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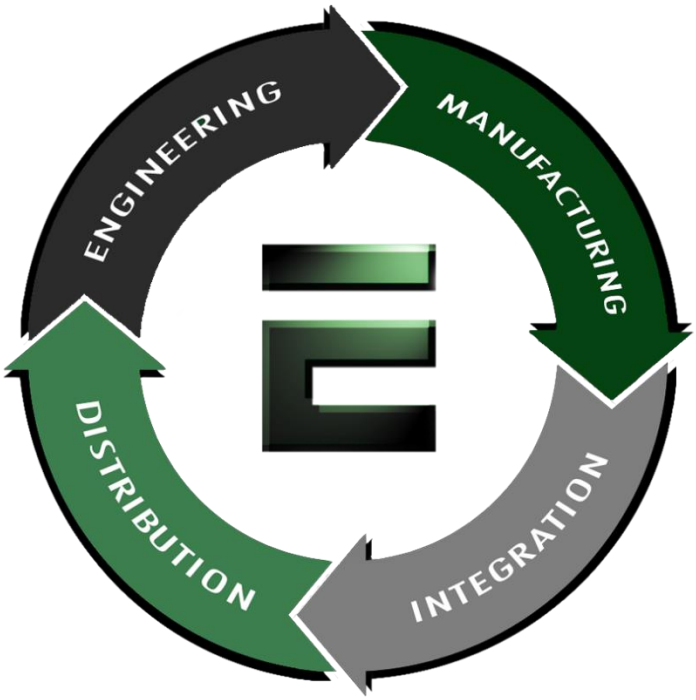


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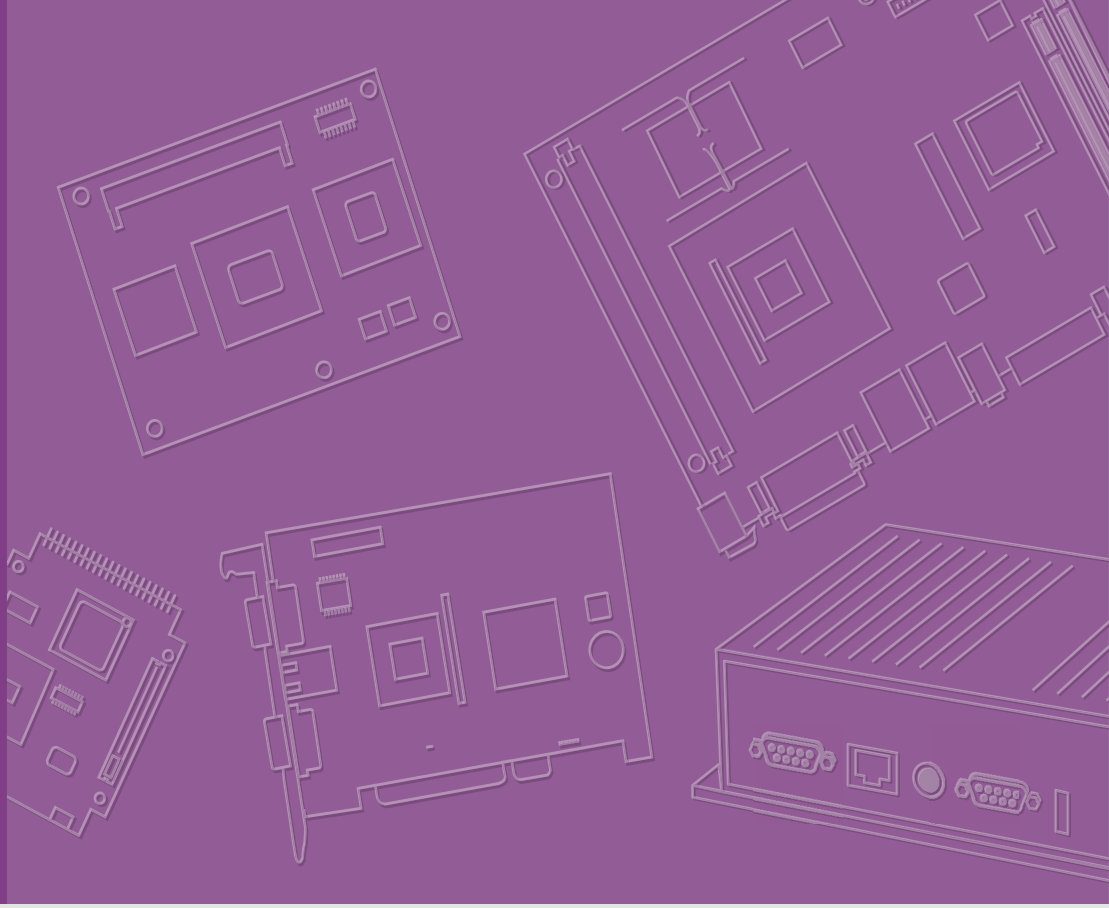

# User Manual

# MIO-5375

## 11th Gen. Intel® Core™ i7/i5/i3/ Celeron U-Series 3.5" SBC w/ MIOe

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This manual is for the MIO-5375.

