

COM Express™ PCOM-B645VGL UserManual

Revision 1.0

Revision History

| | |
|------|--------------------------|
| R1.0 | Official Release Rev 1.0 |
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1. Introduction

PCOM-B645VGL User Manual contains detail information of the product specifications, features, mechanical dimensions, heat sink/heat spreader and BIOS settings.

PCOM-B645VGL is designed to fulfill PICMG Open Modular Computing Standards COM Express™ Specification Rev3.0 Type 6 with Basic form factor (95 x 95 mm).

PCOM-B645VGL, a brand-new COM-Express Type 6 compact module launched by Portwell Inc. PCOM-B645VGL is designed based on Intel® Atom® Elkhart Lake series processors, and it plans to satisfy most of entry applications. PCOM-B645 provides multiple interfaces like 6x PCIe 3.0 x1, 2x SATA 3.0 ports, and 4x USB3.2 Gen2 ports. With 2.5GbE PHY, it provides option of Time Sensitive Networking (TSN) and Time Coordinated Computing (TCC) for real-time applications. Intel® UHD Graphics (Gen11) controller brings 4K high definition resolution and supports three independent displays. Furthermore, PCOM-B645VGL also can support in extreme environment from -40°C ~ 85°C.

2. Block Diagram

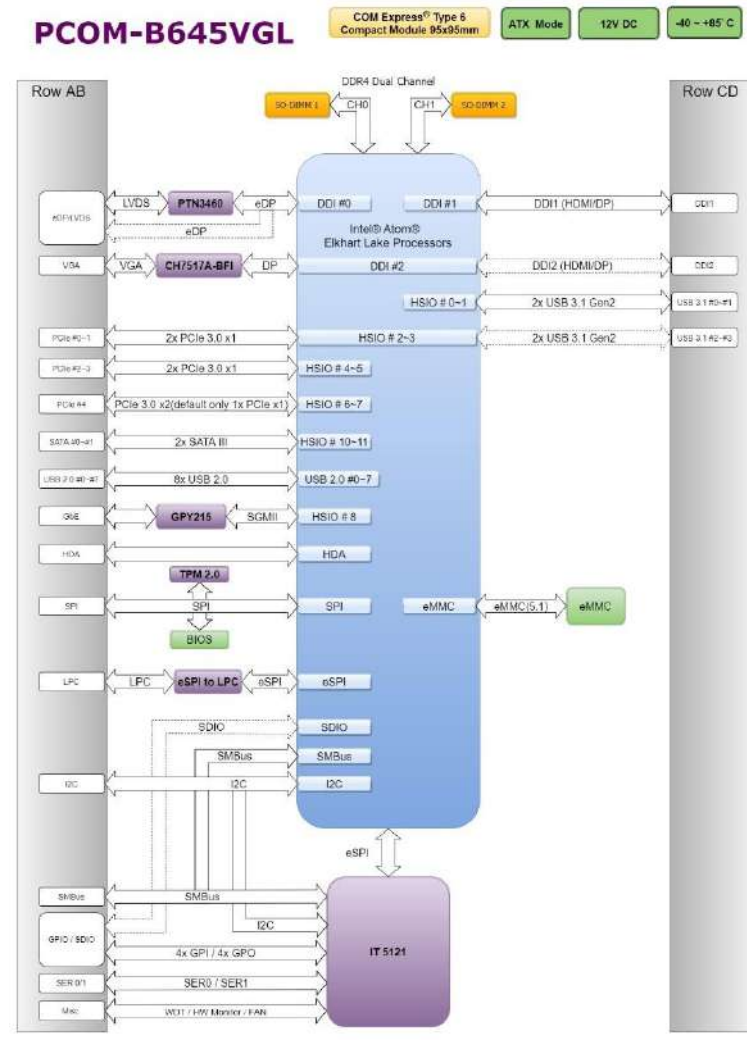


Figure 1 Block Diagram

3. Specifications

| General | |
|-----------------------|---|
| Product | ➤ PCOM-B645VGL |
| Form Factor | ➤ Compact COM Express™ Type 6 Rev. 3.0 |
| Processor | <ul style="list-style-type: none"> ➤ Intel® Atom® J6426 Processor ➤ Intel® Atom® x6211E Processor ➤ Intel® Atom® x6413E Processor ➤ Intel® Atom® x6425E Processor ➤ Intel® Atom® x6425RE Processor |
| Chipset | ➤ SoC |
| BIOS | ➤ AMI Aptio5 UEFI BIOS |
| Memory | <ul style="list-style-type: none"> ➤ 2x SODIMM DDR4 ➤ Dual channel ➤ Up to 32GB 3200MT/s |
| Security | ➤ TPM 2.0 |
| I/O Interface | |
| Embedded Controller | ➤ IT5121 Embedded Controller, Voltage, Fan and Temperature |
| Serial IO | <ul style="list-style-type: none"> ➤ 8 GPIO (default 4xGPI/ 4x GPO) ➤ I2C (SoC& Embedded Controller) ➤ 2x Serial Ports (TX and RX) ➤ SMBus (EC and SoC) |
| Processor PCI Express | ➤ 6x PCIe 3.0 x 1Gen3 (8.0 GT/s); (PCIe 0/1/2/3) can be configured to x1,x2,x4 |
| USB | <ul style="list-style-type: none"> ➤ 8x USB2.0 (480 Mbps) ➤ Up to 4x USB3.1Gen2 (10Gbps)(2x shared with 2x PCIe x1) |

| | |
|-------------------------------------|---|
| SATA | ➤ 2x SATA3.0 (6 Gbps) |
| Ethernet | ➤ GPY215 with 2.5 GbE PHY |
| Audio | ➤ Intel® High Definition Audio |
| Display | |
| Graphic Controller | ➤ Intel® UHD Graphics 11 th Processor dependent |
| Graphics Options | <ul style="list-style-type: none"> ➤ VGA: 1920x 1200 @ 60Hz ➤ LVDS: 1920x 1200 @ 60Hz ➤ eDP: 4096x 2160 @ 60Hz ➤ DP: 4096x 2160 @ 60Hz ➤ HDMI: 4096x 2160 @ 60Hz |
| Mechanical & Environment | |
| Dimension | <ul style="list-style-type: none"> ➤ COM Express™ standard pin out Type 6 Rev. 3.0 ➤ 95 x 95mm / 3.74" x 3.74" (Compact COM Express) |
| Hardware Monitors | ➤ Voltage, Fan and Temperature |
| Power DC IN | ➤ +12VDC (Nominal) |
| Power Management | ➤ ACPI 5.0 |
| Environment | <ul style="list-style-type: none"> ➤ Operating Temperature -40°C ~ +85°C ➤ Storage Temperature -40°C ~ +85°C ➤ Relative Humidity 5% ~ 95% |
| MTBF | ➤ TBD |

Table 1 PCOM-B645VGL Specification

3.1. PCOM-B645VGL Processorlist

PCOM-B645VGL Processor list

| Processor Sku | Intel® Pentium® J6426 | Intel® Atom® x6211E | Intel® Atom® x6413E | Intel® Atom® x6425E | Intel® Atom® x6425RE |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Lithography | 10 nm | 10 nm | 10 nm | 10 nm | 10 nm |
| # of Cores | 4 | 2 | 4 | 4 | 4 |
| # of Threads | 4 | 2 | 4 | 4 | 4 |
| Processor Base Frequency | 2.0 GHz | 1.3 GHz | 1.5 GHz | 2.0 GHz | 1.9 GHz |
| Burst Frequency | 3.0 GHz | 3.0 GHz | 3.0 GHz | 3.0 GHz | N/A |
| Cache | 1.5MB | 1.5MB | 1.5MB | 1.5MB | 1.5MB |
| TDP | 10 W | 6 W | 9 W | 12 W | 12 W |
| Max Memory Size (dependent on memory type) | 32 GB | 32 GB | 32 GB | 32 GB | 32 GB |
| Max # of Memory Channels | 2 | 2 | 2 | 2 | 2 |
| Processor Graphics | Intel® UHD Graphics (Gen11) | Intel® UHD Graphics (Gen11) | Intel® UHD Graphics (Gen11) | Intel® UHD Graphics (Gen11) | Intel® UHD Graphics (Gen11) |
| Graphics Base Frequency | 400 MHz | 350 MHz | 500 MHz | 500 MHz | 400 MHz |
| Graphics Burst Frequency | 850 MHz | 750 MHz | 750 MHz | 750 MHz | N/A |
| DirectX* Support | 12 | 12 | 12 | 12 | 12 |
| OpenGL* Support | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Intel® Quick Sync Video | Yes | Yes | Yes | Yes | |
| # of Displays Supported | 3 | 3 | 3 | 3 | 3 |
| 4K Support | Yes | Yes | Yes | Yes | Yes |
| Max Resolution (HDMI 1.4b/2.0b) | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz |
| Max Resolution (DP 1.4) | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz | 4096x2160 @ 60Hz |

| | | | | | |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|
| Max Resolution (eDP - Integrated Flat Panel) | 4096x 2160 @ 60Hz | 4096x 2160 @ 60Hz | 4096x 2160 @ 60Hz | 4096x 2160 @ 60Hz | 4096x 2160 @ 60Hz |
| PCI Express Revision | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| PCI Express Configurations | x1, x2, x4 | x1, x2, x4 | x1, x2, x4 | x1, x2, x4 | x1, x2, x4 |
| Max # of PCI Express Lanes | 6 | 6 | 6 | 6 | 6 |
| USB Revision | 2.0/3.1 | 2.0/3.1 | 2.0/3.1 | 2.0/3.1 | 2.0/3.1 |
| # of USB Ports | 8 | 8 | 8 | 8 | 8 |
| Total # of SATA Ports | 2 | 2 | 2 | 2 | 2 |
| TJUNCTION | 105°C | 105°C | 105°C | 105°C | 110°C |

Table 2 PCOM-B645VGL Processor list

3.2. Supported Operating Systems

The PCOM-B645VGL supports the following operating systems.

| Category | Operating System | Support |
|-----------|----------------------------------|-----------------|
| Microsoft | Windows 10 IoT Enterprise(64bit) | LTSC 2019, 2021 |
| Linux | Kernel version | 5.4 |
| | Yocto | YP 3.0 Zeus |

Table 3 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 | Windows 10 OS |
|---------|----------------------------|---|
| Chipset | 10.1.18768.8273-public-mup | Chipset-10.1.18768.8273-public-mup |
| Graphic | 100.9565 | Graphic Driver Production Version MR1_100.9565 |
| ME_SW | 15.40.15.2416 | Intel CSE 15.40.15.2416 supporting Elkhart lake MR1 |
| LAN | 656543 | Intel_Gbe-210620_20210820_646543 |

Table 4 Windows OS driver list

3.4. Electrical Characteristics

| | |
|---------------|--------------------------|
| Input voltage | +12VDC (Nominal) / +5VSB |
| RTC Battery | +3.0V |
| Power on mode | AT / ATX |

Table 5 Electrical Characteristics

3.5. Power sequence

Figure 29-43. Platform Power Up Sequence Timing - G3 to S0

Discrete VRs Power Up Sequence Timing – G3 to S0 (Non Deep Sx)

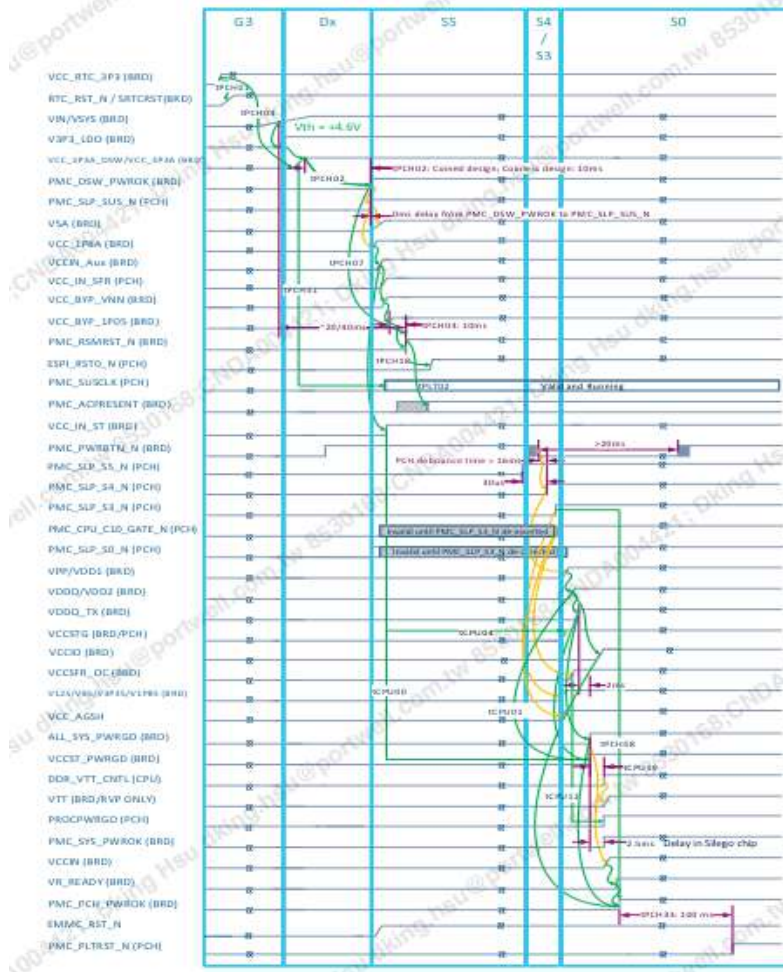


Figure 29-44. Platform Power Down Sequence Timing - S0 to G3

Discrete VRs Power Down Sequence Timing – S0 to G3 (Non Deep Sx)

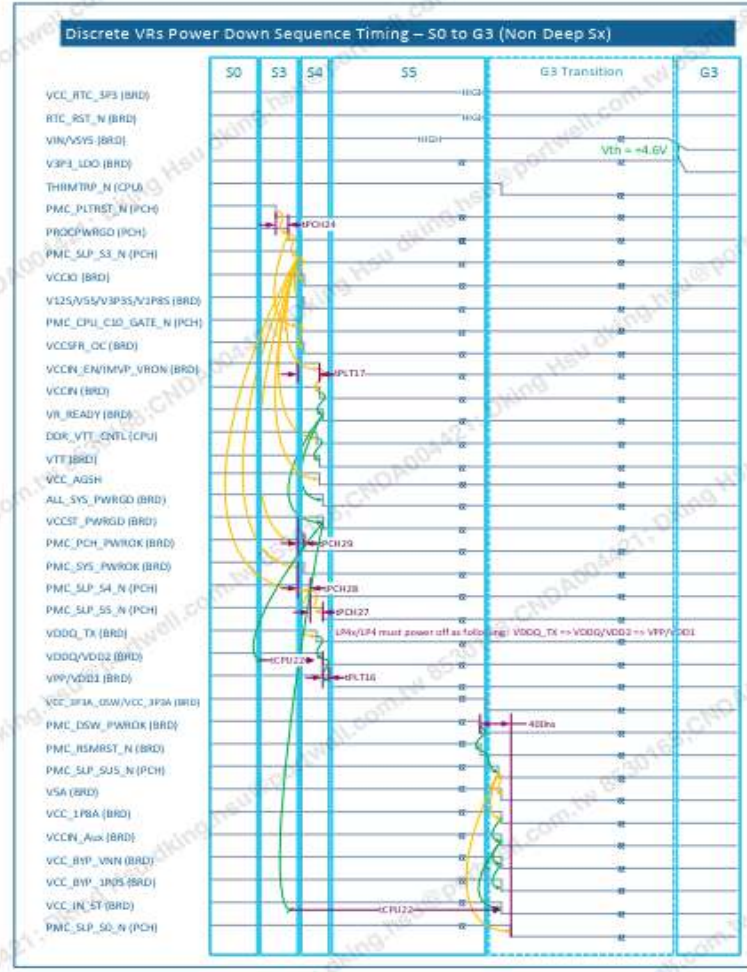


Figure 2 PCOM-B645VGL Power On/Off Sequence

3.6. Circuit protection design

PCOM-B645VGL 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.

