
ASUS[®] P4T-M

Intel[®] 850 ATX Motherboard

Quick Setup Manual

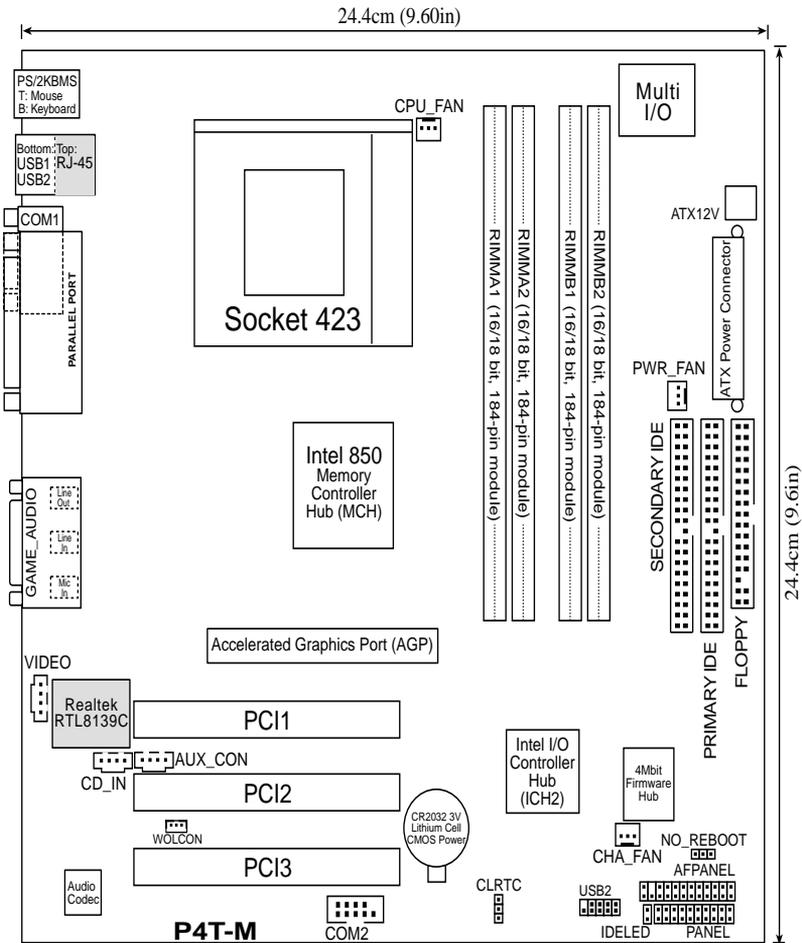
SPECIFICATIONS AND INFORMATION CONTAINED IN THIS MANUAL ARE FURNISHED FOR INFORMATIONAL USE ONLY, AND ARE SUBJECT TO CHANGE AT ANY TIME WITHOUT NOTICE, AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY ASUSTeK COMPUTER INC. (ASUS). ASUS ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS OR INACCURACIES THAT MAY APPEAR IN THIS MANUAL, INCLUDING THE PRODUCTS AND SOFTWARE DESCRIBED IN IT.

Copyright © 2000 ASUSTeK COMPUTER INC. All Rights Reserved.

Product Name: **ASUS P4T-M**
Release Date: **December 2000**

1. FEATURES

1.1 P4T-M Motherboard Layout



3. HW SETUP
Motherboard Layout

1. FEATURES

1.2 Layout Contents

Expansion

- 1) RIMMA1/A2/B1/B2 p.18 184-Pin System Memory Support
- 2) CPU p.19 Central Processing Unit (CPU)6
- 3) PCI1/2/3/4/5 p.25 32-bit PCI Bus Expansion Slots
- 4) AGPPRO p.26 Accelerated Graphics Port (AGP Pro) Slot

