

USER MANUAL

# EPIA-M860

Mini-ITX embedded board

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## 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

### **EPIA-M860-12E (ATX version)**

- ☐ 1 x EPIA-M860 embedded board
- ☐ 1 x I/O bracket
- ☐ 1 x SATA cable

### **EPIA-M860-12PE (DC-in version)**

- ☐ 1 x EPIA-M860 embedded board
- ☐ 1 x I/O bracket
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC/DC adapter (optional)

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# 1. Product Overview

The VIA EPIA-M860 Mini-ITX mainboard is an entry-level native x86 mainboard for systems in embedded and multimedia applications. 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-M860 includes a powerful, secure, and efficient VIA Nano™ processor. The VIA Nano processor includes the VIA Padlock Security Engine, VIA CoolStream™ Architecture, VIA StepAhead™ Technology Suite, and VIA TwinTurbo™ technology.

The VIA EPIA-M860 includes one 1066 MHz DDR3 DIMM slot that supports up to 4 GB. The VIA EPIA-M860 provides support for high fidelity audio with its included VIA VT1708S High Definition Audio codec. In addition it supports two SATA 3Gb/s storage devices.

The VIA EPIA-M860 is compatible with a full range of Mini-ITX chassis as well as FlexATX and MicroATX enclosures and power supplies. The VIA EPIA-M860 is fully compatible with Microsoft® and Linux operating systems.

## 1.1. Key Features and Benefits

### 1.1.1. VIA Nano™ 1.2GHz Processor

The VIA Nano is a 64-bit superscalar x86 processor based on a 65 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 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.

### 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. Flexible Power Options

The VIA EPIA-M860 comes with two power input options: ATX and DC-in. The ATX version supports standard 20-pin ATX power supply connectors. The DC-in version requires a 12V/5A max input. The AC/DC adapter can be purchased as an option with the DC-in version. The DC-in version also has an onboard 4-pin power supply connector.

### 1.1.4. Modular Expansion Options

The VIA EPIA-M860 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-M860 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-M860 obtain the maximum benefits from its past investments in PCI expansion cards.

The VIA EPIA-M860 also includes a 1-Lane PCI Express 2.0 expansion slot that provides protection against obsolescence.

The VIA EPIA-M860 further proves its versatility with its included Mini PCI Express slot. Companies can feel free to design low-profile systems based on the versatile EPIA-M860.

## 1.2. Product Specifications

- **Processor**
  - VIA Nano 1.2 GHz
  - 6.8W TDP fanless
  - 7 bit VID
- **Chipset**
  - VIA VX900 Unified Digital Media IGP chipset
  - 31 x 31 mm
- **System Memory**
  - 1 DIMM slot supporting DDR3 1066 MHz
  - Supports up to 4 GB
- **Graphics**
  - Integrated VIA Chrome9™ HC3 3D/2D AGP graphics
  - MPEG2, WMV9/VC1, H.264 Full HD video decoder
  - DirectX 9 support
- **Onboard Peripherals**
  - **Serial ATA**
    - 2 SATA connectors
    - Supports up to 3 Gbps
  - **Onboard LAN**
    - VIA VT6130 PCIe Gigabit Ethernet controller
  - **Onboard Audio**
    - VIA VT1708S High Definition Audio Codec
  - **Onboard Super IO**
    - Fintek F81865-I Super I/O controller
- **Onboard I/O Connectors**
  - 3 x USB ports (2 X 2.54mm pin header)
  - 1 x Front audio pin header for Line-out and MIC-in
  - 1 x Digital I/O (GPI x 4 + GPO x 4)
  - 1 x PS/2 Keyboard/Mouse pin header
  - 1 x Front panel pin header
  - 1 x System fan connector
  - 1 x CPU fan connector
  - 3 x COM pin headers by F81865-I

- 1 x SMBUS pin header
- 1 x Mini PCIe x1 slot (with 1 USB port)
- 1 x PCI slot
- 1 x PCIe x1 slot
- 1 x ATX connector (ATX SKU only)
- 2 x SATA power connector (DC-in SKU only)
- 1 x DC-in connector (DC-in SKU only)

#### ● Back Panel I/O

- 1 x DC-in coaxial connector (DC-in SKU only)
- 1 x HDMI® port
- 1 x VGA port
- 1 x COM port
- 1 x RJ45 port
- 4 x USB ports
- 1 x Audio port stack with Line-in (optional), Line-out, MIC-in

#### ● BIOS

- AMI BIOS
- 8Mbit SPI flash memory

#### ● Supported Operating System

- Windows 7
- Windows Embedded Standard 7
- Windows Embedded POSReady 7
- Windows XP
- Windows Embedded Standard/Compact
- Linux

#### ● Power Options

- ATX Connector
- DC-in 12V (manufacturing option)

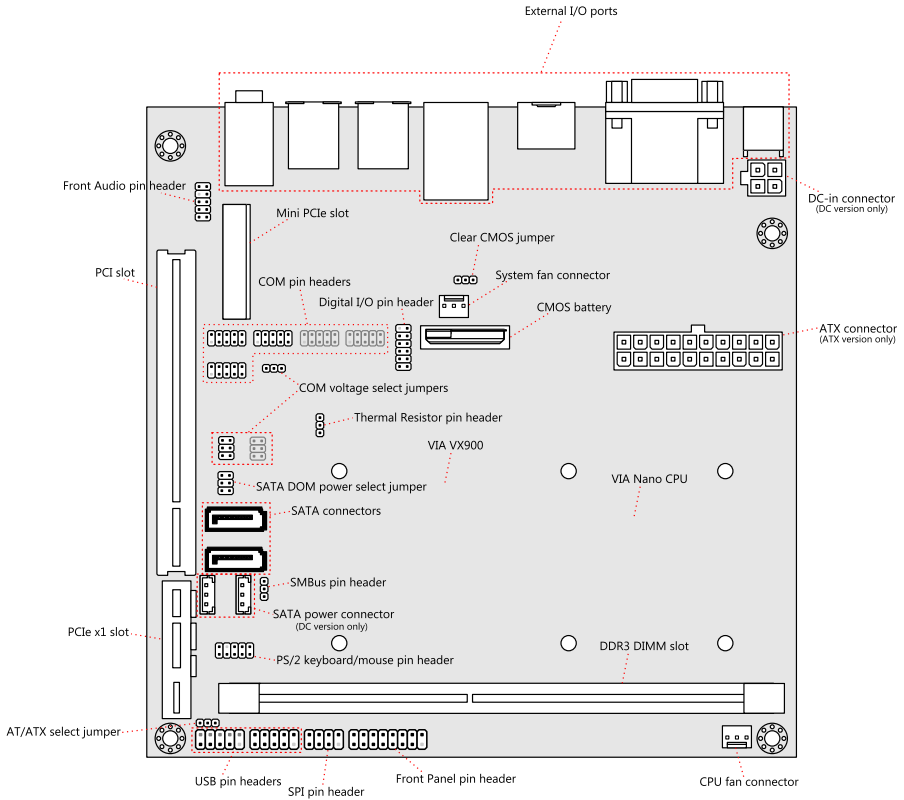
#### ● System Monitoring & Management

- Wake-on-LAN
- Keyboard Power-on
- Timer Power-on
- System power management
- AC power failure recovery
- WatchDog Timer



- **Operating Conditions**
  - **Operating Temperature**
    - 0°C ~ 60°C
  - **Operating Humidity**
    - 0% ~ 95% (relative humidity; non-condensing)
- **Form Factor**
  - Mini-ITX (6-Layer)
  - 17 cm x 17 cm
- **Compliance**
  - CE
  - FCC
  - BSMI
  - RoHS

## 1.3. Layout Diagram



**Figure 1: Layout diagram of the EPIA-M860 mainboard**

# 1.4. Product Dimensions

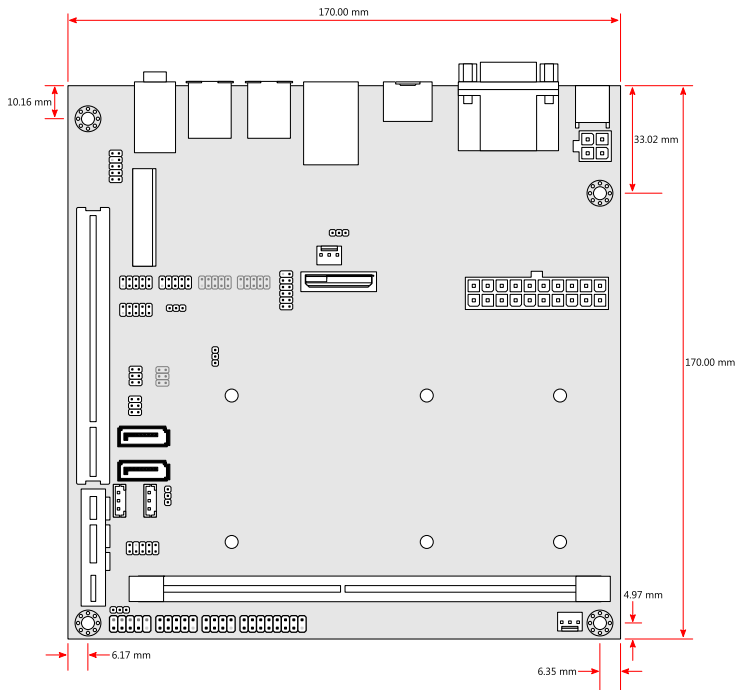


Figure 2: Mounting holes and dimensions of the EPIA-M860 mainboard

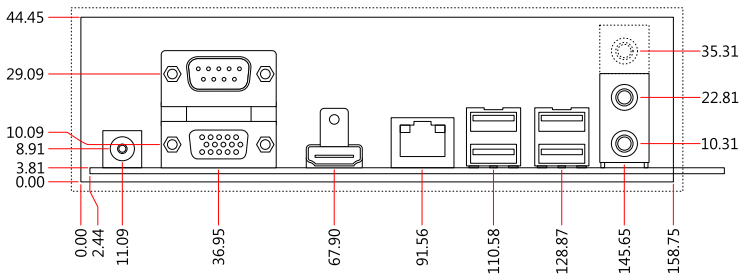


Figure 3: External I/O port dimensions of the EPIA-M860 mainboard

# 1.5. Height Distribution

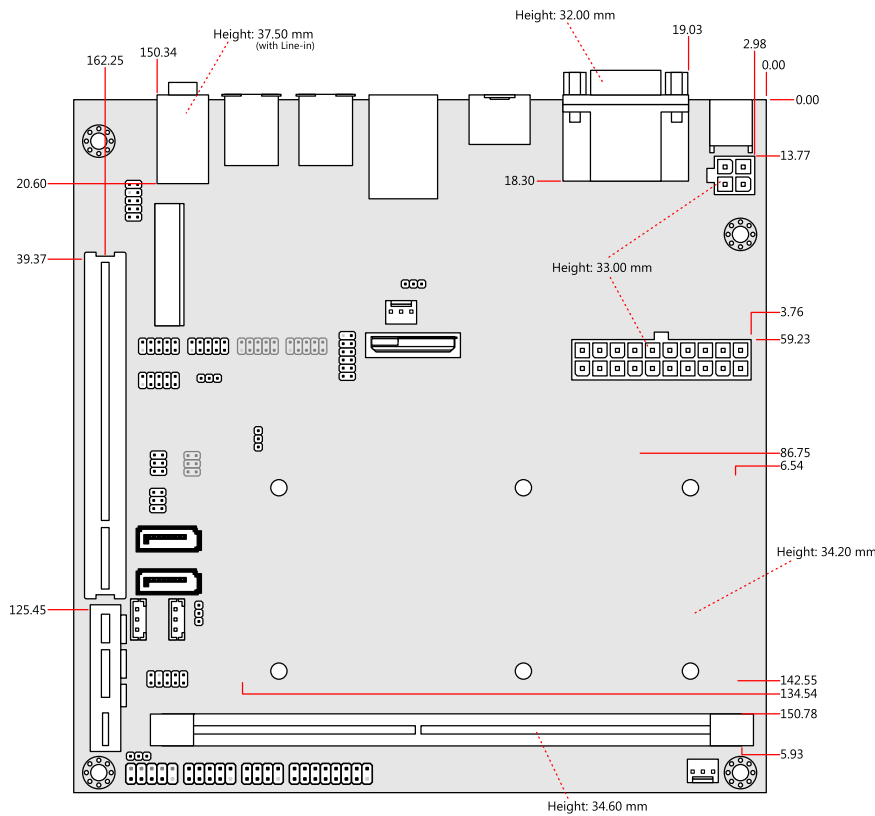
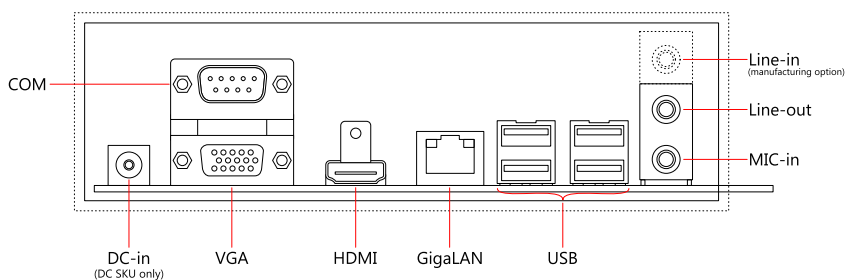


Figure 4: Height distribution of the EPIA-M860 mainboard

## 2. I/O Interface

The VIA EPIA-M860 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.