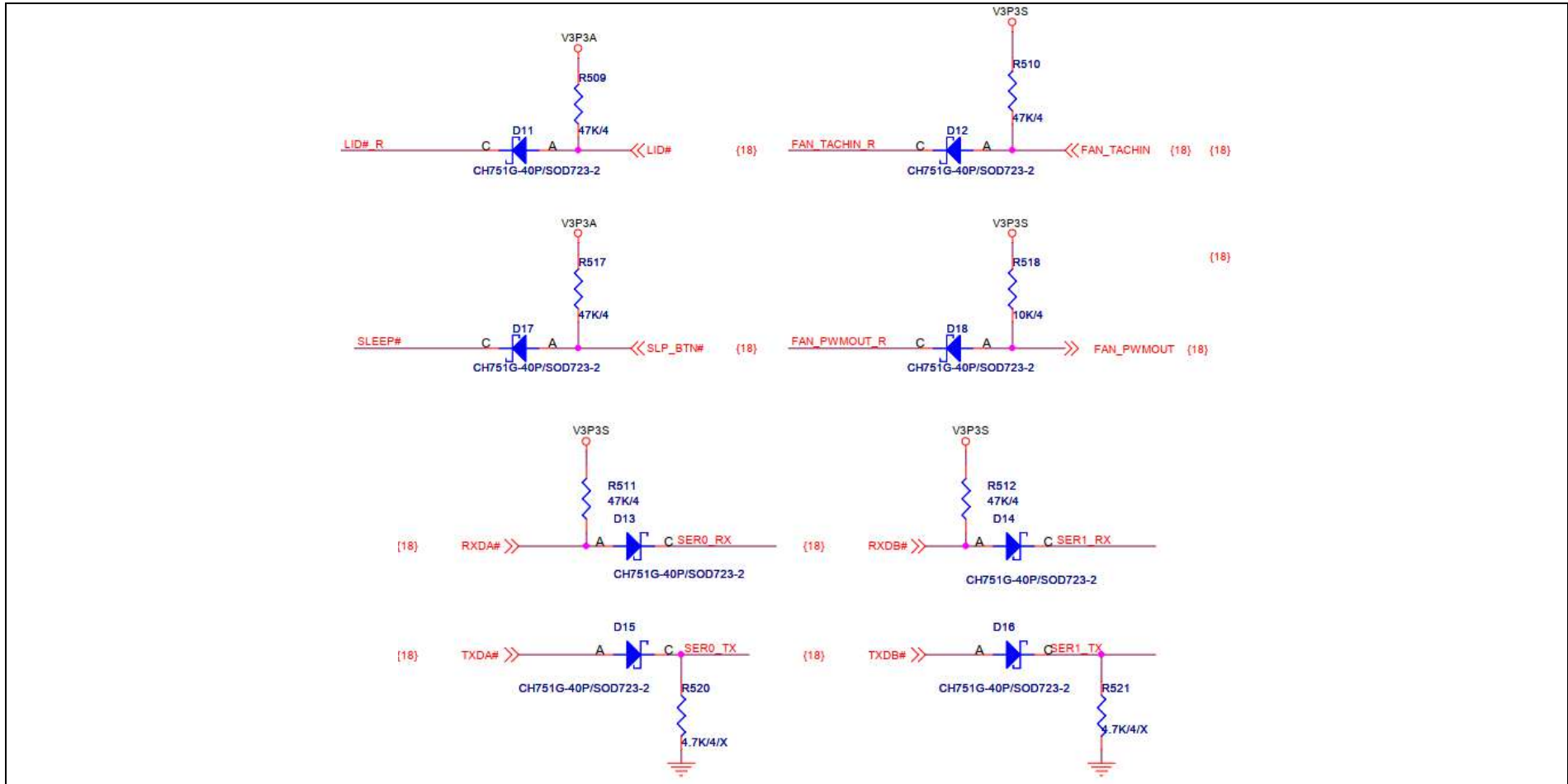


Figure 3 Circuit protection design

3.7. Mechanical Dimensions

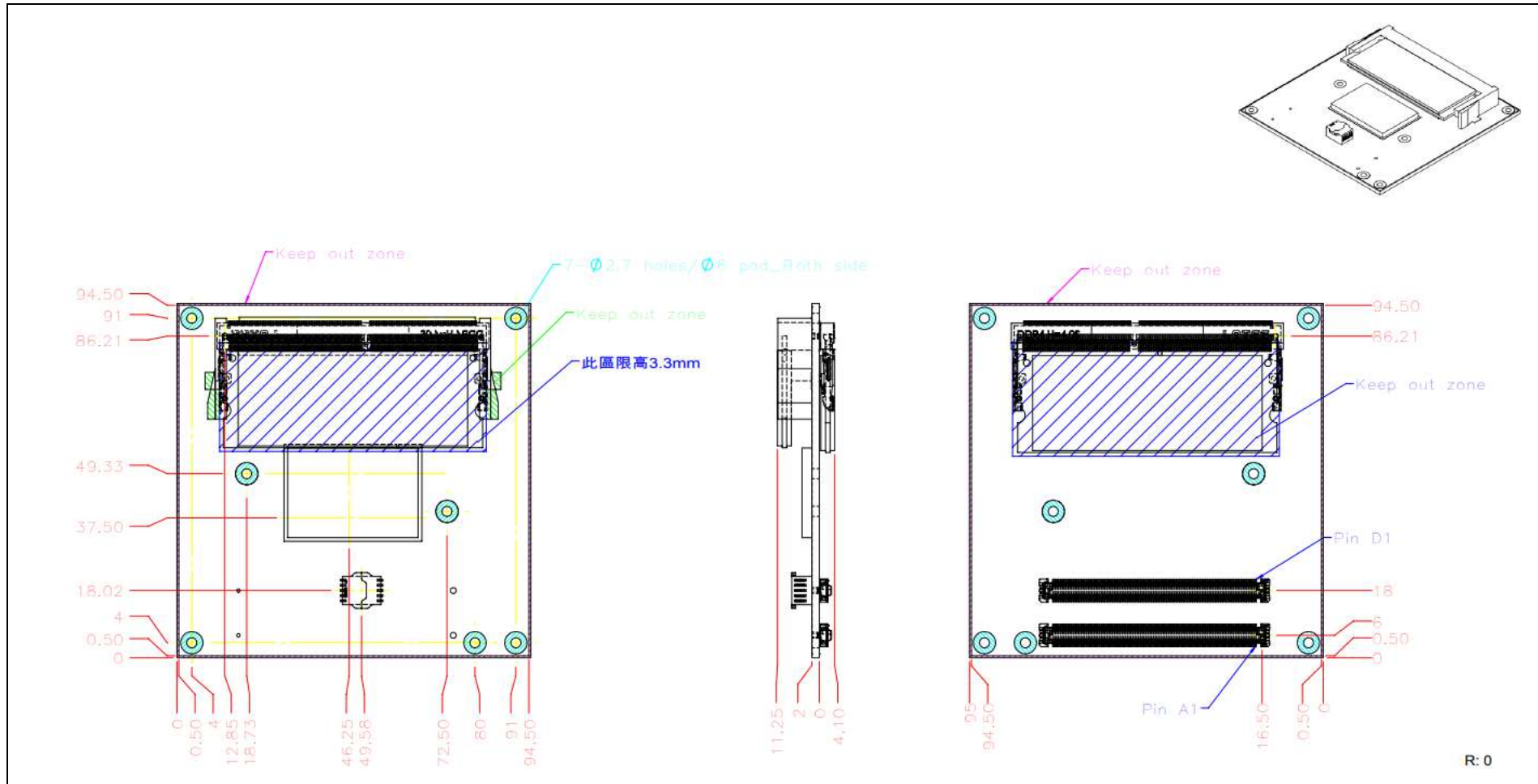


Figure 4 Mechanical Dimensions - Top/Bottom

Restricted component height on the top side of the module :mm

Restricted component height on the bottom side of the module : mm

Do not place plugging component in the zone of restricted component height.

Do not place DIP type component in the zone of restricted component height.

3.8. PCOM-B645VGL and Cooler weight

| | |
|------------------|------------|
| PCOM-B645VGL | TBC +/- 2% |
| Cooler (H/S+FAN) | TBC +/- 2% |
| Heatsink | TBC +/- 2% |

Table 6 Net weight

3.9. Environmental Specifications

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

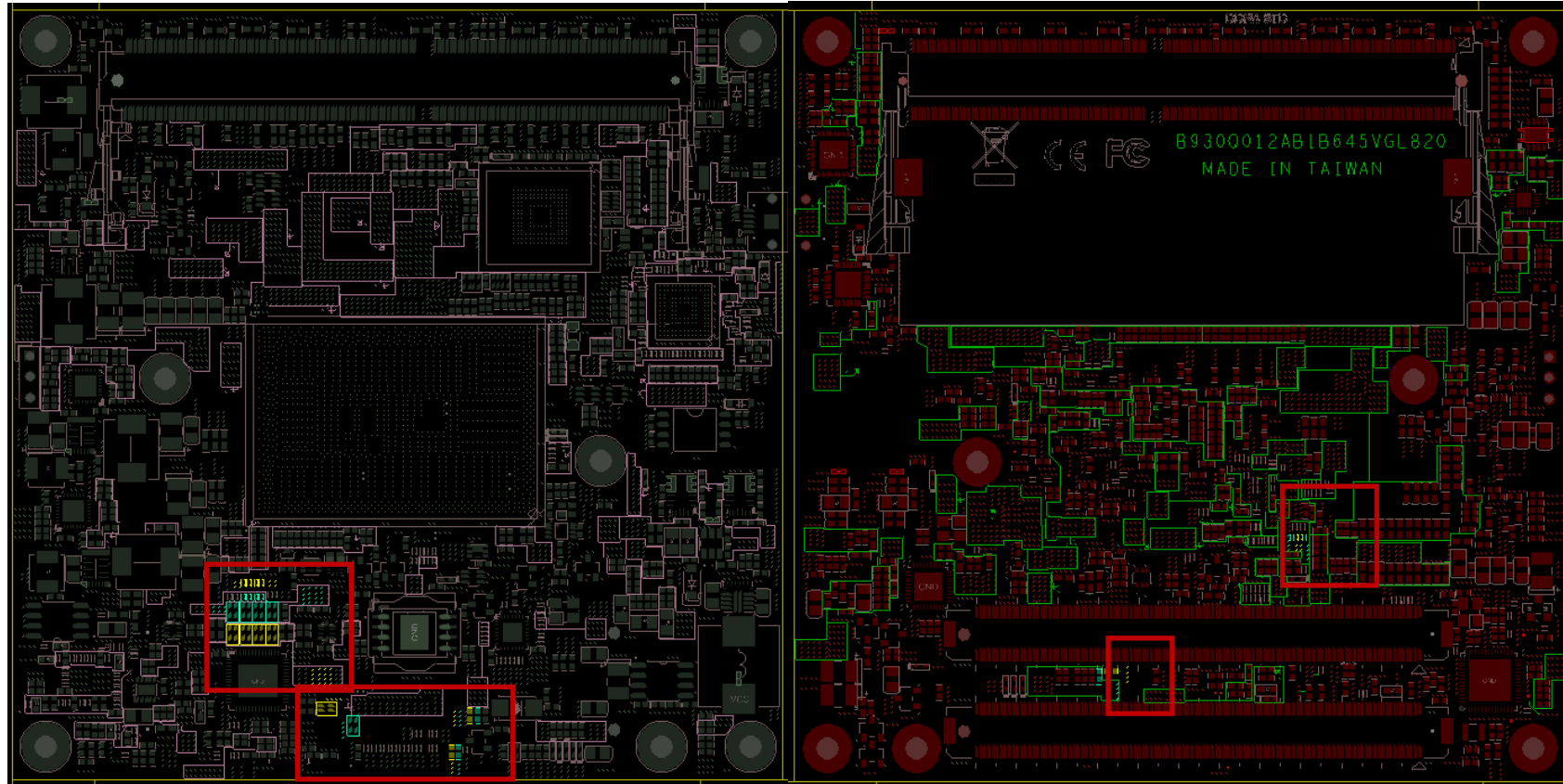
Table 7 Environmental Specifications

3.10. Optional function rework SOP

1. Optional function rework SOP :eDP

PCOM-B645VGL Default display is LVDS, rework following SOP for eDP display interface. [Note. eDP function, carrier must place ac cap.](#)

Top view / Bot view



➤ Step 2

Solder the R530 component to R531

Solder the R503 component to R504

Solder the R21 component to R22

Rework position

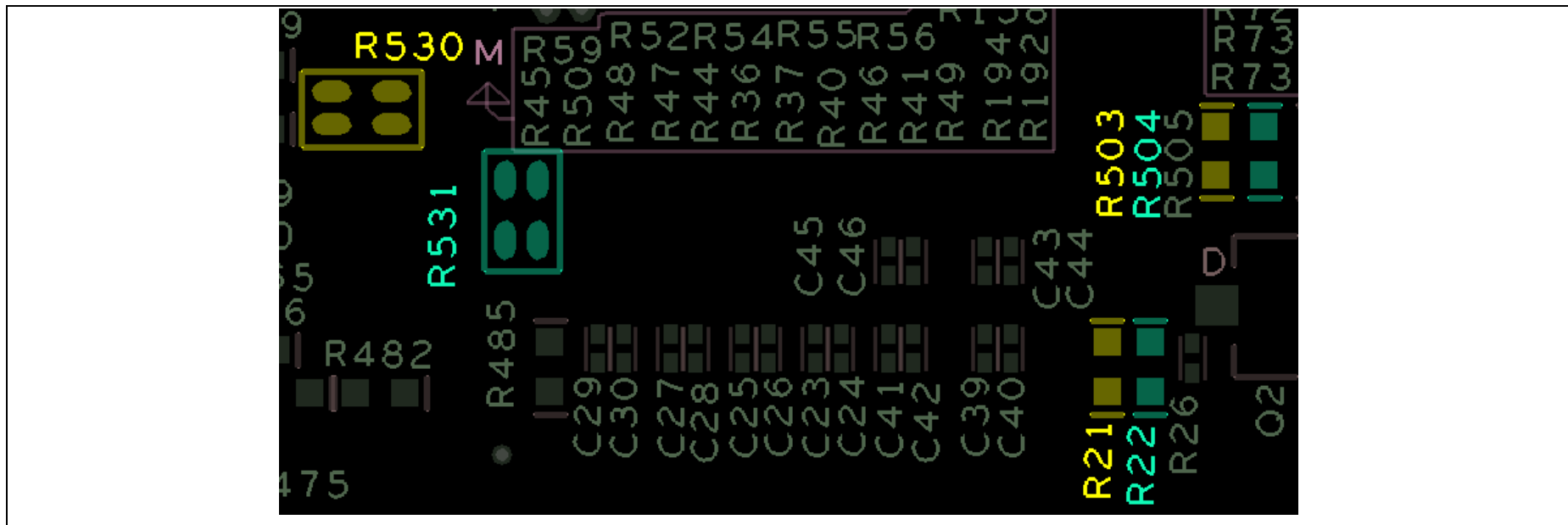


Figure 5 Optional function rework SOP : eDP 1-2

➤ Step 3

Remove C5, C6

Add R833, R834 (0ohm 0201)

