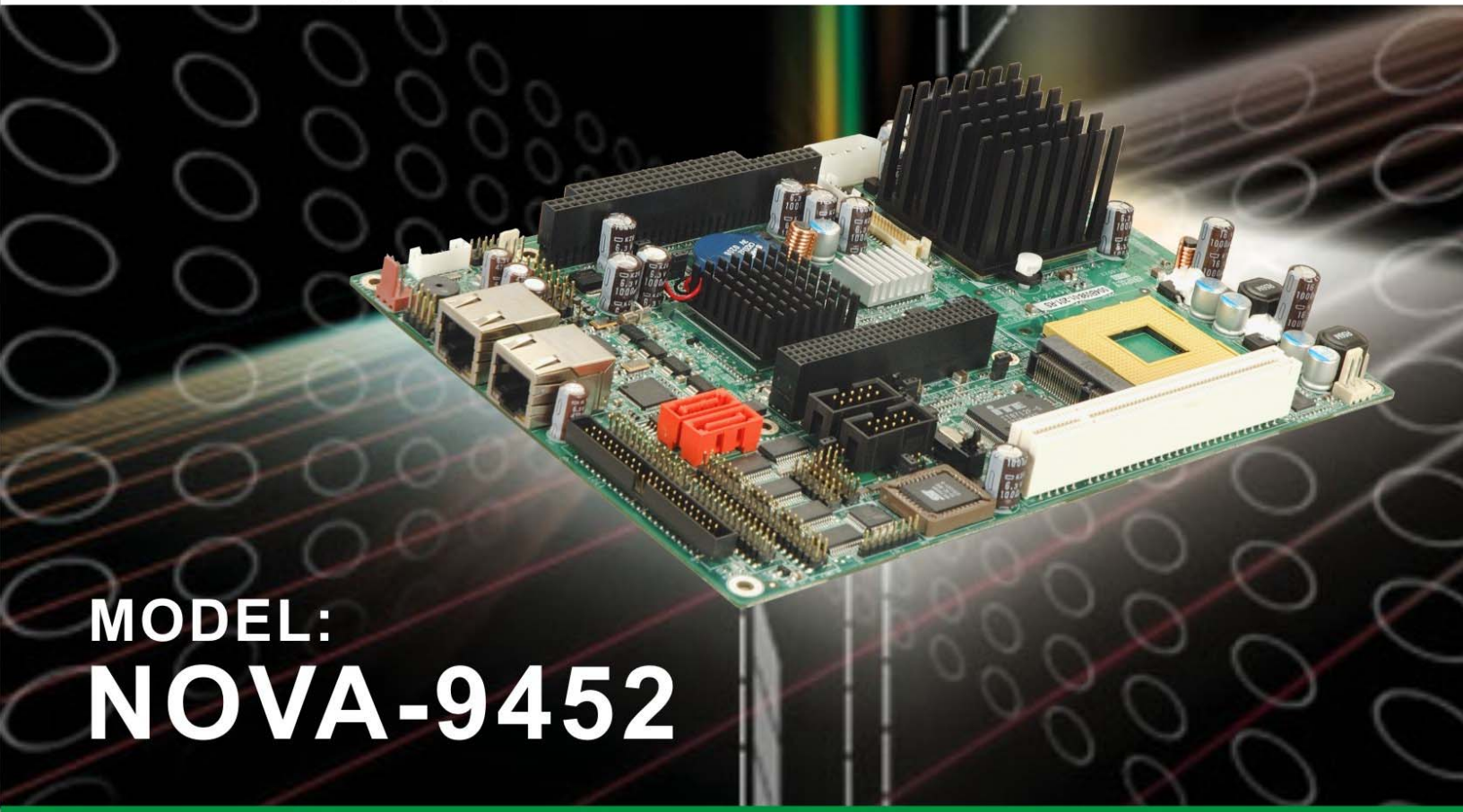
IEI Technology Corp.



MODEL:

NOVA-9452

5.25" SBC that supports an Intel® Core™2 Duo or Core™ Duo/Solo CPU, Dual VGA/LVDS, PC/104-Plus, PCIe Mini Card, PCI, USB 2.0, SATA, CompactFlash® and Gigabit Ethernet

User Manual

Rev. 2.00 MAY 2008

RoHS Lead Free

Revision

Date	Version	Changes
2008-05	2.00	- Changed Northbridge to Intel® 945GME - Added auto power-on function setup jumper (J_AUTOPWR1) information - Added 24-bit LVDS screen support
2007-11	1.00	Initial release

Copyright

COPYRIGHT NOTICE

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

TRADEMARKS

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NOVA-9452 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the NOVA-9452 package.

- 1 x NOVA-9452 single board computer
- 1 x IDE cable (44-pin)
- 2 x SATA cables
- 1 x SATA power cable
- 1 x VGA cable (2 x VGA cables for NOVA-9452VGA)
- 1 x KB/MS Y cable
- 1 x RS-232/422/485 cable
- 1 x Quad RS-232 adapter cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

Table of Contents

List of Figures

List of Tables

BIOS Menus

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: NOVA-9452 SBC

The NOVA-9452 motherboard is a Socket M Intel® Core™2 Duo, Intel® Core™ Duo, Intel® Core™ Solo or Intel® Celeron® M (Yonah core) CPU platform. The NOVA-9452 has a maximum front side bus (FSB) frequency of 667 MHz and supports one 667 MHz DDR2 SO-DIMM up to 2 GB. The NOVA-9452 supports multiple displays including two VGA outputs and an LVDS output. Expansion options on the NOVA-9452 include a PCI port, a PC/104-Plus slot and a PCIe mini card slot. Storage options include two SATA ports and an IDE port to support an IDE device and a CompactFlash® card. Other features include six serial ports, a parallel port, a digital I/O port, 6 USB 2.0 ports and two Gigabit Ethernet ports.

1.1.1 NOVA-9452 Benefits

Some of the NOVA-9452 benefits are listed below:

- Multiple display output options
- Storage flexibility with support for SATA drives, IDE drives and CompactFlash® Type I/II disks
- DDR2 support enables faster data transfers
- Multiple I/O interfaces provide connectivity to a broad range of external peripheral devices

1.1.2 NOVA-9452 Features

Some of the NOVA-9452 features are listed below.

- Support for the following Socket M processors:
  - Intel® Core™2 Duo
  - Intel® Core™ Duo
  - Intel® Core™ Solo
  - Intel® Celeron® M (Yonah core)
- Maximum FSB of 667 MHz
- Maximum of one 2 GB (max.) 400 MHz, 533 MHz or 667 MHz DDR2 SO-DIMM
- Two SATA drives with transfer rates of 1.5 Gb/s supported
- Intel® Matrix Storage Manager
- Two high performance PCIe GbE Ethernet controllers
- Six USB 2.0 devices supported
- Dual VGA and 18-bit/24-bit dual-channel LVDS
- RoHS compliant

1.2 NOVA-9452 Overview

1.2.1 NOVA-9452 Overview Photo

The NOVA-9452 has a wide variety of internal and external peripheral connectors. A labeled photo of the peripheral connectors on the front of the NOVA-9452 is shown in **Figure 1-2**.

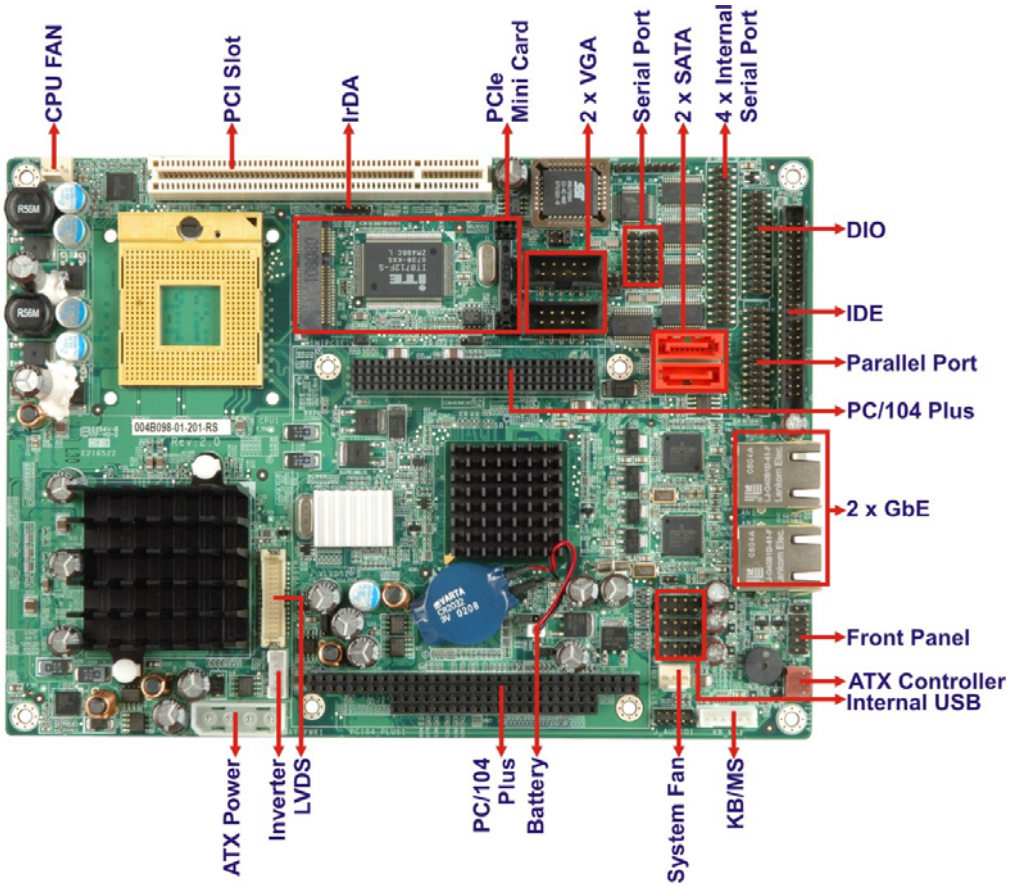


Figure 1-2: NOVA-9452 Overview [Front View]

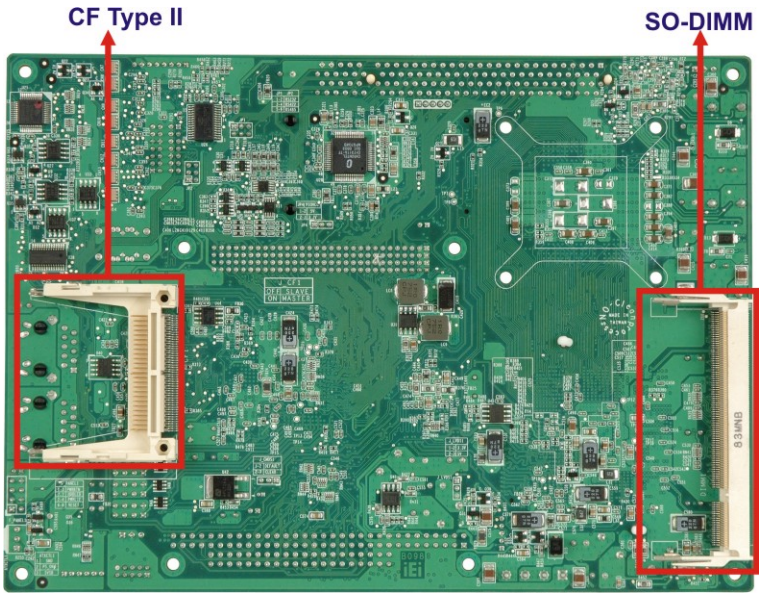


Figure 1-3: NOVA-9452 Overview [Rear View]

1.2.2 NOVA-9452 Peripheral Connectors and Jumpers

The NOVA-9452 has the following connectors on-board:

- 1 x ATX power connector
- 1 x ATX control connector
- 1 x Audio connector
- 1 x CompactFlash® connector
- 1 x Digital input/output connector
- 2 x Fan connector
- 1 x Front panel connector
- 1 x IDE disk drive connector
- 1 x Infrared interface connector
- 1 x Inverter connector
- 1 x Keyboard and mouse connector
- 1 x LVDS connector
- 1 x PCIe mini card socket
- 1 x Parallel port connector
- 1 x PCI slot

- 1 x PC104+ connector
- 2 x Serial ATA (SATA) drive connectors
- 2 x RS-232/422/485 serial port connectors
- 1 x RS-232 serial port connector (for four RS-232 devices)
- 1 x VGA output connector [2 x VGA (on Dual VGA model)]
- 3 x Dual USB connectors

The NOVA-9452 has the following external peripheral interface connectors on the board rear panel

- 2 x Ethernet connectors

The NOVA-9452 has the following on-board jumpers:

- Auto power-on function setup
- COM1 serial port mode selector
- COM2 serial port mode selector
- Clear CMOS
- PCI-104 SERIQ# (as part of PC/104-Plus)
- PC/104 SERIQ# (as part of PC/104-Plus)
- LCD voltage selector
- CF card setting
- VIO voltage selector

1.2.3 Technical Specifications

NOVA-9452 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	NOVA-9452
Form Factor	5.25” Motherboard
System CPU	Socket M Intel® Core™2 Duo Socket M Intel® Core™ Duo Socket M Intel® Core™ Solo Socket M Intel® Celeron® M (Yonah core)
Front Side Bus	533 MHz, or 667 MHz
System Chipset	**Northbridge**: Intel® 945GME **Southbridge**: Intel® ICH7M
Memory	One 200-pin 2 GB (max.) 400/533/667 MHz DDR2 SO-DIMM
Display	**CRT**: Integrated in the Intel® 945GME to support CRT CRT: Through SDVO by Chrontel CH7317A (NOVA-9452VGA-R10) **LVDS**: Dual channel 18-bit or 24-bit LVDS LCD panel
BIOS	AMI Flash BIOS
Audio	7.1 channel or 5.1 channel audio with an optional audio kit
LAN	Dual PCIe GbE Broadcom BCM5787M chipsets
COM	Two RS-232/422/485 serial ports Four RS-232 serial ports
USB2.0	Six USB 2.0 ports
IDE	One 44-pin IDE connects to two Ultra ATA33 devices

Specification	NOVA-9452
SATA	Two 1.5 Gb/s SATA drives supported
Keyboard/mouse	One 6-pin connector connects to a keyboard and mouse
Super I/O	ITE IT8712F-S
Digital I/O	One 24-bit digital I/O connector (12-bit input / 12-bit output)
Infrared	One Infrared connector
SSD	CF Type II
Watchdog Timer	Software programmable 1-255 sec. by super I/O
Power Supply	ATX supported
Temperature	0ºC – 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	203 mm x 146 mm
Weight (GW/NW)	850 g / 290 g

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the NOVA-9452 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 203 mm
- **Width**: 146 mm

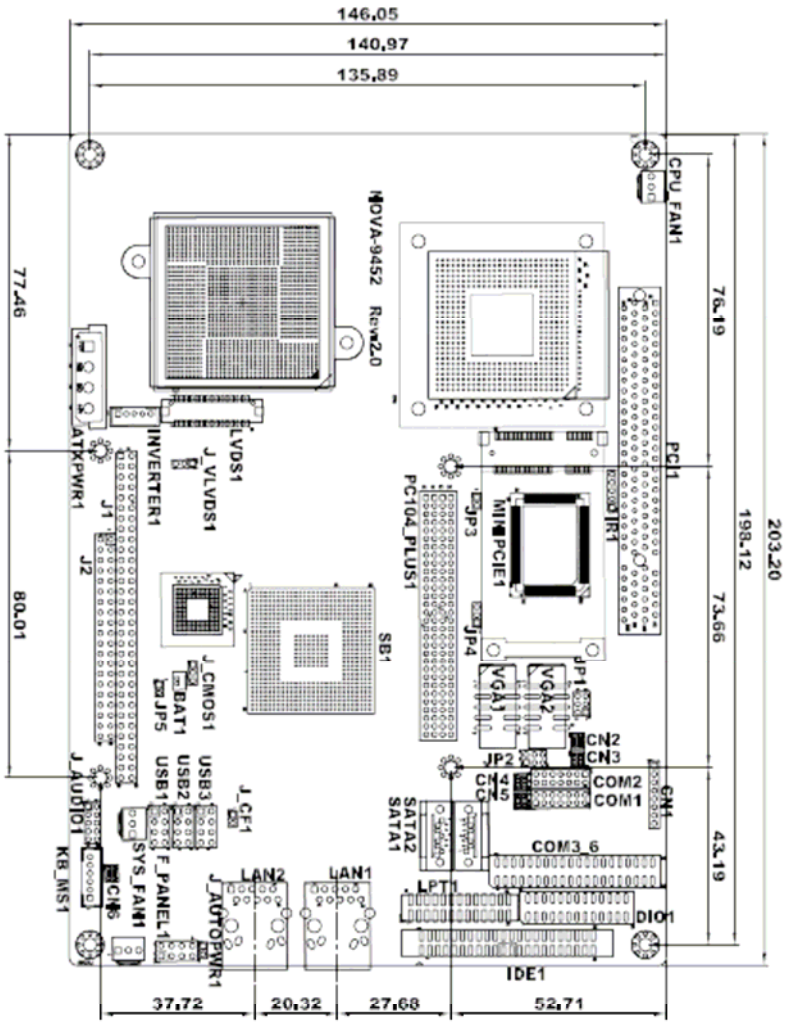


Figure 2-1: NOVA-9452 Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

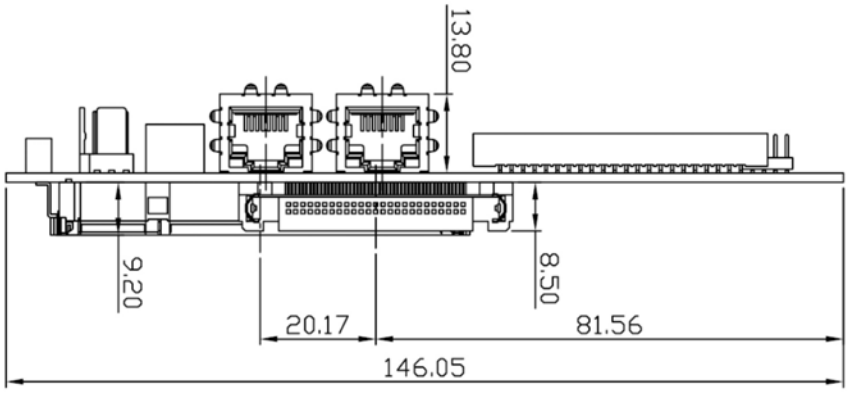


Figure 2-2: External Interface Panel Dimensions (mm)

2.3 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

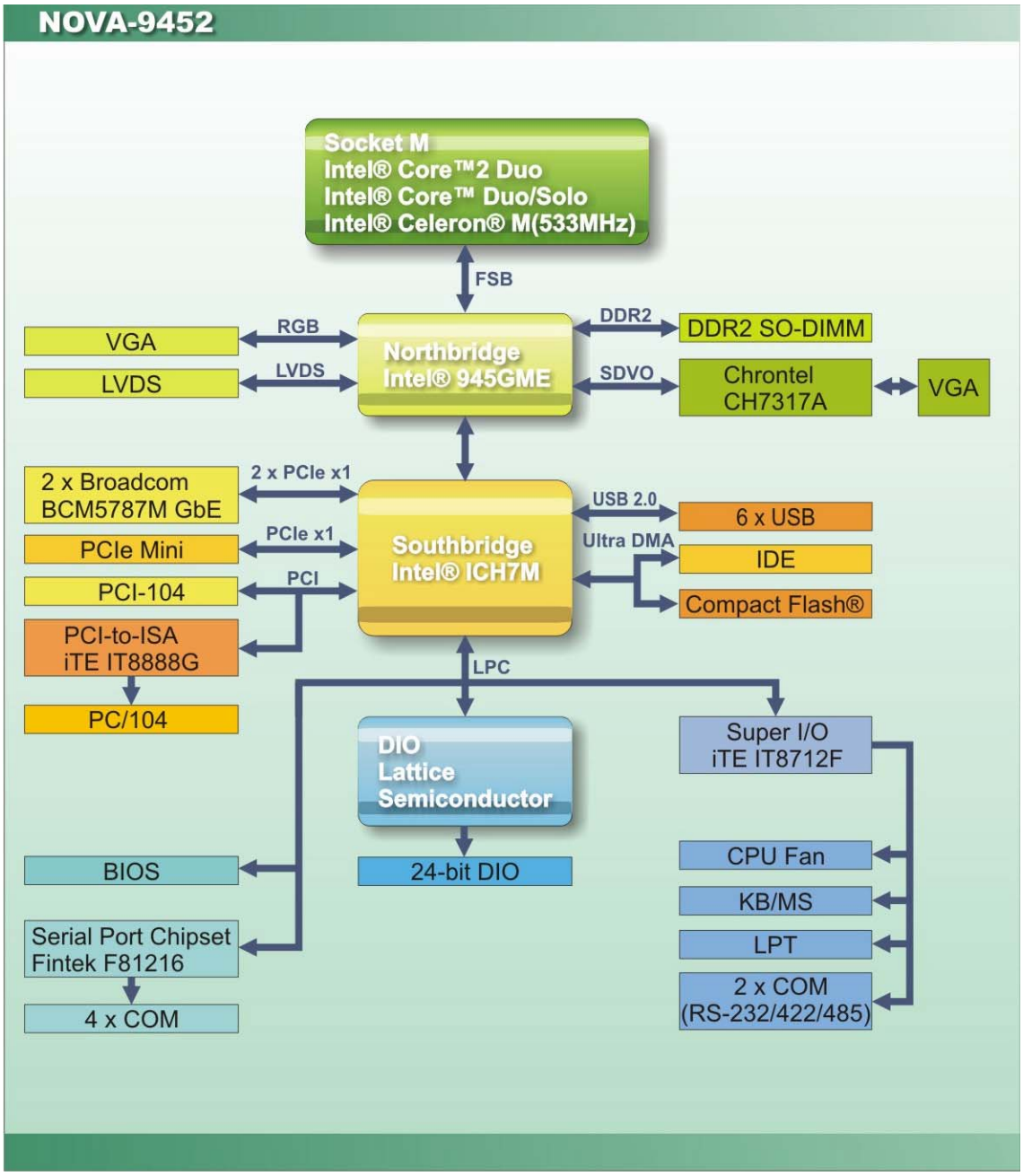


Figure 2-3: Data Flow Block Diagram

2.4 Compatible Processors

2.4.1 Compatible Processor Overview

The NOVA-9452 supports the following Socket M processors:

- Intel® Core™2 Duo processors
- Intel® Core™ Duo processors
- Intel® Core™ Solo processors
- Intel® Celeron® M processors

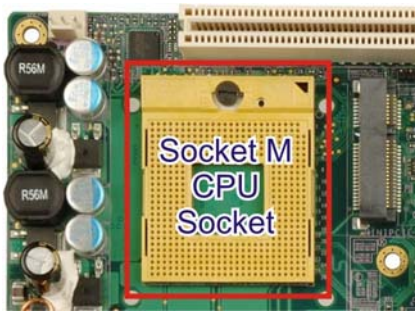


Figure 2-4: Socket M CPU Socket

All three of the above processors communicate with the Intel® 945GME Northbridge chipset through a 667 MHz front side bus (FSB). Features of the supported processors are listed in **Table 2-1**.

CPU Features	Core™2 Duo	Core™ Duo	Core™ Solo	Celeron® M
Dual core	Yes	Yes	No	No
Enhanced Halt State (C1E)	No	Yes	No	No
Enhanced Intel® Speedstep® Technolgy	Yes	Yes	Yes	No
Execute Disable Bit	Yes	Yes	Yes	Yes
Intel® EM64T	Yes	No	No	No
Intel® Virtualization Technology	Yes	Yes	No	No

Table 2-1: Processor Features

2.4.2 Supported Processors

Specifications for the compatible processors are listed in **Table 2-2** below:

Family	CPU Speed	Processor #	Bus Speed	Mfg Tech	Stepping	Cache Size
Core™2 Duo	2.33 GHz	T7600	667 MHz	65 nm	B2	4 MB
	2.16 GHz	T7400	667 MHz	65 nm	B2	4 MB
	2 GHz	T7200	667 MHz	65 nm	B2	4 MB
	1.83 GHz	T5600	667 MHz	65 nm	B2	2 MB
	1.66 GHz	T5500	667 MHz	65 nm	B2	2 MB
Core™ Duo	2 GHz	T2500	667 MHz	65 nm	C0	2 MB
	1.66 GHz	T2300E	667 MHz	65 nm	C0	2 MB
Core™ Solo	1.83 GHz	T1400	667 MHz	65 nm	C0	2 MB
Celeron® M	2 GHz	450	533 MHz	65 nm	D0	1 MB
	1.86 GHz	440	533 MHz	65 nm	D0	1 MB
	1.73 GHz	430	533 MHz	65 nm	C0	1 MB
	1.73 GHz	430	533 MHz	65 nm	D0	1 MB
	1.73 GHz	530	533 MHz	65 nm	-	1 MB
	1.60 GHz	520	533 MHz	65 nm	B2	1 MB
	1.46 GHz	410	533 MHz	65 nm	C0	1 MB

Table 2-2: Supported Processors

2.5 Intel® 945GME Northbridge Chipset

The Intel® 945GME Northbridge chipset has the Generation 3.1 Intel Integrated Graphics Engine and the Intel® Graphics Media Accelerator 950 (Intel® GMA 950).

Figure 2-5: Intel® 945GME Northbridge Chipset

The integrated graphics and memory controller hub (GMCH) facilitates the flow of information primarily between the following four interfaces:

- Front Side Bus (FSB)
- System Memory Interface
- Graphics Interface
- Direct Media Interface (DMI)

2.5.1 Intel® 945GME Memory Support

WARNING:

Only DDR2 memory module can be installed on the NOVA-9452. Do not install DDR memory modules. If a DDR memory module is installed on the NOVA-9452, the NOVA-9452 may be irreparably damaged.

The Intel® 945GME Northbridge chipset on the NOVA-9452 supports one DDR2 200-pin SO-DIMM with the following features:

- One 200-pin SO-DIMM
- DDR2 only (**DO NOT** install a DDR SO-DIMM)
- Capacities of 256 MB, 512 MB, 1 GB or 2 GB

- Transfer speeds of 400 MHz, 533 MHz or 667 MHz
- 64-bit wide channel

The memory socket is shown in **Figure 2-6**.

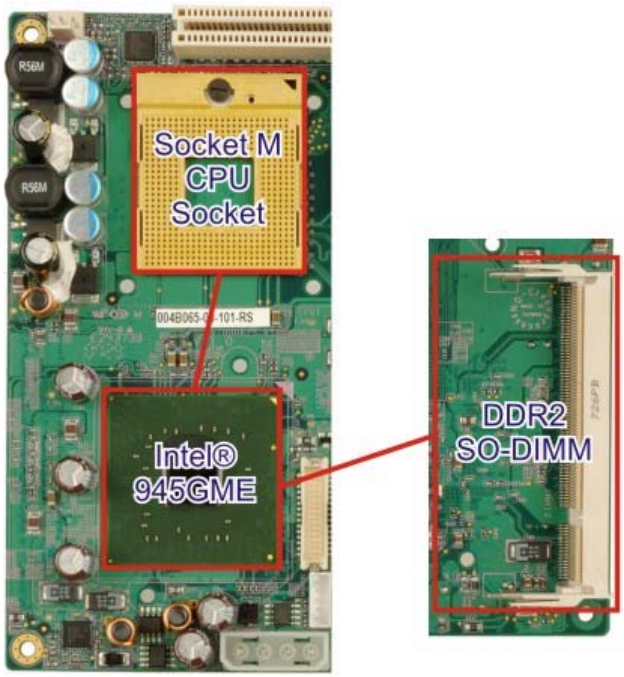


Figure 2-6: 200-pin DDR2 SO-DIMM Socket

2.5.2 Intel® 945GME Integrated Graphics

The Intel® 945GME Northbridge chipset has an Intel® Gen. 3.5 integrated graphics engine that supports the following display devices:

- Analog CRT
- LVDS
- SDVO port (to Chrontel VGA chip)

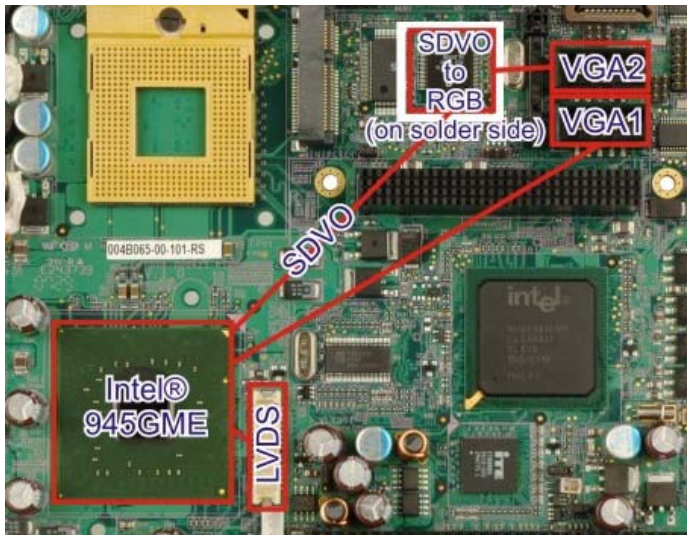


Figure 2-7: Video Outputs

2.5.2.1 Intel® 945GME Analog CRT Support

A DB-15 VGA connector on the external peripheral interface connector panel is interfaced to the Intel® 945GME graphics engine. The Intel® 945GME internal graphics engine, with an integrated 400 MHz RAMDAC and hot plug CRT support, supports analog CRT monitors up to QXGA.

Figure 2-8: VGA Output

2.5.2.2 Intel® 945GME LVDS Support

A 30-pin LVDS crimp connector is interfaced to the Intel® 945GME graphics engine. The Intel® 945GME internal graphics engine supports LVDS displays with the following features:

- Up to UXGA monitors with a maximum resolution of 1600 x 1200
- 18-bit or 24-bit LVDS screens
- 25 MHz to 112 MHz single-channel or dual-channel LVDS screens
- CPIS 1.5 compliant LVDS screens

Figure 2-9: LVDS Output

2.5.2.3 Intel® 945GME SDVO Support

The Intel® 945GME internal graphics engine has the following SDVO output features:

- Concurrent operation of PCIe x 1 with SDVO
- Two SDVO ports supported
  - SDVO is muxed onto the PCIe pins
  - DVI 1.0 support for external digital monitor
  - Only Downstream HDCP support
  - Supports TV and DVD formats
  - Display hot plug support

2.5.2.4 Chrontel CH7317A SDVO / RGB DAC

The Chrontel CH7317A SDVO digital-analog converter connects to the SDVO output on the Northbridge and encodes and transmits data through an analog RGB port:

- Support for VGA RGB bypass
- Analog RGB output
- Fully programmable through serial port
- Three 10-bit video DAC outputs

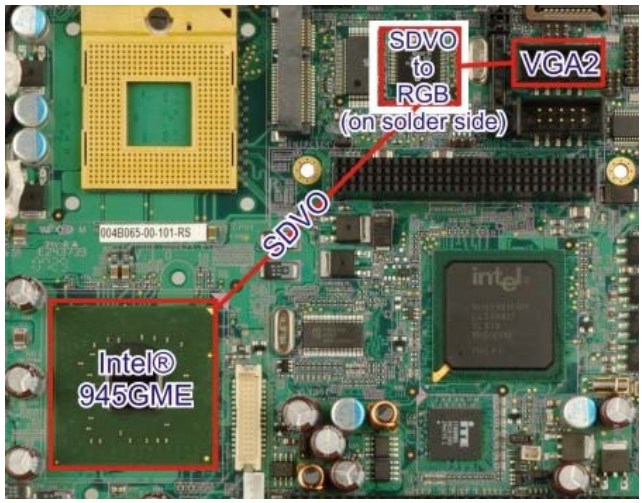


Figure 2-10: Chrontel SDVO-to-RGB DAC Chipset

2.5.3 Intel® 945GME Direct Media Interface (DMI)

Intel® 945GME Northbridge GMCH is connected to the Intel® ICH7M Southbridge Chipset through the chip-to-chip Direct Media Interface (DMI).

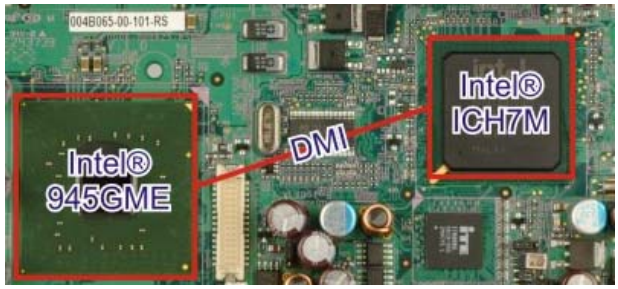


Figure 2-11: DMI Interface

Features of the Intel® 945GME DMI are listed below:

- 2GB/s (1GB/s in each direction) bus speed
- 32-bit downstream address

2.6 Intel® ICH7M Southbridge Chipset

2.6.1 Intel® ICH7M Overview

The Intel® ICH7M Southbridge chipset is connected to the Intel® 945GME Northbridge GMCH through the chip-to-chip Direct Media Interface (DMI).

Figure 2-12: Intel® ICH7M Southbridge

Some of the features of the Intel® ICH7M are listed below.

- Complies with PCI Express Base Specification, Revision 1.0a
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operations interfaced to four SATA connectors on the NOVA-9452
- Integrated IDE controller supports Ultra ATA 100/66/33
- Supports the four USB 2.0 devices on the NOVA-9452 with four UHCI controllers and one EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Audio Codec ’97 (AC’97) Revision 2.3
- Supports Intel® High Definition Audio
- Contains Low Pin Count (LPC) interface
- Supports Firmware Hub (FWH) interface
- Serial peripheral interface support

2.6.2 Intel® ICH7M High Definition Audio Controller

The High Definition (HD) Audio controller integrated into the ICH7M complies with the HD audio Component Specification, Version 2.3. The HD audio controller is connected to the onboard audio connector. The audio connector is connected to an optional 5.1 channel or 7.1 channel audio kit with an embedded AC’97 or HD audio codec.

Figure 2-13: High Definition Audio

The AC’97 controller supports up to six PCM audio outputs. The HD audio controller supports up to eight PCM audio outputs and another independent stereo audio channel. Complete surround sound consists of the following audio channels:

- Front left
- Front right
- Front center
- Subwoofer
- Center left (HD audio only)
- Center right (HD audio only)
- Back left
- Back right

2.6.3 Intel® ICH7M IDE Interface

The integrated IDE interface on the ICH7M Southbridge supports two IDE hard disks and ATAPI devices. PIO IDE transfers up to 16 MB/s and Ultra ATA transfers of 33 MB/s.

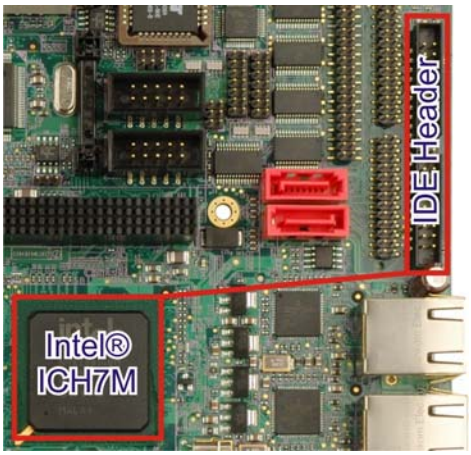


Figure 2-14: IDE Interface

The integrated IDE interface is able to support Ultra ATA/33 IDE HDDs with data transfer rates up to 33 MB/s. The specifications of the Ultra ATA/33 are listed below.

Specification	Ultra ATA/33
IDE devices	2
PIO Mode	0 – 4
PIO Max Transfer Rate	16.6 MB/s
DMA/UDMA designation	UDMA 2
DMA/UDMA Max Transfer	33 MB/s
Controller Interface	5 V

Table 2-3: Supported HDD Specifications

2.6.4 Intel® ICH7M Low Pin Count (LPC) Interface

The ICH7M LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH7 is connected to the following components:

- BIOS chipset
- Super I/O chipset

- Serial port chipset
- Digital I/O chipset

2.6.5 Intel® ICH7M PCI Interface

The PCI interface on the ICH7M is compliant with the PCI Revision 2.3 implementation.

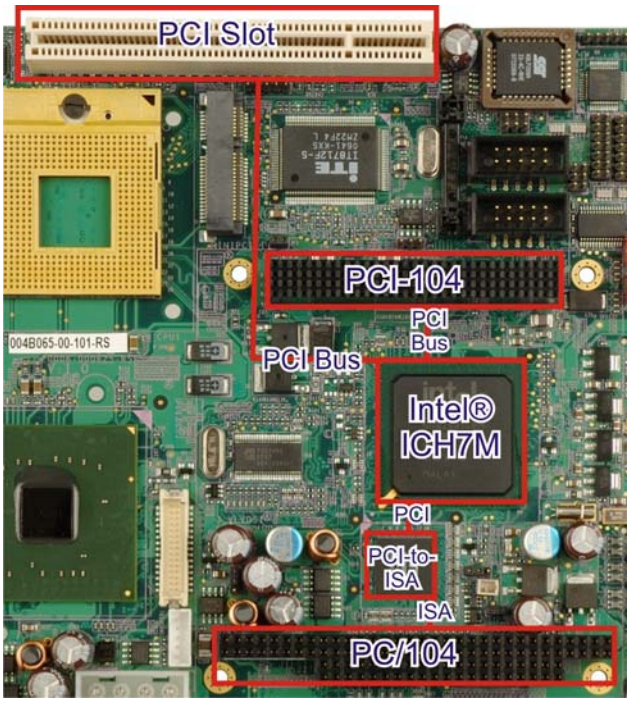


Figure 2-15: PCI Interface

Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33 MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to seven PCI bus masters

The PCI bus is connected to an interface gold finger on the bottom of the CPU cards and supports four expansion PCI cards on the backplane.

2.6.6 Intel® ICH7M Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH6. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.6.7 Intel® ICH7M SATA Controller

The integrated SATA controller on the ICH7M Southbridge supports two SATA drives on the NOVA-9452 with independent DMA operations.

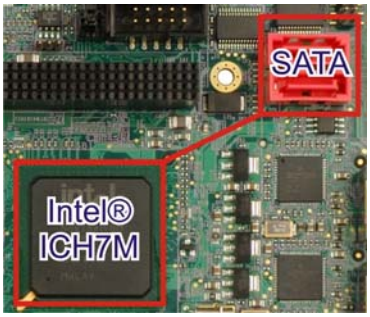


Figure 2-16: SATA

SATA controller specifications are listed below.

- Supports two SATA drives
- Supports 3 Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a

2.6.8 Intel® ICH7M USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the ICH7M on the NOVA-9452. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH7M integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH7M integrated Universal Host Controller Interface (UHCI) controllers. All of the USB ports are implemented with USB pin headers on the NOVA-9452.

Figure 2-17: Onboard USB Implementation

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

The PCI bus is connected to the components listed below:

- PCI expansion slot
- PCI-104 expansion slot (as part of the PC/104-Plus)
- PC/104 expansion slot (as part of the PC/104-Plus)

The PCI bus complies with PCI Local Bus Specification, Revision 2.2 and supports 33MHz PCI operations.

2.7.2 PCI Expansion Slot

The PCI expansion slot enables a PCI expansion card to be connected to the NOVA-9452.

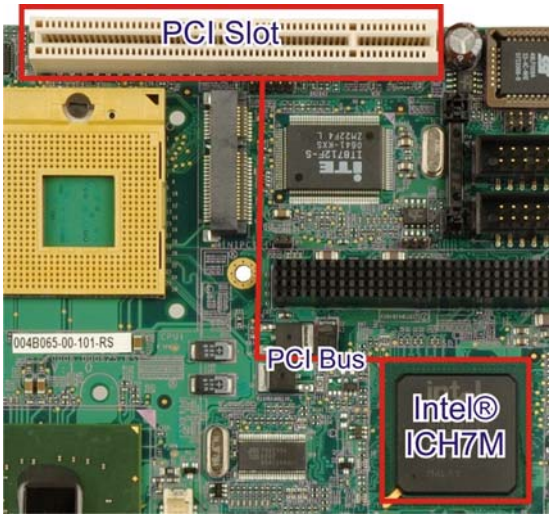


Figure 2-18: PCI Expansion Slot

2.7.3 PCI-104 Connector

The PC/104-Plus expansion slot combines a PCI-104 connector and a PC/104 connector. The PCI-104 connector provides PCI bus connectivity and the PC/104 connector provides ISA connectivity. PCI-104, PC/104-Plus and PC/104 compliant add-on cards connect to the PC/104-Plus expansion slot.

