



VX6090 AMI BIOS

SD.DT.G66-4e - August 2017

 VX6090 AMI BIOS User Reference Manual

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SYMBOLS

The following symbols may be used in this manual:



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



NOTICE indicates a property damage message.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

This symbol inform of the risk of exposure to laser beam from an electrical device. Eye protection per manufacturer notice shall review before servicing.



This symbol indicates general information about the product and the user manual.

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

FOR YOUR SAFETY

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

CAUTION

Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.

CAUTION



Caution, Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instructions



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

GENERAL INSTRUCTIONS ON USAGE

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version, that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

ENVIRONMENTAL PROTECTION STATEMENT

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.



Environmental protection is a high priority with Kontron.
Kontron follows the DEEE/WEEE directive.
You are encouraged to return our products for proper disposal.

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- ▶ Reduce waste arising from electrical and electronic equipment (EEE)
- ▶ Make producers of EEE responsible for the environmental impact of their products, especially when they become waste
- ▶ Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE

Improve the environmental performance of all those involved during the lifecycle of EEE

Table Of Contents

1 /	Overview	1
1.1	Structure	1
1.2	Related Documents	1
2 /	Enter the SETUP Menu	2
3 /	Main Menu	4
4 /	Advanced Menu	5
4.1	Serial Port Console Redirection	7
4.1.1	COM0/COM1 Console Redirection	7
4.1.2	COM0/COM1 Console Redirection Settings	8
4.2	CSM Configuration	9
4.3	USB Configuration	10
5 /	IntelRCSetup Menu	11
5.1	Processor Configuration	11
5.2	Advanced Power Management Configuration	12
5.2.1	EIST	12
5.2.2	Config TDP	13
5.2.3	Turbo Mode	13
5.2.4	C States	13
5.3	PCH Configuration	14
5.3.1	SATA Configuration	14
5.3.2	USB Configuration	16
5.4	Miscellaneous Configuration	16
6 /	Kontron Menu	17
6.1	Board Misc Configuration	17
6.1.1	Ethernet Configuration	18
6.1.2	Serial COM0 Configuration	18
6.1.3	Alarm Configuration	19
6.1.4	USB Keyboard Configuration	20
6.1.5	Watchdog Configuration	20
6.2	VPX Configuration	22
6.2.1	VPX Maskable Reset	22
6.2.2	VPX Reset Propagation to VPX Backplane	23
6.2.3	VPX SYSRESET Input	23
6.2.4	VPX Switch (CPUA side only)	23
6.2.5	VPX Local Delay (CPUA side only)	23
6.2.6	VPX EEPROM Configuration (CPUA side only)	24
7 /	Security Menu	25
8 /	Boot Menu	26
8.1	Setup Prompt Timeout	26
8.2	Bootup Numlock State	26
8.3	Boot Option Priorities	27
8.4	Network Device BBS Priorities	28
8.5	Hard Drive BBS Priorities	29
9 /	Event Logs Menu	30
10 /	Save & Exit Menu	31
10.1	Save/Discard Options with Exit/Reset Actions	31

10.2	Save/Discard/Restore Default Options	32
10.3	Saving a User Configuration	32
10.4	Boot Override	32
11 /	EFI SHELL	33
11.1	Kontron Command	33
11.1.1	kdiag	34
11.1.2	kflash	34
11.1.3	kmac	35
11.1.4	kpld	36
11.1.5	ksensor	36
11.1.6	kvpd	37
11.1.7	kvpX	37
11.2	Environment Variables	39
11.2.1	StartupAuto	39
11.2.2	StartupDelay	39
11.2.3	BootCmd	39
11.2.4	BootDelay	40
11.2.5	StopEfiShell	40
12 /	BIOS Versions Description	41
12.1	Recommendations and Known Limitations	41
12.2	Known Problems Table	42
12.2.1	How to Use the Table:	42
12.2.2	Detailed Description of the Problems	43
12.3	BIOS ID16293EFT Release Notes	45
12.4	BIOS ID17097EFT Release Notes	46
12.5	BIOS ID17153 Release Notes	47
12.6	BIOS ID1786 Release Notes	48
13 /	Use Cases	49
13.1	DEPLOY: How to deploy VX6090 - BIOS	49
13.1.1	Cloning a board	49
13.1.2	Managing a pool of VX6090	49
13.2	DEVEL: How to develop applications with VX6090 - BIOS	50
13.3	EVAL: How to benchmark VX6090 - BIOS	50
13.4	TROUBLESHOOTING: Useful Tips	50
	Appendix A - How to Update and Restore the BIOS	52
A.1	Update BIOS from UEFI Shell using USB device	52
A.2	Restore or Update BIOS from Rescue BIOS	53
A.3	Record BIOS image ROM and setting from UEFI Shell using USB device	53

1 / Overview

This manual introduces the SETUP and the additional EFI Kontron commands of the AMI BIOS firmware available on Kontron VX6090 boards.

In this document, EFI shell prompt **VX6090>** is a shortcut for **VX6090-A>** or **VX6090-B>** depending on the CPU side.

The BIOS SETUP is a ROM-based configuration utility that displays the system's configuration status and provides users with a tool to set their system parameters. These parameters are stored in the non-volatile System Flash which saves this information even when the power is turned off. When the system is turned on, the system is configured with the last saved values. Using easy-to-use pull down menus, users can configure such items as:

- ▶ Date & Time
- ▶ Serial Port, Terminal Type, Console redirection
- ▶ USB keyboard layout
- ▶ Watchdog for OS boot
- ▶ LAN routing, VPX configuration
- ▶ CPU active cores
- ▶ Boot method and boot device priority
- ▶ Security password

1.1 Structure

- ▶ Chapter 1 "Overview"
- ▶ Chapter 2 "Enter the SETUP Menu"
- ▶ Chapter 3 to Chapter 10 . . . "Sampling of menu items"
- ▶ Chapter 11 "EFI SHELL"
- ▶ Chapter 12 "BIOS Versions Description"
- ▶ Chapter 13 "Use Cases"

1.2 Related Documents

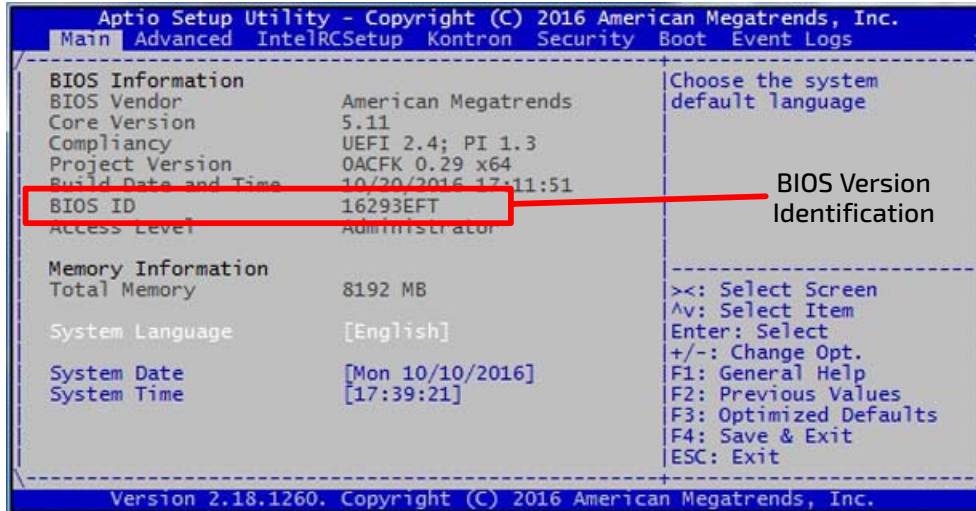
- ▶ VX6090 User's Guide CA.DT.B20
- ▶ VX6090 PBIT User's Guide SD.DT.G65

2 / Enter the SETUP Menu

To access the SETUP MENU, press during system boot when the message below is displayed :

```
Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
BIOS Date: 01/13/2016 16:31:31 Ver: ID16013EFT
Press <DEL> or <ESC> to enter setup.
Entering Setup...
```

A screen similar to the one shown below will appear:



The SETUP displays the system's current configuration settings. The top of the screen has a menu bar with various items (i.e., Main, Advanced, IntelRCSetup, Kontron, etc.). The menu bar items are linked to submenus. Any submenu includes various items to configure the system or to perform specified tasks. For example, the Main menu contains a list of items such as setting the date and time or displaying the AMI BIOS version and ID ...

To get the SETUP menu from COM0 serial line, configure your terminal to 115200 baud. COM0 is available either via the front panel or via the backplane connector of the VX6090 board.

The following chapter details the items that are available on Kontron VX6090. Some of them are for future implementation, so are marked as reserved and should not be used.

The following chapters provide a sampling of menu items:

- ▶ Chapter 3 "Main Menu" page 4
- ▶ Chapter 4 "Advanced Menu" page 5
- ▶ Chapter 5 "IntelRCSetup Menu" page 11
- ▶ Chapter 6 "Kontron Menu" page 17
- ▶ Chapter 7 "Security Menu" page 25
- ▶ Chapter 8 "Boot Menu" page 26
- ▶ Chapter 9 "Event Logs Menu" page 30
- ▶ Chapter 10 "Save & Exit Menu" page 31

To access the menu of your choice:

- ▶ Use the < → > or < ← > keys to select the desired item Menu
- ▶ Use the < ↑ > or < ↓ > keys to highlight the desired setting or submenu in item
- ▶ Press < Enter > key to validate your choice.

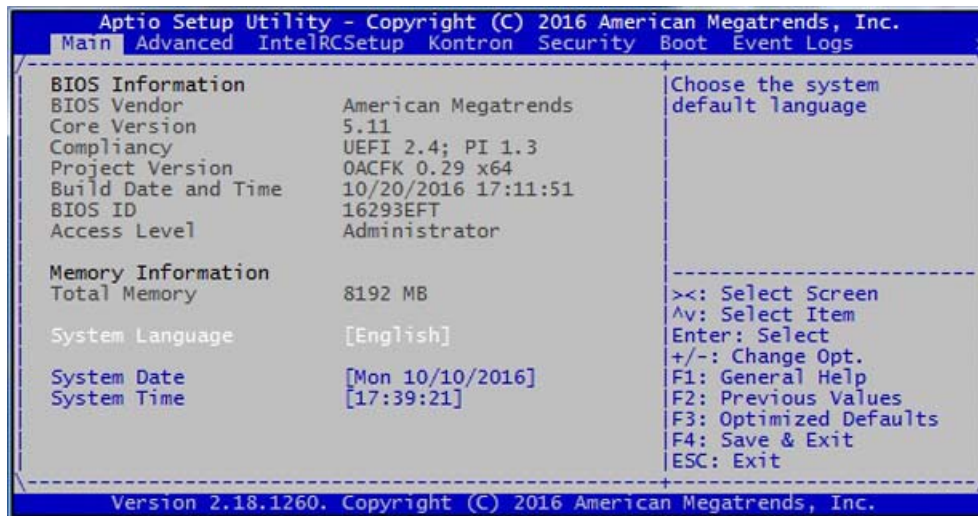
Depending on the menu item selected, one of the following occurs:

- ▶ A pop-up window prompts users to enable/disable the selected item.
- ▶ A window appears with a list of options to choose from.
- ▶ A window appears prompting the user to supply input.
- ▶ Links to the submenu.

While the menu item is highlighted, its corresponding Help text is also displayed to help explain the purpose of the item.

- ▶ Use < ESC > to get out of the current menu item and jump to its parent item

3 / Main Menu



The Main Menu is the first accessible setup page and provides BIOS information as the **BIOS ID** to identify the BIOS version and the **Build Date and Time**.

The total of initialized memory is also displayed.

Only English is supported as **System Language** in this version.

The **System Date** and **System Time** fields allow the user to specify the month/day/year as well as the hour/minute/second of the system.

Time is represented in a 24-hour format.

To update the **System Date**, use the <+> or <-> keys to select the Month (<+> to increase / <-> to decrease the number of the month), and press the <Enter> key to validate your choice. Proceed in the same way for the day and finally for the year.

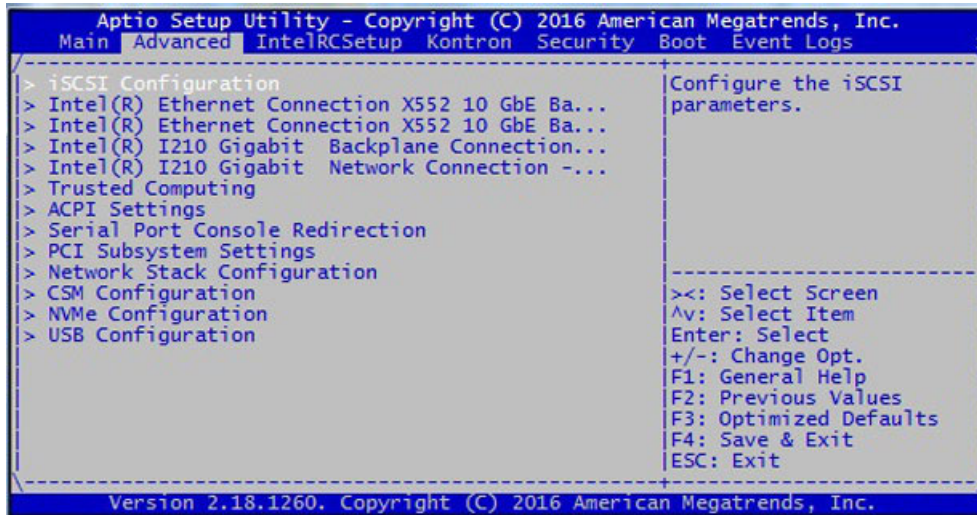
To update the **System Time**, use the <+> or <-> keys to select the Hour (<+> to increase / <-> to decrease the hour), and press the <Enter> key to validate your choice. Proceed in the same way for the minutes and finally for the seconds.

BIOS always reads a Real Time Clock to display the date and the time at each power-on.

To keep the current date and time, the RTC must be supplied by an external battery.

However, the VX6090 board can operate safely without any battery fitted. In this case, the BIOS non-volatile settings and the user settings are stored in a specific area of the BIOS SPI Flash. The date/time are lost at each power-down and the BIOS initializes the RTC with the BIOS build date/time.

4 / Advanced Menu

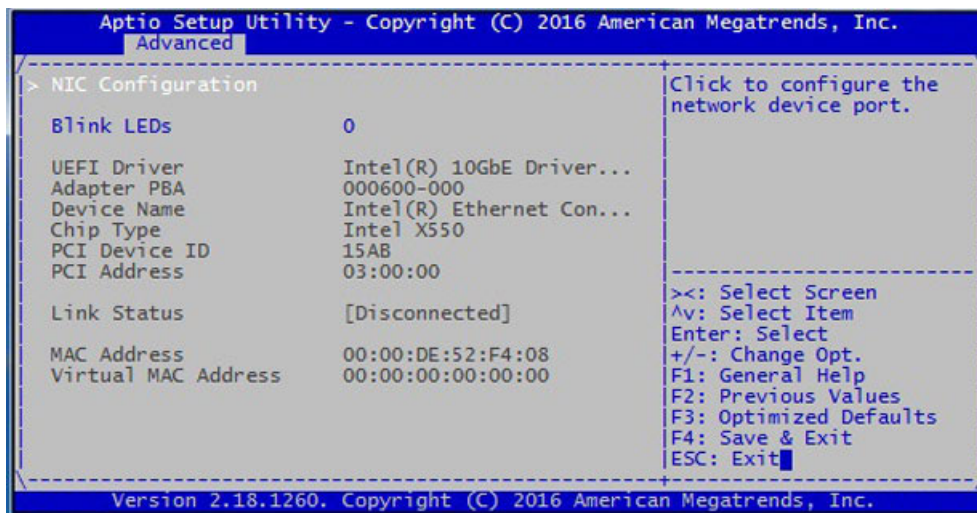


The Advanced menu provides information about the Ethernet interfaces of the board (CPUA or CPUB side): the 10GbE backplane interfaces of the X552 controller LAN0/LAN1, the 1GbE backplane interface (1000BASE-KX) of the i210S controller LAN3 and the 1 GbE interface (1000BASE-T) of the i210T controller LAN2.

