

# SYM86455VG GA

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Version 1.0

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

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment onto an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Shielded interconnect cables and a shielded AC power cable must be employed with this equipment to ensure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.

## Preface

## Declaration of Conformity

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions:

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

## Canadian Department of Communications

This class B digital apparatus meets all requirements of the Canadian Interference-causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

## About the Manual

The manual consists of the following:

<b>Chapter 1</b>	Describes features of the motherboard.
<b>Introducing the Motherboard</b>	Go to ➔ page 1
<b>Chapter 2</b>	Describes installation of motherboard components.
<b>Installing the Motherboard</b>	Go to ➔ page 9
<b>Chapter 3</b>	Provides information on using the BIOS Setup Utility.
<b>Using BIOS</b>	Go to ➔ page 29
<b>Chapter 4</b>	Provides basic trouble shooting tips
<b>Trouble Shooting</b>	Go to ➔ page 63

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# **Chapter 1**

## ***Introducing the Motherboard***

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### **Introduction**

Thank you for choosing the SYM86455 motherboard. This motherboard is a high performance, enhanced function motherboard designed to support the LGA1151 socket for Intel latest Skylake processors for high-end business or personal desktop markets.

This motherboard is based on Intel® H110 Chipset for best desktop platform solution. It supports up to 16 GB of system memory with dual channel DDR4 2133 MHz. Two PCI Express16X Gen3 slots (1 with PClex4) and one PCIE1X Gen2 are supported, intended for Graphics Interface. In addition, four PCI slots are for extending usage.

It integrates USB 2.0 and USB 3.0 interface, supporting up to six USB 2.0 ports (two USB 2.0 ports at the rear panel and three USB 2.0 headers support additional four USB 2.0 ports) and four USB 3.0 ports at rear panel).

The motherboard is equipped with advanced full set of I/O ports in the rear panel, including PS/2 mouse and PS/2 keyboard connectors, one HDMI port, one COM port, one VGA port, one DVI port, two USB 2.0 ports, four USB 3.0 ports, two LAN ports, and audio jacks for line-in, line-out.

In addition, this motherboard supports four SATA 6.0Gb/s connectors for expansion.

## Feature

### Processor

The motherboard uses Skylake series CPU that carries the following features:

- DirectX11.1-compliant GCN-based graphics architecture
- Supports “Hyper-Threading” technology APU
- Supports Win8 and UEFI Secure Boot.

“Hyper-Threading” technology enables the operating system into thinking it's hooked up to two processors, allowing two threads to be run in parallel, both on separate “logical” processors within the same physical processor.

### Chipset

The integrated Skylake H110 chip is a dual-chip with proven reliability and high performance.

- Support one PCI Express x1 slot
- Integrated four SATA 6.0 Gb/s Host Controllers
- Six USB 2.0 ports supported
- Four USB 3.0 port supported
- Support two PCI Express x16 Gen3 slots (1 with PClex4)
- Support four PCI slots
- Intel® High Definition Audio Controller

### Memory

- Supports DDR4 2133 (1GB/ 2GB/ 4GB/ 8GB) SDRAM with two-channel architecture
- Up to 16GB 288 pin DIMM memory module support

### Audio

- 2 Channel High Definition Audio Codec
- Meets Microsoft Windows Logo Program and Lync audio requirements
- All DACs supports 44.1k/48k/96k/192kHz sample rate
- Software selectable 2.5V/3.2V/4.0V VREFOUT
- Direct Sound 3D™ compatible
- Power Support: Digital: 3.3V; Analog: 5.0V

## Ethernet LAN

The onboard LAN provides the following features:

- Supports PCI Express<sup>TM</sup> 1.1
- IEEE 802.3/z
- Wake-on-LAN (including from S3, S4, S5, power button off) and remote wake-up support
- PXE and RPL support

## Expansion Options

The motherboard comes with the following expansion options:

- One PCI Express x1 slot
- Four SATA 6.0Gb/s connectors
- Support two PCI Express x16 Gen3 slots (1 with PClex4)
- Support four PCI slots

## Integrated I/O

The motherboard has a full set of I/O ports and connectors:

- Two LAN ports
- One Serial port (COM)
- One DVI port (DVI-D)
- two USB 2.0 ports
- One VGA port
- One HDMI port
- Four USB 3.0 ports
- One PS/2 keyboard and PS/2 mouse connector
- Audio jacks for line-out and Mic-in

## BIOS Firmware

This motherboard uses AMI BIOS that enables users to configure many system features including the following:

- Power management
- Wake-up alarms
- APU parameters
- APU and memory timing
- Graphic parameters

The firmware can also be used to set parameters for different processor clock speeds.



*1. Some hardware specifications and software items are subject to change without prior notice.*

*2. Due to chipset limitation, we recommend that motherboard be operated in the ambience between 0 and 60 ° C. (NOTICE: Test method: bare PCB with 100% loading running Pass Mark 7.0 at chamber 60 ° C)*

