Federal Communications Commission Statement

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 receiver.
- Connect the equipment into 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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Table of Contents

3. Built-in BIOS Setup Program

Chapter 1.

1. Introduction

Overview

The CB650M-BX motherboard integrates the latest advances in processor, memory, and I/O technologies into a Micro ATX form factor(244x205mm) that combines performance, flexibility, and easy of use into high integrated capable of meeting a variety of price/performance levels.

The CB650M-BX motherboard supports Intel Pentium II/III processor or Celeron processor based on the Intel 440BX AGPsets(82443BX and 82371EB). The CB650M-BX motherboard supports not only a 66MHz host but also a 100MHz host bus. So Intel Pentium II/III 350~450MHz processor and Pentium II/III(Katmai) processor with a 100MHz host bus can be supported for higher performance level. Two standard 168-pin DIMM Sockets with memory size up to 256MB support Synchronous DRAM memory.

The Intel 82371EB PCI-to-ISA/IDE Xcelerator(PIIX4E) provides an integrated Bus Master IDE controller and Ultra DMA/33 with high performance IDE interfaces for up to four devices.

In addition, the CB650M-BX comes with an AGP(Accelerated Graphics Port) bus slot, a faster than the current 33MHz PCI bus. The AGP bus provides a direct connection between graphics subsystem and system memory.

Caution :

There is the danger of an explosion if the battery is incorrectly replaced. Replace the battery with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the battery manufacturer's instructions.

Main Features

1. Processor :

The CB650M-BX motherboard supports a single Pentium II/III or Celeron processor. The processor's VID pins automatically program the voltage regulator on the motherboard to the required processor voltage. The host bus speed(66MHz or 100MHz) is automatically selected. The processor connects to the motherboard through the 242-pin Slot 1 connector. The processor must be secured by a retention mechanism attached to the motherboard.

Caution :

The CB650M-BX motherboard supports Pentium II/III processor with a 100 or 66MHz host bus and Celeron processor with a 66MHz host bus. Processor with a 100MHz host bus should be used only with 100MHz SDRAM;the motherboard will not operate reliably if a processor with a 100MHz host bus is paired with 66MHz SDRAM. However, processors with a 66MHz host bus can be used with either 66MHz or 100MHz SDRAM.

2. Chipsets :

The Intel 82440BX AGPset consists of the Intel 82443BX PAC and the Intel 82371EB PIIX4E bridge chip. The PAC provides an optimized DRAM controller and Accelerated Graphic Port(AGP) interface. The I/O subsystem of the 82440BX is based on the PIIX4E, which is a highly integrated PCI ISA IDE Xcelerator Bridge.

2-1. 82443BX PCI/AGP Controller

- Processor interface control
  - ▶ Support for processor host bus frequencies of 100MHz and 66MHz
- Integrated DRAM controller
  - ▶ +3.3V only DIMM DRAM configurations
  - ▶ 100MHz or 66MHz SDRAM
- Accelerated Graphics Port interface

- PCI bus interface
- Data Buffering
- Power management functions
  - ▶ Compliant with ACPI power management
- SMBus support for desktop management functions
- Support for system management mode(SMM)

2-2. 82371EB PCI ISA IDE Xcelerator(PIIX4E)

- Multifunction PCI-to-ISA bridge
- USB controller
  - ▶ Two USB ports
  - ▶ Support for Universal Host Controller Interface(UHCI) design guide
- Integrated Dual-channel enhanced IDE interface
  - ▶ Support for up to four IDE devices
  - ▶ Support for PIO Mode 4 transfer(up to 16MB/s) and Ultra DMA/33 synchronous DMA mode transfer(up to 33MB/s)
- Enhanced DMA controller
  - ▶ Support for PCI DMA with three PC/PCI channels and distributed DMA protocols
- Interrupt controller based on 82C59
- Power management logic

  Support for Wake on Ring and Wake on LAN technology

  Support for APM and ACPI
- Real-Time Clock
- 16-bit counters/timers based 82C54

3. AGP

The integrated AGP is a high-performance bus for graphics-intensive applications, such as 3D applications. AGP, while based on the PCI Local Bus Specification, Rev.2.1, is independent of the PCI bus and is intended for exclusive use with graphical display devices. AGP overcomes certain limitations of the PCI bus related to handling large amount of graphics data with the following features:

- Pipelined memory read and write operations that hide memory access latency
- Demultiplexing of address and data on the bus for nearly 100% bus efficiency

4. USB

The CB650M-BX motherboard has two USB ports;one USB peripheral can be connected to each port. The two USB ports are implemented with stacked back panel I/O connectors. The CB650M-BX motherboard fully supports UHCI and uses UHCI-compatible software drivers.

