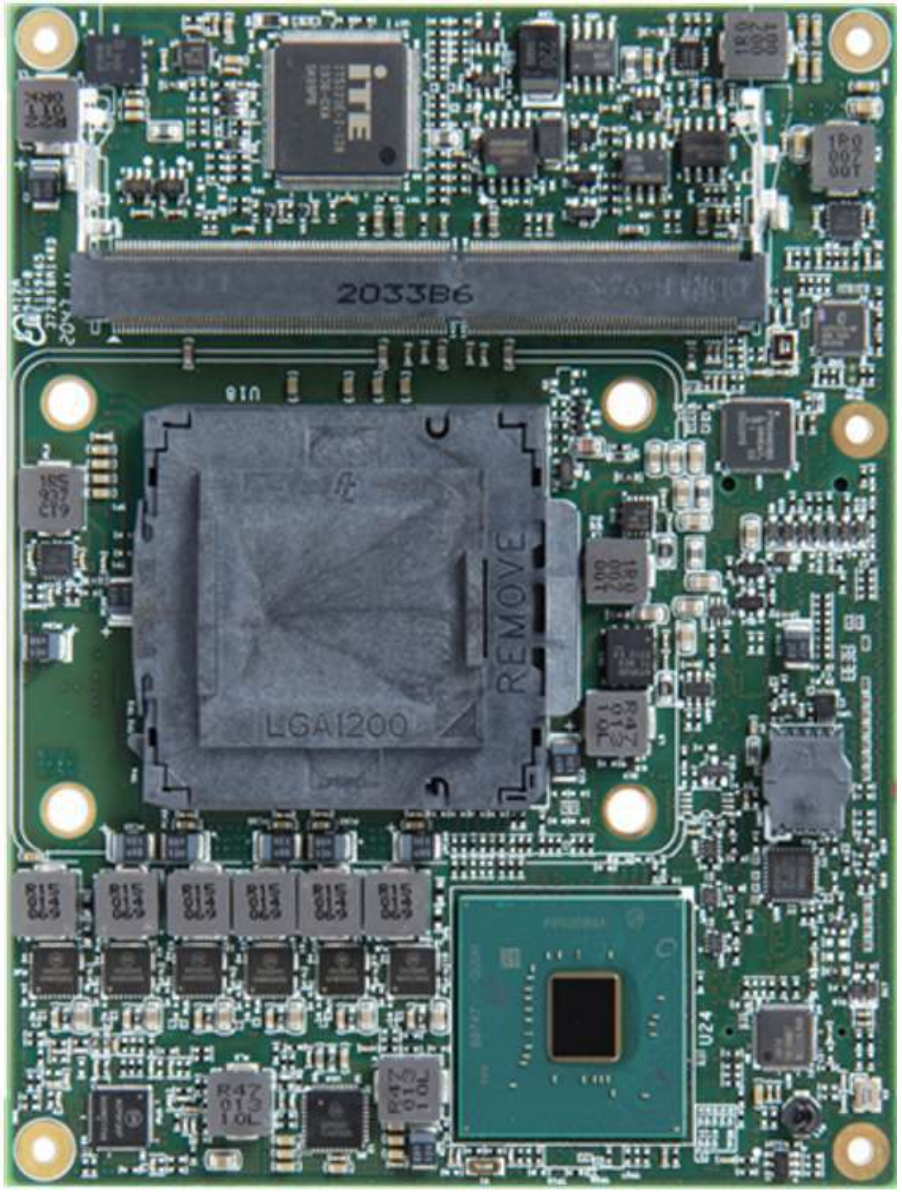

COM Express™ PCOM-B655VGL User's Guide Revision 1.1

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Revision History

R0.1	Preliminary
R0.2	1. Change the photo 2. Memory capacity (32GB >> 64GB) 3. Remove the feature - Intel® Smart Response Technology 4. Modify the list of supported operating system 5. Replace the context of 3.3~3.6、3.10、ch5.
R0.3	1. Correction :W480E (ECC) >> W480E (ECC，only with i3-10100TE) 2. Add VGA (up to 1920 x 1200@60Hz) 3. Modify supported OS (Ubuntu and CentOS； Tested with DQA)
R0.4	1. Graphic options add more information as below: DDI1/DDI12 (DP/HDMI) DDI3 (HDMI) 2. Power DC IN: Remove "+ 9 VDC ~ + 18 VDC (Wide range)".
R0.5	1. USB 3.1 Gen 2 >> USB 3.2 Gen 2
R1.0	Initial Release
R1.1	1. Replace the Blockdiagram with the one which contains the string of "USB 3.2 Gen". 2. Correct all the wrong indexes.

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Preface

This PCOM-B655VGL 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-B655VGL User's Guide contains detail information of the product specifications, features, mechanical dimensions, cooler and BIOS Setup.

PCOM-B655VGL is designed according to COM (Computer On Module) PICMG Open Modular Computing Standards COM Express™ Specification Rev3.0 Type 6 and Basic form factor (125x95cm).

PCOM-B655VGL designed with Intel® 10th Generation processor code name Comet Lake - S. Desktop processor on COM Express Module, which makes PCOM-B655VGL more flexible than mobile processor series. Customer can choose any TDP 35W processor SKUs along with two chipsets (Q470E and W480E) to their specific applications.

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2 Block Diagram

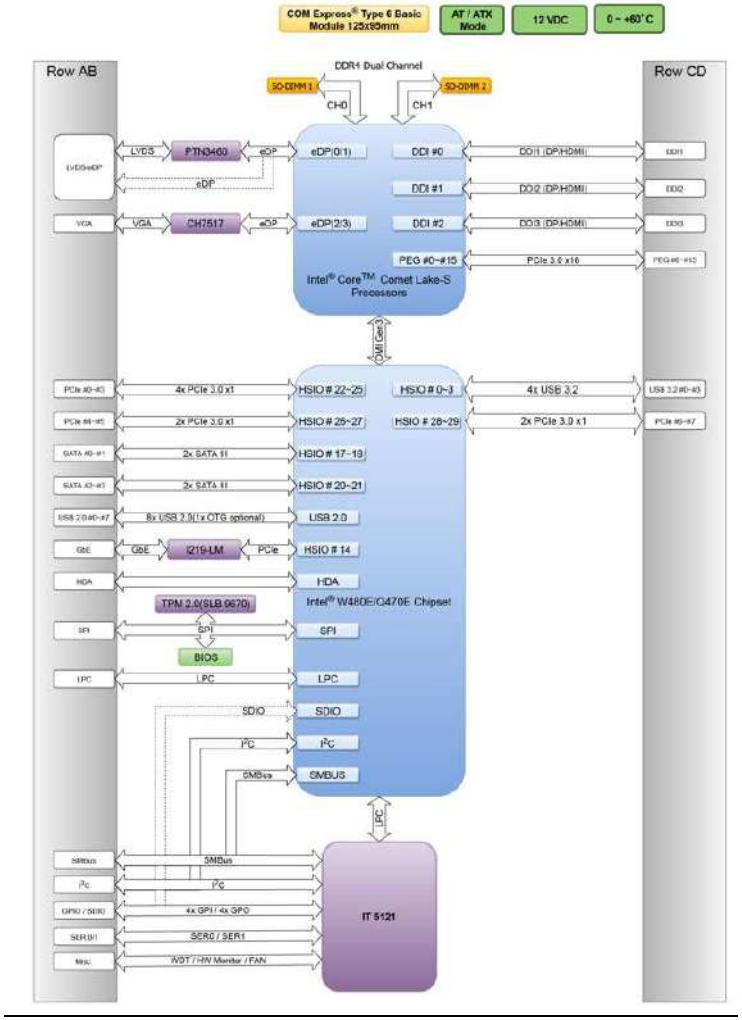

Figure 1 Block Diagram

3 Specifications

Product	➢ PCOM-B655VGL
Form Factor	➢ COM Express™ standard pin out Type 6 Rev. 3.0 (Basic 125 x 95mm / 4.92” x 3.74”).
Processor	➢ Desktop 35W SKU (See below section for processor list)
Chipset	➢ Q470E (Non-ECC) ➢ W480E (ECC;only with core i3-10100TE & Xeon W processor)
BIOS	➢ AMI Aptio5 BIOS
Memory	➢ 2x SODIMM DDR4 ECC / Non-ECC ➢ Dual channel ➢ Up to 64GB 2933MHz/2666Mhz
Graphics Options	➢ LVDS (24bit, dual channel) (up to1920x1200@60Hz) ➢ VGA (up to 1920 x 1200@60Hz) ➢ 3 DDI (DP++) (up to 4096x2304@60Hz) DDI1/DDI12 (DP/HDMI) DDI3 (HDMI)
Ethernet	➢ 1x GbE (I219-LM)
Audio	➢ Intel® High Definition Audio
Security	➢ TPM* ■ TPM 2.0 (Infineon SLB9670) ■ Intel® AES
Serial IO	➢ 8 GPIO (default 4x GPI / 4x GPO) ➢ I^2C ➢ 2 Serial Ports (TX / RX)

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	➢ SMBus

Table 1 PCOM-B655VGL Specification 1-2

*Enable Intel TXT and TPM at same time cause system un-stable. (Intel TXT default Disable in BIOS setting)

<continued>

PCI Express	➢ 1 PCI Express x16 (PEG) Gen3 (8.0 GT/s); can be configured to 2x8, 1x8+2x4 ➢ 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 (10 Gbps)
SATA	➢ 4 x SATA3.0 (6 Gbps)
Power DC IN	➢ +12VDC (Nominal)
Hardware Monitors	➢ IT5121E Embedded Controller, Voltage, Fan and Temperature
Power Management	➢ ACPI 4.0
Environment	➢ Operating Temperature 0°C to 60°C (processor dependent) ➢ Storage Temperature -20°C to 80°C ➢ Relative Humidity 5%~95%

Table 2 PCOM-B655VGL Specification 2-2

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3.1 PCOM-B655VGL Processor & Chipset list

PCOM-B655VGL Processor list

PCOM-B655VGL supported processor	Intel® Core i9-10900TE Processor	Intel® Core i7-10700TE Processor	Intel® Core i5-10500TE Processor	Intel® Core i3-10100TE Processor
Performance				
# of Cores	10	8	6	4
# of Threads	20	16	12	8
Processor Base Frequency	1.8 GHz	2.0 GHz	2.3 GHz	2.3 GHz
Max Turbo Frequency	4.5 GHz	4.4 GHz	3.7 GHz	3.6 GHz
Cache	20 MB	16 MB	12 MB	6 MB
Bus Speed	8 GT/s			
TDP	35W			
Memory Specifications				
Max # of Memory Channels	2			
Max Memory Bandwidth	45.8 GB/s		41.6 GB/s	
ECC Memory Supported	NO			YES(only with W480E PCH)
Processor Graphics				
Processor Graphics	Intel® UHD Graphics 630	Intel® UHD Graphics 630	Intel® UHD Graphics 630	Intel® UHD Graphics 630
Graphics Base Frequency	350 MHz	350 MHz	350 MHz	350 MHz
Graphics Max Dynamic Frequency	1.20 GHz	1.15 GHz	1.15 GHz	1.10 GHz
Graphics Video Max Memory	64 GB			
Graphics Output	eDP/DP/HDMI/DVI			
4K Support	Yes, at 60Hz			
Max Resolution (HDMI 1.4)	4096 x 2160@30Hz			
Max Resolution (DP)	4096 x 2304@60Hz			
Max Resolution (eDP - Integrated Flat Panel)	2880 x 1800@60Hz			
# of Displays Supported	3			
Expansion Options				
PCI Express Revision	3			
PCI Express Configurations	Up to 1x16, 2x8, 1x8+2x4			
Max # of PCI Express Lanes	16			
Package Specifications				
Sockets Supported	FCLGA1200			
TJUNCTION	100°C	100°C	100°C	100°C
Package Size	37.5mm x 37.5mm			
Lithography	14 nm			

Table 3 PCOM-B655VGL Processor list

PCOM-B655VGL Chipset list

PCOM-B655VGL PCH	Intel® W480E	Intel® Q470E
Essentials		
TDP	6W	
Bus Speed	8 GT/s	
Memory Specifications		
# of DIMMs per channel	2	
Expansion Options		
PCI Express Revision	3	
Max # of PCI Express Lanes	24	
PCI Express Configurations	x1, x2, x4	
I/O Specifications		
USB Revision	3.2/2.0	
Max # of SATA 6.0 Gb/s Ports	8	6
Integrated LAN	Integrated MAC	
Integrated Wireless	Intel® Wireless-AC MAC	
Supported Processor PCI Express Port Revision	3	
Supported Processor PCI Express Port Configurations	1x16 or 2x8 or 1x8+2x4	
Advanced Technologies		
Intel® Optane™ Memory Supported	Yes	Yes
Intel® Virtualization Technology for Directed I/O	Yes	Yes
Intel® vPro™ Platform Eligibility	Yes	Yes
Intel® ME Firmware Version	14	
Intel® HD Audio Technology	Yes	Yes
Intel® Rapid Storage Technology	Yes	Yes
Intel® Rapid Storage Technology Enterprise	No	No
Intel® Standard Manageability	Yes	Yes
Intel® Rapid Storage Technology for PCI Storage	Yes	Yes
Intel® Platform Trust Technology (Intel® PTT)	Yes	Yes
Intel® Stable Image Platform Program (SIPP)	No	Yes
Intel® Smart Sound Technology	Yes	Yes
Processor Graphics		
# of Displays Supported	3	

Table 4 PCOM-B655VGL Chipset list

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3.2 Supported Operating Systems

The PCOM-B655VGL supports the following operating systems.

Vendor	Operating System	Supported
Microsoft	Windows 10	Yes
Linux	CentOS	Yes
	Ubuntu	Yes

Table 5 Supported Operating Systems

3.3 Windows OS driver

Please download the drivers from Portwell download center website http://www.portwell.tw/support/download_center.php

Item	Driver version	Description
Chipset	10.1.18460.8229	Chipset Driver Windows 10 64bits
Graphic	27.20.100.8723	Graphics Driver for Windows 10 64bit
CS ME driver	14.0.37.1165	Intel® Converged Security and Management Engine
LAN I219	26.0	Ethernet Driver for Windows 10 64bits

Table 6 Windows OS driver list

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3.4 Electrical Characteristics

Input voltage	● +5VSB (Nominal) ● +12VDC (Nominal)
RTC Battery	6u A
Power on mode	AT / ATX

Table 7 Electrical Characteristics

3.5 Power sequence

COM Express input power sequencing

Figure 7-1: Power Sequencing

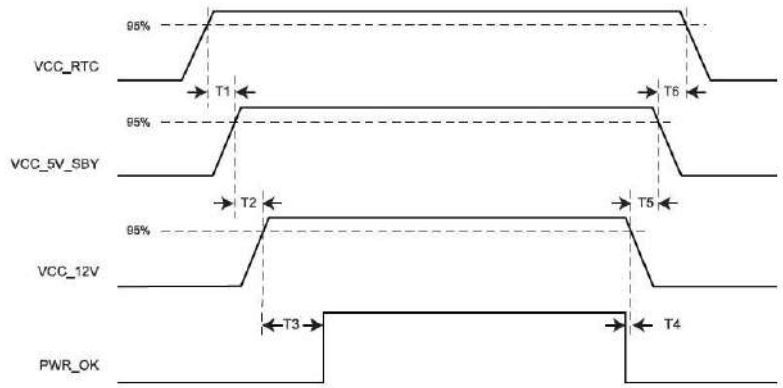

Table 7.3: Power Sequencing

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

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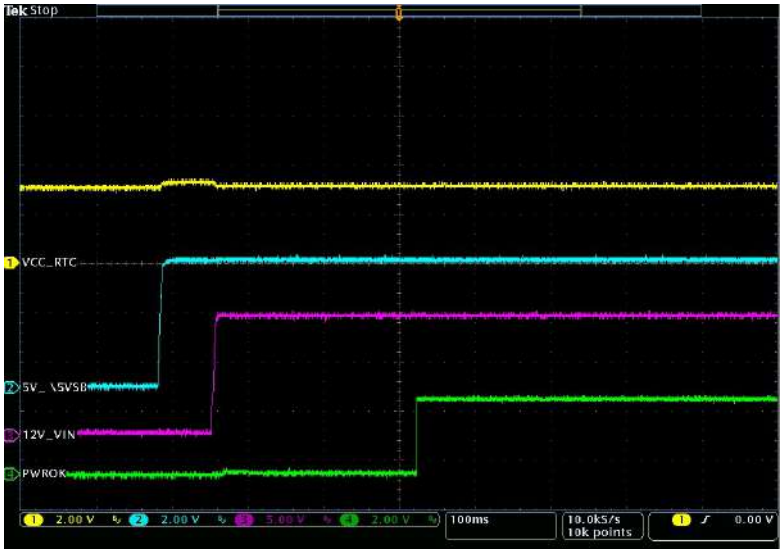

Figure 2 Power sequence up

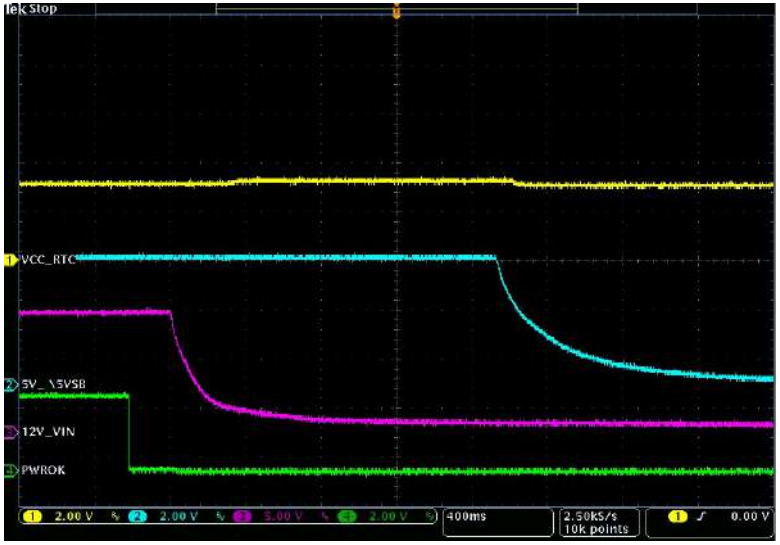

Figure 3 Power Sequence down

3.6 Circuit protection design

PCOM-B655VGL Type 6 is also compatible with COM Express Type 2 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.

