

# **ET980 Series**

**Intel® 12th Gen. Core™  
COM Express Type 6 Module**

## **User's Manual**

Version 1.0  
(March 2023)

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## Compliance



This product has passed CE tests for environmental specifications and limits. This product is in accordance with the directives of the European Union (EU). In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.



This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

### WEEE



This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

### Green IBASE



This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

## Important Safety Information

Carefully read the precautions before using the board.

### Environmental conditions:

- Use this product in environments with ambient temperatures between 0°C and 60°C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

### Care for your iBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.



### WARNING

### Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

### Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.



### CAUTION

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

## Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3<sup>rd</sup>-party parts:**

12-month (1-year) warranty from delivery for the 3<sup>rd</sup>-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

- \* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

## Technical Support & Services

1. Visit the IBASE website at [www.ibase.com.tw](http://www.ibase.com.tw) to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
  - Product model name
  - Product serial number
  - Detailed description of the problem
  - The error messages in text or in screenshots if there is any
  - The arrangement of the peripherals
  - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please login in the RMA system of the website or and contact your distributor or sales representative for assistance.

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# Chapter 1

## General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Block Diagram
- Board View
- Board Dimensions

## 1.1 Introduction

Designed for computing embedded applications in industrial, gaming, medical and various IoT applications, ET980 is a COM Express module based on the platform of Intel 12th Gen. Core i7/i5/i3 processors. It supports COM Express carrier boards that can be upgraded to newer or backward-compatible versions. The ET980 features two DDR4-3200 memory slots, 2.5GbE connectivity, triple independent displays, and a comprehensive set of I/O including 4x USB 3.2, 8x USB 2.0, 2x SATA III, 2x COM, as well expansion slots for 1x PCI-E(x16), 1x PCI-E(x4), 4x PCI-E(x1) via the carrier board.

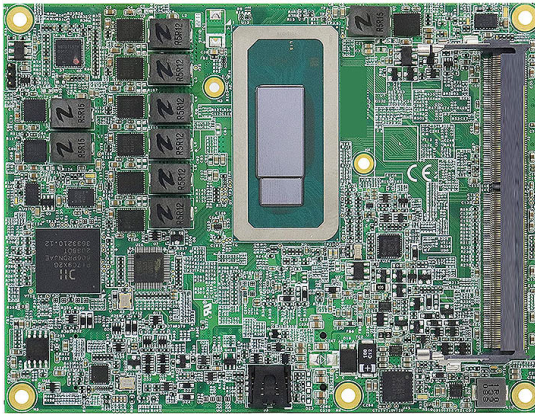


Photo of ET980

## 1.2 Features

- Onboard 12th Gen Intel® Core™ i7/i5/i3 processors
- 2x DDR4-3200 SO-DIMM sockets, Max. 64GB
- Onboard 2.5 GbE
- Supports 3x independent displays - HDMI / DP / VGA / LVDS or eDP
- 4x USB 3.2, 8x USB 2.0, 2x SATA III, 2x COM
- 1x PCI-E(x8) [2x PCI-E(4x) signal\*\*], 1x PCI-e(x4), 4x PCI-E(x1) to carrier board
  - \*\*Only one PCI-E (x8) signal from Alder Lake-P 28W/15W CPU skus\*\*
- Digital I/O, TPM (2.0), Watchdog timer



### 1.3 Packing List

Your ET980 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- ET980 COM Express Module x 1
- Disk (including drivers and flash memory utility) x 1
- This User's Manual x 1

### 1.4 Specifications

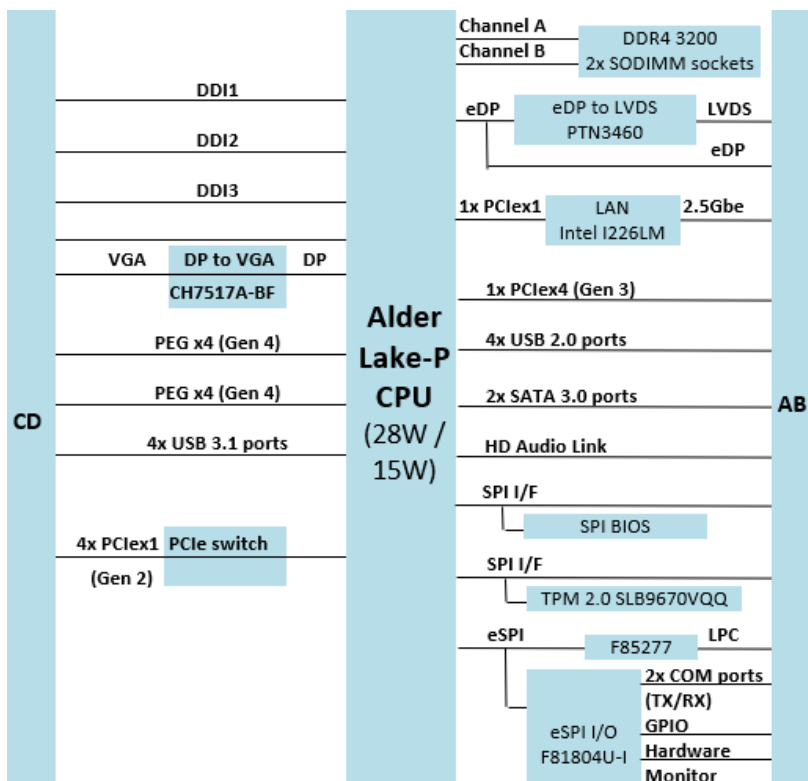
| Product Models  |
|---|
| <b>ET980LV-I7U</b> - Intel® Core™ i7-1265UE with LVDS support |
| <b>ET980LV-I7P</b> - Intel® Core™ i7-1270PE with LVDS support |
| <b>ET980LV-I5U</b> - Intel® Core™ i5-1245UE with LVDS support |
| <b>ET980-I5U</b> - Intel® Core™ i5-1245UE with eDP support    |
| <b>ET980LV-I5P</b> - Intel® Core™ i5-1250PE with LVDS support |
| <b>ET980LV-I3P</b> - Intel® Core™ i3-1220PE with LVDS support |

| System                  |   |
|-------------------------|---|
| <b>Operating System</b> | Windows 10 (64-bit)   |
| <b>Memory</b>           | 2x DDR4-3200 SO-DIMM sockets, Max. 64GB, ECC compatible   |
| <b>Graphics</b>         | 12th Gen Intel® Core™ P-series processor integrated graphics  |
| <b>Video Output</b>     | HDMI, DisplayPort, VGA, LVDS or eDP on carrier board  |
| <b>Ethernet</b>         | Intel® I226LM 2.5 GbE RJ45 on carrier board   |
| <b>Super I/O</b>        | Fintek F81804U-I  |
| <b>USB 2.0</b>          | 8x USB 2.0 via carrier board  |
| <b>USB 3.X</b>          | 4x USB 3.1 (Gen 2) via carrier board  |
| <b>Serial ATA</b>       | 2x SATA III via carrier board   |
| <b>Audio</b>            | Built-in HD Audio controller  |
| <b>Expansion Slot</b>   | 1x PCI-E(x8) [(Gen. 4) (PCIe(4x)+ PCIe(4x)), 1xPCI-E(x4) (Gen. 3), 4x PCI-E(x1) (Gen. 2) to carrier board |

|                          |   |
|--------------------------|---|
| <b>Watchdog Timer</b>    | Yes (256 segments, 0, 1, 2...255 sec / min)   |
| <b>BIOS</b>              | AMI BIOS  |
| <b>H/W Monitor</b>       | Yes   |
| <b>TPM</b>               | TPM (2.0)   |
| <b>Dimensions</b>        | 125 x 95 mm ( 4.92" x 3.74")  |
| <b>Certification</b>     | CE, FCC Class B, LVD  |
| <b>RoHS</b>              | Yes   |
| <b>Environment</b>       |   |
| <b>Temperature</b>       | <ul style="list-style-type: none"><li>• Operation: 0 ~ 60 °C (32 ~ 140 °F)</li><li>• Storage: -20 ~ 80 °C (-4 ~ 176 °F)</li></ul> |
| <b>Relative Humidity</b> | 10 ~ 95 %, non-condensing   |

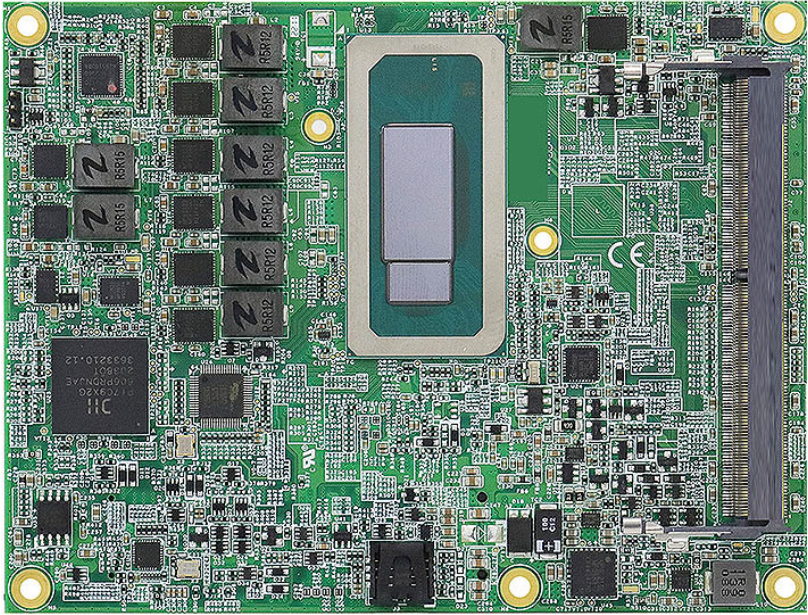
All specifications are subject to change without prior notice.

## 1.5 Block Diagram

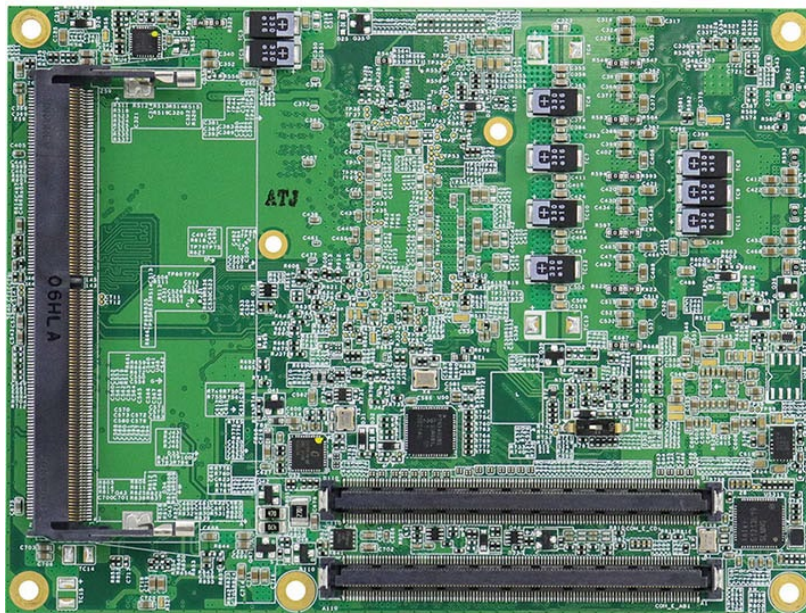


## 1.6 Board View

### Top View



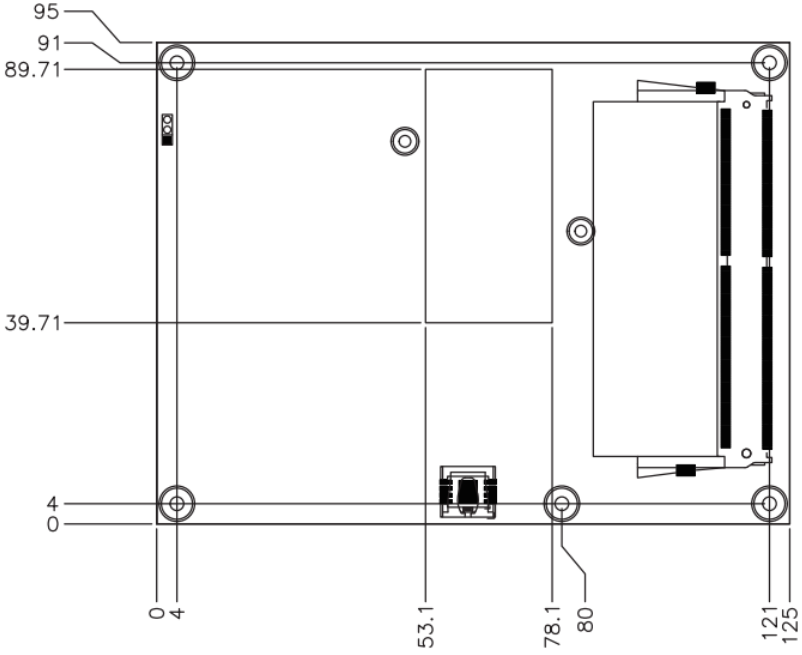
## Bottom View



\* The pictures are for reference only. Some minor components may differ.

