

HOT-541
Pentium PCI MAIN BOARD
User's Manual

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Preface

HOT-541 mainboard is a highly integrated IBM PC/AT compatible system board. The design will accept Pentium processors operating in 75MHz, 90MHz, 100MHz, 120MHz, and 133MHz, and also features high-performance asynchronous and pipelined burst secondary cache memory support with size of 256KB and 512KB. The memory subsystem is designed to support up to 128 MB of EDO RAM or standard Fast Page DRAM in standard 72-pin SIMM socket. A type 5 or type 7 Pentium CPU socket provides access to future processor enhancements.

HOT-541 provides a new level of I/O integration. Intel's T-Chip 82430 PCISet chip set provides increased integration and improved performance over other chip set designs. The T-Chip chipset provides an integrated Bus Mastering IDE controller with two high performance IDE interfaces for up to four IDE devices.

The SMC Super I/O controller provides the standard PC I/O functions: floppy interface, two FIFO serial ports, one 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 four ISA slots complete the I/O function.

The HOT-541 provides the foundation for cost effective, high performance, highly expandable platforms, which deliver the latest in Pentium processor and I/O standard

Chapter 1 Introduction

Specification

CPU Function

- ❑ CPU clock: 75/90/100/120/133 MHz
- ❑ Fully supports Intel's 3.3V Pentium processors
- ❑ Optional VRM socket for Intel's future P55C processors

Chipset

- ❑ Intel T-Chip PCISet 82437FX, 82438FX, and 82371FB

Memory

- ❑ Supports two banks of EDO RAM and Fast Page DRAM ranging from 8MB to 128MB
- ❑ Supports 1M x 32 (4MB), 2M x 32 (8MB), 4M x 32(16MB), and 8M x 32 (32MB) 72-pins SIMMs

Cache Memory

- ❑ Integrated L2 write-back cache controller
 - Pipelined Burst or standard SRAM
 - 256KB or 512KB Direct Mapped

Power Management Function

- ❑ Provides four power management modes : Full on, Standby, and Suspend
- ❑ Supports Microsoft APM
- ❑ Provides EPMI (External Power Management Interrupt) pin

Expansions

- ❑ 32-bit PCI bus slot x 4
- ❑ 16-bit ISA bus slot x 4
- ❑ 2-channel PCI IDE port
 - Support up to 4 IDE devices
 - PIO Mode 4 transfers up to 16 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** (Extended Parallel Port), and **ECP** (Extended Capabilities Port) high performance parallel port.
- ❑ Two serial ports
 - Supports 16C550 compatible UARTS.
- ❑ One or two PS/2 mouse ports

Board Design

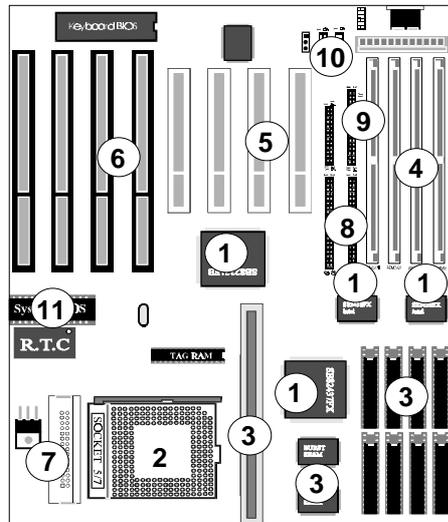
- ❑ Dimension 22cm x 28cm

541 Mainboard Description

The major components of 541 mainboard are illustrated and described right and below. Please take a minute to become familiar with the board design.

1. Chipset ASIC

541 mainboard is designed around a set of highly integrated Intel T-Chip PCISet, which offers optimum performance on PCI and ISA base system for a cache controller, a local DRAM controller, and an integrated Peripherals controller.



2. System Microprocessor

541 mainboard accept member of the 3.3V Pentium family and future P55C high performance 64-bit microprocessors in PGA package. The mainboard is designed to run at a clock speed from 50 to 66MHz on CPU bus clock, and 75 to 133 MHz on CPU core clock.

3. Secondary Cache Architecture

541 mainboard support pipelined burst or standard SRAM on external cache memory with size of 256KB or 512KB, and a Card Edge Low Profile (CELP) socket provides flexibility for cache module options.

4. Memory Architecture

541 mainboard features four 72-pin SIMM (Single In-line Memory Module) sockets organized into two banks, which allow flexible memory configuration and expansion. It may use 4MB, 8MB, 16MB and 32MB EDO or Fast Page SIMMs to expand memory from 8MB to 128MB.

5. PCI Expansion Slots

541 mainboard provides four 32-bit PCI expansion slots, which may accommodate many third-party expansion cards and increase flexibility in designing custom platforms.

6. ISA Expansion Slots

541 mainboard provides four 16-bit ISA expansion slots, which may accommodate many third-party expansion cards and enormous flexibility in designing custom platforms.

7. Voltage Regulator & VRM

The on-board volt regulator or VRM (Voltage Regulator Module) provides power for the Pentium process, PCISet and secondary cache. It provides 3.3V range for Pentium P54C family and 3.3V/2.5V for P55C.

8. On-board PCI IDE Controller

541 mainboard provides a on-board 2-channel IDE controller with high speed data transfer rate. It support up to four IDE devices.

9. On-board Floppy Controller

541 mainboard provides a on-board floppy controller that support 360KB, 1.2MB, 720KB, 1.44MB, and 2.88MB type floppy disk drives.

10. On-board Serial/Parallel Port

541 mainboard provides two serial (COM) ports and one parallel port.

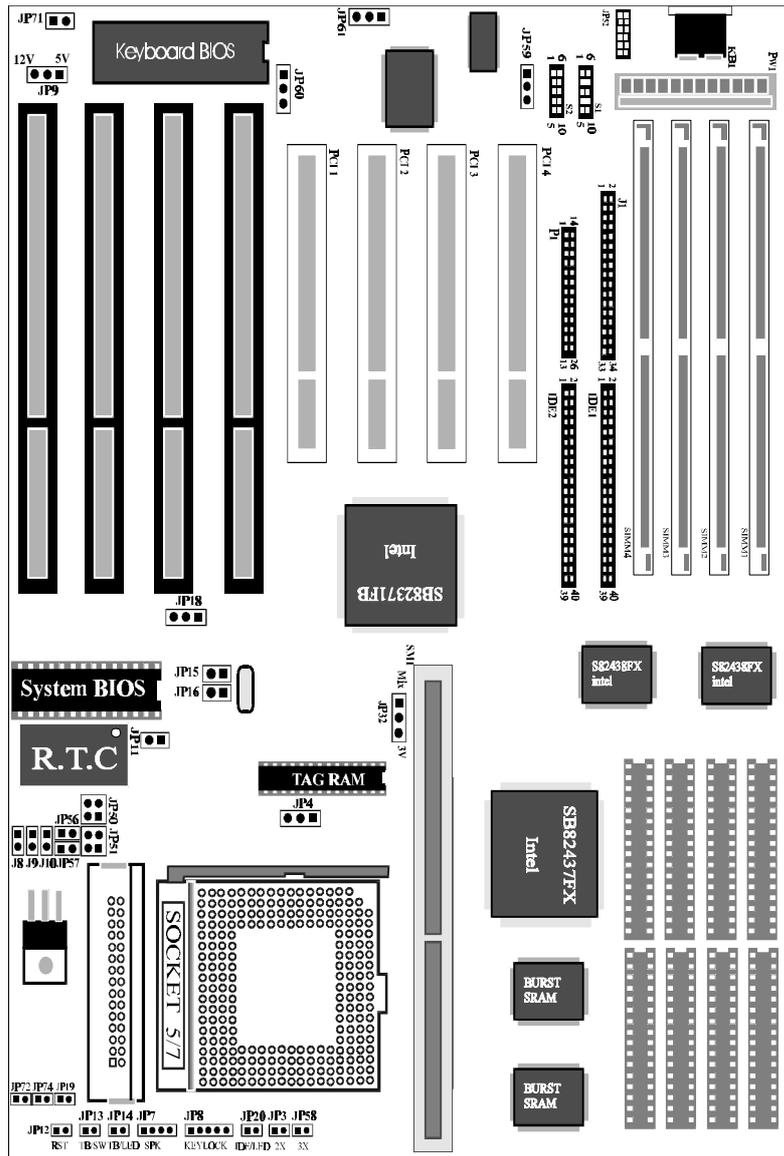
11. System BIOS

541 mainboard provides licensed AMI WinBIOS or Award system BIOS which are particularly designed to offer optimise performance of the mainboard.

12. Attached Accessories

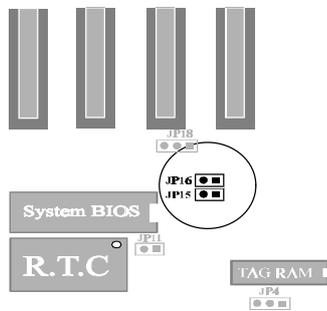
- one 40-pin hard disk drive flat cable
- one 34-pin floppy disk drive flat cable
- one 9-pin and 25-pin serial connector with cable
- one 25-pin parallel port connector with cable

541 Mainboard Layout



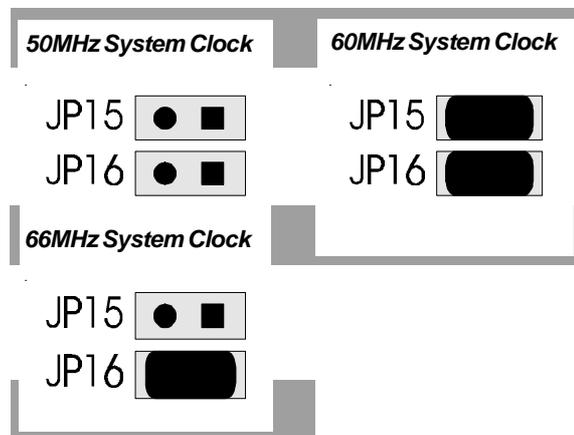
Chapter 2 Jumper Setting

System Clock Selection



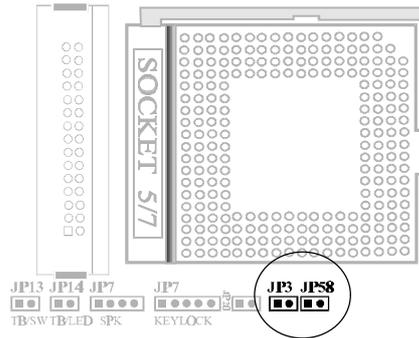
541 mainboard features a clock generator to provide adjustable system clock frequency. JP15 and JP16 are 2-pin jumpers which determine the system clock frequency.

