HOT-613

Dual Pentium™ Pro processor

Based PCI MAIN BOARD

User's Manual

CE Notice:

Following standards were applied to this product, in order to achieve compliance
with the electromagnetic compatibility:
- Immunity in accordance with EN 50082-1: 1992
- Emmitions in accordance with EN 55022: 1987 Class B.

FCC Notice:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of
FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential
installation. This equipment generates, uses and can radiate radio frequency energy. If not installed and used properly, in
strict accordance with the manufacturer's 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 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.

Increase the separation between the equipment and receiver.

Connect 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 help and for additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful "How to Identify
and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office.
Washington, DC 20402, Stock 004-000-00345-4

FCC Warning

The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's
authority to operate this equipment.

*Note : In order for an installation of this product to maintain compliance with the limits for a Class B device, shielded
cables and power cord must be used.*

NOTICE

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Manual Ver 1.0

*All information, documentation, and specifications contained in this manual are subject to change without
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TABLE OF CONTENTS

Preface

HOT-613 mainboard is a highly integrated IBM PC/AT compatible system board. The design will accept dual or single Intel 180MHz or 200 MHz Pentium Pro processors with size of 256KB and 512KB cache. The memory subsystem is designed to support up to 512 MB of EDO, Burst EDO, and Fast Page Mode DRAM Module in standard 72-pin SIMM socket. A type 8 Pentium processor socket provides access to future processor enhancements.

HOT-613 mainboard provides a new level of I/O integration. Intel's 82440FX PCIset chipset provides increased integration and improved performance over other chipset designs. The 82440FX PCIset chipset provides an integrated Bus Mastering IDE controller with two high performance IDE interfaces for up to four IDE devices.

The onboard Super I/O controller provides the standard PC I/O functions: floppy interface, two FIFO serial ports, an IrDA device port and a SPP/EPP/ECP capable parallel port.

Up to four PCI local bus slots provide a high bandwidth data path for data-movement intensive functions such as graphics, and up to three ISA slots complete the I/O function.

The HOT-613 mainboard provides the foundation for cost effective, high performance, highly expandable platforms, which deliver the latest in Pentium Pro processor and I/O standard.

Chapter **1** Introduction

Specification

CPU

❑ Supports dual or single 180MHz or 200MHz Pentium™ Pro CPU on ZIF socket 8.

Note : HOT-613 main board doesn't support older Pentium ™ Pro processors without VID (Voltage Identification) supported

VRMs

❑ Provide two VRM headers for external VRMs.

Chipset

❑ Features Intel's i440FX PCIset with super I/O subsystems.

Memory

❑ Supports four 72-pin SIMMs of 4MB, 8MB, 16MB, 32MB, 64MB, and 128MB to form a memory size from 8MB to 512MB.

❑ Supports Fast Page Mode (FPM), Extended Data Output (EDO), and Burst Extended Data Output (BEDO) DRAM Module.

❑ Supports Error Checking and Correcting (ECC) function, when using parity DRAM modules can detect and correct 1 bit memory errors.

Cache Memory

❑ Support Pentium™ Pro's built-in 256KB or 512KB level 2 cache so that no external cache chips are required.

Power Management Function

❑ Provides four power management modes : Full on, Doze, Standby, and Suspend.

❑ Supports Microsoft APM 1.2.

❑ Provides EPMI (External Power Management Interrupt) pin

Expansions

❑ 32-bit PCI bus slot x 4

❑ 16-bit ISA bus slot x 3

- 2-channel PCI IDE port support up to 4 IDE devices.

  - PIO Mode 4, DMA Mode 2 transfers up to 22 MB/sec

  - Integrated 8 x 32-bit buffer for PCI IDE burst transfers

- One floppy port

- One parallel port

  - Supports **SPP** (PS/2 compatible bidirectional Parallel Port),
    EPP (Enhanced Parallel Port), and
    ECP (Extended Capabilities Port) high performance parallel port.

- Two serial ports

  - Supports 16C550 compatible UARTS.

  - Supports IrDA (Infrared) communication.

- One PS/2 mouse port

- Two USB (Universal Serial Bus) ports

System BIOS

- Award 4.51PG Pentium Pro™ PCI BIOS

- Support DMI (Desktop Management Interface)

## Board Design

- ATX form factor 305mm x 240mm

Jumpers

CN3

JP25
FAN

JP37

VRM SOCKET

VRM SOCKET

COM 1

PS/2 Keyboard

PS/2 Mouse

PARALLEL

Socket 8

Socket 8

Intel SB82442FX

Intel SB82441FX

CN2

CN4

COM 2

J7
J6

SIMM1

SIMM2

JP3
JP2

SIMM3

SIMM4

JP34

JP8
JP9

UMC UM8669F

PCI 1

JP4
JP5
JP6
JP7

PCI 2

IR JP29

PCI 3

Intel SB82371

JP12 JP13

CN1

JP21

PCI 4

JP22

Keyboard BIOS

Intel IOAPIC

JP36

J11

JP17

R.T.C

J12

System BIOS

JP24

JP20

JP15

System / PCI
Close Select - JP8, JP9

System	PCI	JP8	JP9
50MHz	25MHz	Close	Close
60MHz	30MHz	Close	Open
66MHz	33MHz	Open	Close

