User's Manual

Single Board Computer, V1.0

3307720

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How to Use This Manual

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The manual describes how to configure your 3307720 system to meet
various operating requirements.   It is divided into five chapters, with each chapter
addressing a basic concept and operation of Single Board Computer.

Chapter 1 : System Overview. Presents what you have in the box and give you an
overview of the product specifications and basic system architecture for this series
model of single board computer.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of
Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main
and memory to get a safe installation and provides a programming guide of Watch
Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup
parameters, how to get advanced BIOS performance and update new BIOS. In
addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get 3307720
running with success. As basic hardware installation has been addressed
in Chapter 3, this chapter will basically focus on system integration issues, in terms
of backplane setup, BIOS setting, and OS diagnostics.

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without prior notice.   These changes will be incorporated in new editions of the
document.   **Global American, Inc.** may make supplement or change in the products
described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked
questions   will   be   shown   on   the   following   web   site   :
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Chapter 1
System Overview

1.1   Introduction

Industries hungry the increasing computing power of dual core processor on single host board computer for a long time.   However, the 130W TDP Pentium® D processor is like a monster with big and heavy cooler.   The cooler may introduce damage of system as result of improper fixing.   Risk inherent system, like a bomb that could explode any time, anywhere.   That's why Global American, Inc. presented LGA775 processor with SHB form factor just now with Intel® latest Core 2 Duo processor.

Core 2 Duo processor was created based on Intel® latest Core Micro-Architecture which combined high execution bandwidth, high energy / execution efficiency features of traditional NetBurst Micro-Architecture (Pentium® 4) and Mobile Micro-Architecture (Pentium® M) and innovations such as wide dynamic execution, Intel® ligent memory access, advanced power capability, multi-core optimized cache and single cycle SSE/2/3.   The best of the new architecture offers up to 65W TDP that even lower than well-recognized socket 478 processor on single host board with up to 84W TDP.

3307720, a PICMG 1.0 PCI/ISA single host board adopts Intel® 965 chipset that supports up to Intel® 1,066MHz FSB Core 2 Duo processor and 4GB DDR2-800 system memory.   965 equipped the 4th generation Intel® integrated graphics controller, Graphics Media Accelerator 3000 that supports DirectX 9.0, Shader Model 2.0, 256MB of video memory

As replacement of socket 478 Pentium® 4 single board computer, 3307720 supports dual Gigabit Ethernet port, four SATA 300 ports, six USB 2.0 ports, dual serial port, one parallel port, GPIO and Watchdog timer as usual.   However, some functions are evolved with higher bandwidth such like PCI Express x1 interface Gigabit Ethernet compares to PCI, SATA 300 rather than SATA 150. ISA expansion of 3307720 is building as standard function.

3307720 brief specifications:

● Support Intel® Core 2 Duo, Pentium® D, Pentium® 4, Celeron® D processor in an LGA775 socket that equipped with dual core, Hyper-Threading, EM64T, EIST, XD & VT technologies

● Dual 240-pin DDR2 SDRAM DIMMM socket, support for DDR2 1066/800/533 DIMMs, up to 4GB system memory

● Intel® Q965 integrated GMA 3000 on-board graphics interface

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- Intel® Q965 integrated GMA 3000 on-board graphics interface

- Equipped dual Gigabit Ethernet port

- Audio in/out, Watch-dog timer, 6 USB 2.0 ports (dual USB on bracket dedicated to keyboard & mouse; four internal ports)

1.2   Check List

The 3307720 package should cover the following basic items:

✓ One 3307720 single board computer
✓ Dual 7-pin SATA signal cable
✓ One 4-pin ATX power control cable for backplane connection
✓ One FDD cable
✓ One Parallel and one Serial ports with bracket
✓ One Installation Resources CD-Title
✓ One booklet of 3307720 manual

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3   Product Specification

- **Main processor**
  - Intel® Core 2 Duo / Pentium® D / Pentium® 4 / Celeron® D Processor
  - FSB: 1,066/800/533MHz

- **BIOS**
  Phoenix (Award) system BIOS with 16Mb Flash ROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible

- **Main Memory**
  - Support dual-channel & signal channel DDR2 memory interface
  - Non-ECC, non-buffered DIMMS only
  - Two DIMM sockets support 800/667/533 DDR2-SDRAM up to 4GB System Memory

- **L2 Cache Memory**
  Built-in Processor

- **Chipset**
  Intel® Q965 GMCH and ICH8 chipset

- **Bus Interface**
  - Follow PICMG 1.0 Rev 2.0 standard (32-bit PCI and 16-bit ISA)
  - Fully complies with PCI Local Bus specification V2.2 (support 4 master PCI slots)
  - Support ISA function

- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD

- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs

- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes

- **USB Interface**
  Support six USB (Universal Serial Bus) ports for high-speed I/O peripheral devices (Dual USB ports on bracket dedicated to Keyboard & Mouse)

- **PS/2 Mouse and Keyboard Interface**
  Support one 6-pin connector for PS/2 keyboard/mouse connection