Proper jumper settings for generating 50MHz to 66MHz clock frequency for Pentium system are shown below.



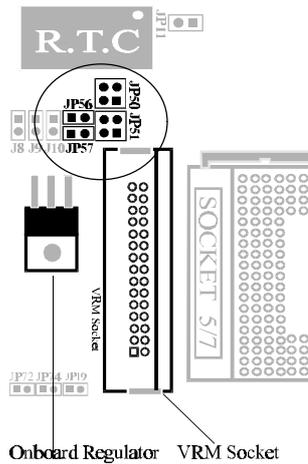
Pentium CPU Clock Multiplier

541 mainboard provides JP3 and JP58 to figure up Pentium CPU core clock multiplier. By inserting or removing jumper caps on JP3 and JP58, the user can change the **Host Bus Clock/CPU Core Clock** ratio from 1 : 1.5 to 1 : 3.



JP3	JP58	Bus/Core Ratio	P54C/CQA/CS Fractions(MHz)	Bus/Core Ratio	P54CS C-Step Fractions(MHz)
JP3	JP58	2 : 3	50 / 75	2 : 3	50 / 75
■ ●	60 / 90		60 / 90		
■ ●	66 / 100		66 / 100		
JP3	JP58	1 : 2	50 / 100	1 : 2	50 / 100
■	60 / 120		60 / 120		
■ ●	66 / 132		66 / 132		
JP3	JP58	1 : 3	50 / 150	1 : 3	50 / 150
■ ●	60 / 180		60 / 180		
JP3	JP58	2 : 5	60 / 150	2 : 5	60 / 150
■	66 / 166		66 / 166		

Onboard regulator & VRM Selection



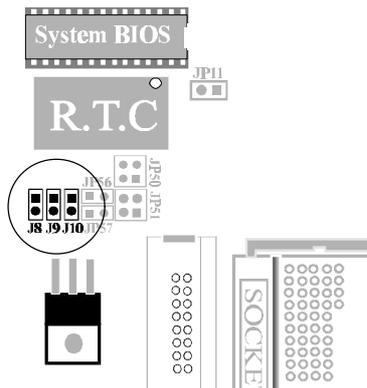
541 mainboard is designed an onboard voltage regulator to provide 3.3V ranger for pentium(P54C) and a optional VRM (Voltage Regulator Module) to offer 3.3V/2.5V ranger for future P55C processors.

For P55C processors, they need two voltage level, 3.3V for CPU I/O and 2.5V for CPU core.

Nomarily, VRM supports both voltage level, but some particular VRM, they only provide 2.5V and require onboard regulator to complement 3.3V to P55C.

Voltage Output	JP50, 51, 56, 57	Power Supply Path
Onboard regulator for P54C (Default)		3.3V ranger from onboard regulator
Add-on VRM for P55C		3.3V & 2.5V from add-on VRM
Onboard regulator and Add-on VRM for P55C		3.3V ranger from onboard regulator, 2.5V from add-on VRM

Onboard Voltage Regulator Output Selection



541 mainboard is designed to offer several CPU voltages level for Pentium(P54C) family requirements. 3.3V for standard 75/90/100/120/133MHz Pentium processor, 3.45V for VR s-spec Pentium processor (3.3V +5% - 0%), and 3.6V for VRE s-spec Pentium processor (3.45V to 3.6V).

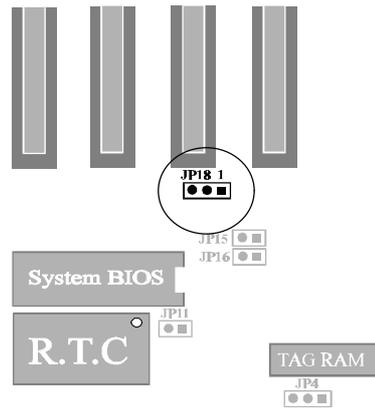
Voltage Output	J8, J9, J10	Pentium Processor
3.3 V	 JP8 JP9 JP10	STD/VR
3.45 V	 JP8 JP9 JP10	VR/VRE
3.6 V	 JP8 JP9 JP10	VRE

AT Bus Clock Selection

541 mainboard provides a jumper JP18 to set the AT bus (ISA bus) clock that divide from system clock, the available settings are SCLK/6 and SCLK/8.

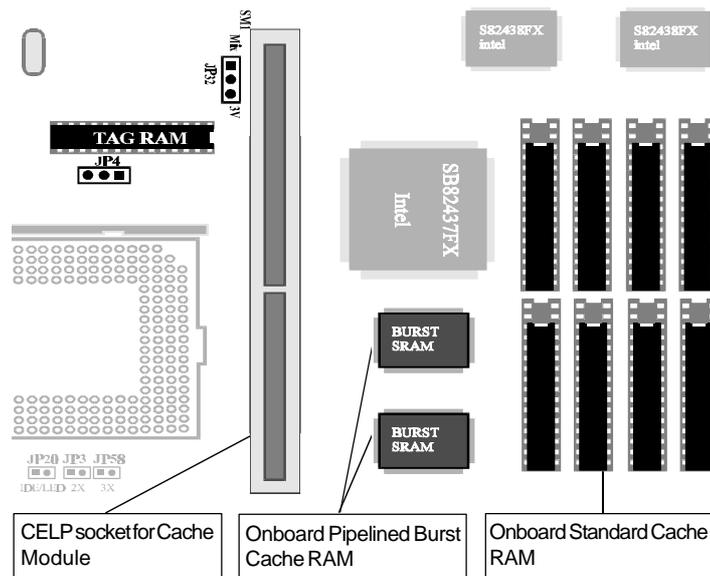
Please refer the follow table to set the AT bus clock.

Note : 8MHz AT bus clock is recommended.



System Clock (SCLK)	JP18	AT Bus Clock
50 MHz	JP18	6.25 MHz
	JP18	8.33 MHz
60 MHz	JP18	7.50 MHz
	JP18	10.0 MHz
66 MHz	JP18	8.25 MHz
	JP18	11.0 Mhz

Cache Type Selection



541 mainboard support several types cache scheme including onboard standard asynchronous cache RAM, standard asynchronous cache module, onboard pipelined burst cache SRAM, and pipelined burst cache module.

Onboard standard asynchronous cache

541 mainboard provides 9 pcs DIP socket to accommodate standard asynchronous cache, with default size of 256KB and upgradable to 512KB. (please refer to section of **'Standard Type Cache Selection'**)

Standard asynchronous cache module

541 mainboard provides one CELP (Card Edge Low Profile) socket to accommodate 256KB standard asynchronous cache module. (The same CELP socket also accommodate pipelined burst cache module)

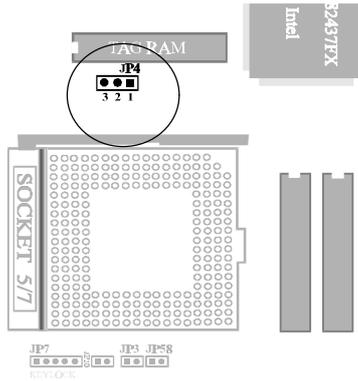
Onboard pipelined burst cache RAM

A factory option on 541 mainboard is an integrated 256KB external cache implemented with two 32K x 32 pipelined burst SRAM devices soldered to the mainboard. A 5v 32KB x 8 external Tag SRAM is required.

Pipelined Burst cache module

If the HOT-541 is ordered with no cache installed, the cache can be added later in a field upgrade by installing a pipelined burst cache module into the socket. The CELP socket can accommodate 256KB cache modules.

Standard Type Cache Size Selection



541 mainboard supports standard type extended cache memory sizes of 256KB and 512KB. Cache memory is realized by eight Data SRAM and one Tag SRAM. The 512KB configuration uses eight 64KB x 8 SRAM, each of SRAM fills the entire socket. The 256KB configuration uses eight 32KB x 8 SRAM, note that each of the 32KB x 8 SRAM do not fill the entire socket, just leaving the top four pin holes empty.

Note : All Data SRAM must be mixed mode, and Tag SRAM must be 5V. All of Data and Tag SRAM must with a speed of 15ns or faster.

256 KB Cache Memory



Cache Size	Data RAM	Tag RAM
	U25, U26, U35, U36, U37, U38	U27, U28, U37, U38
256KB	32K x 8	32K x 8

512 KB Cache Memory



Cache Size	Data RAM	Tag RAM
	U25, U26, U35, U36, U37, U38	U27, U28, U37, U38
512KB	64K x 8	32K x 8

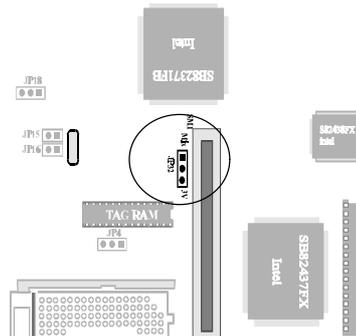
Cache Voltage Selection

541 support support either mixed mode SRAM (3V I/O and 5V voltage) or 3V SRAM (3V I/O and 3V voltage).

