Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- REORIENT OR RELOCATE THE RECEIVING ANTENNA
- INCREASE THE SEPARATION BETWEEN THE EQUIPMENT AND THE RECEIVER
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT OF THE RECEIVER
- CONSULT THE DEALER OR AN EXPERIENCED AUDIO/TELEVISION TECHNICIAN

NOTE:
Connecting this device to peripheral devices that do not comply with Class B requirements, or using an unshielded peripheral data cable, could also result in harmful interference to radio or television reception.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate this equipment.

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

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While every precaution has been taken in the preparation of this manual, no responsibility for errors or omissions is assumed. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Trademarks
All brand names, logos and registered trademarks mentioned are property of their respective owners.

CAUTION:
Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.
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Information
Motherboard Specifications

- **Chipset**
  - Intel® H61 Chipset

- **Size**
  - Mini ITX form factor of 6.7 X 6.7 inch

- **Microprocessor support**
  - Supports LGA 1155 Socket for 2nd Generation Intel® Core i3/i5/i7 and Pentium processors

- **Operating systems**
  - Supports Windows XP 32bit/64bit, Windows Vista 32bit/64bit and Windows 7 32bit/64bit

- **System Memory**
  - Supports 1 GB, 2 GB, 4 GB and 8 GB DDR3 DRAM devices
  - Supports Dual Channel DDR3 1066 and 1333 MT/s
  - Maximum memory size: 16 GB

- **USB 2.0 ports**
  - Supports hot plug and play
  - Eight USB 2.0 ports (four ports on the back panel, four via the USB brackets connected to the internal USB headers)
  - Supports USB 2.0 protocol up to 480 Mbps transmission rate

- **USB 3.0 ports**
  - Supports hot plug and play
  - Four USB 3.0 ports (two on the back panel, two via the USB bracket connected to the internal USB header)
  - Fully backward compatible with USB 2.0 and 1.1 specifications

- **Onboard Serial ATA ports**
  - Independent DMA operation on three ports
  - Three SATAII ports (3.0 Gb/s)

- **eSATA Port**
  - One eSATA port on backpanel
  - Supports hot plug and play
  - Provide a link for 3.0 Gb/s data speed

- **Onboard LAN**
  - Support Full Duplex flow control (IEEE802.3x)
  - 10/100/1000 BASE-T IEEE 802.3 compliant
Wake On LAN (WOL) power management support

WiFi support
- Compliant with IEEE802.11n Draft 2.0 Standard
- High speed wireless connection and enhanced wireless security
- Max transfer rate up to 150 Mbps

Audio
- 8 channel High Definition Audio (including one optical SPDIF output port)
- All DACs support 192k/96k/48k/44.1kHz sample rate
- One SPDIF-out header on board

Green Function
- Support SMM, APM, ACPI
- Suspend to DRAM supported (STR)
- AC power failure recovery

Onboard Graphics Features
- Integrated GPU contains a refresh of the sixth generation graphics core
- DX10.1 and OpenGL 3.0 are supported
- 3D Graphics Rendering Enhancements
- HDMI/DP/DVI ports output support (DVI-VGA adaptor bundled in some model)
- Support resolution up to 1920x1200 @ 60Hz for HDMI/DVI and 2560x1600 @ 60Hz for DP

PCI Express Interface
- Supports PCI Express 2.0
- Wake up function is supported
- Clock spread spectrum capability

Expansion slots
- One PCI Express x16 slot
- One Mini PCI Express slot (full-height)
Motherboard Layout

Figure 1 shows the motherboard and Figure 2 shows the back panel connectors.

Figure 1. Board Layout

1. COM Header-CN4 (Optional)
2. 24-pin ATX Power Connector-PW1
3. CPU Fan Connector-CPUFAN3
4. Front Panel Header-FP1
5. Speaker Header-SPK1
6. PCI Express x16 Slot-PCIE1
7. CPU Socket
8. 4-pin ATX_12V power connector-PW2
9. SPDIF-Out Header-CN5
10. Front Pannel Audio Header-FP_S1
11. Backpanel Connectors
12. Clear CMOS Button-SW1
13. USB 3.0 Header-FP_USB3_1
14. USB 2.0 Headers (FP_U1~FP_U2)
15. Serial-ATA (SATA) Connectors (SATA1/2/5)
16. Chipset
17. SYS Fan Connector-SYSFAN3
18. Clear CMOS Jumper-JP1
19. Mini PCI Express Slot-MINI_PCIE1
20. DDRIII DIMM Sockets-DDRII1~2
Figure 2. Backpanel connectors

1. USB 3.0 Ports
2. HDMI Port
3. DVI Port
4. eSATA Port
5. USB 2.0 Ports
6. Optical SPDIF Output

7. Port	2-Channel	4-Channel	6-Channel	8-Channel
Blue	Line-In	Line-In	Line-In	Side Speaker Out
Green	Line-Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Black	—	—	Center/Subwoofer	Center/Subwoofer
Orange	—	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