### 1.7 Dimensions

Unit: mm



# Chapter 2

## Hardware Configuration

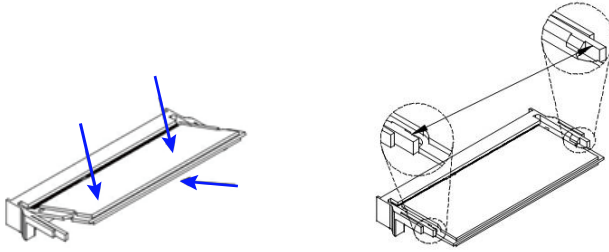
This section provides information on jumper settings and connectors on the ET980 in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

- Installations
- Switch and connector locations and information

## 2.1 Installations

### 2.1.1 Installing the Memory

To replace or install a memory module, locate the memory slot (J2, J4) on the board and perform the following steps:



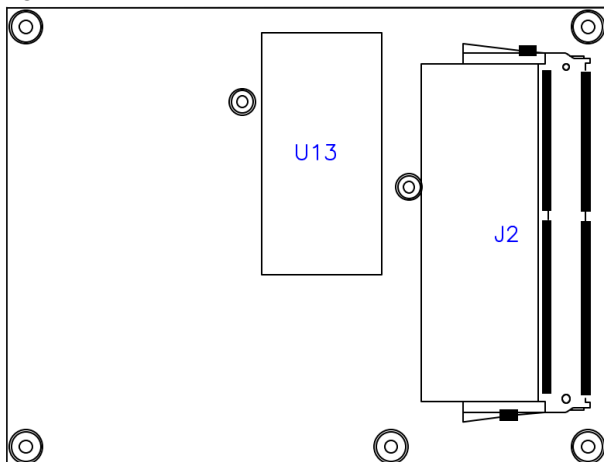
1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

To remove the module, press the clips outwards with both hands, and the module will pop-up.

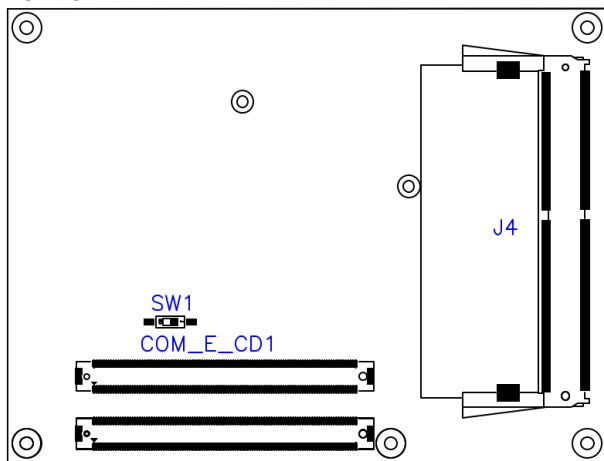


## 2.2 Switch & Connector Locations

TOP VIEW



BOTTOM VIEW



COM\_E\_AB1

**Remarks:**

SW1: ATX / AT Mode



J2, J4: SO-DIMM Sockets

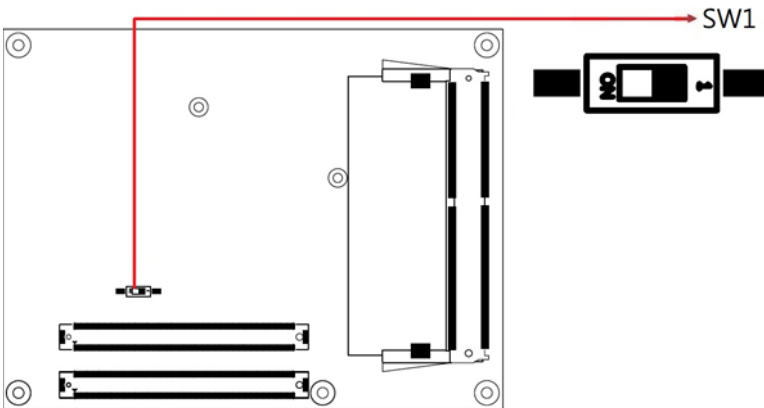
COM\_E\_AB1, COM\_E\_CD1: COM Express Module Type 6 Connector

## 2.3 Switch & Connector Quick Reference

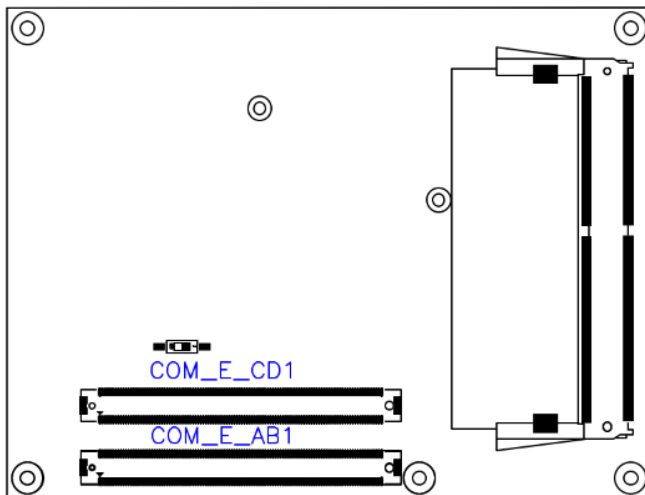
| Function                               | Jumper                    | Page |
|--|---------------------------|------|
| ATX / AT Mode                          | SW1                       | 12   |
| COM Express Module<br>Type 6 Connector | (COM_E_AB1,<br>COM_E_CD1) | 13   |

### 2.3.1 ATX / AT Mode (SW1)

| Function                | Pin closed | Illustration  |
|-------------------------|------------|---|
| ATX<br><i>(default)</i> | P1-OFF     |  |
| AT                      | P1-ON      |  |



## 2.3.2 COM Express Module Type 6 Connector



| Row A |                | Row B |             | Row C |             | Row D |                    |
|-------|----------------|-------|-------------|-------|-------------|-------|--------------------|
| Pin   | Signal         | Pin   | Signal      | Pin   | Signal      | Pin   | Signal             |
| A1    | GND (FIXED)    | B1    | GND (FIXED) | C1    | GND (FIXED) | D1    | GND (FIXED)        |
| A2    | GBE0 MDI3-     | B2    | GBE0 ACT#   | C2    | GND         | D2    | GND                |
| A3    | GBE0 MDI3+     | B3    | LPC FRAME#  | C3    | USB SSRX0-  | D3    | USB SSTX0-         |
| A4    | GBE0 LINK100#  | B4    | LPC AD0     | C4    | USB SSRX0+  | D4    | USB SSTX0+         |
| A5    | GBE0 LINK1000# | B5    | LPC AD1     | C5    | GND         | D5    | GND                |
| A6    | GBE0 MDI2-     | B6    | LPC AD2     | C6    | USB SSRX1-  | D6    | USB SSTX1-         |
| A7    | GBE0 MDI2+     | B7    | LPC AD3     | C7    | USB SSRX1+  | D7    | USB SSTX1+         |
| A8    | GBE0 LINK#     | B8    | LPC DRQ0#   | C8    | GND         | D8    | GND                |
| A9    | GBE0 MDI1-     | B9    | NC          | C9    | USB SSRX2-  | D9    | USB SSTX2-         |
| A10   | GBE0 MDI1+     | B10   | LPC CLK     | C10   | USB SSRX2+  | D10   | USB SSTX2+         |
| A11   | GND (FIXED)    | B11   | GND (FIXED) | C11   | GND (FIXED) | D11   | GND (FIXED)        |
| A12   | GBE0 MDI0-     | B12   | PWRBTN#     | C12   | USB SSRX3-  | D12   | USB SSTX3-         |
| A13   | GBE0 MDI0+     | B13   | SMB CK      | C13   | USB SSRX3+  | D13   | USB SSTX3+         |
| A14   | GBE0 CTREF     | B14   | SMB DAT     | C14   | GND         | D14   | GND                |
| A15   | SUS_S3#        | B15   | SMB_ALERT#  | C15   | NC          | D15   | DDI1_CTRLCLK_AUX+  |
| A16   | SATA0_TX+      | B16   | SATA1_TX+   | C16   | NC          | D16   | DDI1_CTRLDATA_AUX- |
| A17   | SATA0_TX-      | B17   | SATA1_TX-   | C17   | RSVD        | D17   | RSVD               |
| A18   | SUS_S4#        | B18   | NC          | C18   | RSVD        | D18   | RSVD               |
| A19   | SATA0_RX+      | B19   | SATA1_RX+   | C19   | PCIE_RX6+   | D19   | PCIE_TX6+          |
| A20   | SATA0_RX-      | B20   | SATA1_RX-   | C20   | PCIE_RX6-   | D20   | PCIE_TX6-          |
| A21   | GND (FIXED)    | B21   | GND (FIXED) | C21   | GND (FIXED) | D21   | GND (FIXED)        |
| A22   | NC             | B22   | NC          | C22   | PCIE_RX7+   | D22   | PCIE_TX7+          |
| A23   | NC             | B23   | NC          | C23   | PCIE_RX7-   | D23   | PCIE_TX7-          |
| A24   | SUS_S5#        | B24   | PWR_OK      | C24   | DDI1_HPDP   | D24   | RSVD               |
| A25   | NC             | B25   | NC          | C25   | NC          | D25   | RSVD               |
| A26   | NC             | B26   | NC          | C26   | NC          | D26   | DDI1_PAIR0+        |
| A27   | BATLOW#        | B27   | WDT         | C27   | RSVD        | D27   | DDI1_PAIR0-        |
| A28   | SATA_ACT#      | B28   | NC          | C28   | RSVD        | D28   | RSVD               |
| A29   | HDA_SYNC       | B29   | NC          | C29   | NC          | D29   | DDI1_PAIR1+        |
| A30   | HDA_RST#       | B30   | HDA_SDIN0   | C30   | NC          | D30   | DDI1_PAIR1-        |

| Row A |                       | Row B |             | Row C |                    | Row D |                  |
|-------|-----------------------|-------|-------------|-------|--------------------|-------|------------------|
| Pin   | Signal                | Pin   | Signal      | Pin   | Signal             | Pin   | Signal           |
| A31   | GND (FIXED)           | B31   | GND (FIXED) | C31   | GND (FIXED)        | D31   | GND (FIXED)      |
| A32   | HDA BITCLK            | B32   | NC          | C32   | DDI2_CTRLCLK_AUX+  | D32   | DDI1_PAIR2+      |
| A33   | HDA SDOUT             | B33   | I2C CK      | C33   | DDI2_CTRLDATA_AUX- | D33   | DDI1_PAIR2-      |
| A34   | BIOS DIS0#            | B34   | I2C_DAT     | C34   | DDI2_DDC_AUX_SEL   | D34   | DDI1_DDC_AUX_SEL |
| A35   | THRMTRIP#             | B35   | THRM#       | C35   | RSVD               | D35   | RSVD             |
| A36   | USB6-                 | B36   | USB7-       | C36   | DDI3_CTRLCLK_AUX+  | D36   | DDI1_PAIR3+      |
| A37   | USB6+                 | B37   | USB7+       | C37   | DDI3_CTRLDATA_AUX- | D37   | DDI1_PAIR3-      |
| A38   | USB 6 7 OC#           | B38   | USB 4 5 OC# | C38   | DDI3_DDC_AUX_SEL   | D38   | RSVD             |
| A39   | USB4-                 | B39   | USB5-       | C39   | DDI3_PAIR0+        | D39   | DDI2_PAIR0+      |
| A40   | USB4+                 | B40   | USB5+       | C40   | DDI3_PAIR0-        | D40   | DDI2_PAIR0-      |
| A41   | GND (FIXED)           | B41   | GND (FIXED) | C41   | GND (FIXED)        | D41   | GND (FIXED)      |
| A42   | USB2-                 | B42   | USB3-       | C42   | DDI3_PAIR1+        | D42   | DDI2_PAIR1+      |
| A43   | USB2+                 | B43   | USB3+       | C43   | DDI3_PAIR1-        | D43   | DDI2_PAIR1-      |
| A44   | USB 2 3 OC#           | B44   | USB 0 1 OC# | C44   | DDI2 HPD           | D44   | DDI2 HPD         |
| A45   | USB0-                 | B45   | USB1-       | C45   | RSVD               | D45   | RSVD             |
| A46   | USB0+                 | B46   | USB1+       | C46   | DDI3_PAIR2+        | D46   | DDI2_PAIR2+      |
| A47   | VCC_RTC               | B47   | NC          | C47   | DDI3_PAIR2-        | D47   | DDI2_PAIR2-      |
| A48   | RSVD                  | B48   | NC          | C48   | RSVD               | D48   | RSVD             |
| A49   | GBE0_SDP              | B49   | SYS_RESET#  | C49   | DDI3_PAIR3+        | D49   | DDI2_PAIR3+      |
| A50   | LPC_SERIRQ            | B50   | CB_RESET#   | C50   | DDI3_PAIR3-        | D50   | DDI2_PAIR3-      |
| A51   | GND (FIXED)           | B51   | GND (FIXED) | C51   | GND (FIXED)        | D51   | GND (FIXED)      |
| A52   | PCIE TX5+             | B52   | PCIE RX5+   | C52   | RSVD               | D52   | RSVD             |
| A53   | PCIE TX5-             | B53   | PCIE RX5-   | C53   | RSVD               | D53   | RSVD             |
| A54   | GPI0                  | B54   | GPO1        | C54   | NC                 | D54   | NC               |
| A55   | PCIE TX4+             | B55   | PCIE RX4+   | C55   | RSVD               | D55   | RSVD             |
| A56   | PCIE TX4-             | B56   | PCIE RX4-   | C56   | RSVD               | D56   | RSVD             |
| A57   | GND                   | B57   | GPO2        | C57   | NC                 | D57   | TYPE2#           |
| A58   | PCIE TX3+             | B58   | PCIE RX3+   | C58   | RSVD               | D58   | RSVD             |
| A59   | PCIE TX3-             | B59   | PCIE RX3-   | C59   | RSVD               | D59   | RSVD             |
| A60   | GND (FIXED)           | B60   | GND (FIXED) | C60   | GND (FIXED)        | D60   | GND (FIXED)      |
| A61   | PCIE TX2+             | B61   | PCIE RX2+   | C61   | RSVD               | D61   | RSVD             |
| A62   | PCIE TX2-             | B62   | PCIE RX2-   | C62   | RSVD               | D62   | RSVD             |
| A63   | GPI1                  | B63   | GPO3        | C63   | RSVD               | D63   | RSVD             |
| A64   | PCIE TX1+             | B64   | PCIE RX1+   | C64   | RSVD               | D64   | RSVD             |
| A65   | PCIE TX1-             | B65   | PCIE RX1-   | C65   | RSVD               | D65   | RSVD             |
| A66   | GND                   | B66   | WAKE0#      | C66   | RSVD               | D66   | RSVD             |
| A67   | GPI2                  | B67   | WAKE1#      | C67   | NC                 | D67   | GND              |
| A68   | PCIE TX0+             | B68   | PCIE RX0+   | C68   | RSVD               | D68   | RSVD             |
| A69   | PCIE TX0-             | B69   | PCIE RX0-   | C69   | RSVD               | D69   | RSVD             |
| A70   | GND (FIXED)           | B70   | GND (FIXED) | C70   | GND (FIXED)        | D70   | GND (FIXED)      |
| A71   | LVDS_A0+/<br>eDP_TX2+ | B71   | LVDS_B0+    | C71   | RSVD               | D71   | RSVD             |
| A72   | LVDS_A0-/<br>eDP_TX2- | B72   | LVDS_B0-    | C72   | RSVD               | D72   | RSVD             |
| A73   | LVDS_A1+/<br>eDP_TX1+ | B73   | LVDS_B1+    | C73   | GND                | D73   | GND              |
| A74   | LVDS_A1-/<br>eDP_TX1- | B74   | LVDS_B1-    | C74   | RSVD               | D74   | RSVD             |
| A75   | LVDS_A2+/<br>eDP_TX0+ | B75   | LVDS_B2+    | C75   | RSVD               | D75   | RSVD             |

