



RUBY-D722G2A

Industrial Board

User Manual

Version R1.0

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Revision History

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Chapter 1

Overview

1 Introduction

1. Introduction

The RUBY-D722G2A supports Intel® Core Ultra Processors (Series 2), LGA1851, utilizes the mATX form factor. It supports two DDR5 U-DIMMs up to 96GB capacity, one M.2 M key socket. Graphic with Xe LPG Graphic, support three independent displays via DisplayPort, HDMI. Additionally, it features two 1GbE ports, four USB3.2 ports and four USB 2.0 ports. Meanwhile, through i210AT RJ-45 port, OOB functions like Remote On/Off, SOL, BIOS recovery & OS recovery can be fulfilled.

The RUBY-D722G2A is versatile, compact, powerful, making it ideal for diverse applications Factory Automation, Medical & Gaming industries.

Chapter 2

- 2 Specifications
- 2.1 Supported Operating Systems
- 2.2 Mechanical Dimension
- 2.3 Power Consumption

2. Specifications

Main Processor	Intel® Core™ Ultra Processors (Series 2) in LGA1851 package
Chipset	Intel® H810E Chipset
System BIOS	AMI UEFI BIOS
Main Memory	2x non-ECC DDR5 5600MT/s U-DIMM up to 96GB
Graphics	Controller: Controller: Intel®Xe LPG Graphic DP: Supports one Display port HDMI: Supports two HDMI port
Expansion Interface	1 x PCIe 5.0 x16 slot 1 x PCIe 4.0 x8 slot (x4 mode, open slot) 1 x PCIe 4.0 x4 slot (x1 mode, open slot) 1 x M.2 Socket with M key, type 2242/2260/2280 (SATA III/PCIe 4.0 x1 mode)
SATA Interface	Four SATA III ports
Input/Output	COM Ports: Six Ports _ 2x RS-232/422/485 on rear I/O & 4x RS-232 on board header USB Port: 4(2 x USB 3.2 Gen2, 2 x USB 3.2 Gen1) and 4x USB2.0 ports on REAR I/O, 1 x Header Support Additional 2 x USB2.0 Connectors Audio Interface: Line-In / Line-Out / Mic-In
Ethernet	Intel i219LM Intel i210AT (i210AT supports OOB)
High Drive GPIO	One pin-header for GPIO(8bit GPIO)
Mechanical and environmental specifications	Operating temperature: 0 ~ 60° C Storage temperature: -20 ~ 80° C Humidity: 5 ~ 95% non-condensing Power supply voltage: ATX Board size: 244mm x 244 mm
Certification	CE/FCC

2.1 Supported Operating Systems

The RUBY-D722G2A supports the following operating systems.

- Windows® 10 IoT Enterprise LTSC
- Windows® 11 IoT Enterprise LTSC
- Ubuntu 24.04
- RedHat Enterprise

Power Consumption

<i>Item</i>	<i>Power ON</i>	<i>Full Loading 10mins</i>
CPU (+12V)	0.98A	8.76A
System (+12V)	0.60A	0.55A
System (+3.3V)	3.02A	2.93A
System (+5V)	2.37A	2.78A
Device (+12V)	2.01A	0.47A
Device (+5V)	0.70A	1.43A

2.4 Environmental Specifications

Storage Temperature: -20~80° C

Operation Temperature: 0~60° C

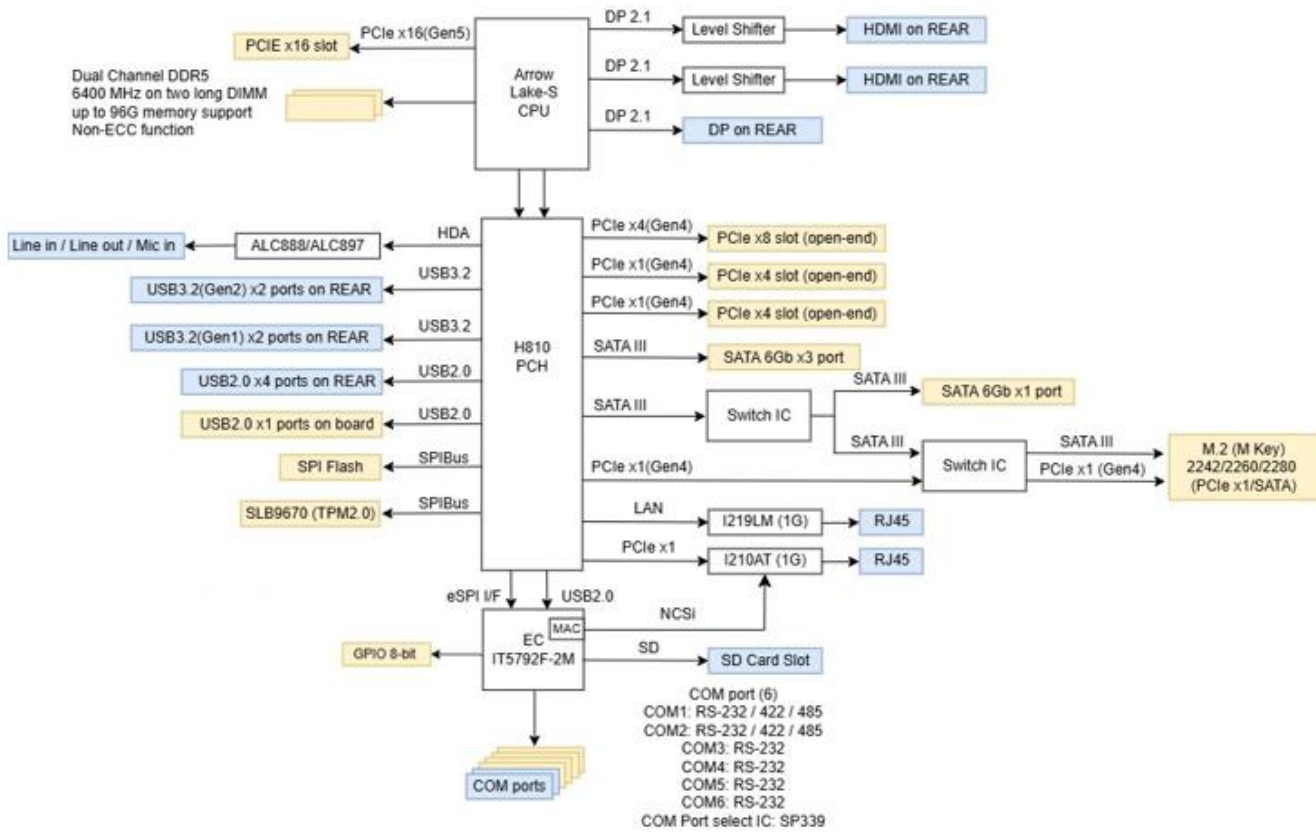
Storage Humidity: 5~95%, non-condensing

Operation Humidity: 5~95%, non-condensing

Chapter 3

3 Block Diagram

3. Block Diagram



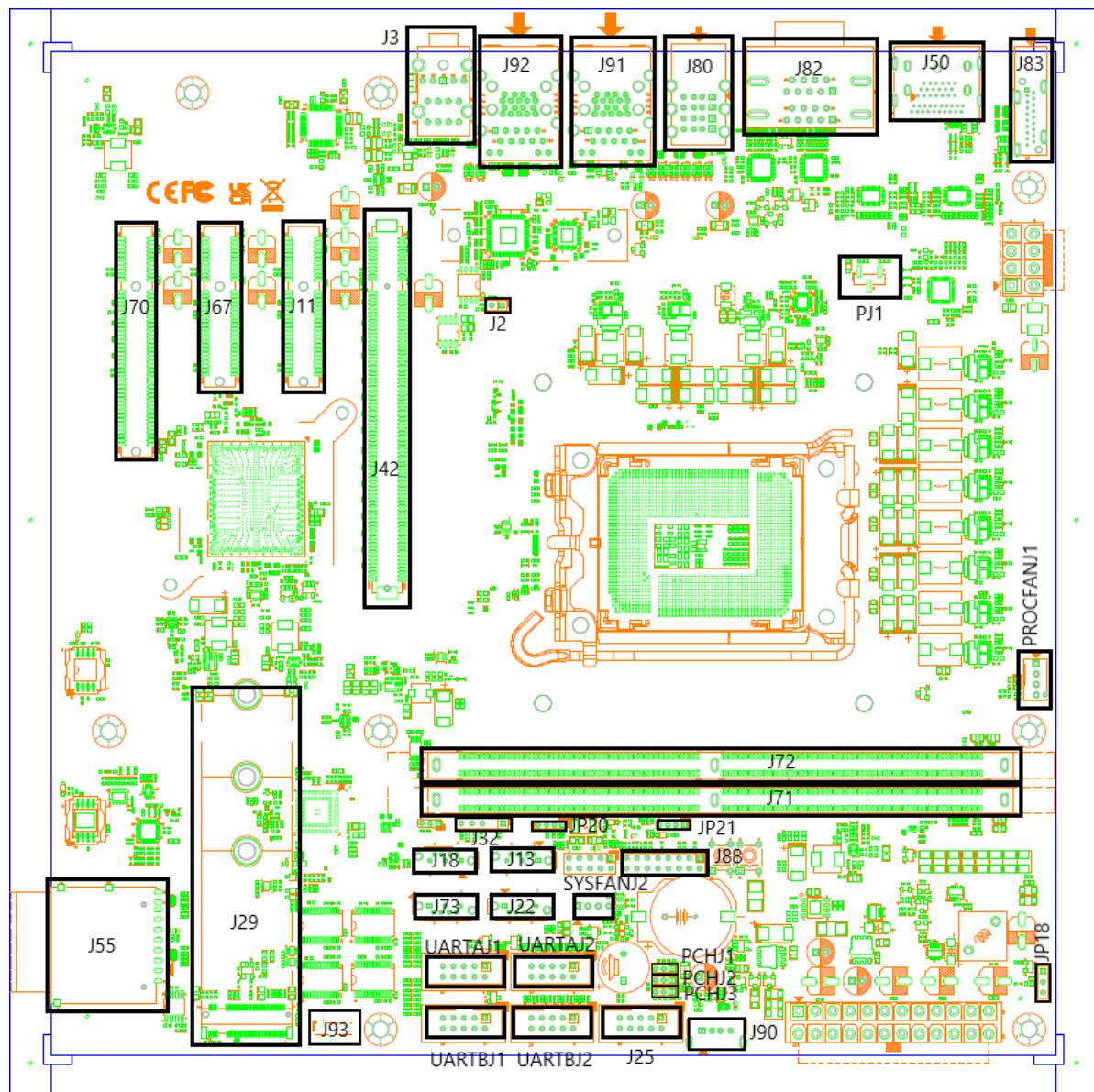
Chapter 4

- 4 Hardware Configuration
- 4.1 Jumpers and Connectors
- 4.2 Jumper Settings
- 4.3 Connector Settings

4. Hardware Configuration

4.1 Jumpers and Connectors

Figure 1, RUBY-D722G2A Top View



4.2 Jumper Settings

For users to customize RUBY-D722G2A's features. In the following sections, Short means covering a jumper cap over jumper pins; Open or N/C (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 for the Jumper allocations.

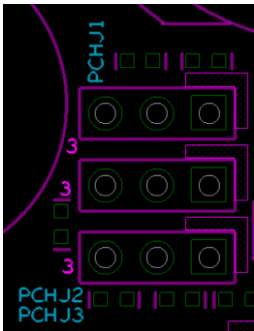
Jumper Table

The jumper settings are schematically depicted in this manual as follows:

Jump Function List:

Connector	Function	Remark
PCHJ1	CLR RTC	PH3Px1/2mm
PCHJ2	CLR SRTC	PH3Px1/2mm
PCHJ3	PCH Configuration Select	PH3Px1/2mm
JP18	ATX POWER	Header3Px1/2.54mm

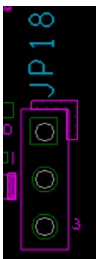
Jump Function List:



PCHJ1	Description	PIN No.
CLR RTC	CLR_RTCRST	1
	RTCST_N	2
	X	3
	CLR RTC	1-2
	NORMAL *	2-3

PCHJ2	Description	PIN No.
CLR SRTC	CLR_SRTCST	1
	SRTCST_N	2
	X	3
	CLR SRTC	1-2
	NORMAL *	2-3

PCHJ3	Description	PIN No.
PCH Configuration Select	PCH_CONFIG_JP	1
	PCH_CONFIG_PULL_UP	2
	PCH_RECOVERY	3
	NORMAL	1-2
	CONFIGURE	2-3
	RECOVERY	N/A



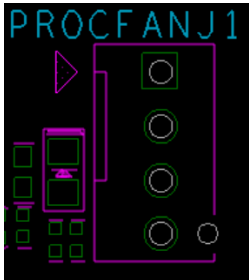
JP18	Description	PIN No.
ATX POWER	X	1
	PS_ON#	2
	GND	3
	ATX POWER ON (NORMAL)	1-2
	AT POWER ON	2-3

4.3 Connector Settings

Connector Function List:

Connector	Function	Remark
PROCFANJ1	CPU FAN	FAN_Header4Px1
SYSFANJ2	SYS FAN	FAN_Header4Px1
UARTAJ1	COM3	BH5Px2/2.54mm
UARTAJ2	COM5	BH5Px2/2.54mm
UARTBJ1	COM4	BH5Px2/2.54mm
UARTBJ2	COM6	BH5Px2/2.54mm
J82	COM1 COM2	D-SUB 9Mx2
J3	Triple_AudioJack	
J91	RJ45+USB3.2 x2(Gen1)	
J92	RJ45+USB3.2 x2(Gen2)	
J80	USB 2.0 x4	
J90	USB 2.0 x1	
J50	Display port + HDMI	
J83	HDMI	
J11	PCIe x4 Gen4	
J42	PCIe x16 Gen5	
J67	PCIe x4 Gen4	
J70	PCIe x8 Gen4	
J13	SATA 2	
J18	SATA 3	
J22	SATA 1	
J73	SATA 4	
J29	PCIe/SATA M.2	M.2 KEY-M
J55	SD Card	
J25	GPIO	BH5Px2/2.54mm
J71	DDR5 UDIMM CHA_DIMM0	UDIMM DDR5 288Pin
J72	DDR5 UDIMM CHB_DIMM0	UDIMM DDR5 288Pin
J32	SMBus Header	PH5Px1-Pin2/2.54mm
J88	Front Panel Pin Header	HEADER 8PX2

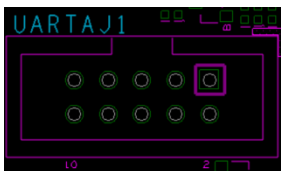
Connector Function List:



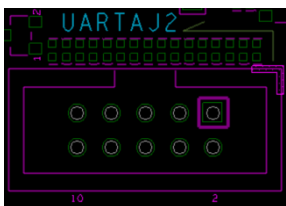
PROCFANJ1	Description	PIN No.
CPU FAN	GND	1
	+12VL	2
	KBC_CPU_FANIN_R	3
	BUFF_CPU_FANOUT_R	4



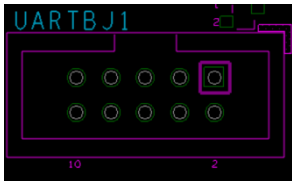
SYSFANJ2	Description	PIN No.
SYS FAN	GND	1
	+12VL	2
	KBC_SYS_FANIN_R	3
	BUFF_SYS_FANOUT_R	4



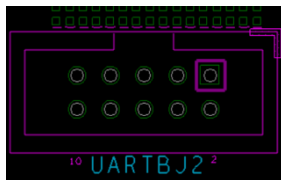
UARAJ1	Description	PIN No.	PIN No.	Description
COM3	DCD_N_3	1	2	RXD_N_3
	TXD_N_3	3	4	DTR_N_3
	GND	5	6	DSR_N_3
	RTS_N_3	7	8	CTS_N_3
	RI_N_3	9	10	X



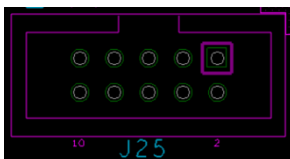
UARAJ2	Description	PIN No.	PIN No.	Description
COM5	DCD_N_5	1	2	RXD_N_5
	TXD_N_5	3	4	DTR_N_5
	GND	5	6	DSR_N_5
	RTS_N_5	7	8	CTS_N_5
	RI_N_5	9	10	X



UARTBJ1	Description	PIN No.	PIN No.	Description
COM4	DCD_N_4	1	2	RXD_N_4
	TXD_N_4	3	4	DTR_N_4
	GND	5	6	DSR_N_4
	RTS_N_4	7	8	CTS_N_4
	RI_N_4	9	10	X



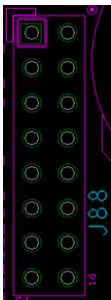
UARTBJ2	Description	PIN No.	PIN No.	Description
COM6	DCD_N_6	1	2	RXD_N_6
	TXD_N_6	3	4	DTR_N_6
	GND	5	6	DSR_N_6
	RTS_N_6	7	8	CTS_N_6
	RI_N_6	9	10	X



J25	Description	PIN No.	PIN No.	Description
GPIO	GPI0	1	2	GPO0
	GPI1	3	4	GPO1
	GPI2	5	6	GPO2
	GPI3	7	8	GPO3
	GND	9	10	+VCC5



J32	Description	PIN No.
SMBus Header	SMB_CLK_DUAL	1
	X	2
	GND	3
	SMB_DAT_DUAL	4
	+VCC3	5



J88	Description	PIN No.	PIN No.	Description
Front Panel Pin Header	+VCC5	1	2	+VCC5
	PS_ON#	3	4	X
	+V3P3A	5	6	X
	L2_LED_LINK#/ACT#	7	8	BUZZER
	I210_LED_LNK#_ACT	9	10	GND
	+V3P3A	11	12	POWERBTN#
	+VCC3	13	14	RESETBTN#
	HDD_LED_N	15	16	GND

Chapter 5

Overview

- 5 Sample Code
- 5.1 Watch Dog Signal
- 5.2 Signal GPIO Signal

5. Sample Code

5.1 Watch Dog Signal

WDT setting

SIO_INDEX_PORT is 0x2E SIO_DATA_PORT is 0x2F

1. Set WDT Time Unit

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x08);
```

```
Outportb(SIO_INDEX_PORT, 0xF0); //select WDT setting
```

```
val = Inportb(SIO_DATA_PORT) // Read current WDT setting
```

```
val = val | 0x08; // minute mode, val = val & 0xF7 if second mode Outportb(SIO_INDEX_PORT, 0xF0); //select WDT setting Outportb(SIO_DATA_PORT, val); // Write back WDT setting
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

2. Set WDT Time

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x08);
```

```
Outportb(SIO_INDEX_PORT, 0xF1); //select time value
```

```
Outportb(SIO_DATA_PORT, Time); // Write WDT time, value 1 to 255
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

3. Enable WDT

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); // select device Outportb(SIO_DATA_PORT, 0x08); // device 8 Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port val = Inportb(SIO_DATA_PORT) // Read current WDT status
```

```
val = val | 0x01; // Enable WDT Timer
```

```
Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port Outportb(SIO_DATA_PORT, val); // Write back WDT status
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

