80 Port Frequently Asked Questions

Below is a list of some basic POST Codes, possible problems and solutions. For
more detailed information about POST Codes, refer to Appendix E in this manual.

POST CODE	Problem	Solution
FFh or CFh	1.BIOS chip inserted incorrectly 2. Incorrect BIOS update version 3. Mainboard problem 4. Add-on card inserted incorrectly.	1. Reinsert the BIOS chip 2. Download the correct BIOS version update from the manufacturer's Web site. 3. Replace mainboard 4. Remove and replace the add-on card
C1h - C5h	1. Memory module inserted incorrectly 2. Memory compatibility problem 3. Memory module damaged	1. Reinsert memory module 2. Replace memory with correct type 3. Replace memory module
2Dh	1. Error occured in VGA BIOS 2. VGA card inserted incorrectly	1. Replace VGA card 2. Reinsert the VGA card
26h	Overclock error	Clear CMOS or press the insert key to power on the system
07h - 12h	1. ▮▮▮▮▮▮▮ controller error 2. RTC error	1. Ensure that the keyboard and mouse are connected correctly. 2. Replace the RTC battery.

Table of Contents

Section 1
INTRODUCTION

1-1 Package Contents

Contents

A. Mainboard

B. User's manual

C. Floppy drive cable

D. HDD drive cable

E. CD (drivers and utilities)

F. I/O Shield

G. S-ATA data and power cable

Powerpack items (Optional)

H. Mini heatsink

I. Tool Pen

Optional Items

J. ThermoStick cable

K. Game & COM bracket cable

L. Extra USB2.0 port cable

M. S/PDIF Module

If you need the optional item, please contact your dealer for assistance.

1-2 System Block Diagram

The diagram contains the following blocks and connections:

- **LGA775 Processor** (top)
- **Intel i915-P (Grantsdale-P) GMCH** — connected to LGA775 Processor
  - **PCI Express x16 graphics** (left)
  - **Dual DDR-400** (right): Channel A, Channel B
- **Intel ICH6 or ICH6R (Optional)** (center) — connected to GMCH
  - **ATA-100 IDE x 1**
  - **80 Port**
  - **BIOS**
  - **LPC IO W83627THF** (LPC): PS/2 KB & Mouse, COM1/2, GAME, Printer, Floppy, SIR
  - **Realtek ALC 850** (AC-Link): SPDIF-Out, SPDIF-In, CD-In, AUX-In, Mic-In#2 for Front, Line-In, Front stereo-out, Mic-In, Side stereo-out, Rear stereo-out, Center&Subwoffer
  - **USB x 8**
  - **S-ATA x 4**
  - **PCI Express*1 x 2**
  - **PCI x 4**
    - **ITE IT8212F IDE RAID (Optional)** — ATA-133 X 2
    - **Marvell 88E8001 GbE LAN** — RJ-45

Section 2
FEATURES

Mainboard Features

● Processor

 š Support Intel® Pentium 4® 5xx series processors up to 4.0+GHz in LGA775 socket with 533/800 MHz front-side system bus

 š Support Intel® Pentium 4® 3xx series processors up to 3.2+GHz in LGA775 socket with 533 MHz front-side system bus

 š Support Intel 04B or 04A Platform Compatibility Guide

 š Supports Hyper-Threading Technology

 To enable the Hyper-Threading Technology function on your computer system requires ALL of the following platform components:

) CPU: An Intel® Pentium® 4 Processor with HT Technology.

) Chipset   An Intel® Chipset that supports HT Technology.

) BIOS: A BIOS that supports HT Technology and has it enabled.

) OS: An operating system that supports HT Technology.

 Performance will vary depending on the specific hardware and software you use. See <http://www.intel.com/info/hyperthreading> for information including details on which processor support HT Technology.

● Chipset

 š Intel® i915P Chipset (i915P + ICH6R or ICH6)

● Main Memory

 š Four 184-pin DDR SDRAM DIMM sockets

 š Support single-sided or double-sided 2.5v DDR-400/DIMMs with dual channel architecture in 256Mb/512Mb/1Gb technologies

 š Supports up to 4GB memory size

● BIOS

 š Flash EEPROM with Award BIOS

  - ACPI v2.0 compliant

  - S3 (Suspend to DRAM) sleep-state support

- SMBIOS (System Management BIOS) V2.2 compliant
- Supports Power failure recovery
- Able to wake the computer from specific states by LAN, Power switch, PME#, RTC alarm, USB, PS2 K/B, PS2 Mouse, Modem Ring-in COM#1…

● Onboard PCI Devices

  Š LAN --> Integrates 1Gbps Fast Ethernet controller with onboard Marvell 88E8001 LAN chip

  Š IDE RAID --> (Optional) Two additional ATA-133 IDE ports with RAID 0, 1, 0+1 support from onboard ITE IT8212F RAID controller

● Legacy IO Controller

  Š Winbond W83627THF LPC IO controller with keyboard, mouse, floppy, printer, game, serial and IR interface

  Š Support Hardware Monitoring for fan speed monitoring, CPU/System temperature and ThermoStick temperature (Optional)

  Š Intelligent fan speed control for CPU-fan (PWM) and Chassis-fan (DC) for quiet operation

● Audio

  Š Eight channel audio with analog and digital output using Realtek ALC850 AC'97 CODEC

  - AC'97 v2.3 compliant
  - Supports CD-In, Aux-In and S/PDIF-in/out interface
  - Supports Line-out and Mic-In for front panel
  - Supports automatic "jack-sensing"
  - Rear panel audio jacks configuration:

Audio Jack Color			
	Line-in	Line-in	Line-in
	Line-out	Front stereo-out	Front stereo-out
	Mic-in	Mic-in	Mic-in
			Side stereo-out
		Rear stereo-out	Rear stereo-out
		Center&Subwoofer	Center&Subwoofer

● Peripheral Interfaces

〉 At Rear Panel

- Š PS/2 keyboard and mouse ports
- Š One Parallel (printer) port
- Š One S/PDIF-Out Coaxial jack
- Š One S/PDIF-Out Optical
- Š One Serial port
- Š One RJ45 LAN connector
- Š Four USB2.0 ports
- Š Three Audio jacks

〉 Onboard connector and pin-header

- Š One floppy drive connector
- Š One ATA-100 IDE connector
- Š Two ATA-133 IDE connectors from IT8212F RAID controller (Optional)
- Š Four extra USB2.0 ports
- Š One CD-IN and One AUX-IN connector
- Š One S/PDIF-in/out connector
- Š One IR connector
- Š One Game port connector
- Š One Serial Port (COM2) connector
- Š Four S-ATA connectors
- Š Three Fan connectors

● Front Panel Controller

Š Supports Reset & Soft-Off switches

Š Supports HDD & Power LEDs

Š Supports PC speaker

Š Supports Front Panel Audio connector

● Expansion Slots

Š Four PCI connectors compliant with PCI v2.3

Š Two PCI Express x1 connectors compliant with PCI Express 1.0a

Š One PCI Express x16 connectors compliant with PCI Express 1.0a

● Other BIOS Features

Š Magic Health – A quick "dashboard" display at POST to show hardware status. Helps to detect faults early.

Š EZ Boot – An easy way let end-user can choose to boot from hard drive, CD-ROM, floppy, …

Š KBPO – Keyboard power on, turn on the computer from keyboard

Š PowerBIOS for excellent Overclocking capabilities through

 - subtle voltage tuning for CPU, Memory

 - subtle frequency tuning on FSB with 1MHz increment

 - Supports complete Asynchronous FSB/Memory scheme for overclocking

 - Supports Asynchronous clocking between FSB and PCI/PCI-Express
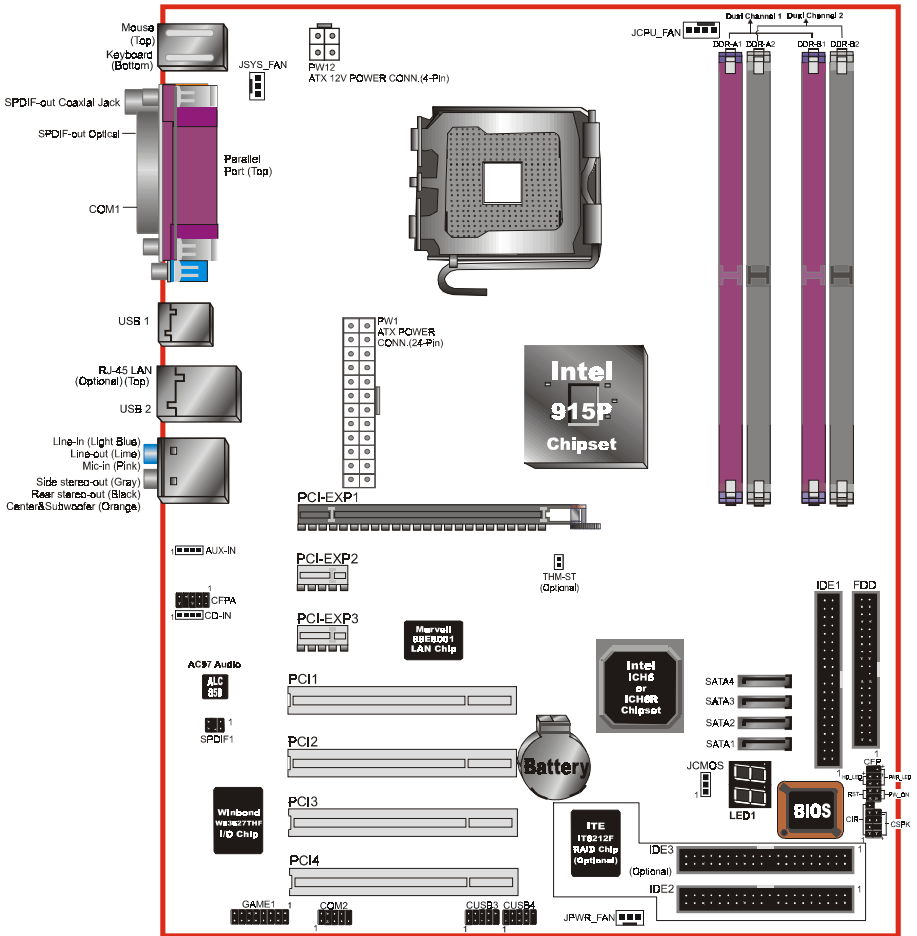
Š P80P for system debugging

● Form Factor

Š 305mm x 245 mm ATX size

Section 3
INSTALLATION

Note: Depending on the model you purchased, some components
are optional and may not be available.