| Row A |                        | Row B |                          | Row C |             | Row D |             |
|-------|------------------------|-------|--------------------------|-------|-------------|-------|-------------|
| Pin   | Signal                 | Pin   | Signal                   | Pin   | Signal      | Pin   | Signal      |
| A76   | LVDS_A2-/eDP_TX0-      | B76   | LVDS_B2-                 | C76   | GND         | D76   | GND         |
| A77   | LVDS_VDD_EN/eDP_VDD_EN | B77   | LVDS_B3+                 | C77   | RSVD        | D77   | RSVD        |
| A78   | LVDS_A3+               | B78   | LVDS_B3-                 | C78   | PEG_RX8+    | D78   | PEG_TX8+    |
| A79   | LVDS_A3-               | B79   | LVDS_BKLT_EN/eDP_BKLT_EN | C79   | PEG_RX8-    | D79   | PEG_TX8-    |
| A80   | GND (FIXED)            | B80   | GND (FIXED)              | C80   | GND (FIXED) | D80   | GND (FIXED) |
| A81   | LVDS_A_CK+/eDP_TX3+    | B81   | LVDS_B_CK+               | C81   | PEG_RX9+    | D81   | PEG_TX9+    |
| A82   | LVDS_A_CK-/eDP_TX3-    | B82   | LVDS_B_CK-               | C82   | PEG_RX9-    | D82   | PEG_TX9-    |
| A83   | LVDS_I2C_CK/eDP_AUX+   | B83   | LVDS_BKLT_CTRL           | C83   | RSVD        | D83   | RSVD        |
| A84   | LVDS_I2C_DAT/eDP_AUX-  | B84   | VCC_5V_SBY               | C84   | GND         | D84   | GND         |
| A85   | GPI3                   | B85   | VCC_5V_SBY               | C85   | PEG_RX10+   | D85   | PEG_TX10+   |
| A86   | RSVD                   | B86   | VCC_5V_SBY               | C86   | PEG_RX10-   | D86   | PEG_TX10-   |
| A87   | eDP_HP                 | B87   | VCC_5V_SBY               | C87   | GND         | D87   | GND         |
| A88   | PCIE_CLK_REF+          | B88   | BIOS_DIS1#               | C88   | PEG_RX11+   | D88   | PEG_TX11+   |
| A89   | PCIE_CLK_REF-          | B89   | VGA_RED                  | C89   | PEG_RX11-   | D89   | PEG_TX11-   |
| A90   | GND (FIXED)            | B90   | GND (FIXED)              | C90   | GND (FIXED) | D90   | GND (FIXED) |
| A91   | SPI_POWER              | B91   | VGA_GRN                  | C91   | PEG_RX12+   | D91   | PEG_TX12+   |
| A92   | SPI_MISO               | B92   | VGA_BLU                  | C92   | PEG_RX12-   | D92   | PEG_TX12-   |
| A93   | GPO0                   | B93   | VGA_HSYNC                | C93   | GND         | D93   | GND         |
| A94   | SPI_CLK                | B94   | VGA_VSYNC                | C94   | PEG_RX13+   | D94   | PEG_TX13+   |
| A95   | SPI_MOSI               | B95   | VGA_I2C_CK               | C95   | PEG_RX13-   | D95   | PEG_TX13-   |
| A96   | TPM_PP                 | B96   | VGA_I2C_DAT              | C96   | GND         | D96   | GND         |
| A97   | NC                     | B97   | SPI_CS#                  | C97   | RSVD        | D97   | RSVD        |
| A98   | SER0_TX                | B98   | RSVD                     | C98   | PEG_RX14+   | D98   | PEG_TX14+   |
| A99   | SER0_RX                | B99   | RSVD                     | C99   | PEG_RX14-   | D99   | PEG_TX14-   |
| A100  | GND (FIXED)            | B100  | GND (FIXED)              | C100  | GND (FIXED) | D100  | GND (FIXED) |
| A101  | SER1_TX                | B101  | FAN_PWMOUT               | C101  | PEG_RX15+   | D101  | PEG_TX15+   |
| A102  | SER1_RX                | B102  | FAN_TACHIN               | C102  | PEG_RX15-   | D102  | PEG_TX15--  |
| A103  | NC                     | B103  | NC                       | C103  | GND         | D103  | GND         |
| A104  | VCC_12V                | B104  | VCC_12V                  | C104  | VCC_12V     | D104  | VCC_12V     |
| A105  | VCC_12V                | B105  | VCC_12V                  | C105  | VCC_12V     | D105  | VCC_12V     |
| A106  | VCC_12V                | B106  | VCC_12V                  | C106  | VCC_12V     | D106  | VCC_12V     |
| A107  | VCC_12V                | B107  | VCC_12V                  | C107  | VCC_12V     | D107  | VCC_12V     |
| A108  | VCC_12V                | B108  | VCC_12V                  | C108  | VCC_12V     | D108  | VCC_12V     |
| A109  | VCC_12V                | B109  | VCC_12V                  | C109  | VCC_12V     | D109  | VCC_12V     |
| A110  | GND (FIXED)            | B110  | GND (FIXED)              | C110  | GND (FIXED) | D110  | GND (FIXED) |

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# Chapter 3

## Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- Graphics Driver
- HD Audio Driver
- LAN Driver
- Intel® Management Engine Drivers
- Intel® Serial IO Drivers

## 3.1 Introduction

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. The contents of this section include the following:

---

**Note:** After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

---

## 3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right pane.

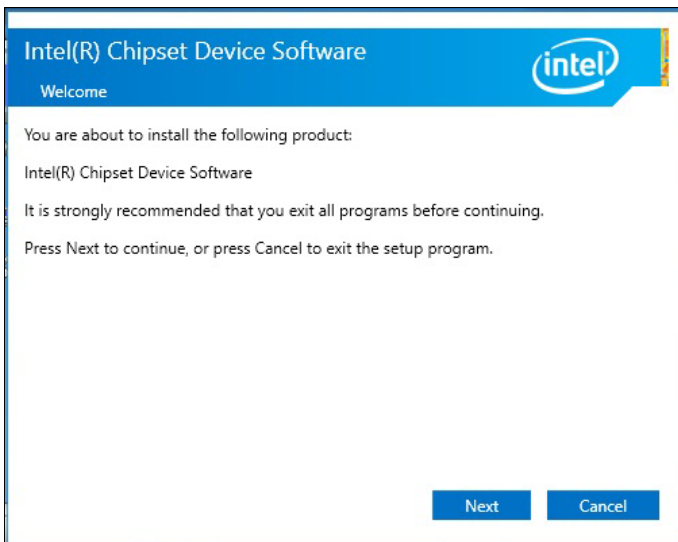




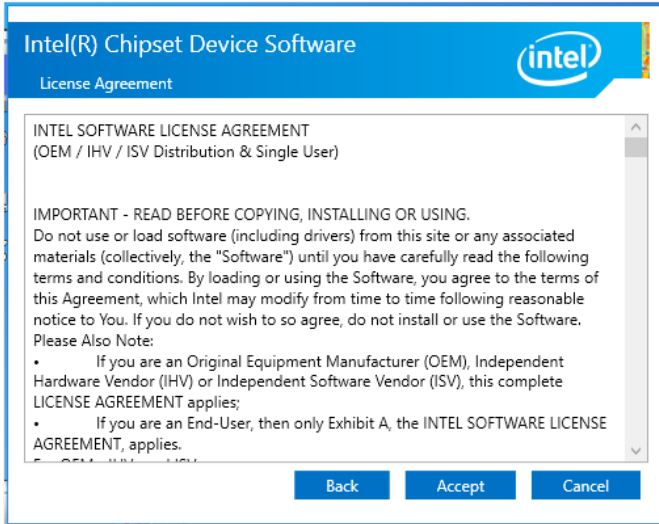
2. Click **Intel(R) Chipset Software Installation Utility**.



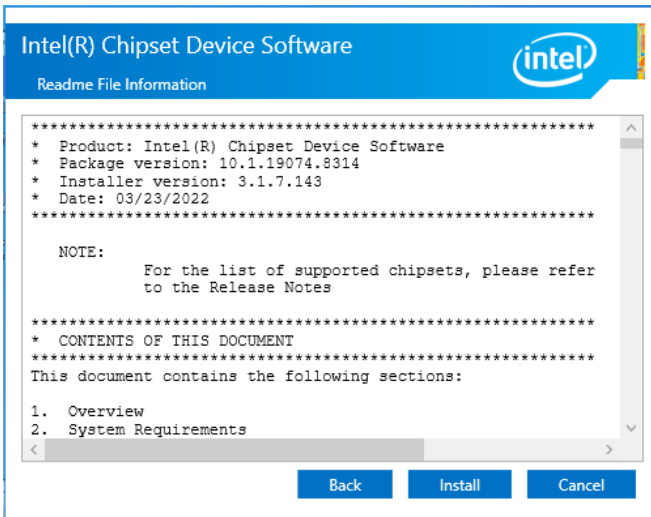
3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next**.



4. Accept the software license agreement.



5. On the *Readme File Information* screen, click **Install**.



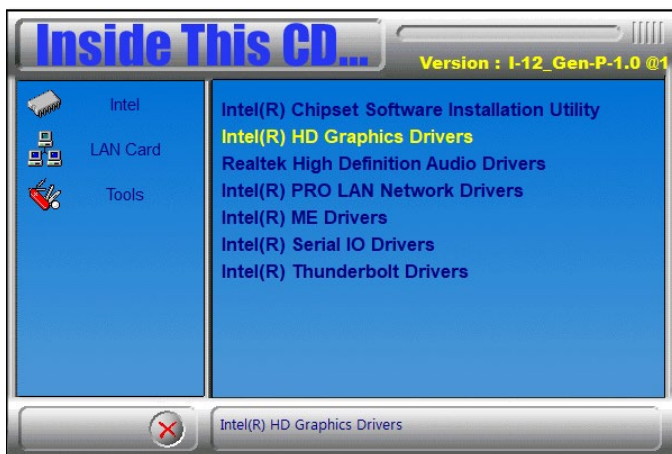
6. The driver has been completely installed. Click **Finish**.

### 3.3 Graphics Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right pane.



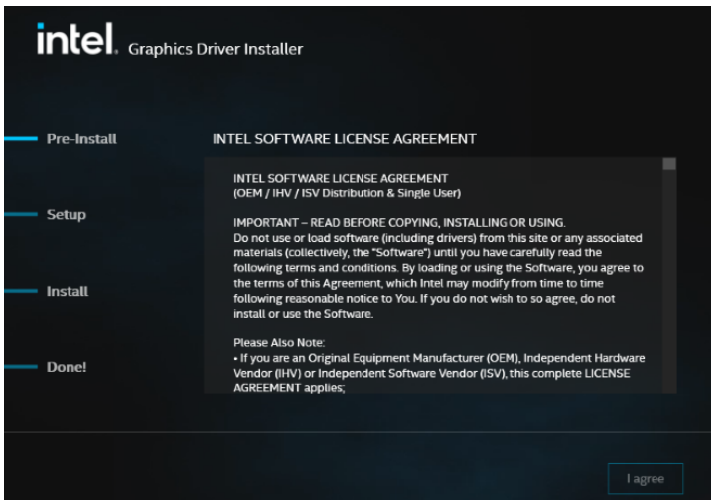
2. Click **Intel(R) HD Graphics Driver**.



