

# CHAINTECH

## 9CJS

**Intel® Socket 478  
Intel® 875P + ICH5R  
ATX Motherboard**

### User's Guide

Version 1.0



### *Declaration of Conformity*

According to 47 CFR, Parts 2 and 15 of the FCC Rules

The following designated product:

**EQUIPMENT: MAINBOARD**

**MODEL NO.: CT-9CJS**

is a Class B digital device that complies with 47 CFR Parts 2 and 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This declaration is given to the manufacturer:

CHAINTECH-EXCEL COMPUTER INC.  
4427 Enterprise St. Fremont, CA 94538, U.S.A.

<http://www.chaintechusa.com>

Chaintech President: Simon Ho

Signature:

A handwritten signature in black ink, appearing to be 'Simon Ho', written over a horizontal line.

**Federal Communications Commission Statement**

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- \* This device may not cause harmful interference.
- \* This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If this equipment is not installed and used in accordance with the manufacturer's instructions, it 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 harmful 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 to an outlet on a circuit different from that to which the receiver is connected.
- \* Consult the dealer or an experienced radio/TV technician for help.

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**Canadian Department of Communications Statement**

This digital apparatus does not exceed the Class B limits for audio noise emissions from digital apparatuses set out in the Radio Interference Regulations of the Canadian Department of Communications.

**Manufacturer's Disclaimer Statement**

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## Chapter 1 Introduction

### 1-1 Product Specifications

#### Processor

- Supports Intel® Socket 478 CPU with Hyper-Threading Technology
- Supports Intel® Pentium 4/Celeron system bus at 400/533/800MHz

#### Chipset

- Intel® 875P + ICH5R, supports Hyper-Threading Technology

#### Main Memory

- Supports four 184 pin DDR DIMMs up to 4GB
- Supports Dual-Channel DDR266/333/400 ECC memory and Performance Accelerated Technology (PAT)

#### Expansion Slots

- One 1.5V AGP slot for 8X/4X AGP
- Five 32-Bit PCI slots (v2.2 compatible)
- One CMR (Chaintech Multimedia Raiser) for Chaintech Multimedia Card (CMC)

#### On-board 7.1 Channel audio

- 24-bit resolution audio format support
- Sampling rates up to 96 KHz
- Multi-channel AC-link supported alternatively
- Supports SPDIF Out

#### Two UltraDMA-66/100 IDE Ports

- Supports PIO Mode 4 up to 16.6MBps, Multi -Word DMA Mode 2 and Ultra DMA Mode 5 up to 100MB/s with Bus Mastering
- Bus-Mastering software drivers for all common multi-tasking operating systems

#### On-board SATA RAID Controller

- Build-in ICH5R supports 2 Serial ATA devices for the highest data transfer rates (1.5 Gbps burst) with RAID 0 solution

#### On-board VIA VT6306 IEEE1394 Host Controller

- Serial bus data rates of 100,200 and 400 Mbps
- IEEE P1394a compliant and IEEE Std 1394-1995
- Programmable ATA/ATAPI interface supporting PIO modes 0-4, DMA modes 0-2 and Ultra DMA modes 0-4

#### Embedded USB 2.0 Host Controller

- Three EHCI USB 2.0 Controllers support total 8 USB 2.0/1.1 Ports
- Support USB 2.0 High-Speed Device @ 480 Mb/s Transfer Rates
- Optional USB adapters for additional USB 2.0/1.1 ports

#### Dual LAN: Intel CSA Gigabit LAN & Fast Ethernet Controller

- On-board Intel CSA GbE controller supports 10/100/1000 BASE-T Gigabit LAN
- On-board Realtek RTL8101L supports 10/100 Mb Fast Ethernet

#### On board Super I/O Controller

- ITE 8712 LPC I/O with system monitors hardware
- Two UARTs support serial ports and IR function (up to 115.2Kbps) for HPSIR and ASKIR
- One SPP/ECP/EPP parallel port
- One floppy disk drive connector supports up to 2.88MB

#### Boot-Block Flash ROM

- Award system BIOS support PnP, APM, DMI, ACPI, & Multi-device booting features

#### Embedded system monitoring

- 8 external voltage inputs
- 2 temperatures sensing for CPU and system
- 3 Fan speed (CPU, system and Case) monitoring

**1-2 Package Contents**

This product comes with the following components:

- |                 |     |
|-----------------|-----|
| 1. Motherboard  | x 1 |
| 2. I / O Shield | x 1 |
| 3. Round Cable  |     |

**Include:**

- |                                    |     |
|------------------------------------|-----|
| - IDE Cable (60cm)                 | x 2 |
| - Floppy Cable (60cm)              | x 1 |
| 4. Serial ATA cable                | x 2 |
| 5. Serial ATA Power Cable          | x 1 |
| 6. CMC (Chaintech Multimedia Card) | x 1 |

**Include:**

- |                       |     |
|-----------------------|-----|
| - Fiber Optical Cable | x 1 |
|-----------------------|-----|

## 7. CBOX3™ Package

**Include:**

- |                            |     |
|----------------------------|-----|
| - 5-1/4" CBOX™3            | x 1 |
| - USB 10-pin Cable         | x 2 |
| - Front Audio 10-pin Cable | x 1 |
| - 80-Port 10-pin Cable     | x 1 |
| - IEEE-1394 8-pin Cable    | x 1 |
| - Zenith Emblem            | x 1 |

## 8. Manual

**Include:**

- |                |     |
|----------------|-----|
| - User's Guide | x 1 |
| - EZ Manual    | x 1 |

## 9. Digidoc 80-Port POST Error Code List x 1

## 10. CD Box Package

**Include:**

- |                       |     |
|-----------------------|-----|
| - Driver              | x 1 |
| - Value-pack 2003     | x 1 |
| - Thermal grease pack | x 1 |

**1-3 CHAINTECH's Special Features:****CBOX™ 3**

- Fits in any 5-1/4" drive bay
- "DigiDoc" displays CPU's temperature and 80-port Post Code during POST at boot up
- Integrates 6 in 1 Card Reader with USB 2.0, IEEE1394, Headphone, Microphone and more
- Infrared accompanies with Chaintech Handigator sets you free from annoying wires

**Include:**

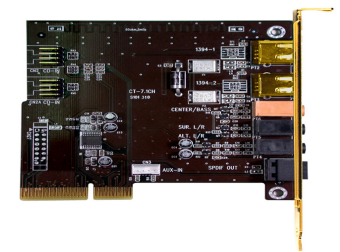
- |                                      |     |
|--------------------------------------|-----|
| USB (1.1 / 2.0 compliant) Ext. ports | x 2 |
| Earphone (Ø 3.5mm) phone jack        | x 1 |
| MIC – in (Ø 3.5mm) phone jack        | x 1 |
| IEEE-1394 Ext. port                  | x 1 |
| DigiDoc System Monitoring Display    | x 1 |
| IR (Infrared)                        | x 1 |
| 6 in 1 Card Reader                   | x 1 |

**Handigator**

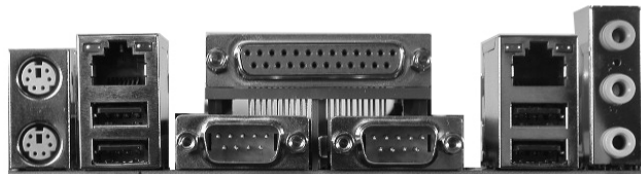
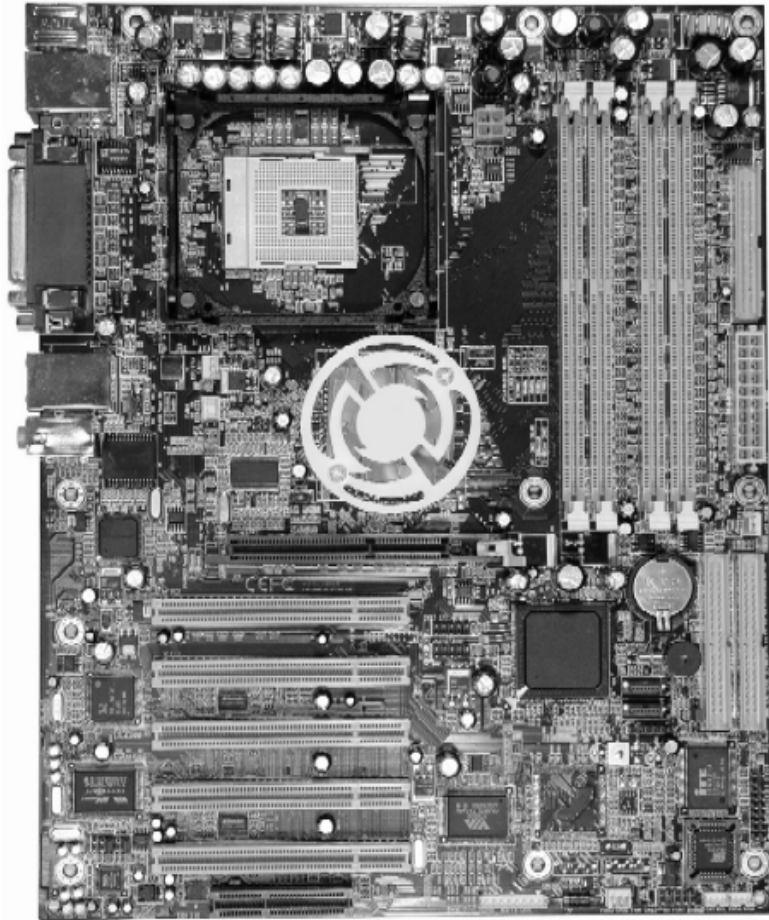
Handigator offers the function of a mouse, hot keys to Internet access (browser, E-mail etc) and Win DVD.

**CMC (Chaintech Multimedia Card)**

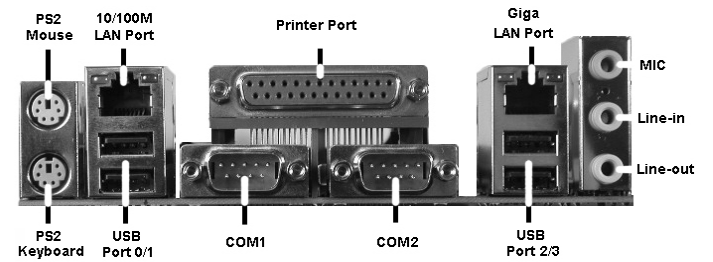
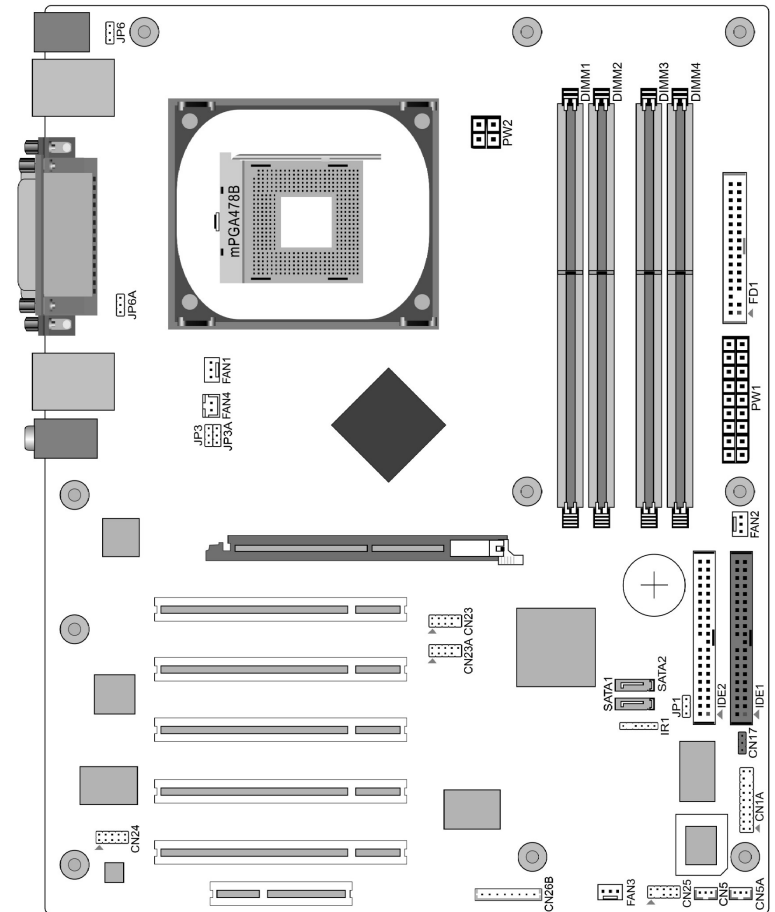
CMC which fits right into Chaintech proprietary CMR (Chaintech Multimedia Raiser) integrates most multimedia functions within one card, including two IEEE 1394 ports, three Audio jacks for 7.1 channel surround and one S/PDIF port for digital audio output.



1-4 9CJS Motherboard Diagram



1-5 9CJS Motherboard Layout



## Chapter 2 Hardware Setup

If your motherboard has already been installed in your computer you may still need to refer to this chapter if you plan to upgrade your system's hardware.

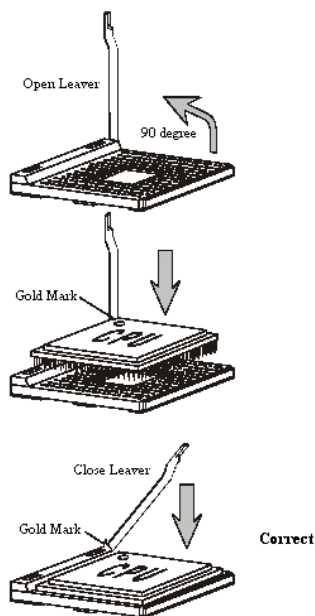


**This motherboard is electrostatic sensitive. Do not touch without wearing proper safety gadget and make sure to disconnect the power cable from the power source before performing any work on your motherboard. Not doing so may result in electrical shock!**

### 2-1 Installing a CPU Processor for Socket 478

The Intel® Socket 478, designed for the Pentium 4 processor, has been incorporated as a standard motherboard specification. This motherboard will support Intel® Pentium 4 CPUs with its embedded Hyper-Threading technology. To insert your CPU into Socket 478 please follow the steps below:

1. Locate the 478-pin CPU socket on the motherboard.
2. Unlock the socket by pressing the lever sideways, and then open it up to a 90-degree angle.
3. Locate a Gold Mark on the top surface of the CPU, which is close to one of the CPU corners. The same corner will also be cut off, leaving a noticeable notch in the CPU's corner. These markings indicate Pin 1 on the CPU.
4. Gently insert the CPU with Gold Mark/Pin 1 at the same corner of Socket 478, which is located close to the end of the lever. Allow the weight of the CPU to push itself into place. Do not apply extra pressure as doing so may result in damaging your CPU.
5. When the CPU is correctly inserted, close the lever with your finger on top of the CPU to make sure the CPU is properly embedded into the socket.
6. Insert an appropriate heat sink and fan for proper Heat dispatch.



**Installing a standard Intel® specified heat sink with cooling fan is necessary for proper heat dissipation from your CPU. Failing to install these items may result in overheating and possible burnout of your CPU.**



**In order to boot up with a newly installed CPU, AC Power must be switched off before installation.**

### 2-2 Setting your CPU's Parameters

#### “Hyper-Threading Technology”

Basic requirements for Hyper-Threading Technology:

- 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; and
- OS:** An operating system that supports HT Technology.

#### Boxed Intel Pentium 4 Processor naming convention

##### ● Letter Designators for overlapping speeds

- This data not reflected in Spec Update

Intel Pentium 4 Processor with FSB	HTT	For overlapping FSB speeds uses letter designator	Example Intel Pentium 4 Processor at
800 MHz	Yes	“C”(if overlapping with 500 MHz or 400 MHz FSB)	2.40C GHz (w/800MHz FSB)
533 MHz	Yes	No overlapping speeds	3.06 GHz (w/533MHz FSB)
533 MHz	No	“B”(if overlapping with 400 MHz FSB)	2.40B GHz (w/533MHz FSB)
400 MHz w/512K	No	“A”(if overlapping with 400 MHz w/256K cache)	2A GHz (w/ 400MHz FSB)
400 MHz w/256K Cache	No	None	2 GHz (w/400MHz FSB and 256K cache)

#### Electrical/Power Requirements for the Intel Celeron Processor

##### ● Specifications for Celeron 400 MHz FSB

- See the latest Celeron Processor EMTS for specifications on other speeds

Frequency	VID (V) Max	ICC Max (A)	TDP (W)	Tcase Min(C)	Tcase Max(C)
2.30 GHz (1,3)	1.525	49.2	58.3	5	70
2.40 GHz (1,3)	1.525	50.7	59.8	5	71
FMB1 (1,3)	1.525	60	64	5	70
FMB2 (2,3)	1.525	70	82	5	70

1. This processor will ship under multiple VIDs of 1.475, 1.500, and 1.525 with 1.525 being the max voltage.

2. This processor will ship under multiple VIDs of 1.475, 1.500, 1.525, and 1.550 with 1.550 being the max voltage.
3. ICC, TDP, and Tcase are specified for highest VID only.

Refer to the Intel Celeron Processor with 128 KB L2 Cache on 0.13 Micron Process EMTS Addendum: 400 MHz System Bus Specifications for details.

