GA - 686LX

USER'S MANUAL

Pentium â II Processor MAINBOARD

REV. 1 First Edition

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1. INTRODUCTION

1.1. PREFACE

Welcome to use the **GA - 686LX** motherboard. The motherboard is a Pentium® II 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 Processor based PC / AT compatible mainboard.
- Slot 1 supports Pentium® II processor running at 233-633 MHz.
- Intel 440LX chipset, Support AGP / SDRAM / Ultra DMA/33 IDE / ACPI features.
- Support CPU FAN Failure / Overheat Alarm & auto slow down CPU speed.
- Support Intel LDCM® Network Manageability.
- Supports 4xDIMMs using 3.3V EDO or SDRAM DIMM module.
- Supports 8 MB - 1 GB EDO / 512MB SDRAM memory on board.
- Supports ECC or Non-ECC type DRAM module.
- 1xAGP slot, 4xPCI Bus slots, 3xISA Bus slots.
- Supports 2 channels Ultra DMA/33 IDE ports for 4 IDE Device.
- Supports 2xCOM (16550), 1xLPT (EPP / ECP), 1x1.44MB Floppy port.
- Supports 2xUSB ports, 1xPS/2 Mouse & 1xPS/2 Keyboard ports.
- Licensed AWARD BIOS, 2M bit FLASH RAM.

- ATX form factor, Double stack I/O connector, 4 layers PCB.

1.3. PERFORMANCE LIST

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

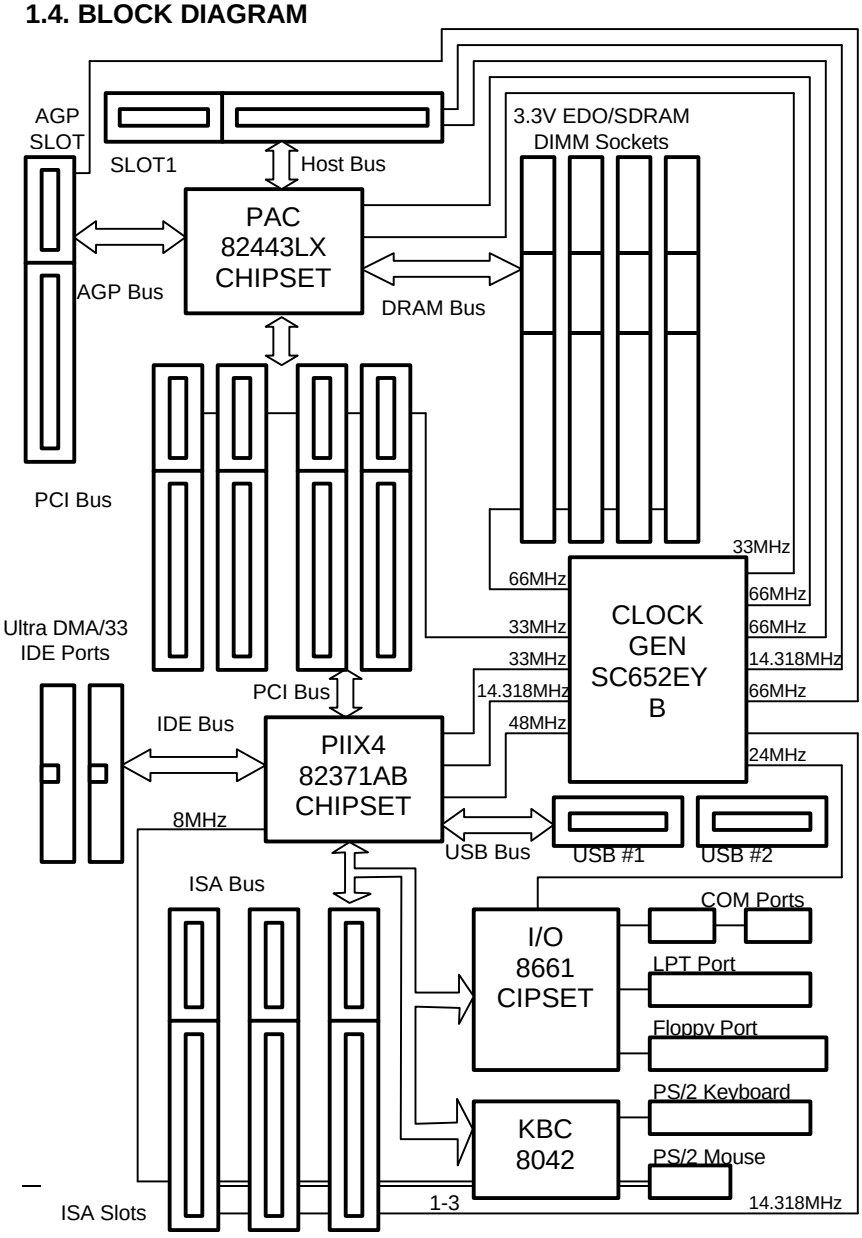
These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU Pentium® II processor
- DRAM 64 MB SDRAM
- CACHE SIZE 512 KB included in CPU
- DISPLAY Matrox Millennium II 4MB PCI VGA
- STORAGE Onboard IDE port
- O.S. Windows95 OSR2.0.
- DRIVER Display Driver at 1024 x 768 x 64K colors x 75Hz.
  Triones Bus Master IDE Driver 3.60K

