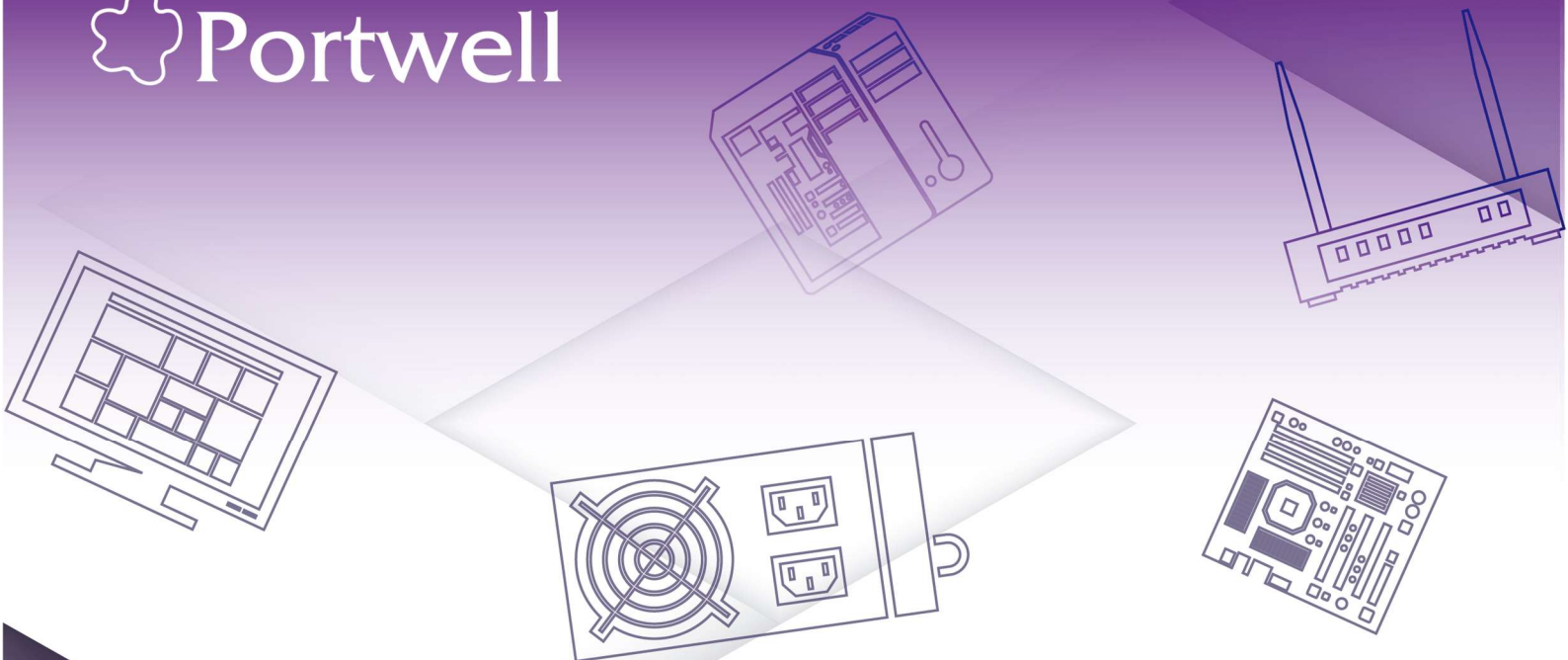




# PCOM-B885 Series

COM HPC Client Size C

## User Manual

Version R 0.3

## Copyright

The documentation and the software included with this product are copyrighted 2024 by Portwell. All rights are reserved. Portwell reserves the right to make improvements to the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of Portwell. The information provided in this manual is intended to be accurate and reliable. However, Portwell assumes no responsibility for its use, nor for any infringements of the rights of third parties that may result from its use.

## Revision History

| Rev. | Date      | Note                                           |
|------|-----------|------------------------------------------------|
| 0.1  | Mar. 2024 | Preliminary release                            |
| 0.2  | Nov. 2024 | Add BIOS menu                                  |
| 0.3  | May 2025  | Modify PCIe Lane Configuration and USB3.2 Gen2 |

# Table of Content

|                                          |    |
|------------------------------------------|----|
| 1. INTRODUCTION .....                    | 10 |
| 1.1. PCOM-B885 SKU LIST .....            | 11 |
| 2. BLOCK DIAGRAM.....                    | 14 |
| 3. SPECIFICATION.....                    | 16 |
| 3.1. USB 3.2 GEN2 X1 COMPATIBILITY ..... | 17 |
| 3.2. MEMORY POPULATION RULES.....        | 17 |
| 3.3. SUPPORTED OPERATING SYSTEM.....     | 18 |
| 3.4. WINDOWS OS DRIVER.....              | 19 |
| 3.5. ELECTRICAL CHARACTERISTICS .....    | 19 |
| 3.6. POWER CONSUMPTION .....             | 22 |
| 3.7. MECHANICAL DIMENSION.....           | 25 |
| 3.8. ENVIRONMENTAL SPECIFICATIONS .....  | 27 |
| 4. THERMAL SOLUTION .....                | 30 |
| 5. PIN OUT TABLE.....                    | 33 |
| 6. SYSTEM RESOURCE .....                 | 44 |
| 7. BIOS SETUP ITEMS.....                 | 46 |

|        |                                |    |
|--------|--------------------------------|----|
| 7.1.   | INTRODUCTION.....              | 46 |
| 7.2.   | HOW TO ENTER BIOS SETUP.....   | 46 |
| 7.3.   | BIOS SETUP.....                | 47 |
| 7.3.1. | Main .....                     | 47 |
| 7.3.2. | Configuration .....            | 49 |
| 7.3.3. | Security .....                 | 73 |
| 7.3.4. | Boot.....                      | 76 |
| 7.3.5. | Save & Exit .....              | 77 |
| 7.3.6. | MEBx .....                     | 78 |
| 8.     | BIOS / EC UPDATE.....          | 80 |
| 9.     | PORTWELL SOFTWARE TOOL.....    | 89 |
| 10.    | PACKAGING INFORMATION.....     | 91 |
| 11.    | INDUSTRIAL SPECIFICATION ..... | 93 |

# List of Table

|                                                        |    |
|--------------------------------------------------------|----|
| Figure 1 Block Diagram.....                            | 14 |
| Figure 2 PCOM-B885 Power on sequence .....             | 19 |
| Figure 3 Input Power Sequencing .....                  | 21 |
| Figure 4 Mechanical Dimension - Top .....              | 25 |
| Figure 5 Mechanical Dimension – Bottom .....           | 26 |
| Figure 6 Cooler (1U / 95w) mechanical dimension .....  | 30 |
| Figure 7 Cooler (2U / 125w) mechanical dimension ..... | 31 |
| Figure 8 Heatspreader mechanical dimension .....       | 31 |

# List of Figure

|                                                        |    |
|--------------------------------------------------------|----|
| Figure 1 Block Diagram.....                            | 14 |
| Figure 2 PCOM-B885 Power on sequence .....             | 19 |
| Figure 3 Input Power Sequencing .....                  | 21 |
| Figure 4 Mechanical Dimension - Top .....              | 25 |
| Figure 5 Mechanical Dimension – Bottom .....           | 26 |
| Figure 6 Cooler (1U / 95w) mechanical dimension .....  | 30 |
| Figure 7 Cooler (2U / 125w) mechanical dimension ..... | 31 |
| Figure 8 Heatspreader mechanical dimension .....       | 31 |

# Disclaimer

## Warranty

PORTWELL tries to procure that this user manual and our product features are correct and reliable, but in any condition, PORTWELL provides no express or implied warranty and guaranty regard to this user manual or any other product information.

PORTWELL shall not be liable for loss of revenues or profits, inconveniences, expenses for substitute equipment or service, storage charges, loss or corruption of data, or any other special, incidental or consequential damage caused by the use or misuse of or inability to use the PORTWELL products, regardless of the legal theory on which the claim is based, and even if PORTWELL has been advised of the possibility of such damages.

The information contained within this user manual, including but not limited to any other product specification, PORTWELL reserves its right to modify them at any time without notice.

## Trademarks

All product names, logos, brands, trademarks and registered trademarks in this user's manual or the PORTWELL website are the property of their respective owners.

## Certification

PORTWELL is certified to ISO 9001:2008 standard.



## Technical Support

PORTWELL technicians and engineers are committed to providing the best possible technical support for our customers so that our products can be easily used and implemented.

We request that you first visit our website at <http://www.PORTWELL.com.tw/support/> for the latest documentation, utilities and drivers, which have been made available to assist you. If you still require assistance after visiting our website, you can contact our technical support department by email at [tsd@mail.PORTWELL.com.tw](mailto:tsd@mail.PORTWELL.com.tw) for further assistance

# Chapter 1

## Overview

- 1 Introduction
- 1.1 PCOM-B885GT SKU List

# 1. Introduction

PCOM-B885 is COM-HPC module based on Intel® 13th/14th Core™ platform. It is compatible with COM-HPC 1.15 standard. The platform adopts Intel 7 lithography and VNNI instruction set, offers advance computing power with 35~65W thermal and embedded use condition for wide range application. PCOM-B885 supports PCIe Gen5 x16 lanes, and 4x ECC/Non-ECC DDR5 SO-DIMM(memory capacity up to 192GB), which is suit for mission critical use conditions and AI edge computing. This module also provides 4x PCIe Gen4 x4, 2x PCIe Gen3 x4, 1x PCIe Gen3 x2, 4x USB 3.2 Gen2 x1, and 2x SATA. The complete and flexible I/O capacity also mapped to wide range of industrial applications.

## 1.1. PCOM-B885 SKU List

| PCOM-B885                           |      |            |         |       |           |                |                           |       |                |                 |
|-------------------------------------|------|------------|---------|-------|-----------|----------------|---------------------------|-------|----------------|-----------------|
| COM HPC Client Size C (160 x 120mm) |      |            |         |       |           |                |                           |       |                |                 |
| CPU SKU                             | TDP  | Core (P+E) | Threads | Cache | Base Freq | Max Turbo Freq | Max Memory MT/s           | ECC   | vPro           | PEG Bifurcation |
| i9-14900                            | 65 W | 8 + 16     | 32      | 36 MB | 2.0 Ghz   | 5.8 Ghz        | 3600 MT/s<br>(4x SO-DIMM) | R680E | R680E<br>Q670E | R680E<br>Q670E  |
| i9-14900T                           | 35 W | 8 + 16     | 32      | 36 MB | 1.1 Ghz   | 5.5 Ghz        |                           |       |                |                 |
| i7-14700                            | 65 W | 8 + 12     | 28      | 33 MB | 2.1 Ghz   | 5.4 Ghz        |                           |       |                |                 |
| i7-14700T                           | 35 W | 8 + 12     | 28      | 33 MB | 1.3 Ghz   | 5.2 Ghz        |                           |       |                |                 |
| i5-14500                            | 65 W | 6 + 8      | 20      | 24 MB | 2.6 Ghz   | 5.0 Ghz        |                           | N/A   | N/A            |                 |
| i5-14500T                           | 35 W | 6 + 8      | 20      | 24 MB | 1.7 Ghz   | 4.8 Ghz        |                           |       |                |                 |
| i5-14400                            | 65 W | 6 + 4      | 16      | 20 MB | 2.5 Ghz   | 4.7 Ghz        |                           |       |                |                 |
| i5-14400T                           | 35 W | 6 + 4      | 16      | 20 MB | 1.5 Ghz   | 4.5 Ghz        |                           |       |                |                 |
| i3-14100                            | 60 W | 4 + 0      | 8       | 12 MB | 3.5 Ghz   | 4.7 Ghz        |                           | R680E | N/A            |                 |
| i3-14100T                           | 35 W | 4 + 0      | 8       | 12 MB | 2.7 Ghz   | 4.4 Ghz        |                           |       |                |                 |
| Processor 300                       | 46 W | 2 + 0      | 4       | 6 MB  | 3.9 Ghz   | 3.9 Ghz        |                           |       |                |                 |
| Processor 300T                      | 35 W | 2 + 0      | 4       | 6 MB  | 3.4 Ghz   | 3.4 Ghz        |                           |       |                |                 |

Table 1 PCOM-B885 CPU Support List

|                        |                                                     |                                                     |  |
|------------------------|-----------------------------------------------------|-----------------------------------------------------|--|
| Series                 | PCOM-B885                                           |                                                     |  |
| Ordering P/N           | AB1-3R22                                            | AB1-3R23                                            |  |
| CPU/PCH Specifications |                                                     |                                                     |  |
| Processor              | Socket Type                                         | Socket Type                                         |  |
| PCH                    | R680E                                               | Q670E                                               |  |
| TDP Range              | 35 ~ 65 W                                           | 35 ~ 65 W                                           |  |
| Temperature Range      | 0 ° C ~ 60 ° C                                      | 0 ° C ~ 60 ° C                                      |  |
| Memory Specifications  |                                                     |                                                     |  |
| Capacity               | 4x SO-DIMM (192GB)                                  | 4x SO-DIMM (192GB)                                  |  |
| Speed                  | 3600 Mhz                                            | 3600 Mhz                                            |  |
| ECC                    | Yes<br>(Selected CPU)                               | No                                                  |  |
| I/O Specifications     |                                                     |                                                     |  |
| PCIe                   | PEG (Gen5 x16)<br>4x PCIe 4.0 x4<br>10x PCIe 3.0 x1 | PEG (Gen5 x16)<br>4x PCIe 4.0 x4<br>10x PCIe 3.0 x1 |  |
| USB 3.2 Gen2 /2.0      | 4x / 8x                                             | 4x / 8x                                             |  |
| SATA                   | 2x                                                  | 2x                                                  |  |
| Ethernet               | 2x 2.5 GbE                                          | 2x 2.5 GbE                                          |  |

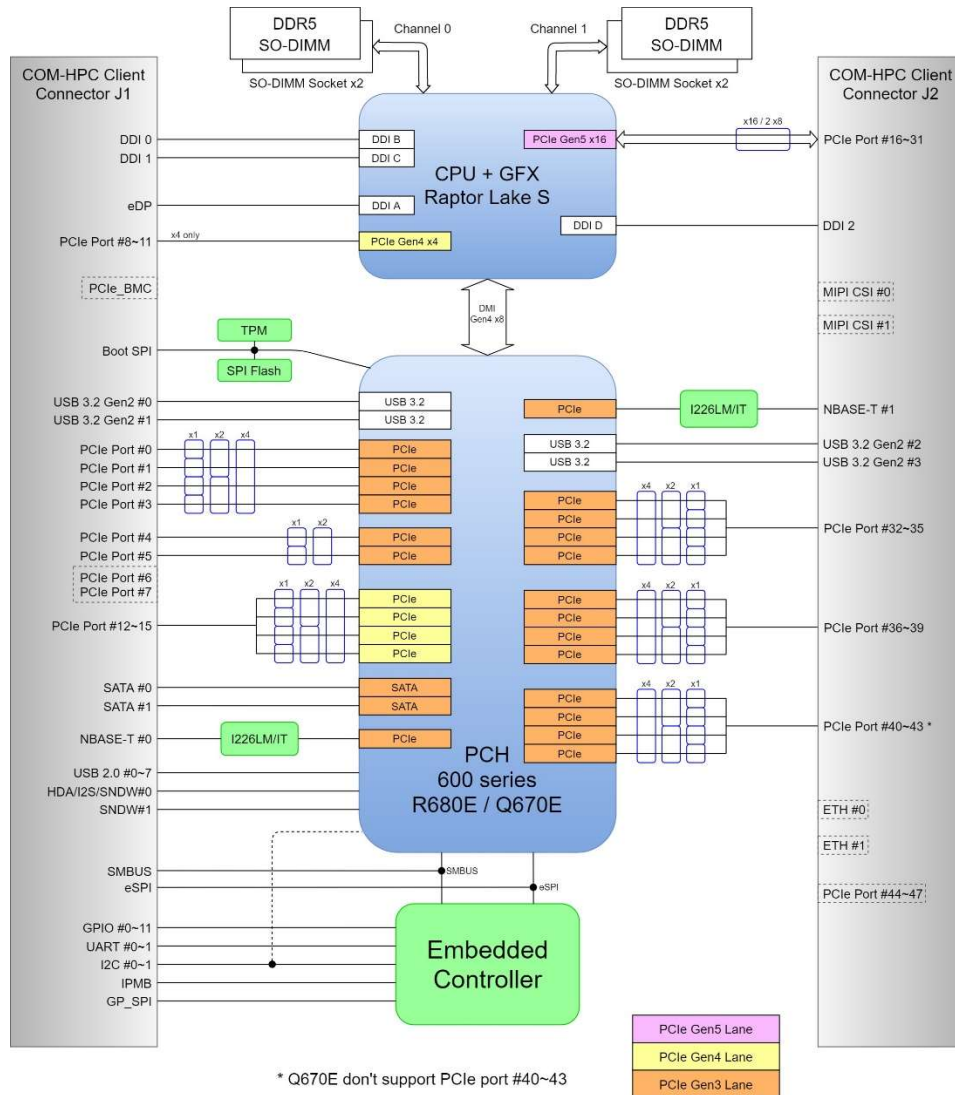
Table 2 PCOM-B885 Module SKU

# Chapter 2

## Overview

### 2 Block Diagram

## 2. Block Diagram



### Figure 1 Block Diagram

# Chapter 3

## Overview

- 3 Specifications
- 3.1 USB 3.2 Gen2 x2 Compatibility
- 3.2 Memory Population Rules
- 3.3 Supported Operating System
- 3.4 Windows OS Driver
- 3.5 Electrical Characteristics
- 3.6 Power Consumption
- 3.7 Mechanical Dimension
- 3.8 Environmental Specifications

## 3.Specification

|                                                          |                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product                                                  | PCOM-B885                                                                                                                                                                                                                                                                                                    |
| Form Factor                                              | COM-HPC® Client, Size C (160 X 120mm)                                                                                                                                                                                                                                                                        |
| Processor                                                | Intel® Core™ i9-14900<br>Intel® Core™ i9-14900T<br>Intel® Core™ i7-14700<br>Intel® Core™ i7-14700T<br>Intel® Core™ i5-14500<br>Intel® Core™ i5-14500T<br>Intel® Core™ i5-14400<br>Intel® Core™ i5-14400T<br>Intel® Core™ i3-14100<br>Intel® Core™ i3-14100T<br>Intel® Processor 300<br>Intel® Processor 300T |
| BIOS                                                     | AMI BIOS                                                                                                                                                                                                                                                                                                     |
| Memory                                                   | 4x non-ECC/ECC DDR5 SO-DIMM<br>Up to 192GB 3600MT/s                                                                                                                                                                                                                                                          |
| Graphic                                                  | Intel® UHD Graphics 770/730/710                                                                                                                                                                                                                                                                              |
| Display<br>(4 independent<br>displays<br>simultaneously) | 3x DDI<br>1x eDP<br>1x VGA                                                                                                                                                                                                                                                                                   |
| Ethernet                                                 | 2x 2.5 GbE (via Intel® i226 series)                                                                                                                                                                                                                                                                          |
| Audio                                                    | HDA                                                                                                                                                                                                                                                                                                          |
| PCI Express                                              | 1x PEG Gen5 x16 (bifurcation 2 x8)<br>4x PCIe Gen4 x4<br>2x PCIe Gen3 x4<br>1x PCIe Gen3 x2                                                                                                                                                                                                                  |
| I/O                                                      | 4x USB 3.2 Gen2<br>8x USB 2.0<br>2x SATA<br>12 bit GPIO ( default 6 in / 6 out )                                                                                                                                                                                                                             |

|                   |                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------|
|                   | I2C / SMBus<br>2x UART                                                                                                  |
| Hardware Monitors | ITE series Embedded Controller, Voltage, Fan and Temperature                                                            |
| Security          | TPM 2.0                                                                                                                 |
| Power Management  | ACPI                                                                                                                    |
| Environment       | Operating Temperature<br>Standard: 0 ° C ~ 60 ° C<br>Storage Temperature -40 ° C ~ 85 ° C<br>Relative Humidity 5% ~ 95% |

Table 3 PCOM-B885 SPEC

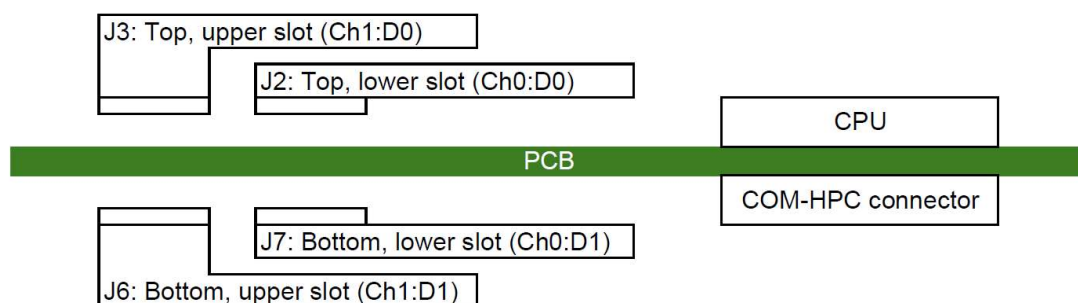
## 3.1. USB 3.2 Gen2 x1 Compatibility

PCOM-B885 supports four USB 3.2 Gen2, and the hardware design is compatible with USB 3.2 Gen2 x1.

Data transfers of up to 10 Gbps for USB 3.2 Gen2 x1 port. (requires a customized BIOS and two differential signals + USB Type-C connector by carrier design)

For better compatibility, the BIOS default of PCOM-B885 is four Gen2 x1 (10 Gbps) port.

## 3.2. Memory Population Rules



PCOM-B885 supports up to 4x DDR5 SO-DIMMs and up to 4000MT/s. For better compatibility, the default BIOS limit the memory speed to 3600MT/s, PCOM-B885 users can decide whether to increase the memory speed to 4000MT/s in the bios settings.

The following population rules must be observed:

Either J6 or J7 must be populated or the PCOM-B885 will not boot.

All populated memory modules should have the same part number to avoid potential compatible issues.

Mixing ECC and non-ECC memory modules is not supported

For two or more dual-rank (2R) memory modules, please try to use one memory module first if encounter no booting symptom, then adjust the memory speed down in the bios.

