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ROCKY-3786EV

PICMG Socket-370 133MHz FSB CPU Card

with VGA, LAN, GbE, USB 2.0, Audio and SATA RAID

User Manual

Rev. 4.0 July, 2006

RoHS Lead Free

REVISION HISTORY

Title	ROCKY-3786EV Socket 370 CPU board	
Revision Number	Description	Date of Issue
4.0	Initial release of the RoHS compliant ROCKY-3786EV CPU card	July 2006

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TRADEMARKS

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Glossary

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

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Chapter

1

Introduction

1.1 ROCKY-3786EV CPU Board Overview

The PICMG form factor ROCKY-3786EV Pentium® III CPU platform is fully equipped with a high performance processor and advanced multi-mode I/Os. The ROCKY-3786EV is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 ROCKY-3786EV Model Variations

The ROCKY-3786EV has two model variations shown in **Table 1-1**.

Model Name	CPU	Ethernet	USB	VGA	CFII
ROCKY-3786EV-RS-R40	Socket 370 base	10/100Mbps	USB 1.1	Yes	Yes
ROCKY-3786EVGU2-RS-R40	Socket 370 base	GbE	USB 2.0	Yes	Yes

Table 1-1: ROCKY-3786EV Model Variations

1.1.2 ROCKY-3786EV CPU Board Applications

The ROCKY-3786EV CPU board has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.3 ROCKY-3786EV CPU Board Benefits

Some of the ROCKY-3786EV CPU board benefits include,

- providing on-chip VGA which supports up to 1600x1200 resolution.
- operating reliably in harsh industrial environments with ambient temperatures as high as 60°C
- providing parallel port and IDE interface which are compatible with IBM PC/AT architecture

1.1.4 ROCKY-3786EV CPU Board Features

Some of the ROCKY-3786EV CPU board features are listed below:

- Complies with PICMG 1.0

- Complies with RoHS
- Supports up to 133 MHz front side bus (FSB)
- Supports up to 512 MB SDRAM memory module
- Supports two SATA channels with transfer rates up to 150MB/s
- Optional high performance gigabit Ethernet (GbE) controller
- Optional USB 2.0 connectors

1.2 ROCKY-3786EV CPU Board Overview
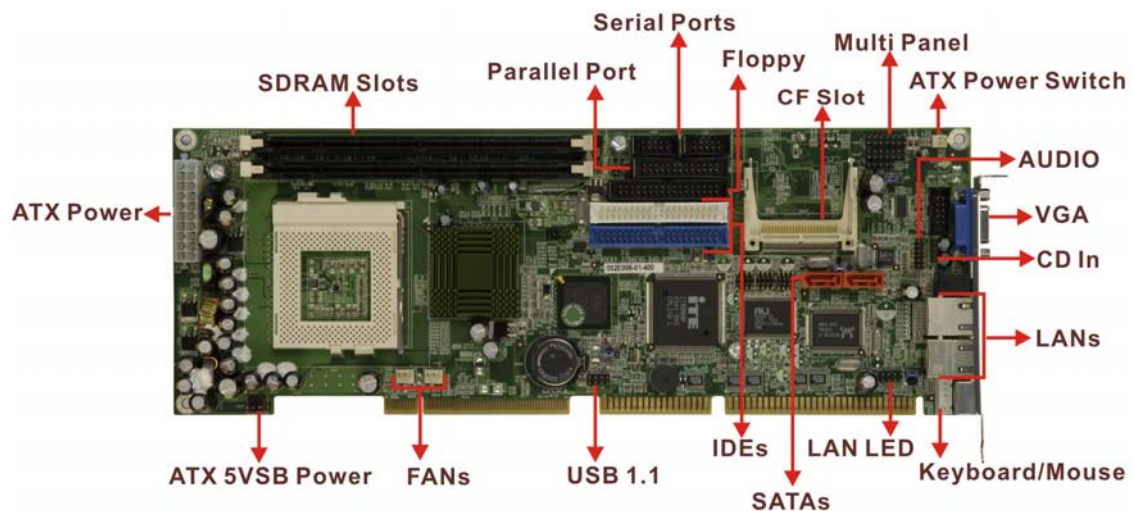
Figure 1-1 ROCKY-3786EV CPU Board Overview

1.2.1 ROCKY-3786EV CPU Board Connectors

The ROCKY-3786EV CPU board has the following connectors onboard:

- 1 x ATX power connector
- 1 x ATX power 5VSB and PSON connector
- 1 x ATX power switch connector
- 1 x Audio connector
- 1 x CD-in connector
- 1 x Compact Flash slot
- 2 x CPU fan connectors
- 2 x SDRAM slots
- 1 x Floppy disk drive connector
- 2 x IDE device connectors
- 1 x IrDA connector

- 1 x Keyboard/Mouse connector
- 1 x LAN LED connector
- 1 x Multi panel connector
- 1 x Parallel port connector
- 2 x SATA connectors
- 2 x Serial port connectors
- 2 x USB 1.1 connectors
- 4 x USB 2.0 connectors (optional)
- 1 x VGA connector

The ROCKY-3786EV CPU board has the following connectors on the board rear panel:

- 1 x Audio Line Out connector
- 2 x RJ-45 Ethernet connectors
- 1 x Keyboard/Mouse connector
- 1 x VGA connector

The location of these connectors on the CPU Card can be seen in **Figure 3-21**. These connectors are fully described in **Chapter 2**.

NOTE:

There are no configuration jumpers or connectors on

the soldering side.

1.2.2 Technical Specifications:

ROCKY-3786EV CPU board technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	
CPUs Supported	Intel® Pentium® III, Celeron, or VIA C3
Chipsets	Northbridge: Intel® 815E Southbridge: ICH2

I/O Controller	IT8712
Graphics Support	On Chip 815E
Memory	Two PC 100/133 SDRAM memory modules (Max. 512MB)
PCI Bus Interface	33MHz, Revision 2.2
Serial ATA (SATA)	Two SATA connectors
HDD Interface	Two IDE channels supports four Ultra ATA 33/66/100 devices
Floppy Disk Drive (FDD)	Supports FDD
USB Interfaces	Two USB 1.1 connectors supported Four USB 2.0 connectors supported (optional)
Serial Ports	Two high-speed 16C550 compatible UARTs ports
Hardware Monitoring	Cooling fan, temperature and system voltages
Power Management	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
Infrared Support	Supports Serial Infrared (SIR) and Amplitude Shift Keyed IR (ASKIR) interface
Ethernet	Intel® 82562ET 10/100Mbps or Intel® 82541 GbE
BIOS	AwardBIOS
Physical Dimensions	380mm x 125mm (width x length)
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)
Audio	Audio Codec '97 (AC'97) version 2.3 Realtek ALC655

Table 1-2: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 CPU Support

The ROCKY-3786EV CPU card has socket 370 and supports the following CPUs:

- Intel® Pentium® III (FC-PGA) processor, up to 1.4GHz
- Intel® Celeron® processor, 700MHz – 1.2GHz
- VIA C3 processor, 733MHz or above

2.1.1 Pentium® III

The Intel® Pentium® III CPU comes with the following features:

- Available in 1.10 GHz, 1 GHz, 900, 850, 800, 750, 700, 650, 600E, 550E, and 500E MHz for a 100 MHz system bus
- System bus frequency at 100 MHz and 133 MHz ("E" denotes support for Advanced Transfer Cache and Advanced system buffering; "B" denotes support for a 133 MHz system bus where both bus frequencies are available for order per each given core frequency
- Available in versions that incorporate 256-KB Advanced Transfer Cache (on-die, full speed Level 2 (L2) cache with Error Correcting Code (ECC))
- Dual Independent Bus (DIB) architecture: Separate dedicated external System Bus and dedicated internal high-speed cache bus
- Internet Streaming SIMD Extensions for enhanced video, sound and 3D performance
- Binary compatible with applications running on previous members of the Intel microprocessor line
- Dynamic execution micro architecture
- Intel Processor Serial Number
- Power Management capabilities
  - System Management mode
  - Multiple low-power states
- Optimized for 32-bit applications running on advanced 32-bit operating systems
- Flip Chip Pin Grid Array (FC-PGA/FC-PGA2) packaging technology; FC-PGA/FC-PGA2 processors deliver high performance with improved handling protection and socketability
- Integrated high performance 16-KB instruction and 16-KB data, nonblocking,

level one cache

- 256-KB Integrated Full Speed level two cache allows for low latency on read/store operations
- Double Quad Word Wide (256 bit) cache data bus provides extremely high throughput on read/store operations.
- 8-way cache associativity provides improved cache hit rate on reads/store operations.
- Error-correcting code for System Bus data
- Enables systems which are scaleable for up to two processors

2.1.2 Celeron®

The Intel® Celeron® CPU comes with the following features:

- 300, 366, 433, 566, 733, 850 MHz, and 1.2 GHz processor speeds
- 32K L1 cache (16K code and 16K data)
- 128K integrated L2 cache; 256K for 1.2 GHz
- High performance floating-point unit
- Intel® MMX™ technology
- 66 MHz Processor Side Bus (PSB) for 300 - 733 MHz processor speeds, and 100 MHz PSB for 850 MHz and 1.2 GHz
- Compatible with 370 pin Socket specifications
- Compatible with Intel® 815, 815E, 810 and Intel® 440BX chipsets (except 1.2 GHz)
- 1.2 GHz supported by Intel® 815/E, 810E2 chipsets
- Flip-Chip Pin Grid Array (FC-PGA2) package (for 1.2 GHz)
- Flip-Chip Pin Grid Array (FC-PGA) package (566, 733 and 850 MHz)
- Plastic Pin Grid Array (PPGA) package (300, 366, and 433 MHz)
- Built-in Self Test (BIST)

2.1.3 VIA® C3

The VIA® C3 CPU comes with the following features:

- Padlock Advanced Cryptography Engine (available in Stepping 8 and higher).
- Padlock Random Number Generator (available in Stepping 3 and higher).
- Plug-compatible with Socket 370 processors in terms of bus protocol,

electrical interface, and physical package

- Software-compatible with thousands of x86 software applications available

- MMX-compatible instructions

- SSE-compatible instructions

- Two large (64-KB each, 4-way) on-chip caches (2-way in Stepping 8 and higher)

- 64-KB Level 2 victim cache (16-way)

- Two large TLBs (128 entries each, 8-way)

- Branch Target Address Cache with 1k entries each identifying 2 branches

- Unique and sophisticated branch prediction mechanisms

- Bus speeds up to 133 MHz

- Extremely low power dissipation

- Very small die-52 mm2 in TSMC 0.13µ technology (47 mm2 for Stepping 8 and higher)

2.2 Onboard Chipsets

2.2.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- **Northbridge**: Intel® 815E
- **Southbridge**: Intel® ICH2

The following two sections (**Section 2.2.2** and **Section 2.2.3**) list some of the features of the Intel® 815E and the Intel® ICH2 chipsets. For more information on these two chipsets please refer to the Intel website.

2.2.2 Intel® 815E Northbridge Chipset

The Intel® 815E northbridge chipset comes with the following features:

- Flexible processor support ranging from the Intel Celeron processor - Ultra Low Power at 300MHz to the Pentium III processor - Low Power at 700 MHz and the Celeron processor at 566 MHz to the Pentium III processor with 512K cache at 1.26 GHz and beyond with support for 66, 100, or 133 MHz Processor Side Bus (PSB) speeds

- Increased I/O bus bandwidth through the use of Intel Hub Architecture which

allows better concurrency for next-generation embedded computing applications

- Support for 100 and 133 MHz SDRAM enabling cost effective high volume memory
- 512 MB maximum memory
- Low power sleep mode for energy savings
- Dual (815) or Quad (815E) USB ports
- Support for ATA/66 (815) or ATA/100 (815E)
- Integrated AC '97 Controller for cost effective audio and modem solutions
- Support (815E)
- Alert on LAN 1.0
- Intel 3D integrated graphics with Direct AGP expandability for vivid 2D and 3D graphics
- AGP4X upgradeable for increased graphics bandwidth allowing the highest possible graphics performance
- Add-in Graphics Performance Accelerator (GPA) card to provide up to a 30% boost for better 2D and 3D graphics performance over similar systems without a GPA card
- AC '97 Controller for better audio quality
- Soft DVD MPEG-2 playback with HW motion compensation for life-like audio and video

2.2.3 Intel® ICH2 Southbridge Chipset

The Intel® ICH2 southbridge chipset comes with the following features:

- PCI Bus I/F
  - Supports PCI at 33 MHz
  - Supports PCI Rev 2.2 Specification
  - 133 MByte/sec maximum throughput
  - Supports up to 6 master devices on PCI
  - One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
- Integrated LAN Controller
  - WfM 2.0 Compliant
  - Interface to discrete LAN Connect component
  - 10/100 Mbit/sec Ethernet support

- 1 Mbit/sec HomePNA* support
- Integrated IDE Controller
  - Independent timing of up to 4 drives
  - Ultra ATA/100/66/33, BMIDE and PIO modes
  - Read transfers up to 100MB/s, Writes to 89 MB/s
  - Separate IDE connections for Primary and Secondary cables
  - Implements Write Ping-Pong Buffer for faster write performance
- USB
  - 2 UHCI Host Controllers with a total of 4 ports
  - USB 1.1 compliant
  - Supports wake-up from sleeping states S1–S4
  - Supports legacy Keyboard/Mouse software
- AC'97 Link for Audio and Telephony CODECs
  - AC'97 2.1 compliant
  - Independent bus master logic for 5 channels (PCM In/Out, Mic Input, Modem In/Out)
  - Separate independent PCI functions for Audio and Modem
  - Support for up to six channels of PCM audio output (full AC3 decode)
  - Supports wake-up events
- Interrupt Controller
  - Support up to 8 PCI interrupt pins
  - Supports PCI 2.2 Message-Based Interrupts
  - Two cascaded 82C59
  - Integrated I/O APIC capability
  - 15 interrupts supported in 8259 mode, 24 supported in I/O APIC mode
  - Supports Serial Interrupt Protocol
  - Supports Front-Side Bus interrupt delivery
- 1.8 V operation with 3.3 V I/O
  - 5V tolerant buffers on IDE, PCI, USB Overcurrent and Legacy signals
- GPIO
  - TTL, Open-Drain, Inversion
- Timers Based on 82C54
  - System timer, Refresh request, Speaker tone output
- Power Management Logic
  - ACPI 1.0 compliant
  - ACPI Power Management Timer

- o PCI PME# support
- o SMI# generation
- o All registers readable/restorable for proper resume from 0V suspend states
- o Support for APM-based legacy power management for non-ACPI implementations
- ■ External Glue Integration
  - o Integrated Pull-up, Pull-down and Series Termination resistors on IDE and processor interface
- ■ Enhanced Hub I/F buffers improve routing flexibility (Not available with all Memory Controller Hubs)
- ■ Firmware Hub (FWH) I/F supports BIOS memory size up to 8 MBs
- ■ Low Pin count (LPC) I/F
  - o Allows connection of legacy ISA and X-Bus devices such as Super I/O
  - o Supports two Master/DMA devices.
- ■ Enhanced DMA Controller
  - o Two cascaded 8237 DMA controllers
  - o PCI DMA: Supports PC/PCI Includes two PC/PCI REQ#/GNT# pairs
  - o Supports LPC DMA
  - o Supports DMA Collection Buffer to provide Type-F DMA performance for all DMA channels
- ■ Real-Time Clock
  - o 256-byte battery-backed CMOS RAM
  - o Hardware implementation to indicate century rollover
- ■ System TCO Reduction Circuits
  - o Timers to generate SMI# and Reset upon detection of system hang
  - o Timers to detect improper processor reset
  - o Integrated processor frequency strap logic
- ■ SM Bus
  - o Host interface allows processor to communicate via SM Bus
  - o Slave interface allows an external Microcontroller to access system resources
  - o Compatible with most 2-Wire components that are also I2C compatible
- ■ Supports ISA bus via external PCI-ISA Bridge
- ■ 360-pin EBGA package

2.3 Data Flow

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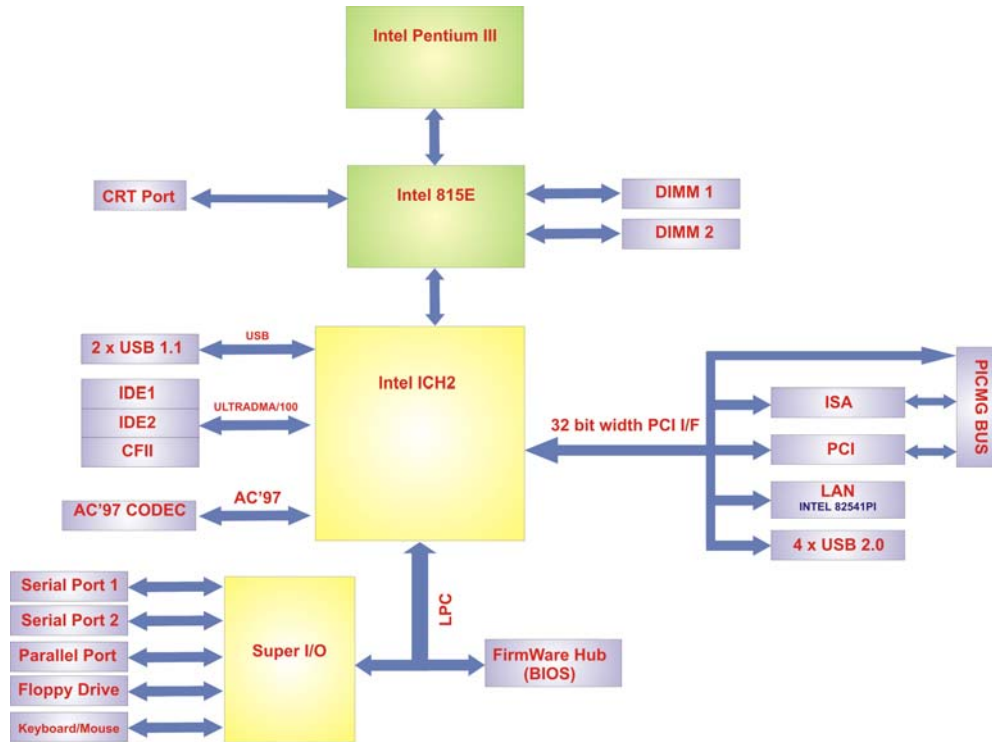
Figure 2-1: Data Flow Block Diagram

2.4 Graphics Support

The graphics features listed below are all integrated on the Intel 815E northbridge chipset.

- Integrated Graphics Controller Multiplexed with AGP Controller
  - ○ 3D Hyper Pipelined Architecture
  - ○ Full 2D H/W Acceleration
  - ○ Motion Video Acceleration
  - ○ Supports 133 MHz System Memory while running in non-CPC mode
- 3D Graphics Visual Enhancements
  - ○ Flat & Gouraud Shading
  - ○ Mip Maps with Trilinear and Anisotropic Filtering
  - ○ Full Color Specular

- o Fogging Atmospheric Effects
- o Z Buffering
- o 3D Pipe 2D Clipping
- o Backface Culling
- ■ Digital Video Output
  - o 85 MHz Flat Panel Monitor/Digital CRT Interface Or Digital Video Output for use with a external TV encoder
- ■ Display
  - o Integrated 24-bit 230 MHz RAMDAC
  - o Gamma Corrected Video
  - o DDC2B Compliant
- ■ 2D Graphics
  - o Up to 1600x1200 in 8-bit Color at 85 Hz Refresh
  - o Hardware Accelerated Functions
- ■ Arithmetic Stretch Blitter Video
  - o H/W Motion Compensation Assistance for S/W MPEG2 Decode
  - o Software DVD at 30 fps
  - o Digital Video Out Port
  - o NTSC and PAL TV Out Support
  - o H/W Overlay Engine with Bilinear Filtering
  - o Independent gamma correction, saturation, brightness & contrast for overlay

2.5 Memory Support

The ROCKY-3786EV CPU card has two 168-pin memory module (DIMM) sockets and support PC100/133 SDRAM with the following specifications:

- ■ **Maximum RAM**: 512MB
- ■ **DIMM Transfer Rates**: 100MHz, 133MHz

2.6 PCI Bus Interface Support

The PCI bus on the ROCKY-3786EV CPU Board has the following features:

- ■ 33MHz Revision 2.2 is implemented
- ■ Up to six master devices are supported

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

2.7 10/100/1000Mbps Ethernet

The onboard Intel 82562ET controller (for ROCKY-3786EV) provides 10/100 Base-T Internet connectivity to the system. The Intel 82562ET controller features are below.

- IEEE 802.3 10BASE-T/100BASE-TX compliant physical layer interface
- IEEE 802.3u Auto-Negotiation support
- Digital Adaptive Equalization control
- Link status interrupt capability
- XOR Tree mode support for board testing
- 3-port LED support (speed, link and activity)
- 10BASE-T auto-polarity correction
- Diagnostic loopback mode
- 1:1 transmit transformer ratio support
- Low power (less than 300 mW in active transmit mode)
- Reduced power in "unplugged mode" (less than 50 mW)
- Automatic detection of "unplugged mode"
- 3.3 V device
- 48-pin Shrink Small Outline Package
- Platform LAN connect interface support

The onboard Intel 82541PI controller (for ROCKY-3786EVGU2) provides GbE Ethernet interface. The Intel 82541PI controller features are below.

- IEEE 802.3 10BASE-T compliant physical layer interface
- IEEE 802.3u Auto-Negotiation and 100BASE-TX support
- Power Save mode switches link speed from 1000Mb/s down to 10 or 100Mb/s
- PCI clock suspension for low-power mobile design
- Programmable host memory receive buffers (256B to 16KB)
- TCP segmentation (LSO), TCP and UDP checksum off-loading
- Compliance with PCI Power Management v1.1/ACPI v2.0
- Automatic link speed switching from 1000Mb/s down to 10 or 100Mb/s in standby

2.8 Drive Interfaces

The ROCKY-3786EV can support the following drive interfaces.

- 2 x SATA drives
- 2 x IDE devices
- 1 x FDD
- 1 x Compact Flash (CF) Card

2.8.1 SATA Drives

The ROCKY-3786EV CPU Board supports two first generation SATA drives with transfer rates up to 150MB/s.

2.8.2 IDE HDD Interfaces

The ROCKY-3786EV southbridge chipset IDE controller supports up to four HDDs with the following specifications:

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

2.8.3 Floppy Disk Drive (FDD)

The ROCKY-3786EV CPU Board supports a single FDD. The following FDD formats are compatible with the board.

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

2.8.4 Compact Flash Support

- Standard CF-II cards can be inserted into the compact flash slot on the solder side of the ROCKY-3786EV.

2.9 Serial Ports

The ROCKY-3786EV CPU board has two high-speed UART serial ports, configured as CN2 and CN8. The serial ports have the following specifications.

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

2.10 Real Time Clock

256-byte battery backed CMOS RAM

2.11 Infrared Data Association (IrDA) Interface

The ROCKY-3786EV CPU Board IrDA supports the following interfaces.

- Serial Infrared (SIR)
- Shift Keyed Infrared (ASKIR)

If an IrDA port is need, COM2 must be configured as either SIR or ASKIR mode in the BIOS under **Super IO devices**.

2.12 USB Interfaces

The ROCKY-3786EV CPU board has two internal USB 1.1 interfaces. The ROCKY-3786EVGU2 has additional four internal USB 2.0 interfaces.

2.13 BIOS

The ROCKY-3786EV CPU Board uses a licensed copy of Phoenix AwardBIOS. Flash BIOS features used are listed below:

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

2.14 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the ROCKY-3786EV CPU Board are listed below.

■ Minimum Operating Temperature: 0ºC (32°F)

■ Maximum Operating Temperature: 60°C (140°F)

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

2.15 Audio Codec

The ROCKY-3786EV has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

■ Meets performance requirements for audio on PC99/2001 systems

■ Meets Microsoft WHQL/WLP 2.0 audio requirements

■ 16-bit Stereo full-duplex CODEC with 48KHz sampling rate

■ Compliant with AC'97 Rev 2.3 specifications

■ Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing

■ 14.318MHz -> 24.576MHz PLL to eliminate crystal

■ 12.288MHz BITCLK input

■ Integrated PCBEEP generator to save buzzer

■ Interrupt capability

■ Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX

■ High-quality differential CD input

■ Two analog line-level mono inputs: PCBEEP, PHONE-IN

■ Two software selectable MIC inputs

■ Dedicated Front-MIC input for front panel applications (software selectable)

■ Boost preamplifier for MIC input

■ LINE input shared with surround output; MIC input shared with Center and LFE output

■ Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out

■ External Amplifier Power Down (EAPD) capability

■ Power management and enhanced power saving features

- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode

2.16 Power Consumption

Table 2-1 shows the power consumption parameters for the ROCKY-3786EV CPU board when a Pentium® III processor with a clock speed of 1GHz is running with a 256MB DDR module.

Voltage	Current
+5V	7.6A
+12V	0.23A

Table 2-1: Power Consumption

2.17 Packaged Contents and Optional Accessory Items

2.17.1 Package Contents

The ROCKY-3786EV is shipped with the following components.

