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1. INTRODUCTION

1.1. PREFACE

Welcome to use the **6BNZ** motherboard. It is a Pentium® II / III / Celeron™ Processor based PC / AT compatible system with AGP / PCI / ISA Bus, and has been designed to be the fastest PC / AT system. There are some new features allow you to operate the system with just the performance you want.

This manual also explains how to install the motherboard for operation, and how to set up your CMOS CONFIGURATION with BIOS SETUP program.

1.2. KEY FEATURES

- Intel Pentium® II / III / Celeron™ Processor based PC / AT compatible mainboard.
- Slot 1 supports Pentium® II / III / Celeron™ processor running at 233-633 MHz.
- Intel 440BX chipset, Supports SDRAM / Ultra DMA/33 IDE / Keyboard and PS/2 Mouse Power On / ACPI features.
- Built-in **AGP ATi 3D RAGE PRO 3D** graphics acceleration chip.
- Built-in **YAMAHA 715E** audio chip.
- Built-in **INTEL SB82558B** LAN chip.
- Supports 3xDIMMs using 3.3V SDRAM DIMM module.
- Supports 16 MB - 768 MB SDRAM memory on board.
- Supports ECC or Non-ECC type DRAM module.
- 2xPCI Bus slots, 2xISA Bus slots.
- Supports 2 channels Ultra DMA/33 IDE ports for 4 IDE Devices.
- Supports 2xCOM (16550), 1xLPT (EPP / ECP), 1x Floppy port.
- Supports 2xUSB ports, 1xPS/2 Mouse / Keyboard.
- Licensed AWARD BIOS, 2Mbits FLASH RAM.
- 28.2 cm x 21.6 cm NLX SIZE form factor, 4 layers PCB.

1.3. PERFORMANCE LIST

The following performance data list is the testing results of some popular benchmark testing programs.

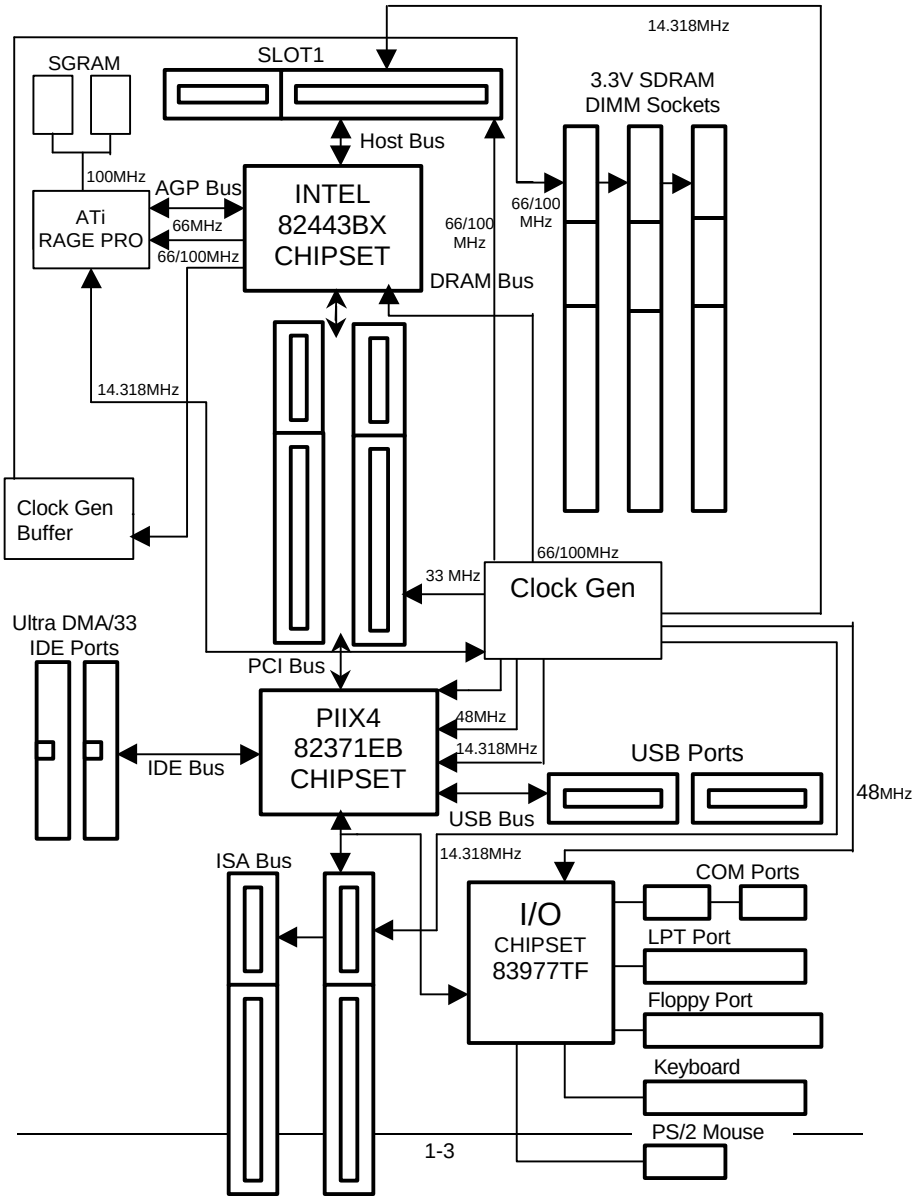
These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU Pentium® II processor
- DRAM (128 × 2) MB SDRAM (SEC KM48S8030BT-GH)
- CACHE SIZE 512 KB included in CPU
- DISPLAY ATi RAGE Pro AGP Display Onboard (4MB SGRAM)
- STORAGE Onboard IDE (IBM DHEA-36481)
- O.S. Windows® NT 4.0
- DRIVER Display Driver at 1024 x 768 x 256 colors x 75Hz.
  Triones Bus Master IDE Driver 3.70

