USER MANUAL

COMe-8X91

Computer-On-Module Express

1.02-01292013-095400

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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

COMe-8X91

- ☐ 1 X COMe-8X91 COM Express Module Board
- ☐ 1 x Screw Bag
- ☐ 1 x Heatsink or Heatspreader (optional)

COMe-8X91 Starter Kit

- ☐ 1 x COMe-8X91 COM Express Module Board with Heatsink
- ☐ 1 x COMEDB3 COM Express Carrier Board
- ☐ 1 x SATA Cable
- ☐ 1 x Dual-Port USB 2.0 Cable
- ☐ 1 x COM Cable
- ☐ 1 x LPT Cable
- ☐ 1 x Quick Guide
- ☐ 1 x Driver CD
- ☐ 1 x LVDS Cable (optional)
- ☐ 1 x Inverter Cable (optional)
- ☐ 1 x 12.1" LCM (optional)

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1. Product Overview

The VIA COMe-8X91 is a compact and highly integrated Type 10 COM Express Module. It comes with an integrated VIA Eden™ X2 800MHz processor, boasting of ultra-low power consumption, cool and quiet operation, and enhanced multi-tasking ability.

The COMe-8X91 is based on the VIA VX900 all-in-one single chipset featuring the Integrated Chrome9™ HD DX9 2D/3D graphics processor and unified video decoding accelerator for rich digital media performance. It provides support for extensive connectivity options, including audio, USB, Ethernet, and graphics, through board-to-board connectors to an I/O carrier board.

1.1. Key Components

1.1.1. VIA Eden™ X2 Processor

The VIA Eden X2 is a 64-bit superscalar x86 dual core processor based on a 40 nanometer process technology. Packed into an ultra compact NanoBGA2 package (measuring 21mm x 21mm), it delivers an energy-efficient yet powerful performance, with cool and quiet operation. The VIA Eden X2 processor 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.

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 System 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™ HD DX9 2D/3D video processor with MPEG-2, WMV9/VC1, and H.264 video decoding acceleration, DDR3 1066/800 MHz support, motion compensation and dual display support to ensure a rich overall entertainment experience. The VIA VX900 is packed in single chip package measuring 33mm x 33mm.

1.2. Product Specifications

Core

Processor
- VIA Eden X2 800MHz NanoBGA2 processor

Chipset
- VIA VX900 all-in-one system processor

System Memory
- On board 1GB DDR3/DDR3L 1066

On-board BIOS
- AMI BIOS
- SPI 4/8Mbit flash memory

Operating System
- Windows 7
- Windows Embedded System 7
- Windows XP
- Windows XPe
- Windows CE 6.0
- Linux

Hardware Monitoring
- CPU temperature reading
- CPU fan speed reading
- System voltage monitoring

WatchDog Timer
- Software Programmable

Expansion Bus
- 3 x PCIe Gen2 x1

Video

Chipset
- Integrated VIA Chrome9™ HD DX9 2D/3D graphics processor

LVDS Interface
- 1 x LVDS channel supports single-channel 18-bit or 24-bit LVDS panel

Video Port
- Either 1 x HDMI® port or 1 x DisplayPort (without HDCP support)

Ethernet

Chipset
- VIA VT6130 Gigabit Ethernet Controller

Input/Output

Audio
- Support 1 HD audio digital interface

LAN
- Support 1 LAN port

USB
- Support 8 USB 2.0 ports

SATA
- Support up to 2 SATA 3.0Gbps ports

Serial
- Support 2 serial ports with TX and RX signal

Expansion Buses
- Support 1 SMBus interface
- Support 1 I^2C bus (default for Eup LAN control)
- Support 1 SDIO interface
- Support 1 GPIO interface with 4 INs and 4 OUTs (shared with SDIO)
- Support 1 LPC bus interface
- Support SPI
- Support speaker out, reset function, thermal protection, suspend/wake signals, power button, power good and fan control signals

Mechanical and Environment

COM Express Compliance
- COM Express™ Type 10, Mini Module

Input Power
- 12V
- 5V_SBY

Dimension
- 55 mm x 84 mm

Operating Temperature
- 0˚C up to 50˚C

Storage Temperature
- -40˚C to 70˚C

Operating Humidity
- 0% to 95˚C (relative humidity; non-condensing)

1.3. Layout Diagram

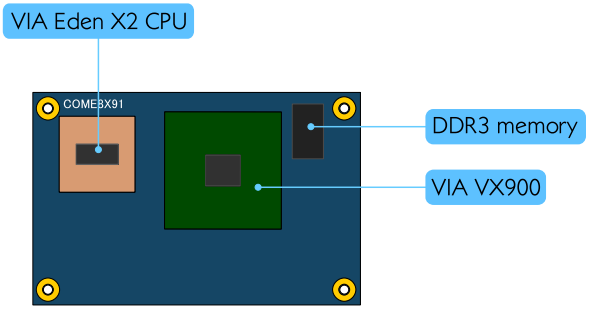

Figure 1: Layout diagram of the COMe-8X91 mainboard (top view)

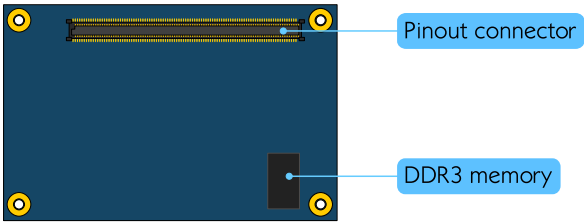

Figure 2: Layout diagram of the COMe-8X91 mainboard (bottom view)

2. Hardware Installation

2.1. Install heatsink with fan/heatspreader on the COMe-8X91

Step 1

Locate the heatsink/heatspreader mounting holes.

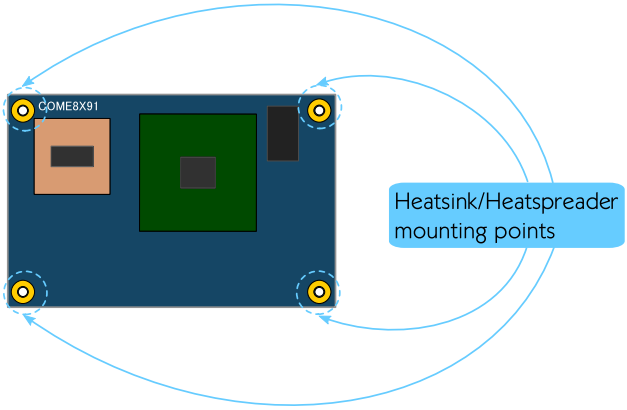

Figure 3: Heatsink/Heatspreader mounting points

Step 2

Align the heatsink/heatspreader over the mounting hole on COMe-8X91

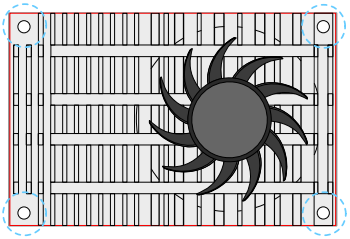

Figure 4: Aligned heatsink on module

Figure 5: Aligned heatspreader on module

2.2. Install COMe-8X91 module on the COMEDB3 carrier board

Step 1

Identify the carrier board mounting points and the connector slots.

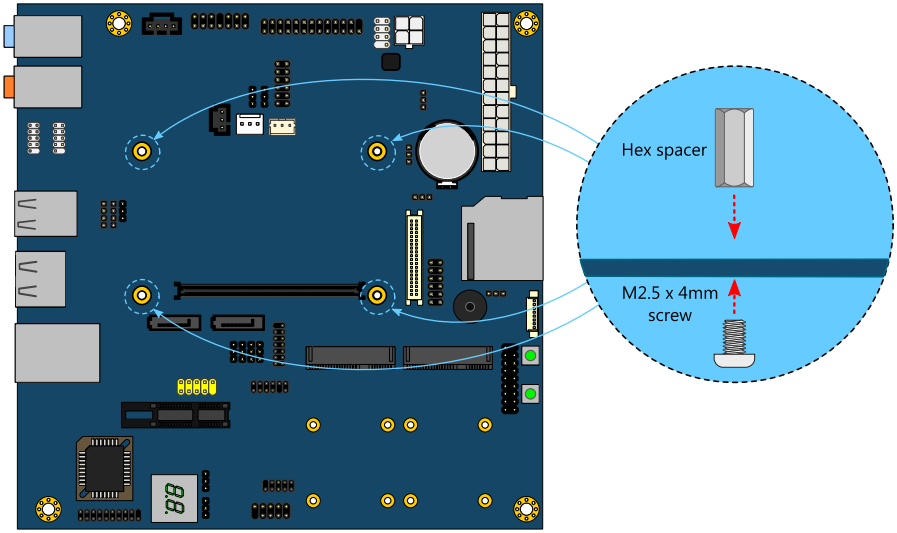

Figure 6: Installing carrier board hex spacers

Step 2

Install the hex spacers onto the carrier board. The hex spacers will be placed on top of the board. From the bottom of the board, tighten the hex spacers by using M2.5 x 4mm screws.

