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User's Manual

Single Board Computer 3307870

Version 1.0, September 2006

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Glossary

AC '97	Audio Codec 97		HDD	Hard Disk Drive
ACPI	Advanced Configuration and Power Interface		IDE	Integrated Data Electronics
			I/O	Input/Output
APM	Advanced Power Management		ICH4	I/O Controller Hub 4
ARMD	ATAPI Removable Media Device		L1 Cache	Level 1 Cache
ASKIR	Shift Keyed Infrared		L2 Cache	Level 2 Cache
ATA	Advanced Technology Attachments		LCD	Liquid Crystal Display
			LPT	Parallel Port Connector
BIOS	Basic Input/Output System		LVDS	Low Voltage Differential Signaling
CFII	CompactFlash Type 2		MAC	Media Access Controller
CMOS	Complementary Metal Oxide Semiconductor		OS	Operating System
			PCI	Peripheral Connect Interface
CPU	Central Processing Unit		PIO	Programmed Input Output
Codec	Compressor/Decompressor		PnP	Plug and Play
COM	Serial Port		POST	Power On Self Test
DAC	Digital to Analog Converter		RAM	Random Access Memory
DDR	Double Data Rate		SATA	Serial ATA
DIMM	Dual Inline Memory Module		S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
DIO	Digital Input/Output			
DMA	Direct Memory Access		SPD	Serial Presence Detect
EIDE	Enhanced IDE		S/PDI	Sony/Philips Digital Interface
EIST	Enhanced Intel SpeedStep Technology		SDRAM	Synchronous Dynamic Random Access Memory
FDD	Floppy Disk Drive		SIR	Serial Infrared
FDC	Floppy Disk Connector		UART	Universal Asynchronous Receiver-transmitter
FFIO	Flexible File Input/Output			
FIFO	First In/First Out		USB	Universal Serial Bus
FSB	Front Side Bus		VGA	Video Graphics Adapter
IrDA	Infrared Data Association			

Chapter

1

Introduction

1.1 3307870 Overview

The 5.25" 3307870 socket 479/embedded Celeron M single board computer (SBC) is fully equipped with advanced multi-mode I/Os. The 3307870 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 3307870 Models

The 3307870 series has two models:

- 3307870A
- 3307870B

The specifications for the four models are show in **Table 1-1**.

3307870	-7870A	-7870A-1GHz	-7870B	-7870B-1GHz
Embedded CPU	NO	YES*	NO	YES*
CRT/LCD	YES	YES	YES	YES
Dual GbE	YES	YES	YES	YES
Dual USB	YES	YES	YES	YES
DVI Function	NO	NO	YES	YES

Table 1-1: 3307870 Model Specifications

*The 3307870A 1GHz and 3307870B 1GHz both come with an embedded 1GHz Intel Celeron M zero cache CPU.

1.1.2 3307870 Features

Some of the 3307870 features are listed below:

- 5.25" form factor
- RoHS compliant
- Socket 479 Intel® Pentium M/Celeron M processors supported
- Dual-independent display functionality

- Up to 1GB of 266MHz of DDR memory supported
- Dual channel 18-bit LVDS supported
- Two high performance gigabit Ethernet (GbE) controllers onboard
- Five USB 2.0 devices supported
- Two RS-232 serial communication channels
- Integrated audio

1.2 3307870 Overview
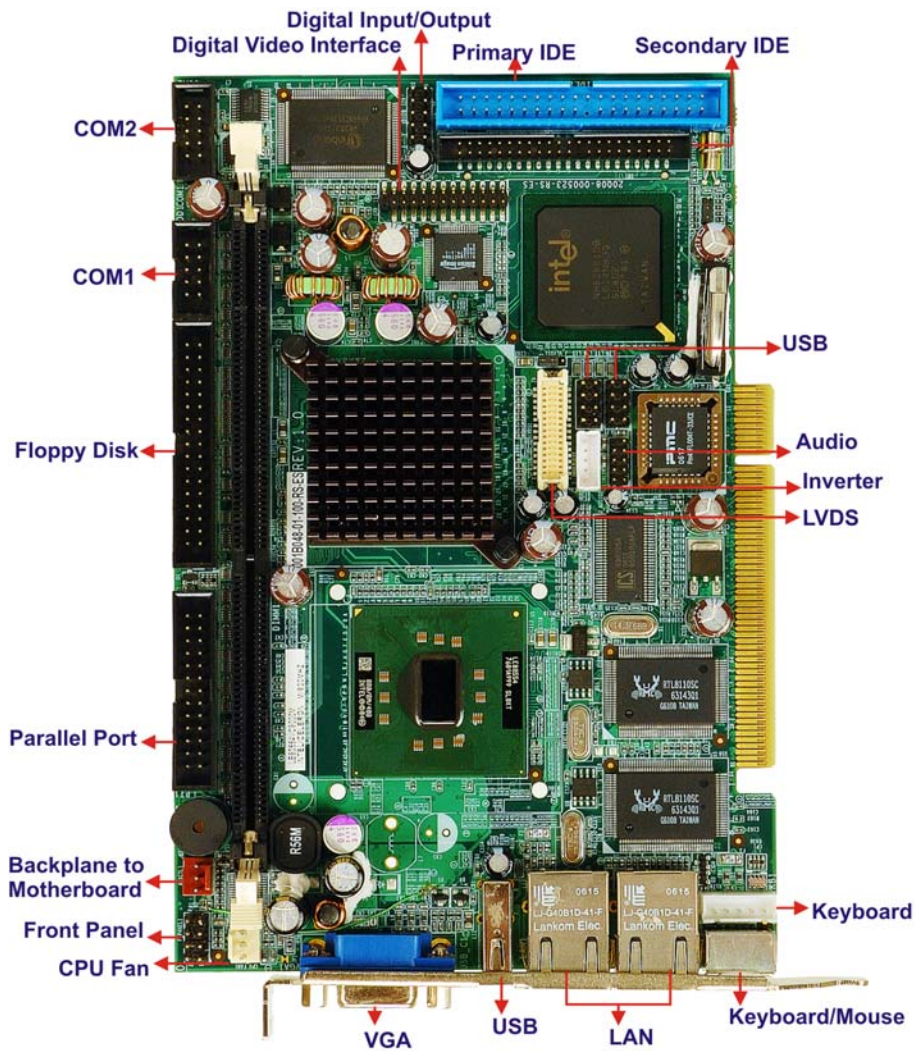
Figure 1-1: 3307870 Overview
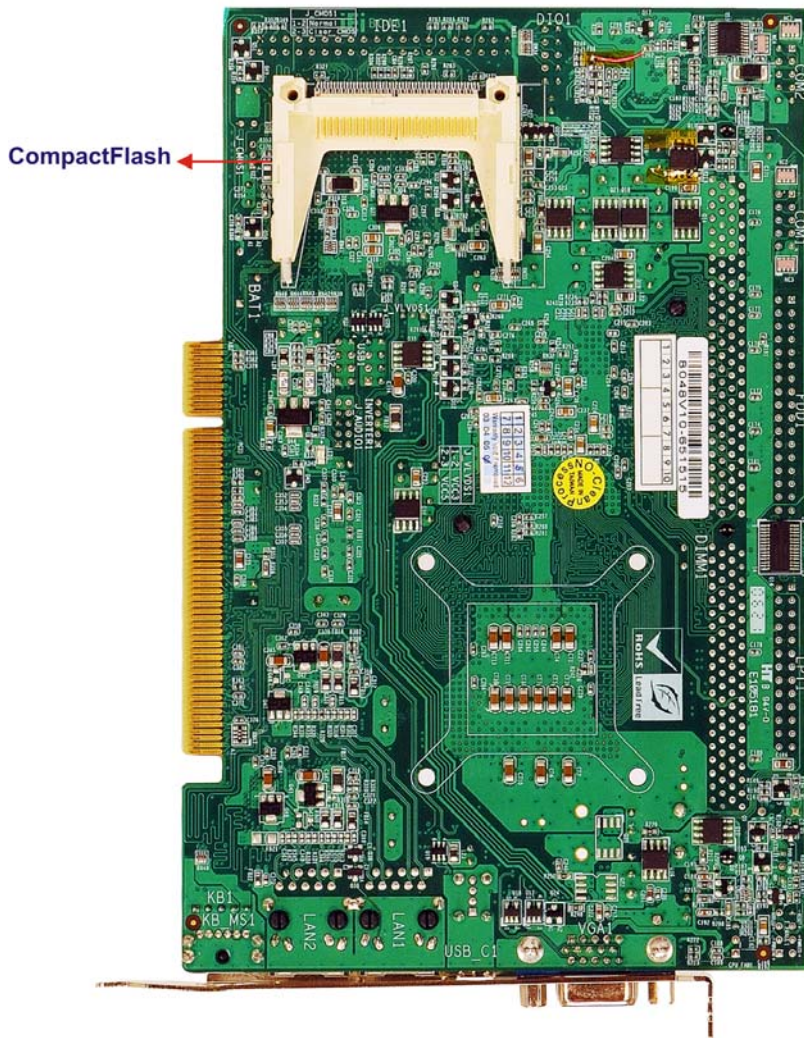
CompactFlash ←

Figure 1-2: 3307870 Solder Side Overview

1.2.1 3307870 Connectors

The 3307870 has the following connectors onboard:

- 1 x Audio connector
- 1 x Backplane to mainboard connector
- 1 x CompactFlash connector
- 1 x Digital input/output connector
- 1 x Digital visual interface connector
- 1 x Fan connector
- 1 x Floppy disk drive connector

- 1 x Front panel connector
- 2 x IDE connectors
- 1 x Keyboard connector
- 1 x LVDS connector
- 1 x Panel backlight 12V power source
- 1 x Parallel port connector
- 2 x Serial port connectors
- 2 x USB connectors

The 3307870 has the following connectors on the board rear panel:

- 2 x Ethernet connectors
- 1 x PS/2 Keyboard/mouse connector
- 1 x USB connector
- 1 x VGA connector

The 3307870 has the following onboard jumpers:

- Clear CMOS
- LVDS voltage selection

1.2.2 Technical Specifications

3307870 technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2 Detailed Specifications**.

Specification	3307870
Form Factor	5.25" form factor
CPU	Intel socket 479 Pentium M (up to 2.1 GHz) Intel socket 479 Celeron M (up to 1.7 GHz)
Northbridge Chipset	Intel 852GM
Southbridge Chipset	ICH4
Display	Intel Extreme Graphics 2 (integrated into Northbridge)
Memory	Supports one 1GB DDR266 184-pin DIMM modules

BIOS	AMI BIOS Label
SSD	CompactFlash (CF)
Super I/O	W83627EHG
Audio	Realtek ALC655 AC'97 Codec
LAN	Dual RTL8110SC
COM	2 x RS-232
USB2.0	Five USB 2.0 devices supported with two onboard USB 2.0 connectors and one external USB 2.0 port
IDE	1 x 40-pin IDE connects to two Ultra ATA33/66/100 devices 1 x 44-pin IDE connects to two Ultra ATA33/66/100 devices
Parallel Port	1 x LPT port connector
KB/MS	PS/2 connector
WDT	Software programmable 1-255 sec. by super I/O
Digital I/O	4 input / 4 output by super I/O
Fan connector	1x3 pin for CPU Fan
Power	+5V/+12V, AT/ATX support
Temperature	0ºC - 60ºC
Humidity	5%~95% non-condensing
Dimensions	146.05mm x 203.2mm
Weight (GW/NW)	1000g/400g

Table 1-2: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and onboard features of the 3307870 in detail.

2.2 Compatible GAI Backplanes

The 3307870 CPU card is compatible with all GAI PCI backplanes. For more information on these backplanes, please visit the GAI website or contact your CPU card reseller or vendor.

2.3 Board Dimensions

The dimensions of the board are listed below:

- **Length**:   165mm
- **Width**:   115mm

2.4 CPU Support

 NOTE:

The 3307870A 1GHz and the 3307870B 1GHz have an embedded zero cache Intel Celeron M 1GHz on board.

The 3307870 supports normal voltage, low voltage (LV) and ultra low voltage (ULV) mobile (M) Intel$^®$ Pentium$^®$ M processors and Intel$^®$ Celeron$^®$ M processors

2.4.1 Supported Pentium® M CPUs

Table 2-1 lists the Intel$^®$ Pentium$^®$ M processors supported by the 3307870 CPU board. All the Intel$^®$ Pentium$^®$ M processors support Enhanced Intel SpeedStep® Technology.

Processor Number	Power	Architecture	L2 Cache	Speed	FSB	Execute Disable Bit
778	LV	90nm	2MB	1.60GHz	400MHz	Yes
765	Normal	90nm	2MB	2.10GHz	400MHz	No
758	LV	90nm	2MB	1.50GHz	400MHz	Yes
755	Normal	90nm	2MB	2GHz	400MHz	No
753	ULV	90nm	2MB	1.20GHz	400MHz	Yes
745	Normal	90nm	2MB	1.80GHz	400MHz	No
738	LV	90nm	2MB	1.40GHz	400MHz	No
735	Normal	90nm	2MB	1.70GHz	400MHz	No
733J	ULV	90nm	2MB	1.10GHz	400MHz	Yes
733	ULV	90nm	2MB	1.10GHz	400MHz	No
725	ULV	90nm	2MB	1.60GHz	400MHz	No
723	ULV	90nm	2MB	1GHz	400MHz	No
718	LV	130nm	1MB	1.30GHz	400MHz	No

Table 2-1: Supported Pentium® M CPUs

2.4.2 Supported Celeron® M CPUs

Table 2-2 lists the Intel® Celeron® M processors supported by the 3307870 CPU board.

Processor Number	Power	Architecture	L2 Cache	Speed	FSB	Execute Disable Bit
390	Normal	90nm	1MB	1.70GHz	400MHz	Yes
383	ULV	90nm	1MB	1GHz	400MHz	Yes
380	Normal	90nm	1MB	1.60GHz	400MHz	Yes
373	ULV	90nm	512KB	1GHz	400MHz	Yes
370	Normal	90nm	1MB	1.50GHz	400MHz	Yes
360J	Normal	90nm	1MB	1.40GHz	400MHz	Yes

360	Normal	90nm	1MB	1.40GHz	400MHz	No
353	ULV	90nm	512KB	900MHz	400MHz	No
350J	Normal	90nm	1MB	1.30GHz	400MHz	Yes
350	Normal	90nm	1MB	1.30GHz	400MHz	No
340	Normal	130nm	512KB	1.50GHz	400MHz	No
333	ULV	130nm	512KB	900MHz	400MHz	No
330	Normal	130nm	512KB	1.40GHz	400MHz	No
320	Normal	130nm	512KB	1.30GHz	400MHz	No
310	Normal	130nm	512KB	1.20GHz	400MHz	No

Table 2-2: Supported Celeron® M CPUs

2.5 Onboard Chipsets

2.5.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- **Northbridge**: Intel® 852GM
- **Southbridge**: Intel® ICH4

The following two sections (**Section 2.5.2** and **Section 2.5.3**) list some of the features of the Intel® 852GM and the Intel® ICH4 chipsets. For more information on these two chipsets please refer to the Intel website.

