USER MANUAL

# VB8004

## Mini-ITX Mainboard

1.17-03302018-163200

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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.

### Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.

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

## VB8004-16X SKU

- ☐ 1 x VB8004 mainboard (with Nano X2 1.6 GHz processor)
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC-to-DC adapter (optional)

## VB8004-16XS SKU

- ☐ 1 x VB8004 mainboard (with Nano X2 1.6 GHz processor)
- ☐ 1 x VB8004-A daughter board
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC-to-DC adapter (optional)

## VB8004-16S SKU

- ☐ 1 x VB8004 mainboard (with Nano 1.6 GHz processor)
- ☐ 1 x VB8004-A daughter board
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC-to-DC adapter (optional)

## VB8004-16 SKU

- ☐ 1 x VB8004 mainboard (with Nano 1.6 GHz processor)
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC-to-DC adapter (optional)

## VB8004-12E SKU

- ☐ 1 x VB8004 mainboard (with Nano 1.2 GHz processor)
- ☐ 1 x SATA cable
- ☐ 1 x SATA power cable
- ☐ 1 x AC-to-DC adapter (optional)



**Note:**

The VB8004-16S and VB8004-16XS SKU are only for project base and not for a standard Stock-keeping Unit.

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# 1. Product Overview

The VIA VB8004 Mini-ITX mainboard is a highly integrated x86 mainboard optimized for systems in ultra-thin embedded, industrial and multimedia applications. The mainboard is based on the low power VIA VX900 Unified Digital Media IGP chipset that features the VIA C-9 HC DX9 with 2D/3D graphics and video accelerators for rich digital media performance.

The VIA VB8004 has one expansion I/O daughter board called VB8004-A. The VB8004-A daughter board is connected through a proprietary 80-pin connector that carries signals for one 4-Lane PCIe, one 1-Lane PCIe, dedicated graphics S3 5400E, HDMI®, and DVI-I. The combination of mainboard and daughter board offers up to four displays that makes it ideal for various digital signages and perfect for gaming.

The VIA VB8004 includes a powerful, secure, and efficient VIA Nano™ X2 / Nano™ processor. The VIA Nano™ X2 / Nano™ processor includes the VIA Padlock Security Engine, VIA CoolStream™ Architecture, VIA StepAhead™ Technology Suite, and VIA TwinTurbo™ technology.

The VIA VB8004 includes one 1066 MHz DDR3 SODIMM slot that supports up to 4 GB memory size. The VIA VB8004 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 VB8004 is fully compatible with Microsoft® and Linux operating systems, as well as with standard Mini-ITX chassis enclosures. However, the length of I/O coastline of VB8004 mainboard is non-standard; therefore a customized I/O bracket is necessary.

**Note:**

The VB8004 Mini-ITX mainboard does not include an I/O bracket due to the non-standard length of the I/O coastline. All users should check with the local sales representative for I/O brackets customization details.

# 1.1. Key Features and Benefits

## 1.1.1. VIA Nano™ X2 / Nano™ Processor

The VIA Nano™ X2 and VIA Nano are 64-bit superscalar x86 processors based on a 40 nanometer and 65 nanometer process technology respectively. 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 and VIA Nano™ are 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..



**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 IGP 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 C-9 HC DX9 2D/3D graphics and video acceleration, VC1, MPEG-2, WMV9, H.264 decoding acceleration, DDR3 1066 MHz support, motion compensation and dual display support to ensure a rich overall entertainment experience.

## 1.1.3. DC-In Power Input

The VIA VB8004 comes with DC-in power input jack. The DC-in power input requires a 12V/5A max input. The AC-to-DC adapter can be purchased with the mainboard.

### 1.1.4. Expansion Option

The VIA VB8004 further proves its versatility by providing a unique expansion option that uses a proprietary 80-pin connector for daughter board. The VB8004-A daughter board provides additional graphics support for the VB8004 mainboard. With the additional DVI-I and HDMI® ports on the VB8004-A, the VB8004 mainboard can support up to four displays. In addition, the VB8004-A daughter board has a Mini PCI Express slot to support an optional WLAN or 3G/4G module.

# 1.2. Product Specifications

- **Processor**
  - VIA Nano™ X2 40nm processor
    - 1.6 GHz VIA Nano X2 (for VB8004-16X SKU[1] and VB8004-16XS SKU[2])
  - VIA Nano™ E-Series 65nm processor
    - 1.6 GHz VIA Nano (for VB8004-16S SKU[3] and VB8004-16 SKU[4])
    - 1.2 GHz VIA Nano (for VB8004-12E SKU[5])
  - Supports 800MHz Front Side Bus
  - 7 bit VID VRM Operation
  - 21 x 21 mm FCBGA

- **Chipset**
  - VIA VX900 Unified Digital Media IGP chipset
  - 31 x 31 mm FCBGA

- **System Memory**
  - 1 x SODIMM slot supporting DDR3 1066 MHz SDRAM
  - Supports up to 4 GB memory size

- **Graphics**
  - Integrated VIA C-9 HC DX9 3D/2D graphics
  - MPEG2, WMV9/VC1, H.264 Full HD video decoder
  - DirectX 9 support

- **Onboard Peripherals**
  - **Onboard LAN**
    - VIA VT6130 PCI Express Gigabit Ethernet controller
  - **Onboard Audio**
    - VIA VT1708S High Definition Audio Codec
  - **Onboard Super IO**
    - Fintek F81801U-I Super I/O controller

- **Onboard I/O Connectors**
  - 4 x USB 2.0 pin header
  - 1 x Audio pin header for Line-out and MIC-in
  - 1 x Digital I/O (GPI x 4 + GPO x 4)
  - 1 x LPC connector for BIOS debugging
  - 1 x Serial connector for COM port
  - 2 x COM port voltage select pin header

- 1 x Panel and Back Light power select pin header
- 1 x Front panel pin header
- 1 x CPU/System fan connector
- 1 x SPI Flash ROM pin header
- 1 x OPTO Out pin header (SPDIF_Out)
- 2 x SATA HDD connectors
- 2 x SATA HDD power connectors
- 1 x Proprietary 80-pin I/O connector
- 1 x LVDS connector, for 24-bit single channel LVDS panel

- **Back Panel I/O**
  - 1 x 12V DC-in power jack
  - 1 x PS/2 Keyboard port
  - 1 x PS/2 Mouse port
  - 1 x RJ45 port (GigaLAN)
  - 2 x USB 2.0 ports
  - 1 x Serial port (COM port)
  - 1 x DVI-I port
  - 1 x HDMI® port

- **BIOS**
  - AMI BIOS
  - 8 Mbit SPI flash memory

- **Supported Operating System**
  - Windows 7
  - Windows Embedded Standard 7
  - Windows XP
  - Windows Embedded Standard/Compact
  - Linux
- **Power**
  - DC-in 12V

- **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 up to 50°C
  - **Operating Humidity**
    - 0% up to 95% (relative humidity; non-condensing)

- **Form Factor**
  - Mini-ITX (6-layer)
  - 17 cm x 17 cm

- **Compliance**
  - CE
  - FCC
  - BSMI
  - RoHS

**Notes:**

1. The VB8004-16X SKU uses heatsink with fan and has LVDS connector but does not support the VB8004-A daughter board.
2. The VB8004-16XS SKU supports VB8004-A daughter board, LVDS connector and uses heatsink with fan.
3. The VB8004-16S SKU supports VB8004-A daughter board, LVDS connector and uses heatsink with fan.
4. The VB8004-16 SKU uses heatsink with fan and has LVDS connector but does not support the VB8004-A daughter board.
5. The VB8004-12E SKU is a fanless and has LVDS connector but does not support the VB8004-A daughter board.

# 1.3. Layout Diagram

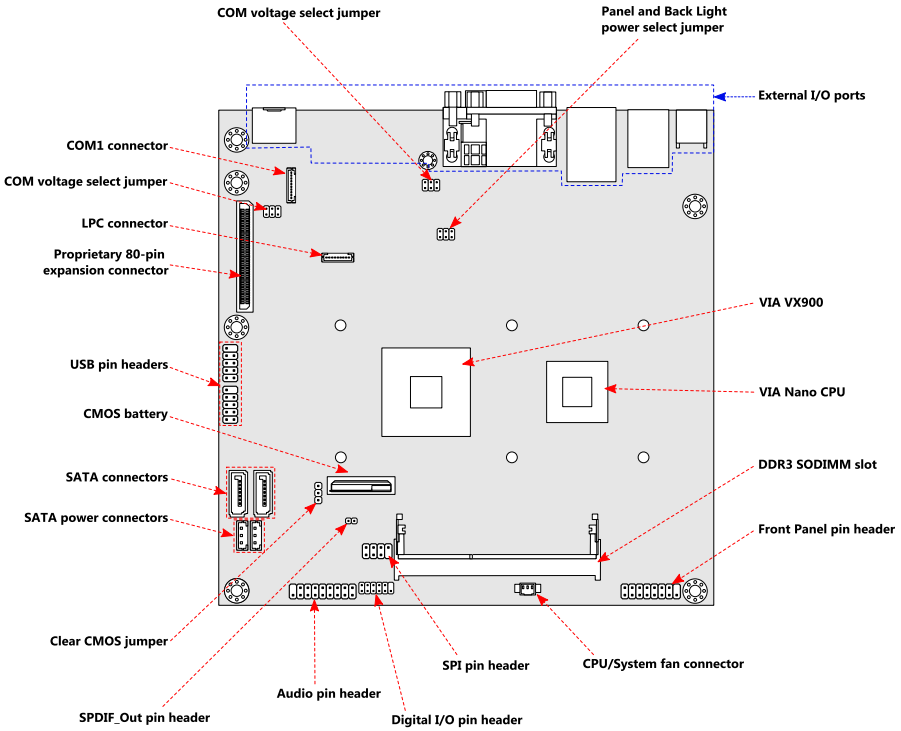



Figure 1: VB8004 mainboard top view layout

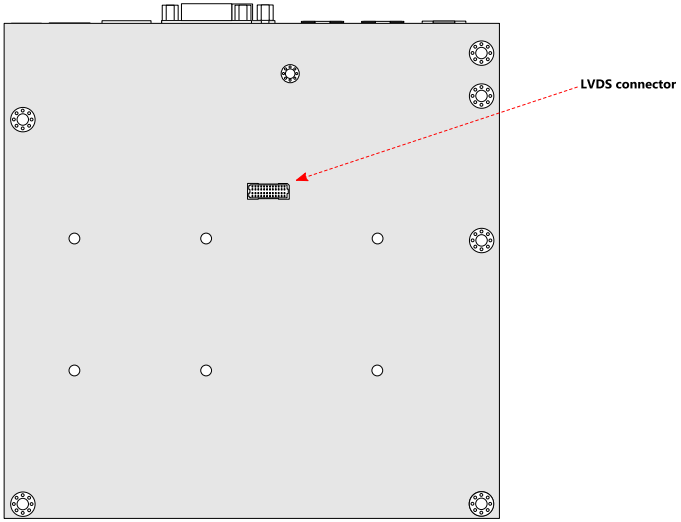



Figure 2: VB8004 mainboard bottom view layout

# 1.4. Product Dimensions

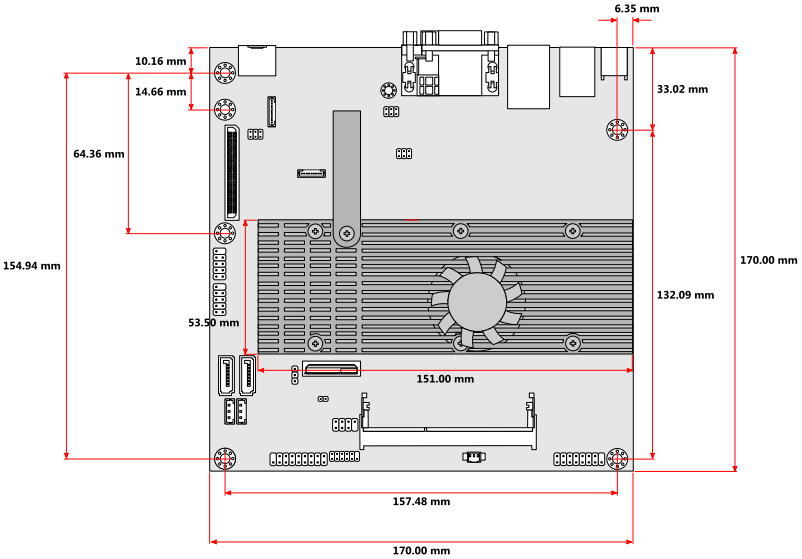



Figure 3: Dimensions of the VB8004 mainboard (VB8004-16 SKU)

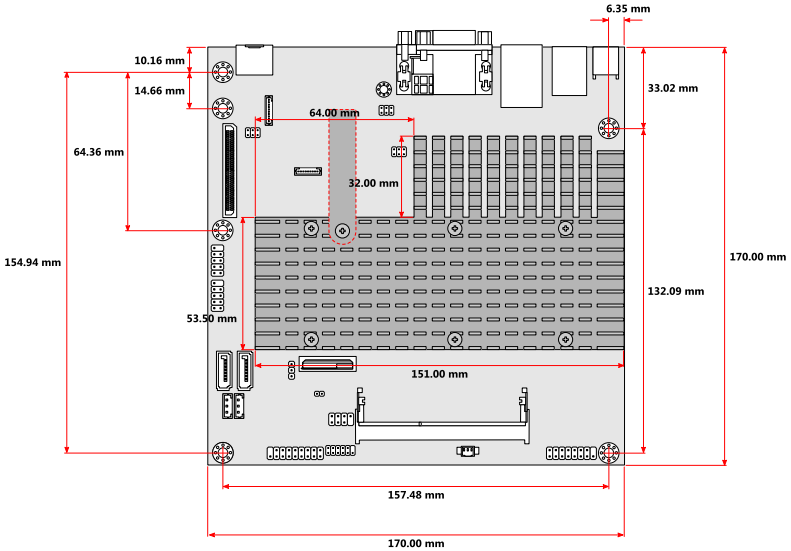



Figure 4: Dimensions of the VB8004 mainboard (VB8004-12E SKU)

