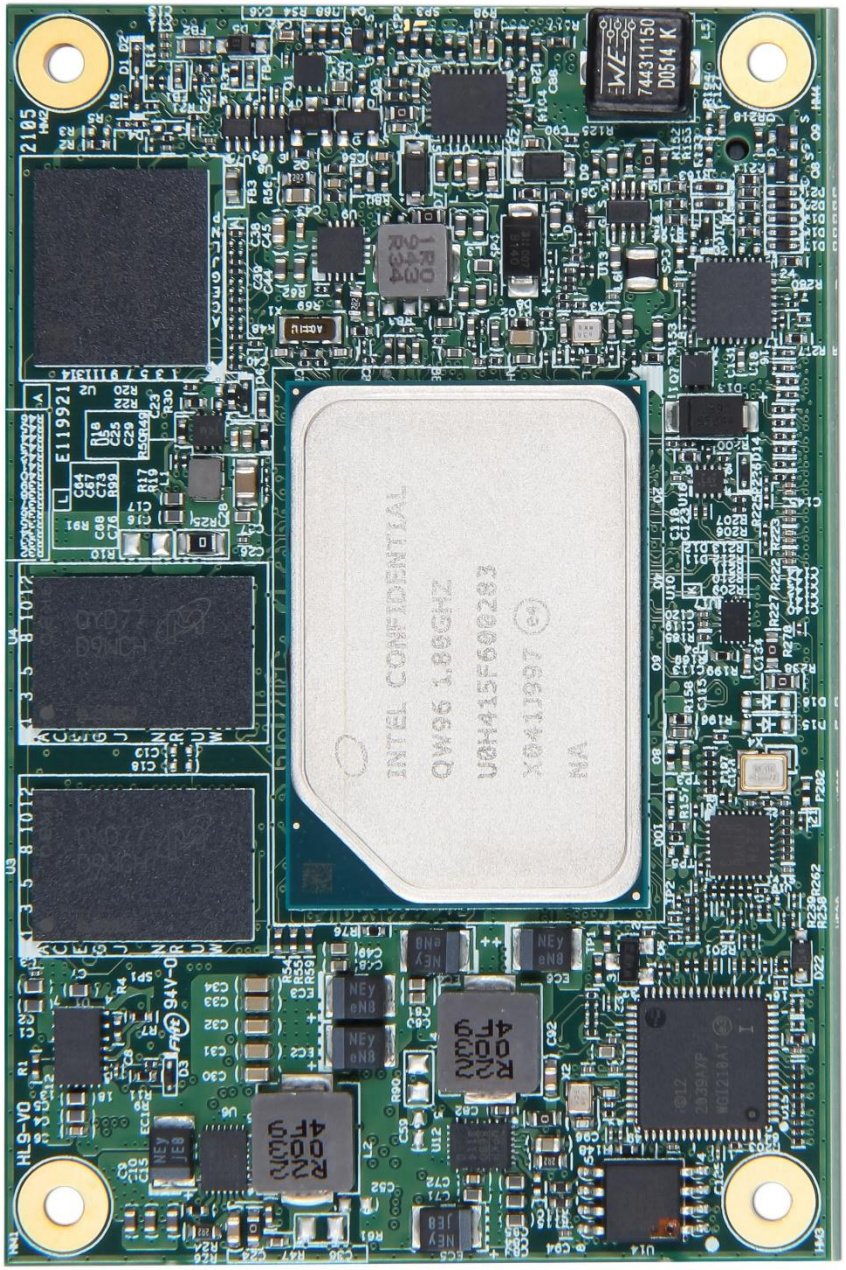

COM Express™ PCOM-BA02GL User's Guide R0.1

Revision History

Rev.	Note	Date
R0.1	Preliminary	2022 / 02 / 25

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1 Introduction

PCOM-BA02GL, a Type 10 Mini COM Express® (84 x 55 mm) module which based on Intel® Elkhart Lake Atom® x6000 and Pentium® J / N series processors. In this architecture, it could provide LVDS, and high quantity HDMI, eDP, DP with 4K resolution. And it also provides turbo mode up to 3.0GHz, with extending 4x PCIe 3.0 x1, 2x USB 3.2 Gen2, 8x USB 2.0, and 2x SATA III devices. With ultra low power consumption(4.5 to 12W), wide-temp support, it could provide very energy saving and high effective performance. Portwell want to promote PCOM-BA02GL as vertical solution to aim in the different versatile applications, such as automation, military, hospitality, transportation and so on.

1.1 PCOM-BA02GL SKU List

Series	PCOM-BA02GL					
Ordering P/N	AB1-3K47	AB1-3L76	AB1-3L79	AB1-3L78	AB1-3L77	AB1-3L75
CPU Specifications						
Processor	Atom® x6425E	Atom® x6413E	Atom® x6211E	Pentium® J6426	Celeron® N6211	Atom® x6425RE
# of Cores	4	4	2	4	2	4
# of Threads	4	4	2	4	2	4
Cache	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB
Base Frequency	2.0 GHz	1.5 GHz	1.3 GHz	2.0 GHz	1.2 GHz	1.9 GHz
Turbo Frequency	3.0 GHz	3.0 GHz	3.0 GHz	3.0 GHz	3.0 GHz	N/A
TDP	12 W	9 W	6 W	10 W	6.5 W	12 W
Memory Specifications						
Capacity	8GB LPDDR4	8GB LPDDR4	4GB LPDDR4	8GB LPDDR4	4GB LPDDR4	8GB LPDDR4
Speed	3200 Mhz	3200 Mhz	3200 Mhz	3200 Mhz	3200 Mhz	4267 Mhz
ECC	In-Band ECC	In-Band ECC	In-Band ECC	N/A	N/A	In-Band ECC
I/O Specifications						
eMMC	32GB	16GB	16GB	32GB	16GB	16GB
PCIe	4x PCIe 3.0	4x PCIe 3.0	4x PCIe 3.0	4x PCIe 3.0	4x PCIe 3.0	4x PCIe 3.0
USB 3.2 Gen2 / 2.0	2x / 4x	2x / 4x	2x / 4x	2x / 4x	2x / 4x	2x / 4x
SATA	2x	2x	2x	2x	2x	2x
Ethernet	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE (TSN/TCC)

Table 1 PCOM-BA02GL SKU

2 Block Diagram

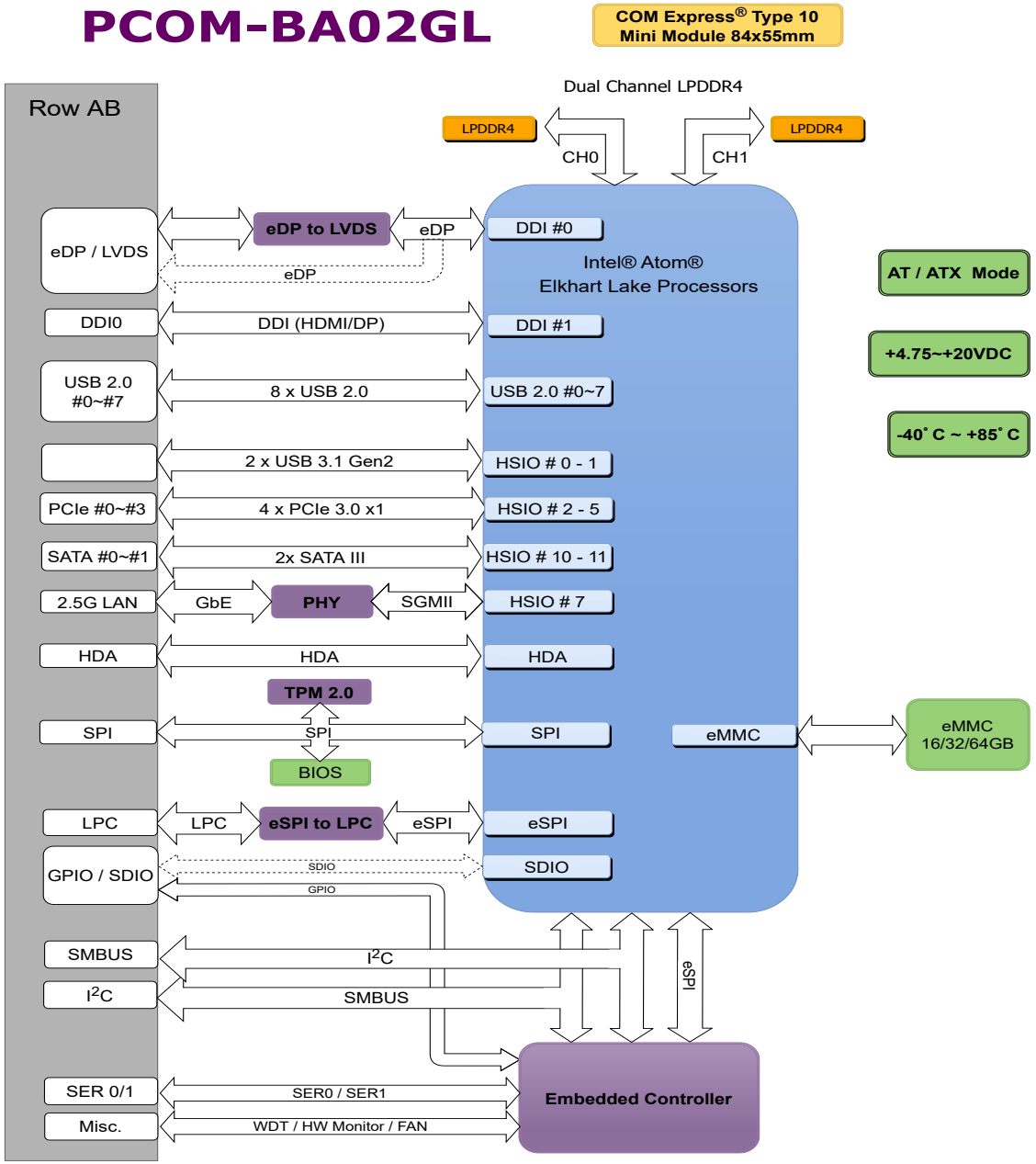


Figure 1 Block Diagram

3 Specifications

Product	➢ PCOM-BA02GL
Form Factor	➢ COM Express® Type 10, mini size (84 X 55mm)
Processor	➢ Intel® Atom® x6425E ➢ Intel® Atom® x6413E ➢ Intel® Atom® x6211E ➢ Intel® Pentium® J6426 ➢ Intel® Celeron® N6211 ➢ Intel® Atom® x6425RE
BIOS	➢ AMI BIOS
Memory	➢ Up to 8GB LPDDR4 ➢ Support in-band ECC on selected SKU
Graphic Display interface	➢ Intel® UHD Graphics (Gen11) ➢ 1x DDI ➢ 1x LVDS share with eDP
Ethernet	➢ 1x 2.5GbE (via GPY215 PHY) ➢ Support TSN/TCC on selected SKU
Audio	➢ HDA
PCI Express	➢ 4x PCIe 3.0
I/O	➢ 2x USB 3.2 Gen2 / 2.0 + 2x USB 2.0 ➢ 2x SATA ➢ 8 bit GPIO (default 4 in / 4 out) ➢ I2C / SMBus ➢ 2x UART

Hardware Monitors	➢ ITE series Embedded Controller, Voltage, Fan and Temperature
Security	➢ TPM 2.0 (Option)
Power Management	➢ ACPI 4.0
Environment	➢ Operating Temperature 0°C ~60°C Extended : -40°C ~+85°C (selected SKU) ➢ Storage Temperature -40°C ~+85°C ➢ Relative Humidity 5%~95%

Table 2 PCOM-BA02GL SPEC

3.1 Supported Operating Systems

The PCOM-BA02GL supports the following operating systems.

Vendor	Operating System	Distribution and Support
Microsoft	Windows 10 IoT Enterprise x64 (RS5)	Intel & Microsoft
Linux	Yocto Project (64-bit) Kernel 5.4	Yocto Project and ISV Partners
	Ubuntu (64-bit)	Canonical
	Wind River Linux LTS distribution (64-bit)	Wind River
	Wind River VxWorks 7	Wind River

Table 3 OS Support list

Portwell does not endorse/validate/support any specific Linux distribution or entity mentioned on this list.
Portwell recommends customers to work with Linux vendors/open source communities to find feature list and support model.

3.2 Windows OS Driver

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

3.3 Electrical Characteristics

Input voltage	+12V ± 5%
RTC Battery	From Carrier
Power on mode	ATX Mode & AT Mode

Table 4 Electrical characteristics

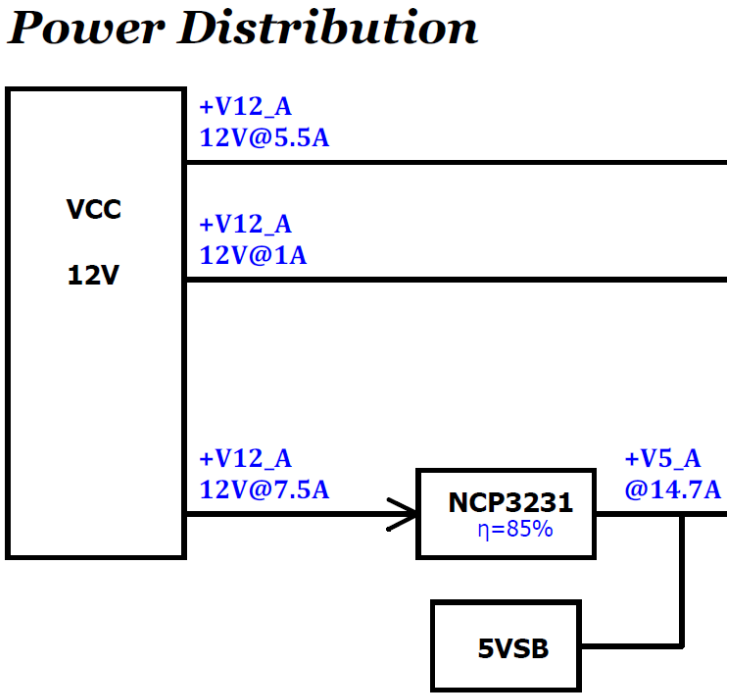


Figure 2 PCOM-BA02GL Power on sequence

- ATX Power Sequence

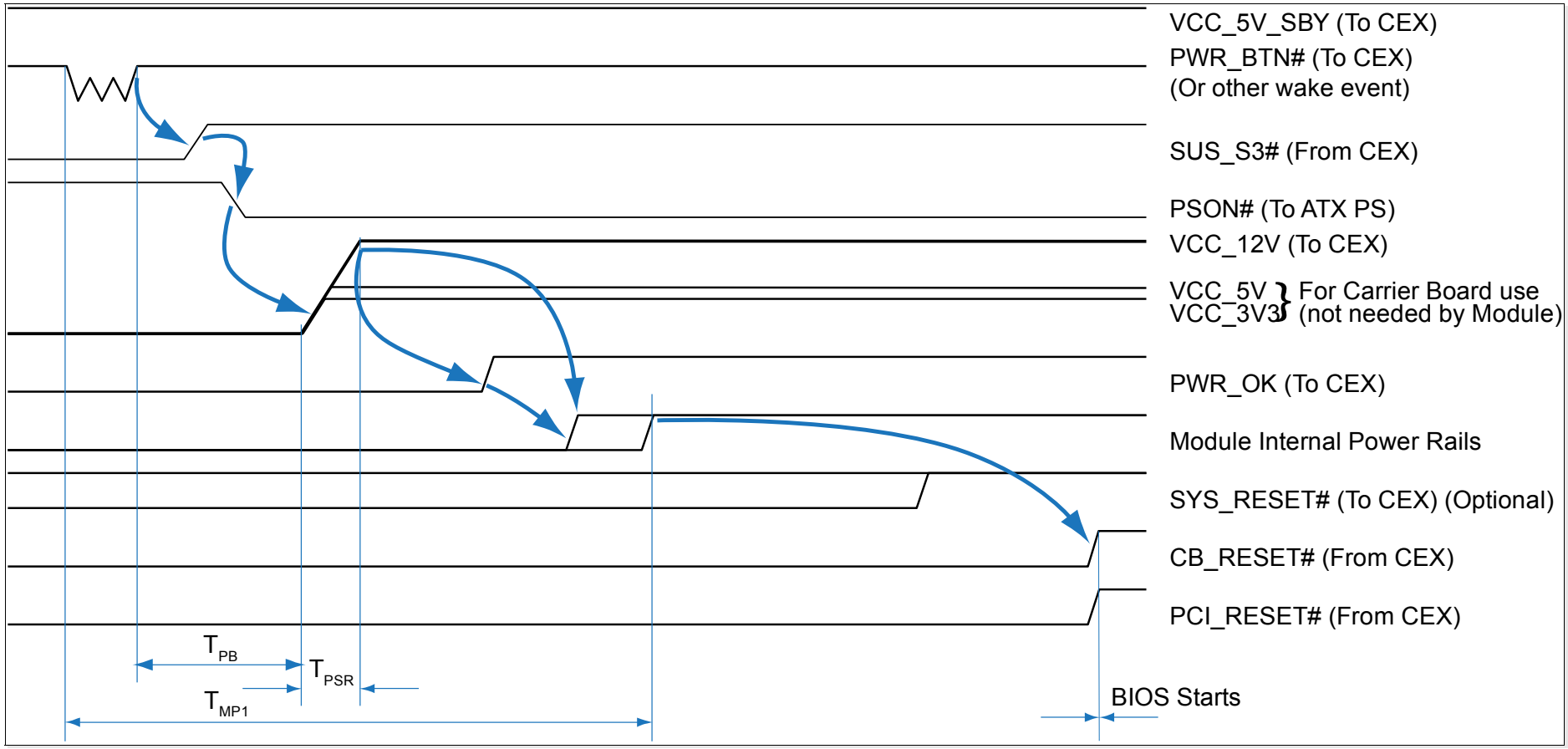


Figure 3 ATX style boot
(Reference from COM Express® Carrier Design Guide)