2.5.2 Intel® 852GM Northbridge Chipset

The Intel 852GM northbridge chipset comes with the following features:

- The Intel 852GM chipset is designed, validated, and optimized for the Mobile Intel Celeron processor and Intel Celeron processor with Intel® NetBurst® micro-architecture
- 400 MHz system bus delivers a high-bandwidth connection between the processor and the platform
- Supports integrated graphics utilizing Intel® Extreme Graphics 2 technology

- Advanced packaging technology and industry leading electrical design innovations deliver long-term system reliability over wide operating conditions
- Three USB host controllers provide high performance peripherals with 480 Mbps of bandwidth, while enabling support for up to six USB 2.0 ports.
- The on-chip AC '97 implementation delivers 20-bit audio for enhanced sound quality and full surround-sound capability.
- Dual Ultra ATA/100 controllers, coupled with the Intel® Application Accelerator – a performance software package – support faster IDE transfers to storage devices
- Intel Application Accelerator software provides additional performance over native ATA drivers by improving I/O transfer rates and enabling faster O/S load time, resulting in accelerated boot times
- Communication and Network Riser (CNR) offers flexibility in system configuration with a baseline feature set that can be upgraded with an audio card, modem card, or network card
- Embedded lifecycle support
- Integrated graphics

2.5.3 Intel® ICH4 Southbridge Chipset

The ICH4 southbridge chipset comes with the following features, functions and capabilities:

- PCI Local Bus Specification, Revision 2.2-compliant with support for 33 MHz PCI operations.
- PCI slots (supports up to 6 Req/Gnt pairs)
- ACPI Power Management Logic Support
- Enhanced DMA controller, Interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- Integrated LAN controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I²C devices
- Supports Audio Codec '97, Revision 2.3 specification (a.k.a., AC '97 Component Specification, Revision 2.3) Link for Audio and Telephony codecs (up to seven channels)
- Low Pin Count (LPC) interface

- Firmware Hub (FWH) interface support
- Alert On LAN* (AOL) and Alert On LAN 2* (AOL2)

2.6 Data Flow

Figure 2-1 shows the data flow between the two onboard chipsets and other components installed on the motherboard and described in the following sections of this chapter.
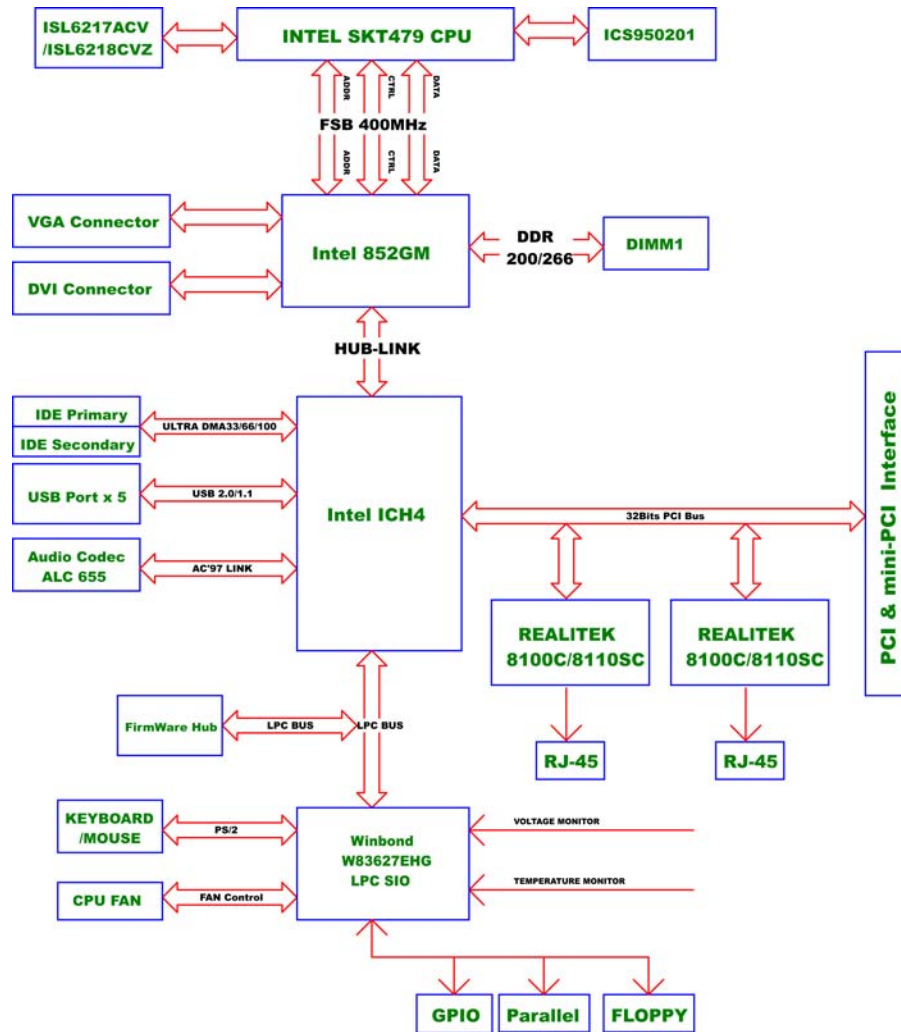
Figure 2-1: Data Flow Block Diagram

2.7 Graphics Support

Features of the Intel Extreme Graphics 2 technology integrated on the Intel 852GM northbridge chipset are listed below.

- **Enhanced 2D 256-bit internal path**:
  - 8/16/32bpp
  - DirectDraw*, GDI, GDI+
  - Anti-aliased text support
  - Alpha blending
  - Alphas stretch blitter
  - Hardware alpha blended RGB cursor
  - Color space conversion
  - 5x2 overlay support
  - Rotate, scale and translate operations
- **High-performance 3D 256-bit internal path**:
  - 32bpp/ 24ZorW/ 8 Stencil
  - DX7*/DX8*/OGL*1.1
  - DXTn texture compression
  - Up to 4 textures / pixel on a single pass
  - Cubic reflection map
  - Embossed/DOT3 bump mapping
  - Multi-texture
  - DOT3 bump-mapping
  - Point sprites
- **Video and Display DirectShow*/DirectVA***:
  - Hardware motion compensation support for DVD playback
  - 4x2 overlay filter
  - 350 MHz DAC frequency
  - Maximum DVO pixel rate of up to 330MP/s
  - Flat panel monitors via AGP Digital Display (ADD) cards
  - 350 MHz DAC for 1800x1440 @ 85Hz max CRT resolution or 2048x1536@60Hz max FP resolution
  - Synchronous display for dual monitor capabilities
  - 350MHz RAMDAC for up to QXGA analog monitor support
  - Dual DVO ports for up to QXGA digital display support
  - Multiple display types (LVDS, DVI, CRT)

2.8 Memory Support

The 3307870 has one 184-pin dual inline memory module (DIMM) sockets and supports up to one un-buffered DDR DIMMs with the following specifications:

- **Maximum RAM**: 1GB
- **DIMM Transfer Rates**: 200MHz or 266MHz

2.9 PCI Bus Interface Support

The PCI bus on the 3307870 has the following features:

- 33MHz Revision 2.2 is implemented
- Maximum throughput: 133MB/sec
- One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)

2.10 GbE Ethernet

The 3307870 has two RTL8110SC GbE Ethernet controllers onboard. The technical features of these controllers are listed below.

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next page capability
- Supports PCI 2.3, 32bit, 33/66MHz
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802.1Q VLAN tagging
- Serial EEPROM
- 3.3V signaling, 5V PCI I/O tolerant
- Transmit/Receive FIFO (8K/64K) support
- Supports power down/link down power saving

2.11 Drive Interfaces

The 3307870 can support the following drive interfaces.

- 4 x IDE devices
- 1 x FDD
- 1 x CF Type 2 card

2.11.1 IDE HDD Interfaces

The 3307870 southbridge chipset IDE controller supports up to two HDDs with the following specifications:

- Supports PIO IDE transfers up to 16MB/s
- Supports the following Ultra ATA devices:
  - ○ **Ultra ATA/100**, with data transfer rates up to 100MB/s
  - ○ **Ultra ATA/66**, with data transfer rates up to 66MB/s
  - ○ **Ultra ATA/33**, with data transfer rates up to 33MB/s

2.11.2 Floppy Disk Drive (FDD)

The 3307870 supports a single FDD. The following FDD formats are compatible with the board.

- 5.25": 360KB and 1.2MB
- 3.5": 720KB, 1.44MB and 2.88MB

2.11.3 CompactFlash Support

Standard CF Type 2 cards can be inserted into the CompactFlash slot on the solder side of the 3307870 PCB.

2.12 Serial Ports

The 3307870 has two high-speed UART serial ports, configured as COM1 and COM2. The serial ports have the following specifications.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

2.13 Real Time Clock

256-byte battery backed CMOS RAM

2.14 System Monitoring

The 3307870 is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.15 USB Interfaces

The 3307870 supports upto five USB 2.0 devices.

2.16 BIOS

The 3307870 uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.17 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3307870 are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.18 Audio Codec

The 3307870 has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications
- Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
- 14.318MHz -> 24.576MHz PLL to eliminate crystal
- 12.288MHz BITCLK input
- Integrated PCBEEP generator to save buzzer
- Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- LINE input shared with surround output; MIC input shared with Center and LFE output

- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode
- AVRack® Media Player
- Configuration Panel for improved user convenience

2.19 Power Consumption

Table 2-3 shows the power consumption parameters for the 3307870 when a 1.6GHz Celeron M processor is running with a 1GB DDR333 module.

Voltage	Current
+5V	4.64A

Table 2-3: Power Consumption

Table 2-4 shows the power consumption parameters for the 3307870 when a 800MHz Celeron M processor is running with a 1GB DDR333 module.

Voltage	Current
+5V	2.78A

Table 2-4: Power Consumption

2.20 Packaged Contents and Optional Accessory Items

2.20.1 Package Contents

The 3307870 is shipped with the following components.

- 1x 3307870 single board computer
- 1 x Mini jumper pack
- 1 x ATA66/100
- 1 x KB/MS Y cable
- 1 x Dual RS-232 cable
- 1 x Audio cable
- 1 x Utility CD
- 1 x Quick Installation Guide

2.20.2 Optional Accessory Items

The items shown in the list below are optional accessory items are purchased separately.

- 5.1 Channel Audio Kit with Realtel ALC655
- LPT cable

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Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. **Section 3.1.2** lists all the peripheral interface connectors seen in **Section 3.1.1**.

3.1.1 3307870 Layout

Figure 3-1 shows the onboard peripheral connectors, external peripheral interface connectors and onboard jumpers.
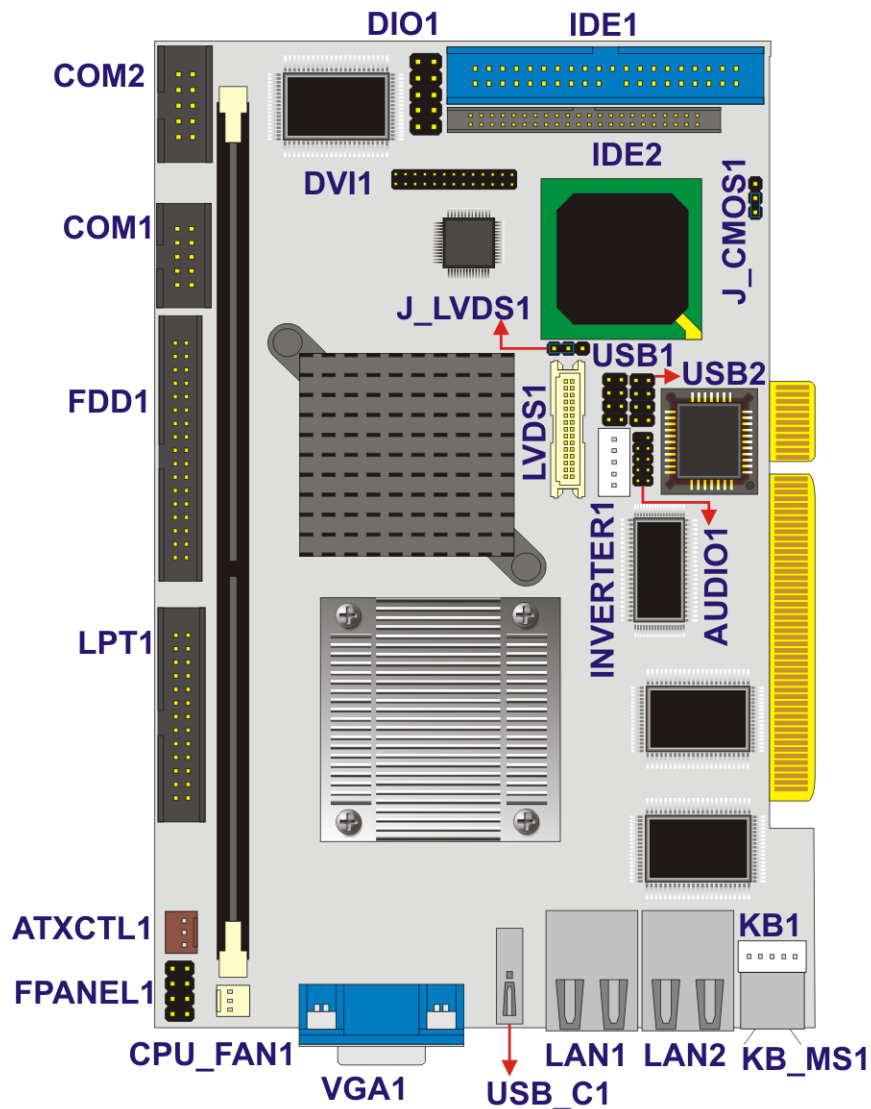
Figure 3-1: Connector and Jumper Locations
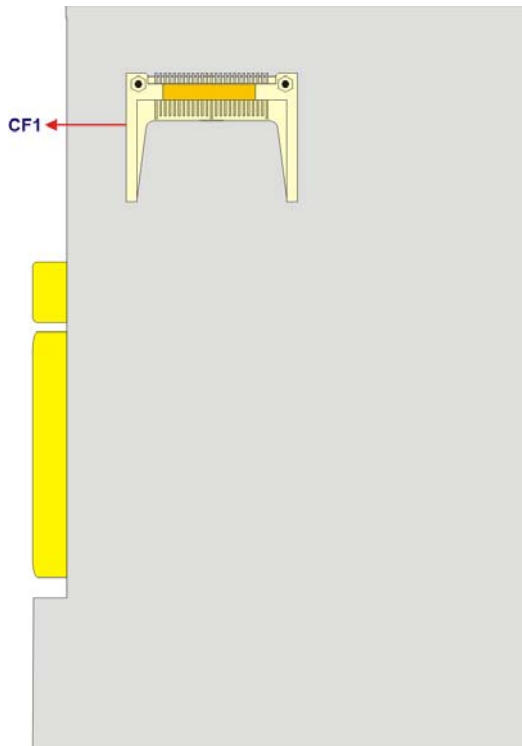
Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the 3307870. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 39**.