- 1 x ROCKY-3786EV single board computer
- 1 x ATA66/100 flat cable
- 2 x SATA cable
- 1 x SATA power cable
- 1 x RS232 cable

- 1 x USB cable
- 1 x Keyboard/ PS2 mouse Y cable
- 1 x Mini jumper pack
- 1 x QIG (quick installation guide)
- 1 x Utility CD

2.17.2 Optional Accessory Items

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

- FDD cable
- LPT cable
- CPU cooler

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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 ROCKY-3786EV CPU Board Layout

Figure 3-1 shows the onboard peripheral connectors, backplane peripheral connectors and onboard jumpers.
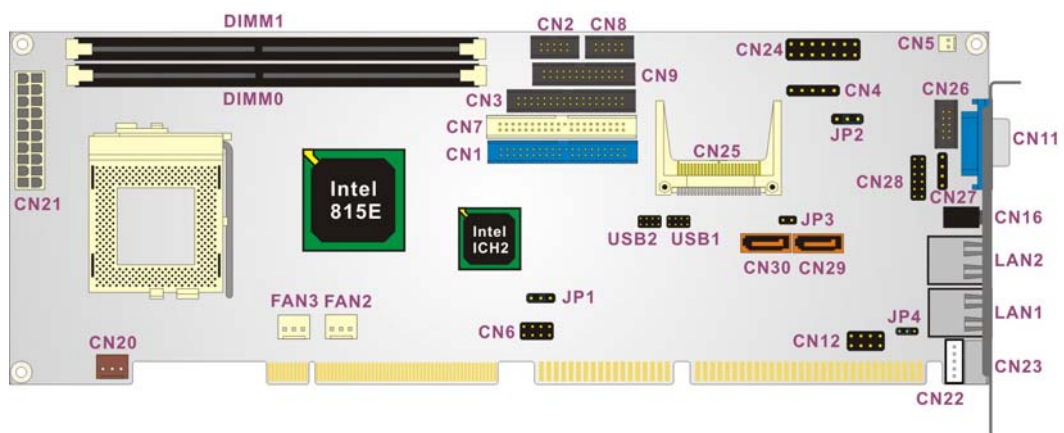
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the ROCKY-3786EV CPU board. Detailed descriptions of these connectors can be found in **Section 3.2**.

Connectors	Type	Label
ATX power connector	20-pin header	CN21
ATX power 5VSB and PSON connector	3-pin header	CN20
ATX power switch connector	2-pin header	CN5
Audio connector	12-pin header	CN28
CD In connector	4-pin header	CN27

Compact Flash (CF) slot	50-pin header	CN25
CPU fan connector (1)	3-pin header	FAN2
CPU fan connector (2)	3-pin header	FAN3
CRT connector	10-pin header	CN26
SDRAM slot (1)	168-pin slot	DIMM0
SDRAM slot (2)	168-pin slot	DIMM1
FDD connector	34-pin header	CN3
IDE Interface connector (Primary)	40-pin header	CN1
IDE Interface connector (Secondary)	40-pin header	CN7
IrDA connector	5-pin header	CN4
Keyboard connector	5-pin header	CN22
LAN LED connector	8-pin header	CN12
Multi Panel connector	14-pin header	CN24
Parallel port connector	26-pin header	CN9
SATA drive port (1)	SATA disk drive port	CN29
SATA drive port (2)	SATA disk drive port	CN30
Serial port connector	10-pin header	CN2
Serial port connector	10-pin header	CN8
USB 1.1 connector	8-pin header	CN6
USB 2.0 connector (optional)	8-pin header	USB1
USB 2.0 connector (optional)	8-pin header	USB2

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the ROCKY-3786EV CPU card. Detailed descriptions of these connectors can be found in **Section 3.3**.

Connectors	Type	Label
Audio Line Out connector	LINE OUT	CN16
10/100Mbps Ethernet connector	RJ-45	LAN1
Optional 1Gb Ethernet connector	RJ-45	LAN2
Keyboard/Mouse connector	PS/2	CN23
VGA connector	15-pin VGA connector	CN11

Table 3-2: Peripheral Interface Connectors

3.1.4 Onboard Jumpers

Table 3-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in **Section 3.4**.

Jumpers	Type	Label
Clear CMOS Setup	3-pin header	JP1
BIOS protection setting	3-pin header	JP2
Keyboard power selection	3-pin header	JP4
CF mode selection	2-pin header	JP3

Table 3-3: Onboard Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU board is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the ROCKY-3786EV CPU board.

3.2.1 ATX Power Connector

CN Label: CN21

CN Type: 20-pin header (2x10)

CN Location: See Figure 3-2

CN Pinouts: See Table 3-4

The ROCKY-3786EV can work without backplane, while attaching external power to this ATX power connector. This connector supports the ATX power supply.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
11	3.3V	1	3.3V
12	-12V	2	3.3V
13	GND	3	GND
14	PSON#	4	+5V
15	GND	5	GND
16	GND	6	+5V
17	GND	7	GND
18	-5V	8	Power good
19	+5V	9	+5VSB
20	+5V	10	+12V

Table 3-4: ATX Power Connector Pinouts
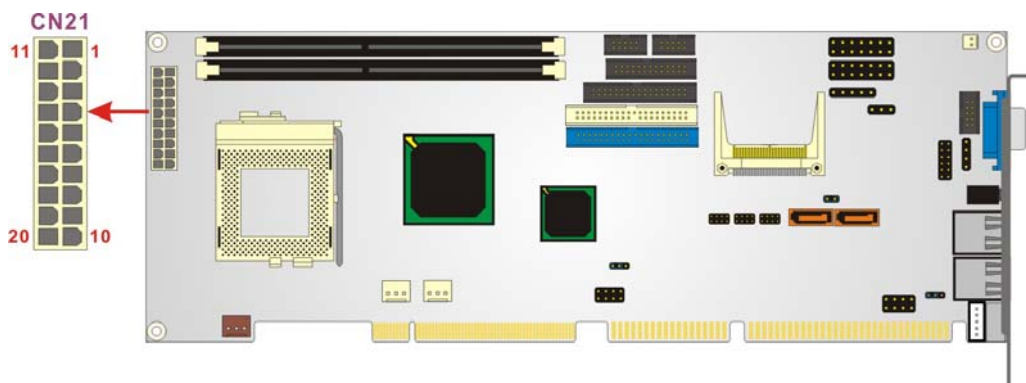
Figure 3-2: ATX Power Connector Location

3.2.2 ATX Power 5VSB and PSON connector

CN Label: CN20

CN Type: 3-pin header

CN Location: See Figure 3-3

CN Pinouts: See Table 3-5

PIN NO.	DESCRIPTION
1	+5VSB
2	PSON#
3	GND

Table 3-5: ATX Power 5VSB and PSON Connector Pinouts
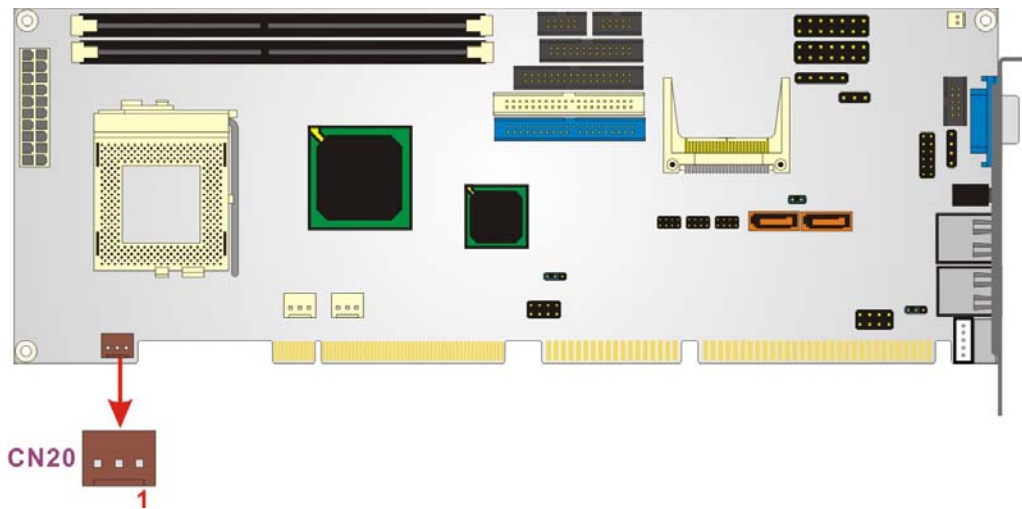
Figure 3-3: ATX Power 5VSB and PSON Connector Location

3.2.3 ATX Power Switch Connector

CN Label: CN5

CN Type: 2-pin header

CN Location: See Figure 3-4

CN Pinouts: See Table 3-6

The ATX power switch connector supports ATX power switch and enables power on/off from the chassis.

PIN NO.	DESCRIPTION
1	PWR_BUTTON+
2	PWR_BUTTON-

Table 3-6: ATX Power Switch Connector Pinouts
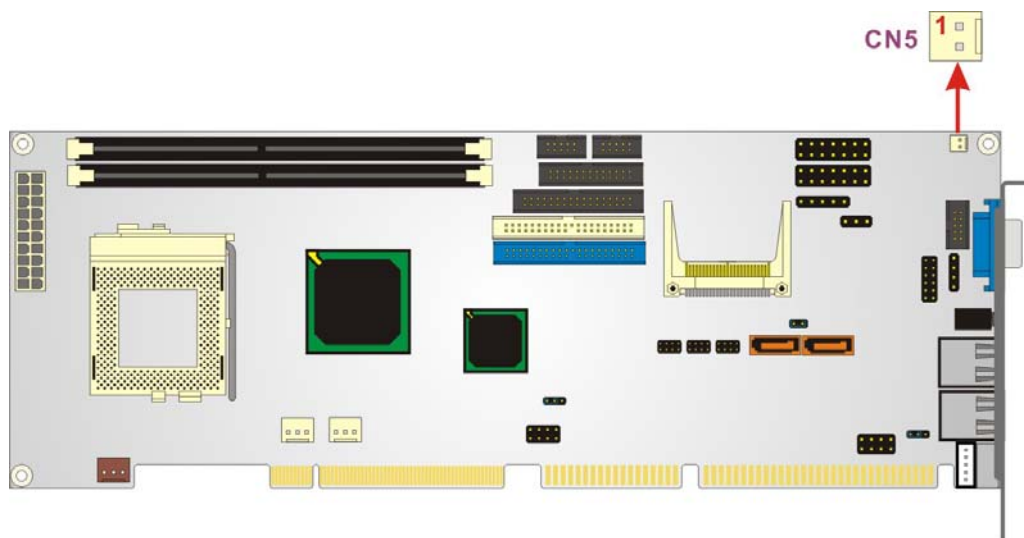
Figure 3-4: ATX Power Switch Connector Location

3.2.4 Audio Connector

CN Label: CN28

CN Type: 12-pin header (2x6)

CN Location: See Figure 3-5

CN Pinouts: See Table 3-7

The ROCKY-3786EV has a built-in AC '97 AUDIO CODEC connector directly connected to the SPEAKER-OUT, MIC-IN, LINE-IN and LINE-OUT.

PIN NO.	DESCRIPTION
1	LEFT SPEAKER OUT SIGNAL (WITH OP MPLIFIER)
2	RIGHT SPEAKER OUT SIGNAL (WITH OP AMPLIFIER)
3	GROUND (FOR SPK CONNECTOR)
4	GROUND (FOR LINE OUT CONNECTOR)
5	LEFT LINE OUT SIGNAL
6	RIGHT LINE OUT SIGNAL
7	LEFT LINE IN SIGNAL
8	RIGHT LINE IN SIGNAL
9	GROUND (FOR LINE IN CONNECTOR)
10	GROUND (NO USE)
11	MIC IN
12	GROUND (FOR MIC IN CONNECTOR)

Table 3-7: Audio Connector Pinouts
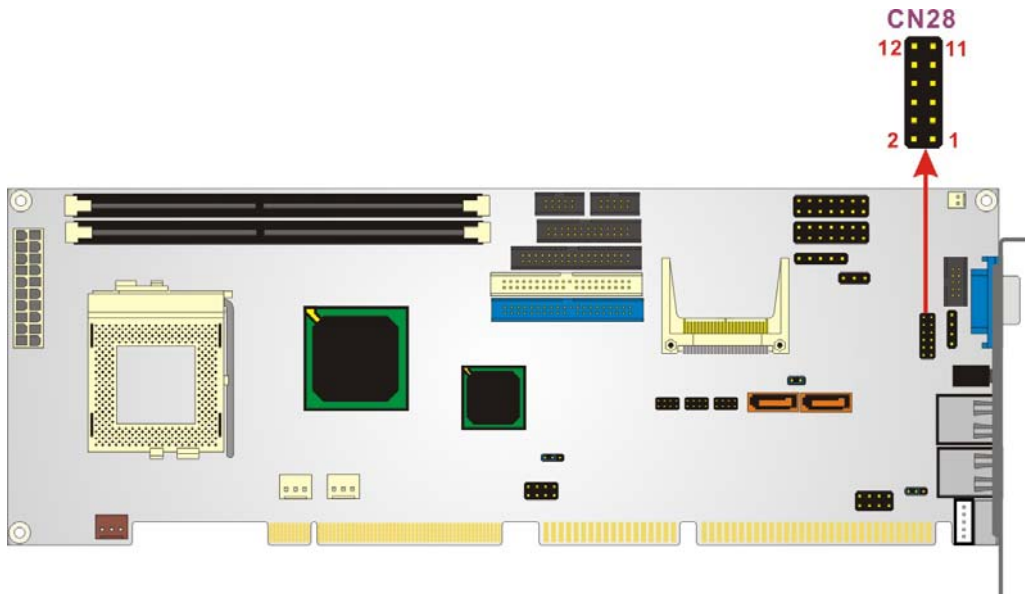
Figure 3-5: Audio connector Location

3.2.5 CD In Connector

CN Label: CN27

CN Type: 4-pin header

CN Location: See Figure 3-6

CN Pinouts: See Table 3-8

This 4-pin header connects to audio sources such as CD/DVD-ROM optical drives.

PIN NO.	DESCRIPTION
1	CD Left
2	GND
3	GND
4	CD Right

Table 3-8: CD In Connector Pinouts
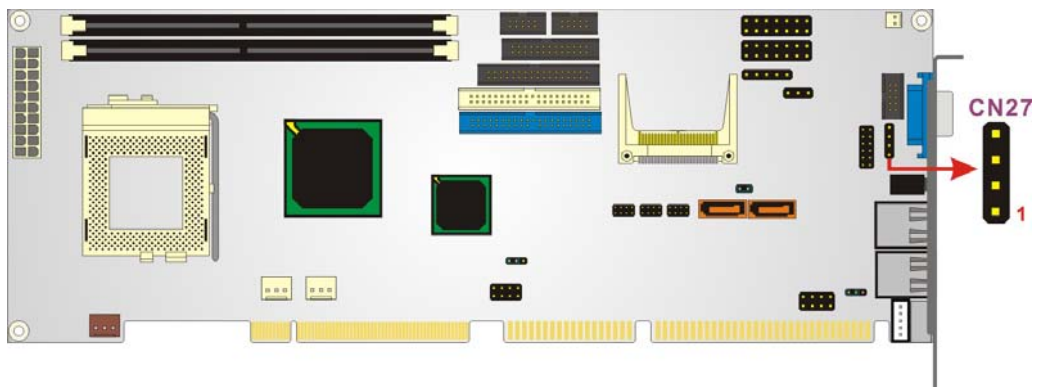
Figure 3-6: CD In Connector Location

3.2.6 Compact Flash Socket

CN Label: CN25

CN Type: 50-pin header (2x25)

CN Location: See Figure 3-7

CN Pinouts: See Table 3-9

A compact flash memory module is inserted to the Compact Flash connector (CF1). Jumper 2 (JP2) configures the compact flash drive as either a slave or master device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	CARD DETECT1
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS1#	32	CS3#
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	OBLIGATORY TO PULL HIGH
12	N/C	37	IRQ15
13	VCC	38	VCC
14	N/C	39	MASTER/SLAVE
15	N/C	40	N/C
16	N/C	41	RESET#
17	N/C	42	IORDY
18	A2	43	N/C
19	A1	44	OBLIGATORY TO PULL HIGH
20	A0	45	ACTIVE#
21	D0	46	PDIAG#
22	D1	47	D8
23	D2	48	D9
24	N/C	49	D10
25	CARD DETECT2	50	GROUND

Table 3-9: CFII Socket Pinouts
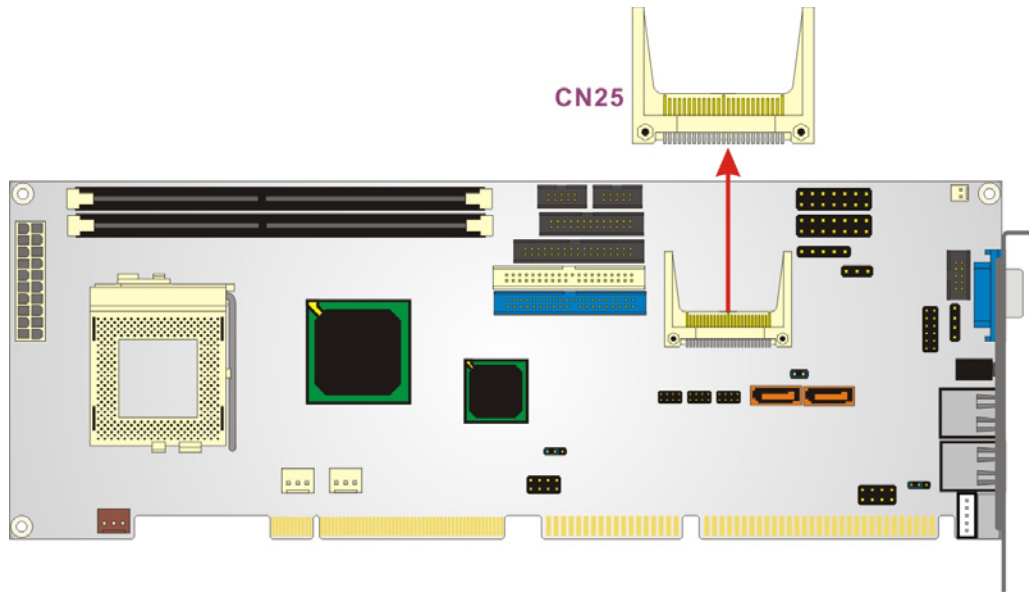
Figure 3-7: CFII Socket Location

3.2.7 CPU Fan Connector

CN Label: FAN2 and FAN3

CN Type: 3-pin header

CN Location: See Figure 3-8

CN Pinouts: See Table 3-10

The CPU fan connector provides a 12V/500mA to the cooling fan. The connector has a "rotation" pin to get rotation signals from the fan and notify the system so the system BIOS can recognize the fan speed. Please note that only certain fans can issue the rotation signals.

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Sensor

Table 3-10 CPU Fan Connector Pinouts
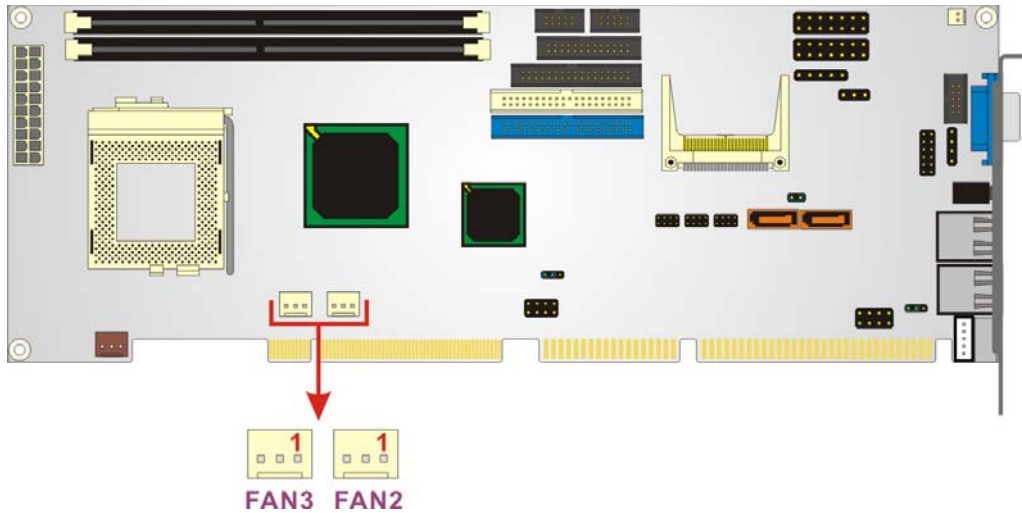
Figure 3-8 CPU Fan Connector Locations

3.2.8 CRT Connector

CN Label: CN26

CN Type: 10-pin header (2x5)

CN Location: See Figure 3-10

CN Pinouts: See Table 3-12

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	DDCCLK
3	GREEN	4	DDC DAT
5	BLUE	6	GROUND
7	HSYNC	8	GROUND
9	VSYNC	10	GROUND

Table 3-11: CRT Connector Pinouts
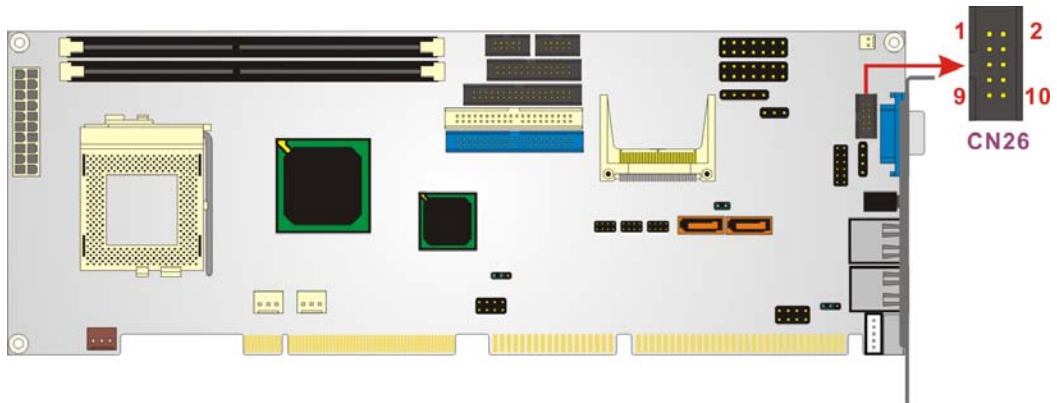
Figure 3-9: CRT Connector Location

3.2.9 FDD Connector

CN Label: CN3

CN Type: 34-pin header (2x17)

CN Location: See Figure 3-10

CN Pinouts: See Table 3-12

The ROCKY-3786EV is shipped with a 34-pin daisy-chain drive connector cable. This cable can be connected to the FDD connector.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	REDUCE WRITE
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX#
9	GROUND	10	MOTOR ENABLE A#
11	GROUND	12	DRIVE SELECT B#
13	GROUND	14	DRIVE SELECT A#
15	GROUND	16	MOTOR ENABLE B#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#

23	GROUND	24	WRITE GATE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	N/C	30	READ DATA#
31	GROUND	32	SIDE 1 SELECT#
33	N/C	34	DISK CHANGE#

Table 3-12: FDD Connector Pinouts
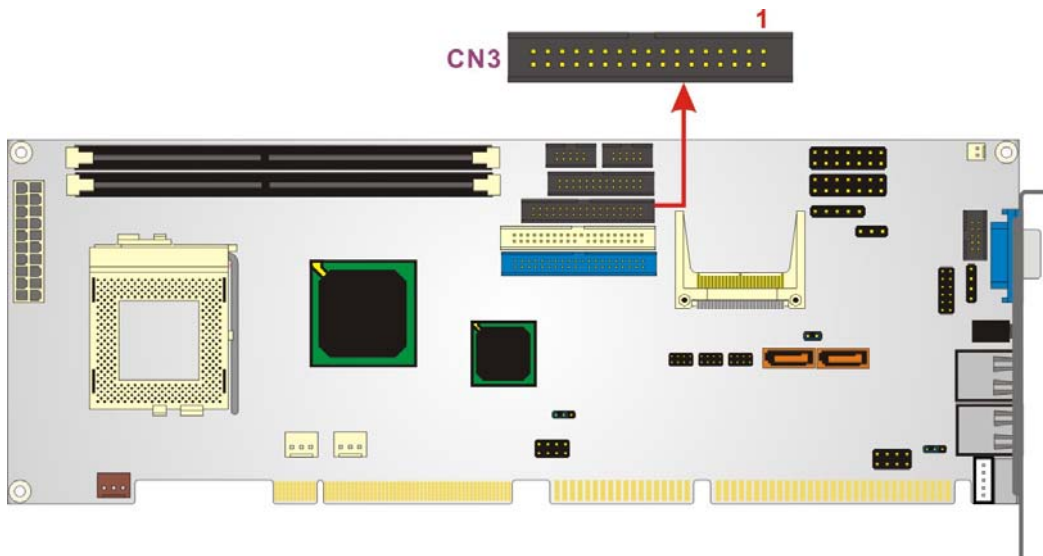
Figure 3-10: FDD Connector Location

3.2.10 IDE Interface Connectors

CN Label: CN1 (primary) and CN7 (secondary)

CN Type: 40-pin header (2x20)

CN Location: See Figure 3-11

CN Pinouts: See Table 3-13

Two IDE connectors provide connectivity for four IDE devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	N/C	28	BALE - DEFAULT
29	N/C	30	GROUND - DEFAULT
31	INTERRUPT	32	IOCS16#-DEFAULT
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 3-13: IDE Interface Connector Pinouts
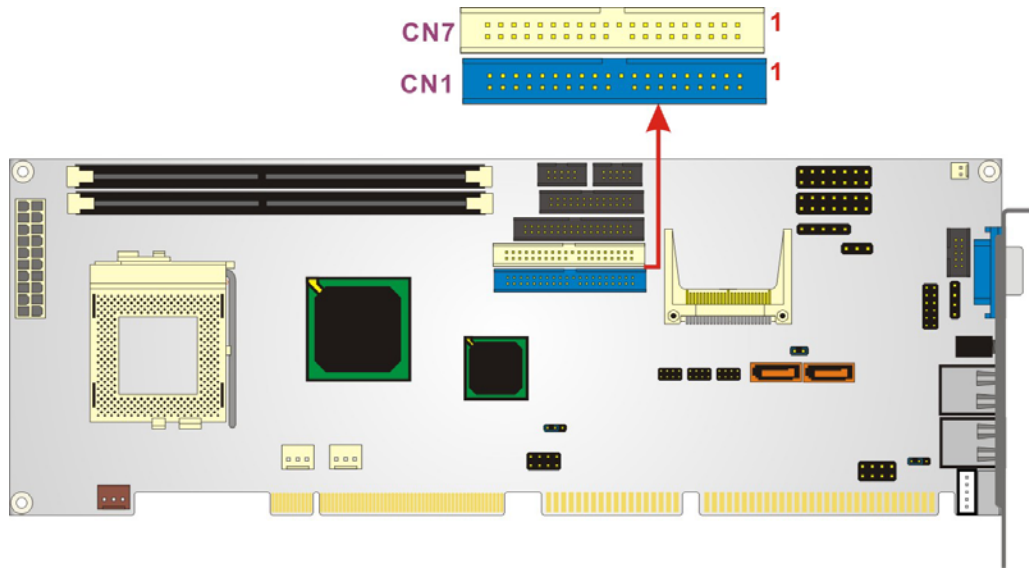
Figure 3-11: IDE Interface Connector Locations

3.2.11 IrDA Connector

CN Label: CN4

CN Type: 5-pin header

CN Location: See Figure 3-12

CN Pinouts: See Table 3-14

The integrated IrDA connector supports both the SIR and ASKIR infrared protocols.