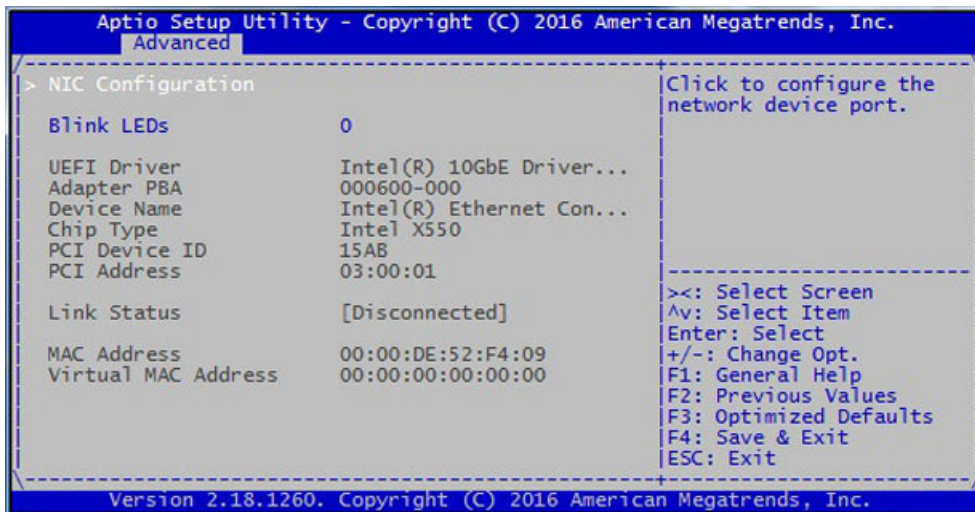
The Ethernet Interfaces are listed in the PCI discovery order.

The corresponding forms display information as the Hardware MAC address and the PCI address or PCI deviceID (also returned by the pci EFI shell command).

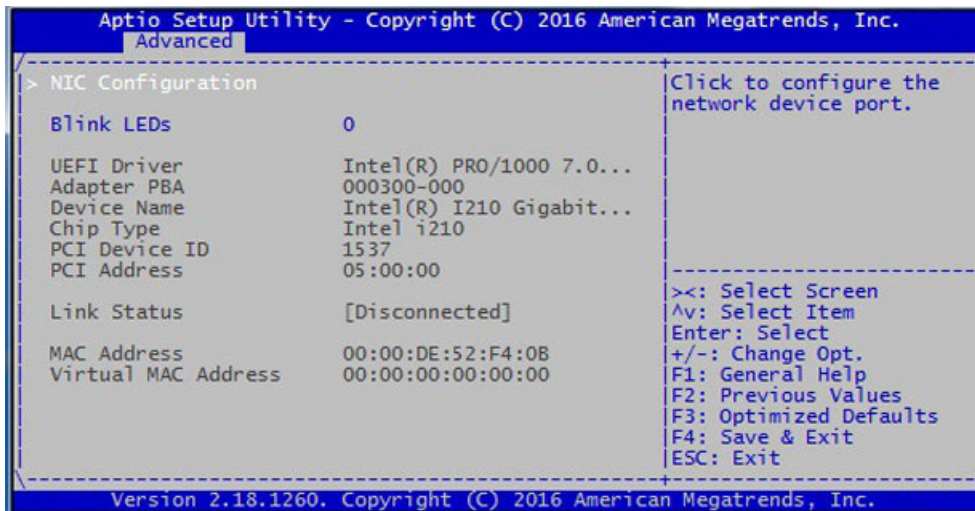
For the 10 GbE Ethernet interface LAN0:



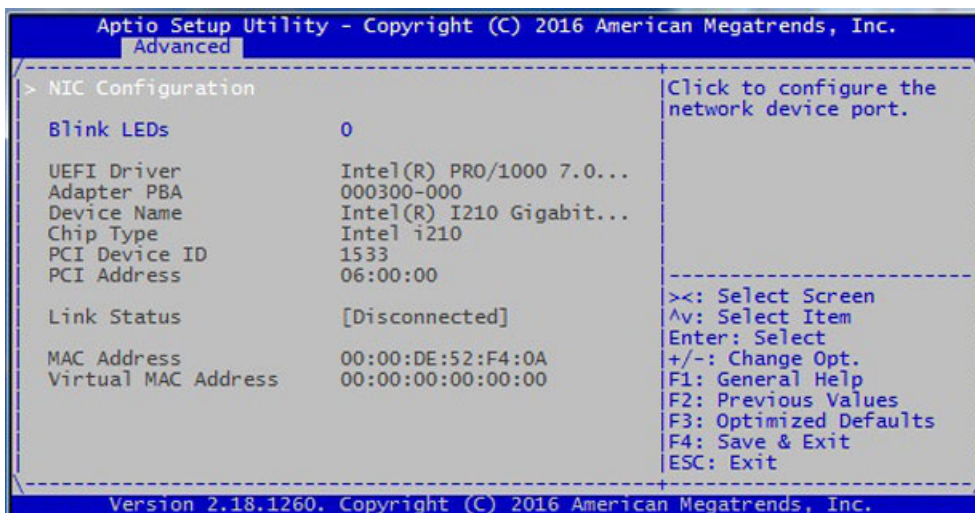
For the 10 GbE Ethernet interface LAN1:



For the 1 GbE Ethernet interface LAN3 (backplane 1000BASE-KX):



For the 1 GbE Ethernet interface LAN2 (1000BASE-T):



The Advanced setup page also provides configuration menus as:

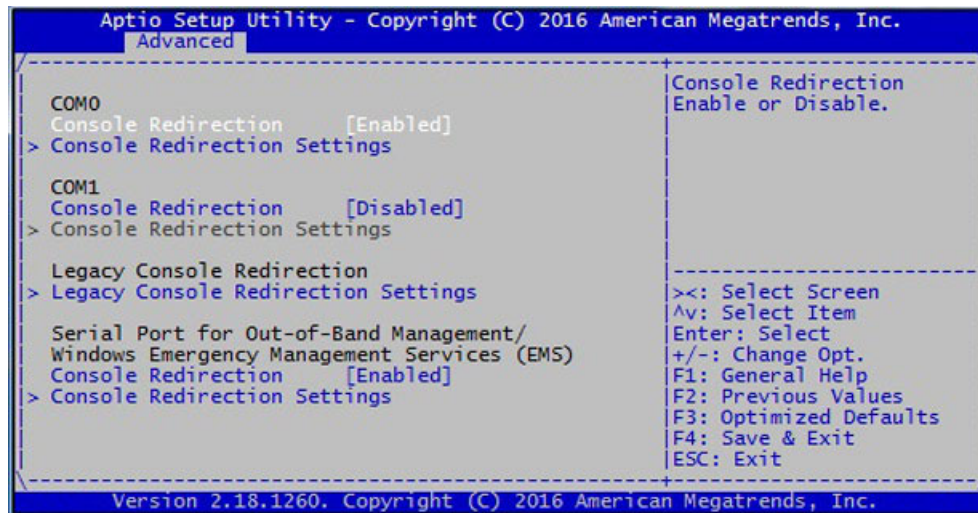
- ▶ Serial Port Console Redirection - Section 4.1 page 7
- ▶ CSM Configuration - Section 4.2 page 9
- ▶ USB Configuration (Legacy support) - Section 4.3 page 10



The other submenus should NOT be modified

4.1 Serial Port Console Redirection

The BIOS console can be redirected to the serial COM0 and/or the serial COM1 with the Console Redirection menus. Also the characteristics of the COM0 or COM1 serial line can be modified with the Console Redirection Settings menus as described after:



4.1.1 COM0/COM1 Console Redirection

Without graphic option, it is necessary to enable the **Console Redirection** on one serial line to access the BIOS setup and the EFI shell.

Console Redirection may be enabled or disabled on each serial line independently.

By default the redirection is enabled on COM0 and disabled on COM1.



To display the PXE messages on the COM1 serial line instead of COM0, change the **Legacy Serial Redirection** option to **COM1** in the **Legacy Console Redirection Settings** submenu.

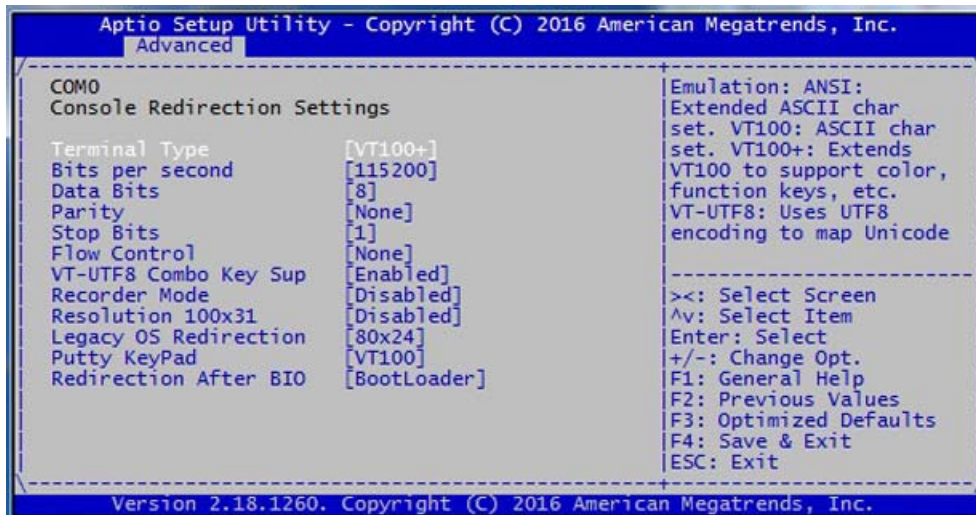
However, OS will need to use this line as console also.

4.1.2 COM0/COM1 Console Redirection Settings

This menu allows to configure several parameters for a serial line on which the console redirection has been enabled. The main configurable parameters are:

- ▶ Terminal Type
- ▶ Bits per second
- ▶ Data Bits
- ▶ Parity
- ▶ Stop Bits
- ▶ Flow Control

This shows the default settings:

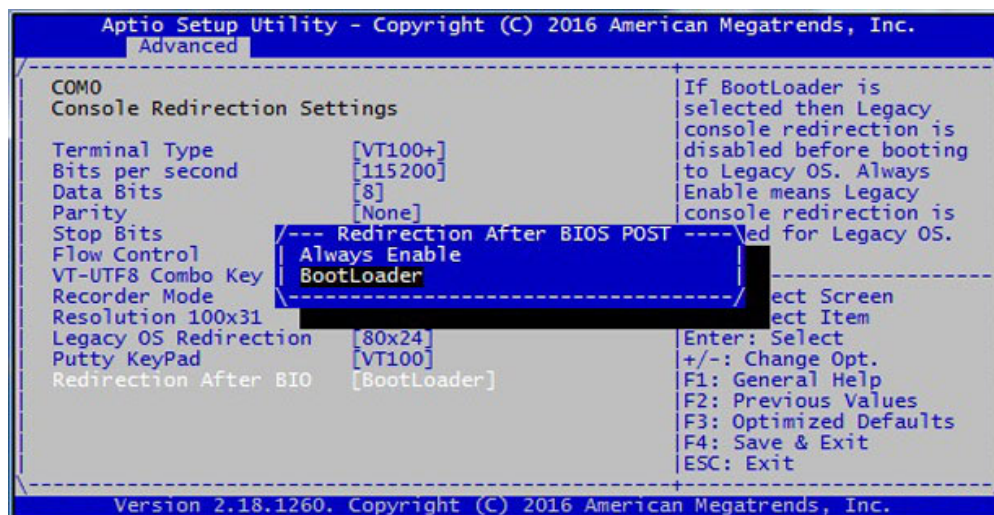


The **Redirection after BIOS** option is used to keep or disable the legacy console redirection before booting OS.

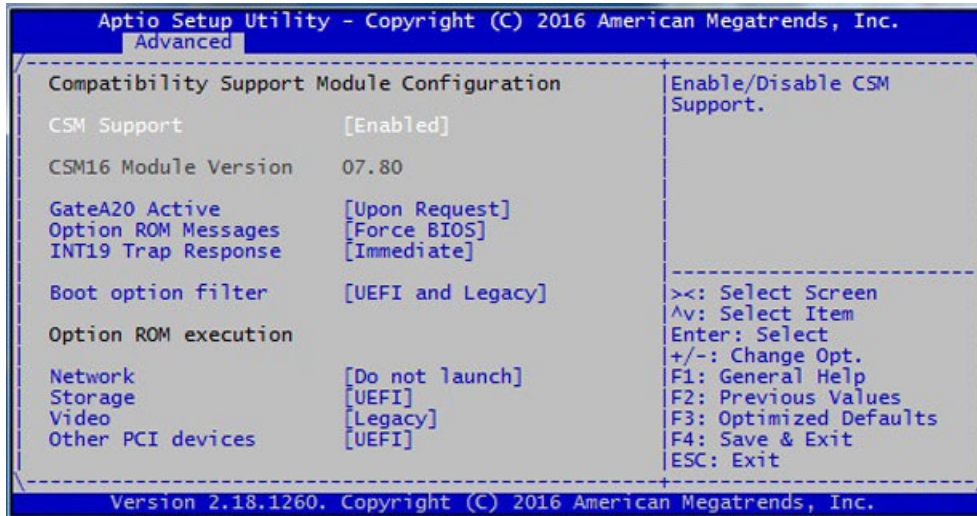
For example, set the option to **BootLoader** (default value) if Grub bootloader is booted to prevent any double display on the serial line.

Thus, only the bootloader will control the line.

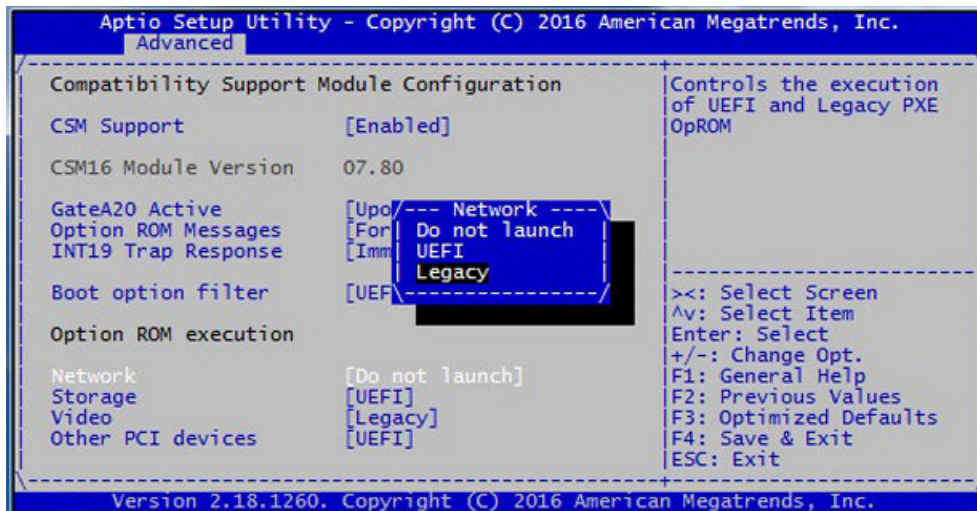
If PXE boot is used, you must set the option to **Always Enable** to get the PXE boot messages.



4.2 CSM Configuration

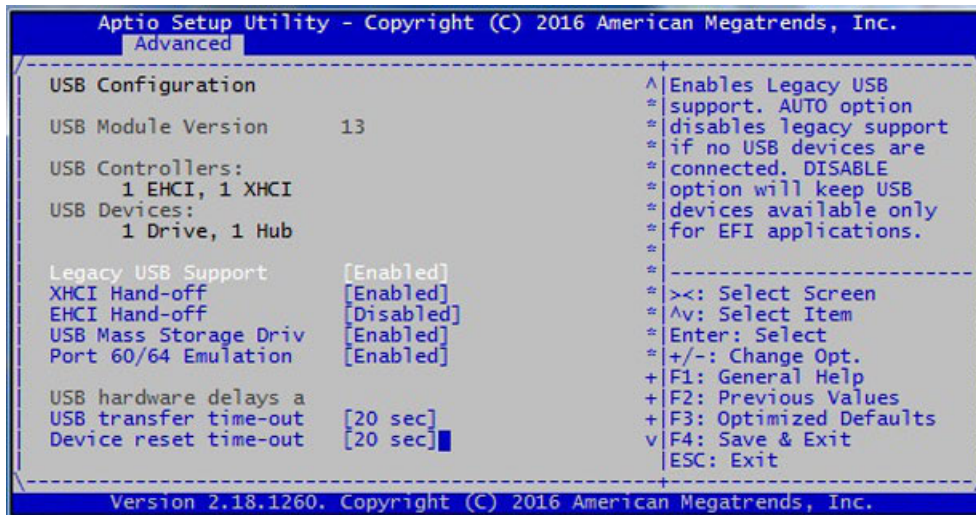


The **Network option** is used to enable/disable the execution of the network device OpROMs.
 Set the option to **Legacy** to enable PXE boot.