#### Boxed Processor FSB Chipset Support

- 800 MHz FSB processors require a new chipset
- Willamette (0.18) processors are not supported on 875/865 chipsets

Processor	FSB	HTT	Supporting Chipsets	Non-Supporting Chipsets
Intel Pentium 4 Processor	800 MHz	Yes	875P, 865G/PE	865P, 850E, 845(all)
Intel Pentium 4 Processor	533 MHz	Yes	865G/PE/P, 850E, 845(all)	845GL
Intel Pentium 4 Processor (1.6AGHz, 1.8AGHz, 2.0AGHz and above) Intel Celeron Processor (2.0GHz and above)	533 MHz & 400 MHz	No	865G/PE/P, 850E, 845(all)	N/A
Intel Pentium 4 Processor (2.0GHz, 1.8 GHz, 1.6GHz and below) Intel Celeron Processor (1.8GHz and below)	400 MHz	No	850E, 845(all)	865 (all), 875P

#### Frequency Configuration:

With the latest user-friendly technology this motherboard enables users to setup main board's CPU parameters through an easy-to-use BIOS setup procedure. Now it is no longer necessary to change the various jumper settings as on conventional motherboard. After installing all your hardware into your PC system, you can manually configure your CPU clock ratio and CPU clock according to your processor's specifications: After turning on your system's power, enable the CMOS Setup Utility by pressing **delete key** when your BIOS identification screen appears. Then go to Frequency/ Voltage control option and select your CPU clock ratio and CPU clock speed (please refer to Chapter 3 for more details).

If you install a CPU on this motherboard, you must set the [External Clock Frequency] JP3 according to your processor types (See Section 2.4).

#### How to Derive your CPU Core Speed?

- CPU Core Speed = CPU Clock \* Core/Bus Ratio



You do not need to change voltage settings because this board will automatically set your CPU voltage.

#### Overclocking:

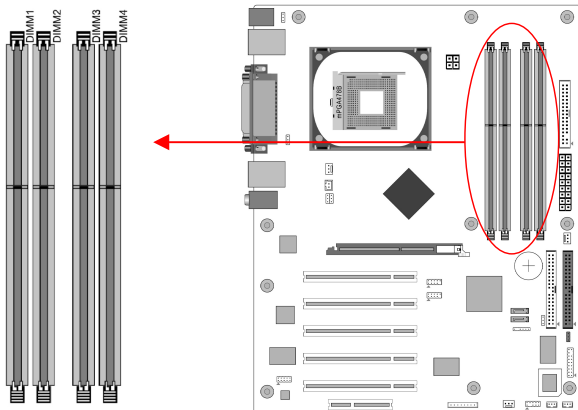


This motherboard is designed to support overclocking. However, please make sure your peripherals are able to tolerate such abnormal settings while CPU clock speed is overclocked. Any attempt to operate beyond product specifications is not recommended. We are not responsible for damages caused by inadequate operation or settings beyond product specifications.



### 2-3 Main Memory Configuration

This motherboard provides four 184pin Double Data Rate (DDR) Dual-In-line Memory Modules (DIMM) slots, which supports PC 1600/PC2100/2700/3200 DDR SDRAM modules up to 4GB. Install at least one DIMM module on the slots. Memory modules can be installed on the slots in any order. You can install either single- or double-sided modules to meet your own needs.



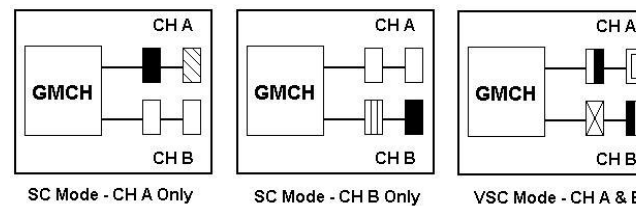
To install your DDR Modules please follow these steps below:

1. Unlock a DIMM socket by pressing the retaining clips outward. The DDR Modules has only one notch at the center of module. The DDR module will only fit in the right position.
2. Insert the DDR Module vertically into the DIMM slot, with the correct alignment. Then push it in until the golden finger on the memory module is deeply inserted into the socket.
3. The plastic clip on each side of the DIMM slot will automatically close to hold the DDR Modules in place.

### Memory Channel Modes

	Single Channel / Virtual Single Channel	Dual Channel
<b>DIMM Population</b>	No restrictions	Matching DIMM pairs
<b>Rank (Row) Size</b>	Size of one side of the DIMM populated in the channel (64MB – 512MB)	2x the size of one side of the DIMM populated in the channel (A or B) (128MB – 1GB)
<b>Number of Ranks (Rows)</b>	8 maximum	4 maximum
<b>Channel Size</b>	64 bits	128 bits
<b>Page Size</b>	Size read from DIMM (4KB, 8KB, 16KB)	2 x Size read from DIMM (8KB, 16KB, 32KB)
<b>Burst Length</b>	4 or 8	4

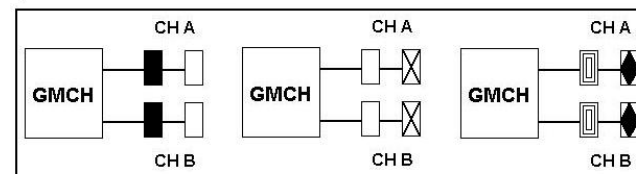
### Single Channel Mode



Single Channel (SC) mode is also referred to as Virtual Single Channel (VSC) mode.

**Note:** Memory channel speed determined by slowest DIMM populated in system

### Dual Channel Mode



Memory Channel	DIMM Slot Number
Channel A	DIMM 1
	DIMM 2
Channel B	DIMM 3
	DIMM 4

The following conditions *must* be met:

- Matched DIMM configuration in each channel
  - Same Density (128MB, 256MB, 512MB, etc.)
  - Same DRAM technology (128Mb, 256Mb, or 512Mb)
  - Same DRAM bus width (x8 or x16)
  - Both either single-sided or dual-sided
- Matched in both Channel A and Channel B memory channels
  - Populate symmetrical memory slots (Slot 0 or Slot 1)

The following conditions do *not* need to be met:

- Same brand
- Same timing specifications
- Same DDR speed

Symmetrical DIMMs *must* be identical for optimal performance

- Same DIMM density, eg 128MB, 256MB, 512MB, etc.
- Same DRAM Technology, eg 128M-bit, 256M-bit, etc.
- Same DRAM bus width, eg x8 or x16
- Single Sided or Dual Sided

**Note:** Memory interface speed will be set to lowest speed of memory populated

### Memory Characteristics

Optimize performance for single or dual channel is obtained with matched DIMM population

Table below shows DIMMs with same Organization and Density, but are non-matching as bus width, technology and/or external banks are different

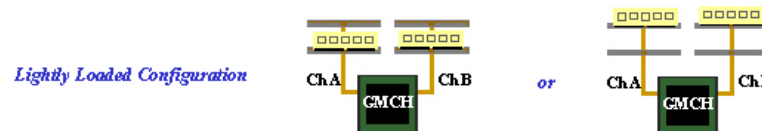
- Mixing these DIMMs will put platform into single channel mode

	Same Organization	Same Density	Different Bus Width	Different Technology	Same # of DRAM Banks
Non-Matched 128MB DIMMs	Organization	Density	Composition	Technology	External Banks
	16Mx64	128MB	16Mx8 * 8 pcs	128Mb	1
	16Mx64	128MB	16Mx16 * 4 pcs	256Mb	1
Non-Matched 256MB DIMMs	32Mx64	256MB	16Mx8 * 16 pcs	128Mb	2
	32Mx64	256MB	32Mx8 * 8 pcs	256Mb	1
	Same Organization	Same Density	Same Bus Width	Different Technology	Different # of DRAM Banks

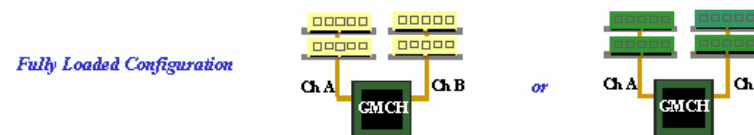
### Maximizing Performance

Optimal configurations for highest performance:

- Matched, DDR400, Double-sided DIMMs
- Dual Channel Mode (Symmetrical DIMM population)



- Matched, DDR400, Dual Channel Mode



When not using DDR400, highest performing configuration:

- Symmetrical DIMM population with matched double-sided DIMMs
- Lightly loaded memory population aids in higher performance
- x8 Bus Width and lower DIMM cache latency also assists in higher performance



Dual Channel memory configuration provides higher performance than Single Channel configurations

Matched DIMMs need to have identical density, DRAM technology, DRAM bus width, and equal number of memory banks

Optimal platform performance with Dual Channel, DDR400, matched DIMMs

- Fully loaded configurations can be single or double sided DIMMs
- Lightly loaded configurations need to be double sided DIMMs

When not using DDR400, best performance obtained with

- Symmetrical DIMM population and matched double-sided DIMMs
- Lightly loaded configuration

## 2-4 Connector and Jumper Reference Chart

Jump Connector	Function	Page
PW1 / 2	ATX Power Supply Connector	16
CN1A	Front Panel (Power / Rest / SPK...etc.) Connector	17
FD1	Floppy Connector	18
IDE1 / 2	IDE Hard-Disk Connector	19
JP1	CMOS Clear Jumper	19
JP6 / 6A	Disable/Enable USB 0/1, 2/3 Device Power ON Jumper	20
FAN 1 / 2 / 3 / 4	CPU / System / Case/ North Bridge Cooling Fan Connector (12V)	20
CN5 / 5A	Wake on LAN / Modem Connector	21
CN17	Blue LED Connector (5V)	22
CN23 / 23A	CBOX™3 Front USB Connector	22
CN24	CBOX™3 Front Audio Connector	23
CN25	CBOX™3 DigiDoc System Display Connector	23
IR1	IR Connector	24
CN26B	IEEE1394 Connector	24
JP3 / 3A	CPU Front Side Bus setting	25
SATA1 / 2	Serial ATA	25

## 2-5 Connector and Jumper Settings

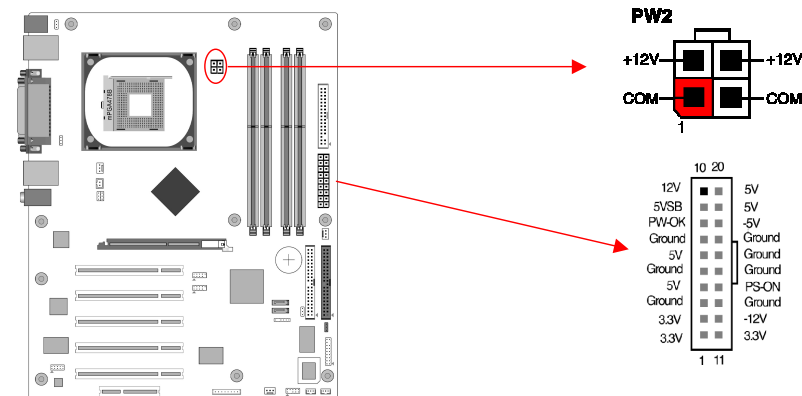
Connectors are used to link the system board with other parts of the system, including the power supply, the keyboard, and the various controllers on the front panel of the system case.



**The power supply connector is the last connection to be made while installing a motherboard. Before connecting the power supply, please make sure it is not connected to the power source.**

**All cables that provided by CHAINTECH come with a security-proof.**

### PW 1 / 2 (ATX Power Supply Connector):



The power cord leading from the system's power supply to the external power source must be the very last part connected when assembling a system. The ATX power supply provides a single 20-pin connector interface, which incorporates standard +/-5V, +/-12V, optional 3.3V and Soft-power signals. The Soft power signal, a 5V trickle supply is continuously supplied when AC power is available. When the system is in Soft-Off mode, this trickle supply maintains the system in its minimum power state.

The ATX 12V power supply has a new +12V (4-pin) and +5V / 3.3V (6-pin) auxiliary power connector to enable the delivery of more +12 VDC and + 5/ 3.3V VDC current to the motherboard.

### Power-On By Modem:

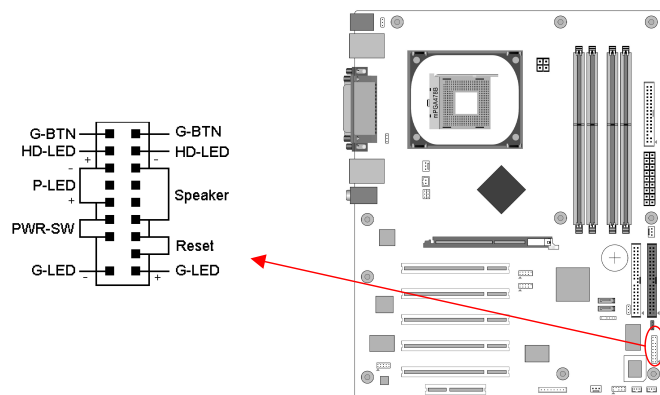
While in Soft-Off state, if an external modem ring-up signal is detected, the system will be activated and therefore can be remotely accessed. You may enable this function in BIOS's Power Management Setup menu. (See section 3. 5)

**Blinking LED in Suspend Mode:**

While in Suspend mode, the LED light on the front panel of your computer will flash. Suspend mode is entered by pressing the Green Override Power Button on your ATX case, or by enabling the Power Management and Suspend Mode options in BIOS's Power Management menu. (See section 3.5)

**Poly-fuse Over Current Protection:**

The poly-fuse protects the system from dangerous voltages that the system might be exposed to via keyboards or USB connectors. In case of such an exposure, the poly-fuse will immediately be disconnected from the circuit just like a normal fuse. After being disconnected for a certain period of time, the poly-fuse will return to its normal state and the keyboard or USB connector can function properly again. Unlike conventional fuses, the poly-fuse will not need to be replaced, relieving users from such inconveniences.

**CN1A (Front Panel Connector):****1. PWR-SW (Over-ride Power Button Connector):**

The power button on the ATX chassis can be used as a normal power switch as well as a device to activate the Advanced Power Management Suspend mode. This is a power-saving mode used for saving electricity when the computer is not in use for a long period of time. The Soft-OFF by PWR-BTTN function in BIOS's Power Management Setup menu must be set to **[Delay 4 Sec.]** to activate this function.

When the Soft-OFF by PWR-BTTN function is enabled, pressing the power button rapidly will switch the system to Suspend mode. Any occurrence of external activities such as pressing any keys on the keyboard or moving the mouse will bring the system back to Full-On. Pushing the button while in Full-On mode for more than **[4 seconds]** will switch the system completely off. See Over-ride Power Button Operation diagram.

**2. P-LED (Power LED Connector):**

The power indicator LED shows the system's power status. It is important to pay attention to the correct cables and pin orientation (i.e. Be careful not to reverse the order of these two connectors.)

**3. G-BTN/G-LED (Green Button Switch/LED Connector):**

Some ATX cases provide a Green button switch, which is used to put the system in Suspend mode. While in Suspend mode, the power supply to the system is reduced to a trickle, the CPU clock is stopped, and the CPU core is in its minimum power state. The system is activated whenever the keyboard or mouse is touched. The system will resume in various ways as defined by Power Management Setup screen in BIOS.



**For Green LED connector please refer to Section 2.7 CBOX™ 3**

**4. RESET (System Reset Switch Connector):**

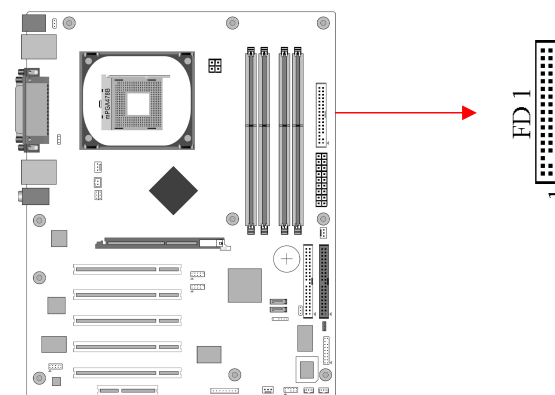
This connector should be connected to the reset switch on the front panel of the system case. The reset switch allows you to restart the system without turning the power off.

**5. SPEAKER (Speaker Connector):**

This 4-pin connector connects to the case-mounted speakers.

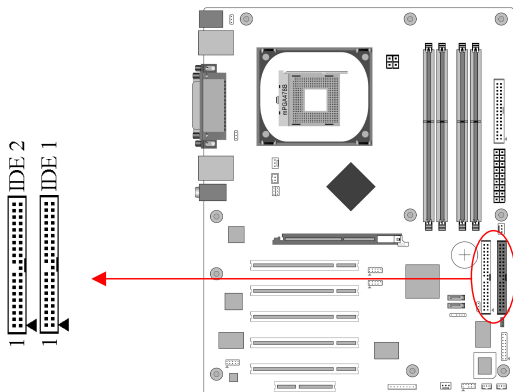
**6. HD-LED (IDE - Activity LED Connector):**

The IDE- activity LED lights up whenever the system reads/writes to the IDE devices.

**FD1 (Floppy Connector)**

The motherboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types. A Floppy disk drive of 34 pins is connected using this connector.

**IDE 1/2 (IDE Hard-Disk Connector)**



The motherboard has a 32-bit Enhanced PCI IDE and Ultra ATA66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra ATA66/100 function. This connector is used for connecting 40 pins of ATAPI devices.

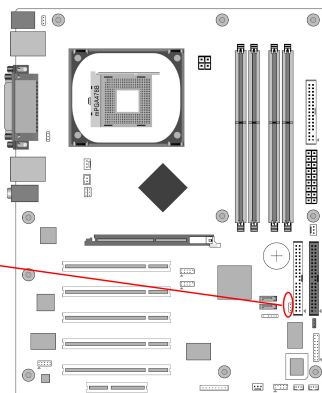
IDE 1 only connects two IDE devices. (**Primary** Master/Slave)

IDE 2 only connects two IDE devices. (**Secondary** Master/Slave)

Please refer to *Section 2-6 Serial ATA and Parallel ATA* for details.