Part No. 2006537500 Edition 1

June 2021

# Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

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1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

# Declaration of Conformity

### CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

### FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital 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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

***Caution!*** *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manflatterer. Discard used batteries according to the manufacturer's instructions.*

# Technical Support and Assistance

1. Visit the Advantech website at http://support.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

# Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 x MIO-5375 SBC
- 1 x SATA Cable 30cm (p/n: 1700006291)
- 1 x SATA Power Cable 35cm (p/n: 1700031583-01)
- 1 x USB 2.0 Cable 20cm (p/n: 1700030406-01)
- 1 x Audio Cable 20cm (p/n: 1700019584-01)
- 2 x COM RS-232/422/485 Cable 20cm (p/n: 1700030404-01)
- 2 x COM RS-232 Cable 20cm (p/n: 1700031582-01)
- 1 x Cooler (Heatsink) (p/n: 1970004884T001, (1970004794T001))
- 1 x Startup manual (p/n: 2046537500)
- 1 x Mini Jumper(10pcs package)
- 1 x Screw Kit (2sets screws and post for M.2 device & 4sets of screws and stand-off)
- 1 x DeviceOn Package

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

# Optional MIOe Module

| Part Number | Description |
|---|---|
| MIOe-260L-00A1 | Dual Intel GbE with M.2 B-key & F/S miniPCIe |
| MIOE-210-D6A1E | 4 x RS232/422/485, 2 x RS422/485, 8-bit GPIO |
| MIOe-220-B3A1E | 3 x Intel® Gigabit Ethernet with PCIe Switch |
| MIOe-230-L0A1E | 48-bit LVDS or DisplayPort, 2 x USB 2.0 |

# Optional Accessories

| Part number | Description |
|---|---|
| 1970004833N001 | Heat spreader of MIO-5375 |

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# Chapter 1

## General Information

This chapter gives background information on the MIO-5375.

Sections include:

- Introduction
- Specifications
- Block diagram

## 1.1 Introduction

MIO-5375 is designed using MI/O Extension form factor (compact series, 146 x 102 mm) and powered by 11th generation of Intel® Core™ U series processors. MIO-5375 offers embedded iManager 3.0, SUSI 4.0 and WISE-PaaS/DeviceOn created by Advantech to monitor and control system operation effectively and remotely.

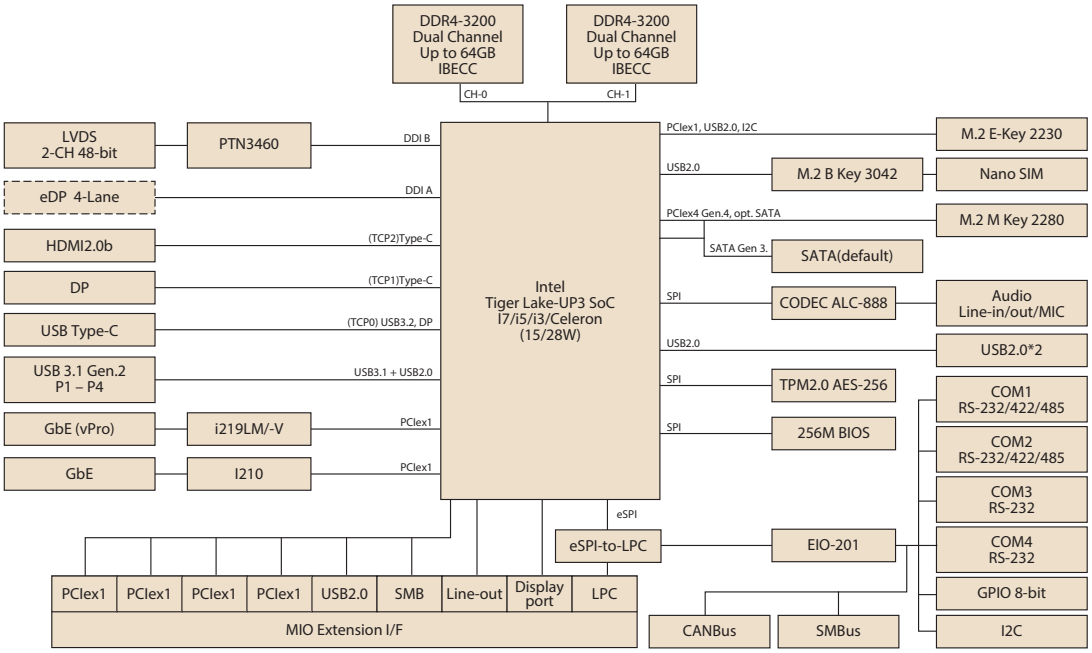
MIO-5375 adopts the latest 64-bit, multi-core processors built on 10nm process technology for improvements in CPU processing, graphics, security and I/O flexibility.

