

USER'S MANUAL
Of
Intel 946GZ Express Chipset
&
Intel FW82801GB ICH Chipset
Based
M/B Ready For LGA 775 Core™ Quad
Processor

No. G03-946GZM3-F

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Trademark:

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Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



Chapter 1

Introduction of Intel 946GZ + ICH7 Motherboard Series

1-1 Features of motherboard

The Intel 946GZ+ ICH7 chipset motherboard series are based on the latest Intel 946GZ Express Chipset technology which supports the innovative 65nm and 90nm Dual-Core Intel® Pentium® D Processor 8 and 9 Series, Intel® Pentium® D Processor, and Intel® Core 2 Duo® (Code Name: Conroe) Processor with Intel® Hyper-Threading Technology. The motherboard is optimized to deliver innovative features and professional desktop platform solution with the advantages of the new generation dual core Intel® Core 2 Duo® Processor for those who demand the best experience of personal computing. Through the high bandwidth of dual channel DDR2 667/DDR2 533MHz/DDR2 400MHz system memories which are expandable to 4 GB and the next generation PCI Express interface for the latest graphics cards from both NVIDIA & ATI.

The Intel 946GZ + ICH7chipset motherboard series for Intel® Core 2 Duo® Processor are absolutely the cost-effective solution for game enthusiasts and applications, and it also meets the demanding usage of computing of gaming, multimedia entertainment and business applications. Moreover, the Intel 946GZ express chipset incorporates Intel Graphics Media Accelerator 3000 to provide you incredible visual quality, faster graphics performance and flexible display options without the need for a separate graphics card.

The motherboards implement Intel 946GZ+ ICH7 Express Chipset which supports Front Side Bus 1333MHz of data transferring and offers with 667MHz memory clock frequency for Dual channel DDR2 400/DDR2 533/DDR2 667 MHz memory DIMMs to double the performance of memory access. The motherboard is embedded with ICH7 chipset of providing one parallel Ultra ATA 100 interface for one IDE drives and four serial ATA2 interface of 3Gb / s data transfer rate for four serial ATA devices.

The 946GZ + ICH7 motherboard series offer one PCI-Express x16 graphics slot of 4Gbyte/sec data transfer rate at each relative direction which gets 3.5 times of bandwidth more than AGP 8X and it's up to a peak concurrent bandwidth of 8Gbyte/sec at full speed to guarantee the ultimate GPU computing performance. Two 32-bit PCI slots guarantee the rich connectivity for the I/O of peripherals. The motherboards are designed of tackling the profuse multimedia requirements nowadays.

The motherboards provide 10 Mbit / 100Mbit Ethernet compatible LAN function by using the Realtek RTL8102E10/100 PCI-E LAN chip. And the embedded ALC662 chipset fully compatible with Sound Blaster Pro standards with providing 6-channel Azalia HD CODEC offers you with the home cinema quality and satisfying software compatibility.

Embedded USB controller as well as capability of expanding to8 of USB2.0 functional ports delivering 480Mb/s of rich connectivity, these motherboards meet the demands of future USB peripherals which are also equipped with hardware monitor function on system to monitor and protect your system and maintain your non-stop business computing.

Some special features---**CPU Thermal Throttling/CPU Smart Fan** in this motherboard are designed for power user to use the over-clocking function in more flexible ways. But please be caution that the over-clocking maybe causes the fails in system reliabilities. This motherboard provides the guaranteed performance and meets the demands of the next generation computing. But if you insist to gain more system performance with variety possibilities of the components you choose, please be careful and make sure to read the detailed descriptions of these value added product features, please get them in the coming section.

1-1.1 Special Features of Motherboard

CPU Thermal Throttling Technology--- (The CPU Overheat Protection Technology)

To prevent the increasing heat from damage of CPU or accidental shutdown while at high workload, the CPU Thermal Throttling Technology will force CPU to enter partially idle mode from 87.5% to 12.5% according to preset CPU operating temperature in BIOS (from 40 °C to 90°C). When the system senses the CPU operating temperature reaching the preset value, the CPU operating bandwidth will be decreased to the preset idle percentage to cool down the processor. When at throttling mode the beeper sound can be optionally selected to indicate it is in working.

CPU Smart Fan---(The Noise Management System (Only support 4-pin CPU cooler))
It's never been a good idea to gain the performance of your system by sacrificing its acoustics. CPU Smart Fan Noise Management System is the answer to control the noise level needed for now-a-day's high performance computing system. The system will automatically increase the fan speed when CPU operating loading is high, after the CPU is in normal operating condition, the system will low down the fan speed for the silent operating environment. The system can provide the much longer life cycle for both CPU and the system fans for game use and business requirements.