Mainboard Layout

Note: Depending on the model you purchased, some components are optional and may not be available.

Easy Installation Procedure

The following must be completed before powering on your new system:

3-1. CPU Installation
3-2. Jumper Settings
3-3. System Memory Configuration
3-4. Expansion Slots
3-5. Device Connectors

3-1 CPU Installation

Step 1

Carefully remove the plastic protection plate from the socket.

Warning:
The pins inside the CPU socket are fragile and are easily broken. Be careful not to touch them when installing the CPU.

<Figure 1>

<Figure 3>

<Figure 2>
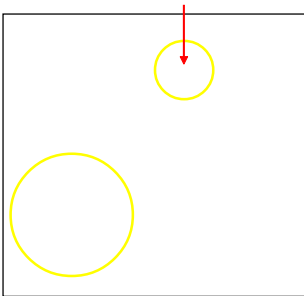
Step 2

Open the socket by releasing the actuation lever, and press downwards at the tip shown by the arrow.
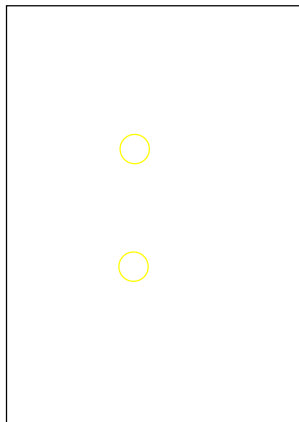
Step 3

Before inserting the CPU, align the CPU according to the key slots shown in the picture. Gently place the CPU into the socket and make sure it is fully seated.

<Figure 4>

<Figure 5>

Step 4
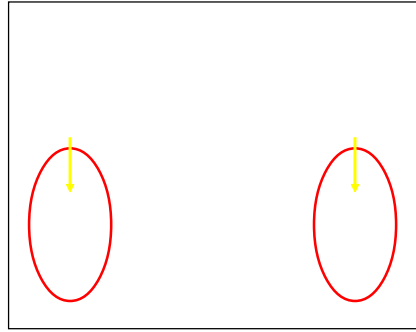
a) Put the CPU lid on the socket, and close the socket by lowering and locking the actuation lever.

b) Apply thermal compound to the top of the CPU and into the four holes around CPU area to install the cooler as shown.

Step 5

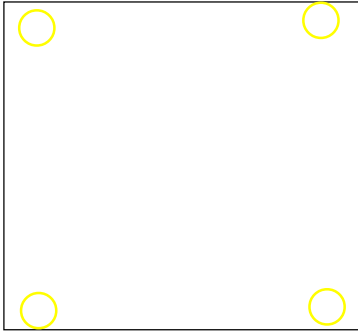Place the CPU cooler on top of the socket. Press its clips down firmly until it is completely seated in the hole.

<Figure 6>
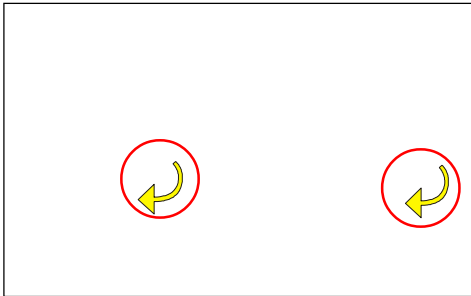
Step 6

a) Rotate the clips 90 degrees to lock the CPU cooler in place.

b) Plug the cooler fan power into the mainboard's CPU fan connector. The installation is complete.

CAUTION:

• Installing with incorrect CPU cooler and heatsink assemblies may damage the CPU. Use Intel's thermal solution shown in the illustrations above: an active heatsink; an extruded aluminum heatsink base; and a fan attached to the top of the fin array.

• Apply thermal compound or paste to the CPU to avoid CPU overheating and damage.

• In accordance with Intel guidelines specifications, do not install a CPU over 20 times to avoid damaging the pins on the CPU socket.

3-2 Jumper Settings
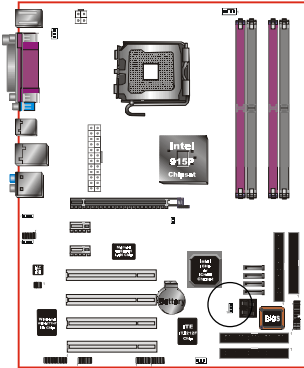
JCMOS: Clear CMOS data Jumper
If the CMOS data becomes corrupted or you forgot the supervisor or user password, clear the CMOS data to reconfigure the system back to the default values stored in the ROM BIOS.

Settings:
1-2: Normal (Default)
2-3: Clear CMOS

To CMOS Clear data, please follow the steps below.
1. Turn off the system.
2. Change the jumper from "1-2" to "2-3" position for a few seconds.
3. Replace the jumper on to the "1-2" position.
4. Turn on the system and hold down the <Del> key to enter BIOS setup.

3-3 System Memory Configuration

The mainboard accommodates four PC2700/PC3200 184-pin DIMMs (Dual In-line Memory Modules):

- Supports up to 4.0GB of 333/400MHz DDR SDRAM.
- Supports dual channel memory interface.
- Supports non-ECC memory and non-Registered DIMMs only.
- Supports 256Mb/512Mb/1Gb DDR technologies in x8 and x16 devices only.
- SPD (Serial Presence Detect) scheme for DIMM detection support.
- Supports configurations defined in the JEDEC DDR DIMM specification only.

Memory configurations supported:

- The four DIMM sockets are divided into two Dual Channel pairs according to the color <Figure 7>. Each dual channel pair has the same color, e.g. DIMM1 and DIMM3. <Figure 8> shows the logical memory layout. We recommend you to use DIMM sockets of the same color to obtain the best memory performance.

  - Single Channel Flexibility:
    Each channel is populated with different amount of memory.

  - Dual Channel Advantage:
    Both channel populated with same amount of memory.

Channel A — DDR-A2 DIMM 2 → Dual Channel 1

Channel B — DDR-B2 DIMM 4 → Dual Channel 2

<Figure 7>

DIMM1 DIMM3 → Dual Channel 1

DIMM2 DIMM4 → Dual Channel 2

MCH

Channel A   Channel B

<Figure 8>
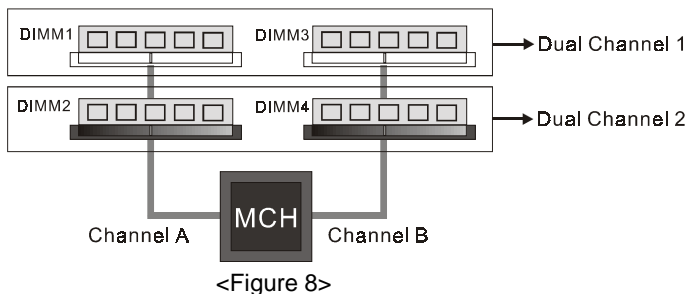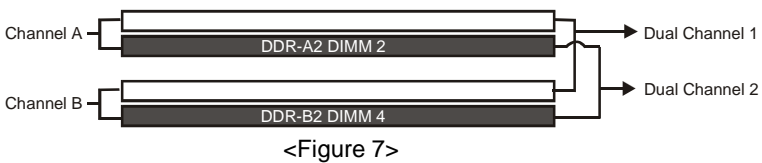
Follow the recommendation below for memory performance.

	1 DIMM (64-bit)				2 DIMM (128-bit)				3 DIMM (128-bit)		4 DIMM (128-bit)
DIMM#1	SS/DS				SS/DS			SS/DS	SS/DS	SS/DS	SS/DS
DIMM#2		SS/DS				SS/DS	SS/DS		SS/DS	SS/DS	SS/DS
DIMM#3			SS/DS		SS/DS		SS/DS		SS/DS		SS/DS
DIMM#4				SS/DS		SS/DS		SS/DS		SS/DS	SS/DS

* SS: Single-Sided DIMM, DS: Double-Sided DIMM

Note: Using non-compliant memory with higher bus speeds (overclocking) may severely compromise the integrity of the system.

DIMM Module Installation

Figure 9 displays the notch on the DDR DIMM memory module.

DIMMs have 184 pins and one notch that matches with the DDR DIMM socket. DIMM modules are installed by placing the chip firmly into the socket and pressing straight down as shown in figure 10 until the white clips close and the module fits tightly into the DIMM socket (figure 11).

