

**P5LP-LE**  
*(Leonite)*



**Motherboard**

**E2905**

**First Edition V1  
October 2006**

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## P5LP-LE specifications summary

<b>CPU</b>	LGA775 socket for the Intel® Pentium® 4 and Conroe processor in the 775-land package
<b>Chipset</b>	Northbridge: Intel® 945G Graphics Memory and Controller Hub (GMCH) Southbridge: Intel® ICH7DH
<b>Front Side Bus (FSB)</b>	1066 MHz
<b>Memory</b>	Dual-channel memory architecture 4 x 240-pin DIMM sockets support unbuffered non-ECC 4 GB 667/533/400 MHz DDR2 memory modules
<b>Expansion slots</b>	1 x PCI Express™ x16 slot for discrete graphics card 3 x PCI slots
<b>Rear panel</b>	1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x IEEE 1394a port 1 x LAN (RJ-45) port 6 x audio ports support 8-channel audio configuration 4 x USB 2.0 ports support hot-plug function 1 x VGA port 1 x Coaxial SPDIF out port 1 x Coaxial SPDIF in port
<b>Internal connectors</b>	1 x Floppy connector 1 x IDE connector 1 x 24-pin ATX power connector 1 x 4-pin ATX 12 V power connector 4 x Serial ATA connectors 1 x IEEE 1394a connector 2 x USB 2.0 connectors 1 x CPU fan connector 1 x System fan connector 1 x Internal audio connector 1 x Digital audio connector 1 x Front headphone connector 1 x System panel connector
<b>Storage</b>	Southbridge supports: - 2 x Ultra DMA 100/66 hard disk drives - 4 x Serial ATA hard disk drives with hot-swap function

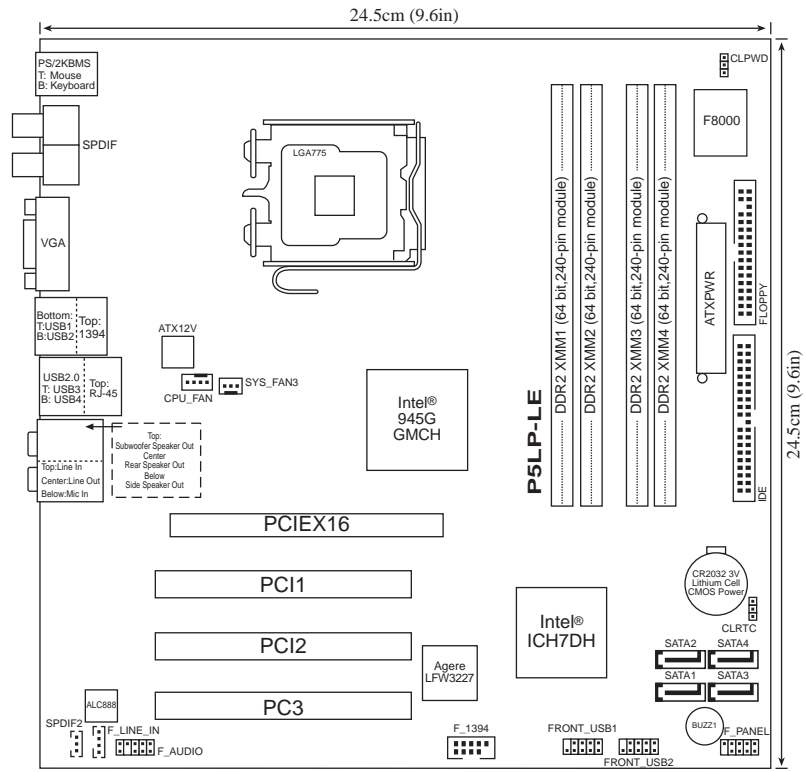
(continued on the next page)

## P5LP-LE specifications summary

<b>Audio</b>	Southbridge supports 8-channel audio configuration with Intel® High Definition Audio CODEC Realtek ALC888 High Definition Audio CODEC
<b>LAN</b>	Intel® 82562GT 10/100 Mbps Fast Ethernet LAN PHY
<b>IEEE 1394</b>	Agere LFW3227 two IEEE 1394a ports
<b>PC health monitoring</b>	ASUS F8000 for CPU, system, and chassis fan control, motherboard and CPU temperature
<b>BIOS features</b>	4 Mb SPI Flash ROM HP BIOS with enhanced ACPI, DMI, Green, and PnP Features Plus
<b>Form factor</b>	Micro-ATX form factor: 9.6 in x 9.6 in