The standard 5V SRAM (5V I/O, 5V voltage) is not supported.

541 provide jumpers JP32 to set the voltage required of SRAM in use including onboard standard asynchronous SRAM and onboard pipelined burst SRAM.

For standard asynchronous SRAM module and pipelined burst SRAM module on CELP socket, JP32 should be fixed on mixed mode.



Voltage	JP32	Description
Mixed Mode		<ul style="list-style-type: none"> - For onboard mixed mode standard asynchronous cache. - For onboard mixed mode pipelined burst cache. - For mixed or 3V mode pipeline burst cache module. - For mixed or 3V mode standard asynchronous cache module.
3 V Mode		<ul style="list-style-type: none"> - For onboard 3V mode standard asynchronous cache. - For onboard 3V mode pipelined burst cache.

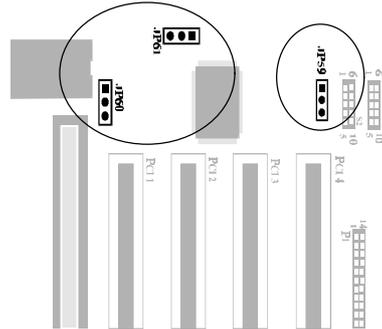
I/O Port Setting & Parallel Port DREQ Selection

I/O Port Setting

541 mainboard provide JP59 for Enabling or Disabling onboard floppy controller, Parallel port, and Serial ports.

When onboard I/O port isn't required, the user may disable them from BIOS setup or from JP59.

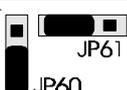
I/O Port Setting	JP59
Enabled (default)	
Disabled	



Parallel Port DREQ Selection

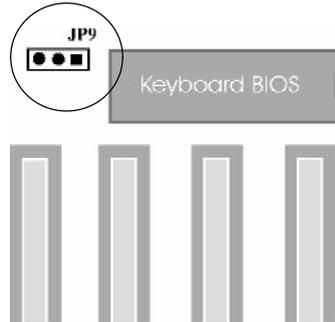
541 mainboard onboard parallel port supports ECP mode (Extended Capabilities Port), and provide two available DMA Request lines DREQ1 and DREQ3 for it.

When an ECP mode device is in use, the user may assign DREQ1 or DREQ3 for parallel port. If SPP/EPP mode is selected, the user may ignore those jumpers.

Parallel Port DMA Selection	JP60, JP61
Parallel Port ECP Mode DMA Request 1 (default)	
Parallel Port ECP Mode DMA Request 3	

Flash EPROM Jumper

541 mainboard supports two types of flash EPROM, 5 volt and 12 volt. By setting up jumper JP9, you can update both types of flash EPROM with new system BIOS files as they come available.



Flash EPROM Type	JP9
5 Volt (default)	
12 Volt	

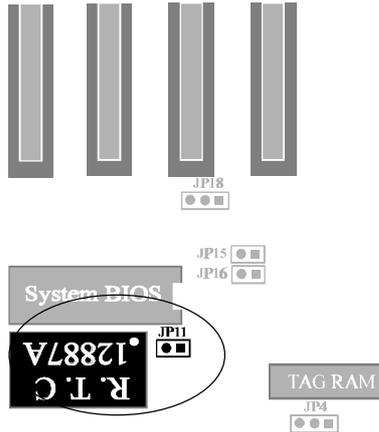
BIOSUPGRADES

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

The flash upgrade utility, **Amiflash.com** or **Awdflash.exe**, has two notices for BIOS upgrades:

- 1 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.
- 2 Flash utility supports both 5V and 12V Flash EEPROM.

Clear CMOS

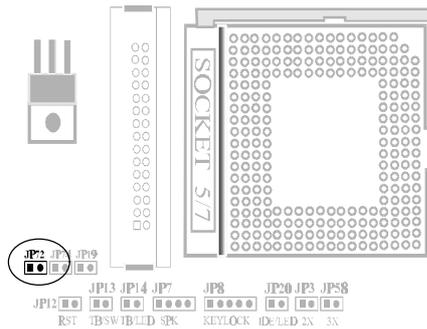


541 mainboard supports jumper **JP11** for discharge mainboard's CMOS memory. The CMOS memory retains the system configuration information in the component of R.T.C.

You should short this jumper for a moment when you wish to clear CMOS memory, and then make sure open this jumper for normal operation to retain your new CMOS data.

Note: Clear CMOS & R.T.C function available only when "DS12887A" is in use.

Clear Password



Allows system password to be cleared by shorting jumper JP72 and turning the system on, **"Password is cleared by jumper, (JCP)!"** message will shown up on power-on screen. The system should then be turned off and the jumper JP72 should be returned to OPEN to restore normal operation. The procedure should only be done if the user password has been forgotten.

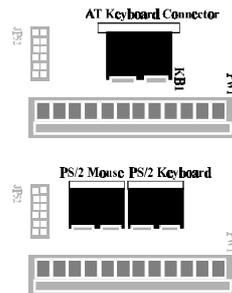
Connectors

Power Connector

PIN	Name	Function	Pin	Name	Function
1	PWRGD	Power Good	7	GND	Ground
2	+ 5 V	+ 5 volts Vcc	8	GND	Ground
3	+ 12 V	+ 12 volts	9	- 5 V	- 5 volts
4	- 12 V	- 12 volts	10	+ 5 V	+ 5 volts Vcc
5	GND	Ground	11	+ 5 V	+ 5 volts Vcc
6	GND	Ground	12	+ 5 V	+ 5 volts Vcc

Keyboard Connector

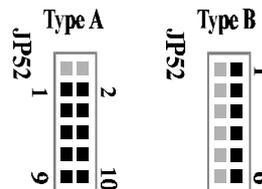
541 mainboard provides access to AT-style keyboard connector integrated on the back panel, a PS/2 style keyboard and PS/2 style mouse connector are optional.



PS/2 Mouse Connector

541 mainboard provides two type of PS/2 style mouse connectors, one for 12 pin header JP52 near by keyboard connector and one for optional mini DIN type connector.

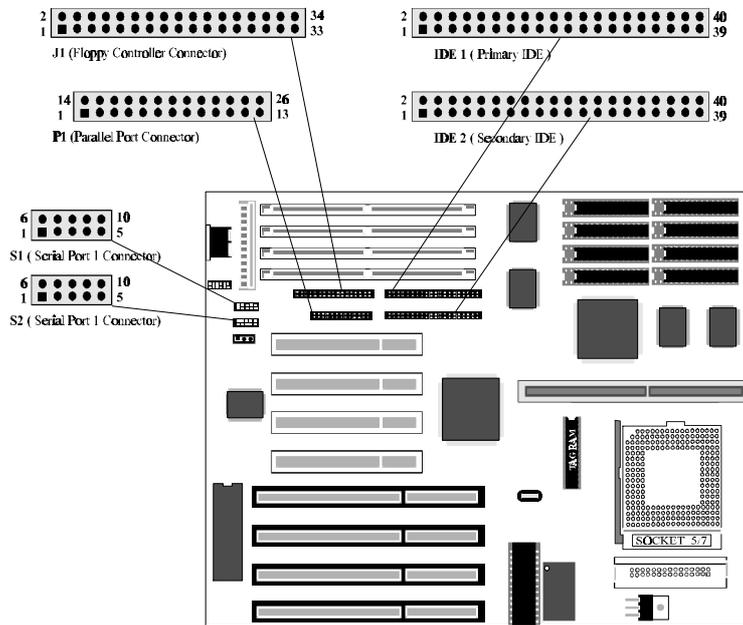
12 pin header connector support two type connection (Type A and Type B) for PS/2 mouse, the right table shows the pinout connection for each type.



PIN	TYPE A	TYPE B
1	Empty	Clock
2	Ground	Empty
3	Clock	Ground
4	Ground	VCC
5	VCC	Data
6	Empty	Empty
7	Empty	
8	Empty	
9	Data	
10	Empty	

I/O Connectors

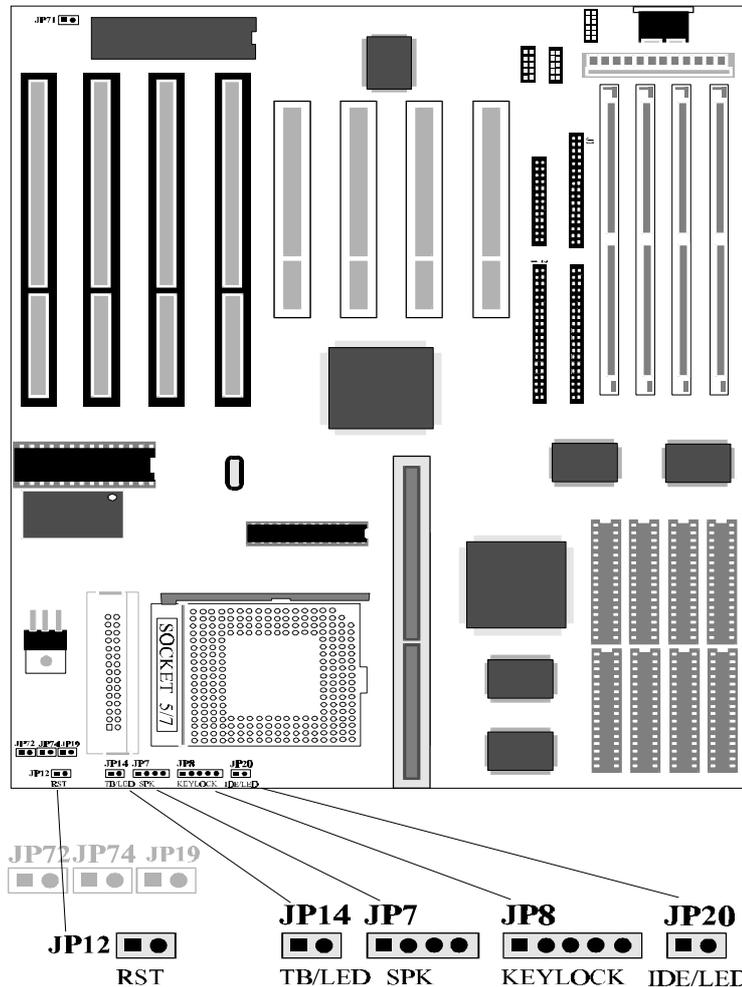
The mainboard contains pin header connections for cabling, to the serial, parallel, floppy, and IDE interfaces. List figure show the locations of these connectors and the orientation of pin 1 on each.



