



integration with integrity

2801330 User's Manual

Mini-ITX Motherboard

Version 1.0

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**Chapter**  
**1**

# **Introduction**

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## 1.1 Motherboard Overview

### 1.1.1 Applications

- Industrial PC applications
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications

### 1.1.2 Benefits

Some of the benefits include:

- Low power, high performance
- Multiple storage option integration including
  - 40 Pin IFM or 3.5" HDD
  - 34 Pin floppy disk drive (FDD) support
  - Dual SATA ports with RAID 0 and RAID 1 support
- Data security SATA RAID support

### 1.1.3 Features

- Complies with mini-ITX form factor
- Complies with RoHS
- Embedded AMD™ Geode™ LX 800 CPU
- Supports a maximum front side bus (FSB) speed up to 500MHz
- DDR 333MHz up to 1GB
- Complete I/O support with IDE, Dual LAN, 4 x USB2.0 and 6 x COM ports

- Supports 24-bit TTL LCD and single channel 18-bit LVDS LCD
- Comes with two high performance 10/100MB Ethernet controllers
- Supports two SATA channels with transfer rates up to 150Mb/s

## 1.2 Overview

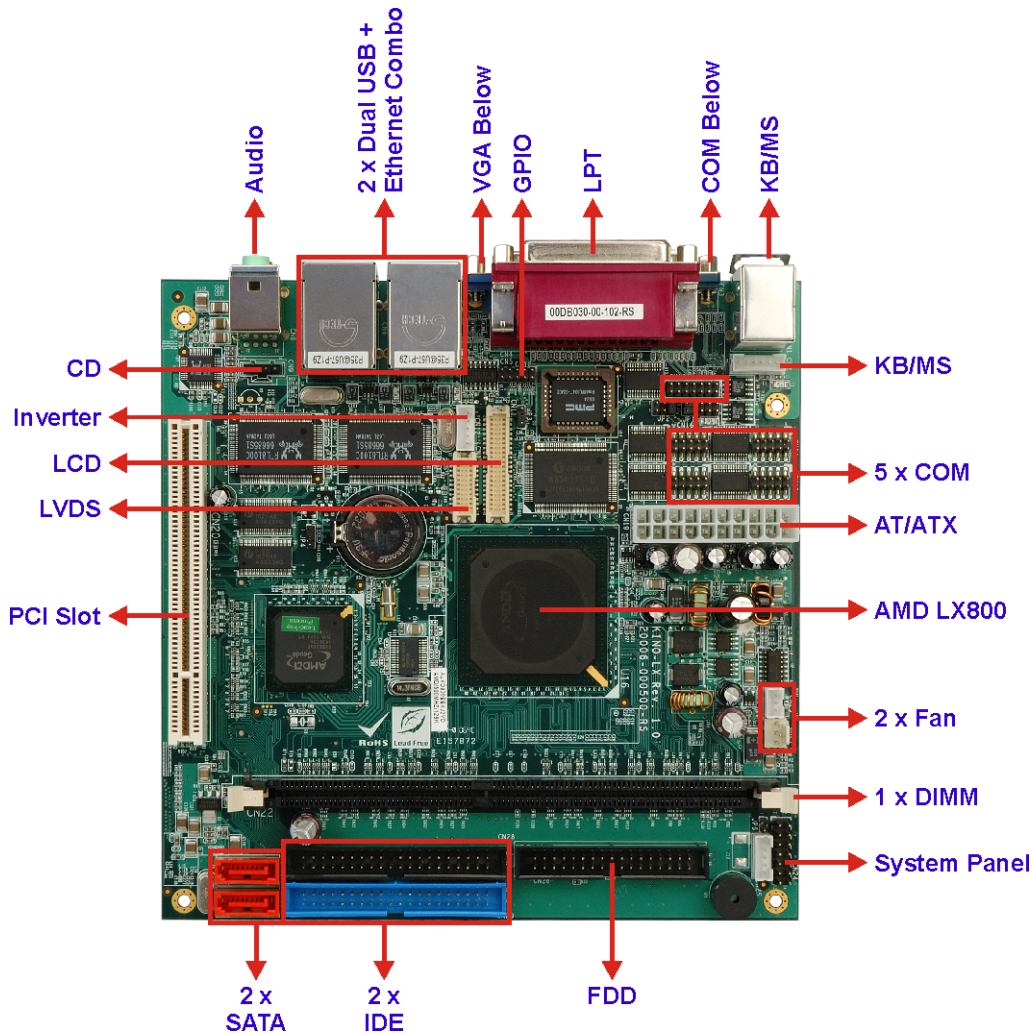


Figure 1-1: Overview

### 1.2.1 Connectors

- 1 x 184-pin DDR DIMM socket
- 1 x AT/ATX power connector
- 1 x CD-IN connector

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- 2 x Fan connectors
  - 1 x Floppy disk connector
  - 1 x Front panel connector
  - 1 x GPIO connector
  - 2 x IDE Interface connectors
  - 1 x Inverter power connector
  - 1 x Keyboard/Mouse connector
  - 1 x LCD LVDS interface Connector
  - 1 x LCD TTL interface Connector
  - 1 x RS-422/485 serial port connector
  - 1 x PCI slot connector
  - 4 x RS-232 serial port connectors
  - 1 x RS-232/422/485 serial port connector
  - 2 x SATA connectors

- 1 x Audio connector (two audio jacks)
- 2 x Ethernet connectors
- 2 x PS/2 keyboard/mouse connectors
- 1 x LPT port connector
- 1 x RS-232 serial port connector
- 4 x USB connectors
- 1 x VGA connector

- AT/ATX power mode select
- Clear CMOS
- COM1/2 RI and voltage select
- COM2 RS-232/422/485 select
- LCD clock setup
- LCD voltage select

The location of these connectors on the motherboard can be seen in **Figure 1-1**. These connectors are fully described in **Chapter 3**.

## 1.2.2 Technical Specifications

Technical specifications are listed in Table 1-1 . Detailed descriptions of each specification can be found in Chapter 2 .

<b>SPECIFICATION</b>	<b>DESCRIPTION</b>
<b>CPUs Supported</b>	<b>AMD™ Geode™ LX 800</b>
<b>Cache Memory</b>	<b>64K I/ 64k D L1 cache, 128K L2 cache</b>
<b>System Chipset</b>	<b>AMD™ CS5536</b>
<b>I/O Controller</b>	<b>AMD™ CS5536</b>
<b>Memory</b>	<b>One 184-pin DDR 333MHz DIMM up to 1GB</b>
<b>PCI Bus Interface</b>	<b>Revision 2.2</b>
<b>Super IO</b>	<b>W83627EHG</b>
<b>Display</b>	<b>CRT integrated in AMD™ LX 800</b>
<b>LVDS</b>	<b>Single channel 18 bit LVDS integrated in AMD™ LX 800</b>
<b>TTL</b>	<b>24 bit TTL integrated in AMD LX 800</b>
<b>HDD Interface</b>	<b>One IDE channel supports two Ultra ATA 100/66/33 devices</b>
<b>Power Support</b>	<b>ATX power support</b>
<b>Power Consumption</b>	<b>+5V @ 1.45A, +12V @ 0.08A LX-800, 500MHz, DDR 333MHz/512MHz MB-HCT</b>
<b>Power Management</b>	<b>Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0</b>
<b>Watchdog Timer</b>	<b>Software programmable supports 1~255 sec. system reset</b>
<b>Serial ATA (SATA)</b>	<b>Two SATA channels with 150Mb/s transfer rates</b>
<b>Floppy Disk Drive (FDD)</b>	<b>Supports FDD</b>
<b>USB Interfaces</b>	<b>Four USB 2.0 connectors supported</b>
<b>Serial Ports</b>	<b>Six RS-232 and one RS422/485 COM ports</b>
<b>Audio Interfaces</b>	<b>Realtek ALC203</b>
<b>PCI Interface</b>	<b>PCI slot connector</b>
<b>Real Time Clock</b>	<b>256-byte battery backed CMOS RAM</b>
<b>Hardware Monitoring</b>	<b>CPU temperature and system voltages</b>
<b>Ethernet</b>	<b>10/100 Base-T RTL8100C</b>
<b>BIOS</b>	<b>AWARD</b>

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<b>SPECIFICATION</b>	<b>DESCRIPTION</b>
<b>Physical Dimensions</b>	<b>170mm x 170mm</b>
<b>Operating Temperature</b>	<b>Minimum: 0°C (32°F) - Maximum: 60°C (140°F)</b>
<b>Operating Humidity</b>	<b>Minimum: 5% - Maximum: 95%</b>
<b>Weight</b>	<b>Gross: 1.1Kg - Net: 500g</b>

**Table 1-1: Technical Specifications**



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Chapter

2

# Detailed Specifications

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## 2.1 CPU Support

The PCB has a preinstalled AMD LX 800 processor. Technical specifications for the AMD LX 800 processor are listed below:

- x86/x87-compatible core
- Processor frequency up to 500 MHz
- 64K I/64K D L1 cache and 128K L2 cache
- Split I/D cache/TLB (Translation Look-Aside Buffer)
- 64-bit DDR Memory interface. 333MHz DDR memory supported
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
  - True Random Number Generator
- High-resolution CRT and TFT outputs (simultaneous operation)
  - Support for High Definition (HD) and Standard Definition (SD) standards
  - Support 1920x1440 in CRT mode and 1600x1200 in TFT mode
- VESA 1.1 and 2.0 VIP/VDA support
- 0.13 micron process
- 481-terminal PBGA (Plastic Ball Grid Array) with internal heatspreader

Power management features for the AMD LX 800 processor are listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

## 2.2 System Chipset

The PCB motherboard has an AMD Geode™ CS5536 chipset installed. The AMD Geode™ CS5536 is a companion device for the AMD Geode™ LX 800 to create a high-performance, low- power x86 solution for embedded applications.

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Technical specifications of the AMD Geode™ CS5536 chipset are listed below. For more information on these two chipsets please refer to the AMD website.

- **GeodeLink™ Interface Unit:**
  - 64-bit, 66MHz operation
  - PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
  - Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)
- **ATA-6 Controller:**
  - 100 MB/second IDE Controller in UDMA mode per the ATA-6 specification
  - 5V interface
- **Flash Interface:**
  - Multiplexed with IDE interface Connects to an array of industry standard NAND Flash and/or NOR Flash
- **USB Controller:**
  - 4 USB ports
  - Supports both USB 1.1 and USB 2.0
  - 3 host ports
  - 1 host/device
- **Audio Codec 97 (AC97) Controller:**
  - AC97 specification v2.3 compliant interface to multiple audio codecs: Serial In, Serial Out, Sync Out, Bit Clock In
  - Legacy “PC Beep” support
- **Diverse Device:**
  - 82xx Legacy Devices
  - IR Communication Port
  - System Management Bus (SMB) Controller
  - LPC (Low Pin Count) Port
  - General Purpose I/Os (GPIOs)
  - 8 Multi-Function General Purpose Timers (MFGPTs)
  - Real-Time Clock (RTC) with CMOS RAM
- **Power Management Controller:**
  - ACPI v2.0 compliant



## 2.3 Graphics Support

Feature	AMD Geode™ LX Processor
Color Depth	8, 16, 32 bpp (A) RGB 4 and 8-bit indexed
ROPs	256 (2-src, dest and pattern)
BLT Buffers	FIFOs in Graphics Processor
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK
Bresenham Lines	Yes
Patterned (stippled) Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (throttled rep movs writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels
Pattern Size (Color)	8x8 pixels
Monochrome Pattern	Yes (with inversion)
Dithered Pattern (4 color)	No
Color Pattern	8, 16, 32 bpp
Transparent Pattern	Monochrome
Solid Fill	Yes
Pattern Fill	Yes
Transparent Source	Monochrome
Color Key Source Transparency	Y with mask

Feature	AMD Geode™ LX Processor
Variable Source Stride	Yes
Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes (constant $\alpha$ , $\alpha/\text{pix}$ , or sep. $\alpha$ channel)
VGA Support	Decodes VGA Register
Pipeline Depth	Unlimited
Accelerated Rotation BLT	8, 16, 32 bpp
Color Depth Conversion	5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8

**Table 2-1: Geode LX Graphics Processor Features**

## 2.4 Memory Support

Up to 1GB of DDR 333 MHz DIMM is supported.