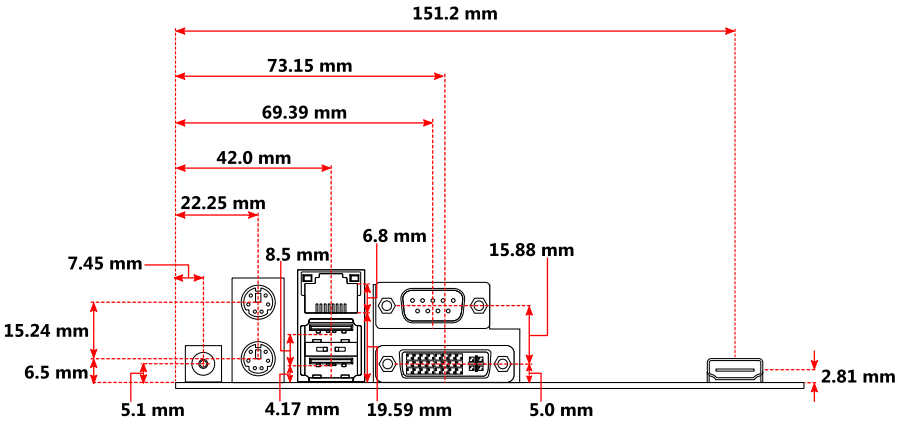



Figure 5: Dimensions of the VB8004 mainboard I/O

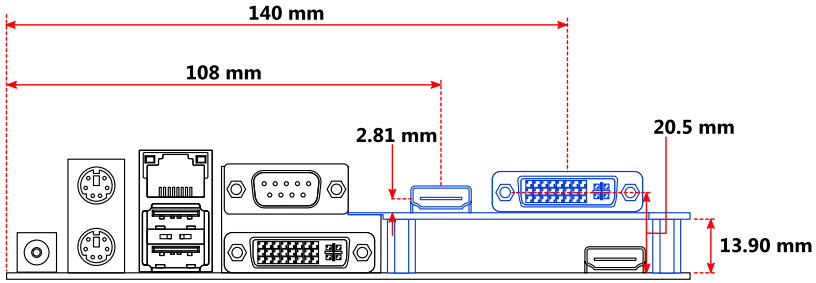



Figure 6: Dimensions of the VB8004 with VB8004-A daughter board I/O

# 1.5. Height Distribution

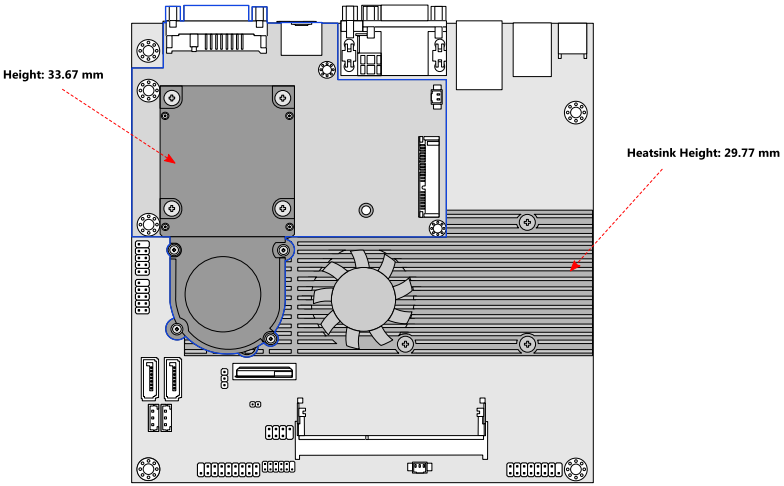



Figure 7: Height distribution of VB8004 mainboard (VB8004-16S SKU)

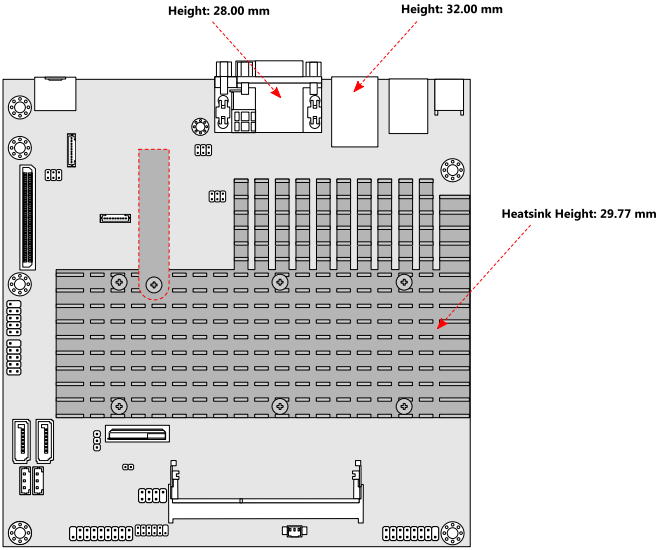



Figure 8: Height distribution of VB8004 mainboard (VB8004-12E SKU)

# 2. I/O Interface

The VIA VB8004 mainboard 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

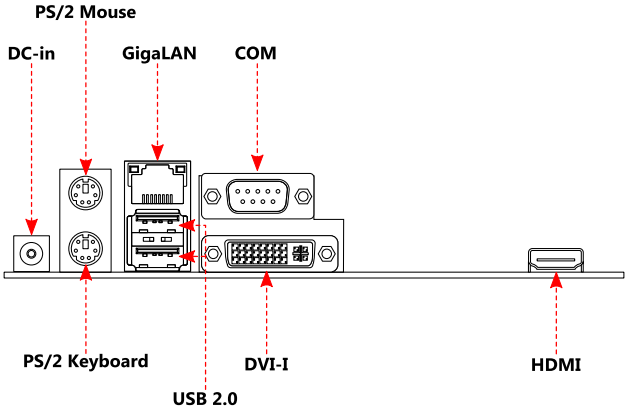



Figure 9: I/O ports of VB8004 mainboard

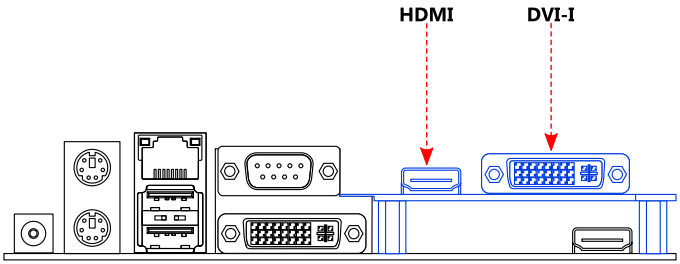



Figure 10: I/O ports of VB8004 mainboard with VB8004-A daughter board

**Note:**

The VB8004-A daughter board is supported only in VB8004-16XS and VB8004-16S SKU.

### 2.1.1. DC-in Jack

The VB8004 mainboard comes with a DC-in coaxial power connector. The specifications of the DC coaxial power connector are shown below

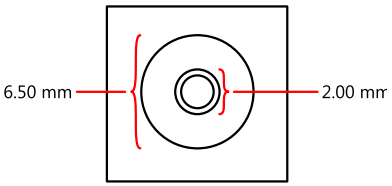



Figure 11: DC-in coaxial connector

| 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 1: DC-in coaxial connector specifications

**Note:**

1. 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. Max. power support is 72W.

## 2.1.2. PS/2 Port

The mainboard provides two PS/2 ports. The green PS/2 port is used to attach a PS/2 mouse while the purple PS/2 port is for a PS/2 keyboard. The pinout of the PS/2 port is as shown below

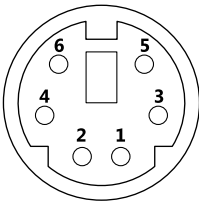



Figure 12: PS/2 port pin diagram

| Pin | Signal |
|---|---|
| 1 | +Data |
| 2 | NC |
| 3 | GND |
| 4 | +5V |
| 5 | +CLK |
| 6 | NC |

Table 2: PS/2 port pinout

## 2.1.3. GigaLAN 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.

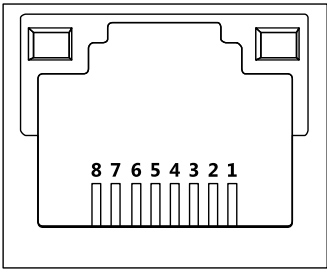



Figure 13: Gigabit Ethernet port pinout diagram

| 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 3: Gigabit Ethernet port pinout

## 2.1.4. USB 2.0 Port

The VB8004 mainboard provides two USB 2.0 ports located below the GigaLAN port at the back panel I/O. The USB 2.0 gives complete Plug & Play and hot swapping external devices. Each USB 2.0 port is using the USB Type A receptacle connector. The pinout of the typical USB 2.0 port is as shown below.

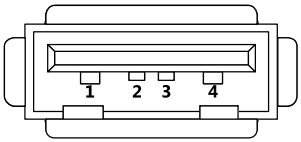



Figure 14: USB 2.0 port pinout diagram

| Pin | Signal |
|---|---|
| 1 | +5V |
| 2 | Data- |
| 3 | Data+ |
| 4 | GND |

Table 4: USB 2.0 port pinout

## 2.1.5. COM Port

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

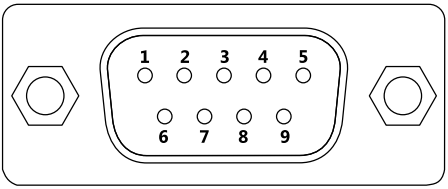



Figure 15: COM port pinout diagram

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | RxD | 7 | RTS |
| 3 | TxD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | GND | | |

Table 5: COM port pinout

## 2.1.6. DVI-I Connector

The integrated DVI-I uses a 24-pin DVI-I female connector. The DVI-I is used to interface with a high-speed, high resolution LCD or CRT displays for digital video output. The pinout of the DVI-I connector is as shown below.

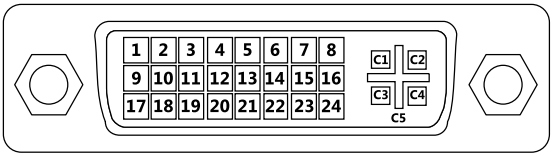



Figure 16: DVI-I connector pinout diagram

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | Tx2- | 13 | — | C1 | CRT_R |
| 2 | Tx2+ | 14 | +5V | C2 | CRT_G |
| 3 | GND | 15 | GND | C3 | CRT_B |
| 4 | CRT_SPCLK | 16 | Hot plug detect | C4 | CRT_HSYNC |
| 5 | CRT_SPD | 17 | Tx0- | C5 | GND |
| 6 | DVI_SPCLK | 18 | Tx0+ | | |
| 7 | DVI_SPD | 19 | GND | | |
| 8 | CRT_VSYNC | 20 | — | | |
| 9 | Tx1- | 21 | — | | |
| 10 | Tx+ | 22 | GND | | |
| 11 | GND | 23 | TxC+ | | |
| 12 | — | 24 | TxC- | | |

Table 6: DVI-I connector pinout

**Note:**

The DVI-to-VGA adapters used for the VB8004 mainboard and VB8004-A daughter board are different. The DVI connector of the VB8004 mainboard has a special specification that requires a special DVI-to-VGA adapter. For more details, check with local sales representatives.

## 2.1.7. 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.

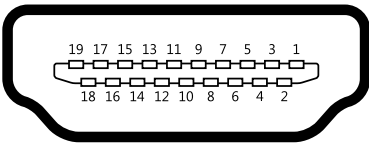



Figure 17: HDMI® port pinout diagram

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | TMDS Data0+ | 2 | GND |
| 3 | TMDS Data0– | 4 | TMDS Data1+ |
| 5 | GND | 6 | TMDS Data1– |
| 7 | TMDS Data2+ | 8 | GND |
| 9 | TMDS Data2– | 10 | TMDS Data3+ |
| 11 | GND | 12 | TMDS Data3- |
| 13 | CEC | 14 | Reserved / HEC Data- [1] |
| 15 | SCL [2] | 16 | SDA [3] |
| 17 | DDC/CEC/HEC Ground | 18 | +5V Power [4] |
| 19 | Hot Plug Detect and HEC Data+ [5] | | |

Table 7: HDMI® port pinout

Notes:

1. Pin 15: SCL is for I²C Serial Clock for DDC.
2. Pin 16: SDA is for I²C Serial Data Line for DDC.
3. Pin 18: max 50 mA

# 2.2. Onboard Connectors

## 2.2.1. SATA Power Connector

The mainboard provides 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.

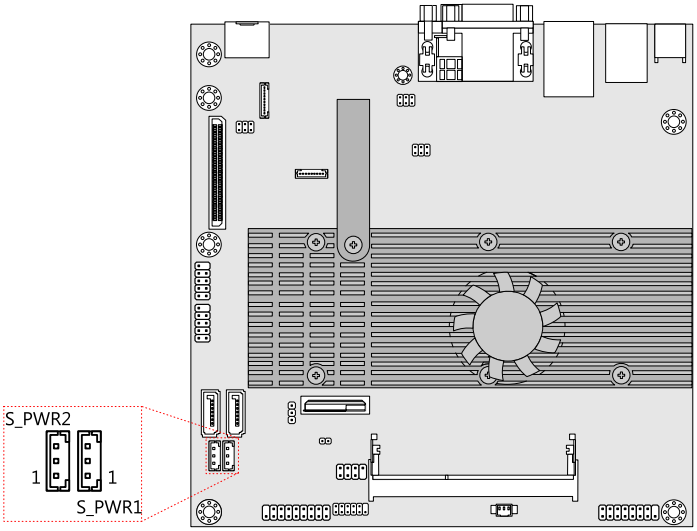



Figure 18: SATA power connector

| Pin | Signal |
|---|---|
| 1 | +5V |
| 2 | +12V |
| 3 | GND |

Table 8: SATA power connector pinout

## 2.2.2. CMOS Battery Slot

The VB8004 mainboard is equipped with a CMOS battery slot, which is compatible with CR2032 coin batteries. The CMOS battery slot is labeled as "BAT1".

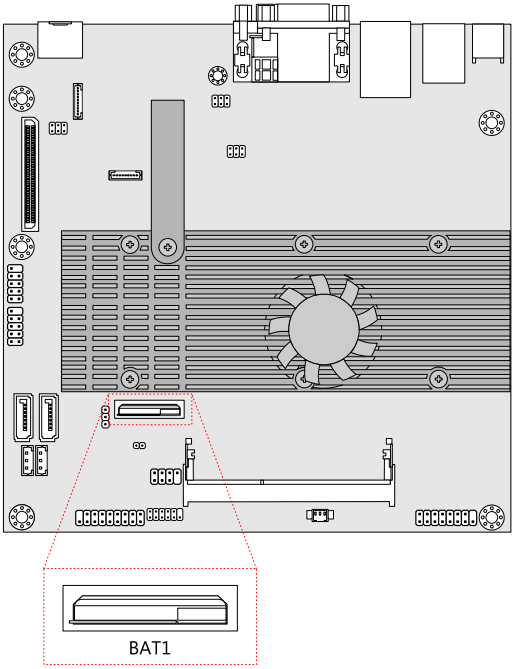



Figure 19: CMOS battery slot

| Pin | Signal |
|---|---|
| 1 | +3V |
| 2 | GND |

Table 9: CMOS battery slot pinout

## 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 power LED, HDD LED, power switch and reset switch. The pinout of the front panel pin header is shown below.

