EPIA-M900

VIA embedded

EPIA-M900

Mini-ITX embedded board

Copyright

Trademarks

Disclaimer

Regulatory Compliance

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his personal expense.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Battery Recycling and Disposal

- ☐ Only use the appropriate battery specified for this product.
- ☐ Do not re-use, recharge, or reheat an old battery.
- ☐ Do not attempt to force open the battery.
- ☐ Do not discard used batteries with regular trash.
- ☐ Discard used batteries according to local regulations.

Safety Precautions

- ☐ Always read the safety instructions carefully.
- ☐ Keep this User's Manual for future reference.
- ☐ All cautions and warnings on the equipment should be noted.
- ☐ Keep this equipment away from humidity.
- ☐ Lay this equipment on a reliable flat surface before setting it up.
- ☐ Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- ☐ Place the power cord in such a way that people cannot step on it.
- ☐ Always unplug the power cord before inserting any add-on card or module.
- ☐ If any of the following situations arises, get the equipment checked by authorized service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment has not worked well or you cannot get it work according to User's Manual.
  - The equipment has dropped and damaged.
  - The equipment has obvious sign of breakage.
- ☐ Do not leave this equipment in an environment unconditioned or in a storage temperature above 60°C (140°F). The equipment may be damaged.
- ☐ Do not leave this equipment in direct sunlight.
- ☐ Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- ☐ Do not place anything over the power cord.
- ☐ Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating

Box Contents and Ordering Information

Model Number	CPU Frequency	Description
EPIA-M900-16L	1.6GHz Nano™ X2	Standard kit
		1 x SATA cable
		1 x I/O bracket
EPIA-M900-12LQ	1.2GHz QuadCore	Standard kit
		1 x SATA cable
		1 x I/O bracket

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1. Product Overview

The VIA EPIA-M900 Mini-ITX mainboard is an entry-level native x86 mainboard designed mainly for embedded and thin client applications. It can also be used for various domain applications such as desktop PC, industrial PC, etc. The mainboard is based on the VIA VX900 Unified Digital Media IGP chipset that features the VIA Chrome9™ HC with 2D/3D graphics and video accelerators for rich digital media performance.

The VIA EPIA-M900 includes a powerful, secure, and efficient VIA Nano™ X2 / VIA QuadCore processor. The Nano™ X2 / VIA QuadCore processor includes the VIA Padlock Security Engine, VIA CoolStream™ Architecture, VIA StepAhead™ Technology Suite, and VIA TwinTurbo™ technology.

The VIA EPIA-M900 includes two 1066 MHz DDR3 SODIMM slots that support up to 8 GB. The VIA EPIA-M900 provides support for high fidelity audio with its included VIA VT2021 High Definition Audio codec. In addition it supports two SATA 3Gb/s storage devices.

The VIA EPIA-M900 is compatible with a full range of Mini-ITX chassis as well as FlexATX and MicroATX enclosures and power supplies. The VIA EPIA-M900 is fully compatible with Microsoft® and Linux operating systems.

1.1. Key Features and Benefits

1.1.1. VIA Nano™ X2 / VIA QuadCore Processor

The VIA Nano X2 processor is a 64-bit superscalar x86 dual core processor based on a 40 nanometer process technology. Packed into an ultra compact NanoBGA2 package (measuring 21mm x 21mm), it delivers an energy-efficient yet powerful performance, with cool and quiet operation. The VIA Nano X2 is ideal for embedded system applications such as industrial PCs, test machines, measuring equipment, digital signage, medical PCs, monitoring systems, gaming machines, in-vehicle entertainment, etc..

The VIA QuadCore processor is a combine four 64-bit 'Isaiah' cores on two dies, offering enhanced multi-tasking and superb multimedia performance on a low power budget. Featuring high-performance superscalar processing, out-of-order x86 architecture and advanced multi-core processing. The distributed performance of the VIA QuadCore provides a highly compatible and low-power consumption solution for any computing market. The VIA QuadCore processor is manufactured using a 40 nanometer process technology.

> **Note:**
>
> For Windows 7 and Windows Server 2008 R2 users only:
> If encounter the issue such as the operating system recognize the VIA Dual-Core CPU as two processors instead of one processor with two cores. Download and install the hotfix released by Microsoft to address this issue. The downloadable hotfix is available at **http://support.microsoft.com/kb/2502664**

1.1.2. VIA VX900 Chipset

The VIA VX900 Unified Digital Media Chipset is designed to enable high quality digital video streaming and DVD playback in a new generation of fanless, small form factor PCs and IA devices. The VIA VX900 features VIA Chrome9™ HC3 with 2D/3D graphics and video acceleration, DDR3 1066/800

MHz support, motion compensation and dual display support to ensure a rich overall entertainment experience.

1.1.3. Modular Expansion Options

The VIA EPIA-M900 ensures long-term usability with its support for industry standard expansion options. Its support for legacy PCI expansion cards helps to smooth and reduce the costs of transitioning to newer expansion technologies. The VIA EPIA-M900 enables companies to slowly roll out upgrades as necessary instead of having to replace everything all at once. This ensures that companies using the EPIA-M900 obtain the maximum benefits from its past investments in PCI expansion cards.

The VIA EPIA-M900 also includes a 16-Lane PCI Express 2.0 expansion slot that provides protection against obsolescence.

1.2. Product Specifications

- **Processor**
  - o **EPIA-M900-16L**
    - VIA Nano X2 1.6GHz NanoBGA2 processor (with Fan)
  - o **EPIA-M900-12LQ**
    - VIA QuadCore 1.2GHz NanoBGA2 processor (with Fan)

- **Chipset**
  - o VIA VX900 advanced all-in-one system processor

- **System Memory**
  - o 2 DDR3 1066 SO-DIMM sockets
  - o Supports up to 8 GB

- **VGA**
  - o Chrome9 HC3 Integrated Graphics Processor with 3D/2D/Video Controllers
  - o Unified Video Decoding Accelerator for MPEG-2, WMV9/VC1, H.264 Full HD

- **Onboard Peripherals**
  - o **Serial ATA**
    - 2 SATA connectors
  - o **Onboard LAN**
    - 1 VIA VT6130 Gigabit LAN Controller
  - o **Onboard Audio**
    - VIA VT2021 High Definition Audio Codec
  - o **Onboard Super IO**
    - Fintek F81865-I Super I/O controller

- **Onboard I/O Connectors**
  - o 4 x USB connectors
  - o 1 x USB client connector
  - o 1 x Front audio pin header for Line-out and MIC-in
  - o 2 x Digital I/O (GPI x 8 + GPO x 8)
  - o 1 x PS/2 Keyboard/Mouse pin header
  - o 1 x Front panel pin header
  - o 2 x Smart Fan connectors (for CPU and system)
  - o 3 x RS232 connectors
  - o 1 x LPC pin header (for programming)
  - o 1 x S/PDIF-out pin header
  - o 1 x SMBUS pin header

- o 1 x MFX pin header
- o 1 x PCI slot
- o 1 x PCIe x16 slot
- o 1 x 24-bit 2-channel LVDS connector
- o 1 x backlight control connector for inverter power and brightness control
- o 1 x ATX power connector

- **Back Panel I/O**
  - o 1 x HDMI® port
  - o 1 x VGA port
  - o 1 x COM port
  - o 1 x RJ45 port
  - o 4 x USB 2.0 ports
  - o 3 x Audio port stack with Line-in, Line-out, MIC-in

- **BIOS**
  - o AMI BIOS
  - o 8Mbit SPI Flash ROM

- **Supported Operating System**
  - o Windows 7
  - o Windows Embedded Standard 7
  - o Windows XP
  - o Windows Embedded Standard/Compact
  - o Linux

- **System Monitoring & Management**
  - o Wake-on-LAN
  - o Keyboard Power-on
  - o Timer Power-on
  - o System power management
  - o AC power failure recovery
  - o WatchDog Timer

- **Operating Conditions**
  - o **Operating Temperature**
    - 0°C up to 60°C
  - o **Operating Humidity**
    - 0% ~ 95% (relative humidity; non-condensing)

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- **Form Factor**
  - Mini-ITX (8-layer)
  - 17 cm x 17 cm
- **Compliance**
  - CE
  - FCC
  - RoHS

Note:

1. Some system resources require physical memory addresses and may reduce total available memory.
2. PCI Express slot has an effective bandwidth of 8x.
3. This specification is subject to change without prior notice.

1.3. Layout Diagram

External I/O ports

COM connectors

Front Audio pin header

PS/2 keyboard/mouse pin header

SPDIF connector

Backlight power select

PCI slot

PCIe x16 slot

ATX connector

VIA VX900

VIA Nano X2 CPU

CMOS battery

Clear CMOS jumper

SATA connectors

USB Device pin header

COM connector

MFX connector

Smart Fan connectors

SMBus pin header

LPC pin header

SPI pin header

USB pin headers

Digital I/O pin headers

DDR3 SODIMM slots

Front Panel pin header

Figure 1: Layout diagram of the EPIA-M900 mainboard (top view)

Inverter connector

LVDS connector
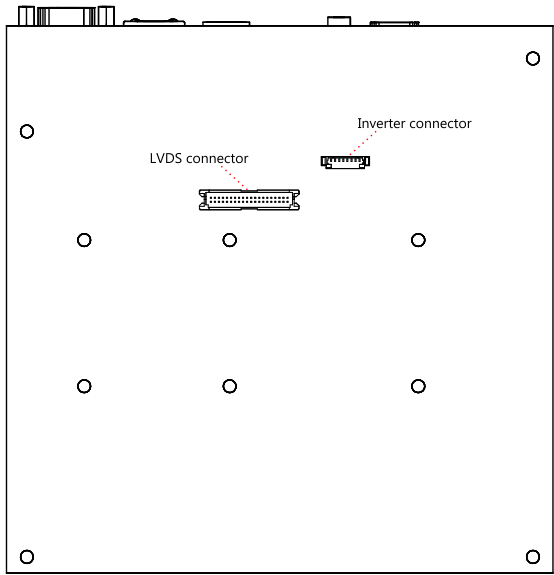
Figure 2: Layout diagram of the EPIA-M900 mainboard (bottom view)

1.4. Product Dimensions

170.00 mm

10.16 mm

33.02 mm

170.00 mm

4.97 mm

6.17 mm

6.35 mm
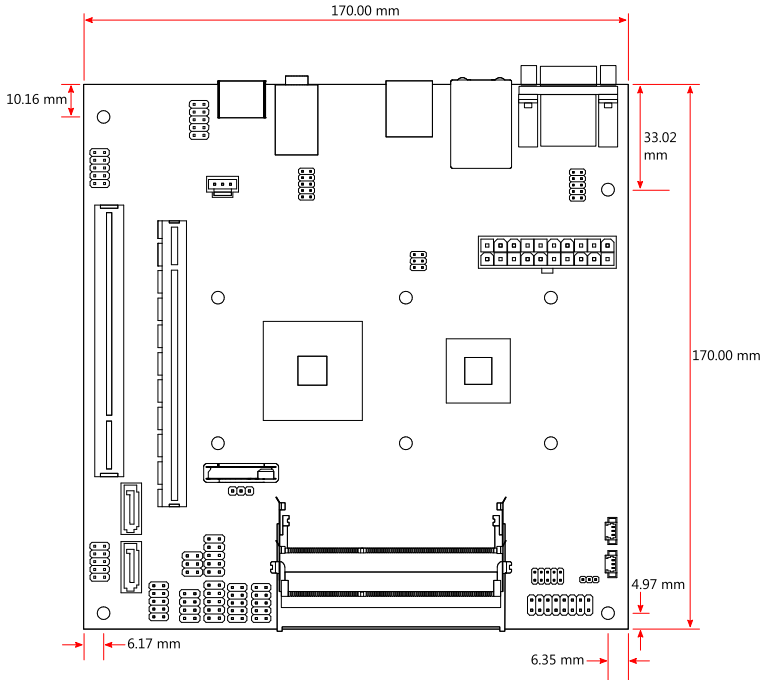
Figure 3: Mounting holes and dimensions of the EPIA-M900 mainboard

1.5. Height Distribution

Height: 37.50 mm

Height: 32.00 mm

Height: 32.80 mm

Height: 33.00 mm
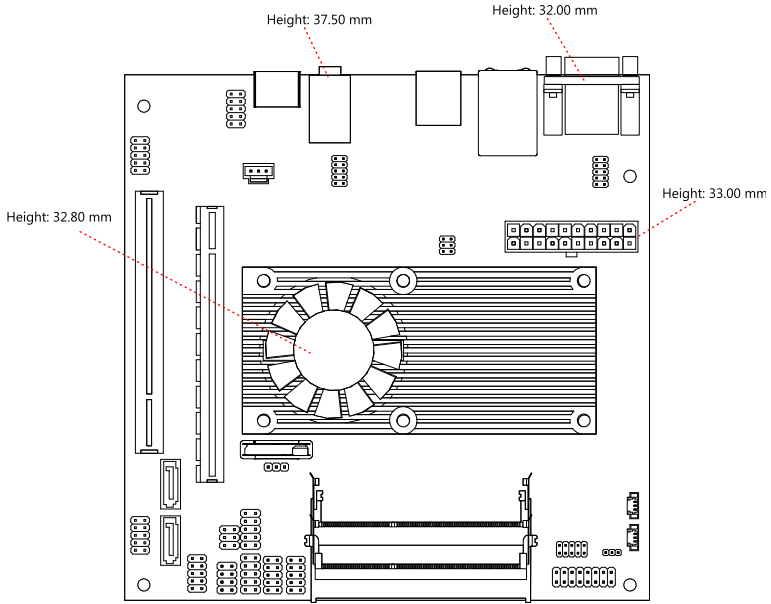
Figure 4: Height distribution of the EPIA-M900 mainboard

2. I/O Interface

The VIA EPIA-M900 has a wide selection of interfaces integrated into the board. It includes a selection of frequently used ports as part of the external I/O coastline.