- **ATX Power Control Interface**
  One 4-pin header to support ATX power control via backplane

- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, and HDD active LED, etc

- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar with battery backup for 7-year data retention

- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset

- **SATA**
  Four SATA 300 ports

- **On-board VGA**
  GMCH integrated graphics, 400MHz core frequency; share system memory up to 64MB for system with greater than or equal to 192MB of system memory

- **On-board Ethernet LAN**
  Dual Realtek RTL8111B Gigabit controller to support RJ-45 connector

- **High Driving GPIO**
  Support 8 programmable high driving GPIO

- **Cooling Fans**
  Support one 4-pin and one 3-pin headers for CPU, and System fans

- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc

- **Bracket**
  Support dual Ethernet port with 2 indicators, dual USB ports, and one CRT port

- **Outline Dimension (L X W):**
  338.5mm (13.33") X 122mm (4.8")

- **Power Requirements:**

  Configuration :
  - +12V (CPU) @2.8A
  - +12V (System) @1.3A
  - +5V @5.6A

  Test configuration:
  - CPU: Intel® Core 2 Duo 2.12GHz
  - Memory: DDR II 1GBx2
  - Primary Master IDE HDD: ST 3808110AS
  - OS: Microsoft Windows XP SP2
  - Test Programs: 3D Mark 2003 PRO for loading VGA and Burning Test V5.0 for loading CPU
  - Connected Fans: Only CPU fan connected
  - Run Time: 30 minutes

- **Operating Temperature:**
  0°C ~ 60°C (23°F ~ 140°F)

- **Storage Temperature:**
  -20°C ~ 80°C

- **Relative Humidity:**
  5% ~ 90%, non-condensing

1.3.1 Mechanical Drawing
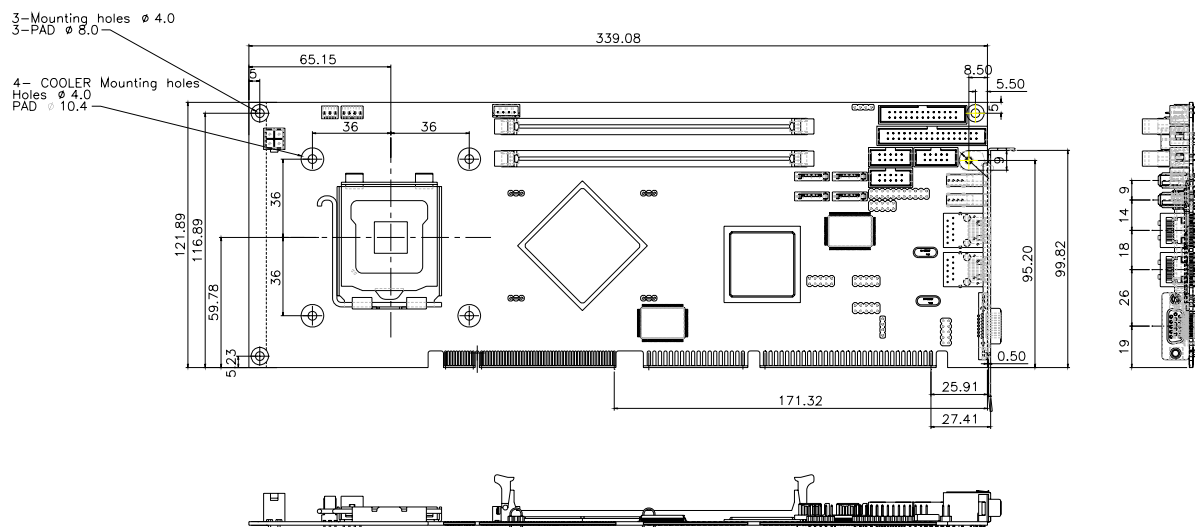
1.4 System Architecture

3307720 adopts Intel® 965 GMCH (Graphics Memory Controller Hub) and ICH8 (I/O Controller Hub) chipset for processor, display, memory and peripheral I/O interfaces such as PCI Express, PCI bus, ISA Bus, SATA ports, USB ports, and LPC (Low Pin Count) interface.

Dual Realtek RTL8111B Gigabit Ethernet controllers are attached to the PCI Express x1 interface to add Ethernet connectivity.   Meanwhile, Winbond W83627, Super I/O on LPC interface provides I/O such as PS/2 keyboard & mouse, floppy, parallel and serial ports.