Processor	Intel Pentium® II	
	266MHz (66×4)	350MHz (100×3.5)
Winbench98 CPU mark32	719	862
FPU Winmark	1380	1800
Business Disk	1840	1900
Hi-End Disk	4370	4620
Business Graphics	156	195
Hi-End Graphics	171	219
Winstone98 Business	29.4	34.1

Hi-End	32.8	37.4

1.4. BLOCK DIAGRAM



1.5. INTRODUCE THE Pentium â II / III Processor

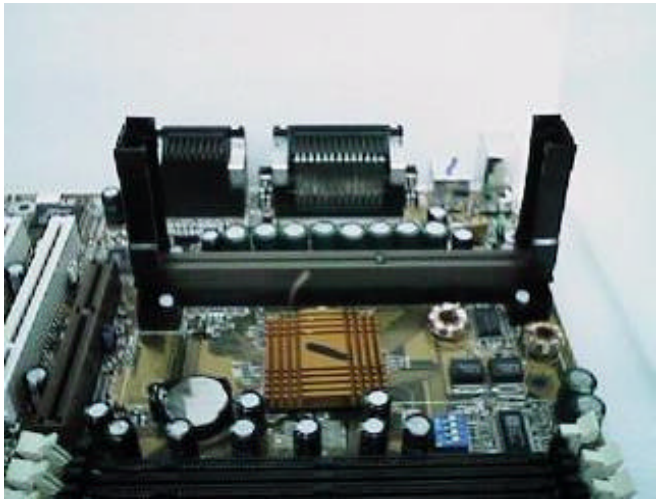


Figure 1: Universal Retention Mechanism & attach Mount

Figure 2:OEM Pentium® II Processor

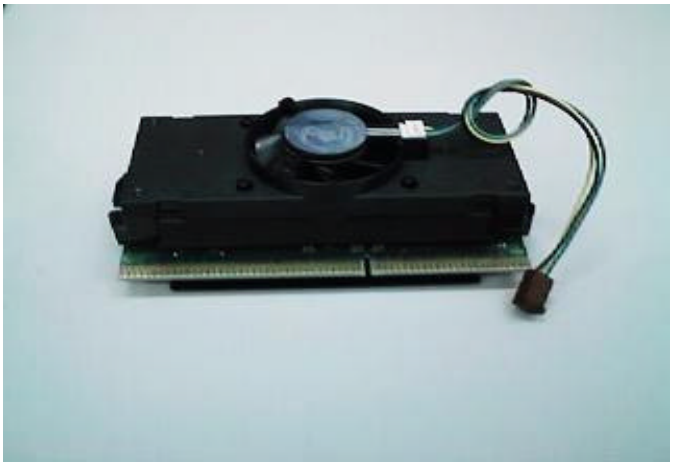


Figure 3: OEM Pentium® III Processor

1.6. What is AGP?

The Accelerated Graphics Port (AGP) is a new port on the Host-To-PCI bridge device that supports an AGP port. The main purpose of the AGP port is to provide fast access to system memory.