Note:

Make sure the thermal grease/paste has been applied on top of the processor and chipset before installing the heatsink/heatspreader.

Step 3

Align the connector of the COMe-8X91 module into the connector slot on the COMEDB3 carrier board. Also, align mount points of COMe-8X91 module into the hex spacers on the carrier board.

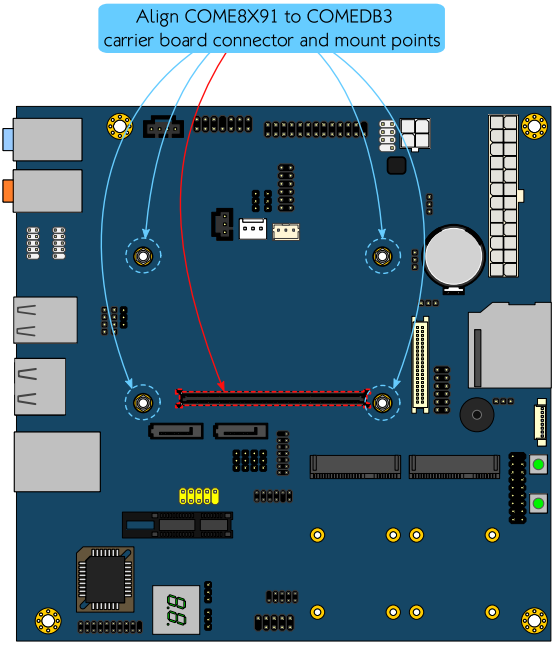

Figure 7: Aligning COMe-8X91 and carrier board mount points

Step 4

Secure the COMe-8X91 module with the heatsink by screwing and tightening the four screws (10mm screws).

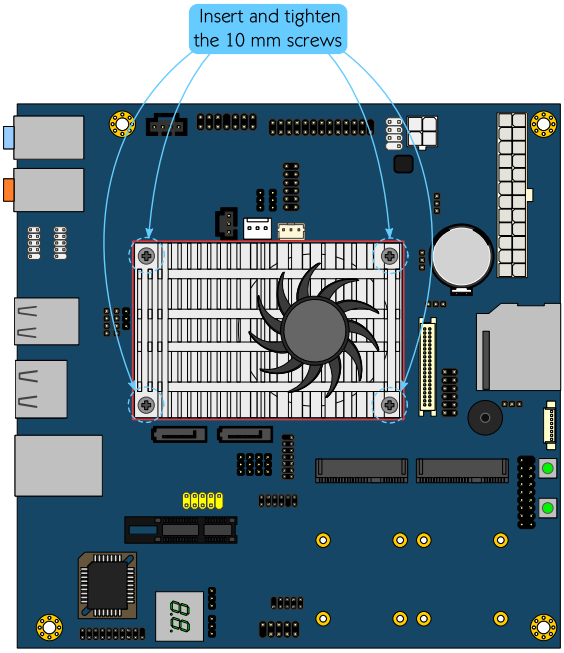

Figure 8: Secure the COMe-8X91 (with heatsink) Module

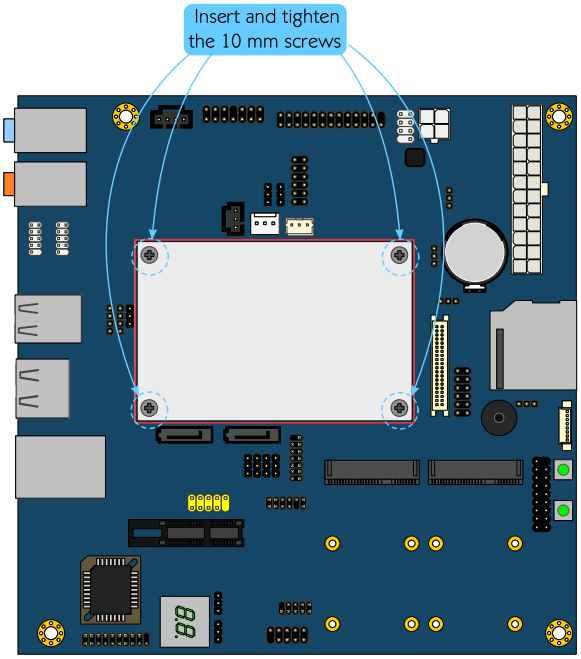

Figure 9: Secure the COMe-8X91 (with heatspreader) Module

Note:

For heatspreader model, user has to add his/her own thermal solution in order to provide sufficient cooling to the board.

Step 5

Connect the CPU fan cable to the CPU fan connector on the COMEDB3 carrier board.

3. BIOS Setup Utility

3.1. 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.

3.2. 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 / Select the item

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

Page up / +[1] Increase the numeric value

Page down / -[1] Decrease the numeric value

F1 General help[2]

F5 Restore the previous CMOS value

F9 Load optimized defaults

F10 Save all the changes and exit

Note:

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

3.3. Navigating the BIOS Menus

The main menu displays all the BIOS setup categories. Use the <**Left**>/<**Right**> and <**Up**>/<**Down**> arrow keys to select any item or sub-menu. Descriptions of the selected/highlighted category are displayed at the bottom of the screen.

The small triangular arrowhead symbol next to a field indicates that a sub-menu is available (see figure below). Press <**Enter**> to display the sub-menu. To exit the sub-menu, press <**Esc**>.

3.4. 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.

3.5. 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.

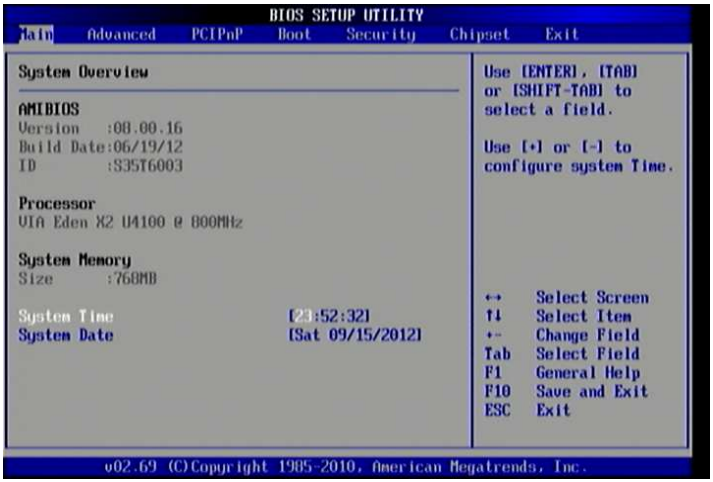

Figure 10: Illustration of the Main menu screen

3.5.1. AMIBIOS

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

3.5.2. Processor

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

3.5.3. System Memory

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

3.5.4. 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].

3.5.5. 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].

3.6. 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.

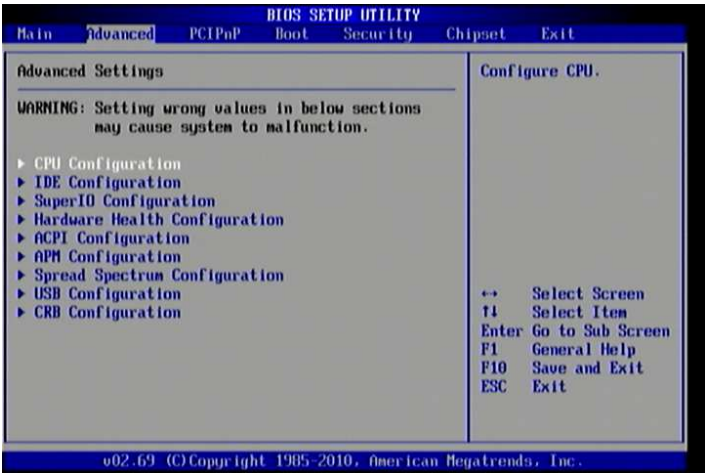

Figure 11: Illustration of the Advanced Settings screen

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

3.6.1. CPU Configuration

The CPU Configuration screen shows detailed information about the built-in processor.