\* Specifications are subject to change without notice

# 1. Motherboard layout



## 2. Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Pentium® 4 and Conroe processor in the 775-land package.

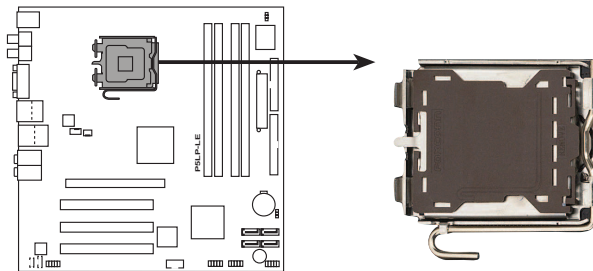


- Your boxed Intel® Pentium® 4 processor package should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.
- Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA775 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

### Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

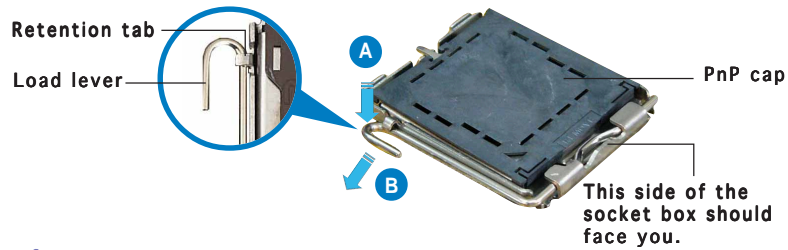


**P5LP-LE (Leonite) CPU Socket 775**



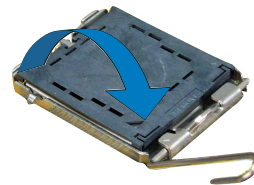
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.

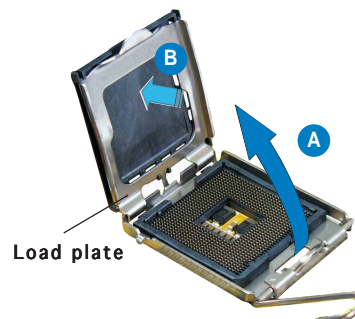


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

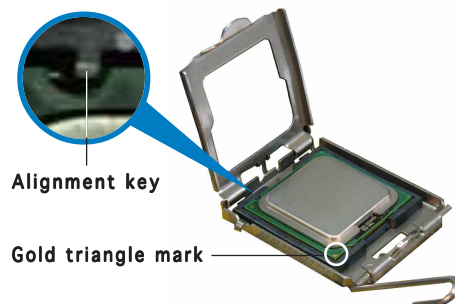
3. Lift the load lever in the direction of the arrow to a 135° angle.



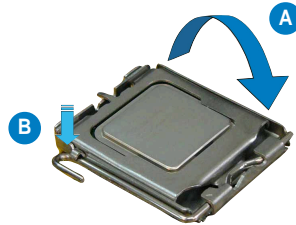
4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B).



5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.



6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.



The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

### Notes on Intel® Hyper-Threading Technology



- This motherboard supports Intel® Pentium® 4 processor in the 775-land package with Hyper-Threading Technology.
- Hyper-Threading Technology is supported under Windows® XP/2003 Server and Linux 2.4.x (kernel) and later versions only. Under Linux, use the Hyper-Threading compiler to compile the code. If you are using any other operating systems, disable the Hyper-Threading Technology item in the BIOS to ensure system stability and performance.
- Installing Windows® XP Service Pack 1 or later version is recommended.
- Make sure to enable the Hyper-Threading Technology item in BIOS before installing a supported operating system.
- For more information on Hyper-Threading Technology, visit [www.intel.com/info/hyperthreading](http://www.intel.com/info/hyperthreading).

To use the Hyper-Threading Technology on this motherboard:

1. Install an Intel® Pentium® 4 processor that supports Hyper-Threading Technology.
2. Power up the system and enter the BIOS Setup. Under the Advanced Menu, make sure that the item Hyper-Threading Technology is set to Enabled. The item appears only if you installed a CPU that supports Hyper-Threading Technology.
3. Reboot the computer.