The +5V lines to these ports are protected with a PolySwitch circuit that, like a self-healing fuse, reestablishes the connection after an overcurrent condition is removed.

- Self-identifying peripherals that can be plugged in while the computer is running
- Automatic mapping function to driver and configuration
- Support for up to 127 physical devices

NOTE

Computer systems that have an unshielded cable attached to a USB port may not meet FCC Class B requirements, even if no device or a low-speed USB device is attached to the cable. Use shielded cable that meets the requirements for full-speed devices.

5. IDE Support

The CB650M-BX motherboard has two independent bus-mastering IDE interfaces. These interface support:

- ATAPI devices(such as CD-ROM devices)
- ATA devices using these transfer modes
  - ▶ PIO Mode 3
  - ▶ PIO Mode 4
  - ▶ Ultra DMA/33 synchronous-DMA mode

6. Real-Time Clock, CMOS RAM, and Battery

The real-time clock is compatible with DS1287 and MC146818 components. The clock provides a time-of-day clock and a multi-century calendar with alarm features and century rollover. The real-time clock supports 256 bytes of battery-backed CMOS SRAM in two banks that are reserved for BIOS use.

A coin-cell battery powers the real-time clock and CMOS memory. When the computer is plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the 3.3V standby current from the power supply extends the life of the battery. The clock is accurate to ±13 minutes / year at 25˚C with 3.3V Stand-by voltage applied.

7. I/O Controller

The IT8671F controller from ITE is an ISA Plug and Play-compatible, multifunctional I/O device that provides following features:

- Two serial ports
- One parallel port with ECP and EPP support
- Interface for one 1.2MB, 1.44MB, and 2.88MB diskette drive
- PS/2 style mouse and keyboard interfaces

The BIOS Setup program provides configuration options for the I/O controller.

7-1. Serial Ports

The motherboard has two 9-pin D-sub serial connectors located on the back panel. The serial ports support NS16C550-compatible UARTs and can be assigned as COM1(3F8), COM2(2F8), COM3(3E8), or COM4(2E8).

7-2. Parallel Ports

The connector for the multimode bidirectional parallel port is a 25-pin D-Sub connector located on the back panel.

7-3. Diskette Drive Controller

The I/O controller support two diskette drive that is compatible with the 82077 diskette drive controller and support both PC-AT and PS/2 modes.

7-4. Keyboard and Mouse Interface

PS/2 keyboard and mouse connectors are located on the back panel. The +5V lines to these connectors are protected with a Fuse circuit from an overcurrent condition.

8. Audio Subsystem

The audio subsystem contains of these devices.

- Yamaha YMF724F or YMF740C
- AKM AK4542 stereo audio codec or compatible part

8-1. Yamaha YMF724F(or YMF740C)

- PCI 2.1 compliant
- PC97/PC98 compliant
- Legacy audio compatibility
- Supports PC/PCI and Distributed DMA for legacy DMAC(8237) emulation

8-2. AKM AK4542 Stereo Audio Codec

- High performance 18-bit stereo full-duplex audio codec with up to 48KHz sampling rate
- Connects to the Yamaha YMF724F(or YMF740C) using a five-wire digital interface

9. Hardware Monitor

The hardware monitoring subsystem provides low-cost instrumentation capabilities. The feature of the hardware monitor subsystem include:

- An integrated ambient temperature sensor
- Fan speed sensors
- Power supply voltage monitoring to detect levels above or below acceptable values

When suggested ratings for temperature, fan speed, or voltage are exceeded, an interrupt is activated.

10. Wake on LAN Technology

Wake on LAN technology enables remote wakeup of the computer through a network. Wake on LAN technology requires a PCI add-in network interface card(NIC) with remote wakeup capabilities. The remote connector on the NIC must be connected to the motherboard Wake on LAN connector. The NIC monitors network traffic at the MII interface;upon detecting a Magic Packet, the NIC asserts a wakeup signal that powers up the computer.

11. Wake on Ring

Wake on Ring enables the computer to wake from sleep or soft-off mode when a call is received on a telephony device, such as a faxmodem, configured for operation on either serial port.