## Introducing the Motherboard

## Specifications

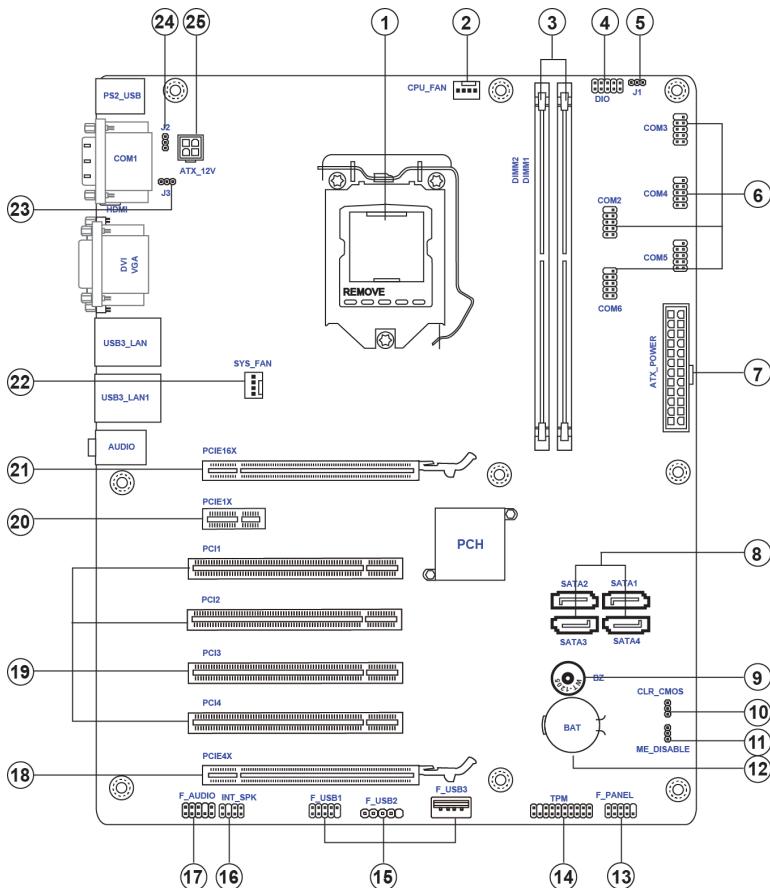
<b>CPU</b>	<ul style="list-style-type: none"> <li>• LGA1151 socket for Intel Skylake processors, Dual cores</li> </ul>
<b>Chipset</b>	<ul style="list-style-type: none"> <li>• Intel® H110 Chipset</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>• Dual-channel DDR4 memory architecture</li> <li>• 2 x DDR4 DIMM sockets support up to 32 GB</li> <li>• Supports DDR4 2133 MHz</li> </ul>
<b>Expansion Slots</b>	<ul style="list-style-type: none"> <li>• 2 x PCI Express x16 Gen3 slots (1 with PClex4)</li> <li>• 1 x PCI Express x1 Gen2 slot</li> <li>• 4 x PCI slots</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>• Supported by Intel® H110 Express Chipset           <ul style="list-style-type: none"> <li>- 4 x Serial ATA 6.0 Gb/s devices</li> </ul> </li> </ul>
<b>Audio</b>	<ul style="list-style-type: none"> <li>• Realtek ALC662 HD audio CODEC</li> </ul>
<b>LAN</b>	<ul style="list-style-type: none"> <li>• Intel I211AT</li> <li>• Intel I219V</li> </ul>
<b>Rear Panel I/O</b>	<ul style="list-style-type: none"> <li>• 1 x PS/2 keyboard &amp; PS/2 mouse connectors</li> <li>• 1 x HDMI port</li> <li>• 1 x COM port</li> <li>• 1 x VGA port</li> <li>• 1 x DVI port (DVI-D)</li> <li>• 2 x USB 2.0 ports</li> <li>• 4 x USB 3.0 ports</li> <li>• 2 x RJ45 LAN connectors</li> <li>• 1 x COM port (RS232/422/485 Controlled by BIOS)</li> <li>• 1 x Audio port (Line in, line out)</li> </ul>
<b>Internal I/O Connectors &amp; Headers</b>	<ul style="list-style-type: none"> <li>• 1 x 24-pin ATX Power Supply connector</li> <li>• 1 x 4-pin ATX_12V Power Supply connector</li> <li>• 1 x 4-pin CPU_FAN connector</li> <li>• 1 x 4-pin SYS_FAN connector</li> <li>• 4 x SATA III 6.0Gb/s connectors</li> <li>• 1 x Front panel switch/LED header</li> <li>• 1 x Front panel audio header</li> <li>• 1 x USB 2.0 header support additional two USB 2.0 ports</li> <li>• 1 x 5-pin USB 2.0 header support additional one USB 2.0 port</li> <li>• 1 x USB 2.0 port</li> <li>• 5 x Onboard Serial port headers (COM2~6) (RS232)</li> <li>• 1 x Clear CMOS header with jumper</li> <li>• 1 x ME disable header with jumper</li> <li>• 1 x Buzzer header</li> <li>• 1 x INT_SPK header</li> <li>• 1 x DIO header</li> <li>• 1 x J1 jumper</li> <li>• 1 x J2 jumper</li> <li>• 1 x J3 jumper</li> </ul>

Introducing the Motherboard

<b>System BIOS</b>	<ul style="list-style-type: none"><li>• AMI BIOS with 64Mb SPI Flash ROM</li><li>• Supports Plug and Play, STR (S3) / STD (S4) , Hardware monitor</li><li>• Supports ACPI &amp; DMI</li><li>• Audio, LAN, can be disabled in BIOS</li><li>• F7 hot key for boot up devices option</li></ul>
<b>Form Factor</b>	<ul style="list-style-type: none"><li>• Micro ATX Size, 305mm x 244mm</li></ul>