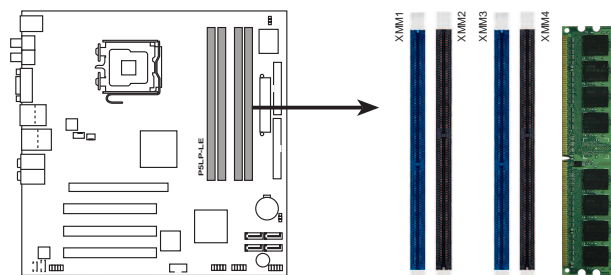


### 3. System memory

The motherboard comes with four Double Data Rate 2 (DDR2) Dual Inline Memory Module (DIMM) sockets.

A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket.

The following figure illustrates the location of the DDR2 DIMM sockets.



P5LP-LE (Leonite) 240-pin DDR2 DIMM sockets

#### 3.1 Memory configurations

You can install 256 MB, 512 MB, and 1 GB DDR2 SDRAM DIMMs into the DIMM sockets using the memory configurations in this section.



- Installing DDR2 DIMMs other than the recommended configurations may cause memory sizing error or system boot failure. Use any of the recommended configurations on the next page.
- Install only **identical** (the same type and size) DDR2 DIMM pairs using the recommended configurations.
- Make sure that the memory frequency matches the CPU FSB (Front Side Bus). Refer to the Memory frequency/CPU FSB synchronization table on the next page.
- This motherboard does not support double-sided 16-bit DDR DIMMs.
- Do not create a three-DIMM configuration in dual-channel mode. The third DIMM is ignored in the dual-channel operation.

## Recommended memory configurations

Mode		Sockets			
		DIMM1	DIMM2	DIMM3	DIMM4
Single-channel	(1)	Installed	—	—	—
	(2)	—	Installed	—	—
	(3)	—	—	Installed	—
	(4)	—	—	—	Installed
Dual-channel*	(1)	Installed	—	Installed	—
	(2)	—	Installed	—	Installed
	(3)	Installed	Installed	Installed	Installed

\* Use only identical DDR2 DIMM pairs.

## Memory frequency/CPU FSB synchronization

CPU FSB	DDR DIMM Type	Memory Frequency
1066 MHz	PC2-5300/PC2-4200	667/533 MHz
800 MHz	PC2-5300/PC2-4200/PC2-3200	667/533/400 MHz
533 MHz	PC2-5300/PC2-4200/PC2-3200	667/533/400 MHz

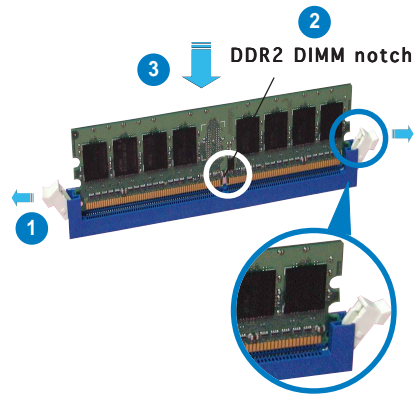
## 3.2 Installing a DDR2 DIMM



Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

To install a DIMM:

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



Unlocked retaining clip



- A DDR2 DIMM is keyed with a notch so that it fits in only one direction. Do not force a DIMM into a socket to avoid damaging the DIMM.
- The DDR2 DIMM sockets do not support DDR DIMMs. Do not install DDR DIMMs to the DDR2 DIMM sockets.

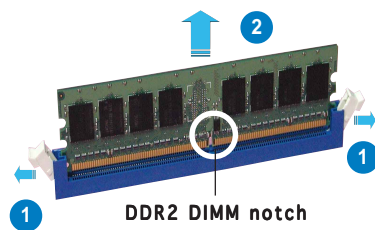
## 3.3 Removing a DDR2 DIMM

To remove a DIMM:

1. Simultaneously press the retaining clips outward to unlock the DIMM.



Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.



2. Remove the DIMM from the socket.

## 4. Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.



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Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

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### 4.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

### 4.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.



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When using PCI cards on shared slots, ensure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments; otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable. Refer to the table on the next page for details.

