) |
| | – Supports Mode 3,4 IDE & ATAPI CD – ROM. |
| • I/O PORTS | – Supports 2 x16550 COM ports. (Using IRQ4, 3) |
| | – Supports 1 x EPP/ECP LPT port. (Using IRQ7 or 5 and DMA3 or 1) |
| | – Supports 1 x 1.44/2.88 MB Floppy port. (Using DMA2 & IRQ6) |
| | – Supports PS/2 Mouse. (Using IRQ12 ) |
| • GREEN FUNCTION | – Suspend mode support. |
| | – Green switch & ACPI LED support. |
| | – IDE & Display power down support. |
| | – Monitor all IRQ / DMA / Display / I/O events. |
| • BIOS | – 1Mbit FLASH RAM. |
| | – Supports Plug & Play Function. |
| • DIMENSION | – ATX Form Factor, 4 layers PCB. |

## 2.2. SOFTWARE

| | |
|---|---|
| • BIOS | – Licensed AWARD BIOS. |
| | – AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included. |
| • O.S. | – Operation with MS-DOS®, Windows®95, WINDOWS™ NT, OS/2, NOVELL and SCO UNIX. |

## 2.3. ENVIRONMENT

| | |
|---|---|
| • Ambient Temp. | – 0°C to +50°C (Operating). |
| • Relative Hum. | – 0 to +85% (Operating). |
| • Altitude | – 0 to 10,000 feet (Operating). |
| • Vibration | – 0 to 1,000 Hz. |
| • Electricity | – 4.9 V to 5.2 V. |
| | – Max. 20A current at 5V. |

# 3. HARDWARE INSTALLATION

## 3.1. UNPACKING

The mainboard package should contain the following:

- The **5AX** mainboard.
- USER'S MANUAL for mainboard.
- Cable set for IDE  Floppy.
- Diskette for Mainboard Utility.

The mainboard contains sensitive electric components which can be easily damaged by static electricity, so the mainboard should be left in its original packing until it is installed.

Unpacking and installation should be done on a grounded anti-static mat.

The operator should be wearing an anti static wristband, grounded at the same point as the anti-static mat.

Inspect the mainboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damage on the board before proceeding.

After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface component side up. Again inspect the board for damage.

Press down on all of the socket IC's to make sure that they are properly seated. Do this only on with the board placed on a firm flat surface.

**DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

It is assumed that the chassis is designed for a standard ATX mainboard mounting. Place the chassis on the anti-static mat and remove the cover.

Take the plastic clips, Nylon stand-off and screws for mounting the system board, and keep them separate.

## 3.2. MAINBOARD LAYOUT

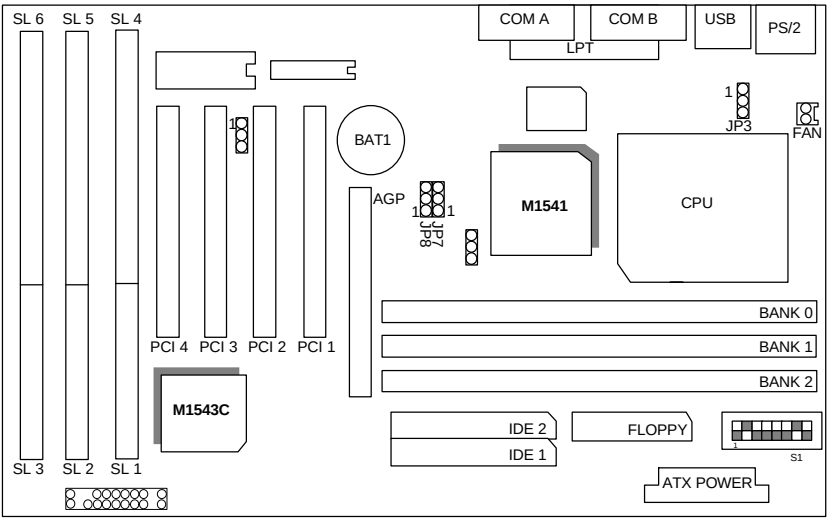
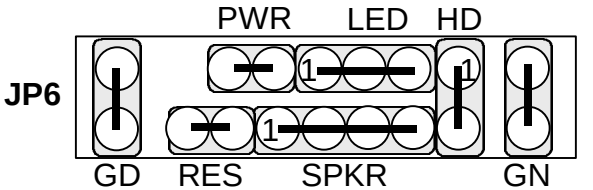



Figure 3.1

## 3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

| ♦ I/O Port Connectors | |
|---|---|
| IDE 1 | For Primary IDE port. |
| IDE 2 | For Secondary IDE port. |
| FLOPPY | For Floppy port. |
| USB | For USB port. |
| COM B | For Serial port2 (COM B){Support Modem Ring On}. |
| COM A | For Serial port1 (COM A). |
| LPT | For LPT port. |
| PS/2 | For PS/2 Mouse & Keyboard Connector. |
| ATX PWR | For ATX Power Connector. |

JP6 : 2*11 PIN Jumper



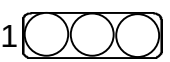

PWR: Soft Power Connector

On – Off : For POWER ON or Suspend IN / OUT.
On 4 sec : For POWER OFF before VGA Enable or CMOS setup select “delay 4sec.” for POWER OFF mode.

RES: Reset Switch

Open: Normal Operation
Short: For Hardware Reset System

LED: Power LED

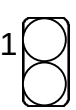



PIN 1: anode (+)
PIN 2: cathode (-)
PIN 3: cathode (-)

SPKR: Speaker Connector


PIN 1: VCC
PIN 2: NC
PIN 3: NC
PIN 4: Data

HD: IDE Hard Disk Active LED




PIN 1: LED anode (+)
PIN 2: LED cathode (-)

GN: Green Switch


Open: Normal operation
Short: Entering Green Mode

GD: Green Function Active LED


PIN 1: LED athode (+)
PIN 2: LED cathode (-)

| ♦ JP5: Wake on Lan | |
|---|---|
| Pin No. | Function |
| 1 | +5V SB |
| 2 | GND |
| 3 | Signal |

| ♦ FAN: CPU cooling FAN Power Connector | |
|---|---|
| Pin No. | Function |
| 1 | GND. |
| 2 | +12V |
| 3 | SENSE |

| ♦ JP3: Keyboard Power On/Off Connector | |
|---|---|
| Pin No. | Function |
| 1,2 Close | Enabled Keyboard power on/off. |
| 2,3 Close | Disabled Keyboard power on/off. |

## 3.4. SRAM INSTALLATION

***Sync. SRAM (Pipeline Burst SRAM)***

If Sync SRAM Chip is installed, it consists of Pipeline Burst 1 Pc 64 K x 64 512KByte.

## 3.5. DRAM INSTALLATION

The mainboard can be installed with 8 / 16 / 32 / 64 / 128 / 256 MB 168 pins DIMM module DRAM, and the DRAM speed must be 67~100 MHz for SDRAM. The DRAM memory system on mainboard consists of bank 0, 1 & bank 2.

Because the 168 pins DIMM module is 64 bits width, using 1 PCS which can match a 64 bits system. The total memory size is 8 MB ~ 768 MB DRAM. The DRAM installation position refer to Figure 3.1, and notice the Pin 1 of DIMM module must match with the Pin 1 of DIMM socket. Insert the DRAM DIMM module into the DIMM socket at Vertical angle. If there is a wrong direction of Pin 1, the DRAM DIMM module couldn't be inserted into socket completely.

