COM Express™ PCOM-B656VGL

User's Guide Revision 1.1

Revision History

R0.1	Preliminary
R0.2	Content check
R0.3	Content check
R0.4	Update environment spec & support OS
R1.0	Add power consumption data (Section 3.11) Minor description modification
R1.1	Correct the pinout table

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Preface

This PCOM-B656VGL User's Guide contains information about the product features, functions and BIOS Setup.

- COM Express™ Design Guide
- COM Express™ Specification

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1. Introduction

This PCOM-B656VGL User's Guide contains detail information of the product specifications, features, mechanical dimensions, cooler and BIOS Setup.

PCOM-B656VGL is designed according to COM (Computer On Module) PICMG Open Modular Computing Standards COM Express™ Specification Rev3.0 Type 6 and Compact form factor (95x95cm).

PCOM-B656VGL, a COM Express Module with Intel 11th Generation processor code name Tiger lake UP3. PCOM-B656VGL is the successor of PCOM-B653VG (Intel Whiskey lake U platform) targeted on Ultra low power processors 12-28W, new Powerful & Efficient architecture on 10nm processor includes a Platform Controller Hub (PCH) on the same die and suitable for wide working temperature for Embedded and Industrial use condition. PCOM-B656VGL supports dual channel DDR4 memory. Display interfaces are VGA, LVDS, dual DDI and DP display with 4K x 2K high resolution.

2. Block Diagram

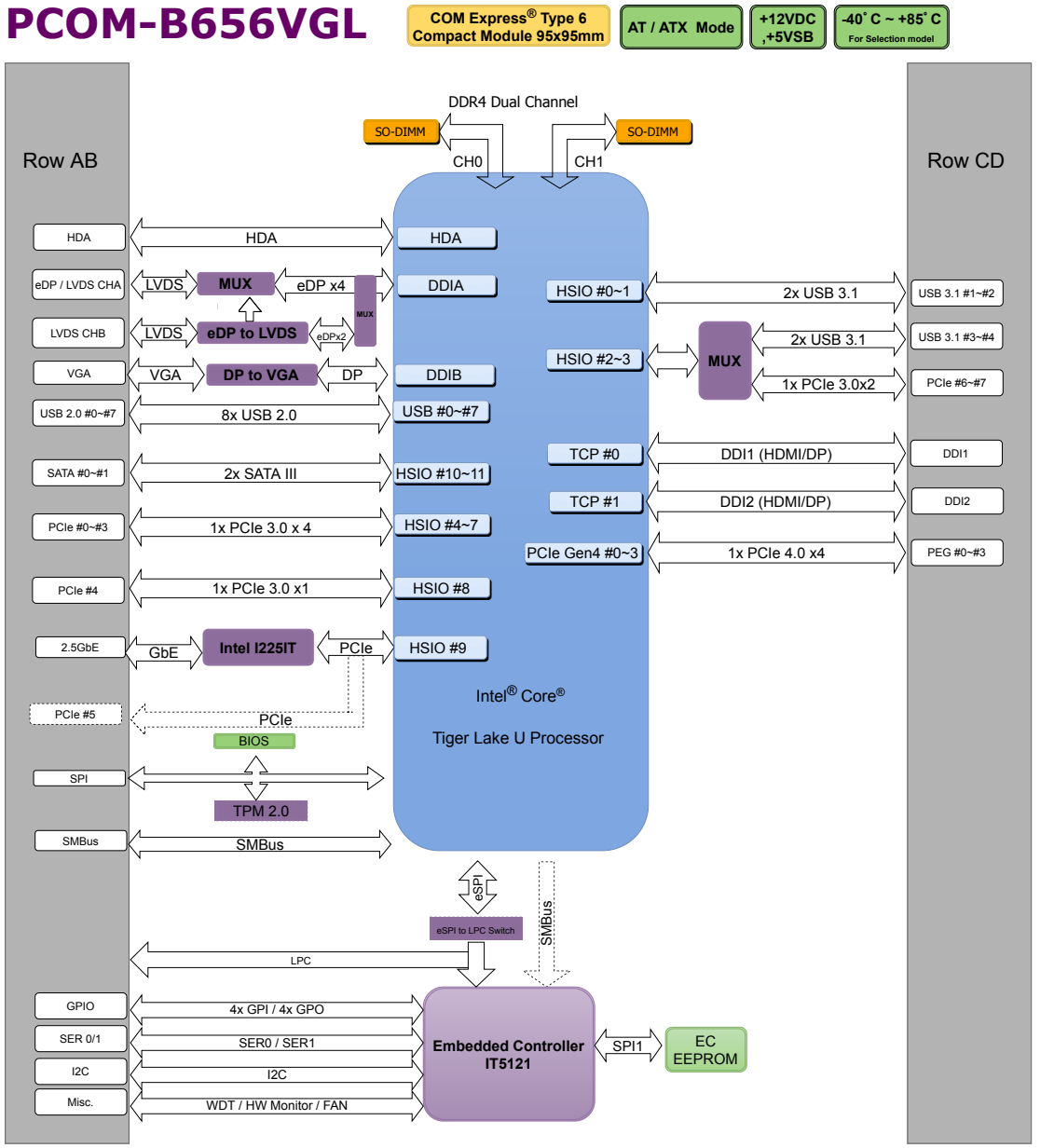


Figure 1 Block Diagram

3. Specifications

Product	➢ PCOM-B656VGL
Form Factor	➢ COM Express™ standard pinout Type 6 Rev. 3.0 (Basic95 x 95mm / 3.74” x 3.74”).
Processor	➢ 11th generation Intel® Core™ i3/i5/i7/ Celeron® processor, up to 4 cores/8 threads: - Embedded: i7-1185G7E / i5-1145G7E / i3-1115G4E/ Celeron 6305E - Industrial: i7-1185GRE / i5-1145GRE / i3-1115GRE
Chipset	➢ Integrated SoChttp://ark.intel.com/products/90593/Intel-GL82CM236-PCH
BIOS	➢ AMI Aptio5 BIOS
Memory	➢ 2x SODIMM DDR4 Non-ECC ➢ Dual channel ➢ Up to 32GB 3200 MHz
Graphics Options	➢ LVDS (24bit, dual channel) (up to1920x1200@60Hz) ➢ 2 DDI(DP++)(up to 4096x2304@60Hz) ➢ VGA(up to1920x1200@60Hz)
PCI Express	➢ 1 PCI Express x4 (PEG) Gen4 (16.0 GT/s) ➢ 8 PCI Express Gen3 (8.0 GT/s); can be configured to x1,x2,x4
USB	➢ 8 x USB2.0 (480 Mbps) ➢ 4 x USB3.2 Gen2 x1(10 Gbps)
SATA	➢ 2 x SATA3.0 (6Gbps)
Ethernet	➢ 1x 2.5 GbE(I225IT/AT)

Table 1 PCOM-B656VGLSpecification 1-2

Audio	➢ Intel® High Definition Audio
Security	➢ TPM 2.0(Infineon SLB9670) ➢ Intel® AES Enable Intel TXT and TPM at same time cause system un-stable (Intel TXT default Disable in BIOS setting)
Legacy IO	➢ 8 GPIO (default 4x GPI / 4x GPO) ➢ I^2C ➢ 2 Serial Ports (TX / RX) ➢ SMBus
Power DC IN	➢ +12V DC
Hardware Monitors	➢ IT Embedded Controller, Voltage, Fan and Temperature
Power Management	➢ ACPI 4.0
Environment	➢ Operating Temperature 0°C to 60°C/-40°C to 85°C(wide temp SKU) ➢ Storage Temperature -40°C to 85°C ➢ Relative Humidity 0%~95%

Table 2 PCOM-B656VGL Specification 2-2

3.1. PCOM-B656VGL SKU list

Series	PCOM-B656VGL						
Ordering P/N	AB1-3L45	AB1-3L47	AB1-3L49	AB1-3L50	AB1-3L28	AB1-3L48	AB1-3L46
CPU Specifications							
Processor	i7-1185G7E	i5-1145G7E	i3-1115G4E	C-6305E	i7-1185GRE	i5-1145GRE	i3-1115GRE
# of Cores	4	4	2	2	4	4	2
# of Threads	8	8	4	2	8	8	4
Cache	12MB	8MB	6MB	4MB	12MB	8MB	6MB
Base Frequency	2.8 GHz	2.6GHz	3.0GHz	1.8GHz	2.8 GHz	2.6GHz	3.0GHz
Turbo Frequency	4.4 GHz	4.1GHz	3.9 GHz	N/A	4.4 GHz	4.1GHz	3.9 GHz
cTDP	28/15/12W	28/15/12W	28/15/12W	15W	28/15/12W	28/15/12W	28/15/12W
Wide-Temp	No	No	No	No	Yes	Yes	Yes
Memory Specifications							
Capacity	2x SO-DIMM	2x SO-DIMM	2x SO-DIMM	2x SO-DIMM	2x SO-DIMM	2x SO-DIMM	2x SO-DIMM
Speed	3200 Mhz	3200 Mhz	3200 Mhz	3200 Mhz	3200Mhz	3200 Mhz	3200Mhz
ECC	No	No	No	No	IB-ECC	IB-ECC	IB-ECC
I/O Specifications							
PCIe	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0	8x PCIe 3.0 1x PCIe 4.0
USB 3.0/2.0	4/8	4/8	4/8	4/8	4/8	4/8	4/8
SATA	2	2	2	2	2	2	2
Ethernet	2.5 GbE	2.5 GbE	2.5 GbE	2.5 GbE	2.5 GbE	2.5 GbE	2.5 GbE

3.2. Supported Operating Systems

The PCOM-B656VGL supports the following operating systems.

Vendor	Operating System	Supported
Microsoft	Windows 10 (64bit)	Yes
Linux LTS	Kernel Ver 5.4	Yes

Table 3 Supported Operating Systems

3.3. Windows OS driver

Please download the drivers from Portwell download center website https://www.portwell.com.tw/support-center/download-center/

Item	Driver version	Description
Chipset	10.1.18460.8229	Chipset Driver Windows 10 64bits
Graphic	27.20.100.9415	Graphics Driver for Windows 10 64bit
LAN I225	1.0.2.14	Ethernet Driver for Windows 10 64bits
ME	2040.100.0.1029	ME Driver for Windows 10 64bit
GNA	02.00.00.1097	GNA Driver for Windows 10 64bit
Dynamic Tuning Technology	8.7.10401.16510	DTT Driver for Windows 10 64bit
HID Event Filter	2.2.1.384	HID Event Filter Driver for Windows 10 64bit
Rapid Storage Technology	18.6.1.1016	RST Driver for Windows 10 64bit

Table 4 Windows OS driver list

3.4. Electrical Characteristics

Input voltage	● +5VSB (Nominal) ● +12VDC (Nominal)
RTC Battery	1.7μA
Power on mode	AT / ATX

Table 5 Electrical Characteristics

3.5. Power sequence

ATX Mode

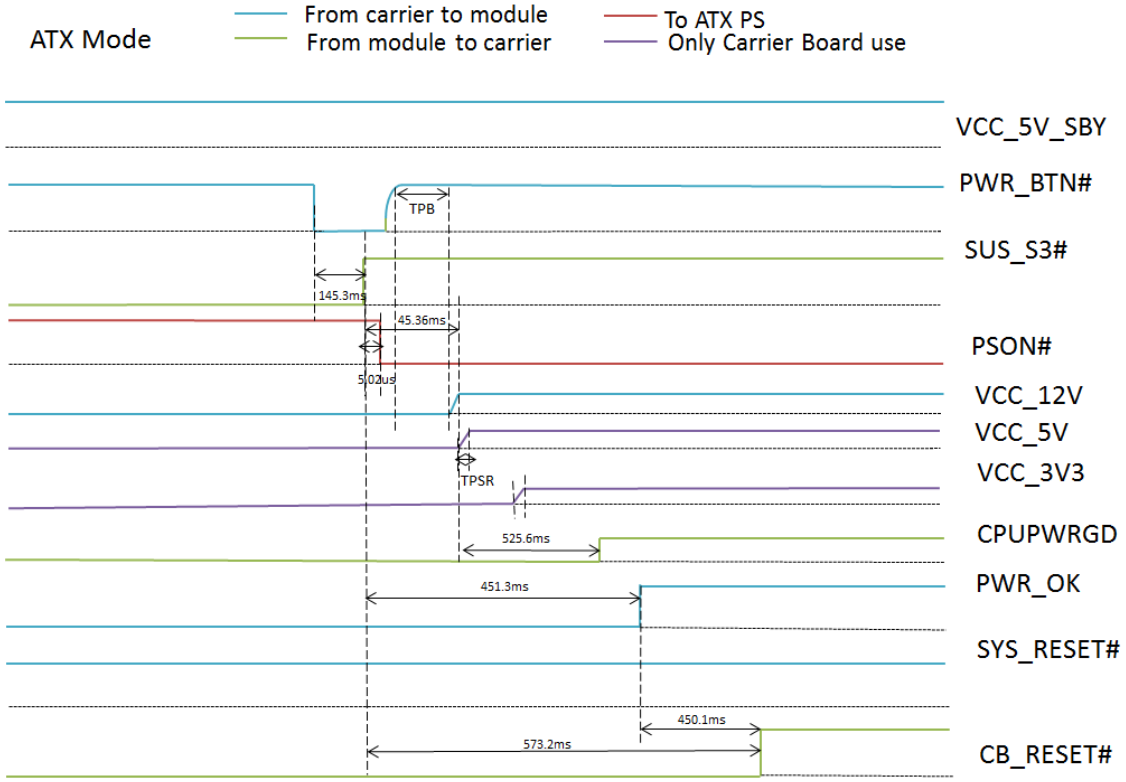


Figure 2 Power sequence ATX Mode

AT Mode

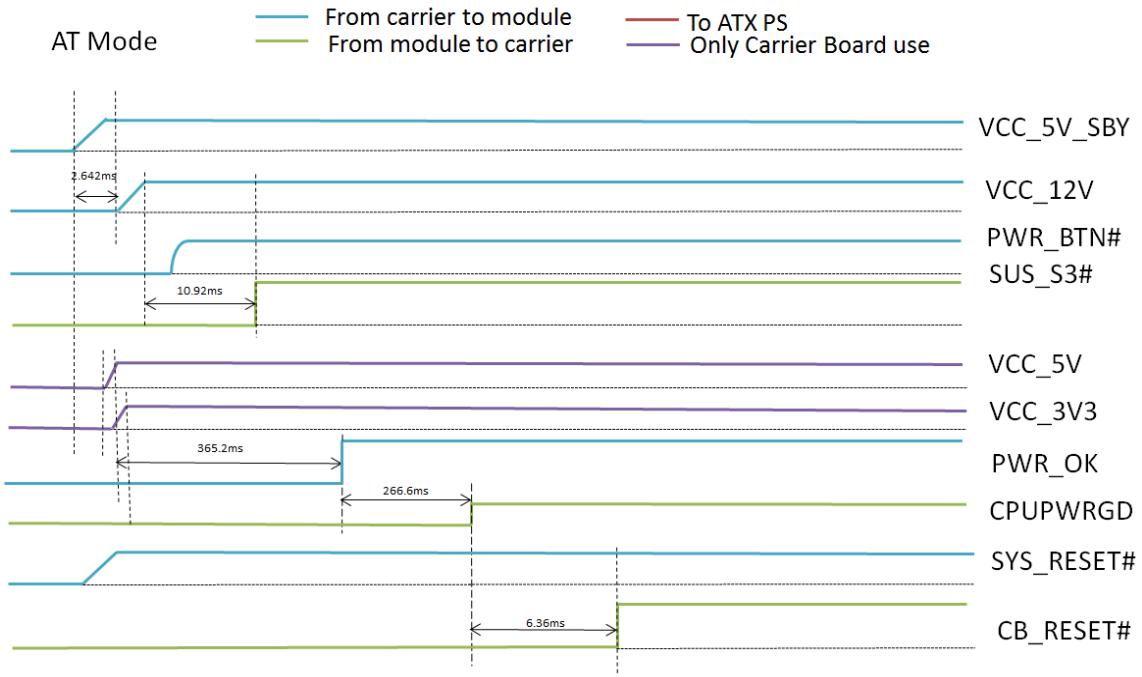
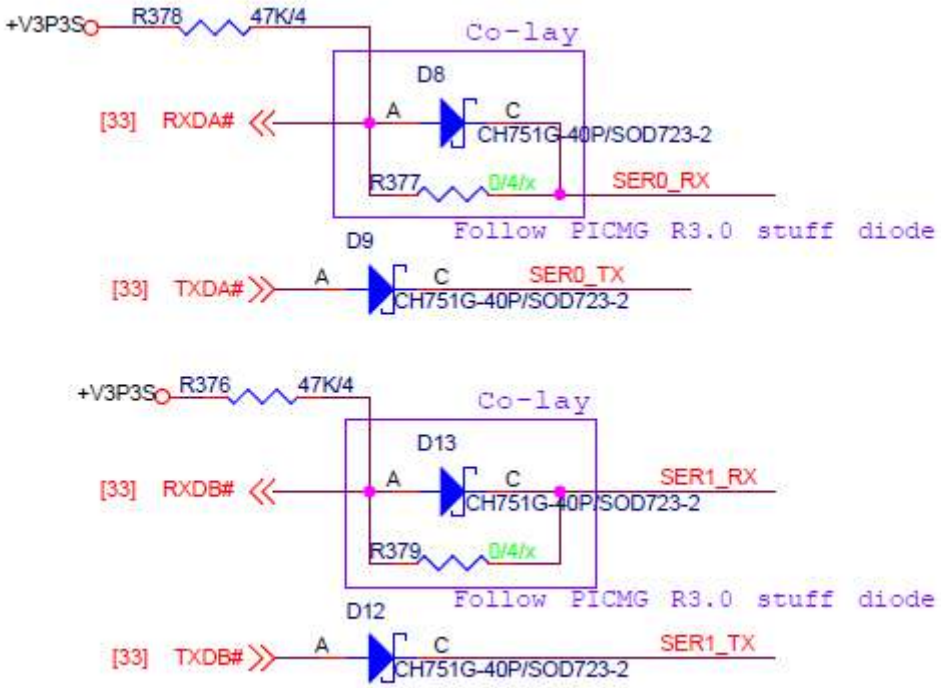


Figure 3 Power Sequence AT Mode

3.6. Circuit protection design

PCOM-B656VGL Type 6 is also compatible with COM Express Type 6 carrier, Schottky diode protection has been design on the COM Express module for Serial Port, FAN(PWMOUT & TACHIN), LID and SLEEP. Considerations must be taken while designing carrier board.



