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GIGA-BYTE TECHNOLOGY

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Note:
Your motherboard may not have all of the features introduced in this manual.

GIGABYTE™

TECHNOLOGY

Intel® 925X EXPRESS CHIPSET

Intel® 915P EXPRESS CHIPSET



GIGABYTE 8Σ Series

Fusion of Top Innovations

Intel® 925X/915P Express** Chipset Motherboard **Supports LGA775 Intel® Pentium®4 Processor

- **Processor** — LGA775 90nm Intel® Pentium® 4 Processor
- **Memory** — Dual Channel DDR2 533
- **D.P.S** — U Plus D.P.S. (Universal Plus Dual Power System)
- **Ethernet** — Dual Gigabit LAN
- **Cooling** — U-Plus D.P.S. and Cool Plus
- **Peripherals** — PCI-Express/IEEE 1394b SATA/USB 2.0
- **Audio** — Intel® High Definition Audio
- **ShieldWare** — A solid pack of unique software features



Chapter 0 Before Building Your PC

0.1 Introduction

Many PC users often hesitate to build their own PCs because of the perceived risks associated with the hardware installation. However, as technology has progressed, PC components have more and more been accompanied with user-friendly operational and installation interfaces, making installation a snap. Generally speaking, almost anyone can successfully install PC components by reading the user's manual prior to the installation, carefully following the steps, and using the necessary tools.

As a well-known PC parts manufacturer, GIGABYTE supplies various high-quality PC parts. In order to make it easier for everyone to effortlessly and securely install PC parts, GIGABYTE has prepared this DIY Booklet. The content of this DIY booklet are based on previous editions, with the latest parts information added in the hopes of helping you to build your own PC effortlessly.



▲Some of GIGABYTE high performance PC products/parts for 2004

0.2 Preparation Before Building Your PC

PC hardware installation covers a lot of details, ranging from simply fastening a screw to installing devices such as a printer or scanner. Insufficient preparation often causes most of the problems during installation. Even for an old hand at hardware installation, difficulties might occur if not well enough prepared. As the saying goes, “You cannot make bricks without straw.” Good preparation will make your installation smooth and efficient.

Step 1 Suitable toolkit and working gloves



■ **The proper set of tools makes installation more efficient, while working gloves can prevent your hands from harm. It’s best to use an anti-static wrist band to prevent electrical static discharge.**

Step 2 Jumpers



■ **Jumpers are small plastic connectors used for manual Hardware configuration. They are important pieces, so please take care not to lose them.**

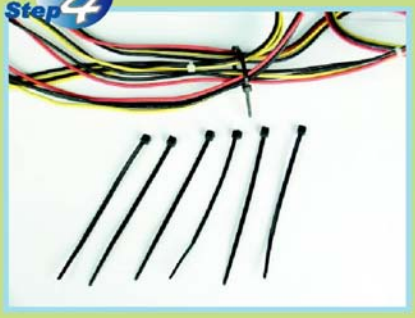


Step 3 Cables and Wires



■ When unpacking certain PC parts & accessories, you may find cables or wires included in the package. Use these cables and wires with care, as you don't want to spend time or money to buy them if they become damaged.

Step 4 Cable Ties



■ We recommended that you get some cable ties ready. When building a PC, use cable ties to bundle wires for a more clean and organized installation. It also enables free air flow inside your case for a better cooling effect.

Step 5 Operating System and Drivers

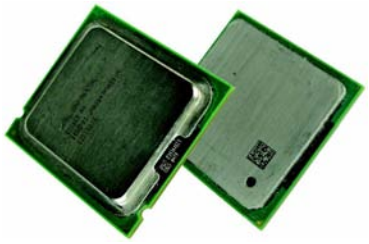


■ When unpacking the PC components, we suggest that you keep all of the installation CDs together and in a safe place. After installation, make sure you store them along with all your other software and driver programs where you can redily access them again if necessary.

Chapter 1 Central Processing Unit (CPU)

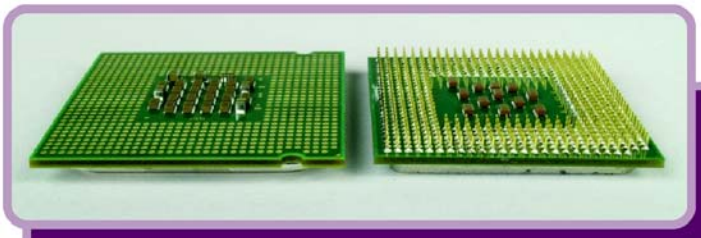
1.1 The main processor of a PC - CPU

CPU stands for Central Processing Unit. This consists of the Control Unit (CU), Arithmetic and Logic Unit (ALU) and Memory Unit (MU) that are all needed for the CPU to function.



State of the art CPUs are enhanced with special registers and “instruction sets”, such as the MMX, the SSE and the SSE2, of which are used to speed-up calculation for multimedia and Internet applications.

After years of competition, Intel’s CPU has occupied the largest market share, mainly due to its stability and excellent performance. As a result, many PC users will choose the latest Intel CPU when they are buying a new PC. Intel’s latest CPUs - the Pentium 4 processor - has been released in various versions. Intel’s most popular CPU currently on market is the 800MHz CPUs with Hyper Threading technology. As for Intel’s future CPUs, their appearance will be similar to that of Pentium 4 processor, however, no more 478-pin socket (e.g. LGA775).

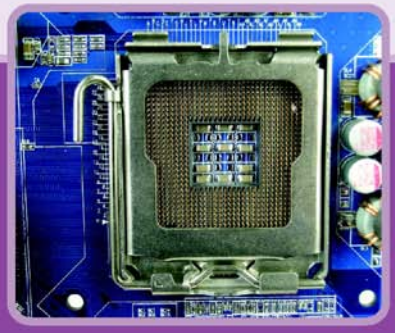


▲Intel’s Pentium 4 (right) currently has 478 pins, while the LGA775 Uses a 775-contact pin-less Land Grid Array (LGA)



CPU Socket





▲ On the left is Socket 478 for the Pentium 4, having 478-pins.
The LGA775 processor (right) has no pins on the CPU, only contacts.

Processor clock

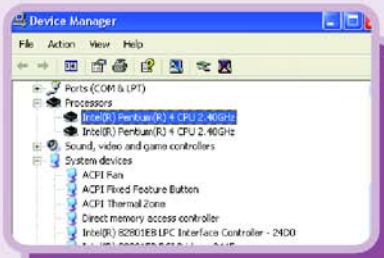
CPU clock simply means the speed at which a CPU can execute instructions. The higher the clock speed is, the faster the CPU can process instructions.

Front Side Bus (FSB)

Front Side Bus (FSB) is the interface between your CPU, motherboard chipset and main memory. Currently the Intel Pentium 4 processors use a 533MHz or 800MHz FSB. But how is it measured? It all depends on the processor architecture.
Because Intel's Pentium 4 processor has 4 data bus data transmission, if the FSB for the new Pentium 4 line is 133MHz and 200MHz, the CPU's data signaling rate will be 533MHz and 800MHz, respectively.

Hyper Threading (HT) Technology

What is Hyper Threading (HT) technology?
HT is a new technology adopted by Intel to enhance the performance of Pentium 4 processors (the newest versions of their processors).
With HT, a Pentium 4 processor can achieve greater performance just as if you have two processors. Hyper Threading technology allows multiple threads to be executed simultaneously so that a job can be completed in a shorter amount of time. Digital audio and video processing capabilities are also enhanced.



▲Hyper Threading Technology working on a Window XP operating system can achieve a performance as if you have two processors.

CPU Cooling

With increasing CPU clock speed and performance, also comes heat. Typically Intel Pentium 4 processors will have a CPU cooler included. The CPU cooler can dissipate heat adequately enough as long as the CPU works at its nominal clock speed. But for overclockers, this cooling solution may not be satisfactory, so they will pay extra to purchase high performance CPU cooler, such as GIGABYTE's 3D Cooler-ULTRA, to provide better cooling effect.





▲ Left is the cooler included in the original Intel Pentium 4 processor; right is GIGABYTE 3D Cooler-ULTRA favored by many DIY hobbyists.



1.2 Installing a CPU

When buying a PC, choosing a CPU is often the first decision, because a CPU almost always determines the performance of your PC system. When building a PC, the CPU is usually the first hardware to be installed. Since it is not very convenient to install a CPU from within the computer case, we recommend that you install the CPU and memory modules on the motherboard before you install the motherboard into the PC case.

The CPU installation can be divided into two steps. The first step is to install the CPU itself, and the second step is to install the CPU cooler. Since Intel CPUs comprise the mainstream of the current CPU market, we will use Socket 478 Pentiums 4 CPUs and the latest processor LGA775 as examples to show you how to install a CPU.

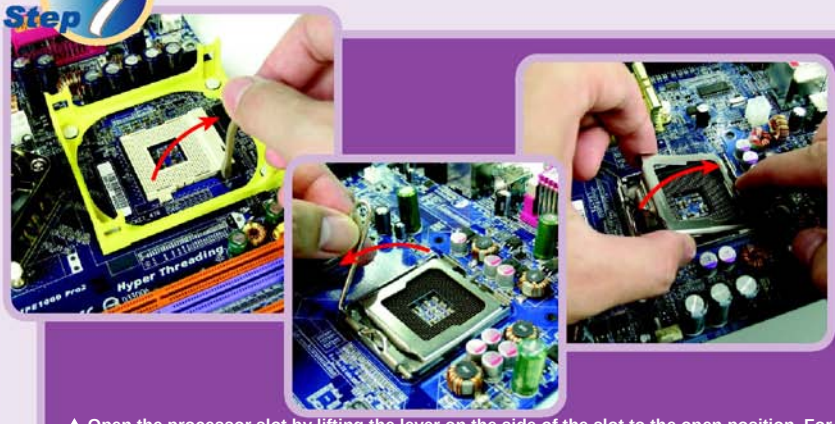
As for CPU cooler installation, there is one important point that you should keep in mind: if you are using an original Intel cooler, there is already a layer of black thermal paste on the bottom surface which acts as thermal conductor therefore it is unnecessary to apply additional thermal paste on the CPU surface. Other cooler manufactures usually wont have such a layer, and the thermal paste will be provided that you should apply yourself.



◀ **Original Intel cooler has a layer of black thermal paste on the bottom to enhance cooling performance, while non-Intel cooler usually don't have such a layer.**

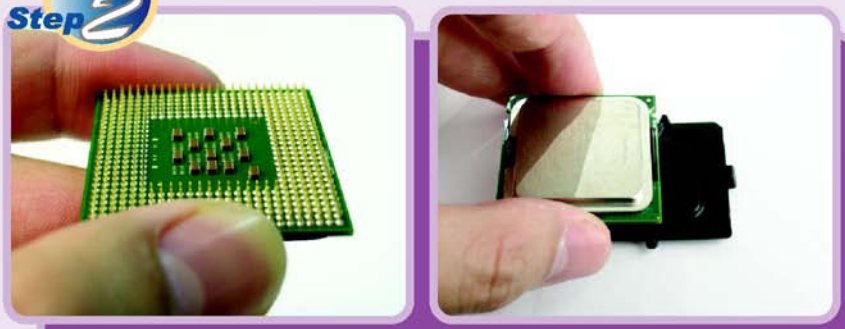
Quickly Installing a CPU

Step 1



▲ Open the processor slot by lifting the lever on the side of the slot to the open position. For a LGA 775 CPU socket, lift the CPU cover according to seesaw principle in the opposite direction.
Warning: Don't touch the pins in the socket, or the socket may be damaged by static electricity.

Step 2



▲ Pick up the CPU. Please make sure that all of the pins on the bottom of the Socket 478 CPU are well lined up. If one of the pins is bent, CAREFULLY straighten it with a tiny screwdriver. For the LGA775 CPU, there should be a protected cover on the bottom. Remove the cover with care, and don't touch the bottom of the processor.



Step 3





▲ Hold the two opposite sides of the CPU with your fingers, and align the processor to the slot based on the keyed corner. Carefully drop the processor into the slot so that all pins are in the appropriate holes.

Step 4







▲ For the LGA775 CPU, after dropping the CPU into the slot, you should replace the CPU cover. Then lower the lever on the side of the processor slot until it is in the locked position. Now you have successfully installed the CPU!

Quickly Installing a CPU cooler

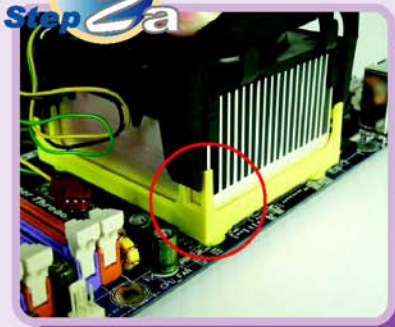
Step 1





▲ Because there is no thermal paste on the bottom of 3D Cooler-ULTRA, you should first apply some thermal paste to the surface of the CPU (If you are using an original Intel heat sink, skip this step).

Step 2a



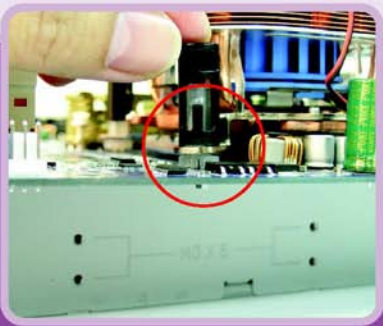


▲ When using an original Intel cooler, you should first correctly press the black clamp into the yellow mounting clip, and then press the levers on the sides of the heat sink in the opposite direction. In this way the cooler can be installed firmly.



Step 2b

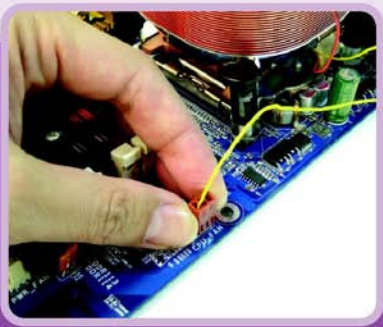




▲ When using a 3D Cooler-ULTRA, press the clamp on the heat sink into the corresponiding clip of the motherboard.

Step 3





▲ Don't forget to connect the heat sink's 3-pin power lead, otherwise the CPU may be damaged due to overheating.

Step 4



◀ When using a 3D Cooler-ULTRA, don't forget to connect the 4-pin power lead.

3D Cooler

COOL

360° COOLING TECHNOLOGY

Complete Copper Design

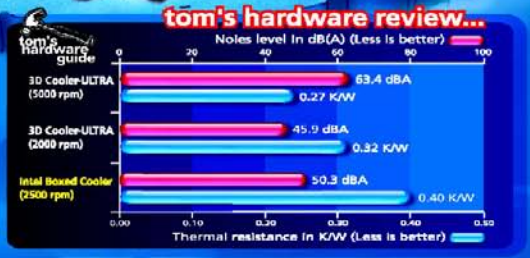


3D Cooler-ULTRA Series

- Better performance than boxed cooler
- Lower noise output than boxed cooler
- Reduces CPU temperature by more than 10°C than boxed cooler at highest speed and more than 6°C at lowest speed during full loading (TDP 82W)

From tom's hardware test result ▶

tom's hardware review...



Cool

- Central-Blower
- 360° Cooling Architecture
- Double Inlet From Top & Bottom
- Multi-cooling of CPU and Surrounding Components

Attractive

- Hollow High Density Copper Fins with Embedded 4 way Heat Pipes
- Unique Heat Sink Structure
- Eye-Catching LED Display PCU31-VH ONLY

Universal

- Compatible with Intel® Pentium® 4 and AMD Athlon™ 64 /Athlon™ XP
- Compatible with Intel® Prescott LGA775 using Optional Retention Mechanism
- Easy Tool-Free Product Installation

Super Silent

- PCB for Linear Fan Speed Control on Panel Lower Noise Output (suitable for both 3.5" front panel and PCI rear panel) PCU31-VH ONLY
- Use of Fan Control Cable for Decreased Fan Speed from 2500rpm to 1900rpm PCU31-SD ONLY
- Optimum Design for Balanced Performance and Noise Output

Superior Quality

- Entirely Copper-Based Heat Sink Design
- Advanced Heat Sink Paste Included (ShinEtsu X-23-7762)



Tool-Free & Easy to Install

Support Intel® Prescott LGA775 w/t Optional Retention Mechanism



GH-PCU31-SD



GH-PCU31-VH

GT 2004 GT-Edition



1.3 Intel's New Processor Number System and Purchase Guidelines

To help users easily understand the overall features of a processor and choose their ideal PCs, Intel has adopted a new processor number system for desktop and notebook computers.

