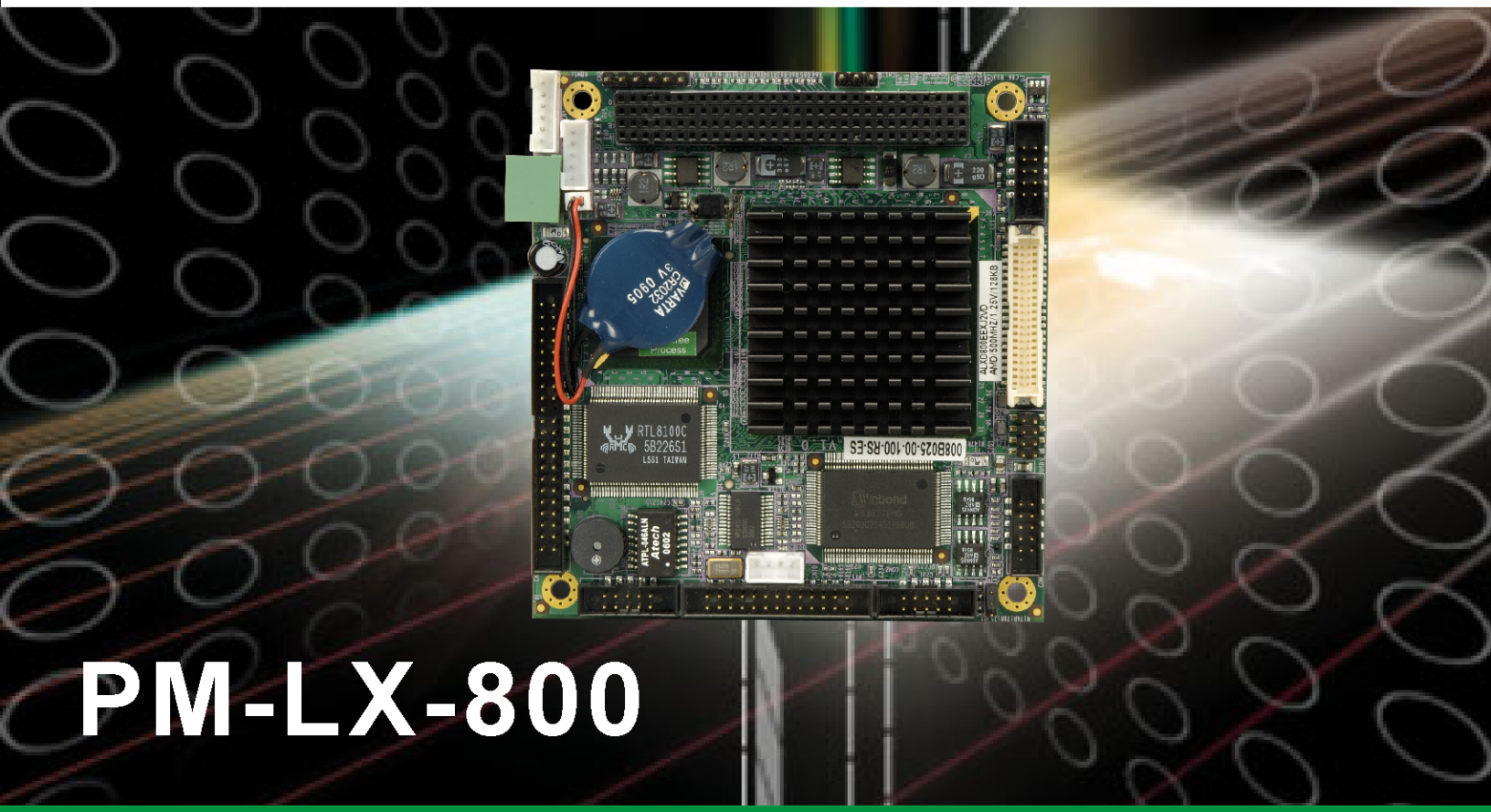
IEI Technology Corp.



# PM-LX-800

## PC/104 AMD LX800 CPU Board

## with on-board TTL, VGA and USB2.0

# User Manual

Rev. 1.0 November, 2006

RoHS Lead Free

## REVISION HISTORY

| Title | PM-LX-800 Motherboard | |
|---|---|---|
| Revision Number | Description | Date of Issue |
| 1.0 | Initial release | November 2006 |

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# Glossary

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

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Chapter

1

# Introduction

## 1.1 PM-LX-800 Motherboard Introduction

The PC/104 form factor PM-LX-800 is a highly integrated embedded computer specifically optimized for multi-media applications requiring minimum installation space. The PM-LX-800 is particularly suitable for low power and fan-less applications. The PM-LX-800 supports a full range of functions for an AT compatible industrial computer in a space-saving 90mm x 96mm profile. The PM-LX-800 is equipped with an on-board low-power consumption and high performance AMD™ Geode™ LX 800 processor. It also contains a DDR SO-DIMM socket that supports up to 1GB memory in size.

### 1.1.1 PM-LX-800 Motherboard Applications

The PM-LX-800 motherboard has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

### 1.1.2 PM-LX-800 Motherboard Benefits

Some of the PM-LX-800 motherboard benefits include,

- operating reliably in harsh industrial environments with ambient temperatures as high as 60°C
- rebooting automatically if the BIOS watchdog timer detects that the system is no longer operating

### 1.1.3 PM-LX-800 Motherboard Features

Some of the PM-LX-800 motherboard features are listed below:

- Complies with RoHS
- Supports AMD™ Geode™ LX 800 CPU
- Supports a maximum front side bus (FSB) speed up to 500MHz
- DDR 333 SO-DIMM SDRAM up to 1GB
- Complete I/O support with IDE, CFII, PCI-104, LAN, and 2 x USB2.0 and 2 x RS-232
- Supports 24-bit TTL LCD

## 1.2 PM-LX-800 Motherboard Overview

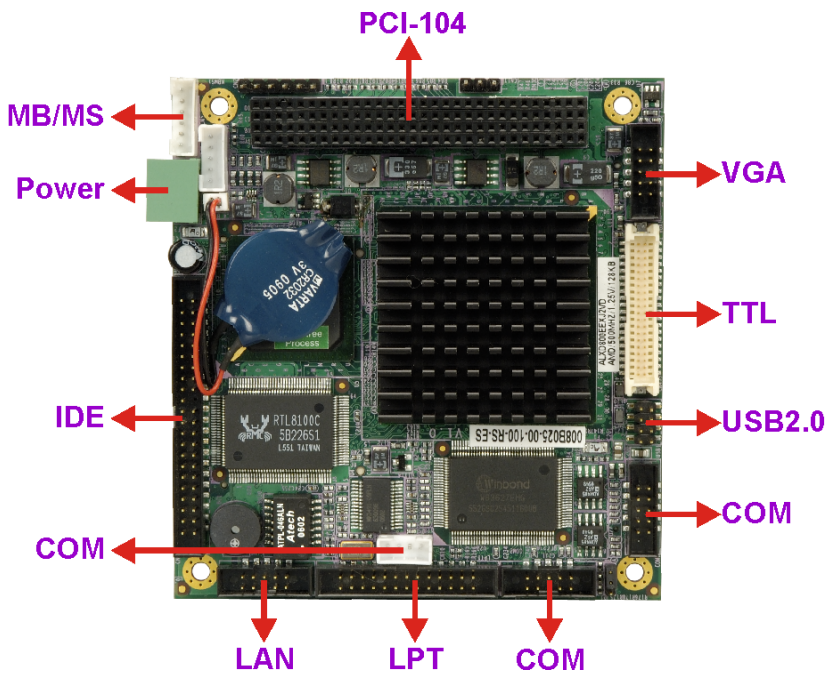


**Figure 1-1: PM-LX-800 Motherboard Overview (Front Side)**

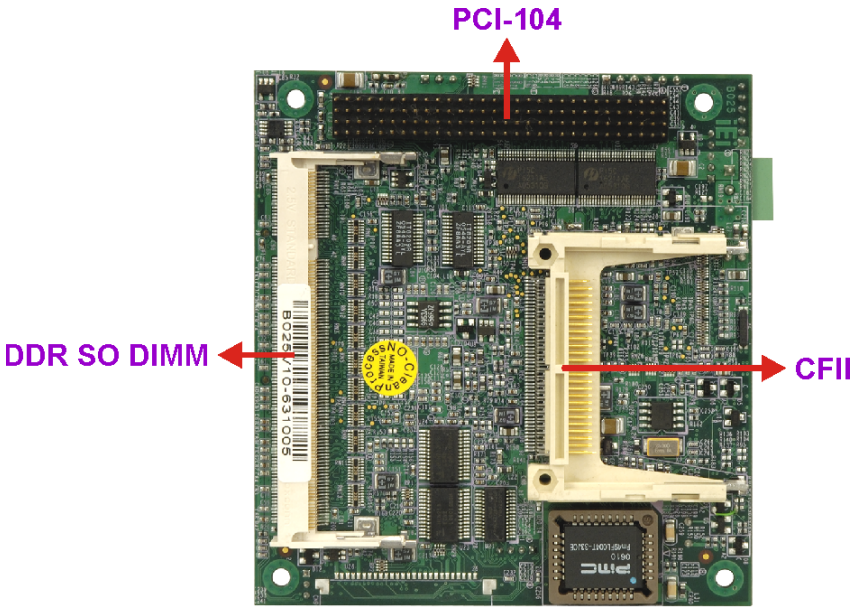


**Figure 1-2: PM-LX-800 Motherboard Overview (Solder Side)**

### 1.2.1 PM-LX-800 Motherboard Connectors

The PM-LX-800 motherboard has the following connectors on-board:

- 1 x AT 12V/5V connector
- 1 x CFII compact flash connector (solder side)
- 1 x DDR SO-DIMM connector (solder side)
- 1 x IDE device connector
- 1 x Inverter connector
- 1 x Keyboard/Mouse connector
- 1 x LAN connector
- 1 x Parallel port connector
- 1 x PCI-104 connector
- 2 x RS-422 connectors
- 1 x RS-485 connector
- 1 x TTL/LCD connector
- 1 x USB connector
- 1 x VGA connector

The location of these connectors on the motherboard can be seen in **Figure 1-1** and **Figure 1-2**. These connectors are fully described in **Chapter 3**.

### 1.2.2 Technical Specifications:

PM-LX-800 motherboard technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2**.

| SPECIFICATION | DESCRIPTION |
|---|---|
| **CPUs Supported** | **AMD™ Geode™ LX 800** |
| **Cache Memory** | **64K I/ 64k D L1 cache, 128K L2 cache** |
| **System Chipset** | **AMD™ CS5536** |
| **I/O Controller** | **AMD™ CS5536** |
| **Memory** | **One 200-pin DDR 333MHz SO-DIMM SDRAM with a maximum size of 1GB.** |
| **PCI Bus Interface** | **Revision 2.2** |
| **Super IO** | **W83627EHG** |

| SPECIFICATION | DESCRIPTION |
|---|---|
| Display | CRT integrated in AMD™ LX 800 |
| TTL | 24 bit TTL integrated in AMD LX 800 |
| HDD Interface | One IDE channel supports two<br>Ultra ATA 100/66/33 devices |
| Power Support | AT power support |
| Power Consumption | +5V @ 1.13A (LX-800, 500MHz, DDR 333, 1GB RAM) |
| Power Management | Supports Advanced Configuration and Power Interface<br>(ACPI) Specifications Revision 2.0 |
| Watchdog Timer | Software programmable supports<br>1~255 sec. system reset |
| Interfaces | 1 x LPT<br>1 x CFII<br>1 x IDE<br>1 x KB/MS<br>1 x LAN<br>1 x LCD Inverter<br>2 x RS-232<br>1 x RS-422/485<br>1 x TTL<br>1 x USB<br>1 x VGA |
| PC/104 Interface | PCI-104 stack through connector |
| Real Time Clock | 256-byte battery backed CMOS RAM |
| Hardware Monitoring | CPU temperature and system voltages |
| Ethernet | 10/100Base-T RTL8100C |
| BIOS | AWARD |
| Physical Dimensions | 90mm x 96mm |
| Operating Temperature | Minimum: 0ºC (32°F)<br>Maximum: 60°C (140°F) |

Table 1-1: Technical Specifications

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Chapter

2

# Detailed Specifications

## 2.1 CPU Support

The PM-LX-800 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
- 1.3W Typical (3.1W TDP) @ 433MHz
- 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 PM-LX-800 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.

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

### 2.2.1 Data Flow

**Figure 2-1** shows the data flow between the system chipset, the CPU and other I/O interfaces that can connect to the PM-LX-800 motherboard.

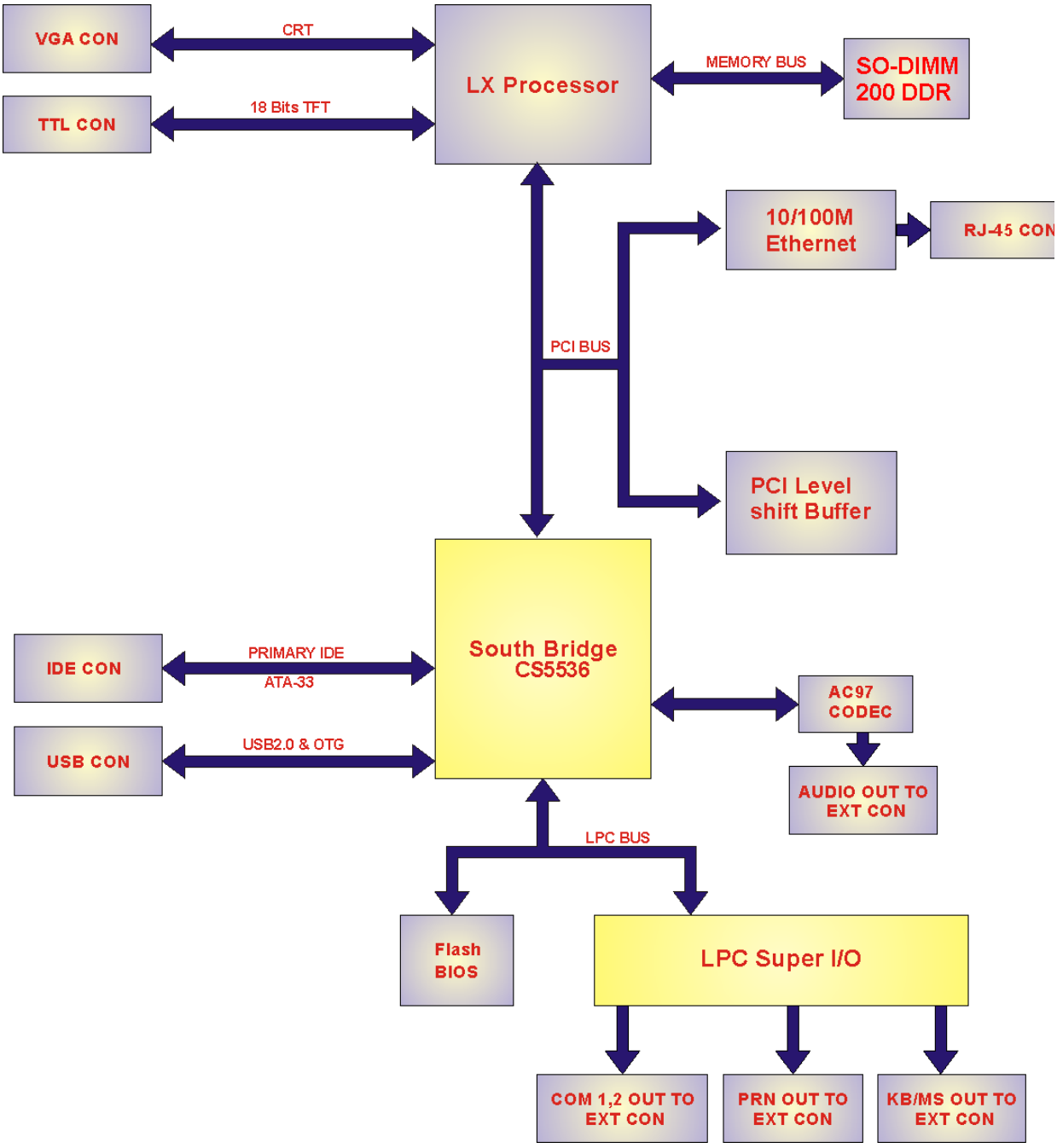


**Figure 2-1: Data Flow Block Diagram**

## 2.3 Graphics Support

**Table 2-1** lists the PM-LX-800 graphics processor features.

| 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) |
| 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 |
| Pattern Fill | Yes |
| Transparent Source | Monochrome |
| Color Key Source Transparency | Y with mask |
| Variable Source Stride | Yes |
| Variable Destination Stride | Yes |
| Destination Write Bursting | Yes |
| Selectable BLT Direction | Vertical and Horizontal |
| Alpha BLT | Yes (constant α, α/pix, or sep. α channel) |
| VGA Support | Decodes VGA Register |
| 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 SO-DIMM SDRAM is supported.

## 2.5 PCI Bus Interface Support

The GeodeLink PCI South Bridge (GLPCI_SB) provides a PCI interface for the Geode CS5536 system chipset. The GLPCI_SB acts as a PCI master or PCI slave in providing PCI transactions to and from the Geode CS5536 system chipset and the PCI bus. A special serial interface to the Geode LX processor, the CPU Interface Serial (CIS) assists in the transfer of information between the Geode CS5536 companion device and the Geode LX processor.

The interface is compliant to PCI specification v2.2 and may operate at up to 66 MHz. Within a PCI burst, zero wait state operation is achieved. The PCI interface supports programmable IDSEL selection, and can handle inbound transactions immediately after system reset.

## 2.6 Ethernet

The Realtek RTL8100C(L) 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). Realtek RTL8100C features are listed below.

- 128-pin PQFP/LQFP (PQFP package pin-to-pin compatible with Realtek RTL8110S-32 Single-Chip Gigabit Ethernet Controller)
- 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
- 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

The PM-LX-800 can support the following drive interfaces:

- 1 x IDE connector supports two IDE devices
- 1 x Compact flash device

The PM-LX-800 is compliant to the ATA-6 specification. The IDE interface supports one channel, that in turn supports two devices that can operate in PIO modes 0 to 4, MDMA modes 0 to 2, or UDMA modes 0 to 5 (up to 100 MB/s).

## 2.8 Serial Ports

The PM-LX-800 CPU Board has three high-speed UART serial ports, configured as COM1, COM2 and CN10. The serial ports have the following specifications.

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

## 2.9 Real Time Clock

256-byte battery backed CMOS RAM

## 2.10 System Monitoring

The PM-LX-800 motherboard is capable of self-monitoring various aspects of its operating status including:

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

## 2.11 BIOS

The PM-LX-800 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 (**P**re-Boot E**x**ecution **E**nvironment ) support
- USB booting support

## 2.12 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the PM-LX-800 motherboard are listed below.

- Minimum Operating Temperature: 0ºC (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.

## 2.13 Power Consumption

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

| Voltage | Current |
|---|---|
| +5V | 1.13A |

**Table 2-2: Power Consumption**

## 2.14 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.

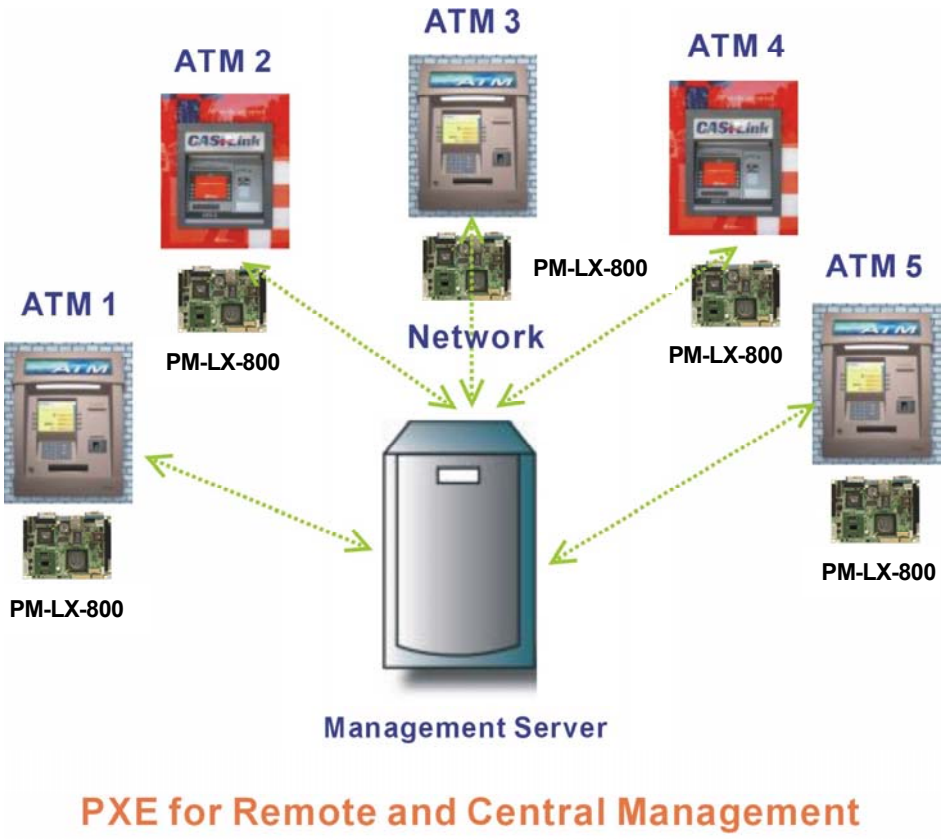


**Figure 2-2: PXE: Pre-Boot Execution Environment**

## 2.15 Packaged Contents and Optional Accessory Items

### 2.15.1 Package Contents

When you unpack the PM-LX-800 motherboard, you should find the following components.

- 1 x PM-LX single board computer
- 1 x Mini jumper pack
- 1 x ATA33 flat cable
- 2 x RS232 cable
- 1 x USB cable
- 1 x VGA cable
- 1 x LAN cable
- 1 x Power cable
- 1 x KB/MS cable
- 1 x Utility CD
- 1 x QIG (quick installation guide)

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Chapter

3

# Connectors and Jumpers

## 3.1 Peripheral Interface Connectors

The locations of the peripheral interface connectors are shown in **Section 3.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 3.1.2**.