## 3.6. CPU INSTALLATION AND JUMPERS SETUP

The system speed depends on the frequency of CLOCK GENERATOR. The user can change SW selection to set up the system speed to 66 / 75 /83 / 95 /100MHz for 3.3V/2.5V Pentium® Processor (100-200 MHz) / AMDK5(PR133 / PR166) / AMD-K6(166/200(2.9V)/233(3.2V)/266/300(2.2V)) / AMD-K6-2(266/300/333(95*3.5)(2.2V)), Cyrix / IBM 6x86 (PR166+/ PR200+), Cyrix / IBM 6x86L (PR166+/PR200+ (2.8V)), Cyrix / IBM 6x86MX (PR200 (66x2.5 2.9V) (75x2 2.9V)/ PR233 (66x3 2.9V) (75x2.5 2.9V) / PR266 (66x3.5 2.9V) (75x3 2.9V) (83x2.5 2.9V)), Cyrix M -PR300 (66*3.5 2.9V); IDT C6-200(66*3) / 225(75*3) / 266(66*4).

The mainboard can use Pentium® Processor, P54CT, MMX or P54CTB, AMDK5, AMD-K6, AMD-K6-2, Cyrix / IBM 6x86, Cyrix M , IDT C6 CPU, and the CPU speed must match with the frequency of CLOCK GEN. It will cause system hanging up if the CLOCK GEN.'S frequency is faster than CPU's.

- **The CPU is a sensitive electric component and it can be easily damaged by static electricity, so users must keep it away from metal surface when the CPU is installed onto mainboard.**
- **When the user installs the CPU on socket, please notice that the PIN 1 of CPU is in the same corner as the PIN 1 of socket!**
- **Before the CPU is installed, the mainboard must be placed on a flat**

**plane in order to avoid being broken by the pressure of CPU installation.**

♦ SW: CPU INT./ EXT. FREQ. RATIO

| | |
|---|---|
| O | ON |
| X | OFF |

| SW | 2 | 3 | 8 |
|---|---|---|---|
| x 1.5 | X | X | X |
| x 2 | O | X | X |
| x 2.5 | O | O | X |
| x 3 | X | O | X |
| x 3.5 | X | X | X |
| x 4 | O | X | O |
| x 4.5 | O | O | O |
| x 5 | X | O | O |
| x 5.5 | X | X | O |

| SW | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| AUTO | X | X | X | O |
| 2.0 V | X | X | X | X |
| 2.1 V | X | X | O | X |
| 2.2 V | X | O | X | X |
| 2.3 V | X | O | O | X |
| 2.4 V | O | X | X | X |
| 2.5 V | O | X | O | X |
| 2.6 V | O | O | X | X |
| 2.7 V | O | O | O | X |
| 2.8 V | X | X | X | O |
| 2.9 V | X | X | O | O |
| 3.0 V | X | O | X | O |
| 3.1 V | X | O | O | O |
| 3.2 V | O | X | X | O |
| 3.3 V | O | X | O | O |
| 3.4 V | O | O | X | O |
| 3.5 V | O | O | O | O |

| CPU | AGP | SW1 | JP7 | JP8 | JP9 |
|---|---|---|---|---|---|
| 100 | 66 | OFF | 1-2 | 1-2 | 2-3 |
| 95 | 63 | ON | 1-2 | 1-2 | 2-3 |
| 83 | 66 | OFF | 1-2 | 2-3 | 2-3 |
| 75 | 75 | OFF | 2-3 | 1-2 | 2-3 |
| 75 | 60 | ON | 1-2 | 2-3 | 2-3 |
| 66 | 66 | OFF | 2-3 | 2-3 | 2-3 |

✶ Note: If Cyrix 6x86 is being used, please check the CPU Date Code after 605.

✶ Note: If you want to run 75, 83 ,95 or 100MHz in your system properly, it depends on your hardware configurations: CPU, SDRAM, Cards, etc.

## 3.7. CMOS RTC & ISA CFG CMOS SRAM

Built-in Real Time Clock (RTC) With 256B CMOS SRAM in M5819.

## 3.8. SPEAKER CONNECTOR INSTALLATION

There is a speaker in AT system for sound purpose. The 4 - Pins connector **SPKR** is used to connect speaker. The speaker can work well in both direction of connector when it is installed to the connector **SPKR** on mainboard.

## 3.9. ACPI LED CONNECTOR INSTALLATION

This mainboard uses the existing power LED as ACPI LED .The ACPI LED will light on when system is power-on .The ACPI LED is off when the system is power-off. The ACPI LED will blink when system is in Green mode.This connector should be installed to ACPI LED jumper of the mainboard in correct direction.

## 3.10. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function which is almost the same as power-on/off. The system will do a cold start after the RESET switch is pushed and released by user. The RESET switch is a 2 PIN connector and should be installed to **RES** on mainboard.

## 3.11. GREEN FUNCTION INSTALLATION

There is one jumper for the purpose of power saving, **GN**, to indicate the power saving function . This mainboard uses the existing power LED as ACPI LED . If the ACPI LED is blinking, the system is in green mode. The **GN** switch will force the system into green mode .

## 3.12. PERIPHERAL DEVICE INSTALLATION

After installation of the device and setup of the jumpers, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral devices could be installed now. The basic system needs a display interface card and a storage device.

If a PCI - Bus device is to be installed in the system, any one of three PCI - Bus slots can be used for Slave or Master PCI - Bus device.

After installing the peripheral device, the user should check everything again and prepare to power-on the system.

# 4. BIOS CONFIGURATION

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration.

This type of information is stored in battery-backed CMOS SRAM so that it retains the Setup information when the power is turned off.

## 4.1. ENTERING SETUP

Power ON the computer and press <Del> immediately will allow you to enter Setup.

The other way to enter Setup is to power on the computer, when the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press <Del> Key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

**Press DEL to enter SETUP.**

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" bottom on the system case.

You may also restart by simultaneously press <Ctrl>,<Alt>, and <Del> keys.

## 4.2. CONTROL KEYS

| | |
|---|---|
| Up arrow | Move to previous item. |
| Down arrow | Move to next item. |
| Left arrow | Move to the item in the left hand. |
| Right arrow | Move to the item in the right hand. |
| Esc key | Main Menu - Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - Exit current page and return to Main Menu. |
| PgUp key | Increase the numeric value or make changes. |
| PgDn key | Decrease the numeric value or make changes. |
| F1 key | General help, only for Status Page Setup Menu and Option Page Setup Menu. |
| F2 key | Change color from total 16 colors. |
| F3 key | Calendar, only for Status Page Setup Menu. |
| F4 key | Reserved. |
| F5 key | Restore the previous CMOS value from CMOS, only for Option Page Setup Menu. |
| F6 key | Load the default CMOS value from BIOS default table, only for Option Page Setup Menu. |
| F7 key | Load the default. |
| F8 key | Reserved. |
| F9 key | Reserved. |
| F10 key | Save all the CMOS changes, only for Main Menu. |

## 4.3. GETTING HELP

### *4.3.1. Main Menu*

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

### *4.3.2. Status Page Setup Menu / Option Page Setup Menu*

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc>.

## 4.4. THE MAIN MENU

Once you enter Award BIOS CMOS Setup Utility, the Main Menu (Figure 4.1) will appear on the screen.

