MSI

K8N Neo4-FX
MS-7125 (v1.X) ATX Mainboard

G52-M7125XE

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed $C \epsilon$ **N1996** to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

= Reorient or relocate the receiving antenna.
= ncrease the separation between the equipment and receiver.
= Connec the equipment into an outlet on a circuit different from that to which the receiver is connected.
= Consult the dealer or an experienced radio/television technician for help.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

Micro-Star International
MS-7125
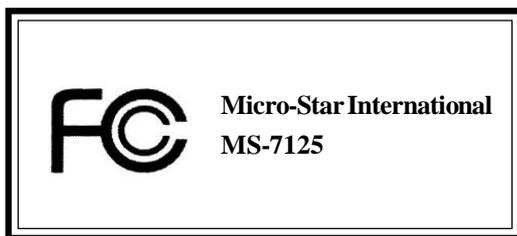
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation

Copyright Notice

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Manual Rev: 1.2
Release Date: July 2005

Revision History

Revision	Revision History	Date
V1.2	Change single chip to nVidia nForce4 4X (standard)	July 2005

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.
† Visit the MSI homepage & FAQ site for technical guide, BIOS updates, driver updates, and other information: **http://www.msi.com.tw** & **http://www.msi.com.tw/program/service/faq/faq/esc_faq_list.php**
† Contact our technical staff at: **support@msi.com.tw**

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. **Do not cover the openings.**
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
    † The power cord or plug is damaged.
    † Liquid has penetrated into the equipment.
    † The equipment has been exposed to moisture.
    † The equipment has not work well or you can not get it work according to User's Manual.
    † The equipment has dropped and damaged.
    † The equipment has obvious sign of breakage.
12. **Do not leave this equipment in an environment unconditioned, storage temperature above 60^0 C (140^0F), it may damage the equipment.**

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

WEEE Statement

ENGLISH

To protect the global environment and as an environmentalist, MSI must remind you that...

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

Gemäß der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte dürfen Elektro- und Elektronik-Altgeräte nicht mehr als kommunale Abfälle entsorgt werden. MSI hat europaweit verschiedene Sammel- und Recyclingunternehmen beauftragt, die in die Europäische Union in Verkehr gebrachten Produkte, am Ende seines Lebenszyklus zurückzunehmen. Bitte entsorgen Sie dieses Produkt zum gegebenen Zeitpunkt ausschliesslich an einer lokalen Altgerätesammelstelle in Ihrer Nähe.

FRANÇAIS

En tant qu'écologiste et afin de protéger l'environnement, MSI tient à rappeler ceci...

Au sujet de la directive européenne (EU) relative aux déchets des équipement électriques et électroniques, directive 2002/96/EC, prenant effet le 13 août 2005, que les produits électriques et électroniques ne peuvent être déposés dans les décharges ou tout simplement mis à la poubelle. Les fabricants de ces équipements seront obligés de récupérer certains produits en fin de vie. MSI prendra en compte cette exigence relative au retour des produits en fin de vie au sein de la communauté européenne. Par conséquent vous pouvez retourner localement ces matériels dans les points de collecte.

РУССКИЙ

Компания MSI предпринимает активные действия по защите окружающей среды, поэтому напоминаем вам, что....

В соответствии с директивой Европейского Союза (ЕС) по предотвращению загрязнения окружающей среды использованным электрическим и электронным оборудованием (директива WEEE 2002/96/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязуется соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

ESPAÑOL

MSI como empresa comprometida con la protección del medio ambiente, recomienda:

Bajo la directiva 2002/96/EC de la Unión Europea en materia de desechos y/o equipos electrónicos, con fecha de rigor desde el 13 de agosto de 2005, los productos clasificados como "eléctricos y equipos electrónicos" no pueden ser depositados en los contenedores habituales de su municipio, los fabricantes de equipos electrónicos, están obligados a hacerse cargo de dichos productos al termino de su período de vida. MSI estará comprometido con los términos de recogida de sus productos vendidos en la Unión Europea al final de su periodo de vida. Usted debe depositar estos productos en el punto limpio establecido por el ayuntamiento de su localidad o entregar a una empresa autorizada para la recogida de estos residuos.

NEDERLANDS

Om het milieu te beschermen, wil MSI u eraan herinneren dat....

De richtlijn van de Europese Unie (EU) met betrekking tot Vervuiling van Electrische en Electronische producten (2002/96/EC), die op 13 Augustus 2005 in zal gaan kunnen niet meer beschouwd worden als vervuiling.

Fabrikanten van dit soort producten worden verplicht om producten retour te nemen aan het eind van hun levenscyclus. MSI zal overeenkomstig de richtlijn handelen voor de producten die de merknaam MSI dragen en verkocht zijn in de EU. Deze goederen kunnen geretourneerd worden op lokale inzamelingspunten.

SRPSKI

Da bi zaštitili prirodnu sredinu, i kao preduzeće koje vodi računa o okolini i prirodnoj sredini, MSI mora da vas podesti da...

Po Direktivi Evropske unije ("EU") o odbačenoj ekektronskoj i električnoj opremi, Direktiva 2002/96/EC, koja stupa na snagu od 13. Avgusta 2005, proizvodi koji spadaju pod "elektronsku i električnu opremu" ne mogu više biti odbačeni kao običan otpad i proizvođači ove opreme biće prinuđeni da uzmu natrag ove proizvode na kraju njihovog uobičajenog veka trajanja. MSI će poštovati zahtev o preuzimanju ovakvih proizvoda kojima je istekao vek trajanja, koji imaju MSI oznaku i koji su prodati u EU. Ove proizvode možete vratiti na lokalnim mestima za prikupljanje.

POLSKI

Aby chronić nasze środowisko naturalne oraz jako firma dbająca o ekologię, MSI przypomina, że...

Zgodnie z Dyrektywą Unii Europejskiej ("UE") dotyczącą odpadów produktów elektrycznych i elektronicznych (Dyrektywa 2002/96/EC), która wchodzi w życie 13 sierpnia 2005, tzw. "produkty oraz wyposażenie elektryczne i elektroniczne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

Avrupa Birliği (AB) Kararnamesi Elektrik ve Elektronik Malzeme Atığı, 2002/96/EC Kararnamesi altında 13 Ağustos 2005 tarihinden itibaren geçerli olmak üzere, elektrikli ve elektronik malzemeler diğer atıklar gibi çöpe atılamayacak ve bu elektonik cihazların üreticileri, cihazların kullanım süreleri bittikten sonra ürünleri geri toplamakla yükümlü olacaktır. Avrupa Birliği'ne satılan MSI markalı ürünlerin kullanım süreleri bittiğinde MSI ürünlerin geri alınması isteği ile işbirliği içerisinde olacaktır. Ürünlerinizi yerel toplama noktalarına bırakabilirsiniz.

ČESKY

Záleží nám na ochraně životního prostředí - společnost MSI upozorňuje...

Podle směrnice Evropské unie ("EU") o likvidaci elektrických a elektronických výrobků 2002/96/EC platné od 13. srpna 2005 je zakázáno likvidovat "elektrické a elektronické výrobky" v běžném komunálním odpadu a výrobci elektronických výrobků, na které se tato směrnice vztahuje, budou povinni odebírat takové výrobky zpět po skončení jejich životnosti. Společnost MSI splní požadavky na odebírání výrobků značky MSI, prodávaných v zemích EU, po skončení jejich životnosti. Tyto výrobky můžete odevzdat v místních sběrnách.

MAGYAR

Annak érdekében, hogy környezetünket megvédjük, illetve környezetvédőként fellépve az MSI emlékezteti Önt, hogy ...

Az Európai Unió („EU") 2005. augusztus 13-án hatályba lépő, az elektromos és elektronikus berendezések hulladékairól szóló 2002/96/EK irányelve szerint az elektromos és elektronikus berendezések többé nem kezelhetőek lakossági hulladékként, és az ilyen elektronikus berendezések gyártói kötelessé válnak az ilyen termékek visszavételére azok hasznos élettartama végén. Az MSI betartja a termékvisszavétellel kapcsolatos követelményeket az MSI márkanév alatt az EU-n belül értékesített termékek esetében, azok élettartamának végén. Az ilyen termékeket a legközelebbi gyűjtőhelyre viheti.

ITALIANO

Per proteggere l'ambiente, MSI, da sempre amica della natura, ti ricorda che....

In base alla Direttiva dell'Unione Europea (EU) sullo Smaltimento dei Materiali Elettrici ed Elettronici, Direttiva 2002/96/EC in vigore dal 13 Agosto 2005, prodotti appartenenti alla categoria dei Materiali Elettrici ed Elettronici non possono più essere eliminati come rifiuti municipali: i produttori di detti materiali saranno obbligati a ritirare ogni prodotto alla fine del suo ciclo di vita. MSI si adeguerà a tale Direttiva ritirando tutti i prodotti marchiati MSI che sono stati venduti all'interno dell'Unione Europea alla fine del loro ciclo di vita. È possibile portare i prodotti nel più vicino punto di raccolta.

CONTENTS

1

Getting Started

Thank you for choosing the **K8N Neo4-FX** (MS-7125) v2.X ATX mainboard. The **K8N Neo4-FX** mainboard is based on ***n*VIDIA® nForce™4 4X** chipset for optimal system efficiency. Designed to fit the advanced **AMD® K8 Athlon 64 FX / Athlon 64 /Athlon 64 X2** processor, the **K8N Neo4-FX** mainboard delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU
† Supports Socket-939 for AMD K8 Athlon 64 FX / Athlon 64/ Athlon 64 X2 (Socket939) processor
† Supports up to Athlon64 3500+, 3800+, or higher CPU
(For the latest information about CPU, please visit http://www.msi.com.tw/program/ products/mainboard/mbd/pro_mbd_cpu_support.php)

Chipset
† nVIDIA nForce4 4X
  - HyperTransport link to the AMD Athlon 64/Athlon 64 FX CPU
  - HyperTransport supporting speed up to 1GHz (2000MT/s)
  - Supports PCI Express x16/x1/x2 interface
  - Two independent SATA controllers, for four drives
  - Dual Fast ATA-133 IDE controllers
  - IEEE802.3 nVIDIA MAC for 1000BASE-T

Main Memory
† Supports dual channel, eight memory banks DDR 266/333/400, using four 184-pin DDR DIMMs
† Supports a maximum memory size up to 4GB
† Supports 2.5v DDR SDRAM DIMM
(For the updated supporting memory modules, please visit http://www.msi.com.tw/ program/products/mainboard/mbd/pro_mbd_trp_list.php.)

Slots
† One PCI Express x16 slot (supports PCI Express Bus specification v1.0a compliant)
† Two PCI Express x1 slots (supports PCI Express Bus specification v1.0a compliant)
† Four 32-bit Master PCI Bus slots.
† Support 3.3V/5V PCI bus Interface

On-Board IDE
† An IDE controller on the nVIDIA® nForce4 4X chipset provides IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA 66/100/133 operation modes
† Can connect up to 4 IDE devices

On-Board SATA
† nForce4 4X supports 4 SATA ports. Transfer rate is up to 150MB/s.

USB Interface
† 10 USB ports
  - Controlled by nForce4 Ultra chipset
  - 4 ports in the rear I/O, 6 ports via the external bracket

NV RAID (Software)
† Supports up to 4 SATA and 4 ATA133 Hard drives
    - RAID 0 or 1, 0+1, JBOD is supported
    - RAID function available for PATA+SATA H/D drives

Gigabit LAN
† Supports one LAN jack
    - Supports 10/100/1000 Fast Ethernet by Marvell 88E1111

Audio
† Chip integrated by Realtek ALC850
    - Direct Sound AC97 audio
    - 7.1 Channel output

On-Board Peripherals
† On-Board Peripherals include:
    - 1 floppy port supports 1 FDD with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
    - 1 serial port
    - 1 parallel port supporting SPP/EPP/ECP mode
    - 1 Audio jack(5-in-1) and fiber SPDIF out (for nForce 4 Ultra)
    - 1 Audio jack (Line-in/Line-out/Mic) (for nForce 4 Standard)
    - 1 coaxial SPDIF out
    - 1 IrDA pinheader
    - 1 CD-In pinheader
    - 1 D-Bracket2 pinheader
    - 10 USB1.1/2.0 ports (Rear * 4 / Front * 6)

BIOS
† The mainboard BIOS provides "Plug & Play" BIOS which detects the peripheral devices and expansion cards of the board automatically.
† The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications.
† Supports boot from LAN, USB Device 1.1 & 2.0, and SATA HDD.

Dimension

† ATX Form Factor (30.4 cm X 24.4 cm)

Mounting

† 9 mounting holes

MSI

MSI Reminds You...

1. Now the nVidia nForce4 system driver is only available for Windows 2000 and Windows XP.

2. To create a bootable RAID volume for a Windows 2000 environment, Microsoft's Windows 2000 Service Pack 4 (SP4) is required. As the end user cannot boot without SP4, a combination installation CD must be created before attempting to install the operating system onto the bootable RAID volume.

To create the combination installation CD, please refer to the following website:

http://www.microsoft.com/windows2000/downloads/

servicepacks/sp4/HFdeploy.htm

Mainboard Layout
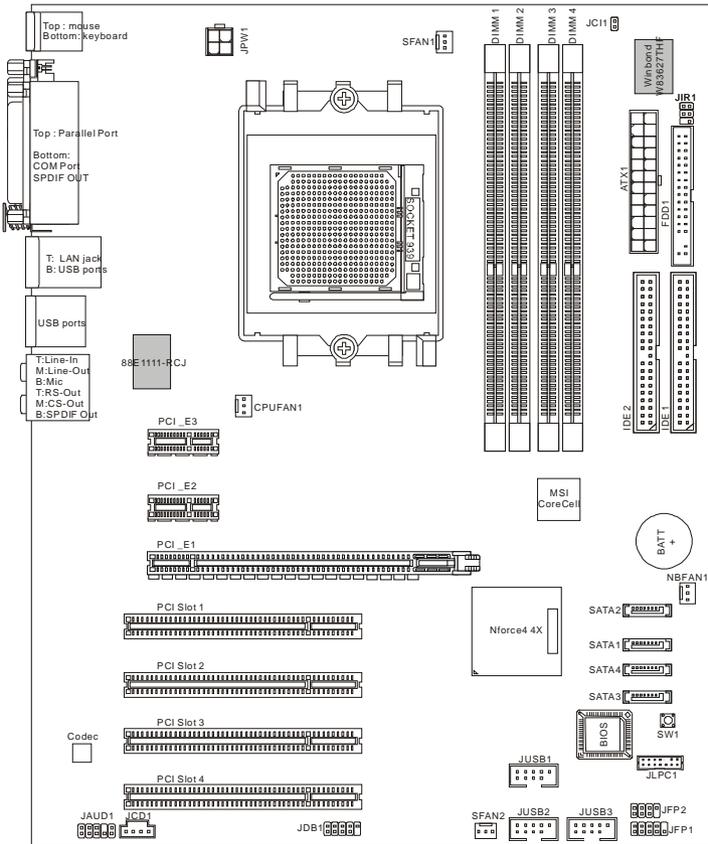
K8N Neo4-FX (MS-7125 v1.X) ATX Mainboard

Packing Contents

MSI motherboard

MSI Driver/Utility CD
SATA RAID Driver
Diskette

SATA Cable (Optional)

Power Cable

D-Bracket 2 (Optional)

Round Cable of
IDE Devices (Optional)

Round Cable of
Floppy Disk (Optional)

Back IO Shield

User's Guide

* The pictures are for reference only. Your packing contents may vary depending on
the model you purchased.