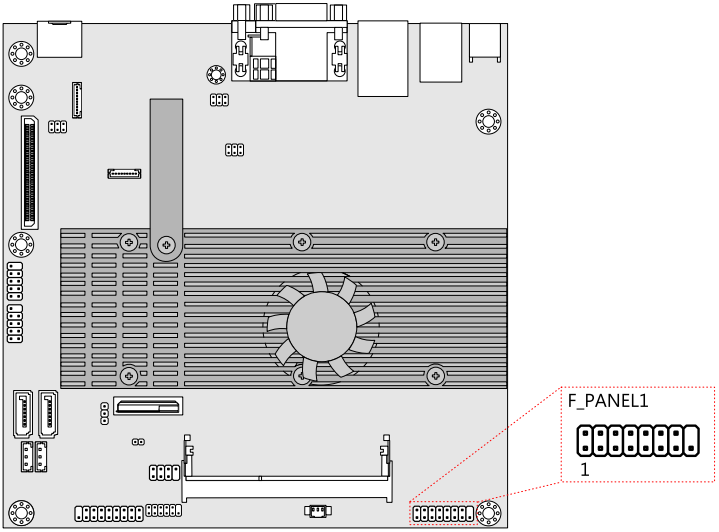



Figure 20: Front panel pin header block

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | HDD_LED+ | 2 | P_LED+(+5VSUS) |
| 3 | HDD_LED- | 4 | P_LED+(+5VSUS) |
| 5 | Power SW | 6 | -PWR_LED/(SUS_LED) |
| 7 | GND | 8 | LNK_ACT |
| 9 | Reset SW | 10 | +3.3VSUS |
| 11 | GND | 12 | LED1 |
| 13 | +5VSUS | 14 | LED2 |
| 15 | -SLEEP_LED | 16 | — |

Table 10: Front panel pin header pinout

## 2.2.4. CPU Fan Connector

The onboard CPU fan connector labeled "CN10" is for connecting the CPU fan to maintain CPU cooling. The fan connector is standard 3-prong fan connector. The pinout of the fan connector is as shown below.

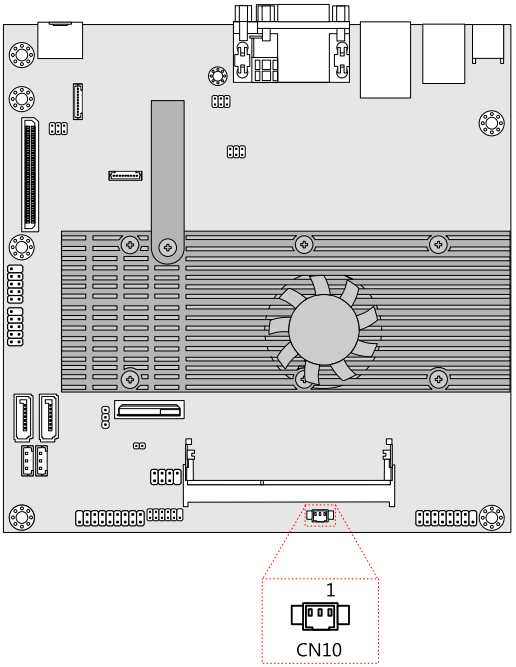



Figure 21: CPU Fan connector

| Pin | Signal |
|---|---|
| 1 | FANIN |
| 2 | FANPWM |
| 3 | GND |

Table 11: CPU Fan connector pinouts

## 2.2.5. 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 shown below.

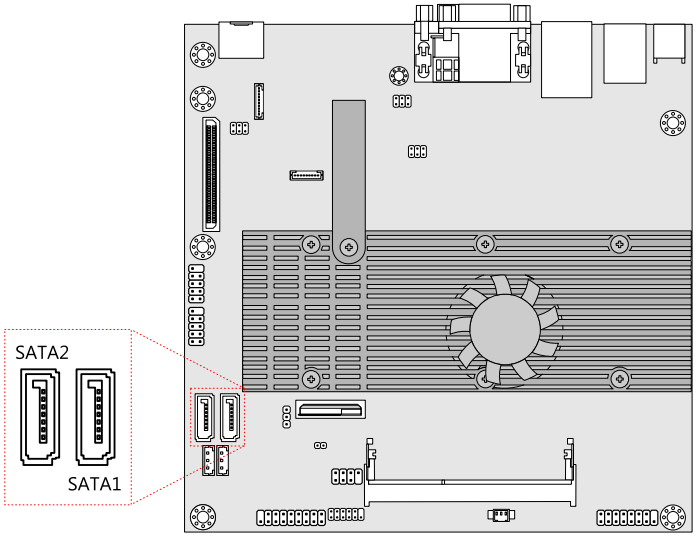



Figure 22: SATA connectors

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

| SATA2 | |
|---|---|
| Pin | Signal |
| 1 | Ground |
| 2 | STXP_2 |
| 3 | STXN_2 |
| 4 | GND |
| 5 | SRXN_2 |
| 6 | SRXP_2 |
| 7 | GND |

Table 12: SATA connector pinouts

## 2.2.6. USB 2.0 Pin Header

The VB8004 mainboard has two onboard USB pin headers that enable additional four USB 2.0 ports and allow connecting the WLAN USB module accessory. The pin header blocks are labeled as "USB1" and "USB2". The pinout of the USB pin headers are shown below.

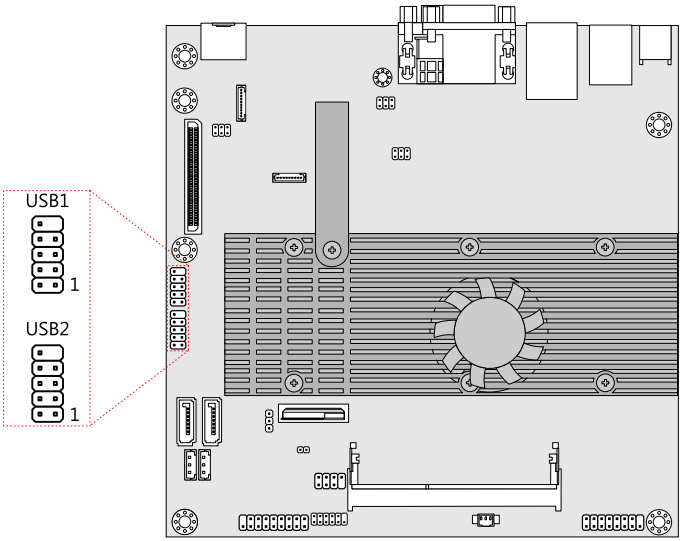



Figure 23: USB 2.0 pin headers block

| USB1 | | | |
|---|---|---|---|
| Pin | Signal | Pin | Signal |
| 1 | +5VSUS | 2 | +5VSUS |
| 3 | USBH_P1- | 4 | USBH_P0- |
| 5 | USBH_P1+ | 6 | USBH_P0+ |
| 7 | GND | 8 | GND |
| 9 | — | 10 | GND |

| USB2 | | | |
|---|---|---|---|
| Pin | Signal | Pin | Signal |
| 1 | +5VSUS | 2 | +5VSUS |
| 3 | USBH_P2- | 4 | USBH_P7- |
| 5 | USBH_P2+ | 6 | USBH_P7+ |
| 7 | GND | 8 | GND |
| 9 | — | 10 | GND |

Table 13: USB 2.0 pin header pinout

## 2.2.7. COM Connector

The mainboard includes one onboard COM connector in addition to COM port on the external I/O. The onboard COM connector labeled as "COM1" is used to attach additional COM port that support RS-232 standard. The pinout of 10-pin COM connector is as shown below.

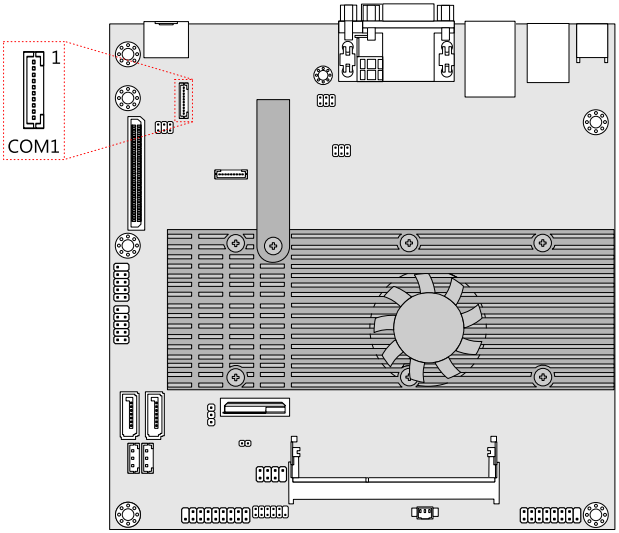



Figure 24: COM connector

| Pin | Signal |
|---|---|
| 1 | DCD_1 |
| 2 | RXD_1 |
| 3 | TXD_1 |
| 4 | DTR_1 |
| 5 | GND |
| 6 | DSR_1 |
| 7 | RTS_1 |
| 8 | CTS_1 |
| 9 | RI_5_12V1 |
| 10 | NC |

Table 14: COM connector pinout

## 2.2.8. LPC Connector

The mainboard include one LPC connector for connecting LPC device. It is labeled as "LPC1". The pinout of the 9-pin LPC connector is as shown below.

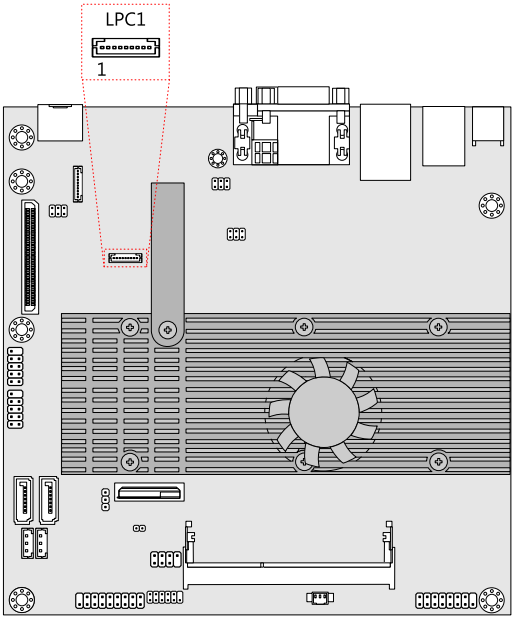



Figure 25: LPC connector

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

Table 15: LPC connector pinout

## 2.2.9. Audio Pin Header

The VB8004 mainboard has an audio pin header for Line-in, Line-out, MIC-in, S/PDIF-in and 5.1 channel audio output. The pin header is labeled as "AUDIO1". The pinout of the pin header is shown below.

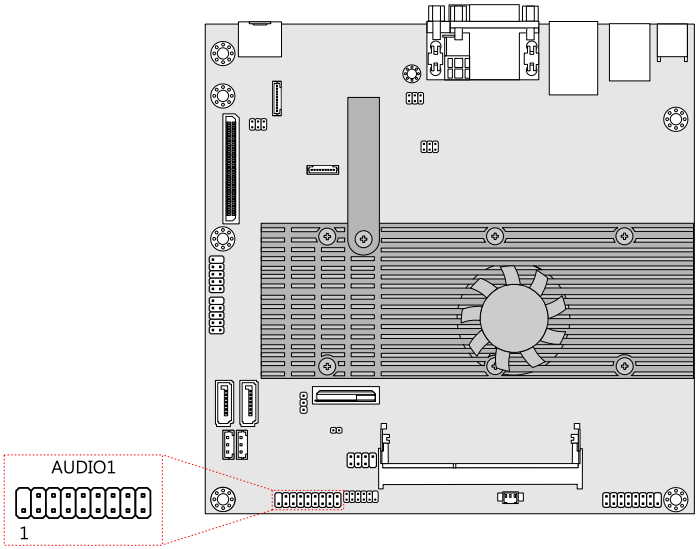



Figure 26: Audio pin header block

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | AVDD5 | 2 | — |
| 3 | LINEOUT_L | 4 | LINEOUT_R |
| 5 | GND_AUD | 6 | AD_5V |
| 7 | MICIN2 | 8 | MICIN |
| 9 | LINEL | 10 | LINER |
| 11 | SROUT_L | 12 | SROUT_R |
| 13 | LFE_OUT | 14 | CEN_OUT |
| 15 | SSROUT_L | 16 | SSROUT_R |
| 17 | GND | 18 | SPDIF_IN1 |

Table 16: Audio pin header pinout

**Note:**

For MIC-in: The pin 7 & 8 is stereo sound while pin 6 & 8 is mono sound but only in the left channel.

## 2.2.10. Digital I/O Pin Header

The onboard Digital I/O pin header supports up to eight GPIO signals. The pin header is labeled as "DIO1". The pinout of the pin header is shown below.

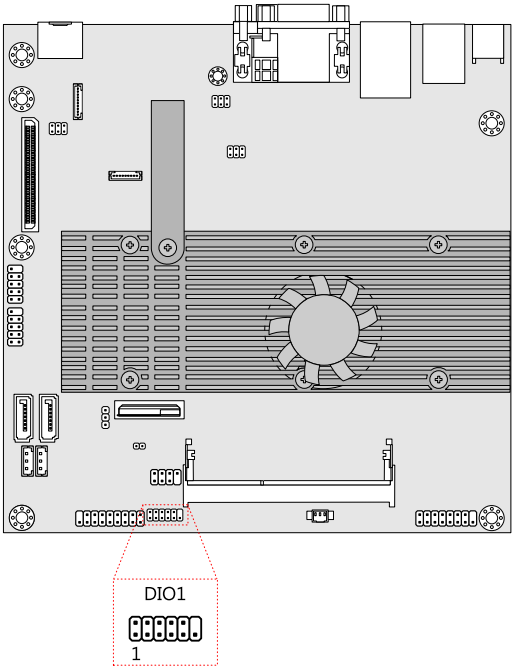



Figure 27: Digital I/O pin header block

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | 5V_DIO | 2 | 12V_DIO |
| 3 | GPIO13 | 4 | GPIO12 |
| 5 | GPIO14 | 6 | GPIO9 |
| 7 | GPIO15 | 8 | GPI10 |
| 9 | GPIO16 | 10 | GPI11 |
| 11 | GND | 12 | — |

Table 17: Digital I/O pin header pinout

## 2.2.11. Optical Out (SPDIF_Out) Pin Header

The VB8004 mainboard includes Optical Out (S/PDIF Out) pin header. The Optical Out pin header provides digital audio transmission. The S/PDIF audio cable connects to the Optical Out (S/PDIF Out) pin header on the mainboard, and connects the other end to the Optical / S/PDIF module.

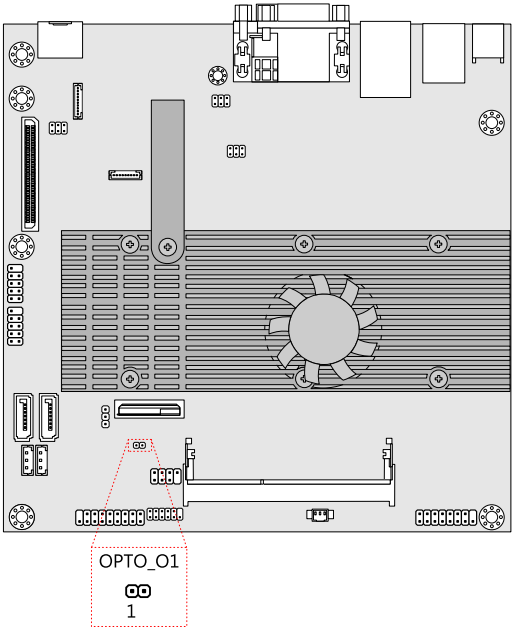



Figure 28: Optical Out pin header

| Pin | Signal |
|---|---|
| 1 | SPDIF_OUT |
| 2 | GND |

Table 18: Optical Out pin header pinout

## 2.2.12. SPI Pin Header

The VB8004 mainboard has one onboard 8-pin SPI pin header. The pin header is labeled as "SPI1". The pinout of the pin header is shown below.