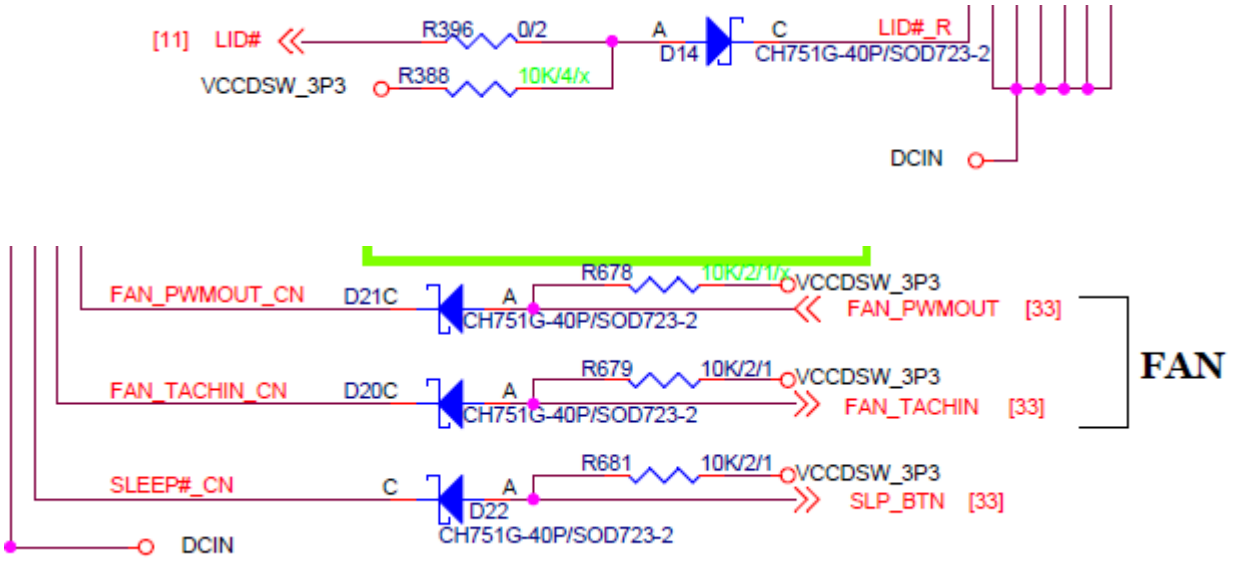


Figure 4 Circuit protection design

3.7. Mechanical Dimensions

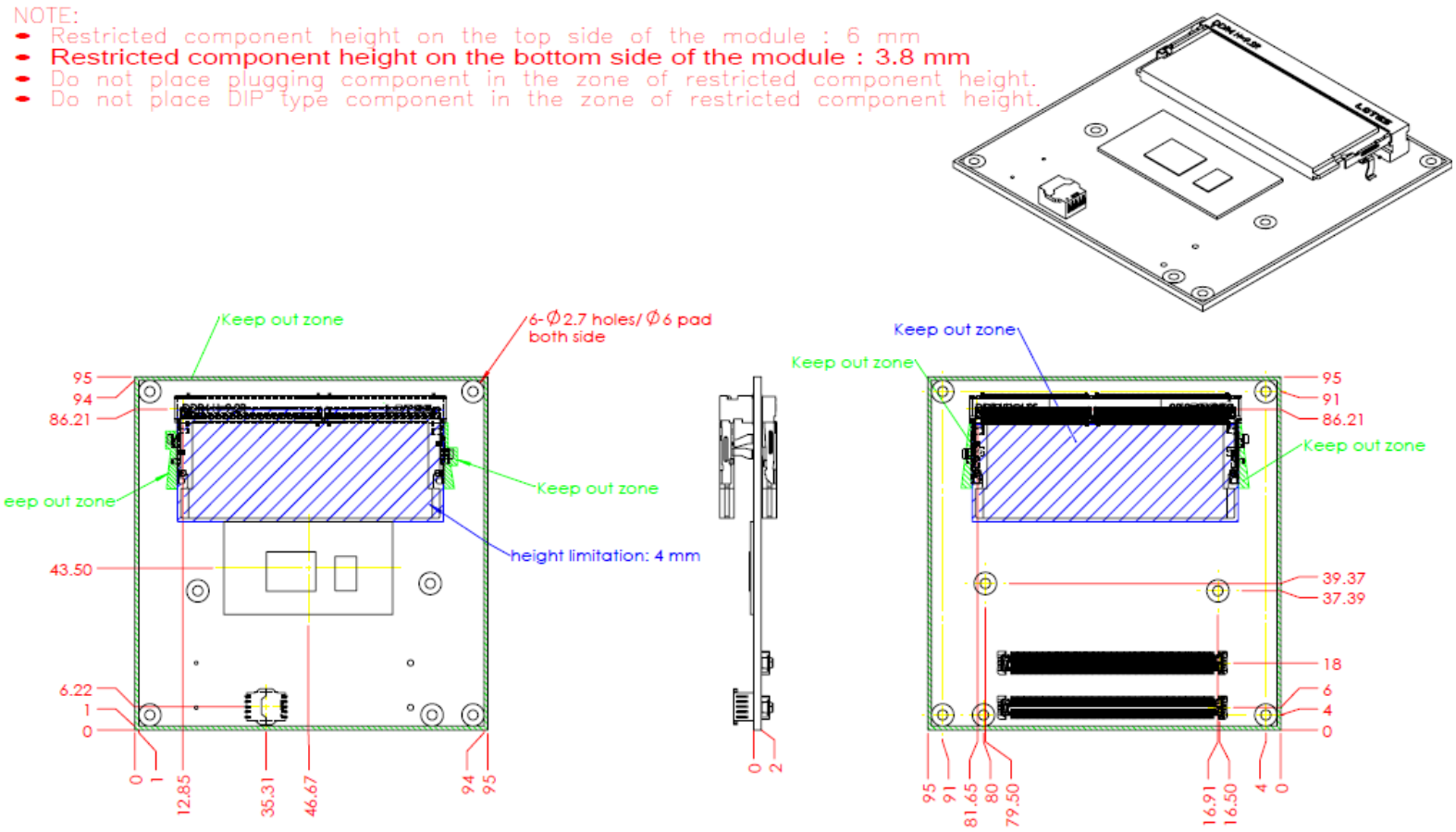


Figure 5 Mechanical Dimensions - Top/Bottom

3.8. PCOM-B656VGL and Cooler weight

PCOM-B656VGL	106.0g +/- 2%
Cooler (H/S+FAN) with Stand-Off	468.0g +/- 2%
H/S with Stand-Off	416.0g +/- 2%

Table 6 Net weight

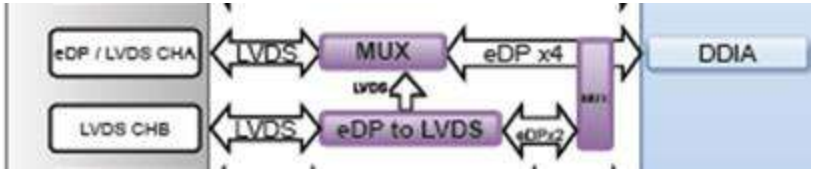
3.9. Environmental Specifications

Storage Temperature	-40~85°C
Operation Temperature	0~60°C/-40~85°C
Storage Humidity	0%~95%
Operation Humidity	0%~95%

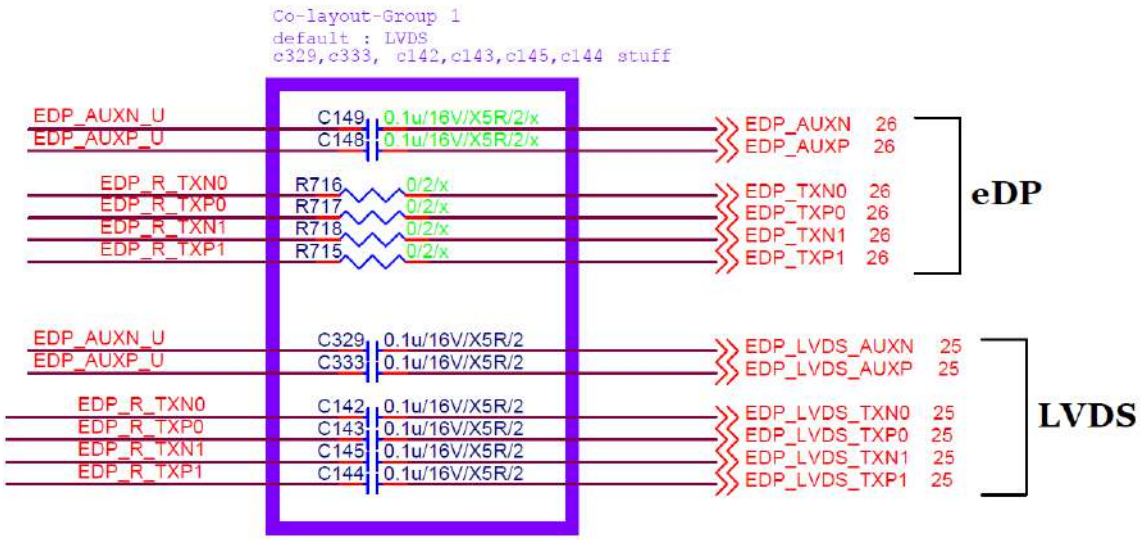
Table 7 Environmental Specifications

3.10. Optional function rework SOP

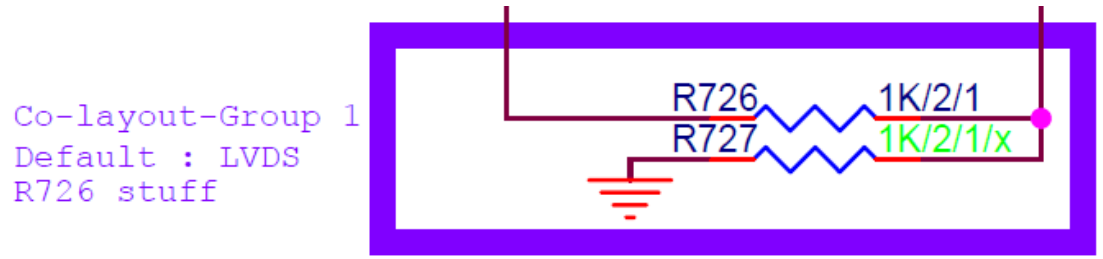
DDIA :Option to eDP(default eDP to LVDS)



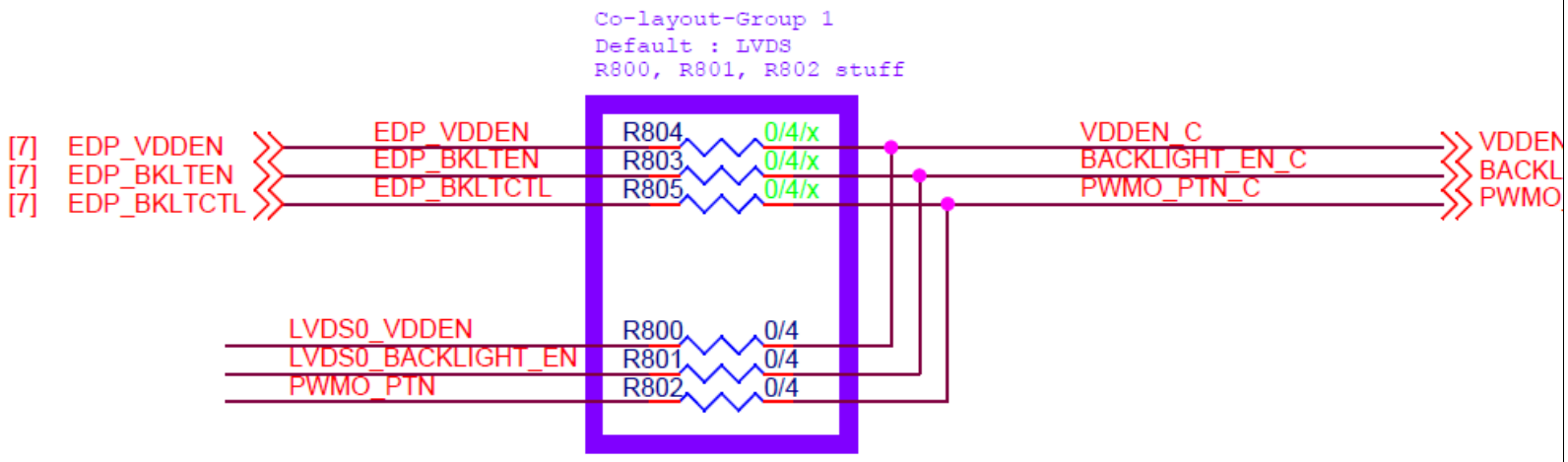
Rework items



unstuff
C329,C333,C142,C143,C145,C144
stuff
C149,C148,R716,R717,R718,R715

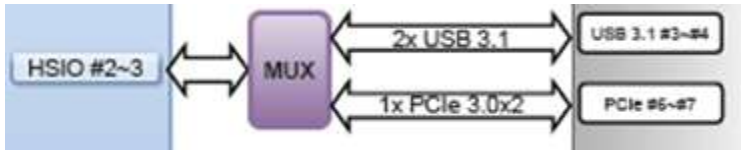


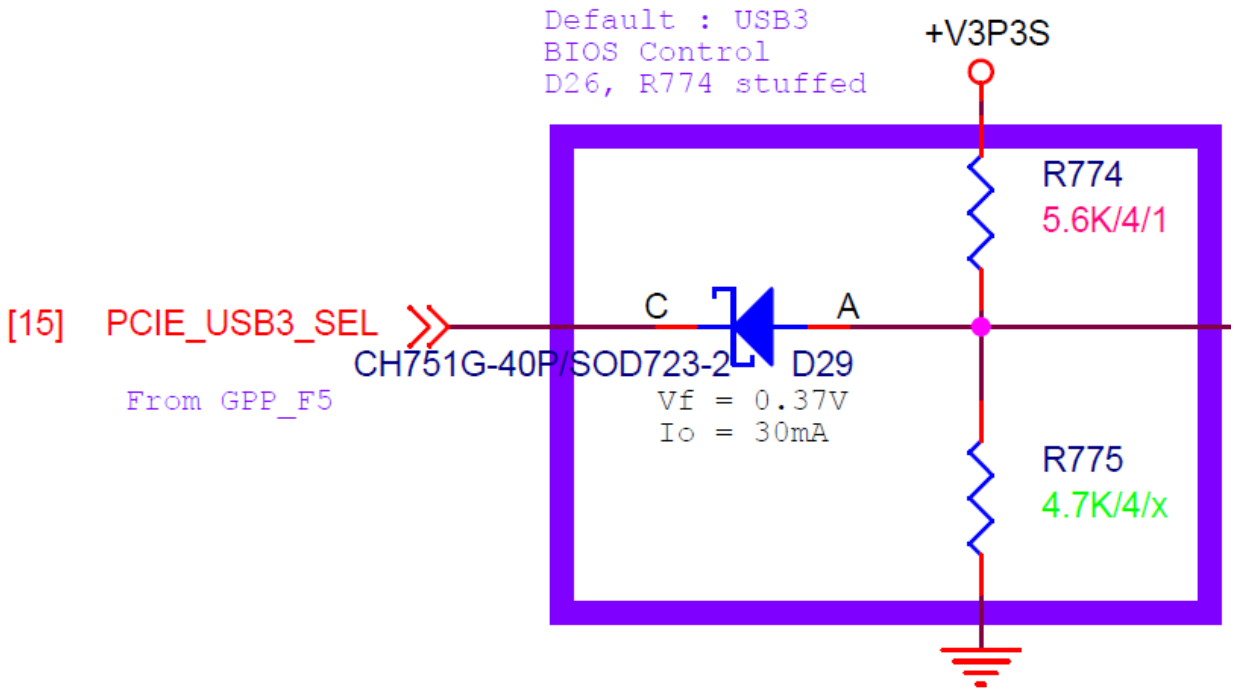
unstuff R726
stuff R727



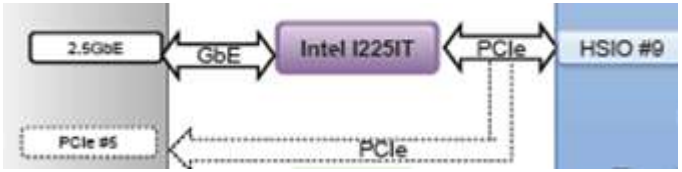
unstuff R800,R801,R802
stuff R803,R804,R805

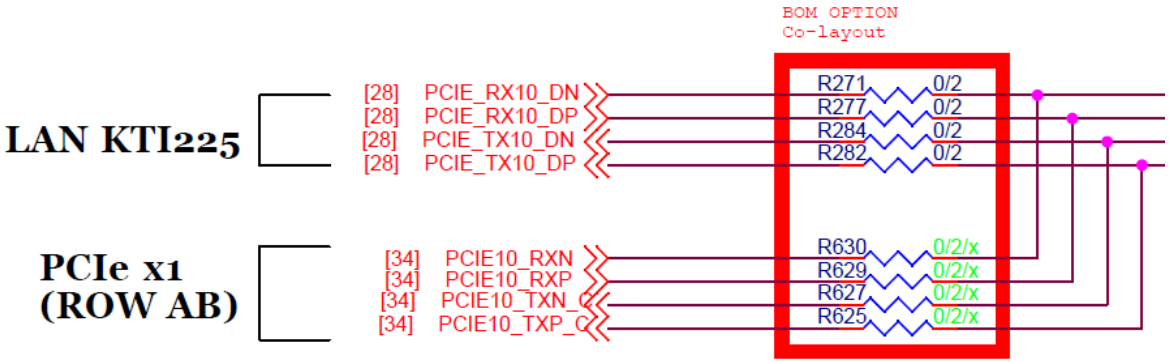
HSIO#2~3 : Option to 2* PCIe 3.0 x 1 (default 2* USB 3.1)



Rework items	
	可用客製版 BIOS 來做 option

HSIO#9: Option to PCIe 3.0 x 1 (default Intel I225 2.5GbE)



Rework items	
	Unstuff R271,R277,R284,R282 Stuff R630,R629,R627,R625

3.11. Power Consumption

The power consumption values were measured with the following condition:

- ATX power supply
- PCOM-B656VGL module
- PCOM-C60B carrier
- PCOM-B656VGL standard Cooler
- Windows 10 IoT Enterprise LTSC

The power consumption values were recorded during the following methods:

- S0 Idle: 12v current, boot into Windows desktop and idle for 5 min
- 100% Workload with turbo: The average 12v current during 100% workload
- Peak Current: The maximum 12v current during the beginning of turbo mode running
- S3: 5v standby current, wait 5 min later after system into sleeping status
- S5: 5v standby current, wait 5 min later after system into shutdown status

Series	PCOM-B656VGL						
Ordering P/N	AB1-3L28	AB1-3L45	AB1-3L48	AB1-3L47	AB1-3L46	AB1-3L49	AB1-3L50
Processor	i7-1185GRE	i7-1185G7E	i5-1145GRE	i5-1145G7E	i3-1115GRE	i3-1115G4E	Celeron 6305E
Cores / Threads	4 / 8	4 / 8	4 / 8	4 / 8	2 / 4	2 / 4	2 / 2
TDP	28W	28W	28W	28W	28W	28W	15W
Power Consumption							
S0 Idle	0.71	0.64	0.65	0.66	0.65	0.64	0.66
100% Workload with turbo mode	3.10	3.18	3.19	3.08	2.54	2.85	0.99
Peak Current	6.37	6.48	5.05	5.42	2.72	3.01	1.16
S3	0.15	0.17	0.14	0.13	0.13	0.12	0.16
S5	0.14	0.16	0.11	0.11	0.11	0.16	0.13