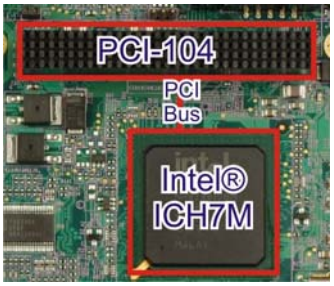


Figure 2-19: PCI-104

2.7.4 PC/104 Connector

The PC/104 expansion slot is enabled through an ITE IT8888G PCI-to-ISA bridge single function. The PC/104 expansion slot provides ISA connectivity to PC/104 and PC/104-Plus compliant add-on cards. The PCI-to-ISA bridge and PC/104 expansion slot are shown in **Figure 2-20**.

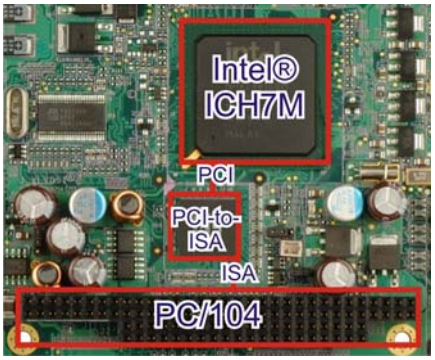


Figure 2-20: PC/104 Expansion Slot

The IT8888G has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. Some of the features of the IT8888G PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- 1 analog line-level mono output: MONO_OUT
- Power-on Serial Bus Configuration
- Serial IRQ
- Versatile power-on strapping options
- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

2.8 PCIe Bus Components

2.8.1 PCIe Bus Overview

The Intel® ICH7M Southbridge chipset has six PCIe lanes. Three of the PCIe lanes are attached to the following devices:

- PCIe Mini card expansion slot
- Two Broadcom PCIe GbE controllers

2.8.2 PCIe Mini Card Socket

One of the PCIe x1 lanes from the Intel® ICH7M is connected to a 52-pin PCIe mini card socket. The socket can support standard PCIe mini cards that are 30mm wide, 50.95mm long and 5mm high.

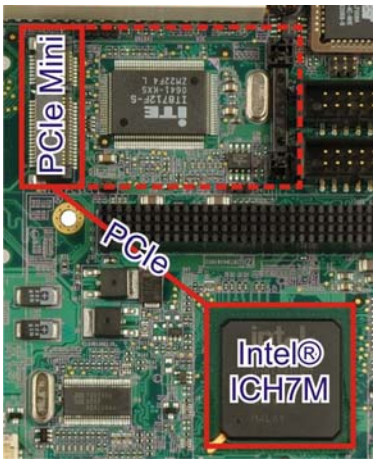


Figure 2-21: PCIe Mini Card Socket

2.8.3 PCIe GbE Controller

Two PCIe x1 lanes are connected to two Broadcom BCM5787M PCIe GbE controllers shown in **Figure 2-22** below.

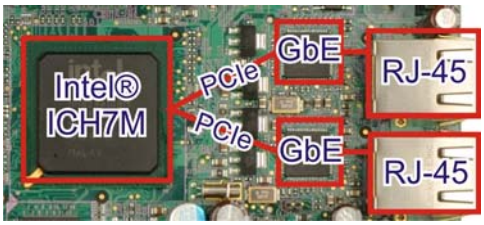


Figure 2-22: Broadcom PCI GbE Controllers

The Broadcom BCM5787M is a 10/100/1000BASE-T Ethernet LAN controller. The BCM5787M combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, a PCIe bus interface, and an on-chip buffer memory. Some of the BCM5787 controller features are listed below:

- Integrated 10/100/1000BASE-T transceiver
- Automatic MDI crossover function
- PCIe v1.0a
- 10/100/1000BASE-T full/half-duplex MAC
- Wake on LAN support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z, clause 30)
- Serial EEPROM or serial flash support
- JTAG support

2.9 LPC Bus Components

2.9.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset
- Lattice Semiconductor digital I/O chipset
- Fintek serial port chipset

2.9.2 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

The BIOS chipset is shown in **Figure 2-23** below.

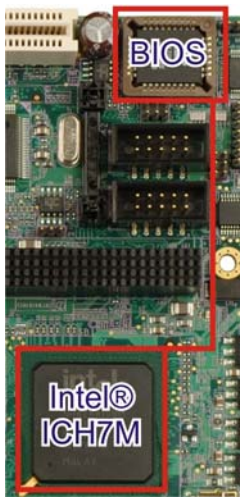


Figure 2-23: BIOS Chipset

2.9.3 Super I/O chipset

The iTE IT8712F Super I/O chipset is connected to the ICH7 Southbridge through the LPC bus. The iTE IT8712F is an LPC interface-based Super I/O device that comes with Environment Controller integration.

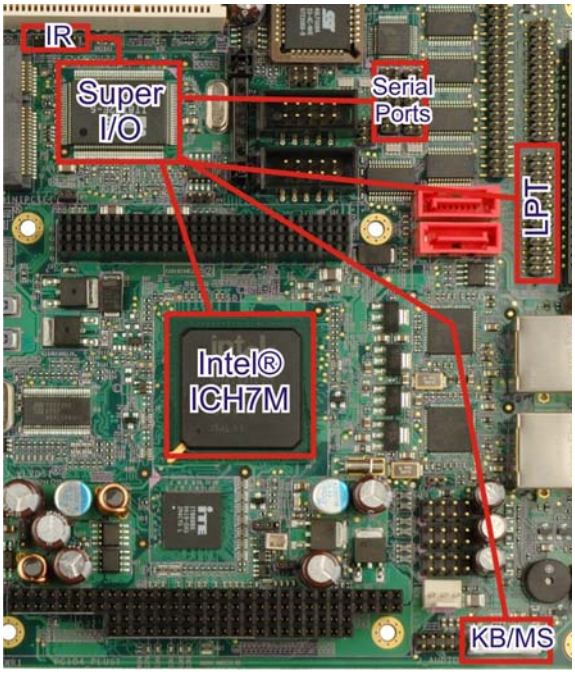


Figure 2-24: Super I/O Chipset

Some of the features of the iTE IT8712F chipset are listed below:

- LPC Interface
- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- SmartGuardian Controller
- Single +5V Power Supply
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Floppy Disk Controller
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

Some of the Super I/O features are described in more detail below:

2.9.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.9.3.2 Super I/O 16C550 UARTs

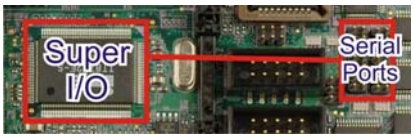


Figure 2-25: Serial Ports

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports
- IrDa 1.0 and ASKIR protocols

The Fintek chipset connected to the LPC bus provides connectivity to another four serial ports.

2.9.3.3 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.9.3.4 Super I/O Infrared

Figure 2-26: Infrared

The Super I/O has dedicated infrared pins that use the programmable amplitude shift keyed (ASKIR serial) communication protocol to communicate with consumer remote control equipment. Some features of the infrared interface are listed below:

- ASKIR serial communication protocol
- 30 kHz – 57 kHz or 400 kHz – 500 kHz
- Baud rates up to 115.2 KBps

2.9.3.5 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.9.3.6 Super I/O Parallel Port

The Super I/O parallel port (LPT) supports standard mode, enhanced mode and high-speed mode parallel port devices.

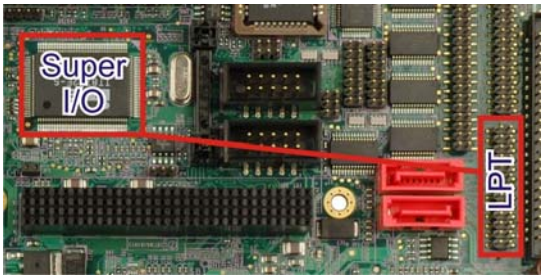


Figure 2-27: Parallel Port

The LPT is compliant with the following LPT modes.

- Standard mode
  - Bi-directional SPP compliant
- Enhanced mode
  - EPP v1.7 compliant
  - EPP v1.9 compliant
- High-speed mode
  - ECP, IEEE 1284 compliant

2.9.3.7 Super I/O Keyboard Controller

The Super I/O keyboard controller can execute the 8042 instruction set.

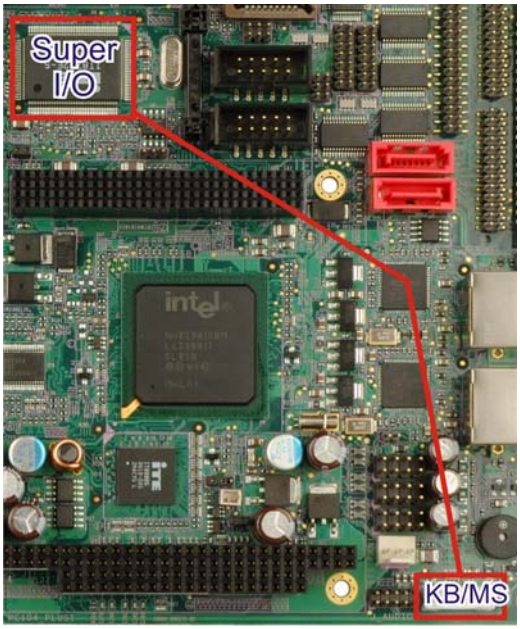


Figure 2-28: Keyboard Controller

Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events

2.9.4 Fintek F81216DG LPC Serial Port Chipset

The Fintek F81216DG chipset enables the addition of four additional UART serial ports (COM3, COM4, COM5 and COM6). UART includes 16-byte send/receive FIFO. The Fintek serial port chipset is interfaced to the Southbridge chipset through the LPC bus.

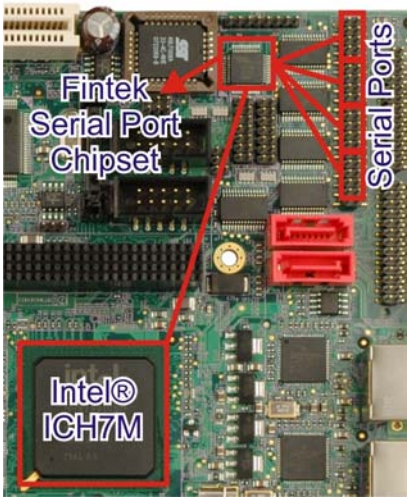


Figure 2-29: Fintek F81216DG LPC Serial Port Chipset

Some of the features of the Fintek chipset are listed below:

- Supports LPC interface
- Totally provides 4 UART (16550 asynchronous) ports
  - 3 x Pure UART
  - 1 x UART+IR
- One Watch dog timer with WDTOUT# signal
- One Frequency input 24/48 MHz
- Powered by 3Vcc

2.9.5 Lattice Semiconductor LC4064V LPC Digital I/O Chipset

The NOVA-9452 has a Lattice Semiconductor digital I/O chipset onboard that enables a 24-bit Digital I/O. The LC4064V chipset consists of multiple 36-input, 16 macrocell Generic Logic Blocks interconnected by a Global Routing Pool. Output Routing Pools (ORPs) connect the GLBs to the I/O Blocks that contain multiple I/O cells.

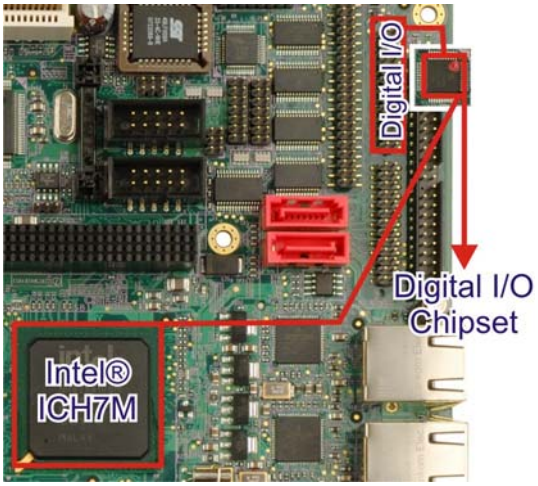


Figure 2-30: Lattice Semiconductor LC4064V Digital I/O Chipset

Some of the features of the Lattice Semiconductor LC4064V chipset are listed below:

- Up to four global clock pins with programmable clock polarity control
- 400 MHz maximum operating frequency
- Operates with 3.3V, 2.5V or 1.8V power

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the NOVA-9452 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- Power temperature
- CPU temperature

Eight voltage inputs on the NOVA-9452 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- Vcore
- +2.5V
- +3.3V
- +5.0V

- +12.0V
- DDR Vtt
- +1.5V
- 5VSB

The NOVA-9452 Super I/O Enhanced Hardware Monitor also monitors the following voltages internally:

- VBAT

The NOVA-9452 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the NOVA-9452 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.

2.10.3 Power Consumption

Table 2-4 shows the power consumption parameters for the NOVA-9452 running with a 2.16 GHz Intel® Core™2 Duo T7400 processor with a 667 MHz FSB and 512MB of 667 MHz DDR2 memory.

Voltage	Current
+5V	3.81A
+12V	2.42A

Table 2-4: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NOVA-9452 may result in permanent damage to the NOVA-9452 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NOVA-9452. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NOVA-9452, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the NOVA-9452, place it on an antic-static pad. This reduces the possibility of ESD damaging the NOVA-9452.
- ***Only handle the edges of the PCB***:- When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the NOVA-9452 is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 3.1.
- Make sure the packing box is facing upwards so the NOVA-9452 does not fall out of the box.
- Make sure all the components shown in Section 3.3 are present.

3.3 Unpacking Checklist

Note:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NOVA-9452 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The NOVA-9452 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NOVA-9452	
1	HDD cable (**P/N**: 32200-000009-RS)	
4	SATA cable (**P/N**: 32000-062800-RS)	
2	SATA power cable (**P/N**: 32100-088600-RS)	
1 for NOVA-9452 2 for NOVA-9452VGA	VGA cable (**P/N**: 32000-033800-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-023800-RS)	

Quantity	Item and Part Number	Image
1	Quad RS-232 (**P/N**: 32100-147900-RS)	
1	Dual USB cable (wo bracket) (**P/N**: 32000-044300-RS)	
1	Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	
1	Quick installation guide	
1	Utility CD	

Table 3-1: Package List Contents

3.3.2 Optional Items

NOTE:

The items listed in this section are optional items that must be ordered separately. Please contact your NOVA-9452 vendor, distributor or reseller for more information or, contact iEi directly by sending an email to sales@iei.com.tw.

The following optional items are available for the NOVA-9452.

Item and Part Number	Image
Audio kit_ 5.1 Channel (**P/N**: AC-KIT08R-R10)	
Audio kit_ 7.1 Channel (**P/N**: AC-KIT883HD-R10)	
Cooling Kit (**P/N**: CF-479B-RS)	
LPT cable (**P/N**: 19800-000049-RS)	
RS-232/422/485 cable (**P/N**: 32200-026500-RS)	

Table 3-2: Optional Items

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.1 shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.1**.

4.1.1 NOVA-9452 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

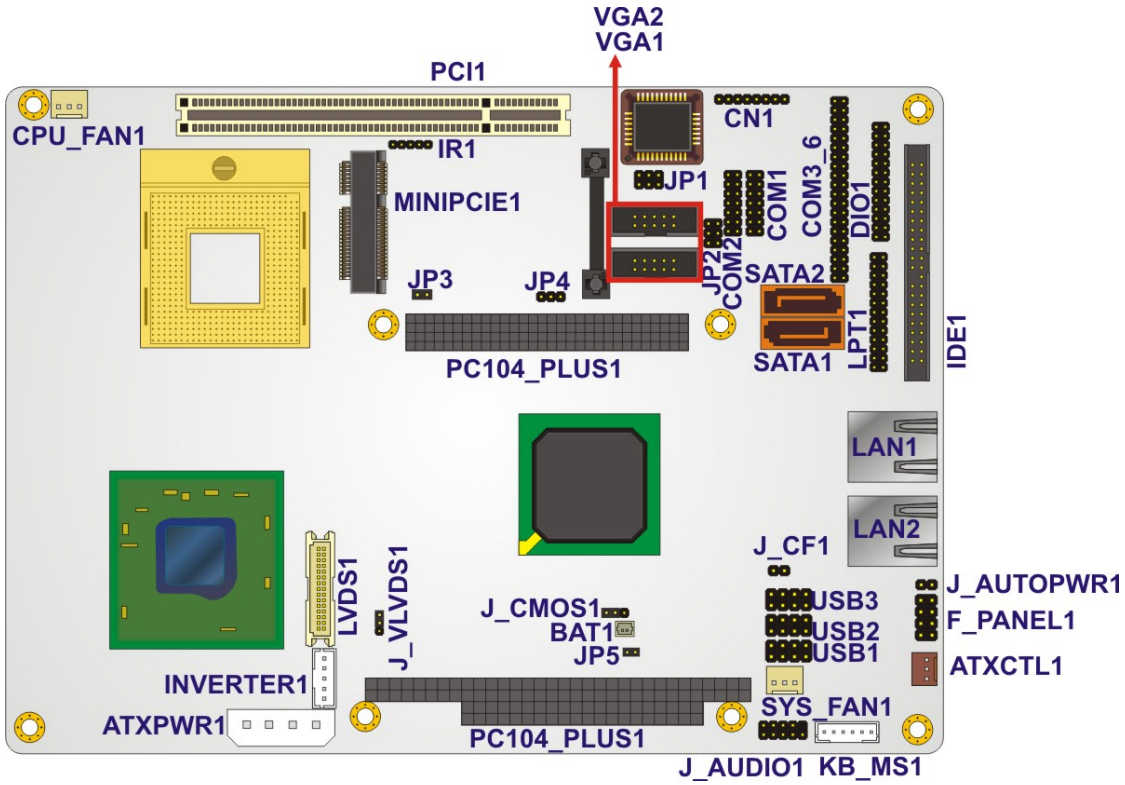


Figure 4-1: Connector and Jumper Locations

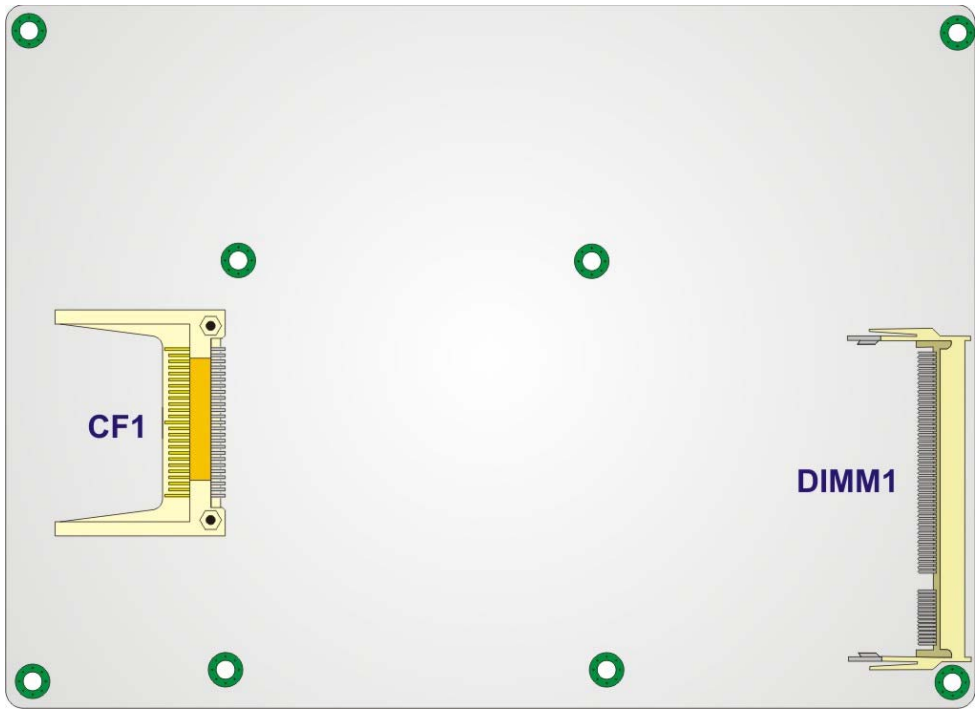


Figure 4-2: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the NOVA-9452. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
AT power connector	4-pin header	ATXPWR1
ATX control connector	3-pin wafer	ATXCTL1
Audio connector	14-pin header	J_AUDIO1
CompactFlash® (CF) connector	50-pin header	CF1
CPU fan connector	3-pin wafer	CPU_FAN1
Digital I/O connector	10-pin header	DIO1
Front panel connector	8-pin header	F_PANEL1
IDE Interface connector	44-pin header	IDE1

Connector	Type	Label
Infrared connector	5-pin header	IR1
Inverter power connector	5-pin header	INVERTER1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LVDS connector	30-pin crimp	LVDS1
Parallel port connector	26-pin header	LPT1
PC/104-Plus connector	120-pin PCI-104 connector and 104-pin PC/104 connector	PC104_PLUS1
PCI slot	124-pin PCI slot	PCI1
PCIe mini card connector	52-pin PCIe mini card slot	MINIPCIE1
Serial ATA (SATA) connector	7-pin SATA connector	SATA1
Serial ATA (SATA) connector	7-pin SATA connector	SATA2
Serial port connector (COM 1)	14-pin header	COM1
Serial port connector (COM 2)	14-pin header	COM2
Serial port connector (COM3-COM6)	40-pin header	COM3_6
System fan connector	3-pin wafer	SYS_FAN1
VGA connector	10-pin header	VGA1
VGA connector (dual VGA model only)	10-pin header	VGA2
USB connector	8-pin header	USB1
USB connector	8-pin header	USB2
USB connector	8-pin header	USB3

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the NOVA-9452. Detailed descriptions of these connectors can be found in **Section 4.2.20** on **page 80**

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NOVA-9452.

4.2.1 AT Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin AT power connector (1x4)

CN Location: See **Figure 4-3**

CN Pinouts: See **Table 4-3**

The 4-pin AT power connector is connected to an AT power supply.

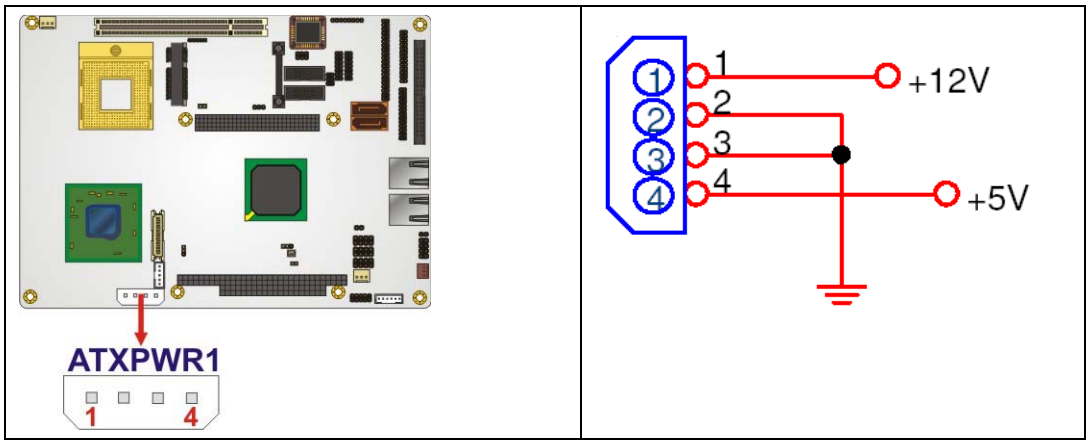


Figure 4-3: AT Power Connector Location

PIN NO.	DESCRIPTION
1	+12V
2	GND
3	GND
4	+5V

Table 4-3: AT Power Connector Pinouts

4.2.2 ATX Power Control Connector

CN Label: **ATXCTL1**

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 4-4**

CN Pinouts: See **Table 4-4**

The ATX power supply enable connector enables the NOVA-9452 to be connected to an ATX power supply. In default mode, the NOVA-9452 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to Chapter 3 for more details.

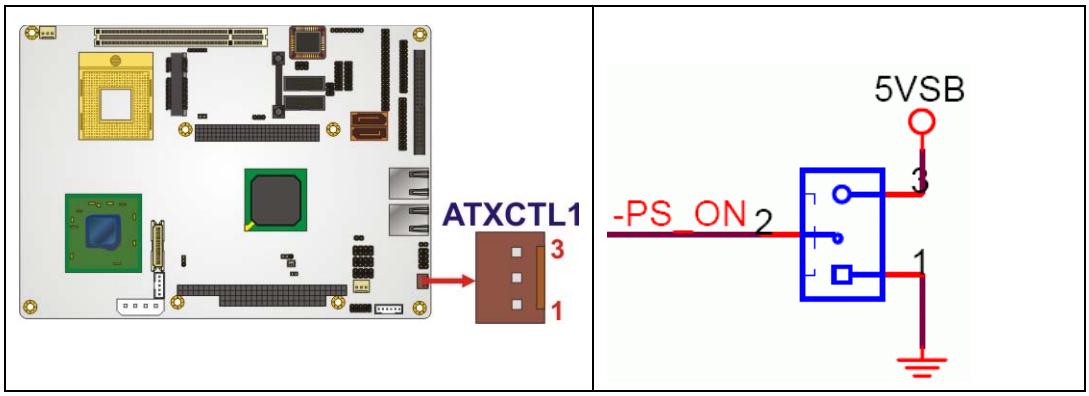


Figure 4-4: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS-ON
3	+5V Standby

Table 4-4: ATX Power Supply Enable Connector Pinouts

4.2.3 Audio Connector (9-pin)

CN Label: **J_AUDIO1**

CN Type: 9-pin header

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-5**

An optional module can be connected to the 9-pin audio connector to provide the system with a high quality AC’97 or High Definition audio codec that provides a complete integrated audio solution.

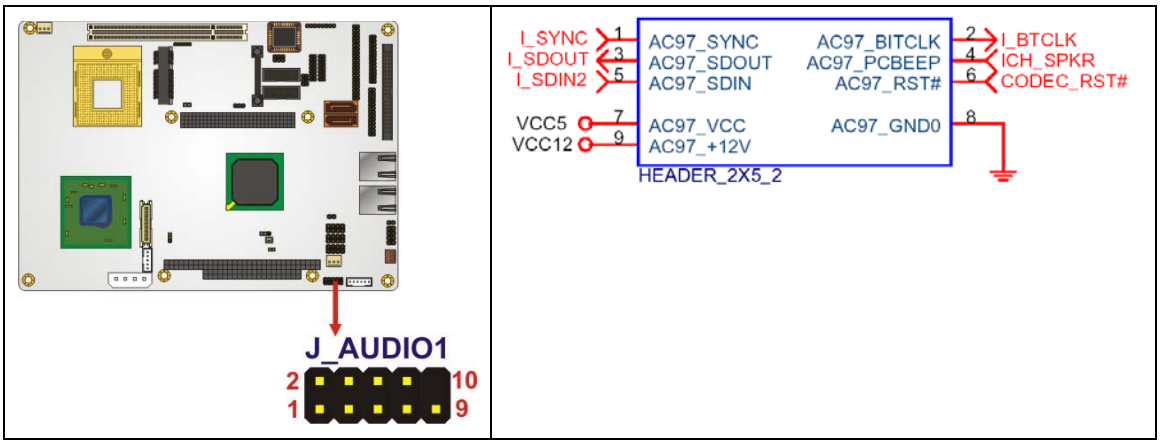


Figure 4-5: Audio Connector Pinouts (10-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	AC97_SYNC	2	AC97_BITCLK
3	AC97_SDOUT	4	AC97_PCBEEP
5	AC97_SDIN	6	AC97_RST#
7	AC97_VCC	8	AC97_GND
9	AC97_12V		

Table 4-5: Audio Connector Pinouts (9-pin)

4.2.4 CompactFlash® Socket

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

CN Type: 50-pin header (2x25)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-6**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the NOVA-9452.

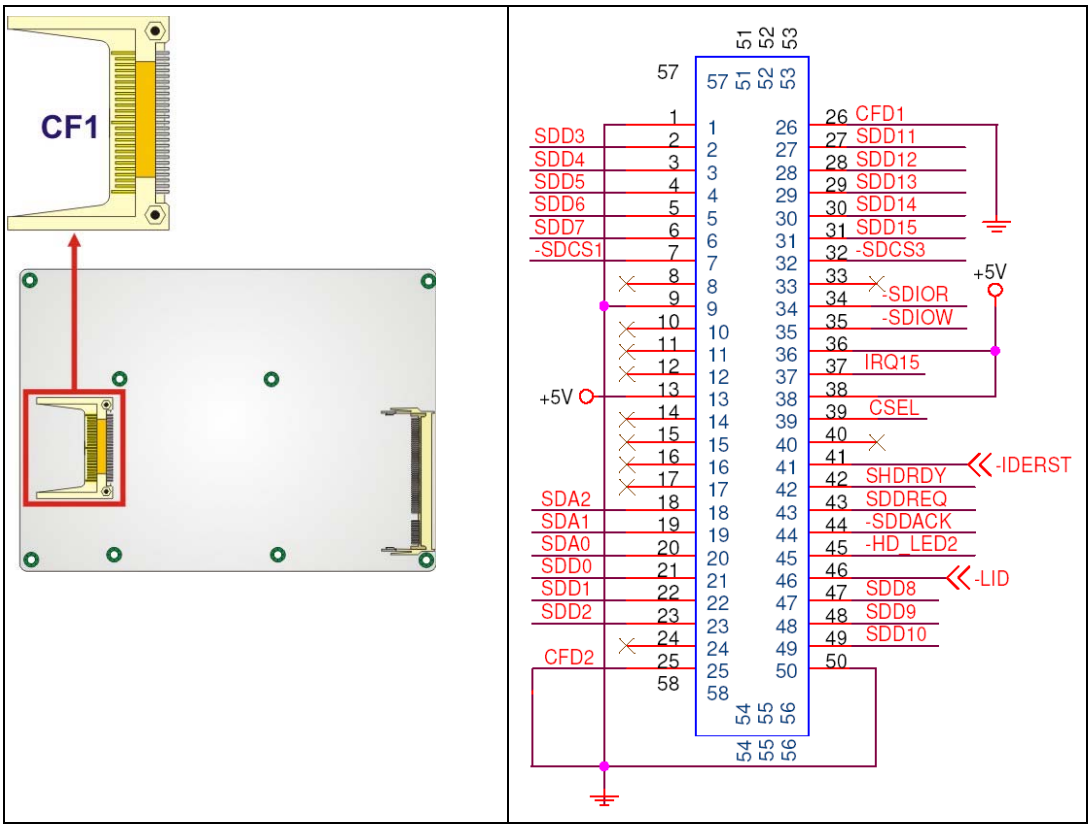


Figure 4-6: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 4-6: CF Card Socket Pinouts

4.2.5 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 26-pin header (2x13)

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

CN Pinouts: See **Table 4-7**

The digital input/output connector is managed through a dedicated Digital I/O chip. The DIO connector pins are user programmable. The DIO provides 24-bit input/output capabilities, up to 12-bits input and 12-bits output.

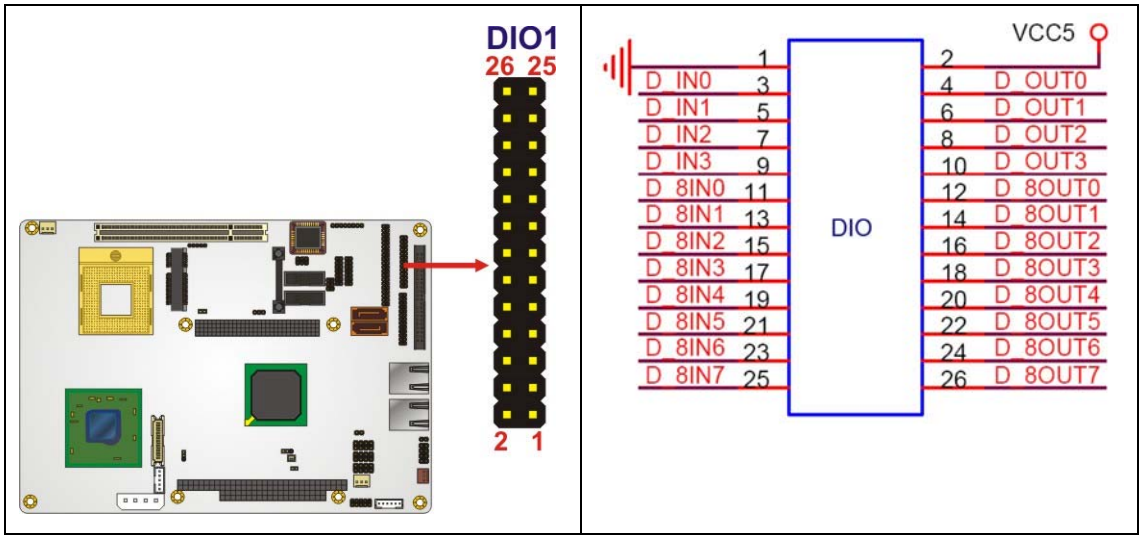


Figure 4-7: DIO Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	Input 0	4	Output 0
5	Input 1	6	Output 1
7	Input 2	8	Output 2
9	Input 3	10	Output 3
11	Input 4	12	Output 4
13	Input 5	14	Output 5
15	Input 6	16	Output 6
17	Input 7	18	Output 7
19	Input 8	20	Output 8
21	Input 9	22	Output 9
23	Input 10	24	Output 10
25	Input 11	26	Output 11

Table 4-7: DIO Connector Pinouts

4.2.6 Fan Connector (+12V)

CN Label: **CPU_FAN1**, **SYS_FAN1**

CN Type: 3-pin header

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-8**

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

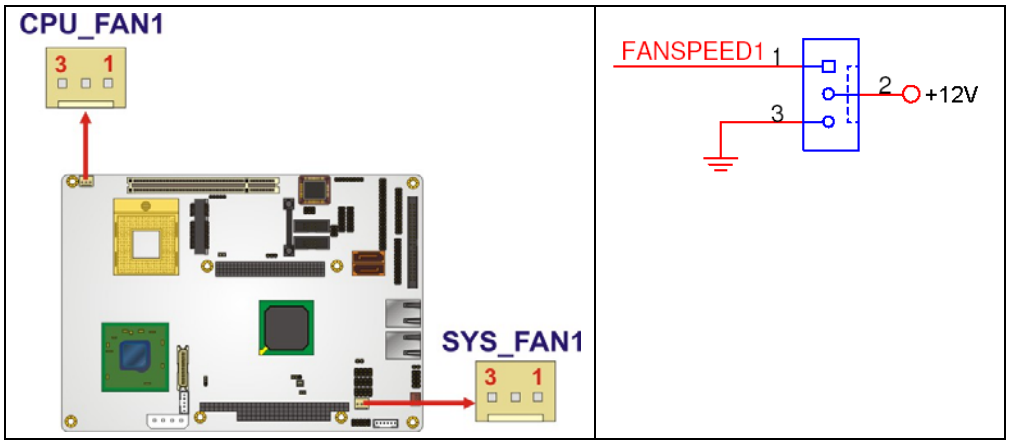


Figure 4-8: +12V Fan Connector Location

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

Table 4-8: +12V Fan Connector Pinouts

4.2.7 Front Panel Connector (8-pin)

CN Label: **F_PANEL1**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-9**

CN Pinouts: See **Table 4-9**

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

- Power button
- Reset button
- Power LED
- HDD LED

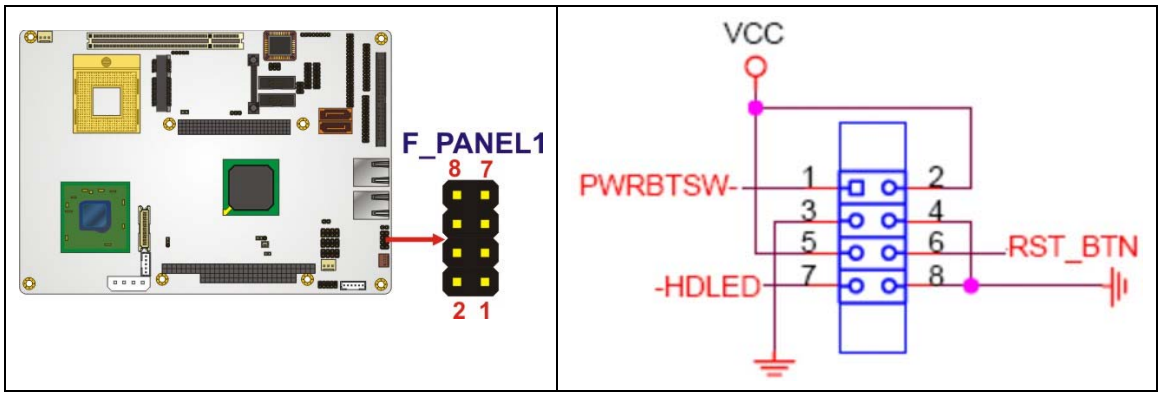


Figure 4-9: Front Panel Connector Pinout Locations

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWRBTSW-	Power LED	2	VCC
	3	GND		4	GND
HDD LED	5	VCC	Reset	6	SYSRST#
	7	-HDLED		8	GND

Table 4-9: Front Panel Connector Pinouts

4.2.8 IDE Connector(44-pin)

CN Label: **IDE1**

CN Type: 44-pin header (2x22)

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-10**

One 44-pin IDE device connector on the NOVA-9452 supports connectivity to two hard disk drives.

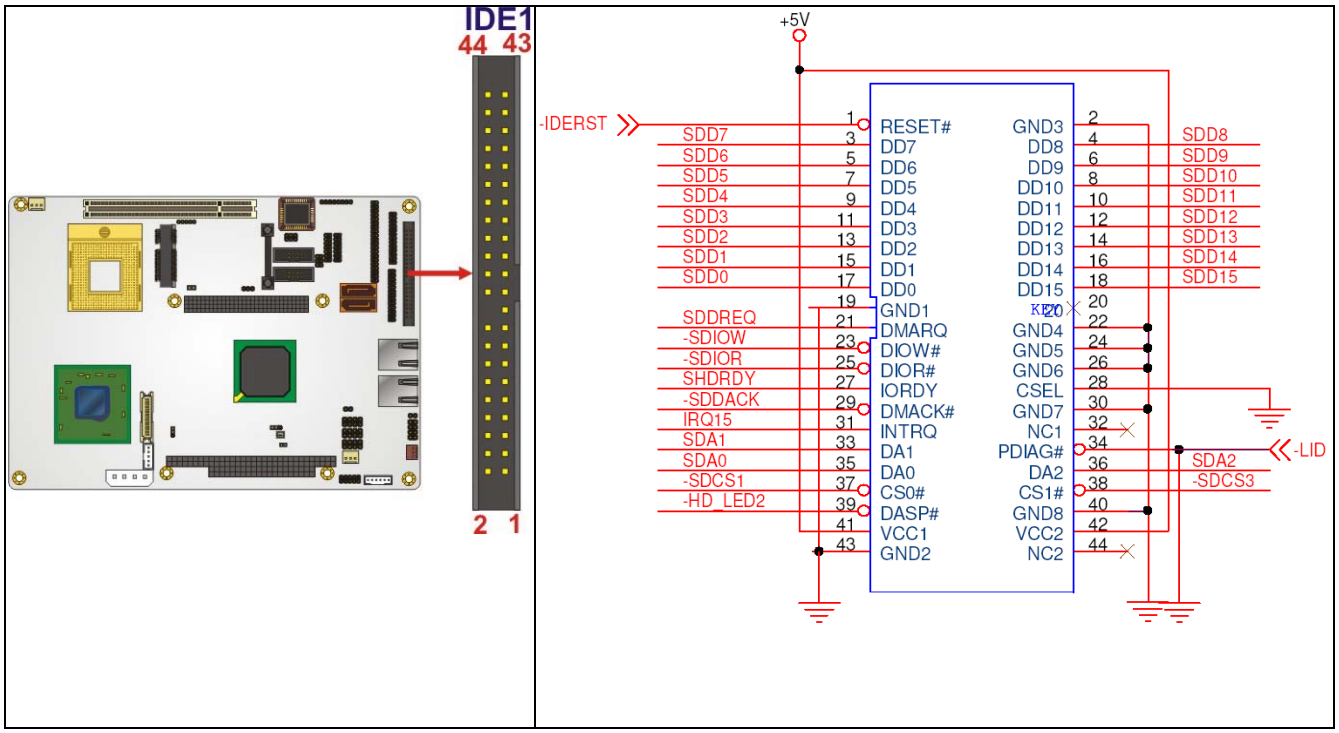


Figure 4-10: Secondary IDE Device Connector Locations

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

Table 4-10: Secondary IDE Connector Pinouts

4.2.9 Infrared Interface Connector (5-pin)

CN Label: **IR1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-11**

The infrared interface connector supports both the Amplitude Shift Key Infrared (ASKIR) interface.