**JP1 (CMOS Clear Jumper):**

Pin	Definition
1-2	Normal (default)
2-3	Clear CMOS Data

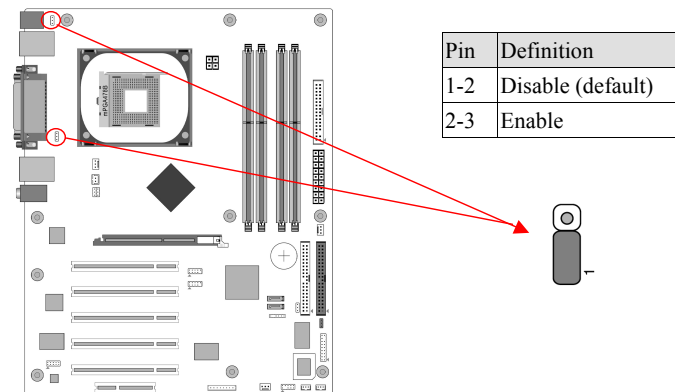


There is a CMOS RAM on board that has a power supply from external battery to keep the data and system configuration. To clear the contents of the CMOS, please follow the steps below.

1. Disconnect the system power supply from the power source.
2. Set the jumper cap at location [2-3] for <5 seconds>, and then set it back to the default position.

3. Connect the system's power and then start the system.
4. Enter BIOS's CMOS Setup Utility and choose Load Setup Defaults. Type [Y] and then press [Enter] to continue.
5. Set the system configuration in the Standard CMOS Setup menu.

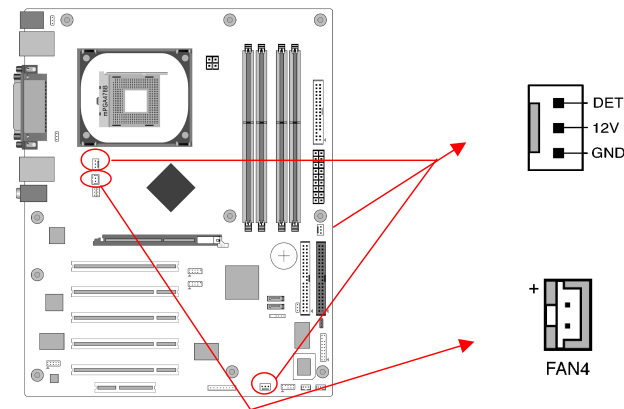
**JP6/JP6A (Enable/Disable USB 0/1, 2/3 Device Power ON Jumper)**



**JP6 → USB 0/1      JP6A → USB 2/3**

An USB keyboard hot key or an USB mouse-click can activate this board. To use this function, select a hot key of your choice at the USB Resume from S3 option under Wake Up Events in the BIOS's Power On Management screen. You must also set this jumper's cap to pins 2-3 to use this function.

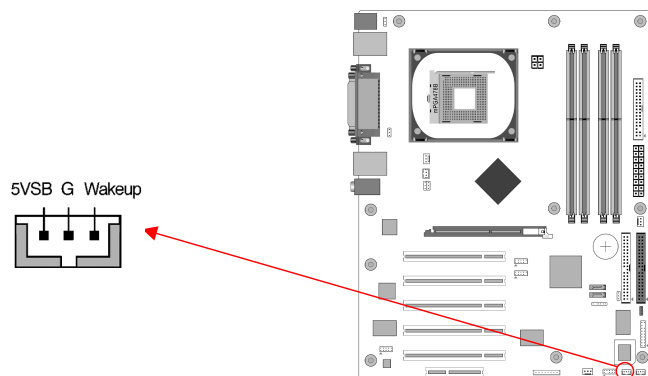
**FAN1/2/3/4 (CPU/System/ North Bridge Cooling Fan Connectors):**



The board's hardware management is able to detect the CPU and system fan speed in rpm (revolutions per minute). The wiring and plugging may vary depending on the

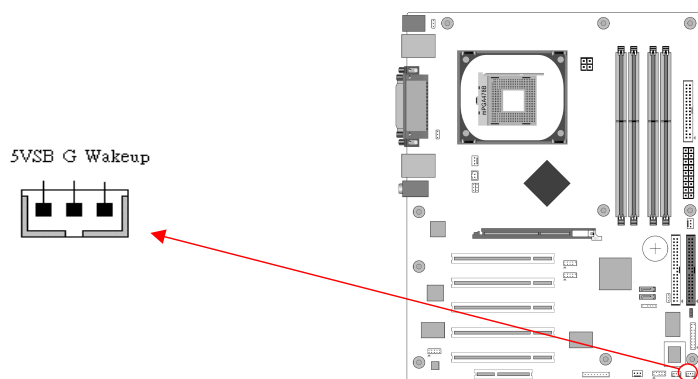
manufacturer. On standard fans, the red is positive (+12V), the black is ground, and the yellow wire is the rotation signal. Connect the north-bridge cooling fan to FAN3.

#### CN5 [WOL (Wake-on-LAN) Connector]:



Enable the Wake Up On LAN selection in BIOS's Power Management Menu to use this function. The capability to remotely manage PCs over networks is a significant factor in reducing administrative and ownership costs. Magic Packet technology is designed to give WOL function to LAN controller. This header is used to connect an add-in NIC (Network Interface Card) that provides WOL function to the motherboard.

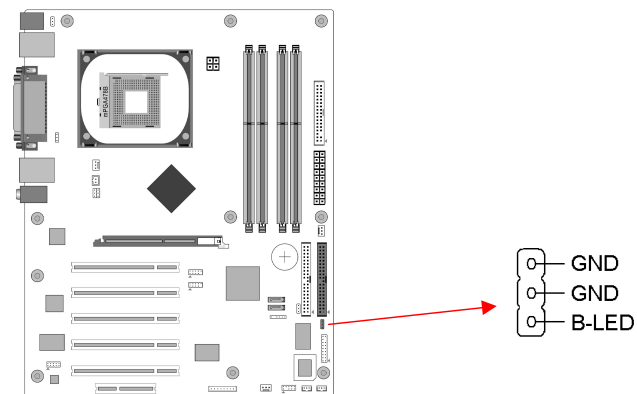
#### CN5A [WOM (Wake-on-Modem) Connector]:



Enable the Wake Up On Modem selection in BIOS's Power Management Menu to activate this function. This header is used to connect an add-in modem card, which

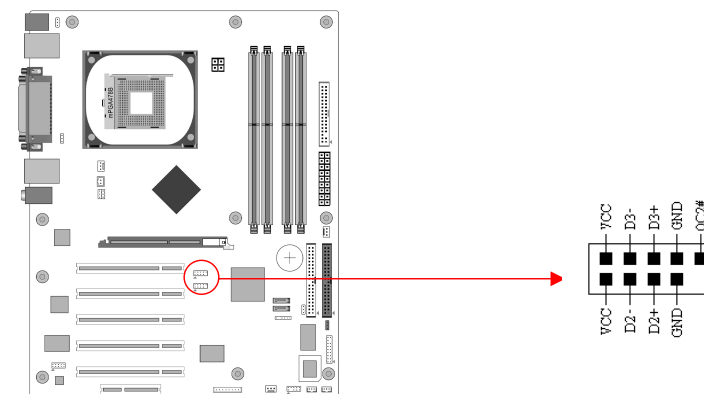
provides WOM function to the motherboard.

#### CN17 (Blue LED Connector)



This feature works exactly the same as the power indicator LED, of which both indicate the system's power status. The only difference is that this one is blue while the other one is red.

#### CN23/CN23A (CBOX™ 3 Front USB Connector for USB 2/3 and 4/5):



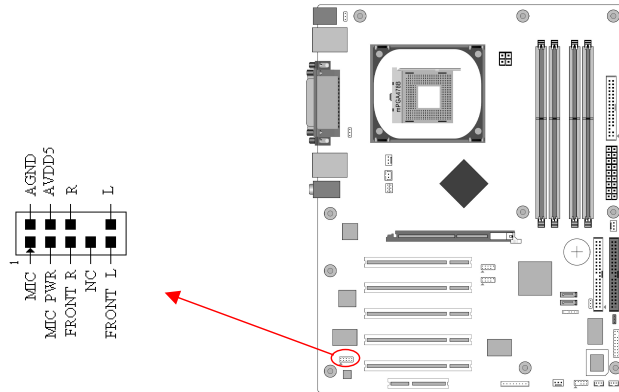
USB Port 2/3 → CN23

USB Port 4/5 → CN23A

If you want to use a USB Keyboard, you must enable the USB keyboard support function in BIOS's Integrated Peripherals menu (See Section 3.4). This board

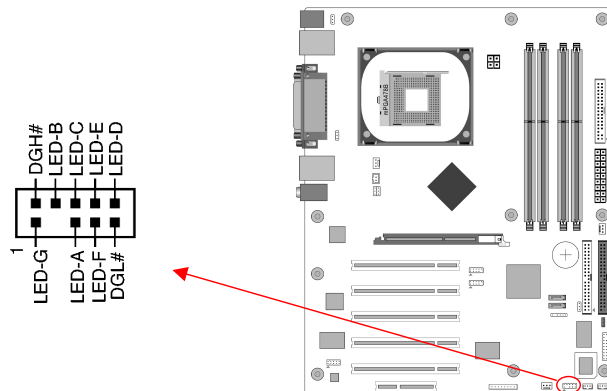
contains a USB Host controller and a root hub with two connectors is included for an optional USB Adaptor (USB 2/3 and 4/5).

#### CN24 (CBOX™ 3 Front Audio Connector):



This connector gives you the option of a front-panel audio-jack cable ext. to be plugged into a special custom-designed system case. Simply remove the two jumper caps at pins [5-6] and [9-10] then plug it into the (optional) cable ext. connector. Pins [5-6] and [9-10] are shorted (default) to enable the back-panel audio function.

#### CN25 (CBOX™ 3 DigiDoc System Display Connector):



CBOX™ 3 features CHAINTECH's exclusive DigiDoc, the most advanced system diagnostic monitoring display.

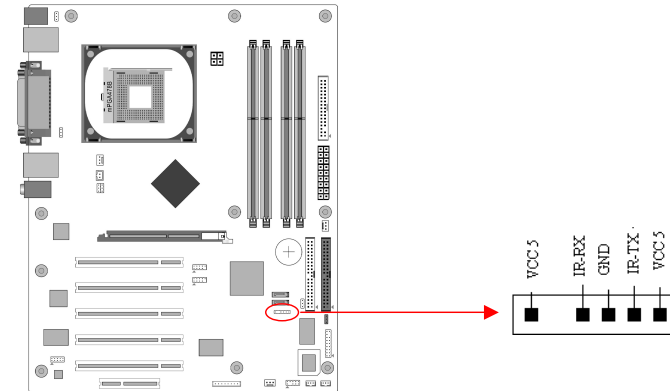
80-PORT diagnostic display during POST at system boot up!

CPU temperature monitoring, your system stays cool always!

DigiDoc is the doctor for your system!

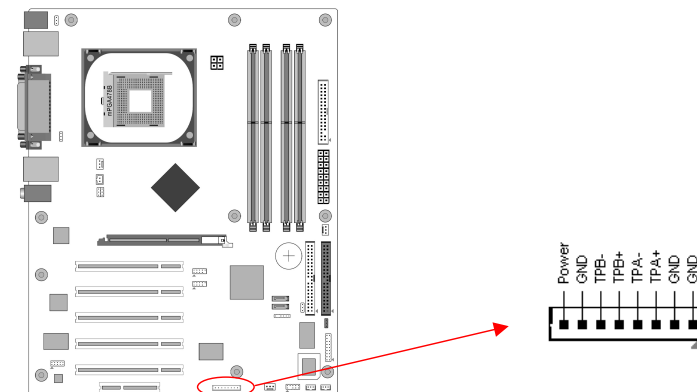
Refer to Appendix **Digdoc 80-Port POST Error Code List** for its details.

#### IR 1 (IR Connector):



Select the UART port used in UART Mode from BIOS's Integrated Peripherals menu to support IR function. (See section 3.4 Super I/O Device of **Integrated Peripherals**)

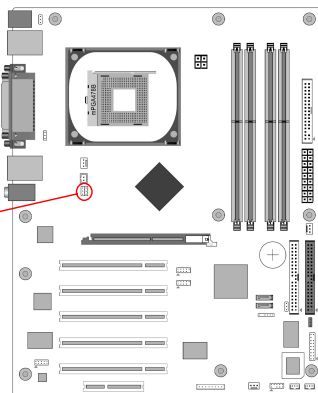
#### CN26B (IEEE1394 Connector)



Attach the IEEE 1394 serial connector cable to the IEEE 1394 bracket, and the CBOX™ 3 Front panel.

**JP3 / 3A (CPU Front Side Bus setting)**

JP3	JP3A	Definition
1-2	1-2	Default
OPEN	2-3	133 MHz
2-3	OPEN	200 MHz

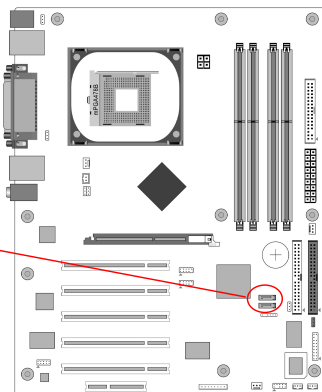
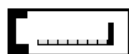


This function allows you to set the CPU's FSB. The default setting is at pin [1-2], and your CPU's FSB will be automatically detected. Set the cap at [2-3] to force the FSB to run at 400 MHz. Remove the cap to set the FSB at 533MHz.



**It is recommended that you leave the default settings to prevent any burnout on your CPU.**

**SATA1/2 (Serial ATA Connector):**



This can connect to new IDE device; it supports ATA 150MB/sec. Please refer to *Section 2-6 Serial ATA and Parallel ATA* and *Section 3-4 Integrated Peripherals -> OnChip IDE Device -> OnChip Serial ATA* for details.

**2-6 Serial ATA and Parallel ATA**

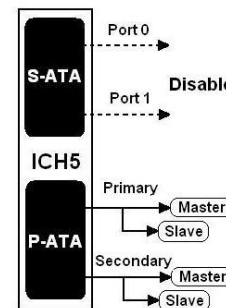
**SATA & PATA configurations**

1. Compatible mode -
  - Older OSs don't support switch to native mode (DOS, Win2K, Win98/ME...) should set SATA and PATA to Compatible Mode.
  - Maximum 4 ATA devices
  - Combine mode and Non-Combine mode
  
2. Enhanced mode -
  - New OS that support switch to native mode (WinXP, Windows.NET Server) can set SATA and PATA to Enhanced Mode.
  - Comprehend both legacy and /or native modes
  - Maximum 6 ATA devices (4 for PATA, 2 for SATA)

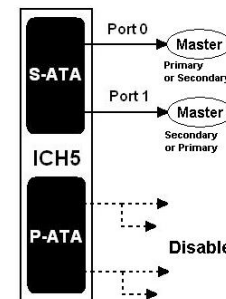
Proper support: BIOS provide a BIOS setup option for Enhanced mode or Compatible mode user selection.

**SATA- Compatible mode**

- **Option 1 – Non-Combined Mode**
  - P-ATA devices only
  - Maximum of 4



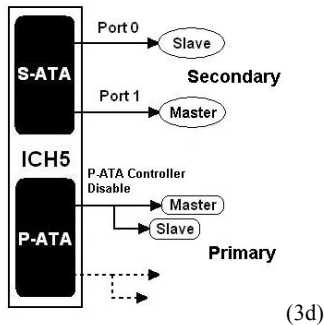
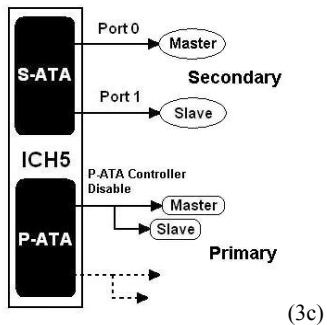
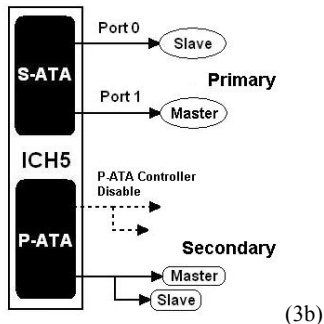
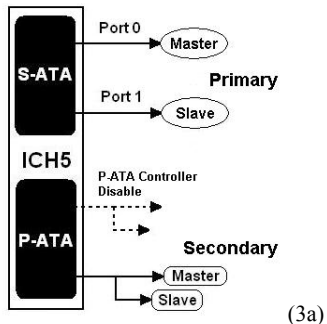
- **Option 2 – Non-Combined Mode**
  - S-ATA devices only
  - Maximum of 2





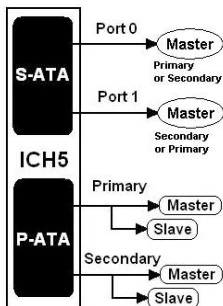
**Option 3 – Combined Mode**

- S-ATA devices
- P-ATA devices
- Maximum of 2 Each



**Enhanced Mode**

- Enable S-ATA & P-ATA
- Max 6 ATA (4 ATA + 2 ATA)



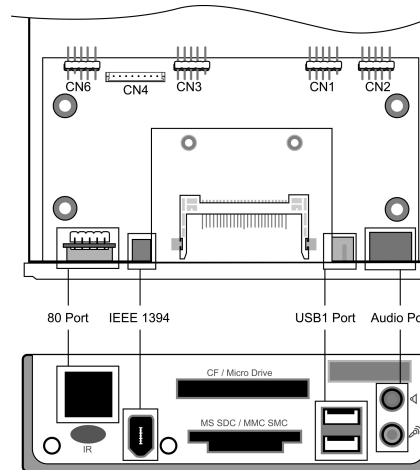
**2-7 CBOX™ 3 Setup**

1. Gently insert **CBOX™ 3** into the regular 5-1/4" drive bay at the front of system chassis and securely tighten the side screws.
2. Connect Motherboard to **CBOX™ 3**:

Function	Motherboard	CBOX™ 3
USB 4 & 5	CN23	CN1
USB 6 & 7	CN23A	CN2
*Front Audio	CN24	CN3
IEEE 1394	CN26B	CN4
80 Port Display	CN25	CN6

\* Remove CN24 Jumper Caps on motherboard 5-6, 9-10 before installation.