4. Disable WDT

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x08); Outportb(SIO_INDEX_PORT, 0xF1); //select time value Outportb(SIO_DATA_PORT, 0x00); // Clear WDT time, it means WDT Time-Out disable Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port
```

```
val = Inportb(SIO_DATA_PORT) // Read current WDT status val = val & 0xFE; // Disable WDT Timer Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port Outportb(SIO_DATA_PORT, val); // Write back WDT status
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

5. RUBY-D813-H610E SIO not support WDT Reset Flag judgement.

5.2 GPIO Signal

GPIO Setting

SIO_INDEX_PORT is 0x2E SIO_DATA_PORT is 0x2F

```
Set GPIOn to GPI or GPO Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x07);
```

```
Outportb(SIO_INDEX_PORT, 0x30); val = Inportb(SIO_DATA_PORT)
val = val | 0x10; Outportb(SIO_INDEX_PORT, 0x30);
Outportb(SIO_DATA_PORT, val); // Active GPIO
```

```
Outportb(SIO_INDEX_PORT, 0xF0);
val = Inportb(SIO_DATA_PORT) // Read current value
val = val | (0x01 << GPIOn); // GPO, val = val & ~(0x01 << GPIOn); if GPI, GPIOn is value 0 to 7
```

```
Outportb(SIO_INDEX_PORT, 0xF0); Outportb(SIO_DATA_PORT, val);
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

```
Get GPIOn GPI value Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x07);
```

```
Outportb(SIO_INDEX_PORT, 0x30); val = Inportb(SIO_DATA_PORT)
val = val | 0x10; Outportb(SIO_INDEX_PORT, 0x30);
Outportb(SIO_DATA_PORT, val); // Active GPIO
```

```
Outportb(SIO_INDEX_PORT, 0xF1);
val = Inportb(SIO_DATA_PORT) // Read current value Outportb(SIO_INDEX_PORT, 0xAA); //
Lock SIO
```

```
if (val & (0x01 << GPIO_n)) // Determine if GPIO_n is High or Low; GPIO_n is value 0 to 7
```

```
else
```

```
return HIGH; //GPI High return LOW; //GPI Low
```

```
Set GPIO_n GPO value Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); Outportb(SIO_DATA_PORT, 0x07);
```

```
Outportb(SIO_INDEX_PORT, 0x30); val = Inportb(SIO_DATA_PORT)
```

```
val = val | 0x10; Outportb(SIO_INDEX_PORT, 0x30);
```

```
Outportb(SIO_DATA_PORT, val); // Active GPIO
```

```
Outportb(SIO_INDEX_PORT, 0xF1);
```

```
val = Inportb(SIO_DATA_PORT) // Read current value
```

```
val = val | (0x01 << GPIO_n); // GPO LOW, val = val & ~(0x01 << GPIO_n); if GPO High, GPIO_n is  
value 0 to 7 Outportb(SIO_INDEX_PORT, 0xF1);
```

```
Outportb(SIO_DATA_PORT, val); Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

Chapter 6

- 6 BIOS Setup Items
 - 6.1 Entering Setup -- Launch System Setup
 - 6.2 Main
 - 6.3 Configuration
 - 6.4 Security
 - 6.5 Boot
 - 6.6 Save & Exit

6. BIOS Setup Items

RUBY-D722G2A is equipped with the AMI BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in SPI Flash so that it is retained during power-off periods. When the system is turned on, RUBY-D722G2A communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the startup.

6.1 Entering Setup -- Launch System Setup

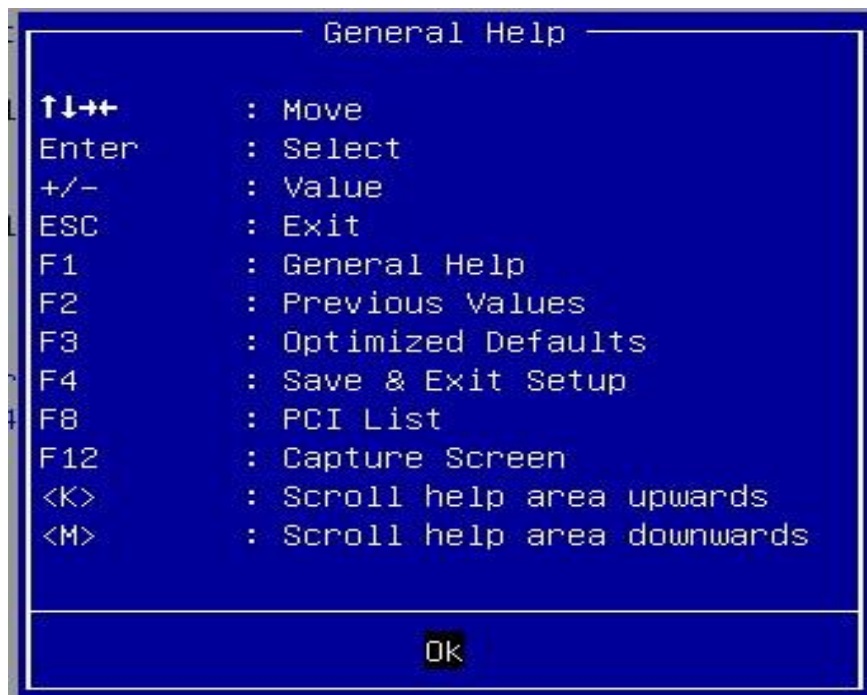
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press key will enter BIOS setup screen.

Press to enter SETUP

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

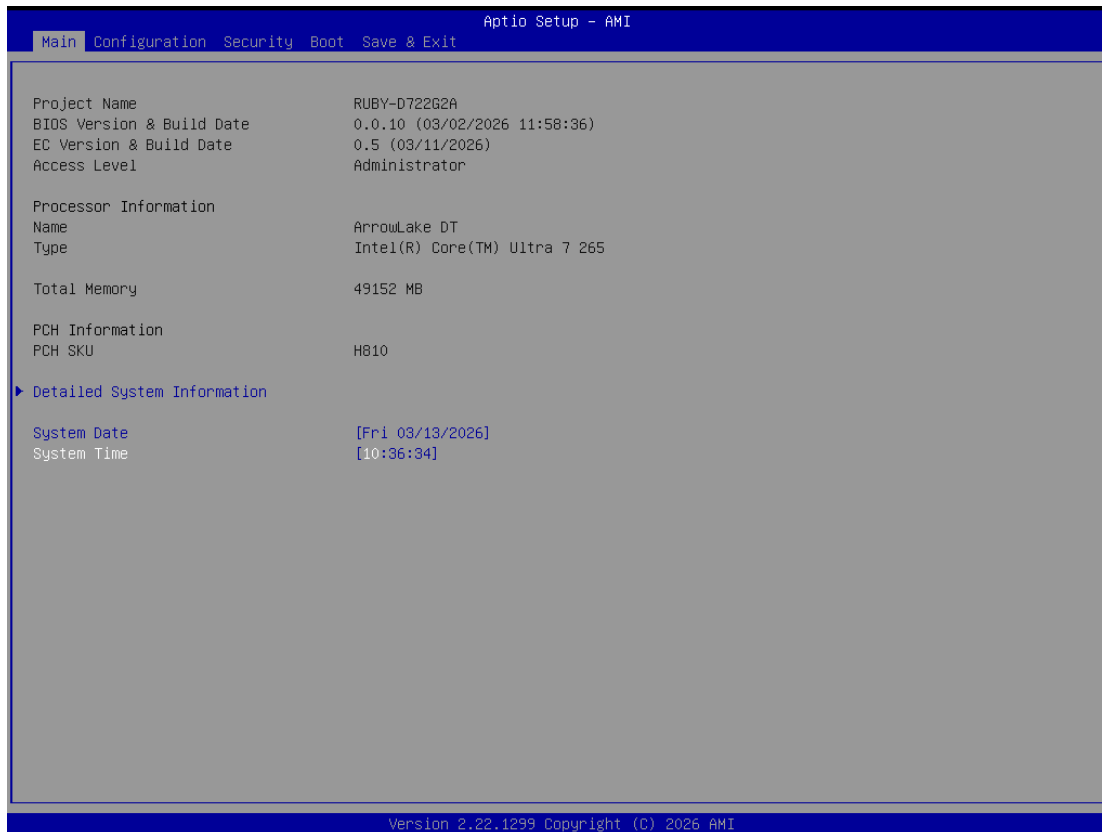
Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.



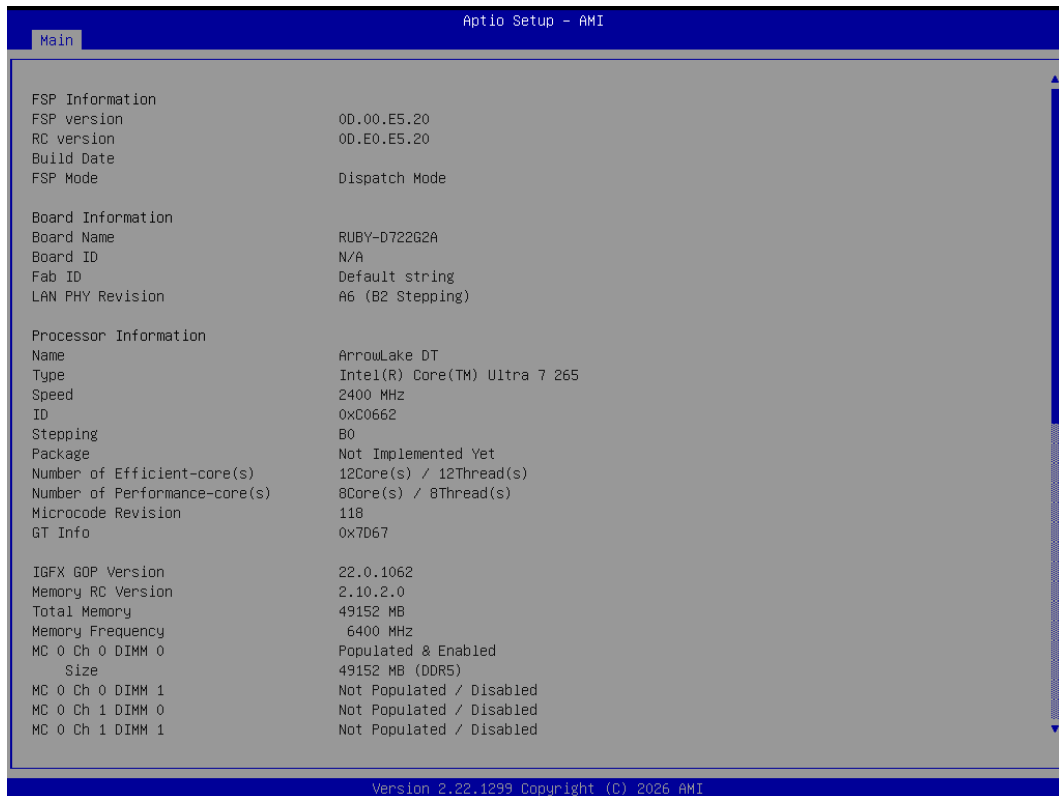
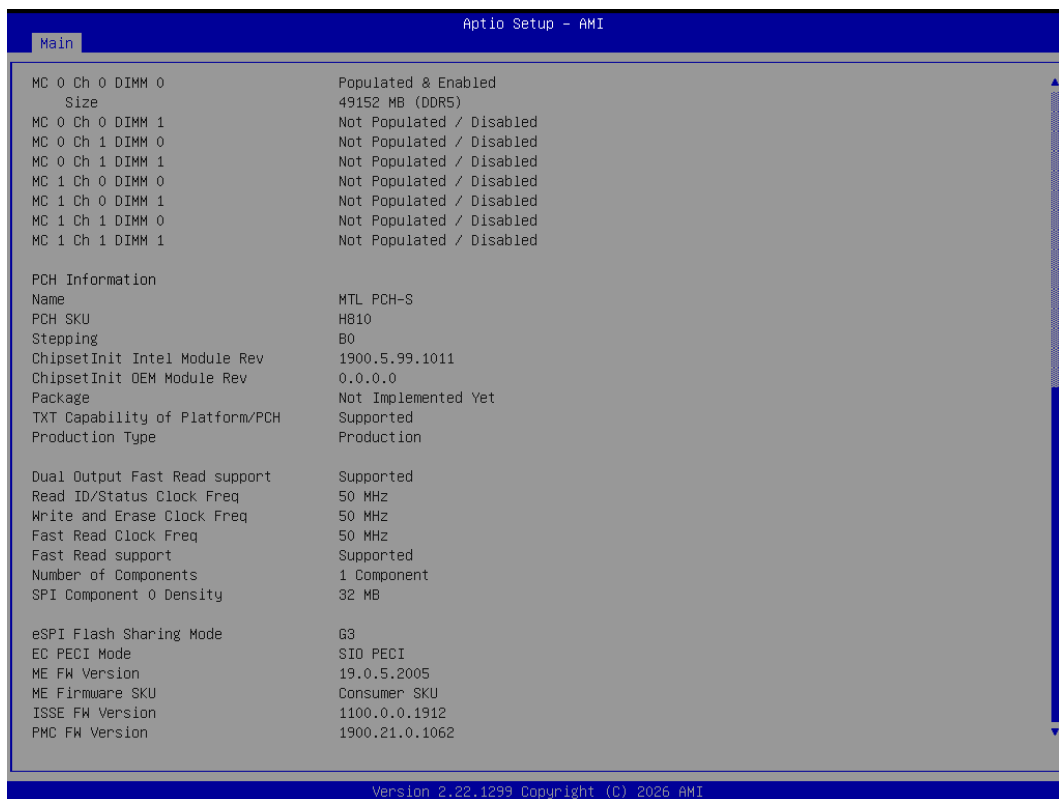
6.2 Main

Use this menu for basic system configurations, such as time, date etc.



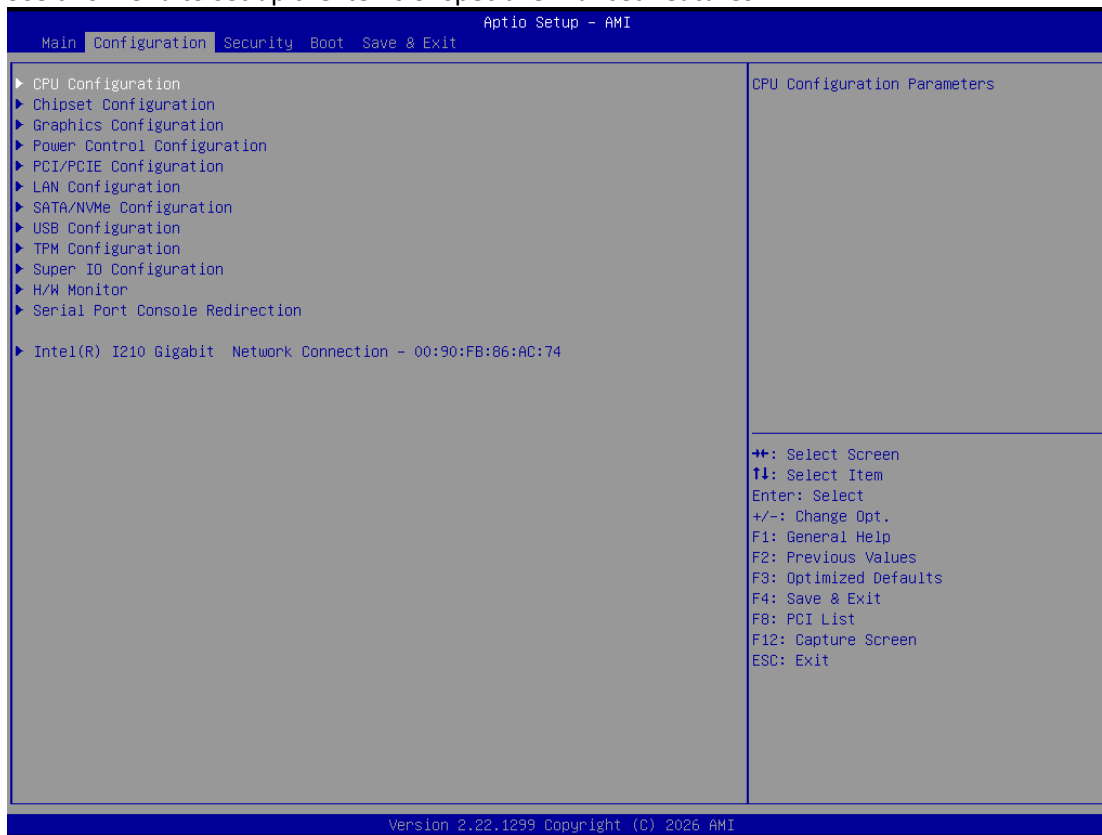
Feature	Description	Options
System Date	The date format is <Day>, <Month> <Date> <Year>. Use [+] or [-] to configure system Date.	
System Time	The time format is <Hour> <Minute> <Second>. Use [+] or [-] to configure system Time.	

