ALUDRA
5.25" Single Board Computer

DIGITAL TECHNOLOGIES FOR A BETTER WORLD

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EUROTECH

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Revision history

Issue no.	PCB	Date	Comments
A		4 November 2009	First full release.

For contact details, see page 122.

Contents

Important user information

In order to lower the risk of personal injury, electric shock, fire or equipment damage, users must observe the following precautions as well as good technical judgment, whenever this product is installed or used.

All reasonable efforts have been made to ensure the accuracy of this document; however, Eurotech assumes no liability resulting from any error/omission in this document, or from the use of the information contained herein.

Eurotech reserves the right to revise this document and to change its contents at any time without obligation to notify any person of such revision or changes.

Safety notices and warnings

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Eurotech assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware of. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Installation in cupboards and safes

In the event that the product is placed within a cupboard or safe, together with other heat generating equipment, ensure proper ventilation.

Do not operate in an explosive atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Alerts that can be found throughout this manual

The following alerts are used within this manual and indicate potentially dangerous situations:

Symbol	Explanation
	Information and/or notes: These will highlight important features or instructions that should be observed.
	Warning: Information regarding potential hazards: • Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed. • Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.
	Danger, electrical shock hazard: Information regarding potential electrical shock hazards: • Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed. • Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.

Battery

The board contains a lithium non-rechargeable battery. Do not short circuit the battery or place on a metal surface where the battery terminals could be shorted. When disposing of the board or battery, take appropriate care. Do not incinerate, crush or otherwise damage the battery. Use only standard CR1220 button batteries.

Antistatic precautions

To avoid damage caused by ESD (Electro Static Discharge), always use appropriate antistatic precautions when handing any electronic equipment.

Packaging

Please ensure that, should a board need to be returned to Eurotech, it is adequately packed, preferably in the original packing material.

Electromagnetic compatibility (EMC)

The ALUDRA is classified as a component with regard to the European Community EMC regulations and it is the user's responsibility to ensure that systems using the board are compliant with the appropriate EMC standards.

Life support policy

Eurotech products are not authorized for use as critical components in life support devices or systems without the express written approval of Eurotech.

WEEE

The information below is issued in compliance with the regulations as set out in the 2002/96/EC directive, subsequently superseded by 2003/108/EC. It refers electrical and electronic equipment and the waste management of such products.

When disposing of a device, including all of its components, subassemblies and materials that are an integral part of the product, you should consider the WEEE directive.

The symbol to the right has been attached to the equipment or, if this has not been possible, on the packaging, instruction literature and/or the guarantee sheet. By using this symbol, it states that the device has been marketed after August 13th 2005, and implies that you must separate all of its components when possible, and dispose of them in accordance with local waste disposal legislations:

- Because of the substances present in the equipment, improper use or disposal of the refuse can cause damage to human health and to the environment.

- With reference to WEEE, it is compulsory not dispose of the equipment with normal urban refuse, arrangements should be instigated for separate collection and disposal.

- Contact your local waste collection body for more detailed recycling information.

- In case of illicit disposal, sanctions will be levied on transgressors.

RoHS

This device, including all it components, subassemblies and the consumable materials that are an integral part of the product, has been manufactured in compliance with the European directive 2002/95/EC known as the RoHS directive (Restrictions on the use of certain Hazardous Substances). This directive targets the reduction of certain hazardous substances previously used in electrical and electronic equipment (EEE).

Introduction

The ALUDRA 5.25" motherboard utilises a 45nm Intel® Atom™ N270 processor with a 1.60 GHz clock, a 533 MHz FSB and a 512 KB L2 cache. The ALUDRA also supports one 200-pin 533MHz 2.0GB (max.) DDR2 SDRAM SO-DIMM. The board comes with one LVDS connector and supports 18-bit dual-channel LVDS screens. The ALUDRA also comes with one PCI socket, two PCI Express (PCIe) sockets, a PC/104-*Plus* expansion slot and two Gigabit Ethernet (GbE) connectors.

Figure 1: ALUDRA

ALUDRA 'at a glance'

The ALUDRA has a wide variety of peripheral interface connectors. **Figure 2** is a labelled photo of the peripheral interface connectors on the ALUDRA.
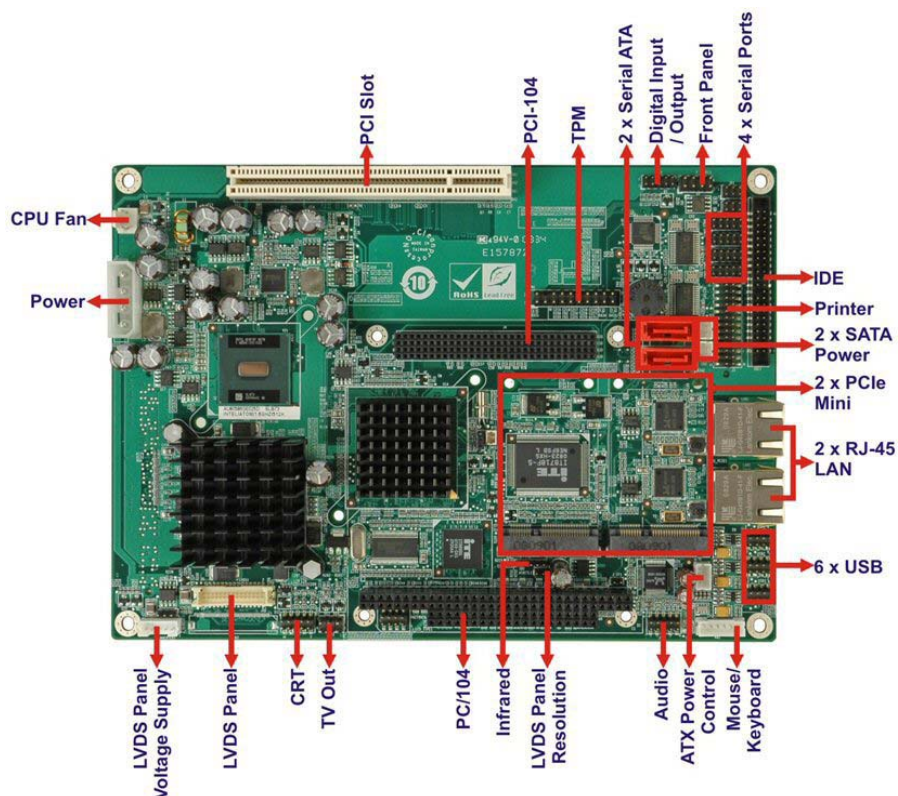
Figure 2: ALUDRA Overview [Front View]
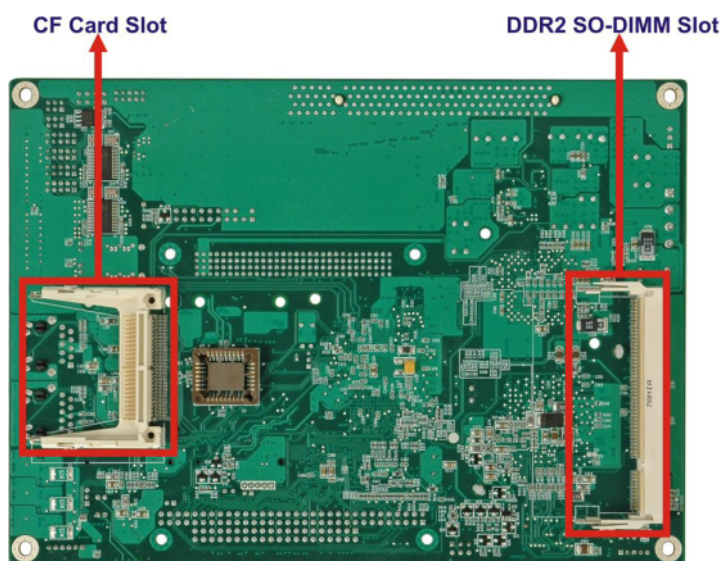
Figure 3: ALUDRA Overview [Solder Side]

ALUDRA Peripheral Connectors and Jumpers

The ALUDRA has the following connectors on-board:

- One ATX power connector for +5V and +12V supplies
- One Audio connector
- One ATX power control connector
- One Backlight inverter connector
- One CompactFlash® socket
- One CRT connector
- One Digital input/output (DIO) connector
- One Fan connector
- One Front panel connector
- One IDE disk drive connectors (44-pin)
- One Infrared interface (IrDA) connector
- One Keyboard/mouse connector
- One LVDS connector
- One Parallel port connector
- One PC/104-*Plus* slot
- One PCI slot
- Two PCIe Mini Card slots
- Two Gigabit Ethernet (GbE) connectors
- Two Serial ATA (SATA) drive connectors
- One SDVO connector
- Three RS-232 serial port connectors
- One RS-232/422/485 serial port connector
- One TPM connector
- One TV Out connector
- Three USB 2.0 connectors (supports six USB 2.0 devices)

The ALUDRA has the following on-board jumpers:

- AT power selection
- Clear CMOS
- CF card setup
- LVDS Voltage Selection
- LVDS Panel Resolution Selection

Technical Specifications

ALUDRA technical specifications are listed in **Table 1**.

Specification	ALUDRA
System CPU	45 nm 1.6 GHz Intel$^®$ Atom™ N270
Front Side Bus (FSB)	533 MHz
System Chipset	Northbridge: Intel$^®$ 945GSE Southbridge: Intel$^®$ ICH7-M
Memory	One 200-pin SO-DIMM socket supports one 533/400 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM
CompactFlash$^®$	One CompactFlash$^®$ Type II socket
Super I/O	ITE IT8718F
Display	Analog CRT supports CRT hot-plug HDTV with 1080i maximum resolution supported 18-bit dual-channel LVDS integrated in Intel$^®$ 945GSE
BIOS	AMI BIOS label
Audio	Realtek ALC655 AC'97 codec
LAN	Two Realtek RTL8111CP GbE controllers
COM	Three RS-232 serial ports One RS-232/422/485 serial port
USB2.0	Six USB 2.0 devices supported by on-board pin-headers
SATA	Two 1.5 Gbps SATA drives supported
Keyboard/mouse	One 6-pin header for keyboard and mouse
Parallel Port	One 26-pin parallel port connector
Hard Drives	One 44-pin IDE connector connects to two Ultra ATA33/66/100 devices
TPM	One 20-pin header support TPM function
Expansion	One PC/104-*Plus* expansion slot (ISA + PCI bus) Two PCIe mini card (PCIe bus) One PCI slot (PCI bus)
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8718F super I/O
Watchdog Timer	Software programmable 1-255 sec. through the ITE super I/O
Infrared	One infrared connector through the ITE super I/O. Supports: • Serial Infrared (SIR) • Amplitude Shift Keyed IR (ASKIR)

Power Supply	ATX and AT power supported
Power Consumption	5V @ 2.89A, 12V@0.04A (1.6 GHz Intel$^{®}$ Atom™ N270 CPU with one 1 GB DDR2 SO-DIMM)
Temperature	0ºC – 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	203 mm x 146 mm
Weight (GW/NW)	1000g/400g

Table 1: Technical Specifications

Detailed Specifications

Board Dimensions

The dimensions of the board are listed below:

- **Length**:   203 mm
- **Width**:   146 mm
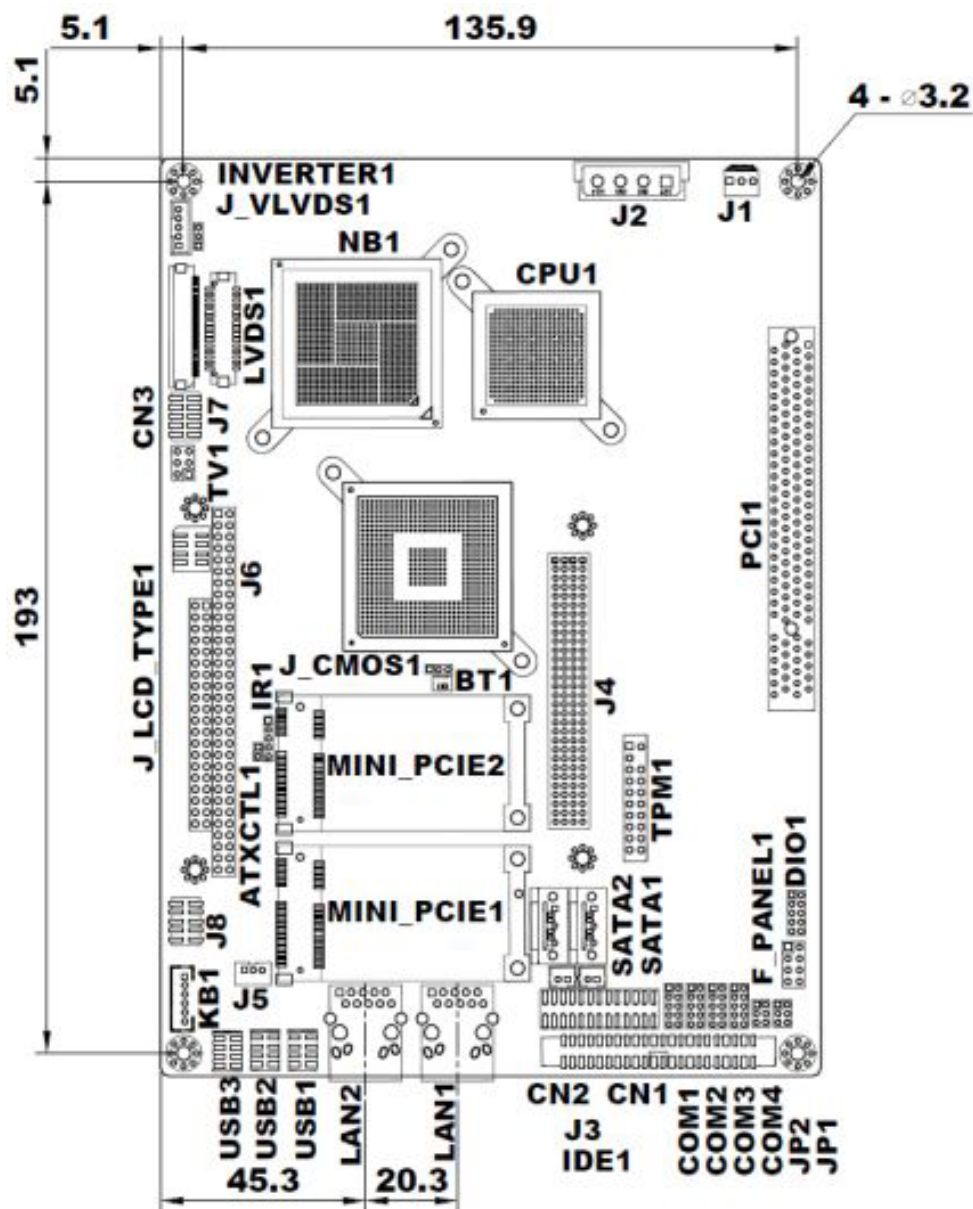
Figure 4: ALUDRA Dimensions (mm)

External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 5**.
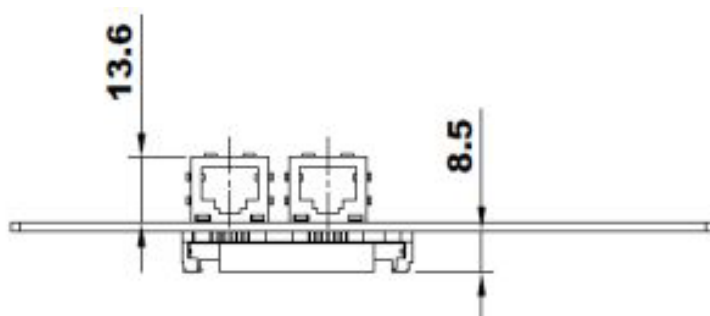
Figure 5: External Interface Panel Dimensions (mm)

Data Flow

Figure 6 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.
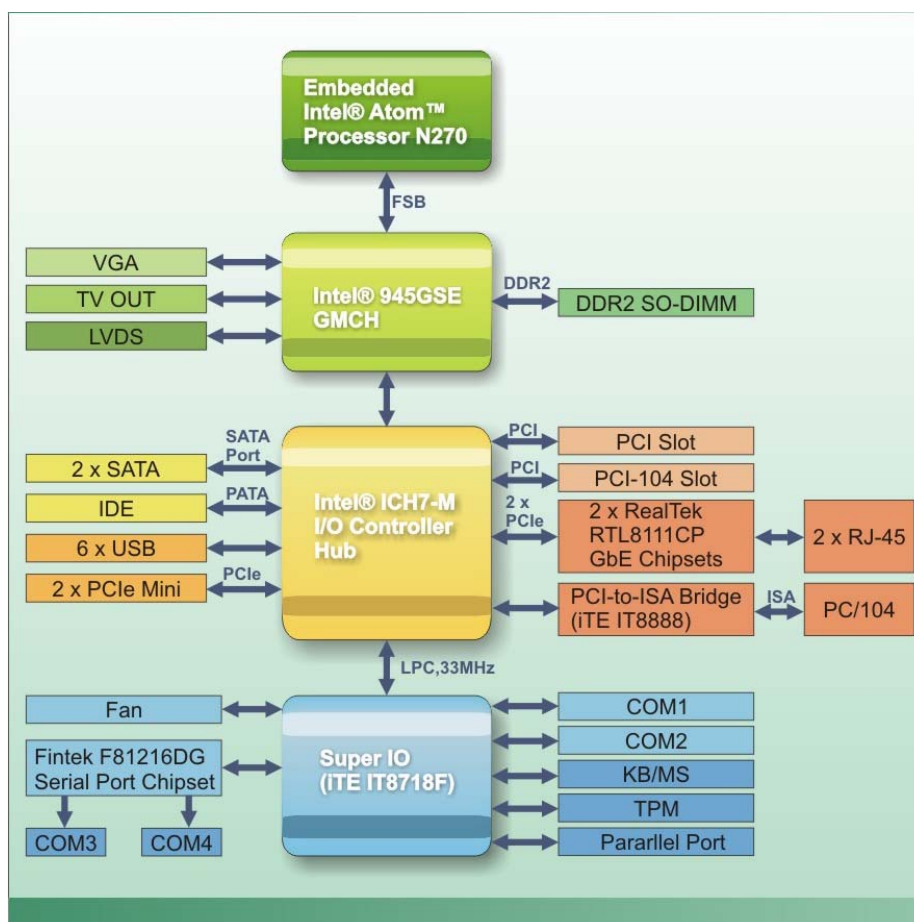
Figure 6: Data Flow Block Diagram

Embedded ALUDRA Processor

The ALUDRA comes with an embedded 45 nm 1.60 GHz Intel$^®$ Atom™ processor N270. The processor supports a 533 MHz FSB and has a 1.6 GHz 512 KB L2 cache. The low power processor has a maximum power of 2.5 W. The processor is shown in **Figure 7** below.
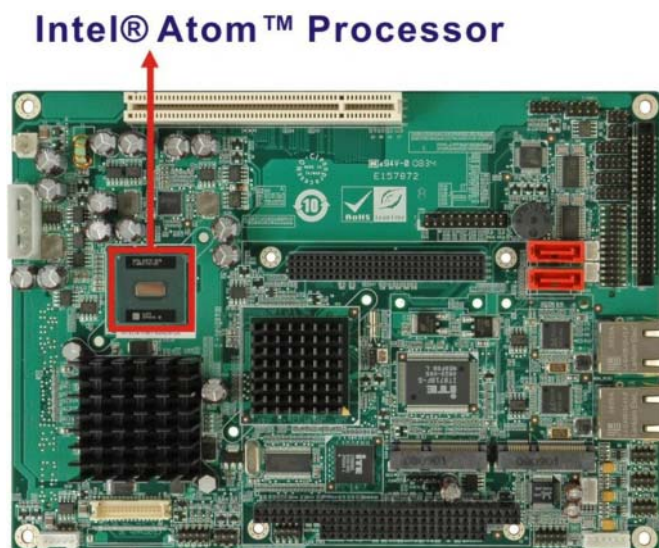
Figure 7: Embedded Processor

Features

Some of the features of the Intel$^®$ Atom™ processor N270 are listed below:

- On-die, primary 32-kB instructions cache and 24-kB write-back data cache
- 533-MHz source-synchronous front side bus (FSB)
- 2-Threads support
- On-die 512-kB, 8-way L2 cache
- Support for IA 32-bit architecture
- Intel$^®$ Streaming SIMD Extensions-2 and -3 (Intel$^®$ SSE2 and Intel$^®$ SSE3) support and Supplemental Streaming SIMD Extension 3 (SSSE3) support
- Micro-FCBGA8 packaging technologies
- Thermal management support via Intel$^®$ Thermal Monitor 1 and Intel Thermal Monitor 2
- FSB Lane Reversal for flexible routing
- Supports C0/C1(e)/C2(e)/C4(e)
- L2 Dynamic Cache Sizing
- Advanced power management features including Enhanced Intel SpeedStep$^®$ Technology
- Execute Disable Bit support for enhanced security

Front Side Bus (FSB)

The Intel® Atom™ processor on the ALUDRA is interfaced to the Intel® 945GSE through a 533 MHz front side bus (FSB). The FSB is shown in **Figure 8** below.
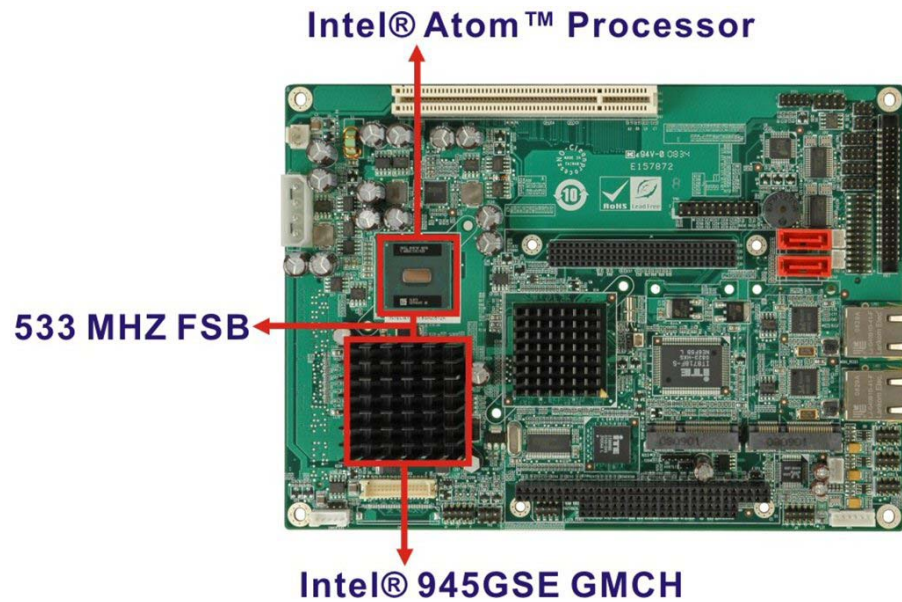
Figure 8: Front Side Bus

Intel 945GSE Northbridge Chipset

The Intel® 945GSE Graphics and Memory Controller Hub (GMCH) supports the embedded Intel® Atom™ N270 processor. The Intel® 945GSE is interfaced to the processor through a 533 MHz FSB.

