

VPX3-TL BIOS

User's Manual

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Preface

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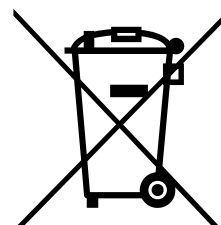
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Revision History

Revision	Release Date	Description of Change(s)
1.0	2023-07-05	Initial release, based on BIOS Eng. Spec. 0.4

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1 BIOS Setup Menu

1.1 Introduction

The BIOS setup utility is invoked by pressing <ESC> or keys. User can change BIOS settings during setup utility runs. A reset of system is required in order to make new settings take effect.

In BIOS setup utility, there are several hot keys are designed for specific purpose. Hot keys are listed as below.

- <F1>: General help in setup menu
- <F8>: Load previous BIOS values
- <F9>: Load BIOS default in setup utility
- <F10>: Save & Exit setup utility

1.2 Menu Selection Bar

The Menu Selection Bar is located at the top of the screen. It displays the top level available menus to the user:

- Main Menu
- Advanced Menu
- Chipset Menu
- Server Mgmt Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

1.3 Menu Conventions

The appearance of setup menu listed in this chapter is a sample to describe the item list. It is shown on VT100 terminal via serial console. Followings are the menu conventions.

- **Using color**

The mandatory BIOS setup fields are in black. The BIOS setup fields currently not used are in grey. The display only strings are in black.

- **Using brackets**

Editable menu options are marketed with squares '[' and ']' to distinguish them from display only fields that can't be modified.

2 Getting Started

The Main Menu provides read-only information about system and also allows to set system's date and time. Refer to the tables below, it shows the screen shot of Main menu for detail, and submenus and settings as well.

Aptio Setup – AMI		
Main	Advanced	Chipset Server Mgmt Security Boot Save & Exit
BIOS Information		Set the Date. Use Tab to switch between Date elements.
BIOS Vendor	American Megatrends	
BIOS Version	0.14.10	
Build Date	03/30/2022	
MRC Version	2.2.0.8	
GOP Version	17.0.1061	
ME FW Version	15.0.30.1776	
BIOS Boot Source	Primary BIOS	
System Information		
Project Name	VPX-TL	
CPU Board Version	A1	
CPU Brand String	Intel(R) Xeon(R) W-1155	
	5MRE @ 2.60GHz	
CPU Frequency	2.6GHz	
Total Memory	32768 MB (DDR4)	
Memory Frequency	3200 MHz	
PCH SKU	H RM590E	
> Board Information		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit
System Date	[Thu 01/07/2022]	
System Time	[16:28:59]	
Access Level	Administrator	

2.1 BIOS Information

BIOS Item	Options	Description
BIOS Vendor	Info-only. American Megatrends	Display vendor name of system BIOS.
BIOS Version	Info-only. x.yy.zz	Display version of booting BIOS.
Build Date	Info-only. MM/DD/YYYY	It shows the date that BIOS was built.
MRC Version	Info-only. w.x.y.z	Display the revision of MRC code which is implemented in BIOS.

BIOS Item	Options	Description
VBIOS Version / GOP Version	Info-only. yyyy/x.y.zzzz	<i>VBIOS Version:</i> When video option ROM is set to "Legacy Only", it will show up. <i>GOP Version:</i> When video option ROM is set to "UEFI Only", it will show up.
ME FW Version	Info-only. ww.x.yy.zzzz	Display the version of Intel manageability firmware which is implemented in BIOS.
BIOS Boot Source	Info-only. Primary BIOS/Backup BIOS	It shows which BIOS flash boots the system. <i>Primary BIOS:</i> usually means that boots from SPI0 <i>Backup BIOS:</i> usually means that boots from SPI1

2.2 System Information

BIOS Item	Options	Description
Project Name	Info-only. VPX-TL	It shows the project name.
CPU Board Version	Info-only. A1/A2/A3/...	It shows the CPU board HW version.
CPU Brand String	Info-only. Intel(R) Core, ...	It shows what CPU is booting the system.
CPU Frequency	Info-only. XXXX GHz	It shows CPU's frequency.
Total Memory	Info-only. XXXX MB (DDR _x)	It shows total memory size used on the motherboard and memory type.
Memory Frequency	Info-only. XXXX MHz	It shows memory's frequency.
PCH SKU	Info-only. xxxx	It shows what PCH SKU is designed on motherboard.

2.3 System Date/Time

BIOS Item	Options	Description
System Date	MM/DD/YYYY	For configuring/showing system date. When setting the Date, use <Tab> key to switch between Date elements.
System Time	HH:MM:SS	For configuring/showing system time. When setting the Time, use <Tab> key to switch between Time elements.
Access Level	Info-only. Administrator/User	It shows what access level is used to enter BIOS setup menu.

2.4 Board Information

Aptio Setup – AMI

Main

Board Information

Serial Number	N/A
Manufacturing Date	N/A
Last Repair Date	N/A
MAC ID	N/A

Runtime Statistics

Total Runtime	12h 51m
Current Runtime	0h 01m 29s
Power Cycles	98
Boot Cycles	198
Boot Reason	Software-reset

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
Serial Number	Info-only.	Display board's serial number.
Manufacturing Date	Info-only.	Display manufacturing date.
Last Repair Date	Info-only.	Display Last Repair Date.
MAC ID	Info-only.	Shows onboard Ethernet's MAC ID.
Total Runtime	Info-only.	The returned value specifies the total time in minutes the system is running in S0 state.
Current Runtime	Info-only.	The returned value specifies the time in seconds the system is running in S0 state. This counter is cleared when the system is removed from the external power supply.
Power Cycle	Info-only.	The returned value specifies the number of times the external power supply has been shut down.
Boot Cycles	Info-only.	The boot cycle is increased after a HW or SW reset or after a successful power-up.
Boot Reason	Info-only.	The boot reason is the event which causes the reboot of the system.

3 Advanced Menu

This menu contains the settings for most of the user interfaces in the system.

Aptio Setup – AMI						
Main	Advanced	Chipset	Server Mgmt	Security	Boot	Save & Exit
> CPU Configuration > Power & Performance > Intel(R) Time Coordinated Computing > Power Management > System Management > Thermal Management > Watchdog Timer > Super IO Configuration > VPX Configuration > USB Configuration > AMI Graphic Output Protocol Policy > Serial Port Console Redirection > Network Stack Configuration > Trusted Computing > TLS Auth Configuration > RAM Disk Configuration > Intel(R) Ethernet Network Adapter X710-TL – XX:XX:XX:XX:XX:XX > Intel(R) Ethernet Network Adapter X710-TL – XX:XX:XX:XX:XX:XX > Intel(R) Ethernet Controller X710 for 10 Gigabit backplane – XX:XX:XX:XX:XX:XX > Intel(R) Ethernet Controller X710 for 10 Gigabit backplane – XX:XX:XX:XX:XX:XX > Intel(R) Ethernet Controller (3) I225-IT – XX:XX:XX:XX:XX:XX						CPU Configuration Parameters ><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
CPU Configuration	Submenu	For configuring CPU features/functions.
Power & Performance	Submenu	For configuring Power & Performance Options
Intel(R) Time Coordinated Computing	Submenu	Intel(R) Time Coordinated Computing (Intel(R) TCC) options
Power Management	Submenu	
System Management	Submenu	
Thermal Management	Submenu	
Watchdog Timer	Submenu	
Super IO Configuration	Submenu	
VPX Configuration	Submenu	
USB Configuration	Submenu	

AMI Graphic Output Protocol Policy	Submenu	User Select Monitor Output by Graphic Output Protocol
Serial Port Console Redirection	Submenu	
Network Stack Configuration	Submenu	
Trusted Computing	Submenu	
TLS Auth Configuration	Submenu	
RAM Disk Configuration	Submenu	
Intel(R) Ethernet Network Adapter X710-TL	Submenu	Configure Gigabit Ethernet device parameters.
Intel(R) Ethernet Controller X710 for 10 Gigabit backplane	Submenu	Configure Gigabit Ethernet device parameters.
Intel(R) Ethernet Controller (3) I225-IT	Submenu	Configure Gigabit Ethernet device parameters.

3.1 CPU Configuration

Aptio Setup – AMI

Advanced		
CPU Configuration		
Type	Intel(R) Xeon(R) W-11555MRE@2.60GHz	
Speed	2600 MHz	
ID	0x806D1	
Stepping	R0	
Number of Processors	6Core(s) / 12Thread(s)	
Microcode Revision	32	
GT Info	0x9A70	
eDRAM Size	N/A	
L1 Instruction Cache	32 KB x 6	
L2 Cache	1280 KB x 6	
L3 Cache	12MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Supported	
Intel (VMX) Virtualization Technology	[Enable]	
Active Processor Cores	[All]	
Hyper-Threading	[Enabled]	
Intel Trusted Execution Technology	[Disabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Type	Info-only.	It shows what detail CPU information
Speed	Info-only.	It shows what detail CPU information
ID	Info-only.	It shows what detail CPU information
Stepping	Info-only.	It shows what detail CPU information

Number of Processors	Info-only.	It shows what detail CPU information
Microcode Revision	Info-only.	It shows what detail CPU information
GT Info	Info-only.	It shows what detail CPU information
eDRAM Size	Info-only.	It shows what detail CPU information
L1 Instruction Cache	Info-only.	It shows what detail CPU information
L2 Cache	Info-only.	It shows what detail CPU information
L3 Cache	Info-only.	It shows what detail CPU information
L4 Cache	Info-only.	It shows what detail CPU information
VMX	Info-only.	It shows what CPU support feature.
SMX/TXT	Info-only.	It shows what CPU support feature.
Intel (VMX) Virtualization Technology	Enabled Disabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All / 1 / 2 / 3 / 4 / 5	Number of cores to enable in each processor package.
Hyper-Threading	Enabled Disabled	Enable or Disable Hyper-Threading Technology.
Intel Trusted Execution Technology	Enabled Disabled	Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology. Changes require a full power cycle to take effect.