Processor	Intel Pentium® II	
	266MHz	300MHz
Winbench97		
CPU mark32	697	783
Business Disk	2210	2260
Hi-End Disk	5890	6490
Business Graphic	116	127
Hi-End Graphic	50.8	56.3
Winstone 97		
Business	62	64.9

Hi-End	30.6	32.6

1.4. BLOCK DIAGRAM



1.5. INTRODUCE THE Pentium â II Processor & AGP

Figure 1:Retention Mechanism & attach Mount

Figure 2:OEM Pentium® II Processor

Figure 3:Heatsink / FAN & Heat sink support for OEM Pentium® II Processor

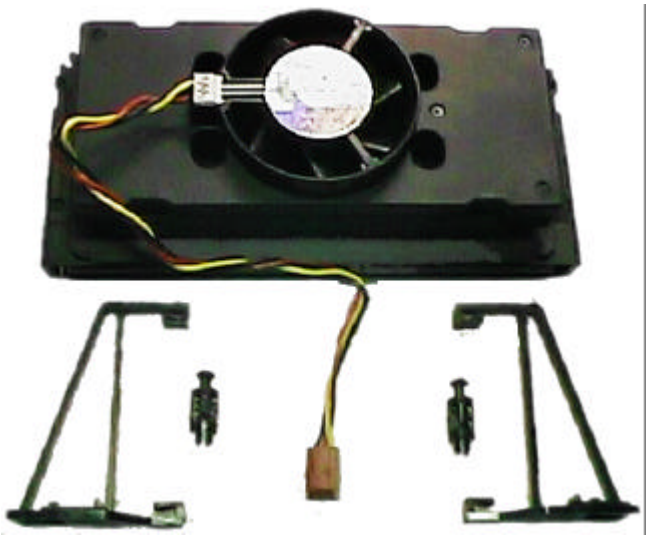


Figure 4:Boxed Pentium® II Processor & Heat sink support

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-bit 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 further speed the transaction.

2. SPECIFICATION

2.1. HARDWARE

- CPU
  - Pentium® II processor 233 – 633 MHz.
  - 242 pins 66MHz slot1 on board.
- PROTECTION
  - Onboard Buzzer Alarm when detect "CPU FAN Failure" or " CPU Overheat" .
  - Automatically slow down CPU speed when "CPU FAN Failure" or "CPU Overheat".
  - Intel LDCM® support.
  - H/W monitor power status (±5V, ±12V, CPU voltage & CMOS battery voltage).
- SPEED
  - 66 MHz system speed.
  - 66 MHz AGP bus speed. (133MHz 2*mode)
  - 33 MHz PCI-Bus speed.
  - 8 MHz AT bus speed.
- DRAM MEMORY
  - 4 banks 168 pins DIMM module sockets on board.
  - Use 8 / 16 / 32 / 64 / 128 / 256 MB 60~70 ns DIMM module DRAM.
  - 8 ~ 1 GB DRAM size.
  - Support 3.3V SDRAM / EDO type DRAM.
  - Support ECC or Non-ECC type DRAM.
- CACHE MEMORY
  - 32 KB 1st cache memory included in CPU.
  - 256KB/512 KB 2nd cache in CPU.
  - Support DIB speed mode for L2 Cache.
  - 1 66MHz / 133MHz AGP bus.
- I/O BUS SLOTS
  - 4 33MHz Master / Slave PCI-BUS.
  - 3 8MHz 16 bits ISA BUS.
- IDE PORTS
  - 2 Ultra DMA/33 Bus Master IDE channels on board.(Using IRQ14,15)
  - Back ward Support Mode 3,4 IDE & ATAPI CD - ROM.