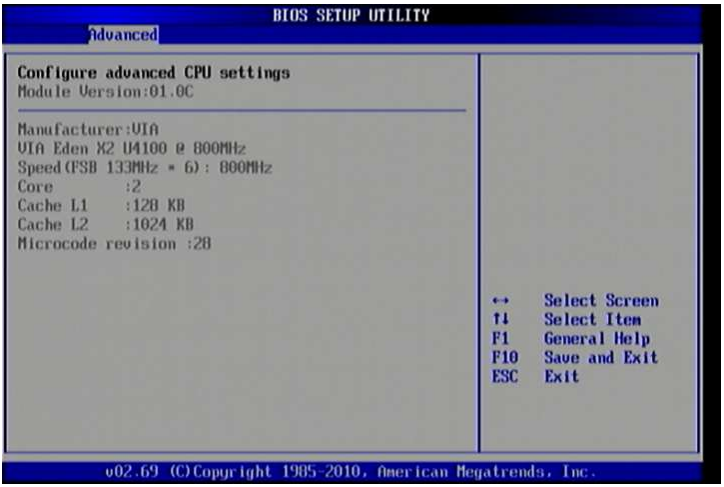

Figure 12: Illustration of the CPU Configuration screen

3.6.2. IDE Configuration

The IDE Configuration screen shows links to the primary IDE Master and primary IDE Slave hard drive information screens.

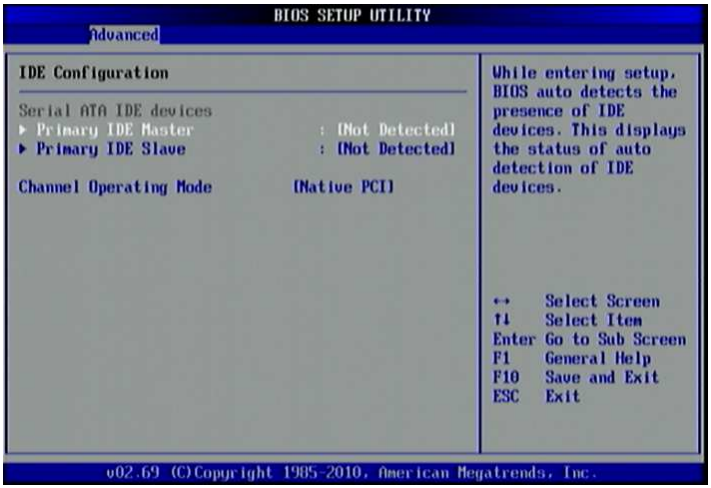

Figure 13: Illustration of IDE Configuration screen

3.6.2.1. Primary IDE Master

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

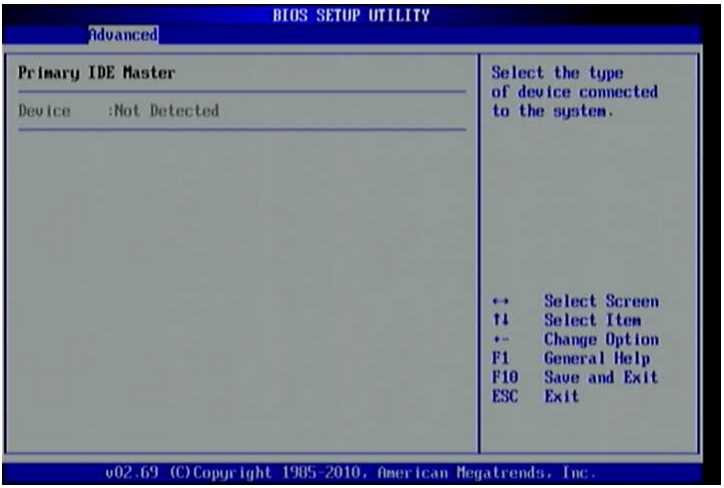

Figure 14: Illustration of Primary IDE Master screen

3.6.3. SuperIO Configuration

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

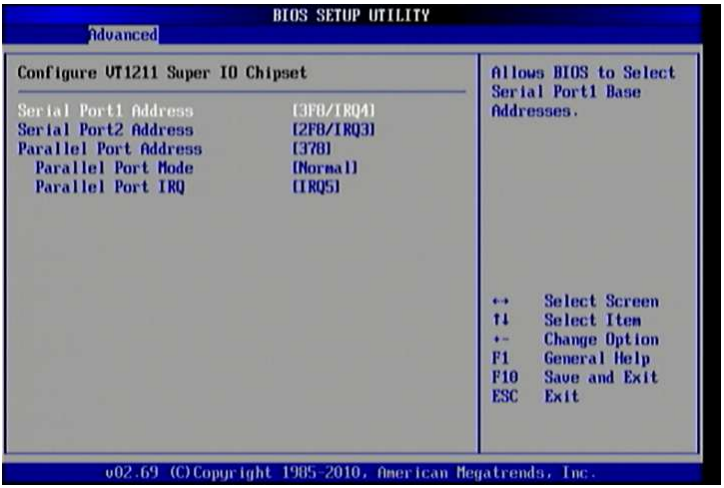

Figure 15: Illustration of SuperIO Configuration screen

3.6.3.1. Serial Ports 1 to 2

This option allows the user to select the Serial Port 1 and 2 base I/O address and interrupt request 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 1: Serial port addresses and IRQs

3.6.3.2. Parallel Port Address

This specifies the I/O port address and IRQ of the parallel port. The parallel port has four options: Disabled, 378, 278 and 3BC.

3.6.3.3. Parallel Port Mode

This specifies the parallel port mode. The parallel port mode has five options: Normal, Bi-Directional, ECP, EPP, EPP+ECP.

3.6.3.4. Parallel Port IRQ

This specifies the parallel port interrupt request address. The parallel port IRQ has 2 options: IRQ5 and IRQ7.

3.6.4. Hardware Health Configuration

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

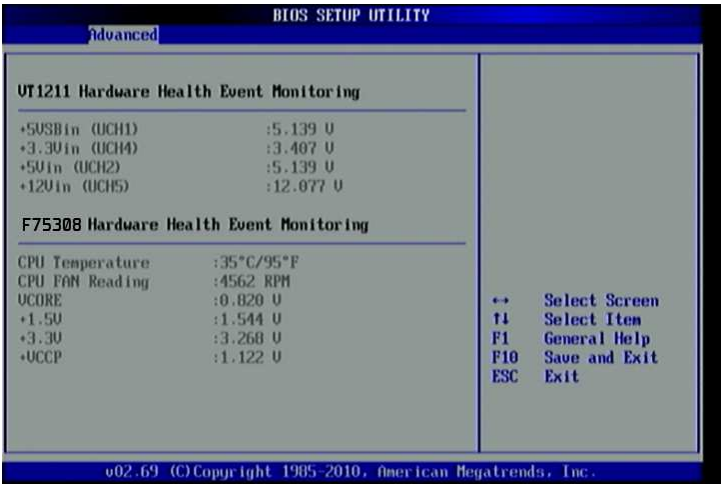

Figure 16: Illustration of Hardware Health Configuration screen

3.6.5. 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.

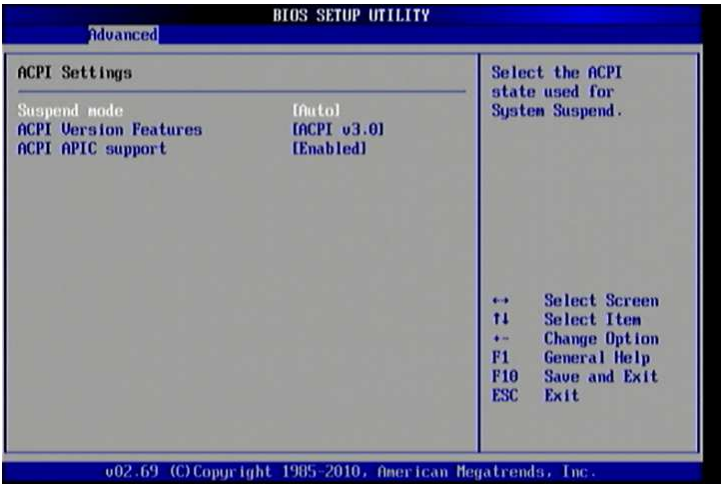

Figure 17: Illustration of ACPI Configuration screen

3.6.5.1. 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.