8. LAN port LED indicators

<table>
<thead>
<tr>
<th>Speed LED</th>
<th>Activity LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Description</td>
</tr>
<tr>
<td>Off</td>
<td>Speed: 10 Mbps</td>
</tr>
<tr>
<td>Green</td>
<td>Speed: 100 Mbps</td>
</tr>
<tr>
<td>Orange</td>
<td>Speed: 1000 Mbps</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speed LED</th>
<th>Activity LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Description</td>
</tr>
<tr>
<td>Off</td>
<td>No link</td>
</tr>
<tr>
<td>Orange</td>
<td>Linked</td>
</tr>
<tr>
<td>Blinking</td>
<td>Data activity</td>
</tr>
</tbody>
</table>

9. DisplayPort

10. PS2 Keyboard/Mouse Port
11. WiFi antenna connectors (Optional)
   This motherboard can support two WiFi antenna modules. Refer to the following to install
   the WiFi antenna modules.
   Step 1. Remove the red caps from the WiFi antenna connectors.
   Step 2. Install the WiFi antennas to the WiFi antenna connectors, and make sure the screws
   are rotated in clockwise direction.

   **Note:**
   1. Users please note that the appearance of your WiFi antenna modules may
      not be exactly the same as those shown in this manual.
   2. Users can install one or two WiFi antennas to the motherboard.
   3. Users can bend or rotate the WiFi antennas to the best receiving direction
      according to the picture below.
Hardware Installation
This section will guide you through the installation of the motherboard. The topics covered in this section are:

- Preparing the motherboard
  - Installing the CPU
  - Installing the CPU fan
  - Installing Memory DIMMs
- Installing the motherboard
- Connecting cables and setting switches

Safety Instructions
To reduce the risk of fire, electric shock, and injury, always follow basic safety precautions.

Remember to remove power from your computer by disconnecting the AC main source before removing or installing any equipment from/to the computer chassis.
Preparing the Motherboard
The motherboard shipped in the box does not contain a CPU or memory DIMM. You need to purchase them to complete this installation.

Installing the CPU
Be very careful when handling the CPU. Make sure not to bend or break any pins on the back. Hold the processor only by the edges and do not touch the bottom of the processor.
The following illustration shows CPU installation components

1. Unhook the socket lever by pushing down and away from the socket.

2. Lift the socket lever and the load plate to fully open position.

3. Use your thumb and forefinger to lift the cap up vertically.
   - Be careful not to touch the socket contacts.

4. Hold the processor with your thumb and forefinger. Insert the processor into the socket vertically.
   - Align the CPU pin 1 mark with the pin 1 corner of the CPU socket.

5. Make sure the CPU is fully seated, and then replace the load plate.
   - Be sure that the front end of the load plate is under the shoulder screw.

6. Secure the load lever to its locked location.
Installing the CPU Fan
There are many different fan types that can be used with this motherboard. Follow the instruction that came with your fan assembly. Be sure that the fan orientation is correct for your chassis type and your fan assembly.

Installing Memory Modules
Your new motherboard has two 1.5V 240-pin slots for DDR3 memory. These slots support 1 GB/2 GB/4 GB/8 GB DDR3 devices. There must be at least one memory bank populated to ensure normal operation. Refer to the following recommendations to install memory modules.

Note that a memory module has a notch, so it can only fit in one direction. Refer to the following procedure to install memory modules into the slots on the motherboard.

1. Unlock a DIMM slot by pressing the module clips outward.
2. Align the memory module to the DIMM slot, and insert the module vertically into the DIMM slot. The plastic clips at both sides of the DIMM slot automatically lock the DIMM into the connector.
Installing the Motherboard

The sequence of installing the motherboard into the chassis depends on the chassis you are using and if you are replacing an existing motherboard or working with an empty chassis. Determine if it would be easier to make all the connections prior to this step or to secure the motherboard and then make all the connections. It is normally easier to secure the motherboard first. Use the following procedure to install the I/O shield and secure the motherboard into the chassis.

*Note: Be sure that the CPU fan assembly has enough clearance for the chassis covers to lock into place and for the expansion cards. Also make sure the CPU Fan assembly is aligned with the vents on the covers.*

Installing the I/O Shield

The motherboard kit comes with an I/O shield that is used to block radio frequency transmissions, protects internal components from dust and foreign objects, and promotes correct airflow within the chassis.

Before installing the motherboard, install the I/O shield from the inside of the chassis. Press the I/O shield into place and make sure it fits securely. If the I/O shield does not fit into the chassis, you would need to obtain the proper size from the chassis supplier.

Securing the Motherboard into the Chassis

Most computer chassis have a base with mounting studs or spacers to allow the motherboard to be secured to the chassis and help to prevent short circuits. If there are studs that do not align with a mounting hole on the motherboard, it is recommended that you remove that stud to prevent the possibility of a short circuit. In most cases, it is recommended to secure the motherboard with spacers.