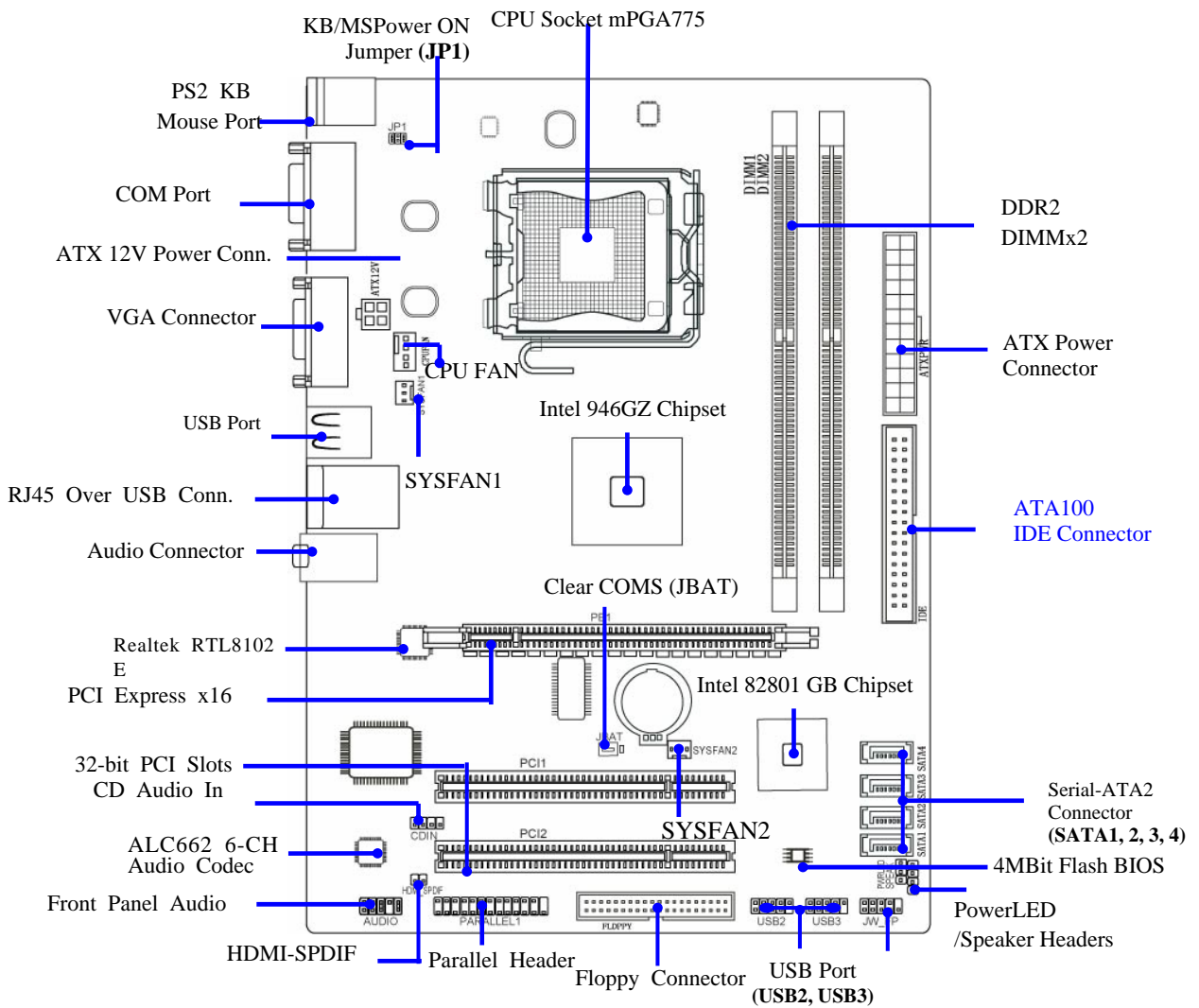
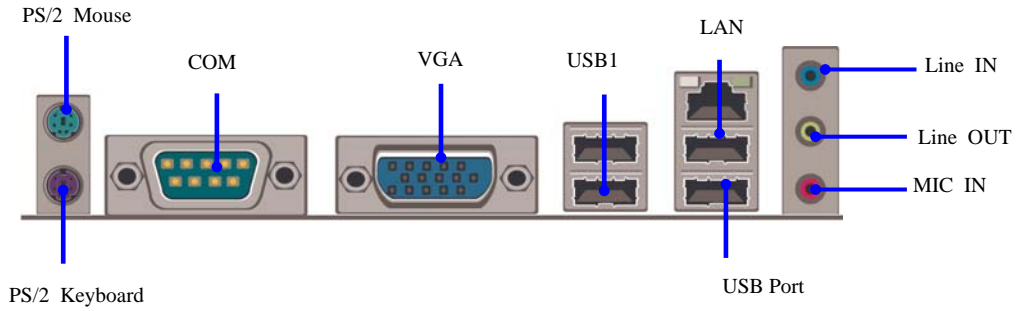
1-2 Specification