2.1. External I/O Ports
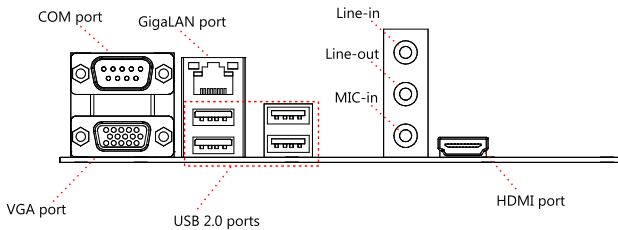
Figure 5: External I/O ports

2.1.1. HDMI® Port

The integrated 19-pin HDMI® port uses an HDMI® Type A receptacle connector. The pinout of the HDMI® port is as shown below.
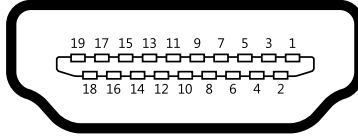
Figure 6: HDMI® port pinout diagram

Pin	Signal	Pin	Signal
1	TMDS Data0+	2	Ground
3	TMDS Data0–	4	TMDS Data1+
5	Ground	6	TMDS Data1–
7	TMDS Data2+	8	Ground
9	TMDS Data2–	10	TMDS Data3+
11	Ground	12	TMDS Data3–
13	CEC	14	NC
15	HDMI Clock	16	HDMI Data
17	Ground	18	HDMI Power
19	Hot Plug Detect		

Table 1: HDMI® port pinout

2.1.2. VGA Port

The integrated 15-pin VGA port uses a female DE-15 connector. The pinout of the VGA port is as shown below.
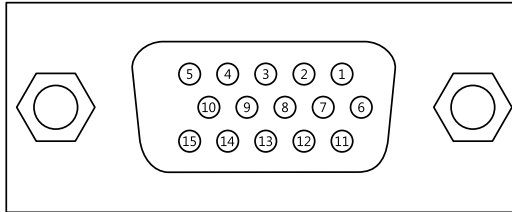
Figure 7: VGA port pinout diagram

Pin	Signal	Pin	Signal	Pin	Signal
1	RED	6	Ground	11	VGP_20
2	GREEN	7	Ground	12	SDA
3	BLUE	8	Ground	13	HSync
4	NC	9	+5V	14	VSync
5	Ground	10	NC	15	SCL

Table 2: VGA port pinout

2.1.3. COM Port

The integrated 9-pin COM port uses a male DE-9 connector. The pinout of the
COM port is as shown below.
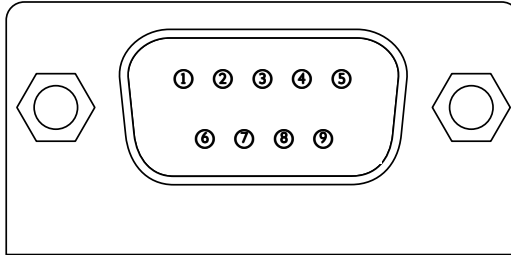
Figure 8: COM port pinout diagram

Pin	Signal	Pin	Signal
1	DCD_1	6	DSR_1
2	RXD_1	7	RTS_1
3	TXD_1	8	CTS_1
4	DTR_1	9	RI_1
5	GND		

Table 3: COM port pinout

2.1.4. USB Ports

There are four integrated USB 2.0 ports separated into two USB port stacks. Each USB port is using the USB Type A receptacle connector. The pinout of the typical USB port is as shown below.

Pin	Signal
1	+5VSUS
2	Data-
3	Data+
4	Ground

Table 4: USB port pinout
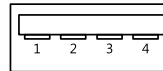
Figure 9: USB port pinout diagram

2.1.5. Gigabit Ethernet Port

The integrated 8-pin Gigabit Ethernet port is using an 8 Position 8 Contact (8P8C) receptacle connector (commonly referred to as RJ45). The pinout of the Gigabit Ethernet port is as shown below.

Pin	Signal
1	Signal pair 1+
2	Signal pair 1-
3	Signal pair 2+
4	Signal pair 3+
5	Signal pair 3-
6	Signal pair 2-
7	Signal pair 4+
8	Signal pair 4-

Table 5: Gigabit Ethernet port pinout
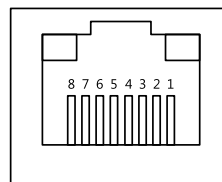
Figure 10: Gigabit Ethernet port pinout diagram

2.1.6. Audio Ports

There are three audio jack receptacles integrated into a single stack on the I/O coastline. Each receptacle can fit a 3.5 mm Tip Ring Sleeve (TRS) connector to enable connections to Line-in, Line-out, and MIC-in.

Wiring	Line-in	Line-out	MIC-in
Tip	Left channel in	Left channel	Left channel
Ring	Right channel in	Right channel	Right channel
Sleeve	Ground	Ground	Ground

Table 6: Audio jack receptacle pinout
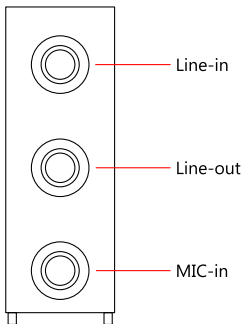
Figure 11: Audio jack receptacle stack

2.2. Onboard Connectors

2.2.1. ATX Power Connector

The mainboard has a 20-pin ATX power connector onboard. The ATX power connector is labeled as "CN6". The pinout of the ATX power connector is shown below.
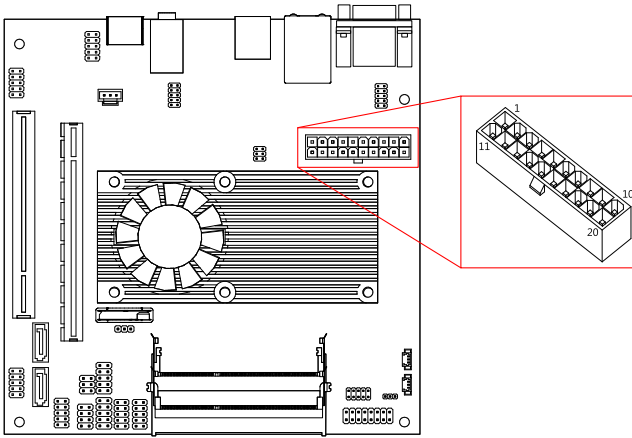
Figure 12: ATX power connector

Pin	Signal	Pin	Signal
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	Power Supply On
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	Power OK	18	-5V
9	+5VSB	19	+5V
10	+12V	20	+5V

Table 7: ATX power connector pinout

2.2.2. CMOS Battery Slot

The mainboard is equipped with a CMOS battery slot, which is compatible with CR2032 coin batteries. The CMOS battery slot is labeled as "BAT1". When inserting a CR2032 coin battery, be sure that the positive side is facing the locking clip.

Pin	Signal
1	Ground
2	+3V
3	Ground

Table 8: CMOS battery slot/connector pinout
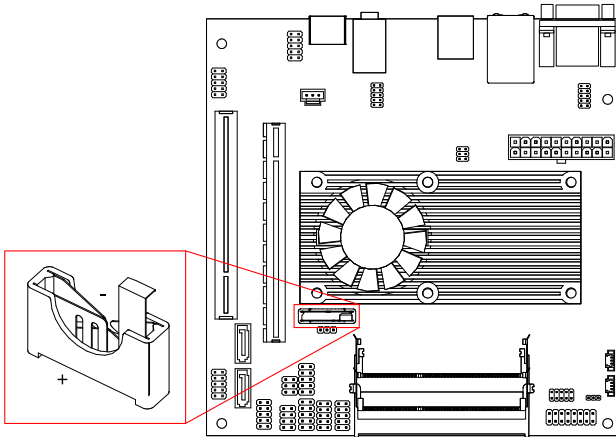
Figure 13: CMOS battery slot/connector

2.2.3. Front Panel Pin Header

The front panel pin header consists of 15 pins in a 16-pin block. Pin 15 is keyed. The front panel pin header is labeled as "F_PANEL1". It provides access to system LEDs, power, reset, and system speaker. The pinout of the front panel pin header is shown below.
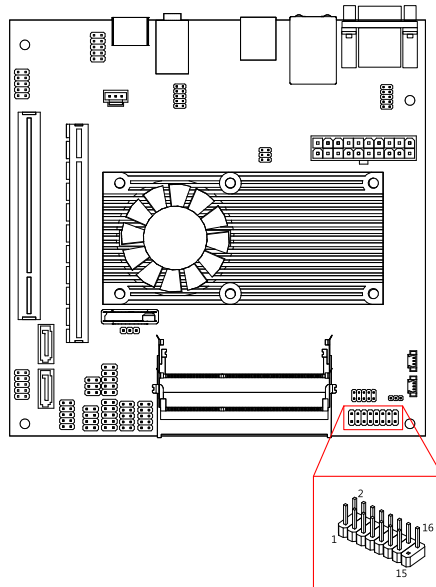
Figure 14: Front panel pin header block

Pin	Signal	Pin	Signal
1	P_LED	2	H_LED
3	P_LED	4	SATA_LED
5	PWR_LED	6	PWR_BTN
7	+5V	8	Ground
9	NC	10	-RST_SW
11	NC	12	Ground
13	SPEAK	14	5V_SPEAK
15	—	16	NC

Table 9: Front panel pin header pinout

2.2.4. SMBus Pin Header

The SMBus pin header consists of three pins. It is labeled as "SMB1". The pinout of the SMBus pin header is shown below.
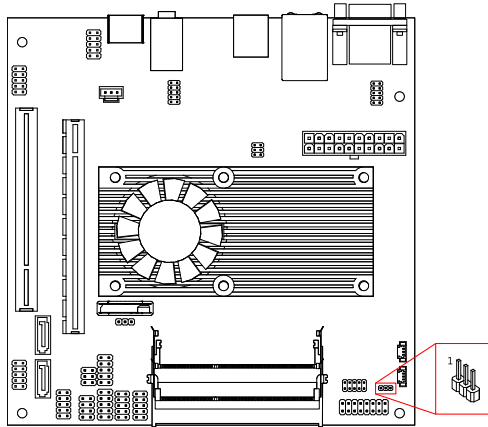
Figure 15: SMBus pin header

Pin	Signal
1	SMBCK
2	SMBDT
3	Ground

Table 10: SMBus pin header pinout

2.2.5. MFX Pin Header

The mainboard has an MFX pin header. The MFX pin header is a proprietary interface derived from the SMBus. The MFX pin header can be used with VIA MFX modules. The pin header is labeled as "MFX1". The pin out of the pin header is shown below.
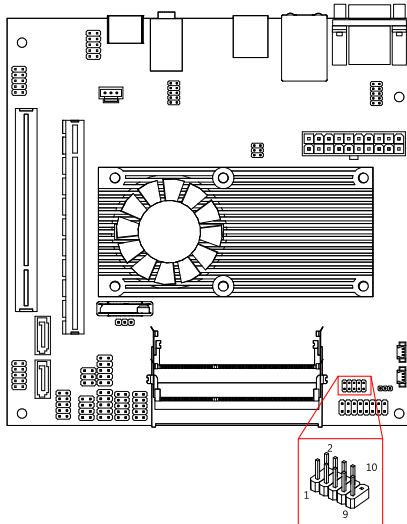
Figure 16: MFX pin header

Pin	Signal	Pin	Signal
1	+5V	2	+5VSUS
3	PWR_BTN	4	SMB_CLK
5	NC	6	SMB_DAT
7	NC	8	GND
9	GND	10	—

Table 11: MFX pin header pinout

2.2.6. Smart Fan Connectors

There are two Smart Fan connectors on board: one for the CPU and one for the chassis. The fan connector for the CPU is labeled as "CN7". The fan connector for the system is labeled as "CN8". Smart Fans provide variable fan speeds controlled by the BIOS. The fans can be forced to operate at full speed by disabling the Smart Fan feature in the BIOS. See page 69 for details. The pinout of the fan connectors is shown below.
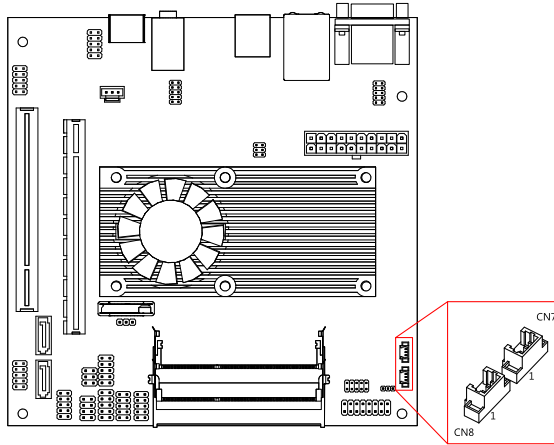
Figure 17: Fan connectors

CPU fan (CN7)	
Pin	**Signal**
1	FANIN1
2	FANCTL
3	Ground

System fan (CN8)	
Pin	**Signal**
1	FANIN2
2	FANCTL
3	Ground

Table 12: Fan connector pinouts

2.2.7. SATA Connectors

The two SATA connectors on board can support up to 3 Gb/s transfer speeds. The SATA connectors are labeled as "SATA1" and "SATA2". The pinout of the SATA connectors are as shown below.