### 3.3. Supported Operating System

The PCOM-B885 supports the following operating systems.

| Vendor    | Operating System                  | Implementation |
|-----------|-----------------------------------|----------------|
| Microsoft | Windows 10 IoT Enterprise LTSC    |                |
|           | Windows 11                        |                |
|           |                                   |                |
|           |                                   |                |
|           |                                   |                |
| Linux     | Linux LTS kernel v5.4.x & v5.10.x |                |
|           | Ubuntu 22.04                      |                |
|           |                                   |                |
|           |                                   |                |
|           |                                   |                |

Table 4 OS Support list

*Note. Portwell does not endorse/validate/support any specific Linux distribution or entity mentioned on this list.*

*Note. Portwell recommends customers to work with Linux vendors/open source communities to find feature list and support model.*

## 3.4. Windows OS Driver

Please download the drivers from Portwell download center website  
[http://www.portwell.tw/support/download\\_center.php](http://www.portwell.tw/support/download_center.php)

## 3.5. Electrical Characteristics

|               |                    |
|---------------|--------------------|
| Input voltage | +12V $\pm$ 5%      |
| RTC Battery   | From Carrier       |
| Power on mode | ATX Mode & AT Mode |

Table 5 Electrical characteristics

### ***Power Distribution***

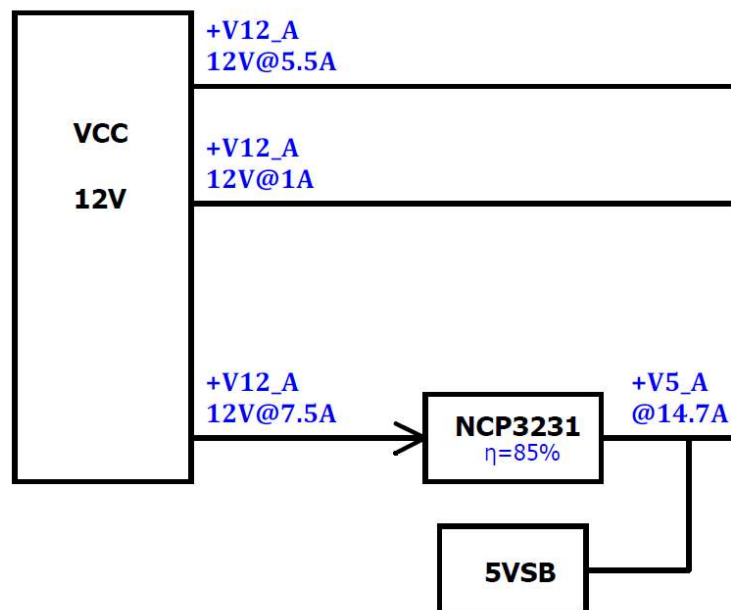


Figure 2 PCOM-B885 Power on sequence

## ● Input Power Sequencing

COM-HPC input power sequencing requirements are as follows:

- VCC\_RTC should come up at the same time or before VCC\_5V\_SBY comes up
- VCC\_5V\_SBY should come up at the same time or before VCC comes up
- RSMRST\_OUT# should come up when the Module standby rail(s) are stable
- VIN\_PWR\_OK should be active after VCC is stable
- VIN\_PWR\_OK should be inactive at the same time or before VCC goes down
- VCC should go down at the same time or before VCC\_5V\_SBY goes down
- VCC\_5V\_SBY should go down at the same time or before VCC\_RTC goes down

|    |                                                     |             |
|----|-----------------------------------------------------|-------------|
| T1 | VCC_RTC rise to VCC_5V_SBY rise                     | $\geq 0$ ms |
| T2 | VCC_5V_SBY rise to VCC_12V rise                     | $\geq 0$ ms |
| T3 | VCC rise to 95% of nominal value to VIN_PWR_OK rise | $\geq 0$ ms |
| T4 | VIN_PWR_OK fall to VCC_12V fall (90%)               | $\geq 0$ ms |
| T5 | VCC fall to VCC_5V_SBY fall                         | $\geq 0$ ms |
| T6 | VCC_5V_SBY fall to VCC_RTC fall                     | $\geq 0$ ms |

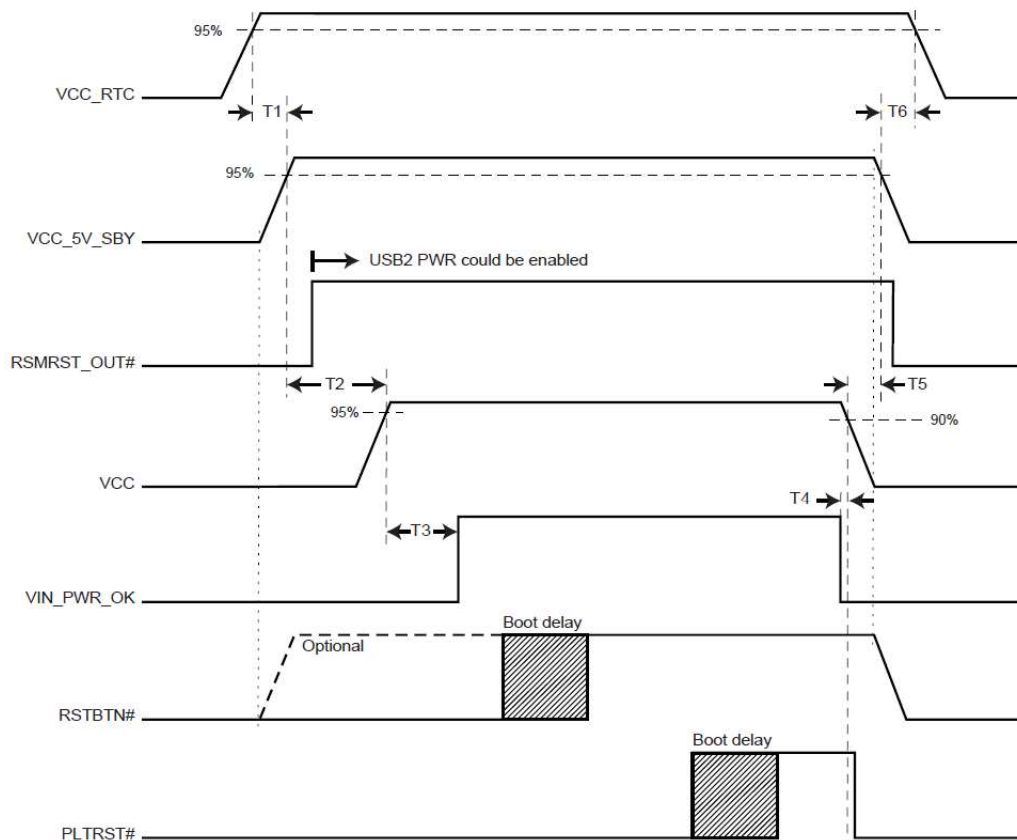


**Figure 3 Input Power Sequencing**

(Reference from COM-HPC® Module Base Specification)

- **Power signals**

Signals VIN\_PWR\_OK, RSTBTN#, and PLTRST# shall be supported for all COM-HPC Modules. Signal VIN\_PWR\_OK indicates that all the power to the Module is stable within the specified range and can be used to enable Module internal power supplies.

On COM Express designs, the VIN\_PWR\_OK line is used to hold off a CPU boot to allow off Module devices such as large FPGAs enough time to be configured. This method should not be used on COM-HPC designs. An alternative method, pausing the Module boot by BIOS code monitoring the RSTBTN# signal.

Some input signals such as PWRBTN# and RSTBTN# may require debounce and ESD protection components on the Carrier board. Please refer to the COM-HPC Carrier Board Design Guide for details

## 3.6. Power Consumption

The power consumption values were measured with the following condition:

- ATX power supply
- PCOM-B885 module
- PCOM-C880 carrier
- PCOM-B885 standard cooler
- Windows 11 23H2

The power consumption values were recorded during the following methods:

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

Note. Power consumption results are measured at Portwell laboratory and are for reference only.

## ● CPU SKU #1

| Series                        | PCOM-B885     |               |               |               |              |              |
|-------------------------------|---------------|---------------|---------------|---------------|--------------|--------------|
| Processor                     | i9-14900      | i9-14900T     | i7-14700      | i7-14700T     | i5-14500     | i5-14500T    |
| Cores / Threads               | 8P + 16E / 32 | 8P + 16E / 32 | 8P + 12E / 28 | 8P + 12E / 28 | 6P + 8E / 20 | 6P + 8E / 20 |
| TDP                           | 65W           | 35W           | 65W           | 35W           | 65W          | 35W          |
| Power Consumption             |               |               |               |               |              |              |
| S0 Idle                       | 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          |

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| S5 | TBD | TBD | TBD | TBD | TBD | TBD |
|----|-----|-----|-----|-----|-----|-----|

Table 6 PCOM-B885 Power Consumption List #1

*Note. Power consumption results are measured at Portwell laboratory and are for reference only.*

## ● CPU SKU #2

|                               |              |              |             |             |               |                |
|-------------------------------|--------------|--------------|-------------|-------------|---------------|----------------|
| Series                        | PCOM-B885    |              |             |             |               |                |
| Processor                     | i5-14400     | i5-14400T    | i3-14100    | i3-14100T   | Processor 300 | Processor 300T |
| Cores / Threads               | 6P + 4E / 16 | 6P + 4E / 16 | 4P + 0E / 8 | 4P + 0E / 8 | 2P + 0E / 4   | 2P + 0E / 4    |
| TDP                           | 65W          | 35W          | 60W         | 35W         | 46W           | 35W            |
| <b>Power Consumption</b>      |              |              |             |             |               |                |
| S0 Idle                       | 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            |
| S5                            | TBD          | TBD          | TBD         | TBD         | TBD           | TBD            |

Table 7 PCOM-B885 Power Consumption List #2

## 3.7. Mechanical Dimension

### ● Top Side Dimension

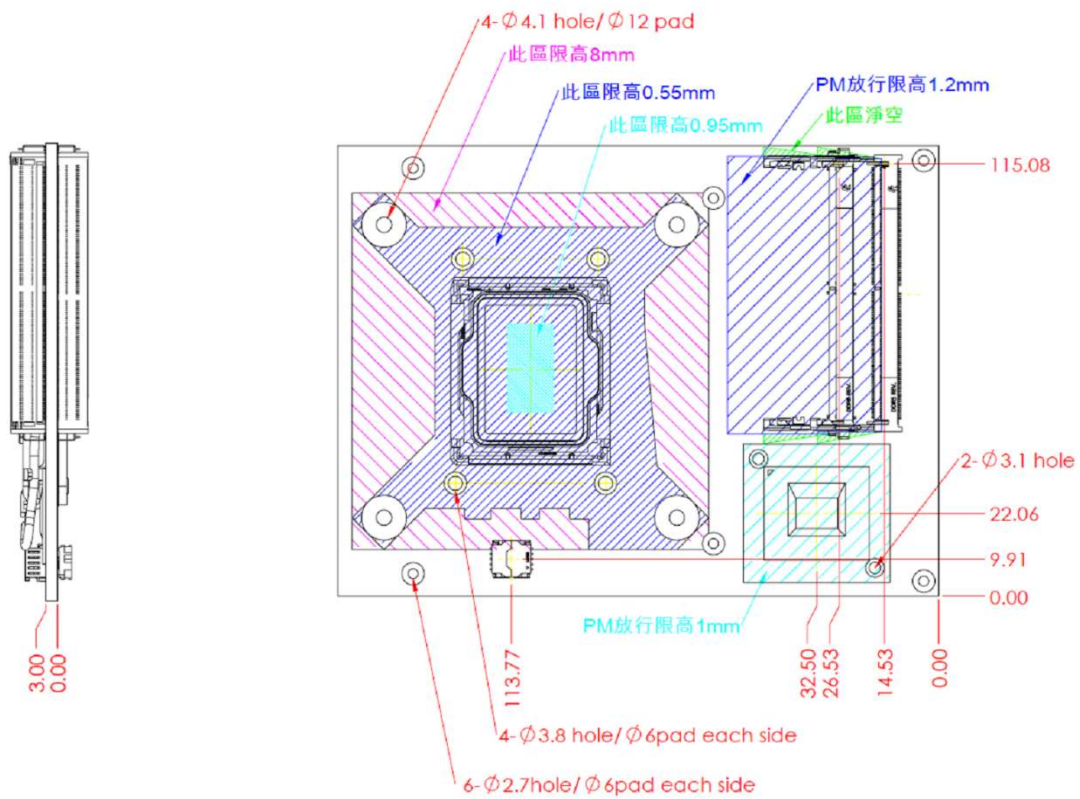


Figure 4 Mechanical Dimension - Top

## ● Bottom Side Dimension

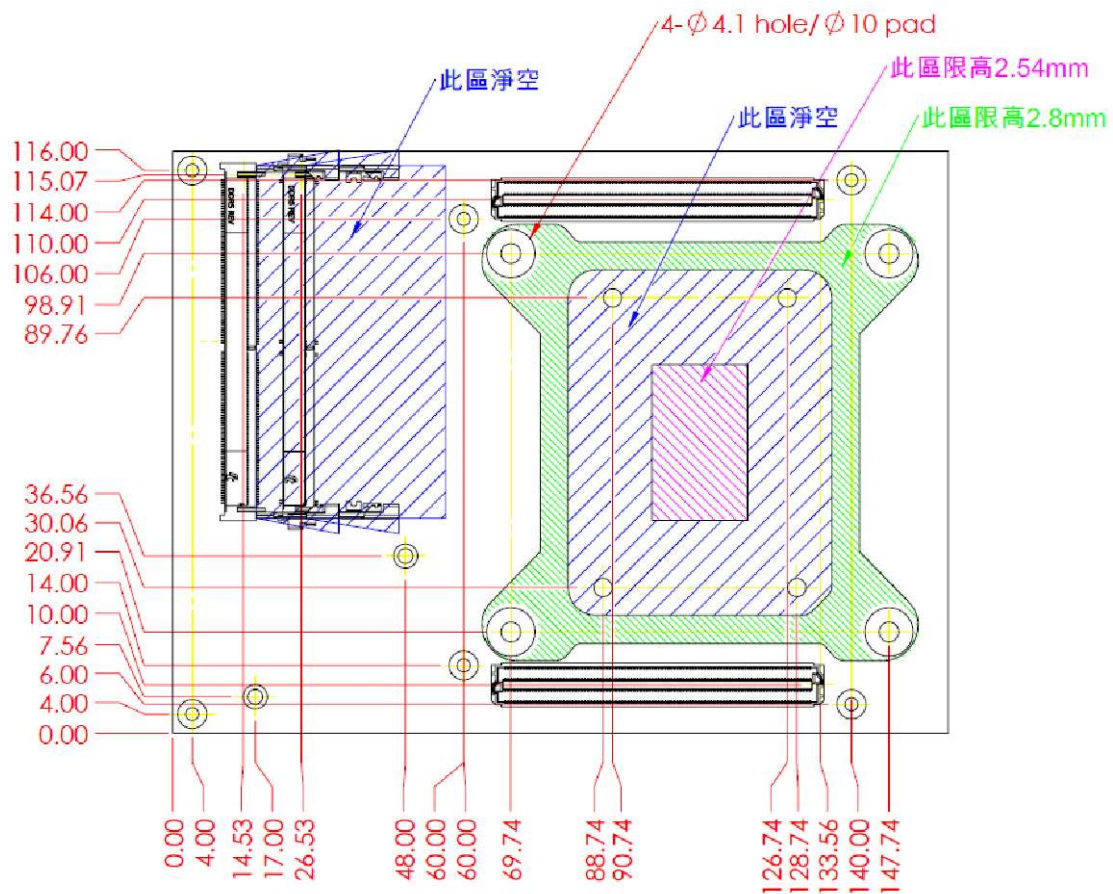
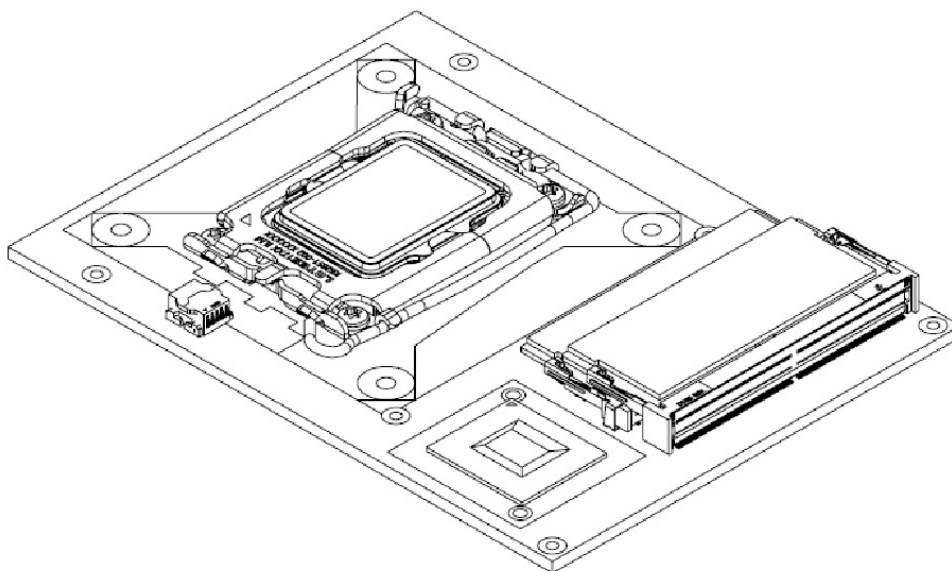


Figure 5 Mechanical Dimension – Bottom

## 3.8. Environmental Specifications

### ♦ Module

| Product         | Ordering P/N |
|-----------------|--------------|
| PCOM-B885-R680E | AB1-3R22     |
| PCOM-B885-Q670E | AB1-3R23     |
|                 |              |

Table 8 Ordering Guide - PCOM-B885

### ♦ Accessory

| Accessory                             | Ordering P/N | Remark         |
|---------------------------------------|--------------|----------------|
| Cooler (1U / 95w)                     | B9972080     | Available      |
| Cooler (2U / 125w)                    | B9972100     | Available      |
| Cooler (backplate)                    | B723M670     | Available      |
| Evaluation Carrier (ATX)<br>PCOM-C880 | AB1-3L34Z    | In Development |
| FAN Cable                             | B786Z150     | Available*     |

Table 9 Ordering Guide - Accessory

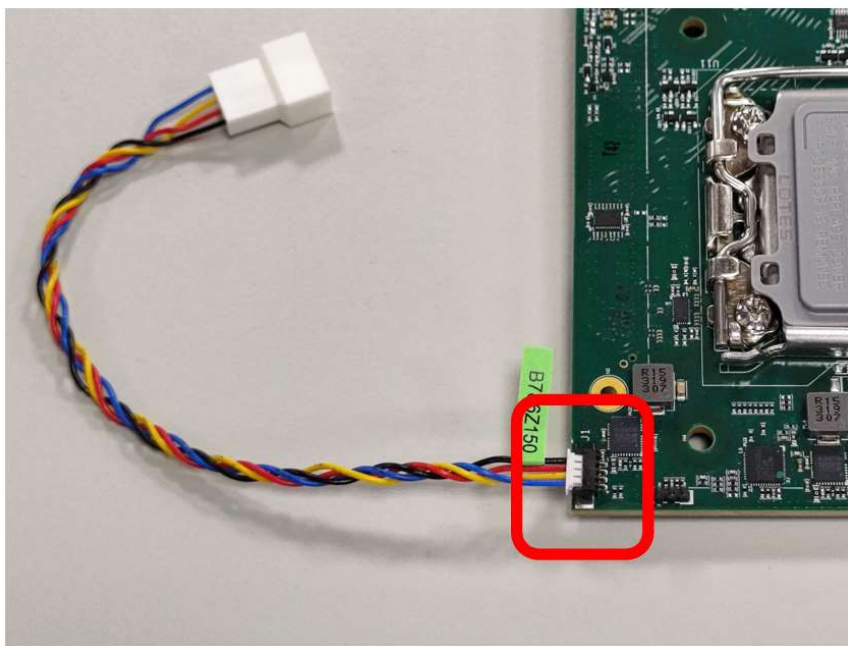
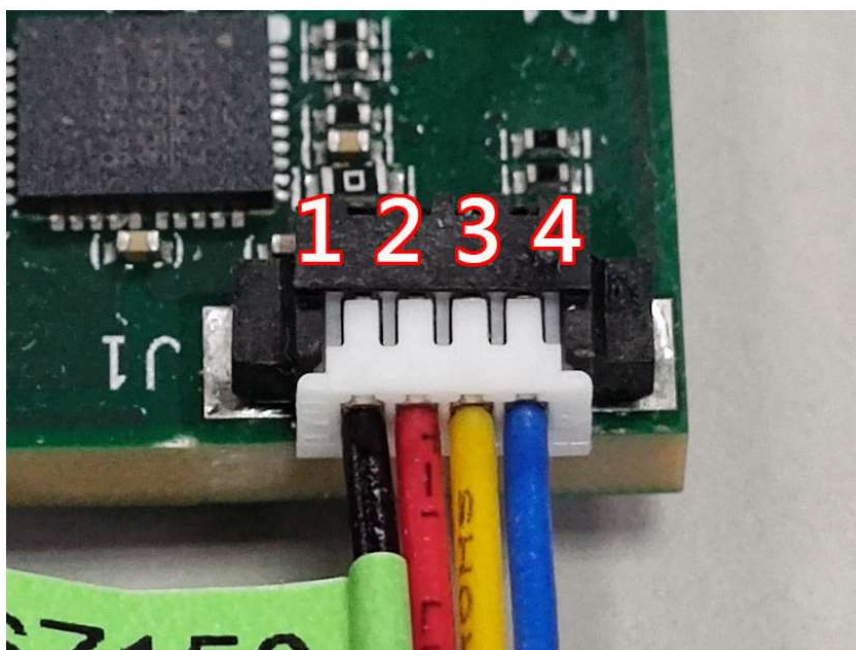
*Note. FAN Cable has already bundled in the standard module package.*

### ♦ FAN Cable Instructions

PCOM-B885 provides signals for a primary (onboard) and secondary (carrier) FAN, here is the picture indicate the location of onboard FAN connector. This FAN cable transforms the 4-pin standard FAN connector to a SMD type onboard connector.