PIN NO.	DESCRIPTION
1	VCC5V
2	N/C
3	IR-RX
4	Ground
5	IR-TX

Table 3-14: IrDA Connector Pinouts
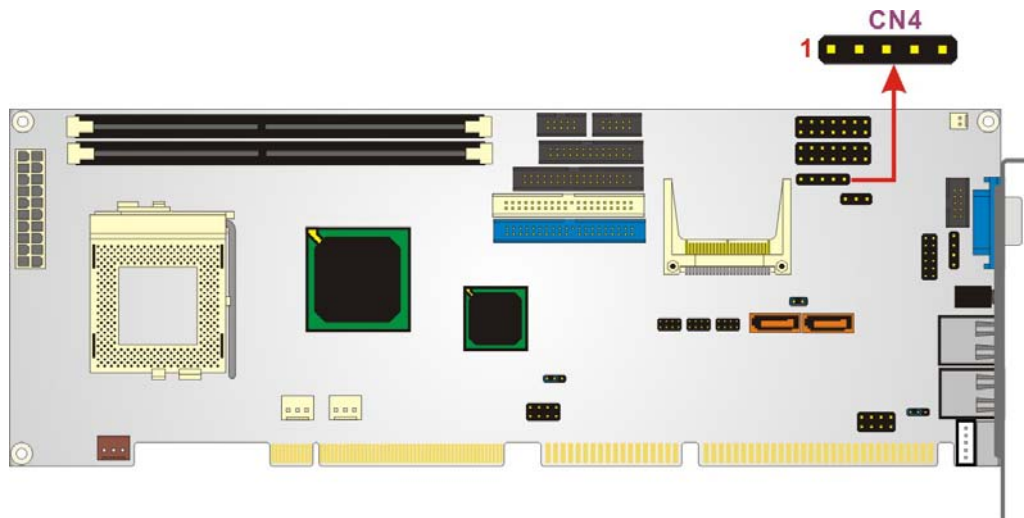
Figure 3-12: IrDA Connector Location

3.2.12 Keyboard Connector

CN Label: CN22

CN Type: 5-pin header

CN Location: See Figure 3-13

CN Pinouts: See Table 3-15

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

PIN NO.	DESCRIPTION
1	KEYBOARD CLK
2	KEYBOARD DATA
3	N/C
4	GND
5	+5V

Table 3-15: Keyboard Connector Pinouts
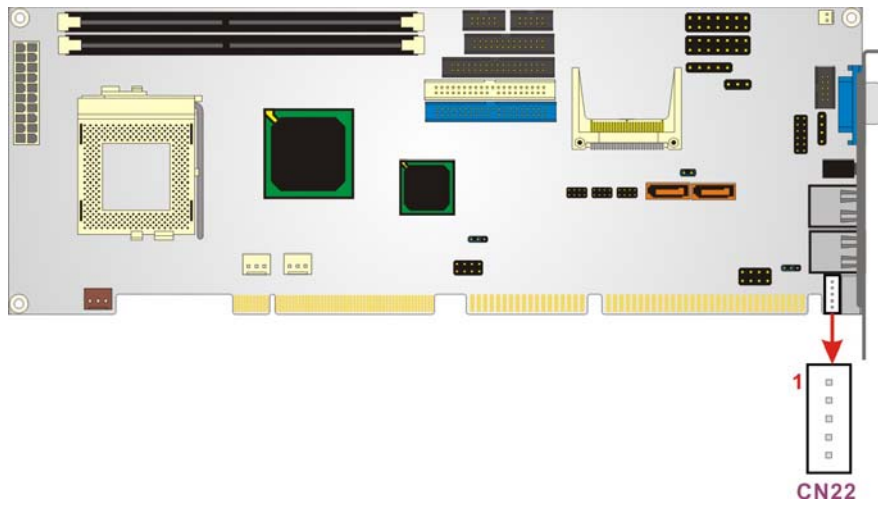
Figure 3-13: Keyboard Connector Location

3.2.13 LAN LED Connector

CN Label: CN12

CN Type: 8-pin header

CN Location: See Figure 3-14

CN Pinouts: See Table 3-16

Use the LAN LED connector to connect the LAN status and activity LEDs.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	100ACT+	2.	100ACT-
3	100LINK+	4.	100LINK-
5.	1G_ACT+	6.	1G_ACT-
7.	1G_ LINK+	8.	1G_LINK-

Table 3-16: LAN LED Connector Pinouts
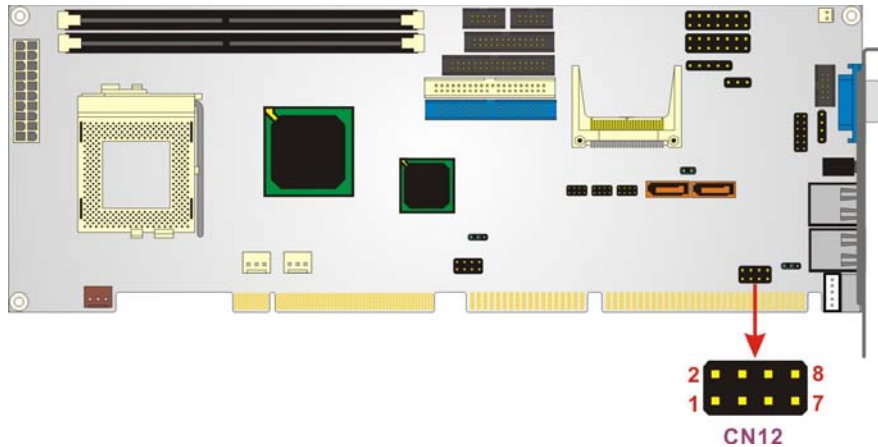
Figure 3-14: LAN LED Connector Location

3.2.14 Multi Panel Connector

CN Label: CN24

CN Type: 14-pin header (2x7)

CN Location: See Figure 3-15

CN Pinouts: See Table 3-17

The Multi Panel connector provides connectivity to several external switches and indicators for monitoring and controlling the CPU board.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1.	POWER-LED +	2	SPEAKER -
3.	N/C	4	N/C
5.	POWER-LED -	6	N/C
7.	N/C	8	SPEAKER +5V
9.	N/C	10	RESET SW
11.	GND	12	RESET SW GND
13.	HDD LED +	14	HDD LED -

Table 3-17: Multi Panel Connector Pinouts
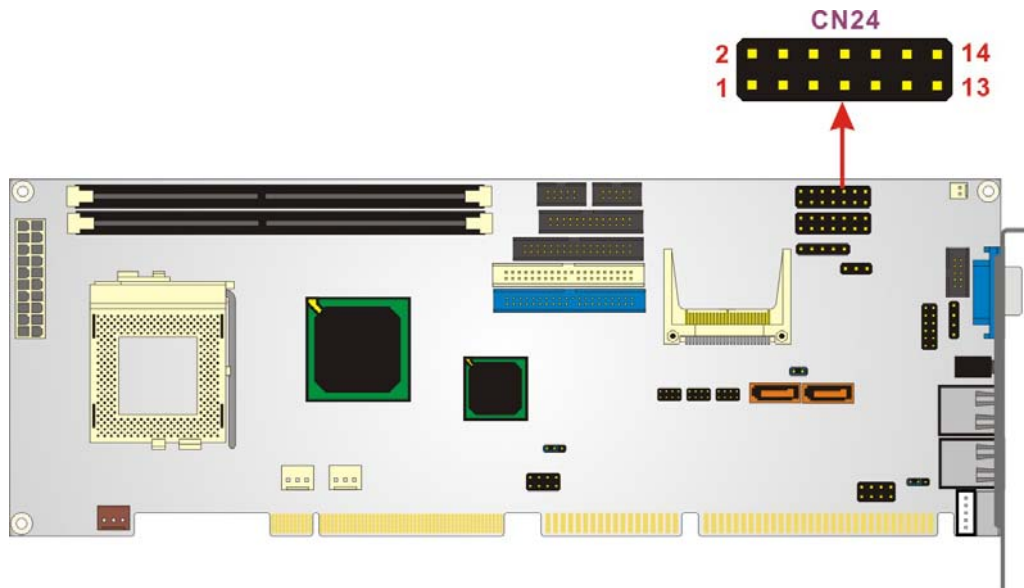
Figure 3-15: Multi Panel Connector Location

3.2.15 Parallel Port Connector

CN Label: CN9

CN Type: 26-pin header (2x13 pins)

CN Location: See Figure 3-16

CN Pinouts: See Table 3-18

The parallel port is connected to a printer or other parallel device with a 26-pin flat-cable connector.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE

17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 3-18: Parallel Port Connector Pinouts
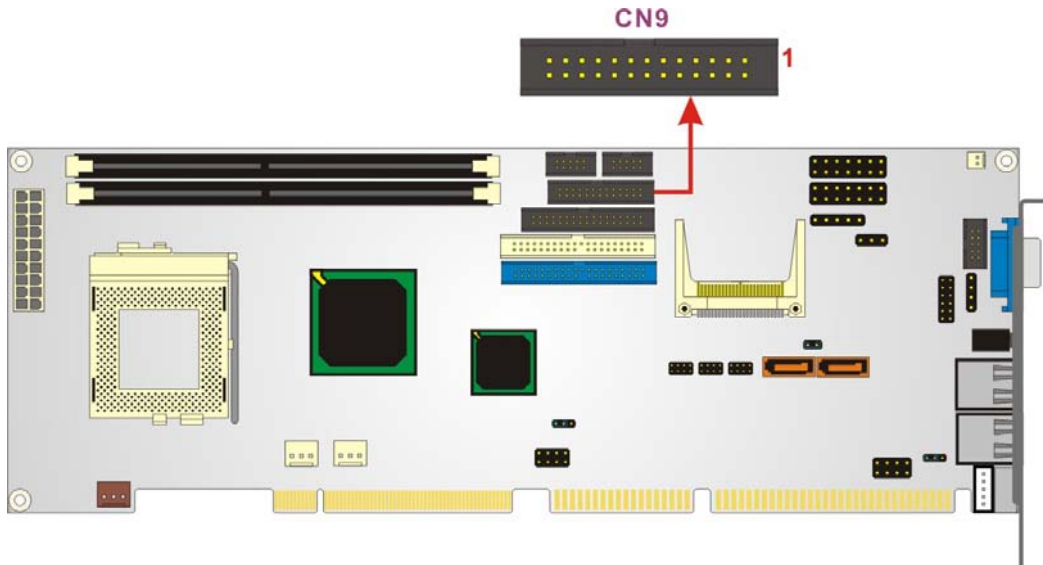
Figure 3-16: Parallel Port Connector Location

3.2.16 SATA Drive Ports

CN Label: CN29, CN30

CN Type: 7-pin port

CN Location: See Figure 3-17

CN Pinouts: See Table 3-19

The SATA drive ports provide connectivity to SATA drives with a maximum data transfer rate of 150MB/s.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND		

Table 3-19: SATA Connector Pinouts
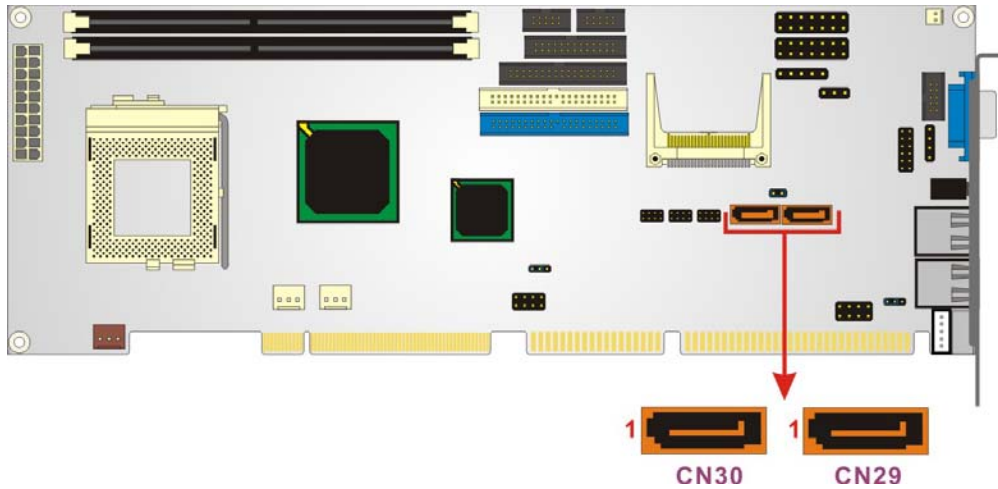
Figure 3-17: SATA Connector Locations

3.2.17 Serial Port Connectors

CN Label: CN2, CN8

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

CN Location: See Figure 3-18

CN Pinouts: See Table 3-20

The CN2 and CN8 serial port connectors connect to RS-232 serial port devices.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DATA CARRIER DETECT (DCD)	6	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	7	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	8	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	9	RING INDICATOR (RI)
5	GND (GND)	10	NC

Table 3-20: Serial Port Connector Pinouts
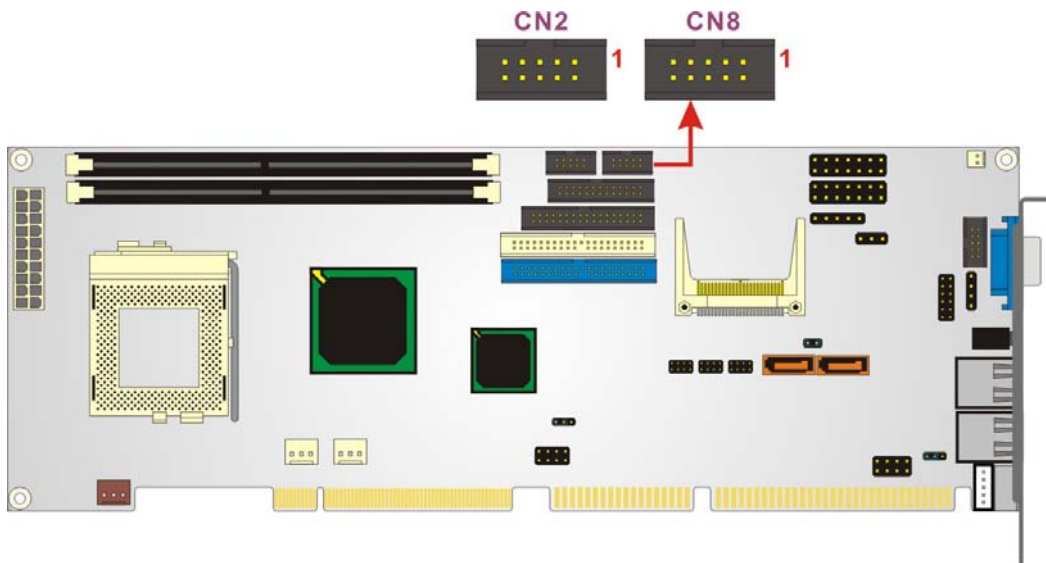
Figure 3-18 Serial Port Connector Locations

3.2.18 Internal USB 1.1 Connector

CN Label: CN6

CN Type: 8-pin header (2x4 pins)

CN Location: See Figure 3-19

CN Pinouts: See Table 3-21

One 2x4 pin connectors provide connectivity to two USB 1.1 ports. The USB port is used for I/O bus expansion.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA1-	4	DATA1+
5	DATA2+	6	DATA2-
7	GND	8	VCC

Table 3-21: Internal USB 1.1 Connector Pinouts
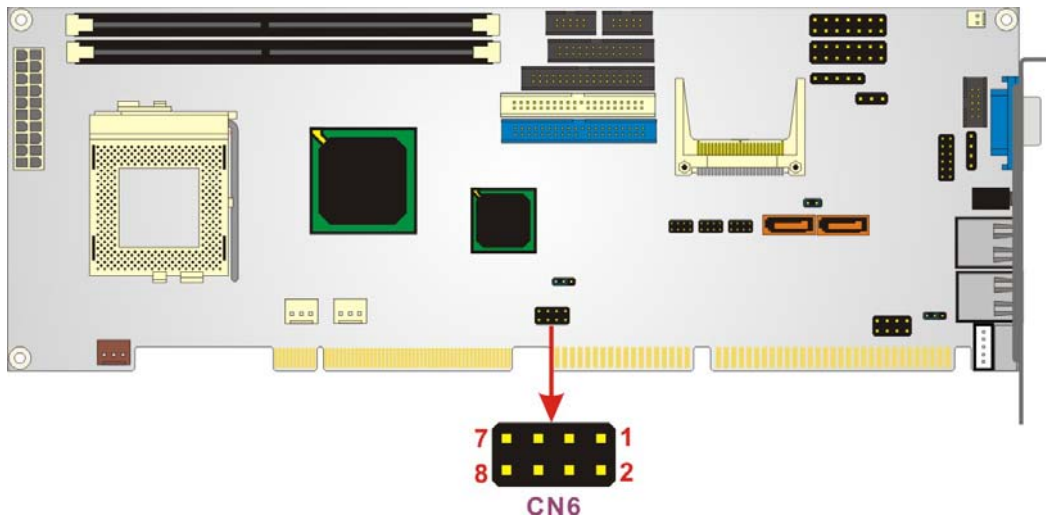
Figure 3-19: Internal USB 1.1 Connector Location

3.2.19 Optional USB 2.0 Connectors

CN Label: USB1, USB2

CN Type: 8-pin header (2x4 pins)

CN Location: See Figure 3-20

CN Pinouts: See Table 3-22

Two 2x4 pin connectors provide connectivity to four USB 2.0 ports. The USB ports are used for I/O bus expansion. The USB1 and USB2 connectors are only available on the ROCKY-3786EVGU2-RS-R40 CPU board.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	DATA1-
3	DATA1+	4	GND
5	VCC	6	DATA2-
7	DATA2+	8	GND

Table 3-22: Optional USB 2.0 Connector Pinouts
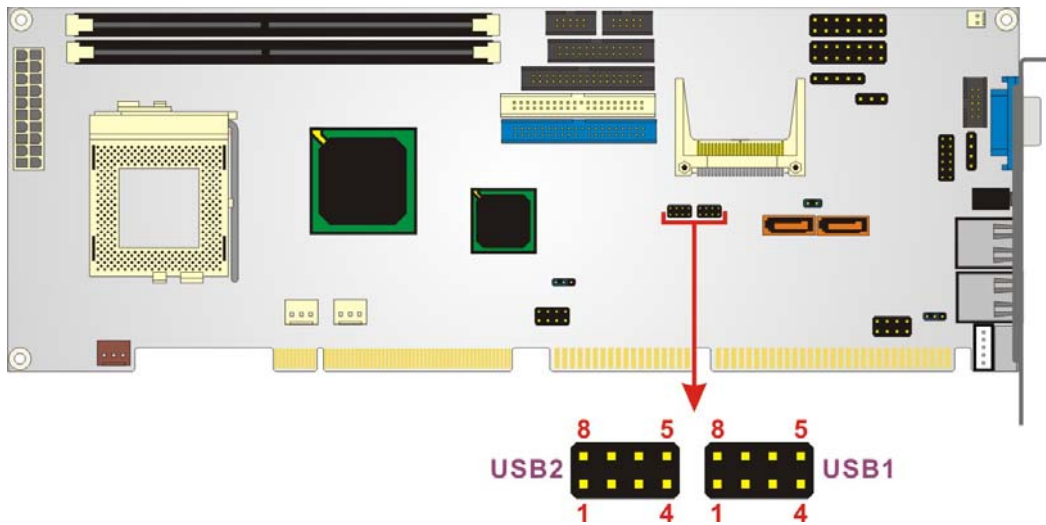
Figure 3-20: Optional USB 2.0 Connector Locations

3.3 External (Rear Panel) Connectors

Figure 3-21 shows the ROCKY-3786EV CPU board rear panel. The peripheral connectors on the back panel can be connected to devices externally when the CPU card is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x Audio Line-out connector
- 2 x Ethernet connectors
- 1 x PS/2 keyboard/mouse connector
- 1 x VGA connector
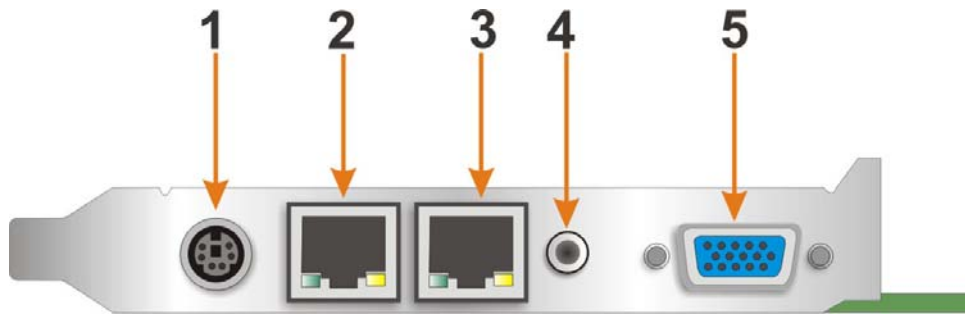
Figure 3-21: ROCKY-3786EV CPU Board Rear Panel

3.3.1 Audio Line Out Connector

CN Label: CN16

CN Location: See Figure 3-21 (labeled number 4)

CN Pinouts: See Table 3-23

Connect an audio device to the line out connector on the rear panel **Figure 3-21** (labeled number 4).