CPU Frequency
Multiplier Select - JP4, JP5, JP6, JP7

Multiplier	JP4	JP5	JP6	JP7
2x	Close	Close	Close	Close
2.5x	Open	Close	Close	Close
3x	Close	Open	Close	Close
3.5x	Open	Open	Close	Close

IDE LED

JP21

EPMI

JP22

GLED

SPK

JP36

J11

KEYLOCK

J12

JP24

RST

Flash EEPROM Vpp
Select - JP15

5V - Pin 2-3 Close
12V - Pin 1-2 Close

CPU Clock Speed Selection

HOT-613 mainboard features a clock generator to provide adjustable System Bus Clocks and PCI Bus Clocks. JP8 and JP9 are 2-pin jumper that determine the System Bus Clock from 50 MHz to 66 MHz and PCI Bus Clock from 25MHz to 33MHz.

HOT-613 mainboard also provides Jumper JP4, JP5, JP6, and JP8 to figure the CPU Core Clock multiplier. By inserting or removing jumper caps on those jumpers, the user can change the **System Bus Clock**/**CPU Core Clock** ratio from 1 : 2 to 1 : 4.

System Bus Clock & PCI Bus Clock Selection - JP8, JP9

System Bus Clock	50 MHz	60 MHz	66 MHz
PCI Bus Clock	25 MHz	30 MHz	33 MHz
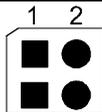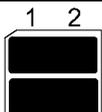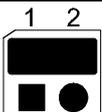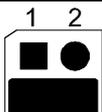
CPU Frequency Multiplier Selection - JP4, JP5, JP6, JP7

Frequency Multiplier	2 X	2.5 X	3 X	3.5 X	4 X
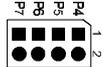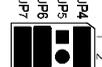
Pentium Pro Processor Frequency Reference Table

Pentium Pro	System Bus Clock - JP8, JP9	Multiplier - JP4, JP5, JP6, JP7	Remark
180 MHz	60 MHz	3 X	
200 MHz	66 MHz	3 X	Factory Default

Onboard Voltage Regulators

HOT-613 mainboard is designed with onboard voltage regulator to provide V$_{IO}$ power for onboard chipset and Pentium™ Pro processor. HOT-613 needs external VRMs to provide power for V$_{CORE}$ of Pentium™ Pro processor.

Pentium™ Pro processors required different voltages. Current processors (marked "Pentium™ Pro") support VID and will automatically adjust the voltage regulator so that no jumper settings are required and provided on HOT-613.

HOT-613 doesn't support older Pentium Pro processors without VID supported .
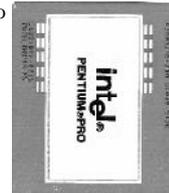
Clear CMOS - JP17

This jumper clears the CMOS data stored in the DALLAS R.T.C device. To clear the CMOS data please follow one of list steps:

Onboard DALLAS DS12887A:

1) Turn off the PC,
2) Insert the jumper cap on JP17 for a while,
3) Remove the jumper cap from JP17,
4) Turn on the PC.

Onboard DALLAS DS12B887:

1) Turn off the PC,
2) Insert the jumper cap on JP17,
3) Turn on the PC for a while,
4) Turn off the PC,
3) Remove the jumper cap from JP17,
4) Turn on the PC.

Selection	JP17
Normal Operation	● ■ 2　1
Clear CMOS	▬▬ 2　1

Flash EEPROM Jumper - JP15

HOT-613 mainboard supports two types of flash EEPROM, 5 volt and 12 volt. By setting up jumper JP15, you can update both types of flash EEPROM with new system BIOS files as they come available.

Normal, JP15 was set by factory, the user need not to change.

JP15 Pin 2-3 Close for 5V
JP15 Pin 1-2 Close for 12V

BIOS UPGRADES

Flash memory makes distributing BIOS upgrades easy. A new version of the BIOS can be installed from a diskette.

Please note the following when making the BIOS updates.

** Flash utility can't work under protected/virtual mode. Memory manager like **QEMM.386**, **EMM386** should not be loaded. (or Simply bypass all **config.sys** and **autoexec.bat** on system boot up.

** Flash utility supports both 5V and 12V Flash EEPROM.

Connectors & Sockets

Connectors

ITEM	FUNCTION
JP12	On-board PCI Primary IDE Connector
JP13	On-board PCI Secondary IDE Connector
CN1	On-board Floppy Controller Connector
CN2	On-board Parallel Port Connector
CN4	On-board Serial port-1 Connector
CN3	On-board Serial Port-2 Connector
JP29	IrDA Connector - * Note 1
J6, J7	USB Connectors - * Note 2
KB1	PS/2 Keyboard Connector
PS1	PS/2 Mouse Connector - * Note 3
J11	PC Speaker Connector
J12	Power LED & Keylock Connector
JP24	Hardware Reset Switch Connector
JP36	Power Management LED Connector
JP21	On-board IDE Read/Write LED Connector
JP25, JP37	12 V Cooling Fan Power Connectors - * Note 4
JP22	EPMI Connector
JP34	ATX Power Switch Connector

Note 1: JP29 - Infrared module connector

The main board provides a 5-pin infrared connector - JP29 as an optional infrared module for wireless transmitting and receiving. Only first 4 pins are available, left 3 pins are reserved for future use.