J10 FAN

|   |            |
|---|------------|
| 1 | GND        |
| 2 | +12V       |
| 3 | FAN_TACHIN |
| 4 | FAN_PWMOUT |



# Chapter 4

## Overview

### 4 Thermal Solution

## 4. Thermal Solution

- Cooler Dimension (1U / 95w)

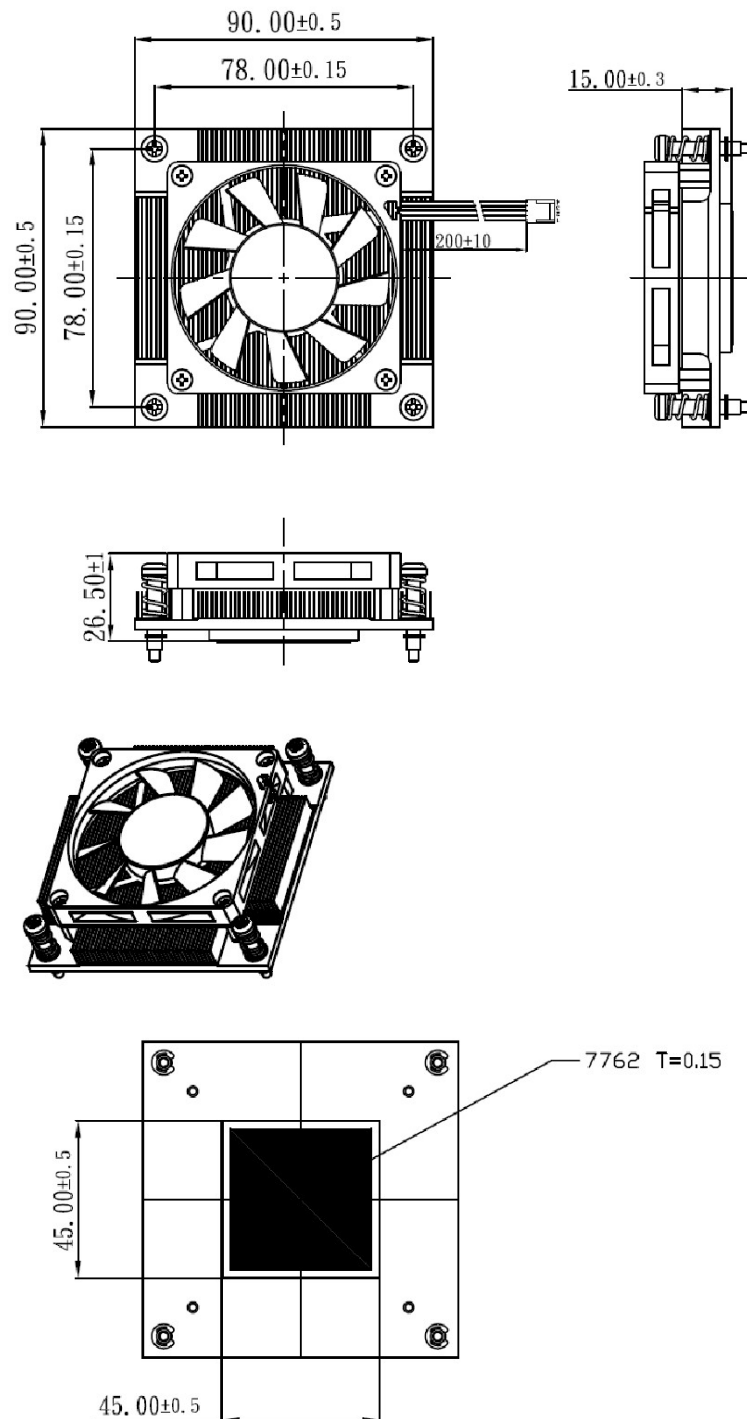


Figure 6 Cooler (1U / 95w) mechanical dimension

- Cooler Dimension (2U / 125w)

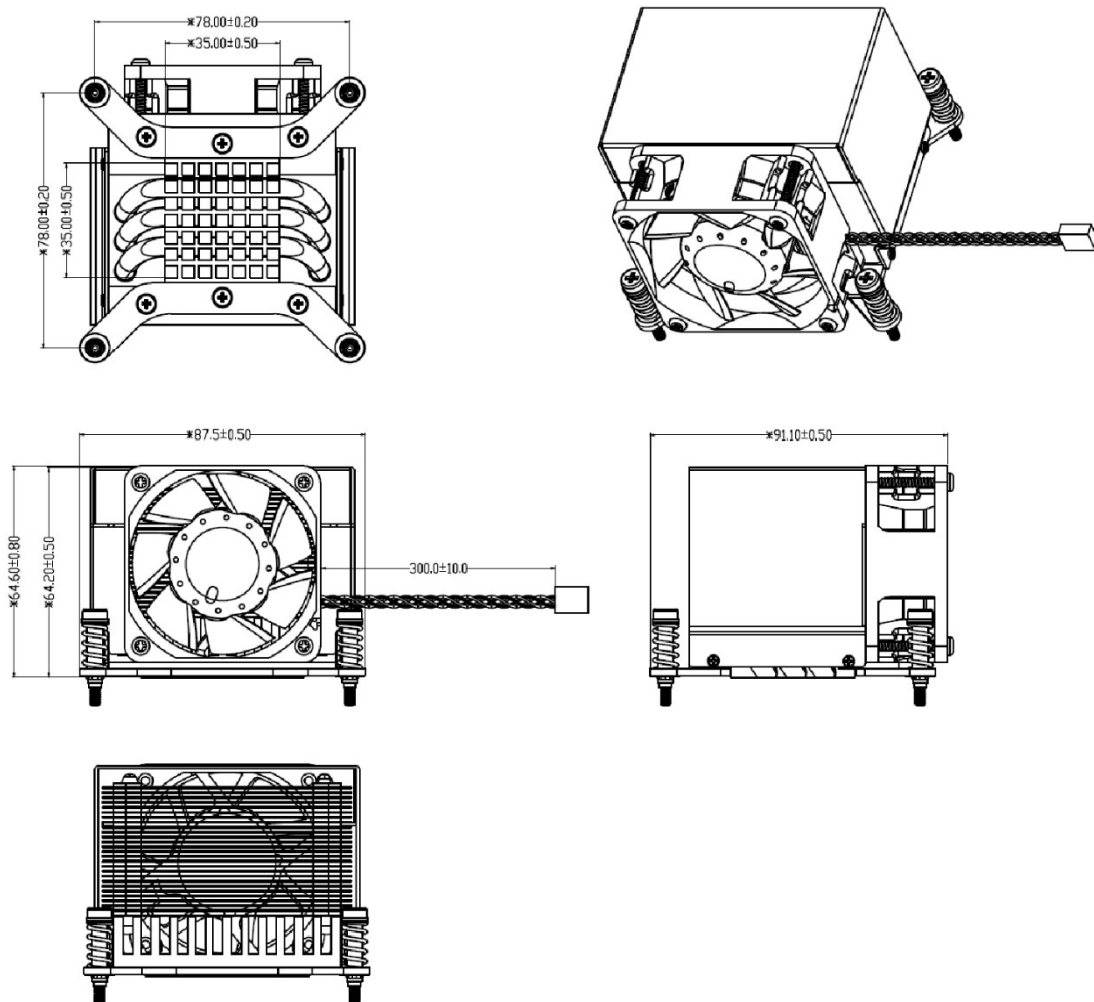


Figure 7 Cooler (2U / 125w) mechanical dimension

- Heatspreader Dimension (1U / 95w)

TBD

Figure 8 Heatspreader mechanical dimension

# Chapter 5

## Overview

### 5 Pin Out Table

## 5.Pin Out Table

- COM-HPC J1

| J1  |             |     |              |     |                 |     |                |
|-----|-------------|-----|--------------|-----|-----------------|-----|----------------|
| Pin | RAW A       | Pin | RAW B        | Pin | RAW C           | Pin | PAW D          |
| A1  | +V12P0S     | B1  | +V12P0S      | C1  | +V12P0S         | D1  | +V12P0S        |
| A2  | +V12P0S     | B2  | EXT_PWRBTN#  | C2  | RSTBTN_N        | D2  | +V12P0S        |
| A3  | +V12P0S     | B3  | +V12P0S      | C3  | +V12P0S         | D3  | +V12P0S        |
| A4  | +V12P0S     | B4  | THERMTRIP_CN | C4  | CARRIER_HOT_N   | D4  | +V12P0S        |
| A5  | +V12P0S     | B5  | +V12P0S      | C5  | +V12P0S         | D5  | +V12P0S        |
| A6  | +V12P0S     | B6  | TAMPER_N     | C6  | ATX_PWROK       | D6  | +V12P0S        |
| A7  | +V12P0S     | B7  | +V12P0S      | C7  | +V12P0S         | D7  | +V12P0S        |
| A8  | +V12P0S     | B8  | KBC_SLP_S3_N | C8  | KBC_SLP_S4_N    | D8  | +V12P0S        |
| A9  | +V12P0S     | B9  | +V12P0S      | C9  | +V12P0S         | D9  | +V12P0S        |
| A10 | GND         | B10 | WDT_STROBE_N | C10 | GND             | D10 | PCIE_WAKE_CN_N |
| A11 | PMC_BATLOW# | B11 | EC_WDT_CN    | C11 | KBC_SYS_FANOUT1 | D11 | N/C            |
| A12 | EC_PLTRST   | B12 | GND          | C12 | KBC_SYS_FANIN1  | D12 | GND            |
| A13 | GND         | B13 | USB2_P6_DN   | C13 | GND             | D13 | USB2_P2_DN     |
| A14 | USB2_P8_DN  | B14 | USB2_P6_DP   | C14 | USB2_P4_DN      | D14 | USB2_P2_DP     |
| A15 | USB2_P8_DP  | B15 | GND          | C15 | USB2_P4_DP      | D15 | GND            |
| A16 | GND         | B16 | USB2_P5_DN   | C16 | GND             | D16 | USB2_P1_DN     |
| A17 | USB2_P7_DN  | B17 | USB2_P5_DP   | C17 | USB2_P3_DN      | D17 | USB2_P1_DP     |
| A18 | USB2_P7_DP  | B18 | GND          | C18 | USB2_P3_DP      | D18 | GND            |

|     |                     |     |                 |     |               |     |                     |
|-----|---------------------|-----|-----------------|-----|---------------|-----|---------------------|
| A19 | GND                 | B19 | HDA_CODEC_SYNC  | C19 | GND           | D19 | DDIB_CTRLDATA_AUX_N |
| A20 | DDIC_CTRLDATA_AUX_N | B20 | HDA_CODEC_SDO   | C20 | SNDW2_CLK     | D20 | DDIB_CTRLCLK_AUX_P  |
| A21 | DDIC_CTRLCLK_AUX_P  | B21 | HDA_CODEC_RST_N | C21 | SNDW2_DATA    | D21 | GND                 |
| A22 | GND                 | B22 | HDA_SDI         | C22 | GND           | D22 | DDIB_TXP0_DN        |
| A23 | DDIC_TXP0_DN        | B23 | HDA_CODEC_BCLK  | C23 | SNDW1_CLK     | D23 | DDIB_TXP0_DP        |
| A24 | DDIC_TXP0_DP        | B24 | +5VSB           | C24 | SNDW1_DATA    | D24 | GND                 |
| A25 | GND                 | B25 | USB_OC3_N       | C25 | GND           | D25 | DDIB_TXP1_DN        |
| A26 | DDIC_TXP1_DN        | B26 | USB_OC2_N       | C26 | DDIB_AUX_SEL  | D26 | DDIB_TXP1_DP        |
| A27 | DDIC_TXP1_DP        | B27 | USB_OC1_N       | C27 | DDIC_AUX_SEL  | D27 | GND                 |
| A28 | GND                 | B28 | USB_OC0_N       | C28 | DDIB_HPD      | D28 | DDIB_TXP2_DN        |
| A29 | DDIC_TXP2_DN        | B29 | NC              | C29 | DDIC_HPD      | D29 | DDIB_TXP2_DP        |
| A30 | DDIC_TXP2_DP        | B30 | NC              | C30 | EDP_HPD       | D30 | GND                 |
| A31 | GND                 | B31 | NC              | C31 | EDP_VDDEN     | D31 | DDIB_TXP3_DN        |
| A32 | DDIC_TXP3_DN        | B32 | NC              | C32 | EDP_BKLTEN    | D32 | DDIB_TXP3_DP        |
| A33 | DDIC_TXP3_DP        | B33 | NC              | C33 | EDP_BKLTCTL   | D33 | GND                 |
| A34 | GND                 | B34 | NC              | C34 | GND           | D34 | ACPRESENT_CN        |
| A35 | eDP_AUX_DN          | B35 | USB_PD_I2C_CLK  | C35 | NC            | D35 | N/C                 |
| A36 | eDP_AUX_DP          | B36 | USB_PD_I2C_DATA | C36 | NC            | D36 | GND                 |
| A37 | GND                 | B37 | NC              | C37 | GND           | D37 | USB3_P3_TX_DN       |
| A38 | eDP_TXP0_DN         | B38 | NC              | C38 | USB3_P3_RX_DN | D38 | USB3_P3_TX_DP       |
| A39 | eDP_TXP0_DP         | B39 | NC              | C39 | USB3_P3_RX_DP | D39 | GND                 |
| A40 | GND                 | B40 | NC              | C40 | GND           | D40 | USB3_P4_TX_DN       |
| A41 | eDP_TXP1_DN         | B41 | NC              | C41 | USB3_P4_RX_DN | D41 | USB3_P4_TX_DP       |

|     |                 |     |                 |     |                      |     |               |
|-----|-----------------|-----|-----------------|-----|----------------------|-----|---------------|
| A42 | eDP_TXP1_DP     | B42 | GND             | C42 | USB3_P4_RX_DP        | D42 | GND           |
| A43 | GND             | B43 | NC              | C43 | GND                  | D43 | USB3_P1_TX_DN |
| A44 | eDP_TXP2_DN     | B44 | NC              | C44 | USB3_P1_RX_DN        | D44 | USB3_P1_TX_DP |
| A45 | eDP_TXP2_DP     | B45 | LID_N           | C45 | USB3_P1_RX_DP        | D45 | GND           |
| A46 | GND             | B46 | SLEEP_N         | C46 | GND                  | D46 | USB3_P2_TX_DN |
| A47 | eDP_TXP3_DN     | B47 | +V3P3A          | C47 | USB3_P2_RX_DN        | D47 | USB3_P2_TX_DP |
| A48 | eDP_TXP3_DP     | B48 | SPI0_CS_CN_N    | C48 | USB3_P2_RX_DP        | D48 | GND           |
| A49 | GND             | B49 | BSEL0           | C49 | GND                  | D49 | SATA6_RX_DN   |
| A50 | ESPI_IO0_CONN   | B50 | BSEL1           | C50 | SPI0_IO0_MOSI_CONN   | D50 | SATA6_RX_DP   |
| A51 | ESPI_IO1_CONN   | B51 | BSEL2           | C51 | SPI0_IO1_MISO_CONN   | D51 | GND           |
| A52 | ESPI_IO2_CONN   | B52 | ESPI_ALERT0_N   | C52 | SPI0_IO2_WP_N_CONN   | D52 | SATA6_TX_DN   |
| A53 | ESPI_IO3_CONN   | B53 | ESPI_ALERT1_N   | C53 | SPI0_IO3_HOLD_N_CONN | D53 | SATA6_TX_DP   |
| A54 | ESPI_CLK_CONN   | B54 | ESPI_CS0_CN_N   | C54 | SPI0_CLK_CONN        | D54 | GND           |
| A55 | GND             | B55 | N/C             | C55 | GND                  | D55 | SATA7_RX_DN   |
| A56 | SRCCLKREQB_7_R  | B56 | ESPI_RESET_N    | C56 | CLKOUT_P8_DN         | D56 | SATA7_RX_DP   |
| A57 | SRCCLKREQB_8_R  | B57 | GND             | C57 | CLKOUT_P8_DP         | D57 | GND           |
| A58 | GND             | B58 | N/C             | C58 | GND                  | D58 | SATA7_TX_DN   |
| A59 | N/C             | B59 | N/C             | C59 | CLKOUT_P7_DN         | D59 | SATA7_TX_DP   |
| A60 | N/C             | B60 | GND             | C60 | CLKOUT_P7_DP         | D60 | GND           |
| A61 | GND             | B61 | PCIE_0_X4_RX_DN | C61 | GND                  | D61 | PCIE_1_TX_DN  |
| A62 | PCIE_0_X4_TX_DN | B62 | PCIE_0_X4_RX_DP | C62 | PCIE_1_RX_DN         | D62 | PCIE_1_TX_DP  |
| A63 | PCIE_0_X4       | B63 | GND             | C63 | PCIE_1_RX_DP         | D63 | GND           |

|     |                 |     |                 |     |                |     |              |
|-----|-----------------|-----|-----------------|-----|----------------|-----|--------------|
|     | _TX_DP          |     |                 |     |                |     |              |
| A64 | GND             | B64 | PCIE_1_X4_RX_DN | C64 | GND            | D64 | PCIE_2_TX_DN |
| A65 | PCIE_1_X4_TX_DN | B65 | PCIE_1_X4_RX_DP | C65 | PCIE_2_RX_DN   | D65 | PCIE_2_TX_DP |
| A66 | PCIE_1_X4_TX_DP | B66 | GND             | C66 | PCIE_2_RX_DP   | D66 | GND          |
| A67 | GND             | B67 | PCIE_2_X4_RX_DN | C67 | GND            | D67 | PCIE_3_TX_DN |
| A68 | PCIE_2_X4_TX_DN | B68 | PCIE_2_X4_RX_DP | C68 | PCIE_3_RX_DN   | D68 | PCIE_3_TX_DP |
| A69 | PCIE_2_X4_TX_DP | B69 | GND             | C69 | PCIE_3_RX_DP   | D69 | GND          |
| A70 | GND             | B70 | PCIE_3_X4_RX_DN | C70 | GND            | D70 | PCIE_4_TX_DN |
| A71 | PCIE_3_X4_TX_DN | B71 | PCIE_3_X4_RX_DP | C71 | PCIE_4_RX_DN   | D71 | PCIE_4_TX_DP |
| A72 | PCIE_3_X4_TX_DP | B72 | GND             | C72 | PCIE_4_RX_DP   | D72 | GND          |
| A73 | GND             | B73 | PCIE_13_RX_DN   | C73 | GND            | D73 | PCIE_5_TX_DN |
| A74 | PCIE_13_TX_DN   | B74 | PCIE_13_RX_DP   | C74 | PCIE_5_RX_DN   | D74 | PCIE_5_TX_DP |
| A75 | PCIE_13_TX_DP   | B75 | GND             | C75 | PCIE_5_RX_DP   | D75 | GND          |
| A76 | GND             | B76 | PCIE_14_RX_DN   | C76 | GND            | D76 | PCIE_6_TX_DN |
| A77 | PCIE_14_TX_DN   | B77 | PCIE_14_RX_DP   | C77 | PCIE_6_RX_DN   | D77 | PCIE_6_TX_DP |
| A78 | PCIE_14_TX_DP   | B78 | GND             | C78 | PCIE_6_RX_DP   | D78 | GND          |
| A79 | GND             | B79 | PCIE_15_RX_DN   | C79 | GND            | D79 | NC           |
| A80 | PCIE_15_TX_DN   | B80 | PCIE_15_RX_DP   | C80 | NC             | D80 | NC           |
| A81 | PCIE_15_TX_DP   | B81 | GND             | C81 | NC             | D81 | GND          |
| A82 | GND             | B82 | PCIE_16_RX_DN   | C82 | GND            | D82 | NC           |
| A83 | PCIE_16_TX_DN   | B83 | PCIE_16_RX_DP   | C83 | NC             | D83 | NC           |
| A84 | PCIE_16_TX_DP   | B84 | GND             | C84 | NC             | D84 | GND          |
| A85 | GND             | B85 | N/C             | C85 | GND            | D85 | L1_MDI0_DN   |
| A86 | +VRTC_C         | B86 | RSMRST_OUT_C    | C86 | SMB_CLK_RESUME | D86 | L1_MDI0_DP   |

|      |           |      |              |      |                 |      |                 |
|------|-----------|------|--------------|------|-----------------|------|-----------------|
| A87  | SUS_CLK   | B87  | UART1_TXD    | C87  | SMB_DATA_RESUME | D87  | GND             |
| A88  | EC_GPIO0  | B88  | UART1_RXD    | C88  | SMBALERT_N      | D88  | L1_MDI1_DN      |
| A89  | EC_GPIO1  | B89  | UART1_RTS_N  | C89  | UART0_TXD       | D89  | L1_MDI1_DP      |
| A90  | EC_GPIO2  | B90  | UART1_CTS_N  | C90  | UART0_RXD       | D90  | GND             |
| A91  | EC_GPIO3  | B91  | N/C          | C91  | UART0_RTS_N     | D91  | L1_MDI2_DN      |
| A92  | EC_GPIO4  | B92  | N/C          | C92  | UART0_CTS_N     | D92  | L1_MDI2_DP      |
| A93  | EC_GPIO5  | B93  | GSPI0_MOSI_R | C93  | SML1CLK         | D93  | GND             |
| A94  | EC_GPIO6  | B94  | GSPI0_MISO   | C94  | SML1DATA        | D94  | L1_MDI3_DN      |
| A95  | EC_GPIO7  | B95  | GSPI0_CS0#   | C95  | I2C0_ALERT_N    | D95  | L1_MDI3_DP      |
| A96  | EC_GPIO8  | B96  | GSPI0_CS1#   | C96  | I2C1_SCL        | D96  | GND             |
| A97  | EC_GPIO9  | B97  | N/C          | C97  | I2C1_DATA       | D97  | LED1_2500_N     |
| A98  | EC_GPIO10 | B98  | N/C          | C98  | L1_SDP0         | D98  | LED1_1000_N     |
| A99  | EC_GPIO11 | B99  | GSPI0_CLK    | C99  | N/C             | D99  | LED1_LINK_ACT_N |
| A100 | Type0     | B100 | GSPI0_ALERT# | C100 | TYPE1           | D100 | TYPE2           |

## ● COM-HPC J2

| J2  |                     |     |       |     |                 |     |                 |
|-----|---------------------|-----|-------|-----|-----------------|-----|-----------------|
| Pin | RAW E               | Pin | RAW F | Pin | RAW G           | Pin | RAW H           |
| E1  | RAPID_SHUTDOWN      | F1  | N/C   | G1  | +5VSB           | H1  | GND             |
| E2  | GND                 | F2  | N/C   | G2  | GND             | H2  | USB3_P7_TXDR_DN |
| E3  | DDID_CTRLDATA_AUX_N | F3  | N/C   | G3  | USB3_P7_RXDR_DN | H3  | USB3_P7_TXDR_DP |
| E4  | DDID_CTRLCLK_AUX_P  | F4  | N/C   | G4  | USB3_P7_RXDR_DP | H4  | GND             |
| E5  | GND                 | F5  | N/C   | G5  | GND             | H5  | USB3_P8         |

|     |               |     |               |     |                  |     |                  |
|-----|---------------|-----|---------------|-----|------------------|-----|------------------|
|     |               |     |               |     |                  |     | _TXDR_DN         |
| E6  | DDID_TXP0_DN  | F6  | N/C           | G6  | USB3_P8_RXDR_DN  | H6  | USB3_P8_TXDR_DP  |
| E7  | DDID_TXP0_DP  | F7  | N/C           | G7  | USB3_P8_RXDR_DP  | H7  | GND              |
| E8  | GND           | F8  | N/C           | G8  | GND              | H8  | USB3_P9_TXDR_DN  |
| E9  | DDID_TXP1_DN  | F9  | N/C           | G9  | USB3_P9_RXDR_DN  | H9  | USB3_P9_TXDR_DP  |
| E10 | DDID_TXP1_DP  | F10 | N/C           | G10 | USB3_P9_RXDR_DP  | H10 | GND              |
| E11 | GND           | F11 | N/C           | G11 | GND              | H11 | USB3_P10_TXDR_DN |
| E12 | DDID_TXP2_DN  | F12 | N/C           | G12 | USB3_P10_RXDR_DN | H12 | USB3_P10_TXDR_DP |
| E13 | DDID_TXP2_DP  | F13 | N/C           | G13 | USB3_P10_RXDR_DP | H13 | GND              |
| E14 | GND           | F14 | N/C           | G14 | GND              | H14 | NC               |
| E15 | DDID_TXP3_DN  | F15 | N/C           | G15 | N/C              | H15 | NC               |
| E16 | DDID_TXP3_DP  | F16 | N/C           | G16 | N/C              | H16 | GND              |
| E17 | GND           | F17 | N/C           | G17 | N/C              | H17 | NC               |
| E18 | DDID_AUX_SEL  | F18 | N/C           | G18 | N/C              | H18 | NC               |
| E19 | DDID_HPD      | F19 | GND           | G19 | PEG_LANE_REV_N   | H19 | GND              |
| E20 | GND           | F20 | PCIE_21_RX_DN | G20 | GND              | H20 | PCIE_9_TX_DN     |
| E21 | PCIE_21_TX_DN | F21 | PCIE_21_RX_DP | G21 | PCIE_9_RX_DN     | H21 | PCIE_9_TX_DP     |
| E22 | PCIE_21_TX_DP | F22 | GND           | G22 | PCIE_9_RX_DP     | H22 | GND              |
| E23 | GND           | F23 | PCIE_22_RX_DN | G23 | GND              | H23 | N/C              |
| E24 | PCIE_22_TX_DN | F24 | PCIE_22_RX_DP | G24 | PCIE_10_RX_DN    | H24 | N/C              |
| E25 | PCIE_22_TX_DP | F25 | GND           | G25 | PCIE_10_RX_DP    | H25 | GND              |
| E26 | GND           | F26 | PCIE_23_RX_DN | G26 | GND              | H26 | N/C              |

|     |                  |     |                  |     |                  |     |                  |
|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
| E27 | PCIE_23_TX_DN    | F27 | PCIE_23_RX_DP    | G27 | PCIE_11_RX_DN    | H27 | N/C              |
| E28 | PCIE_23_TX_DP    | F28 | GND              | G28 | PCIE_11_RX_DP    | H28 | GND              |
| E29 | GND              | F29 | PCIE_24_RX_DN    | G29 | GND              | H29 | N/C              |
| E30 | PCIE_24_TX_DN    | F30 | PCIE_24_RX_DP    | G30 | PCIE_12_RX_DN    | H30 | N/C              |
| E31 | PCIE_24_TX_DP    | F31 | GND              | G31 | PCIE_12_RX_DP    | H31 | GND              |
| E32 | GND              | F32 | PCIE_25_RX_DN    | G32 | GND              | H32 | N/C              |
| E33 | PCIE_25_TX_DN    | F33 | PCIE_25_RX_DP    | G33 | N/C              | H33 | N/C              |
| E34 | PCIE_25_TX_DP    | F34 | GND              | G34 | N/C              | H34 | GND              |
| E35 | GND              | F35 | PCIE_26_RX_DN    | G35 | GND              | H35 | N/C              |
| E36 | PCIE_26_TX_DN    | F36 | PCIE_26_RX_DP    | G36 | N/C              | H36 | N/C              |
| E37 | PCIE_26_TX_DP    | F37 | GND              | G37 | N/C              | H37 | GND              |
| E38 | GND              | F38 | PCIE_27_RX_DN    | G38 | GND              | H38 | N/C              |
| E39 | PCIE_27_TX_DN    | F39 | PCIE_27_RX_DP    | G39 | N/C              | H39 | N/C              |
| E40 | PCIE_27_TX_DP    | F40 | GND              | G40 | N/C              | H40 | GND              |
| E41 | GND              | F41 | PCIE_28_RX_DN    | G41 | GND              | H41 | N/C              |
| E42 | PCIE_28_TX_DN    | F42 | PCIE_28_RX_DP    | G42 | N/C              | H42 | N/C              |
| E43 | PCIE_28_TX_DP    | F43 | GND              | G43 | N/C              | H43 | GND              |
| E44 | GND              | F44 | PCIE_0_X16_RX_DN | G44 | GND              | H44 | PCIE_8_X16_TX_DN |
| E45 | PCIE_0_X16_TX_DN | F45 | PCIE_0_X16_RX_DP | G45 | PCIE_8_X16_RX_DN | H45 | PCIE_8_X16_TX_DP |
| E46 | PCIE_0_X16_TX_DP | F46 | GND              | G46 | PCIE_8_X16_RX_DP | H46 | GND              |
| E47 | GND              | F47 | PCIE_1_X16_RX_DN | G47 | GND              | H47 | PCIE_9_X16_TX_DN |
| E48 | PCIE_1_X16_TX_DN | F48 | PCIE_1_X16_RX_DP | G48 | PCIE_9_X16_RX_DN | H48 | PCIE_9_X16       |