3.6.5.2. ACPI Version Features

The ACPI Version Features enables the BIOS to support the designated ACPI specification. There are three versions to choose from: ACPI v1.0, ACPI v2.0, and ACPI v3.0.

3.6.5.3. ACPI APIC Support

The ACPI APIC Supports enables the ACPI support in APIC. The ACPI APIC Supports has two options: Enabled and Disabled. When select "Enabled", the ACPI APIC table pointer includes in the Root System Description Table (RSDT) pointer lists. When select "Disabled", support for this feature will be unavailable.

3.6.6. 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.

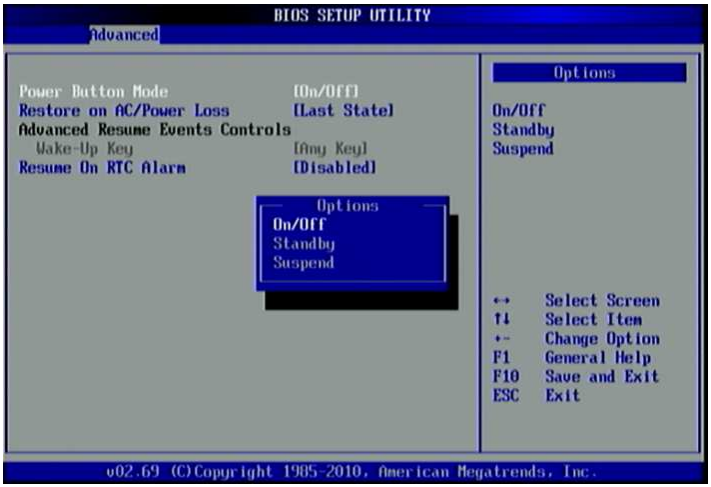

Figure 18: Illustration of APM Configuration screen

3.6.6.1. 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.

3.6.6.2. 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.

3.6.6.3. 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 not be 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.

3.6.6.4. 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.

3.6.6.5. 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.

3.6.6.6. 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.

3.6.6.7. 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**.

3.6.7. Spread Spectrum Configuration

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

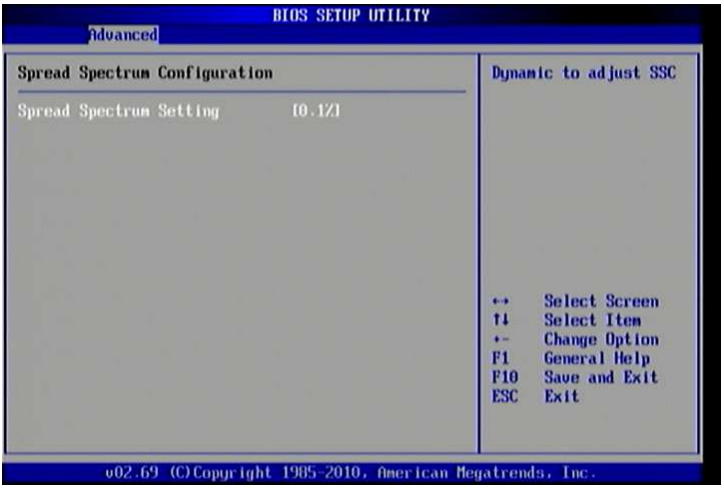

Figure 19: Illustration of Spread Spectrum Configuration screen

3.6.7.1. Spread Spectrum Setting

The CPU Spread Spectrum Setting feature enables the BIOS to modulate the clock frequencies originating from the mainboard. This feature has two settings: Disabled and 0.1%.

3.6.8. USB Configuration

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

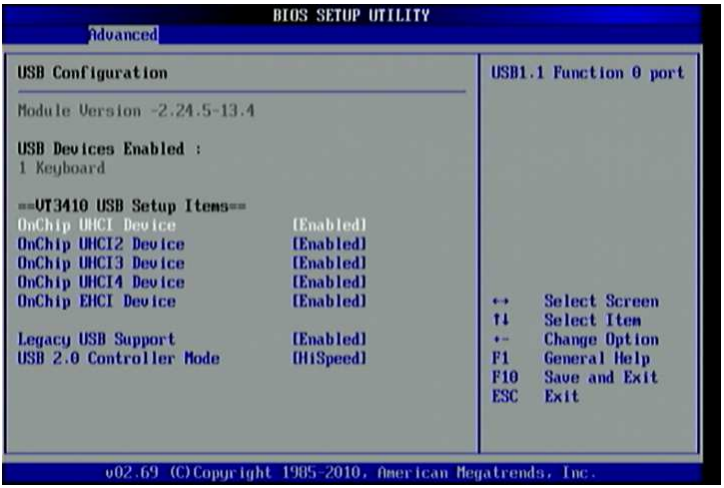

Figure 20: Illustration of USB Configuration screen

3.6.8.1. 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.

3.6.8.2. 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.

3.6.8.3. Legacy USB Support

The Legacy USB Support feature has two options: "Enabled" and "Auto". When set to "Enabled", the system enables support for legacy USB devices. When set to "Auto", the system automatically disables legacy support if no USB Devices are connected.

3.6.8.4. USB 2.0 Controller Mode

Configure the USB 2.0 controller in FullSpeed or HiSpeed. The FullSpeed limits the USB 2.0 controller to transfer data at 12 Mbps. The HiSpeed enables the USB 2.0 controller to transfer data at 480Mbps. The connected USB device must support HiSpeed in order to benefit from this setting.

3.6.9. CRB Configuration

The CRB Configuration screen includes several chipset settings.

Figure 21: Illustration of CRB Configuration screen

3.6.9.1. VIA USB Wireless LAN Control

This feature enables support for USB wireless LAN control: This feature has two options: "Enabled" and "Disabled".

3.7. 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.

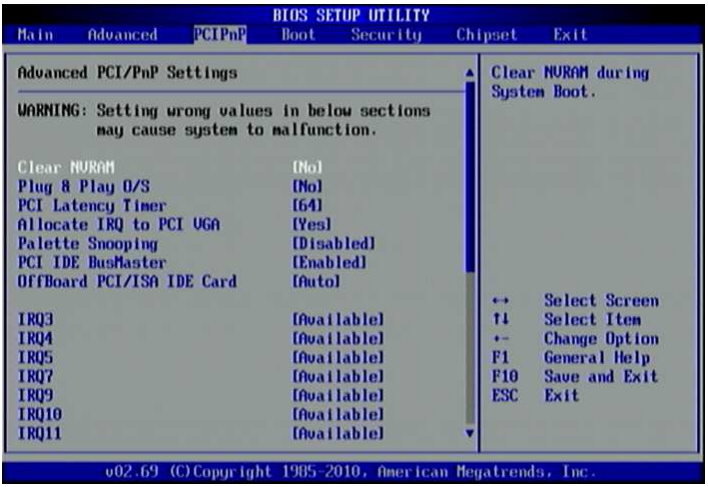

Figure 22: Illustration of Advanced PCI/PnP Settings screen

3.7.1. 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.

3.7.2. 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.

3.7.3. 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.

3.7.4. 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.

3.7.5. 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".

3.7.6. 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".

3.7.7. OffBoard PCI/ISA IDE Card

Some PCI IDE cards may require this to be set to the PCI slot number (PCI Slot 1~6) that is holding the card.

Auto: Works for most PCI IDE cards.

3.7.8. 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.

3.7.9. 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.

3.7.10. 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.

3.7.11. 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.

3.7.12. 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.

3.7.13. 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.