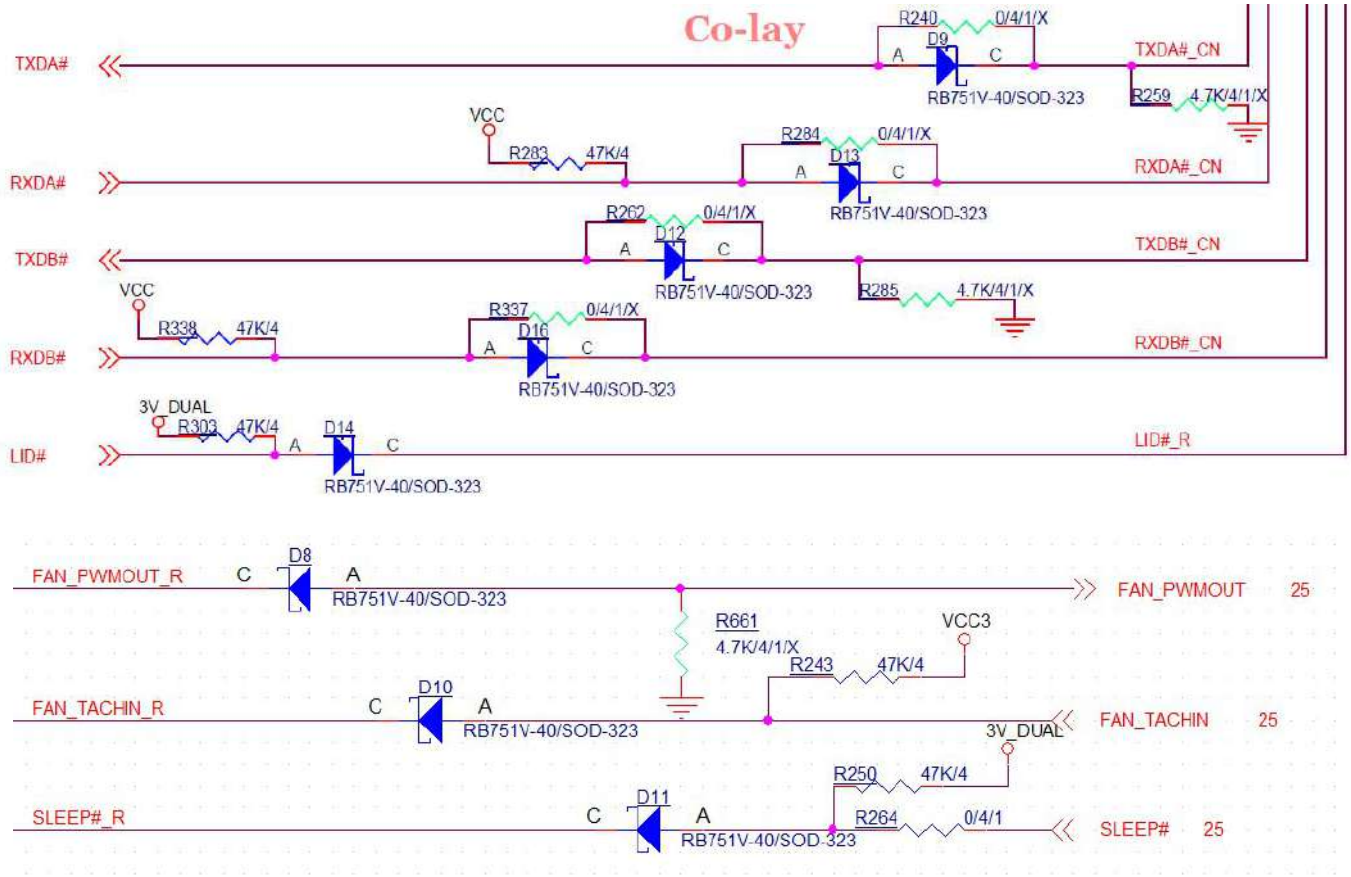

Figure 4 Circuit protection design

3.7 Mechanical Dimensions

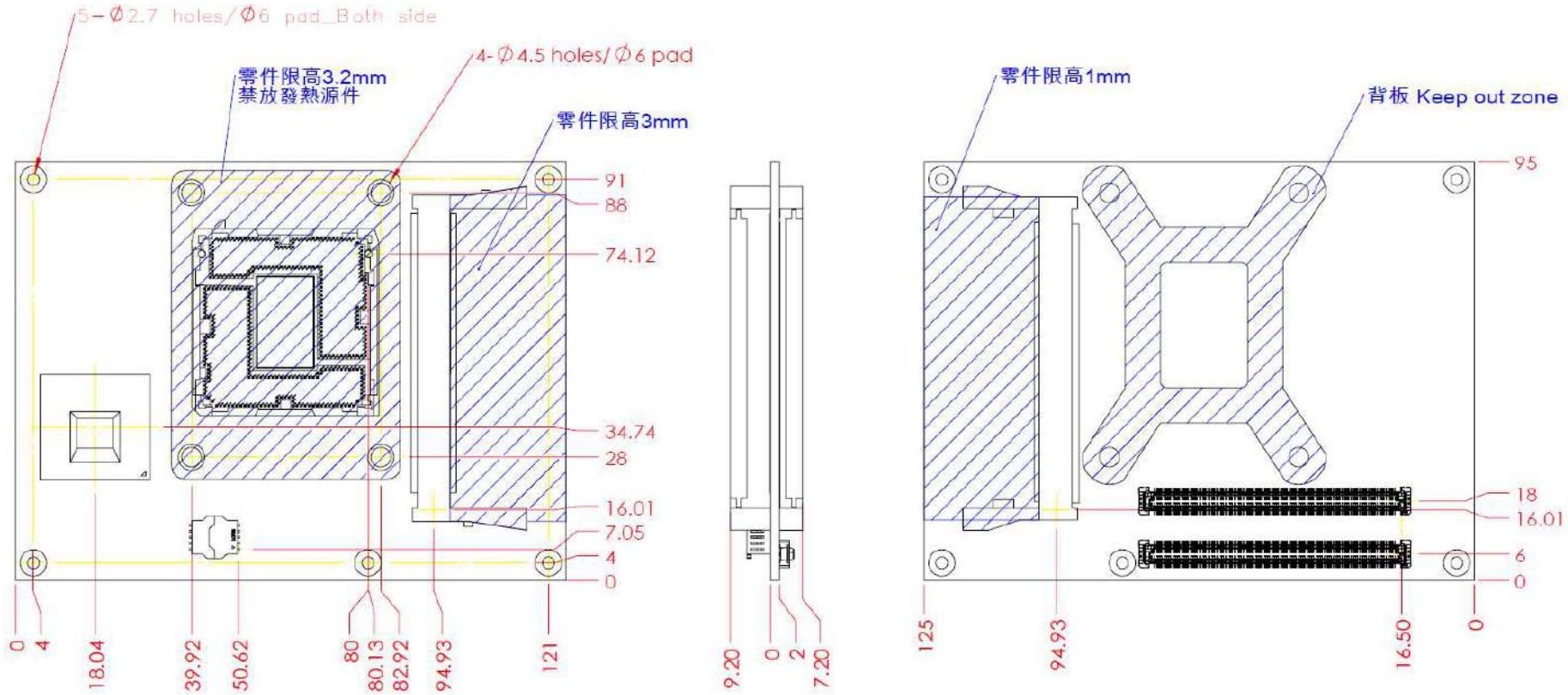

Figure 5 Mechanical Dimensions - Top/Bottom

3.8 PCOM-B655VGL and Cooler weight

PCOM-B655VGL	106.0g +/- 2%
Cooler (H/S+FAN) with Stand-Off	468.0g +/- 2%
H/S with Stand-Off	416.0g +/- 2%

Table 8 Net weight

3.9 Environmental Specifications

Storage Temperature	-20~80°C
Operation Temperature	0~60°C
Storage Humidity	0%~95%
Operation Humidity	0%~95%

Table 9 Environmental Specifications

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3.10 Optional function rework SOP

1. Optional function rework SOP : eDP

PCOM-B655VGL Default display is LVDS, rework following SOP for eDP display interface.

- Step 1

Remove below resistors and caps:
C297,C304,C289,C291,C310,C313,R296,R297,R298,R299,R305,R314,R323,R670,R664,R527,R324,R325,R326,R327

- Step 2

Add below resistors and caps :
R452,R462,R476,R487,C311,C314,R306,R307,R308,R309,R313,R304,R340,R228,R666,R518

- Quick Tips

Remove 16 parts(Red color rectangle)+ 4 parts(Red color rectangle)
Add 16 parts (Block color rectangle)

Just move the Red component to next Blue position for 16 resistors/caps.

1.C297,C304,C289,C291,C310,C313 to R452,R462,R476,R487,C311,C314
2.R527 to R518
3.R296,R297,R298,R299,R305,R314 to R306,R307,R308,R309,R313,R304
4.R323 to R340

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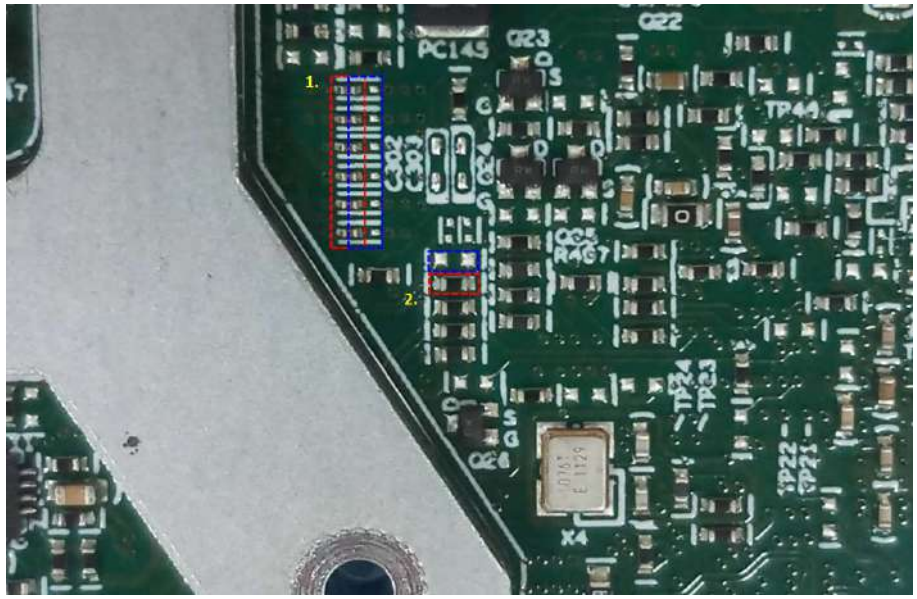
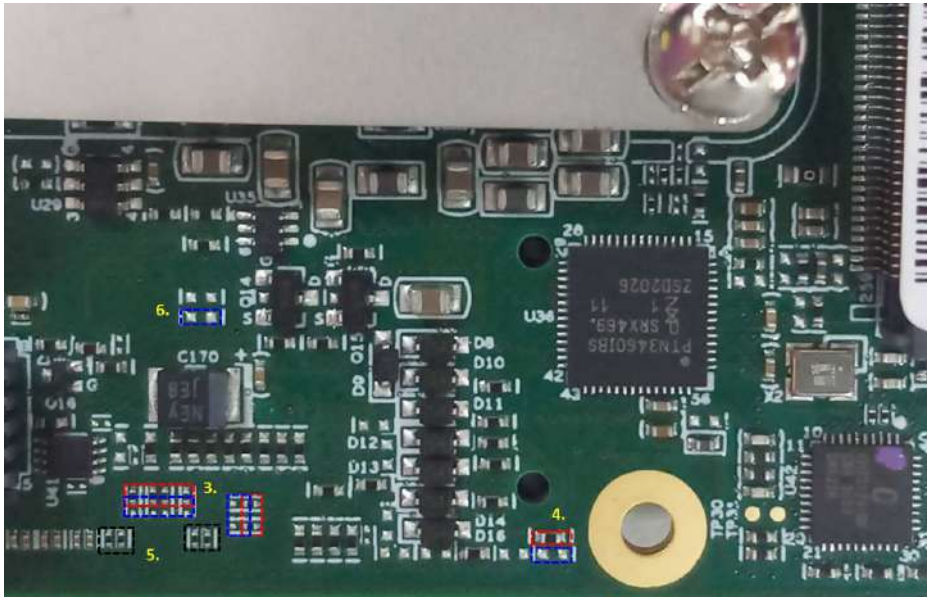
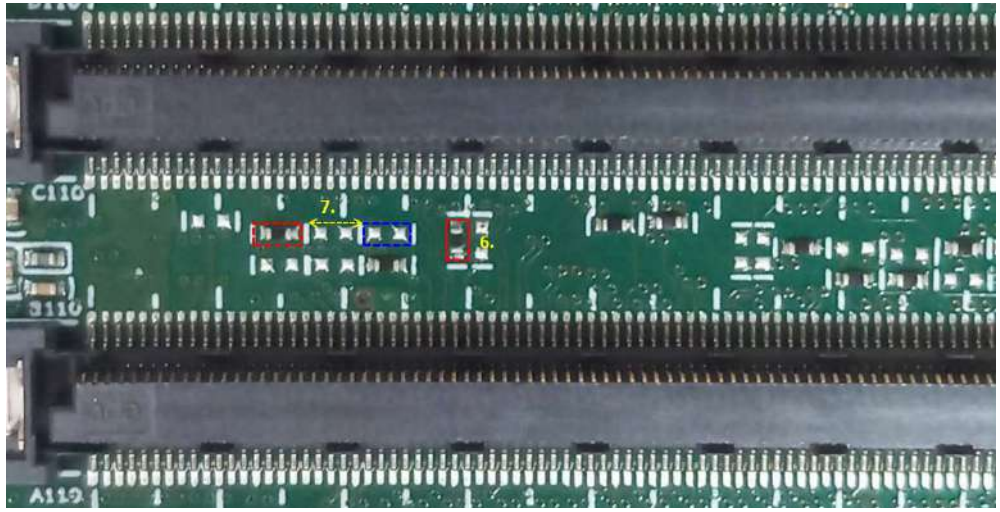
5. Remove R324,R325,R326,R327

6. R670 to R288





7. R664 to R666



2. Optional function rework SOP : DDI3 (support DP)

PCOM-B655VGL Default display is VGA, rework following SOP for DDI3 (DP)display interface..