3.2 Power & Performance

Aptio Setup – AMI

Advanced

>CPU – Power Management Control >GT – Power Management Control	CPU – Power Management Control Options ><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit
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BIOS Item	Options	Description
CPU – Power Management Control	Submenu	CPU – Power Management Control Options
GT – Power Management Control	Submenu	GT – Power Management Control Options

3.2.1 CPU – Power Management Control

Aptio Setup – AMI

Advanced

CPU – Power Management Control		CPU – Power Management Control Options
Boot performance mode	[Turbo Performance]	
Intel(R) SpeedStep(tm)	[Enabled]	
Race To Halt (RTH)	[Enabled]	
Intel(R) Speed Shift Technology	[Enabled]	
Per Core P State OS control mode	[Enabled]	
HwP Autonomous Per Core P State	[Enabled]	
HwP Autonomous EPP Grouping	[Enabled]	
EPB override over PECI	[Disabled]	
HwP Fast MSR Support	[Enabled]	
HDC Control	[Enabled]	
Turbo Mode	[Disabled]	
> View/Configure Turbo Options		
> Config TDP Configurations		
> CPU VR Settings		
Platform PL1 Enable	[Enabled]	
Platform PL1 Power	50000	
Platform PL1 Time Window	[0]	
Platform PL2 Enable	[Enabled]	
Platform PL2 Power	55000	
Power Limit 4 Override	[Disabled]	
C states	[Disabled]	
Thermal Monitor	[Enabled]	
Interrupt Redirection Mode Selection	[Fixed Priority]	
Timed MWAIT	[Disabled]	
> Custom P-state Table		
Energy Performance Gain	[Disabled]	
EPG DIMM Idd3N		
EPG DIMM Idd3P		
> Power Limit 3 Settings		
> CPU Lock Configuration		
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Boot performance mode	Max Battery Max Non-Turbo Performance Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Enabled Disabled	Allows more than two frequency ranges to be supported.
Race To Halt (RTH)	Enabled Disabled	Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through

BIOS Item	Options	Description
		MSR 1FC bit 20)
Intel(R) Speed Shift Technology	Enabled Disabled	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Per Core P State OS control mode	Enabled Disabled	Enable/Disable Per Core P state OS control mode. Disabling will set Bit 31 = 1 command 0x06. When set, the highest core request is used for all other core requests.
HwP Autonomous Per Core P State	Enabled Disabled	Disable Autonomous PCPS (Bit 30 = 1, command 0x11) Autonomous will request the same value for all cores all the time. Enable PCPS (default Bit 30 = 0, command 0x11)
HwP Autonomous EPP Grouping	Enabled Disabled	Enable EPP grouping (default Bit 29 =0, command 0x11) Autonomous will request the same values for all cores with same EPP. Disable EPP grouping (Bit 29 =1 , command 0x11) autonomous will not necessarily request same values for all cores with same EPP.
EPB override over PECI	Enabled Disabled	Enable/Disable EPB override over PECI. Enable by sending pcode command 0x2b , subcommand 0x3 to 1. This will allow OOB EPB PECI override control
HwP Fast MSR Support	Enabled Disabled	Enable/Disable HwP Fast MSR Support for IA32_HWP_REQUEST MSR.
HDC Control	Enabled Disabled	This option allows HDC configuration.
Turbo Mode	Enabled Disabled	Enable/Disable Per Core P state OS control mode. Disabling will set Bit 31 = 1 command 0x06. When set, the highest core request is used for all other core requests.
View/Configure Turbo Options	Submenu	
Config TDP Configurations	Submenu	
CPU VR Settings	Submenu	
Platform PL1 Enable	Enabled Disabled	Enable/Disable Platform Power Limit 1 programming. If this option is enabled, it activates the PL1 value to be used by the processor to limit the average power of given time window.

BIOS Item	Options	Description
Platform PL1 Power	50000	Platform Power Limit 1 Power in Milli Watts. BIOS will round to the nearest 1/8W when programming. Any value can be programmed between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). For 12.50W, enter 12500. This setting will act as the new PL1 value for the Package RAPL algorithm.
Platform PL1 Time Window	0	Platform Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default values. Indicates the time window over which Platform TDP value should be maintained.
Platform PL2 Enable	Enabled Disabled	Enable/Disable Platform Power Limit 2 programming. If this option is disabled, BIOS will program the default values for Platform Power Limit 2.
Platform PL2 Power	55000	Platform Power Limit 2 Power in Milli Watts. BIOS will round to the nearest 1/8W when programming. Any value can be programmed between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). For 12.50W, enter 12500. This setting will act as the new PL2 value for the Package RAPL algorithm.
Power Limit 4 Override	Enabled Disabled	Enable/Disable Power Limit 4 override. If this option is disabled, BIOS will leave the default values for Power Limit 4.
C states	Enabled Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Thermal Monitor	Enabled Disabled	Enable/Disable Thermal Monitor
Interrupt Redirection Mode Selection	Fixed Priority Round robin Hash Vector No Change	Interrupt Redirection Mode Select for Logical Interrupts
Timed MWAIT	Enabled Disabled	Enable/Disable Timed MWAIT Support
Custom P-state Table	Submenu	
Energy Performance Gain	Enabled Disabled	Enable/disable Energy Performance Gain.
EPG DIMM Idd3N	26	Active standby current (Idd3N) in milliamps from datasheet. Must be calculated on a per DIMM basis.
EPG DIMM Idd3P	11	Active power-down current (Idd3P) in milliamps from datasheet. Must be calculated on a per DIMM basis.

BIOS Item	Options	Description
Power Limit 3 Settings	Submenu	
CPU Lock Configuration	Submenu	

CPU – Power Management Control → View /Configure Turbo Options

Aptio Setup – AMI

Advanced

Current Turbo Settings		
Max Turbo Power Limit	4095.875	
Min Turbo Power Limit	0.0	
Package TDP Limit	45.0	
Power Limit 1	45.0	
Power Limit 2	83.0	
1-core Turbo Ratio Limit Ratio (TRLR)	45	
2-core Turbo Ratio Limit Ratio (TRLR)	45	
3-core Turbo Ratio Limit Ratio (TRLR)	44	
4-core Turbo Ratio Limit Ratio (TRLR)	43	
5-core Turbo Ratio Limit Ratio (TRLR)	42	
6-core Turbo Ratio Limit Ratio	41	
Energy Efficient P-state	[Enabled]	
Package Power Limit MSR Lock	[Disabled]	
Energy Efficient Turbo	[Disabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Max Turbo Power Limit	Info-only.	
Min Turbo Power Limit	Info-only.	
Package TDP Limit	Info-only.	
Power Limit 1	Info-only.	
Power Limit 2	Info-only.	
1-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	
2-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	
3-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	
4-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	

5-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	
6-core Turbo Ratio Limit Ratio (TRLR)	Info-only.	
Energy Efficient P-state	Enabled Disabled	
Package Power Limit MSR Lock	Enabled Disabled	
Energy Efficient Turbo	Enabled Disabled	

CPU – Power Management Control → Config TDP Configurations

Aptio Setup – AMI

Advanced

Config TDP Configurations		
Enable Configurable TDP	Applies to cTDP	
Configurable TDP Boot Mode	Nominal	
Configurable TDP Lock	Disabled	
CTDP BIOS control	Disabled	
ConfigTDP Levels	2	
ConfigTDP Turbo Activation Ratio	25 (Unlocked)	
Power Limit 1	45.0W (MSR:45.0)	
Power Limit 2	83.0W (MSR:83.0)	
Custom Settings Nominal		
ConfigTDP Nominal	Ratio:26 TAR:25 PL1:13.0W	
Power Limit 1	0	><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit
Power Limit 2	0	
Power Limit 1 Time Window*	[0]	
ConfigTDP Turbo Activation Ratio	0	
Custom Settings Down		
ConfigTDP Level1	Ratio:21 TAR:20 PL1:3.0W	
Power Limit 1	0	ESC: Exit
Power Limit 2	0	
Power Limit 1 Time Window*	[0]	
ConfigTDP Turbo Activation Ratio	0	

BIOS Item	Options	Description
Enable Configurable TDP	Applies to non-cTDP Applies to cTDP	Applies TDP initialization settings based on non-cTDP or cTDP. Default is 1: Applies to cTDP; if 0 then applies non-cTDP and BIOS will bypass cTDP initialization flow
Configurable TDP Boot Mode	Nominal Down Up Deactivate	Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.

BIOS Item	Options	Description
Configurable TDP Lock	Enabled Disabled	Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Note: When CTD Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.
CTDP BIOS control	Enabled Disabled	Enables CTD control via runtime ACPI BIOS methods. This "BIOS only" feature does not require EC or driver support.
ConfigTDP Levels	Info-only.	
ConfigTDP Turbo Activation Ratio	Info-only.	
Power Limit 1	Info-only.	
Power Limit 2	Info-only.	
ConfigTDP Nominal	Info-only.	
Power Limit 1	0	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP
Power Limit 2	0	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.
Power Limit 1 Time Window*	[0]	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default value (28 sec for Mobile and 8 sec for Desktop). Defines time window which TDP value should be maintained.
ConfigTDP Turbo Activation Ratio	0	Custom value for Turbo Activation Ratio. Needs to be configured with valid values from LFM to Max Turbo. 0 means don't use custom value.
ConfigTDP Level1	Info-only.	
Power Limit 1	0	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP

BIOS Item	Options	Description
Power Limit 2	0	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.
Power Limit 1 Time Window*	[0]	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default value (28 sec for Mobile and 8 sec for Desktop). Defines time window which TDP value should be maintained.
ConfigTDP Turbo Activation Ratio	0	Custom value for Turbo Activation Ratio. Needs to be configured with valid values from LFM to Max Turbo. 0 means don't use custom value.