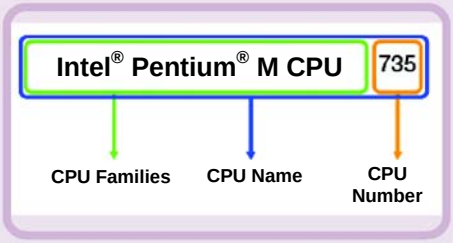
Composition of an Intel Processor Number

So what does a new processor number stand for? There are five important components.

1. **Architecture: Basic design of a microprocessor may include process technology and/or other architectural enhancements.**
2. **Cache (MB/KB): A temporary storage area for frequently or recently accessed data.**
3. **Clock Speed (GHz/MHz): Speed of the processor clock dictates how fast the processor can process data.**
4. **Front Side Bus (GHz/MHz): The connecting path of the processor and other key components such as the memory controller hub.**
5. **Other Intel Technologies: As Intel processors evolve and progresses over time, Intel will integrate new feature technologies and capabilities that may increment the processor number.**

Processor Number Nomenclature System

Going forward, Intel processors will be named using a combination of the processor brand (the "processor family") and a specific 3-digit number (the "7processor number"). The processor number will be a specific 3-digit number, such as 7xx, 5xx and 3xx.



Examples of Intel Processor Families

Desktop processor families	Number Sequence
Intel® Pentium® 4 processor (including the Intel® Pentium® 4 processor supporting Hyper Threading Technology and Intel® Pentium® 4 processor with HT Technology)	7xx 5xx
Intel® Celeron® D processor	3xx

Note: A higher number within a processor family can indicate more processor features, more specific processor features, or a change in architecture. Note that in some cases, a higher number processor may be indicated that a specific function or feature is added or deleted.



Simplify Decision-making Process

Intel wishes for consumers to be able to quickly identify the advantages among the processors in the same series and to perform a complete analysis or comparison for their functions and features during the selection process. For example, consumers who wish to purchase a digital camera purchase might wish to compare the optical zoom and digital zoom as well as the resolution among various brands.

Similarly, references to the clock speed in the processor name (as has been used in the past) will be completely replaced with the processor number, which now represent a broader set of features that influence the overall user experience. Processor families may also change to reflect changes in Intel's product offerings, hence helping users to compare products of the same line or brand.



Because Performance Matters

- Supports Intel® Pentium® 4 Processor with HT Technology[1] Extreme Edition
- 800MHz FSB support
- Dual Channel DDR2 Memory
- PCI Express* Graphics
- Intel® High Definition Audio
- Intel® Wireless Connect Technology
- Intel® Matrix Storage Technology

intel

[1]Look for systems with the Intel® Pentium® 4 Processor with HT Technology logo which your system vendor has verified utilize Hyper-Threading Technology. Hyper-Threading Technology requires a computer system with an Intel Pentium 4 processor supporting HT Technology and an HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See www.intel.com/info/hyperthreading for more information including details on which processors support HT Technology.

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

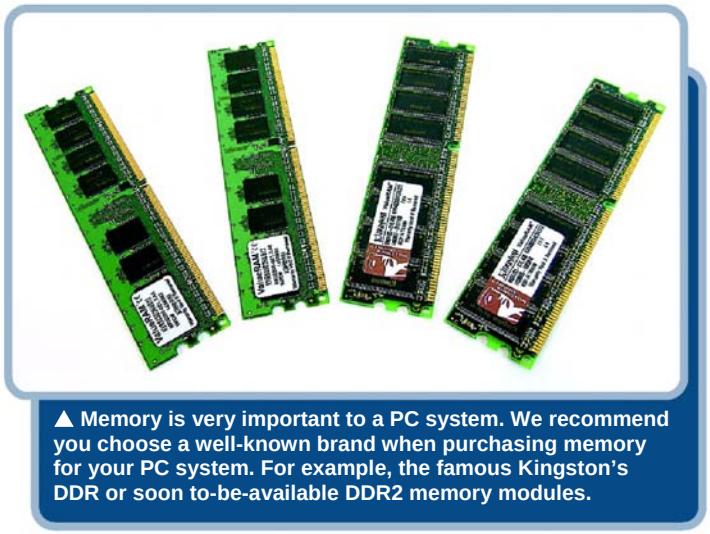
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Chapter 2 Memory Modules

2.1 Identifying Memory Modules

The current and mainstream demand on memory modules is the so called DDR Memory. But if your PC is somewhat out of date (if your PC is two or three years old), the memory in your PC may be of the former mainstream—that is, SDRAM memory. As technology rapidly develops DDR2 will soon replace DDR as the mainstream memory module. The new DDR2 memory is considered by many vendors as “the memory of tomorrow”, and it is expected that DDR2 products will be available late in 2004. Of course, this is dependent upon market demands and supply polices of chipset and motherboard vendors.

Well, regardless of whether it is SRAM, DDR or DDR2, memory that is used as the “main memory”, memory capacity has, and will continue to increase. The memory capacity has evolved from former 64MB or 128MB to current 256MB, 512MB, or even 1GB (single stick), and the higher capacity costs more. Moreover, memory modules have specifications for clock speed. For example, there are PC-100, PC-133 and so on for SDRAM memory, and DDR266, DDR333, DDR400 and so forth for DDR memory. Those specifications indicate the performance as well as the price of the memory modules. So, you should pay attention to those details during purchase or use.

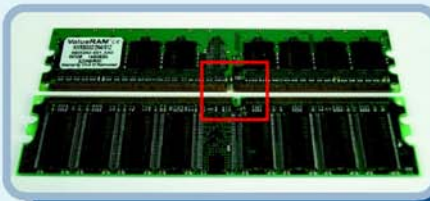


▲ Memory is very important to a PC system. We recommend you choose a well-known brand when purchasing memory for your PC system. For example, the famous Kingston’s DDR or soon to-be-available DDR2 memory modules.



How to differentiate between DDR and DDR2 memory modules?

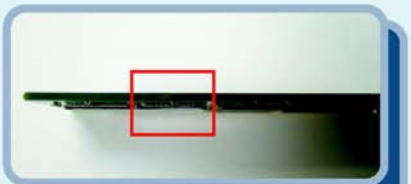
A memory module mainly consists of memory units, the PCB board, the SPD and corresponding circuits. No matter if they are SDRAM, DDR or DDR2, memory modules, they all have a very similar physical appearance. The most obvious difference lies in the pins at the bottom of the motherboard that are designed according to the signal transmitting mode of the memory module. When buying or installing memory note that DDR2 modules have a different number of pins and have a notch in a different position than DDR. This will help you to differentiate between DDR and DDR2 memory modules.



◀ **Pay attention to the small notches and you will see the differences between DDR (upper) and DDR2 (lower) memory modules.**

Single and double-sided memory modules

Both DDR and the new DDR2 memory modules have two types: single and double-sided. A single-sided DDR/DDR2 memory module is a single memory bank, while a double-sided module is two memory banks. The number of memory modules that can be installed in a PC system depends on the motherboard and chipset specifications. For instance, if the chipset supports six memory banks, and the motherboard has 3 memory slots, then you can install at most three double-sided DDR/DDR2 memory modules. On the other hand, if the chipset supports six banks of memory, but the motherboard has 4 memory slots, then you can use only 3 of the 4 slots to install double-sided DDR/DDR2 memory modules, or you have to install two double-sided modules and two single-sided modules—that is, under this condition, you can install at most three double-sided modules, or you can install two double-sided modules and two-single sided modules. Refer to Motherboard chapter of the DIY Book.



▲ **A single-sided memory module is a memory bank**



▲ **A double-sided memory module is two memory banks**

Clock Speed and Frequency Bandwidth

There are some differences in how to calculate the clock speeds of SDRAM and DDR memory modules. This is because DDR memory can send 2 bits of data per clock cycle, while SDRAM memory can send only 1. So with equivalent core speeds, DDR offers theoretically double the data throughput of SDRAM. This effectively means that a PC-100 SDRAM module and a DDR200 module have equivalent core speed, as does a PC-133 SDRAM module and a DDR266 module. Some typical DDR clock speeds are 200MHz, 266MHz, 333MHz, 400MHz, while DDR2 memory has even higher clock speeds, such as 400MHz, 533MHz, and 667MHz.

After learning a bit about memory clock speed, its now time to move forward to learn another term -- **frequency bandwidth**. It is the product of data bandwidth and system clock speed given by the formula below:

frequency bandwidth = bandwidth of each data transfer x clock speed

SDRAM, DDR and DDR2 memory modules all have the same bandwidth of each data transfer – 64 bits, which is equal to 8 bytes. As we just learned, these modules each have different clock speeds, and they also have different frequency bandwidths and the relationship is shown in the table given below. Theoretically, the higher the frequency bandwidth is, the better performance the system can offer. So if your PC system can support PC3200/DDR400 memory modules, its better not to use PC2700/DDR333 or older products. But on the other hand, can faster PC4000/DDR500 memory modules be used in this system? The answer is “Yes”, but you would not observe an increase in performance – the performance will be exactly the same as if you use PC3200/DDR400 memory modules.

The Dual-channel Architecture of Memory

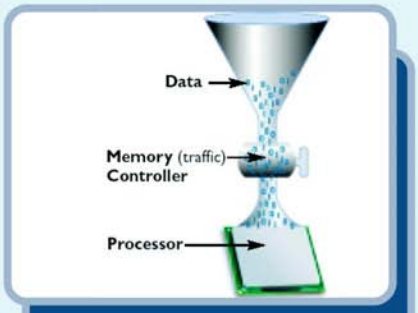
Taking a road as example, more lanes will theoretically allow faster traffic. The same theory applies to memory architecture – more channels will improve the performance of memory.



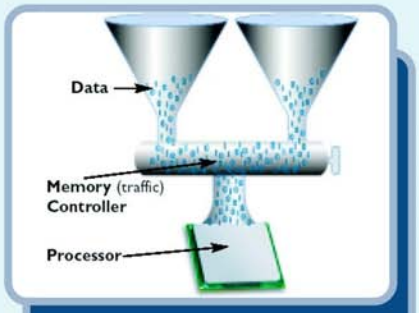
To adopt the dual-channel architecture, some requirements must first be met. First and foremost, your motherboard chipset must support dual-channel. Secondly, you have to get at least two identical memory modules, with the same capacity, clock speed, CL (CAS latency) and other parameters. Lastly, when installing these memory modules, you should correctly install them into memory slots supporting dual-channel architecture. Most of the new motherboards out there on the market use different colors to distinguish memory slots of this kind. Taking GIGABYTE's DDR/DDR2 motherboards as examples (illustrated as below), the DDR memory slots are indicated in orange or purple, while the DDR2 memory slots are indicated in orange or red.

The relationship between memory modules' clock speeds and frequency bandwidths

Frequency band mode	Data Bits Accessed	PC-133	PC2100/DDR266	PC2700/DDR333	PC3200/DDR400	PC4000/DDR500
single-channel	64-bit	1.1 GB/s	2.1 GB/s	2.7 GB/s	3.2 GB/s	4.0 GB/s
dual-channel	128-bit	N/A	4.2 GB/s	5.4 GB/s	6.4 GB/s	8.0 GB/s



▲ Diagram of single-channel memory architecture



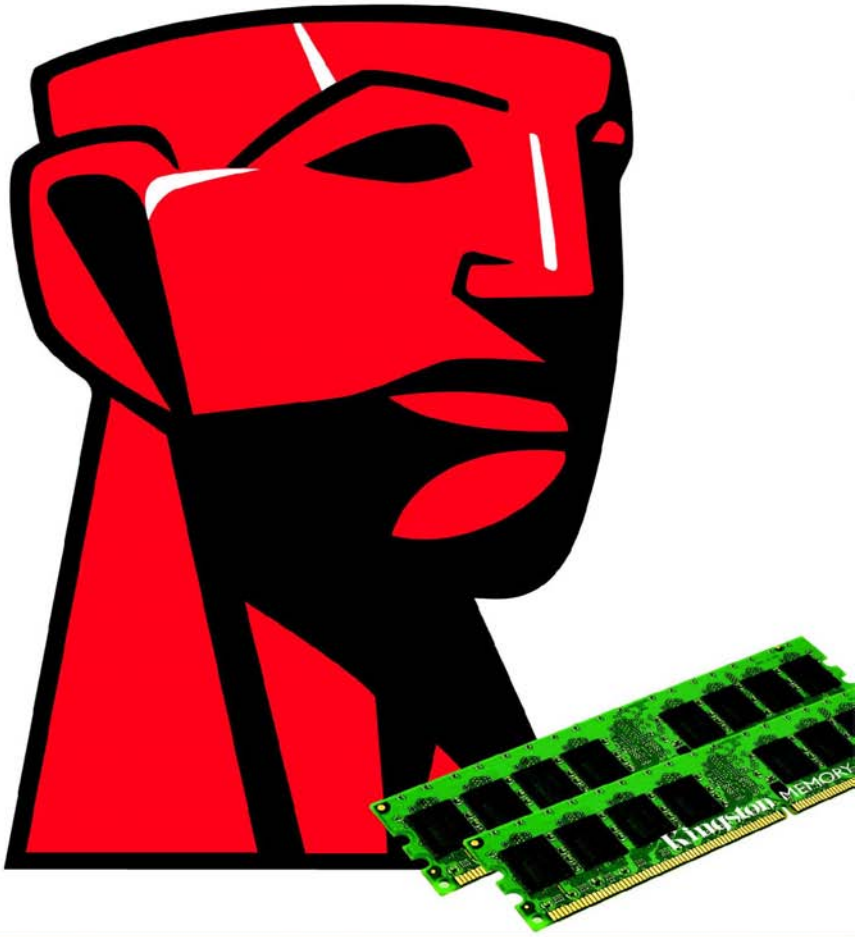
▲ Diagram of dual-channel architecture. Memory frequency bandwidth will be doubled.



▲ These are DDR memory slots. Dual-channel architecture is indicated in orange and purple.



▲ These are DDR2 memory slots. Dual-channel architecture is indicated in orange and red.



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2.2 Installing and Uninstalling Memory Modules

Regardless of wether you are installing SDRAM, DDR or DDR2 memory modules, the steps for installing and uninstalling them are the same for all. Note that when you find it difficult to insert the memory module into your motherboard memory slot, examine the module carefully to see that the module notches and pins match the slot. Another point to keep in mind: on some motherboards, there is very little space between the memory slot and the CPU slot. Sometimes too the CPU cooler/heat sink will be too close to the memory module, again allowing very little room for installation. In this case, we recommend that you install memory modules after the CPU and heat sink have been properly installed to avoid damage to the memory modules.

Installing Memory Modules



▲ First, press open the module's securing slips outwards at both ends of the memory slot.



▲ Check whether the memory module matches the memory slot. If so, align the notch of the memory module with that of the empty memory slot and gently insert.

Step 3



▲ We recommend that you press the module down with your two thumbs in the direction vertical to the motherboard. Press until all the pins are resting down inside the slot.

Step 4



▲ Fasten the memory module in place by attaching any module's securing slips, and the installation is complete. If the module's securing slips have not been properly located, please lift the module out of the slot and try again.

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Uninstalling a Memory Module





▲ To lift a module out of a slot, you should press the securing slips at both ends of the slot with your thumbs, and press outwards until the module "jumps out". Note that you should press gently; otherwise the securing slips may be damaged.

Installing a DDR /DDR2 dual-channel memory module

Step 1



▲ Prepare two (or four) DDR/DDR2 memory modules with identical capacity and specifications.