Spec	Description
Design	* Micro u-ATX form factor 4 layers PCB size: 24.5x18.0 cm
Chipset	* Intel 946GZ Memory Controller Hub (MCH) Chipset * Intel 82801GB I/O Controller Hub (ICH7) Chipset
CPU Socket (LGA775)	* Support Intel Pentium 4, Celeron D, Pentium D, and Core 2 Duo 775-Land LGA Package utilizes Flip-Chip Land Grid Array (FCLGA) package processor * Support FSB Frequency 1333MHz * Suggest the power of the CPU should be below 65w
Memory Socket	* Support Dual channel DDR2 400/DDR2 533/DDR2 667 MHz RAM Module and which is expandable to 4GB.
Expansion Slots	* PCI-Express x16 slot 1pcs delivers up to 8 GB/s of concurrent bandwidth. * 32-bit PCI slot x 2pcs at 133MHz
Integrate IDE and Serial ATA2	* One PCI IDE controller that supports PCI Bus Mastering, ATA PIO/DMA and the ULTRA DMA 33/66/100 functions that deliver the data transfer rate up to 100 MB/s; four Serial ATA2 ports provide 3 Gb/sec data transfer rate.
Integrated VGA	* Integrated Graphic Media Accelerator 3000 in 946GZ Express NB chipset.
LAN	* Integrated Realtek RTL8102E 10M/100M PCI-E LAN chip. * Support Fast Ethernet LAN function of providing 10Mb / 100Mb
6CH-Audio	* Realtek 6-channel ALC662 Audio Codec onboard * Audio driver and utility included
BIOS	* Award 4MB Flash ROM
Multi I/O	* PS/2 keyboard and PS/2 mouse connectors * Floppy disk drive connector x1 & Hard disk drive connector x 1 * Serial Port Connector x1 * VGA Connector x1. * USB 2.0 connector x 4, headers x4 * RJ45 LAN Connector x1 * Parallel header x1 * HDMI-SPDIF header x1 * 6-channel Audio connector (Line-in, Line-out, MIC)

1-3 Item Checklist

- Intel 946GZ Platform Processor Chipset based motherboard
- Intel 946GZ Platform Processor Chipset motherboard User's Manual
- Cable for IDE
- Cable for Serial ATA Port
- CD for motherboard utilities
- I/O Back panel Shield

1-4 Layout Diagram



Chapter 2

Hardware Installation

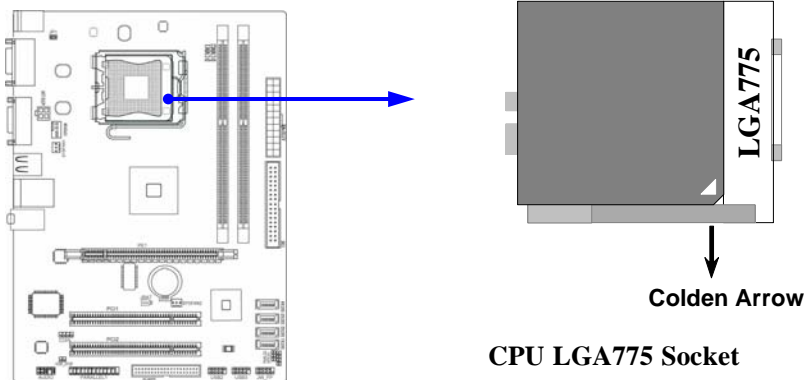
2-1 Install LGA 775 Supported Intel Processor

This motherboard provides a 775-pin surface mount, LGA775 Land Grid Array socket, referred to as in the 775 Pin package utilizes Flip-Chip Land Grid Array (FC-LGA) package technology.

The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

WARNING! Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the LGA775 socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.



2-2 Install Memory

This motherboard provides two 240-pin DDR2 DUAL INLINE MEMORY MODULES (DIMM) socket for DDR2 memory expansion available from minimum memory volume of 128MB to maximum memory volume of 4GB DDR2 SDRAM.

Valid Memory Configurations

Bank	240-Pin DIMM	PCS	Total Memory
Bank 0, 1 (DIMM1)	DDR2 400/ 533 DDR DRAM Module	X1	128MB~2 GB
Bank 2, 3 (DIMM2)	DDR2 400/ 533 DDR DRAM Module	X1	128MB~2 GB
Total	Memory (Max. 4 GB)	2	128MB~4 GB