|     |                      |     |                      |     |                       |     |                       |
|-----|----------------------|-----|----------------------|-----|-----------------------|-----|-----------------------|
|     |                      |     |                      |     |                       |     | _TX_DP                |
| E49 | PCIE_1_X16<br>_TX_DP | F49 | GND                  | G49 | PCIE_9_X16<br>_RX_DP  | H49 | GND                   |
| E50 | GND                  | F50 | PCIE_2_X16<br>_RX_DN | G50 | GND                   | H50 | PCIE_10_X16<br>_TX_DN |
| E51 | PCIE_2_X16<br>_TX_DN | F51 | PCIE_2_X16<br>_RX_DP | G51 | PCIE_10_X16<br>_RX_DN | H51 | PCIE_10_X16<br>_TX_DP |
| E52 | PCIE_2_X16<br>_TX_DP | F52 | GND                  | G52 | PCIE_10_X16<br>_RX_DP | H52 | GND                   |
| E53 | GND                  | F53 | PCIE_3_X16<br>_RX_DN | G53 | GND                   | H53 | PCIE_11_X16<br>_TX_DN |
| E54 | PCIE_3_X16<br>_TX_DN | F54 | PCIE_3_X16<br>_RX_DP | G54 | PCIE_11_X16<br>_RX_DN | H54 | PCIE_11_X16<br>_TX_DP |
| E55 | PCIE_3_X16<br>_TX_DP | F55 | GND                  | G55 | PCIE_11_X16<br>_RX_DP | H55 | GND                   |
| E56 | GND                  | F56 | PCIE_4_X16<br>_RX_DN | G56 | GND                   | H56 | PCIE_12_X16<br>_TX_DN |
| E57 | PCIE_4_X16<br>_TX_DN | F57 | PCIE_4_X16<br>_RX_DP | G57 | PCIE_12_X16<br>_RX_DN | H57 | PCIE_12_X16<br>_TX_DP |
| E58 | PCIE_4_X16<br>_TX_DP | F58 | GND                  | G58 | PCIE_12_X16<br>_RX_DP | H58 | GND                   |
| E59 | GND                  | F59 | PCIE_5_X16_RX_DN     | G59 | GND                   | H59 | PCIE_13_X16<br>_TX_DN |
| E60 | PCIE_5_X16<br>_TX_DN | F60 | PCIE_5_X16_RX_DP     | G60 | PCIE_13_X16<br>_RX_DN | H60 | PCIE_13_X16<br>_TX_DP |
| E61 | PCIE_5_X16<br>_TX_DP | F61 | GND                  | G61 | PCIE_13_X16<br>_RX_DP | H61 | GND                   |
| E62 | GND                  | F62 | PCIE_6_X16<br>_RX_DN | G62 | GND                   | H62 | PCIE_14_X16<br>_TX_DN |
| E63 | PCIE_6_X16<br>_TX_DN | F63 | PCIE_6_X16<br>_RX_DP | G63 | PCIE_14_X16<br>_RX_DN | H63 | PCIE_14_X16<br>_TX_DP |
| E64 | PCIE_6_X16<br>_TX_DP | F64 | GND                  | G64 | PCIE_14_X16<br>_RX_DP | H64 | GND                   |
| E65 | GND                  | F65 | PCIE_7_X16           | G65 | GND                   | H65 | PCIE_15_X16           |

|     |                  |     | _RX_DN           |     |                   |     | _TX_DN            |
|-----|------------------|-----|------------------|-----|-------------------|-----|-------------------|
| E66 | PCIE_7_X16_TX_DN | F66 | PCIE_7_X16_RX_DP | G66 | PCIE_15_X16_RX_DN | H66 | PCIE_15_X16_TX_DP |
| E67 | PCIE_7_X16_TX_DP | F67 | GND              | G67 | PCIE_15_X16_RX_DP | H67 | GND               |
| E68 | GND              | F68 | N/C              | G68 | GND               | H68 | N/C               |
| E69 | N/C              | F69 | N/C              | G69 | N/C               | H69 | N/C               |
| E70 | N/C              | F70 | GND              | G70 | N/C               | H70 | GND               |
| E71 | N/C              | F71 | L2_MDI0_DN       | G71 | GND               | H71 | N/C               |
| E72 | N/C              | F72 | L2_MDI0_DP       | G72 | N/C               | H72 | N/C               |
| E73 | N/C              | F73 | GND              | G73 | N/C               | H73 | GND               |
| E74 | N/C              | F74 | L2_MDI1_DN       | G74 | GND               | H74 | N/C               |
| E75 | N/C              | F75 | L2_MDI1_DP       | G75 | N/C               | H75 | N/C               |
| E76 | N/C              | F76 | GND              | G76 | N/C               | H76 | GND               |
| E77 | N/C              | F77 | L2_MDI2_DN       | G77 | GND               | H77 | N/C               |
| E78 | N/C              | F78 | L2_MDI2_DP       | G78 | N/C               | H78 | N/C               |
| E79 | L2_SDP0          | F79 | GND              | G79 | N/C               | H79 | GND               |
| E80 | LED2_1000_N      | F80 | L2_MDI3_DN       | G80 | GND               | H80 | N/C               |
| E81 | LED2_LINK_ACT_N  | F81 | L2_MDI3_DP       | G81 | N/C               | H81 | N/C               |
| E82 | LED2_2500_N      | F82 | GND              | G82 | N/C               | H82 | GND               |
| E83 | GND              | F83 | N/C              | G83 | GND               | H83 | N/C               |
| E84 | N/C              | F84 | N/C              | G84 | N/C               | H84 | N/C               |
| E85 | N/C              | F85 | N/C              | G85 | N/C               | H85 | GND               |
| E86 | GND              | F86 | N/C              | G86 | GND               | H86 | N/C               |
| E87 | N/C              | F87 | N/C              | G87 | N/C               | H87 | N/C               |
| E88 | N/C              | F88 | GND              | G88 | N/C               | H88 | N/C               |
| E89 | GND              | F89 | N/C              | G89 | N/C               | H89 | N/C               |

|      |                  |      |              |      |     |      |     |
|------|------------------|------|--------------|------|-----|------|-----|
| E90  | N/C              | F90  | N/C          | G90  | N/C | H90  | N/C |
| E91  | N/C              | F91  | GND          | G91  | N/C | H91  | GND |
| E92  | GND              | F92  | CLKOUT_P6_DN | G92  | GND | H92  | N/C |
| E93  | PEG_CLKOUT_P1_DN | F93  | CLKOUT_P6_DP | G93  | N/C | H93  | N/C |
| E94  | PEG_CLKOUT_P1_DP | F94  | GND          | G94  | N/C | H94  | GND |
| E95  | GND              | F95  | N/C          | G95  | GND | H95  | N/C |
| E96  | SRCCLKREQB_1_R   | F96  | N/C          | G96  | N/C | H96  | N/C |
| E97  | SRCCLKREQB_6_R   | F97  | N/C          | G97  | N/C | H97  | GND |
| E98  | N/C              | F98  | N/C          | G98  | N/C | H98  | N/C |
| E99  | N/C              | F99  | N/C          | G99  | N/C | H99  | N/C |
| E100 | N/C              | F100 | N/C          | G100 | N/C | H100 | N/C |

# Chapter 6

## Overview

### 6 System Resource

## 6. System Resource

### eSPI

| 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 |
|                     | 0xE300~0xE3FF | EC LPC IO Space               |
|                     | 0x3F8~0x3FF   | EC UART1                      |
|                     | 0x3E8~0x3EF   | EC UART2                      |
| Carrier SIO         | N/A           |                               |

### SMBUS

| SMBUS Address             | Information                    |
|---------------------------|--------------------------------|
| 0x44 / 0x48               | SMBus ARP                      |
| 0x50 / 0x51 / 0x52 / 0x53 | Memory SPD                     |
| 0x6B / 0x6D               | PCIe Clock Buffer on PCOM-C880 |

Table 10 System Resources

# Chapter 7

## Overview

- 7 BIOS Setup Items
- 7.1 Introduction
- 7.2 How to Enter BIOS Setup
- 7.3 BIOS Setup
  - 7.3.1 Main
  - 7.3.2 Configuration
  - 7.3.3 Security
  - 7.3.4 Boot
  - 7.3.5 Save & Exit
  - 7.3.6 MEB

## 7. BIOS Setup Items

### 7.1. 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.

### 7.2. How to Enter BIOS Setup

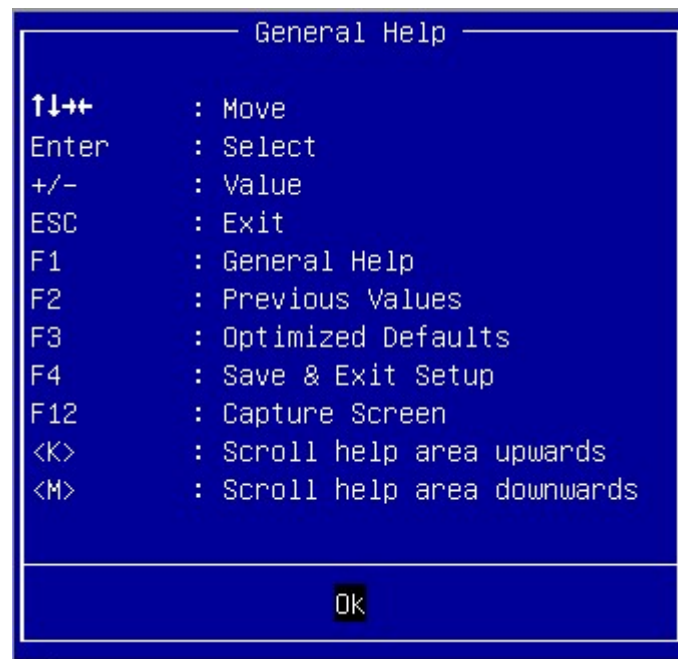
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <ESC> key will enter BIOS setup screen.

#### **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**

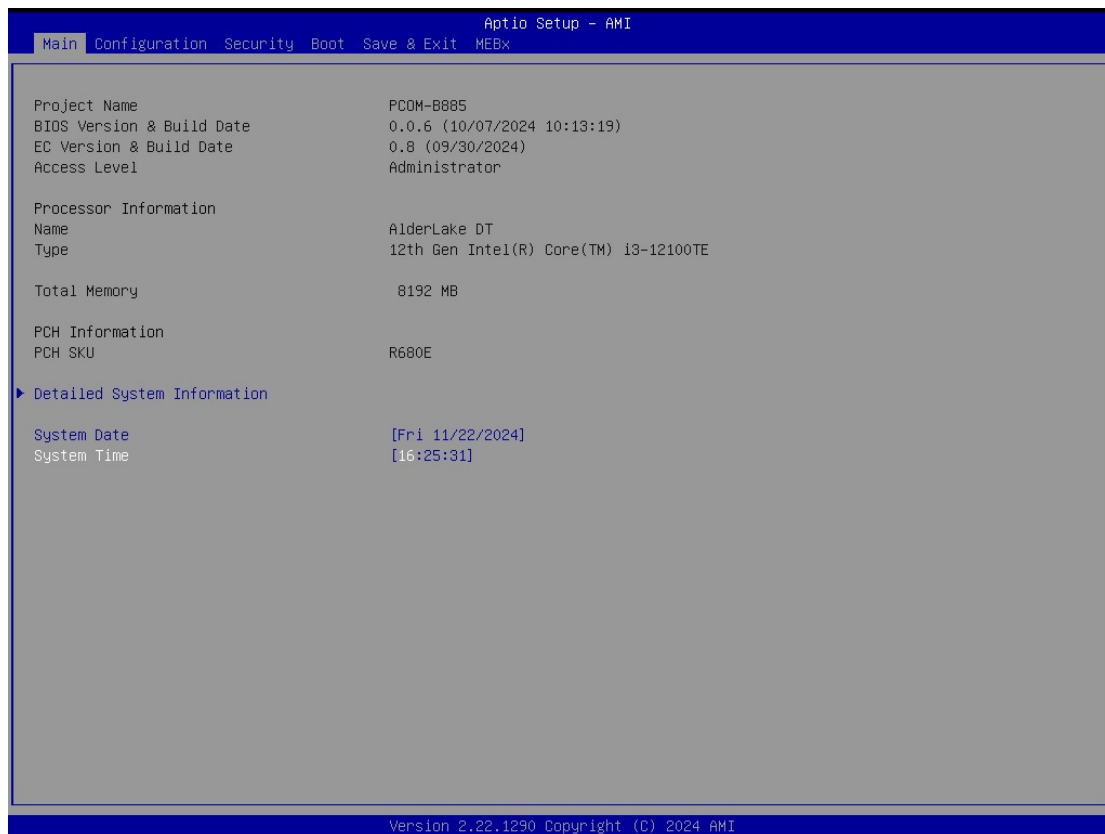
The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help Screen

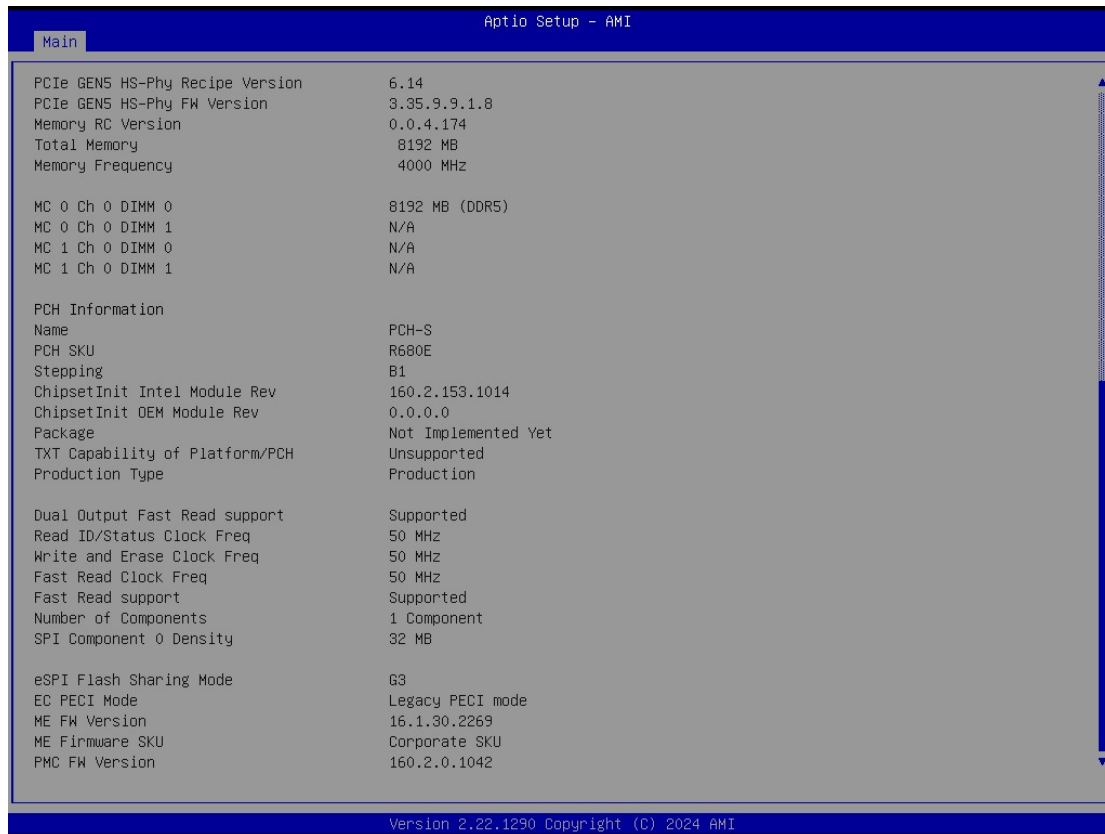


## 7.3. BIOS Setup

### 7.3.1. Main

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

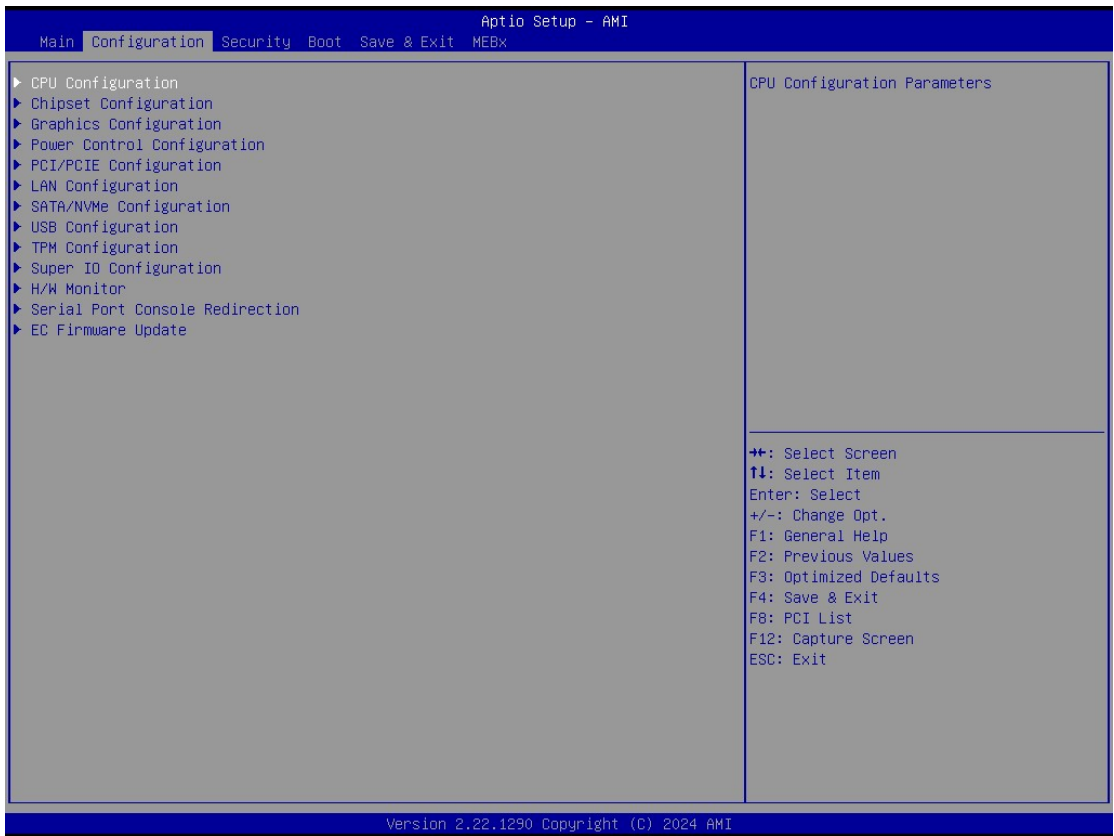




| Feature                          | Description                                                                                   | Options |
|----------------------------------|-----------------------------------------------------------------------------------------------|---------|
| <b>Detail system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

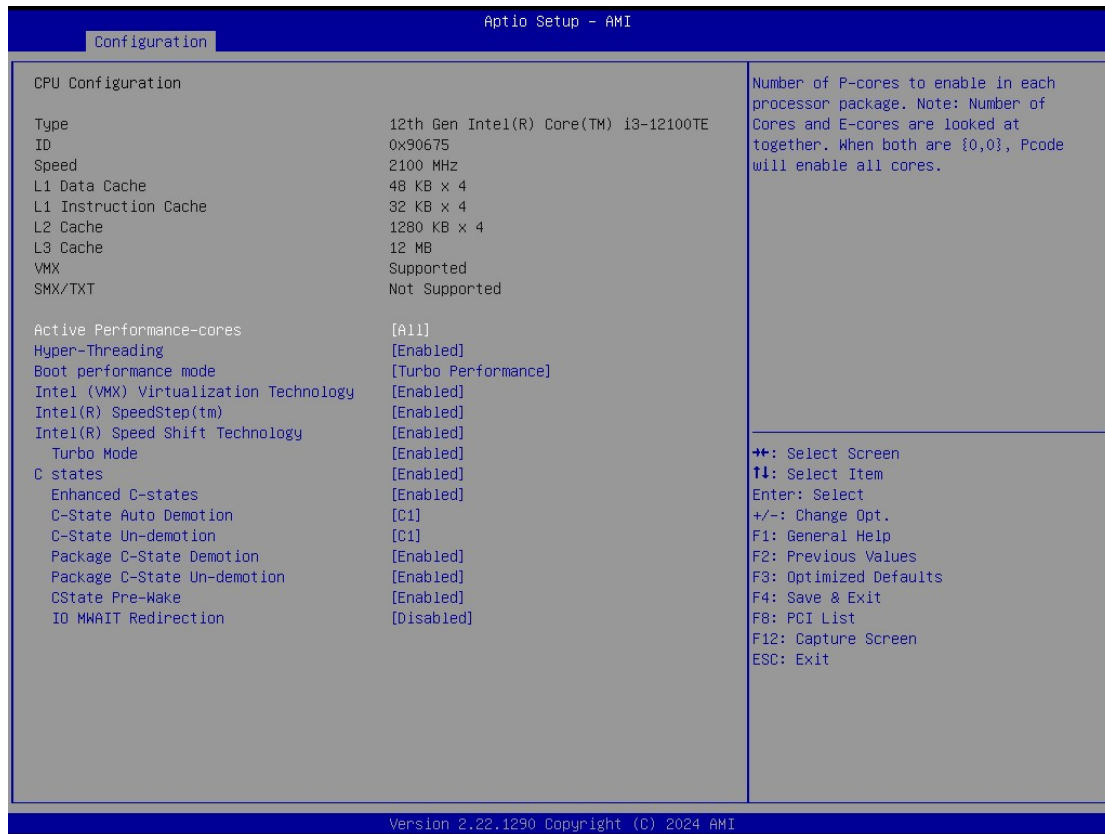
## 7.3.2. Configuration

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



# CPU Configuration

## CPU Configuration Parameters

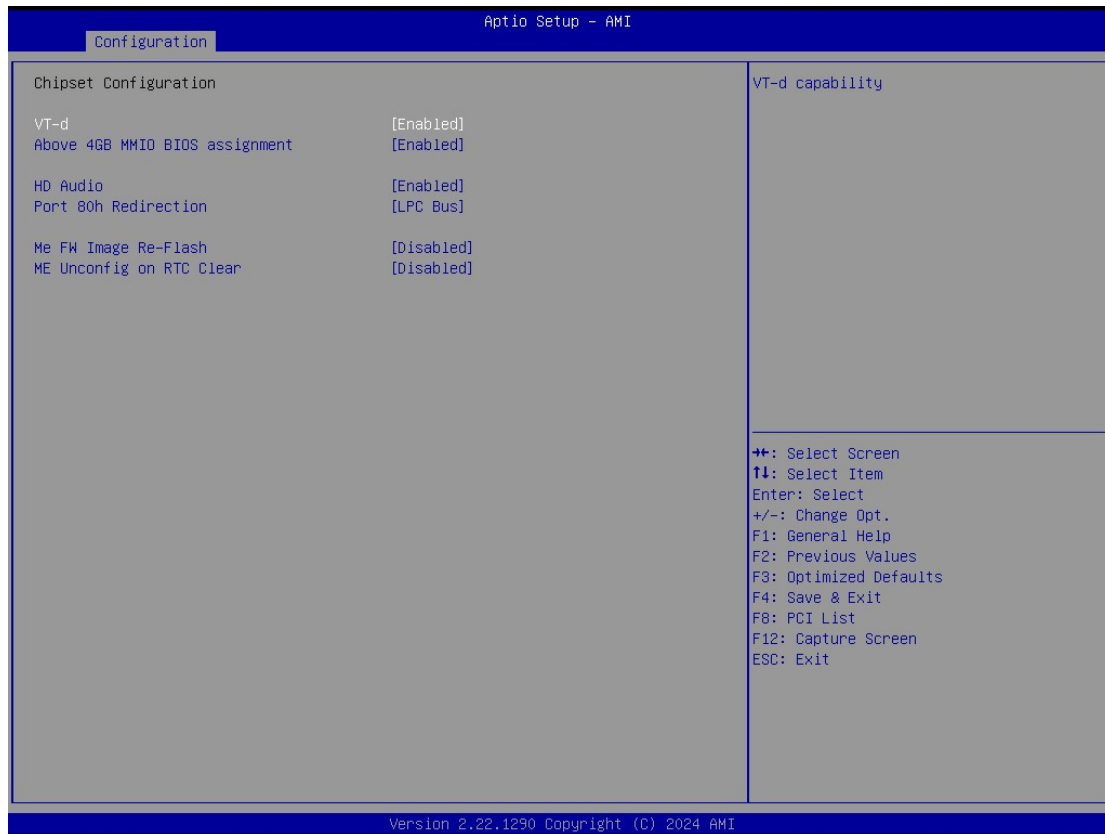


| Feature                                      | Description                                                                                                                                                        | Options                                                        |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Active Performance-Cores</b>              | Number of P-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. when both are {0,0}, Pcode will enable all cores. | ★All, 3, 2, 1                                                  |
| <b>Hyper-Threading</b>                       | Enable or Disable Hyper-Threading Technology                                                                                                                       | Disabled,★Enabled                                              |
| <b>Boot performance mode</b>                 | Select the performance state that the BIOS will set starting from reset vector                                                                                     | Max Battery<br>Max Non-Turbo Performance<br>★Turbo Performance |
| <b>Intel (VMX) Virtualization Technology</b> | When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.                                                           | Disabled,★Enabled                                              |
| <b>Intel (R) Speed Step (tm)</b>             | Allows more than two frequency ranges to be supported.                                                                                                             | Disabled,★Enabled                                              |