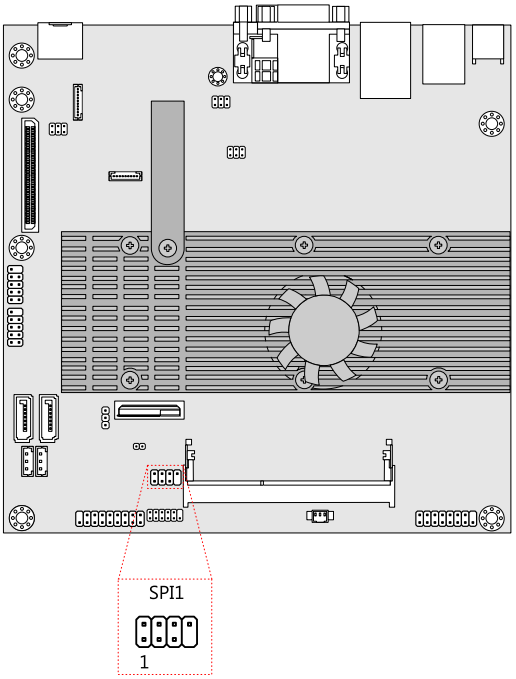



Figure 29: SPI pin header block

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | SPIVCC | 2 | GND |
| 3 | MSPISS0 | 4 | MSPICLK |
| 5 | MSPIDI | 6 | MSPIDO |
| 7 | — | 8 | RST_SW |

Table 19: SPI pin header pinout

## 2.2.13. LVDS panel connector

The onboard LVDS panel connector supports single-channel 24-bit displays. It is labeled as LVDS1 and located at the bottom side of the mainboard. The pinout of the LVDS panel connector is as shown below.

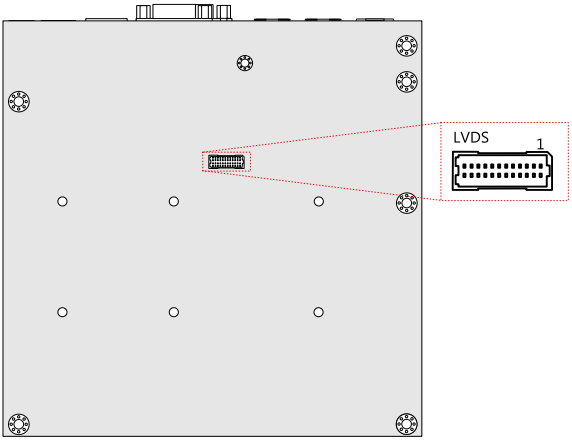



Figure 30: LVDS panel connector

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LVDSD0- | 2 | LVDSD1- |
| 3 | LVDSD0+ | 4 | LVDSD+ |
| 5 | GND | 6 | GND |
| 7 | PVDD2 | 8 | LVDSD2- |
| 9 | PVDD2 | 10 | LVDSD2+ |
| 11 | LCD1_DATA | 12 | GND |
| 13 | LCD1_CLK | 14 | LVDSCLK+ |
| 15 | GND | 16 | LVDSCLK- |
| 17 | VDD_BL | 18 | GND |
| 19 | VDD_BL | 20 | LVDSD3- |
| 21 | BLEN_1 | 22 | LVDSD3+ |
| 23 | DIMMING | 24 | GND |

Table 20: LVDS panel connector pinouts

Note:

LVDS panel connector (LVDS1):
- Vendor: ACES
- Part number: 87216-2416-06

# 3. Jumpers and Switches

## 3.1. 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.

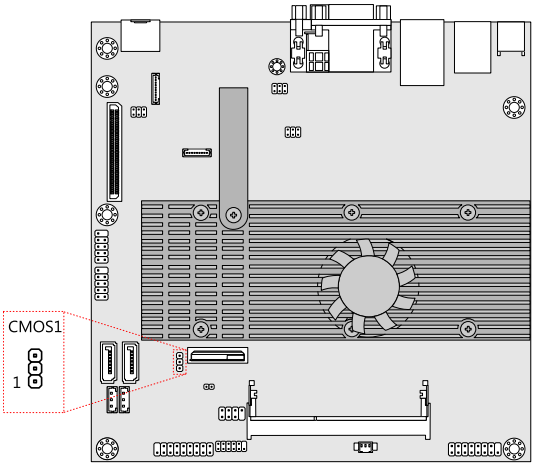



Figure 31: Clear CMOS jumper

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

Table 21: 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.

## 3.2. COM Voltage Select Jumpers

The voltage select jumpers are set to determine the input voltage of COM connectors. Each COM connector (available through the onboard COM pin headers) can support both +5V and +12V.

### 3.2.1. J1: Voltage Select Jumper

The voltage for external COM port ("labeled "CN2A") at the back panel is controlled by the jumper labeled as "J1".

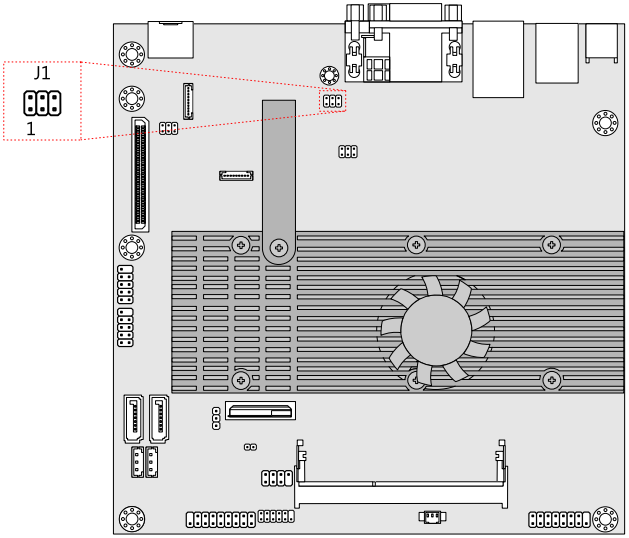
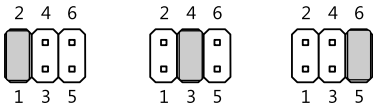



Figure 32: Voltage select jumper (J1) for COM port




| Setting | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 |
|---|---|---|---|---|---|---|
| RI (default) | On | On | Off | Off | Off | Off |
| +5V | Off | Off | On | On | Off | Off |
| +12V | Off | Off | Off | Off | On | On |

Table 22: Voltage select jumper settings (J1)

## 3.2.2. J2 Voltage Select Jumper

The voltage for onboard COM connector (labeled "COM1") is controlled by the jumper labeled as "J2".

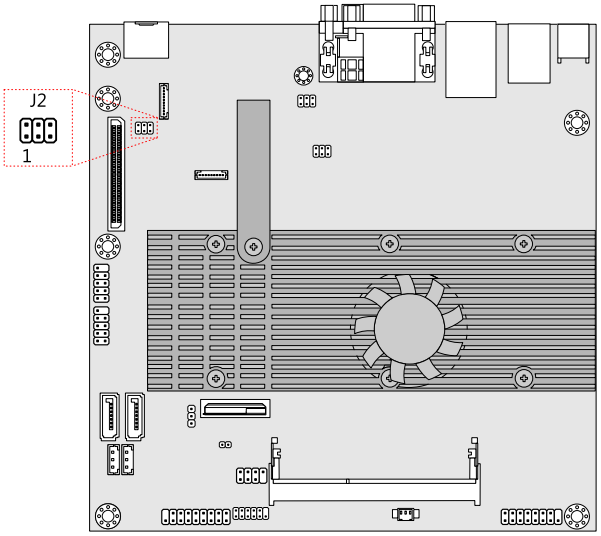
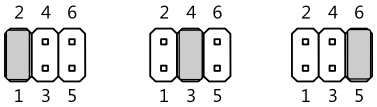



Figure 33: Voltage select jumper (J2) for COM connector




| Setting | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 |
|---|---|---|---|---|---|---|
| RI (default) | On | On | Off | Off | Off | Off |
| +5V | Off | Off | On | On | Off | Off |
| +12V | Off | Off | Off | Off | On | On |

Table 23: Voltage select jumper settings (J2)

# 3.3. Panel and Backlight Power Select Jumper

The power selectors for panel and backlight are controlled by the jumper labeled as "J3". It can be either +3.3V or +5V for panel power and +12V or +5V for backlight power. The J3 jumper settings are shown below.

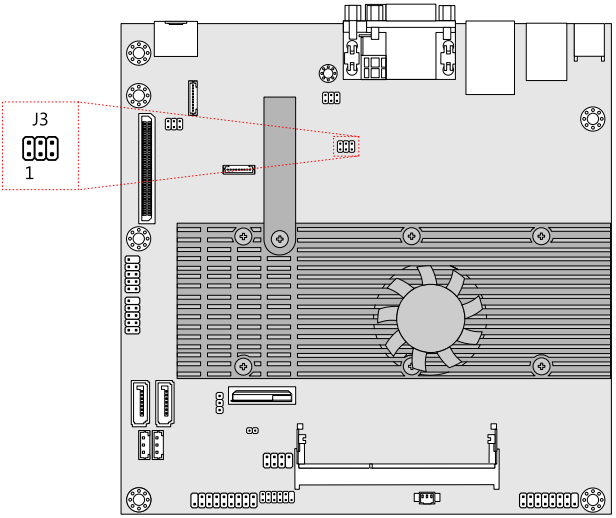
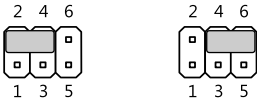
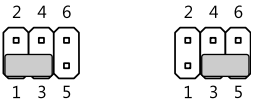



Figure 34: Panel and backlight power select jumper (J3)




| Setting | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 |
|---|---|---|---|---|---|---|
| +3.3V (default) | Off | On | Off | On | Off | Off |
| +5V | Off | Off | Off | On | Off | On |

Table 24: Panel power select jumper settings




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

Table 25: Backlight power select jumper settings

# 4. Expansion Slots

## 4.1. DDR3 SODIMM Memory Slot

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

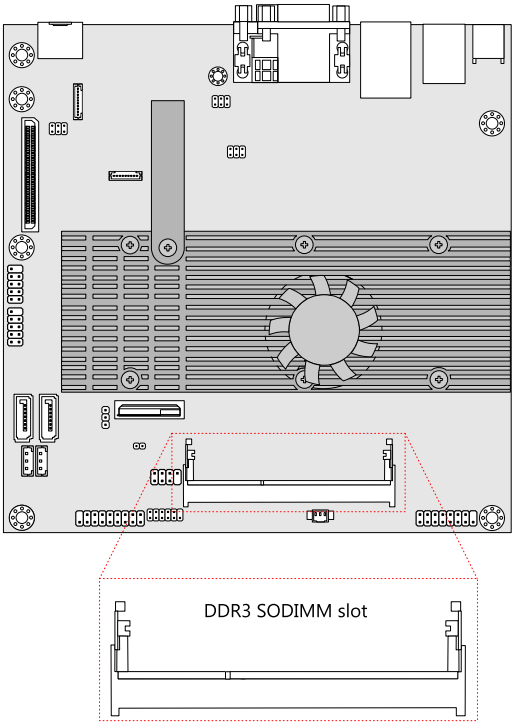



Figure 35: DDR3 SODIMM memory slot

### 4.1.1. Installing a SODIMM Memory Module

**Step 1**

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

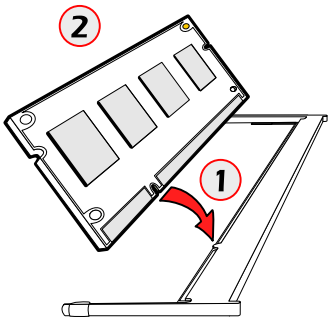



Figure 36: Installing memory 1

**Step 2**

Then insert the memory module into the SODIMM socket at a 30 degree angle.

**Step 3**

Then push down until the memory module snaps into place. The SODIMM slot has two locking mechanisms that will click once the memory module has been fully inserted.

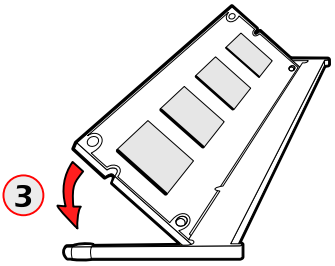



Figure 37: Installing memory 2

# 4.2. Proprietary 80-pin connector

The Proprietary 80-pin connector labeled as "CN9" is an onboard expansion connector for connecting VB8004-A daughter board to the VB8004 mainboard. The location and pinout of the 80-pin connector are as shown below.

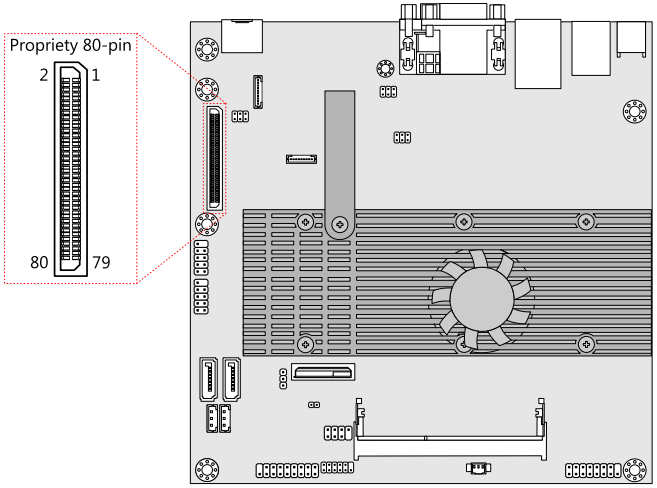



Figure 38: Proprietary 80-pin connector

**Note:**

Proprietary 80-pin connector (CN9):
- Vendor: SAMTEC
- Part number: ERM8-040-09.0-L-DV-K-TR

| Pin | Signal | | Pin | Signal |
|---|---|---|---|---|
| 1 | USBHP5- | | 2 | VMAIN |
| 3 | USBHP5+ | | 4 | VMAIN |
| 5 | GND | | 6 | VMAIN |
| 7 | CR_D3 | | 8 | -PEX4RST |
| 9 | CR_CMD | | 10 | GND |
| 11 | GND | | 12 | PEXRX9- |
| 13 | CR_D2 | | 14 | PEXRX9+ |
| 15 | -CR_CD | | 16 | GND |
| 17 | GND | | 18 | PETN9 |
| 19 | CR_D1 | | 20 | PETP9 |
| 21 | CR_WPD | | 22 | GND |
| 23 | GND | | 24 | PE4CLK- |
| 25 | CR_D0 | | 26 | PE4CLK+ |
| 27 | CR_CLK | | 28 | GND |
| 29 | GND | | 30 | PEXRX4- |
| 31 | DP2TN3 | | 32 | PEXRX4+ |
| 33 | DP2TP3 | | 34 | GND |
| 35 | GND | | 36 | PEXRX5- |
| 37 | DP2TP2 | | 38 | PEXRX5+ |
| 39 | DP2TN2 | | 40 | GND |
| 41 | GND | | 42 | PEXRX6- |
| 43 | DP2TP1 | | 44 | PEXRX6+ |
| 45 | DP2TN1 | | 46 | GND |
| 47 | GND | | 48 | PEXRX7- |
| 49 | DP2TP0 | | 50 | PEXRX7+ |
| 51 | DP2TN0 | | 52 | GND |
| 53 | GND | | 54 | PETP4 |
| 55 | DP2_AUX- | | 56 | PETN4 |
| 57 | DP2_AUX+ | | 58 | GND |
| 59 | -DP2_HPD | | 60 | PETP5 |
| 61 | -PEREQ1 | | 62 | PETN5 |
| 63 | VCCCRPWR | | 64 | GND |
| 65 | NC | | 66 | PETP6 |
| 67 | GND | | 68 | PETN6 |
| 69 | -USBHOC5 | | 70 | GND |
| 71 | -SUSB | | 72 | PETP7 |
| 73 | -PEX1RST | | 74 | PETN7 |

| | | | | |
|---|---|---|---|---|
| 75 | -PEXWAKE | | 76 | GND |
| 77 | SMB_DAT | | 78 | PE1CLK+ |
| 79 | SMB_CLK | | 80 | PE1CLK- |

Table 26: Proprietary 80-pin connector pinout

# 5. Hardware Installation

## 5.1. Installing into a Chassis

The mounting holes of VB8004 mainboard are compatible with the standard Mini-ITX holes. The mainboard can be fitted into any chassis that has the mounting holes compatible with the standard Mini-ITX mounting holes locations. However, the length of I/O coastline on the VB8004 mainboard is non-standard in length. Therefore, the user must have a customized I/O bracket.