- AT Power Sequence

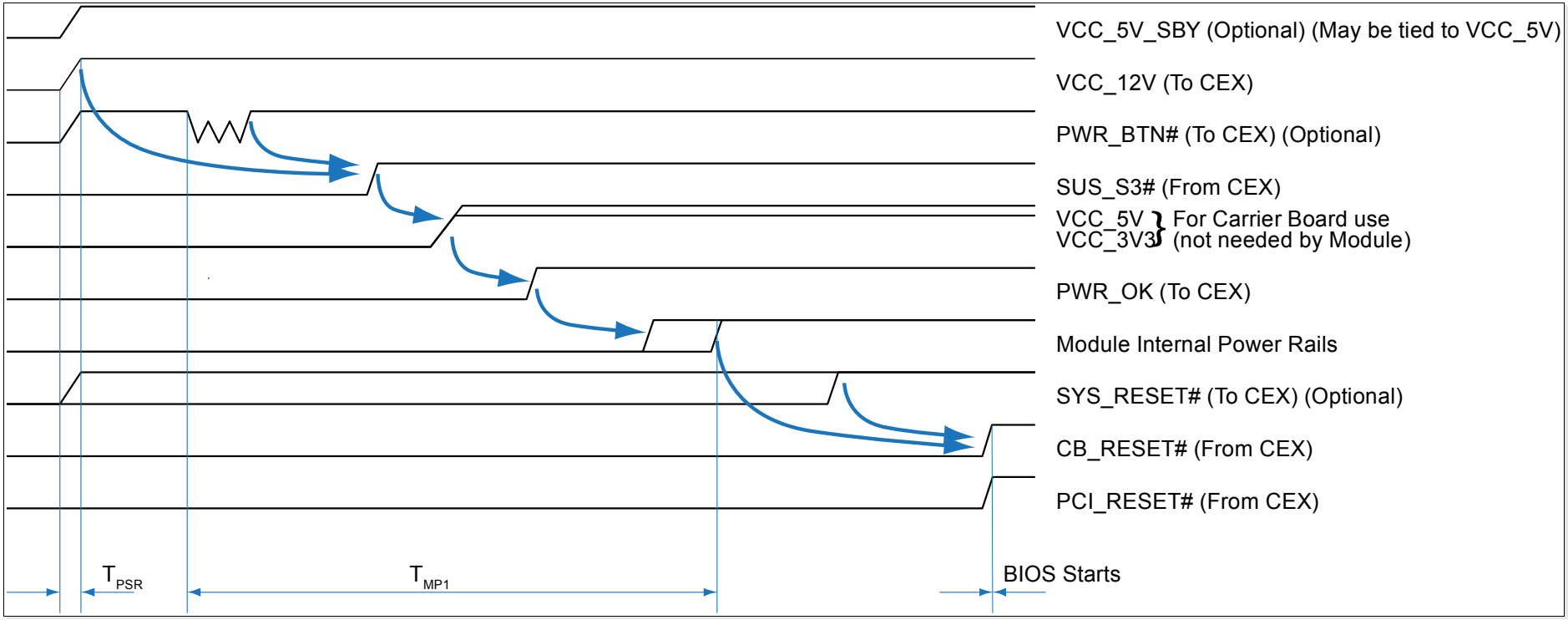


Figure 4 AT style boot
(Reference from COM Express® Carrier Design Guide)

- PWR_OK signal

Carrier board hardware must keep this signal low until all power rails and clocks are stable. Releasing PWR_OK too early or not driving it low at all may cause boot up abnormal symptom. It is a good design implementation to delay the PWR_OK signal a little (at least 100ms) after all carrier board power rails are up, to ensure a stable system.

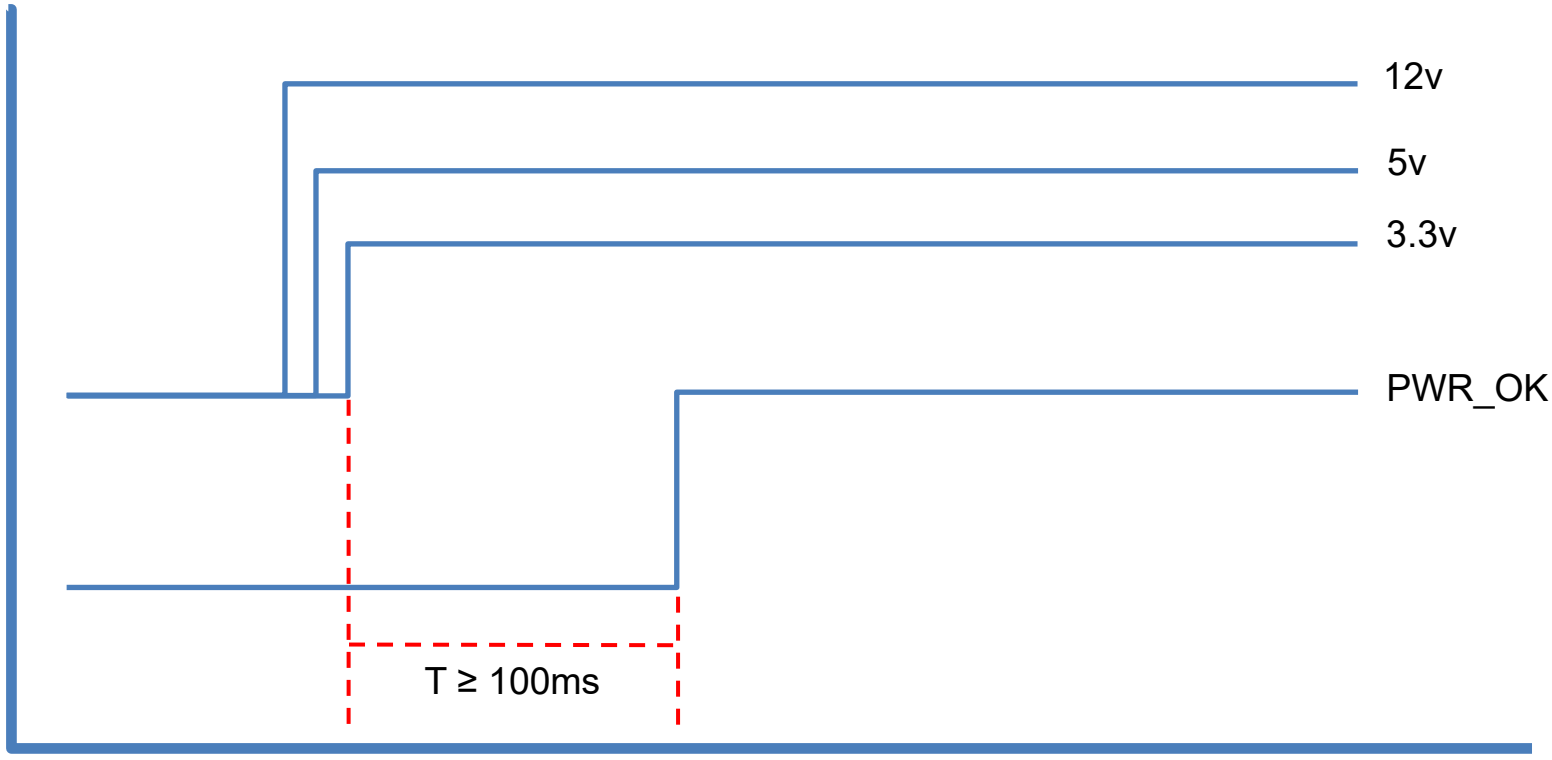


Figure 5 PWR_OK signal brief diagram

3.4 Power Consumption

Series	PCOM-BA02GL					
Ordering P/N	AB1-3K47	AB1-3L76	AB1-3L79	AB1-3L78	AB1-3L77	AB1-3L75
Processor	Atom® x6425E	Atom® x6413E	Atom® x6211E	Pentium® J6426	Celeron® N6211	Atom® x6425RE
Power Consumption						
S0 Idle	TBD	TBD	TBD	TBD	TBD	TBD
100% workload without turbo mode	TBD	TBD	TBD	TBD	TBD	TBD
100% Workload with turbo mode	TBD	TBD	TBD	TBD	TBD	TBD
Peak Current	TBD	TBD	TBD	TBD	TBD	TBD
S3	TBD	TBD	TBD	TBD	TBD	TBD

Table 5 PCOM-BA02GL Power Consumption

3.5 Mechanical Dimensions

- Top / Bottom Side Dimension

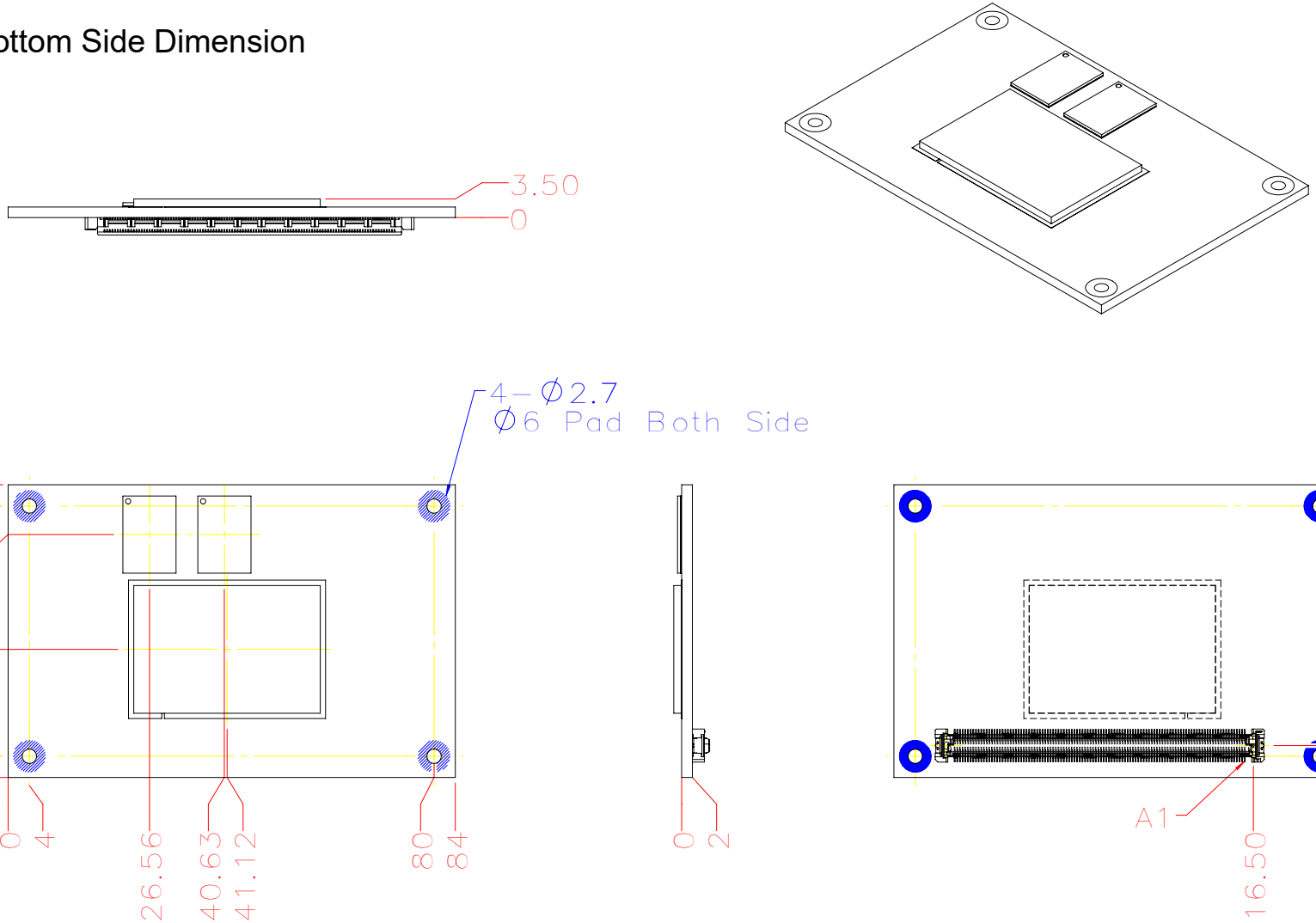


Figure 6 Mechanical Dimension - Top / Bottom

3.6 Environmental Specifications

Storage Temperature	-40°C ~ 85°C
Operation Temperature	0°C ~ 60°C Extended : -40°C ~ 85°C (Selected SKU)
Storage Humidity	5% ~ 95%
Operation Humidity	5% ~ 95%

Table 6 Environmental Specifications

3.7 Ordering Guide

- **Module**

Product	Ordering P/N
PCOM-BA02GL-x6425E-8G-32G	AB1-3K47
PCOM-BA02GL-x6413E-8G-16G	AB1-3L76
PCOM-BA02GL-x6211E-4G-16G	AB1-3L79
PCOM-BA02GL-J6426-8G-32G	AB1-3L78
PCOM-BA02GL-N6211-4G-16G	AB1-3L77
PCOM-BA02GL-x6425RE-8G-16G	AB1-3L75

Table 7 Ordering Guide - PCOM-BA02GL

- **Accessory**

Accessory	Ordering P/N
Heatsink (Atom series)	B830B480
Heatspreader (Atom series)	B830B500
Heatsink (J/N series)	B830B490
Heatspreader (J/N series)	B830B510
Evaluation Carrier PCOM-CA00	AB1-3917