|                                         |                                                                                                                                               |                    |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Intel (R) Speed Shift Technology</b> | Enable/Disable Intel (R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states | Disabled,★Enabled  |
| <b>Turbo Mode</b>                       | Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.                                                         | Disabled,★Enabled  |
| <b>C states</b>                         | Enable/disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized                                                 | Disabled,★Enabled  |
| <b>Enhanced C-states</b>                | Enable/Disable C1E.When enabled, CPU will switch to minimum speed when all cores enter C-state                                                | Disabled,★Enabled  |
| <b>C-State Auto Demotion</b>            | Configure C-State Auto Demotion                                                                                                               | Disable,★C1        |
| <b>C-State Un-demotion</b>              | Configure C-State Un-demotion                                                                                                                 | Disable,★C1        |
| <b>Package C-State Demotion</b>         | Package C-State Demotion                                                                                                                      | Disabled,★Enabled  |
| <b>Package C-State Un-demotion</b>      | Package C-State Un-demotion                                                                                                                   | Disabled,★Enabled  |
| <b>CState Pre-Wake</b>                  | Disable – Sets bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the Cstate Pre-Wake                                                             | Disabled,★Enabled  |
| <b>IO MWAIT Redirection</b>             | When set, will map IO_read instructions sent to IO registers<br>PMG_IO_BASE_ADDRBASE+offset to MWAIT(offset)                                  | ★Disabled, Enabled |

## Chipset Configuration

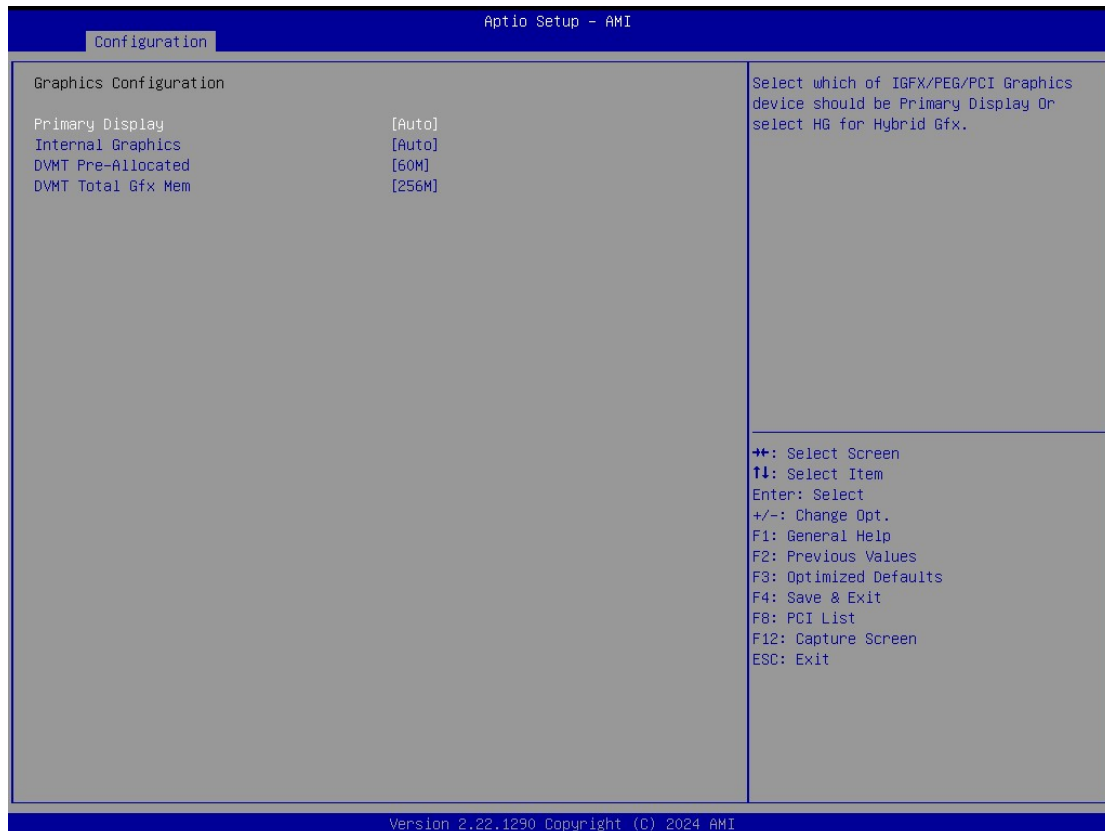
Configuration Chipset feature



| Feature                               | Description                                                                                                                                  | Options            |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>VT-d</b>                           | VT-d capability.                                                                                                                             | Disabled, ★Enabled |
| <b>Above 4GB MMIO BIOS assignment</b> | Enable/Disable above 4GB MemoryMappedIO BIOS assignment<br>This is enabled automatically when Aperture Size is set to 2048MB                 | Disabled, ★Enabled |
| <b>HD Audio</b>                       | Control Detection of the HD-Audio device<br>Disabled = HAD will be unconditionally disabled<br>Enabled = HAD will be unconditionally enabled | Disabled, ★Enabled |
| <b>Port 80h Redirection</b>           | Control where the Port 80h cycles are sent.                                                                                                  | ★LPC Bus, PCIE Bus |
| <b>Me FW Image Re-Flash</b>           | Enable/Disable Me FW Image Re-Flash function.                                                                                                | ★Disabled, Enabled |
| <b>ME Unconfig on RTC Clear</b>       | When Disable ME will not be unconfigured on RTC Clear                                                                                        | ★Disabled, Enabled |

# Graphics Configuration

## Configuration Graphics Settings

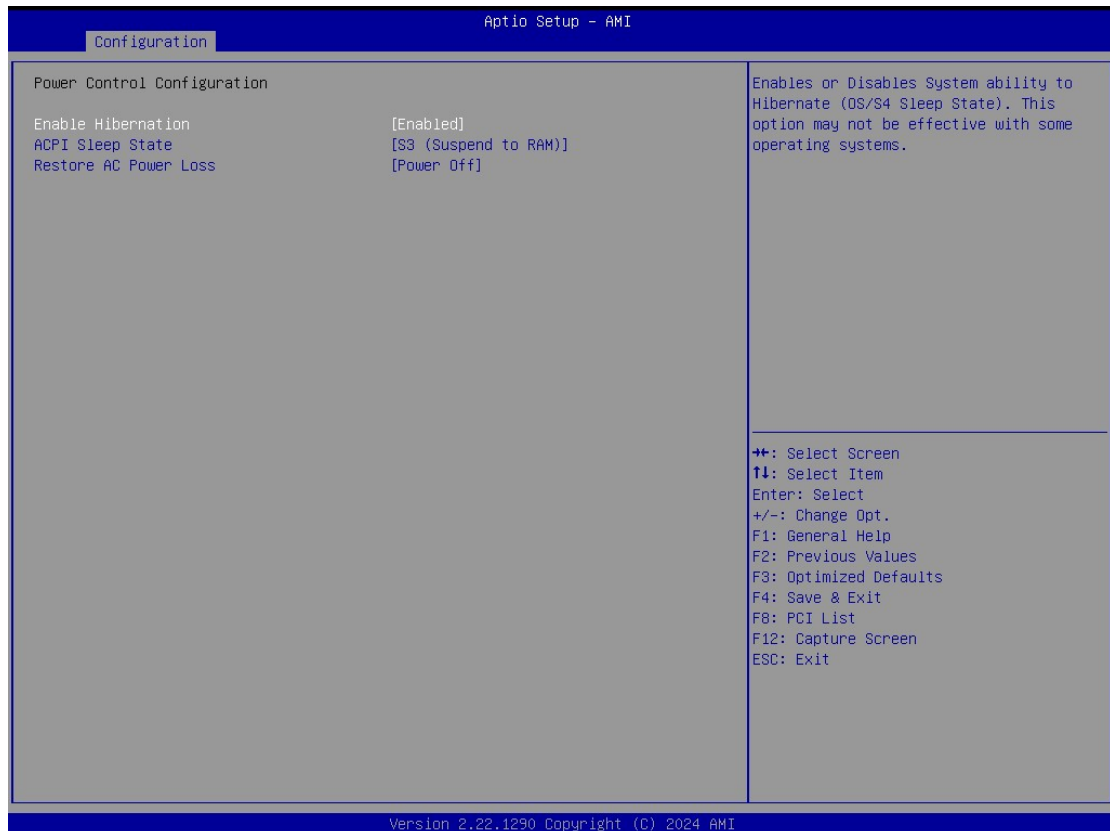


| Feature                   | Description                                                                                         | Options                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Primary Display</b>    | Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or Select HG for Hybrid Gfx. | ★ Auto, IGFX, PEG Slot, PCH PCI                                                               |
| <b>Internal Graphics</b>  | Keep IGFX enable based on the setup options.                                                        | ★ Auto, Disable, Enable                                                                       |
| <b>DVMT Pre-Allocated</b> | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.    | 60M, 32M, 64M, 96M, 128M, 160M, 12M, 16M, 20M, 24M, 28M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M |

|                           |                                                                               |                 |
|---------------------------|-------------------------------------------------------------------------------|-----------------|
| <b>DVMT Total Gfx Mem</b> | Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device | 128M,★256M, MAX |
|---------------------------|-------------------------------------------------------------------------------|-----------------|

## Power Control Configuration

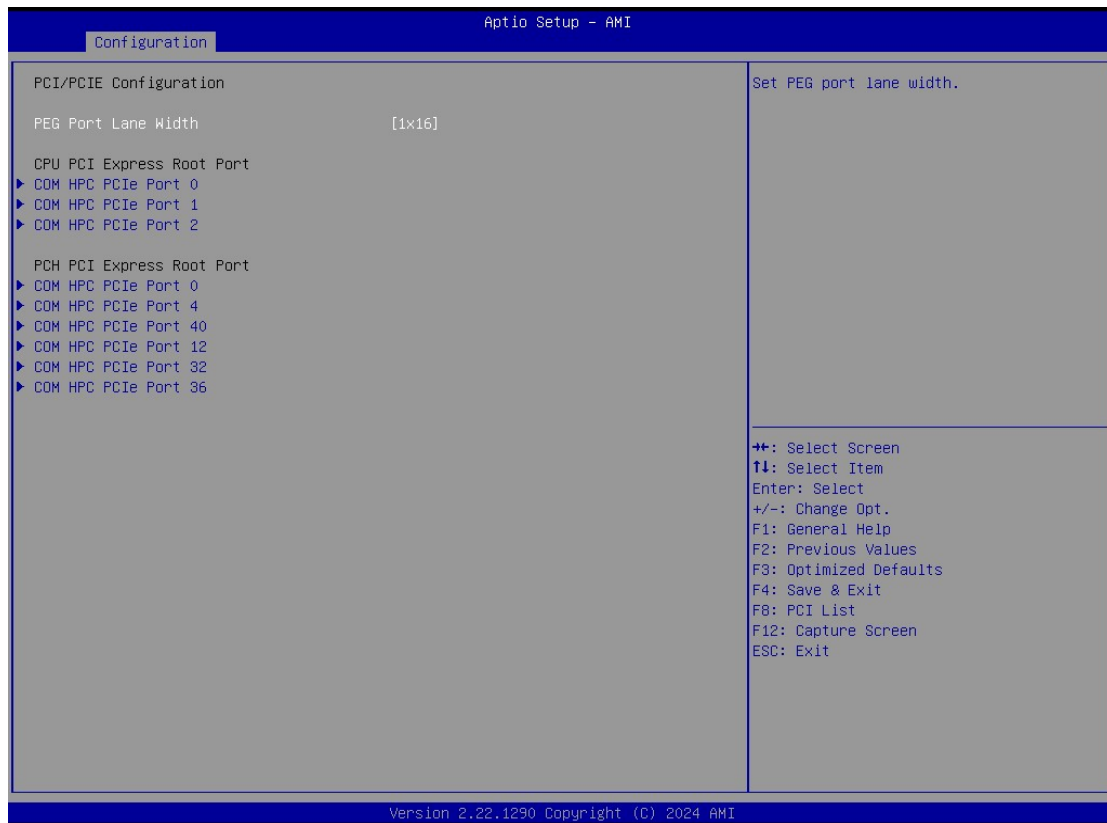
### System Power Control Configuration Parameters



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

# PCI/PCIE Configuration

PCI, PCI-X and PCI Express Settings

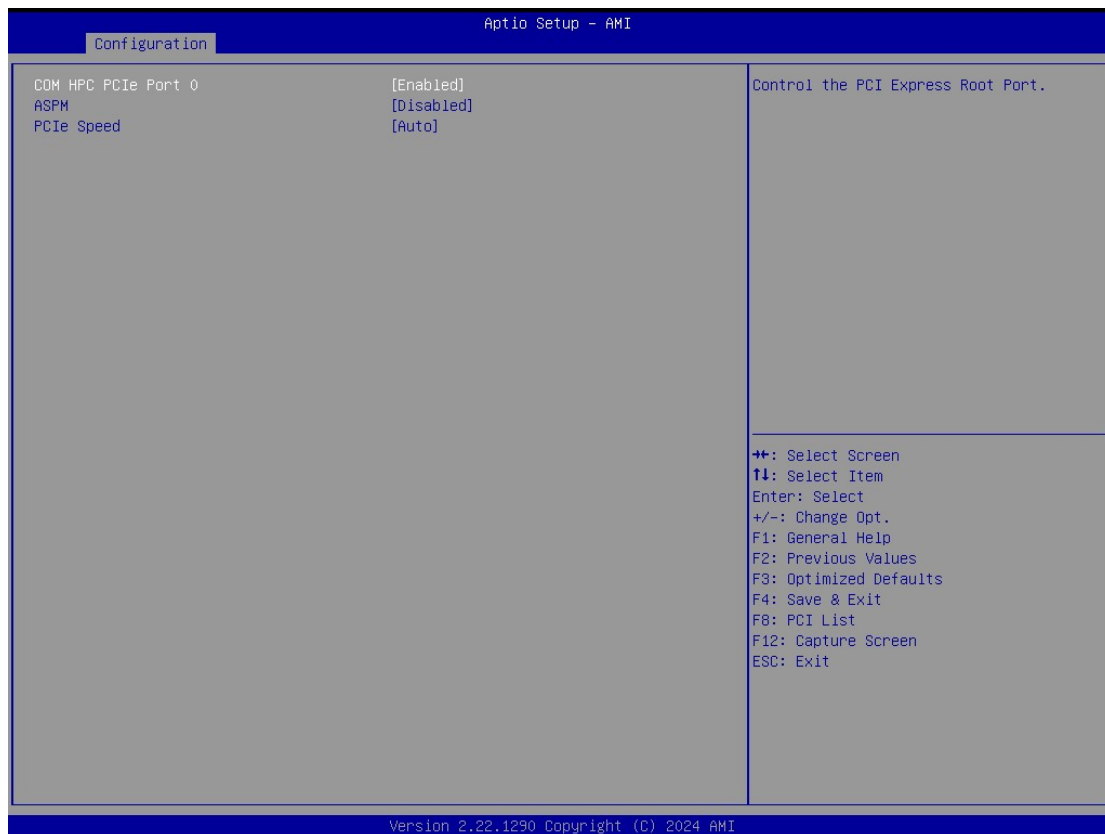


| Feature             | Description             | Options    |
|---------------------|-------------------------|------------|
| PEG Port Lane Width | Set PEG port Lane width | ★1x16, 2x8 |

## CPU PCI Esxpress Root Port

PCI Express Root Port Settings

**COM HPC PCIe Port 0 / COM HPC PCIe Port 1 / COM HPC PCIe Port 2**



| Feature                                          | Description                                                                              | Options                                  |
|--------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------|
| <b>COM HPC PCIe Port 0 – Port 2</b>              | Control the PCI Express Root Port.                                                       | Disabled, ★ Enabled                      |
| <b>ASPM</b>                                      | Set the ASPM Level: Force L0s – Force all links to L0s State<br>Disabled – Disables ASPM | ★ Disabled, L0s, L1, L0sL1               |
| <b>PCIe Speed (COM HPC PCIe Port 0)</b>          | Configuration PCIe Speed                                                                 | ★ Auto, Gen 1, Gen 2, Gen3, Gen 4,       |
| <b>PCIe Speed (COM HPC PCIe Port 1 / Port 2)</b> | Configuration PCIe Speed                                                                 | ★ Auto, Gen 1, Gen 2, Gen3, Gen 4, Gen 5 |

## PCH PCI Express Root Port

PCI Express Root Port Settings.

**COM HPC PCIe Port 0 / Port 4 / Port 40 / Port 12 / Port 32 / Port 36**

| Configuration                                                               |                                                                                                                       |                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aptio Setup - AMI                                                           |                                                                                                                       |                                                                                                                                                                                                                                                                                                 |
| COM HPC PCIe Port 4<br>ASPM<br>PCIe Speed                                   | [Enabled]<br>[Disabled]<br>[Auto]                                                                                     | Control the PCI Express Root Port.<br><br><br><br><br><br><br><br><br><br>++: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F8: PCI List<br>F12: Capture Screen<br>ESC: Exit |
| Version 2.22.1290 Copyright (C) 2024 AMI                                    |                                                                                                                       |                                                                                                                                                                                                                                                                                                 |
| Feature                                                                     | Description                                                                                                           | Options                                                                                                                                                                                                                                                                                         |
| <b>COM HPC PCIe Port 0 / Port 4 / Port 40 / Port 12 / Port 32 / Port 36</b> | Control the PCI Express Root Port.                                                                                    | Disabled, ★<br>Enabled                                                                                                                                                                                                                                                                          |
| <b>ASPM</b>                                                                 | Set the ASPM Level: Force L0s – Force all links to L0s State<br>Auto - BIOS auto configure / Disabled – Disables ASPM | ★ Disabled, L1, Auto                                                                                                                                                                                                                                                                            |
| <b>PCIe Speed (Root Port 0 / Port 4 / Port 40 )</b>                         | Configuration PCIe Speed                                                                                              | ★Auto, Gen 1, Gen 2, Gen3                                                                                                                                                                                                                                                                       |
| <b>PCIe Speed (Root Port 12 / Port 32 / Port 36)</b>                        | Configuration PCIe Speed                                                                                              | ★Auto, Gen 1, Gen 2, Gen3, Gen 4                                                                                                                                                                                                                                                                |

## LAN Configuration

Configuration onboard LAN device.

