ZRT 智锐通

ECM-C114

COM-Express Type6 核心板
USER Manual V2.1

USER MANUAL
用户手册

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⚠安全须知

1	产品使用前，务必仔细阅读产品说明书。
2	对未准备安装的板卡，应将其保存在防静保护袋中。
3	在从包装袋中拿板卡前，应将手先置于接地金属物体上一会儿，以释放身体及手中的静电。
4	在拿板卡时，需佩带静电保护手套，并且应该养成只触及其边缘部份的习惯。
5	主板与电源连接时，请确认电源电压。
6	为避免人本被电击或产品被损坏，在每次对主板、板卡进行拔插或生新配置时须先关闭交流电源或将交流电源线从电源插座中拔掉。
7	在对板卡进行搬动前，先将交流电源线从电源插座中拔掉。
8	当您需连接或拔除任何设备前，须确定所有的电源线事先已被拔掉。
9	为避免频繁开关机对产品造成不必要的损伤,关机后,应至少等待30秒后再开机。
10	设备在使用过程时出现异常情况，请找专业人员处理。

目录

第一章 产品介绍

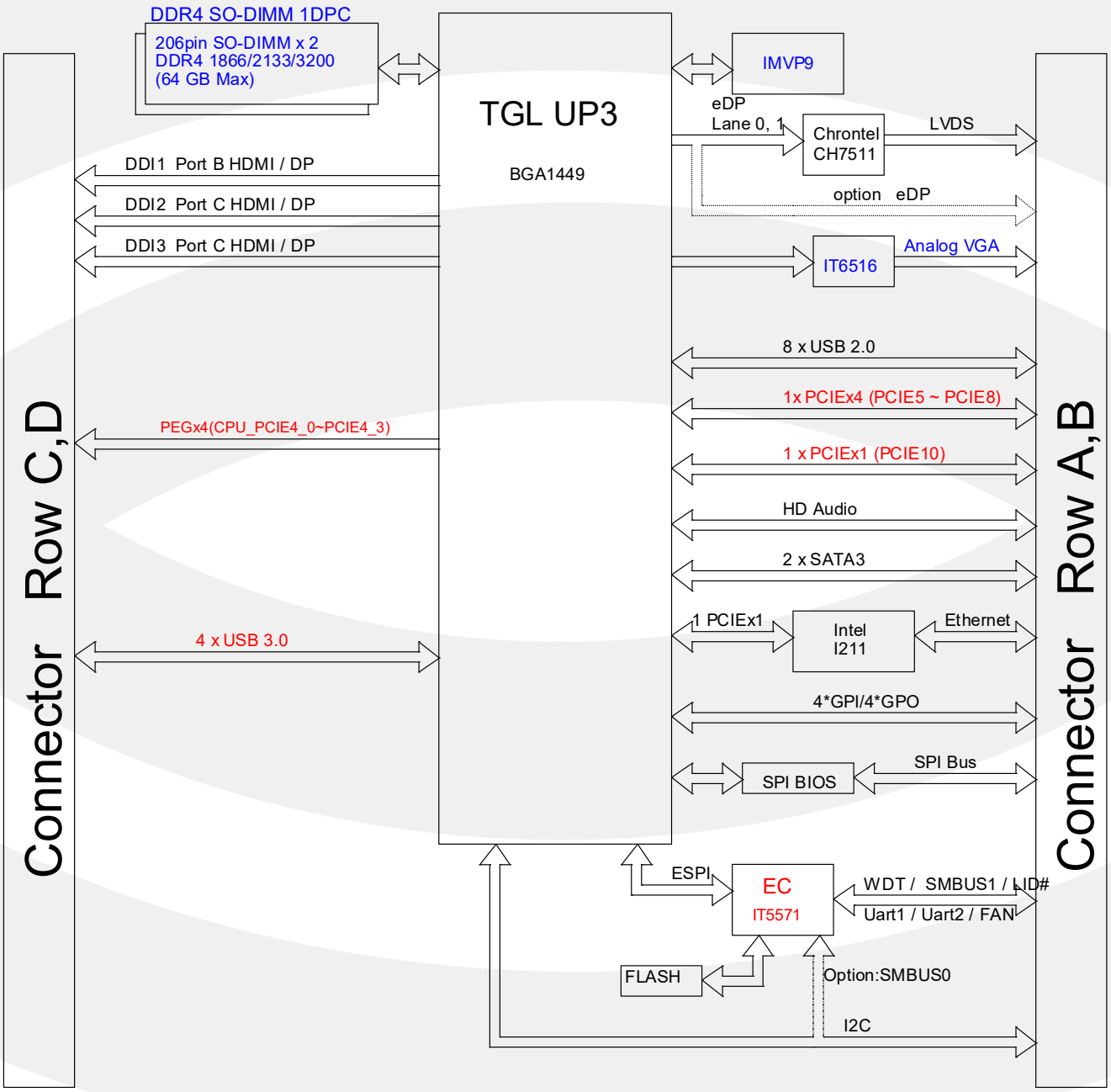
1.1 产品规格

Model		ECM-C114		
配置 Item	规格 Specification	描述 Describe		
处理器 Processor System	处理器 CPU	i3-1115G4	i5-1135G7	i7-1165G7
	内核数 Core Number	2C/4T	4C/8T	4C/8T
	最高主频 Max. Speed	4.1GHz	4.2GHz	4.7GHz
	三级缓存 L3 Cache	6M	8M	12M
	功耗 TDP (W)	28W	28W	28W
	指令集 Instruction Set Extensions	SSE4.1, SSE4.2, AVX2, AVX-512		
	EC	Support		
	BIOS	AMI EFI BIOS		
扩展插槽 Expansion Slot	PCI Express	2*PCIe 4x 1*PCIe 1x		
内存 Memory	规格 Technology	DDR4		
	最大容量 Max. Capacity	64G 3200MHz		
	插槽 Socket	2*SO-DIMM		
以太网 Ethernet	控制器 Controller	Intel®i211-AT		
显示 Display	控制器 Controller	3*DDI(Option HDMI/DVI/DP) 1*DDI to VGA 1*eDP to LVDS(Option eDP)		
	分辨率 Resolution	HDMI:4096*2304@24Hz DP:4096*2304@60Hz eDP:4096*2304@60Hz LVDS:1920*1200@60Hz VGA:2048*1536@50Hz		
	显卡 Graphics	Intel® Iris® Xᵉ		

内部接口 Internal Connector	**USB 3.0**	4*USB 3.0
	USB 2.0	8*USB2.0
	SATS3.0	2*SATA3.0
	GPIO	1*8-bit GPIO
	SER	2*SER(TX, RX 两线)
	I2C	1*I2C
	SMBUS	1*SMBUS
	LID	1*LID
	SLEEP	1*SLEEP
	音频 Audio	1*HDA
	按钮 Button	1*Power Button 1*Reset Button
	其他 Others	2*FAN
	拓展 Connector	2*COM-E 220Pin
电源 Power Requirements	**电源类型 Power Type**	ATX: VCC, VSB AT: VCC
	电源电压 Power input `Voltage	ATX:5VSB+12V AT:12~20V
	连接器 Connector type	COMe 连接器
环境 Environment	**工作温度 Operating Temperature**	0~60℃
	存储温度 Storage Temperature	-40~85℃
	工作湿度 Operating Humidity	20~90%(non-condensing)
物理特性 Physical	**尺寸 Dimensions**	95*95mm
	PCB 颜色 Color	Green

操作系统 OS	**Microsoft**	Windows 10 LTSC/1809(RS5)
	Linux	Red Hat 8.4 Ubuntu 20.04 Yocto 4.0xLTS

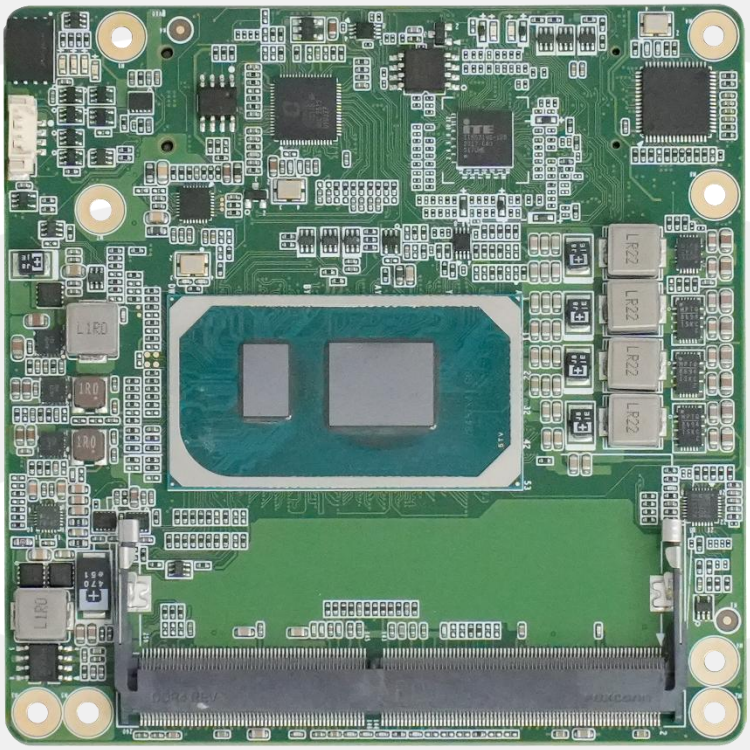
1.2 功能框图

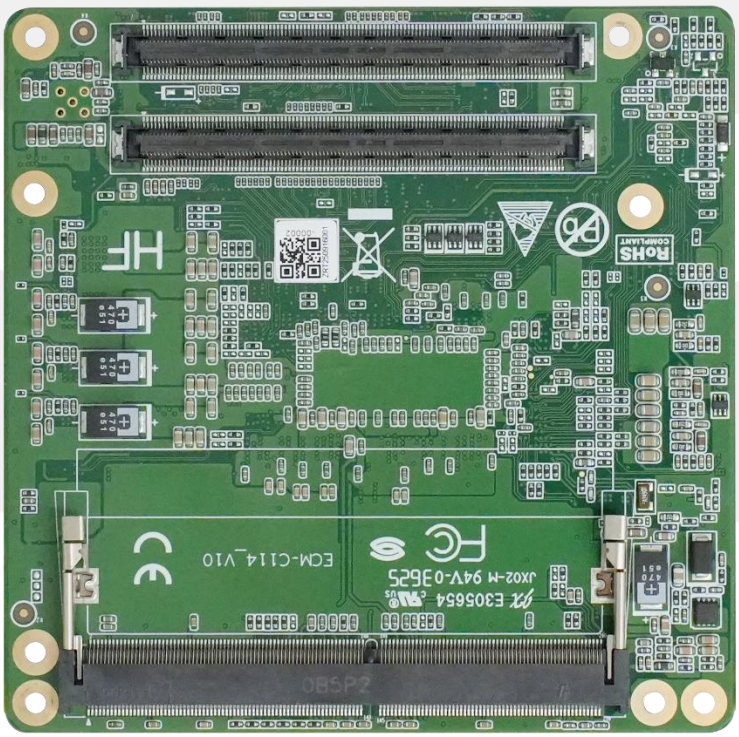


1.3 产品料号

Model Name	Part Number	Specification
ECM-C114 (i5-1135G7)	8.ZRT.80-1645-02-LEF	ECM-C114_V10,I5-1135G7,双内存条插槽,散热器,LVDS,装二十入,版本 V00
ECM-C114 (i3-1115G4)	8.ZRT.80-1645-03-LEF	ECM-C114_V10,I3-1115G4,双内存条插槽,散热器,LVDS,装二十入,版本 V00

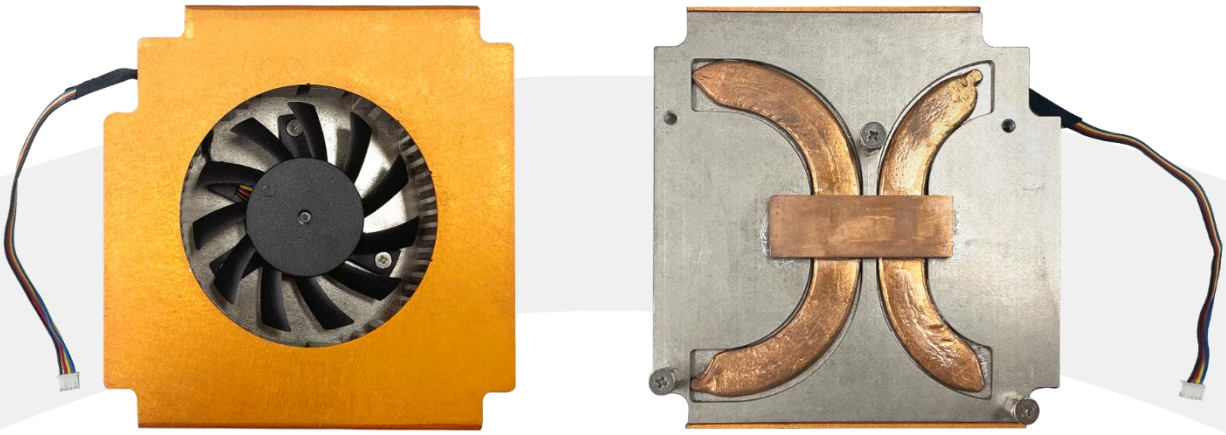
1.4 产品照片





1.5 散热器

Part Number: 1.ZRT.48-6259-00-A00



1.6 安装视频

https://www.douyin.com/user/MS4wLjABAAAAfV567McP9KjHrjFWngJgFG8h7XMSWsqH55hBIryutmg?from_tab_name=main&modal_id=7429655415694052618

1) 作业时请戴好接地良好且紧贴皮肤的静电环或静电手套。
2) 检查各元件有否掉件、撞件等。
3) 连接器有无黏胶、脏污、印痕未清洁干净、氧化、锣槽锣偏。
4) 在 BGA 中间表面涂上适量均匀导热膏(导热系数 5, 建议型号：信越 7921-5)，覆盖面积不可少於 BGA 玻璃表面 75%。

注意：

a) 导热膏搅拌后再使用。

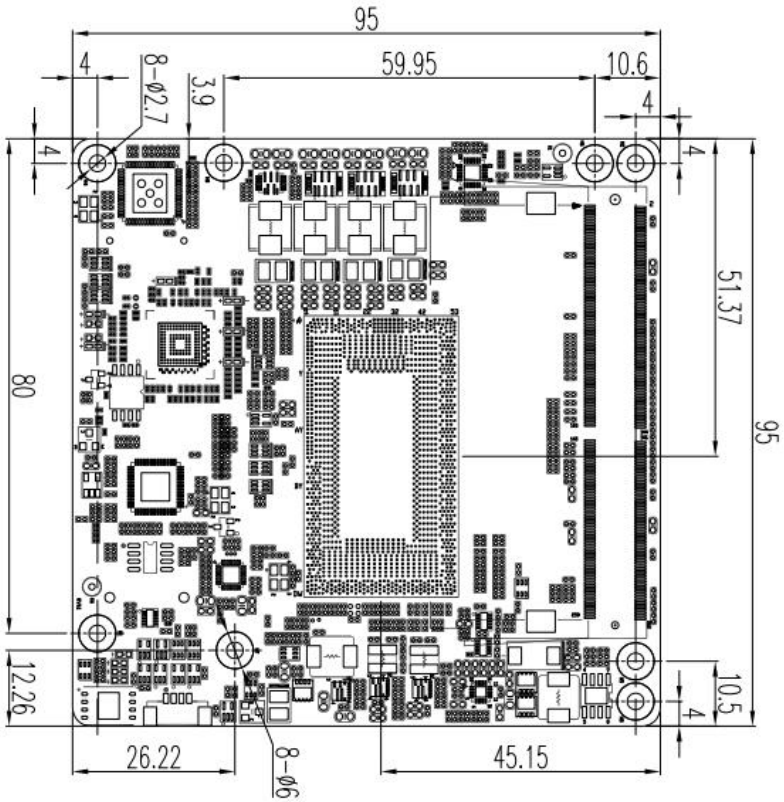
b) 导热膏不可粘到其它元器件上。

5) 取散热器，将散热器导热垫上的保护膜撕除干净，导热垫上不能有杂物。
6) MOS 位置上不可漏少导热垫。
7) 对准螺丝孔位，使用电批将弹簧螺柱按照对角顺序拧紧到位，不可漏锁螺丝，螺丝不可滑牙。
8) 装配至主板 COMe 插槽时，斜 30 度对准一个连接器，用力压下，二个连接器都压到位，核心板背面和螺柱贴合。
9) 检查板卡外观应良好，无变形；芯片及散热器紧密贴合无缝隙。
10) 装配在主板上时，检查 COMe 底部与主板是否有干涉。

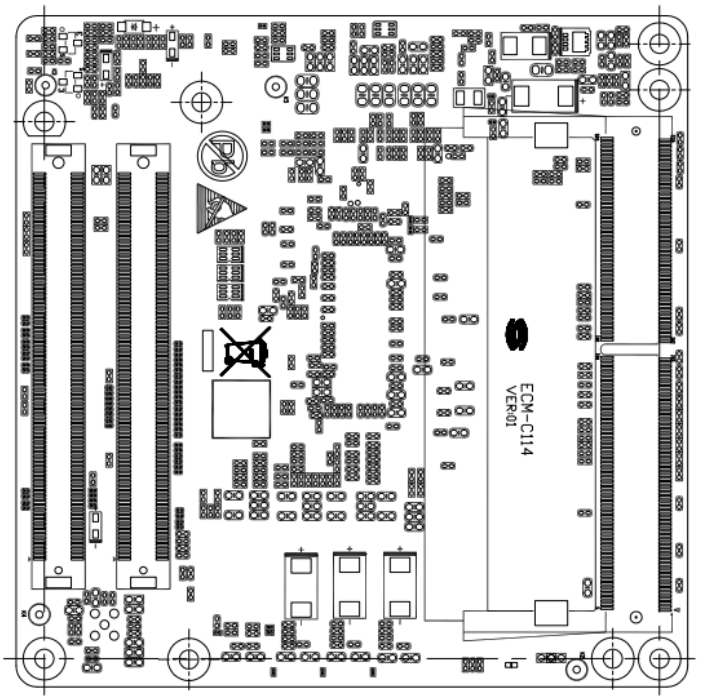
第二章 安装说明

2.1 接口/尺寸图

安装设备时，请对照此示意图并详细阅读下面的说明，安装组件过程中必须小心，对于有些部件，如果安装不正确，设备将不能正常工作。



TOP Side



Bottom Side

2.2 硬件安装

⚠注意：操作时，请戴上防静电手套，因为静电有可能会损坏部件。

本主板关键元器件都是集成电路，而这些元件很容易因为遭受静电的影响而损坏。因此，请在正式安装主板之前，请先做好以下的准备：

1. 拿主板时手握板边，尽可能不触及元器件和插头插座的引脚。
2. 接触集成路元件(如 CPU、RAM 等)时，最好戴上防静电手环/手套。
3. 在集成电路元件未按装前，需将元件放在防静电垫或防静电袋内。
4. 在确认电源的开关处于断开位置后，再插上电源插头。