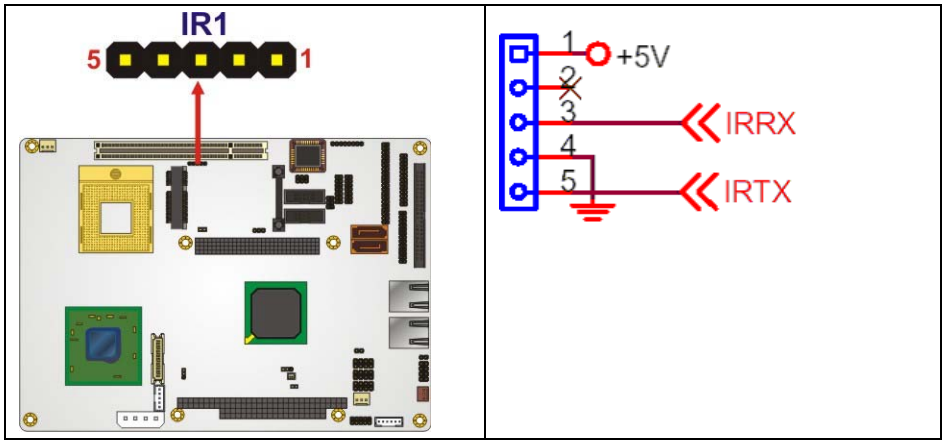


Figure 4-11: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 4-11: Infrared Connector Pinouts

4.2.10 Inverter Connector

CN Label: **INVERTER1**

CN Type: 5-pin wafer (1x5)

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-12**

The backlight inverter connector provides the backlight on the LCD display connected to the NOVA-9452 with +12V of power.

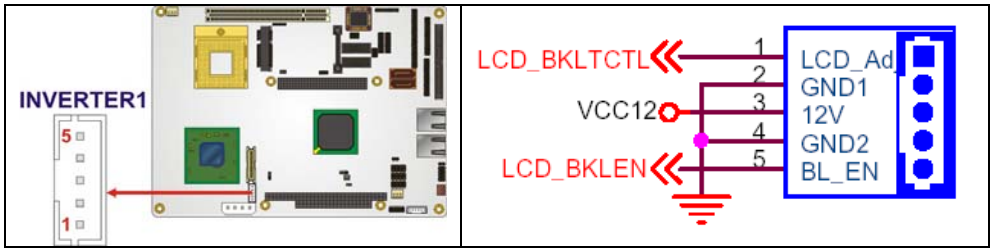


Figure 4-12: Panel Backlight Connector Pinout Locations

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

Table 4-12: Panel Backlight Connector Pinouts

4.2.11 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin header (1x6)
CN Location:	See **Figure 4-13**
CN Pinouts:	See **Table 4-13**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

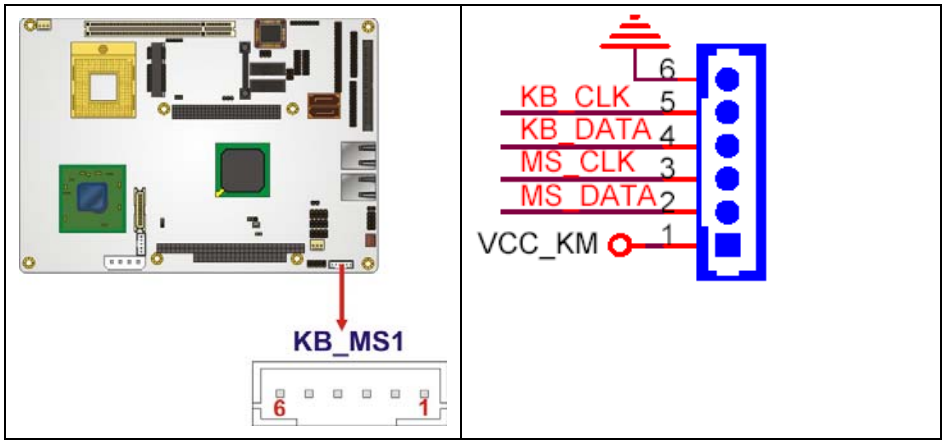


Figure 4-13: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V KB DATA
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 4-13: Keyboard/Mouse Connector Pinouts

4.2.12 LVDS LCD Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp (2x10)

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-14**

The 30-pin LVDS LCD connector can be connected to single channel or dual channel, 18-bit or 24-bit LVDS panel.

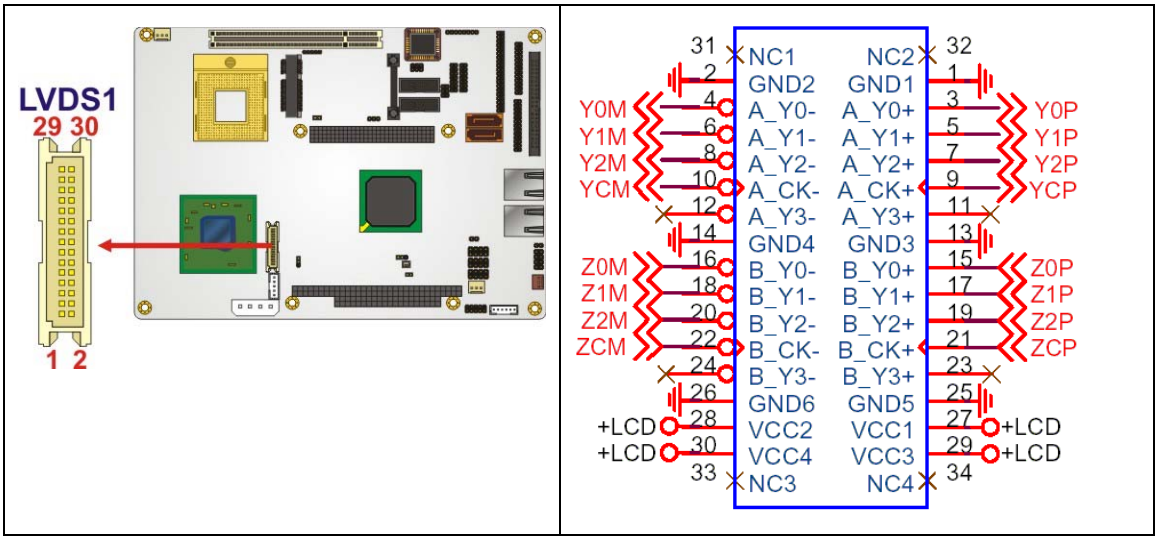


Figure 4-14: LVDS LCD Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND1	2	GND2
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND3	14	GND4
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND5	26	GND6
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 4-14: LVDS LCD Port Connector Pinouts

4.2.13 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-15**

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

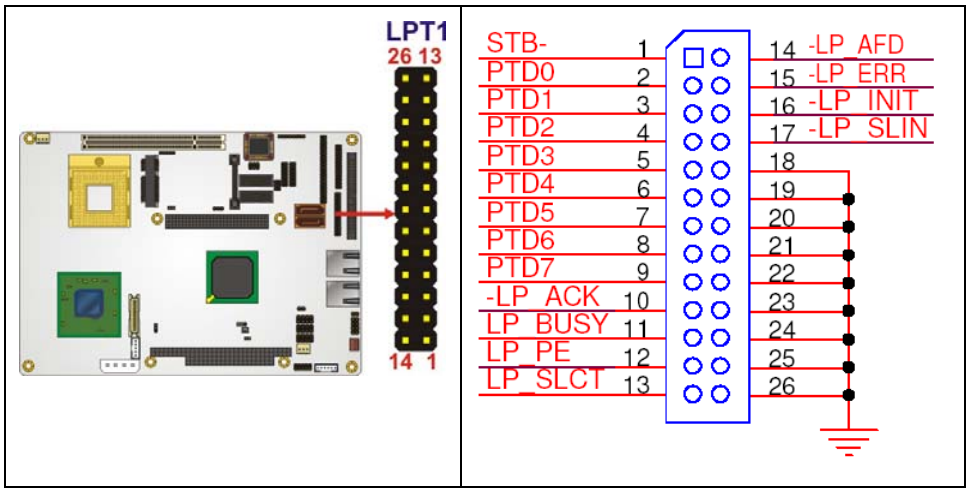


Figure 4-15: Parallel Port Connector Location

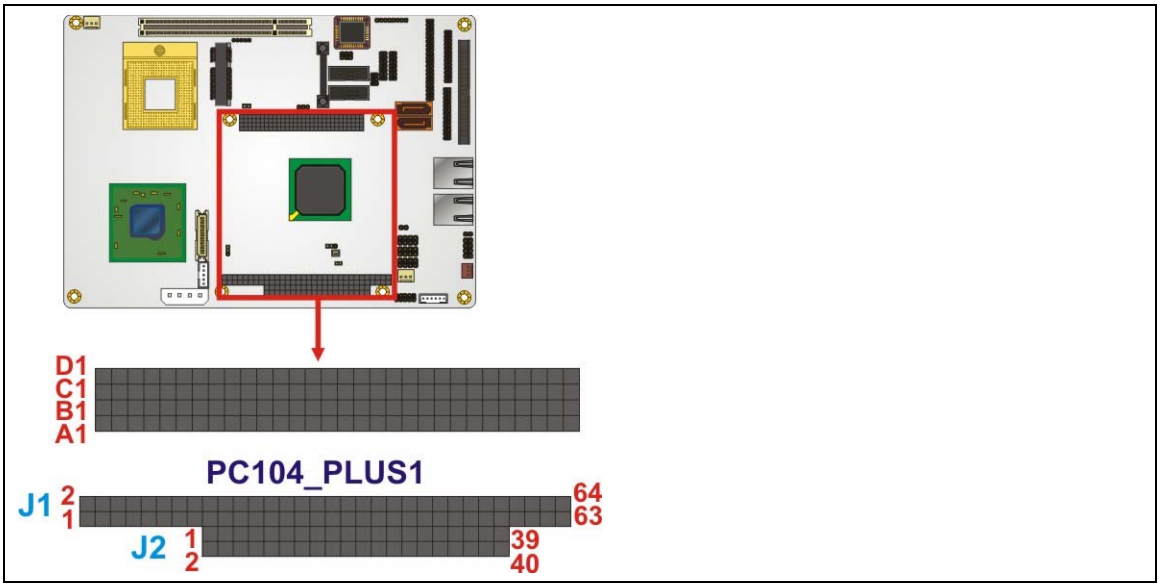
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND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

Table 4-15: Parallel Port Connector Pinouts

4.2.14 PC/104-Plus Slot

CN Label:	**PC104_PLUS1**
CN Type:	PC/104-Plus Slot
CN Location:	See **Figure 4-17**
CN Pinouts:	See **Table 4-19**

The PC/104-Plus slot enables PC/104-Plus expansion cards to be connected to the board. PC/104-Plus allows compatibility with 8-bit PC/104 cards, 16-bit PC/104 cards and PCI-104 cards.



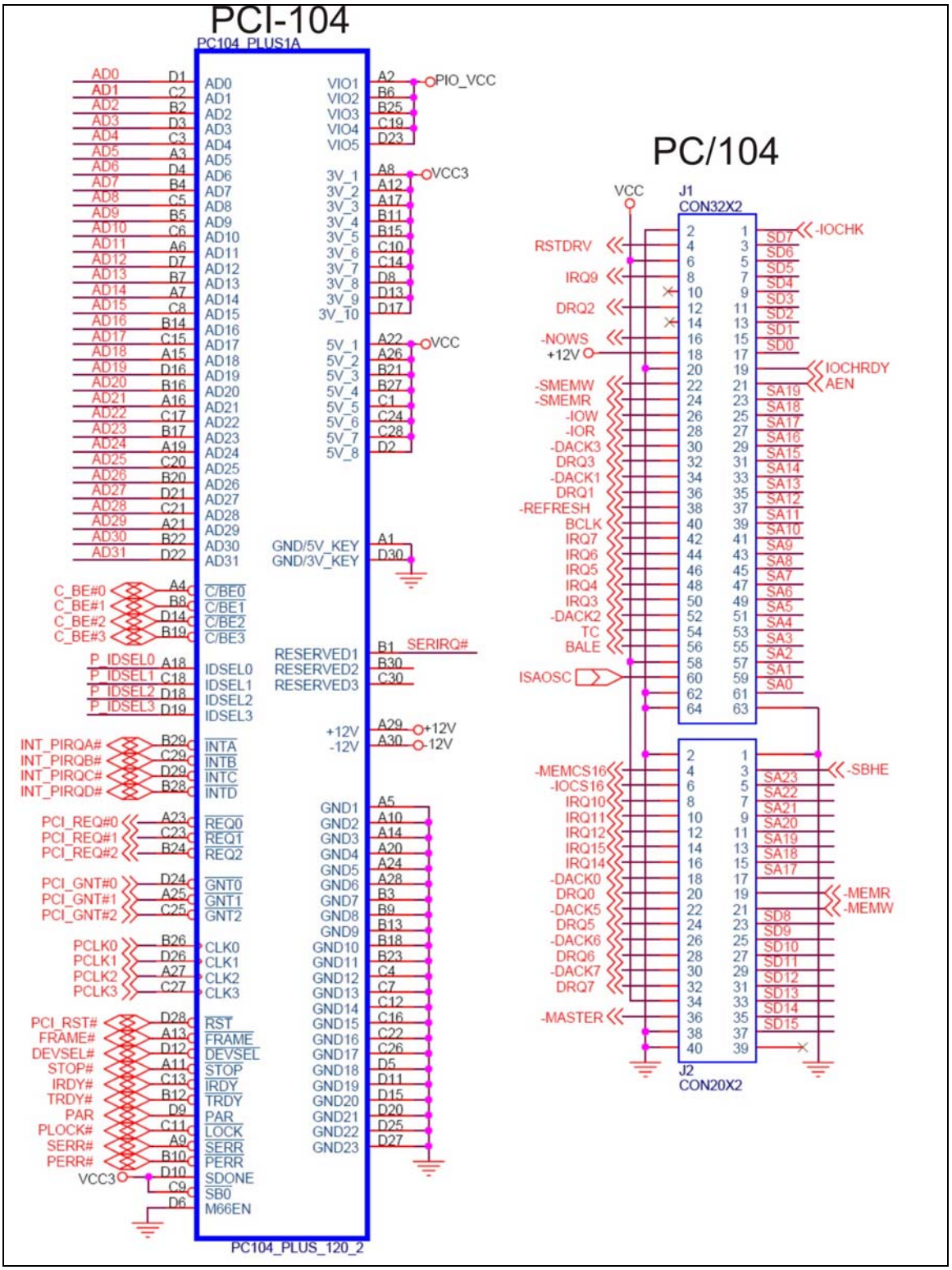


Figure 4-16: PC/104-Plus Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
A1	GND/5V KEY	B1	RESERVED1	C1	VCC	D1	AD0
A2	PIO_VCC	B2	AD2	C2	AD1	D2	VCC
A3	AD5	B3	GND7	C3	AD4	D3	AD3
A4	C/BE0	B4	AD7	C4	GND12	D4	AD6
A5	GND1	B5	AD9	C5	AD8	D5	GND18
A6	AD11	B6	PIO_VCC	C6	AD10	D6	M66EN
A7	AD14	B7	AD13	C7	GND13	D7	AD12
A8	VCC3	B8	C/BE1	C8	AD15	D8	VCC3
A9	SERR	B9	GND8	C9	SB0	D9	PAR
A10	GND2	B10	PERR	C10	VCC3	D10	SDONE
A11	STOP	B11	VCC3	C11	LOCK	D11	GND19
A12	VCC3	B12	TRDY	C12	GND14	D12	DEVSEL
A13	FRAME	B13	GND9	C13	IRDY	D13	VCC3
A14	GND3	B14	AD16	C14	VCC3	D14	C/BE2
A15	AD18	B15	VCC3	C15	AD17	D15	GND20
A16	AD21	B16	AD20	C16	GND15	D16	AD19
A17	VCC3	B17	AD23	C17	AD22	D17	VCC3
A18	IDSEL0	B18	GND10	C18	IDSEL1	D18	IDSEL2
A19	AD24	B19	C/BE3	C19	PIO_VCC	D19	IDSEL3
A20	GND4	B20	AD26	C20	AD25	D20	GND21
A21	AD29	B21	VCC	C21	AD28	D21	AD27
A22	VCC	B22	AD30	C22	GND16	D22	AD31
A23	REQ0	B23	GND11	C23	REQ1	D23	PIO_VCC
A24	GND5	B24	REQ2	C24	VCC	D24	GNT0
A25	GNT1	B25	PIO_VCC	C25	GNT2	D25	GND22
A26	VCC	B26	CLK0	C26	GND17	D26	CLK1
A27	CLK2	B27	VCC	C27	CLK3	D27	GND23
A28	GND6	B28	INTD	C28	VCC	D28	RST
A29	+12V	B29	INTA	C29	INTB	D29	INTC
A30	-12V	B30	RESERVED2	C30	RESERVED3	D30	GND/3V_KEY

Table 4-16: PCI-104 Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	-IOCHK	2	GND	3	SD7	4	RSTDRV
5	SD6	6	VCC	7	SD5	8	IRQ9
9	SD4	10	NC	11	SD3	12	DRQ2
13	SD2	14	NC	15	SD1	16	-NOWS
17	SD0	18	+12V	19	IOCHRDY	20	GND
21	AEN	22	-SMEMW	23	SA19	24	-SMEMR
25	SA18	26	-IOW	27	SA17	28	-IOR
29	SA16	30	-DACK3	31	SA15	32	DRQ3
33	SA14	34	-DACK1	35	SA13	36	DRQ1
37	SA12	38	-REFRESH	39	SA11	40	BCLK
41	SA10	42	IRQ7	43	SA9	44	IRQ6
45	SA8	46	IRQ5	47	SA7	48	IRQ4
49	SA6	50	IRQ3	51	SA5	52	-DACK2
53	SA4	54	TC	55	SA3	56	BALE
57	SA2	58	VCC	59	SA1	60	ISAOSC
61	SA0	62	GND	63	GND	64	GND

Table 4-17: PC/104-Plus J2 Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND	3	-SBHE	4	-MEMCS16
5	SA23	6	-IOCS16	7	SA22	8	IRQ10
9	SA21	10	IRQ11	11	SA20	12	IRQ12
13	SA19	14	IRQ15	15	SA18	16	IRQ14
17	SA17	18	-DACK0	19	-MEMR	20	DRQ0
21	-MEMW	22	-DACK5	23	SD8	24	DRQ5
25	SD9	26	-DACK6	27	SD10	28	DRQ6
29	SD11	30	-DACK7	31	SD12	32	DRQ7
33	SD13	34	VCC	35	SD14	36	-MASTER
37	SD15	38	GND	39	NC	40	GND

Table 4-18: PC/104-Plus J1 Connector Pinouts

4.2.15 PCI Slot

CN Label: **PCI1**

CN Type: PCI Slot

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-19**

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

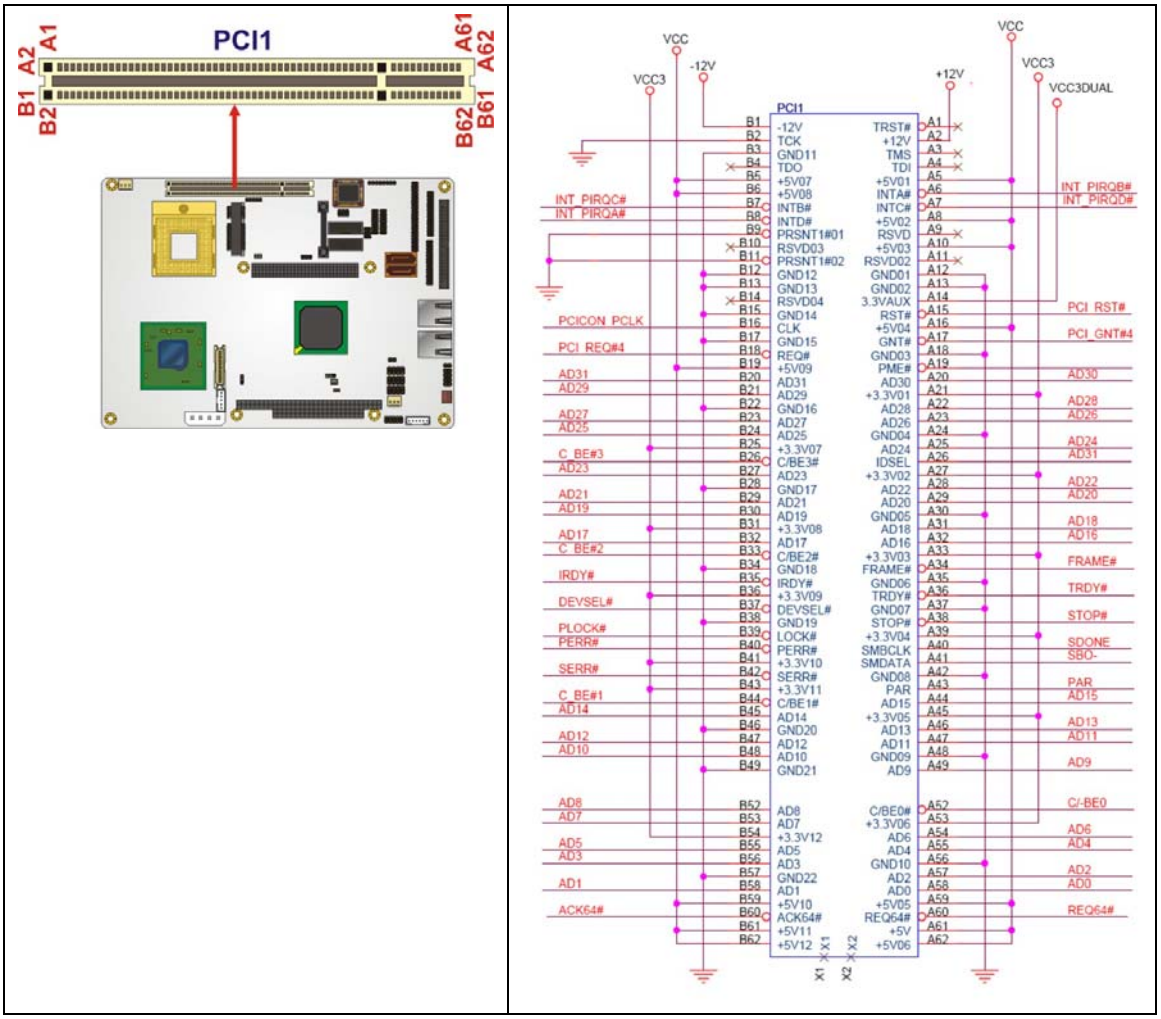


Figure 4-17: PCI Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
A1	TRST	B1	-12V
A2	+12V	B2	TCK
A3	TMS	B3	GND
A4	TDI	B4	TDO
A5	+5V	B5	+5V
A6	INTA	B6	+5V
A7	INTC	B7	INTB
A8	+5V	B8	INTD
A9	RESERVED3	B9	PRSNT1
A10	+5V	B10	RESERVED1
A11	RESERVED4	B11	PRSNT2
A12	GND	B12	GND
A13	GND	B13	GND
A14	3.3V_AUX	B14	RESERVED2
A15	RST	B15	GND
A16	+5V	B16	CLK
A17	GNT	B17	GND
A18	GND	B18	REQ
A19	PME	B19	+5V
A20	AD30	B20	AD31
A21	+3.3V	B21	AD29
A22	AD28	B22	GND
A23	AD26	B23	AD27
A24	GND	B24	AD25
A25	AD24	B25	+3.3V
A26	IDSEL	B26	C/BE3
A27	+3.3V	B27	AD23
A28	AD22	B28	GND
A29	AD20	B29	AD21
A30	GND	B30	AD19
A31	AD18	B31	+3.3V

A32	AD16	B32	AD17
A33	+3.3V	B33	C/BE2
A34	FRAME	B34	GND
A35	GND	B35	IRDY
A36	TRDY	B36	+3.3V
A37	GND	B37	DEVSEL
A38	STOP	B38	GND
A39	+3.3V	B39	LOCK
A40	SDONE	B40	PERR
A41	SBO	B41	+3.3V
A42	GND	B42	SERR
A43	PAR	B43	+3.3V
A44	AD15	B44	C/BE1
A45	+3.3V	B45	AD14
A46	AD13	B46	GND
A47	AD11	B47	AD12
A48	GND	B48	AD10
A49	AD9	B49	GND
A52	C/BE0	B52	AD8
A53	+3.3V	B53	AD7
A54	AD6	B54	+3.3V
A55	AD4	B55	AD5
A56	GND	B56	AD3
A57	AD2	B57	GND
A68	AD0	B68	AD1
A59	+5V	B59	+5V
A60	REQ64	B60	ACK64
A61	+5V	B61	+5V
A62	+5V	B62	+5V

Table 4-19: PCI Slot

4.2.16 SATA Drive Connectors

CN Label: **SATA1** and **SATA2**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 4-18**

CN Pinouts: See **Table 4-20**

The four SATA drive connectors are each connected to a second generation SATA drive. Second generation SATA drives transfer data at speeds as high as 150MB/s.

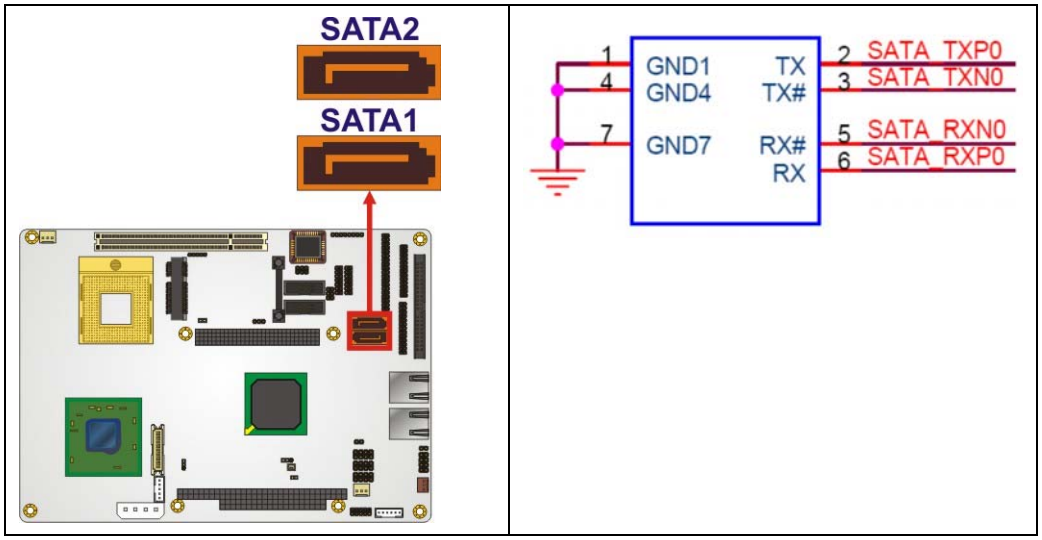


Figure 4-18: SATA Drive Connector Locations

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

Table 4-20: SATA Drive Connector Pinouts

4.2.17 Serial Port Connector (COM1 and COM 2)(RS-232/422/485)

CN Label:	**COM1** and **COM2**
CN Type:	14-pin header (2x7)
CN Location:	See **Figure 4-19**
CN Pinouts:	See **Table 4-21**

The 14-pin serial port connector connects to the COM1 and COM 2 serial communications channels. COM1 and COM2 are multi function channels. In default mode COM1 and COM2 are RS-232 serial communication channels but, with the function select jumper, can be configured as either an RS-422 or RS-485 serial communications channels.

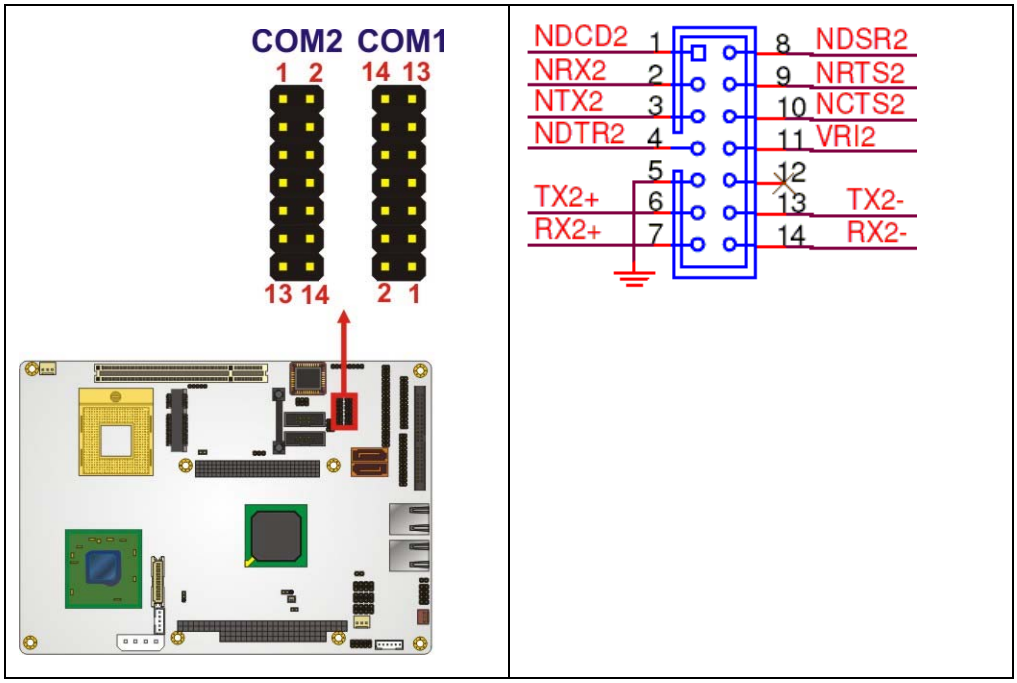


Figure 4-19: RS-232/422/485 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD2	8	NDSR2
2	NRX2	9	NRTS2
3	NTX2	10	NCTS2
4	NDTR2	11	NRI2
5	GND	12	GND
6	TX2+	13	TX2-
7	RX2+	14	RX2-

Table 4-21: RS-232/422/485 Serial Port Connector Pinouts

4.2.18 Serial Port Connector (4 x RS-232)

CN Label: **COM3_6**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-22**

The 40-pin serial port connector contains four serial ports. All four serial ports are RS-232 serial communications channels. The serial port locations are specified below.

- COM 3 is located on pin 1 to pin 10
- COM 4 is located on pin 11 to pin 20
- COM 5 is located on pin 21 to pin 30
- COM 6 is located on pin 31 to pin 40

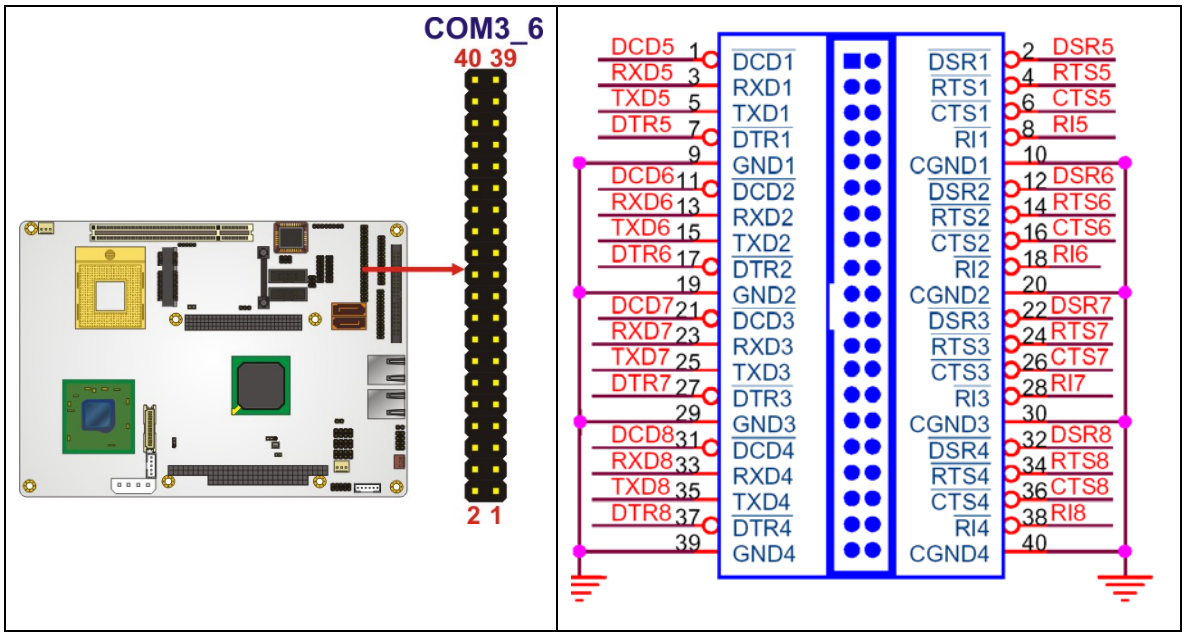


Figure 4-20: COM3 to COM6 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TXD485+	2	TXD485-
3	RXD485+	4	RXD485-
5	N/C	6	N/C
7	N/C	8	N/C
9	GND	10	GND
11	DCD2	12	DSR2
13	RXD2	14	RTS2
15	TXD2	16	CTS2
17	DTR2	18	RI2
19	GND	20	GND
21	DCD3	22	DSR3
23	RXD3	24	RTS3
25	TXD3	26	CTS3
27	DTR3	28	RI3
29	GND	30	GND
31	DCD4	32	DSR4
33	RXD4	34	RTS4
35	TXD4	36	CTS4
37	DTR4	38	RI4
39	GND	40	GND

Table 4-22: COM3 to COM6 Connector Pinouts

4.2.19 USB Connectors (Internal)

CN Label:	**USB1**, **USB2** and **USB3**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 4-21**
CN Pinouts:	See **Table 4-23**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. The USB ports are used for I/O bus expansion.

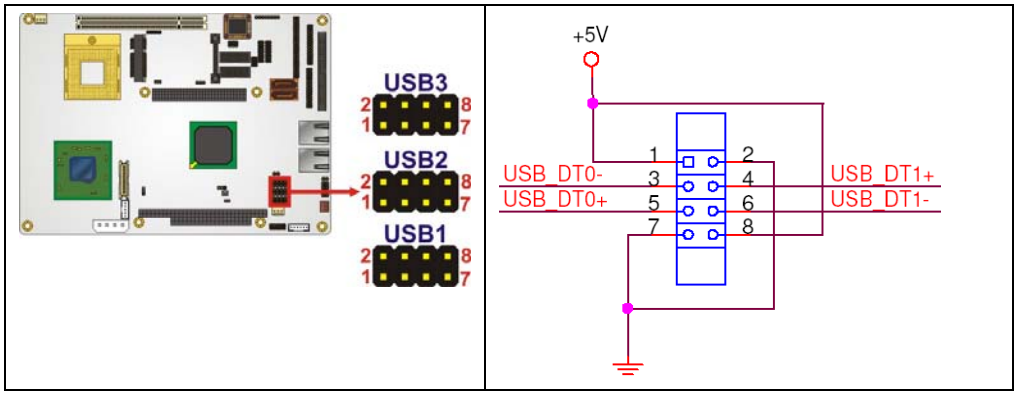


Figure 4-21: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATAN-	4	DATA1M-
5	DATAN+	6	DATAM+
7	GND	8	VCC

Table 4-23: USB Port Connector Pinouts

4.2.20 VGA Connectors (Internal)

CN Label: **VGA1** and **VGA2**

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

CN Location: See **Figure 4-22**

CN Pinouts: See **Table 4-24**

The 2x5 VGA pin connectors provide connectivity to external VGA ports enabling the system to be connected to a standard CRT screen.

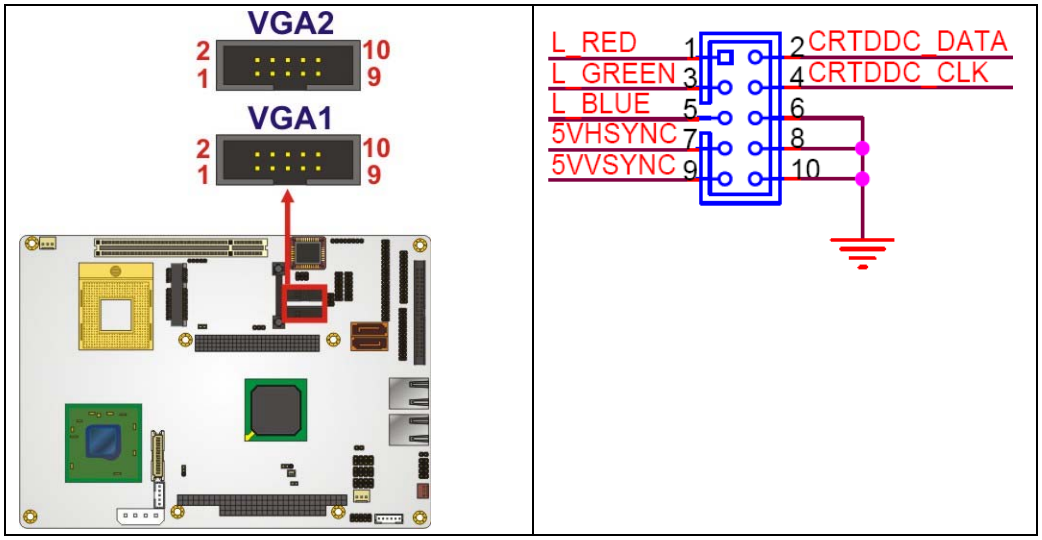


Figure 4-22: VGA Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	L_RED	2	CRT_DDC_DATA
3	L_GREEN	4	CRT_DDC_CLK
5	L_BLUE	6	GND
7	5VHSYNC	8	GND
9	5VVSYNC	10	GND

Table 4-24: VGA Connector Pinouts

4.3 External Peripheral Interface Connector Panel

Figure 4-23 shows the NOVA-9452 rear panel. The NOVA-9452 rear panel consists of two RJ-45 Ethernet connectors. These connectors are accessible when the NOVA-9452 is installed in a chassis.

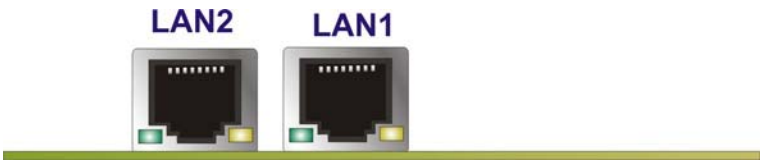


Figure 4-23: NOVA-9452 External Peripheral Interface Connector

4.3.1 LAN Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 4-23**

CN Pinouts: See **Table 4-25**

The NOVA-9452 is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXA+	5	TXC+
2	TXA-	6	TXC-
3	TXB+	7	TXD+
4	TXB-	8	TXD-

Table 4-25: LAN Pinouts

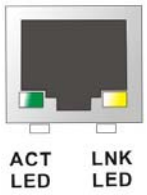


Figure 4-24: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-26**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 4-26: RJ-45 Ethernet Connector LEDs

Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NOVA-9452 may result in permanent damage to the NOVA-9452 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NOVA-9452. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NOVA-9452, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the NOVA-9452, place it on an antic-static pad. This reduces the possibility of ESD damaging the NOVA-9452.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the NOVA-9452 is installed. All installation notices pertaining to the installation of the NOVA-9452 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NOVA-9452 and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NOVA-9452, NOVA-9452 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the NOVA-9452 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the NOVA-9452 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the NOVA-9452 off:

- When working with the NOVA-9452, 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 NOVA-9452 **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.