CENTER KEY ZONE
(2.5 V DRAM)
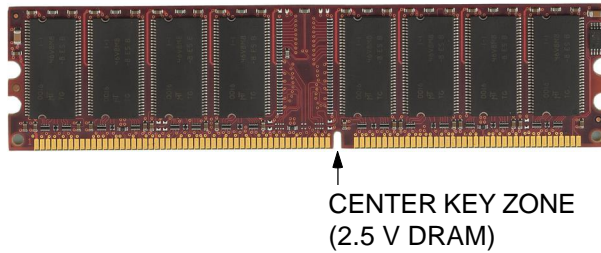
Figure 9 - DIMM notch
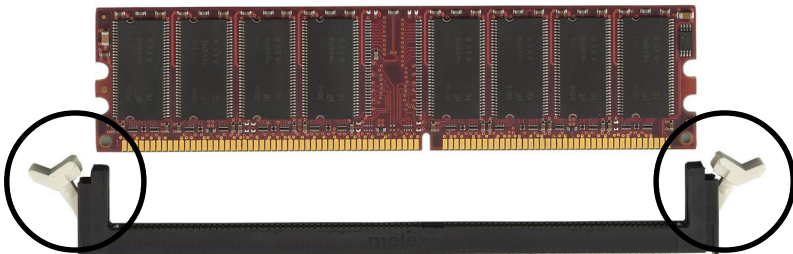
Figure 10 - DIMM module clips before installation
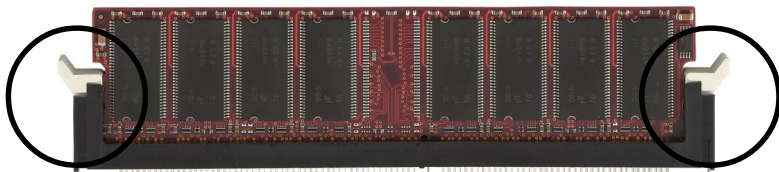
Figure 11 - DIMM module clip after installation

To remove the DIMM module press down the white clips and the module is ejected from the socket.

3-4 Expansion Slots
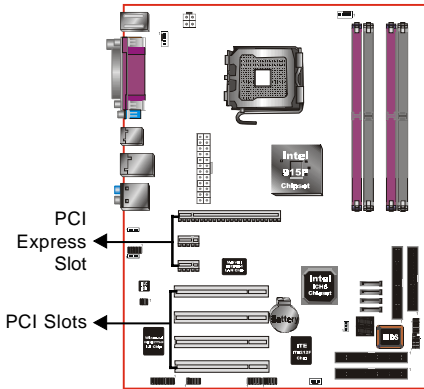
PCI Express Slot
The mainboard is equipped with two PCI Express (x1) and one PCI Express (x16) slots compliant with PCI Express 1.0a.

PCI Slots
The mainboard is equipped with 4 PCI slots.

Installing an Expansion Card

The steps below assume that the mainboard is already installed in the system chassis.

1. Make sure the PC and all other peripheral devices connected to its has been powered down.

2. Disconnect all power cords and cables.

3. Remove the system unit cover.

4. Remove the bracket of the slot that you intend to use. (You need to remove the screw in order to remove the bracket.)

5. Align the card above the slot then press it down firmly until it is completely seated in the slot.

6. Secure the card to the chassis with the screw you removed in step 4.

7. Replace the system unit cover.

8. Power on the PC.

9. Enter the BIOS step program to make the necessary settings.

10. Save the settings and restart the PC.

11. Install the software drivers of the expansion cards, if necessary.

VGA Card Installation Caution
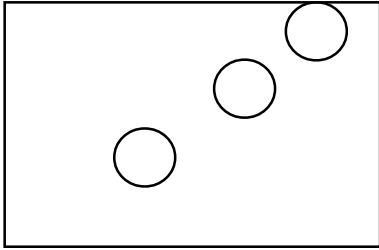
1. VGA card component is blocked by DIMM socket lock.
2. VGA slot clicker is not locked.
3. VGA card edge connector is not inserted properly.

1. VGA card component is not blocked by DIMM socket lock.
2. VGA slot clicker is locked.
3. VGA card edge connector is inserted properly.
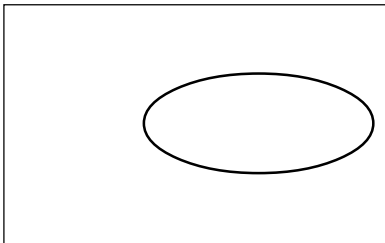
1. VGA slot clicker is not locked.
2. VGA card edge connector is not inserted properly.
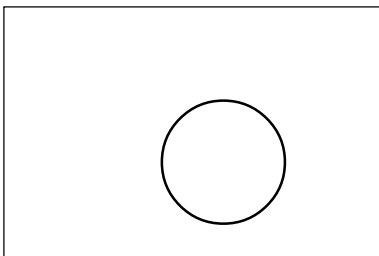
1. VGA slot clicker is locked.
2. VGA card edge connector is inserted properly.

3-5 Device Connectors

The I/O back panel for this mainboard is shown below. When installing the mainboard into the computer case, use the bundled I/O shield to protect this back panel.

Parallel Port
RJ45 LAN
PS/2 Mouse
PS/2 Keyboard
7.1 Audio Channel
S/PDIF-out Coaxial Jack
S/PDIF-out Optical
COM1
USB2.0 x 4 ports

Figure 12 - I/O Ports

JSYS_FAN
JCPU_FAN
Intel 915P Chipset
JPWR_FAN
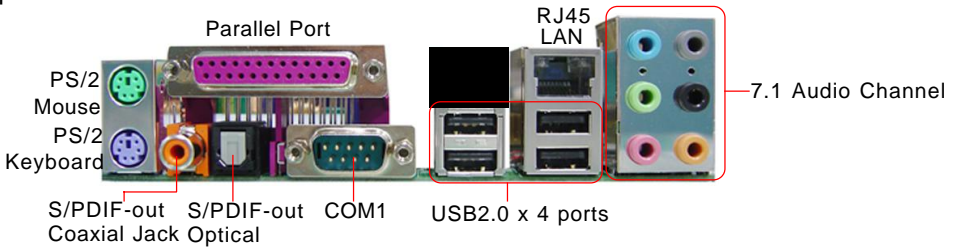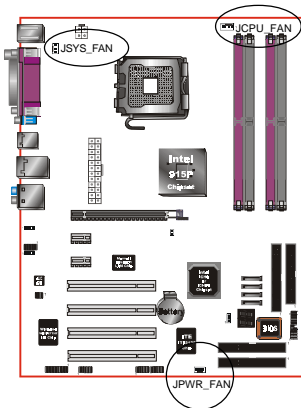
JCPU_FAN / JPWR_FAN / JSYS_FAN:

CPU/Power/Chassis Fan Power Connectors

JCPU_FAN: The CPU must be kept cool by using a heatsink with fan assembly.

JPWR_FAN: Ifyou are installing an additional fan in the unit, connect to this fan connector.

JSYS_FAN: The chassis fan will provide adequate airflow throughout the chassis to prevent overheating the CPU.

JCPU_FAN   JPWR_FAN   JSYS_FAN

Control   Ground
Sense
+12V

Sense   Ground
+12V

Sense   Ground
+12V
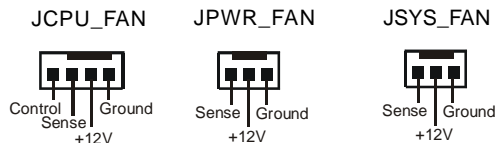
This mainboard is equipped with intelligent fan speed control. Refer to the PC Health Status submenu of the BIOS.
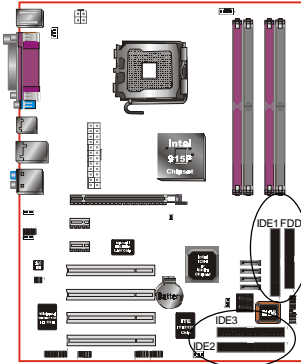
FDD: Floppy Controller Connector

IDE1: ATA-66/100 IDE Connector
Supports up to 2 IDE devices from embedded IDE controller .

IDE2/IDE3: ATA-133 IDE Connectors (Optional)
Supports up to 4 IDE devices from on board ITE IT8212F RAID controller with RAID 0, 1, 0+1 function.
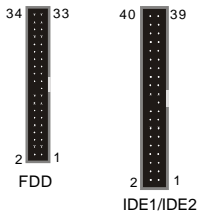
When using two IDE drives, one must be set to Master mode and the other to Slave mode. Refer to your disk drive user's manual for information about selecting the proper drive switch settings.

34 33   40 39

2   1
FDD   2   1
          IDE1/IDE2
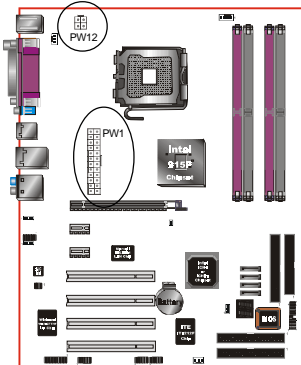
PW1:   24-pin ATX Power Connector

PW12: 4-pin ATX12V Power Connector

The mainboard is equipped with a standard 24-pin ATX main power connector and a 4-pin +12V power connector for connecting an ATX12V power supply. The plugs of the power cables are designed to fit in only one orientation. Insert the plugs into the connectors until they fit in place.
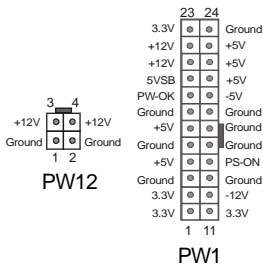
Caution:
The PW1 and PW12 Power Connector must be used simultaneously or else this system will not boot-up.