Audio codec, Realtek ALC262 based on HDA (High Definition Audio) to provide 2-channel audio function such as Line-in/Line-out/MIC via header on-board.
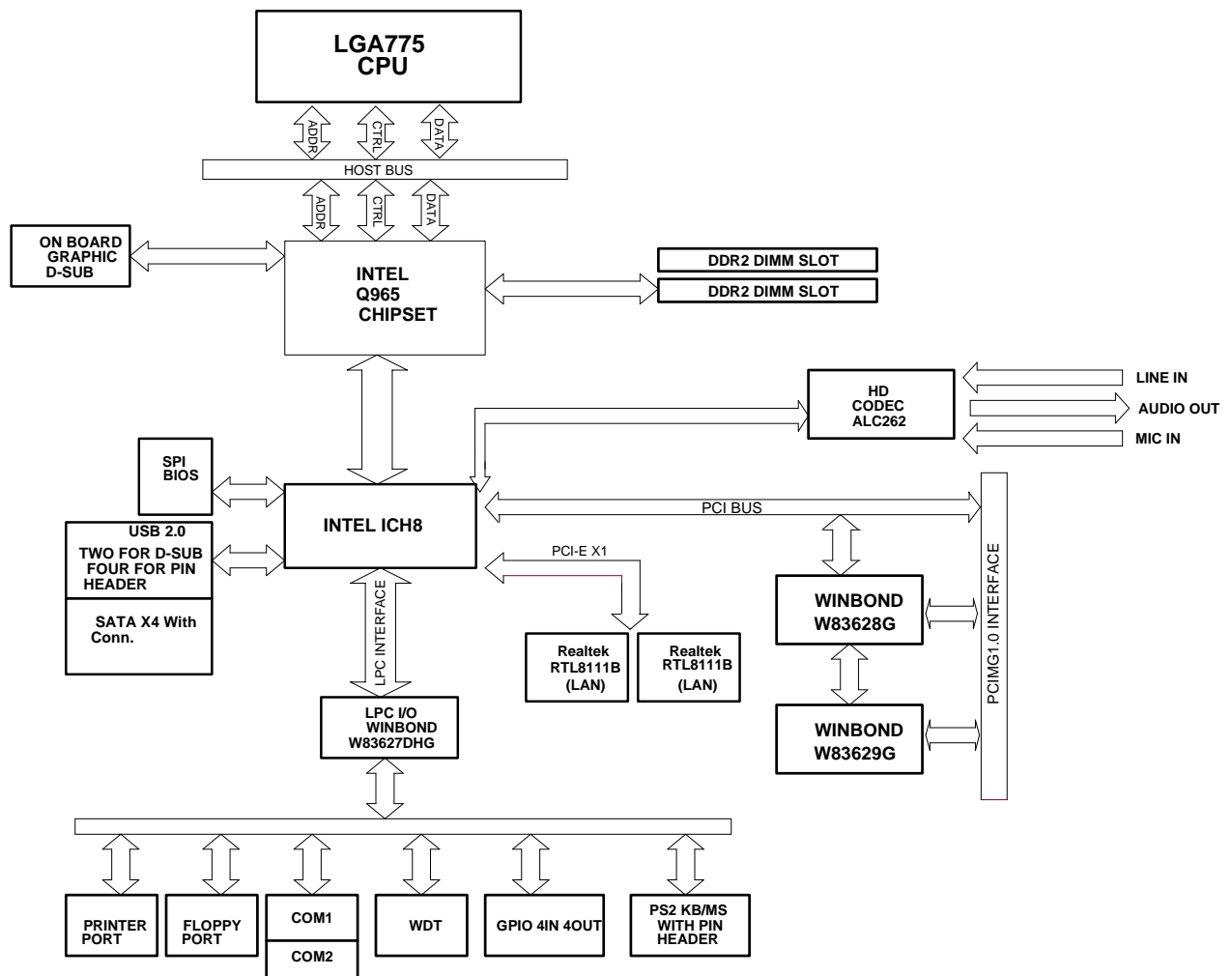
3307720 System Block Diagram

Chapter 2
Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connector.   All of the configuration jumpers on 3307720 series are in the proper position.   The default settings shipped from factory are marked with a star (★).