12. Expansion Slots

- One AGP slot
- Two dedicated PCI slots
- One shared ISA / PCI slot

Motherboard Layout

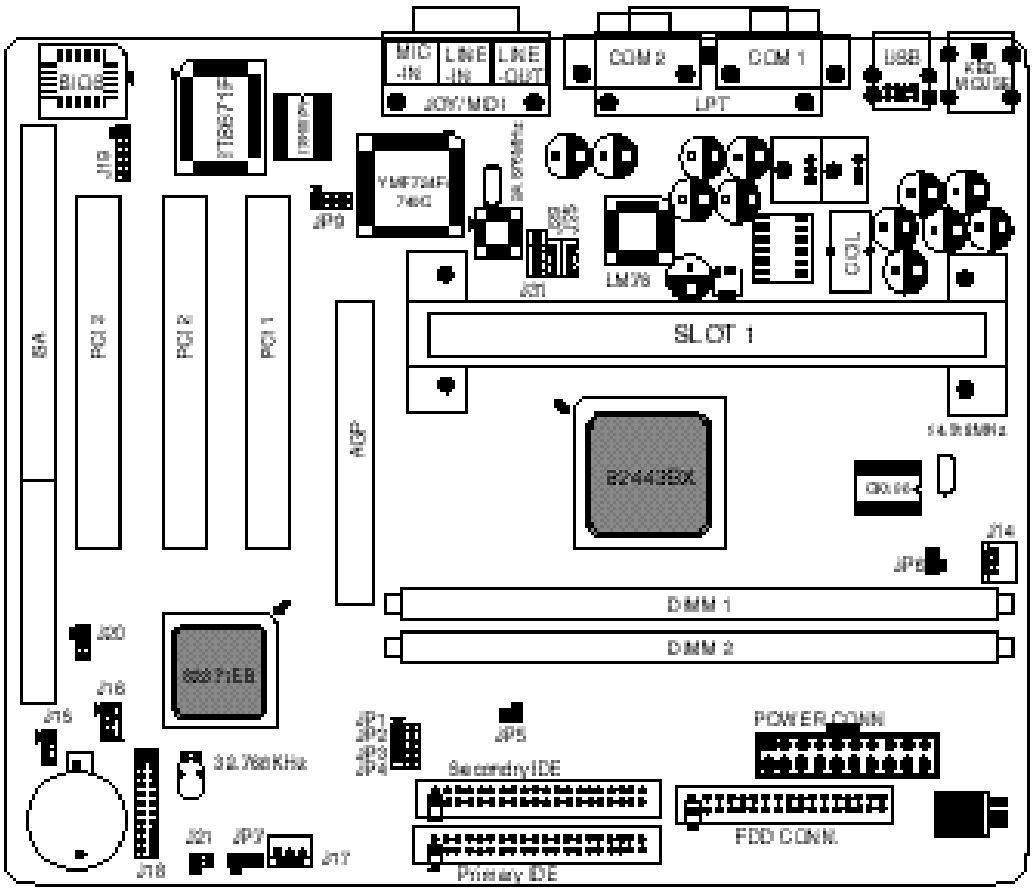


Figure 1. CB650M-BX Motherboard Layout

Chapter 2.

2. Installation

This Chapter provides information how to install and configure the CB650M-BX motherboard.

Check List

The standard packing of the CB650M-BX should include :

- ☑ CB650M-BX motherboard
- ☑ 1 IDE cable
- ☑ 1 Floppy cable
- ☑ CB650M-BX User's Manual
- ☑ Device driver CD
- ☑ Universial Retention Mechanism Kit(URM)

Installation Steps

Installing of the CB650M-BX motherboard depends on the type of case you use. The CB650M-BX motherboard is designed for the micro ATX form factor and must be installed in an micro ATX chassis.

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

1. Set Jumpers
2. Installing the System Memory
3. Installing the Processor
4. Installing Cables

Set Jumpers

Several hardware settings are made through the use of jumper cap to connect jumper pins on the motherboard. See motherboard layout on page 1-8 for location of jumpers. The jumper settings will be described numerically such as '1-2', '2-3' or 'On(Short)', 'Off(Open)'.

1. Processor Core : BUS Frequency Multiple

To install the processor at its correct frequency, Please refer the following table to set up processor frequency.