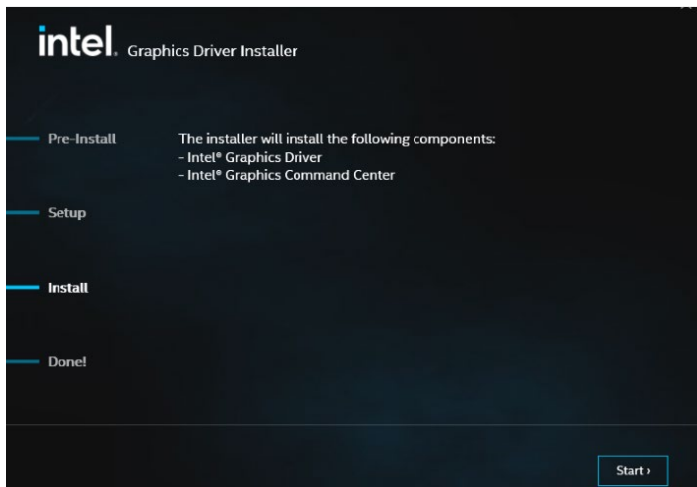
3. On the next screen shown below, click **Begin installation**.



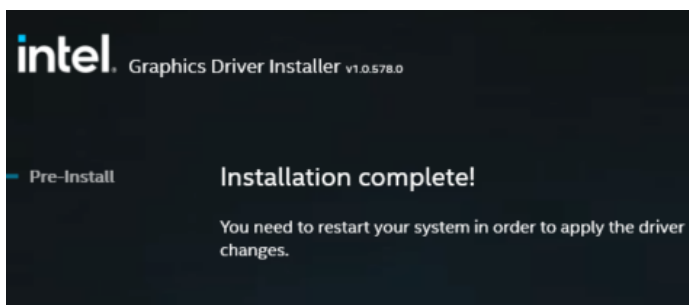
4. Click **I agree**.



5. Click **Start**.



6. When installation is complete, restart your system in order to apply the driver changes.

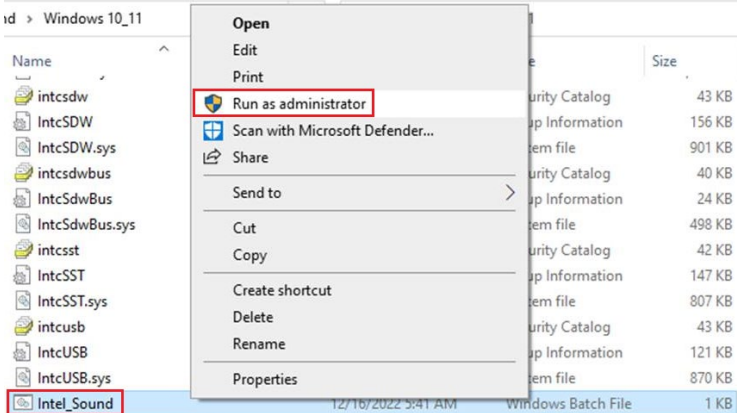
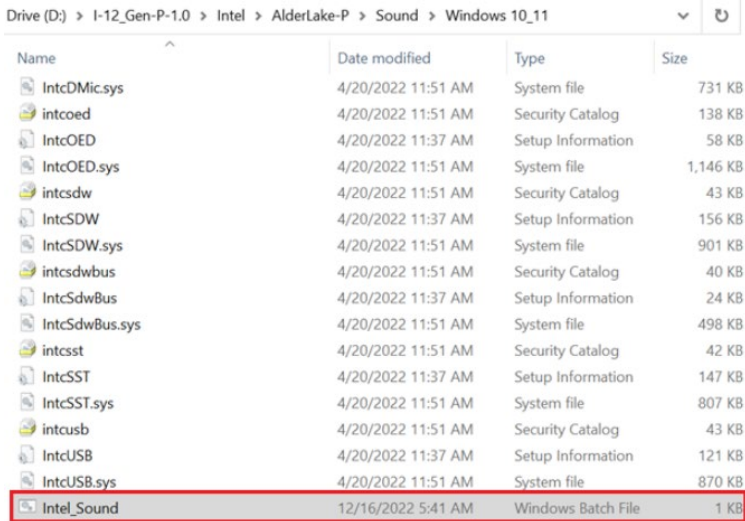


### 3.4 HD Audio Driver Installation

1. Before installing the audio drivers in the disk provided, run the batch file - **Intel\_Sound.bat** in the directory shown in the picture below:

**I-12\_Gen-P-1.0\Intel\AlderLake-P\Sound\Windows 10\_11**

Right-click **Intel\_Sound.bat** and **run the batch file as administrator**.

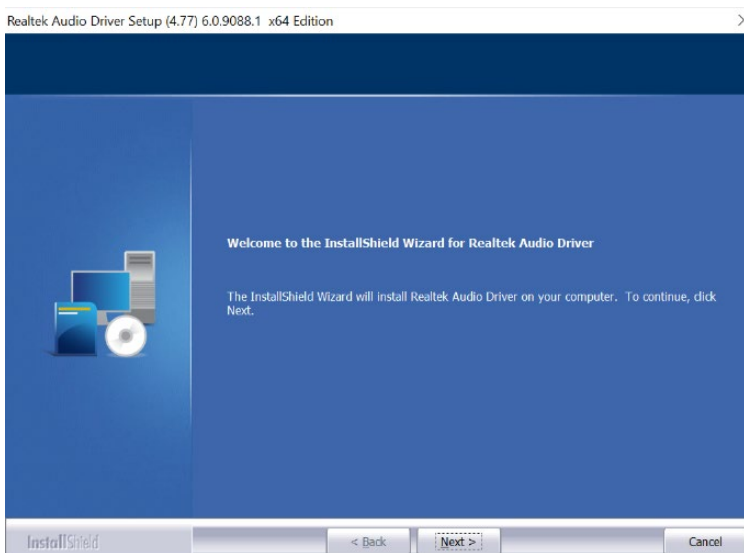


2. After running the batch file, install the audio drivers. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right.

3. Click **Realtek High Definition Audio Drivers**.



4. On the *Welcome* screen of the InstallShield Wizard, click **Next**.



5. When the InstallShield Wizard has completed the installation, restart your computer to be able to use the program.

### 3.5 LAN Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right pane.

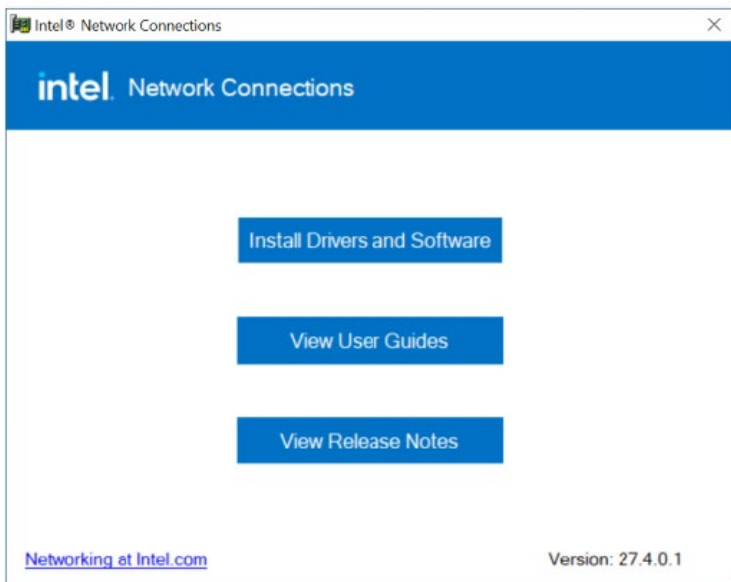


2. Click **Intel(R) PRO LAN Network Drivers..**

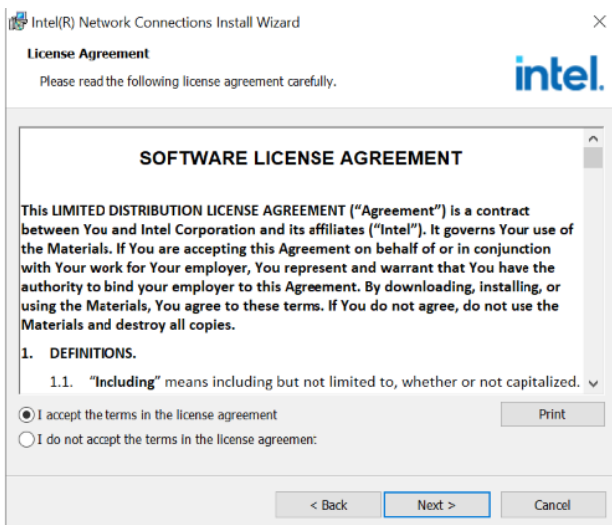




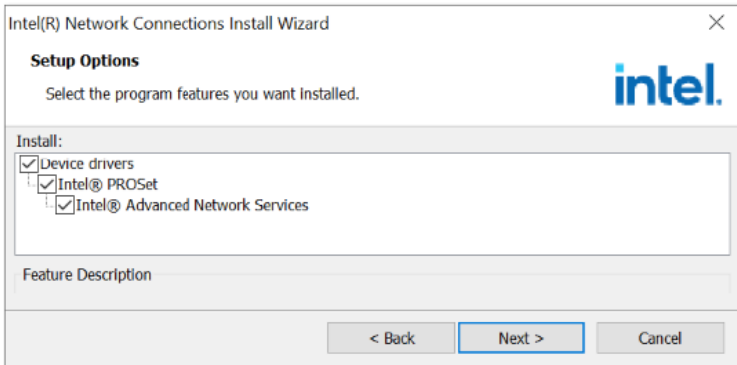
3. Click **Install Drivers and Software**.



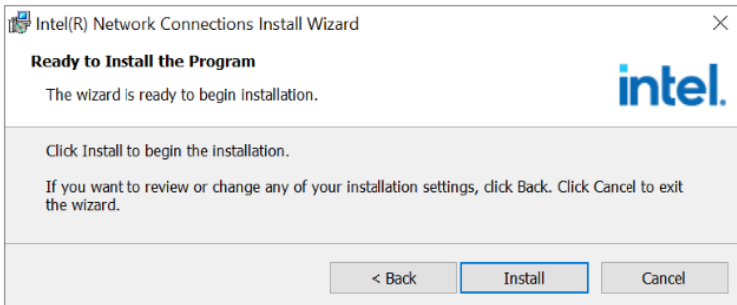
4. On the *Welcome* screen appears, click **Next**.
5. Accept the license agreement and click **Next**.



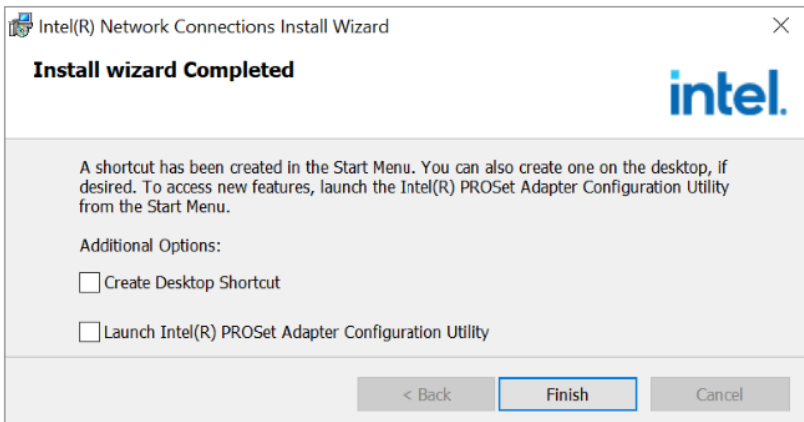
- In the *Setup Options*, click **Next**.



- Click **Install**.



- Install wizard has completed the installation. Click **Finish**.



### 3.6 Intel® Management Engine Drivers Installation

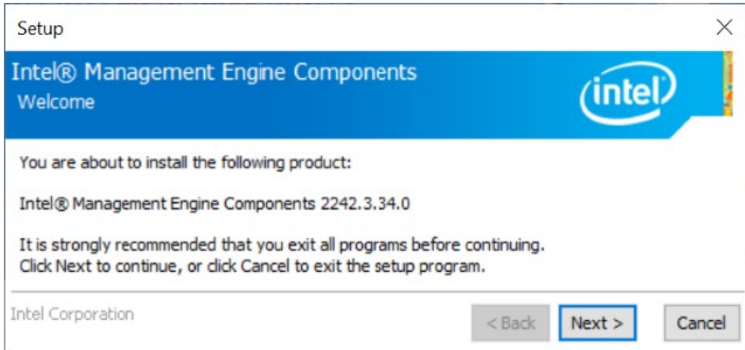
1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right pane.