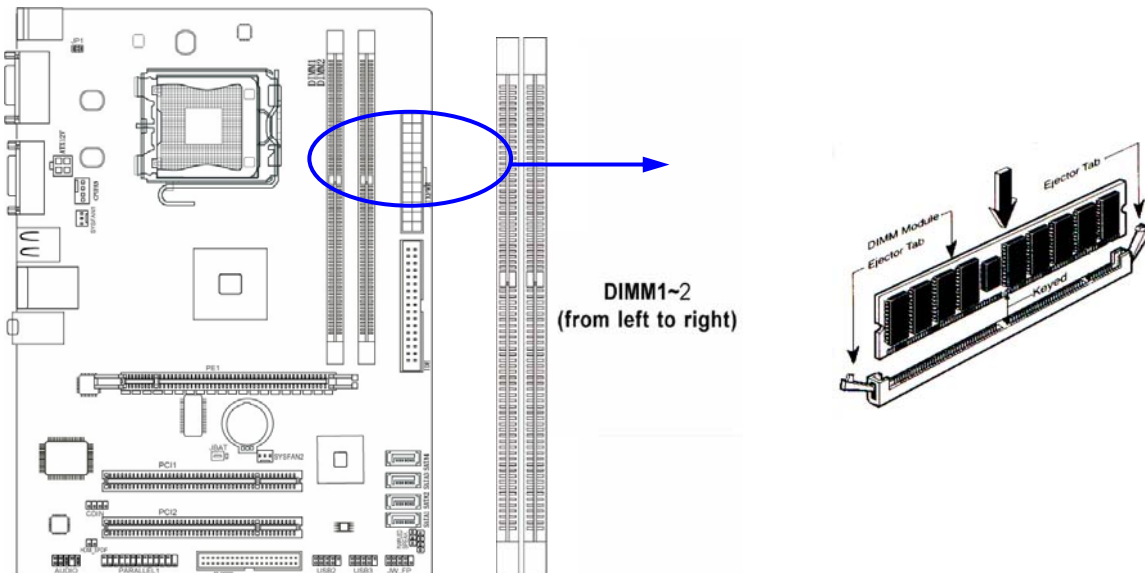
Recommend DIMM Module Combination

1. **One DIMM Module** ---Plug in DIMM1
2. **Two DIMM Modules**---Plug in DIMM1 and DIMM2 for Dual channel function

For Dual channel Limited!

3. Dual channel function only supports when 2 DIMM Modules plug in either both DIMM1 & DIMM2
4. DIMM1 & DIMM2 must be the same type, same size, and same frequency for dual channel function.

Install DDR2 SDRAM modules to your motherboard is not difficult, you can refer to figure below to see how to install a 240-Pin DDR2 400/DDR2 533/DDR2 667 SDRAM module.

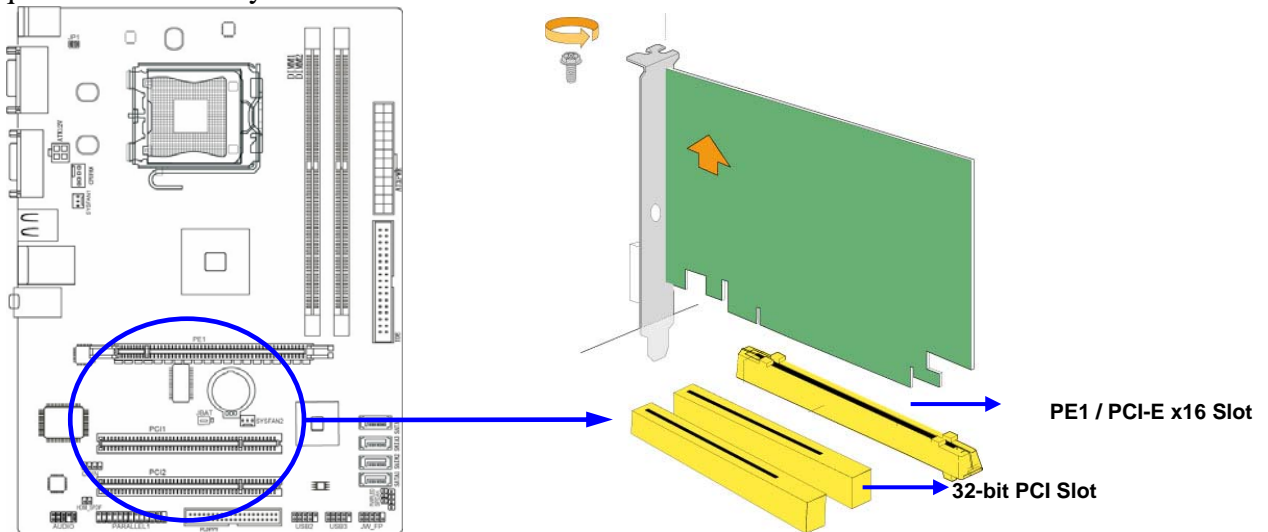


NOTE!

When you install DIMM module fully into the DIMM socket the eject tab should be locked into the DIMM module very firmly and fit into its indentation on both sides.

2-3 Expansion Cards

The 946GZ motherboard series offer one PCI-Express x16 graphics slot of 4Gbyte/sec data transfer rate at each relative direction which gets 3.5 times of bandwidth more than AGP 8X and it's up to a peak concurrent bandwidth of 8Gbyte/sec at full speed to guarantee the ultimate GPU computing performance. Two 32-bit PCI slots guarantee the rich connectivity for the I/O of peripherals. The motherboards are designed of tackling the profuse multimedia requirements nowadays..