2.1   Jumper Setting
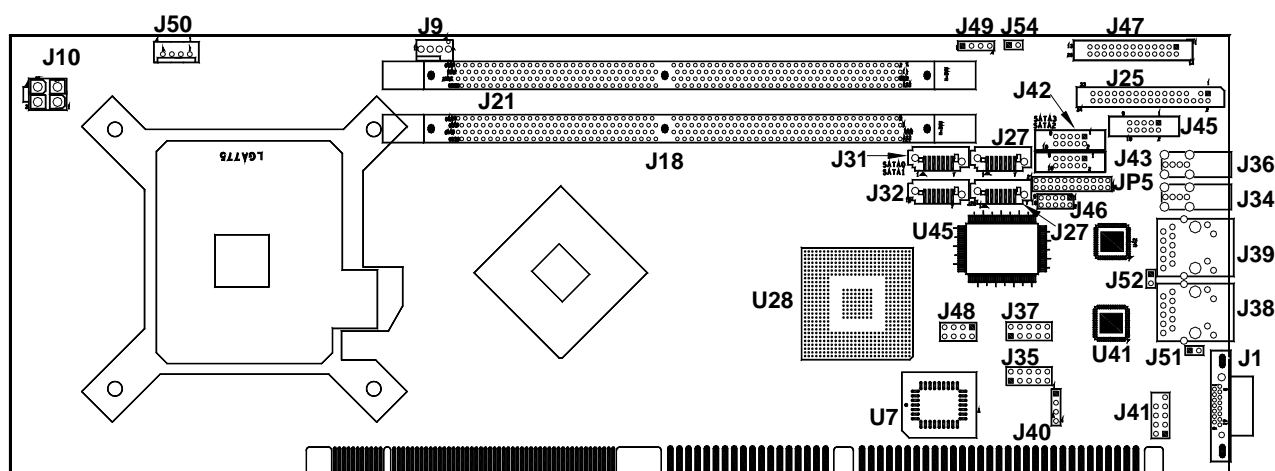
Figure 2-1   3307720 Jumper Location

JP5: COM2 (J43) Interface Selection

JP5	Function
5-6, 9-11, 10-12, 15-17, 16-18 Short	RS-232 ★
3-4, 7-9, 8-10, 13-15, 14-16, 21-22 Short	RS-422
1-2, 7-9, 8-10, 19-20 Short	RS-485

JP4: CMOS Clear

JP4	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors on this Single Board Computer.

Connector Function List

Connector	Description	Remark (Model)
J1	VGA D-SUB Connector	
J9	FAN 1 (CPU FAN)	
J10	+12V Power Connector	
J17	FAN 2 (SYSTEN FAN)	
J18	DDR2 SDRAM SLOT(DIMM0)	
J21	DDR2 SDRAM SLOT(DIMM1)	
J25	Floppy Connector	
J27	SATA Connector	
J28	SATA Connector	
J31	SATA Connector	
J32	SATA Connector	
J34	External USB D-SUB Connector	
J35	Internal USB Connector	
J36	External USB D-SUB Connector	
J37	Internal USB Connector	
J38	Ethernet RJ-45 Connector	
J39	Ethernet RJ-45 Connector	
J40	Audio CD -IN Connector	
J41	Audio Connector	
J42	COM1 Serial Port 1 Connector	
J43	COM2 Serial Port 2 Connector	
J45	PS/2 Keyboard/Mouse Connector	
J46	General Purpose I/O Connector	
J47	Parallel Port Connector	
J48	Front panel Connector	
J49	External Speaker Connector	
J50	ATX Power Control Connector	
J53	Reserve	
J54	Reserve	

Pin Assignments of Connectors

J1: On-board VGA CRT Connector

PIN No.	Signal Description
1	Red
2	Green
3	Blue
4	Monitor ID0 (MONID0) (5V I/F)
5	Ground
6	Ground
7	Ground
8	Ground
9	+5V
10	Ground
11	Monitor ID1 (MONID1) (5V I/F)
12	VGA DDC Data (5V I/F)
13	Horizontal Sync. (HSYNC) (5V I/F)
14	Vertical Sync. (VSYNC) (5V I/F)
15	VGA DDC Clock (5V I/F)

J9: CPU Fan Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Fan Control
4	Fan Speed Detecting signal

J10: 12V POWER Connector

PIN No.	Signal Description
1	Ground
2	Ground
3	+12V
4	+12V

J17: System Fan Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Fan Speed Detecting signal

J25: FDC Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	Density Select 1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Head Select#
33	Ground	34	Disk Change#

J27/J28/J31/J32: Primary/Secondary SATA Connector

PIN No.	Signal Description
1	Ground
2	SATATX+ (SATATXP)
3	SATATX- (SATATXN)
4	Ground
5	SATARX- (SATARXN)
6	SATARX+ (SATARXP)
7	Ground

J34/J36: D-SUB USB Connector

PIN No.	Signal Description
1	5V Dual
2	USB0-
3	USB0+
4	Ground

J35/J37: External USB Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	5V Dual
3	Ground	4	USB3-
5	USB2+	6	USB3+
7	USB2-	8	Ground
9	5V Dual	10	Ground

Note:

5V Dual is always available. It's supplied by either 5V VCC power source in normal operation mode or 5V standby power source in standby mode.

J38/J39 : Ethernet RJ-45 Connector

PIN No.	Signal Description
1	MDI0+ (MDI0P)
2	MDI0- (MDI0N)
3	MDI1+ (MDI1P)
4	MDI2+ (MDI2P)
5	MDI2- (MDI2N)
6	MDI1- (MDI1N)
7	MDI3+ (MDI3P)
8	MDI3- (MDI3N)

J40: Audio CD-in Connector

PIN No.	Signal Description
1	CD-in Left Channel
2	CD Ground
3	CD Ground
4	CD-in Right Channel

J41: Audio MIC/Line-in/Line-out Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	MIC with Reference Voltage	2	Analog Ground
3	Line-in Left Channel	4	Analog Ground
5	Line-in Right Channel	6	Analog Ground
7	Line-out Left Channel	8	Analog Ground
9	Line-out Right Channel	10	N/C

J42: COM1 Serial Port 1 Connector

PIN No.	Signal Description
	RS-232
1	DCD (Data Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND (Ground)
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)
10	N/C