- Step 1

Remove below resistors and caps:
C98,C102,C191,C188,C187,C186,R551

- Step 2

Add below resistors and caps :
C97,C101

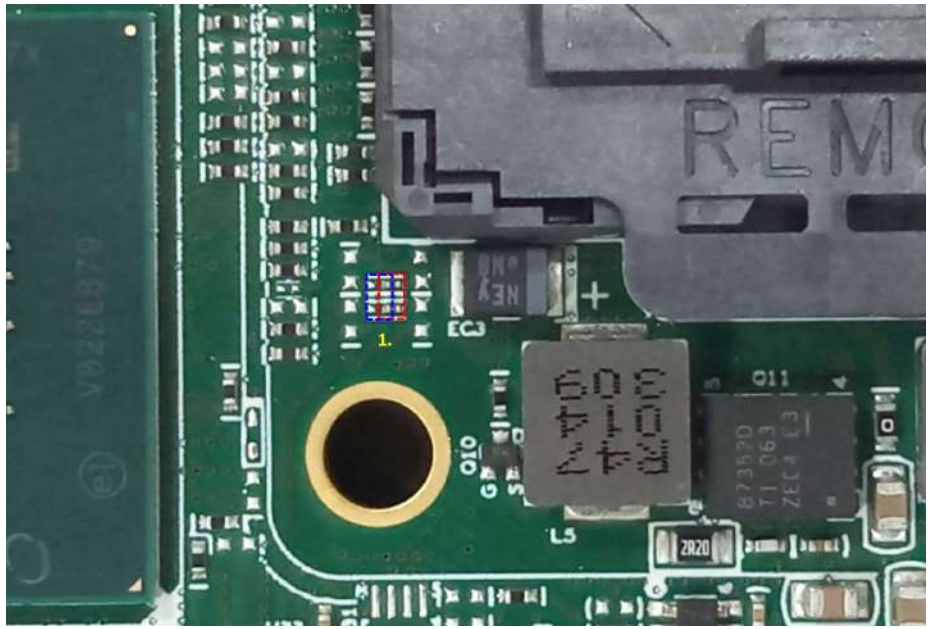
- Quick Tips

Remove 2 parts(Red color rectangle)+ 5 parts(Red color rectangle)
Add 2 parts (Block color rectangle)

Just move the Red component to next Blue position for 2 resistors/caps.

1.C98,C102 to C97,C101

2. Remove C191,C188,C187,C186



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4 Heat sink / Cooler dimensions

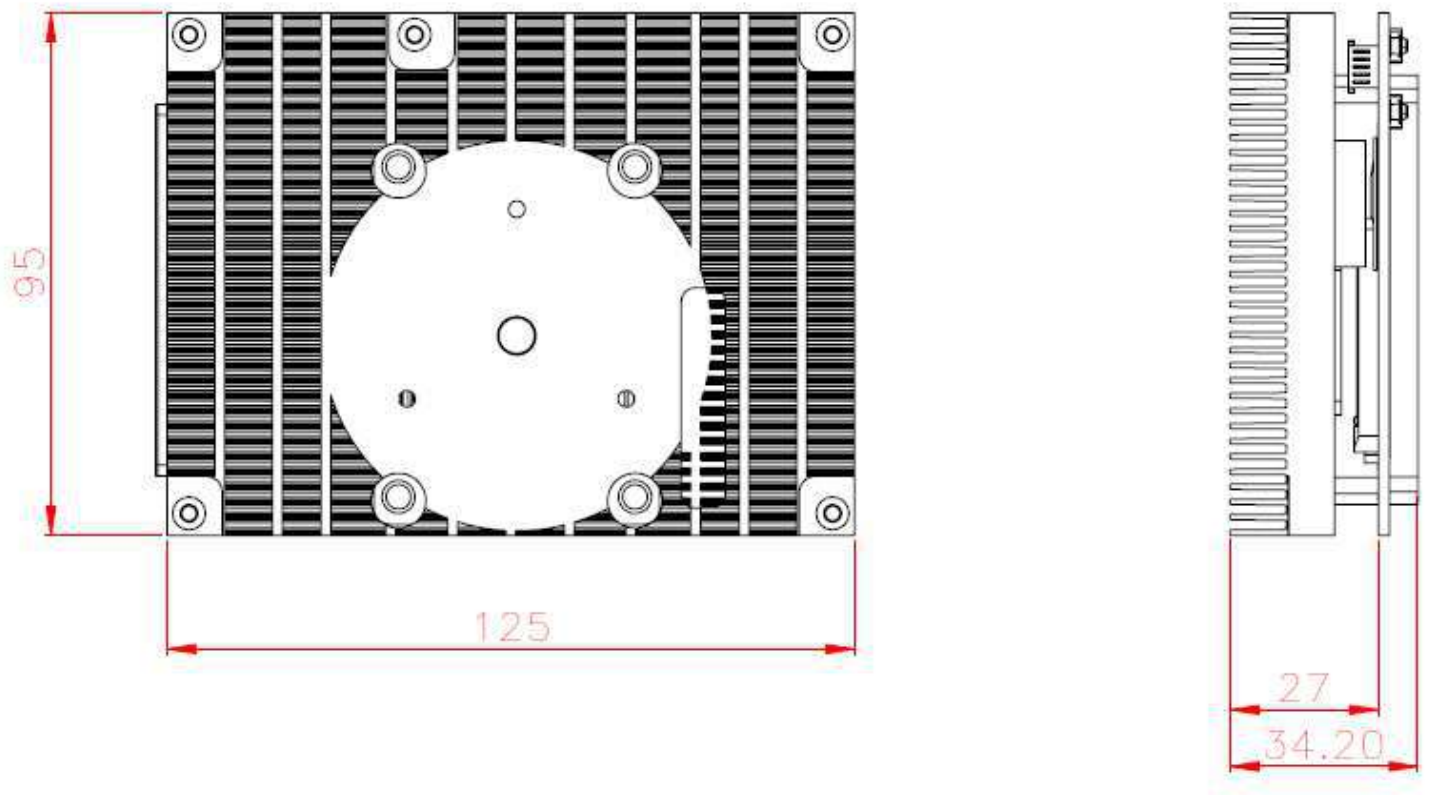

Figure 6 PCOM-B655VGL with HS

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4.1 H/S Assembly Guide

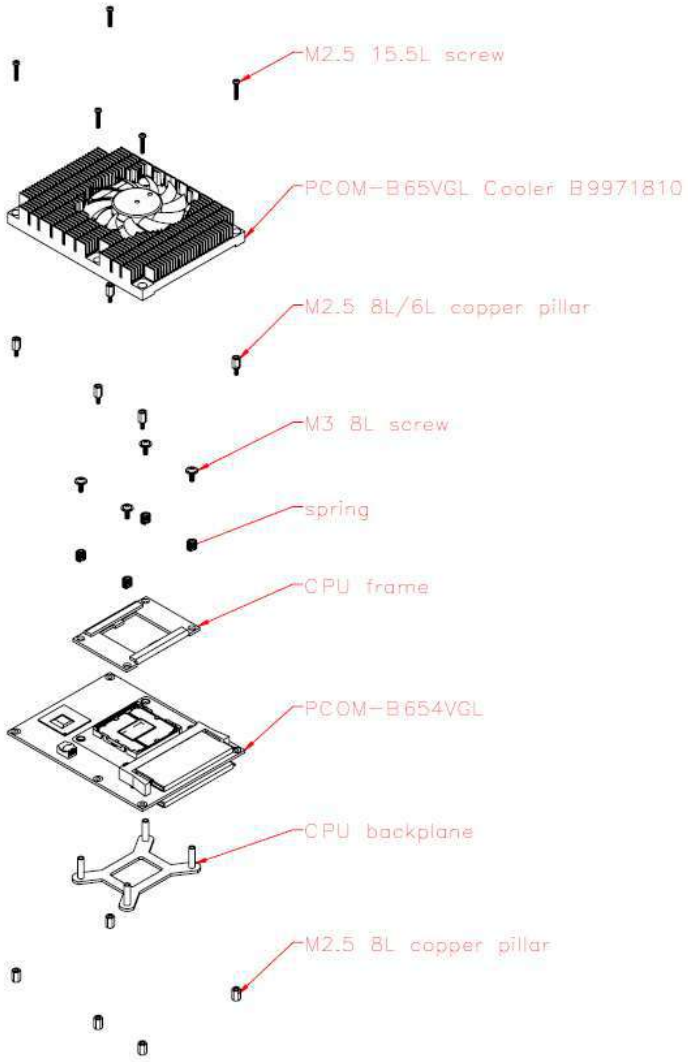

Figure 6 H/S Assembly guide

4.2 Packaging

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

Table 10 Packaging

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4.3 Ordering Guide

PCOM-B655VGL

Product	Ordering P/N	Status
PCOM-B655VGL-Q370	AB1-3J47	Available
PCOM-B655VGL-C246	AB1-3J46	Available

Table 11 Ordering Guide - PCOM-B655VGL

Accessory

Product	Ordering P/N	Status
PCOM-B655VGL Cooler	B9971810	Available
PCOM-C605	AB1-3998	Available
PCOM-C60B	AB1-3G22Z	Contact Us

Table 12 Ordering Guide - Accessory

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5 Pin out Tables

Below tables lists PCOM-B655VGL AB and CD Row connectors Type 6 pin name, un-connected pins are present as NC.

PCOM-B655VGL Type6 Pin-Out							
Pin	Row A	Pin	Row B	Pin	Row C	Pin	Row D
A1	GND(FIXED)	B1	GND(FIXED)	C1	GND(FIXED)	D1	GND(FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#	C2	GND	D2	GND
A3	GBE0_MDI3+	B3	LPC_FRAME#	C3	USB_SSRX0-	D3	USB_SSTX0-
A4	GBE0_LINK100#	B4	LPC_AD0	C4	USB_SSRX0+	D4	USB_SSTX0+
A5	GBE0_LINK1000#	B5	LPC_AD1	C5	GND	D5	GND
A6	GBE0_MDI2-	B6	LPC_AD2	C6	USB_SSRX1-	D6	USB_SSTX1-
A7	GBE0_MDI2+	B7	LPC_AD3	C7	USB_SSRX1+	D7	USB_SSTX1+
A8	GBE0_LINK#	B8	N/C	C8	GND	D8	GND
A9	GBE0_MDI1-	B9	N/C	C9	USB_SSRX2-	D9	USB_SSTX2-
A10	GBE0_MDI1+	B10	LPC_CLK	C10	USB_SSRX2+	D10	USB_SSTX2+
A11	GND(FIXED)	B11	GND(FIXED)	C11	GND(FIXED)	D11	GND(FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#	C12	USB_SSRX3-	D12	USB_SSTX3-
A13	GBE0_MDI0+	B13	SMB_CK	C13	USB_SSRX3+	D13	USB_SSTX3+
A14	N/C	B14	SMB_DAT	C14	GND	D14	GND
A15	SUS_S3#	B15	SMB_ALERT#	C15	N/C	D15	DDI1_CTRLCLK_AUX+
A16	SATA0_TX+	B16	SATA1_TX+	C16	N/C	D16	DDI1_CTRLCLK_AUX-
A17	SATA0_TX-	B17	SATA1_TX-	C17	N/C	D17	N/C
A18	SUS_S4#	B18	SUS_STAT	C18	N/C	D18	N/C
A19	SATA0_RX+	B19	SATA1_RX+	C19	PCIE_RX6+	D19	PCIE_TX6+
A20	SATA0_RX-	B20	SATA1_RX-	C20	PCIE_RX6-	D20	PCIE_TX6-
A21	GND(FIXED)	B21	GND(FIXED)	C21	GND(FIXED)	D21	GND(FIXED)
A22	SATA2_TX+	B22	SATA3_TX+	C22	PCIE_RX7+	D22	PCIE_TX7+
A23	SATA2_TX-	B23	SATA3_TX-	C23	PCIE_RX7-	D23	PCIE_TX7-
A24	SUS_S5#	B24	PWR_OK	C24	DDI1_HPD	D24	N/C
A25	SATA2_RX+	B25	SATA_RX+	C25	N/C	D25	N/C
A26	SATA2_RX-	B26	SATA_RX-	C26	N/C	D26	DDI1_PAIR0+
A27	BATLOW#	B27	WDT	C27	N/C	D27	DDI1_PAIR0-
A28	(S)ATA_ACT#	B28	N/C	C28	N/C	D28	N/C
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1	C29	N/C	D29	DDI1_PAIR1+
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0	C30	N/C	D30	DDI1_PAIR1-

Table 13 PCOM-B655VGL Pin-out 1-4

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A31	GND(FIXED)	B31	GND(FIXED)	C31	GND(FIXED)	D31	GND(FIXED)
A32	AC/HDA_BITCLK	B32	SPKR	C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
A33	AC/HDA_SDOUT	B33	I2C_CK	C33	DDI2_CTRLCLK_AUX-	D33	DDI1_PAIR2-
A34	BIOS_DIS0#	B34	I2C_DAT	C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
A35	THRMTRIP#	B35	THRM#	C35	N/C	D35	N/C
A36	USB6-	B36	USB7-	C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
A37	USB6+	B37	USB7+	C37	DDI3_CTRLCLK_AUX-	D37	DDI1_PAIR3-
A38	USB_6_7_OC#	B38	USB_4_5_OC#	C38	DDI3_DDC_AUX_SEL	D38	N/C
A39	USB4-	B39	USB5-	C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
A40	USB4+	B40	USB5+	C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
A41	GND(FIXED)	B41	GND(FIXED)	C41	GND(FIXED)	D41	GND(FIXED)
A42	USB2-	B42	USB3-	C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
A43	USB2+	B43	USB3+	C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
A44	USB_2_3_OC#	B44	USB_0_1_OC#	C44	DDI3_HPD	D44	DDI2_HPD
A45	USB0-	B45	USB1-	C45	N/C	D45	N/C
A46	USB0+	B46	USB1+	C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
A47	VCC_RTC	B47	N/C	C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
A48	N/C	B48	CPU_CFG6	C48	N/C	D48	N/C
A49	CPU_CFG5	B49	SYS_RESET#	C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
A50	LPC_SERIRQ	B50	CB_RESET#	C50	DDI3_PAIR3-	D50	DDI2_PAIR3-
A51	GND(FIXED)	B51	GND(FIXED)	C51	GND(FIXED)	D51	GND(FIXED)
A52	PCIE_TX5+	B52	PCIE_RX5+	C52	PEG_RX0+	D52	PEG_TX0+
A53	PCIE_TX5-	B53	PCIE_RX5-	C53	PEG_RX0-	D53	PEG_TX0-
A54	GPI0	B54	GPO1	C54	TYPE0#	D54	N/C
A55	PCIE_TX4+	B55	PCIE_RX4+	C55	PEG_RX1+	D55	PEG_TX1+
A56	PCIE_TX4-	B56	PCIE_RX4-	C56	PEG_RX1-	D56	PEG_TX1-
A57	GND	B57	GPO2	C57	TYPE1#	D57	TYPE2#
A58	PCIE_TX3+	B58	PCIE_RX3+	C58	PEG_RX2+	D58	PEG_TX2+
A59	PCIE_TX3-	B59	PCIE_RX3-	C59	PEG_RX2-	D59	PEG_TX2-
A60	GND(FIXED)	B60	GND(FIXED)	C60	GND(FIXED)	D60	GND(FIXED)

Figure 7 PCOM-B655VGL Pin-out 2-4

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A61	PCIE_TX2+	B61	PCIE_RX2+	C61	PEG_RX3+	D61	PEG_TX3+
A62	PCIE_TX2-	B62	PCIE_RX2-	C62	PEG_RX3-	D62	PEG_TX3-
A63	GPI1	B63	GPO3	C63	N/C	D63	N/C
A64	PCIE_TX1+	B64	PCIE_RX1+	C64	N/C	D64	N/C
A65	PCIE_TX1-	B65	PCIE_RX1-	C65	PEG_RX4+	D65	PEG_TX4+
A66	GND	B66	WAKE0#	C66	PEG_RX4-	D66	PEG_TX4-
A67	GPI2	B67	WAKE1#	C67	RAPID_SHUTDOWN	D67	GND
A68	PCIE_TX0+	B68	PCIE_RX0+	C68	PEG_RX5+	D68	PEG_TX5+
A69	PCIE_TX0-	B69	PCIE_RX0-	C69	PEG_RX5-	D69	PEG_TX5-
A70	GND(FIXED)	B70	GND(FIXED)	C70	GND(FIXED)	D70	GND(FIXED)
A71	LVDS_A0+	B71	LVDS_B0+	C71	PEG_RX6+	D71	PEG_TX6+
A72	LVDS_A0-	B72	LVDS_B0-	C72	PEG_RX6-	D72	PEG_TX6-
A73	LVDS_A1+	B73	LVDS_B1+	C73	GND	D73	GND
A74	LVDS_A1-	B74	LVDS_B1-	C74	PEG_RX7+	D74	PEG_TX7+
A75	LVDS_A2+	B75	LVDS_B2+	C75	PEG_RX7-	D75	PEG_TX7-
A76	LVDS_A2-	B76	LVDS_B2-	C76	GND	D76	GND
A77	LVDS_VDD_EN	B77	LVDS_B3+	C77	N/C	D77	N/C
A78	LVDS_A3+	B78	LVDS_B3-	C78	PEG_RX8+	D78	PEG_TX8+
A79	LVDS_A3-	B79	LVDS_BKLT_EN	C79	PEG_RX8-	D79	PEG_TX8-
A80	GND(FIXED)	B80	GND(FIXED)	C80	GND(FIXED)	D80	GND(FIXED)
A81	LVDS_A_CK+	B81	LVDS_B_CK+	C81	PEG_RX9+	D81	PEG_TX9+
A82	LVDS_A_CK-	B82	LVDS_B_CK-	C82	PEG_RX9-	D82	PEG_TX9-
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL	C83	N/C	D83	N/C
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY	C84	GND	D84	GND
A85	GPI3	B85	VCC_5V_SBY	C85	PEG_RX10+	D85	PEG_TX10+
A86	N/C	B86	VCC_5V_SBY	C86	PEG_RX10-	D86	PEG_TX10-
A87	N/C	B87	VCC_5V_SBY	C87	GND	D87	GND
A88	PCIE_CLK_REF+	B88	BIOS_DIS1#	C88	PEG_RX11+	D88	PEG_TX11+
A89	PCIE_CLK_REF-	B89	VGA_RED	C89	PEG_RX11-	D89	PEG_TX11-
A90	GND(FIXED)	B90	GND(FIXED)	C90	GND(FIXED)	D90	GND(FIXED)

Figure 8 PCOM-B655VGL Pin-out 3-4

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A91	SPI_POWER	B91	VGA_GRN	C91	PEG_RX12+	D91	PEG_TX12+
A92	SPI_MISO	B92	VGA_BLU	C92	PEG_RX12-	D92	PEG_TX12-
A93	GPO0	B93	VGA_HSYNC	C93	GND	D93	GND
A94	SPI_CLK	B94	VGA_VSYNC	C94	PEG_RX13+	D94	PEG_TX13+
A95	SPI_MOSI	B95	VGA_I2C_CK	C95	PEG_RX13-	D95	PEG_TX13-
A96	N/C	B96	VGA_I2C_DAT	C96	GND	D96	GND
A97	TYPE10#	B97	SPI_CS#	C97	N/C	D97	N/C
A98	SER0_TX	B98	N/C	C98	PEG_RX14+	D98	PEG_TX14+
A99	SER0_RX	B99	N/C	C99	PEG_RX14-	D99	PEG_TX14-
A100	GND(FIXED)	B100	GND(FIXED)	C100	GND(FIXED)	D100	GND(FIXED)
A101	SER1_TX	B101	FAN_PWMOUT	C101	PEG_RX15+	D101	PEG_TX15+
A102	SER1_RX	B102	FAN_TACHIN	C102	PEG_RX15-	D102	PEG_TX15-
A103	LID#	B103	SLEEP#	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND(FIXED)	B110	GND(FIXED)	C110	GND(FIXED)	D110	GND(FIXED)

Figure 9 PCOM-B655VGL Pin-out 4-4

A49 pin and B48 pin : For PCI Express x16 lane *Bifurcation Reserved* function .