2

Hardware Setup

This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. Also, it provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc.

While doing the installation, be careful in holding the components and follow the installation procedures.

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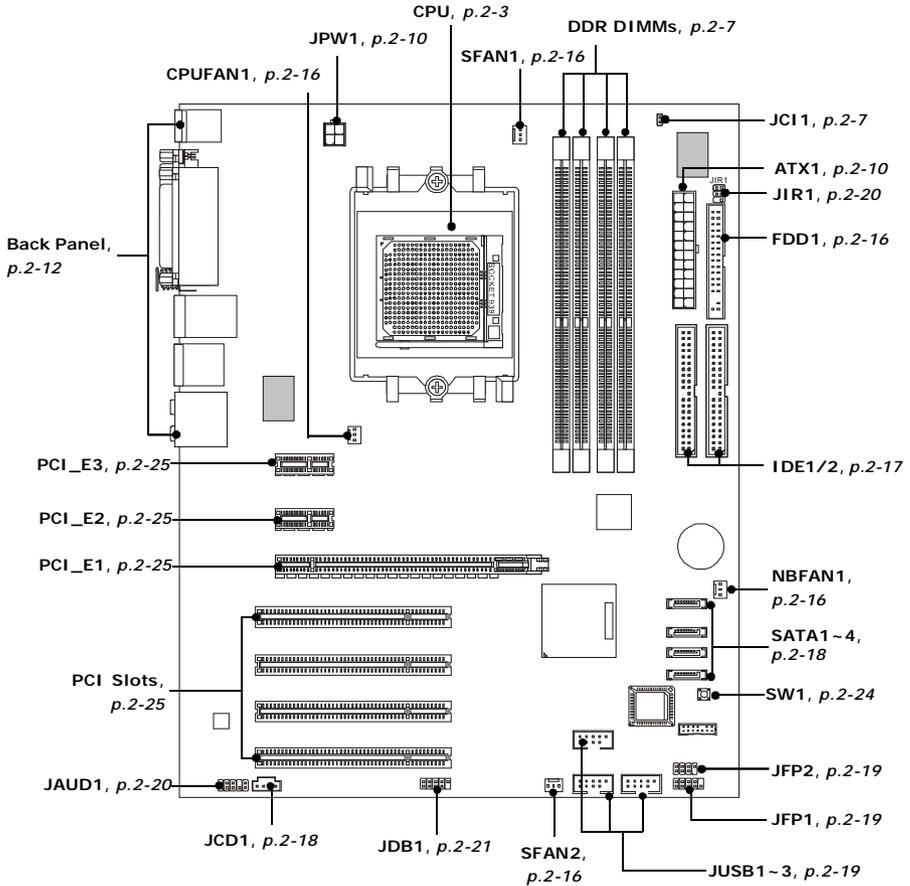
Central Processing Unit: CPU

The mainboard supports AMD® Athlon64 processor. The mainboard uses a CPU socket called Socket-939 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

For the latest information about CPU, please visit http://www.msi.com.tw/program/ products/mainboard/mbd/pro_mbd_cpu_support.php.

MSI	**MSI Reminds You...**

MSI Reminds You...

Overheating
Overheating will seriously damage the CPU and system, always make sure the cooling fan can work properly to protect the CPU from overheating.

Replacing the CPU
While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from grounded outlet first to ensure the safety of CPU.

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

CPU Installation Procedures for Socket 939

1. Please turn off the power and unplug the power cord before installing the CPU.

2. Pull the lever sideways away from the socket. Make sure to raise the lever up to a 90-degree angle.

3. Look for the gold arrow on the CPU. The gold arrow should point as shown in the picture. The CPU can only fit in the correct orientation.Lower the CPU down onto the socket.

4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.

Open Lever

Sliding Plate   90 degree

Gold arrow

Correct CPU placement

Gold arrow   O

Incorrect CPU placement

Gold arrow   X

Press down the CPU   Close Lever
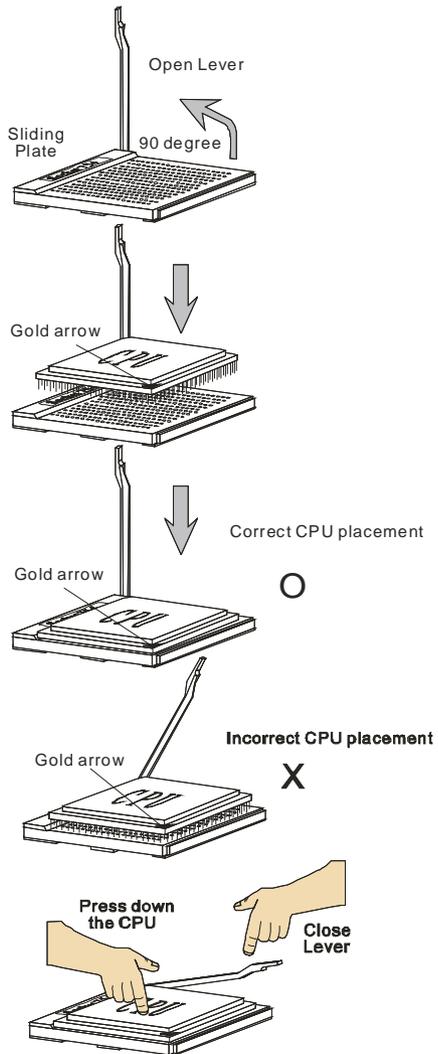
Installing AMD Athlon64 CPU Cooler Set

When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

1. Detach the shield of the backplate's paster.
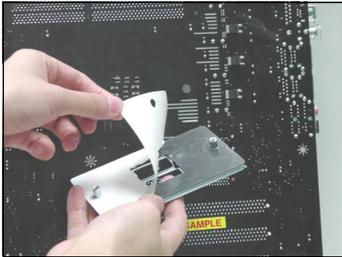
2. Turn over the mainboard, and install the backplate to the proper position.
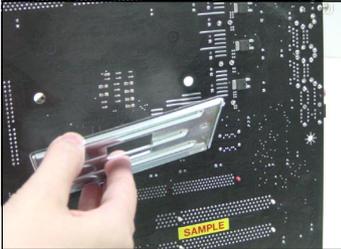
3. Turn over the mainboard again, and place the mainboard on the flat surface.

   Locate the two screw holes of the mainboard.
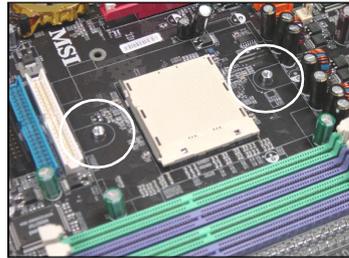
4. Align the retention mechanism and the backplate.

   Fix the retention mechanism and the backplate with two screws.
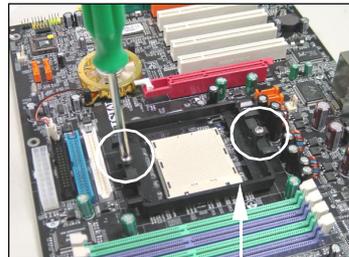
retention mechanism

5. Position the cooling set onto the re-tention mechanism.

Hook one end of the clip to hook first, and then press down the other end of the clip to fasten the cooling set on the top of the retention mechanism.

6. Locate the Fix Lever, Safety Hook and the Fixed Bolt.

Lift up the intensive fixed lever.

Fixed Lever   Fixed Bolt
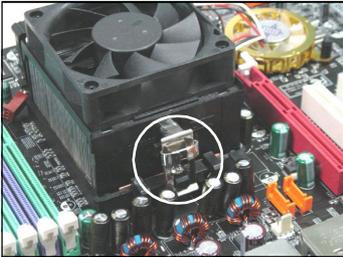
7. Fasten down the lever.
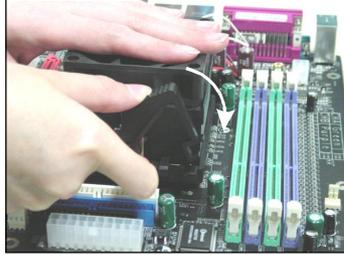
8. Make sure the safety hook completely clasps the fixed bolt of the retention mechanism.
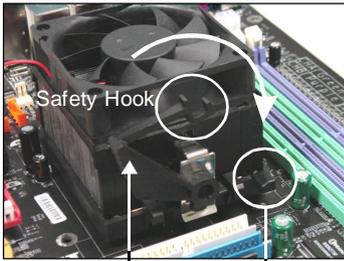
9. Attach the CPU Fan cable to the CPU fan connector on the mainboard.
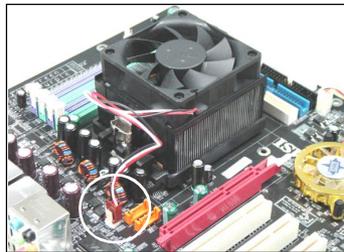
MSI Reminds You...

While disconnecting the Safety Hook from the fixed bolt, it is neces-sary to keep an eye on your fingers, because once the Safety Hook is disconnected from the fixed bolt, the fixed lever will spring back instantly.

Memory

The mainboard provides 4 slots for 184-pin DDR SDRAM DIMM (Double In-Line Memory Module) modules and supports the memory size up to 4GB. You can install DDR266/333/400 modules on the DDR DIMM slots (DDR 1~4).
For the updated supporting memory modules, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_trp_list.php.
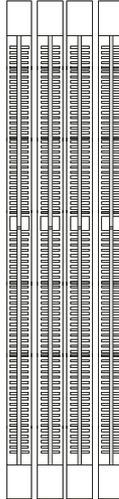
DIMM1~4
(from bottom to top)

Introduction to DDR SDRAM

DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM. High memory bandwidth makes DDR an ideal solution for high performance PC, workstations and servers.

DIMM Module Combination

Install at least one DIMM module on the slots. Each DIMM slot supports up to a maximum size of 1GB. Users can install either single- or double-sided modules to meet their own needs. Please note that *each DIMM can work respectively for single-channel DDR, but there are some rules while using dual-channel DDR* (Please refer to the suggested DDR population table below)*.* Users may install memory modules of different type and density on different-channel DDR DIMMs. However, the *same type and density memory modules* are necessary while using dual-channel DDR, or instability may happen. Please refer to the following table for detailed dual-channel DDR. Other combination not listed below will function as single-channel DDR.

GREEN	PURPLE	GREEN	PURPLE	
DIMM1 (Ch A)	DIMM2 (Ch B)	DIMM3 (Ch A)	DIMM4 (Ch B)	System Density
128MB~1GB	128MB~1GB			256MB~2GB
		128MB~1GB	128MB~1GB	256MB~2GB
128MB~1GB	128MB~1GB	128MB~1GB	128MB~1GB	512MB~4GB

MSI

MSI Reminds You...
- *Dual-channel DDR works **ONLY** in the 3 combinations listed in the table as below.*
- *Please select the identical memory modules to install on the dual channel, and DO NOT install three memory modules on three DIMMs, or it may cause some failure.*
- *Always insert the memory modules into the GREEN slots first, and it is strongly recommended not to insert the memory modules into the PURPLE slots while the GREEN slots are left empty.*
- *This mainboard DO NOT support the memory module installed with more than 18 pieces of IC (integrated circuit).*

Recommended Memory Combination List

DIMM Slots				Max Speed
Green	Purple	Green	Purple	
DIMM1	DIMM2	DIMM3	DIMM4	
S	-	-	-	DDR400
-	-	S	-	DDR400
D	-	-	-	DDR400
-	-	D	-	DDR400
S	-	S	-	DDR400
D	-	D	-	DDR333
S	S	-	-	DDR400
-	-	S	S	DDR400
D	D	-	-	DDR400
-	-	D	D	DDR400
S	S	S	S	DDR400
D	D	D	D	DDR333

S: Single Side   D: Double Side

> **MSI Reminds You...**
> *1. The maximum memory speed decreases when the following two Memory Combination is selected (you can also refer to the Recommended Memory Combination list shown in the previous page:*
>   *- Each channel is installed with two double-sided memory modules*
>   *- Both DIMM1 and DIMM3 slots are installed with double-sided memory module.*
> *2. Due to the South Bridge resource deployment, the system density will only be detected up to 3+GB (not full 4GB) when each DIMM is installed with an 1GB memory module.*

Installing DDR Modules

1. The DDR DIMM has only one notch on the center of module. The module will only fit in the right orientation.
2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.
3. The plastic clip at each side of the DIMM slot will automatically close.

Volt   Notch
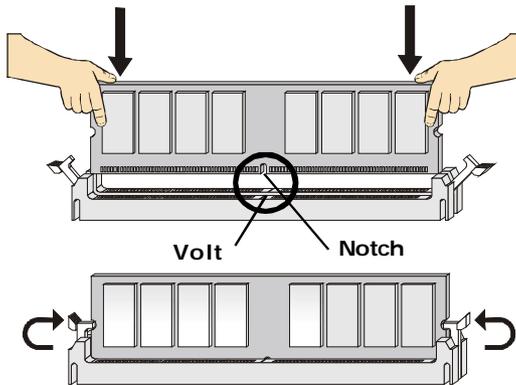
> **MSI Reminds You...**
> *You can barely see the golden finger if the module is properly inserted in the socket.*

Power Supply

The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 24-Pin Power Connector: ATX1

This connector allows you to connect an SSI power supply. To connect the SSI power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

pin 13

pin 12

You may use the 20-pin ATX power supply or 24-pin SSI power supply as you like. If you'd like to use the ATX power supply, please plug your power supply along with pin 1 & pin 13 (refer to the image at the right hand). There is also a foolproof design on pin 11, 12, 23 & 24 to avoid wrong installation.

Pin Definition

ATX1

12   24

1   13
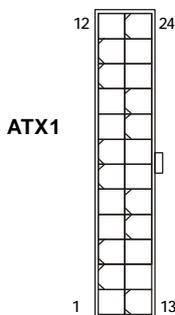
PIN	SIGNAL	PIN	SIGNAL
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWROK	20	Res
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	NC	24	GND

ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.