## Introducing the Motherboard

## Motherboard Components



Introducing the Motherboard

*Table of Motherboard Components*

LABEL	COMPONENTS
1. CPU	LGA1151 socket for Intel Skylake processors
2. CPU_FAN	CPU cooling fan connector
3. DIMM1~2	288-pin DDR4 Module slots
4. DIO	Digital Input & output header
5. J1	Power mode Select jumper
6. COM2~6	Onboard serial port headers
7. ATX_POWER	Standard 24-pin ATX power connector
8. SATA1~4	Serial ATA 6.0Gb/s connectors
9. BZ	Buzzer
10. CLR_CMOS	Clear CMOS header with jumper
11. ME_DISABLE	Disable ME header with jumper
12. BAT	Battery
13. F_PANEL	Front panel switch/LED header
14. TPM	Trusted Platform Modual header
15. F_USB1~3	Front panel USB 2.0 headers
16. INT_SPK	Speaker header
17. F_AUDIO	Front panel audio header
18. PCIE4X	PCI Express x16 Gen2 slot for graphics interface
19. PCI1~4	32-bit add-on card slots
20. PCIE1X	PCI Express x1 slot
21. PCIE16X	PCI Express x16 Gen3 slot for graphics interface
22. SYS_FAN	System cooling fan connector
23. J3	COM1 Transmission Distance Select jumper (J3 and J2 need to switch at the same time)
24. J2	COM1 Transmission Distance Select jumper (J3 and J2 need to switch at the same time)
25. ATX_12V	Auxiliary 4-pin power connector

This concludes Chapter 1. The next chapter explains how to install the motherboard.

***Memo***

**Introducing the Motherboard**

## Chapter 2

### ***Installing the Motherboard***

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#### **Safety Precautions**

- Follow these safety precautions when installing the motherboard
- Wear a grounding strap attached to a grounded device to avoid damage from static electricity
- Discharge static electricity by touching the metal case of a safely grounded object before working on the motherboard
- Leave components in the static-proof bags they came in
- Hold all circuit boards by the edges. Do not bend circuit boards

#### **Choosing a Computer Case**

There are many types of computer cases on the market. The motherboard complies with the specifications for the DTX system case. Some features on the motherboard are implemented by cabling connectors on the motherboard to indicators and switches on the system case. Make sure that your case supports all the features required.

Most cases have a choice of I/O templates in the rear panel. Make sure that the I/O template in the case matches the I/O ports installed on the rear edge of the motherboard.

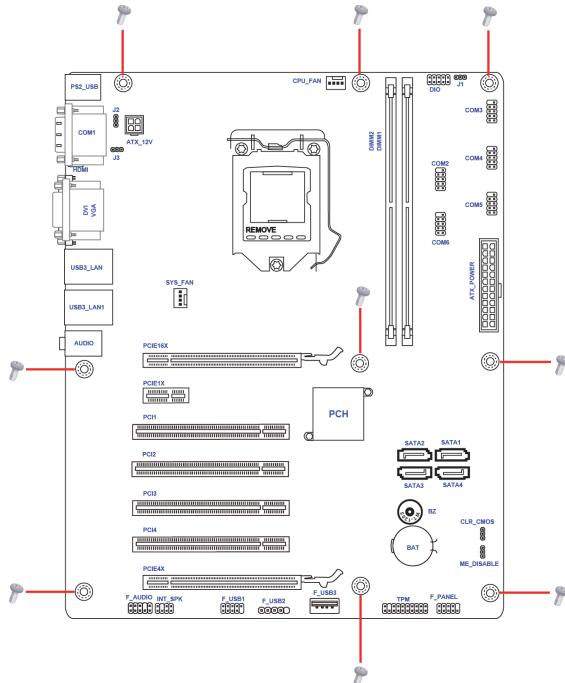
This motherboard carries a ATX form factor of 305 x 244 mm. Choose a case that accommodates this form factor.

#### **Installing the Motherboard in a Case**

Refer to the following illustration and instructions for installing the motherboard in a case.

Most system cases have mounting brackets installed in the case, which correspond to the holes in the motherboard. Place the motherboard over the mounting brackets and secure the motherboard onto the mounting brackets with screws.

Ensure that your case has an I/O template that supports the I/O ports and expansion slots on your motherboard.



*Do not over-tighten the screws as this can stress the motherboard.*

## Checking Jumper Settings

This section explains how to set jumpers for correct configuration of the motherboard.

### Setting Jumpers

Use the motherboard jumpers to set system configuration options. Jumpers with more than one pin are numbered. When setting the jumpers, ensure that the jumper caps are placed on the correct pins.

The illustrations show a 2-pin jumper. When the jumper cap is placed on both pins, the jumper is **SHORT**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **OPEN**.

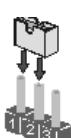
This illustration shows a 3-pin jumper. Pins 1 and 2 are **SHORT**.



**SHORT**



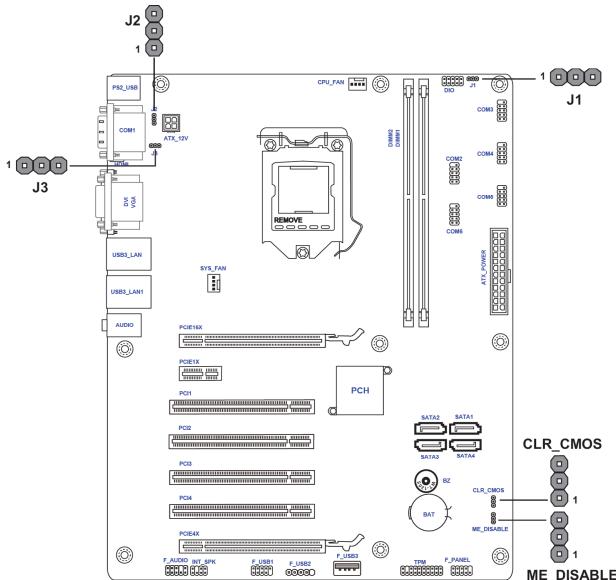
**OPEN**



## Installing the Motherboard

## Checking Jumper Settings

The following illustration shows the location of the motherboard jumpers. Pin 1 is labeled.