B48 Pin (CFG6)	A49 Pin (CFG5)	Description
0	0	1x8 , 2x4 PCI Express
0	1	Reserved
1	0	2x8 PCI Express
1	1	1x16 PCI Express *

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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.

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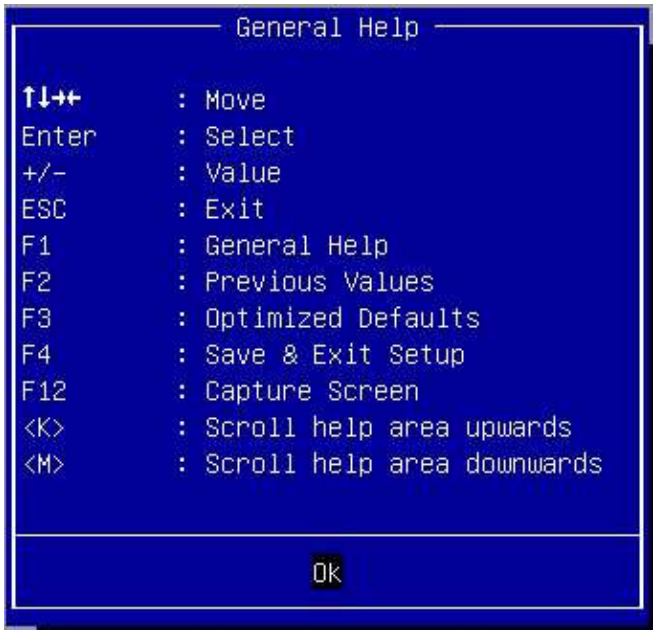

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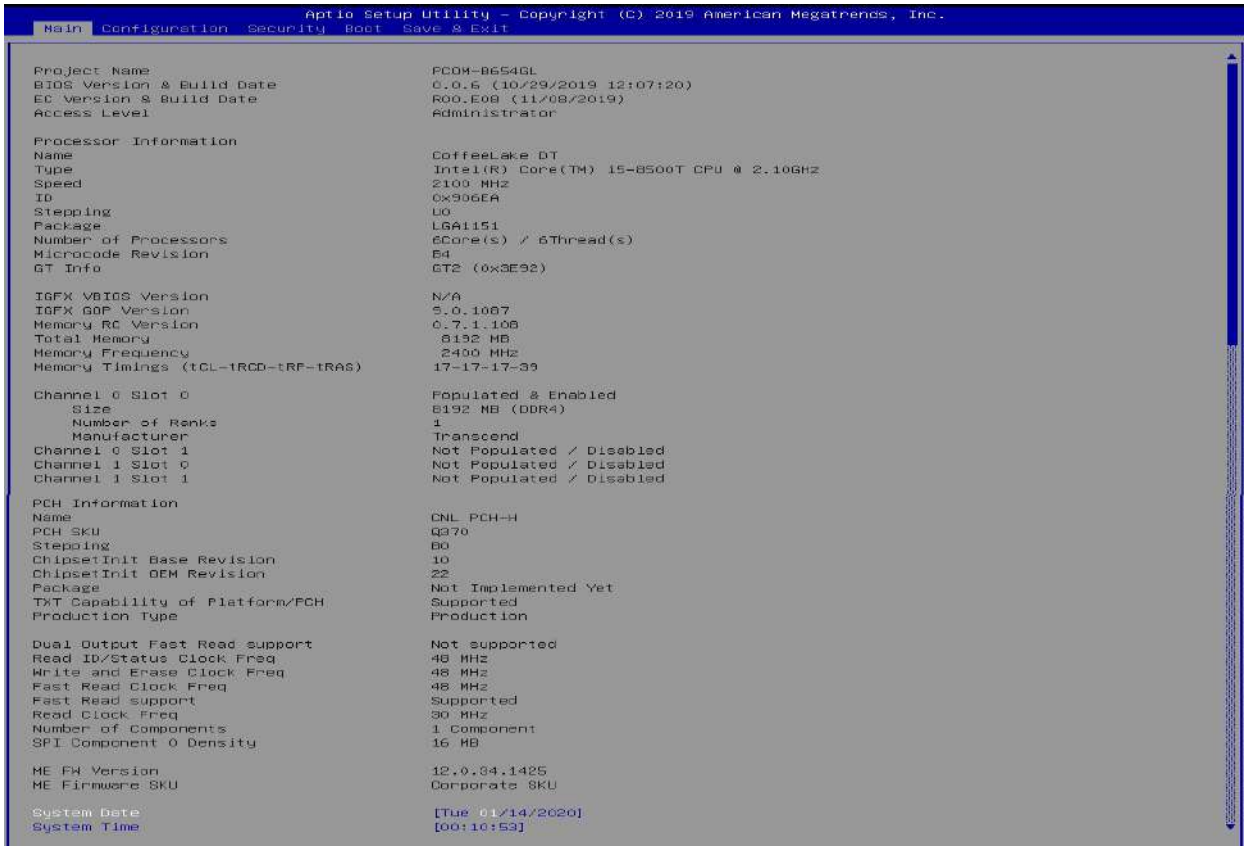
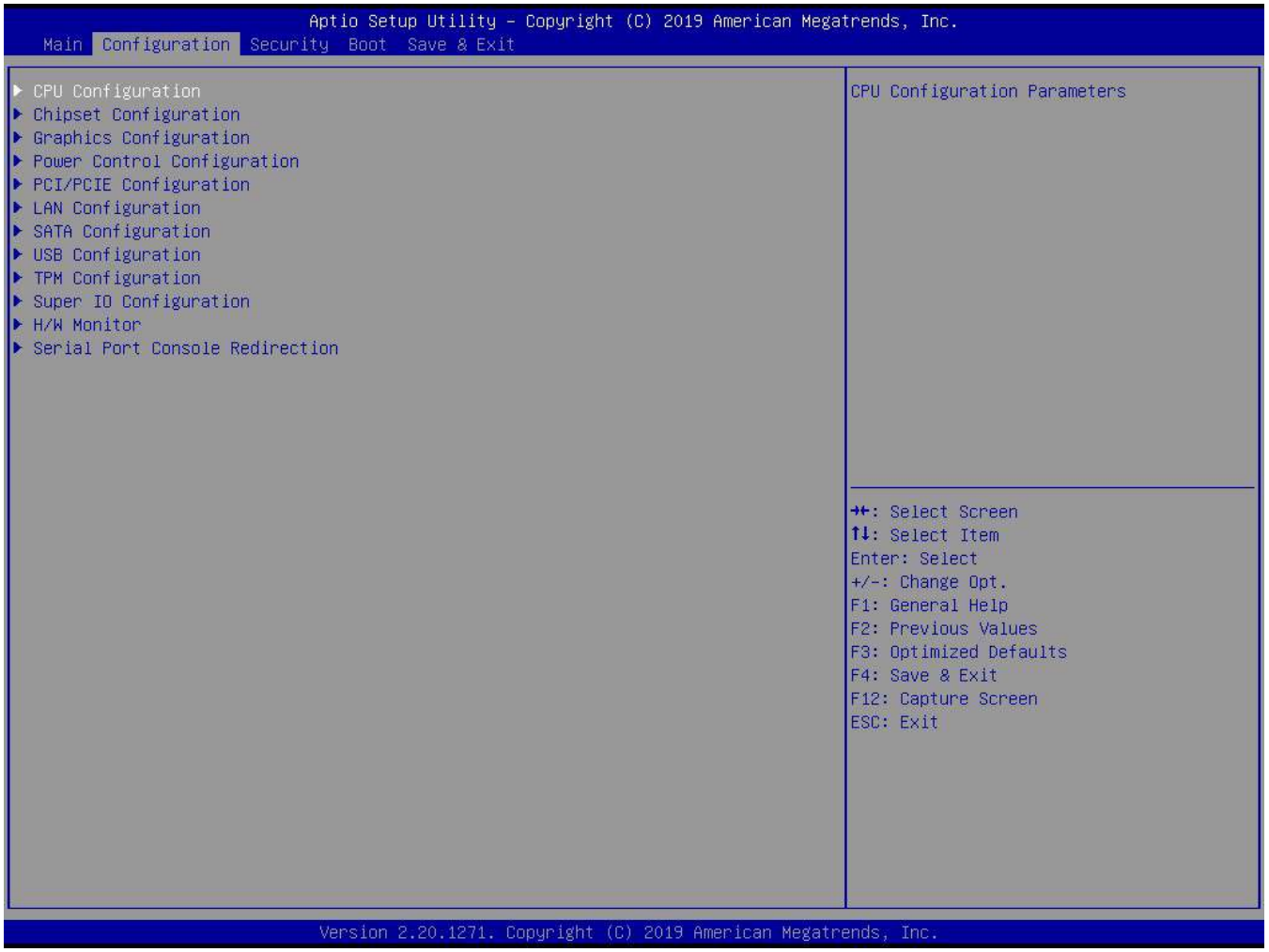
6.3 Main

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



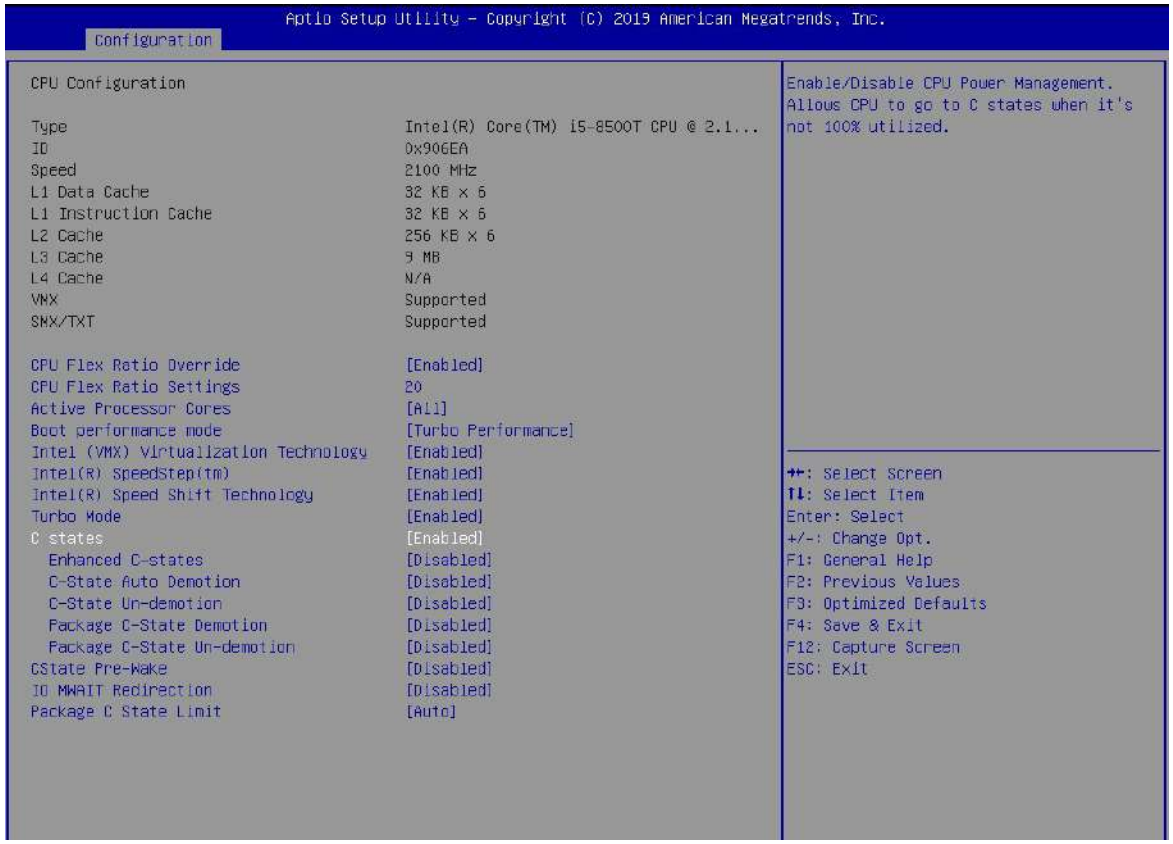
6.4 Configuration

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



CPU Configuration

CPU Configuration Parameters



Feature	Description	Options
CPU Flex Ratio Override	Enable/Disable CPU Flex Ratio Programming	★Disabled, Enabled
CPU Flex Ratio Override[Enabled]		
CPU Flex Ratio Settings	This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).	★20
Active Processor Cores	Number of cores to enable in each processor package.	★All, 1, 2, 3,4,5
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector	★Turbo Performance, Max

		Battery ,Max Non-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	★Disabled, Enabled
C states[Enabled]		
Enhanced C-states	Enable/Disable C1E.When enabled, CPU will switch to minimum speed when all cores enter C-state	★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,

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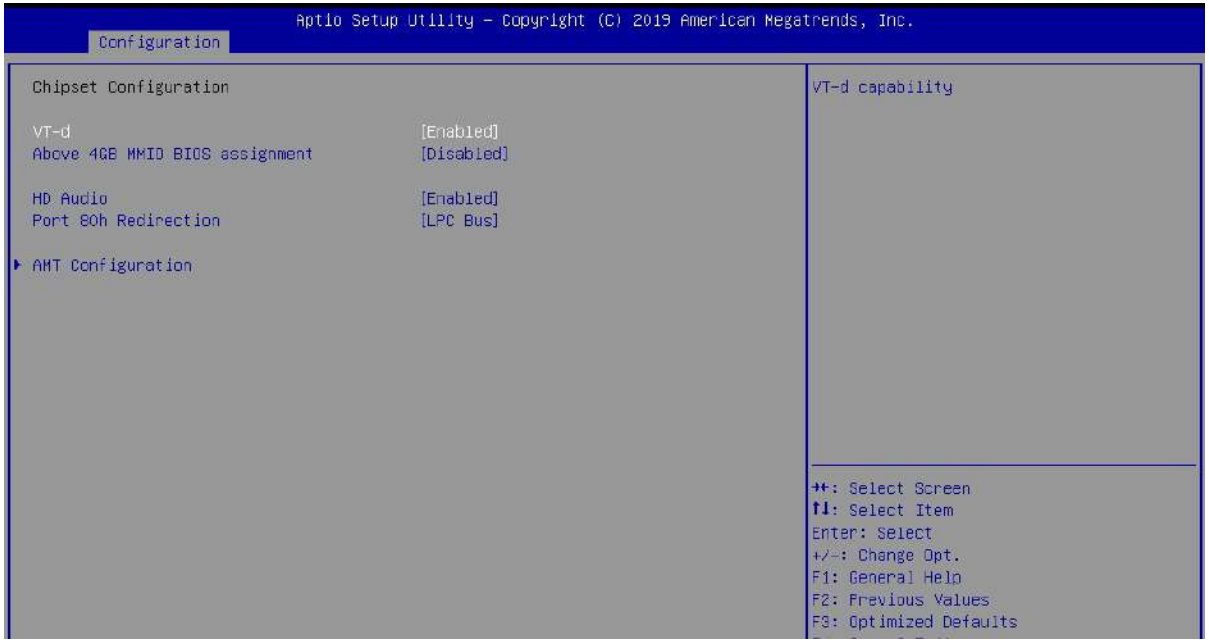
Chipset Configuration