Detailed System Information



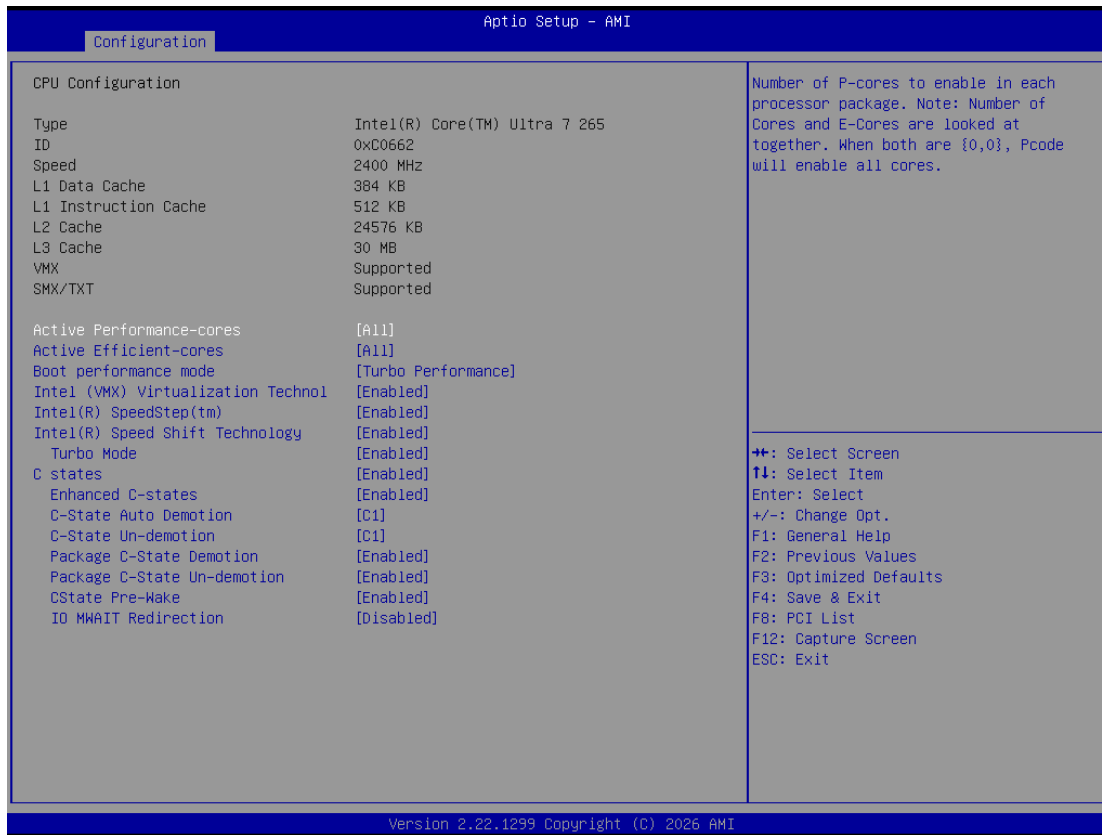
6.3 Configuration

Use this menu to set up the items of special enhanced features



6.3.1 CPU Configuration

CPU Configuration Parameters



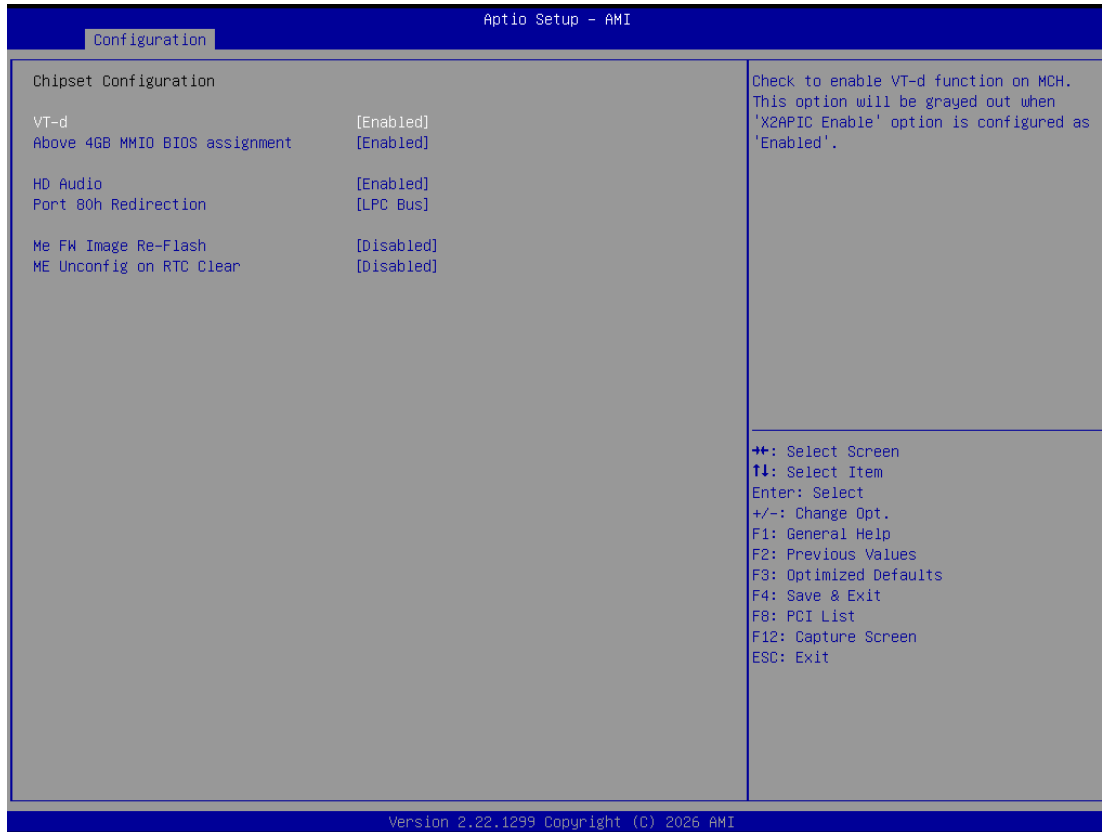
Feature	Description	Options
Active Performance-Cores	Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together, When both are {0,0}, Pcode will enable all cores.	★All, 7, 6, 5, 4, 3, 2, 1
Active Efficient-Cores	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together, When both are {0,0}, Pcode will enable all cores.	★All, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector.	★ Turbo Performance, Max Non-Turbo Performance, Max Battery
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.	Disabled, ★Enabled
Intel ® Speed Step™	Allows more than two frequency ranges to be supported.	Disabled, ★Enabled

Feature	Description	Options
Intel ® Speed Shift Technology	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states	Disabled, ★Enabled
Turbo Mode	Enable/Disable processor Turbo Mode.	Disabled, ★Enabled
C states	Enable/disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized	Disabled, ★Enabled

Enhanced C-states	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-state	Disabled, ★Enabled
C-State Auto Demotion	Configure C-State Auto Demotion	Disabled, ★C1
C-State Un-demotion	Configure C-State Un-demotion	Disabled, ★C1
Package C State Demotion	Package C-State Demotion	Disabled, ★Enabled
Package C State Un-demotion	Package C-State Un-demotion	Disabled, ★Enabled
CState Pre-Wake	Disable – Sets bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the Cstate Pre-Wake	Disabled, ★Enabled
IO MWAIT Redirection	When set, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+offset to MWAIT(offset)	★Disabled, Enabled

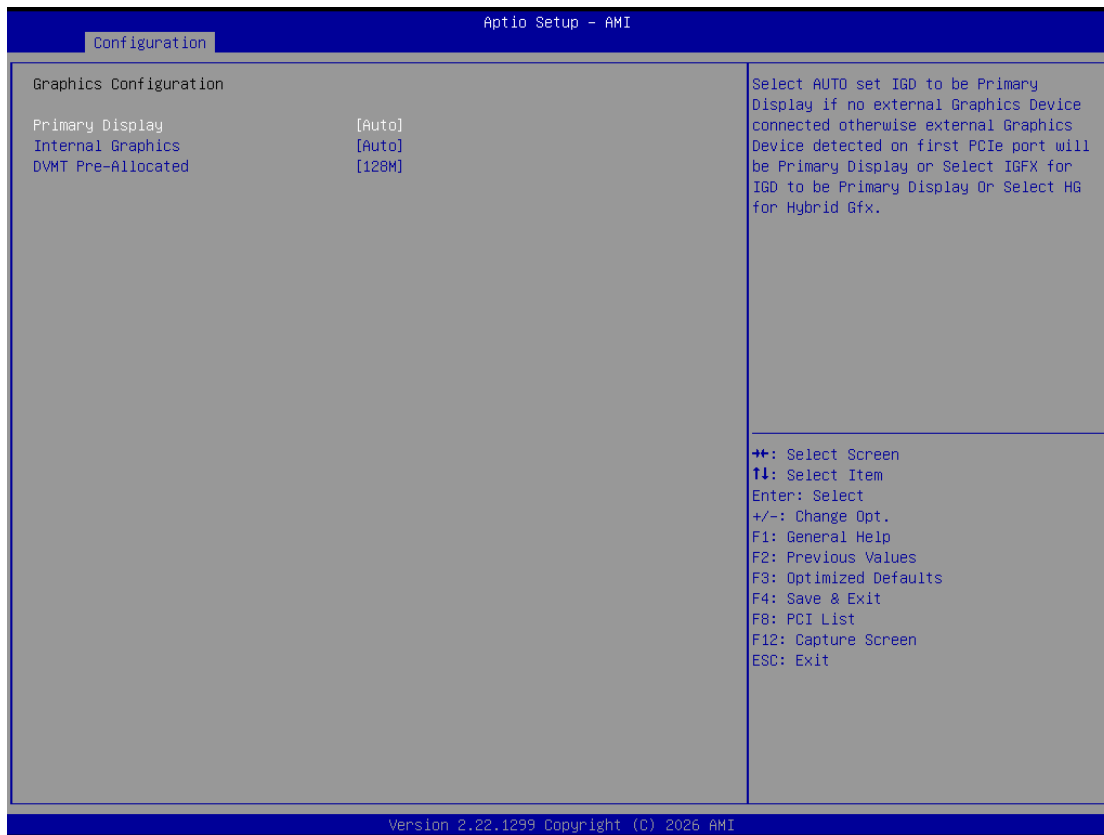
6.3.2 Chipset Configuration

Use this menu for basic system configurations, such as time, date etc.



Feature	Description	Options
VT-d	Check to enabled VT-d function on MCH. This option will be grayed out when 'X2APIC Enable' option is configured as 'Enabled' Capability.	Disabled, ★Enabled
Above 4GB MMIO BIOS assignment	Enable/Disable above 4GB Memory Mapped IO BIOS assignment, This is enabled automatically when Aperture Size is set to 2048MB.	Disabled, ★Enabled
HD Audio	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.	Disabled, ★Enabled
Port 80h Redirection	Control when the Port 80h cycles are sent.	★LPC Bus, PCIE Bus
Me FW Image Re-Flash	Enable/Disable Me FW Image Re-Flash function.	★Disabled, Enabled
ME Unconfig on RTC Clear	When Disabled ME will not be unconfigured on RTC Clear.	★Disabled, Enabled

6.3.3 Graphics Configuration



Feature	Description	Options
Primary Display	Select AUTO set IGD to be Primary Display if no external Graphics Device connected otherwise external Graphics Device detected on first PCIe port will be Primary Display Or Select HG for Hybrid Gfx.	★Auto, IGFX, HG
Internal Graphics	Keep IGFX enable based on the setup options.	★Auto, Disabled, Enabled
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.	32M, 64M, 96M, ★128M, 12M, 16M, 20M, 24M, 28M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M, 60M

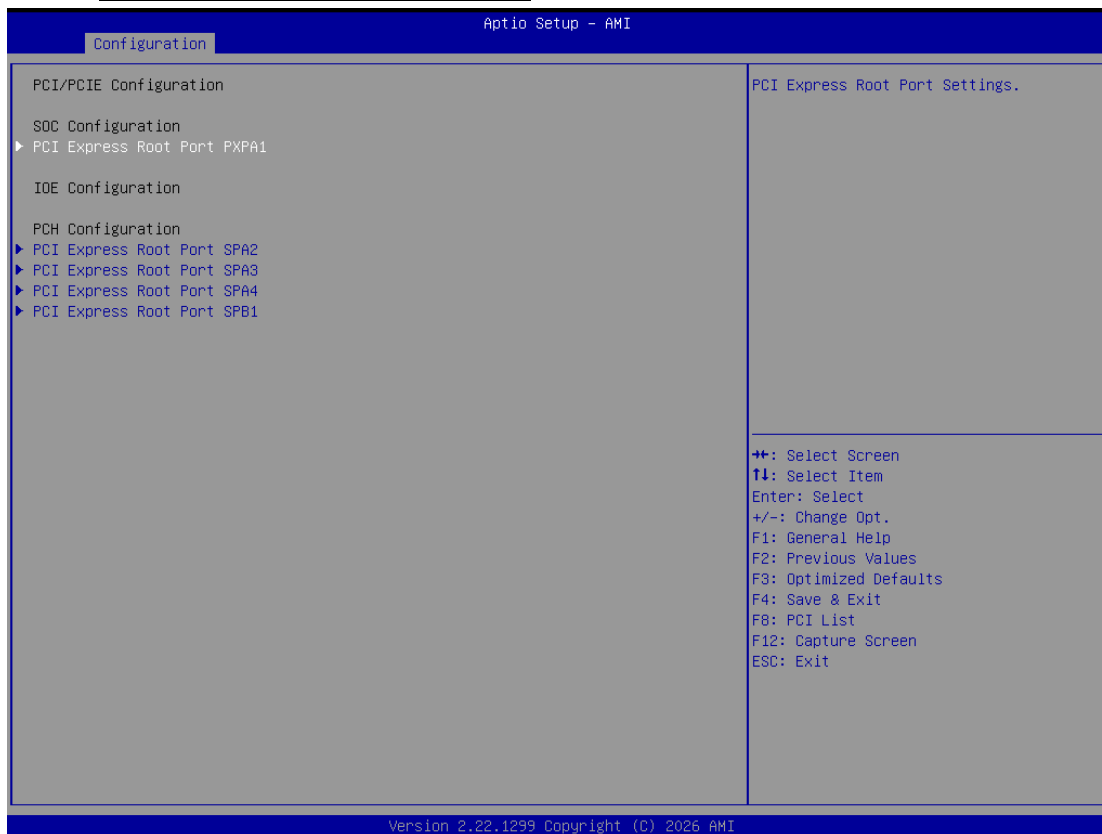
6.3.4 Power Control Configuration

Configuration		Aptio Setup - AMI
Power Control Configuration		Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
Enable Hibernation	[Enabled]	
ACPI Sleep State	[S3 (Suspend to RAM)]	
Restore AC Power Loss	[Power Off]	
		++: Select Screen F1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit

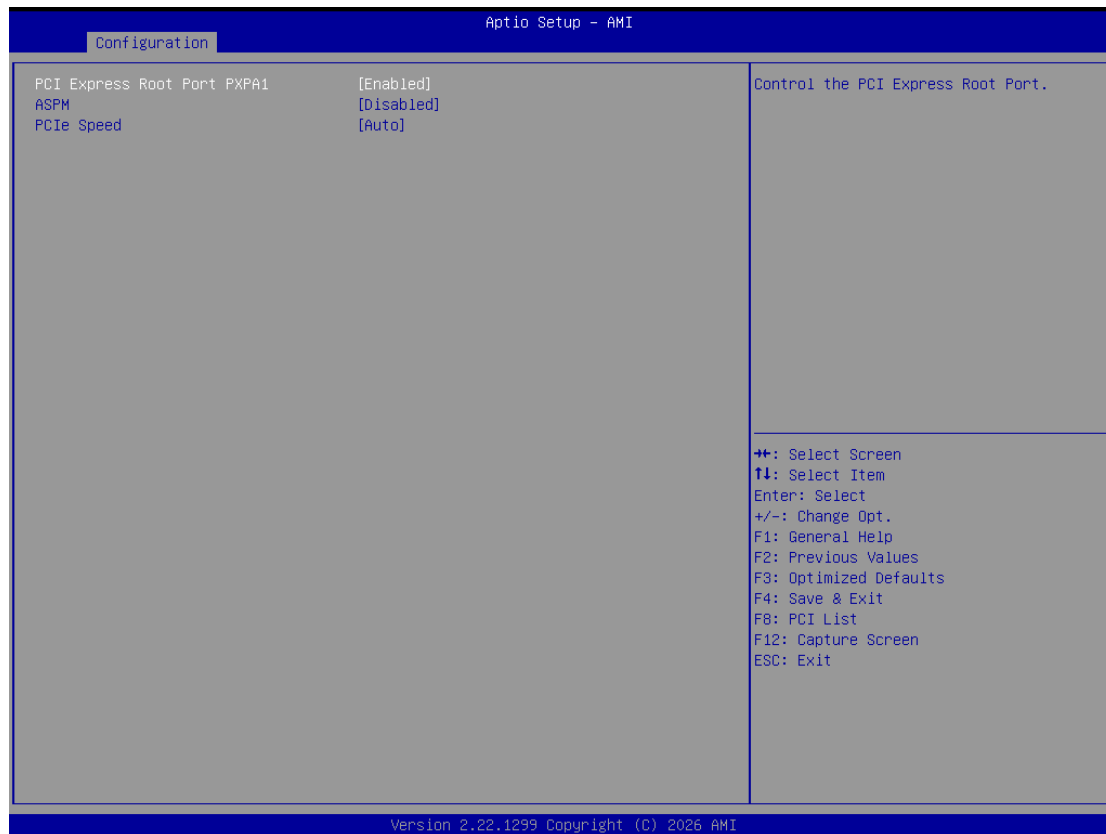
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Feature	Description	Options
Enable Hibernation	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.	Disabled, ★ Enabled
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	★S3 (Suspend to RAM), Suspend Disabled
Restore AC Power Loss	Specify what state to go to when power is re-applied after a power failure (G3 state)	★Power Off, Power On, Last State

6.3.5 PCI/PCIE Configuration

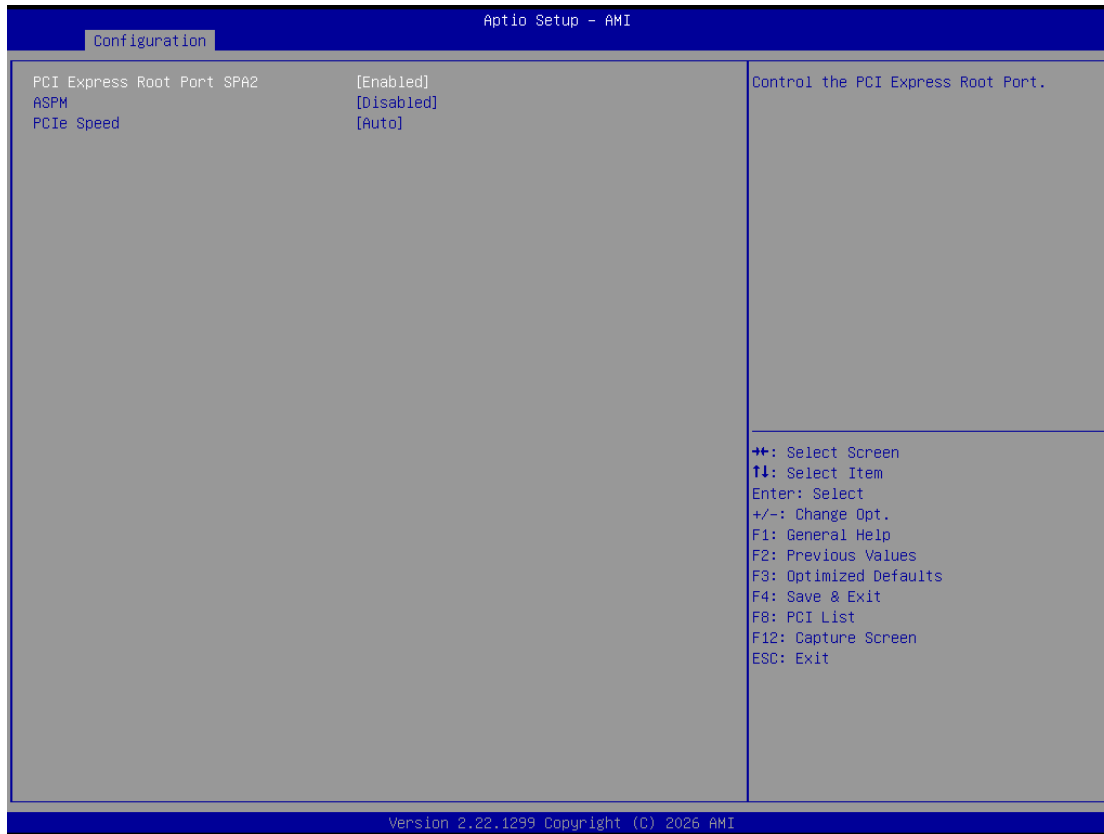


PCI Express Root Port PXPA1



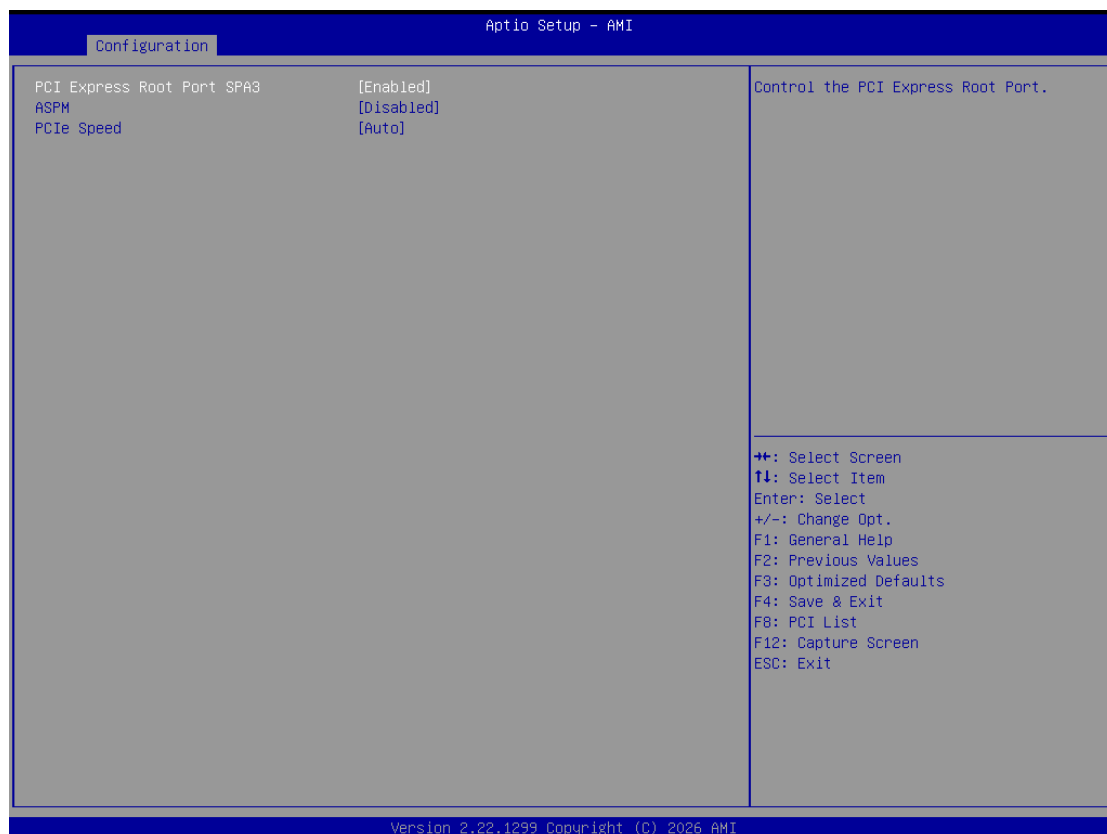
Feature	Description	Options
PCI Express Root Port PXPA1	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4, Gen5