The chassis to be used must meet the minimum height requirements of the VB8004 mainboard and accommodate the additional height space requirements if the VB8004-A daughter board is being used.

### 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 VB8004 mainboard.

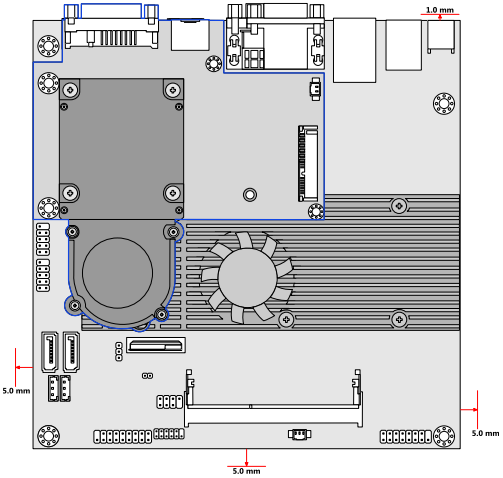



Figure 39: Suggested minimum chassis dimensions

Each side of the VB8004 mainboard should have a buffer zone from the internal wall of the chassis. The side of the VB8004 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 and the two adjacent sides should have a buffer of at least 5.00 mm each.

## 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 VB8004-A daughter board heatsink.

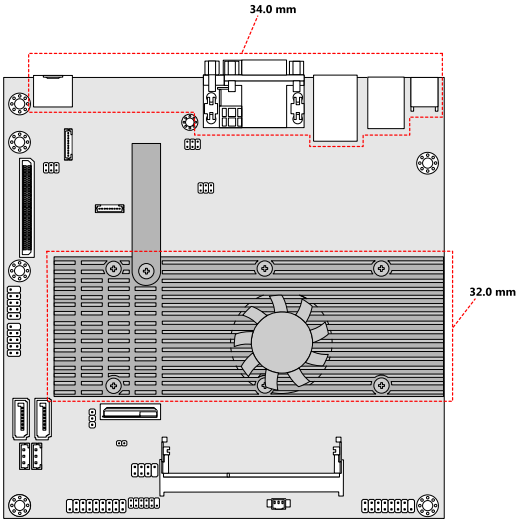



Figure 40: Suggested minimum internal chassis height for VB8004-16X SKU

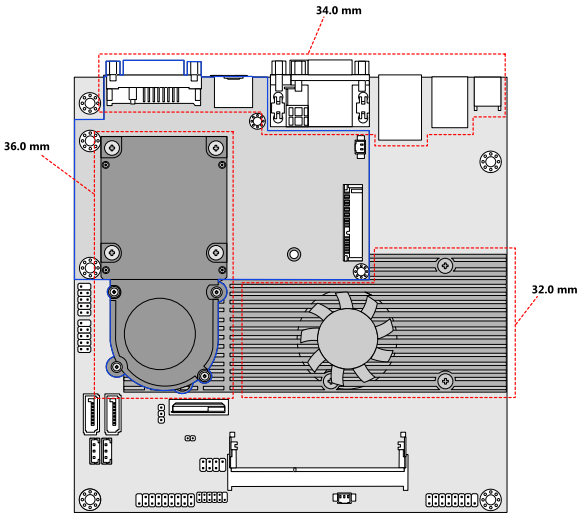



Figure 41: Suggested minimum internal chassis height for VB8004-6XS SKU

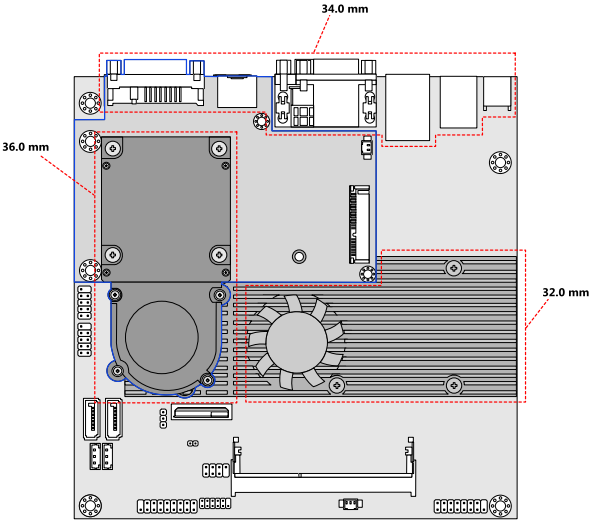



Figure 42: Suggested minimum internal chassis height for VB8004-16S SKU

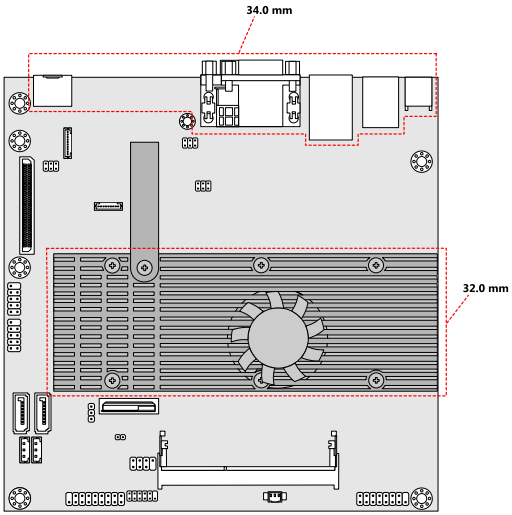



Figure 43: Suggested minimum internal chassis height for VB8004-16 SKU

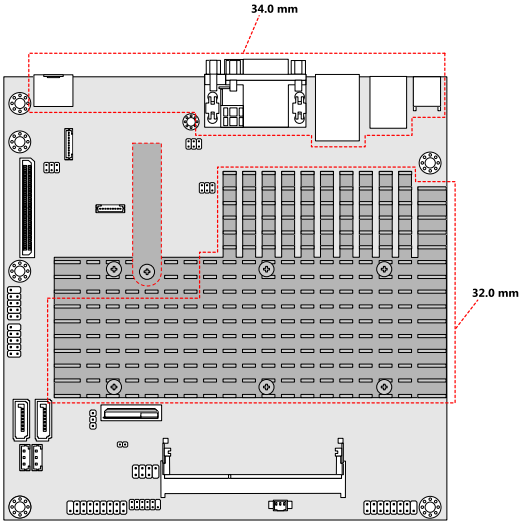



Figure 44: Suggested minimum internal chassis height for VB8004-12E SKU

**Note:**

In getting the minimum height requirement for internal space of the chassis, it is required to consider the height of the LVDS connector located at the bottom side of the VB8004 mainboard.

## 5.1.3. Suggested keep out areas

The figures below show the areas of the mainboard that is highly suggested to leave unobstructed.

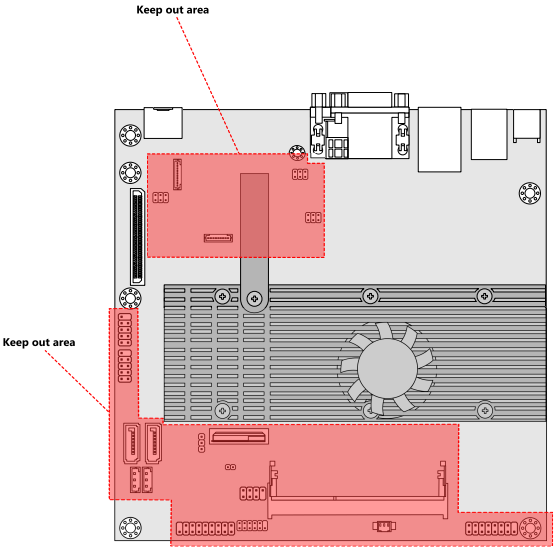



Figure 45: Suggested keep out areas for VB8004-16X SKU

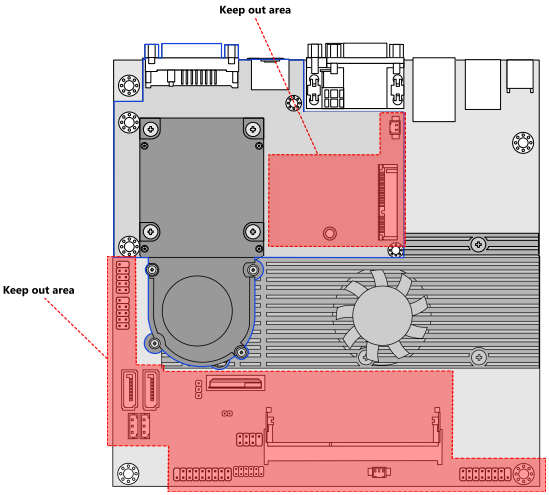



Figure 46: Suggested keep out areas for VB8004-16XS SKU

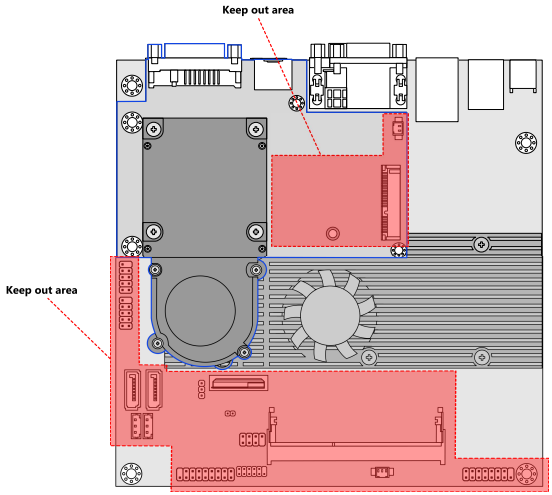



Figure 47: Suggested keep out areas for VB8004-16S SKU

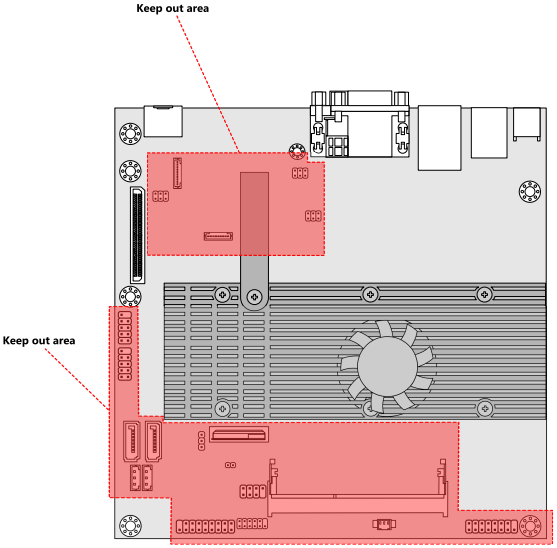



Figure 48: Suggested keep out areas for VB8004-16 SKU

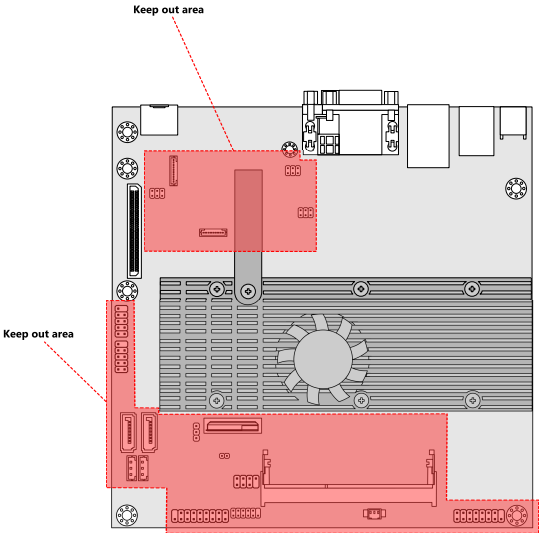



Figure 49: Suggested keep out areas for VB8004-12E SKU

# 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

**Notes:**

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.

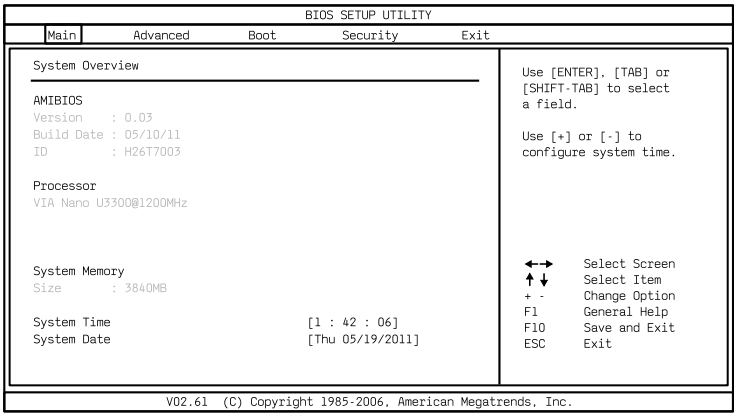



Figure 50: Illustration of the Main menu screen

### 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 and speed.

### 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.

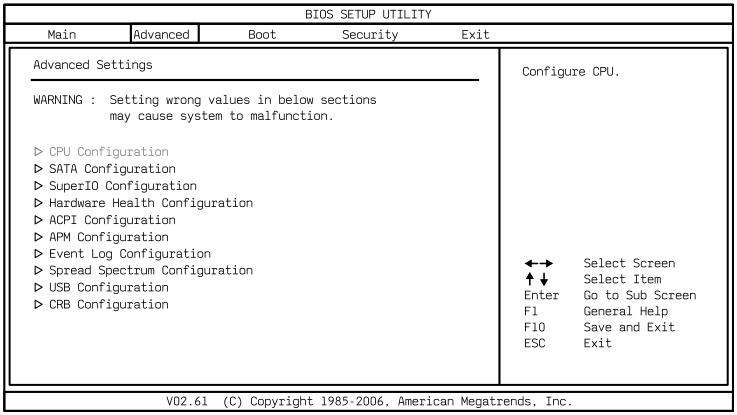



Figure 51: Illustration of the Advanced Settings screen

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.