5.2.2 Installation Checklist

The following checklist is provided to ensure the NOVA-9452 is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The NOVA-9452 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - IDE device
  - SATA drives
  - Keyboard and mouse cable
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
  - Parallel port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen

- USB device
- LAN connection

5.3 CPU, CPU Cooling Kit and SO-DIMM Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, NOVA-9452 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and SO-DIMM are the most critical components of the NOVA-9452. If one of these component is not installed the NOVA-9452 cannot run.

5.3.1 Socket M 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 the correct cooling kit is properly installed.

To install a Socket M CPU onto the NOVA-9452, follow the steps below:

WARNING:

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

Step 1: **Unlock the CPU retention screw.** When shipped, the retention screw of the CPU socket should be in the unlocked position. If it is not in the unlocked position, use a screwdriver to unlock the screw. See **Figure 5-1**.

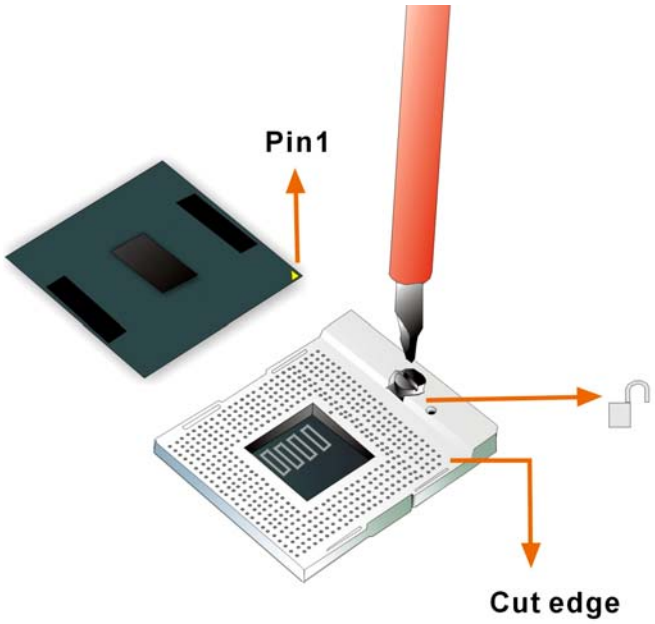


Figure 5-1: Make sure the CPU socket retention screw is unlocked

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

Step 3: **Correctly Orientate the CPU**. Make sure the IHS (integrated heat sink) side is facing upwards.

Step 4: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket. See **Figure 5-1**.

Step 5: **Align the CPU pins.** Carefully align the CPU pins with the holes in the CPU socket.

Step 6: **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 7: **Lock the retention screw.** Rotate the retention screw into the locked position. See **Figure 5-2**.

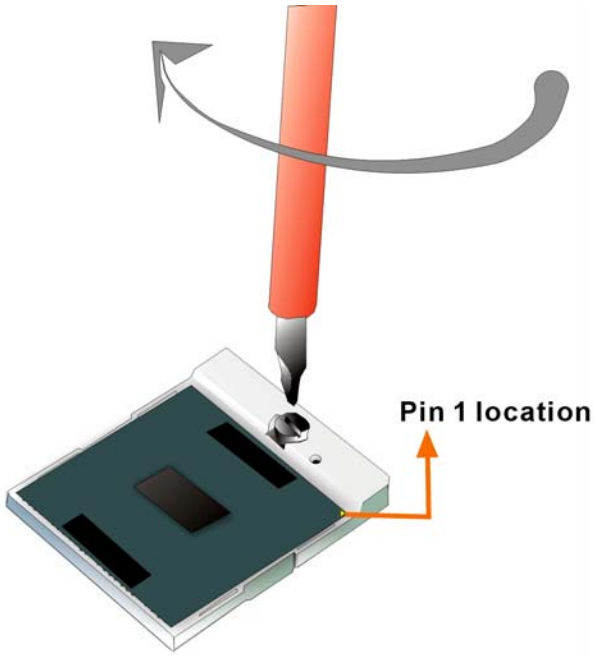


Figure 5-2: Lock the CPU Socket Retention Screw

5.3.2 Cooling Kit Installation

Figure 5-3: Cooling Kit

An IEI Socket M CPU cooling kit can be purchased separately. The cooling kit comprises a CPU heat sink and a cooling fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the [Fan model#] heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the CF-479B-RS cooling kit, please follow the steps below.

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

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

Step 3: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 5-4**)

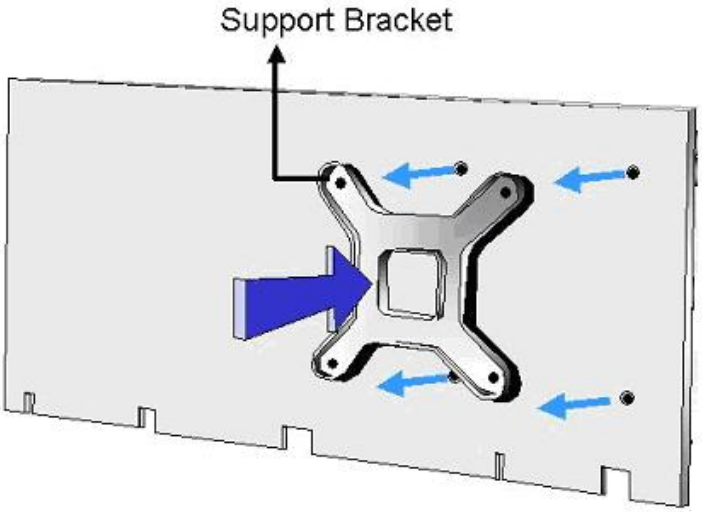


Figure 5-4: Cooling Kit Support Bracket

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

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

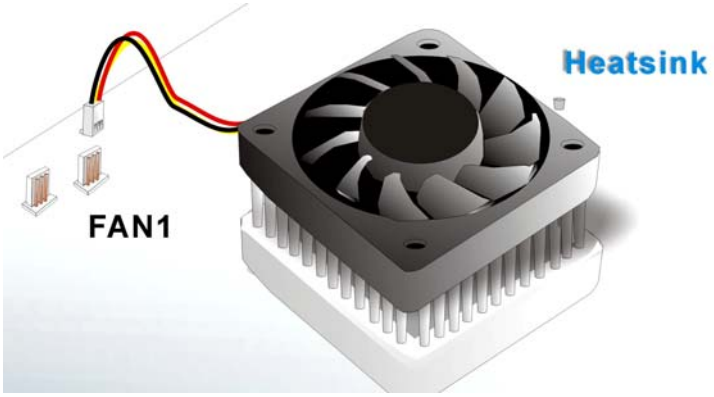


Figure 5-5: Connect the cooling fan cable

5.3.3 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the NOVA-9452. Please make sure the purchased SO-DIMM complies with the memory specifications of the NOVA-9452. SO-DIMM specifications compliant with the NOVA-9452 are listed in **Chapter 2**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 5-6**.

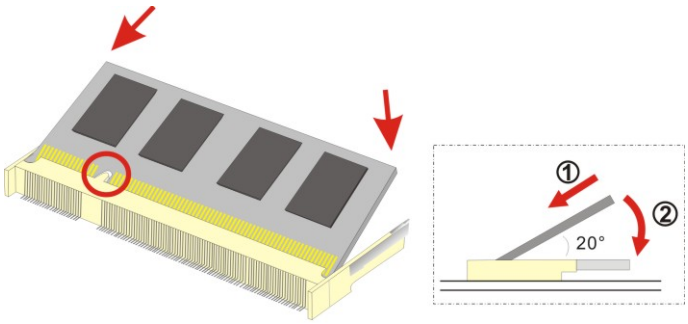


Figure 5-6: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the NOVA-9452 on an anti-static pad with the solder side facing up.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 5-6**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 5-6**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

5.3.4 CF Card Installation

NOTE:

The NOVA-9452 can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install the a CF card (Type 1 or Type 2) onto the NOVA-9452, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the NOVA-9452 on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-7**.

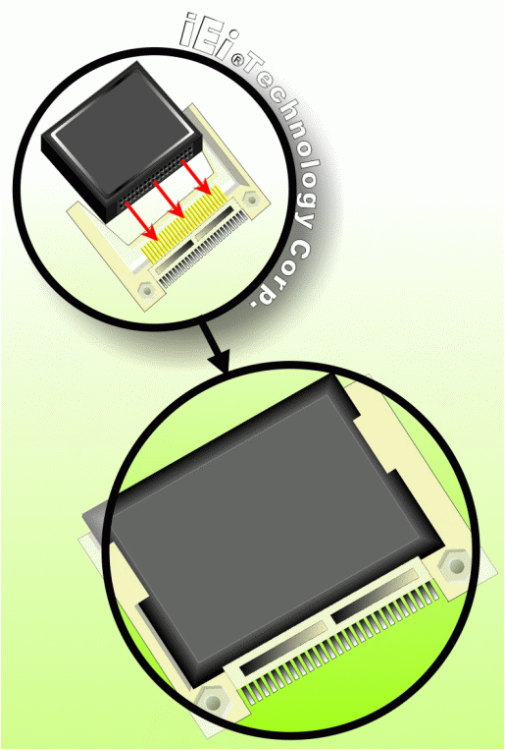


Figure 5-7: CF Card Installation

5.4 Jumper Settings

NOTE:

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

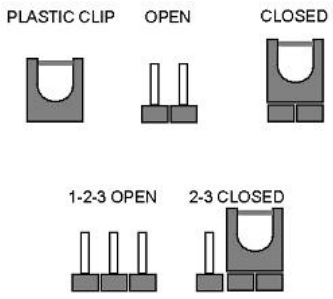


Figure 5-8: Jumper Locations

Before the NOVA-9452 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NOVA-9452 are listed in **Table 5-1**.

Description	Label	Type
Auto power-on function setup	J_AUTOPWR1	2-pin header
CF card setup	J_CF1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
PCI-104 SERIQ#	JP3	2-pin header
PC/104 SERIQ#	JP5	2-pin header
Serial port mode selector	JP1	6-pin header
Serial port mode selector	JP2	6-pin header
VIO voltage selector	JP4	3-pin header

Table 5-1: Jumpers

5.4.1 Auto Power-on Function Setup

Jumper Label: **J_AUTOPWR1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See **Figure 5-9**

The Auto Power-on Function Setup jumper enables or disables the auto power-on function.

Auto Power-on Function Setup jumper settings are shown in **Table 5-3**.

Auto Power-on	Description	
Open	Enable	Default
Closed	Disable	

Table 5-2: Auto Power-on Function Setup Jumper Settings

The Auto Power-on Function Setup jumper location is shown in **Figure 5-10**.

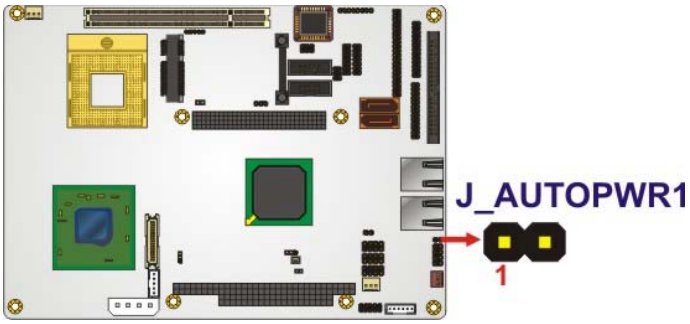


Figure 5-9: Auto Power-on Function Setup Jumper Location

5.4.2 CF Card Setup

Jumper Label: **J_CF1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-3**

Jumper Location: See **Figure 5-10**

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in **Table 5-3**.

AT Power Select	Description	
Open	Slave	Default
Closed	Master	

Table 5-3: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in **Figure 5-10**.

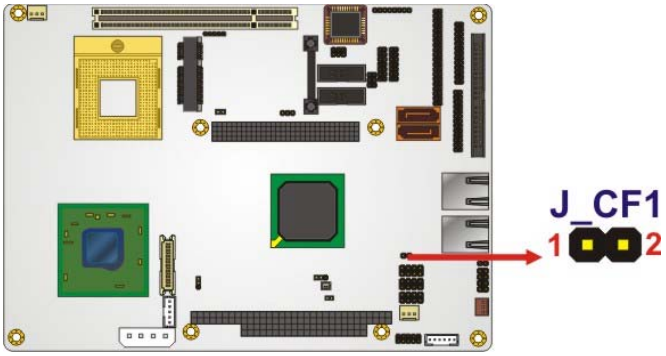


Figure 5-10: CF Card Setup Jumper Location

5.4.3 Clear CMOS Jumper

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 5-4**
Jumper Location:	See **Figure 5-11**

If the NOVA-9452 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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

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

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

The clear CMOS jumper settings are shown in **Table 5-4**.

AT Power Select	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-4: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-11** below.

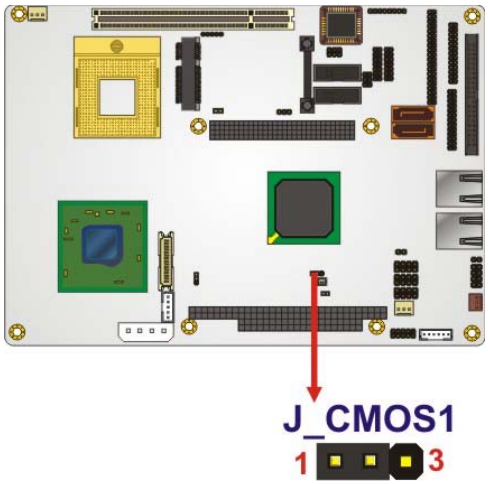


Figure 5-11: Clear CMOS Jumper

5.4.4 LVDS Voltage Selection

WARNING:

Permanent damage to the screen and NOVA-9452 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that cam with the monitor to select the correct voltage.

Jumper Label: **J_VLVDS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-5**

Jumper Location: See **Figure 5-12**

The **LVDS Voltage Selection** jumper allows the LVDS screen voltage to be set. The **LVDS Voltage Selection** jumper settings are shown in **Table 5-5**.

AT Power Select	Description	
Short 1-2	+3.3V LVDS	Default
Short 2-3	+5V LVDS	

Table 5-5: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in **Figure 5-12**.

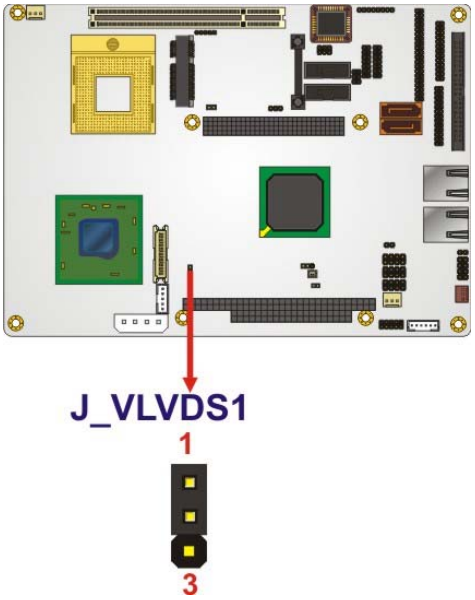


Figure 5-12: LVDS Voltage Selection Jumper Pinout Locations

5.4.5 PCI-104 Serial IRQ Selector

Jumper Label: **JP3**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-5**

Jumper Location: See **Figure 5-12**

The **PCI-104 Serial IRQ Selector** enables the serial IRQ protocol for this device. The **PCI-104 Serial IRQ Selector jumper** settings are shown in **Table 5-5**.

PCI-104 B1 selector	Description	
Open	Disconnect	
Closed	Connect	Default

Table 5-6: PCI-104 Voltage Setup Jumper Settings

The PCI-104 Voltage Setup jumper location is shown in **Figure 5-12**.

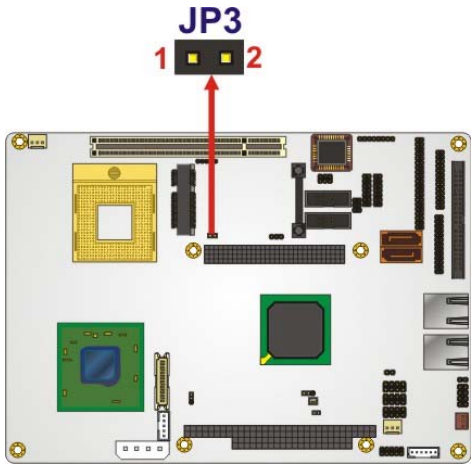


Figure 5-13: PCI-104 Voltage Setup Jumper Pinout Locations

5.4.6 PC/104 Serial IRQ Selector

Jumper Label:	**JP5**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 5-5**
Jumper Location:	See **Figure 5-12**

The **PC/104 Serial IRQ Selector** enables the serial IRQ protocol for this device. The **PC/104 Serial IRQ Selector jumper** settings are shown in **Table 5-5**.

PC/104 B1 selector	Description	
Open	Disconnect	
Closed	Connect	Default

Table 5-7: PC/104 Voltage Setup Jumper Settings

The PC/104 Voltage Setup jumper location is shown in **Figure 5-12**.

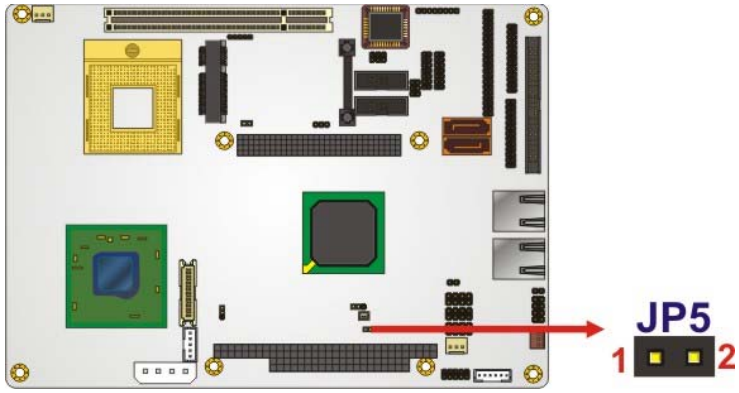


Figure 5-14: PC/104 Voltage Setup Jumper Pinout Locations

5.4.7 Serial Port Mode Selectors (COM1 and COM2)

Jumper Label:	**JP1, JP2**
Jumper Type:	6-pin header
Jumper Settings:	See **Table 5-8**
Jumper Location:	See **Figure 5-15**

The COM 1 and COM2 serial port mode selectors configure the serial ports to use RS-232, RS-422 or RS-485 signaling. The jumper selection options are shown in **Table 5-8**.

COM	Description	
Short 1 – 2	RS-232	Default
Short 3 – 4	RS-422	
Short 5 – 6	RS-485	

Table 5-8: Serial Port Mode Selector Jumper Settings

The serial port mode selectors are shown in **Figure 5-15** below.

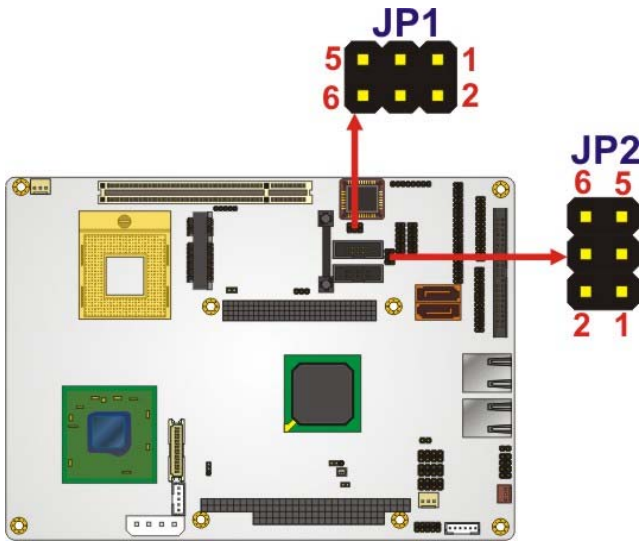


Figure 5-15: Serial Port Mode Selector Pinout Location

5.4.8 PCI-104 Voltage Setup

Jumper Label:	**JP4**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 5-5**
Jumper Location:	See **Figure 5-12**

The **PCI-104 Voltage Setup** jumper allows the PC/104-Plus VIO voltage to be set. The **PCI-104 Voltage Setup** jumper settings are shown in **Table 5-5**.

PCI-104 Voltage Setup	Description	
Short 1-2	+5V	
Short 2-3	+3.3V	

Table 5-9: PCI-104 Voltage Setup Jumper Settings

The PCI-104 Voltage Setup jumper location is shown in **Figure 5-12**.

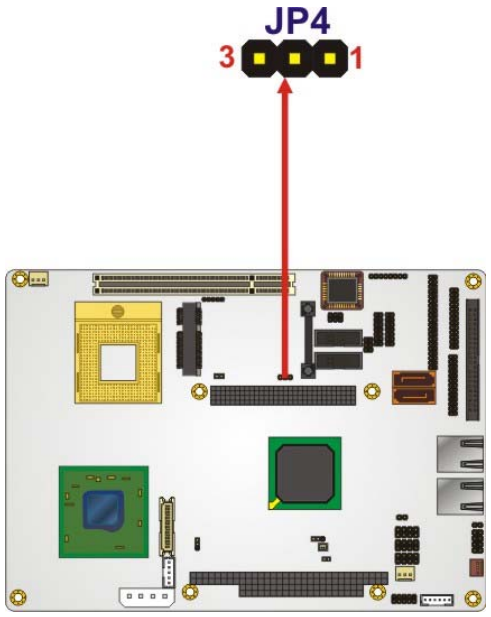


Figure 5-16: PCI-104 Voltage Setup Jumper Pinout Locations

5.5 Chassis Installation

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the NOVA-9452 must have air vents to allow cool air to move into the system and hot air to move out.

The NOVA-9452 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

5.6 Internal Peripheral Device Connections

5.6.1 Peripheral Device Cables

The cables listed in **Table 5-10** are shipped with the NOVA-9452.

Quantity	Type
1	IDE cable
1	KB/MS cable
2	SATA drive cable
1	SATA drive power cable
1	Serial port cable
1	Quad Serial port cable
1	USB cable
1	VGA cable (2 x VGA cable for NOVA-9452VGA)

Table 5-10: IEI Provided Cables

Optional cables are listed below:

- LPT cable
- FDD cable
- 7.1 channel audio kit
- 5.1 channel audio kit

5.6.2 IDE Cable Connection

The IDE flat cable connects to the NOVA-9452 to one or two IDE devices. To connect an IDE HDD to the NOVA-9452 please follow the instructions below.

Step 1: **Locate the IDE connector**. The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the IDE cable connector to the onboard connector. See **Figure 5-17**. A key on the front of the cable connector ensures it can only be inserted in one direction.

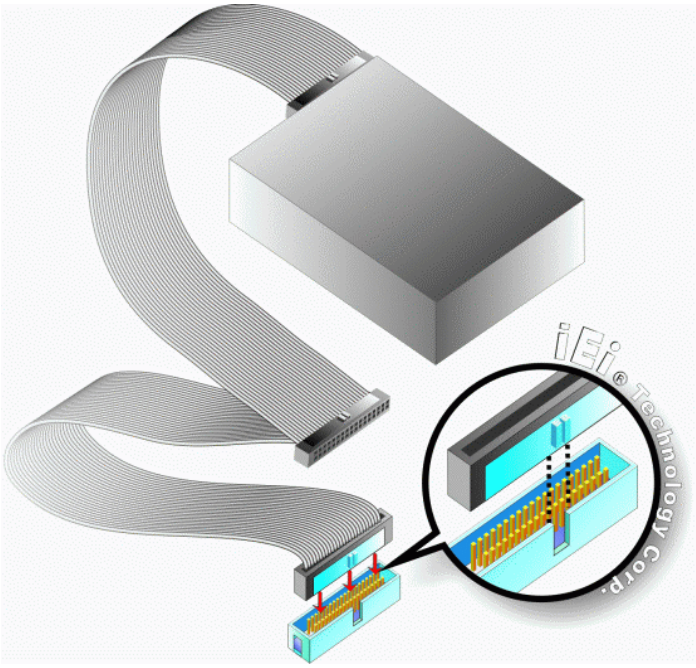


Figure 5-17: IDE Cable Connection

Step 3: **Connect the cable to an IDE device**. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector

5.6.3 5.1 Channel Audio Kit Installation

NOTE:

This is an optional item that must be ordered separately. For further information please contact the nearest NOVA-9452 distributor, reseller or vendor or contact an iEi sales representative directly. Send any queries to sales@iei.com.tw.

The optional 5.1 channel audio kit connects to the 10-pin audio connector on the NOVA-9452. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: **Connect the audio kit cable.** The audio kit is shipped with a cable that connects the audio kit to the NOVA-9452. Connect the cable to the connector on the back of the audio kit. Make sure the pins are properly aligned (i.e. pin 1 connects to pin 1).

Step 2: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 3: **Align pin 1**. Align pin 1 on the onboard connector with pin 1 on the audio kit cable connector. Pin 1 on the audio kit cable connector is indicated with a white dot. See **Figure 5-18**.

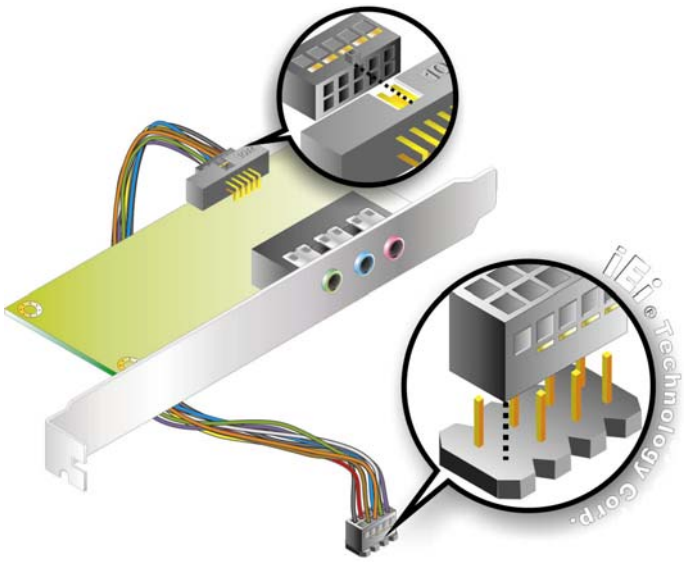


Figure 5-18: 5.1 Channel Audio Kit

Step 4: **Mount the audio kit onto the chassis**. Once the audio kit is connected to the NOVA-9452, secure the audio kit bracket to the system chassis.

Step 5: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

Step 6: **Install the driver**. If the 5.1 channel audio kit is used, the ALC655 Realtek codec driver must be installed. Refer to **Chapter 7** for driver installation instructions.

5.6.4 7.1 Channel Audio Kit Installation

NOTE:

This is an optional item that must be ordered separately. For further information please contact the nearest NOVA-9452 distributor, reseller or vendor or contact an iEi sales representative directly. Send any queries to sales@iei.com.tw.

The optional 7.1 channel audio kit connects to the 10-pin audio connector on the NOVA-9452. The audio kit consists of five audio jacks. One audio jack, Mic In, connects to a microphone. The remaining four audio jacks, Line-In, Front-Out, Rear-Out, and Center Subwoofer, connect to speakers. To install the audio kit, please refer to the steps below:

Step 1: **Connect the audio kit cable.** The audio kit is shipped with a cable that connects the audio kit to the NOVA-9452. Connect the cable to the connector on the back of the audio kit. Make sure the pins are properly aligned (i.e. pin 1 connects to pin 1).

Step 2: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 3: **Align pin 1**. Align pin 1 on the onboard connector with pin 1 on the audio kit cable connector. Pin 1 on the audio kit cable connector is indicated with a white dot. See **Figure 5-18**.

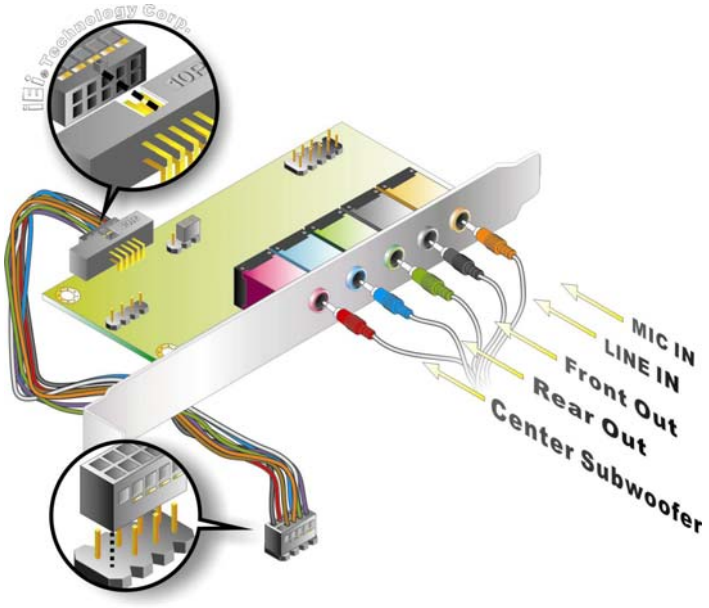


Figure 5-19: 7.1 Channel Audio Kit

Step 4: **Mount the audio kit onto the chassis**. Once the audio kit is connected to the NOVA-9452, secure the audio kit bracket to the system chassis.

Step 5: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

Step 6: **Install the driver**. If the 5.1 channel audio kit is used, the ALC883 Realtek codec driver must be installed. Refer to **Chapter 7** for driver installation instructions.

5.6.5 Parallel Port Cable

The optional parallel port (LPT) cable respectively connects the onboard LPT 26-pin box header to an external LPT device (like a printer). The cable comprises a 26-pin female header, to be connected to the onboard LPT box-header, on one side and on the other side a standard external LPT connector. To connect the LPT cable, please follow the steps below.

Step 1: **Locate the connector**. The LPT connector location is shown in **Chapter 4**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NOVA-9452 LPT box-header connector. See **Figure 5-20**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 26-pin box-header connector on the NOVA-9452, connect the cable connector to the onboard connector. See **Figure 5-20.**

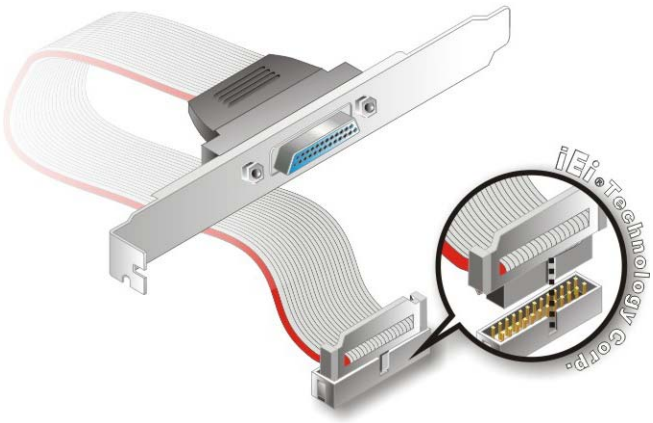


Figure 5-20: LPT Cable Connection

Step 4: **Attach the LPT connector bracket to the chassis**. The LPT cable connector is connected to a standard external LPT interface connector. To secure the LPT interface connector to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect LPT device**. Once the LPT interface connector is connected to the chassis, the LPT device can be connected to the LPT interface connector. See **Figure 5-21**

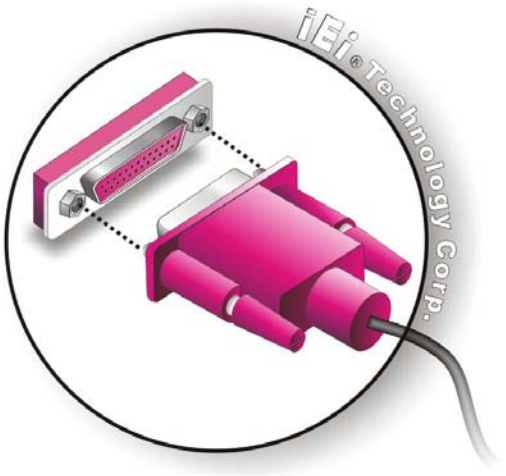


Figure 5-21: Connect the LPT Device

5.6.6 SATA Drive Connection

The NOVA-9452 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-22**.

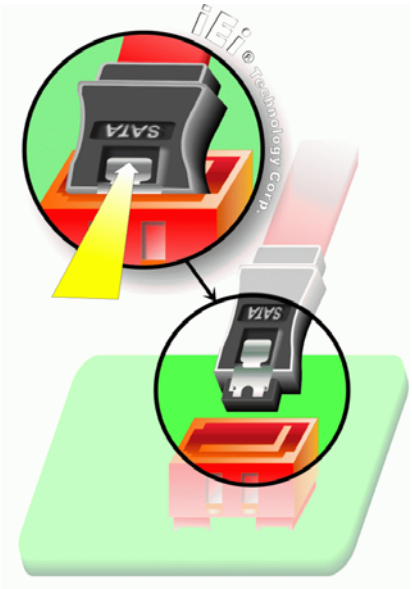


Figure 5-22: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-23**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-23**.

Figure 5-23: SATA Power Drive Connection

5.6.7 Keyboard/Mouse Y-cable Connector

The NOVA-9452 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the NOVA-9452 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector please follow the steps below.

Step 1: **Locate the connector**. The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NOVA-9452 keyboard/mouse connector. See **Figure 5-24**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the NOVA-9452, connect the cable connector to the onboard connectors. See **Figure 5-24**.

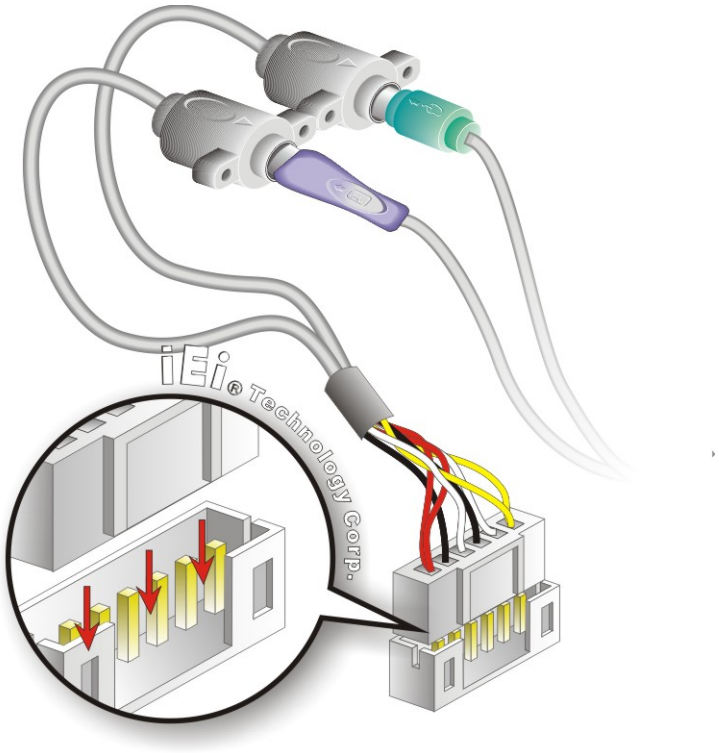


Figure 5-24: Keyboard/mouse Y-cable Connection

Step 4: **Attach PS/2 connectors to the chassis**. The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect the keyboard and mouse**. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

5.6.8 PCIe Mini card Installation

A PCIe Mini expansion card can be installed on the NOVA-9452 using the PCIe Mini card expansion slot. To install a PCIe Mini card into the PCIe Mini card socket, please follow the steps below and refer to **Figure 5-6**.

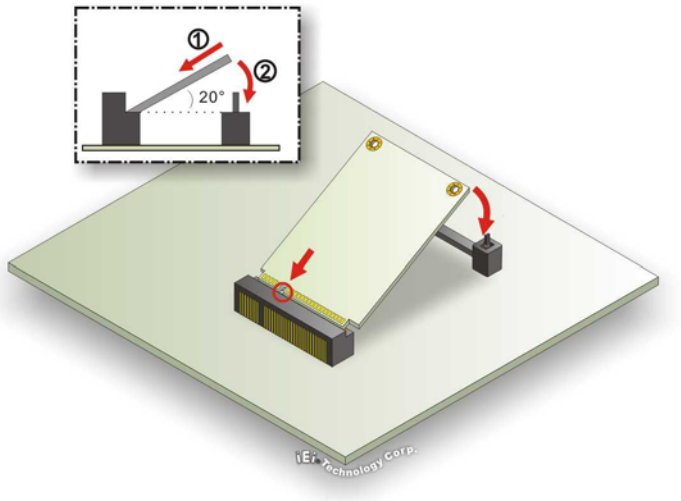


Figure 5-25: PCIe Mini Card Installation

Step 1: **Locate the PCIe Mini socket**. Place the NOVA-9452 on an anti-static pad with the solder side facing down.

Step 2: **Align the PCIe Mini card with the socket**. The PCIe Mini card must be oriented in such a way that the notch on the PCIe Mini card aligns with the plastic bridge in the socket.

Step 3: **Insert the PCIe Mini card**. Push the PCIe Mini card into the socket at an angle. (See **Figure 5-6**)

Step 4: **Secure the PCIe Mini card**. Push the PCIe Mini card down until the two clips snap into place, securing the card in place.

5.6.9 Serial Port Connector Cable (Four Ports) Cable Connection

The NOVA-9452 is shipped with one four serial port connector cable. The four serial port connector cable connects four serial port connectors on the cable to the 40-pin serial port connectors on the NOVA-9452. To connect the four serial port connector cable please follow the steps below.

Step 1: **Locate the serial port connector**. The location of the 40-pin serial port connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NOVA-9452 40-pin serial port connector. See **Figure 5-24**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 40-pin serial port connector on the NOVA-9452, connect the cable connector to the onboard connectors. See **Figure 5-24**.

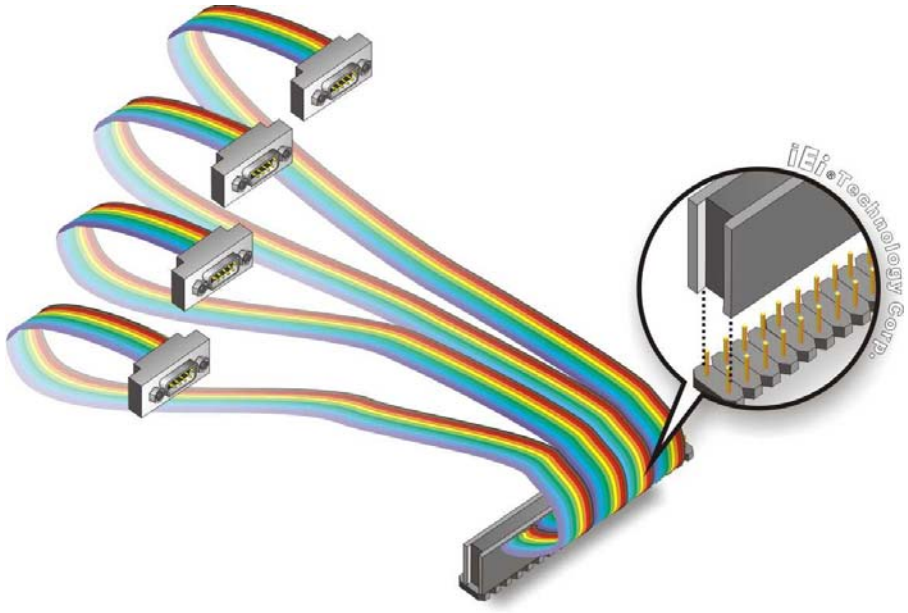


Figure 5-26: Four Serial Port Connector Cable Connection

Step 4: **Attach DB-9 serial port connectors to the chassis**. The four DB-9 serial port connectors can be inserted into four preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with the retention screws.