Intel® 945GSE DDR2 Controller

There is one 200-pin DDR2 SO-DIMM socket on the ALUDRA. The socket supports DDR2 SO-DIMM with the following specifications:

- Maximum Memory supported 2 GB
- Support for DDR2 at 400 MHz and 533 MHz
- No support for Dual-Channel Interleaved mode of operation
- Enhanced Addressing support (Swap only)

The SO-DIMM socket is shown in Figure 9 below.
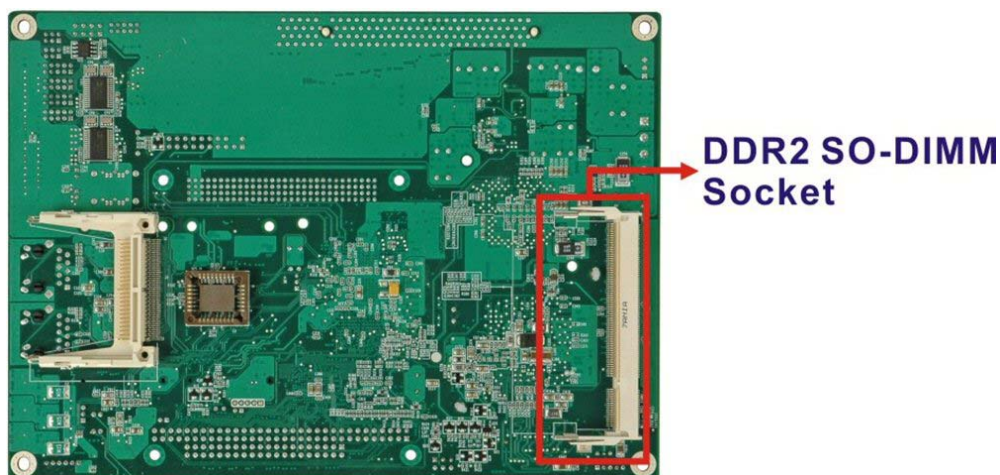
Figure 9: DDR2 SO-DIMM Socket

Intel® 945GSE Graphics

The Intel® 945GSE supports CRT, LVDS, TV-Out and SDVO. The internal graphics engine has the following features:

- Intel® Gen 3.5 Integrated Graphics Engine
- 250-MHz core render clock and 200 MHz core display clock at 1.05-V core voltage
- Supports TV-Out, LVDS, CRT and SDVO
- Dynamic Video Memory Technology (DVMT 3.0)
- Intel® Display Power Saving Technology 2.0 (Intel® DPST 2.0)
- Intel® Smart 2D Display Technology (Intel® S2DDT)
- Intel® Automatic Display Brightness
- Video Capture via x1 concurrent PCIe port
- Concurrent operation of x1 PCIe and SDVO
- Four pixel rate HWMC

- Microsoft DirectX* 9.1 operating system

- Intermediate Z in Classic Rendering

- Internal Graphics Display Device States: D0, D1, D3

- Graphics Display Adapter States: D0, D3.
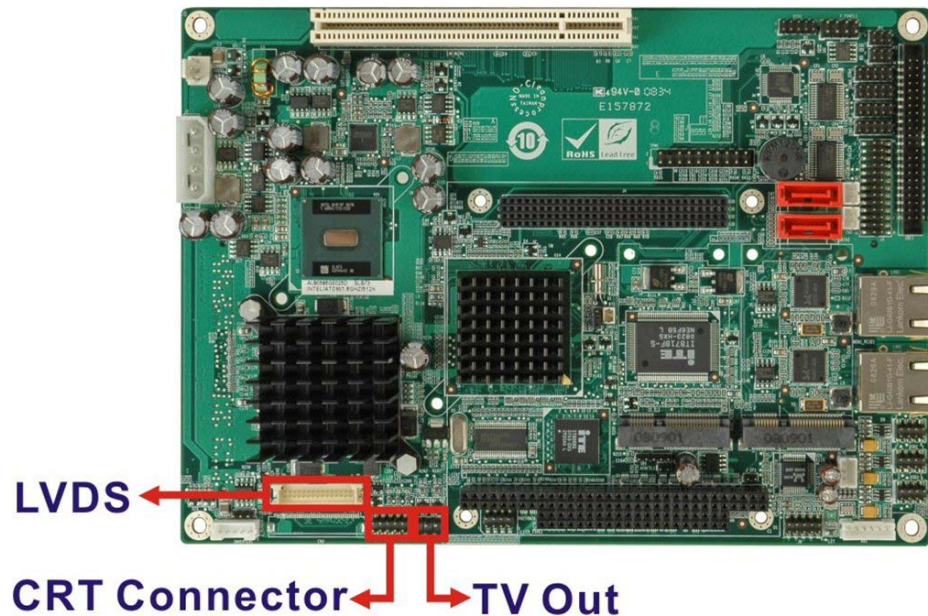
Figure 10: CRT, LVDS and TV-Out Connectors

Analogue CRT Graphics Mode

The analogue CRT bus is interfaced to an on-board 10-pin connector. The connector is shown in **Figure 10**. The CRT interface has the following features.

- Integrated 400-MHz RAMDAC

- Analogue Monitor Support up to QXGA

- Support for CRT Hot Plug

LVDS Interface

The LVDS interface is connected directly to the LVDS connector on the board (**Figure 10**). The LVDS interface has the following features.

- Panel support up to UXGA (1600 x 1200)

- 25-MHz to 112-MHz single-/dual-channel; @18 bpp
  - TFT panel type supported

- Pixel Dithering for 18-bit TFT panel to emulate 24-bpp true colour displays

- Panel Fitting. Panning, and Center Mode Supported

- CPIS 1.5 compliant

- Spread spectrum clocking supported

- Panel Power Sequencing support

- Integrated PWM interface for LCD backlight inverter control

TV Out Interface

The TV Out interface (Figure 10) has the following features.

- Three integrated 10-bit DACS
- Overscaling
- NTSC/PAL
- Component, S-Video and Composite Output interfaces
- HDTV support: 480p/720p/1080i/1080p

Intel® ICH7-M Southbridge Chipset

The Intel® ICH7-M chipset is connected to the Intel® 945GSE GMCH through the chip-to-chip Direct Media Interface (DMI). Some of the features of the Intel® ICH7-M 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 two SATA connectors on the ALUDRA

- Supports the four USB 2.0 devices on the ALUDRA 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

Intel® ICH7-M Audio Codec '97 Controller

The Audio Codec '97 (AC'97) controller integrated into the ICH7-M complies with AC'97 Component Specification, Version 2.3. The AC'97 controller is integrated to a RealTek ALC655 audio codec. The RealTek ALC655 is in turn connected to on-board audio connectors, which are then connected to compliant audio devices. The RealTek ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio codec. The codec and the audio connectors are shown in **Figure 11**.
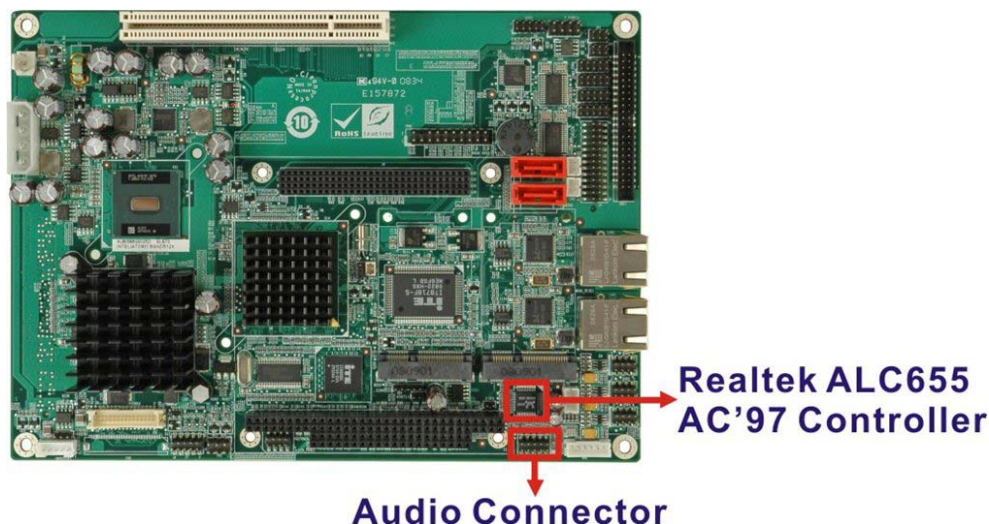
Figure 11: Audio Codec and Connectors

Some of the features of the RealTek ALC655 are listed below:

- Meets performance requirements for audio on PC99/2001 systems

- Meets Microsoft WHQL/WLP 2.0 audio requirements

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

- Compliant with AC'97 Rev 2.3 specifications
    - Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
    - 14.318MHz -> 24.576MHz PLL to eliminate crystal
    - 12.288MHz BITCLK input
    - Integrated PCBEEP generator to save buzzer
    - Interrupt capability

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

- High-quality differential CD input

- Two analogue line-level mono inputs: PCBEEP, PHONE-IN

- Two software selectable MIC inputs

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

- Boost preamplifier for MIC input

Intel® ICH7-M IDE Interface

The integrated IDE interface on the ICH7-M southbridge supports two IDE hard disks and ATAPI devices. The IDE connector is shown in **Figure 12** below.

Figure 12: IDE Connector

PIO IDE transfers up to 16MB/s and Ultra ATA transfers of 100MB/s. The integrated IDE interface is able to support the following IDE HDDs:

• **Ultra ATA/100**, with data transfer rates up to 100MB/s

• **Ultra ATA/66**, with data transfer rates up to 66MB/s

Specification	Ultra ATA/100	Ultra ATA/66
IDE devices	2	2
PIO Mode	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4
DMA/UDMA Max Transfer	100MB/s	66MB/s
Controller Interface	5V	5V

Table 2: Supported HDD Specifications

Intel® ICH7-M Low Pin Count (LPC) Interface

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

• BIOS chipset

• Super I/O chipset

Intel® ICH7-M PCI Interface

The PCI interface on the ICH7-M is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant

- 33MHz

- 5V tolerant PCI signals (except PME#)

- Integrated PCI arbiter supports up to seven PCI bus masters

The PCI bus is connected to a PC/104-*Plus* connector as shown in **Figure 13**.
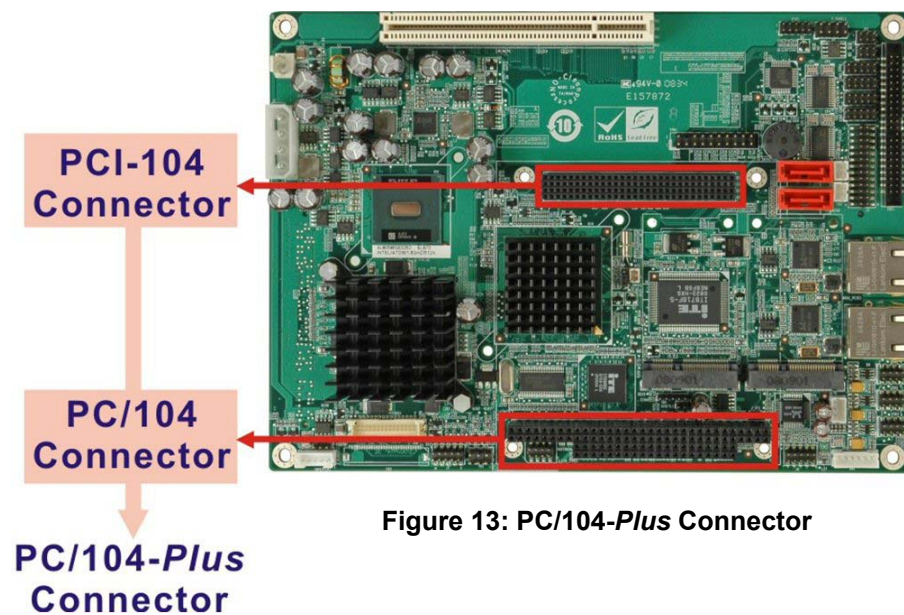
Figure 13: PC/104-*Plus* Connector

Intel® ICH7-M PCIe Bus

The Intel® ICH7-M southbridge chipset has four PCIe lanes. Two of the four PCIe lanes are interfaced to PCIe GbE controller. A third PCIe lane is interfaced to a PCIe mini socket.

PCIe GbE Ethernet

Two PCIe lanes are connected to two Realtek RTL8111C PCIe GbE controllers shown in **Figure 14** below.
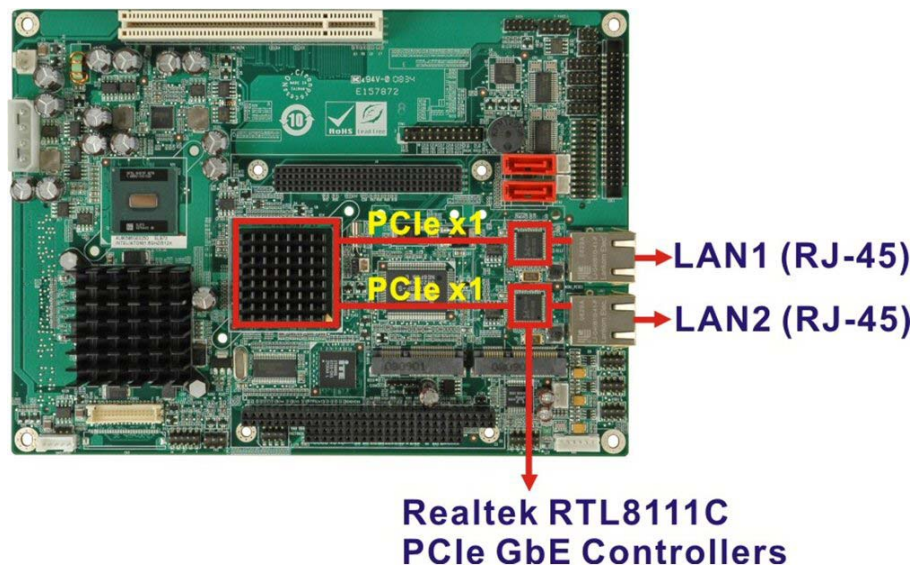
Figure 14: Realtek PCI GbE Controllers

The Realtek RTL8111C PCIe GbE controllers combine a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, 32-bit PCIe bus controller, and embedded memory. With state-of-the-art DSP technology and mixed-mode signal technology, they offer high-speed transmission over CAT 5 UTP cable or CAT 3 UTP (10Mbps only) cable. Functions such as Crossover Detection & Auto-Correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented to provide robust transmission and reception capability at high speeds.

Some of the features of the Realtek RTL8111CP PCIe GbE controllers are listed below.

- Integrated 10/100/1000 transceiver

- Auto-Negotiation with Next Page capability

- Supports PCI Express™ 1.1

- Supports pair swap/polarity/skew correction

- Crossover Detection & & Auto-Correction

- Wake-on-LAN and remote wake-up support

- Microsoft® NDIS5, NDIS6 Checksum Offload (IPv4, IPv6, TCP, UDP) and Segmentation Task-offload (Large send and Giant send) support

- Supports Full Duplex flow control (IEEE 802.3x)

- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab

- Supports IEEE 802.1P Layer 2 Priority Encoding

- Supports IEEE 802.1Q VLAN tagging

- Serial EEPROM

- Transmit/Receive on-chip buffer support

- Supports power down/link down power saving

- Supports PCI MSI (Message Signalled Interrupt) and MSI-X

- Supports Receive-Side Scaling (RSS)

PCIe Mini Expansion Slots

Two PCIe x1 lanes in combination with USB port on the ICH7-M is interfaced directly to two PCIe mini expansion slots. These enable the addition of PICe mini expansion devices. The PCIe mini slots are shown in **Figure 15**.
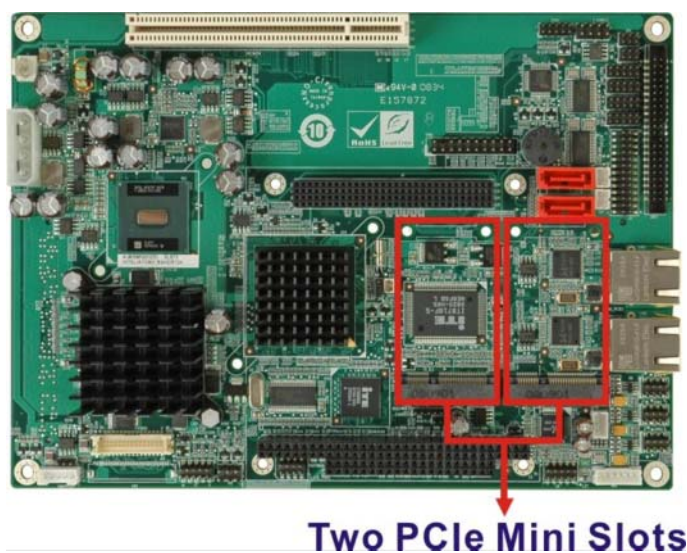
Figure 15: PCIe Mini Slots

Intel® ICH7-M Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH7-M. 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.

Intel® ICH7-M SATA Controller

The integrated SATA controller on the ICH7-M supports up to four SATA drives with independent DMA operations. Two SATA controllers are connected to two SATA connectors on the ALUDRA. The SATA connectors are shown in **Figure 16**.
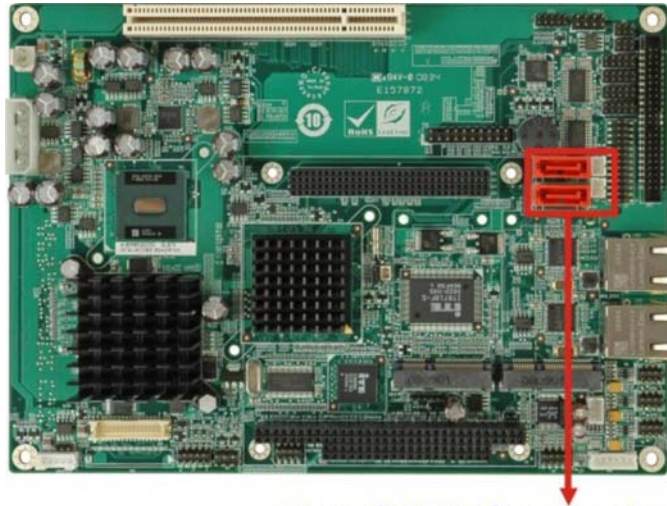
Figure 16: SATA Connectors

SATA controller specifications are listed below.

- Supports four SATA drives
- Supports 1.5 Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a

Intel® ICH7-M USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the ICH7-M on the ALUDRA. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH7-M integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signalling is supported by the ICH7-M integrated Universal Host Controller Interface (UHCI) controllers.

The six USB ports implemented on the ALUDRA are connected to three internal connectors. See **Figure 17**.
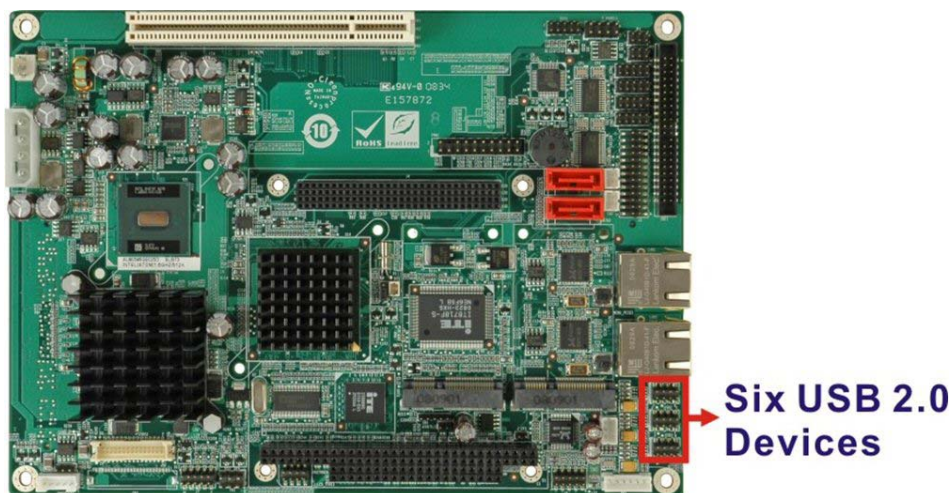
Figure 17: On-board USB Implementation

LPC Bus Components

The ICH7-M LPC bus is connected to components listed below:

- Super I/O chipset
- LPC Serial Port Chipset

iTE IT8718F Super I/O Chipset

The iTE IT8718F Super I/O chipset is connected to the ICH7-M through the LPC bus.
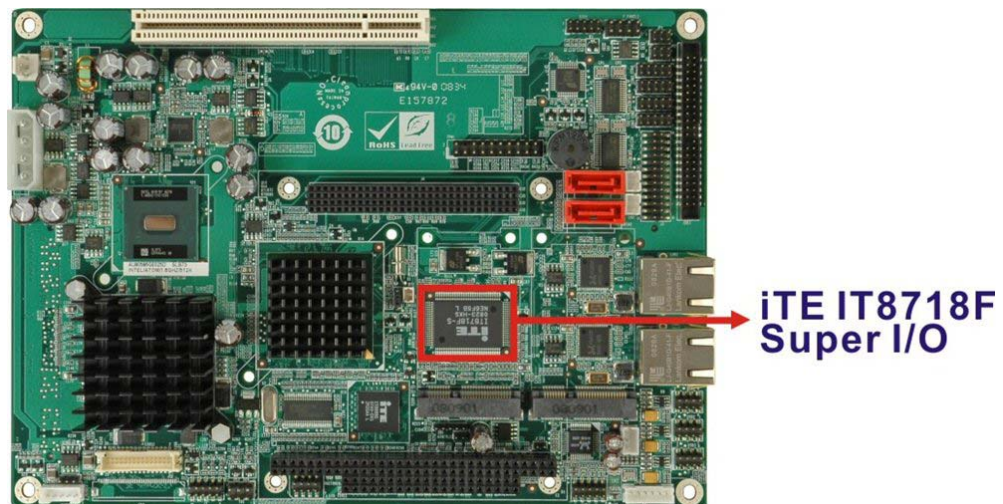
Figure 18: Super I/O

The iTE IT8718F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8718F chipset are listed below:

- ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer

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

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.