Rework position

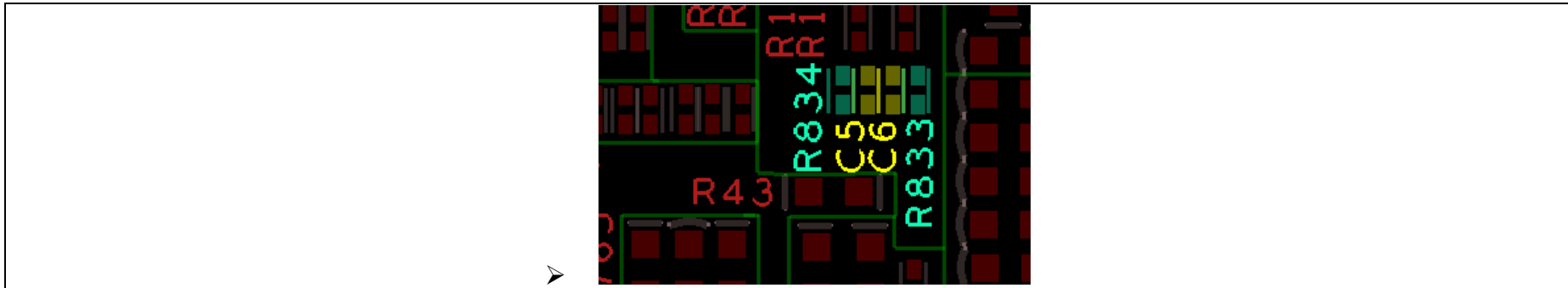


Figure 6 Optional function rework SOP : eDP 1-3

➤ Step 4

Solder the R492 component to R494

Rework position

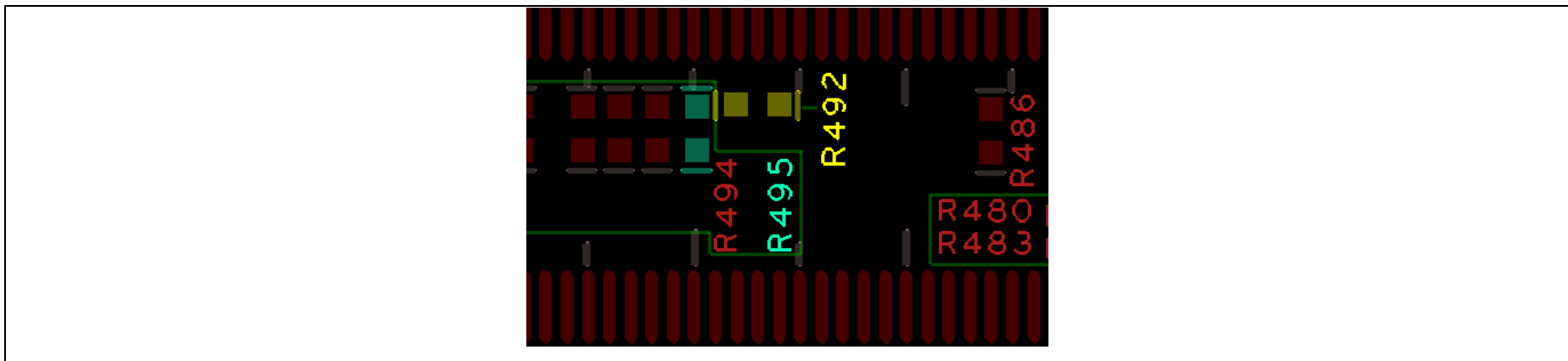


Figure 7 Optional function rework SOP : eDP 1-4

4. Heatsink / Cooler dimensions

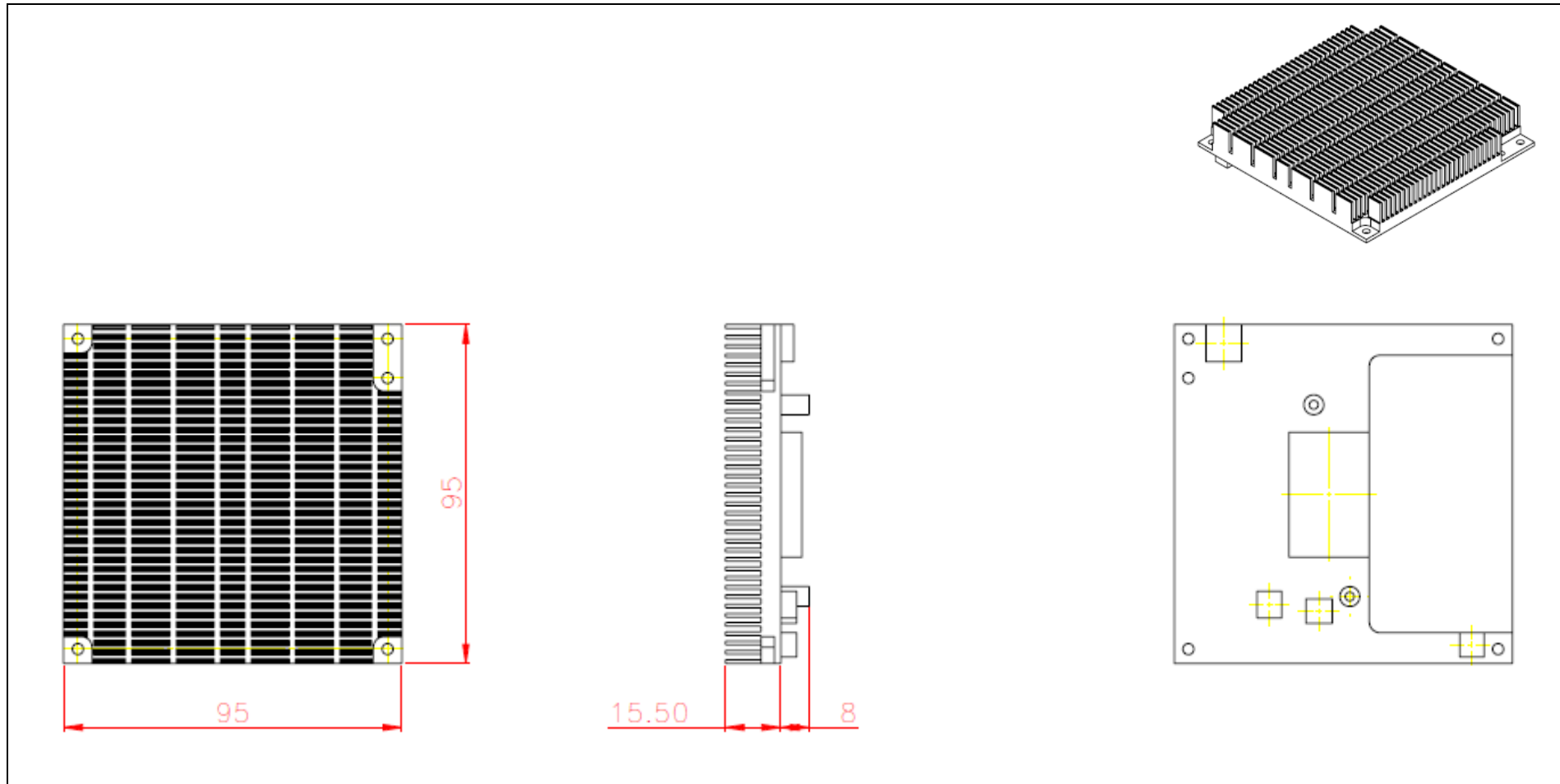


Figure 8 Heat sink / cooler mechanical dimensions

4.1. H/S Assembly Guide

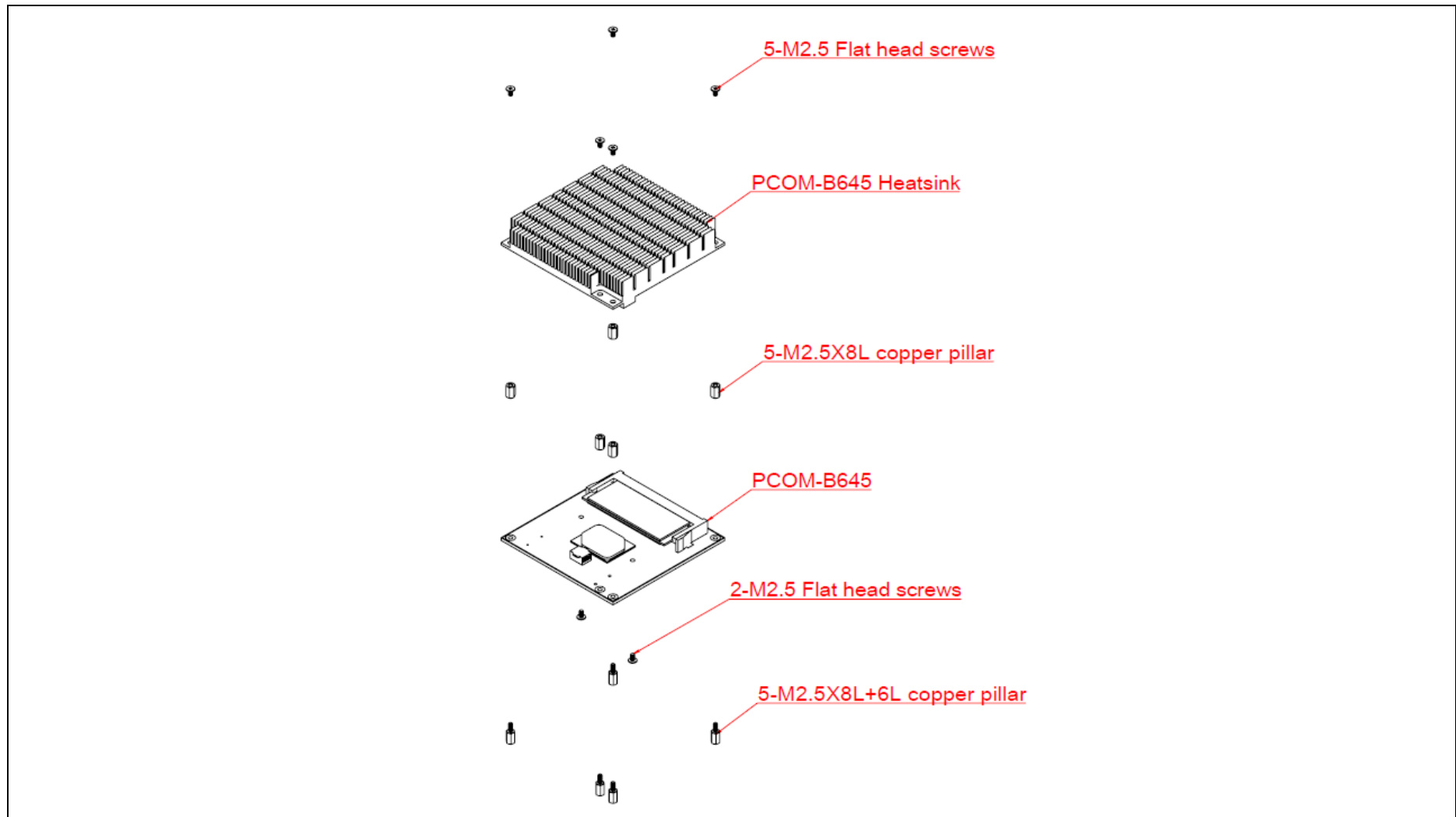


Figure 9 H/S Assembly guide

4.2. Packaging




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

Table 8 Packaging

4.3. Ordering Guide

PCOM-B645VGL

| Product | Ordering P/N | Status |
|----------------------|--------------|-----------|
| PCOM-B645VGL-J6426. | AB1-3L84 | Available |
| PCOM-B645VGL-x6211E | AB1-3L83 | Available |
| PCOM-B645VGL-x6413E | AB1-3L82 | Available |
| PCOM-B645VGL-x6425E | AB1-3K43 | Available |
| PCOM-B645VGL-x6425RE | AB1-3L81 | Available |

Table 9 Ordering Guide - PCOM-B645VGL

Accessory

| Product | Ordering P/N | Status |
|--------------------------|--------------|------------|
| Heat Sink J/N Series | B830B390 | Available |
| Heat Sink X Series | B830B380 | Available |
| Heat Spreader J/N Series | B830B460 | Available |
| Heat Spreader X Series | B830B470 | Available |
| PCOM-C60B | AB1-3G22Z | Contact us |

Table 10 Ordering Guide - Accessory

5. Pinout Tables

Below tables lists PCOM-B645VGL AB and CD Row connectors Type 6 pin name, un-connected pins are present as N/A.

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|----------------|------------|------------|-------------------|
| 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# | USB_SSRX0- | USB_SSTX0- |
| 4 | GBE0_LINK100# | LPC_AD0 | USB_SSRX0+ | USB_SSTX0+ |
| 5 | GBE0_LINK1000# | LPC_AD1 | GND | GND |
| 6 | GBE0_MDI2- | LPC_AD2 | USB_SSRX1- | USB_SSTX1- |
| 7 | GBE0_MDI2+ | LPC_AD3 | USB_SSRX1+ | USB_SSTX1+ |
| 8 | GBE0_LINK# | N/A | GND | GND |
| 9 | GBE0_MDI1- | N/A | USB_SSRX2- | USB_SSTX2- |
| 10 | GBE0_MDI1+ | LPC_CLK | 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 | N/A | SMB_DAT | GND | GND |
| 15 | SUS_S3# | SMB_ALERT# | N/A | DDI1_CTRLCLK_AUX+ |

Table 11 PCOM-B645VGL Pin-out 1-6

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|-------------------|-------------------|--------------------|--------------------|
| Pin | Row A | Row B | Row C | Row D |
| 16 | SATA0_TX+ | SATA1_TX+ | N/A | DDI1_CTRLDATA_AUX- |
| 17 | SATA0_TX- | SATA1_TX- | RSVD19 | RSVD19 |
| 18 | SUS_S4# | SUS_STAT# | RSVD19 | RSVD19 |
| 19 | SATA0_RX+ | SATA1_RX+ | N/A | N/A |
| 20 | SATA0_RX- | SATA1_RX- | N/A | N/A |
| 21 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 22 | N/A | N/A | N/A | N/A |
| 23 | N/A | N/A | N/A | N/A |
| 24 | SUS_S5# | PWR_OK | DDI1_HPD | RSVD19 |
| 25 | N/A | N/A | N/A | RSVD19 |
| 26 | N/A | N/A | N/A | DDI1_PAIR0+ |
| 27 | BATLOW# | WDT | RSVD19 | DDI1_PAIR0- |
| 28 | SATA_ACT# | HDA_SDIN2 | RSVD19 | RSVD19 |
| 29 | HDA_SYNC | HDA_SDIN1 | N/A | DDI1_PAIR1+ |
| 30 | HDA_RST# | HDA_SDIN0 | N/A | DDI1_PAIR1- |
| 31 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 32 | HDA_BITCLK | SPKR | DDI2_CTRLCLK_AUX+ | DDI1_PAIR2+ |
| 33 | HDA_SDOOUT | I2C_CK | DDI2_CTRLDATA_AUX- | DDI1_PAIR2- |
| 34 | BIOS_DIS0# | I2C_DAT | DDI2_DDC_AUX_SEL | DDI1_DDC_AUX_SEL |
| 35 | THRMTRIP# | THRM# | RSVD19 | RSVD19 |
| 36 | USB6- | USB7- | N/A | DDI1_PAIR3+ |
| 37 | USB6+ | USB7+ | | DDI1_PAIR3- |

Table 12 PCOM-B645VGL Pin-out 2-6

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Pin | Row A | Row B | Row C | Row D |
| 38 | USB_6_7_OC# | USB_4_5_OC# | N/A | RSVD19 |
| 39 | USB4- | USB5- | N/A | DDI2_PAIR0+ |
| 40 | USB4+ | USB5+ | N/A | DDI2_PAIR0- |
| 41 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 42 | USB2- | USB3- | N/A | DDI2_PAIR1+ |
| 43 | USB2+ | USB3+ | N/A | DDI2_PAIR1- |
| 44 | USB_2_3_OC# | USB_0_1_OC# | N/A | DDI2_HPD |
| 45 | USB0- | USB1- | RSVD19 | RSVD19 |
| 46 | USB0+ | USB1+ | N/A | DDI2_PAIR2+ |
| 47 | VCC_RTC | N/A | N/A | DDI2_PAIR2- |
| 48 | N/A | N/A | RSVD19 | RSVD19 |
| 49 | N/A | SYS_RESET# | N/A | DDI2_PAIR3+ |
| 50 | LPC_SERIRQ | CB_RESET# | N/A | DDI2_PAIR3- |
| 51 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 52 | PCIE_TX5+ | PCIE_RX5+ | N/A | N/A |
| 53 | PCIE_TX5- | PCIE_RX5- | N/A | N/A |
| 54 | GPIO | GPO1 | TYPE0# | N/A |
| 55 | PCIE_TX4+ | PCIE_RX4+ | N/A | N/A |
| 56 | PCIE_TX4- | PCIE_RX4- | N/A | N/A |
| 57 | GND | GPO2 | TYPE1# | TYPE2# |
| 58 | PCIE_TX3+ | PCIE_RX3+ | N/A | N/A |
| 59 | PCIE_TX3- | PCIE_RX3- | N/A | N/A |

Table 13 PCOM-B645VGL Pin-out 3-6

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Pin | Row A | Row B | Row C | Row D |
| 60 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 61 | PCIE_TX2+ | PCIE_RX2+ | N/A | N/A |
| 62 | PCIE_TX2- | PCIE_RX2- | N/A | N/A |
| 63 | GPI1 | GPO3 | RSVD19 | RSVD19 |
| 64 | PCIE_TX1+ | PCIE_RX1+ | RSVD19 | RSVD19 |
| 65 | PCIE_TX1- | PCIE_RX1- | N/A | N/A |
| 66 | GND | WAKE0# | N/A | N/A |
| 67 | GPI2 | WAKE1# | RAPID_SHUT | GND |
| 68 | PCIE_TX0+ | PCIE_RX0+ | N/A | N/A |
| 69 | PCIE_TX0- | PCIE_RX0- | N/A | N/A |
| 70 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 71 | LVDS_A0+ | LVDS_B0+ | N/A | N/A |
| 72 | LVDS_A0- | LVDS_B0- | N/A | N/A |
| 73 | LVDS_A1+ | LVDS_B1+ | GND | GND |
| 74 | LVDS_A1- | LVDS_B1- | N/A | N/A |
| 75 | LVDS_A2+ | LVDS_B2+ | N/A | N/A |
| 76 | LVDS_A2- | LVDS_B2- | GND | GND |
| 77 | LVDS_VDD_EN | LVDS_B3+ | RSVD19 | RSVD19 |
| 78 | LVDS_A3+ | LVDS_B3- | N/A | N/A |
| 79 | LVDS_A3- | LVDS_BKLT_EN | N/A | N/A |
| 80 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 81 | LVDS_A_CK+ | LVDS_B_CK+ | N/A | N/A |

Table 14 PCOM-B645VGL Pin-out 4-6

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Pin | Row A | Row B | Row C | Row D |
| 82 | LVDS_A_CK- | LVDS_B_CK- | N/A | N/A |
| 83 | LVDS_I2C_CK | LVDS_BKLT_CTRL | RSVD19 | RSVD19 |
| 84 | LVDS_I2C_DAT | VCC_5V_SBY | GND | GND |
| 85 | GPI3 | VCC_5V_SBY | N/A | N/A |
| 86 | RSVD19 | VCC_5V_SBY | N/A | N/A |
| 87 | eDP_HPD | VCC_5V_SBY | GND | GND |
| 88 | PCIE_CLK_REF+ | BIOS_DIS1# | N/A | N/A |
| 89 | PCIE_CLK_REF- | VGA_RED | N/A | N/A |
| 90 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 91 | SPI_POWER | VGA_GRN | N/A | N/A |
| 92 | SPI_MISO | VGA_BLU | N/A | N/A |
| 93 | GPO0 | VGA_HSYNC | GND | GND |
| 94 | SPI_CLK | VGA_VSYNC | N/A | N/A |
| 95 | SPI_MOSI | VGA_I2C_CK | N/A | N/A |
| 96 | TPM_PP | VGA_I2C_DAT | GND | GND |
| 97 | TYPE10# | SPI_CS# | RSVD19 | RSVD19 |
| 98 | SER0_TX | RSVD19 | N/A | N/A |
| 99 | SER0_RX | RSVD19 | N/A | N/A |
| 100 | GND(FIXED) | GND(FIXED) | GND(FIXED) | GND(FIXED) |
| 101 | SER1_TX | FAN_PWNOUT | N/A | N/A |

Table 15 PCOM-B645VGL Pin-out 5-6

| PCOM-B645VGL ZR5 Pin Out | | | | |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Pin | Row A | Row B | Row C | Row D |
| 102 | SER1_RX | FAN_TACHIN | N/A | N/A |
| 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 16 PCOM-B645VGL Pin-out 6-6

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

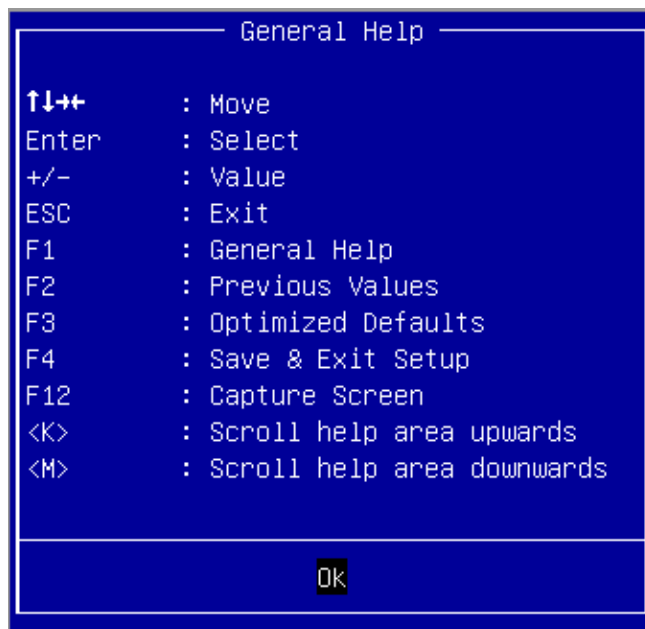
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <ESC> key will enter BIOS setup screen.

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.

```
Aptio Setup - AMI
Main Configuration Security Boot Save & Exit

Project Name                PCOM-B645VGL
BIOS Version & Build Date   0.0.24 (12/07/2021 16:32:08)
EC Version & Build Date     0.6 (11/26/2021)
Access Level                Administrator

Processor Information
Name                        ElkhartLake ULX
Type                        Intel Atom(R) x6425E Processor @ 2.00GHz
Speed                       2000 MHz
ID                           0x90661
Stepping                     B0
Package                      Not Implemented Yet
Number of Processors         4Core(s) / 4Thread(s)
Microcode Revision          11
GT Info                      GT4 (0x4571)
Memory RC Version           0.0.4.104
Total Memory                 8192 MB
Memory Data Rate             2400 MTPS

PCH Information
Name                        EHL PCH
PCH SKU                      MCC SKU 0
Stepping                     B1

▶ Detailed System Information

System Date                  [Fri 01/01/2021]
System Time                  [22:57:47]
```