PIN NO.	DESCRIPTION
1	GROUND
2	LEFT SIGNAL
3	NC
4	RIGHT SIGNAL
5	NC

Table 3-23: Line Out Connector Pinouts

3.3.2 10/100Mbps Ethernet Connector

CN Label: LAN1

CN Type: RJ-45

CN Location: See Figure 3-21 (labeled number 2)

CN Pinouts: See Table 3-24

The 10/100Mbps connection can be made between the Ethernet connectors and a Local Area Network (LAN) through a network hub. An RJ-45 Ethernet connector is shown in **Figure 3-22**.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TX+	5.	N/C
2	TX-	6.	RX-
3.	RX+	7.	N/C
4.	N/C	8.	N/C

Table 3-24: 10/100Mbps Ethernet Connector Pinouts
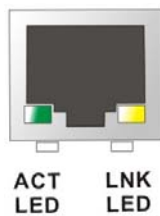
Figure 3-22: Ethernet Connector

3.3.3 Optional 1Gb Ethernet Connector

CN Label: LAN2

CN Type: RJ-45

CN Location: See Figure 3-21 (labeled number 3)

CN Pinouts: See Table 3-25

The 1Gb connection can be made between the Ethernet connectors and a Local Area Network (LAN) through a network hub. An RJ-45 Ethernet connector is shown in **Figure 3-22**.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TXA+（TX+）	5.	TXC-（N/C）
2	TXA-（TX-）	6.	TXB-（RX-）
3.	TXB+（RX+）	7.	TXD+（N/C）
4.	TXC+（N/C）	8.	TXD-（N/C）

Table 3-25: Optiona 1Gb Ethernet Connector Pinouts

3.3.4 Keyboard/Mouse Connector

CN Label: CN23

CN Type: PS/2

CN Location: See Figure 3-21 (labeled number 1)

CN Pinouts: See Table 3-26

The PS/2 mouse and keyboard connectors are connected to a mouse and a keyboard.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	KEYBOARD DATA	2	MOUSE DATA
3	GND	4	+5V
5	KEYBOARD CLOCK	6	MOUSE CLOCK

Table 3-26: Keyboard/Mouse Pinouts
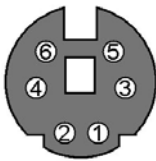
Figure 3-23: Keyboard/Mouse Pinout locations

3.3.5 VGA Connector

CN Label: CN11

CN Pinouts: See Table 3-27

CN Location: See Figure 3-21 (labeled number 5)

The standard 15-pin VGA connector connects to a CRT or LCD display monitor.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	NC	10	GROUND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-27: VGA Connector Pinouts
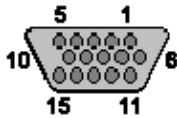
Figure 3-24: VGA Connector Pin Locations

3.4 Onboard Jumpers

![NOTE icon] **NOTE:**

A jumper is a metal bridge that is used to close an electrical circuit.   It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
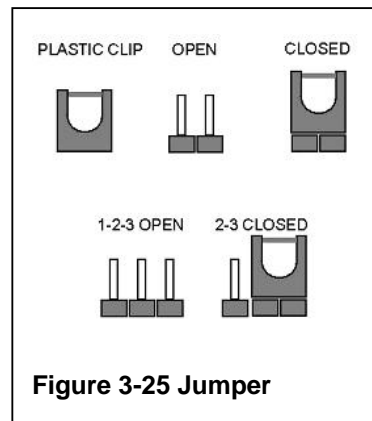
Figure 3-25 Jumper

The ROCKY-3786EV CPU Board has four onboard jumpers. See **Table 3-3**.
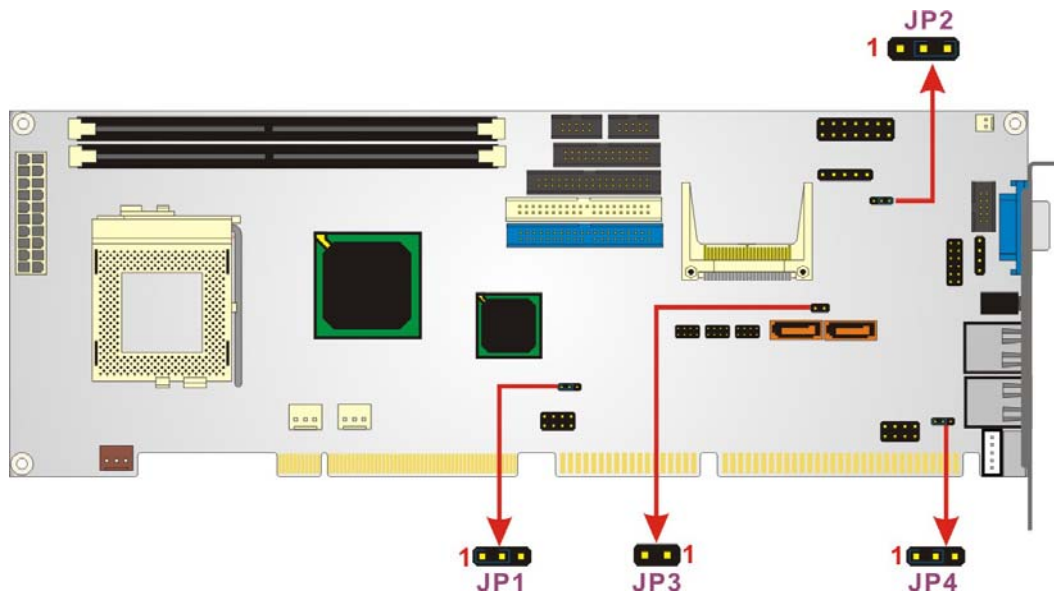
Figure 3-26: Jumper Locations

3.4.1 Clear CMOS Jumper

Jumper Label: JP1

Jumper Type: 3-pin header

Jumper Settings: See Table 3-28

Jumper Location: See Figure 3-26

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

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

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

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

JP1	CLEAR CMOS
1-2 closed	Keep CMOS setup (default)
2-3 closed	Clear CMOS setup

Table 3-28: Clear CMOS Jumper Settings

3.4.2 BIOS Protection Selection Jumper

Jumper Label: JP2

Jumper Type: 3-pin header

Jumper Settings: See Table 3-29

Jumper Location: See Figure 3-26

Use the jumper cap to close pins 2 and 3 of the JP2 jumper to protect BIOS from writing.

JP2	BIOS Protection
2-3 closed	Locked (default)
1-2 closed	Unlocked

Table 3-29: BIOS Protection Selection Jumper Settings

3.4.3 Keyboard Power Selection Jumper

Jumper Label: JP4

Jumper Type: 3-pin header

Jumper Settings: See Table 3-30

Jumper Location: See Figure 3-26

This jumper allows the user to set the keyboard power.

JP4	Keyboard Power
1-2 closed	VCC (default)
2-3 closed	5VSB

Table 3-30: Keyboard Power Selection Jumper Settings

3.4.4 CF Mode Selection Jumper

Jumper Label: JP3

Jumper Type: 2-pin header

Jumper Settings: See Table 3-31

Jumper Location: See Figure 3-26

The CF Card Setup jumper sets the compact flash card as either the slave device or the master device. Make the necessary jumper setting in accordance with the settings shown in **Table 3-31**.

JP3	CF Mode
Open	SLAVE (default)
Closed	MASTER

Table 3-31: CF Mode Selection Jumper Settings

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Chapter

4

Installation and Configuration

4.1 Installation Considerations

![NOTE icon] **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 please **DO** the following:

- **Read the user manual**:
  - o The user manual provides a complete description of the ROCKY-3786EV installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  - o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the motherboard on an antistatic pad**:
  - o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power to the ROCKY-3786EV off**:
  - o When working with the ROCKY-3786EV, 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 ROCKY-3786EV **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for

warranty validation.

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

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

4.2 Unpacking

NOTE:

If any of the items listed below are missing when the ROCKY-3786EV is unpacked, do not proceed with the installation. Contact the ROCKY-3786EV reseller or vendor.

4.2.1 Unpacking Precautions

Some components on ROCKY-3786EV are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect the ROCKY-3786EV from being damaged, by ESD follow these precautions:

■ Any person handling the ROCKY-3786EV should be grounded. This removes static charge before the ROCKY-3786EV is touched. To remove static electricity, wear a grounded wrist strap at all times or frequently touch any conductive materials that are connected to the ground.

■ Handle the ROCKY-3786EV by its edges. Do not touch the IC chips, leads or circuitry unnecessarily.

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

4.2.2 Checklist

When unpacking the ROCKY-3786EV, please make sure that the package contains the following items.

- 1 x ROCKY-3786EV single board computer
- 1 x ATA66/100 flat cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x RS232 cable
- 1 x USB cable
- 1 x Keyboard/ PS2 mouse Y cable
- 1 x Mini jumper pack
- 1 x QIG (Quick Installation Guide)
- 1 x Utility CD

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

4.3 ROCKY-3786EV CPU Card Installation

WARNING:

Never run the motherboard without the appropriate heat sinks and coolers. Heat sinks and coolers can be ordered from IEI Technology or purchased separately.

WARNING:

Please note that the installation instructions described in this manual should be carefully followed in order to prevent damage to the ROCKY-3786EV components and injury to the user.

WARNING:

When installing electronic components onto the ROCKY-3786EV 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 ROCKY-3786EV or connected to the ROCKY-3786EV during the installation process.

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

4.3.1 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heat sink and CPU cooling fan are properly installed before the ROCKY-3786EV is run.

If a heat sink and cooling fan are not properly installed both the CPU and the board may be damaged.

To install Socket 370-pin CPU onto the ROCKY-3786EV, follow the steps below:

When handling the CPU, only hold it on the sides. DO
NOT touch the pins at the bottom of the CPU.

Step 1: Inspect the CPU socket. Make sure there are no bent pins and make sure the
socket contacts are free of foreign material. If any debris is found, remove it with
compressed air.

Step 2: Open the CPU socket lever. Disengage the load lever by pressing the lever
down and slightly outward to clear the retention tab. Rotate the load lever to a
fully open position. (See Figure 4-1)

Step 3: Orientate the CPU properly. Make sure the IHS (Integrated Heat Sink) side is
facing upward. (See Figure 4-1)

Step 4: Correctly position the CPU. Match the Pin 1 mark with the cut edge on the CPU
socket. (See Figure 4-1)
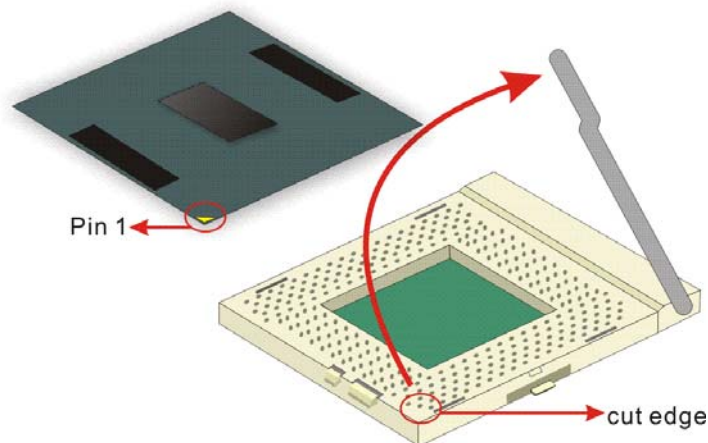
Figure 4-1: Install the CPU

Step 5: Insert the CPU. Gently insert the CPU into the socket. If the CPU pins are
properly aligned, the CPU should slide into the CPU socket smoothly

Step 6: Close the CPU socket.　Re-engage the load lever by pushing it back to its

original position. Secure the load lever under the retention tab on the side of CPU socket.

4.3.2 Socket 370 Cooling Kit Installation

IEI provides an optional cooling kit designed for Socket 370 CPUs. The cooling kit is comprises a CPU heat sink and a cooling fan.

CF-504-RS   **CF-507-RS**

CF-512-RS   **CF-513-RS**

Figure 4-2: IEI Socket 370 Cooling Kits

⚠ NOTE:

The heat sink comes with a sprayed layer of thermal paste.   Do not accidentally wipe away the thermal paste while unpacking or installing the heat sink. Thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

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

Step 1: Properly orient the cooling kit. Be sure the cooling kit is properly oriented before attaching the mounting clips. The levered cooling kit mounting clip should be aligned with the connecting tabs of the CPU socket closest to the DIMM socket.

Step 2: Attach the unlevered mounting clip first. Slip the unlevered mounting clip under the connecting tab of the CPU socket. (See Figure 4-3)

Step 3: Secure the cooling kit in place. Gently push the levered mounting clip down with a slight inward movement to snap it into place under the connecting tab. (See Figure 4-3)

Step 4: Connect the fan cable. Connect the cooling kit fan cable to the fan connector on the CPU card. Carefully route the cable and avoid heat generating chips and fan blades.
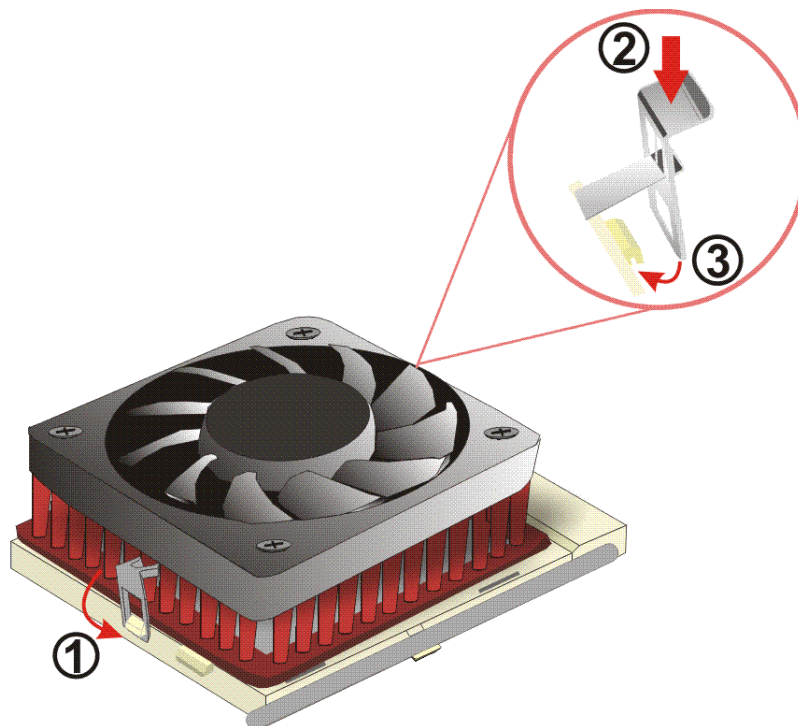
Figure 4-3: Install the CPU cooler

4.3.3 DIMM Module Installation

4.3.3.1 Purchasing the Memory Module

⚠️ **WARNING!**

> When purchasing the DIMM modules, make sure the modules are compatible with the DIMM slot specified in **Section 2.5 Memory Support**.

4.3.3.2 DIMM Module Installation

The ROCKY-3786EV CPU card has two SDRAM DIMM socket. Follow the steps below to install the DIMM module.

Step 1: Make sure the two handles of the DIMM socket are in the "open" position, leaning outward (Figure 4-4).
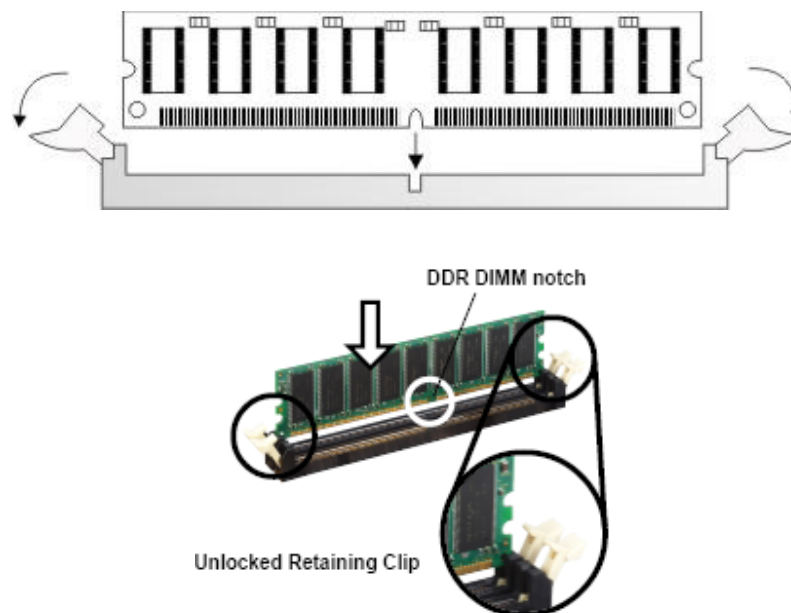
Figure 4-4: Installing the DIMM Module

Step 2: Slowly slide the DIMM module along the plastic guides on both ends of the socket. Press the DIMM module down into the socket until it clicks into position and the two handles have automatically locked the memory module into place

(Figure 4-5).
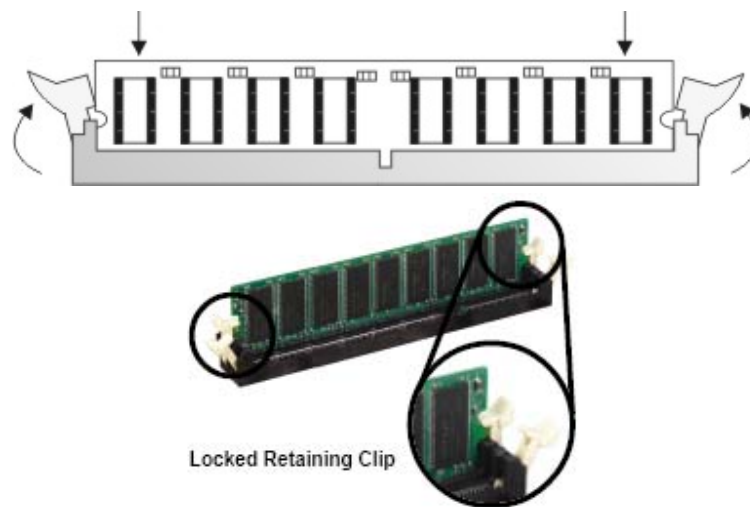
Figure 4-5: Locking the DIMM Module

Step 3: To remove the memory module, push both handles outward, and the memory

module is ejected by the mechanism in the socket.

4.3.4 Peripheral Device Connection

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

Quantity	Type
1	IDE cable
1	Keyboard/Mouse Y cable
1	RS-232 port cable
2	SATA cables
1	SATA power cable
1	USB cable

Table 4-1: IEI Provided Cables

4.3.4.1 Compact Flash Disk

When appropriately formatted, a Compact Flash disk can serve as a bootable hard drive in applications where installation space is limited. The Compact Flash card occupies a secondary IDE channel.

4.3.4.2 IDE Disk Drive Connector (CN1, CN7)

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

Step 1: Find the ATA66/100 flat cable in the kit that came with the CPU card.

Step 2: Connect one end of the cable to the IDE1 connector on the CPU card. A keyed pin on the IDE connectors prevents them from being connected incorrectly.

Step 3: Locate the red wire on the cable that corresponds to the pin 1 connector.

Step 4: Connect the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.

NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.
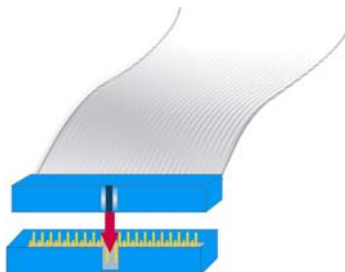
Figure 4-6: Connection of IDE Connector

4.3.4.3 Floppy Drive Connector

The floppy drive connector provides access to one (1) externally mounted floppy drive.

A 26-pin FPC connector cable is required for the connection to the floppy drive. The cable should come with a 26-pin FPC-cable connector and floppy disk drive connector on the other end. Follow the instructions below to connect an IDE HDD to the CPU card.

Step 1: Plug the 26-pin FPC-cable connector into CN34. Make sure that the red wire corresponds to pin one on the connector.

Step 2: Attach the appropriate connector on the other end of the cable to the floppy drive. Only one connector in the set can be used.

4.3.4.4 Parallel Port Connector (CN9)

The onboard parallel port connector (CN9) connects to a printer. The ROCKY-3786EV comes with a multi-mode (ECP/EPP/SPP) parallel port. The parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is used. The parallel port interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility. The default interrupt channel is IRQ7. Select ECP or EPP DMA mode using the BIOS configuration utility.

4.3.4.5 Audio Interface

AC'97 Audio signals are interfaced through a 10-pin flat-cable connector. The signals include microphone line-in, line-in stereo and line-out stereo. An audio 10-pin-to-phone-jack adapter kit is required.

4.3.4.6 COM Port Connectors [CN2, CN8]

The ROCKY-3786EV provides two RS-232 serial ports interfaced through one 14-pin male header. The serial ports facilitate the connection to serial devices or a communications network, e.g., terminal console.

4.4 Chassis Installation

The CPU card can be mounted into a chassis only after the CPU, the cooling kit, and the DIMM module have 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 CPU card into a chassis.

4.5 Rear Panel Connectors

4.5.1 Ethernet Connection

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

4.5.2 Keyboard and Mouse Connection

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

4.5.3 VGA Connection

The conventional CRT monitor connector (CN11) is a 15-pin, female D-SUB connector. It can be connected to an external monitor.

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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

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 CPU card should come with a restore CMOS settings jumper. Refer to **Section 0** for more information.

5.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (**BIOS Menu 1**) appears.
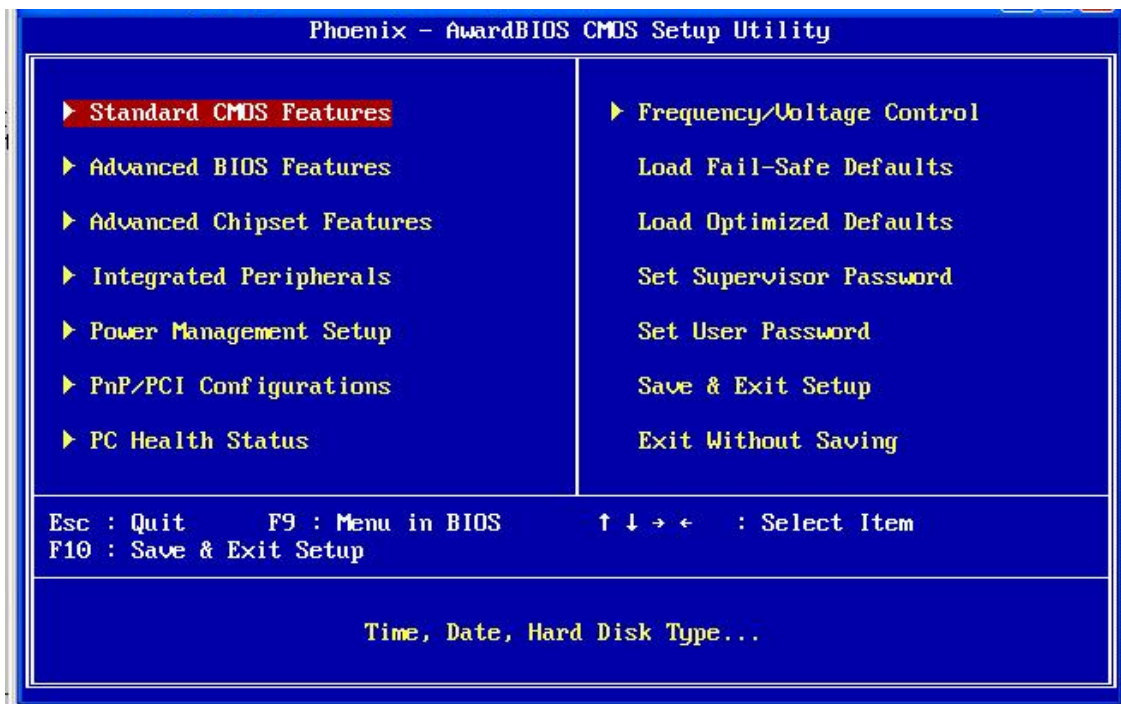
BIOS Menu 1: Award BIOS CMOS Setup Utility

> ![NOTE icon] **NOTE:**
>
> The following sections completely describe the menus listed below and the configuration options available to users.

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.
- **Frequency Voltage Control**: Changes the DIMM and CPU clock settings

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

➔ **Load Fail-Safe Defaults**

Use the **Load Fail-Safe Defaults** 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**

Use the **Load Optimized Defaults** 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**

Use the **Set Supervisor Password** option to set the 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**

Use the **Set User Password** option to set the 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**

Use the **Save & Exit Setup** option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Use the **Exit Without Saving** option to 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.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Standard CMOS Features

   Date (mm:dd:yy)          Fri, Jun 25 1999       Item Help
   Time (hh:mm:ss)          12 :  2 : 21
                                                 Menu Level  ▶
 ▶ IDE Primary Master
 ▶ IDE Primary Slave                             Press [Enter] to enter
 ▶ IDE Secondary Master                          next page for detail
 ▶ IDE Secondary Slave                           hard drive settings

   Drive A                  [1.44M, 3.5 in.]
   Drive B                  [None]

   Video                    [EGA/VGA]
   Halt On                  [All , But Keyboard]

   Base Memory                    0K
   Extended Memory              15360K
   Total Memory                 15360K


 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values      F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

Use the **Date** option to set the system date.

➔ **Time [hh/mm/ss]**

Use the **Time** option to set 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 Secondary Master
- IDE Secondary Slave

IDE device configurations are changed or set in the IDE Configuration menu. 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 0** appear.

➔ **Drive A/B [1.44M, 3.5in]**

Use the **Drive A/B** 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.

➔ **Video**

Use the **Video** option to select the CRT screen type the system connects to. The video configuration options are:

- EGA/VGA (Default)
- CGA 40
- CGA 80
- MONO

➔ **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 to set or change the master/slave IDE configurations.