Table 8 Power consumption of PCOM-B656VGL

4. Thermal Solutions

Figure 6 PCOM-B656VGLcooler

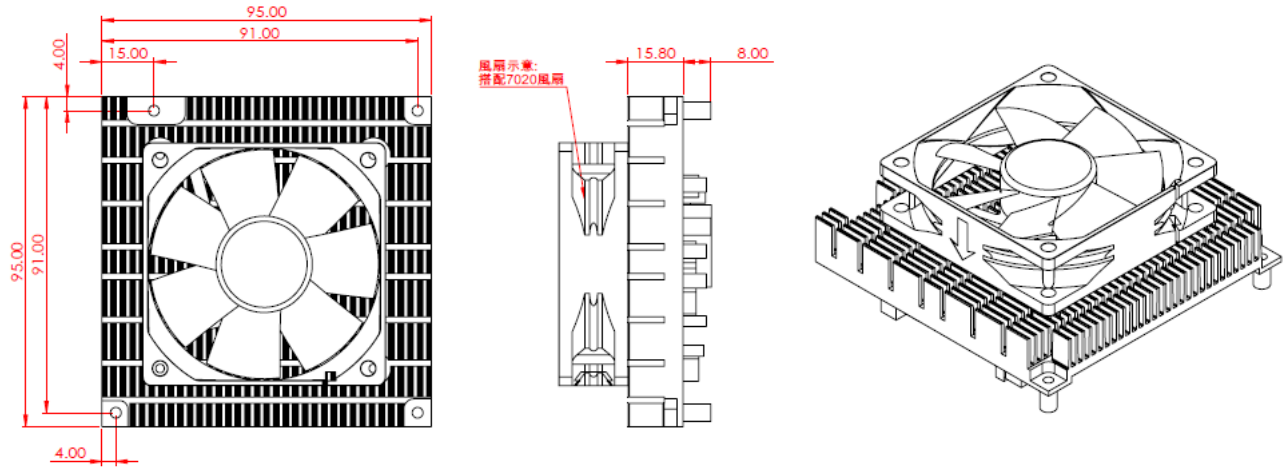


Figure 6 PCOM-B656VGL Heatsink

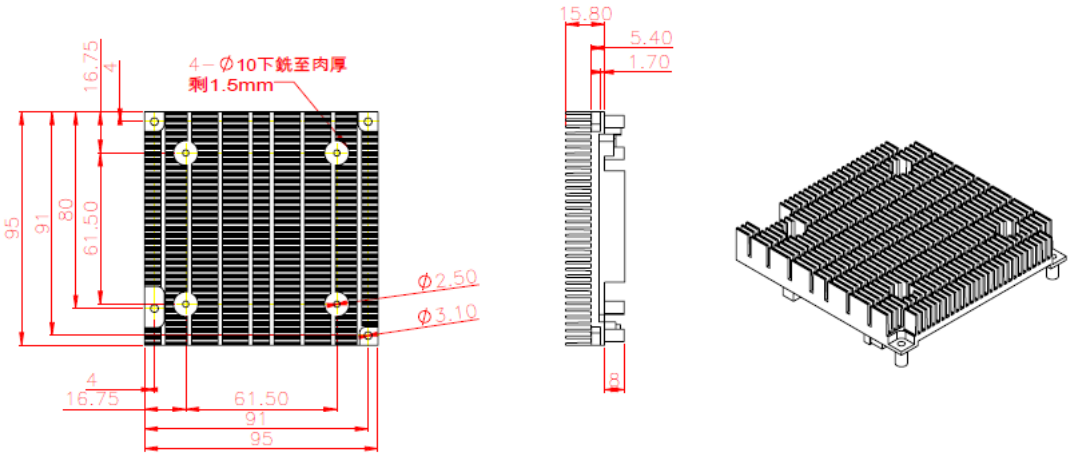


Figure 6 PCOM-B656VGL Heat spreader

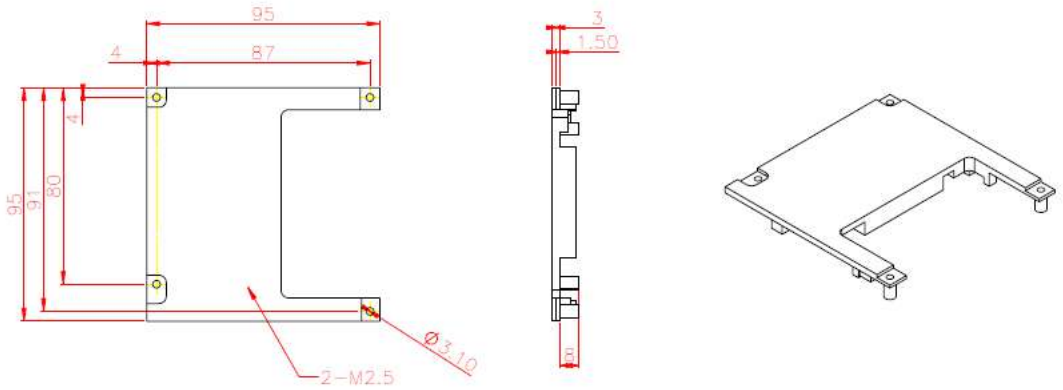
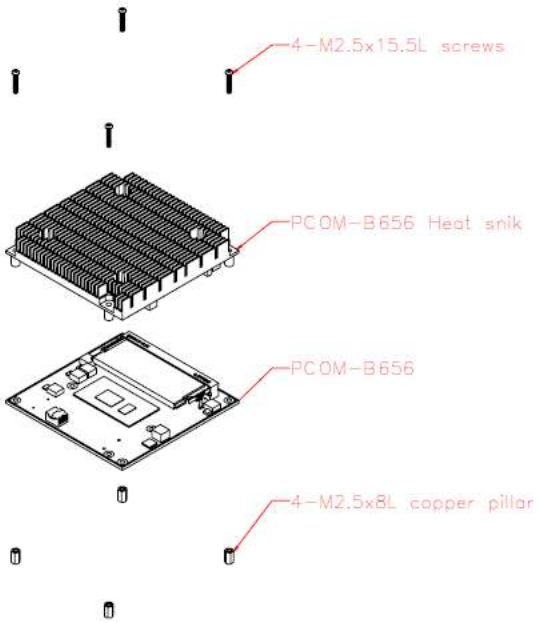


Figure 6 HS Assembly guide



4.1. Packaging

Package	Appearance	Size
Anti-Static bubble bag		180x135mm
White Paper Box		210x151x40mm
Shipping Box (10 pcs White paper box)		595x300x195mm

Table 9 Packaging

4.2. Ordering Guide

PCOM-B656VGL

Product	Ordering P/N	Status
PCOM-B656VGL-1185GRE	AB1-3L28	Available
PCOM-B656VGL-1185G7E	AB1-3L45	Available
PCOM-B656VGL-1145GRE	AB1-3L48	Available
PCOM-B656VGL-1145G7E	AB1-3L37	Available
PCOM-B656VGL-1115GRE	AB1-3L46	Available
PCOM-B656VGL-1115G4E	AB1-3L49	Available
PCOM-B656VGL-6305E	AB1-3L50	Available

Table 10 Ordering Guide - PCOM-B656VGL

Accessory

Product	Ordering P/N	Status
PCOM-B656VGL Cooler	B9971920	Available
PCOM-B656VGL Heatsink	B830B270	Available
PCOM-B656VGL heat spreader	B830B280	In development , order by request
PCOM-C60B	AB1-3G22	Available

Table 11 Ordering Guide - Accessory

5. Pinout Tables

Below tables list PCOM-B656VGL AB and CD Row connectors Type 6 pin name, un-connected pins are present as NC.

Pin	Row A	Row B	Row C	Row D
1	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
2	GBE0_MDI3-	GBE0_ACT#	GND	GND
3	GBE0_MDI3+	LPC_FRAME#/ESPI_CS0#	USB_SSRX0-	USB_SSTX0-
4	GBE0_LINK100#	LPC_AD0/ESPI_IO_0	USB_SSRX0+	USB_SSTX0+
5	GBE0_LINK1000#	LPC_AD1/ESPI_IO_1	GND	GND
6	GBE0_MDI2-	LPC_AD2/ESPI_IO_2	USB_SSRX1-	USB_SSTX1-
7	GBE0_MDI2+	LPC_AD3/ESPI_IO_3	USB_SSRX1+	USB_SSTX1+
8	GBE0_LINK#	LPC_DRQ0#/ESPI_ALERT0#(NC)	GND	GND
9	GBE0_MDI1-	LPC_DRQ1#/ESPI_ALERT1#(NC)	USB_SSRX2-	USB_SSTX2-
10	GBE0_MDI1+	LPC_CLK/ESPI_CK	USB_SSRX2+	USB_SSTX2+
11	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
12	GBE0_MDI0-	PWRBTN#	USB_SSRX3-	USB_SSTX3-
13	GBE0_MDI0+	SMB_CK	USB_SSRX3+	USB_SSTX3+
14	GBE0_CTREF	SMB_DAT	GND	GND
15	SUS_S3#	SMB_ALERT#	DDI1_PAIR6+(NC)	DDI1_CTRLCLK_AUX+
16	SATA0_TX+	SATA1_TX+	DDI1_PAIR6-(NC)	DDI1_CTRLDATA_AUX-
17	SATA0_TX-	SATA1_TX-	RSVD(NC)	RSVD(NC)
18	SUS_S4#	SUS_STAT#/ESPI_RESET#	RSVD(NC)	RSVD(NC)
19	SATA0_RX+	SATA1_RX+	PCIE_RX6+	PCIE_TX6+

20	SATA0_RX-	SATA1_RX-	PCIE_RX6-	PCIE_TX6-
21	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
22	SATA2_TX+(NC)	SATA3_TX+(NC)	PCIE_RX7+	PCIE_TX7+
23	SATA2_TX-(NC)	SATA3_TX-(NC)	PCIE_RX7-	PCIE_TX7-
24	SUS_S5#	PWR_OK	DDI1_HPD	RSVD(NC)
25	SATA2_RX+(NC)	SATA3_RX+(NC)	DDI1_PAIR4 +(NC)	RSVD(NC)
26	SATA2_RX-(NC)	SATA3_RX-(NC)	DDI1_PAIR4-(NC)	DDI1_PAIR0+
27	BATLOW#	WDT	RSVD(NC)	DDI1_PAIR0-
28	(S)ATA_ACT#	HDA_SDIN2	RSVD(NC)	RSVD(NC)
29	HDA_SYNC	HDA_SDIN1	DDI1_PAIR5+(NC)	DDI1_PAIR1+
30	HDA_RST#	HDA_SDIN0	DDI1_PAIR5-(NC)	DDI1_PAIR1-
31	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
32	HDA_BITCLK	SPKR	DDI2_CTRLCLK_AUX+	DDI1_PAIR2+
33	HDA_SDOUT	I2C_CK	DDI2_CTRLDATA_AUX-	DDI1_PAIR2-
34	BIOS_DIS0#/ESPI_SAFS	I2C_DAT	DDI2_DDC_AUX_SEL	DDI1_DDC_AUX_SEL
35	THRMTRIP#	THRM#	RSVD(NC)	RSVD(NC)
36	USB6-	USB7-	DDI3_CTRLCLK_AUX+(NC)	DDI1_PAIR3+
37	USB6+	USB7+	DDI3_CTRLDATA_AUX-(NC)	DDI1_PAIR3-
38	USB_6_7_OC#	USB_4_5_OC#	DDI3_DDC_AUX_SEL(NC)	RSVD(NC)
39	USB4-	USB5-	DDI3_PAIR0+(NC)	DDI2_PAIR0+
40	USB4+	USB5+	DDI3_PAIR0-(NC)	DDI2_PAIR0-
41	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
42	USB2-	USB3-	DDI3_PAIR1+(NC)	DDI2_PAIR1+

43	USB2+	USB3+	DDI3_PAIR1-(NC)	DDI2_PAIR1-
44	USB_2_3_OC#	USB_0_1_OC#	DDI3_HPD(NC)	DDI2_HPD
45	USB0-	USB1-	RSVD(NC)	RSVD(NC)
46	USB0+	USB1+	DDI3_PAIR2+(NC)	DDI2_PAIR2+
47	VCC_RTC	ESPI_EN#	DDI3_PAIR2-(NC)	DDI2_PAIR2-
48	RSVD[10]	USB0_HOST_PRSNT	RSVD(NC)	RSVD(NC)
49	GBE0_SDP	SYS_RESET#	DDI3_PAIR3+NC)	DDI2_PAIR3+
50	LPC_SERIRQ/ESPI_CS1#	CB_RESET#	DDI3_PAIR3-(NC)	DDI2_PAIR3-
51	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
52	PCIE_TX5+	PCIE_RX5+	PEG_RX0+	PEG_TX0+
53	PCIE_TX5-	PCIE_RX5-	PEG_RX0-	PEG_TX0-
54	GPI0	GPO1	TYPE0#	PEG_LANE_RV#
55	PCIE_TX4+	PCIE_RX4+	PEG_RX1+	PEG_TX1+
56	PCIE_TX4-	PCIE_RX4-	PEG_RX1-	PEG_TX1-
57	GND	GPO2	TYPE1#	TYPE2#
58	PCIE_TX3+	PCIE_RX3+	PEG_RX2+	PEG_TX2+
59	PCIE_TX3-	PCIE_RX3-	PEG_RX2-	PEG_TX2-
60	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
61	PCIE_TX2+	PCIE_RX2+	PEG_RX3+	PEG_TX3+
62	PCIE_TX2-	PCIE_RX2-	PEG_RX3-	PEG_TX3-
63	GPI1	GPO3	RSVD(NC)	RSVD(NC)
64	PCIE_TX1+	PCIE_RX1+	RSVD(NC)	RSVD(NC)
65	PCIE_TX1-	PCIE_RX1-	PEG_RX4+(NC)	PEG_TX4+(NC)

66	GND	WAKE0#	PEG_RX4-(NC)	PEG_TX4-(NC)
67	GPI2	WAKE1#(NC)	RAPID_SHUTDOWN	GND
68	PCIE_TX0+	PCIE_RX0+	PEG_RX5+(NC)	PEG_TX5+(NC)
69	PCIE_TX0-	PCIE_RX0-	PEG_RX5-(NC)	PEG_TX5-(NC)
70	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
71	LVDS_A0+	LVDS_B0+	PEG_RX6+(NC)	PEG_TX6+(NC)
72	LVDS_A0-	LVDS_B0-	PEG_RX6-(NC)	PEG_TX6-(NC)
73	LVDS_A1+	LVDS_B1+	GND	GND
74	LVDS_A1-	LVDS_B1-	PEG_RX7+(NC)	PEG_TX7+(NC)
75	LVDS_A2+	LVDS_B2+	PEG_RX7-(NC)	PEG_TX7-(NC)
76	LVDS_A2-	LVDS_B2-	GND	GND
77	LVDS_VDD_EN	LVDS_B3+	RSVD(NC)	RSVD(NC)
78	LVDS_A3+	LVDS_B3-	PEG_RX8+(NC)	PEG_TX8+(NC)
79	LVDS_A3-	LVDS_BKLT_EN	PEG_RX8-(NC)	PEG_TX8-(NC)
80	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
81	LVDS_A_CK+	LVDS_B_CK+	PEG_RX9+(NC)	PEG_TX9+(NC)
82	LVDS_A_CK-	LVDS_B_CK-	PEG_RX9-(NC)	PEG_TX9-(NC)
83	LVDS_I2C_CK	LVDS_BKLT_CTRL	RSVD(NC)	RSVD(NC)
84	LVDS_I2C_DAT	VCC_5V_SBY	GND	GND
85	GPI3	VCC_5V_SBY	PEG_RX10+(NC)	PEG_TX10+(NC)
86	RSVD(NC)	VCC_5V_SBY	PEG_RX10-(NC)	PEG_TX10-(NC)
87	eDP_HPD	VCC_5V_SBY	GND	GND
88	PCIE_CLK_REF+	BIOS_DIS1#	PEG_RX11+(NC)	PEG_TX11+(NC)

89	PCIE_CLK_REF-	VGA_RED	PEG_RX11-(NC)	PEG_TX11-(NC)
90	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
91	SPI_POWER	VGA_GRN	PEG_RX12+(NC)	PEG_TX12+(NC)
92	SPI_MISO	VGA_BLU	PEG_RX12-(NC)	PEG_TX12-(NC)
93	GPO0	VGA_HSYNC	GND	GND
94	SPI_CLK	VGA_VSYNC	PEG_RX13+(NC)	PEG_TX13+(NC)
95	SPI_MOSI	VGA_I2C_CK	PEG_RX13-(NC)	PEG_TX13-(NC)
96	TPM_PP	VGA_I2C_DAT	GND	GND
97	TYPE10#	SPI_CS#	RSVD(NC)	RSVD(NC)
98	SER0_TX	RSVD(NC)	PEG_RX14+(NC)	PEG_TX14+(NC)
99	SER0_RX	RSVD(NC)	PEG_RX14-(NC)	PEG_TX14-(NC)
100	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)
101	SER1_TX	FAN_PWMOUT	PEG_RX15+(NC)	PEG_TX15+(NC)
102	SER1_RX	FAN_TACHIN	PEG_RX15-(NC)	PEG_TX15-(NC)
103	LID#	SLEEP#	GND	GND
104	VCC_12V	VCC_12V	VCC_12V	VCC_12V
105	VCC_12V	VCC_12V	VCC_12V	VCC_12V
106	VCC_12V	VCC_12V	VCC_12V	VCC_12V
107	VCC_12V	VCC_12V	VCC_12V	VCC_12V
108	VCC_12V	VCC_12V	VCC_12V	VCC_12V
109	VCC_12V	VCC_12V	VCC_12V	VCC_12V
110	GND(FIXED)	GND(FIXED)	GND(FIXED)	GND(FIXED)

Table 13 PCOM-B656VGL Pin-out

6. BIOS Setup Items

6.1. Introduction

The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

6.2. BIOS Setup

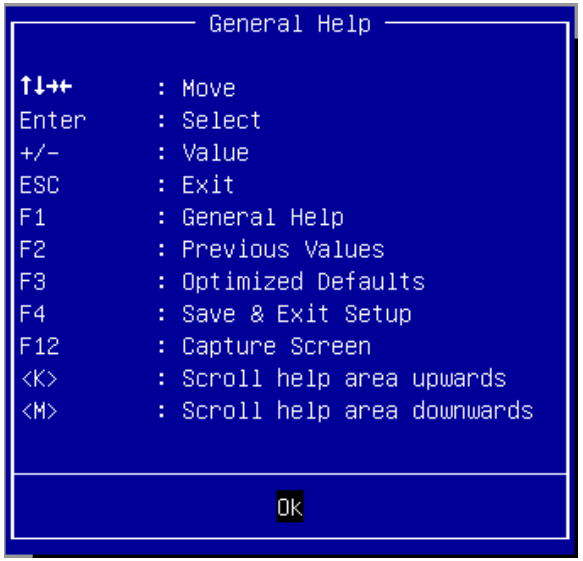
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <ESC> key will enter BIOS setup screen.

Press <ESC > or <Delete> 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.