### 3.1.1 PM-LX-800 Motherboard Layout

**Figure 3-1** shows the on-board peripheral connectors and jumpers on the front side of the motherboard.

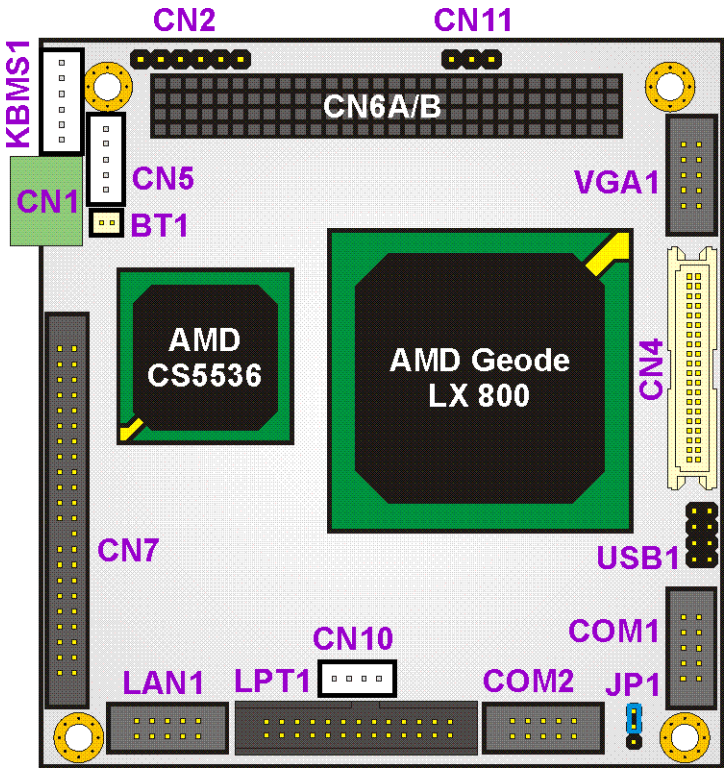



**Figure 3-1: Connector and Jumper Locations (Front Side)**

**Figure 3-2** shows the onboard peripheral connectors on the solder side of the board.

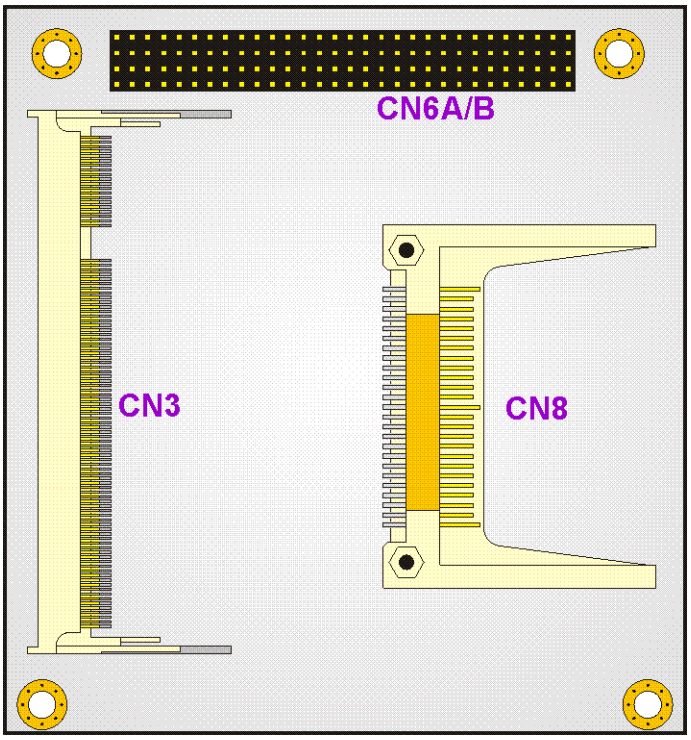



**Figure 3-2: Connector and Jumper Locations (Solder Side)**

### 3.1.2 Peripheral Interface Connectors

**Table 3-1** shows a list of the peripheral interface connectors on the PM-LX-800 motherboard. Detailed descriptions of these connectors can be found in **Section 3.2**.

| Connector | Type | Label |
|---|---|---|
| 12V / 5V Power connector | 3-pin terminal block | CN1 |
| 12V Input connector | 3-pin header | CN11 |
| 200-pin DDR SO-DIMM socket | 200-pin socket | CN3 |
| Battery Connector | 2-pin header | BT1 |
| Compact Flash Type II connector | 50-pin header | CN8 |
| IDE Interface connector | 44-pin header | CN7 |
| Inverter connector | 5-pin header | CN5 |
| Keyboard/Mouse connector | 6-pin header | KBMS1 |
| LAN connector | 10-pin header | LAN1 |
| LED Power connector | 6-pin header | CN2 |
| Parallel Port connector | 26-pin header | LPT1 |

| Connector | Type | Label |
|---|---|---|
| PCI-104 connector | PCI-104 connector | CN6A/B |
| RS-232 Serial Communications connector | 10-pin header | COM1, COM2 |
| RS-422/485 Serial Communications connector | 4-pin header | CN10 |
| TTL LCD connector | 40-pin connector | CN4 |
| USB connector | 6-pin header | USB1 |
| VGA connector | 10-pin header | VGA1 |

Table 3-1: Peripheral Interface Connectors

### 3.1.3 Onboard Jumpers

**Table 3-2** lists the onboard jumper. A detailed description of the jumper can be found in Section **3.3**.

| Connector | Type | Label |
|---|---|---|
| COM3 RS422/RS485 Select | 3-pin header | JP1 |

**Table 3-2: Onboard Jumper**

## 3.2 Internal Peripheral Connectors

Internal peripheral connectors on the motherboard are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the PM-LX-800 motherboard.

### 3.2.1 12V / 5V Power Connector

CN Label: CN1

CN Type: 3-pin terminal block

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

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

The **12V / 5V Power Connector** supplies power to the motherboard.

| PIN | DESCRIPTION |
|---|---|
| 1 | VCC12 |
| 2 | GND |
| 3 | VCC5 |

**Table 3-3: 12V / 5V Power Connector Pinouts**

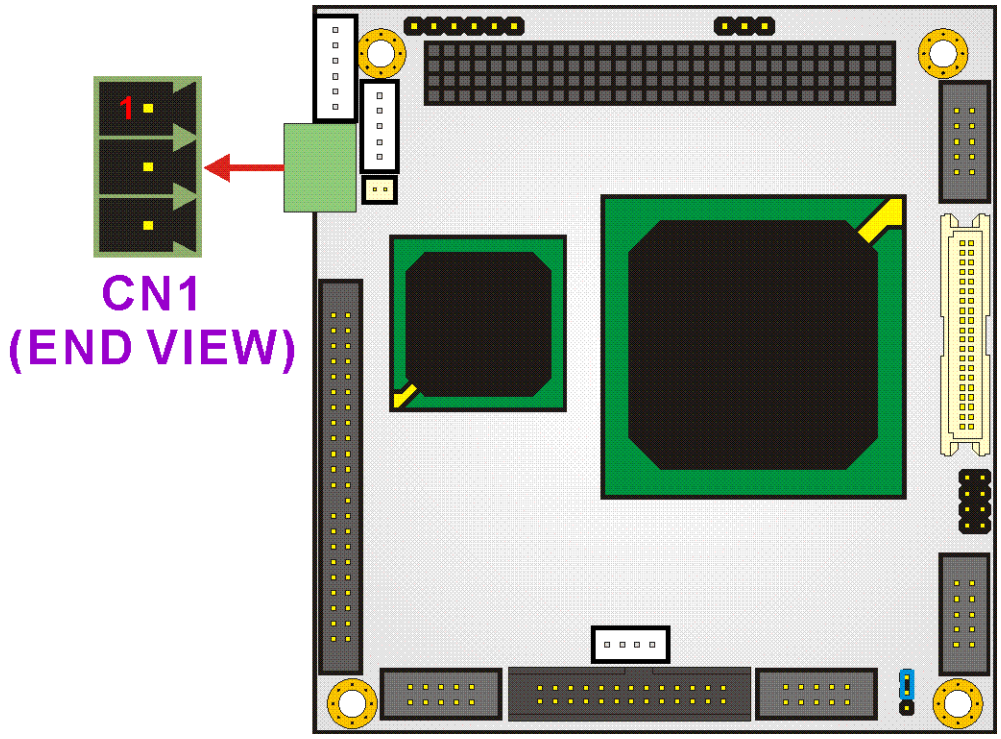



**Figure 3-3: 12V / 5V Power Connector Location**

### 3.2.2 12V Input Connector

CN Label: CN11

CN Type: 3-pin header

CN Pinouts: See Table 3-4

CN Location: See Figure 3-4

The 12V input connector can be used to supply 12V power to the motherboard.

| PIN | DESCRIPTION |
|---|---|
| 1 | N/C |
| 2 | GND |
| 3 | -12V |

**Table 3-4: 12V Input Connector Pinouts**

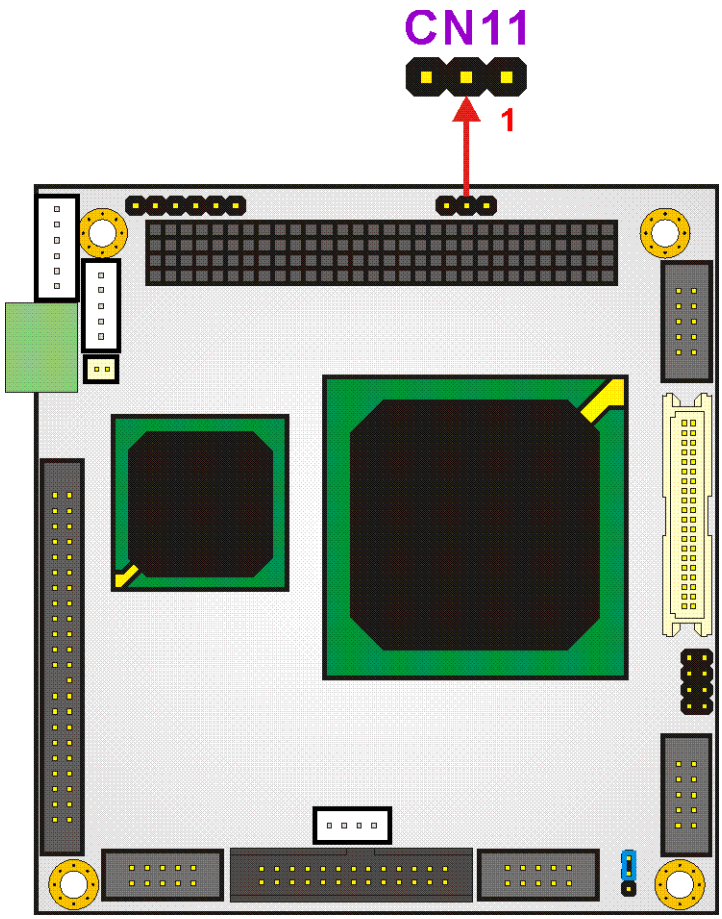



**Figure 3-4: 12V Input Connector Location**

### 3.2.3 200-pin DDR SO-DIMM Socket

CN Label: CN3

CN Type: 200-pin header

CN Pinouts: See **Table 3-5**

CN Location: See **Figure 3-5**

The 200-pin DDR SO-DIMM socket receives a DDR 333 MHz SO-DIMM module.

| Pin | Front | Pin | Back | Pin | Front | Pin | Back |
|---|---|---|---|---|---|---|---|
| 1 | VREF | 2 | VREF | 101 | A9 | 102 | A8 |
| 3 | VSS | 4 | VSS | 103 | VSS | 104 | VSS |
| 5 | DQ0 | 6 | DQ4 | 105 | A7 | 106 | A6 |
| 7 | DQ1 | 8 | DQ5 | 107 | A5 | 108 | A4 |
| 9 | VDD | 10 | VDD | 109 | A3 | 110 | A2 |
| 11 | DQS0 | 12 | DM0\DQS9 | 111 | A1 | 112 | A0 |
| 13 | DQ2 | 14 | DQ6 | 113 | VDD | 114 | VDD |
| 15 | VSS | 16 | VSS | 115 | A10\AP | 116 | BA1 |
| 17 | DQ3 | 18 | DQ7 | 117 | BA0 | 118 | /RAS |
| 19 | DQ8 | 20 | DQ12 | 119 | /WE | 120 | /CAS |
| 21 | VDD | 22 | VDD | 121 | /S0 | 122 | /S1 |
| 23 | DQ9 | 24 | DQ13 | 123 | DU(A13) | 124 | DU(BA2) |
| 25 | DQS1 | 26 | DM1\DQS10 | 125 | VSS | 126 | VSS |
| 27 | VSS | 28 | VSS | 127 | DQ32 | 128 | DQ36 |
| 29 | DQ10 | 30 | DQ14 | 129 | DQ33 | 130 | DQ37 |
| 31 | DQ11 | 32 | DQ15 | 131 | VDD | 132 | VDD |
| 33 | VDD | 34 | VDD | 133 | DQS4 | 134 | DM4\DQS13 |
| 35 | CK0 | 36 | VDD | 135 | DQ34 | 136 | DQ38 |
| 37 | /CK0 | 38 | VSS | 137 | VSS | 138 | VSS |
| 39 | VSS | 40 | VSS | 139 | DQ35 | 140 | DQ39 |
| 41 | DQ16 | 42 | DQ20 | 141 | DQ40 | 142 | DQ44 |
| 43 | DQ17 | 44 | DQ21 | 143 | VDD | 144 | VDD |
| 45 | VDD | 46 | VDD | 145 | DQ41 | 146 | DQ45 |

| Pin | Front | Pin | Back | Pin | Front | Pin | Back |
|---|---|---|---|---|---|---|---|
| 47 | DQS2 | 48 | DM2\DQS11 | 147 | DQS5 | 148 | DM5\DQS14 |
| 49 | DQ18 | 50 | DQ22 | 149 | VSS | 150 | VSS |
| 51 | VSS | 52 | VSS | 151 | DQ42 | 152 | DQ46 |
| 53 | DQ19 | 54 | DQ23 | 153 | DQ43 | 154 | DQ47 |
| 55 | DQ24 | 56 | DQ28 | 155 | VDD | 156 | VDD |
| 57 | VDD | 58 | VDD | 157 | VDD | 158 | /CK1 |
| 59 | DQ25 | 60 | DQ29 | 159 | VSS | 160 | CK1 |
| 61 | DQS3 | 62 | DM3\DQS12 | 161 | VSS | 162 | VSS |
| 63 | VSS | 64 | VSS | 163 | DQ48 | 164 | DQ52 |
| 65 | DQ26 | 66 | DQ30 | 165 | DQ49 | 166 | DQ53 |
| 67 | DQ27 | 68 | DQ31 | 167 | VDD | 168 | VDD |
| 69 | VDD | 70 | VDD | 169 | DQS6 | 170 | DM6\DQS15 |
| 71 | CB0* | 72 | CB4* | 171 | DQ50 | 172 | DQ54 |
| 73 | CB1* | 74 | CB5* | 173 | VSS | 174 | VSS |
| 75 | VSS | 76 | VSS | 175 | DQ51 | 176 | DQ55 |
| 77 | DQS8* | 78 | DM8\DQS17* | 177 | DQ56 | 178 | DQ60 |
| 79 | CB2* | 80 | CB6* | 179 | VDD | 180 | VDD |
| 81 | VDD | 82 | VDD | 181 | DQ57 | 182 | DQ61 |
| 83 | CB3* | 84 | CB7* | 183 | DQS7 | 184 | DM7\DQS16 |
| 85 | DU | 86 | DU(/RESET) | 185 | VSS | 186 | VSS |
| 87 | VSS | 88 | VSS | 187 | DQ58 | 188 | DQ62 |
| 89 | CK2* | 90 | VSS | 189 | DQ59 | 190 | DQ63 |
| 91 | /CK2* | 92 | VDD | 191 | VDD | 192 | VDD |
| 93 | VDD | 94 | VDD | 193 | SDA | 194 | SA0 |
| 95 | CKE1 | 96 | CKE0 | 195 | SCL | 196 | SA1 |
| 97 | DU | 98 | DU | 197 | VDDSPD | 198 | SA2 |
| 99 | A12 | 100 | A11 | 199 | VDDID* | 200 | DU |

Table 3-5: 200-pin DDR SO-DIMM Socket Pinouts

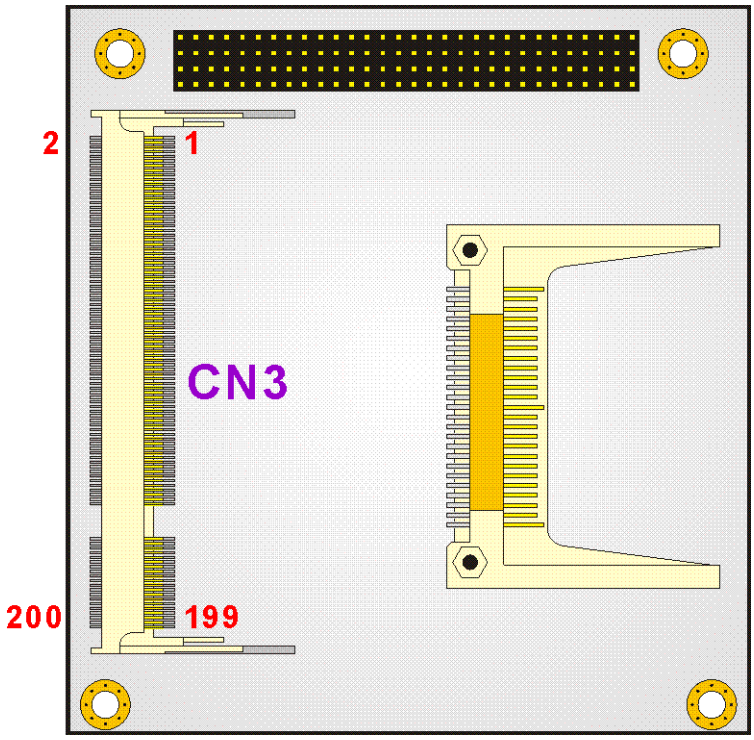



**Figure 3-5: 200-pin DDR SO-DIMM Socket Location**

### 3.2.4 Battery Connector

CN Label: BT1

CN Type: 2-pin header

CN Pinouts: See Table 3-6

CN Location: See Figure 3-6

This battery connector connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032). The life expectancy of the battery is approximately 7 years. Depending on the working condition, the life expectancy may be shorter.

Replacing the battery is not a user operation.

If the battery starts to weaken and lose voltage, contact a vendor or IEI for a replacement module. Dispose of the used battery properly. Contact the local waste disposal agency for disposal instructions. Do not dispose of a used battery with normal household waste.

**WARNING!**

1. Keep batteries away from children.
2. There is a danger of explosion if the battery is incorrectly replaced.
3. Only a certified module from IEI can be used as a replacement.
4. Do not expose the battery to excessive heat or fire.
5. If the battery shows signs of leakage, contact a local vendor or IEI immediately.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | BAT+ | 2 | GND |

**Table 3-6: Battery Connector Pinouts**

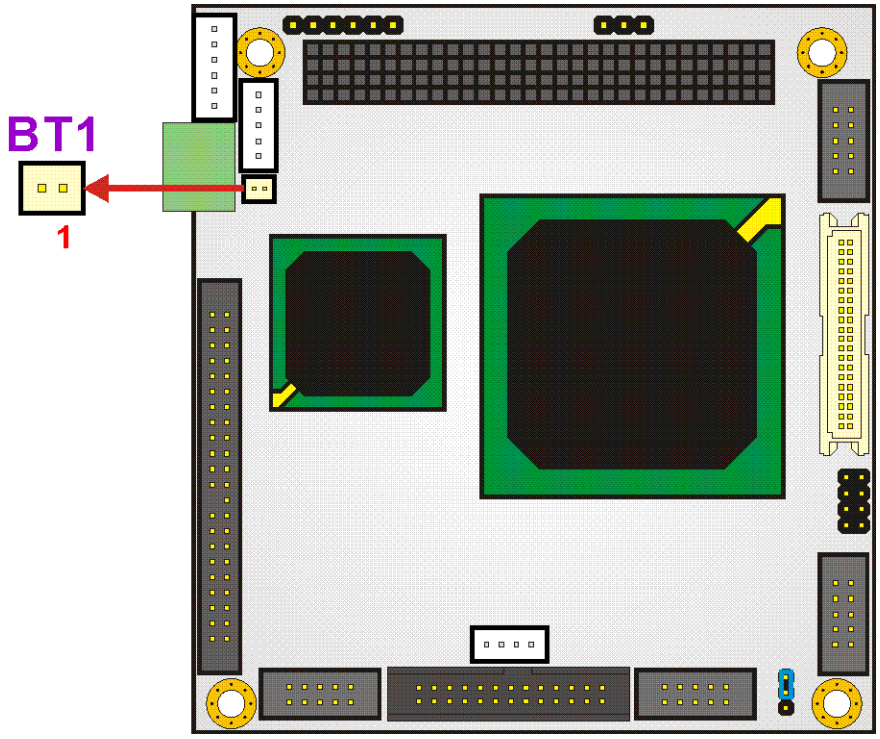



**Figure 3-6: Battery Connector Location**

### 3.2.5 CompactFlash Connector

CN Label: CN8

CN Type: 50-pin header (2x25 pins)

CN Pinouts: See **Table 3-7**

CN Location: See **Figure 3-7**

The CompactFlash connector is used to adapt Type II CompactFlash and CF+ cards for use in Type II (5 mm thick) PCMCIA card slots.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | GND | 26 | GROUND |
| 2 | D03 | 27 | D11 |
| 3 | D04 | 28 | D12 |
| 4 | D05 | 29 | D13 |
| 5 | D06 | 30 | D14 |
| 6 | D07 | 31 | D15 |
| 7 | -CS0 | 32 | -CS1 |
| 8 | (N/C) | 33 | (N/C) |
| 9 | GND | 34 | -IORD |
| 10 | (N/C) | 35 | -IOWR |
| 11 | (N/C) | 36 | -WE |
| 12 | (N/C) | 37 | INTRQ |
| 13 | VCC | 38 | VCC |
| 14 | (N/C) | 39 | -CSEL |
| 15 | (N/C) | 40 | (N/C) |
| 16 | (N/C) | 41 | RESET |
| 17 | (N/C) | 42 | IORDY |
| 18 | A02 | 43 | SDRQ |
| 19 | A01 | 44 | SDACK# |
| 20 | A00 | 45 | -DASP |
| 21 | D00 | 46 | -PDIAG |
| 22 | D01 | 47 | DO8 |

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 23 | D02 | 48 | DO9 |
| 24 | (N/C) | 49 | D10 |
| 25 | GROUND | 50 | GND |