## 1.2 Specifications

| | | | | | |
|---|---|---|---|---|---|
| **Platform** | **Processor** | **i7-1185G7E** | **i7-1185GRE** | **i5-1145G7E** | **i3-1115G4E** |
| | Max. Frequency | 4.40 GHz | 4.40 GHz | 4.10 GHz | 3.90 GHz |
| | Base Frequency | 1.80/ 2.8 GHz | 1.80/ 2.8 GHz | 1.50/ 2.6 GHz | 2.20/ 3.0 GHz |
| | Core/Tread | 4/8 | 4/8 | 4/8 | 4/8 |
| | LLC | 12MB | 12MB | 8MB | 6MB |
| | CPU cTDP-down/ Up/ Nominal | 12W/ 15W/ 28W | 12W/ 15W/ 28W | 12W/ 15W/ 28W | 12W/ 15W/ 28W |
| | Chipset | Intel® 300 Series Chipset (SoC Integrated) | | | |
| | BIOS | AMI EFI 256Mbit | | | |
| Memory | Technology | DDR4-3200 | | | |
| | Max. Capacity | Up to 64GB | | | |
| | Channel/Socket | Dual Channels / 2 Sockets | | | |
| | ECC Support | No | Yes | No | No |
| Graphics | Controller | Integrated GFx Intel®UHD Graphics 630 | | | |
| | Max. Frequency | 3200MT/s | 3200MT/s | 3200MT/s | 3200MT/s |
| | Graphics Memory | TBU | | | |
| | 3D/HW Acceleration | DX12, OGL4.0, OCL1.2, HW Encode: H.265/HEVC, H.264, MPEG2, HW Decode: H.264 | | | |
| Display I/F | LCD | 1 x LVDS: Dual Channel 18/24-bit, up to 1920 x 1200 | | | |
| | | Optional eDP1.4 HBR3, up to 4096x2304x36bpp@60Hz or 5120x3200x24bpp@24Hz | | | |
| | HDMI/DP | 1 x HDMI 2.0b, up to 4Kx2Kx24bpp@60Hz | | | |
| | | 1 x DP1.4a, up to 4096x2304x36bpp@60Hz or 5120x3200x24bpp@60Hz | | | |
| | Multiple Display | 4 simultaneous displays with each display interface combinations | | | |
| External I/O | Ethernet | 2 x GbE, LAN1: Intel i219LM, LAN2: Intel i210AT/IT (for industrial grade) | | | |
| | HDMI/DP | 1/1 | | | |
| | USB Type-C | 1 x USB3.2 Gen. 2x2 20Gbps, support DP1.4a via Alt. Mode | | | |
| | USB3.2 | 4 x USB3.2 Gen. 2x1 10Gbps | | | |
| | LED | Power status, SATA R/W | | | |
| | Power DC-Jack | Optional | | | |