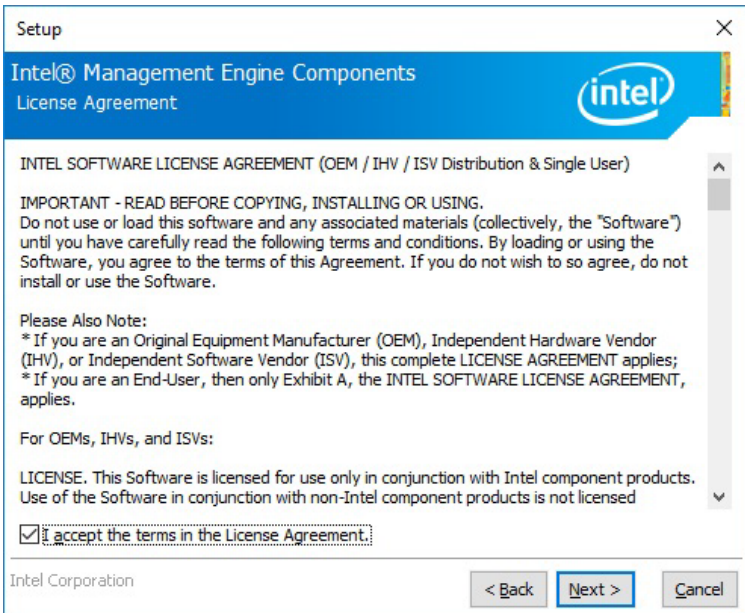
2. Click **Intel(R) ME Drivers**.



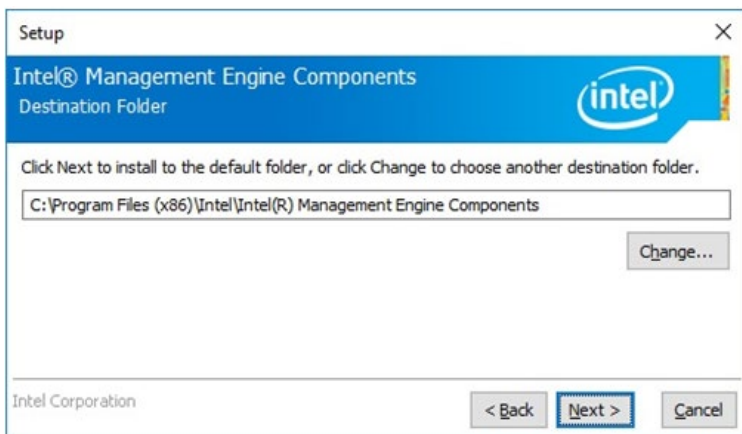
- When the *Welcome* screen appears, click **Next**.



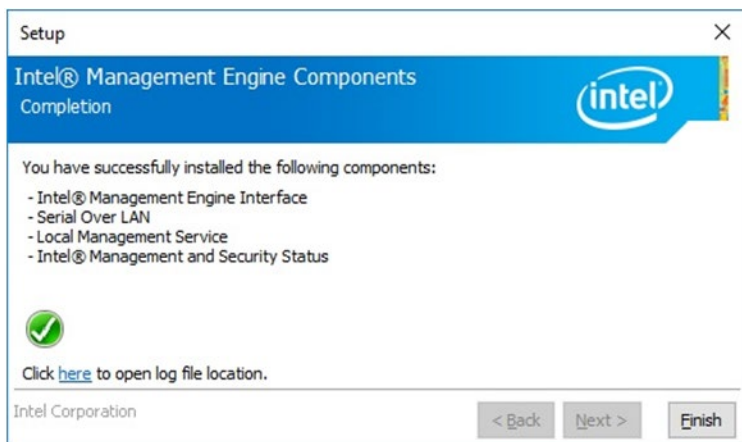
- Accept the license agreement and click **Next** until the installation starts.



5. Click **Next** to install to the default folder or click **Change** to choose another destination folder.



6. When installation has been completed, click **Finish**.



### 3.7 Intel® Serial IO Drivers Installation

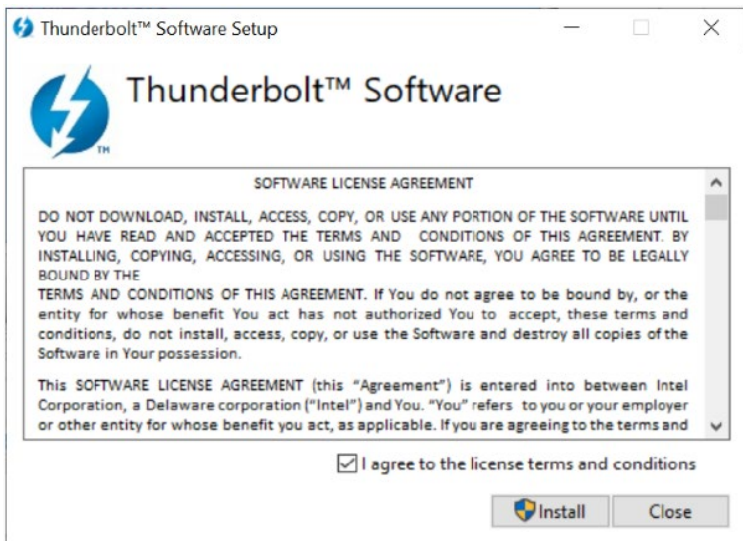
1. Click **Intel** on the left pane and then **Intel(R) AlderLake-P Chipset Drivers** on the right pane.



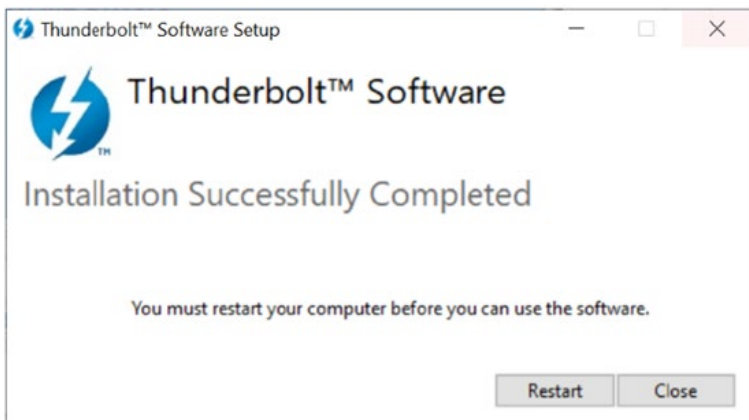
2. Click **Intel(R) Serial IO Drivers**.



3. Agree with the license terms and conditions and click **Install**.



4. Installation has been successfully completed. Click **Restart**.



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# Chapter 4

## BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

## 4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## 4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

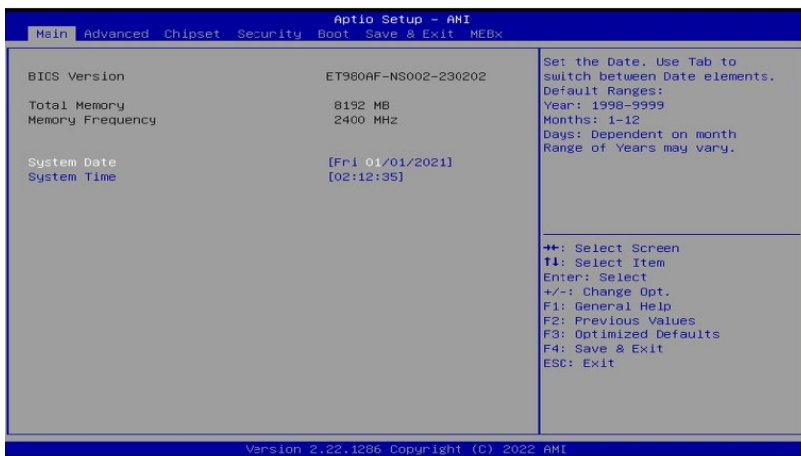
---

**Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

---

### 4.3 Main Settings



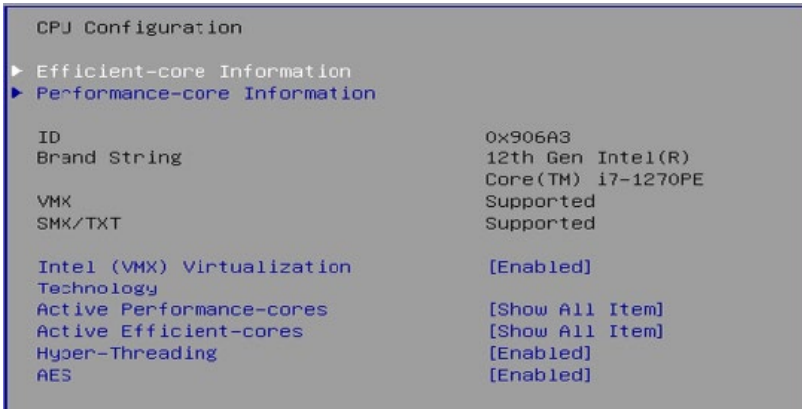
| BIOS Setting    | Description   |
|-----------------|---|
| System Language | Choose the system default language.                                   |
| System Date     | Sets the date. Use the <Tab> key to switch between the date elements. |
| System Time     | Set the time. Use the <Tab> key to switch between the time elements.  |

## 4.4 Advanced Settings

This section allows you to configure, improve your system and allows you to set up some system features according to your preference.



### 4.4.1 CPU Configuration



```

Performance-core Information

L1 Data Cache           48 KB x 4
L1 Instruction Cache    32 KB x 4
L2 Cache                1280 KB x 4
L3 Cache                18 MB
    
```

```

CPJ Configuration
└─▶ Efficient-core Information
└─▶ Performance-core Information

ID              0x906A3
Brand String    12th Gen Intel(R)
                Core(TM) i7-1270PE
                Supported
VMX
SMX/TXT
Active Performance-cores 3
Active Efficient-cores  2
    
```

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.

Active Performance-cores

Show All Item

3

2

1

→: Select Screen  
 ←: Select Item

```

CPJ Configuration
└─▶ Efficient-core Information
└─▶ Performance-core Information

ID              0x906A3
Brand String    12th Gen Intel(R)
                Core(TM) i7-1270PE
                Supported
VMX
SMX/TXT
Active Performance-cores 3
Active Efficient-cores  7
Hyper-Threading 1
AES
    
```

Number of E-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.

Active Efficient-cores

Show All Item

7

6

5

4

3

2

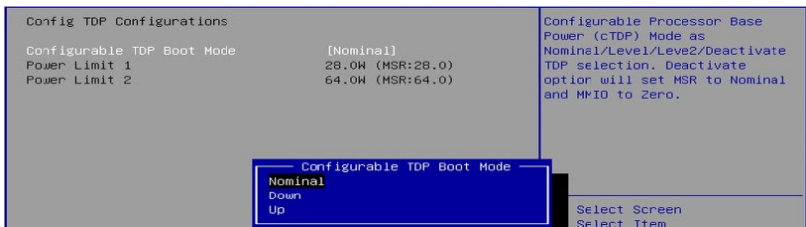
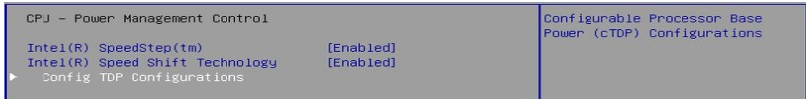
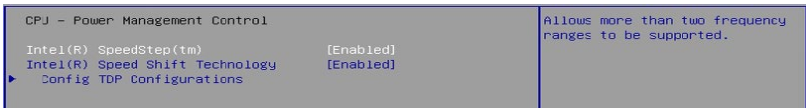
1

0

→: Select Screen  
 ←: Select Item  
 Enter: Select  
 F1: Change Opt.  
 F2: General Help

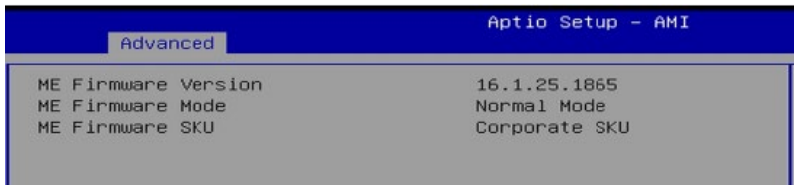
| BIOS Setting                          | Description  |
|---------------------------------------|--|
| Efficient-core Information            | Displays the E-core Information  |
| Performance-core Information          | Displays the P-core Information  |
| Intel (VMX) Virtualization Technology | Enables / Disables a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| Intel (VMX) Virtualization Technology | Enables / Disables a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| Active Performance-Cores              | Number of cores to enable in each processor package. Options: 3, 2, 1  |
| Active Efficient-cores                | Number of cores to enable in each processor package. Options: 7, 6, 5, 4, 3, 2, 1                            |
| Hyper-Threading                       | Enables / Disables Hyperthreading Technology.  |
| AES                                   | Enables / Disables AES (Advanced Encryption Standard).   |

## 4.4.2 Power & Performance



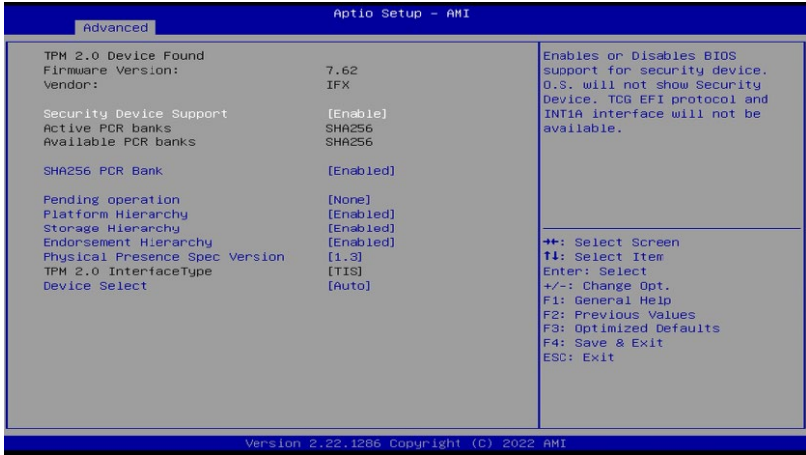
| BIOS Setting                    | Description   |
|---------------------------------|---|
| Intel(R) SpeedStep(tm)          | Allows more than two frequency ranges to be supported.  |
| Intel(R) Speed Shift Technology | Enables / Disables Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.           |
| Config TDP Configurations       | Configurable Processor Base Power (cTDP) Configurations   |
| Configurable TDP Boot Mode      | Configurable Processor Base Power (cTDP) Mode as Nominal/Level/Level2/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero. |

### 4.4.3 PCH-FW Configuration



Displays the information of PCH firmware, such as the firmware version, mode, and SKU.