Note 2: J6, J7 - USB connectors

The main board provides two sets USB (Universal Serial Bus) connectors - J6 and J7 for USB devices use.
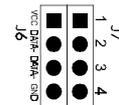
Note 3: Dual FAN - 12V cooling fan power connectors

The main board provides dual on-board 12V cooling fan power connector for cooling fan. Please make sure the red wire connect to +12V and black wire connect to ground (GND).

Chapter **3** Memory Configuration

The HOT-613 mainboard provides four 72-pin SIMM(Single In-line Memory Module) sockets that make it possible to install up to 512MB of RAM. The SIMM socket support 4MB, 8MB, 16MB, 32MB, 64MB, and 128MB Fast Page Mode(FPM), EDO(Extended Data Output), and Burst EDO(BEDO).

HOT-613 mainboard supports memory *Error Checking and Correcting (ECC)* function. To support ECC, the user must use *true* (opposed to phantom parity generated by TTL chips) 36-bit parity-type SIMMs.

The four SIMM sockets are arranged in two banks of two sockets each. Each bank provides a 72-bit(with parity) or 64-bit(without parity) wide data path. Both SIMMs in a bank must be of the same memory size and type, although the different types of memory may differ between banks.

Table 3-1 listed the SIMMs memory configurations.

Table 3-1. Memory Configuration Table

SIM 1	SIM 2	SIM 3	SIM 4	TOTAL
4 MB	4 MB	——	——	8 MB
4 MB	4 MB	4 MB	4 MB	16 MB
8 MB	8 MB	——	——	16 MB
4 MB	4 MB	8 MB	8 MB	24 MB
8 MB	8 MB	8 MB	8 MB	32 MB
16 MB	16 MB	——	——	32 MB
4 MB	4 MB	16 MB	16 MB	40 MB
8 MB	8 MB	16 MB	16 MB	48 MB
16 MB	16 MB	8 MB	8 MB	48 MB
16 MB	16 MB	16 MB	16 MB	64 MB
32 MB	32 MB	——	——	64 MB
8 MB	8 MB	32 MB	32 MB	80 MB
16 MB	16 MB	32 MB	32 MB	96 MB
32 MB	32 MB	32 MB	32 MB	128 MB
64 MB	64 MB	——	——	128 MB
16 MB	16 MB	64 MB	64 MB	160 MB
32 MB	32 MB	64 MB	64 MB	192 MB
64 MB	64 MB	64 MB	64 MB	256 MB
128 MB	128 MB	——	——	256 MB
32 MB	32 MB	128 MB	128 MB	320 MB
64 MB	64 MB	128 MB	128 MB	384 MB
128 MB	128 MB	128 MB	128 MB	512 MB

Chapter 4 **Award BIOS Setup**

HOT-613 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 RAM so that it retains the Setup information when the power is turned off.

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 appear 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.

TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF the ON or pressing the "RESET" button on the system case. You may also restart by simultaneously press <Ctrl>,<Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to,

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

The Main Menu

```
                    ROM PCI/ISA BIOS (2A69HH2A)
                       CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.

    STANDARD CMOS SETUP            INTEGRATED PERIPHERALS

    BIOS FEATURES SETUP            IDE HDD AUTO DETECTION

    CHIPSET FEATURES SETUP         SUPERVISOR PASSWORD

    POWER MANAGEMENT SETUP         USER PASSWORD

    PNP/PCI CONFIGURATION          SAVE & EXIT SETUP

    LOAD BIOS DEFAULTS             EXIT WITHOUT SAVING

    LOAD SETUP DEFAULTS

    Esc : Quit                     ↑ ↓ → ←   : Select Item
    F10 : Save & Exit Setup        (Shift)F2 : Change Color

                  Time, Date, Hard Disk Type...
```

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 features.

Power Management Setup

This setup page includes all the items of Power Management features.

PNP/PCI Configuration setup

This item specifies the value (in units of PCI bus blocks) of the latency timer for the PCI bus master and the IRQ level for PCI device. Power-on with BIOS defaults

Load BIOS Defaults

BIOS defaults loads the values required by the system for the maximum performance. However, you may change the parameter through each Setup Menu.

Load Setup Defaults

Setup defaults loads the values required by the system for the O.K. performance. However, you may change the parameter through each Setup Menu.

Integrated Peripherals

This setup page includes all the items of peripheral features.

IDE HDD auto detection

Automatically configure IDE hard disk drive parameters.