SATA1	
Pin	Signal
1	Ground
2	STXP_1
3	STXN_1
4	Ground
5	SRXN_1
6	SRXP_1
7	Ground

SATA2	
Pin	Signal
1	Ground
2	STXP_2
3	STXN_2
4	Ground
5	SRXN_2
6	SRXP_2
7	Ground
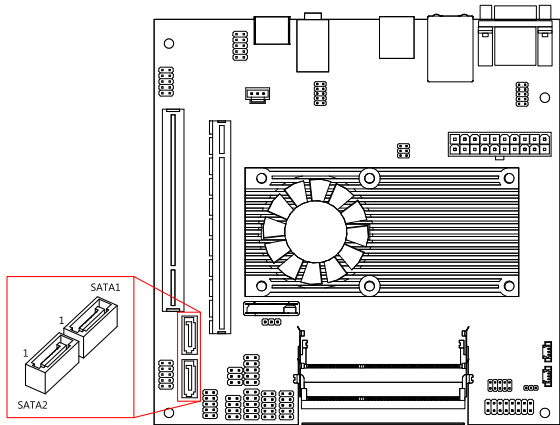
Table 13: SATA connector pinouts

Figure 18: SATA connectors

2.2.8. USB Pin Headers

The mainboard has two USB pin header blocks that support up to four USB 2.0 ports. The pin header blocks are labeled as "H_USB1" and "H_USB2". The pinout of the USB pin headers are shown below.
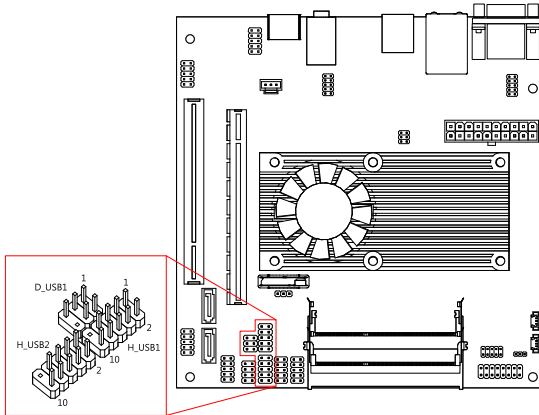
Figure 19: USB and USB Device pin headers

H_USB1			
Pin	Signal	Pin	Signal
1	+5VSUS	2	+5VSUS
3	USBH_P5-	4	USBH_P0-
5	USBH_P5+	6	USBH_P0+
7	Ground	8	Ground
9	—	10	Ground

H_USB2			
Pin	Signal	Pin	Signal
1	+5VSUS	2	+5VSUS
3	USBH_P1-	4	USBH_P2-
5	USBH_P1+	6	USBH_P2+
7	Ground	8	Ground
9	—	10	Ground

Table 14: USB pin header pinouts

2.2.9. USB Device Port Pin Header

The mainboard can support one USB Device port. The pin header block is labeled as "D_USB1". The pinout of the pin header is shown below

Pin	Signal	Pin	Signal
1	+5VUSBD	2	USB_DP-
3	NC	4	USB_DP+
5	GND	6	—

Table 15: USB Device pin header pinout

2.2.10.   COM Pin Headers

There are a total of three COM pin headers on the mainboard. Each COM pin header supports the RS-232 standard. The pin headers are labeled as "COM2", "COM3", and "COM4". All of the COM pin headers can support +5V. The pinout of the COM pin headers are shown below.
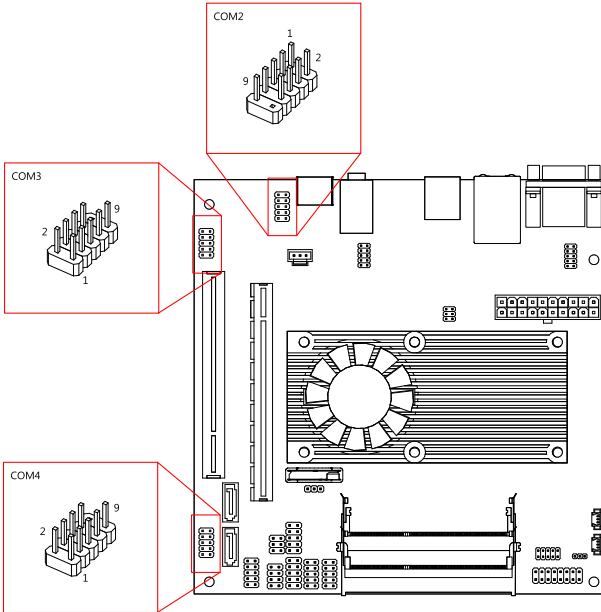
Figure 20: COM pin headers

Pin	Signal	Pin	Signal
1	COM_DCD	2	COM_RXD
3	COM_TXD	4	COM_DTR
5	Ground	6	COM_DSR
7	COM_RTS	8	COM_CTS
9	COM_RI	10	—

Table 16: COM pin header pinout

2.2.11. PS/2 Keyboard and Mouse Pin Header

The mainboard has a pin header for a PS/2 keyboard and mouse. The pin header is labeled as "KBMS1". The pinout of the pin header is shown below.
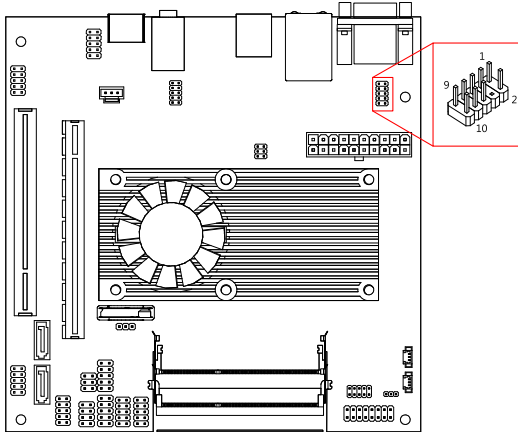
Figure 21: PS/2 keyboard and mouse pin header

Pin	Signal	Pin	Signal
1	+5VSUS	2	+5VSUS
3	NC	4	—
5	Ground	6	Ground
7	KB_DT	8	MS_DT
9	KB_CK	10	MS_CK

Table 17: PS/2 keyboard and mouse pin header pinout

2.2.12. LVDS Connector

The mainboard has one 40-pin LVDS connector on the bottom side. The LVDS connector is labeled as "LVDS1". The pinout of the connector is shown below.

Pin	Signal	Pin	Signal
1	1LDC4-	2	PVDD1
3	1LDC4+	4	PVDD1
5	GND	6	GND
7	1LDC5-	8	GND
9	1LDC5+	10	1LDC0-
11	GND	12	1LDC0+
13	1LDC6-	14	GND
15	1LDC6+	16	1LDC1-
17	GND	18	1LDC1+
19	1LCLK2-	20	GND
21	1LCLK2+	22	1LDC2-
23	GND	24	1LDC2+
25	1LDC7-	26	GND
27	1LDC7+	28	1LCLK1-
29	NC	30	1LCLK1+
31	GND	32	GND
33	NC	34	1LDC3-
35	NC	36	1LDC3+
37	NC	38	LCD CLK
39	NC	40	LCD DATA

Table 18: LVDS connector pinout
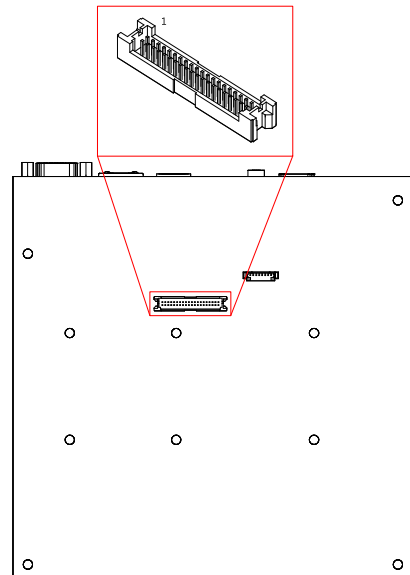
Figure 22: LVDS connector

2.2.13.   Inverter Connector

The mainboard has one Inverter connector on the bottom side. The Inverter connector is labeled as "BL1". The pinout of the connector is shown below.
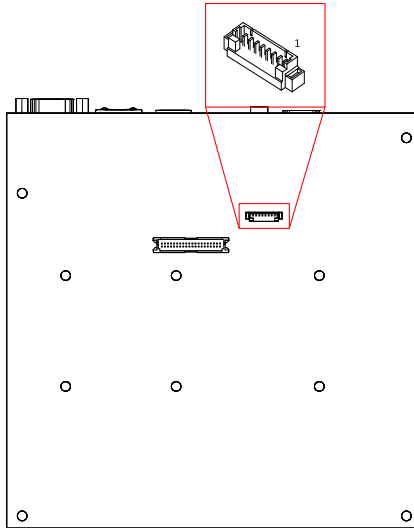
Figure 23: Inverter connector

Pin	Signal
1	IVDD1_CEN
2	IVDD1_CEN
3	ENABLT/ENAVDD1
4	NC
5	ENAVDD1/ENABLT1
6	BRIGHTNESS1_CTL
7	Ground
8	Ground

Table 19: Inverter connector pinout

2.2.14.   Front Audio Pin Header

In addition to the TRS audio jacks on the external I/O coastline, the mainboard has a pin header for Line-out and MIC-in. The pin header is labeled as "F_AUDIO1". The pinout of the pin header is shown below.
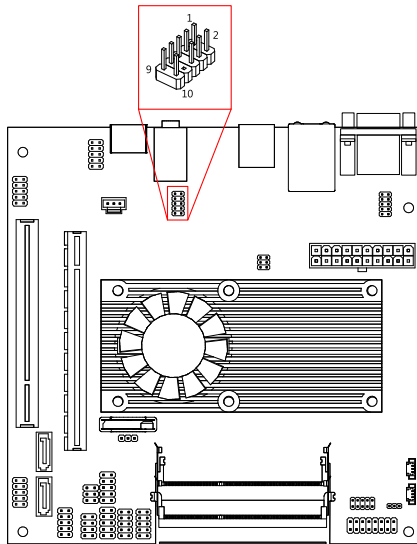
Figure 24: Front audio pin header

Pin	Signal	Pin	Signal
1	MIC2IN_L	2	Ground
3	MIC2IN_R	4	Ground
5	LINEOUT_R	6	MIC2_JD
7	FRONT_IO_SENSE	8	—
9	LINEOUT_L	10	LINEOUT_JD

Table 20: Front audio pin header pinout

2.2.15.   SPDIF Connector

The mainboard has one 3-pin SPDIF connector. The connector is labeled as "SPDIF1". The pinout of the connector is shown below.
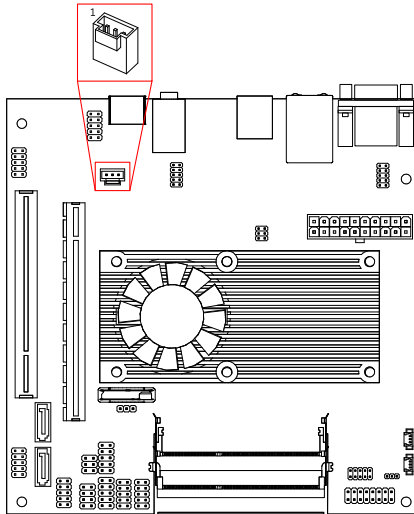
Figure 25: SPDIF connector

Pin	Signal
1	VDD
2	SPDIFO
3	Ground

Table 21: SPDIF connector pinout

2.2.16.　Digital I/O Pin Header

There are two onboard Digital I/O pin headers that support up to eight GPO and eight GPI signals. The pin headers are labeled as "DIO1" and "DIO2". The pinout of the pin headers are shown below.
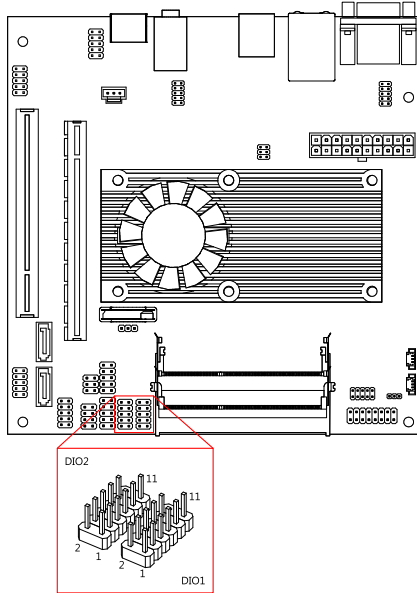
Figure 26: Digital I/O pin header

DIO1			
Pin	Signal	Pin	Signal
1	5V_DIO	2	12V_DIO
3	GPO11	4	GPI7
5	GPO12	6	GPI9
7	GPIO60	8	GPIO62
9	GPIO61	10	GPIO63
11	GND	12	—