J43 : COM2 Serial Port 2 Connector

PIN No.	Signal Description		
	RS-232	RS-422	RS-485
1	DCD (Data Carrier Detect)	TX-	DATA-
2	RXD (Receive Data)	TX+	DATA+
3	TXD (Transmit Data)	RX+	N/C
4	DTR (Data Terminal Ready)	RX-	N/C
5	GND (Ground)	GND	GND
6	DSR (Data Set Ready)	N/C	N/C
7	RTS (Request to Send)	N/C	N/C
8	CTS (Clear to Send)	N/C	N/C
9	RI (Ring Indicator)	N/C	N/C
10	N/C	N/C	N/C

Note:
J43 (COM2) could be configurable as RS-232/422/485 with jumper JP5.

J45: External Keyboard Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Mouse Data	2	Keyboard Data
3	N/C	4	N/C
5	Ground	6	Ground
7	PS2 Power	8	PS2 Power
9	Mouse Clock	10	Keyboard Clock

J46: General Purpose I/O Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	Ground	10	+5V

Note:

All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each Fan.

J47: Parallel Port Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J48: Front Panel Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	+3.3V(pull up 33Ohm)	2	Ground
3	+3.3V(Pull up 330 ohm)	4	H.D Active Signal
5	3V_DUAL(Pull up 1K ohm)	6	PWR_Button Signal
7	+3.3V(pull_up)	8	Reset Signal

J49: External Speaker Connector

PIN No.	Signal Description
1	Speaker Signal Output (Open-drain w/ internal series 33 Ohm)
2	N/C
3	Ground
4	+5V

Note:

The pull-high voltage of external speaker is limited at 5V maximum.

J50: ATX Power Control Connector

PIN No.	Signal Description
1	ATX Power Good Signal (PW-OK)
2	ATX 5V Stand-by (5VSB)
3	ATX Power On Control (PS-ON)
4	Ground

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you handle WDT and GPIO operation in software programming.

3.1   Intel® LGA775 Processor

Installing LGA775 CPU

1) Lift the handling lever of CPU socket outwards and upwards to the other end. Following step A position to step B position

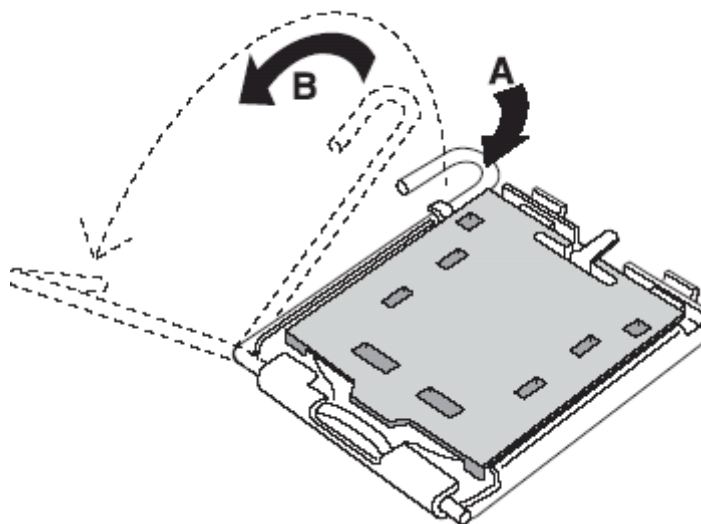Figure 3-1

2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end (see Fig.3-2). Then press the CPU gently until it fits into place (see Fig.3-4). If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