3.8. Boot Settings

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

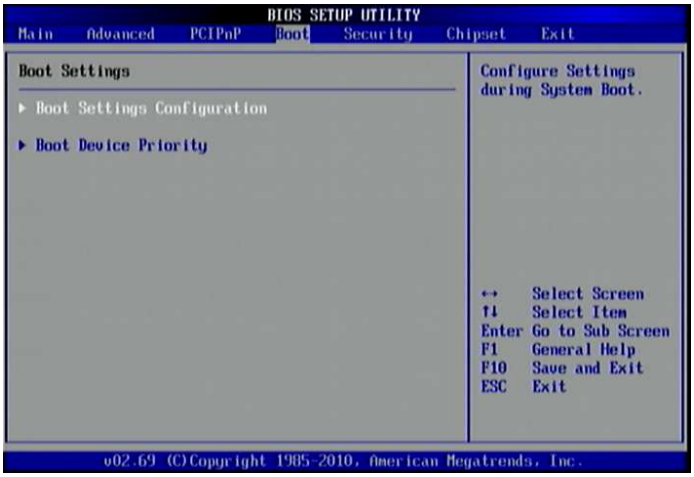

Figure 23: Illustration of Boot Settings screenBoot Settings Configuration

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

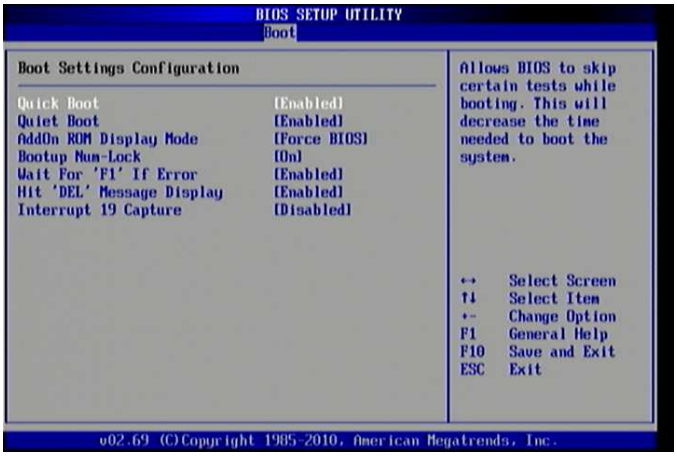

Figure 24: Illustration of Boot Settings Configuration screen

3.8.1.1. 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".

3.8.1.2. 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.

3.8.1.3. 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.

3.8.1.4. 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.

3.8.1.5. 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.

3.8.1.6. Hit 'DEL' Message Display

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

Note:

1. If the Quiet Boot option is enabled, the settings of this feature will have no effect.

3.8.1.7. 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".

3.8.2. Boot Device Priority

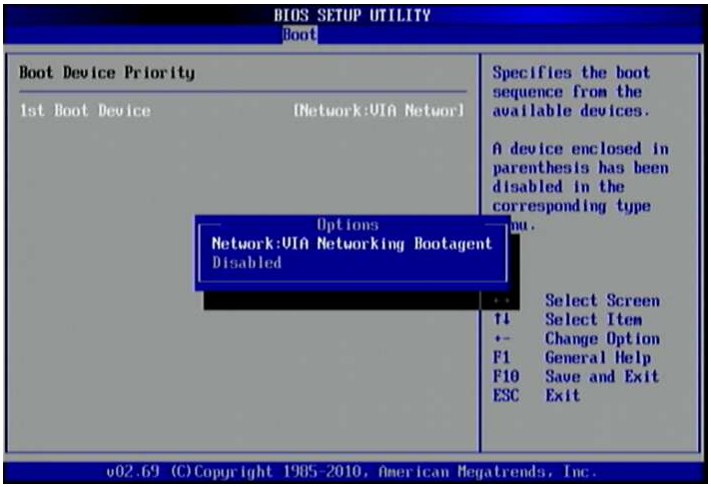

Figure 25: Illustration of Boot Device Priority screen

3.8.2.1. 1st Boot Device

To specifies the boot 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]

3.9. Security Settings

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

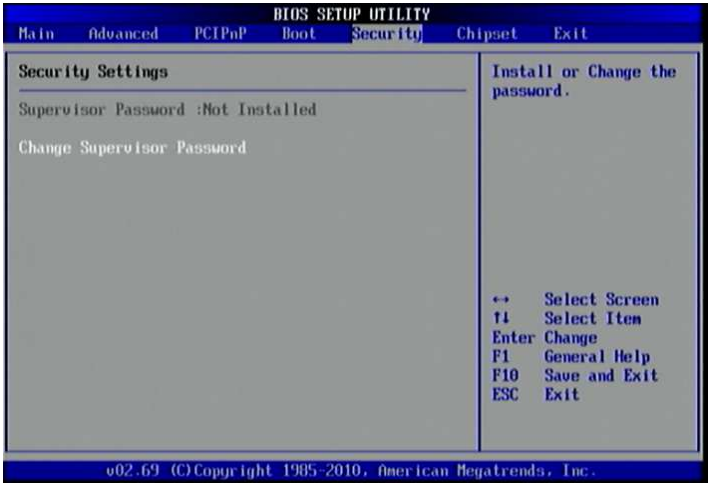

Figure 26: Illustration of Security Settings screenChange Supervisor Password

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.

3.9.1. 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.

3.10. 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.

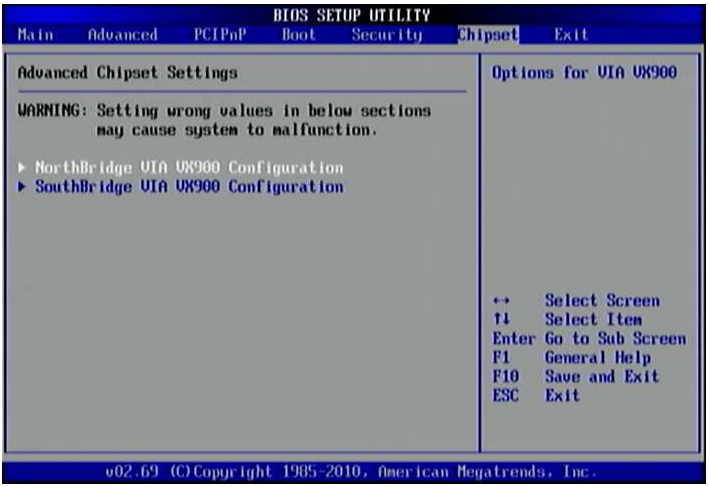

Figure 27: Illustration of Advanced Chipset Settings screenNorth Bridge VIA VX900 Configuration

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

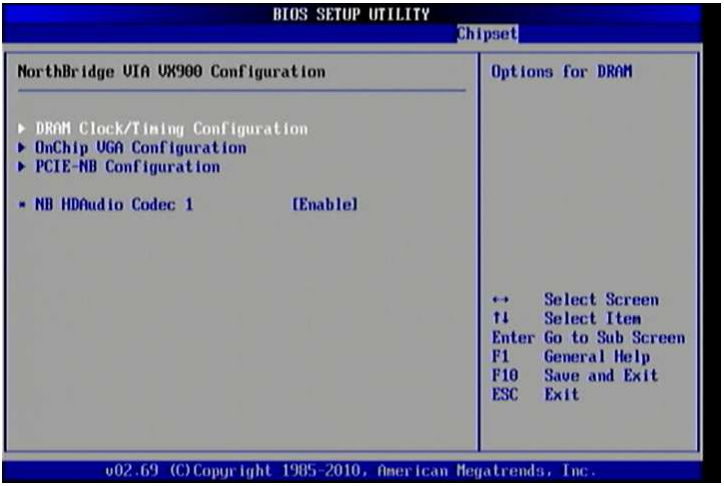

Figure 28: Illustration of North Bridge VIA VX900 Configuration screen

3.10.1.1. NB HDAudio Codec 1

The NB HDAudio Codec 1 feature enables the BIOS to control the high definition audio codec in the chipset. This feature has two options: "Enable" and "Disable".

3.10.1.2. 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 29: Illustration of DRAM Frequency/Timing Configuration screen

3.10.1.2.1. 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.

3.10.1.2.2. Bank Interleave

This item is for setting the interleave mode of the SDRAM interface. Interleaving allows banks of SDRAM to alternate their refresh and access cycles. One bank will undergo its refresh cycle while another is being accessed. This improves performance of the SDRAM by masking the refresh time of each bank.

This feature has 5 options: "SPD", "Non-Page", "2-Way", "4-Way" and "8-Way".

3.10.1.2.3. Output Impedance Control

This feature has 2 options: "Normal" and "Weak".

3.10.1.2.4. DDR2 Memory Chip ODT [DDR2/DDR

This feature has 7 options: "Auto", "Disabled","75 ohm/60 ohm","150 ohm/120 ohm","50 ohm/40 ohm","NA/20 ohm" and "NA/30 ohm".

3.10.1.2.5. DDR3 Dynamic ODT

This feature has 4 options: "Auto","Disabled","R2Q/4" and "R2Q/2".

3.10.1.2.6. BA0 SEL

This feature has 5 options: "A11","A13","A15","A17" and "A19".