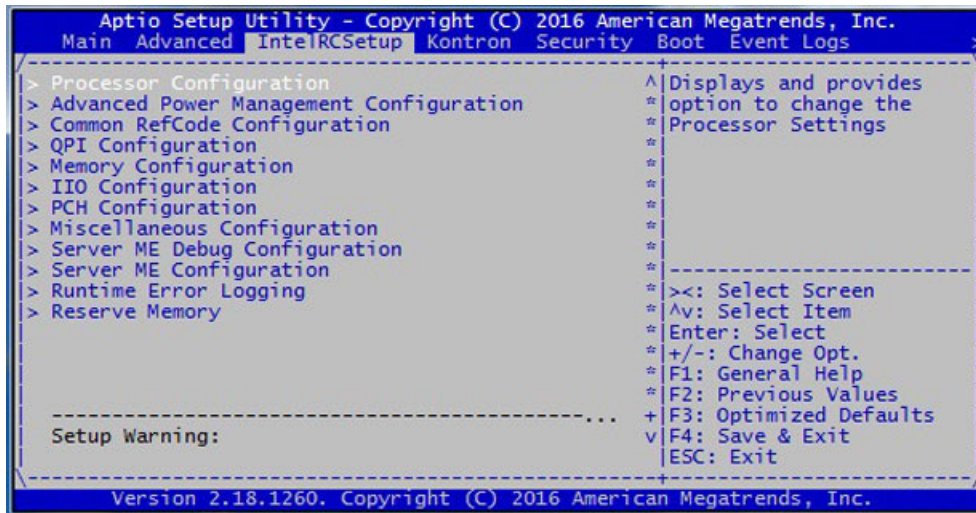
4.3 USB Configuration

This menu is used to enable/disable the **Legacy USB Support** (such as DOS legacy environment) and avoid boot from a USB device.



The other options should not be changed.

5 / IntelRCSetup Menu

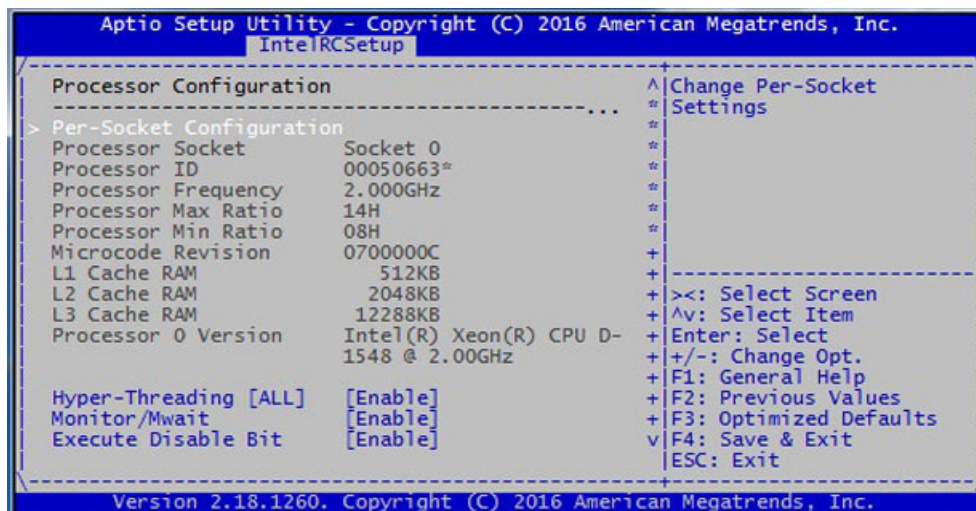


The following chapters describe the settings tested on VX6090. All the other settings should not be modified to prevent malfunction.

5.1 Processor Configuration

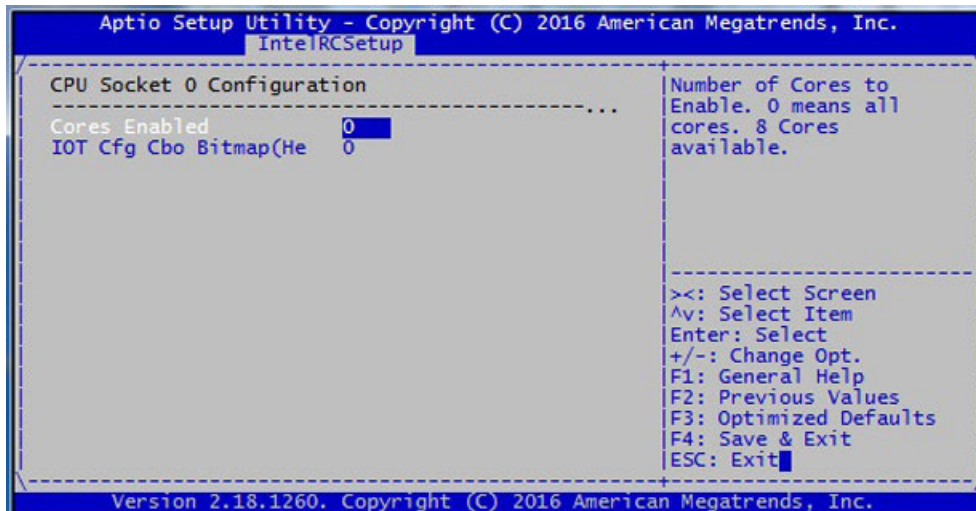
This menu displays the CPU configuration.

On VX6090 boards, the unique socket (0) is equipped with Intel® Xeon® D-1548 @ 2.00 GHz."

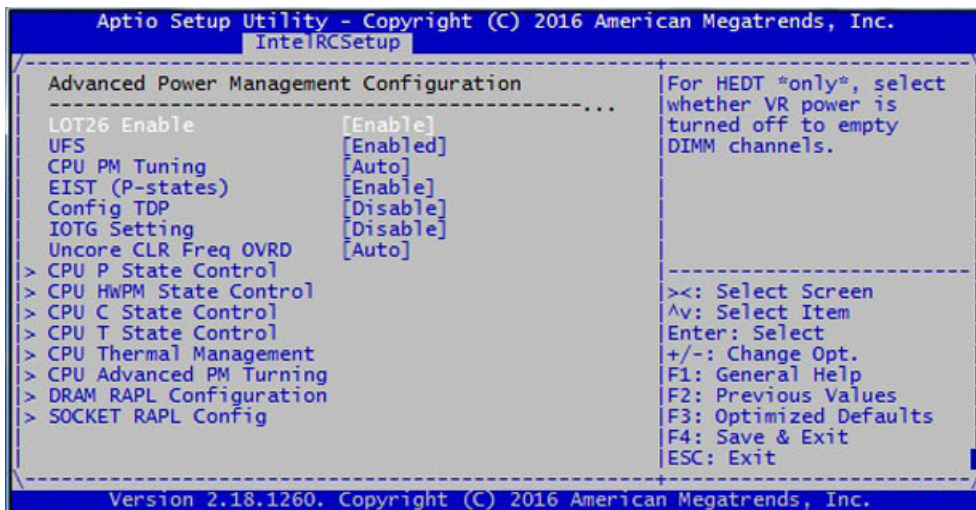


The **Hyper-Threading** option is used to enable/disable the logical processor threads globally (2 logical threads per core).

In the **Per-Socket Configuration** submenu for socket 0, the **Cores Enabled** option defines the number of cores to activate, 0 meaning all cores (default).



5.2 Advanced Power Management Configuration



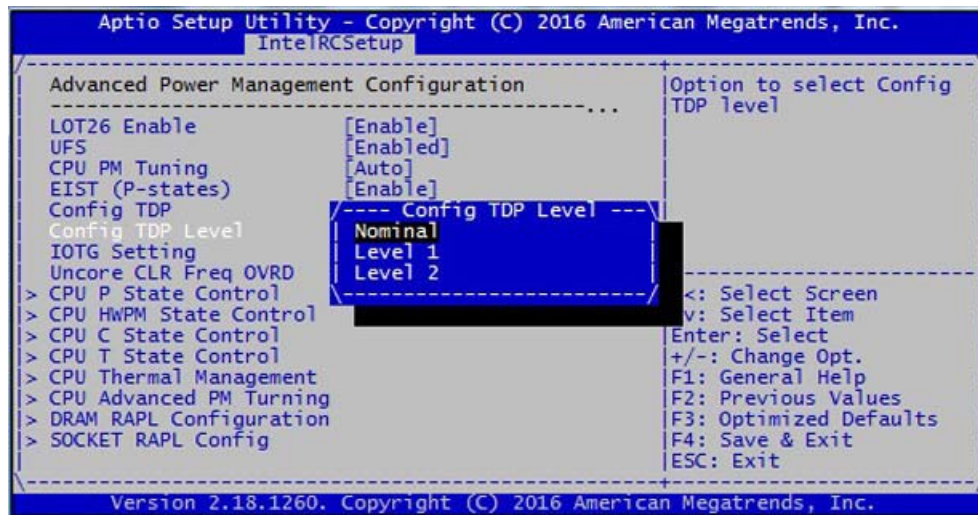
5.2.1 EIST

The **EIST (P-states)** option enables/disables the Enhanced Intel Speed Step feature. Default is Enabled. When enabled, the OS can set the CPU frequency according to load. When disabled, the CPU frequency is set at the Max non-Turbo frequency.

Refer to the VX6090 User's Guide for CPU frequency information according to the processor version.

5.2.2 Config TDP

When **EIST** is enabled, the **Config TDP** option allows to select the **TDP level** (Thermal Design Power). Each TDP level allows the OS to set the CPU frequency ratio within a specific range [Min Ratio, Max Ratio].



The Nominal TDP level for a Xeon D-1548 processor @ 2.00 GHz sets the Min Ratio to 8 and the Max Ratio to 20, meaning the minimum frequency can be set to 800 MHz/16 W and the maximum non turbo frequency can be set to 2000 MHz/45 W. The Level 1 TDP level sets the Min Ratio to 8 and the Max Ratio to 15, meaning the minimum frequency can be set to 800 MHz/16 W and the maximum non turbo frequency can be set to 1500 MHz/36 W.

5.2.3 Turbo Mode

When **EIST** is enabled, the **Turbo Mode** option can be enabled/disabled in the **CPU PState Control** submenu.

Turbo mode allows the CPU to operate at a higher frequency for a while when enough power is available.

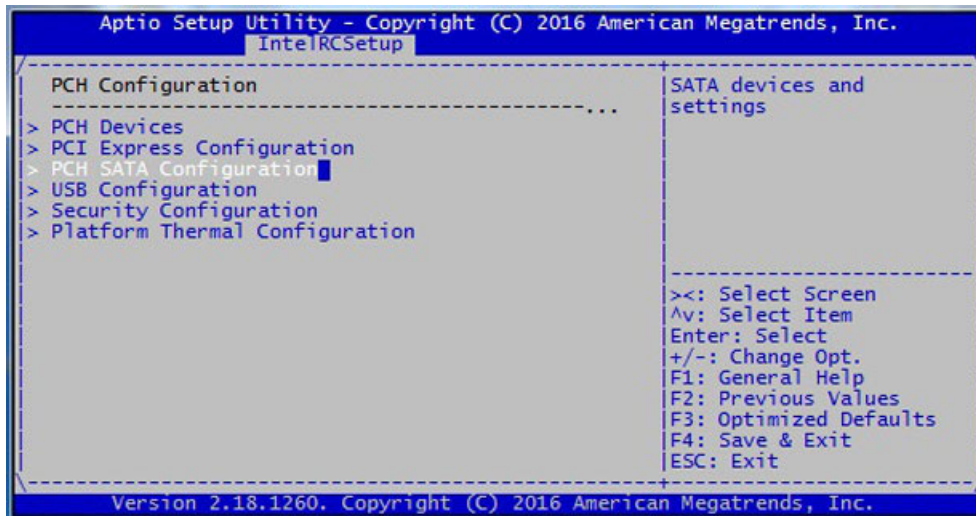
The following timings associated with **Turbo Mode** can be configured in the **SOCKET RAPL Configuration** submenu: Long Duration Power Limit, Long Duration Time Window, Short Duration Power Limit. For more information, refer to the Intel® Turbo Boost Technology documentation.

5.2.4 C States

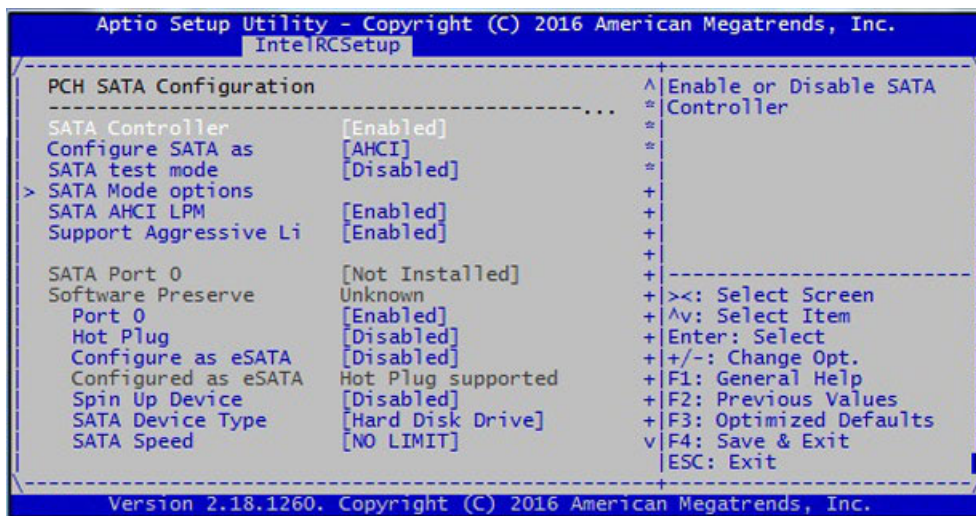
The **Enhanced Cx State** is enabled by default and can be disabled in the **CPU C State Control** submenu. This option controls the Package C state.

BUT to guarantee the minimal C1 state on the core when the CPU is in IDLE mode, the setup option **Monitor/MWAIT** must also be disabled in the **Processor Configuration** submenu. Disabling this option will automatically disable C states.

5.3 PCH Configuration

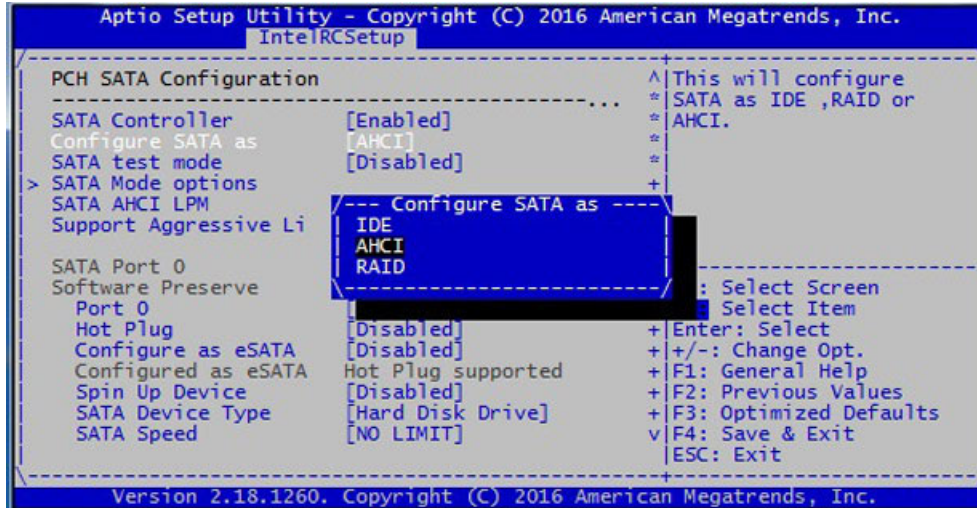


5.3.1 SATA Configuration



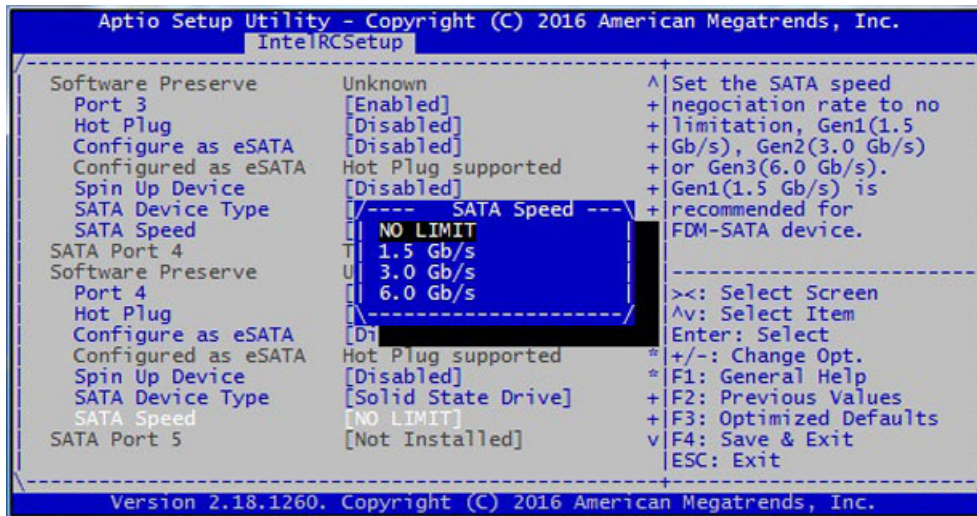
This menu can be used to :

- ▶ Select the SATA mode (AHCI or IDE)



RAID mode is supported by the BIOS but has not been tested.