➔ **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 1 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 BIOS configuration option 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

Use the **Advanced BIOS Features** menu (**BIOS Menu 3**) to configure the CPU and peripheral device configuration options.
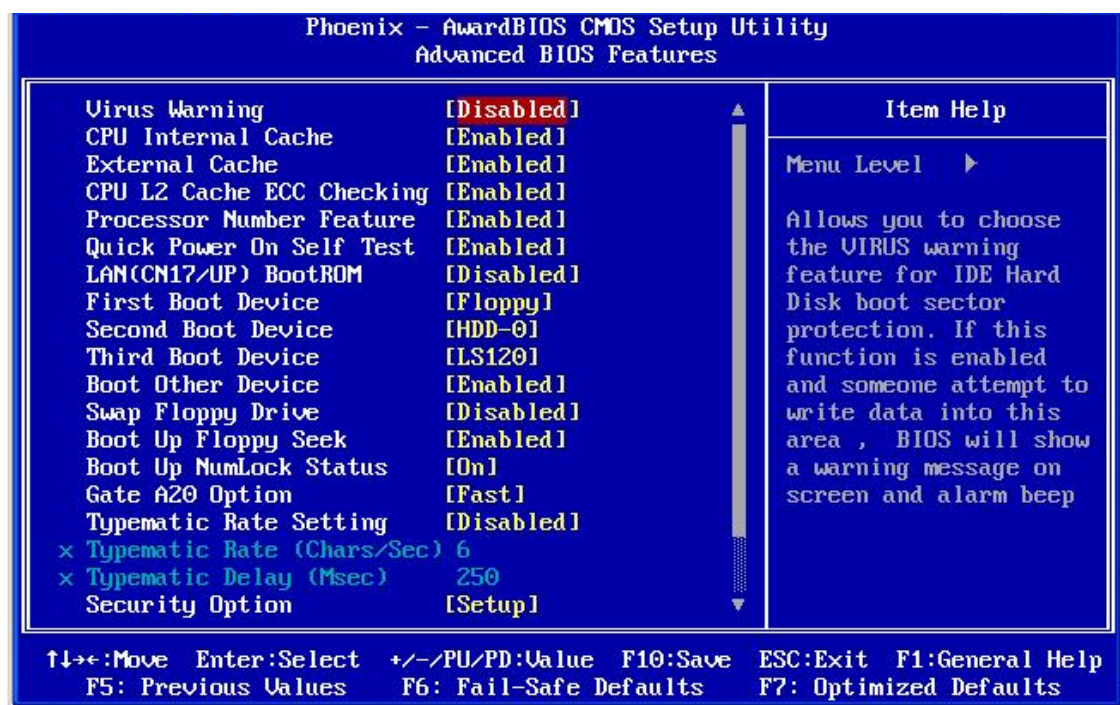
BIOS Menu 3: Advanced BIOS Features

→ **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. It is recommended that the virus protection function be

disabled before running such a program.

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.

➔ **External Cache [Enabled]**

Use the **External Cache** option to enable the system to transfer data from the main DRAM into the cache memory when the CPU requests the transfer.

➔ **Disabled**   The CPU cannot access external DRAM.

➔ **Enabled** (Default)   The CPU can access external DRAM.

➔ **CPU L2 Cache ECC Checking [Enabled]**

Use the **CPU L2 Cache ECC Checking** option to enable memory checking when the external cache contains ECC SRAM (Static Random Access Memory).

➔ **Disabled**   Memory checking disabled.

➔ **Enabled**   (Default)   Memory checking enabled.

➔ **Quick Power On Self Test [Enabled]**

Use the **Quick Power On Self Test** option to speed up the POST after the computer is turned on. If enabled, BIOS shortens or skips some POST check items.

➔ Disabled   Normal POST occurs after the computer is turned on.

➔ Enabled   (Default)   Quick POST occurs after the computer is turned on.

➔ **LAN(CN17/UP) BootROM [Disabled]**

Use the **LAN(CN17/UP) BootROM** 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.

➔ **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: LS120]

Using the default values, the system first looks for a floppy disk drive to boot from. If it cannot find an FDD, it boots from a HDD. If both the FDD and the HDD are unavailable, the system boots from a LS120 drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- HDD-2
- HDD-3
- 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.

➔ **Swap Floppy Drive [Disabled]**

Use the **Swap Floppy Drive** option to logically swap the mapping of drives A: and B:. It is only useful when two floppy drives are installed.

➔ **Disabled** (Default) The floppy drive mapping is set by the drive connector arrangement.

➔ **Enabled** The floppy drive originally mapped to drive A: is

remapped to drive B: and vice versa.

➔ **Boot Up Floppy Seek [Enabled]**

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**		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**	(Default)	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** 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.

➔ **x 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

➔ **x 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.

➔ **Non-OS2**   (Default)   Select this option when not using the OS/2 operating system.

➔ **OS2**   Specifies the operating system used as OS/2.

➔ **Report No FDD For WIN 95 [No]**

Use the **Report No FDD For WIN 95** option to specify whether the BIOS reports no FDD to Windows 95 or not.

➔ **No**   (Default)   The BIOS does not report the missing floppy drive to Windows 95.

➔ **Yes**   The BIOS reports the missing floppy drive to Windows 95.
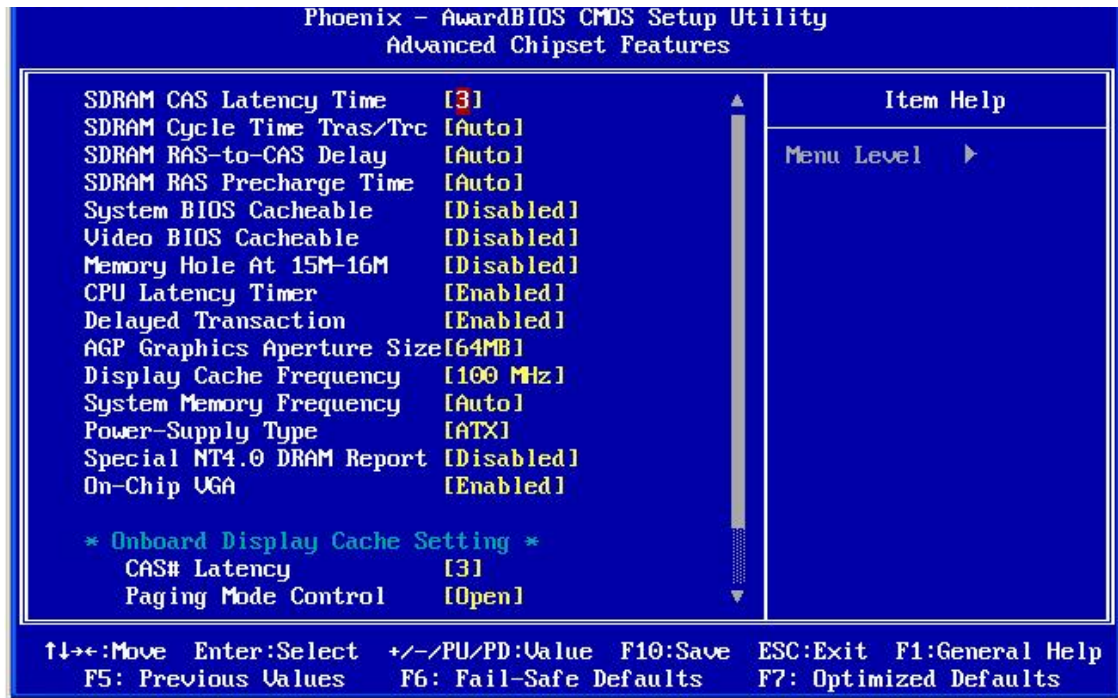
➔ **Small Logo (EPA) Show [Disabled]**

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 4**) to change chipset configuration options.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    Advanced Chipset Features

   SDRAM CAS Latency Time     [3]      ▲         Item Help
   SDRAM Cycle Time Tras/Trc [Auto]
   SDRAM RAS-to-CAS Delay    [Auto]         Menu Level    ▶
   SDRAM RAS Precharge Time  [Auto]
   System BIOS Cacheable     [Disabled]
   Video BIOS Cacheable      [Disabled]
   Memory Hole At 15M-16M    [Disabled]
   CPU Latency Timer         [Enabled]
   Delayed Transaction       [Enabled]
   AGP Graphics Aperture Size[64MB]
   Display Cache Frequency   [100 MHz]
   System Memory Frequency   [Auto]
   Power-Supply Type         [ATX]
   Special NT4.0 DRAM Report [Disabled]
   On-Chip VGA               [Enabled]

   * Onboard Display Cache Setting *
     CAS# Latency            [3]
     Paging Mode Control     [Open]    ▼

 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 4: Advanced Chipset Features

➔ **SDRAM CAS Latency Time [3]**

The **CAS Latency Time** configuration option refers to the Column Address Strobe (CAS) delay time. The following configuration options are available:

- ■ 2
- ■ 3 (Default)

➔ **SDRAM Cycle Time Tras/Trc [Auto]**

The **SDRAM Cycle Time Tras/Trc** option determines the tRAS and the tRC parameters of the SDRAM memory module. tRAS refers to the SDRAM Row Active Time; tRC refers to the SDRAM Row Cycle Time. The following configuration options are available:

- ■ 7/9
- ■ 5/7
- ■ Auto (Default)

➔ **SDRAM RAS-to-CAS Delay [Auto]**

The **SDRAM RAS-to-CAS Delay** sets the delay between the RAS and CAS signals. The appropriate delay for the memory module is reflected in its rated timings. The following configuration options are available:

- 3
- 2
- Auto   (Default)

➔ **SDRAM RAS Precharge Time [Auto]**

Use **SDRAM RAS Precharge Time** option to set the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes. The following configuration options are available:

- 3
- 2
- Auto   (Default)

➔ **System BIOS Cacheable [Disabled]**

Use the **System BIOS Cacheable** option to enable caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

➔ **Disabled**   System BIOS not written to F0000h-FFFFFh.

➔ **Enabled**   (Default)   System BIOS is written to F0000h-FFFFFh.

➔ **Video BIOS Cacheable [Disabled]**

Use the **Video BIOS Cacheable** option to enable caching of the video BIOS ROM at C0000h-C7FFFh via the L2 cache.

➔ **Disabled**   Video BIOS not written to C0000h-C7FFFh.

➔ **Enabled**   (Default)   Video BIOS is written to F0000h-FFFFFh.

➔ **Memory Hole At 15M – 16M [Disabled]**

Use the **Memory Hole At 15M – 16M** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled** (Default) Memory is not reserved for ISA expansion cards.

➔ **Enabled** Memory is reserved for ISA expansion cards.

➔ **CPU Latency Timer [Enabled]**

Use the **CPU Latency Timer** option to control how the processor should handle a deferrable processor operation when there is a new request for the processor.

➔ **Disabled** The processor immediately defers all deferrable operations when there is a new processor request.

➔ **Enabled** (Default) The processor defers those operations only after they have been held in a Snoop Stall for 31 clock cycles when the new processor request arrives.

➔ **Delayed Transaction [Enabled]**

The **Delayed Transaction** option controls the operation of the embedded 32-bit posted write buffer that supports delayed transaction cycles. The buffer is designed to store PCI-to-ISA writes so that the PCI bus can be released to perform other transactions.

➔ **Disabled** The PCI bus bypasses the write buffer and writes directly to the ISA bus.

➔ **Enabled** (Default) All PCI-to-ISA writes are buffered and the PCI bus is released after writing to the buffer.

➔ **AGP Graphics Aperture Size**

Use the **AGP Graphics Aperture Size** option to select the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. **AGP Graphics Aperture Size** configuration options are:

- 64M
- 32M

➔ **Power Supply Type [ATX]**

Use the **Power Supply Type** option to specify whether an AT or ATX power supply is connected to the system.

➔ **AT**   An AT power supply is used.

➔ **ATX**   (Default)   An ATX power supply is used.

➔ **Special NT4.0 DRAM Report [Disabled]**

Use the **Special NT4.0 DRAM Report** option to fix Windows NT4.0 can not find FDD if 511MB memory is installed (511MB Main Memory + 1M Shared Memory).

➔ **Disabled**   (Default)   The Special NT4.0 DRAM Report function is disabled.

➔ **Enabled**   The Special NT4.0 DRAM Report function is enabled.

➔ **On-chip VGA [Enabled]**

Use the **On-Chip VGA** option to specify if the system uses the integrated VGA channel or not.

➔ **Disabled**   The VGA channel is not used.

➔ **Enabled**   (Default)   The VGA channel is used.

5.5 Integrated Peripherals

Use the Integrated Peripherals menu (**BIOS Menu 5**) to change the configuration options for the attached peripheral devices.
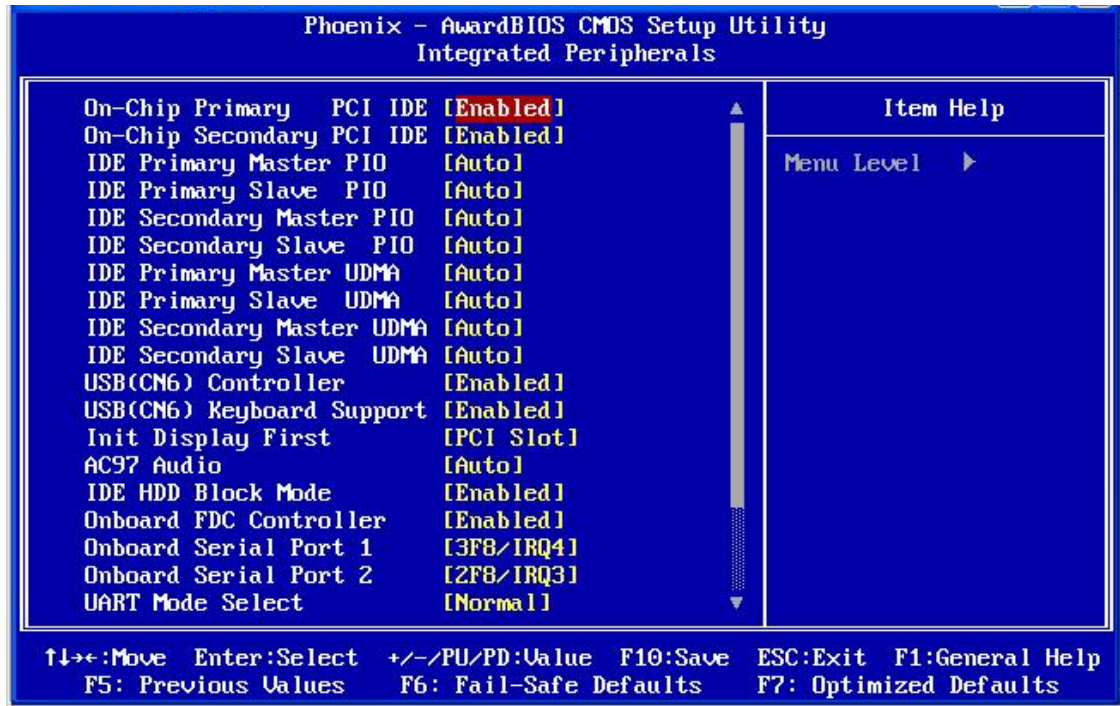
BIOS Menu 5: Integrated Peripherals

➔ **On-Chip PCI IDE [Enabled]**

Use the **On-Chip PCI IDE** options below to select if the system uses the following integrated IDE controller or not:

- On-Chip Primary PCI IDE
- On-Chip Secondary PCI IDE
- ∎

➔ **Disabled**   The onboard IDE controller is not used.

➔ **Enabled**   (Default)   The onboard IDE controller is used.

➔ **IDE PIO [Auto]**

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

- IDE Primary Master PIO
- IDE Primary Slave PIO
- IDE Secondary Master PIO
- IDE Secondary Slave PIO

➔ **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
- IDE Secondary Master UDMA
- IDE Secondary Slave UDMA
-

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

➔ **Disabled** The UDMA for the HDD device is disabled.

➔ **USB(CN6) Controller**

Use the **USB Controller** option to enable or disable the integrated USB controller.

➔ **Disabled** Integrated USB controller disabled.

➔ **Enabled** (Default) Integrated USB controller enabled.

➔ **USB(CN6) Keyboard Support [Enabled]**

Use the **USB Keyboard Support** option to enable or disable the use of a USB keyboard.

➔ **Disabled** USB keyboard cannot be used.

➔ **Enabled** (Default) USB keyboard can be used.

➔ **Init Display First [PCI Slot]**

Use the **Init Display First** option to select the primary display device.

➔ **PCI Slot** (Default) The display connected to the PCI slot is the primary display.

➔ **Onboard/AGP** The AGP display is the primary display.

➔ **AC97 Audio [Auto]**

Use the **AC97 Audio** option to enable or disable the onboard codec.

➔ **Auto** The onboard codec is automatically detected.

➔ **Disabled** (Default) The onboard codec is disabled.

➔ **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 [Enabled]**

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** The FDD controller is disabled.

➔ **Enabled** (Default) 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

➔ **UART Mode Select [Normal]**

Use the **UART Mode Select** to select the UART mode for the system.

➔ **Normal**   (Default)   RS-232C serial port

➔ **IrDA**   Infrared port compliant with IrDA 1.0 specification

➔ **ASKIR**   Amplitude shift keyed infrared port

➔ **SCR**   Scratch pad register

➔ **UR2 Duplex Mode [Half]**

Use the **UR2 Duplex Mode** option to specify the transmission mode for the IR port device.

➔ **Full**   Simultaneous bi-directional transmission occurs.

➔ **Half**   (Default)   Transmission only occurs in one direction at a time.

➔ **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.

➔ **ECP Mode Use DMA [3]**

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.

➔ **PWRON After PWR-Fail [Off]**

Use the **PWRON After PWR-Fail** option to specify the power status after the power is reapplied.

➔ **Off** (Default) The power is off after the power is reapplied.

➔ **On** The power is on after the power is reapplied.

➔ **Former-Sts** The power remains in its former status after the power is reapplied.

5.6 Power Management Setup

Use the Power Management Setup menu (**BIOS Menu 6**) to set the BIOS power management and saving features.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                    Power Management Setup

ACPI Function             [Enabled]            ▲        Item Help
ACPI Suspend Type         [S1(POS)]
Power Management          [Min Saving]              Menu Level    ▶
Video Off Method          [DPMS]
Video Off In Suspend      [Yes]
Suspend Type              [Stop Grant]
MODEM Use IRQ             [NA]
Suspend Mode              [Disabled]
HDD Power Down             15 Min
Soft-Off by PWR-BTTN      [Instant-Off]
Power On by Ring          [Enabled]
Resume by Alarm           [Disabled]
x  Date(of Month) Alarm     0
x  Time(hh:mm:ss) Alarm      0 :  0 :  0

** Reload Global Timer Events **
Primary IDE 0             [Disabled]
Primary IDE 1             [Disabled]
Secondary IDE 0           [Disabled]         ▼

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 6: Power Management Setup

➔ **ACPI Function [Enabled]**

Use the **ACPI Function** to enable the ACPI (Advanced Configuration and Power Interface) function.

| **Disabled** | | ACPI function disabled. |
| **Enabled** | (Default) | ACPI function enabled. |

➔ **ACPI Suspend Type [S1(POS)]**

Use the **ACPI Suspend Type** BIOS option to specify the sleep state the system enters when not being used.

➔ **S1 (POS)** (Default) System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **S3 (STR)** System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

➔ **Power Management [Min Saving]**

Use the **Power Management** option to specify the power management selection methods.

➔ **User Defined** User must define when the system goes into a sleep state or a suspend state.

➔ **Min. Saving** (Default) The longest period of time that can be specified before the system enters either the Doze mode or the suspend state. The longest time for either of these is one hour.

➔ **Max. Saving** The shortest period of time that can be specified before the system enters either the Doze mode or the suspend state. The shortest time for either of these is one minute.

➔ **Video Off Method [DPMS]**

Use the **Video Off Method** option to specify what display components are powered off when the system enters a sleep or suspend state Method.

➔ **Blank Screen** The display screen goes blank when the video is disabled.

➔ **V/H SYNC + Blank** The display screen goes blank and the V-SYNC and H-SYNC signals from VGA cards

		to the display are turned off when the video is disabled.
DPMS	(Default)	If the system supports the VESA (Video Electronics Association) DPMS (Display Power Management Signaling) select this option. Power management software comes with the display. Use this software to specify the power management options for the display.

➔ **Video Off In Suspend [Yes]**

Use **Video Off In Suspend** option to specify the status of the system display when the system is in a sleep or suspend state.

➔ **No**		The system display is on when the system is in a suspend state.
➔ **Yes**	(Default)	The system display is off when the system is in a suspend state.

➔ **Suspend Type [Stop Grant]**

The **Suspend Type** option specifies the CPU status during power saving mode.

➔ **Stop Grant**	(Default)	The CPU goes into idle mode during power saving mode.
➔ **PwrOn Suspend**		The CPU and system remain powered on in suspend mode.

➔ **MODEM Use IRQ [NA]**

Use **MODEM Use IRQ** to select the IRQ address for the system modem. The following IRQ addresses are available.

- NA   (Default)
- 3
- 4
- 5
- 7
- 9
- 10
- 11

➔ **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 Min
- 2 Min
- 4 Min
- 8 Min
- 12 Min
- 20 Min
- 30 Min
- 40 Min
- 1 Hour

➔ **HDD Power Down [Disabled]**

Use the **HDD Power Down** option to specify how long the computer must wait for no activity before the HDD powers down. If this option is disabled, the HDD does not power down. The following settings can be made.

- Disable (Default)
- 1 Min
- 2 Min
- 3 Min
- 4 Min

IEI® Technology, Corp.

- 5 Min
- 6 Min
- 7 Min
- 8 Min
- 9 Min
- 10 Min
- 11 Min
- 12 Min
- 13 Min
- 14 Min
- 15 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.

➔ **Power-On by Ring [Disabled]**

Use the **Power-On by Ring** to enable an incoming call on the modem to rouse the system from a suspend or doze state.

➔ **Disabled** (Default) Wake event not generated by modem activity.

➔ **Enabled** Wake event generated by modem activity.

➔ **Resume by Alarm [Disabled]**

Use the **Resume by Alarm** option to specify the time the system should be roused from a suspended state.

➔ **Disabled** (Default) The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following appears with values that can be selected:

➔ **Date (of Month) Alarm**

➔ **Time (hh:mm:ss) Alarm**

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

➔ **Reload Global Timer Events**

The Reload Global Timer Events option allows the user to specify the following events that activate the power management timer.

- Primary IDE 0
- Primary IDE 1
- Secondary IDE 0
- Secondary IDE 1
- FDD, COM, LPT Port
- PCI PIRQ[A-D]#
-

➔ **Disabled** (Default) An event occurring on each listed device does not restart the global timer for Standby mode.

➔ **Enabled** An event occurring on each listed device restarts the global timer for Standby mode.

-

5.7 PnP/PCI Configurations

Use the PnP/PCI Configurations menu (**BIOS Menu 7**) to set the plug and play, and PCI options.
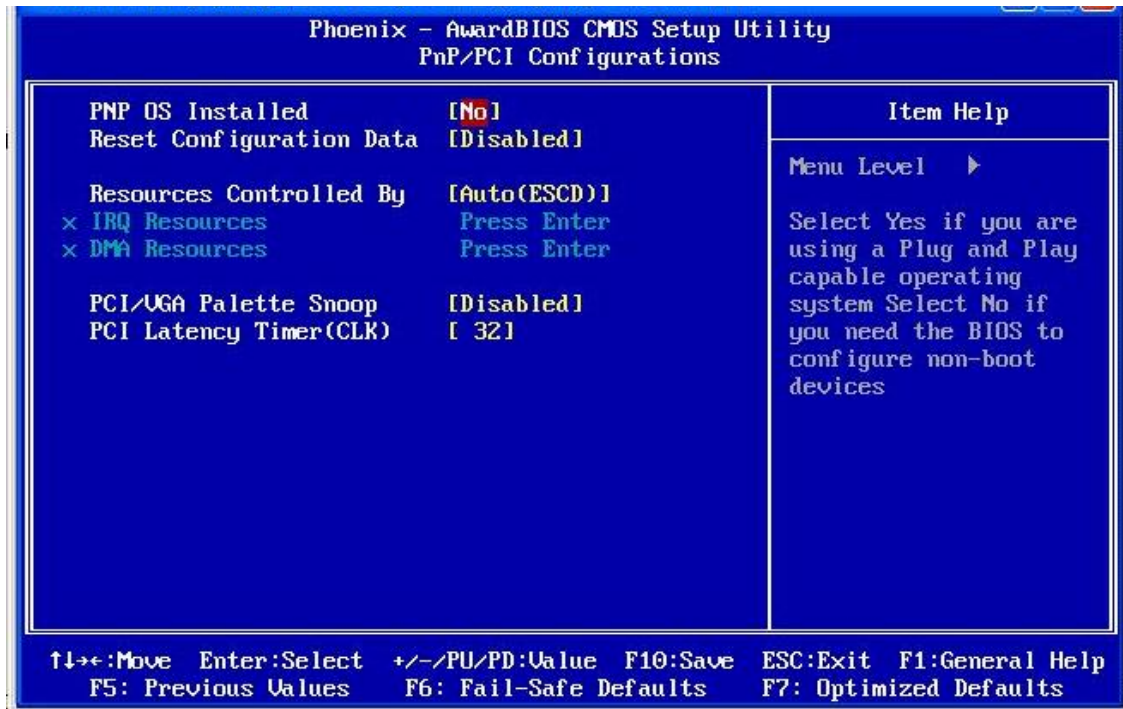
BIOS Menu 7: PnP/PCI Configurations

➔ **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.

➔   **IRQ Resources [Press Enter]**

The **IRQ Resources** option can only be selected if the **Resources Controlled By** option is set to Manual.

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-9 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to
- IRQ-12 assigned to
- IRQ-14 assigned to
- IRQ-15 assigned to

The above options all have the following default options.

➔ **PCI/ISA PnP** (Default) The IRQ is assigned to PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔ **Legacy ISA** The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification.

➔ **DMA Resources [Press Enter]**

The **DMA Resources** menu can only be accessed if the **Resources Controlled By** option is set to Manual.

The menu has six configurable options:

- DMA-0 assigned to
- DMA-1 assigned to
- DMA-3 assigned to
- DMA-5 assigned to
- DMA-6 assigned to
- DMA-7 assigned to

The above options all have the following default options.