Front Panel Connectors & Display Switch

The mainboard contains pin header connections for cabling, to the Hardware Reset, Turbo LED, PC Speaker, Key Lock/Power LED, and Hard Drive IDE LED. List figure show the locations of these connectors and display switcher.

Display Switch JP71
 Close : Color
 Open : Monochrome



Chapter **3** Memory Configuration

541 mainboard support great flexibility of different on-board fast page mode and EDO DRAM up to 128MB.

On-board four SIMM sockets are organized into two banks, with two SIMM sockets assigned to one memory bank. 541 mainboard supports 4MB, 8MB, 16MB and 32MB 72-pin SIMM modules.

The table on next page shows the possible memory combinations of 541 mainboard.

Notes:

- * Both two banks are auto banking.
- * All SIMMs must be 70 ns or faster.
- * All banks can use either single-sided or double-sided SIMMs.
- * Fast page mode SIMM and EDO SIMM can not mixed within the same memory bank.

Memory Configuration Reference Table

541 Memory Configuration Reference Table		
SIMM 1, 2	SIMM 3, 4	TOTAL
4 MB	Empty	8 MB
8 MB	Empty	16 MB
16 MB	Empty	32 MB
32 MB	Empty	64 MB
Empty	4 MB	8 MB
Empty	8 MB	16 MB
Empty	16 MB	32 MB
Empty	32 MB	64 MB
4 MB	4 MB	16 MB
4 MB	8 MB	24 MB
4 MB	16 MB	40 MB
4 MB	32 MB	72 MB
8 MB	4 MB	24 MB
8 MB	8 MB	32 MB
8 MB	16 MB	48 MB
8 MB	32 MB	80 MB
16 MB	4 MB	40 MB
16 MB	8 MB	48 MB
16 MB	16 MB	64 MB
16 MB	32 MB	96 MB
32 MB	4 MB	72 MB
32 MB	8 MB	80 MB
32 MB	16 MB	96 MB
32 MB	32 MB	128 MB

Chapter 4 Power Management

541 mainboard provides four power management modes for reducing power consumption : **Full-on**, (**Doze**), **Standby**, and **Suspend**.

541 mainboard provide EPMI connector to enhanced power management.

Power Management Modes Description

Full-on mode. The **Full-on** mode is the normal operating mode of the PC system. In this mode, the Standby timer starts counting if no activity is taking place, when the programmable time-out period has expired, the system will enter to Standby mode. The types of activity monitored include IRQ3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15.

DOZE mode. CPU and system reduce to half of normal frequency. In this mode, the **STANDBY** timer starts counting if no activity is taking place. The activities monitored are the same as in **Full-on** mode. (**Note** : AMI BIOS doesn't support this mode)

STANDBY mode. CPU and system reduce to a lower frequency. In this mode, the **SUSPEND** timer starts counting if no activity is taking place. The activities monitored are the same as in **Full-on** mode.

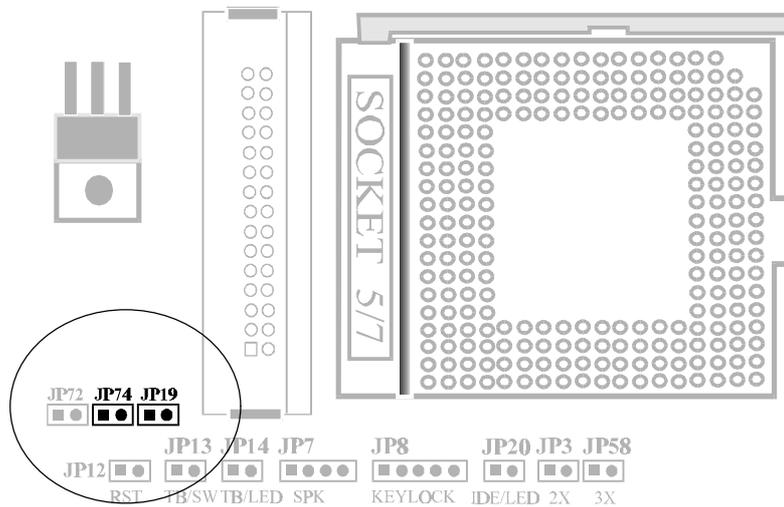
SUSPEND mode. In this mode, if S-Series CPU is present, 541 mainboard will stop the CPU clock (0MHz), slow down the system clock, power down the secondary cache. The activities monitored are the same as in **Full-on** mode.

EPMI Connector

EPMI (External Power Management Interrupt) pin, when shorted once, it will put the system directly into power management SUSPEND mode.

Auto-wake up activities include, K/B, mouse, ..., is programmable in the BIOS power management.

541 mainboard provides JP19 for EPMI function connector, and JP74 for power saving indicate LED connector.



Chapter **5** AMI BIOS Setup

BIOS Setup configures system information that is stored in CMOS RAM. WINBIOS Setup has an easy-to-use graphical user interface that will be immediately recognizable to anyone who has ever used Microsoft Windows. WinBIOS Setup sets a new standard in BIOS user interfaces.

Starting WinBIOS Setup

As POST executes, the following message appears :

Hit if you want to run SETUP

Press to run WinBIOS Setup.

Bus Mouse and Microsoft Mouse Support on BIOS Setup :

The following types of mouse devices are supported.

- * PS/2- type mouse.
- * Bus mouse that use IRQs 3, 4, or 5 (IRQ2 is not supported).
- * Microsoft-compatible mouse.
- * Logitech C-series-compatible mice using the MM protocol.

WinBIOS Setup can be accessed via keyboard, mouse, or pen. The mouse click functions are :

single click to change or select both global and current field and double click to perform an operation in the selected field.

BIOS Setup Feature

The WinBIOS Setup main menu, shown below, is organized into four windows. Each window corresponds to a section in this chapter.



Each section contains several icons. Clicking on each icon activates a specific function. The WinBIOS Setup icons and functions are described in this chapter. The sections are :

Setup

This section has five icons that permit you to set system configuration options such as date, time hard disk type, floppy type, chipset parameter, power management, and peripheral I/O setup.

Utilities

This section has two icons that perform system functions.

Security

This section has one icon that control WinBIOS security features.

Default

This section has two icons that permit you to select a group of settings for all WinBIOS Setup options.

Each WinBIOS Setup option has two default settings. These settings can be applied to all WinBIOS Setup options when you select the Default section on the WinBIOS Setup main menu. The types of default are:



Original

These settings restore old setup values.



Optimal

These settings provide that best performance characteristics.

Navigating with the Keyboard in WinBIOS Setup

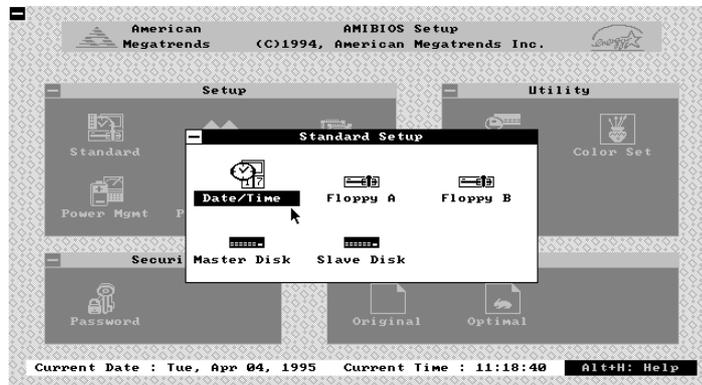
WinBIOS Setup has a built-in keyboard driver that uses simple key-stroke combinations :

Keystroke	Function
<Tab>	Move to the next window or field.
⇒ ⇐ ⇑ ⇓	Move to the next field to the right, left, above, or below.
<Enter>	Select in the current field.
+	Increments a value.
-	Decrements a value.
<Esc>	Closes the current operation and return to previous level.
<PgUp>	Returns to the previous page.
<PgDn>	Advances to the next page.
<Home>	Returns to the beginning of the text
<End>	Advances to the end of the text.
<Alt> <H>	Access a help window.
<Alt> <Spacebar>	Exit WinBIOS Setup.
Alphabetic keys	A to Z are used in the Virtual Keyboard, and are not casesensitive.
Numeric Keys	0 to 9 are used in the Virtual Keyboard and Numeric Keypad.

Standard Setup

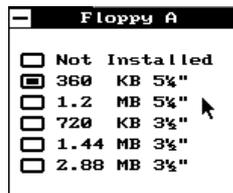


The WinBIOS Standard Setup option described in this section are selected by choosing the appropriate high-level icon from the WinBIOS Setup main menu selection screen. The selection window follows.