Table 8 Ordering Guide - Accessory

4 Thermal Solution

- Heatsink Dimension

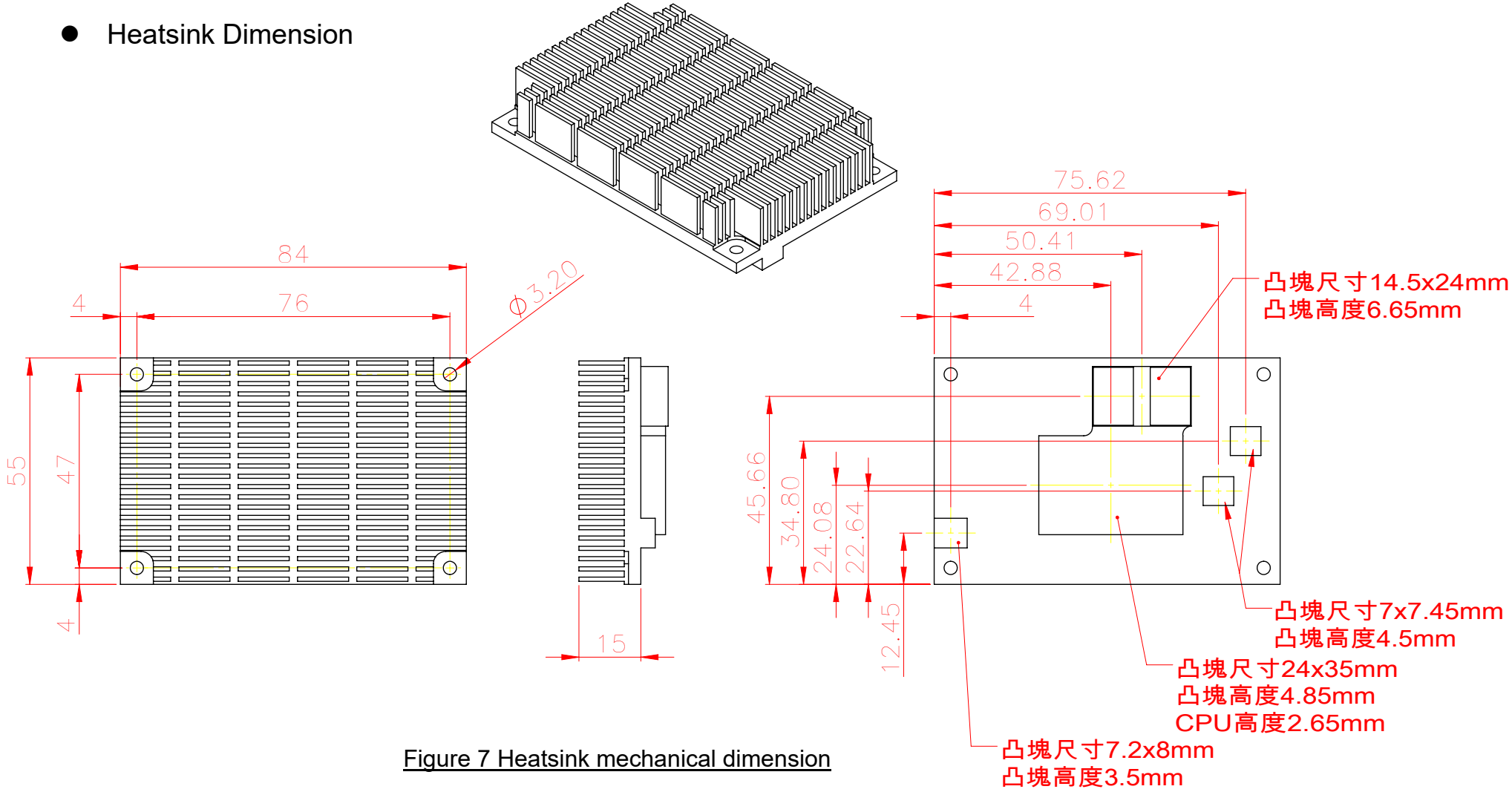


Figure 7 Heatsink mechanical dimension

- Heatspreader Dimension

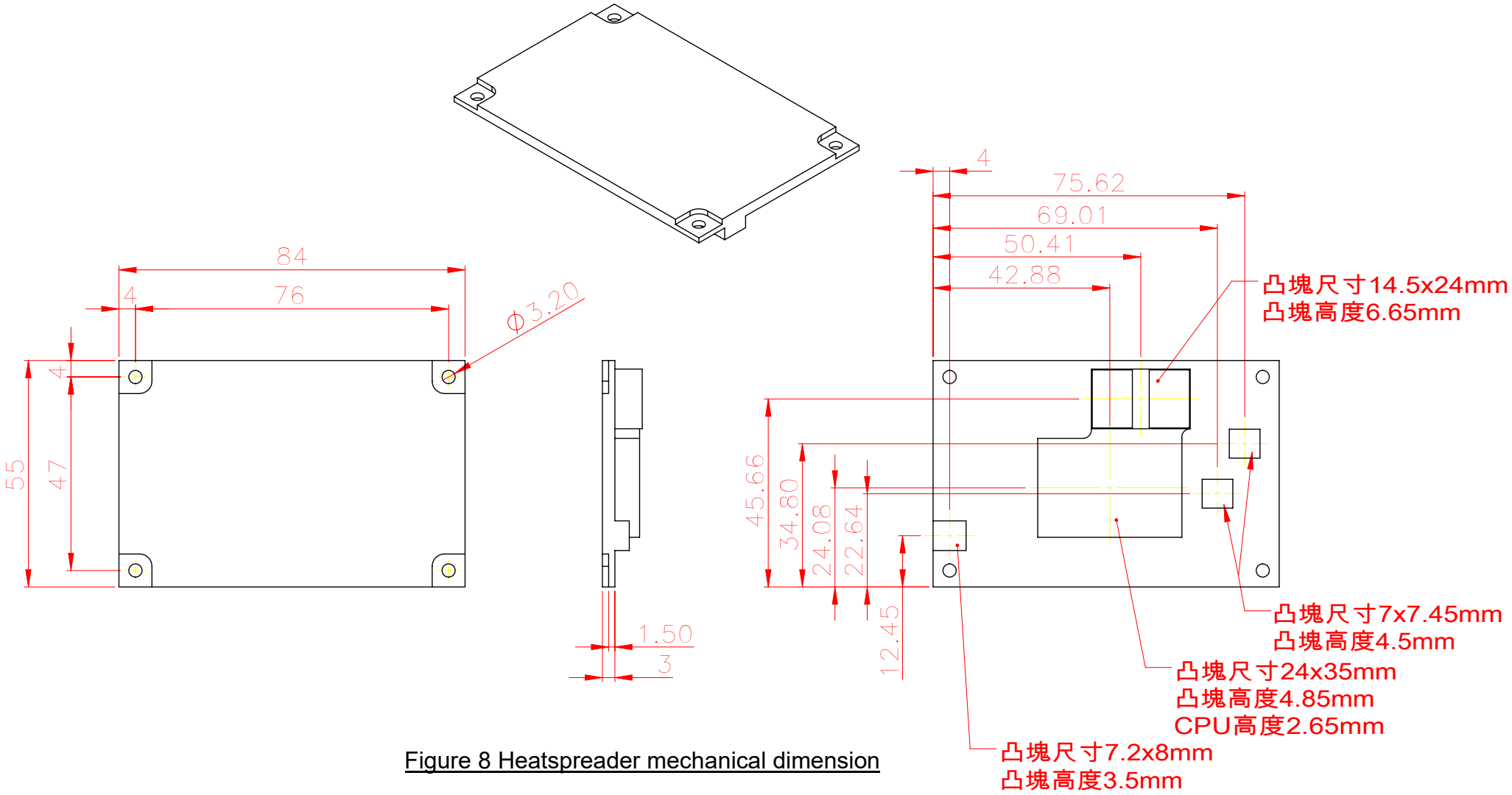


Figure 8 Heatspreader mechanical dimension

5 Pin out Tables

Pin	Row A	Row B
1	GND(FIXED)	GND(FIXED)
2	GBE0_MDI3-	GBE0_ACT#
3	GBE0_MDI3+	LPC_FRAME#
4	GBE0_LINK100#	LPC_AD0
5	GBE0_LINK1000#	LPC_AD1
6	GBE0_MDI2-	LPC_AD2
7	GBE0_MDI2+	LPC_AD3
8	GBE0_LINK#	LPC_DRQ0#
9	GBE0_MDI1-	LPC_DRQ1#
10	GBE0_MDI1+	LPC_CLK
11	GND(FIXED)	GND(FIXED)
12	GBE0_MDI0-	PWRBTN#
13	GBE0_MDI0+	SMB_CK
14	GBE0_CTREF	SMB_DAT
15	SUS_S3#	SMB_ALERT#
16	SATA0_TX+	SATA1_TX+
17	SATA0_TX-	SATA1_TX-
18	SUS_S4#	SUS_STAT#
19	SATA0_RX+	SATA1_RX+
20	SATA0_RX-	SATA1_RX-

21	GND(FIXED)	GND(FIXED)
22	USB_SSRX0-	USB_SSTX0-
23	USB_SSRX0+	USB_SSTX0+
24	SUS_S5#	PWR_OK
25	USB_SSRX1-	USB_SSTX1-
26	USB_SSRX1+	USB_SSTX1+
27	BATLOW#	WDT
28	(S)ATA_ACT#	HDA_SDIN2
29	HDA_SYNC	HDA_SDIN1
30	HDA_RST#	HDA_SDIN0
31	GND(FIXED)	GND(FIXED)
32	HDA_BITCLK	SPKR
33	HDA_SDOUT	I2C_CK
34	BIOS_DIS0#	I2C_DAT
35	THRMTRIP#	THRM#
36	USB6-	USB7-
37	USB6+	USB7+
38	USB_6_7_OC#	USB_4_5_OC#
39	USB4-	USB5-
40	USB4+	USB5+
41	GND(FIXED)	GND(FIXED)
42	USB2-	USB3-
43	USB2+	USB3+
44	USB_2_3_OC#	USB_0_1_OC#
45	USB0-	USB1-
46	USB0+	USB1+

47	VCC_RTC	NC
48	NC	NC
49	GBE0_SDP	SYS_RESET#
50	LPC_SERIRQ	CB_RESET#
51	GND(FIXED)	GND(FIXED)
52	NC	NC
53	NC	NC
54	GPI0	GPO1
55	NC	NC
56	NC	NC
57	GND	GPO2
58	PCIE_TX3+	PCIE_RX3+
59	PCIE_TX3-	PCIE_RX3-
60	GND(FIXED)	GND(FIXED)
61	PCIE_TX2+	PCIE_RX2+
62	PCIE_TX2-	PCIE_RX2-
63	GPI1	GPO3
64	PCIE_TX1+	PCIE_RX1+
65	PCIE_TX1-	PCIE_RX1-
66	GND	WAKE0#
67	GPI2	WAKE1#
68	PCIE_TX0+	PCIE_RX0+
69	PCIE_TX0-	PCIE_RX0-
70	GND(FIXED)	GND(FIXED)
71	LVDS_A0+	DDI0_PAIR0+
72	LVDS_A0-	DDI0_PAIR0-

73	LVDS_A1+	DDI0_PAIR1+
74	LVDS_A1-	DDI0_PAIR1-
75	LVDS_A2+	DDI0_PAIR2+
76	LVDS_A2-	DDI0_PAIR2-
77	LVDS_VDD_EN	DDI0_PAIR4+
78	LVDS_A3+	DDI0_PAIR4-
79	LVDS_A3-	LVDS_BKLT_EN
80	GND(FIXED)	GND(FIXED)
81	LVDS_A_CK+	DDI0_PAIR3+
82	LVDS_A_CK-	DDI0_PAIR3-
83	LVDS_I2C_CK	LVDS_BKLT_CTRL
84	LVDS_I2C_DAT	VCC_5V_SBY
85	GPI3	VCC_5V_SBY
86	NC	VCC_5V_SBY
87	NC	VCC_5V_SBY
88	PCIE_CK_REF+	BIOS_DIS1#
89	PCIE_CK_REF-	DDI0_HPD
90	GND(FIXED)	GND(FIXED)
91	SPI_POWER	DDI0_PAIR5+
92	SPI_MISO	DDI0_PAIR5-
93	GPO0	DDI0_PAIR6+
94	SPI_CLK	DDI0_PAIR6-
95	SPI_MOSI	DDI0_DDC_AUX_SEL
96	TPM_PP	USB7_HOST_PRSNT
97	TYPE10#	SPI_CS#
98	SER0_TX	DDI0_CTRLCLK_AUX+

99	SER0_RX	DDI0_CTRLDATA_AUX-
100	GND(FIXED)	GND(FIXED)
101	SER1_TX	FAN_PWMOUT
102	SER1_RX	FAN_TACHIN
103	LID#	SLEEP#
104	VCC_12V	VCC_12V
105	VCC_12V	VCC_12V
106	VCC_12V	VCC_12V
107	VCC_12V	VCC_12V
108	VCC_12V	VCC_12V
109	VCC_12V	VCC_12V
110	GND(FIXED)	GND(FIXED)

Table 9 Pin out description

6 BIOS Setup Items

PCOM-BA02GL 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 ROM so that it is retained during power-off periods. When system is turned on, PCOM-BA02GL communicates with peripheral devices and checks its hardware resources against the configuration information stored in the BIOS. If any error is detected, or the BIOS 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 start up.

6.1 Entering Setup -- Launch System Setup

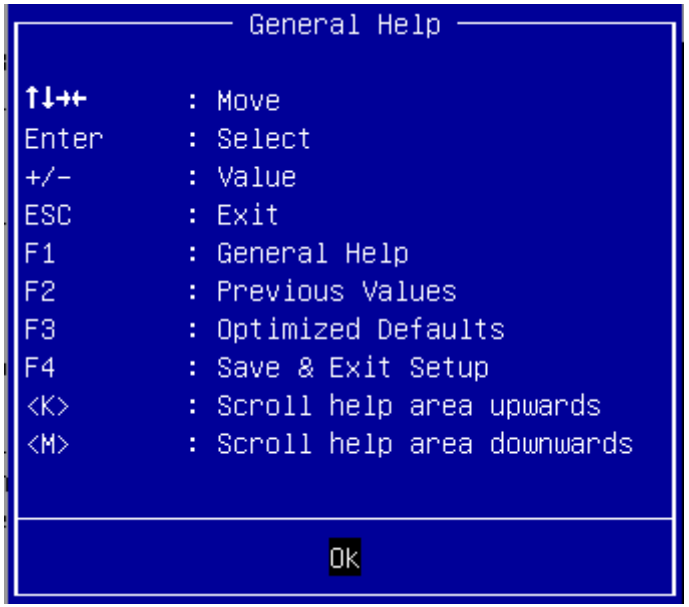
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key will enter BIOS setup screen.