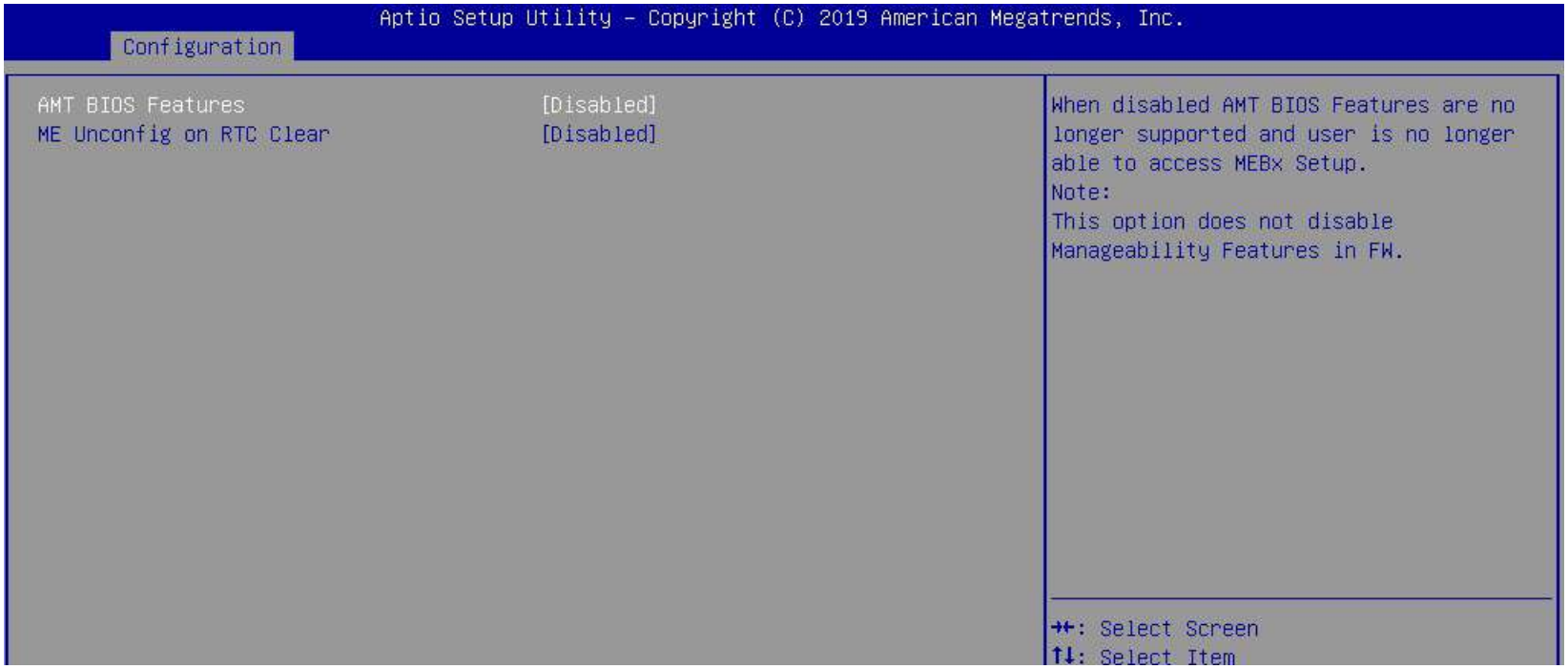
Configuration Chipset feature



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

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

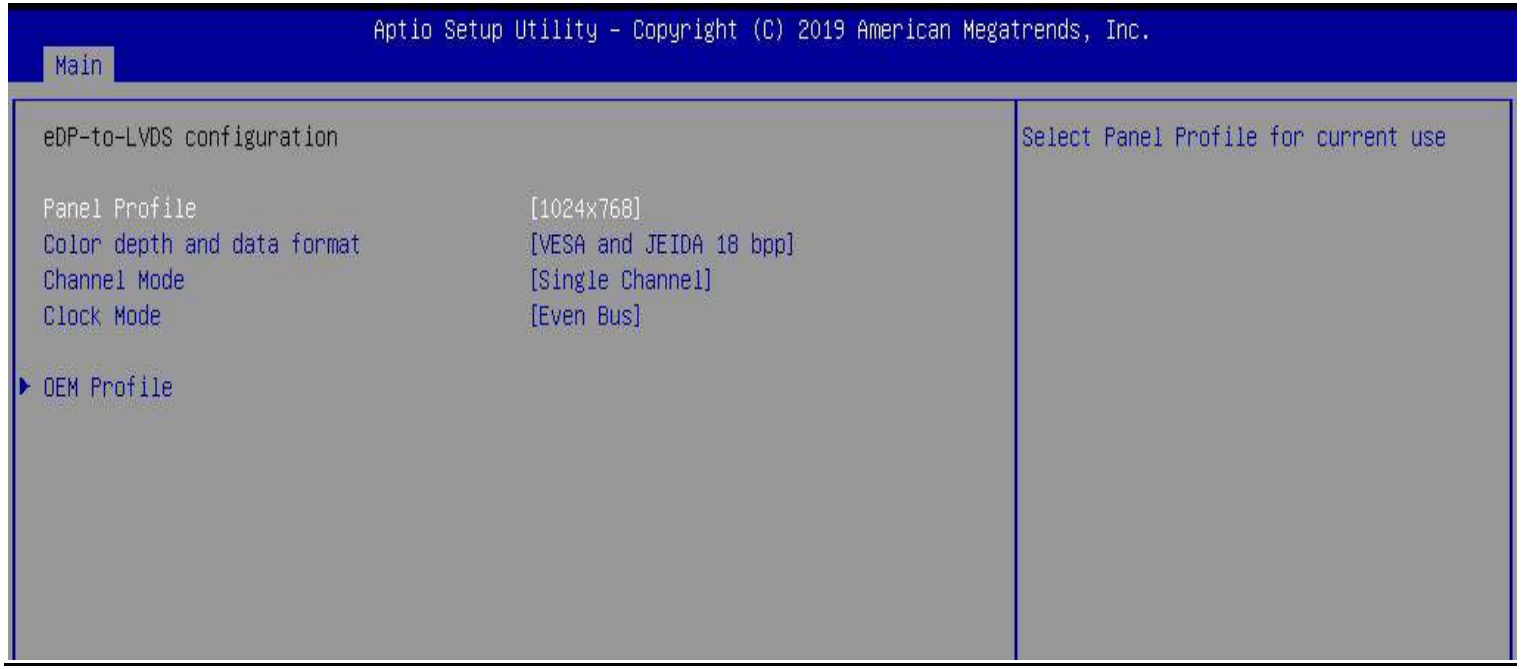
Graphics Configuration

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, PCIE
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.	★32M,0M,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(PTN3460)



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

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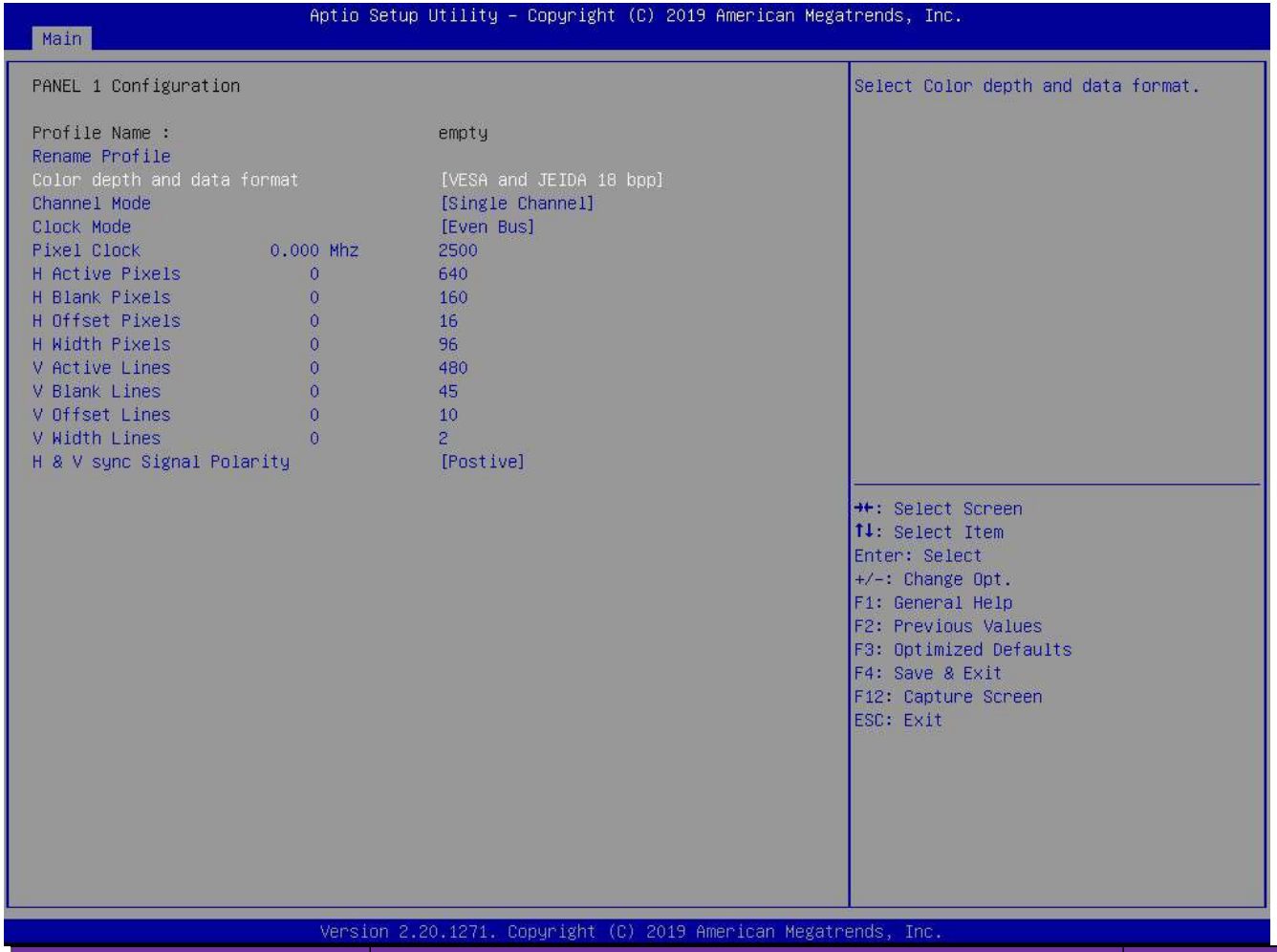
OEM Profile

PANEL 1 Help



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

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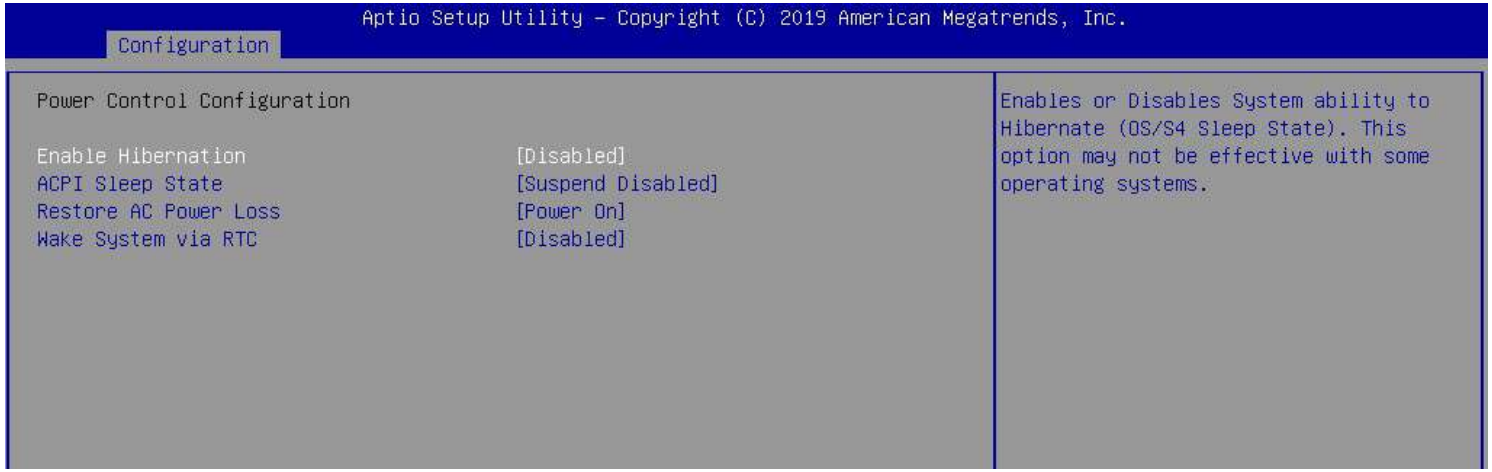
Power Control Configuration

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 OS.	★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)
Restore AC Power Loss	Specify what state to go to when power is re-applied after a power failure (G3 state)	★Power On ,Power Off ,Last State
Wake System from S5 via RTC	Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec Specified/programmed by the Tools from OS	★Disabled, Enabled

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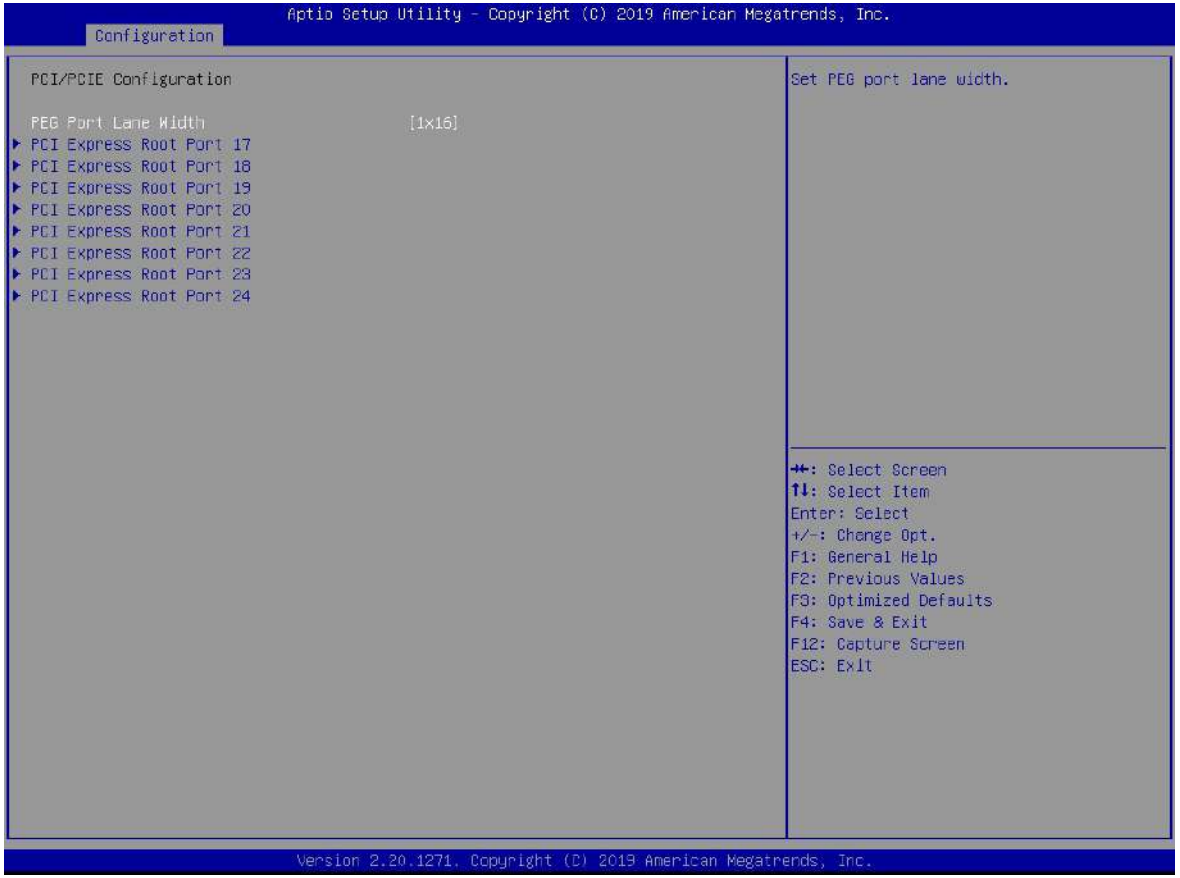
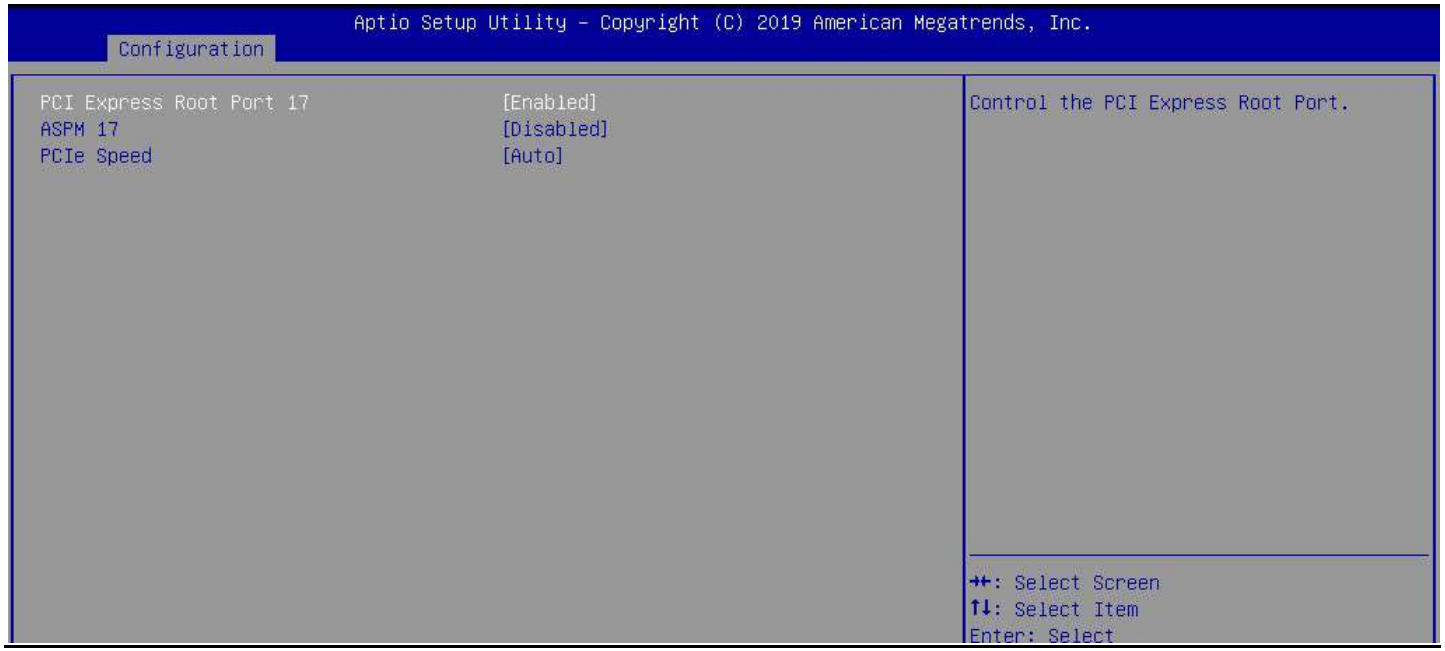
PCI/PCIE Configuration