Connector	Type	Label
Audio connector	12-pin header	J_AUDIO1
Backplane to mainboard connector	3-pin wafer	ATXCTL1
CompactFlash (CF) connector	50-pin socket	CF1
Digital Input/Output Connector	10-pin header	DIO1
Digital video interface (DVI) connector	26-pin header	DVI1
Fan connector	3-pin wafer	CPU_FAN1
Floppy Disk connector	34-pin box header	FDD1

Front Panel connector	8-pin header	F_PANEL1
IDE Interface connector (Primary)	40-pin box header	IDE1
IDE Interface connector (Secondary)	44-pin box header	IDE2
Keyboard connector	5-pin wafer	KB1
LVDS output connector	30-pin crimp	LVDS1
Parallel port connector	26-pin box header	LPT1
Serial port connector	10-pin box header	COM1
Serial port connector	10-pin box header	COM2
Panel backlight connector	5-pin wafer	Inverter1
USB connector (USB 1.1 and USB 2.0)	8-pin header	USB1
USB connector (USB 1.1 and USB 2.0)	8-pin header	USB2

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the 3307870. Detailed descriptions of these connectors can be found in **Section 3.3** on **page 61**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
Keyboard/mouse connector	Mini-DIN 6 PS/2	KB_MS1
USB port connector	USB	USB_C1
VGA connector	HD-D-sub 15 female	VGA1

Table 3-2: Rear Panel Connectors

3.1.4 Onboard Jumpers

Table 3-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in **Section 3.3.1** on **page 61**.

Description	Label	Type
Clear CMOS	J_COMS1	3-pin header
LVDS voltage setting	J_VLVDS1	3-pin header

Table 3-3: Onboard Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 3307870.

3.2.1 Audio Connector (9-pin)

 CN Label: J_AUDIO1

 CN Type: 10-pin header (2x5)

 CN Location: See Figure 3-3

 CN Pinouts: See Table 3-4

The audio connector is connected to an onboard codec. An external audio connector kit can be connected to the connector to provide sound input and output.
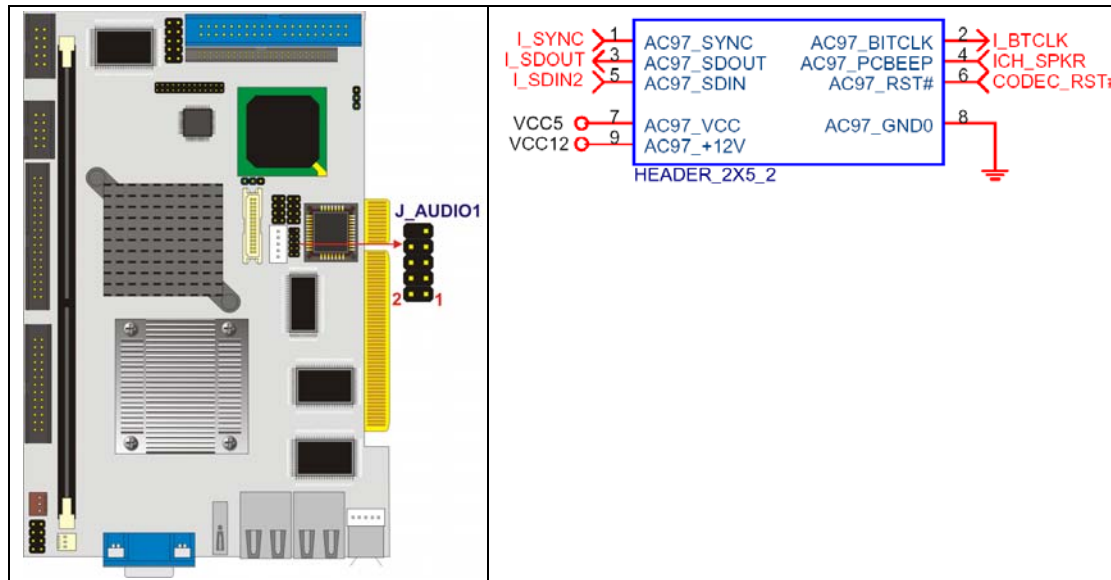
Figure 3-3: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12V		

Table 3-4: Audio Connector Pinouts

3.2.2 Backplane to Mainboard Connector

CN Label: ATXCTL1

CN Type: 3-pin wafer (1x3)

CN Location: See Figure 3-4

CN Pinouts: See Table 3-5

The Backplane to Mainboard connector closes the circuit between the mainboard and the backplane in which it is installed. The backplane should have an ATX connector and be powered by an ATX power supply.
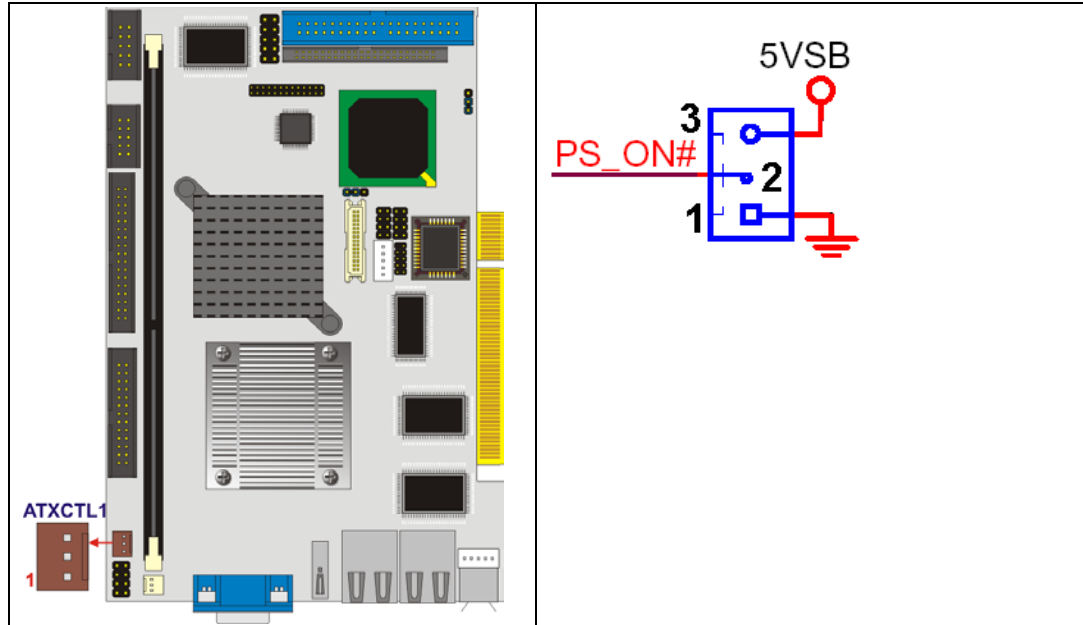
Figure 3-4: Backplane to Mainboard Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS_ON#
3	5VSB

Table 3-5: Backplane to Mainboard Connector Pinouts

3.2.3 CompactFlash Connector

CN Label: **CF1** (solder side)

CN Type: 50-pin socket (2x25)

CN Location: See Figure 3-5

CN Pinouts: See Table 3-6

A CompactFlash memory module is inserted to the CompactFlash on the solder side of the PCB.
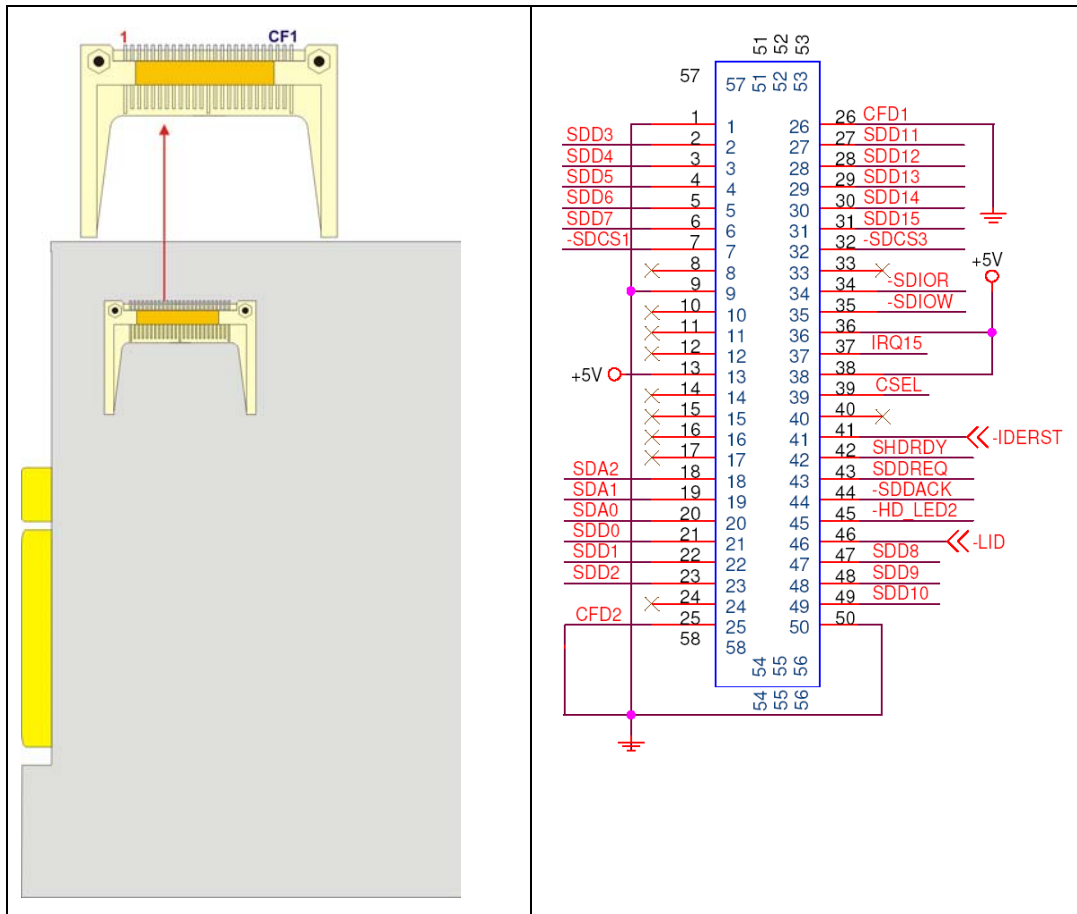
Figure 3-5: CompactFlash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC–IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	SDCS#1	32	SDCS#3
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15

13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-6: CompactFlash Connector Pinouts

3.2.4 Digital Input/Output (DIO) Connector

CN Label: DIO1

CN Type: 10-pin header (2x5)

CN Location: See Figure 3-6

CN Pinouts: See Table 3-7

The DIO connector is managed through a Super I/O chip. The DIO connector pins are user programmable.
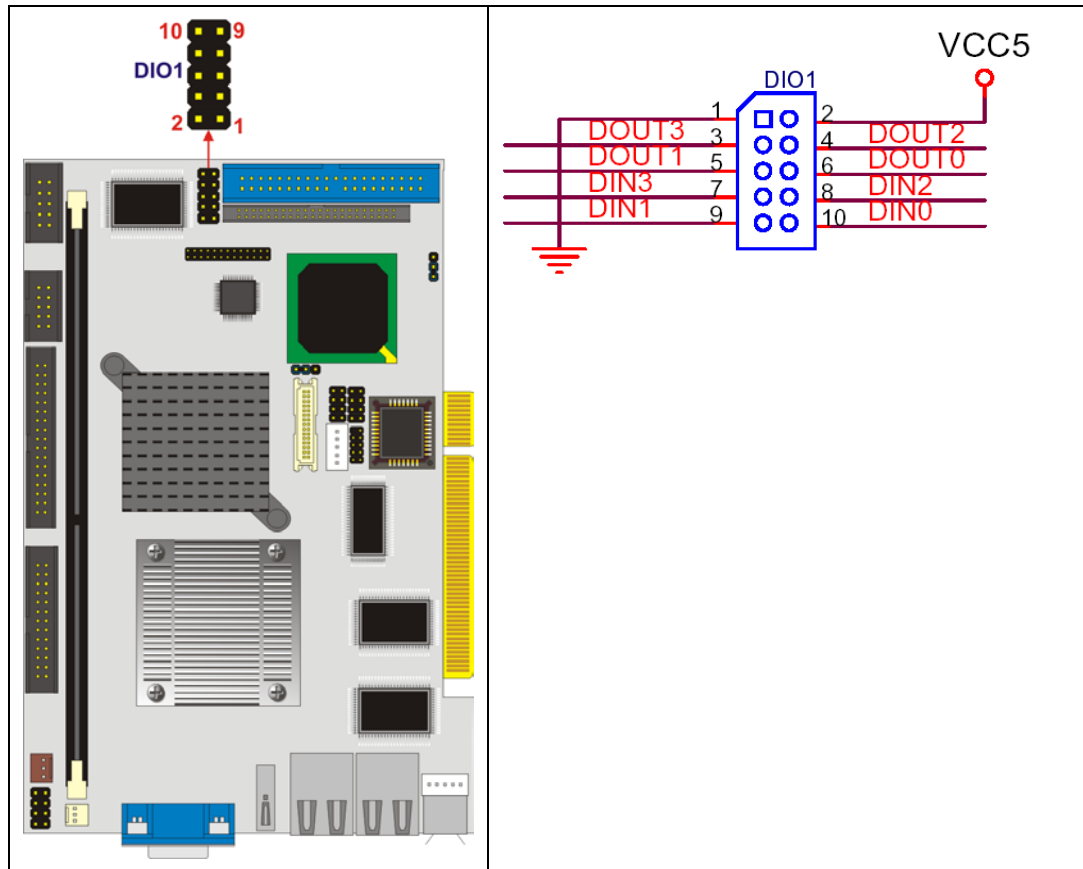
Figure 3-6: DIO Connector Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-7: DIO Connector Connector Pinouts