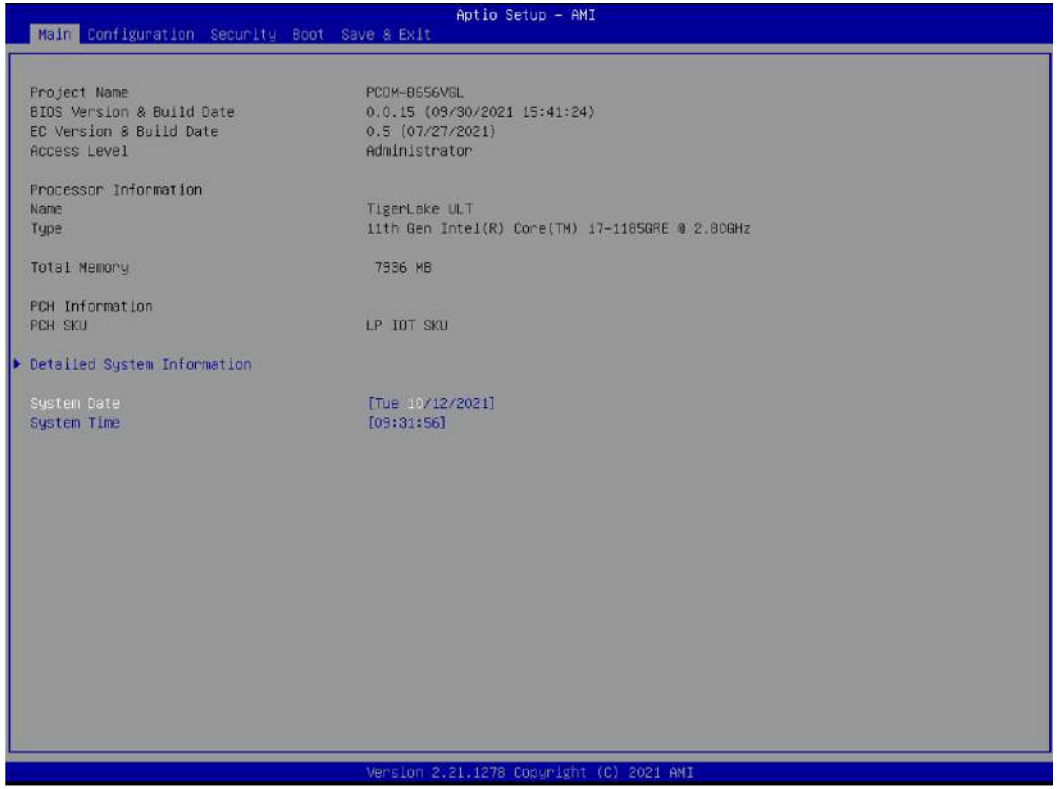
Press <F1> to Run General Help or Resume

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.



6.2.1 Main

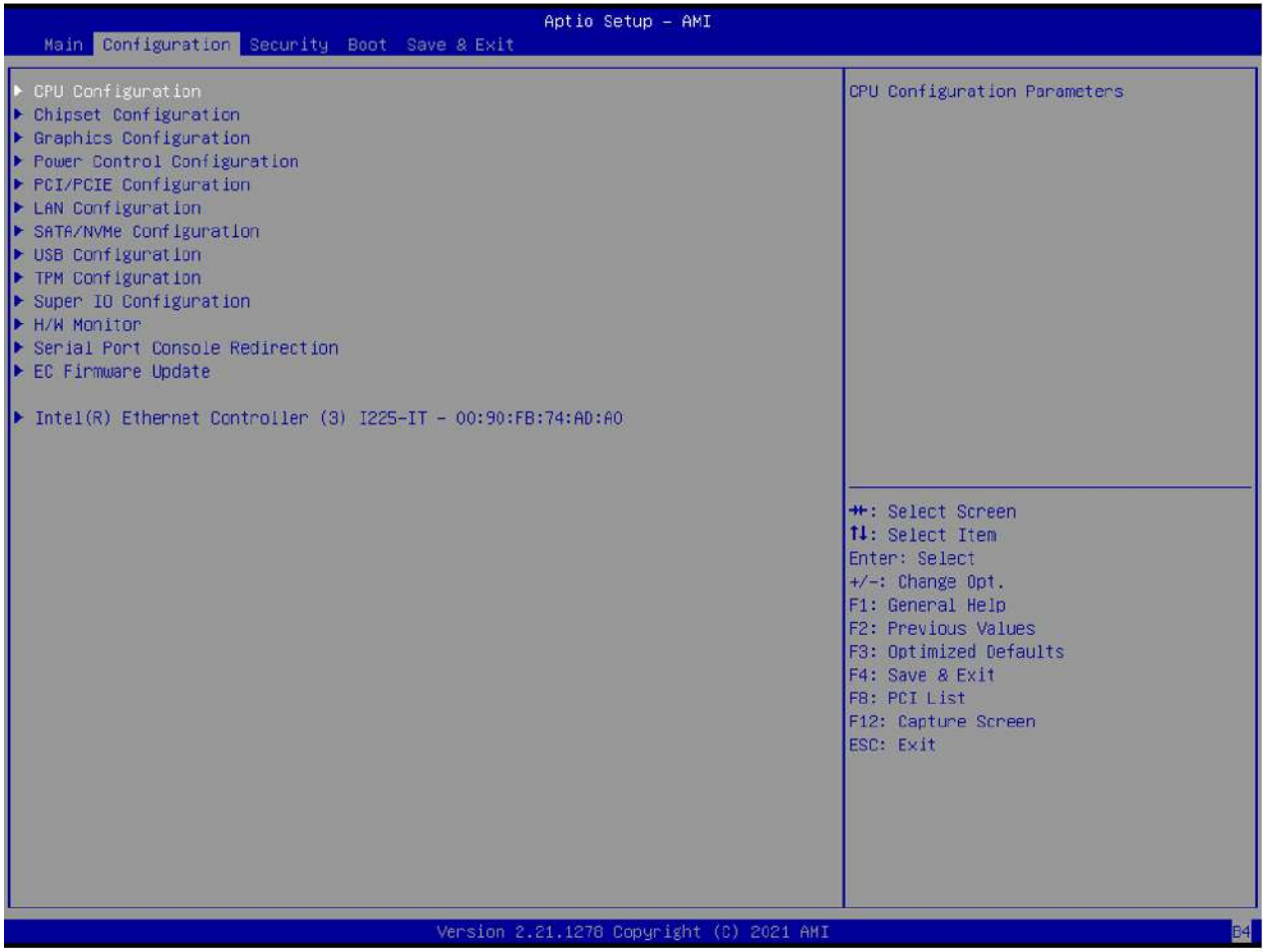
Use this menu for basic system configurations, such as time, date etc.



Feature	Description	Options
Detailed System Information		
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.	

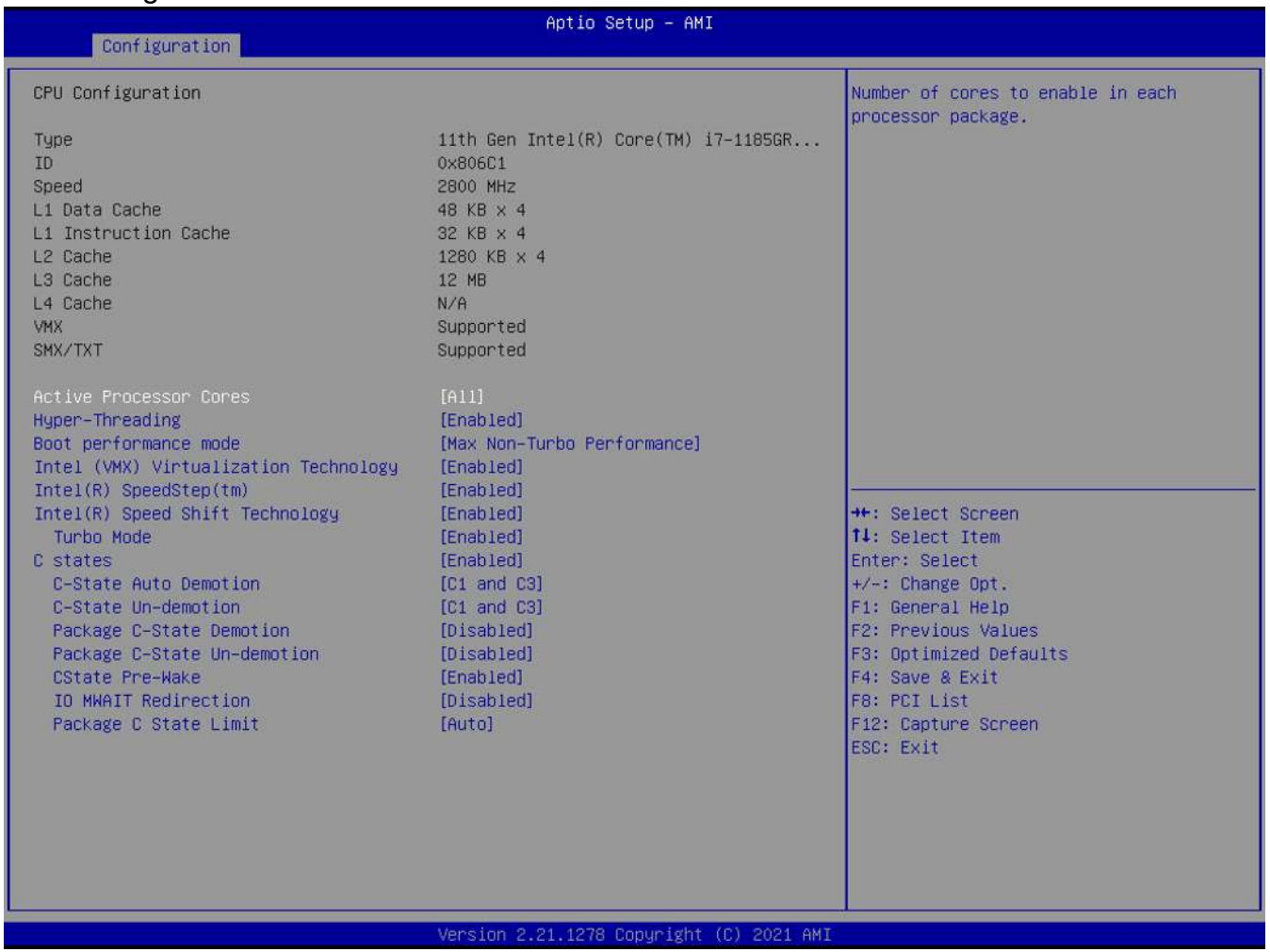
6.2.2 Configuration

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



CPU Configuration

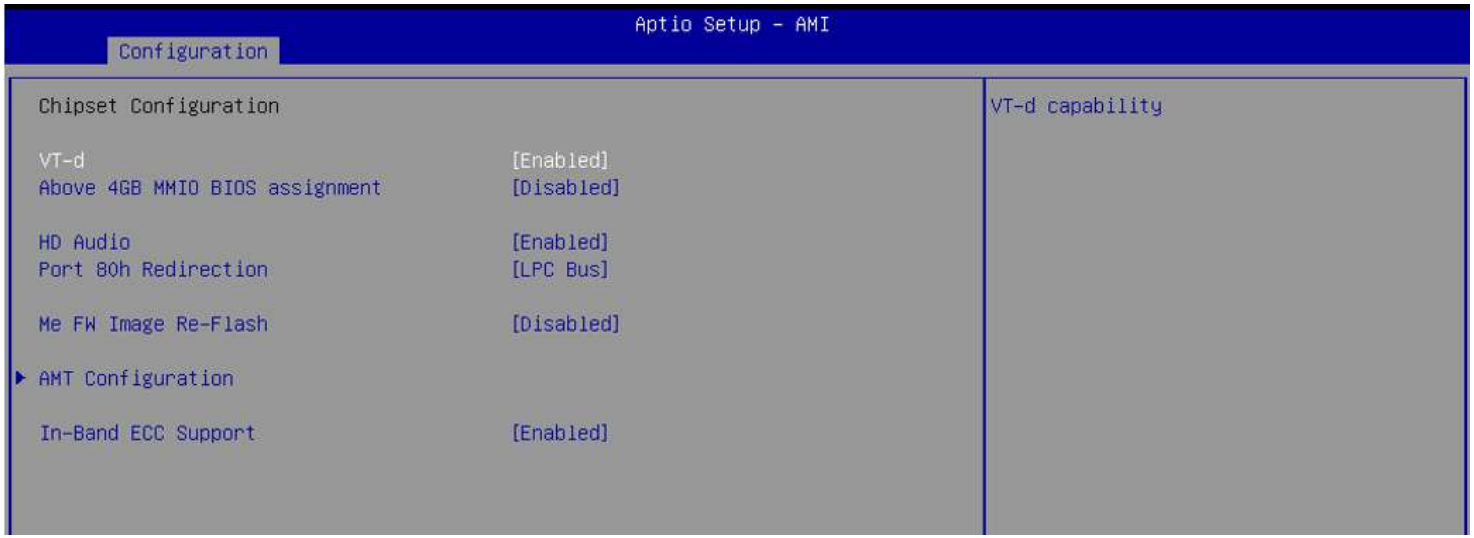
CPU Configuration Parameters



Feature	Description	Options
Active Processor Cores	Number of cores to enable in each processor package.	★All, 1, 2, 3
Hyper-Threading	Enabled or Disabled Hyper-Threading Technology.	★Enabled, Disabled
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector	Max Battery, ★Max Non-Turbo Performance Turbo Performance,
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.	★Enabled, Disabled
Intel® Speed Step™	Allows more than two frequency ranges to be supported.	★Enabled, Disabled
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	★Enabled, Disabled
Turbo Mode	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled)	★Enabled, Disabled
C states	Enable/disable CPU Power Management. Allows CPU to go to C states It's not 100% utilized	★Enabled, Disabled
C-State Auto Demotion	Configure C-State Auto Demotion	Disable, C1 ,C3 , ★C1 and C3
C-State Un-demotion	Configure C-State Un-demotion	Disable, C1 ,C3 , ★C1 and C3
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
Package C State Limit	Maximum Package C State Limit Setting. Cpu Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C States Limit	★Auto,C0/C1,C2,C3,C6, C7, C7S,C8,C9,C10,Cpu Default,

Chipset Configuration

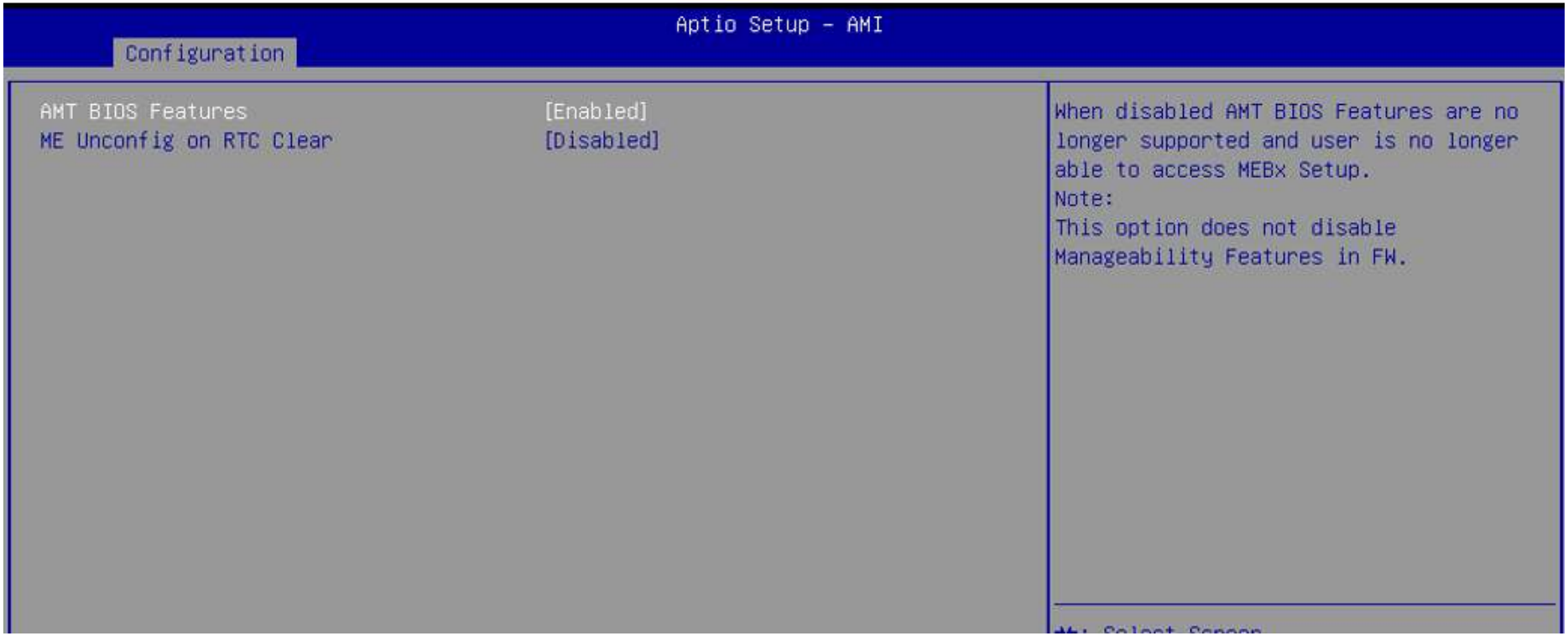
Configuration Chipset feature



Feature	Description	Options
VT-d	VT-d Capability	★Enabled ,Disabled
Above 4GB MMIO BIOS assignment	Enable/Disable above 4GB MemoryMappedIO 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= HAD will be unconditionally disabled Enabled= HAD will be unconditionally enabled.	★Enabled ,Disabled
Port 80h Redirection	Control where 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
In-Band ECC Support	Enable/Disable In-Band ECC. Either the IBECC or the TME can be enabled	Disabled,★Enabled

AMT Configuration

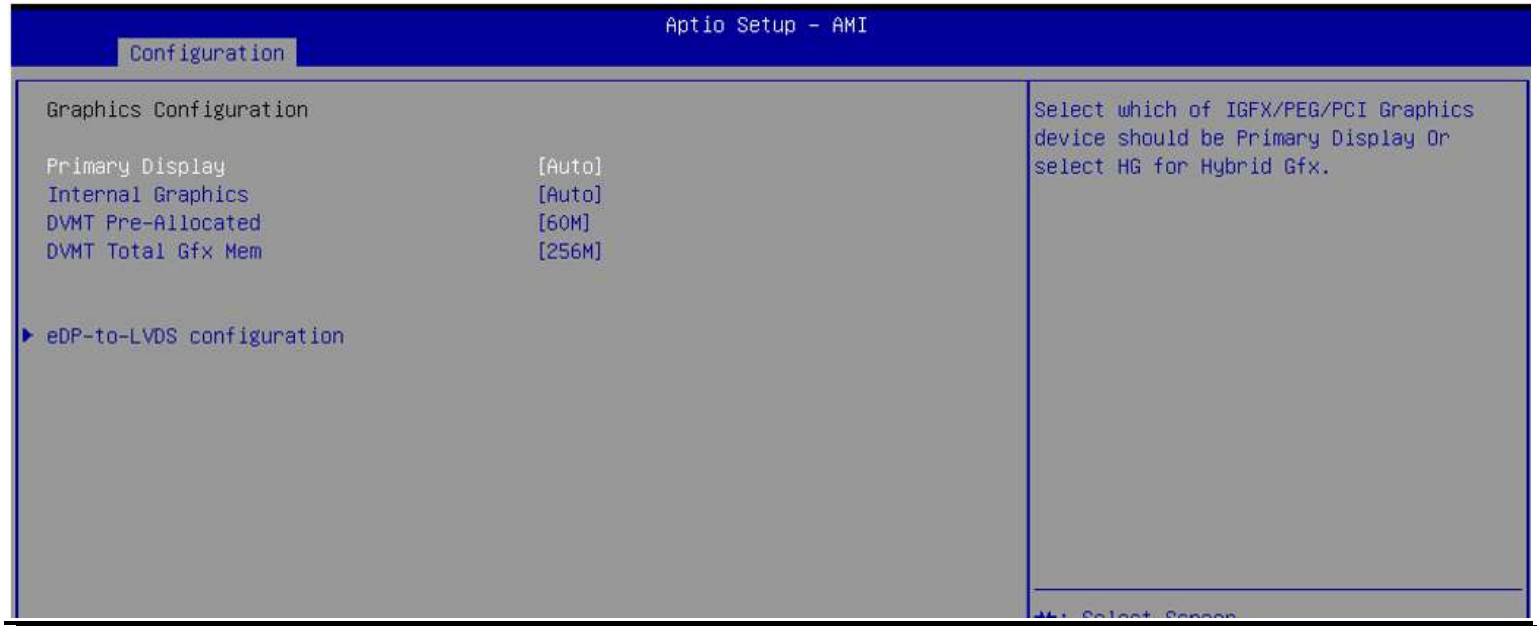
Configure Intel® Active Management Technology Parameters