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

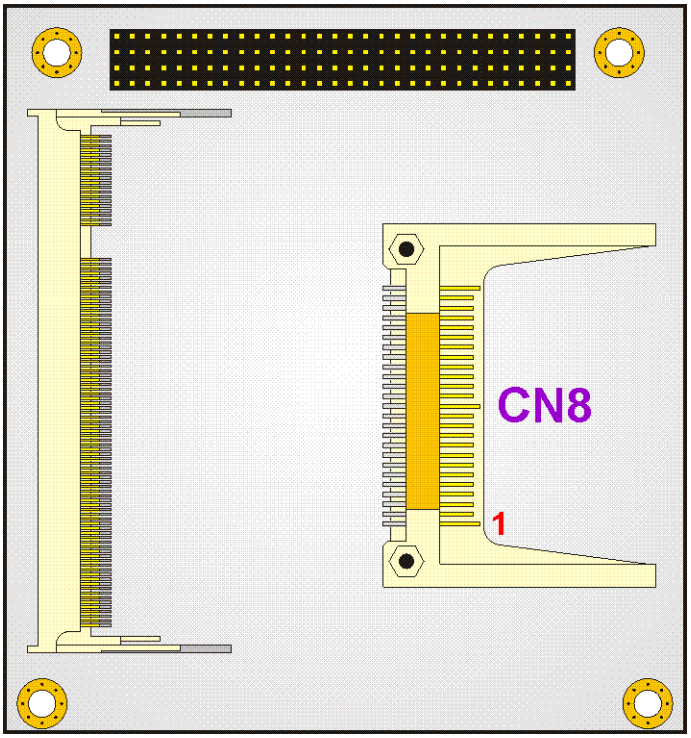



**Figure 3-7: Compact Flash Connector Location**

### 3.2.6 IDE Interface Connector

| | |
|---|---|
| CN Label: | CN7 |
| CN Type: | 44-pin header (2x22 pins) |
| CN Pinouts: | See able 3-8 |
| CN Location: | See **Figure 3-8** |

The IDE Interface connector provides connectivity for two IDE devices.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | RESET# | 2 | GND |
| 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 | GND | 20 | N/C |
| 21 | IDE DRQ | 22 | GND |
| 23 | IOW# | 24 | GND |
| 25 | IOR# | 26 | GND |
| 27 | IDE CHRDY | 28 | GND |
| 29 | IDE DACK# | 30 | GND |
| 31 | INTERRUPT | 32 | N/C |
| 33 | SA 1 | 34 | IDE CABLEID |
| 35 | SA 0 | 36 | SA 2 |
| 37 | HDC CS0# | 38 | HDC CS1# |
| 39 | HDD ACTIVE# | 40 | GND |
| 41 | VCC | 42 | VCC |
| 43 | GND | 44 | N/C |

able 3-8: IDE Interface Connector Pinouts

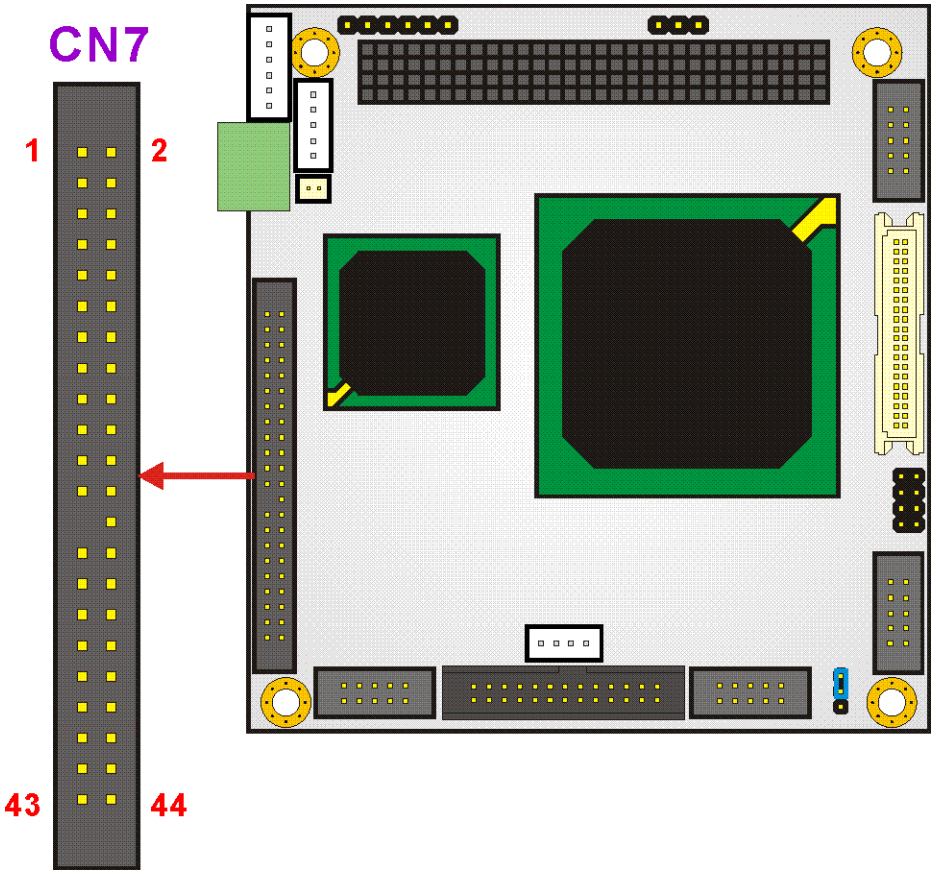



**Figure 3-8: IDE Interface Connector Location**

### 3.2.7 Inverter Connector

| | |
|---|---|
| CN Label: | CN5 |
| CN Type: | 5-pin header |
| CN Pinouts: | See **Table 3-9** |
| CN Location: | See **Figure 3-9** |

The Inverter connector connects to the LCD backlight.

| PIN | DESCRIPTION |
|---|---|
| 1 | LCD_BKLTCTL |
| 2 | GND |
| 3 | VCC12 |
| 4 | GND |
| 5 | LCD_BKLEN |

**Table 3-9: Inverter Connector Pinouts**

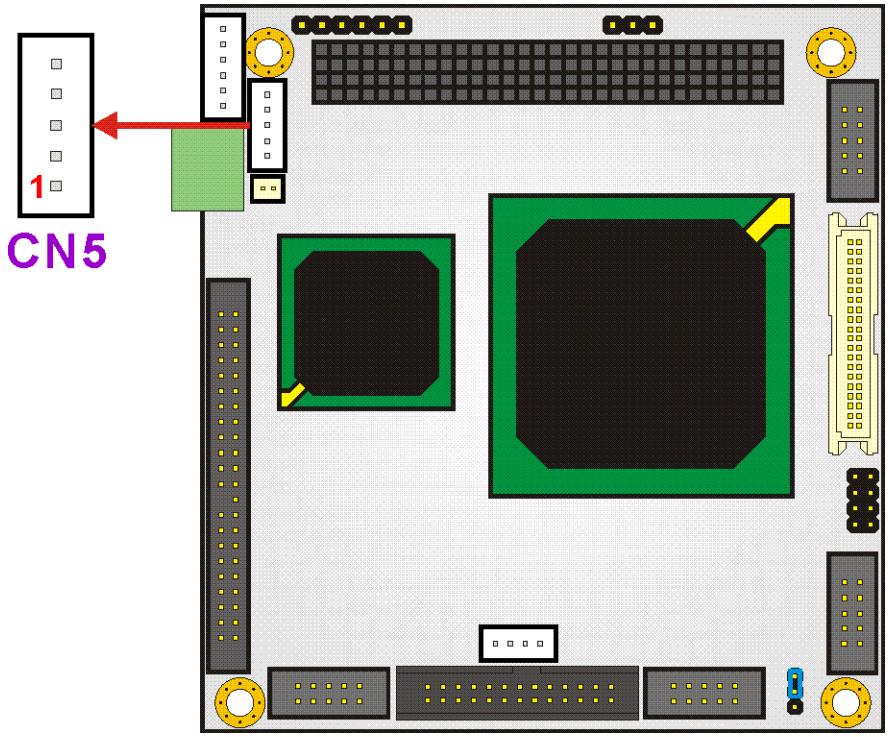



**Figure 3-9: Inverter Connector Location**

### 3.2.8 Keyboard/Mouse Connector

CN Label: KBMS1

CN Type: 6-pin header

CN Pinouts: See **Table 3-10**

CN Location: See **Figure 3-10**

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

| PIN | DESCRIPTION |
|---|---|
| 1 | VCC5 |
| 2 | MOUSE DATA |
| 3 | MOUSE CLOCK |
| 4 | KEYBOARD DATA |
| 5 | KEYBOARD CLOCK |
| 6 | GND |

**Table 3-10: Keyboard/Mouse Connector Pinouts**

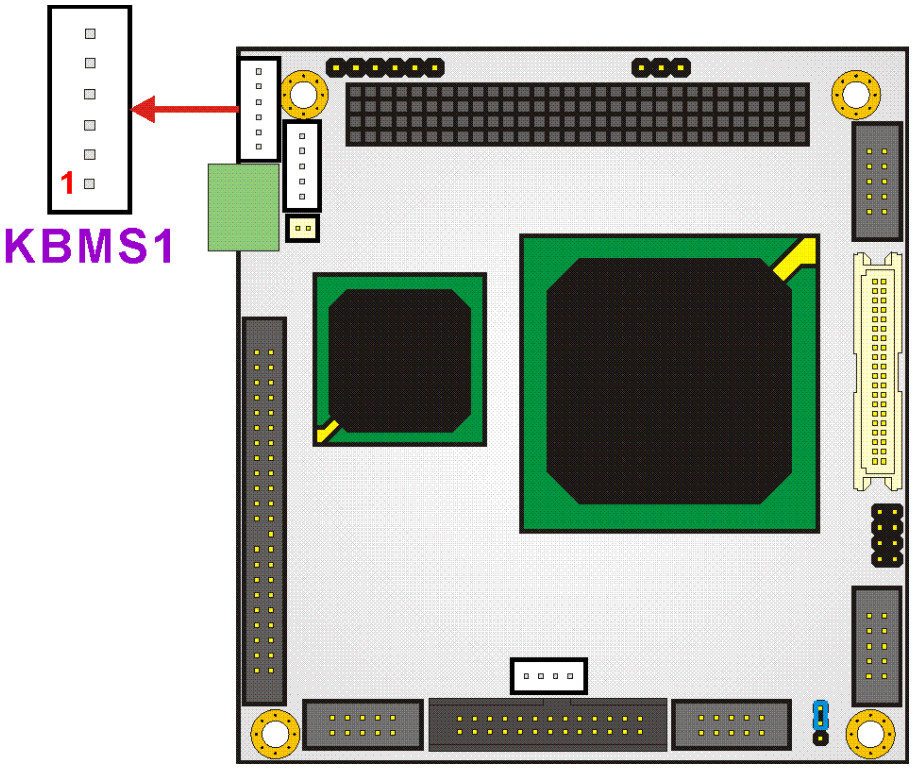



**Figure 3-10: Keyboard/Mouse Connector Location**

### 3.2.9 LAN Connector

| | |
|---|---|
| CN Label: | LAN1 |
| CN Type: | 10-pin header (2x5 pins) |
| CN Pinouts: | See Table 3-11 |
| CN Location: | See Figure 3-11 |

Use the LAN connector to connect to a LAN.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | VCC3.3 | 6 | ACTIVE |
| 2 | RX+ | 7 | RX- |
| 3 | LINK | 8 | GND |
| 4 | N/C | 9 | GND |
| 5 | TX+ | 10 | TX- |

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

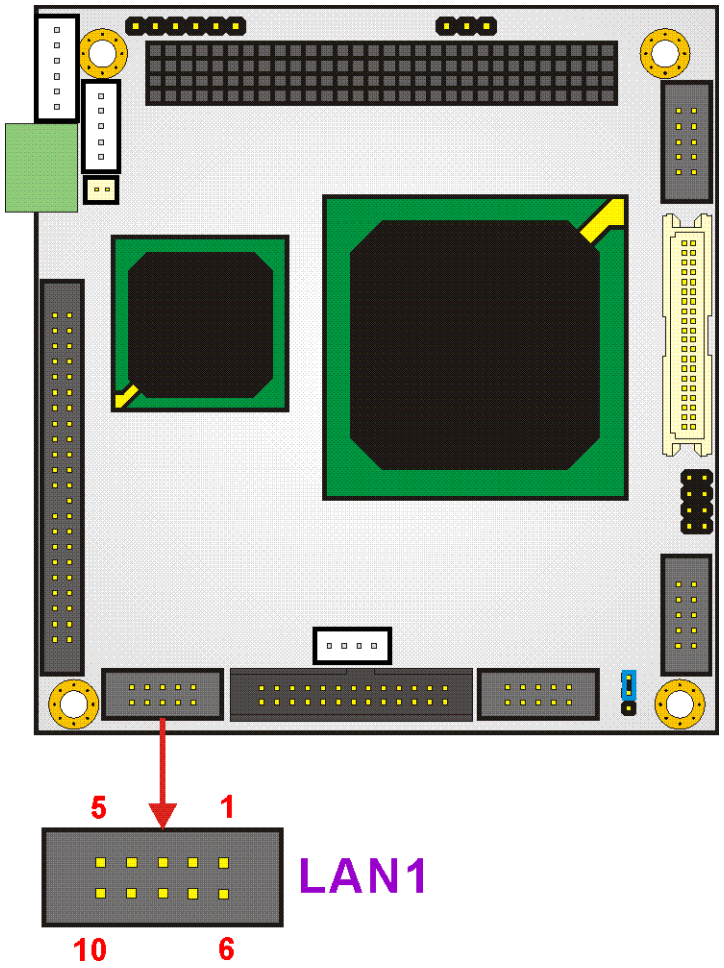



**Figure 3-11: LAN Connector Location**

### 3.2.10 LED Power Connector

CN Label: CN2

CN Type: 6-pin header

CN Pinouts: See Table 3-12

CN Location: See Figure 3-12

The LED power connector provides the connectivity to the power and hard drive activity LEDs on the chassis front panel. An adapter cable is required.

| PIN | DESCRIPTION |
|---|---|
| 1 | RESET 1 |
| 2 | RESET 2 |
| 3 | VCC5 LED+ |
| 4 | GND |
| 5 | HDD LED+ |
| 6 | HDD LED- |

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

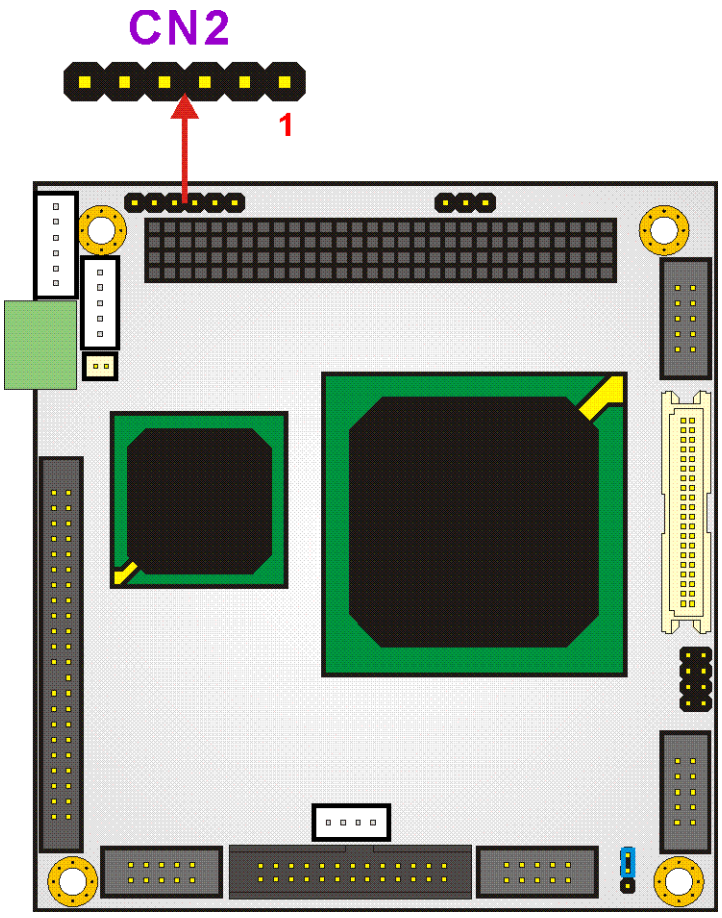



**Figure 3-12: LED Power Connector Location**

### 3.2.11 Parallel Port Connector

| | |
|---|---|
| CN Label: | LPT1 |
| CN Type: | 26-pin header (2x13 pins) |
| CN Pinouts: | See **Table 3-13** |
| CN Location: | See **Figure 3-13** |

The parallel port connector connects to a printer. The PM-LX-800 comes with a multi-mode (ECP/EPP/SPP) parallel port. The CN20 parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is preferred. The parallel 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.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | STROBE# | 14 | AUTO FORM FEED # |
| 2 | DATA 0 | 15 | ERROR# |
| 3 | DATA 1 | 16 | INITIALIZE |
| 4 | DATA 2 | 17 | PRINTER SELECT LN# |
| 5 | DATA 3 | 18 | GROUND |
| 6 | DATA 4 | 19 | GROUND |
| 7 | DATA 5 | 20 | GROUND |
| 8 | DATA 6 | 21 | GROUND |
| 9 | DATA 7 | 22 | GROUND |
| 10 | ACKNOWLEDGE | 23 | GROUND |
| 11 | BUSY | 24 | GROUND |
| 12 | PAPER EMPTY | 25 | GROUND |
| 13 | PRINTER SELECT | 26 | N/C |

**Table 3-13: Parallel Port Connector Pinouts**

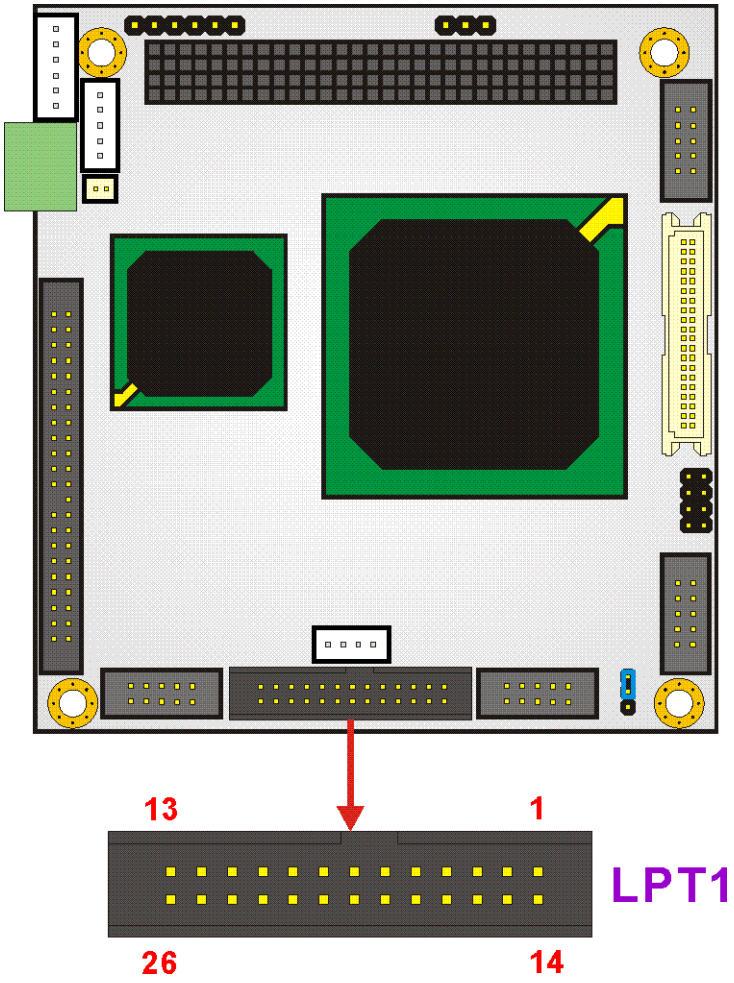



**Figure 3-13: Parallel Port Connector Location**

### 3.2.12 PCI-104 Connector

| | |
|---|---|
| CN Label: | CN6A/B |
| CN Type: | PCI-104 connector |
| CN Pinouts: | See Table 3-14 |
| CN Location: | See **Figure 3-14** |

Use the PCI-104 connector to add auxiliary boards using stack-through connectors.

| Pin | A | B | C | D |
|---|---|---|---|---|
| 1 | GROUND | NC/SERIRQ | +5V | AD0 |
| 2 | VIO | AD2 | AD1 | +5V |
| 3 | AD5 | GND | AD4 | AD3 |
| 4 | CBE0- | AD7 | GND | AD6 |
| 5 | GND | AD9 | AD8 | GND |
| 6 | AD11 | VIO | AD10 | N66EV |
| 7 | AD14 | AD13 | GND | AD12 |
| 8 | +3.3V | CBE1- | AD15 | +3.3V |
| 9 | SERR- | GND | SBO- | PAR |
| 10 | GND | PERR- | +3.3V | SDONE |
| 11 | STOP- | +3.3V | LOCK- | GND |
| 12 | +3.3V | TRDY- | GND | DEVSEL- |
| 13 | FRAME- | GND | IRDY- | +3.3V |
| 14 | GND | AD16 | +3.3V | CBE2- |
| 15 | AD18 | +3.3V | AD17 | GND |
| 16 | AD21 | AD20 | GND | AD19 |
| 17 | +3.3V | AD23 | AD22 | +3.3V |
| 18 | IDSEL0 | GND | IDSEL1 | IDSEL2 |
| 19 | AD24 | CBE3- | VIO | IDSEL3 |
| 20 | GND | AD26 | AD25 | GND |
| 21 | AD29 | +5V | AD28 | AD27 |
| 22 | +5V | AD30 | GND | AD31 |
| 23 | REQ0- | GND | REQ1- | VIO |
| 24 | GND | REQ2- | +5V | GNT0- |
| 25 | GNT1- | VIO | GNT2- | GND |
| 26 | +5V | PCICLK0 | GND | PCICLK1 |
| 27 | PCICLK2 | +5V | PCICLK3 | GND |
| 28 | GND | INTD- | +5V | PCIRST- |
| 29 | +12V | INTA- | INTB- | INTC- |
| 30 | -12v | REQ3- | GNT3- | GND/3.3V |