JPW1 Pin Definition

3   4
1   2

JPW1

PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

MSI

MSI Reminds You...

1. These two connectors connect to the ATX power supply and have to work together to ensure stable operation of the mainboard.
2. Power supply of 350 watts (and above) is highly recommended for system stability.
3. For ATX 12V power connection, it should be greater than 18A.

Important Notification about Power Issue

NForce chipset is very sensitive to ESD (Electrostatic Discharge), therefore this issue mostly happens while the users intensively swap memory modules under S5 (power-off) states, and the power code is plugged while installing modules. Due to several pins are very sensitive to ESD, so this kind of memory-replacement actions might cause system chipset unable to boot. Please follow the following solution to avoid this situation.

Unplug the AC power cable (shown in figure 1) or unplug the ATX1 & JPW1 power connectors (shown in figure 2 & figure 3) before the 1st installation or during system upgrade procedure.
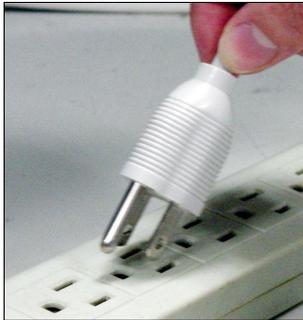
Figure 1:
Unplug the AC power cable

Figure 2:
Unplug the ATX1 power connector
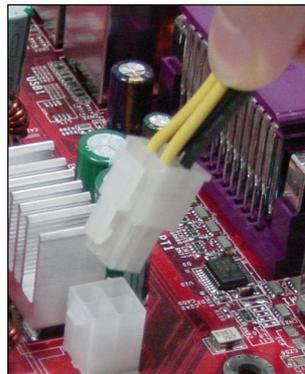
Figure 3:
Unplug the JPW1 power connector

Back Panel

The back panel provides the following connectors:

L-In   RS-Out

Mouse   **Parallel**   **LAN**

Keyboard   COM Port   **SPDIF**   **USB Ports**   **L-Out CS-Out**
                                   Out   **Mic SPDIF Out**
                                   (Coaxial)   **(Optical)**
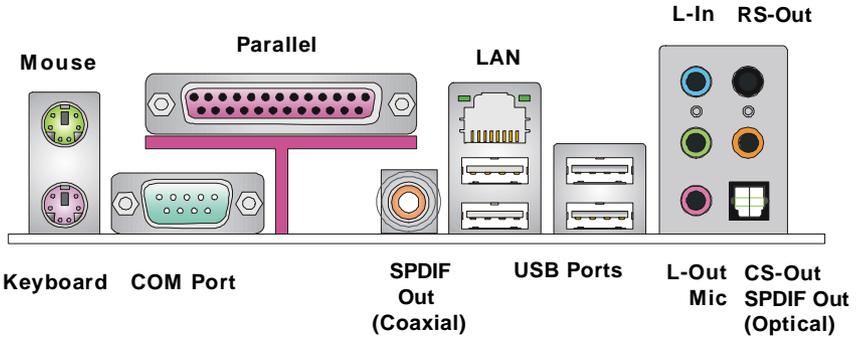
Mouse Connector (Green) / Keyboard Connector (Purple)

The mainboard provides a standard PS/2® mouse/keyboard mini DIN connector for attaching a PS/2® mouse/keyboard. You can plug a PS/2® mouse/keyboard directly into this connector. The connector location and pin assignments are as follows:

PS/2 Mouse / Keyboard
(6-pin Female)

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Mouse/Keyboard Data	Mouse/Keyboard data
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse/Keyboard Clock	Mouse/Keyboard clock
6	NC	No connection

Serial Port Connector

The mainboard offers one 9-pin male DIN connector as the serial port. The port is a 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

Pin Definition

```
1  2  3  4  5
  o o o o o
   o o o o
  6  7  8  9
```
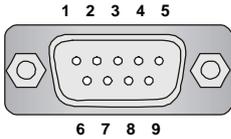
9-Pin Male DIN Connector

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

USB Connectors

The mainboard provides two OHCI (Open Host Controller Interface) Universal Serial Bus roots for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.
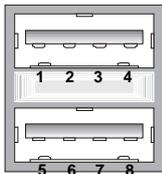
USB Port Description

```
  1  2  3  4

  5  6  7  8
```

USB Ports

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

LAN (RJ-45) Jack

The mainboard provides one standard RJ-45 jacks for connection to single Local Area Network (LAN). This Giga-bit LAN enables data to be transferred at 1000, 100 or 10Mbps. You can connect a network cable to either LAN jack.

Giga-bit LAN Pin Definition
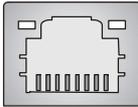
RJ-45 LAN Jack

PIN	SIGNAL	DESCRIPTION
1	D0P	Differential Pair 0+
2	D0N	Differential Pair 0-
3	D1P	Differential Pair 1+
4	D2P	Differential Pair 2+
5	D2N	Differential Pair 2-
6	D1N	Differential Pair 1-
7	D3P	Differential Pair 3+
8	D3N	Differential Pair 3-

Audio Port Connectors

The left 3 audio jacks are for 2-channel mode for stereo speaker output: **Line Out** is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices. **Mic** is a connector for microphones.

However, there is an advanced audio application provided by Realtek ALC850 to offer support for **7.1-channel audio operation** and can turn rear audio connectors from 2-channel to 4-/5.1-/7.1 channel audio.

S/PDIF Out-Coaxial

Line In
(in 7.1CH / 6CH)

Rear Speaker Out
(in 7.1CH / 6CH / 4CH)

Line Out

Center/Subwoofer
Speaker Out
(in 7.1CH / 6CH)

MIC

S/PDIF Out-Optical
(in 7.1CH / 6CH)
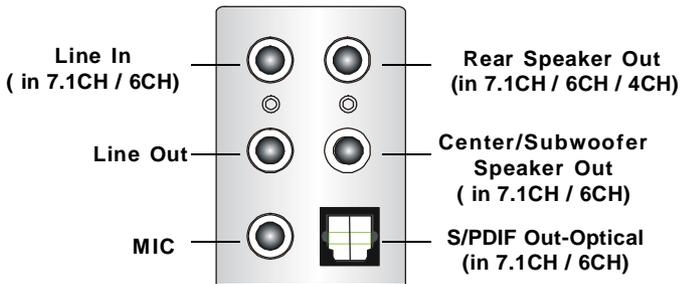
Parallel Port Connector: LPT1

The mainboard provides a 25-pin female centronic connector as LPT. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.
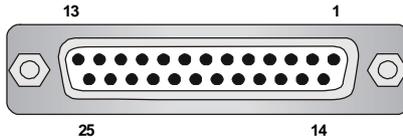
Pin Definition

PIN	SIGNAL	DESCRIPTION
1	STROBE	Strobe
2	DATA0	Data0
3	DATA1	Data1
4	DATA2	Data2
5	DATA3	Data3
6	DATA4	Data4
7	DATA5	Data5
8	DATA6	Data6
9	DATA7	Data7
10	ACK#	Acknowledge
11	BUSY	Busy
12	PE	PaperEnd
13	SELECT	Select
14	AUTO FEED#	AutomaticFeed
15	ERR#	Error
16	INIT#	Initialize Printer
17	SLIN#	Select In
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, LAN, USB Ports, IR module and CPU/System FAN.

Floppy Disk Drive Connector: FDD1

The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.

FDD1
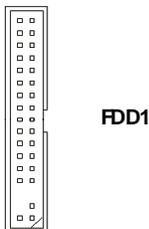
Fan Power Connectors: CPUFAN1 / SFAN1 / SFAN2 / NBFAN1

The CPUFAN1 (processor fan), SFAN1 (system fan 1), SFAN2 (system fan 2) and NBFAN1 (NorthBridge Chipset fan) support system cooling fan with +12V. It supports three-pin head connector. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

GND	GND	GND +12V NC	GND
+12V	+12V		+12V
SENSOR	SENSOR		Sensor
CPUFAN1	SFAN1	SFAN2	NBFAN1
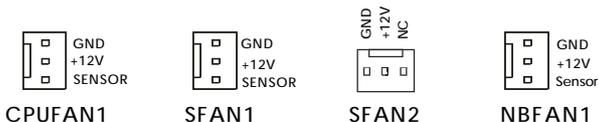
MSI Reminds You...

1. Always consult the vendors for proper CPU cooling fan.

*2. CPUFAN1 supports fan control. You can install **Core Center** utility that will automatically control the CPU fan speed according to the actual CPU temperature.*

3. Please refer to the recommended CPU fans at AMD® official website.

Hard Disk Connectors: IDE1 / IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect up to four hard disk drives, CD-ROM, or other devices.

IDE2   IDE1
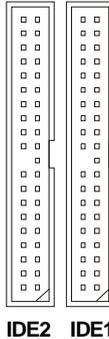
IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.

MSI **MSI Reminds You...**
If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Chassis Intrusion Switch Connector: JCI1

This connector is connected to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.

GND ▢ 2
CINTRU ▢ 1
JCI1

Serial ATA/Serial ATA RAID Connectors controlled by nForce4 4X: SATA1 / SATA2 / SATA3 / SATA4

The single chip of this mainboard is nForce4 4X which supports four serial ATA connectors SATA1~SATA4. SATA1~SATA4 support 1st generation serial ATA data rates of 150MB/s. Each Serial ATA connector can connect to 1 serial ATA device. Please refer to the *nVidia RAID Introduction* for detailed software installation procedure.

SATA2

7   1

SATA1

SATA4

7   1

SATA3
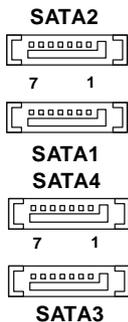
SATA1~ SATA4 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		

Serial ATA cable
(Optional)

Connect to serial ATA ports

Take out the dust cover and connect to the hard disk devices

MSI
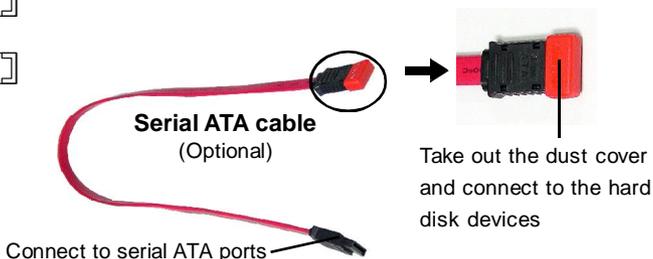
MSI Reminds You...
Please do not fold the serial ATA cable in a 90-degree angle, which will cause the loss of data during the transmission.

CD-In Connector: JCD1

The connector is for CD-ROM audio connector.

JCD1

R   GND L
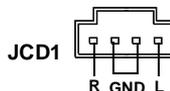
Front Panel Connectors: JFP1 / JFP2

The mainboard provides two front panel connectors for electrical connection to the front panel switches and LEDs. JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

Power Power
LED Switch

JFP1

HDD Reset
LED Switch

JFP1 Pin Definition
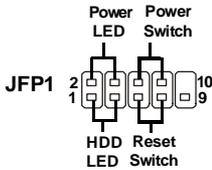
PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Power Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

Speaker

JFP2

Power
LED
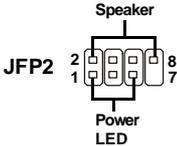
JFP2 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	SPK-
3	SLED	4	BUZ+
5	PLED	6	BUZ-
7	NC	8	SPK+

Front USB Connectors: JUSB1 / JUSB2 / JUSB3

The mainboard provides three standard USB 2.0 pin headers *JUSB1 & JUSB2* & JUSB3. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

JUSB1 & JUSB2 & JUSB3 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	USBOC

JUSB1, JUSB2, JUSB3
(USB 2.0)
Connected to JUSB1, JUSB2, or JUSB3 (the USB pinheader in *YELLOW* color)

USB 2.0 Bracket
(Optional)

MSI Reminds You...
Note that the pins of VCC and GND must be connected correctly, or it may cause some damage.

Front Panel Audio Connector: JAUD1

The JAUD1 front panel audio connector allows you to connect to the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.

Pin Definition

JAUD1

PIN	SIGNAL	DESCRIPTION
1	AUD_MIC	Front panel microphone input signal
2	AUD_GND	Ground used by analog audio circuits
3	AUD_MIC_BIAS	Microphone power
4	AUD_VCC	Filtered +5V used by analog audio circuits
5	AUD_FPOUT_R	Right channel audio signal to front panel
6	AUD_RET_R	Right channel audio signal return from front panel
7	HP_ON	Reserved for future use to control headphone amplifier
8	KEY	No pin
9	AUD_FPOUT_L	Left channel audio signal to front panel
10	AUD_RET_L	Left channel audio signal return from front panel

MSI Reminds You...

If you don't want to connect to the front audio header, pins 5 & 6, 9 & 10 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.
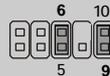
IrDA Infrared Module Header: JIR1

The connector allows you to connect to IrDA Infrared module. You must configure the setting through the BIOS setup to use the IR function. JIR1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

JIR1 Pin Definition

JIR1

Pin	Signal	Pin	Signal
1	NC	2	NC
3	VCC5	4	GND
5	IRTX	6	IRRX

D-Bracket™ 2 Connector: JDB1

The mainboard comes with a JDB1 connector for you to connect to D-Bracket™ 2. D-Bracket™ 2 is a USB Bracket that supports both USB1.1 & 2.0 spec. It integrates four LEDs and allows users to identify system problem through 16 various combinations of LED signals.
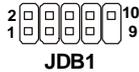
Pin Definition

Pin	Signal
1	DBG1 (high for green color)
2	DBR1 (high for red color)
3	DBG2 (high for green color)
4	DBR2 (high for red color)
5	DBG3 (high for green color)
6	DBR3 (high for red color)
7	DBG4 (high for green color)
8	DBR4 (high for red color)
9	Key
10	NC

2 **10**
1 **9**
JDB1

Connected to JDB1

D-Bracket™ 2
(Optional)

Connected to JUSB1, JUSB2 or JUSB3
(the USB pinheader in *YELLOW* color)

LEDs

D-Bracket™ 2 is an external USB bracket integrating four Diagnostic LEDs, which use graphic signal display to help users understand their system. The LEDs provide up to 16 combinations of signals to debug the system. The 4 LEDs can debug all problems that fail the system, such as VGA, RAM or other failures. This special feature is very useful for the overclocking users. These users can use the feature to detect if there are any problems or failures.

D-Bracket™ 2 supports both USB 1.1 & 2.0 specification.