## Jumper Settings

Jumper	Type	Description	Setting (default)	
<b>CLR_CMOS</b>	3-pin	Clear CMOS	1-2: NORMAL <b>(Default)</b>	
			2-3: CLEAR Before clearing the CMOS, make sure to turn off the system.	
<b>J1</b>	3-pin	Power supply switch	1-2: ATX <b>(Default)</b>	
			2-3: AT	



To avoid the system instability after clearing CMOS, we recommend users to enter the main BIOS setting page to “Load Default Settings” and then “Save and Exit Setup”.

## Installing the Motherboard

Jumper	Type	Description	Setting (default)	
<b>ME_DISABLE</b>	3-pin	Disable ME	1-2: NORMAL <b>(Default)</b>	1
			2-3: ME DISABLE	1
<b>J3*</b>	3-pin	COM1 Transmission Distance switch	1-2: Long distance transmission (for RS-422, RS-485)	1
			2-3: Short distance transmission <b>(Default)</b>	1
<b>J2*</b>	3-pin	COM1 Transmission Distance switch	1-2: Long distance transmission (for RS-422, RS-485)	1
			2-3: Short distance transmission <b>(Default)</b>	1



\*J3 and J2 need to switch at the same time.

Note:

ATX Mode	EUP=Disabled		EUP=Enabled	
	S0->S5->G3	S0->G3	S0->S5->G3	S0->G3
Power On	S5->S0	S5->S0	S5->S5	S5->S5
Last State	S5->S5	S5->S0	S5->S5	S5->S5
Power Off	S5->S5	S5->S5	S5->S5	S5->S5

AT Mode	EUP=Disabled		EUP=Enabled	
	S0->S5->G3	S0->G3	S0->S5->G3	S0->G3
Power On	S5->S0	S5->S0	S5->S0	S5->S0
Last State	S5->S0	S5->S0	S5->S0	S5->S0
Power Off	S5->S0	S5->S0	S5->S0	S5->S0

## Installing the Motherboard

## Installing Hardware

### Installing the Processor



*Caution: When installing a CPU heatsink and cooling fan make sure that you DO NOT scratch the motherboard or any of the surface-mount resistors with the clip of the cooling fan. If the clip of the cooling fan scrapes across the motherboard, you may cause serious damage to the motherboard or its components.*

*On most motherboards, there are small surface-mount resistors near the processor socket, which may be damaged if the cooling fan is carelessly installed.*

*Avoid using cooling fans with sharp edges on the fan casing and the clips. Also, install the cooling fan in a well-lit work area so that you can clearly see the motherboard and processor socket.*

### Before installing the Processor

This motherboard automatically determines the CPU clock frequency and system bus frequency for the processor. You may be able to change the settings in the system Setup Utility. We strongly recommend that you do not over-clock processors or other components to run faster than their rated speed.



*Warning:*

- 1. Over-clocking components can adversely affect the reliability of the system and introduce errors into your system. Over-clocking can permanently damage the motherboard by generating excess heat in components that are run beyond the rated limits.*
- 2. Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.*

This motherboard has an LGA1151 socket. When choosing a processor, consider the performance requirements of the system. Performance is based on the processor design, the clock speed and system bus frequency of the processor, and the quantity of internal cache memory and external cache memory.

### Fail-Safe Procedures for Over-clocking

When end-users encounter failure after attempting over-clocking, please take the following steps to recover from it.

1. Shut down the computer.
2. Press and hold the “Page Up Key (PgUp)” of the keyboard, and then boot the PC up.
3. Two seconds after the PC boots up, release the “Page Up Key (PgUp)”.
4. The BIOS returns to the default setting by itself.

## Installing the Motherboard

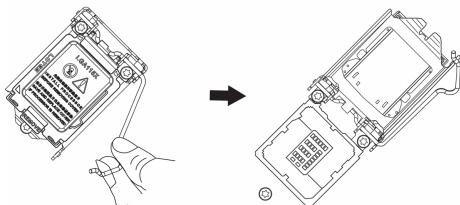
## CPU Installation Procedure

The following illustration shows CPU installation components.

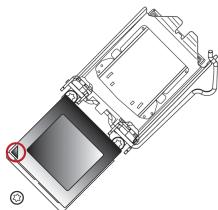
- A. Press the hook of lever down with your thumb and pull it to the right side to release it from retention tab.



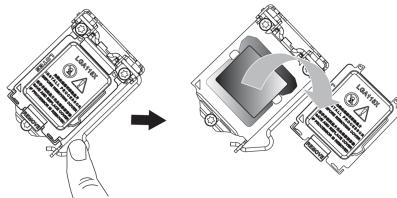
- B. Lift the tail of the load lever and rotate the load plate to fully open position.



- C. Grasp the edge of the package substrate. Make sure pin 1 indicator is on your bottom-left side. Aim at the socket and place the package carefully into the socket by purely vertical motion.