3.2.5 Digital Visual Interface (DVI) Connector

CN Label: DVI1

CN Type: 26-pin header (2x13)

CN Location: See Figure 3-7

CN Pinouts: See Table 3-8

The DVI connector converts analog signals into digital signals and provides connectivity to both analog and digital monitors.
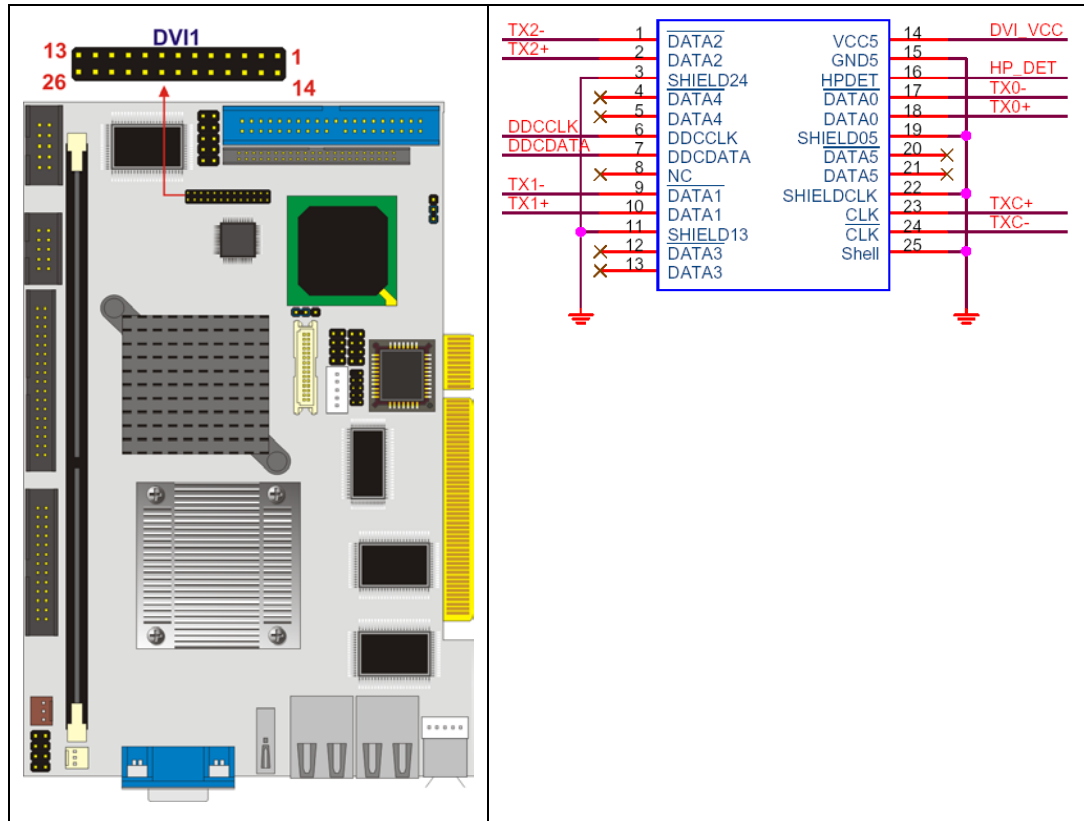
Figure 3-7: DVI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA2-	14	+5V
2	DATA2+	15	GND
3	GND	16	HPDET
4	NC	17	DATA0-
5	NC	18	DATA0+
6	DDCCLK	19	GND
7	DDCDATA	20	NC
8	NC	21	NC
9	DATA1-	22	GND

10	DATA1+	23	CLK+
11	GND	24	CLK-
12	NC	25	GND
13	NC	26	NC

Table 3-8: DVI Connector Connector Pinouts

3.2.6 Fan Connector

CN Label: CPU_FAN1

CN Type: 3-pin wafer

CN Location: See Figure 3-8

CN Pinouts: See Table 3-9

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
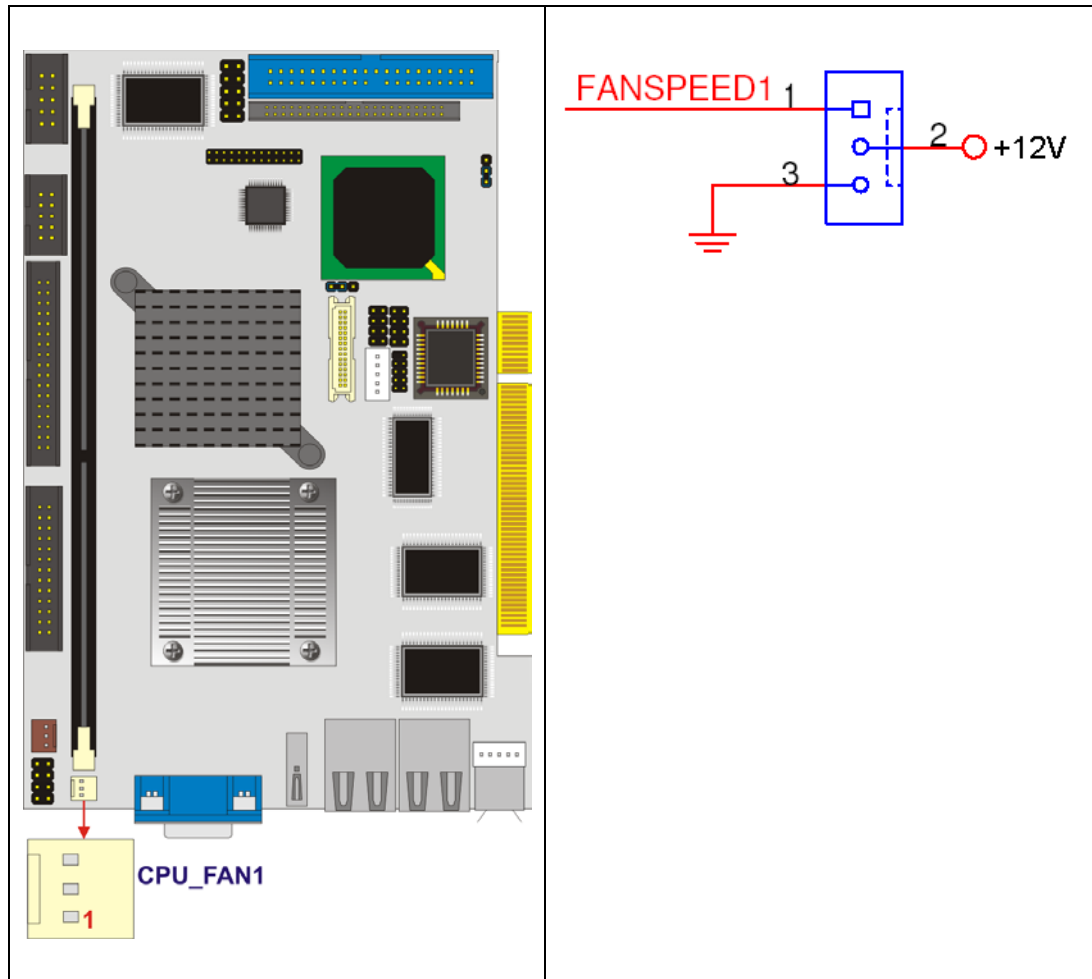
Figure 3-8: Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 3-9: Fan Connector Pinouts

3.2.7 Floppy Disk Connector

CN Label: FDD1

CN Type: 34-pin box header (2x17)

CN Location: See Figure 3-9

CN Pinouts: See Table 3-10

The floppy disk connector (FDD1) is connected to a floppy disk drive.
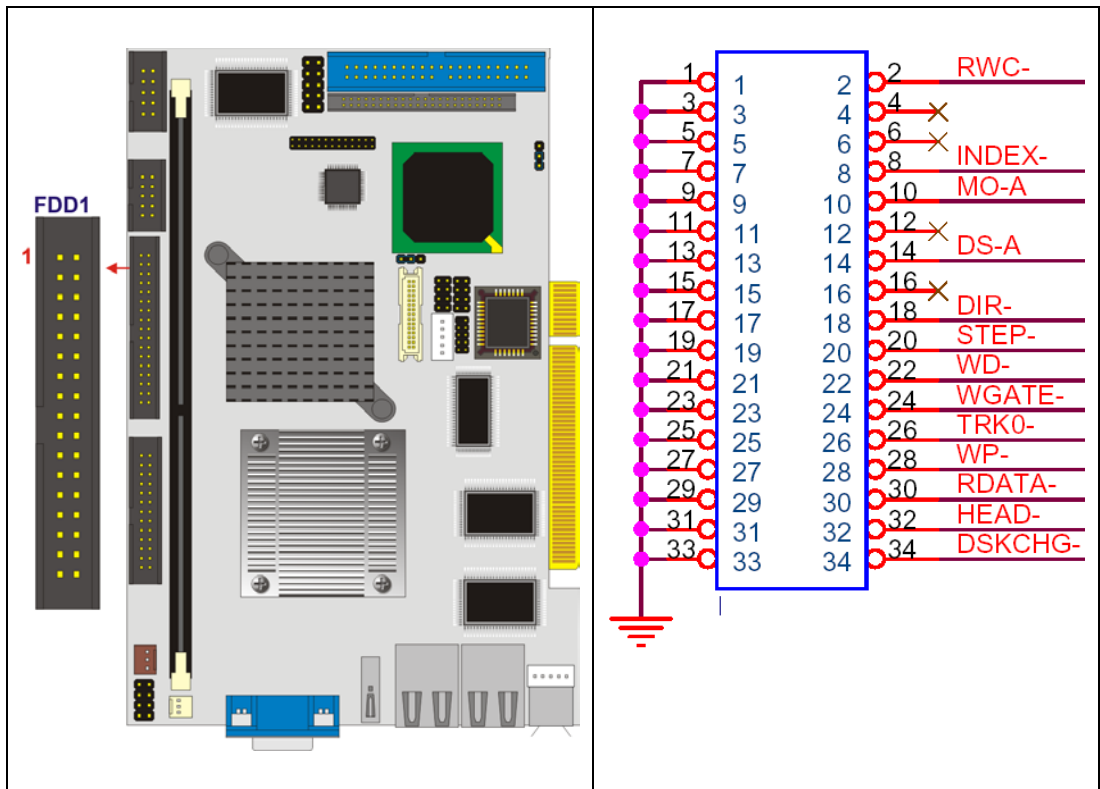
Figure 3-9: FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	DRVDEN0
3	GND	4	N/C
5	N/C	6	DRVDEN1
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#

11	GND	12	DRIVE SELECT B#
13	GND	14	DRIVE SELECT A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 3-10: FDD Connector Pinouts

3.2.8 Front Panel Connector

CN Label: F_PANEL1

CN Type: 12-pin header (2x6)

CN Location: See Figure 3-10

CN Pinouts: See Table 3-11

The front panel connector (CN1) connects to several external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Power LED
- HDD LED
- Reset
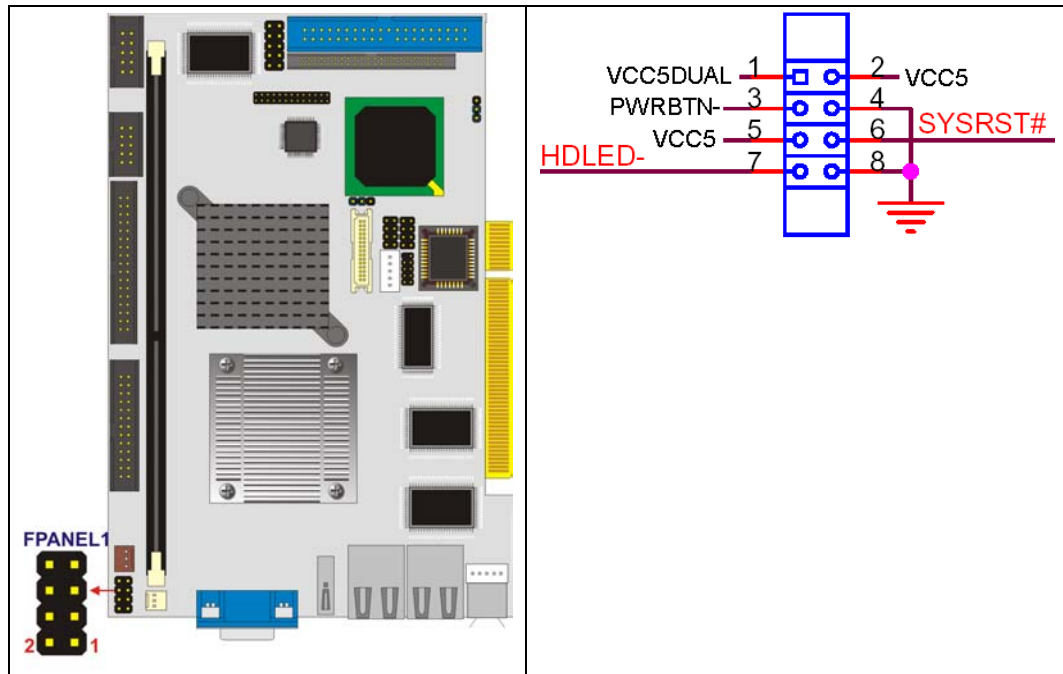
Figure 3-10: Front Panel Connector Locations

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power	1	5VSB	Power LED	2	+5V
Button	3	PWRBTN-		4	GND
HDD LED	5	+5V	Reset	6	SYSRST-
	7	HDD LED-		8	GND

Table 3-11: Front Panel Connector Pinouts

3.2.9 IDE Connector (Primary)

CN Label: IDE1

CN Type: 40-pin box header (2x20)