D-Bracket™ 2

● Red   ◯ Green

D-Bracket™ 2	Description
1 ● ● 2 3 ● ● 4	System Power ON The D-LED will hang here if the processor is damaged or not installed properly.
◯ ● ● ●	Early Chipset Initialization
● ◯ ● ●	Memory Detection Test Testing onboard memory size. The D-LED will hang if the memory module is damaged or not installed properly.
◯ ◯ ● ●	Decompressing BIOS image to RAM for fast booting.
● ● ◯ ●	Initializing Keyboard Controller.
◯ ● ◯ ●	Testing VGA BIOS This will start writing VGA sign-on message to the screen.
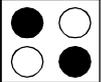
D-Bracket™ 2	Description
1 ● ○ 2 3 ○ ● 4	Processor Initialization This will show information regarding the processor (like brand name, system bus, etc...)
○ ○ ○ ●	Testing RTC (Real Time Clock)
● ● ● ○	Initializing Video Interface This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter.
○ ● ● ○	BIOS Sign On This will start showing information about logo, processor brand name, etc...
● ○ ● ○	Testing Base and Extended Memory Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.
○ ○ ● ○	Assign Resources to all ISA.
● ● ○ ○	Initializing Hard Drive Controller This will initialize IDE drive and controller.
○ ● ○ ○	Initializing Floppy Drive Controller This will initialize Floppy Drive and controller.
● ○ ○ ○	Boot Attempt This will set low stack and boot via INT 19h.
○ ○ ○ ○	Operating System Booting
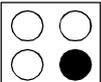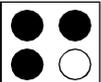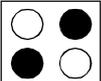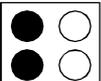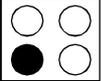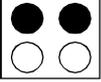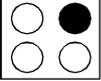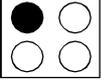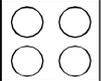
Button

The motherboard provides the following button for you to set the computer's function. This section will explain how to change your motherboard's function through the use of button.

Clear CMOS Button: SW1

There is a CMOS RAM on board that has a power supply from external battery to keep the system configuration data. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, use the SW1 (Clear CMOS Button) to clear data. Press the button in the middle of the connector top side to clear the data.

SW1

Slots

The mainboard provides one PCI Express x16 slot, one PCI Express x1 slots, one PCI Express x4 slots and four 32-bit PCI bus slots.

PCI Express Slots

The PCI Express slots, as a high-bandwidth, low pin count, serial, interconnect technology. You can insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first.

PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a PCI Express x1 lane for Gigabit Ethernet, TV Tuners, 1394 controllers, and general purpose I/O. Also, desktop platforms with PCI Express Architecture will be designed to deliver highest performance in video, graphics, multimedia and other sophisticated applications. Moreover, PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP8x designs with transfer rates of 4.0 GB/s over a PCI Express x16 lane for graphics controllers, while PCI Express x1 supports transfer rate of 250 MB/s.

PCI Express x16 slot

PCI Express x1 slot
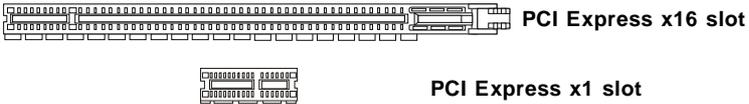
PCI (Peripheral Component Interconnect) Slots

The PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

The orange PCI slot (PCI4) also works as a communcation slot, which allows you to insert the communcation card.

PCI Slots
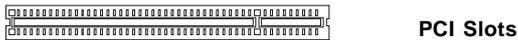
PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus INT A# ~ INT D# pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#
PCI Slot 3	INT C#	INT D#	INT A#	INT B#
PCI Slot 4	INT D#	INT A#	INT B#	INT C#

3

BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

You may need to run the Setup program when:

- ² An error message appears on the screen during the system booting up, and requests you to run SETUP.
- ² You want to change the default settings for customized features.

MSI Reminds You...

1. The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

2. While booting up, the BIOS version is shown in the 1st line appearing after the memory counting. It is usually in the format: example: W7125NMS V2.0B32 061705

where:

1st digit refers to BIOS maker as A=AMI(R); W=AWARD(R)
2nd - 5th digit refers to the model number.
6th digit refers to nVIDIA chipset.
7th - 8th digit refers to the customer, MS=all standard customers.
V2.0 refers to the BIOS version.
061705 refers to the date this BIOS is released.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <DEL> key to enter Setup.

Press DEL to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Selecting the First Boot Device

You are allowed to select the 1st boot device without entering the BIOS setup utility by pressing <F11>. When the same message as listed above appears on the screen, press <F11> to trigger the boot menu.

The POST messages might pass by too quickly for you to respond in time. If so, restart the system and press <F11> after around 2 or 3 seconds to activate the boot menu similar to the following.

Select First Boot Device		
Floppy	**: 1st Floppy**	
IDE-0	**: IBM-DTLA-307038**	
CDROM	**: ATAPI CD-ROM DRIVE 40X M**	
[Up/Dn] Select	**[RETURN] Boot**	**[ESC] cancel**

The boot menu will list all the bootable devices. Select the one you want to boot from by using arrow keys, then press <Enter>. The system will boot from the selected device. The selection will not make changes to the settings in the BIOS setup utility, so next time when you power on the system, it will still use the original first boot device to boot up.

MSI Reminds You...
The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F5>	Previous Values
<F7>	Load Optimized Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Main Menu

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

```
               Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features        ▶ H/W Monitor

   ▶ Advanced BIOS Features        ▶ Cell Menu

   ▶ Advanced Chipset Features        Load Optimized Defaults

   ▶ Integrated Peripherals           BIOS Setting Password

   ▶ Power Management Setup           Save & Exit Setup

   ▶ PnP/PCI Configurations           Exit Without Saving


  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup

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

Standard CMOS Features
Use this menu for basic system configurations, such as time, date etc.

Advanced BIOS Features
Use this menu to setup the items of AWARD® special enhanced features.

Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

Power Management Setup
Use this menu to specify your settings for power management.

PNP/PCI Configurations
This entry appears if your system supports PnP/PCI.

H/W Monitor
Use this menu to specify your settings for hardware.

Cell Menu
Use this menu to specify your settings for CPU/AGP frequency/voltage control and overclocking.

Load Optimized Defaults
Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

BIOS Setting Password
Use this menu to set the password for BIOS.

Save & Exit Setup
Save changes to CMOS and exit setup.

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items in Standard CMOS Features Menu includes some basic setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                   Standard CMOS Features

    Date (mm:dd:yy)          Fri, Dec 24 2004       Item Help
    Time (hh:mm:ss)          16 : 10 : 2
                                               Menu Level    ▶
  ▶ IDE Primary Master
  ▶ IDE Primary Slave                          Change the day, month,
  ▶ IDE Secondary Master                       year and century
  ▶ IDE Secondary Slave        [ None]

    Floppy Drive A            [1.44M, 3.5 in.]
    Halt On                   [All Errors]
  ▶ System Information        [Press Enter]




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

Date

This allows you to set the system to the date that you want (usually the current date). The format is <day><month> <date> <year>.

day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
month	The month from Jan. through Dec.
date	The date from 1 to 31 can be keyed by numeric function keys.
year	The year can be adjusted by users.

Time

This allows you to set the system time that you want (usually the current time). The time format is <hour> <minute> <second>.

IDE Primary/Secondary Master/Slave

Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

Access Mode	The settings are CHS, LBA, Large, Auto.
Capacity	The formatted size of the storage device.
Cylinder	Number of cylinders.

Head	Number of heads.
Precomp	Write precompensation.
Landing Zone	Cylinder location of the landing zone.
Sector	Number of sectors.

Drive A
This item allows you to set the type of floppy drive installed. Available options: [None], [360K, 5.25 in.], [1.2M, 5.25 in.], [720K, 3.5 in.], [1.44M, 3.5 in.], [2.88M, 3.5 in.].

Halt On
The setting determines whether the system will stop if an error is detected at boot. Available options are:

[All Errors]	The system stops when any error is detected.
[No Errors]	The system doesn't stop for any detected error.
[All, But Keyboard]	The system doesn't stop for a keyboard error.
[All, But Diskette]	The system doesn't stop for a disk error.
[All, But Disk/Key]	The system doesn't stop for either a disk or a keyboard error.

System Information
Press <Enter> to enter the sub-menu and the following screen appears:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                     System Information
 CPU Type                                    Item Help
 BIOS version  V1.0B31 122304
 System Memory      1024K           Menu Level   ▶▶
 Total Memory       1024K
```
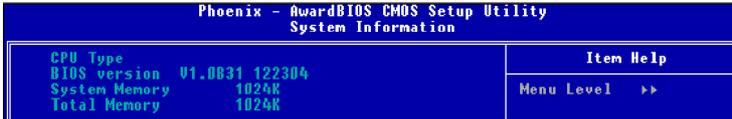
CPU Type/BIOS Version/System Memory/Total Memory
The items show the CPU type, BIOS version and memory status of your system (read only).

Advanced BIOS Features

```
            Phoenix - AwardBIOS CMOS Setup Utility
                   Advanced BIOS Features

    Quick Booting                [Enabled]            Item Help
    Boot To OS/2                 [No]
    IOAPIC Function              [Enabled]         Menu Level   ▶
    MPS Table Version            [1.4]
    Full Screen LOGO Display     [Enabled]         Allows the system to
    Security Option              [Setup]           skip certain tests
  ▸ Boot Sequence                [Press Enter]     while booting. This
                                                   will decrease the time
                                                   needed to boot the
                                                   system




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

Quick Boot
Setting the item to [Enabled] allows the system to boot within 5 seconds since it will skip some check items. Available options: [Enabled], [Disabled].

Boot To OS/2
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose [No], you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose [Yes].

IOAPIC Function
This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance with PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQ resources for the system. Settings: [Enabled], [Disabled].

MPS Table Version
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system. Settings: [1.4], [1.1].

Full Screen LOGO Display
This item enables you to show the company logo on the bootup screen. Settings are:
> [Enabled]   Shows a still image (logo) on the full screen at boot.
> [Disabled]   Shows the POST messages at boot.

Security Option

This specifies the type of BIOS password protection that is implemented. Settings are described below:

Option	Description
[Setup]	The password prompt appears only when end users try to run Setup.
[System]	A password prompt appears every time when the computer is powered on or when end users try to run Setup.

Boot Sequence

Press <Enter> to enter the sub-menu and the following screen appears:

```
              Phoenix - AwardBIOS CMOS Setup Utility
                          Boot Sequence
 ┌──────────────────────────────────────┬─────────────────────────┐
 │   1st Boot Device        [Floppy]     │       Item Help         │
 │   2nd Boot Device        [Hard Disk]  │                         │
 │   3rd Boot Device        [CDROM]      │   Menu Level    ▶▶      │
 │   Boot From Other Device [Enabled]    │                         │
 │ ▶ Hard Disk Boot Priority [Press Enter]│   Select Your Boot      │
 │                                        │   Device Priority       │
 └──────────────────────────────────────┴─────────────────────────┘
```

1st/2nd/3rd Boot Device

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

Boot Other Device

Setting the option to [Enabled] allows the system to try to boot from other device if the system fails to boot from the 1st/2nd/3rd boot device.
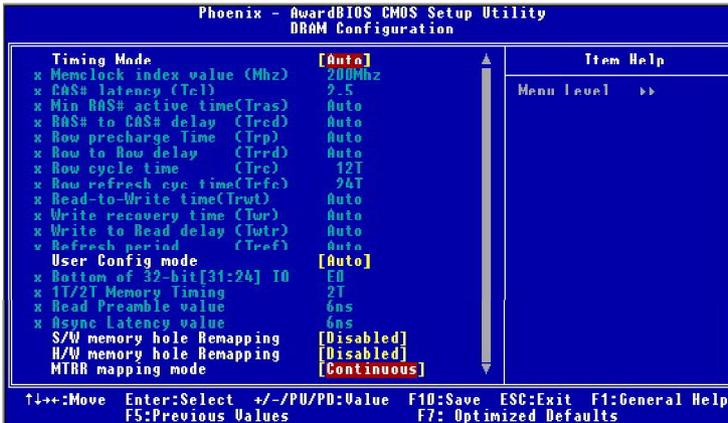
Hard Disk Boot Priority

Press <Enter> to enter the sub-menu. Then you may use the arrow keys ($\uparrow\downarrow$) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in this hard disk boot priority list.

Advanced Chipset Features

```
            Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced Chipset Features

 ▶ DRAM Configuration          [Press Enter]          Item Help

                                                Menu Level   ▶

                                                DRAM timing and
                                                control




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

DRAM Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                      DRAM Configuration

   Timing Mode                  [Auto]        ▲       Item Help
 x Memclock index value (Mhz)    200Mhz
 x CAS# latency (Tcl)            2.5                Menu Level   ▶▶
 x Min RAS# active time(Tras)    Auto
 x RAS# to CAS# delay  (Trcd)    Auto
 x Row precharge Time  (Trp)     Auto
 x Row to Row delay    (Trrd)    Auto
 x Row cycle time      (Trc)     12T
 x Row refresh cyc time(Trfc)    94T
 x Read-to-Write time(Trwt)      Auto
 x Write recovery time (Twr)     Auto
 x Write to Read delay (Twtr)    Auto
 x Refresh period      (Tref)    Auto
   User Config mode             [Auto]
 x Bottom of 32-bit[31:24] IO    E0
 x 1T/2T Memory Timing           2T
 x Read Preamble value           6ns
 x Async Latency value           6ns
   S/W memory hole Remapping    [Disabled]
   H/W memory hole Remapping    [Disabled]
   MTRR mapping mode            [Continuous]  ▼

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

Timing Mode
This field has the capacity to automatically detect all of the DRAM timing. If you set this field to [Manual], the following fields will be selectable. The settings are: [Auto], [Manual].

Memclock index value (Mhz)
When the *Timing Mode* is set to [Manual], user can place an artificial memory clock on the system. Please note that memory is prevented from running faster than this frequency. Setting options: [100], [120], [133], [140], [150], [166], [180] [200].

CAS# Latency (Tcl)
When the *Timing Mode* is set to [Manual], the field is adjustable.This controls the CAS latency, which determines the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Settings: [Auto], [CL=2.0], [CL=2.5], [CL=3.0]. [CL=2.0] increases the system performance the most while [CL=3.0] provides the most stable performance.

Min RAS# Active Time (Tras)
When the *Timing Mode* is set to [Manual], the field is adjustable. This setting determines the time RAS takes to read from and write to a memory cell. Setting options: [Auto], [5T], [6T], [7T], [8T], [9T], [10T], [11T], [12T], [13T], [14T], [15 T].

RAS# to CAS# delay (Trcd)
When the *Timing Mode* is set to [Manual], the field is adjustable. When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance. Setting options: [Auto], [2T], [3T], [4T], [5T], [6T], [7T].