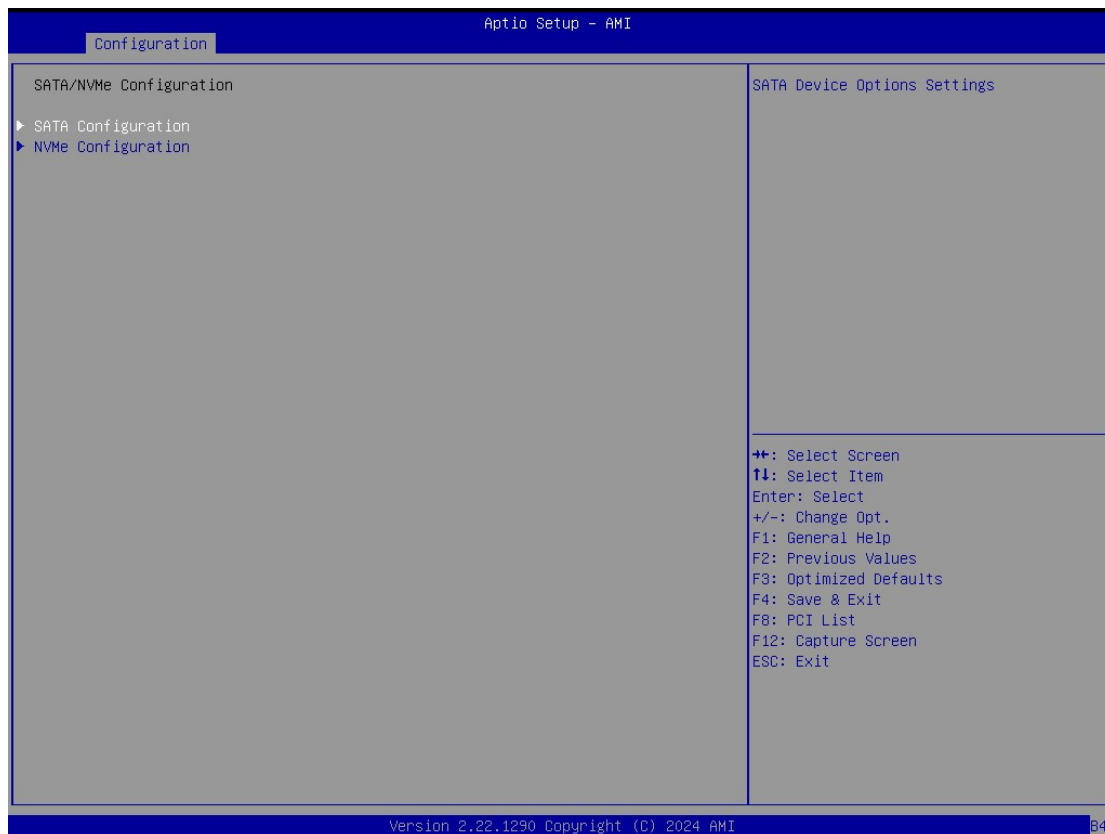
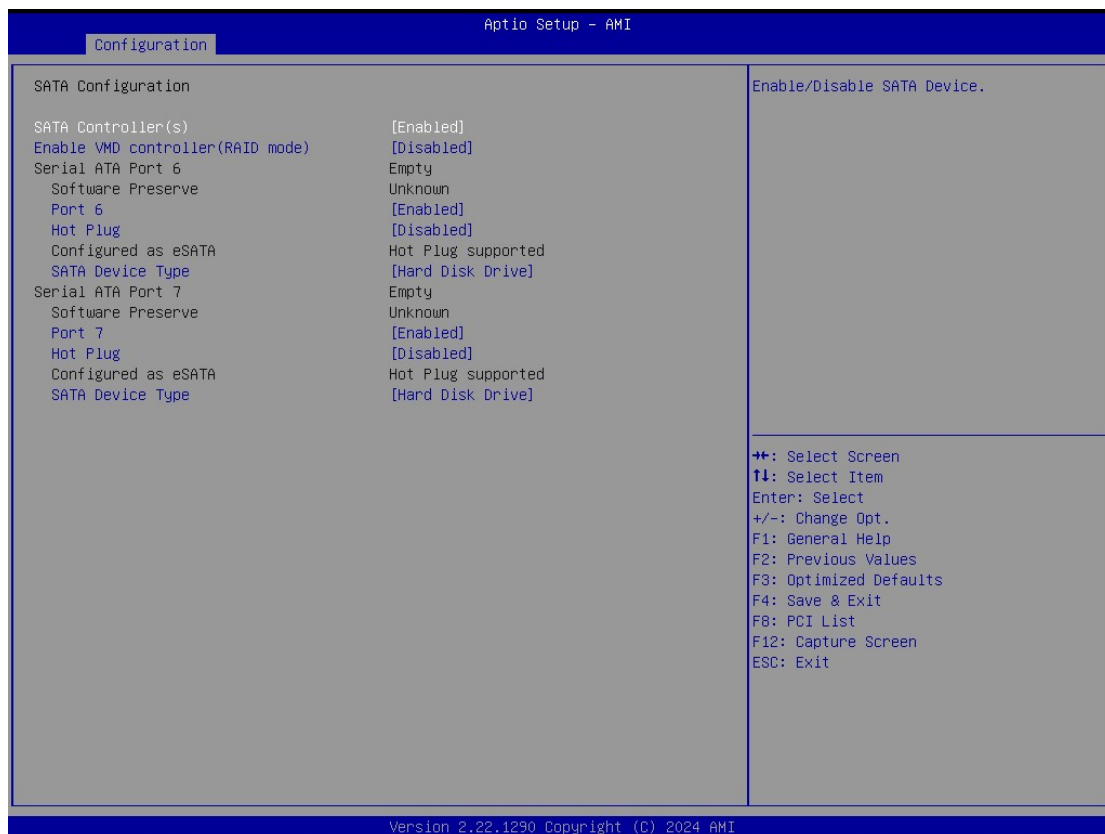
| Configuration                            |                   | Aptio Setup - AMI                                                                                                                                                                                                     |  |
|------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| LAN Configuration                        |                   | Control OnBoard LAN enable or disable.                                                                                                                                                                                |  |
| Module Ethernet Port 0                   |                   |                                                                                                                                                                                                                       |  |
| LAN MAC Address                          | 00-A0-C9-00-00-00 |                                                                                                                                                                                                                       |  |
| OnBoard LAN Controller#0                 | [Enabled]         |                                                                                                                                                                                                                       |  |
| Module Ethernet Port 1                   |                   |                                                                                                                                                                                                                       |  |
| LAN MAC Address                          | 00-A0-C9-00-00-00 |                                                                                                                                                                                                                       |  |
| OnBoard LAN Controller#1                 | [Enabled]         |                                                                                                                                                                                                                       |  |
| Launch UEFI PXE ROM                      | [Disabled]        |                                                                                                                                                                                                                       |  |
|                                          |                   | ++: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F8: PCI List<br>F12: Capture Screen<br>ESC: Exit |  |
| Version 2.22.1290 Copyright (C) 2024 AMI |                   |                                                                                                                                                                                                                       |  |

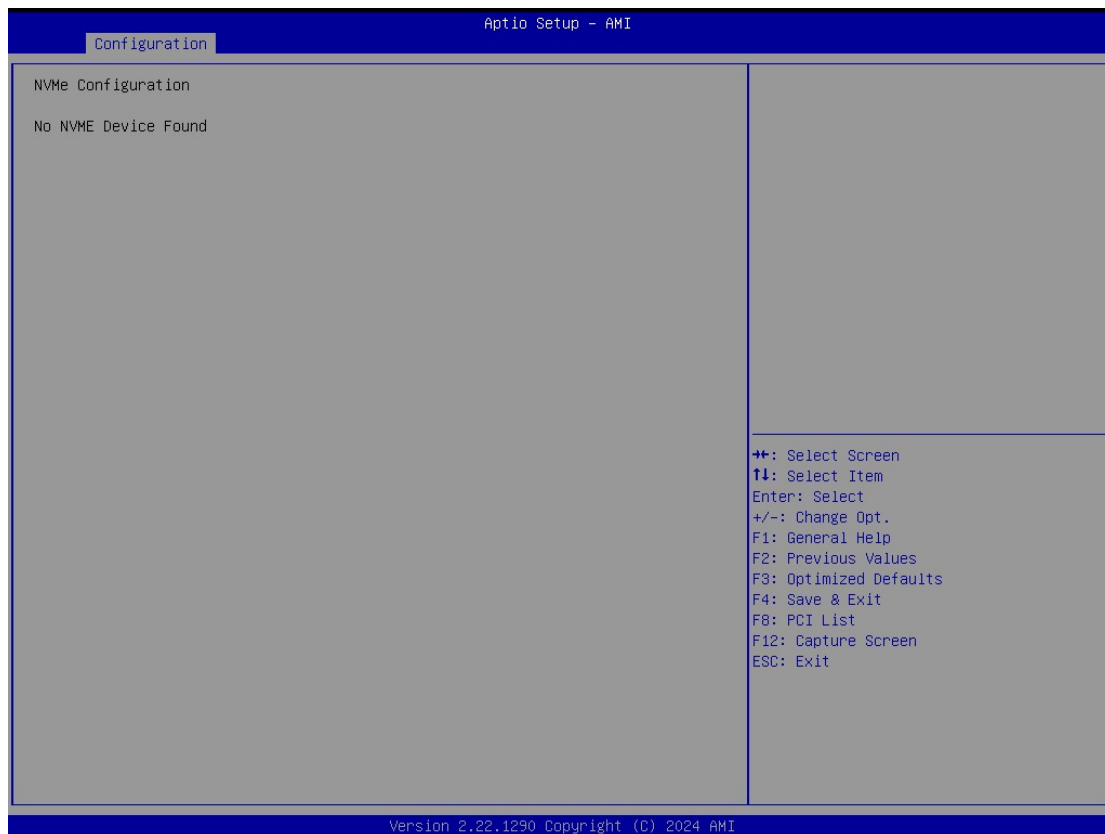
| Configuration                            |                   | Aptio Setup - AMI                                                                                                                                                                                                     |  |
|------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| LAN Configuration                        |                   | Enable/Disable UEFI Network Stack                                                                                                                                                                                     |  |
| Module Ethernet Port 0                   |                   |                                                                                                                                                                                                                       |  |
| LAN MAC Address                          | 00-A0-C9-00-00-00 |                                                                                                                                                                                                                       |  |
| OnBoard LAN Controller#0                 | [Enabled]         |                                                                                                                                                                                                                       |  |
| Module Ethernet Port 1                   |                   |                                                                                                                                                                                                                       |  |
| LAN MAC Address                          | 00-A0-C9-00-00-00 |                                                                                                                                                                                                                       |  |
| OnBoard LAN Controller#1                 | [Enabled]         |                                                                                                                                                                                                                       |  |
| Launch UEFI PXE ROM                      | [Enabled]         |                                                                                                                                                                                                                       |  |
| IPv4 PXE Support                         | [Enabled]         |                                                                                                                                                                                                                       |  |
| IPv4 HTTP Support                        | [Enabled]         |                                                                                                                                                                                                                       |  |
| IPv6 PXE Support                         | [Enabled]         |                                                                                                                                                                                                                       |  |
| IPv6 HTTP Support                        | [Enabled]         |                                                                                                                                                                                                                       |  |
| PXE boot wait time                       | 0                 |                                                                                                                                                                                                                       |  |
| Media detect count                       | 1                 |                                                                                                                                                                                                                       |  |
|                                          |                   | ++: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>F8: PCI List<br>F12: Capture Screen<br>ESC: Exit |  |
| Version 2.22.1290 Copyright (C) 2024 AMI |                   |                                                                                                                                                                                                                       |  |

| Feature                                | Description                                                                                                                 | Options             |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Onboard LAN Controller #0</b>       | Control the PCI Express Root Port.                                                                                          | ★Enabled , Disabled |
| <b>Onboard LAN Controller #1</b>       | Control the PCI Express Root Port.                                                                                          | ★Enabled , Disabled |
| <b>Launch UEFI PXE Rom</b>             | Enable/Disable UEFI Network Stack.                                                                                          | ★Disabled, Enabled  |
| <b>Launch UEFI PXE Rom – [Enabled]</b> |                                                                                                                             |                     |
| <b>IP4 PXE Support</b>                 | Enable/Disable IPv4 PXE boot support. If disable, IPv4 PXE boot support will not be available.                              | Disabled, ★Enabled  |
| <b>IPv4 HTTP Support</b>               | Enable/Disable IPv4 HTTP boot support. If disable, IPv4 HTTP boot support will not be available.                            | Disabled, ★Enabled  |
| <b>IPv6 PXE Support</b>                | Enable/Disable IPv6 PXE boot support. If disable, IPv6 PXE boot support will not be available.                              | Disabled, ★Enabled  |
| <b>IPv6 HTTP Support</b>               | Enable/Disable IPv6 HTTP boot support. If disable, IPv6 HTTP boot support will not be available.                            | Disabled, ★Enabled  |
| <b>PXE boot wait time</b>              | Wait time in seconds to press ESC key to abort the PXE boot. The PXE boot. Use either +/- or numeric keys to set the value. | ★0                  |
| <b>Media detect count</b>              | The number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.                 | ★1                  |

## SATA/NBMe Configuration

### SATA / NVMe Device Options Settings

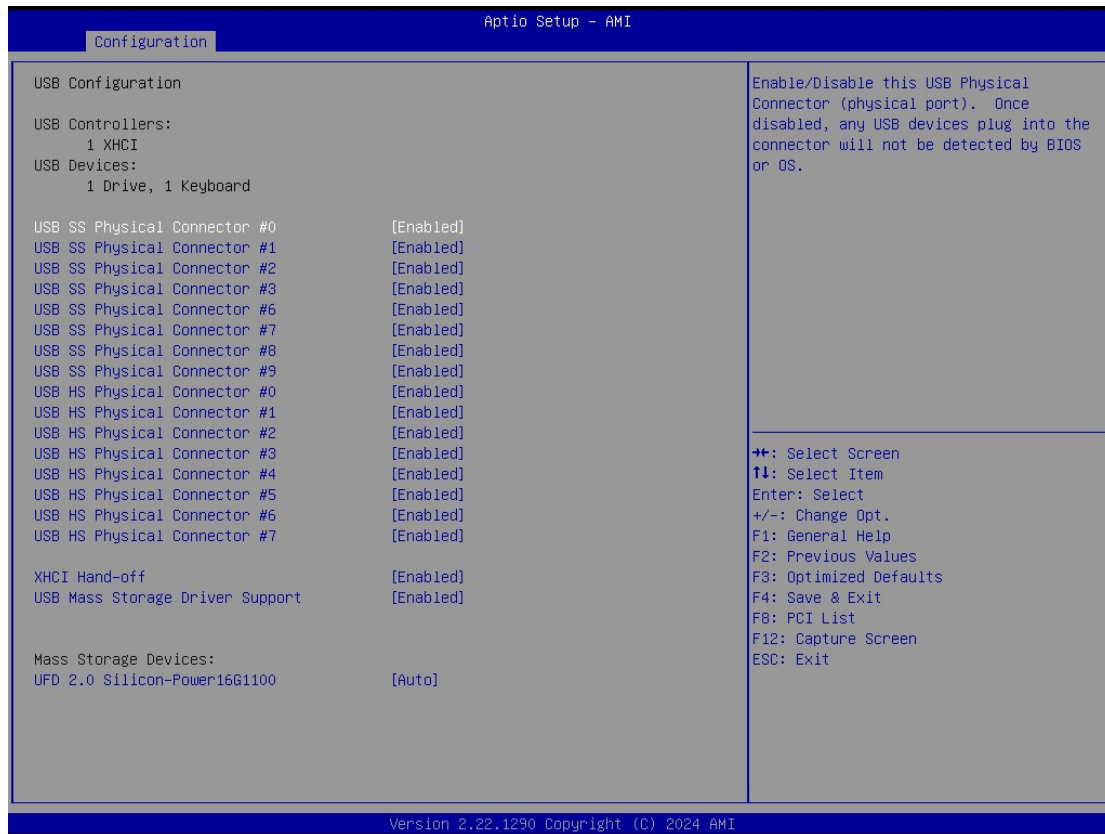




| Feature                                        | Description                                                                 | Options                             |
|------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------|
| <b>SATA Controller(s)</b>                      | Enable/disable SATA Device.                                                 | ★Enabled, Disabled                  |
| <b>Enable VMD controller (RAID mode)</b>       | Enable/disable to VMD controller.                                           | ★Disabled , Enabled                 |
| <b>Serial SATA Port 6 / Serial SATA Port 7</b> |                                                                             |                                     |
| <b>Port 6 / Port7</b>                          | Enable or Disable SATA Port                                                 | Disabled, ★Enabled                  |
| <b>Hot Plug</b>                                | Designates this port as Hot Pluggable                                       | ★Disabled, Enabled                  |
| <b>SATA Device Type</b>                        | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive | ★Hard Disk Drive, Solid State Drive |

## USB Configuration

### USB Configuration Parameters



| Feature                                  | Description                                                                                                                                            | Options               |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>USB SS Physical Connector #0 ~ #3</b> | 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. | Disabled,<br>★Enabled |
| <b>USB SS Physical Connector #6 ~ #9</b> | 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. | Disabled,<br>★Enabled |
| <b>USB HS Physical Connector #0 ~ #7</b> | 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. | Disabled,<br>★Enabled |
| <b>XHCI Hand-off</b>                     | This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver                                | Disabled,<br>★Enabled |
| <b>USB Mass Storage Driver Support</b>   | Enable/Disable USB Mass Storage Driver Support                                                                                                         | Disabled,<br>★Enabled |

# TPM Configuration

## Trusted Computing Setting

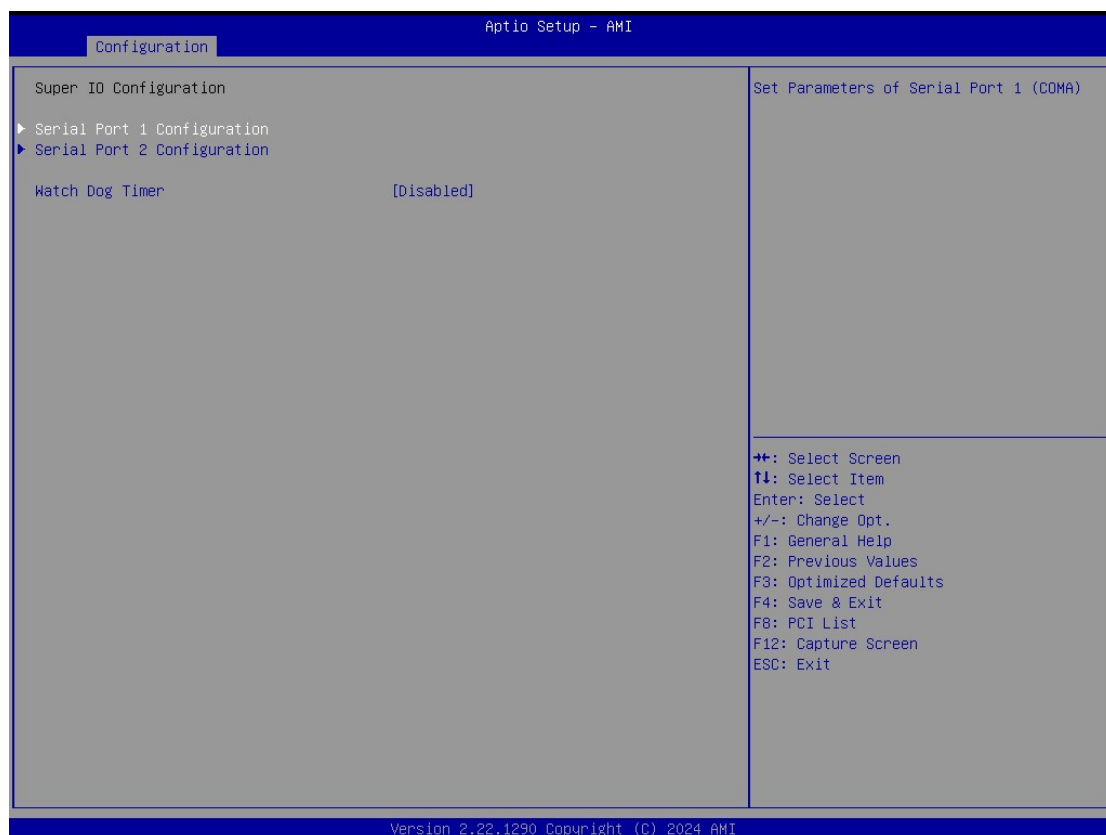


| Feature                        | Description                                                                                                                                           | Options               |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Security Device Support</b> | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A Interface will not be available. | Disabled,<br>★Enabled |
| <b>SHA256 PCR Bank</b>         | Enables or Disables SHA256 PCR Bank.                                                                                                                  | Disabled,<br>★Enabled |
| <b>Pending operation</b>       | 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      |
| <b>Platform Hierarchy</b>      | Enables or Disables Platform Hierarchy.                                                                                                               | Disabled,<br>★Enabled |
| <b>Storage Hierarchy</b>       | Enables or Disables Storage Hierarchy.                                                                                                                | Disabled,<br>★Enabled |
| <b>Endorsement</b>             | Enables or Disables Endorsement Hierarchy.                                                                                                            | Disabled,             |

| Hierarchy                             |                                                                                                                                                                                                                      | ★Enabled                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>TPM2.0 UEFI Spec Version</b>       | Select the TCG2 Spec Version Support<br>TCG_1_2: the Compatible mode for Win8/Win10<br>TCG_2: Support new TCG2 protocol and event format for Win10 or later                                                          | ★TCG_2, TCG_1_2         |
| <b>Physical Presence Spec Version</b> | Select to Tell O.S. to Support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.                                                                                                               | 1.2, ★1.3               |
| <b>Device Select</b>                  | 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

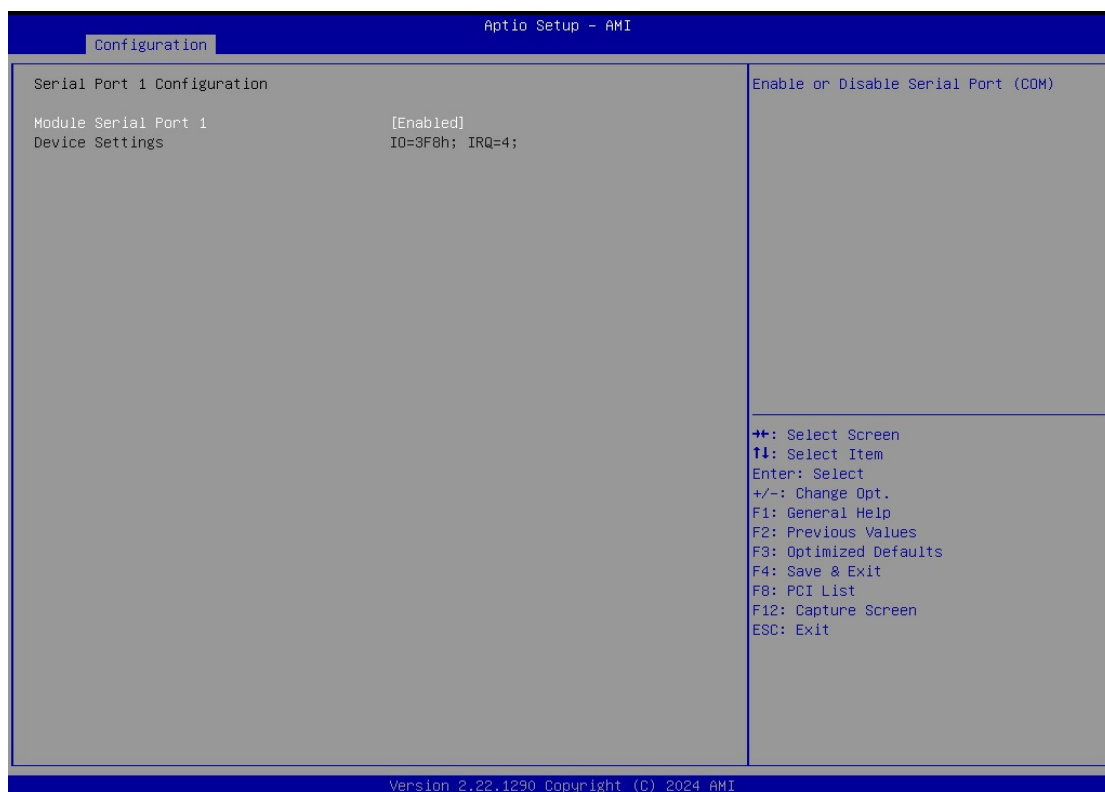
System Super IO Chip Parameters.