The AGP port can be used either as fast PCI port (32-bits at 66MHz vs. 32-bits at 33MHz) or as an AGP port which supports 2x data-rate, a read queue, and side band addressing. When the 2x-data rate is used, the port can transmit data at 533MB/sec (66.6*2*4). The read-queue can be used to pipeline reads – removing the effects of the reads-latency. Side band addressing can be used to transmit the data address on a separate line in order to speed up the transaction.

2. SPECIFICATION

2.1. HARDWARE

- CPU
  - Pentium® II / III / Celeron™ 233 – 633MHz..
  - 242 pins 66/100 MHz slot1 on board.
- SPEED
  - 66 / 100MHz system speed.
  - 66 MHz AGP-Bus speed. (2X mode 133MHz)
  - 33 MHz PCI-Bus speed.
  - 8 MHz AT bus speed.
- PROTECTION
  - Speaker Alarm when detect "CPU FAN Failure" or "CPU Overheat".
  - Automatically slow down CPU speed when "CPU Overheat".
  - H/W monitor power status (+5V, ±12V, VGTL,5VSB, CPU voltage & CMOS battery voltage).(Optional)
- DRAM MEMORY
  - 3 banks 168 pins DIMM module sockets on board.
  - Use 16 / 32 / 64 / 128 / 256 MB DIMM module DRAM.
  - 16 ~ 768 MB SDRAM.
  - Supports 3.3V SDRAM type DRAM.
  - Supports ECC or Non-ECC type DRAM.
- CACHE MEMORY
  - 32 KB 1st cache memory included in CPU.
  - 128KB/512 KB 2nd cache in CPU.
  - Supports DIB speed mode for L2 Cache.
- I/O BUS SLOTS
  - 2 33MHz PCI-BUS.
  - 2 8MHz 16 bits ISA BUS.
- IDE PORTS
  - 2 Ultra DMA/33 Bus Master IDE channels on board.(Using IRQ14,15)
  - Support Mode 3,4 IDE & ATAPI CD – ROM.

• I/O PORTS	– Supports 2 16550 COM ports.
	– Supports 1 EPP/ECP LPT port.
	– Supports 1 1.44/2.88 MB Floppy port.
	– Supports 2 USB ports.
	– Supports PS/2 Mouse/ Keyboard.
• LAN (Optional)	– Built-in INTEL SB82558B LAN chip.
	– Supports Wake On LAN.
• VGA	– Built-in ATi 3D RAGE PRO 3D graphics acceleration chip.
	– Built-in 2M high speed SGRAM.
	– For AGP 1.0 Interface compliant.
• SOUND	– Built-in YAMAHA 715E audio chip.
	– Supports Line Out, Line In, MIC, Joystick and CD-Line.
• GREEN FUNCTION	– Suspend mode support.
	– Green switch & ACPI LED support.
	– IDE & Display power down support.
	– Monitor all IRQ / DMA / Display / I/O events.
• BIOS	– 2M bits FLASH RAM.
	– Supports Plug & Play, DMI, ACPI Function.
• DIMENSION	– NLX Form Factor, 4 layers PCB.

2.2. SOFTWARE

- DRIVER
  - Bus Master IDE Driver.
  - INTEL Patch 95.
  - VGA Utility Driver.
  - Intel LAN Utility Driver (Optional).
  - YAMAHA Sound Utility Driver (Optional).
- BIOS
  - Licensed AWARD BIOS.
  - AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included.
- O.S.
  - Operation with MS-DOS®, Windows®95 / 98, WINDOWS™ NT, OS/2, NOVELL and SCO UNIX.