➔ **PCI/ISA PnP** (Default) The DMA is assigned to PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔ **Legacy ISA** The DMA is assigned to legacy ISA for devices compliant with the original PC AT bus specification.

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

Use the **PCI/VGA Palette Snoop** option to enable 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.

➔ **PCI Latency Timer (CLK) [32]**

The **PCI Latency Timer (CLK)** option defines the minimum amount of time, in PCI clock cycle, that the bus master can retain the ownership of the bus. The values are from 0 to 255. The default value is 32.

5.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 8**) has no user configurable options, but shows system operating parameters that are essential to the stable operation of the system.

```
           Phoenix - AwardBIOS CMOS Setup Utility
                     PC Health Status
 ┌─────────────────────────────────────┬─────────────────────────┐
 │ Vcore                                │      Item Help          │
 │ VTT                                  │                         │
 │ +3.3V                                │  Menu Level    ▶        │
 │ +5.0V                                │                         │
 │ + 12V                                │                         │
 │ - 12V                                │                         │
 │ -5.0V                                │                         │
 │ +5USB                                │                         │
 │ Voltage Battery                      │                         │
 │ CPU Temperature                      │                         │
 │ System Temperature                   │                         │
 │ FAN2 Speed                           │                         │
 │ FAN3 Speed                           │                         │
 │                                      │                         │
 ├──────────────────────────────────────┴─────────────────────────┤
 │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
 │    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults    │
 └────────────────────────────────────────────────────────────────┘
```
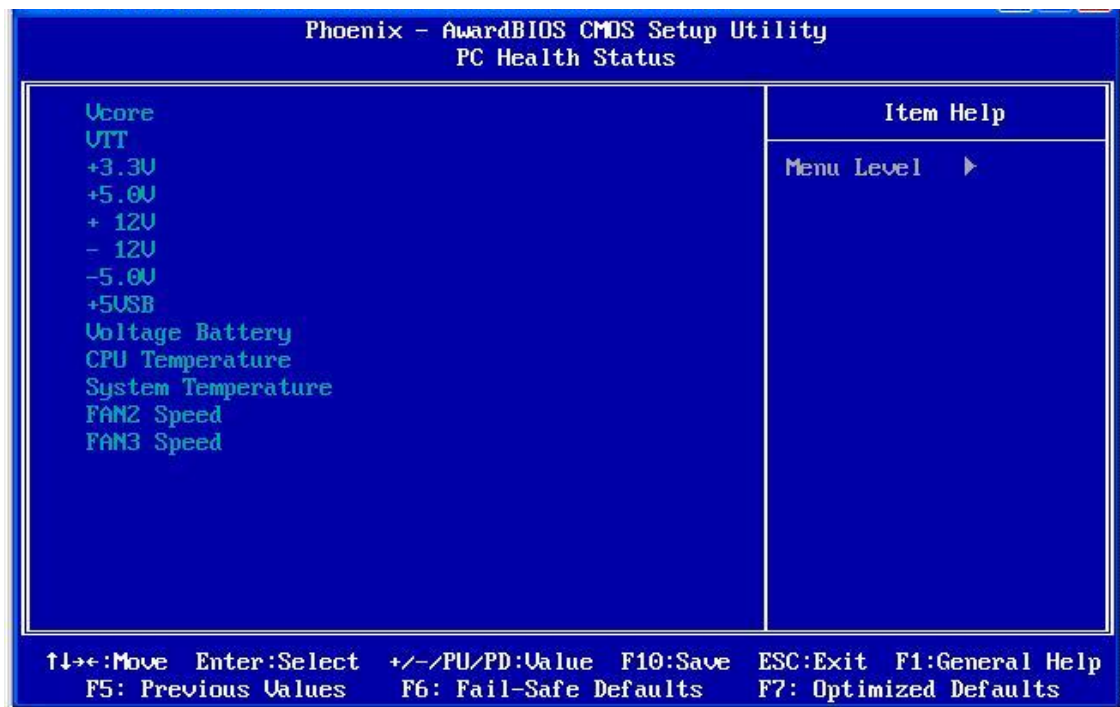
BIOS Menu 8: PC Health Status

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

➔ **Voltages**

The following voltages are monitored:

- Vcore
- VTT
- +3.3 V
- +5.0 V
- +12 V
- -12 V
- -5.0 V
- 5VSB
- Voltage Battery

➔ **System Temperature**

The following temperatures are monitored:

- System Temperature
- CPU Temperature

➔ **Fan Speeds**

The following fan speeds are monitored:

- FAN2 Speed
- FAN3 Speed

5.9 Frequency/Voltage Control

Use the **Frequency/Voltage Control** menu (**BIOS Menu 9**) to set the frequency options for the DIMM, PCI and CPU host.
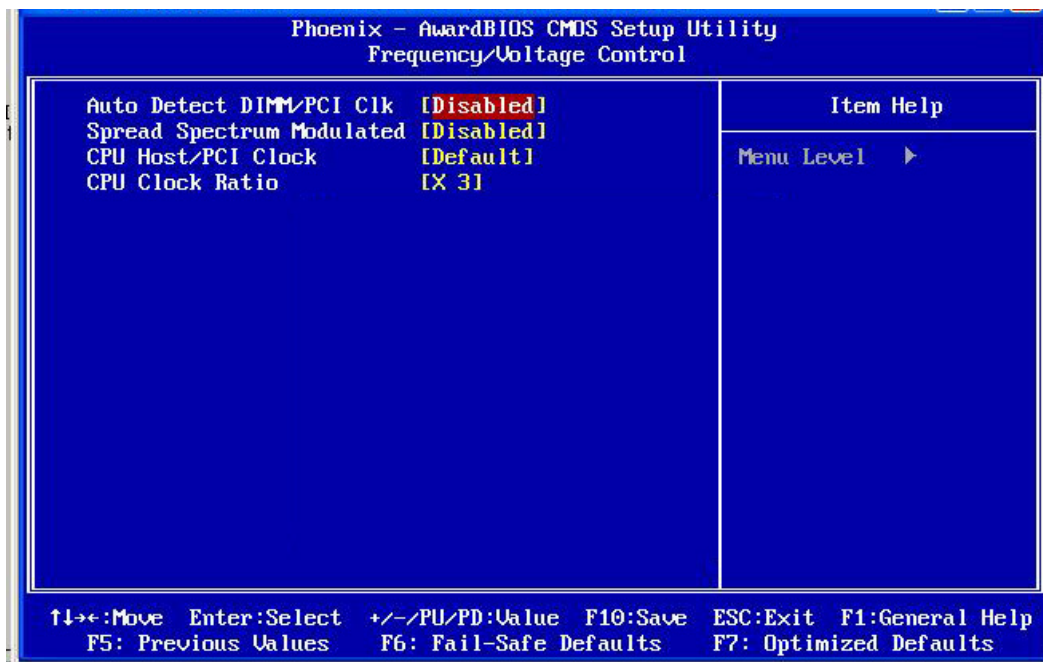
BIOS Menu 9: Frequency/Voltage Control

➔ **Auto Detect DIMM/PCI Clk [Enabled]**

Use the **Auto Detect DIMM/PCI Clk** option to actively reduce EMI (Electromagnetic Interference) and reduce power consumption by turning off unoccupied or inactive expansion slots.

➔ **Disabled**   AGP, PCI and memory slots are not monitored.

➔ **Enabled** (Default) AGP, PCI and memory slots are monitored and clock signals to all unoccupied and inactive slots are turned off.

➔ **Spread Spectrum [Disabled]**

Use the **Spread Spectrum** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

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➔ **Disabled**   (Default)   EMI not reduced.

➔ **Enabled**   EMI reduced.

➔ **CPU Host/PCI Clock [Default]**

Use the **CPU Host/PCI Clock** option to select a timing combination for the CPU and the PCI bus. When set to Default, the BIOS uses the actual CPU and PCI bus clock values. Configuration options are below.

- Default   (Default)
- 83/28 MHz
- 90/30 MHz
- 100/33 MHz
- 103/34 MHz
- 112/37 MHz
- 115/38 MHz
- 120/40 MHz
- 125/42 MHz

➔ **CPU Clock Ratio [X 3]**

Use the **CPU Clock Ratio** option to select CPU clock ratio. The following configuration options are available:

■ X 3	■ X 8
■ X 3.5	■ X 8.5
■ X 4	■ X 9
■ X 4.5	■ X 9.5
■ X 5	■ X 10
■ X 5.5	■ X 10.5
■ X 6	■ X 11
■ X 6.5	■ X 11.5
■ X 7	■ X 12
■ X 7.5	

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. Visit the IEI website or contact technical
support for the latest updates.

The ROCKY-3786EV CPU card has the following software drivers:

- Ali SATA/RAID Driver
- ATI Display Driver
- Intel® Chipset Driver
- Realtek Lan Driver (For GbE Lan)

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

6.2 ALi SATA/RAID Driver

To install the **ALi SATA/RAID** driver, please follow the steps below.

Step 1:   Insert the Utility CD that came with the CPU card into the system CD drive.

Open the X:\5-SATA\ directory (where X:\ is the system CD drive) and

double-click the setup.exe installation file.

Step 2:   The Install Shield Wizard (Figure 6-1) is prepared to guide the user through the

rest of the process.
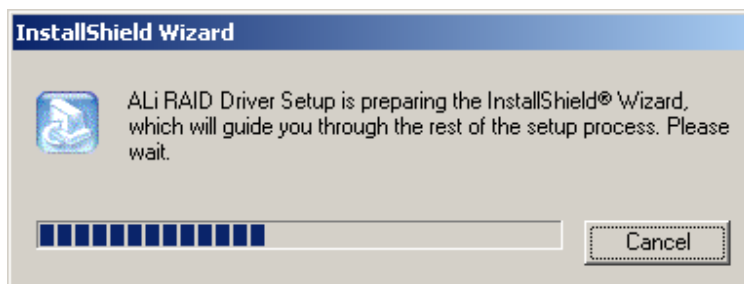
Figure 6-1: RAID Driver Preparing Setup Screen

Step 3: Once initialized, the Install Wizard welcome screen appears (Figure 6-2).
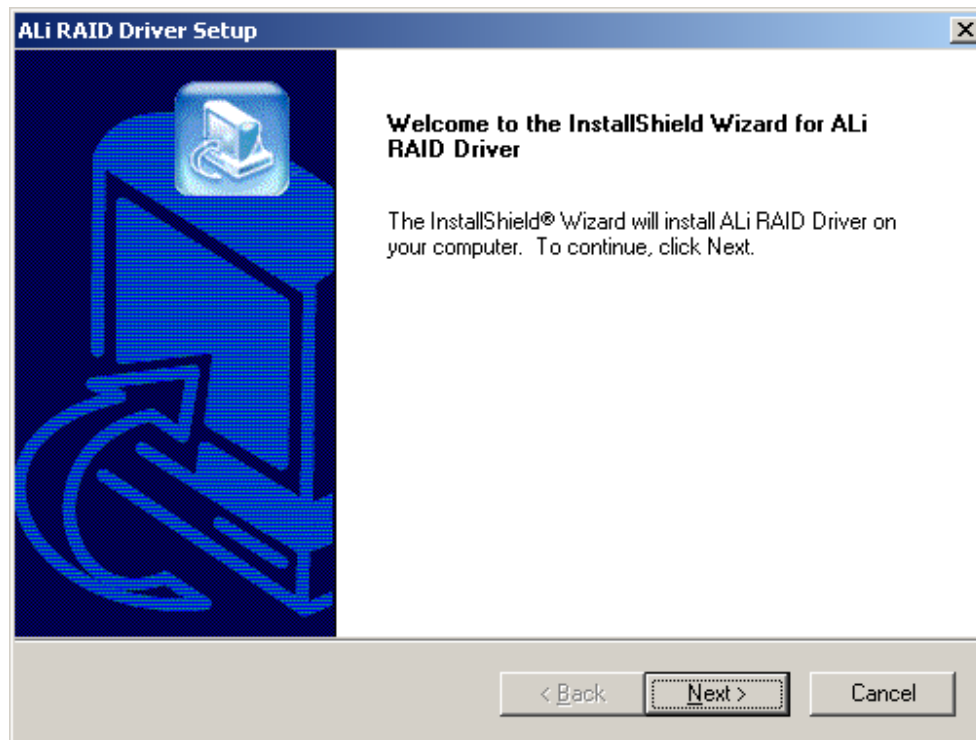
Figure 6-2: RAID Driver Install Wizard Welcome Screen

Step 4: Click NEXT to continue the installation or CANCEL to stop the installation.

Step 5: The Install Wizard starts to install the driver (Figure 6-3).
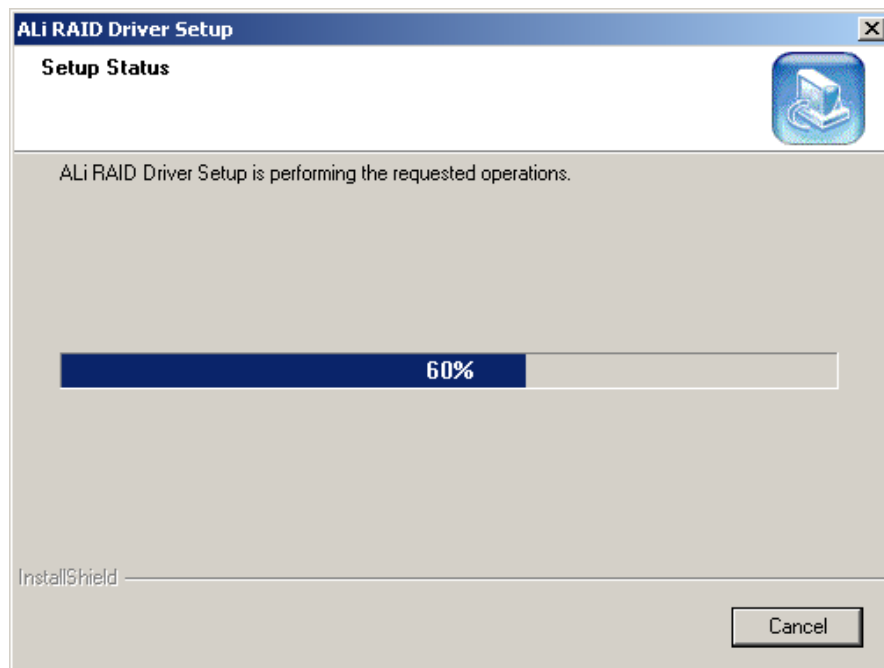
Figure 6-3: RAID Driver Installing Screen

Step 6: A Digital Signal Not Found screen appears (Figure 6-4). Click YES to continue

the installation process.
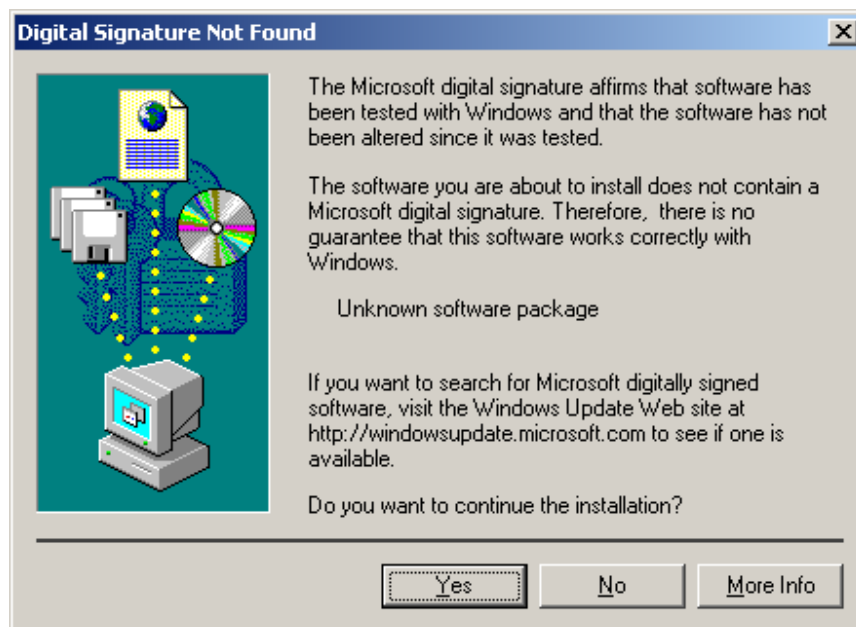
Figure 6-4: RAID Driver Digital Signal

Step 7: Once the installation is complete, the InstallShield Wizard Complete screen

appears (Figure 6-5).
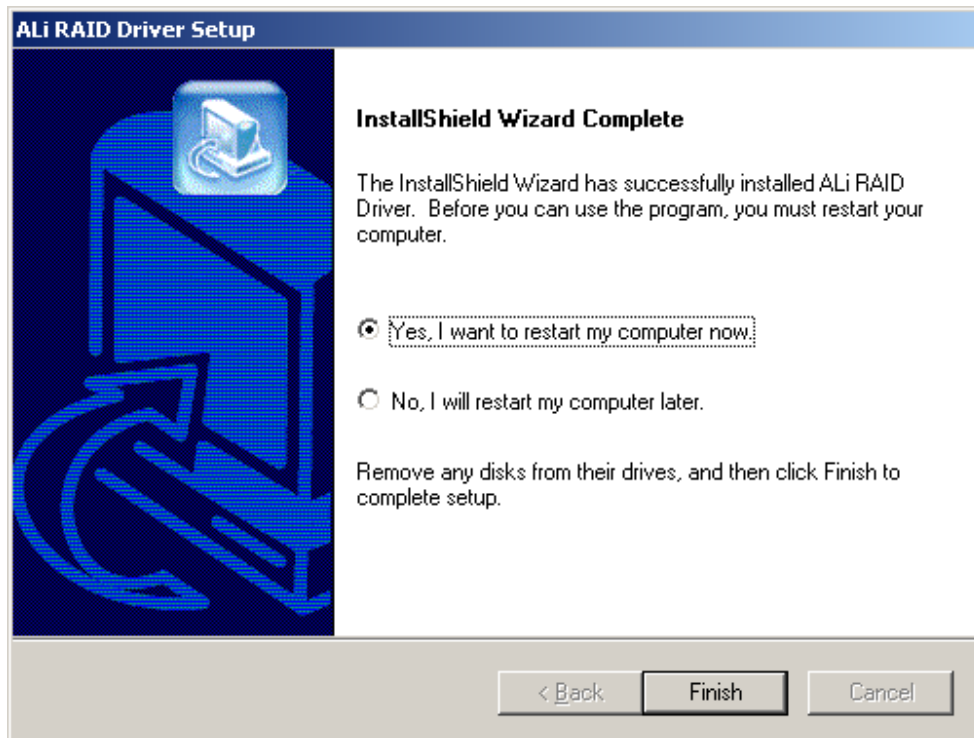
Figure 6-5: InstallShield Wizard Complete Screen

Step 8: Once the installation process is complete, the computer may be restarted

immediately or later. For the settings to take effect, the computer must be

restarted. Click FINISH to restart the computer.

6.3 ATI Display Driver

To install the **ATI Display** driver, please follow the steps below:

Step 1: Insert the Utility CD that came with the CPU card into the system CD drive.

Open the X:\ROCKY-3786EV-R70\2-VGA\ATI\M_M1\ directory (where X:\ is the

system CD drive) and double-click the SETUP.EXE installation file.

Step 2: The Install Shield Wizard (Figure 6-6) is prepared to guide the user through the

rest of the process.
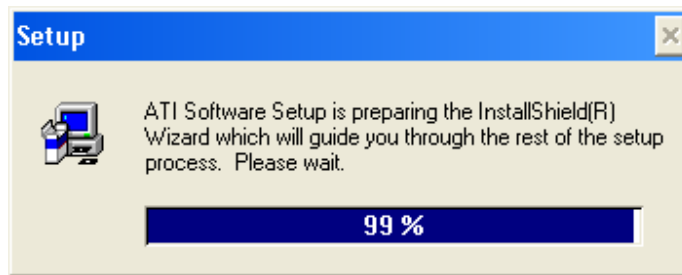
Figure 6-6: ATI Software Setup

Step 3: Once initialized, the ATI Software Setup welcome screen appears (Figure 6-7).
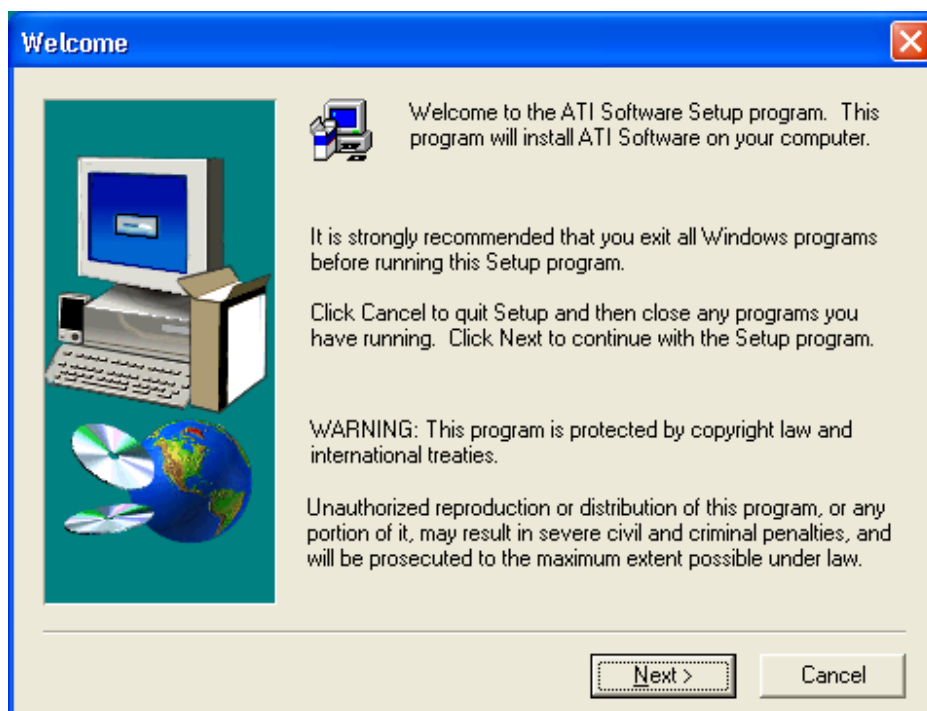
Figure 6-7: ATI Software Setup Welcome

Step 4: Click NEXT and the license agreement appears (Figure 6-8).
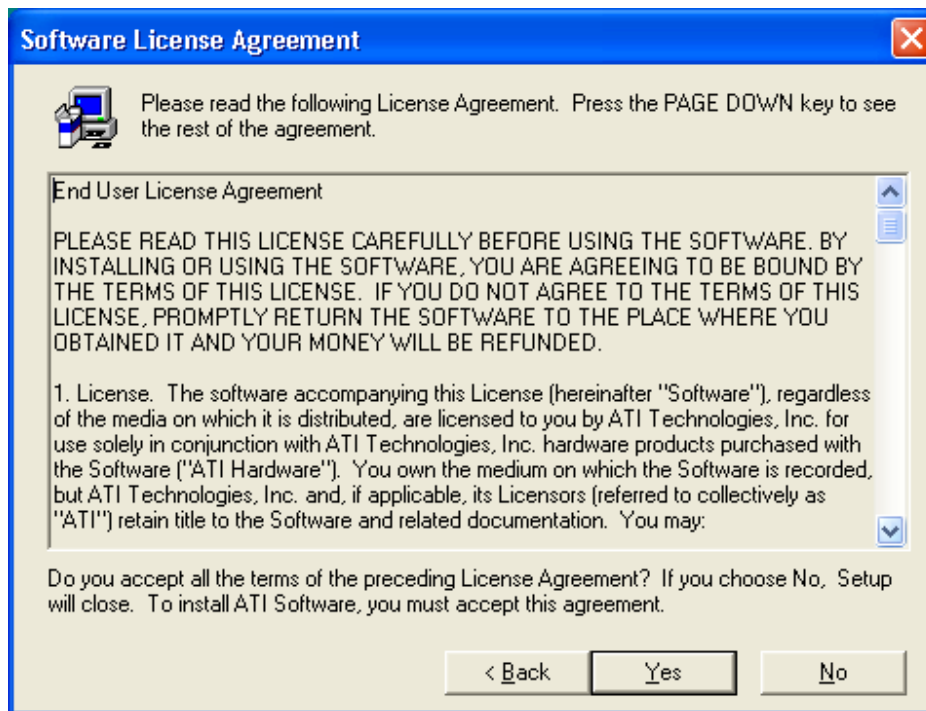
Figure 6-8: License Agreement

Step 5:   Read the license agreement. To accept the terms and conditions stipulated in

the agreement, click YES and the Select Components screen appears (Figure

6-9).
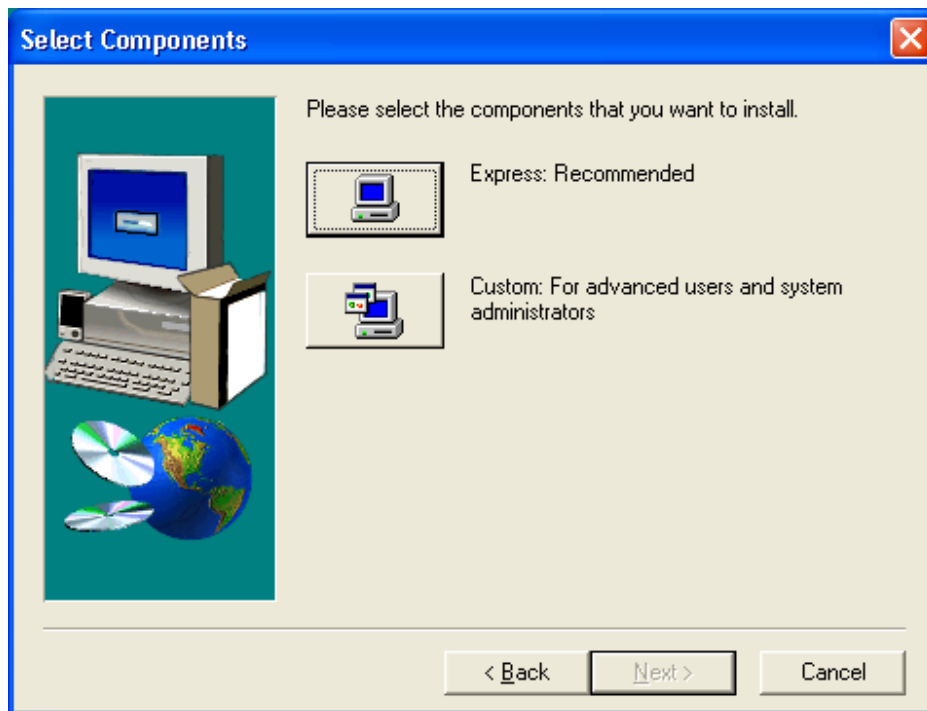
Figure 6-9: Select Components

Step 6: There are two options for express or custom software installations. Click EXPRESS to continue (Figure 6-9).