The board requires a minimum of 300 Watt power supply to operate. Your system configuration (amount of memory, add-in cards, peripherals, etc.) may exceed this minimum power requirement. To ensure that adequate power, use a 350 Watt or greater power supply.

23 24

	3.3V		Ground
+12V		+5V
+12V		+5V
5VSB		+5V
PW-OK		-5V
Ground		Ground
+5V		Ground
Ground		Ground
+5V		PS-ON
Ground		Ground
3.3V		-12V
3.3V		3.3V

1 11
PW1

3   4

| +12V | | +12V |
| Ground | | Ground |

1   2
PW12
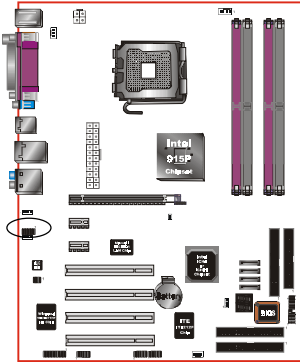
CFPA: Front Panel Audio Connector

When the jumpers are removed this connector can be used for front panel audio. The front panel phone jack should have "normal close" switch. Without phone plug inserted, the rear panel audio is enabled. With phone plug inserted, the rear panel audio will be disabled.

```
              1        2
    MIC_In ─■   ■─ GND
       NC ─■   ■─ +5V
Front Line-out-R ─■   ■─ Rear Line-out-FR
                     ■─ Key
Front Line-out-L ─■   ■─ Rear Line-out-FL
              9        10
```
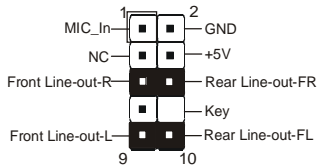
Settings

Pins (5-6) & (9-10) Short (default): Only the onboard rear panel audio jack can be used.

Pins (5-6) & (9-10) Open: Only front panel audio jack can be used.

In 2-Channel audio mode, Mic-In is shared for both front panel and rear panel. In 6-Channel audio mode, the Mic-In is dedicated for front panel use, and rear panel Mic-In function will switch to Center and Subwoofer support.
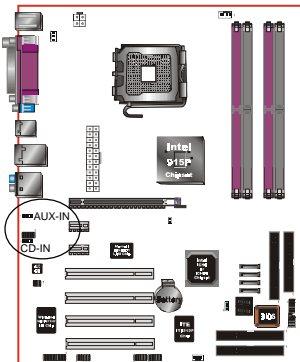
CD-IN/AUX-IN: CD Audio_IN Connector

The CD-IN and AUX-IN connectors are used to receive audio form a CD-ROM drive, TV tuner or MPEG card.

CD-IN

```
   ■─ CD_IN_Right
   ■─ CD_Reference
1  ■─ CD_IN_Left
```

AUX-IN

```
   ■─ AUX_IN_Right
   ■─ GND
1  ■─ AUX_IN_Left
```
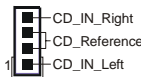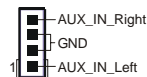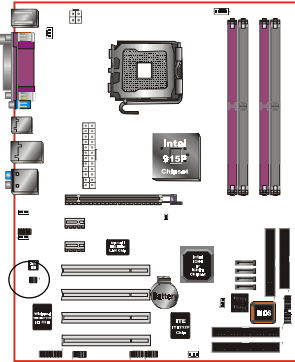
SPDIF: Sony/Philips Digital InterFace connector
This connector links digital audio between the mainboard and your audio devices, such as CD player, sampler or DAT recorder. It allows the digital transmission of audio data in S/PDIF format.

```
        SPDIF_IN  VCC
      5  ■ ■ ■   1
      6  ■ ■ ■   2
            NC
       GND    SPDIF_OUT
```
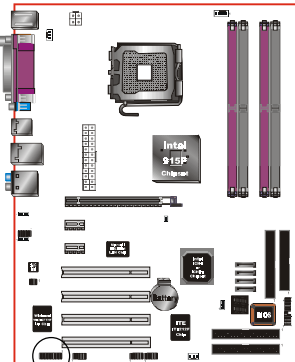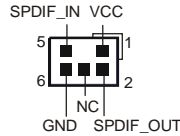
GAME1: Game/MIDI connector
This port works well with any application that is compatible with the standard PC joystick.

```
              J1CY        J1CX
         J1B2     GND J1B1     +5V
      +5V  
      15  ■ ■ ■ ■ ■ ■ ■ ■  1
      16  ■ ■ ■ ■ ■ ■ ■ ■  2
         MIDI_In      J2CX  +5V
              J2B2      J2B1
              J2CY MIDI_Out
```
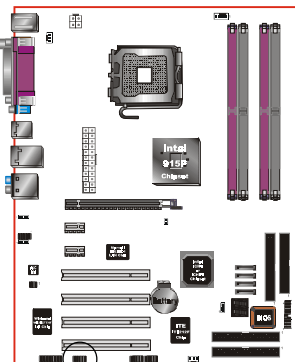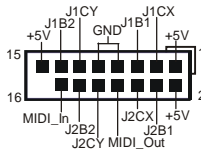
COM2: Serial Port Connector
The serial port can be used with modems, serial printers, remote display terminals, and other serial device.

```
           RTS   RI
        DSR  CTS   NC
      2  ■ ■ ■ ■ ■  10
      1  ■ ■ ■ ■ ■  9
        DCD  TXD  Ground
           RXD  DTR
```
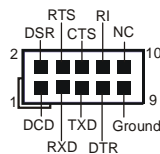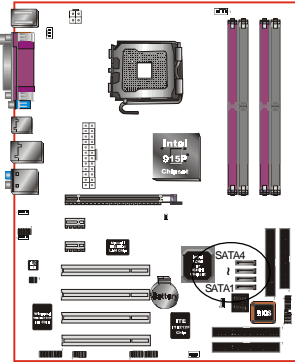
SATA1 / SATA2 / SATA3 / SATA4:

Serial ATA Connectors

These connectors enable you to connect Serial ATA devices that conform to the Serial ATA specification.

```
GND  B+  B-      A-  A+ GND
         GND
```
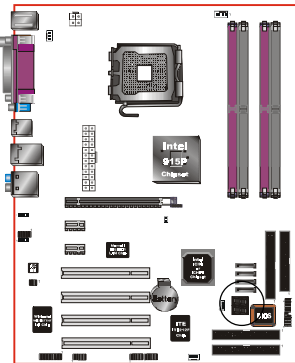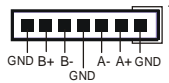
LED: 80 Port Debug LED
Provides two-digit POST code to show why the system fail to boot. Allows quick and easy optimization.

The LED will display the CPU temperature when you urn the bundle USDM software.

80 Port Debug 7-segment LED display (Refer to Appendix E for POST codes)
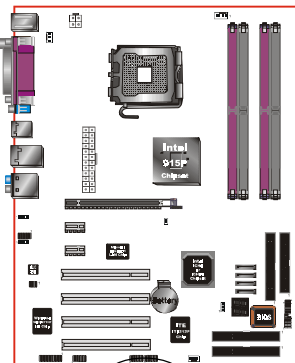
CUSB3/CUSB4:Four USB 2.0 ports

This mainboard includes 2 additional USB2.0 ports, identified by two 10-pin connector.

If you wish to use the additional USB ports, install the card-edge bracket to the system chassis then insert its cables to this 10-pin connector.

```
        1        2
VCC  ■  ■  ─ VCC
DATA0- ■  ■ ─ DATA1-
DATA0+ ■  ■ ─ DATA1+
GND  ■  ■ ─ GND
Key ─  ■ ─ NC
     9        10
```
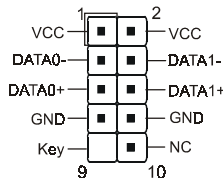
CAUTION!
Please make sure the USB cable has the same pin assignment. A different pin assignment may cause damage to the system. If you need the USB cable, please contact our retailer.

CFP

CIR

CSPK
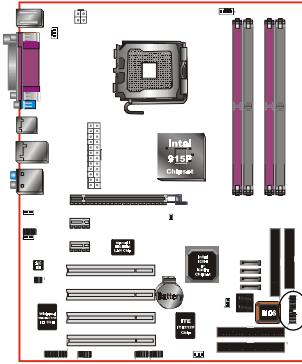
CFP: Front Panel Connector

HD_LED
This LED will light up whenever the hard drive is being accessed.

PWR_LED
This connects to the power button of the system chassis

RST
This switch allows you to reboot without having to power off the system thus prolonging the life of the power supply or system.
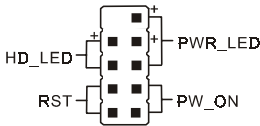
PW_ON
This is connected to the power button on the case. To use the Soft-Off by PWR-BTTN feature, refer to the Power Management Setup in the BIOS setup section of this manual.
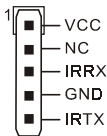
CIR: IR connector
Connect your IrDA cable to this IR connector.

CSPK: Speaker
Connect to the system's speaker for beeping
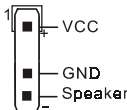
3-6 Thermo Stick Function (Optional)

This mainboard is equipped with a digital thermometer capability to monitor any temperature. This is useful for measuring the heat on peripherals such as VGA cards, hard disk drives, DIMMs or even on-board components such as chipset, MOSFETS, etc.