1. Carefully place the motherboard onto the studs/spacers located inside the chassis.
2. Align the mounting holes with the studs/spacers.
3. Align the connectors to the I/O shield.
4. Ensure that the fan assembly is aligned with the chassis vents according to the fan assembly instruction.
5. Secure the motherboard with screws.
Connecting Cables and Setting Switches

This section takes you through all the connectors and switch settings necessary on the motherboard. This will include:

- **Power Connectors**
  - 24-pin ATX Power Connector-PW1
  - 4-pin ATX_12V Power Connector-PW2

- **Internal Headers/Connectors**
  - SPDIF-Out Header-CN5
  - COM Header-CN4 (Optional)
  - Front Panel Header-FP1
  - USB Headers (FP_U1/2/FP_USB3-1)
  - Front Pannel Audio Header-FP_S1
  - Speaker Header-SPK1

- **Serial-ATA (SATA) Connectors (SATA1/2/5)**
- **Fan Connectors**
- **Expansion Slots**
- **CMOS Jumper Settings**

*See Figure 1 to locate the connectors and jumpers referenced in the following procedure.*
24-pin ATX Power Connector-PW1

PW1 is the main power supply connector. Make sure that the power supply cable and pins are properly aligned with the connector on the motherboard. Firmly plug the power supply cable into the connector and make sure it is secure.

PW1-Pin Definition

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+3.3V</td>
<td>13</td>
<td>+3.3V</td>
</tr>
<tr>
<td>2</td>
<td>+3.3V</td>
<td>14</td>
<td>-12V</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>15</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>+5V</td>
<td>16</td>
<td>PS_ON</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>17</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>+5V</td>
<td>18</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>19</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>PWROK</td>
<td>20</td>
<td>-5V</td>
</tr>
<tr>
<td>9</td>
<td>+5V_AUX</td>
<td>21</td>
<td>+5V</td>
</tr>
<tr>
<td>10</td>
<td>+12V</td>
<td>22</td>
<td>+5V</td>
</tr>
<tr>
<td>11</td>
<td>+12V</td>
<td>23</td>
<td>+5V</td>
</tr>
<tr>
<td>12</td>
<td>+3.3V</td>
<td>24</td>
<td>GND</td>
</tr>
</tbody>
</table>

4-pin ATX_12V power connector-PW2

PW2, the 4-pin ATX 12V power connector, is used to provide power to the CPU. Align the pins to the connector and press firmly until seated.

PW2-Pin Definition

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>+12V</td>
</tr>
<tr>
<td>4</td>
<td>+12V</td>
</tr>
</tbody>
</table>
SPDIF-Out Header-CN5
This header provides a SPDIF (Sony/Philips Digital Interface) output to digital multimedia device through coaxial connector.

COM Header-CN4 (Optional)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>RI</td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
</tr>
</tbody>
</table>

Front panel header-FP1

The front panel header on this motherboard is one connector used to connect the following four cables:

**FP1-Pin Definition**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HDD_LED+</td>
</tr>
<tr>
<td>2</td>
<td>PW_LED+</td>
</tr>
<tr>
<td>3</td>
<td>HDD_LED-</td>
</tr>
<tr>
<td>4</td>
<td>PW_LED-</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>PWR_SW</td>
</tr>
<tr>
<td>7</td>
<td>RESET</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
</tr>
<tr>
<td>10</td>
<td>KEY</td>
</tr>
</tbody>
</table>

- **PWRLED**
  Attach the front panel power LED cable to these two pins of the connector. The Power LED indicates the system’s status.

- **PWR SW**
  Attach the power button cable from the case to these two pins. Pressing the power button on the front panel turns the system on and off rather than using the power supply button.

- **HDD LED**
  Attach the hard disk drive indicator LED cable to these two pins. The HDD indicator LED indicates the activity status of the hard disks.

- **RST SW**
  Attach the Reset switch cable from the front panel of the case to these two pins. The system restarts when the RESET switch is pressed.

*Note: Some chassis do not have all four cables. Be sure to match the name on the connectors to the corresponding pins.*
USB Headers-FP_U1/2/FP_USB3_1
This motherboard contains four USB 2.0 and two USB 3.0 ports that are exposed on the rear panel of the chassis. The motherboard also contains two 10-pin internal USB 2.0 headers and one 20-pin USB 3.0 connector onboard.

Front Panel Audio Header-FP_S1
The audio connector supports HD audio standard and provides two kinds of audio output choices: the Front Audio, the Rear Audio. The front Audio supports retasking function.