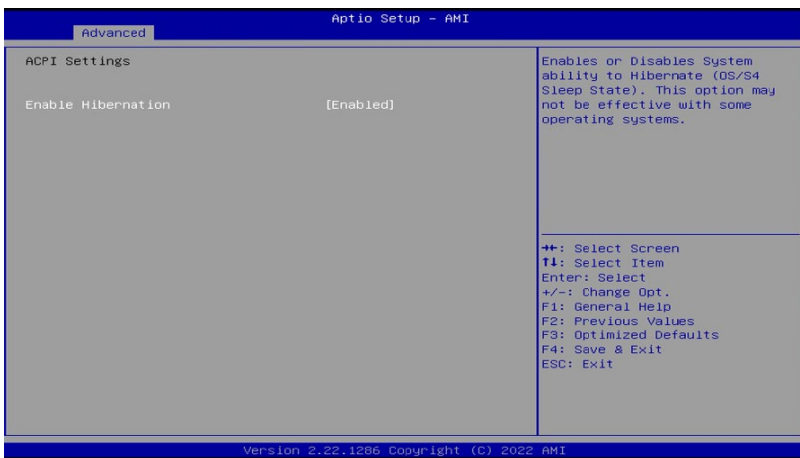
4.4.3.1. Trusted Computing



| BIOS Setting                   | Description   |
|--------------------------------|---|
| Security Device Support        | Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available.  |
| SHA256 PCR Bank                | Enables / Disables SHA256 PCR Bank.   |
| Pending operation              | Schedule an operation for the security device.<br>Note: Your computer will reboot during restart in order to change state of security device.   |
| Platform Hierarchy             | Enables / Disables platform hierarchy.  |
| Storage Hierarchy              | Enables / Disables storage hierarchy.   |
| Endorsement Hierarchy          | Enables / Disables endorsement hierarchy.   |
| Physical Presence Spec Version | Selects to show the PPI Spec Version (1.2 or 1.3) that the OS supports. <b>Note:</b> Some HCK tests might not support 1.3.  |
| Device Select                  | <ul style="list-style-type: none"> <li>• <b>TPM 1.2</b> will restrict support to TPM 1.2 devices only. <b>TPM 2.0</b> will restrict support to TPM 2.0 devices only.</li> <li>• <b>Auto</b> will support both with the default being set to TPM 2.0 devices if not found, and TPM 1.2 device will be enumerated.</li> </ul> |

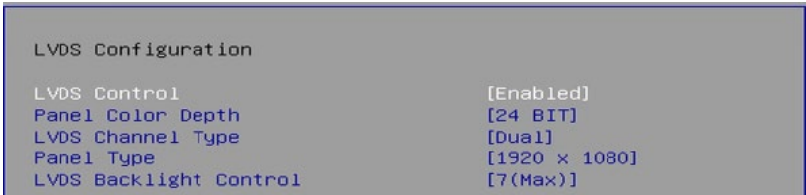
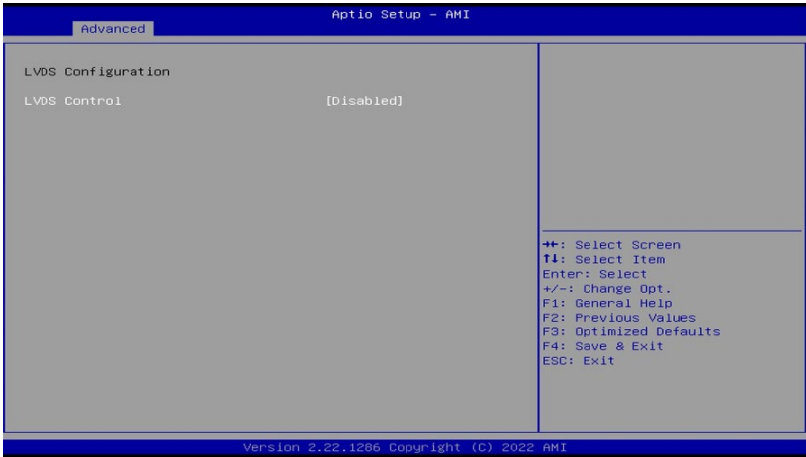


## 4.4.4 ACPI Settings



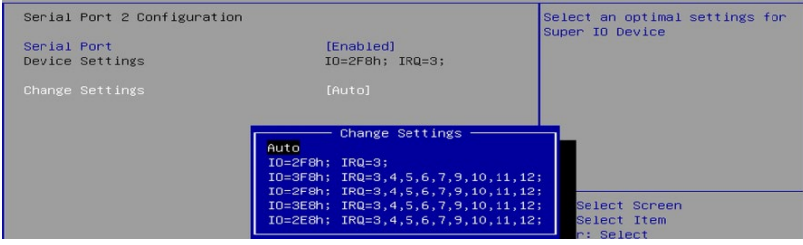
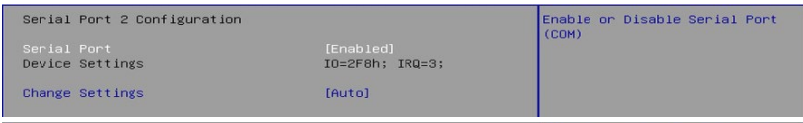
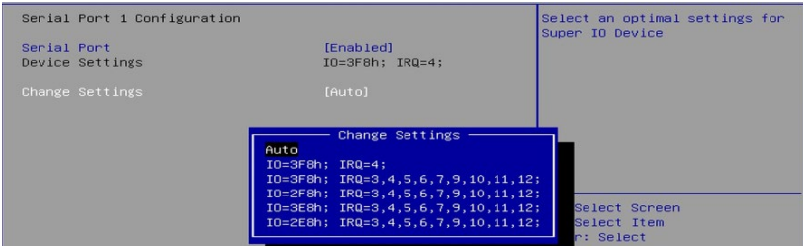
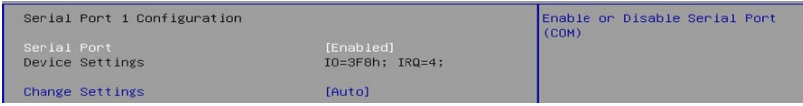
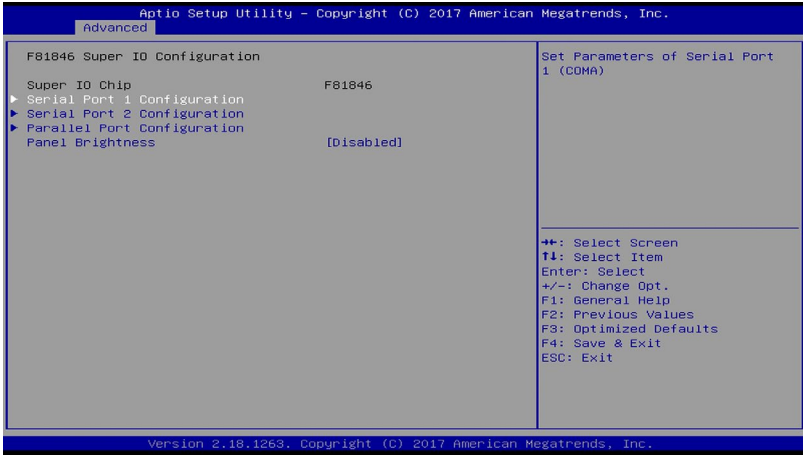
| BIOS Setting       | Description  |
|--------------------|--|
| Enable Hibernation | Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |

## 4.4.5 LVDS Configuration



| BIOS Setting           | Description  |
|------------------------|--|
| LVDS Control           | Enabled / Disabled   |
| Panel Color Depth      | 18 BIT / 24 BIT  |
| LVDS Channel Type      | Single / Dual  |
| Panel Type             | Options: 800 x 480 / 800 x 600 / 1024 x 768 / 1280 x 768 / 1280 x 960 / 1280 x 1024 / 1366 x 768 / 1440 x 900 / 1600 x 900 / 1600 x 1200 / 1680 x 1050 / 1920 x 1080 / 1920 x 1200 |
| LVDS Backlight Control | Options: 0 (Min) ~ 7 (Max)   |

### 4.4.6 F81966 Super IO Configuration



## 4.4.7 F81804SEC Super IO Configuration

Aptio Setup - AMI

Advanced

F81804SEC Super IO Configuration

Super IO Chip F81804SEC

Serial Port 1 Configuration

Serial Port 2 Configuration

Set Parameters of Serial Port 1 (COMA)

Serial Port 1 Configuration

Serial Port [Enabled]

Device Settings IO=240h; IRQ=10;

Change Settings [Auto]

Enable or Disable Serial Port (COM)

Serial Port 1 Configuration

Serial Port [Enabled]

Device Settings IO=240h; IRQ=10;

Change Settings [Auto]

Select an optimal settings for Super IO Device

Change Settings

Auto

IO=240h; IRQ=10;

IO=240h; IRQ=3,4,5,6,7,10,11,12;

IO=248h; IRQ=3,4,5,6,7,10,11,12;

Select Screen

Select Item

Serial Port 2 Configuration

Serial Port [Enabled]

Device Settings IO=248h; IRQ=11;

Change Settings [Auto]

Change Settings [Disable IR1 function]

Enable or Disable Serial Port (COM)

Serial Port 2 Configuration

Serial Port [Enabled]

Device Settings IO=248h; IRQ=11;

Change Settings [Auto]

Change Settings [Disable IR1 function]

Select an optimal settings for Super IO Device

Change Settings

Auto

IO=248h; IRQ=10;

IO=240h; IRQ=3,4,5,6,7,10,11,12;

IO=248h; IRQ=3,4,5,6,7,10,11,12;

Select Screen

Select Item

Serial Port 2 Configuration

Serial Port [Enabled]

Device Settings IO=248h; IRQ=11;

Change Settings [Auto]

Change Settings [Disable IR1 function]

Select an optimal settings for Super IO Device

Change Settings

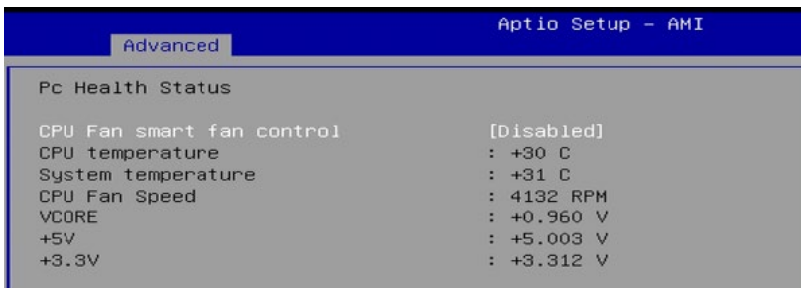
Disable IR1 function

Enable IR1 function, active pulse 1.6uS

Enable IR1 function, active pulse 3/16 bit time

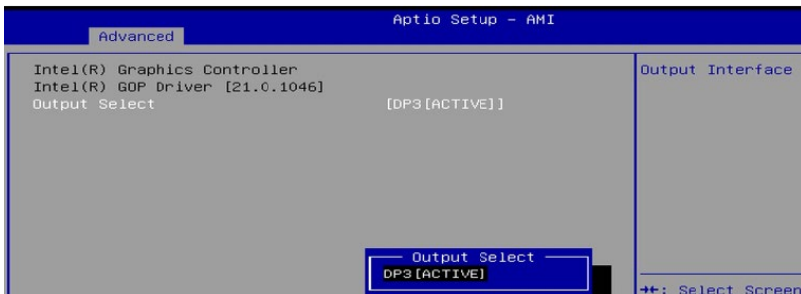
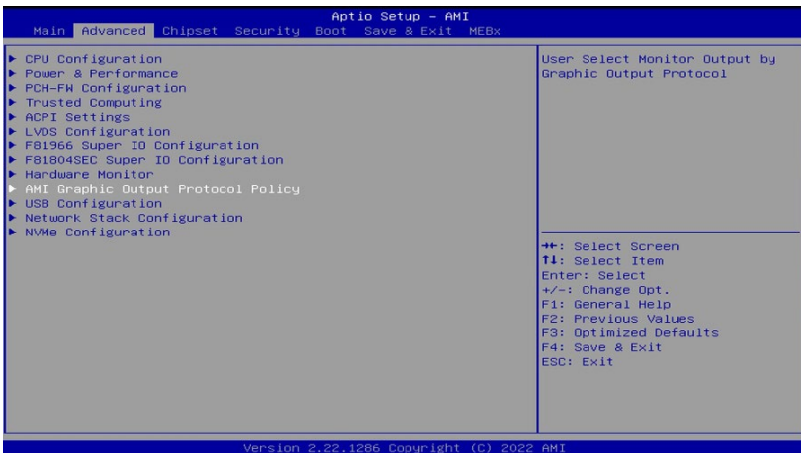
Screen

### 4.4.8 Hardware Monitor



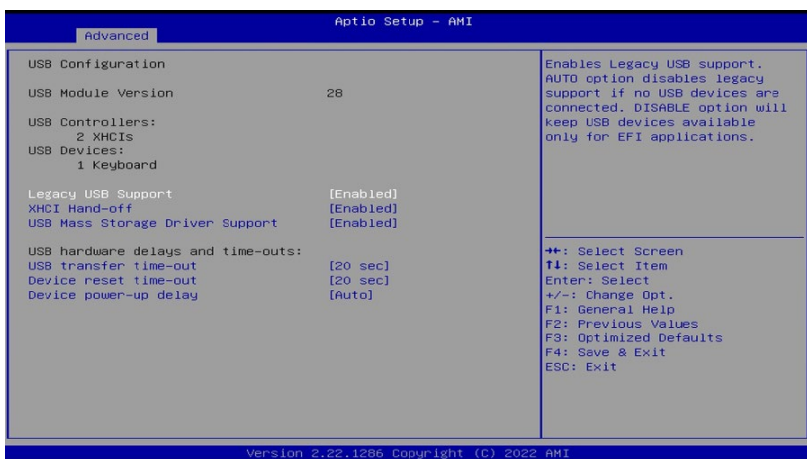
Displays the information of the computer health status.