Step 2

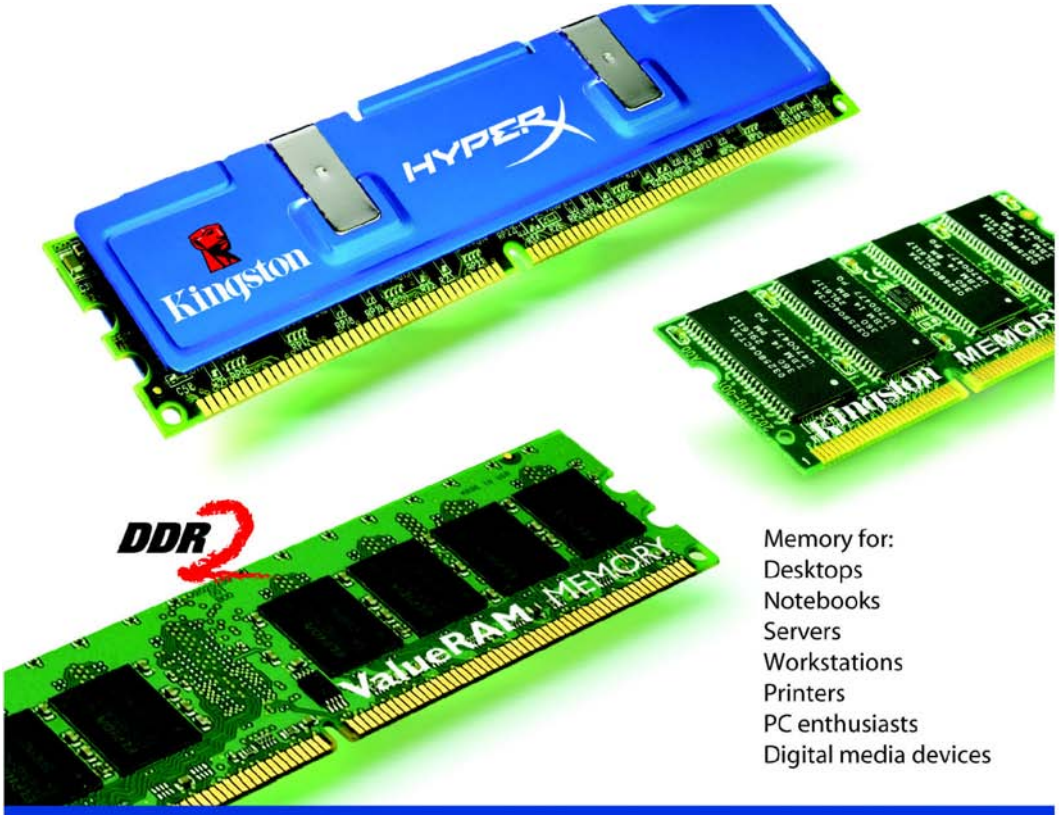


▲ Following the steps mentioned above to installing memory modules; insert a memory module into a memory slot.

Step 3



▲ Install another memory module into the memory slot in the same color, and the installation of the dual-channel memory module is completed.



Memory for:
Desktops
Notebooks
Servers
Workstations
Printers
PC enthusiasts
Digital media devices



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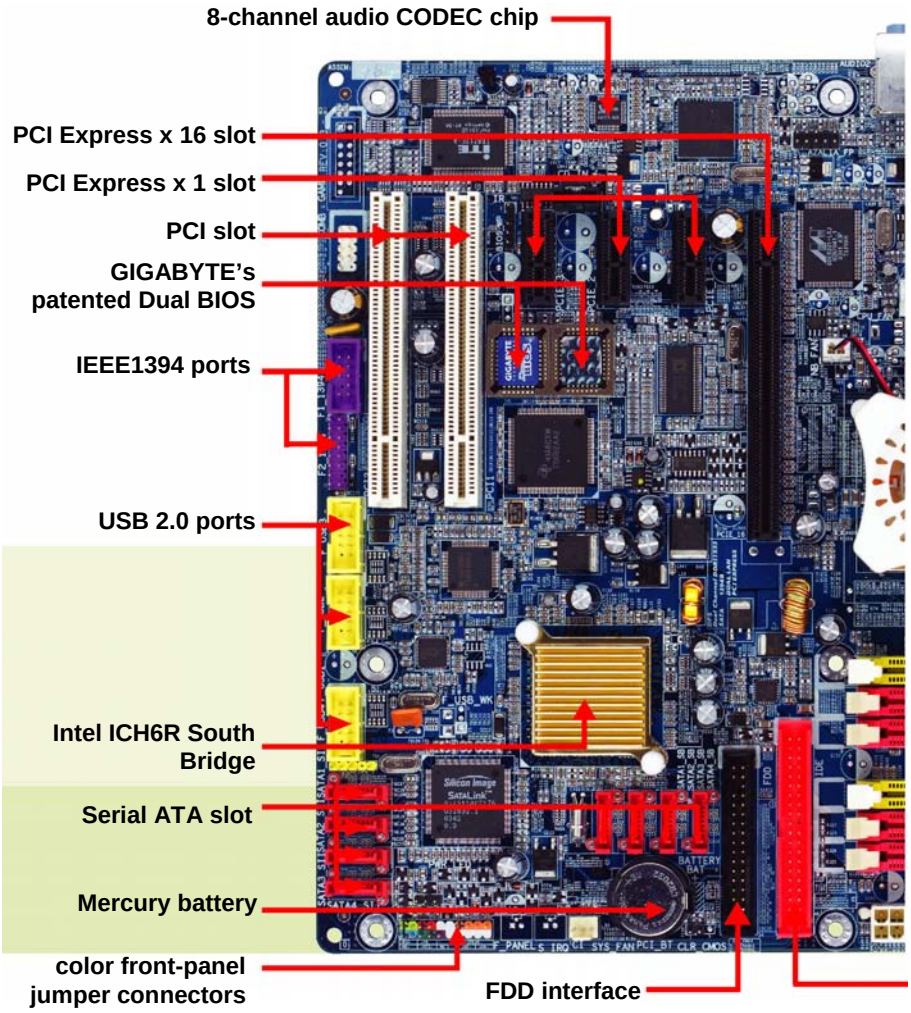
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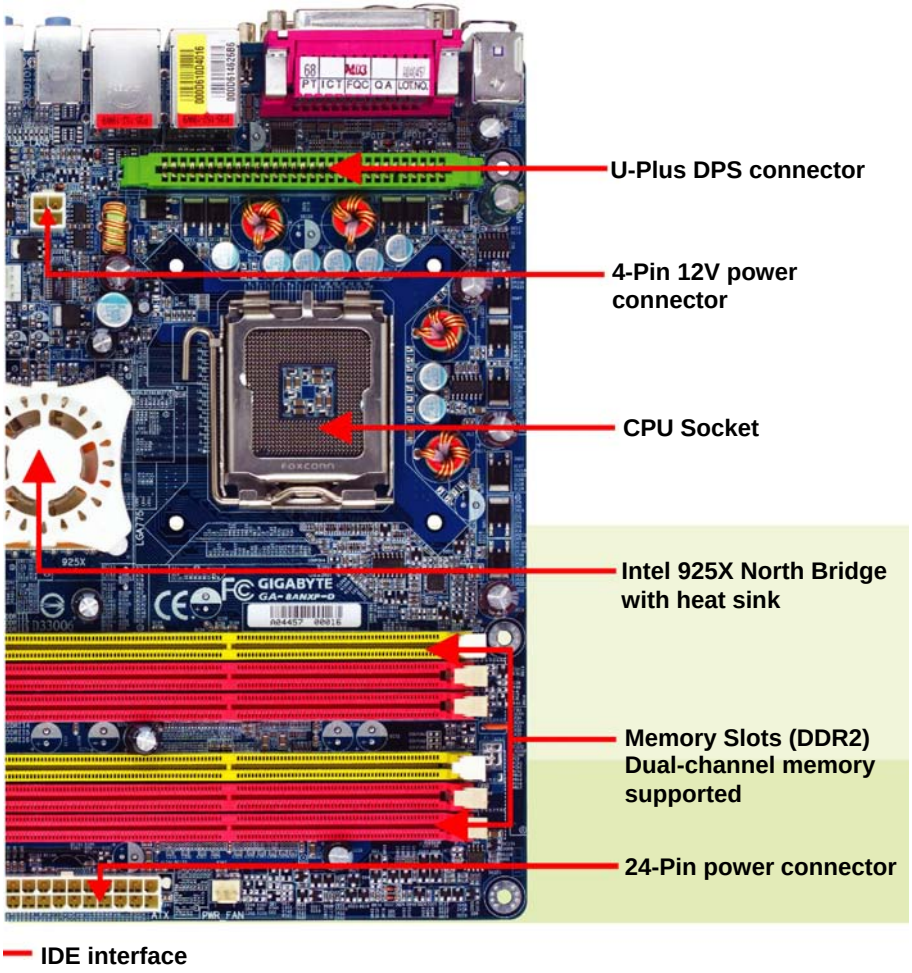
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Serial-ATA
Intel® High Definition Audio

Chapter 3 Motherboard and System Case




U-Plus DPS connector
4-Pin 12V power connector
CPU Socket
Intel 925X North Bridge with heat sink
Memory Slots (DDR2) Dual-channel memory supported
24-Pin power connector
IDE interface

3.1 Parts on the Motherboard

When building a PC, almost all devices will be installed onto or connected to the motherboard, including the CPU, memory, video adapter, hard disk drive and CD-ROM drive. The motherboard is a core component to your PC system because the performance and stability of your PC largely depends on your motherboard.

Chipset

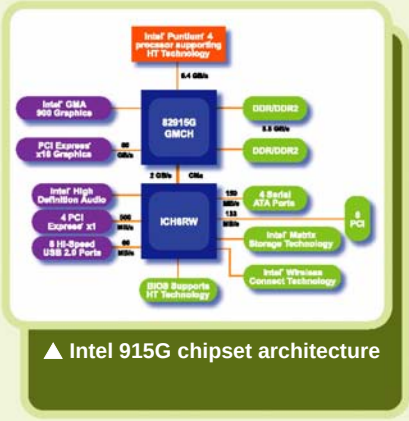
Among the many parts of your motherboard, the chipset is the most important part. It decides the types of all other components on or connected to the motherboard, including the CPU, memory, video adapter, IDE devices and USB devices. When a new type of product – such as a new CPU - is released, if the chipset on your motherboard is relatively out of date, your PC may not support the latest products.

The chipset generally consists of a south bridge chip and a north bridge chip. Intel's north bridge chip is called MCH (Memory Controller Hub), and that with built-in video features is called GMCH (Graphics Memory Controller Hub). Features such as Pentium 4 processors' Hyper-Threading (HT) technology, memory's dual-channel architecture, and

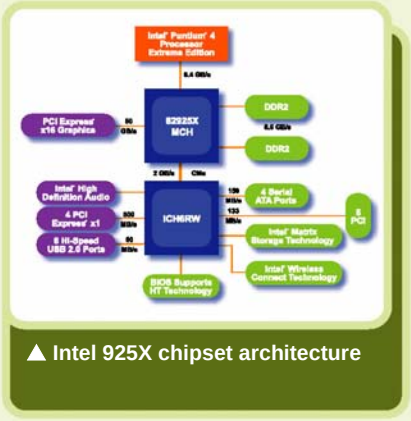
Intel Chipsets Comparison Chart

chipset name	925X	915G	915P
FSB Support	800MHz	800/533MHz	800/533MHz
Memory (dual-channel) Support	DDR2 533/400	DDR2 533/400 or DDR 400/333	DDR2 533/400 or DDR 400/333
Integrated Graphics Capability	No	Yes	No
Video Adapter Interface	PCI Express x16	PCI Express x16	PCI Express x16
Serial ATA Interface	4 SATA 150	4 SATA 150	4 SATA 150
ICH Type	ICH6/ICH6R/ICH6W/ICH6RW	ICH6/ICH6R/ICH6W/ICH6RW	ICH6/ICH6R/ICH6W/ICH6RW





▲ Intel 915G chipset architecture



▲ Intel 925X chipset architecture

PCI Express x 16 interfaces, require the support of the north bridge chip. On the other hand, Intel's south bridge chip is called ICH (I/O Controller Hub), and the latest ICH6 has several different versions. Basically they all support up to 8 USB2.0 ports, 4 Serial ATA hard disk connectors, 4 PCI Express x 1 slots, Intel's high-definition audio and so on (see diagrams of 925X/915G chipset architecture).

865G	865PE	865GV	848P
800/533/400MHz	800/533/400MHz	800/533/400MHz	800/533/400MHz
DDR 400/333/266	DDR 400/333/266	DDR 400/333/266	DDR 400/333/266 (dual-channel not supported)
Yes	No	Yes	No
AGP 8X	AGP 8X	No	AGP 8X
2 SATA 150	2 SATA 150	2 SATA 150	2 SATA 150
ICH5/ICH5R	ICH5/ICH5R	ICH5/ICH5R	ICH5/ICH5R

Intel Chipsets Integrated Graphics Comparison

Currently, Intel's chipsets can be classified into two categories: independent chipsets that use the traditional architecture (such as chipset 925X) and integrated chipsets with built-in graphics features (such as chipset 915G). Years ago, integrated chipsets were considered as products for low-end PCs, but as the manufacturers' technologies gradually advanced, new integrated chipsets now offer new and faster graphics features, which are far more advanced than old ones.

Taking Intel's latest chipset 915G as an example, its hardware core can support latest DirectX 9.0 and OpenGL 1.4, and its clock speed, frequency bandwidth, display technology, supported memory capacity and many other features are faster or better than Intel's chipsets 845G and 865G. Most importantly, chipset 915G supports HDTV features (1080i, 720p), which means that a PC equipped with chipset 915G has the best design for a home theatre PC.

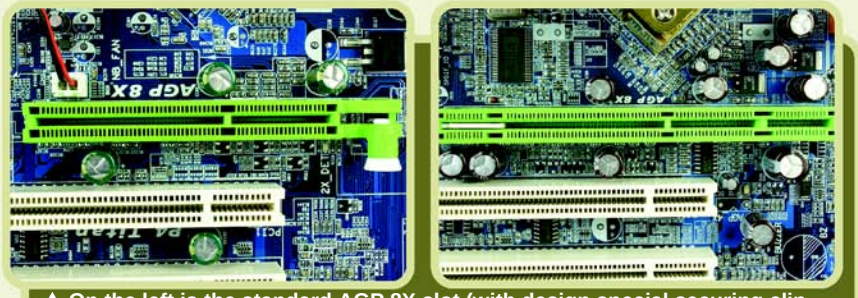
Intel Chipsets Integrated Graphics Comparison Chart

Specifications and Features	845G	865G	915G Express
DirectX hardware support	DirectX 7.1	DirectX 7.1	DirectX 9
OpenGL version support	1.2	1.3	1.4
core clock speed	200MHz	266MHz	333MHz
Pixel pipes	1/clock	1/clock	4/clock
Single texture filling	200MT/s	266MT/s	1.3GT/s
Display pipes	single	single	dual independent pipes
Display memory (Max)	64MB	64MB	224MB
Memory bandwidth (Max config)	2.1GB/s	6.4GB/s	8.5GB/s
Display support	D-Sub, DVI, RCA, S-Video (via DVO)	D-Sub (QXGA), DVI, RCA, S-Video (via DVO)	D-Sub (QXGA), DVI, HDTV (1080i/720p), RCA, S-Video (via DVO)
Maximum resolution	QXGA 60Hz	QXGA 60Hz	QXGA 85Hz



Interface Slots

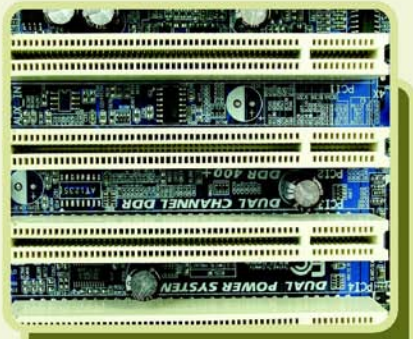
Depending on the device to be installed, there are specific slots or ports on motherboards. Those related to interface adapters are mainly of three types – AGP slots, PCI slots and the latest PCI Express slots. AGP and PCI interfaces have experienced many iterations of upgraded, and the latest versions are AGP 8X and PCI 2.2 respectively. Most of the latest versions are compatible with former versions, but AGP 8X slots only support 1.5V video adapters, making older 3.3V video adapters incompatible. The PCI Express interfaces are the latest interfaces, and they are likely to replace AGP and PCI interfaces – that is, PCI Express x16 is about to replace AGP so that we will see more PCI Express interfaces on new motherboards.