- I/O PORTS
  - Supports 2 16550 COM ports. (Using IRQ4, 3)
  - Supports 1 EPP/ECP LPT port. (Using IRQ7 or 5 and DMA3 or 1)
  - Supports 1 1.44/2.88 MB Floppy port. (Using DMA2 & IRQ6)
  - Supports 2 USB ports.
  - Supports PS/2 Mouse. (Using IRQ12)
  - Supports PS/2 Keyboard. (Using IRQ1)
- GREEN FUNCTION
  - Suspend mode support.
  - Green switch & LED support.
  - IDE & Display power down support.
  - Monitor all IRQ / DMA / Display / I/O events.
- BIOS
  - 256KB FLASH EEPROM.
  - Supports Plug & Play, DMI, ACPI Function.
- DIMENSION
  - ATX Form Factor, 4 layers PCB.

2.2. SOFTWARE

- DRIVER
  - Intel LDCM® optional.
  - Health monitor Utility.
  - Bus Master IDE Driver
- BIOS
  - Licensed AWARD BIOS.
  - AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included.
  - Monitor Health status.
- O.S.
  - Operation with MS-DOS®, Windows®95, 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 **GA - 686LX** mainboard.
- The Retention Mechanism & Attach Mount
- USER'S MANUAL for mainboard.
- Cable set for IDE & Floppy device.
- Diskette or CD for Mainboard Utility.

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.

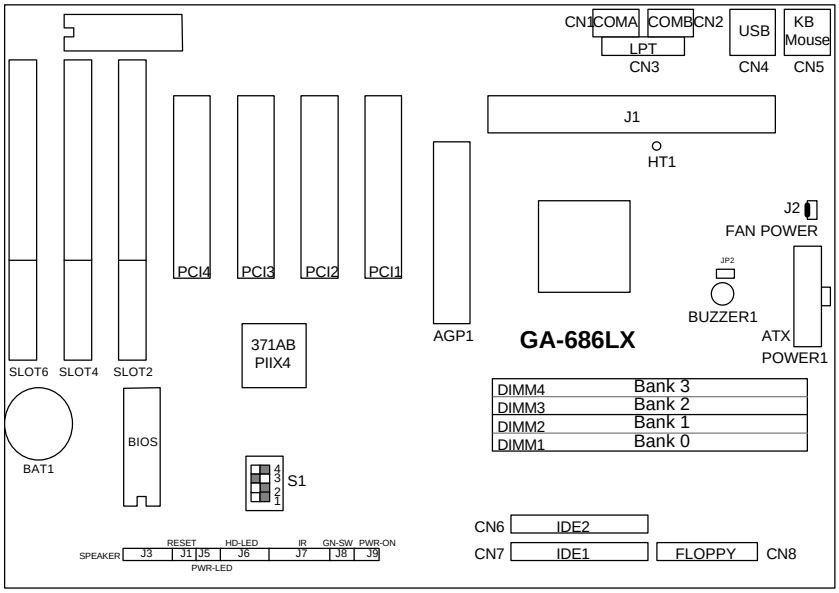
DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.

You are now ready to install your mainboard. The mounting hole pattern on the mainboard matches the ATX system board. It is assumed that the chassis is designed for a standard ATX mainboard mounting.

Place the chassis on the anti-static mat and remove the cover. Take the clips, stand-off and screws for mounting the system board, and keep them

separate.

3.2. MAINBOARD LAYOUT



<Figure 3.1>

3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

♦ CN1-8 I/O Ports Connector	
CN1	For Serial port1 (COM A).
CN2	For Serial port2 (COM B).
CN3	For LPT port.
CN4	USB port.
CN5	For Keyboard I/O port.
CN5	For PS/2 Mouse port.
CN6	For Secondary IDE port.
CN7	For Primary IDE port.
CN8	For Floppy port

♦ J1: slot1

For Pentium® II processor installed.