2.3. ENVIRONMENT

- Ambient Temp. – 0°C to +50°C (Operating).
- Relative Hum. – 0 to +85% (Operating).
- Altitude – 0 to 10,000 feet (Operating).
- Vibration – 0 to 1,000 Hz.
- Electricity – 4.9 V to 5.2 V. (Max. 20A current at 5V.)

3. HARDWARE INSTALLATION

3.1. UNPACKING

The mainboard package should contain the following:

- The **6BNZ** mainboard and RISER card (Optional).
- Universal Retention Mechanism & Attach Mount
- USER'S MANUAL for mainboard.
- Cable set for IDE ¡ Floppy and Joystick (Optional).
- Diskette or CD for Mainboard ¡ VGA ¡ Sound and LAN Utility (Optional).

The mainboard contains sensitive electric components, which can be easily damaged by static electricity, so the mainboard should be left in its original packing until it is installed.

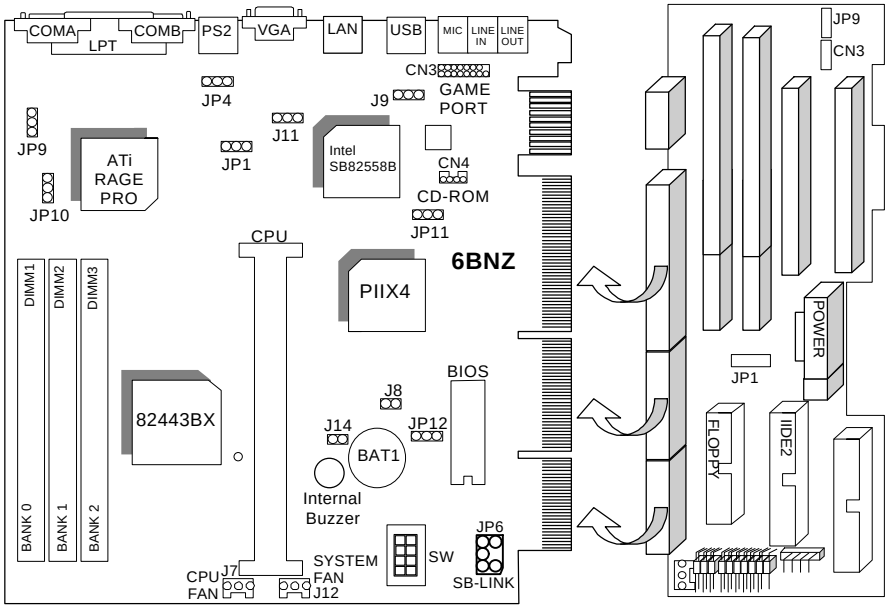
Unpacking and installation should be done on a grounded anti-static mat. The operator should be wearing an anti static wristband, grounded at the same point as the anti-static mat.

Inspect the mainboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damages on the board before proceeding.

After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface component side up. Again inspect the board for damage. Press down on all of the socket IC's to make sure that they are properly seated. Do this only on with the board placed on a firm flat surface.

DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.

3.2. MAINBOARD LAYOUT



≺Figure 3.1≻

3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

♦ I/O Ports Connector	
VGA	For VGA Port.
USB	For USB Connector.
LPT	For Printer port.
COMA	For Serial port1 (COM A).
COMB	For Serial port2 (COM B).
PS2	For PS/2 Keyboard and Mouse port.
GAME Port	For Joystick / MIDI port. (Optional)
AUDIO Port	For MIC / LINE-IN / LINE-OUT port. (Optional)
CD-ROM	For CD Line-In port. (Optional)
LAN	For LAN Connector port. (Optional)

♦ CPU
For Pentium® II / III / Celeron™ processor installed

♦ J8 : By PASS ATX PWR CTRL	
Pin No.	Function
Open	Soft Off
Short	Full On

♦ JP4 : Keyboard Power On Selection	
Pin No.	Function
1-2	Enabled Keyboard power on.
2-3	Disabled Keyboard power on.

♦ J7 : CPU FAN (CPU Cooling FAN Power Connector)	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ J12 : SYSTEM FAN (System Cooling FAN Power Connector) (Optional)	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ JP1 : System Acceleration	
1-2 short	System Speed is set to 66MHz.
2-3 short	Set System Speed to Auto. (auto detect system speed)
OPEN	System Speed is set to 100MHz.