Press <Del> to enter SETUP

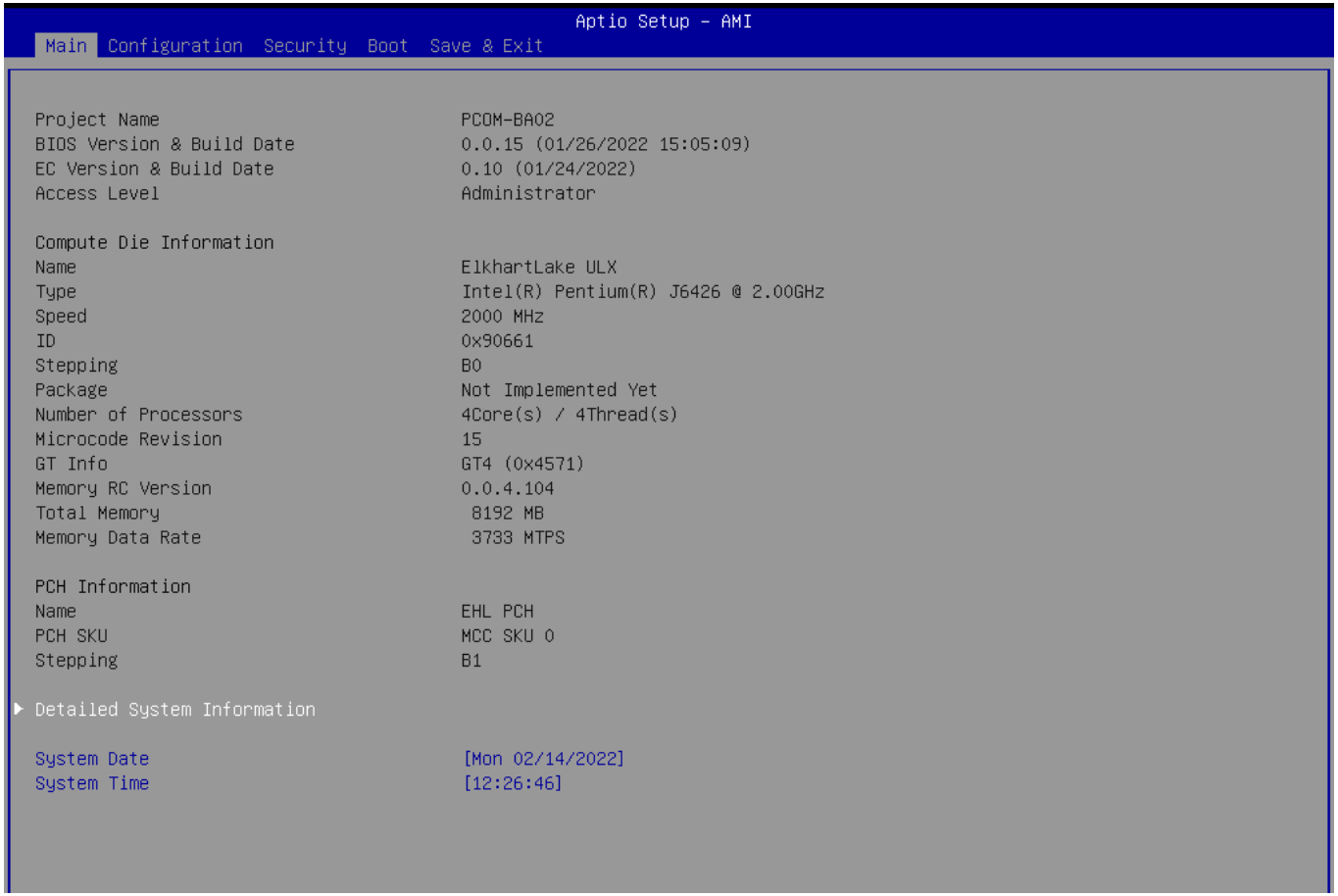
If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run General Help or Resume

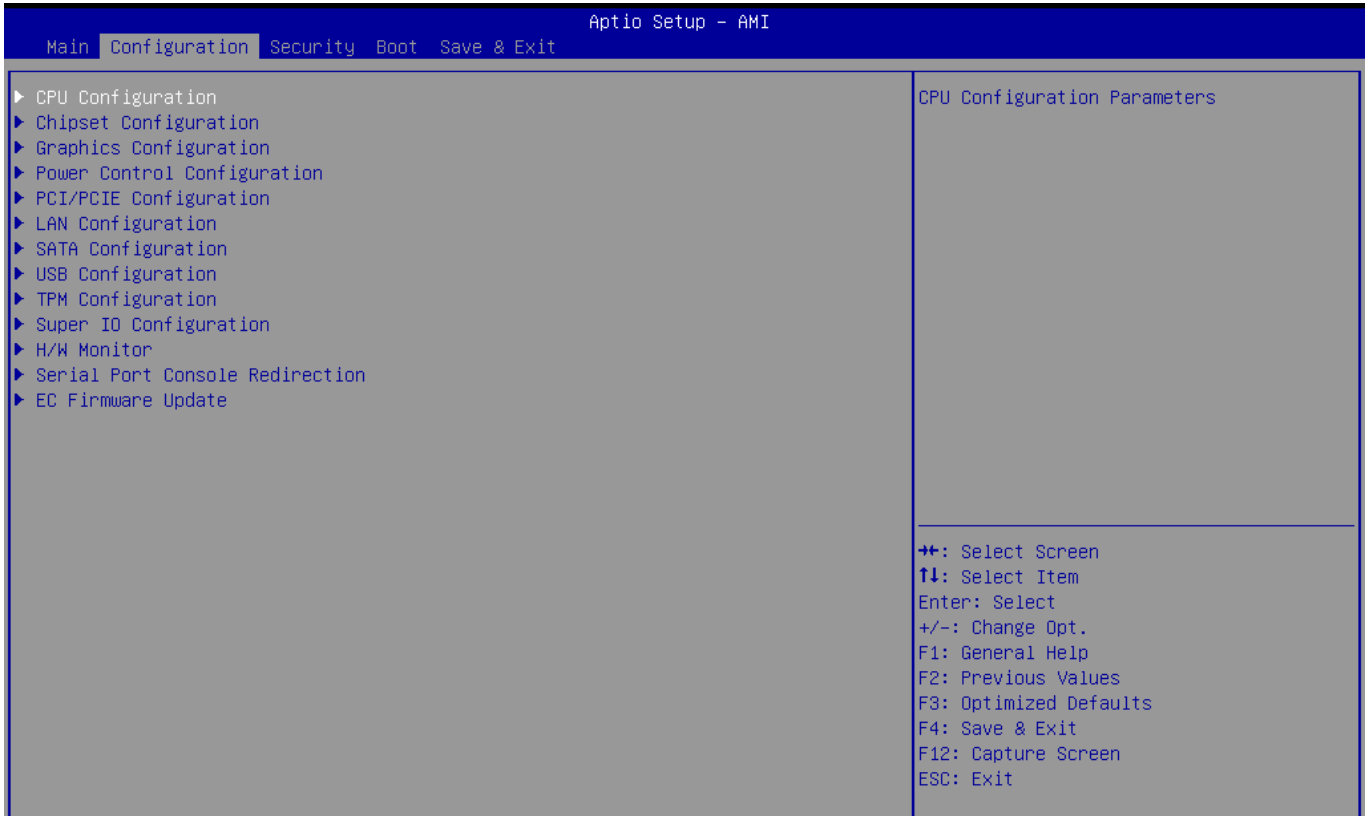
The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.



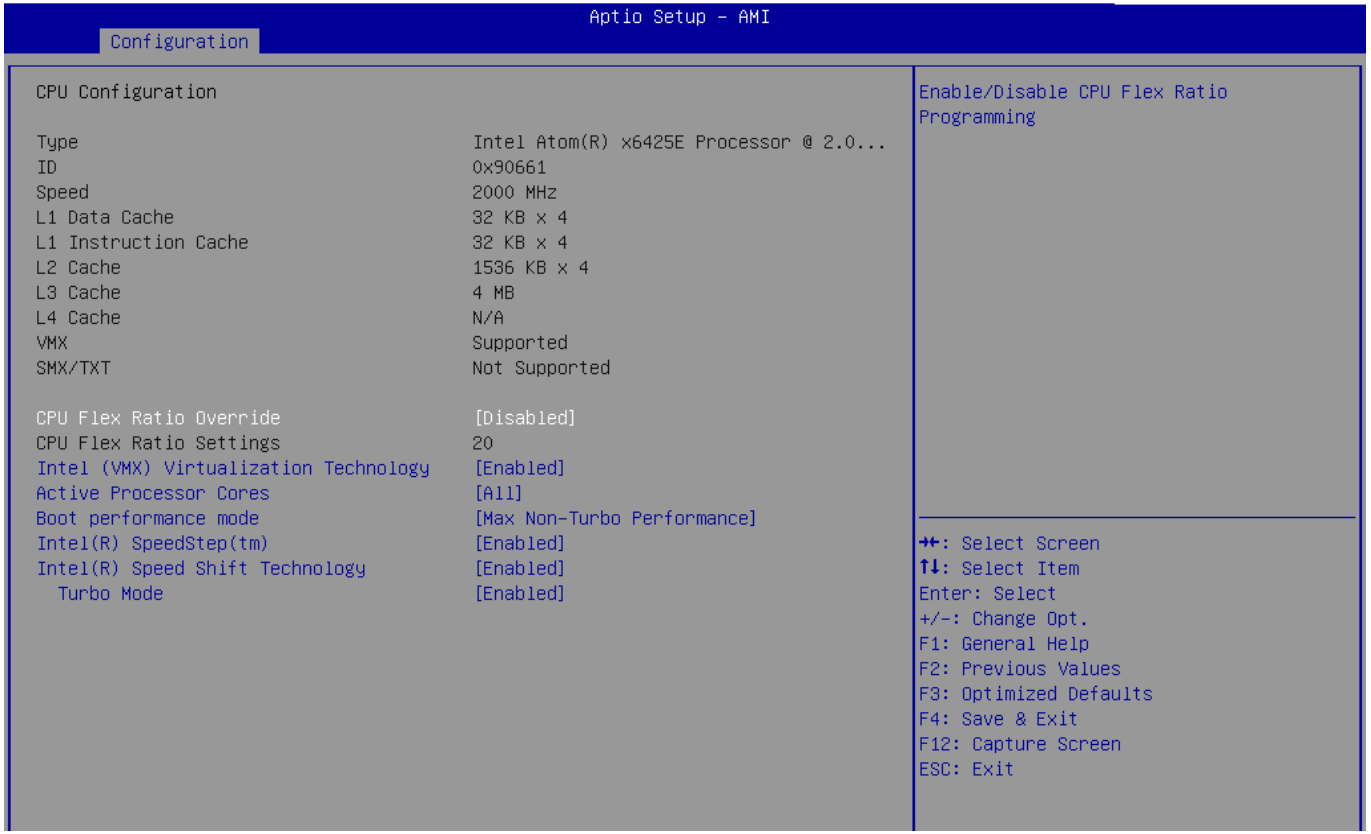
6.2 Main


Aptio Setup – AMI
Main Configuration Security Boot Save & Exit
Project Name PCOM-BA02
BIOS Version & Build Date 0.0.15 (01/26/2022 15:05:09)
EC Version & Build Date 0.10 (01/24/2022)
Access Level Administrator
Compute Die Information
Name ElkhartLake ULX
Type Intel(R) Pentium(R) J6426 @ 2.00GHz
Speed 2000 MHz
ID 0x90661
Stepping B0
Package Not Implemented Yet
Number of Processors 4Core(s) / 4Thread(s)
Microcode Revision 15
GT Info GT4 (0x4571)
Memory RC Version 0.0.4.104
Total Memory 8192 MB
Memory Data Rate 3733 MTPS
PCH Information
Name EHL PCH
PCH SKU MCC SKU 0
Stepping B1
Detailed System Information
System Date [Mon 02/14/2022]
System Time [12:26:46]

6.3 Configuration

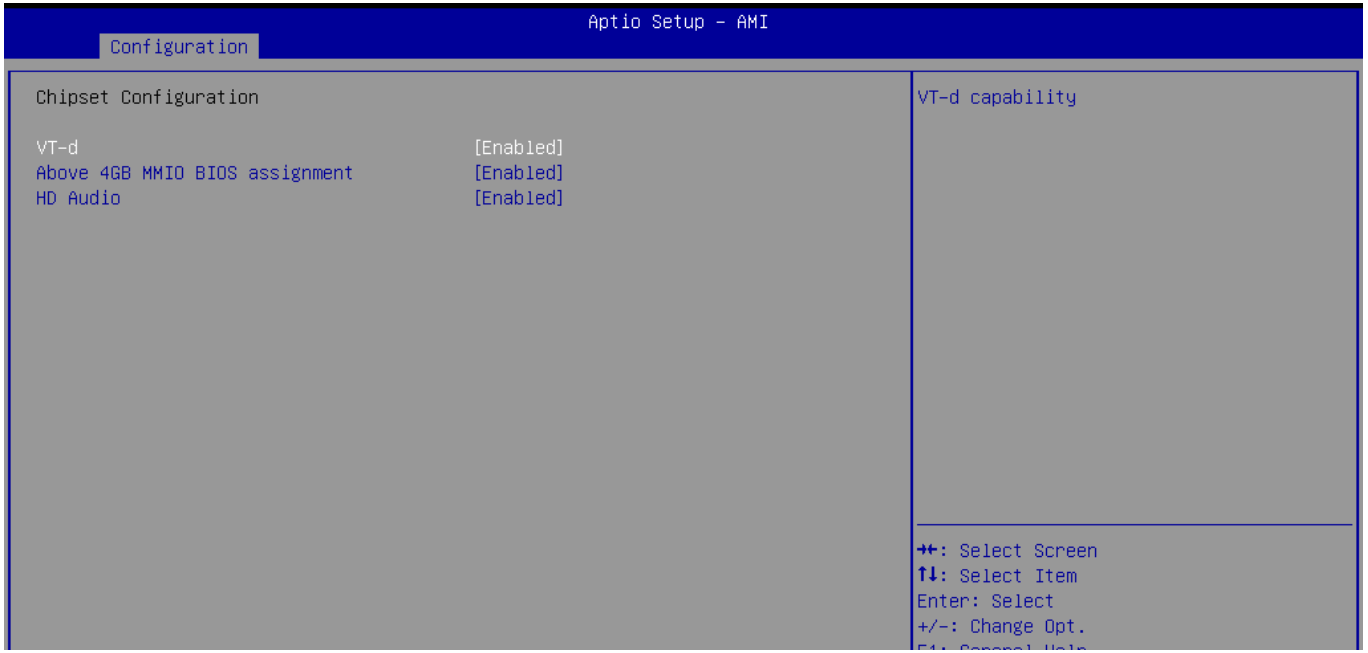


CPU Configuration



Feature	Description	Options
CPU Flex Ratio Override	Enable/Disable CPU Flex Ratio Programming	★Disabled, Enabled
CPU Flex Ratio Settings	This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).	★20
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.	★Enabled, Disabled
Active Processor Cores	Number of cores enable in each processor package.	★All, 1, 2, 3
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector	★Max Non-Turbo Performance, Max Battery, Turbo Performance,
Intel® SpeedStep™	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 EMTTM enabled too). AUTO means enabled.	★Enabled, Disabled

Chipset Configuration



Feature	Description	Options
VT-d	VT-d Capability	★Enabled ,Disabled
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	★Enabled ,Disabled
HD Audio	Control Detection of the HD-Audio device. Disabled = HAD will be unconditionally disabled Enabled = HAD will be unconditionally enabled	★Enabled ,Disabled