CPU – Power Management Control → CPU VR Settings

Aptio Setup – AMI

Advanced

CPU VR Settings		
PSYS Slope	0	
PSYS Offset	0	
PSYS Prefix	[+]	
PSYS PMax Power	0	
Min Voltage Override	[Disabled]	
> Acoustic Noise Settings		
> VccIn VR Settings		
> RFI Settings		
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
PSYS Slope	0	PSYS Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x9."
PSYS Offset	0	PSYS Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. PSYS Uses BIOS VR mailbox command 0x4.
PSYS Prefix	+	Sets the offset value as positive or negative.
PSYS PMax Power	0	PSYS PMax power, defined in 1/8 Watt increments. Range 0-8192. For a PMax of 125W, enter 1000. 0 = AUTO. Uses BIOS VR mailbox command 0xB.
Min Voltage Override	Enabled Disabled	Min Voltage Override. Enable to override minimum voltage for runtime and for C8.
Acoustic Noise Settings	Submenu	
VccIn VR Settings	Submenu	
RFI Settings	Submenu	

CPU – Power Management Control → CPU VR Settings→ Acoustic Noise Settings

Aptio Setup – AMI

Advanced

Acoustic Noise Settings		
Acoustic Noise Mitigation	[Disabled]	
Pre Wake Time	0	
Ramp Up Time	0	
Ramp Down Time	0	
VccIn VR Domain		
Disable Fast PKG C State Ramp for VccIn Domain	[FALSE]	
Slow Slew Rate for VccIn Domain	[Fast/2]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Acoustic Noise Mitigation	Enabled Disabled	Enabling this option will help mitigate acoustic noise on certain SKUs when the CPU is in deeper C state
Pre Wake Time	0	Set the maximum Pre Wake randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Ramp Up Time	0	Set the maximum Ramp Up randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Ramp Down Time	0	Set the maximum Ramp Down randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Disable Fast PKG C State Ramp for VccIn Domain	TRUE FALSE	This option needs to be configured to reduce acoustic noise during deeper C states. False: Don't disable Fast ramp during deeper C states; True: Disable Fast ramp during deeper C state
Slow Slew Rate for VccIn Domain	Fast/2 Fast/4 Fast/8 Fast/16	Set VR VccIn Slow Slew Rate for Deep Package C State ramp time; Slow slew rate equals to Fast divided by number, the number is 2, 4, 8, 16 to slow down the slew rate to help minimize acoustic noise

CPU – Power Management Control → CPU VR Settings → VccIn VR Settings

Aptio Setup – AMI

Advanced

VccIn VR Domain		
VR Config Enable	[Enabled]	
Current AC Loadline	200	
Current DC Loadline	150	
Current Psi1 Threshold	80	
Current Psi2 Threshold	20	
Current Psi3 Threshold	4	
Current Imon Slope	100	
Current Imon Offset	1	
Current VR Current Limit	292	
Current Tdc Current Limit	360	
AC Loadline	0	
DC Loadline	0	
PS Current Threshold1	80	
PS Current Threshold2	20	
PS Current Threshold3	4	
PS3 Enable	[Enabled]	
PS4 Enable	[Enabled]	
IMON Slope	0	
IMON Offset	0	
IMON Prefix	[+]	
VR Current Limit	0	
TDC Enable	[Enabled]	
TDC Current Limit	0	
TDC Time Window	[1 ms]	
TDC Lock	[Disabled]	
VccIn Demotion Override Enable	[Disabled]	

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
VR Config Enable	Enabled Disabled	VR Config Enable
Current AC Loadline	200	
Current DC Loadline	150	
Current Psi1 Threshold	80	
Current Psi2 Threshold	20	
Current Psi3 Threshold	4	
Current Imon Slope	100	
Current Imon Offset	1	
Current VR Current Limit	292	
Current Tdc Current Limit	360	
AC Loadline	0	AC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.

BIOS Item	Options	Description
DC Loadline	0	DC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
PS Current Threshold1	80	PS Current Threshold1, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold2	20	PS Current Threshold2, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold3	4	PS Current Threshold3, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS3 Enable	Enabled Disabled	PS3 Enable/Disable. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.
PS4 Enable	Enabled Disabled	PS4 Enable/Disable. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3
IMON Slope	0	IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x4.
IMON Offset	0	IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x4.
IMON Prefix	[+]	Sets the offset value as positive or negative.
VR Current Limit	0	Voltage Regulator Current Limit (Icc Max). This value represents the Maximum instantaneous current allowed at any given time. The value is represented in 1/4 A increments. A value of 400 = 100A. 0 means AUTO. Uses BIOS VR mailbox command 0x6.
TDC Enable	Enabled Disabled	TDC Enable. 0- Disable, 1 - Enable
TDC Current Limit	0	TDC Current Limit, defined in 1/8A increments. Range 0-32767. For a TDC Current Limit of 125A, enter 1000. 0 = 0 Amps. Uses BIOS VR mailbox command 0x1A.
TDC Time Window	1 ms , 2 ms, 3 ms, 4	TDC Time Window, value in milliseconds.

BIOS Item	Options	Description
	ms, 5 ms, 6 ms, 7 ms, 8 ms, 10 ms	1ms is default. Range from 1ms to 10ms, except for 9ms. 9ms has no valid encoding in the MSR definition.
TDC Lock	Enabled Disabled	TDC Lock
VccIn Demotion Override Enable	Enabled Disabled	Enable VccIn Demotion Override Configuration.

CPU – Power Management Control → CPU VR Settings→ RFI Settings

Aptio Setup – AMI

Advanced

RFI Domain		
RFI Current Frequency	139.800MHz	
RFI Frequency	0	
Spread Spectrum	[Enabled]	
RFI Spread Spectrum	[1.5%]	
RFI Mitigation	[Disabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
RFI Current Frequency	139.800MHz	
RFI Frequency	0	Set desired RFI frequency, in increments of 100KHz. (For a frequency of 100.6MHz, enter 1006.)
Spread Spectrum	Enabled Disabled	Enable or Disable the Spread Spectrum
RFI Spread Spectrum	0.5%, 1%, 1.5% , 2%, 3%, 4%, 5%, 6%	Set the Spread Spectrum
RFI Mitigation	Enabled Disabled	Disable - DCM is the IO_N default; Enable - Enable IO_N DCM/CCM switching as RFI mitigation.

CPU – Power Management Control → Custom P-state Table

Aptio Setup – AMI

Advanced

Custom P-state Table

Number of P states

0

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
Number of P states	0	Sets the number of custom P-states. At least 2 states must be present.

CPU – Power Management Control → Power Limit 3 Settings

Aptio Setup – AMI

Advanced

Power Limit 3 Override	[Disabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Power Limit 3 Override	Enabled Disabled	Enable/Disable Power Limit 3 override. If this option is disabled, BIOS will leave the hardware default values for Power Limit 3 and Power Limit 3 Time Window.

CPU – Power Management Control → CPU Lock Configuration

Aptio Setup – AMI

Advanced

CFG Lock	[Enabled]	
Overclocking Lock	[Enabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
CFG Lock	Enabled Disabled	Configure MSR 0xE2[15], CFG Lock bit
Overclocking Lock	Enabled Disabled	Enable/Disable Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR

3.2.2 GT – Power Management Control

Aptio Setup – AMI

Advanced

GT – Power Management Control

RC6(Render Standby) [Enabled]
Maximum GT frequency [Default Max Frequency]
Disable Turbo GT frequency [Enabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
RC6(Render Standby)	Enabled Disabled	Check to enable render standby support.
Maximum GT frequency	Default Max Frequency , 100Mhz, 150Mhz, 200Mhz, 250Mhz, 300Mhz, 350Mhz, 400Mhz, 450Mhz, 500Mhz, 550Mhz, 600Mhz, 650Mhz, 700Mhz, 750Mhz, 800Mhz, 850Mhz, 900Mhz, 950Mhz, 1000Mhz, 1050Mhz, 1100Mhz, 1150Mhz, 1200Mhz	Maximum GT frequency limited by the user. Choose between 350MHz (RPN) and 1350MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU
Disable Turbo GT frequency	Enabled Disabled	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

3.3 Intel(R) Time Coordinated Computing

Aptio Setup – AMI

Advanced

Intel(R) Time Coordinated Computing (Intel(R) TCC)		
#AC Split Lock	[Disabled]	
IFU Enable	[Disabled]	
Intel(R) TCC Mode	[Disabled]	
Intel(R) TCC Mode Affected Settings		
IO Fabric Low Latency	[Disabled]	
GT CLOS	[Disabled]	
OPIO Recentering	[Enabled]	
C states	[Disabled]	
Intel(R) Speed Shift Technology	[Enabled]	
Intel(R) SpeedStep(tm)	[Enabled]	
Hyper-Threading	[Enabled]	
ACPI D3Cold Support	[Enabled]	
Low Power S0 Idle Capability	[Disabled]	
SA GV	[Enabled]	
WRC Feature	[Disabled]	
Page Close Idle Timeout	[Enabled]	
Power Down Mode	[Auto]	
RC6(Render Standby)	[Enabled]	
DMI Link ASPM Control	[Disabled]	
PCI Express Clock Gating	[Enabled]	
Legacy IO Low Latency	[Enabled]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
#AC Split Lock	Enabled Disabled	Enable or Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crosses two cache lines.
IFU Enable	Enabled Disabled	Enable or Disable Instruction Fetch Unit(IFU). When enabled, Instructions will be prefetch to the cache.
Intel(R) TCC Mode	Enabled Disabled	Enable or Disable Intel(R) TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled.
IO Fabric Low Latency	Enabled Disabled	Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.