Table 3-14: PCI-104 Connector Pinouts

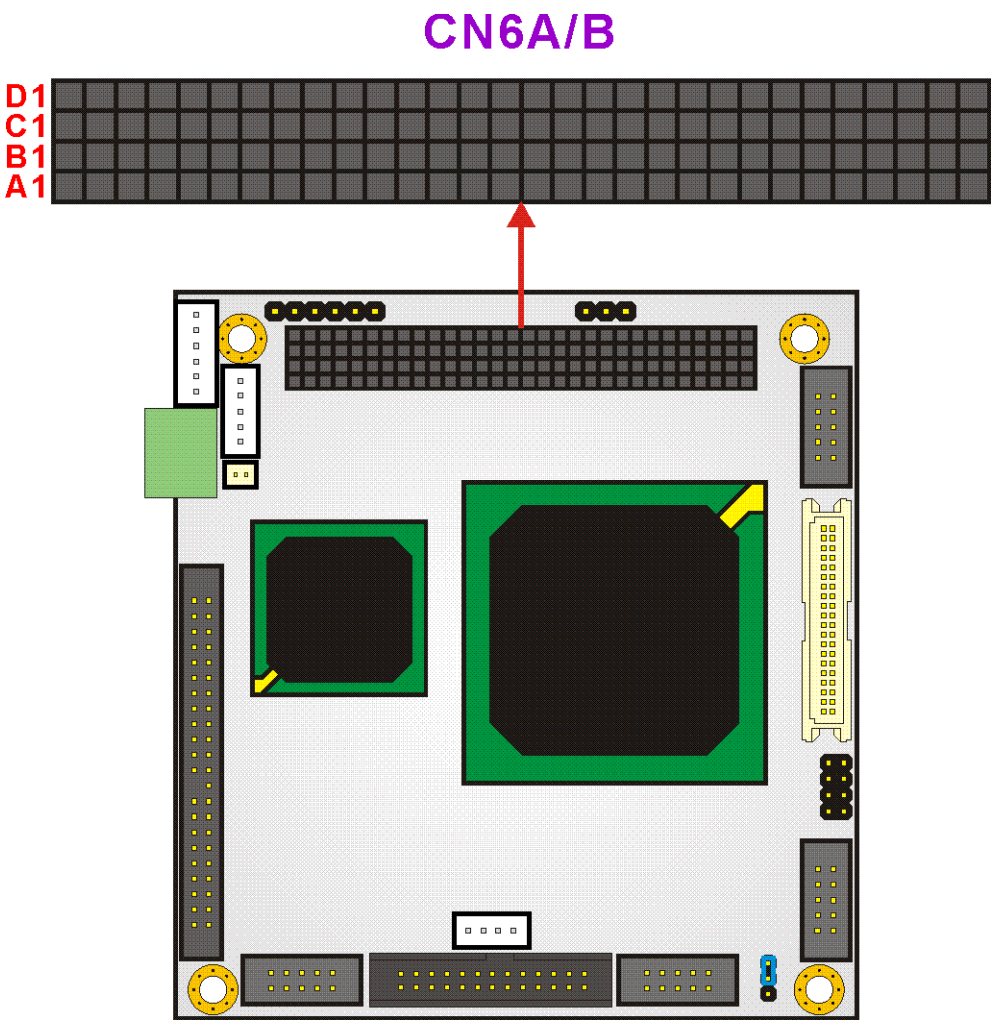



**Figure 3-14: PCI-104 Connector Location**

### 3.2.13 RS-232 Serial Communications Connector

| | |
|---|---|
| CN Label: | COM1, COM2 |
| CN Type: | 10-pin headers (2x5 pins) |
| CN Pinouts: | See **Table 3-15** |
| CN Location: | See **Figure 3-15** |

The PM-LX-800 offers two ten-pin headers for RS-232 serial connections.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | DCD# | 6 | DSR# |
| 2 | RX | 7 | RTS# |
| 3 | TX | 8 | CTS# |
| 4 | DTR# | 9 | RI# |
| 5 | GND | 10 | GND |

**Table 3-15: RS-422 Serial Communications Connector Pinouts**

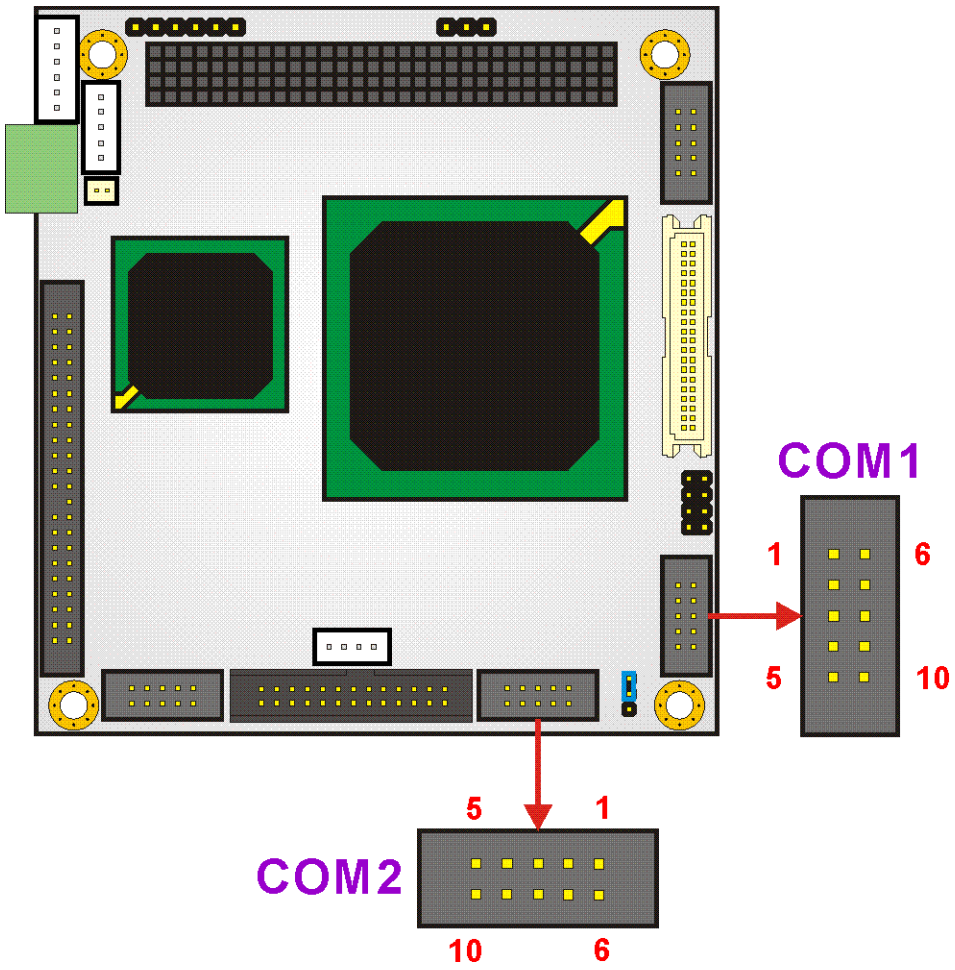



**Figure 3-15 RS-232 Serial Communications Connector Locations**

### 3.2.14 RS-422/485 Serial Communications Connector

CN Label: CN10

CN Type: 4-pin header

CN Pinouts: See Table 3-16

CN Location: See Figure 3-16

The PM-LX-800 offers one four-pin header for RS-485 serial connection.

| PIN | DESCRIPTION |
|---|---|
| 1 | RDX485- |
| 2 | RDX485+ |
| 3 | TXD485+ |
| 4 | TXD485- |

**Table 3-16: RS-422/485 Serial Communications Connector Pinouts**

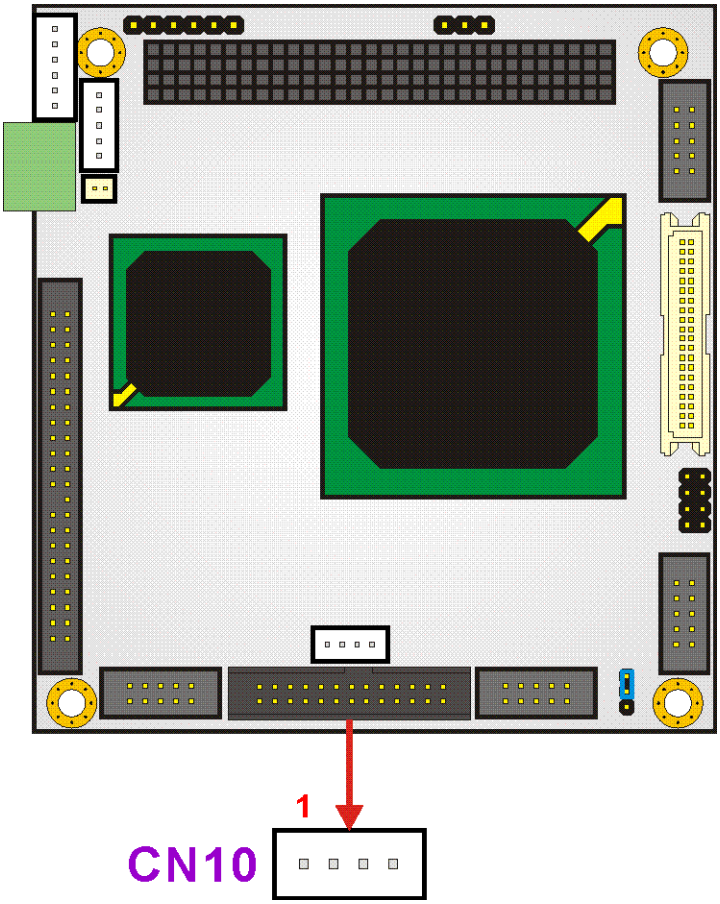



**Figure 3-16 RS-422/485 Serial Communications Connector Locations**

### 3.2.15 TTL LCD Connector

CN Label: CN4

CN Type: 40-pin headers (2x20 pins)

CN Pinouts: See Table 3-17

CN Location: See Figure 3-17

TTL LCD (24-bit one channel; DF13-40DP-1.25V )

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 2 | LCDVCC5 | 1 | LCDVCC5 |
| 4 | GND | 3 | GND |
| 6 | LCDVCC3 | 5 | LCDVCC3 |

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 8 | GND | 7 | N/C |
| 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 | FPCLK |
| 38 | HSYNC | 37 | DISPEN |
| 40 | LCDEN | 39 | N/C |

Table 3-17: TTL LCD Connector Pinouts

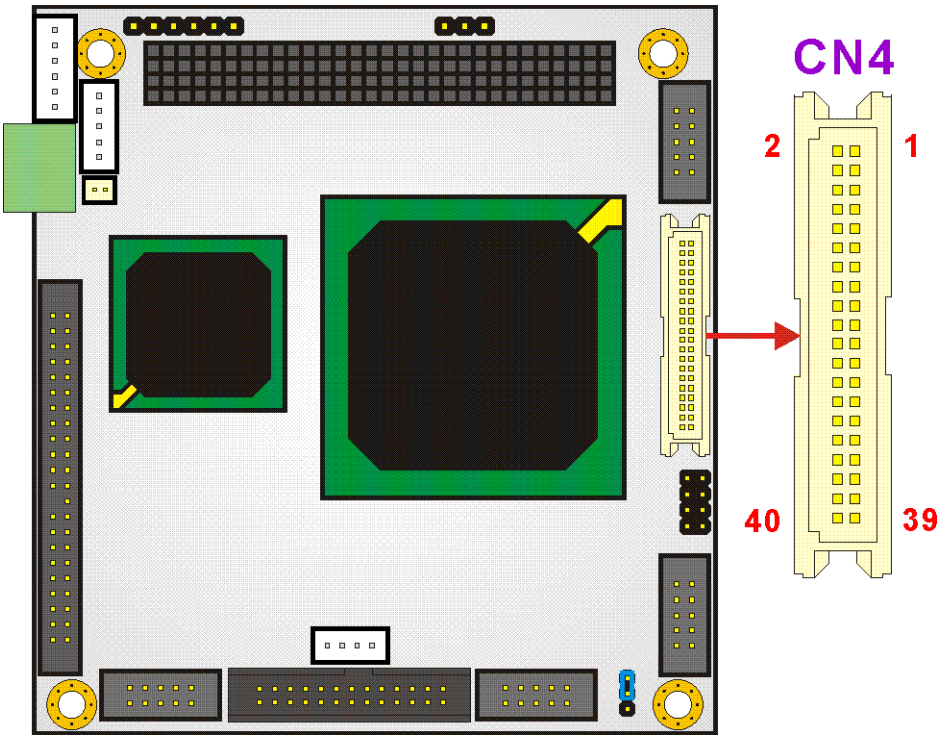



**Figure 3-17 TTL LCD Connector Locations**

### 3.2.16 USB Connector

| | |
|---|---|
| CN Label: | USB1 |
| CN Type: | 8-pin header (2x4 pins) |
| CN Pinouts: | See Table 3-18 |
| CN Location: | See Figure 3-18 |

An 8-pin header provide connectivity to two USB 2.0 ports. The USB ports are used for I/O bus expansion.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | USBVCC1 | 2 | GND |
| 3 | D1F- | 4 | D2F+ |
| 5 | D1F+ | 6 | D2F- |
| 7 | GND | 8 | USBVCC1 |

**Table 3-18: USB Connector Pinouts**

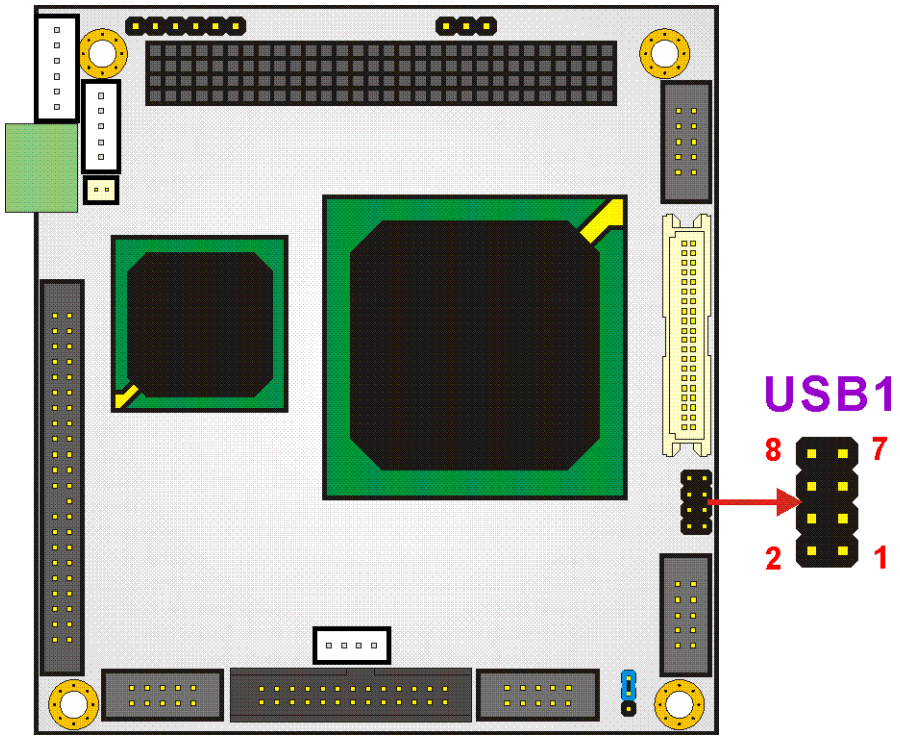



**Figure 3-18 USB Connector Locations**

### 3.2.17 VGA Connector

CN Label: VGA1

CN Type: 10-pin headers (2x5 pins)

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

CN Location: See **Figure 3-19**

The VGA1 connector is an internal VGA connector.

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|---|---|---|---|
| 1 | RED | 6 | DDCCLK |
| 2 | GREEN | 7 | DDCDAT |
| 3 | BLUE | 8 | GROUND |
| 4 | HSYNC | 9 | GROUND |
| 5 | VSYNC | 10 | GROUND |

**Table 3-19: VGA Connector Pinouts**

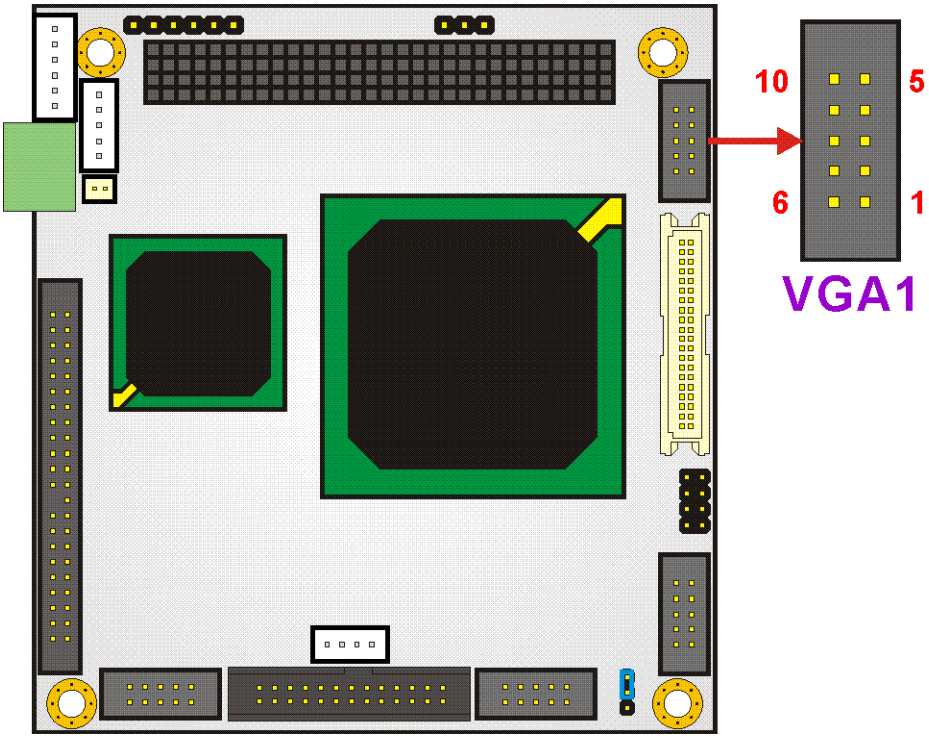



**Figure 3-19 VGA Connector Location**

## 3.3 Onboard Jumpers

**NOTE:**

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three 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.

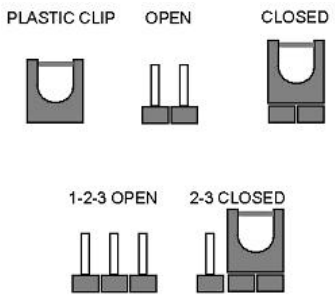



**Figure 3-20: Jumper Locations**

The PM-LX-800 CPU Board has one onboard jumper (**Table 3-2**).

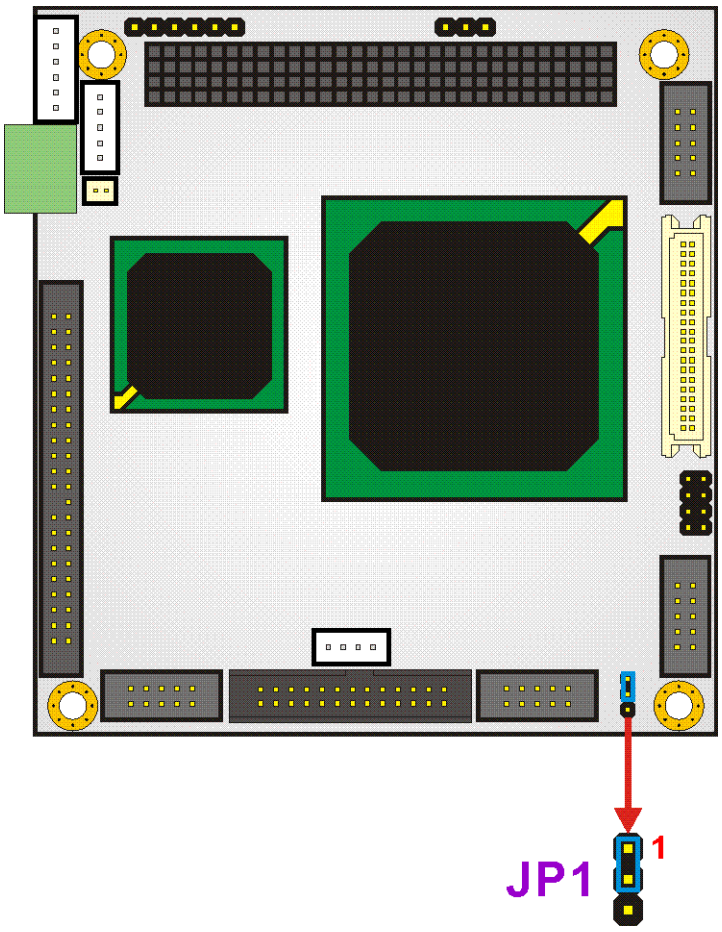



**Figure 3-21: Jumper Locations**

**NOTE:**

The PM-LX-800 does not provide a “Clear CMOS” configuration jumper. If the system fails to boot due to improper BIOS settings, reset the CMOS contents by disconnecting and reconnecting the BT1 battery connector. Use small-sized needle nose pliers to carefully disconnect and reconnect the BT1 battery connector.

### 3.3.1 COM3 RS422/RS485 Select Jumper

Jumper Label: JP1

Jumper Type: 3-pin header

Jumper Location: See Figure 3-21

Jumper Settings: See **Table 3-20**

The **COM3 RS422/RS485 Select** jumper sets the COM3 connector type to RS-422 or RS-485.

| JP1 | Description |
|---|---|
| 1-2 | UART-2 RxD Signal connect to RS-422 (Default) |
| 2-3 | UART-2 RxD Signal connect to RS-485 |

**Table 3-20: COM3 RS422/RS485 Select Jumper Settings**

Chapter

4

# Installation and Configuration

## 4.1 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.

### 4.1.1 Installation Notices

Before and during the installation of the PM-LX-800 motherboard:

- Read the user manual
  - The user manual provides a complete description of the PM-LX-800 motherboard, installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD)
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff will remove ESD from your body and help to prevent ESD damage.
- Place the motherboard on an antistatic pad
  - When installing or configuring the motherboard, place it on an antistatic pad. This will help to prevent potential ESD damage.
- Turn off all power to the PM-LX-800 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 and during the installation of the PM-LX-800 motherboard, **DO NOT**:

- Remove any of the stickers from the PCB. These stickers are required for warranty validation.
- Use the product before you have verified that all cables and power connectors are properly connected.
- Allow screws to contact the PCB, connector pins, or its components.

## 4.2 Unpacking

**NOTE:**

If any of the items listed below are missing when the PM-LX-800 motherboard is unpacked, do not proceed with the installation and contact the reseller or vendor from whom the motherboard was purchased.

### 4.2.1 Unpacking Precautions

Unpack the PM-LX-800 motherboard before installing it. Some components on the PM-LX-800 are very sensitive to static electricity and can be damaged by a sudden rush of power. Follow these precautions to protect the motherboard from damage:

- Ground yourself to remove any static charge before touching the motherboard by wearing a grounded wrist strap at all times or by frequently touching any conducting material that is connected to the ground.
- Handle the motherboard 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.

### 4.2.2 Checklist

Please ensure the package contains the following items.

- 1 x PM-LX single board computer
- 1 x Mini jumper pack
- 1 x ATA33 flat cable
- 2 x RS232 cable
- 1 x USB cable
- 1 x VGA cable
- 1 x LAN cable
- 1 x Power cable
- 1 x KB/MS cable
- 1 x Utility CD
- 1 x QIG

If any of these items are missing, please contact the motherboard reseller or vendor and do not proceed any further with the installation.