Connectors

- 1) PRIMARY/SECONDARY IDE p.30 Primary/Secondary IDE Connectors (Two 40-1pins)
- 2) FLOPPY p.30 Floppy Disk Drive Connector (34-1pins)
- 3) CPU_FAN, PCI_FAN p.31 CPU, PCI, MAIN Fan Connectors (Three 3-pin)
MAIN_FAN
- 4) WOL p.32 Wake-On-LAN Connector (3 pins)
- 5) USB2 p.32 USB Header (10-1 pins)
- 6) IA p.33 Internal Audio (4-pin VIDEO, CD_IN, AUX)
- 7) AFPANEL p.33 Connector (5 pins)
- 8) ATXPWR, AUXPWR, p.34 ATX 12V Power Supply Connectors
ATX12V
- 9) PWRLED (PANEL) p.35 System Power LED Lead (3-1 pins)
- 10) KEYLOCK (PANEL) p.35 Keyboard Lock Switch Lead (2 pins)
- 11) SPEAKER (PANEL) p.35 System Warning Speaker Connector (4 pins)
- 12) MSG.LED (PANEL) p.35 System Message LED (2 pins)
- 13) SMI (PANEL) p.35 System Management Interrupt Switch Lead (2 pins)
- 14) PWRSW (PANEL) p.35 ATX Power / Soft-Off Switch Lead (2 pins)
- 15) RESET (PANEL) p.35 Reset Switch Lead (2 pins)

2. HARDWARE SETUP

2.1 Getting Started

IMPORTANT: Due to Pentium 4 CPU's power consumption requirement, an ATX12V power supply is recommended for this motherboard. For typical system configurations, an ATX12V power supply that can supply at least 230W and at least 8.5A on the +12V lead is required. For heavily-loaded configurations, an ATX12V power supply that can supply at least 300W is required.

Before using your computer, you must complete the following steps:

- **Check Motherboard Settings**
- **Install Memory Modules**
- **Install the Central Processing Unit (CPU)**
- **Install Expansion Cards**
- **Connect Ribbon Cables, Panel Wires, and Power Supply**

WARNING! Computer motherboards and expansion cards contain very delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on your computer.

1. Unplug your computer when working on the inside.
2. Use a grounded wrist strap before handling computer components. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case.
3. Hold components by the edges and try not to touch the IC chips, leads or connectors, or other components.
4. Place components on a grounded antistatic pad or on the bag that came with the component whenever the components are separated from the system.
5. Ensure that the ATX power supply is switched off before you plug in or remove the ATX power connector on the motherboard.

WARNING! Make sure that you unplug your power supply when adding or removing system components. Failure to do so may cause severe damage to your motherboard, peripherals, and/or components. The onboard LED when lit acts as a reminder that the system is in suspend or soft-off mode and not powered OFF.

2. HARDWARE SETUP

2.2 System Memory

NOTE: No hardware or BIOS setup is required after adding or removing memory.

This motherboard has four 184-pin **Rambus Inline Memory Modules (RIMM)** sockets. These sockets support 64Mbit, 128Mbit, and 256Mbit Direct RDRAM technologies.

Location	Memory Module		Subtotal
RIMMA1 (Rows 0&1)	<input type="checkbox"/> RDRAM <input type="checkbox"/> C-RIMM (use when socket will not be populated)	x 1	
RIMMA2 (Rows 2&3)	<input type="checkbox"/> RDRAM <input type="checkbox"/> C-RIMM (use when socket will not be populated)	x 1	
RIMMB1 (Rows 4&5)	<input type="checkbox"/> RDRAM <input type="checkbox"/> C-RIMM (use when socket will not be populated)	x 1	
RIMMB2 (Rows 6&7)	<input type="checkbox"/> RDRAM <input type="checkbox"/> C-RIMM (use when socket will not be populated)	x 1	
TOTAL SYSTEM MEMORY (2GB Max)		=	

IMPORTANT

1. The memory configuration of channel A (RIMMA1 and RIMMA2) and channel B (RIMMB1 and RIMMB2) must be identical (see below).
2. C-RIMMs (Continuity RIMM) must be used to complete the sockets that are not populated by RDRAMs. A C-RIMM is necessary to avoid breaking the signal lines, which are a serial connection in a Rambus interface, such as used in this motherboard. This assures the electrical integrity of a Rambus interface.
3. When C-RIMMs are required, it is recommended that they be inserted into RIMMA2 and RIMMB2.