### 4.4.9 AMI Graphic Output Protocol Policy



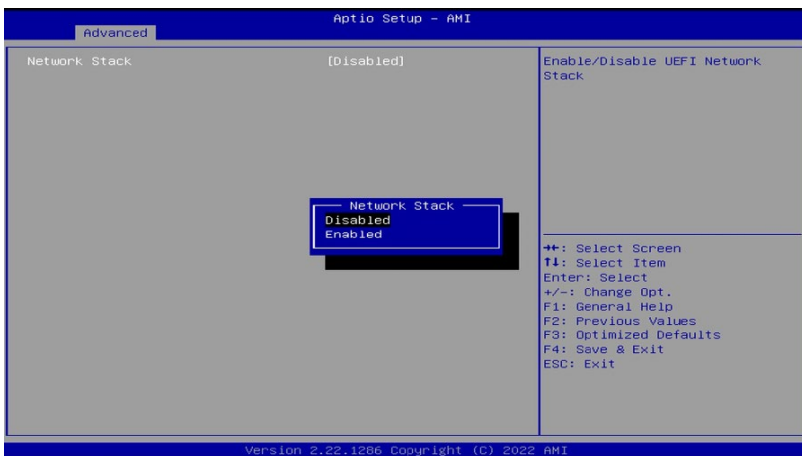
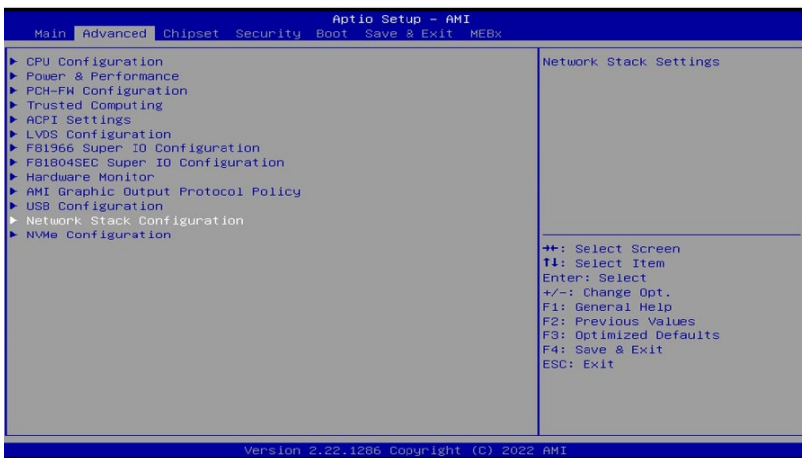
User Select Monitor Output by Graphic Output Protocol.

## 4.4.10 USB Configuration

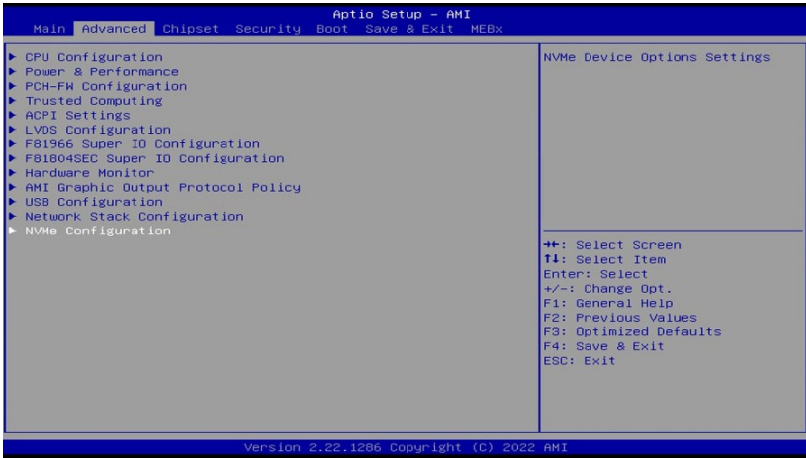


| BIOS Setting                    | Description  |
|---------------------------------|--|
| Legacy USB Support              | <ul style="list-style-type: none"> <li>• <b>Enabled</b> enables Legacy USB support.</li> <li>• <b>Auto</b> disables legacy support if there is no USB device connected.</li> <li>• <b>Disabled</b> keeps USB devices available only for EFI applications.</li> </ul> |
| XHCI Hand-off                   | This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.   |
| USB Mass Storage Driver Support | Enables / Disables the support for USB mass storage driver.  |
| USB Transfer time-out           | The time-out value (1 / 5 / 10 / 20 secs) for Control, Bulk, and Interrupt transfers.  |
| Device reset time-out           | Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.  |
| Device power-up delay           | Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a root port it is 100 ms, for a hub port, the delay is taken from hub descriptor.   |

### 4.4.11 Network Stack Configuration

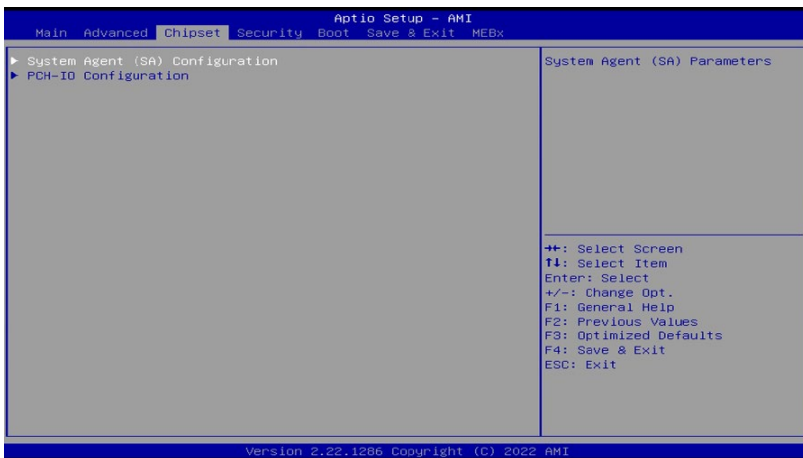


## 4.4.12 NVMe Configuration

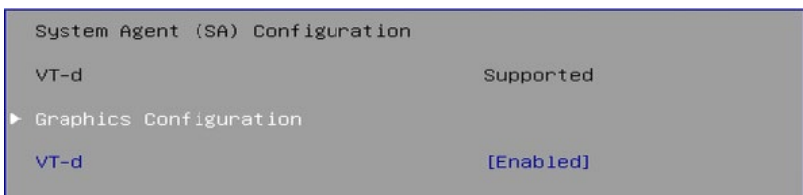




## 4.5 Chipset Settings



### 4.5.1 System Agent (SA) Configuration



| BIOS Setting         | Description                         |
|----------------------|-------------------------------------|
| Memory Configuration | Memory Configuration Parameters     |
| VT-d                 | Enables / Disables VT-d capability. |

|                             |  |
|-----------------------------|--|
| Graphics Configuration      | Graphics turbo IMON current values supported (14-31) |
| Graphics Turbo IMON Current | 31   |
| GTT Size                    | [9MB]  |
| Aperture Size               | [256MB]  |
| PSH1 SUPPORT                | [Disabled]   |
| DVMT Pre-Allocated          | [60M]  |

|                             |   |  |
|-----------------------------|---|--|
| Graphics Configuration      |   | Select the GTT Size                    |
| Graphics Turbo IMDN Current | 31  |  |
| GTT Size                    | [8MB]   |  |
| Aperture Size               | [256MB]   |  |
| PSMI SUPPORT                | [Disabled]  |  |
| DVMT Pre-Allocated          | [60M]   |  |
|                             | <div style="border: 1px solid black; background-color: blue; color: white; padding: 2px;">                     GTT Size<br/>                     2MB<br/>                     4MB<br/>                     8MB                 </div> |  |
|                             |   | ++: Select Screen<br>--: Select Screen |

|                             |            |   |
|-----------------------------|------------|---|
| Graphics Configuration      |            | Select the Aperture Size<br>Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting > 2048MB aperture. To use this feature, please disable CSM Support. |
| Graphics Turbo IMDN Current | 31         |   |
| GTT Size                    | [8MB]      |   |
| Aperture Size               | [256MB]    |   |
| PSMI SUPPORT                | [Disabled] |   |
| DVMT Pre-Allocated          | [60M]      |   |

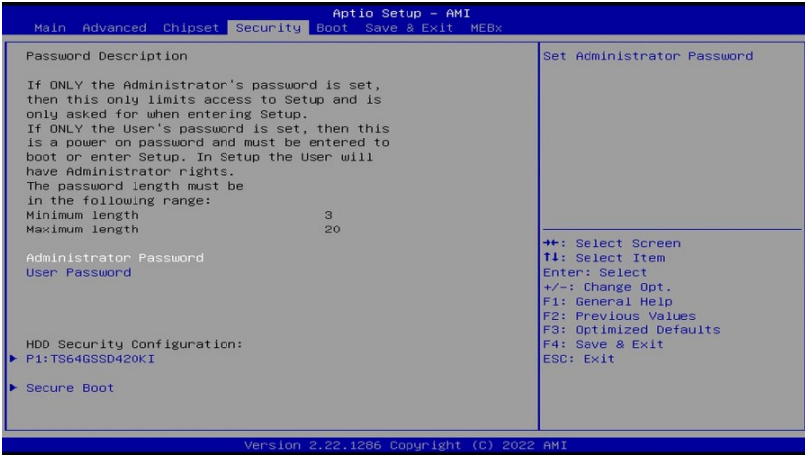
|                             |   |                     |
|-----------------------------|---|---------------------|
| Graphics Configuration      |   | PSMI Enable/Disable |
| Graphics Turbo IMDN Current | 31  |                     |
| GTT Size                    | [8MB]   |                     |
| Aperture Size               | [256MB]   |                     |
| PSMI SUPPORT                | [Disabled]  |                     |
| DVMT Pre-Allocated          | [60M]   |                     |
|                             | <div style="border: 1px solid black; background-color: blue; color: white; padding: 2px;">                     PSMI SUPPORT<br/>                     Disabled<br/>                     Enabled                 </div> |                     |
|                             |   | ++: Select Screen   |

|                             |   |  |
|-----------------------------|---|--|
| Graphics Configuration      |   | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.   |
| Graphics Turbo IMDN Current | 31  |  |
| GTT Size                    | [8MB]   |  |
| Aperture Size               | [256MB]   |  |
| PSMI SUPPORT                | [Disabled]  |  |
| DVMT Pre-Allocated          | [60M]   |  |
|                             | <div style="border: 1px solid black; background-color: blue; color: white; padding: 2px;">                     DVMT Pre-Allocated<br/>                     64M<br/>                     96M<br/>                     128M<br/>                     160M<br/>                     16M<br/>                     4M<br/>                     8M<br/>                     12M<br/>                     16M<br/>                     20M<br/>                     24M<br/>                     28M<br/>                     32M/F7<br/>                     36M<br/>                     40M<br/>                     44M<br/>                     48M<br/>                     52M<br/>                     56M<br/>                     60M                 </div> |  |
|                             |   | ++: Select Screen<br>T1: 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>ESC: Exit |

## PCH-IO Configuration

| Aptio Setup - AMI  |          |   |
|--|----------|---|
| Main   | Advanced | Chipset   |
| Security   | Boot     | Save & Exit   |
| MEBx   |          |   |
| ▶ System Agent (SA) Configuration<br>▶ PCH-IO Configuration  |          | PCH Parameters  |
| PCH-IO Configuration<br>▶ SATA Configuration<br>PCH LAN Controller<br>State After G3   |          | SATA Device Options Settings<br>No GbE Region<br>[S0 State]   |
| SATA Configuration<br>SATA Controller(s)<br>Serial ATA Port 0<br>Software Preserve<br>Hot Plug<br>Serial ATA Port 1<br>Software Preserve<br>Hot Plug<br>Serial ATA Port 2<br>Software Preserve<br>Hot Plug |          | Enable/Disable SATA Device.<br>[Enabled]<br>Empty<br>Unknown<br>[Disabled]<br>TS64GSSD420KI (64.0GB)<br>SUPPORTED<br>[Disabled]<br>Empty<br>Unknown<br>[Disabled] |
| PCH-IO Configuration<br>▶ SATA Configuration<br>PCH LAN Controller<br>State After G3   |          | Specify what state to go to when power is re-applied after a power failure (G3 state).<br>No GbE Region<br>[S0 State]   |
| State After G3<br>S0 State<br>S5 State   |          | ** : Select Screen  |