## 4.3 PM-LX-800 CPU Board Installation

**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 or installing the motherboard onto the baseboard, always take anti-static precautions 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:**

The PM-LX-800 motherboard has a preinstalled AMD CPU.

- SO-DIMM module
- Mount the motherboard onto a baseboard

### 4.3.1 DIMM Module Installation

#### 4.3.1.1 Purchasing the Memory Module

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

- The maximum SO-DIMM capacity supported is 1GB
- The maximum SO-DIMM frequency supported is 333 MHz.
- The SO-DIMM chip must be a 200-pin memory chip

#### 4.3.1.2 SO-DIMM Module Installation

The PM-LX-800 motherboard has one 200-pin SO-DIMM socket. To install the SO-DIMM module, follow the instructions below.

**Step 1:** Turn the PM-LX-800 over so that the SO-DIMM socket is facing up.

**Step 2:** Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

**Step 3:** Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM module down. (See **Figure 4-1**)

**Step 4:** Release the arms of the SO-DIMM socket. They clip into place and secure the SO-DIMM module in the socket.

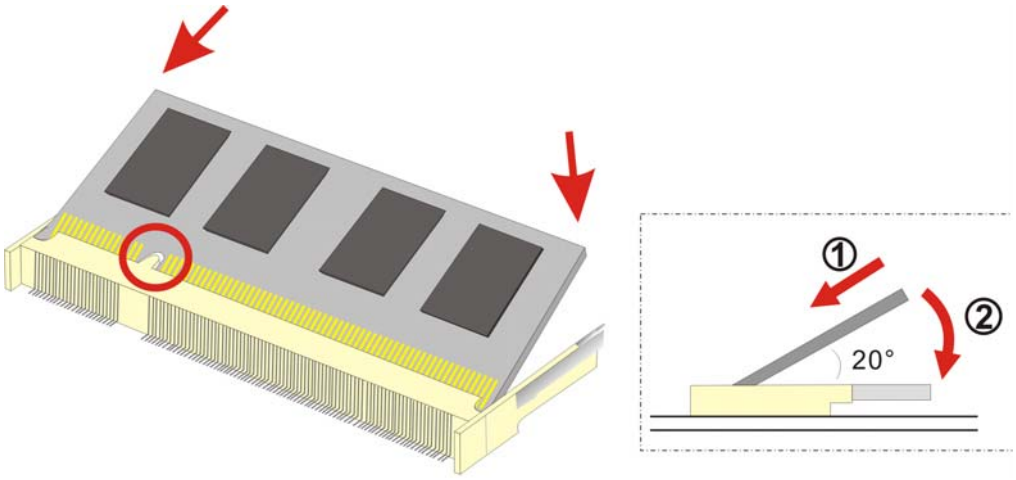



**Figure 4-1: SO-DIMM Module Installation**

### 4.3.2 Compact Flash Disk Installation

When appropriately formatted, a CompactFlash disk can serve as a bootable hard drive in applications where installation space is limited. The CompactFlash card occupies a secondary IDE channel. Configuration options can be found through the BIOS configuration utility. Follow the instructions below to connect a CompactFlash disk to the motherboard.

**Step 1:** Turn the PM-LX-800 over so that the CompactFlash socket is facing up.

**Step 2:** Gently push the CompactFlash chip into the socket until it clicks into place.

### 4.3.3 Peripheral Device Connection

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

| Quantity | Type |
|---|---|
| 1 | ATA33 flat cable |
| 1 | KB/MS cable |
| 2 | RS232 cable |

| Quantity | Type |
|---|---|
| 1 | USB cable |
| 1 | VGA cable |
| 1 | LAN cable |
| 1 | Power cable |

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

### 4.3.4 IDE Disk Drive Installation

The cable used to connect the motherboard to the IDE HDD is a standard 44-pin ATA33 flat cable. To connect an IDE HDD to the motherboard, follow the instructions below.

**Step 1:** Find the ATA33 flat cable in the kit that came with the motherboard.

**Step 2:** Connect one end of the cable to the IDE1 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 end of the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.

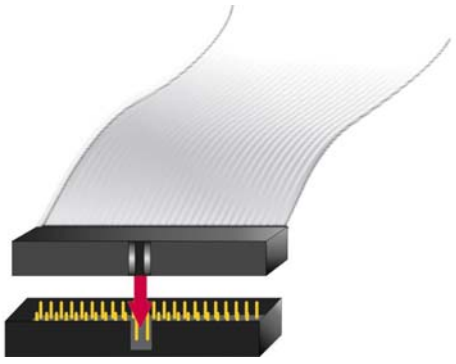


**Figure 4-2: Connection of IDE Connector**

### 4.3.5 Chassis LED Installation

To connect the chassis LED to the motherboard, follow the instructions below.

**Step 1:** Connect the 6-pin connector end of an LED cable to the CN2 pin header on the motherboard. Be sure to align the red wire on the connector to pin 1 on the header.

### 4.3.6 COM1/COM2 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 cables in the kit that came with the motherboard.

**Step 2:** Connect the 10-pin connector end of the cables to the COM1 and COM2 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.

### 4.3.7 COM3 RS-422/485 Serial Port Installation

To connect an RS-422/485 serial port to the motherboard, follow the instructions below.

**Step 1:** Connect the 4-pin connector end of an RS-422/485 serial port cable to the CN10 header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

**NOTE:**

Be sure to configure the JP1 COM3 RS422/RS485 Select Jumper for either an RS-422 or RS-485 connection. Refer to **Section 0** for more information.

### 4.3.8 Keyboard/Mouse Installation

The cable used to connect the motherboard to a keyboard or mouse is a 6-pin header to PS/2 cable connector. To connect a keyboard or mouse to the motherboard, follow the instructions below.

**Step 1:** Find the KB/MS cable in the kit that came with the motherboard.

**Step 2:** Connect the 6-pin connector end of the cable to the KBMS1 header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

**Step 3:** Connect the other side of the cable to a keyboard and/or mouse using a standard PS/2 connector.

### 4.3.9 LAN Installation

The cable used to connect the motherboard to a LAN is a 10-pin header to RJ-45 connector. To connect a LAN to the motherboard, follow the instructions below.

**Step 1:** Find the LAN cable in the kit that came with the motherboard.

**Step 2:** Connect the 10-pin connector end of the cable to the LAN1 box header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

**Step 3:** Connect the other end of the cable to a standard RJ-45 connector.

### 4.3.10 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 CN5 header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

### 4.3.11 LPT Port Installation

To connect an LPT port to the motherboard, follow the instructions below.

**Step 1:** Connect the 26-pin connector end of an LPT printer cable to the LPT1 header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

### 4.3.12 Power Connection

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

**Step 1:** Find the power cable in the kit that came with the motherboard.

**Step 2:** Connect the 3-pin terminal block connector end of the cable to the CN1 terminal block on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

**Step 3:** Connect the other end of the cable to a power supply.

### 4.3.13 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 CN4 miniature crimping connector on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

### 4.3.14 USB Port Installation

The cable used to connect the motherboard to a USB port is an 8-pin header to USB connector. To connect a USB port to the motherboard, follow the instructions below.

**Step 1:** Find the USB cable in the kit that came with the motherboard.

**Step 2:** Connect the 8-pin connector end of the cable to the USB1 header on the motherboard. Be sure to align the red wire on the connector to pin 1 on the header.

**Step 3:** Connect the other end of the cable to standard USB connectors.

### 4.3.15 VGA Port Installation

The cable used to connect the motherboard to a VGA port is a 10-pin header to female HD-D-sub 15 connector. To connect a VGA port to the motherboard, follow the instructions below.

**Step 1:** Find the VGA cable in the kit that came with the motherboard.

**Step 2:** Connect the 10-pin connector end of the cable to the VGA1 box header on the motherboard. A keyed pin on the connector prevents it from being connected incorrectly.

**Step 3:** Connect the other end of the cable to standard male HD-D-sub 15 VGA connector.

### 4.3.16 Mounting the PM-LX-800 Motherboard

The PM-LX-800 motherboard has a standard PCI-104 connector on the front side. Baseboards can be designed by the end user, customized by IEI, or purchased from IEI. For more information visit the IEI webstie (www.ieiworld.com) or contact an IEI sales representative.

To install the module, follow the instructions below.

**Step 1:** Align the PCI-104 connector with the corresponding connector on a compatible module.

**Step 2:** Gently push the motherboard down to ensure the connectors are properly connected.

### 4.3.17 Airflow Consideration

Although the embedded board can operate without active cooling, it is still necessary to install the board in a chassis with ventilation holes on the sides allowing airflow to travel

through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

## 4.4 Jumper Configuration

The PM-LX-800 motherboard has one onboard jumpers:

- COM3 RS422/RS485 Select (JP1)

Make sure the jumper settings are properly configured before the PM-LX-800 motherboard is installed into a chassis. For more information about jumper settings and configurations, refer to **Section 3.3**.

## 4.5 Chassis Installation

The motherboard can be mounted into a chassis only after the CPU and the SO-DIMM module has been installed, the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configured.

Refer to the chassis user guide for instructions on how to mount the motherboard into a chassis.

Chapter

5

# Award BIOS Setup

## 5.1 Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

### 5.1.1 Starting Setup

The Phoenix Award BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears, restart the computer and try again.

### 5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the **PAGEUP** and **PAGEDOWN** keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown below.

| Key | Function |
|---|---|
| Up arrow | Move to the item above |
| Down arrow | Move to the item below |
| Left arrow | Move to the item on the left hand side |
| Right arrow | Move to the item on the right hand side |
| +/Page up | Increase the numeric value or make changes |
| -/Page down | Decrease the numeric value or make changes |
| Esc | Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu |
| F1 | General help, only for Status Page Setup Menu and Option Page Setup Menu |
| F2 | Item help |

| Key | Function |
|---|---|
| F5 | Previous values for the page menu items |
| F6 | Fail-safe defaults for the current page menu items |
| F7 | Optimized defaults for the current page menu items |
| F9 | Menu in BIOS |
| F10 | Save changes and Exit BIOS |

**Table 5-1: BIOS Navigation Keys**

### 5.1.3 Getting Help

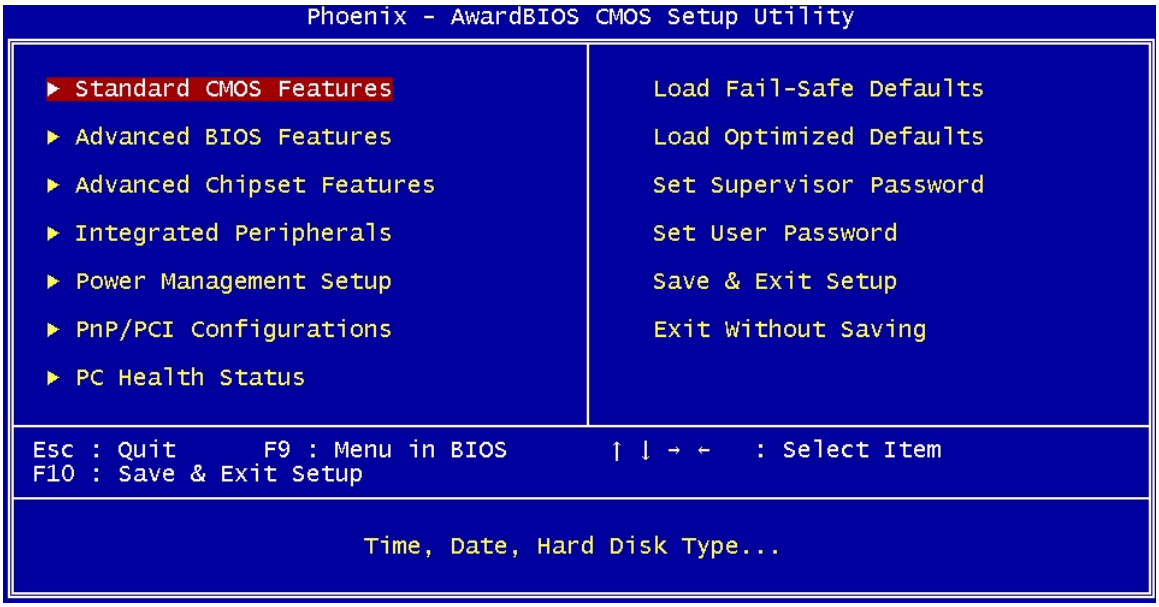
When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

### 5.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The motherboard should come with a restore CMOS settings jumper. Refer to **Section 3.3** for more information.

### 5.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (**BIOS Menu 1**) appears.




**BIOS Menu 1: AwardBIOS CMOS Setup Utility**

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**NOTE:**

The following sections will completely describe the menus listed below and the configuration options available to users.

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The following menu options are seen in **BIOS Menu 1**.

- **Standard CMOS Features**: Changes the basic system configuration.
- **Advanced BIOS Features**: Changes the advanced system settings.
- **Advanced Chipset Features**: Changes the chipset configuration features.
- **Integrated Peripherals**: Changes the settings for integrated peripherals.
- **Power Management Setup**: Configures power saving options.
- **PnP/PCI Configurations**: Changes the advanced PCI/PnP settings.
- **PC Health Status**: Monitors essential system parameters.

The following user configurable options are also available in **BIOS Menu 1**:

➔ **Load Fail-Safe Defaults**

Select this option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

➔ **Load Optimized Defaults**

Select this option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

➔ **Set Supervisor Password**

By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Set User Password**

By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Save & Exit Setup**

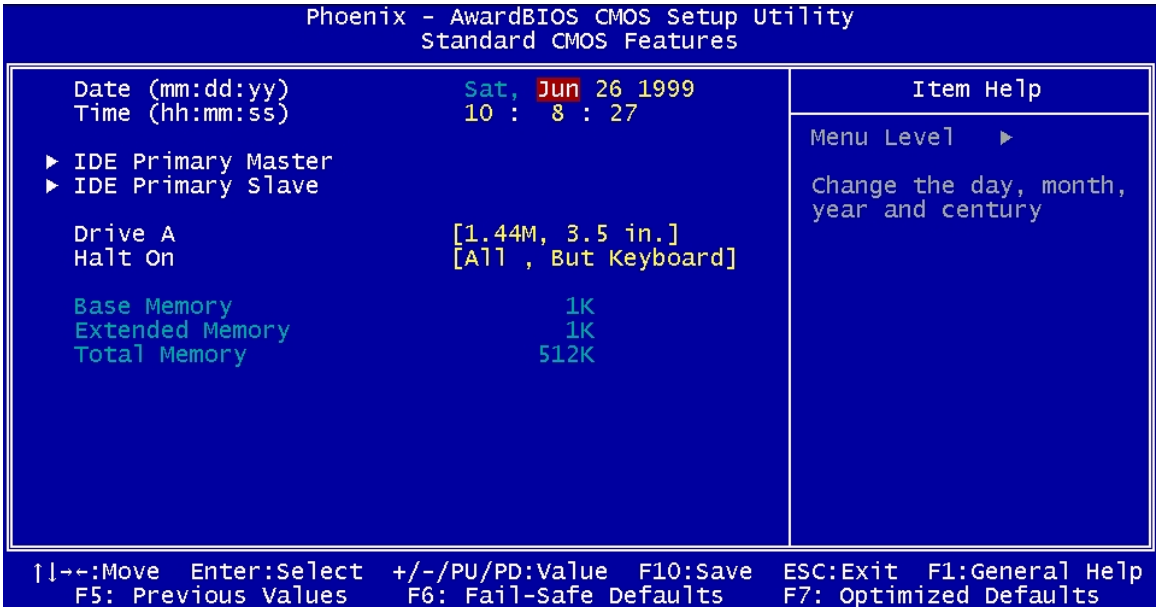
Select this option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Select this option exit the BIOS menus without saving any configuration changes.

## 5.2 Standard CMOS Features

Use the Standard CMOS Features BIOS menu (**BIOS Menu 2**) to set basic BIOS configuration options.




**BIOS Menu 2: Standard CMOS Features**

➔ **Date [Day mm:dd:yyyy]**

The **Date** option sets the system date.

➔ **Time [hh/mm/ss]**

The **Time** option sets the system time.

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. The **Standard CMOS Features** menu shows the status of the auto detected IDE devices. The following IDE devices are detected and shown in the **Standard CMOS Features** menu:

- IDE Primary Master
- IDE Primary Slave

IDE device configurations are changed or set in the IDE Configuration menu (**BIOS Menu 3**). If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 5.2.1** appear.

➔ **Drive A [1.44M, 3.5in]**

Use the Drive A configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default)
- 2.88M, 3.5 in.

➔ **Halt On [All, But Keyboard]**

Use the Halt On option to specify what errors detected during the power up process stop the system.

| | | |
|---|---|---|
| ➔ **All Errors** | | Whenever BIOS detects a non-fatal error the system is stopped and the user prompted. |
| ➔ **No Errors** | | The system boot is not stopped for any errors that may be detected. |
| ➔ **All, But Keyboard** | (Default) | The system boot does not stop for a keyboard error; it stops for all other errors. |
| ➔ **All, But Diskette** | | The system boot does not stop for a disk error; it stops for all other errors. |
| ➔ **All, But Disk/Key** | | The system boot does not stop for a keyboard or a disk error; it stops for all other errors. |

➔ **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

➔ **Extended Memory**

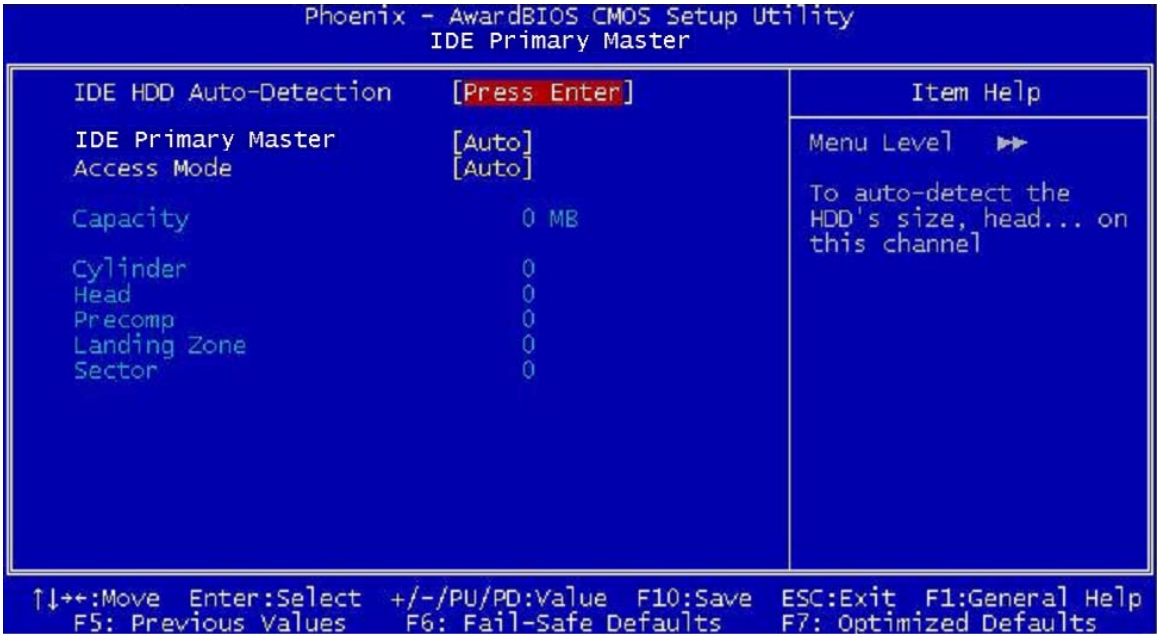
The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔ **Total Memory**

The **Total Memory** is NOT user configurable.

### 5.2.1 IDE Primary Master/Slave

Use the IDE Primary Master/Slave menu (**BIOS Menu 3**) to set or change the master/slave IDE configurations.




**BIOS Menu 3: IDE Primary Master**

➔ **IDE HDD Auto-Detection [Press Enter]**

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press **ENTER.** BIOS automatically detects the HDD type. Do not set this option manually.

➔ **IDE Primary Master [Auto]**

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

➔ **None** If no drives are connected to the IDE channel select this option. Once set, this IDE channel becomes inaccessible and any drives attached to it are undetected.

➔ **Auto** (Default) Setting this option allows the device to be automatically detected by the BIOS.

➔ **Manual** Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

➔ **Access Mode [Auto]**

The **Access Mode** option can only be configured if the **IDE Primary Master** is set to either **Manual** or **Auto**. Use the **Access Mode** option to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto mode should be selected.

➔ **CHS** Select this mode if the HDD capacity is less than 504MB.

➔ **LBA** Select this mode if the HDD capacity is more than 8.4GB.

➔ **Large** This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.

➔ **Auto** (Default) If you are unsure of what access mode to set, select this option.

➔ **Capacity**

The **Capacity** specification indicates the storage capacity of the HDD installed in the system.

➔ **Cylinder**

The **Cylinder** specification indicates how many cylinders (tracks) are on the HDD installed in the system.

➔ **Head**

The **Head** specification indicates how many logical heads are on the HDD installed in the system.

➔ **Precomp**

The **Precomp** specification indicates on what track the write precompensation begins.

➔ **Landing Zone**

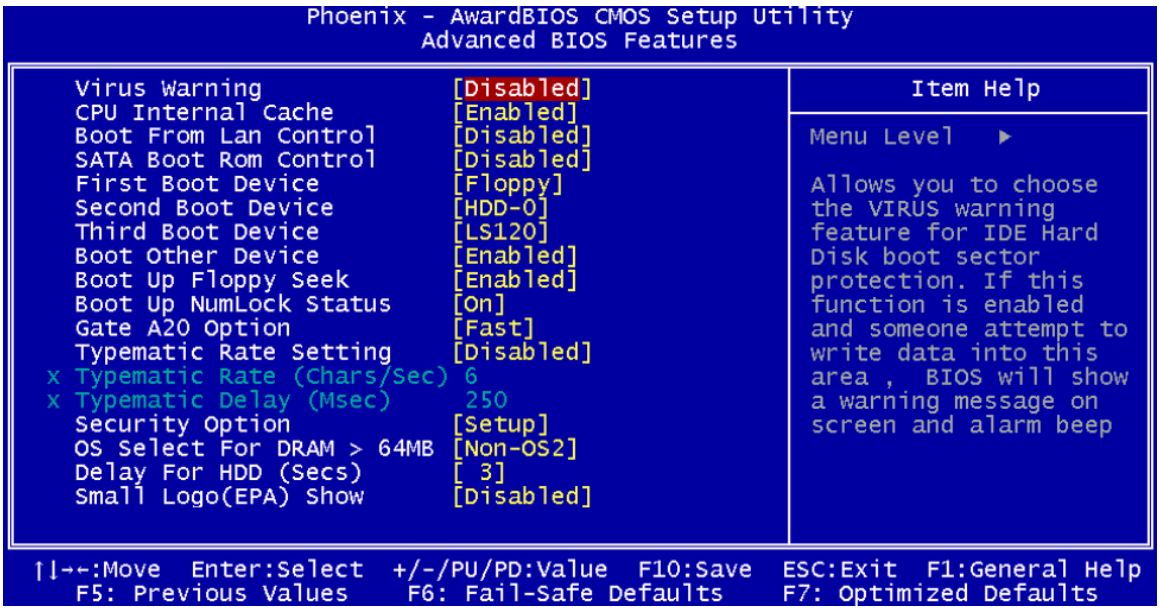
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

➔ **Sector**

The **Sector** specification indicates how many logical sectors the HDD has been divided into.