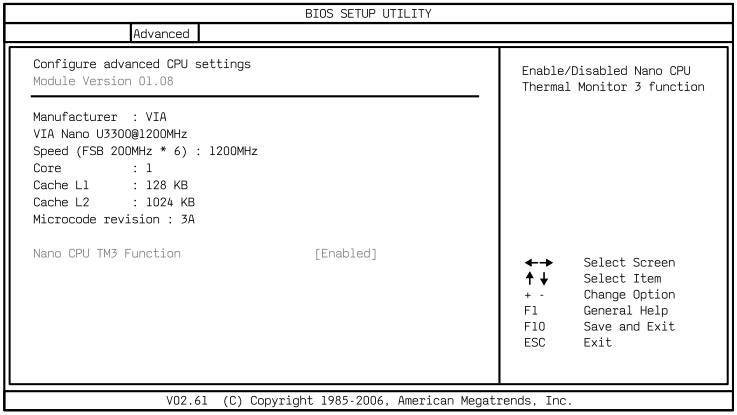



Figure 52: Illustration of the CPU Configuration screen

#### 6.5.1.1. 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 master and slave SATA hard drive information screens.

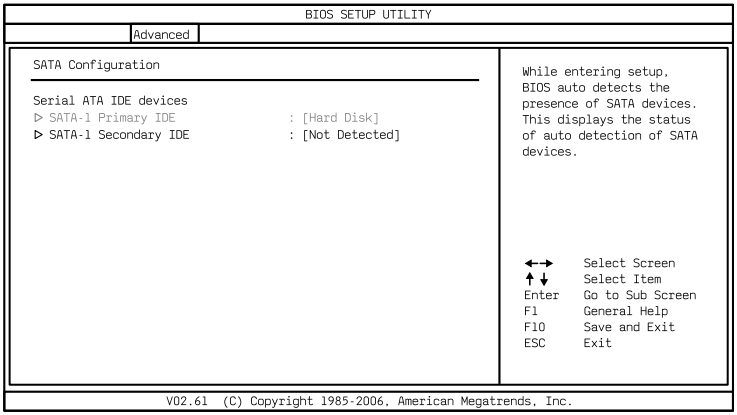



Figure 53: Illustration of SATA Configuration screen

### 6.5.2.1. SATA-1 Primary IDE

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

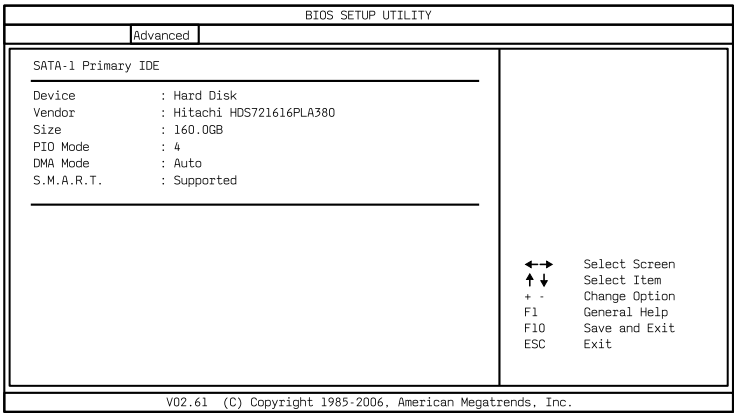



Figure 54: Illustration of SATA-1 Primary IDE screen

### 6.5.2.2. SATA-1 Secondary IDE

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

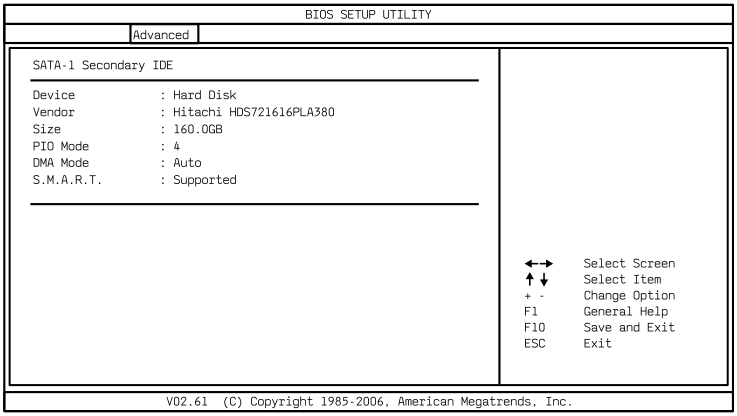



Figure 55: Illustration of SATA-1 Secondary IDE screen

## 6.5.3. SuperIO Configuration

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

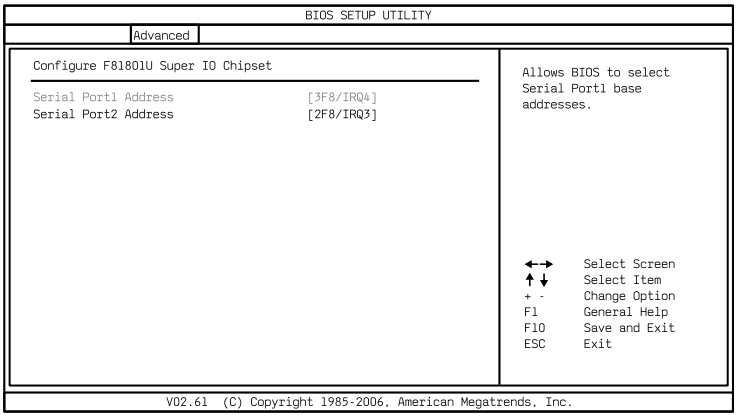



Figure 56: Illustration of SuperIO Configuration screen

### 6.5.3.1. Serial Ports 1 to 2 Address

The Serial Port 1 to 2 has three selectable options.

| Port | Address and IRQs |
|---|---|
| 1 | 3F8/IRQ4, 3E8/IRQ4, 2E8/IRQ3 |
| 2 | 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3 |

Table 27: 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.

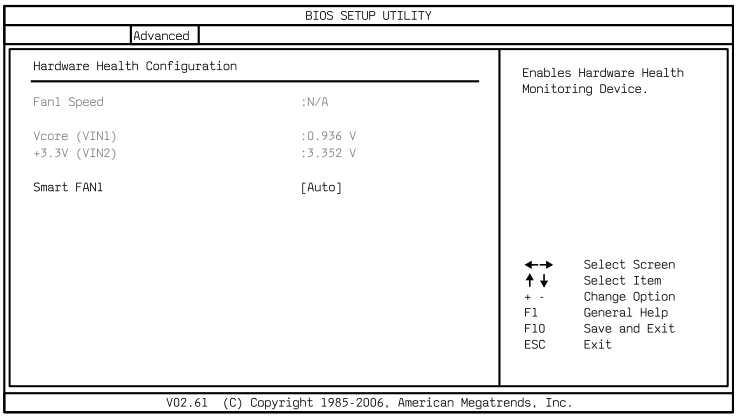



Figure 57: Illustration of Hardware Health Configuration screen

### 6.5.4.1. Smart FAN1

The Smart FAN1 has two selectable mode options.

**Auto**

When set to Auto, the speed of the CPU fan is varied according to CPU temperature.

**Full Speed**

When set to Full Speed, the CPU fan speed is fixed and running at highest speed.

## 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.

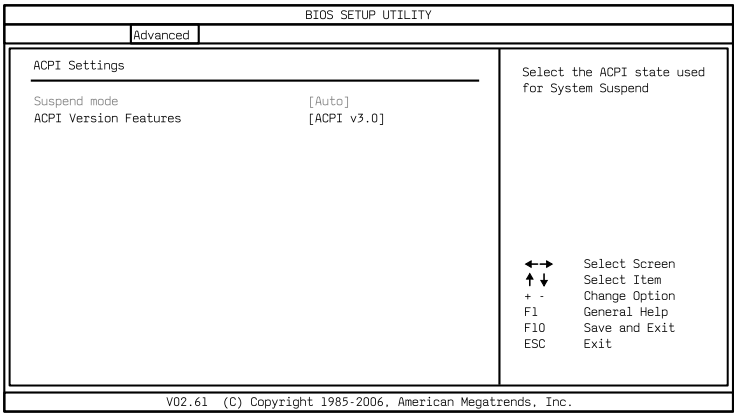



Figure 58: Illustration of ACPI Configuration screen

### 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 has three selectable version options.

**ACPI v1.0**

Supports ACPI v1.0

**ACPI v2.0**

Supports ACPI v2.0

**ACPI v3.0**

Supports ACPI v3.0

### 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.

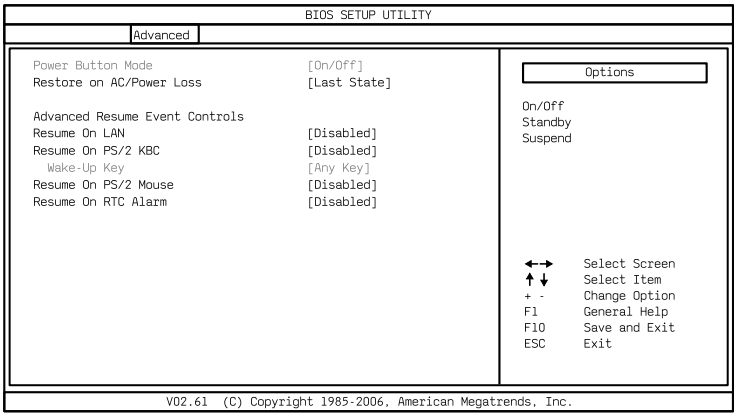



Figure 59: Illustration of APM Configuration screen

#### 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 allows to turned on a system that has been put into suspend or standby mode. When this feature is enabled, LAN activity as defined in the **Resume on LAN** feature will cause the system to wake up. This feature has three options.

**S1**

The S1 option enables LAN activity to be detected if the system is in S1 power saving mode.

**S1/S3/S4/S5**

The S1/S3/S4/S5 option enables LAN activity to be detected if the system is in S1/S3/S4/S5 power saving mode.

**Disabled**

The Disabled option disables the detection of all LAN activity.

### 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 Log Configuration

The Event Log Configuration screen shows the option settings to manage the entire event log.

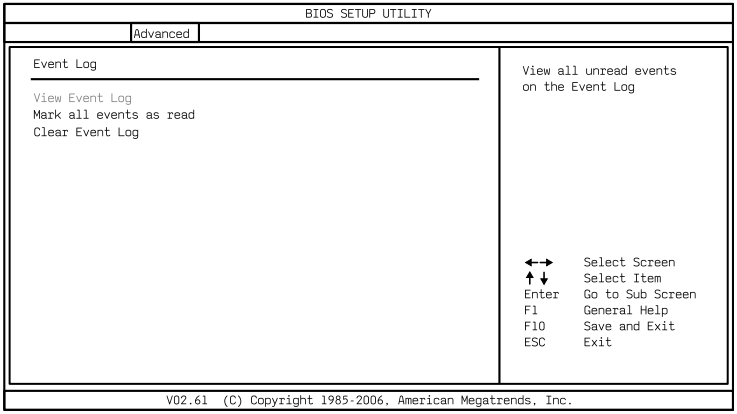



Figure 60: Illustration of Event Log Configuration screen

### 6.5.7.1. View Event Log

The View Event Log is to view all unread events on the Event Log.

### 6.5.7.2. Mark all events as read

Mark all the unread events as read on the Event log.

### 6.5.7.3. Clear Event Log

The Clear Event Log is to discard all events in the Event Log.

## 6.5.8. Spread Spectrum Configuration

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

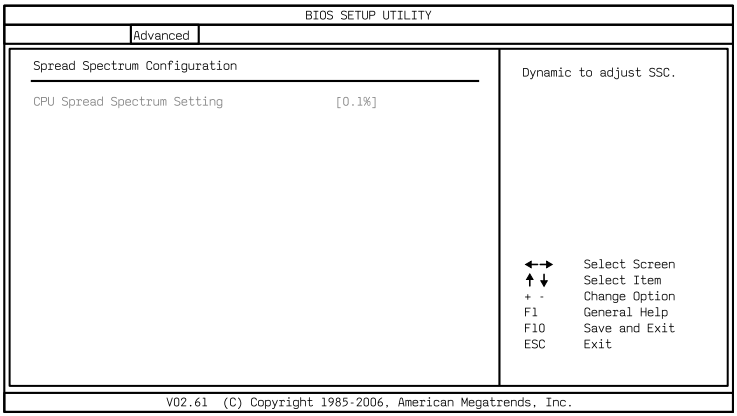



Figure 61: Illustration of Spread Spectrum Configuration screen

### 6.5.8.1. CPU 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%.

## 6.5.9. USB Configuration

The USB Configuration screen shows the number of connected USB devices.

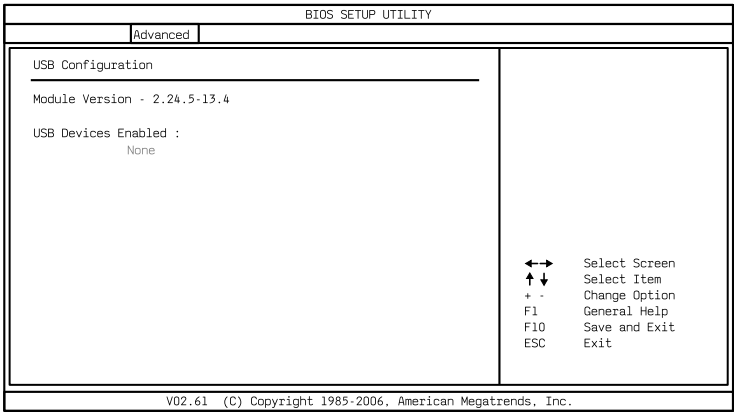



Figure 62: Illustration of USB Configuration screen

## 6.5.10. CRB Configuration

The CRB Configuration screen shows the available BIOS-controlled DRAM clock, graphics adapter, display device and LAN control features.

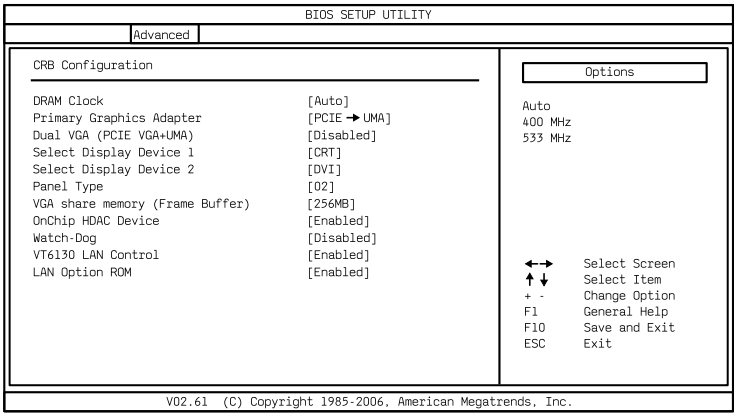



Figure 63: Illustration of CRB Configuration screen

### 6.5.10.1. DRAM Clock

The DRAM Clock feature is for controlling the system DRAM. All other DRAM features are automated and cannot be accessed.