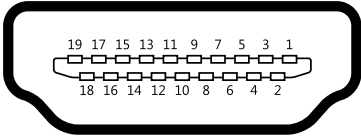


Figure 6: HDMI® port pinout diagram

Pin	Signal	Pin	Signal
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2–	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1–
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0–	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock–
13	CEC	14	Reserved / HEC Data- <sup>1</sup>
15	SCL <sup>2</sup>	16	SDA <sup>3</sup>
17	DDC/CEC/HEC Ground	18	+5 V Power <sup>4</sup>
19	Hot Plug Detect and HEC Data+ <sup>5</sup>		

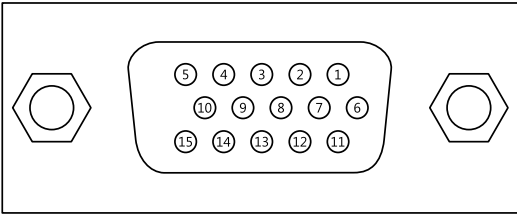
Table 1: HDMI® port pinout

**Note:**

1. Pin 15: SCL is for I<sup>2</sup>C Serial Clock for DDC.
2. Pin 16: SDA is for I<sup>2</sup>C Serial Data Line for DDC.
3. Pin 18: max 50 mA

### 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.



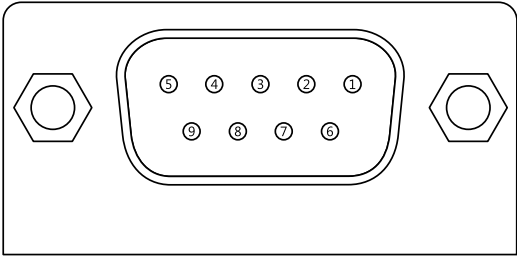
**Figure 7: VGA port pinout diagram**

Pin	Signal	Pin	Signal	Pin	Signal
1	RED	6	GND	11	NC
2	GREEN	7	GND	12	SDA
3	BLUE	8	GND	13	HSync
4	NC	9	+5V	14	VSync
5	GND	10	GND	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	6	DSR
2	RxD	7	RTS
3	TxD	8	CTS
4	DTR	9	RI
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	+5V
2	Data-
3	Data+
4	Ground



**Table 4: USB port pinout**

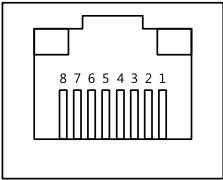
**Figure 9: USB port pinout diagram**



### 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-



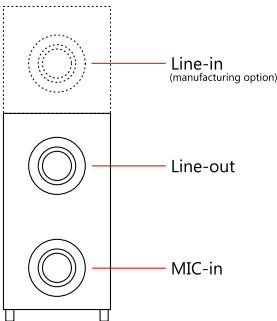
**Table 5: Gigabit Ethernet port pinout**  
**Figure 10: Gigabit Ethernet port pinout diagram**

### 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<sup>1</sup>, Line-out, and MIC-in.

Wiring	Line-in	Line-out	MIC-in
Tip	Left channel in	Left channel	Signal
Ring	Right channel in	Right channel	+5V
Sleeve	Ground	Ground	Ground

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



**Note:**

1. Line-in is available as a manufacturing option. The default SKU does not include Line-in.

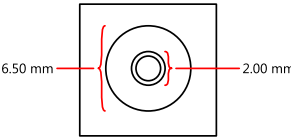
### 2.1.7. DC-in Jack

For the DC version of the mainboard, there is a coaxial power connector adjacent to the COM/VGA connector stack. The specifications of the DC coaxial power connector are shown below

Physical Specifications	
Outer Diameter	6.50 mm
Inner Diameter	2.00 mm
Barrel Depth	8.80 mm
Electrical Specifications	
Input Voltage	12 V
Input Current	5.0 A (max)

**Table 7: DC-in coaxial connector specifications**

**Figure 12: DC-in coaxial connector**



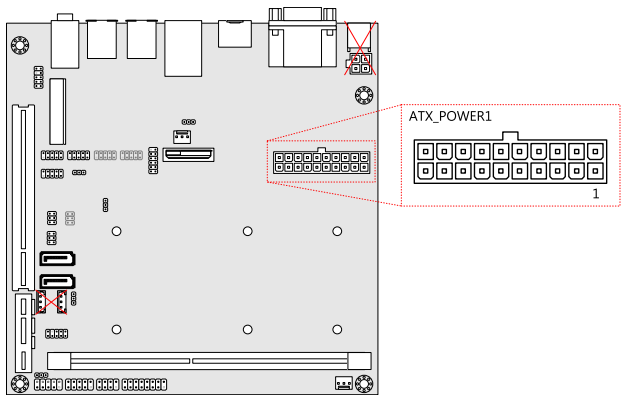
**Note:**

The plug of the power adapter must have an inner diameter of 2.10 mm in order to fit the DC-in coaxial connector properly.

## 2.2. Onboard Connectors

### 2.2.1. ATX Power Connector

For the ATX version of the mainboard, there is a 20-pin ATX power connector onboard. The ATX power connector is labeled as “ATX\_POWER1”. The pinout of the ATX power connector is shown below.



**Figure 13: 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 8: ATX power connector pinout**

**Note:**

The ATX version does not have the DC-in connectors or SATA power connectors.

### 2.2.2. DC-in Power Connector

For the DC version of the mainboard, there is a DC-in power connector in addition to the DC-in coaxial power connector. This enables two methods for delivering +12V to the mainboard. The pinout of the DC-in power connector is shown below.

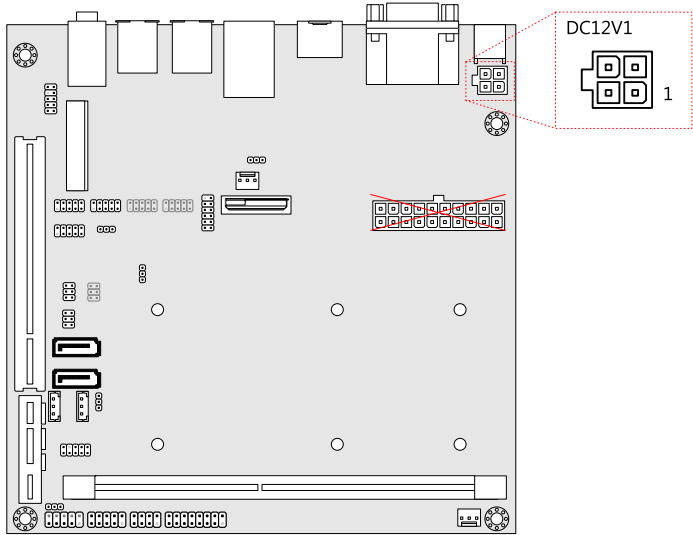


Figure 14: DC-in power connector

Pin	Signal	Pin	Signal
1	Ground	3	+12V
2	Ground	4	+12V

Table 9: DC-in power connector pinout

**Note:**

1. The DC-in version does not have the ATX power connector.
2. Max. power support is 80W.

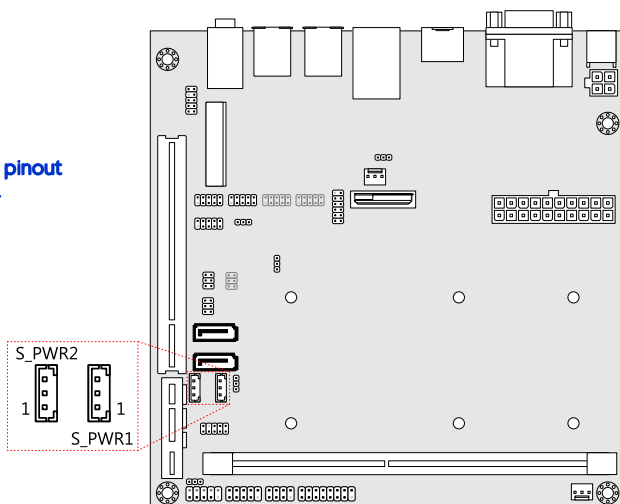
## 2.2.3. SATA Power Connector

For the DC version of the mainboard, there are two built-in SATA power connectors. These connectors are required to power SATA hard drives. The SATA power connectors are labeled as “S\_PWR1” and “S\_PWR2”. The pinout of the SATA power connectors is shown below.

Pin	Signal
1	+5V
2	+12V
3	Ground

**Table 10: SATA power connector pinout**

**Figure 15: SATA power connector**



**Note:**

The ATX version does not have the SATA power connector because power for SATA hard drives is supplied from the ATX power supply.

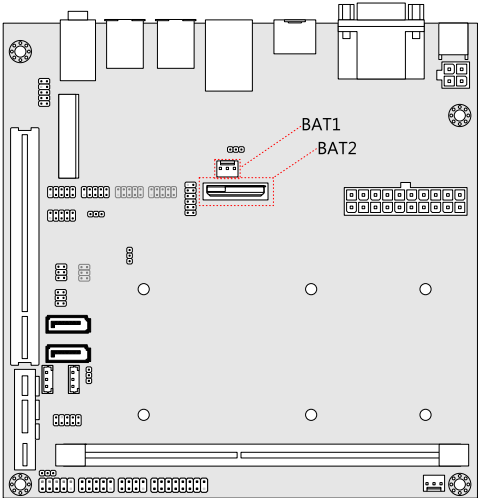
### 2.2.4. CMOS Battery Slot

Depending on the manufacturing option, the mainboard will either be equipped with a CMOS battery slot or a 2-prong cable CMOS battery connector. The default option is the CMOS battery slot, which is compatible with CR2032 coin batteries. The CMOS battery slot is labeled as “BAT2”. If equipped, the 2-prong cable CMOS battery connector will be labeled “BAT1”.

Pin	Signal
1	Ground
2	+3V
3 <sup>1</sup>	Ground

Table 11: CMOS battery slot/connector pinout

Figure 16: CMOS battery slot/connector



**Note:**

1. The cable CMOS battery connector does not have a third pin.

### 2.2.5. 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.

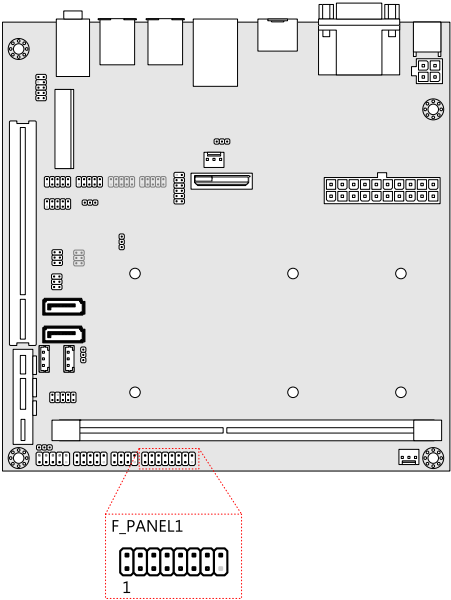


Figure 17: Front panel pin header block

Pin	Signal	Pin	Signal
1	+5VDUAL	2	+5V
3	+5VDUAL	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
15	—	16	NC

Table 12: Front panel pin header pinout

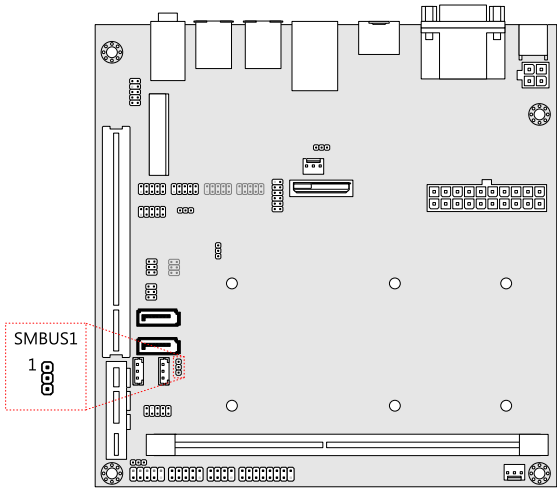
### 2.2.6. SMBus Pin Header

The SMBus pin header consists of three pins. It is labeled as “SMBUS1”. The pinout of the SMBus pin header is shown below.