Supervisor Password

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

User Password

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

Save & Exit setup

Save CMOS value change to CMOS and exit setup

Exit without saving

Abandon all CMOS value changes and exit setup.

Standard CMOS Setup

```
                        ROM PCI/ISA BIOS (2A69HHZA)
                           STANDARD CMOS SETUP
                           AWARD SOFTWARE, INC.

    Date (mm:dd:yy) : Tue, Oct 15 1996
    Time (hh:mm:ss) : 17 : 36 :  0

    HARD DISKS         TYPE  SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE

    Primary Master   : Auto    0      0    0       0     0      0  AUTO
    Primary Slave    : Auto    0      0    0       0     0      0  AUTO
    Secondary Master : Auto    0      0    0       0     0      0  AUTO
    Secondary Slave  : Auto    0      0    0       0     0      0  AUTO

    Drive A : 1.44M, 3.5 in.
    Drive B : None                    ┌─────────────────────────────┐
                                      │     Base Memory:     640K    │
    Video   : EGA/VGA                 │  Extended Memory: 23552K     │
    Halt On : All Errors              │     Other Memory:   384K     │
                                      │  ─────────────────────────── │
                                      │    Total Memory: 24576K      │
                                      └─────────────────────────────┘

    ESC : Quit            ↑ ↓ → ←    : Select Item       PU/PD/+/- : Modify
    F1  : Help            (Shift)F2 : Change Color
```

Date

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

Time

The time format is <hour> <minute> <second>. The time is calculated base on the 24-hour military-time clock. For example. 5 p.m. is 17:00:00.

Drive C type/Drive D type

The categories identify the types of 2 channels that have been installed in the computer. There are 45 predefined types and 4 user definable types are for Enhanced IDE BIOS. Type 1 to Type 45 are predefined. Type user is user-definable.

Press PgUp or PgDn to select a numbered hard disk type or type the number and press <Enter>.   Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use Type "User" to define your own drive type manually.

If you select Type "User", you will need to know the information listed below. Enter the information directly from the keyboard and press <Enter>. This information should be included in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is ESDI, the selection shall be "Type 1".

If the controller of HDD interface is SCSI, the selection shall be "None".

If you select Type "Auto", BIOS will Auto-Detect the HDD & CD-ROM Drive at the POST stage and showing the IDE for HDD & CD-ROM Drive.

Drive A type/Drive B type

This item specifies the types of floppy disk drive A or drive B that has been installed in the system.

Video

This item selects the type of adapter used for the primary system monitor that must matches your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in Setup.

Error halt

This item determines if the system will stop, when an error is detected during power up.

Memory

This item is display-only. It is automatically detected by POST (Power On Self Test) of the BIOS.

Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed on the mainboard, or 640K for systems with 640K or more memory installed on the mainboard.

Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

BIOS Features Setup

```
                    ROM PCI/ISA BIOS (2A69HH2A)
                       BIOS FEATURES SETUP
                       AWARD SOFTWARE, INC.

  CPU Internal Cache      : Enabled    Video  BIOS Shadow  : Enabled
  External Cache          : Enabled    C8000-CBFFF Shadow  : Disabled
  Quick Power On Self Test : Disabled  CC000-CFFFF Shadow  : Disabled
  Boot Sequence           : A,C        D0000-D3FFF Shadow  : Disabled
  Swap Floppy Drive       : Disabled   D4000-D7FFF Shadow  : Disabled
  Boot Up Floppy Seek     : Enabled    D8000-DBFFF Shadow  : Disabled
  Boot Up NumLock Status  : On         DC000-DFFFF Shadow  : Disabled
  Boot Up System Speed    : High
  Gate A20 Option         : Fast
  Security Option         : Setup
  PCI/VGA Palette Snoop   : Disabled
  OS Select For DRAM > 64MB : Non-OS2

                                       ESC : Quit      ↑↓→← : Select Item
                                       F1  : Help      PU/PD/+/- : Modify
                                       F5  : Old Values  (Shift)F2 : Color
                                       F6  : Load BIOS  Defaults
                                       F7  : Load Setup Defaults
```

CPU Internal Cache

This item enables CPU internal cache to speed up memory access.

External Cache

This item enables the external cache to speed up memory access.

Quick Power On Self Test

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

Boot Sequence

This item determines which drive computer searches first for the disk operating system. The system supports feature of boot from IDE D:, E:, or F: drive (if there are present), boot from CD-ROM, and boot from SCSI drive. Default value is A, C, SCSI.

Swap Floppy Drive

When this item enables, the BIOS will swap floppy drive assignments so that Drive A: will function as Drive B: and Drive B: as Drive A:.

Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks.

Boot Up NumLock Status

When this option enables, BIOS turns on *Num Lock* when system is powered on so the end user can use the arrow keys on both the numeric keypad and the keyboard.

Boot Up System Speed

This option sets the speed of the CPU at system boot time. The settings are *High* or *Low*.

Gate A20 Option

When this item sets to Normal, the A20 signal is controlled by keyboard controller. When this item sets to Fast, the A20 signal is controlled by post 92 or chipset specific method.