▲ On the left is the standard AGP 8X slot (with design special securing clip design to prevent adapter to pop-out), and on the right is an AGP Pro slot (with AGP 8X support)



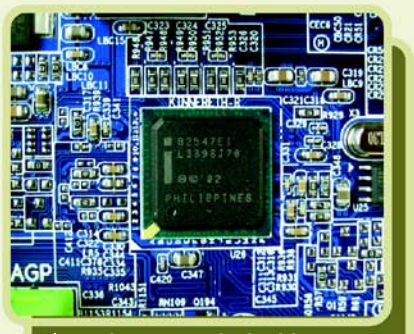
▲ This is the latest PCI Express slot.



▲ PCI slots are common on all motherboards

Integrated Chips on the Motherboard

Due to fierce market competition, and also to offer more functionality to consumers, most current motherboard have various built-in adapter chips, the most common are network, IEEE 1394 and disk raid adapters (including Serial ATA and IDE adapters). For Gigabit LAN adapters, most motherboard manufacturers choose to integrate Intel's products on Pentium 4 motherboards. The reason is that Intel's Gigabit LAN adapters are highly stable and offer reliable transmission.



▲ Intel Integrated Gigabit LAN network chip



▲ Commonly used IEEE 1394 chip

Intel High Definition Audio

All current chipsets have audio features and functionality. Usually an AC'97 audio Codec chip is integrated on the motherboard, often near the AGP, PCI or PCI Express slots. Intel has adopted High Definition Audio 1.0 technology in its latest 925X and 915 chipsets and it is anticipated that the technology could bring the mainstream and high-end PCs into the new era with high definition audio quality.

Intel® PRO Gigabit Network Connections



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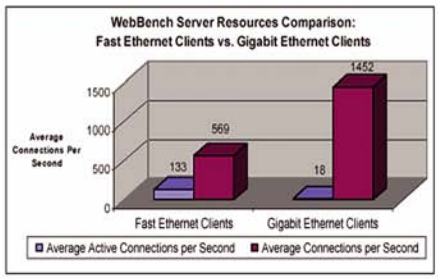
Benefits of Gigabit
Gigabit Ethernet is 100 times faster than regular 10Mbps Ethernet and 10 times faster than 100Mbps Fast Ethernet.

- Increased bandwidth for higher performance and elimination of bottlenecks
- Full-duplex capability, allowing the effective bandwidth to be virtually doubled
- Aggregating bandwidth to multi-Gigabit speeds via Adapter Load Balancing and Gigabit EtherChannel™ technologies
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The Intel Advantage

- Intel offers a complete product line, including desktop, server, iSCSI, security, Gigabit network adapters.
- Intel leads the industry with many important firsts:
  - first to develop an integrated MAC/PHY triple-speed Gigabit controller
  - first to deliver single-chip dual port Gigabit server adapter
  - first to deliver low-profile Gigabit server adapters
  - first to deliver wire-speed Gigabit performance
- Intel is committing significant R&D resources in Gigabit networking
- The Intel brand assures customers of the reliability and performance they expect from every Intel® product.



Source: VeriTest*, Oct 2003 report, *Intel® PRO/100 MT Dual Port Server Adapter: Chariot 4.3 Performance Comparison Testing*

Intel® PRO Network Connections

Intel® 82545EM
Intel® 82545GM



Intel® 82546EM
Intel® 82546GM
Intel® 82546EB



Intel® 82540EM
Intel® 82540EP



Intel® 82541GI
Intel® 82541PI



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The aim of the HD Audio is to replace AC'97 specification, which has been in place for almost ten years. Intel's HD Audio can provide ample audio replay effects and support high quality voice or line inputs. The high quality audio effect comes from upgraded architecture and expanded bandwidth, which creates an audio environment with 192 kHz, 32-bit and multi-channels (now up to 8-channels). The improved audio inputs can support multi-channel microphone arrays and dynamically configured bandwidths, with good flexibility in adjusting audio devices. Intel's HD Audio architecture accords with Microsoft's Universal Audio Architecture, and engineers from these two corporations are cooperating closely to establish the related technical specifications.

8-channel audio interface Installation and configuration

Step 1



◀ Plug the audio source connectors of the 8-channel speakers into the audio input port on the rear panel of your case as illustrated.

Step 2



▲ After the audio driver has been installed on the operating system, you can start the configuration interface by clicking "8CH speakers" as illustrated.(To arrange 8-channel speakers, please refer to the diagram)

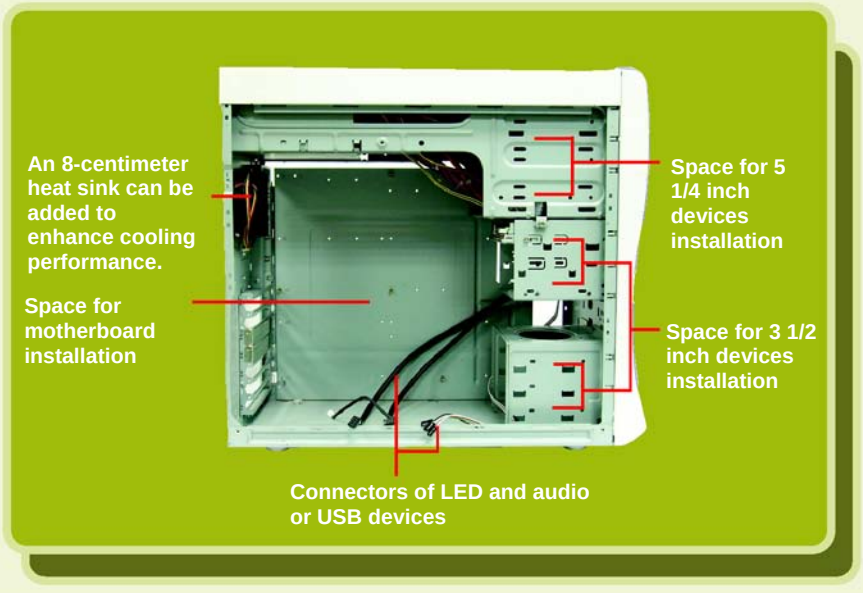


3.2 System Case and Power Supply

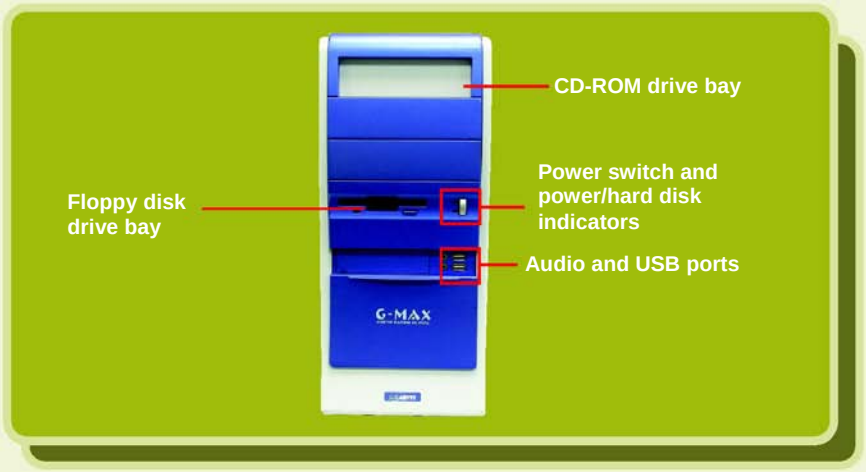
Case Structure and Purchase Guidelines

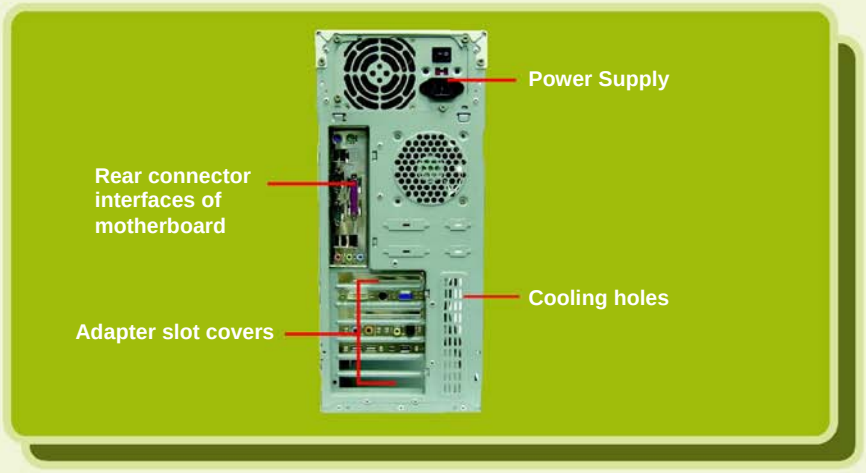
The PC case contains and protects the components of your PC. Unless you open the case, you cannot access or even see the PC components of your system. Because the case is meant to protect devices inside, most cases are made of metal. Perhaps you have seen so-called “transparent” system cases, but most of these “transparent” products can not provide any degree of protection from radiation or RF shielding, so we generally recommended against buying them.

Most of the computer cases out there on the market are classified by the number of 5.25 inch and 3.5 inch slots. 5.25-inch slot can install devices such as CD-ROM or CDR drives while 3.25-inch slot can install devices such as hard disk drives or floppy disk drives. When buying a case, besides the number of slots to install, you should also pay attention to its appearance and ease of installation.



Since many devices reside inside the case – such as the CPU, video adapter and hard disk drive – a good amount of heat will be produced. If the case does not have sufficient cooling solution, your PC probably will not function smoothly, and may result in a system failure. Most cases will have an area for a 8-centimeter fan at the front and/or the rear. However, if you would like your PC to stay really cool, you may buy an additional coolers. In addition, some system cases provide ports for audio plug and USB. After connecting wires to these ports, users can now both ports at front panel of their PC.







Power Supply

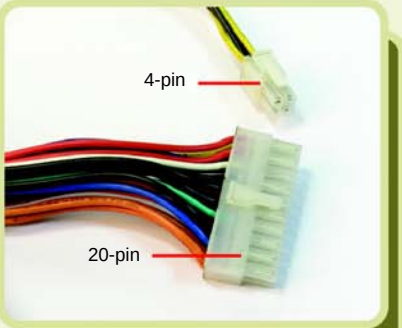
The power provided by the power supply is measured in watts. The watts of your power supply should be decided based on the class of your PC and the number of internal devices. It's generally recommended that a Pentium 4 PC should be equipped with a power supply that can provide at least 250-300 watts of power. Should you have a high-performance video adapter or have multiple CD-ROM drives and hard disk drives, you will need a 350-400 watt power supply.



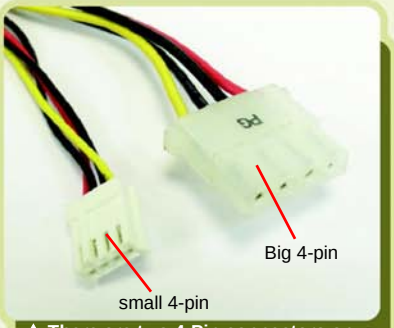
▲ A 300-watt (or higher) power supply is recommended for use with Pentium 4 based PCs



▲ The power supply is attached by the screws located at the rear panel of the case. When installing and/or uninstalling, hold the power supply was you screw or unscrew.



▲ Parts on the motherboard that connect to the power supply are 20-Pin ATX connector and 4-Pin connector (mainly for video card)



▲ There are two 4-Pin connectors on the power supply. Bigger 4-Pin connector is for devices such as hard disk drives or CD-ROM drives, while the smaller connector is for devices such as floppy disk drives.

3.3 Motherboard Quick Installation

After you have installed the CPU and memory on your motherboard. Now, it's time to install the motherboard into the system case. There are two points to keep in mind. The first point is about the power supply. For smaller cases, there may be little space between the motherboard and the power supply. In this case, the installation priority is very important. The second point is that you should pay attention to parts installed or cables connected to on the motherboard to avoid damage to the motherboard and/or your hands.



◀ GIGABYTE motherboards have rounded-corner design to avoid users' hands from harm during installation. The connectors located at the front panel of the system case are designed in various colors for easy identification during installation.

Step 1



▲ Firstly, remove the side cover of the system case.

Step 2



▲ Then, prepare to screw the screws (screw washer preferred) and brass spacers onto the motherboard. (Different cases may have different fixing designs. Here we take the G-MAX case as an example.)



Step 3



▲ Install the ATX plate which comes with your motherboard.

Step 4



▲ Carefully place your motherboard into the case aligning the holes of the motherboard with the brass risers on the case.

Step 5



▲ Make sure the motherboard sits on the fixing and all the spacers align with available holes on the motherboard. Then, fasten the screws.

Step 6



▲ Make sure screws located on corners of the motherboard are properly fastened.

Step 7



▲ Connect the 20-Pin ATX power connector to the motherboard.

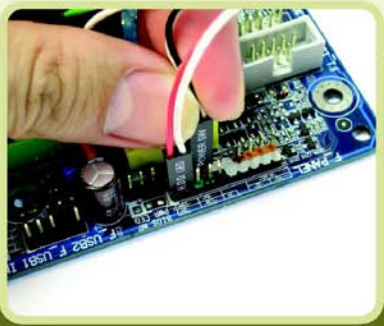
Step 8



▲ Connect the 4-Pin 12V power connector to the motherboard.

Step 9





▲ Lastly, connect various connectors located at the front panel (such as power switch, reset button, HDD LED) to appropriate color connectors on the motherboard.



Chapter 4 Storage Devices

4.1 Essential Storage Devices

If Random Access Memory (RAM) is the short-term storage area of your PC, then storage devices are like long-term memory. When you power off your PC, remember to save files into storage devices constantly to prevent data loss.

Nowadays, the most widely used and important storage media is the hard disk drive (HDD). In the old days of DOS, PCs were booted with floppy disks, and HDD capacity was small (a couple hundred megabytes) and expensive. Things have certainly changed. Now, the Windows operating system alone typically takes up many hundreds of megabytes (MB), or even gigabytes (GB) drive space. Therefore, HDD is definitely a necessity for your PC. In addition, because today's software applications are so large, they are always stored and sold on CDs, consequently, a CD-ROM drive is also a must for your PC.



Floppy Disk Drive



Floppy disk drives can be considered as one of the earliest storage devices of a PC system. Although, it has been gradually replaced by a CD or USB flash memory, however, we still recommend you to install a floppy disk drive when build a PC.

CD-ROM Drive



After your HDD, the CD-ROM drives are one of the most popular storage devices of a PC. These days CD-ROM drives reach up to 56X speed. The DVD-ROM drives, which will probably soon replace the CD-ROM drives in the mainstream, typically run up to 16X speed.

CD Burner



CD Burners have been the most popular storage device for data backup. As CD burners evolve into the age of DVD burners, there has been a tit-for-tat competition between the manufacturers of DVD-R/RW and DVD+R/RW, and while the market is taking the wait-and-see attitude, the prices of CD burners remains sky-high. However, as DVD Dual burners becomes the mainstream, consumers are more then willing to accept DVD burners.



IDE and Serial ATA Hard Disk Drive (HDD)

IDE and SCSI are the hard disk interfaces commonly in use or used in PCs. Since the SCSI interface mainly focuses on the enterprise segment of the market, we don't discuss it in this booklet. What we should pay attention to is the new interface specification - Serial ATA, which was developed to replace IDE, and will eventually become a major player in the mainstream hard disk interface design.



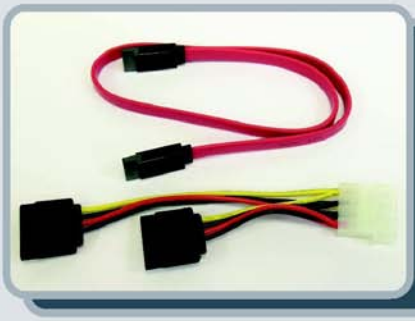
The IDE interface is the traditional hard disk interface commonly in use or used in PCs. Besides hard disk drives, CD-ROM drives, CD burners, large capacity disk drives all use the IDE interface. Strictly speaking, IDE interfaces have several types, such as ATA/33, ATA/66, ATA/100 and ATA/133, however, it's unnecessary to distinguish between them because of their downward compatibility.