Pin	Signal
1	SMBCK
2	SMBDT
3	Ground

Table 13: SMBus pin header pinout

Figure 18: SMBus pin header



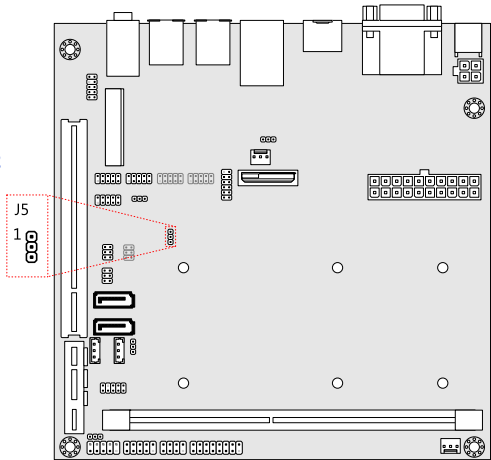
### 2.2.7. Thermal Resistor Pin Header

The thermal resistor pin header consists of three pins. The pin header is labeled as “J5”. The pin out of the thermal resistor pin header is shown below.

Pin	Signal
1	TMPIN2
2	TMPIN2
3	HWMGND

Table 14: Thermal resistor pin header pinout

Figure 19: Thermal resistor pin header





### 2.2.8. Fan Connectors

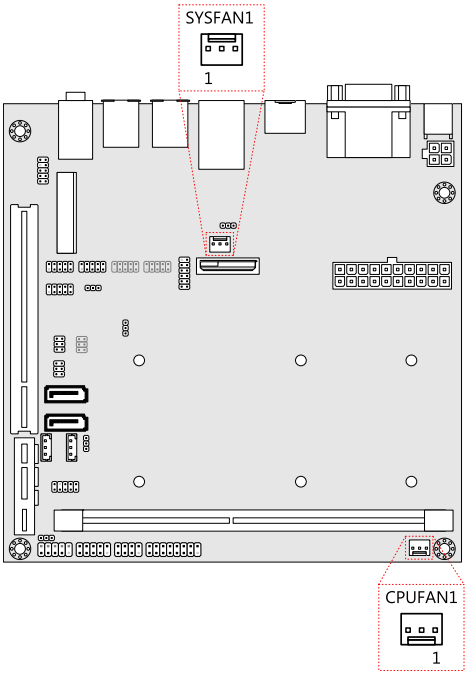
There are two fan connectors on board: one for the CPU and one for the chassis. The fan connectors are the standard 3-prong fan connectors. The pinout of the fan connectors is shown below.

CPU fan	
Pin	Signal
1	F_IO2
2	F_PWM2
3	Ground

System fan	
Pin	Signal
1	F_IO1
2	F_PWM1
3	Ground

Table 15: Fan connector pinouts

Figure 20: Fan connectors



### 2.2.9. 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	SATA1_+5V

SATA2	
Pin	Signal
1	Ground
2	STXP_2
3	STXN_2
4	Ground
5	SRXN_2
6	SRXP_2
7	SATA2_+5V

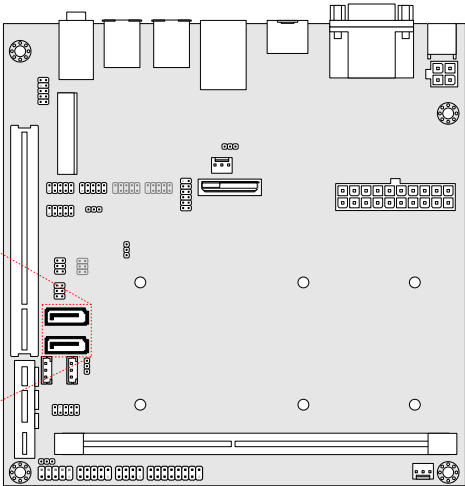
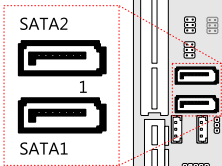


Table 16: SATA connector pinouts

Figure 21: SATA connectors

### 2.2.10. USB Pin Headers

The mainboard has two USB pin header blocks that support up to three USB 2.0 ports. The pin header blocks are labeled as “USB\_3” and “USB\_4”. USB\_4 only supports one USB 2.0 port. The pinout of the USB pin headers are shown below.

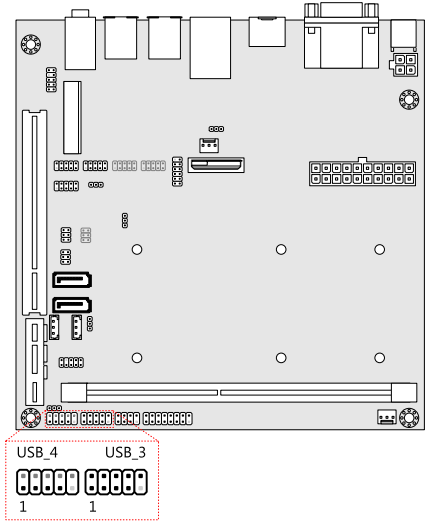


Figure 22: USB pin headers

USB_3			
Pin	Signal	Pin	Signal
1	+5CDUAL	2	+5CDUAL
3	USBD_T3-	4	USBD_T2-
5	USBD_T3+	6	USBD_T2+
7	Ground	8	Ground
9	—	10	Ground

USB_4			
Pin	Signal	Pin	Signal
1	+5CDUAL	2 <sup>1</sup>	Reserved
3	USBD_T6-	4 <sup>1</sup>	Reserved
5	USBD_T6+	6 <sup>1</sup>	Reserved
7	Ground	8 <sup>1</sup>	Reserved
9	—	10 <sup>1</sup>	Reserved

**Note:**

1. The USB signals in pins 2, 4, 6, 8, and 10 in the USB\_4 pin header block are reserved for the Mini PCIe slot.

### 2.2.11. COM Pin Headers

There are a total of three COM pin headers on the mainboard<sup>1</sup>. 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 or +12V. See page 32 for details on setting the voltage. The pinout of the COM pin headers are shown below.

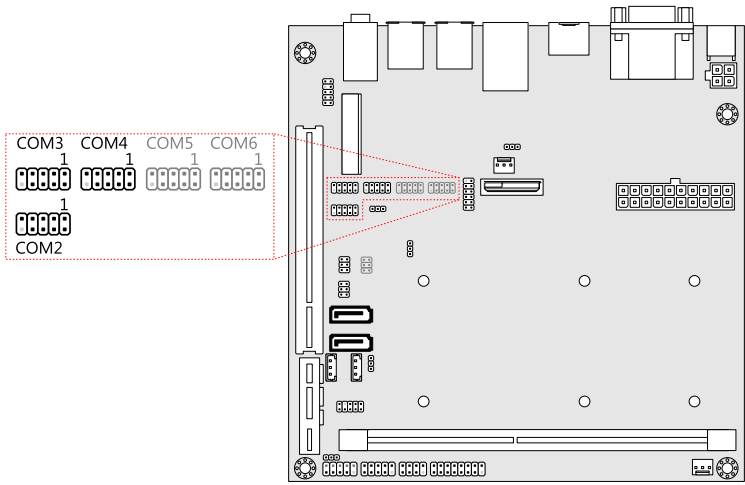


Figure 23: COM pin headers

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 17: COM pin header pinout

**Note:**

1. Two additional COM pin headers can be added as a manufacturing option. The additional COM pin headers will be labeled as “COM5” and “COM6”.

### 2.2.12. 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 “JKB/MS1”. The pinout of the pin header is shown below.

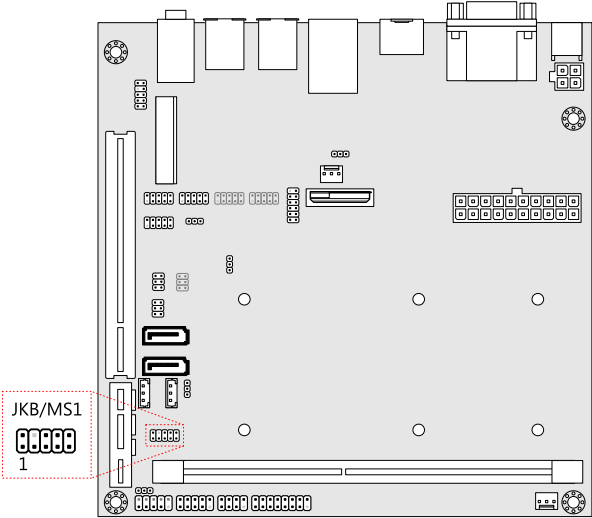


Figure 24: PS/2 keyboard and mouse pin header

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

Table 18: PS/2 keyboard and mouse pin header pinout

### 2.2.13. 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.

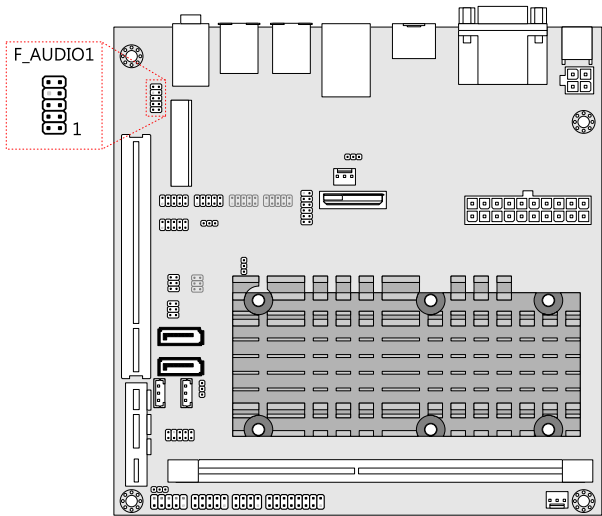


Figure 25: Front audio pin header

Pin	Signal	Pin	Signal
1	MIC2IN_L	2	Ground
3	MIC2IN_R	4	Ground
5	HPOUTR	6	MIC2_JD
7	F_AUDIO_SENSE	8	—
9	HPOUTL	10	HPOUT_JD

Table 19: Front audio pin header pinout

### 2.2.14. Digital I/O Pin Header

The onboard Digital I/O pin header supports up to four GPO and four GPI signals. The pin header is labeled as "DIO1". The pinout of the pin header is shown below.

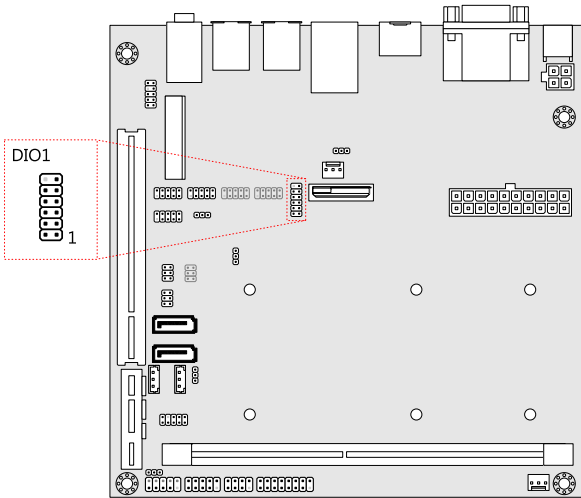


Figure 26: Digial I/O pin header

Pin	Signal	Pin	Signal
1	5V_DIO	2	12V_DIO
3	GPO_23	4	GPI_03
5	GPO_22	6	GPI_02
7	GPO_21	8	GPI_01
9	GPO_20	10	GPI_00
11	Ground	12	—

Table 20: Digital I/O pin header pinout

### 2.2.15. 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.

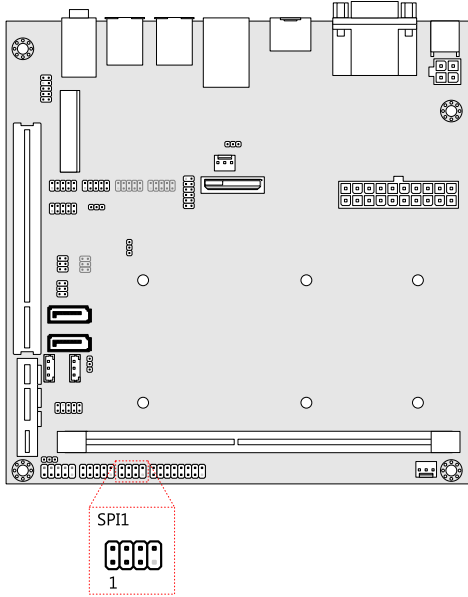


Figure 27: SPI pin header

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

Table 21: SPI pin header pinout



# 3. Jumpers and Switches

## 3.1. AT/ATX Mode

For the ATX version of the EPIA-M860, there is a jumper that can enable to mainboard to switch between two power modes: AT and ATX. The jumper is labeled as "J10". The jumper settings are shown below.