## 2.5 Super I/O

### ■ General

- Meet LPC Spec. 1.01
- Support LDRQ#(LPC DMA), SERIRQ (Serial IRQ)
- Integrated Hardware Monitor functions
- Compliant with Microsoft PC2000/PC2001 Hardware Design Guide
- Support DPM (Device Power Management), ACPI
- Programmable configuration settings
- Single 24 or 48 MHz clock input
- It is 3.3V level but 5V tolerance support
  - Besides LPC function pins(Pin21 ~ Pin30) and H/W monitor analog pins(Pin95 ~ Pin110)
  - Input level can up to 5V and maximum input level can be up to 5V+10%

### ■ FDC

- 
- Compatible with IBM PC AT disk drive systems
  - Variable write pre-compensation with track selectable capability
  - Support vertical recording format
  - DMA enable logic
  - 16-byte data FIFOs
  - Support floppy disk drives and tape drives
  - Detects all overrun and underrun conditions
  - Built-in address mark detection circuit to simplify the read electronics
  - FDD anti-virus functions with software write protect and FDD write enable signal (write data signal was forced to be inactive)
  - Support up to four 3.5-inch or 5.25-inch floppy disk drives
  - Completely compatible with industry standard 82077
  - 360K/720K/1.2M/1.44M/2.88M format; 250K, 300K, 500K, 1M, 2M bps data transfer rate
  - Support 3-mode FDD, and its Win95/98 driver

■ **UART**

- Two high-speed 16550 compatible UARTs with 16-byte send/receive FIFOs
- MIDI compatible
- Fully programmable serial-interface characteristics:
  - 5, 6, 7 or 8-bit characters
  - Even, odd or no parity bit generation/detection
  - 1, 1.5 or 2 stop bits generation
- Internal diagnostic capabilities:
  - Loop-back controls for communications link fault isolation
  - Break, parity, overrun, framing error simulation
- Programmable baud rate generator allows division of 1.8461 MHz and 24 MHz by 1 to (2<sup>16</sup>-1)
- Maximum baud rate up to 921k bps for 14.769 MHz and 1.5M bps for 24 MHz

■ **Infrared**

- Support IrDA version 1.0 SIR protocol with maximum baud rate up to 115.2K bps
- Support SHARP ASK-IR protocol with maximum baud rate up to 57,600 bps

■ **Parallel Port**

- 
- Compatible with IBM parallel port
  - Support PS/2 compatible bi-directional parallel port
  - Support Enhanced Parallel Port (EPP) - Compatible with IEEE 1284 specification
  - Support Extended Capabilities Port (ECP) - Compatible with IEEE 1284 specification
  - Enhanced printer port back-drive current protection
  - **Game Port**
    - Support two separate Joysticks
    - Support every Joystick two axis (X, Y) and two button (A, B) controllers
  - **MIDI Port**
    - The baud rate is 31.25 K baud
    - 16-byte input FIFO
    - 16-byte output FIFO
  - **Keyboard Controller**
    - 8042 based with optional F/W from AMIKKEYTM-2, Phoenix MultiKey/42TM or customer code with 2K bytes of programmable ROM, and 256 bytes of RAM
    - Asynchronous Access to Two Data Registers and One status Register
    - Software compatibility with the 8042
    - Support PS/2 mouse
    - Support port 92
    - Support both interrupt and polling modes
    - Fast Gate A20 and Hardware Keyboard Reset
    - 8 Bit Timer/ Counter
    - Support binary and BCD arithmetic
    - 6 MHz, 8 MHz, 12 MHz, or 16 MHz operating frequency
  - **Serial Flash ROM Interface**
    - Support up to 8M bits flash ROM
  - **General Purpose I/O Ports**
    - 48 programmable general purpose I/O ports
    - GPIO port 1 and 4 can not only serve as simple I/O ports but also watch dog timer output, Power LED output, Suspend LED output
    - Functional in power down mode (GP24 ~ GP27, GPIO-3, GPIO-4, GPIO-5)
  - **OnNow Functions**
-



- 
- Keyboard Wake-Up by programmable keys
  - Mouse Wake-Up by programmable buttons
  - On Now Wake-Up from all of the ACPI sleeping states (S1-S5)
  - **Hardware Monitor Functions**
    - Smart Fan control system, support SMART FANTM I - “Thermal Cruise™” and “Speed Cruise™” Mode , SMART FANTM III function
    - 3 thermal inputs from optionally remote thermistors or Pentium™ II/III/4 thermal diode output
    - 10 voltage inputs (CPUVCORE, VIN[0..4] and intrinsic 3VCC, AVCC , 3VSB, VBAT)
    - 5 fan speed monitoring inputs
    - 4 fan speed control
    - Dual mode for fan control (PWM & DC)
    - Build in case open detection circuit
    - Programmable hysteresis and setting points for all monitored items
    - Over temperature indicate output
    - Issue SMI#, OVT# to activate system protection
    - Winbond Hardware Doctor™ Support
    - 6 VID inputs / outputs
    - Provide I2C interface to read/write registers
  - **Package**
    - 128-pin PQFP

## 2.6 Ethernet Controller

The Realtek RTL8100C is a single-chip Fast Ethernet controller. It is enhanced with an ACPI (Advanced Configuration Power Interface) management function for PCI in order to provide efficient power management for advanced operating systems with OSPM (Operating System Directed Power Management). The RTL8100C also supports remote wake-up (including AMD Magic Packet™ and Microsoft® Wake-up frame). Realtek RTL8100C features are listed below.

- 128-pin PQFP/LQFP
- Supports PCI/mini-PCI interfaces
- Integrates Fast Ethernet MAC, physical chip, and transceiver onto a single chip

- 
- 10Mbps and 100Mbps operation
  - Supports 10Mbps and 100Mbps N-way auto-negotiation
  - Supports 25MHz Crystal or 25MHz OSC as the internal clock source
  - Complies with PC99/PC2001 standards
  - Supports ACPI power management
  - Provides PCI bus master data transfer
  - Provides PCI memory space or I/O space mapped data transfer
  - Supports PCI clock speed of 16.75MHz-40MHz
  - Advanced power saving mode
  - Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
  - Half/Full duplex capability
  - Supports Full Duplex Flow Control (IEEE 802.3x)
  - Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
  - Provides PCI clock run pin
  - Provides LED pins for network operation status indication
  - 2.5/3.3V power supply with 5V tolerant I/Os
  - 0.25µm CMOS process

## 2.7 Drive Interfaces

- 2 x SATA drives
- 2 x IDE devices
- 1 x FDD

### 2.7.1 SATA Drive Interface

Supports two, first generation  
150Mb/s.

SATA drives with transfer rates of up to

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## 2.7.2 IDE HDD Interface

- 100 MB/second IDE Controller in UDMA mode per the ATA-6 specification

## 2.7.3 Floppy Disk Drive (FDD) Interface

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

## 2.8 Serial Ports

- 16C550 UART with 16/32 byte selectable FIFO buffer
- 115.2Kbps transmission rate

## 2.9 Audio Codec

The PCB has an integrated REALTEK ALC203 CODEC. The ALC203 is a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 compatible stereo audio CODEC designed for PC multimedia systems, including host/soft audio, and AMR/CNR based designs. ALC203 features are listed below.

- Single chip with high S/N ratio (>100 dB)
- Meets performance requirements for audio on PC2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing
  - 14.318MHz -> 24.576MHz PLL saves crystal

- 
- 12.288MHz BITCLK input can be consumed
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
  - Page registers and Analog Plug & Play
  - Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications
  - 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 input: PCBEEP, PHONE-IN
  - Supports double sampling rate (96KHz) of DVD audio playback
  - Two software selectable MIC inputs
  - +6/12/20/30dB boost preamplifier for MIC input
  - Stereo output with 6-bit volume control
  - Mono output with 5-bit volume control
  - Headphone output with 50mW/20Ohm amplifier
  - 3D Stereo Enhancement
  - Multiple CODEC extension capability
  - External Amplifier Power Down (EAPD) capability
  - Power management and enhanced power saving features
  - Stereo MIC record for AEC/BF application
  - DC Voltage volume control
  - Auxiliary power to support Power Off CD
  - Adjustable VREFOUT control
  - 2 GPIO pins with smart GPIO volume control
  - 2 Universal Audio Jacks (UAJ)® for front panel
  - Supports 32K/44.1K/48K/96KHz S/PDIF output
  - 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
  - Sensaura™ 3D Enhancement (optional)
  - 10 Bands of Software Equalizer

- 
- Voice Cancellation and Key Shifting in Karaoke mode
  - AVRack® Media Player

## 2.10 Real Time Clock

256-byte battery backed CMOS RAM

## 2.11 System Monitoring

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

## 2.12 BIOS

The PCB uses a licensed copy of Phoenix Award BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-Boot Execution Environment) support
- USB booting support

## 2.13 Operating Temperature and Temperature Control

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

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

A cooling heat sink is installed on the CPU. Thermal paste is smeared on the lower side of the heat sink before it is mounted on the CPU.

## 2.14 Power Consumption

Table 2-2 shows the power consumption parameters for the when an AMD LX-800 CPU is running with a 333 MHz, 256MB DDR RAM module.

Voltage	Current
+5V	1.45A
+12V	0.08A

Table 2-2: Power Consumption

## 2.15 PXE: Pre-Boot Execution Environment

PXE is an open industry standard developed by a number of software and hardware vendors. IEI BIOS PXE feature allows a workstation to boot from a server on a network by receiving a pre-OS agent prior to booting the operating system on the local hard drive.

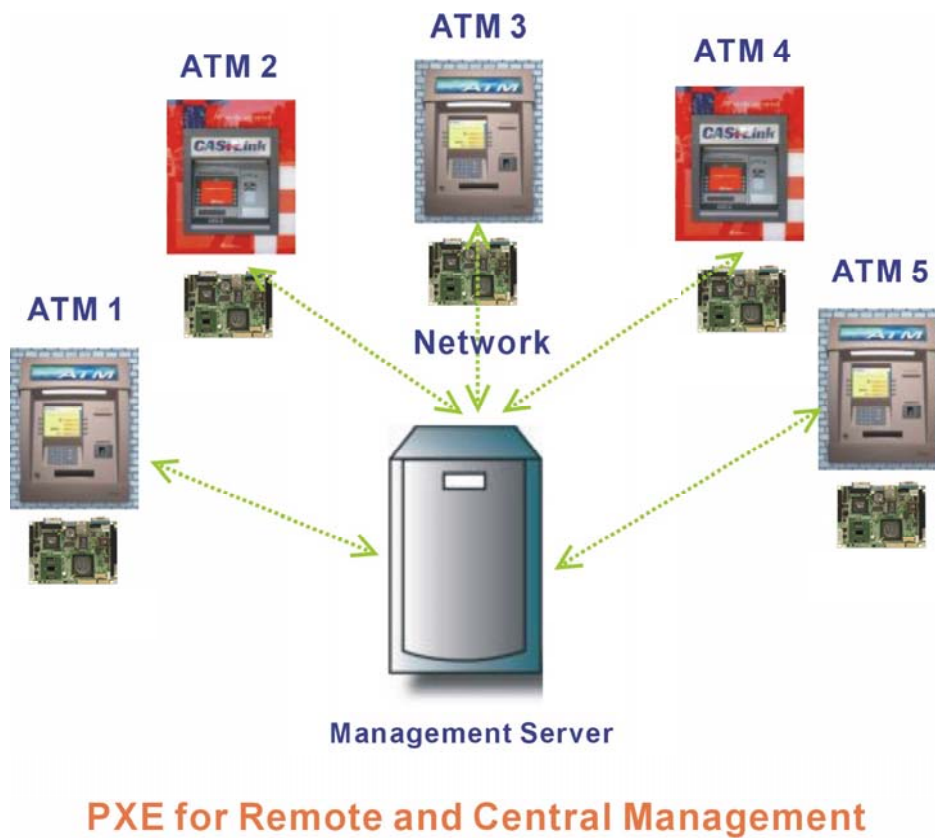


Figure 2-2: PXE: Pre-Boot Execution Environment

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## 2.16 Packaged Contents and Optional Accessory Items

### 2.16.1 Package Contents

- 1 x Mini jumper pack
- 1 x ATA66/100 flat cable
- 2 x Dual RS-232 cables
- 2 x SATA cables
- 1 x SATA Power cable
- 1 x I/O Shielding
- 1 x Utility CD
- 1 x QIG (quick installation guide)

### 2.16.2 Optional Accessory Items

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

- RS-23/422/485 cable

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Chapter

3

# Connectors and Jumpers



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## 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 Layout

Figure 3-1 shows the on-board peripheral connectors and on-board jumpers.