## 5.3 Advanced BIOS Features

CPU and peripheral device configuration options are accessed in the **Advanced BIOS Features** menu (**BIOS Menu 4**).




**BIOS Menu 4: Advanced BIOS Features**

➔ **Virus Warning [Disabled]**

**NOTE:**

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus before any damage is done.

➔ **Enabled** Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.

➔ **Disabled** (Default) No warning message appears when there is an attempt to access the boot sector or HDD partition table.

➔ **CPU Internal Cache [Enabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

➔ **Disabled** The internal CPU cache is disabled.

➔ **Enabled** (Default) The internal CPU cache is enabled.

➔ **Boot From LAN Control [Disabled]**

Use the **BOOT From LAN Control** option to enable the system to be booted from a remote system.

➔ **Disabled** (Default) The system cannot be booted from a remote system through the LAN.

➔ **Enabled** The system can be booted from a remote system through the LAN.

➔ **SATA Boot ROM Control [Disabled]**

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

➔ **Disabled** (Default) Disables SATA IDE use in DOS mode.

➔ **Enabled** Enables SATA IDE use in DOS mode.

➔ **Boot Device**

Use the **Boot Device** options to select the order of the devices the system boots from. There are three boot device configuration options:

- **First Boot Device** [Default: Floppy]
- **Second Boot Device** [Default: HDD-0]
- **Third Boot Device** [Default: CDROM]

Using the default values, the system first looks for a floppy disk to boot from. If it cannot find a floppy disk, it boots from an HDD. If both The floppy and the HDD are unavailable, the system boots from a CDROM drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

➔ **Boot Other Device [Enabled]**

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

| | | |
|---|---|---|
| ➔ **Disabled** | | The system does not look for second and third boot devices if the first one is not found. |
| ➔ **Enabled** | (Default) | The system looks for second and third boot devices if the first one is not found. |

➔ **Boot Up Floppy Seek [Disabled]**

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

| | | |
|---|---|---|
| ➔ **Disabled** | (Default) | BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K. |
| ➔ **Enabled** | | BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks. |

➔ **Boot Up Numlock Status [On]**

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

| | | |
|---|---|---|
| ➔ **Off** | | The keys on the keypad are not activated. |
| ➔ **On** | (Default) | Activates the keys on the keypad. |

➔ **Gate A20 Option [Fast]**

Use the **Gate A20 Option** option to set if the keyboard controller or the chipset controls the Gate A20 switching.

| | | |
|---|---|---|
| ➔ **Normal** | | The keyboard controller does the switching. |
| ➔ **Fast** | (Default) | The chipset does the switching. |

➔ **Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held

down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

- **Disabled** (Default) Disables the typematic rate.
- **Enabled** Enables the typematic rate.

➔ **Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify the rate keys are accelerated.

- **6** (Default) 6 characters per second
- **8** 8 characters per second
- **10** 10 characters per second
- **12** 12 characters per second
- **15** 15 characters per second
- **20** 20 characters per second
- **24** 24 characters per second
- **30** 30 characters per second

➔ **Typematic Delay (Msec) [250]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

- **250** (Default) 250 milliseconds
- **500** 500 milliseconds
- **750** 750 milliseconds
- **1000** 1000 milliseconds

➔ **Security Option [Setup]**

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

➔ **Setup** (Default) The system does not boot and access to Setup is denied if the correct password is not entered at the prompt.

➔ **System** The system boots, but access to Setup is denied if the correct password is not entered at the prompt.

**NOTE:**

To disable security, select the password setting in the Main Menu. When asked to enter a password, don't type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and **Setup** can be accessed.

➔ **OS Select For DRAM > 64MB [Non-OS2]**

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

➔ **Enabled** Specifies the operating system used as OS/2.

➔ **Disabled** (Default) Select this option when not using the OS/2 operating system.

➔ **Delay for HDD (Secs) [3]**

Use the **Delay for HDD** option to specify the period of time the system should wait before the HDD is identified. If selected, the user is asked to enter a number between 0 and 15. The number specified is the number of seconds the system waits before the HDD is identified.

➔ **Small Logo (EPA) Show [Disabled]**

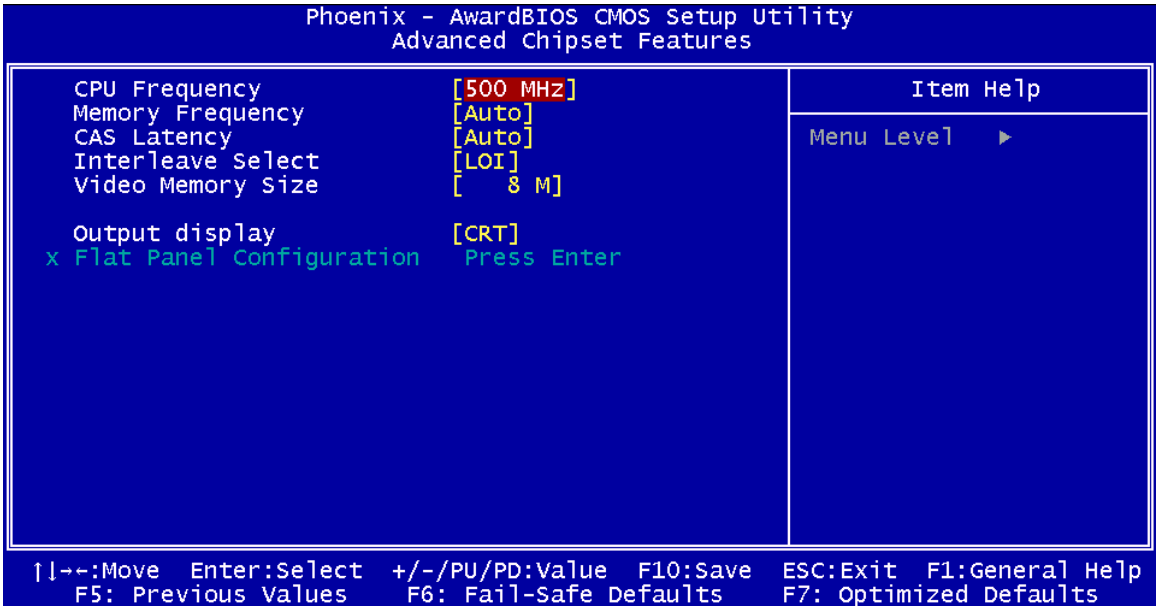
Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

➔ **Disabled** (Default) EPA logo does not appear during boot up.

➔ **Enabled** EPA logo appears during boot up.

## 5.4 Advanced Chipset Features

Use the Advanced Chipset Features menu (**BIOS Menu 5**) to change chipset configuration options.




**BIOS Menu 5: Advanced Chipset Features**

➔ **CPU Frequency [500MHz]**

Use the **CPU Frequency** option to set the CPU frequency.

- 500MHz (Default)

➔ **Memory Frequency [Auto]**

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules. The **Memory Frequency** options are:

- Auto (Default)
- 100 MHz
- 133 MHz
- 166 MHz
- 200 MHz

➔ **CAS Latency [Auto]**

Use the **CAS Latency Time** option to set the Column Address Strobe (CAS) delay time. The **CAS Latency Time** options are:

- Auto (Default)
- 1.5 nanoseconds
- 2.0 nanoseconds
- 2.5 nanoseconds
- 3.0 nanoseconds
- 3.5 nanoseconds

➔ **Interleave Select [LOI]**

Use the **Interleave Select** option to specify how the cache memory is interleaved.

➔ **LOI** (Default) Low order interleaving (LOI) of memory occurs.

➔ **HOI** High order interleaving (HOI) of memory occurs.

➔ **Video Memory Size [8M]**

Use the **Video Memory Size** option to determine how much memory is allocated to the video graphics device. The **Video Memory Size** options are:

- None
- 8M (Default)
- 16M
- 32M
- 64M
- 128M
- 254M

➔ **Output Display [CRT]**

Use the **Output Display** configuration to specify the display devices the system is connected to. The **Output Display** options are:

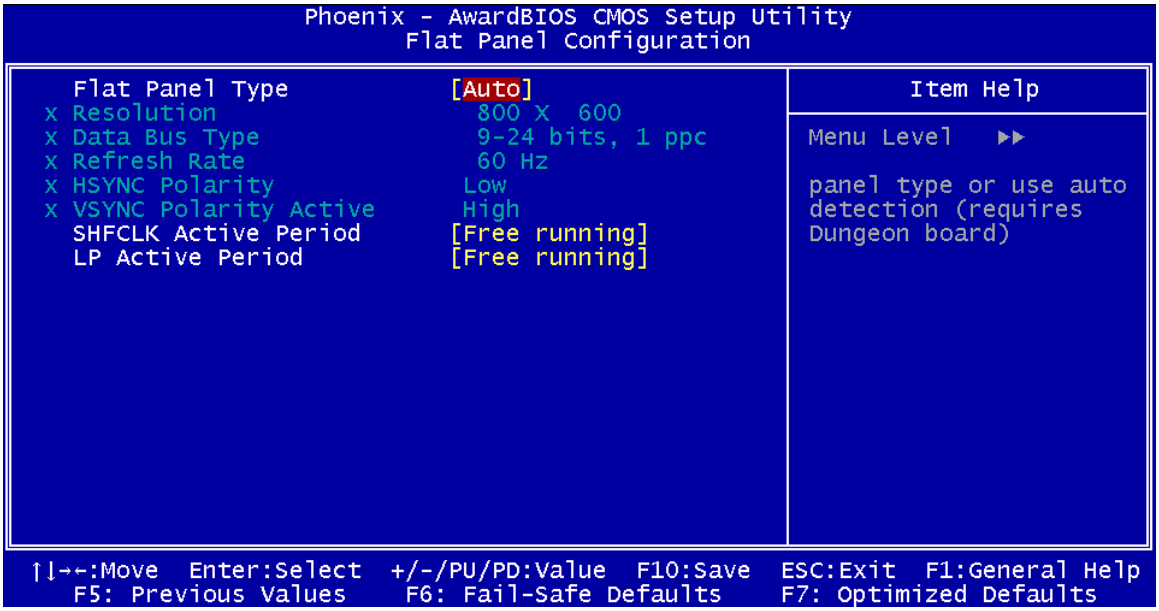
- Flat Panel
- CRT (Default)
- Panel & CRT

➔ **Flat Panel Configuration [Press Enter]**

Use the Flat Panel Configuration option to open the Flat Panel Configuration menu. The Flat Panel Configuration options are shown in Section **5.4.1**.

### 5.4.1 Flat Panel Configuration

Use the **Flat Panel Configuration** menu (**BIOS Menu 6**) to set the configuration settings for the flat panel screen connected to the system.




**BIOS Menu 6: Flat Panel Configuration**

➔ **Flat Panel Type [Auto]**

Use the **Flat Panel Type** option to specify the type of flat panel screen connected to the system.

| | | |
|---|---|---|
| ➔ **TFT** | | Specifies the system is connected to a TFT display. |
| ➔ **LVDS** | | Specifies the system is connected to an LVDS display. |
| ➔ **Auto** | (Default) | The system detects the display type and the display settings. |

➔ **Resolution [800 x 600]**

The **Resolution** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. The **Resolution** options are:

- 320 x 240
- 640 x 480
- 800 x 600 (Default)
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200

➔ **Data Bus Type [9 – 24 bits, 1 ppc]**

The **Data Bus Type** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Data Bus Type** option to set the bus type and the data bus width used to transfer data between the system and the flat panel screen connected to the system. The **Data Bus Type** options are:

- 9-24 bits, 1 ppc (Default)
- 18, 24 bits, 2 ppc

➔ **Refresh Rate [60Hz]**

The **Refresh Rate** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Refresh Rate** option to set the screen refresh rate required by the panel connected to the system. Check the documentation that came with the panel before setting this option. The **Refresh Rate** options are:

- 60Hz (Default)
- 70Hz
- 72Hz
- 75Hz
- 85Hz
- 90Hz
- 100Hz

➔ **HSYNC Polarity [Low]**

The **HSYNC Polarity** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. The **HSYNC Polarity** options are:

- High
- Low (Default)

➔ **VSYNC Polarity Active [Low]**

The **VGSYNC Polarity Active** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **VGSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. The **VGSYNC Polarity Active** options are:

- High
- Low (Default)

➔ **SHFCLK Active Period [Free Running]**

Use the **SHFCLK Active Period** option to set the SHFCLK. The **SHFCLK Active Period** options are:

- Active Only
- Free running (Default)

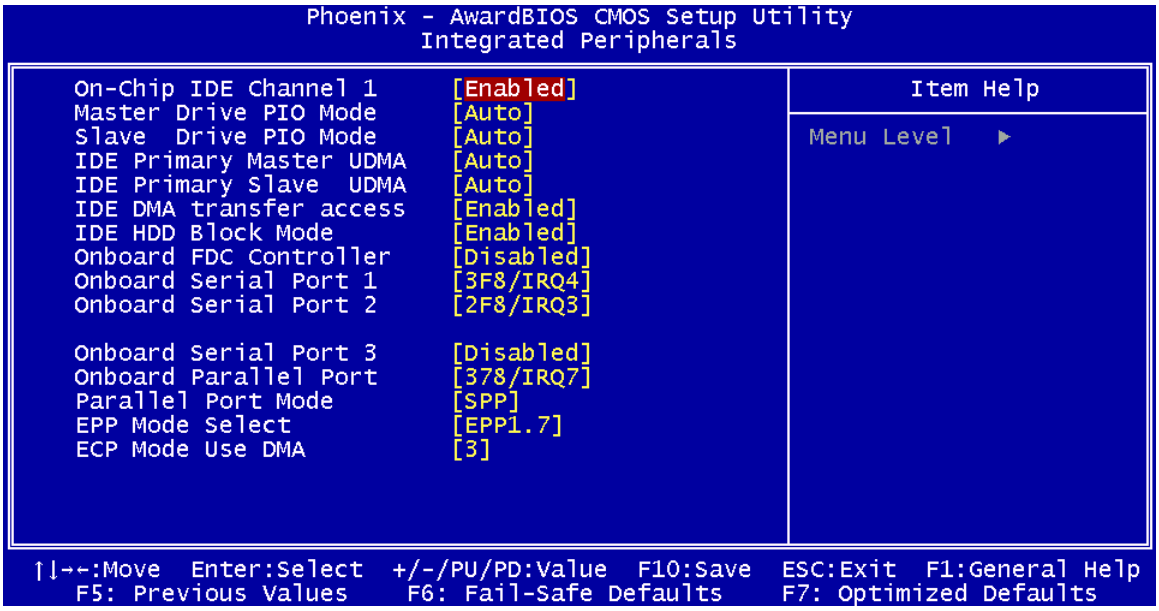
➔ **LP Active Period [Free Running]**

Use the **LP Active Period** option to set the LDE/MOD signal to the panel. The **LP Active Period** options are:

- Active Only
- Free running (Default)

## 5.5 Integrated Peripherals

Use the Integrated Peripherals menu (**BIOS Menu 7**) to change the configuration options for the attached peripheral devices.




**BIOS Menu 7: Integrated Peripherals**

➔ **On-Chip IDE Channel 1 [Enabled]**

The **On-Chip IDE Channel 1** option is enabled and is NOT user configurable.

➔ **Drive PIO Mode [Auto]**

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

- Master Drive PIO Mode
- Slave Drive PIO Mode

➔ **Auto** (Default) The computer selects the correct mode.

➔ **Mode 0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps.

- **Mode 1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps.
- **Mode 2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps.
- **Mode 3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps.
- **Mode 4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

- IDE Primary Master UDMA
- IDE Primary Slave UDMA

- **Auto** (Default) The computer selects the correct UDMA.
- **Disabled** The UDMA for the HDD device is disabled.

➔ **IDE DMA transfer access [Enabled]**

Use the **IDE DMA transfer access** option to enable or disable DMA support for IDE devices connected to the system.

- **Disabled** All IDE drive DMA transfers are disabled. The IDE drives use PIO mode transfers.
- **Enabled** (Default) All IDE drive DMA transfers are enabled.

➔ **IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

- **Disabled** Block mode is not supported.

➔ **Enabled** (Default) Block mode is supported.

➔ **Onboard FDC Controller [Disabled]**

Use the **Onboard FDC Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

➔ **Disabled** (Default) The FDD controller is disabled.

➔ **Enabled** The FDD controller is enabled.

➔ **Onboard Serial Port 1 [3F8/IRQ4]**

Use the **Onboard Serial Port 1** option to select the I/O address and IRQ for the onboard serial port 1. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 1** options are:

- Disabled
- 3F8/IRQ4 (Default)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Serial Port 2 [2F8/IRQ3]**

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 2** options are:

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (Default)
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Serial Port 3 [Disabled]**

Use the **Onboard Serial Port 3** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 3** options are:

- Disabled (Default)
- 3F8/IRQ4
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Parallel Port [378/IRQ7]**

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 378/IRQ7 (Default)
- 278/IRQ5
- 3BC/IRQ7

➔ **Parallel Port Mode [SPP]**

Use the **Parallel Port Mode** option to select parallel port operation mode.

➔ **SPP** (Default) The parallel port operates in the standard parallel port (SPP) mode. This parallel port mode works with most parallel port devices but is slow.

➔ **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

- **ECP** — The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
- **ECP+EPP** — The parallel port is compatible with both ECP and EPP devices.
- **Normal**

➔ **x EPP Mode Select [EPP1.7]**

The **EPP Mode Select** option is only available if the **Parallel Port Mode** option is set to an EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

- **EPP1.9** — EPP 1.9 is selected as the EPP standard.
- **EPP1.7** (Default) — EPP 1.7 is selected as the EPP standard.

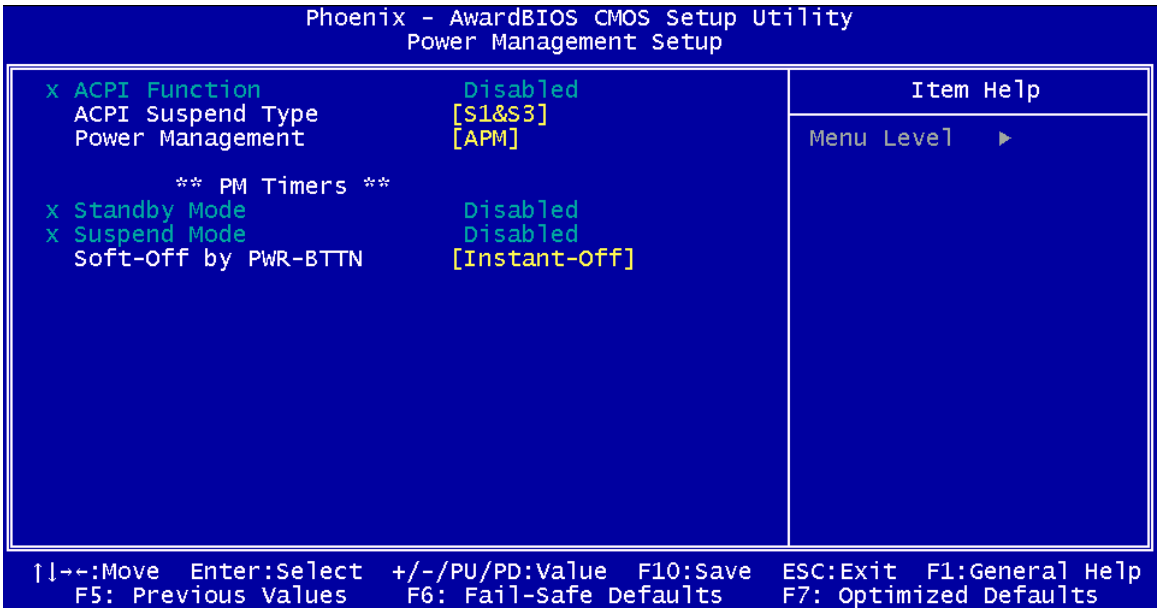
➔ **x ECP Mode Use DMA [3]**

The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

- **1** — The parallel port uses DMA Channel 1 in ECP mode.
- **3** (Default) — The parallel port uses DMA Channel 3 in ECP mode.

## 5.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 8**) to set the BIOS power management and saving features.




**BIOS Menu 8: Power Management Setup**

➔ **x ACPI Function [Disabled]**

The **ACPI Function** is enabled when the **Power Management** option is set to ACPI; otherwise, it is disabled.