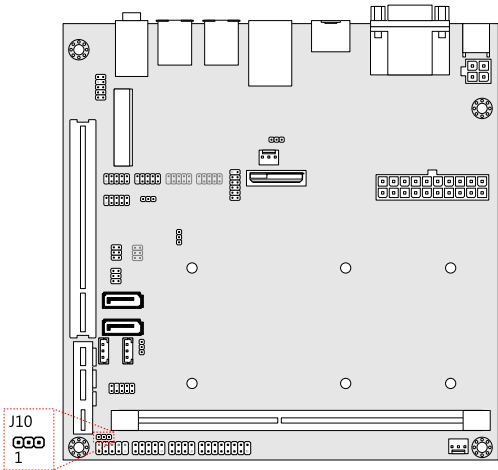


Figure 28: AT/ATX mode jumper

Setting	Pin 1	Pin 2	Pin 3
ATX mode	On	On	Off
AT mode	Off	On	On

Table 22: AT/ATX mode jumper settings

The recommended setting of the jumper is the ATX mode. For the DC version of the board, always keep the jumper on the ATX mode setting.

### 3.2. SATA DOM Power Select Jumper

The SATA connectors (see page 22) can be used to support Disk-on-Module flash drives. When the jumpers are set, +5V will be delivered to the 7<sup>th</sup> pin of the SATA connectors. The jumper settings are shown below.

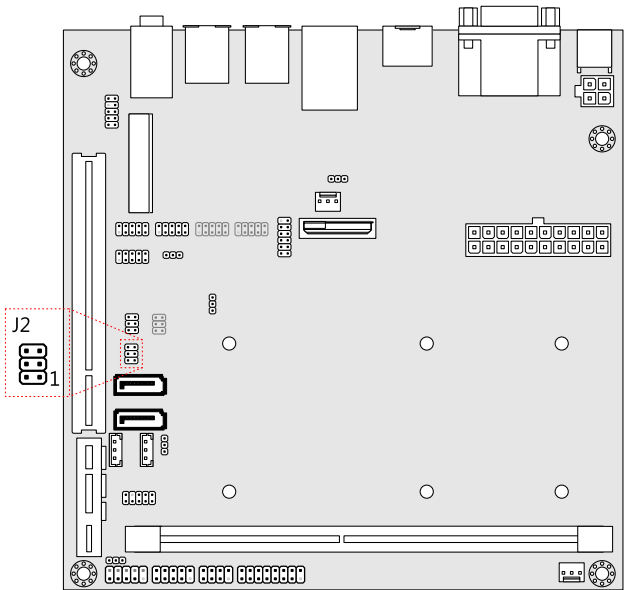


Figure 29: SATA DOM voltage select jumper

SATA1 Setting	Pin 1	Pin 3	Pin 5
DOM support	On	On	Off
Regular (default)	Off	On	On
SATA2 Setting	Pin 2	Pin 4	Pin 6
DOM support	On	On	Off
Regular (default)	Off	On	On

Table 23: SATA DOM voltage select jumper settings

### 3.3. 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.

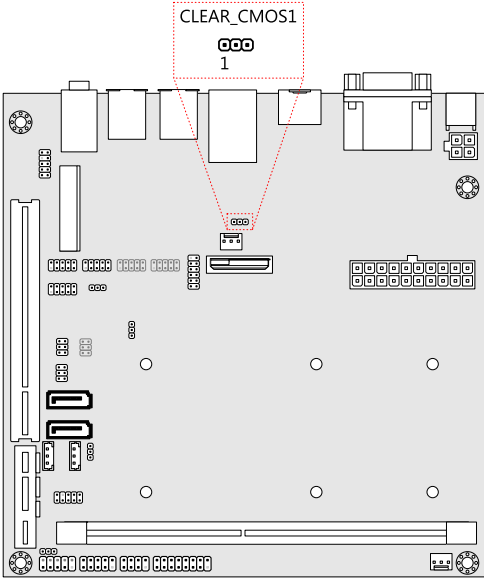


Figure 30: CLEAR CMOS jumper

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

Table 24: 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.

### 3.4. COM Voltage Select Jumpers

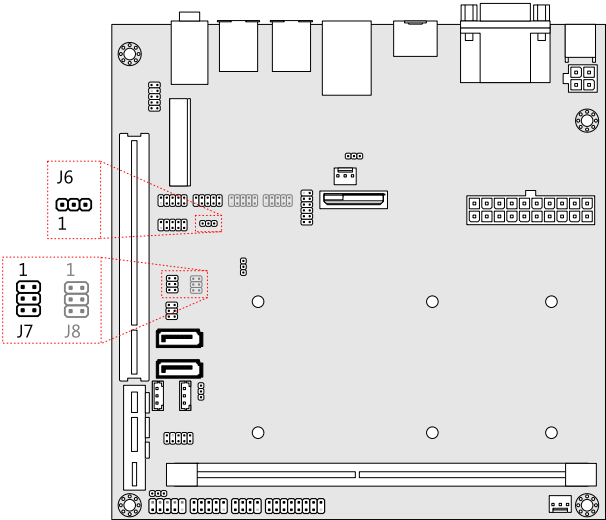
Each of the additional COM ports (available through the onboard COM pin headers, see page 24) can support both +5V and +12V. COM2 has its own pin header block. COM3 and COM4 share a single pin header block. COM5 and COM6 also share a single pin header block.

#### 3.4.1. COM2 Voltage Select Jumper

The voltage for COM2 is controlled by the jumper labeled as “J6”. The voltage can be either +5V or +12V. +5V is the default setting. The jumper settings are shown below.

Setting	Pin 1	Pin 2	Pin 3
+5V (default)	On	On	Off
+12V	Off	On	On

**Table 25: COM2 voltage select jumper settings**



**Figure 31: Voltage select jumpers for COM2 – COM6**

### 3.4.2. COM3 and COM4 Voltage Select Jumper

The voltage for COM3 and COM4 is controlled by the jumper labeled as “J7”. Refer to Figure 31 for the location of the jumper.

The voltage can be either +5V or +12V. +5V is the default setting. The odd pin numbers correspond to COM3. The even pin numbers correspond to COM4. The jumper settings are shown below.

COM3 Setting	Pin 1	Pin 3	Pin 5
+5V (default)	On	On	Off
+12V	Off	On	On
COM4 Setting	Pin 2	Pin 4	Pin 6
+5V (default)	On	On	Off
+12V	Off	On	On

**Table 26: Jumper settings for COM3 and COM4**

### 3.4.3. COM5 and COM6 Voltage Select Jumper

The voltage for COM5 and COM6 is controlled by the jumper labeled as “J8”. Refer to Figure 31 for the location of the jumper.

The voltage can be either +5V or +12V. +5V is the default setting. The odd pin numbers correspond to COM5. The even pin numbers correspond to COM6. The jumper settings are shown below.

COM5 Setting	Pin 1	Pin 3	Pin 5
+5V (default)	On	On	Off
+12V	Off	On	On
COM6 Setting	Pin 2	Pin 4	Pin 6
+5V (default)	On	On	Off
+12V	Off	On	On

**Table 27: Jumper settings for COM5 and COM6**

**Note:**

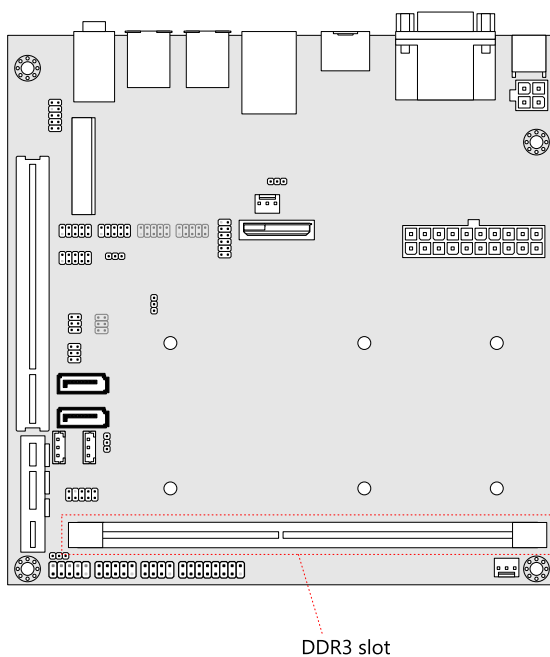
If the mainboard is not equipped with COM5 and COM6, then the J8 jumper will not be on the mainboard either.



## 4. Expansion Slots

### 4.1. DDR3 Memory Slot

The DDR3 memory slot can accommodate up to 4 GB of 1066 MHz memory. The location of the DDR3 memory slot is as shown below.



**Figure 32: DDR3 memory slot**

### 4.1.1. Installing a Memory Module

#### Step 1

Disengage the locking clasps at both ends of the memory slot.

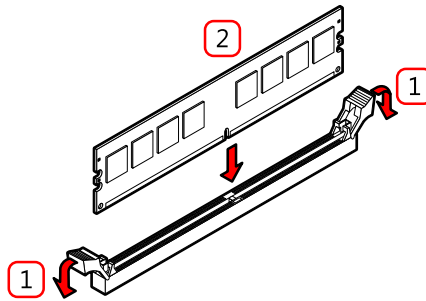


Figure 33: Installing memory 1

#### Step 2

Align the notch on the bottom of the DDR3 memory module with the notch wedge in the slot.

#### Step 3

Slide the DDR3 memory module into the side grooves and push the module into the slot until the locking clasps snap into the closed position.

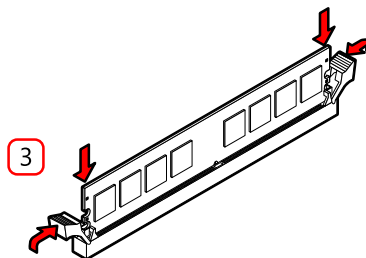


Figure 34: Installing memory 2



## 4.1.2. Removing a Memory Module

### Step 1

Disengage the locking clasps on both sides of the memory slot.

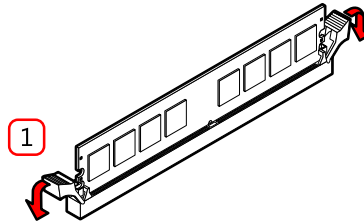


Figure 35: Removing memory 1

### Step 2

Remove the memory module.

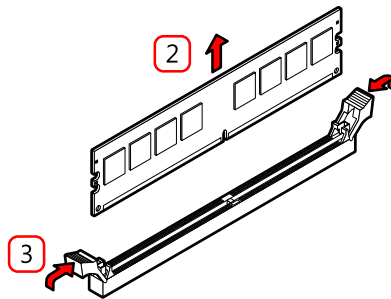


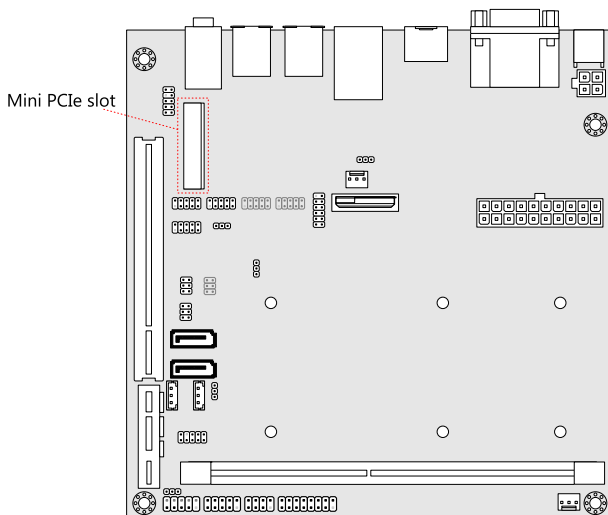
Figure 36: Removing memory 2

### Step 3

Move the locking clasps into the closed position.

## 4.2. Mini PCIe Slot

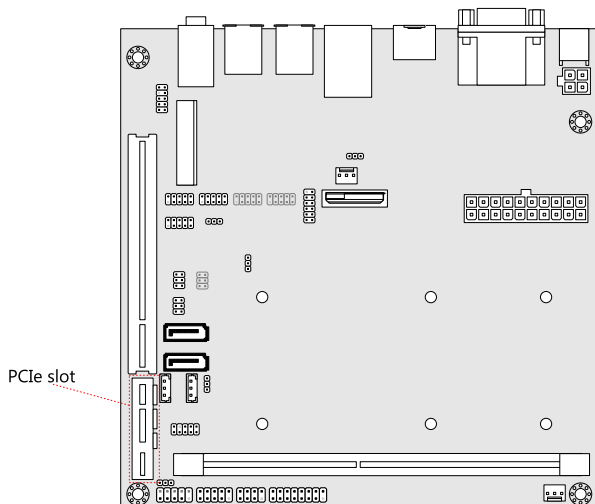
The Mini PCIe slot is compatible with all PCIe 2.0 Mini Cards: full-length and half-length. The location of the Mini PCIe slot is shown below.