DIO2			
Pin	Signal	Pin	Signal
1	5V_DIO	2	12V_DIO
3	GPIO50	4	GPIO54
5	GPIO51	6	GPIO55
7	GPIO52	8	GPIO56
9	GPIO53	10	GPIO57
11		12	—

Table 22: Digital I/O pin header pinout

2.2.17.　　SPI Pin Header

The mainboard has one 8-pin SPI pin header. The pin header is labeled as "SPI1". The pinout of the pin header is shown below.
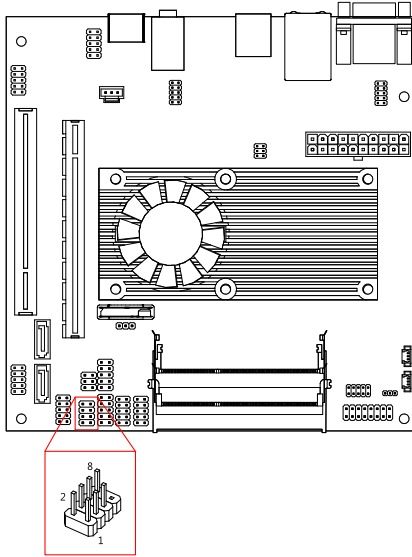
Figure 27: SPI pin header

Pin	Signal	Pin	Signal
1	SPIVCC	2	Ground
3	MSPISS0	4	MSPICLK
5	MSPIDI	6	MSPIDO
7	—	8	-PCIRST

Table 23: SPI pin header pinout

2.2.18.   LPC Pin Header

The mainboard has one LPC pin header for debugging purposes. The pin header is labeled as "LPC1". The pinout of the pin header is shown below.
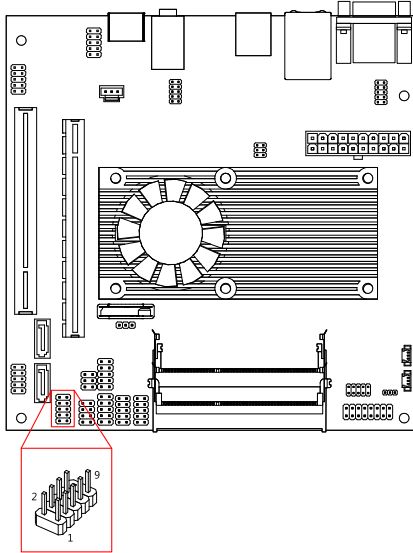
Figure 28: LPC pin header

Pin	Signal	Pin	Signal
1	+3.3V	2	-LPCRST
3	PCICLK2	4	LPCAD0
5	-LPCFRAME	6	LPCAD1
7	LPCAD3	8	LPCAD2
9	GND	10	—

Table 24: LPC pin header pinout

3. Jumpers

3.1. Backlight and Panel Power Select Jumper

The mainboard has a jumper that controls the voltage delivered to the inverter connector and the LVDS panel connector. The jumper is labeled as "J1". The jumper settings are shown below.
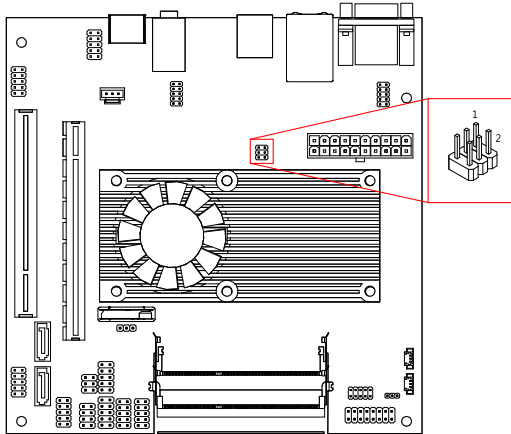
Figure 29: Backlight and LVDS power select jumper

Inverter Voltage	Pin 1	Pin 3	Pin 5
+12V	On	On	Off
+5V	Off	On	On
Panel Voltage	Pin 2	Pin 4	Pin 6
+3.3V	On	On	Off
+5V	Off	On	On

Table 25: Backlight and LVDS power select jumper settings

3.2. Clear CMOS Jumper

The onboard CMOS RAM stores system configuration data and has an onboard battery power supply. To reset the CMOS settings, set the jumper on pins 2 and 3 while the system is off. Return the jumper to pins 1 and 2 afterwards. Setting the jumper while the system is on will damage the mainboard. The default setting is on pins 1 and 2.
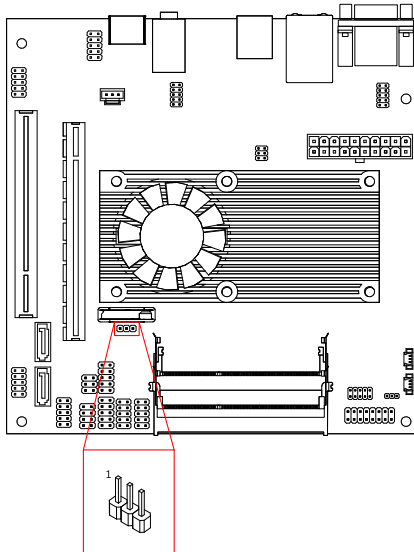
Figure 30: CLEAR CMOS jumper

Setting	Pin 1	Pin 2	Pin 3
Regular (default)	On	On	Off
Clear CMOS	Off	On	On

Table 26: CLEAR CMOS jumper settings

Note:

Except when clearing the RTC RAM, never remove the cap from the CLEAR_CMOS jumper default position. Removing the cap will cause system boot failure. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

4. Expansion Slots

4.1. DDR3 Memory Slots

There are two DDR3 memory slots on the mainboard. The memory slots can accommodate up to 8 GB of 1066 MHz memory[1]. The memory slots are labeled as "DIMM1" and "DIMM2"[2]. The location of the DDR3 memory slots are as shown below.

DIMM2

DIMM1
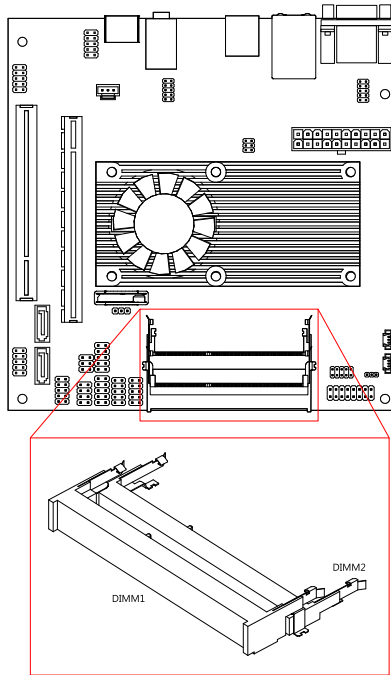
Figure 31: DDR3 memory slots

Note:

1. Some system resources require physical memory addresses and may reduce total available memory.
2. When installing memory modules, always install into DIMM2 first.

4.1.1. Installing a Memory Module

Step 1

Align the notch on the SODIMM memory module with the protruding wedge on the SODIMM memory slot. Insert the SODIMM memory module at a 30 degree angle relative to the SODIMM memory slot.
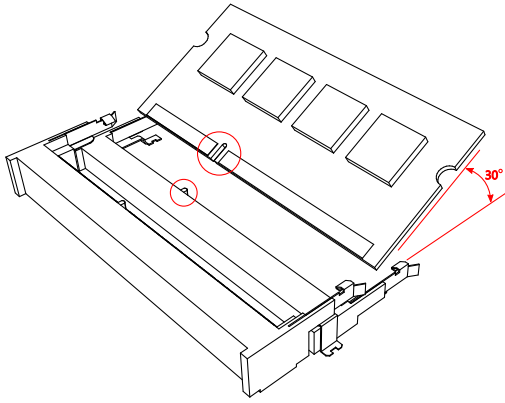
Figure 32: Inserting the memory module

Step 2

Insert the SODIMM memory module between the two rows of pins. Then push down until the locking clips lock the SODIMM memory module into place. There will be a slight tension as the SODIMM memory module is being locked.
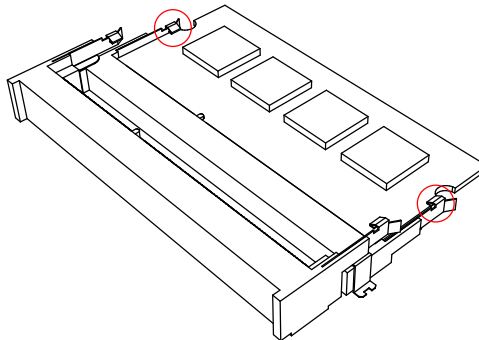
Figure 33: Locking the memory module

4.1.2. Removing a Memory Module

Step 1

To disengage the locking clips, push the locking clips horizontally outward away from the SODIMM memory module.
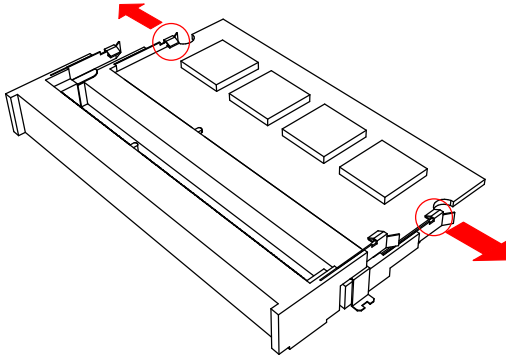
Figure 34: Disengaging the SODIMM locking clips

Step 2

When the locking clips have cleared, the SODIMM memory module will automatically pop up to the 30 degree angle. Remove the memory module.
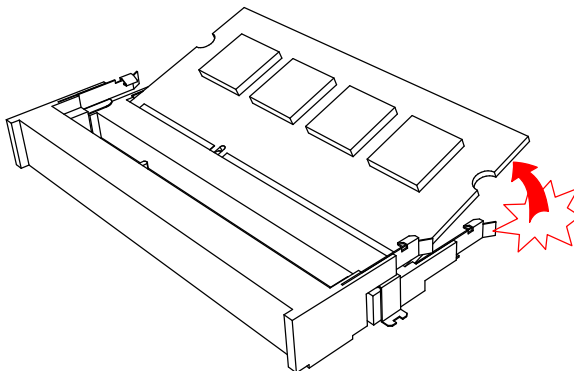
Figure 35: Removing the memory module

4.2. PCI Express Slot

The mainboard has one PCI Express slot labeled as "PCIE1". The PCI Express
slot is physically compatible with most PCI Express cards sizes from x1 to x16.
See page 97 for details on how to install optional riser card modules. The
location of the PCI Express slot is shown below.

key notch
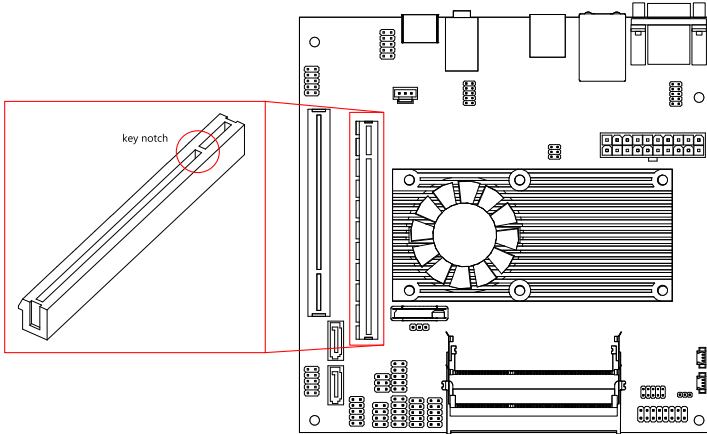
Figure 36: PCI Express slot

Note:

The optional riser card module is PCIE-01. PCIE-01 enables horizontal insertion of PCI Express cards.

4.3. PCI Slot

The onboard PCI slot, labeled as "PCI1", supports 5V 32-bit PCI cards. It is not compatible with PCI cards requiring 3.3V signaling. The location of the PCI slot is shown below.

The orientation of PCI cards can be changed from vertical to horizontal using a riser card module. See page 97 for details on how to install riser card modules.
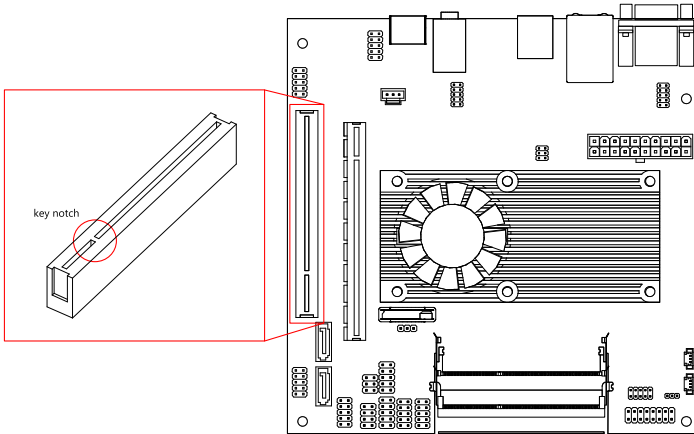
Figure 37: PCI slot

> **Note:**
>
> PCI slot does not support -12V.

5. Hardware Installation

5.1. Installing into a Chassis

The EPIA-M900 can be fitted into any chassis that has the mounting holes for compatible with the standard Mini-ITX mounting hole locations. Additionally, the chassis must meet the minimum height requirements for specified areas of the mainboard.