Security Option

This item allows you to limit access to the system and Setup, or just to Setup.
When *System* is selected, the system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
When *Setup* is selected, the system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

PCI VGA Palette Snoop

This item must be set to enabled if there is a MPEG ISA card installed in the system, and disabled if there is no MPEG ISA card installed in the system.

OS Select For DRAM > 64MB

This item allows you to access the memory that over 64 MB in OS/2.

Video BIOS Shadow/XXXXX-XXXXX Shadow

These items determine whether Video BIOS or optional ROM will be copied to RAM.

Chipset Features Setup

```
            ROM PCI/ISA BIOS (2A69HH2A)
              CHIPSET FEATURES SETUP
              AWARD SOFTWARE, INC.

 Auto Configuration       : Enabled     8 Bit I/O Recovery Time  : 3
                                        16 Bit I/O Recovery Time : 2
 DRAM Speed Selection     : 70ns        Memory Hole At 15M-16M   : Disabled
 DRAM RAS# Precharge Time : 4           DRAM Fast Leadoff        : Disabled
 MA Additional Wait State : Enabled     Passive Release          : Enabled
 RAS# To CAS# Delay       : Disabled    Delayed Transaction      : Disabled
 DRAM Read Burst (B/E/F)  : x3/4/4
 DRAM Write Burst (B/E/F) : x4/4/4
 ISA Bus Clock            : PCICLK/3
 DRAM Refresh Queue       : Enabled
 DRAM RAS Only Refresh    : Enabled
 DRAM ECC/PARITY Select   : Disabled
 Fast Dram Refresh        : Disabled
 Read-Around-Write        : Enabled
 PCI Burst Write Combine  : Enabled
 PCI-To-DRAM Pipeline     : Enabled    ESC : Quit          ↑↓→← : Select Item
 CPU-To-PCI Write Post    : Enabled    F1  : Help          PU/PD/+/- : Modify
 CPU-To-PCI IDE Posting   : Enabled    F5  : Old Values  (Shift)F2 : Color
 System BIOS Cacheable    : Disabled   F6  : Load BIOS  Defaults
 Video RAM Cacheable      : Disabled   F7  : Load Setup Defaults
```

The Chipset Features Setup option is used to control the configuration of chipset registers value. The registers may affect the system stability, please do not change these settings if you are not familiar with the chipset.

Auto Configuration

This item auto configure the following items: DRAM RAS# Precharge time, MA Additional Wait State, RAS# to CAS# Delay, DRAM Read Burst, DRAM Write Burst, and ISA Bus Clock by different system clock.

DRAM Speed Selection

This item set the DRAM Read/Write timings that the system uses. When item of "Auto Configuration" is disabled, this item will not show up.

DRAM RAS# Precharge Time

DRAM must continually be refreshed or it will lose its data. Normally, DRAM is refreshed entirely as the result of a single request. This option allows you to determine the number of CPU clocks allocated for Row Address Strobe to accumulate its charge before the DRAM is refreshed. If insufficient time is allowed, refresh may be incomplete and data lost.

This item sets the DRAM RAS Precharge Timing. The options are *4* and *3* CLKs.

MA Additional Wait State

When enabled, one additional wait state is inserted before the assertion of the first memory address line MA and CAS/RAS assertion during DRAM read or write leadoff cycles.

RAS To CAS# Delay

When DRAM is refreshed, both rows and columns are address separately. This setup item allows you to determine the timing of the transition from Row Address Strobe (RAS) to Column Address Strobe (CAS). The options are *enabled* for 3 and *disabled* for 2 CLKs.

DRAM Read Burst (B/E/F)

This item set the BEDO/EDO/FPM DRAM Read Burst Timing. The timing used depends on the type of DRAM (EDO burst mode or standard fast page mode) on a per-bank basis. The options are *x1/2/3, x2/2/3* , *x2/3/4* and *x3/4/4*.

DRAM Write Burst (B/E/F)

This item set the BEDO/EDO/FPM DRAM Write Burst timing for accessing DRAM. The options are *x2/2/3, x3/3/3, x3/3/4, x4/4/4* .

ISA Clock

This item allows the user to set ISA clock that divide from PCI clock by 3 or by 4. For example, if 200MHz Pentium Pro processor is used, PCI clock will be 33MHz, ISA Clock will be 8.25MHz when PCI clock divided by 4, and 11MHz when PCI clock divided by 3.

DRAM Refresh Queue

When enabled, the chipset's internal 4-deep refresh queue is enabled with 4th request being the priority request. All refresh requests are queued. If disabled, the refresh queue is disabled and all refreshes are priority requests.

DRAM RAS Only Refresh

This item allows the user to the RAS only refresh or CAS before RAS refresh.

DRAM ECC/PARITY Select

When using parity DRAM modules, you can select from the options of ECC (Error Checking and Correcting) or Parity to correct 1 bit memory errors that may occur in the memory. When using no parity DRAM modules, this function is not available.