Thermo Stick consists of:

THM-ST

1) THM_ST header located on the mainboard
2) Thermostick sensor cable with heat-tolerant adhesive sticker bundled in the mainboard package
3) USDM software utility
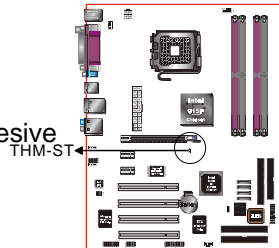
To setup Thermo Stick,

1. Insert the sensor cable to THM_ST header on the mainboard
2. Using the adhesive sticker, affix the sensor head of the cable to your desired point of measure. e.g. the chipset as in the picture below. Trim the adhesive sticker to a suitable size so that it will not affect the heat dissipation of any heatsink.

3. Ensure the cable is neatly tucked away from fans or other moving parts.
4. Install and run the USDM software. The temperature will be shown as below.
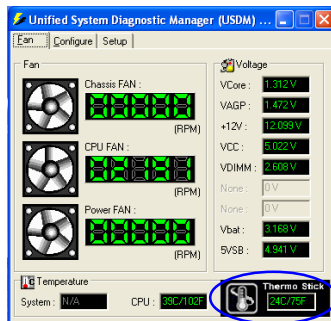
3-7 Power-On/Off (Remote)

This board has a 24-pin ATX and a 4-pin ATX12V power supply connector to support power supplies with Remote On/Off feature. The 4-pin ATX12V connector must be plugged in for the system to operate safely. The chassis power button should be connected to the mainboard front panel PW_ON header (Figure 15).

You can turn off the system in two ways: by pressing the front panel power On/Off button or using the "Soft Off" function that can be controlled by an operating system such as Windows® XP/ME/2000/98.

Note: For maintaining the DDR SDRAM power during STR (ACPI S3) function, it is strongly recommended to use power supplies that have a +5VSB current of (>=) 2A. Please check the 5VSB's specification printed on the power supply's outer case.

Note: The board requires a minimum of 300 Watt power supply to operate. Your system configuration (amount of memory, add-in cards, peripherals, etc.) may exceed this minimum power requirement. To ensure that adequate power, use a 350 Watt (or higher) power supply.
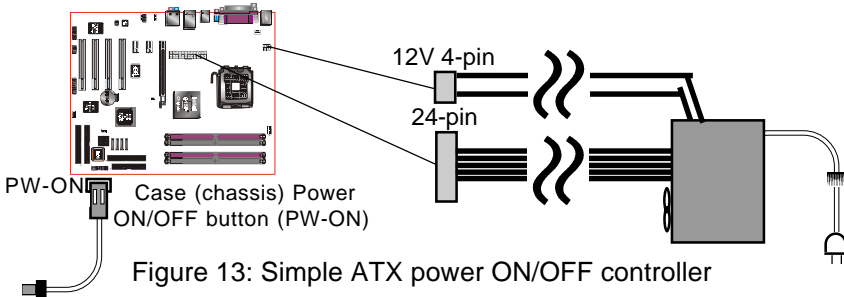
Figure 13: Simple ATX power ON/OFF controller

3-8 External Modem Ring-in Power ON and Keyboard Power ON Functions (KBPO)

Modem-Ring Power ON Function

The mainboard supports External Modem Ring-in Power ON function. Once you connect an external modem to COM1 or COM2, you can turn on the system through remote and host dial-up control.

Keyboard Power ON Function

The mainboard features a keyboard power on function to turn on the power supply using a keypress. Refer to the Power Management Setup in the BIOS setup section for details. To enable this feature, the BIOS default setting is Keyboard Hot Key (<Ctrl> + <F1>). To power off the system, use the Soft-OFF function under Windows XP/ME/2000/98. (refer to Windows online help).

3-9 ACPI S3 (Suspend To RAM) Function

This mainboard supports the STR (Suspend To RAM) power management scheme by maintaining the appropriate power states in the DDR SDRAM interface signals. The power source to the DDR SDRAM is kept active during STR (ACPI S3). Advanced Configuration Power Interface (ACPI) provides many Energy Saving Features for operating systems that support Instant ON and QuickStart™ function.

1. To enable STR functionality to save system power :

   a. Install ACPI certified add-on cards (such as VGA, LAN, and modem cards).

   b. In BIOS, under Power Management Setup (refer to Section 4), select "ACPI Suspend Type: S3(STR)". If you have a USB mouse or keyboard, set "USB Resume from S3" to "Enabled".

   c. Install Windows® XP/2000/ME/98SE.

   d. Restart the system.

   e. When in Windows, open the Control Panel Power Management application, and click the Advanced tab. In the Power buttons section, select "Stand By" from the drop-down lists.

2. To activate the STR function:

   a. Click the START button and choose Shut Down.

   b. In the Shut Down Windows dialog box, select the Stand By option to enter STR mode.

   The following are the differences between STR power saving mode and Suspend (Power On Suspend) mode:

   a. STR is the most advanced Power Management mode.

   b. STR cuts all the power supplied to peripherals except to memory - max. power saving.

   c. STR saves and keeps all on-screen data including any executed applications to DDR SDRAM.

   d. In STR mode, you must push the power button (connected to the onboard PW-On of CFP pin), click your USB mouse buttons, or press your USB keyboard keys to wake up your system to the last display.

Section 4
BIOS SETUP

Main Menu

The ROM BIOS contains a built-in Setup program which allows user to modify the basic system configuration and hardware parameters. The modified data is stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will stay unchanged unless there is a configuration change in the system, such as hard drive replacement or a device is added.

It is possible for the CMOS battery to fail causing CMOS data loss. If this happens you will need install a new CMOS battery and reconfigure your BIOS settings.

> The BIOS setup screen and description are for reference only, and may not exactly match what you see on your screen. The contents of BIOS are subject to change without notice. Please visit our website for updates.

To enter the Setup Program :

Power on the computer and press the <Del> key during the POST (Power On Self Test). The BIOS CMOS SETUP UTILITY opens. (Figure 1)

Figure 1: CMOS Setup Utility

The main menu displays all the major selection items. Select the item you need to reconfigure. The selection is made by moving the cursor (press any direction (arrow key) to the item and pressing the 'Enter' key. An on-line help message is displayed at the bottom of the screen as the cursor is moved to various items which provides a better understanding of each function. When a selection is made, the menu of the selected item will appear so that the user can modify associated configuration parameters.

4-1 Standard CMOS Setup

Choose "STANDARD CMOS FEATURES" in the CMOS SETUP UTILITY Menu (Figure 2). Standard CMOS Features Setup allows the user to configure system settings such as the current date and time, type of hard disk drive installed, floppy drive type, and display type. Memory size is auto-detected by the BIOS and displayed for your reference. When a field is highlighted (use direction keys to move the cursor and the <Enter> key to select), the entries in the field can be changed by pressing the <PgDn> or the <PgUp> key.

Figure 2: Standard CMOS Setup

Notes:
- If the hard disk Primary Master/Slave and Secondary Master/Slave are set to Auto, the hard disk size and model will be auto-detected.
- The "Halt On:" field is used to determine when the BIOS will halt the system if an error occurs.

4-2 Advanced BIOS Features

Selecting the "ADVANCED BIOS FEATURES" option in the CMOS SETUP UTILITY menu allows users to change system related parameters in the displayed menu. This menu shows all of the manufacturer's default values for the board.

Pressing the [F1] key displays a help message for the selected item.

Figure 3: BIOS Features Setup

▶CPU Feature
  This field is available only for Pentium®CPU with Prescott core.

▶Hard Disk Boot Priority
  This item allows you to select the hard disk boot priority.

CPU L1 & L2 Cache
This controls the status of the processor's internal Level One and Level Two cache.
Options: Enables, Disabled.

CPU L3
This controls the status of the processor's internal Level Three cache.
Options: Enables, Disabled.

Hyper-Threading Technology
Enables the CPU Hyper-Threading Technology.
Options: Enables, Disabled.

> Note: It is recommend to enable Hyper-Threading Technology on system with Windows XP and Linux 2.4 and disabling it for legacy OS.

First /Second/Third/Other Boot Device
The BIOS attempts to load the operating system from the devices in the sequence selected in these items.
Options: Floppy, LS120, Hard Disk, CDROM, ZIP100, USB-FDD, USB-CDROM, LAN, Disabled.

Boot Other Device
When enabled, the system searches all other possible locations for an operating system if it fails to find one in the devices specified under the first, second, and third boot devices.
Options: Enabled, Disabled.

Boot Up Floppy Seek
If this item is enabled, it checks the size of the floppy disk drives at start-up time. You don't need to enable this item unless you have a legacy diskette drive with 360K capacity.
Options: Enabled, Disabled.

Boot Up NumLock Status
This controls the state of the NumLock key when the system boots. The default is On.
On: The keypad acts as a 10-key pad.
Off: The keypad acts like cursor keys.

Security Option
This category allows you to limit access to the System and Setup, or just to Setup. The default is Setup.
System   The system will not boot and access to Setup will be denied unless the correct password is entered at the prompt.
Setup   The system will boot, but access to Setup will be denied unless the correct password is entered at the prompt.

APIC Mode

This item allows you to enable APIC (Advanced Programmable Interrupt Controller) functionality. APIC is an Intel chip that provides symmetric multiprocessing (SMP) for its Pentium systems.

Options: Enabled, Disabled.

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

The S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance. S.M.A.R.T. Software resides on both the disk drive and the host computer.   If a device failure is predicted, the host software, through the Client WORKS S.M.A.R.T applet, warns the user of the impending condition and advises appropriate action to protect the data.

Options: Enabled, Disabled.

Full Screen LOGO Show

This item allows you determine Full Screen LOGO display during POST.

Options: Enabled, Disabled.