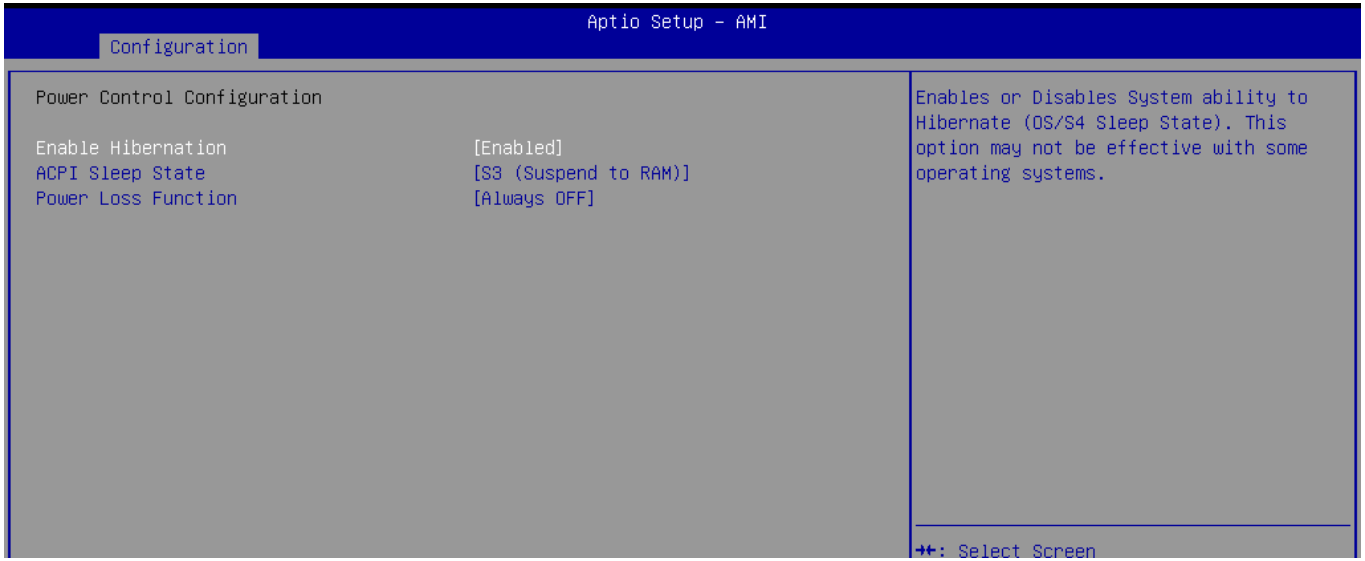
Graphics Configuration

Feature	Description	Options
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.	★Auto, IGFX, PEG, PCI
Internal Graphics	Keep IGFX enabled based on the setup options.	★Auto, Disabled, Enabled

eDP-to-LVDS configuration

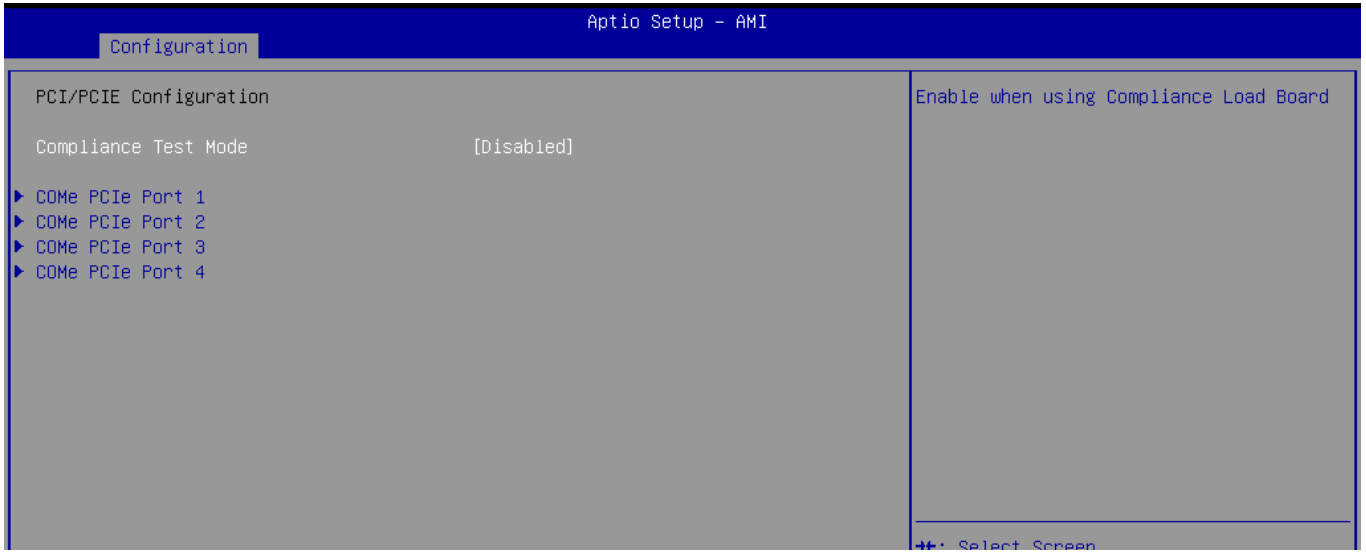
Feature	Description	Options
Panel Profile	Select Panel Profile for current use.	★1024x768,640x480,800x480,800x600,1280x800 1280x1024,1366x768,1440x900,1920x1080,OEM Profile
Color depth and data format	Select Color depth and data format	★VESA 24 bpp, JEIDA 24 bpp, VESA and JEIDA 18 bpp,
Channel Mode	Select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

Power Control Configuration



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.	★Enabled, Disabled
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

PCI/PCIE Configuration



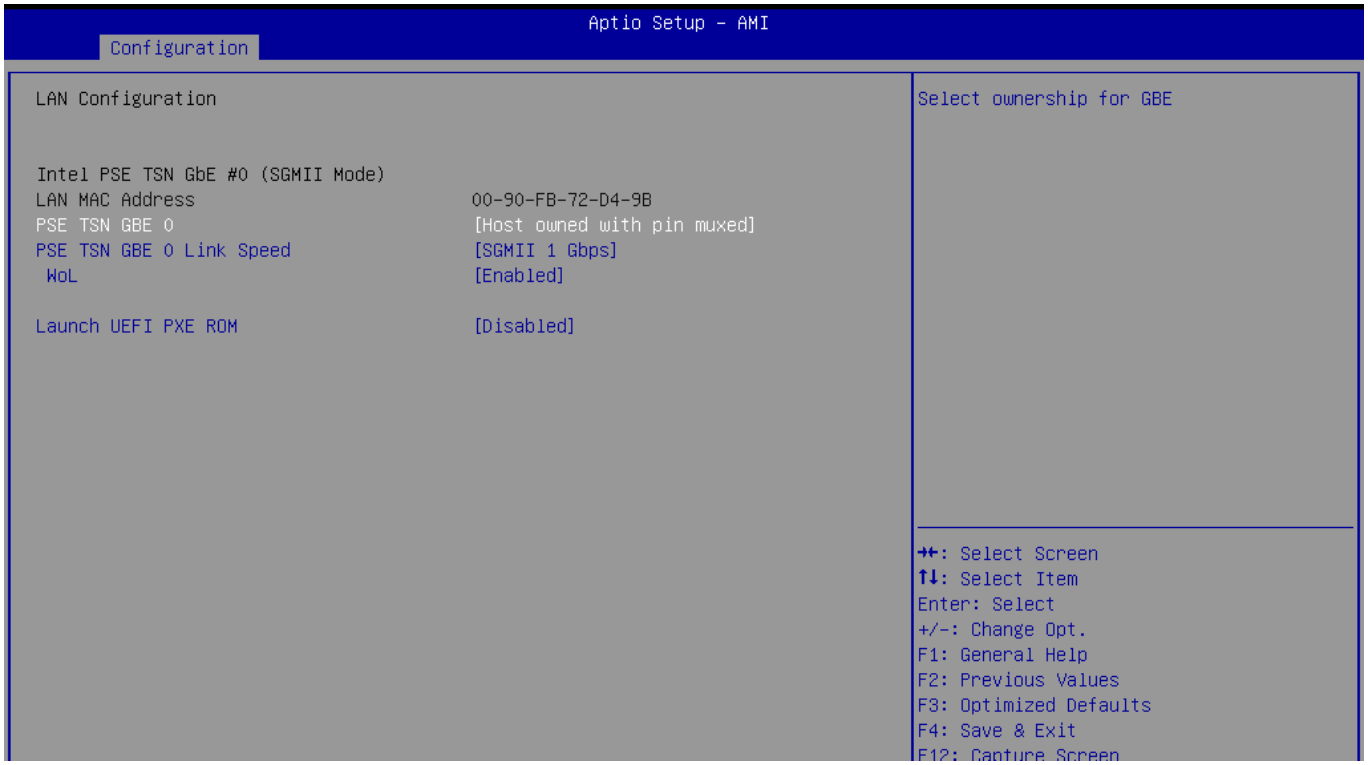
Feature	Description	Options
Enable Hibernation	Enables when using Compliance Load Board.	★Disabled, Enabled

COMe PCIe Port 1 / COMe PCIe Port 2 / COMe PCIe Port 3 / COMe PCIe Port 4

Feature	Description	Options
COMe PCIe Port	Control the PCI Express Root Port.	★Enabled , Disabled
Connection Type	Built-In: a built-in device is connected to this root port. Slot Implemented bit will be clear. Slot: this root port connects to user-accessible slot. Slot Implemented bit will be set.	★Slot, Built-in
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
L1 Substrates	PCI Express L1 Substrates settings.	★L1.1 & L1.2, L1.1, Disabled
ACS	Enable/Disable Access Control Services Extended Capability.	★Enabled , Disabled
PTM	Enable/Disable Precision Time Measurement.	★Disabled, Enabled
DPC	Enable/Disable Downstream Port Containment.	★Enabled , Disabled
EDPC	Enable/Disable Root port extensions for Downstream Port Containment	★Enabled , Disabled
URR	PCI Express Unsupported Request Reporting Enable/Disable.	★Disabled, Enabled
FER	PCI Express Device Fatal Error Reporting Enable/Disable.	★Disabled, Enabled
NFER	PCI Express Device Non-Fatal Error Reporting Enable/Disable.	★Disabled, Enabled
CER	PCI Express Device Correctable Error Reporting Enable/Disable.	★Disabled, Enabled
SEFE	Root PCI Express System Error on Fatal Error Enable/Disable.	★Disabled, Enabled
SENFE	Root PCI Express System Error on Non-Fatal Error Enable/Disable.	★Disabled, Enabled
SECE	Root PCI Express System Error on Correctable Error Enable/Disable.	★Disabled, Enabled
PME SCI	PCI Express PME SCI Enable/Disable.	★Enabled , Disabled
Hot Plug	PCI Express Hot Plug Enable/Disable.	★Disabled, Enabled
Advanced Error Reporting	Advanced Error Reporting Enable/Disable.	★Enabled , Disabled

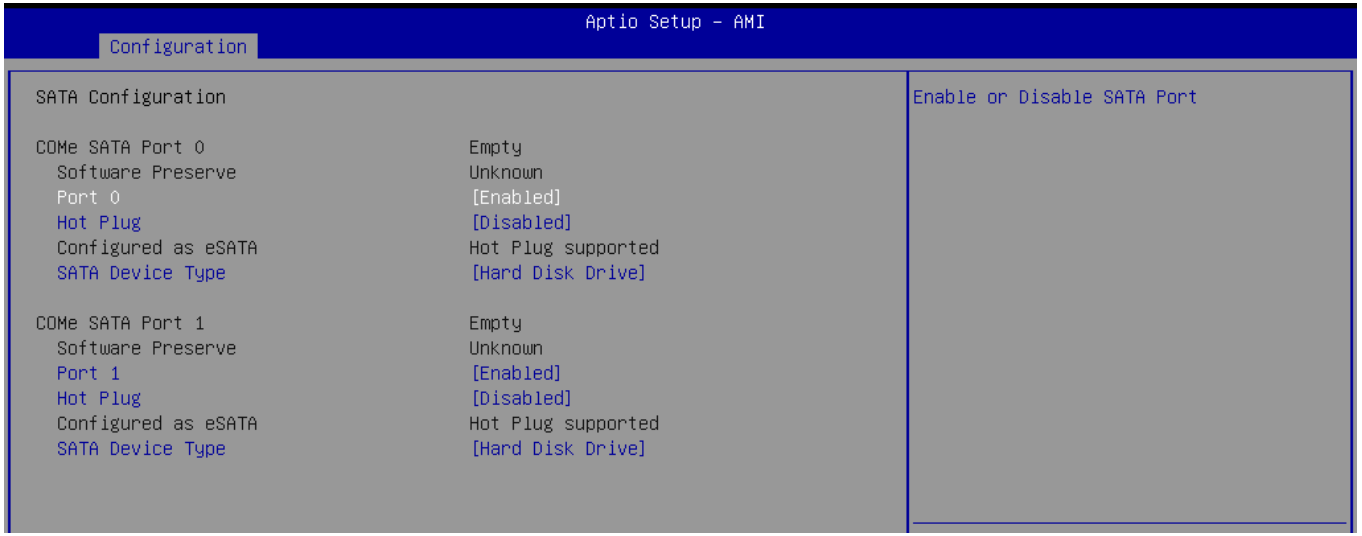
PCIe Speed	Configure PCIe Speed.	★Auto, Gen1, Gen2, Gen3
Transmitter Half Swing	Transmitter Half Swing Enable/Disable.	★Disabled, Enabled
Detect Timeout	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.	★0
Extra Bus Reserved	Extra Bus Reserved (0-7) for bridges behind this Root Bridge.	★0
Reserved Memory	Reserved Memory for this Root Bridge (1-20) MB	★10
Reserved I/O	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.	★4
LTR	PCH PCIE Latency Reporting Enable/Disable	★Enabled , Disabled
Snoop Latency Override	Snoop Latency Override for PCH PCIE. Disabled: Disable override. Manual: Manually enter override values. Auto (default): Maintain default BIOS flow.	★Auto, Manual, Disabled
Snoop Latency Value	LTR Snoop Latency value of PCH PCIE.	★60
Snoop Latency Multiplier	LTR Snoop Latency Multiplier of PCH PCIE.	★1024ns, 1ns, 32ns, 32768ns, 1048576ns, 33554432ns
Non Snoop Latency Override	Non Snoop Latency Override for PCH PCIE. Disabled: Disable override. Manual: Manually enter override values. Auto (default): Maintain default BIOS flow.	★Auto, Manual, Disabled
Non Snoop Latency Value	LTR Non Snoop Latency value of PCH PCIE	★60
Non Snoop Latency Multiplier	LTR Non Snoop Latency Multiplier of PCH PCIE.	★1024ns, 1ns, 32ns, 32768ns, 1048576ns, 33554432ns
Force LTR Override	Force LTR Override for PCH PCIE. Disabled: LTR override values will not be forced. Enable: LTR override values will be forced and LTR messages from the device will be ignored.	★Disabled, Enabled
LTR Lock	PCIE LTR Configuration Lock	★Disabled, Enabled

LAN Configuration



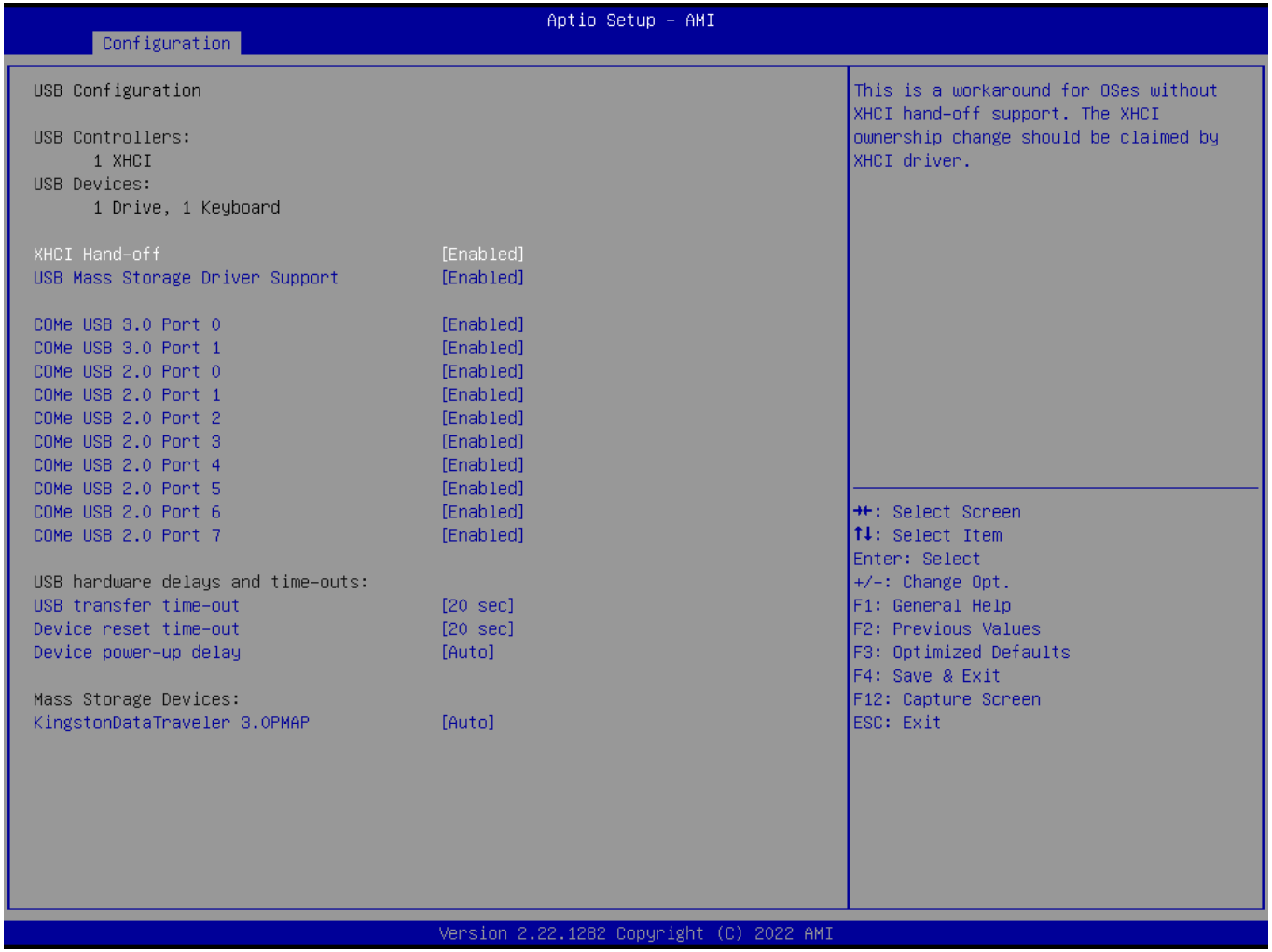
Feature	Description	Options
Intel PSE TSN GbE #0 (SGMII Mode)		
PSE TSN GBE 0	Select ownership for GBE.	Host owned with pin muxed, SPE owned with pin muxed, None
PSE TSN GBE 0 Link Speed	PSE TSN GBE 0 Link Speed configuration.	SGMII 1 Gbps, SGMII 2.5 Gbps
WOL	Enable/Disable PSE GBE WOL.	★Enabled , Disabled
Launch UEFI PXE ROM	Enable/Disable UEFI Network Stack	★Disabled, Enabled
Launch UEFI PXE ROM (Enabled)		
IPv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support Will not be available.	★Enabled , Disabled
IPv4 HTTP Support	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support Will not be available.	★Enabled , Disabled
IPv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support Will not be available.	★Enabled , Disabled
IPv6 HTTP Support	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support Will not be available.	★Enabled , Disabled