PCI Express Root Port SPA2



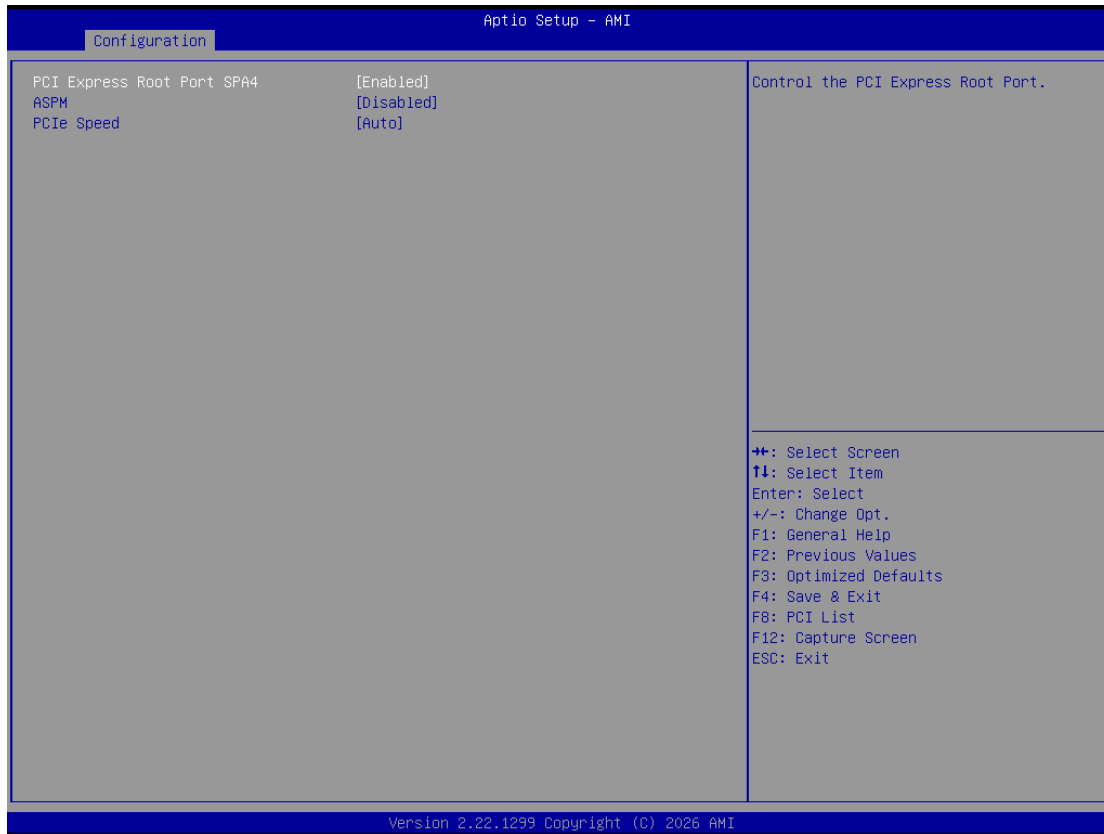
Feature	Description	Options
PCI Express Root Port SPA2	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4

PCI Express Root Port SPA3



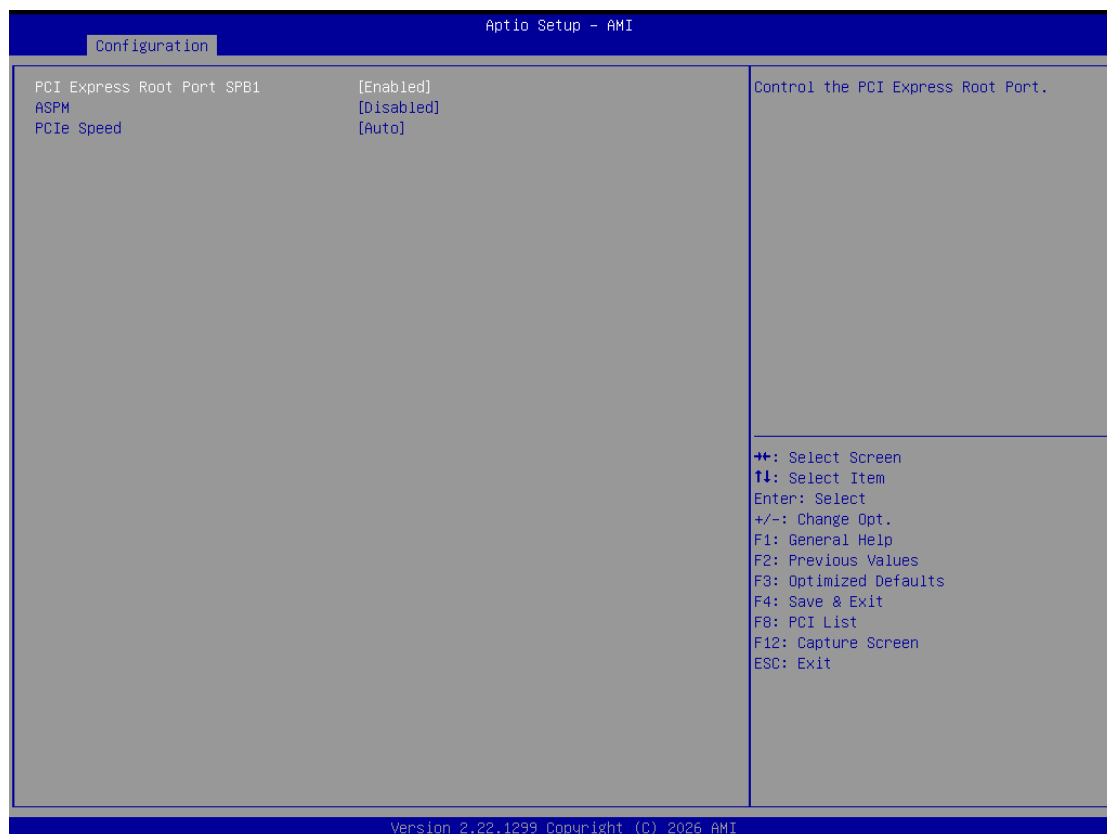
Feature	Description	Options
PCI Express Root Port SPA3	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4

PCI Express Root Port SPA4



Feature	Description	Options
PCI Express Root Port SPA4	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4

PCI Express Root Port SPB1



Feature	Description	Options
PCI Express Root Port SPB1	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4

6.3.6 LAN Configuration

Configuration
Aptio Setup - AMI

LAN Configuration

Intel Ethernet Controller I219LM
LAN MAC Address 88-88-88-88-87-88
PCH LAN Controller #1 [Enabled]
Wake on LAN Enable [Enabled]

Intel Ethernet Controller WGI210AT
LAN MAC Address 00-90-FB-86-AC-74
PCH LAN Controller #2 [Enabled]

PCIE_WAKE(Wake On Lan) [Enabled]
Launch UEFI PXE ROM [Disabled]

Enable/Disable onboard NIC.

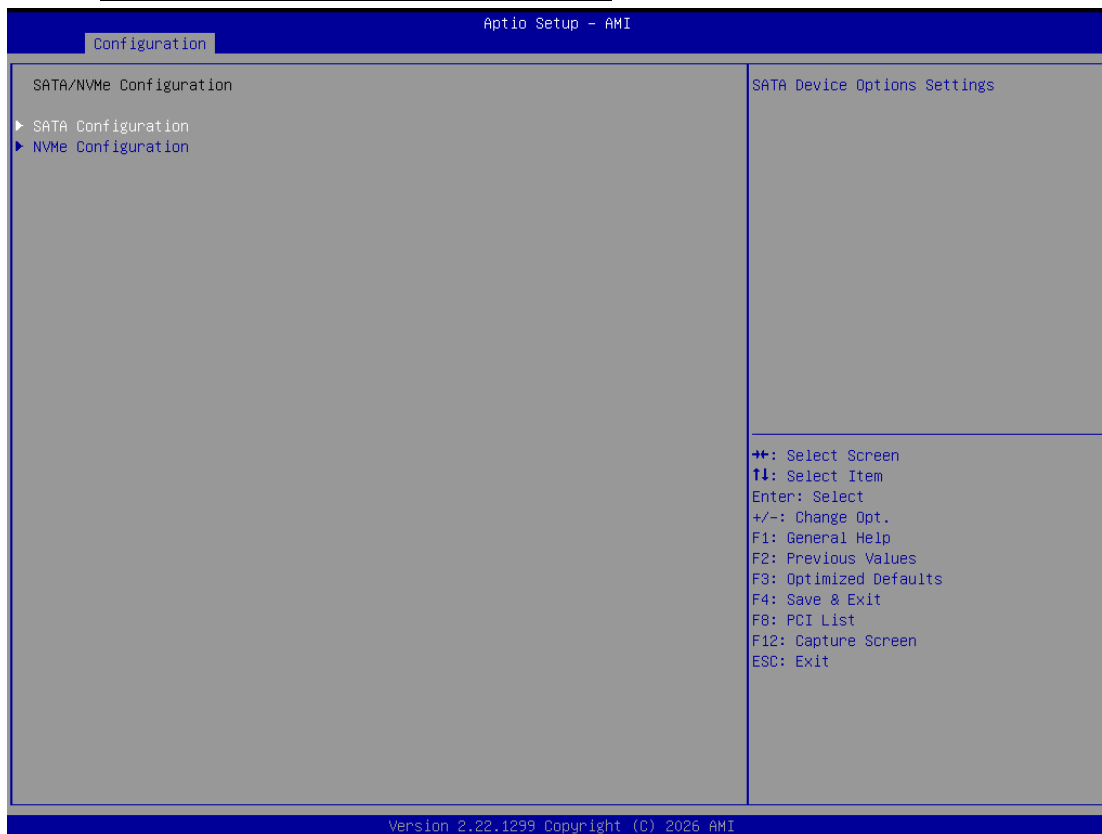
++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit

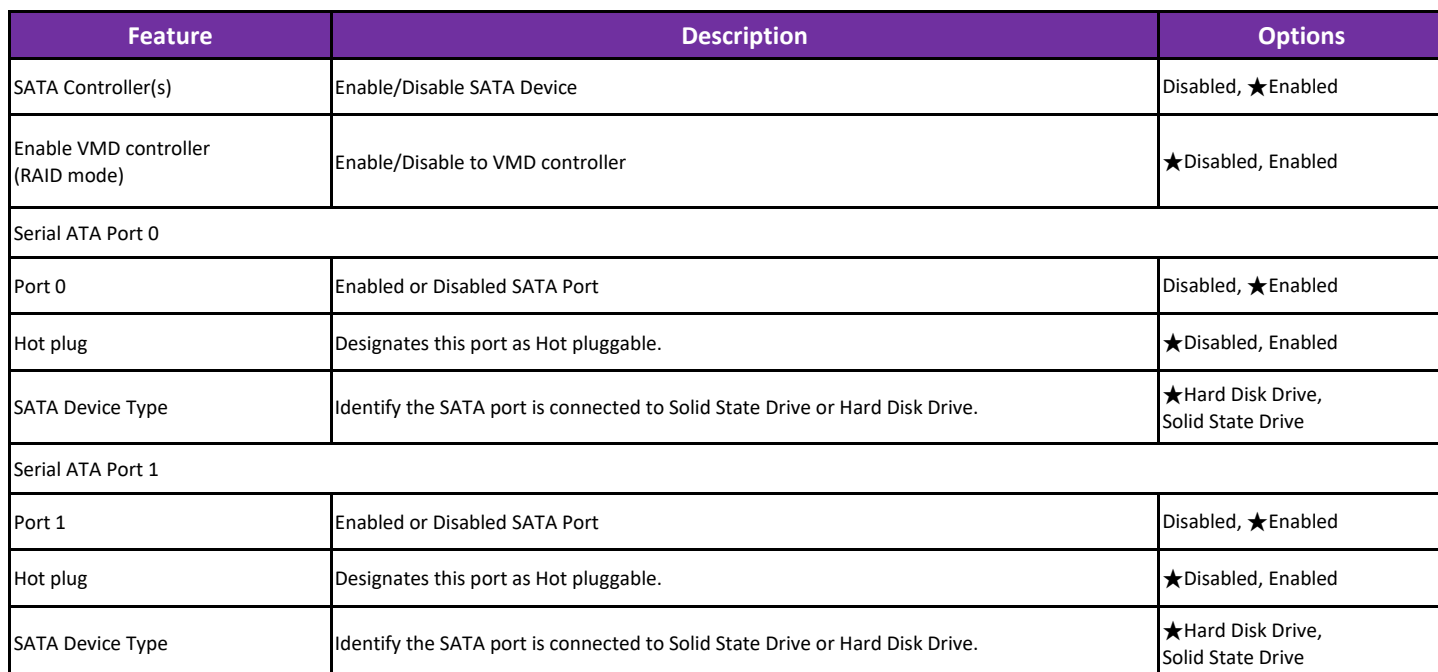
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Feature	Description	Options
PCH LAN Controller #1	Enable or Disable onboard NIC.	Disabled, ★Enabled
Wake On LAN Enable	Enable/Disable integrated LAN to wake the system.	Disabled, ★Enabled
PCH LAN Controller #2	Control on Board LAN Enable or Disable	Disabled, ★Enabled
PCIE_WAKE (Wake On Lan)	Control the PCIE Wake# pin for Wake On Lan function.	Disabled, ★Enabled
Launch UEFI PXE ROM	Enable/Disable UEFI Network Stack	★Disabled, Enabled

Feature	Description	Options
Launch UEFI PXE ROM (Enabled)		
IPv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.	Disabled, ★Enabled
IPv4 HTTP Support	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.	Disabled, ★Enabled
IPv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.	Disabled, ★Enabled
IPv6 HTTP Support	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.	Disabled, ★Enabled
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.	★0
Media detect count	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.	★1

6.3.7 SATA / NVMe Configuration

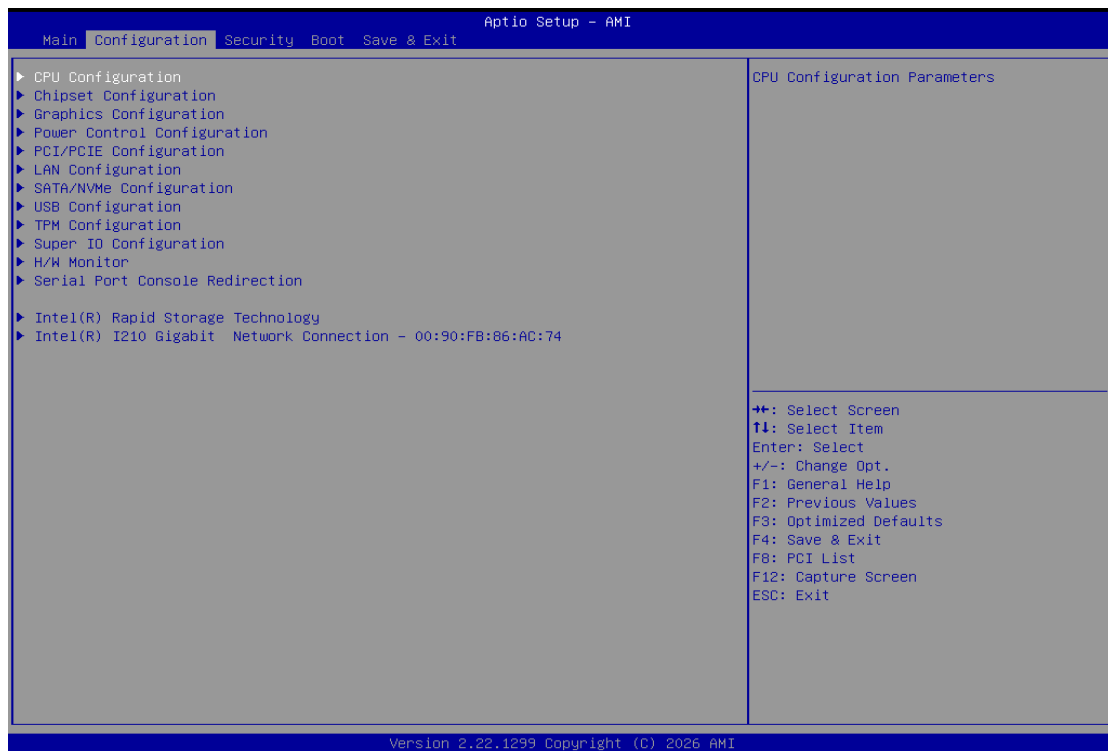
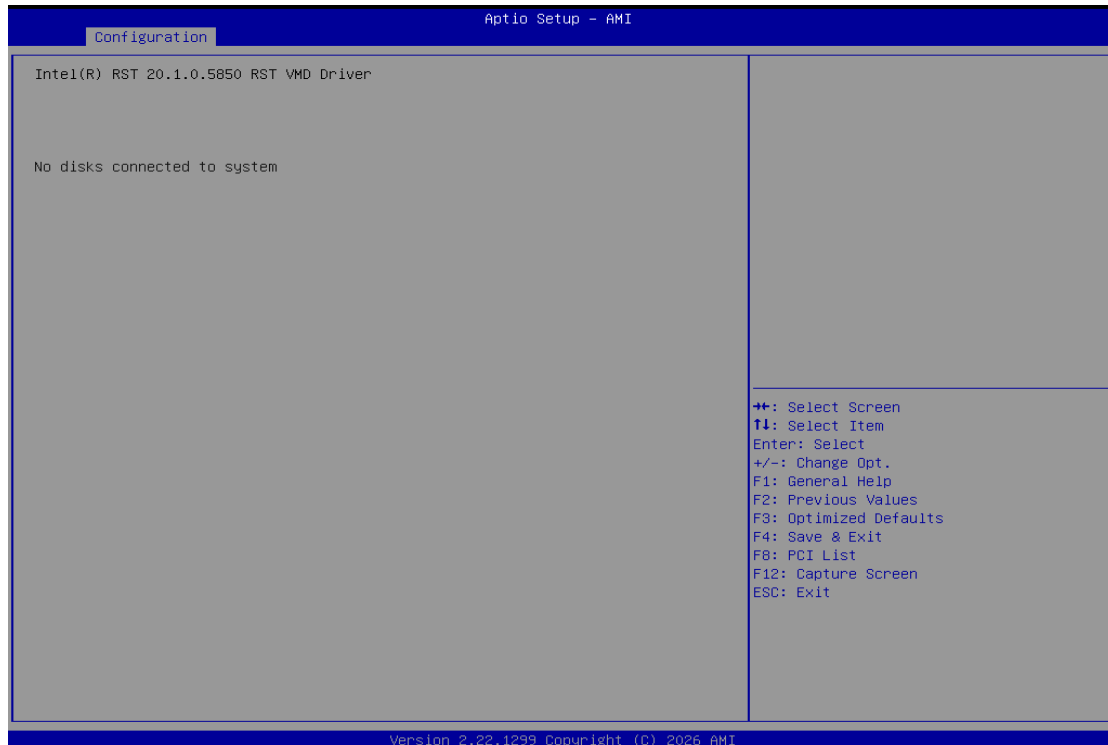