| | | |
|---|---|---|
| Internal I/O | SATA | 1 x SATA GenIII 6.0 Gbps |
| | USB2.0 | 2 |
| | Serial Bus | I2C (support 400Kbit/s), SMBus |
| | COM Port | 2 x RS-232/422/485 (support 1Mbps), 2 x RS-232 (4-wire, support 1Mbps) |
| | GPIO | 8-bit general purpose input output I/O |
| | Audio | Realtek ALC888, Line-in/Line-out/MIC |
| | Inverter | 12V/5V/3.3V selectable |
| | LPC/SPI Bus | - |
| | CAN Bus | 1 x CANBus 2.0 |
| | Fan | 4-wire smart fan |
| | Front Panel Control | Power-on, Reset, Buzzer, SATA LED, CaseOpen |
| Board Feature | Watchdog Timer | 65536 level, 0~65535 sec |
| | TPM | TPM2.0, Infineon SLB9670 |
| | iManager 3.0 | SW API for Hardware Monitor, Smart Fan Control, Brightness Control, I2C, GPIO, WDT |
| Expansion | M.2 E-Key | 1 x E-Key 2230 (PCIe x1, USB2.0) |
| | M.2 B-Key | 1 x B-Key 3042 (USB2.0) w/ Nano-SIM |
| | M.2 M-Key | 1 x M-Key 2280 (PCIe x4 Gen.4 for PCIe SSD), optional SATA |
| MIOe | PCIex1 Port 0 | Gen3 |
| | PCIex1 Port 1 | Gen3 |
| | PCIex1 Port 2 | Gen3 |
| | PCIex1 Port 3 | Gen3 |
| | PCIe Bifurcation | x1/x2/x4 |
| | DisplayPort | 1 |
| | USB3.0 | 1 |
| | USB2.0 | 1 |
| | LPC | Support |
| | eSPI | - |
| | SMBus | Support |
| | Line-out | Support |
| | Power Supply | 12V/5V |
| Power | Supply Voltage | Vin: DC 12V-24V +/- 5%; RTC Battery: Lithium 3V/210mAH |
| | Connector | ATX 2x2 pin 90D, optional DC-Jack or ATX 2x2 pin 180D |
| | Power Management | AT, ATX |
| Environment | Temperature | Operating: Standard: 0 ~ 60° C (32 ~ 140° F), Extend: -40 ~ 85° C (-40 ~ 185° F) |
| | | Storage: -40 ~ 85° C (-40 ~ 185° F) |
| | Humidity | Operating: 40° C @ 95% relative humidity, non-condensing |
| | | Storage: 60° C @ 95%relative humidity, non-condensing |
| | Vibration Resistance | 3.5 Grms |
| Software | OS | Windows10, Linux 20.04, Yocto BSP |
| | Software& API | WISE-DeviceOn, Edge AI Suite, iManager 3.0 |
| Certification | EMC | CE, FCC Class B |
| Mechanical | Dimensions | 146 x 102 mm (5.7” x 4”) |

# 1.3 Block Diagram



# Chapter 2

## Mechanical

This chapter gives mechanical information on the MIO-5375.

Sections include:

- Mechanical Drawing
- Assembly Drawing

## 2.1 Introduction

The MI/O compact form factor SBC is a new-generation SBC design with a variety of mechanical improvements. Here is the quick installation guide for our thermal design and MIOe module installation.

This chapter includes board dimensions, our standard thermal solution, and MIOe expansion board assembly.