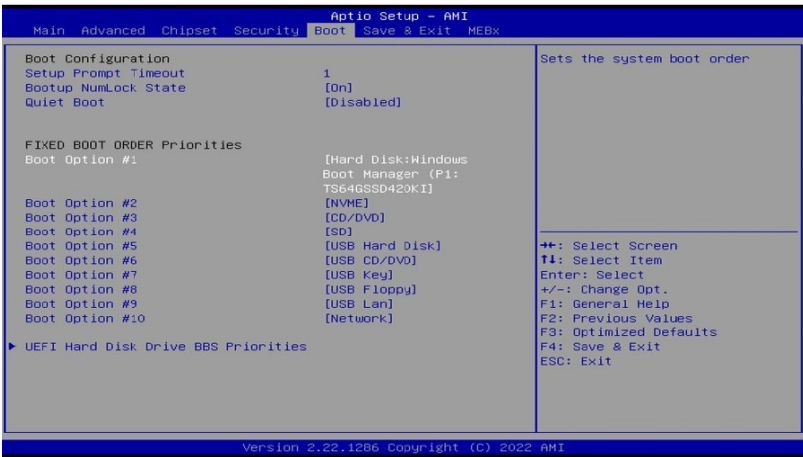
## 4.6 Security Settings



| BIOS Setting           | Description  |
|------------------------|--|
| Administrator Password | Sets an administrator password for the setup utility.  |
| User Password          | Sets a user password.  |
| Secure Boot            | 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. |



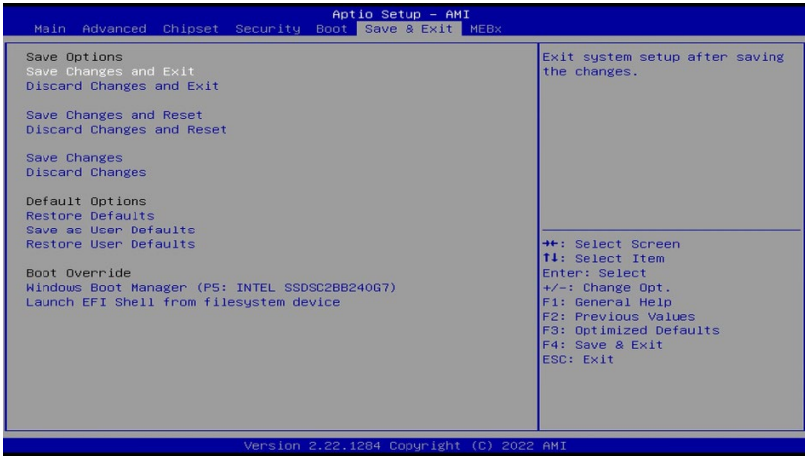
## 4.7 Boot Settings



| BIOS Setting           | Description  |
|------------------------|--|
| Setup Prompt Timeout   | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. |
| Bootup NumLock State   | Selects the keyboard NumLock state.  |
| Quiet Boot             | Enables / Disables Quiet Boot option.  |
| Boot mode select       | Selects a Boot mode, Legacy / UEFI.  |
| Boot Option Priorities | Sets the system boot order priorities.   |



## 4.8 Save & Exit Settings



| BIOS Setting              | Description   |
|---------------------------|---|
| Save Changes and Exit     | Exits system setup after saving the changes.                |
| Discard Changes and Exit  | Exits system setup without saving any changes.              |
| Save Changes and Reset    | Resets the system after saving the changes.                 |
| Discard Changes and Reset | Resets system setup without saving any changes.             |
| Save Changes              | Saves changes done so far to any of the setup options.      |
| Discard Changes           | Discards changes done so far to any of the setup options.   |
| Restore Defaults          | Restores / Loads defaults values for all the setup options. |
| Save as User Defaults     | Saves the changes done so far as User Defaults.             |
| Restore User Defaults     | Restores the user defaults to all the setup options.        |

# Appendix

This section covers the following topics:

- A. I/O Port Address Map
- B. Interrupt Request Lines (IRQ)
- C. Watchdog Timer Configuration

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address               | Device Description                                 |
|-----------------------|--|
| 0x00000A00-0x00000A0F | Motherboard resources                              |
| 0x00000A10-0x00000A1F | Motherboard resources                              |
| 0x00000A20-0x00000A2F | Motherboard resources                              |
| 0x0000002E-0x0000002F | Motherboard resources                              |
| 0x0000004E-0x0000004F | Motherboard resources                              |
| 0x00000061-0x00000061 | Motherboard resources                              |
| 0x00000063-0x00000063 | Motherboard resources                              |
| 0x00000065-0x00000065 | Motherboard resources                              |
| 0x00000067-0x00000067 | Motherboard resources                              |
| 0x00000070-0x00000070 | Motherboard resources                              |
| 0x00000080-0x00000080 | Motherboard resources                              |
| 0x00000092-0x00000092 | Motherboard resources                              |
| 0x000000B2-0x000000B3 | Motherboard resources                              |
| 0x00000680-0x0000069F | Motherboard resources                              |
| 0x0000164E-0x0000164F | Motherboard resources                              |
| 0x0000FFF8-0x0000FFFF | Intel(R) Active Management Technology - SOL (COM5) |
| 0x00000020-0x00000021 | Programmable interrupt controller                  |
| 0x00000024-0x00000025 | Programmable interrupt controller                  |
| 0x00000028-0x00000029 | Programmable interrupt controller                  |
| 0x0000002C-0x0000002D | Programmable interrupt controller                  |
| 0x00000030-0x00000031 | Programmable interrupt controller                  |
| 0x00000034-0x00000035 | Programmable interrupt controller                  |
| 0x00000038-0x00000039 | Programmable interrupt controller                  |
| 0x0000003C-0x0000003D | Programmable interrupt controller                  |
| 0x000000A0-0x000000A1 | Programmable interrupt controller                  |
| 0x000000A4-0x000000A5 | Programmable interrupt controller                  |
| 0x000000A8-0x000000A9 | Programmable interrupt controller                  |
| 0x000000AC-0x000000AD | Programmable interrupt controller                  |



| Address               | Device Description                |
|-----------------------|-----------------------------------|
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |
| 0x000004D0-0x000004D1 | Programmable interrupt controller |
| 0x00003000-0x0000303F | Intel(R) UHD Graphics             |
| 0x000003F8-0x000003FF | Communications Port (COM1)        |
| 0x000002F8-0x000002FF | Communications Port (COM2)        |
| 0x00000240-0x00000247 | Communications Port (COM3)        |
| 0x00000248-0x0000024F | Communications Port (COM4)        |
| 0x00000000-0x00000CF7 | PCI Express Root Complex          |
| 0x00000D00-0x0000FFFF | PCI Express Root Complex          |
| 0x00000040-0x00000043 | System timer                      |
| 0x00000050-0x00000053 | System timer                      |
| 0x0000EFA0-0x0000EFBF | Intel(R) SMBus - 51A3             |
| 0x00002000-0x000020FE | Motherboard resources             |
| 0x00003090-0x00003097 | Standard SATA AHCI Controller     |
| 0x00003080-0x00003083 | Standard SATA AHCI Controller     |
| 0x00003060-0x0000307F | Standard SATA AHCI Controller     |
| 0x00001854-0x00001857 | Motherboard resources             |

## **B. Interrupt Request Lines (IRQ)**

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| <b>Level</b>      | <b>Function</b>   |
|-------------------|---|
| IRQ 4294967294    | Intel(R) PCI Express Root Port #9 - 51B0                        |
| IRQ 14            | Intel(R) Serial IO GPIO Host Controller - INTC1055              |
| IRQ 4294967271~83 | Intel(R) Ethernet Controller I226-LM                            |
| IRQ 19            | Intel(R) Active Management Technology - SOL (COM5)              |
| IRQ 4294967289~91 | PCI Express Downstream Switch Port                              |
| IRQ 4294967287    | Intel(R) UHD Graphics   |
| IRQ 4294967284    | Intel(R) Management Engine Interface #1                         |
| IRQ 4294967292    | PCI Express Downstream Switch Port                              |
| IRQ 4             | Communications Port (COM1)                                      |
| IRQ 3             | Communications Port (COM2)                                      |
| IRQ 10            | Communications Port (COM3)                                      |
| IRQ 11            | Communications Port (COM4)                                      |
| IRQ 4294967286    | Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft) |
| IRQ 4294967270    | Intel® Smart Sound Technology BUS                               |
| IRQ 0             | System timer  |
| IRQ 55 ~ IRQ 204  | Microsoft ACPI-Compliant System                                 |
| IRQ 256 ~ IRQ511  | Microsoft ACPI-Compliant System                                 |
| IRQ 41            | Trusted Platform Module 2.0                                     |
| IRQ 4294967293    | Intel(R) PCI Express Root Port #10 - 51B1                       |
| IRQ 4294967288    | Standard SATA AHCI Controller                                   |
| IRQ 4294967285    | Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft) |

## C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

### 1. Sample Code:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81804.H"
//-----
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----
int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;

    printf("Fintek 81804 watch dog program\n");
    SIO = Init_F81804();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81804, program abort.\n");
        return(1);
    }
    //if (SIO == 0)

    if (argc != 2)
    {
        printf("Parameter incorrect!!\n");
        return (1);
    }
}
```

```

bTime = strtol(argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bTime);

if (bTime)
{
    EnableWDT(bTime);
}
else
{
    DisableWDT();
    return 0;
}
}
//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81804_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81804_Reg(0x2B, bBuf);           //Enable WDTO

    Set_F81804_LD(0x07);                 //switch to logic device 7
    Set_F81804_Reg(0x30, 0x01);         //enable timer

    bBuf = Get_F81804_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81804_Reg(0xF5, bBuf);         //count mode is second

    Set_F81804_Reg(0xF6, interval);     //set timer

    bBuf = Get_F81804_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81804_Reg(0xFA, bBuf);         //enable WDTO output

    bBuf = Get_F81804_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81804_Reg(0xF5, bBuf);         //start counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81804_LD(0x07);                 //switch to logic device 7

    bBuf = Get_F81804_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81804_Reg(0xFA, bBuf);         //disable WDTO output

    bBuf = Get_F81804_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81804_Reg(0xF5, bBuf);         //disable WDT
}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY

```

```

// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81804.H"
#include <dos.h>
//-----
unsigned int F81804_BASE;
void Unlock_F81804 (void);
void Lock_F81804 (void);
//-----
unsigned int Init_F81804(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81804_BASE = 0x4E;
    result = F81804_BASE;

    ucDid = Get_F81804_Reg(0x20);
    if (ucDid == 0x07)                //Fintek 81804
    {
        goto Init_Finish;
    }

    F81804_BASE = 0x2E;
    result = F81804_BASE;

    ucDid = Get_F81804_Reg(0x20);
    if (ucDid == 0x07)                //Fintek 81804
    {
        goto Init_Finish;
    }

    F81804_BASE = 0x00;
    result = F81804_BASE;

Init_Finish:
    return(result);
}
//-----
void Unlock_F81804 (void)
{
    outputb(F81804_INDEX_PORT, F81804_UNLOCK);
    outputb(F81804_INDEX_PORT, F81804_UNLOCK);
}
//-----
void Lock_F81804 (void)
{
    outputb(F81804_INDEX_PORT, F81804_LOCK);
}
//-----
void Set_F81804_LD( unsigned char LD)
{
    Unlock_F81804();
    outputb(F81804_INDEX_PORT, F81804_REG_LD);
    outputb(F81804_DATA_PORT, LD);
    Lock_F81804();
}
//-----

```

```
void Set_F81804_Reg( unsigned char REG, unsigned char DATA)
```

```
{  
    Unlock_F81804();  
    outportb(F81804_INDEX_PORT, REG);  
    outportb(F81804_DATA_PORT, DATA);  
    Lock_F81804();  
}  
//-----  
unsigned char Get_F81804_Reg(unsigned char REG)  
{  
    unsigned char Result;  
    Unlock_F81804();  
    outportb(F81804_INDEX_PORT, REG);  
    Result = inportb(F81804_DATA_PORT);  
    Lock_F81804();  
    return Result;  
}  
//-----
```

```
//-----  
//  
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY  
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE  
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR  
// PURPOSE.  
//  
//-----
```

```
#ifndef F81804_H  
#define F81804_H 1  
//-----  
#define F81804_INDEX_PORT (F81804_BASE)  
#define F81804_DATA_PORT (F81804_BASE+1)  
//-----  
#define F81804_REG_LD 0x07  
//-----  
#define F81804_UNLOCK 0x87  
#define F81804_LOCK 0xAA  
//-----
```

```
unsigned int Init_F81804(void);  
void Set_F81804_LD( unsigned char);  
void Set_F81804_Reg( unsigned char,  
unsigned char); unsigned char  
Get_F81804_Reg( unsigned char);  
//-----  
#endif // F81804_H
```