**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 option enables the user to change the order in which the BIOS seeks for a graphics adapter. There are two paths that can be chosen: UMA -->PCIE and PCIE →UMA

### 6.5.10.3. Dual VGA (PCIE VGA+UMA)

This feature enables the dual VGA function. This feature has two options: enabled and disabled.



**Note:**

The dual VGA function is supported only when using Windows 7 and this feature should enable in MAMM (Multi-Adapter Multiple-Monitor) mode.

### 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 four options: CRT, LCD, DVI, and HDMI®.

**CRT**

Specifies the CRT port as the display port being used by using the DVI to VGA adapter.

### LCD

Specifies the LCD port as the display port being used.

### DVI

Specifies the DVI port as the display port being used.

### HDMI®

Specifies the HDMI® port as the display port being used.

## 6.5.10.5. Panel Type

This feature enables the user to specify the resolution of the display being used with the system. The panel types are predefined in the BIOS.

| Settings | Description |
|---|---|
| 00 | 640 x 480 |
| 01 | 800 x 600 |
| 02 | 1024 x 768 |
| 03 | 1280 x 768 |
| 04 | 1280 x 1024 |
| 05 | 1400 x 1050 |
| 06 | 1440 x 900 |
| 07 | 1280 x 800 |
| 08 | 800 x 400 |
| 09 | 1024 x 600 |
| 10 | 1366 x 768 |
| 11 | 1600 x 1200 |
| 12 | 1680 x 1050 |
| 13 | User define |
| 14 | User define |
| 15 | User define |

Table 28: Panel types resolution

**Note:**

If the user want to sets or adjusts the display backlight brightness, please check with the local sales representative for customized BIOS support.

### 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. Watch-Dog

The Watch-Dog feature monitors the system to ensure that the system has not frozen. If the system appears to have frozen for a specific period of time, then the Watch-Dog function will force the system to reboot. This feature has two options: enable and disabled.

### 6.5.10.9. VT6130 LAN Control

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

### 6.5.10.10. 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 from Gigabit LAN.

# 6.6. Boot Settings

The Boot Settings screen has a single link that goes to the **Boot Settings Configuration** and **Boot Device Priority** screens.

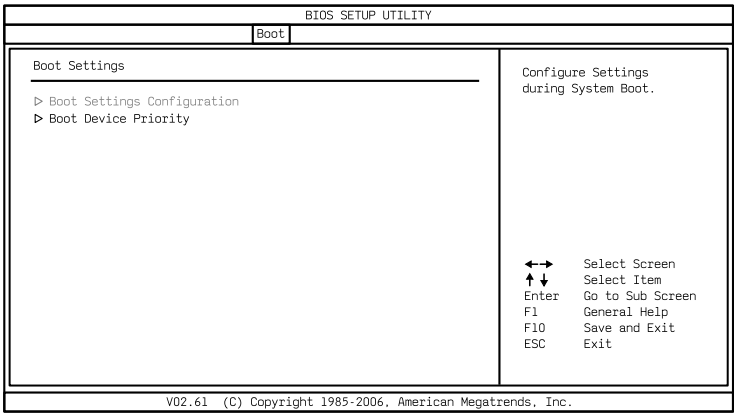



Figure 64: Illustration of Boot Settings screen

## 6.6.1. Boot Settings Configuration

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

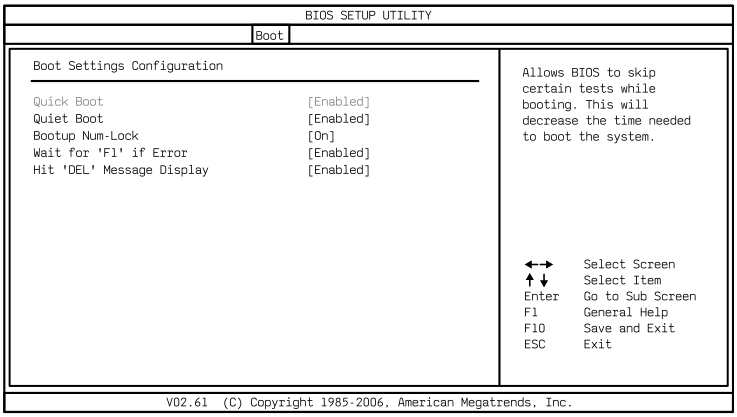



Figure 65: Illustration of Boot Settings Configuration

#### 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:**

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 feature automatically detects and list all bootable storage devices. The boot seek sequence can be changed in this menu.

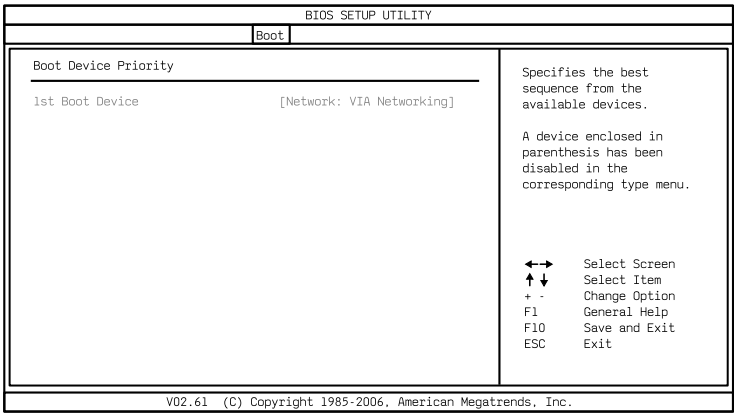



Figure 66: Illustration of Boot Device Priority

### 6.6.2.1. 1st Boot Device

To specifies the boost sequence from the available devices. The available boot devices are detected dynamically according to real situation and variable options will be provided. This feature has two options: Network: VIA Networking Bootagent, and Disabled]

# 6.7. Security Settings

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

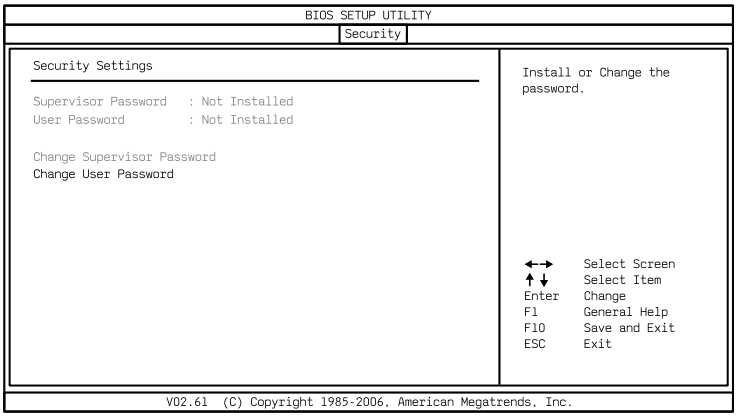



Figure 67: Illustration of Security Settings screen

## 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. 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.

### 6.7.3. Clear User Password

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

### 6.7.4. 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 user 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

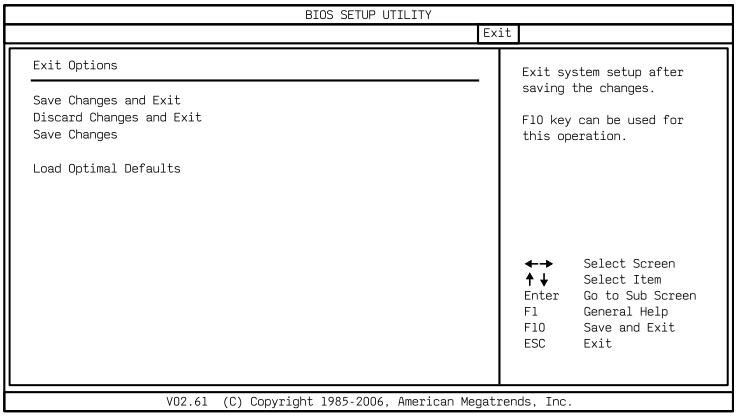



Figure 68: Illustration of Exit Options screen

## 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 VB8004 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VIA Embedded 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 VB8004 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. You can submit a request to your VIA Embedded support contact.

# Appendix A. Video Combination

## A.1. Video Combination

| Device Board | VB8004 Mainboard (output from VX900) | | | | VB8004-A Daughter board (output from S3 5400E) | | |
|---|---|---|---|---|---|---|---|
| | DACs | Internal | DP1 | DVP1 | DAC1 | COMBO 01 | COMBO 02 |
| Output | CRT#0 (from adapter) | LVDS | HDMI | DVI#0 | CRT (from adapter) | DVI | HDMI |
| Configuration 1 (default) | | | B | *A* | | D | *C* |
| Configuration 2 | | B | | *A* | | C | D |
| Configuration 3 | | | *A* | B | | D | *C* |
| Configuration 4 | | B | *A* | | | *C* | D |
| Configuration 5 | B | | *A* | | D | | *C* |
| Configuration 6 | B | *A* | | | D | | *C* |

Table 29: Display Combination

B = SAMM of *A* = Extend mode

D = SAMM of *C* = Extend mode

**Notes:**

1. SAMM (Single-adapter Multiple Monitor)
2. MAMM (Multi-adapter Multiple Monitor)
3. MAMM mode (allows up to 4 displays) supported only on Windows 7 OS.
4. All video combinations in the table are validated by VIA. For other combinations that are not included in the table, please check with the local sales representative for project support.

# Appendix B.
# Power Consumption Report

Power consumption tests were performed on the VIA VB8004. The following tables represent the breakdown of the voltage, amp and wattage values while running common system applications.

## B.1. VB8004-12E

The tests were performed based on the following specification and additional components:

- **CPU:** VIA Nano 1.2 GHz
  - (U3300_1.2 GHz_Fanless)
- **Chipset:** VX900
- **Memory:** Apacer 4GB DDR3
- **HDD:** WD 2.5" 250GB SATA
- **Power:** AC adapter DC-In 12V/5A
- **OS:** Win XP + SP3

### B.1.1. Burn-in 3DMark06, 1280 x 1024 (Bench mode)

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.65 | 1.924 | 22.415 |
| Average | 11.65 | 1.505 | 17.533 |
| Minimum | 11.65 | 1.052 | 12.256 |

## B.1.2. Stress Tool (CPU usage = 100%)

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

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.53 | 1.836 | 21.169 |
| Average | 11.53 | 1.718 | 19.809 |
| Minimum | 11.53 | 1.252 | 14.436 |

## B.1.3. Power DVD 8.0 to Player H.264 1080i_10M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.70 | 1.584 | 18.533 |
| Average | 11.70 | 1.148 | 13.432 |
| Minimum | 11.70 | 1.024 | 11.981 |

## B.1.4. Power DVD 8.0 to Player MPEG2 1080P_40M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.63 | 1.636 | 19.027 |
| Average | 11.63 | 1.340 | 15.584 |
| Minimum | 11.63 | 1.032 | 12.002 |

## B.1.5. Idle at Windows XP

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.81 | 1.256 | 14.833 |
| Average | 11.81 | 0.998 | 11.786 |
| Minimum | 11.81 | 0.960 | 11.338 |

## B.1.6. Suspend S1

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.86 | 0.764 | 9.061 |
| Average | 11.86 | 0.713 | 8.456 |
| Minimum | 11.86 | 0.708 | 8.397 |

## B.1.7. Suspend S3

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.056 | 0.671 |
| Average | 11.99 | 0.048 | 0.576 |
| Minimum | 11.99 | 0.044 | 0.528 |

## B.1.8. Suspend S4

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.032 | 0.384 |
| Average | 11.99 | 0.028 | 0.336 |
| Minimum | 11.99 | 0.024 | 0.288 |

## B.1.9. Suspend S5

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.032 | 0.384 |
| Average | 11.99 | 0.028 | 0.336 |
| Minimum | 11.99 | 0.024 | 0.288 |

## B.2. VB8004-16

The tests were performed based on the following specification and additional components:

- **CPU:** VIA Nano 1.3+ GHz
  - (U3100_1.3+ GHz_Fan 5000rpm)
- **Chipset:** VX900
- **Memory:** Apacer 4GB DDR3
- **HDD:** WD 2.5" 250GB SATA
- **Power:** AC adapter DC-In 12V/5A
- **OS:** Win XP + SP3

### B.2.1. Burn-in 3DMark06, 1280 x 1024 (Bench mode)

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.13 | 2.528 | 28.137 |
| Average | 11.13 | 2.105 | 23.429 |
| Minimum | 11.13 | 1.112 | 12.377 |

### B.2.2. Stress Tool (CPU usage = 100%)

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

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.35 | 2.536 | 28.784 |
| Average | 11.35 | 2.366 | 26.854 |
| Minimum | 11.35 | 1.880 | 21.338 |

### B.2.3. Power DVD 8.0 to Player H.264 1080i_10M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.56 | 2.208 | 25.524 |
| Average | 11.56 | 1.263 | 14.600 |
| Minimum | 11.56 | 1.128 | 13.040 |

### B.2.4. Power DVD 8.0 to Player MPEG2 1080P_40M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.53 | 2.236 | 25.781 |
| Average | 11.53 | 1.533 | 17.675 |
| Minimum | 11.53 | 1.144 | 13.190 |

### B.2.5. Idle at Windows XP

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.67 | 1.436 | 16.758 |
| Average | 11.67 | 1.124 | 13.117 |
| Minimum | 11.67 | 1.088 | 12.697 |

### B.2.6. Suspend S1

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.58 | 0.840 | 9.727 |
| Average | 11.58 | 0.821 | 9.507 |
| Minimum | 11.58 | 0.808 | 9.357 |

### B.2.7. Suspend S3

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.98 | 0.056 | 0.671 |
| Average | 11.98 | 0.051 | 0.611 |
| Minimum | 11.98 | 0.044 | 0.527 |

## B.2.8. Suspend S4

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.036 | 0.432 |
| Average | 11.99 | 0.031 | 0.372 |
| Minimum | 11.99 | 0.028 | 0.336 |

## B.2.9. Suspend S5

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.036 | 0.432 |
| Average | 11.99 | 0.032 | 0.384 |
| Minimum | 11.99 | 0.028 | 0.336 |

## B.3. VB8004-16X

The tests were performed based on the following specification and additional components:

- **CPU:** VIA Nano 1.6 GHz
  - (U3100_1.6 GHz_Fan 5000rpm)
- **Chipset:** VX900
- **Memory:** Apacer 4GB DDR3
- **HDD:** WD 2.5" 250GB SATA
- **Power:** AC adapter DC-In 12V/5A
- **OS:** Win XP + SP3

### B.3.1. Burn-in 3DMark06, 1280 x 1024 (Bench mode)

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.64 | 3.36 | 39.110 |
| Average | 11.64 | 2.68 | 31.195 |
| Minimum | 11.64 | 1.24 | 14.434 |

### B.3.2. Stress Tool (CPU usage = 100%)

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

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.48 | 3.52 | 40.410 |
| Average | 11.48 | 2.92 | 33.522 |
| Minimum | 11.48 | 2.24 | 25.715 |