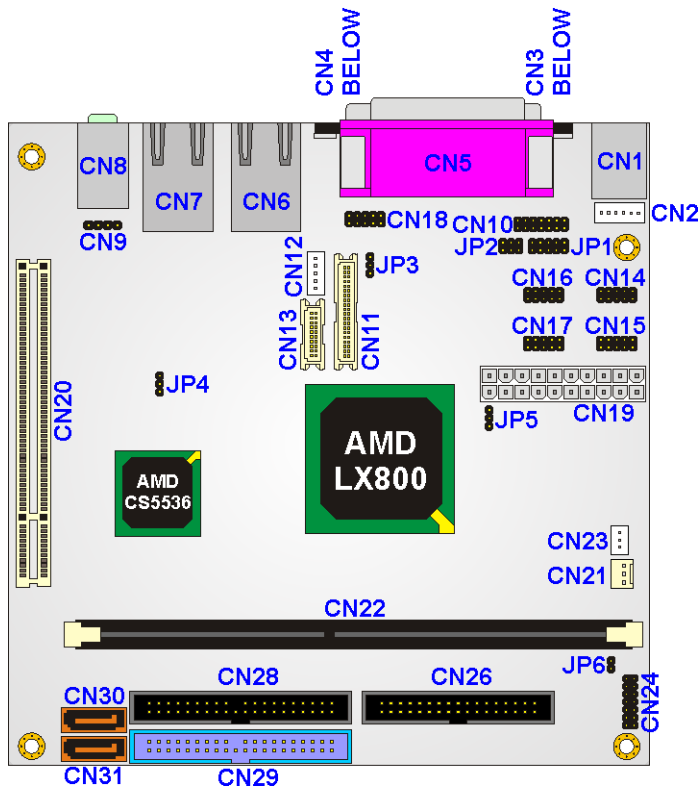


Figure 3-1: Connector and Jumper Locations

### 3.1.2 Peripheral Interface Connectors

Connector	Type	Label
AT/ATX power connector	20-pin header	CN19
CD-IN connector	4-pin header	CN9
DIMM socket	184-pin socket	CN22
5V Fan connector	3-pin box header	CN23
12V Fan connector	3-pin header	CN21
FDD connector	34-pin box header	CN26
Front Panel connector	14-pin header	CN24
GPIO connector	10-pin header	CN18
IDE Interface connector (Primary)	40-pin box header	CN29
IDE Interface connector (Secondary)	40-pin box header	CN28
Inverter Power connector	5-pin wafer connector	CN12
Keyboard/Mouse connector	6-pin wafer connector	CN2
LCD TTL connector	40-pin crimp connector	CN11
LCD LVDS connector	20-pin crimp connector	CN13
PCI slot	128-pin PCI slot	CN20
RS-232/485 COM-2 serial port connector	14-pin header	CN10
RS-232 COM-3 serial port connector	10-pin header	CN14
RS-232 COM-4 serial port connector	10-pin header	CN15
RS-232 COM-5 serial port connector	10-pin header	CN16
RS-232 COM-6 serial port connector	10-pin header	CN17
SATA-1 drive connector	7-pin SATA connector	CN30
SATA-2 drive connector	7-pin SATA connector	CN31

**Table 3-1: Peripheral Interface Connectors**

### 3.1.3 External Peripheral Interface Connectors

Connector	Type	Label
Audio connector	2 x audio jacks	CN8
Ethernet and USB combo connector	RJ-45 and USB 2.0 connectors	CN6
Ethernet and USB combo connector	RJ-45 and USB 2.0 connectors	CN7
Keyboard/mouse connector	Dual PS/2 connector	CN1
Parallel port	DB-25 female connector	CN5
RS-232 serial port connector	D-sub 9 male connector	CN3
VGA connector	HD-D-sub 15 female connector	CN4

**Table 3-2: Rear Panel Connectors**

### 3.1.4 On-board Jumpers

**Table 3-3** lists the on-board jumpers. Detailed descriptions of these jumpers can be found in **Section 4.5**.

Description	Label	Type
Clear CMOS	JP4	3-pin header
LCD voltage select	JP3	3-pin header
COM2 RS-232/422/485 select	JP2	6-pin header
COM1/2 RI and voltage select	JP1	10-pin header
LCD clock setup	JP5	3-pin header
AT/ATX power mode select	JP6	2-pin header

**Table 3-3: On-board Jumpers**

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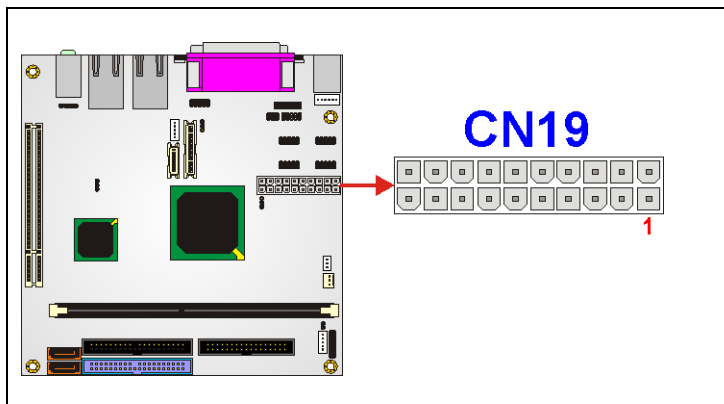
## 3.2 Internal Peripheral Connectors

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.

### 3.2.1 AT/ATX Power Connector

CN Label:	<b>CN19</b>
CN Type:	20-pin connector
CN Location:	See <b>Figure 3-2</b>
CN Pinouts:	See <b>Table 3-4</b>

The ATX Power connector is connected to an ATX or AT power supply.



**Figure 3-2: AT/ATX Power Connector Pinouts**

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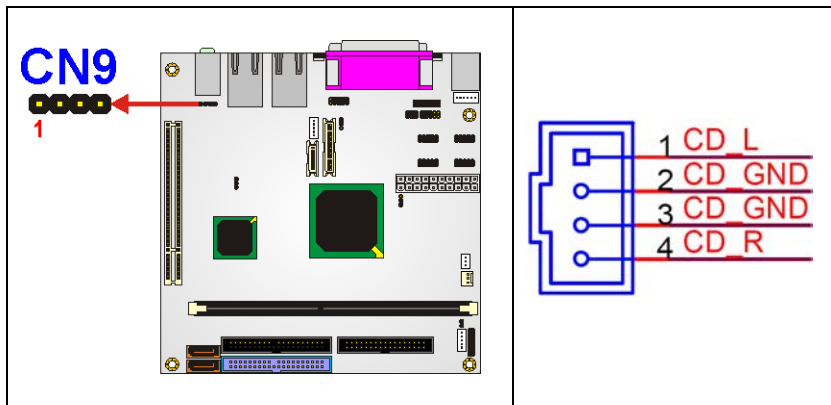
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
<b>11</b>	<b>NC</b>	<b>1</b>	<b>NC</b>
<b>12</b>	<b>-12V</b>	<b>2</b>	<b>NC</b>
<b>13</b>	<b>GND</b>	<b>3</b>	<b>GND</b>
<b>14</b>	<b>PSON</b>	<b>4</b>	<b>+5V</b>
<b>15</b>	<b>GND</b>	<b>5</b>	<b>GND</b>
<b>16</b>	<b>GND</b>	<b>6</b>	<b>+5V</b>
<b>17</b>	<b>GND</b>	<b>7</b>	<b>GND</b>
<b>18</b>	<b>NC</b>	<b>8</b>	<b>PW-OK</b>
<b>19</b>	<b>+5V</b>	<b>9</b>	<b>+5VSB</b>
<b>20</b>	<b>+5V</b>	<b>10</b>	<b>+12V</b>

**Table 3-4: AT/ATX Power Connector Pinouts**

### 3.2.2 CD-IN Connector

- CN Label: **CN9**
- CN Type: 4-pin header
- CN Location: See **Figure 3-3**
- CN Pinouts: See **Table 3-5**

The CD-In connector connects to audio sources such as CD/DVD-ROM optical drives.



**Figure 3-3: CD-IN Connector Pinout Locations**

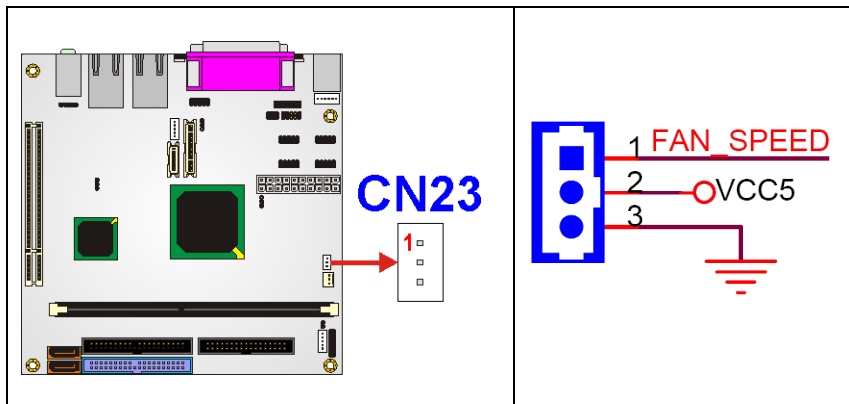
PIN	DESCRIPTION
1	CD-L
2	GND
3	GND
4	CD-R

**Table 3-5: CD-IN Connector Pinouts**

### 3.2.3 5V Fan Connector

- CN Label: **CN23**
- CN Type: 3-pin wafer
- CN Location: See **Figure 3-4**
- CN Pinouts: See **Table 3-6**

The cooling fan connector provides a 5V 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 3-4: 5V Fan Connector Pinout Locations**

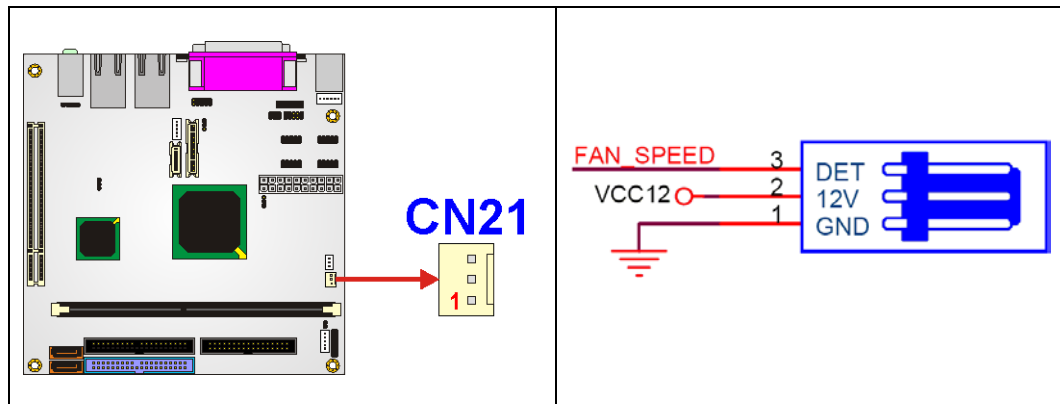
PIN	DESCRIPTION
1	GND
2	+5V
3	Fan Speed Detect

**Table 3-6: 5V Fan Connector Pinouts**

### 3.2.4 12V Fan Connector

- CN Label: **CN21**
- CN Type: 3-pin wafer
- CN Location: See **Figure 3-5**
- CN Pinouts: See **Table 3-7**

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 3-5: Fan Connector Pinout Locations**

PIN	DESCRIPTION
1	GND
2	+12V
3	Fan Speed Detect

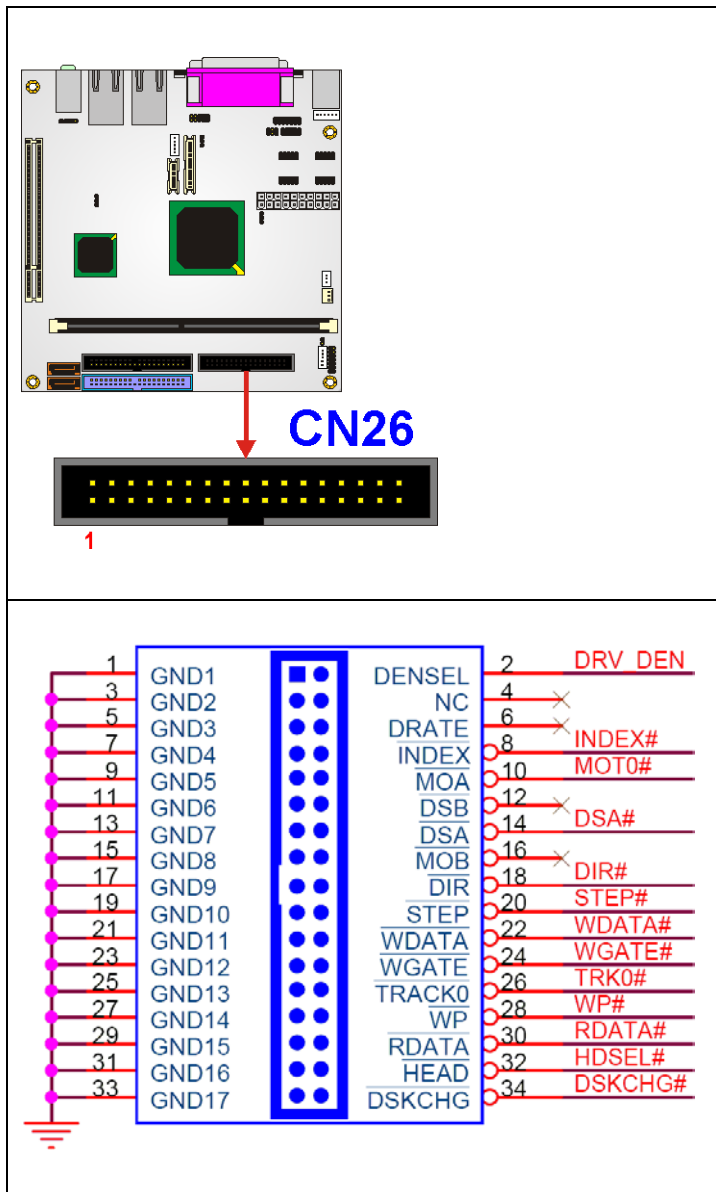
**Table 3-7: Fan Connector Pinouts**



### 3.2.5 Floppy Disk Connector

- CN Label: **CN26**
- CN Type: 34-pin box header
- CN Location: See **Figure 3-6**
- CN Pinouts: See **Table 3-8**

The floppy disk connector connects to a floppy disk drive.