4-3 Advanced Chipset Features

Choose the "ADVANCED CHIPSET FEATURES" option in the CMOS SETUP UTILITY menu to display following menu.

Figure 4: Chipset Features Setup

DRAM Timing Selectable
For setting DRAM Timing, select By SPD to follow Intel PC DDR SDRAM Serial
Presence Detect Specification.
Options: Manual, By SPD.

CAS Latency Time
This item specifies the number of clock cycles needed after a Column Address Strobe
(CAS) signal before data can be read.
Options: 2, 2.5, 3, Auto.

DRAM RAS# to CAS# Delay
This item sets the timing parameters for the system memory such as the CAS (Column
Address Strobe) and RAS (Row Address Strobe).
Options: 2, 3, 4, 5, Auto.

DRAM RAS# Precharge
This item refers to the number of cycles required to return data to its original
location to close the bank or the number of cycles required to page memory before
the next bank activate command can be issued.
Options: 2, 3, 4, 5, Auto.

Precharge Delay (tRAS)
This item specifies the number of clock cycles needed after a bank active command
before a precharge can occur (sets the minimum RAS pulse width.).
Options: Auto, 4 ~ 15.

System BIOS Cacheable
This item allows the system BIOS to be cached in memory for faster execution.
Options: Disabled, Enabled.

Video BIOS Cacheable
This item allows the video BIOS to be cached in memory for faster execution.
Options: Disabled, Enabled.

▶PCI Express Root Port Function
  This field is for PCI Express root port function settings.

4-4 Integrated Peripherals

Figure 5: Integrated Peripherals

Intel RAID Boot ROM (Optional) /ITE RAID Boot ROM (Optional) /Marvell Lan Boot ROM
Enable/disable the onboard Intel RAID/ITE RAID/LAN Boot ROM.
Options: Enabled, Disabled.

▶OnChip IDE Device
  Scroll to OnChip IDE Device and press <Enter>. The following screen appears:

IDE HDD Block Mode
IDE Block Mode allows the controller to access blocks of sectors rather than a
single sector at a time. The default is Enabled.
Options: Enabled, Disabled.

IDE DMA transfer access
Automatic data transfer between system memory and IDE device with minimum CPU
intervention. This improves data throughput and frees CPU to perform other tasks.
Options: Enabled, Disabled.

On-Chip Primary (Secondary) PCI IDE
The mainboard supports two channel of ordinary IDE interface. Select "Enabled"
to activate each channel separately.

Note: If you do not use the onboard IDE connector, set the Onboard Primary
      (Secondary) PCI IDE to "Disabled".

IDE Primary/Secondary Master/Slave PIO
The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4)
for each of the four IDE devices that the onboard IDE interface supports. Modes 0
to 4 provide successively increased performance. In Auto mode, the system
automatically determines the best mode for each device.
Options: Auto, Mode 0 ~ 4.

IDE Primary/Secondary Master/Slave UDMA
Select the mode of operation for the IDE drive. Ultra DMA-33/66/100 implementa-
tion is possible only if your IDE hard drive supports it and the operating environ-
ment includes a DMA driver. If your hard drive and your system software both
support Ultra DMA-33/66/100, select Auto to enable UDMA mode by BIOS.
Options: Auto, Disabled.

*** On-Chip Serial ATA Setting ***

SATA Mode (For ICH6R only)

This item allows you to select Serial ATA Mode.

Options: IDE, RAID, AHCI.

ŠThe following screen shows SATA Mode assigned to "RAID".

> x
> x

Note: O/S driver for this RAID feature is available only for Windows XP, please check future updates for other O/S support.

On-Chip Serial ATA

This option is available only when SATA mode is set to "IDE". Combined mode will force SATA to replace one of the traditional IDE Primary or Secondary ports. Enhanced mode allows Serial ATA to work simultaneously with Parallel -ATA. Options: Disabled, Auto, Combined Mode, Enhanced Mode, SATA Only.

ŠThe following screen shows On-chip Serial ATA assigned to "Auto".

> x
> x

PATA IDE Mode

This option is available only when On-chip Serial ATA is in Combined mode. Assigning "Primary" will make PATA IDE the Primary port and the remaining SATA as Secondary port. Similarly, assigning "Secondary" will make PATA IDE the Secondary port and SATA as Primary port.

ŠThe following screen shows SATA Mode assigned to "IDE" and On-chip Serial ATA assigned to "combined Mode".

▸ Onboard Device Setup
Scroll to Onboard Device Setup and press <Enter>. The following screen appears:

USB Controller
Enables the USB controller.
Options: Disabled, Enabled.

USB 2.0 Controller
Enables the EHCI (USB2.0) controller.
Options: Disabled, Enabled.

USB Keyboard Support
Enable/Disable support for USB keyboard under DOS.
Options: Auto, Enabled, Disabled.

USB Mouse Support
Enable/Disable support for USB mouse under DOS.
Options: Enabled, Disabled.

AC97 Audio
This item allows you disable the chipset on-chip AC97 Audio.
Options: Auto, Disabled.

Game Port Address
Select an address for the Game port.
Options: 201, 209, Disabled.

Marvell LAN Device
Enables the onboard LAN feature.
Options: Enabled, Disabled.

ITE 8212 Device (Optional)
Enables the onboard ITE 8212 Raid feature.
Options: Enabled, Disabled.

▶ SuperIO Device
Scroll to SuperIO Device and press <Enter>. The following screen appears:

Onboard FDC Controller
Select "Enabled" if you wish to use onboard floppy disk controller (FDC).   If you install
an external FDC or the system has no floppy drive, select "Disabled "in this field.
Options: Enabled, Disabled.

Onboard Serial Port 1/2
Select an address and corresponding interrupt for the first and second serial ports.
Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

UART Mode Select
This field configures the 2nd serial port for IR application. Select the required IR
protocol or select "Normal" to disable IR mode.
Options: Normal, IrDA and ASKIR.

Onboard Parallel Port
This field allows the user to configure the LPT port.
Options: 378/IRQ7, 278/IRQ5, 3BC/IRQ7, Disabled.

Parallel Port Mode
This field allows the user to select the parallel port mode.
Options: SPP, EPP, ECP, ECP+EPP.

EPP Mode Select
This field allows the user to select the EPP mode for parallel port mode.
Options: EPP1.9, EPP1.7.

ECP Mode USE DMA
This field allows the user to select DMA1 or DMA3 for the ECP mode.
Options: DMA1, DMA3.

4-5 Power Management Setup

Choose the "POWER MANAGEMENT SETUP" in the CMOS SETUP UTILITY to display the following screen. This menu allows the user to modify the power management parameters and IRQ signals. In general, these parameters should not be changed unless it's absolutely necessary.

Figure 6: Power Management

ACPI Suspend Type
This item allows you to select S1(Power-On-Suspend) or S3(Suspend-To-RAM) function. When set to "S3(STR)" or "S1&S3" the following two fields become available. Options: S1(POS), S3(STR), S1&S3.

Run VGABIOS if S3 Resume
This determines whether or not to enable the system to run the VGA BIOS when resuming from S3(STR) or S1&S3.
Options: Auto, Yes, No.

S3 KB Wake-up Function
This determines whether or not to enable keyboard/mouse activity to awaken the system from S3(STR) or S1&S3.
Options: AnyKey or Mouse, By PowerOn Func., AnyKey, Mouse.

POWER ON Function
Enables computer power on by keyboard, mouse, or hotkey activity.

Password:	Requires you to enter a password when using the keyboard to power on. Set the password in the next field "KB Power ON Password."
Hot KEY: (default)	Enables you to use a hot key combination to power on the computer. Set the hot key combination in the "Hot Key Power ON" field.
AnyKEY:	Enables you to set any keyboard activity to power on the computer.
BUTTON ONLY:	Requires you to push the computer power button to power on the system.
Keyboard 98:	Enables you to set the Windows 98 key to power on the system.

Keyboard Power ON Password
Press "Enter" to create a password that is required when you use the keyboard to power on the system. You must set the POWER ON Function to "Password" to be prompted for a password at power on.

Hot Key Power ON
Enables you to set a hot key combination to be used for powering on the system. The default is Ctrl-F1.
Options: Ctrl+F1 ~ Ctrl+F12.

PWRON After PWR-Fail
This item enables your computer to automatically restart or return to its last operating status after power returns from a power failure.

Off:	The system stays off after a power failure.
Former-Sts:	The system returns to the state it was in just prior to the power failure.

▶PCI Express PM Function
   This field is for PCI Express PM function settings.

Power Management
Use this to select your Power Management selection. The default is User define.

Max. saving:	Maximum power savings. Inactivity period is 1 minute in each mode.
Min. saving:	Minimum power savings. Inactivity period is 1 hour in each mode.

User define   Allows user to define PM Timers parameters to control power saving mode.

Video Off Method

This option allows you to select how the video will be disabled by the power management. The default is V/H Sync + Blank

V/H Sync + Blank: System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.

DPMS Support   Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.

Blank Screen   System only writes blanks to the video buffer.

Suspend Mode

Automatically, shuts off all devices except the CPU after a preset period of system inactivity.

Options: Disabled, 1 , 2, 4 ,6, 8, 10, 20, 30, 40 min and 1 hour .

HDD Power Down

Powers down the hard disk drive after a preset period of system inactivity.

Options: Disabled, 1 ~ 15 Min.

Soft-Off by PWR-BTTN

Use this to select your soft-off function. The default is Instant Off.

Instant Off :   Turns off the system instantly.