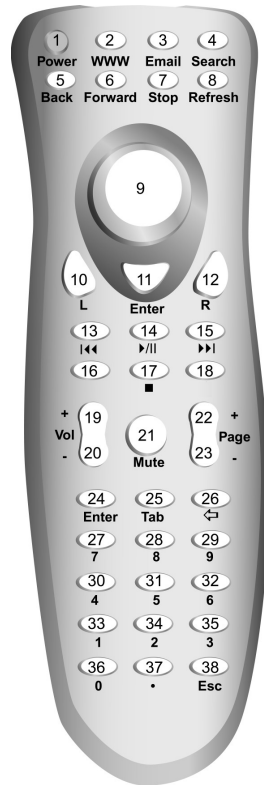
- USB Cable (10 pin) x 2
- Front Audio Cable (10 pin) x 1
- IEEE-1394 Cable (8 pin) x 1
- 80 Port Display (10 pin) x 1



All cables that provided by CHAINTECH come with a security-proof.

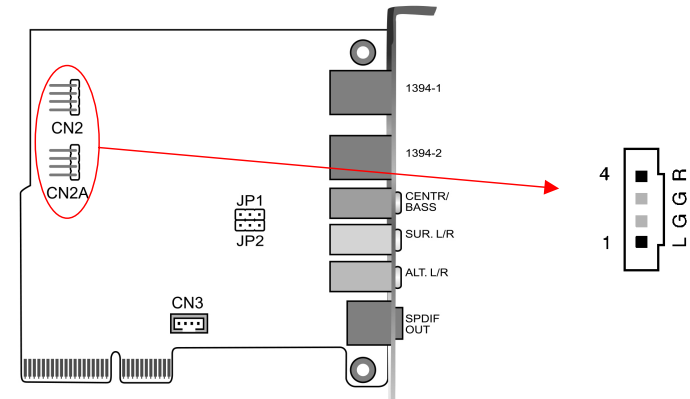
## 2-8 Handigator: Function List

KEY NO.	Function	KEY NO.	Function
1	Turn on/Off PC	20	Volume Down
2	Open Browser	21	Mute
3	Open Email	22	Page Up
4	Search in WWW	23	Page Down
5	Previous page in WWW	24	Enter Key
6	Next Page in WWW	25	Tab Key
7	Stop browsing	26	Backspace Key
8	Refresh in WWW	27	7
9	Mouse	28	8
10	Mouse left button	29	9
11	Enter Key	30	4
12	Mouse right button	31	5
13	Previous Track	32	6
14	Play/Pause Multimedia	33	1
15	Next Track	34	2
16	N/A	35	3
17	Stop playing	36	0
18	N/A	37	.(dot)
19	Volume Up	38	Esc Key



## 2-9 CMC (Chaintech Multimedia Card) Setup

## CN2/CN2A (CD-ROM Audio-in Connector)



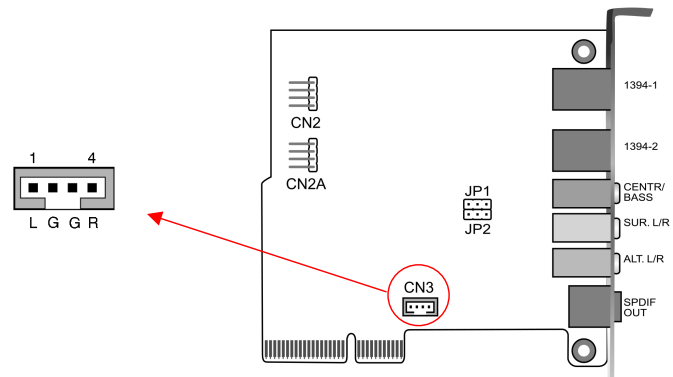
Use the audio cable enclosed with your CD-ROM disk drive to connect the CD-ROM to your motherboard. This will enable your CD-ROM's audio function.

## JP1/JP2 (Bass/Center Select)

Pin	Definition
1-2	Normal (Default)
2-3	Swap

For normal audio cables Bass and Center connection leave the default setting at pins 1-2 and otherwise at pins 2-3.

## CN3 (Auxiliary Audio-In Connector)



This connector is for AUX Audio Device.

## Chapter 3 BIOS Setup Program

Phoenix-Award BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in CMOS RAM so that it can retain the setup information even when the power is turned off.

To enter the **Phoenix-Award BIOS** setup program press **[Delete]** when you **Power on** or **reboot** the computer system. The primary screen as shown in Figure 3-1 is a list of the menus and functions available in the setup program. Select the desired item by using arrow keys and press enter to make the changes. Operating commands are located at the bottom of this and all other BIOS screens. When a field is highlighted, on-line help information is displayed on the right side of the screen.



Figure 3-1 Setup Program Initial Screen

### 3-1 Standard CMOS Setup

The Standard CMOS Setup allows users to configure system components such as hard-disk drive, floppy-disk drive and video display as well as date, time and boot up error signaling. This configuration menu should be changed when installing a motherboard for the first time, or changing hardware in your system such as the HDD, FDD, video display, or when the CMOS data has been lost or corrupted. Choose the Standard CMOS Setup option from the CMOS Setup Utility menu (Figure 3-1) to display the following screen:

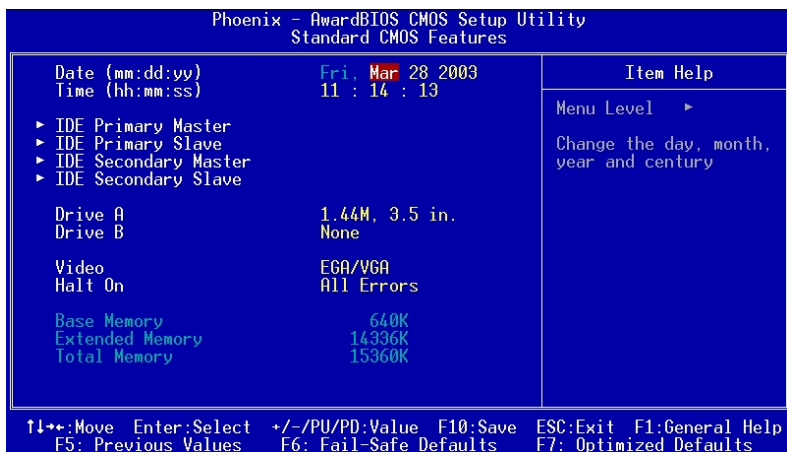


Figure 3-2 Standard CMOS Feature Screen

#### Date/Time:

Set the date and time of the system. Do not skip this function as all of your timed events such as power management, saving files, etc are based on this timer.

#### IDE (Primary/Secondary; Master/Slave):

This category identifies up to four IDE hard-disk drives that have been installed in the computer. This section does not show information on other IDE devices such as CD-ROM drives or other hard drive types such as SCSI drive.

#### Drive A/B:

Select different Floppy device Model. Available options are [None], [360K, 5-1/4 in], [1.2M, 5-1/4 in], [720k, 3-1/2 in], [1.44M, 3-1/2 in], and [2.88M, 3-1/2 in].

#### Video:

Select the type of video adapter present in your system. You can ignore this setting if you are using a VGA monitor; VGA BIOS will automatically configure this setting.

#### Halt On:

When the system is powered on, BIOS performs a series of diagnostic tests called

POST (Power On Self Test). This function stops the computer if BIOS detects a hardware error. You can tell BIOS to halt on all errors, no errors, or not to halt on specific errors.

### 3-2 Advanced BIOS Features

By choosing the Advanced BIOS Features option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard.

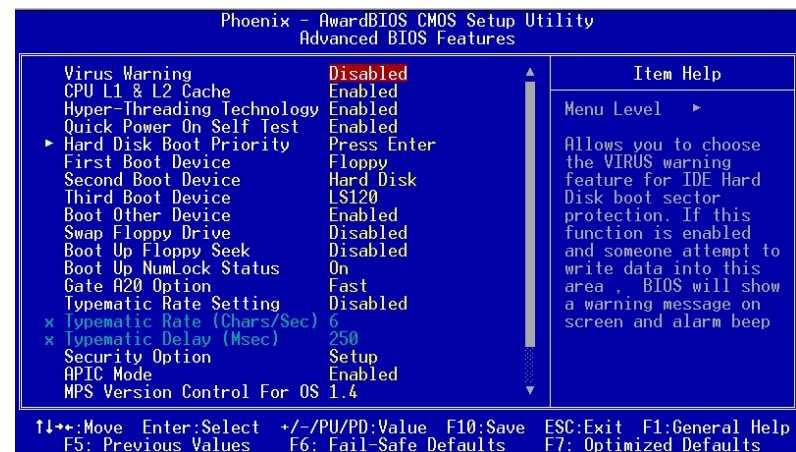


Figure 3-3 Advanced BIOS Feature Screen

#### Virus Warning:

When you set it as enabled, you receive a warning message if a program (specifically, a virus) attempts to write to the boot sector or the partition table of the hard-disk drive.



Many disk diagnostic programs that access the boot sector table can trigger the virus-warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

#### CPU L1 & L2 Cache:

Cache memory is much faster than conventional DRAM system memory. These fields allow you to enable or disable the CPUs Level 1 built-in cache and Level 2 external cache. Both settings are left as Enabled to significantly increase the performance of your computer.

**Hyper-Threading Technology**

Available options are **[Enabled]** and **[Disabled]**. Select **[Enable]** to support Hyper-Threading Technology and vice versa.

**Quick Power On Self Test:**

Enable this function to reduce the amount of time required to run the POST (Power On Self Test). BIOS will save time by skipping some items during POST. It is recommended that you disable this setting. Discovering a problem during boot up is better than losing data during your work.

**Hard Disk Boot Priority:**

Select priority of the hard disk boot device.

**First/Second/Third/Boot Other Device:**

This option sets the sequence of drives BIOS attempts to boot from after POST completes. BIOS will search these drives for an operating system.

**Swap Floppy Drive:**

Enabling this function will swap the floppy drive assignment so that drive A will function as drive B, and drive B will function as drive A. Note that the boot sequence assignment mentioned directly above does not include booting from floppy drive B. This function is useful if floppy drives B and A are of different types of drives and you want to boot from floppy drive B.

**Boot up Floppy Seek:**

This is a set up check for floppy power-on after starting the computer system.

**Boot Up NumLock Status:**

This function defines the keyboard's number pad as number keys or arrow keys. If it is set at On the number keys will be activated, if it is set at Off the arrow keys will be activated.

**Gate A20 Option:**

This allows you to set the Gate A20 status. When set to **[Fast]**, Gate A20 is controlled by chipset. When set to **[Normal]**, Gate A20 is controlled by a specific pin from the keyboard controller. Available options are **[Fast]** and **[Normal]**.

**Keyboard Interface :**

## 1. Typematic Rate Setting

When enabled, you can set the following two-typematic control items. When disabled, the keyboard controller determines keystrokes arbitrarily in your system.

## 2. Typematic Rate (Chars/Sec)

The typematic rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

## 3. Typematic Delay (Msec)

The typematic delay sets how long after you press a key that a character begins repeating.

**Security Option:**

The Supervisor and/or User Password functions shown in Figure 3-1 must be set to take advantage of this function. See Section 3.11 for password setting information. When the Security Option is set to System, a password must be entered to boot up the system or enter the BIOS setup program. When the Security Option is set to Setup, a password is required to enter the BIOS setup program.

**APIC Mode**

In order to comply with PC2001 standard, the system is designed to run in APIC (**Advanced Programmable Interrupt Controller**) mode. Enabling APIC mode will increase the available IRQs resources for the system. Available options are **[Enabled]** and **[Disabled]**.

**MPS Version Control For OS**

This item allows you to select which MPS (**Multi-Processor Specification**) version is used for the operating system. You need to select the MPS version that is supported by your operating system. To find out which version to use, consult the vendor of your operating system. Available options are **[1.4]** and **[1.1]**.

**OS Select (For DRAM >64MB):**

If your system's DRAM is larger than 64MB and you are running OS/2, select OS/2 as the item value. Otherwise, set the item value to Non-OS/2 for all other operating systems.

**Small Logo (EPA) Show**

This setup allows photo that is EPA. Logo.

**Show POST CODE**

Enabling this function can show POST error code on the screen before proceeding to system's operating system.

### 3-3 Advanced Chipset Features

By choosing the [Advanced Chipset Features] option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard.

Phoenix - AwardBIOS CMOS Setup Utility		Advanced Chipset Features	
DRAM Timing Selectable	By SPD	Item Help	
CAS Latency Time	2	Menu Level	▶
Active to Precharge Delay	8		
DRAM RAS# to CAS# Delay	4		
DRAM RAS# Precharge	4		
Memory Frequency For	Auto		
System BIOS Cacheable	Enabled		
Video BIOS Cacheable	Disabled		
Memory Hole At 15M-16M	Disabled		
Delay Prior to Thermal	16 Min		
AGP Aperture Size (MB)	128		
Init Display First	AGP		
CSA LAN (Giga-LAN)	Enabled		
DRAM Data Integrity Mode	ECC		

↑↓:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help  
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 3-4 Advance Chipset Features



All of the above settings have been determined by the motherboard manufacturer and should not be changed unless you are absolutely sure of what you are doing. Explanations of the DRAM timing and chipset features setup are lengthy, highly technical and beyond the scope of this manual. Below are some brief descriptions of the functions in the Setup menu.

#### DRAM Timing Selectable

The function allows you to enable or disable the DRAM timing by SPD. It is recommended to keep the default setting for a stable system operation.

#### CAS Latency Time

This item controls the latency between DRAM read command and the time the data actually becomes available.

#### Active to Precharge Delay

This item controls the number of DRAM clocks used for DRAM parameters.

#### DRAM RAS# to CAS# Delay

This item controls the latency between DRAM active command and read/write command.

#### DRAM RAS# Precharge

This item controls the idle clocks after issuing Precharge command to the DRAM.

#### Memory Frequency For

Please leave the default system setting [Auto] for a stable system operation.

#### WARNING

#### Overclocking:

This motherboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while CPU clock speed is overclocked. Any attempt to operate beyond product specifications is not recommended. **We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.**

#### System BIOS cacheable

Enabling this function allows caching of the system BIOS ROM at F0000h-FFFFFh, which results in better system performance. However, if any program writes to this memory area, a system error may result. It is advised to leave this setting. Caching the system BIOS results in better performance than shadowing the system BIOS.

#### Video BIOS Cacheable

Enabling this function will allow caching of the video BIOS, resulting in better system performance. However, if any programs write to this memory area, a system error may occur.

#### Memory Hole at 15M-16M

Enabling this function will reserve the memory address space between 15MB and 16MB for ISA expansion cards. However, it will also result in not allowing the system to have access to memory above 16MB. Please note that some expansion cards require this setting to be enabled. The default setting is Disabled. If Auto Configuration is enabled, you must set the DRAM timing function to 60ns or 70ns, depending on the type of DRAM you install.

#### Delay Prior to Thermal

Available options are 4, 8, 16 and 32 min.

#### AGP Aperture Size (MB):

This function determines the amount of system memory that is given to the AGP card. Available options range from **32MB** to **512MB**. This is a dynamic memory allocation in that the AGP card will only use the amount of memory that it needs.

The remaining memory, which is not in use, will be available for the system. For example, if 16MB is allocated to the AGP card and the card only needs 8MB, the remaining 8MB will be available for system use.

#### Init Display First

This function allows users to choose between AGP or PCI slots to initialize monitor display.

#### CAS LAN (Giga-LAN)

To enable Giga-Lan port set it as [**Enabled**], and vice versa.

#### DRAM Data Integrity Mode

Please leave the default setting as [**Non-ECC**] for a stable system operation.

Available options are [**ECC**] and [**Non-ECC**].

### 3-4 Integrated Peripherals

This section provides information on setting the peripheral devices. By choosing the Integrated Peripherals option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard.

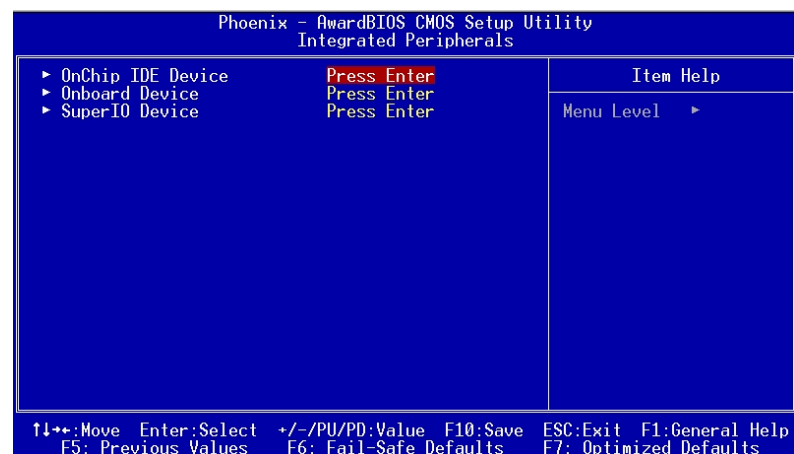


Figure 3-5 Integrated Peripherals Screen

#### OnChip IDE Device:

Press [**Enter**] to enter the sub-menu, which contains the following items for some advanced control:

#### 1. IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard-drive supports block mode, select Enabled to auto-detect the optimal number of block read/writes per sector the drive can support.