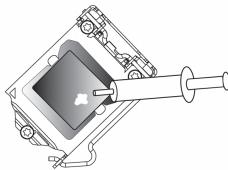
- D. Rotate the load plate onto the package IHS (Intergraded Heat Spreader). Engage the load lever while pressing down lightly onto the load plate. Secure the load lever with the hook under retention tab. Then the cover will flick automatically.



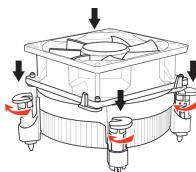
*Please save and replace the cover onto the CPU socket if processor is removed.*

## Installing the Motherboard

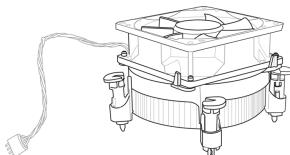
E. Apply some thermal grease onto the contacted area between the heatsink and the CPU, and make it to be a thin layer.



F. Fasten the cooling fan supporting base onto the CPU socket on the motherboard. And make sure the CPU fan is plugged to the CPU fan connector.



G. Connect the CPU cooler power connector to the CPU\_FAN connector.



1. To achieve better airflow rates and heat dissipation, we suggest that you use a high quality fan with 3800 rpm at least. CPU fan and heatsink installation procedures may vary with the type of CPU fan/heatsink supplied. The form and size of fan/heatsink may also vary.

2. DO NOT remove the CPU cap from the socket before installing a CPU.

3. Return Material Authorization (RMA) requests will be accepted only if the motherboard comes with the cap on the LGA1151 socket.

## Installing the Motherboard

## Installing Memory Modules

This motherboard accommodates two memory modules. It can support DDR4 2133 (1GB/ 2GB/ 4GB/ 8GB). The total memory capacity is 16 GB.

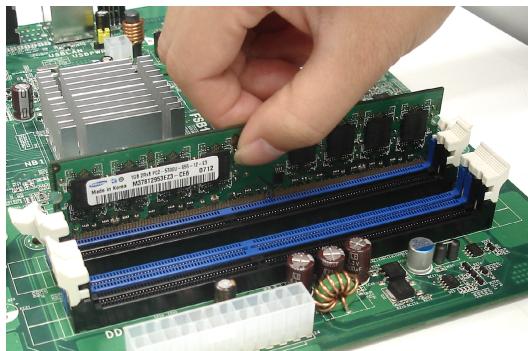


*Do not remove any memory module from its antistatic packaging until you are ready to install it on the motherboard. Handle the modules only by their edges. Do not touch the components or metal parts. Always wear a grounding strap when you handle the modules.*

## Installation Procedure

Refer to the following to install the memory modules.

- 1 This motherboard supports unbuffered DDR4 2133 SDRAM .
- 2 Push the latches on each side of the DIMM slot down.
- 3 Align the memory module with the slot. The DIMM slots are keyed with notches and the DIMMs are keyed with cutouts so that they can only be installed correctly.
- 4 Check that the cutouts on the DIMM module edge connector match the notches in the DIMM slot.
- 5 Install the DIMM module into the slot and press it firmly down until it seats correctly. The slot latches are levered upwards and latch on to the edges of the DIMM.
- 6 Install any remaining DIMM modules.



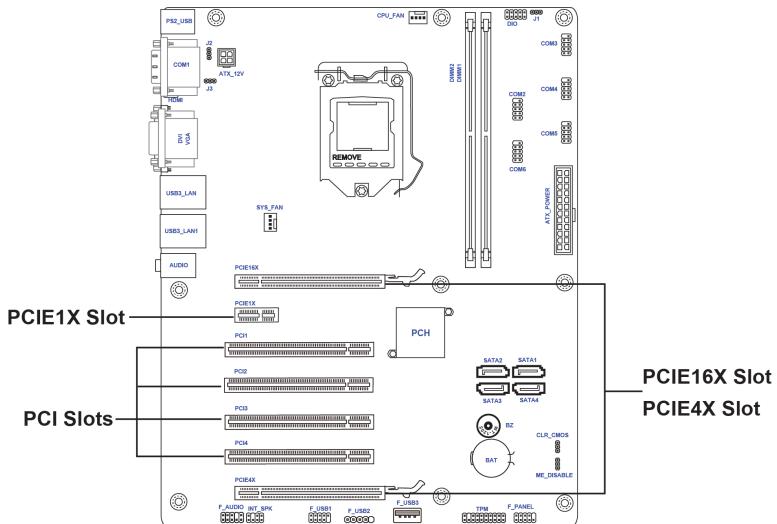
\* For reference only

## Installing the Motherboard

## Expansion Slots

### Installing Add-on Cards

The slots on this motherboard are designed to hold expansion cards and connect them to the system bus. Expansion slots are a means of adding or enhancing the motherboard's features and capabilities. With these efficient facilities, you can increase the motherboard's capabilities by adding hardware that performs tasks that are not part of the basic system.



#### PCIE16X Slot

The PCI Express x16 slot is used to install an external PCI Express graphics card that is fully compliant to the PCI Express Base Specification revision 3.0.

#### PCIE4X Slot

The PCI Express x4 slot is used to install an external PCI Express graphics card that is fully compliant to the PCI Express Base Specification revision 3.0.

#### PCIE Slot

The PCI Express x1 slot is fully compliant to the PCI Express Base Specification revision 2.0.

#### PCI1~4 Slots

This motherboard is equipped with four standard PCI slots. PCI stands for Peripheral Component Interconnect and is a bus standard for expansion cards, which for the most part, is a supplement of the older ISA bus standard. The PCI slots on this board are PCI v2.2 compliant.