Chapter 3

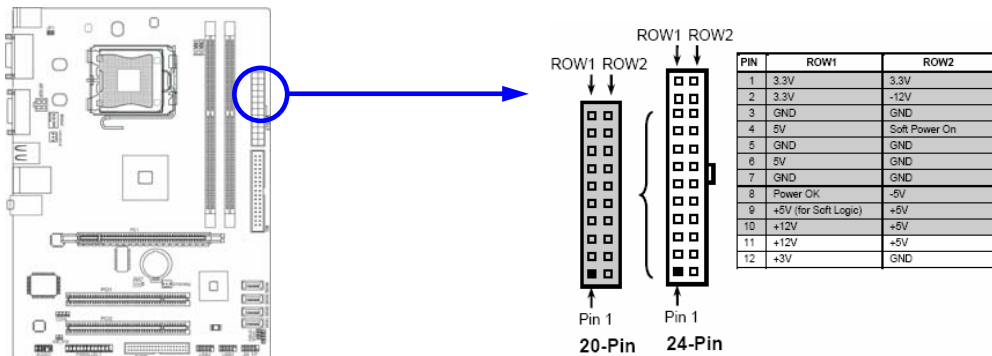
Connectors, Headers & Jumpers Setting

3-1 Connectors

(1) Power Connector (24-pin block) : ATXPWR

ATX Power Supply connector: This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows using soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

- ** We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.
- ** If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.



(2) ATX 12V Power Connector (4-pin block) : ATX12V

This is a new defined 4-pins connector that usually comes with ATX Power Supply. The ATX Power Supply which fully supports AM2 processor must including this connector for support extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.



(3) PS/2 Mouse & PS/2 Keyboard Connector: KB1

The connectors are for PS/2 keyboard and PS/2 Mouse.

(4) USB Port connector: USB1, UL1

The connectors are 4-pin connectors that connect USB devices to the system board.

(5) LAN Port connector: UL1

This connector is standard RJ45 connector for Network

The USBLAN1 support 10M/100M bps or 10M/100M bps data transfer rate.

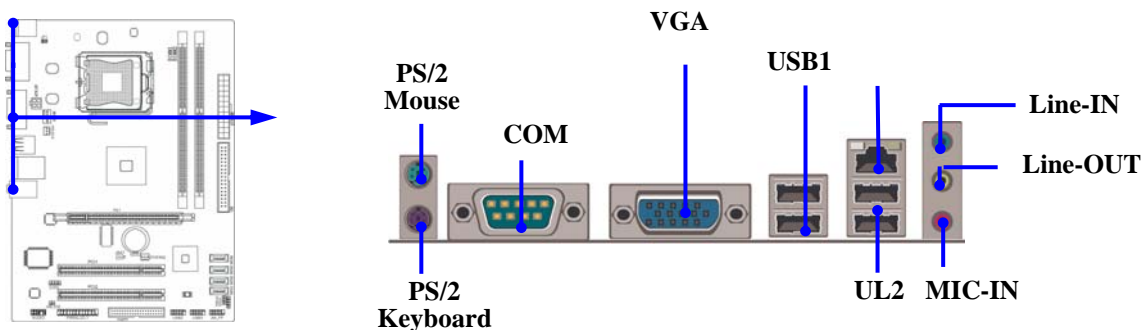
(6) Audio Line-In, Lin-Out, MIC: AUDIO1

This Connector are 6 phone Jack for LINE-OUT, LINE-IN, MIC.

Line-out : (GREEN) Audio output to speaker

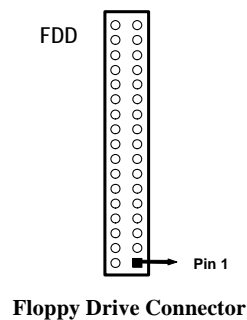
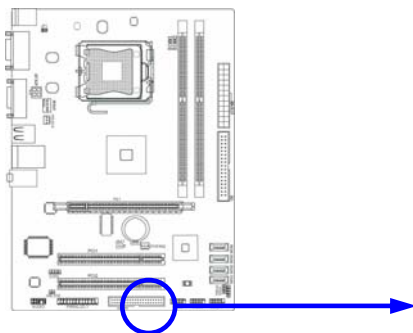
Line-in : (BLUE) Audio input to sound chip

MIC : (PINK) Microphone Connector



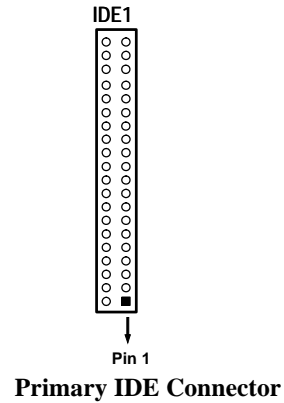
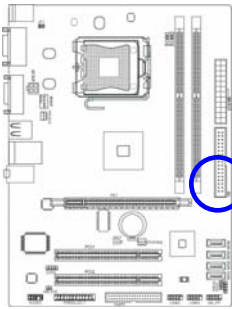
(7) Floppy drive Connector (34-pin block): Floppy

This connector supports the provided floppy drive ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to the floppy drives.