**Figure 3-6: FDD Pinout Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	DENSEL
3	GND	4	NC
5	GND	6	NC
7	GND	8	INDEX#
9	GND	10	MOA#
11	GND	12	NC
13	GND	14	DSA#
15	GND	16	NC
17	GND	18	DIR#
19	GND	20	STEP#
21	GND	22	WDATA#
23	GND	24	WGATE#
25	GND	26	TRACK0#
27	GND	28	WP#
29	GND	30	RDATA#
31	GND	32	HEAD#
33	GND	34	DSKCHG#

**Table 3-8: FDD Connector Pinouts**

### 3.2.6 Front Panel Connector

- CN Label: **CN24**
- CN Type: 14-pin header (2x7 pins)
- CN Location: See **Figure 3-7**
- CN Pinouts: See **Table 3-9**

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

- Power button
- Reset button
- Speaker

- Power LED
- HDD LED

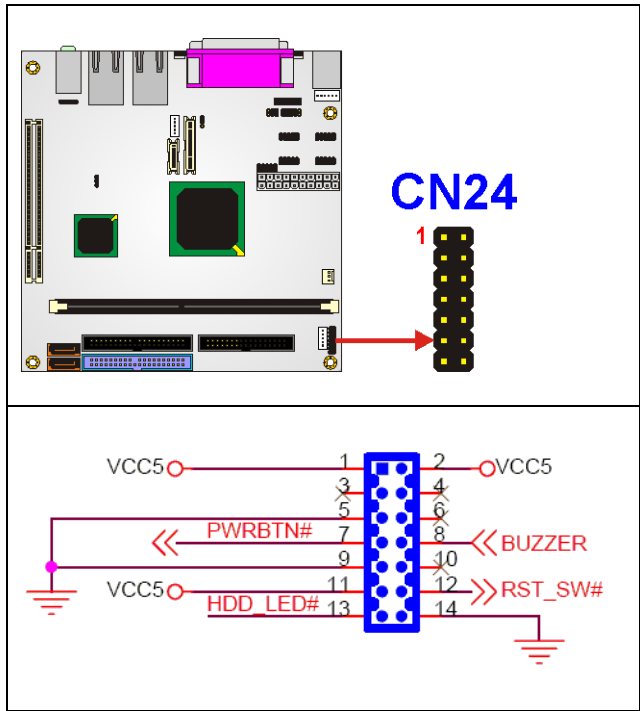


Figure 3-7: Front Panel Connector Pinout Locations

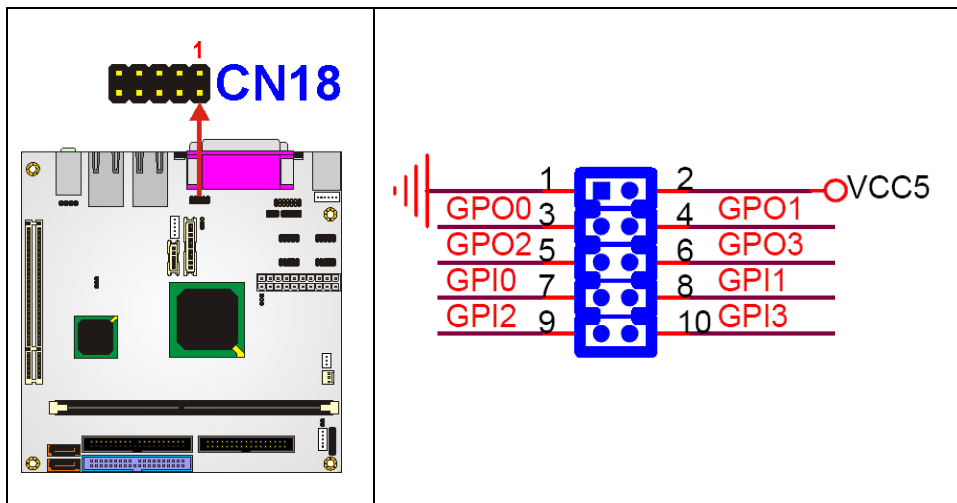
PIN	DESCRIPTION	PIN	DESCRIPTION
1	PWRLED+	2	Buzzer+ (+5V)
3	NC	4	NC
5	PWRLED-	6	NC
7	PWRBTN#	8	Buzzer-
9	GND	10	NC
11	HDDLED+	12	SYS_RST#
13	HDDLED-	14	GND

Table 3-9: Front Panel Connector Pinouts

### 3.2.7 GPIO Connector

- CN Label: **CN18**
- CN Type: 10-pin header (2x5 pins)
- CN Location: See **Figure 3-8**
- CN Pinouts: See **Table 3-10**

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.



**Figure 3-8: GPIO Connector Pinout Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPIO0	8	GPI1
9	GPI2	10	GPI3

**Table 3-10: GPIO Connector Pinouts**

---

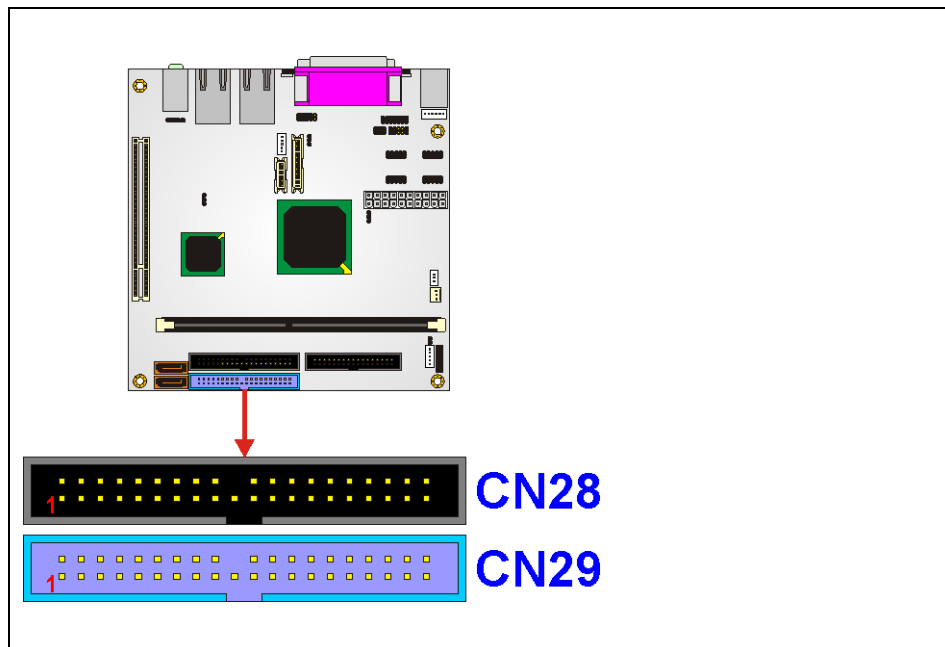
### 3.2.8 IDE Connectors

CN Label: **CN29 (Primary) and CN28 (Secondary)**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-11**



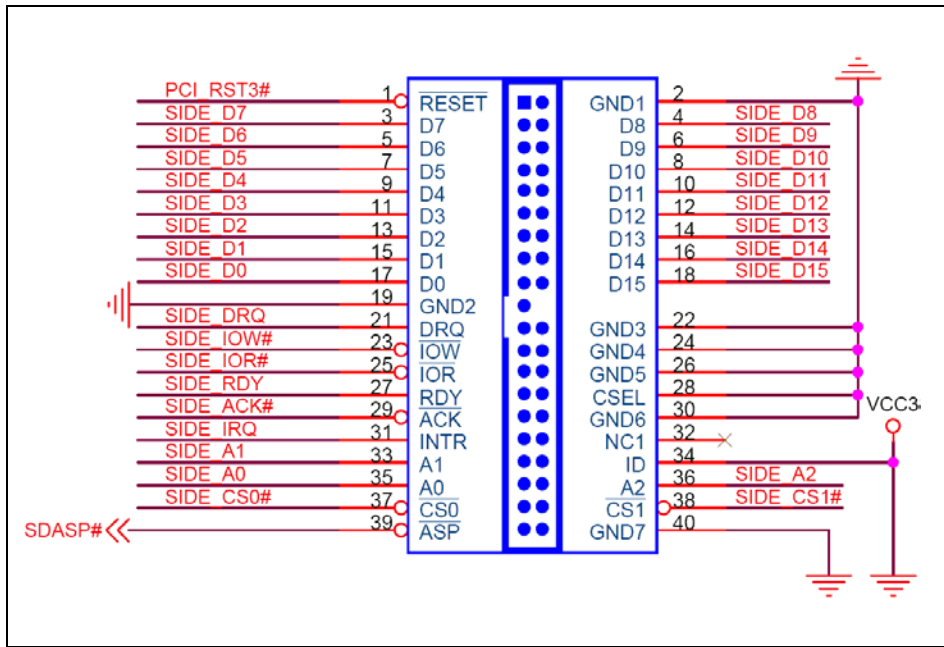


Figure 3-9: IDE Device Connector Locations

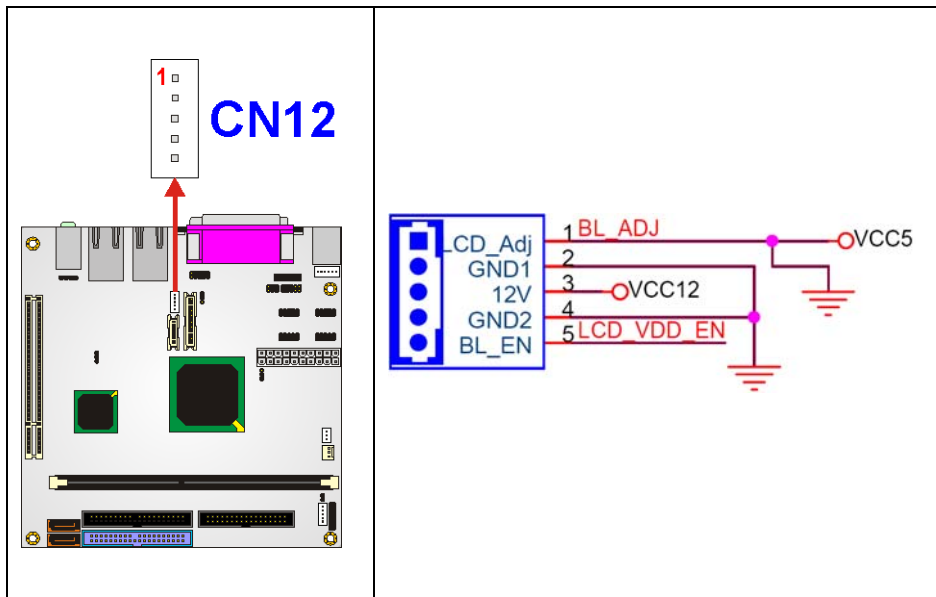
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	RESET#	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC
21	DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	RDY	28	NC
29	ACK#	30	GND
31	INT	32	NC
33	A1	34	CABLEID
35	A0	36	A2
37	CS0#	38	CS1#
39	ASP#	40	GND

**Table 3-11: IDE Connector Pinouts**

### 3.2.9 Inverter Power Connector

- CN Label: **CN12**
- CN Type: 5-pin wafer
- CN Location: See **Figure 3-10**
- CN Pinouts: See **Table 3-12**

The inverter connector is connected to the LCD backlight.