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

## Serial Port 1 Configuration

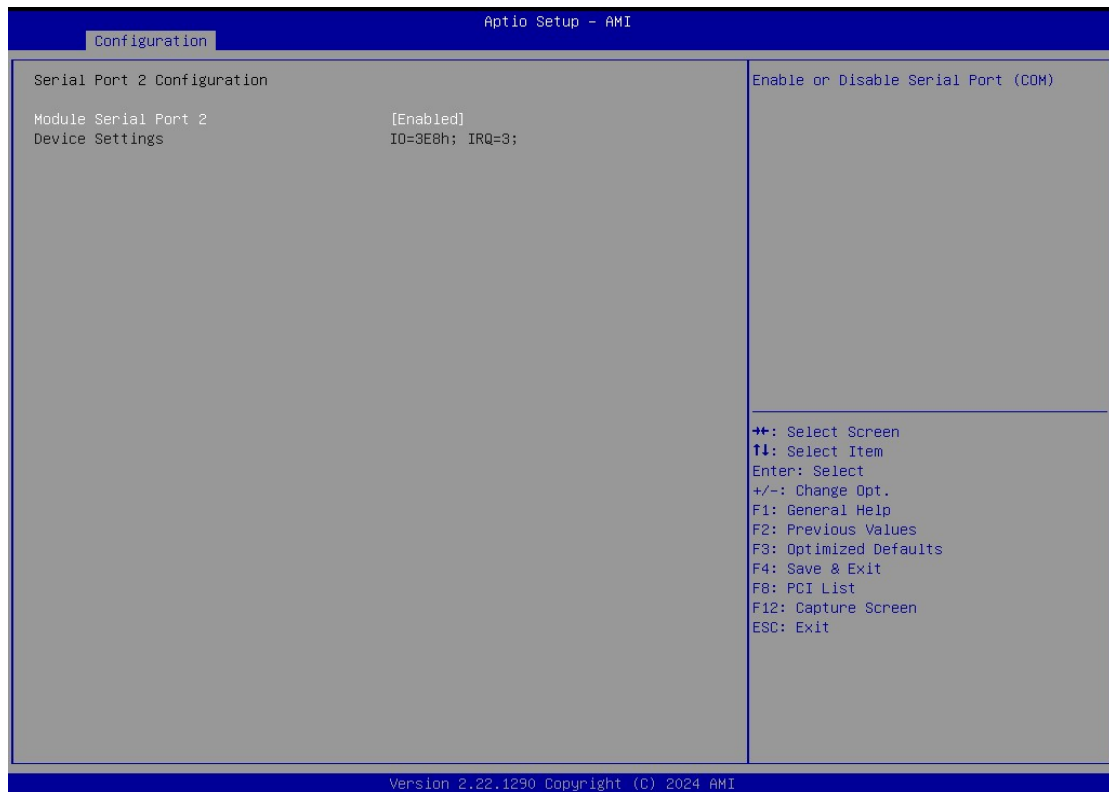
Set Parameters of Serial Port 1



| Feature              | Description                         | Options            |
|----------------------|-------------------------------------|--------------------|
| Module Serial Port 1 | Enable or Disable Serial Port (COM) | Disabled, ★Enabled |
| Device Settings      |                                     | ★IO=3F8h; IRQ=4;   |

## Serial Port 2 Configuration

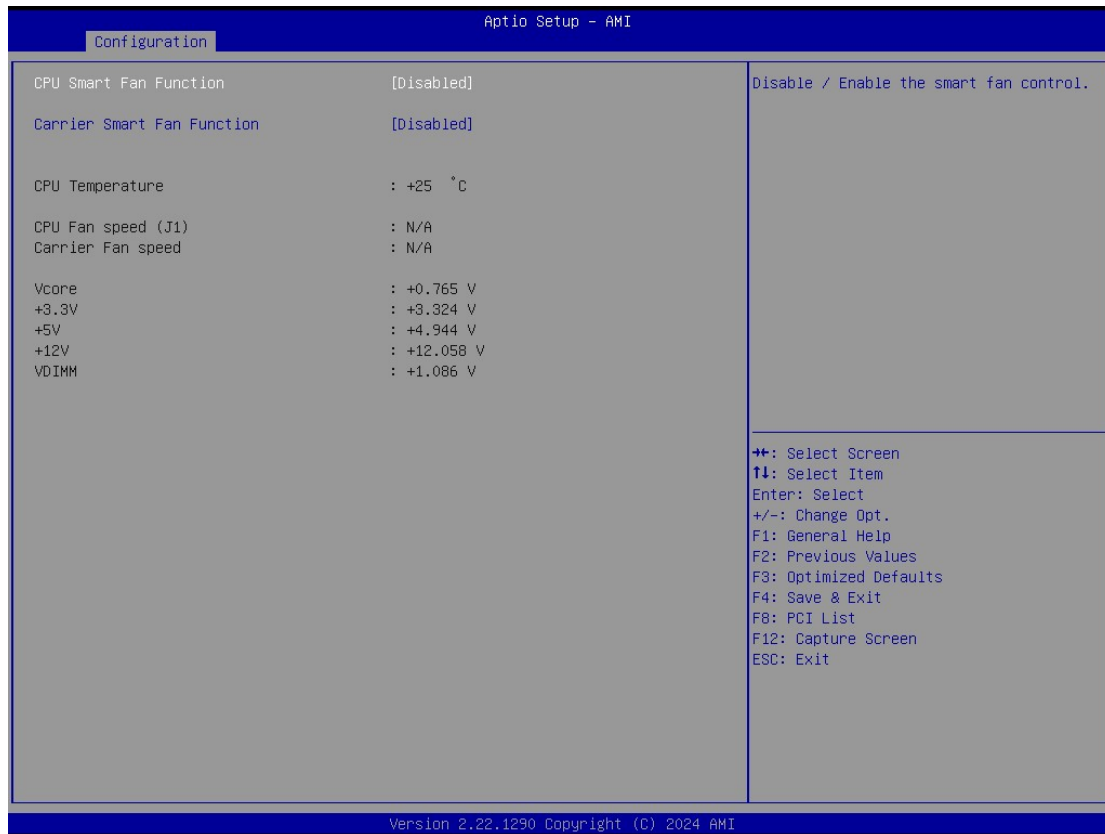
Set Parameters of Serial Port 2



| Feature                     | Description                         | Options               |
|-----------------------------|-------------------------------------|-----------------------|
| <b>Module Serial Port 2</b> | Enable or Disable Serial Port (COM) | Disabled,<br>★Enabled |
| <b>Device Settings</b>      |                                     | ★IO=3E8h; IRQ=3;      |

## H/W Monitor

Monitor hardware status

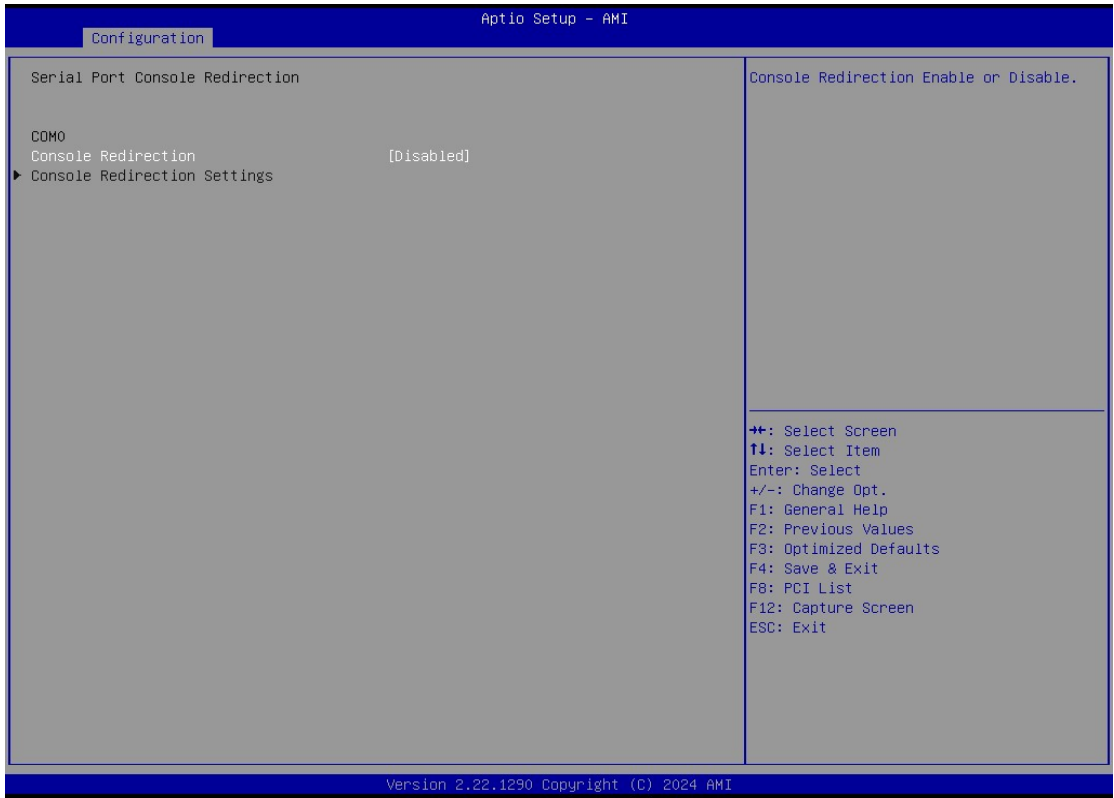


| Feature                                 | Description                                              | Options                                 |
|-----------------------------------------|----------------------------------------------------------|-----------------------------------------|
| <b>CPU Smart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

|                                                      |                                                          |                                        |
|------------------------------------------------------|----------------------------------------------------------|----------------------------------------|
| <b>CPU Smart Fan Control Mode [Control Mode]</b>     |                                                          |                                        |
| <b>CPU Smart Fan Speed (%)</b>                       | SE smart speed. 0-100%                                   | ★100                                   |
| <b>Carrier Smart Fan Function</b>                    | Enable / Disable the Smart Fan Control.                  | ★ Disabled, Enabled                    |
| <b>Carrier Smart Fan Function [Enabled]</b>          |                                                          |                                        |
| <b>Carrier Smart Fan Control Mode</b>                | Select smart fan control mode.                           | ★Thermal Cruise Mode, Fan Control Mode |
| <b>Carrier Smart Fan Tolerance Temp</b>              | In Thermal Cruise Mode: tolerance of target temperature. | ★5                                     |
| <b>Carrier Smart Fan Start Target Temp</b>           | In Thermal Cruise Mode: start temperature.               | ★40                                    |
| <b>Carrier Smart Fan Full Target Temp</b>            | In Thermal Cruise Mode: full speed temperature.          | ★60                                    |
| <b>Carrier Smart Fan Low End</b>                     | In Thermal Cruise Mode: low end of fan speed (0-100%)    | ★5                                     |
| <b>Carrier Smart Fan Control Mode [Control Mode]</b> |                                                          |                                        |
| <b>Carrier Smart Fan Speed (%)</b>                   | Set smart speed. 0-100%                                  | ★100                                   |

## Serial Port Console Redirection

Serial Port Console Redirection



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

## Console Redirection Settings

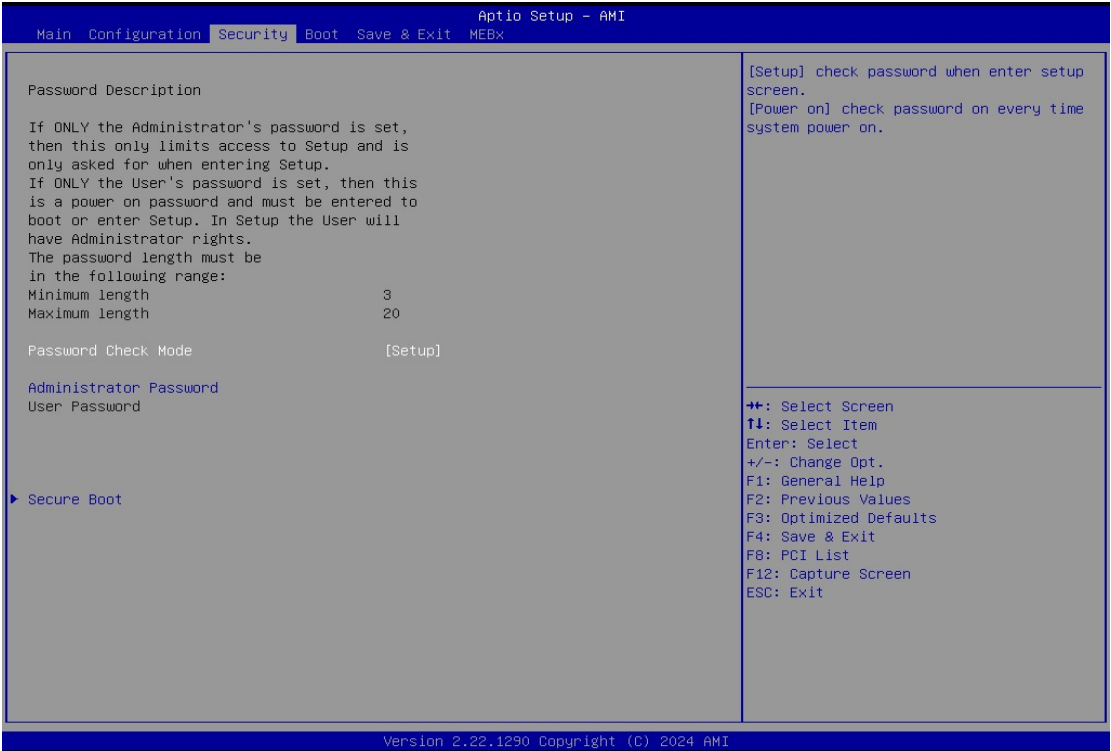
Console Redirection [Enabled]



| Feature                              | Description                                                                                                                                                                                                                                                                                                                                                                   | Options                            |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Console Redirection [Enabled]</b> |                                                                                                                                                                                                                                                                                                                                                                               |                                    |
| <b>Terminal Type</b>                 | Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.                                                                                                                                                                        | ★VT100Plus, VT100, VT-UTF8, ANSI   |
| <b>Bits per second</b>               | 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 |
| <b>Data bits</b>                     | Data bits                                                                                                                                                                                                                                                                                                                                                                     | 7, ★8,                             |
| <b>Parity</b>                        | 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      |

|                                  |                                                                                                                                                                                                                                                                                                                  |                                             |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Stop Bits</b>                 | 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                                        |
| <b>Flow Control</b>              | 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                     |
| <b>VT-UTF8 Combo Key Support</b> | Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals                                                                                                                                                                                                                                                  | Disabled,<br>★Enabled                       |
| <b>Recorder Mode</b>             | With this mode enabled only text will be sent. This is to capture Terminal data.                                                                                                                                                                                                                                 | ★Disabled,<br>Enabled                       |
| <b>Resolution 100x31</b>         | Enables or disables extended terminal resolution                                                                                                                                                                                                                                                                 | ★Disabled,<br>Enabled                       |
| <b>Putty KeyPad</b>              | Select FunctionKey and KeyPad on Putty                                                                                                                                                                                                                                                                           | ★VT100,<br>LINUX,XTERMR6,<br>SCO,ESCN,VT400 |

### 7.3.3. Security



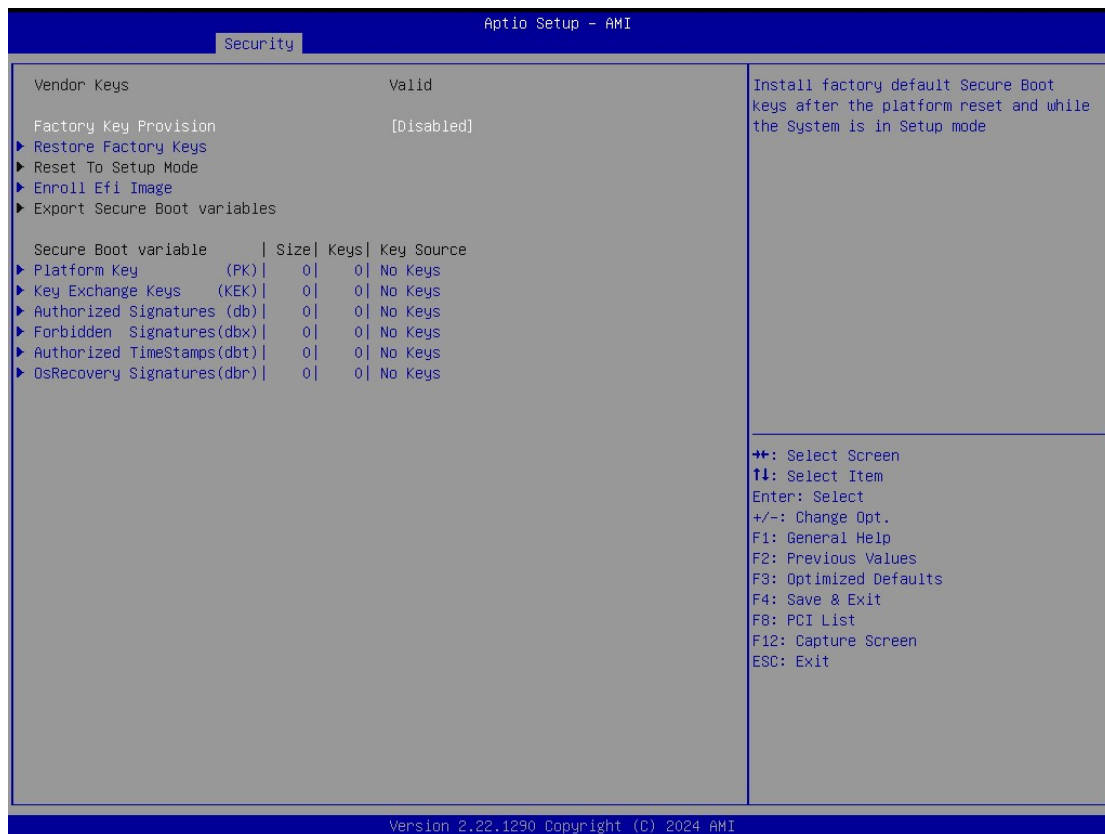
| Feature                | Description                                                                                                 | Options             |
|------------------------|-------------------------------------------------------------------------------------------------------------|---------------------|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

### Secure Boot

Secure Boot configuration



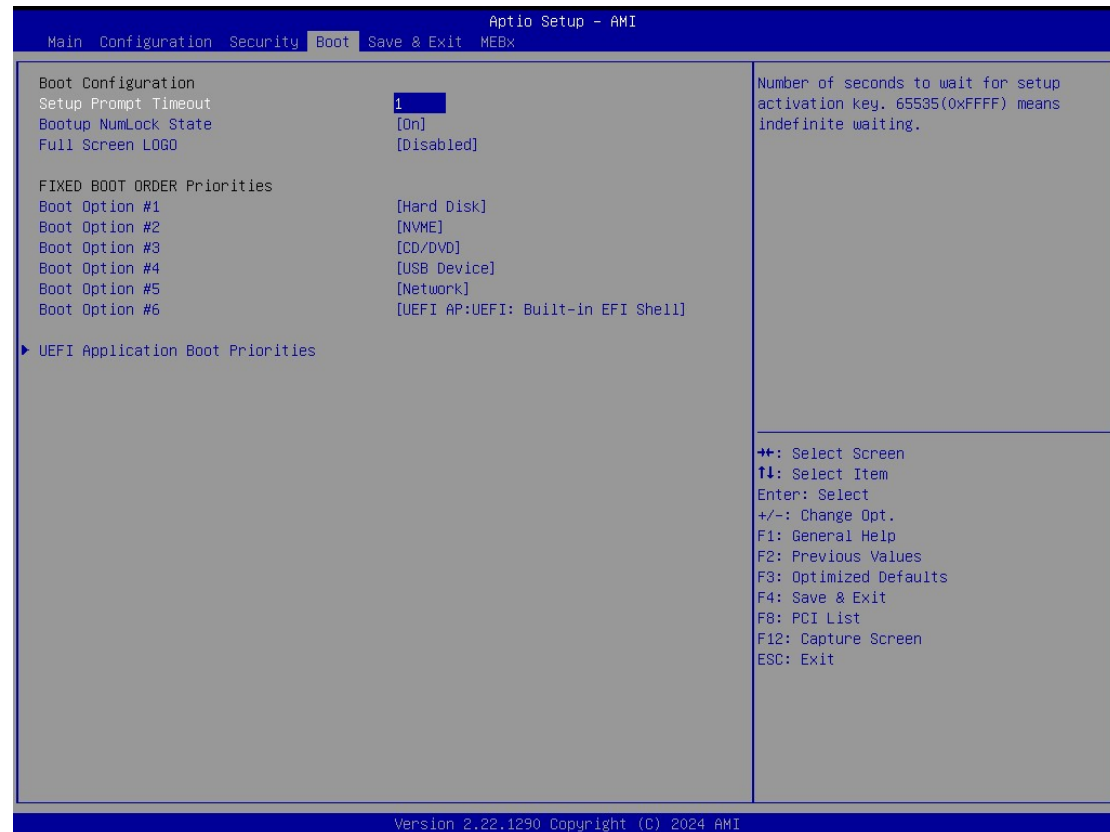
| Feature                     | Description                                                                                                                                                           | Options            |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Secure Boot</b>          | Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.       | ★Disabled, Enabled |
| <b>Secure Boot Mode</b>     | Secure Boot Mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication | ★ Custom ,Standard |
| <b>Restore Factory keys</b> | Force System to User Mode. Install factory default Secure Boot key databases                                                                                          | ★Yes, No           |



| Feature                       | Description                                                                                                                                                                                                                                                                                        | Options             |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Factory keys Provision</b> | Install factory default Secure Boot key after the platform reset and while the System is in Setup mode.                                                                                                                                                                                            | ★ Disabled, Enabled |
| <b>Restore Factory keys</b>   | Force System to User Mode. Install factory default Secure Boot key databases                                                                                                                                                                                                                       | ★ Yes, No           |
| <b>Platform Key(PK)</b>       | Enroll Factory Defaults or load certificates from a file:<br>1.Public Key Certificate:<br>a)EFI_SIGNATURE_LIST<br>b) EFI_CERT_X509 (DER)<br>c) EFI_CERT_RSA2048 (bin)<br>d)EFI_CERT_SHAXXX<br>2.Authenticated UEFI Variable<br>3.EFI PE/COFF Image(SHA256)<br>Key Source: Factory, External, Mixed |                     |
| <b>Key Exchange Keys</b>      |                                                                                                                                                                                                                                                                                                    |                     |
| <b>Authorized Signatures</b>  |                                                                                                                                                                                                                                                                                                    |                     |
| <b>Forbidden Signatures</b>   |                                                                                                                                                                                                                                                                                                    |                     |
| <b>Authorized TimeStamps</b>  |                                                                                                                                                                                                                                                                                                    |                     |
| <b>OsRecovery Signatures</b>  |                                                                                                                                                                                                                                                                                                    |                     |
| <b>Enroll Efi Image</b>       | Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of PE image into Authorized Signature Database (db)                                                                                                                                                                     |                     |

## 7.3.4. Boot

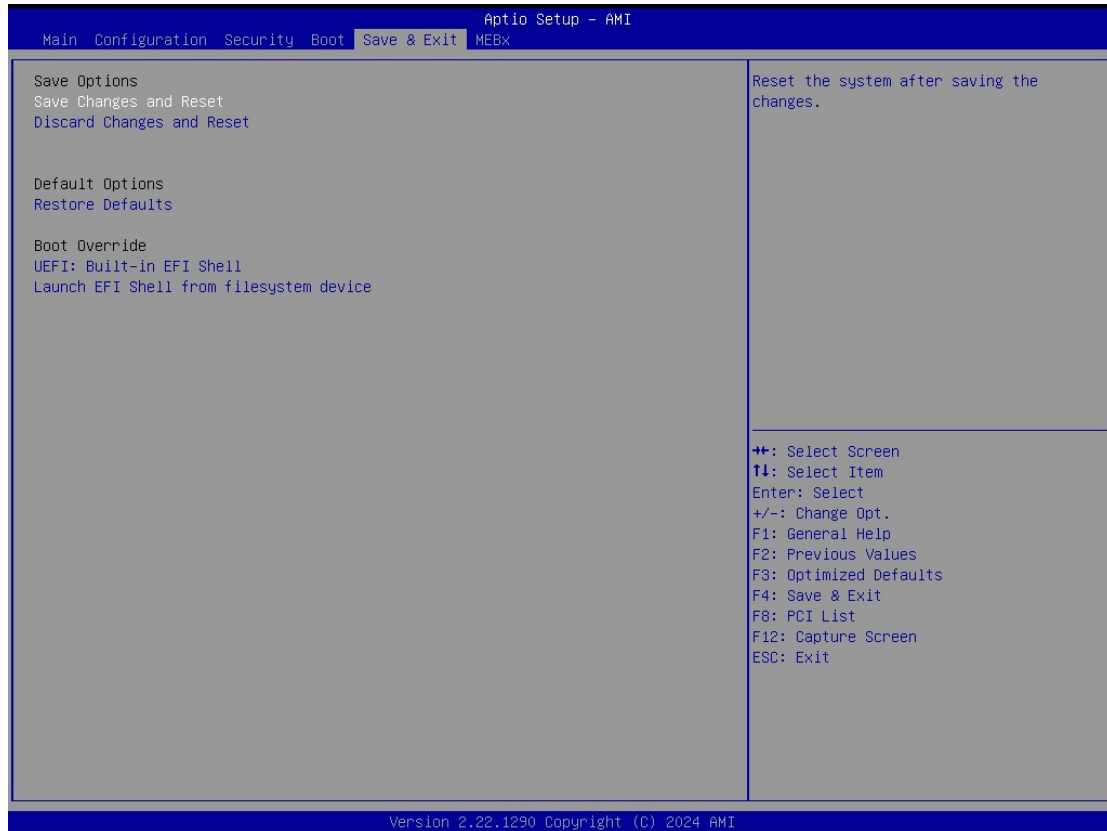
### Boot Configuration



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

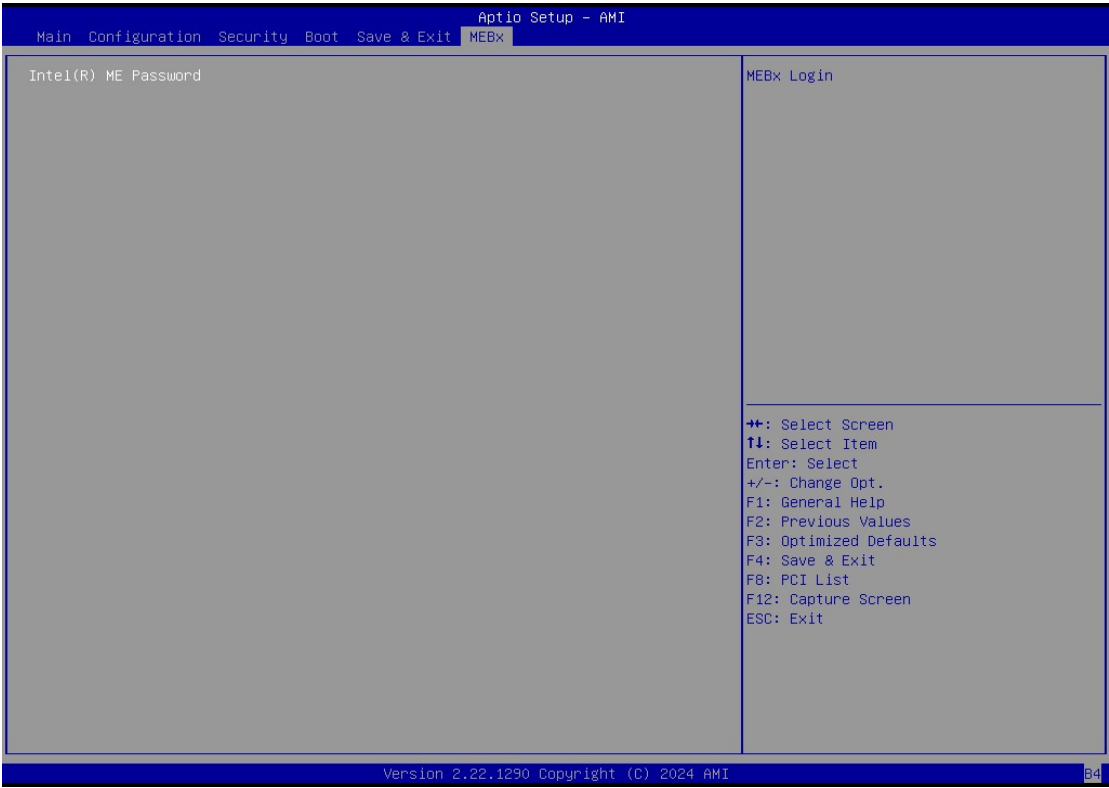
|                                         |                                                                             |  |
|-----------------------------------------|-----------------------------------------------------------------------------|--|
| <b>UEFI Application Boot Priorities</b> | Specifies the Boot Device Priority sequence from available UEFI Application |  |
|-----------------------------------------|-----------------------------------------------------------------------------|--|

## 7.3.5. Save & Exit



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

### 7.3.6. MEBx



| Feature               | Description | Options |
|-----------------------|-------------|---------|
| Intel (R) ME Password | MEBx Login  |         |

# Chapter 8

## Overview

### 8 BIOS / EC Update

## 8.BIOS / EC Update

PCOM-B885 only supports BIOS/EC update under UEFI shell environment; refer the following step, please.