Freq.	Clock Multiplier	Host Clock	JP1	JP2	JP3	JP4
266MHz	4	66MHz	On	On	On	Off
300MHz	4.5	66MHz	On	Off	On	Off
333MHz	5	66MHz	On	On	Off	Off
366MHz	5.5	66MHz	On	Off	Off	Off
400MHz	6	66MHz	Off	On	On	On
350MHz	3.5	100MHz	On	Off	Off	On
400MHz	4	100MHz	On	On	On	Off
450MHz	4.5	100MHz	On	Off	On	Off
500MHz	5	100MHz	On	On	Off	Off

Table 2-1. Pentium II/III or Celeron processor Frequency settings

2. Clear CMOS RAM(JP7)

The CMOS RAM is powered by the onboard coin-cell battery or power supply. To clear the CMOS Data : (1) Turn off your computer and plugged out your AC power cord from a wall socket, (2) Close pins 2-3, wait five seconds and place the jumper back on pins 1-2. (The jumper must be placed back on pins 1-2 for the system to function properly), (3) Turn on your computer.

Clear CMOS	JP7
Normal	1-2
Clear	2-3

3. Disable Onboard Audio(JP9)

This jumper uses for Enable or Disable the onboard audio subsystem.

Internal Audio	JP9
Enable(Default)	1-2
Disable	2-3

Warning!

Computer motherboards and Add-on cards contain very delicate IC chips. To protect them against damage from static electricity, you should follow some precaution 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 such the IC chips, leads or connectors, or other components.*
4. *Place components on a grounded anti-static pad or on the bag that came with the component whenever the components are separated from the system.*

Installing the System Memory

The CB650M-BX motherboard uses only DIMMs. Two sockets are available for 3.3V unbuffered SDRAM for up to 256MB of SDRAM.

1. General DIMM Notes

- For the Host bus to operate at above 100MHz, use only PC100-compliant DIMMs. The CB650M-BX motherboard operates at 100MHz, thus most systems will not even boot if non-compliant modules are used because of the strict timing issues involved under this speed. If your DIMMs are not PC100-compliant, set the Host bus frequency to 66MHz for the system stability.
- Single-side and double-side memory modules are supported.
- BIOS shows SDRAM memory and using banks on bootup screen.

2. Memory Configuration

DIMM memory configuration is auto-banking and therefore does not need to be installed in any particular order. The following table lists a number of possible memory configurations.

DIMM		TOTAL
DIMM1	DIMM2	
8MB	8MB	DIMM1+DIMM2 The combination of memory size is from 8MB to maximum 256MB. All DIMM sockets can use SDRAM
16MB	16MB	
32MB	32MB	
64MB	64MB	
128MB	128MB	

Table 2-2. CB650M-BX Memory Configurations

3. Installing and Removing DIMMs

To install the DIMMs, locate the memory banks on the motherboard and perform the following steps :

1. Hold the DIMM so that notched edge is aligned with the notch on the DIMM socket(Figure 2-1).

2. Insert the DIMM at a 90 degree angle.

3. Gently push the DIMM straight down until it locks into place(past the release tabs).

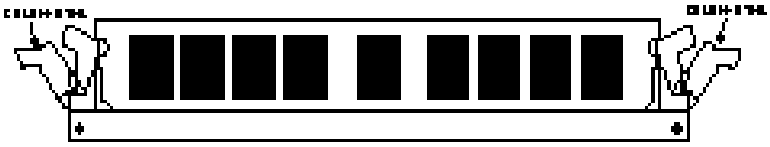


Figure 2-1. Installing a 168-pin DIMM

To remove DIMMs, follow the steps below:

1. With both thumbs (or fingers), press the release tabs away from the socket.
2. With the DIMM free from the release tabs, lift the memory module up and place in the anti-static bag or package.

Installing the Processor

The CB650M-BX is designed to support single Pentium II/III processor or Celeron processor. The Pentium II/III processor comes installed in a SECC(Single Edge Contact Cartridge) or SECC2 that connects into “Slot 1” on the motherboard. Add the Celeron processor comes installed in a Single Edge Processor Package (SEPP) that connects into “Slot 1” on the motherboard.

A URM is supplied to anchor the processor to the motherboard. Attach the URM before inserting the processor.