#### 2. IDE DMA transfer access

The onboard IDE drive interfaces supports Prefetching for faster drive accesses. Set it to [**Disabled**] if this is a primary or secondary function.

#### 3. On-Chip Primary/Secondary PCI IDE

You can set this to disable the On Chip IDE controller if you are going to add a higher performance IDE board.

#### 4. IDE Primary/Secondary Master/Slave PIO:

The four IDE PIO (programmed Input/Output) fields let you set a PIO mode (0-4) for each IDE device that the internal PCI IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

#### 5. IDE Primary/Secondary Master/Slave UDMA:

Ultra DMA implementation is possible only if your IDE device supports it and your operating environment contains a DMA driver. If both your hard drive and software support Ultra DMA, select [**Auto**] to enable BIOS support.

#### 6. On-Chip Serial ATA

Available options are [**Disabled**], [**Auto**], [**Combined Mode**], [**Enhanced Mode**], [**SATA Only**].

- ◆ **Disabled:** Disabled Serial ATA controller.
- ◆ **Auto:** Auto arrange by BIOS.
- ◆ **Combined Mode:** Parallel ATA and serial ATA are combined. Maximum of two IDE drives are supported.
- ◆ **Enhanced Mode:** Enable both serial ATA and parallel ATA. Max of six IDE drives is supported.
- ◆ **SATA Only:** Serial ATA is operating in legacy mode.

#### 7. Serial ATA Port 0 Mode

Please leave the default value as [**Primary Master**] for a stable system operation.

#### 8. Serial ATA Port 1 Mode

Please leave the default value as [**Primary Slave**] for a stable system operation.

**Onboard Device:**

This section provides information for setting the on-board devices. By choosing the Integrated Peripherals option from the CMOS Setup Utility menu (Figure 3-5), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard

Press **[Enter]** to enter the sub-menu, which contains the following items for some advanced controls:

**1. USB controller:**

Enable the on-board Universal Serial Bus (USB V1.1 or V2.0) controller if you want to connect a USB device to your system. Note that if this setting is disabled, you can still temporarily use a USB keyboard during boot up so that you can enter BIOS and enable this setting. If you pass the boot up stage without enabling this function, your PS/2 keyboard will no longer work.

**2. USB 2.0 controller**

This entry is for disable/enable EHCI controller only. This BIOS itself may/may not have high speed USB support. If the BIOS has high speed USB support built in, the support will be automatically turn on when high speed device were attached.

**3. USB Keyboard Support**

Select Enabled if your system uses an USB keyboard. If there is no USB keyboard, select Disabled in this field.

**4. USB Mouse Support**

Select Enabled if your system uses an USB mouse. If there is no USB mouse, select Disabled in this field.

**5. Onboard 1394**

Select Enabled if your system uses an on-board IEEE1394. If there is no on-board IEEE1394, select Disabled in this field.

**6. Onboard Realtek Lan**

Select Enabled if your system uses an on-board Realtek Lan. If there is no on-board Realtek Lan, select Disabled in this field.

**7. Onboard PCI Audio**

Select Enabled if your system uses an on-board PCI Audio card. If there is no on-board PCI Audio card, select Disabled in this field.

**Super IO Device:**

This section provides information on setting the Super I/O devices. By choosing the Integrated Peripherals option from the CMOS Setup Utility menu (Figure 3-5), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard.

Press **[Enter]** to enter the sub-menu, which contains the following items for some advanced controls:

**1. Onboard FDC Controller:**

Select it as Enabled if your system has a floppy-disk controller (FDC) installed on the system board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, choose Disabled in this field.

**2. Onboard Serial Port 1/2:**

Select an address and corresponding interrupt for the first and second serial ports. Available options are **[3F8/IRQ4]**, **[2E8/IRQ3]**, **[3E8/IRQ4]**, **[2F8/IRQ3]**, **[Disabled]**, and **[Auto]**.

**3. UART Mode Select:**

This function allows you to select an operating mode for the second serial port. (Normal RS-232C serial port / IRDA / SCR / ASKIR 0.57-MB/sec infrared port).

**4. UR2 Duplex Mode:**

Available options: **[Half]** and **[Full]**.

**5. Onboard Parallel Port:**

Select a logical LPT port address and the corresponding interrupt for the physical parallel port.

**6. Parallel Port Mode:**

Select an operating mode for the onboard parallel (printer) port. Select SPP unless you are certain that your hardware and software support one of the other available modes.

**7. ECP Mode Use DMA:**

This item automatically specifies a DMA channel **1** or **3** for the parallel port when it is set to **[EPP]** or **[ECP+EPP]** mode.

**8. Game Port Address:**

This item disables or assigns the address of the Game port. Available options are **[201]** and **[209]**.

**9. Midi Port Address:**

This item disables or assigns the address of the Midi port. Available options are **[300]** and **[330]**.

**10. Midi Port IRQ:**

This item specifies an IRQ for the Midi port.



### 3-5 Power Management Setup

This section provides information on the Green PC power management functions. By choosing the Power Management Setup option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard

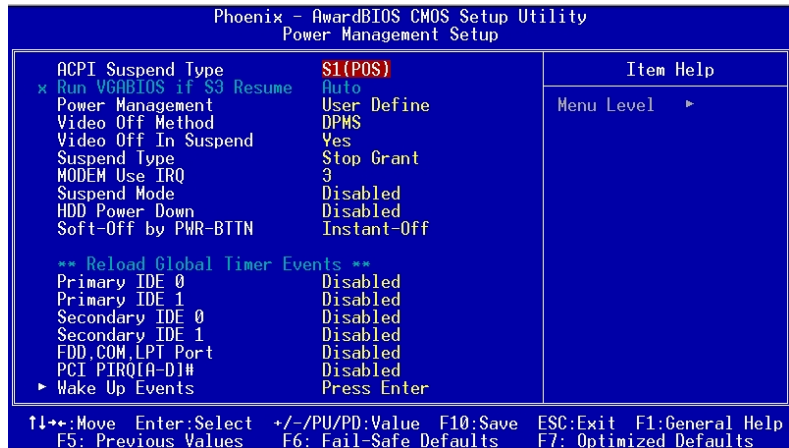


Figure 3-5 Power Management Setup

#### ACPI Suspend Type:

This feature allows users to select a suspend type for the operating system to turn off peripheral devices such as CD-ROM player when it's not in use.

#### Run VGABIOS if S3 Resume

Available options are [Auto], [Yes], [No].

#### Power Management:

Power management saves electricity while the system is idle by entering power-saving modes.

#### Video Off Method:

This function serves as both screen saver and power saver for the monitors. See the next function, Video Off After, for setting the video timer.

1. **Blank Screen** - BIOS will change the monitor screen to blank. The electricity saved in this mode is negligible and this function is only used as a screen saver to prevent screen damage while the screen is idle.
2. **V/H SYNC+ Blank** - The system turns off the vertical and horizontal

synchronization ports, writes blanks to the VGA buffer and the monitor's electron gun turns off. This function requires monitors with Green features in order to take advantage of the power-saving function. If you enable this function and do not have a Green monitor, the result will be the same as if you had selected Blank. This function serves as both a screen saver and a power saver.

3. **DPMS** - Select this option if your video card supports the Display Power Management Signaling (DPMS) standard (i.e., you have a monitor that supports Green features). Use software supplied by your video subsystem to set video power management options.

#### Video off in Suspend:

This setting determines when the monitor enters power saving mode if it is set to Yes. The Power Management function must be enabled to use this function.

#### Suspend Type

Available options are [Stop Grant] and [PwrOn Suspend].

#### MODEM Use IRQ:

If your computer has a built-in modem use this function to inform BIOS the IRQ value occupied by the modem card. When the system is in Green mode, the modem requires an IRQ assignment to activate the system to perform tasks. This assignment is compliant with the APM 1.2 compliant operating systems.

#### Suspend Mode:

The Power Management function is set as [Enabled] to activate this function. If the system runs in Standby mode and the Suspend timer expires, all devices regulated by power management will shut down and the CPU speed will be 0 MHz.

#### HDD Power Down:

It shuts down any IDE hard disk drives in the system after an idle period. This feature does not affect SCSI hard drives.

#### Soft-Off by PWR-BTTN:

When set to Delay 4 Sec., this function allows the power button to put the system in Suspend, a power saving mode. When set to Instant-Off the Soft-Off by PWR-BTN function is disabled and the computer turns completely off when the power button is pressed.

#### Wake up Events

1. **Power On by PCI / Onbd LAN:**

When enabled, a PCI interface that receives a signal will activate the system from soft off and green mode.

**2. Power On by Modem:**

When enabled, a Modem will be able to receive a signal and activate the system from soft off and green mode. You should connect the modem to the COM port and signal your PC to power on.

**3. Wake up on LAN:**

When enabled, a LAN that receives a signal will activate the system from soft off and green mode.

**4. USB KB Wake –up From S3:**

Enables the system to be activated from S3 power-saving modes. Settings are [Enabled] and [Disabled].

**5. Power On by Alarm:**

When enabled, this setting allows the system to turn back on at specified date of the month. User must designate date of month and time of day.

This function is only available when using an ATX power supply and the Software Power-Off function to turn off the computer.

**6. POWER ON Function:**

This function enables PS/2 mouse and keyboard to power on the system. Available settings are [Password], [Hot KEY], [Mouse Move], [Mouse Click], [BUTTON ONLY] and [Keyboard 98].

**7. KB Power ON Password:**

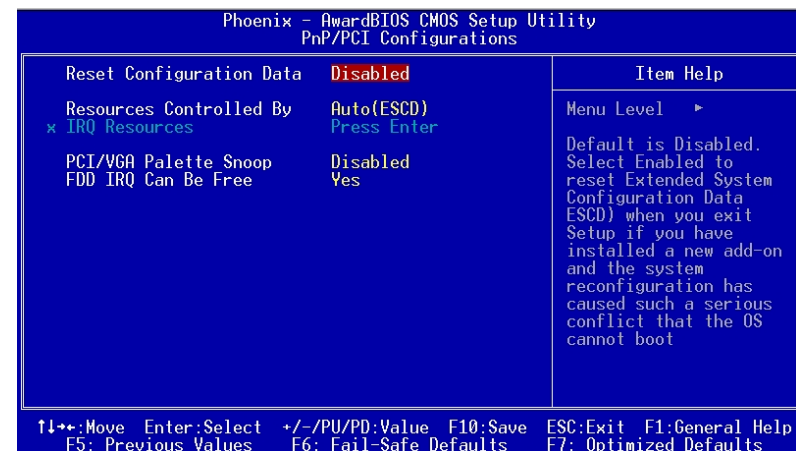
If POWER ON function is set to [Password], then you can set a password for the PS/2 keyboard to power on the system.

**8. Hot Key Power ON:**

If POWER ON function is set to [Hot Key], you can assign hot key combinations from [Ctrl –F1] to [Ctrl-F12] for the PS/2 keyboard to power on the system.

**3-6 PNP/PCI Configurations**

This section provides IRQ and DMA setting information. By choosing the PNP/PCI Configuration option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This screen contains the manufacturer's default values for the motherboard.



**Figure 3-6 PNP/PCI Configurations**

**Reset Configuration Data:**

Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

**Resources Controlled By:**

When set to Manual the system BIOS will not refer to the ESCD for IRQ & DMA information. Instead, it will refer to the items in the setup menu for assigning IRQ & DMA. When set to Auto the system BIOS will refer to the ESCD for all legacy information. ESCD (**Extended System Configuration Data**) provides a detailed format of the configuration data structures stored in flash memory. Each data structure defines the resources used by a device or a card in the system. This includes legacy and PCI/ISA PnP devices.

**PCI/VGA Palette Snoop:**

When set to [Enabled], multiple VGA devices operating on different buses can handle data from CPU to each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). Available options are [Enabled] and [Disabled].

**FDD IRQ Can Be Free:**

This function allows users to choose if the FDD IRQ can be freed up. The default setting is [Yes] and this does not allow the IRQ to be free.

**3-7 PC Health Status**

By choosing the PC Health Status option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This field shows you the current system temperature/external voltages input and the current CPU FAN and System FAN operating speed.

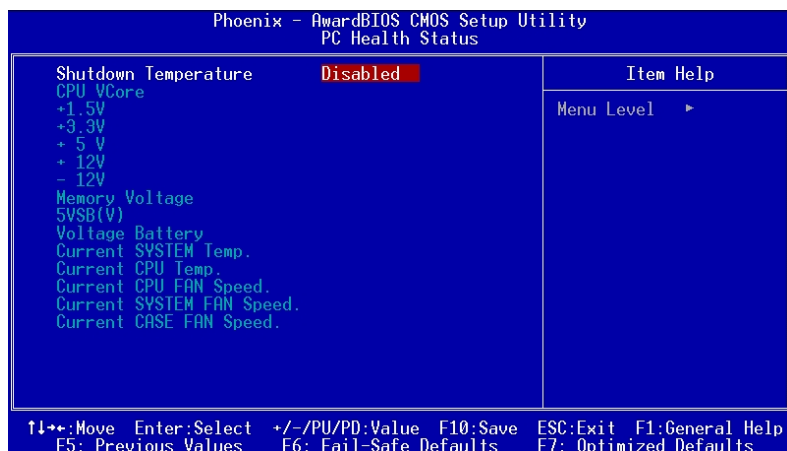


Figure 3-7 PC Health Status

**Shutdown Temperature:**

This item allows you to set the shutdown temperature level for the processor. When the processor reaches the temperature you set, the system will shutdown. This function only works in ACPI-aware OS (such as Windows 98 / ME / 2000).

Available options are [70°C/158°F], [65°C/149°F] and [60°C/140°F]

**3-8 Frequency/Voltage Control**

By choosing the Frequency/Voltage Control option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the motherboard.

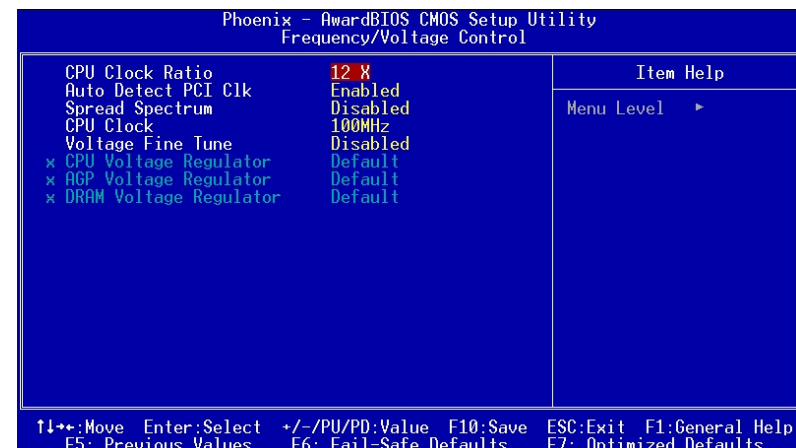


Figure 3-8 Frequency/Voltage Control

**CPU Clock Ratio:**

This feature allows users to manually configure your CPU clock ratio according to your processor's specifications.

**Auto Detect PCI Clk**

Available options are [Enabled] and [Disabled].

**Spread Spectrum**

Available options are [+/- 0.35 %], [+/- 0.50%], [+/- 0.75%], [+/- 1.00%] and [Disabled].

**CPU Clock:**

This feature allows the system memory to run at specified CPU clock speed. The default setting is at 100Mhz.

**Overclocking:**

**This motherboard is designed to support overclocking. However, please make sure your peripherals are able to tolerate such abnormal setting, while CPU clock speed is overclocked. Any attempt to operate beyond product specifications is not recommended. We are not responsible for damages caused by inadequate operation or settings beyond product specifications.**

### Voltage Fine Tune

Please leave the default setting as **[Disable]** for a stable system operation. Available options are **[Enabled]** and **[Disabled]**.

### 3-9 Load Fail-Safe Defaults

Load Fail-Safe Defaults loads the default BIOS values directly from the CMOS Setup Utility menu (Figure3-1). If user-defined BIOS settings are corrupted and therefore unusable, these defaults will be loaded automatically when you turn on the computer.

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

### 3-10 Load Optimized Defaults

Load Optimized Defaults loads the default system values directly from the CMOS Setup Utility menu (Figure3-1). If user-defined BIOS settings are corrupted and therefore unusable, these defaults will be loaded automatically when you turn on the computer.

Load Optimized Defaults (Y/N)? **N**

### 3-11 Supervisor Password & User Password Setting

There are four different variables that control password settings. The first two are located under the Security Option function in BIOS Features Setup Menu (Figure 3-1). When the Security Option function is set to **Setup**, a password is required to enter BIOS and change BIOS settings. When the Security Option function is set to **System**, a password is required to enter both BIOS and computer's operating system (For example, Windows 98) found on the boot drive.

The third and fourth variables are user password and supervisor password selected in BIOS (Figure 3-1). The main purpose of separating users and supervisors is to allow only the supervisor to have control over the BIOS settings. The user, on the other hand, is only allowed to access computer's operating system and change the user password in BIOS.



**When there is no supervisor password being set, the user password controls access to all BIOS settings.**

Enter Password:

### 3-12 Save and Exit Setup

If you select this and type **[Y]** (for Yes) followed by the **[Enter]** key, the values entered in the setup utilities will be recorded in the CMOS memory of the BIOS chip.

SAVE to CMOS and EXIT (Y/N)? **Y**

### 3-13 Exit Without Saving

Selecting this option and pressing **Y** followed by **[Enter]** lets you exit the Setup program without recording any new values or changing old ones.