Delay 4 Second   Turns off the system after a 4 second delay. If momentary press of button, the system will go into Suspend Mode. To wake the system, press the power button again.

Wake-Up by PCI Card

An input signal form PME on the PCI card awakens the system from S3 suspend state.

Options: Enabled, Disabled.

Power On by Ring

When enabled, any modem activity awakens the system from soft-off state.

Options: Enabled, Disabled.

USB Wake-Up From S3
This item allows a USB device to wake-up the system from S3 suspend state.
Options: Enabled, Disabled.

Resume By Alarm
When set to Enable alarm resume, you can set the date (of month) and time (hh:mm:
ss), that will awaken a system which has been powered down.
Options: Enabled, Disabled.

4-6 PNP/PCI Configuration

This page lets the user to modify the PCI IRQ signals when various PCI cards are
inserted.
WARNING: Conflicting IRQ's may cause system unable to locate certain devices.

Figure 7: PNP/PCI Configuration Setup

Init Display First
This item is used to select whether to initialize the VGA or PCI first when the system
boots.
Options: PCI Slot, VGA, PCIEx.

Resources Controlled By

Determines what controls system PNP/PCI resources. The default is Auto (ESCD).

Manual: PNP Card's resources are controlled manually. The "IRQ Resources" field becomes available and you can set which IRQ-X and DMA-X are assigned to PCI and onboard devices.

Auto: BIOS assigns the interrupt resource automatically.

PCI/VGA Palette Snoop

This item is designed to overcome problems that may be caused by some nonstandard VGA cards.

Options: Enabled, Disabled.

*** PCI Express relative items ***

Maximum Payload Size

Set maximum TLP payload size for the PCI Express devices. The unit is byte.

Options: 128, 256, 512, 1024, 2048, 4096.

Interrupt requests are shared as shown below:

	INT A	INT B	INT C	INT D	INT E	INT F
AC97	V					
PCI 1	V					
PCI 2		V				
PCI 3			V			
PCI 4				V		
PCI-EXP1 (x16)	V					
PCI-EXP2 (x1)	V					
PCI-EXP3 (x1)		V				
Onboard LAN					V	
Onboard ITE RAID						V
Onboard USB1	V					
Onboard USB2		V				
Onboard USB3			V			
Onboard USB4				V		
USB 2.0	V					

IMPORTANT!
When using PCI cards on shared IRQ slots, make sure its drivers support "Shared IRQ" or that the cards do not need IRQ assignments. IRQ conflicts between the two PCI groups will make the system unstable or cards inoperable.

4-7 PC Health Status

Figure 8: PC Health Status

Show PC Health in POST
When this function is enabled the PC Health information is displayed during the
POST (Power On Self Test).
Options: Enabled, Disabled.

ACPI Shutdown Temperature
This is the temperature that the computer will turn off the power to combat the
effects of an overheating system. (requires ACPI to be enabled in Power Manage-
ment BIOS and ACPI compliant operating system.) The default is Disabled.
Options available are 60/140°F to 90°C/194°F in increments of 5°C.

Current System/CPU Temperature
Displays the current system/CPU temperature.

Thermal Stick Temperature
Displays the current thermal stick temperature.

Current CPU/Chassis/Power FAN Speed
Displays the current speed of the CPU, chassis, and power fan speed in RPMs.

Vcore (V)
The voltage level of the CPU (Vcore).

VAGP (V)
The voltage level of power supplied to VGA card.

VDIMM(V)
The voltage level of the DRAM.

VBAT(V)
The voltage level of the battery.

+ 12V, VCC, 5VSB(V)
The voltage level of the switching power supply.

CHASSIS Smart Fan Control
This item lets you define a chassis temperature that the system will maintain by smartly adjusting the chassis fan.
Options: Disabled, 36℃/95℉, 40℃/104℉, 45℃/113℉, 50℃/122℉, 55℃/131℉.

CPU Fan Auto Control
This item lets you define a CPU temperature that the system will maintain by smartly adjusting the CPU fan.
Options: Disabled, 36℃/95℉, 40℃/104℉, 45℃/113℉, 50℃/122℉, 55℃/132℉.

4-8 Power BIOS Features

This page lets you adjust various parameters to obtain improved performance for overclocking.

Warning：
Overclocking requires expert knowledge and risks permanent damage to system components. We recommend you leave these parameters at their default values for proper operation.

[12X]

Figure 9: PowerBOIS Features

Auto Detect PCI Clk
When enabled the mainboard automatically disables the clock source for a PCI slot which does not have a module in it, reducing EMI (ElectroMagnetic Interference).
Options: Enabled, Disabled.

Spread Spectrum Modulated
If you enable spread spectrum, it can significantly reduce the EMI (ElectroMagnetic Interference) generated by the system.
Options: Enabled, Disabled.

Watching-Dog Function
If you select "Enabled" and overclock fail before POST code 26h, the system will reset automatically by default configuration.
Options: Enabled, Disabled.

CPU CLOCK/SPEED

Enables you to increment the CPU's clock generator at 1MHz step. This works together with CPU Clock Ratio (below) to set the CPU operating frequency.

CPU Clock Generator x CPU Clock Ratio = CPU Frequency

For example, if you have a processor that is rated at 2.4GHz and the clock generator is 200MHz, then 200MHz x 12 = 2.4GHz

Press <Enter> to display the following screen:

Key in the DEC (decimal) number for the CPU CLOCK/SPEED.

Note: Overclocking failure will cause no display on the monitor. To overcome this switch off the power supply and switch on again. Restart the system, press and hold <Insert> key. This will revert the BIOS to default or initial setting.

Real Time Turbo Mode

This sets a value CPU CLOCK generator will jump to when the system is experiencing a heavy load. Options available depend on system FSB.

CPU Clock	
	Disabled, 134MHz, 137MHz, 140MHz, 142MHz, 146MHz, 150MHz
	Disabled, 202MHz, 206MHz, 210MHz ,214MHz

PCI Express Freq Control

Enables you control the PCI Express frequency to the host bus or manually tune its frequency .

Options: Auto, Enabled, Disabled.

PCI Express Freq

Enables you to subtle tune the PCI Express frequency at increments of 1MHz step.

Press <Enter> to display the following screen:

Key in the DEC (decimal) number for the PCI Express subtle tuning.

System Memory Frequency
Enables you to select a ratio of the DDR DRAM to match the installed DRAM
frequency 333/400MHz. We recommend that you leave this item at the default value.
Options available depend on system FSB.

CPU Clock			
	4:5 => DDR333	2:3 => DDR400	Auto => DDR400 (by SPD)
	6:5 => DDR333	1:1 => DDR400	Auto => DDR400 (by SPD)

CPU Clock Ratio
Use this item to select a multiplier to set the CPU frequency. See CPU CLOCK/
SPEED item above for explanation.

Key in the DEC (decimal) number for the CPU Clock Ratio.

In the following items, "Default Voltage" indicates the original factory
value, and "New Voltage" indicates the value that you assign.

CPU Vcore Voltage
This item allows you to adjust the CPU Vcore voltage.
Options: -0.100V to +0.2875V in 0.0125V increments. We recommend that you leave
this at the default value.

DIMM Voltage

This item allows you to adjust the DIMM slot voltage.

Options: +0.00V to +0.70V in 0.10V increments. We recommend that you leave this at the default value.

4-9 Defaults Menu

Selecting "Defaults" from the main menu shows you two options which are described below

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

4-10 Supervisor/User Password Setting

This function lets you set either Supervisor or User Password, or both, to prevent unauthorized changes to BIOS menus.

supervisor password: full rights to enter and change options of the setup menus.

user password: only enter but no rights to change options of the setup menus.

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:

Type the password, up to eight characters in length, 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 a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to key in each time you enter Setup. This prevents an unauthorized person from changing any part of your system configuration.
Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.
You can determine when the password is required within the Advanced BIOS Features Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

4-11 Exiting BIOS

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Section 5
RAID CONFIGURATION (Optional)

Introduction

This section gives a brief introduction on RAID-related background knowledge and a general procedure to setup RAID system on this mainboard.

RAID Basics

RAID (Redundant Array of Independent Disks) is a method of combining two or more hard disk drives into one logical unit known as a RAID array. The advantage of RAID is to provide better performance or data fault tolerance. Fault tolerance is achieved through data redundant operation, where if one drives fails, a mirrored copy of the data can be found on another drive. This can prevent data loss if the operating system fails or hangs.

Below is an example of a RAID array with 2 drives.
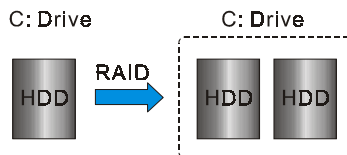
The individual disk drives in an array are called "members". All disk members in a formed disk array are recognized as a single physical drive to the operating system.

Hard disk drives can be combined together through a few different methods. The different methods are referred to as different RAID levels. Different RAID levels represent different performance levels, security levels and implementation costs. The table below briefly introduced these RAID levels.

RAID Level			
RAID 0 (Striping)	2	Number drivers * Smallest size	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection
JBOD (Spanning)	2	Sum of All driver s	No data protection and performance improving, but disk capacity fully used.

RAID 0 (Striping)

RAID 0 reads and writes sectors of data interleaved between multiple drives. If any disk member fails, it affects the entire array. The disk array data capacity is equal to the number of drive members times the capacity of the smallest member. The striping block size can be set from 4KB to 64KB. RAID 0 does not support fault tolerance.