(8) Primary IDE Connector (40-pin block): IDE

This connector connects to the next set of Master and Slave hard disks. Follow the same procedure described for the primary IDE connector. You may also configure two hard disks to be both Masters using one ribbon cable on the primary IDE connector and another ribbon cable on the secondary IDE connector.

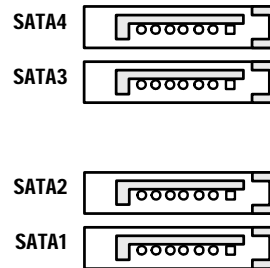
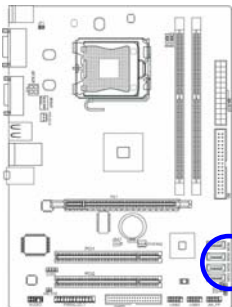


- Two hard disks can be connected to each connector. The first HDD is referred to as the “Master” and the second HDD is referred to as the “Slave”.
- For performance issues, we strongly suggest you don’t install a CD-ROM or DVD-ROM drive on the same IDE channel as a hard disk. Otherwise, the system performance on this channel may drop.

(9) Serial-ATA Port connector:

SATA1 / SATA2 / SATA3/ SATA4

These connectors support the provided Serial ATA and Serial ATA2 IDE hard disk cable to connecting the motherboard and serial ATA hard disk.



Serial-ATA1 & 2 Compatible Connectors

(10) Serial COM Port: COM1

COM1 is a 9-pin RS232 connector.

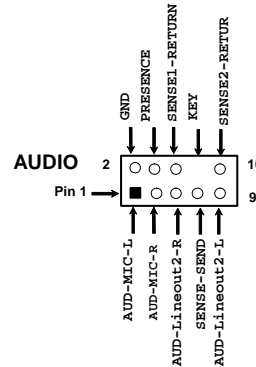
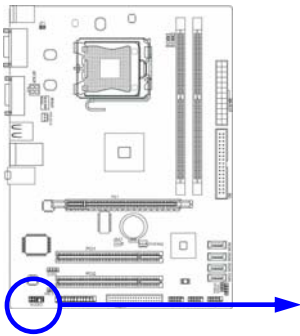
(11) VGA Connector (15-pin D-Sub) Connector: VGA

VGA is the 15-pin D-Subminiature female connector for display monitor.

3-2 Headers

(1) Line-Out/MIC Header for Front Panel (9-pin): AUDIO

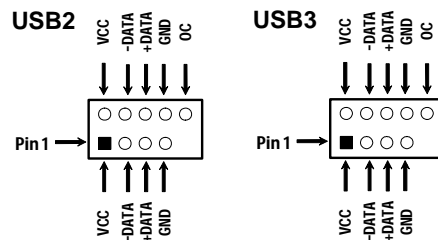
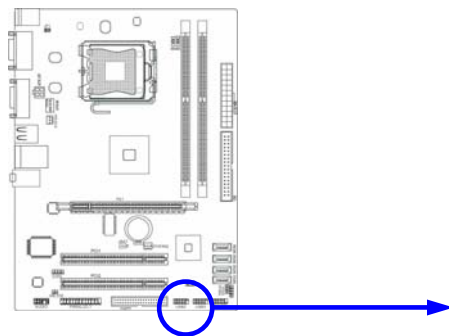
This header connect to Front Panel Line-out, MIC connector with cable.



Line-Out, MIC Headers

(2) USB Port Headers (9-pin) : USB2 / USB3

These headers are used for connecting the additional USB port plug. By attaching an option USB cable, your can be provided with two additional USB plugs affixed to the back panel.



USB Port Headers

(3) Speaker connector: SPEAK

This 4-pin connector connects to the case-mounted speaker. See the figure below.

(4) Power LED: PWR LED

The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin.

(5) IDE Activity LED: IDE LED

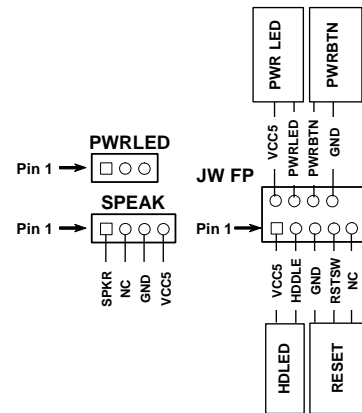
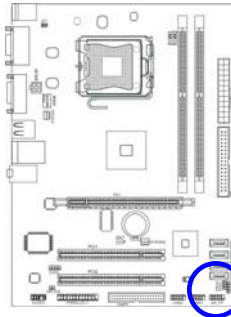
This connector connects to the hard disk activity indicator light on the case.