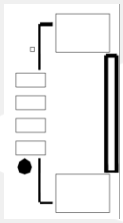
2.3 跳线功能设置

在进行硬件设备安装之前请按照您的需要对相应的跳线进行设置。

提示：如何识别跳线、接口的第 1 针脚，观察插头插座旁边的文字标记，会用“1”或加粗的线条或三角符号表示；看看背面的焊盘，方型焊盘为第 1 针脚；所有跳线的针脚 1 旁都有 1 个白色箭头。

2.4 接口引脚定义

2.4.1 CPU_FAN1 引脚定义



管脚	信号名称
1	GND
2	5V
3	FAN_TAC
4	FAN_CTL

2.4.2 COM-E 220Pin 引脚定义

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	GND	B1	GND	C1	GND	D1	GND
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	GND	D2	GND
A3	GBE0_MDI3+	B3	NC	C3	USB_SSRX0-	D3	USB_SSTX0-
A4	GBE0_LINK100#	B4	NC	C4	USB_SSRX0+	D4	USB_SSTX0+
A5	GBE0_LINK1000#	B5	NC	C5	GND	D5	GND
A6	GBE0_MDI2-	B6	NC	C6	USB_SSRX1-	D6	USB_SSTX1-
A7	GBE0_MDI2+	B7	NC	C7	USB_SSRX1+	D7	USB_SSTX1+
A8	NC	B8	NC	C8	GND	D8	GND
A9	GBE0_MDI1-	B9	NC	C9	USB_SSRX2-	D9	USB_SSTX2-
A10	GBE0_MDI1+	B10	NC	C10	USB_SSRX2+	D10	USB_SSTX2+
A11	GND	B11	GND	C11	GND	D11	GND
A12	GBE0_MDI0-	B12	PWRBTN#	C12	USB_SSRX3-	D12	USB_SSTX3-
A13	GBE0_MDI0+	B13	SMB_CK	C13	USB_SSRX3+	D13	USB_SSTX3+
A14	NC	B14	SMB_DAT	C14	GND	D14	GND
A15	SLP_S3_N	B15	SMB_ALERT#	C15	NC	D15	DDI1_CTRLCLK_AUX+
A16	SATA0_TX+	B16	SATA1_TX+	C16	NC	D16	DDI1_CTRLDATA_AUX-
A17	SATA0_TX-	B17	SATA1_TX-	C17	NC	D17	RSVD-D17
A18	SLP_S4#	B18	NC	C18	GND	D18	RSVD-D18
A19	SATA0_RX+	B19	SATA1_RX+	C19	NC	D19	NC
A20	SATA0_RX-	B20	SATA1_RX-	C20	NC	D20	NC
A21	GND	B21	GND	C21	GND	D21	GND
A22	NC	B22	NC	C22	NC	D22	NC
A23	NC	B23	NC	C23	NC	D23	NC
A24	SLP_S5#	B24	PWR_OK	C24	DDI1_HPD	D24	GND
A25	NC	B25	NC	C25	NC	D25	GND
A26	NC	B26	NC	C26	NC	D26	DDI1_PAIR0+
A27	NC	B27	WDT	C27	NC	D27	DDI1_PAIR0-
A28	SATA_ACT#	B28	NC	C28	GND	D28	GND
A29	AC_SYNC	B29	NC	C29	NC	D29	DDI1_PAIR1+
A30	AC_RST#	B30	AC_SDIN0	C30	NC	D30	DDI1_PAIR1-
A31	GND	B31	GND	C31	GND	D31	GND
A32	AC_BITCLK	B32	SPKR	C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
A33	AC_SDOUT	B33	I2C_CK	C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2-
A34	NC	B34	I2C_DAT	C34	DDI1_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
A35	THRMTRIP#	B35	THRM#	C35	NC	D35	NC

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A36	USB6-	B36	USB7-	C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
A37	USB6+	B37	USB7+	C37	DDI3_CTRLDATA_AUX-	D37	DDI1_PAIR3-
A38	NC	B38	NC	C38	NC	D38	GND
A39	USB4-	B39	USB5-	C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
A40	USB4+	B40	USB5+	C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
A41	GND	B41	GND	C41	GND	D41	GND
A42	USB2-	B42	USB3-	C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
A43	USB2+	B43	USB3+	C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
A44	NC	B44	USB_O_1_OC#	C44	DDI3_HPD	D44	DDI2_HPD
A45	USB0-	B45	USB1-	C45	NC	D45	GND
A46	USB0+	B46	USB1+	C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
A47	VCC_RTC	B47	NC	C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
A48	EXCD0_PERST#	B48	NC	C48	NC	D48	GND
A49	EXCD0_CPPE_N	B49	SYS_RESET#	C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
A50	NC	B50	CB_RESET#	C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
A51	GND	B51	GND	C51	GND	D51	GND
A52	NC	B52	NC	C52	PEG4_RX0+	D52	PEG4_TX0+
A53	NC	B53	NC	C53	PEG4_RX0-	D53	PEG4_TX0-
A54	GPI0	B54	GPO1	C54	TYPE0#	D54	NC
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PEG4_RX1+	D55	PEG4_TX1+
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PEG4_RX1-	D56	PEG4_TX1-
A57	GND	B57	GPO2	C57	NC	D57	NC
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PEG4_RX2+	D58	PEG4_TX2+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PEG4_RX2-	D59	PEG4_TX2-
A60	GND	B60	GND	C60	GND	D60	GND
A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PEG4_RX3+	D61	PEG4_TX3+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PEG4_RX3-	D62	PEG4_TX3-
A63	GPI1	B63	GPO3	C63	GND	D63	GND
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	GND	D64	GND
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	NC	D65	NC
A66	GND	B66	WAKE0#	C66	NC	D66	NC
A67	GPI2	B67	NC	C67	NC	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	NC	D68	NC
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	NC	D69	NC
A70	GND	B70	GND	C70	GND	D70	GND
A71	LVDS_A0+/eDP_TX2+	B71	LVDS_B0+	C71	NC	D71	NC
A72	LVDS_A0-/eDP_TX2-	B72	LVDS_B0-	C72	NC	D72	NC

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A73	LVDS_A1+/eDP_TX1+	B73	LVDS_B1+	C73	GND	D73	GND
A74	LVDS_A1-/eDP_TX1-	B74	LVDS_B1-	C74	NC	D74	NC
A75	LVDS_A2+/eDP_TX0+	B75	LVDS_B2+	C75	NC	D75	NC
A76	LVDS_A2-/eDP_TX0-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN/eDP_VDD_EN	B77	LVDS_B3+	C77	GND	D77	GND
A78	LVDS_A3+	B78	LVDS_B3-	C78	NC	D78	NC
A79	LVDS_A3-	B79	LVDS_BKLT_EN/eDP_BLKT_EN	C79	NC	D79	NC
A80	GND	B80	GND	C80	GND	D80	GND
A81	LVDS_A_CK+/eDP_TX3+	B81	LVDS_B_CK+	C81	NC	D81	NC
A82	LVDS_A_CK-/eDP_TX3-	B82	LVDS_B_CK-	C82	NC	D82	NC
A83	LVDS_I2C_CK/eDP_AUX+	B83	LVDS_BKLT_CTRL/eDP_BLKT_CTRL	C83	GND	D83	GND
A84	LVDS_I2C_DAT/eDP_AUX-	B84	VCC_5V_SBY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_SBY	C85	NC	D85	NC
A86	NC	B86	VCC_5V_SBY	C86	NC	D86	NC
A87	eDP_HPD	B87	VCC_5V_SBY	C87	GND	D87	GND
A88	PCIE0_CK_REF+	B88	NC	C88	NC	D88	NC
A89	PCIE0_CK_REF-	B89	VGA_RED	C89	NC	D89	NC
A90	GND	B90	GND	C90	GND	D90	GND
A91	SPI_POWER	B91	VGA_GRN	C91	NC	D91	NC
A92	SPI_MISO	B92	VGA_BLU	C92	NC	D92	NC
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	SPI_CLK	B94	VGA_VSYNC	C94	NC	D94	NC
A95	SPI_MOSI	B95	VGA_I2C_DAT	C95	NC	D95	NC
A96	TPM_PP	B96	VGA_I2C_CK	C96	GND	D96	GND
A97	NC	B97	SPI_CS#	C97	GND	D97	GND
A98	SER0_TX	B98	NC	C98	NC	D98	NC
A99	SER0_RX	B99	NC	C99	NC	D99	NC
A100	GND	B100	GND	C100	GND	D100	GND
A101	SER1_TX	B101	FAN_PWMOUT	C101	NC	D101	NC
A102	SER1_RX	B102	FAN_TACHIN	C102	NC	D102	NC

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A103	LID#	B103	SLEEP#	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND	B110	GND	C110	GND	D110	GND

第三章 BIOS 程序设置

AMI BIOS 刷新

BIOS 提供对硬件资源的底层驱动，是联系硬件和操作系统的桥梁。现在硬件和各种应用软件不断更新，当您的系统遇到问题时，例如系统不支持最新公布的 CPU 时，就需要升级您的 BIOS 了。

注意:
1、升级 BIOS 只在遇到问题，必要的时候进行。
2、在升级过程中不要关闭电源或重新启动系统，否则您的 BIOS 资料将被损坏，系统也可能不能启动。
3、为防止意外发生，请您先备份当前的 BIOS 资料。

AMI BIOS 描述

开机时，BIOS 会对主板上的硬件进行自我诊断，设定硬件时序参数等工作，最后才将系统控制权交给操作系统。BIOS 是硬件和软件的沟通桥梁，如何正确的设定 BIOS 参数对系统是否稳定的工作及系统是否工作在最佳状态至关重要。

进入 BIOS 参数设置

电脑开机，在完成自我诊断后，屏幕上会显示出如下信息：Del->SETUP，此时您点击一下 Del 键，则 BIOS 在完成 IDE 等设备的侦测后会自动转入 SETUP 设置画面。

1. 打开系统电源或重新启动系统，显示器屏幕将出现自我测试的信息。
2. 当屏幕中间出现〝Press<Del>to enter setup〞提示时，按下<Del>键，就可以进入 BIOS 设定程序。
3. 以方向键移动至你要修改的选项，按下<Enter>键即可进入该选项的子画面。
4. 使用方向键及<Enter>键即可修改所选项目的值，按回车键选择 BIOS 选项并修改。
5. 任何时侯按下<Esc>键即可回到上一画面。

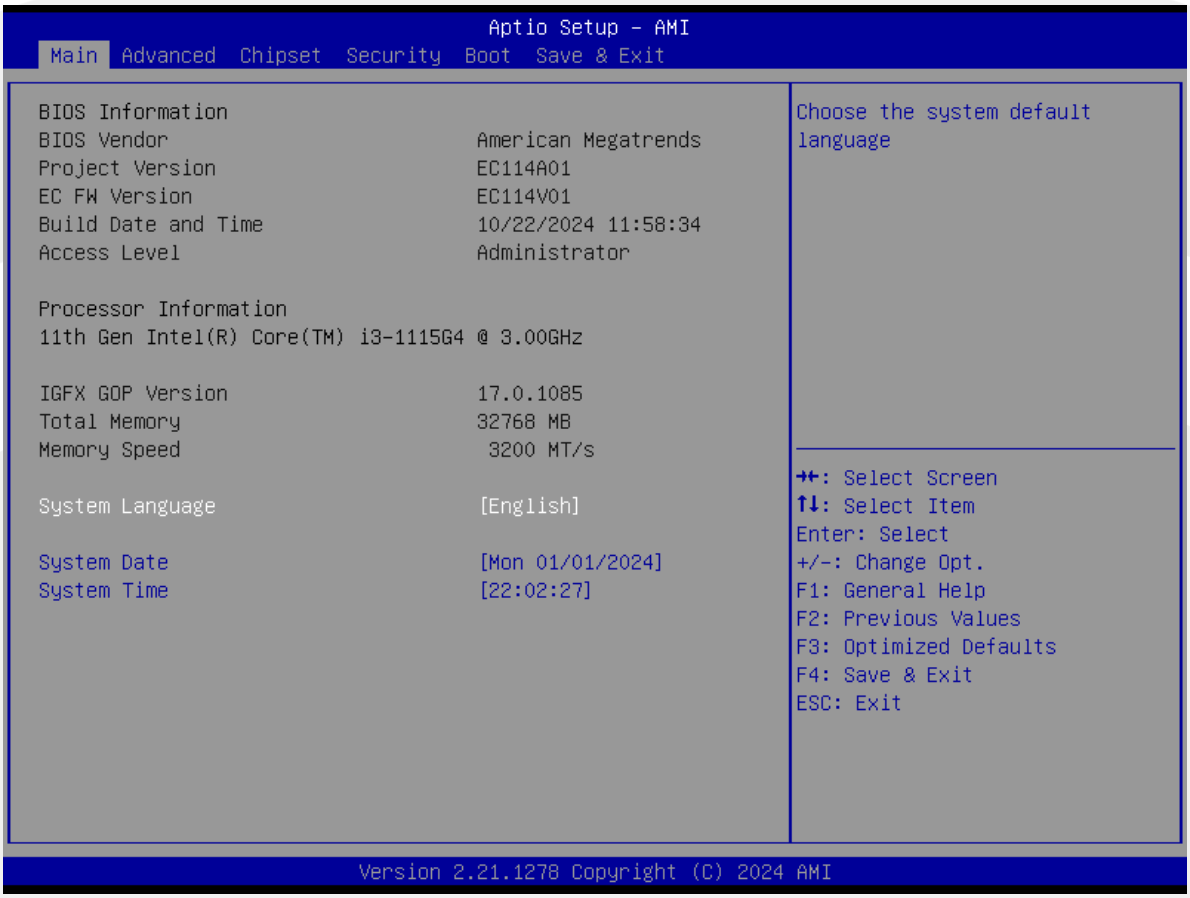
提示：BIOS 参数属于系统关键信息，请勿随意设置，如需设置或者升级请联系我司售后支持，谢谢!

Setup Utility User Interface

This document describes BIOS Setup Utility user interface.

3.1 Main Screen

The Main screen is the first screen that is displayed when the BIOS Setup is entered.

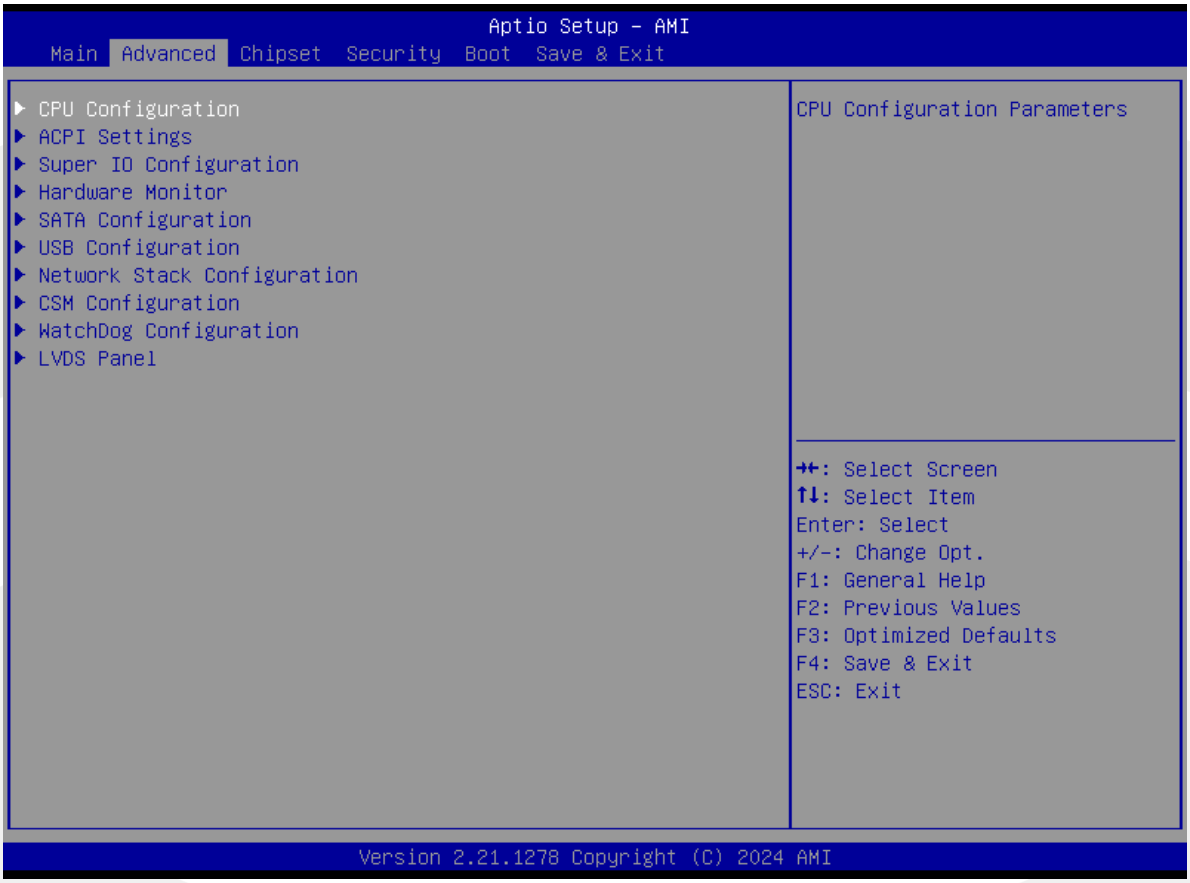


Setup Item	Options	Help Text	Comments
BIOS Information			
BIOS Vendor			Displays BIOS vendor .
Project Version			Displays the current BIOS version: Format: AAAABCC **AAAAA = Project name** **BB = Customer number** **CC = BIOS revision**
EC FW Version			Displays the current EC FW.
Build Date and Time			Displays the current BIOS build date.

Setup Item	Options	Help Text	Comments
Access Level			Displays password level that setup is running in: Administrator or User. With no passwords set, Administrator is the default mode.
Processor Information			
CPU XXXXX			Displays the CPU Brand String installed in the system.
Number of Processors			Displays number of CPU cores.
IGFX GOP Version			Displays the IGFX GOP Version.
Memory Information			
Total Memory			Displays the total physical memory installed in the system, MB Unit.
Memory Speed			
System Language	English	Choose the system default language.	
System Date	[Day of week MM/DD/YYYY]	Set and display the Date.	
System Time	[HH:MM:SS]	Set and display the Time.	