**Figure 37: Mini PCIe slot**

## 4.3. PCI Express Slot

The onboard PCI Express slot is located adjacent to the PCI slot. The PCI Express slot provides support for 1-lane cards. Due to the orientation of the slot, a riser card module<sup>1</sup> must be used. See page 89 for details on how to install the riser card module. The location of the PCI Express slot is shown below.



**Figure 38: PCI Express slot**

**Note:**

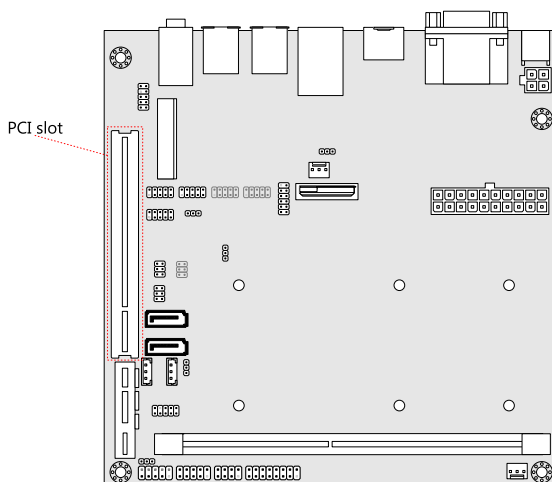
1. The optional riser card module is PCIE-03. PCIE-03 is a combination riser card that connects to both the PCI Express and PCI slots.

## 4.4. PCI Slot

The onboard PCI slot supports 5V 32-bit PCI cards. It is not compatible with PCI cards requiring 3.3V signaling. The PCI slot is located adjacent to the PCI Express slot. Using the PCI slot will negate the use of the PCI Express slot unless the optional PCIE-03 riser card module is used. 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. Compatible optional riser card modules include the following models: EXT-PCI-01 and PCIE-03.

The EXT-PCI-01 module enables the PCI slot to support two PCI expansion cards horizontally. The PCIE-03 module enables the PCI slot to support one PCI card and one PCIe card horizontally. See page 89 for details on how to install the riser card module.



**Figure 39: PCI slot**

# 5. Hardware Installation

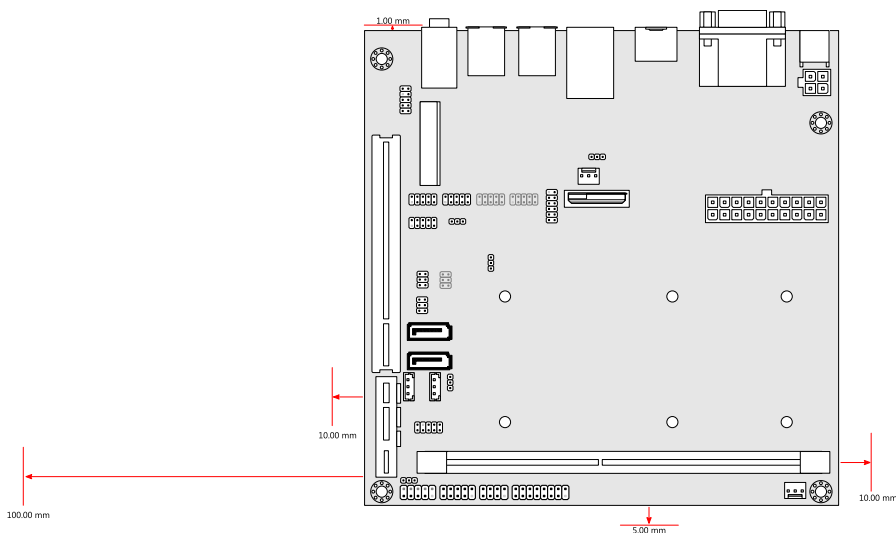
## 5.1. Installing into a Chassis

The EPIA-M860 can be fitted into any chassis that has the mounting holes 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-M860.



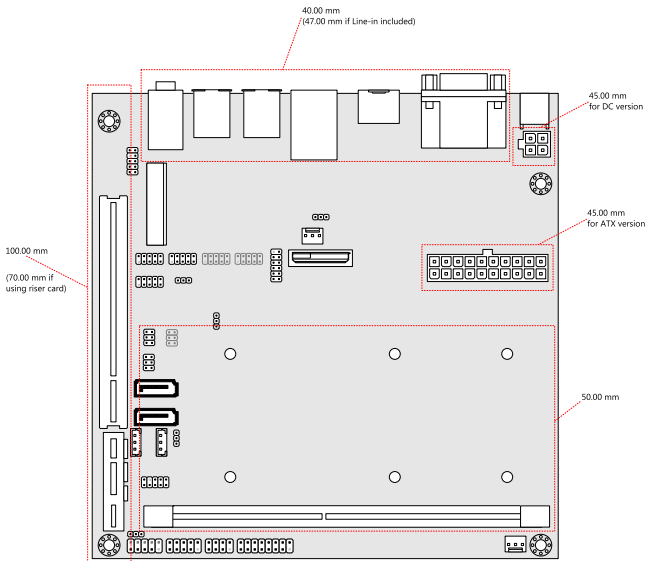
**Figure 40: Suggested minimum chassis dimensions**

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 41: 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.

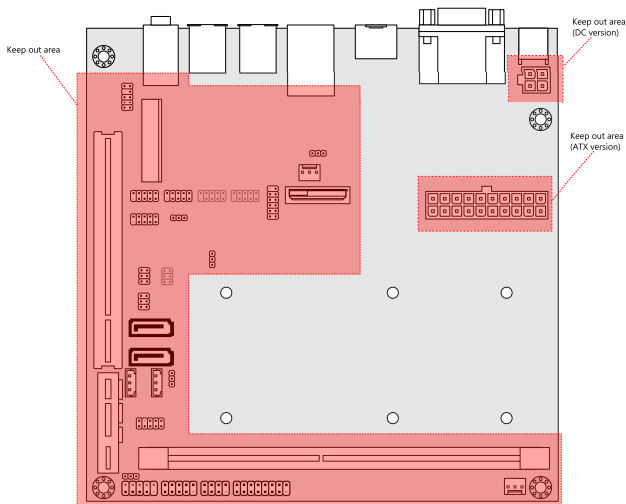


Figure 42: Suggested keepout areas





## 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

<b>Up</b>	Move up one row
<b>Down</b>	Move down one row
<b>Left</b>	Move to the left in the navigation bar
<b>Right</b>	Move to the right in the navigation bar
<b>Enter</b>	Access the highlighted item
<b>Esc</b>	Jumps to the Exit screen or returns to the previous screen
<b>+<sup>1</sup></b>	Increase the numeric value
<b>-<sup>1</sup></b>	Decrease the numeric value
<b>F1</b>	General help <sup>2</sup>
<b>F7</b>	Discard changes
<b>F9</b>	Load optimized defaults
<b>F10</b>	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.

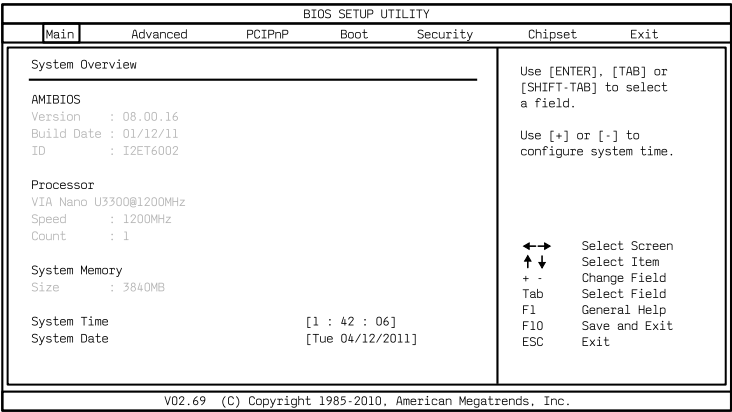


Figure 43: Illustration of the Main menu screen

#### 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. This information includes the CPU name, speed, and number of processors.

#### 6.4.3. System Memory

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

#### 6.4.4. System Time

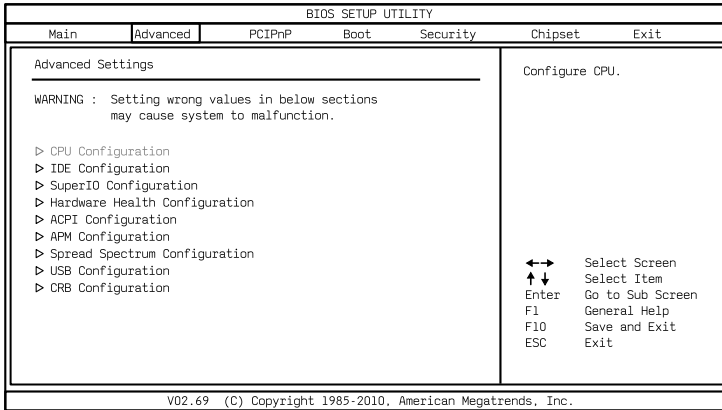
This section shows the current system time. Press **Tab** to traverse right and **Shift+Tab** to traverse left through the hour, minute, and second segments. The **+** and **-** keys on the number pad can be used to change the values. The time format is [Hour : Minute : Second].

#### 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.



**Figure 44: Illustration of the Advanced Settings screen**

The Advanced Settings screen contains the following links:

- CPU Configuration
- IDE Configuration
- SuperIO Configuration
- Hardware Health Configuration
- ACPI Configuration
- APM 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.

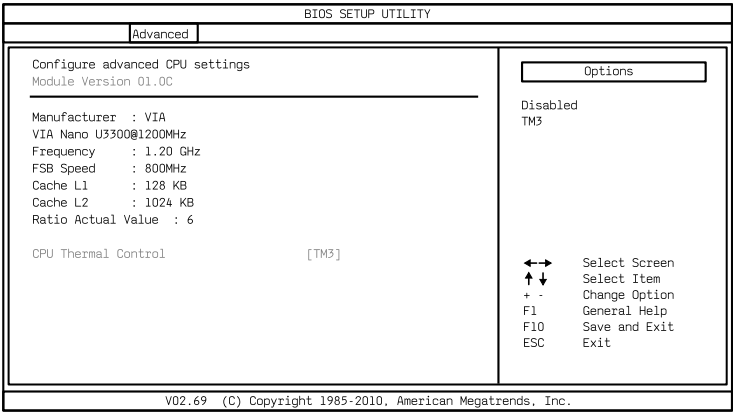


Figure 45: Illustration of the CPU Configuration screen

#### 6.5.1.1. CPU Thermal Control

The CPU Thermal Control has two settings: Disabled and TM3. When the setting is changed to “Disabled”, the CPU’s built-in thermal sensor will not function. When the setting is changed to “TM3”, the thermal sensor will automatically adjust the CPU ratio and  $V_{CORE}$  to prevent the CPU from overheating.

### 6.5.2. IDE Configuration

The IDE Configuration screen shows links to the primary master and slave SATA hard drive information screens.

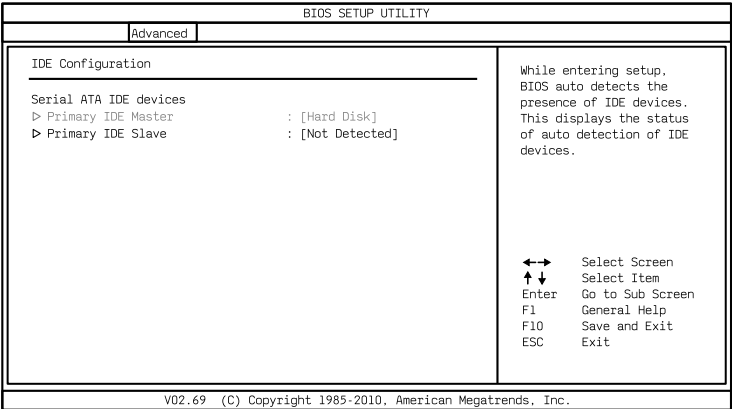


Figure 46: Illustration of IDE Configuration screen

#### 6.5.2.1. Hard Disk Information

When a hard drive is detected, the hard drive’s detailed information can be displayed on the Primary IDE Master/Slave sub-screen.