Triangle mark is meaning first pin position; kindly assemble and take aim at notch of top and bottom between CPU and socket.
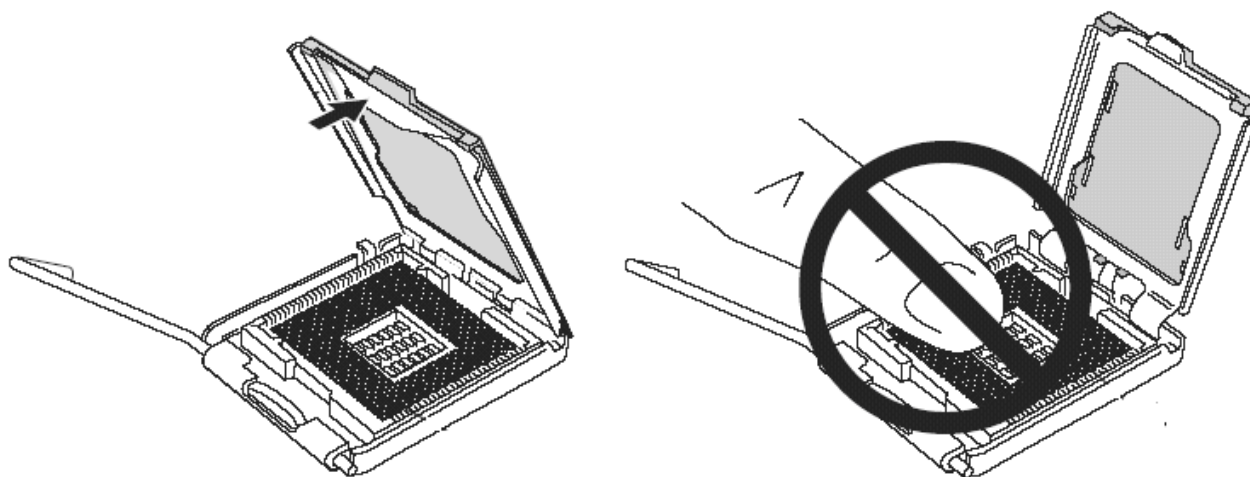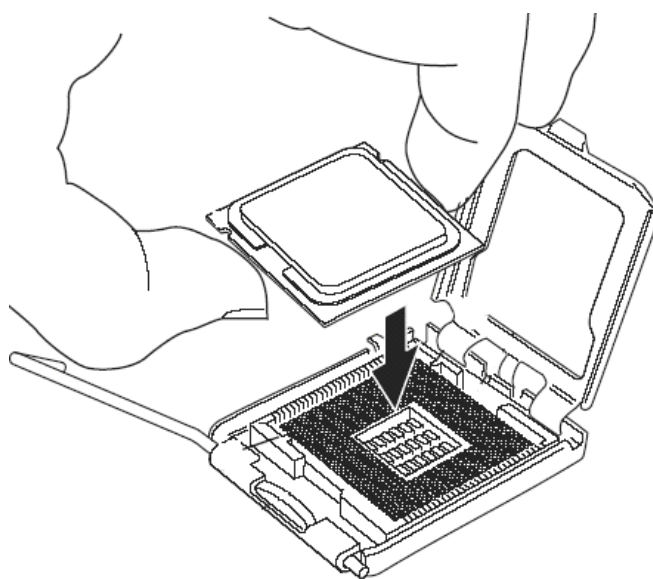

Figure 3-2

Figure 3-3

Figure 3-4

Precaution! (See fig.3-3) Don't touch directly by your hand or impacts internal align balls of CPU socket to avoid motherboard destruction, it is a precise actuator.

3) Push down the lever to lock processor chip into the socket once CPU fits.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the LGA 775.

Removing CPU
1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus
3307720 series will automatically detect the CPU used. CPU speed of Intel® Pentium® D can be detected automatically.

3.2   Main Memory

3307720 provides two DDR2-SDRAM DIMM sockets to support dual-channel & single channel DDR2 memory interface. The maximum memory size can be up to 4 GB, memory frequency includes 1066/800/667/533. Auto detects memory clock, which is according to BIOS CMOS settings.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be either one double-sided DIMM in either one DIMM socket or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Dual Channel DDR2 DIMMs
Dual Channel DDR2 memory technology doubles the bandwidth of memory bus. Adequate or higher bandwidth of memory than processor would increase system performance. To enable Dual Channel DDR2 memory technology, install two identical memory modules in both memory sockets is required. Following tables show bandwidth information of different processor and memory configurations.

CPU FSB	Bandwidth
1066MHz	8.5 GB/s
800MHz	6.4GB/s
533MHz	4.2GB/s

Memory Frequency	Dual Channel DDR2 Bandwidth	Single Channel DDR2 Bandwidth
800MHz	25.6 GB/s	12.8 GB/s
667MHz	21.2 GB/s	10.6 GB/s
533MHz	16.8 GB/s	8.4 GB/s

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade system performance without acquiring technical information.

<u>Memory frequency / CPU FSB synchronization</u>
3307720 series support different memory frequencies depending on the CPU front side bus and the type of DDR2 DIMM.

CPU FSB	Memory Frequency
1066MHz	800/667/533MHz
800MHz	667/533MHz
533MHz	533MHz

3.3 Installing the Single Board Computer

To install your 3307720 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place 3307720 into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

<u>WARNING</u>
Please ensure that SBC is properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work due to bad contact of PICMG 1.0 PCI plus ISA-bus slot.

Note:
Please refer since section 3.3.1 to 3.3.4 to install INF/VGA/LAN drivers.

3.3.1 Chipset Component Driver

The chipset used on 3307720 series is relatively new which operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 2000/XP, please install its INF before any of other Drivers are installed.

3.3.2 Intel® Integrated Graphics GMCH Chip

Using GMCH 3000 High performance graphic integrated chipset is aimed to gain an outstanding graphic performance. It is accompanied by shared 8 to 64MB system DDR2-SDRAM with Intel® DVMT; 400MHz core frequency. This combination makes 3307720 an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI or ISA VGA card can take over the system display.

Drivers Support

Please find Q965 driver in the 3307720 CD-title. Drivers support Windows 2000, Windows XP, OS2, and Linux.

3.3.3 Gigabit Ethernet Controller

Drivers Support

Please find Realtek RTL8111B LAN driver in /Ethernet directory of 3307720 CD-title. The drivers support Windows-XP/2000, and Linux.