SATA Configuration



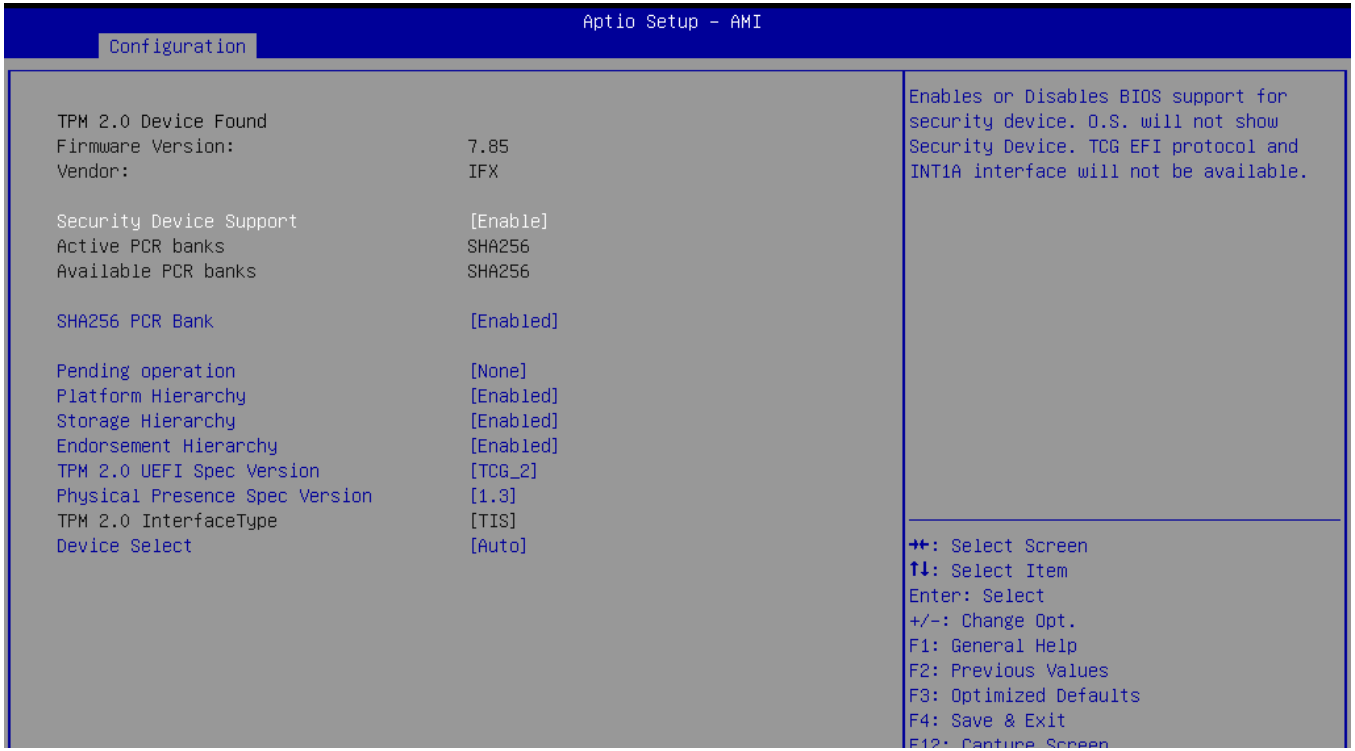
Feature	Description	Options
Serial ATA Port 0		
Port 0	Enabled or Disabled SATA Port.	★Enabled , Disabled
Hot plug	Designates this port as Hot pluggable.	★Disabled, Enabled
SATA Device Type	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.	★Hard Disk Drive, Solid State Drive
Serial ATA Port 1		
Port 1	Enabled or Disabled 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



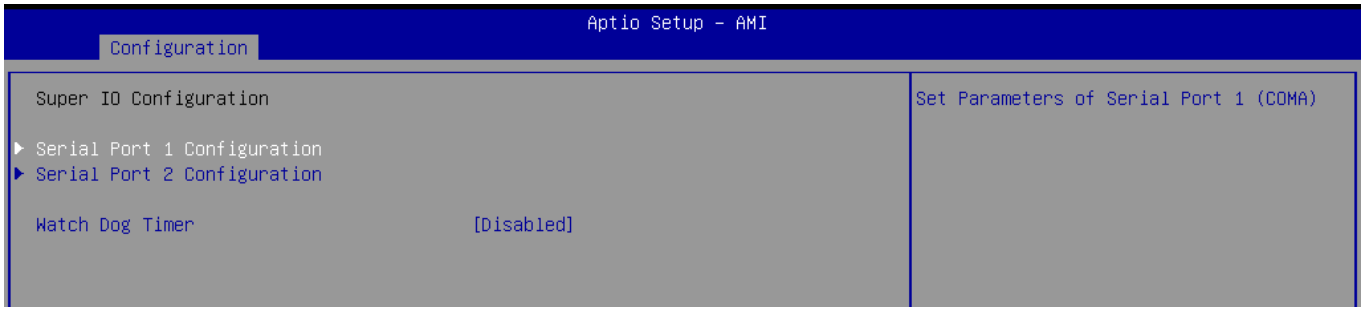
Feature	Description	Options
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.	★Enabled , Disabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support.	★Enabled , Disabled
COMe USB 3.0 Port 0 & COMe USB 3.0 Port 1	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB device plug into the connector will not be detected by BIOS or OS.	★Enabled , Disabled
COMe USB 2.0 Port 0 ~ COMe USB 2.0 Port 7	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB device plug into the connector will not be detected by BIOS or OS.	★Enabled , Disabled
USB transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.	★20 sec , 1 sec, 5 sec, 10 sec
Device reset time-out	USB mass storage device Start Unit command time-out.	★20 sec, 10 sec, 30 sec, 40 sec
Device power-up delay	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.	★Auto, Manual
Device power-up delay -- ★Manual		
Device power-up delay in seconds	Delay range is 1..40 seconds, in one second increments	★5

TPM 2.0 Device Found



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.	★Enabled, Disabled
SHA256 PCR Bank	Enables or Disables SHA256 PCR Bank.	★Enabled, Disabled
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.	★Enabled, Disabled
Storage Hierarchy	Enables or Disables Storage Hierarchy.	★Enabled, Disabled
Endorsement Hierarchy	Enables or Disables Endorsement Hierarchy.	★Enabled, Disabled
TPM2.0 UEFI Spec Version	Select the TCG2 Spec Version Support. TCG_1_2: the Compatible mode for Win8/Win10. TCG_2: Support new TCG2 protocol and event format for Win10 or later.	★TCG_2, TCG_1_2
Physical Presence Spec Version	Select to Tell O.S. to Support PPI Spec Version 1.2 or 1.3. Not some HCK tests might not support 1.3.	★1.3, 1.2
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

Super IO Configuration

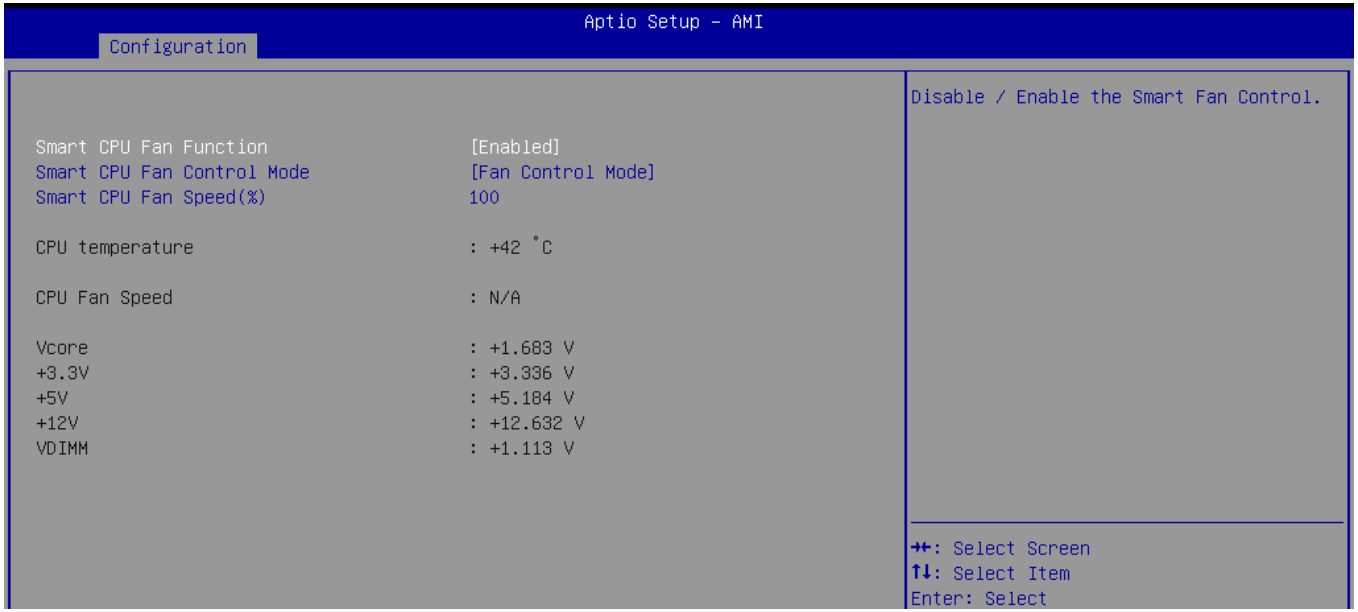


Feature	Description	Options
Watch Dog Timer	Enable/Disable Watch Dog Timer	★Disabled, Enabled
Watch Dog Timer [Enabled]		
Timer Unit	Select Timer count unit of WDT	★Second, Minute
Timer value	Set WDT Timer value seconds / minutes	★20

Serial Port 1 Configuration / Serial Port 2 Configuration

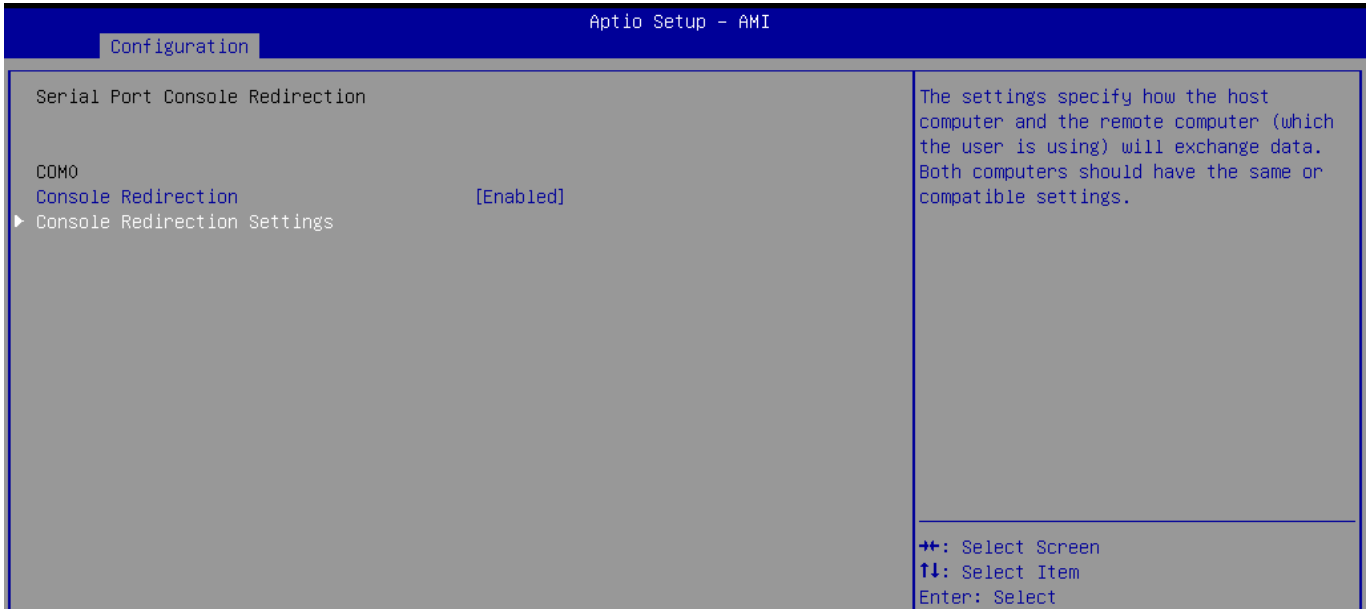
Feature	Description	Options
Module Serial Port 1 / 2	Enable or Disable Serial Port (COM)	★Enabled, Disabled
Change Settings	Select an optimal setting for Super IO Device	★Auto ,IO=3F8h; IRQ=4, IO=3F8h; IRQ=3,4,10,11 IO=2F8h; IRQ=3,4,10,11 IO=3E8h; IRQ=3,4,10,11 IO=2E8h; IRQ=3,4,10,11,

HW Monitor



Feature	Description	Options
Smart CPU Fan Function	Disable / Enable the smart Fan Control	★Disabled, Enabled
Smart CPU Fan Function [Enabled]		
Smart CPU Fan Control Mode	Select smart Fan Control Mode	★Fan Control Mode
Smart CPU Fan Speed (%)	Select smart Fan1 speed 0 – 100%	★100