- a.
- | | |
|-------------|--------|
| C-RIMM | RIMMB2 |
| 128MB RDRAM | RIMMB1 |
| C-RIMM | RIMMA2 |
| 128MB RDRAM | RIMMA1 |
- b.
- | | |
|-------------|--------|
| 128MB RDRAM | RIMMB2 |
| C-RIMM | RIMMB1 |
| 128MB RDRAM | RIMMA2 |
| C-RIMM | RIMMA1 |
- c.
- | | |
|-------------|--------|
| 128MB RDRAM | RIMMB2 |
| 128MB RDRAM | RIMMB1 |
| 128MB RDRAM | RIMMA2 |
| 128MB RDRAM | RIMMA1 |

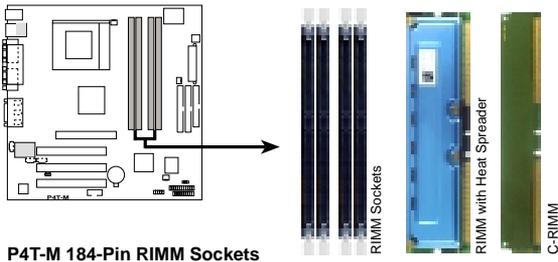
NOTE: When using only two memory modules, it is recommended that you use configuration **a**.

2. HARDWARE SETUP

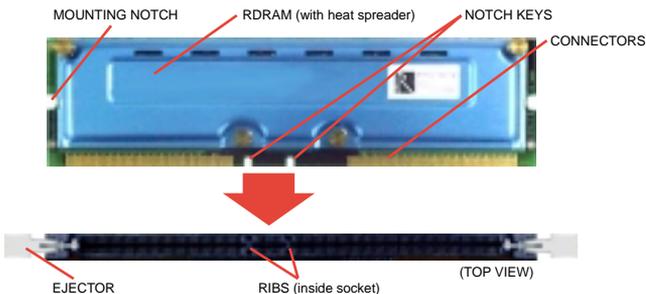
2.2.1 Installing Memory

The memory module (RIMM/C-RIMM) will fit in only one orientation.

IMPORTANT: Do not touch the memory module's connectors. Handle the module only by the edges.



1. Make sure that the notch keys in the module are aligned with the small ribs inside the RIMM sockets.



2. With the ejectors in the open position (as shown), push down gently but firmly on the memory module until it snaps into place. The guides on the socket's ejectors should go through the two mounting notches on the module and the ejectors should close. If necessary, push the ejectors inward to secure the module in place.

Removing Memory

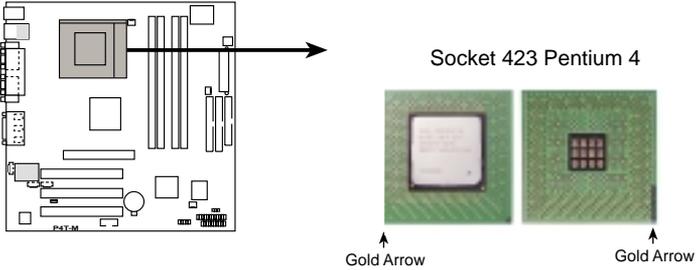
To release a memory module, push both ejectors outward and pull the module straight up and out of the RIMM sockets.

WARNING! RIMM modules become extremely hot during operation. To reduce the risk of personal injury from hot surfaces, allow the modules to cool off before removing them.

2. HARDWARE SETUP

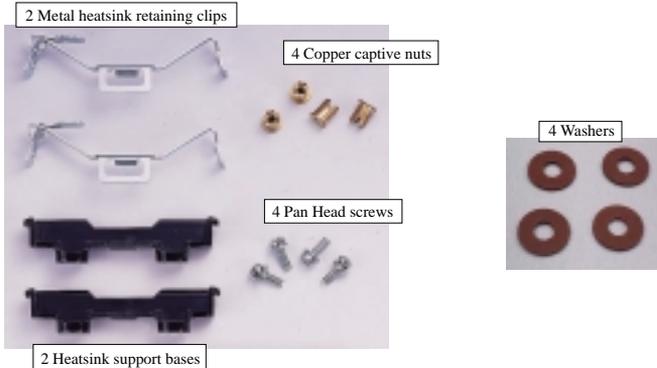
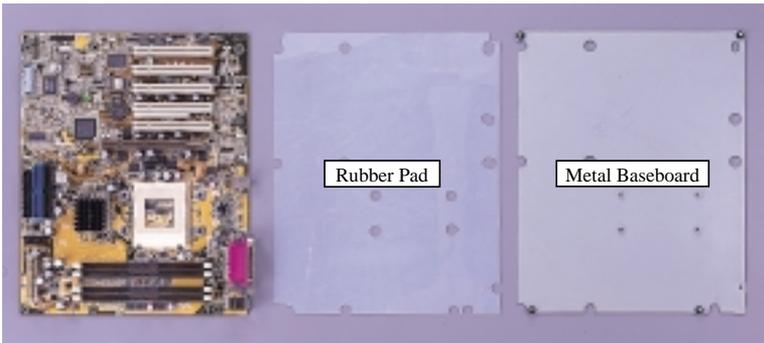
2.3 Central Processing Unit (CPU)