3.2 Advanced Screen

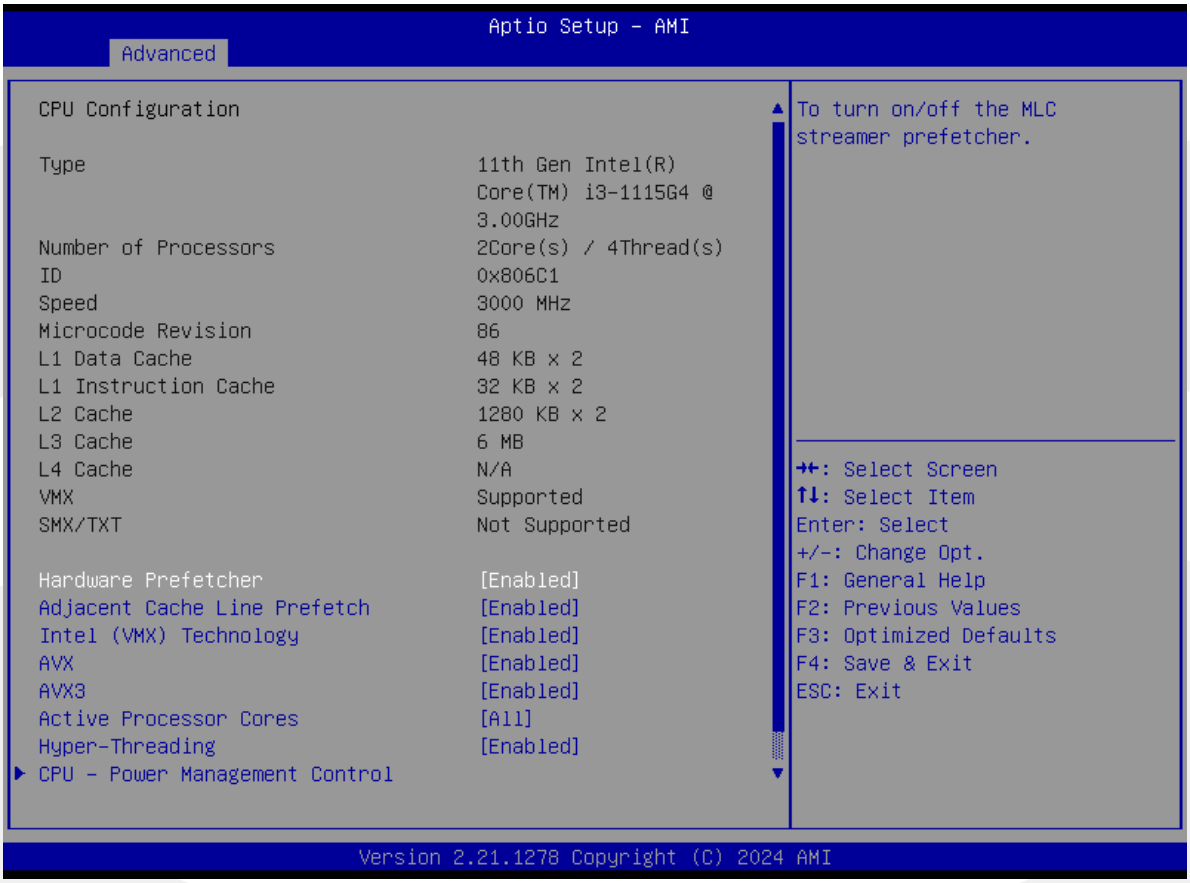
The Advanced screen provides an access point to configure several options. On this screen, the user selects the option that is to be configured.

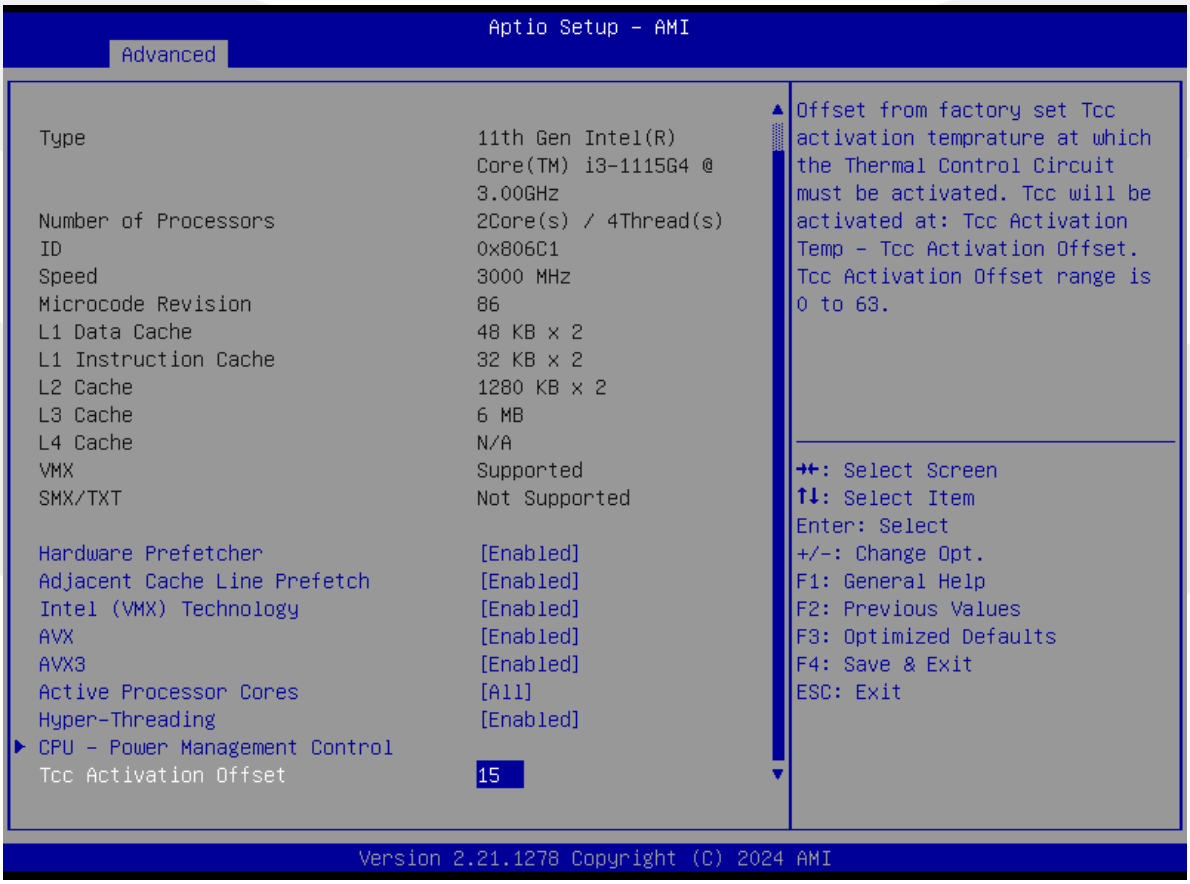


Setup Item	Options	Help Text	Comments
CPU Configuration		CPU Configuration Parameters.	
ACPI Settings		System ACPI Parameters.	
Super IO Configuration		System Super IO Chip Parameters.	
Hardware Monitor		Monitor hardware states.	
SATA Configuration		SATA Device Options Setting.	
USB Configuration		USB Configuration Parameters.	
Network Stack configuration		Network Stack Settings.	
CSM Configuration		CSM configuration: Enable/Disable, Option ROM execution settings, etc.	
Watchdog configuration		Set System Watchdog Parameters.	
LVDS Panel		LVDS Panel Boot Settings.	

3.2.1 CPU Configuration Screen

The CPU Configuration screen allows the user to view the processor information, and to enable or disable processor options. To access this screen from the Main screen, choose ***Advanced > CPU Configuration***.

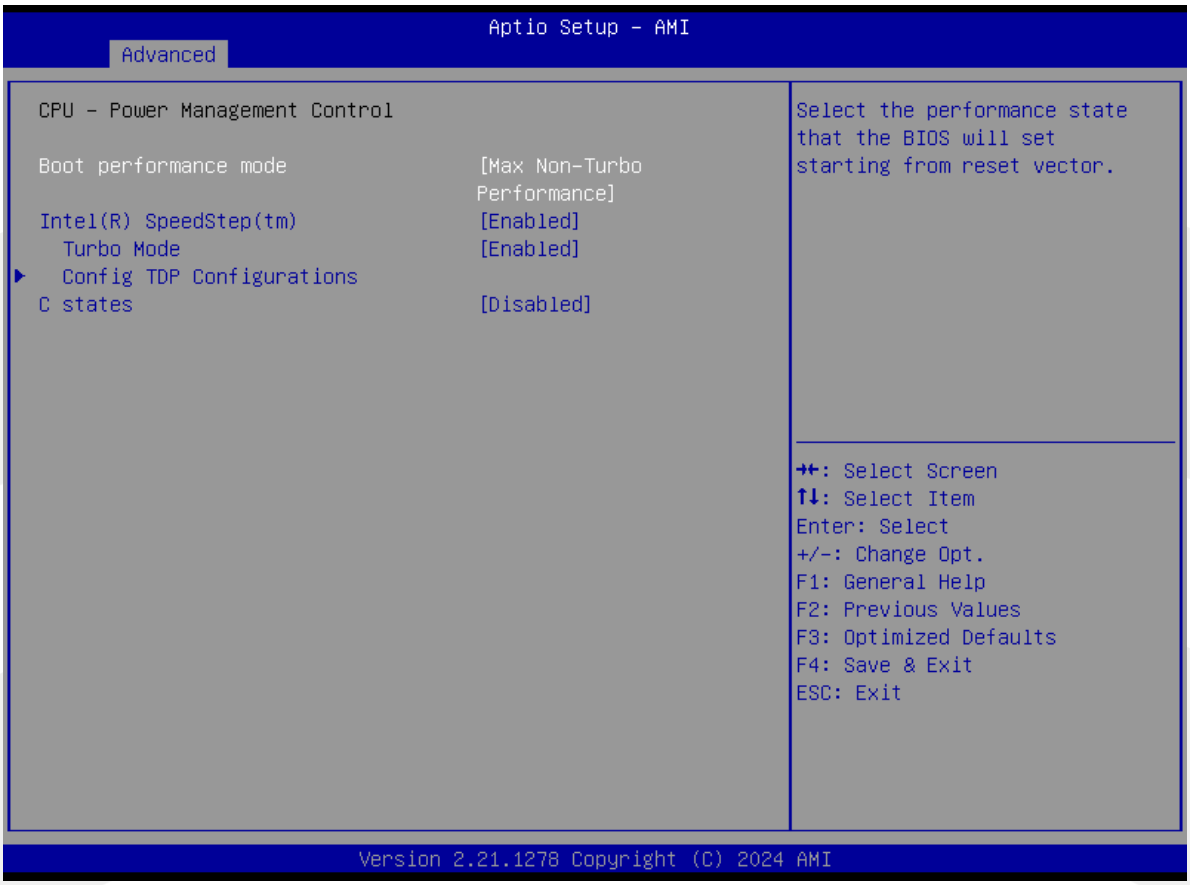




Setup Item	Options	Help Text	Comments
CPU Configuration			
Type			Displays the Processor Type.
Number of Processors			Displays number of CPU cores.
ID			Displays the Processor ID.
Speed			Displays the Processor Speed.
Microcode Revision			Displays the Microcode Revision.
L1 Data Cache			Displays the Processor L1 Data Cache size.
L1 Instruction Cache			Displays the Processor L1 Instruction Cache size.
L2 Cache			Displays the Processor L2 Cache size.
L3 Cache			Displays the Processor L3 Cache size.
L4 Cache			Displays the Processor L4 eDRAM size.
VMX			VMX Supported or Not.
SMX/TXT			SMX/TXT Supported or Not.
Hardware Prefetcher	Enabled Disabled	To turn on/off the MLC streamer prefetcher.	
Adjacent Cache line Prefetch	Enabled Disabled	To turn on/off prefetching of adjacent cache lines.	
Intel(VMX) Technology	Enabled Disabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool technology.	
AVX	Enabled Disabled	Enable/Disable the Avx 2/3 Instructions.	
AVX3	Enabled Disabled	Enable/Disable the Avx 3 Instructions.	

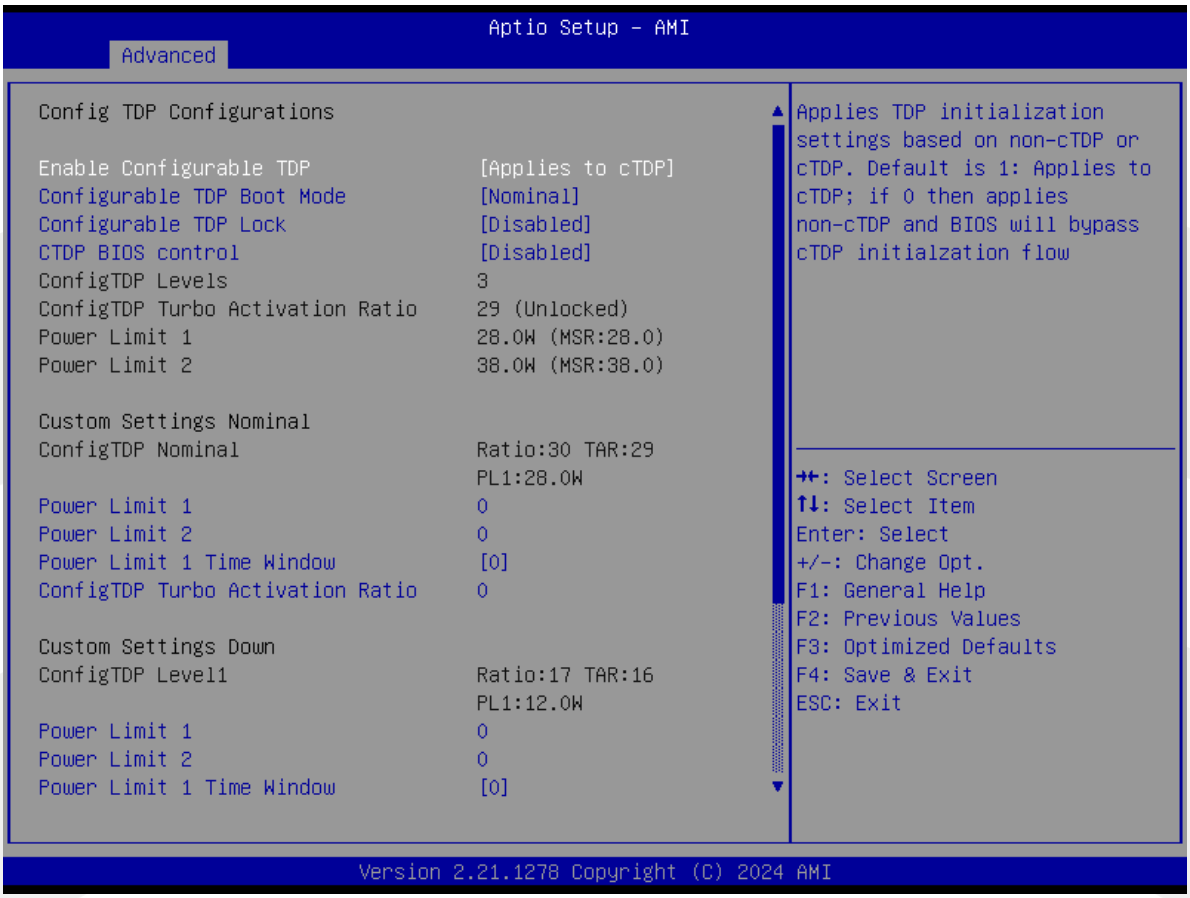
Setup Item	Options	Help Text	Comments
Active Processer Cores	All 1	Number of cores to enable in each processor package.	
Hyper-Threading	Enabled Disabled	Enable or Disable Hyper-Threading Technology.	
CPU - Power Management Control		CPU - Power Management Control Options.	
Tcc Activation Offset	15	Offset from factory set Tcc activation temperature 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."	

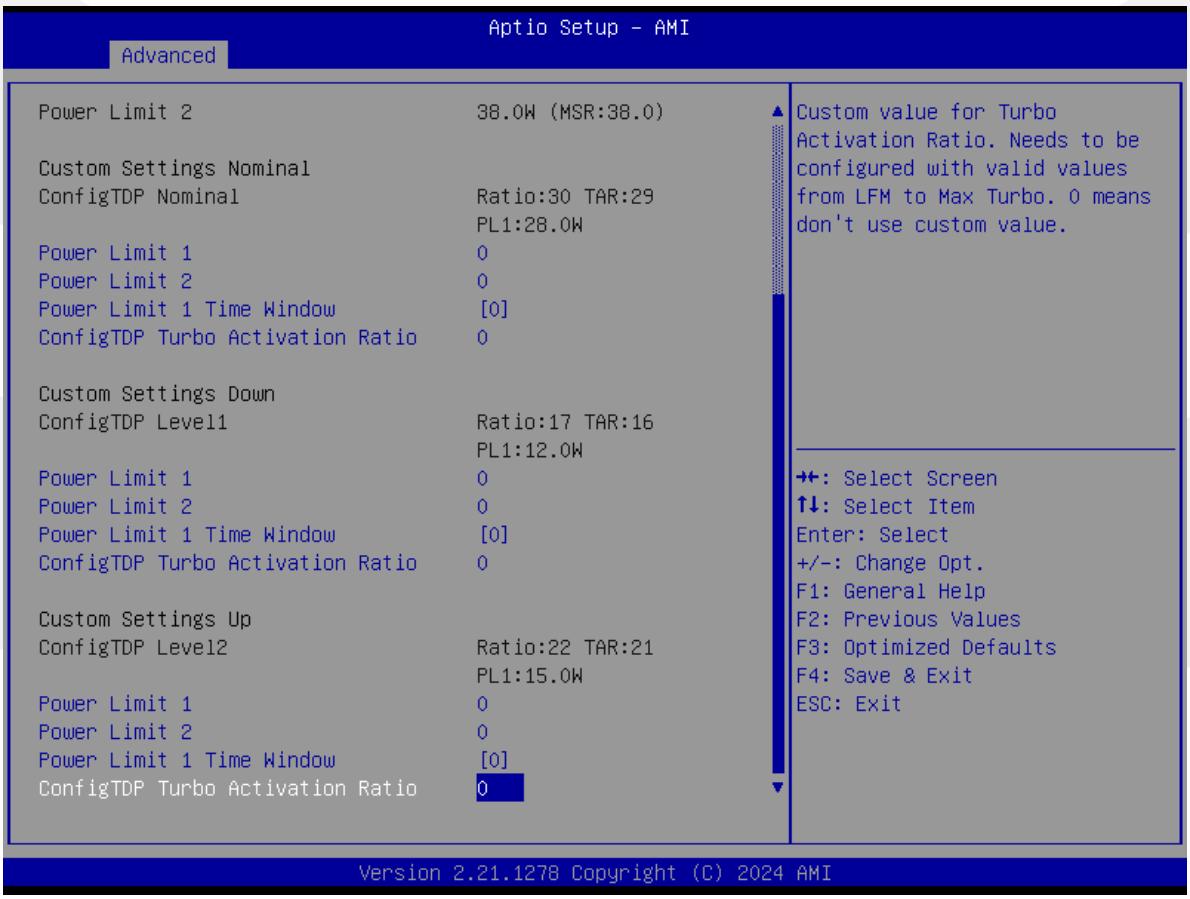
3.2.1.1 CPU - Power Management Control



Setup Item	Options	Help Text	Comments
CPU Power Management Control			
Boot performance mode	Max Non-Turbo Performance Max battery **Turbo Performance**	Select the performance state that the BIOS will set starting from reset vector.	
Intel® SpeedStep™	Enabled Disabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.	
Turbo Mode	Enabled Disabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.	
Config TDP configurations		Config TDP configurations.	
C states	Enabled Disabled	Enabled/Disable CPU Power Management. Allows CPU to go to C states when it is not 100% utilized.	