➔ **ACPI Suspend Type [S1&S3]**

When the system is in the [S1&S3] suspend state, the system appears off. The CPU is stopped, RAM is refreshed and the system is runs in a low power mode.

| | | |
|---|---|---|
| ➔ **S1(POS)** | | Sets the ACPI Suspend Type to POS (Power On Suspend). |
| ➔ **S3(STR)** | | Sets the ACPI Suspend Type to STR (Suspend To RAM). |
| ➔ **S1&S3** | (Default) | Sets the ACPI Suspend Type to POS and STR. |

➔ **Power Management [APM]**

Use the **Power Management** option to set the power management type used by the system.

| | | |
|---|---|---|
| ➔ **Disabled** | | All power management options are turned off. The only user configurable options are the power button and alarm settings. |
| ➔ **Legacy** | | Standby and suspend modes can be set. |
| ➔ **APM** | (Default) | Advanced power management (APM) is activated |
| ➔ **ACPI** | | Advanced Configuration and Power Interface (ACPI) is activated. |

➔ **x Standby Mode [Disabled]**

The **Standby Mode** option can only be selected if the **Power Management** option is set to **Legacy**. The **Standby Mode** specifies the amount of time the system can be inactive before the system enters standby mode. The **Standby Mode** options are:

- Disabled (Default)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

➔ **x Suspend Mode [Disabled]**

The **Suspend Mode** option can only be selected if the **Power Management** option is set to Legacy. The **Suspend Mode** specifies the amount of time the system can be inactive before the system enters suspend mode. The **Suspend Mode** options are:

- Disabled (Default)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

➔ **Soft-Off by PWR-BTTN [Instant-Off]**

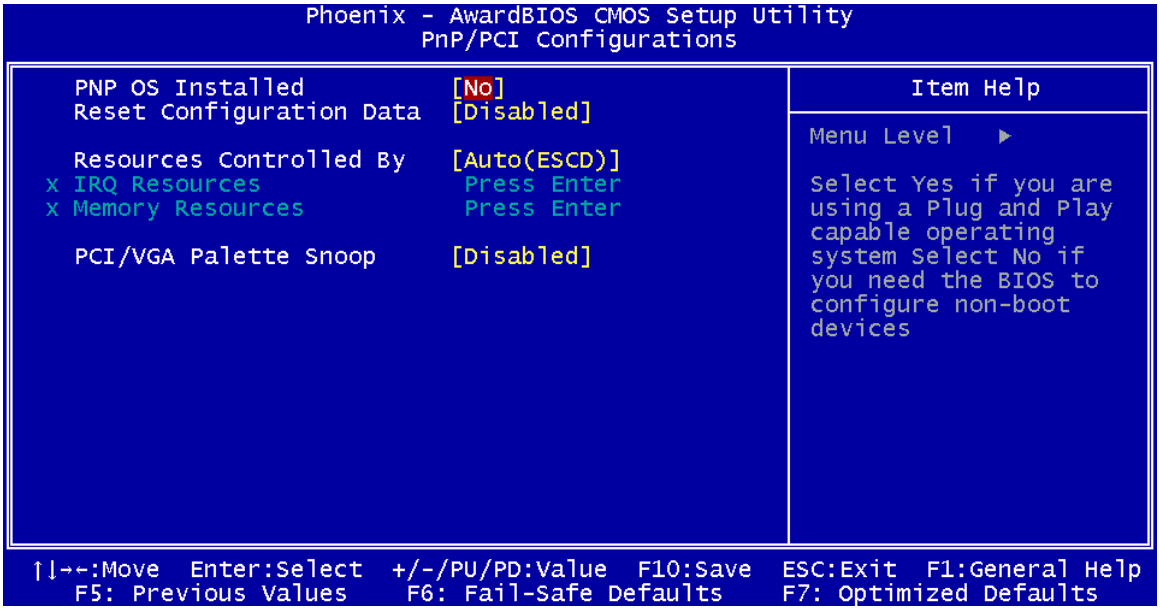
Use the **Soft-Off by PWR-BTTN** option to enabled the system to enter a very low-power-usage state when the power button is pressed.

➔ **Instant-Off** (Default) When the power button is pressed, the system is immediately shutdown.

➔ **Delay 4-sec** To shutdown the system the power button must be held down longer than four seconds otherwise, the system enters a low power usage state.

## 5.7 PnP/PCI Configurations

Use the PnP/PCI Configurations menu (**BIOS Menu 9**) to set the plug and play, and PCI options.




**BIOS Menu 9: PnP/PCI Configurations**

➔ **PNP OS Installed [No]**

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

➔ No (Default) If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.

➔ Yes Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

➔ **Reset Configuration Data [Disabled]**

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

➔ **Disabled** (Default) ESCD will not be reconfigured

➔ **Enabled** ESCD will be reconfigured after you exit setup

➔ **Resources Controlled By [Auto (ESCD)]**

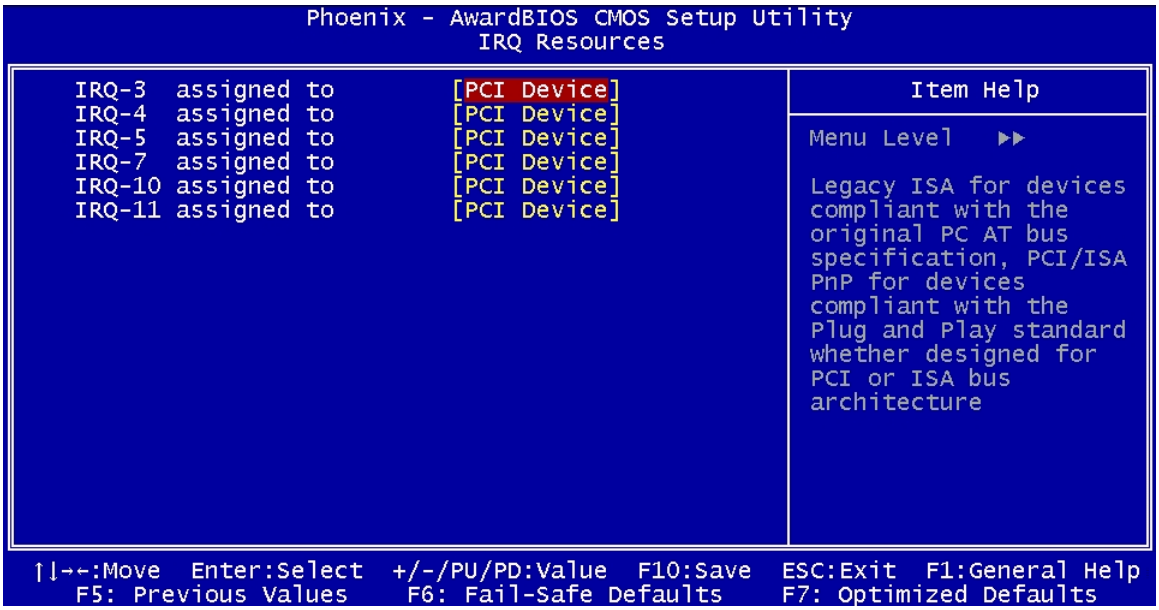
Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

➔ **Auto(ESCD)** (Default) BIOS automatically configures plug and play devices as well as boot devices.

➔ **Manual** Manually configure the plug and play devices and any other boot devices.

➔ **x IRQ Resources [Press Enter]**

The IRQ Resources option (**BIOS Menu 10**) can only be selected if the Resources Controlled By option is set to Manual.




**BIOS Menu 10: IRQ Resources**

The **IRQ Resources** menu has the following options:

- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-7 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to

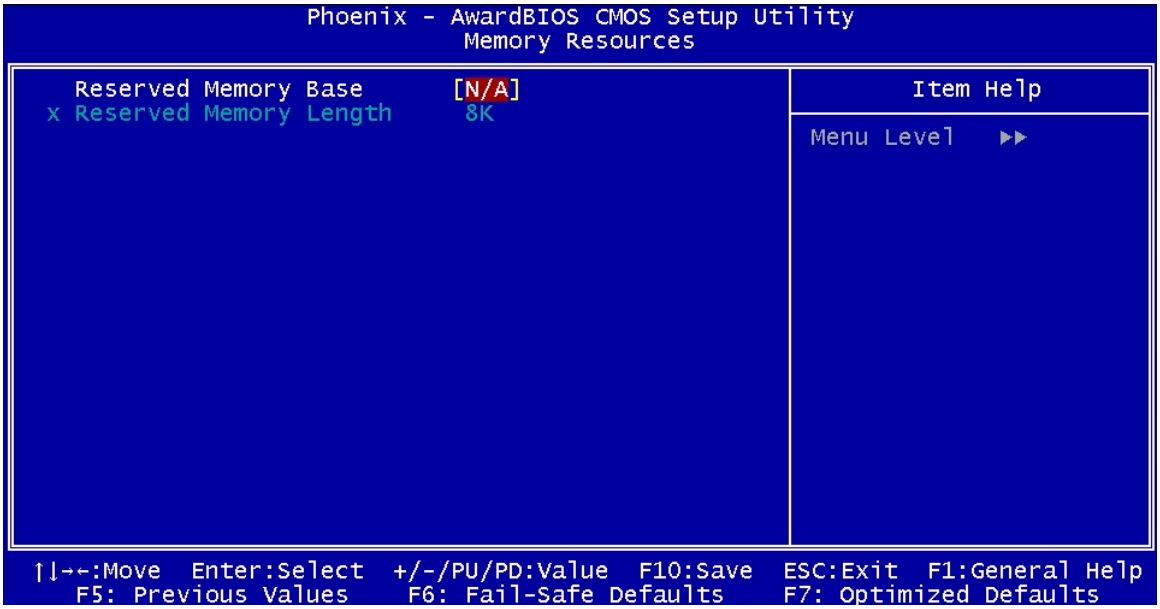
The above options all have the following default options.

➔ **PCI Device** (Default) The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔ **Reserved** The IRQ is reserved by BIOS.

➔ **x Memory Resources [Press Enter]**

The Memory Resources menu (**BIOS Menu 11**) can only be accessed if the Resources Controlled By option is set to Manual. Use Memory Resources to select a base address and the length for the memory area used by a peripheral that requires high memory.




**BIOS Menu 11: Memory Resources**

The menu has two configurable options:

- Reserved Memory Base
- Reserved Memory Length

➔ **Reserved Memory Base [N/A]**

The **Reserved Memory Base** option specifies the base address for the peripheral device. The **Reserved Memory Base** options are:

- N/A (Default)
- C800
- CC00
- D000
- D400
- D800
- DC00

➔ **x Reserved Memory Length [8K]**

The **Reserved Memory Length** option can only be accessed if the **Reserved Memory Base** option is not set to **N/A**. The **Reserved Memory Length** specifies the amount of memory reserved for the peripheral device. The **Reserved Memory Length** options:

- 8K (Default)
- 16K
- 32K
- 64K

➔ **PCI/VGA Palette Snoop [Disabled]**

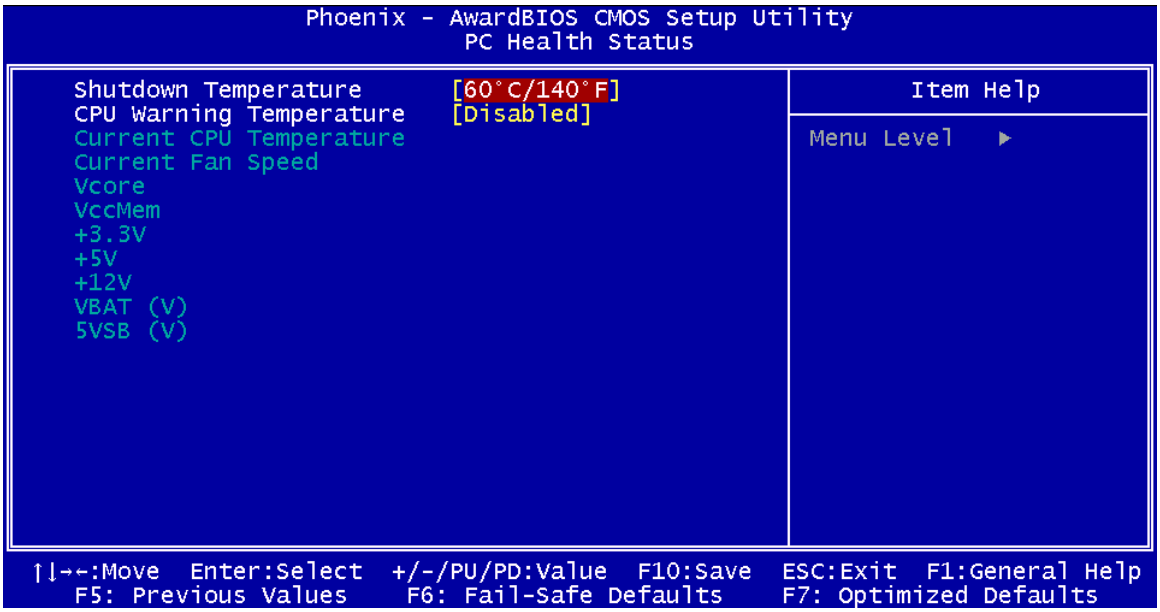
The **PCI/VGA Palette Snoop** option enables the system to determine whether or not some special VGA cards, high-end hardware MPEG decoders and other similar devices are allowed to look at the VGA palette on the video card so these devices can determine what colors are in use. This option is needed *very* rarely and should be left "Disabled" unless a video device specifically requires the setting to be enabled upon installation.

➔ **Disabled** (Default) Does not allow the graphics devices to examine the VGA palette on the graphics card.

➔ **Enabled** Allows the graphics devices to examine the VGA palette on the graphics card.

## 5.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 12**) has two user configurable options and shows system operating parameters that are essential to the stable operation of the system.




**BIOS Menu 12: PC Health Status**

➔ **Shutdown Temperature**

Use the **Shutdown Temperature** option to specify a CPU operating temperature threshold that, when reached, would shutdown the system.

- 60°C/140°F
- 65°C/149°F
- 70°C/158°F
- 75°C/167°F
- Disabled (Default)

➔ **CPU Warning Temperature**

Use the **CPU Warning Temperature** option to specify a CPU operating temperature threshold that, when reached, generates a warning signal.

- Disabled (Default)
- 50°C/122°F
- 53°C/127°F
- 56°C/133°F
- 60°C/140°F
- 63°C/145°F
- 66°C/151°F
- 70°C/158°F

The following system parameters are monitored by the **PC Health Status** menu.

➔ **Temperatures**

The following temperature is monitored:

- Current CPU Temperature

➔ **Fan Speeds**

The following fan speed is monitored:

- Current CPU Fan Speed

➔ **Voltages**

The following voltages are monitored:

- Vcore
- VccMem
- +3.3 V
- +5 V
- +12 V
- VBAT (V)
- 5VSB (V)

Chapter

6

# Software Drivers

## 6.1 Available Software Drivers

**NOTE:**

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the IEI website or contact technical support for the latest updates.

The PM-LX-800 motherboard requires two software drivers:

- VGA Driver
- LAN Driver

All drivers can be found on the CD that came with the motherboard. To install the drivers please follow the instructions in the sections below.

Insert the CD into the system that contains the PM-LX-800 motherboard.

**NOTE:**

If your system does not run the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (replace **X** with the actual drive letter for your CD-ROM) to access the **IEI Driver CD** main menu.

**Step 1:** From the AMD LX/GX Driver CD main menu (**Figure 6-1**), click **PM-LX-800**.


**Figure 6-1: AMD LX/GX CD Main Menu**

**Step 2:** A window appears listing the drivers available for installation (**Figure 6-2**).

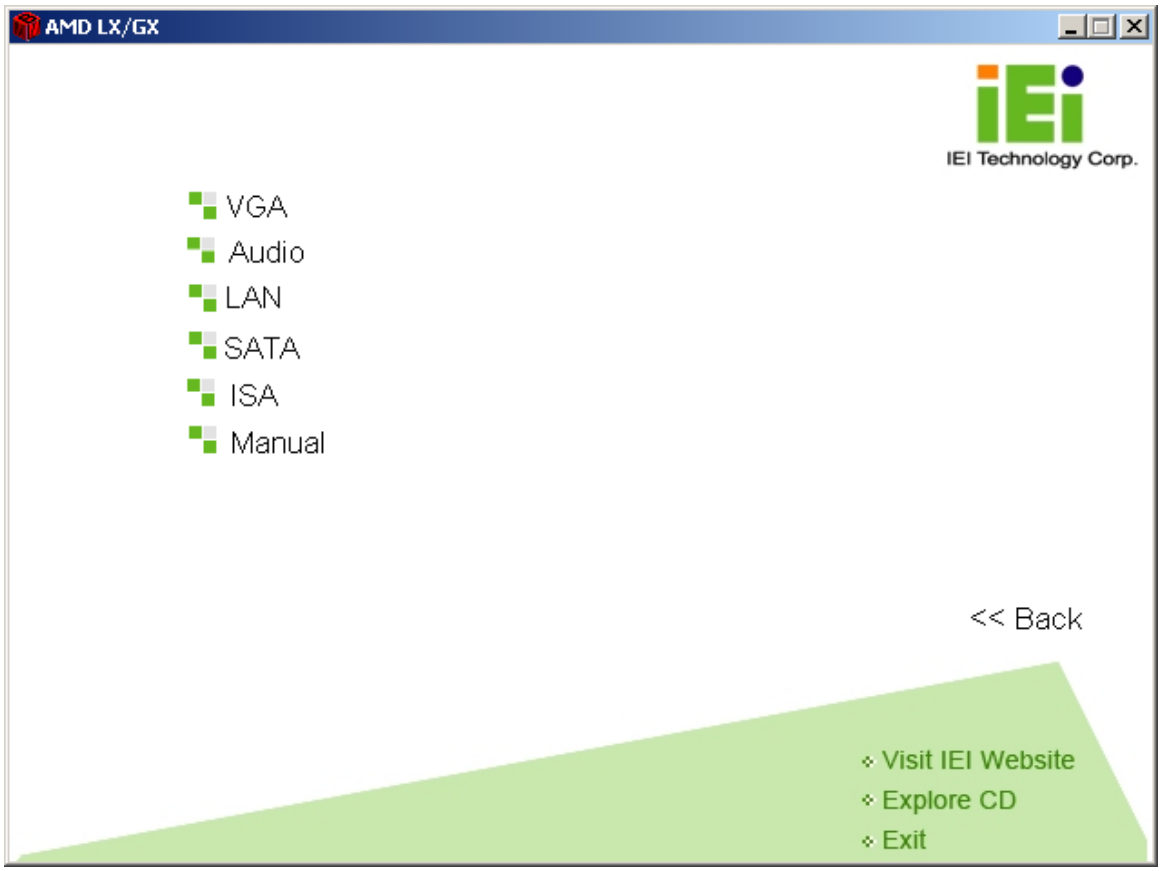



**Figure 6-2: AMD LX/GX CD Driver Menu**

**Step 3:** Select any item from the list to view more information on the driver installation, or select Manual to navigate to the PM-LX-800 user manual.

The following sections fully describe the driver installation procedures for the PM-LX-800 motherboard.

## 6.2 VGA Driver

To install the VGA driver please follow the steps below.