♦ J11 : For Wake On LAN Function Selection (Optional)	
Pin No.	Function
1-2	Enable Wake On LAN Function.
2-3	Disable Wake On LAN Function.

♦ J9 : On-Board Sound Function (Optional)	
Pin No.	Function
1-2	Disable On-Board Sound Function.
2-3	Enable On-Board Sound Function.

♦ JP6 : SB-LINK (For PCI Sound Card Connector) (Optional)	
Pin No.	Function
1	Signal
2	GND
3	NC
4	Signal
5	GND
6	Signal

♦ JP11 : On-Board LAN Function (Optional)	
Pin No.	Function
1-2	Disabled On-Board LAN Function.
2-3	Enabled On-Board LAN Function.

♦ JP12 : Clear COMS Function	
Pin No.	Function
1-2	Clear CMOS.
2-3	Normal.

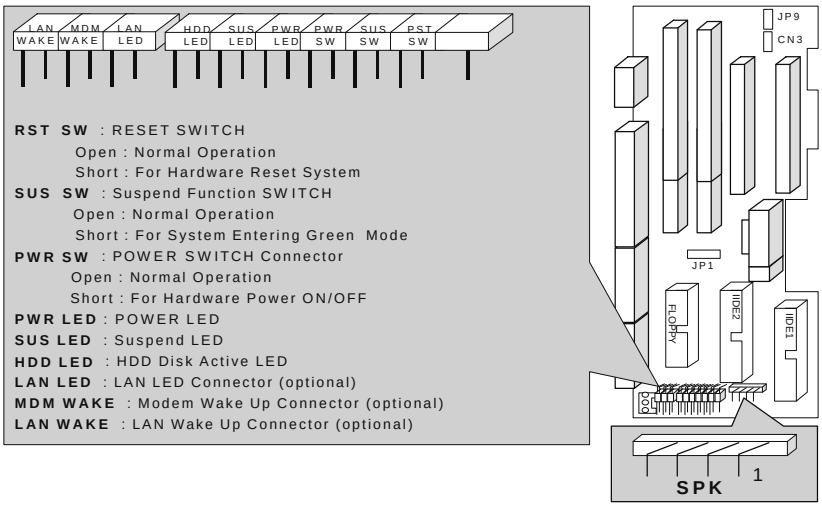
♦ J14 : Internal Buzzer	
Pin No.	Function
Short	Enabled Internal Buzzer.
Open	Disabled Internal Buzzer .

♦ JP9 : Release On-Board VGA from occupying IRQ Resource	
Pin No.	Function
1-2	Non Release On-Board VGA from occupying IRQ Resource.
2-3	Release On-Board VGA from occupying IRQ Resource.

♦ JP10 : On-Board VGA Function	
Pin No.	Function
1-2	Disabled On-Board VGA Function.
2-3	Enabled On-Board VGA Function.

♦ CN4 : CD Audio Line In (optional)	
Pin No.	Function
1	GND
2	Right
3	GND
4	Left

✒ RISER Connector :



♦ I/O Connector	
IDE1	For Primary IDE port.
IDE2	For Secondary IDE port.
PLOPPY	For Floppy port.
POWER	For ATX POWER and POWER FAN connector(optional).

♦ JP1 : Wake on LAN (optional)	
Pin No.	Function
1	+5V SB
2	GND
3	Signal

♦ JP9 : CD Audio Line In (optional)	
Pin No.	Function
1	Left
2	GND
3	GND
4	Right

♦ CN3 : CD Audio Line In(optional)	
Pin No.	Function
1	GND
2	Right
3	GND
4	Left

♦ SPK : SPEAKER Connector	
Pin No.	Function
1	VCC
2	NC.
3	NC.
4	Output

♦ SYSTEM FAN PWR : System Cooling FAN Power Connector (Optional)	
Pin No.	Function
1	GND.
2	+12V
3	SENSE

3.4. CPU SPEED SETUP

The default system bus speed is 66 / 100MHz. The user can change the DIP SWITCH **(SW)** selection to set up the CPU speed for 233 - 633MHz processor. The CPU speed must match with the frequency RATIO. It will cause system hanging up if the frequency RATIO is higher than CPU's.