FP_U1~FP_U2-Pin Definition

<table>
<thead>
<tr>
<th>PIN</th>
<th>Assignment</th>
<th>PIN</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>2</td>
<td>VCC</td>
</tr>
<tr>
<td>3</td>
<td>USBP0-</td>
<td>4</td>
<td>USBP1-</td>
</tr>
<tr>
<td>5</td>
<td>USBP0+</td>
<td>6</td>
<td>USBP1+</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>KEY</td>
<td>10</td>
<td>NC</td>
</tr>
</tbody>
</table>

FP_USB3_1-Pin Definition

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
<td>2</td>
<td>BD+</td>
</tr>
<tr>
<td>3</td>
<td>AD+</td>
<td>4</td>
<td>BD-</td>
</tr>
<tr>
<td>5</td>
<td>AD-</td>
<td>6</td>
<td>GND2</td>
</tr>
<tr>
<td>7</td>
<td>GND1</td>
<td>8</td>
<td>BSSTX+</td>
</tr>
<tr>
<td>9</td>
<td>ASSTX+</td>
<td>10</td>
<td>BSSTX-</td>
</tr>
<tr>
<td>11</td>
<td>ASSTX-</td>
<td>12</td>
<td>GND3</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>14</td>
<td>BSSRX+</td>
</tr>
<tr>
<td>15</td>
<td>ASSRX+</td>
<td>16</td>
<td>BSSRX-</td>
</tr>
<tr>
<td>17</td>
<td>ASSRX-</td>
<td>18</td>
<td>BVBUS</td>
</tr>
<tr>
<td>19</td>
<td>AVBUS</td>
<td>20</td>
<td>KEY</td>
</tr>
</tbody>
</table>

Note: Secure the bracket to either the front or rear panel of your chassis (not all chassis are equipped with the front panel option).

FP_S1-Pin Definition

<table>
<thead>
<tr>
<th>PIN</th>
<th>Assignment</th>
<th>PIN</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIC2(L)</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>MIC(R)</td>
<td>4</td>
<td>-ACZ-DET</td>
</tr>
<tr>
<td>5</td>
<td>Front Audio(R)</td>
<td>6</td>
<td>Reserved</td>
</tr>
<tr>
<td>7</td>
<td>FAVDIO-JD</td>
<td>8</td>
<td>Key(No pin)</td>
</tr>
<tr>
<td>9</td>
<td>Front Audio(L)</td>
<td>10</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Note: In order to utilize the front audio header, your chassis must have front audio connector. Also please make sure the pin assignment on the cable is the same as the pin assignment on the mainboard header. To find out if the chassis you are buying supports a front audio connector, please contact your dealer.
Serial-ATA (SATA) Connectors (SATA1/2/5)
The Serial ATA connector is used to connect the Serial ATA device to the motherboard. These connectors support the thin Serial ATA cables for primary storage devices. The motherboard incorporates three SATA II ports with maximum transfer rate up to 3.0 Gb/s each.

Fan Connectors
There are two fan connectors on the motherboard, including system fan connector-SYSFAN3 and CPU fan connector-CPUFAN3.
Expansion Slots
The motherboard contains two expansion slots, one Mini PCIe slot and one PCIe x16 slot.

Mini PCI Express Slot-MINI_PCIE1
There is one Mini PCIe slot, reserved for the WiFi Module.

PCI Express x16 Slot-PCIE1
There is one PCIe x16 slot reserved for graphics card. It is fully compliant with PCIE 2.0 specification.

Jumper Settings
This section explains how to configure the motherboard’s hardware. Before using your computer, make sure all jumpers and DRAM modules are set correctly. Refer to this section whenever in doubt.

CMOS Clear Jumper-JP1

<table>
<thead>
<tr>
<th>JP1</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-2* Normal*</td>
</tr>
<tr>
<td>1</td>
<td>2-3 CMOS Clear</td>
</tr>
</tbody>
</table>

If you want to clear the system configuration, use the JP1 (Clear CMOS Jumper) or SW1 (Clear CMOS Button) to clear data.

Notice:
1. Be sure to save the CMOS setting when exit the CMOS.
2. If the CPU is frequency multiplier locked, no CPU speed change will be seen even if the frequency multiplier setting in CMOS setup is changed.
Configuring the BIOS

This section discusses how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Enter BIOS Setup

The BIOS is the communication bridge between hardware and software. Correctly setting the BIOS parameters is critical to maintain optimal system performance.

Refer to the following procedure to verify/change BIOS settings.

1. Power on the computer.
2. Press the Del key when the following message briefly displays at the bottom of the screen during the Power On Self Test (POST).

Pressing Del takes you to the BIOS Setup Utility.

Note: 1. We reserve the right to update the BIOS version presented in the manual. The BIOS pictures shown in this section are for reference only.
2. It is strongly recommended that you do not change the default BIOS settings. Changing some settings could damage your system.

Main Menu

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.

Note: Users please note that the data in gray is non-changeable, and the others are for selection.

- **BIOS Information**
  Displays the auto-detected BIOS information.

- **Memory Information**
  Displays the auto-detected memory information.