CN Location: See Figure 3-11

CN Pinouts: See Table 3-12

One 40-pin IDE device connector on the 3307870 motherboard supports connectivity to two Ultra ATA/33/66/100 IDE devices with data transfer rates up to 100MB/s.
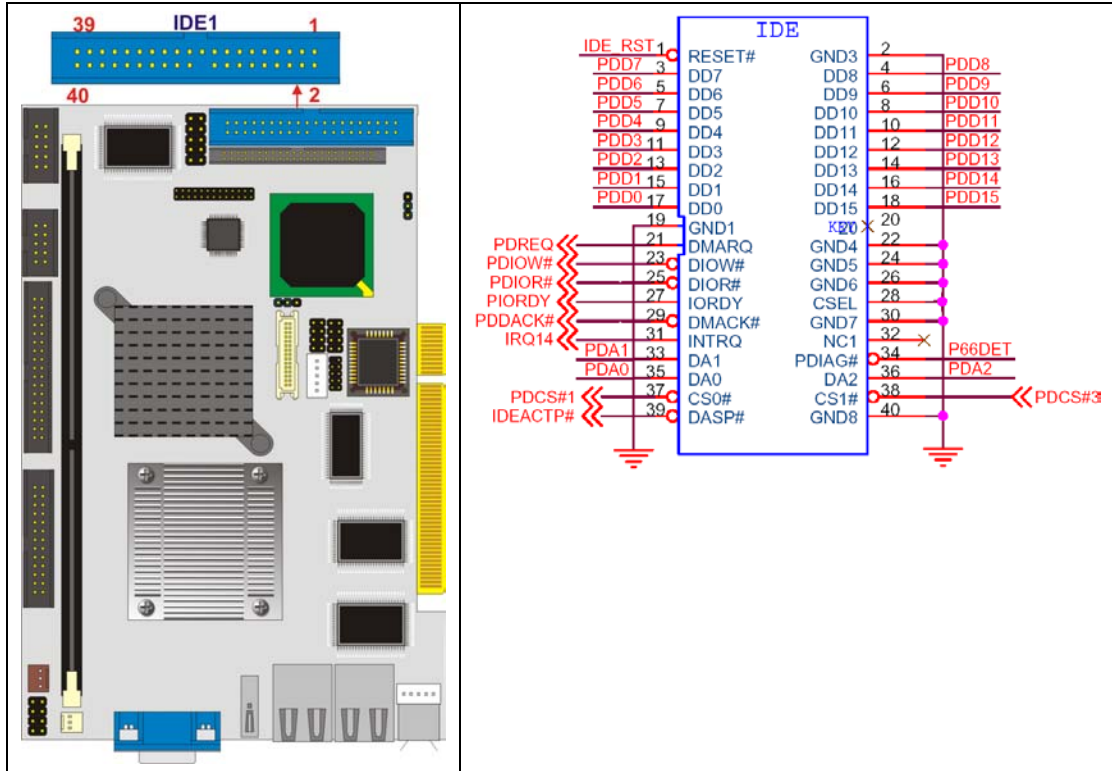
Figure 3-11: Primary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND–DEFAULT
29	IDE DACK	30	GROUND

31	INTERRUPT	32	N/C
33	SA1	34	P66DET
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 3-12: Primary IDE Connector Pinouts

3.2.10 IDE Connector (Secondary, 44-pin)

CN Label: IDE2

CN Type: 44-pin box header (2x22)

CN Location: See Figure 3-12

CN Pinouts: See Table 3-13

One 44-pin IDE device connector on the 3307870 motherboard supports connectivity to two Ultra ATA/33/66/100 IDE devices with data transfer rates up to 100MB/s.
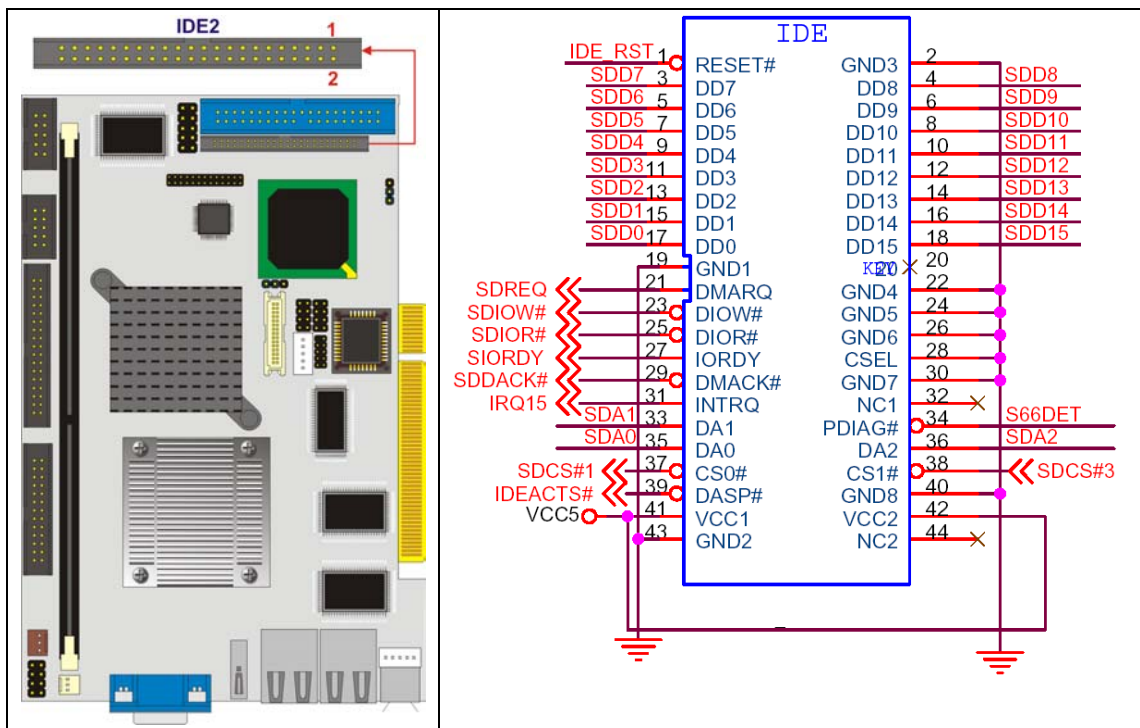
Figure 3-12: Secondary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND−DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-13: Secondary IDE Connector Pinouts

3.2.11 Keyboard Connector

CN Label: KB1

CN Type: 5-pin wafer (1x5)

CN Location: See Figure 3-13

CN Pinouts: See Table 3-14

The keyboard connector can be connected to a standard keyboard directly.
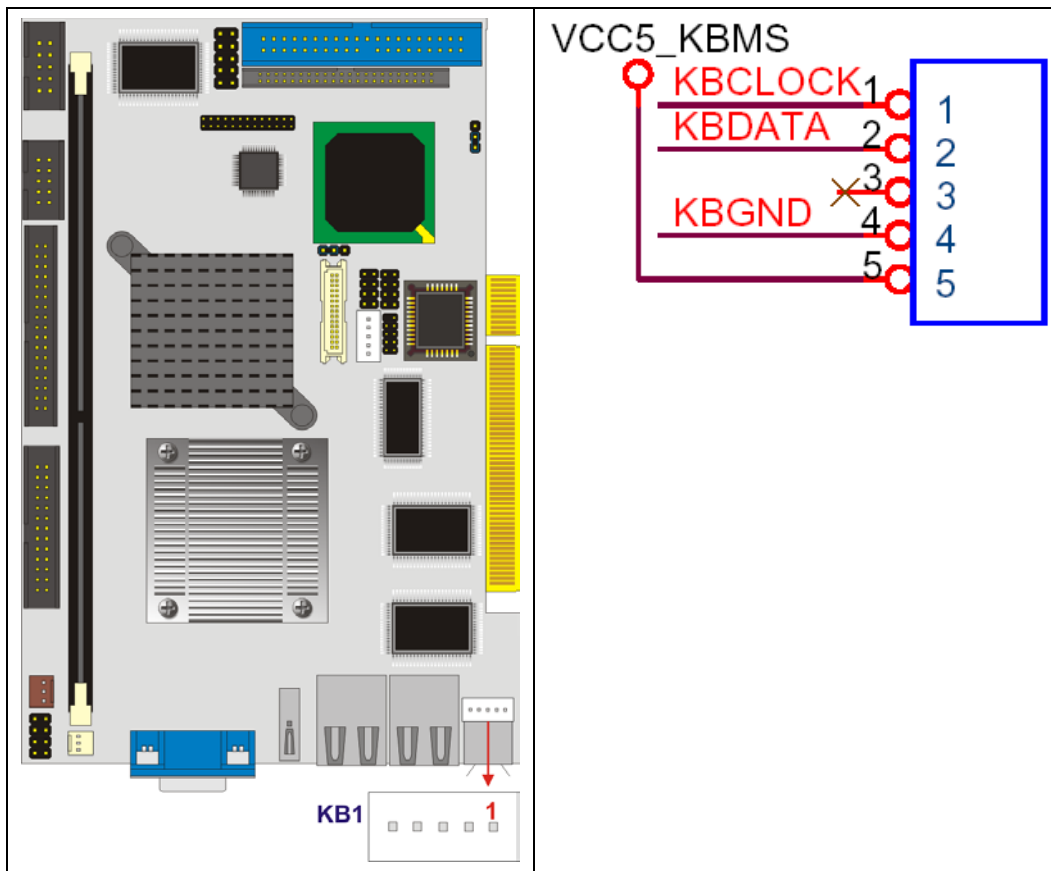
Figure 3-13: Keyboard Connector Location

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	VCC

Table 3-14: Keyboard Connector Pinouts

3.2.12 LCD LVDS Connector

CN Label: LVDS1

CN Type: 30-pin crimp (2x15)

CN Location: See Figure 3-14

CN Pinouts: See Figure 3-14

The LVDS LCD connector (LVDS1) connects to a one or dual channel 18-bit LVDS panel.
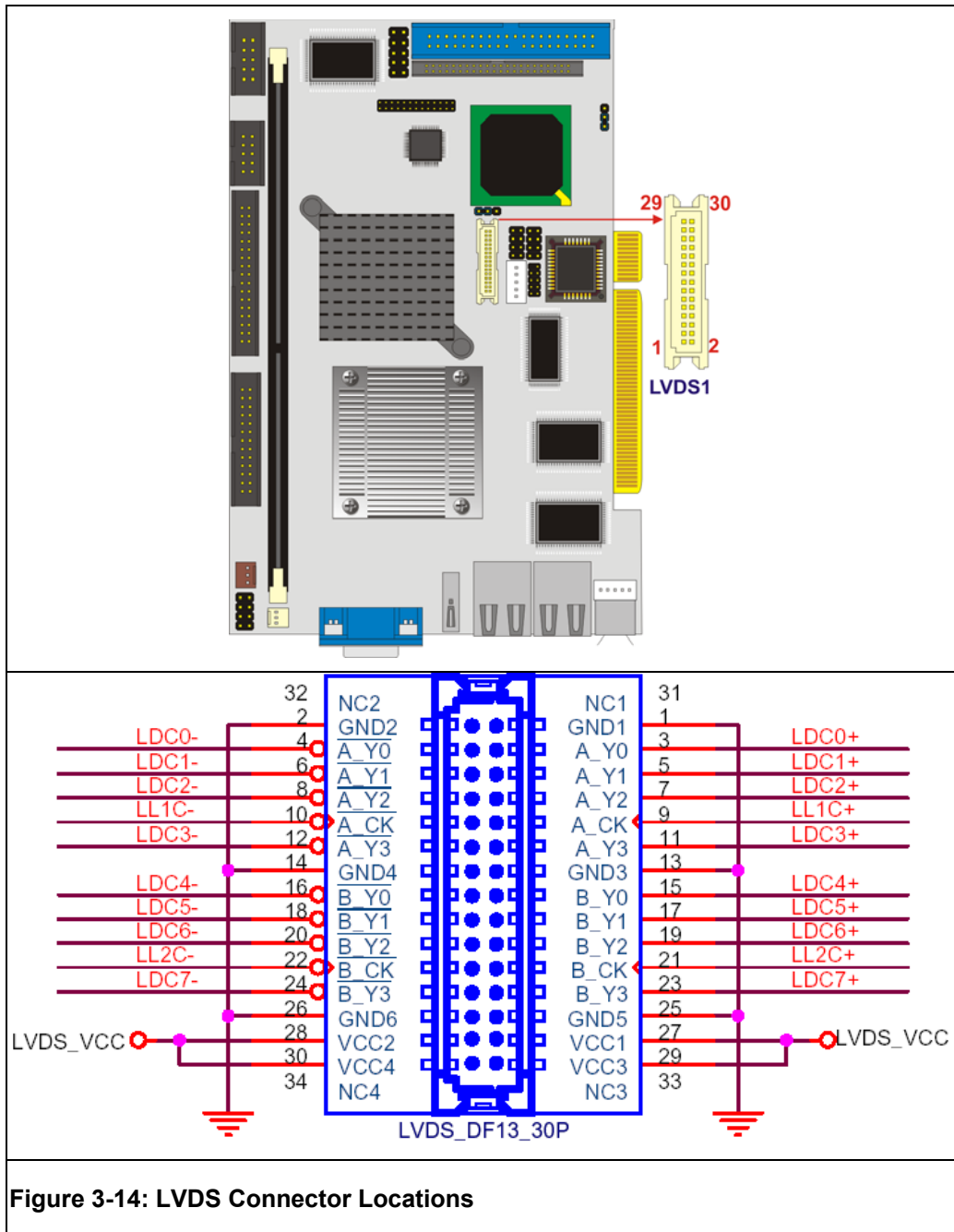
Figure 3-14: LVDS Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	LVDSA_Y0+	4	LVDSA_Y0−
5	LVDSA_Y1+	6	LVDSA_Y1−

7	LVDSA_Y2+	8	LVDSA_Y2-
9	LVDSA_CLK+	10	LVDSA_CLK-
11	LVDSA_Y3+	12	LVDSA_Y3-
13	GND	14	GND
15	LVDSA_Y4+	16	LVDSA_Y4-
17	LVDSA_Y5+	18	LVDSA_Y5-
19	LVDSA_Y6+	20	LVDSA_Y6-
21	LVDSB_CLK+	22	LVDSB_CLK-
23	LVDSA_Y7+	24	LVDSA_Y7-
25	GND	26	GND
27	LVDS_VCC	28	LVDS_VCC
29	LVDS_VCC	30	LVDS_VCC

Table 3-15: LCD LVDS Connector Pinouts

3.2.13 Panel Backlight Connector

CN Label: Inverter1

CN Type: 5-pin wafer (1x5)