Super I/O 16C550 UARTs

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

- Two standard serial ports (COM1 and COM2)
- IrDa 1.0 and ASKIR protocols

Another chipset connected to the LPC bus provided connectivity to another two serial port connectors (COM3 and COM4).

Super I/O Digital Input/Output

The input mode supports switch debouncing or programmable external IRQ routing. The output mode supports two sets of programmable LED blinking periods.

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.

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.

Super I/O Keyboard/Mouse Controller

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

Super I/O Parallel Port

The multi-mode high-performance parallel port supports the bi-directional Standard Parallel Port (SPP), the Enhanced Parallel Port (EPP) and the Extended Capabilities Port (ECP) modes.

Environmental and Power Specifications

System Monitoring

Two thermal inputs on the ALUDRA Super I/O Enhanced Hardware Monitor monitors the following temperatures:

• System temperature

• CPU temperature

Eight voltage inputs on the ALUDRA Super I/O Enhanced Hardware Monitor monitors the following voltages:

• CPU Core

• +1.05V

• +3.30V

• +5.00V

• +12.0 V

• +1.5V

• +1.8V

• 5VSB

• VBAT

The ALUDRA Super I/O Enhanced Hardware Monitor also monitors the CPU Fan speed.

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

Operating Temperature and Temperature Control

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

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

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

A 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.

Power Consumption

Table 3 shows the power consumption parameters for the ALUDRA running with a 1.6 GHz Intel® Atom™ processor N270 with 1 GB DDR2 memory.

Voltage	Current
+5V	2.89A
+12V	0.04A

Table 3: Power Consumption

Unpacking

Unpacking Precautions

When the ALUDRA is unpacked, please follow anti-static precautions and make sure the packing box is facing upwards so the ALUDRA does not fall out of the box.

> ℹ️ No cables are provided with the ALUDRA. A list of available cables and modules for the ALUDRA can be found in Appendix E – Cable Kit and Optional Items, page 120.

Connectors

ALUDRA Layout

Figure 19 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
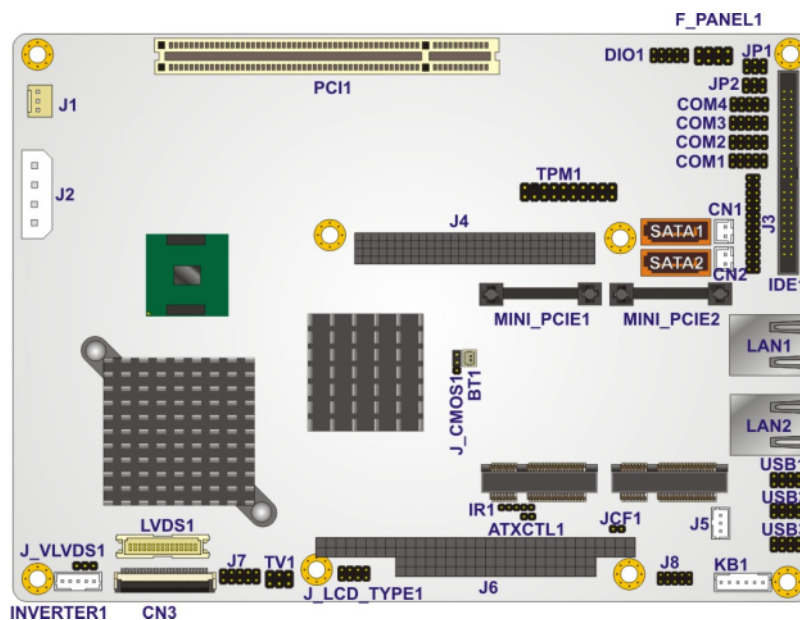
Figure 19: Connector and Jumper Locations [Front Side]
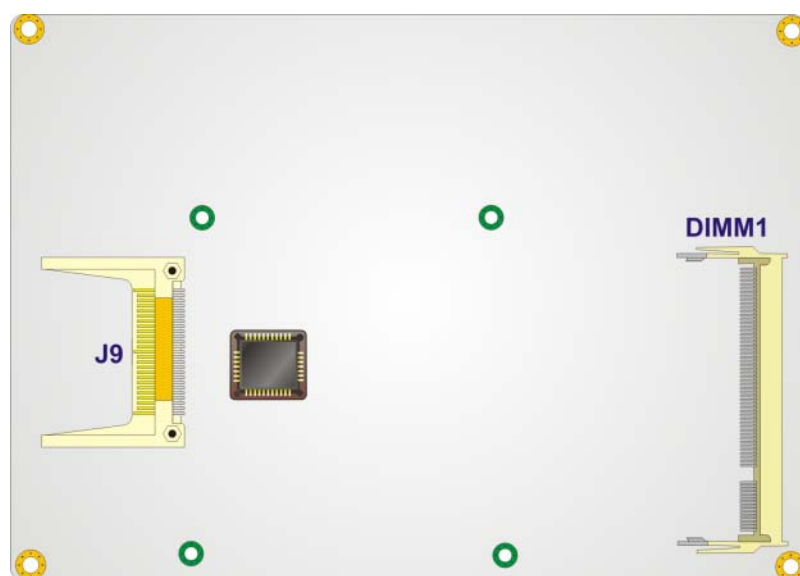
Figure 20: Connector and Jumper Locations [Solder Side]

Table 4 shows a list of the peripheral interface connectors on the ALUDRA. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+5V and +12V power source connector	4-pin connector	J2
ATX power control connector	3-pin wafer	J5
Audio connector	9-pin header	J8
Backlight inverter connector	5-pin wafer	INVERTER1
CompactFlash® socket	50-pin CF socket	J9
CRT connector	10-pin box header	J7
DDR SO-DIMM socket	200-pin socket	DIMM1
Digital input/output (DIO) connector	10-pin header	DIO1
Fan connector	3-pin wafer	J1
Front panel connector	8-pin header	F_PANEL1
IDE disk drive connectors (44-pin)	44-pin box header	IDE1
Infrared interface (IrDA) connector	5-pin header	IR1
Keyboard connector	6-pin wafer	KB1
LVDS connector	30-pin crimp	LVDS1
Parallel port connector	26-pin header	J3
PCI-104 slot	120-pin socket	J4
PC/104 slot	104-pin socket	J6
PCIe Mini Card slot	PCIe Mini Slot	MINI_PCIE1
PCIe Mini Card slot	PCIe Mini Slot	MINI_PCIE2
SDVO connector	47-pin connector	CN3
Serial ATA (SATA) drive connector	7-pin SATA	SATA1
Serial ATA (SATA) drive connector	7-pin SATA	SATA2
SATA power connector	2-pin wafer	CN1
SATA power connector	2-pin wafer	CN2
RS-232 serial port connector	10-pin header	COM1
RS-232 serial port connector	10-pin header	COM2
RS-232/422/485 serial port connector	10-pin header	COM3
RS-232 serial port connector	10-pin header	COM4
COM3 RS-422/485 connector	6-pin header	JP2
TPM connector	20-pin header	TPM1
TV Out connector	6-pin header	TV1
USB 2.0 connector	8-pin header	USB1
USB 2.0 connector	8-pin header	USB2
USB 2.0 connector	8-pin header	USB3

Table 4: Peripheral Interface Connectors

External Interface Panel Connectors

Table 5 lists the rear panel connectors on the ALUDRA. Detailed descriptions of these connectors can be found in the External Peripheral Interface Connector Panel, page 58.

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

Table 5: Rear Panel Connectors

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 ALUDRA.

AT Power Connector

CN Label: **J2**

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

CN Location: See **Figure 21**

CN Pinouts: See **Table 6**

The 4-pin AT power connector is connected directly to an AT power supply.
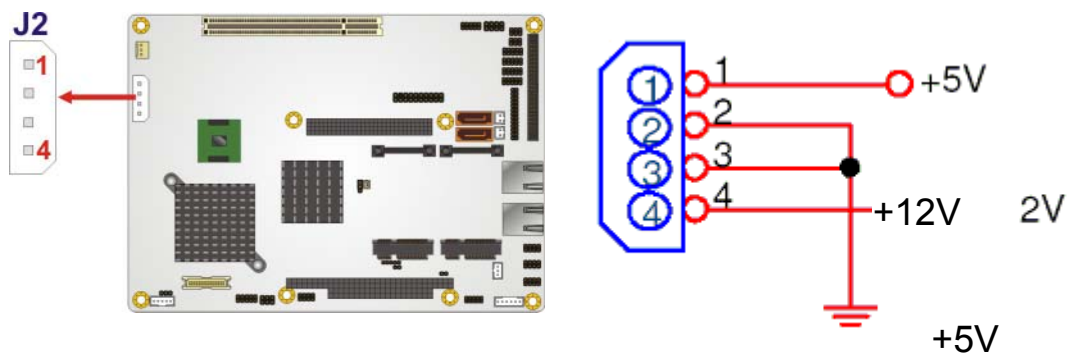
Figure 21: AT Power Connector Location

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

Table 6: AT Power Connector Pinouts

ATX Power Supply Enable Connector

CN Label: **J5**

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 22**

CN Pinouts: See **Table 7**

The ATX power supply enable connector enables the ALUDRA to be connected to an ATX power supply. In default mode, the ALUDRA can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. See Installation, page 59 for more details.
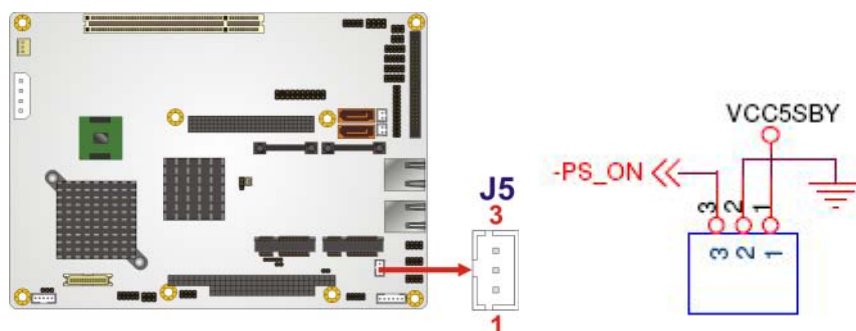
Figure 22: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	+5V Standby
2	GND
3	PS_ON#

Table 7: ATX Power Supply Enable Connector Pinouts

Audio Connector (9-pin)

CN Label: J8

CN Type: 9-pin header (2x5)

CN Location: See **Figure 23**

CN Pinouts: See **Table 8**

The 9-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.
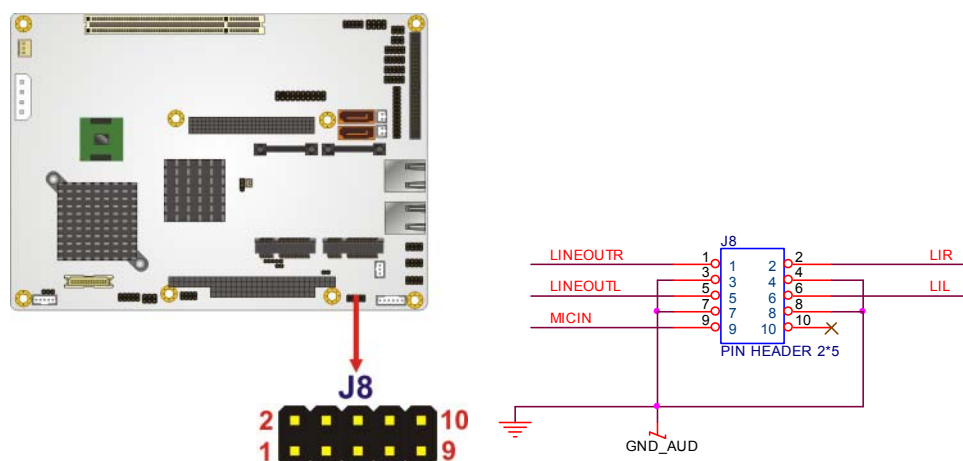
Figure 23: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINE_OUTR	2	LIR
3	GND	4	GND
5	LINE_OUTL	6	LIL
7	GND	8	GND
9	MIC_IN	10	NA

Table 8: Audio Connector Pinouts (9-pin)

Backlight Inverter Connector

CN Label:	**INVERTER1**
CN Type:	5-pin wafer (1x5)
CN Location:	See Figure 24
CN Pinouts:	See **Table 9**

The backlight inverter connector provides the backlight on the LCD display connected to the ALUDRA with +12V of power.
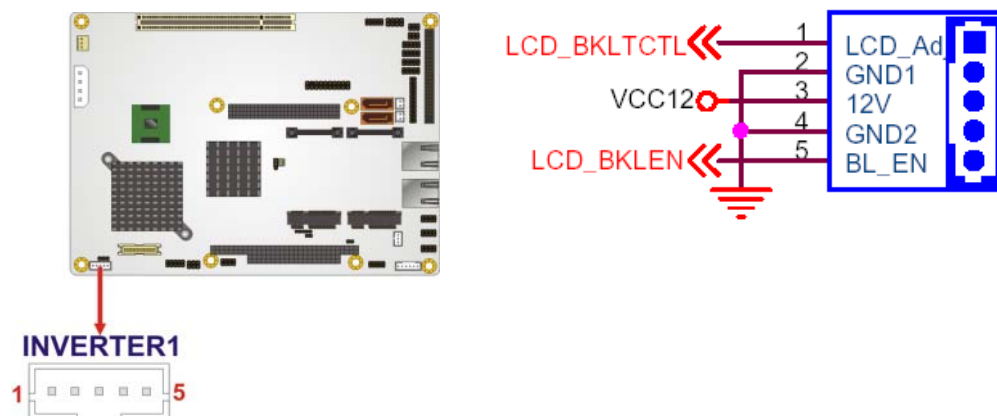
Figure 24: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	**LCD Backlight Control (PWM)**
2	**GND**
3	**+12V**
4	**GND**
5	**Backlight Enable**

Table 9: Panel Backlight Connector Pinouts

CompactFlash® Socket

CN Label:	**J9** (solder side)
CN Type:	50-pin header (2x25)
CN Location:	See **Figure 25**
CN Pinouts:	See **Table 10**

A CF Type II memory card is inserted to the CF socket on the solder side of the ALUDRA.
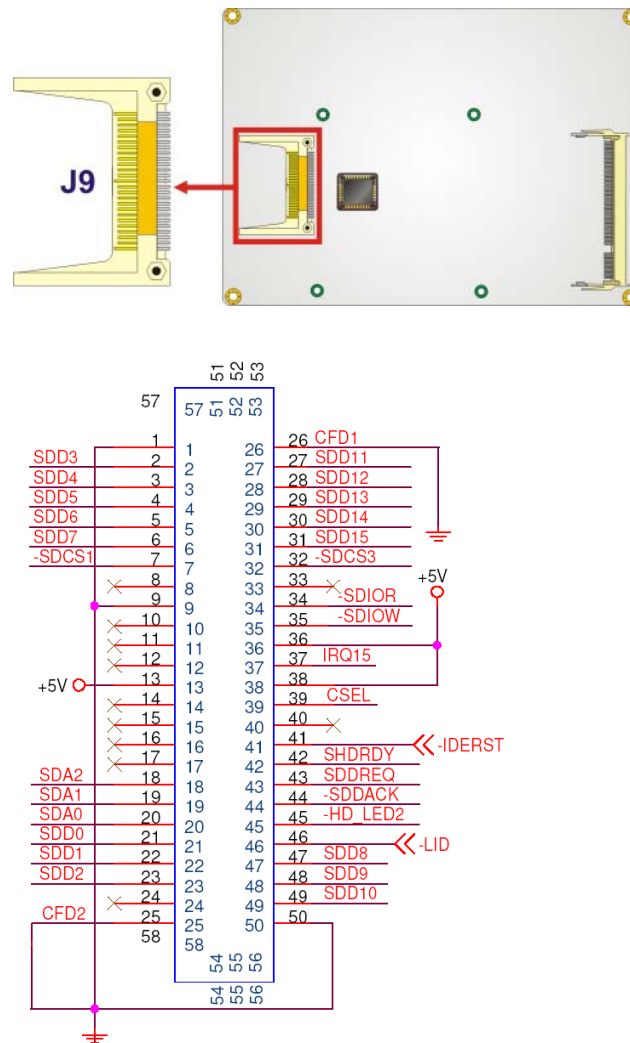
Figure 25: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	26	CARD_DETECT1#
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	CS0#	32	CS1#
8	NC	33	NC
9	GND	34	IOR#
10	NC	35	IOW#
11	NC	36	+5V
12	NC	37	IRQ
13	+5V	38	+5V
14	NC	39	CSEL#
15	NC	40	NC
16	NC	41	RESET#
17	NC	42	IORDY
18	ADDR2	43	SDREQ
19	ADDR 1	44	SDACK#
20	ADDR 0	45	DASP#
21	DATA 0	46	PDIAG#
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	NC	49	DATA 10
25	CARD_DETECT2#	50	GND

Table 10: CF Card Socket Pinouts

CRT Connector

CN Label: **J7**

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

CN Location: See **Figure 26**

CN Pinouts: See **Table 11**

The 2x5 CRT pin connector provides connectivity to an external VGA port enabling the system to be connected to a standard CRT screen.
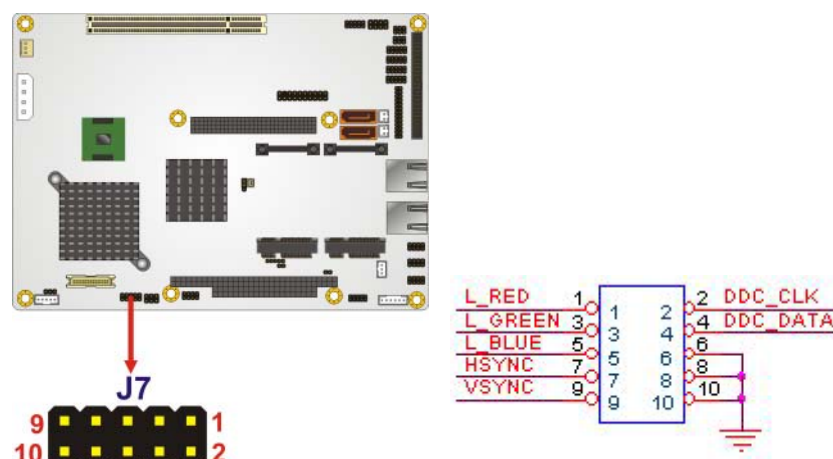
Figure 26: VGA Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	DDC_CLK
3	GREEN	4	DDC_DATA
5	BLUE	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND

Table 11: VGA Connector Pinouts

Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 27**

CN Pinouts: See **Table 12**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.
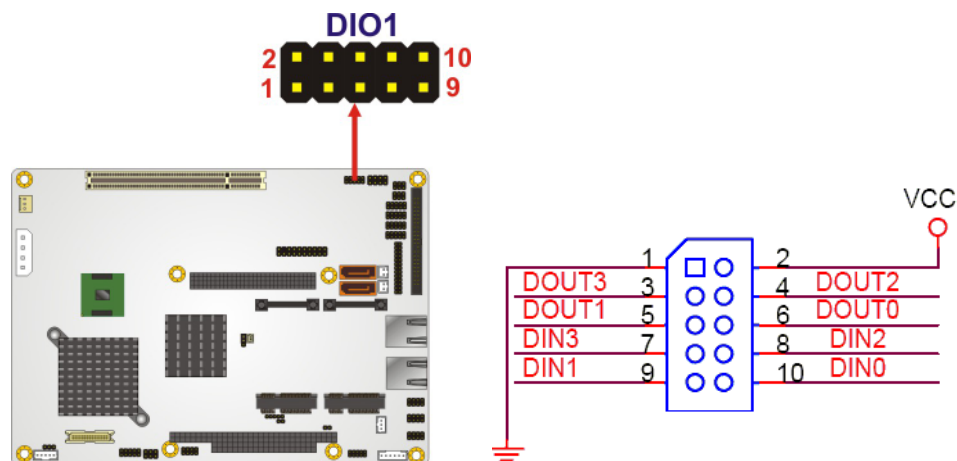
Figure 27: DIO Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	OUTPUT 3	4	OUTPUT 2
5	OUTPUT 1	6	OUTPUT 0
7	INPUT 3	8	INPUT 2
9	INPUT 1	10	INPUT 0

Table 12: DIO Connector Pinouts

Fan Connector (+12V, 3-pin)

CN Label: J1

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 28**

CN Pinouts: See **Table 13**

The cooling fan connector provides a 12V, 500mA current to the 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.
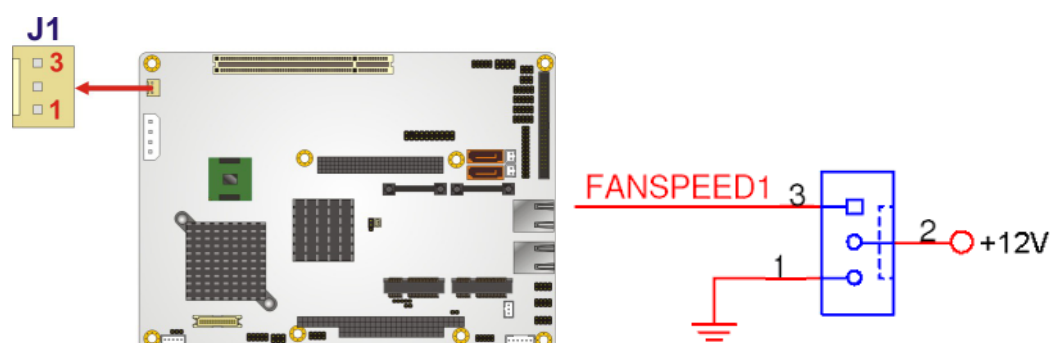
Figure 28: +12V Fan Connector Location