- **System Language**
  Choose the system default language.

- **System Date/Time**
  Allows you to set the system date/time.
Advanced Menu
The Advanced menu items allow you to change the setting for the CPU and other system devices. Press <enter> to display the configuration options:

X-Setting
The X-Setting menu items show the settings of CPU, memory and so on.

- **CPU Performance**
  Use this item to adjust CPU performance.

- **GPU Boost**
  Use this item to adjust graphics configuration.

- **Memory Timing Configuration**
  Use this item to adjust memory timing configuration.

- **Adjust Memory Voltage**
  Use this item to adjust memory voltage.

- **Adjust PCH Voltage**
  Use this item to adjust PCH voltage.

H/W Monitor
The items in this menu allow you to monitor the hardware status. Press <enter> to display the configuration options:

- **CPU FAN Control Mode**
  Use this item to select CPU FAN Control mode.

- **Start Temperature**
  Use this item to select the start temperature.

- **Start Fan Duty**
  Use this item to select the start fan duty.

- **Highest Fan Duty**
  Use this item to select the highest fan duty.
**Storage Configuration**  
The items in this menu allow you to set or change the storage configurations. Press <enter> to display the configuration options:

- **SATA Mode**  
  Allows you to choose SATA mode, including [Disabled], [IDE Mode], and [AHCI Mode].

- **Serial-ATA Controller 0/1**  
  Allows you to configure SATA controller.

**CPU Configuration**  
The items in this menu show the CPU-related information that the BIOS automatically detects. Press <enter> to display the configuration options:

- **Hyper-threading**  
  This item allows you to enable or disable Intel® Hyper-Threading technology support.

- **Active Processor Cores**  
  This item allows you to choose the number of the active processor cores. The default value is [All].

- **Limit CPUID Maximum**  
  Allows you to determine whether to limit CPUID maximum value. Set this item to [Disable] for Windows XP operating system; set this item to [Enable] for legacy operating system such as Windows NT4.0.

- **Execute Disable Bit**  
  When disabled forces the XD feature flag to always return 0, defaults choose [Enable].

- **Hardware Prefetcher**  
  Use this item to enable or disable hardware prefetcher (hardware prefetch mechanism).

- **Adjacent Cache Line Prefetch**  
  Use this item to enable or disable the adjacent cache line prefetch mode. If you disable this item, only one 64-bit line will be prefetched from the 128-bit section (including the required data). If you enable this item, two lines will be prefetched whether there is required data or not.

- **Intel Virtualization Technology**  
  Hardware Virtualization Technology enables processor feature for running multiple simultaneous virtual machines allowing specialized software applications to run in full isolation of each other.

- **Power Technology**  
  Use this option to set Power Technology.

**USB Configuration**  
The items in this menu allow you to change the USB-related features. Press <enter> to display the configuration options:

- **Legacy USB Support**  
  Allows you to enable or disable support for USB devices on legacy operating systems.
EHCI Hand-Off
Allows you to enable support for operating systems without an EHCI hand-off feature.

USB transfer time-out
Allows you to set USB transfer time-out.

Device reset time-out
Allows you to set device reset time-out.

Device power-up delay
Allows you to set device power-up delay.

Super IO Configuration
The items in this menu allow you to configure NCT5577D Super IO Chipset.

Serial Port 0 Configuration
Allows you to set parameters of Serial Port 0 (C0MA).

ACPI Settings
The items in this menu allow you to set ACPI Configuration.

ACPI Sleep State
Select the highest ACPI sleep state, the system will enter when the SUSPEND button is pressed.

Restore on AC Power Loss
This item allows you to configure how the system board responds to a power failure.

Deep Sleep
When enabled, wake up from S4/S5 can only be done by power button.

Chipset Menu
The chipset menu items allow you to change the advanced chipset settings. Press <enter> to display the sub-menu:

Display Configuration
The item allows you to configure north bridge features, including Memory, Graphics, and so on.
OnBoard Device Config
The item allows you to configure onboard device features, including HDA, HDMI, and so on.

Boot Menu
The Boot menu items allow you to change the system boot options. Press <enter> to display the configuration options:

<table>
<thead>
<tr>
<th>Config Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot Configuration</td>
<td></td>
</tr>
<tr>
<td>Setup Prompt Timeout</td>
<td>Use this item to set number of seconds to wait for setup activation key.</td>
</tr>
<tr>
<td>Bootup NumLock State</td>
<td>Use this item to select the keyboard NumLock state: [On] or [Off].</td>
</tr>
<tr>
<td>Quiet Boot</td>
<td>When set to [Disabled], displays normal POST message. When set to [Enabled], displays OEM Logo instead of POST messages.</td>
</tr>
<tr>
<td>Fast Boot</td>
<td>Enable or disable boot with initialization of a minimal set of devices required to launch active boot option.</td>
</tr>
<tr>
<td>GateA20 Active</td>
<td>When set to [Upon Request], GA20 can be disabled using BIOS services. When set to [Always], GA20 can not be disabled; this option is useful when any RT code is executed above 1MB.</td>
</tr>
<tr>
<td>Option ROM Messages</td>
<td>Use this item to set display mode for Option.</td>
</tr>
</tbody>
</table>

Boot Settings Configuration
The items allow you to configure Boot settings. Press <enter> To display the configuration options:

- **Setup Prompt Timeout**
  Use this item to set number of seconds to wait for setup activation key.