Quit without Saving (Y/N)? **N**

## Chapter 4 DRIVER Setup

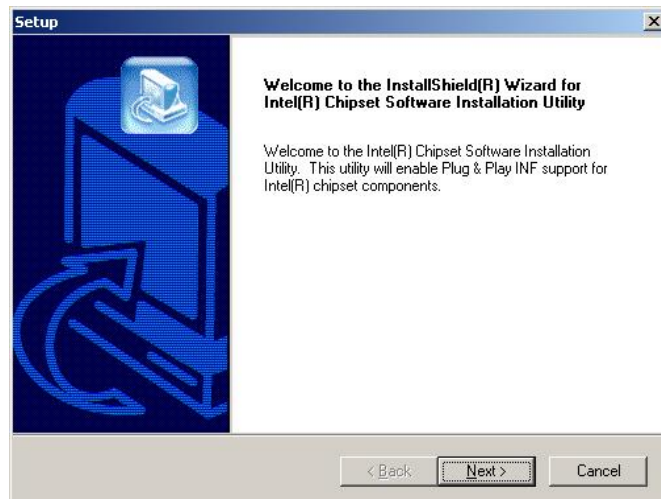
Insert the support CD that come with your motherboard into your CD-ROM driver or double-click the CD drive icon in [My computer] to enter the setup screen.

### 4-1 Intel® IDE Bus Mastering Drivers Setup

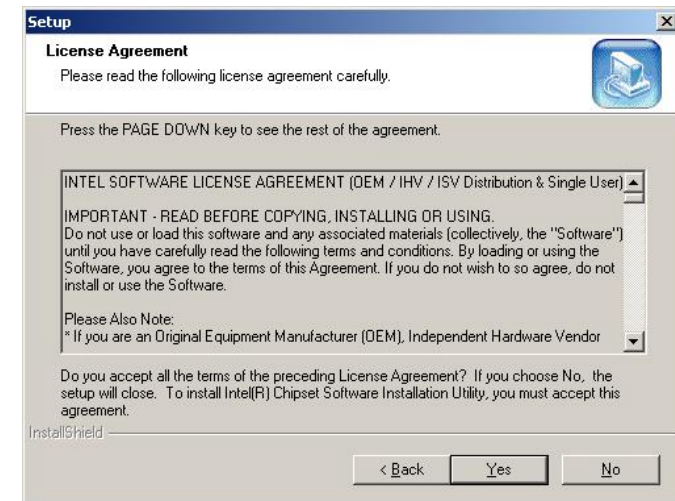
1. Select [Intel® IDE Bus Mastering Drivers].



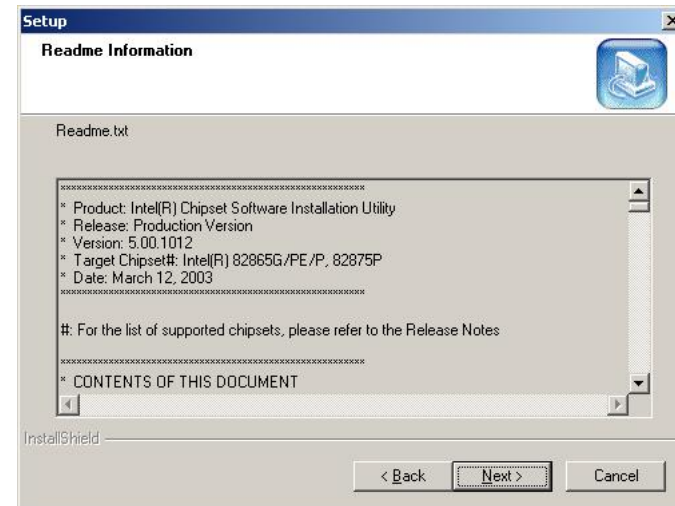
2. Click [Next] to start software installation.



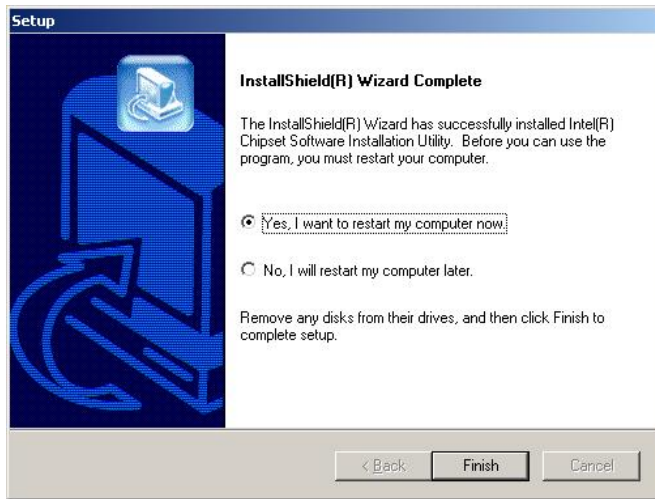
3. Click [Yes] to accept the license agreement.



4. Select [Next] to continue.



5. Please select **[Yes]** to restart computer now or **[No]** to restart later, and then click on **[Finish]** to complete the installation.



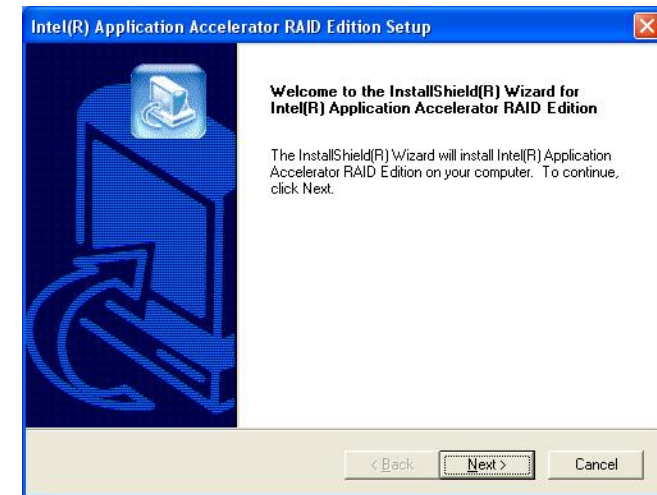
#### 4-2 SATA Driver

Please refer to *Section 2-6 Serial ATA and Parallel ATA* and *Section 3.4 Integrated Peripherals -> OnChip IDE Device -> On-Chip Serial ATA* for details on Serial ATA.

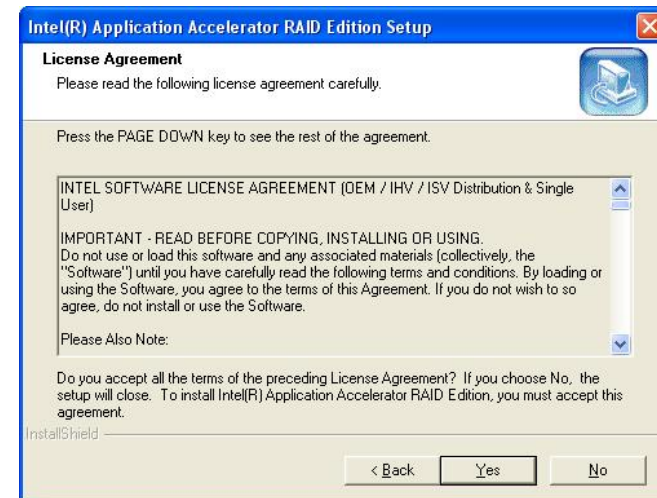
1. Select **[SATA Driver]**



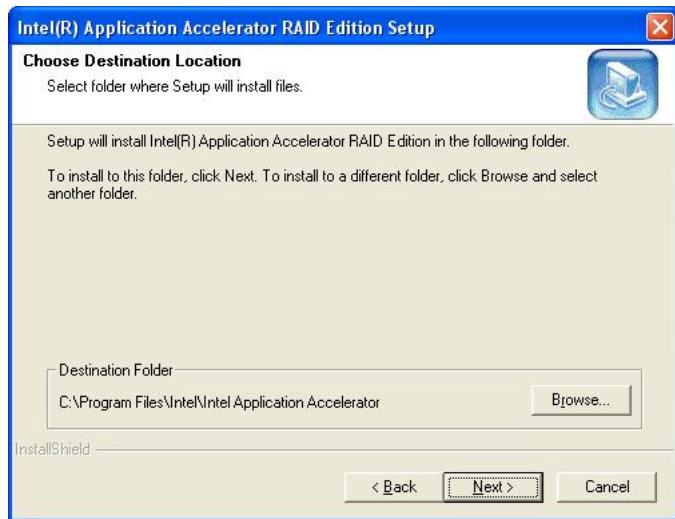
2. Click **[Next>]** to continue the setup process.



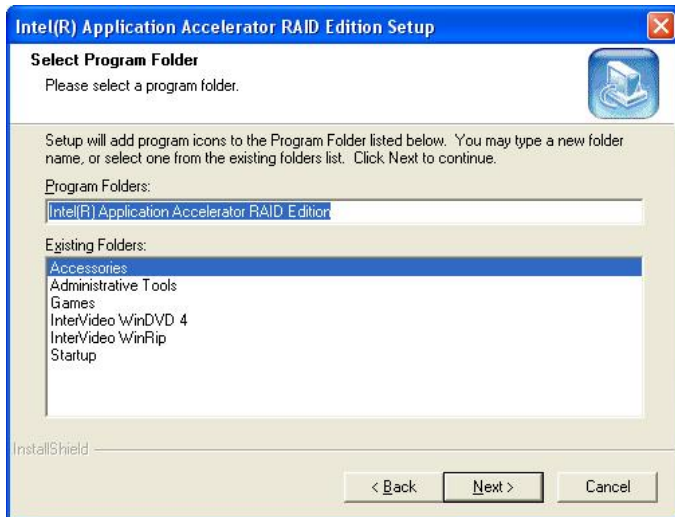
3. After reading the license agreement, please click **[Yes]** to continue.



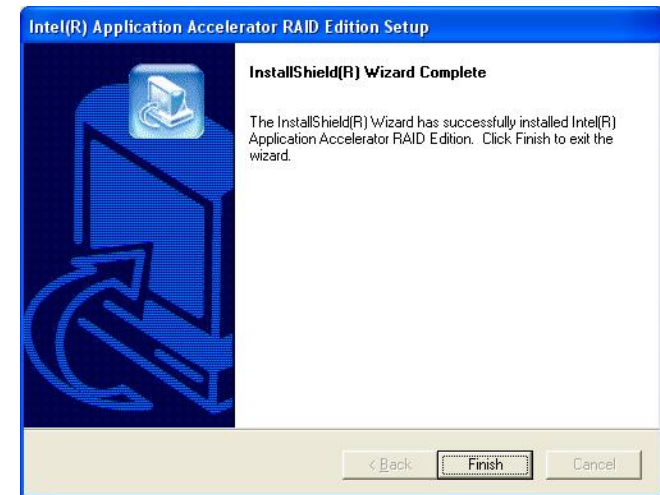
4. Please select a folder where the program will be installed and click on [Next >] to proceed.



5. Please select one folder from existing list of folders and click on [Next >] to proceed.



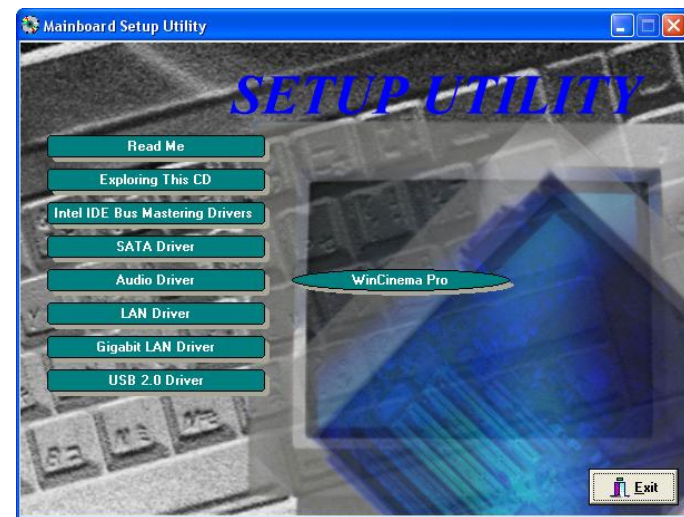
6. Click [Finish] to complete the setup process.



Please refer to **Appendix** for overview on Intel® Application Accelerator RAID.

### 4-3 Audio Driver

1. Select [Audio driver].



2. Click [Next] to start software installation.



3. Select [Install] or [Uninstall] the audio device driver and then click on [Next] to continue the installation.



4. Select [7.1 speakers] and click [Next>] to continue. This option is only available when users install Windows XP SP 1 or its later versions. The option [5.1 speakers] is available when Windows 2000 or its previous versions (ie Win 2000, Win NT, Win Me and Win 9x) are installed.



5. Click [Continue Anyway] to proceed.





6. Please select **[Yes]** to restart computer now or **[No]** to restart later, and then click on **[Finish]** to complete the installation.

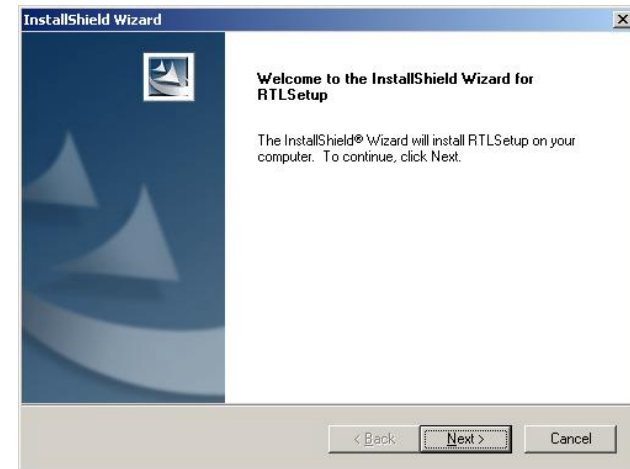


#### 4-3 Intel® LAN Driver Setup

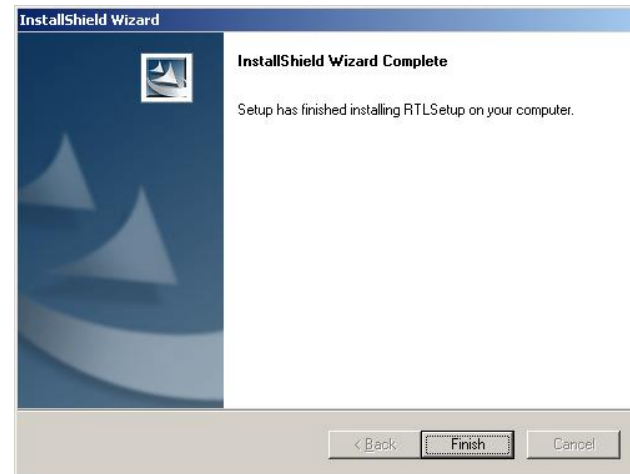
1. Select **[LAN Driver]**



2. Select **[Next >]** to continue.

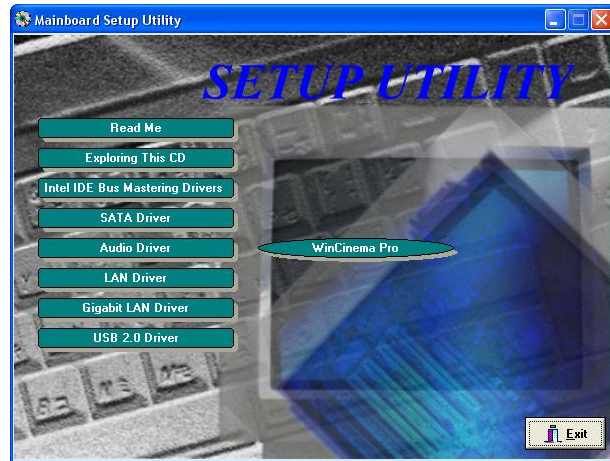


3. Click **[Finish]** to complete the setup process.

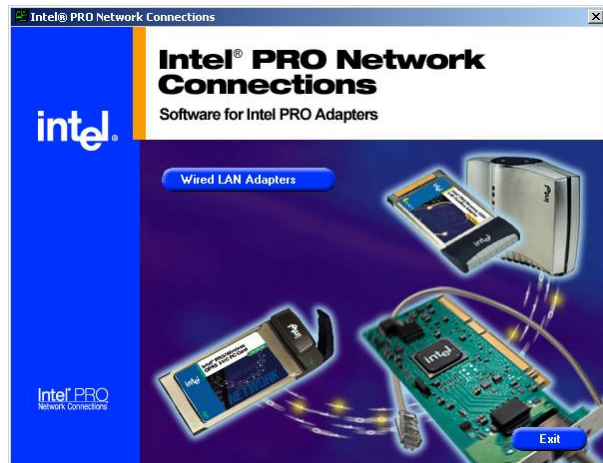


## 4-4 Gigabit Lan Driver

1. Select [Gigabit LAN Driver].



2. Click [Wired LAN Adapters].



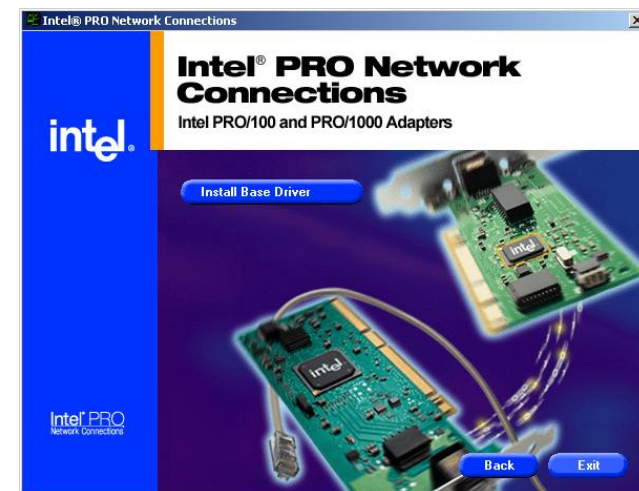
3. Click [Install Base Driver].