Fast DRAM Refresh

When disabled will execute the normal mode where the refresh rate is every 15ns, when enabled, the fast refresh mode implements a refresh cycle every 32 host cycle.

Read-Around-Write

When enabled will increase the execution efficiency of the processor. It allows the processor to execute read commands out of order if there is independence between these read and other write commands.

PCI Burst Write Combining

When enabled will increase the efficiency of PCI bus by combining serval CPU to PCI write cycles into one.

PCI-To-DRAM Pipeline

When enabled will increase the bandwidth of the path between the PCI and the DRAM to enhance the PCI bus efficiency and DRAM accessing

CPU-To-PCI Write Post

When enabled will increase the efficiency of the PCI bus and speed up the execution in the processor.

CPU-To-PCI IDE Posting

When disabled, the CPU to PCI IDE posting cycles are treated as normal I/O write transactions. When enabled will have the I/O write cycles posted.

System BIOS Cacheable

This item allows the user to set whether the system BIOS F000~FFFF areas are cacheable or non-cacheable.

Video RAM Cacheable

This item allows the user to set whether the video BIOS C000~C7FF areas are cacheable or non-cacheable.

8 Bit I/O Recovery Time

The recovery time is the length of time, measured in CPU clocks, which the system will delay after the completion of an input/output request. This delay takes place because the CPU is operating so much after than the input/output bus that the CPU must be delayed to allow for the completion of the I/O.

This item allows you to determine the recovery time allowed for 8 bit I/O. Choices are from NA, 1 to 8 CPU clocks.

16-Bit I/O Recovery Time

This item allows you to determine the recovery time allowed for 16 bit I/O. Choices are from NA, 1 to 4 CPU clocks.

Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

DRAM Fast Leadoff

When enabled, system will reduce the number of CPU clocks allowed before reads and writes to DRAM are performed.

Passive Release

When enabled, the chipset provides a programmable passive release mechanism to meet the required ISA master latencies.

Delayed Transaction

Since the 2.1 revision of the PCI specification requires much tighter controls on target and master latency. PCI cycles to or from ISA typically take longer. When enabled, the chipset provides a programmable delayed completion mechanism to meet the required target latencies.

Power Management Setup

```
                    ROM PCI/ISA BIOS (2A69HH2A)
                       POWER MANAGEMENT SETUP
                        AWARD SOFTWARE, INC.

Power Management    : Disable       ** Power Down & Resume Events **
PM Control by APM   : Yes           IRQ3  (COM 2)        : ON
Video Off Method    : V/H SYNC+Blank IRQ4 (COM 1)        : ON
MODEM Use IRQ       : 3             IRQ5  (LPT 2)        : OFF
                                    IRQ6  (Floppy Disk)  : OFF
Doze Mode           : Disable       IRQ7  (LPT 1)        : ON
Standby Mode        : Disable       IRQ8  (RTC Alarm)    : OFF
Suspend Mode        : Disable       IRQ9  (IRQ2 Redir)   : OFF
HDD Power Down      : Disable       IRQ10 (Reserved)     : OFF
                                    IRQ11 (Reserved)     : OFF
** Wake Up Events In Doze & Standby ** IRQ12 (PS/2 Mouse) : ON
IRQ3  (Wake-Up Event): ON           IRQ13 (Coprocessor)  : ON
IRQ4  (Wake-Up Event): ON           IRQ14 (Hard Disk)    : ON
IRQ8  (Wake-Up Event): ON           IRQ15 (Reserved)     : ON
IRQ12 (Wake-Up Event): ON
                                    ESC : Quit      ↑↓→← : Select Item
                                    F1  : Help       PU/PD/+/- : Modify
                                    F5  : Old Values  (Shift)F2 : Color
                                    F6  : Load BIOS  Defaults
                                    F7  : Load Setup Defaults
```

Power Management

This item determines the options of the power management function. Default value is Disable. The following pages tell you the options of each item & describe the meanings of each options.

Disabled   Global Power Management will be disabled.
User Define Users can configure their own power management.
Min Saving Predefined timer values are used such that all timers are in their maximum value.
Max Saving Predefined timer values are used such that all timers minimum value.

PM Control by APM

If this item set to No, system BIOS will ignore and APM calls when the power is managed the system.   If this item setup to Yes, system BIOS will wait for APM's prompt before it enter any PM mode e.*DOZE*, *STANDBY* or *SUSPEND*.

Video Off Method

Blank Screen The system BIOS will only blanks off the screen when disabling video.
V/H SYN In addition to Blank Screen, BIOS will also turn
+Blank off the V-SYNC & H-SYNC signals from VGA cards to monitor.
DPMS   This function is enabled for only the VGA card supporting DPM.

Doze Mode

1 Min~1 Hr Defines the continuous idle time before the system enters DOZE mode.

Disable System will never enter DOZE mode.

Standby Mode

1 Min~1 Hr Defines the continues idle time before the system enters STANDBY mode.

Disable System will never enter STANDBY mode.

Suspend Mode

1 Min~1 Hr Defines the continuous idle time before the system enters SUSPEND mode.

Disable System will never enter SUSPEND mode.