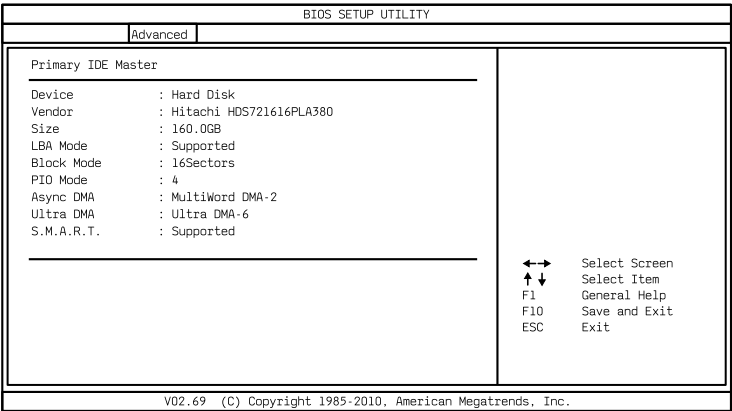


Figure 47: Illustration of Primary IDE Master screen

### 6.5.3. SuperIO Configuration

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

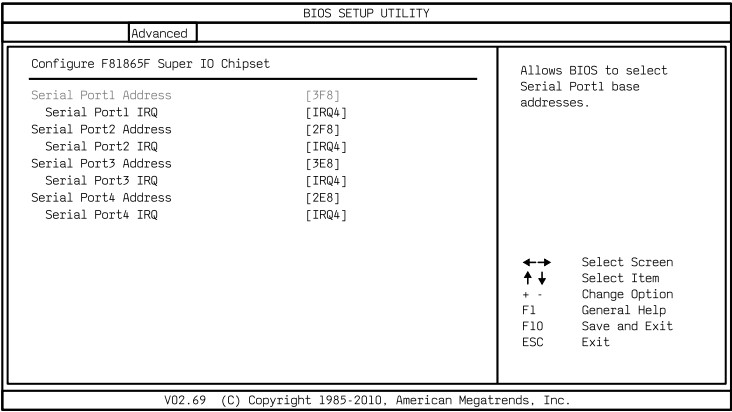


Figure 48: Illustration of SuperIO Configuration screen

#### 6.5.3.1. Serial Ports 1 to 4

Port	Address	IRQ
1	3F8, 3E8, 2E8	4
2	2F8, 3E8, 2E8	4
3	3F8, 2F8, 3E8, 2E8, 2D0, 2E0	4
4	3F8, 2F8, 3E8, 2E8, 2D0, 2E0	4

Table 28: Serial port addresses and IRQs

### 6.5.4. Hardware Health Configuration

The Hardware Health Configuration screen has no editable fields. The system temperature is taken from an optional sensor that is connected to the J5 pin header.

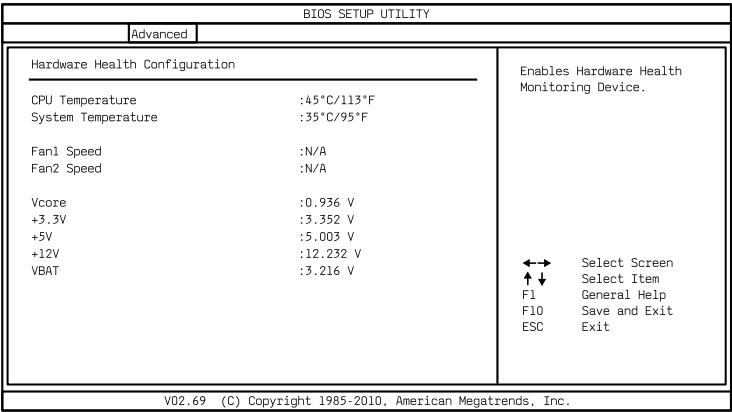


Figure 49. Illustration of Hardware Health Configuration screen



### 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.

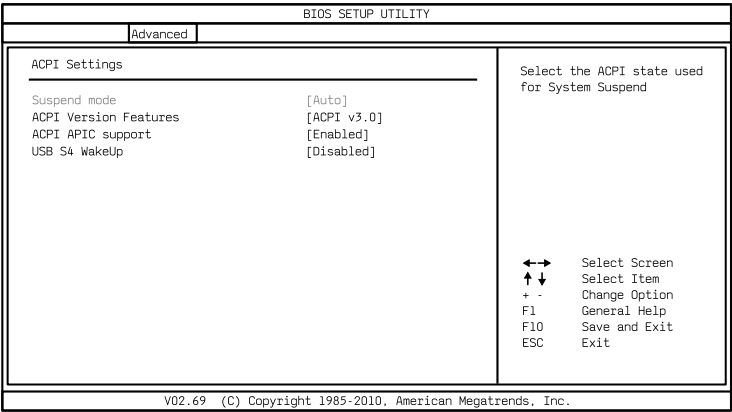


Figure 50: Illustration of ACPI Configuration screen

#### 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.

### 6.5.6. 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.

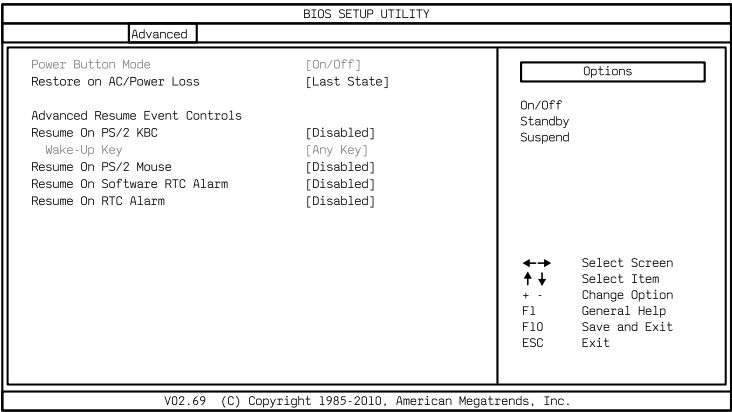


Figure 51: Illustration of APM Configuration screen

#### 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 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.

#### 6.5.6.4. 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.

#### 6.5.6.5. 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.

#### 6.5.6.6. 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.

### 6.5.6.7. Resume on Software RTC Alarm

Resume on Software RTC Alarm should only be used if the FliteDeck®<sup>1</sup> S5 resume function will be used on the system. When Resume on Software RTC Alarm is enabled, **Resume on RTC Alarm** will be disabled.

**Note:**

1. FliteDeck is a system management suite developed by VIA Technologies, Incorporated.

### 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**

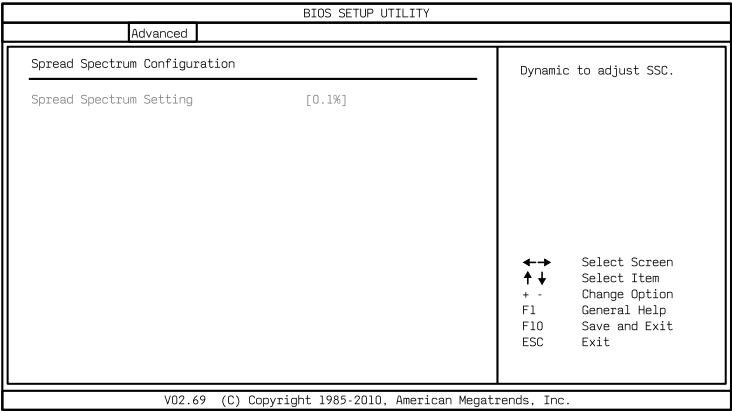
When a specific numeric date is selected, the RTC Alarm will be triggered on that day of the month.

### 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. Spread Spectrum Configuration

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



**Figure 52: Illustration of Spread Spectrum Configuration screen**

#### 6.5.7.1. Spread Spectrum Setting

The 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%.

### 6.5.8. USB Configuration

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

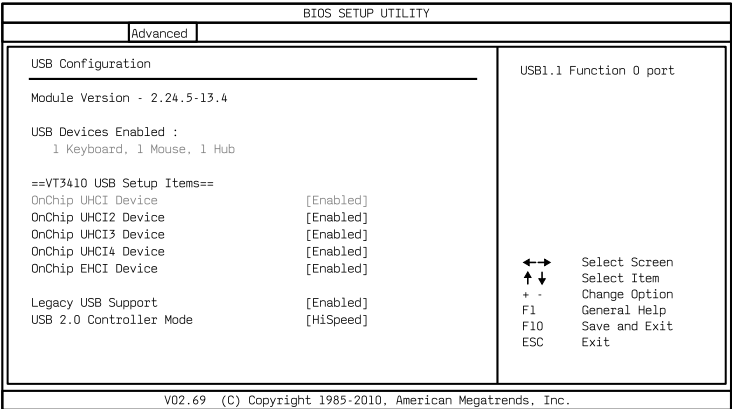


Figure 53: Illustration of USB Configuration screen

#### 6.5.8.1. OnChip UHCI Device

The OnChip UHCI Device feature enables support for USB 1.1 devices. UHCI corresponds with the USB\_1 stack. UCHI2 corresponds with the USB\_2 stack. UCHI3 corresponds with the USB\_3 pin header block. UCHI4 corresponds with the USB\_4 pin header block.

#### 6.5.8.2. OnChip EHCI Device

The OnChip EHCI Device feature enables support for USB 2.0 devices on USB\_1, USB\_2, USB\_3, and USB\_4.

#### 6.5.8.3. Legacy USB Support

The Legacy USB Support feature enables environments that do not have native USB support to use USB devices. This feature has three options.

##### Auto

The Auto option automatically disables legacy support if no USB devices are connected.

**Enabled**

The Enabled option keeps the Legacy USB Support feature on at all times.

**Disabled**

The Disabled option keeps the Legacy USB Support feature off at all times.

**6.5.8.4. USB 2.0 Controller Mode**

The USB 2.0 Controller Mode feature enables the user to set the USB 2.0 controller in HiSpeed (480Mbps) or FullSpeed (12Mbps) mode.

**FullSpeed**

The FullSpeed option limits the USB 2.0 controller to transfer data at 12 Mbps.

**HiSpeed**

The HiSpeed option enables the USB 2.0 controller to transfer data at 480 Mbps. The connected USB device must support USB 2.0 HiSpeed in order to benefit from this setting.



### 6.5.9. CRB Configuration

The CRB Configuration screen shows the available BIOS-controlled LAN features.

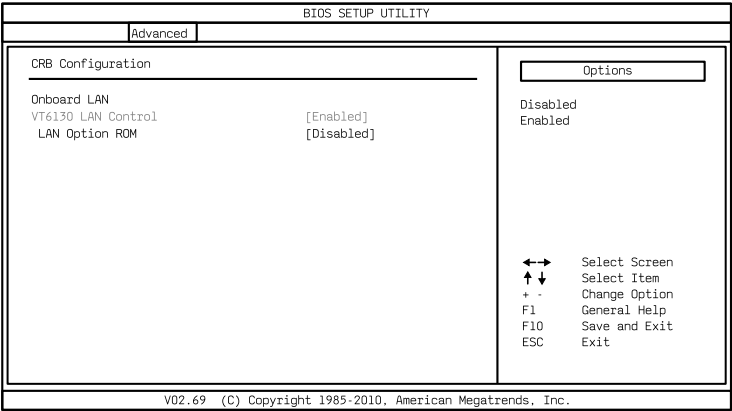


Figure 54: Illustration of CRB Configuration screen

#### 6.5.9.1. VT6130 LAN Control

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

#### 6.5.9.2. 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 support gigabit speeds in environments that do not natively support Gigabit Ethernet.

## 6.6. Advanced PCI/PnP Settings

The Advanced PCI/PnP Settings screen shows the features that relate to PCI bus and Plug and Play devices. Only change these settings if a PCI or Plug and Play device requires it.

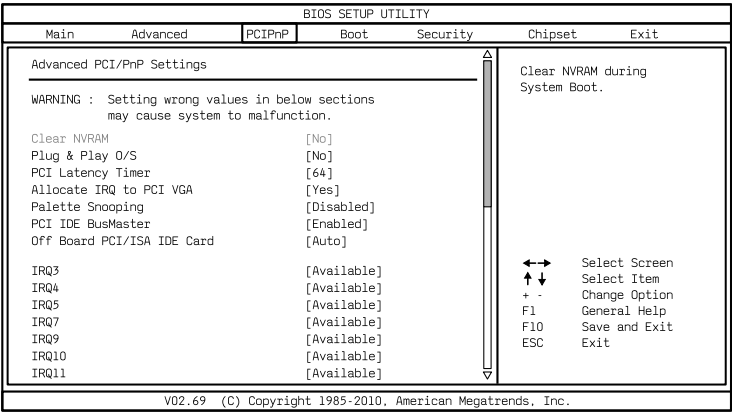


Figure 55: Illustration of Advanced PCI/PnP Settings screen

### 6.6.1. Clear NVRAM

The Clear NVRAM feature will erase all contents of the non-volatile random access memory when booting up the system. There are two options for this feature: yes and no.