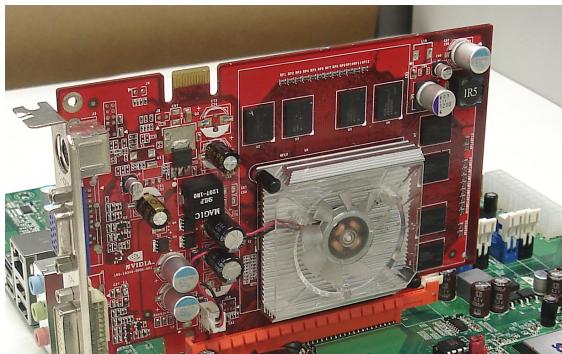


*Before installing an add-on card, check the documentation for the card carefully. If the card is not Plug and Play, you may have to manually configure the card before installation.*

## Installing the Motherboard

Follow these instructions to install an add-on card:

- 1 Remove a blanking plate from the system case corresponding to the slot you are going to use.
- 2 Install the edge connector of the add-on card into the expansion slot. Ensure that the edge connector is correctly seated in the slot.
- 3 Secure the metal bracket of the card to the system case with a screw.



\* For reference only

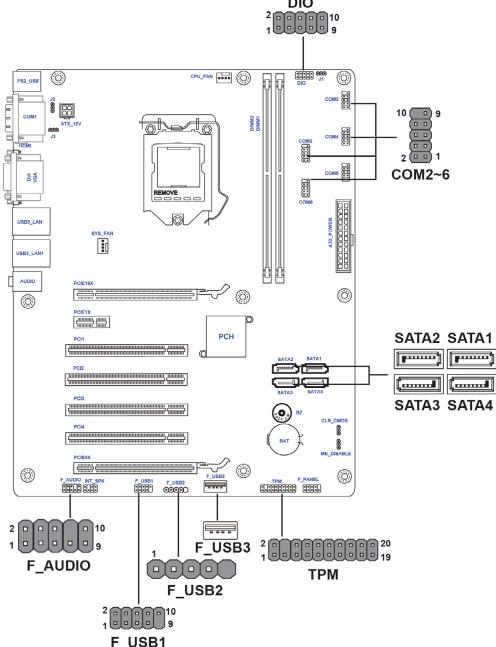


For some add-on cards, for example graphics adapters and network adapters, you have to install drivers and software before you can begin using the add-on card.

## Installing the Motherboard

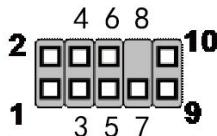
## Connecting Optional Devices

Refer to the following for information on connecting the motherboard's optional devices:



### F\_AUDIO: Front Panel Audio Header

The front panel audio header allows the user to install auxiliary front-oriented microphone and line-out ports for easier access. This header supports HD audio by default. If you want connect an AC' 97 front panel audio to HD onboard headers, please set as below picture.



### For HD Front Audio

Pin	Description	Pin	Description
1	Left channel microphone input signal	2	Analog ground
3	Right channel microphone input signal	4	HD Panel sensor detect
5	Right channel to front panel	6	Microphone sensor detect
7	Analog ground	8	No pin
9	Left channel to front panel	10	Line-in sensor detect

## Installing the Motherboard

## COM2~6 : Onboard serial port headers

Connect a serial port extension bracket to this header to add a second serial port to your system.

Pin	Signal Name	Pin	Signal Name
1	Data Carrier Detect	6	Data Set Ready
2	Serial Input	7	Request to Send
3	Serial Output	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Ground	10	No pin

## SATA1~4: Serial ATA 6.0Gb/s connector

This connector is used to support the Serial ATA devices for the highest data transfer rates (6.0 Gb/s), simpler disk drive cabling and easier PC assembly.

Pin	Signal Name	Pin	Signal Name
1	Ground	2	TX+
3	TX-	4	Ground
5	RX-	6	RX+
7	Ground	8	No pin

## TPM: Trusted Platform Module header

Trusted platform module (TPM) is a published specification detailing a microcontroller that can store secured information, and implementations of that specification.

Pin	Signal Name	Pin	Signal Name
1	TPM_CLK	11	LAD0
2	GND	12	GND
3	LFRAFME#	13	RESERVE0
4	No pin	14	RESERVE1
5	LREST#	15	VCC3_DUAL
6	SMBDATA	16	SERIRQ
7	LAD3	17	GND
8	LAD2	18	GND
9	VCC3	19	LPCPD#
10	LAD1	20	SMBCLK

## Installing the Motherboard

### F\_USB1: Front Panel USB 2.0 header

The onboard F\_USB1~3 header delegate for card reader, it supports additional six USB 2.0 ports.

Pin	Signal Name	Pin	Signal Name
1	Power +5V	6	USB Port B (+)
2	Power +5V	7	Ground
3	USB Port A (-)	8	Ground
4	USB Port B (-)	9	No pin
5	USB Port A (+)	10	Not Connected

### F\_USB2: Front Panel USB 2.0 header

The onboard F\_USB header delegate for card reader, it supports additional one USB 2.0 port.