Feature	Description	Options
AMT BIOS Features	When disable AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW	Disabled,★Enabled
ME Unconfig on RTC Clear	When Disable ME will not be unconfigured on RTC Clear	★Disabled, Enabled

Graphics Configuration

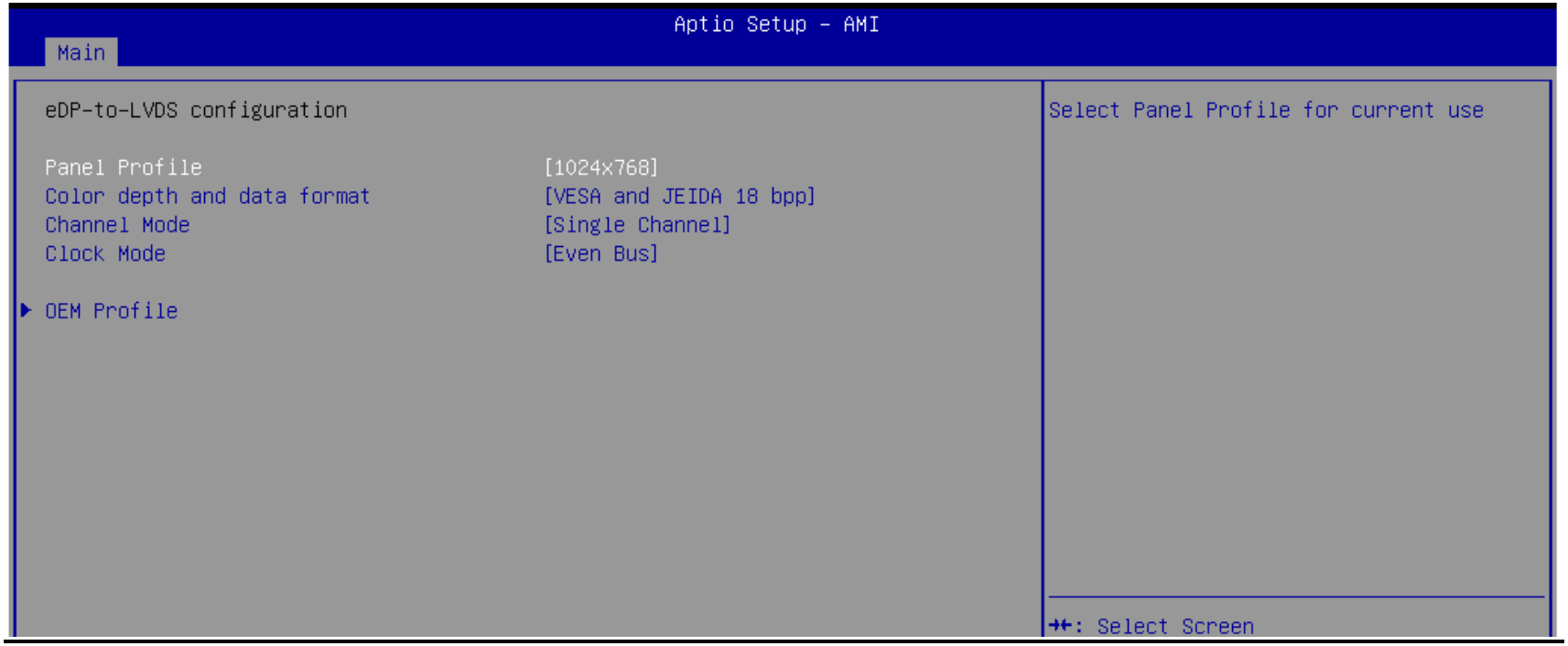
Configuration Graphics Settings



Feature	Description	Options
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.	★Auto, IGFX, PEG, PCI
Internal Graphics	Keep IGFX enable based on the setup options.	★Auto, Disable, Enable
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.	0M,32M,64M,4M,8M,12M,16M,20M,24M,28M, 32M/F7,36M,40M,44M,48M,52M,56M,★60M
DVMT Total Gfx Mem	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device	★256M, 128M, MAX

eDP-to-LVDS configuration

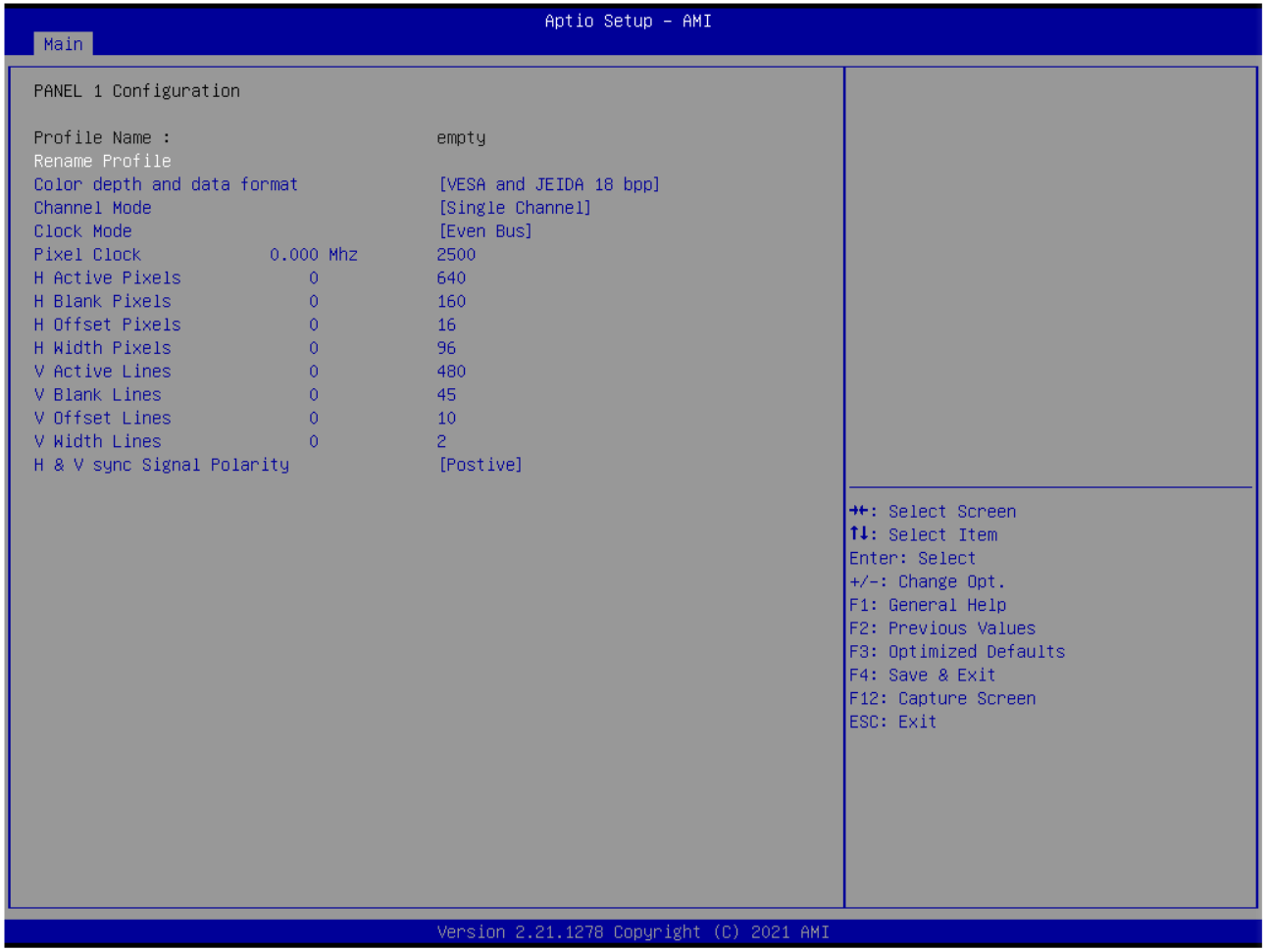
eDP-to-LVDS



Feature	Description	Options
Panel Profile	Select Panel Profile for current use.	★1024x768,640x480,800x480,800x600,1280x800 1280x1024,1366x768,1440x900,1920x1080,OEM Profile
Color depth and data format	Select Color depth and data format	★VESA and JEIDA 18 bpp, VESA 24 bpp, JEIDA 24 bpp
Channel Mode	Select LVDS Channel Mode	★Single Channel, Dual Channel
Clock Mode	Select clock output for LVDS.	★Even Bus, Odd Bus, Both Buses

OEM Profile

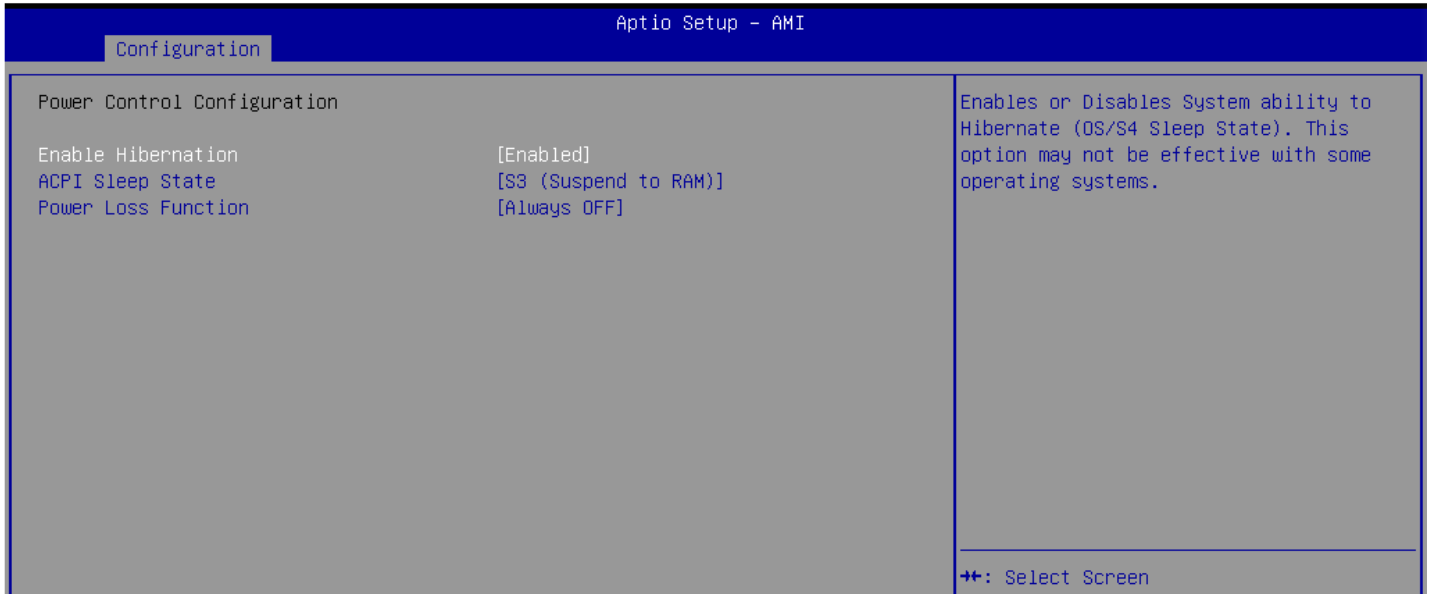
PANEL 1 Configuration



Feature	Description	Options
Color depth and data format	Select Color depth and data format	★VESA and JEIDA 18 bpp, VESA 24 bpp, JEIDA 24 bpp
Channel Mode	Select LVDS Channel Mode	★Single Channel, Dual Channel
Clock Mode	Select clock output for LVDS.	★Even Bus, Odd Bus, Both Buses
Pixel Clock	Pixel Clock(10Khz)	★2500
H Active Pixels	H Active Pixels (Pixel)	★640
H Blank Pixels	H Blank Pixels (Pixel)	★160
H Offset Pixels	H Offset Pixels (Pixel)	★16
H Width Pixels	H Width Pixels (Pixel)	★96
V Active Lines	V Active Lines (Line)	★480
V Blank Lines	V Blank Lines (Line)	★45
V Offset Lines	V Offset Lines (Line)	★10
V Width Lines	V Width Lines (Line)	★2
H&V sync Signal Polarity	Flag: 0x1E Signal Polarity is Postive 0x18 Signal Polarity is Non-Postive	★Postive, Non-Postive

Power Control Configuration

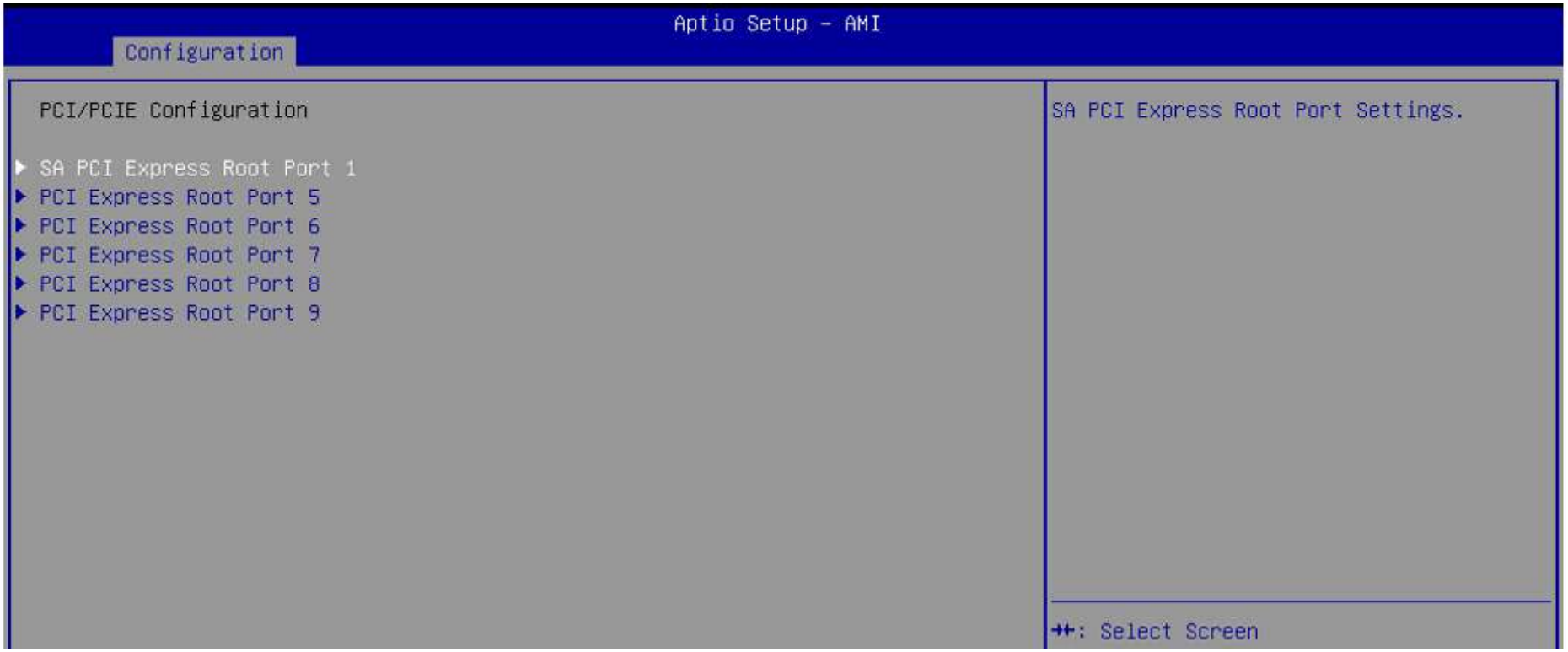
System Power Control Configuration Parameters



Feature	Description	Options
Enable Hibernation	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some operating system	Disabled, ★Enabled
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	Suspend Disabled ,★S3 (Suspend to RAM)
Power Loss Function	Control SIO Power Loss Function. ON is always ON, OFF is always OFF, Last state will depends on last power state	★Always OFF, Always ON, Last State,