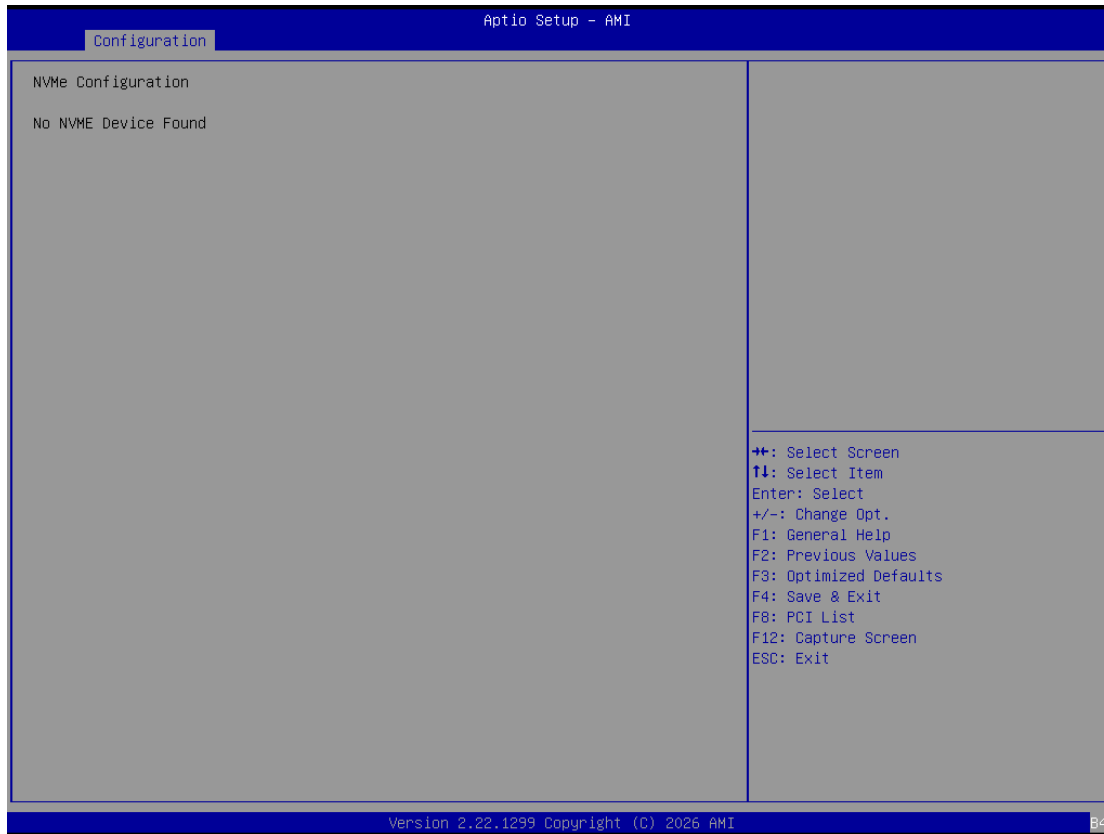
Feature	Description	Options
Serial ATA Port 2		
Port 2	Enabled or Disabled SATA Port	Disabled, ★ Enabled

Hot plug	Designates this port as Hot pluggable.	★ Disabled, Enabled
SATA Device Type	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.	★ Hard Disk Drive, Solid State Drive
Serial ATA Port 3		
Port 3	Enabled or Disabled SATA Port	Disabled, ★ Enabled
Hot plug	Designates this port as Hot pluggable.	★ Disabled, Enabled
SATA Device Type	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.	★ Hard Disk Drive, Solid State Drive

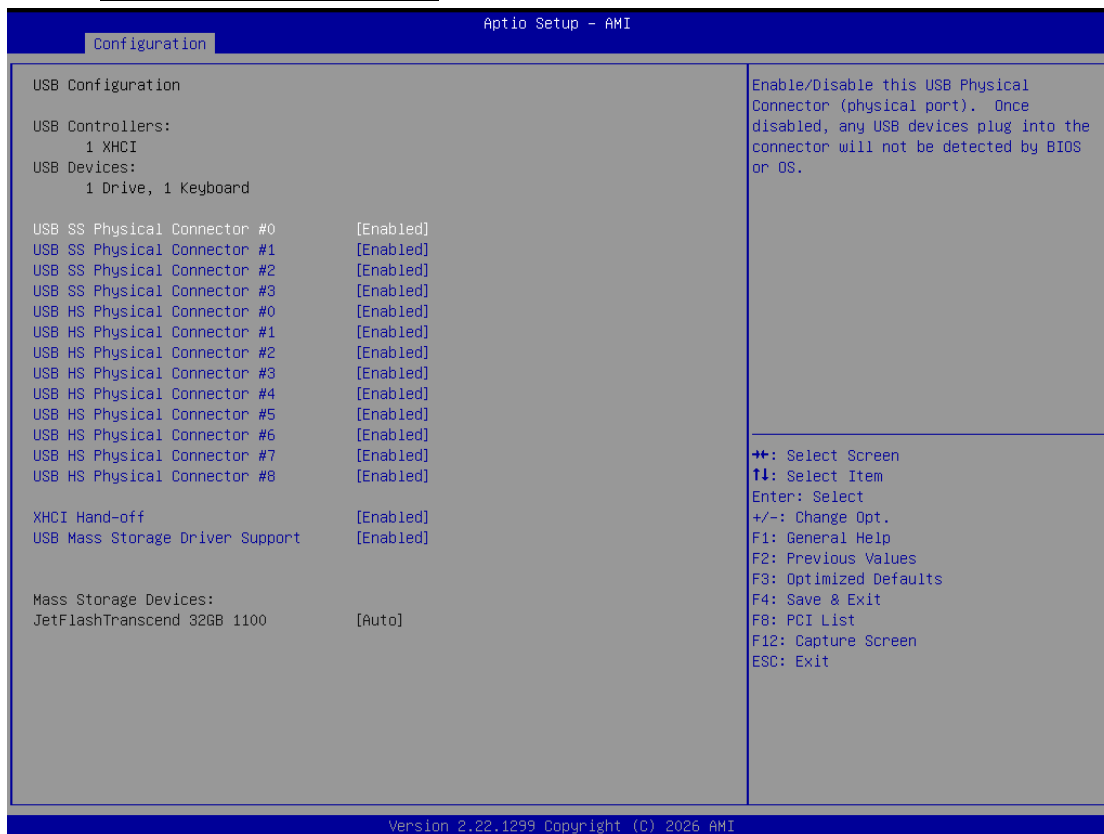
Feature	Description	Options
Enable VMD controller (RAID mode) – [Enabled]		



NVMe Configuration



6.3.8 USB Configuration



Feature	Description	Options
USB SS Physical Connector #0 ~ #3	Enabled/Disabled this USB Physical connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
USB HS Physical Connector #0 ~ #8	Enabled/Disabled this USB Physical connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
XHCI Hand-off	This is a workaround for OSES without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver	Disabled, ★Enabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support	Disabled, ★Enabled
Mass storage Devices: [Auto detect]		
JetFlash Transcend 32GB 1100		★Auto

6.3.9 TPM Configuration

Configuration Aptio Setup - AMI

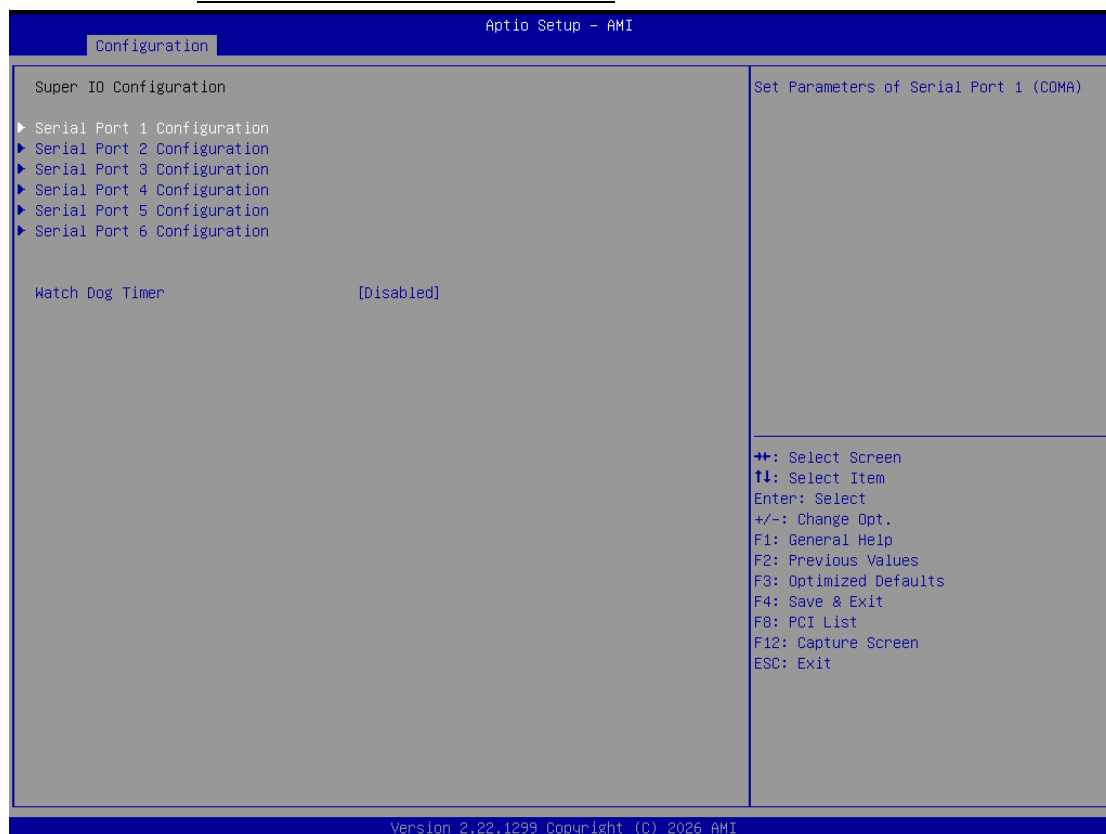
<pre> TPM 2.0 Device Found Firmware Version: 13.11 Vendor: IFX Security Device Support [Enabled] Active PCR banks SHA256 Available PCR banks SHA256 SHA256 PCR Bank [Enabled] Pending operation [None] Platform Hierarchy [Enabled] Storage Hierarchy [Enabled] Endorsement Hierarchy [Enabled] TPM 2.0 UEFI Spec Version [TCG_2] Physical Presence Spec Version [1.3] TPM 2.0 InterfaceType [TIS] Device Select [Auto] </pre>	<p>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.</p> <hr/> <pre> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit </pre>
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Feature	Description	Options
Security Device Support	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.	Disabled, ★Enabled
SHA256 PCR Bank	Enables or Disables SHA256 PCR Bank.	Disabled, ★Enabled
Pending operation	Schedule an Operation for the Security Device. Note: Your Computer will reboot during restart in order to change State of Security Device.	★None, TPM Clear
Platform Hierarchy	Enables or Disables Platform Hierarchy.	Disabled, ★Enabled
Storage Hierarchy	Enables or Disables Storage Hierarchy.	Disabled, ★Enabled
Endorsement Hierarchy	Enables or Disables Endorsement Hierarchy.	Disabled, ★Enabled

Feature	Description	Options
TPM2.0 UEFI Spec Version	Select the TCG2 Spec Version Support. CG_1_2: the Compatible mode for Win8/Win10. TCG_2: Support new TCG2 protocol and event format for Win10 or later.	TCG_1_2, ★TCG_2
Physical Presence Spec Version	Select to Tell O.S. to Support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.	1.2, ★1.3
Device Select	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.	★Auto, TPM 1.2, TPM 2.0

6.3.10 Super IO Configuration



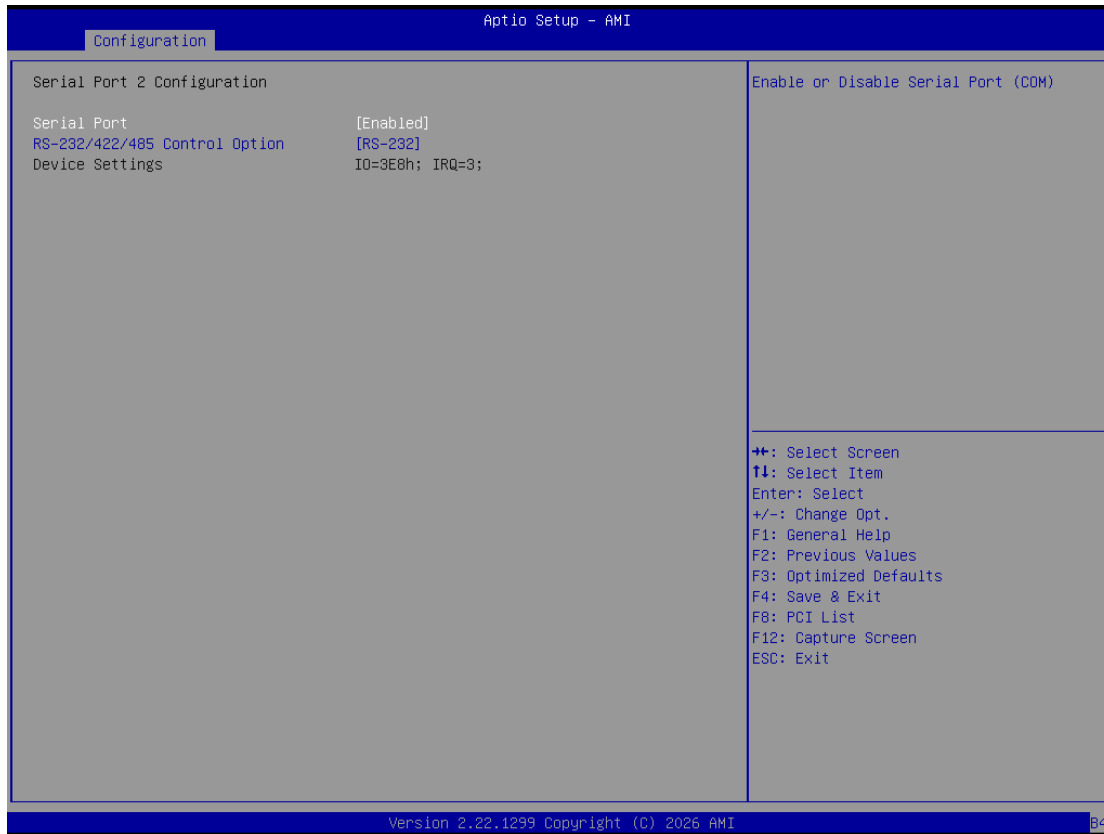
Feature	Description	Options
Serial Port 1 Configuration		
Serial Port 2 Configuration		
Serial Port 3 Configuration		
Serial Port 4 Configuration		
Serial Port 5 Configuration		
Serial Port 6 Configuration		
Watch Dog Timer	Enable/Disable Watch Dog Timer	★ Disabled, Enabled
Watch Dog Timer [Enabled]		
Timer Unit	Select Timer count unit of WDT	★ Second, Minute
Timer value	Set WDT Timer value seconds / minutes	★ 20

Serial Port 1 Configuration

Configuration		Aptio Setup - AMI	
Serial Port 1 Configuration		Enable or Disable Serial Port (COM)	
Serial Port	[Enabled]		
RS-232/422/485 Control Option	[RS-232]		
Device Settings	ID=3F8h; IRQ=4;		
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit	
Version 2.22.1299 Copyright (C) 2025 AMI			

Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
RS-232/422/485 Control Option	Serial Port 1 RS-232/422/485 Control Option	★RS-232, RS-485 HALF DUPLEX, RS-422 FULL DUPLEX

Serial Port 2 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
RS-232/422/485 Control Option	Serial Port 2 RS-232/422/485 Control Option	★RS-232, RS-485 HALF DUPLEX, RS-422 FULL DUPLEX

Serial Port 3 Configuration

Configuration		Aptio Setup - AMI
Serial Port 3 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	ID=2F8h; IRQ=6;	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit

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Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled

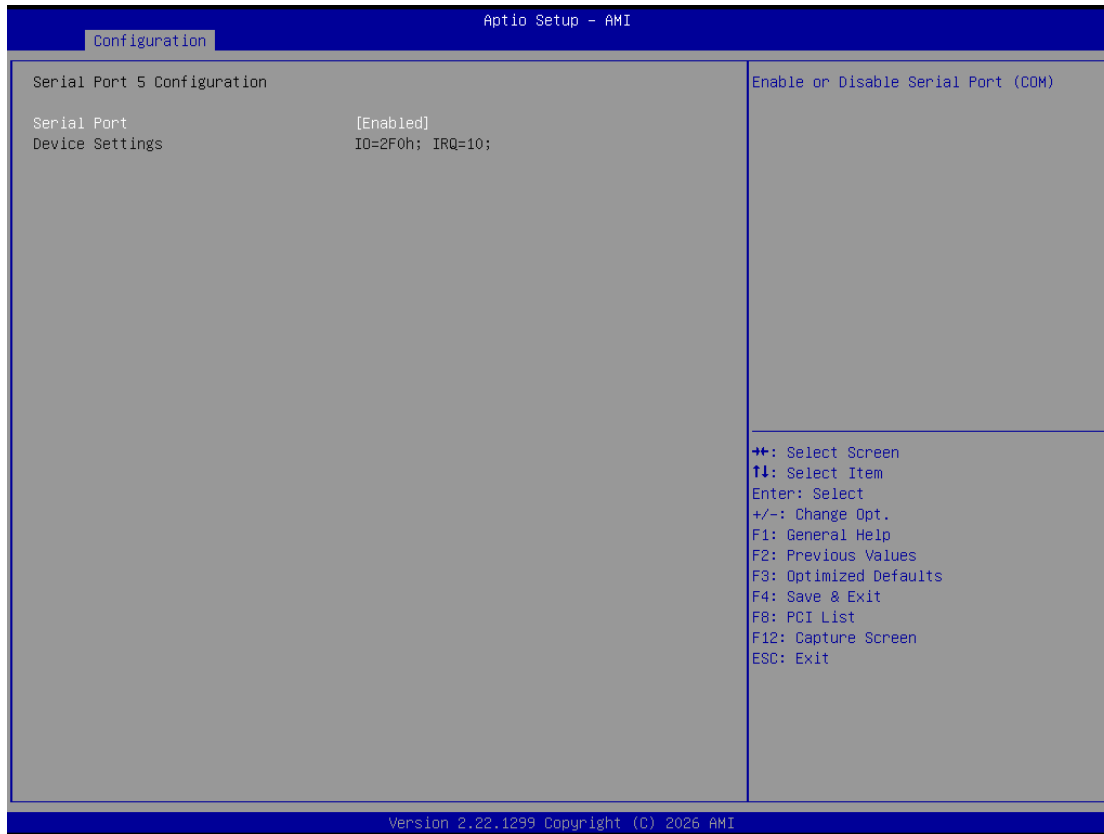
Serial Port 4 Configuration

Configuration		Aptio Setup - AMI	
Serial Port 4 Configuration		Enable or Disable Serial Port (COM)	
Serial Port	[Enabled]		
Device Settings	ID=2E0h; IRQ=7;		
		++: Select Screen ↓↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit	

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Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled

Serial Port 5 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled

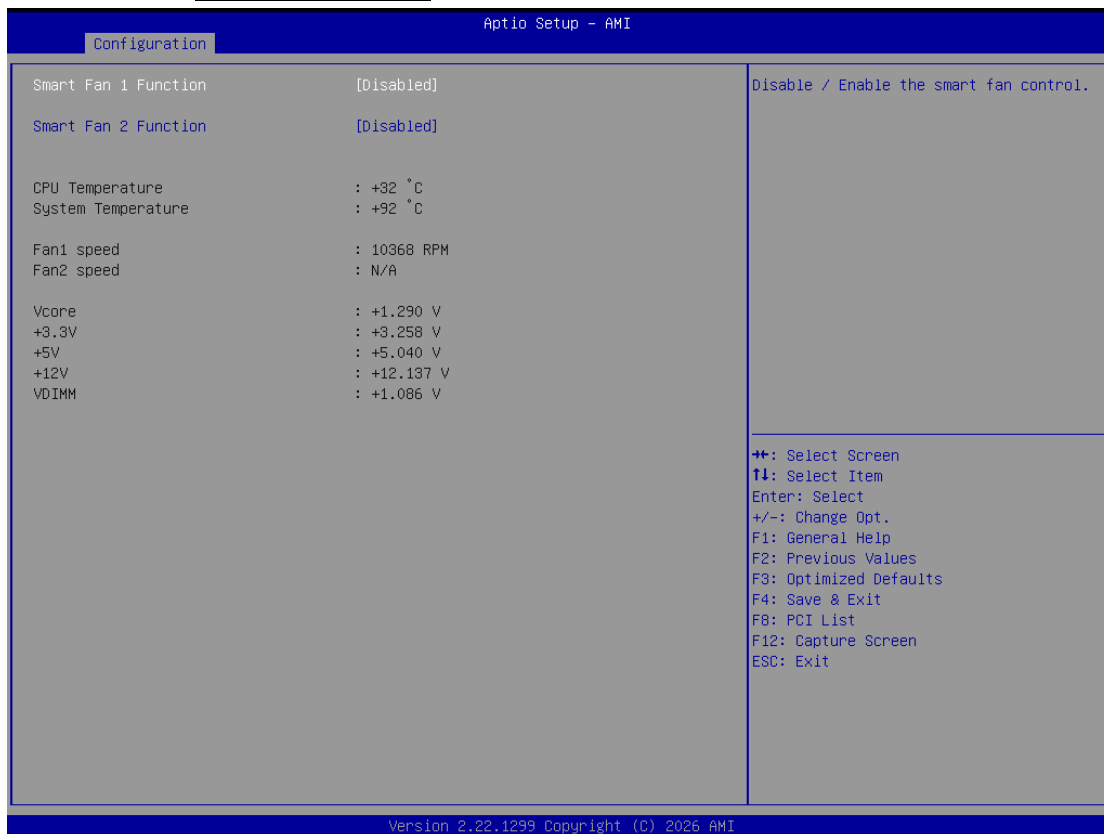
Serial Port 6 Configuration

Configuration	
Serial Port 6 Configuration	Select an optimal settings for Super I/O Device
Change Settings	[Enabled]
Device Settings	ID=2E0h; IRQ=11;
<div>++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit</div>	

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Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled

6.3.11 H/W Monitor

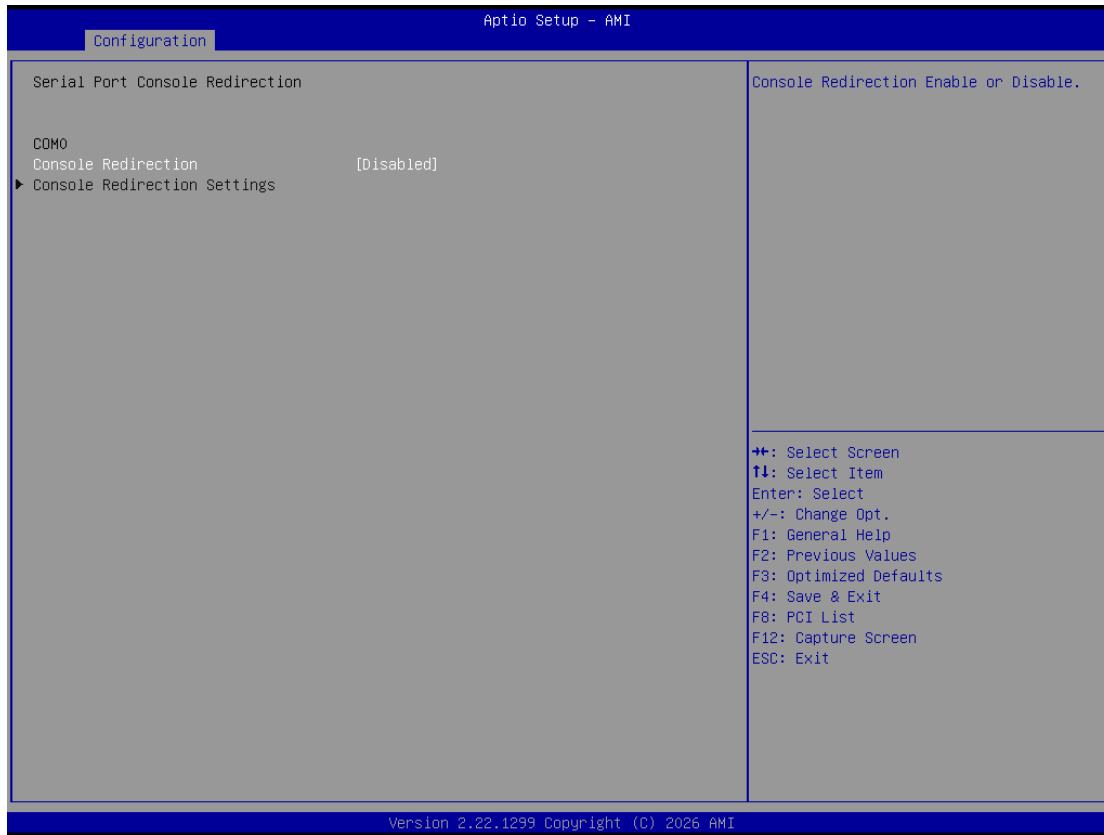


Feature	Description	Options
Smart Fan 1 Function	Disable / Enable the smart fan control.	★Disabled, Enabled
Smart CPU Fan Function [Enabled]		
Smart Fan 1 Control Mode	Select Smart Fan Control Mode.	★Thermal Cruise Mode Fan Control Mode
Smart Fan 1 Control Mode [Thermal Cruise Mode]		
Smart Fan 1 Tolerance Temp	In Thermal Cruise Mode: tolerance of target temperature.	★5
Smart Fan 1 Start Target Temp	In Thermal Cruise Mode: Start temperature.	★40
Smart Fan 1 Full Target Temp	In Thermal Cruise Mode: Full speed temperature.	★60
Smart Fan 1 Low End	In Thermal Cruise Mode: low end of fan speed (0-100%)	★5

Feature	Description	Options
Smart Fan 1 Control Mode [Fan Control Mode]		
Smart Fan 1 Speed (%)	Set Smart speed 0-100%.	★100
Smart Fan 2 Function	Disable / Enable the smart fan control.	★Disabled, Enabled
Smart CPU Fan Function [Enabled]		

Smart Fan 2 Control Mode	Select Smart Fan Control Mode.	★ Thermal Cruise Mode Fan Control Mode
Smart Fan 2 Control Mode [Thermal Cruise Mode]		
Smart Fan 2 Tolerance Temp	In Thermal Cruise Mode: tolerance of target temperature.	★5
Smart Fan 2 Start Target Temp	In Thermal Cruise Mode: Start temperature.	★40
Smart Fan 2 Full Target Temp	In Thermal Cruise Mode: Full speed temperature.	★60
Smart Fan 2 Low End	In Thermal Cruise Mode: low end of fan speed (0-100%)	★5
Smart Fan 2 Control Mode [Fan Control Mode]		
Smart Fan 2 Speed (%)	Set Smart speed 0-100%./	★100

6.3.12 Serial Port Console Redirection



Feature	Description	Options
Console Redirection	Console Redirection Enable or Disable	★ Disabled, Enabled
Console Redirection Settings [Enabled]		
Console Redirection Settings	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.	

COM0 Console Redirection Settings:

Configuration Aptio Setup - AMI

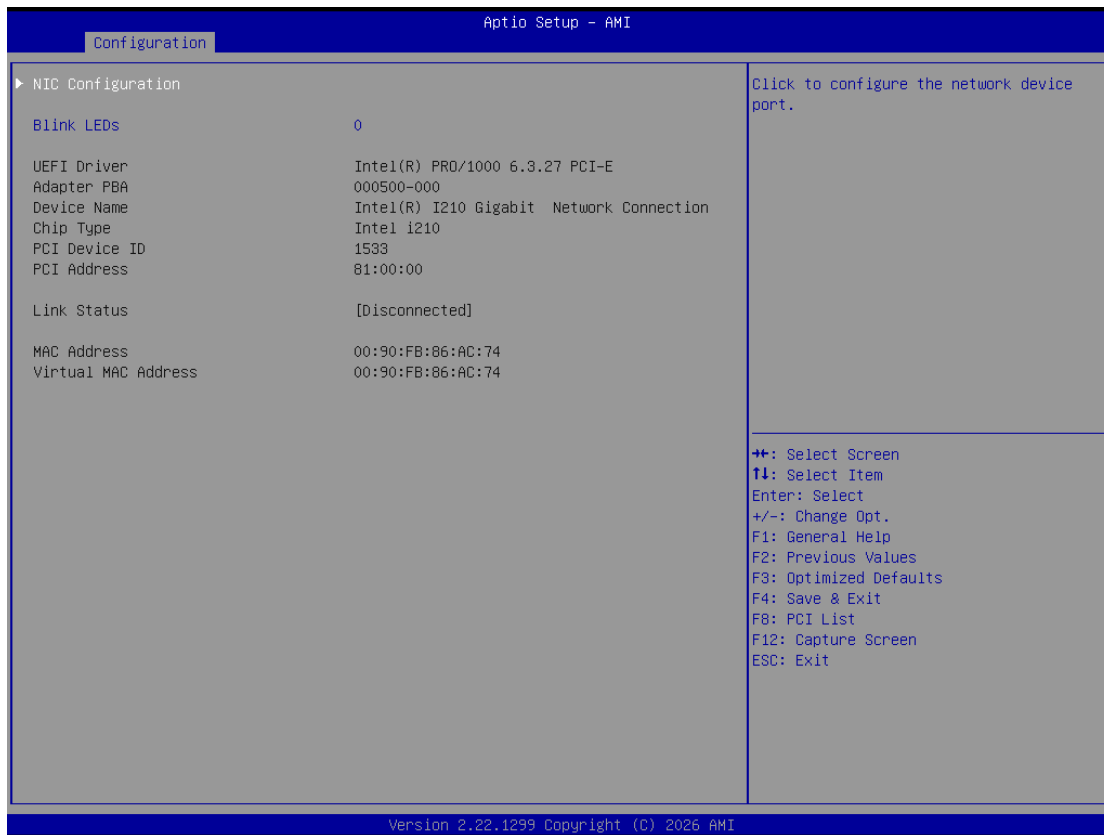
<p>COM0 Console Redirection Settings</p> <p>Terminal Type [VT100Plus] Bits per second [115200] Data Bits [8] Parity [None] Stop Bits [1] Flow Control [None] VT-UTF8 Combo Key Support [Enabled] Recorder Mode [Disabled] Resolution 100x31 [Disabled] Putty KeyPad [VT100]</p>	<p>Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit </p>
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Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	★VT100Plus, ANSI, VT100, VT-UTF8
Bits per second	Select Serial port transmission speed. The speed must be matched on other side. Long or noisy lines may require lower speeds.	★115200, 9600, 19200, 38400, 57600
Data bits	Data bits	★8, 7
Parity	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.	★None, Even, Odd, Mark, Space

Feature	Description	Options
Stop Bits	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.	★1,2
Flow Control	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 signals.	★None, Hardware RTS/CTS
VT-UTF8 Combo Key Support	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals	Disabled, ★Enabled
Recorder Mode	With this mode enabled only text will be sent. This is to capture Terminal data.	★Disabled, Enabled
Resolution 100x31	Enables or disables extended terminal resolution	★Disabled, Enabled
Putty KeyPad	Select FunctionKey and KeyPad on Putty	★VT100, LINUX, XTERMR6, SCO, ESCN, VT400

6.3.13 Intel (R) I210 Gigabit Network Controller – 00:90:FB:86:AC:74



Feature	Description	Options
Blink LEDs	Identify the physical network port by blinking the associated LED.	★0

NIC Configuration

Configuration Aptio Setup - AMI

Link Speed Wake On LAN	[Auto Negotiated] [Enabled]
---------------------------	--------------------------------

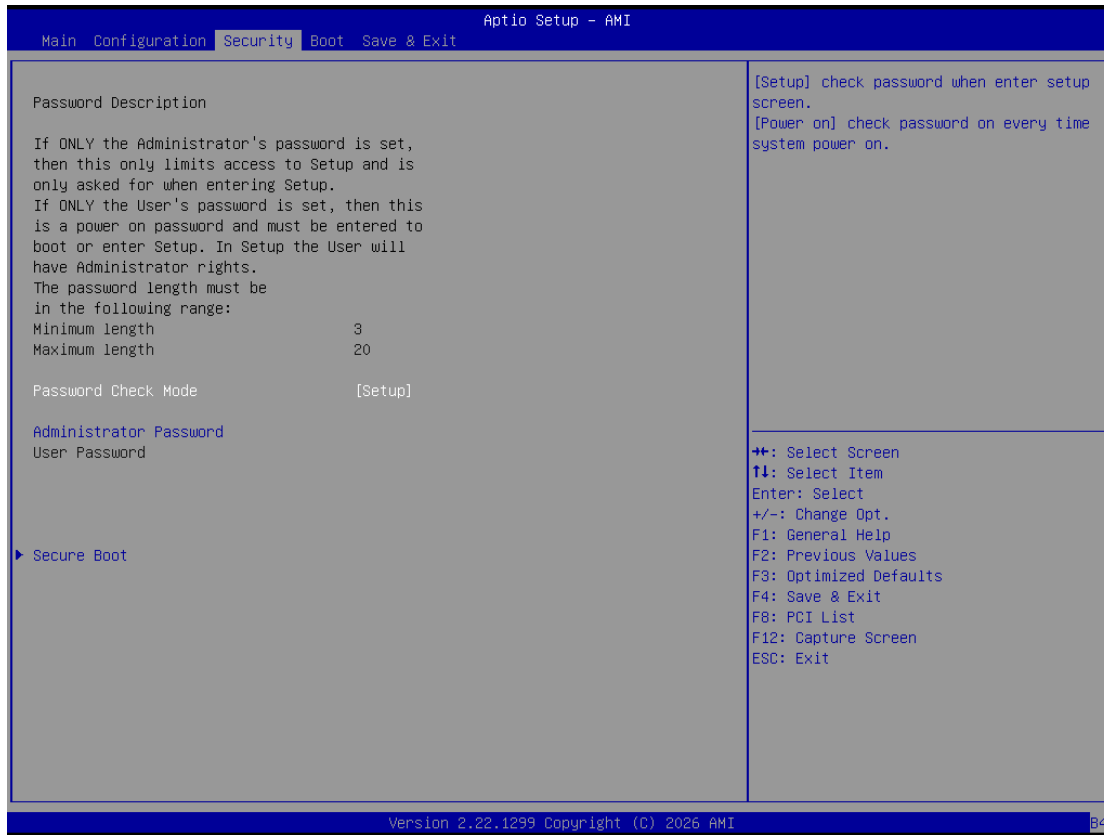
Specifies the port speed used for the selected boot protocol.