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## Standard interrupt assignments

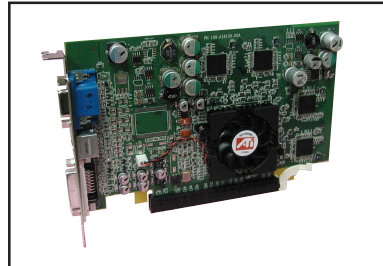
IRQ	Standard Function
0	System Timer
1	Standard 101/102-key or Microsoft® Natural PS/2 Keyboard
2	Programmable Interrupt Controller
3	Intel® USB Enhanced Host Controller
3	Intel® USB Universal Host Controller
4	Intel® USB Universal Host Controller
6	Standard Floppy Disk Controller
7	ECP Printer Port
8	System CMOS/Real Time Clock
9	SCI IRQ used by ACPI Bus
10	Intel® PCI Express Root Port
10	Intel® VGA Controller
10	Intel® ICH7DH High Definition Audio Controller
10	Intel® USB Universal Host Controller
11	VIA OHCI Compliant IEEE 1394 Host Controller
11	Intel® ICH7DH Integrated LAN Controller
12	Microsoft® Port Mouse
13	Numeric Data Processor
14	Intel® USB Universal Host Controller
14	Intel® Ultra ATA Storage Controllers
14	Intel® SMBus Controller

## IRQ assignments for this motherboard

	A	B	C	D	E	F
PCI slot 1	—	—	—	shared	—	—
PCI slot 2	shared	—	—	—	—	—
PCI slot 3	—	used	—	—	—	—
Onboard LAN	—	—	—	—	—	used
Onboard 1394 controller	—	—	—	—	used	—

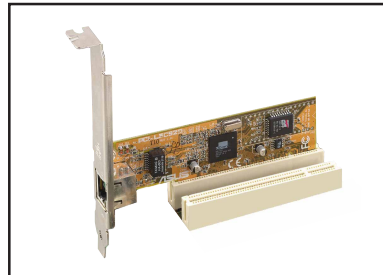
### PCI Express slot

This motherboard has one PCI Express slot, which supports a 164-pin x16 interface graphics card.



### PCI slots

There are three 32-bit PCI slots on this motherboard. The slots support PCI cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.



## 5. Jumpers

### Clear RTC RAM (3-pin CLRTC)

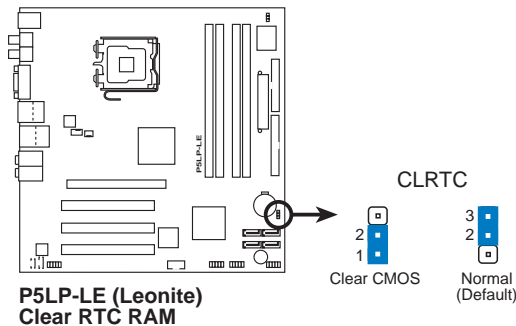
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 2-3 (Normal) to pins 1-2 (Clear CMOS). Keep the cap on pins 1-2 for about 5~10 seconds, then move the cap back to pins 2-3.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



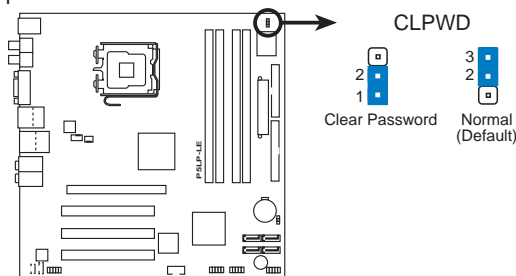
Except when clearing the RTC RAM, never remove the cap from the default position. Removing the cap will cause system boot failure!



**P5LP-LE (Leonite)**  
Clear RTC RAM

### Clear password (3-pin CLPWD)

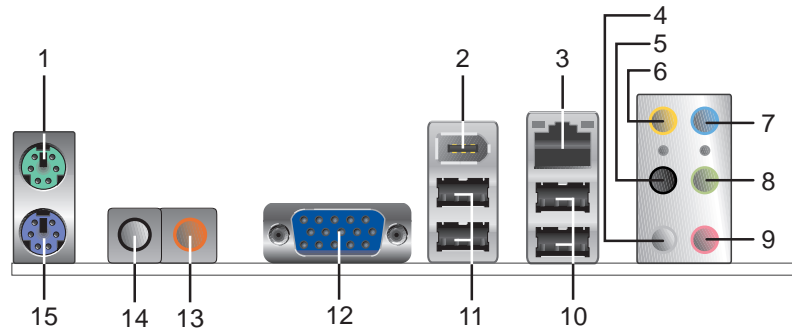
This jumper allows you to clear the password if you forgot your password.