BIOS Item	Options	Description
GT CLOS	Enabled Disabled	Enable or Disable Graphics Technology(GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC
OPIO Recentering	Enabled Disabled	Enable or Disable Opio Recentering to improve Pcie latency.
C states	Enabled Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Intel(R) Speed Shift Technology	Enabled Disabled	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Intel(R) SpeedStep(tm)	Enabled Disabled	Allows more than two frequency ranges to be supported.
Hyper-Threading	Enabled Disabled	Enable or Disable Hyper-Threading Technology.
ACPI D3Cold Support	Enabled Disabled	Enable/Disable ACPI D3Cold support to be executed on D3 entry and exit
Low Power S0 Idle Capability	Enabled Disabled	This variable determines if we enable ACPI Lower Power S0 Idle Capability (Mutually exclusive with Smart connect). While this is enabled, it also disable 8254 timer for SLP_S0 support.
SA GV	Enabled Disabled	System Agent Geyserville. Can disable, fix to a specific point, or enable frequency switching.
WRC Feature	Enabled Disabled	Enable/Disable SA WRC(Write Cache) Feature of IOP. When enabled, supports IO devices allocating onto the ring and into LLC.
Page Close Idle Timeout	Enabled Disabled	Page Close Idle Timeout Control
Power Down Mode	Auto No Power Down APD PPD-DLloff	CKE Power Down Mode Control
RC6(Render Standby)	Enabled Disabled	Check to enable render standby support.
DMI Link ASPM Control	Enabled Disabled	The control of Active State Power Management of the DMI Link.
PCI Express Clock Gating	Enabled Disabled	PCI Express Clock Gating Enable/Disable for each root port.
Legacy IO Low Latency	Enabled Disabled	Set to enable low latency of legacy IO. Some systems require lower IO latency irrespective of power. This is a tradeoff between power and IO latency.

3.4 Power Management

Aptio Setup – AMI

Advanced

Power Management

Enable ACPI Auto Configuration

[Disabled]

Power-Up Mode

[Turn On]

ATTENTION: The Power-Up Mode only has effect, if the module is in ATX-Mode.

> Power Consumption

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
Enable ACPI Auto Configuration	Enabled Disabled	Enables or Disables BIOS ACPI Auto Configuration.
Power-Up Mode	Turn On Remain Off	Turn On: Remain Off: The machine starts automatically when the power supply is turned on. To start the machine the power button has to be pressed.
Power Consumption	Submenu	

3.4.1 Power Consumption

Aptio Setup – AMI

Advanced

Power Consumption

Main Current	XXX A
Current Input Power	XXX W
RTC	XXX V
5VSB	XXX V
VIN	XXX V
3.3V	XXX V
VMEM	XXX V
3.3VSB	XXX V
VCORE	XXX V

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Main Current	Info-only	
Current Input Power	Info-only	
RTC	Info-only	
5VSB	Info-only	
VIN	Info-only	
3.3V	Info-only	
VMEM	Info-only	
3.3VSB	Info-only	
VCORE	Info-only	

3.5 System Management

Aptio Setup – AMI

Advanced

System Management

SEMA Firmware Version ADLINK 005

> SEMA Flags

SEMA Features:

Uptime & Power Cycles Counter

System Restart Event

4096 Bytes User-Flash

Runtime Watchdog

Temperatures

Voltage Monitor

Power-up Watchdog

Boot Counter

Dual-BIOS

I2C Bus 2

AT/ATX Mode

ACPI Thermal Trigger

Ext - GPIO

I2C Bus 3

Other BMC

Error Log

Parameter Memory

Ext-GPIO Input Interrupt Support

><: Select Screen

^v: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F8: Previous Values

F9: Optimized Default

F10: Save & Exit

ESC: Exit

BIOS Item	Options	Description
SEMA Firmware Version	Info-only	
SEMA Flags	Submenu	
SEMA Features	Info-only	If this item is shown in below, it means SEMA supports it.

3.5.1 SEMA Flags

Aptio Setup – AMI

Advanced

SEMA Flags

SEMA Flags 0x00

BMC Select Standard BIOS

ATX/AT-Mode AT Mode

><: Select Screen

^v: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F8: Previous Values

F9: Optimized Default

F10: Save & Exit

ESC: Exit

BIOS Item	Options	Description
Flags	Info-only	
SEMA Flags	Read only	Show current SEMA settings.
BMC Select	Read only	Display current boot BIOS ROM chip.
ATX/AT-Mode	Read only	Display current power mode setting, AT or ATX mode.

3.6 Thermal Management

Aptio Setup – AMI

Advanced

Thermal Management

- > CPU Thermal Configuration
- > Platform Thermal Configuration
- > Temperatures

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
CPU Thermal Configuration	Submenu	
Platform Thermal Configuration	Submenu	
Temperatures	Submenu	

3.6.1 CPU Thermal Configuration

Aptio Setup – AMI

Advanced	
Cpu Thermal Configuration	
DTS SMM	[Enabled]
Tcc Activation Offset	0
Tcc Offset Time Window	[Disabled]
Tcc Offset Clamp Enable	[Disabled]
Tcc Offset Lock Enable	[Enabled]
Bi-directional PROCHOT#	[Enabled]
Disable PROCHOT# Output	[Enabled]
Disable VR Thermal Alert	[Disabled]
PROCHOT Response	[Disabled]
PROCHOT Lock	[Disabled]
ACPI T-States	[Disabled]
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit	

BIOS Item	Options	Description
DTS SMM	Enabled Disabled	Disabled: ACPI thermal management uses EC reported temperature values.
Tcc Activation Offset	0	Offset from factory set Tcc activation temprature at which the Thermal Control Circuit must be activated. Tcc will be activated at: Tcc Activation Temp - Tcc Activation Offset. Tcc Activation Offset range is 0 to 63.
Tcc Offset Time Window	Disabled , 5 ms, 10 ms, 55 ms, 156 ms, 375 ms, 500 ms, 750 ms, 1 sec, 2 sec, 3 sec, 4 sec, 5 sec, 6 sec, 7 sec, 8 sec, 10 sec, 12 sec, 14 sec, 16 sec, 20 sec, 24 sec, 28 sec, 32 sec, 40 sec, 48 sec, 56 sec, 64 sec, 80 sec, 96 sec, 112 sec, 128 sec, 160 sec, 192 sec, 224 sec, 256 sec, 320 sec, 384 sec, 448 sec	Tcc Offset Time Window for Running Average Temperature Limit(RATL) feature. The Tcc offset time window can range from 5ms to 448s.

Tcc Offset Clamp Enable	Enabled Disabled	Tcc Offset Clamp bit Enable for Running Average Temperature Limit(RATL) feature to allow CPU to throttle below P1.
Tcc Offset Lock Enable	Enabled Disabled	Lock Enable for Running Average Temperature Limit(RATL) feature to lock Temperature Target MSR.
Bi-directional PROCHOT#	Enabled Disabled	When a processor thermal sensor trips (either core), the PROCHOT# will be driven.
Disable PROCHOT# Output	Enabled Disabled	Enable/Disable PROCHOT# Output
Disable VR Thermal Alert	Enabled Disabled	Enable/Disable VR Thermal Alert
PROCHOT Response	Enabled Disabled	Enable/Disable PROCHOT Response
PROCHOT Lock	Enabled Disabled	Enable/Disable PROCHOT Lock
ACPI T-States	Enabled Disabled	Enable/Disable ACPI T-States.

3.6.2 Platform Thermal Configuration

Aptio Setup – AMI

Advanced

Platform Thermal Configuration		
Critical Trip Point	[Disabled]	
Active Trip Point 0	[87 C]	
Active Trip Point 1	[55 C]	
Passive Trip Point	[95 C]	
Passive TC1 Value	1	
Passive TC2 Value	5	
Passive TSP Value	10	
Active Trip Points	[Disabled]	
Passive Trip Points	[Enabled]	
Critical Trip Points	[Disabled]	
PCH Temp Read	[Enabled]	><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit
CPU Energy Read	[Enabled]	
CPU Temp Read	[Enabled]	
Alert Enable Lock	[Disabled]	
CPU Temp	72	
Boot DTS Read	[Disabled]	

BIOS Item	Options	Description
Critical Trip Point	Disabled , 80 C, 90 C, 95 C, 100 C	This value controls the temperature of the ACPI Critical Trip Point - the point in which the OS will shut the system off.
Active Trip Point 0	Disabled, 15 C, 23 C, 31 C, 39 C, 47 C, 55 C, 63 C, 71 C, 79 C, 87 C , 95 C, 103 C, 111 C, 119 C (POR)	This value controls the temperature of the ACPI Active Trip Point 0 - the point in which the OS will turn the processor fan on Active Trip Point 0 Fan Speed.
Active Trip Point 1	Disabled, 15 C, 23 C, 31 C, 39 C, 47 C, 55 C , 63 C, 71 C, 79 C, 87 C, 95 C, 103 C, 111 C, 119 C (POR)	This value controls the temperature of the ACPI Active Trip Point 1 - the point in which the OS will turn the processor fan on Active Trip Point 1 Fan Speed.
Passive Trip Point	Disabled, 15 C, 23 C, 31 C, 39 C, 47 C, 55 C, 63 C, 71 C, 79 C, 87 C, 95 C , 103 C, 111 C, 119 C (POR)	This value controls the temperature of the ACPI Passive Trip Point - the point in which the OS will begin throttling the processor.
Passive TC1 Value	1	This value sets the TC1 value for the ACPI Passive Cooling Formula. Range 1 - 16
Passive TC2 Value	5	This value sets the TC2 value for the ACPI Passive Cooling Formula. Range 1 - 16
Passive TSP Value	10	This item sets the TSP value for the ACPI Passive Cooling Formula. It represents in tenths of a second how often the OS will read the temperature when passive cooling is enabled. Range 2 - 32
Active Trip Points	Enabled Disabled	Disable Active Trip Points
Passive Trip Points	Enabled Disabled	Disable Passive Trip Points
Critical Trip Points	Enabled Disabled	Disable Critical Trip Points
PCH Temp Read	Enabled Disabled	PCH Temperature Read Enable
CPU Energy Read	Enabled Disabled	CPU Energy Read Enable
CPU Temp Read	Enabled Disabled	CPU Temperature Read Enable
Alert Enable Lock	Enabled Disabled	Lock all Alert Enable settings
CPU Temp	72	Fail Safe temp that EC will use if OS is hung
Boot DTS Read	Enabled Disabled	Read PCH, CPU DTS Temperature and publish via SMBIOS table

3.6.3 Temperatures

Aptio Setup – AMI

Advanced

Temperatures and Fan Speed		
CPU Temperature		
Current		100 C
Startup		50 C
Min		26 C
Max		100 C
Board Temperatures		
Current		48 C
Startup		28 C
Min		17 C
Max		60 C
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
CPU Temperature Current/Startup/Min/Max	Info-only	
Board Temperatures Current/Startup/Min/Max	Info-only	.