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

Table 13: +12V Fan Connector Pinouts

Front Panel Connector (8-pin)

CN Label: **F_PANEL1**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 29**

CN Pinouts: See **Table 14**

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

- Power button
- Reset
- Power LED
- HDD LED
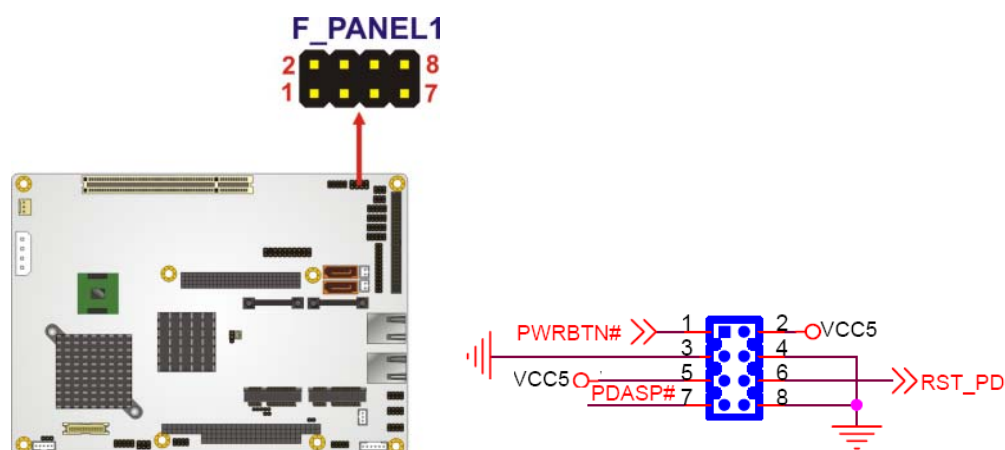
Figure 29: Front Panel Connector Pinout Locations (8-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWR_BTN	Power LED	2	VCC5
	3	GND		4	GND
HDD LED	5	HDD_LED+	Reset	6	SYSRST#
	7	HDD_LED-		8	GND

Table 14: Front Panel Connector Pinouts (8-pin)

IDE Connector (44-pin)

CN Label: **IDE1**

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

CN Location: See **Figure 30**

CN Pinouts: See **Table 15**

One 44-pin IDE device connector on the ALUDRA supports connectivity to two hard disk drives.
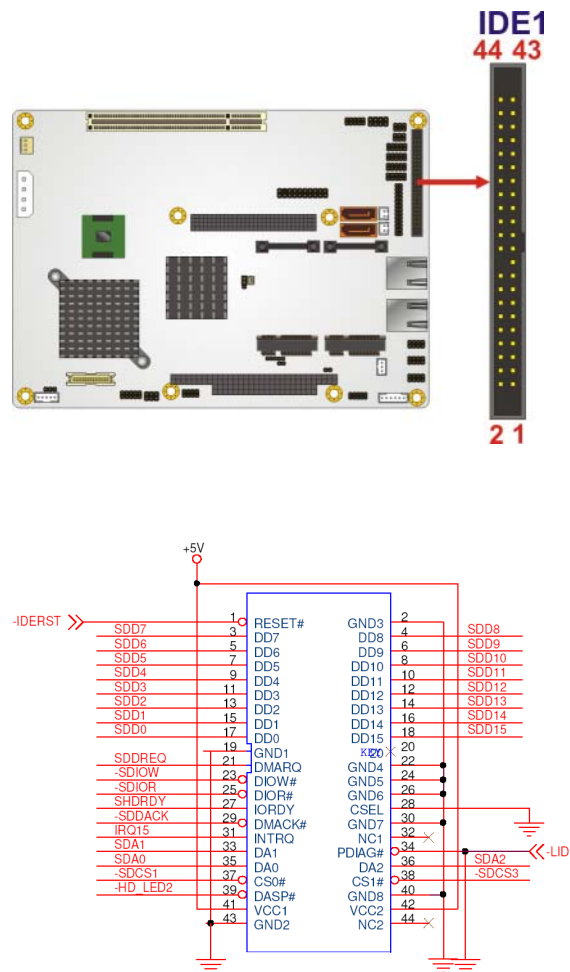
**Figure 30: Secondary IDE Device
Connector Locations**

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	NC
21	IDE DREQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IDE CHRDY	28	GND
29	IDE DACK#	30	GND
31	INTERRUPT	32	NC
33	SA1	34	NC
35	SA0	36	SA2
37	CS0#	38	CS1#
39	HDD ACTIVE#	40	GND
41	VCC	42	VCC
43	GND	44	NC

Table 15: Secondary IDE Connector Pinouts

Infrared Interface Connector (5-pin)

CN Label:	**IR1**
CN Type:	5-pin header (1x5)
CN Location:	See **Figure 31**
CN Pinouts:	See **Table 16**

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.
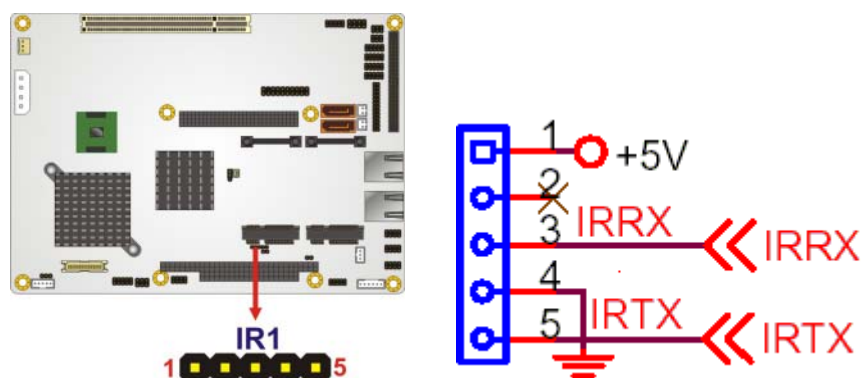
Figure 31: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	+5V
2	NC
3	IR_RX
4	GND
5	IR_TX

Table 16: Infrared Connector Pinouts

Keyboard/Mouse Connector

CN Label:　　　　　**KB1**

CN Type:　　　　　6-pin wafer (1x6)

CN Location:　　　See **Figure 32**

CN Pinouts:　　　　See **Table 17**

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.
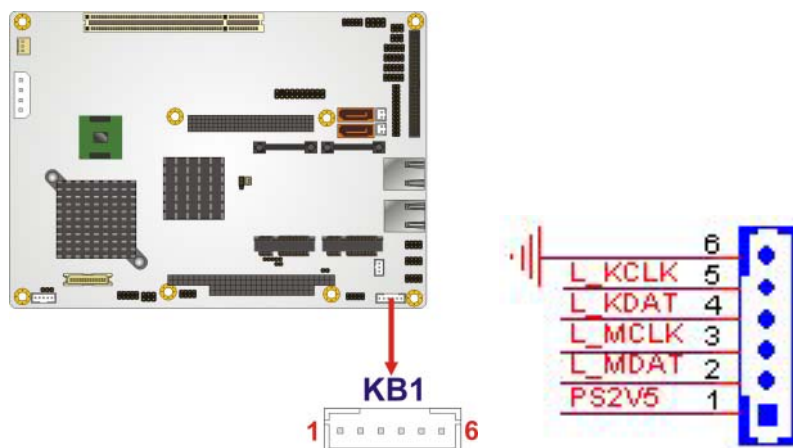
Figure 32: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+2.5V
2	MOUSE DATA
3	MOUSE CLOCK
4	KEYBOARD DATA
5	KEYBOARD CLOCK
6	GND

Table 17: Keyboard/Mouse Connector Pinouts

LVDS LCD Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp (3x10)

CN Location: See **Figure 33**

CN Pinouts: See **Table 18**

The 30-pin LVDS LCD connectors can be connected to single channel or dual channel, 18-bit LVDS panel.
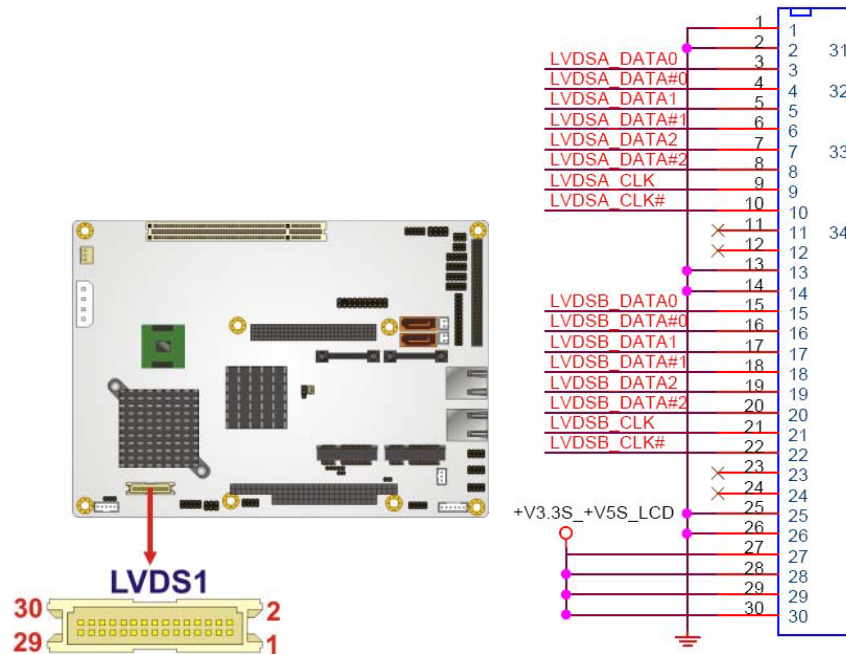
Figure 33: LVDS LCD Connector Pinout Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	LVDSA1+	4	LVDSA1-
5	LVDSA2+	6	LVDSA2-
7	LVDSA3+	8	LVDSA3-
9	LVDSACLK+	10	LVDSACLK-
11	NC	12	NC
13	GND	14	GND
15	LVDSB1+	16	LVDSB1-
17	LVDSB2+	18	LVDSB2-
19	LVDSB3+	20	LVDSB3-
21	LVDSBCLK+	22	LVDSBCLK-
23	NC	24	NC
25	GND	26	GND
27	LCDVCC	28	LCDVCC
29	LCDVCC	30	LCDVCC

Table 18: LVDS LCD Port Connector Pinouts

Parallel Port Connector

CN Label:　　　　J3

CN Type:　　　　26-pin header (2x13)

CN Location:　　See **Figure 34**

CN Pinouts:　　See **Table 19**

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.
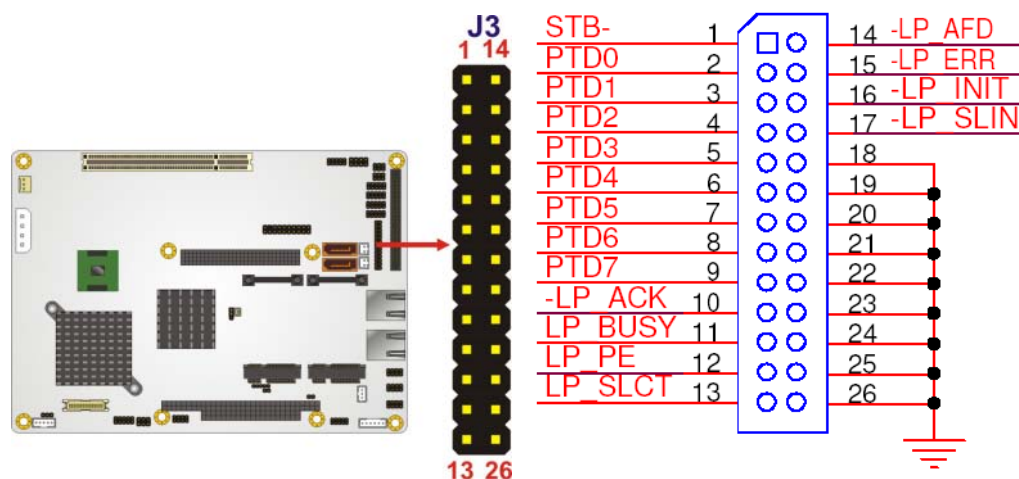
Figure 34: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTOFD#
2	DATA 0	15	ERROR#
3	DATA 1	16	INIT#
4	DATA 2	17	SELIN#
5	DATA 3	18	GND
6	DATA 4	19	GND
7	DATA 5	20	GND
8	DATA 6	21	GND
9	DATA 7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SEL	26	GND

Table 19: Parallel Port Connector Pinouts

SDVO Connector

CN Label: **CN3**

CN Type: 47-pin connector (1x47)

CN Location: See **Figure 35**

CN Pinouts: See **Table 20**

The SDVO (Serial Digital Video Out) port B connector supports additional video signalling interfaces.
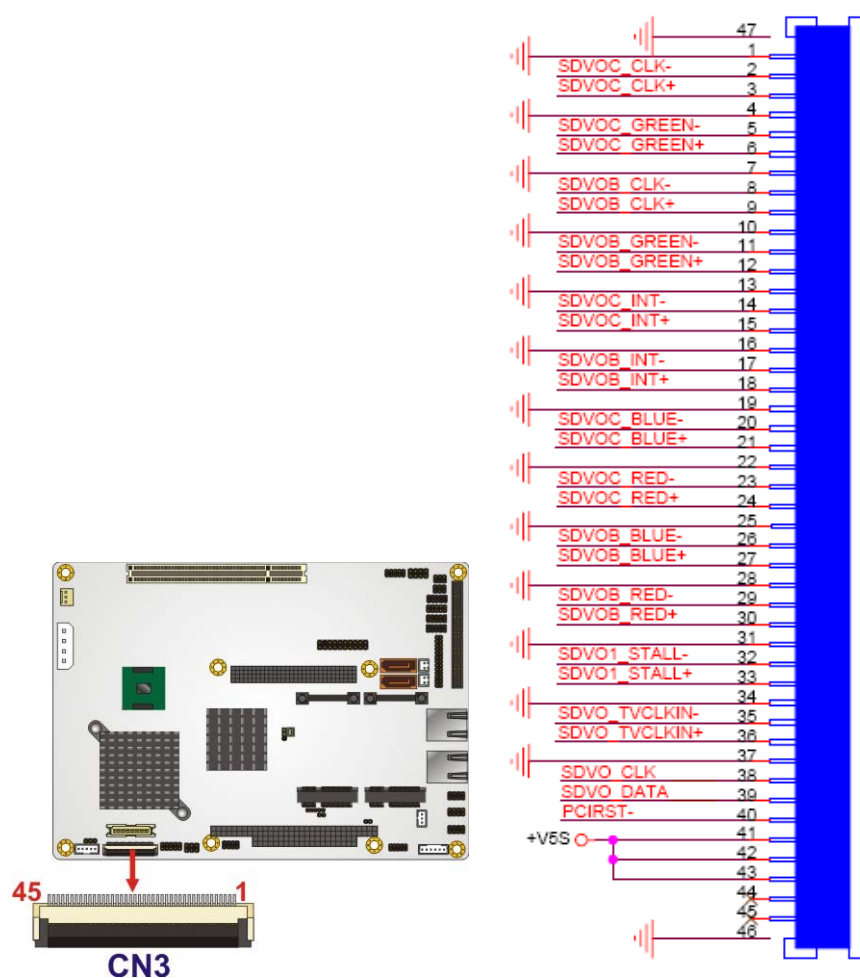
Figure 35: SDVO Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	25	GND
2	SDVOC_CLK-	26	SDVOB_BLUE-
3	SDVOC_CLK+	27	SDVOB_BLUE+
4	GND	28	GND
5	SDVOC_GREEN-	29	SDVOB_RED-
6	SDVOC_GREEN+	30	SDVOB_RED+
7	GND	31	GND
8	SDVOB_CLK-	32	SDVO1_STALL-
9	SDVOB_ CLK+	33	SDVO1_STALL+
10	GND	34	GND
11	SDVOB_GREEN-	35	SDVO_TVCLKIN-
12	SDVOB_GREEN+	36	SDVO_TVCLKIN+
13	GND	37	GND
14	SDVOC_INT+	38	SDVO_CLK
15	SDVOC_INT+	39	SDVO_DATA
16	GND	40	PCIRST
17	SDVOB_INT+	41	+5VS
18	SDVOB_INT+	42	+5VS
19	GND	43	+5VS
20	SDVOC_BLUE-	44	NC
21	SDVOC_BLUE+	45	NC
22	GND	46	GND
23	SDVOC_RED-	47	GND
24	SDVOC_RED+		

Table 20: SDVO Connector Pinouts

SATA Drive Connectors

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

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 36**

CN Pinouts: See **Table 21**

The two SATA drive connectors are each connected to a first generation SATA drive. First generation SATA drives transfer data at speeds as high as 150 Mb/s. The SATA drives can be configured in a RAID configuration.
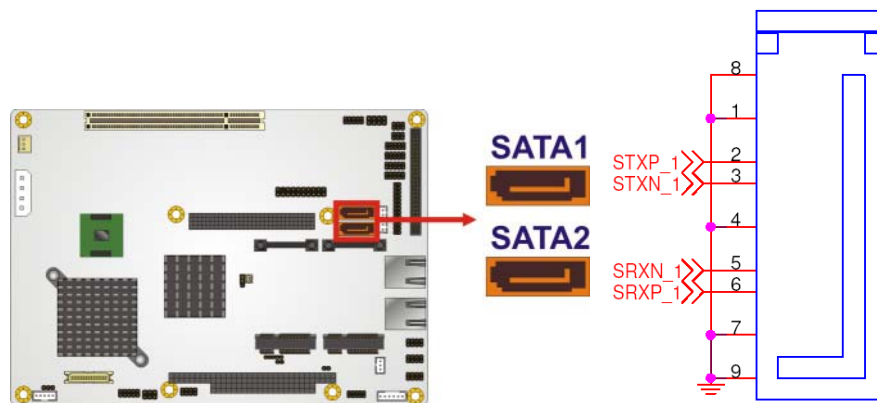
Figure 36: SATA Drive Connector Locations

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

Table 21: SATA Drive Connector Pinouts

SATA Power Connectors

CN Label: **CN1** and **CN2**

CN Type: 2-pin wafer

CN Location: See **Figure 37**

CN Pinouts: See **Table 22**

The SATA power connector provides +5V power to the SATA drive.
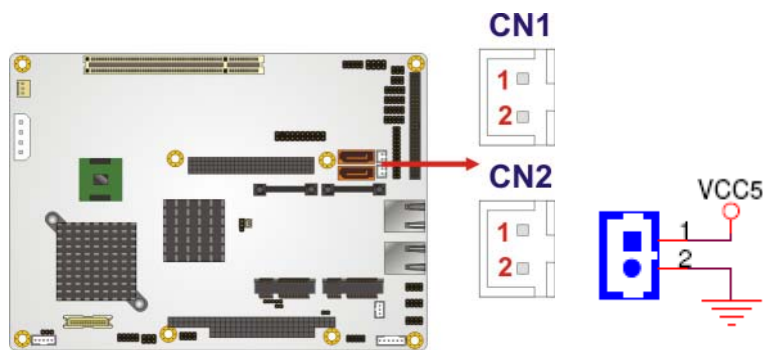
Figure 37: SATA Power Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 22: SATA Power Connector Pinouts

Serial Port Connectors (COM 1 ~ COM 4)

CN Label: **COM1**, **COM2**, **COM3** and **COM4**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 38**

CN Pinouts: See **Table 23**

The 10-pin serial port connector provides a RS-232 serial communications channel. The COM serial port connectors can be connected to external RS-232 serial port devices.
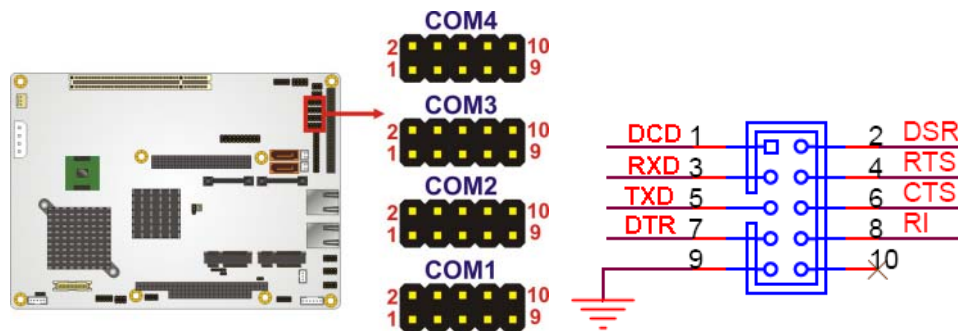
Figure 38: COM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	NC

Table 23: COM Connector Pinouts

COM 3 RS-422/485 Connector

CN Label:	**JP2**
CN Type:	6-pin header (2x3)
CN Location:	See **Figure 39**
CN Pinouts:	See **Table 24**

The COM 3 serial port can be set for RS-422/485 connectivity by on-board jumper (refer to COM 3 Function Select Jumper, page 67). The JP2 connector provides the RS-422 or RS-485 signals when COM 3 is set for RS-422 or RS-485 devices.
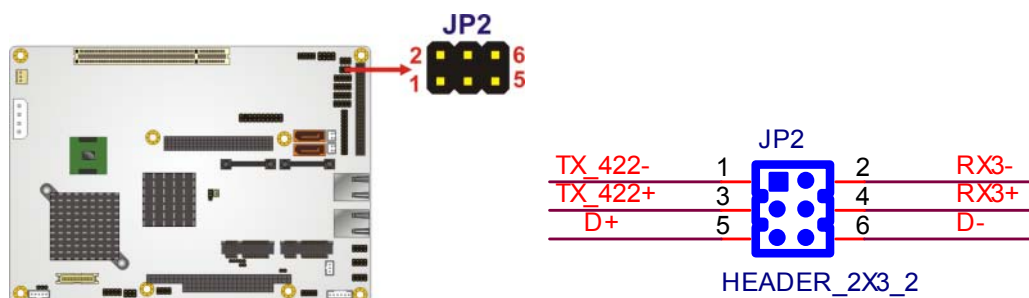
Figure 39: COM 3 RS-422/485 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RS422_TX–	2	RS422_RX–
3	RS422_TX+	4	RS422_RX+
5	RS485_DATA+	6	RS485_DATA–