Row Precharge Time (Trp)
When the *Timing Mode* is set to [Manual], the field is adjustable. This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Available settings: [Auto], [2T], [3T], [4T], [5T], [6T], [7T].

Row to Row delay (Trrd)
When the *Timing Mode* is set to [Manual], the field is adjustable. Specifies the active-to-active delay of different banks. Available settings: [Auto], [2T], [3T], [4T].

Row cycle time (Trc)
When the *Timing Mode* is set to [Manual], the field is adjustable. The row cycle time determines the minimum number of clock cycles a memory row takes to complete a full cycle, from row activation up to the precharging of the active row. Available settings: [Auto], [7T]~[22T].

Row refresh cyc time (Trfc)
When the *Timing Mode* is set to [Manual], the field is adjustable. Auto-refresh -active to RAS#-active or RAS# auto-refresh. Available settings: [Auto], [9T], [10T] ~ [24T].

Read to Write delay (Trwt)
When the *Timing Mode* is set to [Manual], the field is adjustable. This is not a DRAM-specified timing parameter, but must be considered due to routing laten-cies on the clock forwarded bus. It is counted from the first address bus slot that was not associated with part of the read burst. Available settings: [Auto], [1T], [2T], [3T], [4T], [5T], [6T].

Write recovery time (Twr)
When the *Timing Mode* is set to [Manual], the field is adjustable. It specifies the amount of delay (in clock cycles) that must elapse after the completion of a valid write operation, before an active bank can be precharged. This delay is required to guarantee that data in the write buffers can be written to the memory cells before precharge occurs. Available settings: [Auto], [2T], [3T].

Write to Read delay (Twtr)
When the *Timing Mode* is set to [Manual], the field is adjustable. This item controls the Write Data In to Read Command Delay memory timing. This consti-tutes the minimum number of clock cycles that must occur between the last valid write operation and the next read command to the same internal bank of the DDR device. Available settings: [Auto], [1T], [2T].

Refresh period (Tref)
When the *Timing Mode* is set to [Manual], the field is adjustable. Specifies the refresh rate of the DIMM requiring the most frequent refresh. Available settings: [Auto], [1x1552], [1x2064], [1x2592], [1x3120], [1x3632], [1x4128], [1x4672], [2x1552], [2x2064], [2x2592], [2x3120], [2x3632], [2x4128], [2x4672], [4x1552], [4x2064], [4x2592], [4x3120], [4x3632], [4x4128], [4x4672], [128].

User Config mode
This field has the capacity to automatically detect all of the following 4 fields default value.. If you set this field to [Manual], the following fields will be selectable. The settings are: [Auto], [Manual].

Bottom of 32-bit [31:24] IO
When the *User Config mode* is set to [Manual], the field is adjustable. This field specifies the memory which could be remapped to another address higher than 00E0. (This item only activities in 64-bit OS) The settings are: [0000~00E0].

1T/ 2T Memory Timing
When the *User Config mode* is set to [Manual], the field is adjustable. This field controls the SDRAM command rate. Selecting [1T] makes SDRAM signal con-troller to run at 1T (T=clock cycles) rate. Selecting [2T] makes SDRAM signal controller run at 2T rate. Setting options: [1T], [2T].

Read Preamble value
When the *User Config mode* is set to [Manual], the field is adjustable. The time prior to the max-read DQS-return when the DQS receiver should be turned on. This is specified in units of 0.5ns. The controller needs to know when to enbale its DQS receiver in anticipation of the DRAM DQS driver truning on for a read. The controller will disable its DQS receiver until the read preamble time and then enable its DQS receiver while the DRAM asserts DQS. Setting options: [2ns], [2.5ns], [3ns], [3.5ns], [4ns], [4.5ns], [5ns], [5.5ns], [6ns], [6.5ns], [7ns], [7.5ns], [8ns], [8.5ns], [9ns], [9.5ns].

Async Latency value
When the *User Config mode* is set to [Manual], the field is adjustable. This field should be loaded with 4-bit value equal to th e maximum asynchronous latency in the DRAM read round-trip loop. Setting options: [2ns], [3ns], [4ns], [5ns], [6ns], [7ns], [8ns], [9ns], [10ns], [11ns].

S/W memory hole Remapping
This field enables software to remap the physical memory to the address higher than 00E0. (This item only activities in 64-bit OS) Setting options: [Disabled], [Enabled].

H/W memory hole Remapping
This field enables hardware to remap the physical memory to the address higher than 00E0. (This item only activities in 64-bit OS) Setting options: [Disabled], [Enabled].

MTRR Mapping Mode
This field allows you to control the MTRR mapping Mode. Setting options: [Discrete], [Continuous].

Integrated Peripherals

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Integrated Peripherals

     USB Controlller              [Enabled]              Item Help
     USB KB/Storage Support       [Enabled]
     Onboard LAN Controller       [Auto]           Menu Level    ▶
     Onboard LAN Option ROM       [Disabled]
     Onboard IEEE1394 Controller  [Enabled]
     OnBoard Sil3114 RAID         [Enabled]
     Onboard GigaBit LAN          [Enabled]
     Onboard GigaBit LAN ROM      [Disabled]
     AC97 Controller              [Auto]
   ▶ I/O Device Configuration     [Press Enter]
   ▶ IDE Devices Configuration    [Press Enter]
   ▶ SATA Devices Configuration   [Press Enter]




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

USB Controller
This setting allows you to enable/disable the onboard USB controller. Selecting [V1.1+V2.0] enables the system to support both USB 1.1 and 2.0 spec. Setting options: [Disabled], [V1.1], [V1.1+V2.0].

USB KB/Storage Support
Select [Enabled] if you need to use a USB-interfaced keyboard or storage device in the operating system. Setting options: [Enabled], [Disabled].

Onboard LAN Control
This setting controls the onboard LAN controller. Setting options: [Enabled], [Disabled].

OnBoard LAN Option ROM
This setting is used to enable/disable the onboard LAN Option ROM. Setting options: [Enabled], [Disabled].

OnBoard IEEE1394 Controller
This setting is used to enable/disable the onboard IEEE 1394 controller. Setting options: [Disabled], [Enabled].

OnBoard Sil3114 RAID
This setting controls the onboard Sil3114 RAID chip. Setting options: [Enabled], [Disabled].

Onboard GigaBit LAN
Setting to [Enabled] allows the BIOS to detect the Marvell LAN controller and enable it. Setting options: [Enabled] and [Disabled].

Onboard GigaBit LAN ROM
This setting controls the onboard Marvell LAN Boot ROM. Setting options: [Enabled], [Disabled].

AC97 Controller
[Auto] allows the mainboard to detect whether an audio device is used. If an audio device is detected, the onboard AC'97 (Audio Codec'97) controller will be enabled; if not, it is disabled. Disable the controller if you want to use other controller cards to connect an audio device. The settings are: [Auto], [Disabled].

I/O Device Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

Onboard FDC Controller
Select [Enabled] if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it. If you install add-on FDC or the system has no floppy drive, select [Disabled] in this field. The settings are: [Enabled], [Disabled].

COM Port 1
Select an address and corresponding interrupt for the first serial port. The settings are: [3F8/IRQ4], [2E8/IRQ3], [3E8/IRQ4], [2F8/IRQ3], [Disabled], [Auto].

IR Function Select
This setting allows you to specify the operation mode for serial port 2. Setting options: [IrDA], [ASKIR], [Disable].

[Disable]	RS-232C Serial Port
[IrDA]	IrDA-compliant Serial Infrared Port
[ASKIR]	Amplitude Shift Keyed Infrared Port

RxD, TxD Active
This setting controls the receiving and transmitting speed of the IR peripheral in use. Setting options: [Hi,Hi], [Hi,Lo], [Lo,Hi], [Lo,Lo].

IR Transmission Delay
This setting determines whether the IR transmission rate will be delayed while converting to receiving mode. Setting options: [Disabled], [Enabled].

UR2 Duplex Mode
This setting controls the operating mode of IR transmission/reception. Setting options: [Full], [Half]. Under [Full] Duplex mode, synchronous, bi-directional transmission/reception is allowed. Under [Half] Duplex mode, only asynchronous, bi-directional transmission/reception is allowed.

Use IR Pins
Please consult your IR peripheral documentation to select the correct setting of the TxD and RxD signals. Setting options: [RxD2/TxD2], [IR-Rx2Tx2].

Parallel Port
There is a built-in parallel port on the on-board Super I/O chipset that provides Standard, ECP, and EPP features. It has the following options:

> [Disabled]
> [3BC/IRQ7]   Line Printer port 0
> [278/IRQ5]   Line Printer port 2
> [378/IRQ7]   Line Printer port 1

Parallel Port Mode
> SPP : Standard Parallel Port
> EPP : Enhanced Parallel Port
> ECP : Extended Capability Port
> ECP + EPP: Extended Capability Port + Enhanced Parallel Port
> Normal

> **SPP/EPP/ECP/ECP+EPP**
> To operate the onboard parallel port as Standard Parallel Port only, choose [SPP]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously. Choose [Normal] to use Standard Parallel Port + Bi-Directional Mode simultaneously.

EPP Mode Select

The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: "EPP Mode Select." At this time either [EPP 1.7] spec or [EPP 1.9] spec can be chosen.

ECP Mode Use DMA

The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA." At this time, the user can choose between DMA channel [3] or [1].

IDE Function Setup

Press <Enter> to enter the sub-menu and the following screen appears:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    IDE Devices Configuration

   OnChip IDE Channel0        [Enabled]          Item Help
   OnChip IDE Channel1        [Enabled]
   IDE DMA transfer access    [Enabled]      Menu Level    ▶▶
   SATA1/SATA2                [Enabled]
   SATA3/SATA4                [Enabled]
```
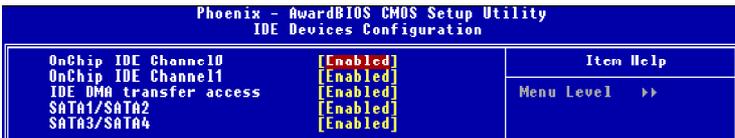
OnChip IDE Channel 0

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Choose [Enabled] to activate each channel separately. Settings: [Enabled], [Disabled].
 both support Ultra DMA/33, Ultra DMA/66 and Ultra DMA/100 select Auto to enable BIOS support. The settings are: [Auto], [Disabled].

OnChip IDE Channel 1

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Choose [Enabled] to activate each channel separately. Settings: [Enabled], [Disabled].

IDE DMA Transfer Access

This item is used to enable or disable the DMA transfer function of the IDE Hard Drive. The settings are: [Enabled], [Disabled].

SATA1/SATA2 & SATA3/SATA4

This item is used to enable or disable onchip SATA controller. The settings are: [Enabled], [Disabled].

IR Function Select
This setting allows you to specify the operation mode for serial port 2. Setting options: [IrDA], [ASKIR], [Disable].

      [Disable]   RS-232C Serial Port
      [IrDA]   IrDA-compliant Serial Infrared Port
      [ASKIR]   Amplitude Shift Keyed Infrared Port

SATA Devices Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

> **RAID Enabled**
> This item is used to enable/disable the onchip RAID function. When you set to enable and the following fields will be selectabled. Setting options: [Enabled], [Disabled].

> **SATA 1/2/3/4 RAID**
> This feature allows users to enable or disable the RAID function for each SATA hard disk drive. The settings are: [Enabled], [Disabled].

Power Management Setup

```
          Phoenix - AwardBIOS CMOS Setup Utility
                  Power Management Setup

   ACPI Standby State           [S1(POS)]          Item Help
   Video Off Method             [DPMS Support]
   Power Button Function        [Power Off]      Menu Level   ▶
   Restore On AC Power Loss     [Off]
 ▶ Wake Up Event Setup          [Press Enter]




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
       F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```
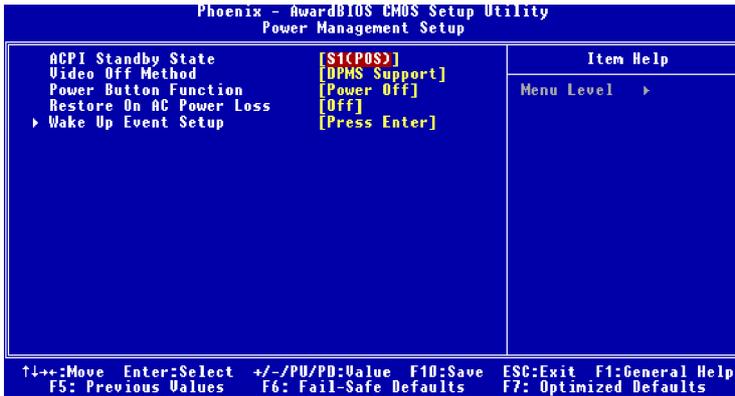
MSI **MSI Reminds You...**
S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.

ACPI Standby State
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME, Windows 2000, and Windows XP, you can choose to enter the Standby mode in S1(POS) or S3(STR) fashion through the setting of this field. Options are:

[S1 (POS)]   The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3 (STR)]   The S3 sleep mode is a lower power state where the in formation of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

Video Off Method
This determines the manner in which the monitor is blanked.

[V/H SYNC+Blank]   This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

[Blank Screen]   This option only writes blanks to the video buffer.

[DPMS Support]   Initial display power management signalling.

Power Button Function

This feature sets the function of the power button. Settings are:

[Power Off]   The power button functions as normal power off button.

[Suspend]   When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

Restore On AC Power Loss

This item specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Off]   Always leaves the computer in the power off state.

[On]   Always leaves the computer in the power on state.

[Last State]   Restores the system to the status before power failure or interrupt occurred.