3.2.1.1.1 Config TDP configurations

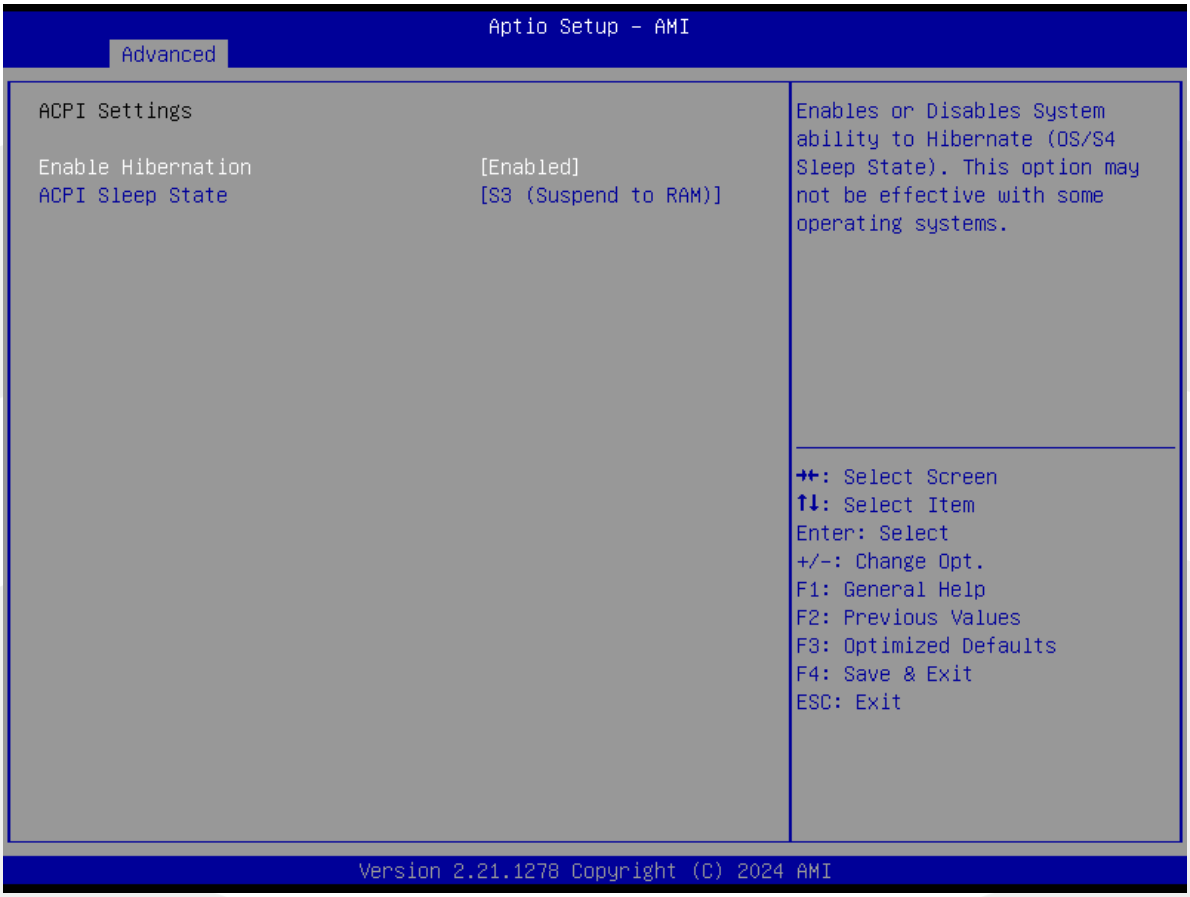




Setup Item	Options	Help Text	Comments
Config TDP configurations			
Enable Configurable TDP	Applies to Ctdp Applies to non-cTDP		
Configurable TDP Boot Mode	Nominal Down Up Deactivate		
Configurable TDP Lock	Enabled Disabled		
CTDP BIOS control	Enabled Disabled		
ConfigTDP Levels	3		
ConfigTDP Turbo Activation Ratio	29(Unlocked)		
Power Limit 1	28.0W(MSR:28.0)		
Power Limit 2	38.0W(MSR:38.0)		
Custom Settings Nominal			
ConfigTDP Nominal	Ratio:30 TAR:29 PL1:28.0W		
Power Limit1	0		
Power Limit2	0		
Power Limit1 Time Window	[0]		
ConfigTDP Turbo Activation Ratio	0		
Custom Settings Down			
ConfigTDP Level1	Ratio:17 TAR:16 PL1:12.0W		
Power Limit1	0		
Power Limit2	0		
Power Limit1 Time Window	[0]		
ConfigTDP Turbo Activation Ratio	0		
Custom Settings Up			
ConfigTDP Level2	Ratio:22 TAR:21 PL1:15.0W		
Power Limit1	0		
Power Limit2	0		
Power Limit1 Time Window	[0]		
ConfigTDP Turbo Activation Ratio	0		

3.2.2 ACPI Settings Screen

The ACPI Settings screen allows the user to set the system ACPI parameters. To access this screen from the Main screen, choose ***Advanced > ACPI Settings***.



Setup Item	Options	Help Text	Comments
ACPI Settings			
Enable Hibernation	Enabled Disabled	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.	
ACPI Sleep State	Suspend Disabled S3 (Suspend to RAM)	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	Sleep supported optionally.

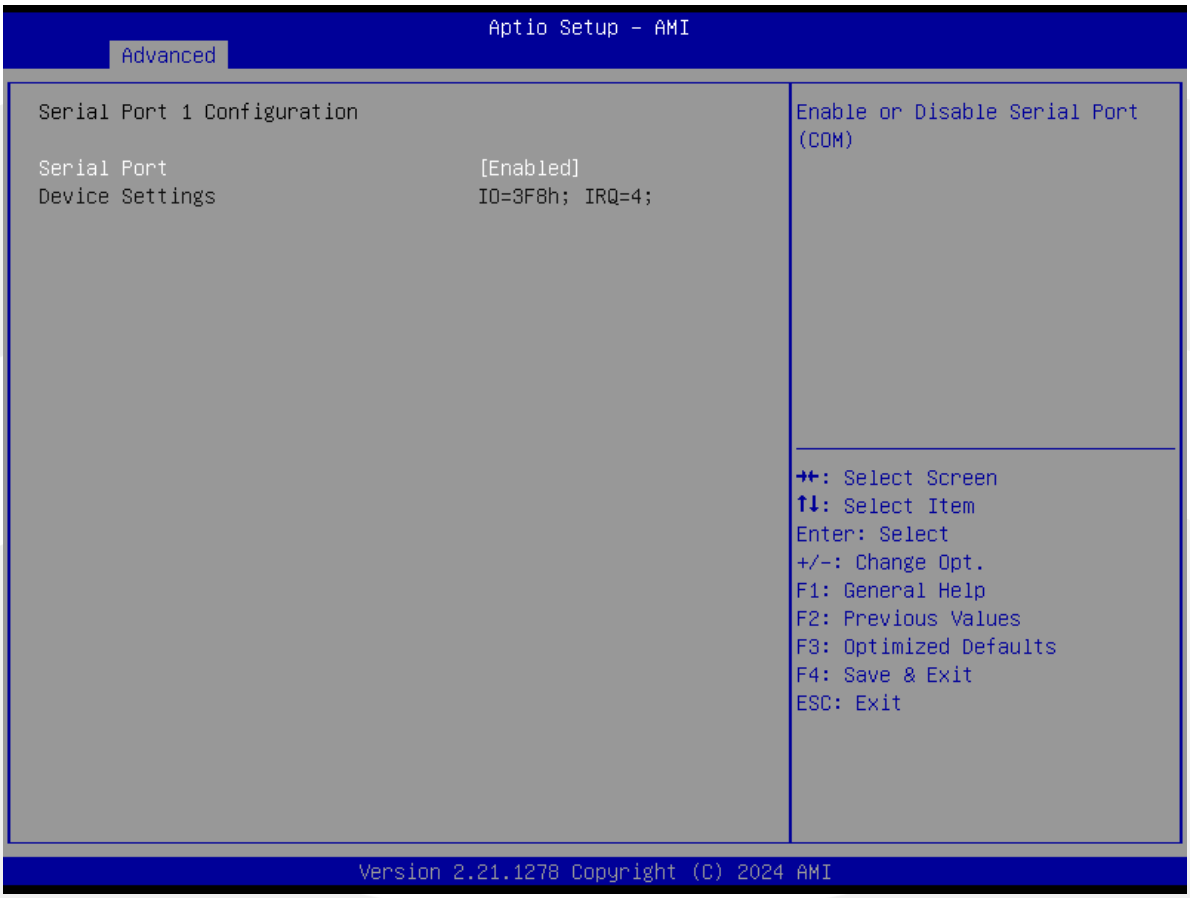
3.2.3 Super IO Configuration

The Super IO Configuration screen allows the user to view the super IO information, and to enable or disable super IO options. To access this screen from the Advanced screen, choose ***Advanced > Super IO Configuration***.

Setup Item	Options	Help Text	Comments
Super IO Configuration			
Serial Port 1 Configuration		View and Set Basic properties of the Super IO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.	Set Parameters of Serial Port 1 (COM1).
Serial Port 1 Configuration		View and Set Basic properties of the Super IO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.	Set Parameters of Serial Port 2 (COM2).

3.2.3.1 Serial PortX Configuration

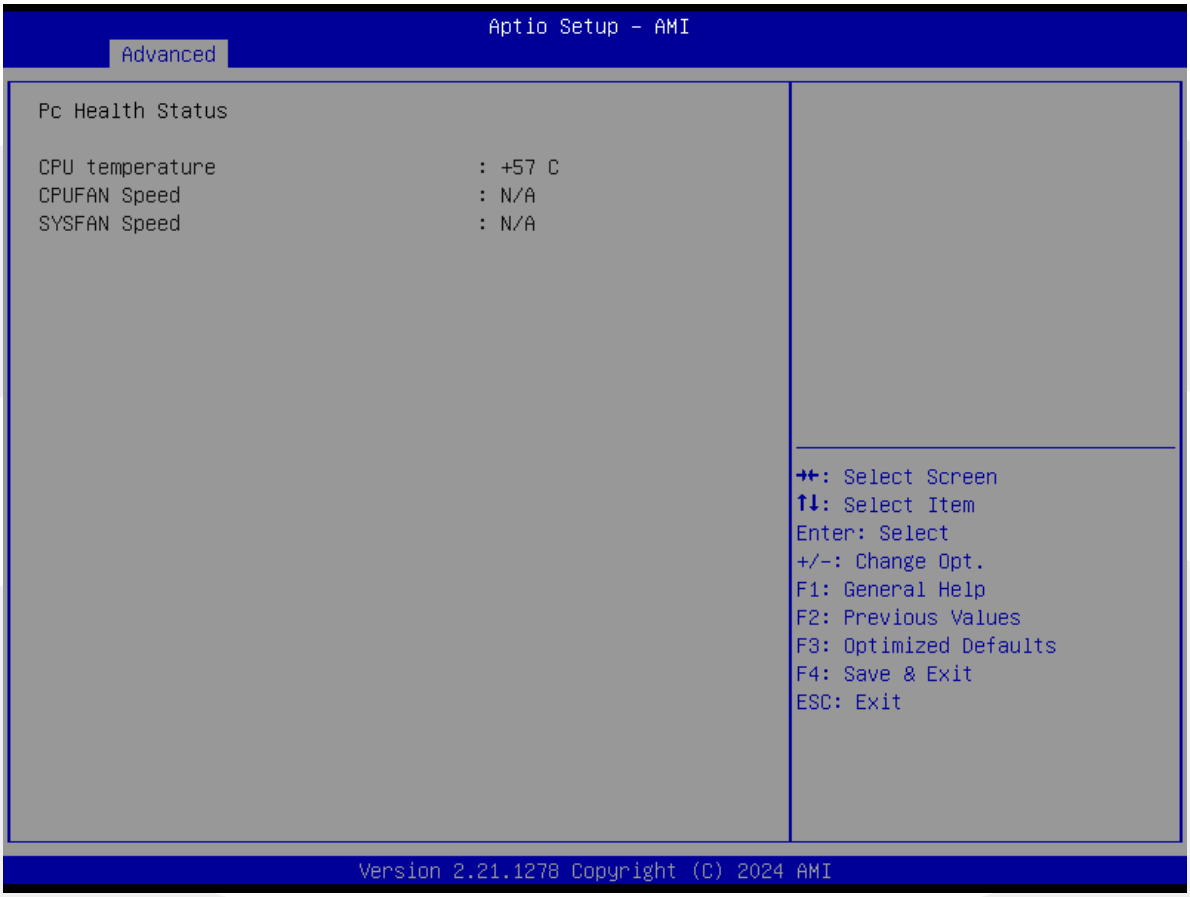
The Super IO Configuration screen allows the user to view the super IO information, and to enable or disable serial port options. To access this screen from the Advanced screen, choose ***Advanced-> SIO Configuration->Serial PortX***.



Setup Item	Options	Help Text	Comments
Serial PortX Configuration			
Serial Port	Enabled Disabled	Enable or Disable Serial Port(COM).	
Device Settings		Default resource settings.	

3.2.4 Hardware Monitor

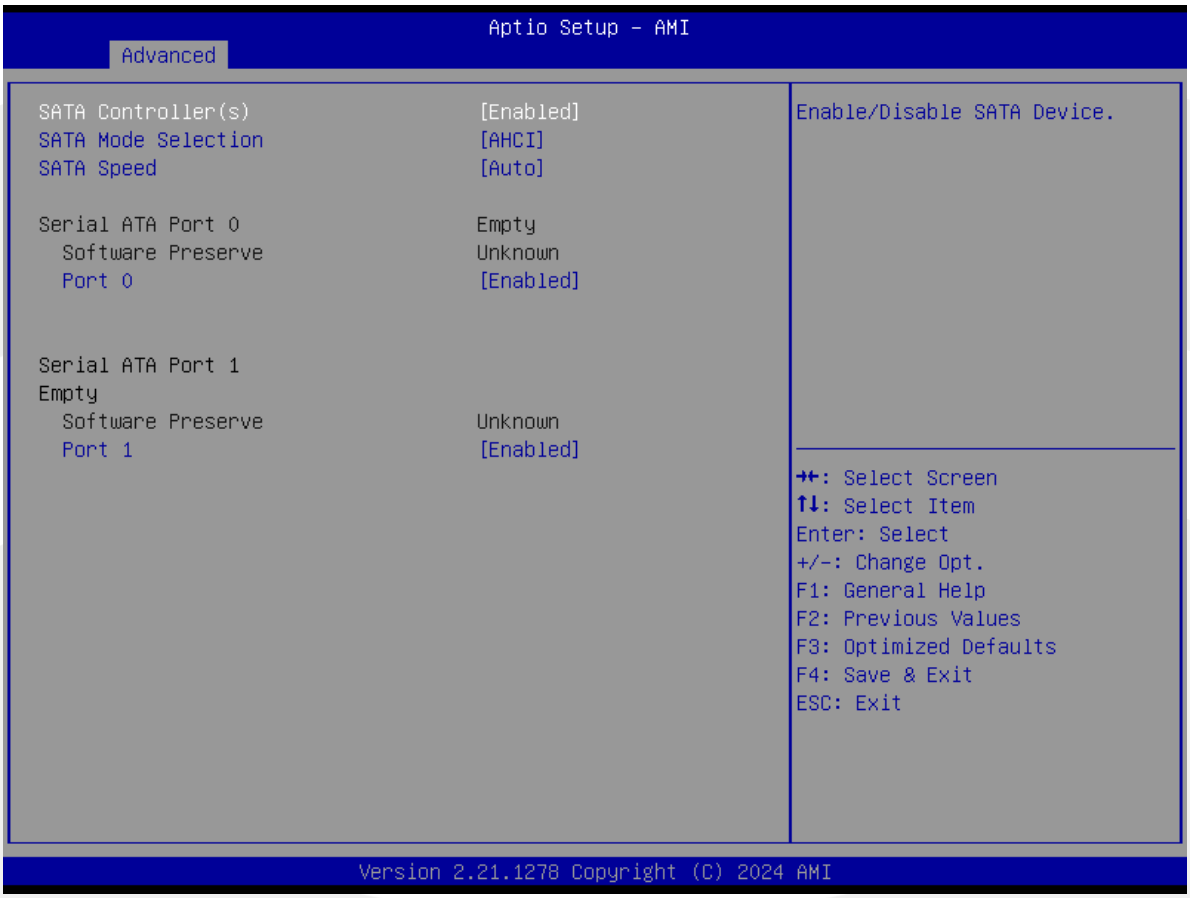
The hardware monitor screen allows the user to view the hardware information. To access this screen from the Advanced screen, choose ***Advanced-> Hardware Monitor***.



Setup Item	Options	Help Text	Comments
PC Health Status			
CPU temperature			
CPUFAN Speed			Monitor hardware status.
SYSFAN Speed			

3.2.5 SATA Configuration

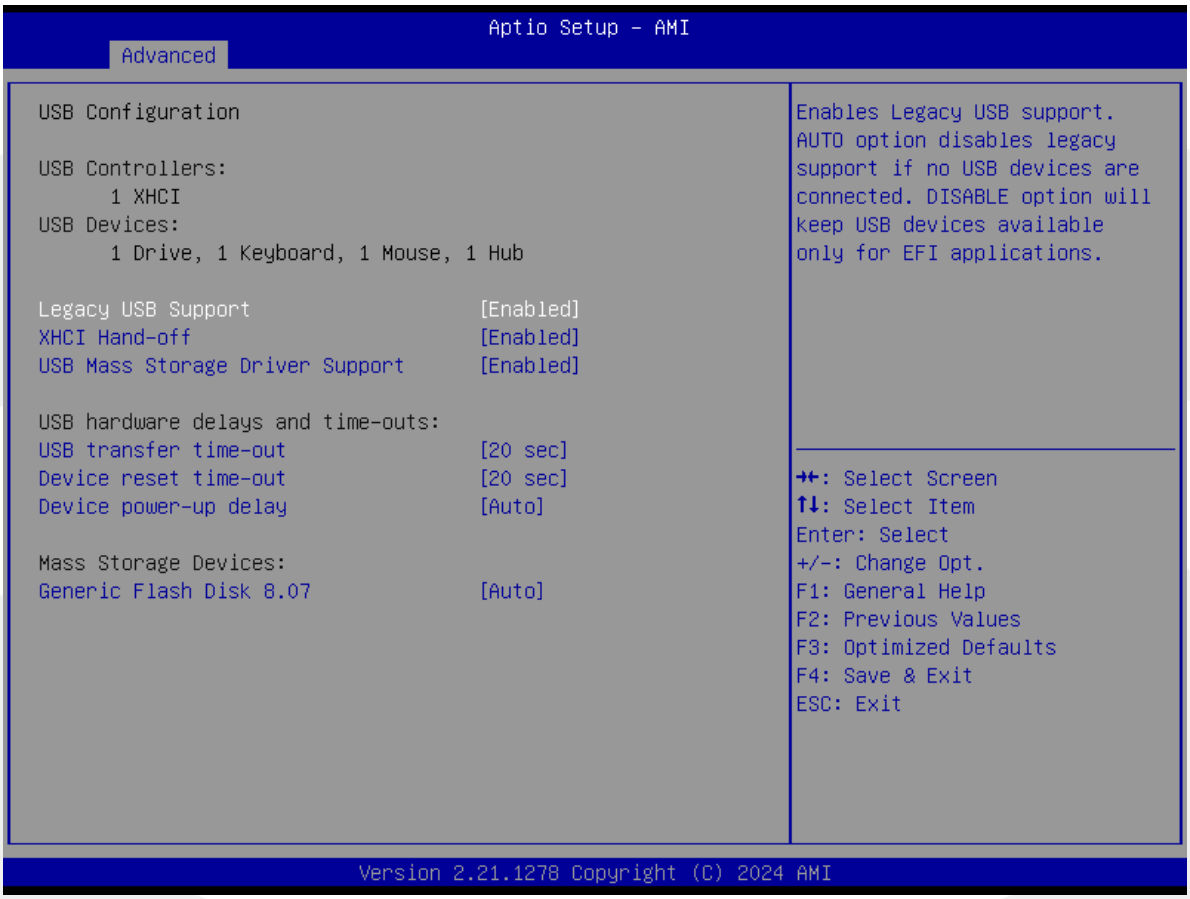
The SATA Configuration screen allows the user to view the SATA Controller information, and to enable or disable SATA Controller options. To access this screen from the Main screen, choose ***Advanced > SATA Configuration***.