4. Click [OK] to continue.



5. Click [Exit] to complete the setup process.



#### 4-5 USB 2.0 Driver

Open Device Manager and open the properties for the USB 2.0 host controller. Select 'Update Driver'. Point the installer to the folder with the USB 2.0 drivers. It should select from *CD-ROM:\intel\usb2\win2k\_XP\ich5usb2\_win2k* (for Win 2000 /XP) or *CD-ROM:\intel\usb2\win98&me* (for 98se / ME) and then install the system files. The host controller should be installed correctly when Device Manager is updated after the install.

#### 4-6 WinCinema Pro

1. Select [WinCinema Pro].

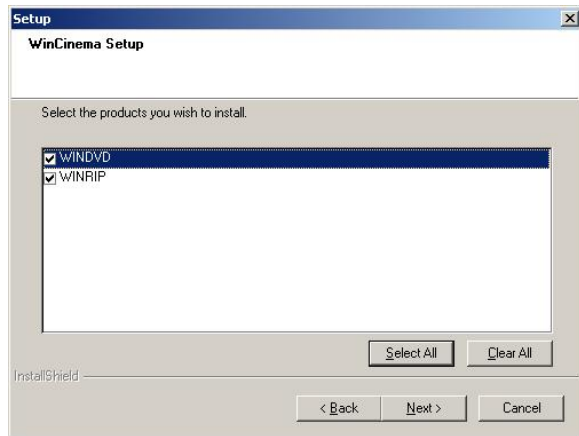


2. Select [Install InterVideo WinCinema].



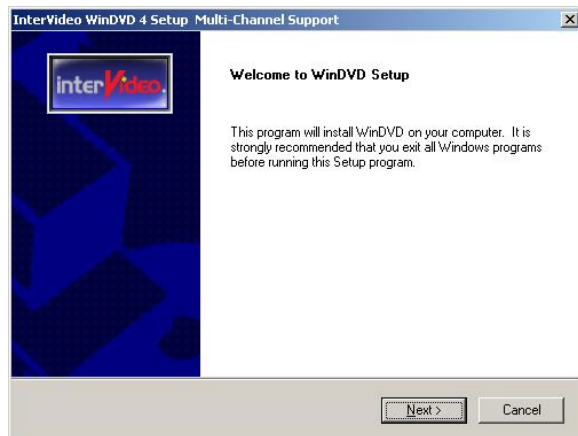
3. Enter personal information on boxes below to register the product.

4. Choose [**Select All**] to select all the products, in this case **WINDVD** and **WINRIP**, and [**Clear All**] to deselect them. Click [**Next >**] to proceed.

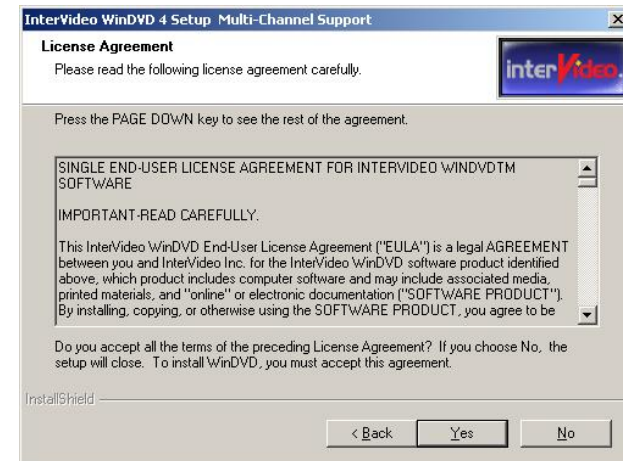


#### 4.6.1 WinDVD Setup

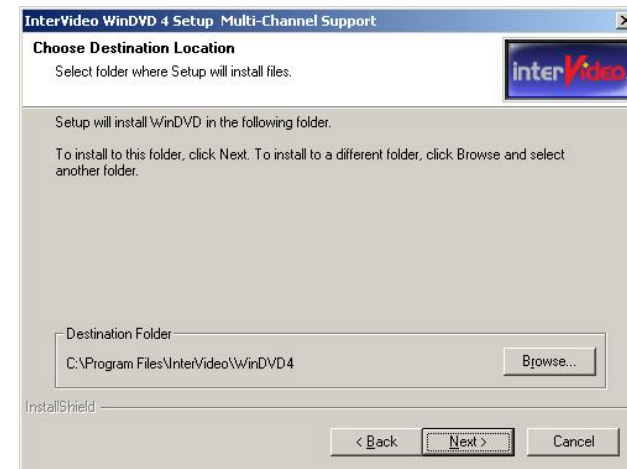
1. Please click [**Next >**] to begin the setup process.



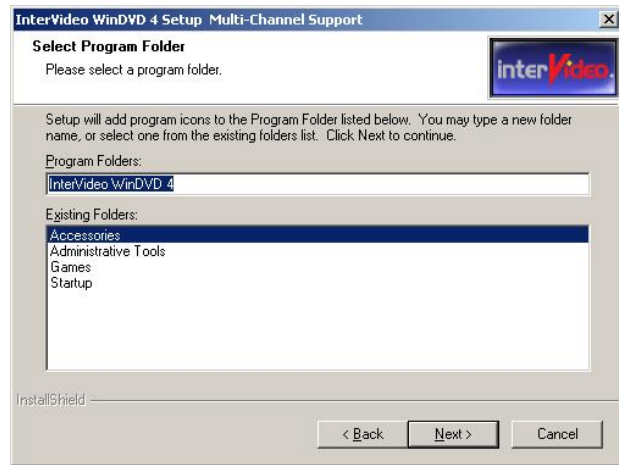
2. After reading the license agreement, please click [**Yes**] to continue.



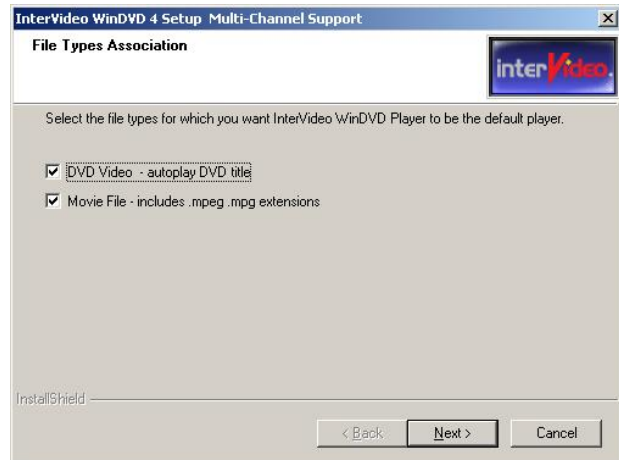
3. Please select a folder where the program will be installed and click on [**Next >**] to proceed.



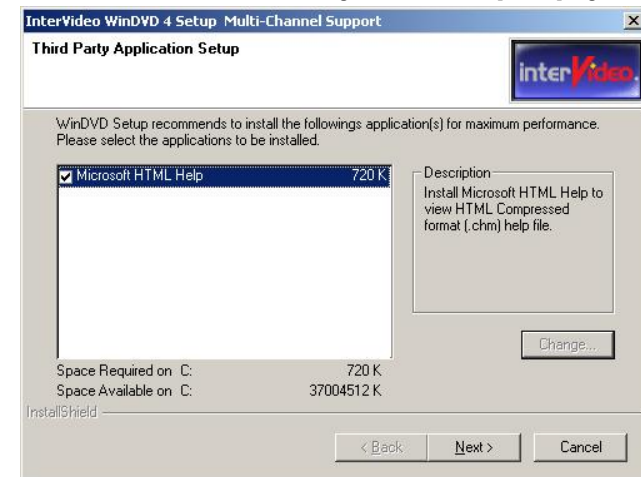
4. Please select one folder name from existing list of folders and click on [Next >] to proceed.



5. Please select the default player by checking the specific boxes and click on [Next>] to proceed.



6. Please check the box to install the help file and click on [Next>] to proceed.



#### 4.6.2 WinRip 2.1 Setup

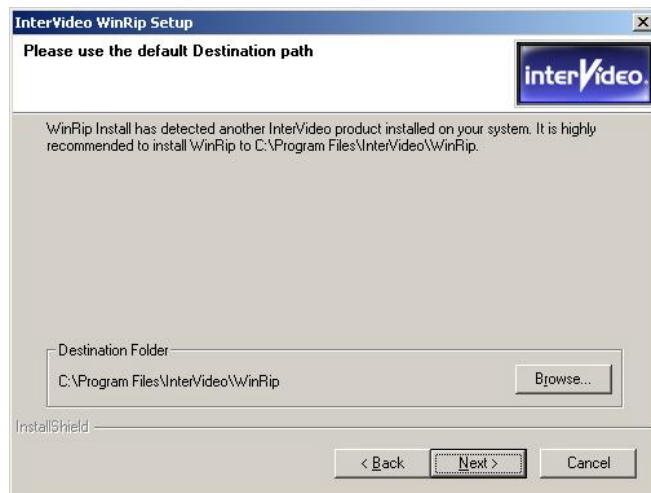
1. Please click [Next >] to begin the setup process.



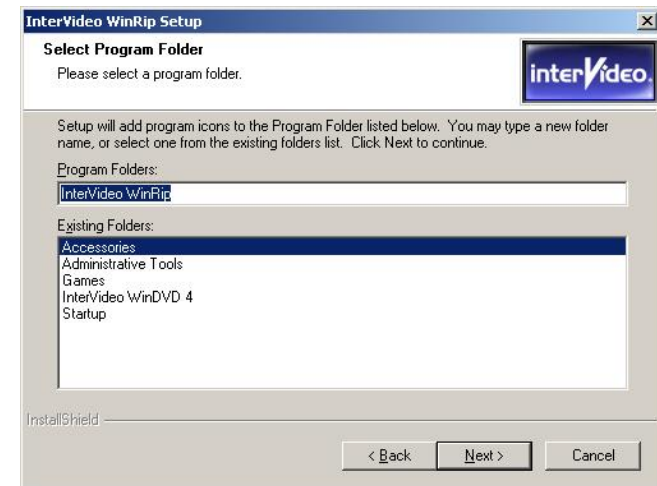
2. After reading the license agreement, please click [Yes] to continue.



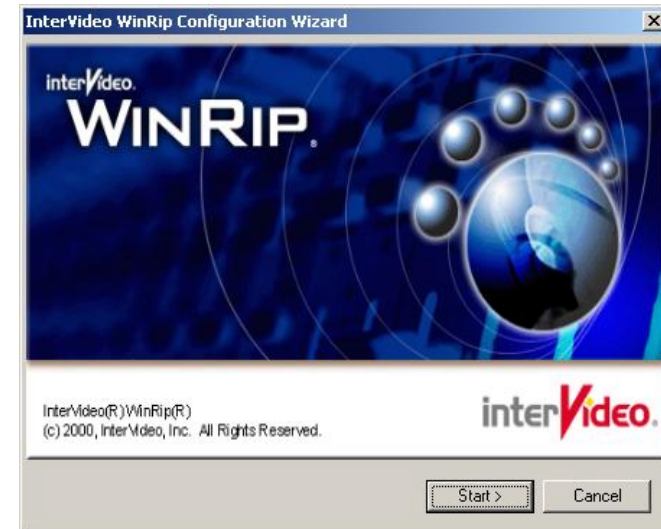
3. Please select a folder where the program will be installed and click on [Next >] to proceed.



4. Please select one folder name from existing list of folders and click on [Next >] to proceed.



5. Click on [Start >] to begin WinRip Configuration Wizard.



6. Choose **[Select All]** to select all file extension types for WinRip and click on **[Next >]** to continue.



7. Click on **[Next >]** to continue.



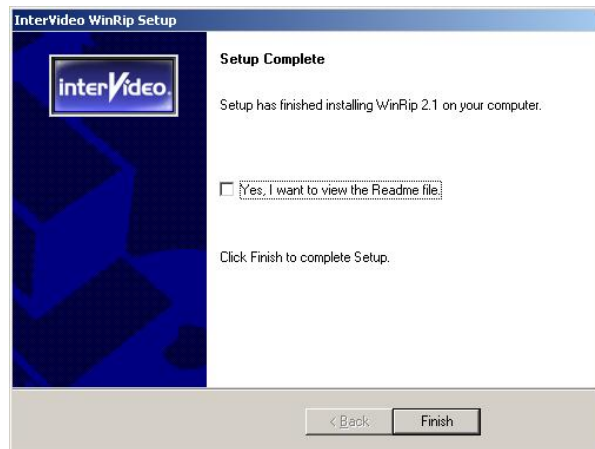
8. Select **[Yes]** to continue.



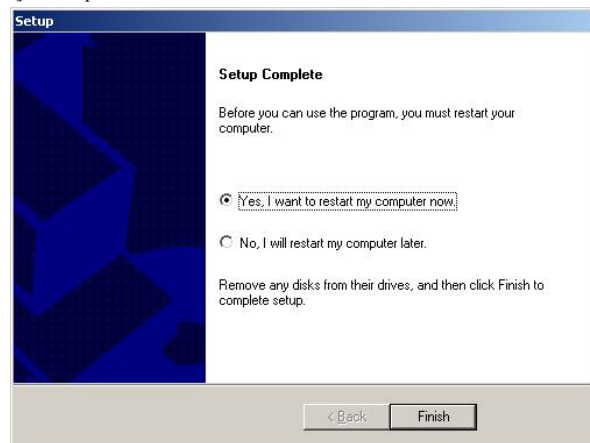
9. Click on **[Finish]** to complete the configuration process.



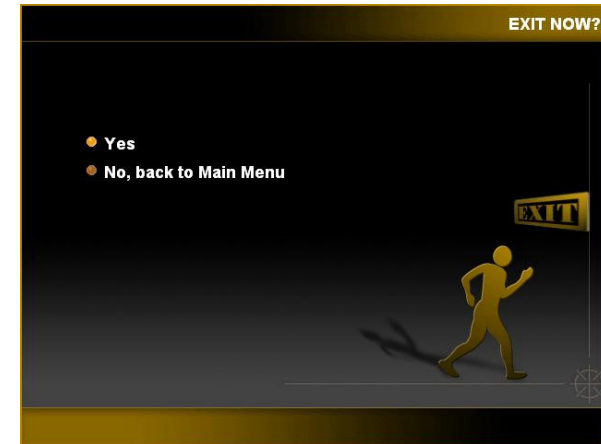
10. Click on [**Finish**] to complete the setup.



11. Please select [**Yes**] for restarting computer now or [**No**] for restart later, then click on [**Finish**] to complete installation.



12. Select [**Yes**] to exit now or [**No**] to go back to Main Menu.





## Appendix

### A-1 Windows 2000/XP CD-ROM Installation

Please refer to *Section 2-6 Serial ATA and Parallel ATA* and *Section 3-4 Integrated Peripherals -> OnChip IDE Device -> OnChip Serial ATA* for details.

1. Start the Windows 2000/XP installation by booting from the Windows 2000/XP CD-ROM:

The system BIOS must support booting from a CD-ROM. BIOS setting may need to be changed to allow CD-ROM booting.

**Note:** Before installing Windows 2000/XP, please copy the Serial ATA drivers to a floppy disk from the Driver CD (CD-ROM:\Intel\Iaadr\BOOTDRIVE).

2. Press the **F6** key to install the Serial ATA drivers when the screen displays "Windows 2000/XP Setup". This must be done or else these new drivers will not be recognized.

**Note:** Be sure to press the **F6** key as any driver loaded later in the installation process is not recognized by the Windows setup. If **F6** is not pressed, all devices controlled by the drivers are not available during Windows 2000/XP setup.

3. Choose **S** to specify an additional device when the screen displays "Setup could not determine the type of one or more mass storage devices...".

**Note:** If this screen is not displayed as the first user input, and then pressing the **F6** key was not seen by the setup program. Reboot the system and try again.

4. Insert the appropriate Serial ATA driver diskette containing the Windows 2000/XP driver required to support your Serial ATA card and press Enter.

5. Press Enter to proceed.

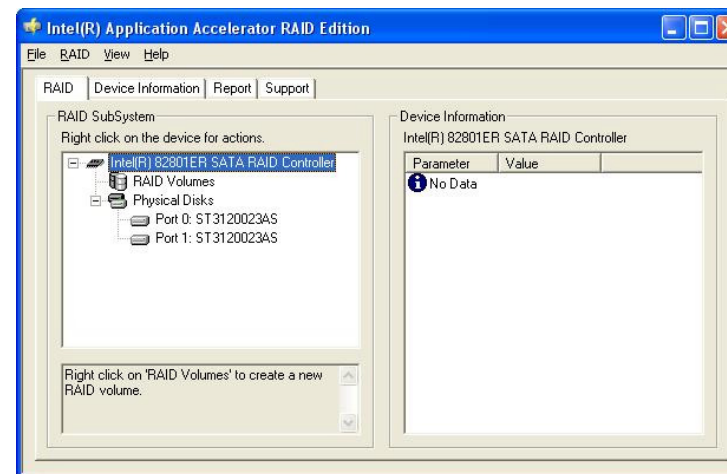
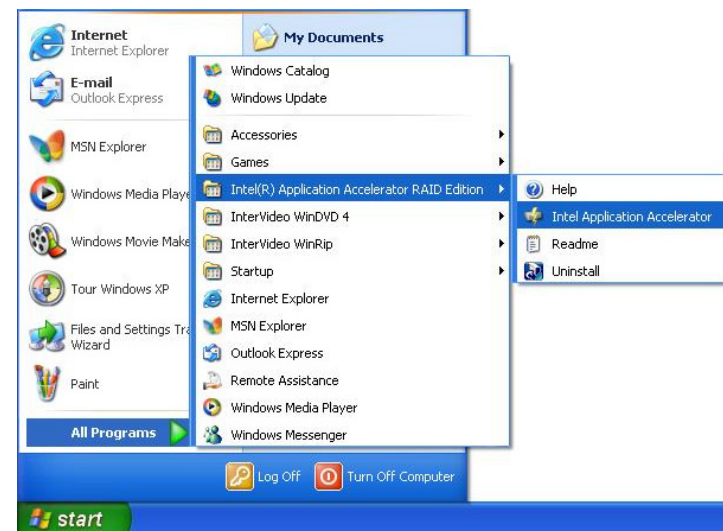
Return to the Windows 2000 Setup screen.