Wake-Up Event Activity

Press <Enter> and the following sub-menu appears.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    Wake Up Event Setup

    Resume S3 by PS2/Keyboard    [Disabled]           Item Help
    Resume S3 by PS2/Mouse       [Disabled]
    Resume By PCI Device PME#     [Disabled]      Menu Level   ▸▸
    Resume By RTC Alarm           [Disabled]
  x Date                              2
  x HH:MM:SS                      0 :  0 : 16
```

Resume S3 by PS2/Keyboard, Resume S3 by PS2/Mouse

These fields allow the activity of the PS2 (keyboard and mouse) to wake up the system from S3 sleep state. Settings: [Enabled], [Disabled].

Resume By PCI Device PME#

When set to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event). Settings: [Enabled], [Disabled].

Resume By RTC Alarm

The field is used to enable or disable the feature of booting up the system on a scheduled time/date. Settings: [Enabled], [Disabled].

Date

The field specifies the date for *Resume By RTC Alarm*. Settings: [0]~[31].

HH:MM:SS

The field specifies the time for *Resume By RTC Alarm*. Format is <hour> <minute><second>.

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        PnP/PCI Configurations
┌────────────────────────────────────────────┬─────────────────────────┐
│   Primary Graphic's Adapter   [First PCIE]  │      Item Help          │
│                                             │                         │
│   Resources Controlled By     [Auto(ESCD)]  │  Menu Level    ▶        │
│ x IRQ Resources Setup          Press Enter  │                         │
│                                             │                         │
│   ** PCI Express relative items **          │                         │
│   Maximum Payload Size         [4096]       │                         │
│                                             │                         │
│                                             │                         │
│                                             │                         │
│                                             │                         │
│                                             │                         │
│                                             │                         │
│                                             │                         │
├─────────────────────────────────────────────┴────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults     │
└──────────────────────────────────────────────────────────────────────┘
```
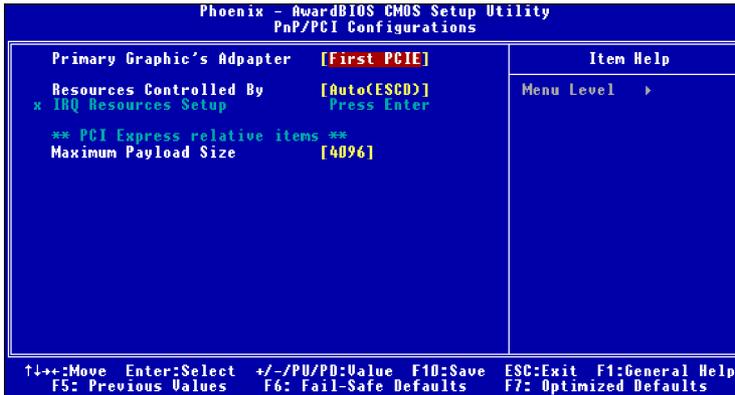
Primary Graphic's Adapter
This item specifies which graphic card is your primary graphics adapter. Settings: [First PCIE], [PCI Slot].

Resource Controlled By
The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 95/98. If you set this field to [Manual], choose specific resources by going into each of the sub menu that follows this field (a sub menu is preceded by a "}"). The settings are: [Auto (ESCD)], [Manual].

IRQ Resources
The items are adjustable only when *Resources Controlled By* is set to [Manual]. Press <Enter> and you will enter the sub-menu of the items. IRQ Resources list IRQ 3/4/5/7/9/10/11/12/14/15 for users to set each IRQ a type depending on the type of device using the IRQ. Settings are:

[PCI Device]	For Plug & Play compatible devices designed for PCI bus architecture.
[Reserved]	The IRQ will be reserved for further request.

** PCI Express relative items **
Maximum Payload Size
This item allows you to set the PCI Express Maximum payload size per time . Settings:
[4096], [128], [256], [512], [1024], [2048].

MSI Reminds You...

MSI

IRQ (Interrupt Request) lines are system resources allocated to I/O devices. When an I/O device needs to gain attention of the operating system, it signals this by causing an IRQ to occur. After receiving the signal, when the operating system is ready, the system will interrupt itself and perform the service required by the I/O device.

H/W Monitor

This section shows the status of your CPU, fan, overall system status, etc. Monitor function is available only if there is hardware monitoring mechanism onboard.
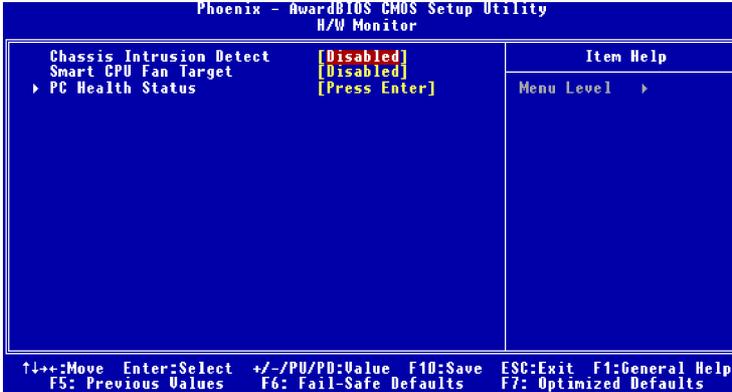
Chassis Intrusion Detect
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later. Setting options: [Enabled], [Reset], [Disabled].

Smart CPU Fan Target
There are 2 pairs of Temperature/FAN Speed control: System Temperature with System Fan, and CPU Temperature with CPU Fan. W83627THF provides the Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it with in a specific range. Settings: [40ºC/104ºF], [40ºC/104ºF], [40ºC/104ºF], [Disabled].

PC Health Status
Press <Enter> and the following sub-menu appears.
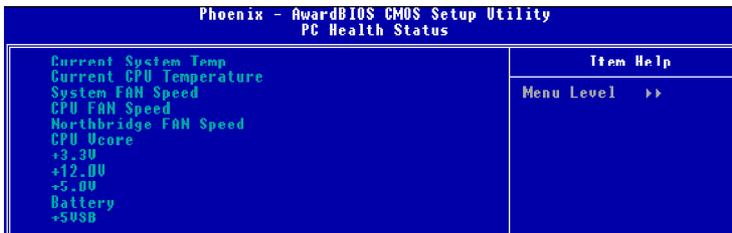
Current System/CPU Temperature, System Fan/CPU Fan Speed, Vcore, +12.0V, +3.3V, +5.0V, Battery, +5VSB
These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

Cell Menu

The items in Cell Menu includes some important settings of CPU, AGP, DRAM and overclocking functions.
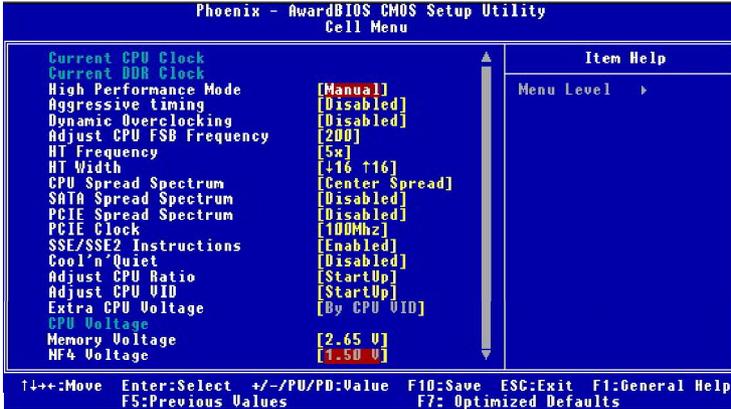
MSI Reminds You...
Change these settings only if you are familiar with the chipset.

Current CPU / DDR Clock
These two items show the current clocks of CPU & DDR. Read-only.

High Performance Mode
This field allows you to select the DDR timing setting. Setting options: [Manual], [Optimized].

Aggressive timing
This item allows you to enable or disable the memory clock. When [Enabled] is selected, the timing delay of memory will be shorten to increase the performance. Setting options: [Enabled], [Disabled].

Dynamic Overclocking
Dynamic Overclocking Technology is the automatic overclocking function, included in the MSI™'s newly developed CoreCell™ Technology. It is designed to detect the load balance of CPU while running programs, and to adjust the best CPU frequency automatically. When the motherboard detects CPU is running programs, it will speed up CPU automatically to make the program run smoothly and faster. When the CPU is temporarily suspending or staying in the low load balance, it will restore the default settings instead. Usually the Dynamic Overclocking Technology will be powered only when users' PC need to run huge amount of data like 3D games or the video process, and the CPU frequency need to be boosted up to enhance the overall performance. Setting options:

[Disabled]	Disable Dynamic Overclocking function.
[Private]	1st level of overclocking, increasing the CPU frequency by 1%.
[Sergeant]	2nd level of overclocking, increasing the CPU frequency by 3%.
[Captain]	3rd level of overclocking, also the default value of "Load High Performance Defaults", increasing the CPU frequency by 5%.
[Colonel]	4th level of overclocking, increasing the CPU frequency by 7%.
[General]	5th level of overclocking, increasing the CPU frequency by 9%.
[Commander]	6th level of overclocking, increasing the CPU frequency by 11%.

MSI Reminds You...
*Even though the Dynamic Overclocking Technology is more stable than manual overclocking, basically, it is still risky. We suggest user to make sure that your CPU can afford to overclocking regularly first. If you find the PC appears to be unstable or reboot incidentally, it's better to disable the Dynamic Overclocking or to lower the level of overclocking options. By the way, if you need to conduct overclocking manually, you also need to disable the **D.O.T Ranger** first.*

Adjust CPU FSB Frequency
This item allows you to select the CPU Front Side Bus clock frequency (in MHz). Select the number between [200]~[400] for needed frequency.

HT Frequency
This setting specifies the maximum operating frequency of the link's transmitter clock. Setting options: [1x], [1.5x], [2x], [2.5x], [3x], [4x], [5x].

HT Width
This field allows you to set the HT Width between CPU & Chip.↑ mark means Chip to CPU HT Width. And ↓ mark means CPU to Chip HT Width. Setting options: [↓ 8 ↑ 8], [↓ 16 ↑ 8], [↓ 8 ↑16], [↓16 ↑16].

CPU Spread Spectrum
This setting is used to enable or disable the CPU Spread Spectrum feature. When overclocking the CPU, always set it to [Disabled]. Setting options: [Center Spread], [Disabled].

SATA Spread Spectrum
This setting is used to enable or disable the SATA Spread Spectrum feature. Setting options: [Disabled], [Down Spread].

PCIE Spread Spectrum
This setting is used to enable or disable the CPU Spread Spectrum feature. When overclocking the CPU, always set it to [Disabled]. Setting options: [Disabled], [Down Spread].

PCIE Clock
The system board designer selects whether the PCIE clock is tightly synchronized with the CPU clock or is asynchronous. Setting options: [100MHz]~[145MHz].

SSE/ SSE2 Instructions
This setting disables/enables the SSE/SSE2 Instructions. The Streaming SIMD Extensions (SSE) were introduced in the Pentium III processor. The SSE extensions consist of a new set of instructions and a new set of registers. These instructions and registers are designed to allow Single-Instruction Multiple-Data (SIMD) computations to be made on single-precision floating-point numbers.
The Streaming SIMD Extensions 2 (SSE2) were introduced in the Pentium 4 and Intel Xeon processors. They consist of a new set of instructions that operate on the XXM and MXCSR registers and perform SIMD operations on double-precision floating-point values and on integer values.Several of these new SSE/SSE2 instructions also operate in the MMX registers. Setting options: [Enabled], [Disabled].

Cool'n'Quiet control
This feature is especially designed for AMD Athlon processor, which provides a CPU temperature detecting function to prevent your CPU's from overheating due to the heavy working loading. Setting options: [Disabled], [Enabled].

Adjust CPU Ratio
This item lets you adjust the CPU ratio. Setting to [Startup] enables the CPU running at the fastest speed which is detected by system. Setting options are: [Startup], [x4]~ [x12].

Adjust CPU VID
This item lets you adjust the CPU VID. Setting to [Startup] enables the CPU running at the default VID which is detected by system. Setting options are: [Startup], [0.825V], [0.850V],[0.875V],~, [1.550V].

Extra CPU Voltage
This feature allows you to trim the voltage of CPU. Setting options are: [By CPU VID], [Over VID 3.3%], [Over VID 5.0%],[Over VID 8.3%].

Memory Voltage
Adjusting the DDR voltage can increase the DDR speed. Any changes made to this setting may cause a stability issue, so *changing the DDR voltage for long-term purpose is NOT recommended*. Setting options are: [Auto], [2.50V]~[2.85V].

NF4 Voltage
NV4 voltage is adjustable in the field. Setting options are: [1.50V]~[1.85V].

> **MSI**
>
> **MSI Reminds You...**
> *The settings shown in different color in* **Extra CPU Voltage**, **Memory Voltage** *and* **NF4 Voltage** *help to verify if your setting is proper for your system.*
> **Gray: Default setting.**
> **Yellow: High performance setting.**
> **Red: Not recommended setting and the system may be unstable.**
> *Changing* **CPU VID, CPU Voltage, Memory Voltage** *and* **NF4 Voltage** *may result in the instability of the system; therefore, it is* **NOT** *recommended to change the default setting for long-term usage.*

Optimized Defaults

The two options on the main menu allow users to restore all of the BIOS settings to the default Optimized values. The Optimized Defaults are the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard. The Fail-Safe Defaults are the default values set by the BIOS vendor for stable system performance.

When you select Load Optimized Defaults, a message as below appears:

Pressing *Y* loads the default factory settings for optimal system performance.

BIOS Setting Password

When you select this function, a message as below will appear on the screen:

Enter Password:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password. To clear a set password, just press <Enter> when you are prompted to enter the password. A message will show up confirming the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup without entering any password.

When a password has been set, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

nVidia RAID Introduction

NVIDIA brings Redundant Array of Independent Disks (RAID) technology—which is used by the world's leading businesses—to the common PC desktop. This technology uses multiple drives to either increase total disk space or to offer data protection. For all levels, RAID techniques optimize storage solutions by using multiple disks grouped together and treating them as a single storage resource.

Introduction

System Requirement

Operating System Support

NVRAID supports the following operating systems:

> Windows XP Home Edition
> Windows XP Professional Edition
> Windows 2000 Professional

RAID Arrays

NVRAID supports the following types of RAID arrays described in this section:

RAID 0: RAID 0 defines a disk striping scheme that improves the disk read and write times for many applications.

RAID 1: RAID 1 defines techniques for mirroring data.

RAID 0+1: RAID 0+1 combines the techniques used in RAID 0 and RAID 1 arrays.

Spanning (JBOD): JBOD provides a method for combining drives of different sizes into one large disk.

Summary of RAID Configurations

Array	Uses	Advantages	Drawbacks	# Hard Disks	Fault Tolerance
RAID 0	Non-critical data requiring high performance.	High data throughput.	No fault tolerance.	multiple	None
RAID 1	Small databases or any other small capacity environment requiring fault tolerance.	100% data redundancy.	Requires 2 drives for the storage space of 1 drive.	2	Yes
RAID 0+1	Critical data requiring high performance.	Optimized for both 100% data redundancy and performance. Allows spare disks.	Requires 2 drives for the storage space of 1 drive—the same as RAID level 1.	4+	Yes
JBOD	Combining odd size drives into one big drive	Combines and uses the capacity of odd size drives.	Decreases performance because of the difficulty in using drives concurrently or to optimize drives for different uses.	Multiple	No

MSI Reminds You...
Please note that users cannot install OS, either WinME or Win98, in their SATA hard drive. Under these two OSs, SATA can not support.