There are two kinds of IDE interfaces – standard (left) and high-density (right) cables. Standard cables are suitable for ATA/33 and earlier hard disk drives or CD-ROM drives, while high density cables are a must for ATA/66, ATA/100 and ATA/133 IDE devices, otherwise they will create a speed bottleneck and cancel the advantage of the highspeed drives.



◀ Serial ATA is new data interface specification. Currently its data transfer speed is up to 150MB/s, and the speed is expected to become faster in the future. In real applications though, the most impressive advantage of Serial ATA is that the cable is so much smaller and convenient than the IDE cable. . Also, if used on power supplies, hot swapping is allowed.



◀ The red cable shown is a Serial ATA cable. Note that some of the power connectors on a Serial ATA hard disk drive may be different from the common power supply's 4-Pin 12V connectors, so you might need to use a MOLEX type converter.

Transfer interfaces and Performance

The new Serial ATA transfer interface provides for much higher bandwidth and increased security, which is certainly helpful to improve the performance of hard disk drives. But, the limiting factors that decide hard disks' performance are still the motor's rotational speed and cache capacity. Just as driving on highway is potentially much faster than driving on ordinary road, But if you drive a slow car on both roads, it really makes no difference whether you drive on the highway or on an ordinary road.



▲ Top to bottom: IDE, Serial ATA and SCSI interfaces.



4.2 Other Storage Devices

Large Capacity Disk Drives



Large capacity disk drives are another kind of storage device, with iomega's Zip drive and Imation's SuperDisk(LS-120) as typical examples. The capacity of a Zip disk can be 100MB, 250MB or 750MB, while that of a SuperDisk is 120MB. Those drives have both internal and external types, with the external type being more flexible.

MO Drives



MO drives once were the favorite storage device for art designers and editors. But, just as with large capacity HDD, because CD burners become popular and cheaper with better compatibility, MO drives no longer make sense.

USB Flash Drives



Also called Thumb Drives. They are portable storage devices with flash memory inside, which support plug-and-play and are very stable. Currently most of USB Flash drives out there on the market use USB 2.0 which is eight times the speed of USB 1.1, so you won't wait too long even if you are transferring large files.

Memory Cards

With digital cameras gaining popularity, memory cards for these cameras have become the new hot product among storage media. Further, with increasingly higher memory requirements of PDA's and mobile phones, the market for memory cards is really looking up. After intense competition, the market for memory cards has become more stable. Among large capacity memory cards, CF cards still dominate, while compact SD/MMC cards are still widely used in digital cameras, PDA's and mobile phones. On the other hand, SONY's MS/MS PRO cards occupy a special part of the market with the support of its own products.

The once popular SM cards have encountered a setback. Currently, SM card manufacturers have delivered xD cards as substitutes, however, since the market share of xD cards remain small without the support of related devices, xD cards are no longer very popular.



▲ CompactFlash Card



▲ SecureDigital Card



▲ MultiMediaCard Card



▲ MemoryStick PRO Card



▲ SmartMedia Card



▲ eXtreme Digital (xD) Picture Card



4.3 Installing a Hard Disk Drive, Floppy Disk Drive or CR-ROM Drive

Although the steps of installing hard disk drives, floppy disk drives and CD-ROM drives (including burners and DVD drives) are similar, there are still some differences because of different styles of computer cases. For example, most cases use screws to fix hard the disk drive, floppy disk drive or CD-ROM drive, but some cases (e.g. GIGABYTE's G-MAX) use slide rails and securing clips, for easy installation.

There is another point that you should pay special attention to. That is, there are usually some screws that come with your hard disk drive or CD-ROM drive. Although similar screws usually come with your computer case, these screws may be slightly different. We recommend that you use the screws that come with your storage devices to avoid possible damage.



◀ On the right is the screw for installing CD-ROM drive, which are different from the ones on the left, which are for the case. Never interchange them.

Configuration for hard disk drive or CD-ROM drive



▲ On back of the hard drive or CD-ROM drive is the jumper setting diagram. In most cases if you wish to connect only a single drive to the IDE slot, select the "Master" option. If there is another drive (CD-ROM or additional HDD that will be connected to the same IDE cable, please select "Slave" for that drive.

Installing a Floppy Disk Drive or CD-ROM Drive

Step 1





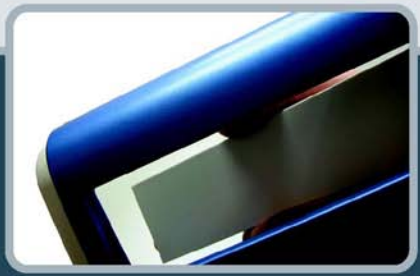




▲ When installing the slide rails of the floppy disk drive or CD-ROM drive, the floppy disk drive must be screwed with one more screw for proper support.

Step 2





▲ Remove the front panel of your case, and remove the protection cover of the CD-ROM bay. If there are iron pieces, just remove them altogether.



Step 3

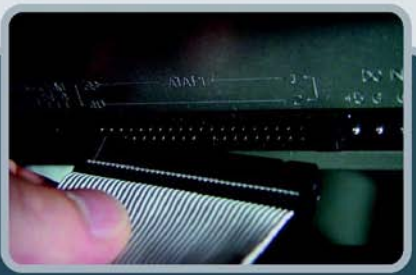




▲ Make sure that the slide rails of your floppy disk drive or CD-ROM drive insert to their bays respectively. Slide your floppy disk drive or CD-ROM drive into the bay until your hear a “click.” You can then give them a little tug to make sure they are properly secured.

Step 4





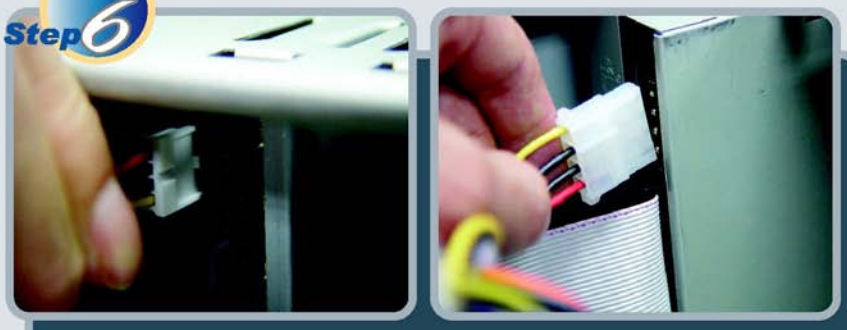
▲ Plug the floppy cable (left) or CD-ROM cable (right) to the drive. The connectors and sockets are keyed to each other so as to prevent incorrect insertion.

Step 5



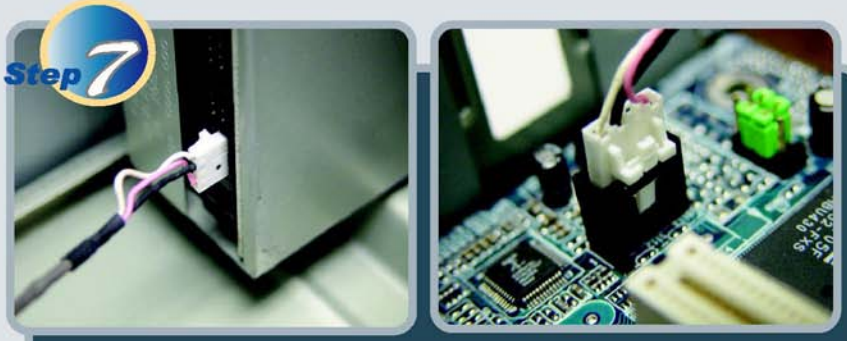
◀ Plug the other end of the cable into the corresponding connector on the motherboard. If you are installing a CD-ROM drive, it’s recommended that you plug the end into the IDE2 connector.

Step 6



▲ Plug one of the smaller 4-pin floppy drive connectors (left) or bigger 4-pin CD-ROM drive connectors to the power supply. These are also keyed, so it's impossible plug them in backwards.

Step 7



▲ When installing a CD-ROM drive, you will plug the audio cable to the rear of the drive (left) and plug the other end into the CD-IN header on the motherboard or audio card (right).

NOTE: When you've finished installing your floppy disk drive and CD-ROM drive, don't forget to replace the front panel of your computer case.

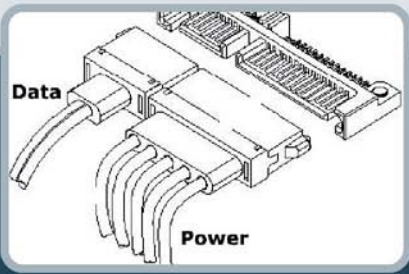


Installing IDE and Serial ATA Hard Disk Drives



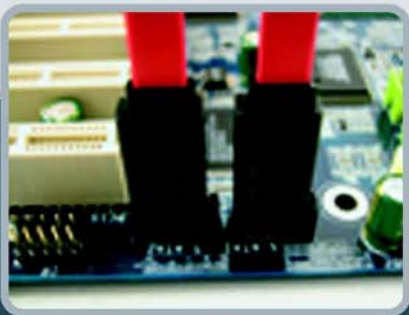
◀ Slide the hard disk drive into the drive bay and fasten it to the case. Take special care not to touch the bottom of your hard disk drive, as the circuit board may be damaged by static electricity on your hand.





▲ Following steps similar to those of installing a CD-ROM drive to connect the cable and power cable. Note that you should use a high-density cable to fully utilize your IDE hard disk drive.





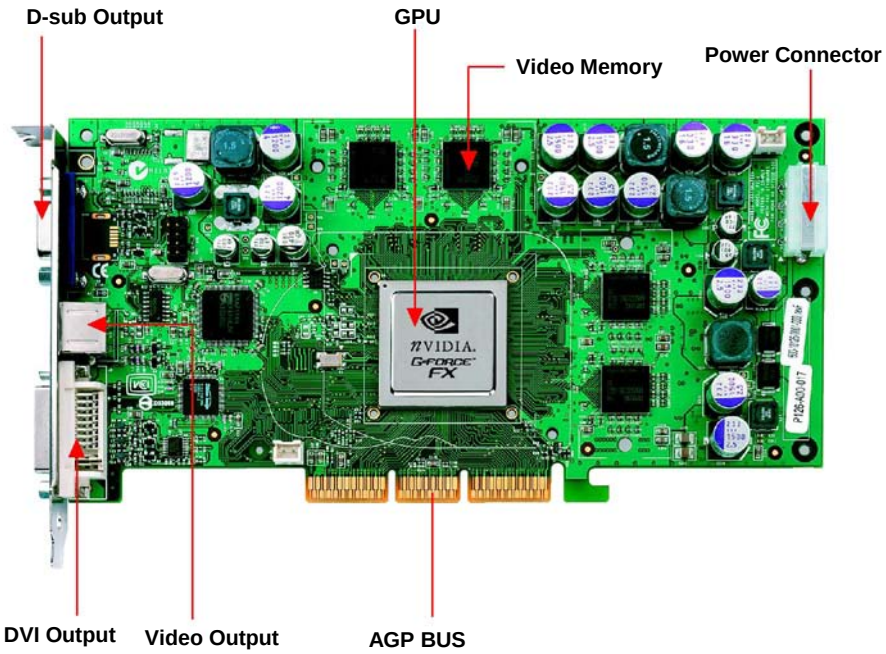
▲ Serial ATA cables, like IDE cables are keyed to allow only proper insertion.

Chapter 5 Video Adapters and Displays

5.1 Identifying Video Adapters

The evolution of the PC has brought with it the power to display stunning 3D graphics. Video cards (or video adapters) play an important role in the performance of a PC, especially for the PC game players, who always have higher demands for 3D graphics performance. Despite the fact that manufacturers release new display chips or display technologies one after another, the enhanced capability is soon diminished after new graphics intensive real-time games have been developed. So, how to stay ahead of the curve and find ways to improve 3D performance is always the development challenge of video adapter manufactures.

As a quick introduction, let's look at some important components of a video adapter.





GPU and Video Memory



◀ The graphics processing unit (GPU) dictates the performance of a video adapter. The graphics chips in today's advanced video adapters are no less complicated than a system CPU, so they are often refered to as GPUs.



◀ Besides the GPU, the memory on the video adapter (video memory) also influences video adapters' performance. Common video memory capacity being 64MB, 128MB and 256MB, in both DDR, and DDR2 flavors.

Additional Power Supply



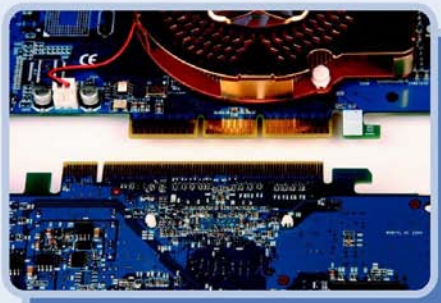
◀ High-end video adapters are powerful, but they consume correspondingly more power. So it's necessary to supply more power in order to keep them working stably. When installing these kinds of video adapters, we recommend you have at least a 300 watt power supply.

Coolers and Heat Sinks



Because GPUs generate a lot of heat, coolers are needed both in your case and on the GPU for your PC to work smoothly. As GPUs become more and more powerful, the coolers also become bigger, and the heat sinks become larger. Some coolers are designed specifically to fit on the video memory in order to achieve an even better cooling effect.

Adapter Interfaces



With the advancement of video adapter technology, and with increased performance, new hardware architecture will be needed before the development reaches its bottleneck under the existing architecture. So the adapter interfaces have evolved from PCI to AGP, and from AGP 2X, AGP 4X to AGP 8X. Now, we are at another breakthrough point. The new PCI Express bus is ready to go, and there will be more and more video adapters available with PCI Express interfaces. The PCI Express interface can provide larger bandwidth, making video adapters working more smoothly. Since the PCI Express interface (lower) and AGP interface (upper) have different pins, and they are not compatible with each other. To distinguish them, look for the golden fingers and the motherboards to support them.



Output Interfaces



- 15-Pin D-Sub: Currently this is the most popular interface between a PC monitor and a video adapter. Not only PC monitors (CRT or LCD) use this D-Sub interface, new generation home displays - such as LCD TVs - and many projectors are also equipped with this kind of interface.



- DVI: What's different from the D-Sub Output is that the DVI interface provides high speed digital video signals for digital display devices, so the signals will not be reduced during digital-to-analog conversion. Consequently, image quality is better than can be seen on D-sub. Given the choice of DVI or D-Sub connectors, give the priority to DVI connector.



- Video: During the time when home displays are still dominated by CRT monitors, if you wanted to connect a TV to your PC, you had to use the Video connector (TV-Out) on the video adapter. (because there was no D-Sub connector on a traditional TV Regardless of S-Video or RCA connector, the images of your TV will still appear to be blurry.

5.2 Installing Video Adapters and Other Interface Cards

As mentioned in Chapter 3, besides a AGP slot, there are PCI slots on a motherboard, and in the future, both of these two types of slots will probably be replaced by PCI Express 16x and PCI Express 1x slots. No matter which interface you are using, the installation steps are the same.

Step 1



▲ Remove the rear panel of your computer case. Align the video adapter (e.g. AGP card or PCI Express card) to the appropriate slot on the motherboard. Press the card into the slot with your hands until it's safely installed.

Step 2



▲ You should hold the video adapter with one hand, and fasten the screw with another hand.