The Main Menu allows you to select setup functions and exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

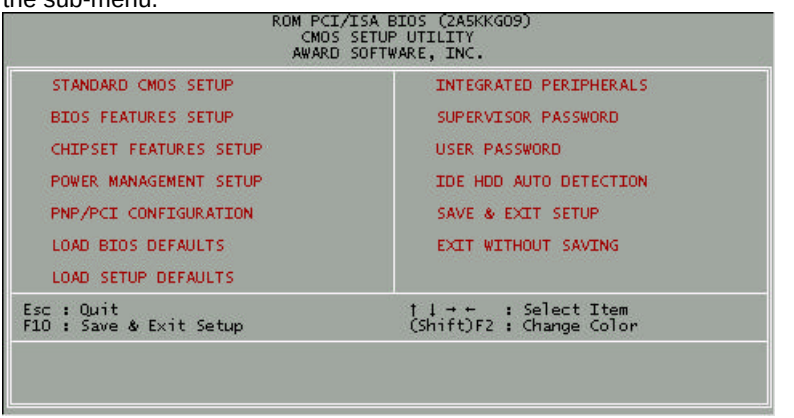



Figure 4.1: Main Menu

- Standard CMOS setup

  This setup page includes all the items in a standard compatible BIOS.

- BIOS features setup

  This setup page includes all the items of Award special enhanced features.

- Chipset features setup

  This setup page includes all the items of chipset special features.

- Power management setup

  This setup page includes all the items of Green function features.

- PNP/PCI configuration

  This setup page includes all the items of PNP/PCI configuration features.

- Load BIOS defaults

  BIOS defaults indicates the most appropriate value of the system parameter which the system would be in safe configuration.

- Load setup defaults

  Setup defaults indicates the most appropriate value of the system parameter which the system would be in safe configuration.

- Integrated Peripherals

  This setup page includes all the items of peripherals features.

- Supervisor Password

  Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

- User Password

  Change, set, or disable password. It allows you to limit access to the system.

- IDE HDD auto detection

  Automatically configure hard disk parameter.

- Save & exit setup

  Save CMOS value changes to CMOS and exit setup.

- Exit without save

Abandon all CMOS value changes and exit setup.

## 4.5. STANDARD CMOS SETUP MENU

The items in Standard CMOS Setup Menu (Figure 4.2) are divided into 9 categories. Each category includes no, one or more than one setup items. Use the arrows to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

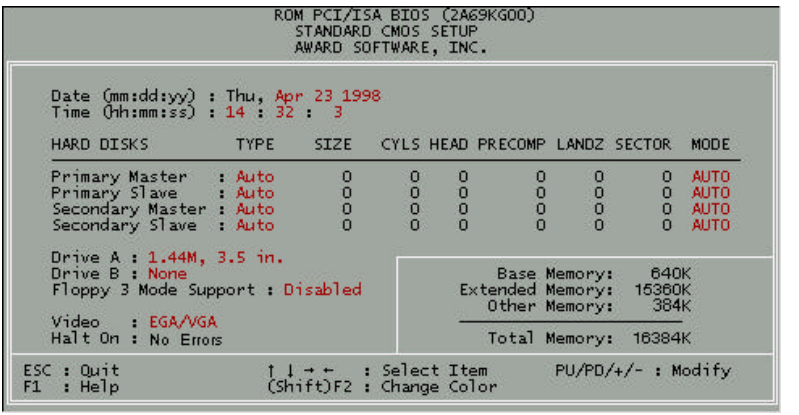



Figure 4.2: Standard CMOS Setup Menu

- Date

  The date format is <day>, <date> <month> <year>. Press <F3> to show the calendar.

| | |
|---|---|
| Day | The day, from Sun to Sat, determined by the BIOS and is display-only |
| Date | The date, from 1 to 31 (or the maximum allowed in the month) |
| Month | The month, Jan. through Dec. |
| Year | The year, from 1994 through 2079 |

- Time

  The time format in <hour> <minute> <second>.

The time is calculated base on the 24-hour military-time clock.

For example, 1 p.m. is 13:00:00.

- Primary HDDs / Secondary HDDs

The category identify the types of hard disk from drive C to drive F

4 devices that has been installed in the computer.

There are three options for definable type; User, Auto and None .

Type User is user-definable; and type Auto means automatically detecting HDD's type and None means No IDE HDD installed.

If you select Type User, related information is asked to be entered to the following items.

Enter the information directly from the keyboard and press <Enter>.

Those information should be provided in the documentation from your hard disk vendor or the system manufacturer.

| | |
|---|---|
| CYLS. | number of cylinders |
| HEADS | number of heads |
| PRECOMP | write precomp |
| LANDZONE | landing zone |
| SECTORS | number of sectors |

If a hard disk has not been installed select NONE and press <Enter>.

- Drive A type / Drive B type

The category identify the types of floppy disk drive A or drive B that has been installed in the computer.

| | |
|---|---|
| None | No floppy drive installed |
| 360K, 5.25 in. | 5-1/4 inch PC-type standard drive; 360 kilobyte capacity. |
| 1.2M, 5.25 in. | 5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity (3-1/2 inch when 3 Mode is Enabled). |

| | |
|---|---|
| 720K, 3.5 in. | 3-1/2 inch double-sided drive; 720 kilobyte capacity |
| 1.44M, 3.5 in. | 3-1/2 inch double-sided drive; 1.44 megabyte capacity. |
| 2.88M, 3.5 in. | 3-1/2 inch double-sided drive; 2.88 megabyte capacity. |

- Floppy 3 Mode Support (for Japan Area)

| | |
|---|---|
| Disable | Normal Floppy Drive. |
| Drive A | Drive A is 3 mode Floppy Drive. |
| Drive B | Drive B is 3 mode Floppy Drive. |
| Both | Drive A & B are 3 mode Floppy Drive. |

- Video

The category detects the type of adapter used for the primary system monitor that must match your video display card and monitor.

Although secondary monitors are supported, you do not have to select the type in setup.

| | |
|---|---|
| EGA/VGA | Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SVGA, or PGA monitor adapters |
| CGA 40 | Color Graphics Adapter, power up in 40 column mode |
| CGA 80 | Color Graphics Adapter, power up in 80 column mode |
| MONO | Monochrome adapter, includes high resolution monochrome adapters |

- Halt on

The category determines whether the computer will stop if an error is detected during power up.

| | |
|---|---|
| NO Errors | The system boot will not be stopped for any error that may be detected |
| All Errors | Whenever the BIOS detects a non-fatal error, the system will be stopped and you will be prompted |
| All, But Keyboard | The system boot will not stop for a keyboard error; it will stop for all other errors |

| | |
|---|---|
| All, But Diskette | The system boot will not stop for a disk error; it will stop for all other errors |
| All, But Disk/Key | The system boot will not stop for a keyboard or disk error; it will stop for all other errors |

- Memory

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

  **Base Memory**

  The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

  The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.

  **Extended Memory**

  The BIOS determines how much extended memory is present during the POST.

  This is the amount of memory located above 1 MB in the CPU's memory address map.

  **Expanded Memory**

  Expanded Memory in memory defined by the Lotus / Intel / Microsoft (LIM) standard as EMS.

  Many standard DOS applications can not utilize memory above 640, the Expanded Memory Specification (EMS) swaps memory which not utilized by DOS with a section, or frame, so these applications can access all of the system memory.