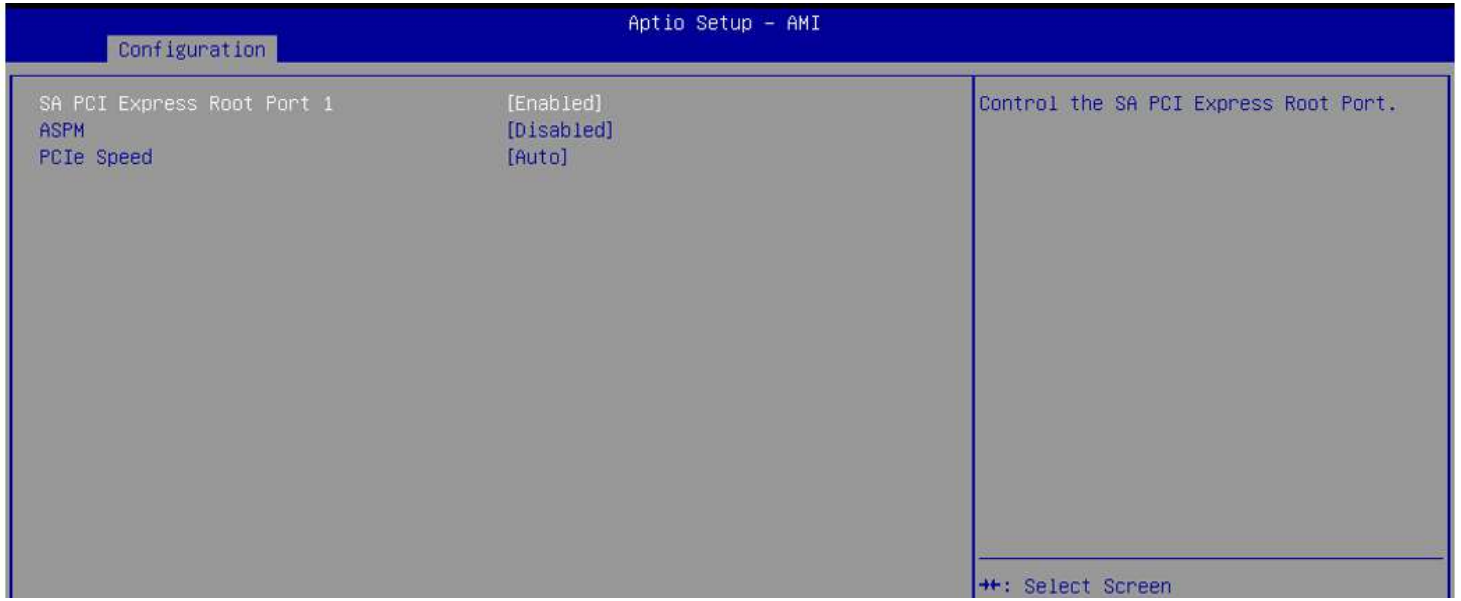
PCI/PCIE Configuration

PCI, PCI-X and PCI Express Settings



PCI Express Root Port 1, 5~9

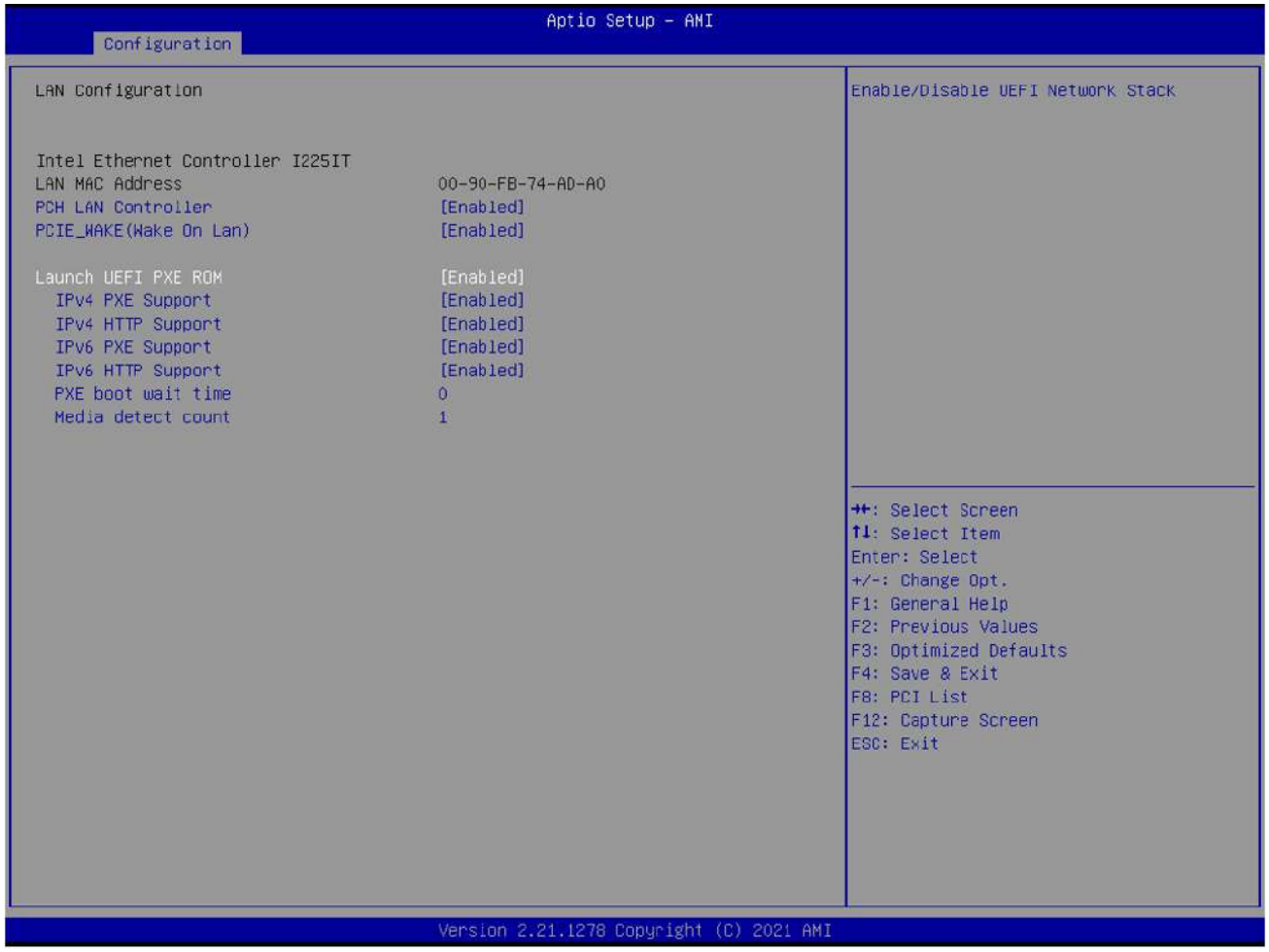
PCI Express Root Port Settings



Feature	Description	Options
SA PCI Express Port 1, 5~9	Control the SA 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

LAN Configuration

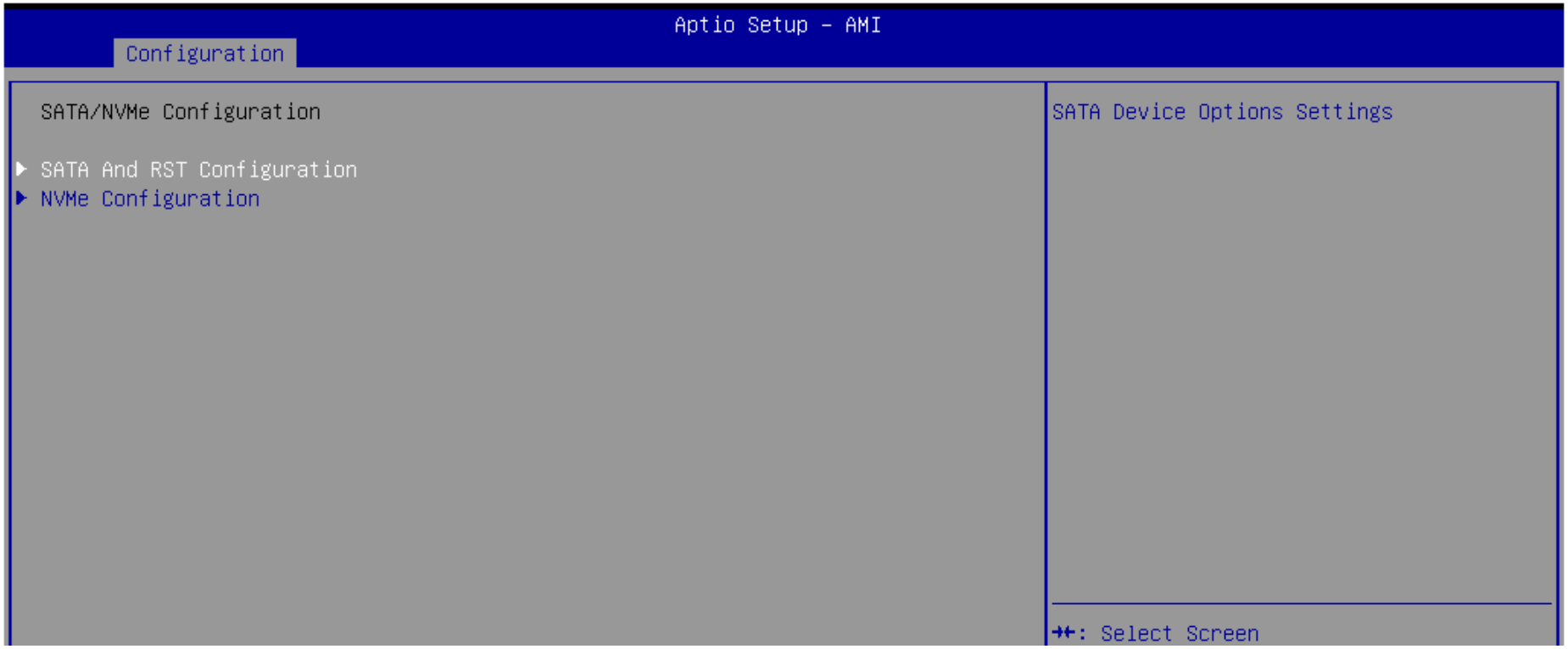
Configuration On Board LAN Device



Feature	Description	Options
PCH LAN Controller	Enable/Disable onboard NIC	★Enabled , Disabled
Wake on LAN Enable	Enable/Disable integrated LAN to wake the system.	★Enabled , Disabled
Launch UEFI PXE ROM	Enable/Disable UEFI Network Stack	★Disabled, Enabled
Launch UEFI PXE ROM[Enable]		
Ipv4 PXE Support	Enable/Disable Ipv4 PXE boot support.	Disabled, ★Enabled
Ipv4 HTTP Support	Enable/Disable Ipv4 HTTP boot support. If disable, IPv4 HTTP boot support will not be available.	Disabled, ★Enabled
Ipv6 PXE Support	Enable/Disable Ipv6 PXE boot support. If disable, IPv6 PXE boot support will not be available.	Disabled, ★Enabled
Ipv6 HTTP Support	Enable/Disable Ipv6 HTTP boot support. If disable, IPv6 HTTP boot support will not be available.	Disabled, ★Enabled
IPSEC Certificate	Support to Enable/Disable IPSEC certificate for Ikev	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 values	★0
Media detect count	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the values.	★1

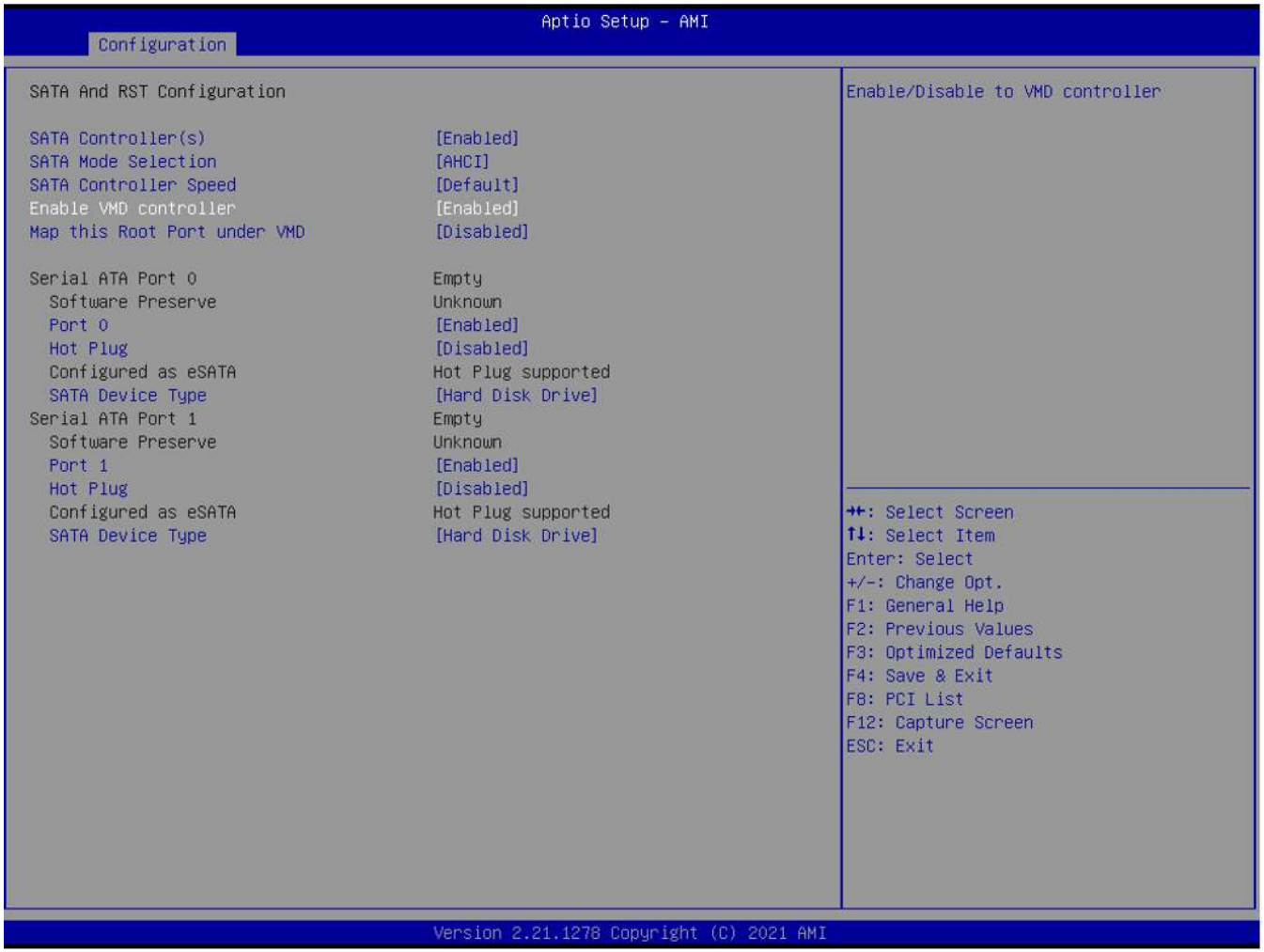
SATA Configuration

SATA/NVMe Device Options Settings



Feature	Description	Options
SATA And RST Configuration	SATA Device Options Settings	
NVMe Configuration	NVMe Device Options Settings	

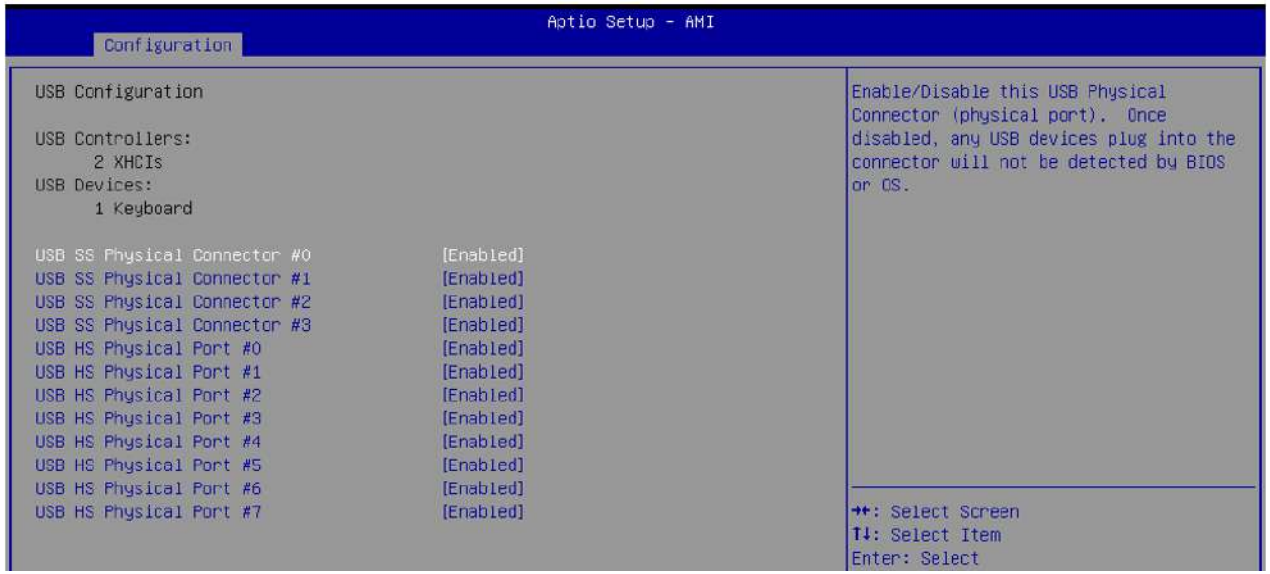
SATA And RST Configuration



Feature	Description	Options
SATA Controller(s)	Enable/Disable the SATA Device.	★Enabled , Disabled
SATA Mode Selection	Determines how SATA controller(s) operate	★AHCI, Intel RST With Intel Optane System Acceieration
SATA Controller Speed	Indicates the maximum speed the SATA controller can support	★Default,Gen1,Gen2,Gen3
Enable VMD controller	Enable/Disable to VMD controller	★Disabled, Enabled
Map this Root Port under VMD	Map/UnMap this Root Port to VMD	★Disabled, Enabled
COMe SATA Port 0~1		
Port 0~1	Enable or Disable SATA Port	★Enabled ,Disabled
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

USB Configuration

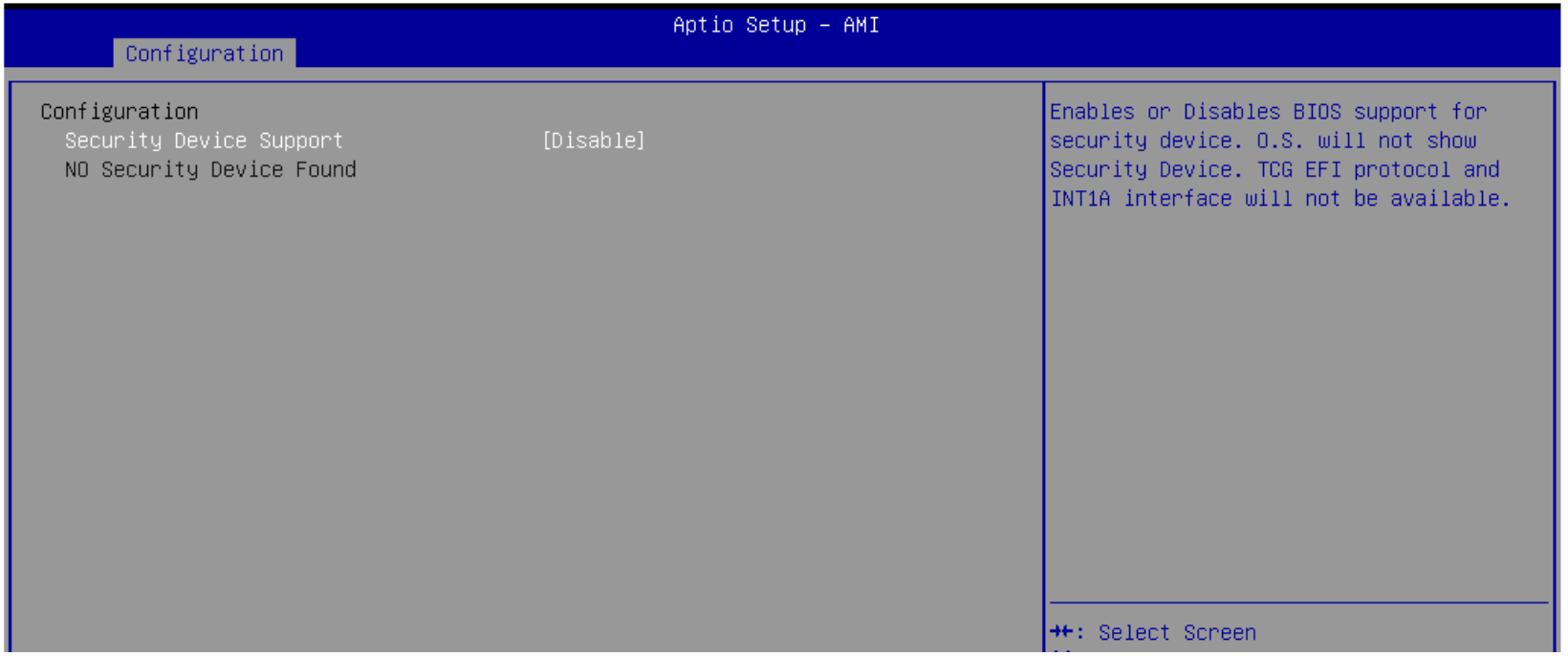
USB Configuration Parameters



Feature	Description	Options
USB SS Physical Connector #0~3	Enable/Disable this USB Physical Connector (physical port). Once disable, any USB devices plug into the connector will not be detected by BIOS or OS	★Enabled ,Disabled
USB HS Physical Port #0~7	Enable/Disable this USB Physical Connector (physical port). Once disable, any USB devices plug into the connector will not be detected by BIOS or OS	★Enabled ,Disabled