Date and Time Configuration

Select the Standard option. Select the Date and Time icon. The current values for each category are displayed. Enter new values through the keyboard.



Floppy Drive A:, Floppy Drive B:

Move the cursor to these fields via and select the floppy type. The settings are 360KB 5 1/4 inch, 1.2MB 5 1/4 inch, 720KB 3 1/2 inch, 1.44MB inch, or 2.88MB 3 1/2 inch.



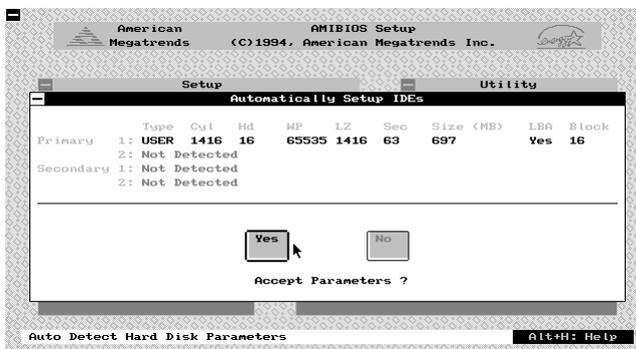
Master Disk Type, Slave Disk Type

Select one of these hard disk drive icons to configure the drive named in the option. A scrollable screen that lists all valid disk drive types is displayed. Select the correct type and press <Enter>. If the hard disk drive is an IDE drive, select **IDE Setup** from the Utility section of the WinBIOS Setup main menu to allow WinBIOS to automatically detect the IDE drive parameters and report them on this screen.



Using IDE Setup (Only for IDE drivers)

If you select **IDE Setup** from the Utility section of the WinBIOS Setup main menu, WinBIOS automatically finds all IDE hard disk drive parameters. WinBIOS places the hard disk drive parameters that it finds in the Drive Type fields in Standard Setup.

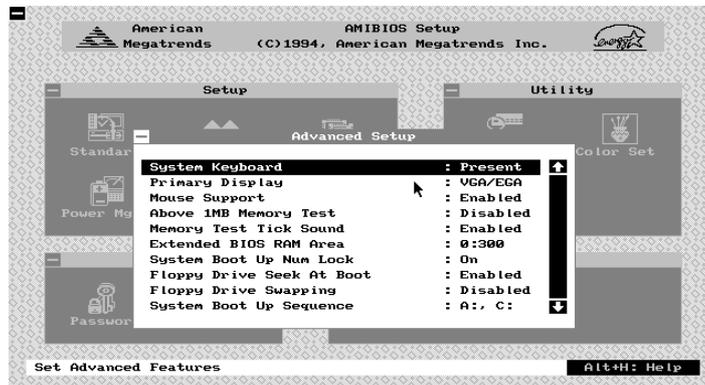


Advanced Setup



The WinBIOS Advanced Setup options described in this section are selected by choosing the appropriate high-level icon from the WinBIOS Setup main menu. The selection window is shown below.

Note: *These items listed below might have a little bit distinct from your BIOS setting for different BIOS versions.*



System Keyboard

Select this icon to configure the present or absent of keyboard. The options are **Present** or **Absent**.

Primary Display

Select this icon to configure the type of monitor attached to the computer. The settings are **Mono**, **CGA 40 x 25**, **CGA 80 x 25**, **VGA/EGA**, or **Absent**.

Mouse Support

When this option is enabled, WinBIOS supports a PS/2-type mouse. The options are **Enabled** or **Disabled**.

Above 1 MB Memory Test

When this option is enabled, the WinBIOS memory test is performed on all system memory. When this option is disabled, the memory test is done only on the first 1 MB of system memory. The settings are **Enabled** or **Disabled**.

Memory Test Tick Sound

This option enables or disables the ticking sound during the memory test. The settings are **Enabled** or **Disabled**.

Extended BIOS RAM Area

This option specifies where the hard disk information is stored. In the **Top 1KB**, beginning at 639K of the system programming area or in the system BIOS area in low memory beginning at **0:300**.

System Boot Up Num Lock

When **On**, this option turns on **Num Lock** when the system is powered on so the end user can use the arrow keys on both the numeric keypad and the keyboard. The settings are **On** or **Off**.

Floppy Drive Seek At Boot

When this option is enabled, WinBIOS performs a Seek command on floppy drive A: before booting the system. The settings are **Enabled** or **Disabled**.

Floppy Drive Swapping

When this feature is enabled, the BIOS will swap floppy drive assignments so that Drive A: will function as Drive B: and Drive B: as Drive A:. The settings are **Enabled** or **Disabled**.

System Boot Up Sequence

This option sets the sequence of boot drive (either floppy drive A: or hard disk drive C:) that WinBIOS attempts to boot from after POST completes. The settings are **C: , A: or A: , C:**.

System Boot Up CPU Speed

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

Password Checking

This option enables the password check option every time the system boots or the end user runs Setup. If **Always** is chosen a user password prompt appears every time the computer is tuned on. If **Setup** is chosen, the password prompt appears if WinBIOS is executed.

Cache Memory

This option enabled or disabled internal cache (L1) and external cache (L2) memory. The settings are **Both**, **Internal**, or **Disabled**.

System BIOS Shadow Cacheable

When this option is set to Enabled, the system BIOS ROM area from F0000h ~ FFFFFh is copied (shadowed) to RAM and cacheable for faster execution. The settings are **Enabled** or **Disabled**.

Video ROM C000, 32K

When this option is set to Enabled, the video ROM area from C0000h ~ C7FFFh is copied (shadowed) to RAM for faster execution. The settings are **Enabled**, **Cache**, or **Disabled**.

Adapter ROM xxxx, 16K,

These options enable shadowing of the contents of the ROM area xxxx in the option title. The settings are **Enabled**, **Cache**, or **Disabled**. The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

IDE Block Mode

If your IDE hard disk drive supports block transfer mode. This feature enable multiple sector reads and writes for IDE drives to enhance data transfer rate. The options are **2**, **4**, **8**, **16**, **32**, **64**, **Auto**, and **Disabled**.

Onboard PCI IDE

This feature specifies PCI on-board 2-channel IDE controller be enabled or disabled.

IDE 32 Bit Transfers

This feature allows 32-bit data transfer between the system and the IDE hard disks if the hard disk controller supports 32-bit transfer.

Onboard PCI IDE PIO Mode

This feature specifies PCI on-board IDE controller's PIO speed mode. The options are **Mode 0**, **Mode 1**, **Mode 2**, **Mode 3**, **Mode 4**, **Optimal**, and **Auto**.

Onboard PCI IDE 32bit Mode

IDE 32-bit transfers will enhance data transfer rate on IDE interface, but only 32-bit PCI IDE controller supports it on this mainboard.

Primary Master LBA Mode

If your primary master IDE hard disk over 528MB, please enables this LBA (Large Block Addressing) mode feature. The settings are **Enabled** or **Disabled**.

Primary Slave LBA Mode

If your primary slave IDE hard disk over 528MB, please enables this LBA (Large Block Addressing) mode feature. The settings are **Enabled** or **Disabled**.

Secondary Master LBA Mode

If your secondary master IDE hard disk over 528MB, please enables this LBA (Large Block Addressing) mode feature. The settings are **Enabled** or **Disabled**.

Secondary Slave LBA Mode

If your secondary slave IDE hard disk over 528MB, please enables this LBA (Large Block Addressing) mode feature. The settings are **Enabled** or **Disabled**.

Secondary Ctrl Drives Present

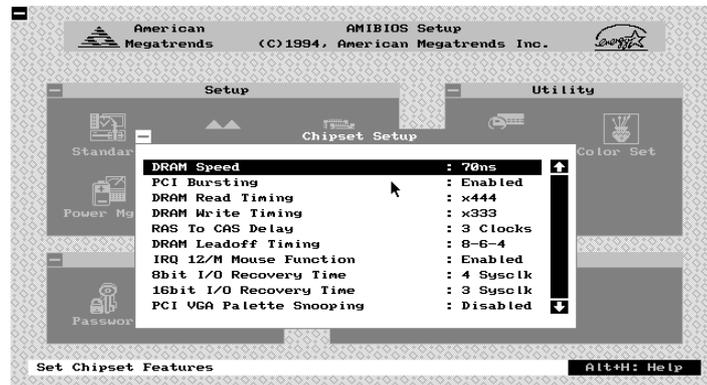
This feature specifies how many IDE hard disk drive connect to secondary channel port. The options are **1**, **2**, and **None**.

Chipset Setup



The WinBIOS Chipset Setup options described in this section are selected by choosing the appropriate high-level icon from the WinBIOS Setup main menu. The selection window is shown below.

Note: *These items listed below might have a little bit distinct from your BIOS setting for different BIOS versions.*



DRAM Speed

This category is used to set the speed of DRAM in use. The options are **60ns** and **70ns**.

PCI Bursting

This category is used to defined PCI Bursting is **'Enable'** or **'Disable'** setting.

DRAM Read Burst Timing

This category to set the DRAM Read Burst Timing. The timing used depends on the type of DRAM (standard page mode or EDO burst mode) on a per-bank basis. The options are **x4444**, **x3333**, and **x2222**.

RAM Write Burst Timing

This category to set the DRAM Write Burst Timing. The timing used depends on the type of DRAM (standard page mode or EDO burst mode) on a per-bank basis. The options are **x4444**, **x3333**, and **x2222**.

DRAM RAS To CAS Delay

This category to set the DRAM RAS to CAS Delay to controls the DRAM page miss and row miss leadoff timings. The options are **3** and **2 CLKs**.