**Figure 3-10: Inverter Connector Locations**

PIN	DESCRIPTION
1	ADJ (Def : GND)
2	GND
3	+12V
4	GND
5	BL_EN

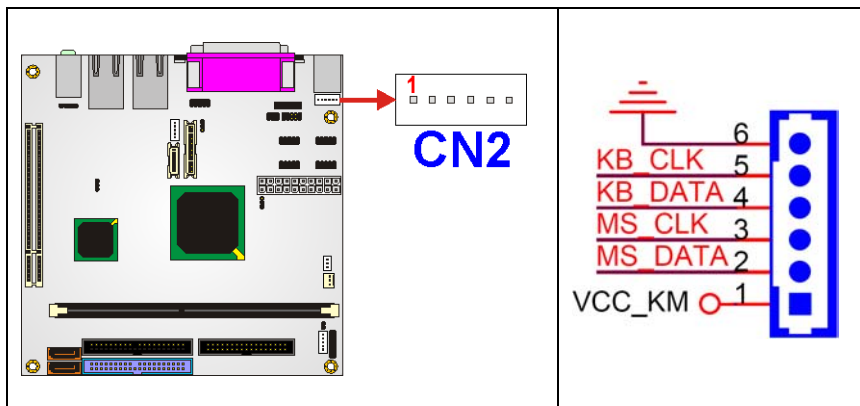
**Table 3-12: Inverter Power Connector Pinouts**



### 3.2.10 Keyboard/Mouse Connector

- CN Label: **CN2**
- CN Type: 6-pin wafer
- CN Location: See **Figure 3-11**
- CN Pinouts: See **Table 3-13**

For alternative applications, an on board keyboard/mouse pin header connector is also available.



**Figure 3-11: Keyboard/Mouse Connector Location**

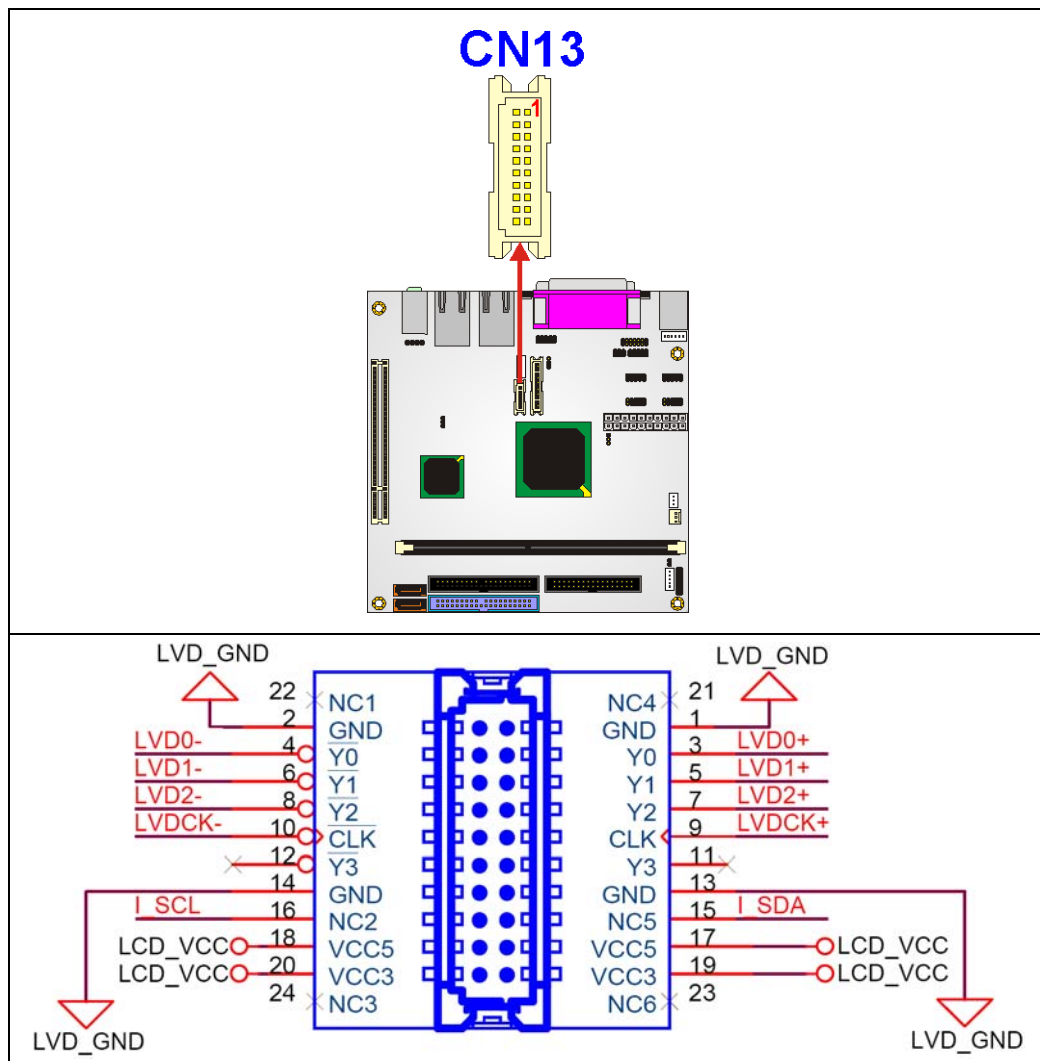
PIN	DESCRIPTION
1	+5V
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	GND

**Table 3-13: Keyboard/Mouse Connector Pinouts**

### 3.2.11 LCD LVDS Connector

- CN Label: **CN13**
- CN Type: 20-pin crimp connector
- CN Location: See **Figure 3-12**
- CN Pinouts: See **Table 3-14**

The LCD LVDS connector is connected to a LCD LVDS display device.



**Figure 3-12: LCD LVDS Connector Locations**

---

<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
<b>2</b>	<b>GND</b>	<b>1</b>	<b>GND</b>
<b>4</b>	<b>D0-</b>	<b>3</b>	<b>D0+</b>
<b>6</b>	<b>D1-</b>	<b>5</b>	<b>D1+</b>
<b>8</b>	<b>D2-</b>	<b>7</b>	<b>D2+</b>
<b>10</b>	<b>CLK-</b>	<b>9</b>	<b>CLK+</b>
<b>12</b>	<b>NC</b>	<b>11</b>	<b>NC</b>
<b>14</b>	<b>GND</b>	<b>13</b>	<b>GND</b>
<b>16</b>	<b>SCL</b>	<b>15</b>	<b>SDA</b>
<b>18</b>	<b>LCD_VCC</b>	<b>17</b>	<b>LCD_VCC</b>
<b>20</b>	<b>LCD_VCC</b>	<b>19</b>	<b>LCD_VCC</b>

**Table 3-14: LCD LVDS Connector Pinouts**

### 3.2.12 LCD TTL Connector

- CN Label: **CN11**
- CN Type: 40-pin crimp connector
- CN Location: See **Figure 3-13**
- CN Pinouts: See **Table 3-15**

The LCD TTL connector is connected to a LCD TTL display device.

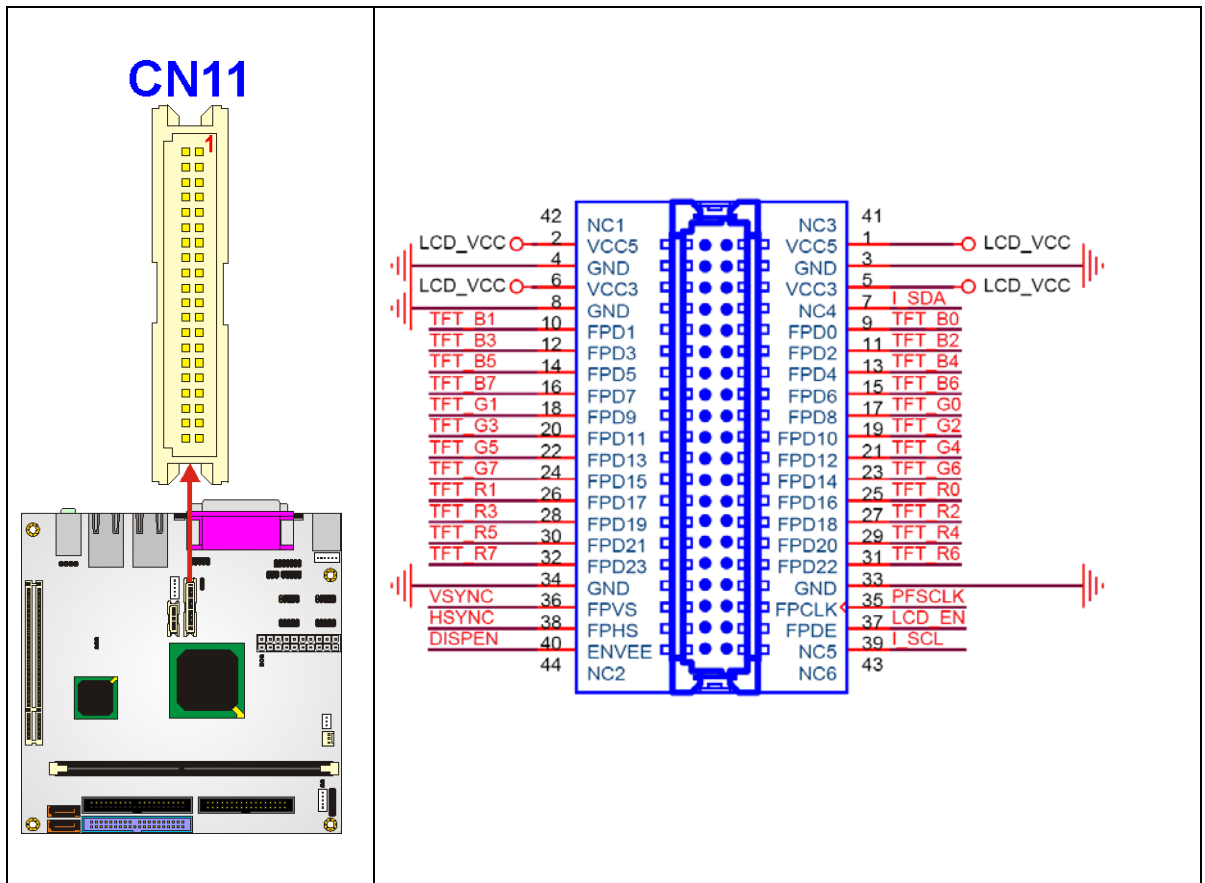


Figure 3-13: LCD TTL Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LCD_VCC	1	LCD_VCC
4	GND	3	GND
6	LCD_VCC	5	LCD_VCC
8	GND	7	SDA
10	B1	9	B0
12	B3	11	B2
14	B5	13	B4
16	B7	15	B6
18	G1	17	G0
20	G3	19	G2
22	G5	21	G4
24	G7	23	G6
26	R1	25	R0
28	R3	27	R2
30	R5	29	R4
32	R7	31	R6
34	GND	33	GND
36	VSYNC	35	CLK
38	HSYNC	37	LCD_EN
40	DISP_EN	39	SCL

**Table 3-15: LCD TTL Connector Pinouts**

### 3.2.13 PCI Slot

CN Label: **CN20**

CN Type: PCI slot

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-16**

The PCI slot enables a PCI expansion module to be connected to the board.