If a riser card module is being used, the chassis will need to accommodate the additional space requirements.

5.1.1. Suggested minimum chassis dimensions

The figure below shows the suggested minimum space requirements that a chassis should have in order to work well with the EPIA-M900.
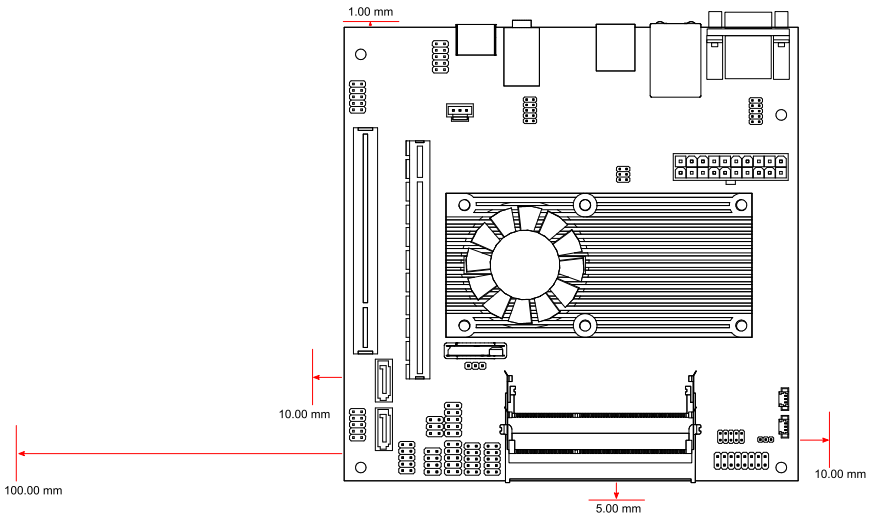
Figure 38: Suggested minimum chassis dimensions

Each side of the mainboard should have a buffer zone from the internal wall of the chassis. The side of the mainboard that accommodates the I/O coastline should have a buffer of 1.00 mm. The side on the opposite end of the I/O coastline should have a buffer of at least 5.00 mm. The two sides adjacent to the I/O coastline should have at least a 10.00 mm buffer.

For the side that is close to the PCI slot, the buffer should be at least 100.00 mm if a riser card module will be used.

5.1.2. Suggested minimum chassis height

The figure below shows the suggested minimum height requirements for the internal space of the chassis. It is not necessary for the internal ceiling to be evenly flat. What is required is that the internal ceiling height must be strictly observed for each section that is highlighted. The highest part of the ceiling will be above the PCI and PCIe slots.
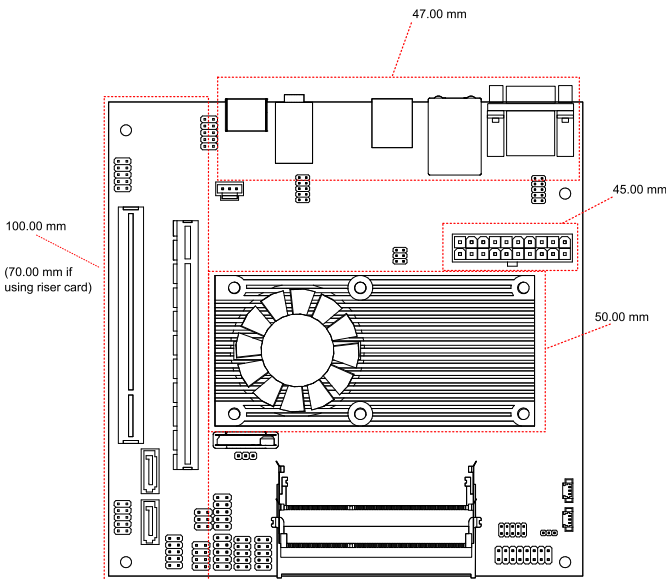
Figure 39: Suggested minimum internal chassis ceiling height

5.1.3. Suggested keepout areas

The figure below shows the areas of the mainboard that is highly suggested to leave unobstructed.
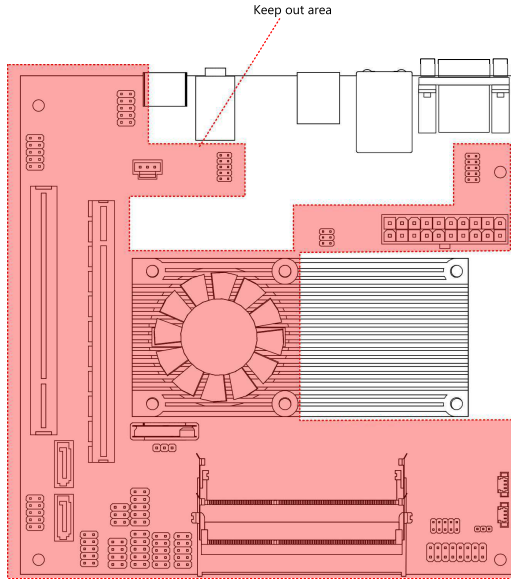
Keep out area

Figure 40: Suggested keepout areas

6. BIOS Setup Utility

6.1. Entering the BIOS Setup Utility

Power on the computer and press **Delete** during the beginning of the boot sequence to enter the BIOS Setup Utility. If the entry point has passed, restart the system and try again.

6.2. Control Keys

Up   Move up one row

Down   Move down one row

Left   Move to the left in the navigation bar

Right   Move to the right in the navigation bar

Enter   Access the highlighted item

Esc   Jumps to the Exit screen or returns to the previous screen

+[1]   Increase the numeric value

-[1]   Decrease the numeric value

F1   General help[2]

F7   Discard changes

F9   Load optimized defaults

F10   Save all the changes and exit

> **Note:**
>
> 1. Must be pressed using the 10-key pad.
> 2. The General help contents are only for the Status Page and Option Page setup menus.

6.3. Getting Help

The BIOS Setup Utility provides a "General Help" screen. This screen can be accessed at any time by pressing **F1**. The help screen displays the keys for using and navigating the BIOS Setup Utility. Press **Esc** to exit the help screen.

6.4. System Overview

The System Overview screen is the default screen that is shown when the BIOS Setup Utility is launched. This screen can be accessed by traversing the navigation bar to the "Main" label.

```
                                   BIOS SETUP UTILITY
   Main          Advanced         Boot        Security        Exit

   System Overview                                    Use [ENTER], [TAB] or
                                                      [SHIFT-TAB] to select
   AMIBIOS                                            a field.
   Version    : 0.02
   Build Date : 05/18/11                              Use [+] or [-] to
   ID         : I2FT7002                              configure system time.

   Processor
   VIA Nano X2 L4350 @ 1.6+ GHz

   System Memory                                      ←→       Select Screen
   Size    : 3840MB                                   ↑ ↓      Select Item
                                                      + -      Change Field
   System Time              [1 : 42 : 06]             Tab      Select Field
   System Date             [Tue 04/12/2011]           F1       General Help
                                                      F10      Save and Exit
                                                      ESC      Exit


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```

Figure 41: Illustration of the Main menu screen

6.4.1. AMIBIOS

The content in this section of the screen shows the current BIOS version, build date, and ID number.

6.4.2. Processor

This content in this section shows the CPU information that has been detected.

6.4.3. System Memory

This section shows the amount of available memory that has been detected.

6.4.4. System Time

This section shows the current system time. Press **Tab** to traverse right and **Shift+Tab** to traverse left through the hour, minute, and second segments. The

+ and **-** keys on the number pad can be used to change the values. The time format is [Hour : Minute : Second].

6.4.5. System Date

This section shows the current system date. Press **Tab** to traverse right and **Shift+Tab** to traverse left through the month, day, and year segments. The **+** and **-** keys on the number pad can be used to change the values. The weekday name is automatically updated when the date is altered. The date format is [Weekday, Month, Day, Year].

6.5. Advanced Settings

The Advanced Settings screen shows a list of categories that can provide access to a sub-screen. Sub-screen links can be identified by the preceding right-facing arrowhead.

```
                              BIOS SETUP UTILITY
   Main        Advanced        Boot       Security       Exit

   Advanced Settings                              Configure CPU.


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

   ▷ CPU Configuration
   ▷ SATA Configuration
   ▷ SuperIO Configuration
   ▷ Hardware Health Configuration
   ▷ ACPI Configuration
   ▷ APM Configuration
   ▷ Event Log Configuration
   ▷ Spread Spectrum Configuration            ←→      Select Screen
   ▷ USB Configuration                        ↑↓      Select Item
   ▷ CRB Configuration                        Enter   Go to Sub Screen
                                              F1      General Help
                                              F10     Save and Exit
                                              ESC     Exit


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```

Figure 42: Illustration of the Advanced Settings screen

The Advanced Settings screen contains the following links:

- CPU Configuration

- SATA Configuration

- SuperIO Configuration

- Hardware Health Configuration

- ACPI Configuration

- APM Configuration

- Event Log Configuration

- Spread Spectrum Configuration

- USB Configuration

- CRB Configuration

6.5.1. CPU Configuration

The CPU Configuration screen shows detailed information about the built-in processor. In addition to the processor information, the thermal controls can be set.

```
                             BIOS SETUP UTILITY
          ┌──────────┐
          │ Advanced │
─────────────────────────────────────────────────────────────────────
  Configure advanced CPU settings
  Module Version 01.08

  Manufacturer  : VIA
  VIA Nano X2 L4350 @ 1.6+ GHz
  Speed (FSB 266MHz * 6): 1600MHz
  Core       : 2
  Cache L1    : 128 KB
  Cache L2    : 1024 KB
  Microcode revision : 26
  PMON Support: : YES
                                                    ←→    Select Screen
  Nano CPU PMON Function          [Auto]            ↑↓    Select Item
  Nano CPU TM3 Function           [Enabled]         + -   Change Option
                                                    F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit

─────────────────────────────────────────────────────────────────────
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```

Figure 43: Illustration of the CPU Configuration screen

6.5.1.1. Nano CPU PMON Function

The Nano CPU PMON Function has two settings: Auto and Disabled. When set to "Auto", the PMON function will be enabled and controlled the CPU speed to perform automatically at best performance to comply with the given system applications.

> **Note:**
> 1. The PMON Function is not available in EPIA-M900-12LQ.
> 2. The VIA Nano X2 E-series 1.6+ GHz highest speed is 1.73 GHz with PMON function enabled. Even the CPU is running at default speed, the system (Windows/Linux) and the BIOS will always display the highest speed.

6.5.1.2. Nano CPU TM3 Function

The Nano CPU TM3 Function has two settings: Disabled and Enabled. When the setting is changed to "Disabled", the CPU's built-in thermal sensor will not

function. When the setting is changed to "Enabled", the thermal sensor will automatically adjust the CPU ratio and V_{CORE} to prevent the CPU from overheating.

6.5.2. SATA Configuration

The SATA Configuration screen shows links to the primary and secondary SATA hard drive information screens.

```
                          BIOS SETUP UTILITY
 ┌──────────┐
 │ Advanced │
 └──────────┘

   SATA Configuration                          While entering setup,
                                               BIOS auto detects the
   Serial ATA IDE devices                      presence of SATA devices.
   ▷ SATA-1 Primary IDE        : [Hard Disk]   This displays the status
   ▷ SATA-1 Secondary IDE      : [Not Detected] of auto detection of SATA
                                               devices.



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


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```

Figure 44: Illustration of SATA Configuration screen

6.5.2.1. Hard Disk Information

When a hard drive is detected, the hard drive's detailed information can be displayed on the SATA-1 Primary/Secondary IDE sub-screen.

```
                          BIOS SETUP UTILITY
 ┌──────────┐
 │ Advanced │
 └──────────┘

   SATA-1 Primary IDE                          Select PIO Mode.

   Device          : Not Detected

   PIO Mode        : 4
   DMA Mode        : Auto




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


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```
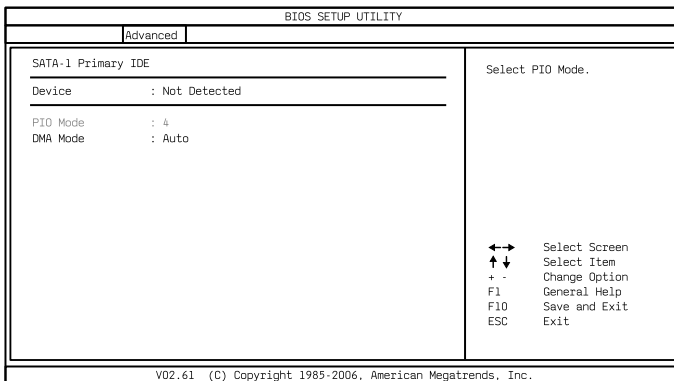
Figure 45: Illustration of SATA-1 Primary IDE screen

In addition, the PIO and DMA modes may be configured for each SATA hard drive.

6.5.2.1.1. PIO Mode

The PIO Mode has six possible settings: Auto, 0, 1, 2, 3, and 4. The "Auto" setting enables the BIOS to autonomously determine the appropriate PIO mode for the hard drive. If a manual setting is preferred, then be sure the correct PIO mode of the hard drive is used. It is not recommended to set the PIO mode higher than what the hard drive manufacturer states.

6.5.2.1.2. DMA Mode

The DMA Mode only has one possible setting: Auto.

6.5.3. SuperIO Configuration

The SuperIO Configuration screen shows the specific addresses and IRQs of the onboard serial ports.