Pin	Signal Name	Function
1	USBPWR	Front Panel USB Power
2	DATA-	USB Port Negative Signal
3	DATA+	USB Port Positive Signal
4	GND	Ground
5	No pin	No pin



*Please make sure that the USB cable has the same pin assignment as indicated above. A different pin assignment may cause damage or system hang-up.*

### DIO: 4 bit GPIO header

Pin	Signal Name	Pin	Signal Name
1	GPIO3	6	GPIO5
2	GPIO7	7	GPIO0
3	GPIO2	8	GPIO4
4	GPIO6	9	+5VSB
5	GPIO1	10	GND

## ***Installing a SATA Hard Drive***

This section describes how to install a SATA Hard Drive.

### **About SATA Connectors**

Your motherboard features four SATA connectors supporting a total of four drives. SATA refers to Serial ATA (Advanced Technology Attachment) is the standard interface for the IDE hard drives which are currently used in most PCs. These connectors are well designed and will only fit in one orientation. Locate the SATA connectors on the motherboard and follow the illustration below to install the SATA hard drives.

### **Installing Serial ATA Hard Drives**

To install the Serial ATA (SATA) hard drives, use the SATA cable that supports the Serial ATA protocol. This SATA cable comes with a SATA power cable. You can connect either end of the SATA cable to the SATA hard drive or the connector on the motherboard.



**SATA cable (optional)**



**SATA power cable (optional)**

Refer to the illustration below for proper installation:

- 1 Attach either cable end to the connector on the motherboard.
- 2 Attach the other cable end to the SATA hard drive.
- 3 Attach the SATA power cable to the SATA hard drive and connect the other end to the power supply.



*\* For reference only*

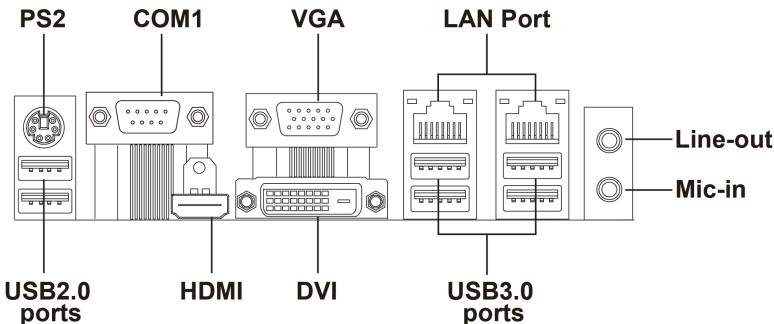


*This motherboard supports the “Hot-Plug” function.*

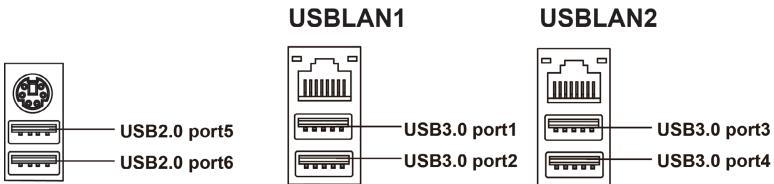
## ***Installing the Motherboard***

## Connecting I/O Devices

The backplane of the motherboard has the following I/O ports:



<b>PS2 Mouse</b>	Use the upper PS2 port to connect a PS/2 pointing device or keyboard.
<b>USB 2.0 Ports</b>	Use the USB 2.0 ports to connect USB 2.0 devices.
<b>Serial port (COM1)</b>	Use the COM port to connect the serial devices such as mice or fax/modems.
<b>HDMI Port</b>	You can connect the cash drawer to the HDMI port.
<b>VGA Port</b>	You can connect the display devices to the VGA port.
<b>DVI Port</b>	You can connect the display devices to the DVI port.
<b>LAN Ports</b>	Connect an RJ-45 jack to the LAN port to connect your computer to the Network.
<b>USB 3.0 Ports</b>	Use the USB 3.0 ports to connect USB 3.0 devices.

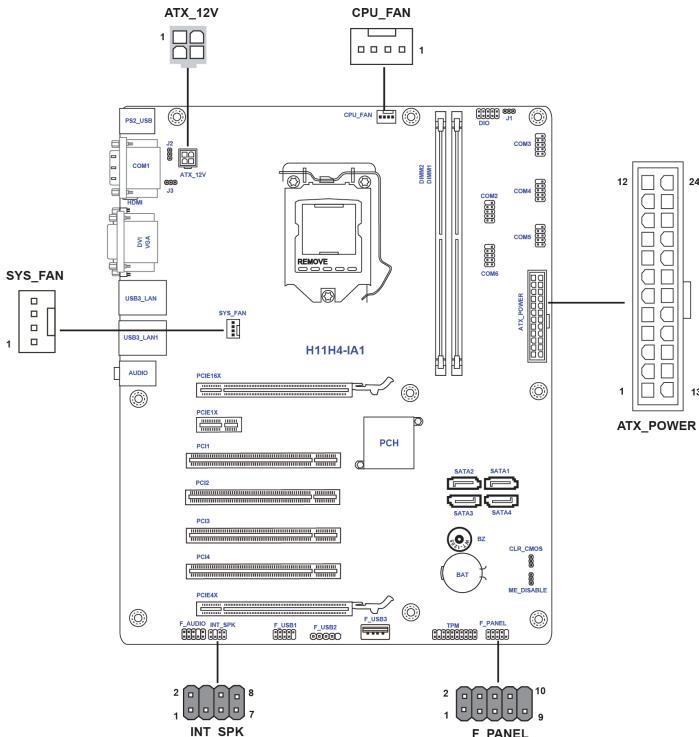


<b>Audio Ports</b>	Use the two audio ports to connect audio devices. The first jack is for stereo line-out singal. The second jack is for stereo Mic-in singal.
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## Connecting Case Components

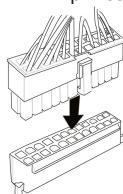
After you have installed the motherboard into a case, you can begin connecting the motherboard components. Refer to the following:

- 1 Connect the CPU cooling fan connector to **CPU\_FAN**.
- 2 Connect the system cooling fan connector to **SYS\_FAN**.
- 3 Connect the standard power supply connector to **ATX\_POWER**.
- 4 Connect the case switches and indicator LEDs to the **F\_PANEL**.
- 5 Connect the case speaker cable to **INT\_SPK**.
- 6 Connect the auxiliary case power supply connector to **ATX\_12V**.