Table 24: COM 3 RS-422/485 Connector Pinouts

Trusted Platform Module (TPM) Connector

CN Label: TPM1

CN Type: 40-pin header (2x20)

CN Location: See **Figure 40**

CN Pinouts: See **Table 25**

The Trusted Platform Module (TPM) connector secures the system on bootup.
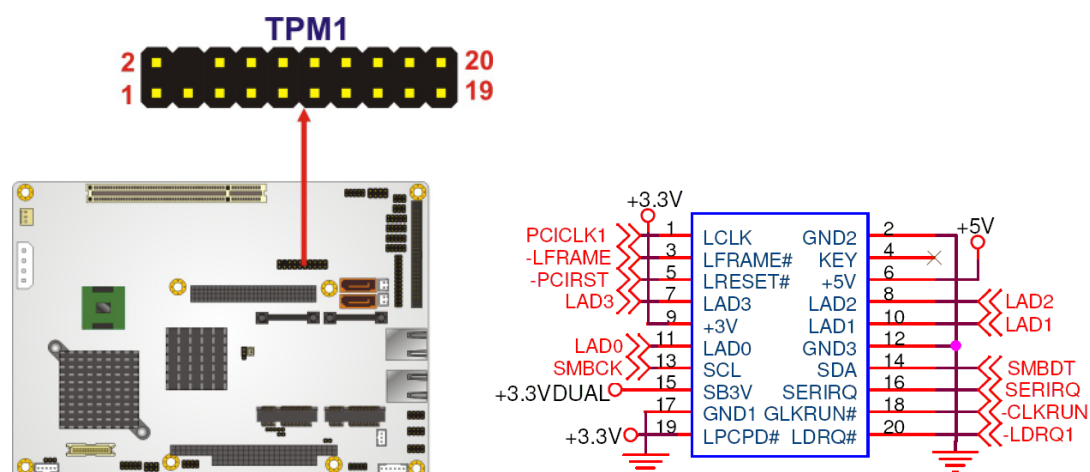
Figure 40: TPM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CLK	2	GND
3	FRAME#	4	KEY
5	RESET#	6	+5V
7	ADDR 3	8	ADDR2
9	+3.3V	10	ADDR 1
11	ADDR 0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	PCPD#	20	DREQ#

Table 25: TPM Connector Pinouts

TV Out Connector

CN Label: **TV1**

CN Type: 6-pin header (2x3)

CN Location: See **Figure 41**

CN Pinouts: See **Table 26**

The 2x3 pin TV out connector connects to a TV output by using an S-Video or RCA connector. The TV out connector makes displaying media data on a television easier.
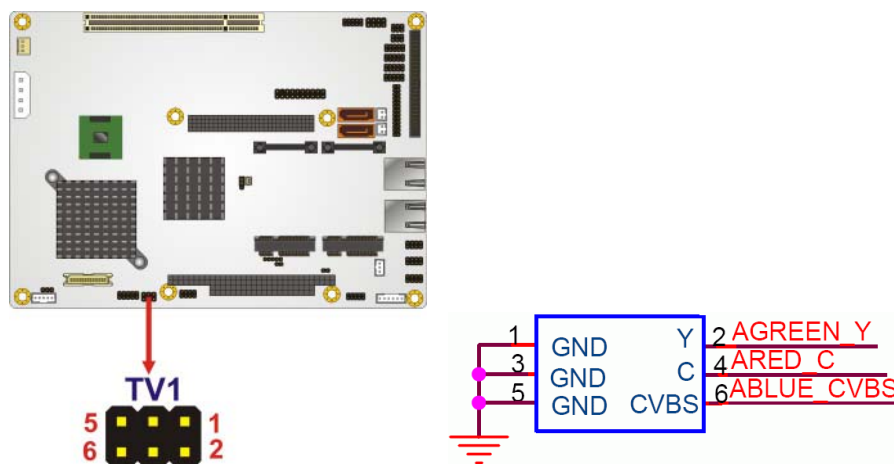
Figure 41: TV Connector Pinout Locations

S-Video Connector			
PIN NO.	**DESCRIPTION**	**PIN NO.**	**DESCRIPTION**
1	GND	2	GREEN / Y
3	GND	4	RED / C
RCA Connector (only video signal)			
5	GND	6	BLUE / CVBS

Table 26: TV Port Connector Pinouts

USB Connectors (Internal)

CN Label: **USB1**, **USB2** and **USB3**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 42**

CN Pinouts: See **Table 27**

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. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.
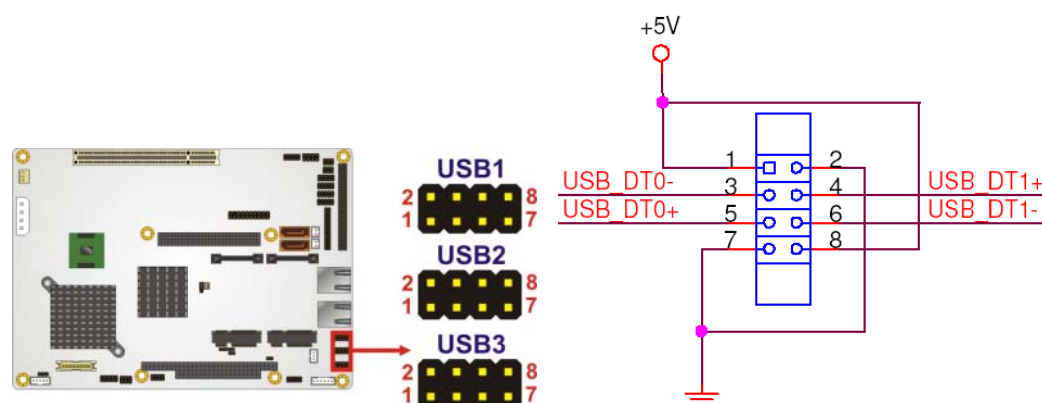
Figure 42: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	+5V

Table 27: USB Port Connector Pinouts

External Peripheral Interface Connector Panel

Figure 43 shows the ALUDRA external peripheral interface connector (EPIC) panel. The ALUDRA EPIC panel consists of two RJ-45 LAN connectors.
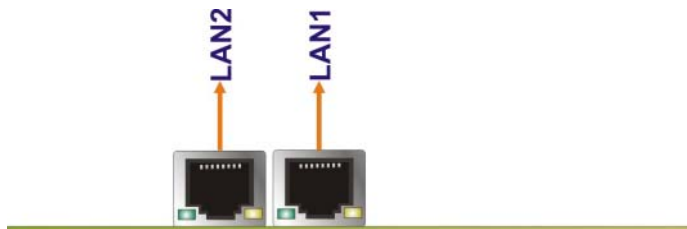
Figure 43: ALUDRA External Peripheral Interface Connector

LAN Connectors

CN Label:	**LAN1** and **LAN2**
CN Type:	RJ-45
CN Location:	See **Figure 43**
CN Pinouts:	See **Table 28**

The ALUDRA is equipped with two built-in RJ-45 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	TX+	5	CT_TERM
2	TX-	6	RX-
3	RX+	7	CT_TERM
4	CT_TERM	8	CT_TERM

Table 28: LAN Pinouts
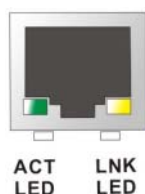
Figure 44: RJ-45 Ethernet Connector

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 29**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 29: RJ-45 Ethernet Connector LEDs

Installation

Installation Considerations

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

Installation Notices

The installation instructions described in this manual should be carefully followed in order to prevent damage to the ALUDRA, ALUDRA 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 ALUDRA 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 ALUDRA 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 ALUDRA off:

  - When working with the ALUDRA, 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 ALUDRA **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.

Installation Checklist

The following checklist is provided to ensure the ALUDRA 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 ALUDRA is inserted into a chassis with adequate ventilation

- The correct power supply is being used

- The following devices are properly connected

    - Primary and secondary IDE device
    - SATA drives
    - Power supply
    - USB cable
    - Serial port cable

- The following external peripheral devices are properly connected to the chassis:

    - VGA screen
    - Keyboard
    - Mouse
    - RS-232 serial communications device
    - USB devices

SO-DIMM and CF Card Installation

SO-DIMM Installation

> ⚠️ Using incorrectly specified SO-DIMM may cause permanently damage the ALUDRA. Please make sure the purchased SO-DIMM complies with the memory specifications of the ALUDRA.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 45**.
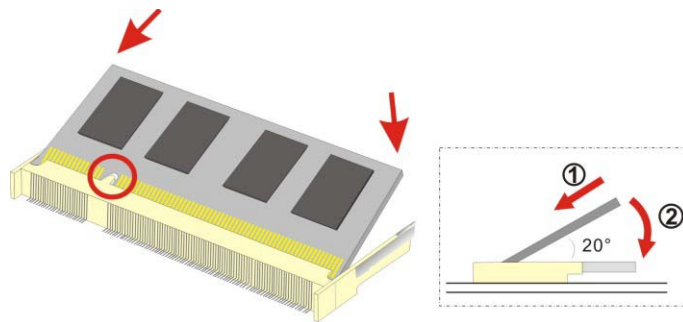
Figure 45: SO-DIMM Installation

1   Locate the SO-DIMM socket. Place the ALUDRA on an anti-static pad with the solder side facing up.

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.

3   Insert the SO-DIMM. Push the SO-DIMM chip into the socket at an angle. (See Figure 45)

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 45**)

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.

CF Card Installation

> The ALUDRA can support both CF Type I cards and CF Type II cards.

To install the a CF card (Type I or Type II) onto the ALUDRA, please follow the steps below:

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

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

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 46**.
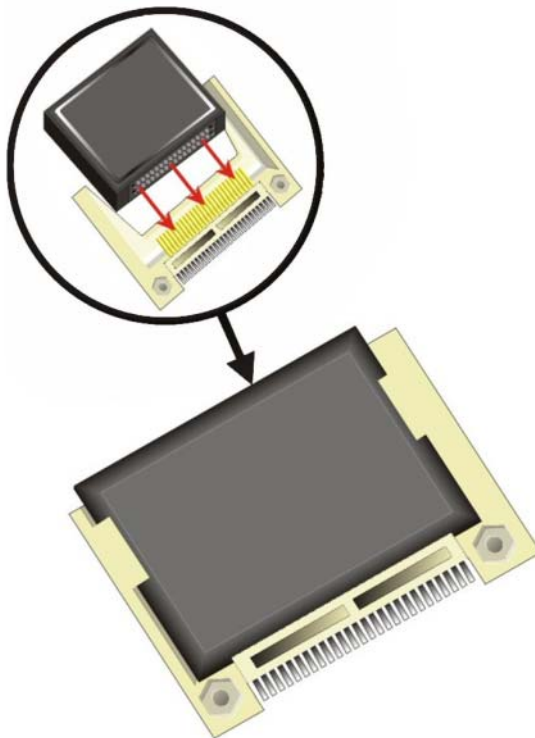
Figure 46: CF Card Installation

Jumper Settings

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.
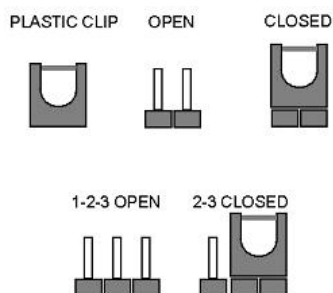
Figure 47: Jumper Locations

Before the ALUDRA is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the ALUDRA are listed in **Table 30**.

Description	Label	Type
AT Power Mode Setting	ATXCTL1	2-pin header
CF Card Setting	J_CF1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
COM3 Function Select	JP1	6-pin header
LVDS Panel Resolution	J_LCD_TYPE1	8-pin header
LVDS Voltage Select	J_VLVDS1	3-pin header

Table 30: Jumpers

AT Power Select Jumper Settings

Jumper Label: **ATXCTL1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 31**

Jumper Location: See **Figure 48**

The AT Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 31**.

AT Power Select	Description	
Open	Use ATX power	Default
Short	Use AT power	

Table 31: AT Power Select Jumper Settings

The location of the AT Power Select jumper is shown in **Figure 48** below.
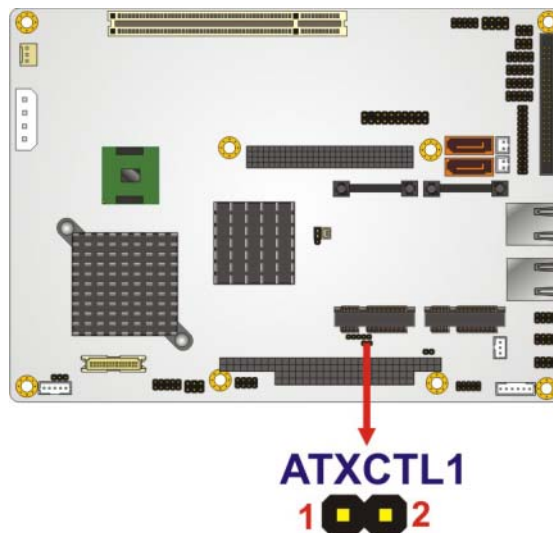
Figure 48: AT Power Select Jumper Location

CF Card Setup

Jumper Label:	J_CF1
Jumper Type:	2-pin header
Jumper Settings:	See **Table 32**
Jumper Location:	See **Figure 49**

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 32**.

CF Card Setup	Description	
Open	**Slave**	**Default**
Closed	**Master**	

Table 32: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in **Figure 49**.
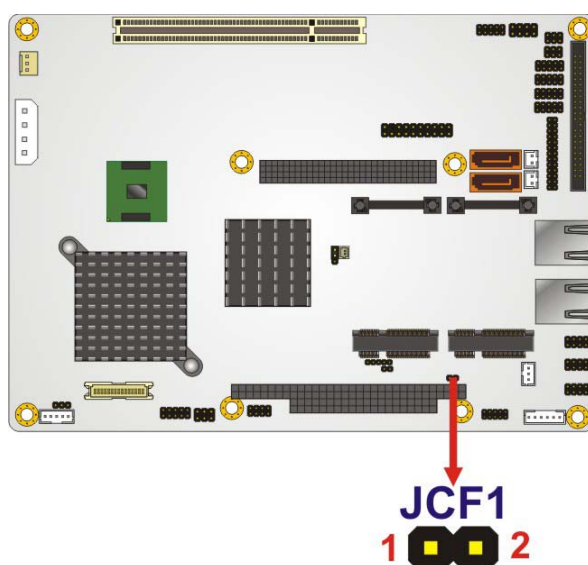
Figure 49: CF Card Setup Jumper Location

Clear CMOS Jumper

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 33**
Jumper Location:	See **Figure 50**

If the ALUDRA 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 33**.

Clear CMOS	Description	
Short 1 – 2	Keep CMOS Setup	Default
Short 2 – 3	Clear CMOS Setup	

Table 33: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 50** below.
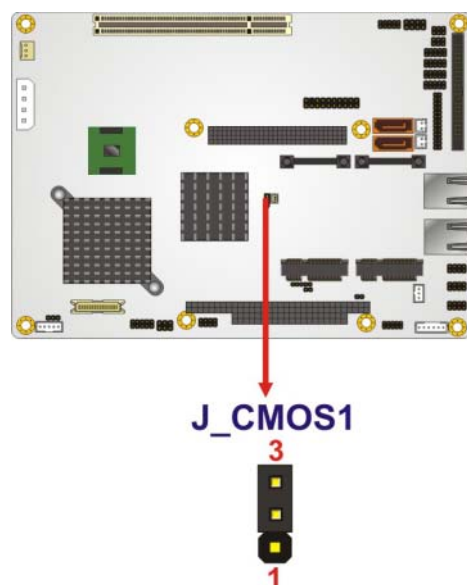
Figure 50: Clear CMOS Jumper

COM 3 Function Select Jumper

Jumper Label: **JP1**

Jumper Type: 6-pin header

Jumper Settings: See **Table 34**

Jumper Location: See **Figure 51**

The COM 3 Function Select jumper sets the communication protocol used by the third serial communications port (COM 3) as RS-232, RS-422 or RS-485. The COM 3 Function Select settings are shown in **Table 34**.

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

Table 34: COM 3 Function Select Jumper Settings

The COM 3 Function Select jumper location is shown in **Figure 51**.
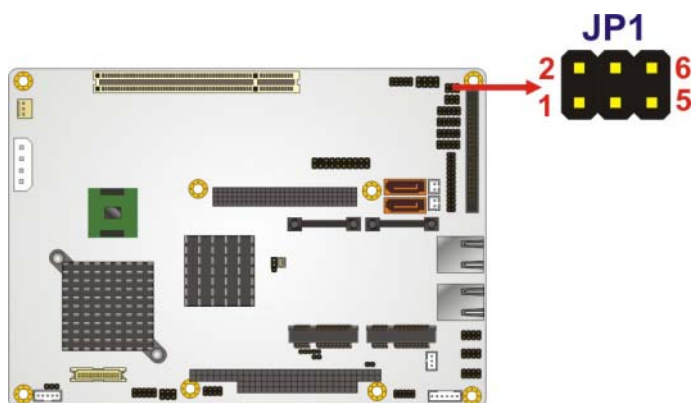
Figure 51: COM 3 Function Select Jumper Location

LVDS Panel Resolution Jumper

Jumper Label:	**J_LCD_TYPE1**
Jumper Type:	8-pin header
Jumper Settings:	See **Table 35**
Jumper Location:	See **Figure 52**

The LVDS Panel Resolution jumper allows the resolution of the LVDS screens connected to the LVDS1 connector to be configured. The LVDS Panel Resolution jumper settings are shown in **Table 35**.

J_LCD_TYPE1	Description
Open	**640 x 480 (18-bit)**
Short 1-2	**800 x 480 (18-bit)**
Short 3-4	**800 x 600 (18-bit)**
Short 1-2, 3-4	**1024 X 768 (18-bit)**
Short 5-6	**1280X1024 (36-bit)**
Short 1-2, 5-6	**1400 X 1050 (36-bit)**
Short 3-4, 5-6	**1400 x 900 (36-bit)**
Short 1-2, 3-4, 5-6	**1600 x 1200 (36-bit)**

Table 35: LVDS Panel Resolution Jumper Settings

The LVDS Panel Resolution jumper location is shown in **Figure 52**.
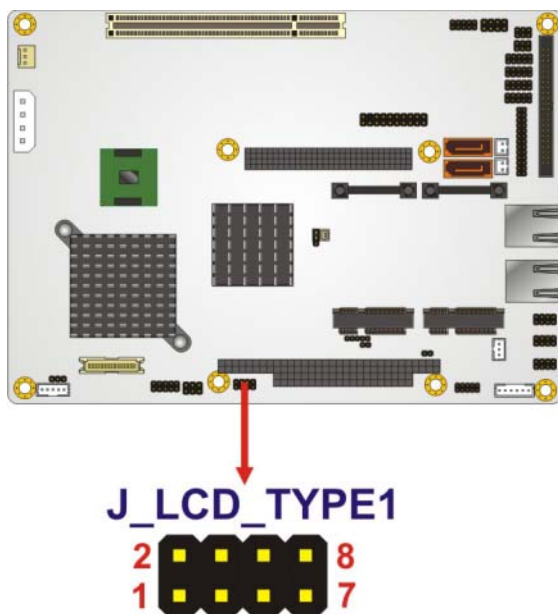
Figure 52: LVDS Panel Resolution Jumper Pinout Locations

LVDS Voltage Selection

⚠ Permanent damage to the screen and ALUDRA 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 36**

Jumper Location: See **Figure 53**

The **LVDS Voltage Selection** jumpers allow the LVDS screen voltages to be set. J_VLVDS1 sets the voltage connected to LVDS1 and J_VLVDS2 sets the voltage for the screen connected to LVDS2. The **LVDS Voltage Selection** jumper settings are shown in **Table 36**.

LCD Voltage Select	Description	
Short 1-2	+3.3V LVDS	Default
Short 2-3	+5V LVDS	

Table 36: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in **Figure 53**.
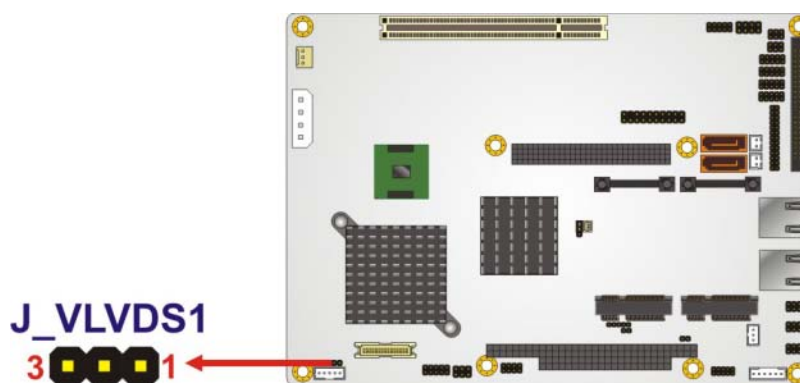
Figure 53: LVDS Voltage Selection Jumper Pinout Locations

Chassis Installation

Airflow

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

The ALUDRA 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.

ℹ️ Eurotech has a wide range of backplanes available. Please contact a Eurotech sales representative or visit the Eurotech website to find out more about the available chassis. See Eurotech Group Worldwide Presence, page 122 for contact details.

Motherboard Installation

To install the ALUDRA motherboard into the chassis please refer to the reference material that came with the chassis.

Internal Peripheral Device Connections

A list of available cables for the ALUDRA can be found in Appendix E – Cable Kit and Optional Items, page 120.

Audio Kit Installation

The audio kit consists of three audio jacks wired to a 10-pin audio connector. 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:

1   **Locate the audio connector**. The location of the 10-pin audio connector is shown in Connectors, page 31.