```
                          BIOS SETUP UTILITY
        ┌──────────┐
        │ Advanced │
 ┌──────┴──────────┴─────────────────────────────────────────────────────┐
 │  Configure F81865F Super IO Chipset         │    Allows BIOS to select │
 │                                             │    Serial Port1 base     │
 │  Serial Port1 Address         [3F8]         │    addresses.            │
 │    Serial Port1 IRQ           [IRQ4]        │                          │
 │  Serial Port2 Address         [2F8]         │                          │
 │    Serial Port2 IRQ           [IRQ4]        │                          │
 │  Serial Port3 Address         [3E8]         │                          │
 │    Serial Port3 IRQ           [IRQ11]       │                          │
 │  Serial Port4 Address         [2E8]         │                          │
 │    Serial Port4 IRQ           [IRQ10]       │                          │
 │                                             │                          │
 │                                             │    ←→     Select Screen  │
 │                                             │    ↑↓     Select Item    │
 │                                             │    + -    Change Option  │
 │                                             │    F1     General Help   │
 │                                             │    F10    Save and Exit  │
 │                                             │    ESC    Exit           │
 │                                             │                          │
 ├───────────────────────────────────────────────────────────────────────┤
 │        V02.61   (C) Copyright 1985-2006, American Megatrends, Inc.      │
 └───────────────────────────────────────────────────────────────────────┘
```

Figure 46: Illustration of SuperIO Configuration screen

6.5.3.1. Serial Ports 1 to 4

Port	Address	IRQ
1	3F8, 3E8, 2E8	3, 4, 10, 11
2	2F8, 3E8, 2E8	3, 4, 10, 11
3	3F8, 2F8, 3E8, 2E8, 2F0, 2E0	3, 4, 10, 11
4	3F8, 2F8, 3E8, 2E8, 2F0, 2E0	3, 4, 10, 11

Table 27: Serial port addresses and IRQs

6.5.4. Hardware Health Configuration

The Hardware Health Configuration screen displays the monitored aspects of the mainboard such as CPU temperature, system temperature, fan speeds, and voltages of the power planes.

```
                              BIOS SETUP UTILITY
         ┌──────────┐
         │ Advanced │
         └──────────┘

    Hardware Health Configuration                      Fan configuration mode
                                                       setting
    CPU Temperature                :33°C/91°F
    System Temperature             :28°C/82°F

    Fan1 Speed                     :N/A
    Fan2 Speed                     :N/A

    VCORE                          :1.080 V
    +1.5VDIMM                      :1.515 V
    +3.3V                          :3.352 V
    +5V                            :5.003 V
                                                    ←→      Select Screen
    Smart FAN 1                    :[Auto]          ↑↓      Select Item
    Smart FAN 2                    :[Auto]          + -     Change Option
                                                    F1      General Help
                                                    F10     Save and Exit
                                                    ESC     Exit


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```

Figure 47. Illustration of Hardware Health Configuration screen

6.5.4.1. Smart FAN 1 and 2

The Smart FAN features have two options: Auto and Full Speed. The "Auto" option enables the BIOS to adjust the fan speed according to the needs of the CPU and system. Smart FAN 1 corresponds to the CPU temperature sensor and Smart FAN 2 corresponds to the system temperature sensor. The "Full Speed" option forces the fans to run at their maximum RPM.

6.5.5. ACPI Configuration

ACPI grants the operating system direct control over system power management. The ACPI Configuration screen can be used to set a number of power management related functions.

```
                         BIOS SETUP UTILITY
       ┌─────────┐
       │Advanced │
 ┌─────┴─────────┴─────────────────────────────────────────────────┐
 │  ACPI Settings                              Select the ACPI state used │
 │                                             for System Suspend         │
 │  Suspend mode                  [Auto]                                  │
 │  ACPI Version Features         [ACPI v3.0]                             │
 │                                                                        │
 │                                                                        │
 │                                                                        │
 │                                                                        │
 │                                             ◄─►      Select Screen     │
 │                                             ↑↓       Select Item       │
 │                                             + -      Change Option     │
 │                                             F1       General Help      │
 │                                             F10      Save and Exit     │
 │                                             ESC      Exit              │
 │                                                                        │
 └────────────────────────────────────────────────────────────────────┘
            V02.61  (C) Copyright 1985-2006, American Megatrends, Inc.
```
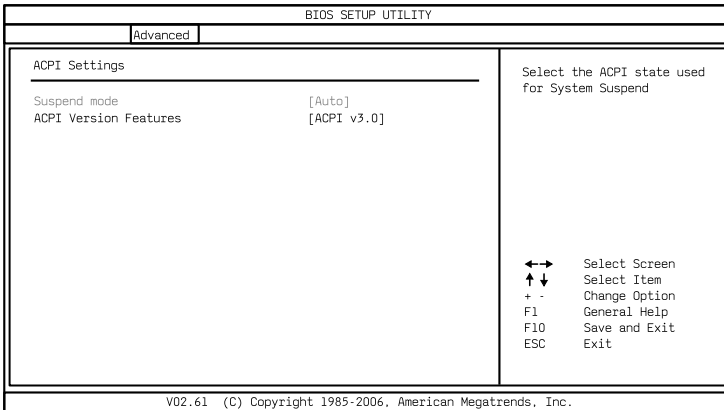
Figure 48: Illustration of ACPI Configuration screen

6.5.5.1. Suspend Mode

The Suspend Mode field has three selectable options.

S1(POS)

S1/Power On Suspend (POS) is a low power state. In this state, no system context (CPU or chipset) is lost and hardware maintains all system contexts.

S3(STR)

S3/Suspend To RAM (STR) is a power-down state. In this state, power is supplied only to essential components such as main memory and wakeup-capable devices. The system context is saved to main memory, and context is restored from the memory when a "wakeup" event occurs.

Auto

When the Suspend Mode is set to Auto, the operating system will control the power state.

6.5.5.2. ACPI Version Features

The ACPI Version Features enables the BIOS to support the designated ACPI specification. There are three versions to choose from: ACPI 1.0, ACPI 2.0, and ACPI 3.0.

6.5.6. APM Configuration

APM enables the operating system to co-work with the BIOS to control the system power management. The APM Configuration screen can be used to set a number of power management functions.

```
                              BIOS SETUP UTILITY
        ┌──────────────┐
        │   Advanced   │
 ┌──────┴──────────────┴─────────────────────────────┬───────────────────────────┐
 │  Power Button Mode            [On/Off]             │        Options             │
 │  Restore on AC/Power Loss     [Last State]         │                            │
 │                                                    │  On/Off                    │
 │  Advanced Resume Event Controls                    │  Standby                   │
 │  Resume On LAN                [Disabled]           │  Suspend                   │
 │  Resume On PS/2 KBC           [Disabled]           │                            │
 │    Wake-Up Key                [Any Key]            │                            │
 │  Resume On PS/2 Mouse         [Disabled]           │                            │
 │  Resume On RTC Alarm          [Disabled]           │                            │
 │                                                    │                            │
 │                                                    │  ←→     Select Screen      │
 │                                                    │  ↑↓     Select Item        │
 │                                                    │  + -    Change Option      │
 │                                                    │  F1     General Help       │
 │                                                    │  F10    Save and Exit      │
 │                                                    │  ESC    Exit               │
 │                                                    │                            │
 └────────────────────────────────────────────────────────────────────────────────┘
            V02.61  (C) Copyright 1985-2006, American Megatrends, Inc.
```

Figure 49: Illustration of APM Configuration screen

6.5.6.1. Power Button Mode

The Power Button Mode has three options.

On/Off

When On/Off is selected, pressing the power button will instantly cause the system to power on or off.

Standby

When Standby is selected, the power button must be pressed and held down for 4 seconds before the system will power off.

Suspend

When Suspend is selected, pressing the power button will instantly cause the system to enter suspend mode.

6.5.6.2. Restore on AC/Power Loss

Restore on AC/Power Loss defines how the system will respond after AC power has been interrupted while the system is on. There are three options.

Power Off

The Power Off option keeps the system in an off state until the power button is pressed again.

Power On

The Power On option restarts the system when the power has returned.

Last State

The Last State option restores the system to its previous state when the power was interrupted.

6.5.6.3. Resume on LAN

Resume on LAN wakes up a system that has been put into suspend or standby mode. When this feature is enabled, the system can be restored to an active state when a PCIE wake up signal is detected on the LAN.

6.5.6.4. Resume on PS/2 KBC

Resume on PS/2 KBC wakes up a system that has been put into suspend or standby mode. When this feature is enabled, keyboard activity as defined in the **Wake-Up Key** feature will cause the system to wake up. This feature has three options.

S3

The S3 option enables PS/2 keyboard activity to be detected if the system is in S3 power saving mode.

S3/S4/S5

The S3/S4/S5 option enables PS/2 keyboard activity to be detected if the system is in S3/S4/S5 power saving mode.

Disabled

The Disabled option disables the detection of all PS/2 keyboard activity.

6.5.6.5. Wake-Up Key

The Wake-Up Key feature can only be set when **Resume on PS/2 KBC** is set to "S3" or "S3/S4/S5". Otherwise, this feature will be not selectable. This feature has two options.

Any Key

The Any Key option enables any key on the keyboard to trigger the Wake-Up event.

Specific Key

The Specific Key option unlocks the **Wake-Up Password** feature.

6.5.6.6. Wake-Up Password

The Wake-Up Password feature can only be set when the **Wake-Up Key** feature is set to "Specific Key". This feature enables the user to specify a key sequence that must be entered in order to wake up the system.

The key sequence can consist of up to 6 alphanumeric characters and some special characters. Function keys and modifier keys (such as Ctrl, Alt, Del, etc.) cannot be used.

6.5.6.7. Resume on PS/2 Mouse

Resume on PS/2 Mouse wakes up a system that has been put into suspend or standby mode. When this feature is enabled, any PS/2 mouse activity that is detected will cause the system to wake up. This feature has three options.

S3

The S3 option enables any PS/2 mouse activity to be detected if the system is in S3 power saving mode.

S3/S4/S5

The S3/S4/S5 option enables any PS/2 mouse activity to be detected if the system is in S3/S4/S5 power saving mode.

Disabled

The Disabled option disables the detection of all PS/2 mouse activity.

6.5.6.8. Resume on RTC Alarm

Resume on RTC Alarm can only be used if **Resume on Software RTC Alarm** is not enabled. This feature enables the BIOS to automatically power on the system at a scheduled time. When enabled, the **RTC Alarm Date** and **System Time** features will be unlocked.

6.5.6.9. RTC Alarm Date (Days)

The RTC Alarm Date feature is visible only when **Resume on RTC Alarm** is enabled. This feature enables the user to specify a specific date each month or daily recurrence. Use the **+** and **-** keys on the number pad to change the value of the RTC Alarm Date.

Every Day

The Every Day option triggers the RTC Alarm daily.

1 – 31

When a specific numeric date is selected, the RTC Alarm will be triggered on that day of the month.

6.5.6.10. System Time

The System Time option enables the user to specify the time the system should power on for the date that is set in **RTC Alarm Date**.

6.5.7. Event Logging Configuration

The Event Logging Configuration screen displays three features for accessing, modifying, and deleting event logs.

```
                            BIOS SETUP UTILITY
 ┌──────────────────────────────────────────────────────────────────────┐
 │       │ Advanced │                                                     │
 │ ┌────────────────┘                                                     │
 │  Event Logging details                     View all unread events      │
 │  ───────────────────────                   on the Event Log.           │
 │  View Event Log                                                         │
 │  Mark all events as read                                               │
 │  Clear Event log                                                       │
 │                                                                        │
 │                                                                        │
 │                                                                        │
 │                                            ←→      Select Screen        │
 │                                            ↑↓      Select Item          │
 │                                            Enter   Go to Sub Screen     │
 │                                            F1      General Help         │
 │                                            F10     Save and Exit        │
 │                                            ESC     Exit                 │
 │                                                                        │
 │        V02.61  (C) Copyright 1985-2006, American Megatrends, Inc.       │
 └──────────────────────────────────────────────────────────────────────┘
```
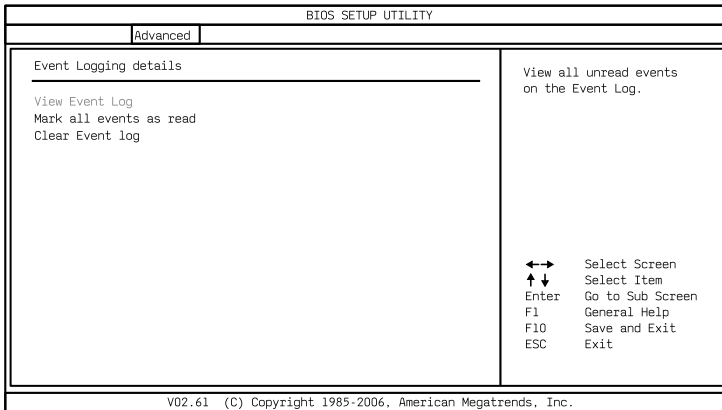
Figure 50: Illustration of Event Logging Configuration screen

6.5.7.1. View Event Log

The View Event Log feature displays all event logs that have been recorded. Event logs include information such as keyboard errors, etc.