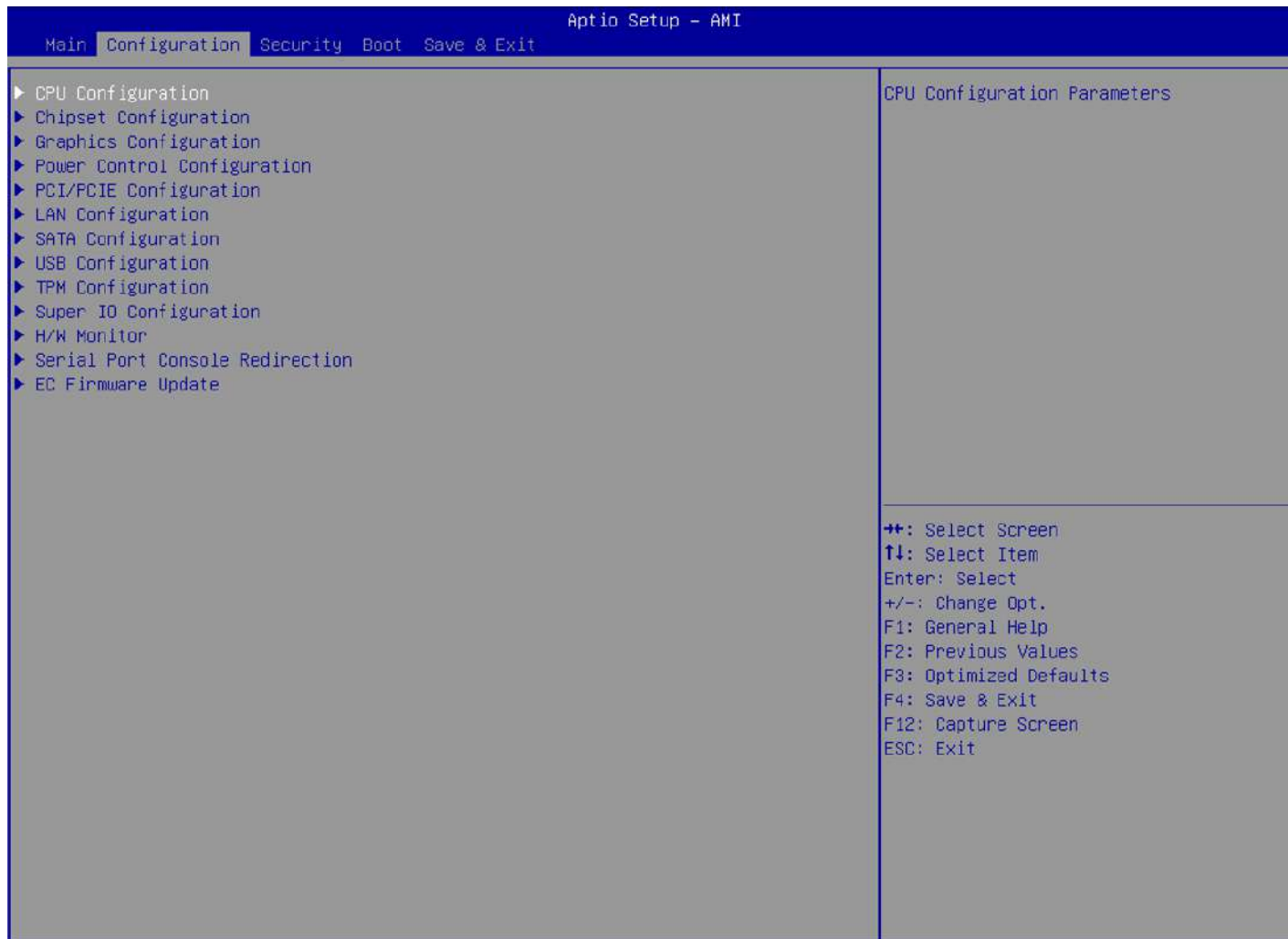
Detailed System Information

| Aptio Setup - AMI | |
|--------------------------------|---------------------|
| Main | |
| Detailed System Information | |
| FSP Information | |
| FSP version | 09.03.16.21 |
| RC version | 09.03.16.21 |
| Build Date | |
| FSP Mode | API Mode |
| PSE Information | |
| PSE version | 0.17.25.0 |
| Board Information | |
| Board Name | PCOM-B645VGL |
| Board ID | N/A |
| Fab ID | Default string |
| LAN PHY Revision | N/A |
| eDRAM Size | N/A |
| IGFX GOP Version | 18.0.1031 |
| OOB Manageability State | |
| OOB Provision | N/A |
| OOB Cloud Type | N/A |
| OOB Cloud URL | N/A |
| OOB Cloud Port | N/A |
| Package | |
| TXT Capability of Platform/PCH | Not Implemented Yet |
| Production Type | Unsupported |
| Intel(R) Safety Island Boot | Production |
| Intel(R) Safety Island Boot | N/A |
| eMMC Device | eMMC DG4032(31.2GB) |
| Memory Type Information | |
| EfiACPISReclaimMemory | 00000069 |
| EfiACPIMemoryNVS | 00000088 |
| EfiReservedMemory | 0000226A |
| EfiRuntimeServicesData | 000005DE |
| EfiRuntimeServicesCode | 00000092 |
| ME FW Version | |
| ME Firmware SKU | 15.40.10.2252 |
| ME Firmware SKU | Consumer SKU |
| PMC FW Version | 154.1.10.1021 |

| 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

Aptio Setup - AMI

Configuration

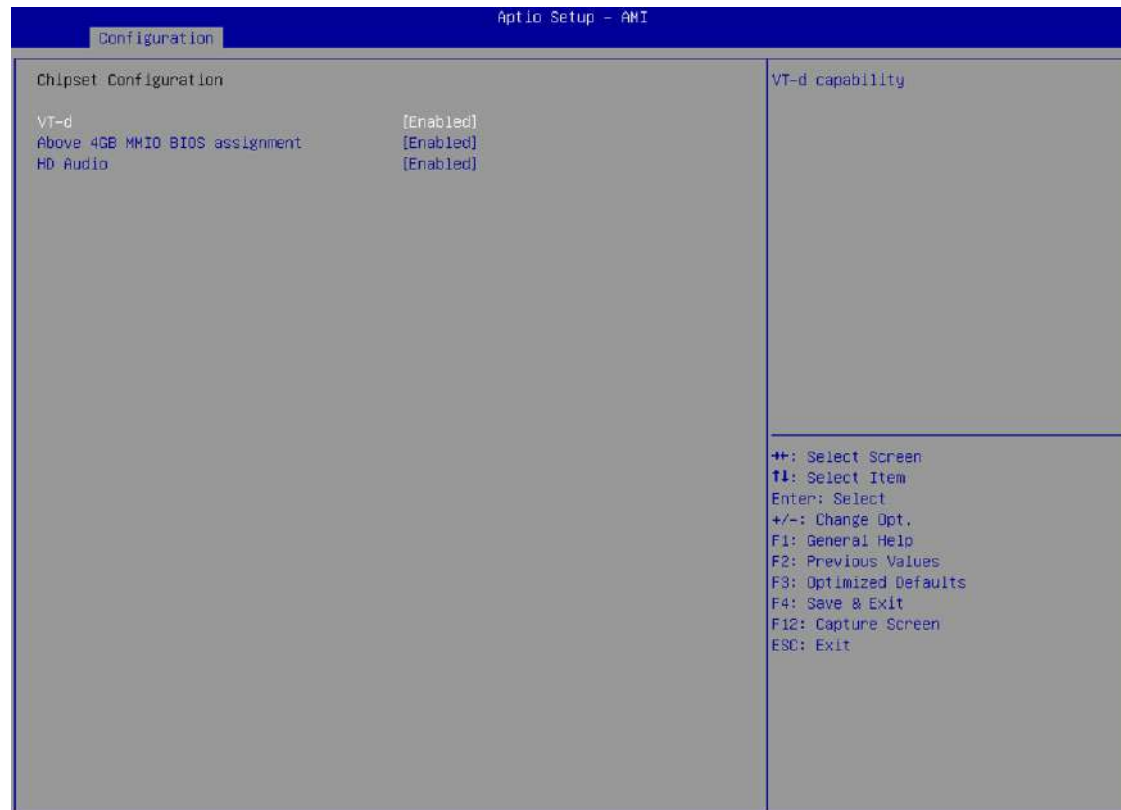
| | | |
|---------------------------------------|---|---|
| CPU Configuration | | Enable/Disable CPU Flex Ratio Programming |
| Type | Intel Atom(R) x6425E Processor @ 2.0... | |
| ID | 0x90661 | |
| Speed | 2000 MHz | |
| L1 Data Cache | 32 KB x 4 | |
| L1 Instruction Cache | 32 KB x 4 | |
| L2 Cache | 1536 KB x 4 | |
| L3 Cache | 4 MB | |
| L4 Cache | N/A | |
| VMX | Supported | |
| SMX/TXT | Not Supported | |
| CPU Flex Ratio Override | | |
| | [Disabled] | |
| CPU Flex Ratio Settings | | |
| | 20 | |
| Intel (VMX) Virtualization Technology | | |
| | [Enabled] | |
| Active Processor Cores | | |
| | [All] | |
| Boot performance mode | | |
| | [Max Non-Turbo Performance] | |
| Intel(R) SpeedStep(tm) | | |
| | [Enabled] | |
| Intel(R) Speed Shift Technology | | |
| | [Enabled] | |
| Turbo Mode | | |
| | [Enabled] | |

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

| 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 Vanderpool 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

Configuration Chipset feature



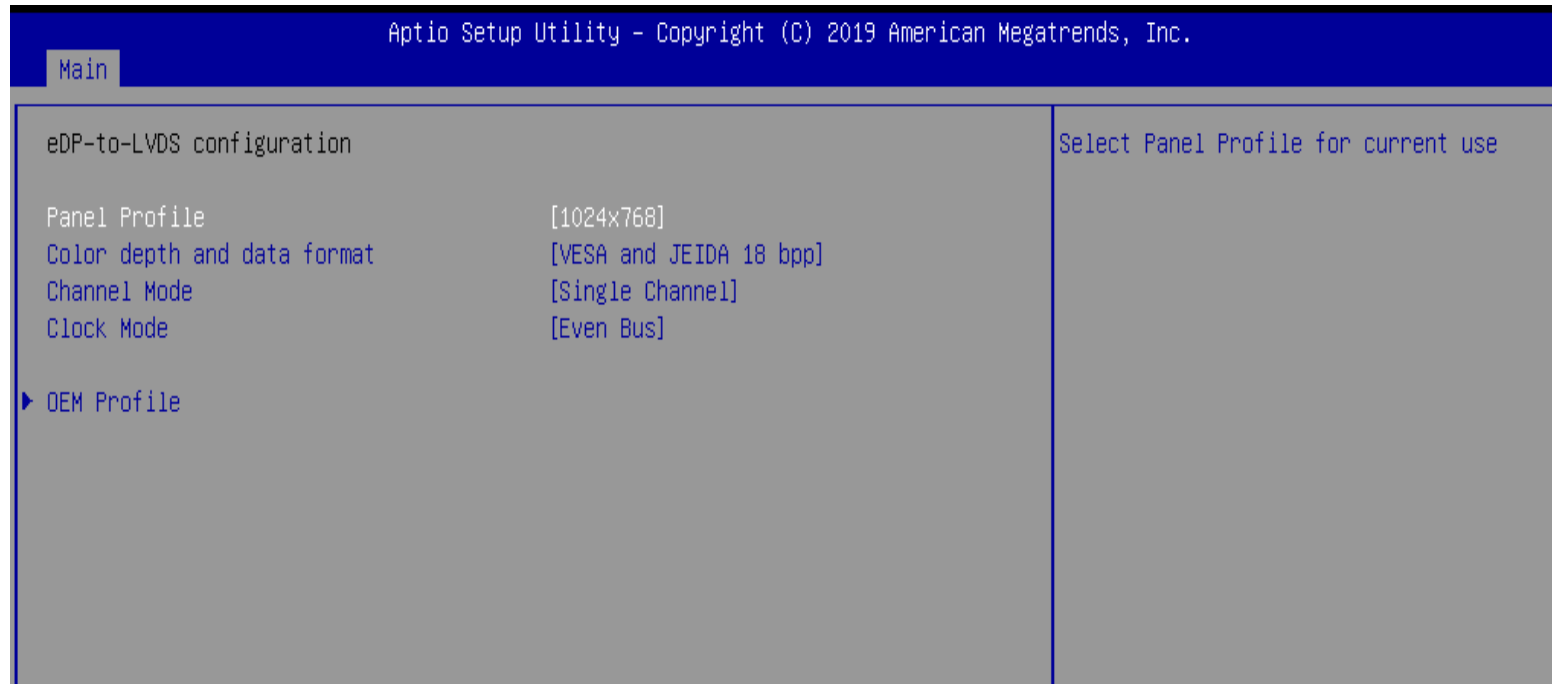
| Feature | Description | Options |
|---------------------------------------|---|--------------------|
| VT-d | VT-d Capability | ★Enabled ,Disabled |
| Above 4GB MMIO BIOS assignment | Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB | ★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

Configuration Graphics Settings



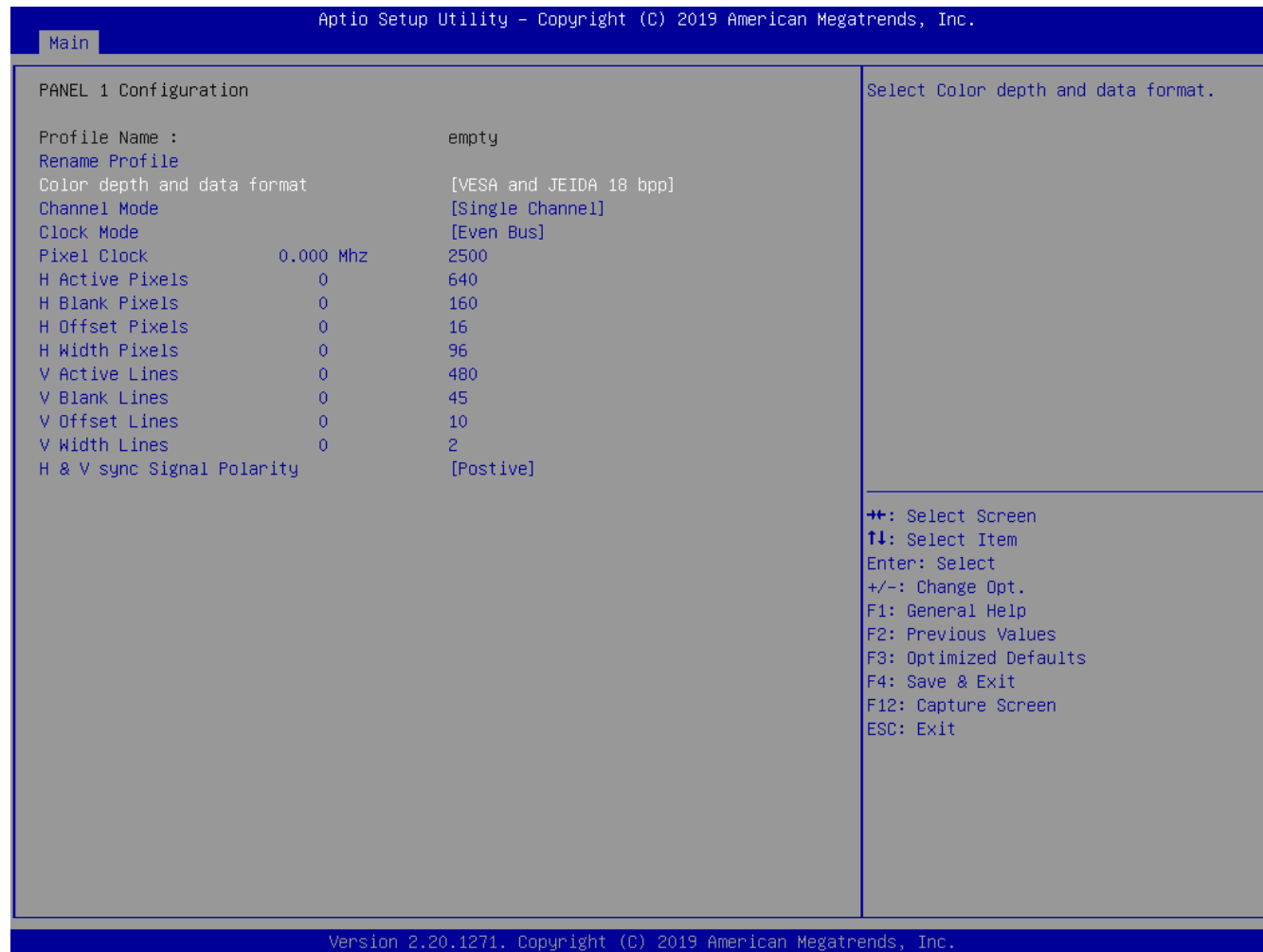
| Feature | Description | Options |
|----------------------------------|---|--------------------------|
| Primary Display | Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx. | ★Auto, IGFX, PEG, PCI |
| Internal Graphics | Keep IGFX enabled based on the setup options. | ★Auto, Disabled, Enabled |
| eDP-to-LVDS configuration | eDP-to-LVDS(PTN3460) | |

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 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

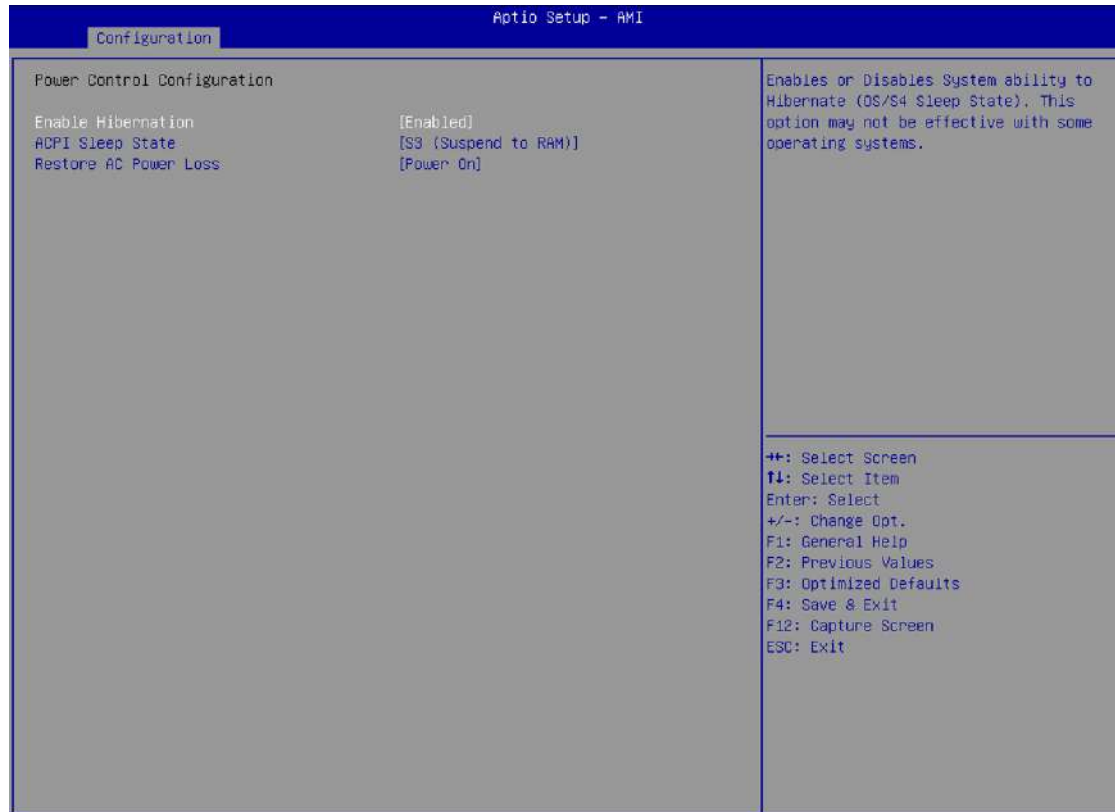
PANEL 1 Configuration



| 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

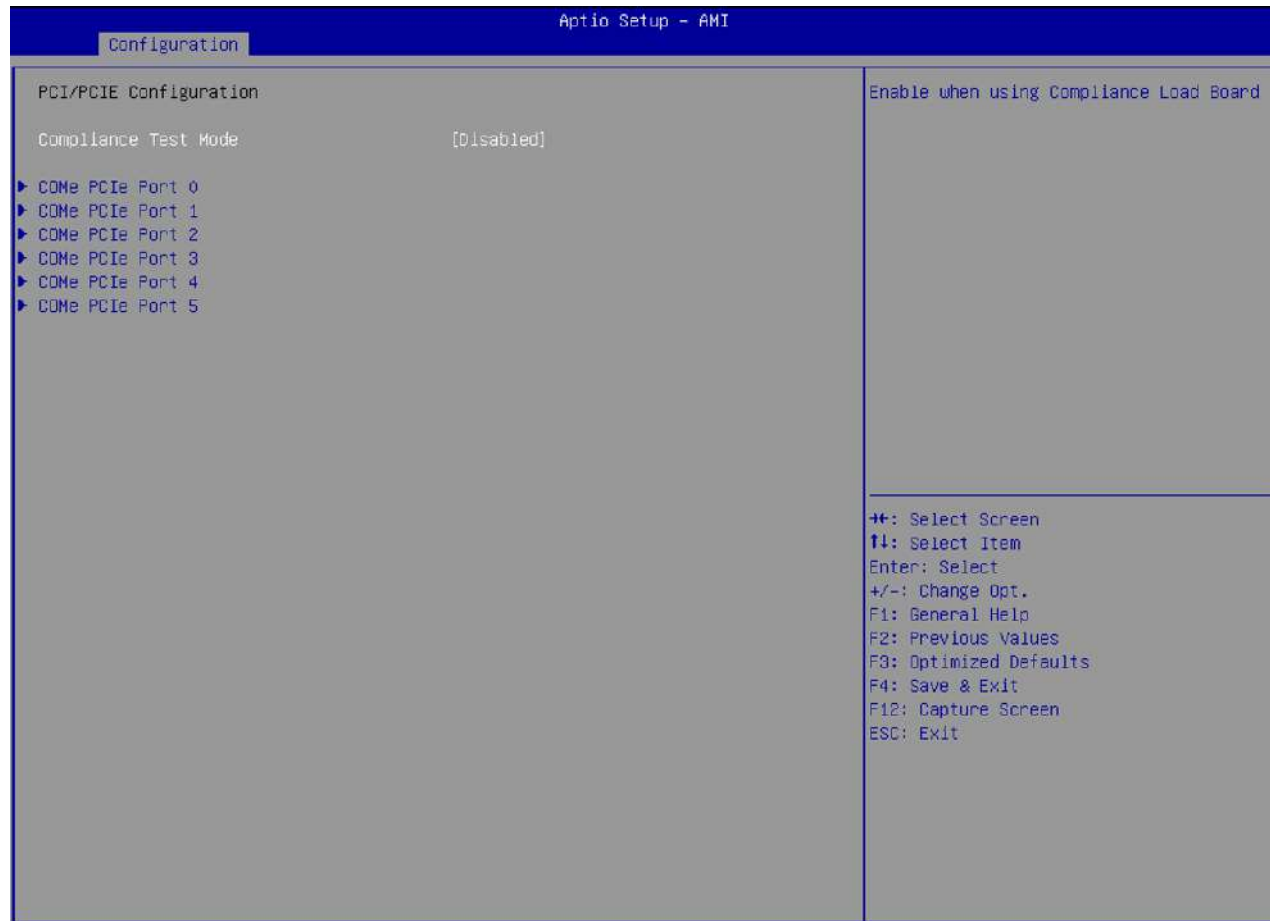
System Power Control Configuration Parameters