  Memory can be swapped by EMS is usually 64K within 1 MB or memory above 1 MB, depends on the chipset design.

  Expanded memory device driver is required to use memory as Expanded Memory.

  **Other Memory**

  This refers to the memory located in the 640 to 1024 address space. This is memory that can be used for different applications.

  DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

## 4.6. BIOS FEATURES SETUP

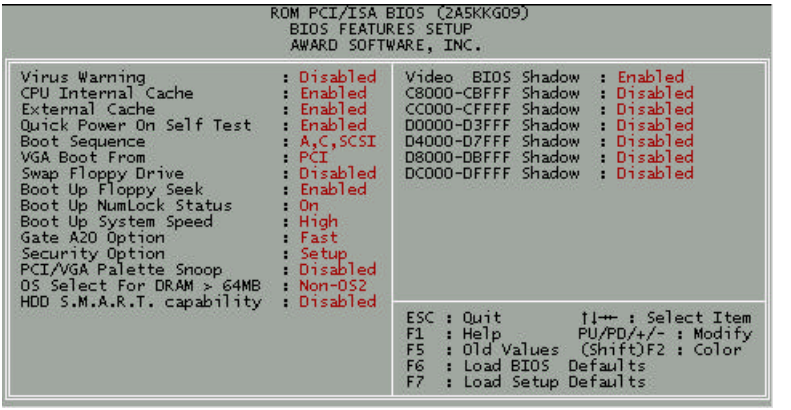



Figure 4.3: BIOS Features Setup

- Virus Warning

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

  The default value is Disabled.

| | |
|---|---|
| Enabled | Activate automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table. |
| Disabled | No warning message appears when anything attempts to access the boot sector or hard disk partition table. |

- CPU Internal Cache / External Cache

  These two categories speed up memory access. However, it depends on CPU / chipset design.

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable cache function. |
| Disabled | Disable cache function. |

- Quick Power On Self Test

  This category speeds up Power On Self Test (POST) after you power on the computer. If it set to Enable, BIOS will skip some check items during POST.

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable quick POST. |
| Disabled | Normal POST. |

- Boot Sequence

  This category determines which drive computer searches first for the disk operating system (i.e., DOS). Default value is A, C, SCSI.

| | |
|---|---|
| X1, X2, X3 | System will first search for X1 disk drive then X2 disk drive and then X3 disk drive. |

- VGA Boot From

  The default value is PCI.

| | |
|---|---|
| AGP | System will boot from AGP Display Card |
| PCI | System will boot from PCI VGA Card |

- Swap Floppy Drive

  The default value is Disabled.

| | |
|---|---|
| Enabled | Floppy A & B will be swapped under DOS. |
| Disabled | Floppy A & B will be normal definition. |

- Boot Up Floppy Seek

  During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360 type is 40 tracks while 720 , 1.2 and 1.44 are all 80 tracks.

  The default value is Enabled.

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

- Boot Up NumLock Status

  The default value is On.

| | |
|---|---|
| On | Keypad is number keys. |
| Off | Keypad is arrow keys. |

- Boot Up System Speed

  The default value is High.

| | |
|---|---|
| High | Set Boot Up System Speed: High. |
| Low | Set Boot Up System Speed: Low. |

- Gate A20 Option

  The default value is Fast.

| | |
|---|---|
| Fast | Set Boot Up System Speed: High. |
| Normal | Set Boot Up System Speed: Low. |

- Security option

  The default value is Setup.

| | |
|---|---|
| Setup | The system will boot and access to Setup will be denied if the correct password is not entered at the prompt. |
| System | The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt. |

**To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. If the user does not type anything and just press <Enter>, it will disable security. Once the**

**security is disabled, the system will boot and you can enter Setup freely.**

- PCI/VGA Palette Snoop

  The default value are Disabled.

| | |
|---|---|
| Enabled | For having Video Card on ISA Bus and VGA Card on PCI Bus. |
| Disabled | For VGA Card only. |

- OS Select For DRAM>64MB

  The default value is Non-OS2.

| | |
|---|---|
| Non-OS2 | Using non-OS2 operating system. |
| OS2 | Using OS2 operating system and DRAM>64MB. |

- HDD S.M.A.R.T. Capability

  The default value is Disable.

| | |
|---|---|
| Enable | Enable HDD S.M.A.R.T. Capability |
| Disable | Disable HDD S.M.A.R.T. Capability |

- Video BIOS Shadow

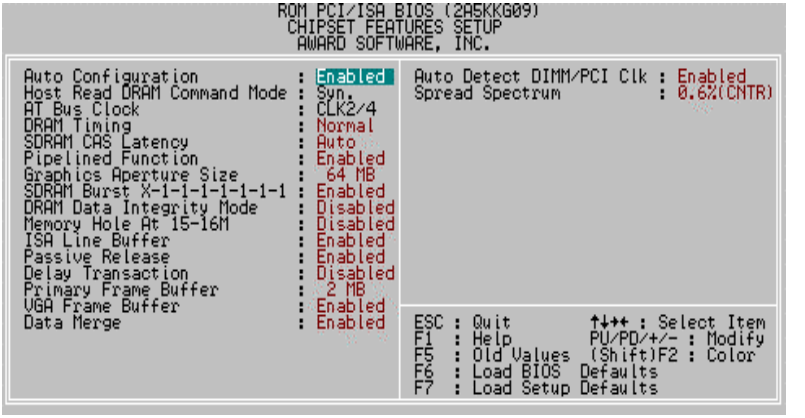
  It determines whether video BIOS will copied to RAM, however, it is optional from chipset design. Video Shadow will increase the video speed.
  The default value is Enable.

| | |
|---|---|
| Enabled | Video shadow is enabled. |
| Disabled | Video shadow is disabled. |

- C8000 - CFFFF Shadow / D0000 - DFFFF Shadow

  These categories determine whether optional ROM will be copied to RAM by 16 byte. The default value are Disabled.

| | |
|---|---|
| Enabled | Optional shadow is enabled. |
| Disabled | Optional shadow is disabled. |




## 4.7. CHIPSET FEATURES SETUP

Figure 4.4: Chipset Features Setup

- Auto Configuration

  The default value is Enabled.

| | |
|---|---|
| Enabled | For General State. |
| Disabled | For Special SDRAM Timing and ISA CLK. |

- Host Read DRAM Command Mode.