Installing the Pentium II/III processor

1. Installing the URM

Before you begin, verify that your URM contains the following items:

- Body (black plastic module : require 2 pieces)
- Pin (Require 4 pieces)

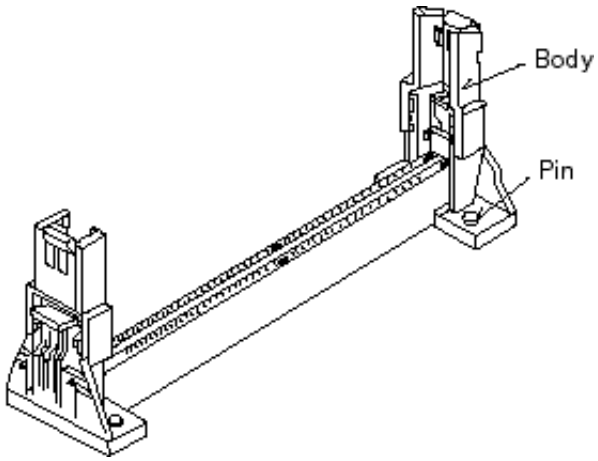


Figure 2-2. Universal Retention Module

Follow the steps below to install the URM :

1. Locate the four Retention Base holes (near each end of the Slot 1 connector). Place the URM Body over each end of the Slot 1 connector.
2. Push down on the Pin with thumb or plastic fastener installation tool.

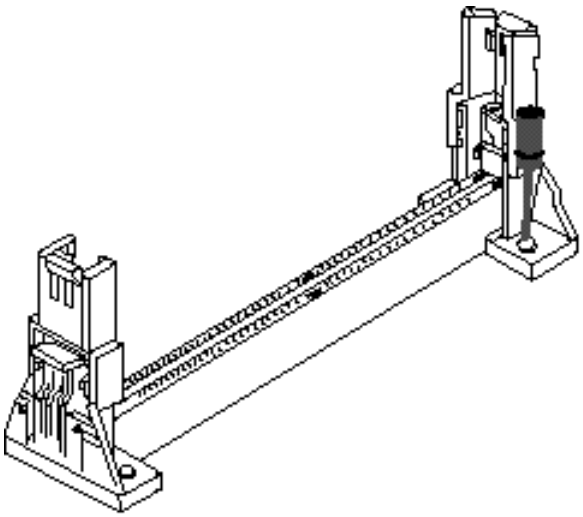


Figure 2-3. Installing the URM Kit

2. Installing a Processor

Follow the steps below to install the Pentium II/III processor:

1. Locate the Slot 1 connector.
2. If you are installing the boxed version of the Pentium II/III processor, follow the instructions in the section "3. Installing a CPU (Boxed version)"
3. The Heatsink supporters consist of a top bar, base and two pins. Gently insert the Heatsink base into the holes next to the Slot 1 connector. Push down until the base snaps into place.

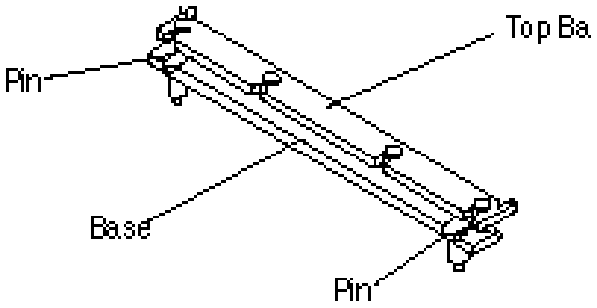
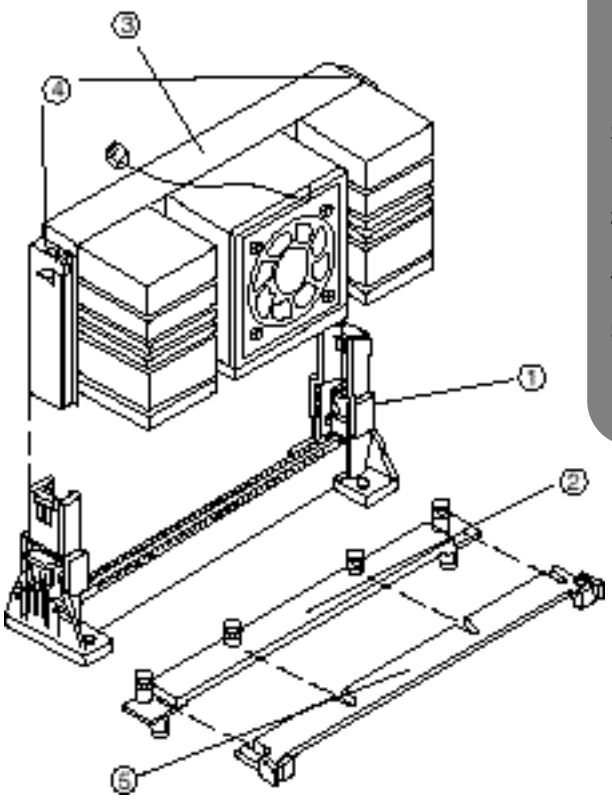