PCI, PCI-X and PCI Express Settings



Feature	Description	Options
PEG Port Lane Width	Set PEG port Lane width	★1x16, 2x8,1x8. 2x4

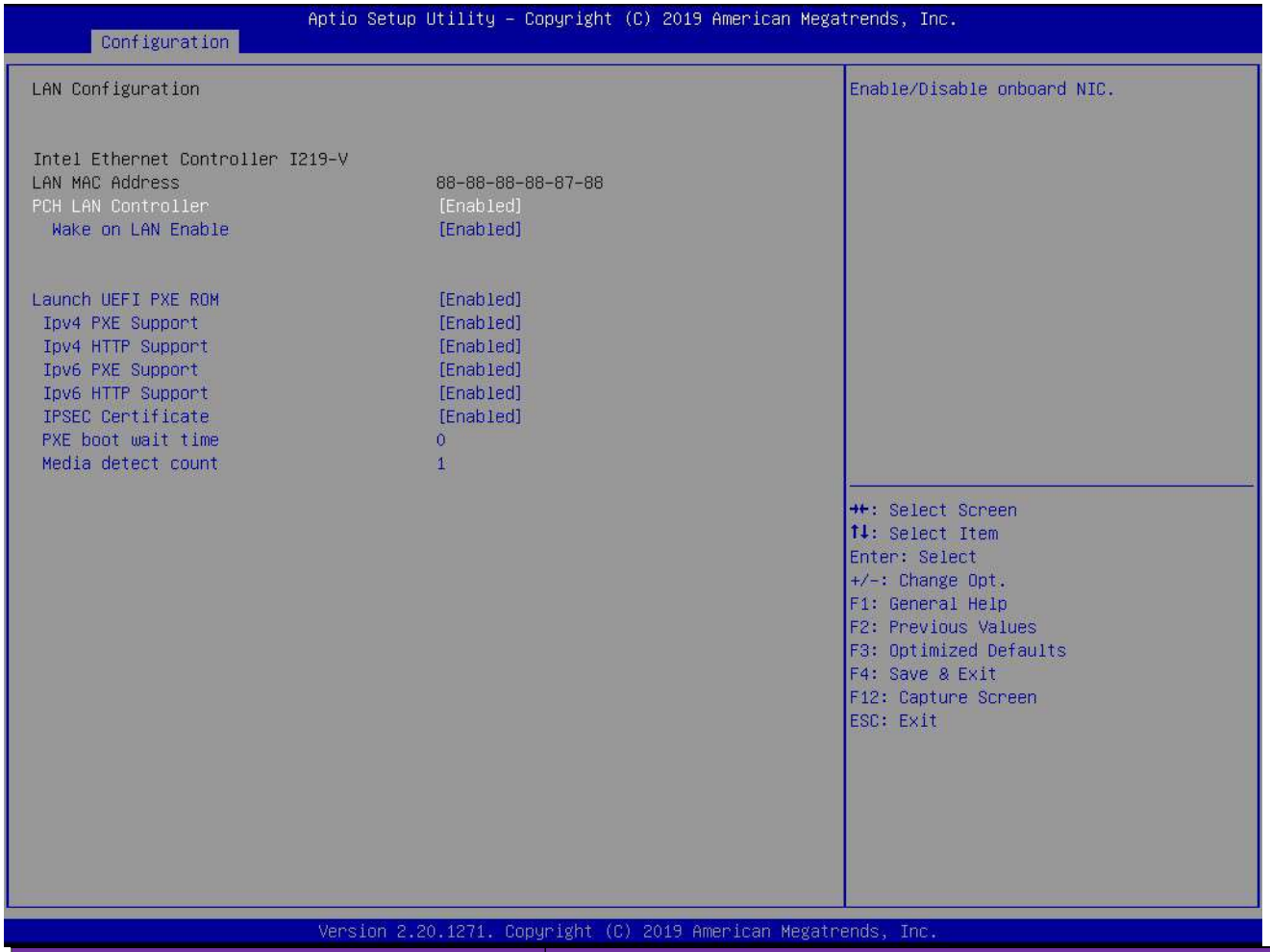
PCI Express Root Port17~Port24



Feature	Description	Options
PCI Express Root Port 17~24	Control the PCI Express Root Port.	★Enabled , Disabled
ASPM 17~24	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	Select PCI Express port 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. If disable, IPv4 PXE boot support will not be available.	★Enabled, Disabled
Ipv4 HTTP Support	Enable/Disable Ipv4 HTTP boot support. If disable, IPv4 HTTP boot support will not be available.	★Enabled, Disabled
Ipv6 PXE Support	Enable/Disable Ipv6 PXE boot support. If disable, IPv6 PXE boot support will not be available.	★Enabled, Disabled
Ipv6 HTTP Support	Enable/Disable Ipv6 HTTP boot support. If disable, IPv6 HTTP boot support will not be available.	★Enabled, Disabled
IPSEC Certificate	Support to Enable/Disable IPSEC certificate for Ikev	★Enabled, Disabled
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

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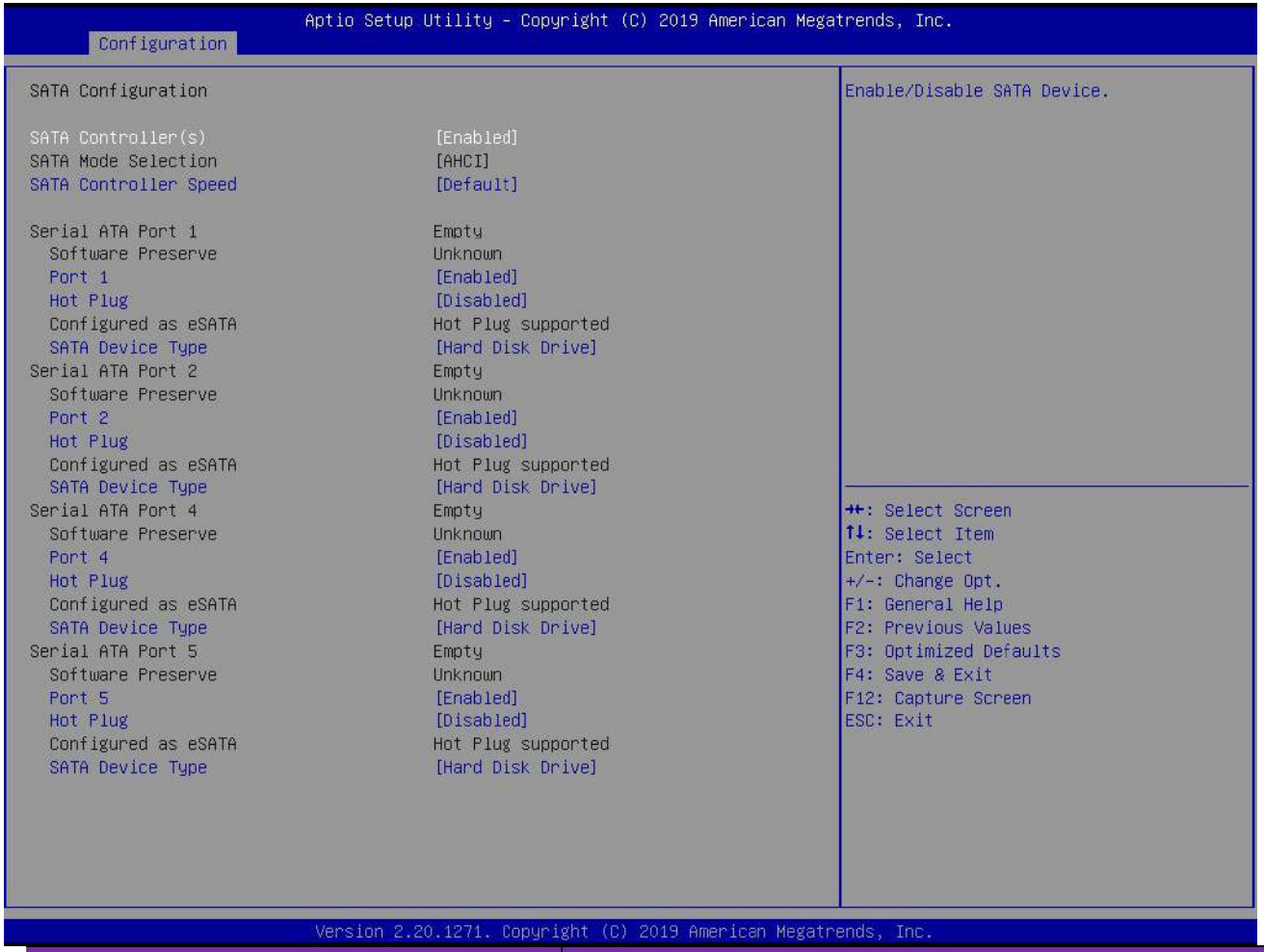
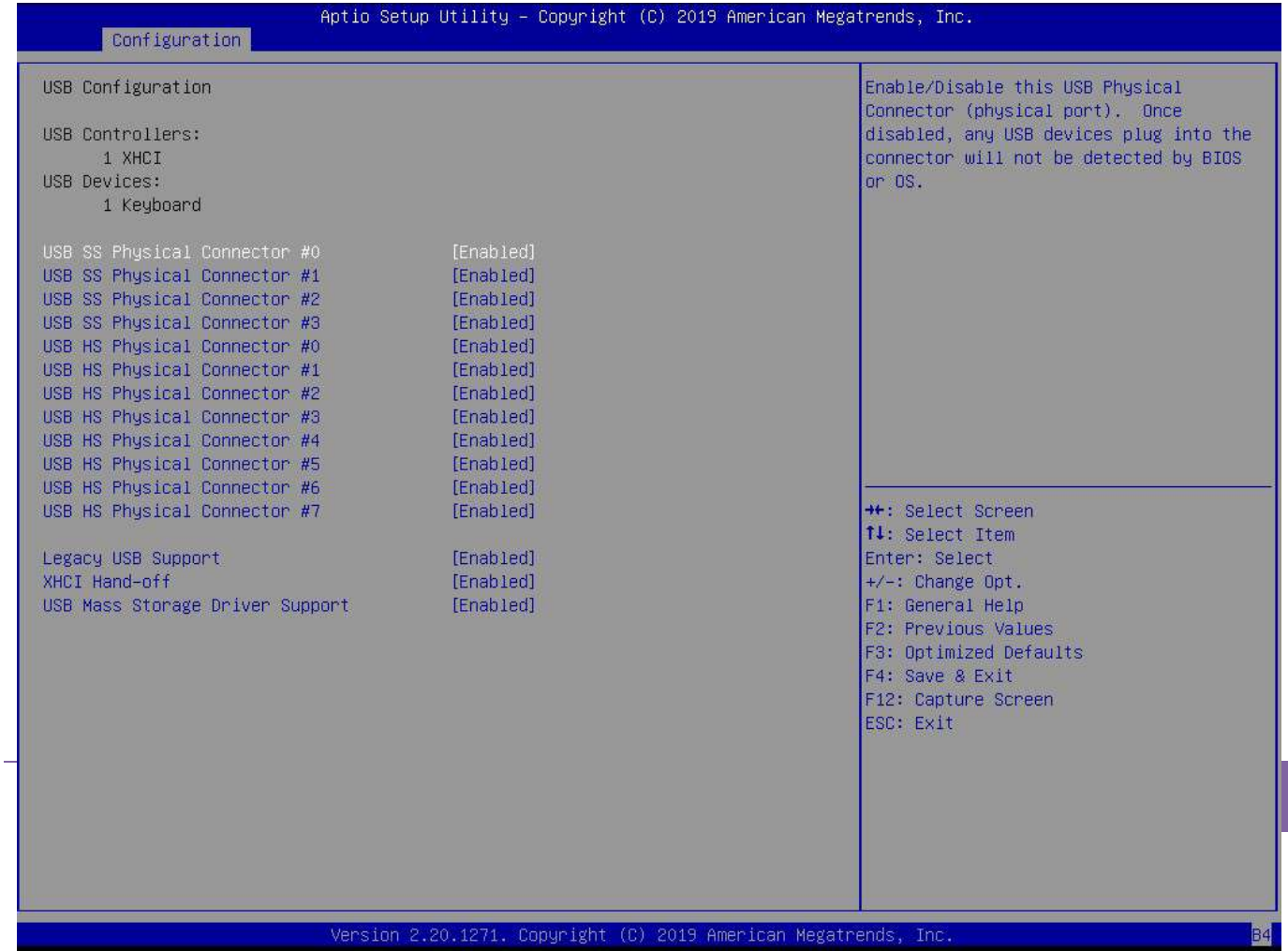
SATA Configuration

SATA Device Options Settings



Feature	Description	Options
SATA Controller(s)	Enable/disable the SATA controllers.	★Enabled , Disabled
SATA Controller Speed	Indicates the maximum speed the SATA controller can support	★Default,Gen1,Gen2,Gen3
Serial ATA Port 1/2/4/5		

Port 1/2/4/5	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/HS Physical Connector #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
Legacy USB Support	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI application	★Enabled , Disabled, Auto
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver	★Enabled , Disabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support	★Enabled , Disabled