- **Bootup NumLock State**
  Use this item to select the keyboard NumLock state: [On] or [Off].

- **Quiet Boot**
  When set to [Disabled], displays normal POST message. When set to [Enabled], displays OEM Logo instead of POST messages.

- **Fast Boot**
  Enable or disable boot with initialization of a minimal set of devices required to launch active boot option.

- **GateA20 Active**
  When set to [Upon Request], GA20 can be disabled using BIOS services. When set to [Always], GA20 can not be disabled; this option is useful when any RT code is executed above 1MB.

- **Option ROM Messages**
  Use this item to set display mode for Option.
Security Menu
The security menu items allow you to change the system security settings. Press <enter> to display the configuration options:

Administrator Password
Select this item to set Setup Administrator Password.

User Password
Select this item to set the user password.

To set an Administrator/User Password:
1. Select the item [Administrator/User Password] and press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted:
   The message “Password Installed” appears after you successfully set your password.
   To change the administrator/user password, follow the same steps as setting a use password.
   To clear the administrator/user password, select the item [Administrator/User password], then press <enter>. The message “Password Uninstalled” appears.

Interrupt 19 Capture
When set to [Enabled], this function allows the option ROMS to trap interrupt 19.
Exit Menu
The exit menu items allow you to load the option or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items. Press <enter> to display the sub-menu:

Save Changes and Exit
Select this item and press <Enter> to save the changes that you have made in the BIOS Setup and exit the BIOS Setup. When the dialog box [Save configuration and exit?] appears, select [Yes] to save and exit, or select [No] to return to the main menu.

Discard Changes and Exit
Select this option only if you do not want to save the changes that you have made to the setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

Save Changes and Reset
Select this item and press <Enter> to reset the system after saving the changes. When the dialog box [Save configuration and reset?] appears, select [Yes] to save and reset, or select [No] to return to the main menu.

Discard Changes and Reset
Select this item and press <Enter> to reset system setup without saving any changes. When the dialog box [Reset without saving?] appears, select [Yes] to discard and reset, or select [No] to return to the main menu.

Save Changes
Select this item and press <Enter> to save the changes that you have made in the BIOS Setup and exit the BIOS Setup. When the dialog box [Save configuration?] appears, select [Yes] to save changes, or select [No] to return to the main menu.
**Discard Changes**
This option allows you to discard the selections you have made and restore the previously saved values. When the dialog box [Load Previous Values?] appears, select [Yes] to discard any change and load the previously saved values.

**Restore Defaults**
Use this item to restore/load default values for all the setup options.

**Save as User Defaults**
Use this item to save the changes as User Defaults.

**Restore User Defaults**
Use this item to restore the User Defaults to all the setup options.

**Launch EFI Shell from filesystem device**
Use this item to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

**FLASH Update Procedure**
The program EFUDOS.exe is included in the driver disk (X:\Utility\EFUDOS.exe). Please follow the recommended procedure to update the flash BIOS, as listed below.

(X: your driver disk letter).
1. Create a DOS-bootable floppy diskette. Copy the new BIOS file (just obtained or downloaded) and the utility program EFUDOS.exe to the diskette.

2. Allow the PC system to boot from the DOS diskette.

3. At the DOS prompt, type

   ```
   EFUDOS XX.ROM /P /B /N <ENTER>
   ```

   *Note: XX (the BIOS file name) can be defined by users.*

4. Wait until the flash-update is complete.

5. Restart the PC.

**Warning:** - Do not turn off or RESET the computer during the flash process.
- If you are not sure how to upgrade the BIOS, please take your computer to an Authorized Service Center and have a trained technician do the work for you.
Installing Drivers and Software

*Note: It is important to remember that before installing the driver disk that is shipped in the kit, you need to load your operating system. The motherboard supports Windows XP 32 bit/64 bit, Windows Vista 32 bit/64 bit and Windows 7 32bit/64bit.*

The kit comes with a driver disk that contains utility drivers and additional software.

The driver disk that has been shipped with your motherboard contains the following software and drivers:

- Intel Chipset Driver
- HDA Sound Driver
- Intel Graphics Driver
- Ethernet PCI-E Driver
- USB 3.0 Controller Driver
- Atheros Wireless Driver
- Intel Management Engine

*Note. We reserve the right to update the driver version presented in the manual. The driver installation pictures shown in this section are for reference only.*

**Drivers Installation**

1. Insert the driver disk into the drive after loading your operating system, and then you can see the interface below.
2. Left-click **Intel Chipset Driver**, begin loading

![Welcome to the Setup Program](image1)

The setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all programs before continuing.