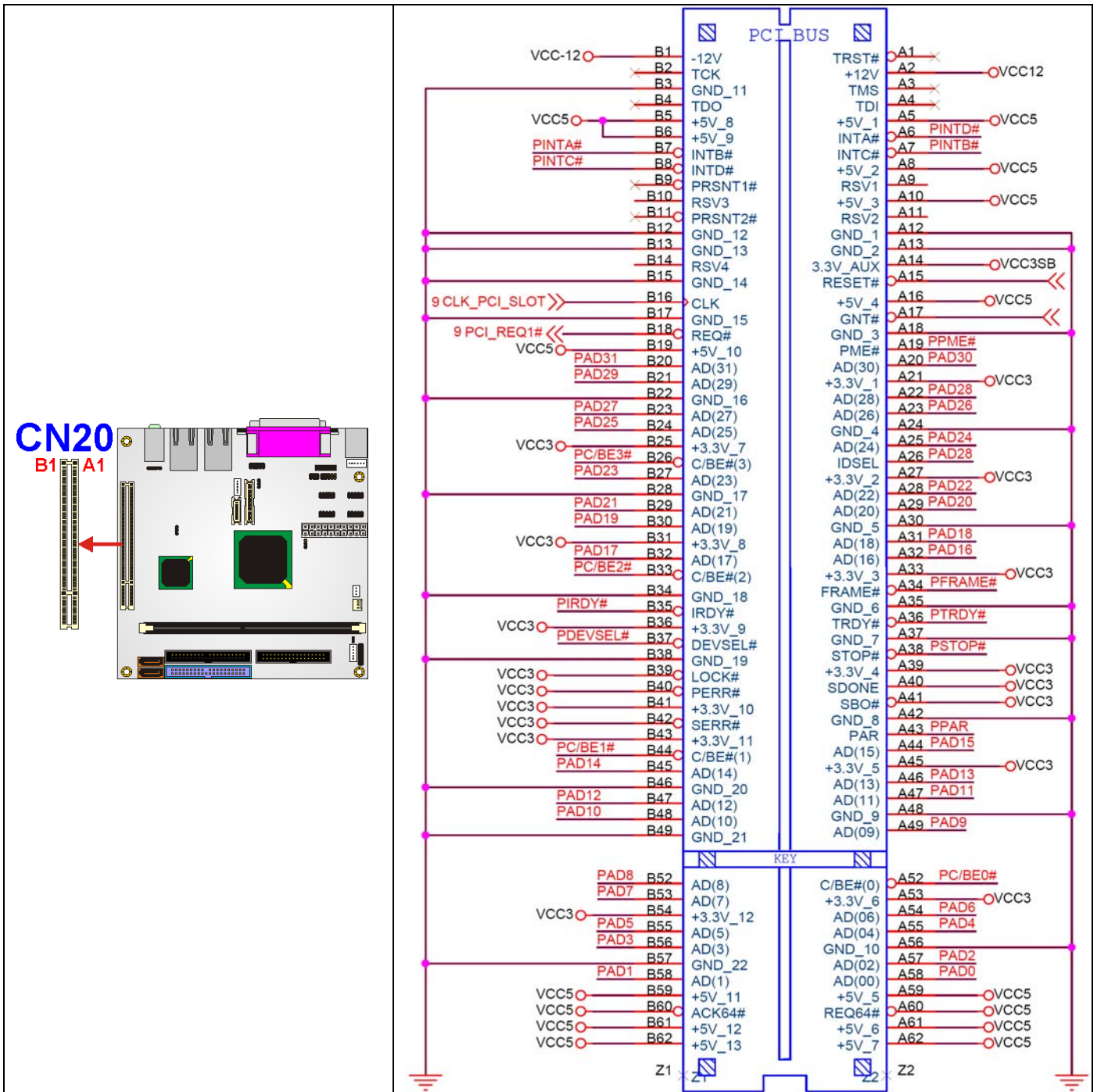


Figure 3-14: PCI Slot Location

PIN	DESCRIPTION	PIN	DESCRIPTION
A1	TRST	B1	-12V
A2	+12V	B2	TCK

<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
<b>A3</b>	<b>TMS</b>	<b>B3</b>	<b>GND</b>
<b>A4</b>	<b>TDI</b>	<b>B4</b>	<b>TDO</b>
<b>A5</b>	<b>+5V</b>	<b>B5</b>	<b>+5V</b>
<b>A6</b>	<b>INTA</b>	<b>B6</b>	<b>+5V</b>
<b>A7</b>	<b>INTC</b>	<b>B7</b>	<b>INTB</b>
<b>A8</b>	<b>+5V</b>	<b>B8</b>	<b>INTD</b>
<b>A9</b>	<b>RESERVED3</b>	<b>B9</b>	<b>PRSNT1</b>
<b>A10</b>	<b>+5V</b>	<b>B10</b>	<b>RESERVED1</b>
<b>A11</b>	<b>RESERVED4</b>	<b>B11</b>	<b>PRSNT2</b>
<b>A12</b>	<b>GND</b>	<b>B12</b>	<b>GND</b>
<b>A13</b>	<b>GND</b>	<b>B13</b>	<b>GND</b>
<b>A14</b>	<b>3.3V_AUX</b>	<b>B14</b>	<b>RESERVED2</b>
<b>A15</b>	<b>RST</b>	<b>B15</b>	<b>GND</b>
<b>A16</b>	<b>+5V</b>	<b>B16</b>	<b>CLK</b>
<b>A17</b>	<b>GNT</b>	<b>B17</b>	<b>GND</b>
<b>A18</b>	<b>GND</b>	<b>B18</b>	<b>REQ</b>
<b>A19</b>	<b>PME</b>	<b>B19</b>	<b>+5V</b>
<b>A20</b>	<b>AD30</b>	<b>B20</b>	<b>AD31</b>
<b>A21</b>	<b>+3.3V</b>	<b>B21</b>	<b>AD29</b>
<b>A22</b>	<b>AD28</b>	<b>B22</b>	<b>GND</b>
<b>A23</b>	<b>AD26</b>	<b>B23</b>	<b>AD27</b>
<b>A24</b>	<b>GND</b>	<b>B24</b>	<b>AD25</b>
<b>A25</b>	<b>AD24</b>	<b>B25</b>	<b>+3.3V</b>
<b>A26</b>	<b>IDSEL</b>	<b>B26</b>	<b>C/BE3</b>
<b>A27</b>	<b>+3.3V</b>	<b>B27</b>	<b>AD23</b>
<b>A28</b>	<b>AD22</b>	<b>B28</b>	<b>GND</b>
<b>A29</b>	<b>AD20</b>	<b>B29</b>	<b>AD21</b>
<b>A30</b>	<b>GND</b>	<b>B30</b>	<b>AD19</b>
<b>A31</b>	<b>AD18</b>	<b>B31</b>	<b>+3.3V</b>
<b>A32</b>	<b>AD16</b>	<b>B32</b>	<b>AD17</b>
<b>A33</b>	<b>+3.3V</b>	<b>B33</b>	<b>C/BE2</b>
<b>A34</b>	<b>FRAME</b>	<b>B34</b>	<b>GND</b>

<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
<b>A35</b>	<b>GND</b>	<b>B35</b>	<b>IRDY</b>
<b>A36</b>	<b>TRDY</b>	<b>B36</b>	<b>+3.3V</b>
<b>A37</b>	<b>GND</b>	<b>B37</b>	<b>DEVSEL</b>
<b>A38</b>	<b>STOP</b>	<b>B38</b>	<b>GND</b>
<b>A39</b>	<b>+3.3V</b>	<b>B39</b>	<b>LOCK</b>
<b>A40</b>	<b>SDONE</b>	<b>B40</b>	<b>PERR</b>
<b>A41</b>	<b>SBO</b>	<b>B41</b>	<b>+3.3V</b>
<b>A42</b>	<b>GND</b>	<b>B42</b>	<b>SERR</b>
<b>A43</b>	<b>PAR</b>	<b>B43</b>	<b>+3.3V</b>
<b>A44</b>	<b>AD15</b>	<b>B44</b>	<b>C/BE1</b>
<b>A45</b>	<b>+3.3V</b>	<b>B45</b>	<b>AD14</b>
<b>A46</b>	<b>AD13</b>	<b>B46</b>	<b>GND</b>
<b>A47</b>	<b>AD11</b>	<b>B47</b>	<b>AD12</b>
<b>A48</b>	<b>GND</b>	<b>B48</b>	<b>AD10</b>
<b>A49</b>	<b>AD9</b>	<b>B49</b>	<b>GND</b>
<b>A52</b>	<b>C/BE0</b>	<b>B52</b>	<b>AD8</b>
<b>A53</b>	<b>+3.3V</b>	<b>B53</b>	<b>AD7</b>
<b>A54</b>	<b>AD6</b>	<b>B54</b>	<b>+3.3V</b>
<b>A55</b>	<b>AD4</b>	<b>B55</b>	<b>AD5</b>
<b>A56</b>	<b>GND</b>	<b>B56</b>	<b>AD3</b>
<b>A57</b>	<b>AD2</b>	<b>B57</b>	<b>GND</b>
<b>A68</b>	<b>AD0</b>	<b>B68</b>	<b>AD1</b>
<b>A59</b>	<b>+5V</b>	<b>B59</b>	<b>+5V</b>
<b>A60</b>	<b>REQ64</b>	<b>B60</b>	<b>ACK64</b>
<b>A61</b>	<b>+5V</b>	<b>B61</b>	<b>+5V</b>
<b>A62</b>	<b>+5V</b>	<b>B62</b>	<b>+5V</b>

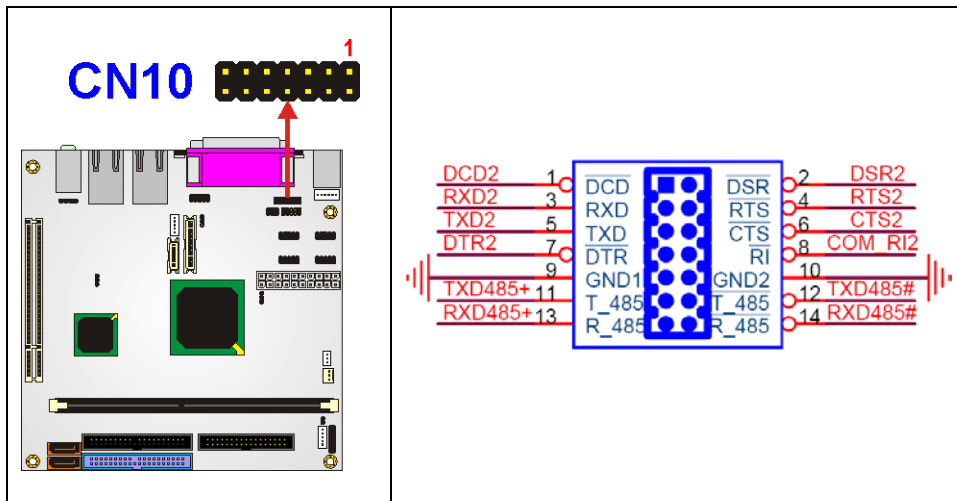
**Table 3-16: PCI Slot**



### 3.2.14 RS-232/422/485 Serial Port Connector

- CN Label: **CN10**
- CN Type: 2x7 pin header
- CN Location: See **Figure 3-15**
- CN Pinouts: See **Table 3-17**

The CN10 serial port connector connects to an RS-232 or RS-485 serial port devices.



**Figure 3-15: RS-232/422/485 Serial Port Connector Pinout Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD#	2	DSR#
3	RxD	4	RTS#
5	TxD	6	CTS#
7	DTR#	8	RI# / Vout
9	GND	10	GND
11	TxD485+	12	TxD485-
13	RxD485+	14	RxD485-

**Table 3-17: RS-232/422/485 Serial Port Connector Pinouts**

### 3.2.15 RS-232 COM Serial Port Connector

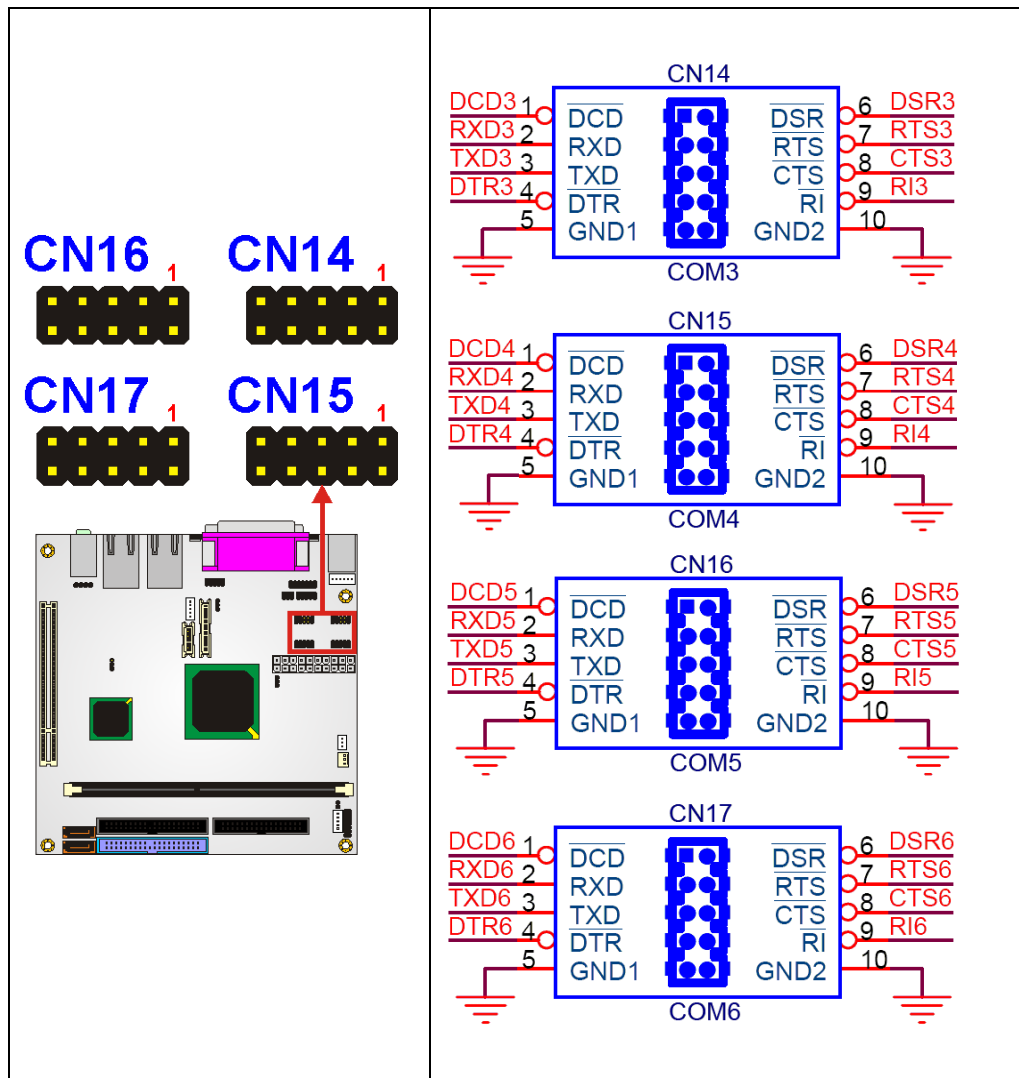
CN Label: **COM3, COM4, COM5 and COM6**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-18**

The COM3, COM4, COM5 and COM6 serial port connectors connect to RS-232 serial port devices.