5.6.10 RS-232/422/485 Cable

The RS-232/422/485 cable consists of one serial port connector attached to a serial communications cable that is then attached to two D-sub 9 male connectors. The connector with four wires is for RS-422/485 communication. The connector with nine wires is for RS-232 communication. To install the cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232/422/485 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

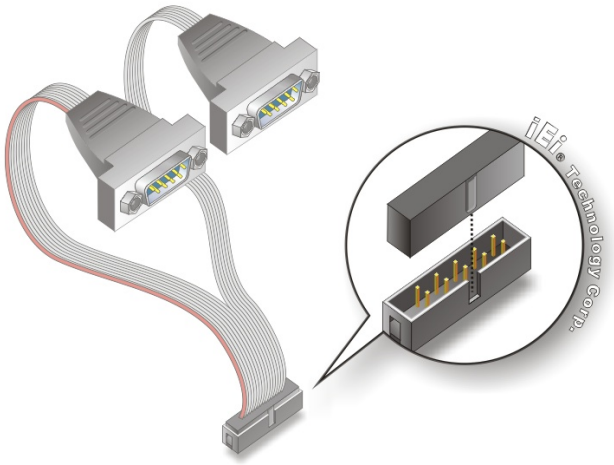


Figure 5-27: RS-232/422/485 Cable Installation

Step 3: **Secure the bracket**. The D-sub 9 male connectors both have two retention screws that must be secured to a chassis or bracket.

Step 4: **Connect the serial device**. Once the connectors are attached, a serial communications device can be connected to the system.

5.6.11 USB Cable (Dual Port)

The NOVA-9452 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connector.** Correctly align pin 1 on the cable connector with pin 1 on the NOVA-9452 USB connector.

Step 3: **Insert the cable connectors.** Once the cable connectors are properly aligned with the USB pins on the NOVA-9452, connect the cable connectors to the onboard connectors. See **Figure 5-28**.

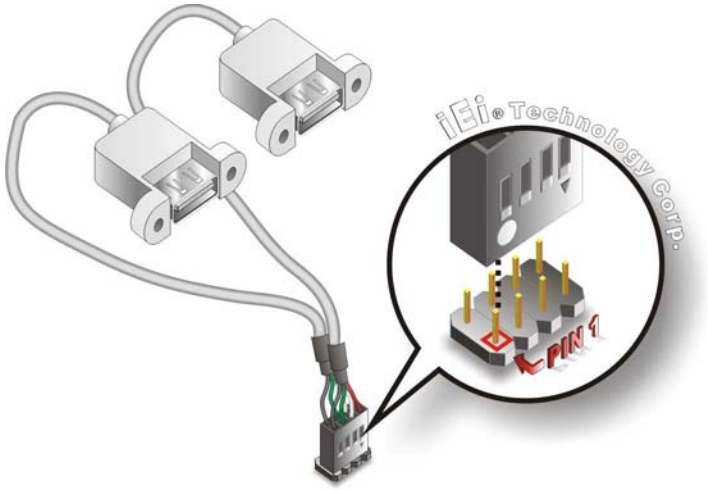


Figure 5-28: Dual USB Cable Connection

Step 4: **Attach the USB ports to the chassis**. The USB 2.0 connectors are attached to the chassis. To secure the ports to the chassis please refer to the installation instructions that came with the chassis.

5.6.12 VGA Monitor Connection

The NOVA-9452 has a single 10-pin VGA box header or two on the VGA model. female DB-15 connector on the external peripheral interface panel. The DB-15 connector is

connected to a CRT or VGA monitor. To connect a monitor to the NOVA-9452, please follow the instructions below.

Step 1: **Align the connector and box header.** Make sure pin 1 on the connector is aligned with pin 1 on the box header.

Step 2: **Insert the connector in the box header.** Once aligned, push the connector into the box header until it is fully seated.

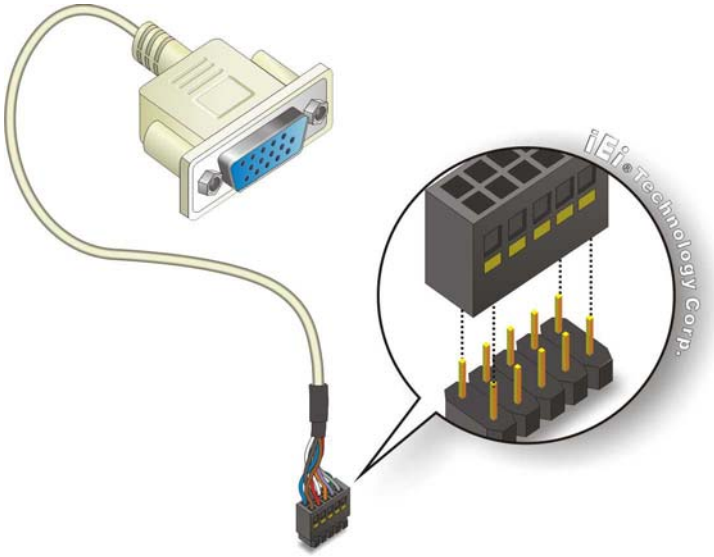


Figure 5-29: VGA Pin Header

Step 3: **Connect the female DB-15 connector to the chassis or a bracket.** Attach the VGA connector directly to the chassis, or connect it to a bracket and install the bracket in the chassis.

Step 4: **Align the VGA connector**. Align the male DB-15 connector from the VGA monitor with the female DB-15 connector on the external peripheral interface.

Step 5: **Insert the VGA connector.** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the NOVA-9452. See **Figure 5-30**.

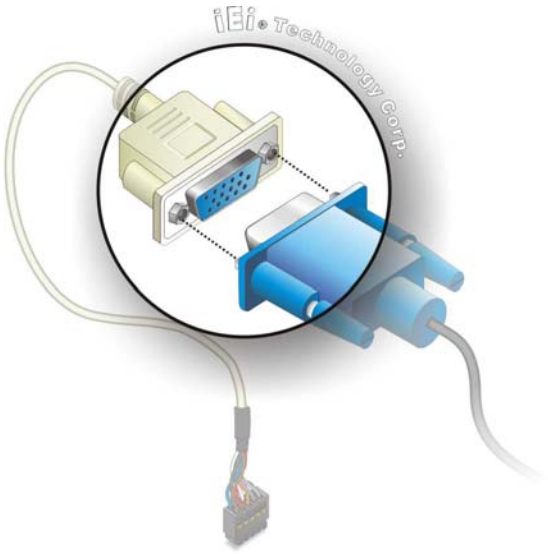


Figure 5-30: VGA Connector

Step 6: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

5.7 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NOVA-9452 external peripheral interface connector making sure the pins are properly aligned.

5.7.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NOVA-9452. See **Figure 5-31**.

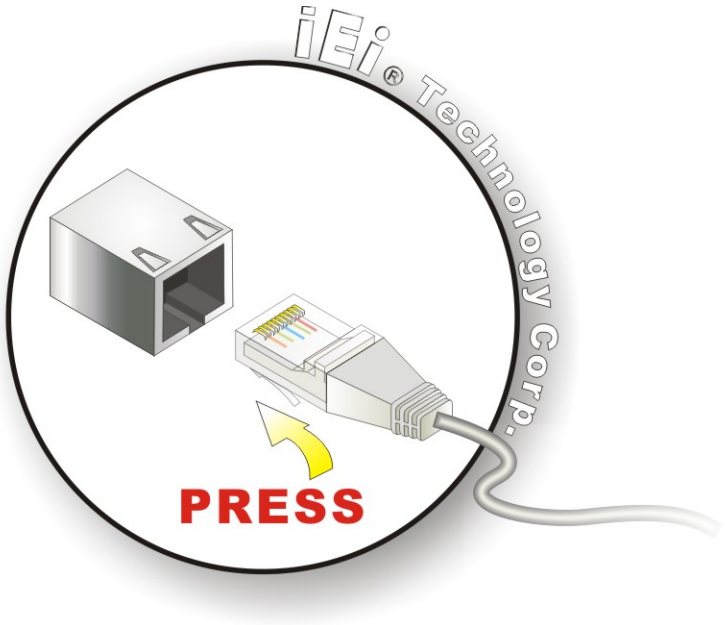


Figure 5-31: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

Chapter

6

AMI BIOS

6.1 Introduction

A licensed copy of AMI 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.

6.1.1 Starting Setup

The AMI 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 before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 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 in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

Key	Function
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 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.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5**.

6.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

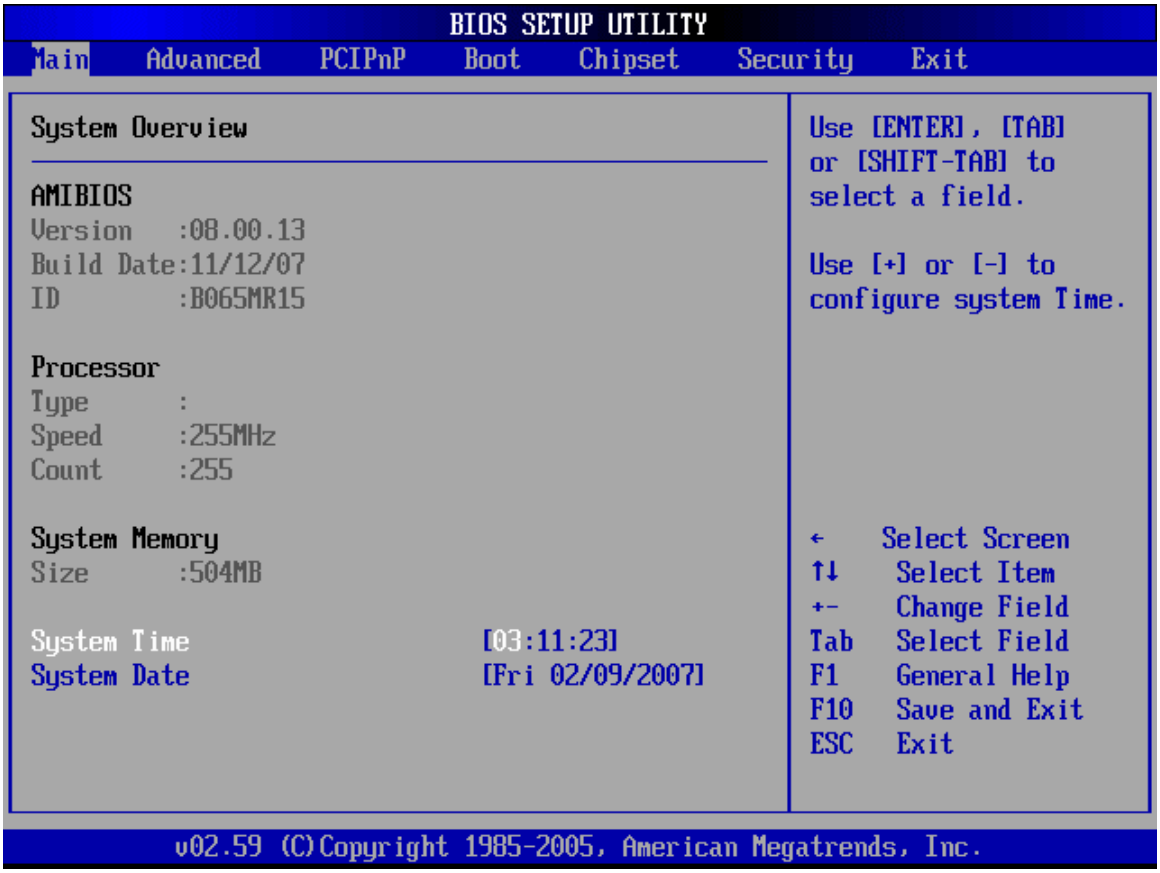
- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

6.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID

- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed
  - **Count**: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The **System Overview** field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

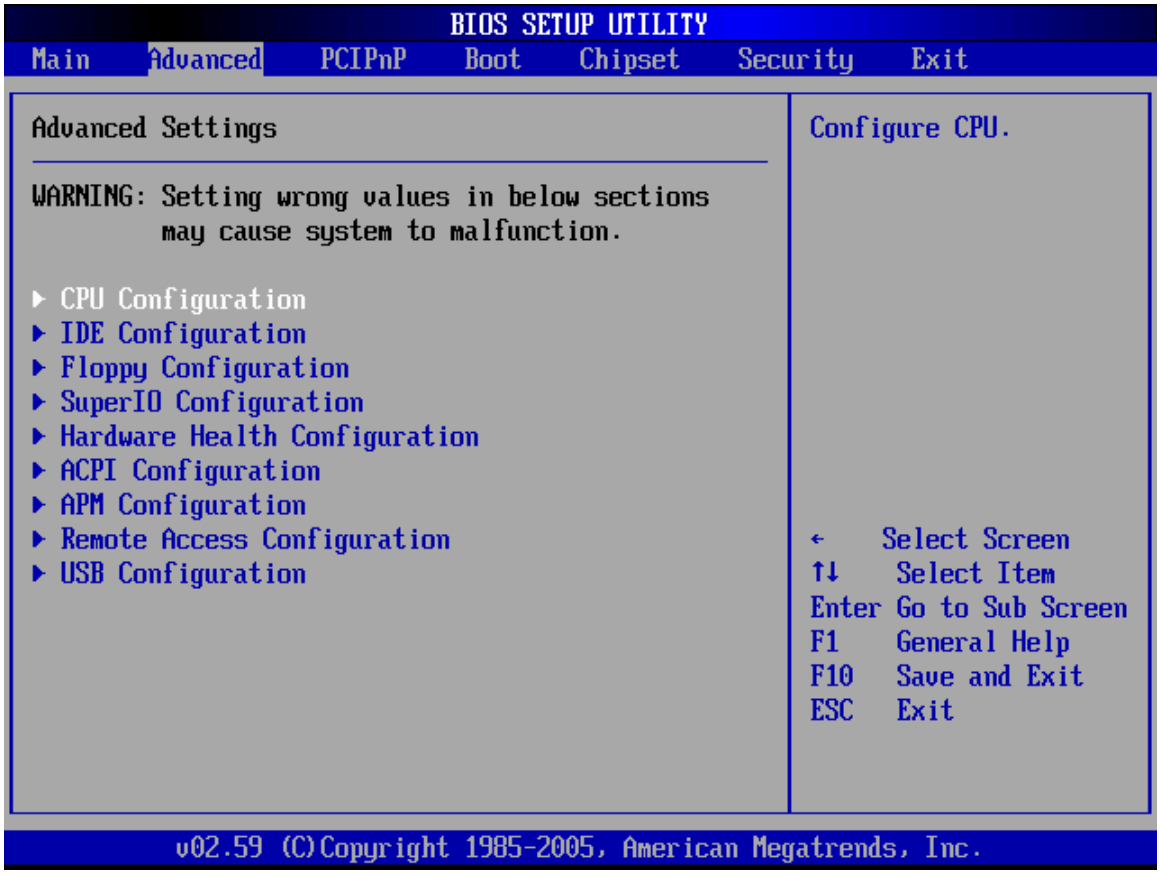
Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- CPU Configuration (see Section 6.3.1)
- IDE Configuration (see Section 6.3.2)
- Floppy Configuration (see Section 6.3.3)
- SuperIO Configuration (see Section 6.3.4)
- Hardware Health Configuration (see Section 6.3.5)

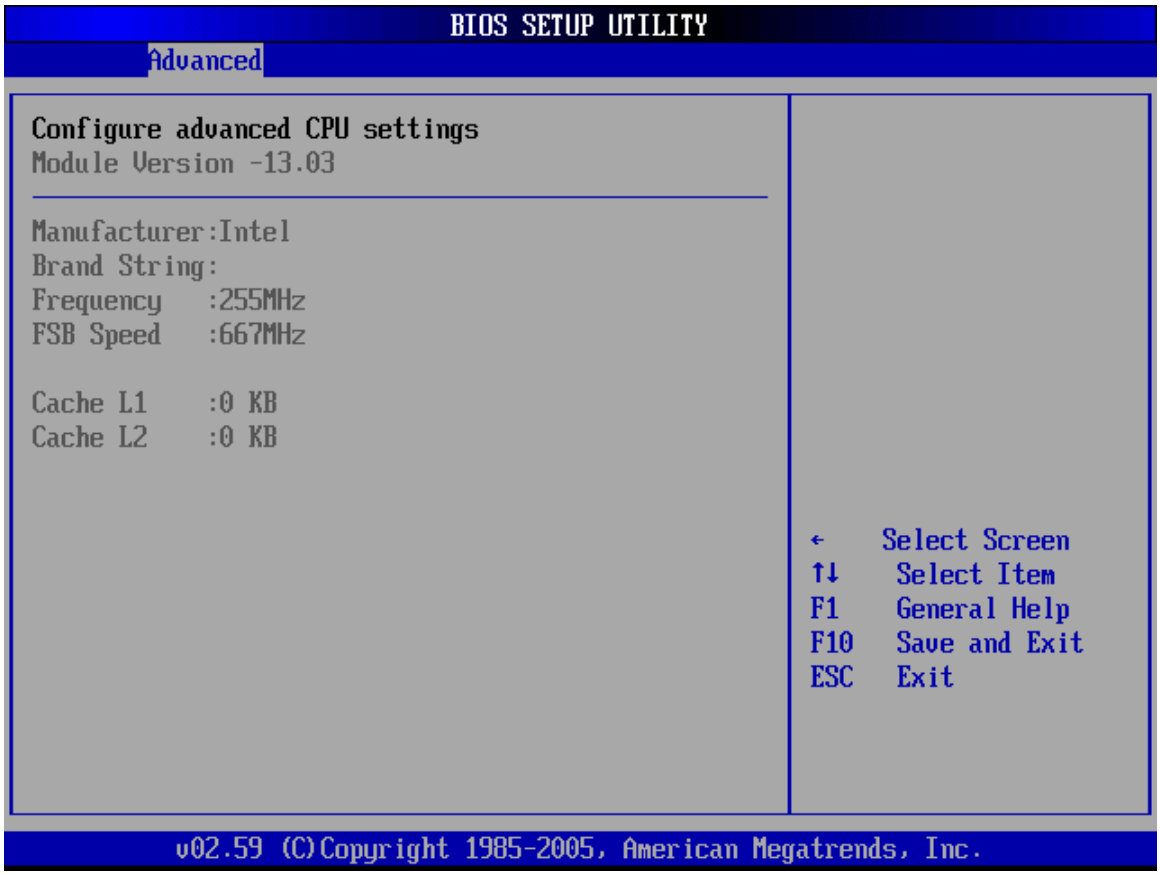
- ACPI Configuration (see Section 6.3.6)
- APM Configuration (See Section 6.3.7)
- Remote Access Configuration (see Section 6.3.8)
- USB Configuration (see Section 6.3.9)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the **CPU Configuration** menu (BIOS Menu 3) to view detailed CPU specifications and configure the CPU.



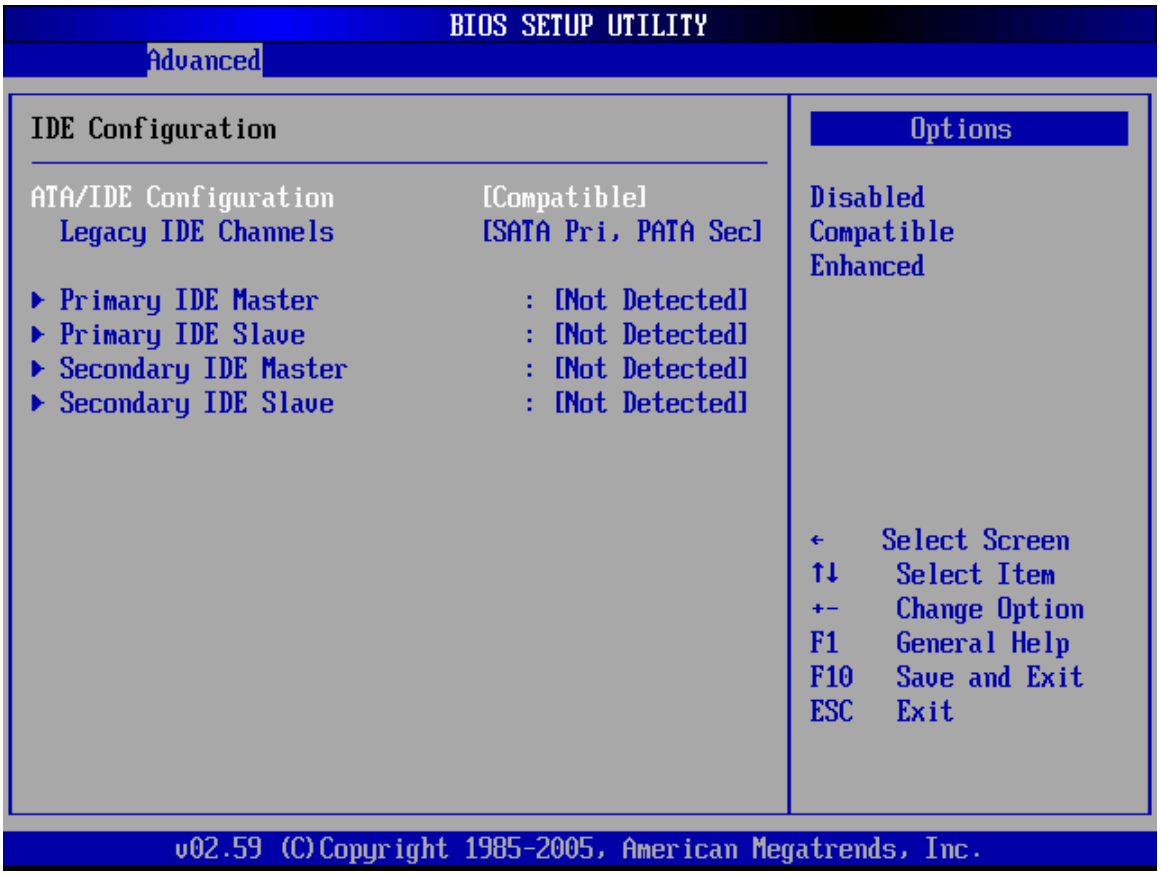
BIOS Menu 3: CPU Configuration

The **CPU Configuration** menu (**BIOS Menu 3**) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Brand String**: Lists the brand name of the CPU being used
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ **ATA/IDE Configurations [Compatible]**

Use the **ATA/IDE Configurations** option to configure the ATA/IDE controller.

➔ **Disabled** Disables the on-board ATA/IDE controller.

➔ **Compatible** Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.

➔ **Enhanced** **DEFAULT** Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA

channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

➔ **Legacy IDE Channels [PATA Pri, SATA Sec]**

➔ **SATA Only**		SATA is configured on the IDE channels
➔ **PATA Pri, SATA Sec**		PATA is the primary IDE channel and SATA is the secondary IDE channel
➔ **SATA Pri., PATA Sec**	**(Default)**	PATA is the secondary channel and SATA is the primary IDE channel
➔ **PATA Only**		PATA is configured on the IDE channels

➔ **IDE Master and IDE Slave**

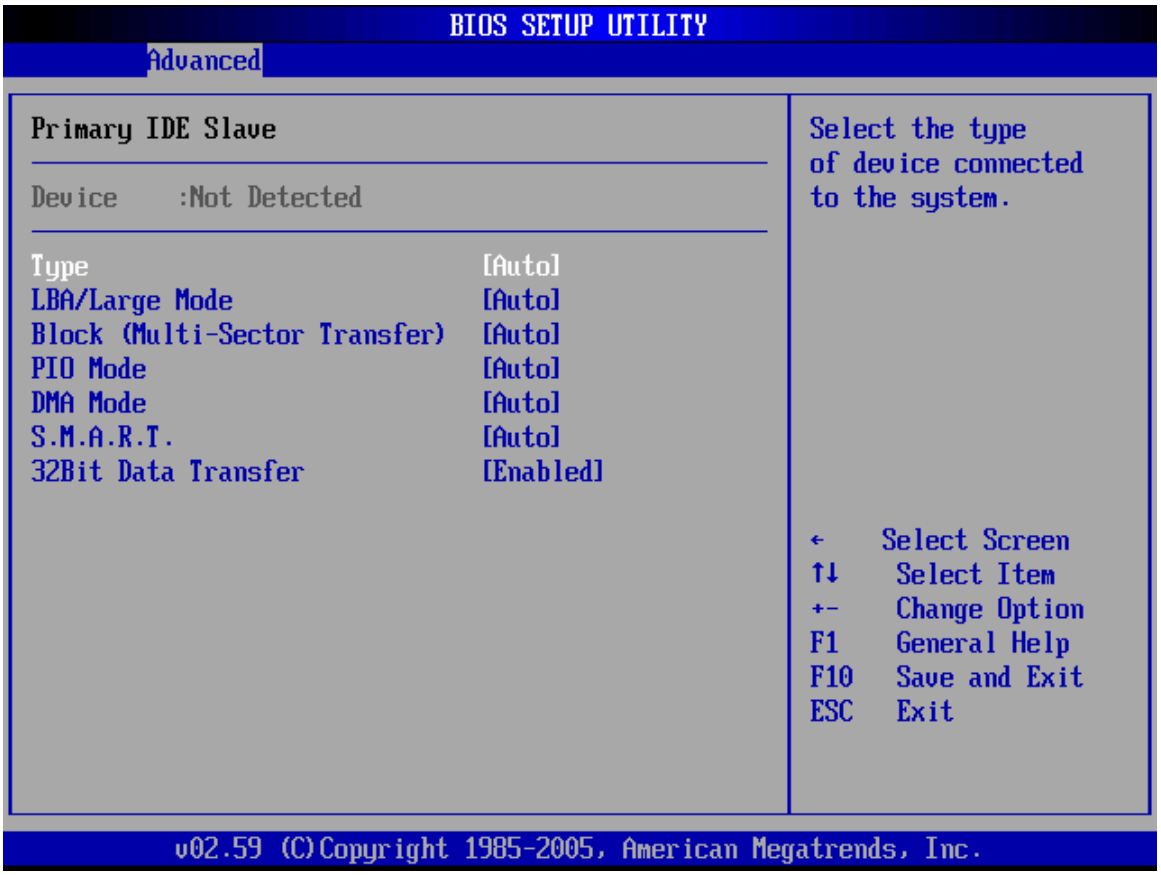
When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

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

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per

interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		The BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.
➔ **ARMD**		This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

➔ **ZIP**

➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled**		The BIOS is prevented from using the LBA mode control on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled**		The BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
➔ **Auto**	**DEFAULT**	The BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto**	**DEFAULT**	BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps
- **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

  (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

- **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

➔	**UDMA1**	Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
➔	**UDMA1**	Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
➔	**UDMA2**	Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
➔	**UDMA3**	Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	**UDMA4**	Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	**UDMA5**	Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔	**Auto**	**DEFAULT**	BIOS auto detects HDD SMART support.
➔	**Disabled**		Prevents BIOS from using the HDD SMART feature.
➔	**Enabled**		Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

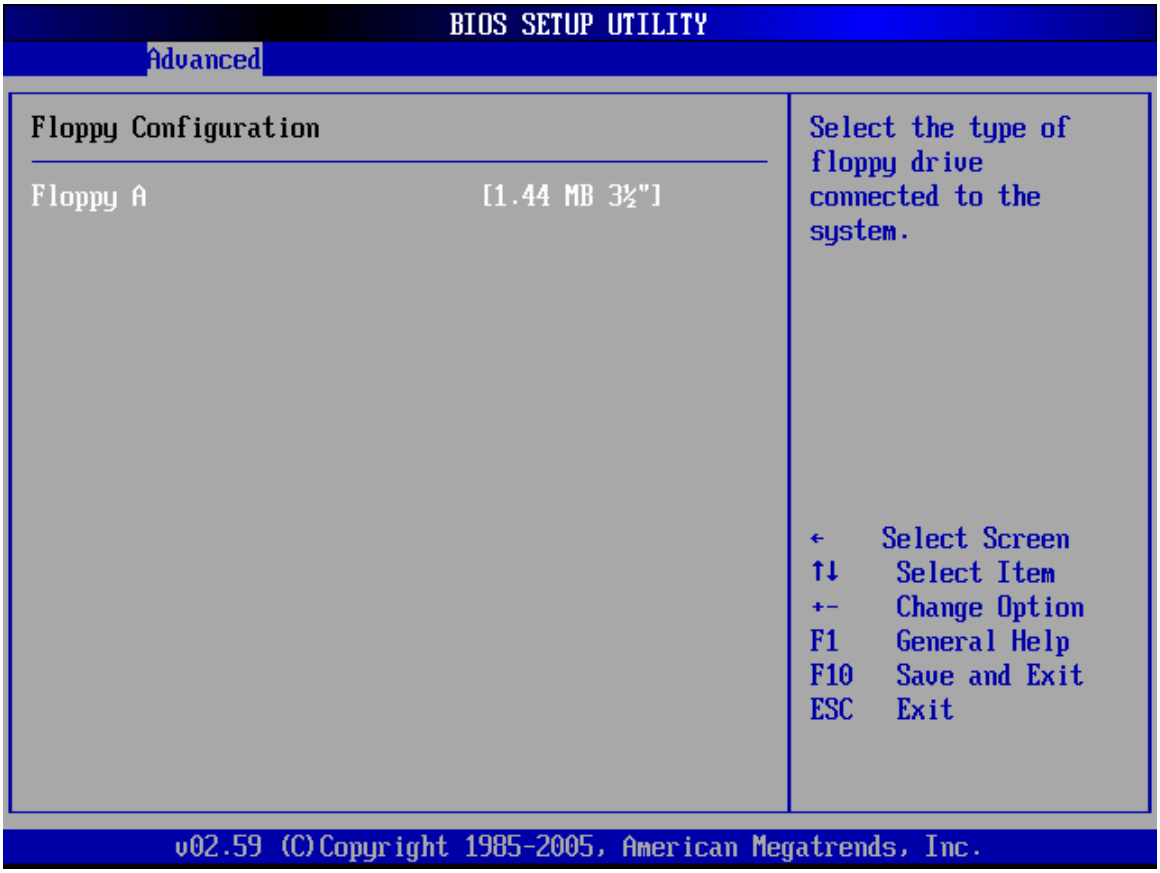
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Floppy Configuration

Use the **Floppy Configuration menu** to configure the floppy disk drive connected to the system.



BIOS Menu 6: Floppy Configuration

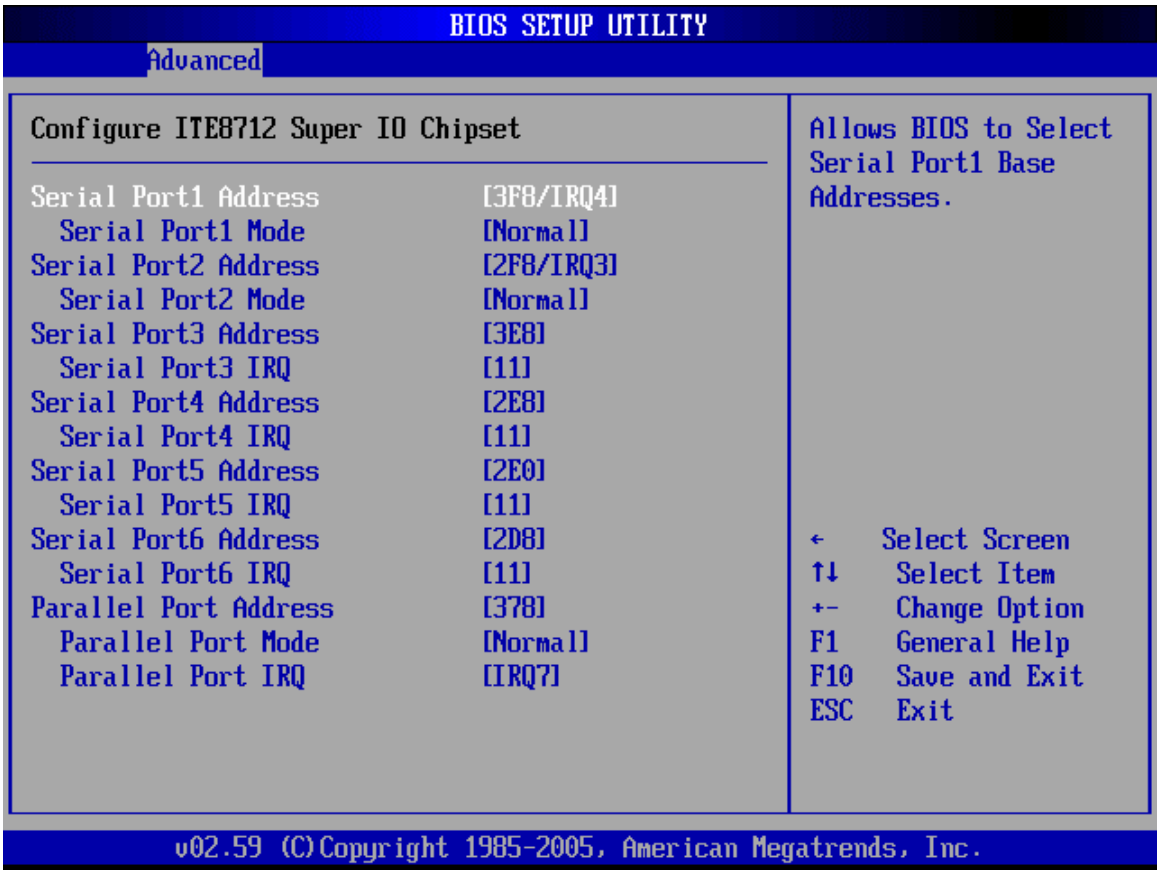
➔ **Floppy A/B**

Use the **Floppy A/B** option to configure the floppy disk drive. Options are listed below:

- Disabled
- 360 KB 51/4”
- 1.2 MB 51/4”
- 720 KB 31/2”
- 1.44 MB 31/2’ **DEFAULT**
- 2.88 MB 31/2”

6.3.4 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 7: Super IO Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled**		No base address is assigned to Serial Port 1
➔ **3F8/IRQ4**	**DEFAULT**	Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
➔ **3E8/IRQ4**		Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port1 Mode [Normal]**

Use the **Serial Port1 Mode** option to select the transmitting and receiving mode for the first serial port.

➔ **Normal**	(Default)	Serial Port 1 mode is normal
➔ **ASK IR**		Serial Port 1 mode is ASK IR

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled**		No base address is assigned to Serial Port 2
➔ **2F8/IRQ3**	**DEFAULT**	Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
➔ **3E8/IRQ4**		Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

➔ **Normal**	**DEFAULT**	Serial Port 2 mode is normal
➔ **IrDA**		Serial Port 2 mode is IrDA
➔ **ASK IR**		Serial Port 2 mode is ASK IR

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the Serial Port 3 base address.

➔ **Disabled**		No base address is assigned to Serial Port 3
➔ **3E8**	**DEFAULT**	Serial Port 3 I/O port address is 3E8
➔ **2E8**		Serial Port 3 I/O port address is 2E8
➔ **2E0**		Serial Port 3 I/O port address is 2E0

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the Serial Port 4 base address.

➔ **Disabled**		No base address is assigned to Serial Port 4
➔ **3E8**		Serial Port 4 I/O port address is 3E8
➔ **2E8**	**DEFAULT**	Serial Port 4 I/O port address is 2E8
➔ **2E0**		Serial Port 4 I/O port address is 2E0

➔ **Serial Port5 Address [2E0]**

Use the **Serial Port5 Address** option to select the Serial Port 5 base address.

➔ **Disabled**		No base address is assigned to Serial Port 5

- ➔ **3E8** Serial Port 5 I/O port address is 3E8
- ➔ **2E8** Serial Port 5 I/O port address is 2E8
- ➔ **2E0** **DEFAULT** Serial Port 5 I/O port address is 2E0
- ➔ **2D8** Serial Port 5 I/O port address is 2D8

➔ **Serial Port6 Address [2D8]**

Use the **Serial Port6 Address** option to select the Serial Port 6 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 6
- ➔ **3E8** Serial Port 6 I/O port address is 3E8
- ➔ **2E8** Serial Port 6 I/O port address is 2E8
- ➔ **2E0** Serial Port 6 I/O port address is 2E0
- ➔ **2D8** **DEFAULT** Serial Port 6 I/O port address is 2D8

➔ **Parallel Port Address [378]**

Use the **Parallel Port Address** option to select the parallel port base address.

- ➔ **Disabled** No base address is assigned to the Parallel Port
- ➔ **378** **DEFAULT** Parallel Port I/O port address is 378
- ➔ **278** Parallel Port I/O port address is 278
- ➔ **3BC** Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

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

- ➔ **Normal** **DEFAULT** The normal parallel port mode is the standard mode for parallel port operation.

➔ **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 Normal 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 Normal mode

➔ **ECP+EPP** The parallel port is also be compatible with EPP and ECP `devices described above

➔ **Parallel Port IRQ [IRQ7]**

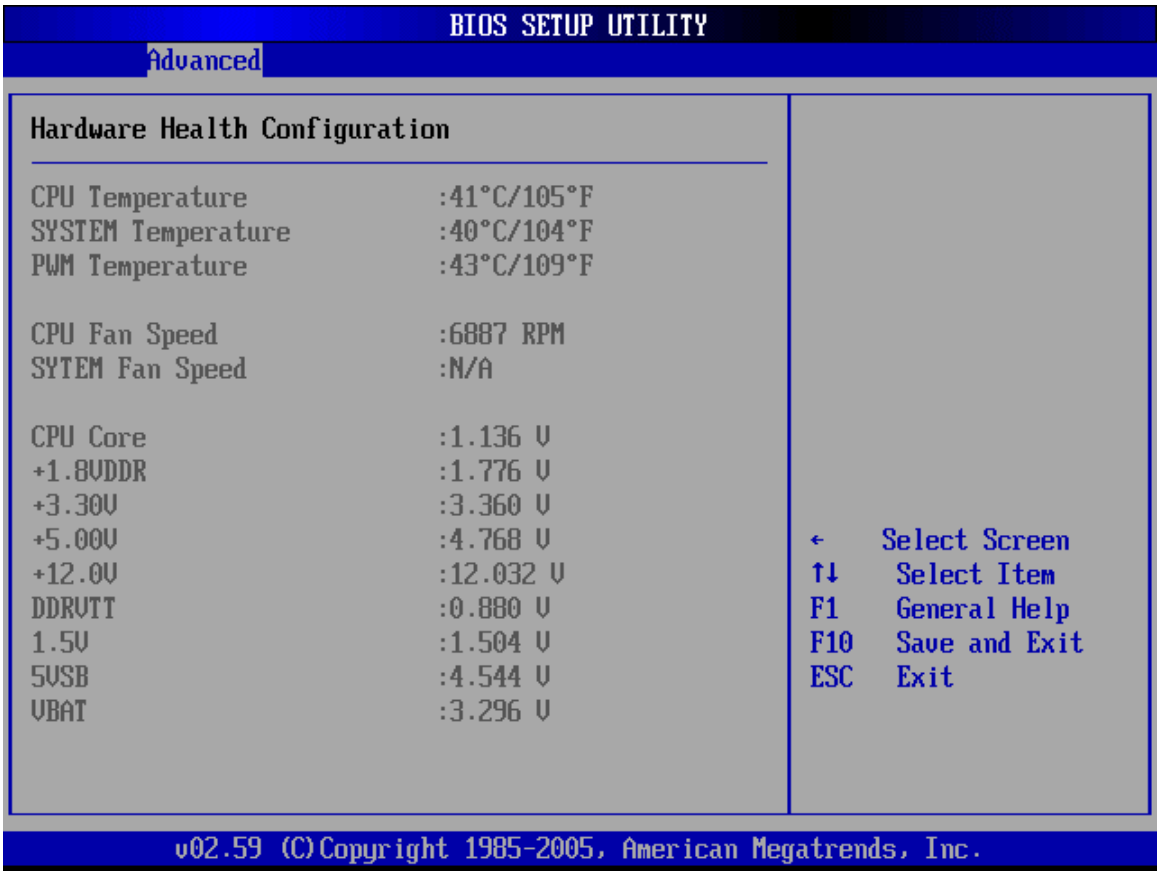
Use the **Parallel Port IRQ** option to set the parallel port interrupt address.