3.10.1.2.7. BA1 SEL

This feature has 5 options: "A12","A14","A16","A18" and "A20".

3.10.1.2.8. BA2 SEL

This feature has 4 options: "A14","A15","A18" and "A19".

3.10.1.2.9. VR Interleave Address Bit 0

This feature has 4 options: "A15","A17","A19" and "A21".

3.10.1.2.10. VR Interleave Address Bit 1

This feature has 4 options: "A14","A16","A18" and "A20".

3.10.1.2.11. Virtual Rank Interleave

This feature has 2 options: "Auto" and "Disabled".

3.10.1.2.12. BA Scramble

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.2.13. RDRDY

This feature has 2 options: "Slowest" and "Default".

3.10.1.2.14. Conversion Circuit

This feature has 2 options: "Auto" and "Async".

3.10.1.2.15. DRAM 32-Bit data width

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.2.16. DramInitMethod

This feature has 2 options: "Auto" and "Force_SW".

3.10.1.2.17. Dram Self Refresh

This feature has 2 options: "Disabled" and "Enabled".

3.10.1.2.18. Dynamic CKE

This feature has 2 options: "Disabled" and "Enabled".

3.10.1.3. OnChip VGA Configuration

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

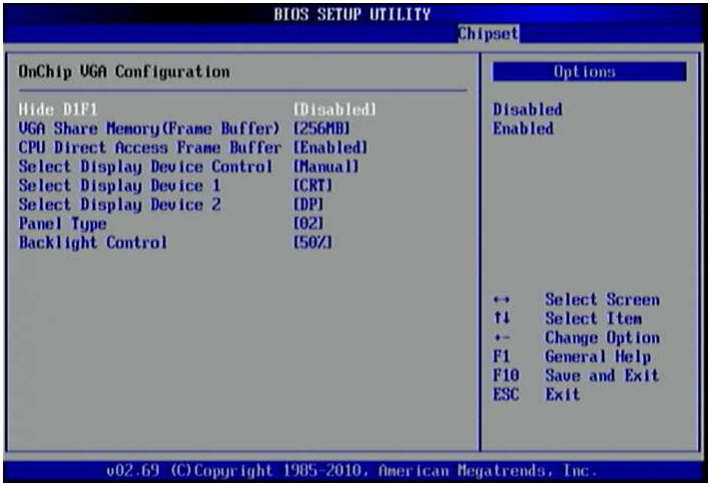

Figure 30: Illustration of OnChip VGA Configuration screen

3.10.1.3.1. Hide D1F1

This feature has 2 options: "Disabled" and "Enabled".

3.10.1.3.2. 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.

3.10.1.3.3. 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: "Disabled" and "Enabled".

3.10.1.3.4. Select Display Device Control

This feature has 2 options: "Auto" and "Manual".

3.10.1.3.5. 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, HDMI® and DP. 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®, LCD and DP port.

3.10.1.3.6. Panel Type

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

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

3.10.1.3.7. Backlight Control

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

Level 1 0% PW Duty

Level 1 25% PW Duty

Level 2 50% PW Duty

Level 3 75% PW Duty

Level 4 100% PW Duty

3.10.1.4. PCIE-NB Configuration

The PCIE-NB Configuration screen has features for controlling the PCIE Express interface in the VX900 chipset.

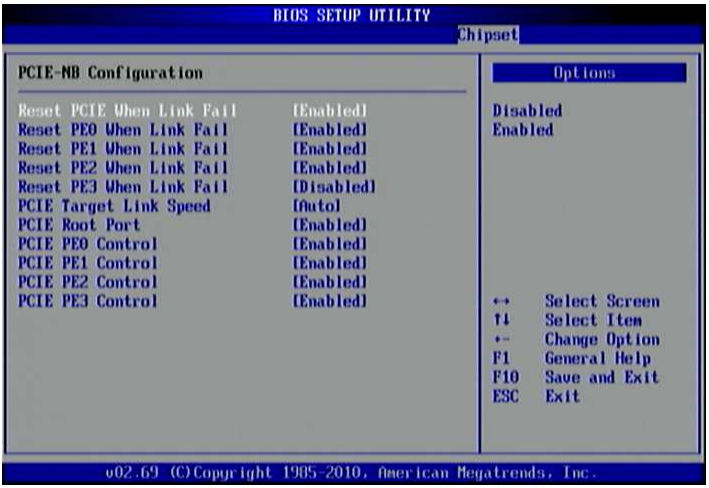

Figure 31: Illustration of PCIE-NB Configuration screen

3.10.1.4.1. Reset PCIE When Link Fail

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.2. Reset PE0 When Link Fail

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.3. Reset PE1 When Link Fail

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.4. Reset PE2 When Link Fail

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.5. Reset PE3 When Link Fail

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.6. PCIE Target Link Speed

This feature has 2 options: "Auto" and "Force Gen1".

3.10.1.4.7. PCIE Root Port

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.8. PCIE PE0 Control

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.9. PCIE PE1 Control

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.10. PCIE PE2 Control

This feature has 2 options: "Enabled" and "Disabled".

3.10.1.4.11. PCIE PE3 Control

This feature has 2 options: "Enabled" and "Disabled".

3.10.2. South Bridge VIA VX900 Configuration

The South Bridge VIA VX900 Configuration screen has the following features.

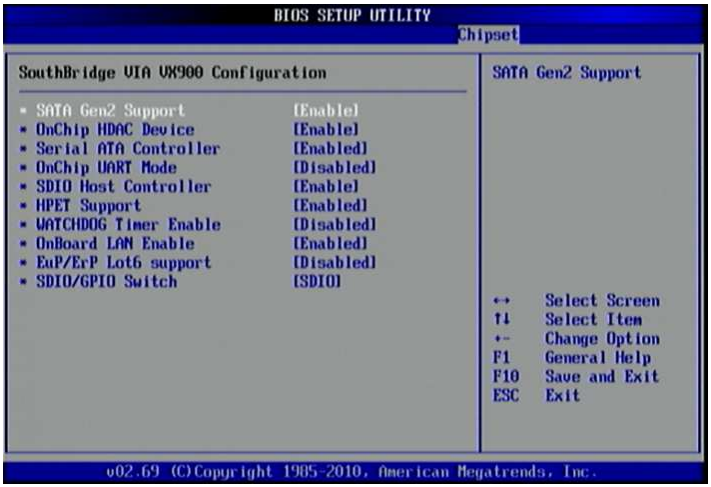

Figure 32: Illustration of South Bridge VIA VX900 Configuration screen

3.10.2.1. 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".

3.10.2.2. 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" or "Disable".

3.10.2.3. 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" or "Disabled".

3.10.2.4. OnChip UART Mode

This feature has two options: "Enabled" or "Disabled".

3.10.2.5. SDIO Host Controller

This feature has two options: "Enable" or "Disable".

3.10.2.6. 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".

3.10.2.7. 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".

3.10.2.8. OnBoard LAN Enable

This feature has two options: "Enabled" or "Disabled".

3.10.2.9. 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.

3.10.2.10. SDIO/GPIO Switch

Switch between SDIO and GPIO.

3.11. Exit Options

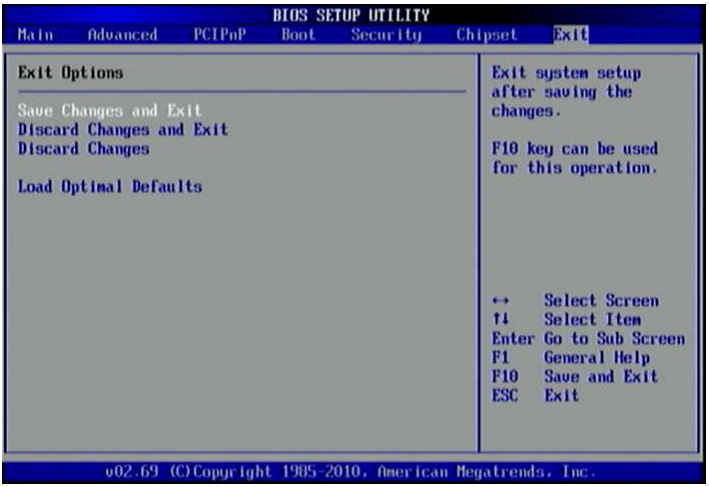

Figure 33: Illustration of Exit Options screen

3.11.1. 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.

3.11.2. Discard Changes and Exit

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

3.11.3. Save Changes

Save all changes to the BIOS.