6.5.7.2. Mark all events as read

The Mark all events as read feature provides a quick mechanism to flag all event logs as having been accessed.

6.5.7.3. Clear Event log

The Clear Event log feature deletes all event logs from the BIOS memory.

6.5.8. Spread Spectrum Configuration

The Spread Spectrum Configuration screen enables access to the CPU Spread
Spectrum Setting feature.

```
                            BIOS SETUP UTILITY
         ┌──────────┐
         │ Advanced │
         └──────────┘
   Spread Spectrum Configuration              Dynamic to adjust SSC.

   CPU Spread Spectrum Setting      [0.1%]




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

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```
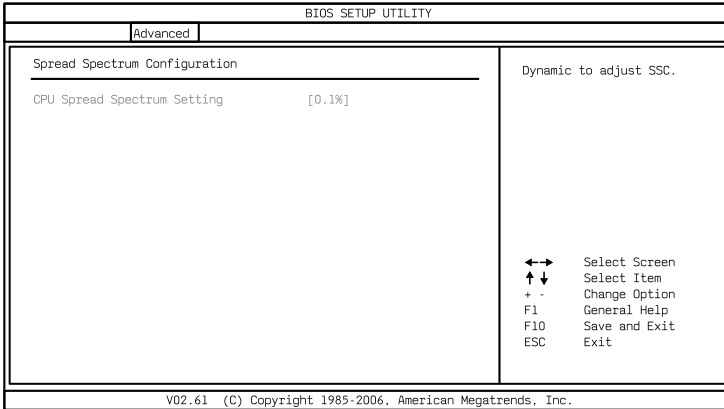
Figure 51: Illustration of Spread Spectrum Configuration screen

6.5.8.1. CPU Spread Spectrum Setting

The CPU Spread Spectrum Setting feature enables the BIOS to modulate the
clock frequencies originating from the mainboard. The settings are in
percentages of modulation. Higher percentages result in greater modulation of
clock frequencies. This feature has settings that range from 0.1% to 0.9%.

6.5.9. USB Configuration

The USB Configuration screen shows the number of connected USB devices. Additionally, support for various USB features can be enabled or disabled.

```
                              BIOS SETUP UTILITY
┌──────────────────────────────────────────────────────────────────────────┐
│  Advanced                                                                   │
├──────────────────────────────────────────────────────────────────────────┤
│  USB Configuration                              Enables USB device mode.    │
│  ──────────────────────────────────────                                     │
│  Module Version - 2.24.5-13.4                                               │
│                                                                             │
│  USB Devices Enabled :                                                      │
│     1 Keyboard, 1 Mouse, 1 Hub                                              │
│                                                                             │
│  USB Device Mode                  [Enabled]                                 │
│                                                                             │
│                                                                             │
│                                                                             │
│                                                 ←→     Select Screen         │
│                                                 ↑↓     Select Item           │
│                                                 + -    Change Option         │
│                                                 F1     General Help          │
│                                                 F10    Save and Exit         │
│                                                 ESC    Exit                  │
│                                                                             │
├──────────────────────────────────────────────────────────────────────────┤
│         V02.61  (C) Copyright 1985-2006, American Megatrends, Inc.          │
└──────────────────────────────────────────────────────────────────────────┘
```
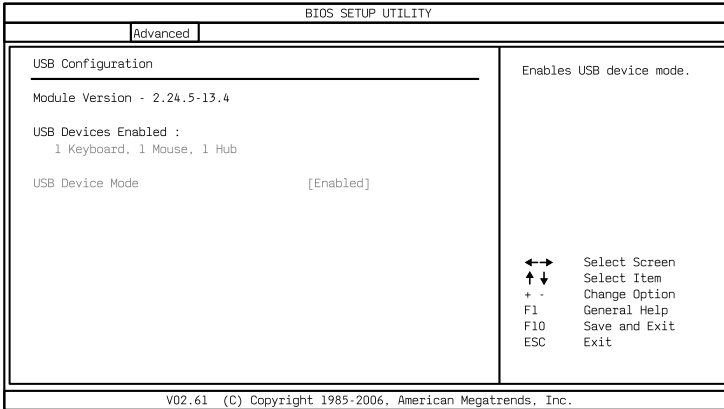
Figure 52: Illustration of USB Configuration screen

6.5.9.1. USB Device Mode

The USB Device Mode feature enables the mainboard to directly connect to another system through the other system's USB port. There are two options: enabled and disabled. In addition, the driver must be installed for this direct connection to function.

6.5.10. CRB Configuration

The CRB Configuration screen includes several chipset settings.

```
                              BIOS SETUP UTILITY
        ┌─────────┐
        │Advanced │
        └─────────┘

    DRAM Clock                       [Auto]                    Options
    Primary Graphics Adapter         [PCI ->  PCIE -> UMA]
    Dual VGA (PCI VGA+UMA)           [Disabled]          Auto
    Select Display Device 1          [CRT]               400 MHz
    Select Display Device 2          [HDMI]              533 MHz
    Panel Type                       [O2]
    VGA Share Memory (Frame Buffer)  [256MB]
    OnChip HDAC Device               [Enable]
    SMBus Device Switch              [New SMBus Device]
    WATCH-DOG                        [Disabled]
    Backlight Control                [Level 2]
    Backlight PWM Clock              [ 7K Hz ]
    VT6130 LAN Control               [Enabled]
     LAN Option ROM                  [Disabled]          ←→      Select Screen
                                                         ↑↓      Select Item
                                                         + -     Change Option
                                                         F1      General Help
                                                         F10     Save and Exit
                                                         ESC     Exit

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```

Figure 53: Illustration of CRB Configuration screen

6.5.10.1. DRAM Clock

The DRAM Clock feature enables the user to determine how the BIOS handles the memory clock frequency. The memory clock can either be dynamic or static. This feature has three options.

Auto

The Auto option enables the BIOS to select a compatible clock frequency for the installed memory.

400 MHz

The 400 MHz option forces the BIOS to be fixed at 800 MHz for DDR3 memory modules.

533 MHz

The 533 MHz option forces the BIOS to be fixed at 1066 MHz for DDR3 memory modules.

6.5.10.2. Primary Graphics Adapter

The Primary Graphics Adapter feature enables the user to change the order in which the BIOS seeks for a graphics adapter. There are three paths that can be chosen.

- PCI → PCIE → UMA

- UMA → PCIE → PCI

- PCIE → UMA → PCI

6.5.10.3. Dual VGA (PCIE VGA+UMA)

The Dual VGA feature enables the user to output display to two display devices. This feature has two options: enabled and disabled. A driver must be installed in the OS in order for this function to function.

6.5.10.4. Select Display Device 1 and 2

The Select Display Device feature enables the user to choose a specific display interface. This feature has three options: CRT, LCD and HDMI. If both Select Display Device 1 and Select Display Device 2 are set to the same interface, then any display device connected to the other interface will not function. For example, if both Select Display 1 and 2 are set to CRT, then no data will be sent to the HDMI and LCD port.

6.5.10.5. Panel Type

The Panel Type feature enables the user to specify the resolution of the display being used with the system. The panel types are predefined in the VGA VBIOS.

Panel Type	Resolution	Panel Type	Resolution
00	640 x 480	08	800 x 480
01	800 x 600	09	1024 x 600
02	1024 x 768	10	1366 x 768
03	1280 x 768	11	1600 x 1200
04	1280 x 1024	12	1680 x 1050
05	1400 x 1050	13	1920 x 1200
06	1440 x 900	14	1920 x 1080
07	1280 x 800	15	1024 x 576

6.5.10.6. VGA Share Memory (Frame Buffer)

The VGA Share Memory feature enables the user to choose the amount of the system memory to reserve for use by the integrated graphics controller. The amount of memory that can be reserved ranges from 64 – 512 MB.

6.5.10.7. OnChip HDAC Device

The OnChip HDAC Device feature enables the BIOS to control the high definition audio codec in the chipset. This feature has two options: enable and disable.

6.5.10.8. SMBus Device Switch

This feature enables support for the new chipset definition of the SMBus interface. There are two options: New SMBus Device and Old SMBus Device. If the OS cannot support the new SMBus definition, then change the setting to "Old SMbus Device".

6.5.10.9. WATCH-DOG

The WATCHDOG Timer Enable feature unlocks two other features that enable the BIOS to monitor the state of the system. This feature has two options: enabled or disabled.

6.5.10.10.   Unit-Select

The Unit-Select feature is only available if the **WATCH-DOG** feature has been enabled. This feature has two options: minutes and seconds.

6.5.10.11.   Time-Select

The Time-Select is only available if the **WATCH-DOG** feature has been enabled. This feature requires the user to input an integer in the range of 0–255 if the **Unit-Select** feature is set to "Seconds". If the **Unit-Select** feature is set to "Minutes", then the user can only input an integer in the range of 0–17. If the user inputs "0", the **WATCH-DOG** feature will be disabled regardless of the setting for **Unit-Select**.

6.5.10.12.   Backlight Control

The Backlight Control feature enables the user to control the brightness of the LCD backlight. This feature has four options.

Level 1 25% Light

Level 2 50% Light

Level 3 75% Light

Level 4 100% Light

6.5.10.13.   Backlight PWM Clock

The Backlight PWM Clock feature enables the user to correct the LCD backlight PWM clock. This feature has four options: 14 kHz, 7 kHz, 110 Hz, 54.4 Hz.

6.5.10.14.   VT6130 LAN Control

The VT6130 LAN Control feature determines whether the onboard LAN controller will be used or not.

6.5.10.15.   LAN Option ROM

The LAN Option ROM feature will only be visible if the **VT6130 LAN Control** feature is enabled. If the LAN Option ROM feature is enabled, then the system will load a separate ROM for the LAN controller in order to boot through the Gigabit Ethernet.

6.6. Boot Settings

The Boot Settings screen has two links that goes to the **Boot Settings Configuration** and **Boot Device Priority** screens.

```
                        BIOS SETUP UTILITY
   Main        Advanced      Boot      Security       Exit

  Boot Settings                                  Configure Settings
                                                 during System Boot.
  ▷ Boot Settings Configuration
  ▷ Boot Device Priority




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


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```
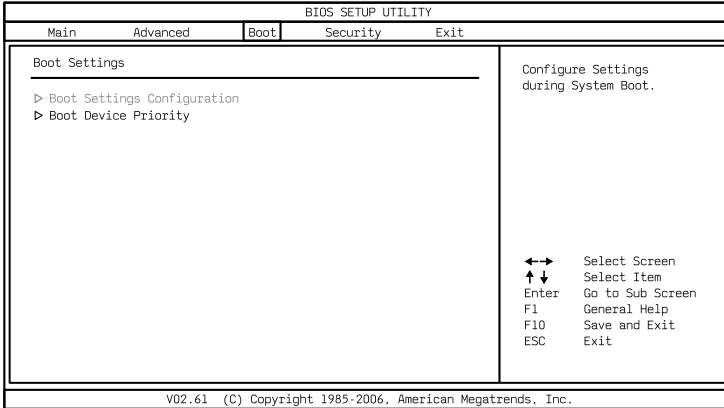
Figure 54: Illustration of Boot Settings screen

6.6.1. Boot Settings Configuration

The Boot Settings Configuration screen has several features that can be run during the system boot sequence.

```
                        BIOS SETUP UTILITY
                          Boot

  Boot Settings Configuration                    Allows BIOS to skip
                                                 certain tests while
  Quick Boot                  [Enabled]          booting. This will
  Quiet Boot                  [Enabled]          decrease the time needed
  Bootup Num-Lock             [On]               to boot the system.
  Wait for 'F1' if Error      [Enabled]
  Hit 'DEL' Message Display   [Enabled]




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

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```

Figure 55: Illustration of Boot Settings Configuration screen

6.6.1.1. Quick Boot

The Quick Boot feature enables the BIOS to skip certain tests in order to speed up the boot sequence. This feature has two options: enabled and disabled.

6.6.1.2. Quiet Boot

The Quiet Boot feature hides all of the Power-on Self Test (POST) messages during the boot sequence. Instead of the POST messages, the user will see an OEM logo. This feature has two options: enabled and disabled.

6.6.1.3. Bootup Num-Lock

The Bootup Num-Lock feature determines how the 10-key pad will behave. When the feature is enabled, the 10-key pad will behave as a number pad. When the feature is disabled, the 10-key pad will behave as cursor navigation keys.

6.6.1.4. Wait for 'F1' if Error

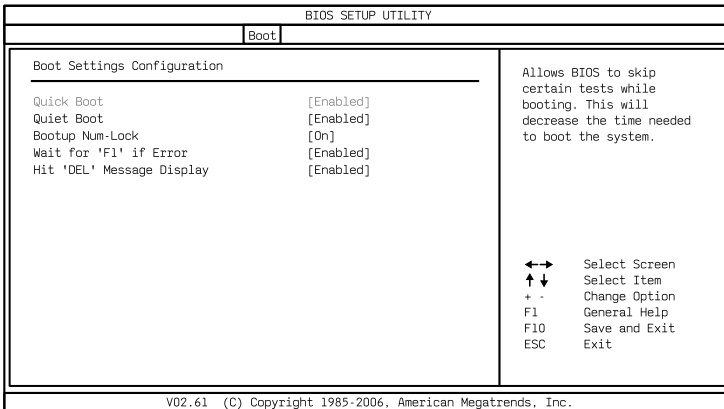This feature determines how the system will respond if an error is detected during the boot sequence. If this feature is enabled, the BIOS will pause booting and wait for the user to press F1 to enter the BIOS setup menu. This feature has two options: enabled and disabled.