## 2.2 Board Layout: Dimensions

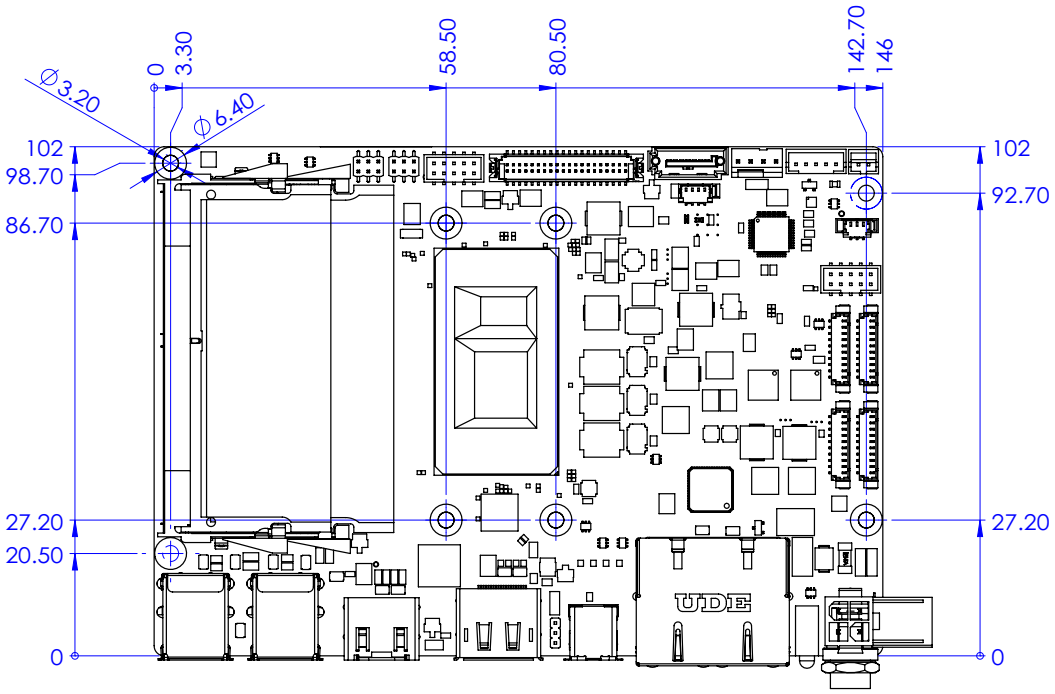



**Figure 2.1 MIO-5375 Mechanical Drawing (Top Side)**

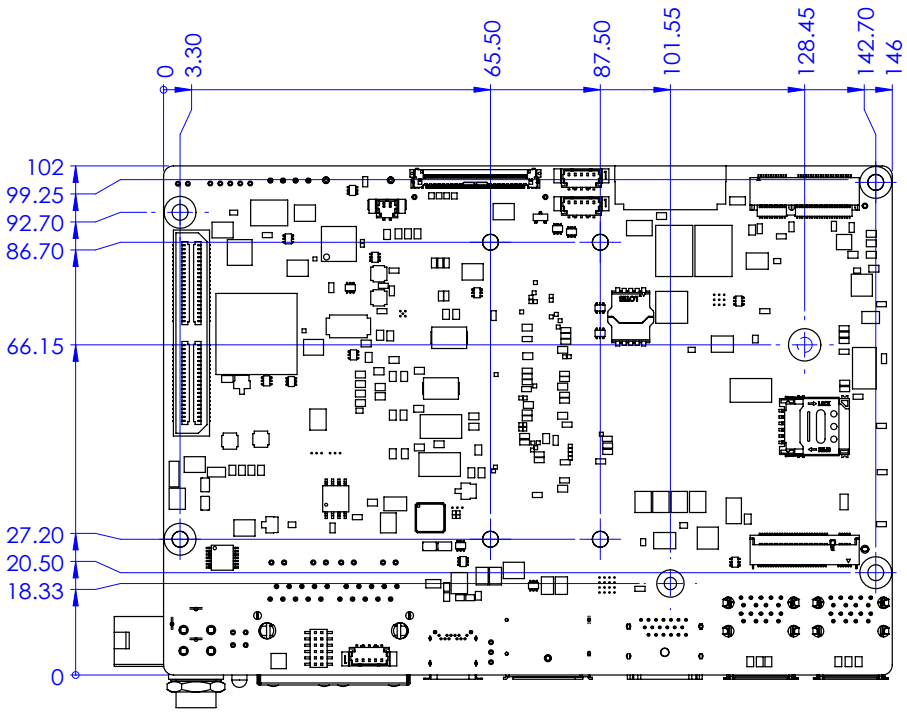



**Figure 2.2 MIO-5375 Mechanical