- ▶ Select the maximum speed for each SATA port:



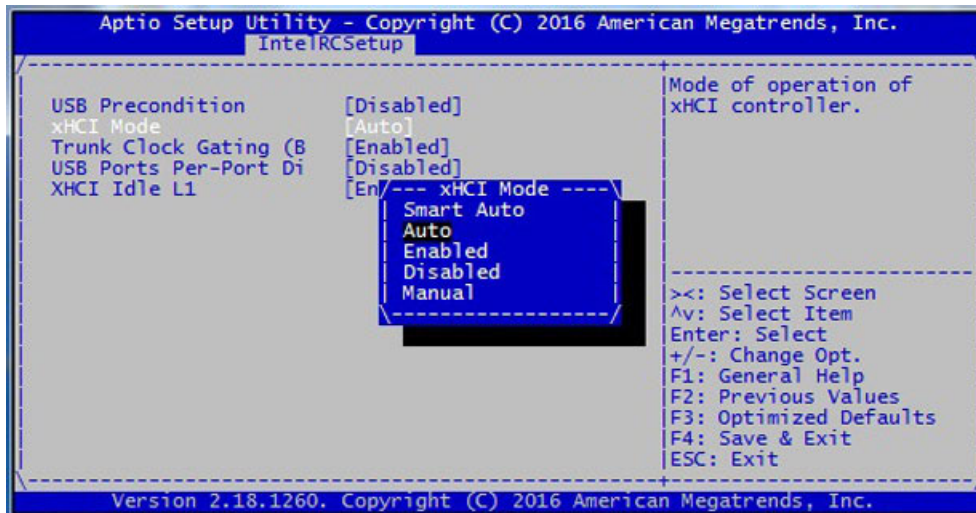
By default, the SATA Speed for each Port is not limited (**NO LIMIT**).



1. In AHCI mode, the SATA controller speed takes precedence over the SATA speed by port.
2. In IDE Mode, only the SATA speed by port can be set.
3. In AHCI mode, usually, the operating system renegotiates the SATA speed based on the capabilities registers. It is possible to force the SATA speed using the `libata.force` option at the kernel command line to boot Linux OS.

5.3.2 USB Configuration

This menu is used to configure the xHCI controller mode.

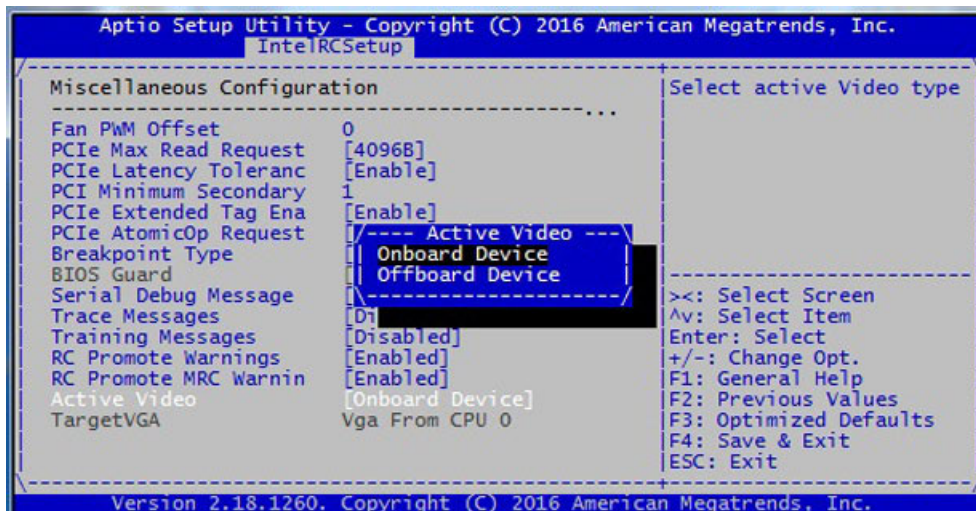


When the **xHCI mode** option is **Enabled**, it allows USB 3.0 SuperSpeed devices to be supported in BIOS and OS. The xHCI controller is turned on. All the VX6090 USB ports (USB 2.0 and USB 3.0) are routed to the xHCI controller.

When the **xHCI mode** option is **Auto**, this mode uses ACPI protocol to provide an option to enable the xHCI controller and reroute the USB ports via the _OSC ACPI method call. With this mode, USB 2.0 devices work in BIOS and OS. USB 3.0 SuperSpeed does not work but should work as High Speed Devices.

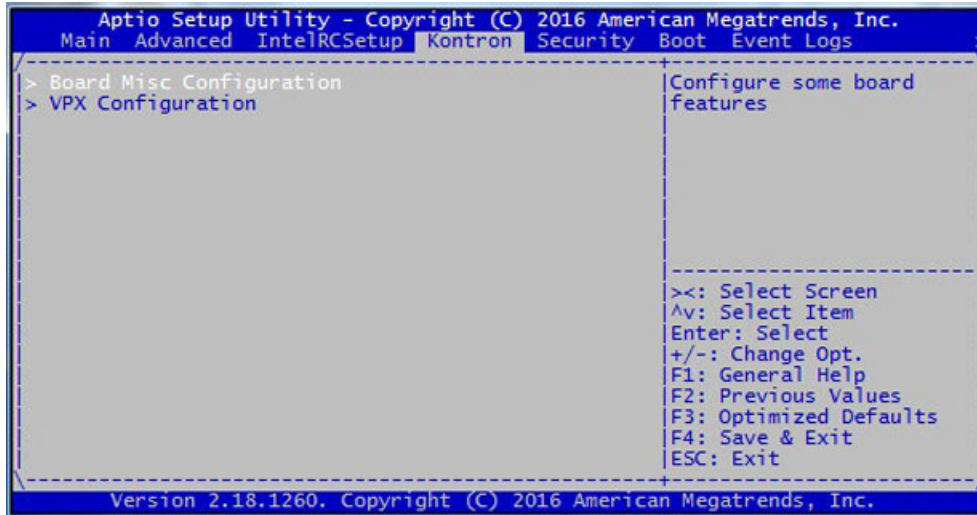
5.4 Miscellaneous Configuration

In this menu, the **Active Video** option is used to select the video either from the **Onboard device** (Silicon Motion SM750 graphic controller) or from a **Offboard device** (graphic card connected on the VPX backplane and discovered on the PCIe).

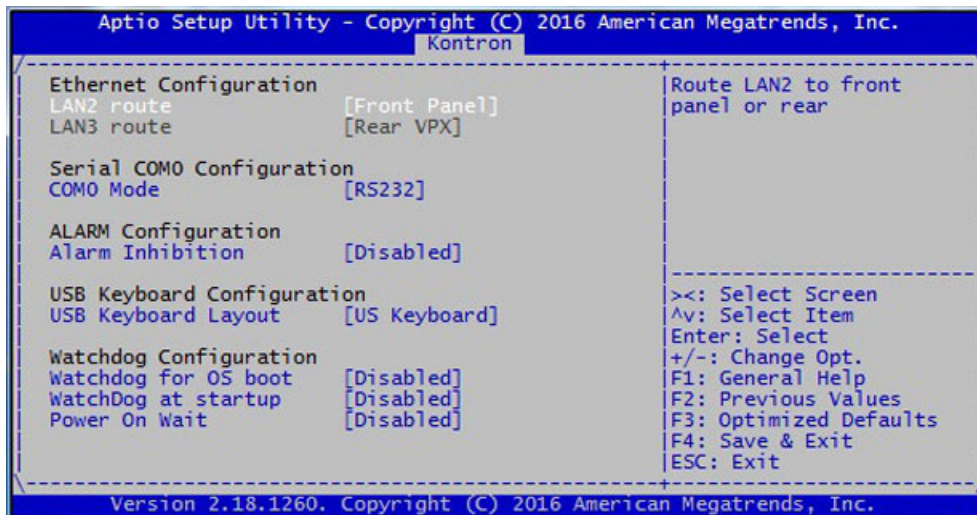


6 / Kontron Menu

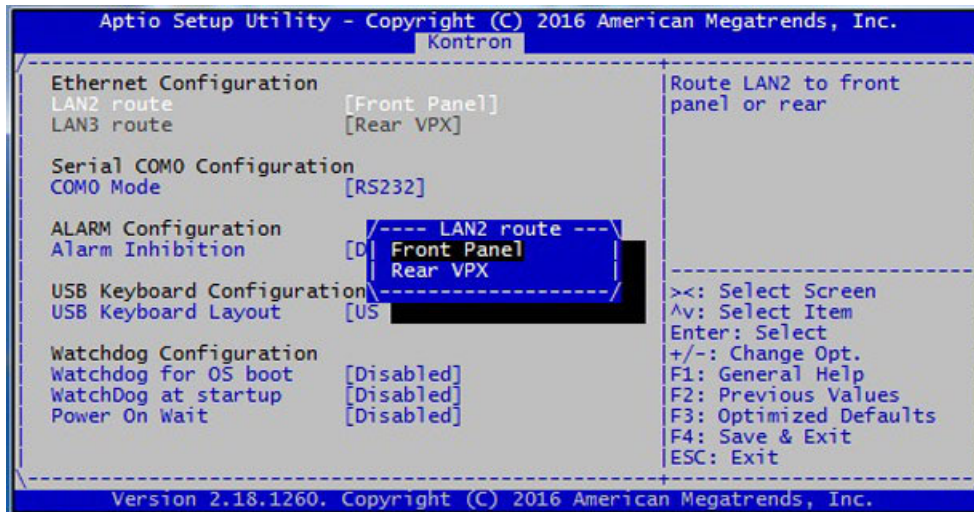
This menu is used to configure specific VX6090 hardware design.



6.1 Board Misc Configuration



6.1.1 Ethernet Configuration



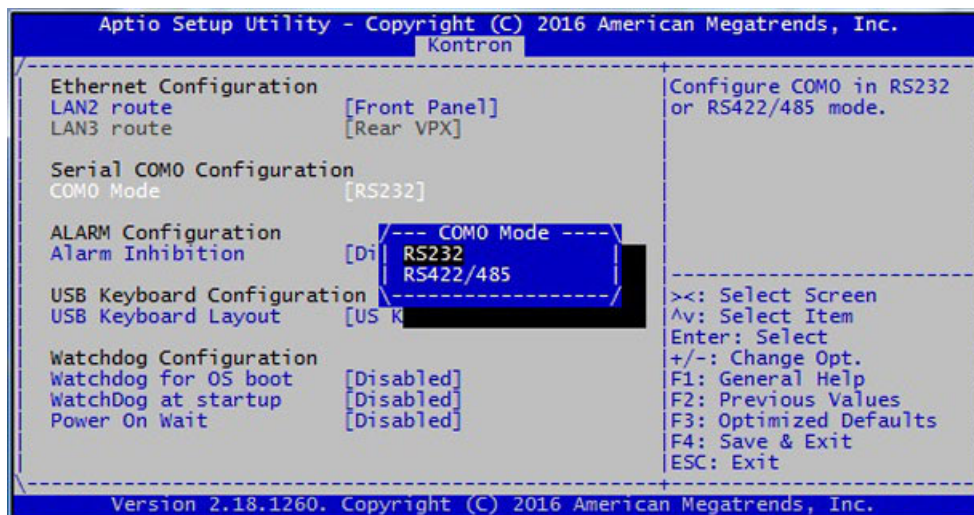
- ▶ The **LAN2 route** option is used to physically route the ETH2 1000Base-T interface to the front panel (default setting) or to the rear.
- ▶ The **LAN3 route** option is used to physically route the ETH3 1000Base-BX interface to the backplane (default setting) or to the LAN3 interface of the other CPU side.

However, depending on the board revision, **LAN3 route** may be forced by the hardware (SW3B microswitch setting) and thus cannot be manageable under setup (grayouted option).

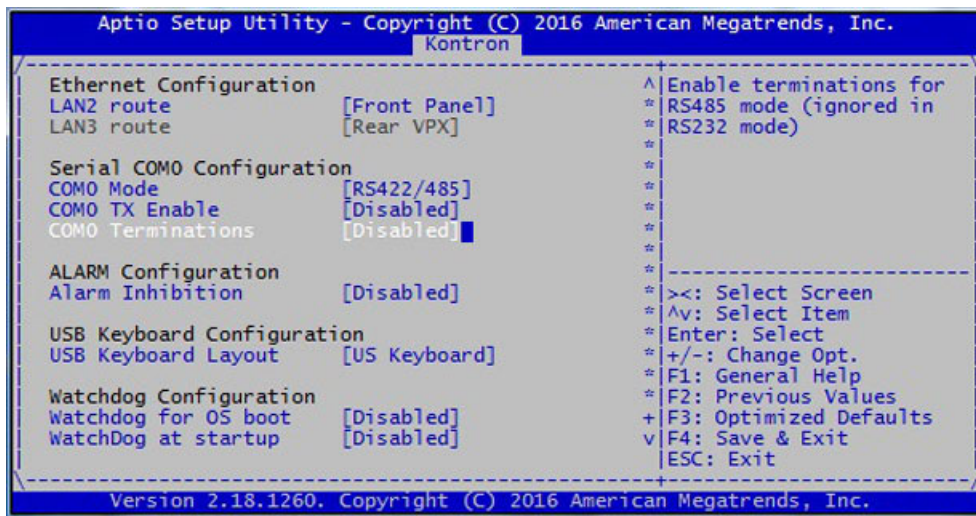
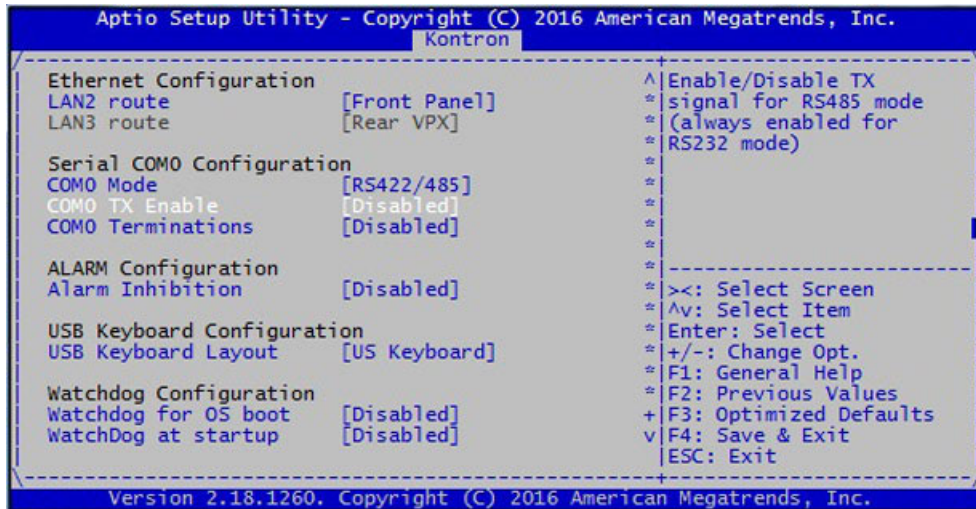
Note that if the **LAN3 route** is managed by the software it is only done from the CPUA side.

6.1.2 Serial COMO Configuration

The **COMO Mode** option is used to select the serial line mode to RS232 or RS422/485.



If **RS422/485** mode is selected, then the **COMO TX Enable** and **COMO Terminations** options are available to adapt the line to the configuration used.



User must turn off the system after saving the settings to have the new Serial configuration taken into account.

When COM0 Mode is set to RS422/485, then COM1 is not operational anymore.

6.1.3 Alarm Configuration

The **Alarm Inhibition** option is used to prevent the cPLD logic to turn off automatically the system in case of THRMTRIP# or PROCHOT# alerts assertion.

By default, alarms are enabled.