JP1

1-2 CLOSE :	**System Speed is set to 66 MHz**
2-3 CLOSE :	**Set system speed to Auto - auto detect system speed (66 / 100MHz FSB)**
OPEN :	**System Speed is set to 100MHz**

CLK RATIO	1	2	3	4
X3	ON	OFF	ON	ON
X3.5	OFF	OFF	ON	ON
X4	ON	ON	OFF	ON
X4.5	OFF	ON	OFF	ON
X5	ON	OFF	OFF	ON
X5.5	OFF	OFF	OFF	ON
X6	ON	ON	ON	OFF
X6.5	OFF	ON	ON	OFF
X 7	ON	OFF	ON	OFF
X 7.5	OFF	OFF	ON	OFF
X 8	ON	ON	OFF	OFF
X 8.5	OFF	ON	OFF	OFF
X 9	ON	OFF	OFF	OFF

The CPU is a sensitive electric component and it can be easily damaged by static electricity, so users must keep it away from metal surface when the CPU is installed onto mainboard.

3.5. DRAM INSTALLATION

The mainboard can be installed with 16 / 32 / 64 / 128 / 256 MB 168 pins DIMM module DRAM, and the DRAM speed must be 67~100 MHz for SDRAM when system bus speed is set to 66MHz. When system bus speed is set to 100MHz, 100MHz SDRAM is required. The DRAM memory system on mainboard consists of bank 0, 1 & bank 2.

Since 168 pins DIMM module is 64 bits width, using 1 PCS which can match a 64 bits system. The total memory size is 16MB ~ 768MB / 256MB SDRAM. The DRAM installation position refer to Figure 3.1, and notice the Pin 1 of DIMM module must match with the Pin 1 of DIMM socket. Insert the DRAM DIMM module into the DIMM socket at Vertical angle. If there is a wrong direction of Pin 1, the DRAM DIMM module couldn't be inserted into socket completely.

3.6. CMOS RTC & ISA CFG CMOS SRAM

The mainboard contains RTC & CMOS SRAM on board. They have a power supply from external battery to keep the DATA inviolate & effective. The RTC is a REAL-TIME CLOCK device, which provides the DATE & TIME to system. The CMOS SRAM is used for keeping the information of system configuration, so the system can automatically boot OS every time. Since the lifetime of internal battery is 5 years, the user can change a new Battery to replace old one when it has consumed.

- Danger of explosion if battery is incorrectly replaced.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer' s instructions.

3.7. VGA Monitor INSTALLATION

ATi RAGE PRO 3D graphics AGP accelerations was built-in the main board. It will auto detect whether the PnP monitor is installed or not. When plug-in the monitor, the Win95 will auto detect it and auto set the necessary settings in the system.

3.8. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function. The system will do a cold start after the RESET switch is press and

released by user. The RESET switch is a 2 PINS connector and should be installed to **RST-SW** on **RISER card**.

3.9. POWER LED CONNECTOR INSTALLATION

System has power LED lamp on the panel of case. The power LED will light on off or flash to indicate which step on the system. The connector should be connected to **PWR-LED** of **RISER card** in correct direction.

3.10. IDE & ATAPI DEVICE INSTALLATION

There are two-Enhanced PCI IDE ports (**IDE1, IDE2**) on **RISER card**, which following ATAPI standard SPEC. Any one IDE port can connected to two ATAPI devices (IDE Hard Disk, CD-ROM & Tape Driver), so total four ATAPI devices can exist in a system. The **HDD-LED** is the active LED port for ATAPI devices on **RISER card**.

3.11. PERIPHERAL DEVICE INSTALLATION

After the I/O device installation and jumpers setup, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral device could be installed now. The basic system needs a display interface card. If the PCI - Bus device is to be installed in the system, any one of four PCI - Bus slots can be used.

3.12. SPEAKER CONNECTOR INSTALLATION

There is a speaker in AT system for sound purpose. The 4 - Pins connector **SPK** is used to connect speaker on **RISER card**.

3.13. KEYBOARD & PS/2 MOUSE INSTALLATION

The main board supports PS/2 Mouse. The BIOS will auto detect whether the PS/2 Mouse is installed or not & assign IRQ12 for PS/2 Mouse port if it is installed. After installing the peripheral device, the user should check everything again, and prepare to power-on the system.