The motherboard provides a ZIF Socket for the supported CPUs. The CPU that came with the motherboard should have a fan attached to it to prevent overheating. If this is not the case, then purchase a fan before you turn on your system.



P4T-M Socket 423

Before you start, you should check to see that you have the following items:
(NOTE: Motherboard layout is not identical to the example.)



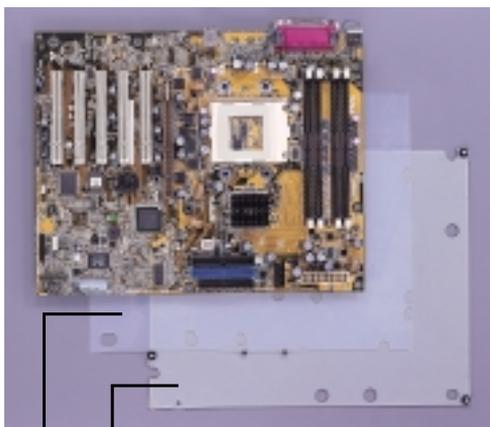
2. HARDWARE SETUP

2.3.1 CPU Installation

Step 1: Install the Baseboard

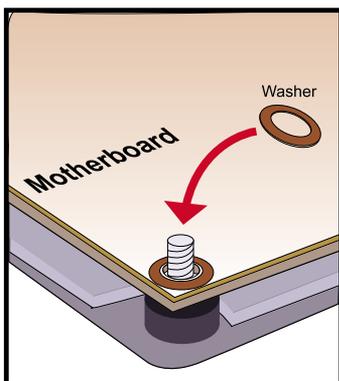
A metal baseboard is required to install the heatsink to the motherboard. A rubber pad is placed between the metal board and motherboard to provide insulation to prevent shorting. (NOTE: Motherboard layout is not identical to the example.)

Align the rubber pad over the metal baseboard so that the holes match. Align the motherboard over the rubber pad and metal baseboard so that the screws on the baseboard match up with the motherboard's screw holes.

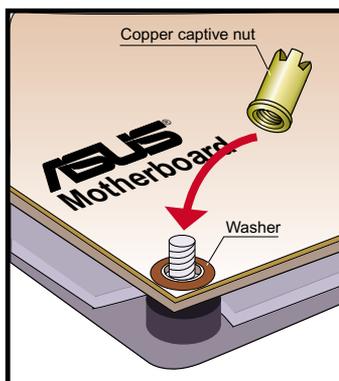


Rubber Pad Metal Baseboard

Place the four washers over the four screws on the baseboard.



Tighten the four copper captive nuts over the washers.



IMPORTANT:

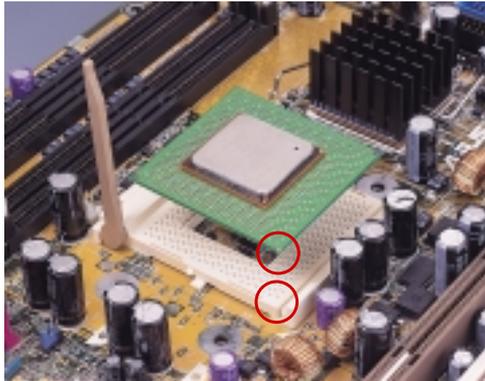
This step is a **M U S T!** The washers are necessary to prevent shorting.

2. HARDWARE SETUP

Step 2: Install the CPU

- A. Locate the ZIF socket on the motherboard.
- B. Unlock the socket by pressing the lever sideways and then lifting it up to a 90°–100° angle.
- C. Align the CPU over the socket such that its notched or marked corner matches the socket's corner near the end of the lever, while making sure that the CPU is parallel to the socket.
- D. Carefully insert the CPU into the socket until it fits in place. The illustration below shows how to insert a CPU properly.