♦ J2: CPU cooling FAN Power Connector

Pin No.	Function
1	GND.
2	+12V
3	SENSE

♦ J3: SPEAKER Connector

Pin No.	Function
1	VCC
2	NC.
3	NC.
4	Output

♦ J4: RESET Switch

Pin No.	Function
1	RESET Input
2	GND

♦ J5: POWER ON LED (PW-LED)

Pin No.	Function
1	LED POWER (+)
2	NC
3	GND (-)

♦ J6: Hard Disk active LED (HD-LED)

Pin No.	Function
1	LED POWER (+)
2	LED POWER (-)
3	NC
4	LED POWER (+)

♦ J7: INFRARED Connector (IR) -- Function Option

Pin No.	Function
1	IR Data Output
2	GND
3	IR Data Input
4	NC

5	POWER (+)

♦ J8: GN-SW
On – Off for enter suspend Green Mode.

♦ J9: Soft Power Switch
On – Off for POWER ON or Suspend IN / OUT.
On 4 sec. For POWER OFF before VGA Enable or CMOS setup select "delay 4sec." For POWER OFF mode.

♦ J10: Green LED	
OFF	Normal mode
ON	Suspend mode

♦ S1: CPU INT. / EXT. FREQ. RATIO					
CPU TYPE	1	2	3	4	CLK RATIO
200MHz	OFF	ON	OFF	OFF	X3
233MHz	ON	ON	OFF	OFF	X3.5
266MHz	OFF	OFF	ON	OFF	X4
300MHz	ON	OFF	ON	OFF	X4.5
333MHz	OFF	ON	ON	OFF	X5
366MHz	ON	ON	ON	OFF	X5.5

♦ POWER1: ATX POWER connector	
Pin No.	Function
3,5,7,13,15-17	GND
4,6,19,20	VCC (+5V)
10	+12V
12	-12V
18	-5V
8	Power Good
9	5V SB (Stand by +5V)
14	PS-ON (Soft ON/OFF)

3.4. DRAM INSTALLATION

The mainboard can be installed with 4 / 8 / 16 / 32 / 64 / 128 / 256 MB 168 pins DIMM module DRAM, and the DRAM speed must be 50 or 60 ns for

EDO & 67~100 MHz for SDRAM. The DRAM memory system on mainboard consists of bank 0, 1, 2 & bank 3. Each bank consists of 3 PCS 168 pins DIMM module DRAM.
Because the 168 pins DIMM module is 64 bits width, using 1 PCS which can match a 64 bits system. The total memory size is 8 MB ~ 1 GB EDO / 512MB 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.

3.5. CPU SPEED SETUP

The system's speed is fixed to 66.6MHz. The user can change the DIP SWITCH **(S1)** 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.

DIP SWITCH (S1)				FREQ. RATIO	EXT.CLK. MHz	NT.CLK. MHz	CPU Type
1	2	3	4				
OFF	ON	OFF	OFF	3	66	200	Pentium® II 200 MHz
ON	ON	OFF	OFF	3.5	66	233	Pentium® II 233 MHz
OFF	OFF	ON	OFF	4	66	266	Pentium® II 266 MHz
ON	OFF	ON	OFF	4.5	66	300	Pentium® II 300 MHz
OFF	ON	ON	OFF	5	66	333	Pentium® II 333 MHz
ON	ON	ON	OFF	5.5	66	366	Pentium® II 366 MHz

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.

3.6. CMOS RTC & ISA CFG CMOS SRAM

There're 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. Due to the life-time of Battery internal battery is 5 years, the user can change a new Battery to replace old one after it can not work.

3.7. SPEAKER CONNECTOR INSTALLATION

There is always a speaker in AT system for sound purpose. The 4 - Pins connector **J3** is used to connect speaker.

The speaker can work well in both direction of connector when it is installed to the connector **J3** on mainboard.

3.8. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function, which is almost the same as power-on/off.

The system will do a cold start after the RESET switch is pushed and released by user. The RESET switch is a 2 PIN connector and should be installed to **J4** on mainboard.

3.9. POWER LED CONNECTOR INSTALLATION

There are system power LED lamps on the panel of case. The power LED will light on when system is powered-on, which is connected to a 3 PIN connector.

The connector should be connected to **J5** of mainboard in correct direction.

3.10. IDE & ATAPI DEVICE INSTALLATION

There are two Enhance PCI IDE ports (**CN6, 7**) on board, 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 booting Hard Disk should be the Master device of 1st IDE channel. The **J6** is the active LED port for ATAPI device.

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.