6.6.1.5. Hit 'DEL' Message Display

This feature determines if the BIOS will display a POST message that informs the user how to access the BIOS Setup Utility.[1] This feature has two options: enabled and disabled.

> **Note:**
>
> 1. if the Quiet Boot option is enabled, the settings of this feature will have no effect.

6.6.2. Boot Device Priority

The Boot Device Priority screen lists all bootable devices.

```
                            BIOS SETUP UTILITY
                    Boot

    Boot Device Priority                        Specifies the best
                                                sequence from the
    1st Boot Device            [Network: VIA Networking]    available devices.
    2nd Boot Device            [Network: VIA Networking]
                                                A device enclosed in
                                                parenthesis has been
                                                disabled in the
                                                corresponding type menu.


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


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```
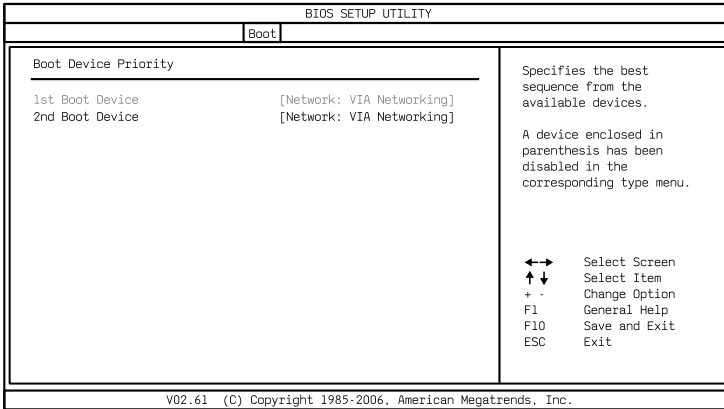
Figure 56: Illustration of the Boot Device Priority screen

6.6.2.1. 1st/2nd Boot Device

This feature specifies the boot sequence from the available devices. The available boot devices are detected dynamically and bootable devices will be listed accordingly.

6.7. Security Settings

The Security Settings screen provides a way to restrict access to the BIOS or even the entire system.
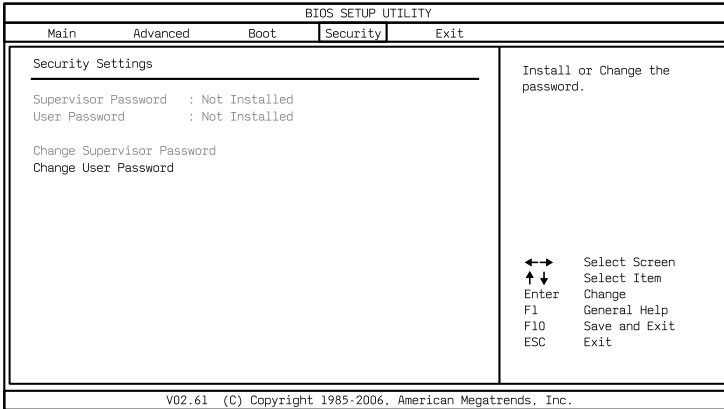
```
                          BIOS SETUP UTILITY
   Main        Advanced        Boot     Security      Exit

   Security Settings                         Install or Change the
   ─────────────────────────────            password.
   Supervisor Password   : Not Installed
   User Password         : Not Installed

   Change Supervisor Password
   Change User Password



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


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```

Figure 57: Illustration of Security Settings screen

6.7.1. Change Supervisor Password

This option is for setting a password for accessing the BIOS setup utility. When a password has been set, a password prompt will be displayed whenever the BIOS setup utility is launched. This prevents an unauthorized person from changing any part of the system configuration.

When a supervisor password is set, the **Password Check** option will be unlocked.

6.7.2. User Access Level

This feature controls the level of access a user (without the supervisor password) is granted to the BIOS setup utility. This feature has four options.

No Access

The No Access option completely locks the BIOS setup utility. The supervisor password is required to access and change the BIOS settings.

View Only

The View Only option only allows access to view the BIOS settings. Users with this permission level cannot make changes to the BIOS.

Limited

The Limited option only allows non-critical BIOS settings to be changed. Changes are allowed to the following BIOS features:

- System Time
- System Date
- Quick Boot
- Display Logo

Full Access

The Full Access option allows all BIOS settings to be changed except for the Change Supervisor Password and User Access Level options.

6.7.3. Change User Password

This option is for setting a password for non-supervisors. When a user password is set, the **Clear User Password** and **Password Check** options will be unlocked.

6.7.4. Clear User Password

This option is only available when the user accesses the BIOS Setup Utility when the user password has been specified.

6.7.5. Password Check

This feature is compulsory when the **Change Supervisor Password** option is set. The user will have up to three chances to enter the correct password before the BIOS forces the system to stop booting. If the user does not enter the correct password, the keyboard will also lock up. The only way to get past this is to do a hard reboot (i.e., use the system reset button or cut off the

power to the system). A soft reboot (i.e., Ctrl+Alt+Del) will not work because the keyboard will be locked. This feature has two options.

Setup

The Setup option forces users to enter a password in order to access the BIOS Setup Utility.

Always

The Always option forces users to enter a password in order to boot up the system.

6.8. Exit Options

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

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

  Load Optimal Defaults




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


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```
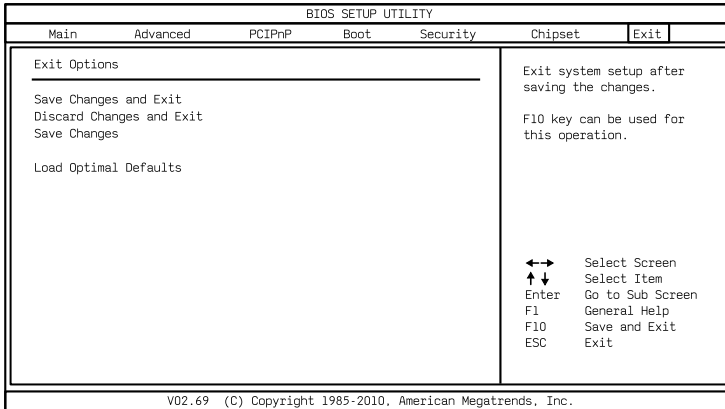
Figure 58: Illustration of Exit Options screen

6.8.1. Save Changes and Exit

Save all changes to the BIOS and exit the BIOS Setup Utility. The "F10" hotkey can also be used to trigger this command.

6.8.2. Discard Changes and Exit

Exit the BIOS Setup Utility without saving any changes. The "Esc" hotkey can also be used to trigger this command.

6.8.3. Discard Changes

This command reverts all changes to the settings that were in place when the BIOS Setup Utility was launched. The "F7" hotkey can also be used to trigger this command.

6.8.4. Load Optimal Defaults

Load optimal default values for all the setup items. The default optimized values are defined by the mainboard manufacturer to provide optimized environment for a basic system. The "F9" hotkey can also be used to trigger this command.

7. Driver Installation

7.1. Microsoft Driver Support

The VIA EPIA-M900 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VEPD website at www.viaembedded.com.

For embedded operating systems, the related drivers can be found in the VIA Embedded website at www.viaembedded.com.

7.2. Linux Driver Support

The VIA EPIA-M900 mainboard is highly compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA

- Using a driver built into a distribution package

- Visiting www.viaembedded.com for the latest updated drivers

- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. Contact VEPD to submit a request.

Appendix A.

Power Consumption Report

Power consumption tests were performed on the VIA EPIA-M900. The following tables represent the breakdown of the voltage, amp and wattage values while running common system applications.

A.1. EPIA-M900-16L

The tests were performed based on the following additional components:

- **Memory:** Transcend 4GB DDR3 1333 MHz SODIMM (x 2 for 8GB total)

- **HDD:** Fujitsu 2.5" MHW2120BH 120GB SATA (+5V, 0.6A)

- **ATX Power Supply:** AcBel API4PC23 (ATX-500CA-AB8FM)

A.1.1. PassMark (CPU Usage = 100%)

Power Plane	Volts	Amperes	Watts
+3.3V	3.328	1.100	3.661
+5V	5.020	1.800	9.036
+5VSB	5.070	0.000	0.000
+12V	12.030	2.000	24.060
		Total Power Consumption	36.757

A.1.2. Power DVD 10 (H.264, 1080i)

Power Plane	Volts	Amperes	Watts
+3.3V	3.328	1.000	3.328
+5V	5.020	1.900	9.538

+5VSB	5.070	0.000	0.000
+12V	12.030	0.900	10.827
		Total Power Consumption	23.693

A.1.3. Power DVD 10 (MPEG2, 1080p)

Power Plane	Volts	Amperes	Watts
+3.3V	3.328	0.800	2.662
+5V	5.020	1.800	9.036
+5VSB	5.070	0.000	0.000
+12V	12.030	0.800	9.624
		Total Power Consumption	21.322

A.1.4. Power DVD 10 (WMV9, 1920x1080)

Power Plane	Volts	Amperes	Watts
+3.3V	3.328	1.000	3.328
+5V	5.020	1.800	9.036
+5VSB	5.070	0.000	0.000
+12V	12.030	1.000	12.030
		Total Power Consumption	24.394

A.1.5. Idle (Windows 7, 64-bit)

Power Plane	Volts	Amperes	Watts
+3.3V	3.328	1.100	3.661
+5V	5.020	1.400	7.028
+5VSB	5.070	0.000	0.000
+12V	12.030	0.600	7.218
		Total Power Consumption	17.907

A.2. EPIA-M900-12LQ

The tests were performed based on the following additional components:

- **Memory:** Transcend 4GB DDR3 1066 SODIMM x 1 (4GB)

- **HDD:** Fujitsu 2.5" SATA2 120GB MHW2120BH (+5V, 0.6A)

- **ATX Power Supply:** AcBel API4PC23 (ATX-500CA-AB8FM)

A.2.1. PassMark (CPU Usage = 100%)

Power Plane	Volts	Amperes	Watts
+12V	11.93V	4.5A	53.685W
+5V	5.11V	1.4A	7W
+5VSUS	4.95V	0A	0W
+3.3V	3.353V	0.6A	2.0118W
		Total Power Consumption	62.6968W

A.2.2. Power DVD 10 to Player H.264 1080P movie

Power Plane	Volts	Amperes	Watts
+12V	11.93V	1.3A	15.509W
+5V	5.11V	1.4A	7.154W
+5VSUS	4.95V	0A	0W
+3.3V	3.353V	0.6A	2.0118W
		Total Power Consumption	24.6748W

A.2.3. Power DVD 10 to Player MPEG2 1080P Movie

Power Plane	Volts	Amperes	Watts
+12V	11.93V	1.6A	19.088W
+5V	5.11V	1.4A	7.154W
+5VSUS	4.95V	0A	0W
+3.3V	3.353V	0.5A	1.6765W
		Total Power Consumption	27.9185W

A.2.4. Power DVD 10 to Player WMV9 1080P Movie

Power Plane	Volts	Amperes	Watts
+12V	11.93V	1.8A	21.474W
+5V	5.11V	1.4A	7.154W
+5VSUS	4.95V	0A	0W
+3.3V	3.353V	0.6	2.0118W
		Total Power Consumption	30.6398W

A.2.5. Idle (Windows 7, 64-bit)

Power Plane	Volts	Amperes	Watts
+12V	11.93V	1.3A	15.509W
+5V	5.11V	1.1A	5.621W
+5VSUS	4.95V	0A	0W
+3.3V	3.353V	0.5A	1.6765W
		Total Power Consumption	22.8065W

Appendix B. Riser Card Modules

There are two riser card modules that are compatible with the EPIA-M900: the PCIE-01 and the EXT-PCI-01.

B.1. PCIE-01

The PCIE-01 riser card has a PCIe x16 slot. This card can only be used if the PCI slot is not being used.

B.2. EXT-PCI-01

The EXT-PCI-01 card is compatible with both 5V and 3.3V PCI slots. However, the PCI slots on the riser card are only compatible with 5V PCI cards. The EXT-PCI-01 riser card must be correctly inserted into the mainboard's PCI slot, otherwise it may be damaged when the system powers on.

Appendix C. Mating Connector Vendor Lists

The following tables listed the mating connector vendor lists of EPIA-M900 mainboard.

Connectors	Part No.	Mating Vendor & P/N	
F_Audio	99G30-05458I	Neltron	SAMTEC
		2207S-XXG	MMS-1XX-01-XX-DV
		2207R-XXG	N/A
		2207SM-XXG-45	TLE-1XX-01-XX-DV
F_PANEL	99G30-05354I	Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	
FAN	99G30-021115	Neltron	MOLEX
		1250HM-03	51021
Inverter	99G30-020537	ACES	MOLEX
		85206-0800	51021-**00
LVDS	99G30-170152	ACES	HRS
		44002-4000	DF13-**DS-1.258C
USB	99G30-05493I	Neltron	SAMTEC SSW Series
		2214S-XXG-85	
		2214R-XXG-85	
USB	99G30-05072K	Neltron	SAMTEC SSW Series
		2214S-XXG-85 2214R-XXG-85	

Table 28: EPIA-M900 mating connector vendor lists

VIA embedded