➔ **IRQ5** IRQ5 is assigned as the parallel port interrupt address

➔ **IRQ7** **DEFAULT** IRQ7 is assigned as the parallel port interrupt address

6.3.5 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 8**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 8: Hardware Health Configuration

➔ **Hardware Health Monitoring**

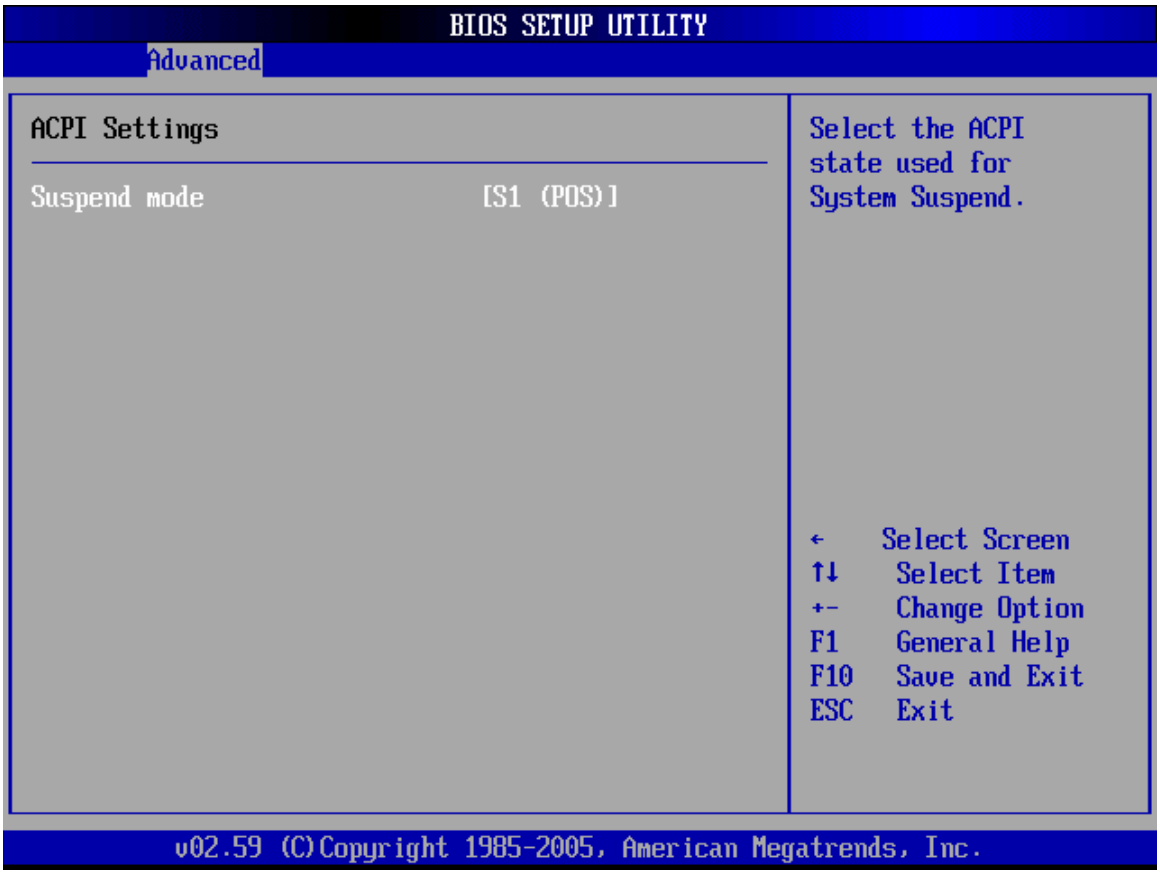
Use the **Hardware Health Configuration** menu (**BIOS Menu 8**) monitor system environmental parameters. The following health parameters are monitored.

- **Temperature monitoring:** The following system temperatures are monitored:
  - CPU Temperature
  - System Temperature
  - PWM Temperature
- **Fan Speed Monitoring:** The following system fan speeds are monitored:
  - CPU Fan Speed
  - System Fan Speed
- **Voltage Monitoring:** The following system voltages are monitored:
  - CPU Core

- +1.8VDDR
- +3.30V
- +5.00V
- +12.0V
- DDRVTT
- 1.5V
- 5VSB
- VBAT

6.3.6 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 9**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 9: ACPI Configuration

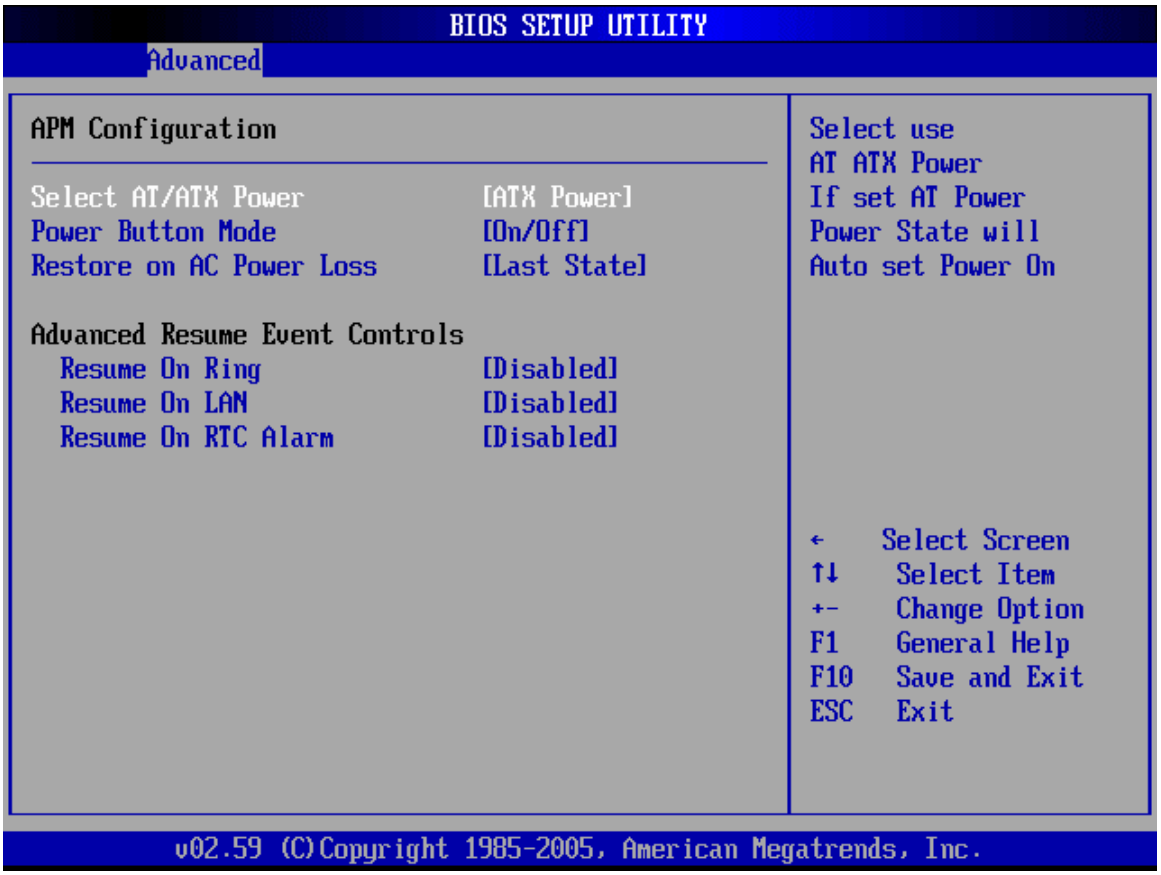
➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔	**S1 (POS)** **DEFAULT**	The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
➔	**S3 (STR)**	The system enters a S3(STR) sleep state. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.
➔	**Auto**	The BIOS automatically selects a sleep state for the system.

6.3.7 APM Configuration

The **APM Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.



BIOS Menu 10:Advanced Power Management Configuration

➔ **Select AT/ATX Power [ATX Power]**

Use the **Select AT/ATX Power** BIOS option to select the power supply that is connected to the system.

➔ **AT Power** An AT power supply is connected to the system and the other APM configuration options are disabled

➔ **ATX Power** **DEFAULT** An ATX power supply is connected to the system

➔ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

- **On/Off** (Default) When the power button is pressed the system is either turned on or off
- **Suspend** When the power button is pressed the system goes into suspend mode

➔ Restore on AC Power Loss [Power Off]

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

- **Power Off** The system remains turned off
- **Power On** The system turns on
- **Last State** (Default) The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ Resume on Ring [Disabled]

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

- **Disabled** (Default) Wake event not generated by an incoming call
- **Enabled** Wake event generated by an incoming call

➔ Resume on LAN [Disabled]

Use the **Resume on LAN** BIOS option to enable activity on the network controller to rouse the system from a suspend or standby state.

- **Disabled** (Default) Wake event not generated by network controller activity

➔ **Enabled** Wake event generated by network controller activity

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC 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

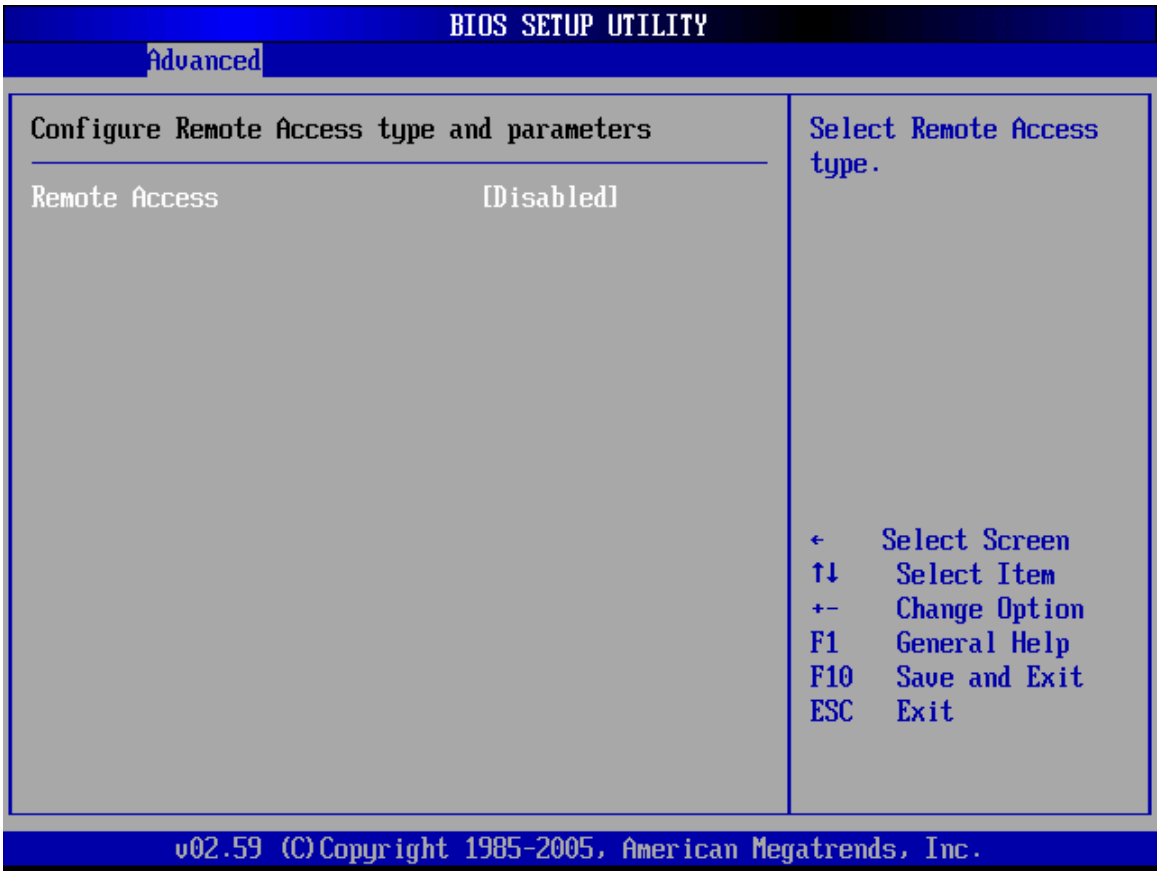
➔ **Enabled** If selected, the following appears with values that can be selected:

- ➔ **RTC Alarm Date (Days)**
- ➔ **System Time**

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

6.3.8 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 11**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 11: Remote Access Configuration [Advanced]

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- ➔ **Serial Port Number**
- ➔ **Serial Port Mode**

➔ **Flow Control**

➔ **Redirection after BIOS POST**

➔ **Terminal Type**

➔ **VT-UTF8 Combo Key Support**

These configuration options are discussed below.

➔ **Serial Port Number [COM1]**

Use the **Serial Port Number** option allows to select the serial port used for remote access.

➔ **COM1**	**DEFAULT**	System is remotely accessed through COM1
➔ **COM2**		System is remotely accessed through COM2

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [2F8h,3]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Flow Control [None]**

Use the **Flow Control** option to report the flow control method for the console redirection application.

➔ **None**	**DEFAULT**	No control flow,
➔ **Hardware**		Hardware is set as the console redirection
➔ **Software**		Software is set as the console redirection

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled**		The console is not redirected after POST
➔ **Boot Loader**		Redirection is active during POST and during Boot Loader
➔ **Always**	**DEFAULT**	Redirection is always active (Some OSes may not work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI

➔ **VT100** The target terminal type is VT100

➔ **VT-UTF8** The target terminal type is VT-UTF8

➔ **VT-UTF8 Combo Key Support [Disabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

➔ **Disabled** **DEFAULT** Disables the VT-UTF8 terminal keys

➔ **Enabled** Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

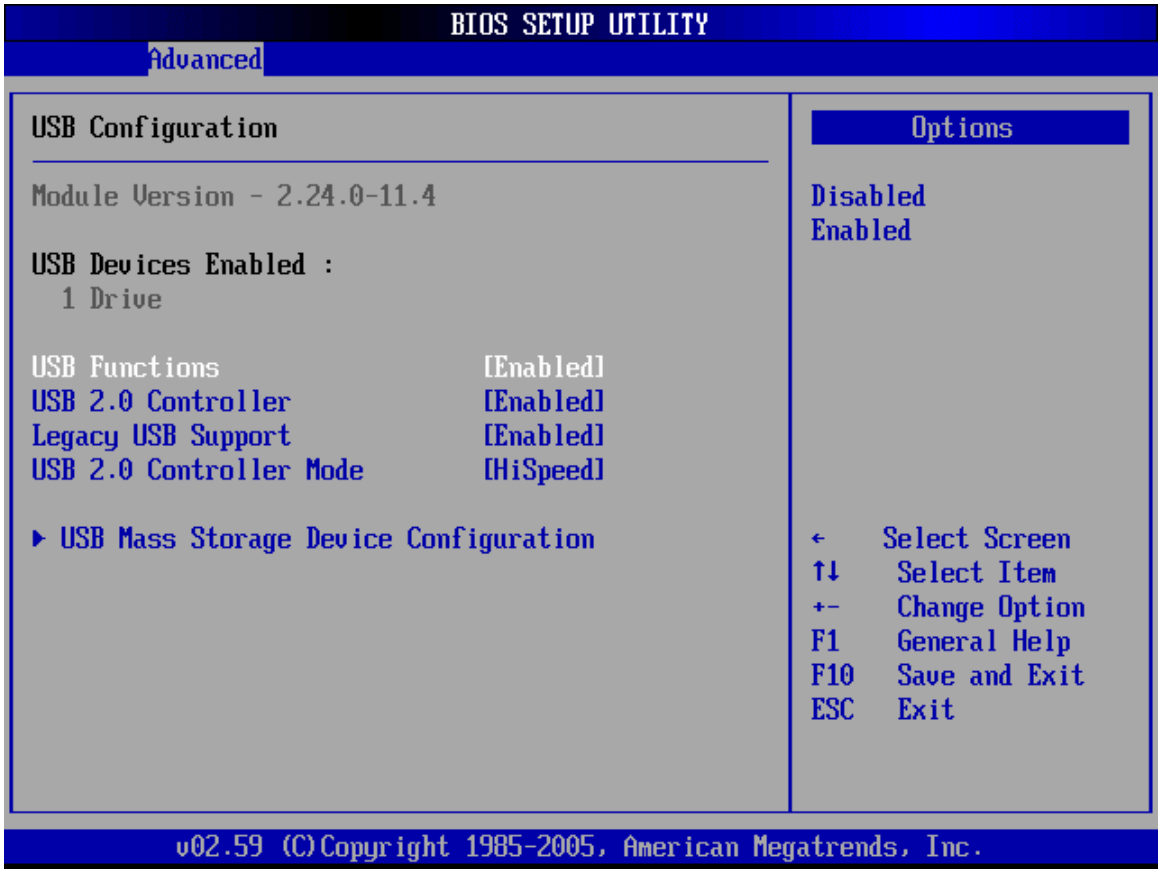
➔ **Sredir Memory Display Delay [Disabled]**

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay **DEFAULT**
- Delay 1 sec
- Delay 2 sec
- Delay 4 sec

6.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 12**) to read USB configuration information and configure the USB settings.



BIOS Menu 12: USB Configuration

➔ **USB Function [Enabled]**

Use the **USB Function** BIOS option to enable or disable a specified number of USB ports. If only two USB ports are being used, disabling the remaining six USB frees up system resources that can be redirected elsewhere.

- ➔ **Disabled** USB function support disabled
- ➔ **Enabled** USB ports are enabled

➔ **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** BIOS option to enable or disable the USB 2.0 controller

- ➔ **Disabled** USB 2.0 controller disabled
- ➔ **Enabled** **DEFAULT** USB 2.0 controller enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- ➔ **Disabled** Legacy USB support disabled
- ➔ **Enabled** **DEFAULT** Legacy USB support enabled

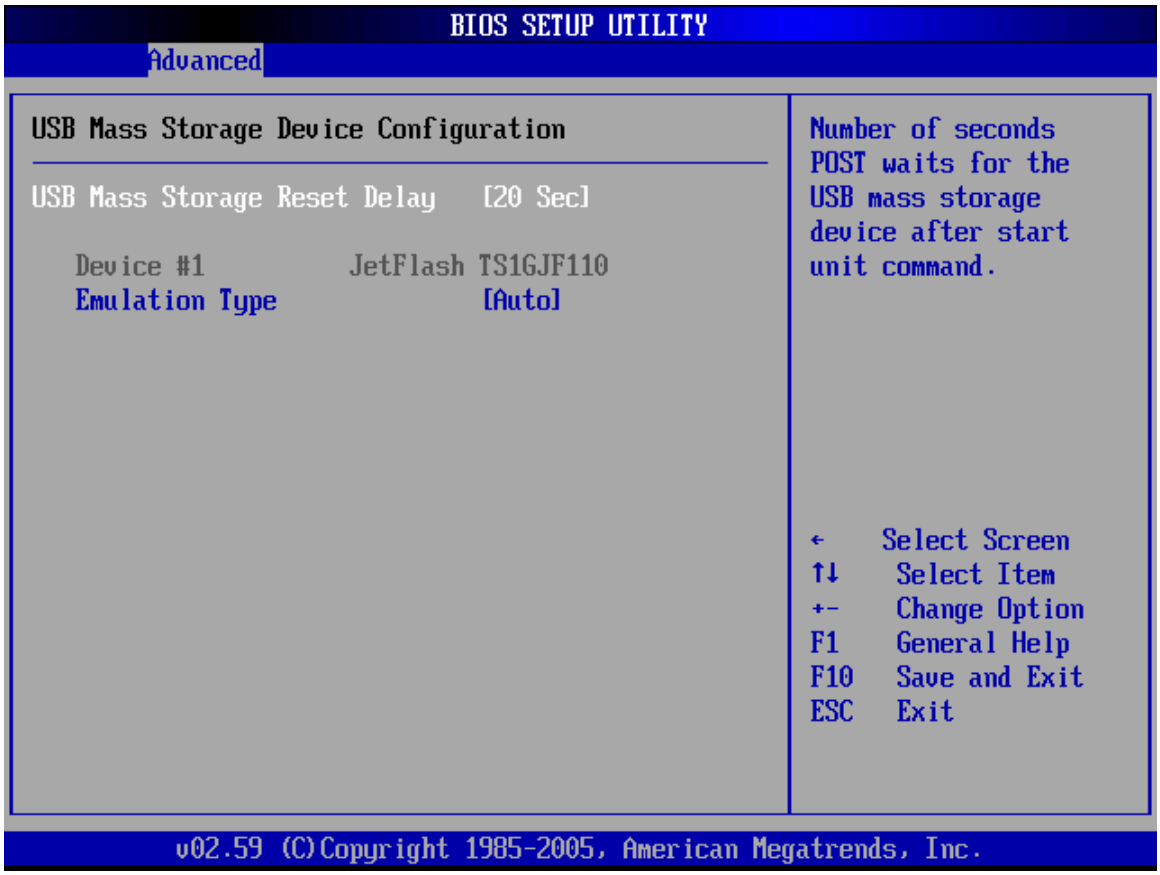
➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

- ➔ **FullSpeed** The controller is capable of operating at 12Mb/s
- ➔ **HiSpeed** **DEFAULT** The controller is capable of operating at 480Mb/s

6.3.9.1 USB Mass Storage Device Configuration

Use the **USB Mass Storage Device Configuration** menu (BIOS Menu 13) to configure USB mass storage class devices.



BIOS Menu 13: USB Mass Storage Device Configuration

➔ **USB Mass Storage Reset Delay [20 Sec]**

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

➔ **10 Sec**		POST waits 10 seconds for the USB mass storage device after the start unit command.
➔ **20 Sec**	**DEFAULT**	POST waits 20 seconds for the USB mass storage device after the start unit command.
➔ **30 Sec**		POST waits 30 seconds for the USB mass storage device after the start unit command.

➔ **40 Sec** POST waits 40 seconds for the USB mass storage device after the start unit command.

➔ **Device ##**

The **Device##** field lists the USB devices that are connected to the system.

➔ **Emulation Type [Auto]**

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

NOTE:

Please note that the device’s formatted type and the emulation type provided by the BIOS must match for a device to boot properly. If both types do not match then device’s behavior is undefined. To make sure both types match, format the device using BIOS INT13h calls after selecting the proper emulation option in BIOS setup. The FORMAT utility provided by Microsoft® MS-DOS®, Microsoft® Windows® 95, and Microsoft® Windows® 98 can be used for this purpose.

➔ **Auto** **DEFAULT** BIOS auto-detects the current USB.

➔ **Floppy** The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively.

➔ **Forced FDD** Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32.

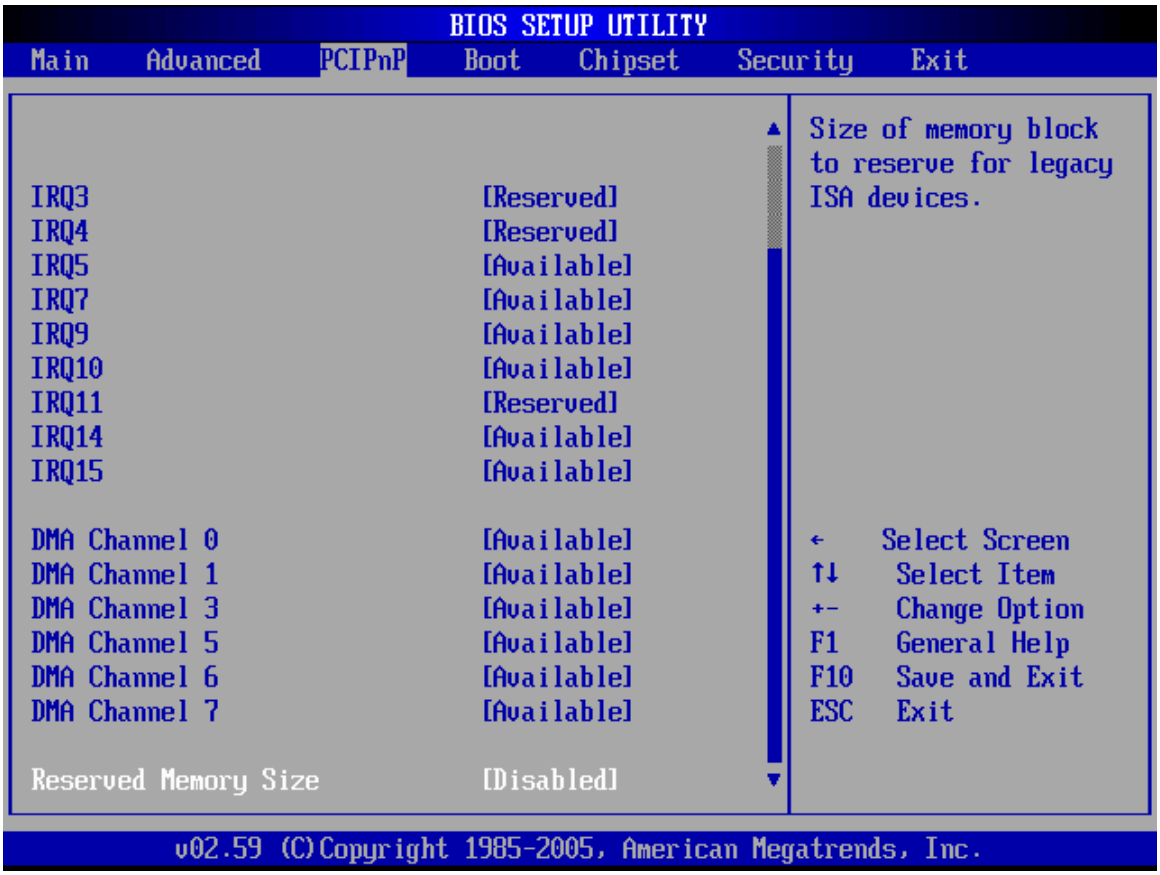
➔ **Hard Disk**	Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above.
➔ **CDROM**	Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option.

6.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 12**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.



BIOS Menu 14: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3

- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** **DEFAULT** The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

➔ **Reserved Memory Size [Disabled]**

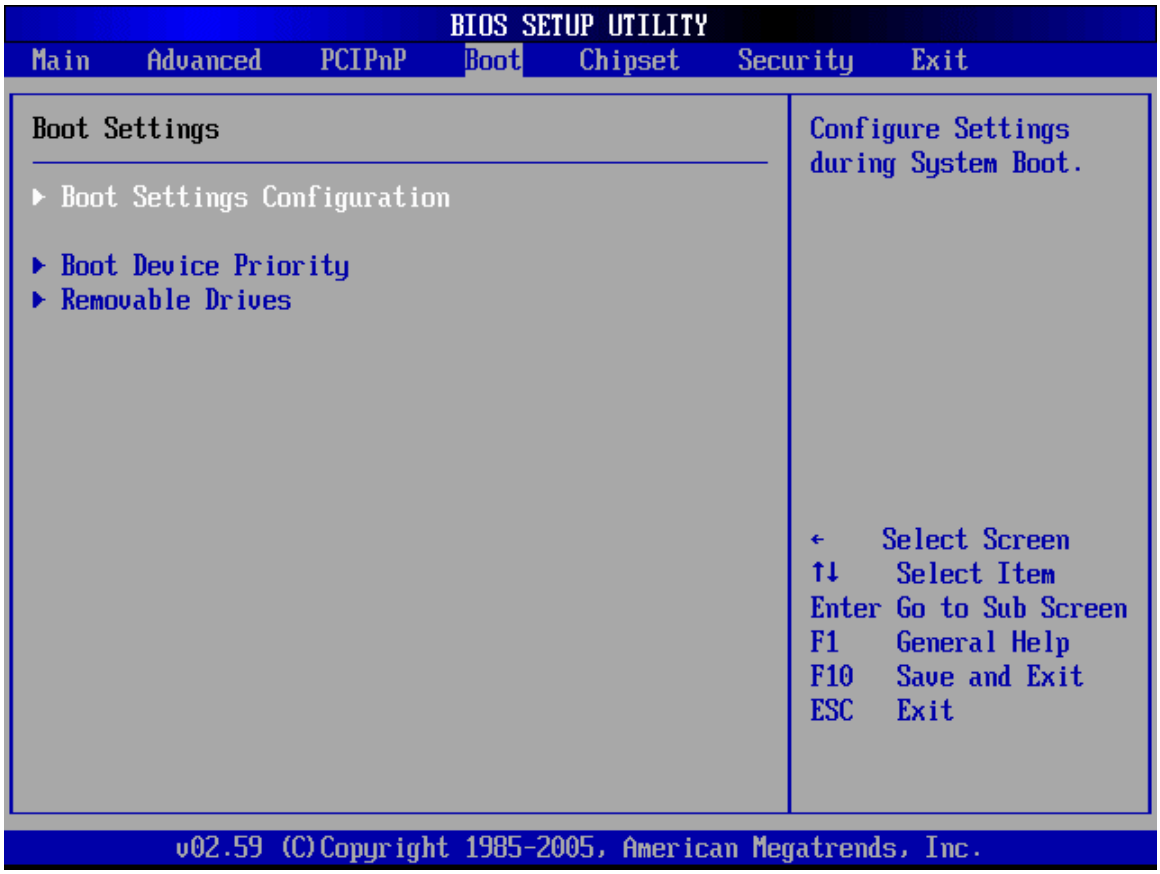
Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔ **Disabled** **DEFAULT** No memory block reserved for legacy ISA devices

- **16K** 16KB reserved for legacy ISA devices
- **32K** 32KB reserved for legacy ISA devices
- **64K** 54KB reserved for legacy ISA devices

6.5 Boot

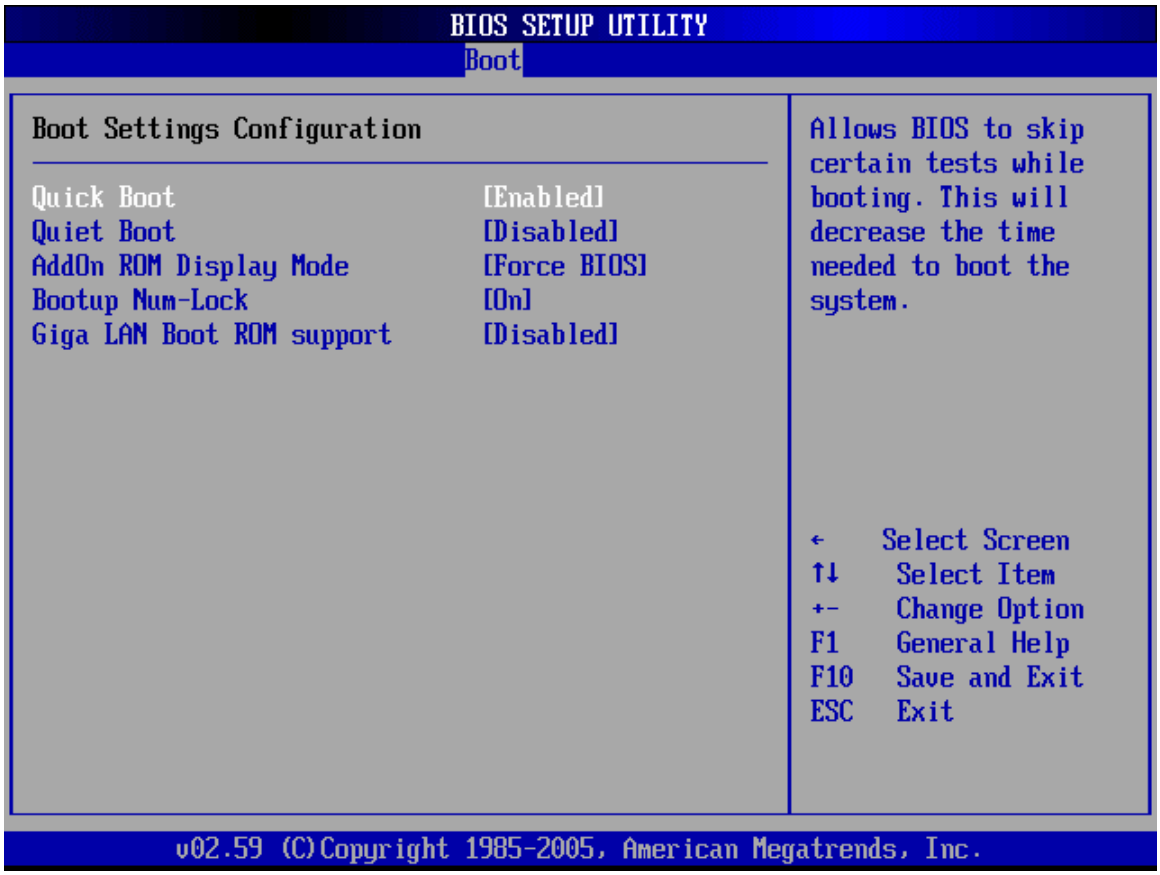
Use the **Boot** menu (**BIOS Menu 15**) to configure system boot options.



BIOS Menu 15: Boot

6.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 15**) to configure advanced system boot options.



BIOS Menu 16: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled** No POST procedures are skipped

➔ **Enabled** **DEFAULT** Some POST procedures are skipped

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled** **DEFAULT** Normal POST messages displayed

➔ **Enabled** OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS**	**DEFAULT**	The system forces third party BIOS to display during system boot.
➔ **Keep Current**		The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Giga LAN Boot ROM Support [Disabled]**

Use the **Giga LAN Boot ROM Support** option to enable the system to be booted from a remote system.

➔ **Disabled**	(Default)	Cannot be booted from a remote system through the

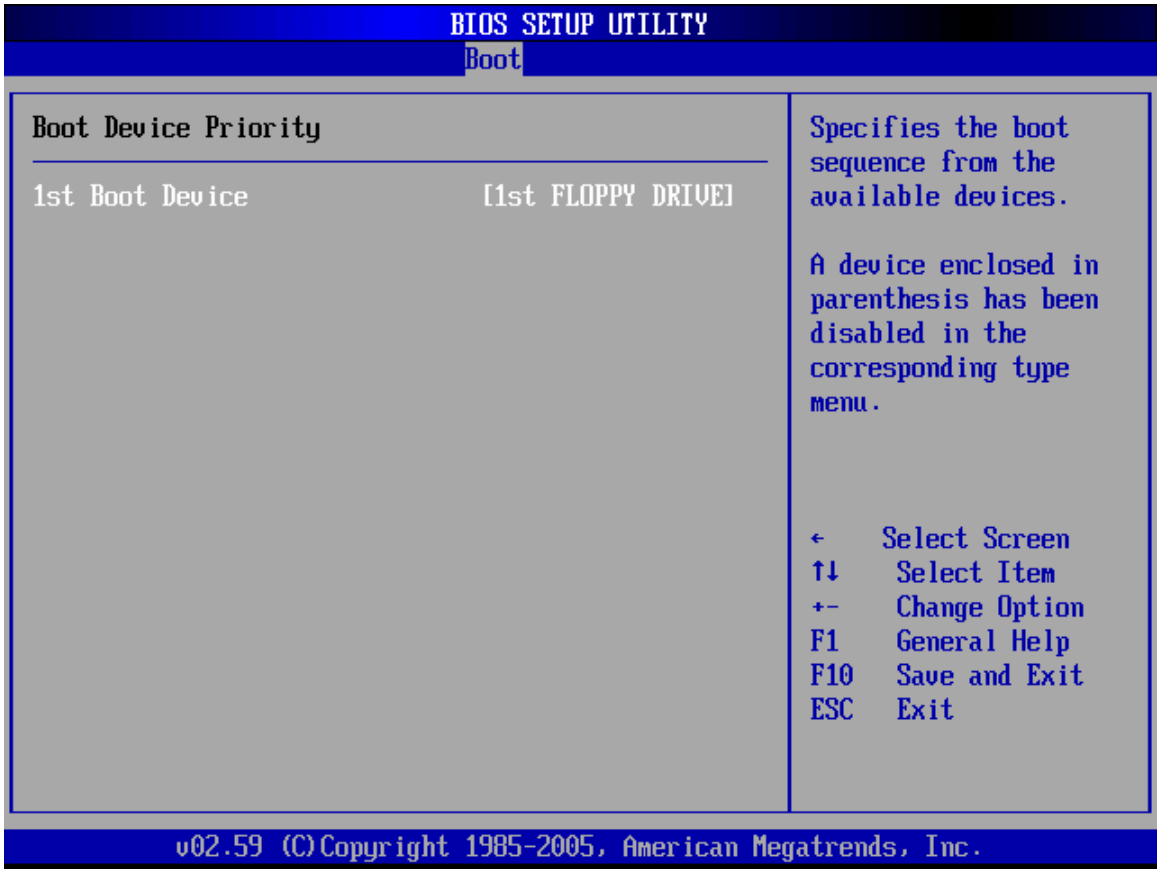
LAN

➔ **Enabled** (Default) Can be booted from a remote system through the LAN

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 17**) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD



BIOS Menu 17: Boot Device Priority Settings

6.5.3 Hard Disk Drives

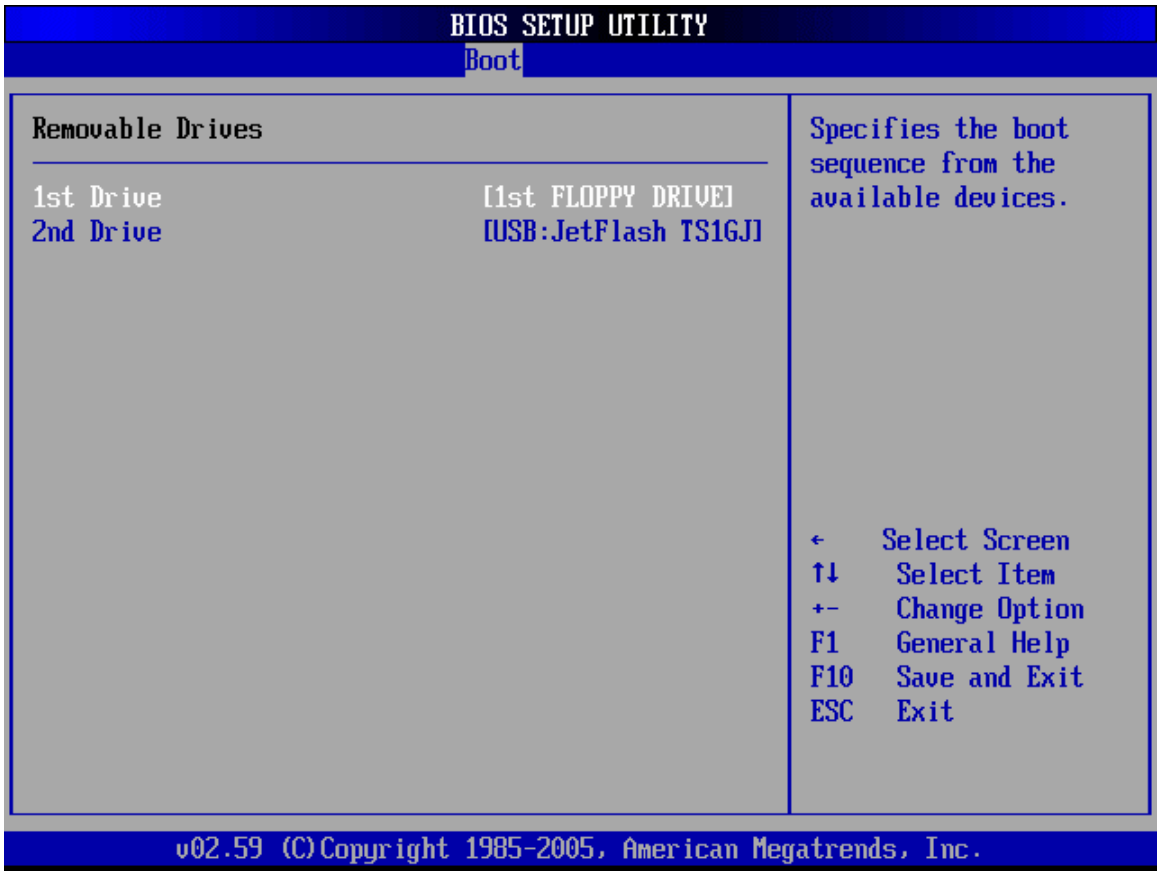
Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

- 1st Drive [HDD: PM-(part number)]
- 2nd Drive [HDD: PS-(part number)]
- 3rd Drive [HDD: SM-(part number)]
- 4th Drive [HDD: SS-(part number)]

NOTE:

Only the drives connected to the system are shown. For example, if only two HDDs are connected only “**1st Drive**” and “**2nd Drive**” are listed.