  The default value is Syn.

| | |
|---|---|
| Bypass | Set DRAM Cycle Start at T3 clock after ADS#. |
| Syn. | Set DRAM Cycle Start at T3+1 clock after ADS#. |

- AT Bus Clock

  The default value is CLK2/4.

| | |
|---|---|
| CLK2/3 | Set AT Bus Clock to CLK2/3. |

| | |
|---|---|
| CLK2/4 | Set AT Bus Clock to CLK2/4. |
| 7.159MHz | Set AT Bus Clock to 7.159MHz. |

- DRAM Timing

  The default value is Normal.

| | |
|---|---|
| Normal | For normal DRAM timing operation. |
| Fast | For Fastest DRAM timing operation. |
| Slow | For Slower DRAM timing operation. |

- SDRAM CAS Latency

  The default value is AUTO.

| | |
|---|---|
| 3 | For Slower SDRAM DIMM module. |
| 2 | For Fastest SDRAM DIMM module. |
| Auto | CAS latency time will be set automatically if you have SPD on SDRAM |

- Pipelined Function

  The default value is Enable.

| | |
|---|---|
| Enable | Enable Pipelined Function. |
| Disable | Disable Pipelined Function. |

- Graphics Aperture Size

  The default value is 64MB.

| | |
|---|---|
| 16MB | Set Graphics Aperture Size to 16MB. |
| 32MB | Set Graphics Aperture Size to 32MB. |
| 64MB | Set Graphics Aperture Size to 64MB. |
| 128MB | Set Graphics Aperture Size to 128MB. |
| 256MB | Set Graphics Aperture Size to 256MB. |

- SDRAM Burst X-1-1-1-1-1-1-1

  The default value is Enable.

| | |
|---|---|
| Enable | Enable SDRAM Burst X-1-1-1-1-1-1-1. |
| Disable | Disable SDRAM Burst X-1-1-1-1-1-1-1. |

- DRAM Data Integrity Mode

  The default value is Disable.

| | |
|---|---|
| ECC | Set DRAM Data Integrity Mode to ECCMode. |
| Parity | Set DRAM Data Integrity Mode to ParityMode. |
| Disable | Disable DRAM Data Integrity Mode. |

- Memory Hole at 15M-16M

  The default value is Disabled.

| | |
|---|---|
| Enabled | Set Address=15-16MB relocate to ISA BUS. |
| Disabled | Normal Setting. |

- ISA Line Buffer

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable ISA Line Buffer. |
| Disabled | Disable ISA Line Buffer. |

- Passive Release

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable Passive Release. |
| Disabled | Disable Passive Release. |

- Delay Transaction

  The default value is Disabled.

| | |
|---|---|
| Enabled | Enable Delay Transaction. |
| Disabled | Disable Delay Transaction. |

- Primary Frame Buffer

  The default value is 2MB.

| | |
|---|---|
| 1MB | Set Primary Frame Buffer to 1MB. |
| 2MB | Set Primary Frame Buffer to 2MB. |
| 4MB | Set Primary Frame Buffer to 4MB. |
| 8MB | Set Primary Frame Buffer to 8MB. |
| 16MB | Set Primary Frame Buffer to 16MB. |
| ALL | Set Primary Frame Buffer to ALL. |
| Disabled | Disable Primary Frame Buffer. |

- VGA Frame Buffer

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable VGA Frame Buffer. |
| Disabled | Disable VGA Frame Buffer. |

- Data Merge

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable Data Merge. |
| Disabled | Disable Data Merge. |

- Auto Detect DIMM/PCI Clk

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enabled Auto Detect DIMM/PCI Clk. |
| Disabled | Disabled Auto Detect DIMM/PCI Clk. |

- Spread Spectrum

  The default value is 0.6% (CNTR)

| | |
|---|---|
| Disabled | Normal |
| 0.6%(CNTR) | Set Spread Spectrum 0.6%(CNTR) |

## 4.8. POWER MANAGEMENT SETUP

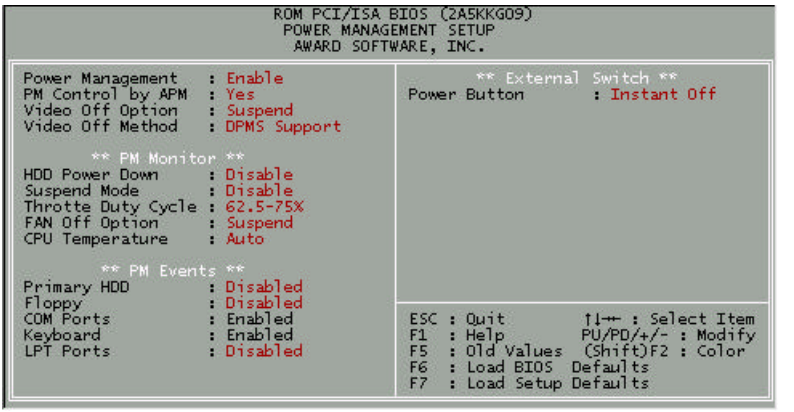



Figure 4.5: Power Management Setup

- Power Management

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable Green function. |
| Disabled | Disable Green function. |

- PM Control by APM

  The default value is Yes.

| | |
|---|---|
| Yes | Enable software APM function. |
| No | Disable software APM function. |

- Video off Option

  The default value is Suspend.

| | |
|---|---|
| Suspend | Set Video off if system enter Suspend Mode. |
| Always On | Set Video always on. |

- Video Off Method

  The default value is DPMS Support.

| | |
|---|---|
| V/H SYNC + Blank | BIOS will turn off V/H-SYNC when gets into Green mode for Green monitor power saving. |
| Blank Screen | BIOS will only black monitor when gets into Green mode. |
| DPMS Support | BIOS will use DPMS Standard to control VGA card. (The Green type VGA card will turn of V/H-SYNC automatically.) |

- HDD Power Down

  The default value is Disable.

| | |
|---|---|
| Disable | Disable HDD Power Down mode function. |
| 1-15 mins. | Enable HDD Power Down mode between 1 to 15 mins. |

- Suspend Mode

  The default value is Disable.

| | |
|---|---|
| Disabled | Disable Suspend Mode. |
| 1 min - 1 Hour | Setup the timer to enter Suspend Mode. |

- Throttle Duty Cycle

  The default value is 62.5-75%.

| | |
|---|---|
| 12.5-25% | Set Throttle Duty Cycle is 12.5-25%. |
| 37.5-50% | Set Throttle Duty Cycle is 37.5-50%. |
| 62.5-75% | Set Throttle Duty Cycle is 62.5-75%. |
| Disable | Disable Throttle Duty Cycle. |

- FAN off Option

  The default value is Suspend.

| | |
|---|---|
| Suspend | Set FAN off if system enter Suspend Mode. |

| | |
|---|---|
| Always On | Set FAN always on. |

- CPU Temperature

  The default value is Auto.

| | |
|---|---|
| Auto | Set CPU Temperature Automatically. |
| 65°C / 149°F | Monitor CPU Temp. at 65°C / 149°F. if Temp. > 65°C / 149°F, the speed of CPU will be slow down. |
| 70°C / 158°F | Monitor CPU Temp. at 70°C / 158°F. if Temp. > 70°C / 158°F, the speed of CPU will be slow down. |
| 75°C / 167°F | Monitor CPU Temp. at 75°C / 167°F. if Temp. > 75°C / 167°F, the speed of CPU will be slow down. |
| 80°C / 176°F | Monitor CPU Temp. at 80°C / 176°F. if Temp. > 80°C / 176°F, the speed of CPU will be slow down. |
| Disable | Disable the Function. |

- Primary HDD

  The default value is Disabled.

| | |
|---|---|
| Enabled | Disable Primary HDD Ports Activity. |
| Disabled | Enable Primary HDD Ports Activity. |

- Floppy

  The default value is Disabled.

| | |
|---|---|
| Enabled | Enable Floppy Ports Activity. |
| Disabled | Disable Floppy Ports Activity. |

- COM Ports

  The default value is Enable.

| | |
|---|---|
| Enabled | Enable COM Ports Activity. |

- Keyboard

  The default value is Enable.

| | |
|---|---|
| Enabled | Enable Keyboard Activity. |

- LPT Ports

  The default value is Disabled.

| | |
|---|---|
| Enabled | Enable LPT Ports. |
| Disabled | Disable LPT Ports. |

- Power Button

  The default value is InstantOff.