CAUTION! The CPU fits in only one orientation. Do not force the CPU into the socket as it will bend the pins and damage the CPU. It should drop into the socket with minimal pressure. If not, check its orientation or check for bent pins.

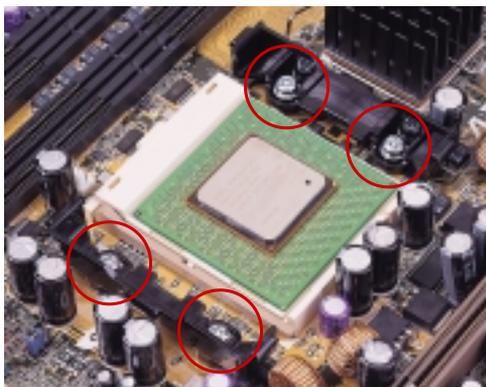


- E. Secure the CPU into the socket by pushing the socket lever all the way down. You will hear a click indicating that the lever is in place.

2. HARDWARE SETUP

Step 3: Install the Heatsink Support Base

Place the two heatsink support base as shown and screw in the four pan head screws.



Step 4: Install the Heatsink

Carefully place the fan heatsink on top of the heatsink support base and connect the fan power cable to the CPU fan connector.



Connect to the
CPU fan connector.

2. HARDWARE SETUP

Step 5: Install the Heatsink Retaining Clips



①

Latch one end of the heatsink retaining clip to one of the tabs on the heatsink support base.

Push down on the other end of the heatsink retaining clip until it locks into place.

Latch the large slotted tab on the clip to the protruding tab on the side of the heatsink support base.

②



③



WARNING! Be sure that there is sufficient air circulation across the processor's heatsink by regularly checking that your CPU fan is working. Without sufficient circulation, the processor could overheat and damage both the processor and the motherboard. You may install an auxiliary fan, if necessary.

NOTE: Do not forget to set the correct Bus Frequency and Multiple (frequency multiple setting is available only on unlocked processors) for your Socket 423 processor or else boot-up may not be possible. Socket 423 processors provide internal thermal sensing so that a socket mounted thermal resistor is not needed.

2. HARDWARE SETUP

2.4 Expansion Cards

WARNING! Unplug your power supply when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards (see *3.3 Hardware Setup Procedure* for more information).

2.4.1 Expansion Card Installation Procedure

1. Read the documentation for your expansion card and make any necessary hardware or software settings for your expansion card, such as jumpers.
2. Remove your computer system's cover and the bracket plate on the slot you intend to use. Keep the bracket for possible future use.
3. Carefully align the card's connectors and press firmly.
4. Secure the card on the slot with the screw you removed above.
5. Replace the computer system's cover.
6. Set up the BIOS if necessary
(such as *IRQ xx Used By ISA: Yes* in PNP AND PCI SETUP)
7. Install the necessary software drivers for your expansion card.

2.4.2 Assigning IRQs for Expansion Cards

Some expansion cards need an IRQ to operate. Generally, an IRQ must be exclusively assigned to one use. In a standard design, there are 16 IRQs available but most of them are already in use, leaving 6 IRQs free for expansion cards. If your motherboard has **PCI** audio onboard, an additional IRQ will be used. If your motherboard also has **MIDI** enabled, another IRQ will be used, leaving 4 IRQs free.

Standard Interrupt Assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	N/A	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	Sound Card (sometimes LPT2)
6	14	Floppy Disk Controller
7*	15	Printer Port (LPT1)
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when enabled
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

*These IRQs are usually available for ISA or PCI devices.

2. HARDWARE SETUP

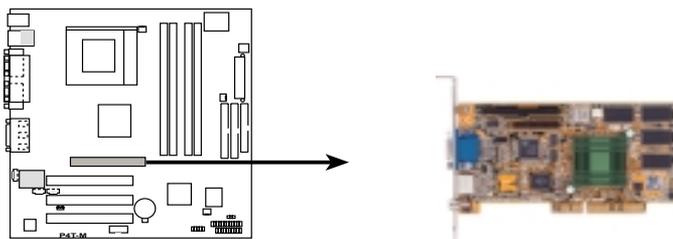
Interrupt Request Table for this Motherboard

	INT-A	INT-B	INT-C	INT-D	INT-E	INT-F	INT-G	INT-H
PCI slot 1	—	—	—	—	—	shared	—	—
PCI slot 2	—	—	—	—	—	—	used	—
PCI slot 3	—	—	—	—	—	—	—	shared
AGP slot	used	—	—	—	—	—	—	—
USB HC0	—	—	—	used	—	—	—	—
USB HC1	—	—	—	—	—	—	—	shared
SMB	—	shared	—	—	—	—	—	—
AC'97	—	shared	—	—	—	—	—	—
LAN (8139C)	—	—	—	—	—	shared	—	—

IMPORTANT: If using PCI cards on shared slots, make sure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments. Conflicts will arise between the two PCI groups that will make the system unstable or cards inoperable.