### 6.6.2. Plug & Play O/S

The Plug & Play O/S feature determines whether the operating system or the BIOS controls the configuration of Plug and Play devices. There are two options for this feature.

#### Yes

The Yes option forces the BIOS to ignore any resource conflicts and enables the installed operating system to configure Plug and Play devices.

### No

The No option gives the BIOS control over handling resource conflicts caused by Plug and Play devices.

## 6.6.3. PCI Latency Timer

The PCI Latency Timer feature enables the user to specify the number of PCI bus cycles a connected PCI device can control before handing control of the PCI bus to the next PCI device waiting to use it. Generally, longer cycles increase PCI performance. The available cycles range from 32 to 248 in increments of 32.

## 6.6.4. Allocate IRQ to PCI VGA

The Allocate IRQ to PCI VGA feature determines whether graphics cards on the PCI bus can access IRQs. This feature has two options.

### Yes

The Yes option enables the BIOS to respond to a request for an IRQ by a connected PCI VGA card.

### No

The No option forces the BIOS to ignore all requests for IRQ by a connected PCI VGA card.

## 6.6.5. Palette Snooping

The Palette Snooping feature should be enabled if video decoder cards are being used in the system. When enabled, video decoder cards can retrieve information about the color palette being used by the system's graphics controller. This feature has two options: enabled and disabled.

### 6.6.6. PCI IDE BusMaster

The PCI IDE BusMaster feature enables IDE controllers on the PCI bus to directly communicate with IDE hard disks connected to PCI IDE cards. This feature has two options: enabled and disabled.

### 6.6.7. IRQ3~15

The available IRQs range from 3 to 15. However, not all IRQs in the range are available. IRQs 3, 4, 5, 7, 9, 10, 11, 14, and 15 can be set as either “Available” or “Reserved”. When set to “Available”, any connected PCI or Plug and Play device can use the IRQ.

### 6.6.8. DMA Channel 0~7

The available DMA Channels range from 0 to 7. However, not all DMA Channels in the range are available. DMA Channels 0, 1, 3, 5, 6, and 7 can be set as either “Available” or “Reserved”. When set to “Available”, any connected PCI or Plug and Play device can use the DMA Channel.

### 6.6.9. Reserved Memory Size

The Reserved Memory Size feature enables the user to reserve a portion of the Upper Memory Area for use by legacy devices. The available sizes are 16k, 32k, and 64k. This feature can also be disabled.

### 6.6.10. HotPlug Reserve I/O Port Size

The HotPlug Reserve I/P Port Size feature enables the user to set aside a specified portion of the I/O port block for hot-swappable or CardBus devices. The available options range from 4k to 28k in increments of 4k. There is also an “Auto” option for enabling the BIOS to dynamically choose the size to reserve.

### 6.6.11. HotPlug Reserve Memory Size

The HotPlug Reserve Memory Size feature enables the user to set aside a specified portion of the memory block for hot-swappable or CardBus devices. The available options range from 8MB to 512MB. There is also an “Auto” option for enabling the BIOS to dynamically choose the size to reserve.

### 6.6.12. HotPlug Reserve PFMemory Size

The HotPlug Reserve PFMemory Size feature enables the user to set aside a specified portion of the pre-fetch memory block for hot-swappable or CardBus devices. The available options range from 32MB to 2048MB. There is also an “Auto” option for enabling the BIOS to dynamically choose the size to reserve.

## 6.7. Boot Settings

The Boot Settings screen has a single link that goes to the **Boot Settings Configuration** screen.

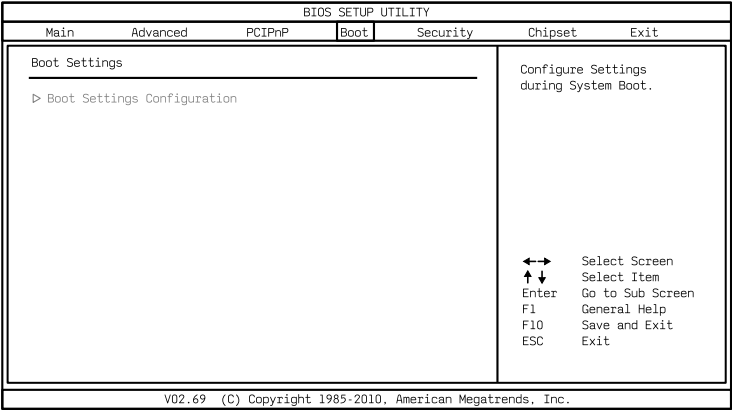


Figure 56: Illustration of Boot Settings screen

### 6.7.1. Boot Settings Configuration

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

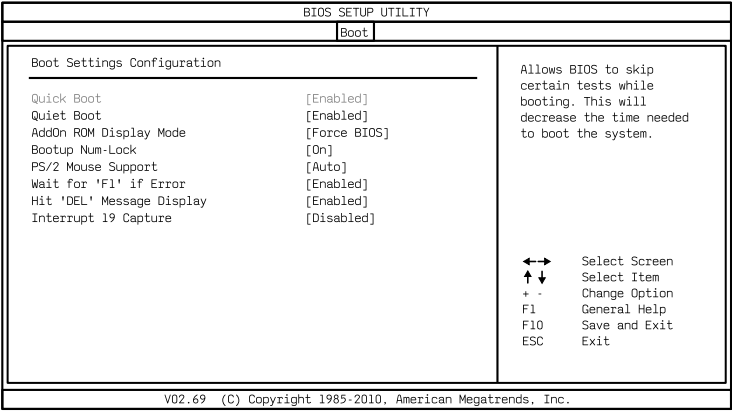


Figure 57: Illustration of Boot Settings Configuration screen

### 6.7.1.1. 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.

### 6.7.1.2. 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.

### 6.7.1.3. AddOn ROM Display Mode

The AddOn ROM Display Mode feature determines whether or not information from option ROMs is displayed during the boot sequence. There are two options for this feature: Force BIOS and Keep Current. The "Force BIOS" option ensures that all information from option ROMs is displayed.

### 6.7.1.4. 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.

### 6.7.1.5. PS/2 Mouse Support

The PS/2 Mouse Support feature is used for assigning an IRQ to the PS/2 mouse. There are three options available.

#### **Auto**

The Auto option enables the BIOS to determine how to handle assign IRQ12 based on the detection of a PS/2 mouse device. If a PS/2 mouse is detected, the BIOS will reserve IRQ12 for the mouse. If a PS/2 mouse is not detected, then IRQ12 will be made available to other devices.

#### **Enabled**

The Enabled option forces the BIOS to reserve IRQ12 for a PS/2 mouse device. No other device may use IRQ12.

## Disabled

The Disabled option forces the BIOS to make IRQ12 available to any device.

### 6.7.1.6. 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.

### 6.7.1.7. 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.<sup>1</sup> 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.

### 6.7.1.8. Interrupt 19 Capture

The Interrupt 19 Capture feature enables hard drives attached to add-on host adaptors (e.g., SCSI cards, eSATA cards, etc) to function as bootable hard drives. Enabling this feature will also grant access to any existing ROM BIOS utilities on the host adapter. This feature has two options: enabled and disabled.



## 6.8. Security Settings

The Security Settings screen provides a way to restrict access to the BIOS or even the entire system.

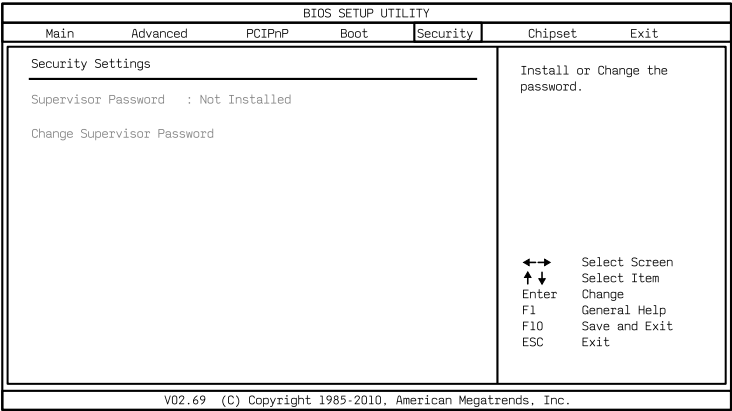


Figure 58: Illustration of Security Settings screen

### 6.8.1. 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.

### 6.8.2. 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.

## 6.9. Advanced Chipset Settings

The Advanced Chipset Settings screen has two links for accessing North and South bridge functions. Though the VX900 is a single chip solution, the North and South bridge categories are still for grouping features.

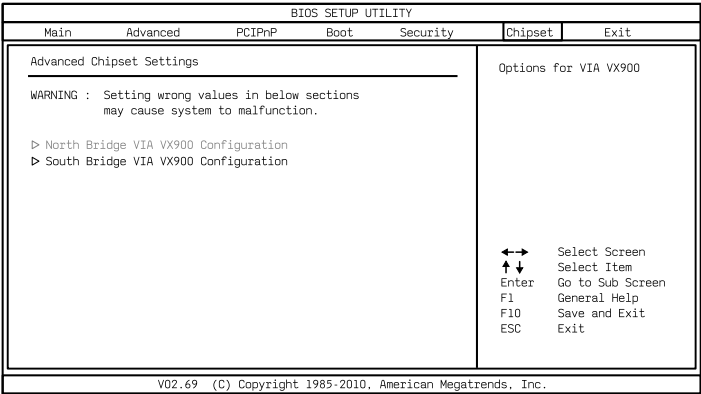


Figure 59: Illustration of Advanced Chipset Settings screen

### 6.9.1. North Bridge VIA VX900 Configuration

The North Bridge VIA VX900 Configuration screen contains three links to sub-screens and one feature.

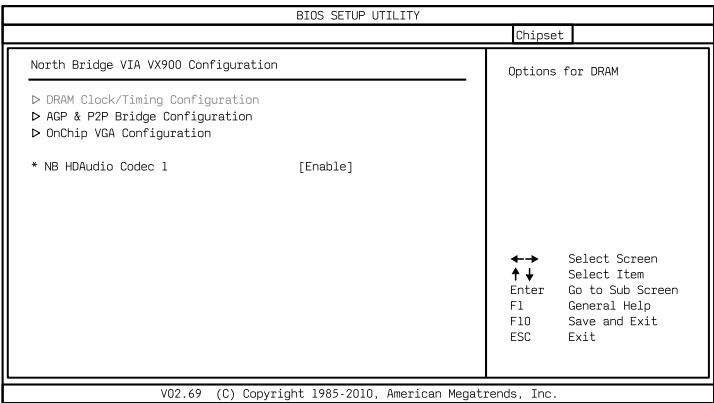


Figure 60: Illustration of North Bridge VIA VX900 Configuration screen

6.9.1.1. DRAM Clock/Timing Configuration

The DRAM Clock/Timing Configuration screen has one feature for controlling the system DRAM. All other DRAM features are automated and cannot be accessed.

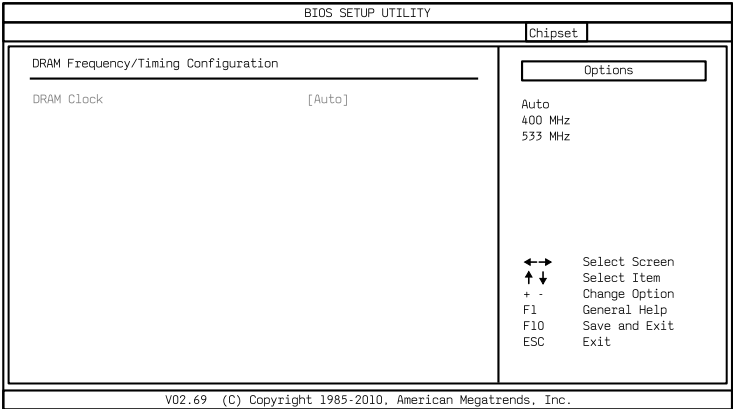


Figure 61: Illustration of DRAM Frequency/Timing Configuration screen

6.9.1.1.1. DRAM Clock

The DRAM Clock option 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**

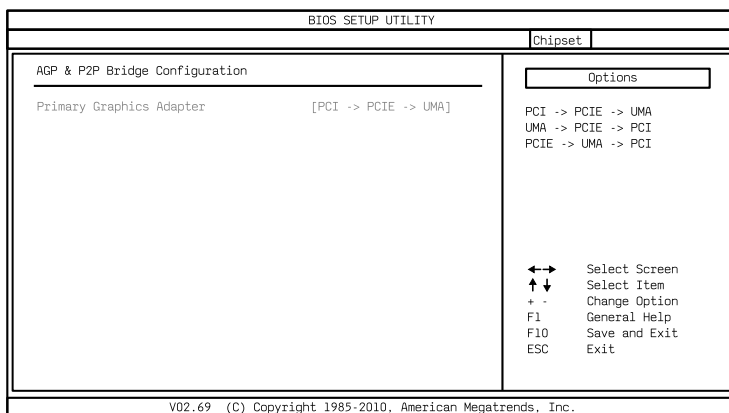
The 400 MHz option forces the BIOS to be fixed at 800 MHz for DDR3 memory modules.