**P5LP-LE (Leonite)**  
Clear password setting

## 6. Connectors

### 6.1 Rear panel connectors



1. **PS/2 mouse port (green)**. This port is for a PS/2 mouse.
2. **IEEE 1394a port**. This 6-pin IEEE 1394a port provides high-speed connectivity for audio/video devices, storage peripherals, PCs, or portable devices.
3. **LAN (RJ-45) port**. This port allows connection to a Local Area Network (LAN) through a network hub.
4. **Side Speaker Out port (gray)**. This port connects to the side speakers in an 8-channel audio configuration.
5. **Rear Speaker Out port (black)**. This port connects to the rear speakers on a 4-channel, 6-channel, or 8-channel audio configuration.
6. **Center/Subwoofer port (yellow orange)**. This port connects the center/subwoofer speakers.
7. **Line In port (light blue)**. This port connects a tape, CD, DVD player or other audio sources.
8. **Line Out port (lime)**. This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel mode, the function of this port becomes Front Speaker Out.
9. **Microphone port (pink)**. This port connects a microphone.



## Audio 2, 4, 6, or 8-channel configuration

Port	Headset/ 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Yellow Orange	-	-	Center/Subwoofer	Center/Subwoofer
Black	-	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Gray	-	-	-	Side Speaker Out

- 10. USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
- 11. USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
- 12. Video Graphics Adapter port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices.
- 13. Coaxial S/PDIF Out port.** This port connects an external audio output device via a coaxial S/PDIF cable.
- 14. Coaxial S/PDIF In port.** This port connects an external audio input device via a coaxial S/PDIF cable.
- 15. PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

## 6.2 Internal connectors

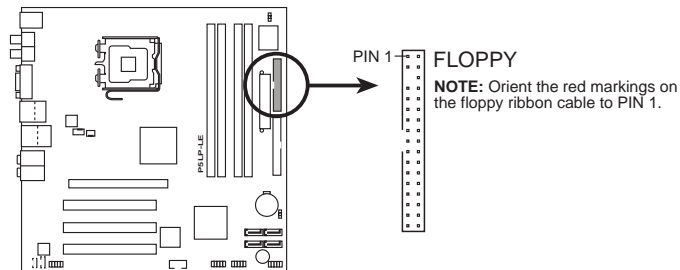
This section describes and illustrates the internal connectors on the motherboard.

### 1. Floppy disk drive connector (34-1 pin FLOPPY)

This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.



Pin 5 on the connector is removed to prevent incorrect cable connection when using an FDD cable with a covered Pin 5.



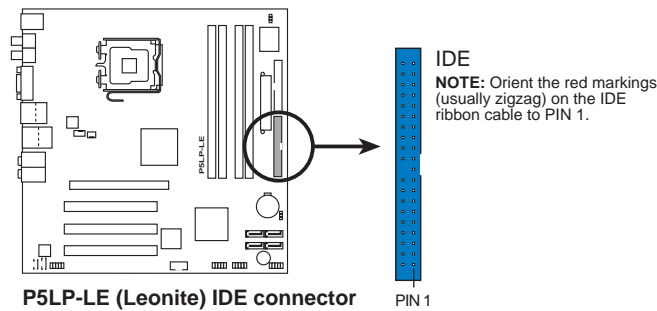
**P5LP-LE (Leonite) Floppy disk drive connector**

## 2. IDE connector (40-1 pin IDE)

This connector is for an Ultra DMA 100/66 signal cable. The Ultra DMA 100/66 signal cable has three connectors: a blue connector for the primary IDE connector on the motherboard, a black connector for an Ultra DMA 100/66 IDE slave device (optical drive/hard disk drive), and a gray connector for an Ultra DMA 100/66 IDE master device (hard disk drive). If you install two hard disk drives, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings.



- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 100/66 IDE devices.