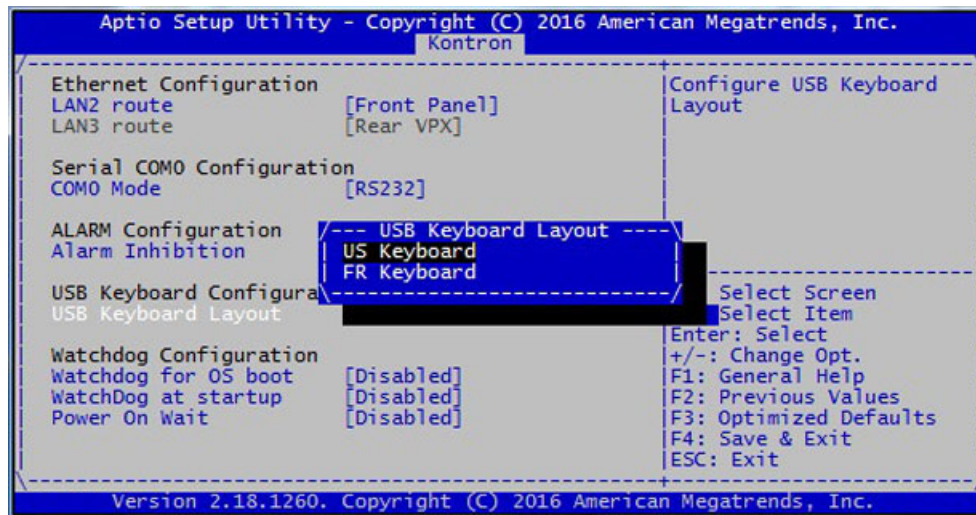


It is highly recommended to not change the default setting for normal use.

This parameter must be used with caution.

6.1.4 USB Keyboard Configuration

The **USB Keyboard Layout** option is used to choose either a qwerty or an azerty keyboard map.

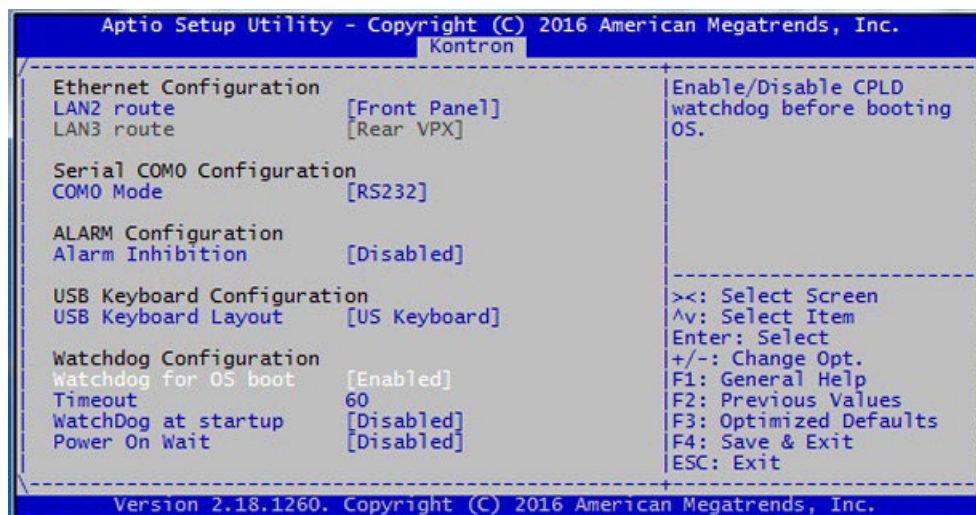


As only the English language is supported under BIOS, accented characters of the French key' board cannot be managed. Moreover, the characters "°", "£", "¤", "µ" and "§" are not displayed either.

6.1.5 Watchdog Configuration

The **WatchDog for OS boot** option enables/disables the cPLD Watchdog Timer at Legacy or EFI boot time.

The timeout value can range between 1 sec and 511 sec. This can be adjusted up and down by using the keys <+> or <->.



If enabled, the timer will start to count down at device boot time.

Only the Power-cycle mode is handled.



The WatchDog for OS setting is kept by the Setup even after a timeout has occurred.

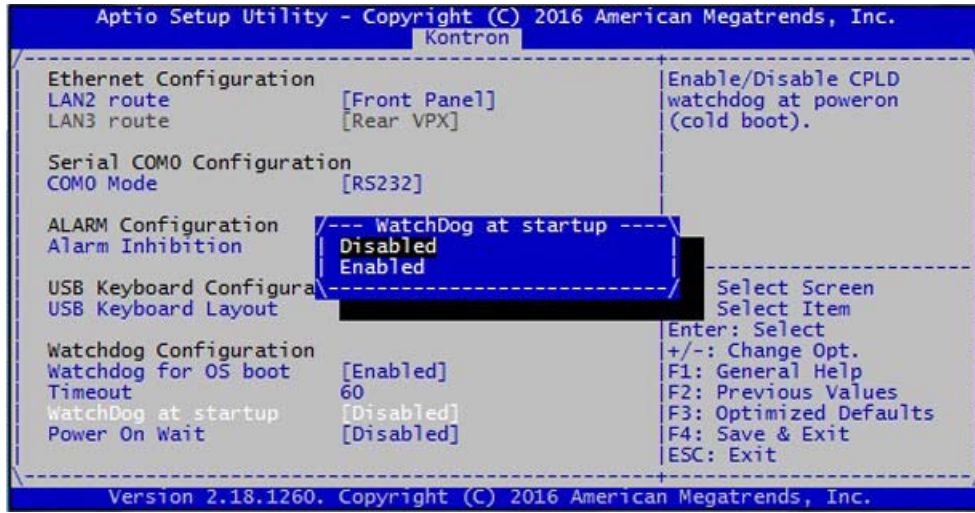


Since BIOS version ID17097 the watchdog feature is applied not only to legacy boots but also to UEFI boots. As the UEFI shell is a UEFI boot device, the watchdog is operational under the shell also.

See recommendation 9. in section 12.1 page 41.

The **WatchDog at Startup** option enable/disable the cPLD Watchdog Timer at Power-On.

The timeout value is set to 31 sec and is not configurable.

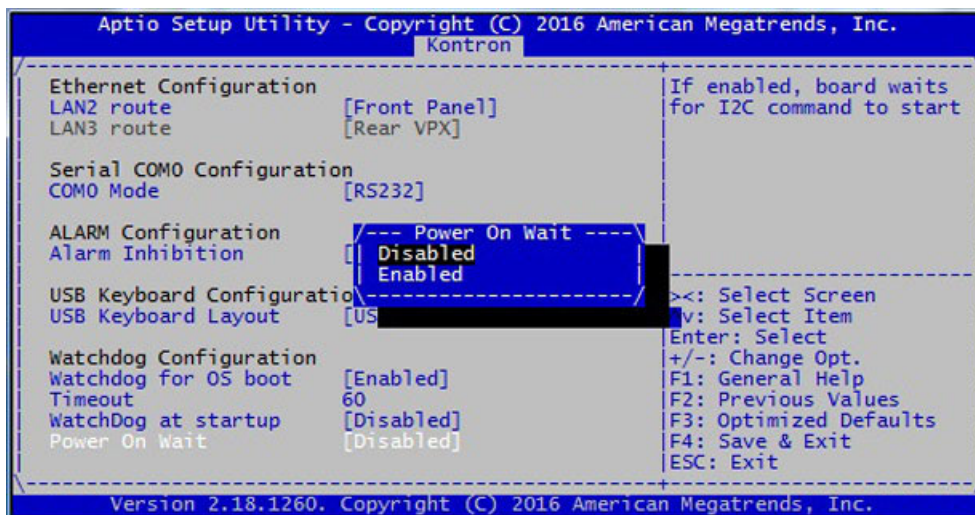


After enabling the feature, the timer will start only at the next board Power-On.

Only the Power-cycle mode is handled.

In case of failure, the board startup can be retried 6 times.

The **Power On Wait** option allows an external equipment to power-on the CPU remotely by using the I2C backplane.



On VX6090, the CPLD of each CPU side is accessible separately so it is possible to enable the Power On Wait option separately and for example to power on CPUB from CPUA.

6.2 VPX Configuration

▶ On CPUA

```

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
Kontron
VPX Maskable Reset : [Enabled]
VPX Resets Output : [Set by SYSCON]
VPX SYSRESET Input : [Enabled]
VPX Switch : [Disabled]
VPX Local Delay : [200 ms]
VPX EEPROM Config. : [Disabled]
VPX Switch Mode : [Set by SYSCON]
VPX Link Width : [1x8]
VPX Link Speed : [GEN3]
Propagation of VPX Maskable Reset to the Local Reset. Default is reset propagated.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1260. Copyright (C) 2016 American Megatrends, Inc.

```

▶ On CPUB

```

Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
Kontron
VPX Maskable Reset : [Enabled]
VPX Resets Output : [Set by SYSCON]
VPX SYSRESET Input : [Enabled]
Propagation of VPX Maskable Reset to the Local Reset. Default is reset propagated.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1260. Copyright (C) 2016 American Megatrends, Inc.

```



The backplane PCIe Switch is only managed from CPUA.

6.2.1 VPX Maskable Reset

The **VPX Maskable Reset** option allows to propagate or not the Maskable Reset from the VPX backplane to the board. By default reset is **propagated**.

6.2.2 VPX Reset Propagation to VPX Backplane

The **VPX Resets Output** parameter allows to propagate or not the local resets of the board to the VPX backplane whatever the state of the **VPX SYSCON#** signal.

By default (**Set By SYSCON** setting) only the CPUA of the System Controller board propagates its local reset to the **VPX SYSRESET#** signal on the backplane.



Caution when using this parameter in a multi-boards system because ALL boards plugged on the VPX backplane can be affected by the **VPX SYSRESET#** signal.

This parameter can be used in conjunction with the parameter **VPX SYSRESET Input**.

6.2.3 VPX SYSRESET Input

The **VPX SYSRESET Input** parameter allows to propagate or not the **VPX SYSRESET#** signal from the VPX backplane to the board.

If this parameter is set to **[Disabled]**, VPX backplane reset has no effect on the board.

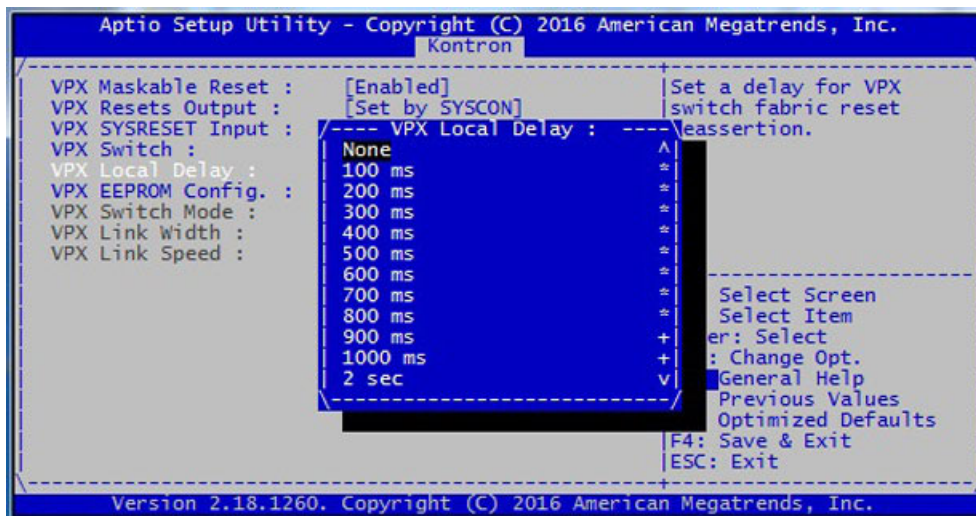
In a multi-boards configuration system, this parameter can be used in conjunction with the **VPX Resets Output** parameter.

6.2.4 VPX Switch (CPUA side only)

The **VPX Switch** option is set to **Disabled** by default and maintains the PCI-E switch PEX8725 component in reset state.

Set this option to **Enabled** to "open" access with the backplane PCI-E. See also section 6.2.6 page 24 for the EEPROM configuration.

6.2.5 VPX Local Delay (CPUA side only)



The **VPX Local Delay** option sets a delay for the PCI-E switch PEX8725 reset deassertion if the **VPX Switch** is enabled.

This can be useful in a multi CPU board system to delay the backplane PCI-E discovery for the System Controller board and adjust the boot sequence.

6.2.6 VPX EEPROM Configuration (CPUA side only)



CAUTION: The automatic EEPROM update to force different link speed and width according to the setup is not operational yet so this option must not be Enabled. See section 12.2 page 42

The factory process programs the EEPROM with a default image configuring the PCI-E switch in Non-Transparent mode, backplane link speed Gen3 and width x8.

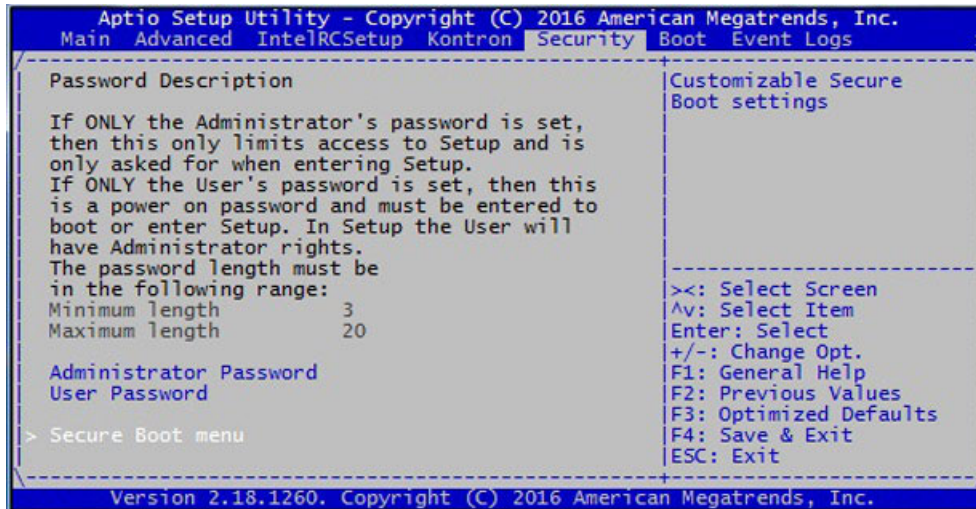
To configure the PCI-E switch in Transparent mode x8 Gen3 for the System Controller board, use the "**kvpx -plx_eeprom prog 0**" command instead.

See section 6.2.4 page 23 for enabling the PCI-E switch.

7 / Security Menu

The **Security** menu provides both **Administrator** and **User password**.

The Administrator and User passwords activate two different levels of password security as written in the following description:



If ONLY the User's password is set, then it must be entered to boot or to enter Setup and in Setup the User will have Administrator rights.

So to protect the BIOS settings at User level, it is required to also set an Administrator's password. In this case, the user does not have Administrator rights anymore.

When both passwords are set, user will have limited access to the Setup as changing the system date and time, selecting boot devices or change the devices boot order. <F4> key to **Save and Exit** is used to save the limited changes, <F3> key to **Load Optimized Defaults** is not allowed.

Note that if an Administrator's password is set, the user cannot change the User's password. This is only possible with the Administrator rights.

To enter the password:

- ▶ Select the administrator or user password item
- ▶ A pop-up window appears to create a new password
- ▶ Enter the password (from 3 up to 20 characters)
- ▶ A new pop-up window appears to confirm the password
- ▶ Save the password by selecting **Save Changes** in the **Save & Exit** menu.

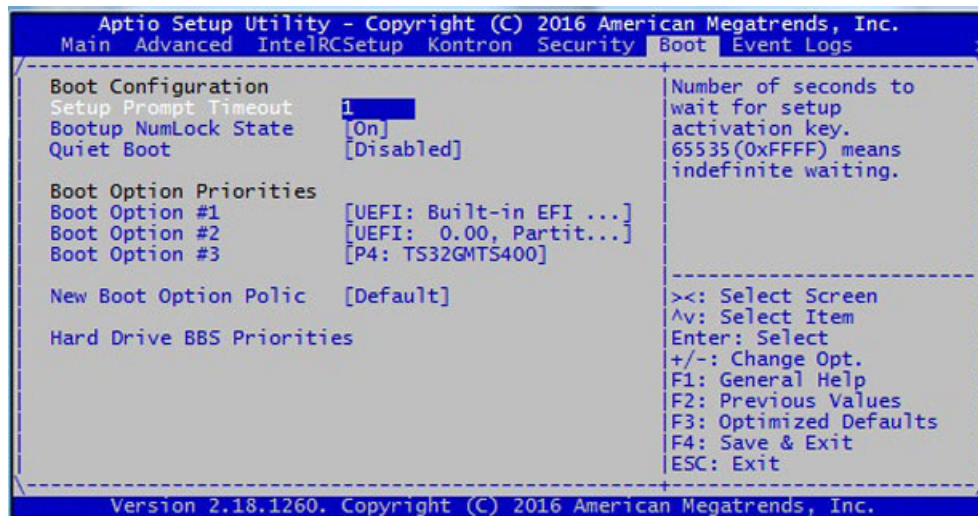
To suppress or change the password:

- ▶ Select the Administrator or User password item
- ▶ A pop-up window appears to enter the current password
- ▶ A new pop-up window appears to enter a new password
- ▶ Type the new password or enter <CR> to suppress the password
- ▶ Confirm the new password or confirm you want to clear the password
- ▶ Save the changes by selecting **Save Changes** in the **Save & Exit** menu.