![License Agreement](image2)

You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?

![Setup Progress](image3)

Please wait while the following setup operations are performed:

- 
  - Installing Driver: Intel(R) 6 Series/C200 Series Chipset Family SATA Controller - LC52 Version 9.2.0.101
  - Installing Driver: Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - Version 9.2.0.101
  - Installing Driver: Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - Version 9.2.0.101
  - Installing Driver: 2nd generation Intel® Core™ processor family CPU Management - Version 9.2.0.101
You must restart this computer for the changes to take effect. Would you like to restart the computer now?

- Yes, I want to restart this computer now.
- No, I will restart this computer later.

Click Finish, then remove any installation media from the drive.

3. Left-click **HDA Sound Driver**, begin loading
4. Left-click **Intel Graphics Driver**, begin loading

![Intel Installation Framework](image1.png)

You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?

![License Agreement](image2.png)

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![Setup Is Complete](image3.png)

You must restart this computer for the changes to take effect. Would you like to restart the computer now?

- [ ] Yes, I want to restart the computer now.
- [ ] No, I will restart the computer later.

Click Finish, then remove any installation media from the drives.
5. Left-click **Ethernet PCI-E Driver**, begin loading
6. Left-click **USB 3.0 Controller Driver**, begin loading
Installing Drivers And Software

Note: USB 3.0 port would not work in POST, CMOS setup and DOS mode.
7. Left-click **Atheros Wireless driver**, begin loading

8. Left-click **Intel Management Engine**, begin loading
Installing Drivers And Software

Intel® Management Engine Components

License Agreement

You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?

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* If you are an end-user, then only Section A of the INTEL SOFTWARE LICENSE AGREEMENT applies.

[Intel] [Back] [Yes] [No]

Intel® Management Engine Components

Readme File Information

Refer to the Readme file below to view the system requirements and installation information.

[Readme file content]

[Intel] [Back] [Next] [Cancel]

Intel® Management Engine Components

Setup Progress

Please wait while the following setup operations are performed:

- Copying File: C\Program Files\Intel\Intel(R) Management Engine Components\SYS\IntelME.sys
- Copying File: C\Program Files\Intel\Intel(R) Management Engine Components\SYS\IntelME.drv
- Copying File: C\Program Files\Intel\Intel(R) Management Engine Components\SYS\IntelME.exe
- Copying File: C\Program Files\Intel\Intel(R) Management Engine Components\SYS\IntelME.frm
- Copying File: C\Program Files\Intel\Intel(R) Management Engine Components\SYS\IntelME.i386.exe
- Creating Process: C\Program Files\Intel\Intel(R) Management Engine Components\IntelME.exe
- Starting Services: INT
- Starting Services: INT
- Copying File: C\WINDOWS\system32\drivers\IntelMSWVer.dll

Click Next to continue.

[Intel] [Next] [Previous]
At last, you can enter Computer Management that provides information about the hardware devices on this motherboard to check if the driver installation is complete.
Realtek HD Audio Driver Setup

Getting Started

After Realtek HD Audio Driver being installed (insert the driver disk and follow the on-screen instructions), “Realtek HD Audio Manager” icon will show in System tray as below. Double click the icon and the control panel will appear:

Sound Effect

After clicking on the “Sound Effect” tab, 3 sections “Environment”, “Equalizer” and “Karaoke” are available for selection.

Environment Simulation

You will be able to enjoy different sound experience by pulling down the arrow, totally 23 kinds of sound effect will be shown for selection. Realtek HD Audio Sound Manager also provides five popular settings “Stone Corridor”, “Bathroom”, “Sewer pipe”, “Arena” and “Audio Corridor” for quick enjoyment.
Equalizer Selection
The Equalizer section allows you to create your own preferred settings by utilizing this tool.

In standard 10 bands of equalizer, ranging from 100Hz to 16KHz are available:

![Equalizer settings](image)

**Frequently Used Equalizer Setting**
Realtek recognizes the needs that you might have. By leveraging our long experience at audio field, Realtek HD Audio Sound Manager provides you certain optimized equalizer settings that are frequently used for your quick enjoyment.

**How to Use**
Other than the buttons “Pop” “Live” “Club” & “Rock” shown on the page, to pull down the arrow in “Others”, you will find more optimized settings available to you.

**Karaoke Mode**
Karaoke mode brings Karaoke fun back home by simply using the music you usually play, Karaoke mode can help you eliminate the vocal of the song or adjust the key to accommodate your range.

**Vocal Cancellation**: Single click on “Voice Cancellation”, the vocals of the songs will be erased, while the background music is still playing which lets you take over the vocal part.