**Figure 3-16: RS-232 Serial Port Connector Pinout Locations**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND	10	GND

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

### 3.2.16 SATA Drive Connectors

CN Label: **CN30 and CN31**

CN Type: 1x7 pin SATA drive connectors

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-19**

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150Mb/s.

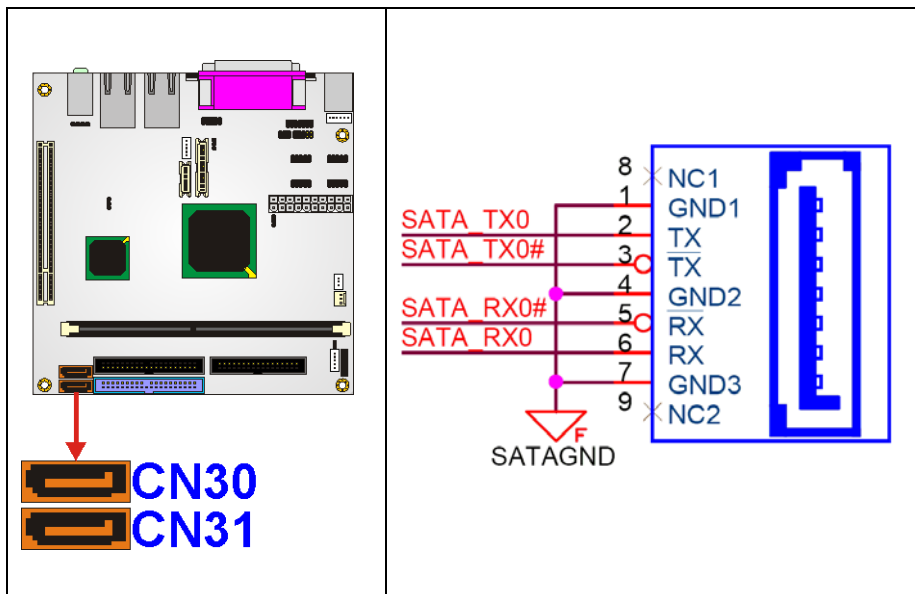


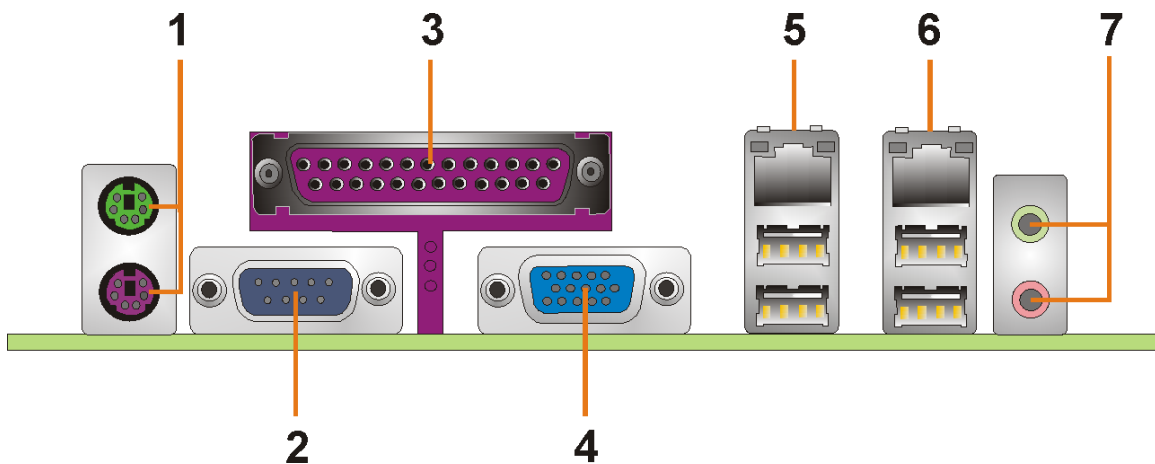
Figure 3-17: SATA Drive Connector Pinout Locations

PIN	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-19: SATA Drive Connector Pinouts

### 3.3 External Peripheral Interface Connector Panel

- 1 x PS/2 keyboard and mouse connector
- 1 x Serial port connector
- 1 x Parallel port connector
- 1 x VGA connector
- 2 x RJ-45 GbE connector
- 4 x USB connectors
- 1 x Audio connector (two audio jacks)



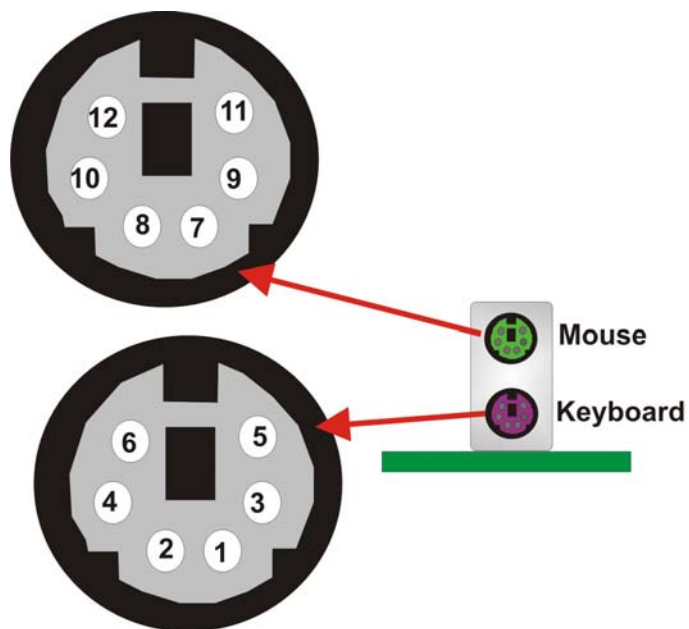
### 3.3.1 Keyboard/Mouse Connector

CN Label: **CN8**

CN Type: Dual PS/2

CN Location: See **Figure 3-18** (labeled number 1)

CN Pinouts: See **Figure 3-19** and **Table 3-20**



**Figure 3-19: Keyboard/Mouse Connector Pinouts**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	L_KDAT	7	L_MDAT
2	NC	8	NC
3	GND	9	GND
4	5V	10	5V
5	L_KCLK	11	L_MCLK
6	NC	12	NC

**Table 3-20: Keyboard/Mouse Connector Pinouts**

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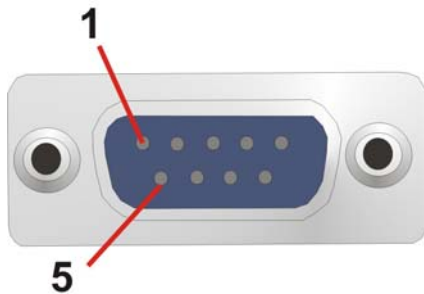
### 3.3.2 Serial Port Connector

CN Label: **CN3**

CN Type: D-sub 9 male connector

CN Location: See **Figure 3-18** (labeled number 2)

CN Pinouts: See **Figure 3-20** and **Table 3-21**



**Figure 3-20: Serial Port Connector**

Serial port connector (COM1) pinouts are shown below.

<b>PIN</b>	<b>Description</b>	<b>PIN</b>	<b>Description</b>
<b>1</b>	<b>DCD1</b>	<b>6</b>	<b>DSR1</b>
<b>2</b>	<b>RXD1</b>	<b>7</b>	<b>RTS1</b>
<b>3</b>	<b>TXD1</b>	<b>8</b>	<b>CTS1</b>
<b>4</b>	<b>DTR1</b>	<b>9</b>	<b>RI1</b>
<b>5</b>	<b>GROUND</b>		

**Table 3-21: Serial Port Connector Pinouts**

### 3.3.3 Parallel Port Connector

- CN Label: **CN5**
- CN Type: DB-25 female connector
- CN Location: See **Figure 3-18** (labeled number 3)
- CN Pinouts: See **Figure 3-21** and **Table 3-22**

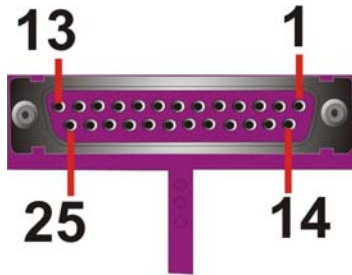


Figure 3-21 Parallel Port Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STB#	14	AFD#
2	PD0	15	ERR#
3	PD1	16	INIT#
4	PD2	17	SLIN#
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

Table 3-22: Parallel Port Pinouts

### 3.3.4 VGA connector

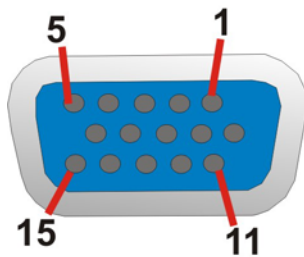
CN Label: **CN4**

CN Type: HD-D-sub 15 female connector

CN Location: See **Figure 3-18** (labeled number 4)

CN Pinouts: See **Figure 3-22** and **Table 3-23**

A 15-pin VGA connector connects to standard displays.



**Figure 3-22: 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 3-23: VGA Connector Pinouts**



---

### 3.3.5 LAN Connectors

CN Label: **CN6 and CN7**

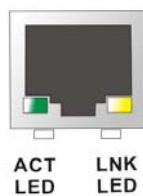
CN Type: RJ-45

CN Location: See **Figure 3-18** (labeled number 5 and 6)

CN Pinouts: See **Table 3-24**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+2.5VCC	2	TX0+
3	TX0-	4	TX1+
5	TX1-	6	TX2+
7	TX2-	8	TX3+
9	TX3-	10	GND
11	LINK-	12	LINK+
13	ACTIVE-	14	ACTIVE+

**Table 3-24: LAN Pinouts**



**Figure 3-23: RJ-45 Ethernet Connector**

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow (**Figure 3-23**). The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-25**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

**Table 3-25: RJ-45 Ethernet Connector LEDs**

### 3.3.6 USB Connectors

CN Label: **CN6** and **CN7**

CN Type: USB port

CN Location: See **Figure 3-18** (labeled number 5 and 6)

CN Pinouts: See **Table 3-26**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USBV3L 5V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5V

**Table 3-26: USB Port Pinouts**

---

### 3.3.7 Audio Connector

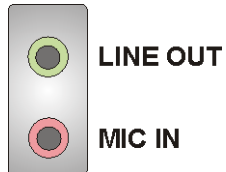
CN Label: **CN1**

CN Type: 2 x audio jacks

CN Location: See **Figure 3-18** (labeled number 7)

CN Pinouts: See **Figure 3-24**

- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.



**Figure 3-24: Audio Connector**

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Chapter

4

# Installation

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## 4.1 Anti-static Precautions

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

- **Wear an anti-static wristband:** - 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 motherboard,

- Read the user manual
  - The user manual provides a complete description of the motherboard, 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 user's body and help to prevent ESD damage.
  - Place the motherboard on an antistatic pad
    - When the motherboard is installed and configured, place it on an antistatic pad. This helps to prevent potential ESD damage.
  - Turn off all power to the motherboard
    - 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 an d during the installation of the motherboard

- remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- use the product before 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 PCB is unpacked, do not proceed with the installation and contact the reseller or vendor motherboard was purchased from.

### 4.3.1 Unpacking Precautions

- Users should ground themselves to remove any static charge before touching

---

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 PCB is unpacked please make sure the package contains the following items.