LED Indicator (for LAN status)

3307720 series provides two LED indicators to report Realtek RTL8111B Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

8111B	Color	Name of LED	Operation of Ethernet Port		
			ON	OFF	
Status LED	Green	LAN Linked & Active LED	Linked	Active (Blinking)	
Speed LED	Orange	LAN speed LED	**Giga Mbps**	**100 Mbps**	**10 Mbps**
	Green		Orange	Green	Off

3.3.4 On-board Realtek ALC262 Device

The Audio codec device provides a more than standard sound display. It is capable for many general purposes. Realtek ALC262 based on HDA (High Definition Audio) to provide 2-channel audio function such as Line-in/Line-out/MIC via header on-board.

Driver Support

Please find Sound driver in/Audio of 3307720 driver CD-title. The drivers support Windows 2000 and Windows XP.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by putting jumpers at proper position.

JP4	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS contents

To correctly operate CMOS Clear function, users must turn off the system, move JP4 jumper to short pin 2 and 3. To clear CMOS contents, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP4 back to 1-2 position (Normal Operation) and start the system. System will then produce a "CMOS Check Sum Error" message and hold up. Users may then follow the displayed message to load BIOS default setting.

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

3307720 allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627 data sheet.

There are two PNP I/O port DDR2 that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
// Enter Extended Function Mode
outp(0x002E, 0x87);
outp(0x002E, 0x87);
// Assign Pin 89 to be a WDTO
outp(0x002E, 0x2C);
outp(0x002F, inp(0x002F) & 0xBF);
// Select Logic Device 8
outp(0x002E, 0x07);
outp(0x002F, 0x08);
// Active Logic Device 8
outp(0x002E, 0x30);
outp(0x002F, 0x01);

// Select Count Mode
outp(0x002E, 0xF5);
outp(0x002F, (inp(0x002F) & 0xF7) | ( Count-mode Register  & 0x08));
// Specify Time-out Value
outp(0x002E, 0xF6);
outp(0x002F,  Time-out Value Register );
// Disable WDT reset by keyboard/mouse interrupts
outp(0x002E, 0xF7);
outp(0x002F, 0x00);
// Exit Extended Function Mode
outp(0x002E, 0xAA);
```

Definitions of Variables:

Value of [Count-mode Register]:
1) 0x00 -- Count down in seconds (Bit3=0)
2) 0x08 -- Count down in minutes (Bit3=1)
Value of [Time-out Value Register]:
1) 0x00 -- Time-out Disable
2) 0x01~0xFF -- Value for counting down

3.6 SMBus

The System Management Bus is a two-wire interface through which simple power-related chips can communicate with rest of the system. It uses I2C as its backbone.

A system using SMBus passes messages to and from devices instead of tripping individual control lines. With the SMBus, a device can provide manufacturer information, tell the system what its model/part number is, save its state for a suspend event, report different types of errors, accept control parameters, and return its status.

The SMBus may share the same host device and physical bus as ACCESS bus components provided that an appropriate electrical bridge is provided between the interal SMB devices and external ACCESS bus devices.

3.7 On-Board USB 2.0 Controller

Drivers Support

Please find Intel® ICH8 USB driver in /USB20 directory of 3307720 CD-title. The drivers support Windows-2000/XP.

3.8 GPIO

The 3307720 series provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

3.8.1 Pin assignment

J46: General Purpose I/O Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	Ground	10	+5V

All General Purpose I/O ports can only apply to standard TTL $\pm$ 5% signal level (0V/5V), and each source sink capacity up to 12mA.

3.8.2 3307720 GPIO Programming Guide

There are 8 GPIO pins on 3307720 series. These GPIO pins are from SUPER I/O (W83627DHG) GPIO pins, and can be programmed as Input or Output direction.

J46 pin header is for 8 GPIO pins and its pin assignment as following :

        J46_Pin1=GPIO0:from SUPER I/O_GPIO34 with Ext. 4.7K PH
        J46_Pin2=GPIO1:from SUPER I/O_GPIO20 with Ext. 4.7K PH
        J46_Pin3=GPIO2:from SUPER I/O_GPIO35 with Ext. 4.7K PH
        J46_Pin4=GPIO3:from SUPER I/O_GPIO21 with Ext. 4.7K PH
        J46_Pin5=GPIO4:from SUPER I/O_GPIO36 with Ext. 4.7K PH
        J46_Pin6=GPIO5:from SUPER I/O_GPIO22 with Ext. 4.7K PH
        J46_Pin7=GPIO6:from SUPER I/O_GPIO37 with Ext. 4.7K PH
        J46_Pin8=GPIO7:from SUPER I/O_GPIO23 with Ext. 4.7K PH
            <<<<<   Be careful Pin9=GND , Pin10=VCC   >>>>>

There are several Configuration Registers (CR) of W83627DHG needed to be programmed to control the GPIO direction, and status(GPI)/value(GPO). CR00h ~ CR2F are common (global) registers to all Logical Devices (LD) in W83627DHG. CR07h contains the Logical Device Number that can be changed to access the LD as needed. LD7 contains the GPIO10~17 registers.

Programming Guide:

Step1: CR2A_Bit [7].P[0]; to select multiplexed pins as GPIO34 pins
Step2: LD9_CR07h.P [09h]; Point to LD9
Step3: LD9_CR30h_Bit[1.0].P[1.1]; Enable GPIO2&GPIO3
Step4: Select GPIO direction, Get Status or output value.

LD9_CRE3h; GPIO27 ~ 20 direction, 1 = input, 0 = output pin
LD9_CRE5h.P [00]; Let CRE4 (GPIO data port) non-invert to prevent from confusion
LD9_CRE4h; GPIO27~20 data port, for input pin, get status from the related bit, for output pin, write value to the related bit.

For example,
    LD9_CRE3h_Bit0.P0; Let GPIO20 as output pin
    LD9_CRE5h_Bit0.P0; Let CRE4_Bit0 non-inverted
    LD9_CRE4h_Bit0.P0; Output "0" to GPIO20 pin (J46_Pin2)

    LD9_CRF0h_Bit4.P1; Let GPIO34 as input pin
    LD9_CRF2h_Bit4.P0; Let CRF1_Bit4 non-inverted
    Read LD9_CRF1h_Bit4; Read the status from GPIO34 pin (J46_Pin1)

How to access W83627DHG CR?

In 3307720, the EFER = 002Eh, and EFDR = 002Fh.
EFER and EFDR are 2 IO ports needed to access W83627HF CR.
EFER is the Index Port, EFDR is the Data Port.
CR index number needs to be written into EFER first,
Then the data will be read/written from/to EFDR.

To R/W W83627DHG CR, it is needed to Enter/Enable Configuration Mode first. When completing the programming, it is suggested to Exit/Disable Configuration Mode.
    Enter Configuration Mode: Write 87h to IO port EFER twice.
    Exit Configuration Mode: Write AAh to IO port EFER.

3.8.3   Example

Define GPIO20 input and GPIO34 output pin, and output "0" to this pin.