2.4.3 Accelerated Graphics Port (AGP) Pro Slot

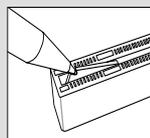
This motherboard provides an accelerated graphics port (AGP) pro slot to support a new generation of AGP graphics cards with ultra-high memory bandwidth.



P4T-M Accelerated Graphics Port (AGP)

CAUTION! The AGP Pro slot is shipped with a warning label over the 20-pin bay. DO NOT remove this label and the safety tab underneath it if you will be using an AGP card *without* a retention notch. Removing may cause the card to shift and may cause damage to your card, slot, and motherboard. Remove **ONLY** when you will be using an **AGP Pro** card. Use a rigid tip, such as a pen tip, to dislodge and remove the tab from the bay.

Removing the tab



2. HARDWARE SETUP

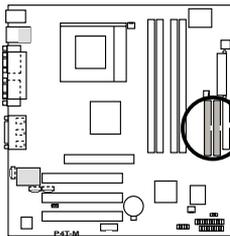
2.5 Onboard Connectors

1) Primary (Blue) / Secondary IDE Connectors (Two 40-1pin IDE)

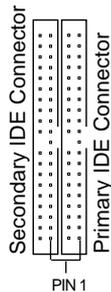
These connectors support the provided IDE hard disk ribbon cable. Connect the cable's blue connector to the motherboard's primary (recommended) or secondary IDE connector, and then connect the gray connector to your UltraDMA/100 slave device (hard disk drive) and the black connector to your UltraDMA/100 master device. It is recommended that non-UltraDMA/100 devices be connected to the secondary IDE connector. If you install two hard disks, you must configure the second drive to Slave mode by setting its jumper accordingly. Please refer to your hard disk documentation for the jumper settings. BIOS now supports specific device bootup (see **4.6 Boot Menu**). **(Pin 20 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 20 plugged).**

TIP: You may configure two hard disks to be both Masters with two ribbon cables – one for the primary IDE connector and another for the secondary IDE connector. You may install one operating system on an IDE drive and another on a SCSI drive and select the boot disk through **4.6 Boot Menu**.

IMPORTANT: UltraDMA/100 IDE devices must use a 40-pin 80-conductor IDE cable for 100MByte/sec transfer rates.



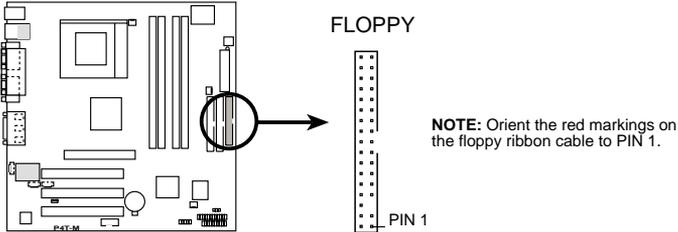
P4T-M IDE Connectors



NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

2) Floppy Disk Drive Connector (34-pin FLOPPY)

This connector supports the provided floppy drive ribbon cable. After connecting the single end to the board, connect the two plugs on the other end to the floppy drives. (**Pin 5 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 5 plugged**).



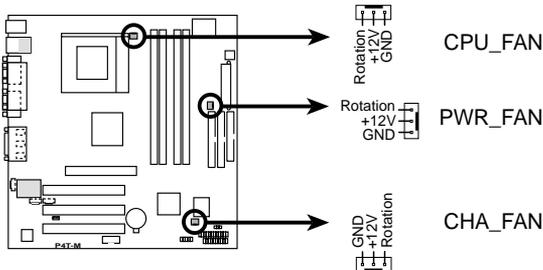
P4T-M Floppy Disk Drive Connector

3) Chassis (PCI_FAN), CPU (CPU_FAN), Power Supply (MAIN_FAN) Fan Connectors (3 pins)

These connectors support cooling fans of 350mA (4.2 Watts) or less. Orientate the fans so that the heat sink fins allow airflow to go across the onboard heat sink(s) instead of the expansion slots. Depending on the fan manufacturer, the wiring and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of the connector.