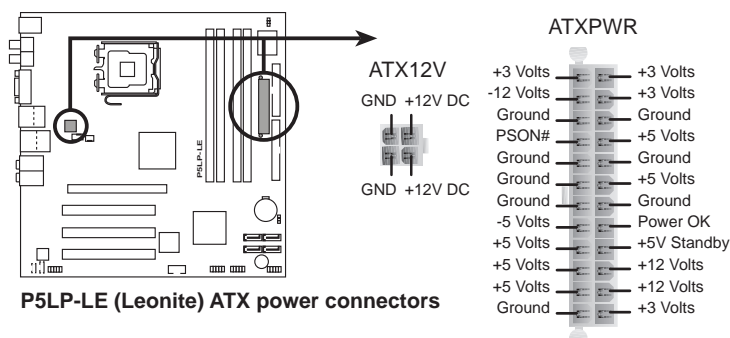


### 3. ATX power connectors (24-pin ATXPWR, 4-pin ATX12V)

These connectors are for an ATX power supply. The plugs from the power supply are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

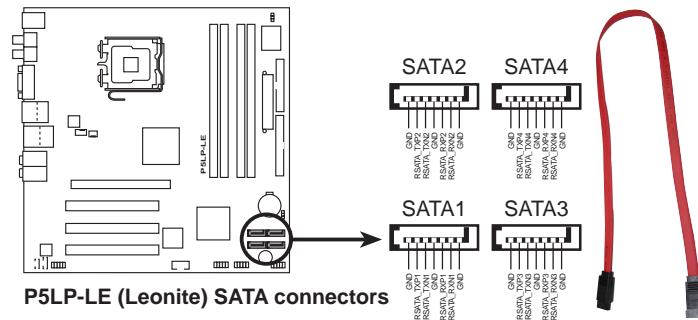


- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot up.
- Make sure that your ATX 12V power supply can provide 8A on the +12V lead and at least 1A on the +5-volt standby lead (+5VSB). The minimum recommended wattage is 230W, or 300W for a fully configured system. The system can become unstable and might experience difficulty powering up if the power supply is inadequate.
- You must install a PSU with a higher power rating if you intend to install additional devices.



#### 4. Serial ATA connectors (7-pin SATA1 [black], SATA2 [white], SATA3 [blue], SATA4 [yellow])

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.



P5LP-LE (Leonite) SATA connectors



#### Important notes on Serial ATA

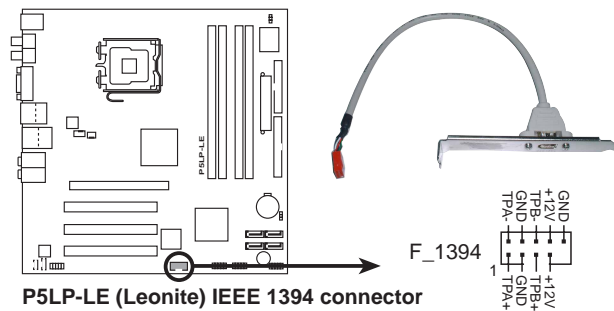
- Install the Windows® 2000 Service Pack 4 or the Windows® XP Service Pack1 before using Serial ATA.
- When using the connectors in **Standard IDE** mode, connect the primary (boot) hard disk drive to the SATA1 connector. Refer to the table below for the recommended SATA hard disk drive connections.

#### Serial ATA hard disk drive connection

Connector	Color	Setting	Use
SATA1	Black	Master	Boot Disk
SATA2	White	Master	Boot Disk
SATA3	Blue	Slave	Data Disk
SATA4	Yellow	Slave	Data Disk

## 5. IEEE 1394a connector (10-1 pin F\_1394)

This connector is for an IEEE 1394a port. Connect the IEEE 1394a module cable to this connector, then install the module to a slot opening at the back of the system chassis.



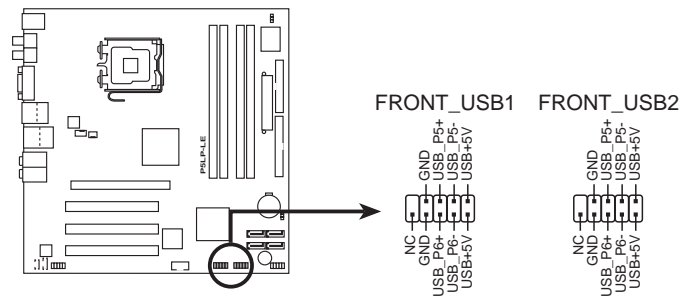
P5LP-LE (Leonite) IEEE 1394 connector



NEVER connect a **USB cable** to the IEEE 1394a connector. Doing so will damage the motherboard!