HDD Power Down

1~15Min Defines the continuous HDD idle time before the HDD enters power saving mode (motor off).

Suspend BIOS will turn the HDD's motor off when system is in SUSPEND mode.

Disable HDD's motor will not be turn off.

IRQ3, 4, 8, 12 **Wake-Up Events In Doze & Standby**

If these items set to Off, the IRQ3, 4, 8 or 12 event's activity will not reactivates the system from Doze and Standby mode.

If these items set to On, the IRQ3, 4, 8 or 12 event's activity will reactivate system from Doze and Standby mode.

*Power Down & Resume Events **

If this items sets to Off, the event's activity will not be monitored to entering power management.

If this items sets to On, the event's activity will be monitored to entering power management.

IRQ 3 (COM 2)	
IRQ 4 (COM1)	IRQ 5 (LPT 2)
IRQ 6 (Floppy Disk)	IRQ 7 (LPT 1)
IRQ 8 (RTC Alarm)	IRQ 9 (IRQ 2 Redirection)
IRQ 10 (Reserved)	IRQ 11 (Reserved)
IRQ 12 (PS/2 Mouse)	IRQ 13(Coprocessor)
IRQ 14 (Hard Disk)	IRQ 15 (Reserved)

PCI Configuration Setup

```
              ROM PCI/ISA BIOS (2A69HH2A)
                 PNP/PCI CONFIGURATION
                  AWARD SOFTWARE, INC.

Resources Controlled By  : Manual    PCI IRQ Actived By  : Level
Reset Configuration Data : Disabled  PCI IDE IRQ Map To  : PCI-AUTO
                                      Primary   IDE INT# : A
IRQ-3  assigned to : Legacy ISA      Secondary IDE INT# : B
IRQ-4  assigned to : Legacy ISA
IRQ-5  assigned to : PCI/ISA PnP
IRQ-7  assigned to : PCI/ISA PnP
IRQ-9  assigned to : PCI/ISA PnP
IRQ-10 assigned to : PCI/ISA PnP
IRQ-11 assigned to : PCI/ISA PnP
IRQ-12 assigned to : PCI/ISA PnP
IRQ-14 assigned to : PCI/ISA PnP
IRQ-15 assigned to : PCI/ISA PnP
DMA-0  assigned to : PCI/ISA PnP
DMA-1  assigned to : PCI/ISA PnP
DMA-3  assigned to : PCI/ISA PnP     ESC : Quit        ↑↓→← : Select Item
DMA-5  assigned to : PCI/ISA PnP     F1  : Help        PU/PD/+/- : Modify
DMA-6  assigned to : PCI/ISA PnP     F5  : Old Values  (Shift)F2 : Color
DMA-7  assigned to : PCI/ISA PnP     F6  : Load BIOS  Defaults
                                     F7  : Load Setup Defaults
```

Resources Controlled By

The Award Plug and Play BIOS has the capability to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system as Windows 95.

Reset Configuration Data

This item allows you to determine reset the configuration data or not.

IRQ 3/4/5/7/9/10/11/12/14/15, assigned to

These items allow you to determine the IRQ assigned to the ISA bus and is not available to any PCI slot.

Choices are *Legacy ISA* and *PCI/ISA PnP* .

DMA 0/1/3/5/6/7 assigned to

These items allow you to determine the DMA assigned to the ISA bus and is not available to any PCI slot.

Choices are *Legacy ISA* and *PCI/ISA PnP* .

PCI IRQ Activated by

This items sets the method by which the PCI bus recognize that an IRQ service is being requested by a device. Under all circumstances, you should not change the default configuration unless advised otherwise by your system's manufacturer. Choices are *Level* (default) and *Edge* .

PCI IDE IRQ Map to

This items allows you to configure your system to the type of IDE disk controller in use. By default, Setup assumes that your controller is an ISA device rather than a PCI controller.

If you have equipped your system with a PCI controller, changing this allows you to specify which slot has the controller and which PCI interrupt (A, B, C or D) is associated with the connected hard drives.

Remember that this setting refers to the hard disk drive itself, rather than individual partitions. Since each IDE controller supports two separate hard disk drivers, you can select the INT# for each. Again, you will note that the primary has a lower interrupt than the secondary as described in "*Slot x Using INT#*" above.

Selecting "*PCI Auto*" allows the system to automatically determine how your IDE disk system is configured.