The boot sequence from the available devices is selected. If the “**1st Drive**” option is selected a list of available HDDs is shown. Select the first HDD the system boots from. If the “**1st Drive**” is not used for booting this option may be disabled.



BIOS Menu 18: Hard Disk Drives

6.5.4 Removable Drives

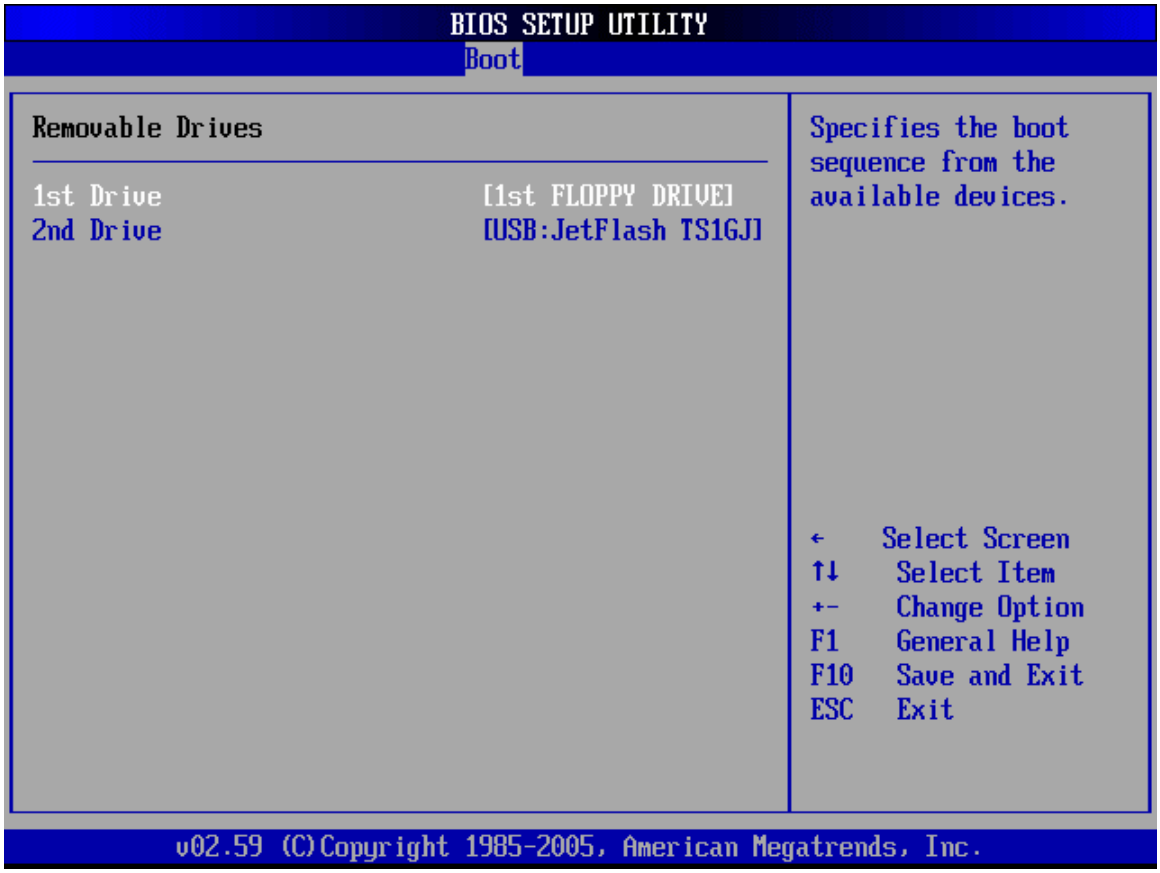
Use the **Removable Drives** menu (**BIOS Menu 19**) to specify the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive [1st FLOPPY DRIVE]
- 2nd Drive [2nd FLOPPY DRIVE]

NOTE:

Only the drives connected to the system are shown. For example, if only one FDD is connected only “**1st Drive**” is listed.

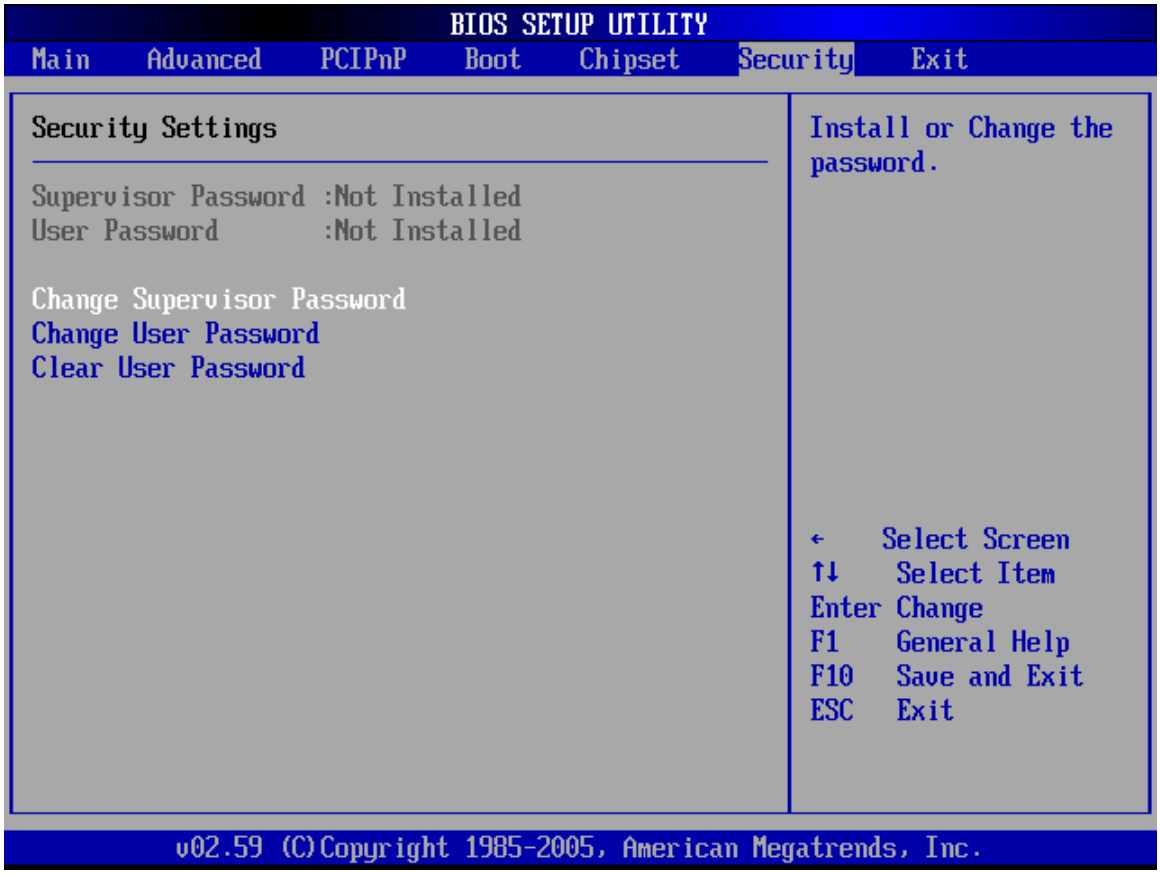
The boot sequence from the available devices is selected. If the “**1st Drive**” option is selected a list of available FDDs is shown. Select the first FDD the system boots from. If the “**1st Drive**” is not used for booting this option may be disabled.



BIOS Menu 19: Removable Drives

6.6 Security

Use the **Security** menu (**BIOS Menu 20**) to set system and user passwords.



BIOS Menu 20: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

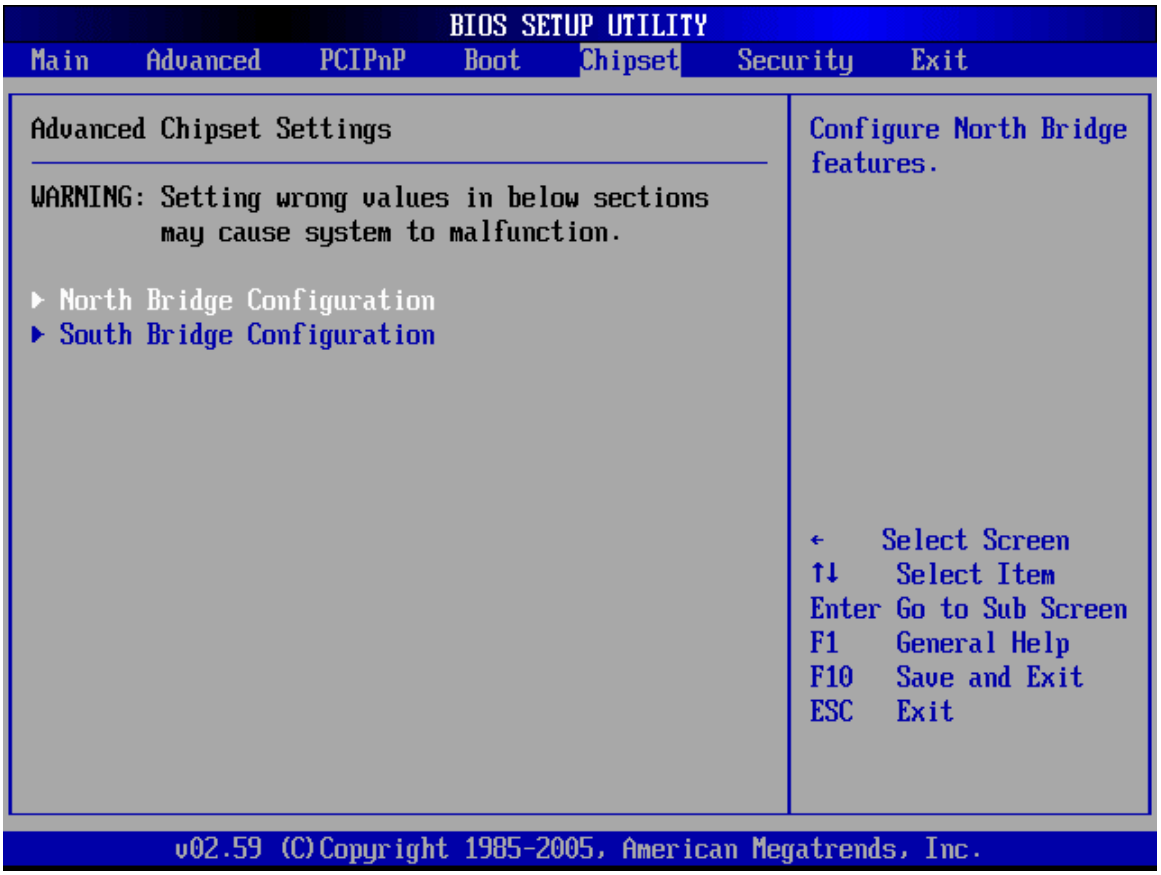
Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

6.7 Chipset

Use the **Chipset** menu (**BIOS Menu 21**) to access the Northbridge and Southbridge configuration menus.

WARNING:

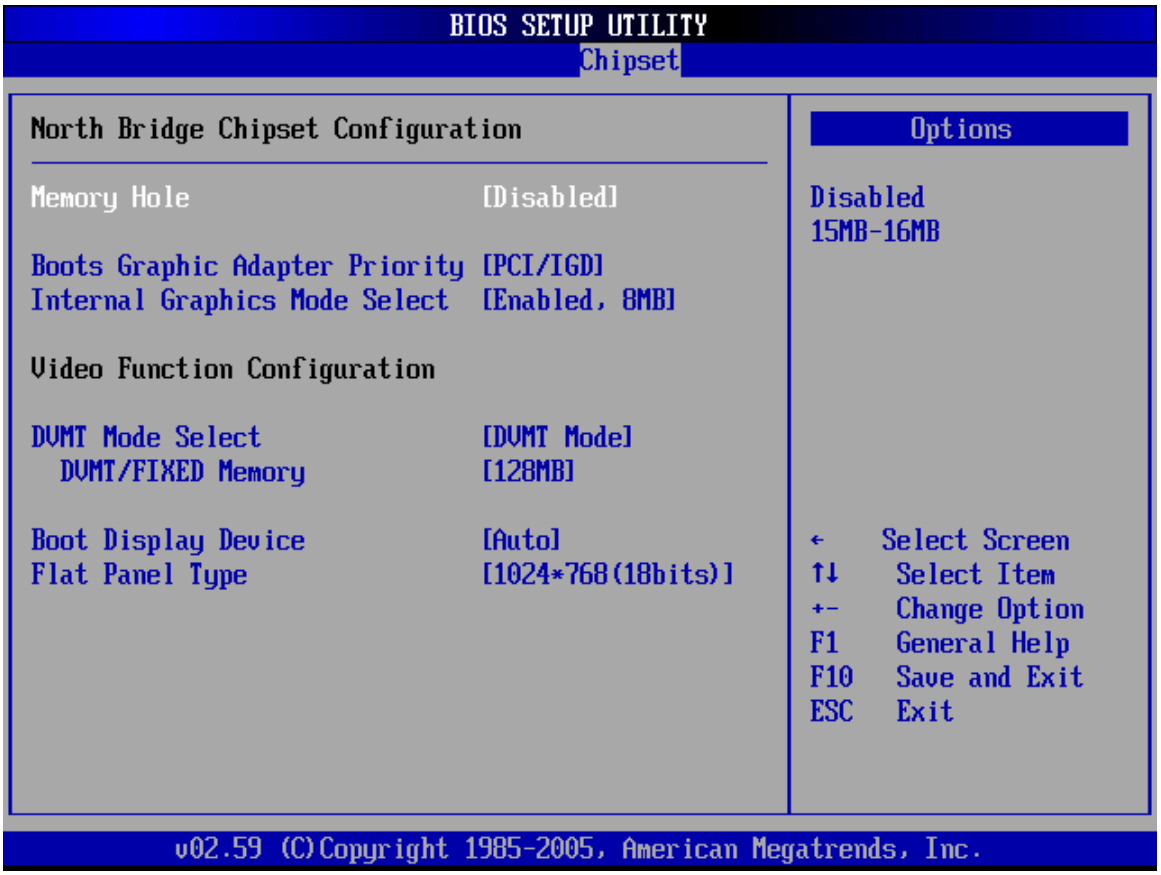
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 21: Chipset

6.7.1 Northbridge Configuration

Use the **Northbridge Configuration** menu (**BIOS Menu 21**) to configure the Northbridge chipset.



BIOS Menu 22: Northbridge Chipset Configuration

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** 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
➔ **15MB – 16MB**		Between 15MB and 16MB of memory is reserved for ISA expansion cards

➔ **Boots Graphics Adapter [PEG/PCI]**

Use the **Boots Graphics Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD **DEFAULT**

➔ **Internal Graphics Mode Select [Enable, 8MB]**

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**		Internal graphics device disabled
➔ **Enable, 1MB**		1MB of memory used by internal graphics device
➔ **Enable, 8MB**	**DEFAULT**	8MB of memory used by internal graphics device

➔ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

➔ **Fixed Mode**		A fixed portion of graphics memory is reserved as graphics memory.
➔ **DVMT Mode**	**DEFAULT**	Graphics memory is dynamically allocated according to the system and graphics needs.
➔ **Combo Mode**		A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

➔ **DVMT/FIXED Memory**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Selec**t option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128MB. Configuration options are listed below.

- 64MB
- 128MB Default
- Maximum DVMT

➔ **Boot Display Device**

Use the **Boot Display Device** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto **DEFAULT**
- CRT1
- LFP
- CRT2
- CRT1+LFP
- CRT1+CRT2

➔ **Flat Panel Type [1024*768(18bits)]**

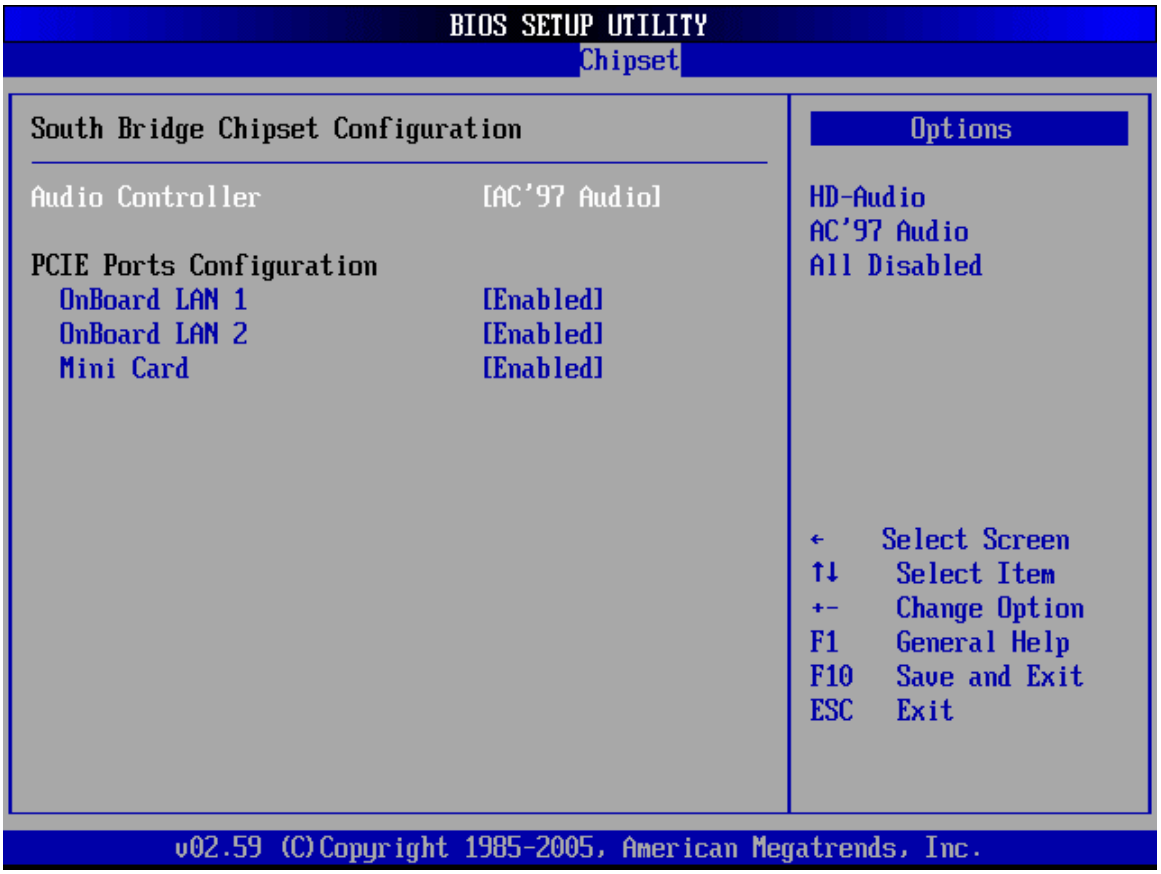
Use the **Flat Panel Type** option to select the type of flat panel connected to the system. Configuration options are listed below.

- 640*480(18bits)
- 800*600(18bits)
- 1024*768(18bits)
- 1280*1024(36bits)
- 1400*1050(36bits)
- 1600*1200(36bits)
- 1024*768(48bits)
- 1440*900(36bits)

- 1440*900(48bits)

6.7.2 Southbridge Chipset Configuration

The **Southbridge Chipset Configuration** menu (**BIOS Menu 23**) allows the Southbridge chipset to be configured.



BIOS Menu 23: Southbridge Chipset Configuration

➔ **Audio Controller [AC`97 Audio]**

The **Audio Controller** option allows selection of the audio controller to use.

➔ **HD-Audio** The Intel® High Definition Audio controller is enabled

➔ **AC`97 Audio** DEFAULT The on-board AC’97 controller is enabled

➔ **All Disabled** All audio controllers are disabled

➔ **On-board LAN1 [Auto]**

The **On-board LAN1** option enables or disables the on-board LAN1.

➔ **Enabled** DEFAULT The on-board LAN1 controller is manually enabled

➔ **Disabled** The on-board LAN1 controller is manually disabled

➔ **On-board LAN2 [Auto]**

The **On-board LAN2** option enables or disables the on-board LAN2.

➔ **Enabled** DEFAULT The on-board LAN2 controller is manually enabled

➔ **Disabled** The on-board LAN2 controller is manually disabled

➔ **Mini Card [Enabled]**

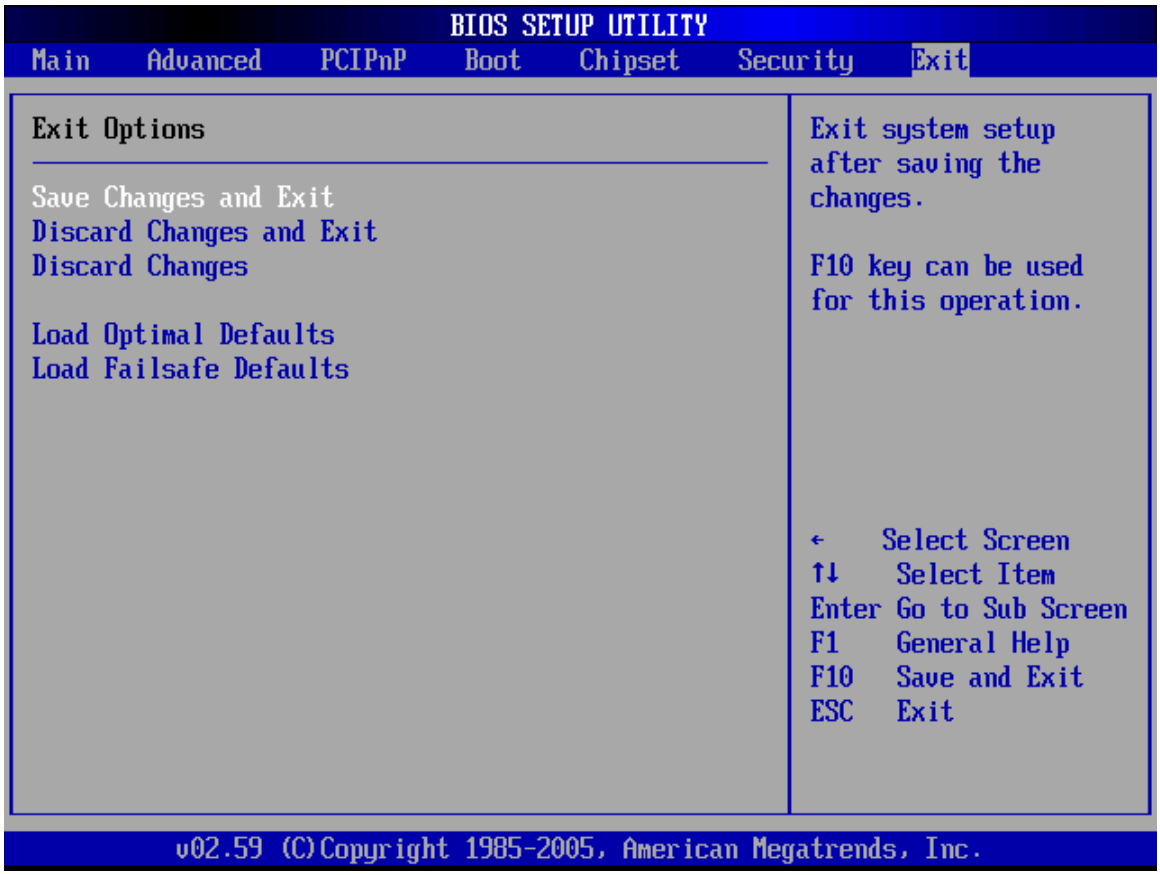
The **Mini Card** option enabled or disables the PCIe Mini card port.

➔ **Enabled** **DEFAULT** The PCIe Mini card is manually enabled

➔ **Disabled** The PCIe Mini card is manually disabled

6.8 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 24:Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the Load Failsafe Defaults option to load failsafe default values for each of the parameters on the Setup menus. F8 key can be used for this operation.

Chapter

7

Driver Installation

7.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system.

- Chipset driver
- VGA driver
- LAN driver
- Audio driver
- SATA driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the NOVA-9452 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

Step 2: The starts up automatically

Step 3: Select NOVA-9452 from the initial menu shown in **Figure 7-1**.

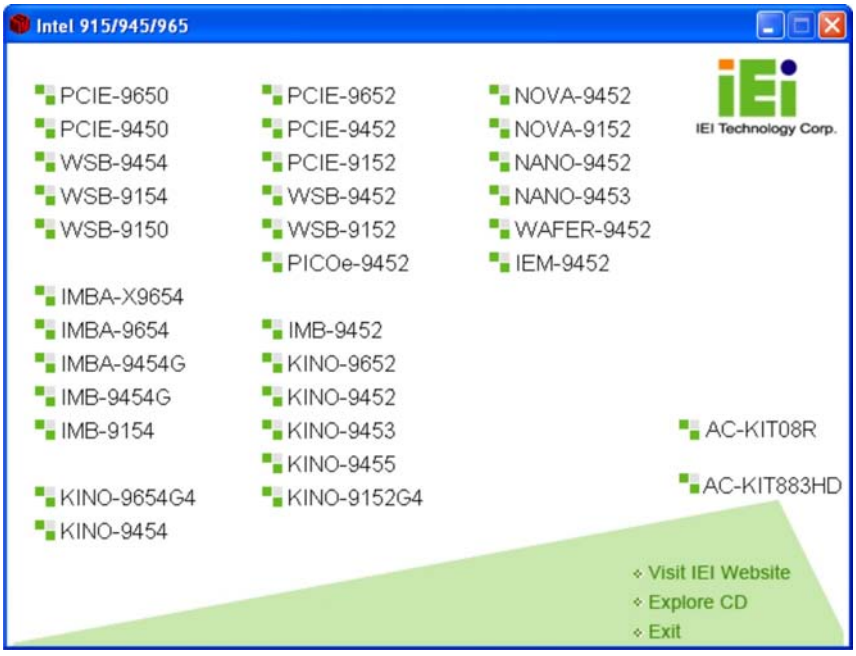


Figure 7-1: Introduction Screen

Step 4: A new screen with a list of available drivers appears (**Figure 7-2**).

Figure 7-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 7-2**.

7.3 Chipset Driver Installation

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

Step 1: Select the INF driver from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-3**).

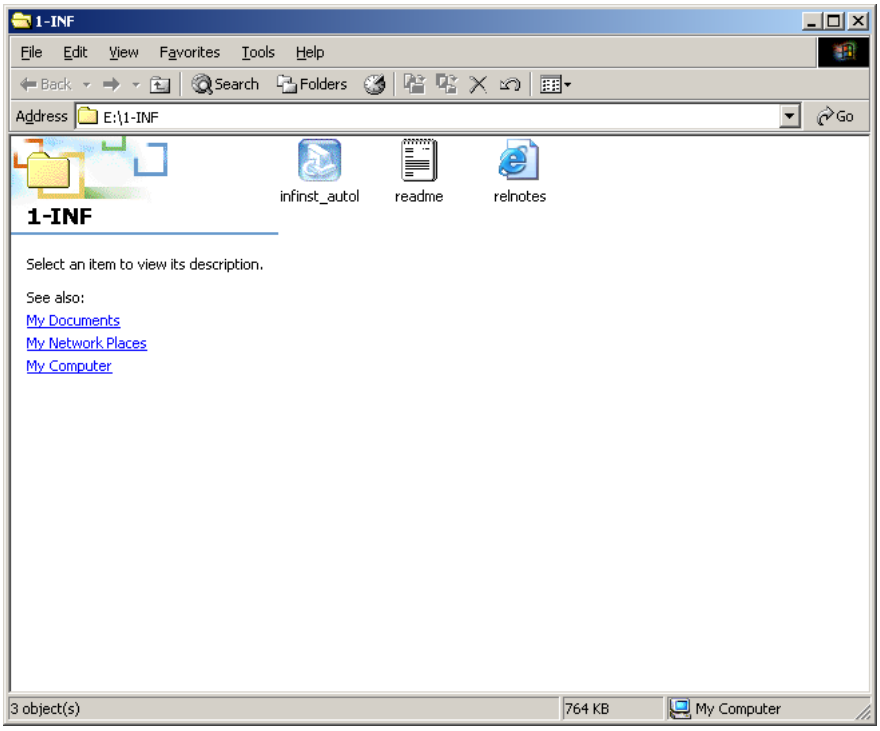


Figure 7-3: Chipset Driver Installation Program

Step 3: Double click the infinst_Autol icon in **Figure 7-3**.

Step 4: The welcome screen in **Figure 7-4** appears.

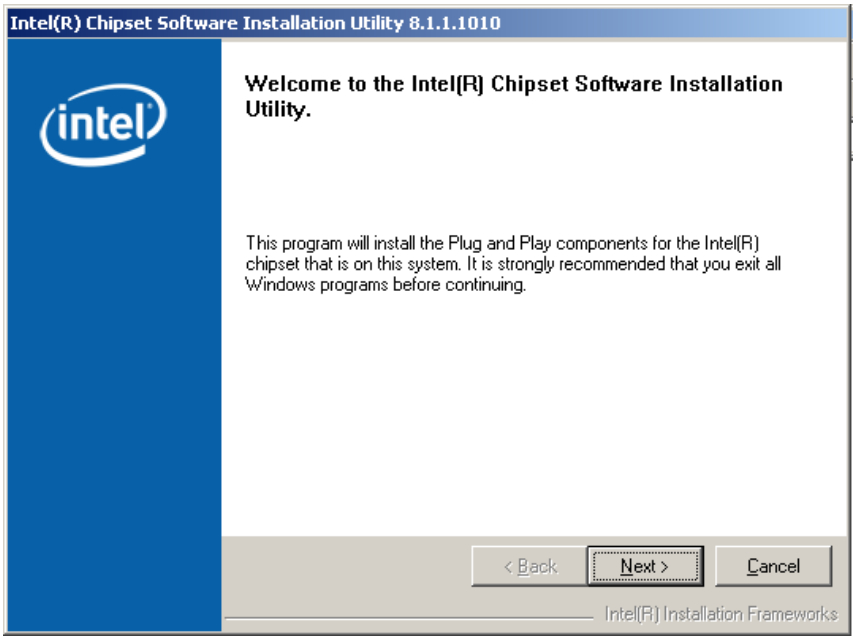


Figure 7-4: Chipset Driver Installation Welcome Screen

Step 5: Click **NEXT** in **Figure 7-4** to continue the installation process.

Step 6: The license agreement in **Figure 7-5** appears.

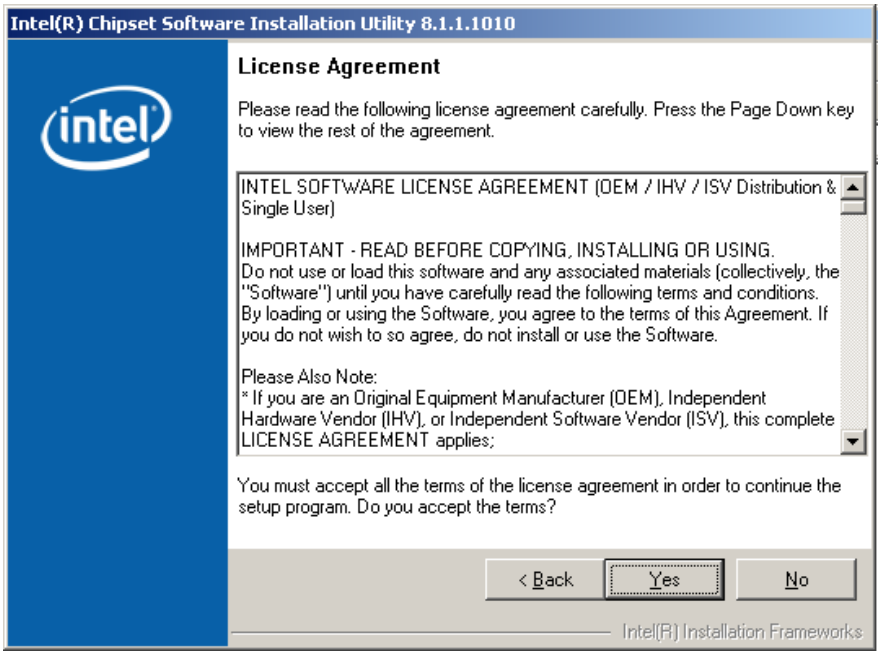


Figure 7-5: Chipset Driver Installation License Agreement

Step 7: Click **YES** to continue the setup.

Step 8: The Readme file in **Figure 7-6** appears.

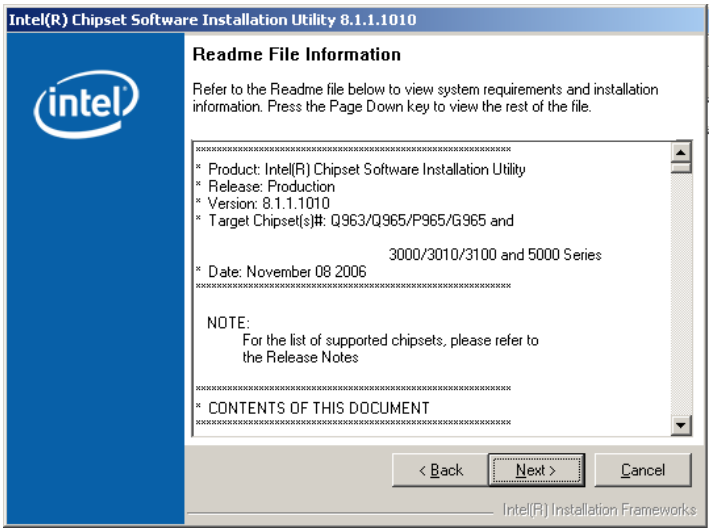


Figure 7-6: Chipset Driver Readme File Information

Step 9: Click **NEXT** in **Figure 7-6** to start the driver installation.

Step 10: After the driver installation process is complete, a confirmation screen (**Figure 7-7)** appears.

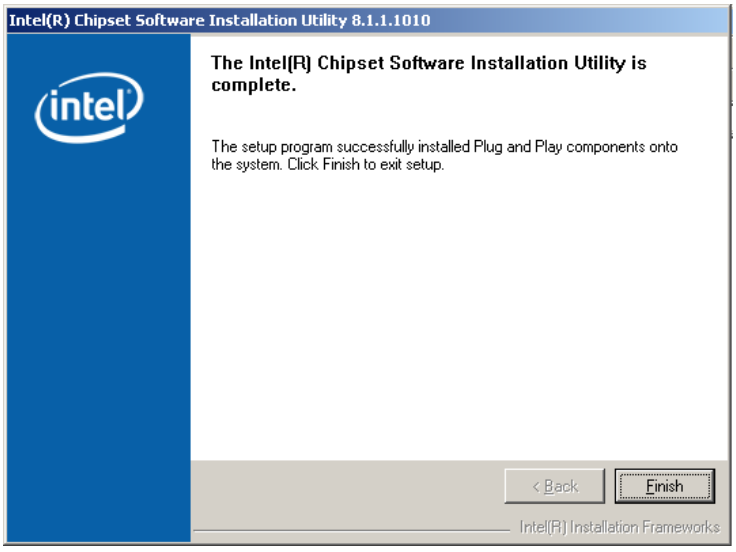


Figure 7-7: Chipset Driver Installation Complete

7.4 Intel Graphics Media Accelerator Driver

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

Step 1: Select the VGA driver from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-8**).

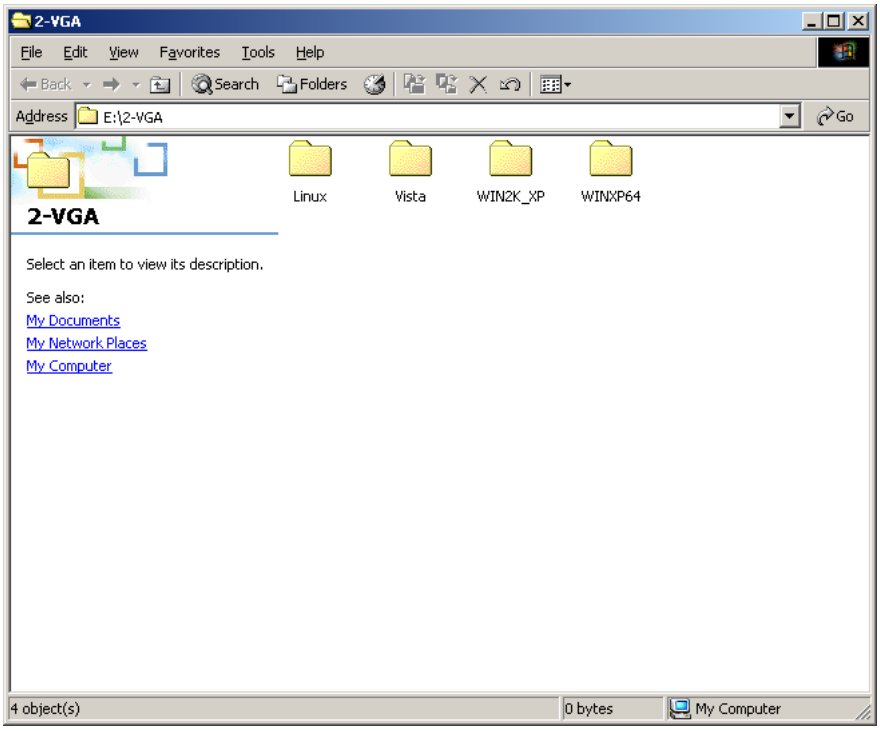


Figure 7-8: Select the Operating System

Step 3: Select the operating system from those shown in **Figure 7-8**.

Step 4: A new window appears (**Figure 7-9**).

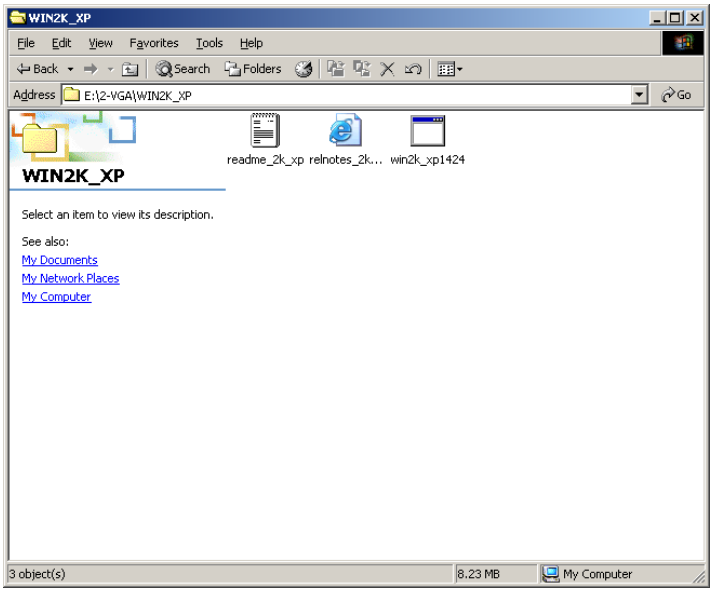


Figure 7-9: VGA Driver

Step 5: Click the installation program icon in **Figure 7-9**.

Step 6: The Readme information file shown in **Figure 7-10** appears.

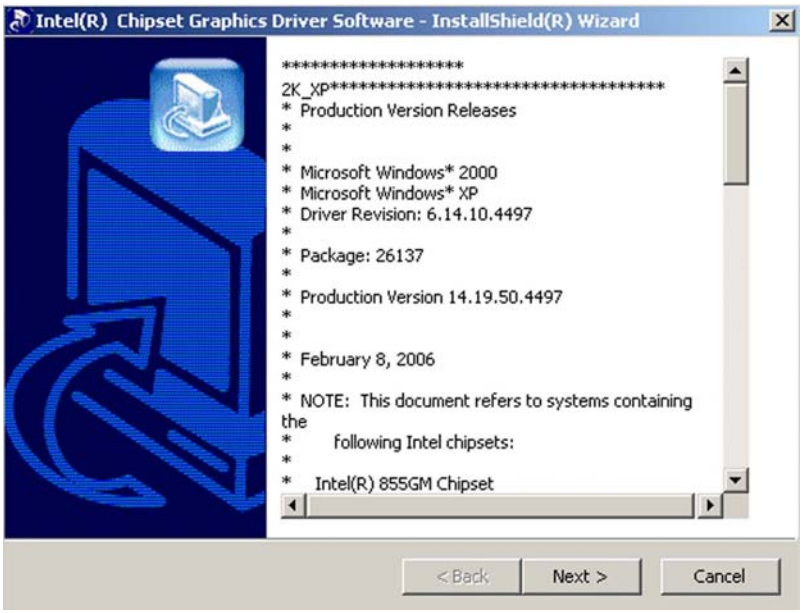


Figure 7-10: GMA Driver Readme File

Step 7: Click **NEXT** to extract the GMA driver files. See **Figure 7-11**.