DRAM R/W Leadoff Timing

This category to set the RAS DRAM Read/Write Leadoff timings for page/row miss cycles. The options are **8-6-3**, **7-5-3**, **8-6-4**, and **7-5-4** CLKs.

8 Bit I/O Recovery Time

This category is used to add additional recovery delay between CPU or PCI master originated 8-bit I/O cycles to the ISA Bus. The options are **1, 2, 3, 4, 5, 6, 7, 8 Sysclk**, and **Disabled**.

16-Bit I/O Recovery Time

This category is used to add additional recovery delay between CPU or PCI master originated 16-bit I/O cycles to the ISA Bus. The options are **1, 2, 3, 4 Sysclk**, and **Disabled**.

PCI VGA Palette Snooping

This category must be set to enabled if there is any ISA VGA adapter card installed in the system, and disabled if there is any PCI VGA adapter card installed in the system.

Pipeline Burst Cache NA#

When pipeline burst cache are used in the second level| cache or the second level cache is disabled, enable this category may improve system performance.

PCI IDE Card Selection

This category is used to indicate an add-on PCI IDE card is present or absent. When system detected an add-on PCI IDE card is present, BIOS will disabled the onboard PCI IDE controller automatically.

PCI Primary IDE INT# Line

This category is used to assign a interrupt line to add-on PCI primary IDE controller.

PCI Secondary IDE INT# Line

This category is used to assign a interrupt line to add-on PCI secondary IDE controller.

IRQxx Available to

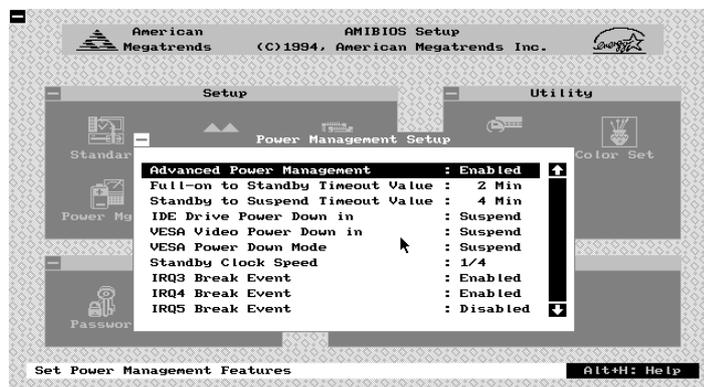
This category is used to assign the interrupt lines to *ISA* bus or to *PCI/PnP*.

Power Management Setup



The WinBIOS Power Management Setup options described in this section are selected by choosing the appropriate high-level icon from the WinBIOS Setup main menu. The selection window is shown below.

Note: *These items listed below might have a little bit distinct from your BIOS setting for different BIOS versions.*



Advanced Power Management

This feature allows the user to enable or disable 541 mainboard power management function.

Full-on to Standby Timeout Value

This feature specifies the length of timeout of system entering **Standby** mode from **full-on** mode. The timer option are from 1 min to 256 min or disabled.

Standby to Suspend Timeout Value

This feature specifies the length of timeout of system entering **Suspend** mode from **Standby** mode. The timer option are from 1 min to 256 min or disabled.

IDE Drive Power Down In

This feature specifies the IDE hard disk drive whether power down or not when standby or suspend timer is expired.

VESA Video Power Down In

This feature specifies the display screen whether power down or not when standby timer is expired.

IRQxx Break Event

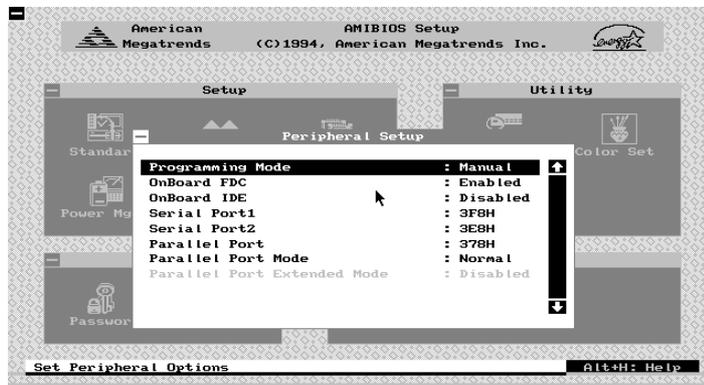
This feature specifies whether the IRQxx (xx: 1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, and 15) will be monitored or not. When system gets into power management mode, any IRQ activities will resume system to *Full-on* mode.

Peripheral Setup



The WinBIOS Peripheral Setup options described in this section are selected by choosing the appropriate high-level icon from the WinBIOS Setup main menu. The selection window is shown below.

Note: *These items listed below might have a little bit distinct from your BIOS setting for different BIOS versions.*



Programming Mode

The options are **Auto** or **Manual**.

On **Auto** mode, first the BIOS checks for the present of other ISA add-on floppy drive controller, serial port, and parallel port.

If ISA add-on serial ports present and use COM1 & COM2, then the on-board serial ports will be set to COM3 & COM4.

If ISA add-on serial ports absent, or if ISA add-on serial ports use COM3 & COM4, then the on-board serial ports will be set to COM1 & COM2.

If ISA add-on serial ports present and use COM1, 2, 3, and 4, then the on-board serial ports will be set to Disabled.

For the parallel port, if ISA add-on parallel ports present and use LPT1, then the on-board parallel port will be set to LPT2.

If ISA add-on parallel port absent, or if ISA add-on parallel port use LPT2, then the on-board parallel port will be set to LPT1.

If ISA add-on parallel present and occupied LPT1 and LPT2, then the on-board parallel port will be set to Disabled.

Choose **Manual** to set these items manually.

Onboard FDC

This option enables the onboard floppy drive controller. The options are **Enabled** and **Disabled**.

Serial Port1

This option enables the use and setting the address of the first serial port on mainboard. The options are **3F8H**, **3E8H**, **2E8H** and **Disabled**.

Serial Port2

This option enables the use and setting the address of the secondary serial port on mainboard. The options are **2F8H**, **3E8H**, **2E8H**, and **Disabled**.

Parallel Port

This option enables the use and setting the address of the parallel port on mainboard. The options are **3BCH**, **378H**, **278H**, and **Disabled**.

Parallel Port Mode

This category specifies on-board parallel port mode. The options are **Normal** (support IBM XT/AT compatible parallel port) and **Extended** (support SPP, EPP, and ECP).

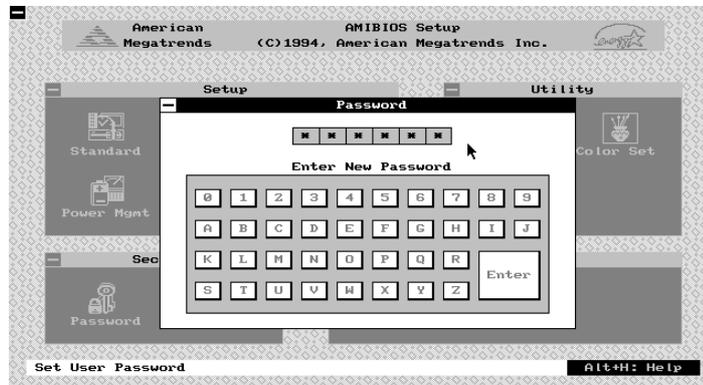
Parallel Port Extended Mode

This category specifies on-board parallel port extended mode. The options are **SPP** (PS/2 type bidirectional Parallel Port), **EPP1.7** or **EPP1.9** (Extended Parallel Port), and **ECP** (Extended Capabilities Port).

WinBIOS Password Support



WinBIOS Setup has an optional password feature. The system can be configured so that all users must enter a password every time the system boots or when WinBIOS Setup is executed. The following screen appears when you select the password icon.



You can enter a password by:

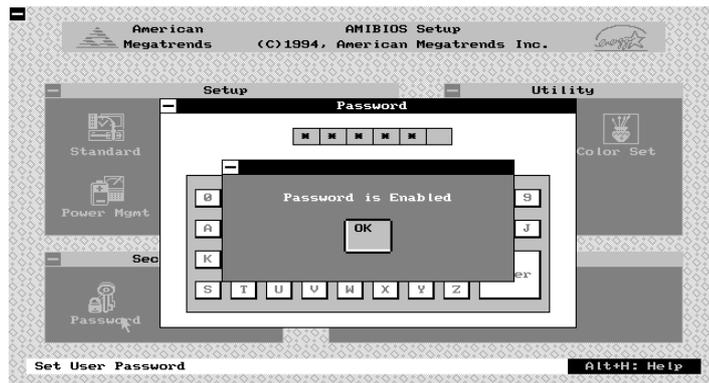
- typing the password on the keyboard,
- selecting each letter via the mouse, or
- selecting each letter via the pen stylus.

Pen access must be customized for each specific hardware platform.

The password check option is enabled in **Advanced Setup** by choosing either *Always* or *Setup*. The password is stored in CMOS RAM.

The password can be from 1 to 6 alphanumeric word. Please make sure the password is noted down. If password is forgotten, the CMOS RAM must be drain and system must be refigure them. WinBIOS will then display the following :

Select the Password icon from the Security section of WinBIOS main menu. Enter the password and press <Enter>. The screen does not display the characters entered. After the new password is entered, retype the new password as prompted and press <Enter>.



If the password confirmation is incorrect, an error message appears. If the new password is entered without error, press <Esc> to return to the WinBIOS Setup Main Menu. The password is stored in CMOS RAM after WinBIOS Setup completes. The next time the system boots, you are prompted for the password if the password function is present and is enabled.

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must drain CMOS RAM and reconfigure the system.