3.11.4. 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.

4. Driver Installation

4.1. Microsoft Driver Support

The VIA COMe-8X91 mainboard is compatible with Microsoft operating systems. The latest Windows drivers can be downloaded from the VEPD website at www.viaembedded.com.

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

4.2. Linux Driver Support

The VIA COMe-8X91 mainboard is highly compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viaembedded.com for the latest updated drivers
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

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

Appendix A. COMEDB3 Carrier Board Reference

A.1. Board Specifications

- **COM Express Module Type**
  - Support Mini Form Factor Type 10

- **Audio**
  - VIA VT2021 High Definition Audio Codec

- **Super I/O**
  - VIA VT1211 LPC super I/O

- **BIOS**
  - AMI BIOS
  - 4/8 M bit LPC Flash BIOS, PLCC 32 pin or SPI BIOS

- **On Board Connector**
  - 1 x LVDS connector
  - 1 x Inverter connector
  - 1 x CD In w/housing connector
  - 1 x SPDIF w/housing connector
  - 1 x SD card connector, shared with DIO1 pin header
  - 1 x ATX power connector
  - 1 x AUX power connector
  - 2 x SATA connectors
  - 2 x FAN with housing connectors for CPU FAN & System FAN.

- **On Board Slot**
  - 1 x PCIe x1 slots
  - 2 x Mini PCIe sockets

- **Onboard Pin Header**
  - 1 x Serial pin header with 2 sets of TX and RX signals
  - 2 x COM pin headers (support 2 COM ports with +5V/+12V power select option RI pin)
  - 1 x LPT pin header
  - 1 x SPI pin header
  - 1 x LPC pin header
  - 1 x DIO1 pin header, shared with SDIO connector
  - 1 x DIO2 pin header (from VIA VT1211)
  - 1 x SMBus pin header
  - 1 x I^2C pin header
  - 2 x USB 2.0 pin headers for four USB 2.0 ports
  - 1 x Panel Power Select pin header
  - 1 x Front LAN LED pin header
  - 1 x Front Audio pin header
  - 1 x Front Panel pin header for HDD LED, Power LED, Switch and Speaker

- **Onboard Jumper**
  - 1 x Clear CMOS jumper
  - 1 x Inverter Voltage Select jumper
  - 1 x Panel Power Select jumper
  - 1 x COM voltage Select jumper
  - 2 x BIOS Type Select jumpers (for select LPC/SPI BIOS)
  - 2 x BIOS Select jumper (for select Module/Carrier board BIOS)
  - 6 x USB Select jumper (for select USB header/MiniPCIe)

- **Switch**
  - 1 x Power button switch
  - 1 x Reset switch

- **Form Factor and Dimension**
  - Mini-iTX Form Factor
  - 6 Layers
  - 17 cm x 17 cm

- **Operating Temperature**
  - 0°C up to 50°C

- **Storage Temperature**
  - -40°C to 70°C

- **Operating and Storage Humidity**
  - 95% relative humidity

- **Operating System**
  - Microsoft Windows 7
  - Microsoft Windows Embedded Standard 7
  - Microsoft Windows XP
  - Microsoft Windows XPe
  - Microsoft Windows CE 6.0
  - Linux

A.2. External I/O Connectors

The COMEDB3 has a wide selection of interfaces. It includes a selection of frequently used ports as part of the external I/O coastline.

A.2.1. Rear I/O

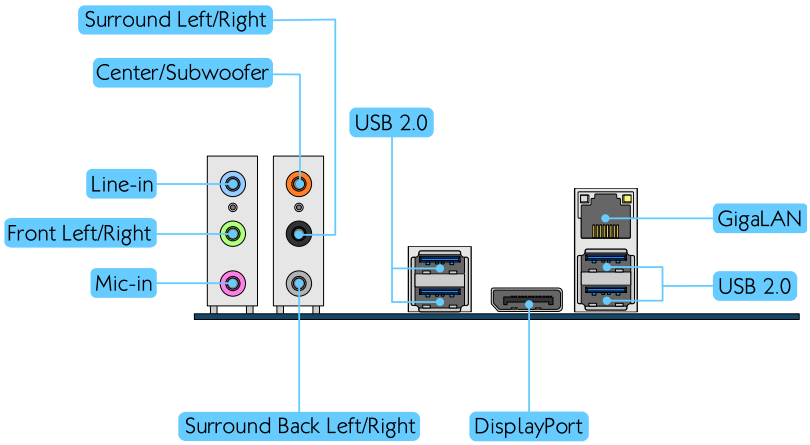

Figure 34: Rear I/O ports and connectors

A.3. COMEDB3 Layout Diagram

A.3.1. Onboard Connectors, Ports and Sockets

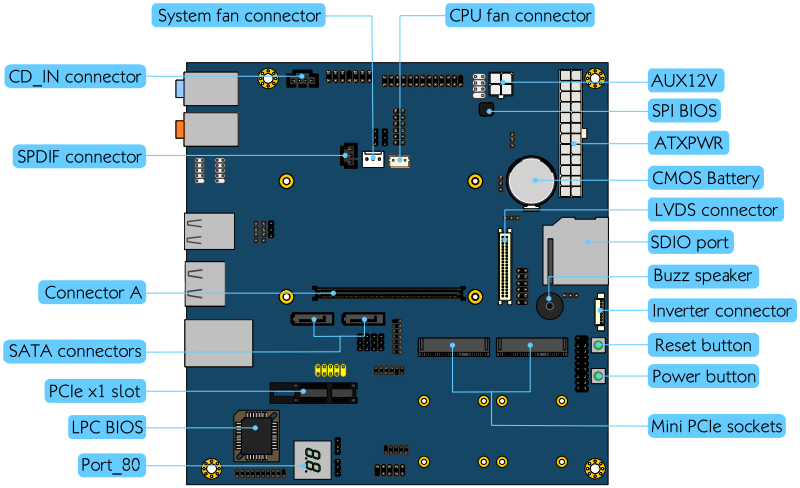

Figure 35: COMEDB3 slots and connectors layout

A.3.2. Onboard Pin headers

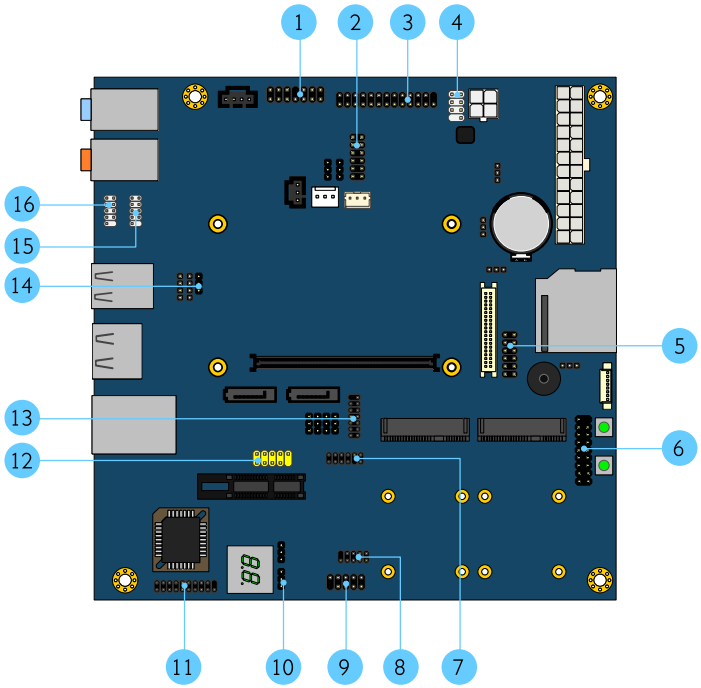

Figure 36: COMEDB3 pin headers

Item	Description
1	F_AUDIO: Front audio pin header
2	DIO2: DIO2 pin header
3	LPT: LPT pin header
4	SPI: SPI pin header
5	DIO1: DIO1 connector
6	F_PANEL: Front Panel pin header
7	USB_4/5: USB 2.0 pin header for port 4 and 5
8	FLAN_LED: Front LAN LED pin header
9	SER_PORT: Serial Port pin header
10	SMBUS: System Management Bus pin header
11	LPC: LPC pin header
12	USB_6/7: USB 2.0 pin header for port 6 and 7
13	VGA: VGA pin header
14	I2C_BUS: I^2C pin header
15	COM2: COM2 pin header
16	COM1: COM1 pin header