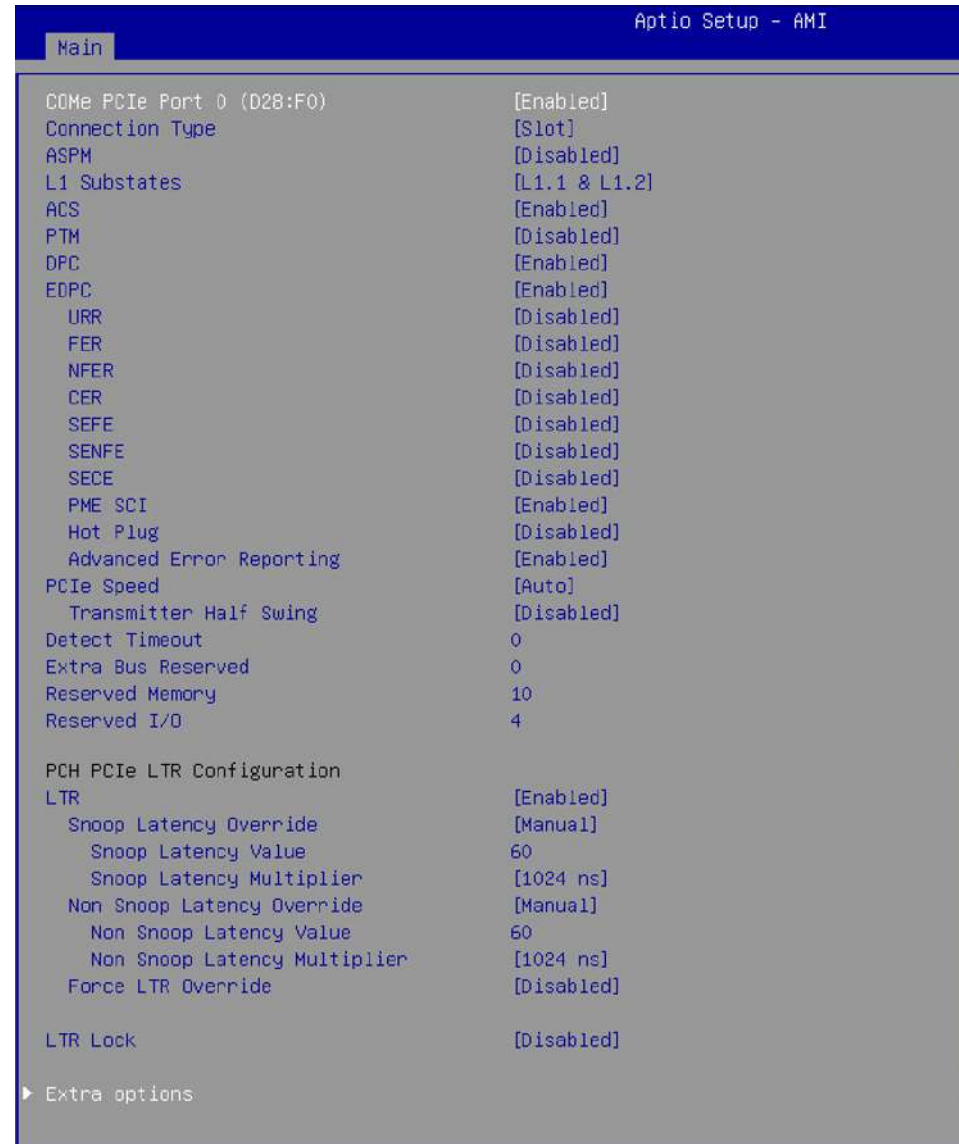
| Feature | Description | Options |
|------------------------------|---|--|
| Enable Hibernation | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. | Disabled, ★Enabled |
| ACPI Sleep State | Select the highest ACPI sleep state the system 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 |

PCI/PCIE Configuration

PCI, PCI Express Settings



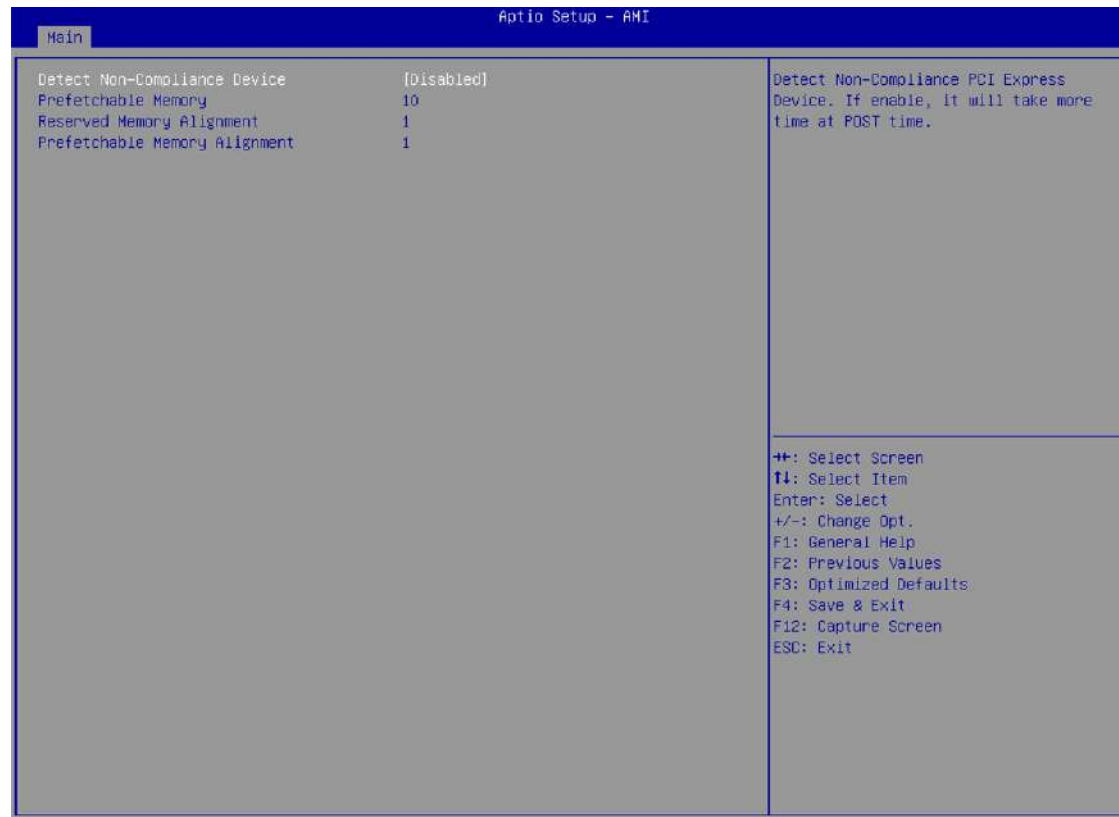
| Feature | Description | Options |
|-----------------------------|---|--------------------|
| Compliance Test Mode | Enable when using Compliance Load Board | ★Disabled, Enabled |
| COMe PCIe Port 0~5 | PCI Express Root Port Settings. | |

COMe PCIe Port

| 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 rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented 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 Substates | PCI Express L1 Substates 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 Rootport 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, Enabled |

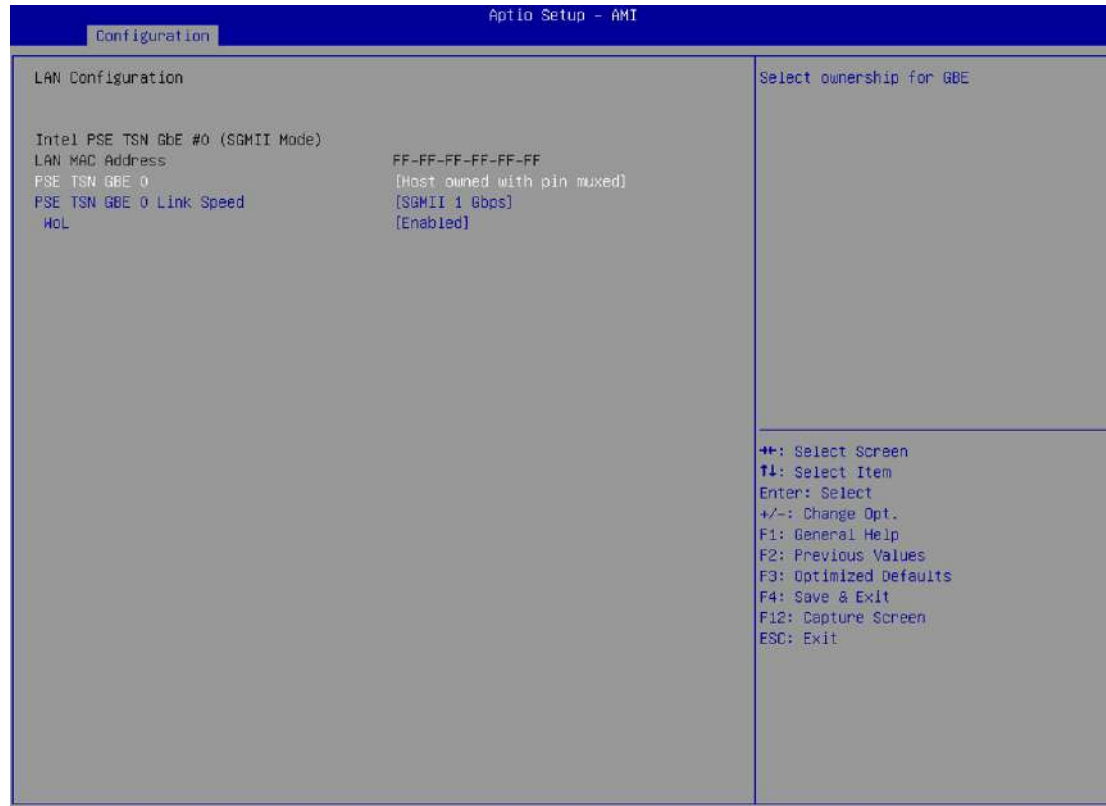
| | | |
|----------------------|---|--------------------|
| | Disabled: LTR override values will not be forced. Enable: LTR override values will be forced and LTR messages from the device will be ignored. | |
| LTR Lock | PCIe LTR Configuration Lock | ★Disabled, Enabled |
| Extra options | PCI Express Root Port extra options. | |

Extra options

| Feature | Description | Options |
|--------------------------------------|---|---------------------|
| Detect Non-Compliance Device | Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time. | ★ Disabled, Enabled |
| Prefetchable Memory | Prefetchable Memory Range for this Root Bridge. | ★ 10 |
| Reserved Memory Alignment | Reserved Memory Alignment (0 – 31 bits) | ★ 1 |
| Prefetchable Memory Alignment | Prefetchable Memory Alignment (0 – 31 bits) | ★ 1 |

LAN Configuration

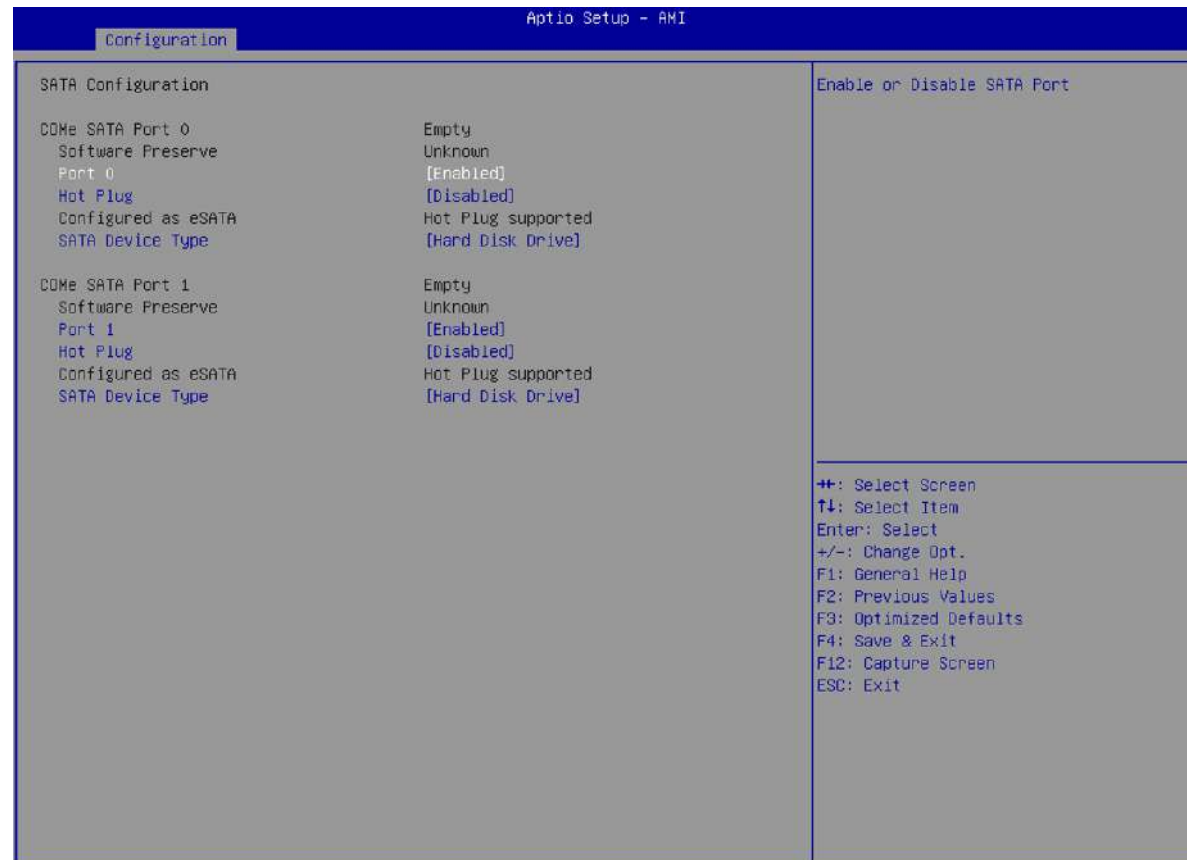
Configuration OnBoard LAN device.



| Feature | Description | Options |
|---------------------------------|---|--|
| PSE TSN GBE 0 | Select ownership for GBE | ★Host owned with pin muxed, PSE 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 |

SATA Configuration

SATA Device Options Settings



| Feature | Description | Options |
|-------------------------|---|-------------------------------------|
| 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