TPM Configuration

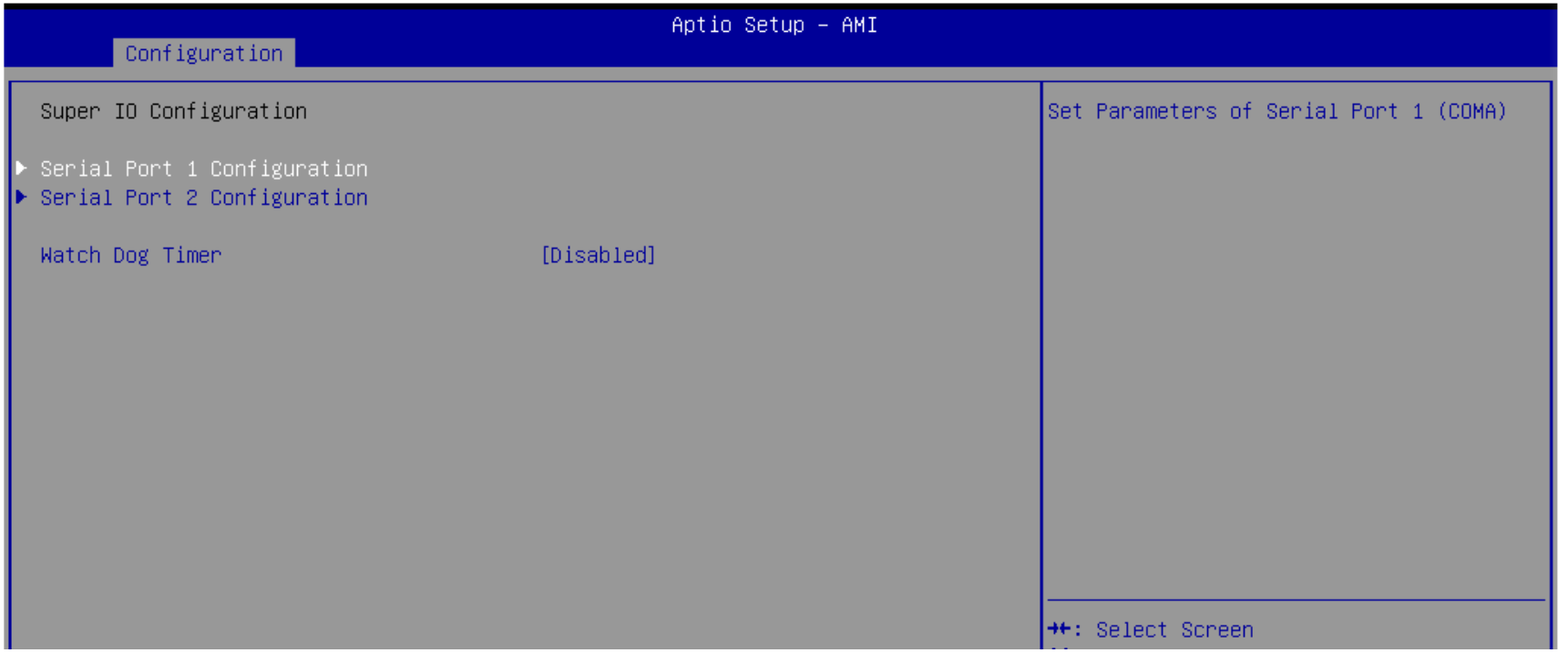
Trust Computing Settings



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

Super IO Configuration

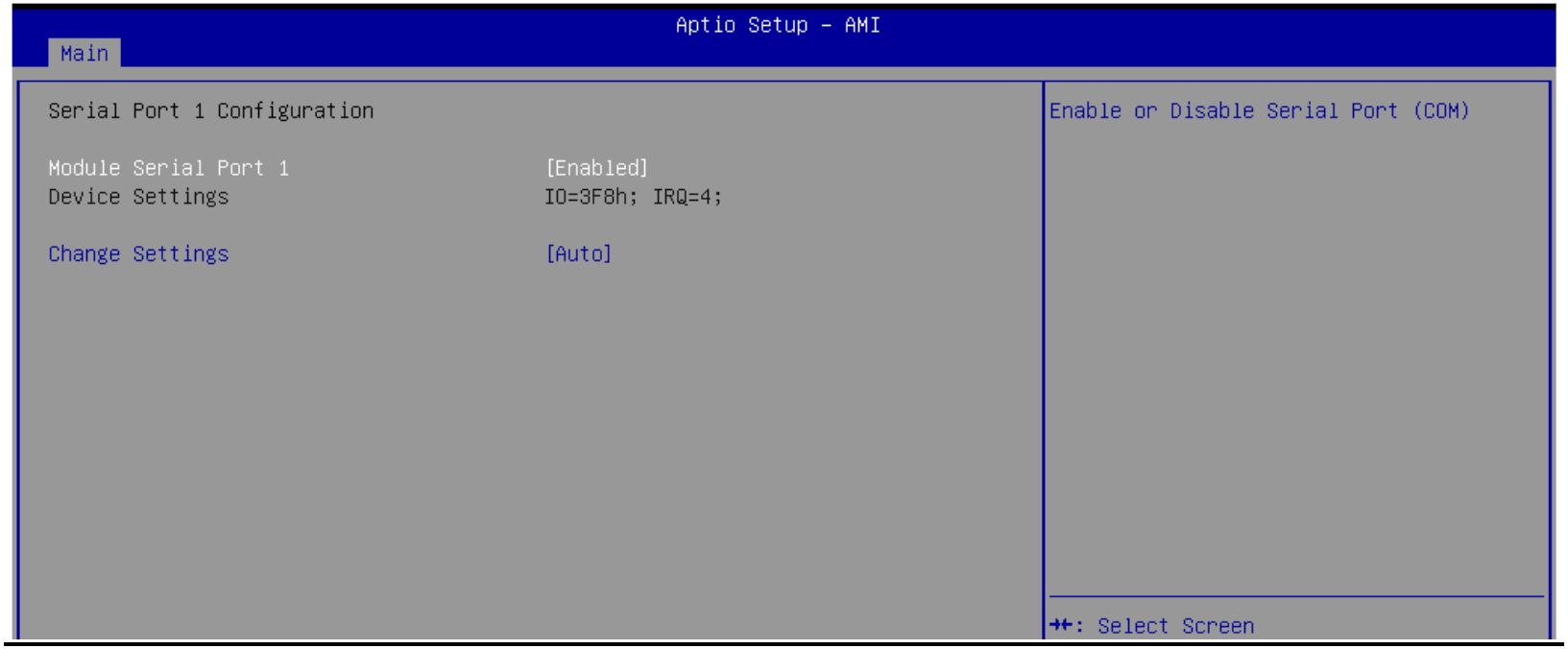
System Super IO Chip Parameters



Feature	Description	Options
Watch Dog Timer	Enable/Disable Watch Dog Timer	★Disabled, Enabled
Watch Dog Timer[Enable]		
Timer Unit	Select Timer count unit of WDT	★Second, Minute
Timer value	Set WDT Timer value seconds/minutes	★20

Serial Port 1 Configuration

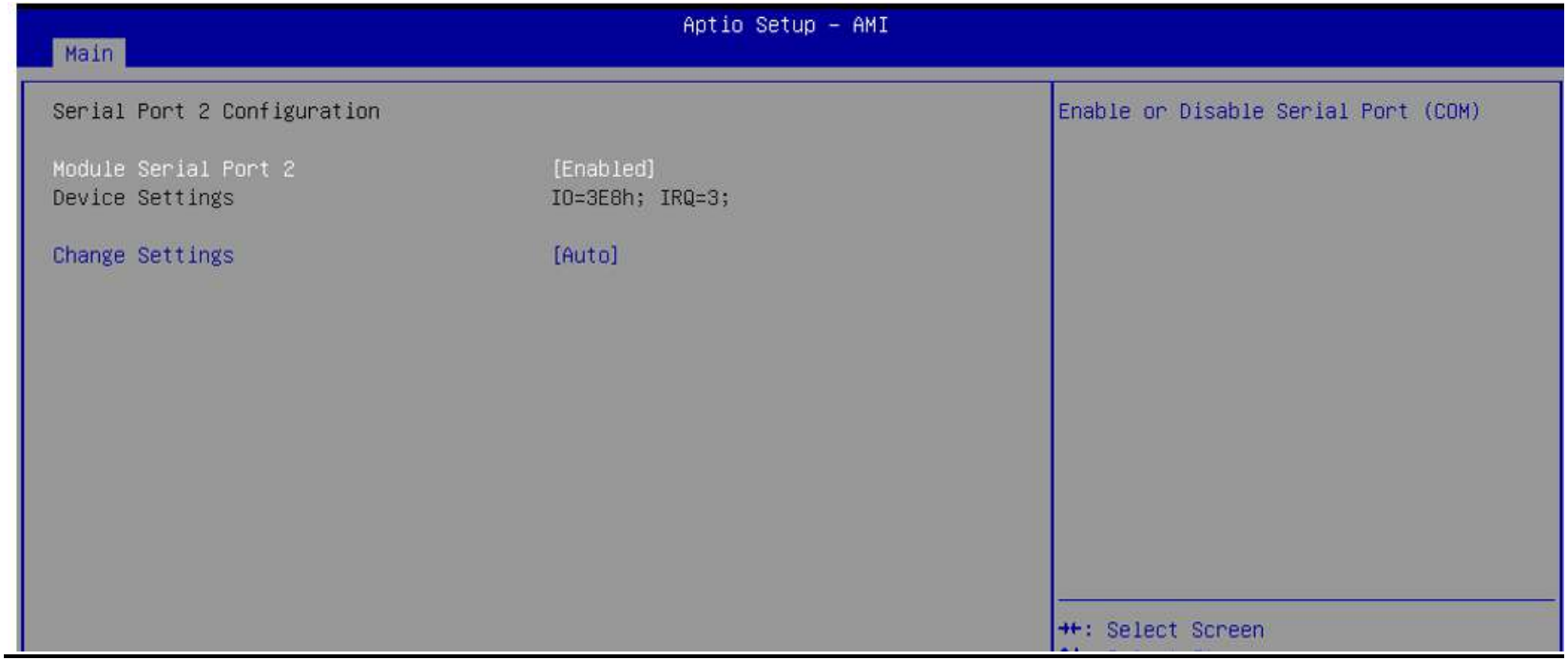
Set Parameters of Serial Port 1



Feature	Description	Options
Module Serial Port 1	Enable or Disable Serial Port (COM)	★Enabled, Disabled
Change Settings	Select an optimal settings for Super IO Device	★Auto ,IO=3F8h; IRQ=4, IO=3F8h; IRQ=3,4,10,11 IO=2F8h; IRQ=3,4,10,11 IO=3E8h; IRQ=3,4,10,11 IO=2E8h; IRQ=3,4,10,11

Serial Port 2 Configuration

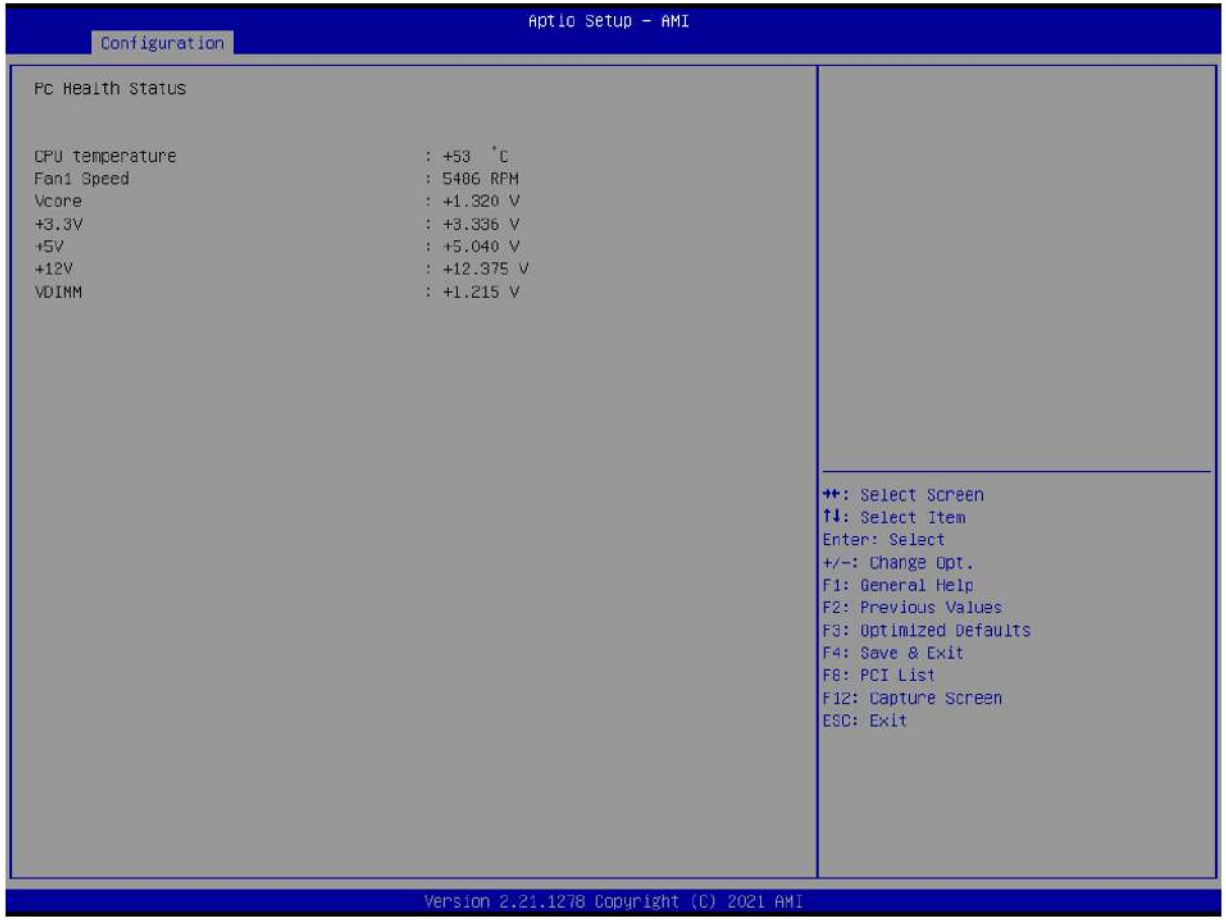
Set Parameters of Serial Port 2



Feature	Description	Options
Serial Port 2	Enable or Disable Serial Port (COM)	★Enabled, Disabled
Change Settings	Select an optimal settings for Super IO Device	★Auto ,IO=3E8h; IRQ=3, IO=3F8h; IRQ=3,4,10,11 IO=2F8h; IRQ=3,4,10,11 IO=3E8h; IRQ=3,4,10,11 IO=2E8h; IRQ=3,4,10,11