(6) Reset switch lead: RESET

This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply. See the figure below.

(7) Power switch: PWR BTN

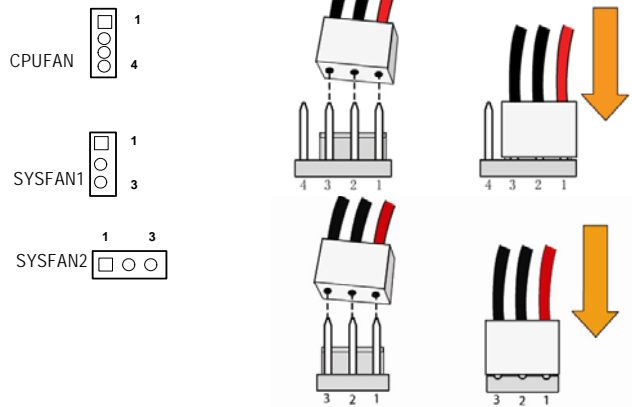
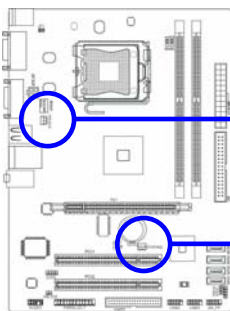
This 2-pin connector connects to the case-mounted power switch to power ON/OFF the system.



System Case Connections

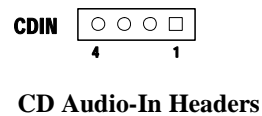
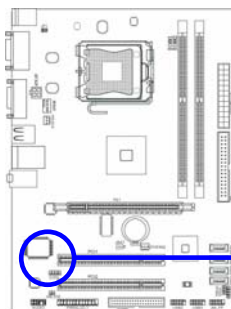
(8) FAN Power Headers: SYSFAN1, SYSFAN2 (3-pin), CPUFAN (4-pin)

These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.



(9) CD Audio-In Headers (4-pin) : CDIN

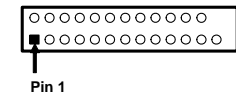
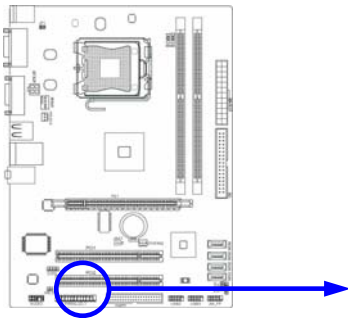
CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.



CD Audio-In Headers

(10) Parallel Port header (25-pin): PARALLEL1

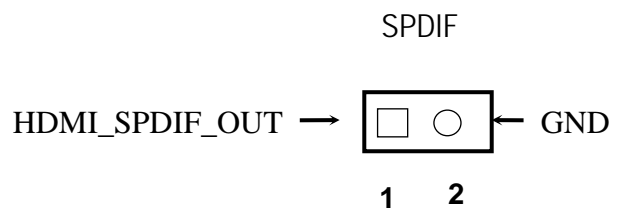
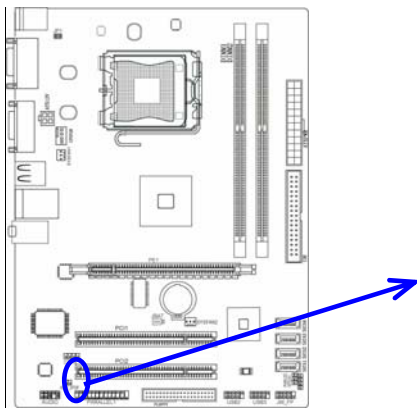
The onboard parallel port header is a 25-pin connector for connecting devices such as old-fashioned printer.



PARALLEL Connector

(11) SPDIF Out header: HDMI_SPDIF

The SPDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby digital decoder. Use this feature only when your stereo system has digital input function.



3-3 Jumper Setting

(1) CMOS RAM Clear (3-pin) : JBAT

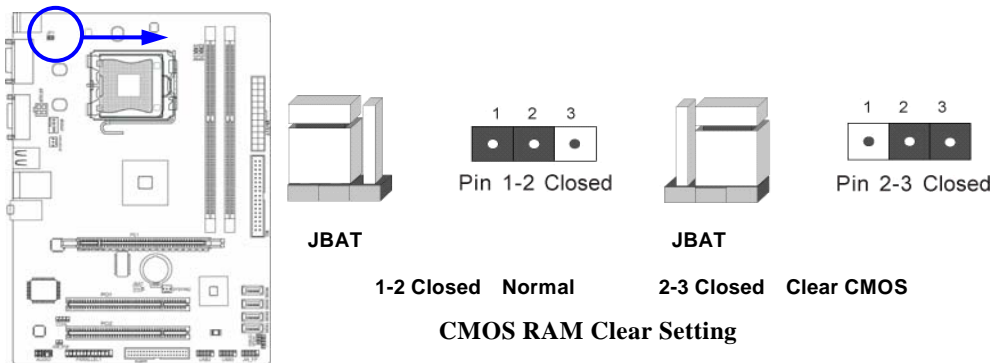
A battery must be used to retain the motherboard configuration in CMOS RAM short 1-2 pins of JBAT to store the CMOS data.