Serial Port Console Redirection

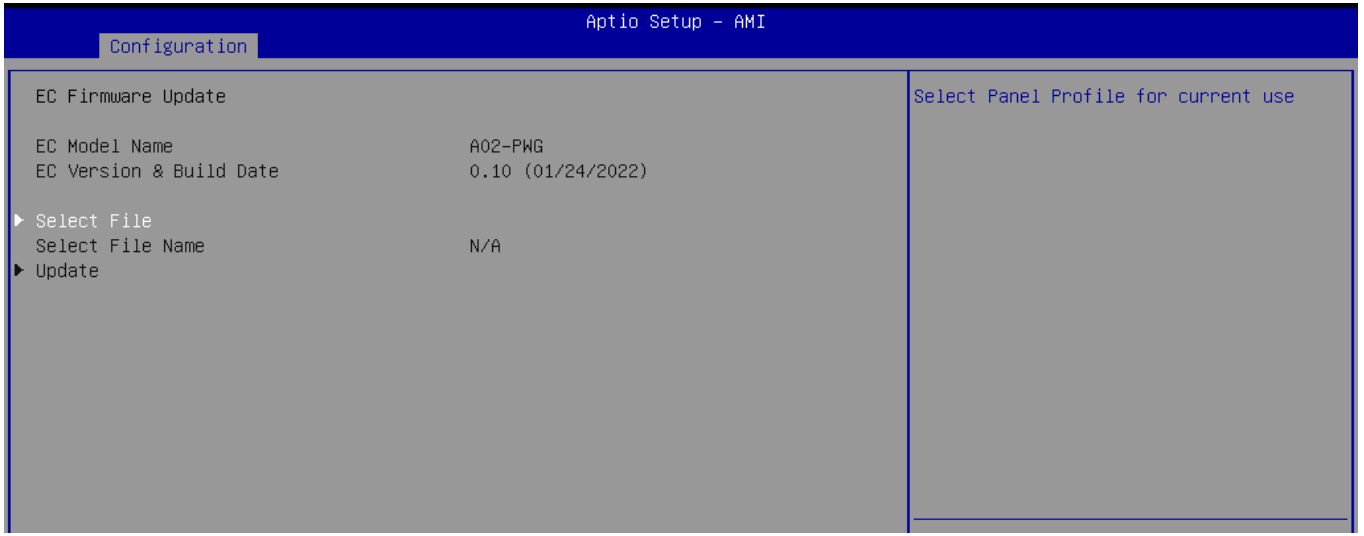


Feature	Description	Options
COM0 Console Redirection	Console Redirection Enable or Disable	★Disabled, Enabled

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+, 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
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-UTF8 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 Function Key and KeyPad on Putty.	★VT100, LINUX, XTERMR6, SCO, ESCN, VT400

EC Firmware Update



Feature	Description	Options
Select File	Select ROM image	Bin file to the USB DOK

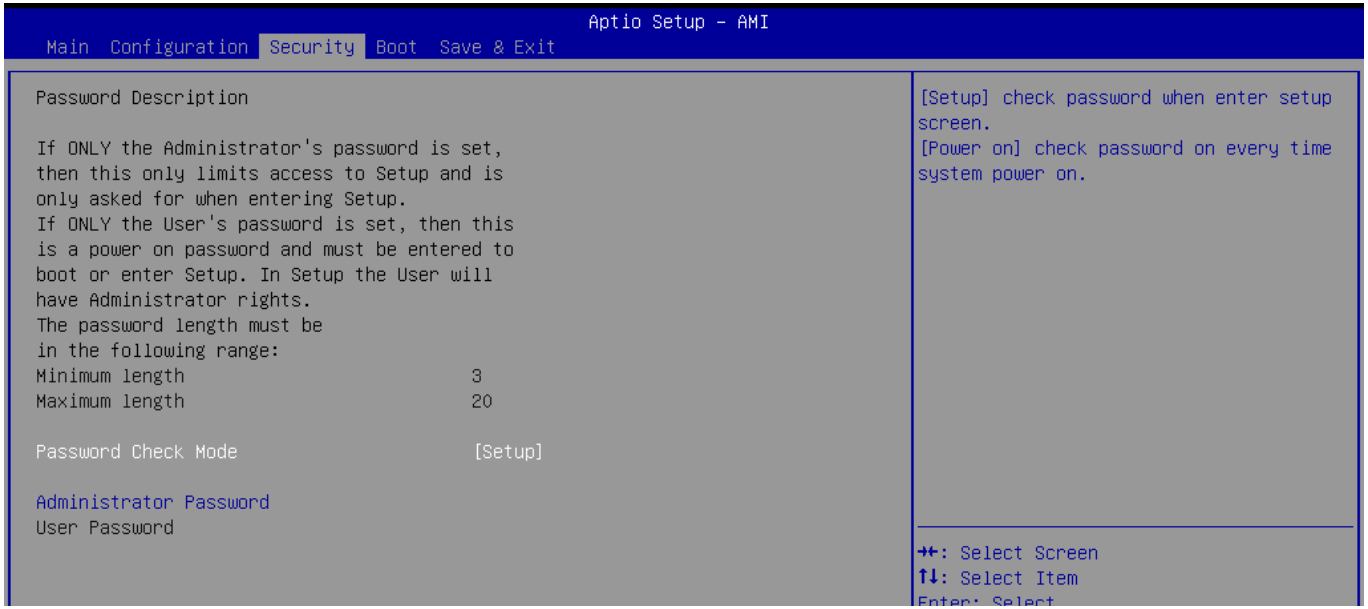
Update EC

Step 1. Prepare a USB DOK.

Step 2. Unzip update file to the USB DOK.

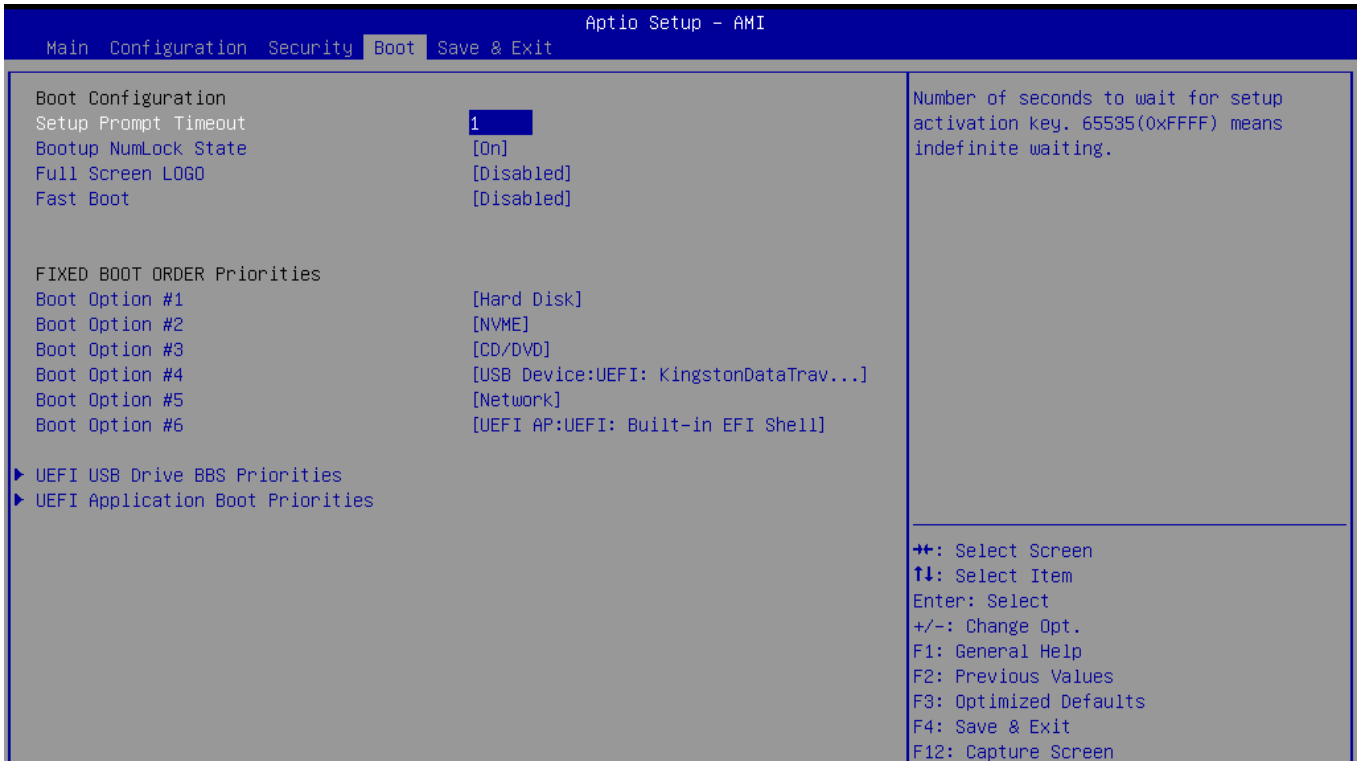
Step 3. Select File System (USB DOK)

6.4 Security



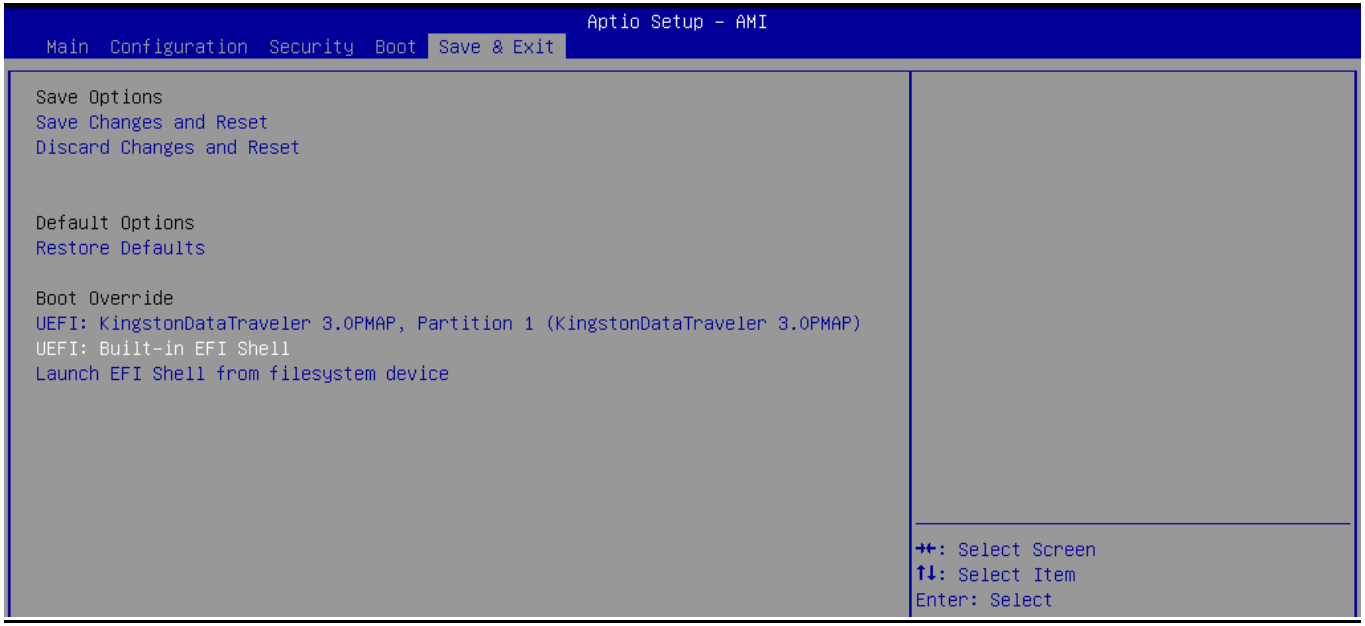
Feature	Description	Options
Password Check Mode	[Setup] check password when enter setup screen. [Power on] check password on every time system power on.	★Setup, Power On
Administrator Password	Set Administrator Password	

6.5 Boot


Aptio Setup – AMI
Main Configuration Security Boot Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Full Screen LOGO [Disabled]
Fast Boot [Disabled]
FIXED BOOT ORDER Priorities
Boot Option #1 [Hard Disk]
Boot Option #2 [NVME]
Boot Option #3 [CD/DVD]
Boot Option #4 [USB Device:UEFI: KingstonDataTrav...]
Boot Option #5 [Network]
Boot Option #6 [UEFI AP:UEFI: Built-in EFI Shell]
UEFI USB Drive BBS Priorities
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
F12: Capture Screen

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
Fast Boot	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	★Disabled, Enabled
Boot Option #1 ~ #6	Sets the system boot order	Hard Disk, UEFI AP: UEFI: Built-in EFI Shell, CD/DVD, USB Device; Network, Disabled
UEFI Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

6.6 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 Values	Restore/Load Default values for all the setup options.	
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.	

7 System Resources

LPC

Device	I/O Address	Note
Embedded Controller	0x6E / 0x6F	EC Address
	0x62 / 0x66	EC ACPI CMD Port
	0x200 / 0x201	EC BRAM Port for I2C function
	0x300~0x3FF	EC LPC IO Space
	0x3F8~0x3FF	EC UART1
	0x3E8~0x3EF	EC UART2
Carrier SIO	N/A	

SMBUS

SMBUS Address	Information
0x44	SMBus ARP
0x6C	PCIe Clock Buffer
0x10 / 0x12 / 0x16 / 0x48	Reserved

Table 10 System Resources

8 BIOS/EC Update

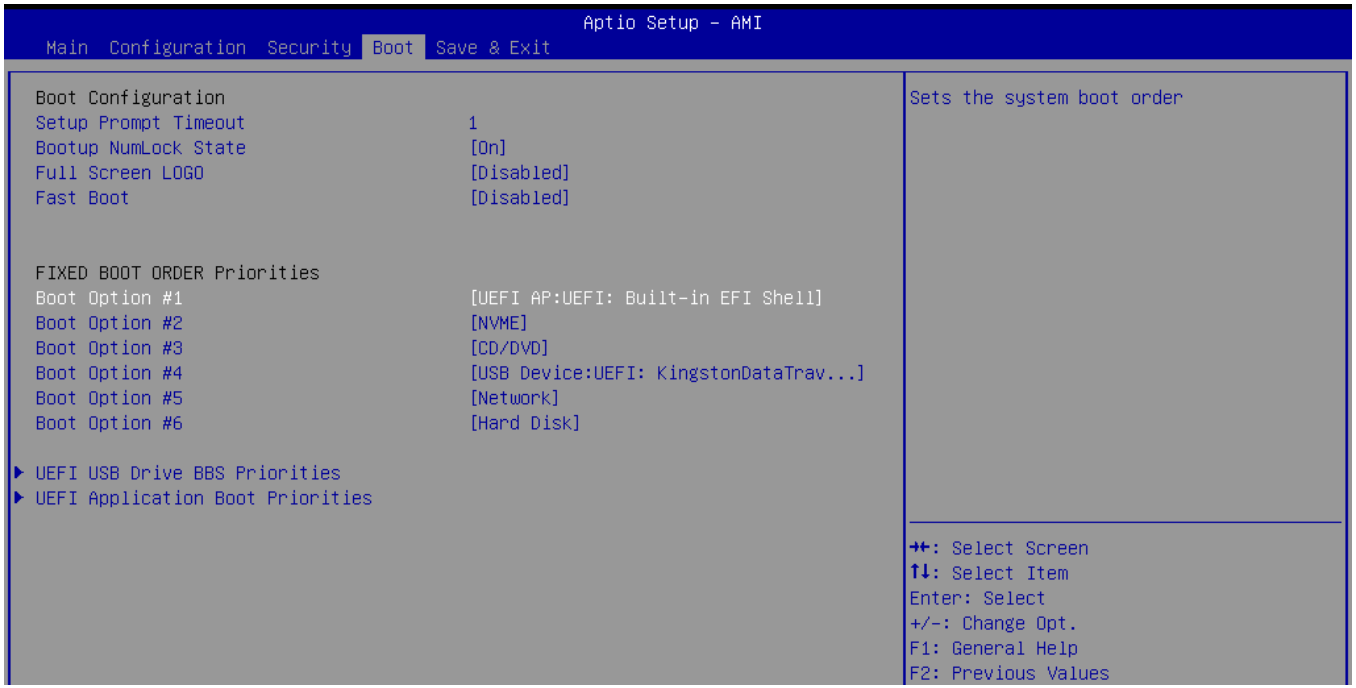
PCOM-BA02GL only support BIOS/EC update under UEFI shell environment, refer the following step, please.