Drawing (Bottom Side)**

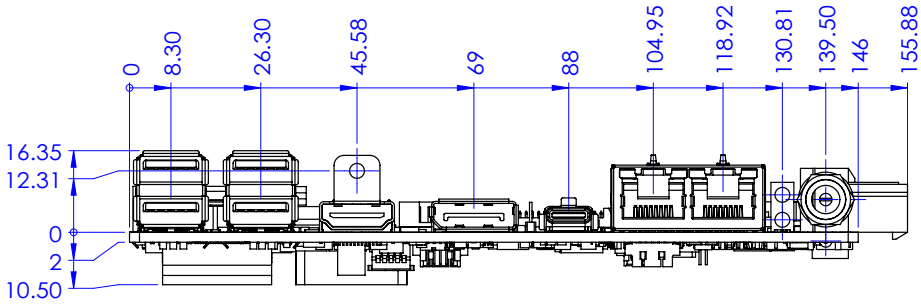



**Figure 2.3 MIO-5375 Mechanical Drawing (Coastline)**

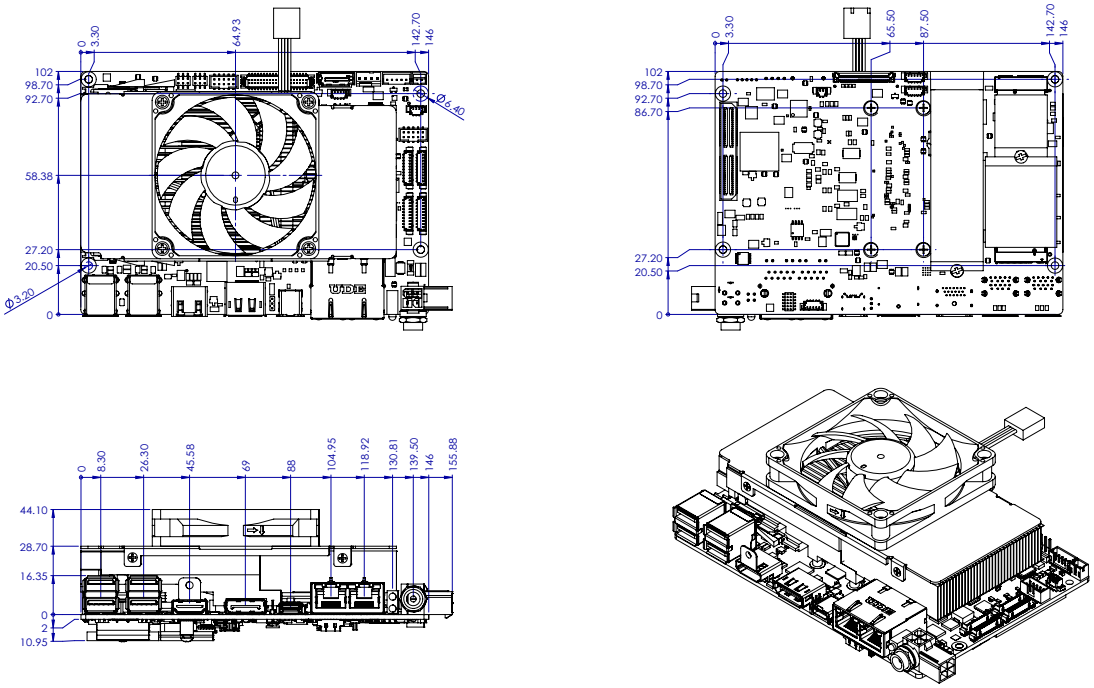



**Figure 2.4 MIO-5375 Mechanical Drawing (with Cooler)**

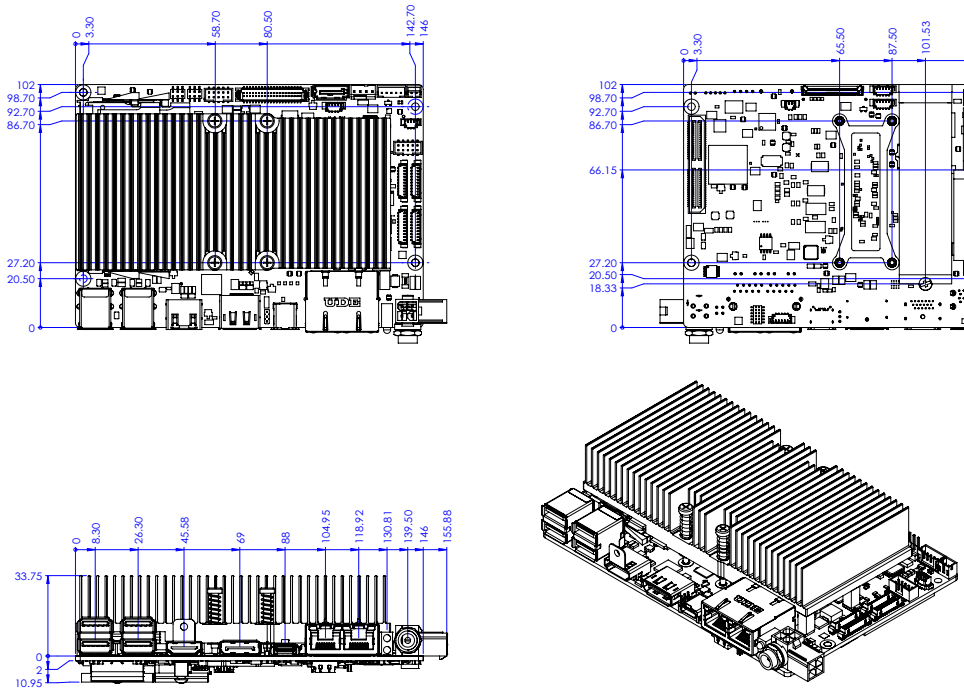



**Figure 2.5 MIO-5375 Mechanical Drawing (with Heatsink)**

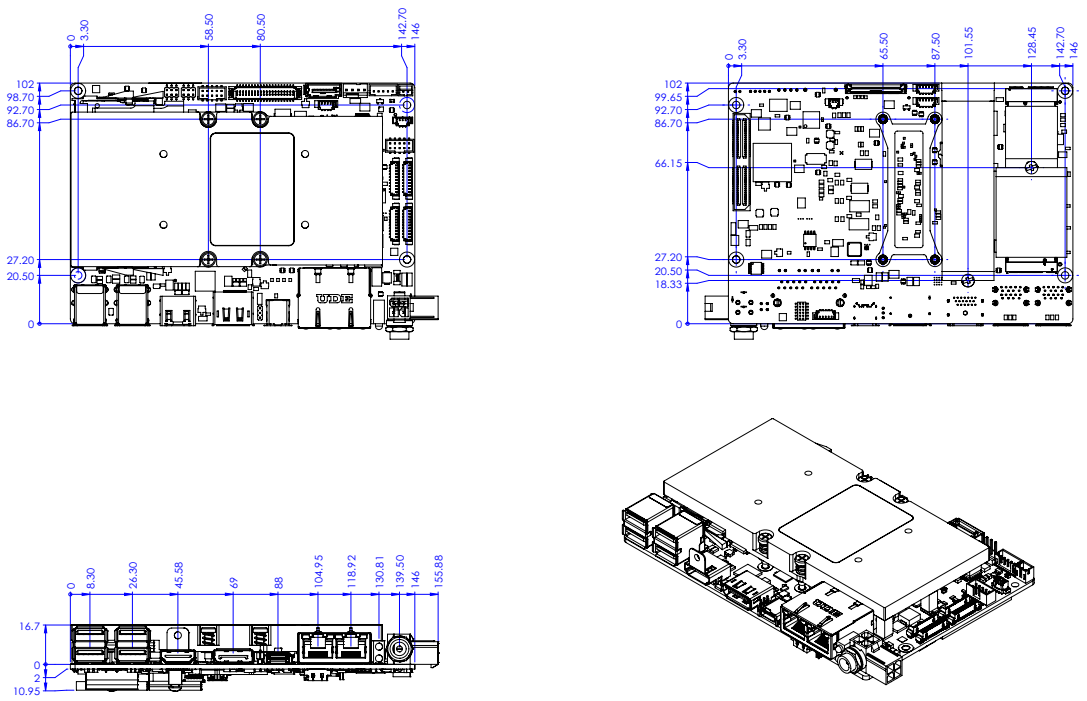
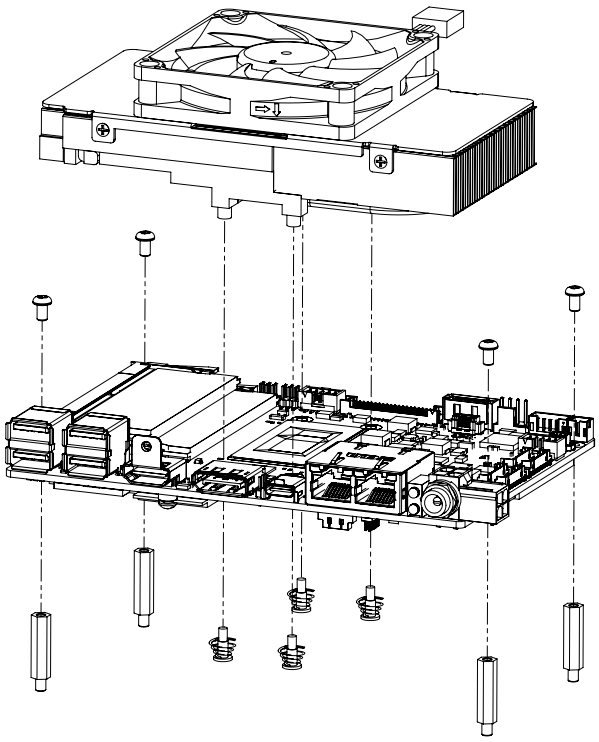