3.7 Watchdog Timer

Aptio Setup – AMI

Advanced

Watchdog Timer	
Power-Up Watchdog	[Disabled]
ATTENTION: Pressing F12 during start up disables the Power Up Watchdog.	
RunTime Watchdog	[Disabled]
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit	

BIOS Item	Options	Description
Power-Up Watchdog	Enabled Disabled	The Power Up Watchdog resets the system after a certain amount of time after power up.
RunTime Watchdog	Enabled Disabled	The RunTime Watchdog resets the system after a certain amount of time after power up.

3.8 Super IO Configuration

Aptio Setup – AMI

Advanced

Super IO Configuration

> NCT5104DSEC Super IO Configuration

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
NCT5104DSEC Super IO Configuration	Submenu	

3.8.1 NCT5104DSEC Super IO Configuration

Aptio Setup – AMI

Advanced

NCT5104DSEC Super IO Configuration

Super IO Chip

> Serial Port 1 Configuration

> Serial Port 2 Configuration

> Serial Port 3 Configuration

> Serial Port 4 Configuration

NCT5104DSEC

><: Select Screen
 ^v: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F8: Previous Values
 F9: Optimized Default
 F10: Save & Exit
 ESC: Exit

BIOS Item	Options	Description
Super IO Chip	Info-only	
Serial Port x Configuration	Submenu	

NCT5104DSEC Super IO Configuration → Serial Port x Configuration

Aptio Setup – AMI.

Advanced

Serial Port x Configuration

Serial Port
Device Settings
Change Settings

[Enabled]
IO=3F8h; IRQ=4;

[Auto]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable serial port (COMx).
Device Setting	Info-only	It will show current resource assignment of serial port (COMx).
Change Settings	Auto IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,7,9,10,11,12 IO=2F8;IRQ=3,4,5,7,9,10,11,12 IO=3E8;IRQ=3,4,5,7,9,10,11,12 IO=2E8;IRQ=3,4,5,7,9,10,11,12	Select an optimal setting for Super IO device.

3.9 VPX Configuration

Aptio Setup – AMI

Advanced

VPX Configuration		
WOL From S5	[ON]	
Active Cooling Trip Point	[Refer to BMC]	
Passive Cooling Trip Point	[Disabled]	
Critical Trip Point	[Disabled]	
Watchdog ACPI Event Shutdown	[Disabled]	
PCIE_BFR_SEL	[1x8 + 2x4]	
GPIO Pin Direction	[Input Mode]	
GPIO Interrupt Setting	[No interrupt]	
EC_GPIO	[Interrupt trigger]	
EC_GPI1	[Interrupt trigger]	
EC_GPI2	[Interrupt trigger]	
EC_GPI3	[Interrupt trigger]	
EC_GPO0	[Low]	
EC_GPO1	[Low]	
EC_GPO2	[Low]	
EC_GPO3	[Low]	
COM2 port mode	[RS232]	
Maintenance port mode	[UART]	
DP++ manual mode	[Displayport]	
PCIe Scan Delay	0	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
WOL From S5	OFF ON	This Config to control power on/off LAN in S5 State by SEMA(EC).
Active Cooling Trip Point	40 C, 50 C, 60 C, 70 C, Refer to BMC	This value is the temperature threshold of the active cooling trip point.
Passive Cooling Trip Point	Disabled , 70 C, 80 C, 90 C	This value is the temperature threshold of the passive cooling trip point.
Critical Trip Point	Disabled , 80 C, 90 C, 95 C	This value is the temperature threshold of the critical trip point.
Watchdog ACPI Event Shutdown	Disabled Enabled	Watchdog ACPI Event Shutdown Enabled/Disabled
PCIE_BFR_SEL	1x8 + 2x4 , 2x8	Refer to the following information for customized functions
GPIO Pin Direction	Input Mode Output Mode	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
GPIO Interrupt Setting	No interrupt , Interrupt for both edge trigger, Low level trigger, High level trigger	When GPIO Pin is input mode, it supports edge trigger and level trigger

BIOS Item	Options	Description
EC_GPIO	Interrupt trigger No Interrupt	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPI1	Interrupt trigger No Interrupt	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPI2	Interrupt trigger No Interrupt	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPI3	Interrupt trigger No Interrupt	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPO0	Low High	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPO1	Low High	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPO2	Low High	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
EC_GPO3	Low High	Indicates whether the GPIO Pin is interrupted. Write 0x00 to clear the interrupt and EC_GPIO_INT will be changed to high level
COM2 port mode	RS232 , RS485, RS422	COM2 port mode
Maintenance port mode	RS232, UART	Maintenance port mode
DP++ manual mode	HDMI with Passive Dongle, Displayport	DP++ manual mode
PCIe Scan Delay	0	System delay before PCIe scan. Unit is second and maximum value is 60 seconds

3.10 USB Configuration

Aptio Setup – AMI

Advanced

USB Configuration	
USB Module Version	26
USB Controllers: 1 XHCI	
USB Devices: 1 Drive, 1 Keyboard, 1 Mouse, 1 Hub	
Legacy USB Support	[Enabled]
XHCI Hand-off	[Enabled]
USB Mass Storage Driver Support	[Enabled]
USB hardware delays and time-outs:	
USB transfer time-out	[20 sec]
Device reset time-out	[20 sec]
Device power-up delay	[Auto]
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit	

BIOS Item	Options	Description
USB Module Version	Info-only	
USB Controllers	Info-only	
USB Devices	Info-only	
Legacy USB Support	Enabled Disabled	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for Oses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec, 5 sec, 10 sec, 20 sec	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec, 20 sec , 30 sec, 40 sec	USB mass storage device Start Unit command time-out.

BIOS Item	Options	Description
Device power-up delay	Auto , Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.11 AMI Graphic Output Protocol Policy

Aptio Setup – AMI

Advanced

Intel(R) Graphics Controller

Intel(R) GOP Driver [17.0.1061]

Output Select [DP3[ACTIVE]]

><: Select Screen

^v: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F8: Previous Values

F9: Optimized Default

F10: Save & Exit

ESC: Exit

BIOS Item	Options	Description
Intel(R) GOP Driver	Info-only	
Output Select	DP3[ACTIVE]	Output Interface

3.12 Serial Port Console Redirection

Aptio Setup – AMI

Advanced

COM2
Console Redirection
> Console Redirection Settings

COM3
Console Redirection
> Console Redirection Settings

Serial Port for Out-of-Band Management/
Windows Emergency Management Services (EMS)
Console Redirection EMS
> Console Redirection Settings

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Console Redirection	Disabled Enabled	To enable or disable console redirection of COMx.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

3.12.1 Console Redirection Settings

Aptio Setup – AMI

Advanced

COMx		Emulation: ANSI:
Console Redirection Settings		Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more
Terminal Type	[ANSI]	
Bits per second	[115200]	
Data Bits	[8]	
Parity	[None]	
Stop Bits	[1]	
Flow Control	[None]	
VT-UTF8 Combo Key Support	[Enabled]	
Recorder Mode	[Disabled]	
Resolution 100x31	[Disabled]	
Putty KeyPad	[VT100]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Terminal Type	VT100, VT100Plus, VT-UTF8, ANSI	Configure the type of console emulation. Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speed.
Data Bits	7 8	Configure the number of data bits in each transmitted or received serial character for both serial ports.

Parity	None , Even, Odd, Mark, Space	Configures if parity bit is generated (transmit data) or checked. A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	1 2	Configures the number of stop bits transmitted and received in each serial character for both serial ports. Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None , Hardware RTS/CTS	Configures flow control for console redirection. Hardware flow control uses RTC/CTS. Software flow control uses XON/XOFF.
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 combination key support for ANSI/VT100 terminals.
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select Function Keys and Key Pad on Putty.