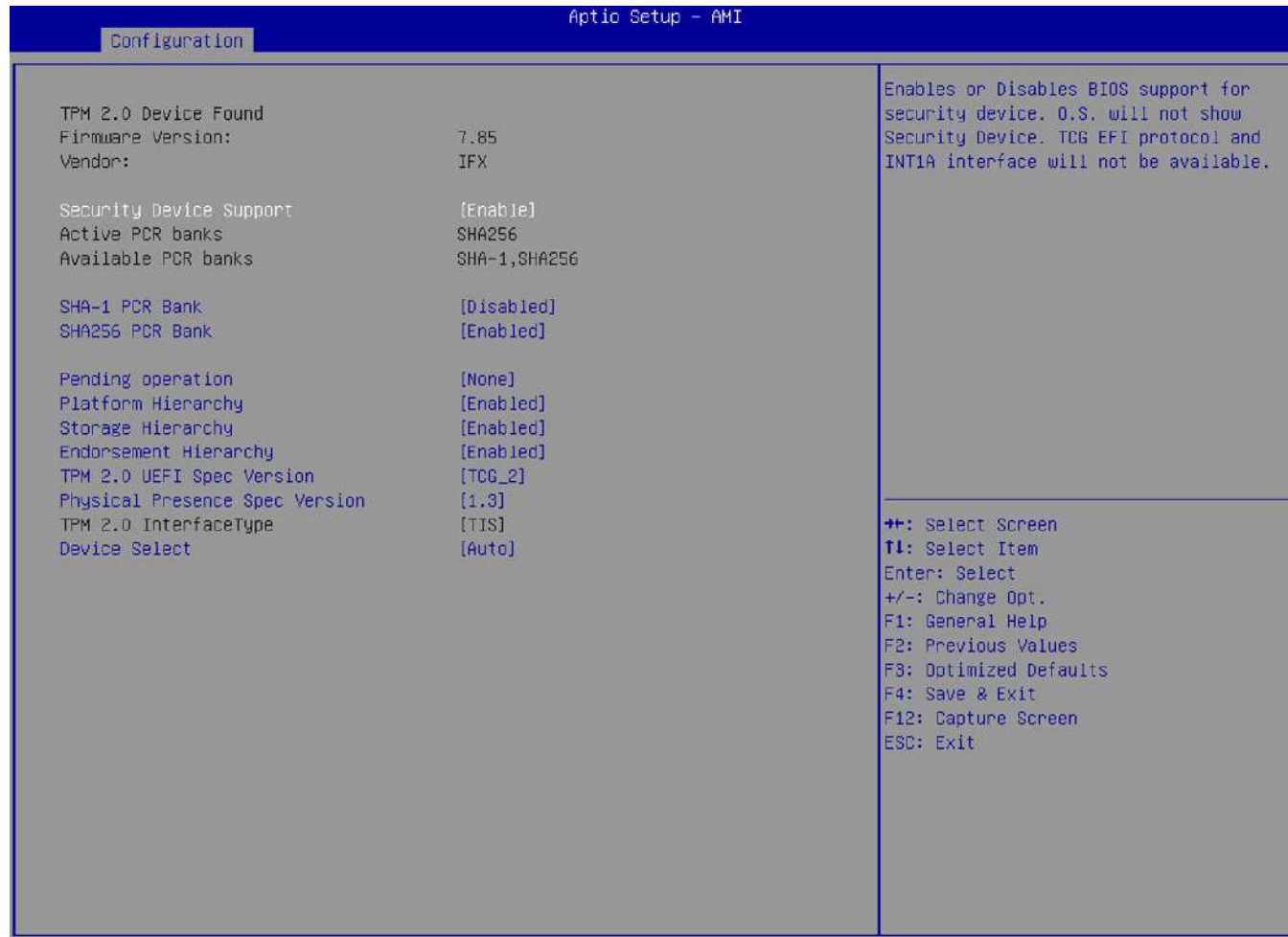
USB Configuration Parameters

| Configuration | | Aptio Setup - AMI |
|------------------------------------|-----------|---|
| USB Configuration | | 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. |
| USB Controllers: | | |
| 1 XHCI | | |
| USB Devices: | | |
| 1 Keyboard | | |
| Legacy USB Support | [Enabled] | |
| XHCI Hand-off | [Enabled] | |
| USB Mass Storage Driver Support | [Enabled] | |
| USB 3.0 Port 0 | [Enabled] | |
| USB 3.0 Port 1 | [Enabled] | |
| USB 2.0 Port 0 | [Enabled] | |
| USB 2.0 Port 1 | [Enabled] | |
| USB 2.0 Port 2 | [Enabled] | |
| USB 2.0 Port 3 | [Enabled] | |
| USB 2.0 Port 4 | [Enabled] | |
| USB 2.0 Port 5 | [Enabled] | |
| USB 2.0 Port 6 | [Enabled] | |
| USB 2.0 Port 7 | [Enabled] | |
| USB hardware delays and time-outs: | | |
| USB transfer time-out | [20 sec] | |
| Device reset time-out | [20 sec] | |
| Device power-up delay | [Manual] | |
| Device power-up delay in seconds | 5 | |
| | | ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F12: Capture Screen ESC: Exit |

| Feature | Description | Options |
|---|--|---------------------------|
| 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 |
| USB 3.0 Port 0~1 | Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS | ★Enabled ,Disabled |
| USB 2.0 Port 0~7 | Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices 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, 5, 10 |
| Device reset time-out | USB mass storage device Start Unit command time-out. | ★20, 10, 30, 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 in seconds | Delay range is 1..40 seconds, in one second increments | ★5 |

TPM Configuration

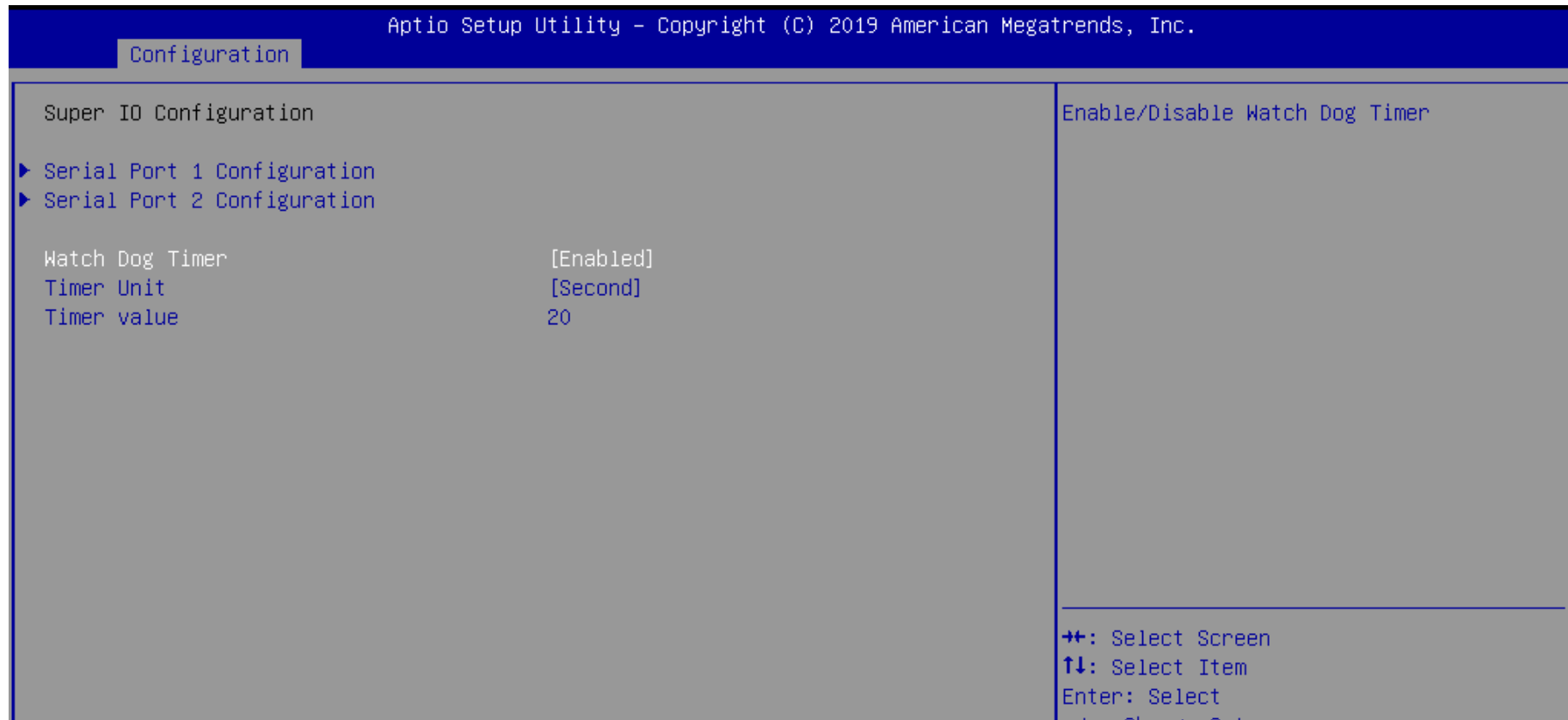
Trusted Computing Setting



| 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. | ★Enabled, Disabled |
| SHA-1 PCR Bank | Enables or Disables SHA-1 PCR Bank. | ★Disabled, Enabled |
| 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

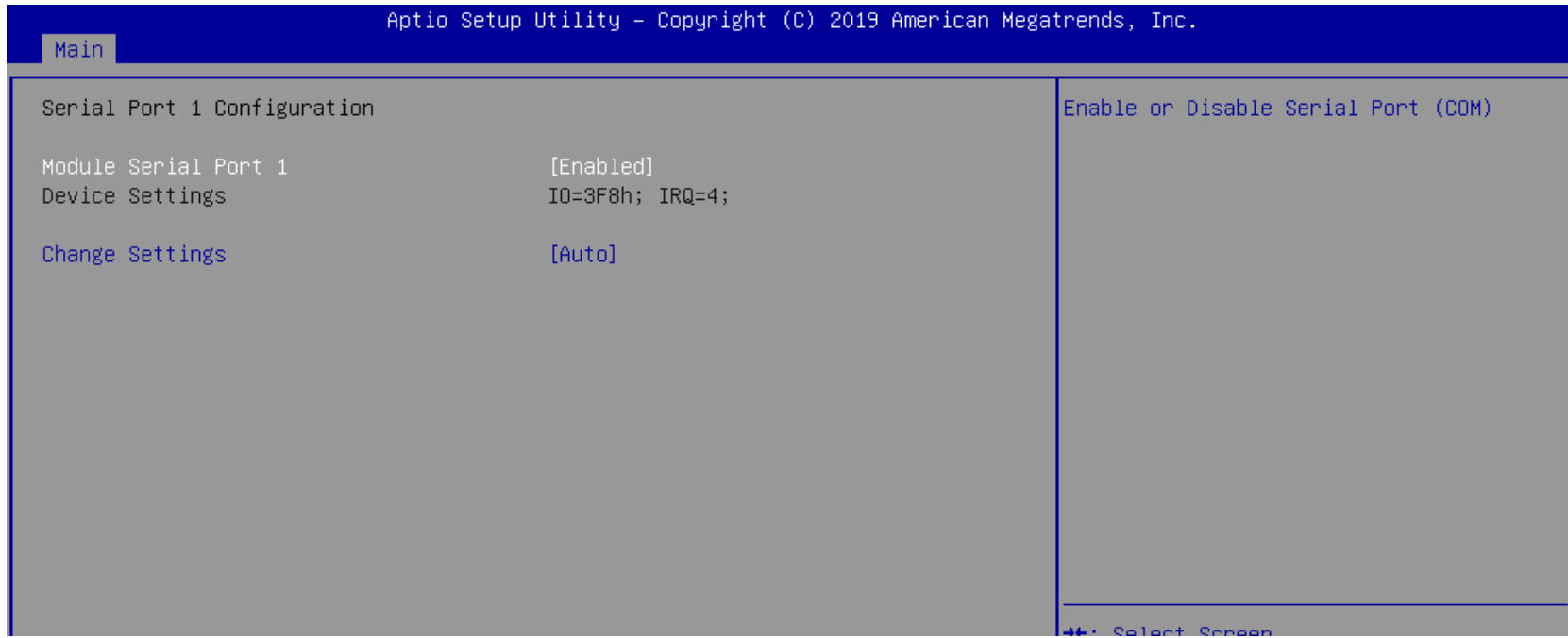
System Super IO Chip Parameters.