```
        mov     dx,2eh      ; Enter Configuration Mode
        mov     al,87h
        out     dx,al
        jmp     $+2
        out     dx,al

        mov     dx,2eh
        mov     al,2Ah      ; Read CR2A
        out     dx,al
        mov     dx,2fh
        in      al,dx
        and     al,07Fh     ; CR2A_Bit[0].P[0]
        out     dx,al

        mov     dx,2eh
        mov     al,07h       ;Point to LDN9
        out     dx,al
        mov     dx,2fh
        mov     al,09h
        out     dx,al

        mov     dx,2eh       ;Read CR30
        mov     al,30h
        out     dx,al
        mov     dx,2fh
        in      al,dx
        or      al,03h
        out     dx,al

        mov     dx,2eh
        mov     al,0E3h     ;Read LD9_CRE3
        out     dx,al
        mov     dx,2fh
        in      al,dx
        and     al,0FEh
        out     dx,al
```

```
mov     dx,2eh
mov     al,0E5h    ;Read LD9_CRE5
out     dx,al
mov     dx,2fh
in      al,dx
and     al,0FEh
out     dx,al


mov     dx,2eh
mov     al,0f0h    ; Read    LD9_CRF0
out     dx,al
mov     dx,2fh
in      al,dx
and     al,0efh
out     dx,al


mov     dx,2eh
mov     al,0f2h    ; LD9_CRF2_Bit4.P0
out     dx,al
mov     dx,2fh
in      al,dx
and     al,0EFh
out     dx,al

mov     dx,2eh     ;Exit Configuration Mode
mov     al,0AAh
out     dx,al
```

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0700-05BD	321K	DOS
05BE-1468	58K	Program Area
1469-9EFE	554K	[Available]
9EFE-9EFE	0.1K	Unused
= Conventional memory ends at 640K =		
9F00-9FBF	3K	Extended BIOS Area
9FC0-9FFF	1K	Unused
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CAFF	44K	Video ROM
CB00-CC49	5.2K	Unused
CC4A-CFFF	14K	High RAM
D000-DFFF	64K	Page Frame
E000-EEFF	60K	Unused
EF00-EFFF	4K	ROM
F000-FFFF	64K	System ROM
HMA	64K	First 64K Extended

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required.   The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	SMARTDRV	System Timer
IRQ 1	SMARTDRV	Keyboard Event
IRQ 2	Unassigned	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	Unassigned	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	Unassigned	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	Unassigned	Usable IRQ
IRQ 10	Unassigned	Usable IRQ
IRQ 11	Unassigned	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	Unassigned	Usable IRQ

Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

Global American Inc.

Address:	17 Hampshire Drive Hudson, NH 03051
TEL:	Toll Free (U.S. Only) 800-833-8999 (603)886-3900
FAX:	(603)886-4545
Website:	http://www.globalamericaninc.com
E-Mail:	salesinfo@globalamericaninc.com