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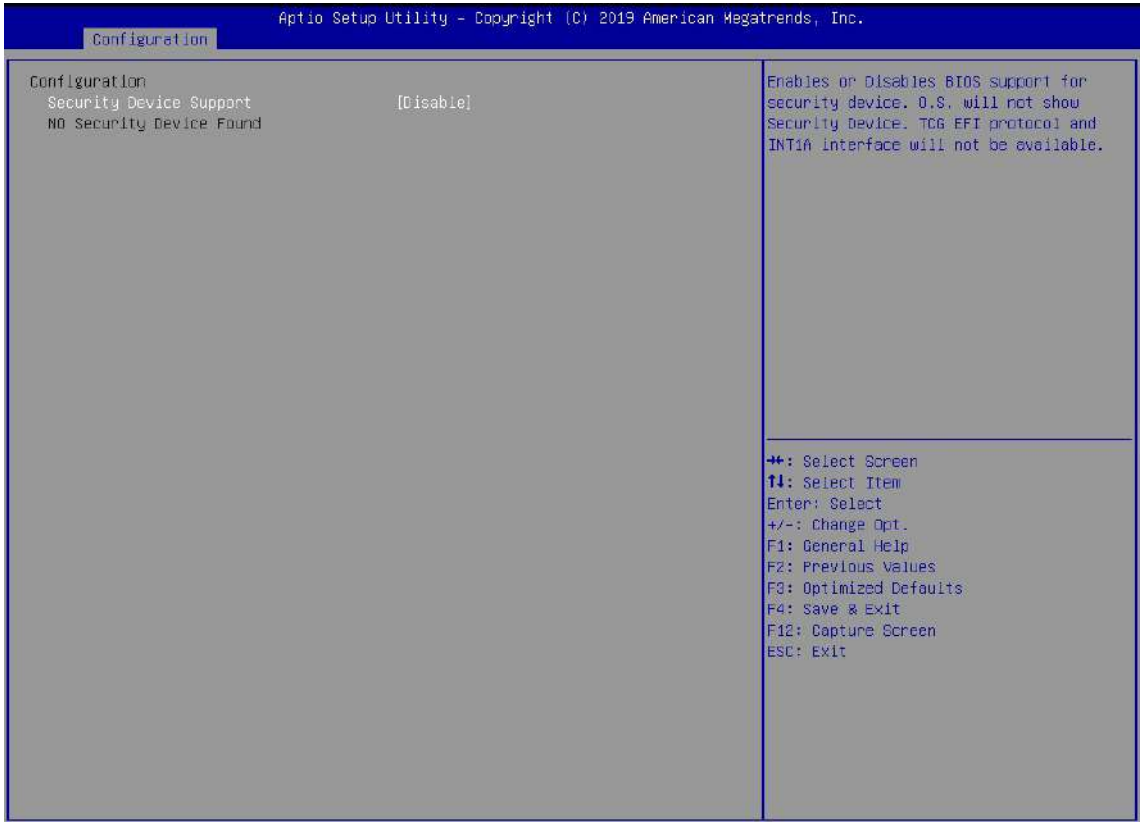
TPM Configuration

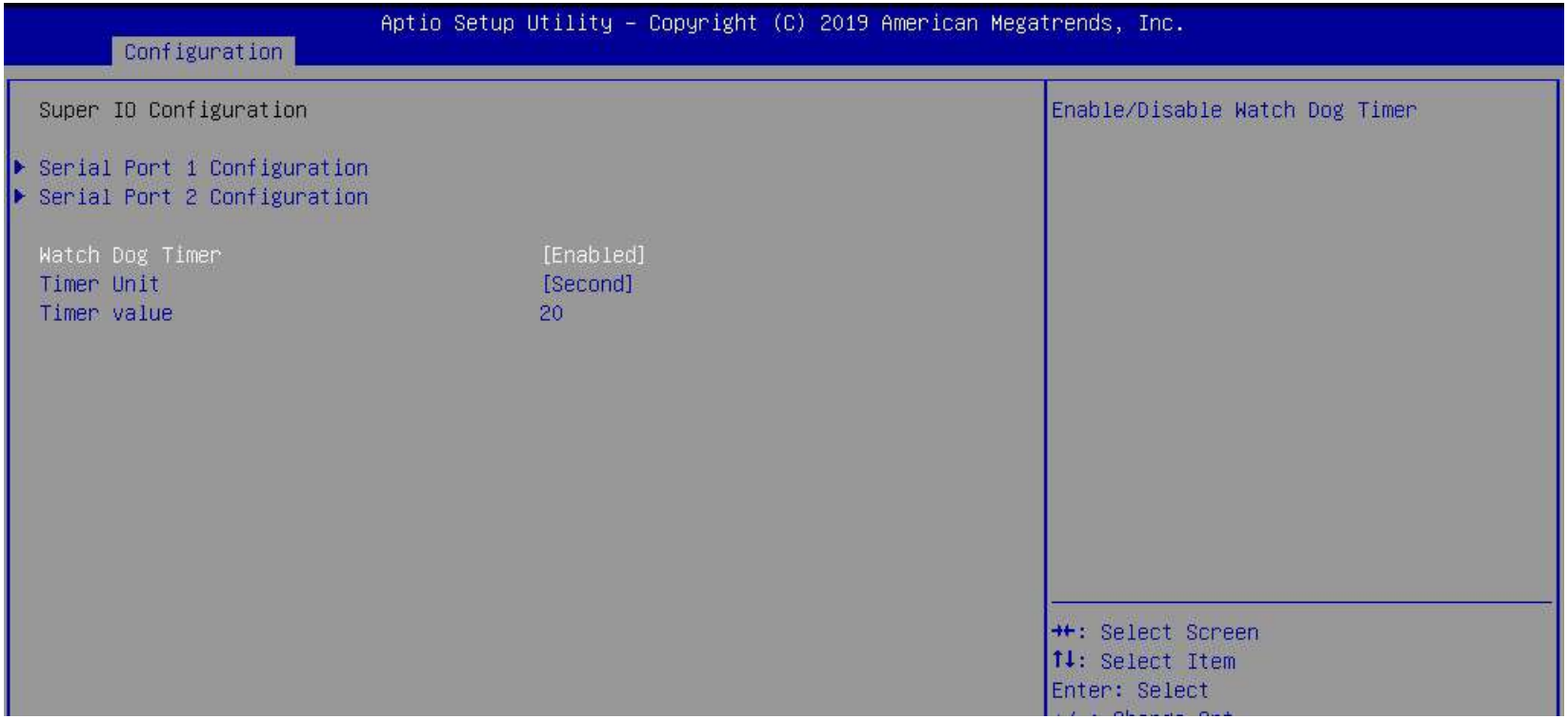
Trusted Computing Setting



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

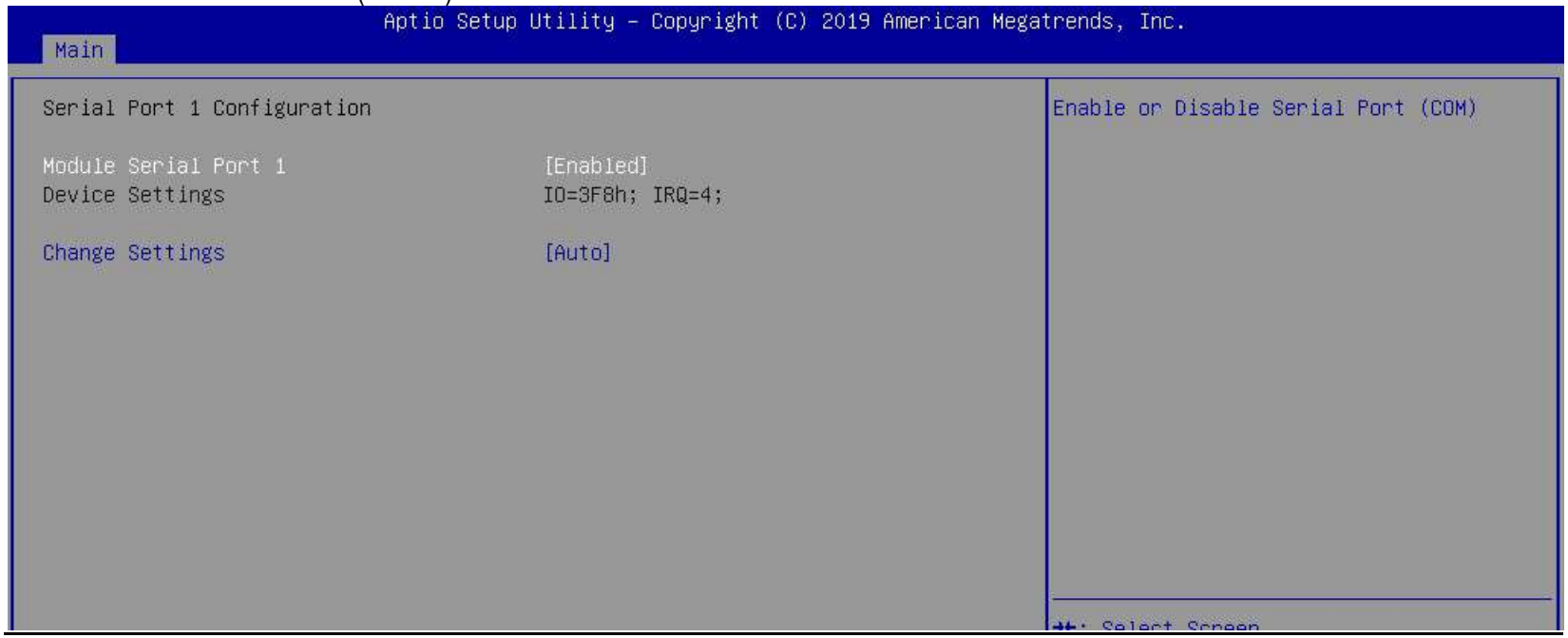
System Super IO Chip Parameters.



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 (COM A)



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=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12

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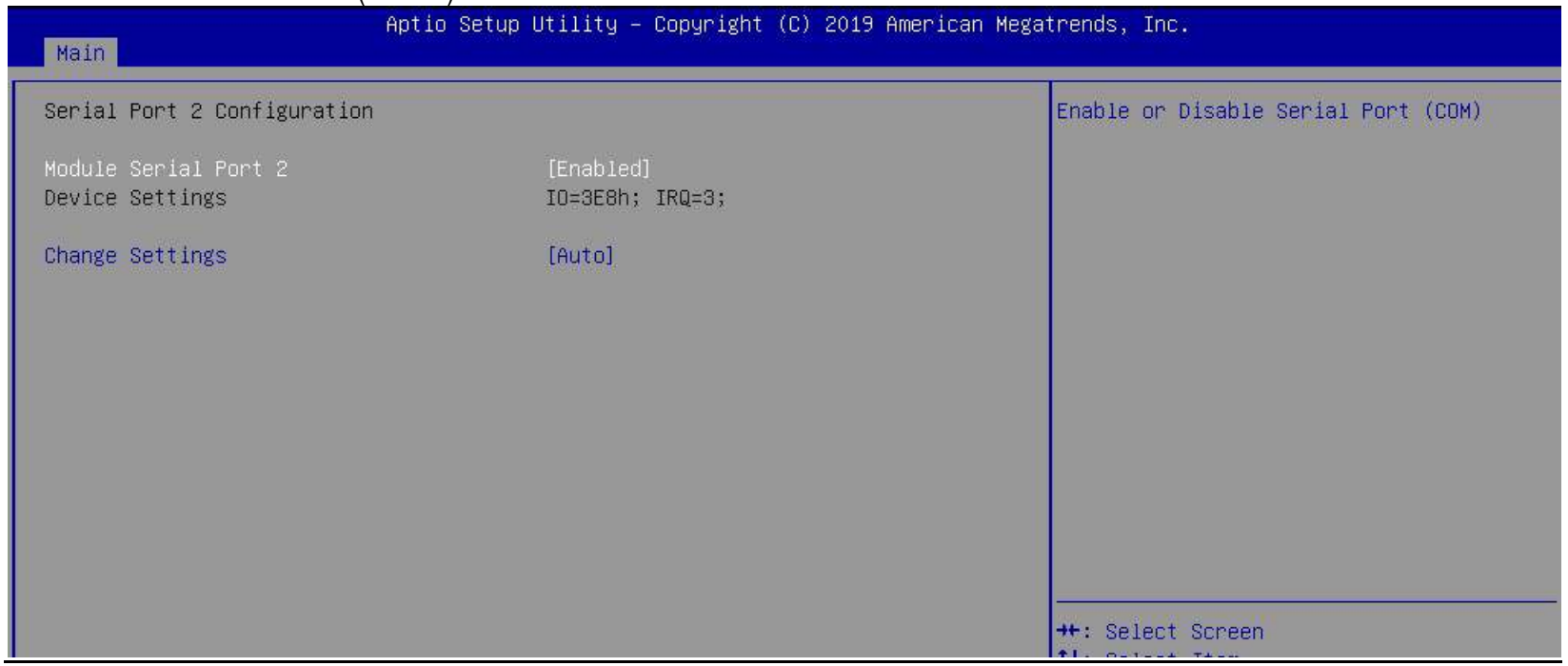
Serial Port 2 Configuration

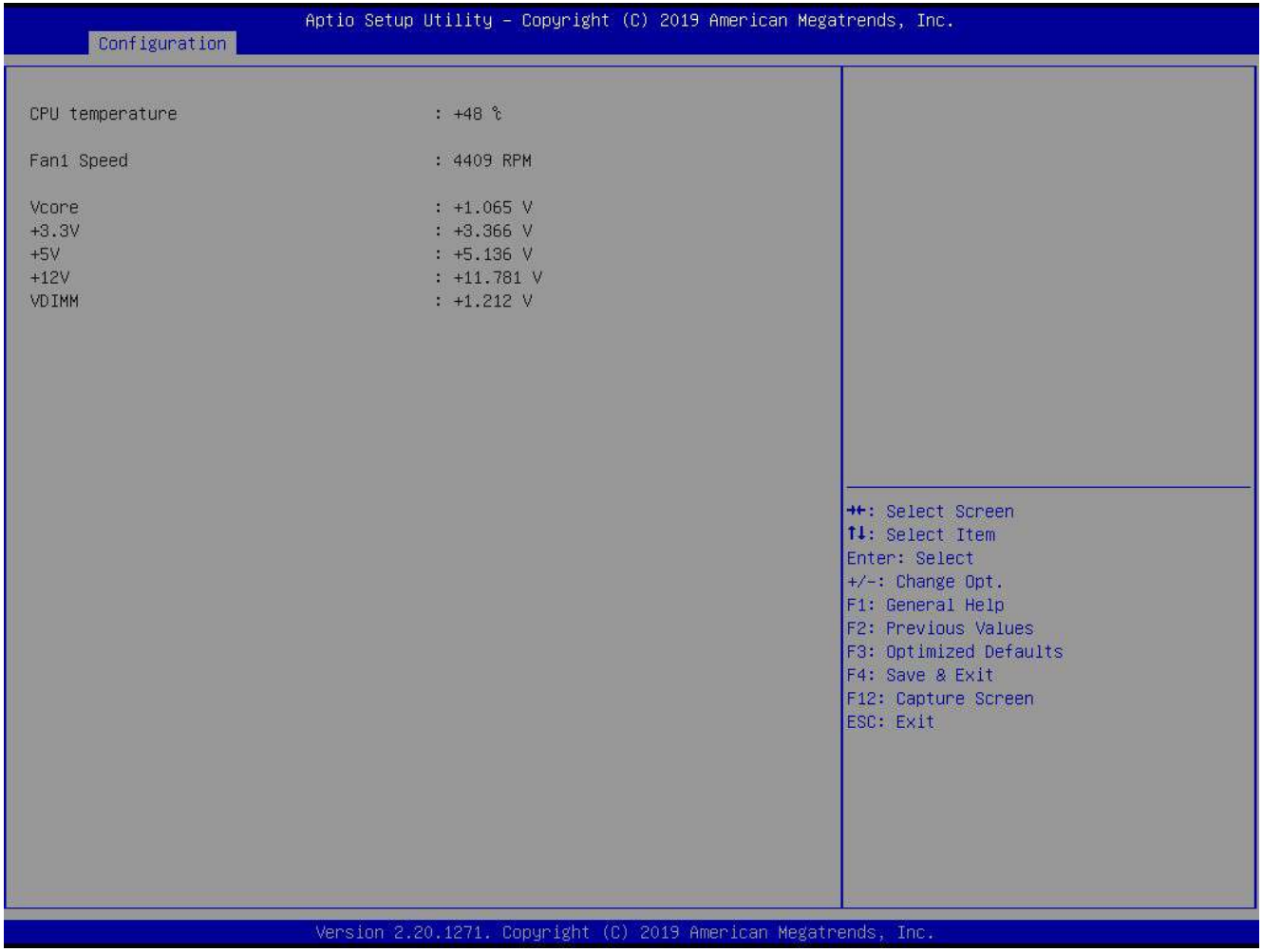
Set Parameters of Serial Port 2 (COM B)



Feature	Description	Options
Serial Port	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=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12