| 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

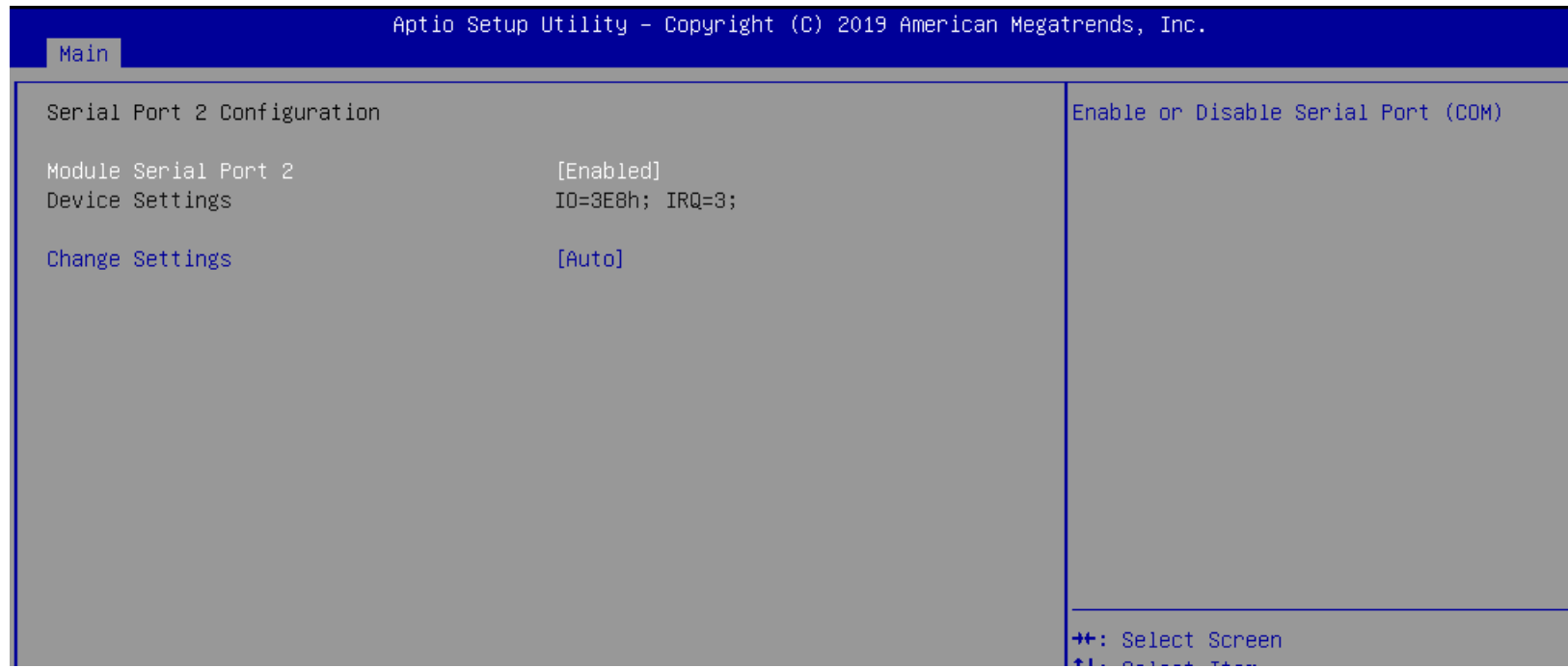
Set Parameters of Serial Port 1



| 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

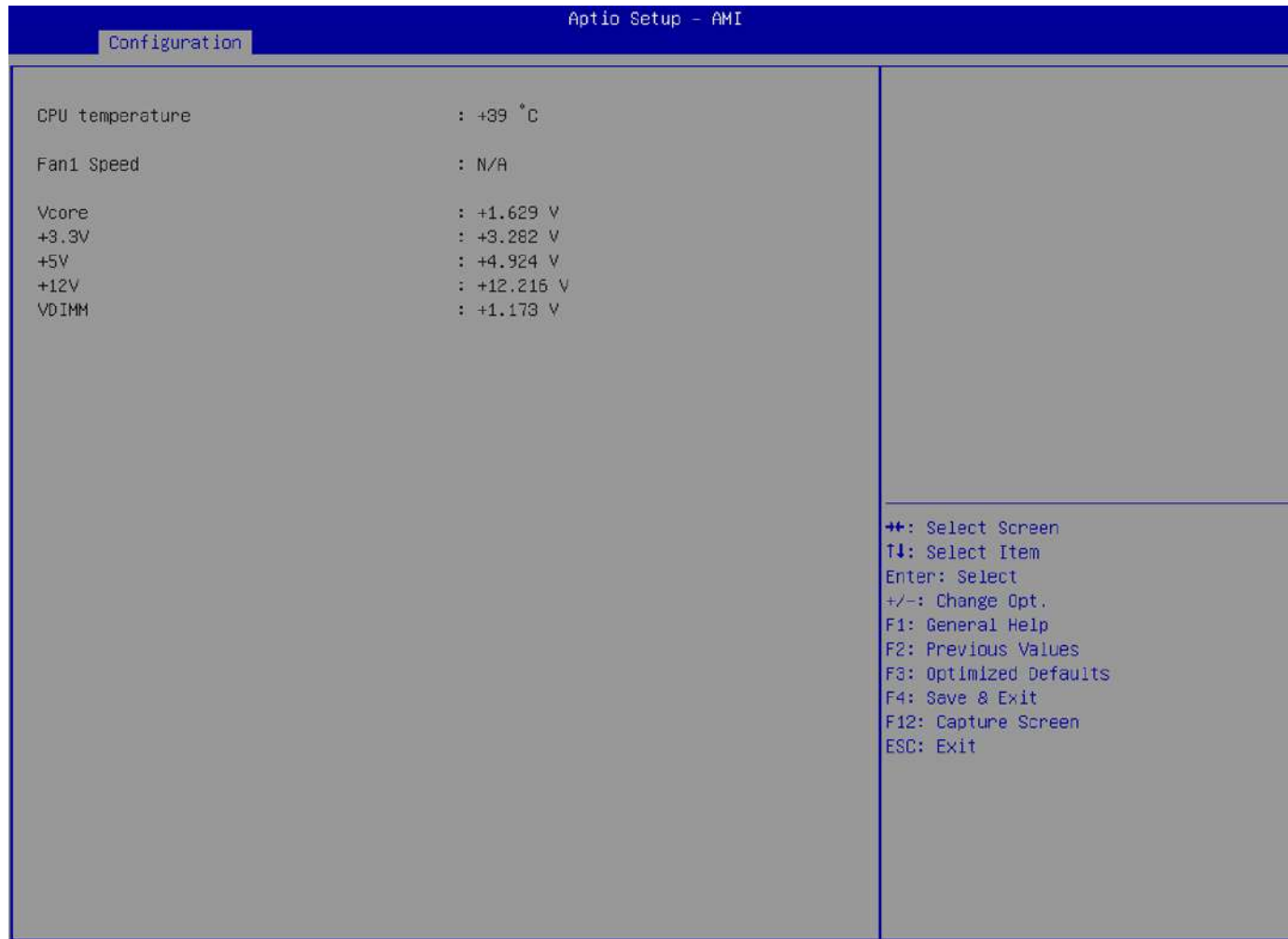
Set Parameters of Serial Port 2



| 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

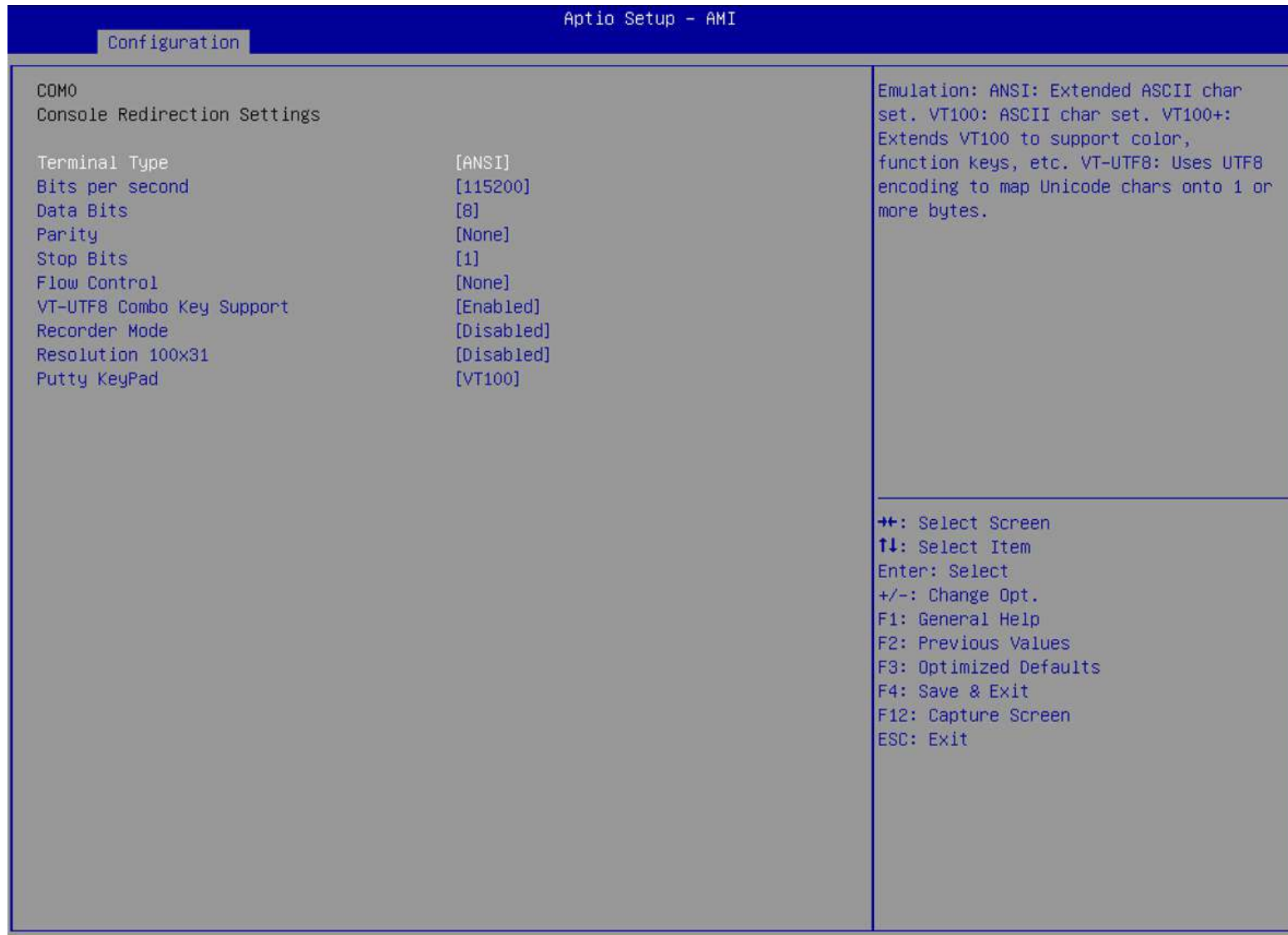


Serial Port Console Redirection

Serial Port Console Redirection

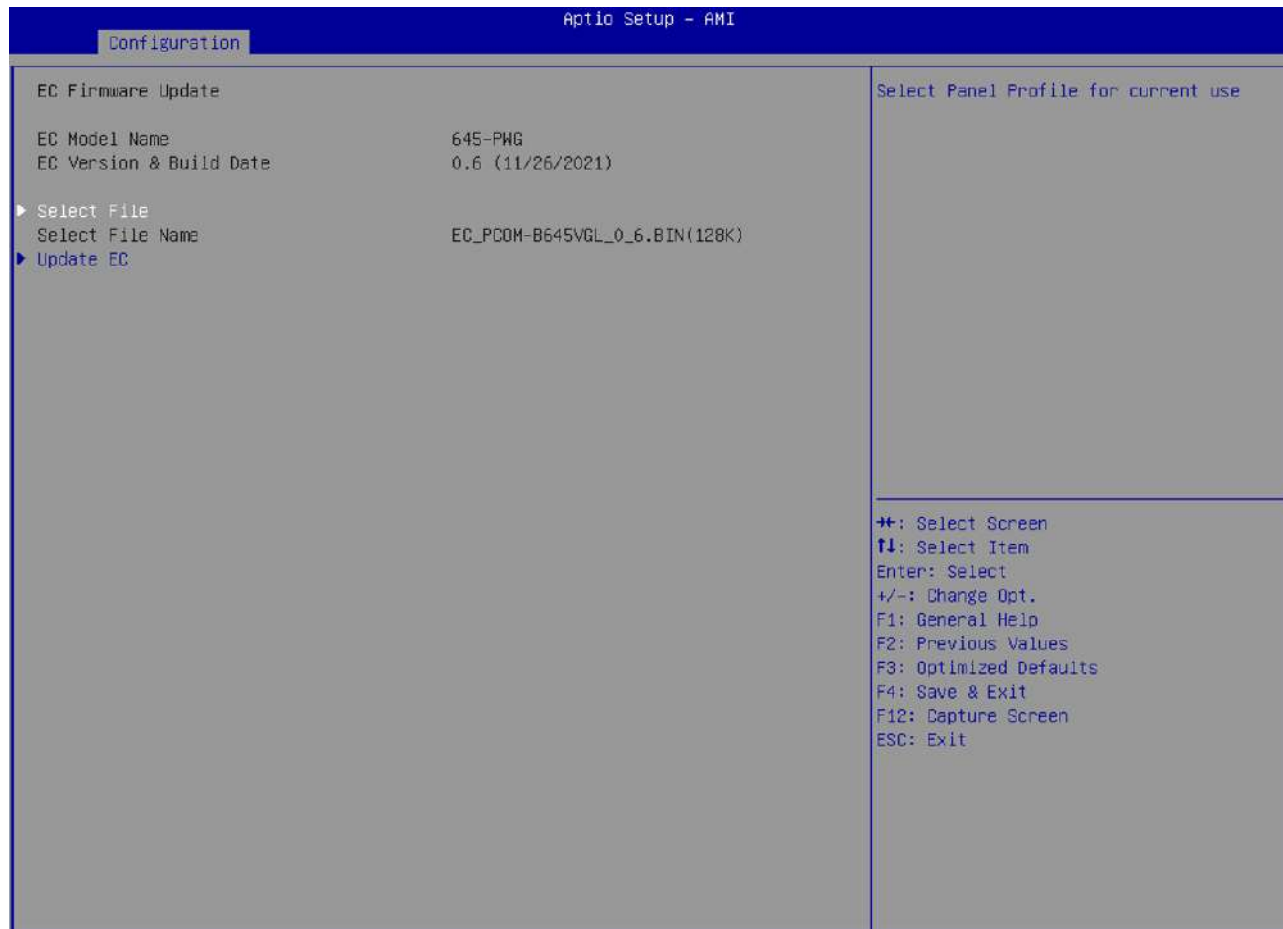


| Feature | Description | Options |
|----------------------------|---------------------------------------|--------------------|
| Console Redirection | Console Redirection Enable or Disable | ★Disabled, Enabled |

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. | ★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-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 |

Aptio Setup - AMI

Configuration

| | | |
|-------------------------|-------------------------------|------------------------|
| EC Firmware Update | | Start update ROM image |
| EC Model Name | 645-PWG | |
| EC Version & Build Date | 0.6 (11/26/2021) | |
| ▶ Select File | | |
| Select File Name | EC_PCOM-B645VGL_0_6.BIN(128K) | |
| ▶ Update EC | | |

Update EC Message

Once choice [OK] will update EC ROM
Notice:Please don't turn off power
during firmware update.

Yes No

: Select Screen
: Select Item
ter: Select
-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F12: Capture Screen
ESC: Exit

Aptio Setup - AMI

Configuration

| | | |
|-------------------------|-------------------------------|------------------------|
| EC Firmware Update | | Start update ROM image |
| EC Model Name | 645-PWG | |
| EC Version & Build Date | 0.6 (11/26/2021) | |
| ▶ Select File | | |
| Select File Name | EC_PCOM-B645VGL_0_6.BIN(128K) | |
| ▶ Update EC | | |

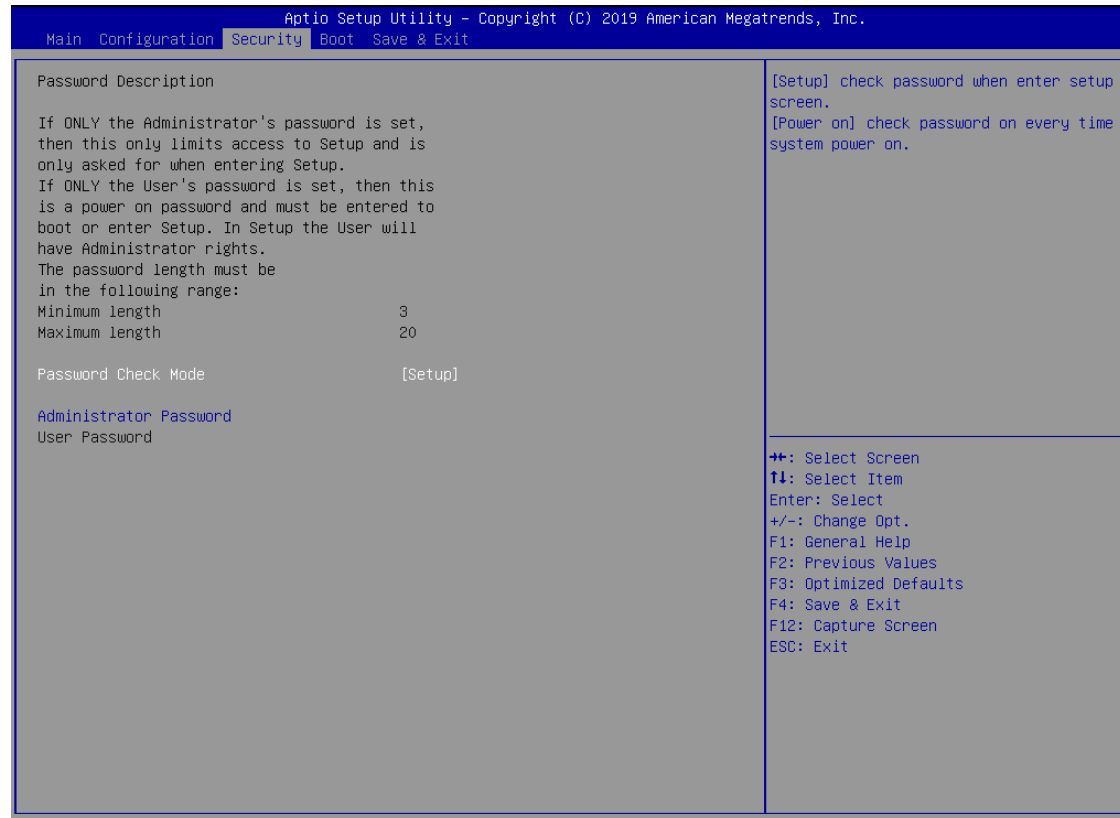
Flash EC Firmware

Please turn off power(G3) by manual , let
EC reload new image !!

OK

: Select Screen
: Select Item
Enter: Select
-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F12: Capture Screen
ESC: Exit

6.2.4 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 | |

6.2.5 Boot

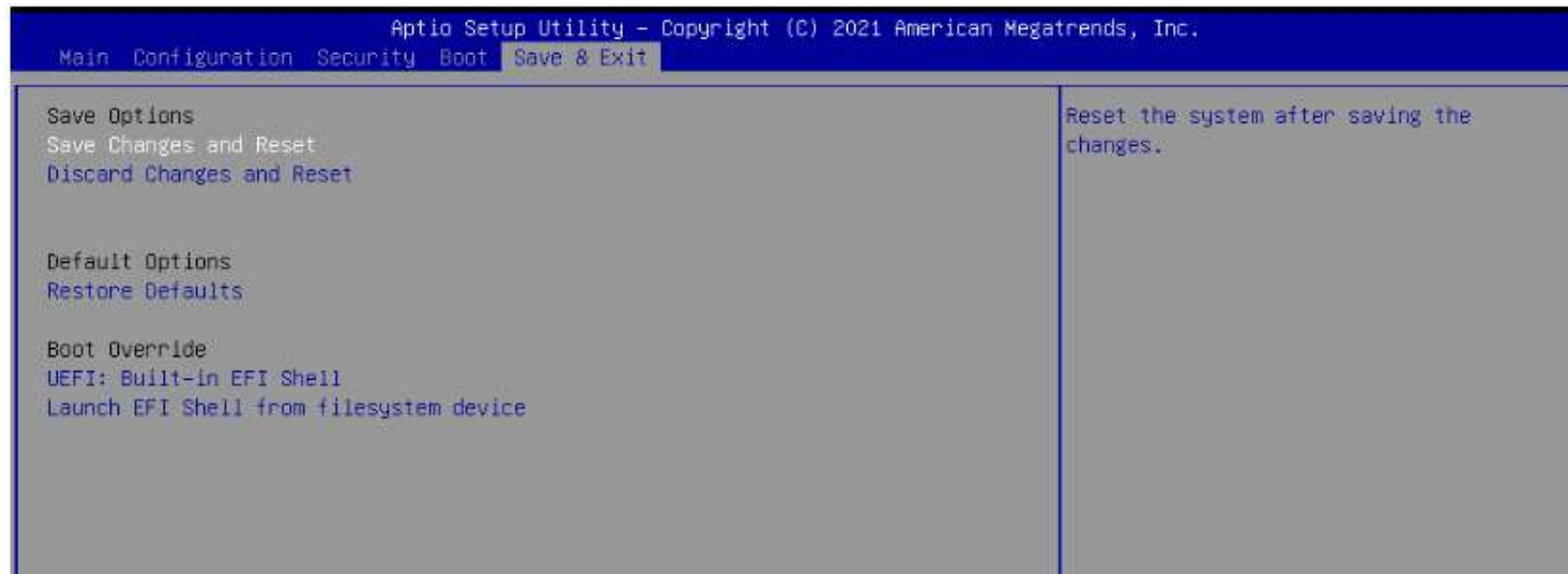
Aptio Setup - AMI

Main Configuration Security **Boot** Save & Exit

| | |
|---|--|
| <p>Boot Configuration</p> <p>Setup Prompt Timeout 1</p> <p>Bootup NumLock State [On]</p> <p>Full Screen LOGO [Disabled]</p> <p>Fast Boot [Enabled]</p> <p>SATA Support [Last Boot SATA Devices Only]</p> <p>NVMe Support [Enabled]</p> <p>VGA Support [EFI Driver]</p> <p>USB Support [Full Initial]</p> <p>PS2 Devices Support [Enabled]</p> <p>Network Stack Driver Support [Disabled]</p> <p>Redirection Support [Disabled]</p> <p>FIXED BOOT ORDER Priorities</p> <p>Boot Option #1 [Hard Disk]</p> <p>Boot Option #2 [NVME]</p> <p>Boot Option #3 [UEFI AP:UEFI: Built-in EFI Shell]</p> <p>Boot Option #4 [CD/DVD]</p> <p>Boot Option #5 [USB Device:UEFI: JetFlashTranscen...]</p> <p>Boot Option #6 [Network]</p> <p>▶ UEFI Application Boot Priorities</p> <p>▶ UEFI USB Drive BBS Priorities</p> | <p>Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.</p> <hr/> <p>↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F12: Capture Screen ESC: Exit</p> |
|---|--|

| Feature | Description | Options |
|---|---|--|
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting. | ★1 |
| BootupNumLockState | 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 |
| SATA Support | If Last Boot SATA Devices Only, Only last boot SATA device will be available in Post. If All SATA Devices, all SATA devices will be available in OS and Post. | ★Last Boot SATA Devices Only, All SATA Devices |
| NVMe Support | If Disabled, NVMe device will be skipped. | ★Enabled, Disabled |
| VGA Support | | ★EFI Driver |
| USB Support | If Disabled, all USB devices will NOT be available until after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Enabled, all USB devices will be available in OS and Post. | ★Full Initial, Partial Initial, Disabled |
| PS2 Devices Support | If Disabled, PS2 devices will be skipped. | ★Enabled, Disabled |
| Network Stack Driver Support | If Disabled, NetWork Stack Driver will be skipped. | ★Disabled, Enabled |
| Redirection Support | If disable, Redirection function will be disabled. | ★Disabled, Enabled |
| Boot Option # | Sets the system boot order | Hard Disk NVME UEFI AP: UEFI: Built-in EFI Shell CD/DVD USB Device Network Disabled |
| Hard Drive BBS Priorities | Set the order of the legacy devices in this group. | |
| UEFI Application Boot Priorities | Specifies the Boot Device Priority sequence from available UEFI Application | |

6.2.6 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 | 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-B645?

Step1. Please visit web site of [Portwell download center](https://www.portwell.com.tw/support-center/download-center/) as below hyperlink

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

Step2. Select “[Search download](#)” and type the keyword “[PCOM-B645](#)”.

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 SHELL mode. Then execute the “[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.

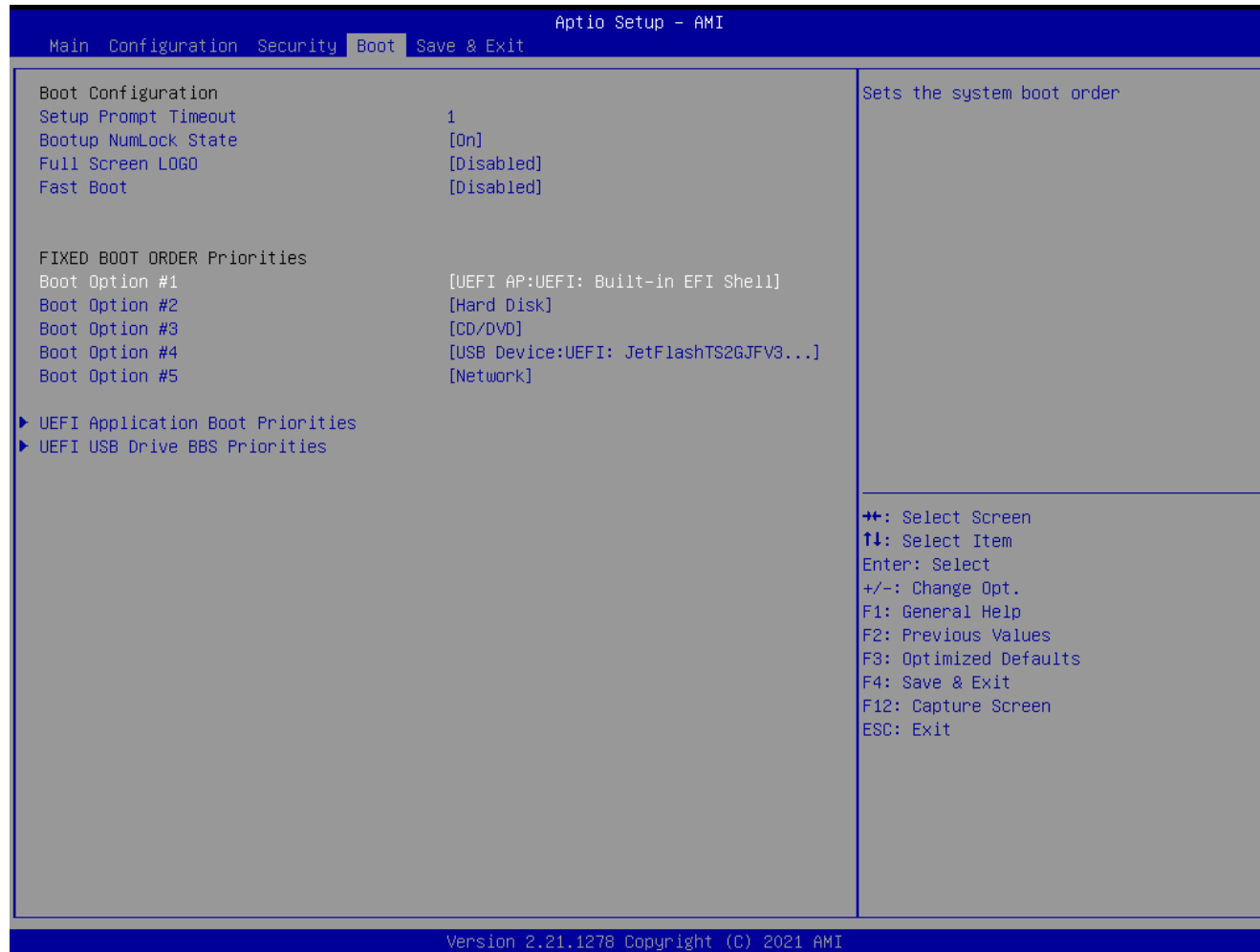
Step6. When you see the “[Programming success](#)” message, which means the BIOS update processes finished. Please cut the AC power off and [wait for 10 seconds](#) before powering on

Please refer to the following steps in detail.