| | |
|---|---|
| Instantoff | Soft switch ON/OFF for POWER ON/OFF. |
| Delay 4Sec. | Soft switch ON 4sec. for POWER OFF. |

## 4.9. PNP/PCI CONFIGURATION

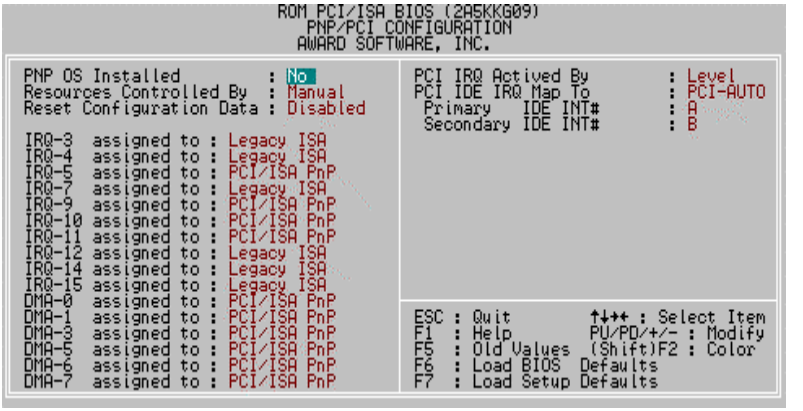



Figure 4.6: PCI Slot Configuration

- PNP OS Installed

  The default value is No.

| | |
|---|---|
| Yes | Enable PNP OS Installed function. |
| No | Disable PNP OS Installed function. |

- Resources Controlled by

  The default value is Manual.

| | |
|---|---|
| Manual | User can set the PnP resource (I/O Address, IRQ & DMA channels) used by legacy ISA DEVICE. |
| Auto | BIOS automatically use these PnP rescuers. |

- Reset Configuration Data

  The default value is Disabled.

| | |
|---|---|
| Disabled | Disable this function. |
| Enabled | Enable clear PnP information in ESCD. |

- IRQ (3,4,5,7,9,10,11,12,14,15), DMA(0,1,3,5,6,7) assigned to

  The default value is "Legacy ISA" or "PCI/ISA PnP".

| | |
|---|---|
| Legacy ISA | The resource is used by Legacy ISA device. |
| PCI/ISA PnP | The resource is used by PCI/ISA PnP device (PCI or ISA). |

- PCI IRQ Actived By

  The default value is Level.

| | |
|---|---|
| Level | Set PCI IRQ Actived by Level. |
| Edge | Set PCI IRQ Actived by Edge. |

- PCI IDE IRQ Map To

  The default value is PCI-AUTO.

| | |
|---|---|
| PCI-AUTO | Map PCI IDE IRQ to PCI slot automatically. |
| ISA | Map PCI IDE IRQ to ISA slot. |

- Primary/Secondary IDE INT#

| | |
|---|---|
| A | Set INTA for primary/secondary PCI IDE. |
| B | Set INTB for primary/secondary PCI IDE. |
| C | Set INTC for primary/secondary PCI IDE. |
| D | Set INTD for primary/secondary PCI IDE. |

## 4.10. LOAD BIOS DEFAULTS

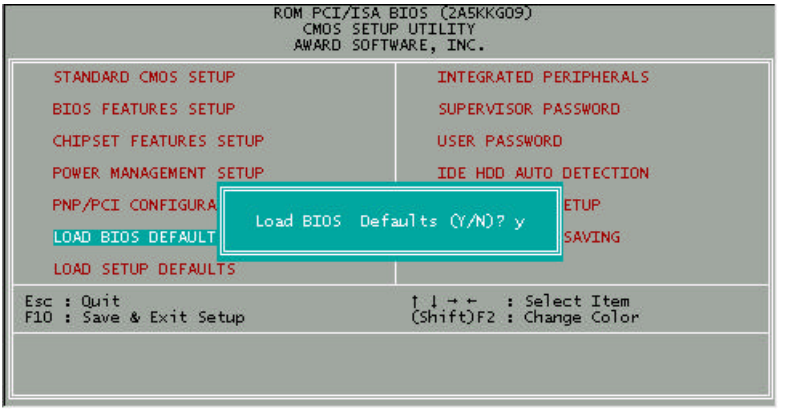



Figure 4.7: Load BIOS Defaults

- Load BIOS Defaults

  To load BIOS defaults value to CMOS SRAM, enter "Y". If not, enter "N".

## 4.11. LOAD SETUP DEFAULTS

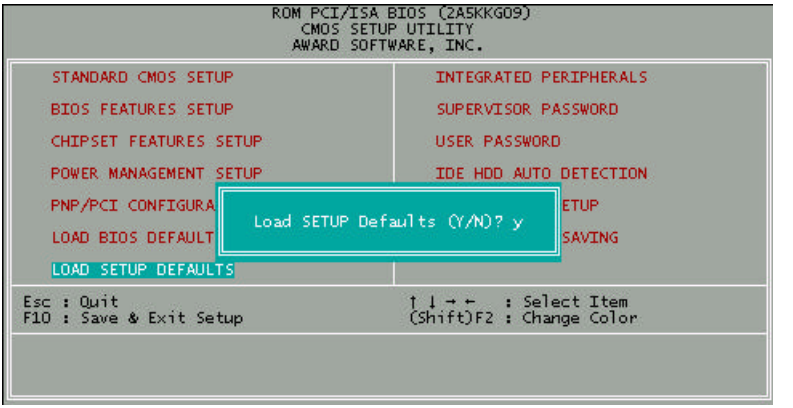



Figure 4.8: Load Setup Defaults

- Load SETUP Defaults

  To load SETUP defaults value to CMOS SRAM, enter "Y". If not, enter "N".

**If there is any problem occurred, loading BIOS DEFAULTS step is recommended.**

## 4.12. INTEGRATED PERIPHERALS

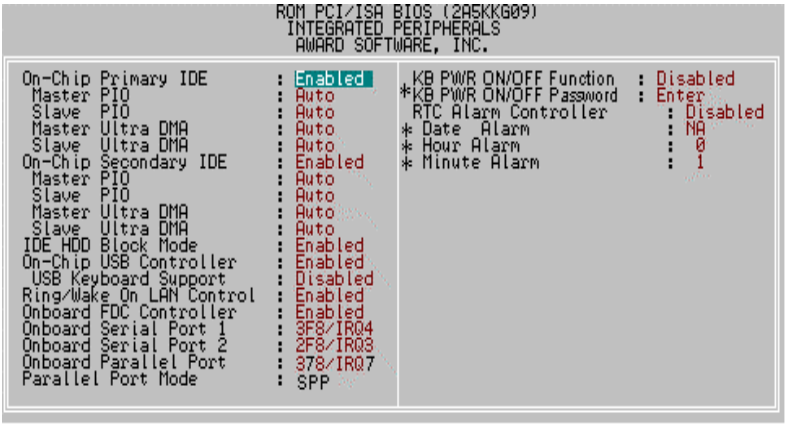



Figure 4.9: Integrated peripherals

*When KB PWR ON/OFF Function set Enabled, KB PWR ON/OFF Password : Enter will show up.

* These three items will show up when RTC Alarm Controller is enabled.