2   **Align pin 1**. Align pin 1 on the on-board connector with pin 1 of the audio kit connector. Pin 1 of the audio kit connector is indicated with a white dot.
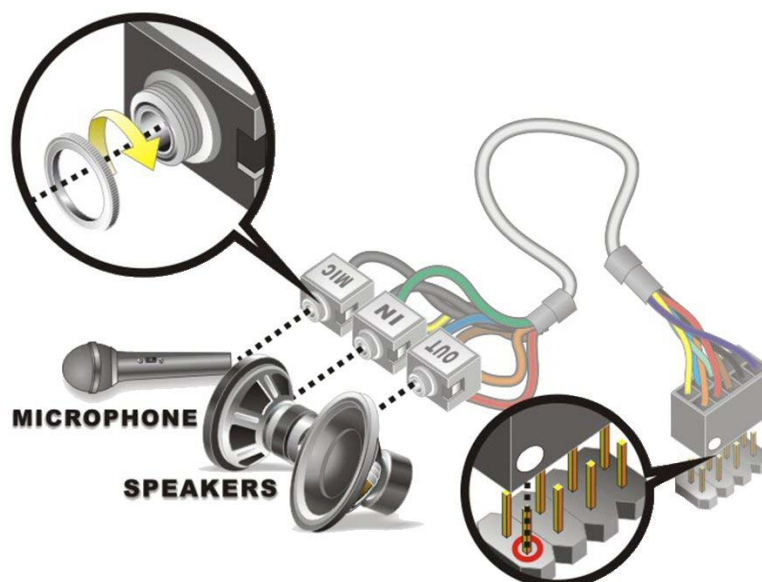
Figure 54: Audio Kit Cable Connection

3   **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.

Keyboard/Mouse Y-cable Connector

The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the ALUDRA 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 connectors please follow the steps below.

1 **Locate the connector**. The location of the keyboard/mouse Y-cable connector is shown in Connectors, page 31.

2 **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the ALUDRA keyboard/mouse connector. See **Figure 55**.

3 **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the ALUDRA, connect the cable connector to the on-board connectors. See **Figure 55**.
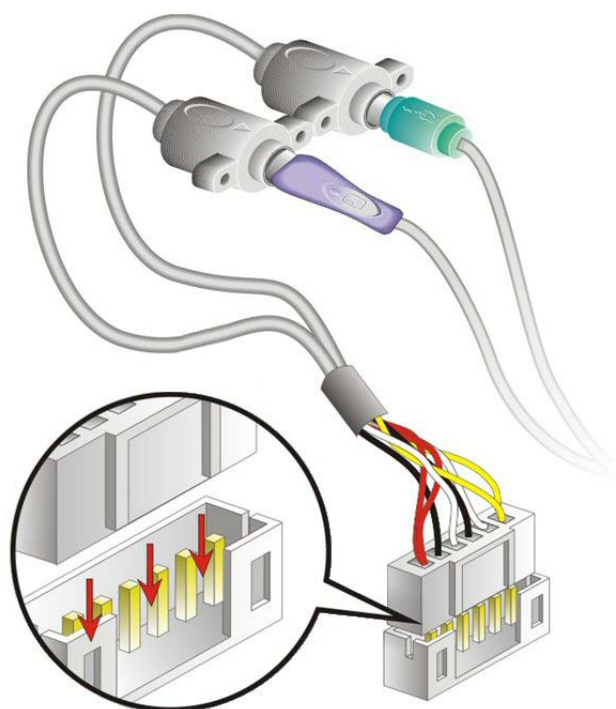
Figure 55: Keyboard/mouse Y-cable Connection

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.

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.

RS-232 Cable (w/o Bracket)

The RS-232 cable consists of one serial port connector attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the RS-232 cable, please follow the steps below.

1   **Locate the connector**. The location of the RS-232 connector is shown in

2   **Insert the cable connector**. Insert the connector into the serial port box header. See **Figure 56**. The red wire in the RS232 cable indicates pin 1. Align pin 1 of the on-board connector with pin 1 of the RS232 cable connector.
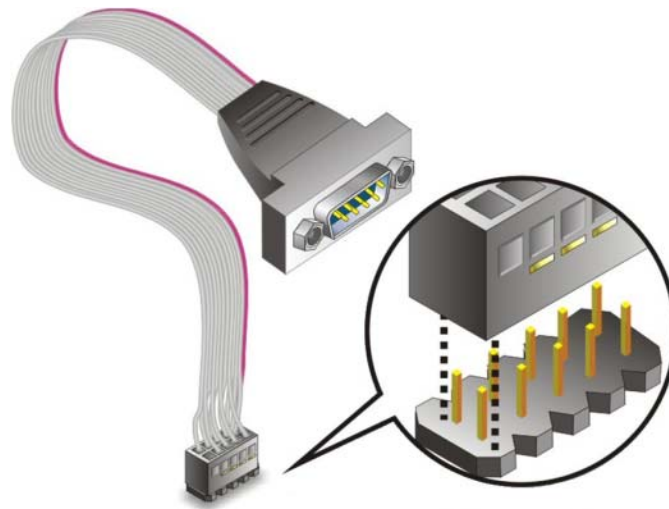
Figure 56: Single RS-232 Cable Installation

3   **Secure the bracket**. The RS-232 connector has two retention screws that must be secured to a chassis or bracket.

4   **Connect the serial device**. Once the RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

SATA Drive Connection

To connect the SATA drives to the connectors, please follow the steps below.

1 **Locate the connectors**. The locations of the SATA drive connectors are shown in Connectors, page 31.

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 on-board SATA drive connector. See **Figure 57**.
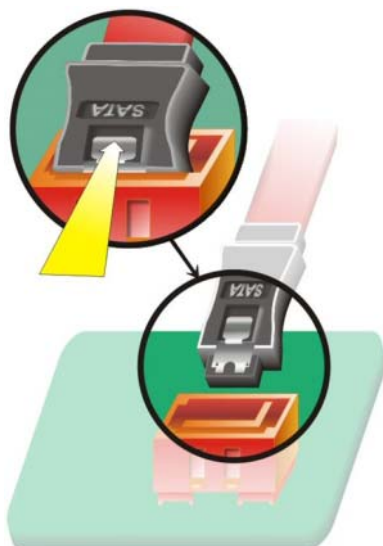
Figure 57: SATA Drive Cable Connection

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 58**.

4 **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 58**.

Figure 58: SATA Power Drive Connection

USB Cable (Dual Port without Bracket)

To connect the dual port USB 2.0 cable, please follow the steps below.

1   **Locate the connectors**. The locations of the USB connectors are shown in Connectors, page 31.

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

2   **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the ALUDRA USB connector.

3   **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the ALUDRA, connect the cable connectors to the on-board connectors. See **Figure 59**.
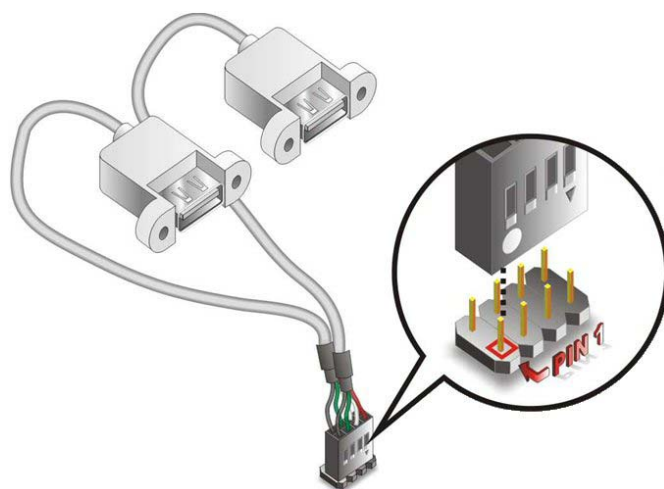
Figure 59: Dual USB Cable Connection

4   **Attach the USB connectors to the chassis**. The USB 2.0 connectors have two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

External Peripheral Interface Connection

An RJ-45 Ethernet cable connector can be connected to the external peripheral interface connectors.

To install this device, connect the corresponding cable connector from the actual device to the corresponding ALUDRA external peripheral interface connector making sure the pins are properly aligned.

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.

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

2 **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the ALUDRA. See **Figure 60**.
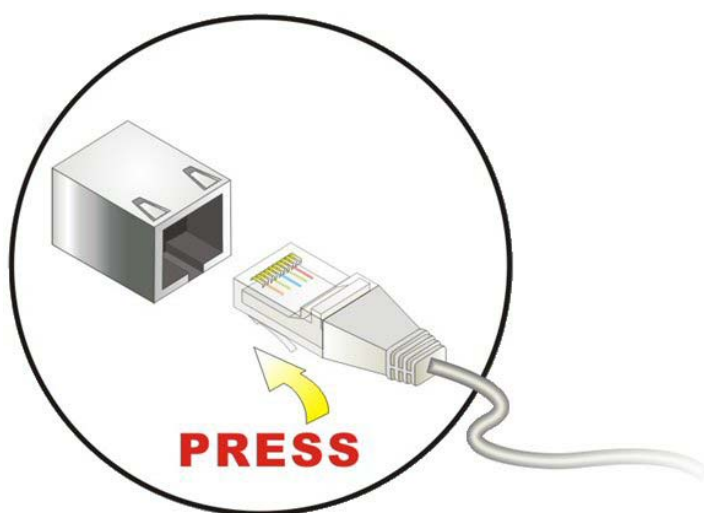
Figure 60: LAN Connection

3 **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

AMI BIOS

A licensed copy of AMI BIOS is pre-programmed 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.

Starting Setup

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

- Press the DELETE key as soon as the system is turned on or

- 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.

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

Table 37: BIOS Navigation Keys

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.

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 <u>Installation</u>, page <u>59</u>.

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.

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 SETUP UTILITY
   Main    Advanced   PCIPnP    Boot    Security   Chipset    Exit

   System Overview                              Use [ENTER], [TAB] or
   ──────────────────────────────────          [SHIFT-TAB] to select
   AMIBIOS                                      a field.
   Version   :08.00.15
   Build Date:10/09/08                          Use [+] or [-] to
   ID        :E225MR12                          configure system
   0                                            Time.

   Processor
   Genuine Intel® CPU N279 @ 1.60GHz
   Speed     :1600MHz
   Count     :1
                                                ←→      Select Screen
   System Memory                                ↑↓      Select Item
   Size      :504MB                             +-      Change Field
                                                Tab     Select Field
   System Time            [14:20:27]            F1      General Help
   System Date            [Tue 09/24/2008]      F10     Save and Exit
                                                ESC     Exit

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```

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.

Advanced

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

> ⚠ 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, page 81.
- IDE Configuration, page 82.
- SuperIO Configuration, page 87.
- Hardware Health Configuration, page 91.
- Power Configuration, page 93.
- Remote Access Configuration, page 96.
- USB Configuration, page 98.
- Trusted Computing, page 99.

```
                          BIOS SETUP UTILITY
  Main    Advanced   PCIPnP    Boot    Security    Chipset    Exit

  Advanced Settings                            Configure CPU

  WARNING: Setting wrong values in below sections
           may cause system to malfunction

  ▶ CPU Configuration
  ▶ IDE Configuration
  ▶ SuperIO Configuration
  ▶ Hardware Health Configuration
  ▶ Power Configuration
  ▶ Remote Access Configuration
  ▶ USB Configuration
  ▶ Trusted Computing
                                          ←→    Select Screen
                                          ↑↓    Select Item
                                          Enter Go to SubScreen
                                          F1    General Help
                                          F10   Save and Exit
                                          ESC   Exit


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```

BIOS Menu 2: Advanced

CPU Configuration

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

```
                    BIOS SETUP UTILITY
        Advanced
┌────────────────────────────────────────┬─────────────────────────┐
│ Configure advanced CPU settings         │                         │
│ Module Version - 3F.10                  │                         │
│                                         │                         │
│ Manufacturer:Intel                      │                         │
│ Genuine Intel(R) CPU N270  @ 1.60GHz    │                         │
│ Frequency   :1.60GHz                    │                         │
│ FSB Speed   :533MHz                     │                         │
│                                         │                         │
│ Cache L1    :24 KB                      │                         │
│ Cache L2    :512 KB                     │                         │
│                                         │                         │
│ Ratio Actual Value:12                   │                         │
│                                         │                         │
│                                         │ ←→    Select Screen     │
│                                         │ ↑↓    Select Item       │
│                                         │ F1    General Help      │
│                                         │ F10   Save and Exit     │
│                                         │ ESC   Exit              │
│                                         │                         │
└────────────────────────────────────────┴─────────────────────────┘
        v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.
```
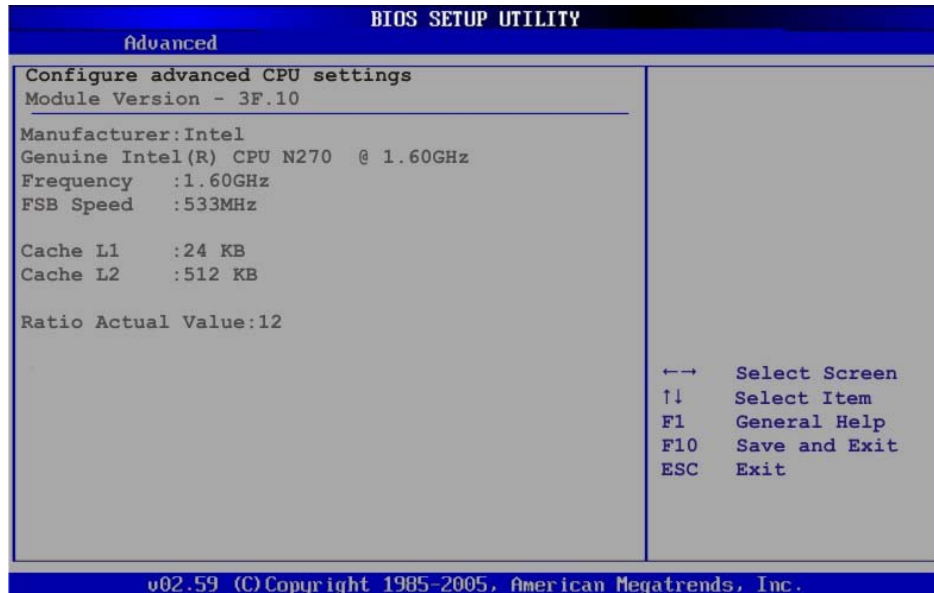
BIOS Menu 3: CPU Configuration

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
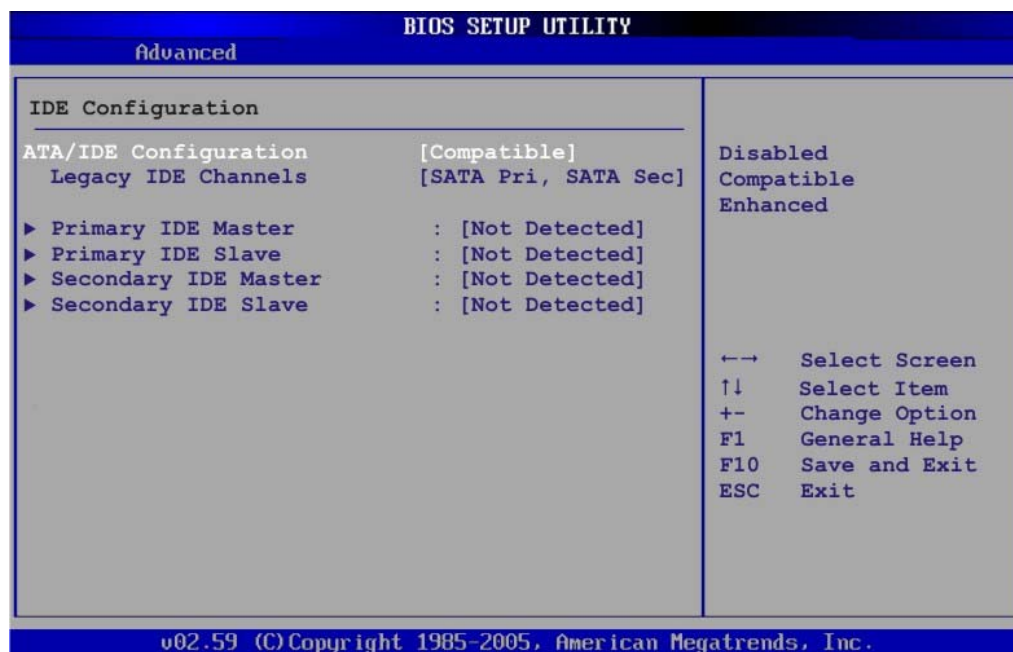
- **Cache L1**: Lists the CPU L1 cache size

- **Cache L2**: Lists the CPU L2 cache size

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 SETUP UTILITY
       Advanced

   IDE Configuration

   ATA/IDE Configuration          [Compatible]       Disabled
      Legacy IDE Channels         [SATA Pri, SATA Sec]  Compatible
                                                      Enhanced
   ▶ Primary IDE Master           : [Not Detected]
   ▶ Primary IDE Slave            : [Not Detected]
   ▶ Secondary IDE Master         : [Not Detected]
   ▶ Secondary IDE Slave          : [Not Detected]


                                                      ←→    Select Screen
                                                      ↑↓    Select Item
                                                      +-    Change Option
                                                      F1    General Help
                                                      F10   Save and Exit
                                                      ESC   Exit


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```

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	DEFAULT	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		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]

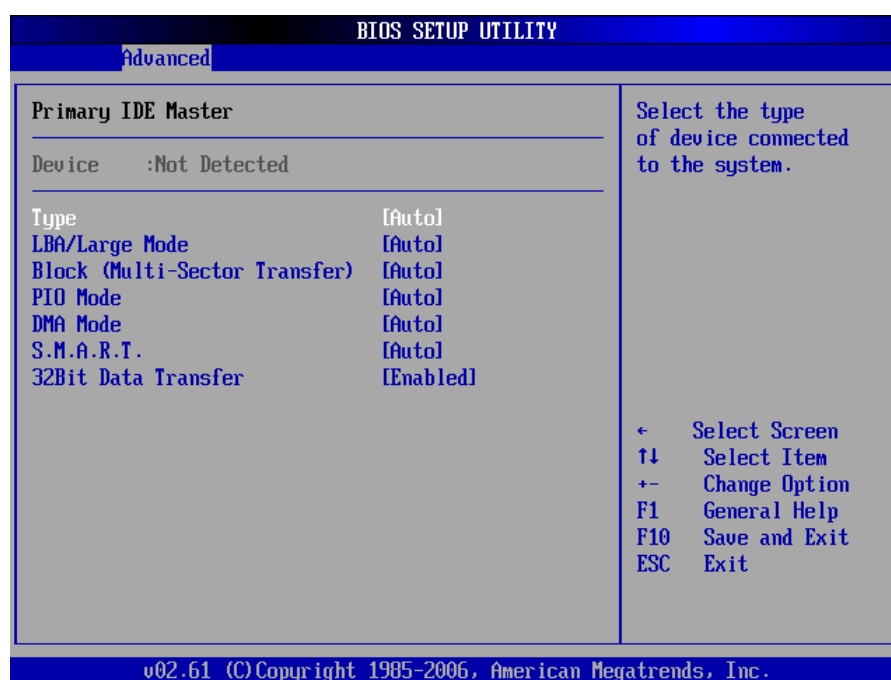|		
SATA Only		Only the SATA drives are enabled.
SATA Pri, PATA Sec	DEFAULT	The IDE drives are enabled on the Primary IDE channel. The SATA drives are enabled on the Secondary IDE channel.
PATA Only		The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

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 below appear.

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 SETUP UTILITY
     Advanced

  Primary IDE Master                           Select the type
  _____          of device connected
  Device    :Not Detected                      to the system.
  _____

  Type                      [Auto]
  LBA/Large Mode            [Auto]
  Block (Multi-Sector Transfer)  [Auto]
  PIO Mode                  [Auto]
  DMA Mode                  [Auto]
  S.M.A.R.T.                [Auto]
  32Bit Data Transfer       [Enabled]


                                              ←    Select Screen
                                              ↑↓   Select Item
                                              +-   Change Option
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit



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```

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		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		BIOS is prevented from using the LBA mode control on the specified channel.
Auto	DEFAULT	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		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	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.

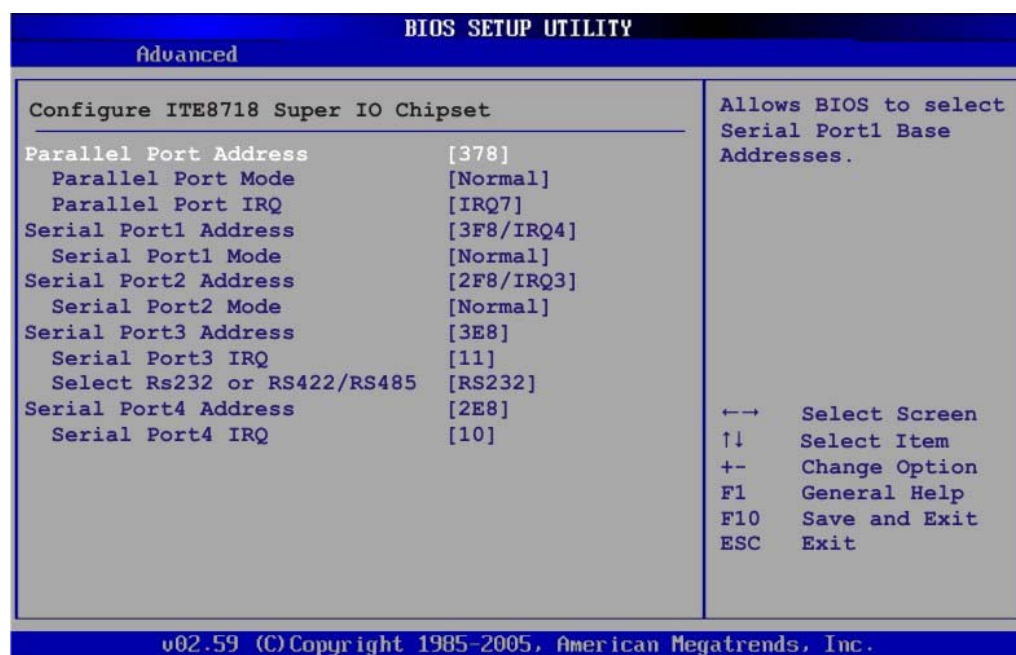|		
Auto	DEFAULT	BIOS auto detects HDD SMART support.
Disabled		Prevents BIOS from using the HDD SMART feature.
Enabled		Allows BIOS to use the HDD SMART feature

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.

Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
                      BIOS SETUP UTILITY
     Advanced

 Configure ITE8718 Super IO Chipset        Allows BIOS to select
                                           Serial Port1 Base
 Parallel Port Address        [378]        Addresses.
   Parallel Port Mode         [Normal]
   Parallel Port IRQ          [IRQ7]
 Serial Port1 Address         [3F8/IRQ4]
   Serial Port1 Mode          [Normal]
 Serial Port2 Address         [2F8/IRQ3]
   Serial Port2 Mode          [Normal]
 Serial Port3 Address         [3E8]
   Serial Port3 IRQ           [11]
   Select Rs232 or RS422/RS485  [RS232]
 Serial Port4 Address         [2E8]        ←→    Select Screen
   Serial Port4 IRQ           [10]         ↑↓    Select Item
                                           +-    Change Option
                                           F1    General Help
                                           F10   Save and Exit
                                           ESC   Exit

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```

BIOS Menu 6: Super IO Configuration

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+EPP		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
		The parallel port is also be compatible with EPP devices described above

Parallel Port IRQ [IRQ7]

Use the **Parallel Port IRQ** selection 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

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
IrDA		Serial Port 1 mode is IrDA
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 base addresses for serial port 3

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
2F0		Serial port 3 I/O port address is 2F0
2E0		Serial port 3 I/O port address is 2E0

Serial Port3 IRQ [11]

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

10		Serial port 3 IRQ address is 10
11	DEFAULT	Serial port 3 IRQ address is 11

Select RS232 or RS485/RS422 [RS/232]

Use the **Select RS232 or RS485/RS422** option to select the Serial Port 3 signalling mode.

RS232	DEFAULT	Serial Port 2 signaling mode is RS-232
RS422/RS485		Serial Port 2 signaling mode is RS-422 or RS-485

Serial Port4 Address [2E8]

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

Disabled		No base address is assigned to serial port 3
3E8		Serial port 4 I/O port address is 3E8
2E8	DEFAULT	Serial port 4 I/O port address is 2E8
2F0		Serial port 4 I/O port address is 2F0
2E0		Serial port 4 I/O port address is 2E0

Serial Port4 IRQ [10]

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

10	DEFAULT	Serial port 4 IRQ address is 10
11		Serial port 4 IRQ address is 11

Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.