CN Location: See Figure 3-15

CN Pinouts: See Table 3-16

The Panel Backlight connector provides the backlight on the LCD panel connected to the 3307870 with +12V of power
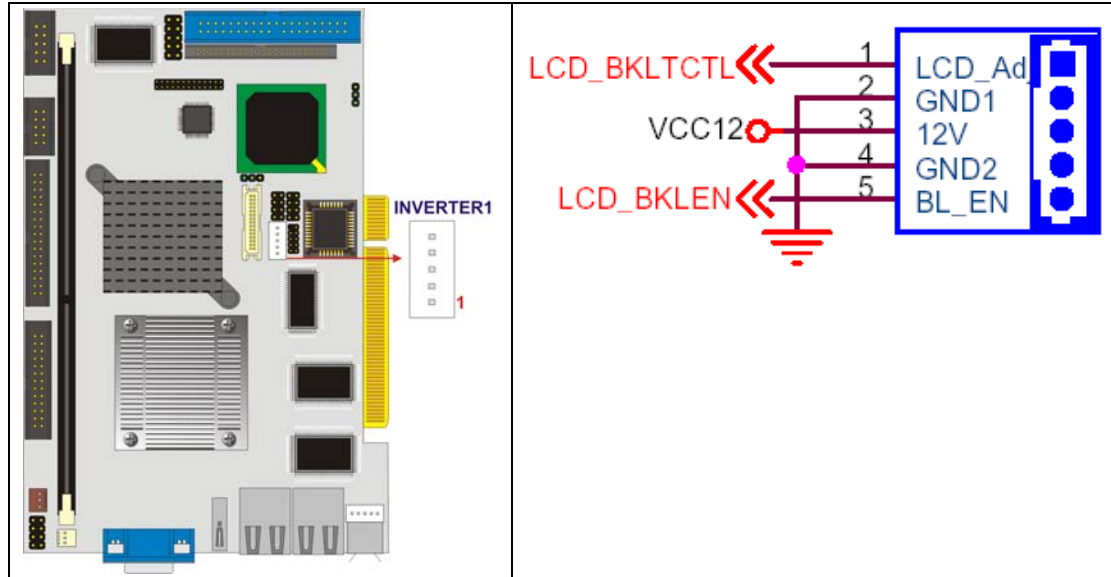
Figure 3-15: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	LCD ADJUST
2	GROUND
3	+12V
4	GROUND
5	BACKLIGHT ENABLE

Table 3-16: Panel Backlight Connector Pinouts

3.2.14 Parallel Port Connector

CN Label: LPT1

CN Type: 26-pin box header

CN Location: See Figure 3-16

CN Pinouts: See Table 3-17

The 3307870 has one 26-pin header that can be connected to a parallel port connector interface or some other parallel port device such as a printer.
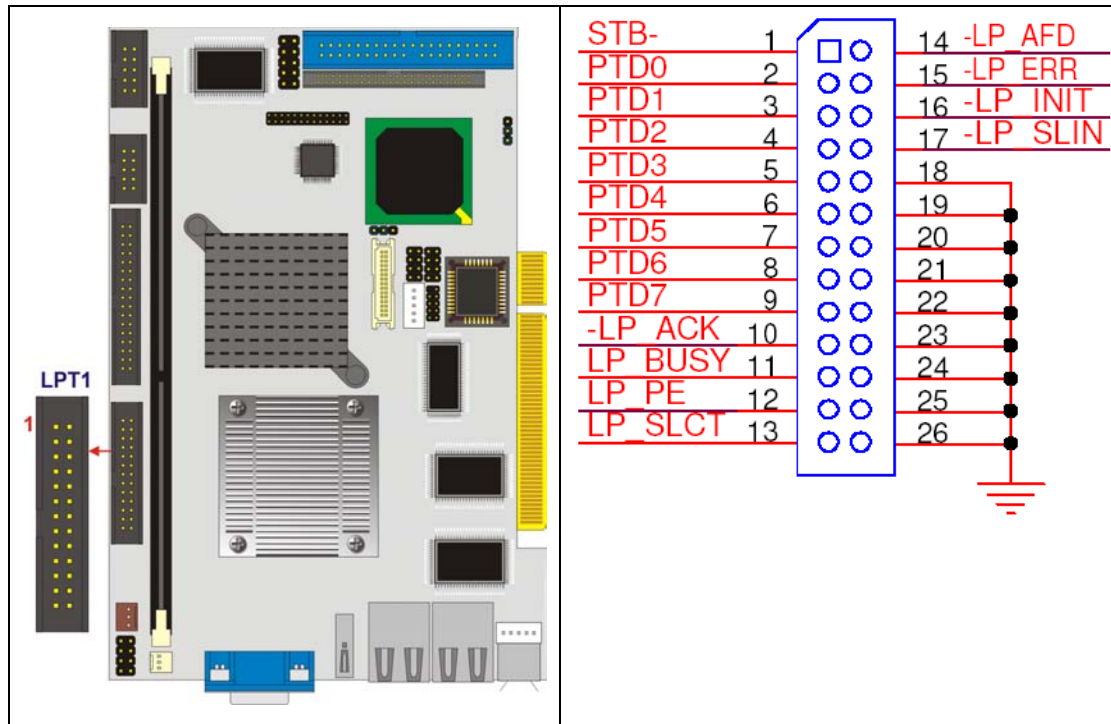
Figure 3-16: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 3-17: Parallel Port Connector Pinouts

3.2.15 RS-232 Serial Port Connectors

CN Label: COM1 and COM2

CN Type: 10-pin box header (2x5)

CN Location: See Figure 3-17

CN Pinouts: See Table 3-18

The COM1 and COM2 serial port connectors connect to RS-232 serial port devices.
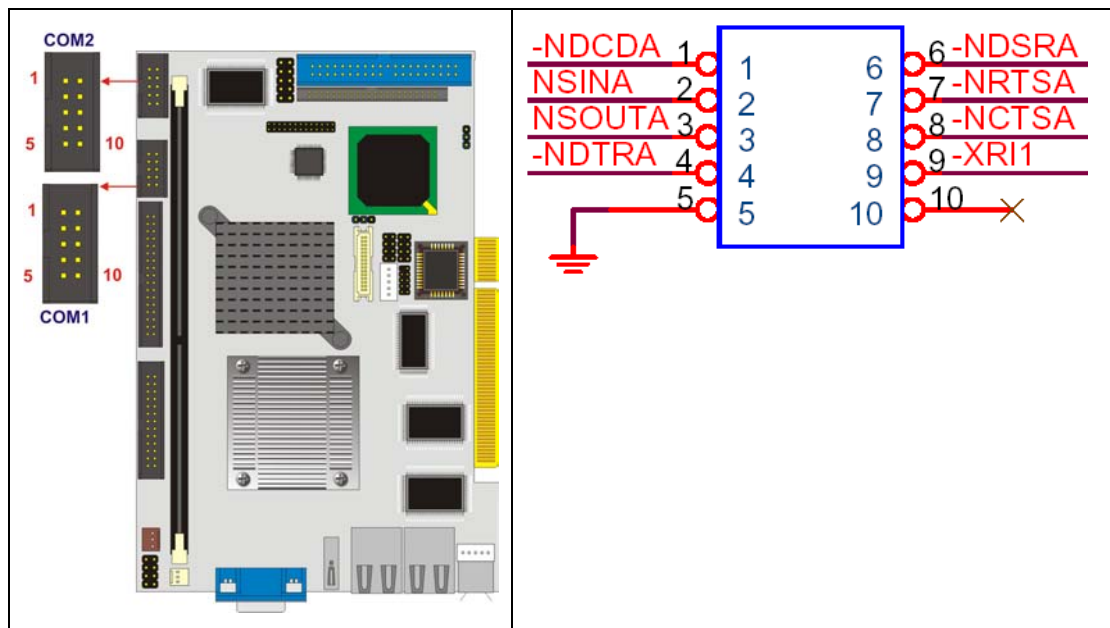
Figure 3-17: RS-232 Serial Port Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)	2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)	4	DATA TERMINAL READY (DTR)
5	GROUND (GND)	6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)	8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)	10	N/C

Table 3-18: RS-232 Serial Port Connector Pinouts

3.2.16 Internal USB Connectors

CN Label: USB1 and USB2

CN Type: 8-pin header (2x4)

CN Location: See Figure 3-18

CN Pinouts: See Table 3-19

The two 2x4 USB pin connectors provide connectivity to four additional USB 2.0 ports. The USB connectors can support two USB devices each. The USB ports are used for I/O bus expansion.
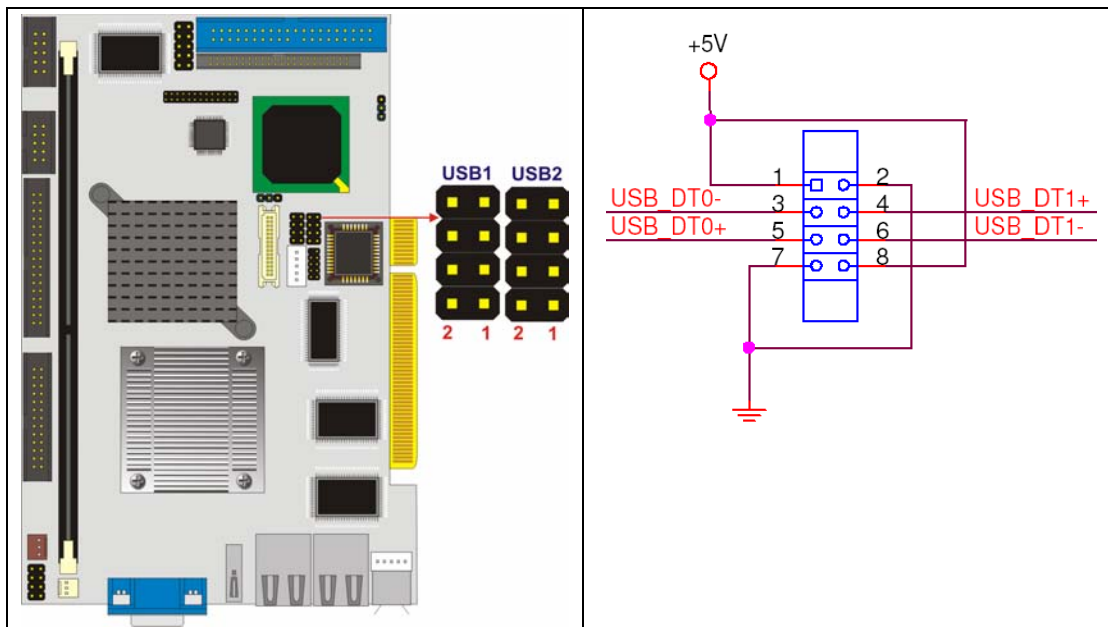
Figure 3-18: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_USB	2	GND
3	DATA0-	4	DATA1+
5	DATA0+	6	DATA1-
7	GND	8	VCC_USB

Table 3-19: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-19 shows the 3307870 rear panel. The 3307870 rear panel consists of two RJ-45 Ethernet connectors, a PS/2 keyboard connector a USB port and a VGA connector. These connectors are accessible when the 3307870 is installed in a chassis.
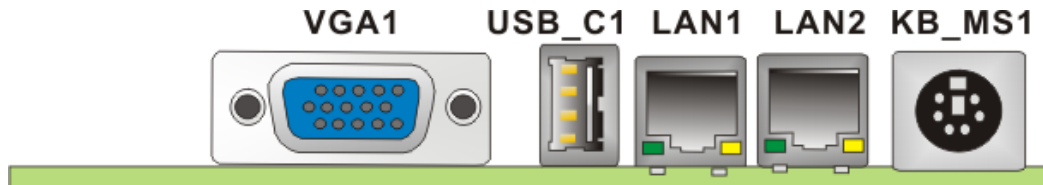
Figure 3-19: 3307870 Rear Panel

3.3.1 Keyboard/Mouse Connector

CN Label: KB_MS1

CN Type: Mini-DIN 6 PS/2

CN Location: See Figure 3-19

CN Pinouts: See Figure 3-20 and Table 3-20

The 3307870 CPU card has a mini-DIN 6 PS/2 connector on the mounting bracket for easy connection to a PS/2 keyboard or PS/2 mouse. The card comes with a cable to convert the mini-DIN 6 PS/2 into two mini-DIN 6 PS/2 connectors for keyboard and mouse connection.
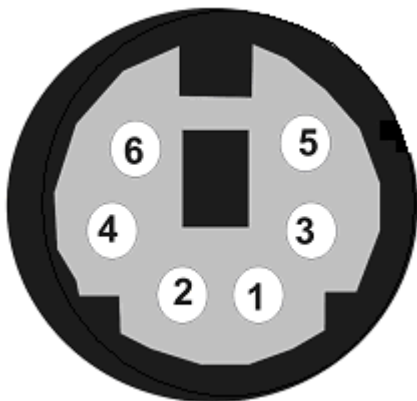
Figure 3-20: PS/2 Pinouts

PIN	DESCRIPTION
1	KEYBOARD DATA
2	MOUSE DATA
3	GND
4	VCC
5	KEYBOARD CLOCK
6	MOUSE CLOCK

Table 3-20: Mini-DIN 6 PS/2 Connector Pinouts

3.3.2 LAN Connectors

CN Label: LAN1 and LAN2

CN Type: RJ-45

CN Location: See Figure 3-19

CN Pinouts: See Table 3-21

The 3307870 is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXA+	5	TXC-
2	TXA-	9	TXB-
3	TXB+	10	TXD+
4	TXC+	11	TXD-

Table 3-21: LAN Pinouts
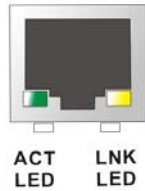
Figure 3-21: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-22**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 3-22: RJ-45 Ethernet Connector LEDs

3.3.3 USB Connector

CN Label: USB_C1

CN Type: USB port

CN Location: See Figure 3-19

CN Pinouts: See Table 3-23

The 3307870 has a one external USB 2.0 port. The port connects to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBV3L 5V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5V

Table 3-23: USB Port Pinouts

3.3.4 VGA connector

CN Label: VGA1

CN Type: HD-D-sub 15 female connector

CN Location: See Figure 3-19

CN Pinouts: See Figure 3-22, Table 3-24

A 15-pin VGA connector connects to standard displays.
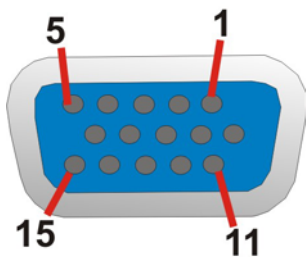
Figure 3-22: Serial Port (COM1) and VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	9	NC
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	DDCDAT
5	GROUND	13	HSYNC
6	GROUND	14	VSYNC
7	GROUND	15	DDCCLK
8	GROUND		

Table 3-24: VGA Connector Pinouts

Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3307870. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the 3307870 (or any other electrical component) is handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wrist band*: - Wearing a simple anti-static wrist band can help to prevent ESD from damaging the board.
- *Self-grounding*:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the motherboard is installed. All installation notices pertaining to the installation of the motherboard should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the motherboard and injury to the person installing the motherboard.