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 on chapter 2.*

Chapter 6 Award BIOS Setup

HOT-541'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 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

Using Control Keys

BIOS Setup has a built-in keyboard driver that uses simple keystroke combinations :

Keystroke	Function
⇒ ⇐ ⇑ ⇓	Move to the next item to the right, left, above, or below.
< Esc >	Main Menu -- Quit and not save changes into CMOS Exit to main menu
< PgUp >	Increase the numeric value or make changes
< PgDn >	Decrease the numeric value or make changes
< F2 >	Change color from total 16 colors
< F3 >	Calendar, only for Standard CMOS Setup Menu
< F5 >	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
< F6 >	Load the Setup default CMOS value from BIOS default table, only in Option Page Setup Menu
< F7 >	Load the BIOS default
< F10 >	Save all the CMOS changes, only for Main Menu

The Main Menu

Once you enter HOT-541 Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from nine setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

ROM PCI/ISA BIOS (2A59CH2E)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	IDE HDD AUTO DETECTION
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
PCI CONFIGURATION SETUP	
LOAD BIOS DEFAULTS	
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.

PCI Configuration setup

This category specifies the value (in units of PCI bus blocks) of the latency timer for this 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 the Option Setup Menu.

Load Setup Defaults

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

IDE HDD auto detection

Automatically configure IDE hard disk drive parameters.

Password setting

Change, set, or disable 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

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes none or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to change the value you want in each item.

ROM PCI/ISA BIOS (2A59CH2A)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm:dd:yy) : Sat, Aug 12 1995							
Time (hh:mm:ss) : 17 : 18 : 33							
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.				Base Memory : 640K Extended Memory : 15360K Other Memory : 384K Total Memory : 16384K			
Drive B : None							
Video : EGA/UGA							
Halt On : All Errors							
ESC : Quit		↑ ↓ + + : Select Item		PU/PD/+/- : Modify			
F1 : Help		(Shift)F2 : Change Color					

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 1900 through 2099

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.

Daylight saving

The category adds one hour to the clock when daylight-saving time begins. It also subtracts one hour when standard time begins.

Enabled	Enable daylight-saving
Disabled	Disable daylight-saving

Drive C type/Drive D type

The category identify the types of hard disk drive C or drive D that has been installed in the computer. There are 46 predefined types and a user definable type. Type 1 to Type 46 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, 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 precom
LANDZONE	Landing zone
SECTORS	Number of sectors

If a hard disk drive 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	5.25 inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in	5.25 inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5 in	3.5 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in	3.5 inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5 in	3.5 inch double-sided drive; 2.88 megabyte capacity

Video

The category 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.

EGA/VGA	Enhanced Graph Adapter/Video Graphics Array. For EGA, VGA, SEGA, or VGA 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

Error halt

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

All errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted
No errors	The system boot will not be stopped for any error that may be detected
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 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.

Expanded Memory

Expanded Memory is memory defined by the Lotus/Intel/Microsoft(LIM) standard as EMS. Many standard DOS applications can not utilize memory above 640K, 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 1MB or memory above 1MB, depends on the chipset design.

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

Other Memory

This refers to the memory located in the 640K to 1024K address space. This is memory that can be used by different applications. Dos uses this area to load device drivers to keep as much base memory free for application programs. It is mostly use by the Shadow RAM.

BIOS Features Setup

ROM PCI/ISA BIOS (2A59CH2A)
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	: Enabled	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/UGA Palette Snoop	: Disabled		
		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 category enabled CPU internal cache to speed up memory access. The default value is enabled.

External Cache

This category enabled onboard external cache to speed up memory access. The default value is enabled.

Quick Power On Self Test

This category 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 category determines which drive computer searches first for the disk operating system. Default value is A, C.

Swap Floppy Drive

When this category enabled, 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. 360K type is 40 tracks while 720K, 1.2M and 1.44M are all 80 tracks.

Boot Up NumLock Status

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

Security Option

This category 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 category must be set to enabled if there is any ISA VGA adapter card installed in the system, and disabled if there is any PCI VGA adapter card installed in the system.

Video BIOS Shadow

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

C8000-CBFFF Shadow/EC000-EFFFF Shadow

These categories determine whether optional ROM will be copied to RAM by 16K byte.

Chipset Features Setup

ROM PCI/ISA BIOS (2A59CH2C)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

DRAM RAS# Precharge Time : 4	PCI Concurrency : Enabled
DRAM R/W Leadoff Timing : 8/6	PCI Streaming : Enabled
DRAM RAS To Cas Delay : 3	PCI Bursting : Enabled
DRAM Read Burst Timing : x3333	Onboard FDD Controller : Enabled
DRAM Write Burst Timing : x3333	Onboard Serial Port 1 : COM1/3F8
System BIOS Cacheable : Disabled	Onboard Serial Port 2 : COM2/2F8
Video BIOS Cacheable : Disabled	Infra Red (IR) Function : Disabled
8 Bit I/O Recovery Time : 3	IR Transfer Mode : Half-Dup
16 Bit I/O Recovery Time : 2	Onboard Parallel Port : 378H/IRQ7
IDE HDD Block Mode : Enabled	Onboard Parallel Mode : ECP+EPF
IDE Primary Master PIO : Auto	ECP Mode Use DMA : 3
IDE Primary Slave PIO : Auto	
IDE Secondary Master PIO : Auto	
IDE Secondary Slave PIO : Auto	
On-Chip Primary PCI IDE: Enabled	ESC : Quit ↑↓+* : Select Item
On-Chip Secondary PCI IDE: Enabled	F1 : Help F1/PD/+/- : Modify
PCI Slot IDE 2nd Channel : Enabled	F5 : Old Values <Shift>F2 : Color
	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

DRAM RAS# Precharge Time

This category set the DRAM RAS Precharge Timing. The options are **4** and **3**CLKs.

DRAM R/W Leadoff Timing

This category set the RAS DRAM Read/Write Leadoff timings for page/row miss cycles. The options are **8/6** and **7/5**CLKs.

DRAM RAS To CAS Delay

This category set the DRAM RAS to CAS Delay to controls the DRAM page miss and row miss leadoff timings. The options are **3** and **2**CLKs.

DRAM Read Burst Timing

This category set the DRAM Read Burst Timing. The timing used depends on the type of DRAM (standard page mode or EDO burst mode) on a per-bank basis. The options are **x4444**, **x3333**, and **x2222**.

DRAM Write Burst Timing

This category set the DRAM Write Burst Timing. The timing used depends on the type of DRAM (standard page mode or EDO burst mode) on a per-bank basis. The options are **x4444**, **x3333**, and **x2222**.

System BIOS Cacheable

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

Video BIOS Cacheable

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

8 Bit I/O Recovery Time

This category is used to add additional recovery delay between CPU or PCI master originated 8-bit I/O cycles to the ISA Bus. The options are **1, 2, 3, 4, 5, 6, 7, 8,** and **NA**.

16-Bit I/O Recovery Time

This category is used to add additional recovery delay between CPU or PCI master originated 16-bit I/O cycles to the ISA Bus. The options are **1, 2, 3, 4, 5, 6, 7, 8,** and **NA**.

IDE HDD Block Mode

This category 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 Master PIO

In this category, 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 Master PIO timing is Auto.

IDE Primary Slave PIO

In this category, 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 Slave PIO timing is Auto.

IDE Secondary Master PIO

In this category, 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 Secondary Master PIO timing is Auto.

IDE Secondary Slave PIO

In this category, 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 Secondary Slave PIO timing is Auto.

On-Chip Primary PCI IDE

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

On-Chip Secondary PCI IDE

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

PCI Slot IDE 2nd Channel

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

PCI Concurrency

This category is used to defined PCI Concurrency is "**Enable**" or "**Disable**" setting.

PCI Streaming

This category is used to defined PCI Streaming is "**Enable**" or "**Disable**" setting.

PCI Bursting

This category is used to defined PCI Bursting is "**Enable**" or "**Disable**" setting.

Onboard FDC Control

This category 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

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

Onboard Serial Port 2

This category is used to define onboard serial port 2 to *COM1/3F8H*, *COM2/2F8H*, *COM3/3E8H*, *COM4/2E8H*, *Disabled*.

Onboard Parallel Port

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

Onboard Printer Mode

This category specifies onboard parallel port mode. The options are *EPP*(Extended Parallel Port), *ECP*(Extended Capabilities Port), *Extended*, and *Compatible*.

Power Management Setup

ROM PCI/ISA BIOS (2A59CH2E)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

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

Power Management

This category 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 category set to No, system BIOS will ignore APM when power managing the system.

If this category setup to Yes, system BIOS will wait for APM's prompt before it enter any PM mode e.g. **DOZE**, **STANDBY** or **SUSPEND**.

Video Off Method

- Blank Screen** The system BIOS will only blanks off the screen when disabling video.
- V/H SYN+Blank** In addition to Blank Screen, BIOS will also turn 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 entering DOZE mode.
- Disable** System will never enter DOZE mode.

Standby Mode

- 1 Min~1 Hr** Defines the continues idle time before the system entering STANDBY mode.
- Disable** System will never enter STANDBY mode.

Suspend Mode

- 1 Min~1 Hr** Defines the continuous idle time before the system entering SUSPEND mode.
- Disable** System will never enter SUSPEND mode.

HDD Power Down

- 1~15Min** Defines the continuous HDD idle time before the HDD entering 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 off.

IRQ3 (Wake-Up Event)

If this category sets to Off, the IRQ3 event's activity will not re-activate the system from Power Management.

If this category sets to On, the IRQ3 event's activity will re-activate system from Power Management.

IRQ4 (Wake-Up Event)

If this category sets to Off, the IRQ4 event's activity will not reactive the system from Power Management.