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 F8: PCI List
 F12: Capture Screen
 ESC: Exit

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Feature	Description	Options
Link Speed	Specifies the port speed used for the selected boot protocol.	★Auto Negotiated, 10 Mbps Half 10 Mbps Full 100 Mbps Half 100 Mbps Full
Wake On LAN	Enables the server to be powered on using an in-band magic packet.	Disabled, ★ Enabled

6.4 Security



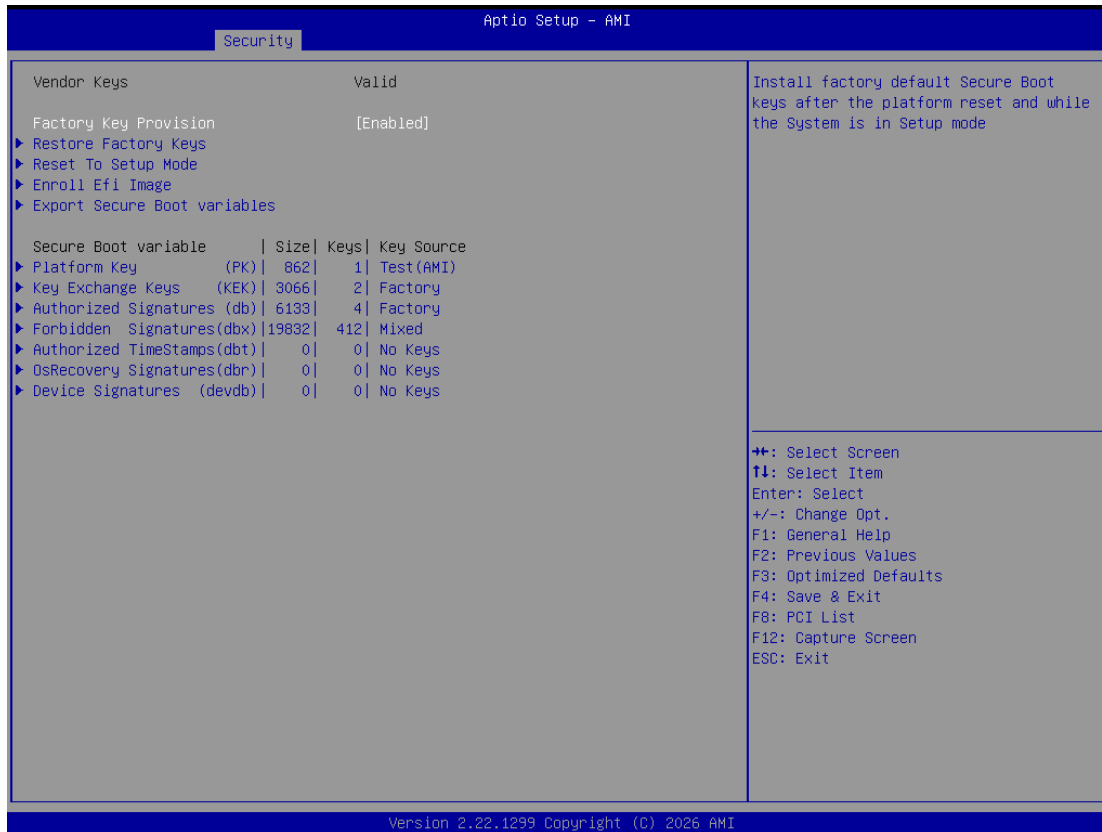
Feature	Description	Options
Password Check Mode	[Setup] check password when enter setup screen. [Power on] check password on every time system power on.	★ Setup, Power On
Administrator Password	Set Administrator Password	
User Password	Set User Password	
Secure Boot	Secure Boot configuration	

Secure Boot



Feature	Description	Options
Secure Boot	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.	★ Disabled, Enabled
Secure Boot Mode	Secure Boot Mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication	★ Custom, Standard
Restore Factory keys	Force System to User Mode. Install factory default Secure Boot key databases	Yes, No
Restore To Setup Mode	Delete all Secure Boot key databases from NVRAM	Yes, No
Expert Key Management	Enables expert users to modify Secure Boot Policy variables without variable authentication	

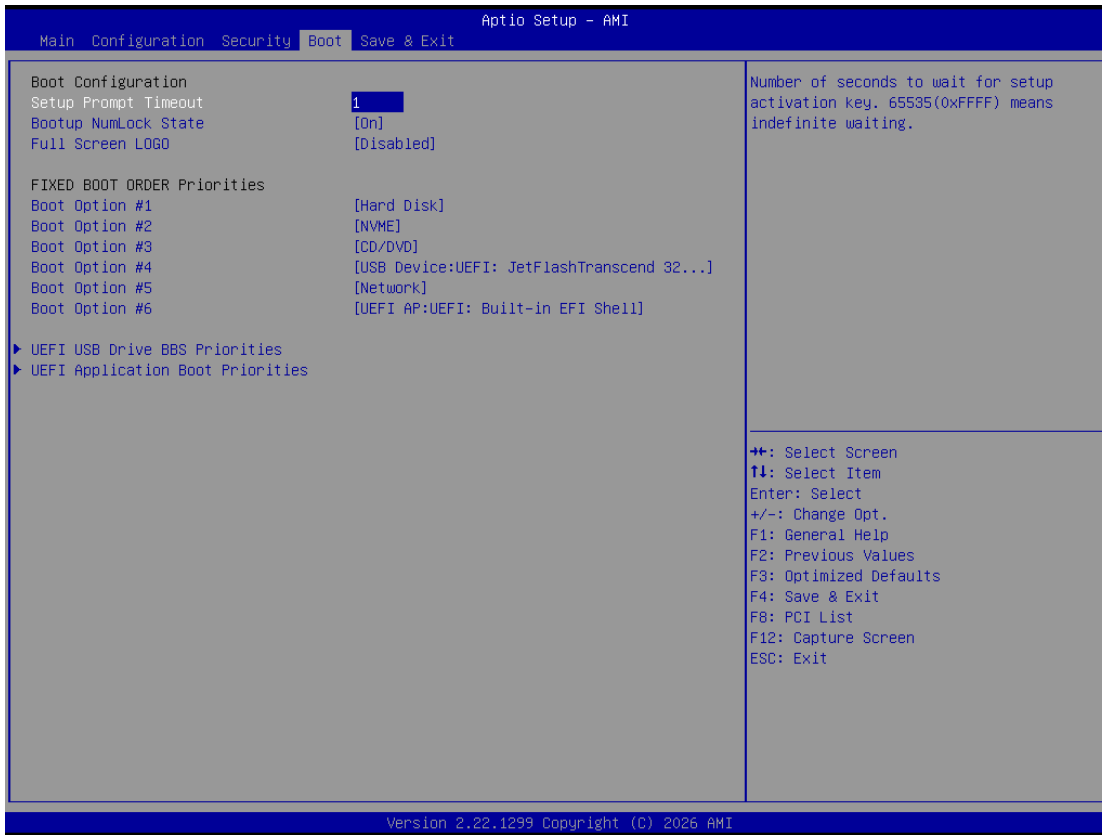
Key Management



Feature	Description	Options
Factory keys Provision	Install factory default Secure Boot key after the platform reset and while the System is in Setup mode.	★ Disabled, Enabled
Restore Factory keys	Force System to User Mode. Install factory default Secure Boot key databases	Yes, No
Reset To Setup Mode	Delete all Secure Boot key databases from NVRAM	Yes, No
Enroll Efi Image	Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)	
Export Secure Boot variables	Save NVRAM content of Secure Boot variable to a file	

Secure Boot variables	Description	Key source
Platform Key(PK)	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3.EFI PE/COFF Image(SHA256) Key Source: Factory, Modified, Mixed	Details, Export, Update, Delete
Key Exchange Keys(KEK)		Details, Export, Update, Delete Append
Authorized Signatures (db)		Details, Export, Update, Delete Append
Forbidden Signatures (dbx)		Details, Export, Update, Delete Append
Authorized TimeStamps (dbt)		Update, Append
OsRecovery Signatures (dbr)		Update, Append
Device Signatures (devdb)		Update, Append

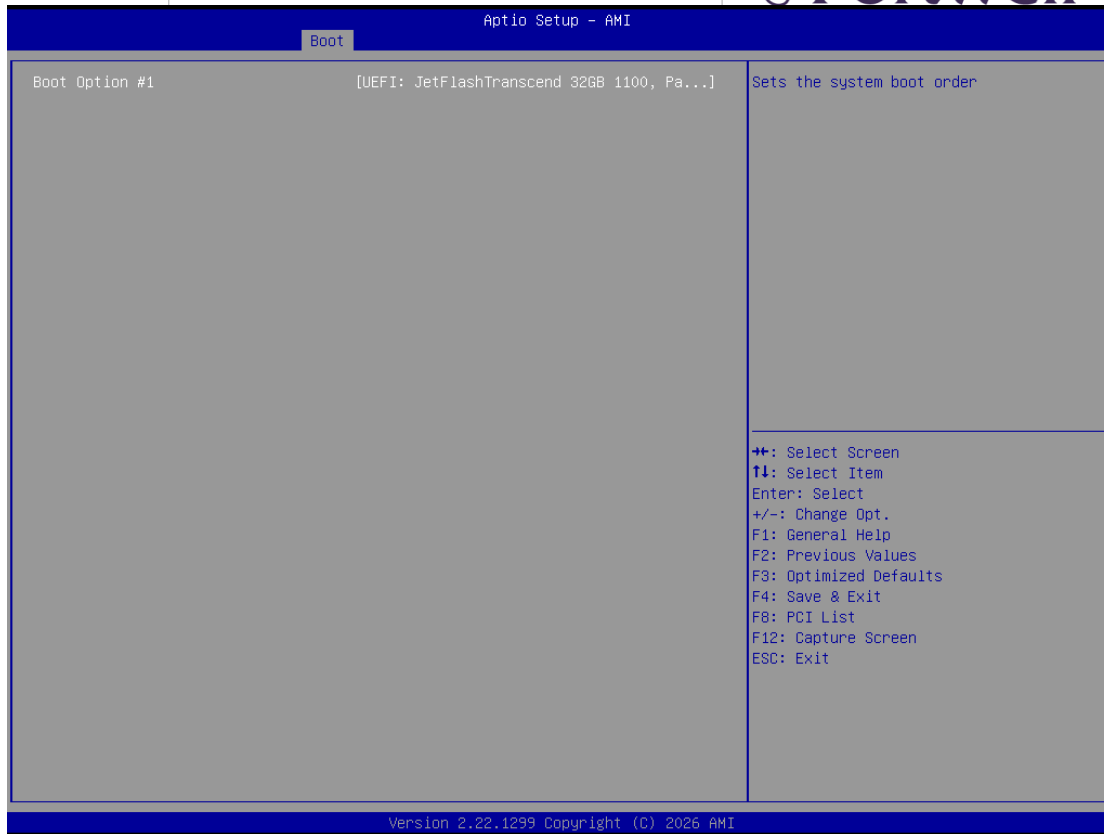
6.5 Boot



Feature	Description	Options
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	★1
Bootup NumLock State	Select the keyboard NumLock state.	★On, Off
Full Screen LOGO	Enables or disables Quiet Boot option and Full screen Logo.	★Disabled, Enabled
Boot Option #1 ~ #6	Sets the system boot order	Hard Disk, NVME, CD/DVD, USB Device, Network, UEFI AP: UEFI: Built-in EFI Shell, Disabled
UEFI USB Drive BBS Priorities	Specifies the Boot Device Priority sequence from available UEFI USB Drive	
UEFI Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

UEFI USB Drive BBS Priorities:

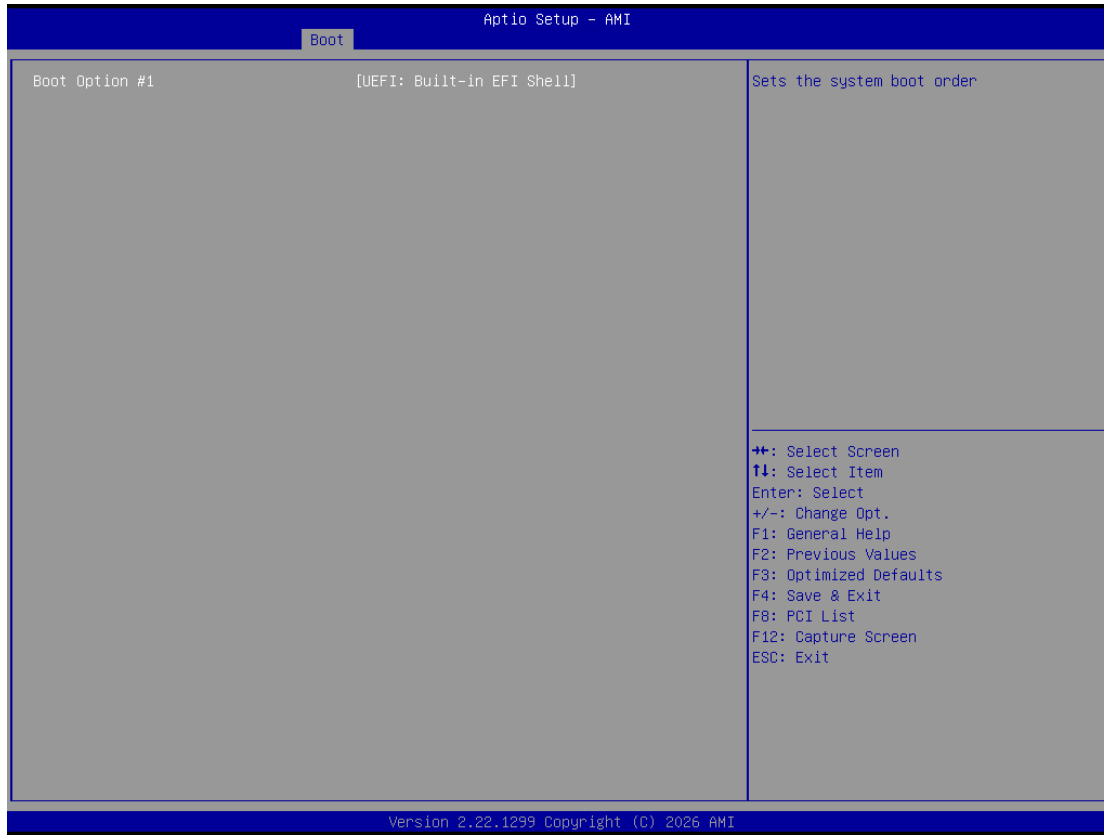
Specifies the Boot Device Priority sequence from available UEFI USB Drive.



Feature	Description	Options
Boot Option #1	Sets the system boot order.	

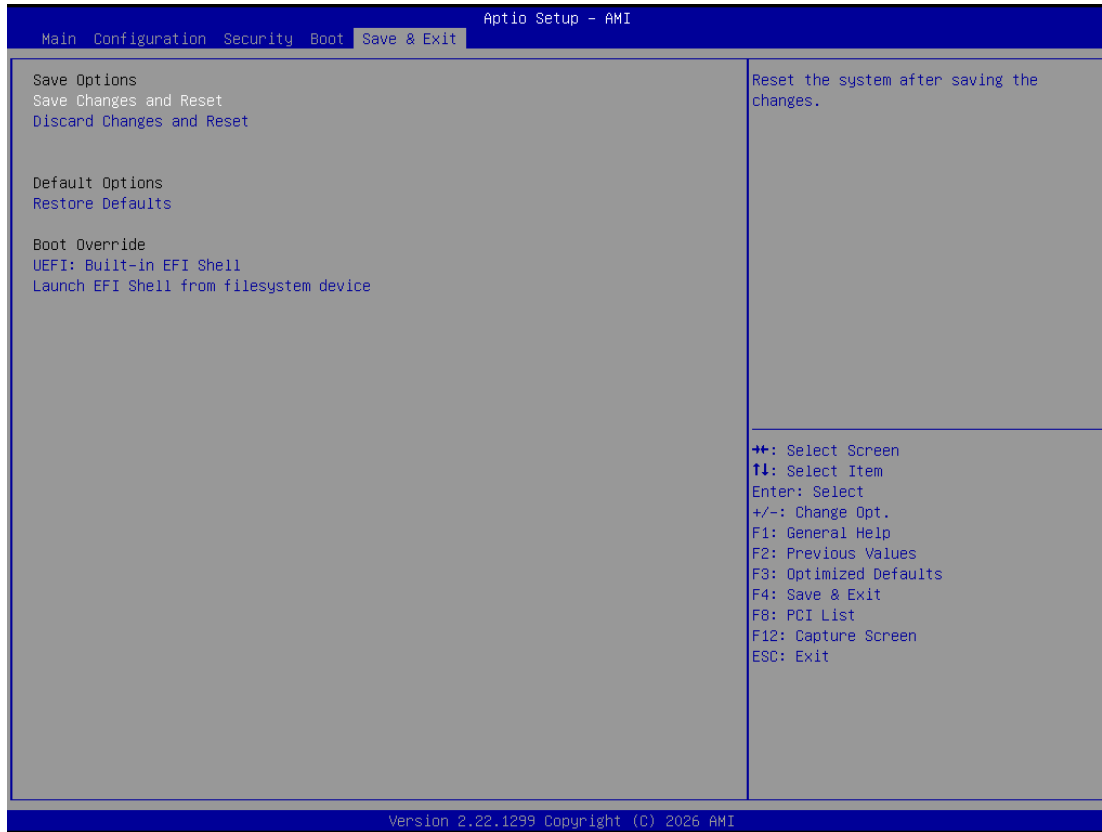
UEFI Application Boot Priorities:

Specifies the Boot Device Priority sequence from available UEFI Application



Feature	Description	Options
Boot Option #1	Sets the system boot order.	

6.6 Save & Exit



Feature	Description	Options
Save Changes and Exit	Reset the system after saving the changes.	
Discard Changes and Exit	Reset system setup without saving any changes.	
Restore Defaults	Restore/Load Default values for all the setup options.	
UEFI: Built-in EFI Shell		
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.	

Chapter 7

Overview

- 7 System Resources
- 7.1 Intel PCH
- 7.2 Main Memory
- 7.3 Installing the Single Board Computer

7. System Resources

7.1 Intel PCH

Intel® H810 Chipset

7.2 Main Memory

RUBY-D722G2A provides 2 Dual Channel DDR5 U-DIMMs sockets which support the maximum memory can be up to 96GB. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory modules into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

7.3 Installing the Single Board Computer

To install your RUBY-D722G2A into the standard chassis or proprietary environment, please perform the following:

Step 1: Check all jumpers setting on proper position

Step 2: Install and configure CPU, CPU cooler and memory module on right position

Step 3: Place RUBY-D722G2A into the dedicated position in the system

Step 4: Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that the motherboard is properly inserted and fixed by the mechanism.

Note:

Please find drivers in the RUBY-D722G2A of Portwell's download center. The driver supports Windows 10/11.