6. Press Enter to proceed.

The message about setup loading files appears.

7. Follow the Microsoft Windows 2000/XP installation procedure at this point.

### A-2 Intel® Application Accelerator RAID



#### Overview

The Intel® Application Accelerator RAID Edition is designed to provide high performance functionality for the Intel® 82801ER SATA RAID Controller. This product is available to enhance performance on Intel® Pentium® 4 processor-based systems with an Intel® 82801ER I/O Controller Hub and running Microsoft\*

Windows\* XP\*.

Software installation is flexible and fully automated for Microsoft Windows XP Home Edition and Windows XP Professional operating systems.

\* Other brands and names may be claimed as the property of others.

### RAID Overview

RAID (Redundant Array of Independent Disks) refers to multiple independent hard drives combined to form one large logical array. With RAID in place, the operating system (e.g. Windows\* XP\*) no longer deals with individual drives, but instead with the entire disk array as one logical drives.

The major objectives of RAID are to improve data availability and security. This version of the Intel Application Accelerator RAID Edition supports RAID Level 0. RAID Levels 1, 4, 5, and 10 are currently not supported.

- **Installation CAUTION:** When setting up RAID configurations and creating a volume, it is important to understand that installing the Intel® Application Accelerator RAID Edition on a system will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. It is important to backup all important data before proceeding with installation.
- **Uninstall CAUTION:** It is important to understand that uninstalling the Intel® Application Accelerator RAID Edition from a RAID-configured system will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. It is important to backup all important data before uninstalling.

### RAID Levels – How the Drives are organized

Each level of RAID spreads the data across the drives of the array in different way and is optimized for specific situations.

#### RAID 0

RAID Level 0 combines two or more hard drives in a way that the data coming from the user is cut into manageable blocks. These blocks are striped across the different drives of the RAID 0 array. By doing this, two or more hard drives are combined and the read/write performance, especially for sequential access, can be improved.

However, no redundancy information is stored in a RAID 0 array, which means that if one hard drive fails, all data is lost. This lack of redundancy is also stated in the number 0, which indicates no redundancy. RAID 0 is thus usually not used in servers where security is a concern.

RAID 0 Advantage: Highest transfer rates

RAID 0 Disadvantage: No redundancy – if one disk fails, all data will be lost

RAID 0 Application: Typically used in workstations for temporary data and high I/O rate

### System Requirements

In order to use the Intel® Application Accelerator RAID Edition, the following system requirements must be met:

- Desktop-based computer system
- Intel® Pentium® 4 processor
- Intel® 865 chipset with an Intel® 82801ER I/O Controller Hub
- Minimum 128 MB physical memory
- Two Serial ATA (SATA) hard drives
- Microsoft\* Windows\* XP\* Home Edition or Windows XP Professional.
- System BIOS with the Intel® RAID Option ROM

Operating Systems not supported:

- Any Version of Microsoft Windows 98, Windows Millennium Edition\* (Me)
- Microsoft Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, and Windows 2000 Data center Server
- Microsoft Windows XP Server, Windows XP Advanced Server, and Windows XP Data center Server
- Any Version of Microsoft Windows 95
- Microsoft Windows NT\* 4.0
- Any Version (including service pack) of Microsoft Windows NT 3.51
- Any Version of Microsoft Windows 3.1
- Linux\*
- UNIX\*
- BeOS\*
- MacOS\*
- OS/2\* (any version)
- MS-DOS\*

\* other brands and names may be claimed as the property of others.

### General Features

Intel® Application Accelerator RAID Edition has the following features available in property pages:

**RAID** – This property page, available for all matching system configurations,

displays information about your system's RAID configuration as viewed by the Intel® Application Accelerator RAID Edition application. The ability to create, view, and delete RAID volumes is provided.

**Device Information** - This property page, available for all matching system configurations, displays information generated and passed-down from the Intel Application Accelerator RAID Edition component. Various parameters are seen giving information about the computer's Serial ATA (SATA) hard drive(s), transfer rate, and controller versions.

**Report** - This property page, available for all matching system criteria, displays a report for support purposes about information relevant to the SATA controller, the SATA channel, and the SATA hard drive(s). This report also has the ability to be printed, saved as a text file, and viewed in an external viewer.

**Support** - This property page, available for all matching system criteria, displays support information, such as support websites and various string text for information, as well as any other information relevant to support of the product.

\* Other brands and names may be claimed as the property of others.

#### **Component Overview: Intel® Application Accelerator RAID Edition Driver**

The Intel® Application Accelerator RAID Edition Driver component is a Windows\* Hardware Quality Labs <<http://www.microsoft.com/hwtest/default.asp>> (WHQL\*) certified component designed specifically with the intention to increase the disk to system subsystem speed.

The Intel Application Accelerator RAID Edition has the ability to query the RAID component via an IOCTL interface and to obtain detailed Ultra ATA Controller and device information, which is displayed in the RAID and Device Information Property Pages, which can be saved to a file and displayed in the Report Property Page.

In addition, a refresh function can be used to refresh the RAID and Device Information Property Pages when devices are swapped in the system. The refresh function can be activated by pressing the "F5" function key or by clicking on the "View" menu, and then selecting "Refresh F5".

\* Other brands and names may be claimed as the property of others.

#### **Component Overview: Displaying Controller and Device Information**

When opened, the Devices window in the Device Information property page contains

entries for the Intel® Ultra ATA controller and all connected ATA devices. Selecting a particular controller or device in the Devices window causes the application to display the corresponding configuration parameters in the Device Information window. Parameters shown with blue bullet icons are read-only; parameters shown with a wrench icon are read-write. The various parameters are described below:

#### *Controller Parameters:*

<b>Name</b>	<b>Description</b>
Storage Kit Installed	Intel® Application Accelerator RAID Edition product version
Driver Version	Device driver version
SATA Mode Support	SATA modes supported by controller

#### *Device Parameters:*

<b>Name</b>	<b>Description</b>
Firmware	Device firmware revision
Serial #	Device serial number
Disk Size (1)	Total size of disk
Current SATA Transfer Mode	Device's current, configured transfer mode

(1) This parameter only appears on devices that meet the ATA specification.

#### **RAID Component Overview: Displaying Controller and Device Information**

When opened, the Devices window in the RAID property page contains entries for the Intel® Ultra ATA controller and all connected ATA devices. Selecting a particular controller or device in the Devices window causes the application to display the corresponding configuration parameters in the Device Information window. Parameters shown with blue bullet icons are read-only; parameters shown with a wrench icon are read-write.

The various parameters are described below:

#### *Physical Disk Parameters:*

<b>Name</b>	<b>Description</b>
Usage	How the RAID subsystem is using the selected disk
	<b><i>Non-RAID disk</i></b>
	Disk that has no RAID meta-data on it, and is visible and available for use by the operating system.
	<b><i>Array member</i></b>
	Disk has been grouped with other disks to form a disk array containing a RAID volume. The RAID volume may be exported to the operating

system but the disk itself is not.

**None**

Disk has meta-data on it that keeps it from being exported to the operating system but it is not an array member

Status

Indicates the health of the disk

**Normal**

Disk is present and functioning as expected

**Error Occurred**

Disk has exceeded its unrecoverable threshold. Disk will continue to be accessed if it's a member of a RAID 0 volume.

**SMART Event**

Disk has exceeded its recoverable error threshold and is at risk of failure.

**Missing**

Disk is not present.

**Incompatible Version**

Disk has RAID meta-data on it but its version is incompatible with the current version of RAID software. Updated version might be needed in order to resolve

System Disk

Indicates if this disk contains protected operating system files

Serial #

Device serial number

Member Volumes

Lists the volumes contained on the disk

**Volume Parameters:**

<b>Name</b>	<b>Description</b>
Status	Indicates the health of the RAID volume <b>Normal</b> Volume data is fully accessible to host <b>Failed</b> One or more disks are missing or have failed, and the volume will complete all I/O requests with a failing status.
Size	Total size of the RAID volume
System Volume	Indicates if this RAID volume contains protected operating system files
RAID Level	RAID technology implemented on the volume
Strip Size	Size of logical contiguous data block on each disk

Number of Disks

Number of disks contained in the RAID volume

Member Disks

Lists the disks contained in the RAID volume

**Component Overview: Create, View and Delete RAID Volumes**

**Navigation Note:** You can right mouse click on a device for actions: Right click on 'RAID Volumes' to create a new RAID volume. After a RAID volume has been created, right click on a volume to modify or delete.

**Create a Volume**

Two methods are provided to create a RAID volume:

## 1. Create Manually:

You can select the volume and strip size to be used. Volume name must be at least 1 alpha character and no more than 16 characters.

*Typical Strip Size Settings:*

<b>Name</b>	<b>Description</b>
16KB	Best for sequential transfers
64KB	Good general-purpose strip size
128KB	Best performance for most desktops and workstations

## 2. Create from Existing Disk:

This option allows you to create a volume on two disks and migrate the data on one of those disks.

The "Create from Existing Disk" feature allows a RAID 0 volume to be created using an existing operating system disk drive with personal data and a second Serial ATA disk drive. The disk with the data you wish to keep is called the source disk. The data on the source disk is copied to the new RAID volume that spans these two disks. This process may take approximately one hour but may take longer depending on disk capacity and system workload.

**View a Volume**

Volumes and other elements of the RAID configuration can be viewed. Select the element and the list on the right window will be updated.

**Delete a Volume**

Right click on a volume and select "Delete". If you delete a volume, all the data on that volume will be lost and the data cannot be recovered. Backup all important data

before you delete a volume.

### Modify a Volume

You can modify the volume name by right clicking on a volume and selecting “Modify”.

### A-3 Digidoc 80-Port POST Error Code List

POST (hex)	Description
<b>CF</b>	Test CMOS R/W functionality.
<b>C0</b>	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers.
<b>C1</b>	Detect memory: -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
<b>C3</b>	Expand compressed BIOS code to DRAM.
<b>C5</b>	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
<b>01</b>	Expand the Xgroup codes locating in physical address 1000:0
<b>03</b>	Initial Superio_Early_Init switch.
<b>05</b>	Blank out screen. Clear CMOS error flag.
<b>07</b>	Clear 8042 interface. Initialize 8042 self-test.
<b>08</b>	Test special keyboard controller for Winbond 977 series Super I/O chips. Enable keyboard interface.
<b>0A</b>	Disable PS/2 mouse interface (optional). Auto detects ports for keyboard & mouse followed by a port & interface swap (optional). Reset keyboard for Winbond 977 series Super I/O chips.
<b>0E</b>	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
<b>10</b>	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
<b>12</b>	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.

<b>14</b>	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
<b>16</b>	Initial Early_Init_Onboard_Generator switch.
<b>18</b>	Detect CPU information including brand, SMI type (Cyrix or Intel®) and CPU level (586 or 686).
<b>1B</b>	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
<b>1D</b>	Initial EARLY_PM_INIT switch.
<b>1F</b>	Load keyboard matrix (notebook platform).
<b>21</b>	HPM initialization (notebook platform)
<b>23</b>	<ol style="list-style-type: none"> <li>1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute.</li> <li>2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.</li> <li>3. Prepare BIOS resource map for PCI &amp; PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.</li> <li>4. Onboard clock generator initialization. Disable respective clock resource to empty PCI &amp; DIMM slots.</li> <li>5. Early PCI initialization: <ul style="list-style-type: none"> <li>- Enumerate PCI bus number.</li> <li>- Assign memory &amp; I/O resource.</li> <li>- Search for a valid VGA device &amp; VGA BIOS, and put it into C000:0.</li> </ul> </li> </ol>
<b>27</b>	Initialize INT 09 buffer.
<b>29</b>	<ol style="list-style-type: none"> <li>1. Program CPU internal MTRR (P6 &amp; PII) for 0-640K memory address.</li> <li>2. Initialize the APIC for Pentium class CPU.</li> <li>3. Program early chipset according to CMOS setup. Example: onboard IDE controller.</li> <li>4. Measure CPU speed.</li> <li>5. Invoke video BIOS.</li> </ol>
<b>2D</b>	<ol style="list-style-type: none"> <li>1. Initialize multi-language.</li> <li>2. Put information on screen display, including Award title, CPU type, and CPU speed.</li> </ol>
<b>33</b>	Reset keyboard except Winbond 977 series Super I/O chips.

<b>3C</b>	Test 8254
<b>3E</b>	Test 8259 interrupt mask bits for channel 1.
<b>40</b>	Test 8259 interrupt mask bits for channel 2.
<b>43</b>	Test 8259 functionality.
<b>47</b>	Initialize EISA slot
<b>49</b>	<ol style="list-style-type: none"> <li>1. Calculate total memory by testing the last double word of each 64K page.</li> <li>2. Program writes allocation for AMD K5 CPU.</li> </ol>
<b>4E</b>	<ol style="list-style-type: none"> <li>1. Program MTRR of M1 CPU</li> <li>2. Initialize L2 cache for P6 class CPU &amp; program CPU with proper cacheable range.</li> <li>3. Initialize the APIC for P6 class CPU.</li> <li>4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.</li> </ol>
<b>50</b>	Initialize USB
<b>52</b>	Test all memory (clear all extended memory to 0)
<b>55</b>	Display number of processors (multi-processor platform)
<b>57</b>	<ol style="list-style-type: none"> <li>1. Display PnP logo.</li> <li>2. Early ISA PnP initialization</li> </ol> <p>- Assign CSN to every ISA PnP device.</p>
<b>59</b>	Initialize the combined Trend Anti-Virus code.
<b>5B</b>	(Optional Feature) Show message for entering AwdFlash.EXE from FDD (optional)
<b>5D</b>	<ol style="list-style-type: none"> <li>1. Initialize Init_Onboard_Super_IO switch.</li> <li>2. Initialize Init_Onboard_AUDIO switch.</li> </ol>
<b>60</b>	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
<b>65</b>	Initialize PS/2 Mouse
<b>67</b>	Prepare memory size information for function call: INT 15h ax=E820h
<b>69</b>	Turn on L2 cache
<b>6B</b>	Program chipset registers according to items described in Setup & Auto-configuration table.
<b>6D</b>	<ol style="list-style-type: none"> <li>1. Assign resources to all ISA PnP devices.</li> </ol>

	<ol style="list-style-type: none"> <li>2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".</li> </ol>
<b>6F</b>	<ol style="list-style-type: none"> <li>1. Initialize floppy controller.</li> <li>2. Set up floppy related fields in 40:hardware.</li> </ol>
<b>73</b>	(Optional Feature) Enter AWDFLASH.EXE if: <ul style="list-style-type: none"> <li>- AwdFlash is found in floppy drive.</li> <li>- ALT+F2 is pressed.</li> </ul>
<b>75</b>	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM
<b>77</b>	Detect serial ports & parallel ports.
<b>7A</b>	Detect & install co-processor
<b>7F</b>	<ol style="list-style-type: none"> <li>1. Switch back to text mode if full screen logo is supported</li> </ol> <ul style="list-style-type: none"> <li>- If errors occur, report errors &amp; wait for keys.</li> <li>- If no errors occur or F1 key is pressed to continue: w/Clear EPA or customization logo.</li> </ul>
<b>82</b>	<ol style="list-style-type: none"> <li>1. Call chipset power management hook.</li> <li>2. Recover the text font used by EPA logo (not for full screen logo)</li> <li>3. If password is set, ask for password.</li> </ol>
<b>83</b>	Save all data in stack back to CMOS
<b>84</b>	Initialize ISA PnP boot devices.
<b>85</b>	<ol style="list-style-type: none"> <li>1. USB final Initialization.</li> <li>2. NET PC: Build SYSID structure.</li> <li>3. Switch screen back to text mode</li> <li>4. Set up ACPI table at top of memory.</li> <li>5. Invoke ISA adapter ROMs.</li> <li>6. Assign IRQs to PCI devices</li> <li>7. Initialize APM</li> <li>8. Clear noise of IRQs.</li> </ol>
<b>93</b>	Read HDD boot sector information for Trend Anti-Virus code
<b>94</b>	<ol style="list-style-type: none"> <li>1. Enable L2 cache</li> <li>2. Program boot up speed</li> <li>3. Chipset final initialization.</li> <li>4. Power management final initialization.</li> <li>5. Clear screen &amp; display summary table.</li> <li>6. Program K6 write allocation.</li> <li>7. Program P6 class write combining.</li> </ol>

<b>95</b>	<ol style="list-style-type: none"><li>1. Program daylight saving.</li><li>2. Update keyboard LED &amp; typematic rate.</li></ol>
<b>96</b>	<ol style="list-style-type: none"><li>1. Build MP table</li><li>2. Build &amp; update ESCD.</li><li>3. Set CMOS century to 20h or 19h</li><li>4. Load CMOS time into DOS timer tick.</li><li>5. Build MSIRQ routing table.</li></ol>
<b>FF</b>	Boot attempt (INT 19h)

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