### Connecting 24-pin power cable

The ATX 24-pin connector allows you to connect to ATX v2.x power supply.



24-pin power cable

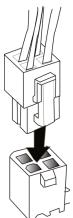
With ATX v2.x power supply, users please note that when installing 24-pin power cable, the latches of power cable and the ATX match perfectly.

## Installing the Motherboard



### **Connecting 4-pin power cable**

The ATX12V4P power connector is used to provide power to the CPU.



**4-pin power cable**

When installing 4-pin power cable, the latches of power cable and the ATX12V4P match perfectly.

## **ATX\_POWER**

Pin	Signal Name	Pin	Signal Name
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS_ON
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	PWRGD	20	-5V
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	Ground

## **ATX\_12V**

Pin	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

## **Installing the Motherboard**

**SYS\_FAN: System Cooling FAN Power Connectors**

Pin	Signal Name	Function
1	GND	System Ground
2	+12V	Power +12V
3	Sense	Sensor
4	CONTROL	CONTROL

**CPU\_FAN: CPU Cooling FAN Power Connectors**

Pin	Signal Name	Function
1	GND	System Ground
2	+12V	Power +12V
3	Sense	Sensor
4	CONTROL	CONTROL

**INT\_SPK: Internal speaker**

Pin	Signal Name	Pin	Signal Name
1	Output_L	5	GND
2	GND	6	GND
3	Output_R	7	+3.3V
4	GND	8	VCC

## **Front Panel Header**

The front panel header (F\_PANEL) provides a standard set of switch and LED headers commonly found on ATX or Micro ATX cases. Refer to the table below for information:



Pin	Signal	Pin	Signal
1	Hard disk LED (+)	6	Power Switch (+)
2	MSG LED (+)	7	Reset Switch (+)
3	Hard disk LED (-)	8	Power Switch (-)
4	MSG LED (-)	9	Reserved
5	Reset Switch (-)	10	No pin

\* MSG LED (dual color or single color)

## **Hard Drive Activity LED**

Connecting pins 1 and 3 to a front panel mounted LED provides visual indication that data is being read from or written to the hard drive. For the LED to function properly, an IDE drive should be connected to the onboard IDE interface. The LED will also show activity for devices connected to the SCSI (hard drive activity LED) connector.

## **Power/Sleep/Message waiting LED**

Connecting pins 2 and 4 to a single or dual-color, front panel mounted LED provides power on/off, sleep, and message waiting indication.

## **Reset Switch**

Supporting the reset function requires connecting pin 5 and 7 to a momentary-contact switch that is normally open. When the switch is closed, the board resets and runs POST.

## **Power Switch**

Supporting the power on/off function requires connecting pins 6 and 8 to a momentary-contact switch that is normally open. The switch should maintain contact for at least 50 ms to signal the power supply to switch on or off. The time requirement is due to internal de-bounce circuitry. After receiving a power on/off signal, at least two seconds elapses before the power supply recognizes another on/off signal.

## **Installing the Motherboard**

Note:

1. Intel I219 LAN PHY, EUP enable, S5 can wake up.

Wake Up on LAN	Driver Status			S0	S3	S4	S5
BIOS Default Wake Up on LAN =Enabled	Default (Wake on LAN Disabled)	Active LED	Access	Blink	Blink	Blink	Blink
			Not Access	OFF	OFF	OFF	OFF
		Speed LED	Disconnected	OFF	OFF	OFF	OFF
			1000: Amber	ON			
			100: Green	ON			
			10: OFF	OFF			

2. Intel I211 EUP enable, S5 cannot wake up.

Wake Up on LAN	Driver Status			S0	S3	S4	S5
BIOS Default Resume by PME/LAN1 =Disabled	Default (Wake on LAN Disabled)	Active LED	Access	Blink	Blink	Blink	OFF
			Not Access	OFF	OFF	OFF	OFF
		Speed LED	Disconnected	OFF	OFF	OFF	OFF
			1000: Amber	ON			
			100: Green	ON			
			10: OFF	OFF			

**Limit CPUID Maximum (Disabled)**

Use this item to enable or disable the maximum CPUID value limit, you can enable this item to prevent the system from “rebooting” when trying to install Windows NT4.0.

**Execute Disabled Bit (Enabled)**

This item allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage or worm propagation. Replacing older computers with Execute Disable Bit enabled systems can halt worm attacks, reducing the need for virus related repair.

**Intel Virtualization Technology (Enabled)**

When disabled, a VMM cannot utilize the additional hardware capabilities provided by Vander Pool Technology.

**Package C State limit (AUTO)**

Use this item to set package C state limit.

**Enhanced Halt (C1E)**

Use this item to enable or disable the Enhanced C1 state.

**Hardware P states (HWP (Disabled))**

Use this item to enable or disable the Hardware P states.

Press <Esc> to return to the Advanced Menu page.