Integrated Peripherals

```
                    ROM PCI/ISA BIOS (2A69HH2A)
                      INTEGRATED PERIPHERALS
                       AWARD SOFTWARE, INC.

  IDE HDD Block Mode       : Enabled
  IDE Primary Master PIO   : Auto
  IDE Primary Slave  PIO   : Auto
  IDE Secondary Master PIO : Auto
  IDE Secondary Slave  PIO : Auto
  On-Chip Primary   PCI IDE: Enabled
  On-Chip Secondary PCI IDE: Enabled
  PCI Slot IDE 2nd Channel : Enabled

  Onboard FDC Controller   : Enabled
  Onboard Serial Port 1    : Auto
  Onboard Serial Port 2    : Auto
  UR2 Mode                 : Standard

  Onboard Parallel Port    : 378/IRQ7
  Parallel Port Mode       : SPP        ESC : Quit          ↑↓→← : Select Item
                                        F1  : Help          PU/PD/+/- : Modify
  USB Controller           : Disabled   F5  : Old Values  (Shift)F2 : Color
                                        F6  : Load BIOS  Defaults
                                        F7  : Load Setup Defaults
```

IDE HDD Block Mode

This item is used to set IDE HDD Block Mode. If your IDE Hard Disk supports block mode, then you can enable this function to speed up the HDD access time. If not, please disable this function to avoid HDD access error.

IDE Primary/Secondary Master PIO

In these items, there are five modes defined in manual mode and one automatic mode. There are *0*, *1*, *2*, *3*, *4*, and *AUTO*. The default settings for on board Primary/Secondary Master PIO timing is Auto.

IDE Primary/Secondary Slave PIO

In these items, there are five modes defined in manual mode and one automatic mode. There are *0*, *1*, *2*, *3*, *4*, and *AUTO*. The default settings for on board Primary/Secondary Slave PIO timing is Auto.

On-Chip Primary PCI IDE

This item is used to defined on chip Primary PCI IDE controller is "*Enable*" or "*Disable*" setting.

On-Chip Secondary PCI IDE

This item is used to defined on chip Secondary PCI IDE controller is "*Enable*" or "*Disable*" setting.

PCI Slot IDE 2nd channel

This item is used to defined add-on PCI IDE secondary controller is "*Enable*" or "*Disable*" setting.

Onboard FDC Controller

This item specifies onboard floppy disk drive controller. This setting allows you to connect your floppy disk drives to the onboard floppy connector. Choose the "Disabled" settings if you have a separate control card.

Onboard Serial Port 1/Port 2

This item is used to define onboard serial port 1/Port2 to *COM1/3F8H* , *COM2/2F8H* , *COM3/3E8H* , *COM4/2E8H, Auto* or *Disabled* .

UR2 Mode

The system board support IrDA 1.0 and Amplitudes Shift Keyed ASKIR infrared through COM 2 port. This item specifies onboard Infra Red mode to *IrDA 1.0* , *ASKIR, Standard* , *MIR 1.15M, MIR 0.57M, or FIR* . MIR 1.15, MIR 0.57, and FIR are reserved for future use.

Onboard Parallel Port

This item specifies onboard parallel port address to *378H* , *278H* , *3BCH* or *Disabled* .

Parallel Port Mode

This item specifies onboard parallel port mode. The options are *SPP* (Standard Parallel Port), *EPP* (Enhanced Parallel Port), *ECP* (Extended Capabilities Port), and *EPP+ECP* .

USB Controller

This item to set the onboard USB controller enabled or diabled.

Password Setting

This section describes the two access modes that can be set using the options found on the Supervisor Password and User Password.

```
                ROM PCI/ISA BIOS (2A69HH2A)
                    CMOS SETUP UTILITY
                   AWARD SOFTWARE, INC.
 ┌──────────────────────────────────┬──────────────────────────────────┐
 │   STANDARD CMOS SETUP             │    INTEGRATED PERIPHERALS         │
 │                                   │                                  │
 │   BIOS FEATURES SETUP             │    IDE HDD AUTO DETECTION         │
 │                                   │                                  │
 │   CHIPSET FEATURES SETUP          │    SUPERVISOR PASSWORD            │
 │                                   │                                  │
 │   POWER MANAGEMENT SETUP          │    USER PASSWORD                  │
 │                                   │                                  │
 │   PNP/PCI CONFIGURATION           │    SAVE & EXIT SETUP              │
 │                                                                      │
 │   LOAD BIOS DEFAULTS   Enter Password:            UT SAVING          │
 │                                                                      │
 │   LOAD SETUP DEFAULTS                                                │
 ├──────────────────────────────────────────────────────────────────────┤
 │ Esc : Quit                        ↑ ↓ → ←   : Select Item            │
 │ F10 : Save & Exit Setup           (Shift)F2 : Change Color           │
 ├──────────────────────────────────────────────────────────────────────┤
 │                   Change/Set/Disable Password                        │
 └──────────────────────────────────────────────────────────────────────┘
```

Supervisor Password and User Password

The options on the Password screen menu make it possible to restrict access to the Setup program by enabling you to set passwords for two different access modes: Supervisor mode and User mode.

In general, Supervisor mode has full access to the Setup options, whereas User mode has restricted access to the options. Thus by setting separate Supervisor and User password, a system supervisor can limit who can change critical Setup values.

Enter Password

Type the password, up to eight characters, and press <Enter>. The password typed now will clear any 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 Disable

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.

Warning : Retain a safe record of your password. If you've forgotten or loosed the password, the only way to access the system is to clear CMOS memory, please refer to "Clear CMOS" or "Clear Password" section.