If the password is lost, the only solution to unlock is to flash the BIOS again.

8 / Boot Menu



The Boot Menu is used to select the boot sequence of the available boot devices.

Boot settings are:

- ▶ **Setup Prompt Timeout:** Section 8.1 page 26
- ▶ **Bootup NumLock State:** Section 8.2 page 26
- ▶ **Boot Option Priorities:** Section 8.3 page 27
- ▶ **Network Device BBS Priorities:** Section 8.4 page 28
- ▶ **Hard Drive BBS Priorities:** Section 8.5 page 29



The VX6090 boot time is about 17s after a reset and 20s after a power-on, assuming network OpROMs are not launched and boot time ends when the EFI shell prompt appears. Boot time may also change depending a USB device is connected or not.

8.1 Setup Prompt Timeout

This option sets the time to wait (in second) for the setup activation key.

Default value is **1 sec**.

8.2 Bootup NumLock State

Set this option to **On** allows the Number Lock on the keyboard to be automatically enabled during boot up.

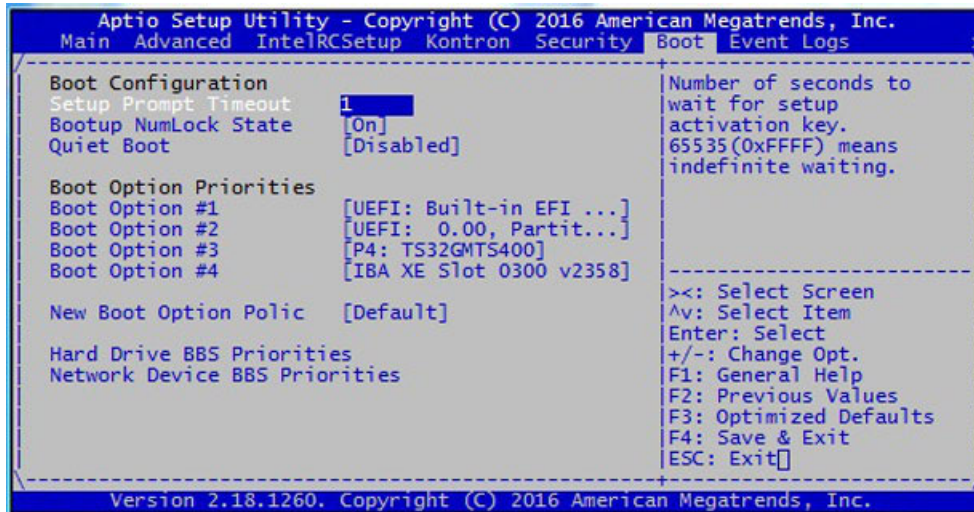
Default is **On**.

8.3 Boot Option Priorities

The **Boot Options Priorities** specify the boot order of the available boot devices.

The first device into the list is the first device that will be booted. If the boot is rejected (for example unsuccessful PXE boot) then the second device in the list will be used for boot and so on.

Here is an example of boot device list:



To change the boot device ordering

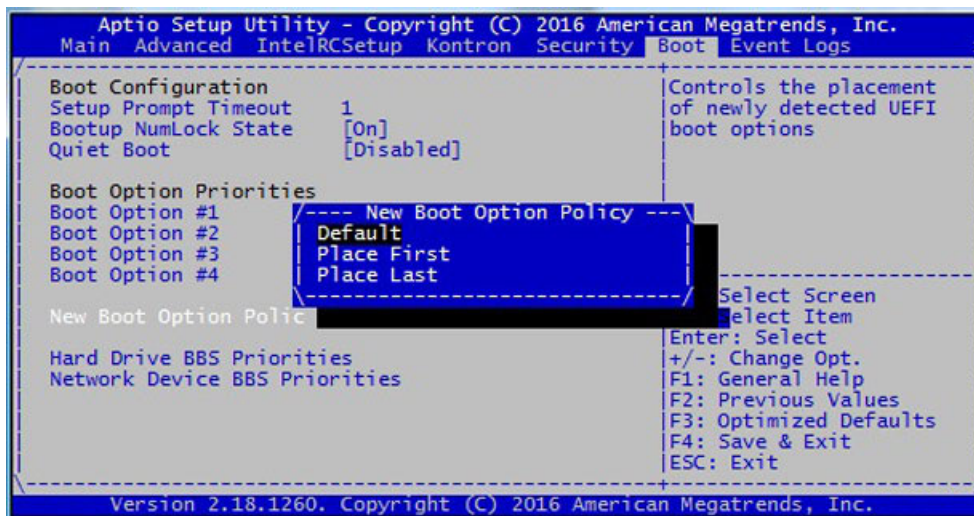
- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item)
- ▶ Use <+> or <-> control keys to move up/down the selected device item into the list



The possible family boot device can be SATA, USB or Gigabit Ethernet (Gbe). In the boot device item list only one item per family will appear. If more than one device is available for booting (for example 2 SATA disk or 3 Ethernets for PXE) then 2 new submenus can appear below the item list. So it can be:

- ▶ **Hard Drive BBS Priorities** This is the submenu for setting a SATA or USB boot order or deleting a SATA & USB boot possibility.
- ▶ **Network Device BBS Priorities** This is the submenu for setting a Gbe boot order or deleting a Gbe boot possibility

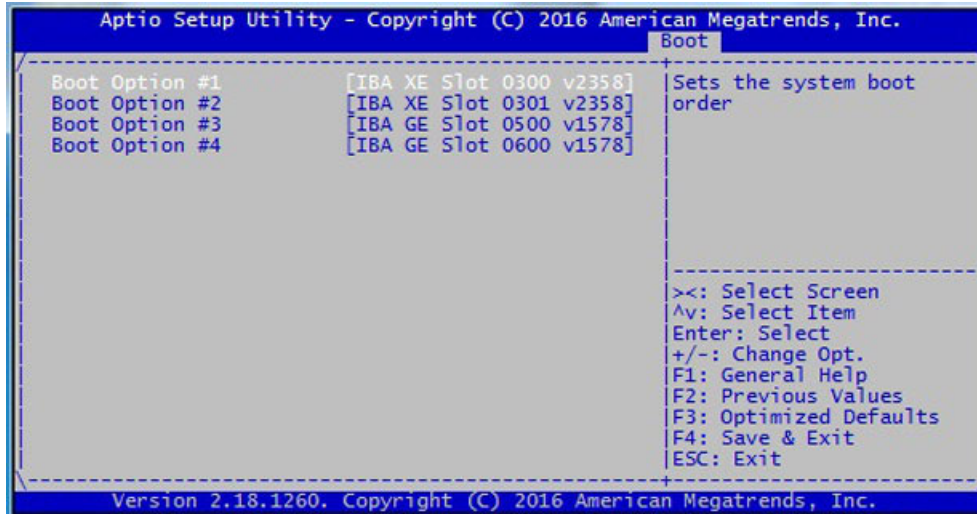
The **New Boot Option Policy** option can be used to control the placement of the newly detected UEFI boot options.



8.4 Network Device BBS Priorities

If the **Network OpROM** option in the Advanced/CSM Configuration menu has been set to **Legacy**, all the Ethernet interfaces become available for PXE boot.

Then, a new entry is displayed in the Boot menu. The **Network Device BBS Priorities** allows to configure the Ethernet boot devices order for PXE boot.



The entries "IBA XE Slot 0300" and "IBA XE Slot 0301" correspond to the 10 GbE interfaces of the Broadwell-DE, respectively LAN0 and LAN1.

The entries "IBA GE Slot 1100" and "IBA GE Slot 1200" correspond to the 1 GbE interfaces of the i210 controllers, respectively LAN3 and LAN2 (Pay attention to the LAN2 and LAN3 order in the list because LAN3 PCI device is detected first when scanning the PCI busses).

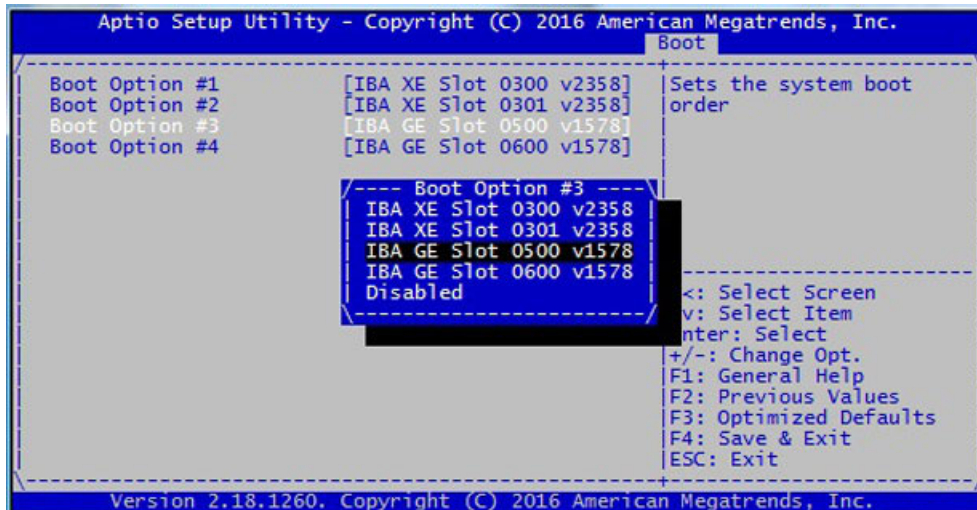
To change the PXE boot device ordering

- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item)
- ▶ Use <+> or <-> control keys to move up/down the selected device item in the list

To disable one of the PXE boot device

- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item)
- ▶ <Enter> to validate the choice

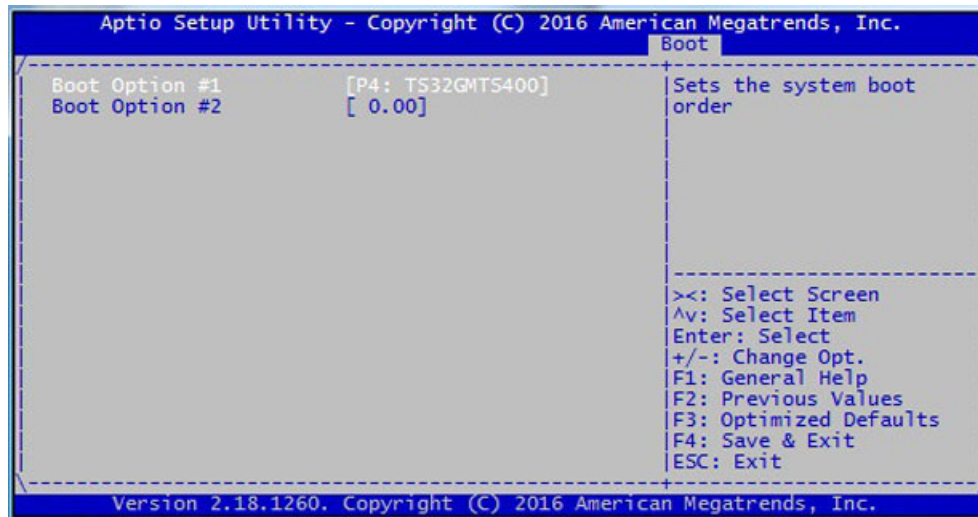
A new submenu appears (see image), select **Disabled** to disable the PXE device



8.5 Hard Drive BBS Priorities

The **Hard Drive BBS Priorities** entry appears when SATA or USB devices are present.

It allows to configure the SATA and USB boot devices order.

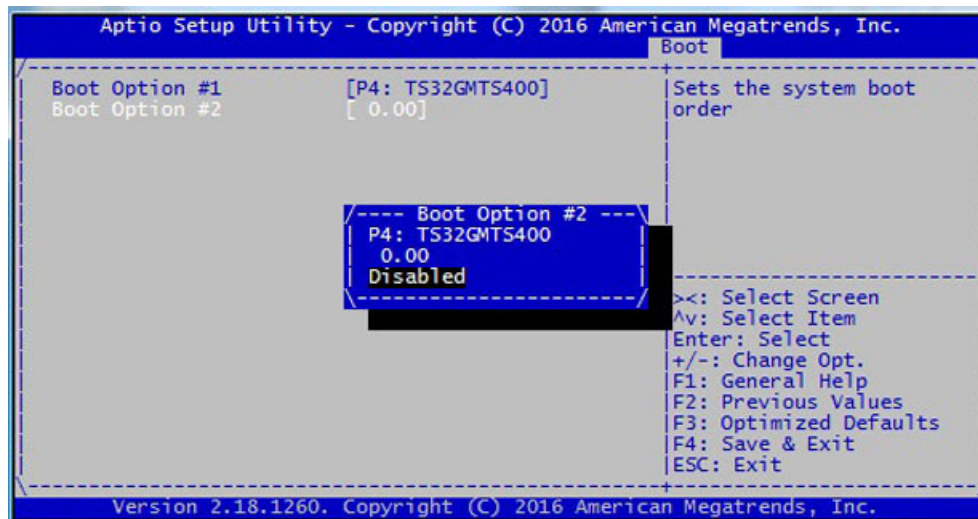


To change the boot devices ordering

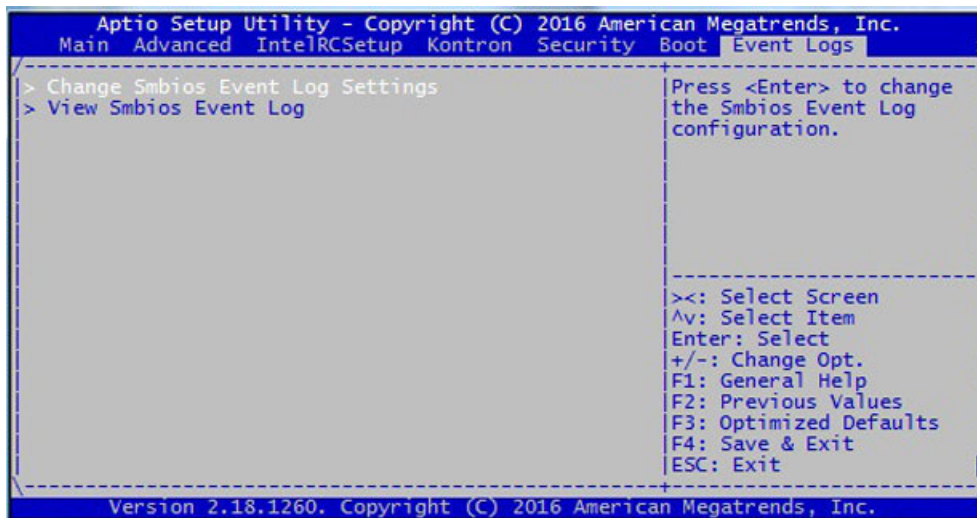
- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item)
- ▶ Use <+> or <-> control keys to move up/down the selected device item in the list

To disable one of the boot devices

- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item)
- ▶ <Enter> to validate the choice

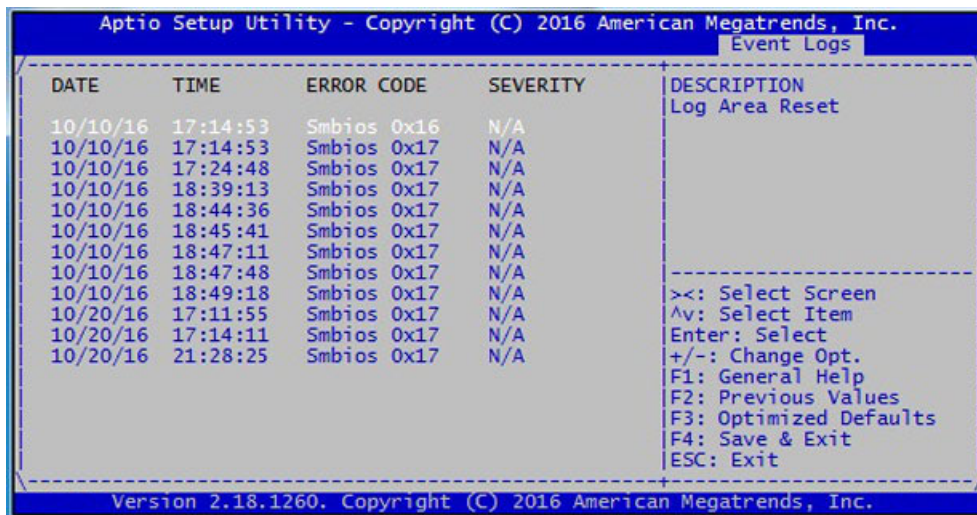


9 / Event Logs Menu



System events logged by the BIOS are displayed in the page **View Smbios Event Log**.