Chapter 8

- 8 Troubleshooting
- 8.1 Hardware Quick Installation
- 8.2 BIOS Setting
- 8.3 FAQ

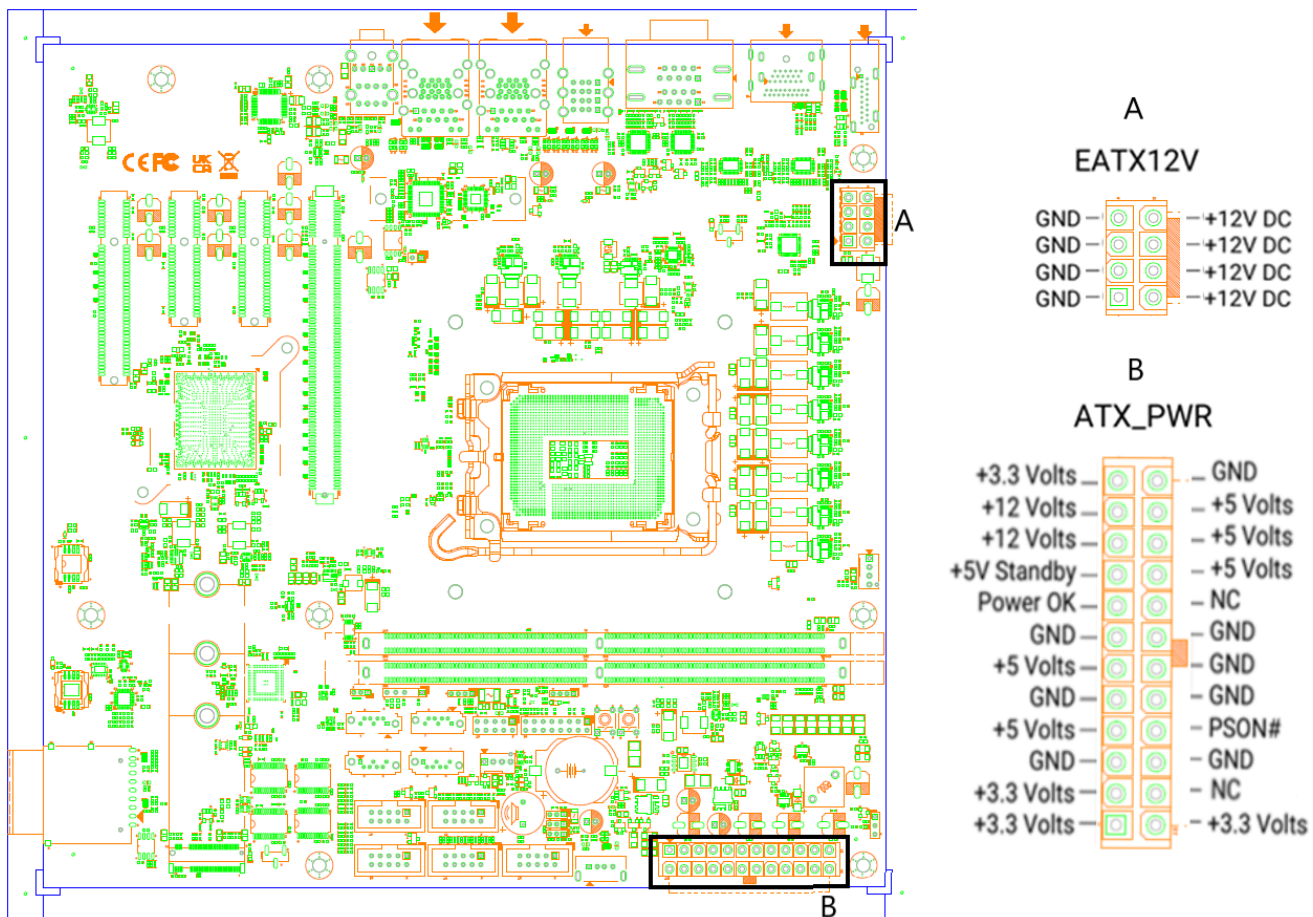
8. Troubleshooting

This chapter provides a few useful tips to quickly get RUBY-D722G2A running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

8.1 Hardware Quick Installation

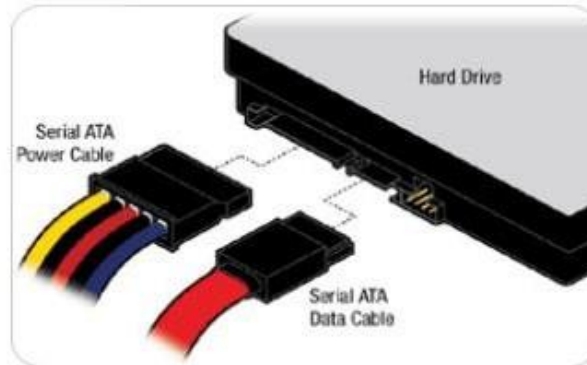
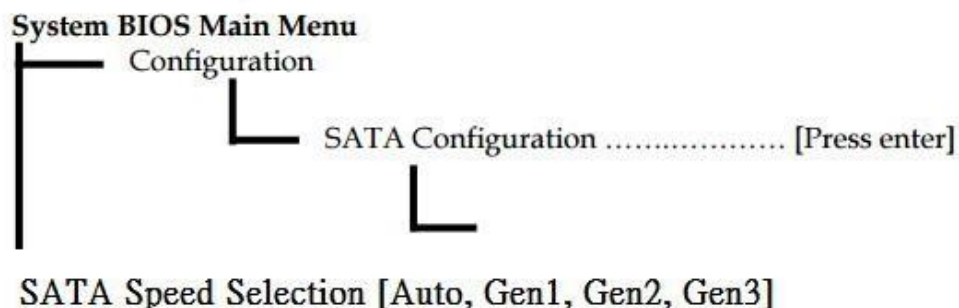
ATX Power Setting

Correctly orient the ATX power supply plugs into these connectors and push down firmly until the connectors completely fit.



Serial ATA

Serial ATA Hard Disk Setting for SATA Speed Selection



8.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power.

DDR5 UDIMM Memory, keyboard, mouse, SATA hard disk, VGA connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with RUBY-D722G2A, it is recommended, when going with the boot-up sequence, to hit “DEL” and” ESC” key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can

wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to “**RestoreDefaults**”, press “**Enter**” and select “**Yes**” to load default optimal BIOS setup. This will force your BIOS setting back to the initial factory configurations. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting at any time when system appears to be unstable in boot up sequence.

8.3 FAQ

Information & Support

Question: I forgot my password for system BIOS, what am I supposed to do?

Answer: You can switch off your power supply then find the RTC battery on the RUBY-D722G2A. Then remove the RTC battery and wait 5 seconds to clean your password then to switch on your power supply.

RUBY-D722G2A BIOS / EC UEFI Update SOP process under UEFI Shell?

1. Please visit web site of Portwell download center as below hyperlink

<https://www.portwell.com.tw/support-center/download-center/>

2. Select “Search Download Center” and type the keyword “RUBY-D722G2A”.

Portwell Download Center

Welcome to Portwell Download Center

The web-based service/support site that could provide you with technical demands and product knowledge.

Please Enter a product name or keyword to help you find the correct support topic and get more relevant results.

Search by Product Model

Search in Download Center

Search:

Order By:

Download Count

Order:

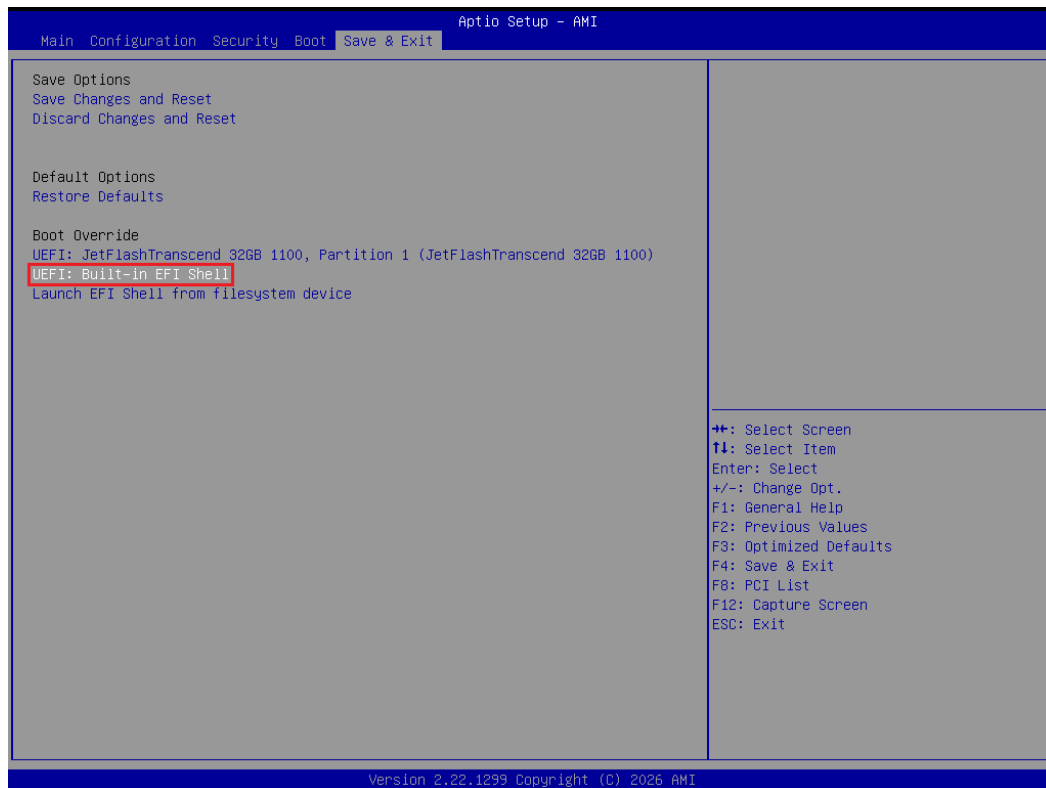
Ascending Order

[Reset filter](#)

3. Step 1. Prepare a USB DOK.

Step 2. Unzip BIOS update file to the USB DOK.

Step 3. Plug the USB DOK into the target system and then boot in UEFI Shell by selecting UEFI: Built-in EFI Shell in the BIOS Save & Exit page.



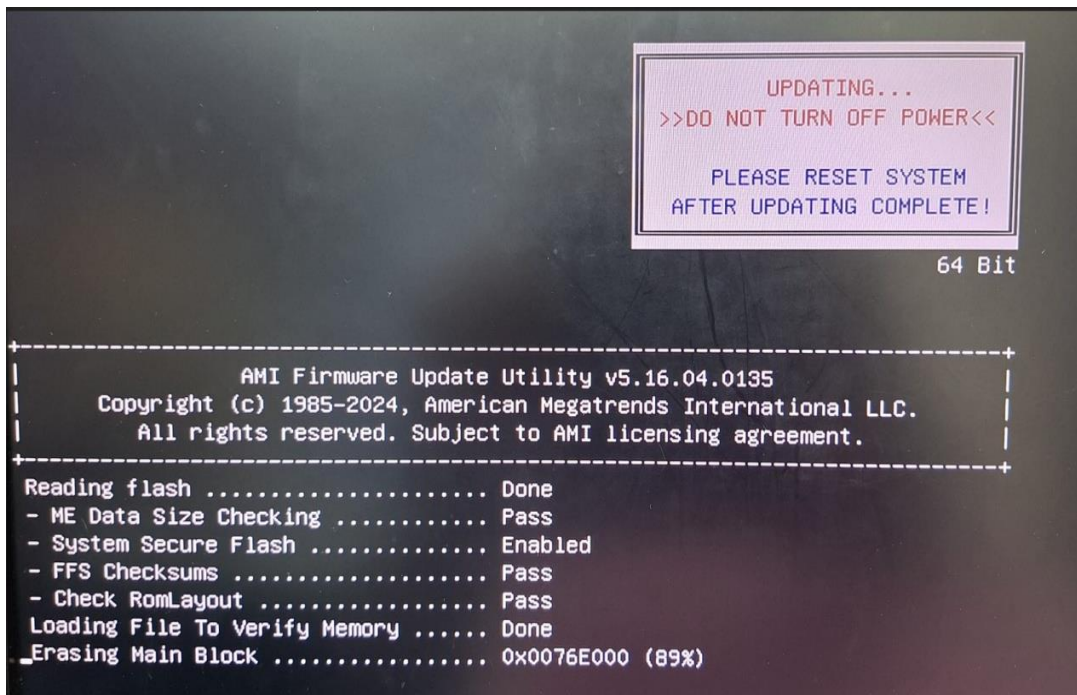
Step 4. Under the UEFI shell, direct to your USB DOK, below picture is an example using fs0. Then direct to the folder with BIOS updated file and then enter command: "Update.efi" to start updating BIOS or EC.

5. Then change the folder with updated file and use command: " **update** " and press enter

```

UEFI Interactive Shell v2.2
EDK II
UEFI v2.90 (American Megatrends, 0x00050020)
Mapping table
  FS0: Alias(s):HD0t0b::BLK1:
        PciRoot(0x1)/Pci(0x14,0x0)/USB(0x13,0x0)/HD(1,GPT,A2C98CB1-9383-4A74-A3DE
  BLK2: Alias(s):
        PciRoot(0x1)/Pci(0x14,0x0)/USB(0x9,0x0)
  BLK0: Alias(s):
        PciRoot(0x1)/Pci(0x14,0x0)/USB(0x13,0x0)
Press ESC in 5 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd Update_RUBY-D722G2A_0_0_10
FS0:\Update_RUBY-D722G2A_0_0_10> ls
Directory of: FS0:\Update_RUBY-D722G2A_0_0_10\
03/05/2026  14:26 <DIR>          16,384  .
03/05/2026  14:26 <DIR>           0  ..
03/02/2026  12:04              384  ReadMe.txt
03/02/2026  12:04        12,520,223  Update.efi
2 File(s)  12,520,607 bytes
2 Dir(s)
FS0:\Update_RUBY-D722G2A_0_0_10> Update.efi_

```



(BIOS File Update)

```

EFI Shell version 2.90 [5.32]
Current running mode 1.1.2
Device mapping table
  fs0      :Removable HardDisk - Alias hd17t0b blk0
             :PciRoot(0x1)/Pci(0x14,0x0)/USB(0x13,0x0)/HD(1,GPT,A2C98CB1-9383-
  blk0     :Removable HardDisk - Alias hd17t0b fs0
             :PciRoot(0x1)/Pci(0x14,0x0)/USB(0x13,0x0)/HD(1,GPT,A2C98CB1-9383-
  blk1     :Removable BlockDevice - Alias (null)
             :PciRoot(0x1)/Pci(0x14,0x0)/USB(0x13,0x0)

Press ESC in 4 seconds to skip startup.nsh, any other key to continue.
Shell> fs0:

fs0:\> cd EC_RUBY-D722_0_5

fs0:\EC_RUBY-D722_0_5> ls
Directory of: fs0:\EC_RUBY-D722_0_5

    03/13/26  10:38a <DIR>          16,384 .
    03/13/26  10:38a <DIR>           0 ..
    03/11/26  10:10a                384 ReadMe.txt
    03/11/26  10:10a           279,527 Update.efi
          2 File(s)      279,911 bytes
          2 Dir(s)

fs0:\EC_RUBY-D722_0_5> Update.efi_

```

```

        UPDATING...
        >>DO NOT TURN OFF POWER<<

        PLEASE RESET SYSTEM
        AFTER UPDATING COMPLETE!

64 Bit

Current shell version is v1.x
ITE EC Flash Utility for UEFI Shell, Version : 1.4.0 (64)
<Re-Write by FoxYang .. 2021/12/22 >

[/NOKBC] support
[/IS] support
!!Please don't use KB/MS during updating ...!!
Device ID      : C2 20 14 1000000C2
SPI Vendor     : MXIC
Eraseing...    : ██████████ -- Erase OK.

Erase Verify... : ██████████ -- Erase Verify OK.

Programing...  : ██████████ -- Programing OK.

Verify...     : █ 64/523 (KB)

```

(EC File Update)

Step 5. The updating process will start and you can see the updating progress. When you see the following pictures, which means the BIOS / EC update processes finished.

Please cut the AC power off and wait for 10 seconds before powering on.

```

+-----+
|          AMI Firmware Update Utility v5.16.04.0135          |
| Copyright (c) 1985-2024, American Megatrends International LLC. |
| All rights reserved. Subject to AMI licensing agreement.      |
+-----+
| Reading flash ..... Done                                     |
| - ME Data Size Checking ..... Pass                          |
| - System Secure Flash ..... Enabled                        |
| - FFS Checksums ..... Pass                                 |
| - Check RomLayout ..... Pass                               |
| Loading File To Verify Memory ..... Done                   |
| Erasing Main Block ..... Done                              |
| Updating Main Block ..... Done                             |
| Verifying Main Block ..... Done                            |
| Erasing Boot Block ..... Done                              |
| Updating Boot Block ..... Done                             |
| Verifying Boot Block ..... Done                            |
| Erasing NVRAM Block ..... Done                             |
| Updating NVRAM Block ..... Done                             |
| Verifying NVRAM Block ..... Done                           |
| Loading The ME Data To BIOS ..... Done                     |
| - Update success for FDR.                                   |
| - Update success for GBER.                                  |
| - Update success for DER2.                                  |
| - Update success for MER.                                   |
| WARNING !!                                                 |
| System must power-off to have the changes which take effect! |
| Process completed.                                         |
| fs0:\Update_RUBY-D722G2A_0_0_10\> _

```

(BIOS updating progress)

```

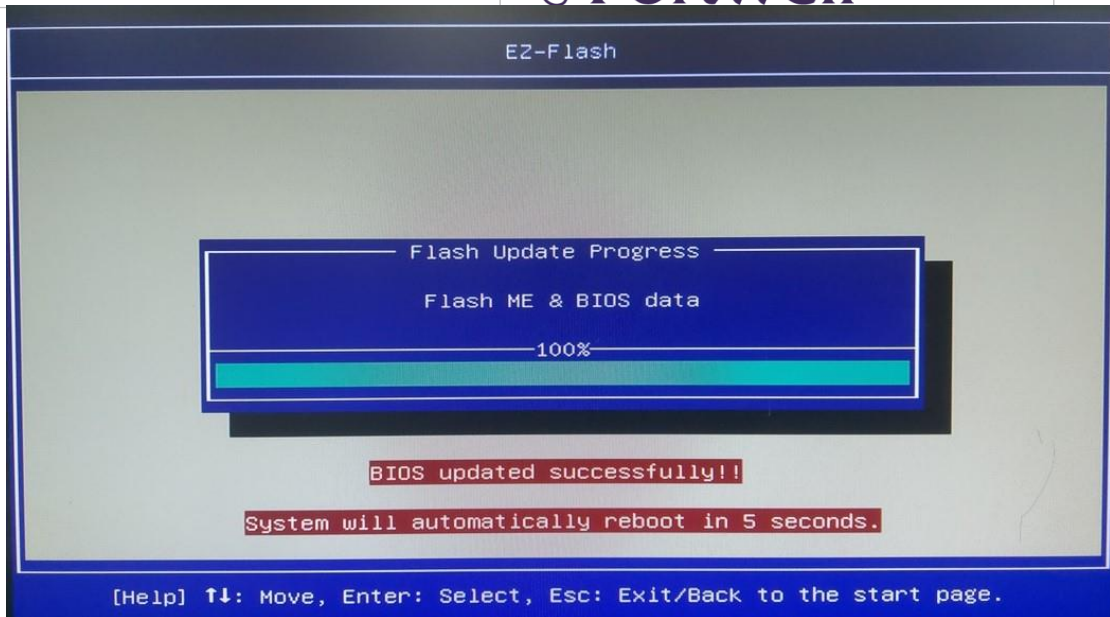
                                         UPDATING...
                                         >>DO NOT TURN OFF POWER<<
                                         PLEASE RESET SYSTEM
                                         AFTER UPDATING COMPLETE!
                                         64 Bit

Current shell version is v1.x
ITE EC Flash Utility for UEFI Shell, Version : 1.4.0 (64)
<Re-Write by FoxYang .. 2021/12/22 >

[/NOKBC] support
[/IS] support
!!Please don't use KB/MS during updating ...!!
Device ID       : C2 20 14 1000000C2
SPI Vendor      : MXIC
Erasing...      : ██████████ -- Erase OK.
Erase Verify... : ██████████ -- Erase Verify OK.
Programing...   : ██████████ -- Programing OK.
Verify...       : ██████████ -- Verify OK.
Please turn off power(G3) by manual , let EC reload new image !!
fs0:\EC_RUBY-D722_0_5>

```

(EC updating progress)



Chapter 9

9 Portwell Software Service

RUBY-D722G2A user manual

9. Portwell Software Service

Portwell Evaluation Tool (PET)

The Portwell Evaluation Tool (PET) is an API which Portwell's customers can access the GPIO, I2C, SMBus, etc under Windows and Linux OS. For more information, please contact Portwell.



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