If this category sets to On, the IRQ4 event's activity causes the system reactive from Power Management.

IRQ8 (Wake-Up Event)

If this category sets to Off, the IRQ8 event's activity will not reactive the system from Power Management.

If this category sets to On, the IRQ8 event's activity causes the system reactive from Power Management.

IRQ12 (Wake-Up Event)

If this category sets to Off, the IRQ12 event's activity will not reactive the system from Power Management.

If this category sets to On, the IRQ12 event's activity causes the system reactive from Power Management.

Power Down Activities

If these categories sets to Off, the event's activity will not be monitored to enter power management.

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

COM Post Accessed	LPT Ports Accessed
Drive Ports Accessed	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 Redir)
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 (2A59CH2E)
PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

PnP BIOS Auto-Config: Disabled	
Slot 1 Using INT# : AUTO	
Slot 2 Using INT# : AUTO	
Slot 3 Using INT# : AUTO	
Slot 4 Using INT# : AUTO	
1st Available IRQ : 9	
2nd Available IRQ : 11	
3rd Available IRQ : 10	
4th Available IRQ : 12	
PCI IRQ Activated By : Level	
PCI IDE IRQ Map To : PCI-AUTO	
Primary IDE INT# : A	
Secondary IDE INT# : B	
ESC : Quit	↑↓←→ : Select Item
F1 : Help	PU/PD/+/- : Modify
F5 : Old Values (Shift)	F2 : Color
F6 : Load BIOS Defaults	
F7 : Load Setup Defaults	

PnP BIOS Auto-Config

If enable this category, system BIOS will auto config Add-on devices under operating system that support PnP function.

Slot x Using INT#

The options in these categories are AUTO, A, B, C and D.

AUTO : BIOS will ask the PCI device which INT# does it want to use for interrupt ,check out which IRQ is available from the above and tell the device which IRQ has been assigned to it.

A, B, C, D : These options are reserved for "Dirty" cards from which the system BIOS cannot tell which INT it use!

Note :

1. Choose "AUTO" for all devices unless you know exactly which card is a dirty device & which INTs does that card uses!
2. Choose only "AUTO" for multifunction PCI devices because options A, B, C, D will force the BIOS to assign IRQs for function 0 only!

1st Available IRQ

The system BIOS will assign these available IRQs to the first found PCI device. The available options are **5, 7, 9, 10, 11, 12, 14, 15** and **NA**.

2nd Available IRQ

The system BIOS will assign these available IRQs to the second found PCI device. The available options are **5, 7, 9, 10, 11, 12, 14, 15** and **NA**.

3rd Available IRQ

The system BIOS will assign these available IRQs to the third found PCI device. The available options are **5, 7, 9, 10, 11, 12, 14, 15** and **NA**.

4th Available IRQ

The system BIOS will assign these available IRQs to the fourth found PCI device. The available options are **5, 7, 9, 10, 11, 12, 14, 15** and **NA**.

PCI IRQ Activated by

To tell the chipset the IRQ signals input is level or edge trigger.

PCI IDE IRQ Map to

The options in this category are : PCI-AUTO, PCI-SLOTx, ISA.

PCI-AUTO : The system BIOS will scan for PCI IDE devices & determine the location of the PCI IDE device.

PCI-SLOTx (x=1~4) : The BIOS will assign IRQ 14 for primary IDE INT#, and IRQ 15 for secondary IDE INT# for the specified slot.

ISA : The BIOS will not assign any IRQs even if PCI IDE card is found. Because some IDE cards connect the IRQ 14 & 15 directly from ISA slot through a extended cord. (this cord is called Legacy Header)

Primary IDE INT#

To tell which INT# does the primary IDE port on PCI IDE cad is using for its interrupts.

Secondary IDE INT#

To tell which INT# does the secondary IDE port on PCI IDE cad is using for its interrupts.

Password Setting

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

ENTER PASSWORD

ROM PCI/ISA BIOS (2A59CH2A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	IDE HDD AUTO DETECTION
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
PCI CONFIGURATION SETUP	
LOAD BIOS DEFAULTS	Enter Password: *****
LOAD SETUP DEFAULTS	
Esc : Quit	↑ ↓ + ← : Select Item
F10 : Save & Exit Setup	(Shift)F2 : Change Color
Change/Set/Disable 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 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.

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 on chapter 2.

IDE HDD Auto Detection

The Enhanced IDE features was included in all 541 Award BIOS. Below is a brief description of this feature.

1. Setup Change

(I) Auto-Detection

BIOS setup will display all possible modes that supported by the HDD including NORMAL, LBA & LARGE.

If HDD does not support LBA modes, no 'LBA' option will be shown.

If no of cylinders is less than or equal to 1024, no 'LARGE' option will be show

Users can select a mode which is appropriate for them.

ROM PCI/ISA BIOS (2A59CH2A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	:							
Select Primary Master Option (N=Skip) : N								
OPTIONS	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE	
2 (Y)	544	528	32	0	1056	63	LBA	
1	545	1057	16	65535	1056	63	NORMAL	
2	544	528	32	65535	1056	63	LARGE	
ESC : Skip								

(II) Standard CMOS Setup

	CYLS	HEADS	PRECOMP	LANDZONE	SECTOR	MODE
Drive C:User(516MB)	1120	16	65535	1119	59	NORMAL
Drive D:User(203MB)	684	16	65535	685	38	-----

When HDD type is in 'user' type, the "MODE" option will be opened for user to select their own HDD mode.

2. HDD Modes

The 541 Award BIOS supports 3 HDD modes : NORMAL, LBA & LARGE.

(I) NORMAL mode

Generic access mode in which neither the BIOS nor the IDE controller will make any transformations during accessing.

The maximum number of cylinders, head & sectors for NORMAL mode are 1024, 16 & 63

no. Cylinder	(1024)
x no. Head	(16)
x no. Sector	(63)
x no. per sector	(512)

528 Megabyte

If user set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that!

(II) LBA (Logical Block Addressing) mode

A new HDD accessing method to overcome the 528 Megabytes bottleneck. The number of cylinders, head & sectors shown in setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by sector, head & cylinder number into its own physical address inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 Gigabytes which is obtained by the following formula:

no. Cylinder	(1024)
x no. Head	(255)
x no. Sector	(63)
x no. per sector	(512)

8.4 Gigabyte

(III) LARGE mode

Extended HDD access mode supported by Award Software.

Some IDE HDDs contain more than 1024 cylinder without LBA support. The 541 Award BIOS provides another alternative to support these kinds of HDD !

Example of LARGE mode

CYLS.	HEADS	SECTOR	MODE
1120	16	59	NORMAL
560	32	59	LARGE

BIOS tricks DOS that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13h in order to access the right HDD address the right HDD address!

Maximum HDD size

no. Cylinder	(1024)
x no. Head	(32)
x no. Sector	(63)
x no. per sector	(512)

1 Gigabyte

If user set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that!

3. Remarks

To support LBA or LARGE mode of HDDs, there must be some software involved. All these software are located in the Award HDD Service Routine(INT 13h). It may be failed to access a HDD with LBA (LARGE) mode selected if you are running under a Operating System which replaces the whole INT 13h.

Appendix **A** AMI BIOS Reference

Error Beeps and Message

Error can occur during POST (Power On Self Test), which is performed every time the system is powered on. Fatal errors are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal errors. Fatal errors do not allow the system to continue the boot process. Most displayed errors allow the system to continue the boot process.

Beeps	Errormessage	Description
1	Refresh Failure	The memory refresh circuitry on the mainboard is faulty.
2	Parity Error	Parity error in the first 64KB of memory.
3	Base 64KB Memory Failure	Memory failure in first 64KB.
4	Timer Not Operational	Memory failure in the first 64KB of memory, or Timer 1 on the mainboard is not functioning.
5	Processor error	The CPU on the mainboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is fault error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in the BIOS
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.
11	Cache Error/External Cache Bad	The external cache is faulty.

Appendix **B** Award BIOS Reference

BIOS Reference - POST Message

When the BIOS encounters an error that requires that user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message "**PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP**" will be shown in the information box at the bottom.

POST Beep

Currently there are two kind of beep codes in BIOS.

The one code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long followed by three short beeps. The other one code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

————— ——— ——— ——— : Video error
————— ————— : DRAM error

Error Message

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Award 541 BIOSes:

"CMOS BATTERY HAS FAILED"

CMOS battery is no longer functional. It should be replaced.

"CMOS CHECKSUM ERROR"

Checksum of CMOS is incorrect. This can indicate that CMOS become corrupt. This error may have been caused by a weak battery. Check that battery and replace if necessary.

"DISPLAY SWITCH IS SET INCORRECTLY"

Display switch on the mainboard can be set to either monochrome or color. This indicates the switch is set to a different than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

- "FLOPPY DISK(S) fail (80)" →Unable to reset floppy subsystem
- "FLOPPY DISK(S) fail (40)" →Floppy type mismatch
- "Hard Disk(s) fail(80)" →HDD reset failed
- "Hard Disk(s) fail(40)" →HDD controller diagnostics failed
- "Hard Disk(s) fail(20)" →HDD initialization error
- "Hard Disk(s) fail(10)" →Unable to recalibrate fixed disk
- "Hard Disk(s) fail (08)" →Sector Verify failed

"Keyboard is locked out"

BIOS detect the keyboard is locked. P17 of keyboard controller is pulled low.

"Keyboard error or no keyboard present"

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

"BIOS ROM checksum error - System halted"

The checksum of ROM address F0000H~FFFFFFH is bad.

"Memory test fail"

BIOS reports the memory test fail if the onboard memory is tested error.

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.