3.12.2 Console Redirection Settings (EMS)

Aptio Setup – AMI

Advanced

Out-of-Band Mgmt Port	[COM0]	
Terminal Type EMS	[VT-UTF8]	
Bits per second EMS	[115200]	
Flow Control EMS	[None]	
Data Bits EMS	8	
Parity EMS	None	
Stop Bits EMS	1	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Out-of-Band Mgmt Port	COM0 COM1 COM2 COM3	Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Terminal Type EMS	VT100 VT100Plus VT-UTF8 ANSI	VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
Bits per second EMS	9600 19200 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Flow Control EMS	None Hardware RTS/CTS Software Xon/Xoff	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop

BIOS Item	Options	Description
Data Bits EMS	Info-only	
Parity EMS	Info-only	
Stop Bits EMS	Info-only	

3.13 Network Stack Configuration

Aptio Setup – AMI

Advanced

Network Stack	[Disabled]	
IPv4 PXE Support	[Disabled]	
IPv4 HTTP Support	[Disabled]	
IPv6 PXE Support	[Disabled]	
IPv6 HTTP Support	[Disabled]	
PXE boot wait time	0	
Media detect count	1	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Network Stack	Disabled Enabled	Enable/Disable UEFI Network Stack
IPv4 PXE Support	Disabled Enabled	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	Disabled Enabled	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	Disabled Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	Disabled Enabled	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

BIOS Item	Options	Description
PXE boot wait time	0	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	1	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.14 Trusted Computing

Aptio Setup – AMI

Advanced

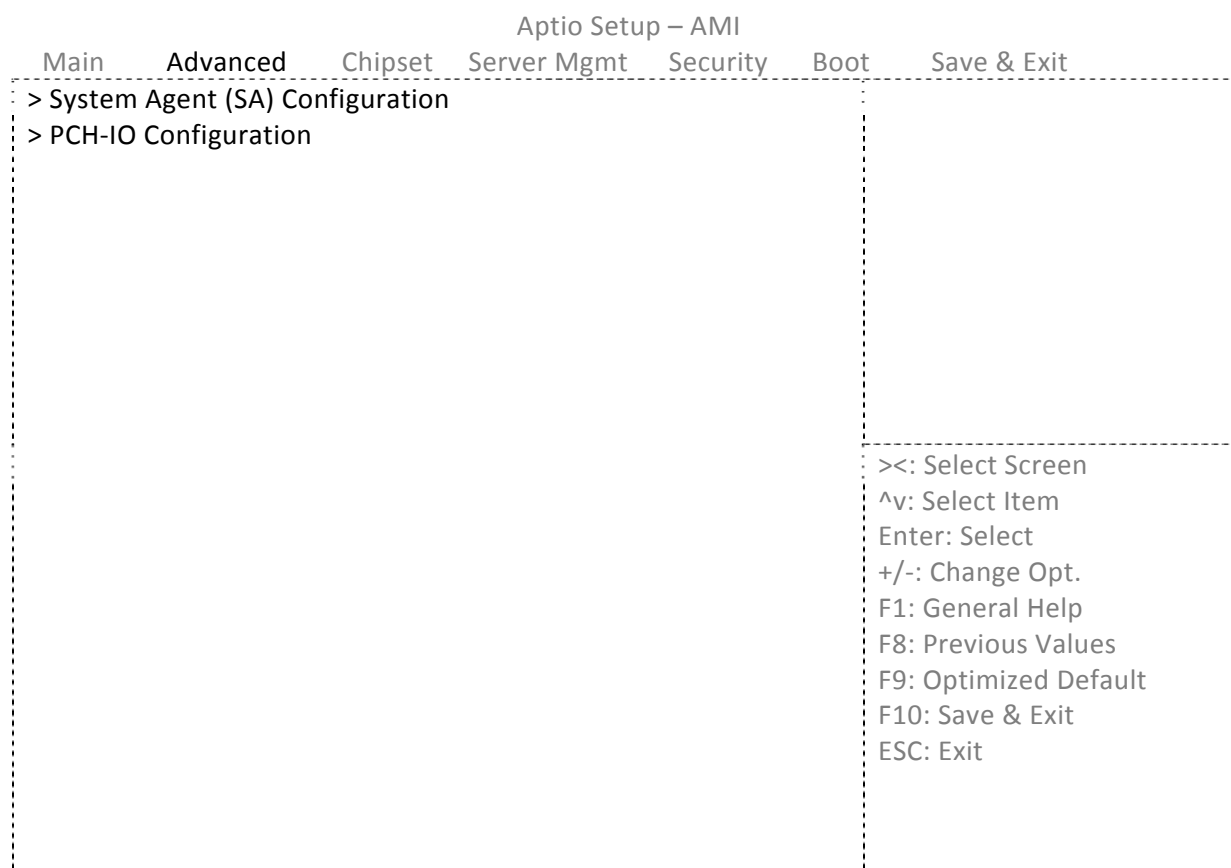
TPM 2.0 Device Found		
Firmware Version:	7.85	
Vendor:	IFX	
Security Device Support	[Enabled]	
Active PCR banks	SHA256	
Available PCR banks	SHA256	
SHA256 PCR Bank	[Enabled]	
Pending operation	[None]	
Platform Hierarchy	[Enabled]	
Storage Hierarchy	[Enabled]	
Endorsement Hierarchy	[Enabled]	
Physical Presence Spec Version	[1.3]	
TPM 2.0 InterfaceType	[TIS]	
Device Select	[Auto]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Firmware Version	Info-only	
Vendor	Info-only	
Security Device Support	Disable Enable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active PCR banks	Info-only	
Available PCR banks	Info-only	

BIOS Item	Options	Description
SHA256 PCR Bank	Disable Enable	Enable or Disable SHA256 PCR Bank
Pending operation	None TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disable Enable	Enable or Disable Platform Hierarchy
Storage Hierarchy	Disable Enable	Enable or Disable Storage Hierarchy
Endorsement Hierarchy	Disable Enable	Enable or Disable Endorsement Hierarchy
Physical Presence Spec Version	1.2 1.3	Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
TPM 2.0 InterfaceType	CRB TIS	Select the Communication Interface to TPM 2.0 Device.
Device Select	TPM 1.2 TPM 2.0 Auto	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated

4 Chipset Menu

This menu contains the settings for most of the chipset I/O in the system.



BIOS Item	Options	Description
System Agent (SA) Configuration	Submenu	System Agent (SA) Parameters
PCH-IO Configuration	Submenu	PCH Parameters

4.1 System Agent (SA) Configuration

Aptio Setup – AMI

Chipset

System Agent (SA) Configuration

VT-d

> Memory Configuration

> Graphics Configuration

> PEG Port Feature Configuration

> VMD setup menu

Stop Grant Configuration

VT-d

X2APIC Opt Out

DMA Control Guarantee

Above 4GB MMIO BIOS assignment

Supported

[Auto]

[Enabled]

[Disabled]

[Enabled]

[Enabled]

><: Select Screen

^v: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F8: Previous Values

F9: Optimized Default

F10: Save & Exit

ESC: Exit

BIOS Item	Options	Description
VT-d	Info-only	
> Memory Configuration	Submenu	
> Graphics Configuration	Submenu	
> PEG Port Feature Configuration	Submenu	
> VMD setup menu	Submenu	
Stop Grant Configuration	Auto Manual	Automatic/Manual stop grant configuration
VT-d	Disabled Enabled	VT-d capability
X2APIC Opt Out	Disabled Enabled	Enable/Disable X2APIC_OPT_OUT bit
DMA Control Guarantee	Disabled Enabled	Enable/Disable DMA_CONTROL_GUARANTEE bit
Above 4GB MMIO BIOS assignment	Disabled Enabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment

4.1.1 Memory Configuration

Aptio Setup – AMI

Chipset

Memory Configuration		
Memory RC Version	2.0.2.8	
Memory Speed	3200 MT/s	
Memory Timings (tCL-tRCD-tRP-tRAS)	22-22-22-52	
Controller 0 Channel 0 Slot 0	Populated & Enabled	
Size	16384 MB (DDR4)	
Number of Ranks	1	
Manufacturer	Micron	
Controller 0 Channel 0 Slot 1	Not Populated / Disabled	
Controller 0 Channel 1 Slot 0	Populated & Enabled	
Size	16384 MB (DDR4)	
Number of Ranks	1	
Manufacturer	Micron	
Controller 0 Channel 1 Slot 1	Not Populated / Disabled	
Memory Test on Warm Boot	[Enabled]	><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit
Maximum Memory Frequency	[Auto]	
ECC Support	[Enabled]	
Max TOLUD	[Dynamic]	
Controller 0, Channel 0 DIMM Control	[Disable DIMM1]	
Controller 1, Channel 0 DIMM Control	[Disable DIMM1]	
In-Band ECC Support	[Disabled]	

BIOS Item	Options	Description
Memory RC Version	Info-only	
Memory Speed	Info-only	
Memory Timings (tCL-tRCD-tRP-tRAS)	Info-only	
Controller X Channel X Slot X	Info-only	
Size	Info-only	
Number of Ranks	Info-only	
Manufacturer	Info-only	
Memory Test on Warm Boot	Disabled Enabled	Enable Or Disable Base Memory Test Run on Warm Boot
Maximum Memory Frequency	Auto	Maximum Memory Frequency Selections in Mhz.
ECC Support	Disabled Enabled	Enable/disable DDR Ecc Support
Max TOLUD	Dynamic , 1 GB, 1.25 GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB, 3.25 GB, 3.5 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

BIOS Item	Options	Description
Controller 0, Channel 0 DIMM Control	Enable both DIMMs, Disable DIMM0, Disable DIMM1 , Disable both DIMMs	Controller 0, Channel 0 DIMM Control Support - Enable or Disable Dimms on Controller 0, Channel 0.
Controller 1, Channel 0 DIMM Control	Enable both DIMMs, Disable DIMM0, Disable DIMM1 , Disable both DIMMs	Controller 1, Channel 0 DIMM Control Support - Enable or Disable Dimms on Controller 1, Channel 0.
In-Band ECC Support	Disabled , Enabled	Enable/Disable In-Band ECC. Either the IBECC or the TME can be enabled.