Step 3

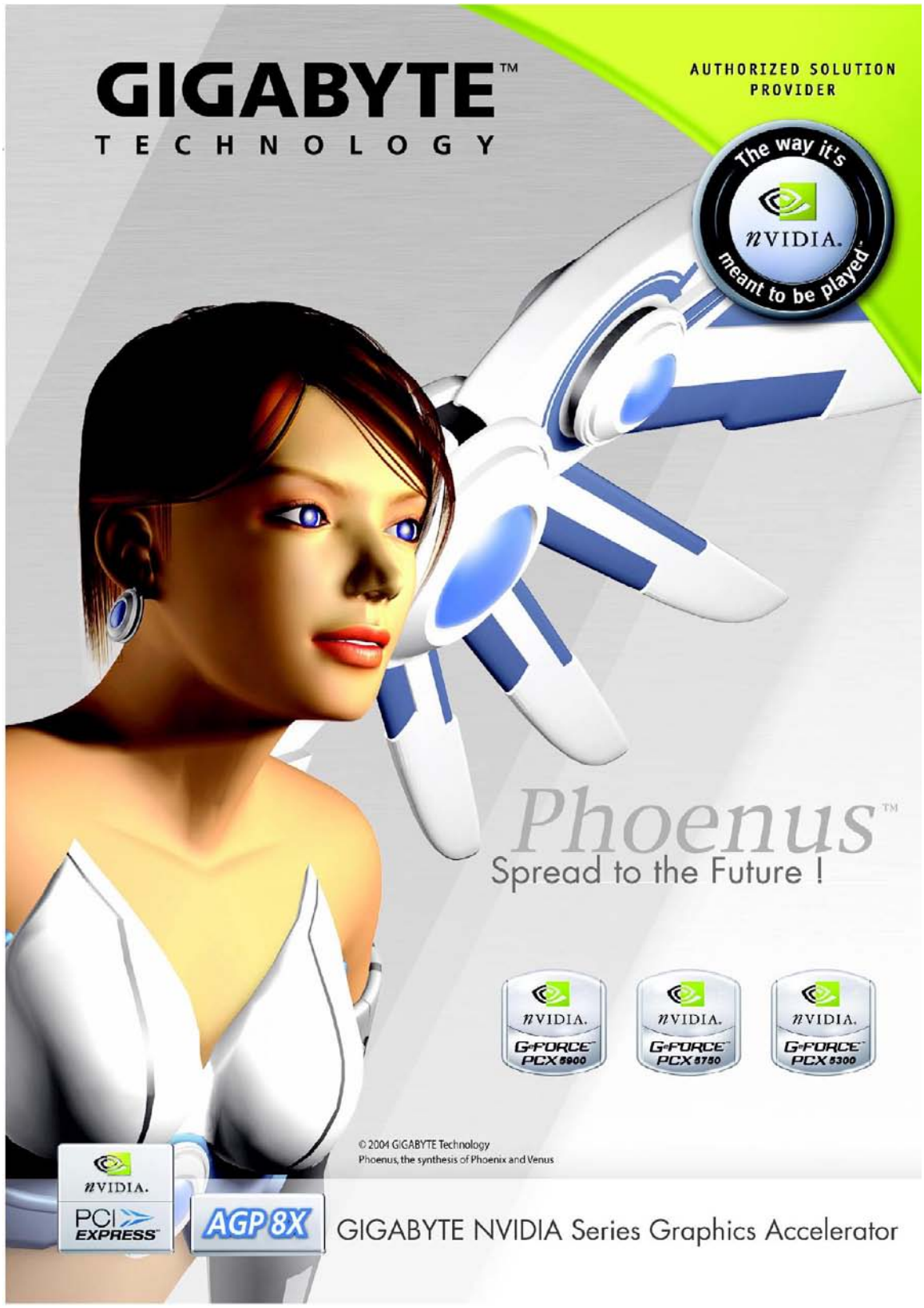


▲ This video adapter has been properly installed.

Step 4

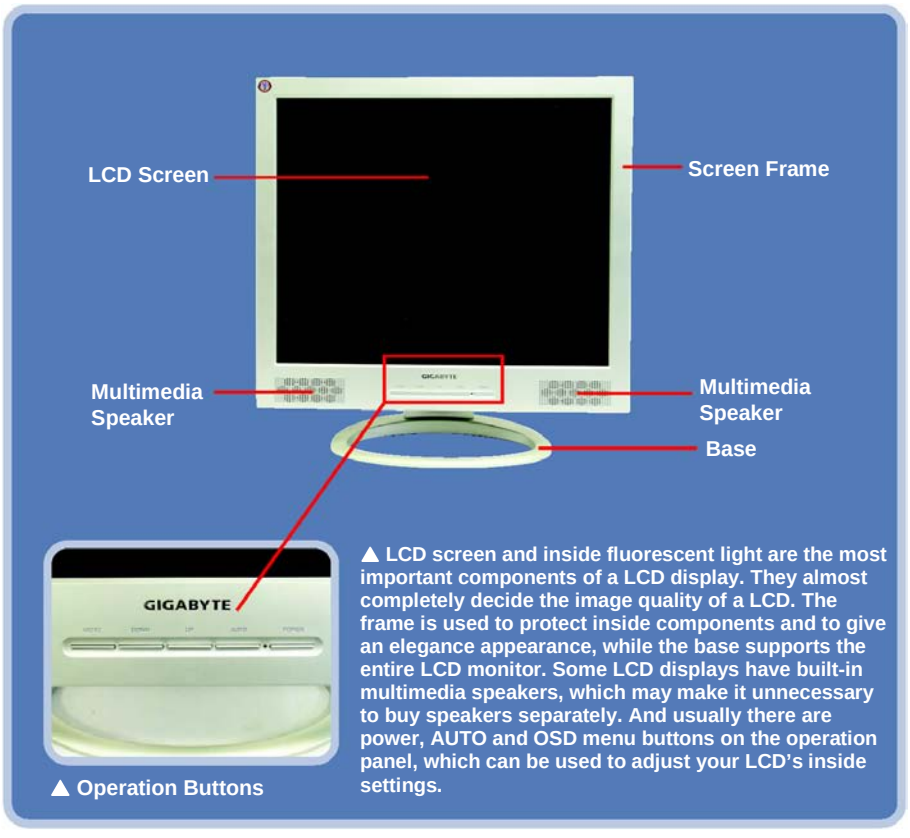


▲ Other types of video adapters can be installed similarly, but you should leave enough space between the cards to achieve good cooling effect inside the case.


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5.3 Identifying LCD Components

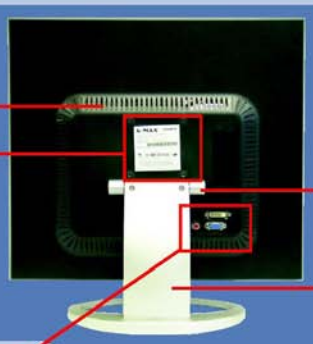
LCD displays have replaced CRT displays as the mainstream on the PC market. Also, LCD displays have stepped into the consumer TV's market to become more popular. LCD displays have advantages such as lightness, power-saving, and lower radiation. It is not surprising that they become the mainstream of the market after their prices have become more reasonable. In the foreseeable future, LCD displays will continue to be the monitor of choice. But there is one important difference that you should pay attention to – a LCD display can provide best images only under its native resolution. To know the key components of a LCD display, let's take GIGABYTE's GD-1903DP as an example.



▲ Operation Buttons

▲ LCD screen and inside fluorescent light are the most important components of a LCD display. They almost completely decide the image quality of a LCD. The frame is used to protect inside components and to give an elegance appearance, while the base supports the entire LCD monitor. Some LCD displays have built-in multimedia speakers, which may make it unnecessary to buy speakers separately. And usually there are power, AUTO and OSD menu buttons on the operation panel, which can be used to adjust your LCD's inside settings.







▲ Connectors

▲ Usually there are some ventilators on the back of the LCD monitor, which are helpful for cooling the fluorescent light. Most LCD displays also have mounting ports (mounting arms are optional) to allow flexible arrangement. The part that connects the LCD screen and the base is the supporting stand. Every LCD may have a different design for this part. This GD-1903DP supports viewing angle adjustment, and some LCDs not only can be turned left or right, but also support 90 degrees of rotation. Most new LCD displays have both D-Sub and DVI connectors. Some products have built-in multimedia speakers and audio input jack.

Common Display Cables





▲ Usually there is at least a power cord (including an adapter), D-Sub cable and audio cable (for types with built-in speakers) included with the purchase of your LCD. Some products have no DVI cable because it is somewhat expensive, in which case you have to buy one yourself if necessary. In addition, some video adapters may come with a video output cable or a DVI/D-Sub converter, which will make your installation easier.

5.4 Installing a Display







▲ Connect the power cord. Attach the adapter if there is one.





▲ If your LCD has built-in speakers, attach the audio cable to the jacks on the back of the LCD and also to the audio outlet on your computer case.





▲ Attach the D-Sub or DVI cable to the LCD.







▲ Attach the other end of the D-Sub or DVI cable to appropriate port on the video adapter.



◀ After you have installed Windows operation system and your video adapter driver, adjust the video adapter's resolution settings same as LCD's native resolution. Then press the AUTO button on your display, and you will get the best images.



◀ If you are not satisfied with display, press your LCD's MENU button to display the OSD menu . From here you can adjust settings (e.g. brightness, contrast, color temperature, etc.)


Graphics to
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Chapter 6 Peripherals

6.1 Keyboard/Mouse Basics and the Installation

Keyboards and mice are essential input devices of a PC system which allow you to move the cursor, input characters or run a program. So, they are really important peripherals! On the other hand, if you use a mouse or keyboard with poor ergonomics for a long time, it is very likely cause you physical harm!

Get to know your Keyboard

The basic function of a keyboard is to input characters. Generally, there are 4 sections on a keyboard – the alphanumeric section, the function section, the numeric section and the navigation section. All alphabetic keys and common keys are located in the alphanumeric section. PC users use this section most frequently. Above this section are function keys – that is, ESC and keys from F1 to F12. These keys can be used to conveniently activate a function or an option. If the function keys are properly used, efficiency will be significantly improved!

The layout of the numeric section is very similar to that of a usual calculator, which are helpful for you to quickly input numbers or do arithmetic calculations. The keys in the navigation section (which has an up-side-down “T” layout) are also frequently used. They can be used not only to quickly move the cursor when you are inputting characters, but also to scroll a page when you don’t want to depend on the mouse.

Many people are very concerned with the performance of their PCs. Besides the speed of your PC system, how smoothly you operate the system will also influence your work efficiency. So, a handy keyboard or mouse can make your PC work better!



▲ The biggest difference between a traditional keyboard and a new keyboard is that there are many shortcut keys on new keyboards.

As technology developed, traditional keyboards did not meet users demands. So special keys such as network shortcut keys were added on new keyboards. For example, there are keys for Home, Favorite and Search. With these shortcut keys, you can surf the Internet by simply pressing a key. With the development of PCs and the growth of the Internet, PC users spend more and more time typing on the keyboard, so a comfortable keyboard is important. There are even some keyboards that you can bend and adjust depending on your personal preference!

Get to know your Mouse

Mice can be classified by the positioning mechanism in roller mice and optical mice. Roller mice position the cursor with the roller ball inside. When the mouse is moved, the ball rolls with the X axis and Y axis inside, and your PC calculates the direction and distance of the movement, with cursor on your display moving correspondingly. An optical mouse can position the cursor by light refection that allow you to move cursor more accurately without worrying about cleaning the mouse, as you would do with a roller mouse.

Besides good positioning capability, ergonomic design is also necessary for a mouse. Only this kind of mouse can offer you the comfort during long-time use. In addition, if your mouse has a built-in scrolling wheel, it can then replace the scrolling bar to help you easily browse documents or web pages.



▲ Roller mice (right) and optical mice.

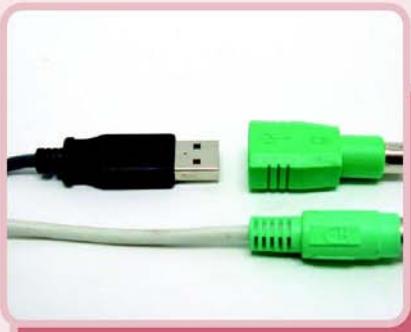


▲ Scrolling wheel for easy document and web browsing.



Installing PS/2 Keyboard/Mouse

Both your keyboard and mouse have two types of interfaces to attach it to your PC. One is the PS/2 interface, with its round connectors and 9-pin cable to transfer data. The other is the USB interface with its rectangular port, which supports hot swapping. The coolest thing about the USB interface for your mouse or keyboard is that you can plug or unplug your keyboard/mouse without restarting your PC!





▲ If you have bought a USB keyboard/mouse (usually a mouse), but you want to attach it to the PS/2 connector, you have to use an USB-PS/2 converter.





▲ The keyboard and mouse connectors on your motherboard are color coded, making them easy to be differentiated since they otherwise look physically alike. Purple represents keyboard and green represents mouse.

6.2 Audio Devices and Installation

Currently motherboards come with more and more integrated features, and audio feature have become a common part of the motherboard. The audio components on most new style motherboards have been upgraded from AC'97 2-channel to AC'97 6-channel. Intel's new 925X and 915 series of motherboards even feature 8-channel high definition audio (see chapter 3). Because most motherboards now have built-in audio adapters, there are only middle or high classes of audio cards available on the market and there is almost no market for low-end audio cards.

To help users easily install their audio cards, there are internal and external audio cards available. Through the USB interface, the audio card can be easily connected to your PC. Of course, to fully enjoy your high-end audio card, you must have multi-channel speakers. Now, many PC speakers have 7.1-channel design, which are comparable to the effects of a high-end home audio system.



▲ Internal audio card



▲ 7.1 channel speakers



▲ External audio card



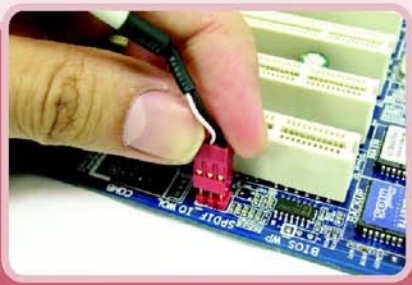
Installing motherboard 6-channel audio cables

To hear music or sound from your PC, just attach the speakers' audio cable to the corresponding audio jacks on the back of your computer. Some multi-channel audio features provided by some motherboards require specific audio cables. Let's show how to connect this kind of cable with the 6-channel audio cables using GIGABYTE's motherboard as an example.



Step 1





▲ Attach the 6-channel audio cables to the S/PDIF (red) header and SUR_CEN (black) header on the motherboard.

Step 2





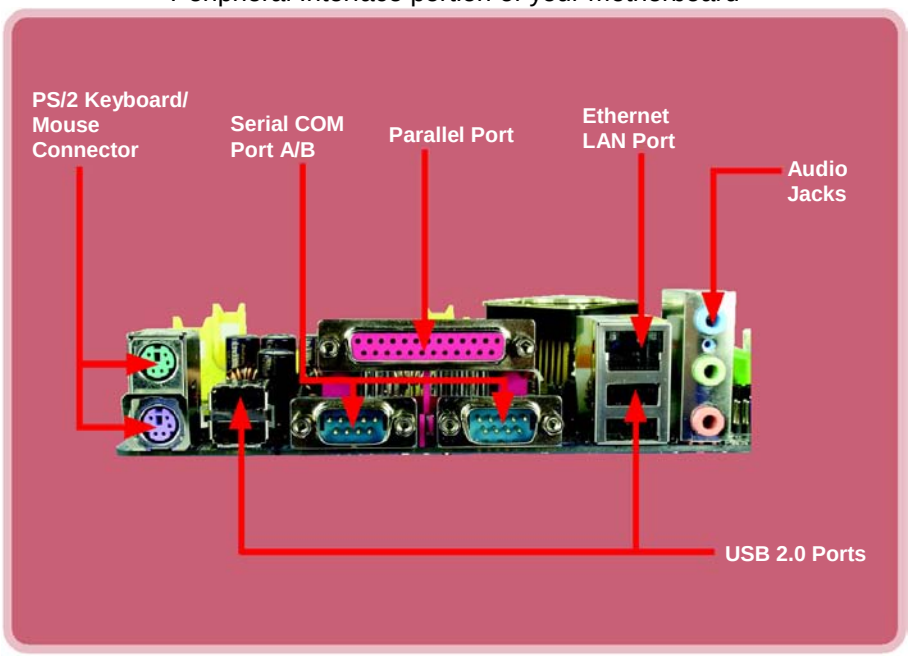
▲ Find an available slot (usually a PCI slot) that will be used and screw the bracket of the 6-channel audio cables into the slot holder.

6.3 Other Peripherals

The keyboard, mouse and audio devices mentioned above can be considered as the fundamental peripherals of a PC, but with different user demands, peripherals such as printers, scanners, web cameras and other network devices are all becoming popular. In particular, as network instant messengers such as MSN and Yahoo Messenger become more and more popular, many young users consider the web camera as a standard peripheral for their PC.