Setup Item	Options	Help Text	Comments
SATA Configuration			
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.	
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.	
SATA Speed	Auto Gen1 Gen2 Gen3	Configuration SATA Speed.	
Serial ATA Port 0			Show HDD information connected.
Serial ATA Port 1			

3.2.6 USB Configuration

The USB Configuration screen allows the user to view the USB Configuration information, and to enable or disable options. To access this screen from the Main screen, choose ***Advanced > USB Configuration***.



Setup Item	Options	Help Text	Comments
USB Configuration			
Legacy USB Support	Enabled Disabled Auto	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 hardware delays and time-outs			
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.	
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 100ms,for a Hub port the delay is taken from Hub descriptor.	

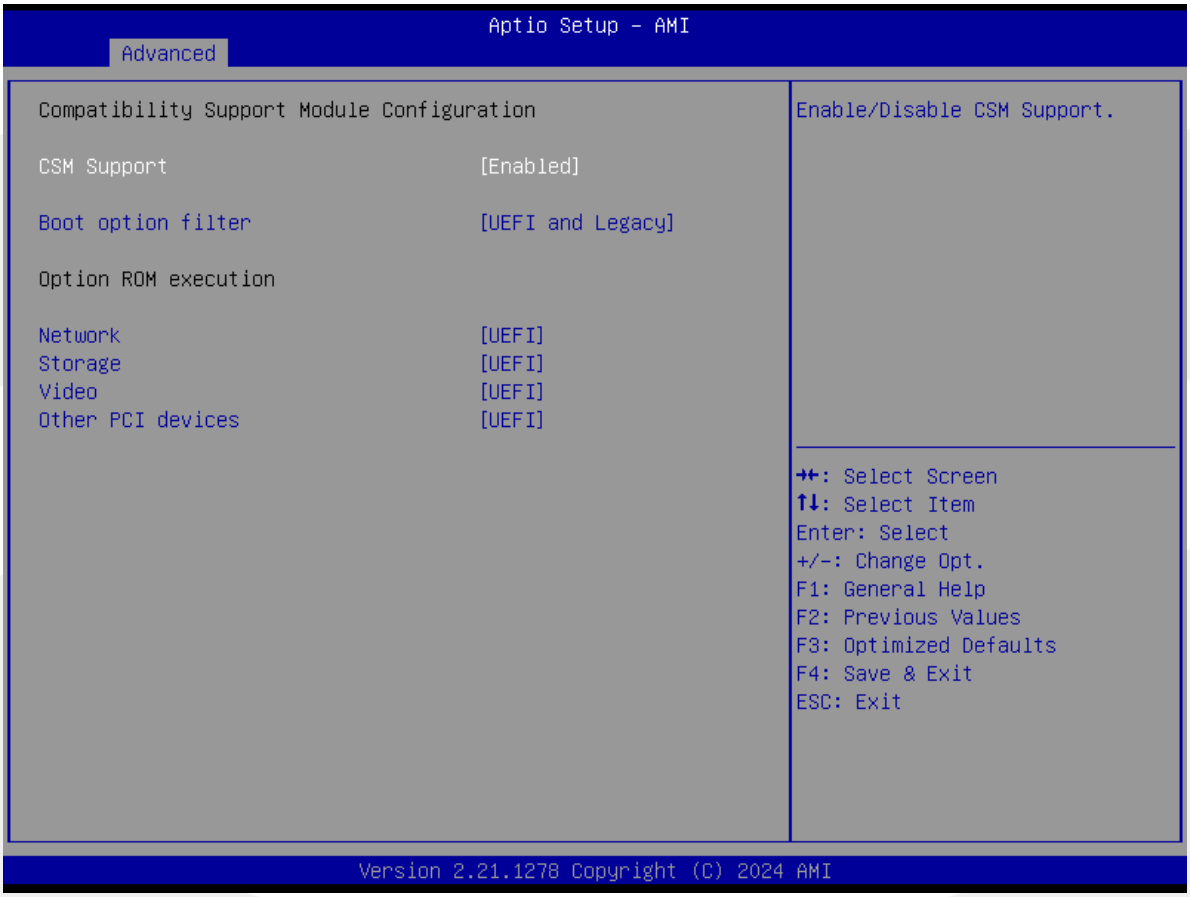
3.2.7 Network Stack Configuration

To access this screen from the Main screen, choose ***Advanced > Network Stack Configuration***.

Setup Item	Options	Help Text	Comments
Network Stack Configuration			
Network Stack	Disabled Enabled		Enable/Disable UEFI Network Stack.

3.2.8 CSM Configuration

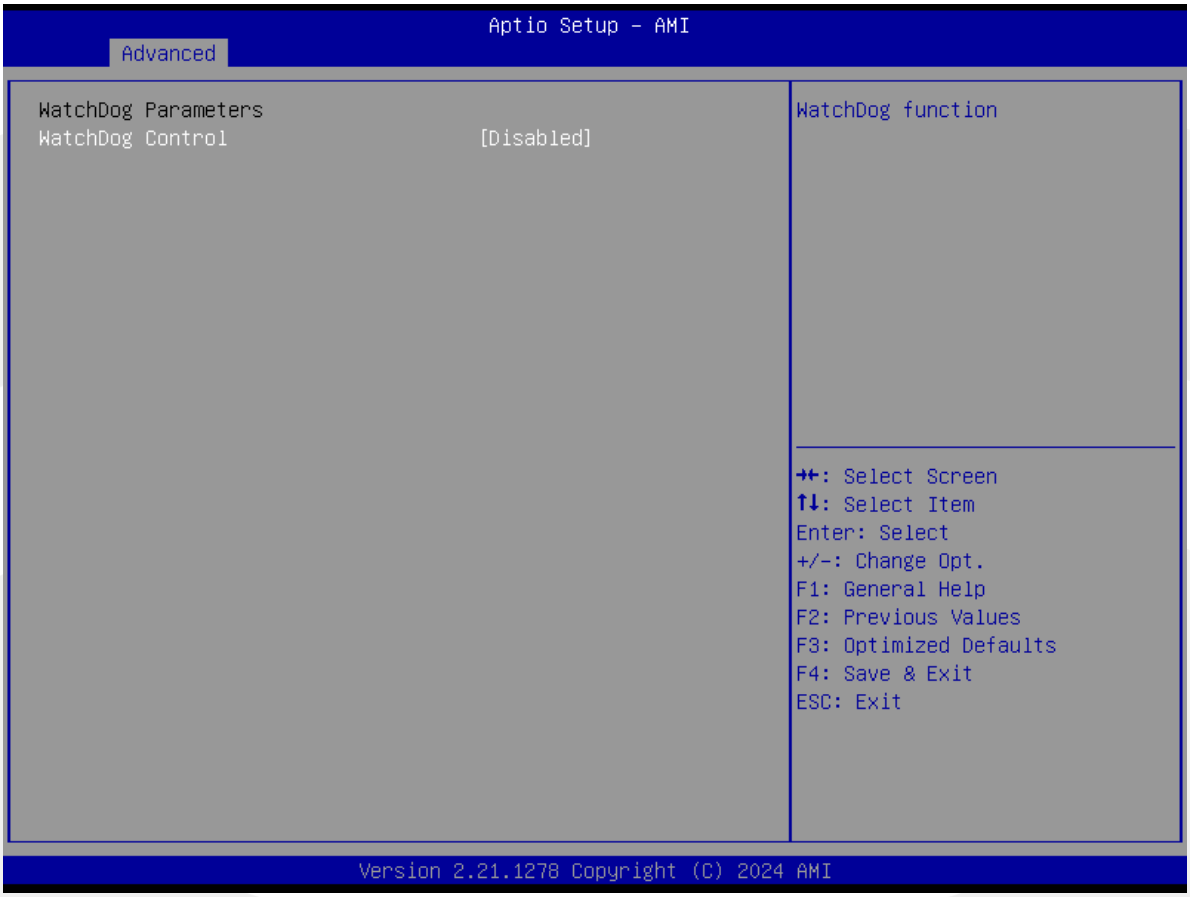
The CSM Configuration screen allows the user to view the CSM information, and to enable or disable CSM options. To access this screen from the Main screen, choose ***Advanced > CSM Configuration***.



Setup Item	Options	Help Text	Comments
CSM Configuration			
CSM Support	Enabled Disabled	Enable/Disable CSM support.	
Boot option filter	UEFI and Legacy Legacy only UEFI only	This option control Legacy/UEFI ROMs priority.	
Option ROM execution			
Network	UEFI Legacy	Control the execution of UEFI and Legacy PXE OpROM.	
Storage	UEFI Legacy	Control the execution of UEFI and Legacy Storage OpROM.	
Video	UEFI Legacy	Control the execution of UEFI and Legacy video OpROM.	
Other PCI devices	UEFI Legacy	Determines OpROM execution policy for devices other than Network,Storage or video.	

3.2.9 Watchdog Configuration

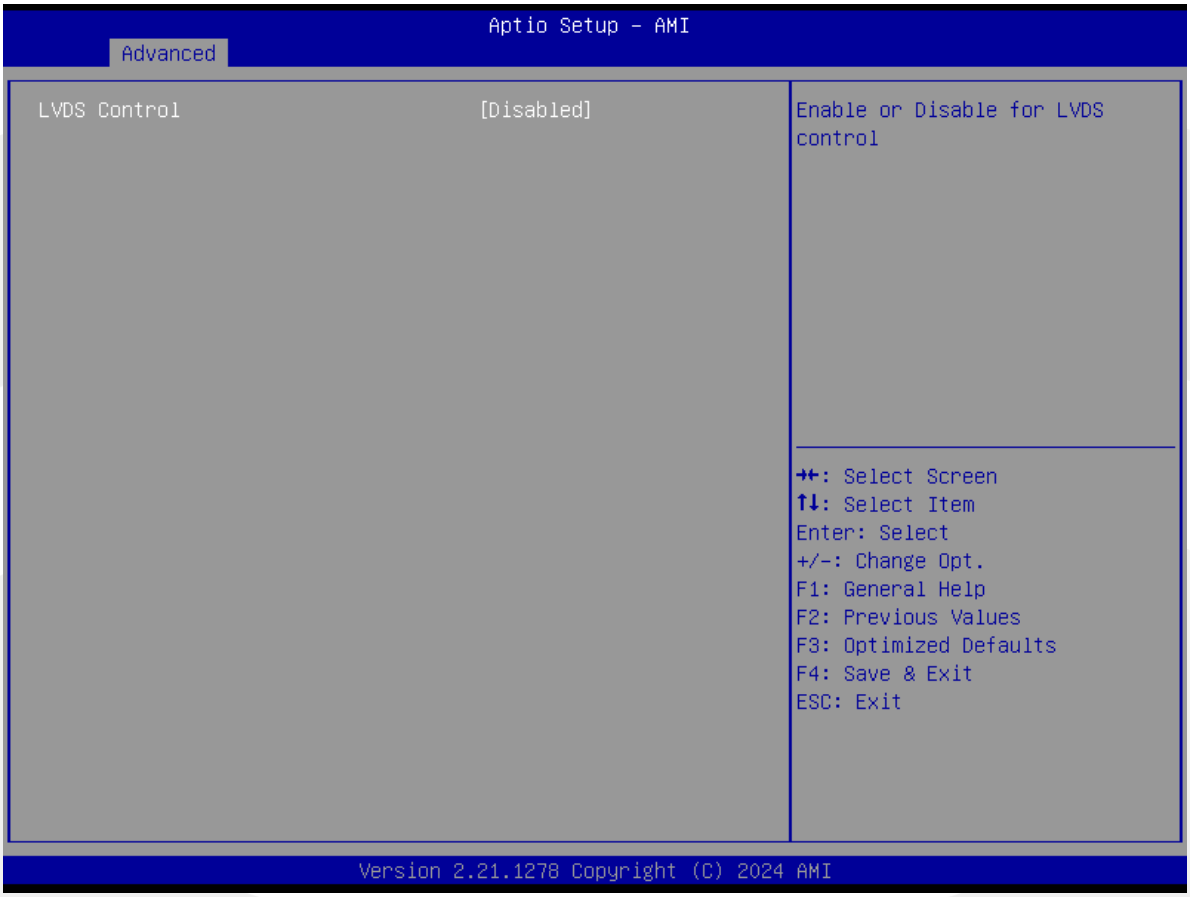
The Watchdog Configuration screen allows the user to Set System WatchDog Parameters. To access this screen from the Main screen, choose ***Advanced > Watchdog Configuration***.



Setup Item	Options	Help Text	Comments
Watchdog Configuration			
WatchDog Control	Disabled Enabled		WatchDog function.

3.2.10 LVDS Panel

The LVDS Panel screen allows the user to Set LVDS panel Parameters options. To access this screen from the Main screen, choose ***Advanced > LVDS Panel***.



Setup Item	Options	Help Text	Comments
LVDS Panel			
LVDS Control	Disabled Enabled	Enable or disable for LVDS control.	LVDS Control.

3.3 Chipset Screen

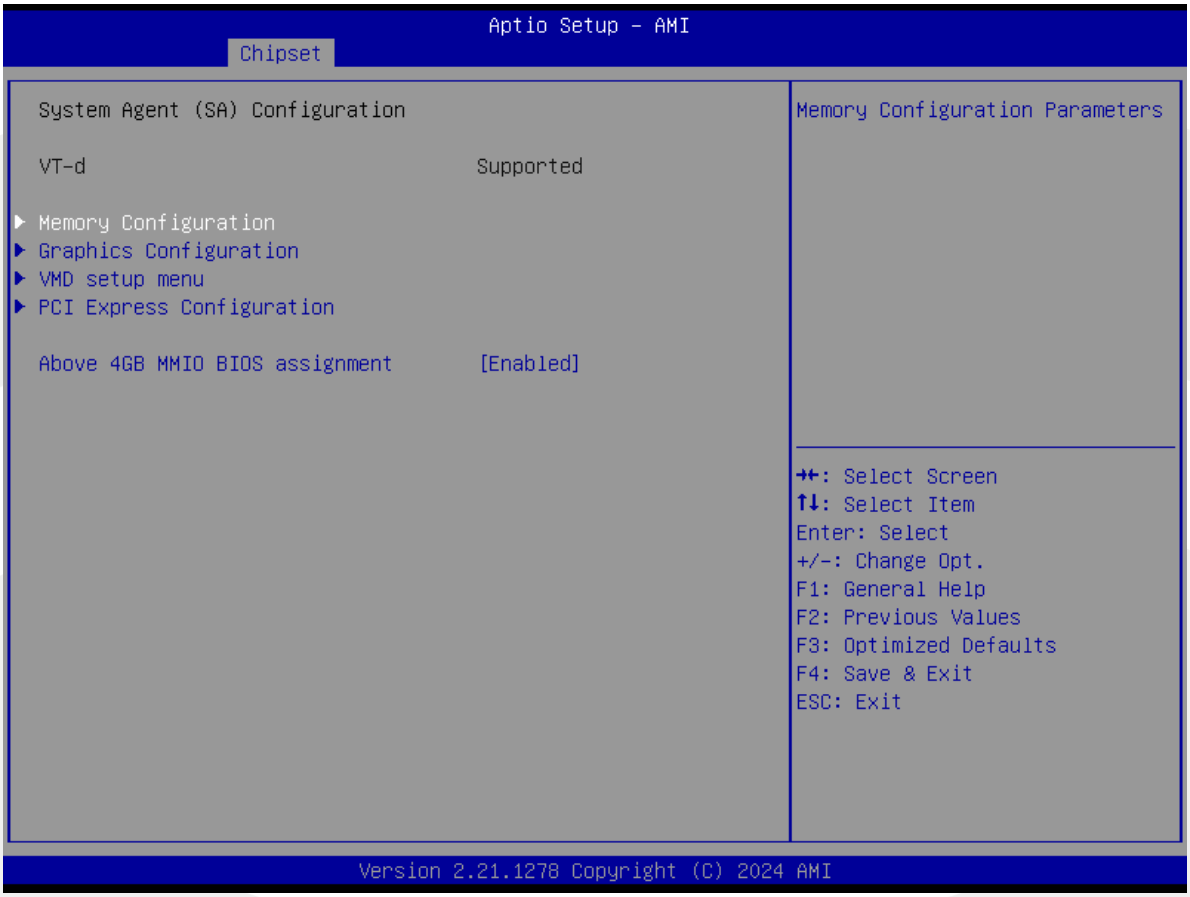
The Chipset screen provides an access point to configure SA Configuration and PCH-IO configuration. To access this screen from the Main screen, press the right arrow until the Chipset screen is chosen.

Setup Item	Options	Help Text	Comments
Chipset Screen			
System Agent (SA) Configuration		System Agent (SA) Parameters.	
PCH-IO Configuration		PCH Parameters.	