- On-Chip Primary IDE

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable onboard 1st channel IDE port. |
| Disabled | Disable onboard 1st channel IDE port. |

- Master PIO (for onboard IDE 1st channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Mode0~4 | Manually set the IDE Accessing mode. |

- Slave PIO (for onboard IDE 1st channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Mode0~4 | Manually set the IDE Accessing mode. |

- Master Ultra DMA (for onboard IDE 1sd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Disabled | Disable UDMA function. |

- Slave Ultra DMA (for onboard IDE 1sd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Disabled | Disable UDMA function. |

- On-Chip Secondary IDE

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable onboard 2nd channel IDE port. |
| Disabled | Disable onboard 2nd channel IDE port. |

- Master PIO (for onboard IDE 2nd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Mode0~4 | Manually set the IDE Accessing mode. |

- Slave PIO (for onboard IDE 2nd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Mode0~4 | Manually set the IDE Accessing mode. |

- Master Ultra DMA (for onboard IDE 2nd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Disabled | Disable UDMA function. |

- Slave Ultra DMA (for onboard IDE 2nd channel).

  The default value is Auto.

| | |
|---|---|
| Auto | BIOS will automatically detect the IDE HDD Accessing mode. |
| Disabled | Disable UDMA function. |

- IDE HDD Block Mode

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable IDE HDD Block Mode |
| Disabled | Disable IDE HDD Block Mode |

- On-Chip USB Controller

  The default value is Enabled.

| | |
|---|---|
| Disabled | Disable USB Controller. |
| Enabled | Enable USB Controller. |

- USB Keyboard Support

  The default value is Disabled.

| | |
|---|---|
| Disabled | Disable USB Keyboard Support. |
| Enabled | Enable USB Keyboard Support. |

- Ring / Wake On Lan Control

  The default value is Enable.

| | |
|---|---|
| Enabled | Enable Modem Ring On / Wake On Lan function. |
| Disabled | Disable this function. |

- Onboard FDC Controller

  The default value is Enabled.

| | |
|---|---|
| Enabled | Enable onboard Floppy port. |
| Disabled | Disable onboard Floppy port. |

- Onboard Serial Port 1

  The default value is 3F8/IRQ4.

| | |
|---|---|
| Auto | BIOS will automatically setup the port 1 address. |
| 3F8/IRQ4 | Enable onboard Serial port 1 and address is 3F8. |
| 2F8/IRQ3 | Enable onboard Serial port 1 and address is 2F8. |
| 3E8/IRQ4 | Enable onboard Serial port 1 and address is 3E8. |
| 2E8/IRQ3 | Enable onboard Serial port 1 and address is 2E8. |
| Disabled | Disable onboard Serial port 1. |

- Onboard Serial Port 2

  The default value is 2F8/IRQ3.

| | |
|---|---|
| Auto | BIOS will automatically setup the port 2 address. |
| 3F8/IRQ4 | Enable onboard Serial port 2 and address is 3F8. |
| 2F8/IRQ3 | Enable onboard Serial port 2 and address is 2F8. |
| 3E8/IRQ4 | Enable onboard Serial port 2 and address is 3E8. |
| 2E8/IRQ3 | Enable onboard Serial port 2 and address is 2E8. |
| Disabled | Disable onboard Serial port 2. |

- Onboard Parallel port

  The default value is 378/IRQ7.

| | |
|---|---|
| 378/IRQ7 | Enable onboard LPT port and address is 378/IRQ7. |
| 278/IRQ5 | Enable onboard LPT port and address is 278/IRQ5. |
| Disabled | Disable onboard LPT port. |
| 3BC/IRQ7 | Enable onboard LPT port and address is 3BC/IRQ7. |

- KB PWR ON/OFF Function

  The default value is Disabled.

| | |
|---|---|
| Disabled | Disabled KB PWR ON/OFF Function |
| Enabled | Enabled KB PWR ON/OFF Function |

KB PWR ON/OFF Password

The default value is Enter.

KB PWR ON/OFF Function Set Enabled, KB PWR ON/OFF Password : Enter will show up. When users enabled KB PWR ON/OFF Function, please set password with three different characters, and press the three different characters password at the same time.
For example, if users set “abc”as password , then he would press “a” “b” “c” at the same time. (a-b-c is hot key) .

- RTC Alarm Controller

  The default value is Disabled.

| | |
|---|---|
| Disabled | Disable this function. |
| Enabled | Enable alarm function to POWER ON system. |

If RTC Alarm Controller is Enabled.

| | |
|---|---|
| Date Alarm : | NA,1~31 |
| Hour Alarm : | 0~24 |
| MinuteAlarm : | 0~59 |

## 4.13. SUPERVISOR / USER PASSWORD

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

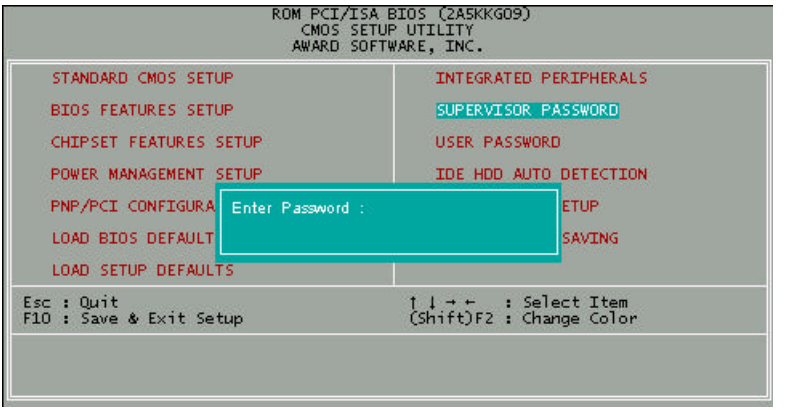



Figure 4.10: Password Setting

Type the password, up to eight characters, and press <Enter>. The password typed now will clear previously entered password from CMOS memory.

You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled.

Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

If you select System at Security Option of BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter Setup.

If you select Setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.

## 4.14. IDE HDD AUTO DETECTION

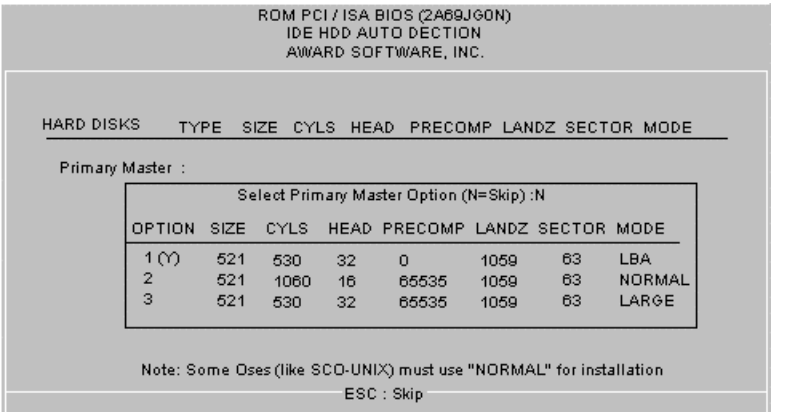



Figure 4.11: IDE HDD Auto Detection

Type "Y" will accept the H.D.D. parameter reported by BIOS.

Type "N" will keep the old H.D.D. parameter setup. If the hard disk cylinder NO. is over 1024, then the user can select LBA mode or LARGE mode for DOS partition larger than 528 MB.