**Step 1:** Open **Windows Control Panel** (**Figure 6-3**).

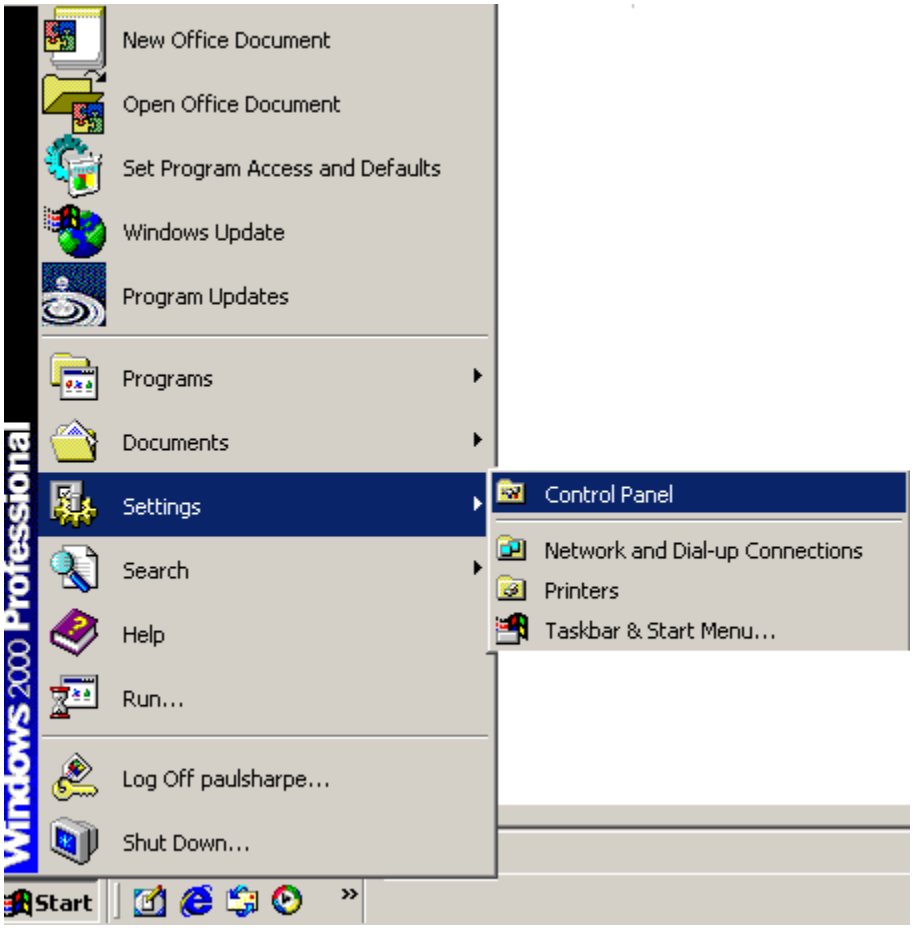



**Figure 6-3: Access Windows Control Panel**

**Step 2:** Double click the **System** icon (**Figure 6-4**).

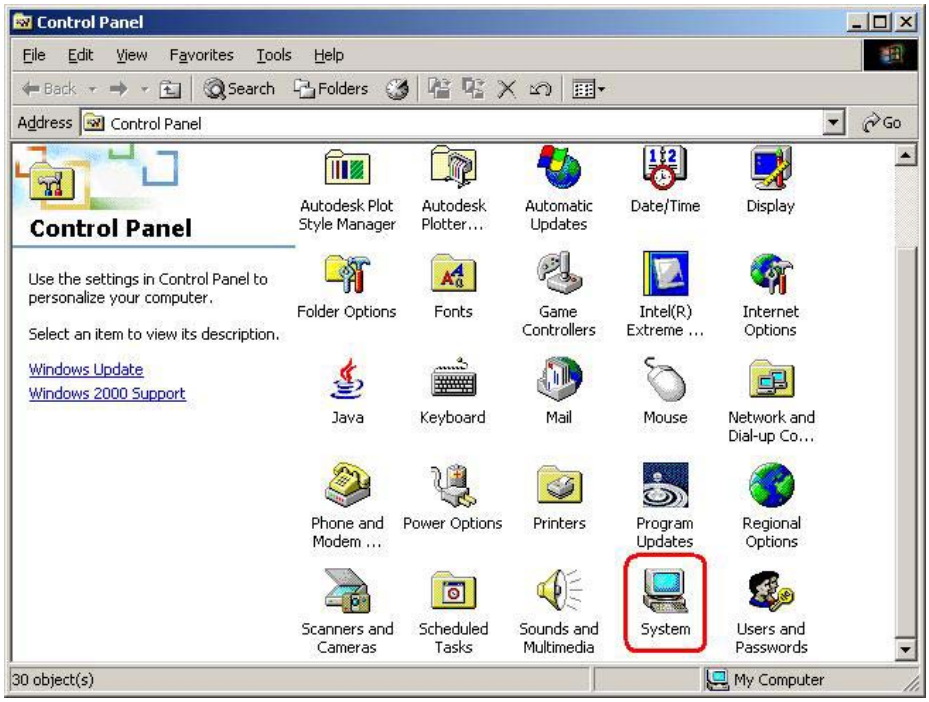



**Figure 6-4: Double Click the System Icon**

**Step 3:** Double click the **Device Manager** tab (**Figure 6-5**).

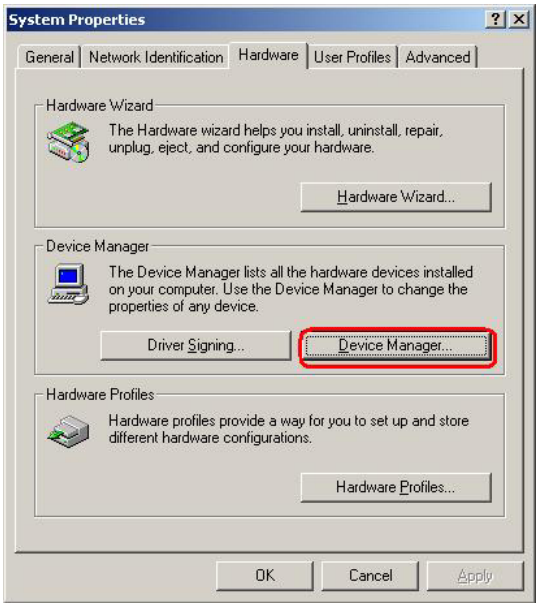



**Figure 6-5: Double Click the Device Manager Tab**

**Step 4:** A list of system hardware devices appears (**Figure 6-6**).

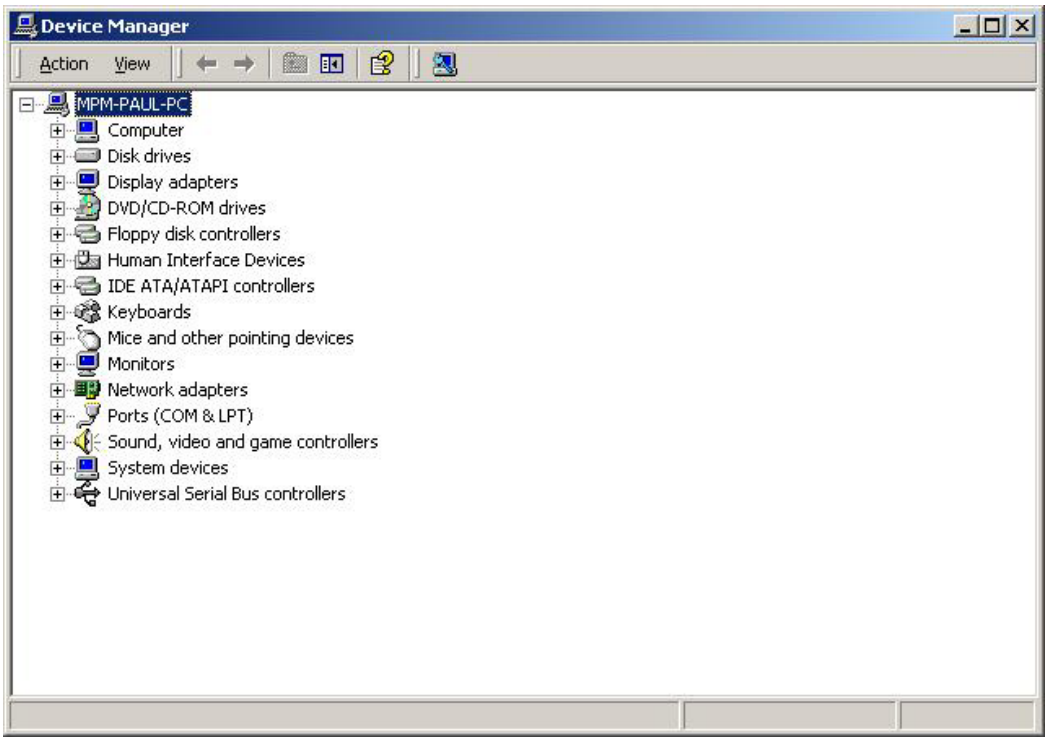



**Figure 6-6: Device Manager List**

**Step 5:** Expand the **Display Adapters** category (**Figure 6-7**). Right click the adapter and select **Properties**.

**NOTE:**

If the **Display Adapters** category is not available, navigate to **X:\VGA\LX800\XP\VGA 2.01.05** (where **X:** is the system CD drive) and read the **ReleaseNotes.txt** file for further information on installing the VGA driver.

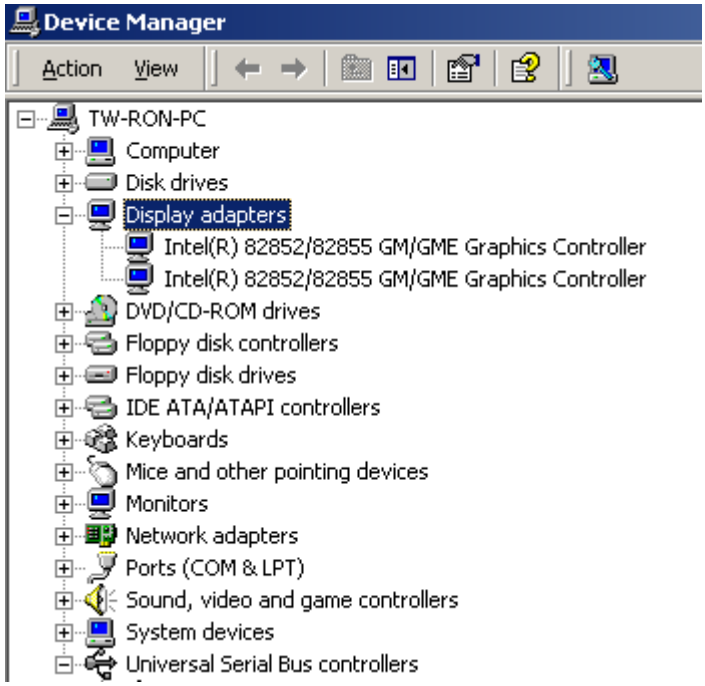



**Figure 6-7: Expand the Display Adapters Category**

**Step 6:** From the **Driver** tab of the **Properties** window, click **Update Driver** (**Figure 6-8**) or, click **Reinstall Driver** if **Update Driver** is not seen.

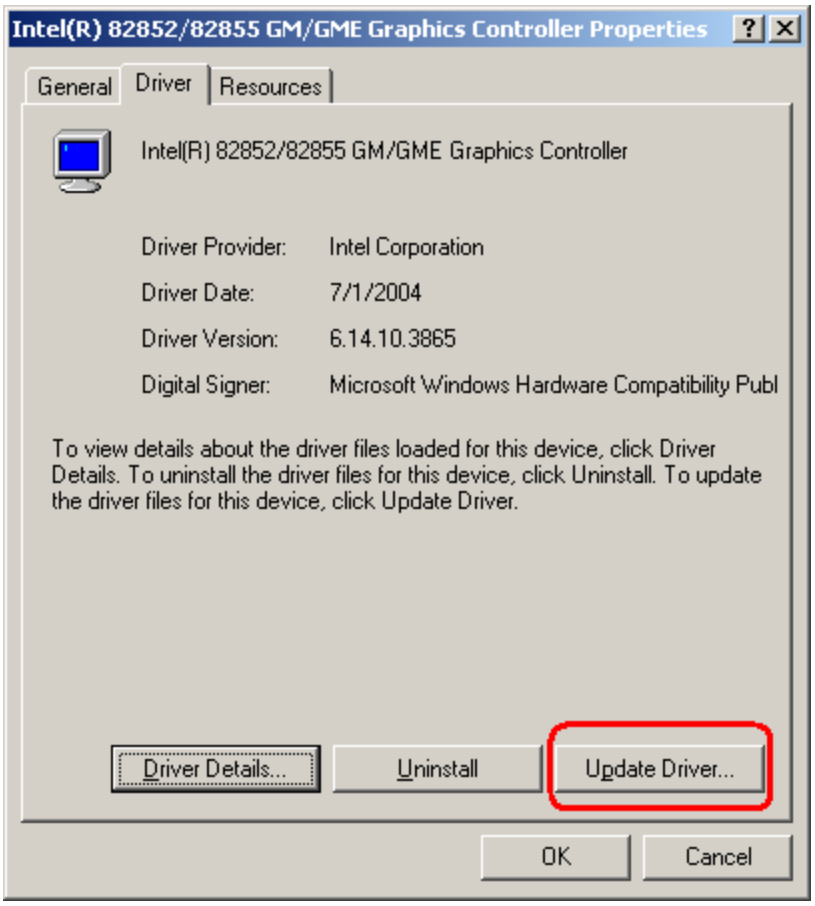



**Figure 6-8: Update Driver**

**Step 7:** The **Upgrade Device Driver Wizard** appears (**Figure 6-9**). Click **NEXT** to continue.


**Figure 6-9: Upgrade Device Driver Wizard**

**Step 8:** The **Install Hardware Device Driver** screen appears (**Figure 6-10**). Select the **Search for a suitable driver for my device** radio button and click **NEXT** to continue.


**Figure 6-10: Search for Suitable Driver**

**Step 9:** Select **Specify a Location** in the **Locate Driver Files** window (**Figure 6-11**).

Click **NEXT** to continue.

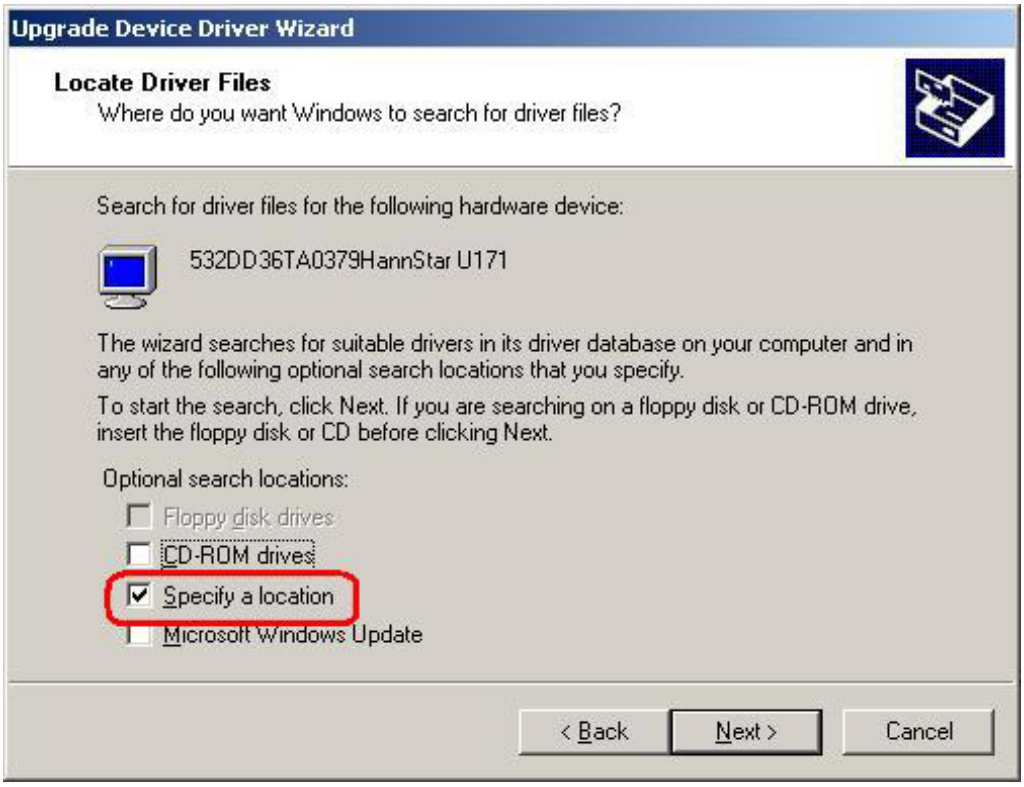



**Figure 6-11: Locate Driver Files**

**Step 10:** Click **Browse** and navigate to the **X:\AMD\LX800\XP\VGA 2.01.05** directory, where "**X:**" is the system CD drive (**Figure 6-12**).

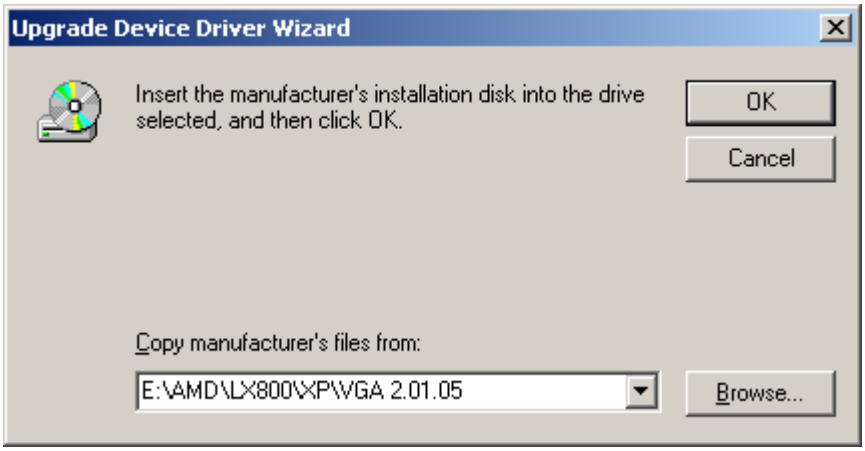



**Figure 6-12: Location Browsing Window**

**Step 11:** Click **OK** to continue.

**Step 12:** A driver files location menu window appears. Click **NEXT** to continue. The driver is installed.

## 6.3 LAN Driver

To install the LAN driver, please follow the steps below.

**Step 1:** Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\LAN\Realtek** (where **X:** is the system CD drive) folder on the driver CD.

**Step 2:** Open the **RTL8100C** folder.

**Step 3:** Locate the **Setup** program icon (**Figure 6-13**).

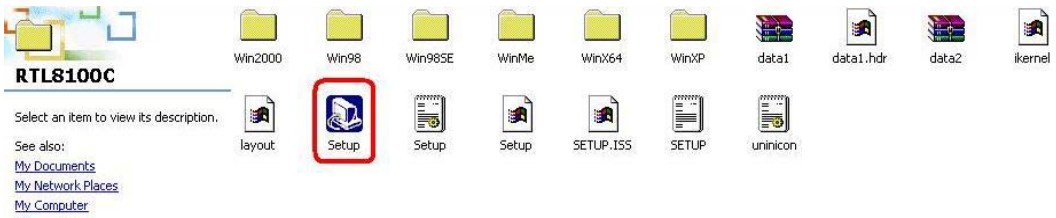



**Figure 6-13: Locate the Setup Program Icon**

**Step 4:** Double click the **Setup** program icon in **Figure 6-13**.

**Step 5:** The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 6-14**).

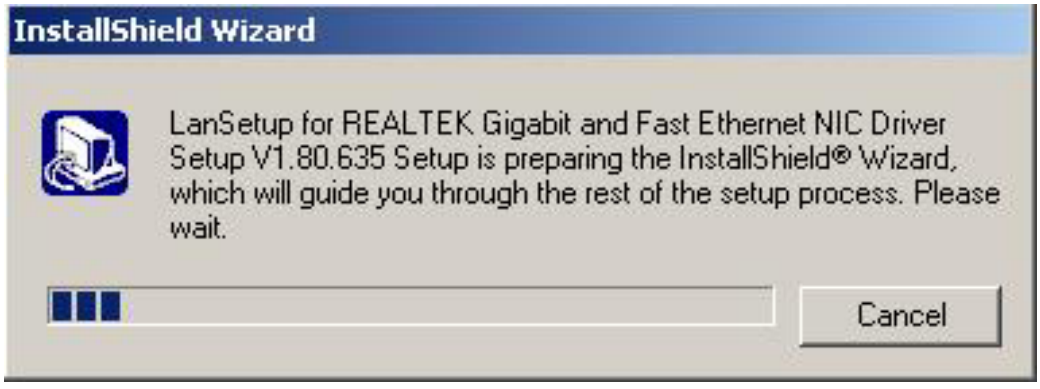



**Figure 6-14: Preparing Setup Screen**

**Step 6:** Once initialized, the **Install Wizard** welcome screen appears (**Figure 6-15**).

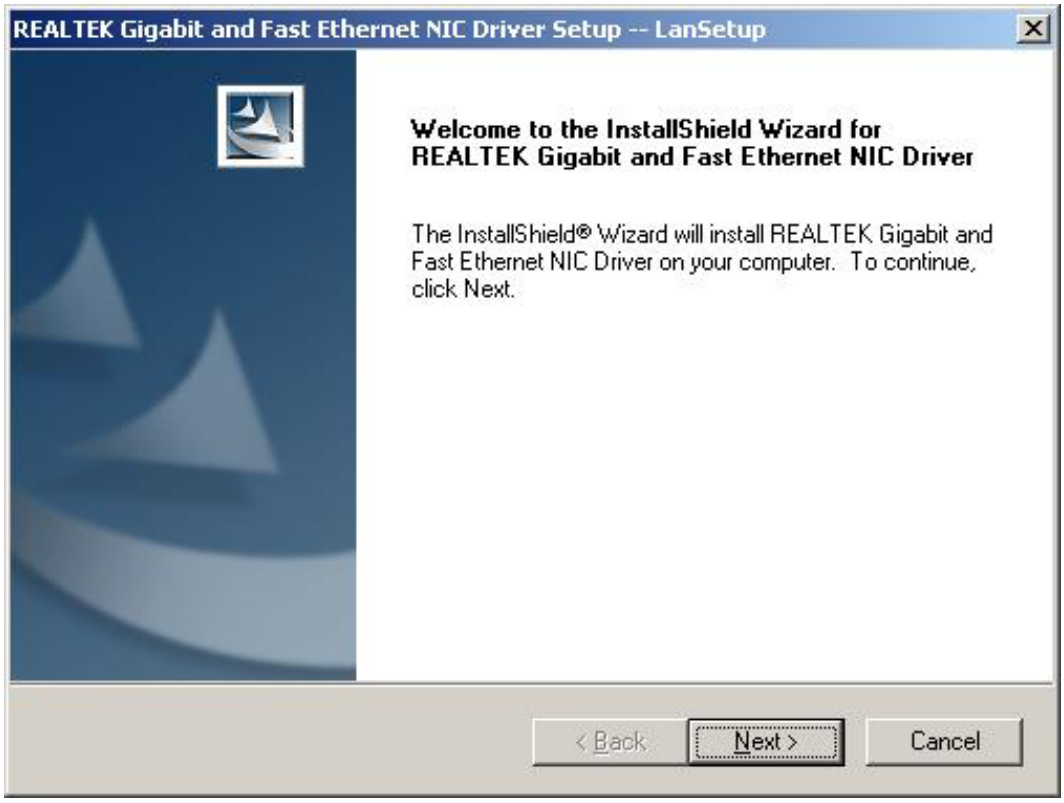



**Figure 6-15: Install Wizard Welcome Screen**

**Step 7:** Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

**Step 8:** The **Install Wizard** starts to install the LAN driver.

**Step 9:** Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 6-16**).

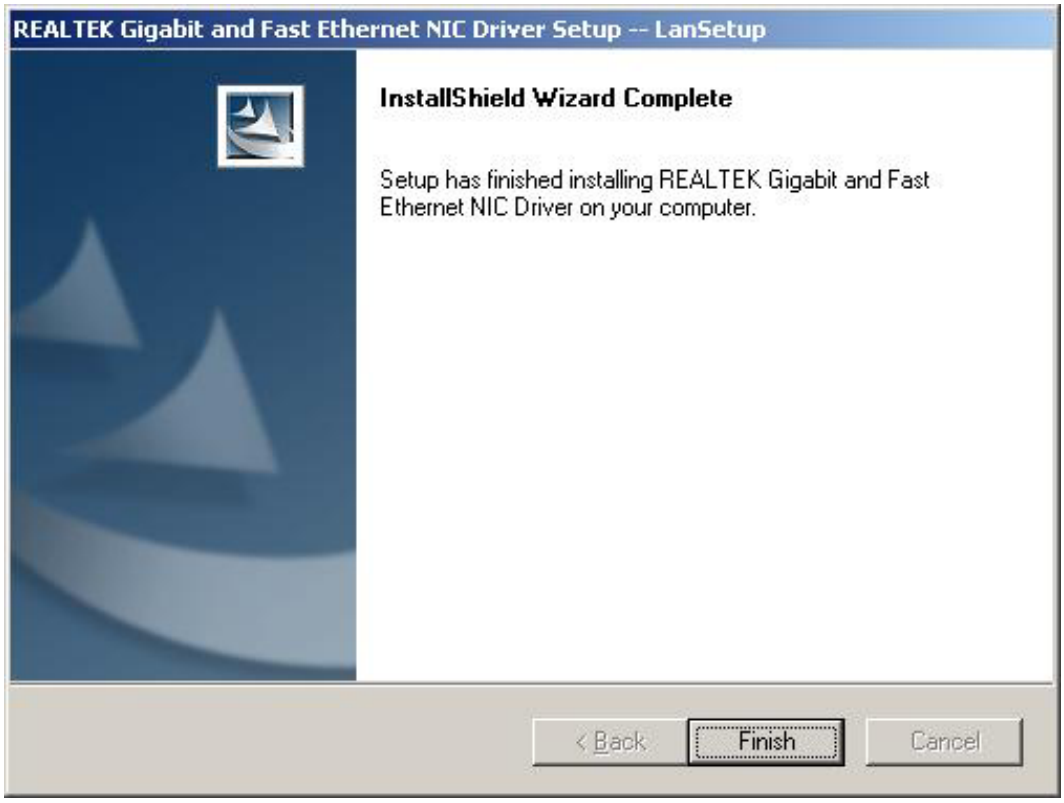



**Figure 6-16: Installing Screen**

**Step 10:** Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

**Step 11:** Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard** (**Figure 6-17**).


**Figure 6-17: Restart the Computer**

Appendix

A

# BIOS Configuration Options

## A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 5**.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Appendix

B

# Watchdog Timer

**NOTE:**

The following discussion applies to DOS environment. It is recommended you contact IEI support or visit our website 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 will either perform 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**

You have to 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 will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer will be disabled if you set the time-out value to be 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 will reset.

## 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
;
; ADD YOUR APPLICATION PROGRAM HERE
;
        CMP     EXIT_AP, 1      ; is your application over?
        JNE     W_LOOP          ; No, restart your application
        MOV     AX, 6F02H       ; disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H
;
; EXIT ;
```

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Appendix

C

# Address Mapping

## C.1 I/O 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 | Intel(R) Graphics Controller |
| 3C0-3DF | Intel(R) Graphics Controller |
| 3F6-3F6 | Primary IDE Channel |
| 3F7-3F7 | Standard floppy disk controller |
| 3F8-3FF | Serial Port 1 (COM1) |

**Table C-1: I/O Address Map**

## C.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 C-2: 1st MB Memory Address Map**

## C.3 IRQ Mapping Table

| IRQ# | Description | IRQ# | Description |
|---|---|---|---|
| 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 C-3: IRQ Mapping Table**

## C.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 C-4: IRQ Mapping Table**

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