## 6. USB connectors (10-1 pin FRONT\_USB1, FRONT\_USB2)

These connectors are for USB 2.0 ports. Connect the USB/GAME module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



P5LP-LE (Leonite) USB 2.0 connectors



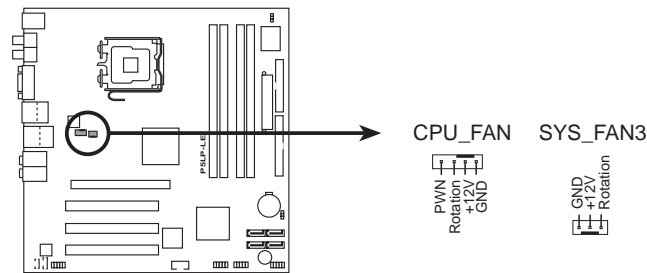
Never connect a **1394 cable** to the USB connectors. Doing so will damage the motherboard!

## 7. CPU and System fan connectors (4-pin CPU\_FAN, 3-pin SYS\_FAN3)

The fan connectors support cooling fans of 350 mA ~ 740 mA (8.88 W max.) or a total of 1 A~2.22 A (26.64 W max.) at +12 V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



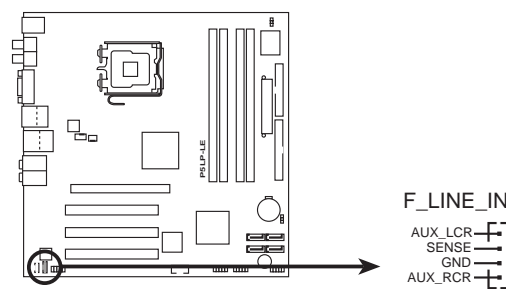
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors.



P5LP-LE (Leonite) Fan connectors

## 8. Internal audio connector (F\_LINE\_IN)

This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.



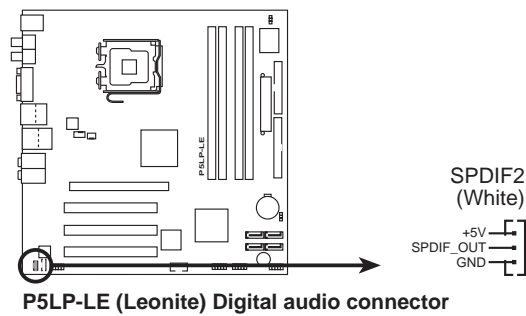
P5LP-LE (Leonite) Internal audio connector

## 9. Digital audio connector (3-pin SPDIF2 )

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). Connect the S/PDIF module cable to this connector, then install the module to a slot opening at the back of the system chassis.

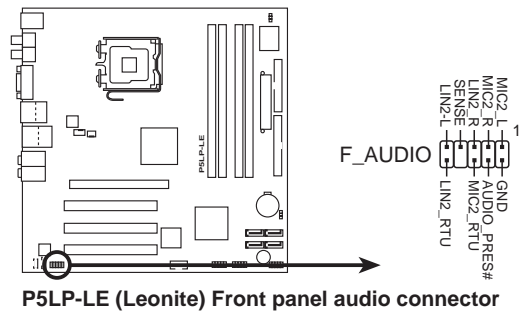


The S/PDIF module is purchased separately.



## 10. Front panel audio connector (10-1-pin F\_AUDIO)

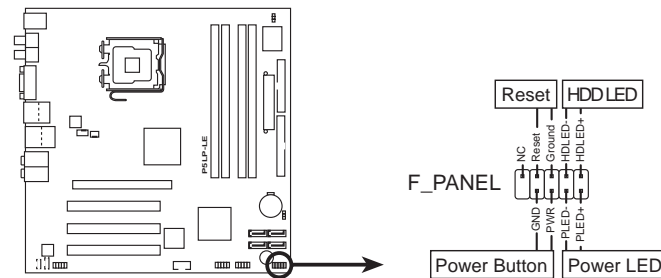
This connector is for a chassis-mounted front panel headphone port.





## 11. System panel connector (10-1 pin F\_PANEL)

This connector supports several chassis-mounted functions.



P5LP-LE (Leonite) System panel connector

- **System power LED**  
This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **Hard disk drive activity**  
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.
- **Power/Soft-off button**  
This connector is for the system power button. Pressing the power button turns the system ON or puts the system in SLEEP or SOFT-OFF mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.
- **Reset button**  
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