```
                        BIOS SETUP UTILITY
      Advanced

Hardware Health Configuration                   Fan configuration
                                                mode setting
CPU FAN Mode Setting              [Full On mode]

CPU Temperature                   :43°C/109°F
System Temperature                :40°C/104°F

CPU Fan Speed                     :N/A

CPU Core                          :1.088 V
+1.05V                            :1.024 V
+3.30V                            :3.312 V
+5.00V                            :5.026 V
+12.0V                            :12.160 V           ←→   Select Screen
+1.5V                             :1.504 V            ↑↓   Select Item
+1.8V                             :1.776 V            F1   General Help
5VSB                              :5.026 V            F10  Save and Exit
VBAT                              :3.232 V            ESC  Exit



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```

BIOS Menu 7: Hardware Health Configuration

CPU FAN Mode Setting [Full On Mode]

Use the **CPU FAN Mode Setting** option to configure the second fan.

Full On Mode	DEFAULT	Fan is on all the time
Automatic mode		Fan is off when the temperature is low enough. Parameters must be set by the user.
PWM Manual mode		Pulse width modulation set manually

When the **CPU FAN Mode Setting** option is in the **Automatic Mode**, the following parameters can be set.

- CPU Temp. Limit of OFF
- CPU Temp. Limit of Start
- CPU Fan Start PWM
- Slope PWM 1

When the **CPU FAN Mode Setting** option is in the **PWM Manual Mode**, the following parameters can be set.

- CPU Fan PWM control

CPU Temp. Limit of OFF [000]

⚠️ Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of OFF** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of OFF** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temp. Limit of OFF** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

CPU Temp. Limit of Start [020]

⚠️ Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of Start** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Start** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **Fan 3 Start PWM** option below. To select a value, select the **CPU Temp. Limit of Start** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

CPU Fan Start PWM [070]

The **Fan 3 Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Fan 3 Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **Temperature 3 Limit of Start** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **Fan 3 Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

Slope PWM [0.5 PWM]

The **Slope PWM 1** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM 1** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. A list of available options is shown below:

- 0.125 PWM
- 0.25 PWM
- 0.5 PWM
- 1 PWM

- 2 PWM
- 4 PWM
- 8 PWM
- 15 PWM

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored

  CPU Temperature

  System Temperature

- **Fan Speeds**: The CPU cooling fan speed is monitored.

  CPU Fan Speed

- **Voltages**: The following system voltages are monitored

  CPU Core

  +1.05V

  +3.30V

  +5.00V

  +12.0 V

  +1.5V

  +1.8V

  5VSB

  VBAT

Power Configuration

The **Power Configuration** menu (**BIOS Menu 8**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.

```
                      BIOS SETUP UTILITY
    Advanced

 Select AT/ATX Power          [ATX Power]        If Set BYHARDWARE is
                                                 detect power supply
 ▶ APM Configuration                             status.




                                                 ←→     Select Screen
                                                 ↑↓     Select Item
                                                 +-     Change Option
                                                 F1     General Help
                                                 F10    Save and Exit
                                                 ESC    Exit

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```
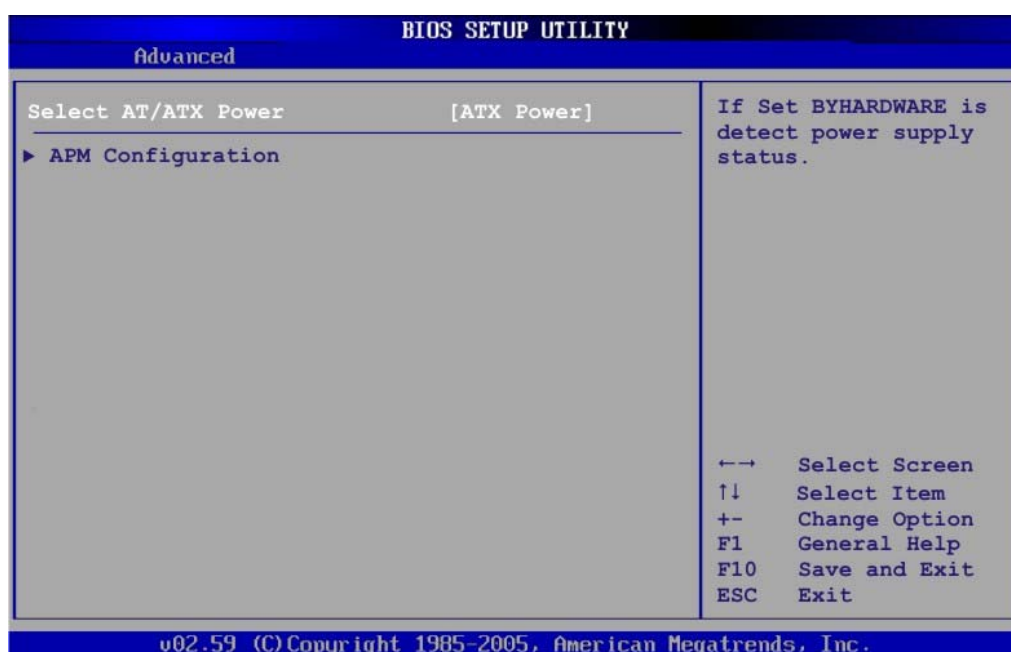
BIOS Menu 8: Power Configuration

APM Configuration

The **APM Configuration** menu (**BIOS Menu 9**) allows the advanced power management options to be configured.
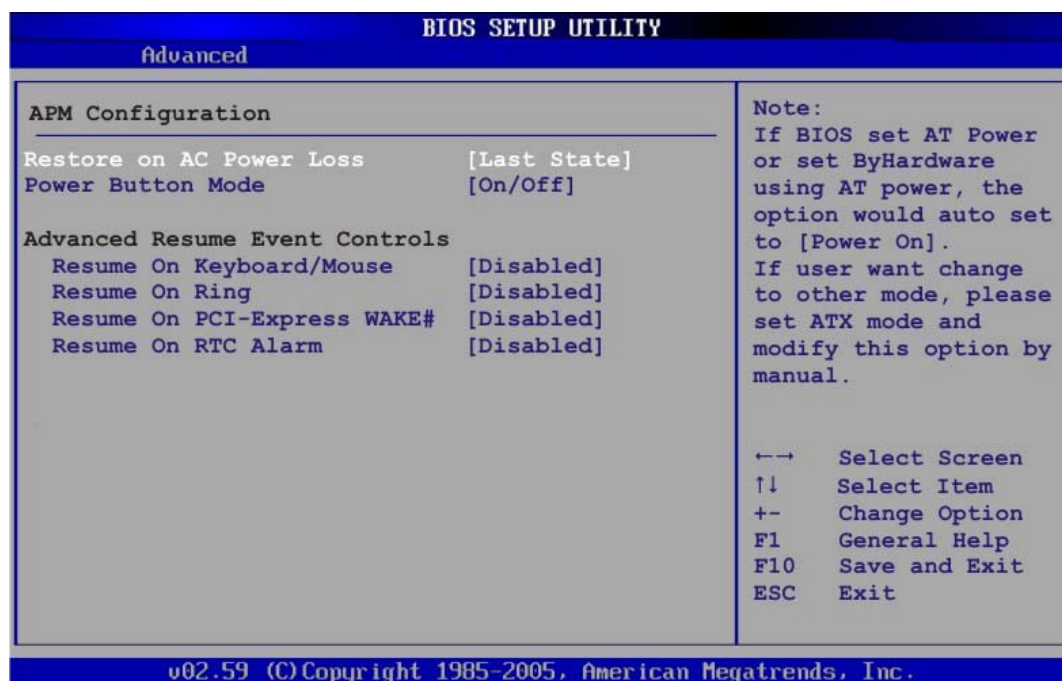
BIOS Menu 9:Advanced Power Management Configuration

Restore on AC Power Loss [Last State]

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.

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

Resume on Keyboard/Mouse [Disabled]

Use the **Resume on Keyboard/Mouse** BIOS option to enable activity on either the keyboard or mouse to rouse the system from a suspend or standby state. That is, the system is roused when the mouse is moved or a button on the keyboard is pressed.

Disabled	DEFAULT	Wake event not generated by activity on the keyboard or mouse
Enabled		Wake event generated by activity on the keyboard or mouse

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 PCI-Express WAKE# [Disabled]

Use the **Resume PCI-Express WAKE#** BIOS option to enable activity on the PCI-Express WAKE# signal to rouse the system from a suspend or standby state.

Disabled	DEFAULT	Wake event not generated by PCI-Express WAKE# signal activity
Enabled		Wake event generated by PCI-Express WAKE# signal 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.

Remote Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 10**) 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 SETUP UTILITY
        Advanced

   Configure Remote Access type and parameters          Select Remote Access
   _____          type.

   Remote Access                  [Disabled]




                                                   ←→      Select Screen
                                                   ↑↓      Select Item
                                                   +-      Change Option
                                                   F1      General Help
                                                   F10     Save and Exit
                                                   ESC     Exit


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```
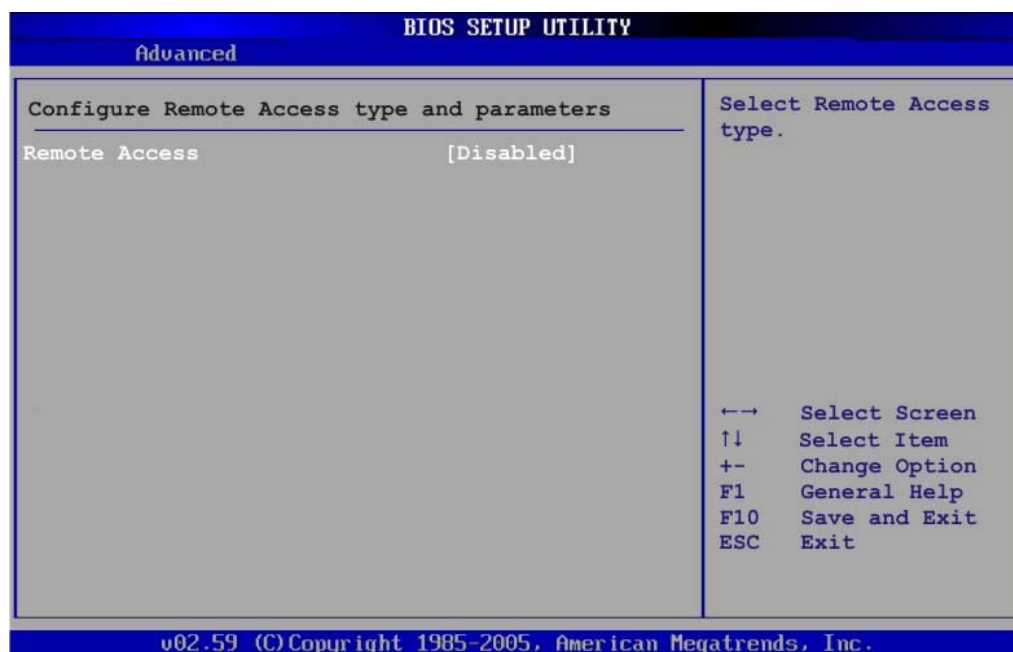
BIOS Menu 10: Remote Access Configuration [Advanced]

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
- Redirection after BIOS POST
- Terminal Type

These configuration options are discussed below.

AMI BIOS

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
COM3		System is remotely accessed through COM3
COM4		System is remotely accessed through COM4

> *i* Make sure the selected COM port is enabled through the Super I/O configuration menu.

Base Address, IRQ [3F8h, 4]

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

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

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 OS's 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

USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 11**) to read USB configuration information and configure the USB settings.
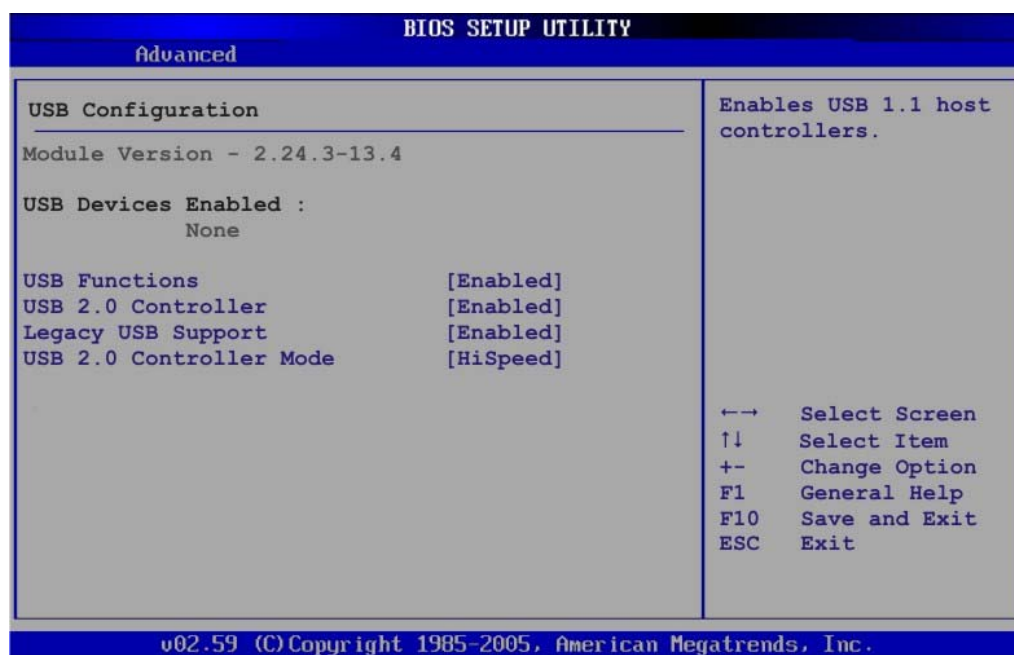
BIOS Menu 11: USB Configuration

USB Functions [Enabled]

Use the **USB Function** option to enable or disable the USB controllers.

Disabled		USB controllers are enabled
Enabled	DEFAULT	USB controllers are disabled

USB 2.0 Controller [Enabled]

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

Disabled		USB function disabled
Enabled	DEFAULT	USB function 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
Auto		Legacy USB support disabled if no USB devices are connected

USB2.0 Controller Mode [HiSpeed]

The **USB2.0 Controller Mode** BIOS option sets the speed of the USB2.0 controller.

FullSpeed		The controller is capable of operating at full speed 12 Mb/s
HiSpeed	DEFAULT	The controller is capable of operating at high speed 480 Mb/s

Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 12**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).
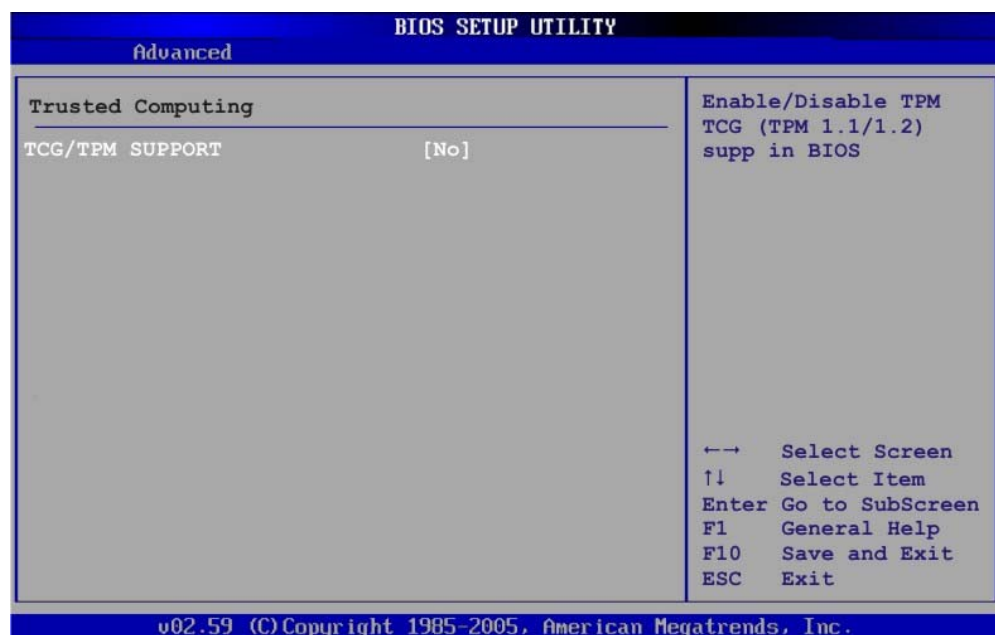
BIOS Menu 12: Trusted Computing

TCG/TPM Support [No]

Use the **TCG/TPM Support** option to configure support for the TPM.

No   Dᴇꜰᴀᴜʟᴛ   TPM support is disabled.

Yes   TPM support is enabled.

PCI/PnP

Use the PCI/PnP menu (**BIOS Menu 13**) to configure advanced PCI and PnP settings.

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

```
                          BIOS SETUP UTILITY
   Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

  Advanced PCI/PnP Settings                         Available: Specified
  ─────────────────────────────────                IRQ is available to
  WARNING: Setting wrong values in below sections   be use by PCI/PnP
           may cause system to malfunction          devices.
  IRQ3                          [Reserved]          Reserved: Specified
  IRQ4                          [Reserved]          IRQ is reserved for
  IRQ5                          [Available]         use by legacy ISA
  IRQ7                          [Reserved]          devices.
  IRQ9                          [Available]
  IRQ10                         [Available]
  IRQ11                         [Available]
  IRQ14                         [Available]
  IRQ15                         [Available]         ←→     Select Screen
                                                    ↑↓     Select Item
  DMA Channel 0                 [Available]         +-     Change Option
  DMA Channel 1                 [Available]         F1     General Help
  DMA Channel 3                 [Available]         F10    Save and Exit
  DMA Channel 5                 [Available]         ESC    Exit
  DMA Channel 6                 [Available]
  DMA Channel 7                 [Available]

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```

BIOS Menu 13: 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

Boot

Use the Boot menu (**BIOS Menu 14**) to configure system boot options.

BIOS Menu 14: Boot

Boot Settings Configuration

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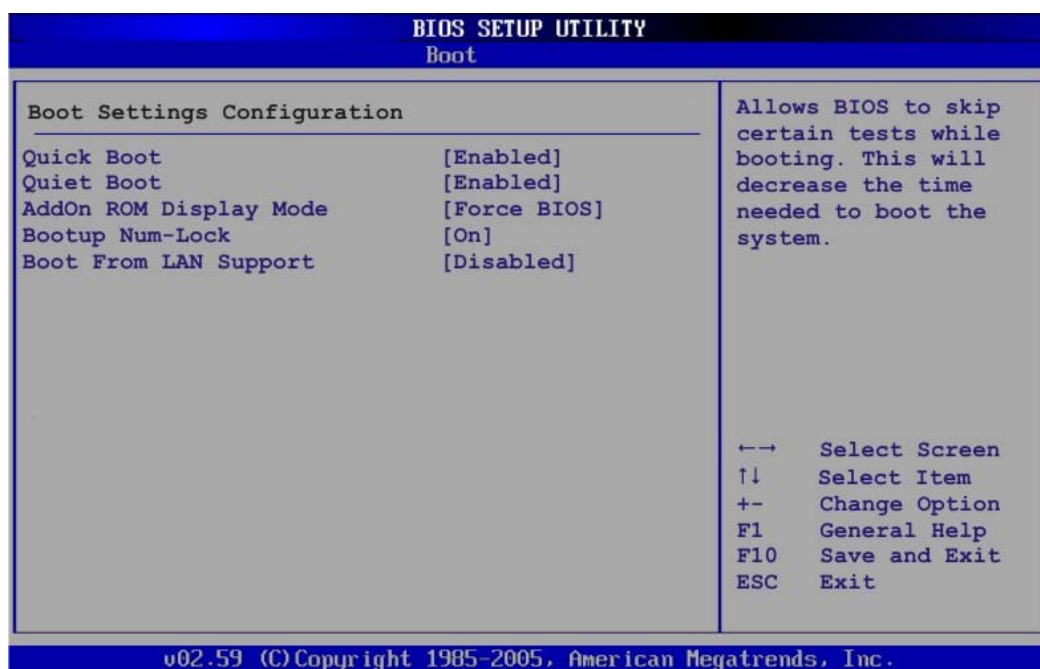
BIOS Menu 15: Boot Settings Configuration

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 to decrease the system boot time

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]

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

Force BIOS	DEFAULT	Allows the computer system to force a third party BIOS to display during system boot.
Keep Current		Allows the computer system to display the information during system boot.