### B.3.3. Power DVD 8.0 to Player H.264 1080i_10M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.64 | 2.56 | 29.798 |
| Average | 11.64 | 1.45 | 16.878 |
| Minimum | 11.64 | 1.12 | 13.037 |

### B.3.4. Power DVD 8.0 to Player MPEG2 1080P_40M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.56 | 2.52 | 29.131 |
| Average | 11.56 | 1.76 | 20.346 |
| Minimum | 11.56 | 1.16 | 13.410 |

### B.3.5. Idle at Windows XP

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.70 | 2.04 | 23.868 |
| Average | 11.70 | 1.18 | 13.806 |
| Minimum | 11.70 | 1.08 | 12.636 |

### B.3.6. Suspend S1

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.81 | 0.80 | 9.448 |
| Average | 11.81 | 0.77 | 9.094 |
| Minimum | 11.81 | 0.76 | 8.976 |

### B.3.7. Suspend S3

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.076 | 0.911 |
| Average | 11.99 | 0.073 | 0.875 |
| Minimum | 11.99 | 0.072 | 0.863 |

## B.3.8. Suspend S4

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.032 | 0.384 |
| Average | 12.00 | 0.028 | 0.336 |
| Minimum | 12.00 | 0.020 | 0.240 |

## B.3.9. Suspend S5

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.064 | 0.767 |
| Average | 11.99 | 0.061 | 0.731 |
| Minimum | 11.99 | 0.056 | 0.671 |

## B.4. VB8004-16S

The tests were performed based on the following specification and additional components:

- **CPU:** VIA Nano 1.6 GHz
  - (U3100_1.6 GHz_Fan 5000rpm)
- **Chipset:** VX900 and S3 5400E
- **Memory:** Apacer 4GB DDR3
- **HDD:** WD 2.5" 250GB SATA
- **Power:** AC adapter DC-In 12V/5A
- **OS:** Win XP + SP3

### B.4.1. Burn-in 3DMark06, 1280 x 1024 (Bench mode)

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.45 | 3.80 | 43.510 |
| Average | 11.45 | 3.08 | 35.266 |
| Minimum | 11.45 | 1.84 | 21.068 |

### B.4.2. Stress Tool (CPU usage = 100%)

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

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.32 | 3.32 | 37.582 |
| Average | 11.32 | 3.05 | 34.526 |
| Minimum | 11.32 | 2.72 | 30.790 |

### B.4.3. Power DVD 8.0 to Player H.264 1080i_10M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.35 | 3.20 | 36.320 |
| Average | 11.35 | 2.82 | 32.007 |
| Minimum | 11.35 | 1.88 | 21.338 |

### B.4.4. Power DVD 8.0 to Player MPEG2 1080P_40M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.42 | 3.16 | 36.087 |
| Average | 11.42 | 2.63 | 30.035 |
| Minimum | 11.42 | 1.88 | 21.470 |

### B.4.5. Idle at Windows XP

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.60 | 2.36 | 27.376 |
| Average | 11.60 | 1.90 | 22.040 |
| Minimum | 11.60 | 1.80 | 20.880 |

### B.4.6. Suspend S1

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.68 | 1.58 | 18.454 |
| Average | 11.68 | 1.56 | 18.221 |
| Minimum | 11.68 | 1.548 | 18.081 |

### B.4.7. Suspend S3

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.048 | 0.576 |
| Average | 12.00 | 0.044 | 0.528 |
| Minimum | 12.00 | 0.040 | 0.480 |

## B.4.8. Suspend S4

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.036 | 0.432 |
| Average | 12.00 | 0.031 | 0.372 |
| Minimum | 12.00 | 0.028 | 0.336 |

## B.4.9. Suspend S5

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.036 | 0.432 |
| Average | 12.00 | 0.030 | 0.360 |
| Minimum | 12.00 | 0.028 | 0.336 |

## B.5. VB8004-16XS

The tests were performed based on the following specification and additional components:

- **CPU:** VIA Nano 1.6 GHz
  - (U3100_1.6 GHz_Fan 5000rpm)
- **Chipset:** VX900 and S3 5400E
- **Memory:** Apacer 4GB DDR3
- **HDD:** WD 2.5" 250GB SATA
- **Power:** AC adapter DC-In 12V/5A
- **OS:** Win XP + SP3

### B.5.1. Burn-in 3DMark06, 1280 x 1024 (Bench mode)

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.44 | 4.44 | 50.794 |
| Average | 11.44 | 3.78 | 43.243 |
| Minimum | 11.44 | 2.12 | 24.253 |

### B.5.2. Stress Tool (CPU usage = 100%)

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

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.28 | 4.48 | 50.534 |
| Average | 11.28 | 3.84 | 43.315 |
| Minimum | 11.28 | 3.16 | 35.645 |

### B.5.3. Power DVD 8.0 to Player H.264 1080i_10M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.58 | 3.96 | 45.857 |
| Average | 11.58 | 3.02 | 34.972 |
| Minimum | 11.58 | 2.00 | 23.160 |

### B.5.4. Power DVD 8.0 to Player MPEG2 1080P_40M Movie

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.60 | 3.64 | 42.224 |
| Average | 11.60 | 2.42 | 28.072 |
| Minimum | 11.60 | 1.92 | 22.272 |

### B.5.5. Idle at Windows XP

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.50 | 2.80 | 32.200 |
| Average | 11.50 | 1.99 | 22.885 |
| Minimum | 11.50 | 1.88 | 21.620 |

### B.5.6. Suspend S1

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.75 | 1.524 | 17.907 |
| Average | 11.75 | 1.507 | 17.707 |
| Minimum | 11.75 | 1.496 | 17.578 |

### B.5.7. Suspend S3

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.044 | 0.528 |
| Average | 12.00 | 0.042 | 0.504 |
| Minimum | 12.00 | 0.040 | 0.480 |

## B.5.8. Suspend S4

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 11.99 | 0.064 | 0.767 |
| Average | 11.99 | 0.062 | 0.743 |
| Minimum | 11.99 | 0.060 | 0.719 |

## B.5.9. Suspend S5

| Test Condition | Volts | Amperes | Watts |
|---|---|---|---|
| Maximum | 12.00 | 0.064 | 0.768 |
| Average | 12.00 | 0.058 | 0.696 |
| Minimum | 12.00 | 0.052 | 0.624 |

# Appendix C.
# VB8004-A Daughter Board

The VB8004-A daughter board has a Mini PCI Express slot and offers additional DVI-I connector and HDMI® port that gives VB8004 mainboard ability to support a maximum up to four displays.

## C.1. Specification

- **Graphics Processor Unit**
  - S3 5400E
- **Memory**
  - DDR3 512MB
- **Back Panel and Onboard I/O**
  - 1 x HDMI® port
  - 1 x DVI-I port
  - 1 x Mini PCI Express slot (PCIe 1-Lane)



**Note:**

VB8004-A does not support 1600 x 1200 resolution

# C.2. Layout Diagram

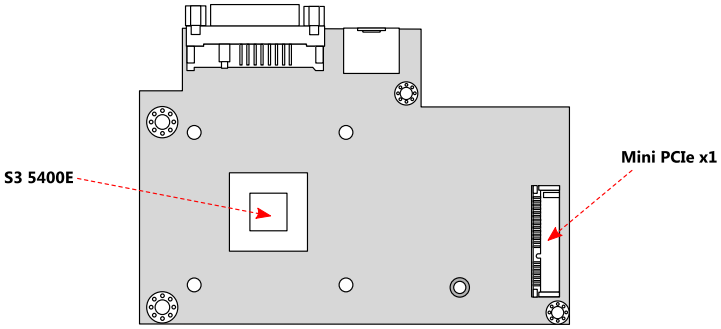



Figure 69: Daughter board top view layout

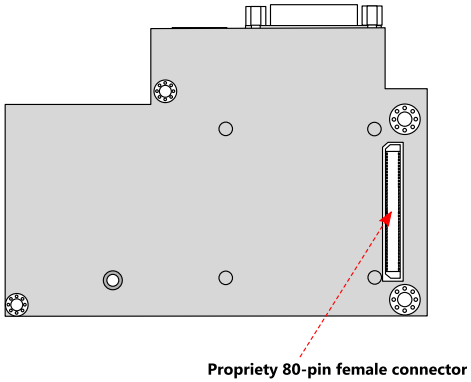



Figure 70: Daughter board bottom view layout

# C.3. Dimensions

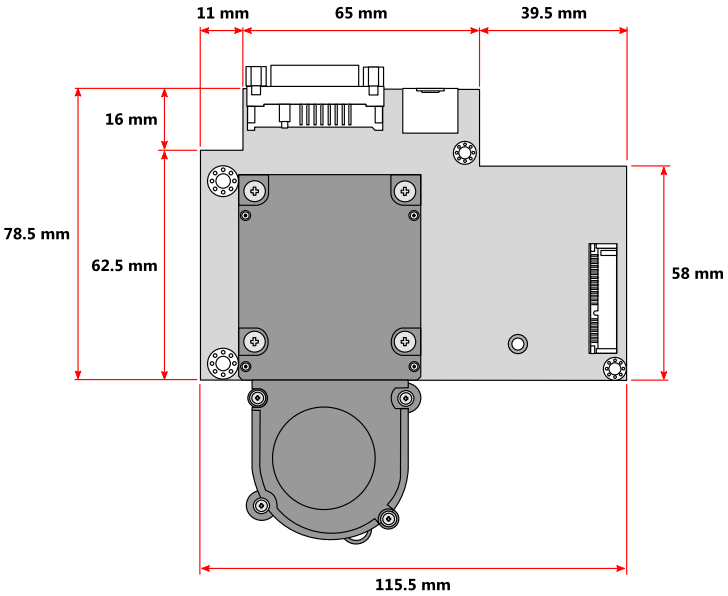



Figure 71: Daughter board dimensions

# C.4. External I/O Ports

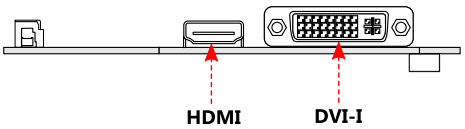



Figure 72: Daughter board External I/O layout

## C.4.1. HDMI® Port

Daughter board provides 19-pin HDMI® port uses an HDMI® Type A receptacle connector. The pinout of the HDMI® port is as shown below.

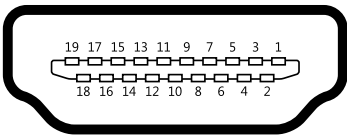



Figure 73: Daughter board HDMI® port pinout diagram

## C.4.2. DVI-I Connector

Daughter board supports 24-pin DVI-I connector that uses to interface with a high-speed, high resolution LCD or CRT displays for digital video output. The pinout of the DVI-I connector is as shown below.

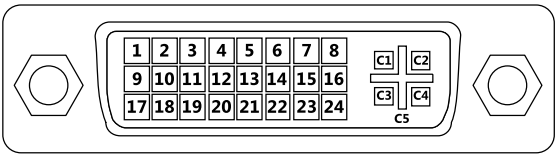



Figure 74: Daughter board DVI-I connector pinout diagram

# C.5. Onboard Connectors

## C.5.1. Mini PCI Express Slot

The Mini PCI Express slot labeled as "CN2" supports an optional WLAN or 3G/4G module.

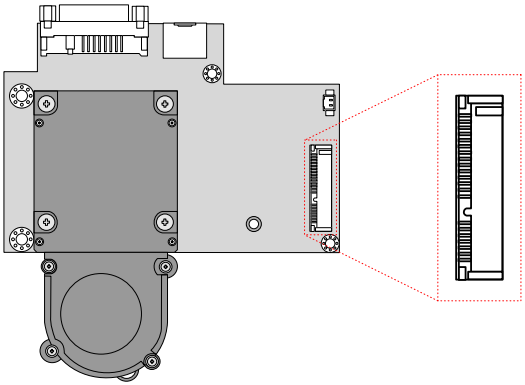


Figure 75: Mini PCI Express slot

## C.5.2. Graphics Processor Fan Connector

The GPU fan connector on the daughter card labeled "J2" is for connecting the GPU fan to maintain the cooling of the S3 5400E graphics processor.

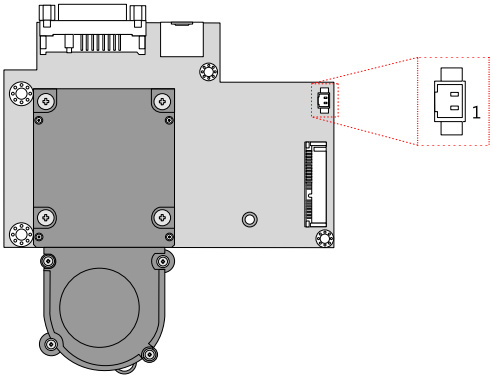



Figure 76: GPU Fan connector

## C.5.3. Proprietary 80-pin female connector

The Proprietary 80-pin female connector labeled as "CN3" is located on the bottom side of the VB8004-A daughter board. The connector provides an interface to the VB8004 mainboard. The location of the 80-pin female connector is as shown below.

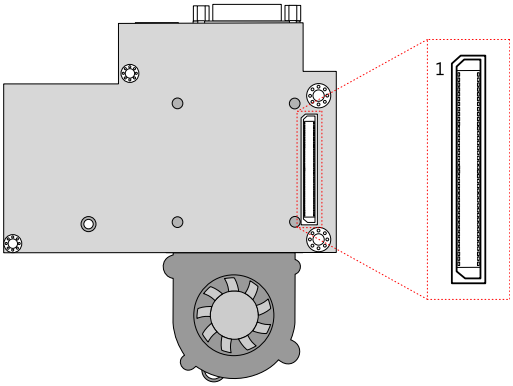



Figure 77: Proprietary 80-pin female connector

# Appendix D. Mating Connector Vendor Lists

The following tables listed the mating connector vendor lists of VB8004 mainboard.

| Connectors | Part No. | Mating Vendor & P/N | |
|---|---|---|---|
| F_Audio | 99G30-05419I | Neltron | SAMTEC MMS-1XX-01-XX-DV |
| | | 2207R-XXG | |
| | | 2207S-XXG | |
| | | 2207SM-XXG-45 | TLE-1XX-01-XX-DV |
| | | Neltron | SAMTEC SSW Series |
| | | 2214S-XXG-85 | |
| | | 2214R-XXG-85 | |
| F_PANEL | 99G30-05596I | Neltron | SAMTEC SSW Series |
| | | 2214S-XXG-85 | |
| | | 2214R-XXG-85 | |
| FAN | 99G30-021115 | Neltron | MOLEX |
| | | 1250HM-03 | 51021 |
| LVDS | 99G30-170022 | ACES | JST |
| | | 87219-2400 | SHDR-XXV-S-B |
| SATA PWR | 99G30-021755 | Neltron | JST |
| | | 2318HEX-03 | EH Series |
| USB | 99G30-05072K | Neltron | SAMTEC SSW Series |
| | | 2214S-XXG-85 | |
| | | 2214R-XXG-85 | |

Table 30: VB8004 mating connector vendor lists