RAID Configuration

Basic Configuration Instructions

The following are the basic steps for configuring NVRAID:

Non-Bootable RAID Array
1. Choose the hard disks that are to be RAID enabled in the system BIOS.
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1), or Spanning (JBOD) and create the desired RAID array.
3. Enter the Windows OS, run the Windows nForce Setup application and install the RAID software. (Check p.5-9 for details.)
4. Initialize the NVRAID Array Disks.

Bootable RAID Array
1. Choose the hard disks that are to be RAID enabled in the system BIOS.
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1), or Spanning (JBOD) and create the desired RAID array.
3. Boot from the Windows CD, use the floppy disk that has the RAID driver to copy and install the nForce RAID software. (Check p.5-9 for details.)
4. Initialize the NVRAID Array Disks.

Setting Up the NVRAID BIOS

Be sure to enable the *IDE RAID or SATA RAID* items in **RAID Config** of **Integrated Peripherals** in BIOS before configuring the NVRAID BIOS. After that press F10 to save the configuration and exit. The PC will reboot right away. Then enter the RAID BIOS Setup by pressing **F10** when prompted, and follow the procedures described below to set up the NVRAID BIOS.

NVRAID BIOS setup lets you choose the RAID array type and which hard drives you want to make part of the array.

Entering the RAID BIOS Setup

1. After rebooting your PC, wait until you see the RAID software prompting you to press **F10**. The RAID prompt appears as part of the system POST and boot process prior to loading the OS.
2. Press **F10**, and the NVIDIA RAID Utility --- **Define a New Array** window will appear.

   The default **RAID Mode** is set to *Mirroring* and **Striping Block** is set to *Optimal*.
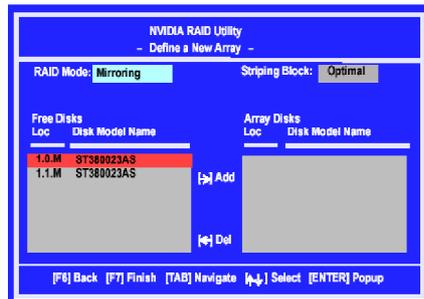
Understanding the "Define a New Array" Window
Use the Define a New Array window to
• Select the RAID Mode
• Set up the Striping Block
• Specify which disks to use for the RAID Array
Depending on the platform used, the system can have one or more channels. In a typical system there is usually one controller and multiple channels, and each channel has a slave and a master.
The channel/controller/master/slave status of each hard disk is given in the Loc (location) columns of the Free Disks and Array Disks lists.
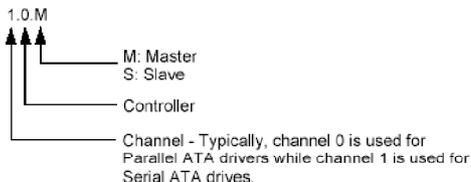
In the example above, 1.0.M means the hard drive is attached to Channel 1, Controller 0, and the drive is set to Master. The following is a list of all possible combinations:

Parallel ATA
0.0.M   Channel 0, controller 0, Master
0.0.S   Channel 0, controller 0, Slave
0.1.M   Channel 0, controller 1, Master
0.1.S   Channel 0, controller 1, Slave

Serial ATA
1.0.M   Channel 1, controller 0, Master
1.1.M   Channel 1, controller 1, Master
2.0.M   Channel 2, controller 0, Master
2.1.M   Channel 2, controller 1, Master

MSI Reminds You...
There is no such thing as Slave drive in Serial ATA. All drives are considered to be Master since there is a one to one connection between the drive and the controller.

Using the Define a New Array Window
If necessary, press the tab key to move from field to field until the appropriate field is highlighted.

• Selecting the RAID Mode
By default, this is set to [Mirroring]. To change to a different RAID mode, press the down arrow key until the mode that you want appears in the RAID Mode box—either [Mirroring], [Striping], [Spanning], or [Stripe Mirroring].

• Selecting the Striping Block Size
Striping Block size is given in kilobytes, and affects how data is arranged on the disk. It is recommended to leave this value at the default [Optimal], which is 32KB, but the
values can be between [4 KB] and [128 KB].

• Assigning the Disks
The disks that you enabled from the RAID Config BIOS setup page appear in the **Free Disks** block. These are the drives that are available for use as RAID array disks.
To designate a free disk to be used as a RAID array disk,
1. Tab to the F**ree Disks** section. The first disk in the list is selected.
2. Move it from the Free Disks block to the Array Disks block by pressing the right arrow key (-->). The first disk in the list is moved, and the next disk in the list is selected and ready to be moved.
3. Continue pressing the right-arrow key (<--) until all the disks that you want to use as RAID array disks appear in the **Array Disks** block.
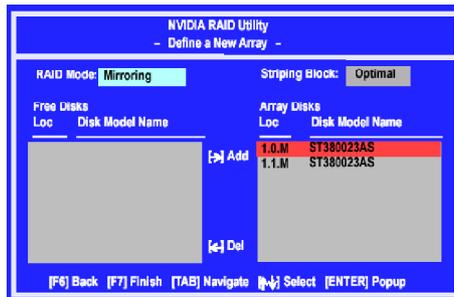
It shows that two disks have been assigned as RAID1 array disks in the figure above.

Completing the RAID BIOS Setup

1. After assigning your RAID array disks, press **F7.** The Clear disk data prompt appears.
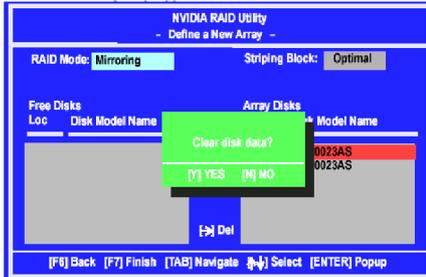
2. Press **Y** if you want to wipe out all the data from the RAID array, otherwise press **N**. You must choose **Yes** if the drives were previously used as RAID drives. The **Array List** window appears, where you can review the RAID arrays that you have set up.

3. Use the arrow keys to select the array that you want to set up, then press **Enter.** The **Array Detail** window appears.
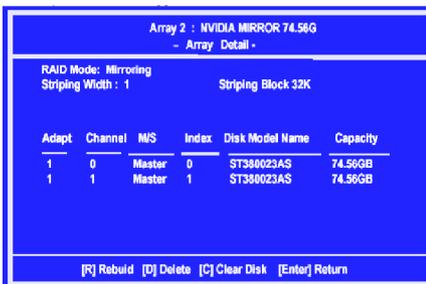
4. If you want to mark this disk as empty and wipe out all its contents then press **C**.
5. At the prompt, press **Y** to wipe out all the data, otherwise press **N**.
6. Press **Enter** again to go back to the previous window and then press **Ctrl-X** to exit the RAID setup. Now that the RAID setup has been configured from the RAID BIOS, the next step is to configure and load NVRAID drivers under Windows, as explained in "Installing the NVIDIA RAID Software Under Windows" on p5-9.

NVIDIA RAID Utility Installation

Installing the RAID Driver (for bootable RAID Array)

1. After you complete the RAID BIOS setup, boot from the Windows CD, and the Windows Setup program starts.
2. Press **F6** and wait for the Windows Setup screen to appear.
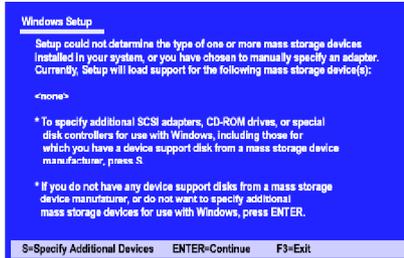
3. Specify the NVIDIA drivers:
    (1) Insert the floppy that has the RAID driver, press S, then press Enter. The Windows Setup screen appears as below:
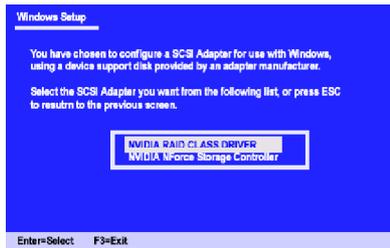
MSI Reminds You...

Please follow the instruction below to make an nVIDIA RAID driver for yourself.

1. Insert the MSI CD into the CD-ROM drive.
2. Ignore the Setup screen and use "Explorer" to browse the CD.
3. Copy all the contents (not including the sub-folders) in the
   \nVidia\System\CK804\IDE\WinXP
   or \nVidia\System\CK804\IDE\Win2k to a formatted floppy disk.
4. The driver disk for nVIDIA RAID driver is done.

---

    (2) Select "NVIDIA RAID CLASS DRIVER" and then press **Enter**.
    (3) Press **S** again at the Specify Devices screen, then press **Enter.**
    (4) Select "NVIDIA NForce Storage Controller" and then press **Enter.** The following Windows Setup screen appears listing both drivers:
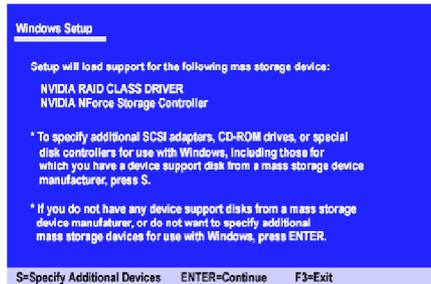
4. Press **Enter** to continue with Windows XP Installation. Be sure to leave the floppy disk inserted in the floppy drive until the blue screen portion of Windows XP installation is completed, then take out the floppy.

5. Follow the instructions on how to install Windows XP. During the GUI portion of the install you might be prompted to click **Yes** to install the RAID driver. Click **Yes** as many times as needed in order to finish the installation. This will not be an issue with a signed driver.

MSI Reminds You...

Each time you add a new hard drive to a RAID array, the RAID driver will have to be installed under Windows once for that hard drive. After that, the driver will not have to be installed

Installing the NVIDIA RAID Software Under Windows
(for Non-bootable RAID Array)

The existing Windows IDE Parallel ATA driver (as well as the Serial ATA driver if SATA is enabled) must be upgraded to use the NVIDIA IDE Parallel ATA driver (as well as the NV Serial ATA driver if SATA is enabled).

This section describes how to run the setup application and install the RAID software which will upgrade the Windows IDE driver and install the RAID software.

1. Start the nForce Setup program to open the NVIDIA Windows nForce Drivers page.
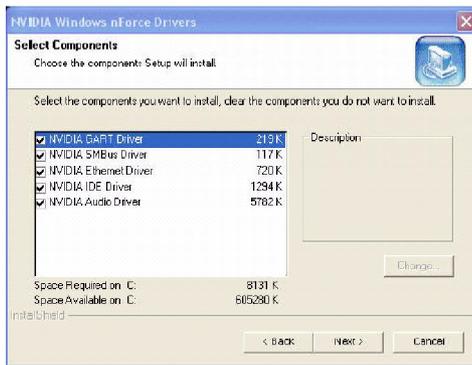
2. Select the modules that you want to install. Make sure that the "NVIDIA IDE Driver" is selected.
3. Click **Next** and then follow the instructions.
4. After the installation is completed, be sure to reboot the PC.
5. After the reboot, initialize the newly created array.

Initializing and Using the Disk Array

The RAID array is now ready to be initialized under Windows.

1. Launch Computer Management by clicking "Start" --> "Settings" --> "Control Panel" --> "Switch to Classic View" then open the "Administrative Tools" folder and double click on "Computer Management".

2. Click "Disk Management" (under the "Storage" section). The Initialize and Convert Disk Wizards appears.

3. Click **Next**. The Select Disks to Initialize window appears. The disks listed depend on how many arrays you have configured.

4. Click **Next**. The Select Disks to Convert window appears.
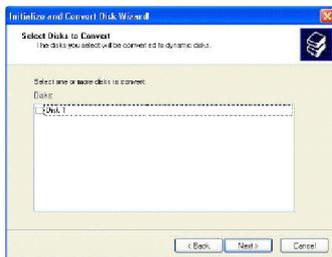
5. Check the disk in the list if you want to make the array a dynamic disk, then click **Next**. The Completing the Initialize and Convert Disk Wizard window appears.
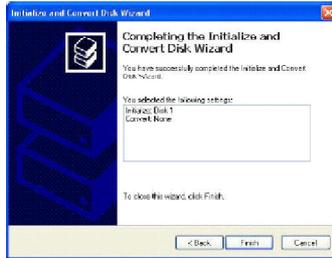
6. Click **Finish**. The "Computer Management" window appears.
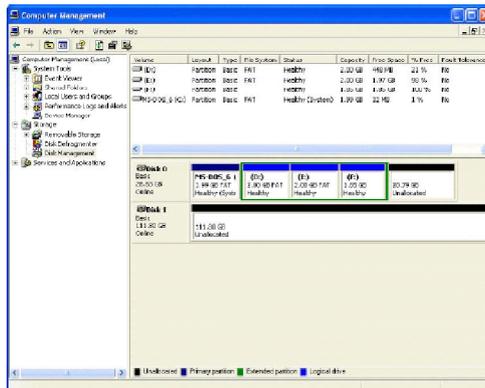
The actual disks listed will depend on your system, and the unallocated partition is the total combined storage of two hard disks. You must format the unallocated disk space in order to use it.

7. Format the unallocated disk space. Right click "Unallocated space", select "New Partition..." and follow the wizard. After the drive has been formatted, it is ready for use.

RAID Drives Management

There is an application called NVRAIDMAN which helps you perform the following tasks of nVDIA RAID.

• **Viewing RAID Array Configurations**
  View an array configuration (mirrored, striped, mirror-striped, JBOD, or any supported combination)
• **Setting Up a Spare RAID Disk**
    • View free and/or dedicated free disks
    • Designate a free disk to a particular array
• **Rebuilding a RAID Mirrored Array**
    • Rebuild a broken mirrored array
    • Watch the progress of rebuilding an array

Viewing RAID Array Configurations

To view your RAID configuration from Windows, launch the NVRAID Management utility by clicking Start-->Programs-->NVIDIA Corporation-->RAID Manager-->RAID Manager (the default location of NvRaidMan.exe is in \\nVidia\System\CK804\IDE\WinXP\raidtool or \\nVidia\System\CK804\ide\win2k\raidtool of the setup CD accompanied with your mainboard).
The RAID configuration information appears in the right-side pane, as shown below.
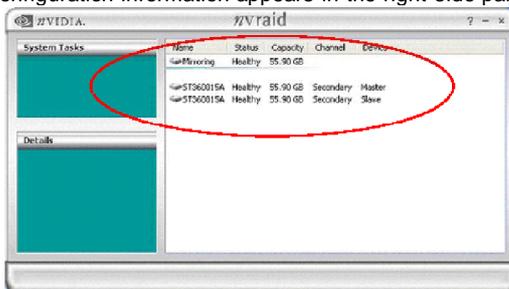
MSI Reminds You...
The information in the figures in this part may very from what it is shown in your system.