Figure 2-4. Installing the Heatsink supporter

4. Lock the base into place by inserting a pin down into the base on the both sides.
5. Gently insert the processor cartridge down into the URM, making sure the connector on the processor cartridge and Slot 1 connector are aligned.
6. Push the processor cartridge down until it snaps into place.
7. Lock the processor cartridge into place by pushing outward on the tabs located on both sides of the processor cartridge. The processor cartridge is locked when the tabs snap into the holes on the side of the URM.
8. After the processor cartridge is locked into place, connect the Heatsink's top bar to the base.

Processor Installation Overview



Processor Installation Overview

1. Mount the URM for the Processor.
2. Mount the (optional) heatsink support base onto the system board.
3. Slide the Processor into the URM.
4. Lock the Processor into the URM using the tabs.
5. Slide in the Heatsink Top Bar, then insert the pins to lock it in place.

Figure 2-5. Processor Installation Overview

3. Installing the Processor (Boxed version)

A boxed version of the Processor is offered through Intel. This packing uses an active cooling fan. The mounting hardware is described below. For detailed instructions, please refer to the documentation that is supplied with your Processor.

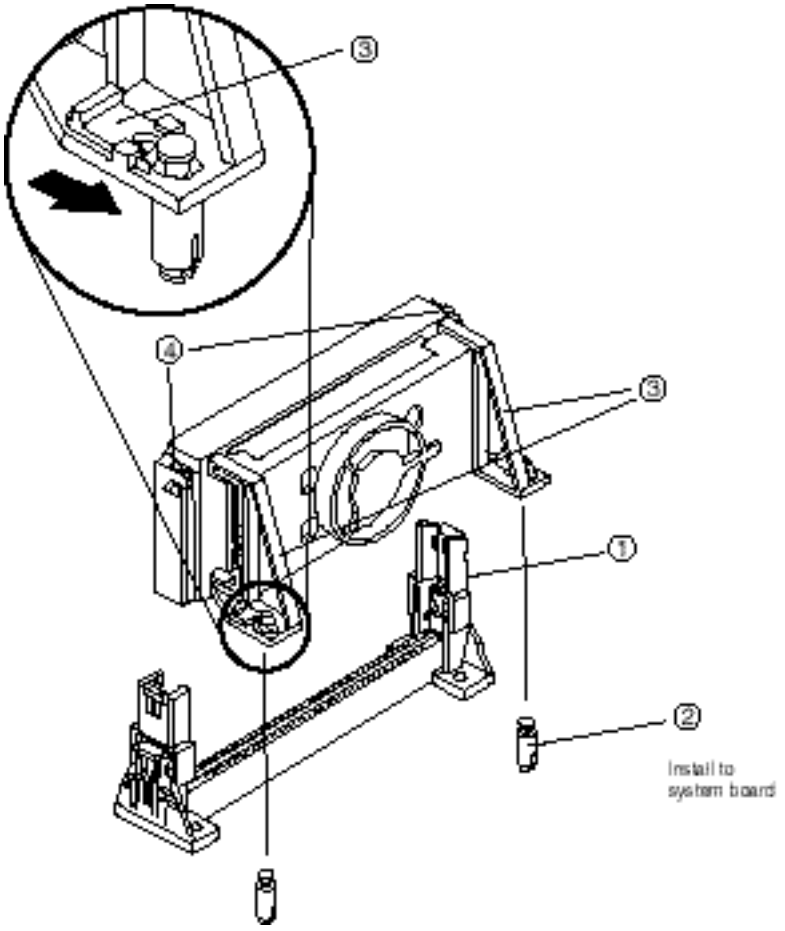


Figure 2-6. Installing the Boxed version Processor

Installing Cables

1. Processor Fan connector (J14)

If you are installing Pentium II / III or Celeron processor with fan, you can use this header to connect the CPU's fan cable (3-pin).

2. Primary / Secondary IDE connectors (J3 / J4)

These connectors support the provided 40-pin ribbon cable. After connecting the single end to the motherboard, connect the two plugs at the other end to your hard disk(s).