4.2.1 Installation Notices

Before and during the installation of the 3307870, please **do** the following:

- **Read the user manual**:
  - ○ The user manual provides a complete description of the 3307870, installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  - ○ Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the motherboard on an antistatic pad**:

○ When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.

■ **Turn off all power to the 3307870**:

○ When working with the motherboard, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the 3307870 **DO NOT:**

■ remove any of the stickers on the PCB board. These stickers are required for warranty validation.

■ use the product before verifying all the cables and power connectors are properly connected.

■ allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Unpacking

 NOTE:

If any of the items listed below are missing when the 3307870 is unpacked, do not proceed with the installation and contact the 3307870 reseller or vendor.

4.3.1 Unpacking Precautions

Before installing the 3307870, unpack the motherboard. Some components on 3307870 are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damaged, follow these precautions:

■ The user should ground them self to remove any static charge before touching the 3307870. To do so wear a grounded wrist strap at all times or frequently touch any conducting materials that is connected to the ground.

■ Handle the 3307870 by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When unpacking the 3307870, please make sure that the package contains the following items.

- 1x 3307870 single board computer
- 1 x Mini jumper pack
- 1 x ATA 66/100 flat cable
- 1 x KB/MS Y cable
- 1 x Dual RS-232 cable
- 1 x Audio cable
- 1 x USB cable
- 1 x Utility CD
- 1 x Quick installation guide

If one or more of these items are missing, please contact the reseller or vendor the 3307870 was purchased from and do not proceed any further with the installation.

4.4 3307870 Motherboard Installation

⚠️ WARNING!

Never run the motherboard without an appropriate heatsink and cooler that can be ordered from Global American, Inc. or purchased separately.

⚠️ WARNING!

Please note that the installation instructions described in this manual should be carefully followed in order to avoid damage to the motherboard components and injury to the user.

> ⚠️ **WARNING!**
>
> When installing electronic components onto the motherboard always take the anti-static precautions listed above in order to prevent ESD damage to the motherboard and other electronic components like the CPU and DIMM modules

The following components must be installed onto the motherboard or connected to the motherboard during the installation process.

> ✔️ **NOTE:**
>
> Some 3307870 models have an embedded CPU. If the motherboard has an embedded CPU the following section on CPU installation can be skipped.

- CPU
- CPU cooling kit
- DIMM modules
- Peripheral device connection

4.4.1 CPU Installation

 WARNING!

> CPUs are expensive and sensitive components. When installing the CPU
> please be careful not to damage it in anyway. Make sure the CPU is installed
> properly and ensure that a heatsink and CPU cooling fan is properly installed
> before the motherboard is run or else both the CPU and the board may be
> damaged.

To install an Intel 479-pin CPU onto the motherboard, follow the steps below:

Step 1: **Is the CPU retention screw in an unlocked position?** When shipped, the
retention screw of the CPU socket should be in the unlocked position. If it is not
in the unlocked position, use a screwdriver to position it in an unlocked position.
(See **Figure 4-1**)
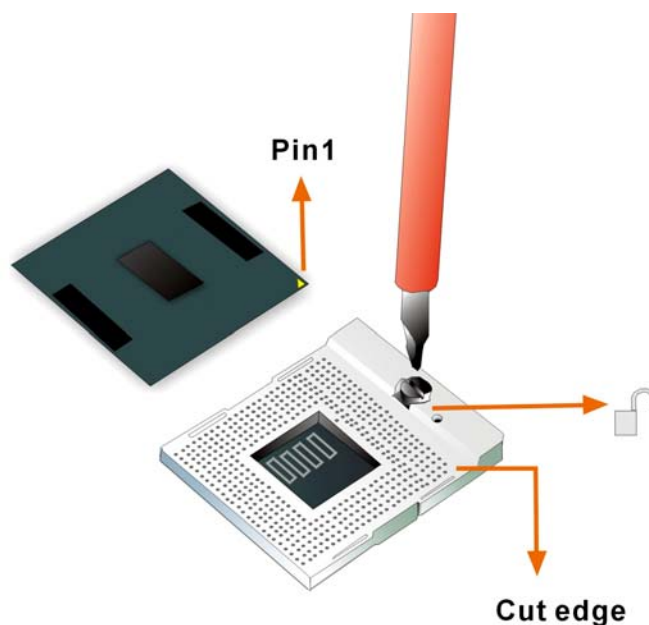
Figure 4-1: Make sure the CPU socket retention screw is unlocked

Step 2: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the
socket contacts are free of foreign material. If any debris is found, remove it with
compressed air.

Step 3: **Correctly position the CPU.** Make sure the pin 1 mark matches the cut edge on the CPU socket. Carefully place the CPU on top of the socket. When properly placed, the CPU should be easily inserted into the socket.

Step 4: **Insert the CPU.** To insert the CPU into the socket, hold the CPU by its edges and follow the instructions below:

Correctly orientate the CPU with the IHS (Integrated Heat Sink) side facing upward.

a. Locate the pin 1 mark on the CPU.

b. Gently insert the CPU into the socket.

c. Rotate the retention screw into the locked position. (See **Figure 4-2**)

Pin 1 location
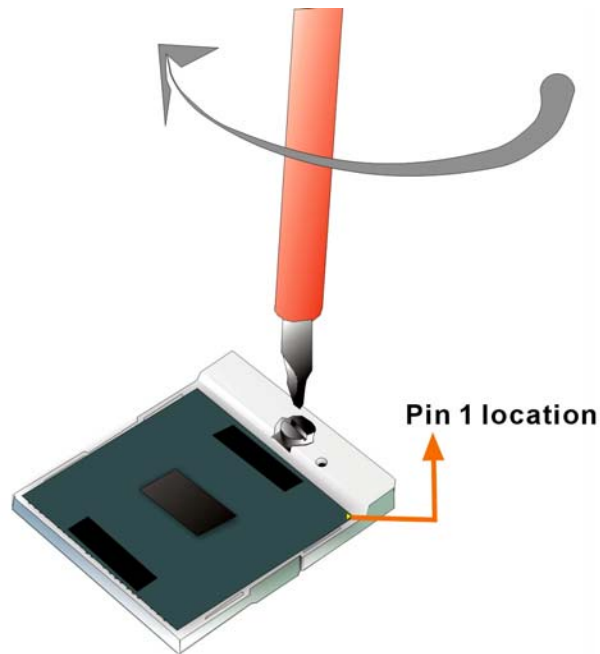
Figure 4-2: Lock the CPU Socket Retention Screw

4.4.2 Cooling Kit (2107703) Installation
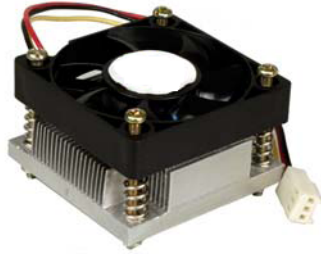

Figure 4-3: GAI 2107703 Cooling Kit

GAI provides a cooling kit designed for socket 479 CPUs. (See **Figure 4-3**)　The cooling kit is comprised of a CPU heat sink and a cooling fan.

 NOTE:

> The 2107703 heat sink comes with a sprayed layer of thermal paste. Make sure the paste is not accidentally wiped during the unpacking or installation of the heat sink. Thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the 2107703 cooling kit, please follow the steps below.

Step 1: **Place the cooling kit onto the CPU**.　Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure its four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 4-4**)
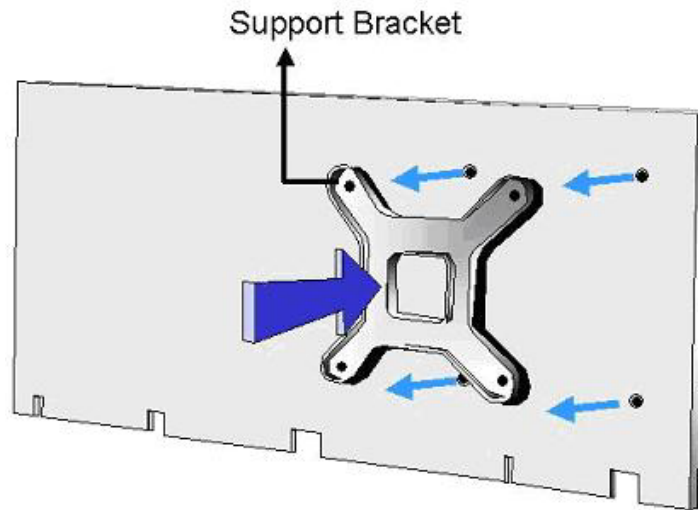
Figure 4-4: Cooling Kit Support Bracket

Step 4: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the motherboard. Carefully route the cable and avoid heat generating chips and fan blades. (See **Figure 4-5**)
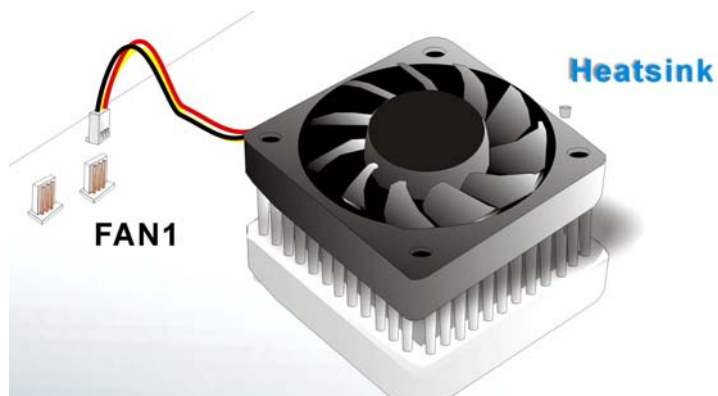
Figure 4-5: Connect the cooling fan cable

4.4.3 DIMM Module Installation

4.4.3.1 Purchasing the Memory Module

When purchasing DIMM modules, the following considerations should be taken into account:

- The DIMM module can support a memory chip with a maximum size of 1GB
- The DIMM module supports SDRAM DIMM speeds of 200MHz and 266MHz

4.4.3.2 DIMM Module Installation

The 3307870 motherboard has one DDR SDRAM DIMM socket. To install the DIMM module, follow the instructions below and refer to *Figure 4-6*.

Step 1: Pull the two white handles on either side of the DIMM socket down.

Step 2: Align the DIMM module with the DIMM socket making sure the matching pins are correctly aligned.

Step 3: Insert the DIMM module slowly. Once it is correctly inserted, push down firmly. The white handles on either side of the socket move back up and lock the module into the socket.
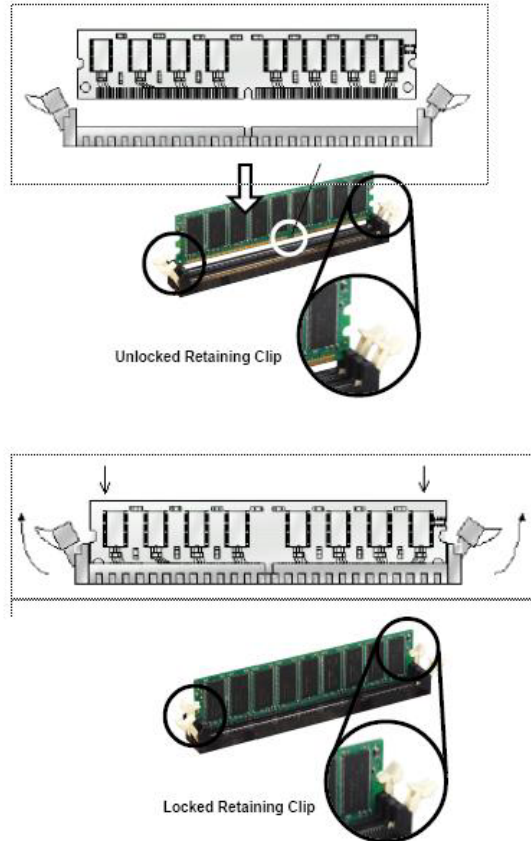
Figure 4-6: DIMM Module Installation

4.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit.   It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
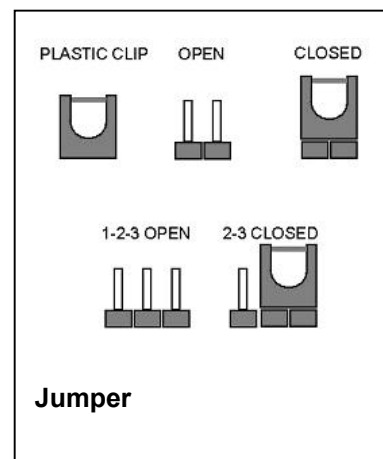
Before the 3307870 is installed in the system, the jumpers must be set in accordance with the desired configuration. The 3307870 motherboard has six on-board jumpers.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header
CompactFlash setup	J_LVDS1	3-pin header

Table 4-1: Jumpers

4.5.1 Clear CMOS Jumper

Jumper Label: J_CMOS1

Jumper Type: 3-pin header

Jumper Settings: See Table 4-2

Jumper Location: See **Figure 4-7**

If the 3307870 fails to boot due to improper BIOS settings, use this connector to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu.   Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

Clear CMOS	DESCRIPTION
Short 1 - 2 (Default)	Keep CMOS Setup
Short 2 - 3	Clear CMOS Setup

Table 4-2: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 4-7** below.
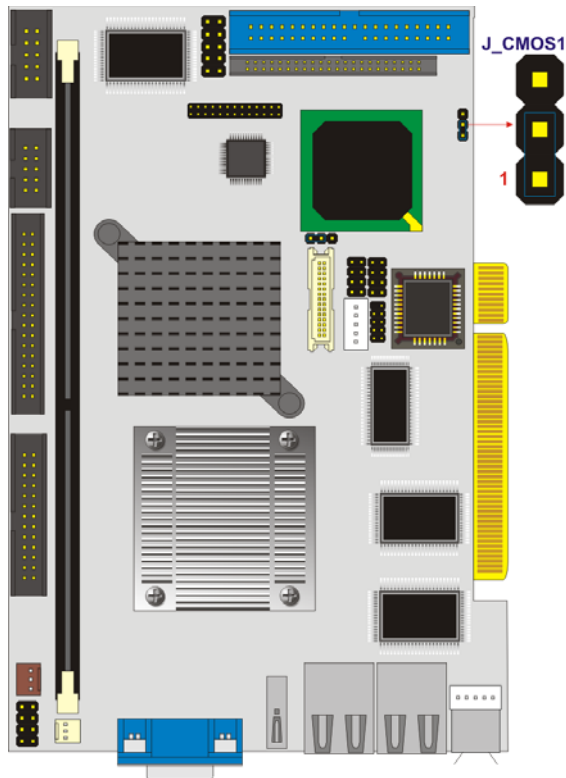
Figure 4-7: Clear CMOS Jumper

4.5.2 LVDS Voltage Selection

⚠️ **WARNING**

Permanent damage to the screen and 3307870 may occur

if the wrong voltage is selected with this jumper. Please refer

to the user guide that cam with the monitor to select the

correct voltage.