**Key Adjustment**: Using “Up/Down Arrow” to find a key which better fits your vocal range.
Mixer

Realtek HD Audio Sound Manager integrates Microsoft’s “Volume Control” functions into the Mixer page. This gives you the advantage to you to create your favorite sound effect in one single tool.

Playback control

You may choose to mute single or multiple volume controls or to completely mute sound output.

Tool

√ Show the following volume control
   This is to let you freely decide which volume control items to be displayed, total 13 items to be chosen.

√ Advanced controls

√ Enable playback multi-streaming
With this function, you will be able to have an audio chat with your friends via headphone (stream 1 from front panel) while still have music (stream 2 from back panel) playing. At any given period, you can have maximum 2 streams operating simultaneously.

**Recording control**

You may choose to mute single or multiple volume controls or to completely mute sound input.

**Tool**

- **Show the following volume controls**
  This is to let you freely decide which volume control items to be displayed.

- **Advanced controls.**
  Advanced control is a “Microphone Boost” icon. Once this item is checked, you will find “advanced” icon beside “Front Pink In” & “Mic Volume”. With this, the input signal into “Front Pink In” & “Mic Volume” will be strengthen.

- **Enable recording multi-streaming**
  At any given period, you can have maximum 2 streams operating simultaneously.
Audio I/O

Realtek HD Audio Manager frees you from default speaker settings. Different from before, for each jack, they are not limited to perform certain functions. Instead, now each jack is able to be chosen to perform either output (i.e. playback) function or input (i.e. Recording) function, we call this “Retasking”.

Audio I/O aims to help you setting jacks as you wish. Moreover, other than blue to blue, pink to pink, the way that you used to do, Audio I/O would guide you to other right jacks that can also serve as microphone / speaker / headphone.
Speaker Configuration

**Step 1:** Plug in the device in any available jack.

**Step 2:** Dialogue “Connected device” will pop up for your selection. Please select the device you are trying to plug in.

* If the device is being plugged into the correct jack, you will be able to find the icon beside the jack changed to the one that is same as your device.
**Connector Settings**
Click ❌ to access connector settings

√ Mute rear panel when front headphone plugged in
   Once this option is checked, when front headphone is plugged, the music that is playing from the back panel, will be stopped.

√ Disable front panel jack detection (option)
   Did not find any function on front panel jacks?
   Please check if front jacks on your system are so-called AC’97 jacks. If so, please check this item to disable front panel jack detection.

√ Enable auto popup dialogue, when device has been plugged in.
   Once this item checked, the dialog “Connected device” would automatically pop up when device plugged in.

**S/PDIF**
Short for Sony/Philips Digital Interface, a standard audio file transfer format. S/PDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format. Maintaining the viability of a digital signal prevents the quality of the signal from degrading when it is converted to analog.
√ Output Sampling Rate
- 44.1KHz: This is recommended while playing CD
- 48KHz: This is recommended while playing DVD or Dolby
- 96KHz: This is recommended while playing DVD-Audio
- 192KHz: This is recommended while playing HD Audio

√ Output Source
- Output digital audio source: The digital audio format (such as .wav, .mp3, .midi etc) will come out through S/PDIF-Out.

Speaker Calibration
After you have successfully plugged in speakers and assigned to the right jacks, you are only one more step to go to enjoy the intended sound. We provide “Speaker Calibration” to help you check if the speakers are located in the correct position.

Step 1
Select the channel output (headphone / 2 / 4 / 6 / 8 channel)

Step 2
Click “play” icon

Step 3
Look at the scene; while the speaker appears flushing, you should be able to hear the sound exactly from that direction.
Microphone
This page is designed to provide you better microphone/recording quality.

Below picture indicates both "Noise Suppression" & "Acoustic Echo Cancellation" are both enabled.

Noise Suppression
If you feel that the background noise, especially the sound generated from the fan inside PC, is too loud? Try “Noise Suppression”, which allows you to cut off and suppress disturbing noise.

Beam Forming
Also known as “directional recording”, this option lets you do the following: Once beam forming is enabled; only the sound from certain direction will be recorded. You will get the best quality if you chose 90° position, which we recommend you to use, this effectively means that you speak right into the microphone.

Note:  A Stereo Microphone is required when using Beam Forming function.

Acoustic Echo Cancellation
This function prevents playback sound from being recorded by microphone together with your sound. For example, you might have chance to use VOIP function through Internet with your friends. The voice of your friend will come out from speakers (playback). However, the voice of your friend might also be recorded into your microphone then go back to your friend through Internet. In that case, your friend will hear his/her own voice again. With AEC (Acoustic Echo Cancellation) enabled at your side, your friend can enjoy the benefit with less echo.
Audio Demo

The section “3D Audio Demo” grants you another possibility to enjoy your sound. The Audio Demo allows you to listen to sound in an extraordinary way.

Information

This section provides information about your current system audio device.