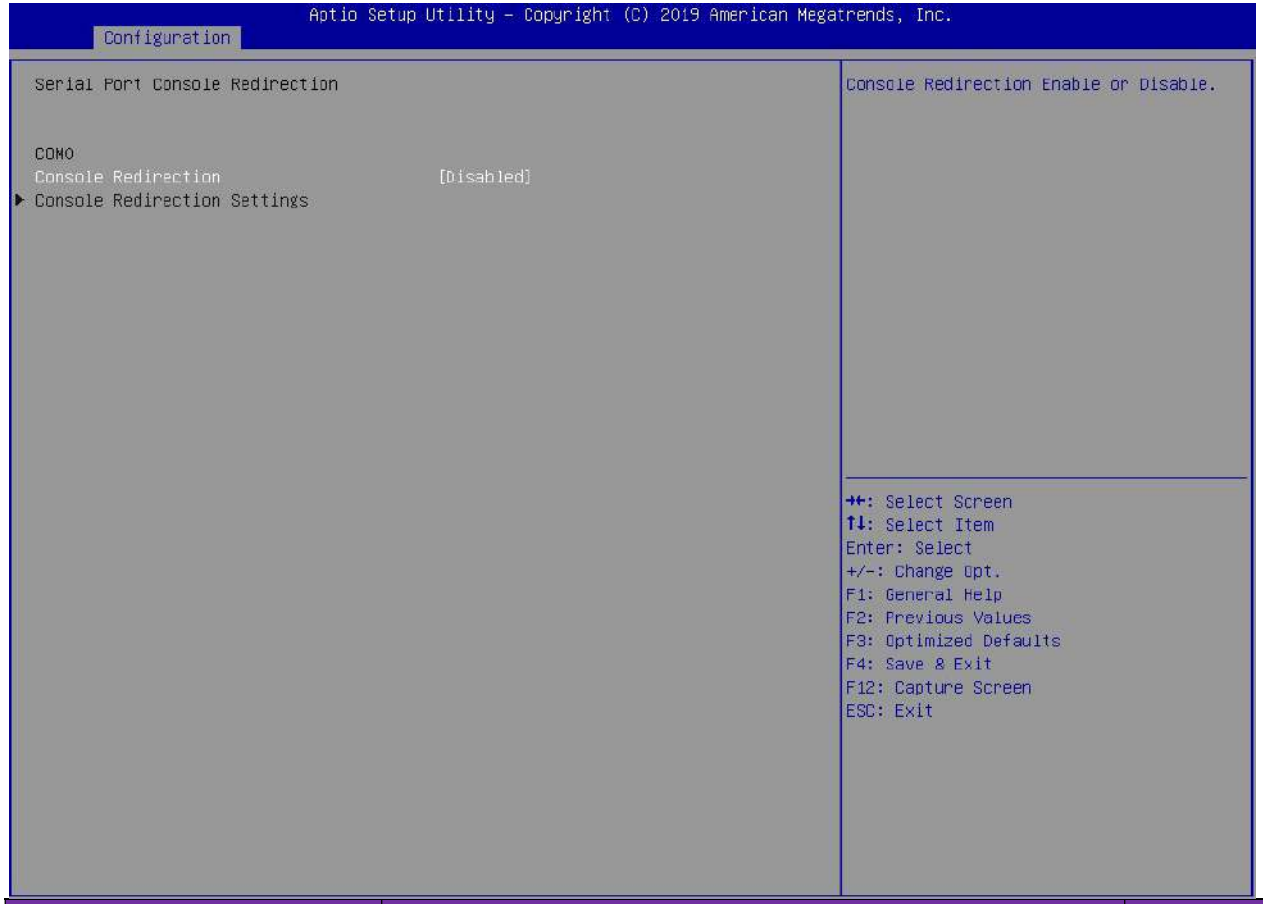
H/W Monitor

Monitor hardware status



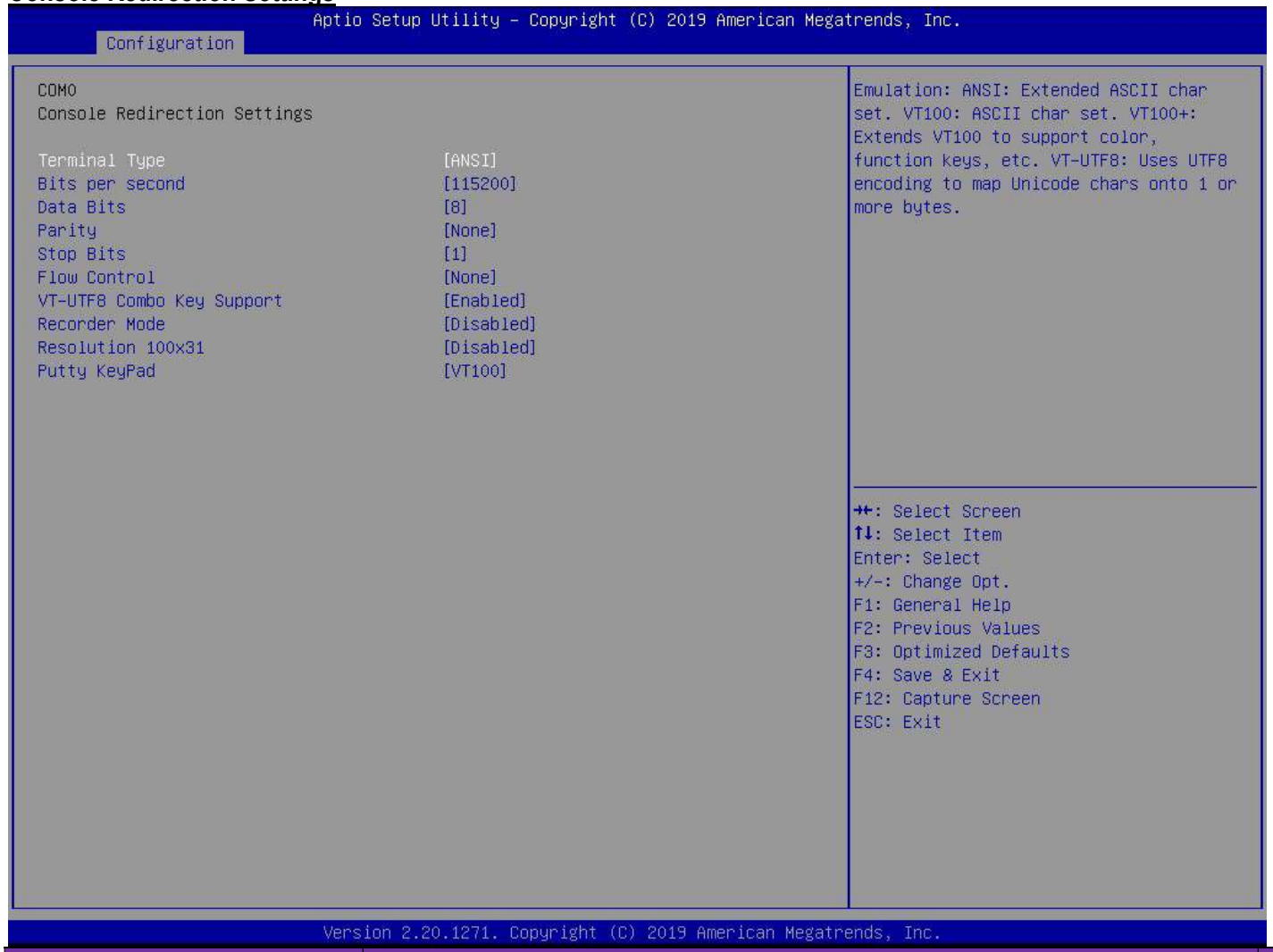
Serial Port Console Redirection

Serial Port Console Redirection



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

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.	★ANSI, VT100, 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
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

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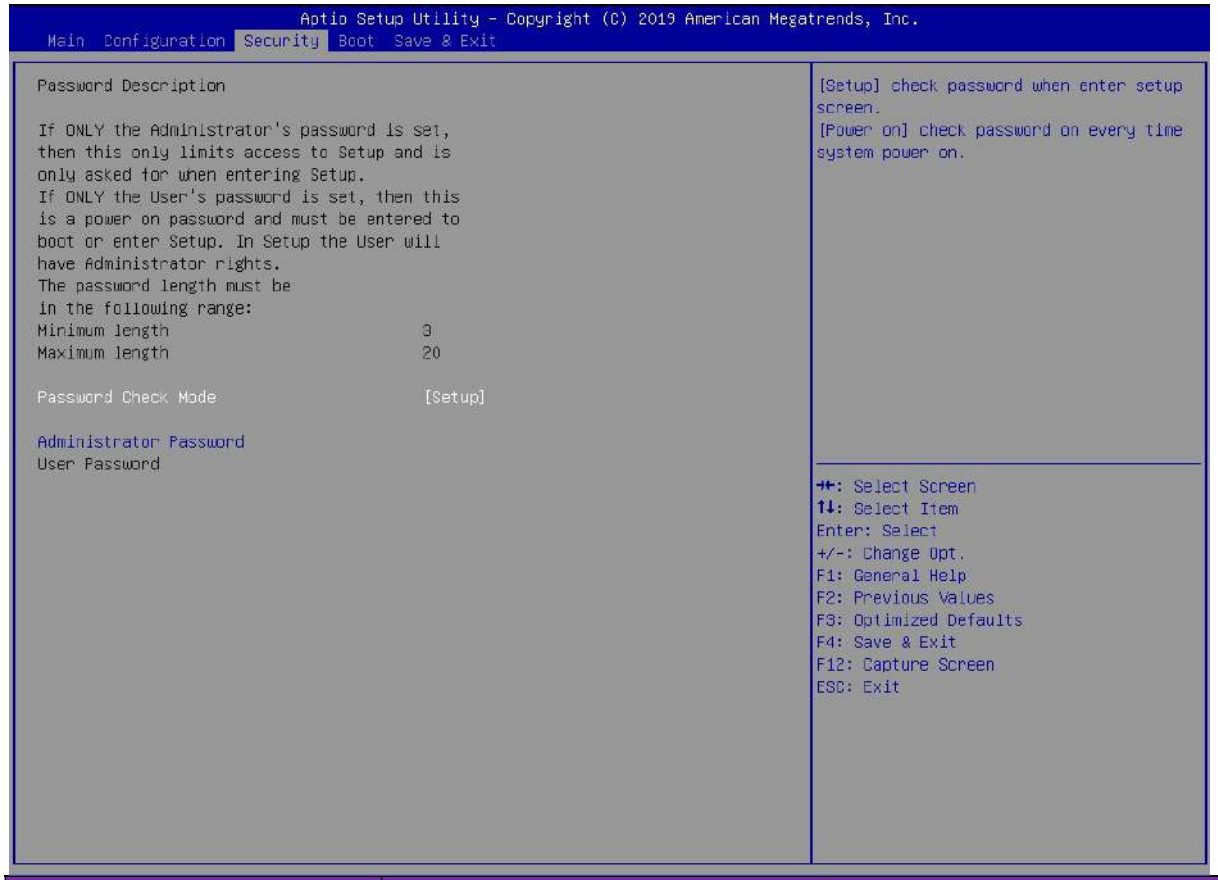
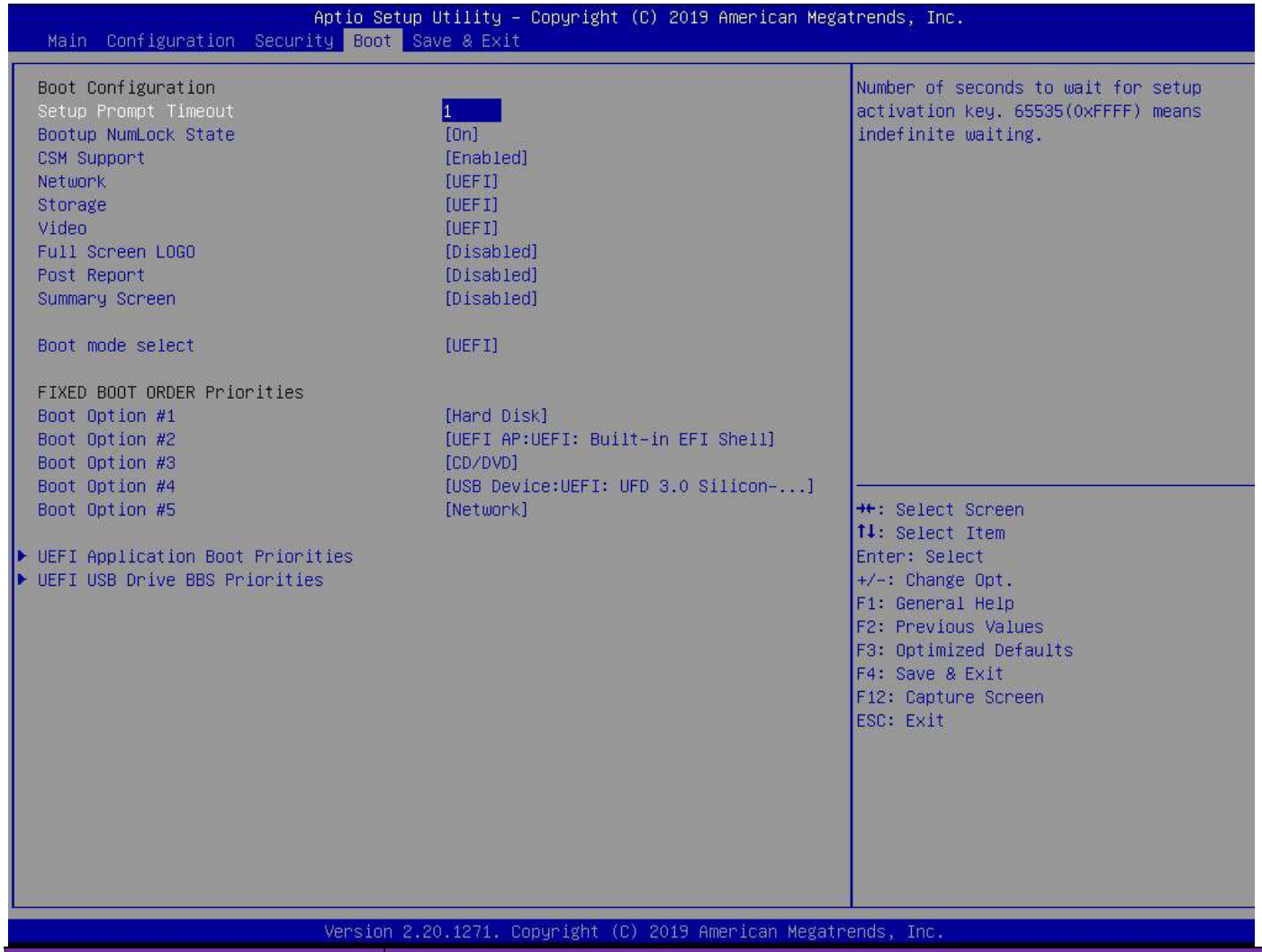
6.5 Security



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	

6.6 Boot



Feature	Description	Options
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite	★1

	waiting.	
Bootup NumLock State	Select the keyboard NumLock state	★On, Off
CSM Support	Enable/Disable CSM support	★Disabled, Enabled
CSM Support[Enable]		
Network	Controls the execution of UEFI and Legacy Network 0pROM	★UEFI, Do not launch, Legacy
Storage	Controls the execution of UEFI and Legacy Storage 0pROM	★UEFI, Do not launch, Legacy
Video	Controls the execution of UEFI and Legacy Video 0pROM	★UEFI, Do not launch, Legacy
Full Screen LOGO	Enables or disables Quiet Boot option and Full screen Logo.	★Disabled, Enabled
Post Report	Post Report Support Enabled/Disabled	★Disabled, Enabled
Summary Screen	Summary Screen Support Enabled/Disabled	★Disabled, Enabled
Boot mode select	Select boot mode LEGACY/UEFI	★UEFI ,Legacy
Boot Option #1~5	Sets the system boot order	★Hard Disk, UEFI AP, CD/DVD,USB Device, Network, Disabled
UEFI Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

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6.7 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.	

Figure 10 BIOS - Save & Exit

7 BIOS Update

How to update the BIOS file of PCOM-B654?

Step1. Please visit web site of Portwell download center as below hyperlink http://www.portwell.com.tw/support/download_center.php
Registering an account in advance is a must. (The E-Mail box should be an existing Company email address that you check regularly.)
http://www.portwell.com.tw/member/newmember.php

Step2. Type in your User name and password and log in the download center.

Step3. Select "Search download" and type the keyword "PCOM-B654".

Step4. Find the **"BIOS "**page and download the ROM file and flash utility.

Step5. 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

Step6. 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.

Step7. 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.

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8 PORTWELL Software Tool

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.

PORTWELL BIOS web Tool (PBT)

The PORTWELL BIOS web Tool (PBT) is a brand new on-line utility which innovated by PORTWELL. PBT now is available for PORTWELL's premiere customers who are able to add customized BIOS logo and change BIOS default settings on American Megatrends (AMI) BIOS. Please contact PORTWELL for more information.

PORTWELL EC Auto Test Tool (PECAT)

The PORTWELL EC Auto Test Tool (PECAT) is a brand new utility which innovated by PORTWELL. PECAT now is available for PORTWELL's premiere customers, who are able to Test Embedded Controller Function in UEFI Mode. Please contact PORTWELL for more information.

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9 Industry Specifications

The list below provides links to industry specifications that apply to PORTWELL COM Express 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/
PICMG® COM Express Module™ Base Specification http://www.picmg.org/
PCI Express Base Specification, Revision 2.0 https://www.pcisig.com/specifications

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