To clear the CMOS, follow the procedure below:

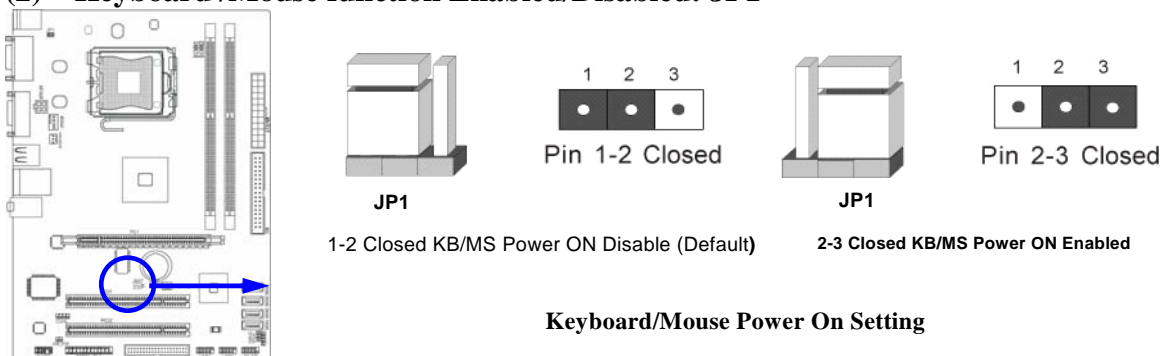
1. Turn off the system and unplug the AC power
2. Remove ATX power cable from ATX power connector
3. Locate JBAT and short pins 2-3 for a few seconds
4. Return JBAT to its normal setting by shorting pins 1-2
5. Connect ATX power cable back to ATX power connector

Note: When should clear CMOS

1. **Troubleshooting**
2. **Forget password**
3. **After over clocking system boot fail**



(2) Keyboard /Mouse function Enabled/Disabled: JP1



Chapter 4

USEFUL HELP

4-1 HOW TO UPDATE BIOS

Before updating the BIOS, users have to check if the “Miscellaneous Control” of BIOS SETUP has the “Flash Part Write Protect” selection. If there is one, users have to “Disable” the “Flash Part Write Protect” selection of the “Miscellaneous Control” in BIOS SETUP. Otherwise the system will not allow you to upgrade BIOS by Award Flash Utility. If there is no such selection, users can follow the 4 steps directly to update BIOS.

STEP 1. Prepare a boot disc. (You may make one by click START click RUN type SYS A: click OK)

STEP 2. Copy utility program to your boot disc. You may copy from DRIVER CD X:\FLASH\AWDFLASH.EXE or download from our web site.

STEP 3. Download and make a copy of the latest BIOS for 946GZ motherboard series from the web site to your boot disc.

STEP 4. Insert your boot disc into A:

Start the computer, type “Awdflash A:\xxxxxx.BIN /SN/PY/CD/CH/WB/CC/R”

xxxxxx.BIN is the file name of latest BIOS

SN means don't save existing BIOS data

PY means renew existing BIOS data

CD means clear DMI data after programming

CH means update HOLE

WB means always programming BootBlock

CC means clear existing CMOS data

R means restart computer

STEP 5. Type ENTER to update and flash the BIOS, then the system will restart automatically.

4-2 Trouble Shooting

Problem	Solution
No power to the system to the all power light don't illuminate, fan inside power supply doesn't turn on.	1. Make sure power cable is security plugged in. 2. Replace cable. 3. Contact technical support.
System inoperative. Keyboard lights are on , power indicator lights are lit, and hard drive is spinning.	Using ever pressure on both ends of the DIMM , press down firmly until the module snaps into places.
System doesn't boot from hard disk drive, can be booted from optical drive.	1. Check cable running from disk to disk controller board. .Make sure both ends are securely plugged in, check the drive type in the standard CMOS setup. 2. Backing up the hard drive is extremely important .All hard disks are capable of breaking down at any time.
System only boots from optical drive .Hard disk can be read and applications can be used but booting from hard disk is impossible.	1. Back up date and applications files. 2. Reformat the hard drive. Reinstall applications and date using backup disks.
Screen message says “Invalid Configuration” or “CMOS Failure”	Review system 's equipment .Make sure correct information on is in setup.
Can not boot system after installing second hard drive.	1. Set master /slave jumpers correctly. 2. Run SETUP program and select correct drive types. Call the drive manufacture for compatibility with other drives.