Bootup Num-Lock [On]

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to 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.

Boot From LAN Support [Disabled]

The **BOOT From LAN Support** option enables 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

Security

Use the Security menu (**BIOS Menu 16**) to set system and user passwords.
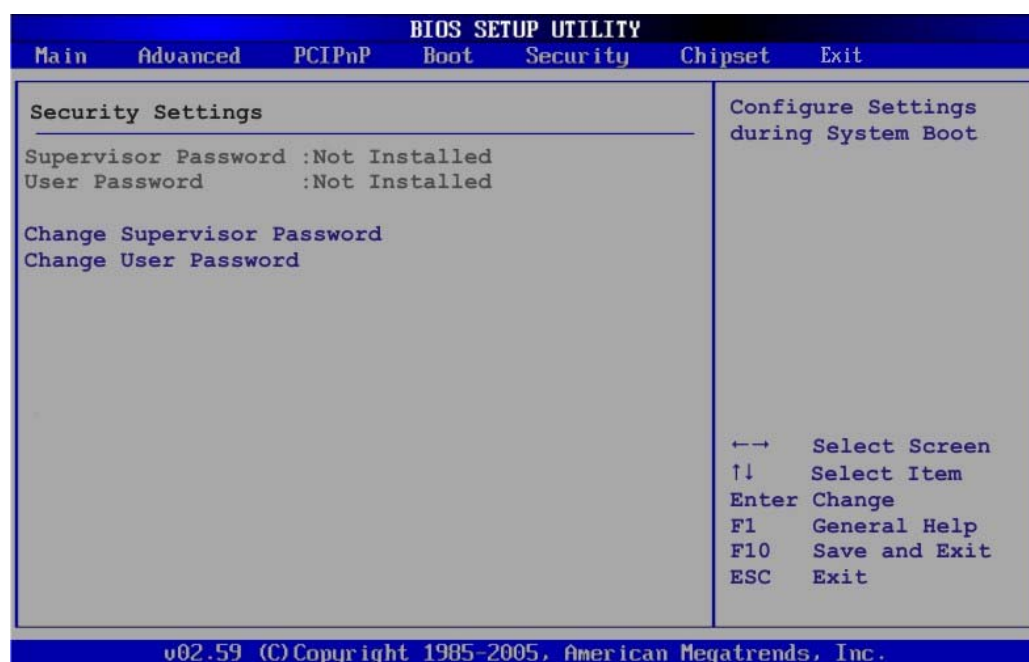
BIOS Menu 16: Security

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**.

Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the NorthBridge and SouthBridge configuration menus.

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

```
                        BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

 Advanced Chipset Settings                        Configure North
 ─────────────────────────────                    Bridge features.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction

 ▶ North Bridge Configuration
 ▶ South Bridge Configuration



                                                  ←→     Select Screen
                                                  ↑↓     Select Item
                                                  Enter Go to SubScreen
                                                  F1     General Help
                                                  F10    Save and Exit
                                                  ESC    Exit


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```

BIOS Menu 17: Chipset

North Bridge Chipset Configuration

Use the **North Bridge Chipset Configuration** menu (**BIOS Menu 18**) to configure the Northbridge chipset settings.
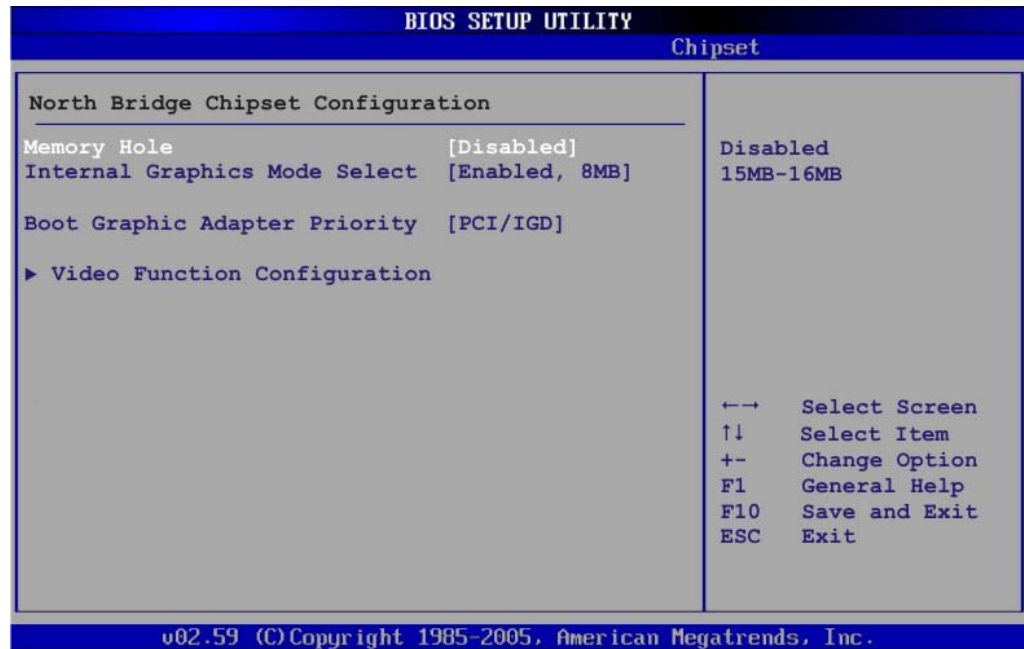
BIOS Menu 18:North Bridge Chipset Configuration

Memory Hole [Disabled]

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

Disabled	DEFAULT	Memory is not reserved for ISA expansion cards
Enabled		Memory is reserved for ISA expansion cards

Internal Graphics Mode Select [Enable, 8MB]

The **Internal Graphic Mode Select** option determines the amount of system memory that can be used by the Internal graphics device.

Disable		
Enable, 1MB		1MB of memory used by internal graphics device
Enable, 8MB	DEFAULT	8MB of memory used by internal graphics device

Boots Graphics Adapter Priority [PCI/IGD]

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, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD   **DEFAULT**

Video Function Configuration

Use the **Video Function Configuration** menu to configure the video device connected to the system.

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 [128MB]

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 [CRT]

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

- CRT **DEFAULT**
- TV
- LVDS

SouthBridge Configuration

The **SouthBridge Configuration** menu (**BIOS Menu 19**) the southbridge chipset to be configured.

```
                         BIOS SETUP UTILITY
                                          Chipset

 South Bridge Chipset Configuration

 Audio Controller            [Ac'97 Audio Only]    Ac'97 Audio Only
 Spread Spectrum Mode        [Disabled]            All Disabled




                                                ←→    Select Screen
                                                ↑↓    Select Item
                                                +-    Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit


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```
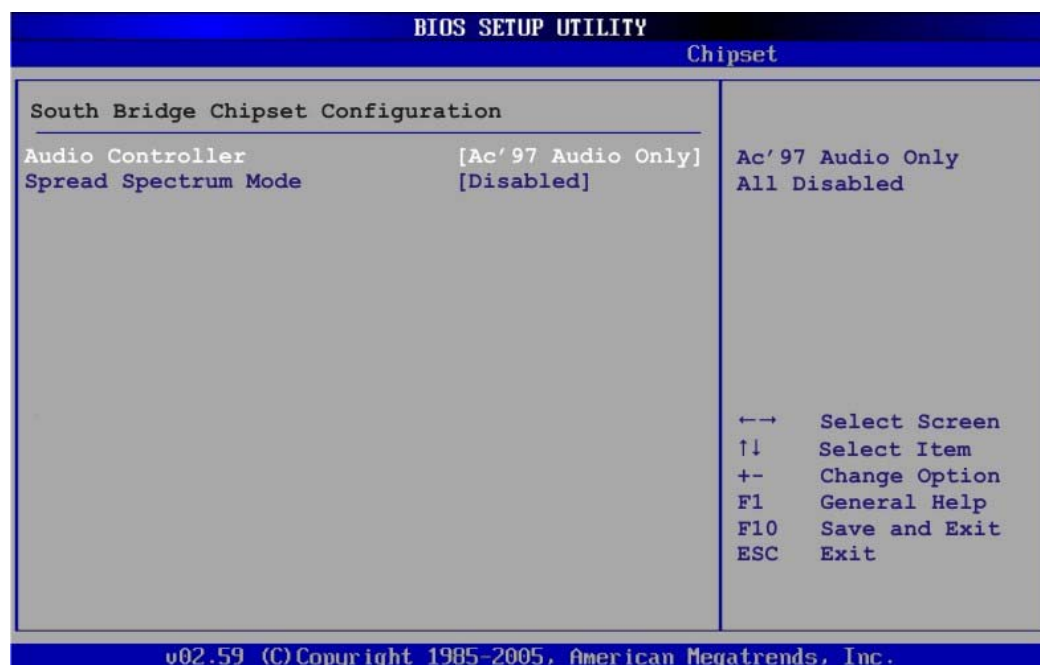
BIOS Menu 19:SouthBridge Chipset Configuration

Audio Controller [AC'97 Audio Only]

The **Audio Controller** option enables or disables the audio controller.

AC'97 Audio Only   The on-board AC'97 audio controller is enabled.

All Disabled   DEFAULT   The on-board audio controller is disabled.

Spread Spectrum [Disabled]

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

Disabled   DEFAULT   EMI not reduced

Enabled   EMI reduced

Exit

Use the **Exit** menu (**BIOS Menu 20**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
                          BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

  Exit Options                                     Exit system setup
  ──────────────────────────────                   after saving the
  Save Changes and Exit                            changes.
  Discard Changes and Exit
  Discard Changes                                  F10 key can be used
                                                   for this operation.
  Load Optimal Defaults
  Load Failsafe Defaults




                                                   ←→     Select Screen
                                                   ↑↓     Select Item
                                                   Enter  Go to SubScreen
                                                   F1     General Help
                                                   F10    Save and Exit
                                                   ESC    Exit

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```

BIOS Menu 20: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.**

Appendix A - Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is a type of integrated circuit used in chips like static RAM and microprocessors.
COM	COM is used to refer to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DE-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input

IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.
PCIe	PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
QVGA	Quarter Video Graphics Array (QVGA) refers to a display with a resolution of 320 x 240 pixels.
RAID	Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.
RAM	Random Access Memory (RAM) is a form of storage used in computer. RAM is volatile memory, so it loses its data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix B - DIO Interface

The DIO connector on the ALUDRA is interfaced to GPIO ports on the ITE IT8718F Super I/O chipset. The DIO has both 4-bit digital inputs and 4-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.

> For further information, please refer to the datasheet for the Winbond W83697HG Super I/O chipset.

DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	GND	NA	NA
2	VCC	NA	NA
3	Output 3	GP23	General Purpose I/O Port 2 Bit 3
4	Output 2	GP22	General Purpose I/O Port 2 Bit 2
5	Output 1	GP21	General Purpose I/O Port 2 Bit 1
6	Output 0	GP20	General Purpose I/O Port 2 Bit 0
7	Input 3	GP33	General Purpose I/O 33
8	Input 2	GP32	General Purpose I/O 32
9	Input 1	GP31	General Purpose I/O 31
10	Input 0	GP30	General Purpose I/O 30

Assembly Language Samples

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
```

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
```

Appendix C - Watchdog Timer

> The following discussion applies to DOS environment. Please contact Eurotech support or visit the Eurotech website for information on drivers used with more sophisticated operating systems, e.g., Windows and Linux. See Eurotech Group Worldwide Presence, page 122 for contact details.

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: 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.

> 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 ;
```

Appendix D - Address Mapping

I/O Address Map

```
Input/output (IO)
    [00000000 - 0000000F]  Direct memory access controller
    [00000000 - 00000CF7]  PCI bus
    [00000010 - 0000001F]  Motherboard resources
    [00000020 - 00000021]  Programmable interrupt controller
    [00000022 - 0000003F]  Motherboard resources
    [00000040 - 00000043]  System timer
    [00000044 - 0000004D]  Motherboard resources
    [00000050 - 0000005E]  Motherboard resources
    [00000060 - 00000060]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    [00000061 - 00000061]  System speaker
    [00000063 - 00000063]  Motherboard resources
    [00000064 - 00000064]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    [00000065 - 00000065]  Motherboard resources
    [00000067 - 0000006F]  Motherboard resources
    [00000070 - 00000071]  System CMOS/real time clock
    [00000072 - 0000007F]  Motherboard resources
    [00000080 - 00000080]  Motherboard resources
    [00000081 - 00000083]  Direct memory access controller
    [00000084 - 00000086]  Motherboard resources
    [00000087 - 00000087]  Direct memory access controller
    [00000088 - 00000088]  Motherboard resources
    [00000089 - 0000008B]  Direct memory access controller
    [0000008C - 0000008E]  Motherboard resources
    [0000008F - 0000008F]  Direct memory access controller
    [00000090 - 0000009F]  Motherboard resources
    [000000A0 - 000000A1]  Programmable interrupt controller
    [000000A2 - 000000BF]  Motherboard resources
    [000000C0 - 000000DF]  Direct memory access controller
    [000000E0 - 000000EF]  Motherboard resources
    [000000F0 - 000000FF]  Numeric data processor
    [00000170 - 00000177]  Secondary IDE Channel
    [000001F0 - 000001F7]  Primary IDE Channel
    [00000274 - 00000277]  ISAPNP Read Data Port
    [00000279 - 00000279]  ISAPNP Read Data Port
    [000002E8 - 000002EF]  Communications Port (COM4)
    [000002F8 - 000002FF]  Communications Port (COM2)
    [00000376 - 00000376]  Secondary IDE Channel
```

[00000378 - 0000037F] Printer Port (LPT1)
[000003B0 - 000003BB] VgaSave
[000003C0 - 000003DF] VgaSave
[000003E8 - 000003EF] Communications Port (COM3)
[000003F6 - 000003F6] Primary IDE Channel
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 0000041F] SM Bus Controller
[00000480 - 000004BF] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[00000800 - 0000087F] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A10 - 00000A1F] Motherboard resources
[00000A20 - 00000A2F] Motherboard resources
[00000A30 - 00000A3F] Motherboard resources
[00000A60 - 00000A6F] Motherboard resources
[00000A79 - 00000A79] ISAPNP Read Data Port
[00000D00 - 0000FFFF] PCI bus
[0000C000 - 0000C0FF] Multimedia Audio Controller
[0000C400 - 0000C43F] Multimedia Audio Controller
[0000C480 - 0000C49F] Standard Universal PCI to USB Host Controller
[0000C800 - 0000C81F] Standard Universal PCI to USB Host Controller
[0000C880 - 0000C89F] Standard Universal PCI to USB Host Controller
[0000CC00 - 0000CC1F] Standard Universal PCI to USB Host Controller
[0000CC80 - 0000CC87] Video Controller (VGA Compatible)
[0000D000 - 0000DFFF] PCI standard PCI-to-PCI bridge
[0000DC00 - 0000DCFF] Ethernet Controller
[0000E000 - 0000EFFF] PCI standard PCI-to-PCI bridge
[0000EC00 - 0000ECFF] Ethernet Controller
[0000FFA0 - 0000FFAF] Standard Dual Channel PCI IDE Controller

Table: IO Address Map

IRQ Address Map

Interrupt request (IRQ)
- (ISA) 0   System timer
- (ISA) 1   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
- (ISA) 3   Communications Port (COM2)
- (ISA) 4   Communications Port (COM1)
- (ISA) 8   System CMOS/real time clock
- (ISA) 9   Microsoft ACPI-Compliant System
- (ISA) 10   Communications Port (COM4)
- (ISA) 11   Communications Port (COM3)
- (ISA) 12   Microsoft PS/2 Mouse
- (ISA) 13   Numeric data processor
- (ISA) 14   Primary IDE Channel
- (PCI) 5   Ethernet Controller
- (PCI) 5   Ethernet Controller
- (PCI) 5   Multimedia Audio Controller
- (PCI) 5   SM Bus Controller
- (PCI) 5   Video Controller (VGA Compatible)
- (PCI) 16   PCI standard PCI-to-PCI bridge
- (PCI) 16   Standard Universal PCI to USB Host Controller
- (PCI) 17   PCI standard PCI-to-PCI bridge
- (PCI) 18   Standard Universal PCI to USB Host Controller
- (PCI) 19   Standard Universal PCI to USB Host Controller
- (PCI) 23   Standard Enhanced PCI to USB Host Controller
- (PCI) 23   Standard Universal PCI to USB Host Controller

Table: IRQ Address Map

Memory Address Map

```
Memory
   [00000000 - 0009FFFF]  System board
   [000A0000 - 000BFFFF]  PCI bus
   [000A0000 - 000BFFFF]  VgaSave
   [000C0000 - 000CFFFF]  System board
   [000D0000 - 000DFFFF]  PCI bus
   [000E0000 - 000FFFFF]  System board
   [00100000 - 1F7FFFFF]  System board
   [1F800000 - DFFFFFFF]  PCI bus
   [D0000000 - DFFFFFFF]  Video Controller (VGA Compatible)
   [E0000000 - E3FFFFFF]  Motherboard resources
   [E4000000 - FED8FFFF]  PCI bus
   [FDE00000 - FDEFFFFF]  PCI standard PCI-to-PCI bridge
   [FDEF0000 - FDEFFFFF]  Ethernet Controller
   [FDF00000 - FDFFFFFF]  PCI standard PCI-to-PCI bridge
   [FDFF0000 - FDFFFFFF]  Ethernet Controller
   [FE880000 - FE8FFFFF]  Video Controller
   [FE93B400 - FE93B4FF]  Multimedia Audio Controller
   [FE93B800 - FE93B9FF]  Multimedia Audio Controller
   [FE93BC00 - FE93BFFF]  Standard Enhanced PCI to USB Host Controller
   [FE940000 - FE97FFFF]  Video Controller (VGA Compatible)
   [FE980000 - FE9FFFFF]  Video Controller (VGA Compatible)
   [FEA00000 - FEAFFFFF]  PCI standard PCI-to-PCI bridge
   [FEAFF000 - FEAFFFFF]  Ethernet Controller
   [FEB00000 - FEBFFFFF]  PCI standard PCI-to-PCI bridge
   [FEBFF000 - FEBFFFFF]  Ethernet Controller
   [FEC00000 - FEC00FFF]  Motherboard resources
   [FED13000 - FED19FFF]  System board
   [FED1C000 - FED1FFFF]  Motherboard resources
   [FED20000 - FED3FFFF]  Motherboard resources
   [FED45000 - FED89FFF]  Motherboard resources
   [FED90000 - FFFFFFFF]  System board
   [FEE00000 - FEE00FFF]  Motherboard resources
   [FFB00000 - FFBFFFFF]  Intel(R) 82802 Firmware Hub Device
   [FFC00000 - FFEFFFFF]  Motherboard resources
   [FFF00000 - FFFFFFFF]  Intel(R) 82802 Firmware Hub Device
```

Table: Memory Address Map

Appendix E ! Cable Kit and Optional Items

Eurotech can provide the following cable kit for the ALUDRA.

Item and Part Number	Image
VGA cable	
Audio cable	
KB/MS PS/2 Y-cable	
Dual USB cable (w/o bracket)	
SATA cable	
RS-232 cable (w/o bracket)	
Mini jumper pack (2.0mm)	

Eurotech can provide the following optional items for the ALUDRA.

Item and Part Number	Image
SATA power cable	
HDD cable	
LPT cable (w/o bracket)	
RS-422/485 cable	

Item and Part Number	Image
802.11 b/g PCIe mini card wireless LAN module	
802.11b/g USB embedded module	
20-pin WINBOND TPM module and S/W management Tool	

Please contact a Eurotech sales representative to obtain the cable kit and optional items. For contact details see Eurotech Group Worldwide Presence, page 122.

Eurotech Group Worldwide Presence
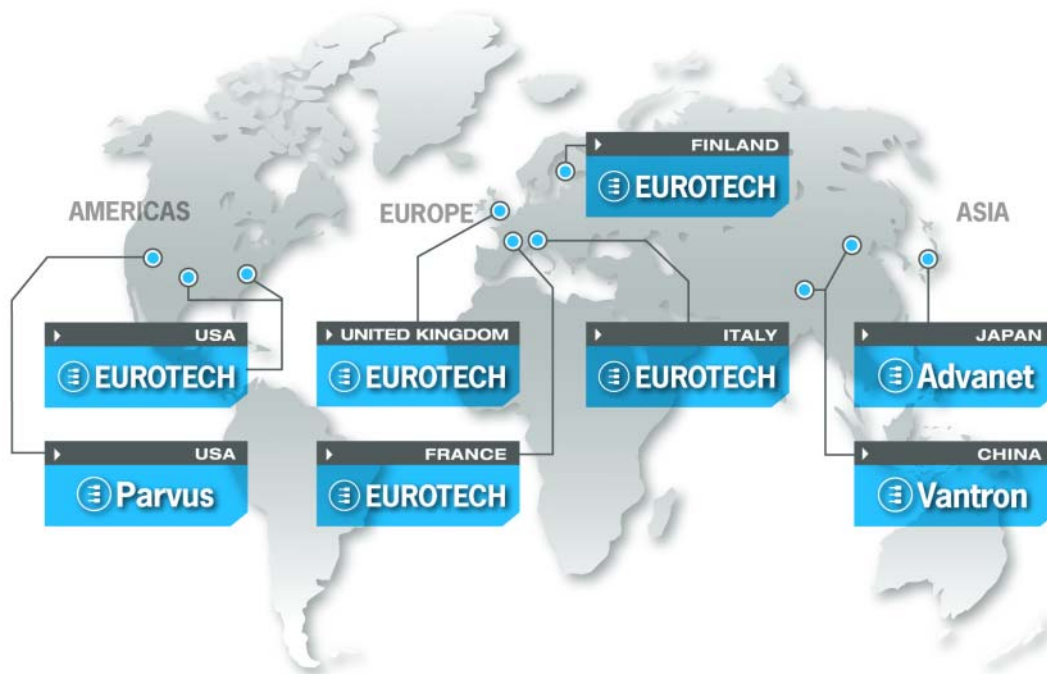
EUROTECH

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North America	*Central & Southern Europe*	*Japan*

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