**533 MHz**

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

### 6.9.1.2. AGP & P2P Bridge Configuration

The AGP & P2P Bridge Configuration screen has one feature for establishing the order the BIOS takes when seeking a graphics adapter.



**Figure 62: Illustration of AGP & P2P Bridge Configuration screen**

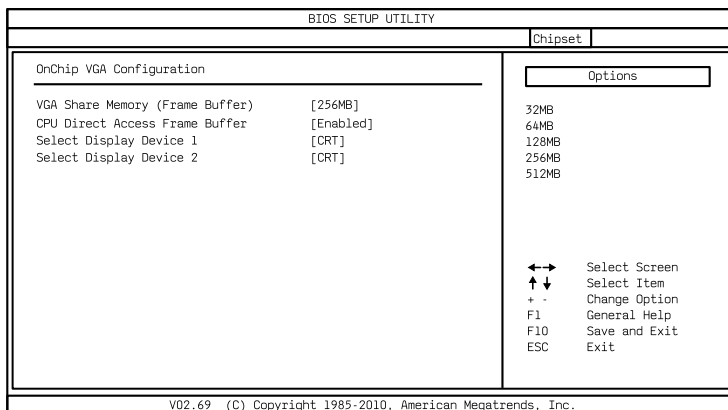
#### 6.9.1.2.1. Primary Graphics Adapter

The Primary Graphics Adapter option 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

### 6.9.1.3. OnChip VGA Configuration

The OnChip VGA Configuration screen has features for controlling the integrated graphics controller in the VX900 chipset.



**Figure 63: Illustration of OnChip VGA Configuration screen**

#### 6.9.1.3.1. 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 32 – 512 MB.

#### 6.9.1.3.2. CPU Direct Access Frame Buffer

The CPU Direct Access Frame Buffer feature enables the CPU to write to the portion of memory reserved for the integrated graphics controller. This feature has two options: enabled and disabled.

#### 6.9.1.3.3. Select Display Device 1 and 2

The Select Display Device feature enables the user to choose a specific display interface. This feature has two options: CRT 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® port.

### 6.9.2. South Bridge VIA VX900 Configuration

The South Bridge VIA VX900 Configuration screen has seven features.

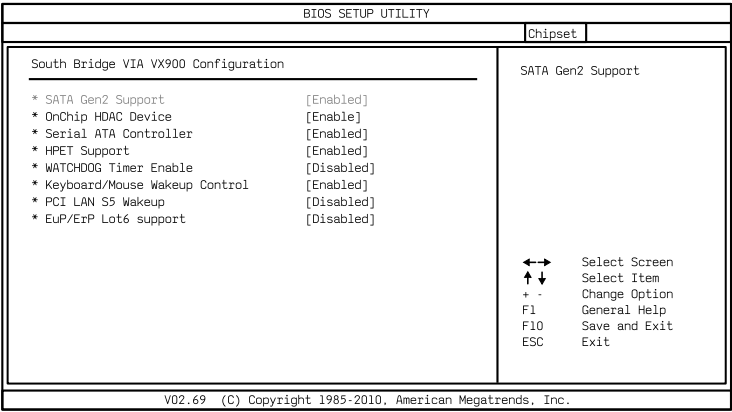


Figure 64: Illustration of South Bridge VIA VX900 Configuration screen

#### 6.9.2.1. SATA Gen2 Support

The SATA Gen2 Support feature enables to BIOS to determine whether SATA 3Gb/s or 1.5Gb/s specifications are followed. This feature has two options: enabled or disabled.

#### 6.9.2.2. 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.

#### 6.9.2.3. Serial ATA Controller

The Serial ATA Controller feature enables the BIOS to turn the SATA controller in the chipset on or off. This feature has two options: enabled and disabled.

#### 6.9.2.4. HPET Support

The HPET Support feature enables the BIOS to determine if the high precision event timer in the chipset is on or off. This feature has two options: enabled or disabled.

#### 6.9.2.5. WATCHDOG Timer Enable

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

#### 6.9.2.6. WATCHDOG Timer RUN/STOP

The WATCHDOG Timer RUN/STOP feature controls if the WATCHDOG timer is active or dormant. This feature has two options: stop and run.

#### 6.9.2.7. WATCHDOG Timer ACTION

The WATCHDOG Timer ACTION feature determines the action the WATCHDOG timer should take if the timer counts down to zero. This feature has two options: reset and power off.

#### 6.9.2.8. WATCHDOG Timer COUNT

The WATCHDOG Timer COUNT feature determines the length of time the timer should count when the timer is first triggered. This feature has four options: 72, 389, 706, and 1023 seconds.

#### 6.9.2.9. Keyboard/Mouse Wakeup Control

The Keyboard/Mouse Wakeup Control feature enables the BIOS to allow keyboard or mouse activity to activate a system in a suspended state. This feature has two options: enabled and disabled.

#### 6.9.2.10. PCI LAN S5 Wakeup

The PCI LAN S5 Wakeup feature enables the BIOS to allow remote wake-up from the S5 power off state through the PCI bus. This feature has two options: enabled and disabled.



### 6.9.2.11. EuP/ErP Lot6 Support

The EuP/ErP Lot6 Support feature enables the BIOS to reduce the power draw to less than 1W when the system is in standby mode. This feature has two options: enabled and disabled.

**Note:**

When EuP/ErP Lot6 support is enabled, the PCIe LAN remote wake-up capability will be disabled.

## 6.10. Exit Options

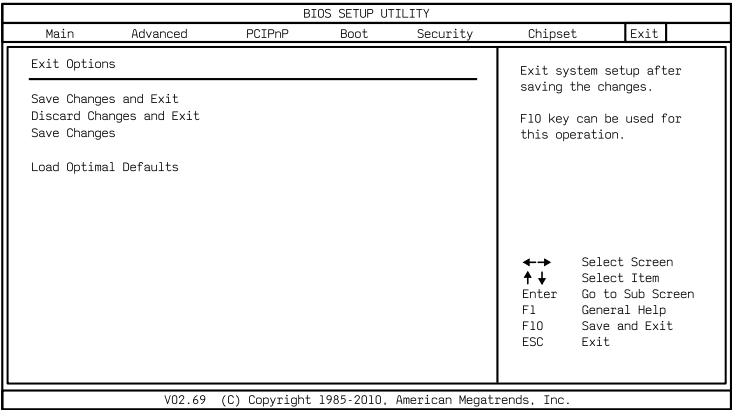


Figure 65: Illustration of Exit Options screen

### 6.10.1. 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.

### 6.10.2. Discard Changes and Exit

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

### 6.10.3. 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.

### 6.10.4. 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-M860 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VEPD website at [www.viaembedded.com](http://www.viaembedded.com).

For embedded operating systems, the related drivers can be found in the VIA Embedded website at [www.viaembedded.com](http://www.viaembedded.com).

### 7.2. Linux Driver Support

The VIA EPIA-M860 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](http://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. You can submit a request to your VEPD support contact.



# Appendix A.

## Power Consumption Report

Power consumption tests were performed on the VIA EPIA-M860. The following tables represent the breakdown of the voltage, amp and wattage values while running common system applications.

### A.1. EPIA-M860

The tests were performed based on the following additional components:

- **Memory:** Corsair 4GB DDR3 1600MHz
- **HDD:** Hitachi HD721616PLA380 160GB SATA
  - The DC-in tests used two HDDs.
- **DVD-ROM:** DVR-115BK

#### A.1.1. Playing DVDs (ATX)

This benchmark was performed using PowerDVD 8.0 using the HDMI interface.

Power Plane	Volts	Amperes	Watts
+3.3V	3.231	1.016	3.283
+5V	5.262	1.854	9.756
+5VSB	4.875	0.424	2.067
+12V	12.977	0.016	0.208
		Total Power Consumption	15.314

### A.1.2. Playing DVDs (DC-in)

This benchmark was performed using PowerDVD 8.0 using the HDMI interface. Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	12.921	1.370	17.702
		Total Power Consumption	17.702

### A.1.3. Playing MP3s (ATX)

Power Plane	Volts	Amperes	Watts
+3.3V	3.208	0.855	2.743
+5V	5.241	1.507	7.898
+5VSB	4.852	0.423	2.052
+12V	12.941	0.009	0.116
		Total Power Consumption	12.809

### A.1.4. Playing MP3s (DC-in)

Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	12.920	1.120	14.470
		Total Power Consumption	14.470



### A.1.5. Copying files on a network (ATX)

Power Plane	Volts	Amperes	Watts
+3.3V	3.211	0.869	2.790
+5V	5.238	1.858	9.732
+5VSB	4.829	0.572	2.762
+12V	12.972	0.012	0.156
		Total Power Consumption	15.440

### A.1.6. Copying files on a network (DC-in)

Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	12.916	1.240	16.016
		Total Power Consumption	16.016

### A.1.7. Idle (ATX)

Power Plane	Volts	Amperes	Watts
+3.3V	3.272	0.864	2.827
+5V	5.312	1.055	5.604
+5VSB	4.946	0.400	1.978
+12V	13.003	0.010	0.130
		Total Power Consumption	10.539

### A.1.8. Idle (DC-in)

Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	12.940	0.950	12.293
		Total Power Consumption	12.293

### A.1.9. CCWINSTONE2004 (ATX)

Power Plane	Volts	Amperes	Watts
+3.3V	3.203	0.877	2.809
+5V	5.227	1.985	10.376
+5VSB	4.850	0.420	2.037
+12V	12.962	0.014	0.181
		Total Power Consumption	15.403

### A.1.10. CCWINSTONE2004 (DC-in)

Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	12.906	1.360	17.552
		Total Power Consumption	17.552

### A.1.11. S3 (ATX)

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.028	0.000	0.000
+5VSB	5.081	0.324	1.646
+12V	0.000	0.000	0.000
		Total Power Consumption	1.646

### A.1.12. S3 (DC-in)

Test results exclude SATA power.

Power Plane	Volts	Amperes	Watts
+3.3V	0.000	0.000	0.000
+5V	0.000	0.000	0.000
+5VSB	0.000	0.000	0.000
+12V	13.106	0.160	2.097
		Total Power Consumption	2.097



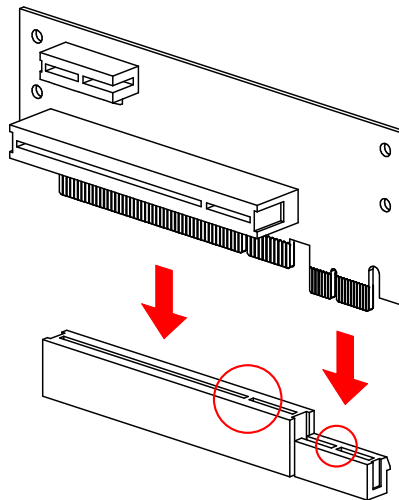
# Appendix B.

## Riser Card Modules

There are two riser card modules that are compatible with the EPIA-M860: the PCIE-03 and the EXT-PCI-01.

### B.1. PCIE-03

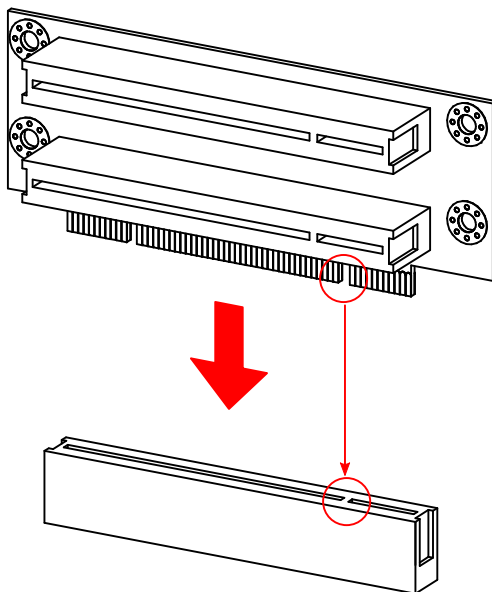
The PCIE-03 riser card has both a PCI slot and a PCIe x1 slot. This card can only be used if the mainboard has a PCI slot properly aligned with a PCIe x1 slot. Additionally, the orientation of the PCIe x1 slot must be reversed so that the key notch is furthest away from the key notch on the PCI slot.



**Figure 66: Installing the PCIE-03 riser card**

## 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. Confirm the proper orientation of the key notch before powering the system.



**Figure 67: Installing the EXT-PCI-01 riser card**



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