RAID 1 (Mirroring)

RAID 1 writes duplicate data onto a pair of drives and reads both sets of data in parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to redundancy, the drive capacity of the array is the capacity of the smallest drive. Under a RAID 1 setup, an extra drive called the "spare drive" can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, if any RAID 1 drive fails, data access will not be affected as long as there are other working drives in the array.

JBOD (Spanning)

A spanning disk array is equal to the sum of the all drives when the drives used are having different capacities. Spanning stores data onto a drive until it is full, then proceeds to store files onto the next drive in the array. When any disk member fails, the failure affects the entire array. JBOD is not really a RAID and does not support fault tolerance.

Others

Other RAID derivatives are RAID 10 and RAID 5. These RAID levels require more than 2 drives to operate, combining the benefits of RAID 0 and RAID 1.

This mainboard is equipped with the following RAID controllers:

1. (Optional) Intel SATA RAID from ICH6R chip (SATA1/ SATA2/SATA3/SATA4)
2. (Optional) ITE PATA RAID for IDE from IT8212F (IDE2/ IDE3)

Each of these controllers has their own unique RAID BIOS setup and Windows software.

> Note: Before you proceed, identify which RAID controller your HDD drives are connected to in order to ensure a successful installation.

Intel ICH6R RAID features

- Support RAID 0, 1
- RAID 1 spare and auto-rebuild support
- RAID 1 mirror restore without user interaction
- Support for 2 RAID arrays on 4 ports
- Support "RAID Ready" – pre-install RAID on one single drive and upgrade to RAID arrays in the future when more drives are added.
- Intel Application Accelerator - Powerful software for RAID control and management under Windows environment
- Support "Hot-plug" – disconnect and rebuild RAID on-the-fly
- Support Intel Matrix RAID technology – Segments the HDD into separate RAID volumes. (See diagram below)

Note: For optimum system performance on 2 SATA drives we recommend to use Intel's Matrix RAID configuration. See Appendix D in this manual for a Quick Guide to set up Intel Matrix RAID.

ITE RAID features

- Compatible with the ATA/ATAPI-6 specification and supports two IDE channels with 4 drives.
- Supports ANSI ATA proposal PIO modes 0, 1, 2, 3, 4 with flow control, DMA modes 0, 1, 2 and Ultra DMA modes 0, 1, 2, 3, 4, 5, 6.
- 512 bytes FIFO for data transfer per IDE channel.
- Supports RAID 0/1/0+1 function.
- Supports JBOD function.
- Supports scatter/Gather function for DMA/UDMA transfer.
- Supports per-fetch and post-write function for PIO mode per IDE channel.

RAID Configuration

Enable RAID Function

For any RAID controller, the general procedure to setup a RAID system is shown below:

Step 1:
Create RAID Array
(BIOS)

Step 2:
Prepare driver floppy

Step 3:
Install O/S into RAID disk

Step 4:
Install RAID Software for Windows

Optional
(for installing WinXP/2000/NT4 only)

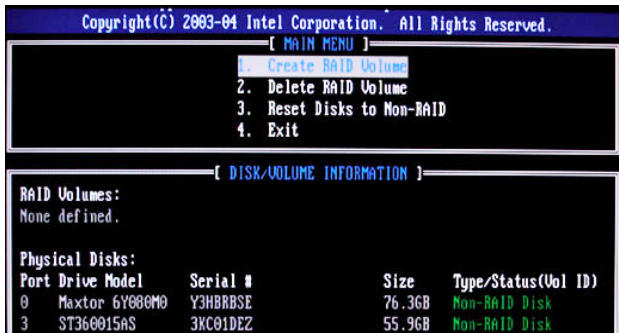Note: If you are not installing O/S into the RAID disks, you may skip Step 2 & Step3.
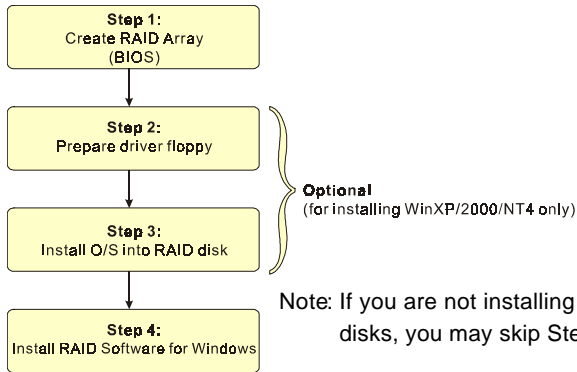
Step 1: Create RAID Array

RAID arrays are created using the RAID controller's BIOS utility.

▶ (Optional) For Intel ICH6R

1. Under CMOS setup, Integrated Peripherals section, set "SATA mode" to RAID, set "Intel RAID Boot ROM" to Enabled and restart the system.

2. Wait for the following screen to appear. Press "CTRL-I" key to enter its BIOS configuration utility.

```
Copyright(C) 2003-04 Intel Corporation.  All Rights Reserved.
═══════════════════[ MAIN MENU ]═══════════════════
                 1.  Create RAID Volume
                 2.  Delete RAID Volume
                 3.  Reset Disks to Non-RAID
                 4.  Exit

═══════════════[ DISK/VOLUME INFORMATION ]═══════════════
RAID Volumes:
None defined.

Physical Disks:
Port Drive Model      Serial #              Size    Type/Status(Vol ID)
0    Maxtor 6Y080M0   Y3HBRBSE              76.3GB  Non-RAID Disk
3    ST360015AS       3KC01DEZ             55.9GB  Non-RAID Disk
```

3. Refer to Appendix C-1 for details about creating RAID array using this utility.

4. After the RAID array is created, press "Esc" to exit.

▶ (Optional) For ITE IT8212F IDE RAID

1. Under CMOS setup, Integrated peripherals section, set "ITE8212 device" to Enabled, set "ITE RAID Boot ROM" to Enabled and restart the system.

2. Wait for the following message to appear during boot-up:

Press <CTRL-F> to enter RAID utility.

An easy-to-use screen will appear with the following choices in the top left:

3. Refer to Appendix C-2 for details about creating RAID array using this utility.

4. After the RAID array is created, press "Esc" to exit.

Step 2: Prepare driver floppy

When installing Windows XP/2000/NT4.0 into any RAID disk, the O/S setup will require a floppy disk containing the RAID driver. This step will show you how to prepare this driver floppy. There are 2 methods to prepare this floppy:

▶ Method 1

1. Insert the bundled CD into the CD-ROM drive

2. Boot the system from the CD-ROM

3. A menu of driver for various RAID controllers will appear

4. Insert a blank floppy into the A:drive

5. Select the appropriate RAID controller to begin copy into the floppy

▶Method 2

1. Locate another computer and insert the bundled CD into its CD-ROM drive.

2. A main menu screen will appear (Autorun feature)

3. Select the page "RAID floppy" as shown below
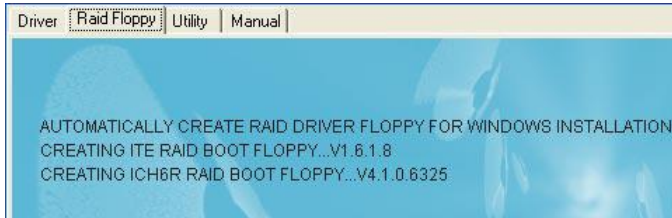
4. Insert a blank floppy into the A:drive

5. Click on the required driver to begin copy into the floppy

Step 3: Install O/S into RAID disk

Continue to install Windows XP/2000/NT4.0 as normal. When requested by Windows Setup for RAID driver, insert the floppy created earlier in Step 2.

Step 4: Install Software utility for Windows

After the O/S has been installed, you may install the RAID controller's driver and software. The RAID software is a Windows-based utility with graphical user interface that provides an easy operating tool to configure and manage RAID arrays.

1) Insert the bundled CD into the CD-ROM drive.

2) When the main menu appears, click on the RAID driver corresponding to the controller you have configured in Step 1. See driver installation in section 6 for more details.

Note: For information on using the software utility, refer to the user guide in the bundled CD.

Section 6
DRIVER INSTALLATION

Easy Driver Installation

Once the operating system has been installed, you need to install the drivers for the mainboard.

Insert the bundled CD into the CD-ROM and the main menu screen will appear. The main menu displays links to the supported drivers, utilities and software.

▶Method 1

This item installs all drivers automatically.

▶Method 2

This item allows you to install the drivers selectively.

Step 1 : Click "INTEL CHIPSET INF FILES" to install chipset driver.

Step 2 : Click "REALTEK AUDIO Driver" to install audio driver.

Step 3 : Click "MARVELL GIGA LAN Driver" to install LAN driver.

Step 3 : Click "USB 2.0 Driver" to install USB 2.0 driver.

Step 4 : Click "INTEL ICH6R RAID Driver" to install Intel RAID driver. The
(Optional) "INTEL APPLICATION ACCELERATOR RAID EDITION" item is for Intel
RAID administrator.

Step 5 : Click "ITE RAID User Interface Installation" to install ITE RAID driver.
(Optional)

Note: Main menu varies depends on model you purchased.

Realtek Sound Manager Quick User-guide

Introduction

To obtain the best performance from your audio system, run the "Sound Manager" utility to adjust the settings to suit your needs. This section of the manual is intended to provide a quick user-guide to setup "Sound Manager". For more detailed information, refer to "Sound Manager manual" in the CD.

<Figure 1>

1. Right-click "Sound Effect" button on the task bar and select "Sound Manager".

Sound
Effect :

<Figure 2>

2. Select "Sound Effect" page to set the desired audio environment from the pull-down menu.

User's Manual

Intel *i915P* mainboard
for Intel Socket 775 processor

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