Step 7: The Hardware Installation window may appear (Figure 6-10). Click **CONTINUE ANYWAY** to continue.
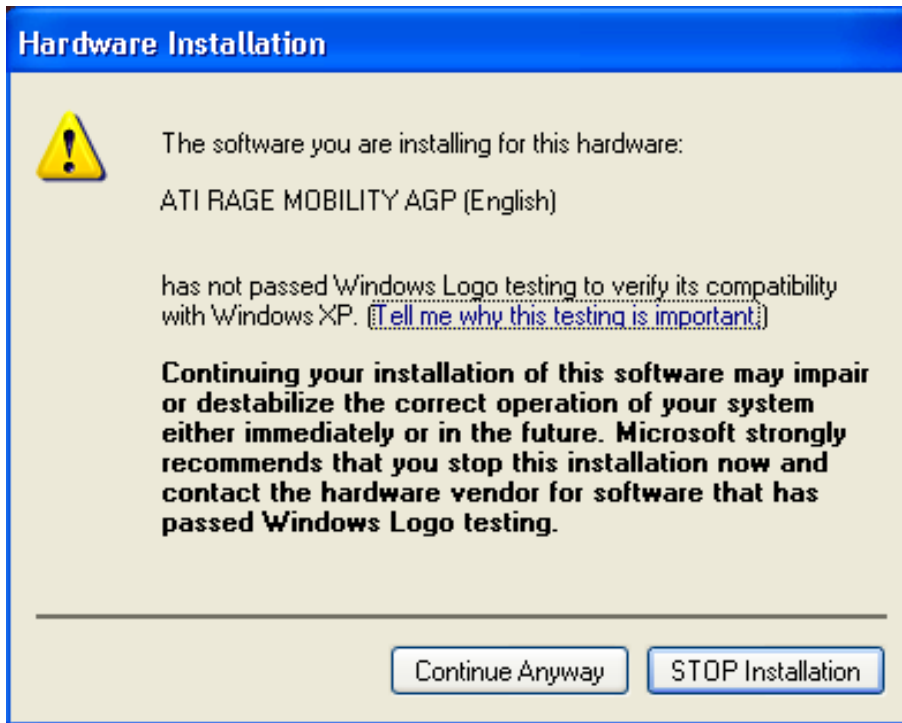
Figure 6-10: Hardware Installation

Step 8: The driver files are copied onto the system (Figure 6-11).
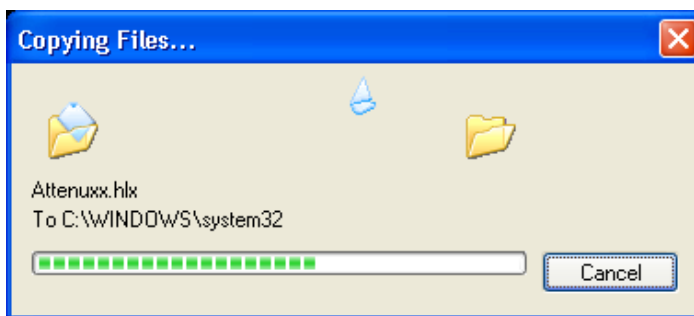
Figure 6-11: Copying Driver Files

Step 9: After the files are copied, the Setup Complete screen appears (Figure 6-12).
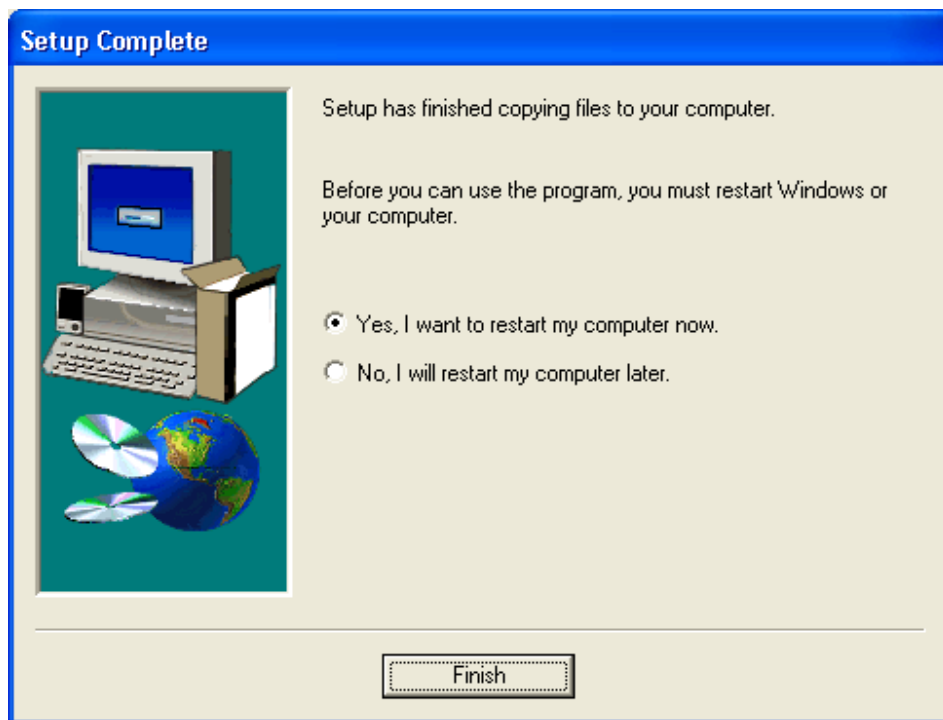
Figure 6-12: Setup Complete

Step 10: Once the installation process is complete, the computer may be restarted immediately or later. For the settings to take effect, the computer must be restarted. Click FINISH to restart the computer.

6.4 Intel® Chipset Driver Installation

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

Step 1: Insert the Utility CD that came with the CPU card into the system CD drive. Open the X:\1-INF\ directory (where X:\ is the system CD drive) and double-click the infinst_enu.exe installation file to begin extracting files (Figure 6-13).
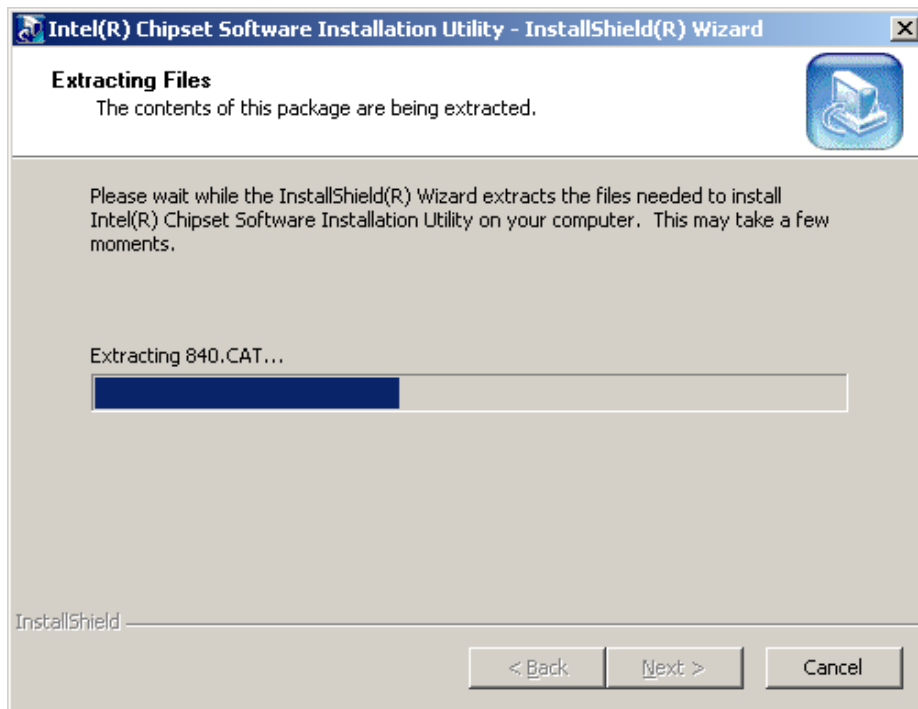
Figure 6-13: Chipset Software Installation Utility Extracting Files

Step 2: The Chipset Software Installation Utility prepares the InstallShield Wizard (Figure 6-14).
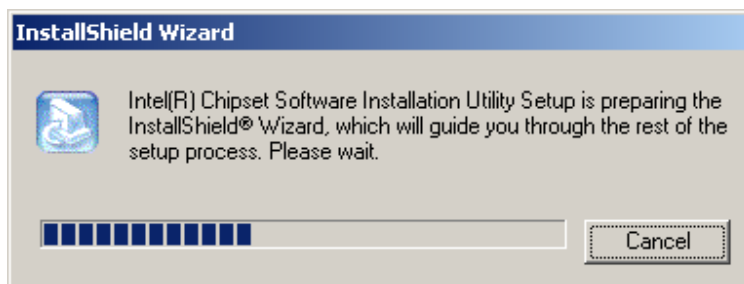
Figure 6-14: InstallShield Wizard Preparation Screen

Step 3: The InstallShield Wizard Welcome screen appears (Figure 6-15).
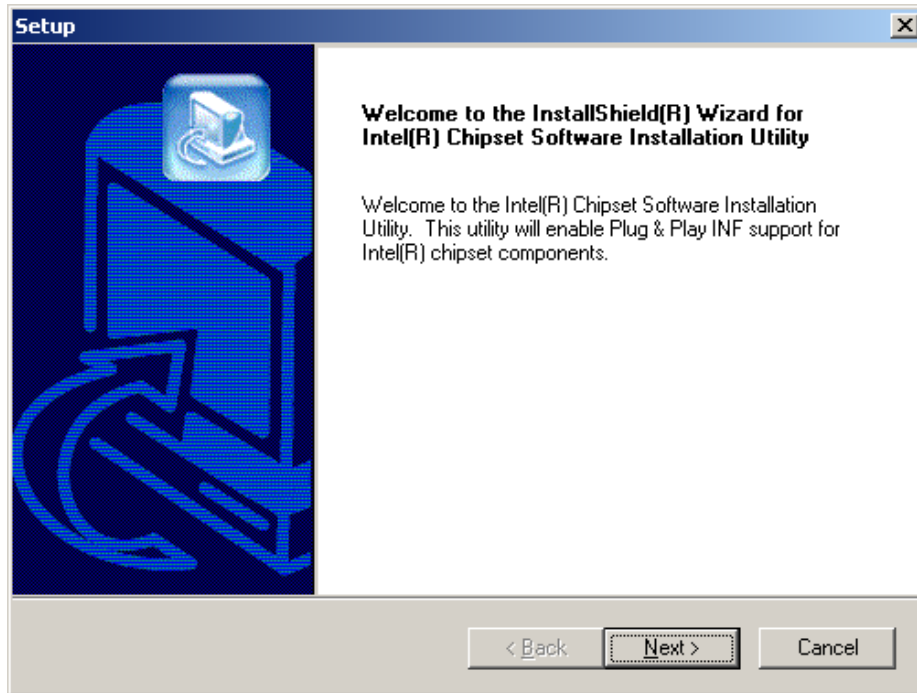
Figure 6-15: Chipset Software Installation Utility Welcome Screen

Step 4: Click NEXT and the license agreement appears (Figure 6-16).
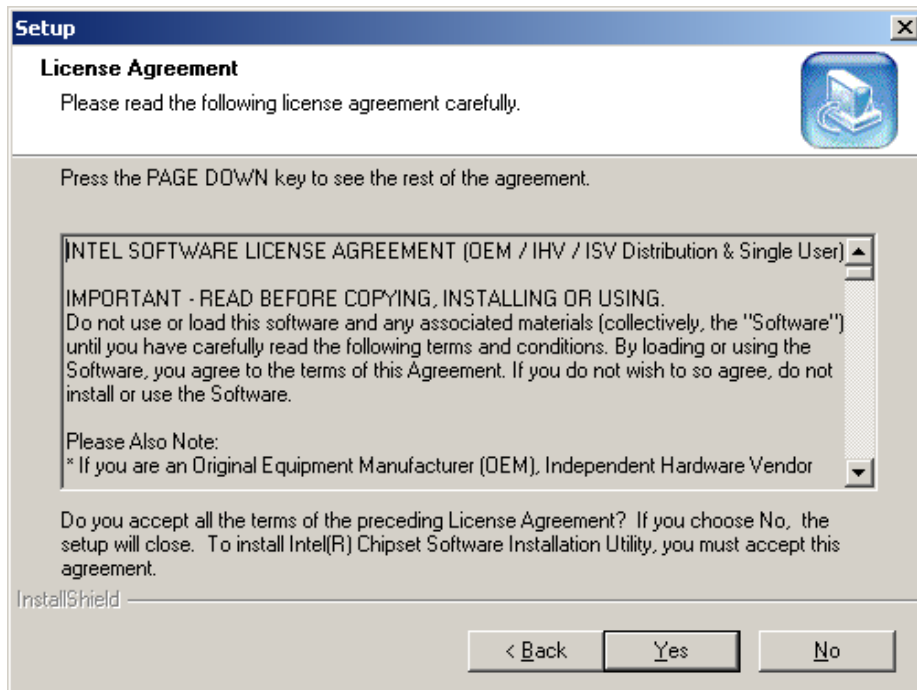
Figure 6-16: Chipset Software Installation Utility License Agreement

Step 5: Read the license agreement. To accept the terms and conditions stipulated in

the agreement, click Yᴇꜱ and the Readme file information appears (Figure

6-17).
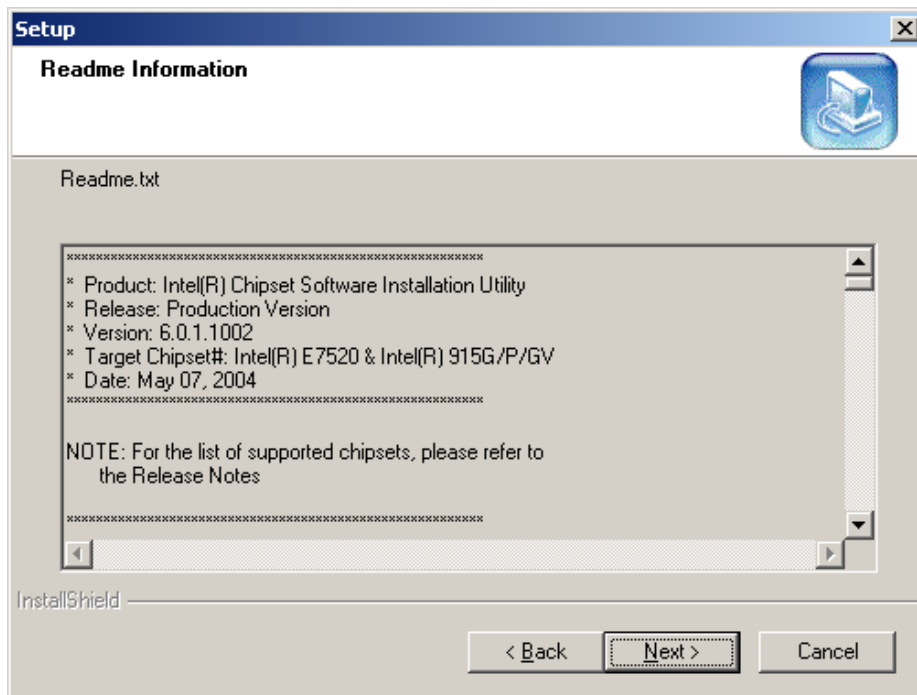
Figure 6-17: Chipset Software Installation Utility Readme File Information

Step 6: Read the Readme file information. Click Nᴇxᴛ and the chipset driver is installed

(Figure 6-18).
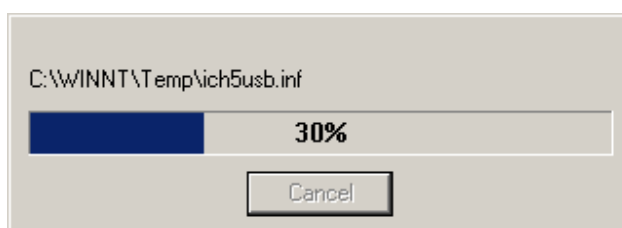
Figure 6-18: Installing Chipset Driver

Step 7: After the driver installation process is complete, a confirmation screen appears

(Figure 6-19).
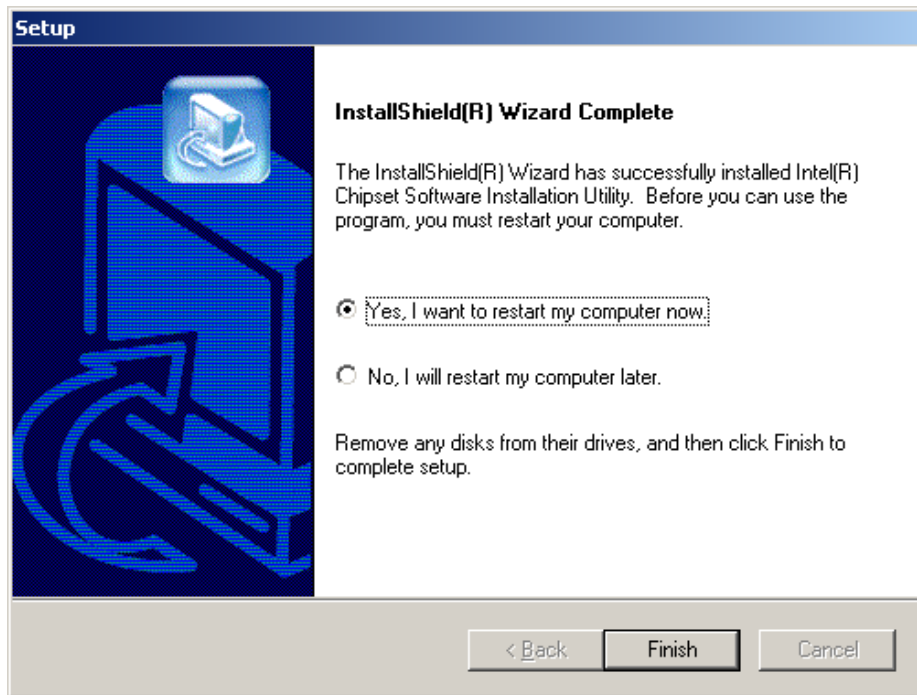
Figure 6-19: Chipset Software Installation Utility Complete

Step 8: The confirmation screen offers the option of restarting the computer now or later.
For the settings to take effect, the computer must be restarted. Click FINISH to
restart the computer.

6.5 Realtek LAN Driver (for GbE LAN) Installation

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

Step 1: Insert the Utility CD that came with the CPU card into the system CD drive.
Open the X:\4-LAN\Realtek\ directory (where X:\ is the system CD drive) and
double-click the setup.exe installation file to initiate the InstallShield Wizard
(Figure 6-20).
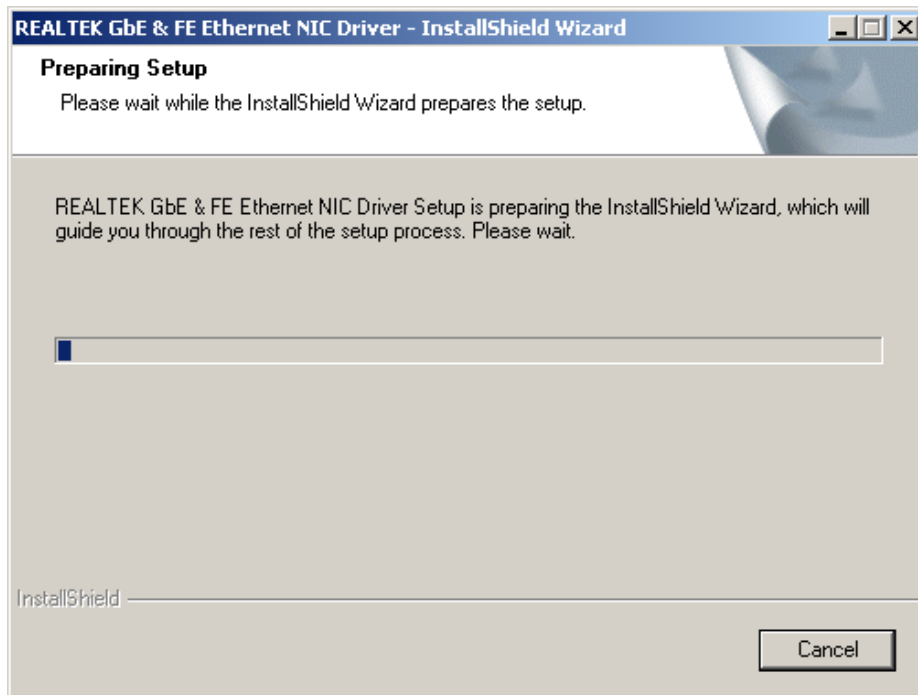
Figure 6-20: Realtek LAN Driver InstallShield Wizard

Step 2: The InstallShield Wizard Welcome screen appears (Figure 6-21).
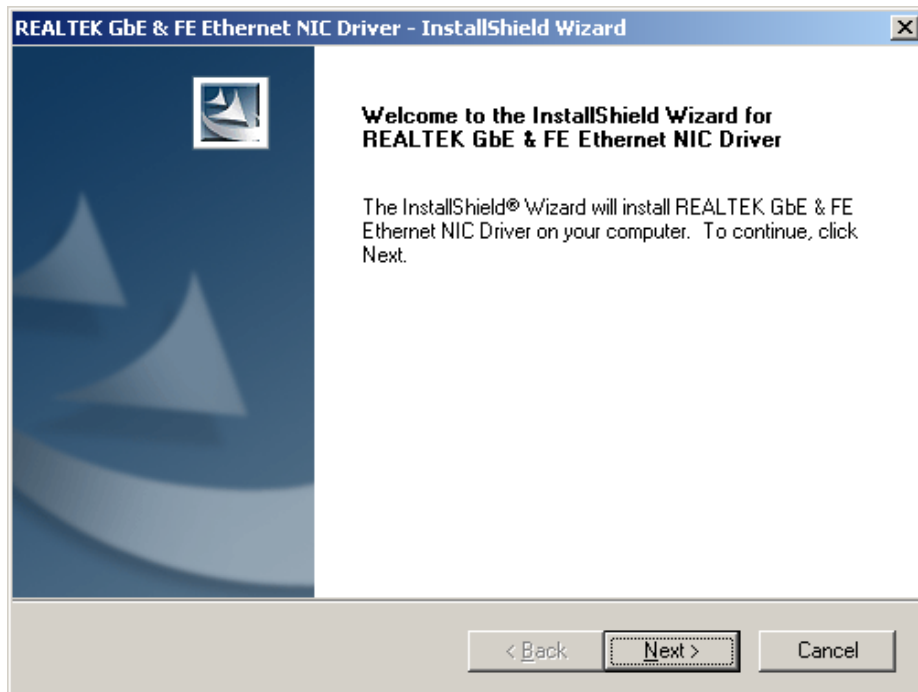
Figure 6-21: Realtek LAN Driver Welcome