NOTE: The "Rotation" signal is to be used only by a specially designed fan with rotation signal. The Rotations per Minute (RPM) can monitored using a utility such as ASUS PC Probe or Intel LDCM.

WARNING! The CPU and/or motherboard will overheat if there is no airflow across the CPU and onboard heatsinks. Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used. **These are not jumpers, do not place jumper caps over these pins.**

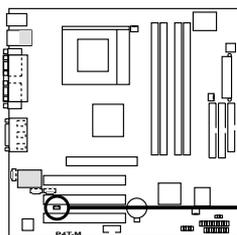


P4T-M 12-Volt Cooling Fan Power

4) Wake-On-LAN Connector (3-pin WOL)

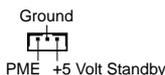
This connector connects to a LAN card with a Wake-On-LAN output, such as the ASUS PCI-L101 Ethernet card (see 7. *Appendix*). The connector powers up the system when a wakeup packet or signal is received through the LAN card.

IMPORTANT: This feature requires that **Wake On LAN or PCI Modem** is enabled (see 4.5.1 *Power Up Control*) and that your system has an ATX power supply with at least 720mA +5V standby power.



IMPORTANT: Requires an ATX power supply with at least 720mA +5 volt standby power

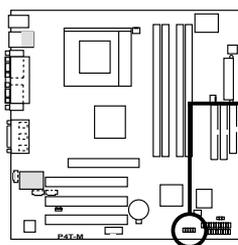
WOL_CON



P4T-M Wake-On-LAN Connector

5) USB Headers (10-1 pin USB2)

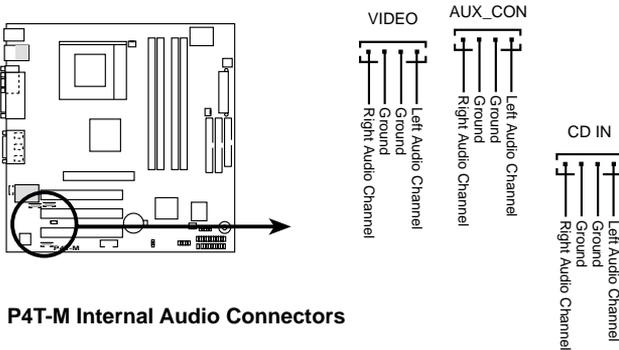
If the USB Ports on the back panels are inadequate, a USB header is available for two additional USB ports. Connect the 10-1 pin ribbon cable from the provided 2-port USB connector set to the midboard 10-1 pin USB header and mount the USB connector set to an open slot on your chassis.



P4T-M USB Headers

6) Internal Audio Connectors (4-pin VIDEO, CD_IN, AUX)

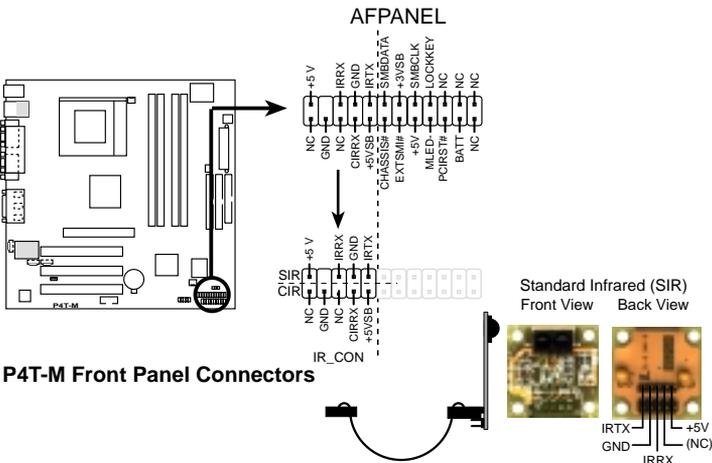
These connectors allow you to receive stereo audio input from such audio-visual sources as a VIDEO or CD-ROM input, or MPEG card.