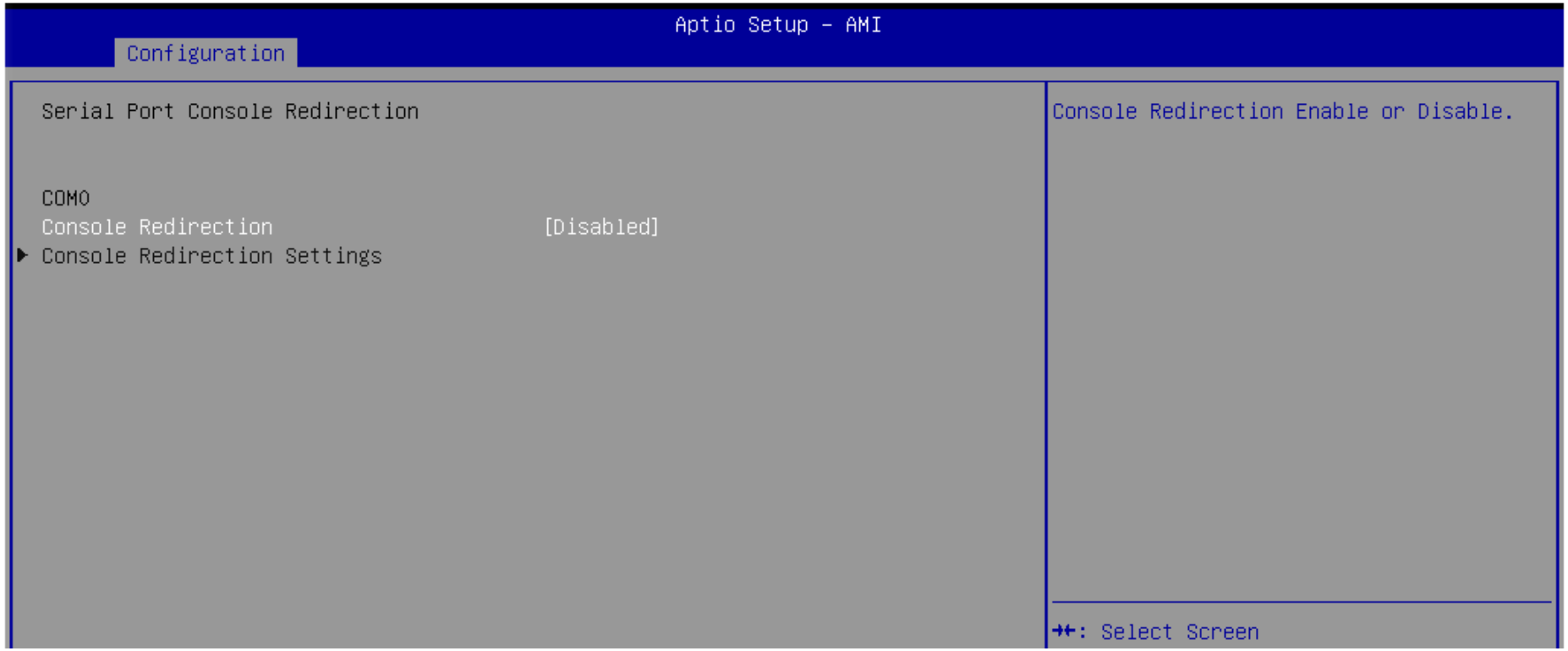
H/W Monitor

Monitor hardware status



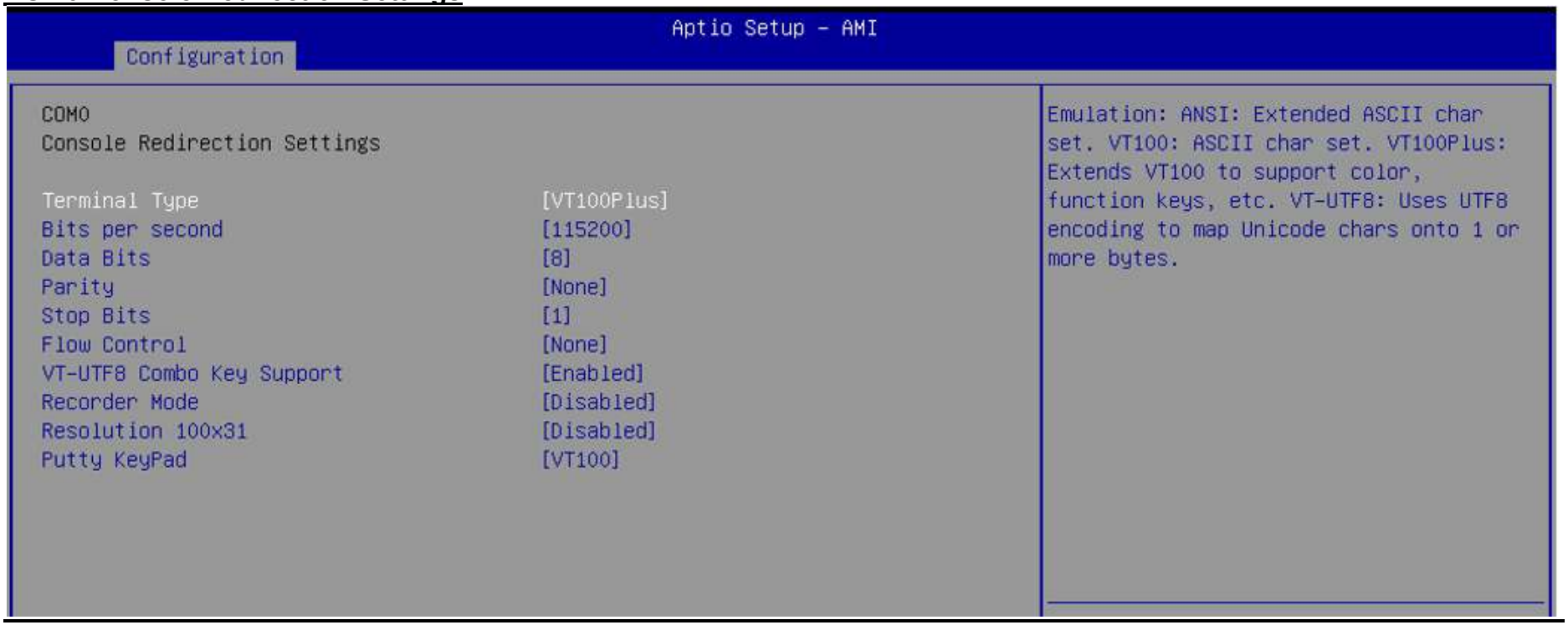
Serial Port Console Redirection

Serial Port Console Redirection



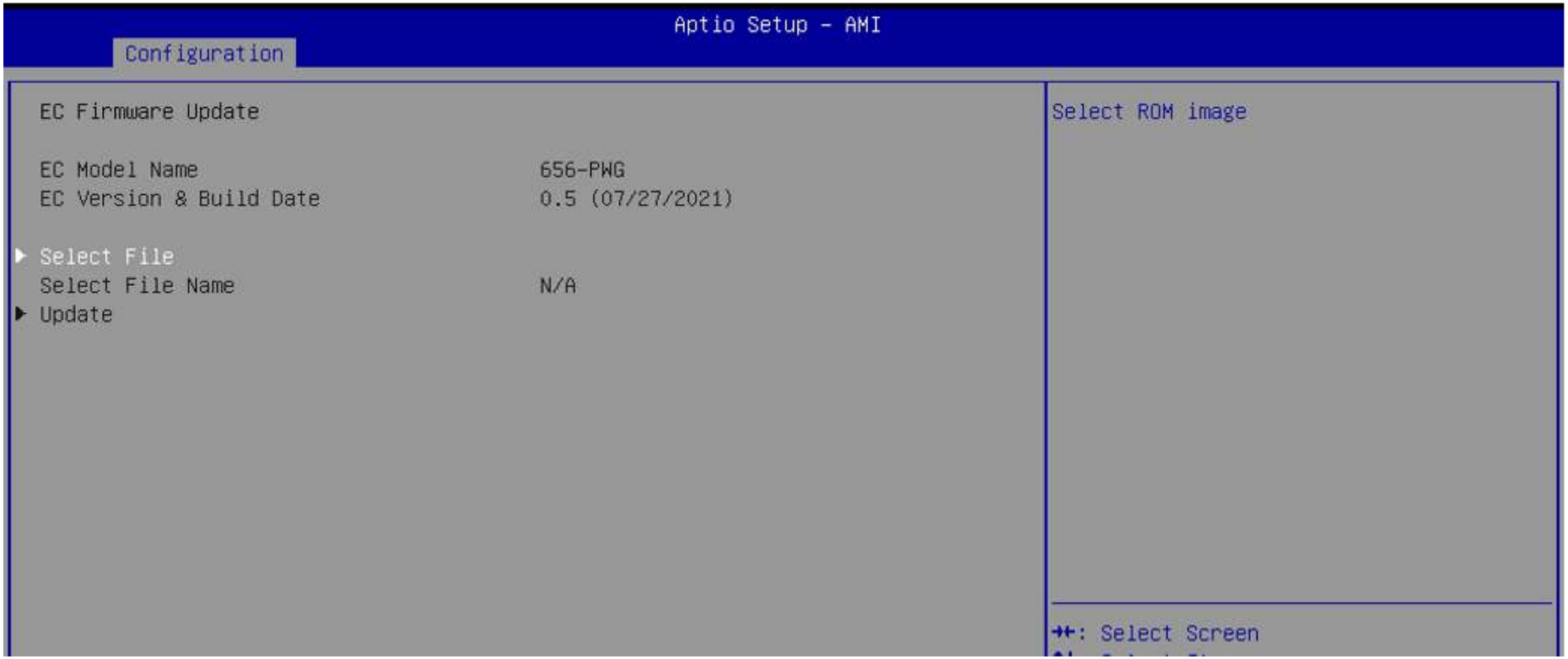
Feature	Description	Options
Console Redirection	Console Redirection Enable or Disable	★Disabled, Enabled

COM0 Console Redirection Settings



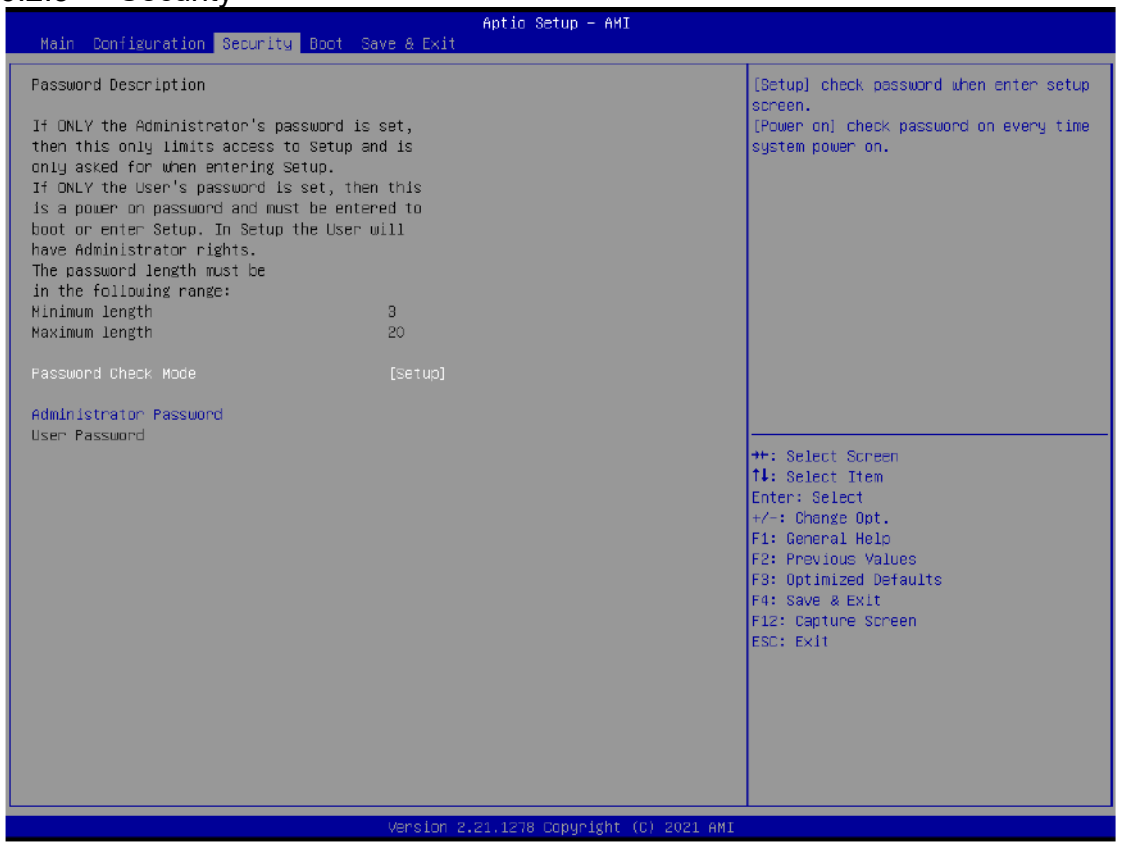
Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color , function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	VT100,★VT100PLUS, VT-UTF8, ANSI
Bits per second	Select Serial 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
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 signal.	★None, Hardware RTS/CTS
VT-UTFB Combo Key Support	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals	★Enabled, Disabled
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

EC Firmware Update



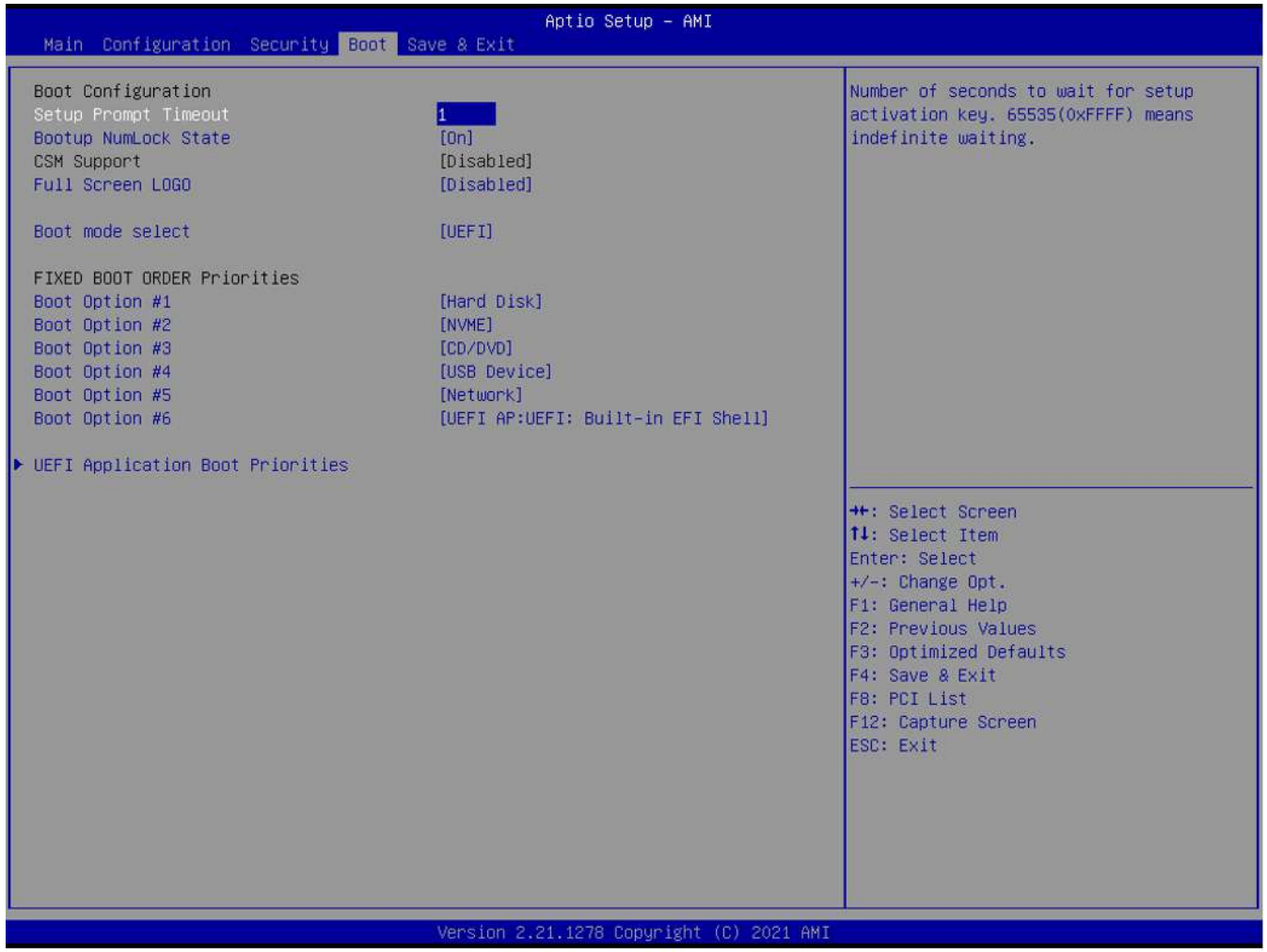
Feature	Description	Options
Select File	Select ROM image	

6.2.3 Security



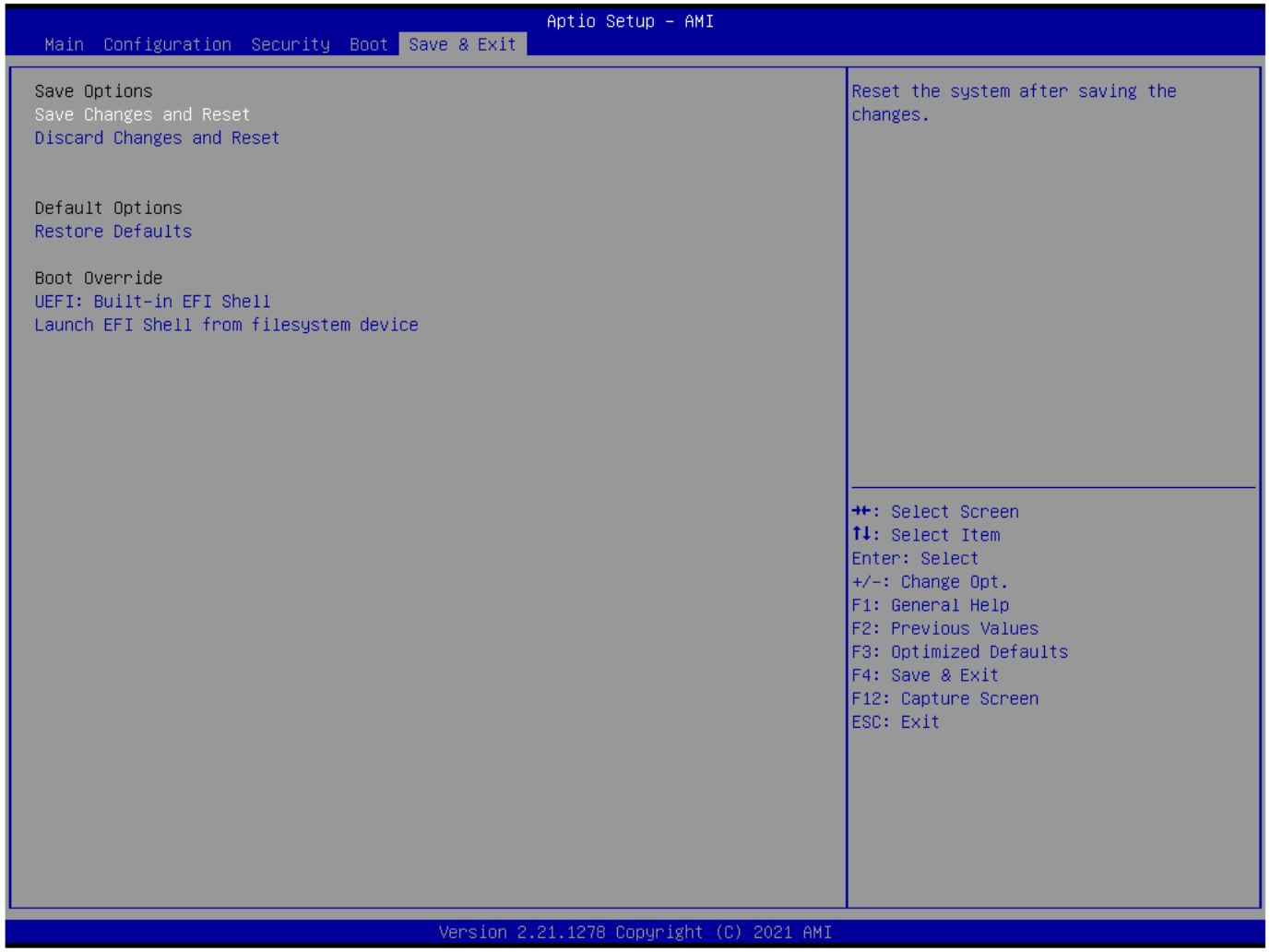
Feature	Description	Options
Password Check Mode	[Setup] check password when enter setup screen. [Power on] check password on every time system power on.	★Setup, Power on
Administrator Password	Set Administrator Password	

6.2.4 Boot


Aptio Setup – AMI
Main Configuration Security Boot Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
CSM Support [Disabled]
Full Screen LOGO [Disabled]
Boot mode select [UEFI]
FIXED BOOT ORDER Priorities
Boot Option #1 [Hard Disk]
Boot Option #2 [NVME]
Boot Option #3 [CD/DVD]
Boot Option #4 [USB Device]
Boot Option #5 [Network]
Boot Option #6 [UEFI AP:UEFI: Built-in EFI Shell]
UEFI Application Boot Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: 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 2.21.1278 Copyright (C) 2021 AMI

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
CSM Support	Enable/Disable CSM support	★Disabled
Full Screen LOGO	Enables or disables Quiet Boot option and Full screen Logo.	★Disabled, Enabled
Boot mode select	Select boot mode LEGACY/UEFI	★UEFI ,Legacy
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 Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

6.2.5 Save & Exit



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

7. BIOS Update

How to update the BIOS file of PCOM-B656?

Step1. Please visit web site of Portwell download center as below hyperlink
https://www.portwell.com.tw/support-center/download-center/
Step2. Select “Search download” and type the keyword “PCOM-B656”.
Step3. Find the **“BIOS “**page and download the ROM file and flash utility.
Step4. Unzip file to bootable USB flash drive which can boot to dos mode. Then execute the **“update.bat”** or **“update.efi ”.** It will start to update Step BIOS. NOTE: Once you use “update.efi” to update BIOS, it must be get into the SHELL MODE to update BIOS
Step5. When you see the “FPT Operation Passed” message, which means the BIOS update processes finished. Please cut the AC power off and **wait for 10seconds** before powering on.
Step6. When you see the “Programming success” message, which means the BIOS update processes finished. Please cut the AC power off and **wait for 10 seconds** before powering on.

8. Portwell Software Service

1. If you have customized requirements of BIOS, you can contact person of our company or branch.
2. If you have requirements of WDT、GPIO APP, you can contact our headquarter or branch, and we can render you assistance on developing.

Portwell Worldwide:	
Portwell, Inc.	E-mail: info@portwell.com.tw
Shanghai Portwell	E-mail: info@portwell.com.cn
Portwell Japan, Inc	E-mail: info@portwell.co.jp
American Portwell Technology	E-mail: info@portwell.com
European Portwell Technology	E-mail: info@portwell.eu
Portwell UK Ltd.	E-mail: info@portwell.co.uk
Portwell Deutschland GmbH	E-mail: info@portwell.eu
Portwell India Technology	E-mail: info@portwell.in
Portwell Korea, Inc.	E-mail: info@portwell.co.kr
Portwell Latin America	E-mail: vendas@portwell.com.br

9. Industry Specifications

9.1. Industry Specifications

The list below provides links to industry specifications that apply to Portwell modules.

Low Pin Count Interface Specification, Revision 1.0 (LPC) http://www.intel.com/design/chipsets/industry/lpc.htm
Universal Serial Bus (USB) Specification, Revision 2.0 http://www.usb.org/home
PCI Specification, Revision 2.3 https://www.pcisig.com/specifications
Serial ATA Specification, Revision 3.0 http://www.serialata.org/
PCI Express Base Specification, Revision 2.0 https://www.pcisig.com/specifications