## 4.15. SAVE & EXIT SETUP

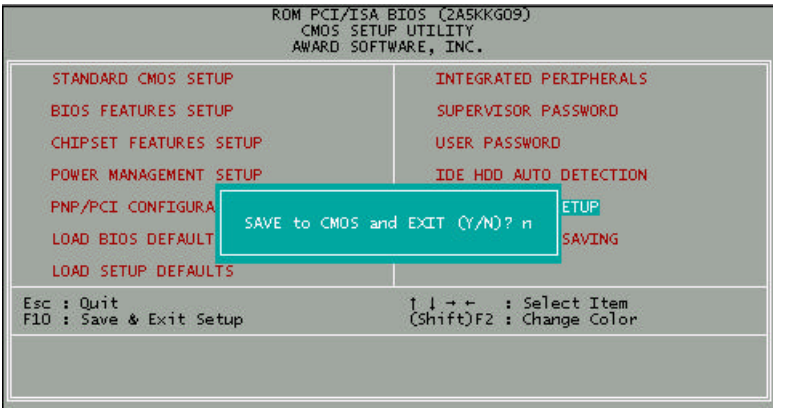



Figure 4.12: Save & Exit Setup

Type "Y" will quit the Setup Utility and save the user setup value to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

## 4.16. EXIT WITHOUT SAVING

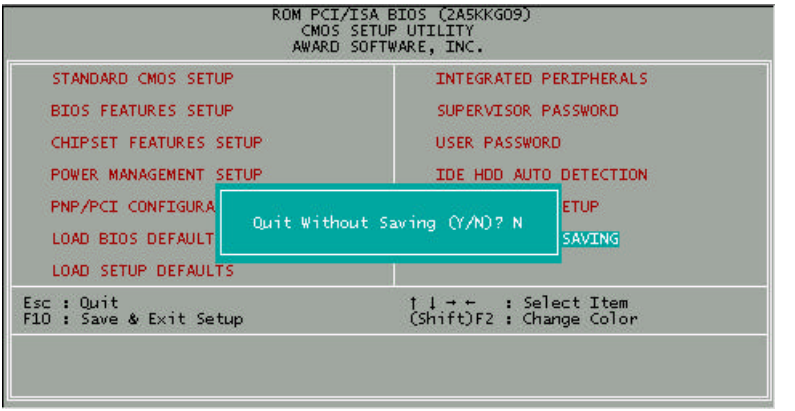



Figure 4.13: Exit Without Saving

Type "Y" will quit the Setup Utility without saving to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

# 5. Troubleshooting

How to remove *“?PCI Universal Serial Bus”* under the Windows 95 ?

**Method 1:**

1.Please Install Windows 95 OSR2.1 attached file “USBSUPP.EXE”

2.Run this file and then system will restart.

3.Please go to the Device Manager , and remove “?PCI Universal Serial Bus”.

4.Please press “Refresh” buttom.

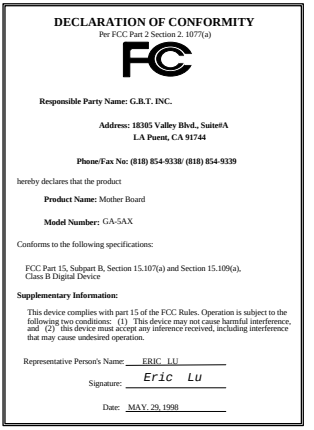
5.System will request your USB Driver under the directory c:\windows\system\openhci.sys

6.Choose this directory and press “OK”, System will find Open HCI’s USB Driver.

7.Restart your system.

**Method 2:**

1. Go to the web site of ALi (http://www.ali.com.tw/eframes.htm)
2. Download ALi USB Host Controller Supplement.
3. Install the file according to readme.



**DECLARATION OF CONFORMITY**

Per FCC Part 2 Section 2. 1077(a)

**Responsible Party Name: G.B.T. INC.**

**Address: 18305 Valley Blvd., Suite#A**
**LA Puent, CA 91744**

**Phone/Fax No: (818) 854-9338/ (818) 854-9339**

hereby declares that the product

**Product Name:** Mother Board

**Model Number:** GA-5AX

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109(a), Class B Digital Device

**Supplementary Information:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any inference received, including interference that may cause undesired operation.

Representative Person's Name: ERIC LU

Signature: Eric Lu

Date: MAY. 29, 1998

## FCC Compliance Statement:

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

-Reorient or relocate the receiving antenna

-Move the equipment away from the receiver

-Plug the equipment into an outlet on a circuit different from that to which the receiver is connected

-Consult the dealer or an experienced radio/television technician for additional suggestions

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void Your authority to operate such equipment.

This device complies with Part 15 of the FCC Rules. Operation is subjected to the following two conditions 1) this device may not cause harmful interference and 2) this device must accept any interference received, including interference that may cause undesired operation.

# Declaration of Conformity

We, Manufacturer/Importer
(full address)

**G.B.T. Technology Trading GMBH**
**Ausschlager Weg 41, 1F, 20537 Hamburg, Germany**

declare that the product
( description of the apparatus, system, installation to which it refers)

**Mother Board**
GA-5AX

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 89/336 EEC-EMC Directive

| | | | |
|---|---|---|---|
| ☐ **EN 55011** | Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM high frequency equipment | ☐ **EN 61000-3-2*** <br> ☒ **EN60555-2** | Disturbances in supply systems caused by household appliances and similar electrical equipment "Harmonics" |
| ☐ **EN55013** | Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment | ☐ **EN61000-3-3*** <br> ☒ **EN60555-3** | Disturbances in supply systems caused by household appliances and similar electrical equipment "Voltage fluctuations" |
| ☐ **EN 55014** | Limits and methods of measurement of radio disturbance characteristics of household electrical appliances, portable tools and similar electrical apparatus | ☒ **EN 50081-1** <br> ☒ **EN 50082-1** | Generic emission standard Part 1: Residual, commercial and light industry <br> Generic immunity standard Part 1: Residual, commercial and light industry |
| ☐ **EN 55015** | Limits and methods of measurement of radio disturbance characteristics of fluorescent lamps and luminaries | ☐ **EN 55081-2** | Generic emission standard Part 2: Industrial environment |
| ☐ **EN 55020** | Immunity from radio interference of broadcast receivers and associated equipment | ☐ **EN 55082-2** | Generic immunity standard Part 2: Industrial environment |
| ☒ **EN 55022** | Limits and methods of measurement of radio disturbance characteristics of information technology equipment | ☐ **ENV 55104** | Immunity requirements for household appliances tools and similar apparatus |
| ☐ **DIN VDE 0855** <br> ☐ **part 10** <br> ☐ **part 12** | Cabled distribution systems; Equipment for receiving and/or **distribution** from sound and television signals | ☐ **EN 50091- 2** | EMC requirements for uninterruptible power systems (UPS) |
| ☒ **CE marking** | | CE (EC conformity marking) | |

**The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 73/23 EEC**

| | | | |
|---|---|---|---|
| ☐ **EN 60065** | Safety requirements for mains operated electronic and related apparatus for household and similar general use | ☐ **EN 60950** | Safety for information technology equipment including electrical business equipment |
| ☐ **EN 60335** | Safety of household and similar electrical appliances | ☐ **EN 50091-1** | General and Safety requirements for uninterruptible power systems (UPS) |

**Manufacturer/Importer**

(Stamp)

Date : MAY. 29, 1998

Signature : Rex Lin

Name : Rex Lin