4.1.2 Graphics Configuration

Aptio Setup – AMI	
Chipset	
Graphics Configuration	
Skip Scanning of External Gfx Card	[Disabled]
Primary Display	[Auto]
Select PCIE Card	[Auto]
> External Gfx Card Primary Display Configuration	
Internal Graphics	[Auto]
GTT Size	[8MB]
Aperture Size	[256MB]
DVMT Pre-Allocated	[60MB]
DVMT Total Gfx Mem	[256MB]
Intel Graphics Pei Display Peim	[Disabled]
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit	

BIOS Item	Options	Description
Skip Scanning of External Gfx Card	Disabled Enabled	If Enable, it will not scan for External Gfx Card on PEG and PCH PCIE Ports
Primary Display	Auto , IGFX, PEG Slot, PCH PCI, HG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.

Select PCIE Card	Auto , Elk Creek 4, PEG Eval	Select the card used on the platform
> External Gfx Card Primary Display Configuration	Submenu	N/A
Internal Graphics	Auto , Disabled, Enabled	Keep IGFX enabled based on the setup options.
GTT Size	2MB, 4MB, 8MB	Select the GTT Size
Aperture Size	128MB, 256MB , 512MB, 1024MB	Select the Aperture Size
DVMT Pre-Allocated	0M, 32M, 64M, 96M, 128M, 160M, 4M, 8M, 12M, 16M, 20M, 24M, 28M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M, 60M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M, 256M , MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
Intel Graphics Pei Display Peim	Disabled Enabled	Enable/Disable Pei (Early) Display

4.1.3 PEG Port Feature Configuration

Aptio Setup – AMI
Chipset

PEG Port Feature Configuration

Detect Non-Compliance Device [Disabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Detect Non-Compliance Device	Disabled Enabled	Detect Non-Compliance PCI Express Device in PEG

4.1.4 VMD setup menu

Aptio Setup – AMI

Chipset

VMD Configuration

Enable VMD controller [Disabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Enable VMD controller	Disabled Enabled	

4.2 PCH-IO Configuration

Aptio Setup – AMI

Chipset

PCH-IO Configuration

- > SATA And RST Configuration
- > USB Configuration
- > Security Configuration
- > HD Audio Configuration
- > Seriallo Configuration
- > Pch Thermal Throttling Control
- > TSN GBE Configuration

Port 80h Redirection
Enhance Port 80h LPC Decoding
Enable TCO Timer
Enable Timed GPIO0
Enable Timed GPIO1

[LPC Bus]
[Enabled]
[Enabled]
[Disabled]
[Disabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
> SATA And RST Configuration	Submenu	
> USB Configuration	Submenu	
> Security Configuration	Submenu	
> HD Audio Configuration	Submenu	
> Seriallo Configuration	Submenu	
> Pch Thermal Throttling Control	Submenu	
> TSN GBE Configuration	Submenu	
Port 80h Redirection	LPC Bus PCIE Bus	Control where the Port 80h cycles are sent.
Enhance Port 80h LPC Decoding	Disabled Enabled	Support the word/dword decoding of port 80h behind LPC
Enable TCO Timer	Disabled Enabled	Enable/Disable TCO timer. When disabled, it disables PCH ACPI timer, stops TCO timer, and ACPI WDAT table will not be published.

Enable Timed GPIO0	Disabled Enabled	Enable/Disable Timed GPIO0. When disabled, it disables cross time stamp time-synchronization as extension of Hammock Harbor time synchronization.
Enable Timed GPIO1	Disabled Enabled	Enable/Disable Timed GPIO1. When disabled, it disables cross time stamp time-synchronization as extension of Hammock Harbor time synchronization.

4.2.1 SATA And RST Configuration

Aptio Setup – AMI Chipset		
SATA And RST Configuration		
SATA Controller(s)	[Enabled]	
SATA Mode Selection	[AHCI]	
SATA Test Mode	[Disabled]	
> Software Feature Mask Configuration		
Aggressive LPM Support	[Enabled]	
SATA Controller Speed	[Gen3]	
Serial ATA Port 0	TS256GSSD420I (256.0GB)	
Software Preserve	SUPPORTED	
Port 0	[Enabled]	
Hot Plug	[Disabled]	
Configured as eSATA	Hot Plug supported	><: Select Screen
External	[Disabled]	^v: Select Item
Spin Up Device	[Disabled]	Enter: Select
SATA Device Type	[Hard Disk Drive]	+/-: Change Opt.
Topology	[Unknow]	F1: General Help
SATA Port 0 DevSlp	[Enabled]	F8: Previous Values
DITO Configuration	[Disabled]	F9: Optimized Default
DITO Value	625	F10: Save & Exit
DM Value	15	ESC: Exit

BIOS Item	Options	Description
SATA Controller(s)	Disabled Enabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
SATA Test Mode	Disabled Enabled	Test Mode Enable/Disable (Loop Back).

> Software Feature Mask Configuration	Submenu	
Aggressive LPM Support	Disabled Enabled	Enable PCH to aggressively enter link power state.
SATA Controller Speed	Default, Gen1, Gen2, Gen3	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 0	Info-only	
Software Preserve	Info-only	
Port 0	Disabled Enabled	Enable or Disable SATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Info-only	
External	Disabled Enabled	Marks this port as external.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
Topology	Unknown ISATA Direct Connect Flex M2	Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2
SATA Port 0 DevSlp	Disabled Enabled	Enable/Disable SATA Port 0 DevSlp. For DevSlp to work, both hard drive and SATA port need to support DevSlp function, otherwise an unexpected behavior might happen. Please check board design before enabling it.
DITO Configuration	Disabled Enabled	Enable/Disable DITO Configuration
DITO Value	625	DITO Value
DM Value	15	DM Value

4.2.2 Software Feature Mask Configuration

Aptio Setup – AMI

Chipset

Software Feature Mask Configuration

HDD Unlock	[Enabled]
LED Locate	[Enabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
HDD Unlock	Disabled Enabled	If enabled, indicates that the HDD password unlock in the OS is enabled.
LED Locate	Disabled Enabled	If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

4.2.3 USB Configuration

Aptio Setup – AMI	
Chipset	
USB Configuration	
xDCI Support	[Disabled]
USB2 PHY Sus Well Power Gating	[Enabled]
USB3 Link Speed Selection	[GEN1]
USB PDO Programming	[Enabled]
XHCI LTR Mode	[Enabled]
USB Overcurrent	[Enabled]
USB Overcurrent Lock	[Enabled]
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit	

BIOS Item	Options	Description
xDCI Support	Disabled Enabled	Enable/Disable xDCI (USB OTG Device).
USB2 PHY Sus Well Power Gating	Disabled Enabled	Select 'Enabled' to enable SUS Well PG for USB2 PHY. This option has no effect on PCH-H
USB3 Link Speed Selection	GEN1 GEN2	This option is to select USB3 Link Speed GEN1 or GEN2
USB PDO Programming	Disabled Enabled	Select 'Enabled' if Port Disable Override functionality is used.
XHCI LTR Mode	Disabled Enabled	Enable/Disable XHCI LTR Mode
USB Overcurrent	Disabled Enabled	Select 'Disabled' for pin-based debug. If pin-based debug is enabled but USB overcurrent is not disabled, USB DbC does not work.
USB Overcurrent Lock	Disabled Enabled	Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCI controller consume the Overcurrent mapping data

4.2.4 Security Configuration

Aptio Setup – AMI

Chipset

Security Configuration

RTC Memory Lock	[Enabled]
BIOS Lock	[Disabled]
Force unlock on all GPIO pads	[Disabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
RTC Memory Lock	Disabled Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	Disabled Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
Force unlock on all GPIO pads	Disabled Enabled	If Enabled BIOS will force all GPIO pads to be in unlocked state

4.2.5 HD Audio Configuration

Aptio Setup – AMI

Chipset

HD Audio Subsystem Configuration Settings

HD Audio
[Enabled]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
HD Audio	Disabled Enabled	Control Detection of the HD-Audio device.

4.2.6 Serial IO Configuration

Aptio Setup – AMI

Chipset

SerialIo Configuration

UART0 Controller

[Communication port (COM)]

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
UART0 Controller	Disabled Enabled Communication port (COM)	Enables/Disables SerialIo Controller

4.2.7 PCH Thermal Throttling Control

Aptio Setup – AMI

Chipset

Thermal Throttling Level DMI Thermal Setting SATA Thermal Setting	[Suggested Setting] [Suggested Setting] [Suggested Setting]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Thermal Throttling Level	Suggested Setting Manual	Determine if use Intel suggested setting
DMI Thermal Setting	Suggested Setting Manual	Determine if use Intel suggested setting
SATA Thermal Setting	Suggested Setting Manual	Determine if use Intel suggested setting

5 Server Mgmt Menu

This menu contains the settings for IPMI BMC in the system.

Aptio Setup – AMI						
Main	Advanced	Chipset	Server Mgmt	Security	Boot	Save & Exit
BMC Self Test Status		PASSED				
BMC Device ID		18				
BMC Device Revision		80				
BMC Firmware Revision		1.05				
IPMI Version		2.0				
IPMI BMC Interface		KCS				
BMC Support		[Enabled]				
SEL is full						
>System Event Log						
>View RFU information				><: Select Screen		
>BMC network configuration				^v: Select Item		
>Adlink IPMI configuration				Enter: Select		
>View System Event Log				+/-: Change Opt.		
>BMC User Setting				F1: General Help		
				F8: Previous Values		
				F9: Optimized Default		
				F10: Save & Exit		

BIOS Item	Options	Description
BMC Self Test Status	Info-only	
BMC Device ID	Info-only	
BMC Device Revision	Info-only	
BMC Firmware Revision	Info-only	
IPMI Version	Info-only	
IPMI BMC Interface	Info-only	
BMC Support	Disabled Enabled	Enable/Disable interfaces to communicate with BMC
SEL is full	Info-only	
>System Event Log	Submenu	
>View RFU information	Submenu	
>BMC network configuration	Submenu	
>Adlink IPMI configuration	Submenu	
>View System Event Log	Submenu	Enter to check SEL.
>BMC User Setting	Submenu	Enter to modify BMC user setting.