3.3.1 System Agent (SA) Configuration

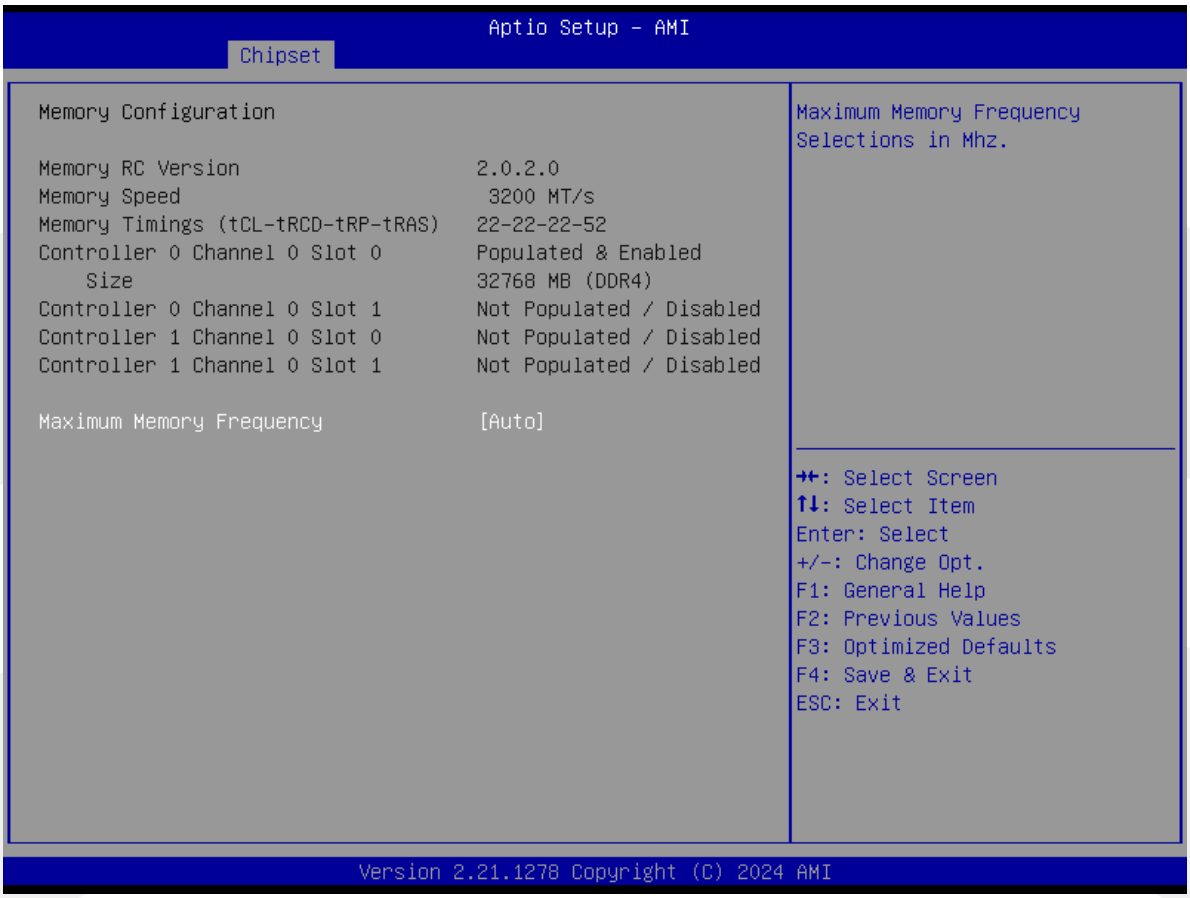
The North Bridge Screen allows user to set NB chipset configuration.

To access this screen, form the Main screen, choose ***Chipset> System Agent (SA) Configuration***.



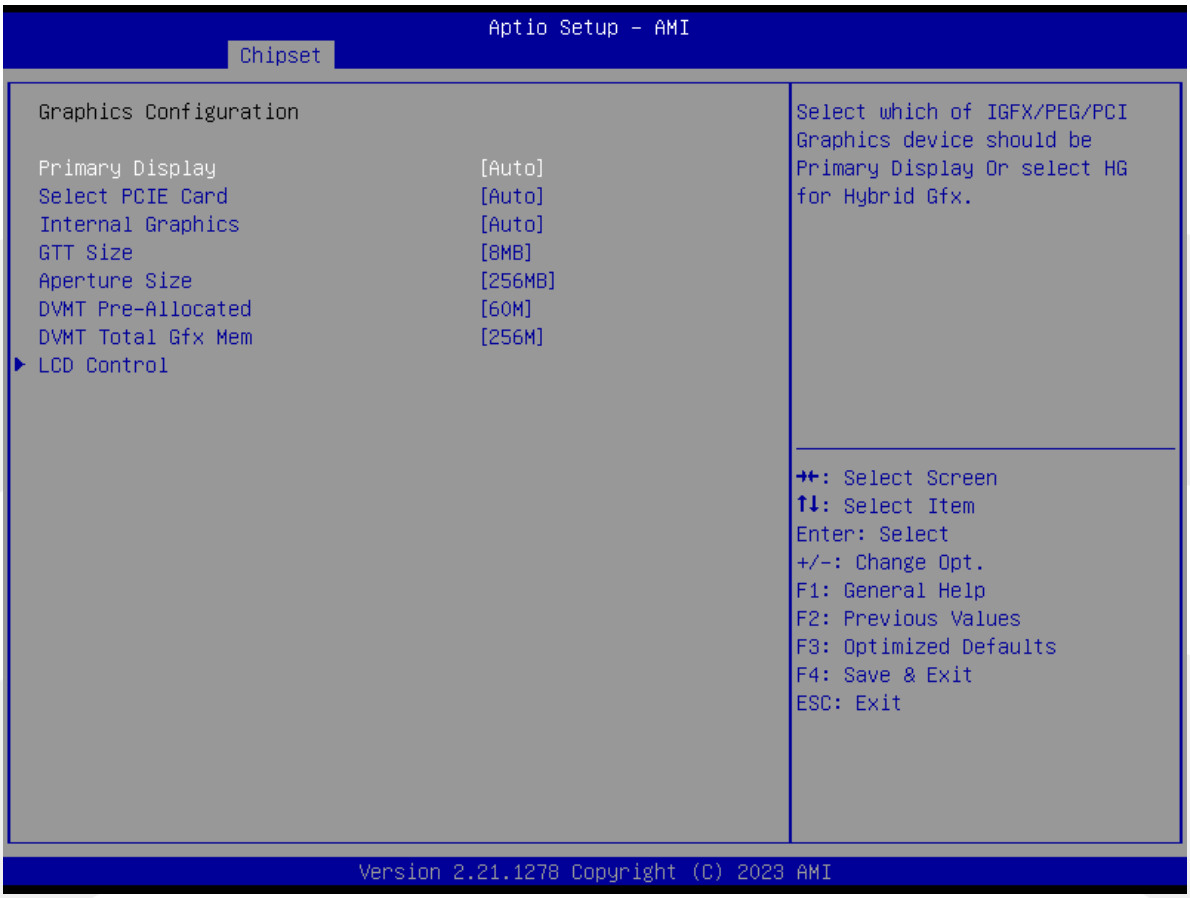
Setup Item	Options	Help Text	Comments
System Agent (SA) Configuration			
VT-d			
Memory Configuration		Memory Configuration Parameters.	
Graphics Configuration		Graphics Configuration.	
VMD setup menu		VMD Configuration settings.	
PCI Express Configuration		PCI Express Configuration settings.	
Above 4GB MMIO BIOS assignment	Enabled Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment\n\nThis is enabled automatically when Aperture Size is set to 2048MB.	

3.3.1.1 Memory Configuration



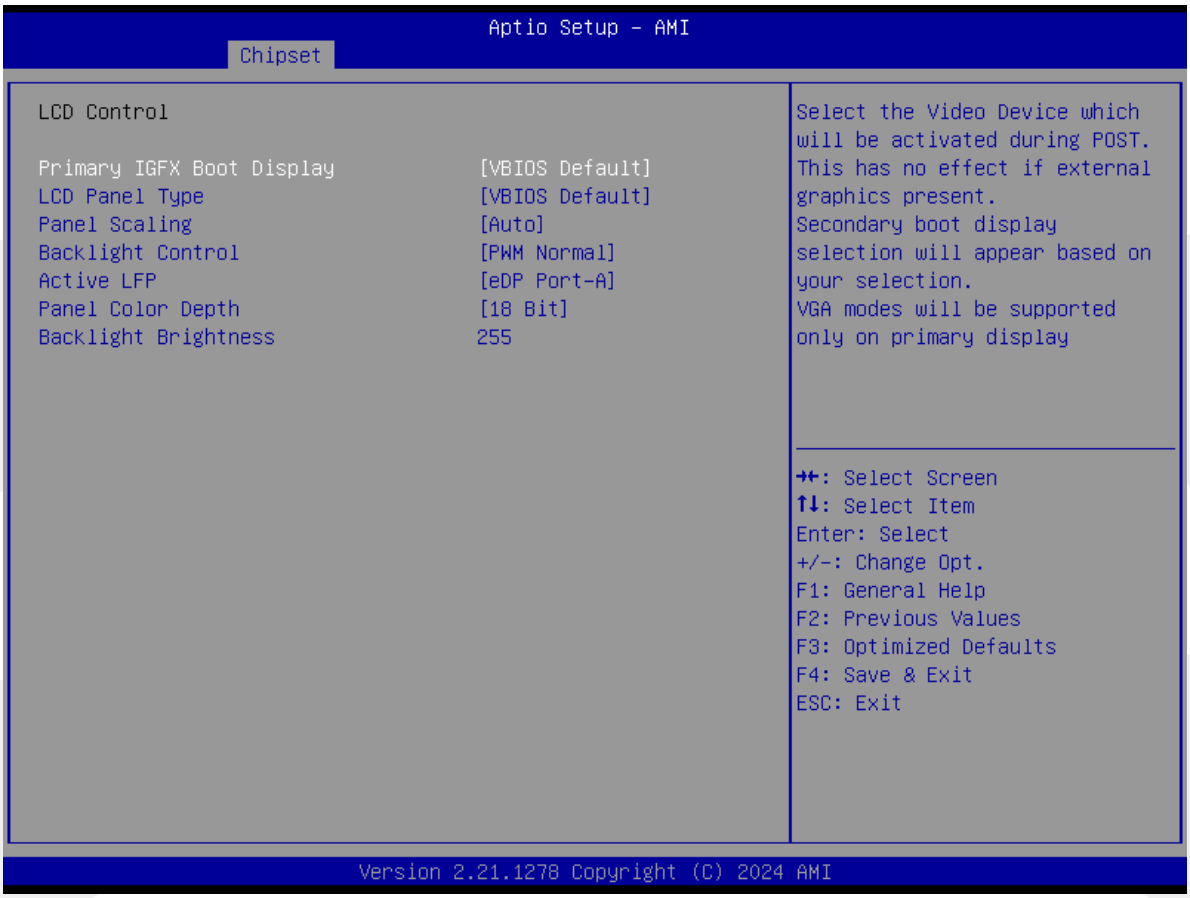
Setup Item	Options	Help Text	Comments
Memory Configuration			
Memory RC Version	2.0.2.0	Show Memory information.	
Memory Speed	3200 MT/S		
Memory Timings (tCL-tRCD-tRP-tRAS)	22-22-22-52		
Controller 0 Channel 0 Slot 0	Populated & Enabled		
Size	32768 MB(DDR4)		
Controller 0 Channel 0 Slot 1	Not Populated/Disabled		
Controller 1 Channel 0 Slot 0	Not Populated/Disabled		
Controller 1 Channel 0 Slot 1	Not Populated/Disabled		
Maximum Memory Frequency	Auto 1267 1200 1333 1467 1733 1867 2133 2267	Maximum Memory Frequency Selections in Mhz.	

3.3.1.2 Graphics Configuration



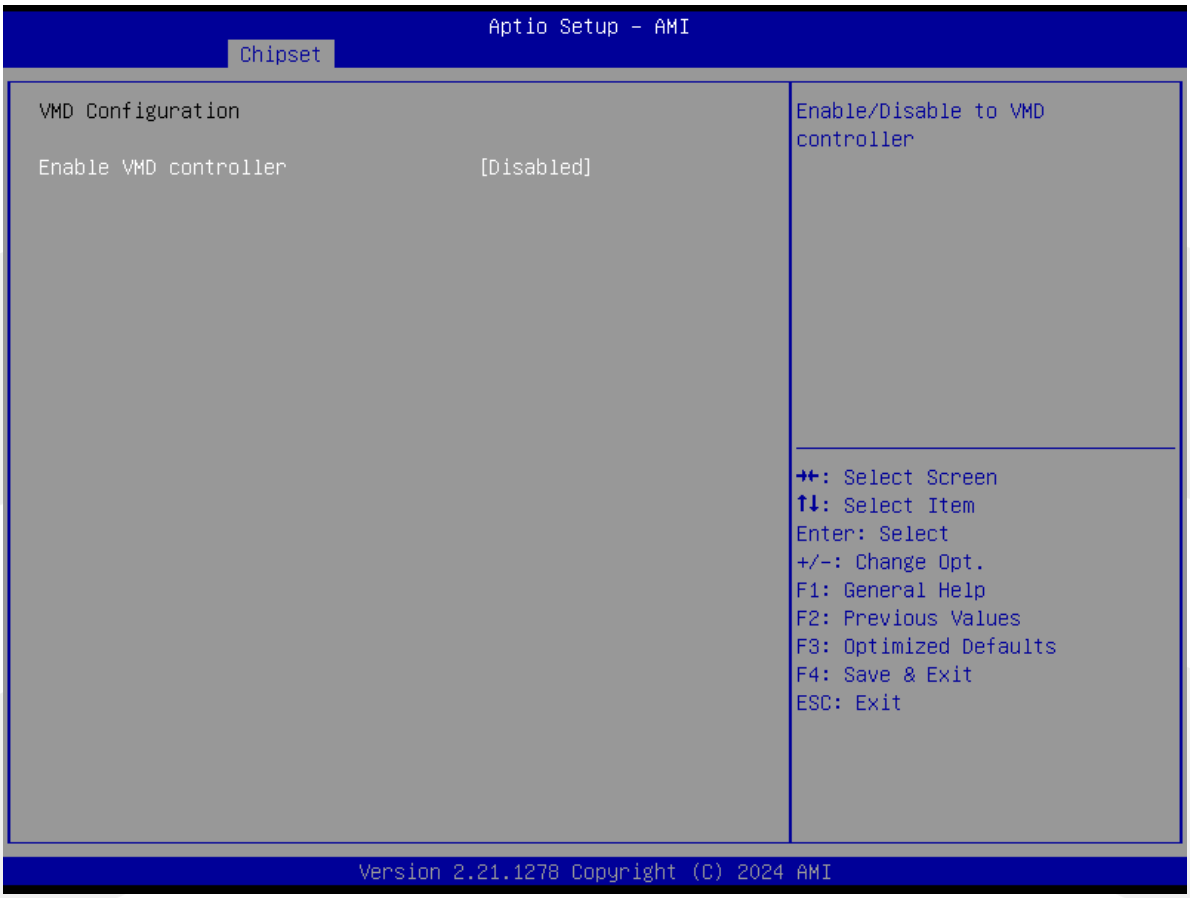
Setup Item	Options	Help Text	Comments
Graphics Configuration			
Primary Display	Auto IGFX PEG Slot PCH PCI HG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.	
Select PCIE Card	Auto Elk Creek 4 PEG Eval	Select the card used on the platform\n" "Auto : Skip GPIO based Power Enable to dGPU\n" "Elk Creek 4: DGPU Power Enable = ActiveLow\n" "PEG Eval : DGPU Power Enable = ActiveHigh	
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\n\nNote : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support."	
DVMT Pre-Allocated	60M 0M 32M 40M	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.	
LCD Control		LCD Control.	

3.3.1.2.1 LCD Control



Setup Item	Options	Help Text	Comments
LCD Control			
Primary IGFX Boot Display	VBIOS Default EFP LFP EFP3 EFP2 EFP4	Select the Video Device which will be activated during POST.\nThis has no effect if external graphics present.\nSecondary boot display selection will appear based on your selection.\nVGA modes will be supported only on primary display.	
LCD Panel Type	VBIOS Default 640x480 LVDS 800x600 LVDS 1024x768 LVDS 1280x1024 LVDS 1400x1050 LVDS1 1400x1050 LVDS2	Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.	
Panel Scaling	Auto Off Force Scaling	Select the LCD panel scaling option used by the Internal Graphics Device.	
Backlight Control	PWM Inverted PWM Normal	Back Light Control Setting.	
Active LFP	No eDP Edp Port-A	Select the Active LFP Configuration.\n\nNo LVDS:VBIOS does not enable LVDS.\nInt-LVDS:VBIOS enables LVDS driver by Integrated encoder.\nSDVO LVDS:VBIOS enables LVDS driver by SDVO encoder.\neDP Port-A:LFP Driven by Int-DisplayPort encoder from Port-A.	
Panel Color Depth	18 Bit 24 Bit	Select the LFP Panel Color Depth.	
Backlight Brightness	255	Set VBIOS Brightness.\nRange : 0-255.	

3.3.1.3 VMD setup menu

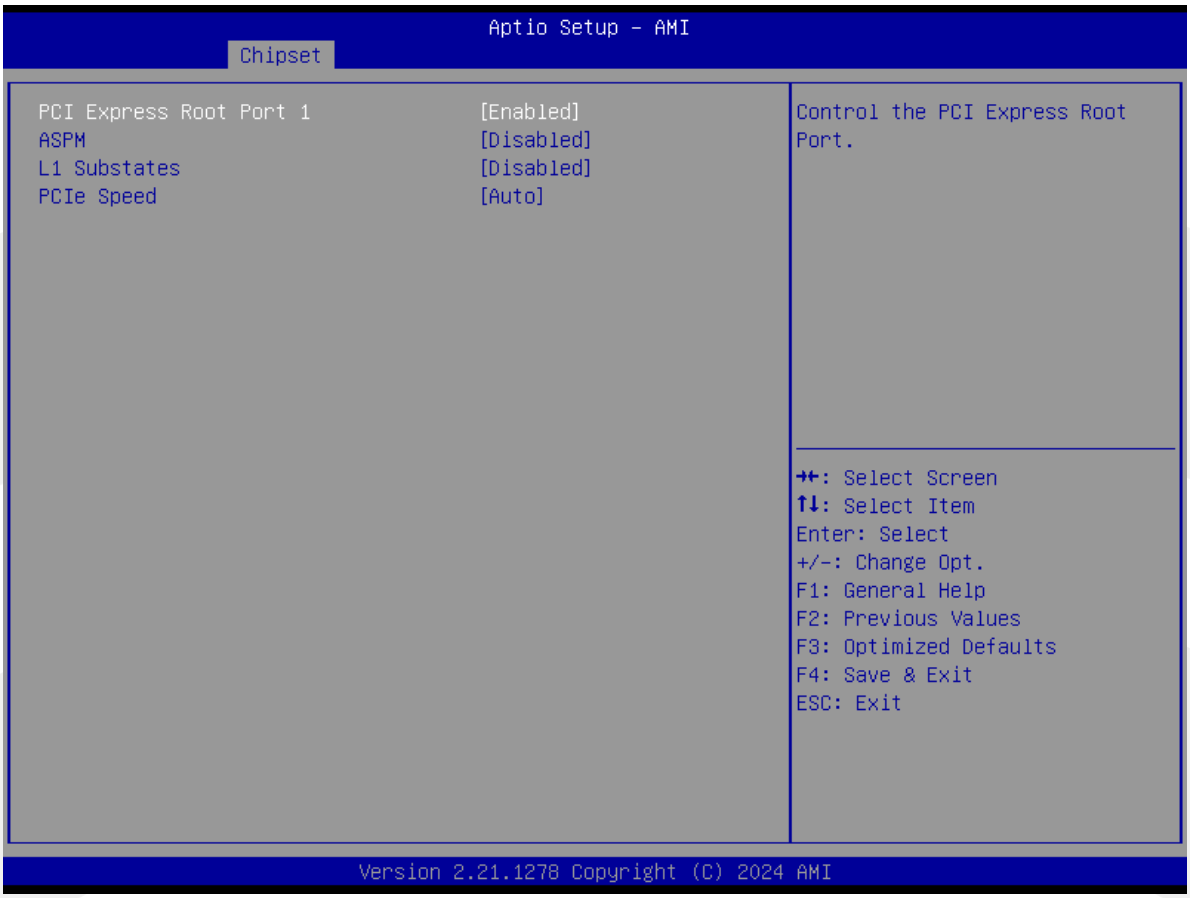


Setup Item	Options	Help Text	Comments
VMD Configuration			
Enable VMD controller	Enable VMD controller	Enable VMD controller	

3.3.1.4 PCI Express Configuration

Setup Item	Options	Help Text	Comments
PCI Express Configuration			
PCIE Resizable BAR Support	Enabled Disabled	Enable/Disable PCIE Resizable BAR Support.	
PCIE Express Root Port 1		PCIE Express Root Port Settings.	