Table 2: Layout diagram description table of the COMe-8X91 mainboard

1 F_AUDIO

MIC2_FR_L	1	2	AGND
MIC2_FR_R	3	4	FNT_DET
HP_OUT_R	5	6	MIC2_JD
FNT_IO_SENSE	7	8	KEY
HP_OUT_L	9	10	LINE2_JD
+12V	11	12	+12V
AGND	13	14	AGND

2 DIO2

5V_DIO2	1	2	12V_DIO2
SIO_GPO30	3	4	SIO_GPI34
SIO_GPO31	5	6	SIO_GPI35
SIO_GPO32	7	8	SIO_GPI36
SIO_GPO33	9	10	SIO_GPI37
GND	11	12	GND

3 LPT

-LP_STB	1	2	-LP_AFD
LP_D0	3	4	-LP_ERR
LP_D1	5	6	-LP_INIT
LP_D2	7	8	-LP_SLIN
LP_D3	9	10	GND
LP_D4	11	12	GND
LP_D5	13	14	GND
LP_D6	15	16	GND
LP_D7	17	18	GND
-LP_ACK	19	20	GND
LP_BUSY	21	22	GND
LP_PE	23	24	GND
LP_SLCT	25	26	KEY

4 SPI

SPI_VCC	1	2	GND
-SPI_SS0	3	4	SPI_CLK
SPI_DI	5	6	SPI_DO
KEY	7	8	RESET

5 DIO1

5V_DIO1	1	2	12V_DIO1
COM_GPO0	3	4	COM_GPI0
COM_GPO1	5	6	COM_GPI1
COM_GPO2	7	8	COM_GPI2
COM_GPO3	9	10	COM_GPI3
GND	11	12	GND

6 F_PANEL

FP_5V	1	2	FP_3V
FP_5V	3	4	-SATA_LED
-PLED	5	6	-PW_BTN
FP_5V	7	8	GND
NC	9	10	RST_SW
NC	11	12	GND
SPEAK	13	14	FP_5V
KEY	15	16	-SLEEP_LED

7 USB2_4/5

VUSB	1	2	VUSB
USBD_T4-	3	4	USBD_T5-
USBD_T4+	5	6	USBD_T5+
GND	7	8	GND
KEY	9	10	W_LESS_LED
GND	11	12	-RF_ON

8 FLAN_LED

3VSUS	1	2	-LAN_ACT
3VSUS	3	4	NC
GND	5	6	W_LAN_LED
3VSUS	7	8	GND
KEY	9	10	GND

9 SER_PORT

SER0_TX_CON	1	2	SER0_RX_CON
NC	3	4	NC
GND	5	6	NC
SER1_TX_CON	7	8	SER1_RX_CON
NC	9	10	KEY

10 SMBUS

1	I2C_CLK
2	I2C_DATA
3	GND

11 LPC

LPC_AD1	1	2	LPC_33M_CLK
-LPC_RESET	3	4	GND
LPC_AD0	5	6	NC
LPC_AD2	7	8	-LPC_FRAME
LPC_SERIRQ	9	10	LPC_AD3
-LPC_DRQ1	11	12	NC
+5V	13	14	+3.3V
+5V	15	16	+3.3V
GND	17	18	GND
GND	19	20	KEY

12 USB2_6/7

VUSB	1	2	VUSB
USBD_T6-	3	4	USBD_T7-
USBD_T6+	5	6	USBD_T7+
GND	7	8	GND
KEY	9	10	GND

13 VGA

GND	1	2	+5V
CRT_R	3	4	SPD2
CRT_G	5	6	SPCLK2
CRT_B	7	8	CRT_HS
GND	9	10	CRT_VS
GND	11	12	GND
GND	13	14	KEY

14 I2C BUS

1	I2C_CLK
2	I2C_DATA
3	GND

15 COM2

COM_DCD2	1	2	COM_RXD2
COM_TXD2	3	4	COM_DTR2
GND	5	6	COM_DSR2
COM_RTS2	7	8	COM_CTS2
COM_RI2	9	10	KEY

16 COM1

COM_DCD1	1	2	COM_RXD1
COM_TXD1	3	4	COM_DTR1
GND	5	6	COM_DSR1
COM_RTS1	7	8	COM_CTS1
COM_RI1	9	10	KEY

A.3.3. Onboard Jumpers

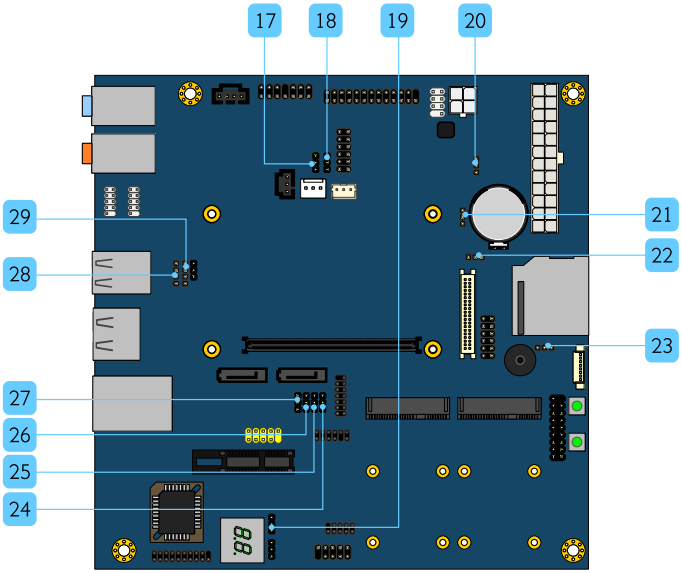

Figure 37: COMEDB3 jumpers

Item	Description
17	BIOS_SEL1: Module and carrier board BIOS select jumper
18	BIOS_SEL0: Module and carrier board BIOS select jumper
19	BIOS_DIS0: Module and carrier board BIOS select jumper
20	BIOS_DIS1: Module and carrier board BIOS select jumper
21	CLEAR_CMOS: Clear CMOS jumper
22	PVDD: LCD panel power select jumper
23	IVDD: Inverter power select jumper
24	JP_USB5_SEL+: USB 2_5 enabled select jumper (+)
25	JP_USB5_SEL-: USB 2_5 enabled select jumper (-)
26	JP_USB6_SEL+: USB 2_6 enabled select jumper (+)
27	JP_USB6_SEL-: USB 2_6 enabled select jumper (-)
28	JP_COM2_VSEL: COM2 voltage select jumper
29	JP_COM1_VSEL: COM1 voltage select jumper

17 BIOS_SEL1 18 BIOS_SEL0

BIOS_SEL1	BIOS_SEL0

Pins		Description
2-3	1-2	(default) Select Module SPI BIOS.
1-2	2-3	Select Carrier LPC BIOS.
2-3	1-2	Select Carrier SPI BIOS.

19 BIOS_DIS0 20 BIOS_DIS1

BIOS_DIS0	BIOS_DIS1

Pin		Description
1-2	1-2	(default) Select Module SPI BIOS.
2-3	1-2	Select Carrier LPC BIOS.
2-3	2-3	Select Carrier SPI BIOS.

21 CLEAR_CMOS

Pins	Description
1-2	(default) Keep CMOS settings.
2-3	Clear CMOS settings.

22 PVDD

Pins	Description
1-2	Use +5V for the LCD panel power.
2-3	(default) Use +3.3V for the LCD panel power.

23 IVDD

Pins	Description
1-2	Use +5V for the Inverter power.
2-3	(default) Use +12V for the Inverter power.

24 JP_USB5_SEL+ 25 JP_USB5_SEL-

JP_USB5_SEL+	JP_USB5_SEL-

Pins		Description
1-2	1-2	(default) Enabled USB_4/5 pin header
2-3	2-3	Enabled MINI_PCIE socket

26 JP_USB6_SEL+ 27 JP_USB6_SEL-

JP_USB6_SEL+ JP_USB6_SEL-

Pins		Description
1-2	1-2	(default) Enabled USB_6/7 pin header
2-3	2-3	Enabled MINI_PCIE1 socket

28 JP_COM2_VSEL

Pins	Description
1-2	Enabled COM2 connector to support +5V.
2-3	(default) Normal
3-4	Enabled COM2 connector to support +12V.

29 JP_COM1_VSEL

Pins	Description
1-2	Enabled COM1 pin header to support +5V.
2-3	(default) Normal
3-4	Enabled COM1 pin header to support +12V.