5.1 System Event Log

Aptio Setup – AMI
Server Mgmt

Enabling/Disabling Options

SEL Components [Enabled]

Erasing Settings

Erase SEL [No]

When SEL is Full [Do Nothing]

Custom EFI Logging Options

Log EFI Status Codes [Error code

NOTE: All values changed here do not take
effect until computer is restarted.

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
SEL Components	Disabled Enabled	Change this to enable or disable event logging for error/progress codes during boot.
Erase SEL	No Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately	Choose options for reactions to a full SEL.
Log EFI Status Codes	Disabled Both Error code Progress code	Disable the logging of EFI Status Codes or log only error code or only progress code or both.

5.2 View FRU information

Aptio Setup – AMI
Server Mgmt

FRU information

Board Manufacturer	ADLINK
Board Product	VPX3-TL
Board Serial Number	PPS0000001
Board Part Number	55-31129
Product Manufacturer	ADLINK
Product Name	VPX3-TL
Product Part Number	91-31129
Product Version	Rev A2
Product Serial Number	0000001

NOTE: No FRU information for fields indicate
information needs to be filled by O.E.M

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Board Manufacturer	Info-only	
Board Product	Info-only	
Board Serial Number	Info-only	
Board Part Number	Info-only	
Product Manufacturer	Info-only	
Product Name	Info-only	
Product Part Number	Info-only	
Product Version	Info-only	
Product Serial Number	Info-only	

5.3 BMC network configuration

Aptio Setup – AMI
Server Mgmt

--BMC network configuration--

Configure IPv4 support

Lan channel 1

Configuration Address source	[Unspecified]
Current Configuration Address source	StaticAddress
Station IP address	xxx.xxx.xxx.xxx
Subnet mask	xxx.xxx.xxx.xxx
Station MAC address	xx-xx-xx-xx-xx-xx
Router IP address	xxx.xxx.xxx.xxx

Lan channel 2

Configuration Address source	[Unspecified]
Current Configuration Address source	StaticAddress
Station IP address	xxx.xxx.xxx.xxx
Subnet mask	xxx.xxx.xxx.xxx
Station MAC address	xx-xx-xx-xx-xx-xx
Router IP address	xxx.xxx.xxx.xxx

><: Select Screen
^v: Select Item
Enter: Select

+/-: Change Opt.
F1: General Help
F8: Previous Values
F9: Optimized Default
F10: Save & Exit
ESC: Exit

BIOS Item	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase
Current Configuration Address source	Info-only	
Station IP address	Info-only	
Subnet mask	Info-only	
Station MAC address	Info-only	
Router IP address	Info-only	

5.4 ADLINK IPMI Configuration

Aptio Setup – AMI Server Mgmt		
PCB Version	A1	
Geographical Address	0x1C	
System Controller	Host	
NVMRO Signal	Non Protect	
Heater Status	Off	
IPMI Product ID	PCIe SKU	
NVMRO item Control	[Non-Protect]	
REF_CLK Support	[Enabled]	
AUK_CLK Support	[Enabled]	
SYS_RESET Support	[Enabled]	
XMC Control	[Non-Ignore]	
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
PCB Version	Info-only	
Geographical Address	Info-only	
System Controller	Info-only	
NVMRO Signal	Info-only	
Heater Status	Info-only	
IPMI Product ID	Info-only	
NVMRO item Control	Protect Non-Protect	Enable or disable NVMRO Control support.
REF_CLK Support	Disabled Enabled	Enable or disable REF_CLK support.
AUK_CLK Support	Disabled Enabled	Enable or disable AUK_CLK support.
SYS_RESET Support	Disabled Enabled	Enable or disable SYS_RESET support.
XMC Control	Ignore Non-Ignore	Ignore or non-ignore XMC

This menu contains the settings for security in the system.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is Only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the user will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20					
Administrator Password User Password					><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit
HDD Security Configuration > Secure Boot menu					

BIOS Item	Options	Description
Administrator Password	Enter to set password	Configure/Clear Administrator Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
User Password	Enter to set password	Configure/Clear User Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.

BIOS Item	Options	Description
HDD Security Configuration	Submenu	For HDD security, it will list all HDD detected on motherboard. Select the HDD and then press enter can figure/clear HDD password.
Secure Boot menu	Submenu	

When selecting a HDD to configure passwords, BIOS will enter another new BIOS setup page like below. The method of configuring HDD password is the same as BIOS passwords. Once password is set, it will reflect the status on the screen, like 'INSTALLED' change on 'HDD User Pwd Status'. When there is no HDD user password installed, you can always change master password without confirming the latest installed password. Once HDD user password is installed, HDD master password is not allowed changing.

Aptio Setup – AMI

Security

HDD Password Description		
Allows Access to Set, Modify and Clear HardDisk User and Master Passwords. User Password need to be installed for Enabling Security. Master Password can be Modified only when successfully unlocked with Master Password in POST		
HDD PASSWORD CONFIGURATION		
Security Supported	Yes	
Security Enabled	Yes	
Security Locked	No	
Security Frozen	No	
HDD User Pwd Status	INSTALLED	
HDD Master Pwd Status	INSTALLED	
Set User Password		
Set Master Password		
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

6.1 Secure Boot

Aptio Setup – AMI

Security

System Mode	User	
Secure Boot	[Disabled] Not Active	
Secure Boot Mode	[Standard]	
> Restore Factory Keys		
> Reset To Setup Mode		
> Key Management		
		><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
System Mode	Info-only	
Secure Boot	Disabled Enabled	Secure Boot feature is Active if Secure Boot is Enabled,
Secure Boot Mode	Standard Custom	Secure Boot mode options

7 Boot Menu

This menu contains the settings for bootable devices in the system.

Aptio Setup – AMI.

Main	Advanced	Chipset	Server Mgmt	Security	Boot	Save & Exit
Boot Configuration						
Setup Prompt Timeout		1				
Bootup NumLock State		[On]				
Quiet Boot		[Enabled]				
Fast Boot		[Disabled]				
Boot mode select		[UEFI]				
Boot Configuration						
Boot Option #1		[Hard Disk]				
Boot Option #2		[NVMe]				
Boot Option #3		[Built-in EFI Shell]				
Boot Option #4		[CD/DVD]				
Boot Option #5		[SD]				
Boot Option #6		[USB Hard Disk]				
Boot Option #7		[USB CD/DVD]				
Boot Option #8		[USB Key]				
Boot Option #9		[USB Floppy]				
Boot Option #10		[USB Lan]				
Boot Option #11		[Network]				
						><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F8: Previous Values F9: Optimized Default F10: Save & Exit ESC: Exit

BIOS Item	Options	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state after system boot.
Quiet Boot	Disabled Enabled	Enabled: will show splash screen during POST. Disabled: will show boot message during POST.
Fast Boot	Disabled Enabled	Enable or disabled Fast boot feature. Most probes are skipped to reduce time cost during boot.
Boot mode select	LEGADY UEFI	Select boot mode, LEGACY/UEFI.

Boot Option #1~#11	Hard Disk NVME CD/DVD SD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Set system boot order.
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8 Save & Exit

Aptio Setup – AMI	
Main	Advanced
Save Options	Exit system setup after saving the changes.
Save Changes and Exit	
Discard Changes and Exit	
Save Changes and Reset	
Discard Changes and Reset	
Save Changes	
Discard Changes	
Default Options	
Restore Defaults	
Save as User Defaults	
Restore User Defaults	
Boot Override	
Launch EFI Shell from filesystem device	

BIOS Item	Options	Description
Save Changes and Exit	Enter	Save changed settings and exit BIOS setup utility.
Discard Changes and Exit	Enter	Skip changed setting and exit BIOS setup utility.
Save Changes and Reset	Enter	Save all changed settings and let system do reset to boot system.
Discard Changes and Reset	Enter	Discard all changed settings and let system do reset to boot system.
Save Changes	Enter	Save all changed settings.
Discard Changes	Enter	Discard changes done so far to any of the setup options.
Restore Default	Enter	Load the default made when BIOS was built.
Save as User Default	Enter	Save all changed done so far as User Defaults.
Restore User Default	Enter	Load the default that user save as user defaults.
Boot Override	Info-only	

Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS**, and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

1. Read these safety instructions carefully.
2. Keep this user's manual for future reference.
3. Read the specifications section of this manual for detailed information on the operating environment of this equipment.
4. The equipment can be operated at an ambient temperature of 40°C.
5. When installing/mounting or uninstalling/removing equipment; or when removal of the chassis lid required for user servicing (Section 3.1-3.5):
 - Turn off power and unplug any power cords/cables, and
6. To avoid electrical shock and/or damage to equipment:
 - Keep equipment away from water or liquid sources;
 - Keep equipment away from high heat or high humidity;
 - Keep equipment properly ventilated (do not block or cover ventilation openings);
 - Make sure to use recommended voltage and power source settings;
 - Always install and operate equipment near an easily accessible electrical socket-outlet;
 - Secure the power cord (do not place any object on/over the power cord);
 - Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
 - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
 - The power cord must be connected to a socket or outlet with a ground connection.
7. Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

8. This equipment is not suitable for use in locations where children are likely to be present.
9. Equipment must be serviced by authorized technicians when:
 - The power cord or plug is damaged;
 - Liquid has penetrated the equipment;
 - It has been exposed to high humidity/moisture;
 - It is not functioning or does not function according to the user's manual;
 - It has been dropped and/or damaged; and/or,
 - It has an obvious sign of breakage.
10. Please pay strict attention to all warnings and advisories appearing on the device, to avoid injury or damage.
11. It is recommended that equipment be installed only in a server room or computer room where access is:
 - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required;
 - Only afforded by the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.
12. Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

Getting Service

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