The USB interface allows the connection of a large number of peripheral devices, as the result that there are more and more USB 2.0 ports provided on a motherboard, and the parallel port and serial COM ports on the interface bracket are seldom used. The interface bracket on the motherboard is not big enough to accommodate too many interfaces, so additional USB ports or IEEE 1394 ports have to be connected with a USB cable or IEEE 1394 cable which comes with your motherboard.

Peripheral Interface portion of your motherboard





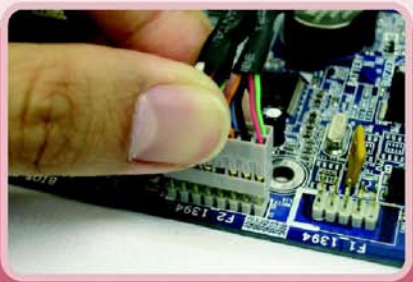
Connecting USB 2.0 / IEEE 1394 Cable

The USB cable and IEEE 1394 cable that come with your motherboard may be combined on one bracket or use separate brackets. No matter which kind it is, the installation steps are the same. But if they use separate brackets, two PCI slots (instead of one) will be occupied. The installation steps are given below with the cables (combined on one bracket) that come with your GIGABYTE motherboard as an example.



Step 1





▲ Attach the USB 2.0 and IEEE 1394 cable connectors to the motherboard USB 2.0 header (yellow, with keyed design) and IEEE 1394 header (gray) respectively.

Step 2





▲ Find an available slot (usually a PCI slot) that will be used and screw the bracket of the USB 2.0 and IEEE 1394 cables into the slot holder.

Installing USB Devices



Installing a USB or IEEE 1394 peripheral is likely the easiest step when building your PC. The USB ports on the back of your PC are usually in groups of two or four. The ports are rectangular and very easy to recognize. The IEEE 1394 port can be a big port or a small port. The big port provides additional power while the small port only provides data. To allow for easy access of peripherals, some PCs have USB or IEEE 1394 ports on the front panel. Both of these two kinds of interfaces support hot swapping, so you wont have to restart your PC when installing them. And, most USB or IEEE 1394 devices don't need any special drivers as long as you use the Windows 2000 or Windows XP operating system. However, we still recommended you to have the driver CD ready during the first installation.

Connecting the Network Cable



As broadband networks become more and more popular, motherboards now shipe with built-in LAN adapters so as to allow users to directly connect to a router without paying extra to buy network interface card. If your motherboard has a built-in LAN adapter, you can get online simply by attaching the network cable to the RJ-45 port on the back of your PC while attaching the other end to the router. Please remember not to mix up the RJ-45 port with traditional telephone RJ-11 port. However, since the LAN RJ-45 port is bigger than a phone RJ-11 port, it is almost impossible to get it wrong.







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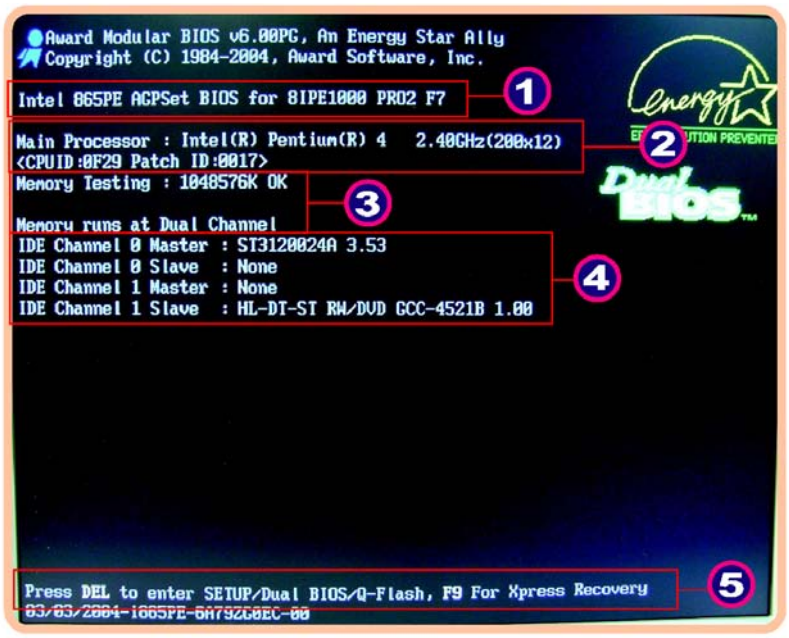
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Chapter 7 System Test and BIOS Setup

7.1 Initial Setup Screen

When you start your PC for the first time, after the power on startup test (POST), you will see the screen as follows, which is usually referred to as the “initial setup screen”. (If you failed to see this screen, it’s possible the POST encountered an error, please check your hardware.)



1. **Motherboard Type and BIOS Version**
   When encountering a hardware problem related to the motherboard, often times a BIOS upgrade will solve it. You can search the manufacturer’s website for your new BIOS version. Download it and update your BIOS then check to see if the problems is resolved.
2. **CPU Information**
   CPU information such as CPU type, clock speed (including external clock and multiplier), and ID number are shown here. Here you can check whether the current configuration matches your CPU standard.



3. **System Main Memory and Features**
When you power on your computer, the POST checks the current system configuration on your motherboard for system memory. After testing, the capacity of your memory will be displayed on the screen. If your motherboard has installed a share memory, the capacity of the share memory is also shown here. If your motherboard features dual-channel memory architecture and the dual memory modules are properly installed, you can also see “dual channel” on the screen.
4. **IDE Devices (Including Serial ATA Devices)**
The types of IDE devices such as your hard disk drive or CD-ROM drive are displayed here. If you have installed any Serial ATA devices, the information is also displayed.
5. **Other Information**
Some motherboards can provide other hardware test or special hot keys information, such as CPU/system temperature, the speed of cooler, and voltage. The information shown here on this screen informs you that you can use the “XpressRecovery” function by pressing the hot key F9.

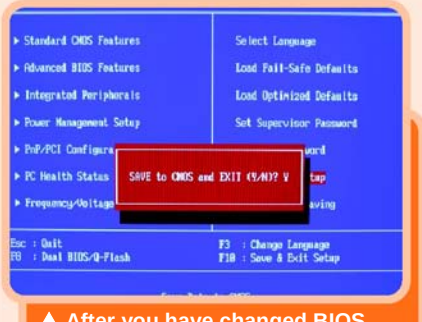
7.2 The Importance of BIOS

The BIOS controls almost all of the hardware devices that are connected with your motherboard, including CPU, memory, video adapter and other interface cards, hard disk drive/CD-ROM drive, network devices and USB devices. Having the latest BIOS version is critical. To build a new PC that works great and is stable, you must understand more about your system BIOS.

How to Configure BIOS?



▲ After you have powered on your PC, upon entering the initial setup screen, please press “Del” to enter BIOS setup screen.



▲ After you have changed BIOS settings, don’t forget to save them by selecting the SAVE option or pressing F10.

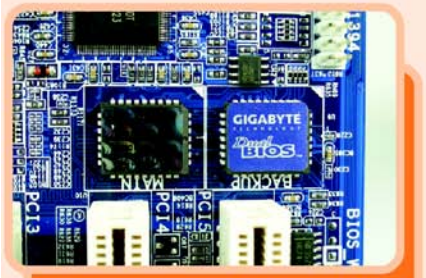


◀ **Most Gigabyte motherboards have BIOS supporting multiple languages to help users for easy setup.**

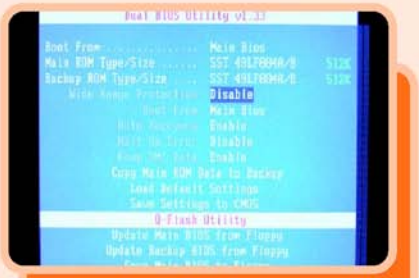
Gigabyte Dual BIOS Feature

Since the BIOS controls the settings of many hardware devices, once it is infected or damaged by virus, your PC may not be able to operate normally. That's why Gigabyte provides Dual BIOS™ feature on its motherboards. This feature provides redundant BIOS capability, as there are two BIOS chipsets – the Main BIOS and the Backup BIOS. Normally these motherboards work with the Main BIOS. However, when the Main BIOS fails to function, the Backup BIOS will take over and restore the Main BIOS. In this way, you can still use your PC.

The jumpers on the motherboard control the Dual BIOS feature, but you can also control it directly from the BIOS setup screen. When you enter the BIOS setup, press F8 and you will see Dual BIOS Utility settings (the upper half) and Q-flash Utility settings (the lower half, see section.7.32.)



▲ **There are two BIOS chipsets on Gigabyte's motherboards with Dual BIOS feature.**



▲ **BIOS Interface for Gigabyte's Dual BIOS utility and Q-flash utility.**



7.3 Essential BIOS Settings for First Start-up

When entering the BIOS setup menu, you may be confused by the many options given. In this section, we will introduce to you some important BIOS options for when you start your PC for the first time. After reading this section, you will be able to get your new PC up and working smoothly. (for settings which are not explained here, please use the default settings)

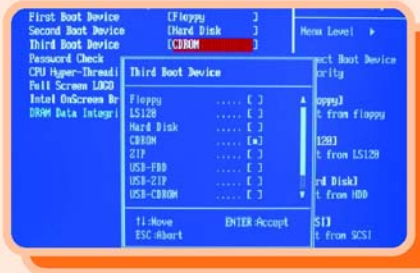
One point to keep in mind: When an error appears on the BIOS setup screen, you may not be able to turn on PC, or your PC may behave unstable. So, please carefully read the section of your motherboard manual on BIOS before you configure any of the BIOS settings.

1: Time and IDE Devices



First, select “Standard CMOS Features,” under which the first two options allow you to set date and time. The following options are for IDE device settings (usually can be automatically detected, if not, you may need to configure them manually). Below are settings for keyboard and floppy drives.

2: Boot Sequence



Next, select “Advanced BIOS Features”. In the second to the forth options on the screen allow you to set the boot sequence. Usually “First Boot Device” is set to Floppy. When you turn on PC and install Window for the first time, set “CD-ROM” for “Second Boot Device” then your PC can be booted from CD-ROM.

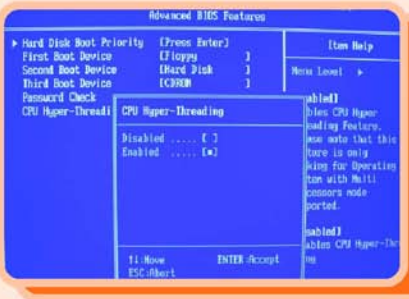
3: Enable Pentium 4 Hyper-Threading technology

Still remember some of Intel's Pentium 4 Hyper Threading (HT) technology we mentioned way back in chapter 1? With HT technology, you can achieve a simulated dual processor performance. According to published information, the performance of your system can be enhanced up to 30%. The feature is certainly worth a try! However, according to Intel's R&D, there are some prerequisites if you want to use Pentium 4 processors' HT technology, and they are as follows:

To Use Hyper Treading Technology…

1. **You should have a Pentium 4 processor with HT technology.**
2. **Use a motherboard with a chipset that supports HT technology.**
3. **The BIOS on your motherboard supports HT technology, and the feature is enabled.**
4. **Your operating system supports HT technology. (Currently, Windows XP and Linux support this feature).**

Among these prerequisites, only the third item has to be manually configured. To enable HT technology in your BIOS, follow the steps and illustrations given below.



On the BIOS setup screen, select "Advanced BIOS Features" to enter "CPU Hyper Threading" option. Then, go back to BIOS setup screen to save the setting after selecting "Enabled." Now, you can activate your Pentium 4 with HT technology!

Note: To fully utilize HT technology, your PC should use a Pentium 4 processor that supports HT technology, along with chipset, BIOS and operating system that supports HT technology. The performance of your system depends on your specific hardware and software. For information about processors with HT technology, please visit www.intel.com/info/hyperthreading



4: CPU, Memory, AGP Clock Speed and Voltage Setup



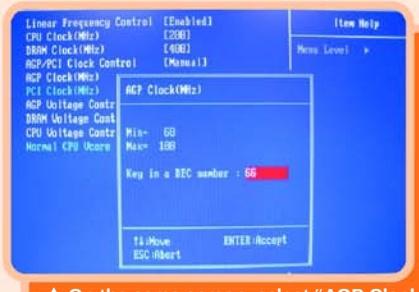


▲ On the BIOS setup screen, select “Frequency/Voltage Control”. On the “CPU Clock” or “CPU Voltage Control” options, you may set the CPU’s external frequency and voltage. As for other options, use the default values.





▲ On the same screen, select “DRAM Clock” and “DRAM Voltage Control” to set memory’s clock speed and voltage. If you don’t want to overload, use the default vales.





▲ On the same screen, select “AGP Clock” and “AGP Voltage Control” to set your video adapter’s clock speed and voltage. Similarly, if you don’t want to overload, use the default values.

5: Hardware Monitoring Setup



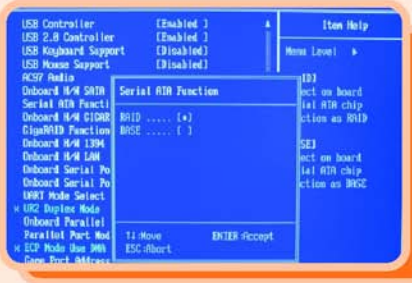
◀ On BIOS setup screen, select “PC Health Status,” under which you can set the temperature or cooler speed for your CPU or system. In particular, make sure that you set a maximum temperature limit to prevent CPU overheating and damage.

6: Keyboard/Mouse Setup



◀ If you envy Apple’s Mac computers that can turn on the PC using keyboard or mouse, then, you should enable this function. Entering BIOS setup screen, select “Power Management Setup” (may be located elsewhere on different motherboard), and look for “Power On By Mouse” and “Power On By Keyboard” options, then enable them. Now, you can turn up PC using your keyboard or mouse!

7: Disk RAID Setup



◀ Currently most new motherboards support IDE or Serial ATA RAID functions, but many users don’t even take full advantage of this function! When enabled, it will test your HDD each time you power on. If you don’t like the time it takes, you can go to “Serial ATA Function” or “GigaRAID Function” option (may be located elsewhere on different motherboard) to disable this function.



7.4 BIOS Update

As mentioned above, its really important to have an updated BIOS. But how exactly do you do it? Currently, only Gigabyte provides most flexible upgrade methods for motherboards: firstly, under the traditional DOS mode, use the Flash program provided by your BIOS supplier to upgrade; secondly, you can use the Gigabyte's Q-flash utility to upgrade; and thirdly, you can use a live BIOS upgrade online (See chapter 8). Just go to Gigabyte's website and download the latest version of your BIOS for the preceding two methods. However, with the third method, you should be on-line all the time since it needs to be updated via Internet.



▲ Please confirm the type and version of your motherboard and go to supplier's website to look for the latest BIOS vision for your motherboard.



▲ Download the BIOS version that you wish to update (usually the latest version). Unzip the files and save them onto a floppy disk or onto your hard disk, do remember where you saved them.



Flash BIOS update (DOS update package)

Three files have been unzipped in the preceding step 2, of which "8knxp.f10" is the BIOS file, "Flash879.exe" is the Flash program provided by your BIOS supplier, and "autoexec.bat" is the batch file created for you by Gigabyte. You can update your BIOS upgrade by simply executing this batch file.



▲ Power on your PC with a DOS boot disk (Windows 98 boot disk is recommended). Under File menu, execute “autoexec.bat” file to enter the Flash setup screen.



▲ Choose the BIOS file “8knxp.f10” to update your BIOS.



▲ BIOS is updating. Do not power off your PC or carry out any actions otherwise your PC can be crashed.



▲ BIOS update is complete. Press ESC to exit the Flash program. Restart your PC and you can check on initial setup screen whether your BIOS has been updated.



Updating BIOS with Q-flash Utility

Q-flash is a BIOS updating utility embedded in Flash ROM and provided by Gigabyte. The interface of this utility is combined with that of “Dual BIOS Utility” mentioned in section 7.2. With this interface, you can choose to update Main BIOS or Backup BIOS, or to save data of Main BIOS or Backup BIOS to a floppy. The following steps show you how to update Main BIOS.



▲ The Q-flash utility can automatically find the files on your floppy. Choose the BIOS file “8KNXP.F10.”