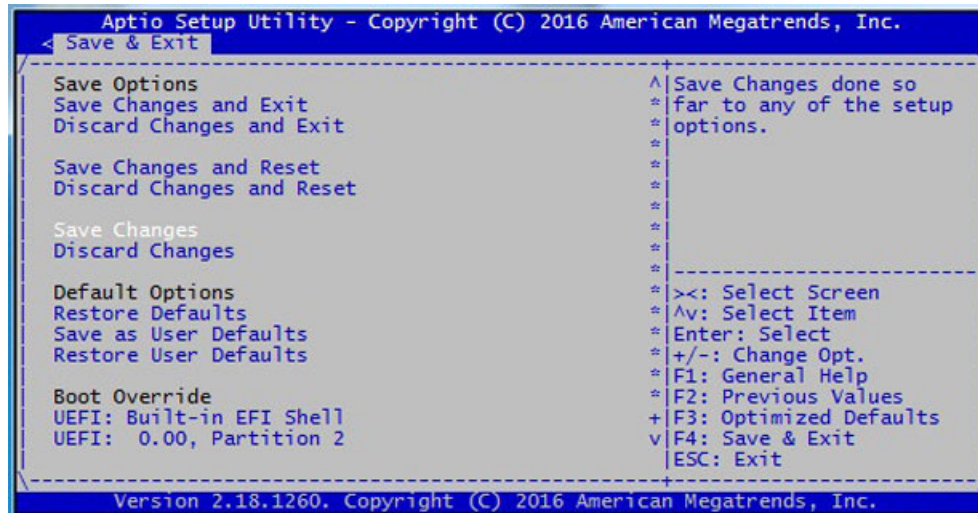
For example, it is possible to trace each time the system has been powered on or reset. System errors are also logged.



The page **Change Smbios Event Log Settings** is used for basic logging management.

10 / Save & Exit Menu

This menu does not appear when entering SETUP, it is necessary to navigate from the Main menu with <→> or <←> keys to find it.



The possible actions are

- ▶ **Save Changes and Exit:** section 10.1 page 31
- ▶ **Discard Changes and Exit:** section 10.1 page 31
- ▶ **Save Changes and Reset:** section 10.1 page 31
- ▶ **Discard Changes and Reset:** section 10.1 page 31
- ▶ **Save Changes:** section 10.2 page 32
- ▶ **Discard Changes:** section 10.2 page 32
- ▶ **Restore Defaults:** section 10.2 page 32
- ▶ **Save as User Defaults:** section 10.3 page 32
- ▶ **Restore User Defaults:** section 10.3 page 32
- ▶ **Boot Override:** section 10.4 page 32

10.1 Save/Discard Options with Exit/Reset Actions

With one of the following options the user can choose to save or record the changes in SETUP and to reset or exit SETUP. Reset will perform a complete board reset while Exit will execute the Boot Device Selection for booting. To apply SETUP parameter modifications a reset is mandatory.

Select desired item and <Enter>

- ▶ Save Changes and Exit
- ▶ Discard Changes and Exit
- ▶ Saving the changes and reset
- ▶ Save Changes and Reset

10.2 Save/Discard/Restore Default Options

SETUP modification can simply be Saved or Discarded without exiting BIOS SETUP.

Also manufacturing default SETUP parameters can be restored with the **Restore Defaults** option.

Select the desired item and <Enter>

- ▶ Save Changes
- ▶ Discard Changes
- ▶ Restore Defaults

10.3 Saving a User Configuration

The current SETUP configuration can be saved as the user configuration and can be restored the same way as the default one.

Select desired item and <Enter>

- ▶ Save as User Defaults
- ▶ Restore User Defaults

10.4 Boot Override

The current sequence of boot devices can be overridden by this menu.

- ▶ Select a device from the list (Use the <↑> or <↓> to highlight the desired item
- ▶ <Enter> to immediately Boot on this device

11.1.1 kdiag

Performs board diagnostics. Available ONLY if ordered.

11.1.2 kflash

Kontron SPI flasher

► Usage:

```
kflash -p -r filename
kflash -s filename
kflash -v filename
kflash -c
kflash -ver
kflash -h|-?
```

► Options

-p	Program flash image file
-r	Raw image mode (.bin, .rom)
-s	Reads flash and saves content to a file
-c	Clone RESCUE flash on MAIN flash
-v	Verifies flash image file and checks flash CRC
-ver	Displays BIOS version of current flash
-h -?	Displays this help

► Description

Programs/Manages SPI flash on Kontron board.

To save current BIOS flash content to file named image.bin:

```
VX6090> kflash -s image.bin
```

To program file image.bin:

```
VX6090> kflash -r -p image.bin
```

To display current BIOS version in SPI flash:

```
VX6090> kflash -ver
```

11.1.3 kmac

Kontron MAC Address utility

▶ **Usage:**

```
kmac [-h|-r|-v|-stat] [-dump lan] [-w value]
```

▶ **Options**

-h	Shows this help
-r	Shows the MAC Address for each LAN
-w value	Updates all the LAN MAC Addresses by auto-increment LAN0 (SOC 10G "LAN0") = value LAN1 (SOC 10G "LAN1") = value+1 LAN2 (i210 "ETH1") = value+2 LAN3 (i210 "ETH2") = value+3 value is a 6-bytes hexa number prefixed with "0x"
-dump [0 1 2 3]	Dumps the first 1024 words of the NVM of each LAN (same NVM for LAN0 and LAN1)
-stat	Displays LAN0 and LAN1 (SOC 10G) link status information
-v	Displays all NVM versions

▶ **Description**

Manages SOC 10GbE and i210T LAN MAC addresses.

To display the MAC addresses:

```
VX6090> kmac -r
MAC Address LAN ETH0 (SOC 10GbE LAN0) = 00:00:DE:52:F4:08
MAC Address LAN ETH1 (SOC 10GbE LAN1) = 00:00:DE:52:F4:09
MAC Address LAN ETH2 (i210 ETH1) = 00:00:DE:52:F4:0A
MAC Address LAN ETH3 (i210 ETH2) = 00:00:DE:52:F4:0B
```

11.1.4 kpld

Kontron PLD Utility

▶ **Usage:**

```
kpld [-h] [-b] [-v] [-m] [-r addr] [-w addr data]
kpld -i2cr i2cbusnum addr offset accesstype [count]
kpld -i2cw i2cbusnum addr offset accesstype data [count]
```

▶ **Options**

-h	Displays help
-v	Shows CPLD revision
-m	Boot Flash information
-r	Reads CPLD register address <addr>
-w	Writes <data> into cpld register address <addr>
-i2cr	Reads I2C device address <addr>, bus number <i2cbusnum>, offset address <offset>, with access type <1 or 2 bytes>
-i2cw	Writes <data> into I2C device address <addr>, bus number <i2cbusnum>, offset address <offset>, with access type <1 or 2 bytes>



All parameters must be raw hexadecimal values (without prefix)

▶ **Description**

Manages read/write access to the CPLD registers or to devices connected to CPLD I2C busses.

I2C device write protection is not controlled before write access.

11.1.5 ksensor

Kontron sensor utility

▶ **Usage:**

```
ksensor [-h]
```

▶ **Options**

-h	Shows this help
----	-----------------

▶ **Description**

Displays the board sensors.

11.1.6 kvpd

Kontron VPD Information

▶ **Usage:**

```
kvpd -p
kvpd -m
kvpd -h
```

▶ **Options**

-p	Displays VPD information
-m	Modifies or enters VPD information
-h	Displays this help

▶ **Description**

Displays the Vital Product Data of the Kontron board: order code, hardware level, serial number, variant.

11.1.7 kvpx

Kontron VPX Configurator

This command is available on CPUA only.

▶ **Usage:**

```
kvpx -plx_eeprom [prog|dump|conf|ver] [0|1|2|3|filename] [-b] [-h|-?]
```

▶ **Options**

-b:	Enables page break
-h -?:	Shows this help
-plx_eeprom:	Manages PCIe switch serial EEPROM

▶ **Suboptions list:**

prog:	Programs PCIe switch serial EEPROM
dump:	Dumps PCIe switch serial EEPROM
conf:	Displays PCIe switch configuration
ver:	Displays version of PCIe switch serial EEPROM

▶ **Parameters:**

prog:	
0 - SYSCON:	Programs PLX EEPROM in TRANSPARENT mode x8 Gen3
1 - PERIPH:	Programs PLX EEPROM in NON-TRANSPARENT mode x8 Gen3
2 - PERIPH:	Programs PLX EEPROM in NON-TRANSPARENT mode x4 Gen3
3 - PERIPH:	Programs PLX EEPROM in NON-TRANSPARENT mode x2 Gen3
filename:	Customs configuration filename in binary format
dump:	
w/o argument:	Displays on screen
filename:	Filename of PLX EEPROM content in binary format

▶ **Description**

Manages PLX EEPROM on Kontron board.

▶ **Examples:**

To save current PLX EEPROM content to file named plx_image.bin:

```
VX6090> kvpx -plx_eeprom dump plx_image.bin
```

To program file plx_image.bin:

```
VX6090> kvpx -plx_eeprom prog plx_image.bin
```

To program PCIe switch in NON-TRANSPARENT mode x8 Gen3

```
VX6090> kvpx -plx_eeprom prog 1
```

To display current PCIE switch configuration:

```
VX6090> kvpx -plx_eeprom conf
```

To display current PLX EEPROM version:

```
VX6090> kvpx -plx_eeprom ver
```

11.2 Environment Variables

EFI shell allows the user to set environment variables.

The following variables are available on the VX6090 board to control the board boot behavior.



WARNING: Variable names are case sensitive.

11.2.1 StartupAuto

The environment variable "**StartupAuto**" allows user to run the EFI shell script file "**startup.nsh**" present for example on a USB Flash drive plugged on the board.

1. To set **StartupAuto** variable on EFI shell:

```
VX6090> set StartupAuto 1
```

2. To clear **StartupAuto** variable on EFI shell:

```
VX6090> set -d StartupAuto
```

11.2.2 StartupDelay

The environment variable "**StartupDelay**" allows user to set a timeout delay before running the EFI shell script file "**startup.nsh**" present for example on a USB Flash drive plugged on the board.

The value of "**StartupDelay**" is a number that represents a delay in seconds.

1. To set a 2 seconds delay in **StartupDelay** variable on EFI shell:

```
VX6090> set StartupDelay 2
```

2. To clear **StartupDelay** variable on EFI shell:

```
VX6090> set -d StartupDelay
```



By default, the startup delay before running the EFI shell script **startup.nsh** is equal to 5 seconds.

11.2.3 BootCmd

The environment variable "**BootCmd**" allows the user to run automatically an EFI command at startup of the shell without typing any command on the keyboard.

1. To set **BootCmd** to run automatically the command "**pci 0 1F 0**":

```
VX6090> set BootCmd "pci 0 1F 0"
```

2. To control the **BootCmd** variable is correctly set:

```
VX6090> set
BootCmd = pci 0 1F 0
  path = .\;FS0:\efi\tools\;FS0:\efi\boot\;FS0:\
profiles = ;Install;Debug1;Driver1;network1;
```

```
uefishellsupport = 3
uefishellversion = 2.0
uefiversion = 2.40
debuglasterror = 0x0
lasterror = 0x0
```

3. To clear the **BootCmd** variable:

```
VX6090> set -d BootCmd
```

11.2.4 BootDelay

The environment variable "**BootDelay**" is used to set a timeout delay before running the command defined in the **BootCmd** variable.

1. To set **BootDelay** to 10 seconds:

```
VX6090> set BootDelay 10
```

2. To clear the **BootDelay** variable:

```
VX6090> set -d BootDelay
```



By default (ie. if **BootDelay** variable does not exist) the delay applied before **BootCmd** execution is equal to 5 seconds.

11.2.5 StopEfiShell

The environment variable "**StopEfiShell**" is used to stop the boot sequence after the **BootCmd** execution.

1. To set **StopEfiShell**:

```
VX6090> set StopEfiShell 1
```

2. To clear the **StopEfiShell** variable:

```
VX6090> set -d StopEfiShell
```

12 / BIOS Versions Description

12.1 Recommendations and Known Limitations

1. Reserved Setup settings



CAUTION: All the settings that are not described in this documentation are reserved and should NOT be changed. Changing any of these settings may cause system dysfunction or failure.

The **Bios Lock** and **Host Flash Lock-Down** options must remain **Disabled** in the IntelRCSetup/PCH Configuration/Security Configuration setup menu.

It is required for the **kflash** command.

2. After BIOS Upgrades

Just after upgrading the BIOS with the **kflash** command, the system must be turned off.

BIOS upgrade shall be completed in flash at the next power-on.

3. Kmac Command

The **kmac** command cannot be used to program the SPI flashes associated to the 10G X552 and the i210 controllers.

It only manages the NVM areas through a Shadow RAM to change the MAC addresses and CRCs.

4. USB3.0 Super Speed

The VX6090 USB 3.0 port can operate in Super Speed mode under BIOS if the xHCI controller configuration is set to **Enabled** instead of **Auto** in the IntelRCSetup/PCH Configuration/USB Configuration menu setup menu.

See section 5.3.2 "USB Configuration" page 16 for more information.

5. UUID Setting

Full UUID management is not supported.

By default, UUID is set to NodeID depending on the VPX slotID.

6. Fast Boot

BIOS boot sequence is speeded up by enabling the options **Attempt Fast Boot** and **Attempt Fast Cold Boot** in the **IntelRCSetup/Memory Configuration** menu. Then if it is possible, BIOS tries to use the fast path of the Memory Reference Code.

Default setting **Auto** enables the options.

7. PXE boot

When booting through PXE, set the option **Redirection After BIOS** to **Always Enabled** in the **Serial Redirection Configuration** menu to get the Intel Boot Agent messages.

8. 10G Ethernet Links

10G KR only supports auto-negotiation, forcing speed is not possible.

SFI is not operational.

9. Watchdog and UEFI Shell

Since BIOS version ID17097 the watchdog feature is applied not only to legacy boots but also to UEFI boots. As the shell is a UEFI boot device, the watchdog operates under the shell also.

Note the PBIT will save the watchdog settings before running the built-in tests (to apply its own settings) and will restore them for the next boot entry, usually an OS boot but can be also the Shell command loop. Also note the PBIT "haltonfail" and "promptonfail" events will stop the watchdog.

If the watchdog is enabled, then a warning message is displayed before each shell prompt display for recalling the operator there is a risk of timeout and reset.

Also, to prevent any damage due to reset timeout during a flash access, the "kflash" commands are denied.

To temporarily disable the watchdog without entering the setup you can type the following commands to access the CPLD WDG_CONTROL register @0x56 and reset bit0 WDG_Enb:

```
Shell> kp1d -r 56
READ : @0x9 = 0x87
Shell> kp1d -w 56 86
```

12.2 Known Problems Table

The following table lists the BIOS/PBIT relative known problems.

12.2.1 How to Use the Table:

1. Get the BIOS ID associated to your board. See Chapter 3 "Main Menu" page 4 of this document.
2. Check for a specific item in the table rows:
 - 2.1. A "X" (cross) in the BIOS ID column indicates this item applies to this BIOS release (problem is not solved).
 - 2.2. No "X" (cross) in the BIOS ID column indicates this item does not apply to this release (problem is fixed).
3. A full description associated to a specific problem is available in the next section.

Item	KDP Issue	Description	BIOS ID			
			16293EFT	17097EFT	17153	17186
1	24737	PEX EEPROM configuration issue	X	X	X	X
2	26443	CPLD register 0x3 definition not compatible with Linux tools	X			
3	27081	BBS popup menu not accessible	X			
4	25776	Watchdog implemented for Legacy boots but not for EFI boot	X			
5	26188	DDR4 refresh rate always set to x1	X			
6	27378	SPD DDR4 8 Gb issue	X			
7	26635	PXE issue after running PBIT memory tests	X			
8	26636	PBIT on CPUB not compatible with Linux BSP sysvartool	X			
9	30208	ECC errors on VX6090 equipped with DDR4-2400 8 Gb			X	
10	30052	Watchdog timeout during PBIT Ethernet test	X	X	X	

12.2.2 Detailed Description of the Problems

Item #1 PEX EEPROM Configuration Issue - KDP 24737

Description: PEX EEPROM configurations other than Gen3 x8 are not operational.

Workaround: None

Item #2 CPLD register 0x3 definition not compatible with Linux tools - KDP 26443

Description: The CPLD register 0x3 PWON_STATUS definition is specific for Xeon D-1500 platforms and is not compatible with the Core-i7 boards. The Linux tools must be adapted. However, the board class bits should be moved by the BIOS to bits 6-5 to remain compatible.