3. FDD connector (J23)

This connector supports the provided 34-pin ribbon cable. After connecting the single end to the motherboard, connect the two plugs on the other end to the floppy drives.

4. IR connector (J19)

CB650M-BX provides one connector which can support IrDA (InfraRed Data Association) receiver module. It gives users IR wireless data exchange directly from mobile computers, printers and PDAs,...etc.

Pin	Signal Name
1	+5V
2	IR_RXH
3	IR_RXL
4	GND
5	IR_TX

5. Wake on LAN connector (J16)

This connector supports Wake on LAN function. If you use Wake on LAN function, connect 3-pin cable between this connector and your LAN Card.

Pin	Signal Name
1	+5V STBY
2	GND
3	WOL

6. Internal Modem Ring connector (J15)

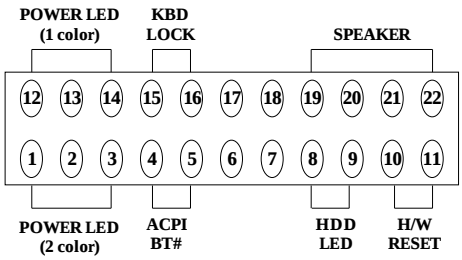
This connector support internal modem ring wake-up function.
If you use this function, connect 3-pin cable between this connector & your modem.

Pin	Signal Name
1	+5V STBY
2	GND
3	RING#

7. Front Panel Switch connector (J18)

This connector supports the signals of the Power LED, HDD LED, Reset Switch, Suspend / Resume Switch, Internal Speaker and Key Lock.

Pin	Signal Name	Pin	Signal Name
1	PWR_LED 1	12	PWR_LED 2
2	GND	13	N.C
3	Green LED 1	14	GND
4	Suspend / Resume Switch	15	KBD LOCK#
5	GND	16	GND
6	Green LED 2	17	N.C
7	GND	18	N.C
8	HDD_Power	19	VCC5
9	HDD_ Active	20	GND
10	GND	21	GND
11	H / W RESET#	22	SPEAKER IN



8. Secondary Fan connector (J17)

This connector support additional system fan such as Front Fan.

9. Power Switch connector (JP21)

This connector is used to provide a way of the user to turn the system on. Connect it to the power on push button on the front panel.

NOTE

In order to prevent the system from shut down by mistake, the CB650M-BX motherboard provides one optional item of the BIOS setup (refer to "3-5 Power Management Setup").
This item is called "Soft-Off by PWR-BTTN". The function is as follows :

Delay 4 sec:

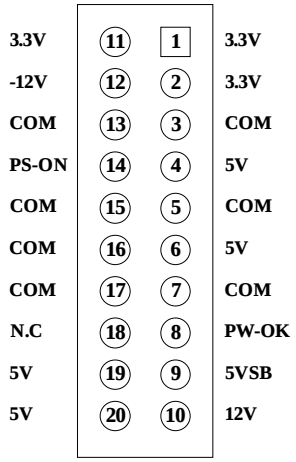
1. Pushing the button one time will change the system from Normal operation mode to Suspend mode. Pushing the button again will wake up the system.
2. Pushing the power button more than 4 seconds will shut down the system.

Instant-Off:

Pushing the power button one time will turn the system on, pushing again will turn the system off.

10. Micro ATX Power Supply Connector (J22)

This connector connects to an Micro ATX power supply. The plug from the power supply will only insert in one orientation because of the different hole-size. Find the proper orientation and push down firmly but gently making sure that the pins aligned.



11. Telephony(TDA) Connector (J25)

Pin	Signal Name
1	MIC input(Phone)
2	GND
3	GND
4	Mono output

12. Aux-In(Line-In) Connector (J26:Factory option)

Pin	Signal Name
1	Left channel Audio In
2	GND
3	Right channel Audio In

13. CD-ROM(Panasonic) Audio Connector (J29)

Pin	Signal Name
1	GND
2	CD Audio Left channel
3	GND
4	CD Audio Right channel

14. ATAPI Audio Connector (J31)

Pin	Signal Name
1	CD Audio Left channel
2	GND
3	GND
	CD Audio Right channel

External Connectors

1. PS/2 Keyboard & Mouse Connector (J9)

The CB650M-BX provides one PS/2 keyboard and one PS/2 mouse connector. Refer to the Figure 2-7 for the direction of keyboard (mouse) cable to install on keyboard (mouse) connector.