3.3.1.4.1 PCI Express Root Port 1

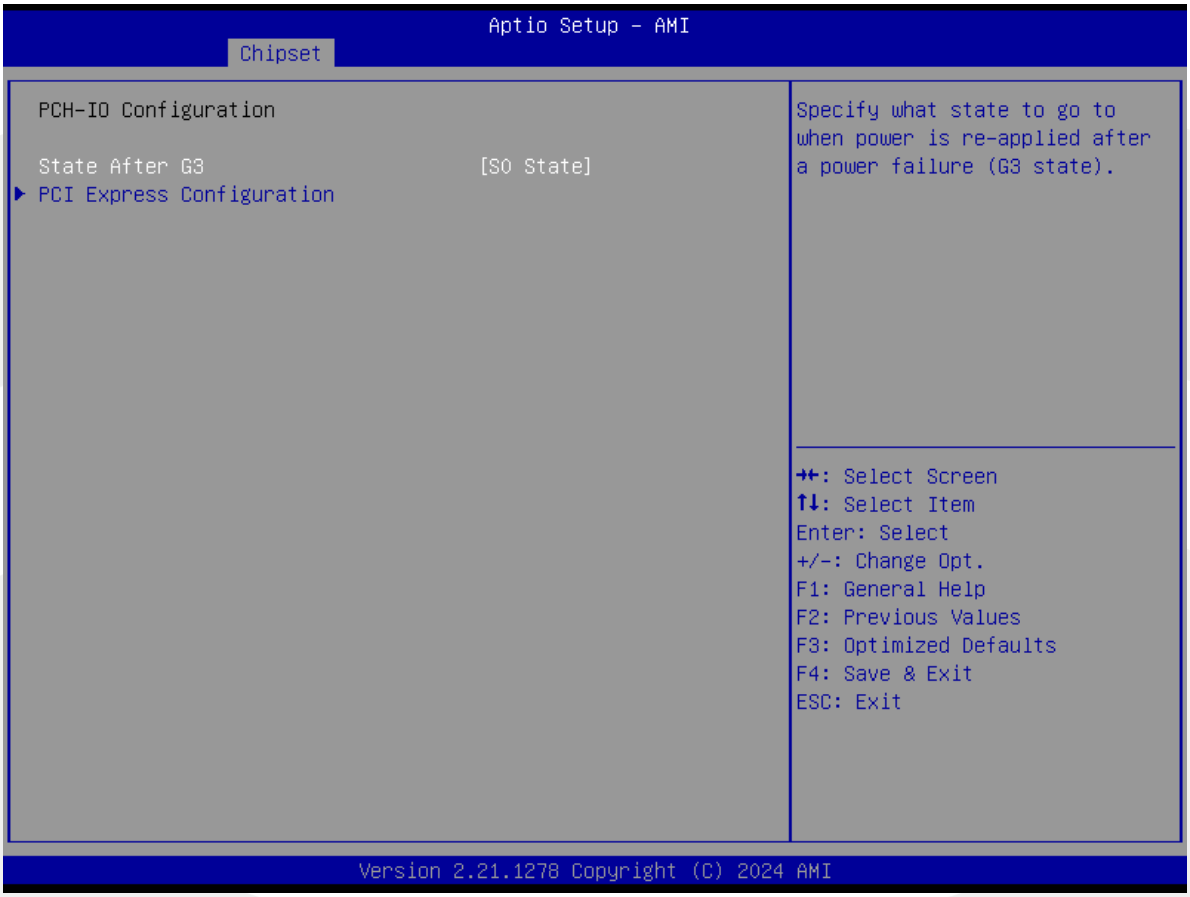


Setup Item	Options	Help Text	Comments
PCI Express Root Port 1	Enabled Disabled	Control the PCI Express Root Port.	
ASPM	Enabled Disabled	Enable/Disable PCIE Resizable BAR Support.	
L1 Substates	Disabled L1.1 L1.1 & L1.2	PCI Express L1 Substates settings	
PCIe Speed	Auto Gen1 Gen2 Gen3 Gen4	PCIe Speed settings	

3.3.2 PCH-IO Configuration

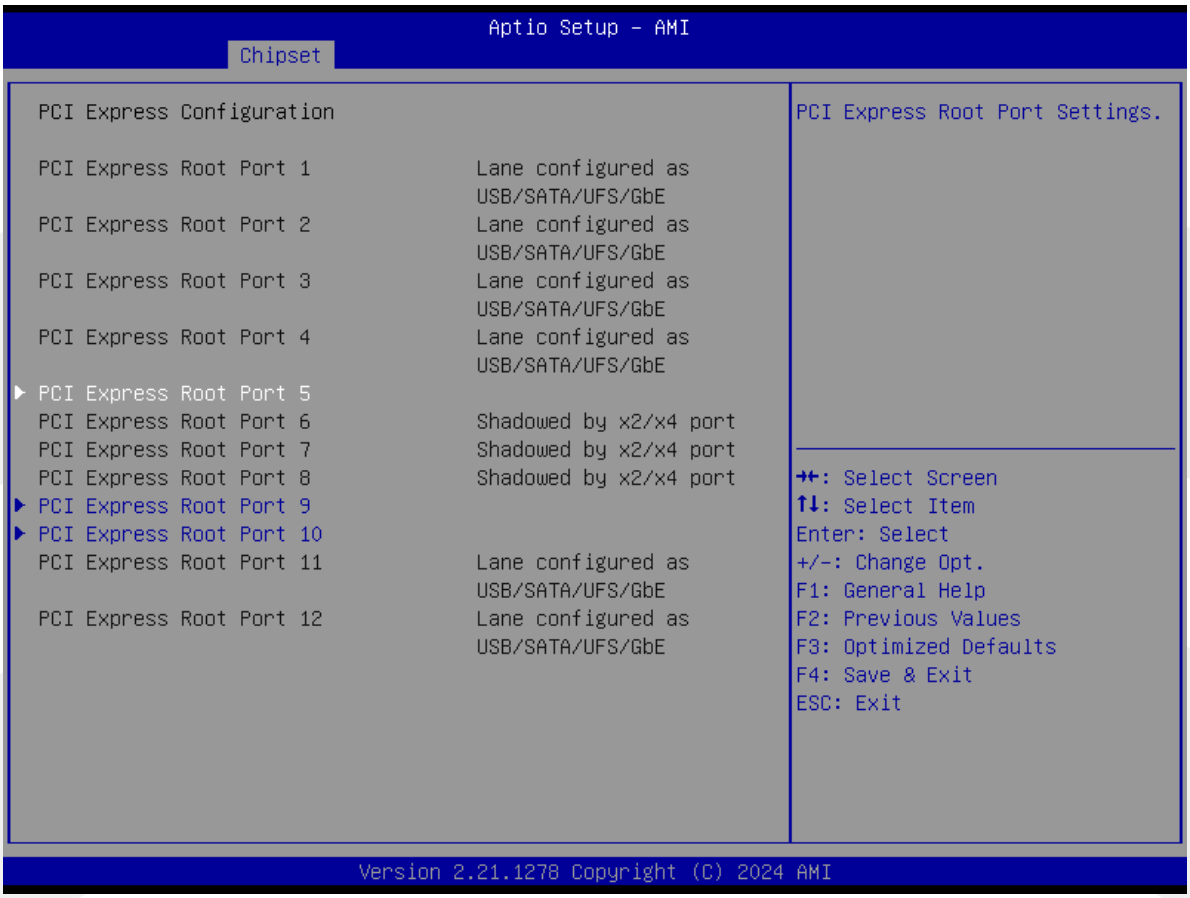
The PCH-IO Configuration Screen allows user to set SB chipset configuration.

To access this screen form the Main screen, choose ***Chipset> PCH-IO Configuration***.



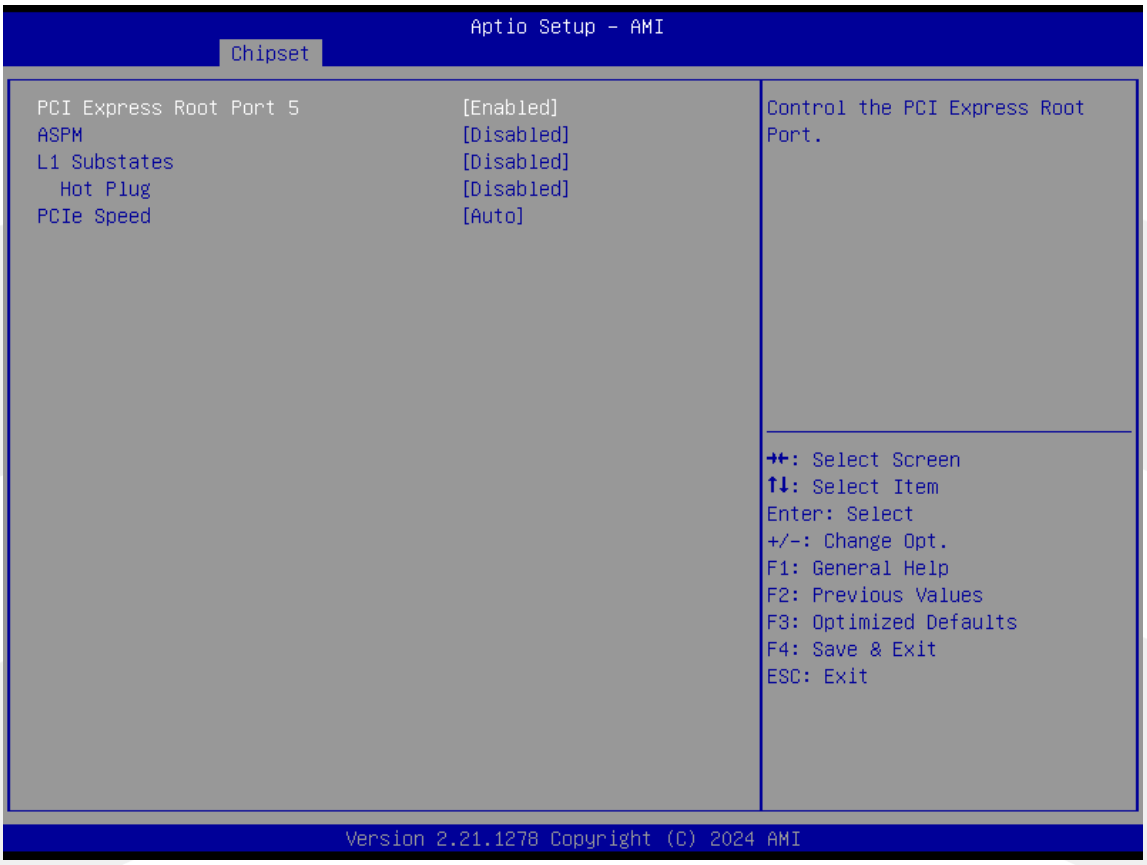
Setup Item	Options	Help Text	Comments
PCH-IO Configuration			
State After G3	S0 State S5 State	Specify what state to go to when power is re-applied after a power failure(G3 state).	
PCI Express Configuration		PCI Express Configuration settings.	

3.3.2.1 PCI Express Configuration



Setup Item	Options	Help Text	Comments
PCI Express Configuration			
PCI Express Root Port 1	Lane configured as USB/SATA/UFS/GbE		
PCI Express Root Port 2	Lane configured as USB/SATA/UFS/GbE		
PCI Express Root Port 3	Lane configured as USB/SATA/UFS/GbE		
PCI Express Root Port 4	Lane configured as USB/SATA/UFS/GbE		
PCI Express Root Port 5		PCI Express Root Port Settings.	
PCI Express Root Port 6	Shadowed by x2/x4 port		
PCI Express Root Port 7	Shadowed by x2/x4 port		
PCI Express Root Port 8	Shadowed by x2/x4 port		
PCI Express Root Port 9		PCI Express Root Port Settings.	
PCI Express Root Port 10		PCI Express Root Port Settings.	
PCI Express Root Port 11	Lane configured as USB/SATA/UFS/GbE		
PCI Express Root Port 12	Lane configured as USB/SATA/UFS/GbE		

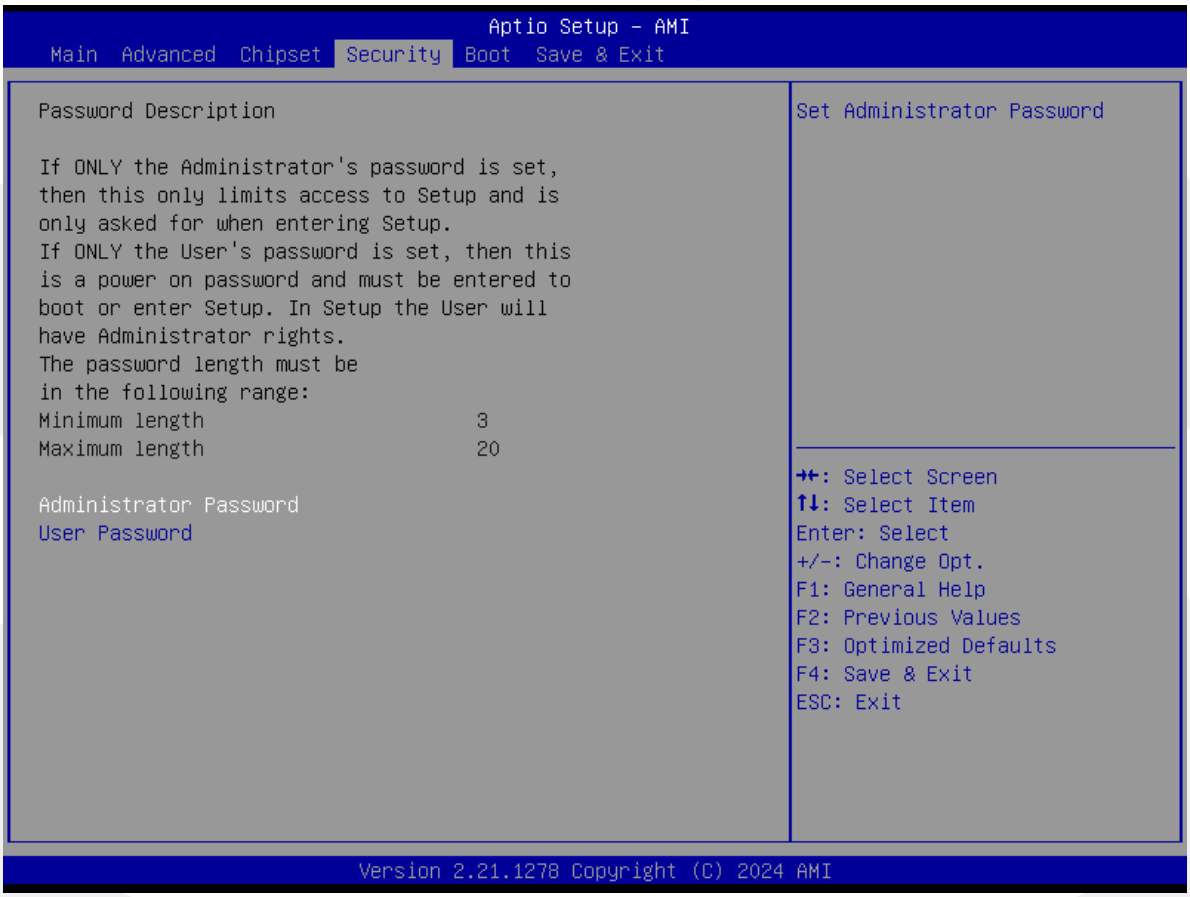
3.3.2.1.1 PCI Express Root Port X



Setup Item	Options	Help Text	Comments
PCI Express Root Port X			
PCI Express Root Port X	Enabled Disabled	Control the PCI Express Root Port.	
ASPM	Disabled L0S L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State. AUTO - BIOS auto configure DISABLE - Disables ASPM .	
L1 Substates	Enabled Disabled	PCI Express L1 Substates settings.	
Hot Plug	Enabled Disabled	PCI Express Hot Plug Enable/Disable.	
PCIe Speed	Auto Gen1 Gen2 Gen3	Configure PCIe Speed.	

3.4 Security

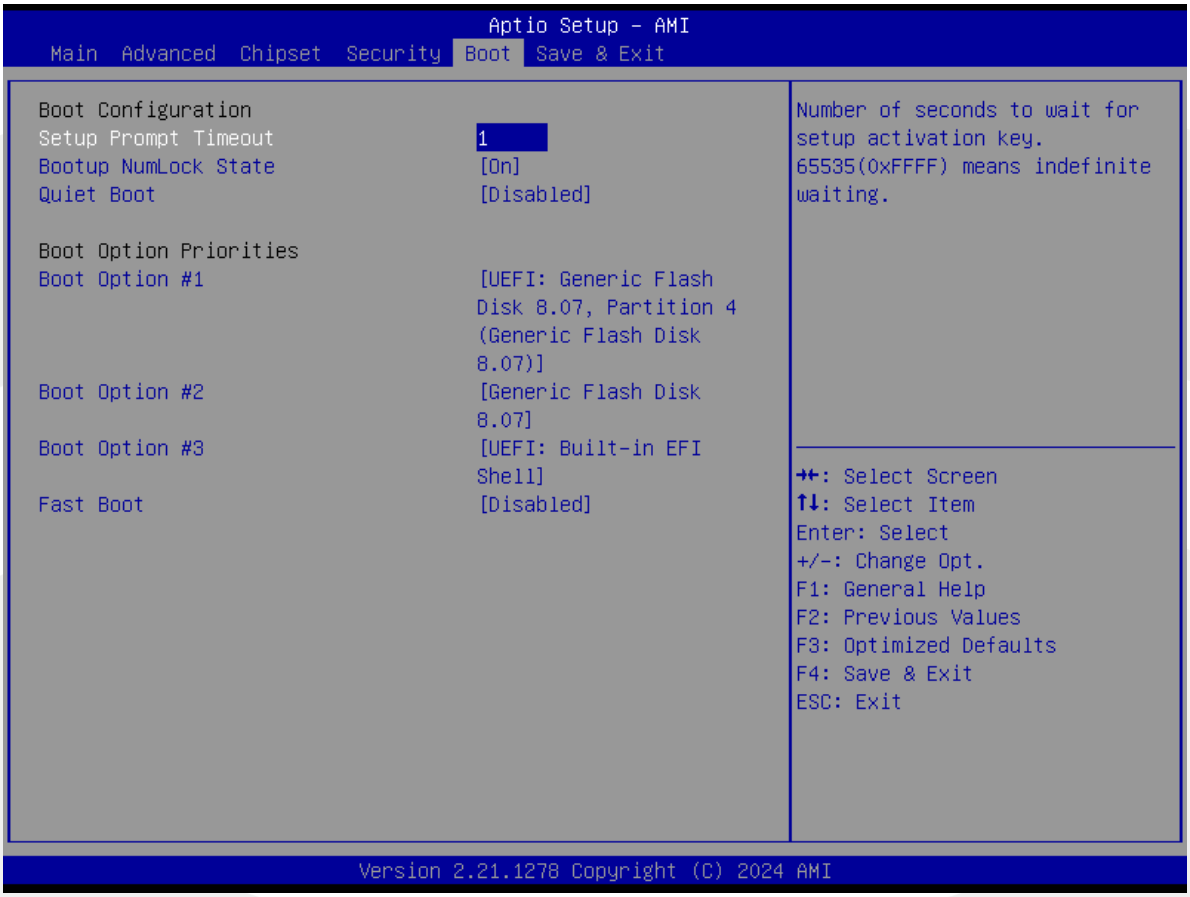
To access this screen form the Main screen, choose ***Security***.