NVRAID Mirrored Array
The figure below shows an example of a two hard drive mirrored array using identical 55.90 GB IDE hard drives (ST360015A), where one drive is configured as Master and the other drive is configured as Slave. The total hard disk space used is 55.90 GB. (1.1 GB = 1,073,741,824 bytes)

NVRAID Striped Array

The figure below shows an example of a two hard drive striped array using identical 55.90 GB IDE hard drives (ST360015A), where one drive is configured as Master and the other drive is configured as Slave. The total disk space used is 111.80 GB.

NVRAID Striped Mirror Array

The figure below shows an example of a four hard drive stripe-mirrored array. The total disk space used is 111.80 GB.

NVRAID Spanning (JBOD) Array

The figure below shows an example of a two hard drive spanning array. The total disk space used is 111.80 GB.

NVRAID Mirrored Array and a Striped Array

The figure below shows an example of a two hard drive mirrored array as well as a two hard drive striped array.

Setting Up a Spare RAID Disk

You can designate a hard drive to be used as a spare drive for a RAID 1 or RAID 0+1 array2. The spare drive can take over for a failed disk. NVRAID supports two types of spare drives:

• Free Disk

A free disk is a disk that is not part of any RAID array, but can be used by any available RAID 1 or RAID 0+1 array that requires a particular disk when one of its disks crashes or becomes unusable. The process is automatic and doesn't require any user interaction.

For example, if you have a system with four hard disks where one disk is used to boot the OS, two hard drives are set up in a mirrored array, and a fourth hard disk is set up as a free disk, then if one of the mirrored array drives fails, the free disk will be automatically assigned to the mirrored array to be used instead of the failed disk.

• Dedicated Disk

A dedicated free disk is a disk that is assigned to a RAID 1 or RAID 0+1 array and that disk is used by that array only when needed, for example during a system crash where a RAID mirrored drive is broken. The dedicated disk can be used only by the array that it is assigned to and not by any other array, unlike a free disk which can be used by any available RAID 1 or RAID 0+1 array.

Assigning a Free Disk

To mark a disk as free, or not a part of any array,

1. Enter the system BIOS setup and make sure that the drive that you want to mark as free is RAID enabled.
2. Enter the RAID BIOS and make sure that the drive is not part of any array (if one exists).
3. Boot into Windows and run the NVRAIDMAN program. The drive appears under the Free Disk section. The figure below shows an example of the NVRAIDMAN display if you have a mirror array and one free disk.

Assigning a Dedicated Disk
To mark a disk as dedicated, or reserve it for use by a specific array,

Step 1: Mark the Disk as a Free Disk
1. Enter the system BIOS setup and make sure that the drive that you want to mark as free is RAID enabled.
2. Enter the RAID BIOS and make sure that the drive is not part of any array (if one exists).
3. Boot into Windows and run the NVRAIDMAN program. The drive appears under the Free Disk section.

Step 2: Dedicate the Free Disk to an Array
While running NVRAIDMAN, dedicate the free disk to an array using one of the following two methods:
        • Method 1: Select a free disk and then assign it to an array.
        • Method 2: Select an array and then assign a free disk to it.
Both methods are equally simple ways of accomplishing the same task.

Method 1: Select a free disk and then assign it to an array.

1. Right click one of the available disks under the Free Disk section. The pop-up menu appears.
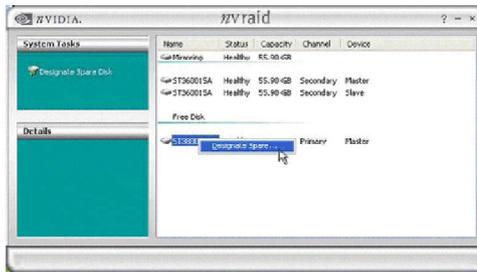
2. Select **Designate Spare** from the menu to launch the Spare Disk Allocation Wizard.

3. Click **Next**.
The RAID Array Selection page appears.
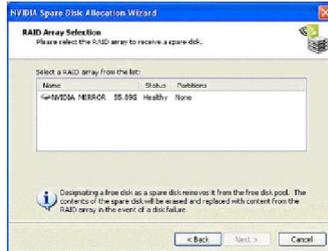
4. From the RAID Array Selection page, select one of the arrays from the list.
This is the array to which you want to allocate the dedicated free disk.

5. Click **Next**.
The Completing the NVIDIA Spare Disk Allocation page appears.

6. Click **Finish**.
As shown in figure below, the ST380023AS drive is now a dedicated free disk in the
mirrored array. If a system crash occurs that causes any of the two ST360015A
drives to fail, the ST380023AS hard drive will take over and be used in the newly
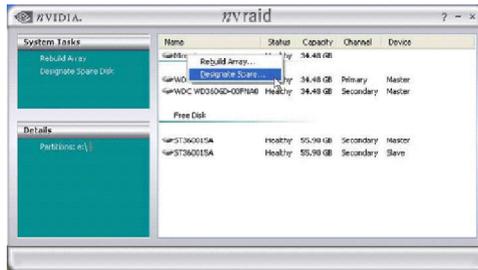formed mirrored array.
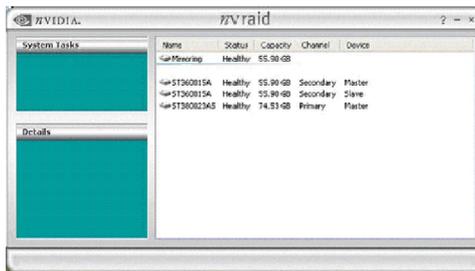
Once a dedicated disk has been assigned to a particular array, it can be removed at
any time. To remove the disk, right click on the dedicated disk and select the option to
remove it.

Method 2: Select an array and then assign a free disk to it.

1. Right click on the array to which you want to assign a dedicated free disk. The pop-up menu appears.

2. Select **Designate Spare** from the menu to launch the Spare Disk Allocation Wizard.
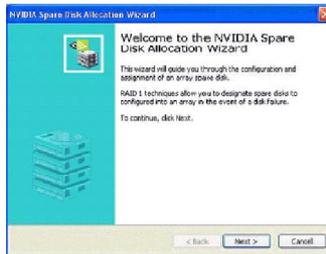
3**.** Click **Next.** The Free Disk Selection page appears.
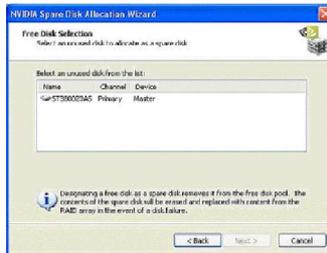
4. From the Free Disk Selection page, select one of the disks from the list. Please note that there can be more than one disk to choose from.

5. Click **Next**. The Completing the NVIDIA Spare Disk Allocation page appears.

6. Click **Finish**.
You have now assigned a dedicated free disk to a mirrored array.
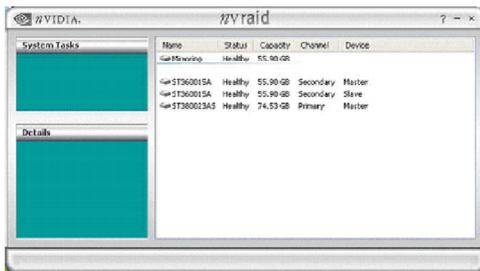
Once a dedicated disk has been assigned to a particular array, it can be removed at any time. To remove the disk, right click on the dedicated disk and select the option to remove it.

Example of Dedicating a Free Disk in a RAID 1 or RAID 0+1 Array

You can also assign a dedicated free disk to a RAID 1 or a RAID 0+1 array, using the same process.

1. Right-click either the free disk that you want to dedicate to an array, the array type, or the array drives as shown in the figure below. Then click Designate Spare to launch the Spare Disk Allocation Wizard.

2. Click **Designate Spare** and then follow the instructions in the Wizard. The figure below shows an example of a RAID 1 array that has one spare disk dedicated to it.

Once a dedicated disk has been assigned to a particular array, it can be removed at any time. To remove the disk, right click on the dedicated disk and select the option to remove it.
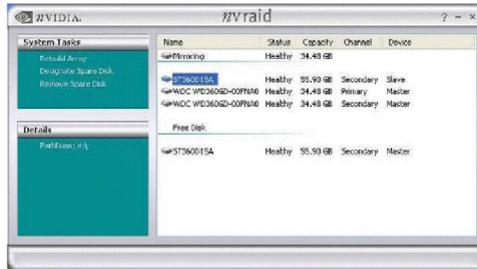
Rebuilding a RAID Mirrored Array

Rebuilding is the process of recovering data from one hard drive to another. All data is copied from one hard drive to another and then the data is synchronized between the two hard drives. This only applies to RAID 1 array as well as a RAID 0+1 array.

Rebuilding Instructions

After creating a mirrored array, you can rebuild the array using the following steps:

1. Go to Windows and run the NVRAID Management utility. The figure below shows an example of a system with one mirrored array.

2**.** Right-click on Mirroring. The popup menu appears.

3. From the popup menu, click **Rebuild Array**. The NVIDIA Rebuild Array Wizard appears.

4**.** Click **Next.** The Disk Selection page appears.
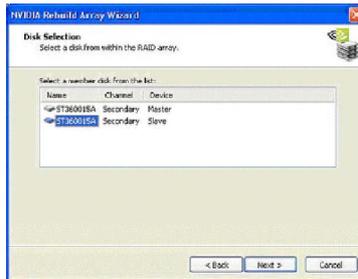
5. Select the drive that you want to rebuild by clicking it from the list, then click **Next**. The Completing the NVIDIA Rebuild Array page appears.
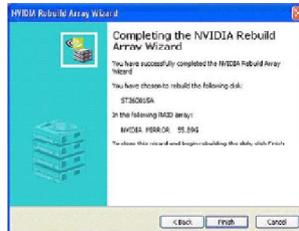
6. Click **Finish**. The array rebuilding starts after a few seconds, and a small pop-up message appears towards the bottom right corner of the screen as shown in the figure below.

During the rebuilding process, the NVRAID Management utility screen shows the status under the System Tasks and Details sections.

More About Rebuilding Arrays
• *Rebuilding Occurs in the Background*
The rebuilding process is very slow (it can take up to a day) and occurs in the background so as not to affect the performance of the system.
• *Rebuilding Applies Only to RAID 1 or RAID 0+1 Arrays*
Rebuilding an array works only when using RAID1 and/or RAID 0+1. Rebuilding does not apply to RAID 0 and JBOD arrays.
• *You Can Use Any Available Free Disk*
You can rebuild a mirrored array using any available Free Disk or Dedicated Disk.
For example, the figure below shows a mirrored array using 34.48 GB HD while having two Free Disks each 55.90 GB large.
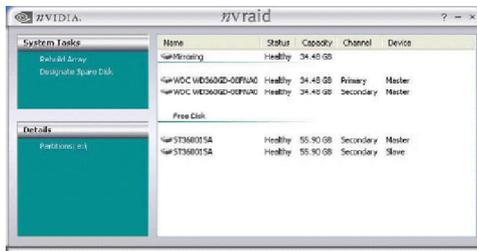
To use one of these available free disks to rebuild your array, except when prompted to select a disk, choose one of the two available free disks.

Installation of Drivers & Utility

MSI provides a setup CD along with your mainboard, which contains the required drivers for your system, and many other useful and powerful utility to bring you the best experience for your office professional working and for your home leisure entertainment.

Driver Installation

Click on the **Driver** tab and the screen below will display. Click on the driver you like to install, and follow the proceeding instructions.


NVIDIA nForce4 System Driver

This driver is only available for Windows 2000 and Windows XP operating system. Please follow the following step to install the driver correctly.

1. Click on this button to install the NVIDIA nForce4 System Drivers for your Windows OS. Then the welcome dialogue will display. Click **Next** to continue.
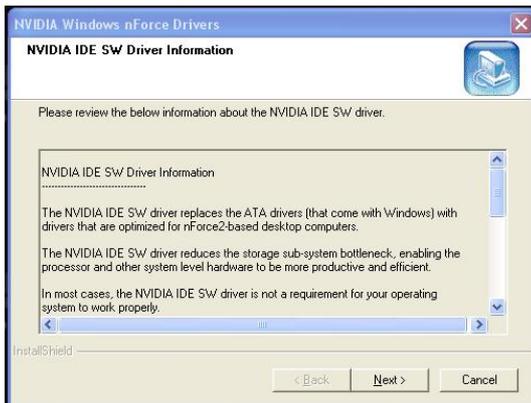
2. Then the following screen displays the available components to install. All the components shown here will be selected to be installed by default. Then click **Next**.
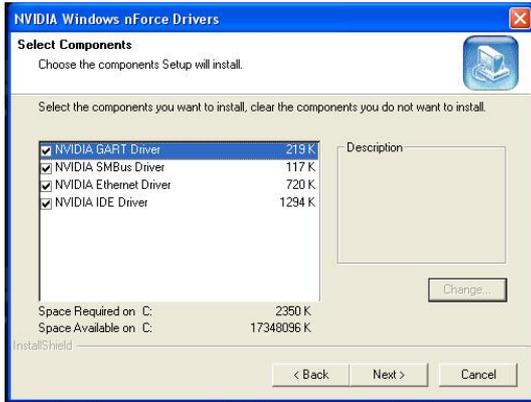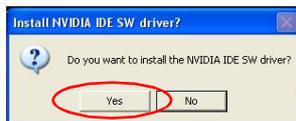

3. The system will start installing the selected driver components automatically.
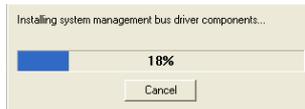
4. Then the following screen displays the information for the NVIDIA IDE SW Driver installation. Click **Next** to continue.

5. Then the following screen displays the installation of NVIDIA IDE SW Driver. Click **Yes** to continue.

6. The following screen indicates that the installation is complete. Click **Yes** to restart your computer or click **No** to restart it later.

MSI Reminds You...

The installation of NVIDIA Firewall and ForceWare Network Access Manager. It is a software firewall to protect the softwares from hacking. However, it is strongly suggested that you do not install this component. *Please follow the instruction below to make a software firewall CD for yourself.*

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

    2. Ignore the Setup screen and use "Explorer" to browse the CD.

    3. In the ***\\nVidia\System\CK804\Ethernet\Firewall*** *double-clicking "NewworkAccessManagerSetup" file to install the software.*

Realtek AC97 Audio Driver

1. Click on this button to install the Realtek AC97 Audio Driver. Then the welcome dialogue will display. Click **Next** to continue. The installation process will launch automatically.

2. The following screen indicates the installation is complete. Click **Yes** to restart your computer or click **No** to restart it later.

Utility Installation

Click on the **Utility** tab and the screen below will display. Click on the utility you like to install, and follow the proceeding instructions.