P4T-M Internal Audio Connectors

7) Front-Panel Connectors (12-pin AFPANEL)

This connector allows you to setup an optional ASUS iPanel, an easy to access operational console mounted in a standard front drive bay. The iPanel offers front I/O ports, status LEDs and space reserved for a hard disk drive. If you are not using an ASUS iPanel, you can connect an optional wireless transmitting and receiving infrared module to the SIR connector or an optional consumer infrared connector set to the CIR and SIR connectors for both wireless transmitting and remote control functions through one external infrared module.

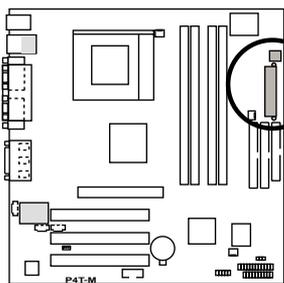


P4T-M Front Panel Connectors

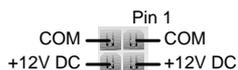
8) Power Supply Connectors (20-pin block ATXPWR) (6-pin AUXPWR) (4-pin ATX12V)

These connectors connect to an ATX 12V power supply. Each plug from the power supply will only insert in one orientation because of the different hole sizes. Find the proper orientation and push down firmly making sure that the pins are aligned. An auxiliary power supply may be needed depending on your system configuration.

IMPORTANT: Make sure that your ATX 12V power supply (minimum recommended wattage: 230 watts; 300W for a fully-configured system) can supply at least 20 amperes on the +5-volt lead and at least 720mA on the +5-volt standby lead (+5VSB). Your system may become unstable/unreliable and may experience difficulty in powering up if your power supply is inadequate. For Wake-On-LAN support, your ATX power supply (minimum recommended wattage: 230watts) must supply at least 720mA +5VSB.

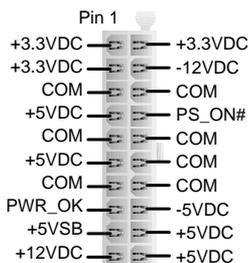


P4T-M ATX & Auxiliary Power Connectors

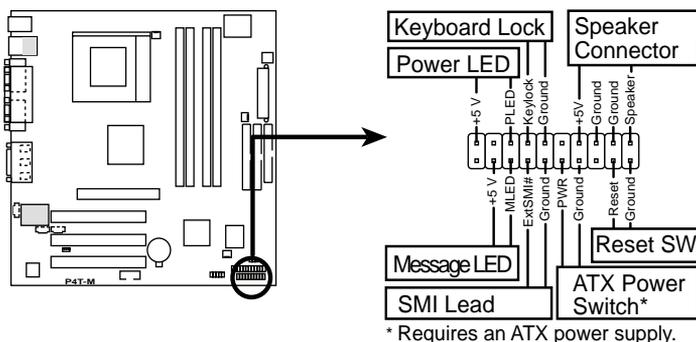


ATX12V

ATXPWR



The following is for items 15–21



P4T-M System Panel Connectors

9) System Power LED Lead (3-1 pin PWRLED)

This 3-1 pin connector connects the system power LED, which lights when the system is powered on and blinks when it is in sleep mode.

10) Keyboard Lock Switch Lead (2-pin KEYLOCK)

This 2-pin connector connects to the case-mounted key switch to allow keyboard locking.

11) System Warning Speaker Connector (4-pin SPEAKER)

This 4-pin connector connects to the case-mounted speaker. Two sources (LINE_OUT and SPEAKER) will allow you to hear system beeps and warnings. Only SPEAKER will allow you to hear system beeps before the integrated audio has been properly initialized.

12) System Message LED Lead (2-pin MSG.LED)

This indicates whether a message has been received from a fax/modem. The LED will remain lit when there is no signal and blink when there is data received. This function requires an ACPI OS and driver support.

13) System Management Interrupt Lead (2-pin SMI)

This allows the user to manually place the system into a suspend mode or “Green” mode, where system activity is decreased to save electricity and expand the life of certain components when the system is not in use. This 2-pin connector connects to the case-mounted suspend switch.

14) ATX Power Switch Lead (2-pin PWRSW)

The system power is controlled by a momentary switch connected to this lead. Pressing the button once will switch the system between ON and SOFT OFF. Pushing the switch while in the ON mode for more than 4 seconds will turn the system off. The system power LED shows the status of the system’s power.

15so1) Reset Switch Lead (2-pin RESET)

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