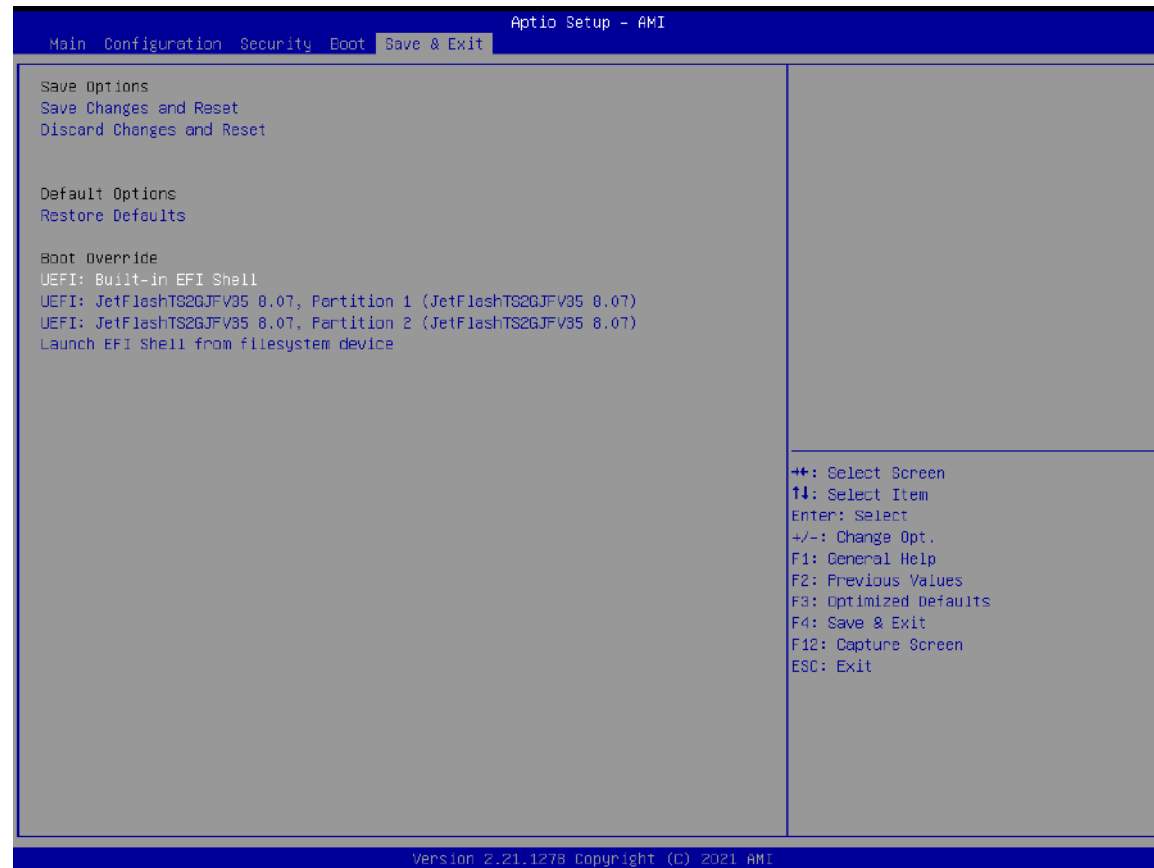
Step 1. Prepare a USB DOK.

Step 2. Unzip update file to the USB DOK.

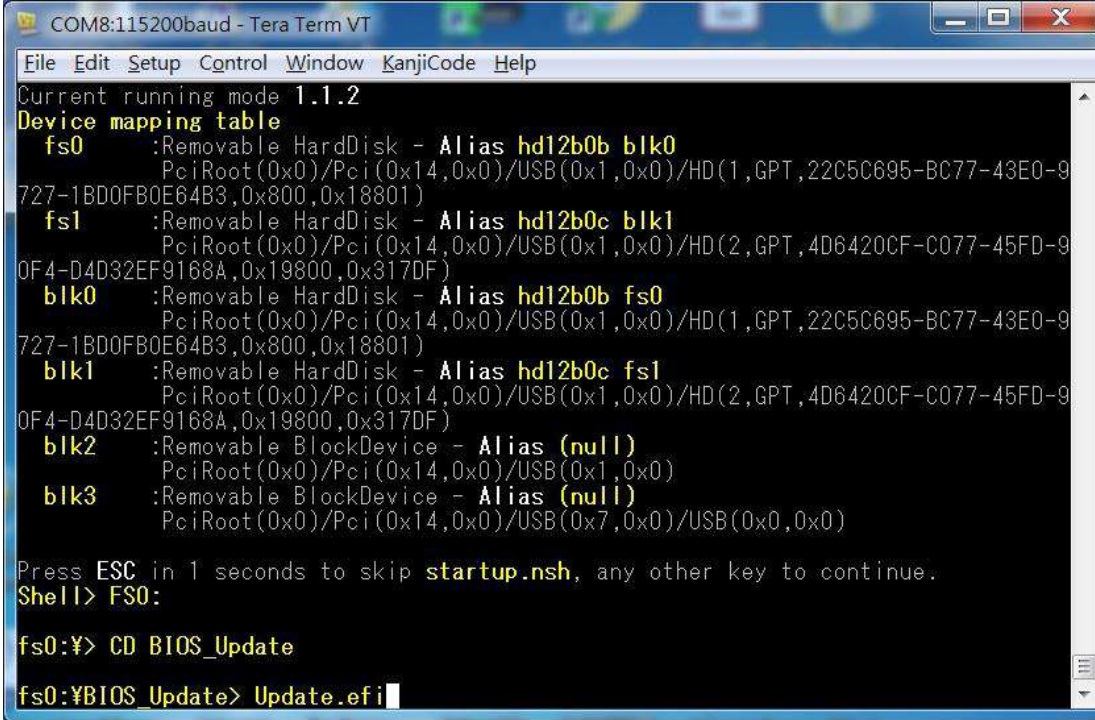
Step 3. Select UEFI: Built-in EFI Shell in the BIOS boot menu and save, then restarts the system.



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



Step 5. Under the UEFI shell, direct to your USB DOK, below is an example uses fs0. Then direct to the folder with updated file and type command: "update" and press enter.

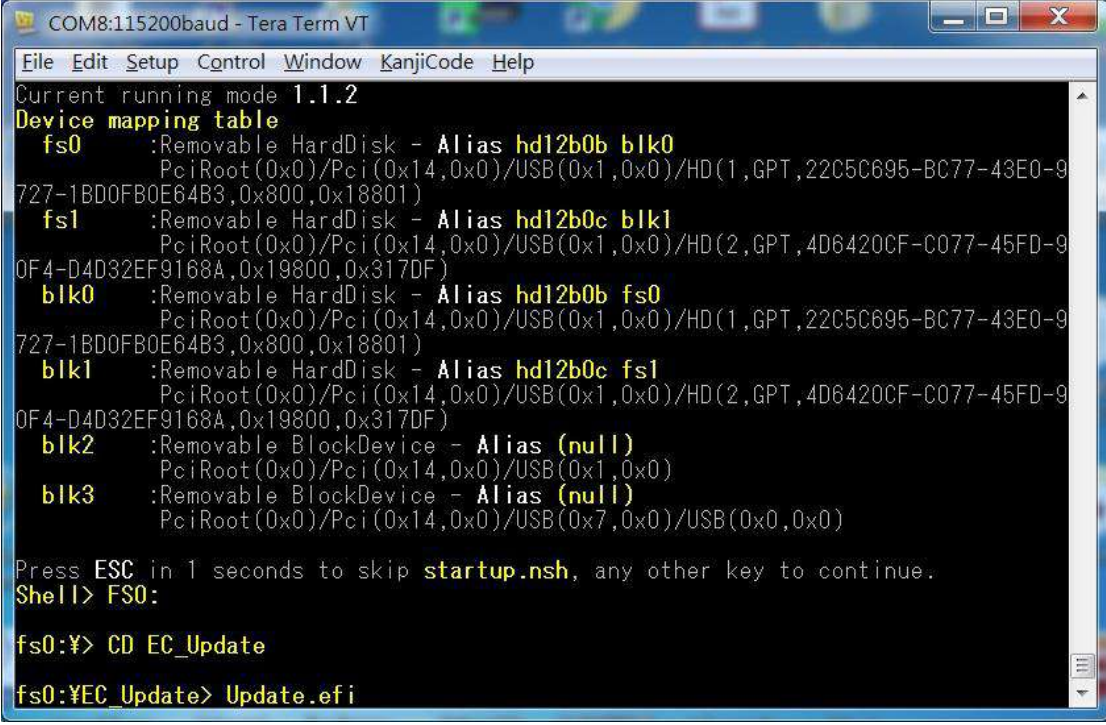


```
COM8:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
Current running mode 1.1.2
Device mapping table
fs0      :Removable HardDisk - Alias hd12b0b blk0
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(1,GPT,22C5C695-BC77-43E0-9
          727-1BD0FB0E64B3,0x800,0x18801)
fs1      :Removable HardDisk - Alias hd12b0c blk1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(2,GPT,4D6420CF-C077-45FD-9
          0F4-D4D32EF9168A,0x19800,0x317DF)
blk0     :Removable HardDisk - Alias hd12b0b fs0
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(1,GPT,22C5C695-BC77-43E0-9
          727-1BD0FB0E64B3,0x800,0x18801)
blk1     :Removable HardDisk - Alias hd12b0c fs1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(2,GPT,4D6420CF-C077-45FD-9
          0F4-D4D32EF9168A,0x19800,0x317DF)
blk2     :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)
blk3     :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x7,0x0)/USB(0x0,0x0)

Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> FS0:

fs0:¥> CD BIOS_Update
fs0:¥BIOS_Update> Update.efi
```

(BIOS File Update)



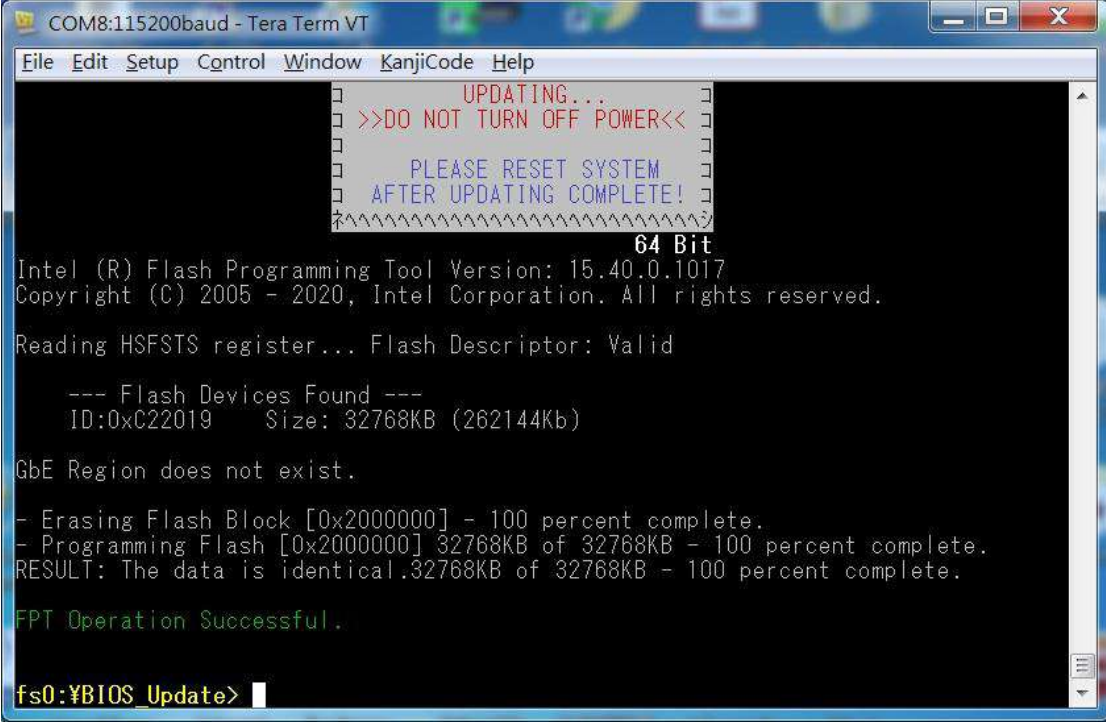
```
COM8:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
Current running mode 1.1.2
Device mapping table
fs0      :Removable HardDisk - Alias hd12b0b blk0
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(1,GPT,22C5C695-BC77-43E0-9
          727-1BD0FB0E64B3,0x800,0x18801)
fs1      :Removable HardDisk - Alias hd12b0c blk1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(2,GPT,4D6420CF-C077-45FD-9
          0F4-D4D32EF9168A,0x19800,0x317DF)
blk0     :Removable HardDisk - Alias hd12b0b fs0
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(1,GPT,22C5C695-BC77-43E0-9
          727-1BD0FB0E64B3,0x800,0x18801)
blk1     :Removable HardDisk - Alias hd12b0c fs1
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/HD(2,GPT,4D6420CF-C077-45FD-9
          0F4-D4D32EF9168A,0x19800,0x317DF)
blk2     :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)
blk3     :Removable BlockDevice - Alias (null)
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0x7,0x0)/USB(0x0,0x0)

Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> FS0:

fs0:¥> CD EC_Update
fs0:¥EC_Update> Update.efi
```

(EC File Update)

Step 6. The updating process will start and you can see the updating progress. Once finished, please power off and restart the system.



The screenshot shows a terminal window titled "COM8:115200baud - Tera Term VT". The window contains the following text:

```
File Edit Setup Control Window KanjiCode Help
        UPDATING...
        >>>DO NOT TURN OFF POWER<<<
        PLEASE RESET SYSTEM
        AFTER UPDATING COMPLETE!
        ~~~~~
                          64 Bit
Intel (R) Flash Programming Tool Version: 15.40.0.1017
Copyright (C) 2005 - 2020, Intel Corporation. All rights reserved.

Reading HSFSTS register... Flash Descriptor: Valid

--- Flash Devices Found ---
ID:0xC22019   Size: 32768KB (262144Kb)

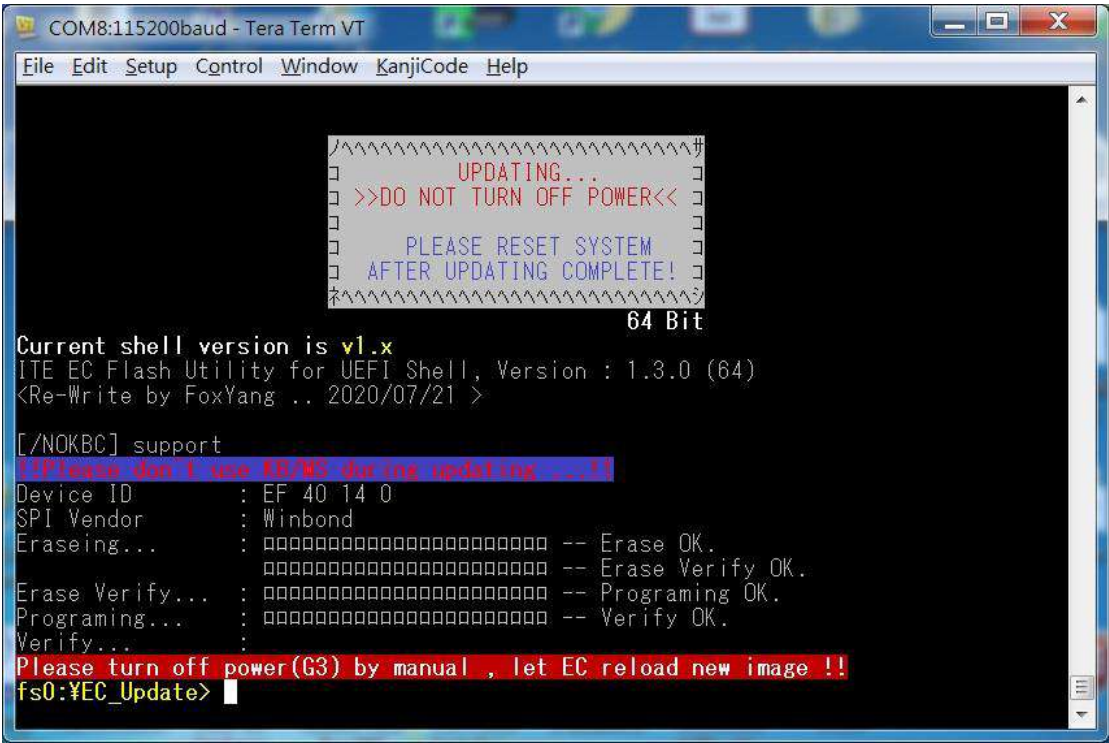
GbE Region does not exist.

- Erasing Flash Block [0x2000000] - 100 percent complete.
- Programming Flash [0x2000000] 32768KB of 32768KB - 100 percent complete.
RESULT: The data is identical.32768KB of 32768KB - 100 percent complete.

FPT Operation Successful.

fs0:¥BIOS_Update> |
```

(BIOS updating progress)



(EC updating progress)

8. PORTWELL Software Tool

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>