Step 3: Click NEXT and the Ready to Install screen appears (Figure 6-22).
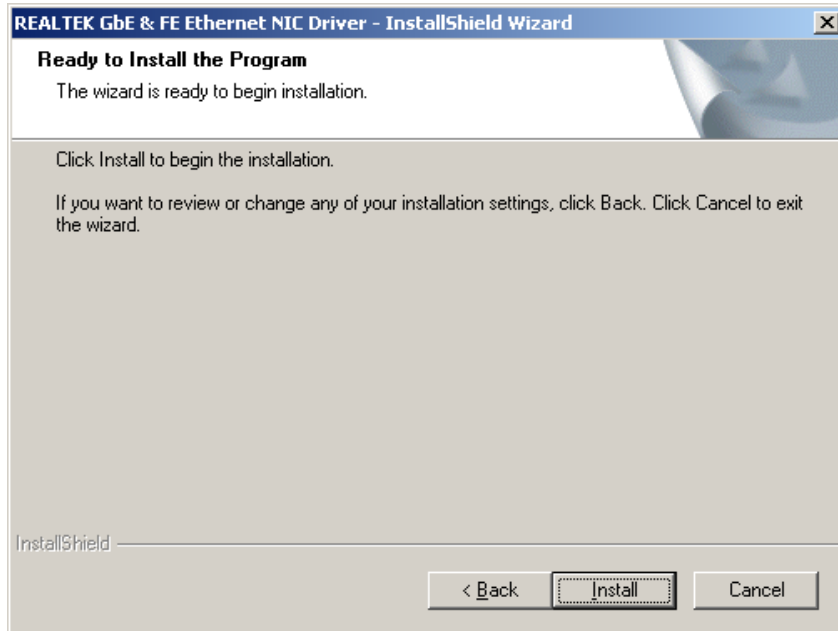
Figure 6-22: Realtek LAN Driver Ready to Install

Step 4: Click INSTALL and the Setup Status screen appears as the driver is installed (Figure 6-23).
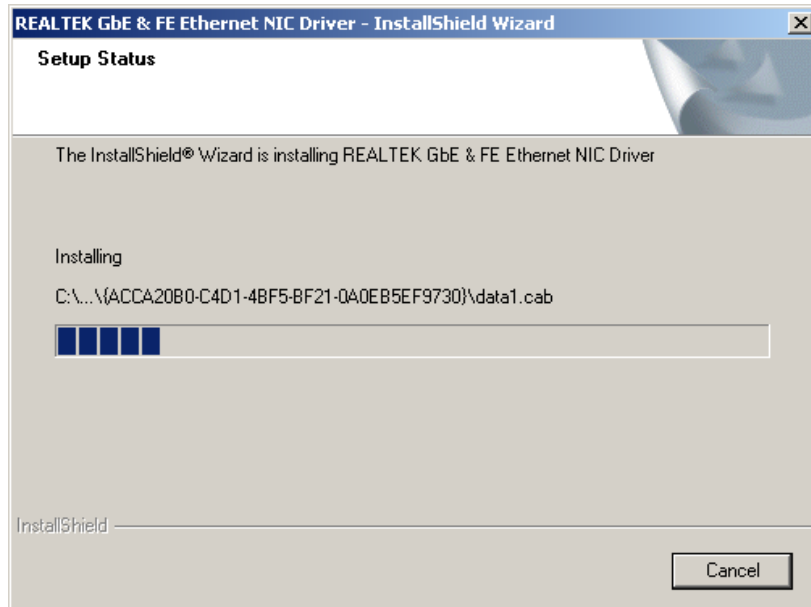
Figure 6-23: Realtek LAN Driver Setup Status

Step 5: After the driver installation process is complete, a confirmation screen appears (Figure 6-24).
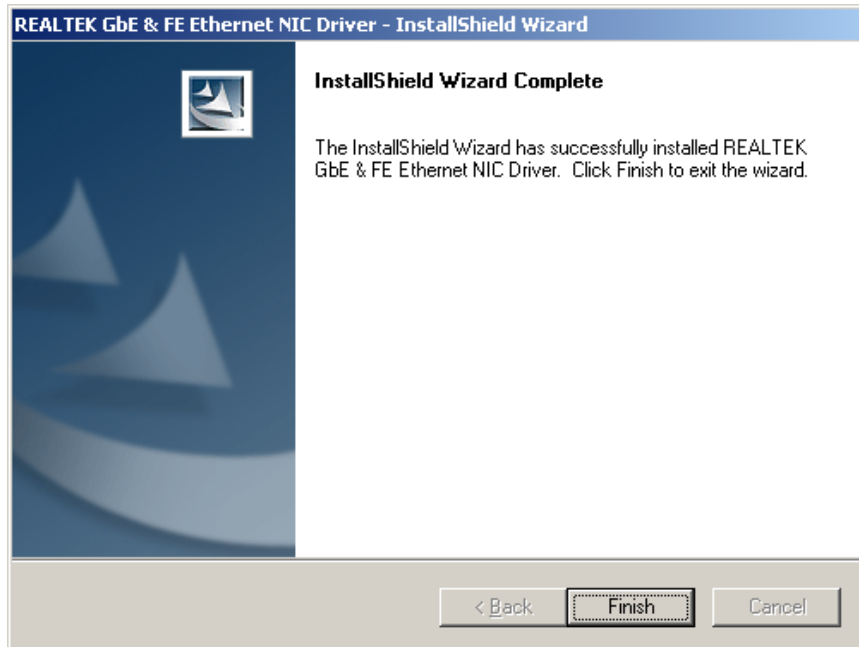
Figure 6-24: Realtek LAN Driver Installation Complete

Step 6: Click FINISH to exit the InstallShield wizard.

Appendix

A

BIOS Configuration

Options

A.1 BIOS Configuration Options

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

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. It is recommended to 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

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 the time-out value is set to zero.

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

Example program:

; **INITIAL TIMER PERIOD COUNTER**

;

W_LOOP:

       MOV   AX, 6F02H   ;setting the time-out value

       MOV   BL, 30   ;time-out value is 48 seconds

       INT   15H

 ;

; **ADD 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** ;

Appendix

C

Address Mapping

C.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-05F	8254 timer
060-06F	Keyboard Controller
070-07F	NMI Mask/Real time Clock
080-09F	DMA Controller
0A0-0BF	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F8	Fixed Disk
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO 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	Avaliable
IRQ2	Cascade to IRQ Controller	IRQ10	AC '97 CODEC
IRQ3	COM2	IRQ11	Intel 82562ET LAN
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	Available	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Parallel Port	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: DMA Channel Assignments

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Appendix

D

External AC'97 Audio CODEC

D.1 Introduction

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

D.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through the phone jack on the rear panel of CPU card. The phone jack include:

1. A LINE input
2. A LINE output
3. A MIC input line
4. A Speaker output

D.1.2 Driver Installation

The driver installation has been described in Chapter 6.

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see **Figure D-1**). If the peripheral speakers are properly connected, sound effects should be heard.

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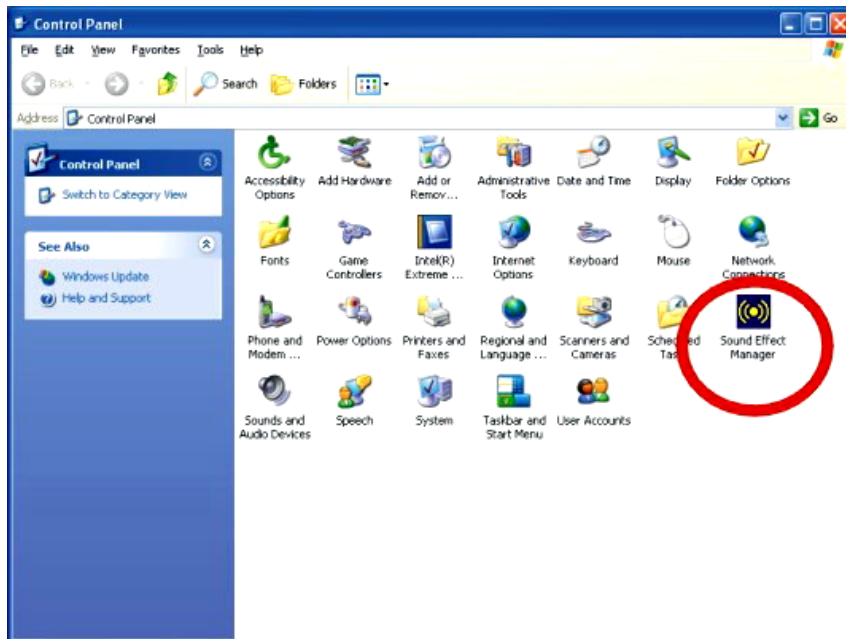
Figure D-1: Sound Effect Manager con

D.2 Sound Effect Configuration

D.2.1 Accessing the Sound Effects Manager

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

Step 1:   Install the audio CODEC driver.

Step 2:   Click either:

■   The **Sound Effect Manager** icon in the **Notification Area** of the system task bar (see **Figure D-2**), or

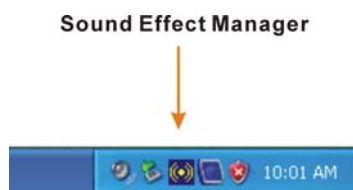■   The **Sound Effect Manager** icon in the Control Panel (**Figure D-3**).

Figure D-2:   Sound Effect Manager Icon [Task Bar]
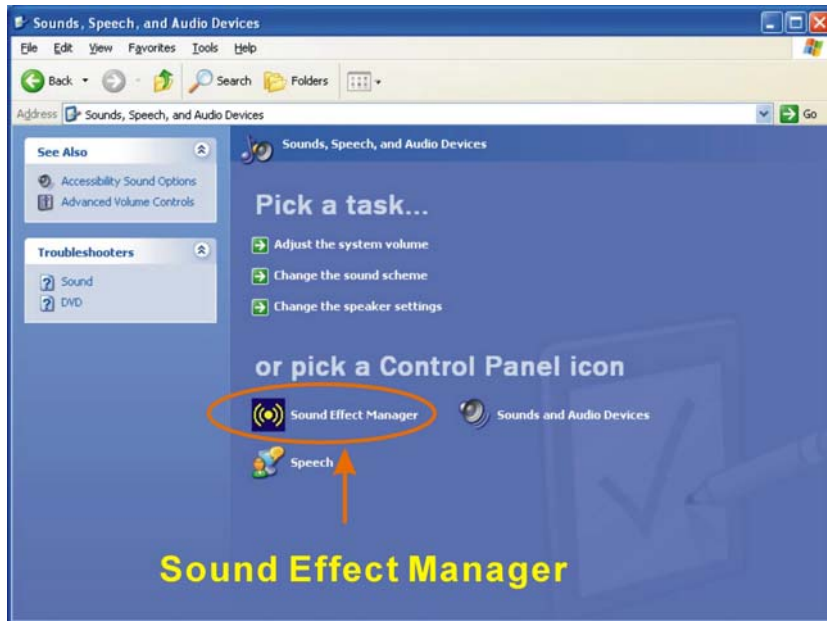
Figure D-3: Sound Effect Manager Icon [Control Panel]

Step 3:   The sound effect manager appears. (See Figure D-4)
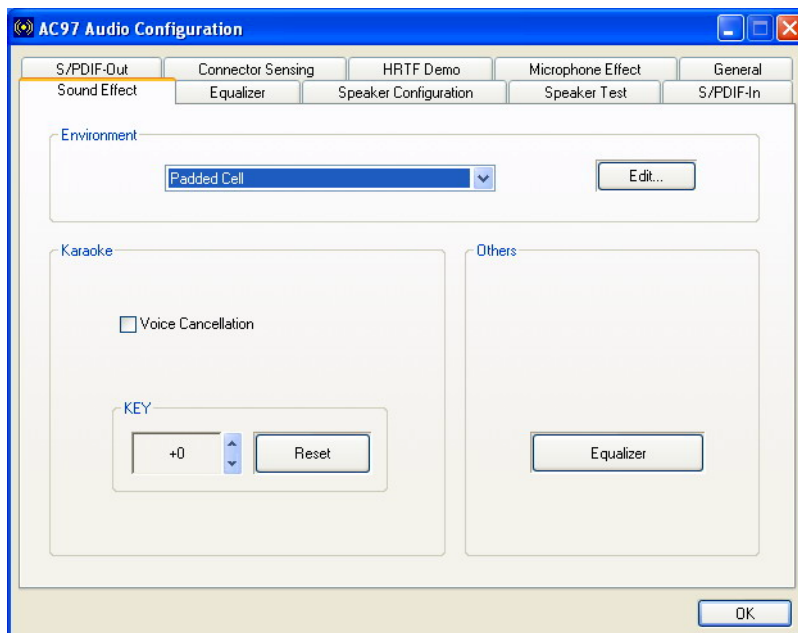
Figure D-4: Sound Effects Manager (ALC655)

NOTE:

The Sound Effect Manager shown in **Figure D-4** is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

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

D.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** in **Figure D-4**.

NOTE:

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

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

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

■

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

- ■ *Sound Effect*:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."

- ■

- ■ *Karaoke Mode*:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key that fits a certain vocal range.

- ■

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

- ■

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

- ■

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

- ■

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

■

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

■

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

■

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

■

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

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Appendix

E

ALi® RAID for SATA

E.1 Introduction

The ALi M5283 SATA RAID chipset can control parallel ATA (PATA) and serial ATA (SATA) disks. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1 disk drives. The ALi M5283 also has a cost-effective RAID functionality that can increase the data read/write speed and provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID 1).

> ### ⚠️ CAUTION!
>
> A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

E.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

> ### ⚡ WARNING!
>
> Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

> ### ⚠️ CAUTION!
>
> Do not accidentally disconnect the SATA drive cables. Carefully route the

cables within the chassis to avoid system down time.

E.2 Features and Benefits

- Supports RAID levels 0, 1, and JBOD
- Supports connectivity to two disk drives
- Supported Operating Systems include: Windows 98/Me, Windows 2000 and Windows XP
- Windows-based software for RAID management

E.3 Accessing the ALi RAID Utility

To access the **Ali RAID Utility**, please follow the steps below:

Step 1: Connect SATA drives to the system. Connect two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration (JBOD, RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: Enable SATA drives in BIOS. Start the computer and access the Phoenix Award BIOS setup program. Next, open the Advanced BIOS Features menu. Enable the SATA BOOT ROM Control BIOS option. (See **Chapter 5, Section 5.3**)

Step 3: Save and Exit BIOS. After the SATA BOOT ROM Control BIOS option is enabled, save and exit the BIOS.

Step 4: Reboot the system. Reboot the system after saving and exiting the BIOS.

Step 5: Press Ctrl-A. When the screen in Figure E-1 appears press Ctrl-A to enter the ALi RAID BIOS setup program.

```
ALi RAID BIOS V1.XX

(c) ALi Corporation 2005, All Rights Reserved.

Identifying IDE drives…


Channel 1 Master: None

Channel 1 Slave: None

Channel 2 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]

Channel 3 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]


Press Ctrl-A to enter ALi RAID BIOS setup utility
```
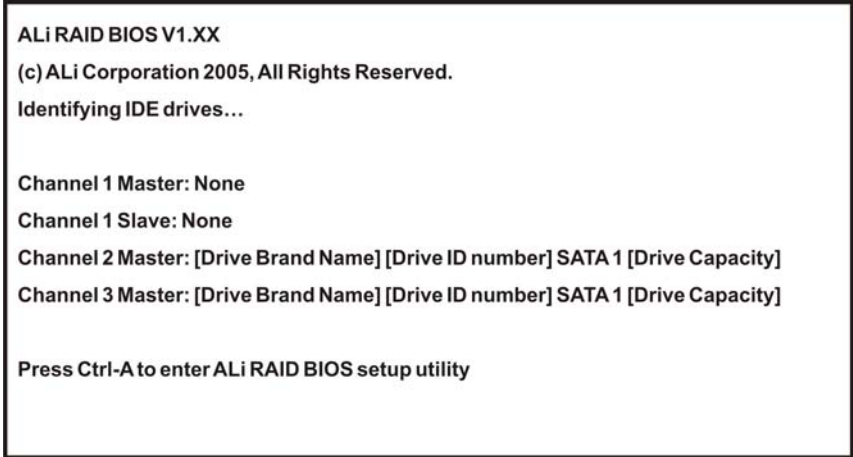
Figure E-1: Accessing ALi RAID BIOS Utility

Step 6: Delete RAID settings and partitions. The RAID BIOS Setup Utility in **Figure E-2**
appears. Before configuring the array select the "Delete All RAID Setting &
Partition".
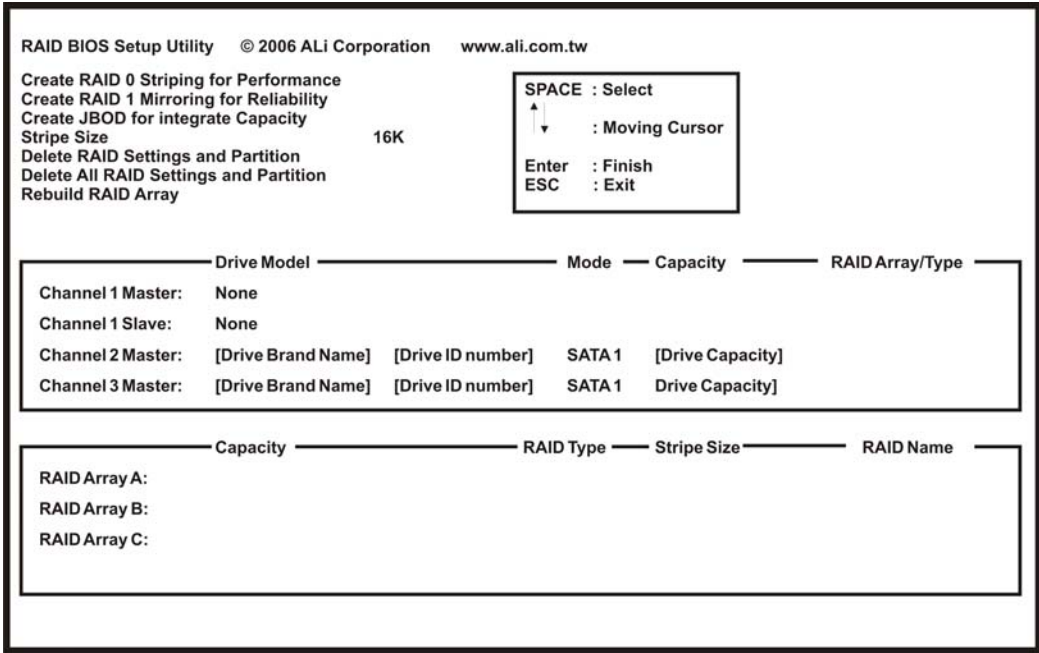
Figure E-2: RAID BIOS Setup Utility

Step 7: Configure the RAID settings. Use the RAID BIOS Setup Utility in **Figure E-2** to
configure the RAID array. Brief descriptions are given below.

Step 8: Install the OS. After the RAID array has been configured (see below) install the

OS. To do this, please refer to the documentation that came with the OS.

E.4 RAID Options:

E.4.1 Create RAID 0 Striping for Performance

⚠️ **WARNING!**

All data previously stored on the member drives of a RAID configuration **are destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: Select "Create RAID 0 Striping for Performance". Use the arrow keys to highlight Create RAID0 Striping for Performance and press ENTER. A flashing 'S' appears on the Drive Menu where the member drives to be included in the RAID 0 array can be chosen.

Step 2: Select RAID array drive members. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: Confirm. The Create RAID0(Y/N) confirm box appears. Press Y.

Step 4: Name the array. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

⚠️ **NOTE:**

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 0 array. Avoid

mixing PATA and SATA disk drives in a RAID 0 array.

2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.
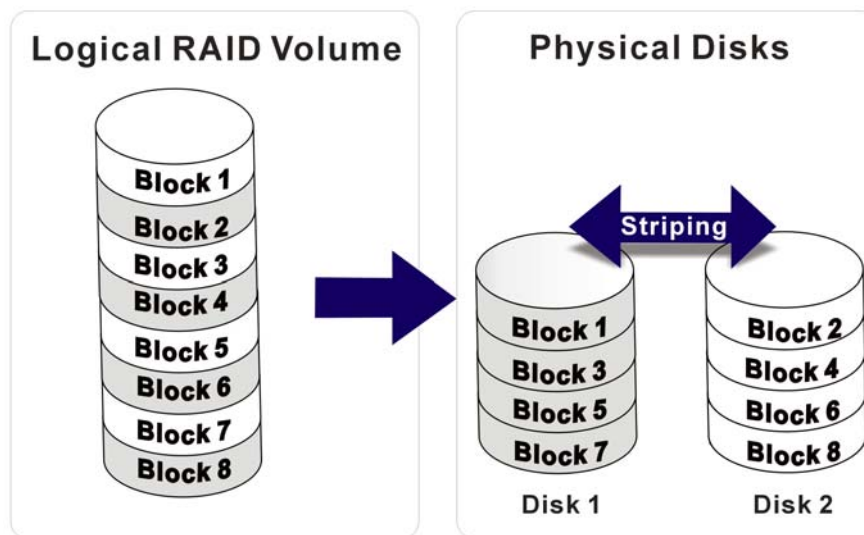
E.4.2 Create RAID 1 Mirroring for Reliability

⚠️ **WARNING!**

All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: Select "Create RAID 1 Striping for Reliability". Use the arrow keys to highlight Create RAID 1 Striping for Reliability and press ENTER. A flashing 'S' appears on the Drive Menu where the member drives to be included in the RAID 0 array can be chosen.

Step 2: Select RAID array drive members. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select

another member drive.

Step 3: Confirm. The Create RAID0(Y/N) confirm box appears. Press Y.

Step 4: Name the array. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

Step 5: View the array. A prompt appears to proceed with drive copy. The Source and Destination drives are indicated as "M" and "m" in the Drive Menu.

⚠ NOTE:

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 1 array. Avoid mixing PATA and SATA disk drives in a RAID 1 array.

2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.
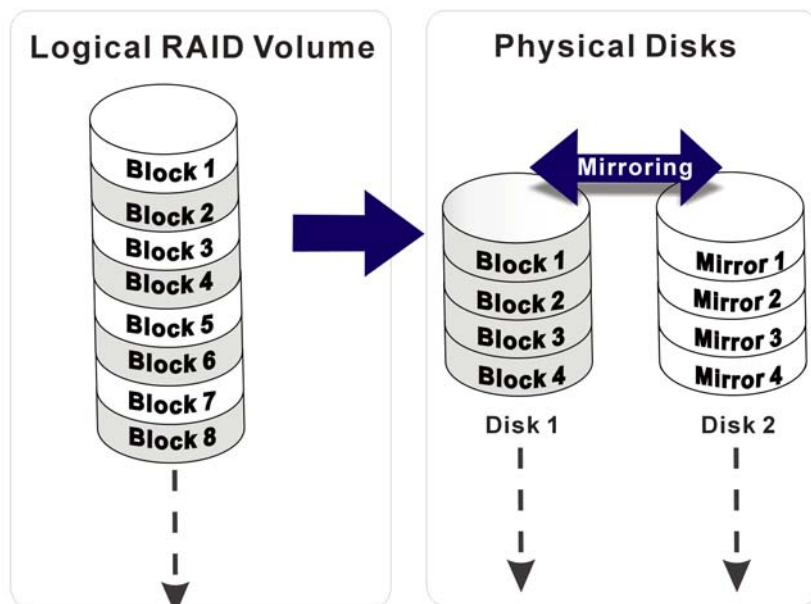
E.4.3 Create JBOD for Integrated Capacity

JBOD is defined as "Just a Bunch of Drives." JBOD provides neither performance gains nor data redundancy.

⚡ WARNING!

All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: Select "Create JBOD for Integrated Capacity". Use the arrow keys to highlight Create JBOD for Integrated Capacity and press ENTER. A flashing 'J' appears on the Drive Menu where the member drives to be included in the JBOD array can be chosen.

Step 2: Select RAID array drive members. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: Confirm. The Create RAID 0 (Y/N) confirm box appears. Press Y.

Step 4: Name the array. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

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⚡ NOTE:

To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Avoid mixing Parallel-ATA and Serial-ATA disk drives in a RAID1 array.

E.4.4 Stripe Size

Changing the stripe size effects RAID 0 arrays. Configurable options are:

- 64K (default)
- 32K
- 16K
- 8K
- 4K

Select a small stripe size if the I/Os to the hard drives are small and occur randomly. Choose a larger stripe size if the I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications. The default value should be appropriate for most applications.

E.4.5 Delete RAID Setting & Partition

⚠️ **WARNING!**

> If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

Step 1: Delete a RAID setting. Use the arrow keys to highlight Delete RAID Setting & Partition and press ENTER. A flashing 'E' appears at the Drive Menu where the member drives to be removed can be chosen.

Step 2: Confirm Delete. The Data on RAID drives will be erased (Y/N) confirm box appears. Press Y.

E.4.6 Delete All RAID Setting & Partition

⚠️ **WARNING!**

> If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

Step 1: Delete RAID Settings. Use the arrow keys to highlight Delete All RAID Setting & Partition and press ENTER.

Step 2: Confirm delete. The Data on RAID drives will be erased (Y/N) confirm box appears. Press Y.

E.4.7 Rebuild RAID Array

The **Rebuild RAID Array** option can rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID 0 nor JBOD provides data redundancy. The **Rebuild RAID Array** option only applies to RAID1 arrays and is applicable when a member of a RAID1 configuration has failed.

Step 1: Select Rebuild Array. Use the arrow keys to highlight Rebuild RAID Array and press ENTER. A flashing 'R' appears in the list of existing arrays. The source and destination drives will be displayed.

Step 2: Confirm rebuild array. Press Y to begin the rebuild process.

NOTE:

A status bar will indicate the rebuild progress. Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

E.4.8 Select Boot Drive

Step 1: Select the Boot Drive. Use the arrow keys to highlight Select Boot Drive and press ENTER. A flashing 'A' appears at the Drive Menu where the boot drive can be chosen.

Step 2: Press ENTER. Press ENTER or the space bar to finish the configuration.

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