Step 1. Prepare a USB DOK.

Step 2. Unzip update file to the USB DOK.

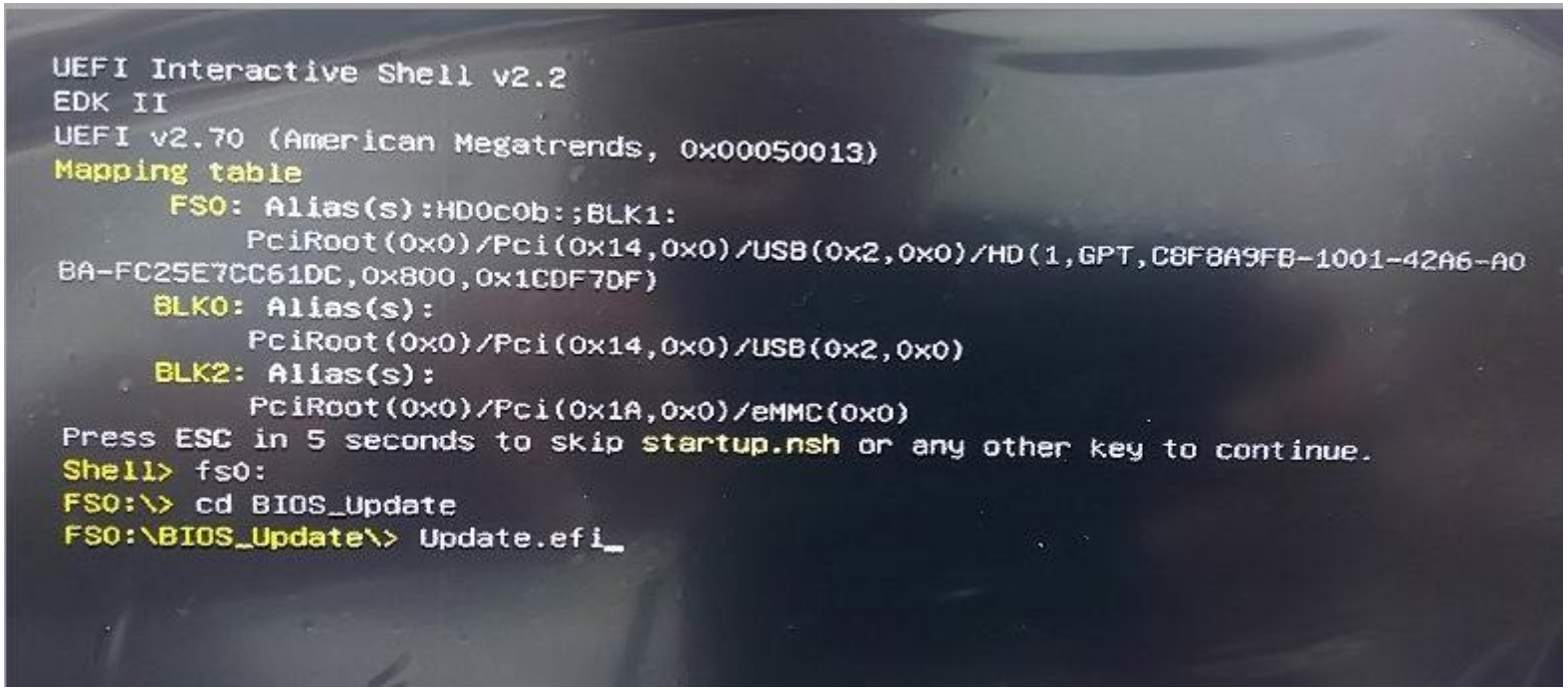
Step 3. Select UEFI: Built-in EFI Shell in the BIOS boot menu and save then restarts the system.

Step 4. Plug the USB DOK into the target system and boot from UEFI Shell.

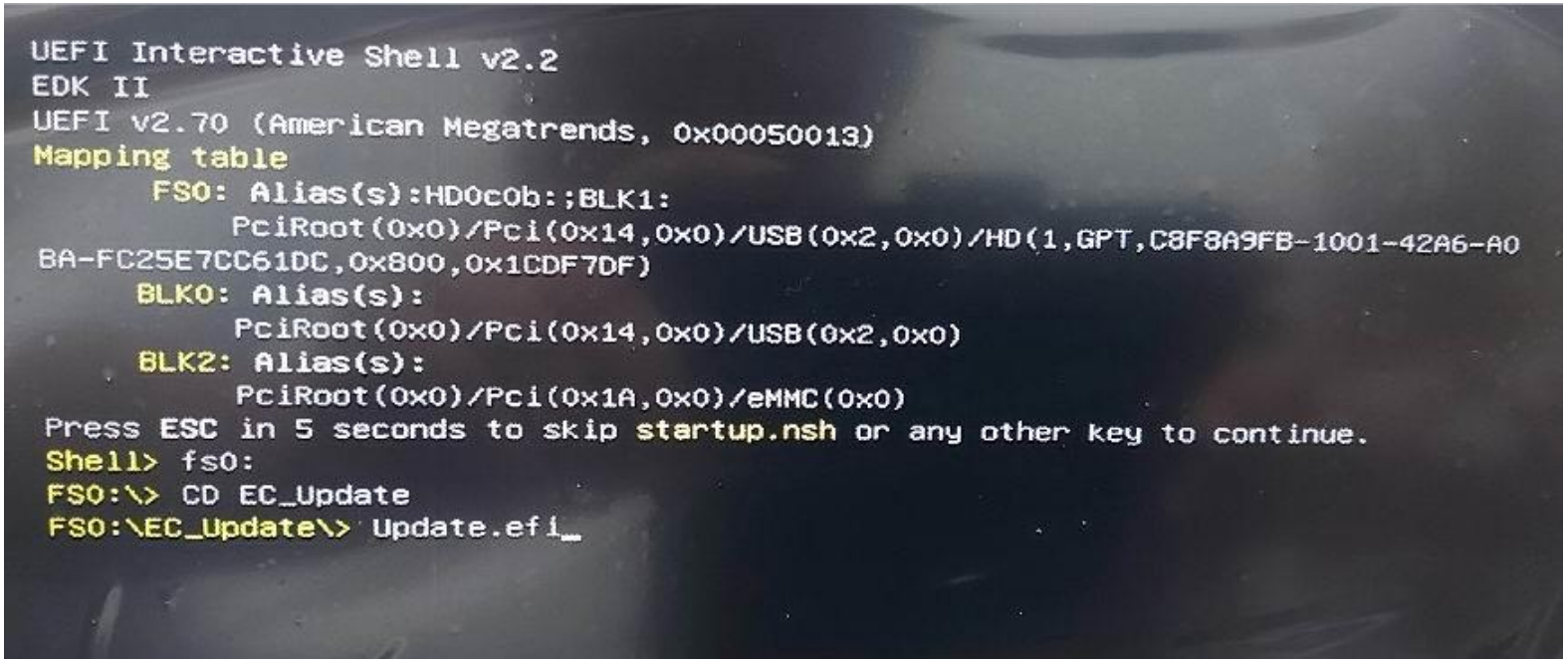


Step 5. Under the UEFI shell, change prompt to your USB DOK, the below example is “ **fs0:** “

Step 6. Then change the folder with updated file and use command: “ **update** “ and press enter

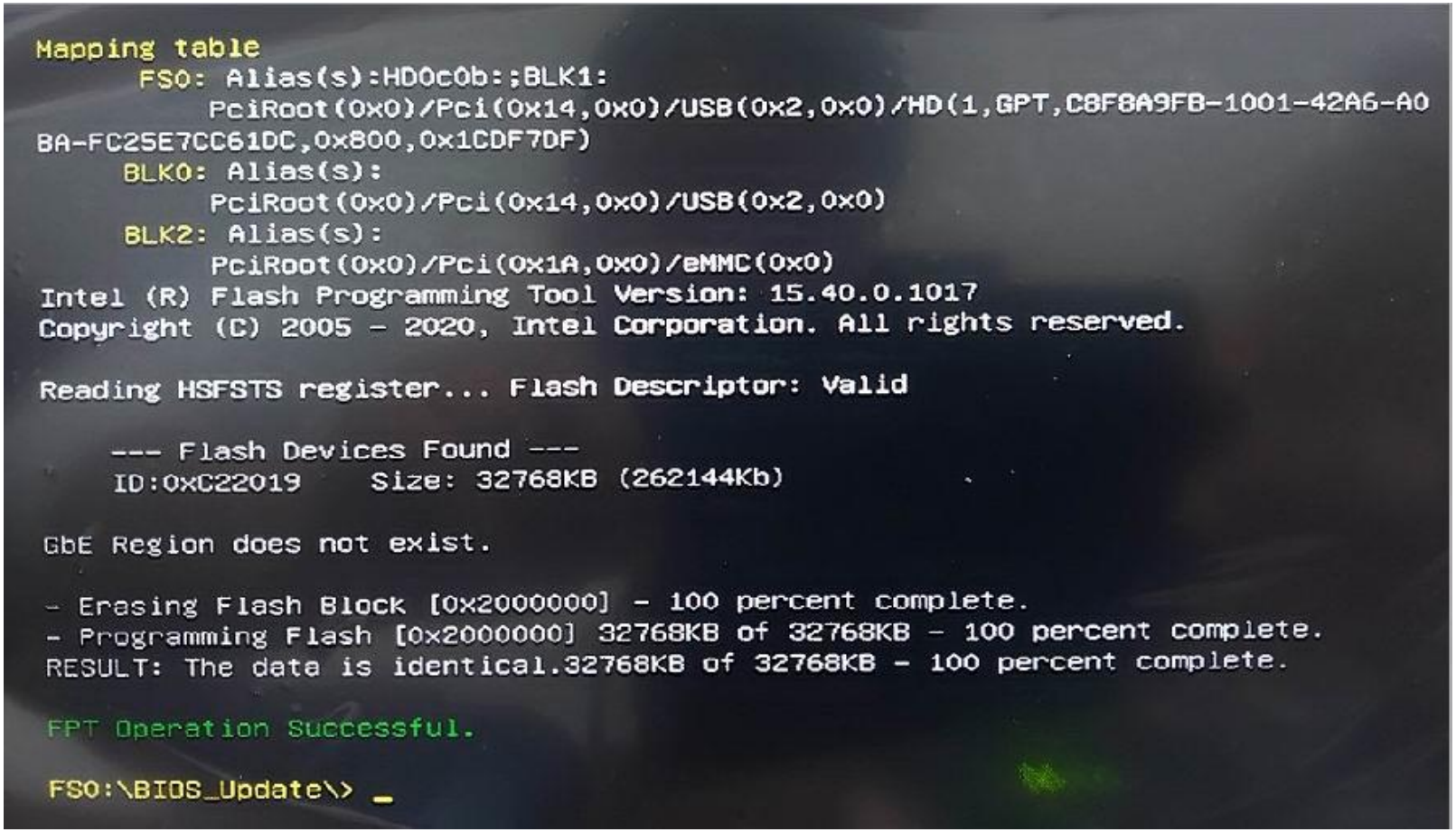


(BIOS file update sample)

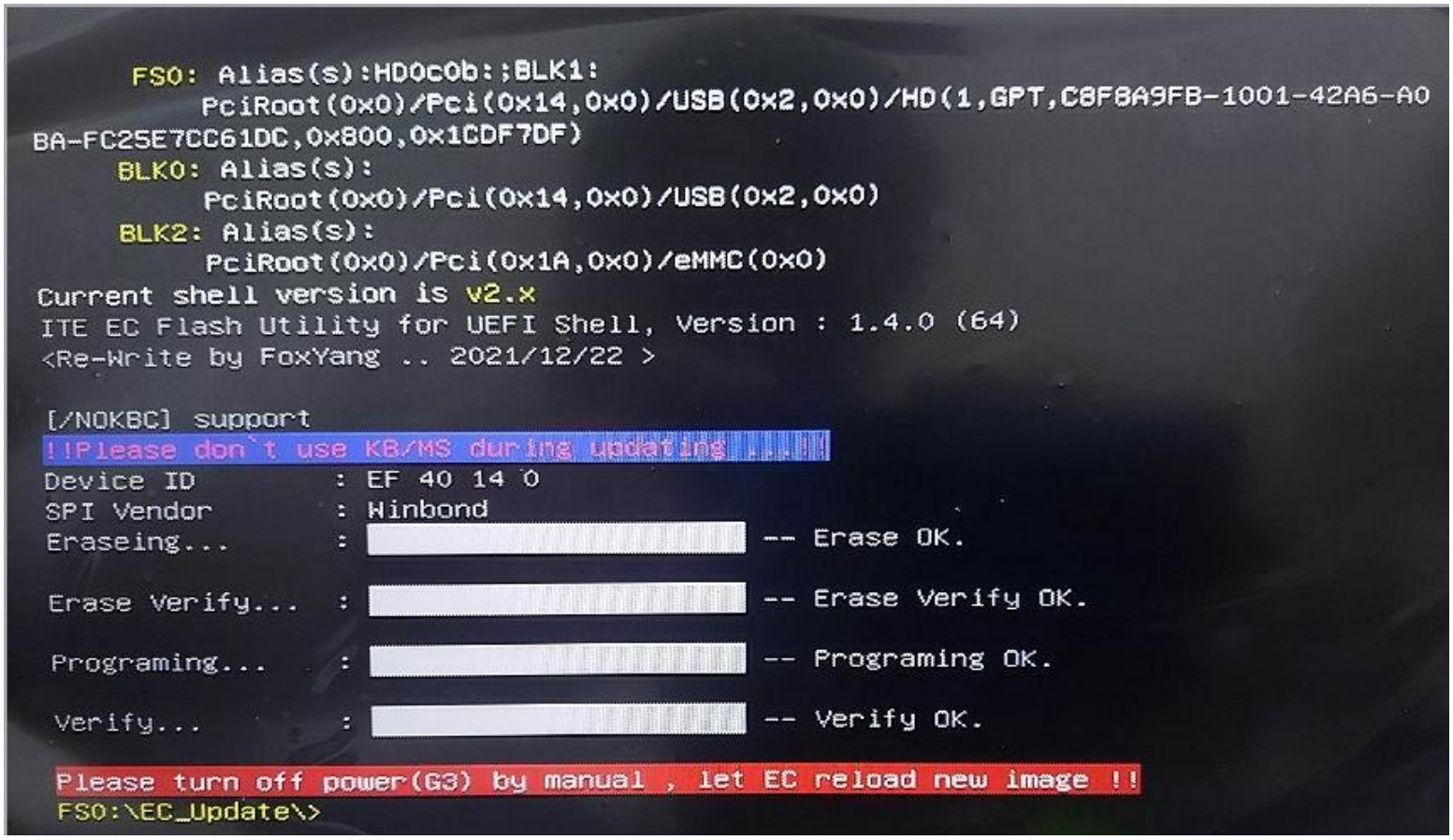


(EC file update sample)

Step 7. The updating process will start and you can see the updating progress. Once finished, please power off and restart the system.



(BIOS updating progress)



(EC updating progress)

9 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 further information please contact PORTWELL.

PORTWELL BIOS web Tool (PBT)
The PORTWELL BIOS web Tool (PBT) is a brand new on-line utility 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 Inc. (AMI) BIOS. Please contact PORTWELL for further information.

PORTWELL EC Auto Test Tool (PECAT)
The PORTWELL EC Auto Test Tool (PECAT) is a brand new utility 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 further information.

10 Packaging Information

PCOM-BA02GL's packaging specification will follow the Portwell standard style.

Package	Appearance	Size
Anti-Static bubble bag		180x130mm
White Paper Box		210x150x40mm
Shipping Box (10 pcs White paper box)		595x300x185mm

Table 11 Packaging information

11 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/
PICMG® COM Express Module™ Base Specification http://www.picmg.org/
PCI Express Base Specification, Revision 2.0 https://www.pcisig.com/specifications