- 1 x Single Board Computer
- 1 x ATA66/100 Flat Cable
- 2 x SATA Cable
- 1 x SATA Power Cable
- 1 x Dual RS-232 Cable
- 1 x I/O Shielding
- 1 x Mini Jumper Pack
- 1 x Utility CD
- 1 x QIG

## 4.4 Motherboard Installation



### **WARNING!**

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



## **WARNING!**

When installing electronic components onto the PCB always take anti-static precautions in order to prevent ESD damage to the PCB and other electronic components like the CPU and DIMM modules

### **4.4.1 Preinstalled Components**

- CPU

### **4.4.2 Components to Install**

- DIMM modules
- Peripheral devices

### **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: to 1GB of 333MHz or 400MHz of DDR memory

- The DIMM module can support a memory chip with a maximum size of 1GB
- The DIMM module can have a of 333MHz or 400MHz
- The DIMM can be either single-sided or dual-sided.

#### **4.4.3.2 DIMM Module Installation**

The motherboard has one DDR SDRAM DIMM socket. To install a DIMM module, follow the instructions below and refer to Figure 4-1 .

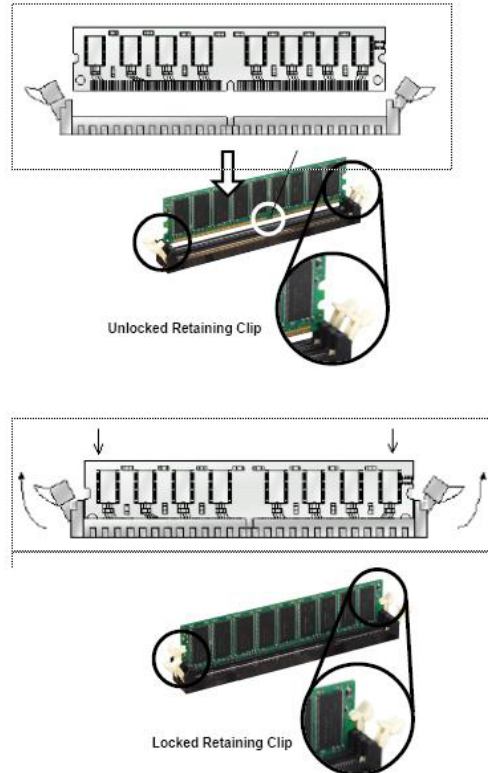
**Step 1:** Pull the two white handles on either side of the DIMM socket down.



---

**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 4-1: DIMM Module Installation**

## 4.5 Peripheral Device Connection

Cables provided by IEI that connect peripheral devices to the board are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

---

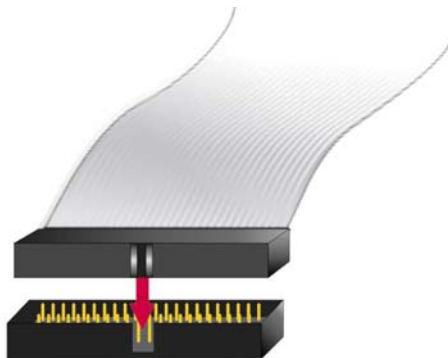
Quantity	Type
1	mini jumper pack
1	ATA 66/100 HDD cable
2	SATA cables
1	SATA power cable
1	Dual RS-232 cables

**Table 4-1: IEI Provided Cables**

#### 4.5.1 IDE Disk Drive Connectors (CN29 Primary, CN28 Secondary)

The cable used to connect the CPU card to an IDE HDD is a standard 40-pin ATA66/100 flat cable. Follow the instructions below to connect an IDE HDD to the CPU card.

- Step 1:** Find the ATA66/100 flat cable in the kit that came with the CPU card.
- Step 2:** Connect one end of the cable to the CN29 (Primary IDE) connector on the CPU card. A keyed pin on the IDE connector prevents it from being connected incorrectly.
- Step 3:** Locate the red wire on the cable that corresponds to the pin 1 connector.
- Step 4:** Connect the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.



**Figure 4-2: Connection of IDE1 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.

#### 4.5.2 COM3-COM6 RS-232 Serial Port Installation

The cable used to connect the motherboard to an RS-232 serial port is a 10-pin header to male D-sub 9 connector. To connect an RS-232 serial port to the motherboard, follow the instructions below.

**Step 1:** Find the RS-232 cable in the kit that came with the motherboard.

**Step 2:** Connect the 10-pin connector end of the cables to the COM3 to COM6 box headers on the motherboard. Be sure to align the red wire on the connector to pin 1 on the box header.

**Step 3:** Connect the other end of the cables to standard female D-sub 9 connectors.

#### 4.5.3 COM2 RS-232/485 Serial Port Installation

To connect an RS-232/485 serial port to the motherboard, follow the instructions below.

**Step 1:** Connect the 14-pin connector end of an RS-422/485 serial port cable to the CN10 connector on the motherboard.

**NOTE:**

Be sure to configure the JP2 COM2 RS232/RS485 Select Jumper for either an RS-232 or RS-485 connection. Refer to **Section 4.5** for more information.

---

#### 4.5.4 LCD Backlight Installation

To connect an LCD backlight (inverter) to the motherboard, follow the instructions below.

**Step 1:** Connect the 5-pin connector end of the LCD backlight cable to the CN12 header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

#### 4.5.5 Power Connection

To connect the motherboard to a power supply, follow the instructions below.

**Step 1:** Connect a 20-pin AT/ATX power connector from a power supply to the CN19 power connector on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

#### 4.5.6 LVDS LCD Installation

To connect a LVDS LCD to the motherboard, follow the instructions below.

**Step 1:** Connect the 20-pin connector end of a TTL LCD cable to the CN13 miniature crimping connector on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

#### 4.5.7 TTL LCD Installation

To connect a TTL LCD to the motherboard, follow the instructions below.

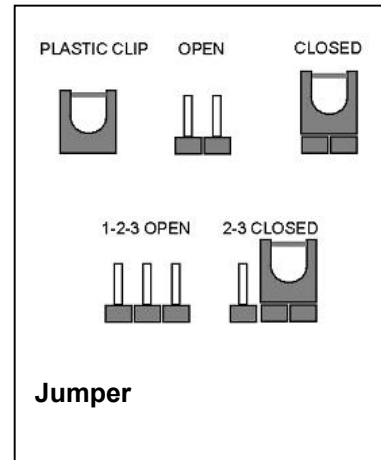
**Step 1:** Connect the 40-pin connector end of a TTL LCD cable to the CN11 miniature crimping connector on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

## 4.6 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.



Description	Label	Type
Clear CMOS	JP4	3-pin header
LCD voltage select	JP3	3-pin header
COM2 RS-232/422/485 select	JP2	6-pin header
COM1/2 RI and voltage select	JP1	10-pin header
LCD clock setup	JP5	3-pin header
AT/ATX power mode select	JP6	2-pin header

**Table 4-2: Jumpers**

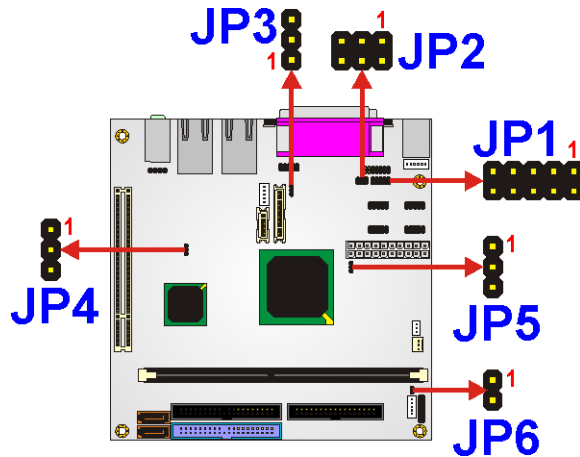


Figure 4-3: Jumper Locations

#### 4.6.1 Clear CMOS Jumper

Jumper Label:	<b>JP4</b>
Jumper Type:	3-pin header
Jumper Settings:	See <b>Table 4-3</b>
Jumper Location:	See <b>Figure 4-3</b>

If the PCB 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 4-3: Clear CMOS Jumper Settings**

## 4.6.2 LCD Voltage Select Jumper



### **WARNING:**

Making the wrong setting on this jumper may cause irreparable damage to both the motherboard and the LCD screen connected to the on-board connector.

Jumper Label:	<b>JP3</b>
Jumper Type:	3-pin header
Jumper Settings:	See <b>Table 4-4</b>
Jumper Location:	See <b>Figure 4-3</b>

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 4-4**.

JP3	DESCRIPTION
Short 1-2 (Default)	Panel Voltage select 3V
Short 2-3	Panel Voltage select 5V

**Table 4-4: LCD Voltage Setup Jumper Settings**

---

### 4.6.3 COM2 RS-232/422/485 Select

Jumper Label:	<b>JP2</b>
Jumper Type:	6-pin header
Jumper Settings:	See <b>Table 4-5</b>
Jumper Location:	See <b>Figure 4-3</b>

The RS-232/422/485 select jumper sets the communication protocol used by the second serial communications port (COM2) as RS-232, RS-422 or RS-485.

<b>JP2</b>	<b>DESCRIPTION</b>
<b>Short 1-2</b>	<b>RS-232</b>
<b>Short 3-4</b>	<b>RS-422</b>
<b>Short 5-6</b>	<b>RS-485</b>

**Table 4-5: COM2 RS-232/422/485 Select Settings**

### 4.6.4 COM1/2 RI and Voltage Select Jumper

Jumper Label:	<b>JP1</b>
Jumper Type:	10-pin header
Jumper Settings:	See <b>Table 4-6</b>
Jumper Location:	See <b>Figure 4-3</b>

This jumper allows the user to set the voltage for pin 9 on COM1 or COM2. Pin 9 is traditionally a ring line but this jumper can set pin 9 to supply 5V or 12V power to a serial device connected to COM1 or COM2. Make the necessary jumper setting in accordance with the settings shown in **Table 4-6**.



JP1	DESCRIPTION
1-3	COM1 RI Pin Use +12V
3-5	COM1 RI Pin Use +5V
7-9	COM1 RI Pin Use RI
2-4	COM2 RI Pin Use +12V
4-6	COM2 RI Pin Use +5V
8-10	COM2 RI Pin Use RI

**Table 4-6: COM2 Voltage Setup Jumper Settings**

#### 4.6.5 LCD Clock Jumper

Jumper Label:	JP5
Jumper Type:	3-pin header
Jumper Settings:	See <b>Table 4-7</b>
Jumper Location:	See <b>Figure 4-3</b>

The LCD clock jumper sets the LCD panel shift clock.

JP5	Description
1-2	Inverted Output (Default)
2-3	Normal Output

**Table 4-7: LCD Clock Jumper Settings**

#### 4.6.6 AT/ATX Power Mode Select Jumper

Jumper Label:	JP6
Jumper Type:	2-pin header
Jumper Settings:	See <b>Table 4-8</b>
Jumper Location:	See <b>Figure 4-3</b>

The AT/ATX power mode select jumper block controls the connection to a power supply.

---

The AT/ATX power connector is used to connect a chassis power On/Off button using an adapter cable and is configured through the JP6 jumper. The AT/ATX power connector has two operational modes:

1. Using **ATX** power: AT/ATX power connects to an externally implemented power switch, and the JP6 jumper should be left open.
2. Using **AT** power: The pins on JP6 are shorted by a jumper cap. JP6 should be shorted by default as the AMD Southbridge is designed without the consideration for a power button signal. The shorted JP6 provides a hardware feedback to initiate the system. The power on/off function is then managed by the AT power switch button.

<b>JP6</b>	<b>Description</b>
<b>Short</b>	<b>AT Mode (Default)</b>
<b>Open</b>	<b>ATX Mode</b>

**Table 4-8: AT/ATX Power Mode Select Jumper Settings**

## 4.7 Chassis Installation

After the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configured,

To mount a board into a chassis, please refer to the chassis user guide that came with the product.

## 4.8 Rear Panel Connectors

### 4.8.1 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.

---

## **4.8.2 Serial Connection**

The external peripheral interface connector panel serial connector provides easy and quick access to external serial devices.

## **4.8.3 Parallel Connector**

The external parallel port connector connects to a printer. The parallel port interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility. The default interrupt channel is IRQ7. Select ECP or EPP DMA mode using the BIOS configuration utility.

## **4.8.4 LCD Panel Connection**

The conventional CRT monitor connector is a 15-pin, female D-SUB connector. It can be connected to an external monitor.

## **4.8.5 Ethernet Connection**

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 10Mbps and 100Mbps.

## **4.8.6 USB Connection**

The rear panel USB connectors provide 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.

## **4.8.7 Audio Interface**

AC'97 Audio signals are interfaced through two phone jack connections. The red phone jack is for Mic In and green is for Speaker Out.

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