Workaround: None

Item #3 BBS popup menu not accessible - KDP 27081

Description: The boot menu that is usually accessible under BIOS by the F7 key is not available.

Workaround: None

Item #4 Watchdog implemented for Legacy boots but not for EFI boot - KDP 25776

Description: The "watchdog for OS" feature does not work for EFI boots but only for Legacy boots.

Workaround: None

Item #5 DDR4 refresh rate always set to x1 - KDP 26188

Description: The DDR4 refresh rate is fixed to x1 in the Intel Reference Code in BIOS and cannot be changed to x2 if required.

Workaround: None

Item #6 SPD DDR4 8 Gb issue - KDP 27378

Description: Wrong refresh timings in the SPD for the 8 Gb DDR4-2400 devices cause memory errors on VX6090 PCB-B.

Workaround: None

Item #7 PXE issue after running PBIT memory tests - KDP 26635

Description: The error "PXE-EC8: !PXE structure was not found in UNDI driver code segment. PXE-MOF: Exiting Intel Boot Agent." occurs on the 1 Gb ethernet links after running the PBIT memory tests.

Workaround: None

Item #8 PBIT on CPUB not compatible with Linux BSP sysvartool - KDP 26636

Description: On CPUB the PBIT tables are not located in the SYSTEM EEPROM at the same offset as for CPUA. This causes the error "**Bad Magic for POST area**" when running the Linux command "**sysvartool -pbit**".

Workaround: None

Item #9 ECC errors on VX6090 equipped with DDR4-2400 8 Gb - KDP 30208

Description: Correctable ECC errors occur on VX6090 equipped with DDR4-2400 8 Gb. The problem is due to wrong DDR4 refresh settings (for refresh 2x) and occurs when Nuvoton temperature exceeds 75°C.

Workaround: In the **IntelRCSetup/Memory Configuration setup** menu, enable the **Manual Self Refresh** option and set the **Fine Granularity Refresh Mode** to Fixed 1x. Note at refresh 1x, the Nuvoton temperature must not exceed 80°C.

Item #10 Watchdog timeout during PBIT Ethernet test - KDP 30052

Description: A watchdog timeout occurs during the PBIT Ethernet test if the Ethernet SPI flash is corrupted.

Workaround: None

12.3 BIOS ID16293EFT Release Notes

This release is based on the AMI Grangeville_029 release including the Intel® Reference Code 2.3.0, the Intel® Server Platform Services firmware 3.0.3.25 and the CPU microcode 0700000C.

The following lists the Kontron specifics implemented in the release:

- ▶ Accessible by setup:
 - ▶ 1Gb Ethernet Configuration - Section 6.1.1 page 18
 - ▶ Serial COM0 RS232/RS485 Configuration - Section 6.1.2 page 18
 - ▶ USB keyboard US/FR Configuration - Section 6.1.4 page 20
 - ▶ Watchdog at Startup and for OS boot Configuration - Section 6.1.5 page 20
 - ▶ VPX Reset and PCIe Switch Configuration - Section 6.2 page 22
- ▶ Accessible by Kontron EFI commands (see chapter 11 page 33 for details):
 - ▶ **kdiag**, Board diagnostics or PBIT(*) (only if ordered).
 - ▶ **kflash**, SPI boot flasher.
 - ▶ **kmac**, MAC address management utility
 - ▶ **kp1d**, PLD management utility
 - ▶ **ksensor**, sensor utility
 - ▶ **kvpd**, Vital Product Data information
 - ▶ **kvpX**, VPX PCIe Switch configurator

This release includes PBIT(*) v1.4 ID16293.

(*) PBIT - Power on Built In Test - is a software developed by Kontron. It is an optional product.

For more information, contact your field representative.

12.4 BIOS ID17097EFT Release Notes

The following lists the changes implemented in the release:

- ▶ Fixed kdp#26443: in CPLD reg @0x3 move boardclass bits to 6-5 instead of 5-4 for Linux BSP tools compatibility (**cp1dtool**).
- ▶ Fixed kdp#27081: add BBS popup menu, accessible with function key <F7>.
- ▶ Fixed kdp#25776: the watchdog feature is now supported for EFI boots.
Note the EFI shell is then also involved!
- ▶ Kdp#26188 : set default DDR4 refresh rate to x2 for RC/RA board class.
Add setting options in Memory Configuration menu to set the MR2 and MR3 refresh fields manually.
Force refresh rate to x2 in debug mode (SW1.2 ON).
- ▶ Override **InstallFwLoadFile()** in order to boot the Built-in EFI Shell when Secure Boot is enabled.
- ▶ Fixed kdp#27378: updated SPD table for 8 Gb DDR4-2400R Micron MT40A1G8WE-083E.
Adjusted parameters for DDR4-2400R type but mainly fix issue with the tRFC parameters for the refresh timings.
Also updated table for 4 Gb DDR4-2400R Micron MT40A512M8RH-083E.
Note that for 2133MT/s operation only tCKAVGmin byte18 and CRC bytes are changed. .

Includes PBIT(*) v1.5 ID17069:

- ▶ Improved SATA controllers test in IDE mode and SATA dev tests according to controller presence.
- ▶ Fixed kdp#26635: PXE issue after running PBIT memory tests.
- ▶ Fixed kdp#25776: the watchdog feature is now supported for EFI boots.
"kdiag run" saves the watchdog settings and restores them for the next boot entry.
promptonfail/halt onfail action stops the watchdog.
- ▶ Fixed kdp#26636: on CPUB, move the PBIT data in the OS EEPROM at the same address as on CPUA for Linux BSP tools compatibility (**sysvartool --pbit**).

(*) PBIT - Power on Built In Test - is a software developed by Kontron. It is an optional product.

For more information, contact your field representative.

12.5 BIOS ID17153 Release Notes

The following lists the changes implemented in the release:

- ▶ Support for 8Gb DDR4-2400 Samsung K4A8G085WB-BIRC.
8Gb DDR4-2400 Micron MT40A1G8WE-083E CL16 vs Samsung K4A8G085WB-BIRC CL17 identified by CPLD register 0xD bit3 (0=Micron, 1=Samsung).
- ▶ DDR4 refresh rate forced to x2 for RA and also SA class boards.
- ▶ Set Nuvoton LTD max limit at +85°C for SA and RA class boards and TCRIT limit to +95°C.

Includes PBIT^(*) v1.6 ID17153:

- ▶ Add warning in "**kdiag run**" if the SYSTEM EEPROM is write protected and override NVMRO write protection on SYSTEM EEPROM by using CPLD register 0x9 bit4.



Important Note:

NVMRO override for SYSTEM EEPROM is only applied for PBIT purpose.

If NVMRO is active, other data stored in SYSTEM EEPROM as CPLD bytes for startup configuration cannot be updated. So Maskable Reset Propagation, Watchdog at Startup and Power On/Off Control settings cannot be modified.

Also with NVMRO active, the SPI boot flash is write protected and NVRAM variables updates cannot be performed.

Thus, errors messages are displayed at BIOS startup.

Write protection is maintained on SYSTEM EEPROM for PBIT if CPLD register 0x9 bit2 is set with NVMRO inactive.

- ▶ Cpld test: do not stop the test in case of error to perform the test of all the features.
- ▶ LAN 0/1 Ethernet link tests: change failure condition in complex mode.
- ▶ Cpu test: support of 4 cores SKU.

(*) PBIT - Power on Built In Test - is a software developed by Kontron. It is an optional product.

For more information, contact your field representative.

12.6 BIOS ID1786 Release Notes

The following lists the changes implemented in the release:

- ▶ Fixed kdp#30208, ECC errors on VX6090 equipped with DDR4-2400 8 Gb.
On SA and RC class boards, keep the **FineGranularity** at **Fixed 1x (trFC 350ns)** but adjust correctly **tREFI** to **3.9 µs** to double refresh rate. Also set the **LowPower Auto Self Refresh** to **Extended Mode**.
- ▶ if the CPLD watchdog is enabled, add a warning before the Shell prompt and disallow the **kflash** command to prevent any boot flash corruption due to a watchdog reset.
See recommendation 9. in section 12.1 page 41.
- ▶ **ksensor** command now displays the **3V3_AUX BKP** presence status.

Includes PBIT^(*) v1.7 ID17185

- ▶ Fixed kdp#30052: during Ethernet test, a watchdog timeout occurs if the Ethernet SPI flash is corrupted.

:

(*) PBIT - Power on Built In Test - is a software developed by Kontron. It is an optional product.

For more information, contact your field representative.

13 / Use Cases

This chapter gives some advise for following practical cases:

- ▶ DEPLOY : How to deploy VX6090 - BIOS, section 13.1 page 49
- ▶ DEVEL: How to develop applications with VX6090 - BIOS, section 13.2 page 50
- ▶ EVAL: How to benchmark VX6090 - BIOS, section 13.3 page 50
- ▶ TROUBLESHOOTING: Useful Tips, section 13.4 page 50

13.1 DEPLOY: How to deploy VX6090 - BIOS

Deploying with VX6090 boards usually requires to handle the following tasks:

- ▶ Cloning a board,
- ▶ Managing a pool of deployed boards.

13.1.1 Cloning a board

To be able to replace a VX6090 with another one in a system, cloning allows to duplicate the VX6090 settings onto the new board prior replacement:

- ▶ **On the initial VX6090**
 - ▶ Get the hardware settings: refer to the VX6090 User's Guide: section 2.3 Board Configuration
 - ▶ Get the BIOS settings: BIOS software and settings are stored in the BIOS SPI flash device itself. Use "**kflash -s**" command to retrieve the flash content in a file.
- ▶ **On the new VX6090**
 - ▶ Check the board ECLevel to be sure the BIOS and Settings you are going to download are compatible with the hardware evolution.
 - ▶ Flash the binary file by using "**kflash -p -r**" command. Powercycle the board and set the Date/Time.

The new VX6090 board is now a functional clone of the initial one.



Once the system has been qualified, it should be worth saving the image of the BIOS and Settings for a later use. For large programs, Kontron can contribute with high level software to automate this cloning task.

Contact support-kom-sa@kontron.com for details.

13.1.2 Managing a pool of VX6090

To manage a pool of boards, the main task is to identify and track board using serial number, E.C. Level, BIOS version, MAC addresses, etc... possibly without having to take the system apart to look at its labels.

Refer to section 2.2 of VX6090 User's Guide about the board identification labels.

Also use the "**kvpd -p**" command to retrieve the Vital Product Data.

See VPD Tool in the Linux BSP document to know how to get this information from a Linux OS running on the board.

Information is also transmitted from the BIOS to the OS using a software table in memory, use the **dmi decode** command to retrieve this information from Linux.



Kontron maintains a database of all the boards sold to customers. This includes customer, program, system and any information you may wish to have maintained by us, allowing to retrieve an exact board pool status, whenever needed.

Contact support-kom-sa@kontron.com for details.

13.2 DEVEL: How to develop applications with VX6090 - BIOS

TBD

13.3 EVAL: How to benchmark VX6090 - BIOS

TBD

13.4 TROUBLESHOOTING: Useful Tips

▶ SETUP is not accessible

If trouble occurred after changing the setup, it should be worth booting in BIOS FailSafe Mode^(*) to force the default settings to be reloaded at startup. Then, save the reloaded settings (see Save and Exit menu). Power off, reconfigure the board in Normal Mode^(*) and power on.

If BIOS does not boot in Normal Mode^(*), make sure the board is still operational in Rescue Mode^(*). In Rescue Mode, you can then clone the rescue boot flash into the normal boot flash by using the "**kflash -c**" shell command.

▶ SETUP is accessible but OS does not boot

Enter setup by pressing the key as indicated at BIOS boot time and check if the boot device is visible in the boot device list. See section 8.3 page 27 "Boot Option Priorities" in this document.

If the device is still not present, it should be worth restoring the manufacturing settings. Select the **Restore Defaults** option in the **Save and Exit** menu, then Save and Reset, and verify if the boot device is now visible.

▶ No 1GbE link

Verify the LAN route option for the corresponding 1GbE interface in the Kontron menu.

Depending on the board revision, also verify the configuration of the SW3B.1 microswitch that forces the LAN3 route to rear or internally to the other side.

▶ No video

If there are several graphic components connected in the system (onboard component and external graphic component on VPX), verify the Active Video Device selection corresponds to the component physically connected to the video cable.

See chapter 5.4 page 16.

▶ No 10G Ethernet backplane link

Verify the LANs configuration with the "**kmac -conf**" shell command. 10G LANs must be configured in KR mode. The link status can be verified with the "**kmac -stat**" command. May be negotiation with the link partner has been done at 1Gb.

Verify also the Ethernet routing layout of your backplane.

▶ No messages on the serial line.

COM0 line is accessible on front or at rear without any setup selection. Note that when COM0 is configured in RS422/RS485, COM1 line (rear only) is not accessible any more.

If the Serial Redirection on COM0 has been unintentionally disabled, boot the board in BIOS FailSafe Mode^(*) to force the default settings to be reloaded at startup. By default COM0 line mode will be RS232.

^(*) VX6090 User's Guide, section "Board Configuration" to change the boot modes by selecting the board switches.

▶ Backplane PCIe dysfunction

If trouble occurs with the backplane PCIe discovery, you can reprogram the PCIe Switch EEPROM by using the "**kvp**
-plx_eeprom prog <num>" command according to the location of the board in the system (System Controller slot or Peripheral slot).

Then, in the Kontron menu, you can select the wanted PCIe link width and speed, enable the VPX EPROM Configuration option and reset the board.

It is not recommended to keep the VPX EPROM Configuration option enabled.

Appendix A - How to Update and Restore the BIOS

A.1 Update BIOS from UEFI Shell using USB device

This section details the update of the AMI BIOS Firmware on a VX6090 board. An USB key with the BIOS image to flash will be used:

- ▶ Copy the BIOS image under the USB device
- ▶ Boot VX6090 on UEFI shell. If necessary enter the BIOS SETUP. Then navigate to Save & Exit Menu and select UEFI shell in Boot override menu and boot under UEFI shell. Plug the USB device on the concerned USB interface
- ▶ Enter command

```
VX6090> map -r
```

- ▶ fs0: file system must become visible, then Enter

```
VX6090> fs0:
```

- ▶ Eventually use cd command to reach a directory where the Bios image is stored. Use ls to display file list
If BIOS image is named **VX6090_IDYYXXX.bin** then flash the BIOS entering command

```
VX6090> kflash -p -r VX6090_IDYYXXX.bin
```



CAUTION: Do not turn off nor reset the board until the end of the command. This prevent the system to boot at next power on.

Do not turn off nor reset the board until the end of the command. This prevent the system to boot at next power on.

- ▶ Wait about 1 minutes and 30 seconds and check if message "**image are equal**" is displayed. If not, do again the flash update. When upgrade is finished without any errors, then turn off the system and do a fresh cold start in order to boot with the new BIOS.



The serial console displays a toolbar [=====] during Flash process to show the progression of the Flash update while the graphical screen not.

A.2 Restore or Update BIOS from Rescue BIOS

A rescue BIOS is available on any VX6090 CPU. It is possible to boot on rescue BIOS and update the main BIOS with the rescue BIOS.

When board is powered off, set micro switch SW2 function 1 to ON. Then Boot on Rescue BIOS and EFI-Shell. If necessary enter BIOS SETUP and then navigate to Save & Exit Menu and select UEFI shell in Boot override menu. Check if EFI-Shell prompt is VX6090-RESCUE.

- ▶ Enter command:

```
VX6090-RESCUE> kflash -c
```



CAUTION: Do not power down the board during update process. This behavior will prevent the board to boot.

- ▶ Wait about 1 minutes and 30 seconds the command end.

The BIOS is restored. Power off the board, set micro switch SW2 function 1 to Off then boot on Main BIOS.

A.3 Record BIOS image ROM and setting from UEFI Shell using USB device

This section details the record of the AMI BIOS Firmware and its setting of a VX6090 board. An USB key will be used to store the BIOS image:

- ▶ Boot VX6090 on UEFI shell. If necessary enter BIOS SETUP. Then navigate to Save & Exit Menu and select UEFI shell in Boot override menu and boot under UEFI shell. Plug the USB device on the concerned USB interface
- ▶ Enter command

```
VX6090> map -r
```

- ▶ fs0: file system must become visible, then Enter

```
VX6090> fs0:
```

- ▶ Eventually use cd command to reach a directory where the Bios image is stored. Use ls to display file list
If BIOS image is named **VX6090_CLONE.bin** then copy the BIOS image entering command

```
VX6090> kflash -s VX6090_CLONE.bin
```

- ▶ Wait 20 seconds. When finished without error then the BIOS ROM image is stored onto the USB device.



About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC".
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