Setup Item	Options	Help Text	Comments
Security			
Administrator Password		Set Administrator Password.	
User Password		Set User Password.	

3.5 Boot Screen

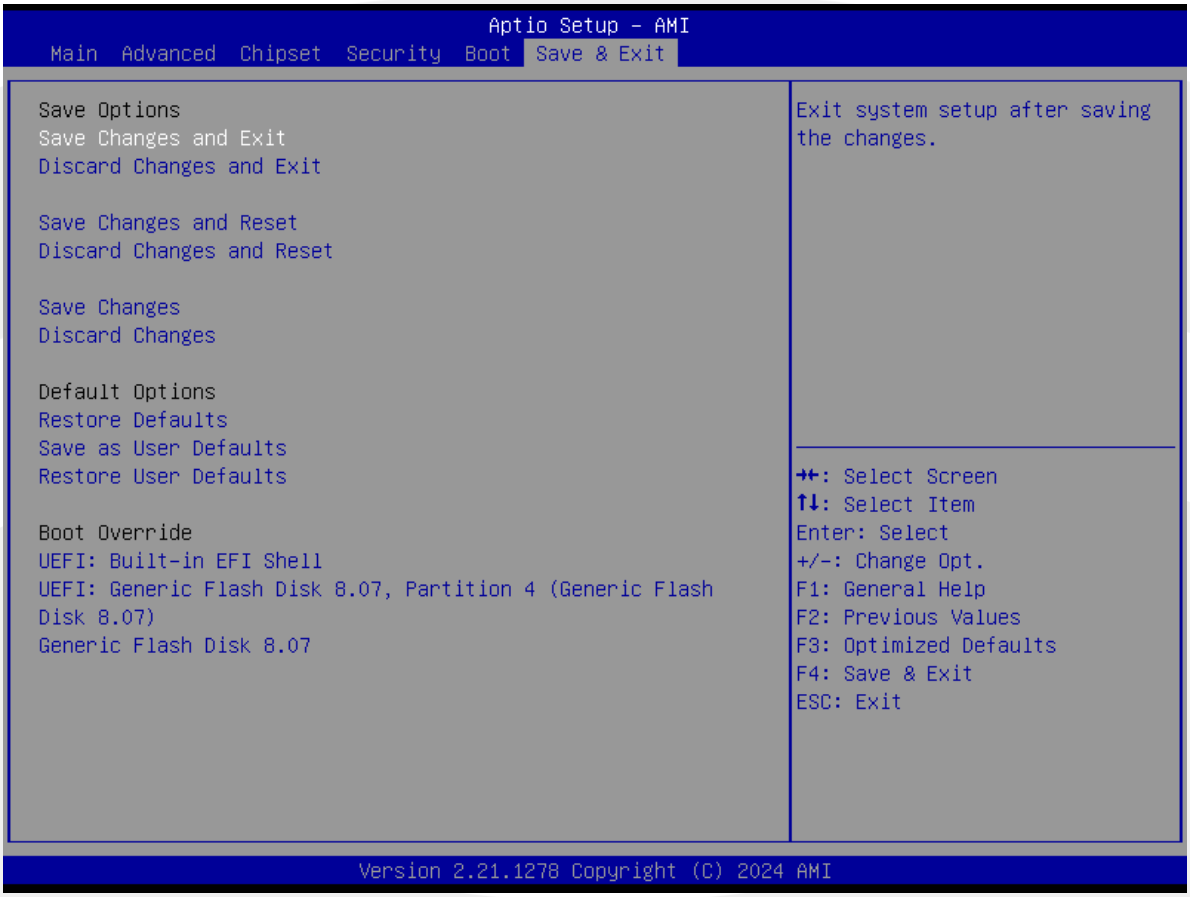
The Boot screen displays any bootable media encountered during POST, and allows the user to configure desired boot device. To access this screen from the Main screen, choose ***Boot***.



Setup Item	Options	Help Text	Comments
Boot Configuration			
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 Number state.	
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.	
Boot Option Priorities			
Boot Option #1		Sets the system boot order.	Note: Showed When boot devices existed.
Boot Option #2		Sets the system boot order.	
Boot Option #3		Sets the system boot order.	
Fast Boot	Disabled Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	

3.6 Save & Exit Screen

The Save & Exit screen allows the user to choose whether to save or discard the configuration changes made on the other screens. It also allows the user to restore the server to the factory defaults or to save or restore them to set of user-defined default values.



Setup Item	Options	Help Text	Comments
Save & Exit			
Save Options			
Save Changes and Exit		Exit system setup after saving the changes.	User is prompted for confirmation only if any of the setup fields were modified.
Discard Changes and Exit		Exit system setup without saving any changes.	
Save Changes and Reset		Reset the system after saving the changes.	
Discard Changes and Reset		Reset system setup without saving and changes.	
Save Changes		Save Changes done so far to any of the setup options.	
Discard Changes		Discard Changes done so far to any or the setup options.	
Default Options			
Restore Defaults		Restore/Load Default values for all the setup options.	

Setup Item	Options	Help Text	Comments
Save as User Defaults		Save the changes done so far as User Defaults.	
Restore User Defaults		Restore the User Defaults to all the setup options.	
Boot Override			
Shows the Device can boot			Note：Showed When boot devices existed.

第四章 Electrical Specifications

4.1 Input Power - General Considerations

The Compact, Basic and Extended Module Modules shall use a single main power rail with a nominal value of +12V.The Mini Module shall support a wide range power supply of 4.75V to 20.0V. In addition, the Mini Module shall be optimized for 5V operation and Module vendors should report Module power figures at 5V, 12V and 18V input voltages.
Two additional rails are specified: a +5V standby power rail and a +3V battery input to power the Module Real-time Clock (RTC) circuit in the absence of other power sources. The +5V standby rail may be left unconnected on the Carrier Board if the standby functions are not required by the application. Likewise, the +3V battery input may be left open if the application does not require the RTC to keep time in the absence of the main and standby sources. There may be Module specific concerns regarding storage of system setup parameters that may be affected by the absence of the +5V standby and / or the +3V battery.

The rationale for this power-delivery scheme is:

- Module pins are scarce. It is more pin-efficient to bring power in on a higher voltage rail.
- Single supply operation is attractive to many users.
- Lithium ion battery packs for mobile systems are most prevalent with a +14.4V output. This is well suited for the +12V main power rail.
- Contemporary chipsets have no power requirements for +5V other than to provide a reference voltage for +5V tolerant inputs. No COM Express Module pins are allocated to accept +5V except for the +5V standby pins. In the case of an ATX supply, the switched (non standby) +5V line would not be used for the COM Express Module, but it might be used elsewhere on the Carrier Board.

4.2 Input Power - Current Load

The Module connector pins limit the amount of power that can be brought into the COM Express Module. The limits are different for Module Pin-out Type 10 vs. Pin-out Types 6 and 7, based on the number of 12V power pins as Pin-out Type 10 has fewer pins available.

Table 4.1: Input Power - Pin-Out Type 10 Modules (Single Connector, 220 pins)

Power Rail	Module Pin Current Capability (Amps)	Nominal Input (Volts)	Input Range (Volts)	Derated Input (Volts)	Max Input Ripple (mV)	Max Module Input Power (w. derated input) (Watts)	Assumed Conversion Efficiency	Max Load Power (Watts)
VCC_12V	6	12	11.4 - 12.6	11.4	+/-100	68	85%	58
Wide input (Mini)	6		4.75 – 20.0	4.75	+/-100	28		
VCC_5V_SBY	2	5	4.75 - 5.25	4.75	+/-50	9		
VCC_RTC	0.5	3	2 0 - 3.3		+/-20			

Table 4.2: Input Power - Pin-Out Type 6/7 Modules (Dual Connector, 440 pins)

Power Rail	Module Pin Current Capability (Amps)	Nominal Input (Volts)	Input Range (Volts)	Derated Input (Volts)	Max Input Ripple (mV)	Max Module Input Power (w. derated input) (Watts)	Assumed Conversion Efficiency	Max Load Power (Watts)
VCC_12V	12	12	11.4 - 12.6	11.4	+/-100	137	85%	116
VCC_5V_SBY	2	5	4.75 - 5.25	4.75	+/-50	9		
VCC_RTC	0.5	3	2 0 - 3.3		+/-20			

The ripple voltage, if present, must not cause the input voltage range to be exceeded.

4.3 Input Power - Sequencing

COM Express input power sequencing requirements are as follows:

VCC_RTC shall come up at the same time or before VCC_5V_SBY comes up(if use)
VCC_5V_SBY shall come up at the same time or before VCC_12V comes up(if use)
PWR_OK shall be active at the same time or after VCC_12V comes up(if use)
PWR_OK shall be inactive at the same time or before VCC_12V goes down(if use)
VCC_12V shall go down at the same time or before VCC_5V_SBY goes down
VCC_5V_SBY shall go down at the same time or before VCC_RTC goes down(if use)
Wide input (Mini) shall follow the power sequencing of the VCC_12V

Figure 4-1: Power Sequencing

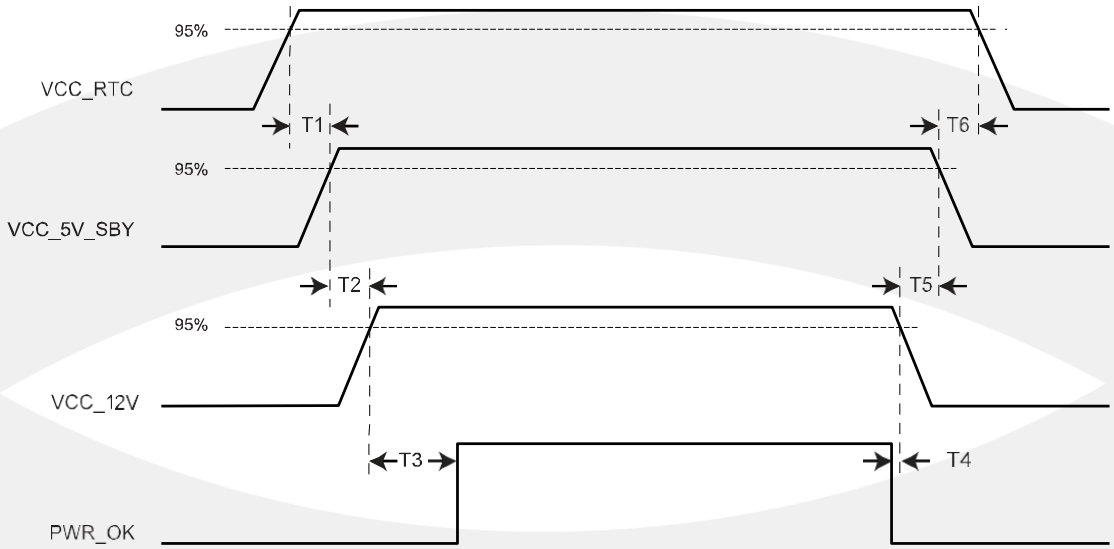


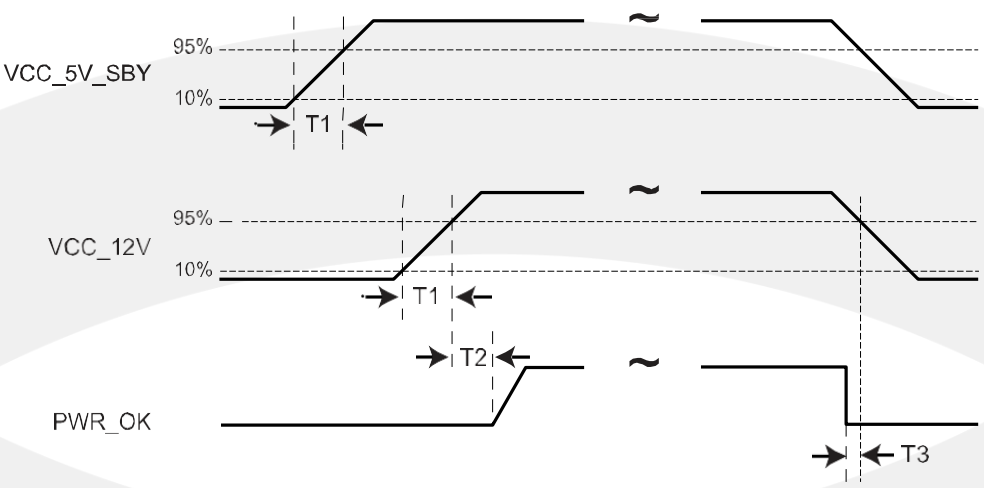
Table 4.3: Power Sequencing

T1	VCC_RTC rise to VCC_5V_SBY rise	≥ 0 ms
T2	VCC_5V_SBY rise to VCC_12V rise	≥ 0 ms
T3	VCC_12V rise to PWROK rise	≥ 0 ms
T4	PWR_OK fall to VCC_12V fall	≥ 0 ms
T5	VCC_12V fall to VCC_5V_SBY fall	≥ 0 ms
T6	VCC_5V_SBY fall to VCC_RTC fall	≥ 0 ms

4.4 Input Power - Rise Time

The input voltages to the COM Express Module VCC_12V, wide input (Mini) and VCC_5V_SBY if used shall rise from ≤10% of nominal to within the regulation ranges within 0.1 ms to 20 ms (0.1 ms ≤ T2 ≤ 20 ms). There must be a smooth and continuous ramp of each DC output voltage from 10% to 90% of its final set point within the regulation band. The smooth turn-on requires that, during the 10% to 90% portion of the rise time, the slope of the turn-on waveform must be positive and have a value of between 0 V/ms and [Vout, nominal / 0.1] V/ms. Also, for any 5ms segment of the 10% to 90% rise time waveform, a straight line drawn between the end points of the waveform segment must have a slope ≥ [Vout, nominal / 20] V/ms.

Figure 4-2: Input Power Rise Time



- T1,min = 0,1ms
- T1,max = 20ms
- T2 ≥ 0ms
- T3 ≥ 0ms

The values chosen were selected to be compatible and enable use of ATX specification R2.2.

4.5 Signal Integrity Requirements

The signal groups listed in the following table have signal-integrity concerns that should be accounted for in Module and Carrier Board designs. A general description is shown in the table for reference only. The designer should consult the relevant interface specification documents for complete information.

Table 4.4: Signal Integrity Requirements

Signal Group	General Description	Source Spec Reference
Gigabit Ethernet	Differential pairs	IEEE 802.3 Specification
LVDS	100Ω edge coupled differential pairs	National Semiconductor LVDS web site
PCI and LPC clocks	50Ω single ended ground-referenced	
PCI Express	Differential pairs	PCI SIG - PCI Express Specification
PCI Express clocks	100Ω edge couple differential pair, ground-referenced	
Serial ATA	Differential pairs	SATA Specification
USB	Differential pairs	USB 2.0 Specification
10GBASE-KR	Differential pairs	IEEE 802.3 Specification
USB SS	Differential pairs	USB 3.0 Specification
SPI	50Ω single ended ground-referenced	
eSPI	50Ω single ended ground-referenced	

附录

附一：术语表

ACPI

高级配置和电源管理。ACPI 规范允许操作系统控制计算机及其附加设备的大部份电能。

BIOS

基本输入/输出系统。是在 PC 中包含所有的输入/输出控制代码界面的软件。它在系统启动时进行硬件检测，开始操作系统的运作，在操作系统和硬件之间提供一个界面。BIOS 是存储在一个只读存储器芯片内。

BUS

总线。在计算机系统中，不同部件之间交换数据的通道，是一组硬件线路。我们所指的 BUS 通常是 CPU 和主内存元件内部的局部线路。

Chipset

芯片组。是为执行一个或多个相关功能而设计的集成芯片。我们指的是由南桥和北桥组成的系统级芯片组，他决定了主板的架构和主要功能。

CMOS

互补金属-氧化物半导体。是一种被广泛应用的半导体类型。它具有高速、低功耗的特点。我们指的 CMOS 是在主板上的 CMOS RAM 中预留的一部份空间，用来保存日期、时间、系统信息和系统参数设定信息等。

COM

串口。一种通用的串行通信接口，一般采用标准 DB9 公头接口连接方式。

DIMM

双列直插式内存模块。是一个带有内存芯片组的小电路板。提供 64bit 的内存总线宽度。

DRAM

动态随机存取存储器。是一个普通计算机的通用内存类型。通常用一个晶体管和一个电容来存储一个位。随着技术的发展，DRAM 的类型和规格已经在计算机应用中变得越来越多样化。例如现在常用的就有 SDRAM、DDR SDRAM 和 RDRAM。

I2C

Inter-Integrated Circuit 总线是一种由 PHILIPS 公司开发的两线式串行总线，用于连接微控制器及其外围设备。

LAN

局域网络接口。一个小区域内相互关联的计算机组成的一个计算机网络，一般是在一个企事业单位或一栋建筑物。局域网一般由服务器、工作站、一些通信链接组成，一个终端可以通过电线访问数据和设备的任何地方，许多用户可以共享昂贵的设备和资源。

LED

发光二极管，一种半导体设备，当电流流过时它会被点亮，通常用来把信息非常直观的表示出来，例如表示电源已经导通或硬盘驱动器正在工作等。

PnP

即插即用。允许 PC 对外接设备进行自动配置，不用用户手动操作系统就可以自己工作的一种规格。为实现这个特点，BIOS 支持 PnP 和一个 PnP 扩展卡都是必需的。

POST

上电自检。在启动系统期间，BIOS 会对系统执行一个连续的检测操作，包括检测 RAM，键盘，硬盘驱动器等，看它们是否正确连接和是否正常工作。

PS/2

由 IBM 发展的一种键盘和鼠标连接的接口规范。PS/2 是一个仅有 6PIN 的 DIN 接口，也可以用以连接其他的设备，比如调制解调器。

USB

通用串行总线。一种适合低速外围设备的硬件接口，一般用来连接键盘、鼠标等。一台 PC 最多可以连接 127 个 USB 设备，提供一个 12Mbit/s 的传输带宽；USB 支持热插拔和多数据流功能即在系统工作时可以插入 USB 设备，系统可以自动识别并让插入的设备正常。

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