### BIOS update

Step 1. Unzip update file to the USB DOK (**USB DOK must be FAT or FAT32 format**)

Step 2. Make sure “Save & Exit select” item is “UEFI: Built-in EFI Shell” in the BIOS “Boot” page. Shown as below picture



Step 3. Under the UEFI shell, change prompt to your USB DOK, the below example is “**fs0:**”

Step 4. Then change the folder with updated file and use command: “**update**” and press enter

```
COM4:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
UEFI Interactive Shell v2.2
EDK II
UEFI v2.80 (American Megatrends, 0x0005001B)
Mapping table
  FS0: Alias(s):HD0d0b:;BLK1:
        PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)/HD(1,MBR,0x006FD866,0x800,0x1E
00800)
  BLK0: Alias(s):
        PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs1:
'fs1:' is not a valid mapping.
Shell> fs0:
FS0:¥> cd Update_PCOM_B885_0_0_6
FS0:¥Update_PCOM_B885_0_0_6¥> Update.efi
```

Step 5. The updating process will start and show the updating progress

Step 6. Please power off and restart the system once updating finished

```
COM4:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
UEFI v2.80 (American Megatrends, 0x0005001B)
Mapping table
  FS0: Alias(s):HD0d0b:;BLK1:
        PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)/HD(1,MBR,0x006FD866,0x800,0x1E
00800)
  BLK0: Alias(s):
        PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)
Intel (R) Flash Programming Tool Version: 16.0.15.1662
Copyright (C) 2005 - 2021, 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 [0x20000000] - 100 percent complete.
- Programming Flash [0x20000000] 32768KB of 32768KB - 100 percent complete.
- Verifying Flash [0x20000000] 32772KB of 32768KB - 100 percent complete.
RESULT: The data is identical.

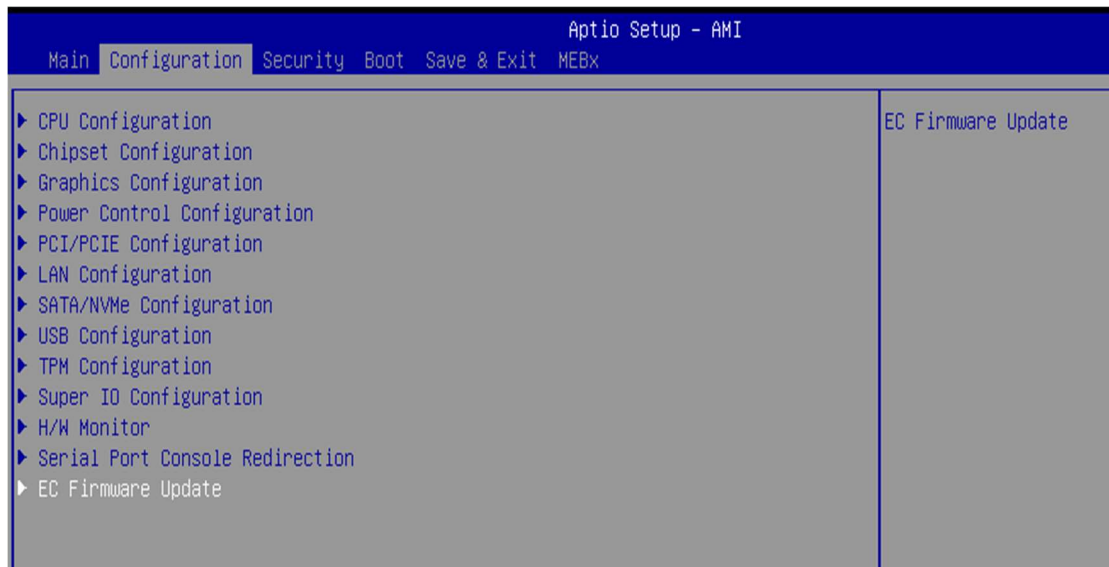
FPT Operation Successful.
FS0:¥Update_PCOM_B885_0_0_6¥>
```

(BIOS updating finished)

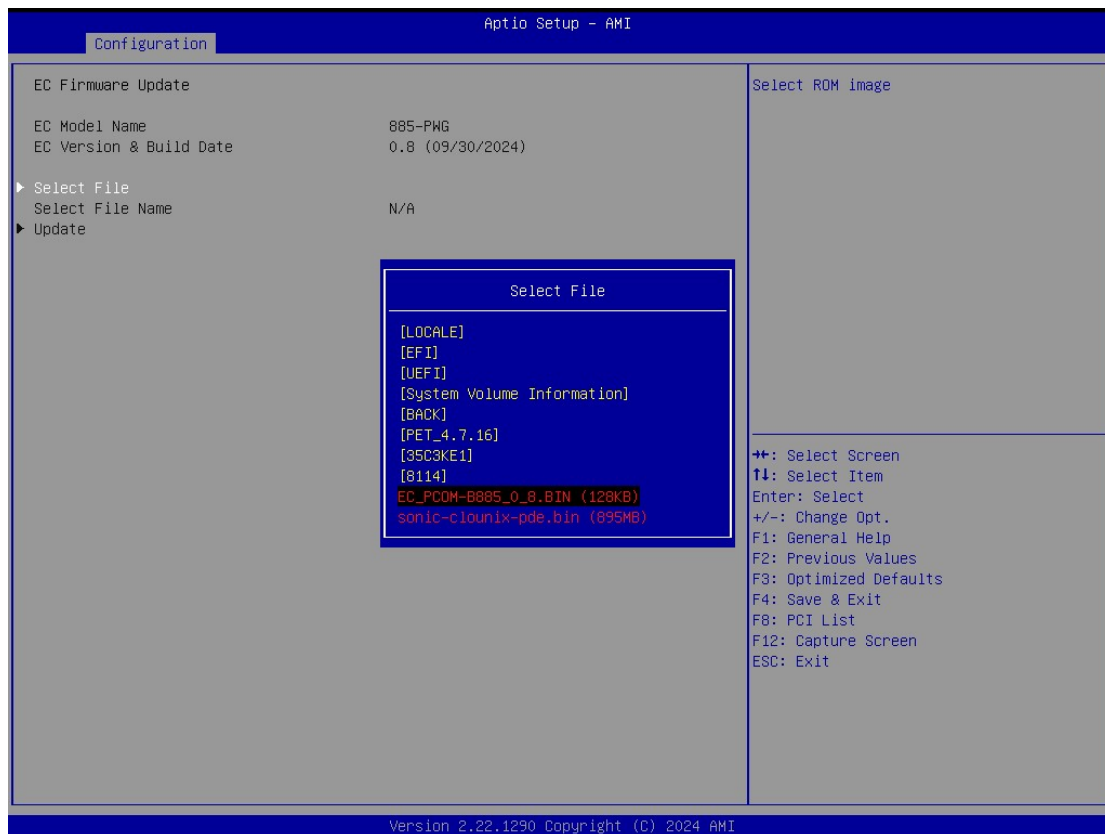
## EC update(Method 1)

Step 1. Unzip EC binary file to the USB DOK (USB DOK must be FAT or FAT32 format)

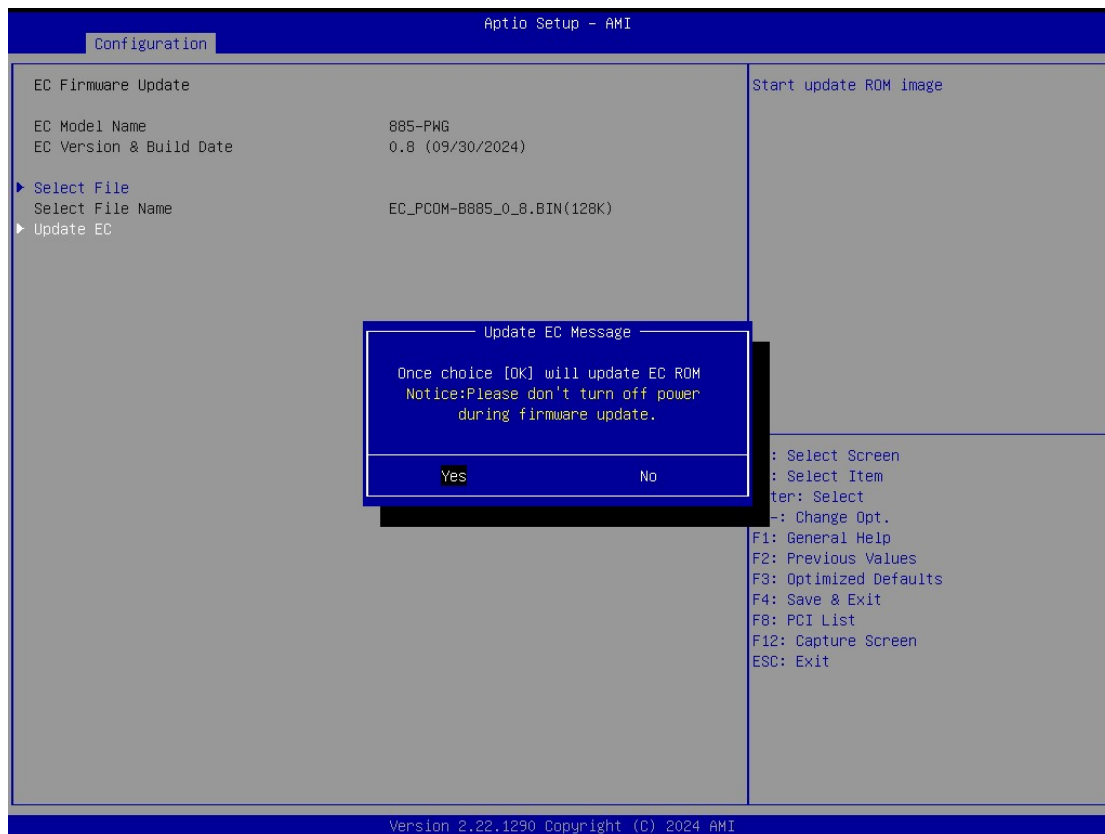
Step 2. Select “EC Firmware Update” item in BIOS setup menu



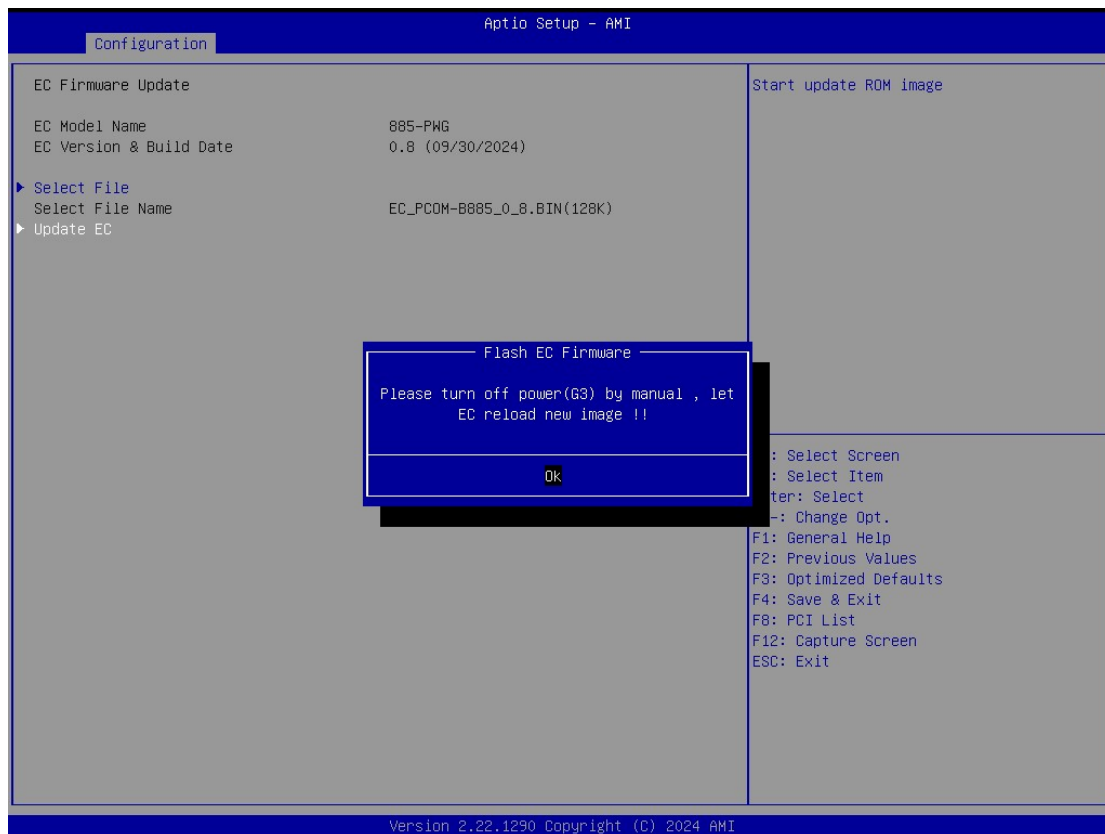
Step 3. Select EC binary file by option item shown as below



Step 4. Select “Yes” to start EC update (Please don’t turn off power during firmware update)



Step 5. Turn off power to make system into G3 status once updating finished, then power on the system



## EC update(Method 2)

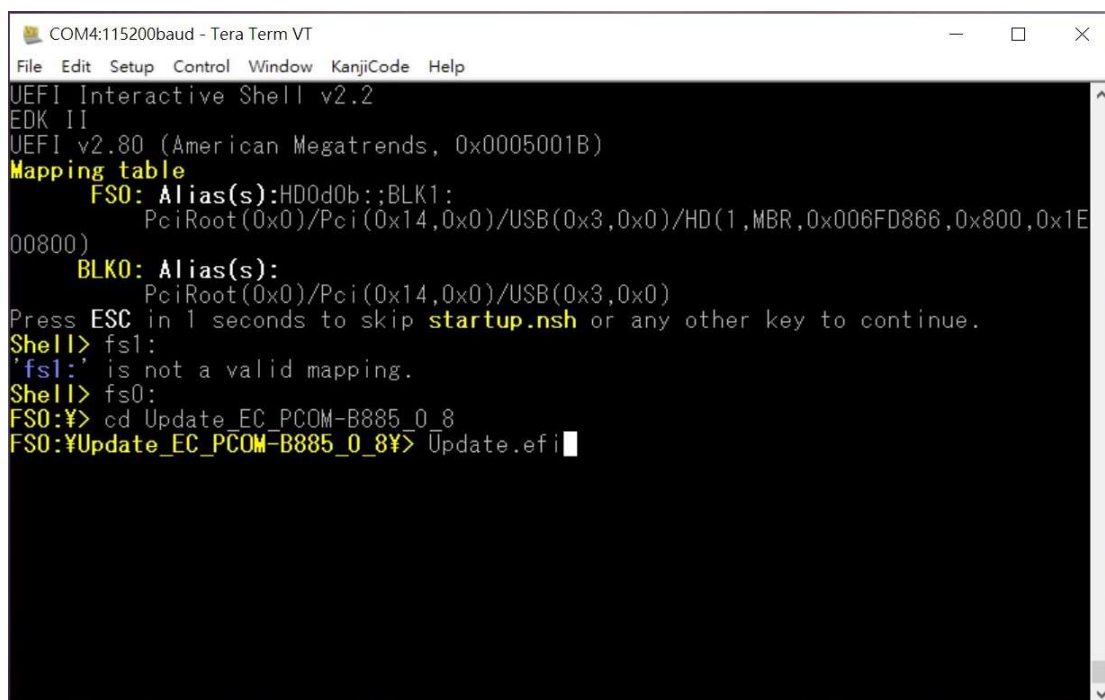
Step 1. Unzip update file to the USB DOK (**USB DOK must be FAT or FAT32 format**)

Step 2. Make sure “Save & Exit select” item is “UEFI: Built-in EFI Shell” in the BIOS “Boot” page. Shown as below picture



Step 3. Under the UEFI shell, change prompt to your USB DOK, the below example is “**fs0:**”

Step 4. Then change the folder with updated file and use command: “**update**” and press enter



Step 5. The updating process will start and show the updating progress

Step 6. Please power off and restart the system once updating finished

```

COM4:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
UEFI v2.80 (American Megatrends, 0x0005001B)
Mapping table
FS0: Alias(s):HD0d0b::BLK1:
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)/HD(1,MBR,0x006FD866,0x800,0x1E
00800)
      BLK0: Alias(s):
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x3,0x0)
Current shell version is v2.x
ITE EC Flash Utility for UEFI Shell, Version : 1.4.0 (64)
<Re-Write by FoxYang .. 2021/12/22 >

[/NOKBC] support
!!Please don't use KB/MS during updating ....!!
Device ID       : EF 40 14 0
SPI Vendor      : Winbond
Erasing...      : ***** -- Erase OK.
Erase Verify... : ***** -- Erase Verify OK.
Programing...   : ***** -- Programing OK.
Verify...       : ***** -- Verify OK.

Please turn off power(G3) by manual , let EC reload new image !!
FS0:¥Update_EC_PCOM-B885_0_8¥>

```

(EC updating finished)

# Chapter 9

## Overview

### 9 Portwell Software Tool

## 9. Portwell Software Tool

PORTWELL Download Center

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

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.

# Chapter 10

## Overview

### 10 Packaging Information

## 10. Packaging Information

PCOM-B885's packaging specification will follow the Portwell standard style.

| Package                   | Appearance                                                                           | Dimension     |
|---------------------------|--------------------------------------------------------------------------------------|---------------|
| Anti-Static Bubble Bag    |    | 180x130mm     |
| White Paper Box           |   | 210x150x40mm  |
| Shipping Box<br>(10 in 1) |  | 595x300x185mm |

Table 113 Packaging Information

# Chapter 11

## Overview

### 11 Industrial Specification

# 11. Industrial Specification

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

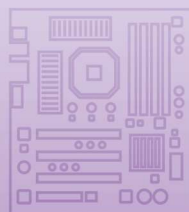
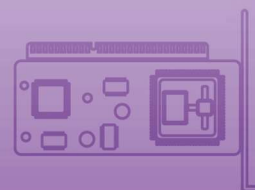
<http://www.picmg.org/>

PCI Express Base Specification, Revision 2.0

<https://www.pcisig.com/specifications>



Please verify specifications before quoting. This guide is intended for reference purposes only. All product specifications are subject to change without notice. No part of this publication may be reproduced in any form or by any means, such as electronically, by photocopying, recording, or otherwise, without prior written permission from the publisher. All brand and product names are trademarks or registered trademarks of their respective companies.



#### Portwell, Inc. Headquarters

No. 242, Bo'AI St., Shu-Lin Dist,  
New Taipei City 238, Taiwan  
Tel: +886-2-7731-8888  
Fax: +886-2-7731-9888  
E-mail: [info@portwell.com.tw](mailto:info@portwell.com.tw)  
[www.portwell.com.tw](http://www.portwell.com.tw)

#### American Portwell

(Fremont, CA)  
Tel: +1-510-403-3399  
E-mail: [info@portwell.com](mailto:info@portwell.com)  
[www.portwell.com](http://www.portwell.com)

#### Portwell UK Ltd.

Tel: +44(0)1235-750-760  
E-mail: [info@portwell.eu](mailto:info@portwell.eu)  
[www.portwell.eu](http://www.portwell.eu)

#### Portwell Japan, Inc.

(Tokyo)  
Tel: +81-3-6902-9225  
E-mail: [info@portwell.co.jp](mailto:info@portwell.co.jp)  
[www.portwell.co.jp](http://www.portwell.co.jp)

#### Portwell Japan, Inc.

(Osaka)  
Tel: +81-6-4807-7721  
E-mail: [info@portwell.co.jp](mailto:info@portwell.co.jp)  
[www.portwell.co.jp](http://www.portwell.co.jp)

#### European Portwell

Tel: +31-252-620790  
E-mail: [info@portwell.eu](mailto:info@portwell.eu)  
[www.portwell.eu](http://www.portwell.eu)

#### KIOSK Embedded Systems GmbH

Tel: +49-8152-3962-500  
E-mail: [info@portwell.eu](mailto:info@portwell.eu)  
[www.portwell.de](http://www.portwell.de)

#### Shanghai Portwell

Tel: +86-21-5771-2505  
E-mail: [info@portwell.com.cn](mailto:info@portwell.com.cn)  
[www.portwell.com.cn](http://www.portwell.com.cn)

#### Portwell Korea, Inc.

Tel: +82-31-450-3043  
E-mail: [info@portwell.co.kr](mailto:info@portwell.co.kr)  
[www.portwell.co.kr](http://www.portwell.co.kr)

#### Portwell India Technology Private Limited

Tel: +91-80-4168-4255  
E-mail: [enquiry@portwell.in](mailto:enquiry@portwell.in)  
[www.portwell.in](http://www.portwell.in)