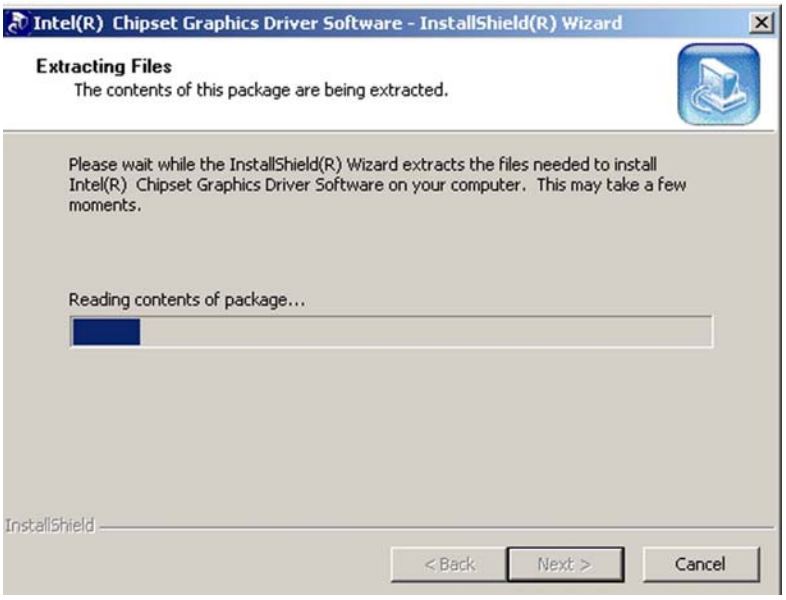


Figure 7-11: GMA Driver File Extraction

Step 8: The welcome screen shown in **Figure 7-12** appears.

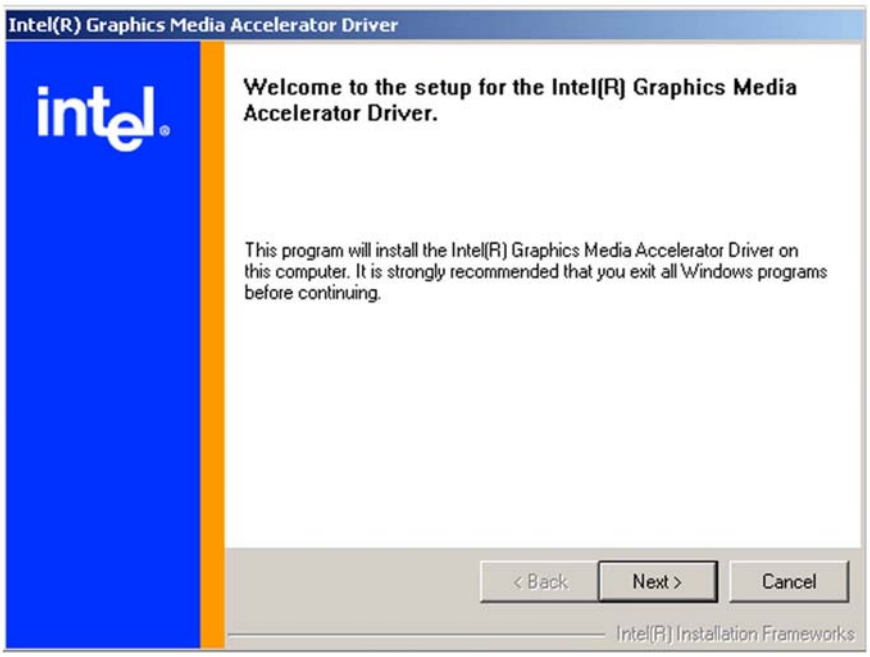


Figure 7-12: GMA Driver Installation Welcome Screen

Step 9: To continue the installation process, click **NEXT**.

Step 10: The license agreement in **Figure 7-13** appears.

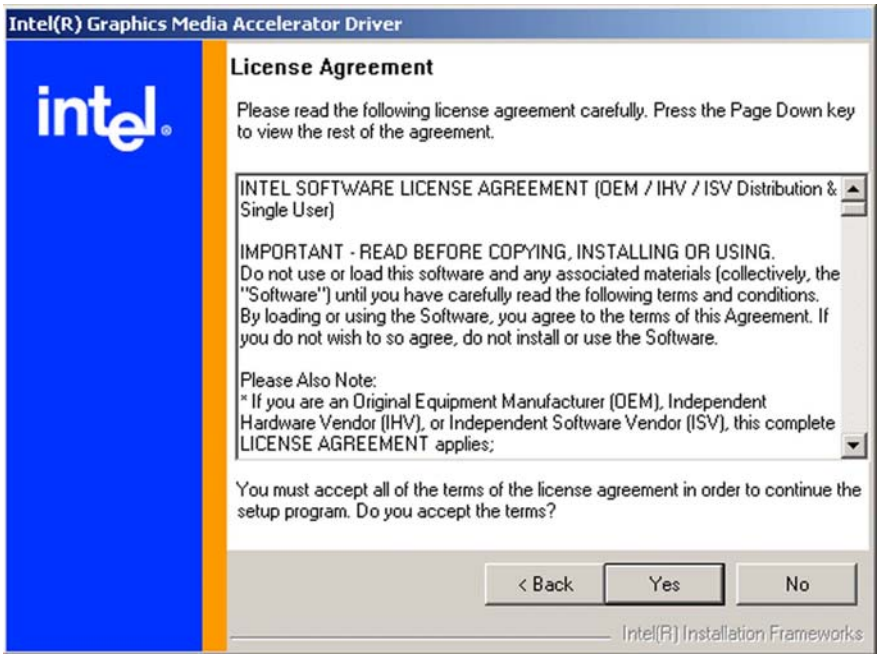


Figure 7-13: GMA Driver License Agreement

Step 11: Click the **YES** in **Figure 7-13** to continue.

Step 12: The installation notice shown in **Figure 7-14** appears.

Figure 7-14: GMA Driver Installing Notice

Step 13: A confirmation screen shown in **Figure 7-15** appears.

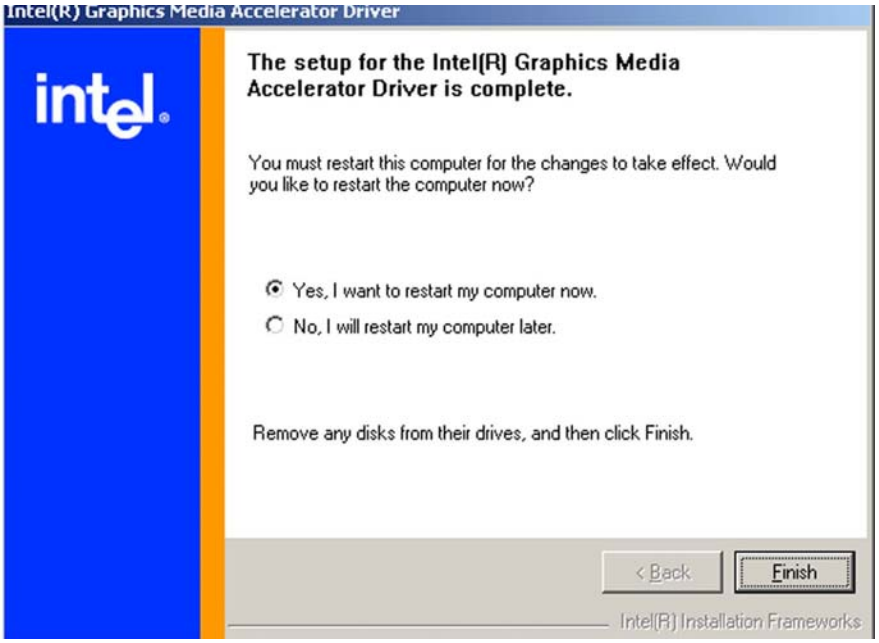


Figure 7-15: GMA Driver Installation Complete

Step 14: After selecting when to restart the computer in **Figure 7-15**, click **FINISH**.

7.5 Broadcom LAN Driver (for GbE LAN) Installation

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

Step 1: Open **Windows Control Panel (Figure 7-16)**.

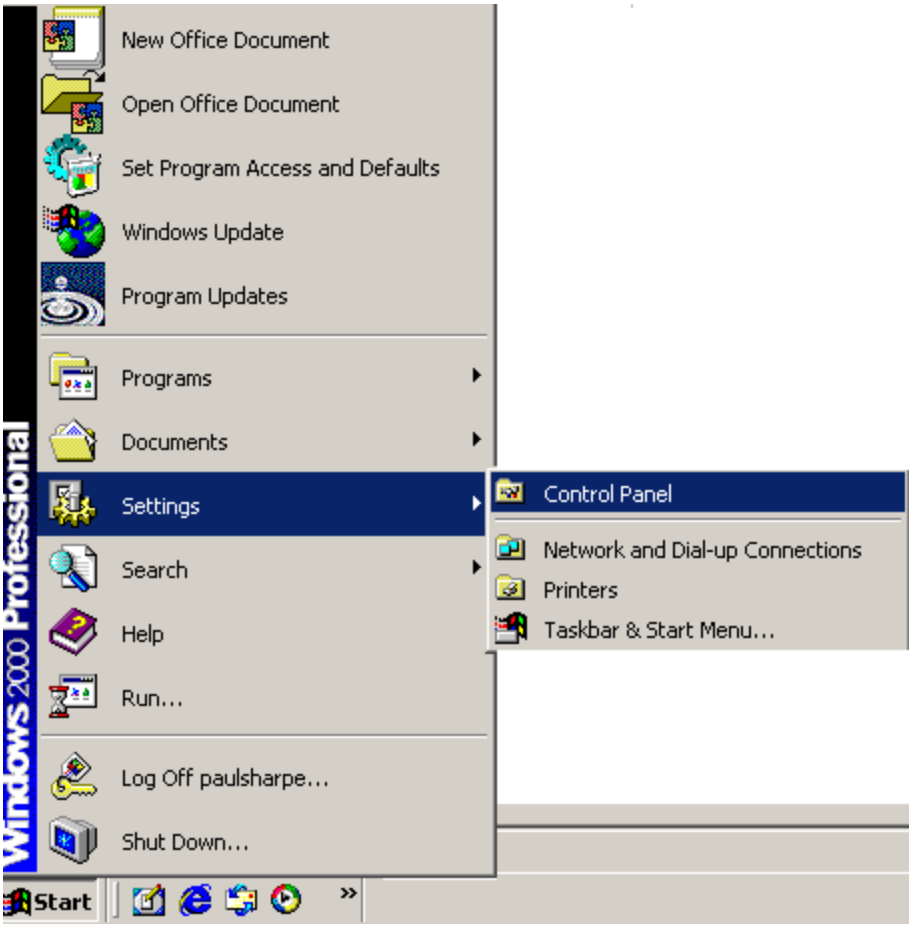


Figure 7-16: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 7-17**).

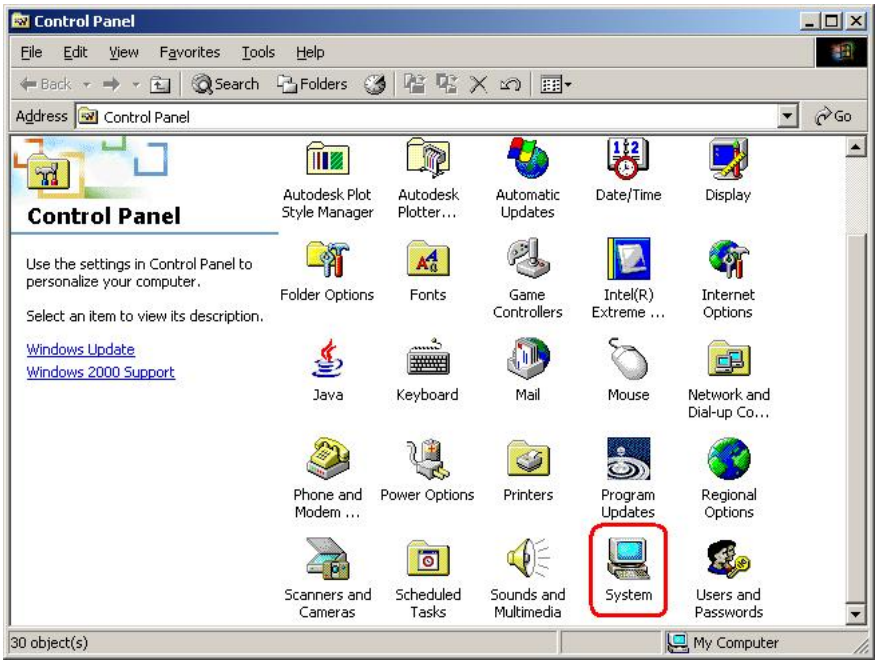


Figure 7-17: Double Click the System Icon

Step 3: Double click the **Device Manager** tab (**Figure 7-18**).

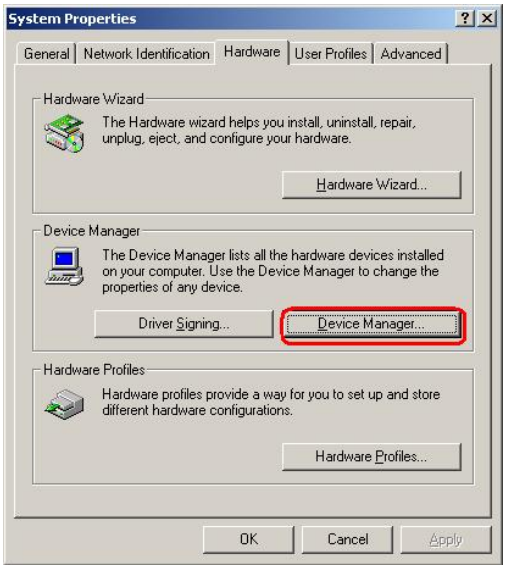


Figure 7-18: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 7-19**).

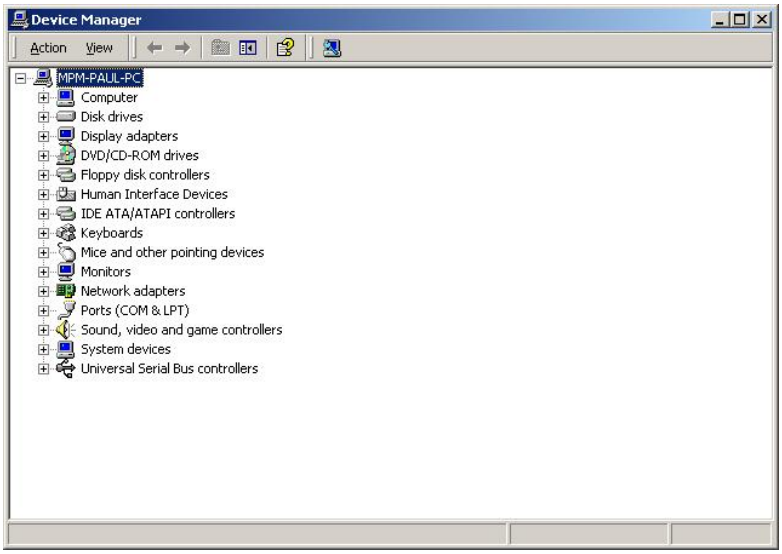


Figure 7-19: Device Manager List

Step 5: Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 7-20**). Click **NEXT** to continue.

Figure 7-20: Search for Suitable Driver

Step 7: Select “**Specify a Location**” in the **Locate Driver Files** window (**Figure 7-21**). Click **NEXT** to continue.

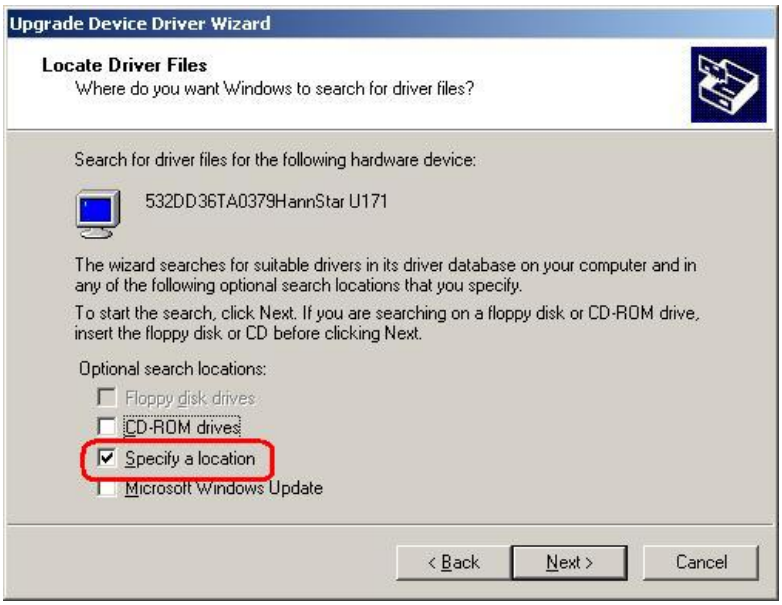


Figure 7-21: Locate Driver Files

Step 8: Select the proper OS folder under the “**X:\3-LAN\BROADCOM BCM57xx Drivers**” directory (**Figure 7-22**) in the location browsing window, where “**X:\”** is the system CD drive.

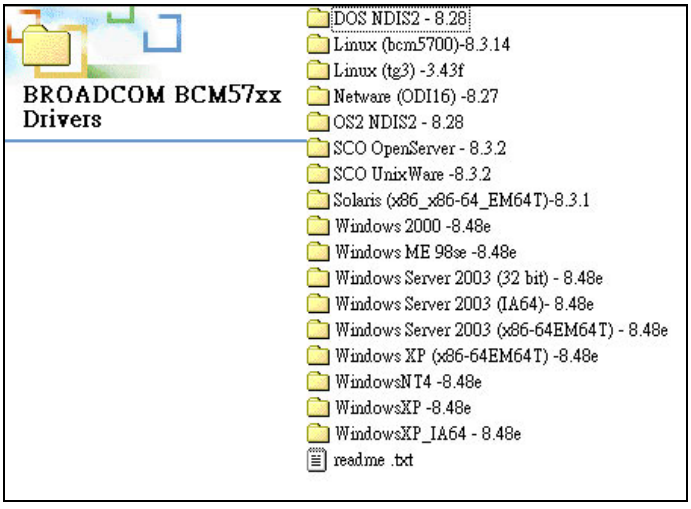


Figure 7-22: Location Browsing Window

Step 9: Click **OK** to continue. A driver files location menu window appears. Click **NEXT** to continue. The driver is installed.

7.6 Realtek HD Audio Driver (ALC883) Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

7.6.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the **Audio Controller** option to [Azalia]. See **Chapter 6** for details.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.6.2 Driver Installation

Step 1: Insert the CD that came with the package.

Step 2: From the main driver menu, navigate to **X:\4-AUDIO\AC-KIT883HD\Windows** (or other appropriate OS). **X:** represents the system CD drive. A new window appears showing the folder contents (**Figure 6-26**).

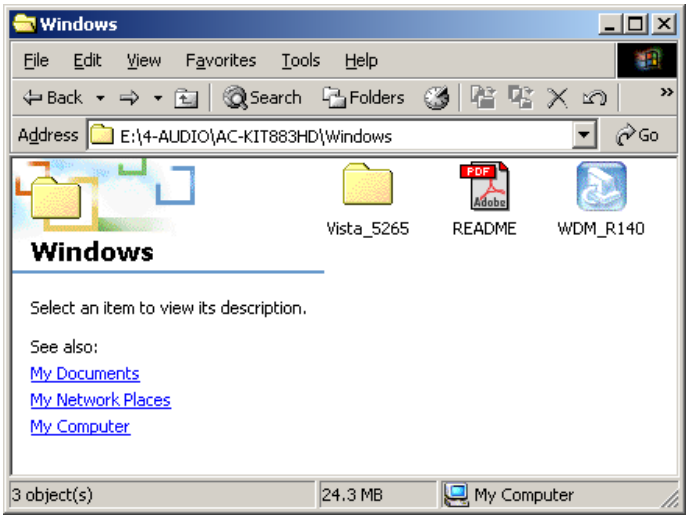


Figure 7-23: 4-AUDIO\AC-KIT883HD\Windows Folder

Step 3: Double-click the **WDM_R140** icon to begin the driver installation process.

Step 4: Once the **WDM_R140** icon is double clicked, the contents of the installation package are extracted. See **Figure 7-24.**

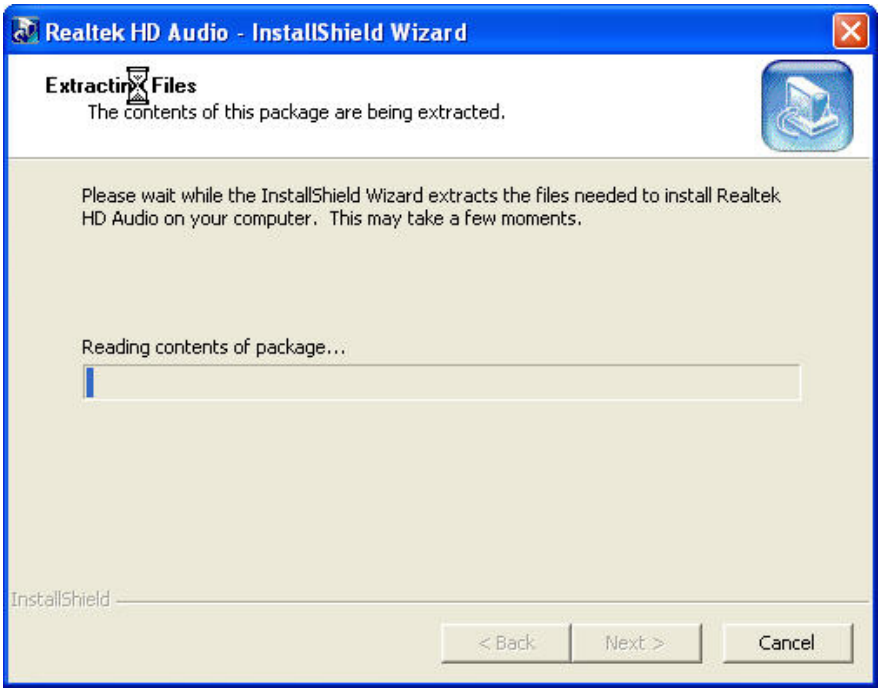


Figure 7-24: HD Audio Driver Setup Extracting Files

Step 5: The **Welcome** screen appears. Click **NEXT**. See **Figure 7-25**.

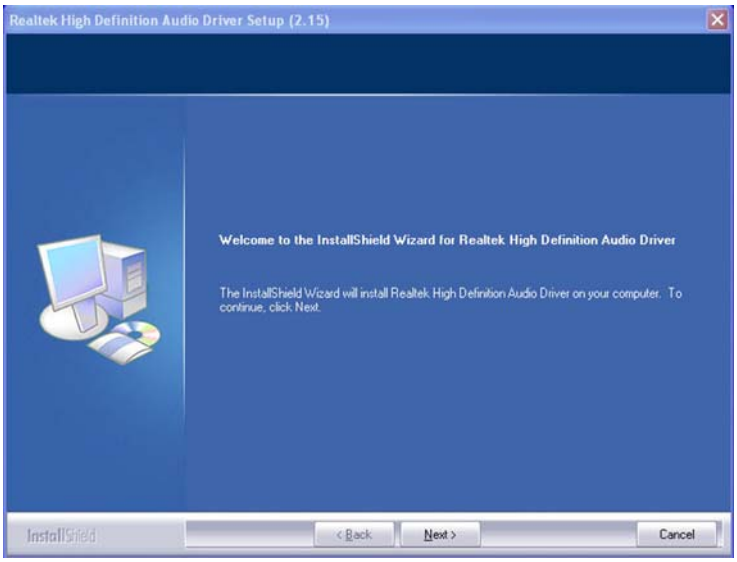


Figure 7-25: HD Audio Driver Setup Welcome Screen

Step 6: The driver is automatically installed.

Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 7-26** appears.

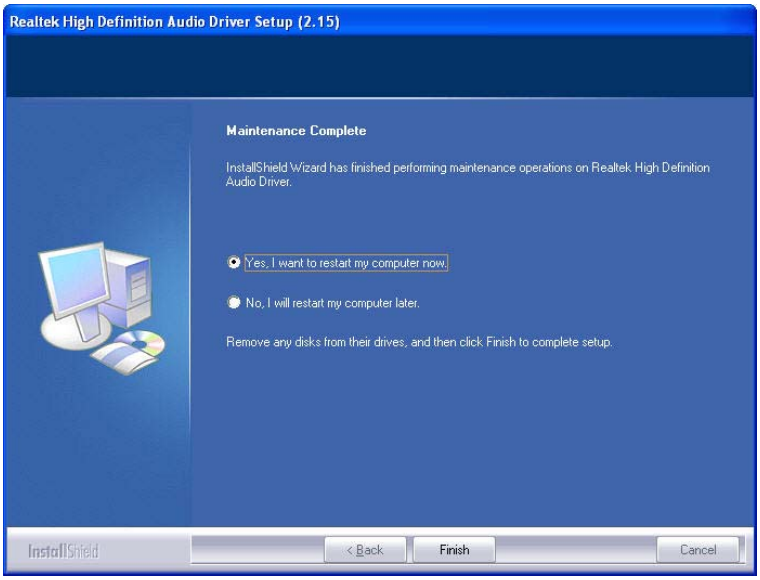


Figure 7-26: HD Audio Driver Installation Complete

Step 8: The confirmation screen shown in **Figure 7-26** allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the “**FINISH**” button.

7.7 Realtek AC`97 Audio Driver (ALC665) Installation

To install the Realtek AC `97 audio driver, please follow the steps below.

7.7.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the **Audio Controller** option to [AC`97]. See **Section 6.7.2** for details.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.7.2 Driver Installation

Step 1: Insert the CD that came with the package.

Step 2: From the main driver menu, navigate to **X:\4-AUDIO\AC-KIT08R\Windows** (or other appropriate OS). **X:** represents the system CD drive. A new window appears showing the folder contents (**Figure 7-27**).

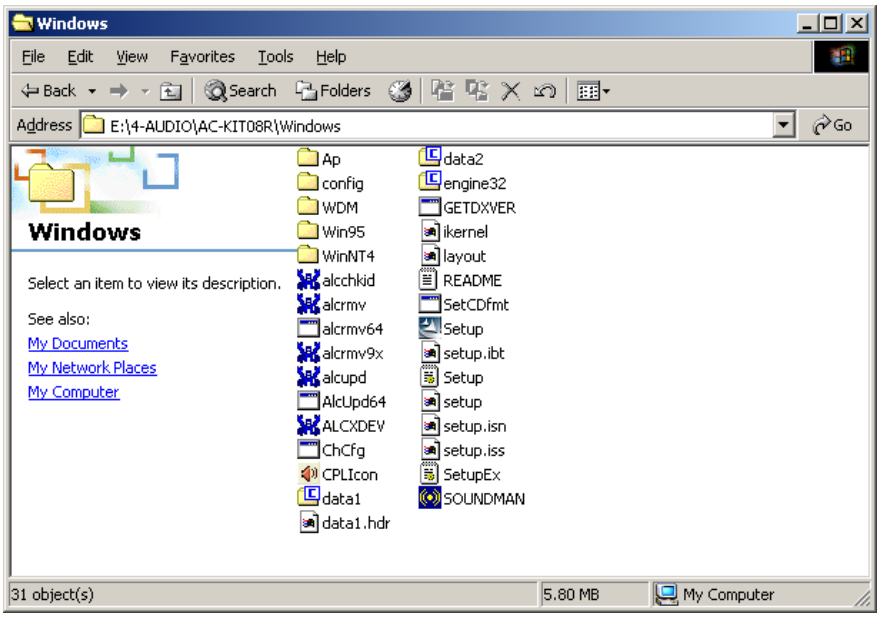


Figure 7-27: CD 4-AUDIO\AC-KIT08R\Windows Folder

Step 3: Double-click the **Setup.exe** file to begin the driver installation process.

Step 4: Once you double click the **Setup** icon, the install shield wizard for the audio driver starts. See **Figure 7-28.**

Figure 7-28: AC`97 Audio Driver Install Shield Wizard Starting

Step 5: The Realtek Audio Setup prepares the install shield to guide you through the rest of the setup process. See **Figure 7-25**.

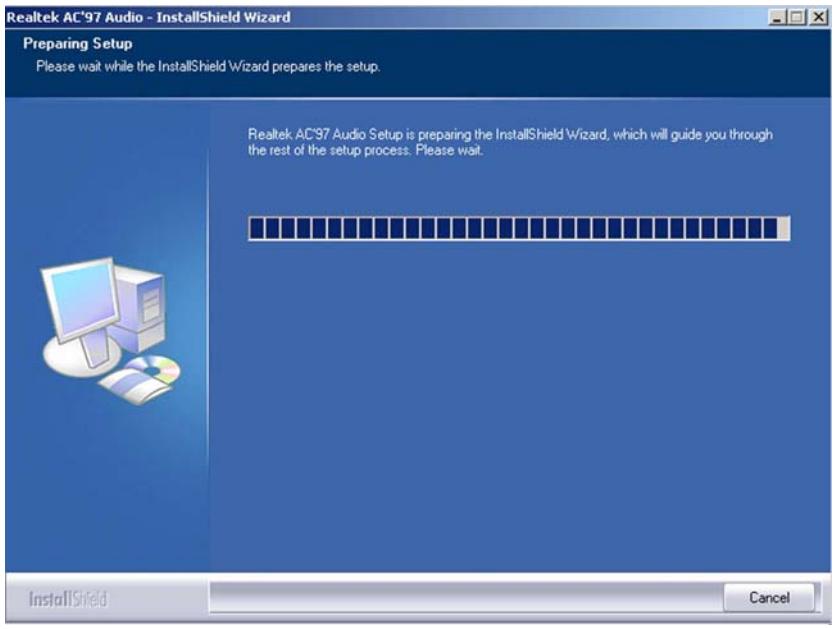


Figure 7-29: AC`97 Audio Driver Setup Preparation

Step 6: After the install shield is prepared, the welcome screen shown in **Figure 7-30** appears. To continue the installation process, click the “**NEXT**” button. The install shield starts to configure the new software as shown in **Figure 7-31**.

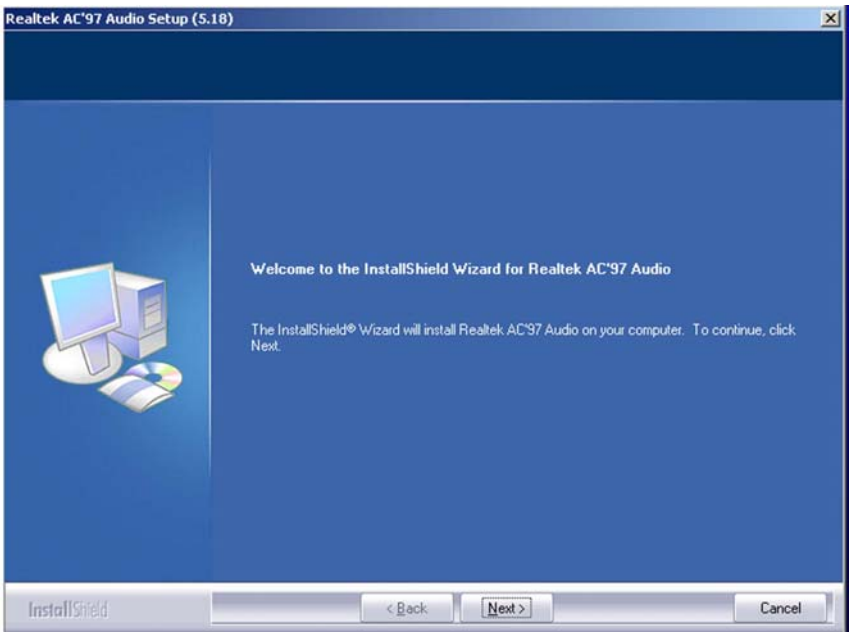


Figure 7-30: AC`97 Audio Driver Welcome Screen

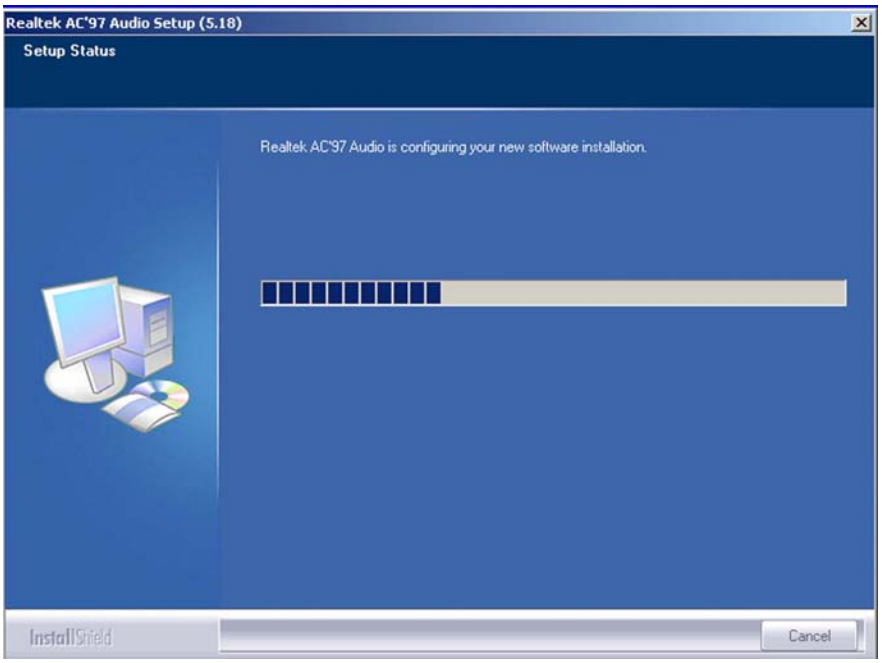


Figure 7-31: AC`97 Audio Driver Software Configuration

Step 7: At this stage the “**Digital Signal Not Found**” screen appears (**Figure 7-32**). To continue the installation process, click the “**YES**” button.

Figure 7-32: AC`97 Audio Driver Digital Signal

Step 8: After clicking the “**YES**” button in **Figure 7-32**, the installation of the driver begins (**Figure 7-33**).

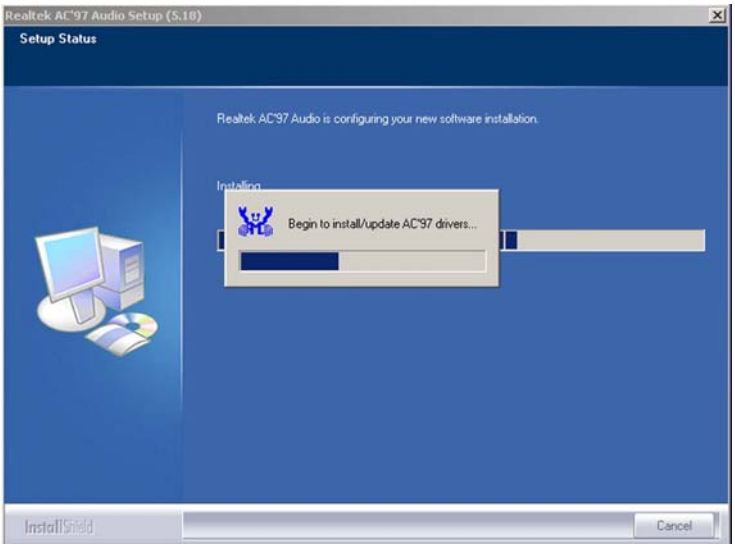


Figure 7-33: AC`97 Audio Driver Installation Begins

Step 9: After the driver installation process is complete, a confirmation screen shown in **Figure 7-34** appears.

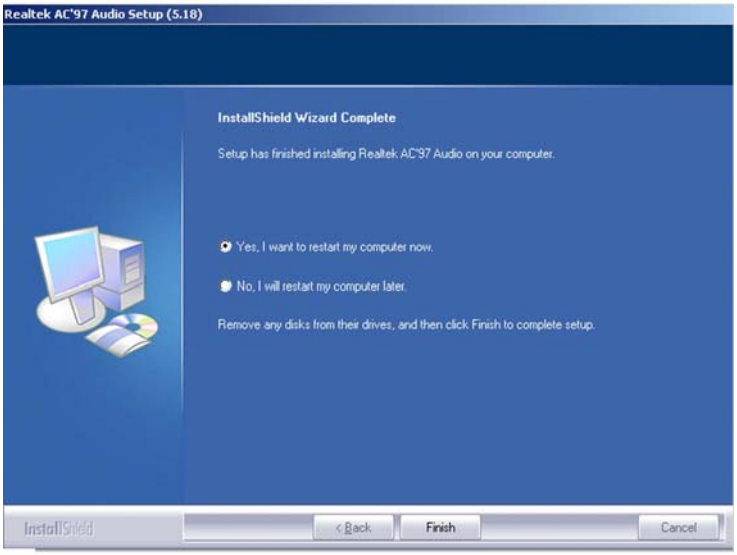


Figure 7-34: AC`97 Audio Driver Installation Complete

Step 10: The confirmation screen shown in **Figure 7-34** allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the “**FINISH**” button.

Appendix

A

BIOS Options

Appendix

B

DIO Interface

B.1 DIO Interface Introduction

The DIO connector on the NOVA-9452 is interfaced to DIO ports on the LC4064V Digital I/O chipset. The DIO has both 12-bit digital inputs and 12-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the LC4064V Digital I/O chipset.

B.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the DIO chipset.

Pin	Description	Digital I/O Pin	Digital I/O Pin Description
1	Ground	N/A	N/A
2	VCC5	N/A	N/A
3	Input 0	34	IO_D6
4	Output 0	26	IO_C10
5	Input 1	38	IO_D8
6	Output 1	27	IO_C12
7	Input 2	39	IO_D10
8	Output 2	28	IO_C14
9	Input 4	40	IO_D12
10	Output 4	31	IO_D0
11	Input 5	41	IO_D14
12	Output 5	47	IO_A6
13	Input 6	42	CLK3/I
14	Output 6	48	IO_A8

Pin	Description	Digital I/O Pin	Digital I/O Pin Description
15	Input 7	43	CLK0/I
16	Output 7	16	IO_B12
17	Input 8	44	IO_A0
18	Output 8	17	IO_B14
19	Input 9	45	IO_A2
20	Output 9	20	IO_C0
21	Input 10	46	IO_A4
22	Output 10	21	IO_C2
23	Input 11	14	IO_B8
24	Output 11	22	IO_C4
25	Input 12	15	IO_B10
26	Output 12	23	IO_C6

B.3 Assembly Language Samples

B.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

```
MOV     AX, 6F08H       Sets the digital port as input
INT     15H             Initiates the INT 15H BIOS call
```

B.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

```
MOV     AX, 6F09H       Sets the digital port as output
MOV     BL, 09H
INT     15H             Initiates the INT 15H BIOS call
```

THIS PAGE IS INTENTIONALLY LEFT BLANK

Appendix

C

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

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

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

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

NOTE:

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

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

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

THIS PAGE IS INTENTIONALLY LEFT BLANK

Appendix

D

Address Mapping

D.1 Address Map

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

Table D-1: IO Address Map

D.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 D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

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

Table D-3: IRQ Mapping Table

D.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 D-4: IRQ Mapping Table

THIS PAGE IS INTENTIONALLY LEFT BLANK

Index

A

B

C

D

E

F

H

I

J

K

L

M

N

P

R

S

T

U

V

W

Y