2. Serial Port COM1 & COM2 (J11 & J12)

The CB650M-BX provides two sets of high speed serial port. Each serial port is 16550 UART compatible.

3. Parallel Port (J13)

The CB650M-BX provides one set of high speed parallel port. The parallel port can support bi-direction / EPP / ECP mode.

4. USB Connector (J10)

Universal Serial Bus(USB) is a new industry standard interface for ease use of PC peripheral expansion. A single USB port can be connect up to 127 peripheral devices, such as mice, modems, and keyboards. USB also supports Plug-and-Play and Hot plugging. The CB650M-BX provides 2 channel USB ports.

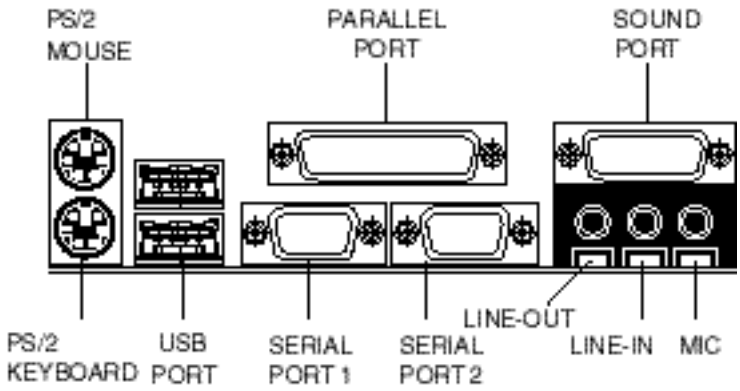


Figure 2-7. External connectors

5. Audio Jack

The CB650M-BX Motherboard contains a High performance PCI Audio Controller(Yamaha YMF724F / 740C). It supports Line-in, Line-out, MIC-in, and MIDI / Game port.

Line-in - Connect this port with cassette recorder, DAT or CD-Player. It can do playback & recording

Line-out - Connect the external speaker or amplifier.

MIC - Mic input port

MIDI / Game port - Connect MIDI Kit or Joy stick

Installing sound driver

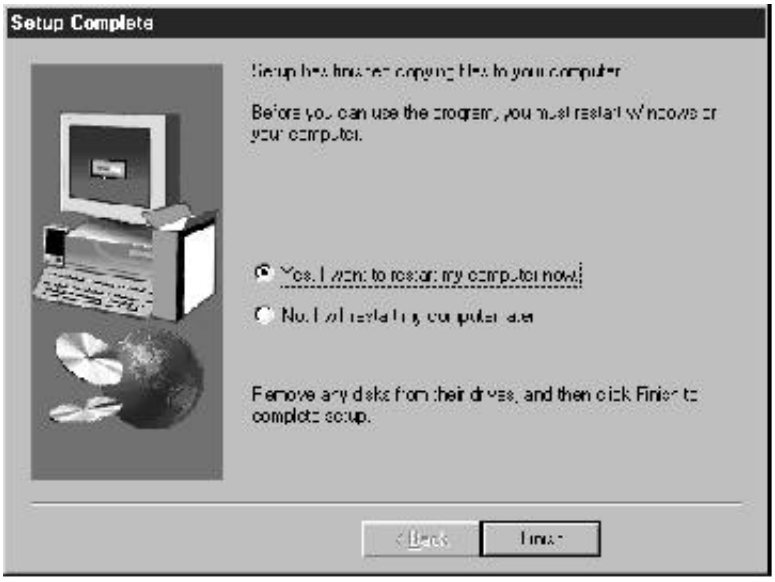
1. Overview

CB650M-BX motherboard uses Yamaha YMF740C / 724F chipset for PCI audio. This controller supports 32-voice XG wavetable synthesizer, DirectSornd hardware Acceleration, Downloadable Sound and DirectMusic acceleration. It supports OPL3, Sound Blaster Pro, MPU401 UART mode.

2. Driver Installation

1) when you start your system, new hardware found wizard appears, then click **cancel** or press **ESC** button.
2) Insert the driver CD into CD-ROM drive, then open the Win9x folder in the Sound foler.
3) Run the setup in the Win9x folder, aned click **next**> button, then setup program copy driver files.

4) Click **finish** button, then the program restart the system and install driver.



- To install driver for Windows NT or DOS, run the setup in the each folder and follow the steps of the setup program.