▲ Reading BIOS file. Do not power off your PC or carry out any actions otherwise your PC can be crashed.



◀ BIOS is updating. Do not power off your PC or carry out any actions otherwise your PC will crash. Restart your PC when BIOS update is complete. You can check on the initial setup screen whether your BIOS has been updated.

Chapter 8 Gigabyte's Exclusive Technologies

8.1 Gigabyte's advanced "6 Dual" Miracle design

Gigabyte has added a latest 6-Dual system on its latest high-end motherboards. Take GA-8KNXP as an example. Its 6-Dual system includes:

1. **Dual Logical Processors supporting Pentium 4 with HT technology**
2. **Dual Channel DDR 400 supporting dual channel memory.**
3. **Dual RAID supported.**
4. **Dual BIOS supported.**
5. **Dual Power System (DPS) 2 supported.**
6. **Dual cooling system supported.**

While some other motherboard manufacturers may offer the first four features, the last two can only be found on Gigabyte's newest motherboards. The Dual Power System (DPS) is designed to provide 6-phase power circuits to ensure enough power for your CPU – ensuring smooth operation. DSP is an add-on card installed in a special slot on your Gigabyte motherboard. Right above the DSP card is a cooler along with the north bridge chipset cooler to form a dual cooling system (Dual Cooling). The Dual Cooling system improves the cooling of your system. DPS has been received well on the market, and Gigabyte now provides its next generation cooling system – DSP2, which will be a further enhancement in overall system cooling.



▲ Both DPS and DPS2 are add-on cards.



▲ The exclusive Gigabyte DSP/DSP2 slot.



8.2 Drivers and Utility Installation

With more and more built-in features on motherboards, there are more and more driver installation options. To simply things, Gigabyte's R&D team has developed two sets of convenient utilities. One is **Xpress Install** to simplify the complicated procedure for driver installation. With **Xpress Install**, you can install all drivers of your motherboard as simply as pressing a single key. The second set of utilities Gigabyte provides is the **Download Center.** This is the online, menu driven service. With **Download Center**, all drivers for your motherboard are smartly selected and effortlessly upgraded to the latest version.

Nowadays, hardware products are released faster, and manufacturers also have to keep up with the latest driver development too. Sometimes after only a period of a few months your original drivers may be out-of-date, causing initialization or 'hardware not found' errors.

Using Xpress Install



▲ Put the CD-ROM that comes with your motherboard into your CD-ROM drive, and you will see this window automatically displayed on your screen.



▲ Since you want to install all drivers, click the Xpress Install icon.



▲ Click "Go" to install all of your drivers.



▲ Xpress Install will display messages on your screen to tell you that some device drivers will restart your system automatically, After restarting your system, Xpress Install will continue to install other drivers.



▲ After all drivers have been successfully installed, Xpress Install will suggest you to restart your PC so as to ensure that all of your hardware works normally.



▲ Lastly, check again whether there is any driver missing.



8.3 Overclocking Utility

Squeezing every bit of speed out of a PC is what every guru attempts to do. Fully utilizing your PC's power by increasing CPU clock speeds is what all "Overclockers" do, and Gigabyte knows that *overclocking* will continue to important to our customers. In the past, if you wanted to experience the fun of overclocking, you needed to first understand the complexities of the BIOS, CPU clock speed, voltage, FSB speeds, jumper setting, etc. These troubles kept a lot of people from experiencing overclocking.

To take the pain out of overclocking, Gigabyte developed two overclocking utilities, **EasyTune** and **V-Tuner**. These two utilities both allow you to enjoy overclocking in Window operating system without having to mess around with jumpers and/or your BIOS setup.

EasyTune 5

EasyTune is a utility provided with along with Gigabyte motherboards. The latest version is EasyTune5. The former EasyTune 4 had two different modes – Easy Mode and Advanced Mode. The same is true of EasyTune 5. If you choose Easy Mode, the operation is simply. Select "Auto Optimize", and click "GO". Then EasyTune 5 will automatically overclock your CPU to the highest stable speed.

If you choose Advanced Mode, there are more features available for you. For example, in EasyTune 4 there is temperature, voltage and fan speed monitors. In EasyTune 5, there is an enhanced intelligent feature for monitoring fan speed – SmartFAN. With SmartFAN, you can achieve the optimal balance between your CPU temperature and fan speed.

In addition, the latest EasyTune 5 has adopted many new technologies such as CIA (CPU Intelligent Accelerator), MIB II (Memory Intelligent Booster II), MIT (Motherboard Intelligent Tweaker) and SOS (System Overclock Saver). Once CIA is enabled, the program will examine the workload of your CPU, and automatically get the best performance out of your PC. With MIB II, your memory will work more efficiently, enlarging the bandwidth to about 10%. Enabling MIT allows you to modify the BIOS settings from within Windows.

What to do if you've overclocked past the system tipping point? This thought is always in the back of every guru's mind. Don't worry! Because now EasyTune5 is equipped with an intelligent SOS feature. If you happen to overclock past the system limit, EasyTune5 will automatically restart your PC, and restore the safe default settings from your CMOS. You do not need to unplug jumpers or take out the battery like the old days. Now it's safe and convenient for everyone to enjoy overclocking!



▲ The main screen of EasyTune 5 on Easy Mode.



▲ EasyTune 5 on Advanced Mode, and all features are available.

V-Tuner 2

Gigabyte has also developed a very powerful Windows utility called V-Tuner 2. With this utility, you can adjust the clock speeds of your video chipset or video memory, and change the design of your operation panel, similar but with many more options than that of V-Tuner 1.



▲ The V-Tuner 2 utility is provided by Gigabyte for new video adapter.

8.4 System Backup and Recovery Utility: Xpress Recovery

There is a powerful system backup and recovery utility standard on Gigabyte's new motherboards --Xpress Recovery. This utility can back up system data to your hard disk. Upon a PC crash, you can use Xpress Recovery to quickly restore your data.

Two Methods to activate Xpress Recovery





▲ Press F9 when you see the initial setup screen and you will see the Xpress Recovery window (left). If you fail to see this window, please set to boot from CD-ROM drive on BIOS setup screen. Insert the CD-ROM to activate "Xpress Recovery (right)". Next, press F9 when the initial setup screen is displayed, you can enter the Xpress Recovery window.

System Backup and Recovery





▲ Select the first option listed on your Xpress Recovery window. Press "B" to back up your system; select the second option and press "R" to return to default settings.

8.5 BIOS Online Update Utility: @BIOS

@BIOS is a software utility available for download from Gigabyte's website. Once installed, this utility will help you update your BIOS online, and you can also backup the current BIOS on your motherboard.



▲ Once the @BIOS setup screen is displayed, select "Internet Update" and click "Update New BIOS".



▲ Then choose the location of the server that you would like it to connect to. We recommended that you choose a server near you. Click "OK", and your BIOS will be updated.

Backup BIOS File



▲ Select "Save Current BIOS" in step 1 mentioned above, and you will see this window. Select or input the name of the BIOS file that you are about to backup, and click "Save".



▲ Once BIOS update is complete, click "OK".

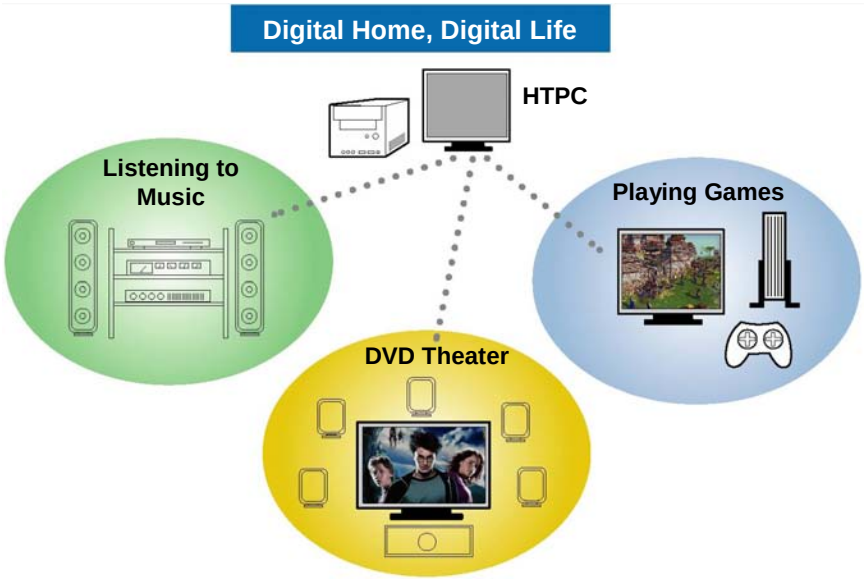


Chapter 9 Welcome to the HTPC Era

9.1 What is a HTPC?

Home Theatre Personal Computer (HTPC) improves the image quality of the latest monitors when playing movies. As the name suggests, a HTPC is for the PC, and its most important purpose is to replace home audio/video devices (such as a DVD player). With a HTPC as the audio/video source, you can achieve an outstanding audiovisual experience.

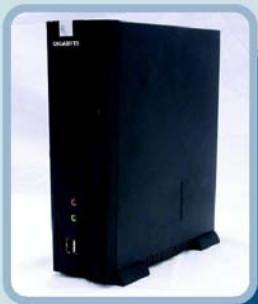
Besides improving the effects of a movie, a HTPC can serve as a home audio/video entertainment center. If you add a TV adapter, your HTPC is not only a DVD player but a TV set. And, by adding a DVD burner, your HTPC can also be seen as a DVD recorder. Its power is enormous.



9.2 Building a HTPC

Appearance

The HTPC is mainly for home use, and a traditional, dull and bulky computer case will no longer do. On the other hand, SFF PCs (Small Form Factor PC), or bare bone PC or Mini PC, are coming to be like a home audio system or game consoles. They are as attractive a stereo system and small enough to be stored out of sight if you like.



▲ Gigabyte's SFF system looks like a game console

Video Card

The video card can be considered as the soul of your HTPC. The reason we adapt a HTPC is that it complies with the resolution of the video card better than that of a traditional DVD player. Differing from a gaming video card, which emphasize on its 3D performance, the HTPC video card does not need powerful 3D performance. And, if you use a latest PCI E video card, its TV resolution will allow you to enjoy the audio and visual effects that a HTPC provides.



▲ Nvidia GV-NX57128D features latest PCI E interface.



Audio Effects

When a HTPC works with a large-size monitor (such as a projector), it is assumed the room is relatively big and the PC speakers may not be satisfactory. In this case, the best solution is to use a optical fiber to connect your HTPC to a home surround decoder and amplifier and let your audio system to enhance the audio effects.



▲ 7.1 channel PC speakers

CPU/Memory

Currently, the speed of a mainstream CPU's are high enough. Generally speaking, to play a DVD movie, a CPU with frequency of 2.4GHz is enough. However, if you want to use it together with WMV-HD, (for more information, visit http://www.wmvhd.com), it is suggested that you use Pentium 4 with HT technology, whose speed is usually above 2.8GHz (e.g. 3.0GHz). In addition, if you are to build your HTPC late this year, you should use a motherboard equipped with Intel's 915G chipset. This kind of motherboard will provide a powerful platform for optimal audio/video effects of your HTPC. The appropriate memory capacity is 512MB. A smaller capacity may lead to unexpected pauses when switching programs.

CD-ROM Drive and Hard Disk

Since the main purpose of your HTPC is to play movies, a DVD-ROM drive should be included in your standard configuration. There are already shorter DVD-ROM drives available on the market, which can be easily installed into your SFF PC. If you want to burn a DVD by yourself, you can install a DVD burner. And, if you are to record some TV programs, you'd better have a hard disk larger than 120GB. With such large capacity, you can even record the whole week's TV programs while you are away.

Chapter 10 FAQ

Q My motherboard seems to be malfunctioning. How long am I covered under warranty? Where can I get help?

A Make sure that your motherboard is an authentic Gigabyte motherboard (yes, there are lots of counterfeit products out there). All Gigabyte's motherboards manufactured after 1 January 2001 can enjoy a warranty period up to three years.

It is Gigabyte's responsibility protect our customers' rights. If you don't know the manufacture date of your motherboard, it's OK. There is an ID label with the serial number on your motherboard and everything you need to know about your motherboard is on it. With this information, Gigabyte's technical support can help. If you think your motherboard has been malfunctioning, it doesn't matter if the warranty is still valid or not, please return it to the store where you first purchased it have it checked or repaired. You may also visit any of Gigabyte's authorized dealers for help.



▲ **There is an ID label with the serial number on each Gigabyte product.**

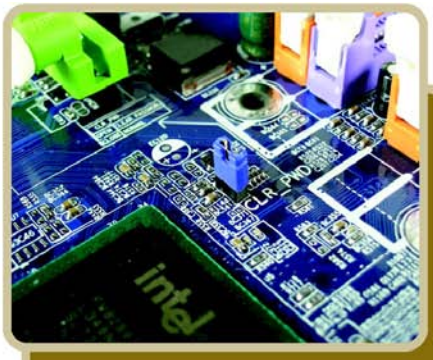
NOTE: For more details about warranty and services, please contact the store where you purchase it, or any dealer or distributor. After the three-year warranty period expires, you will be required to pay extra as the maintenance fee or replacement charge.

Q I forgot my BIOS password. What can I do now?

A Please be careful next time. Although you have set a BIOS password for AMI BIOS or AWARD BIOS, no password is needed to restore the system back to default settings. All you need to do is to restore the BIOS default settings, then this problem is solved.



How do I restore BIOS default settings?
The simplest method is to find the jumper around the BIOS chipset on your motherboard, which is marked with characters such as “ClearCMOS” or “CLR_PWD”. On some motherboards, there may be only “JP1” on this jumper. Please refer to your motherboard’s manual if necessary. Once you’ve found it, remove this jumper while your PC is off. After about 10 seconds, replace the jumper again. Your BIOS default setting should have been restored. If you cannot find such a jumper on your motherboard, you have to resort the settings using the old way – remove the mercury battery on your motherboard, and replace it after about 10 seconds. By doing so, your BIOS default settings are also restored.



▲ Remove the jumper marked with characters such as “CLR_PWD”, and replace it after about 10 seconds to restore the BIOS default settings.

FAQ

Q I am going to update my BIOS, but I don’t know how to identify the type of my motherboard. What can I do?

A Usually there are two methods of determining the type of your motherboard. The first one, which is easier, is to find it on your motherboard’s package. You can find the type and version of your product there. However, if you are like most, you threw away the packaging right after you installed your motherboard. In this case you have to use the second method – to find useful information directly from your motherboard.

Generally the type and version of your motherboard is marked on a relatively obvious part of your motherboard – for instance, the part near memory slots or AGP/PCI slots. Sometimes the type and version are marked at different locations, with the version usually printed at a corner of your motherboard.



▲ Here GA-8IPE1000 Pro2 is the type of this motherboard, and the REV:2.0 displayed at the corner is the version of your PCB(Printed Circuit Board).

FAQ

Q Why do I sometimes have trouble updating the BIOS on my motherboard?

A Since the BIOS data is vitally important, most suppliers will try their best to protect it. Gigabyte's Dual BIOS™ is an example of a best protection mechanism. And usually suppliers will adopt an additional barrier to prevent BIOS from being accidently overwritten. With this protection, it is almost impossible to damage your BIOS data. There are two designs to prevent an erroneous overwrite. The first is to equip the motherboard with a specific jumper, and the second is to provide a "BIOS Flash Protection" option on BIOS setup menu.
If you find that your BIOS cannot be updated, it's probably because such a BIOS protection feature has been enabled (usually it is the default setting).

If you have disabled this feature, but still cannot update your BIOS, please check again whether the BIOS file that you have downloaded is the correct version.



▲ Remember to disable the BIOS protection feature before updating your BIOS.

Q What's the difference between the maintenance of a mechanical roller mouse and that of an optical mouse?

A If you are using a traditional mechanical roller mouse, after a period of time, there will be a layer of dirt accumulated. If you don't clean the balls and rollers, performance of your mouse will degrade. Since an optical mouse controls the movement of your cursor by the reflection of light, it has balls/rollers and does not need cleaning. However, because your optical mouse works by light reflection, using it on a surface where there is random scatter or there is no reflection (e.g. on glass), your optical mouse won't function!