Jumper Label: J_LVDS1

Jumper Type: 3-pin header

Jumper Settings: See Table 4-3

Jumper Location: See Figure 4-8

The **J_LVDS1** jumper allows the LVDS screen voltage to be set.

J_LVDS1	DESCRIPTION
Short 1-2	+3.3V LVDS
Short 2-3 (Default)	+5V LVDS

Table 4-3: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in Figure 4-8
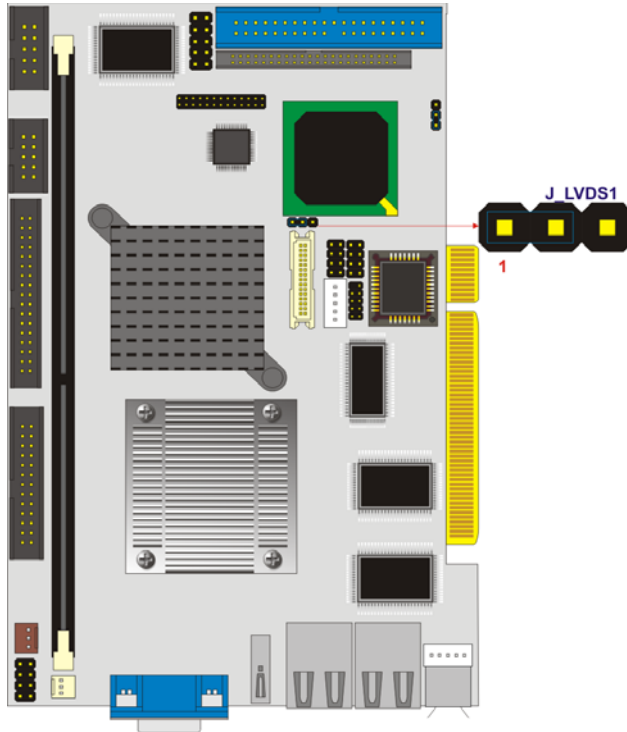
Figure 4-8: LVDS Voltage Selection Jumper Pinout Locations

4.6 Chassis Installation

Cables provided by GAI that connect peripheral devices to the 3307870 are listed in **Table 4-4**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	ATA 66/100 flat cable
1	RS-232 cable
1	USB cable

Table 4-4: GAI Provided Cables

To install the 3307870 into a chassis, please follow the steps below.

Step 1: Select a chassis

Step 2: Install a backplane into a chassis

Step 3: Mount the 3307870 onto the backplane

Step 4: Install the USB 2.0 cable (optional)

Step 5: Install the RS-232 cable (optional)

Step 6: Connect the 3307870 to the hard disks (optional)

Step 7: Connect other internal peripheral devices

4.6.1 Chassis selection

The chassis selected must be able to support a half-size CPU PCI card. GAI has many available options. Please visit the GAI website (www.globalamericaninc.com) or contact an GAI sales representative for more details.

4.6.2 Install the Backplane

The 3307870 must be installed onto a PCI backplane. PCI backplanes are available from GAI. Please visit the GAI website (www.globalamericaninc.com) or contact an GAI sales representative for more details.

To install the backplane into the chassis, please refer to the chassis and backplane user guides respectively.

4.6.3 Mount the 3307870 onto the Backplane

To install the 3307870, please follow the steps below:

Step 1: Align the gold-finger connectors on the bottom of the 3307870 with the respective PCI slot on the backplane. For details refer to the documentation that came with the backplane.

Step 2: Secure the 3307870 external peripheral interface connector panel to the chassis. For details refer to the documentation that came with the chassis.

Step 3: Connect the CPU card top backplane connector (ATXCTL1) to the corresponding connector on the backplane. For details refer to the documentation that came with the backplane.

4.6.4 Install the RS-232 Cable

The 3307870 is shipped with a dual RS-232 cable. The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the RS-232 cable please follow the steps below.

Step 1: Insert the two small connectors on the cables into the serial port box headers on the 3307870.

Step 2: Secure the bracket supporting the two D-sub 9 male connectors to the chassis. To do this, please refer to the chassis manual.

4.6.5 USB 2.0 Cable Connection

The 3307870 is shipped with a dual USB cable. The dual USB cable consists of two connectors attached to two independent cables. Each cable is then attached to a USB port connector that is mounted on a bracket. To install the USB cable, please follow the steps below.

Step 1: Insert the two small connectors on the cables into the USB pin headers on the 3307870.

Step 2: Secure the bracket supporting the two USB port connectors to the chassis. To do this, please refer to the documentation that came with the chassis.

4.6.5.1 IDE Disk Drive Connector (IDE1)

The 3307870 is shipped with an ATA 66/100 flat cable. The cable is connected to the 3307870 and to one or two IDE HDD. To connect an IDE HDD to the 3307870, follow the instructions below.

Step 1: Find the ATA 66/100 flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the PIDE1 connector on the motherboard. A keyed pin on the IDE connectors prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1

connector.

Step 4:   Connect the other side of the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.
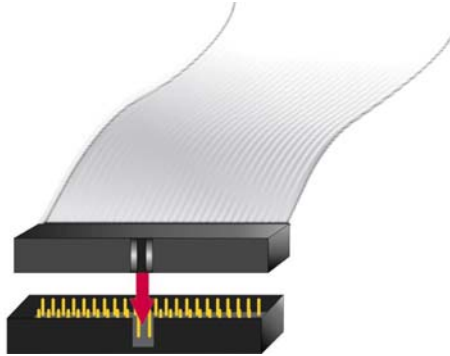
Figure 4-9: Connection of IDE Connector

NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.7 Rear Panel Connectors

4.7.1 LCD Panel Connection

Connect the VGA connector to a standard monitor.

4.7.2 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

4.7.3 USB Connection

The rear panel USB connector provides easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

4.7.4 Keyboard and Mouse Connection

A PS/2 keyboard and a PS/2 mouse can be connected to the appropriate PS/2 connector on the rear panel.

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Appendix

A

Watchdog Timer

 NOTE:

> The following discussion applies to DOS environment. GAI support is contacted or the GAI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table B-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

; **INITIAL TIMER PERIOD COUNTER**

;

W_LOOP:

```
        MOV     AX, 6F02H          ;setting the time-out value
        MOV     BL, 30             ;time-out value is 48 seconds
        INT     15H
 ;
```

; **ADD THE APPLICATION PROGRAM HERE**

;

```
        CMP     EXIT_AP, 1         ;is the application over?
        JNE     W_LOOP         ;No, restart the application

        MOV   AX, 6F02H        ;disable Watchdog Timer
        MOV   BL, 0            ;
        INT     15H
;
```

; **EXIT** ;

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Appendix

B

Address Mapping

B.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Graphics Controller
3C0-3DF	Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table B-1: IO Address Map

B.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table B-2: 1st MB Memory Address Map

B.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table B-3: IRQ Mapping Table

B.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table B-4: IRQ Mapping Table

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Appendix

C

External AC'97 Audio CODEC

C.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. Realtek ALC655 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODEC with a sampling rate of 48KHz.

C.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the 3307870 motherboard. Connect the audio kit to the connector.

C.1.2 Driver Installation

The driver installation has been described in **Chapter 6** ction **6.6**

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see Error! Reference source not found.). If the peripheral speakers are properly connected, sound effects should be heard.
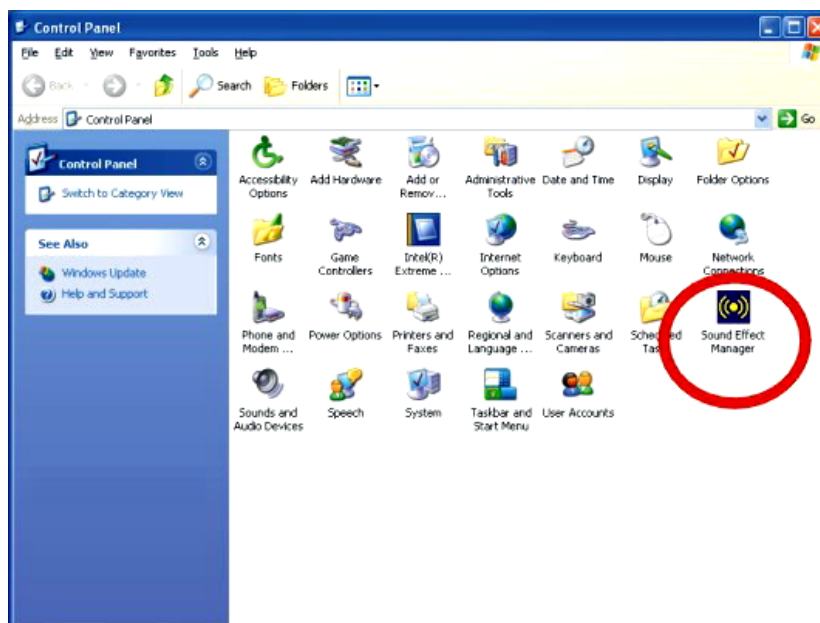

Figure C-1: Sound Effect Manager Icon

C.2 Sound Effect Configuration

C.2.1 Accessing the Sound Effects Manager

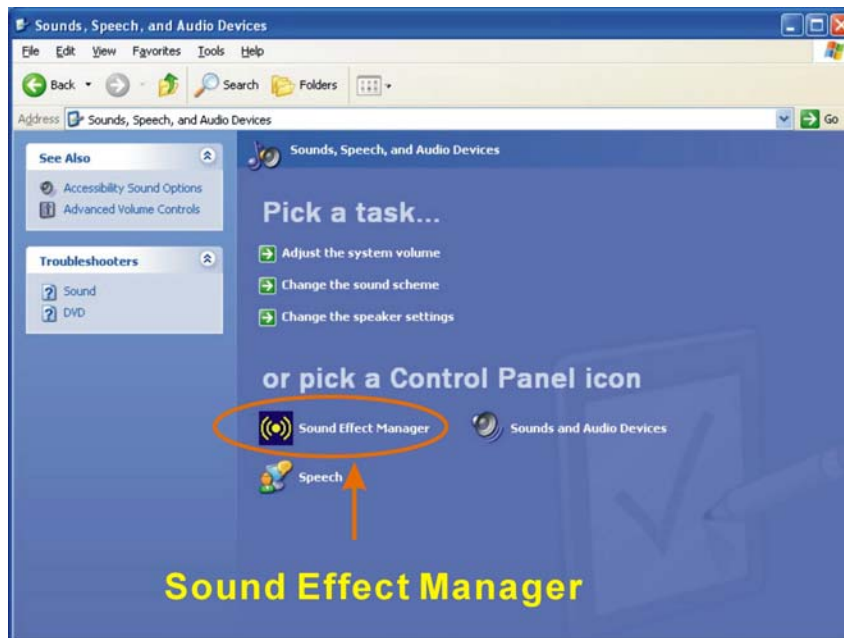To access the **Sound Effects Manager**, please do the following:

Step 1:   Install the audio CODEC driver.

Step 2:   Click either:

- The Sound Effect Manager icon in the Notification Area of the system task bar (see **Figure C-1**), or
- The Sound Effect Manager icon in the Control Panel (**Figure C-2**).
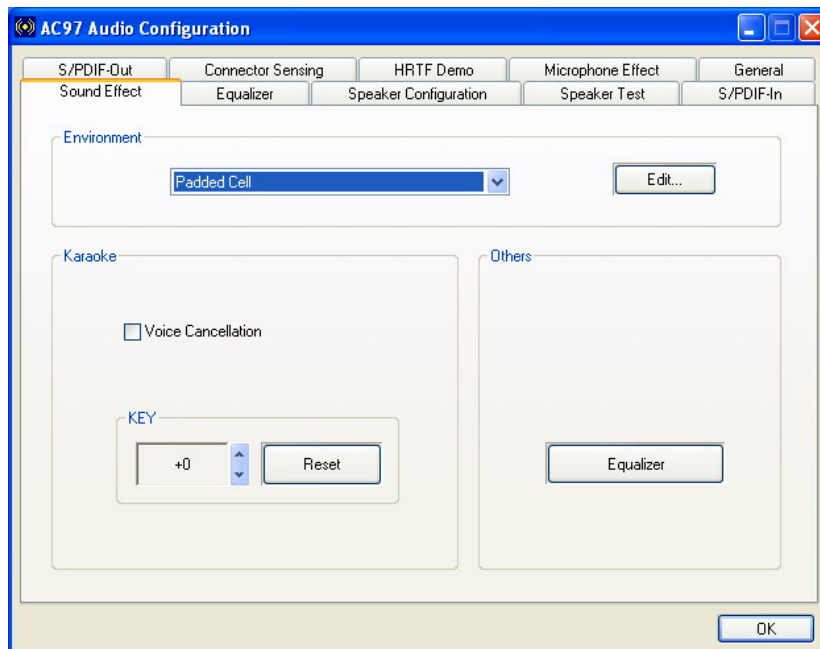

Figure C-2:   Sound Effect Manager Icon [Task Bar]

Figure C-3: Sound Effect Manager Icon [Control Panel]

Step 3:   The sound effect manager appears. (See **Figure C-3**)

Figure C-4: Sound Effects Manager (ALC655)

 NOTE:

The Sound Effect Manager shown in **Figure C-3** is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

C.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** in Error! Reference source not found..

NOTE:

> The **Karaoke Mode** is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

NOTE:

> Not all RealTek **Sound Effect Managers** have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- *Sound Effect*:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."
- *Karaoke Mode*:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key

that fits a certain vocal range.

- ■ *Equalizer Selection*:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.

- ■ *Speaker Configuration*:- Multi-channel speaker settings are configured in this menu. Configurable options include:
  - ○ Headphone
  - ○ Channel mode for stereo speaker output
  - ○ Channel mode for 4 speaker output
  - ○ Channel mode for 5.1 speaker output
  - ○ Synchronize the phonejack switch with speakers settings

- ■ *Speaker Test*:**-** Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.

- ■ *S/PDIF-In & S/PDIF-Out*:- These functions are currently not supported.

- ■ *Connector Sensing*:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

- ■ *HRTF Demo*:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.

- ■ *Microphone Effect*:- Microphone noise suppression is enabled in this menu.

- ■ *General*:- General information about the installed AC'97 audio configuration utility is listed here.

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 your products, projects and business.

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