**Figure 2.6 MIO-5375 Mechanical Drawing (with Heat Spreader)**

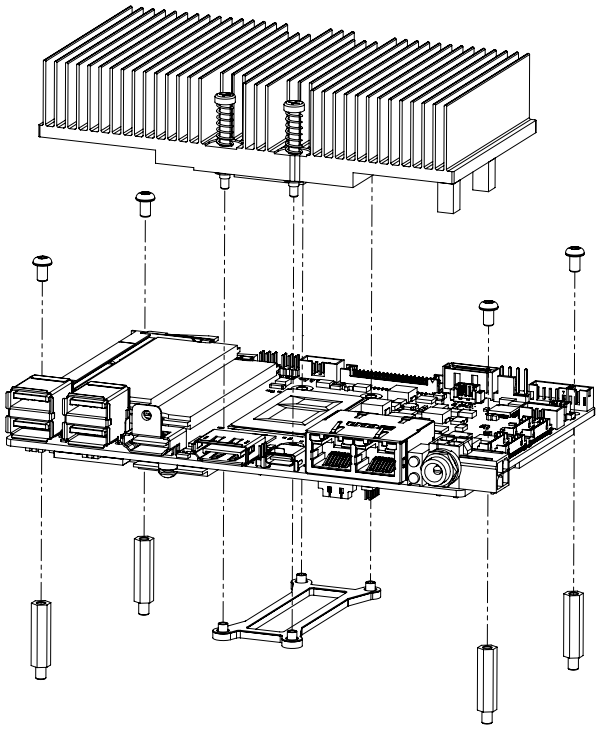
## 2.3 Quick Installation Guide

There is a Heatsink/Cooler (or optional heatspreader) in the white box inside the package. Please assemble it by following the diagrams below. Remember to remove the plastic on the thermal pad before you assemble the mechanical parts.

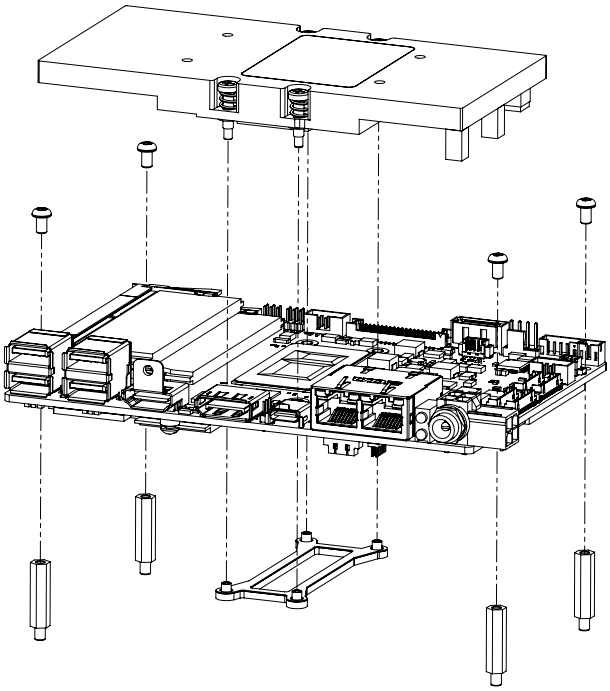
### 2.3.1 Cooler



### 2.3.2 Heatsink



### 2.3.3 Heatspreader (Option)



# Chapter 3

## Installation

This chapter explains the setup procedures of the MIO-5375 hardware, including instructions on setting jumpers and connecting peripherals, switches and indicators. Be sure to read all safety precautions before you begin the installation procedure.

## 3.1 Jumpers & Switches

The MIO-5375 has a number of jumpers that allow you to configure your system to suit your application. The table below lists the functions of the various jumpers.

| Table 3.1: Jumpers & Switches | |
|---|---|
| J3 | AT mode /Load BIOS default |
| VDD1 | LCD Power |

## 3.2 Connectors

Onboard connectors link the MIO-5375 to external devices such as hard disk drives, mouse and keyboard. The table below lists the function of each of the board's connectors.

| Table 3.2: Connectors | |
|---|---|
| **Label** | **Function** |
| CN11 | Power Input |
| DIMM1 | SO-DIMM 9.2mm |
| DIMM2 | SO-DIMM 5.2mm |
| Battery1 | RTC Battery |
| CN4 | CAN BUS |
| CN5 | Front Panel |
| AUDIO1 | Audio |
| CN8 | I2C |
| COM1 | COM1 |
| COM2 | COM2 |
| COM3 | COM3 |
| COM4 | COM4 |
| CN7 | GPIO |
| LAN1 | RJ45_2x1_W/XFMR&LED |
| BL1 | Inverter Power output |
| LVDS1 | 48 bit LVDS |
| EDP1 | eDP/MIPI DSI |
| HDMI1 | HDMI |
| DP1 | DP |
| TYPEC1 | TYPEC |
| M2_1 | M.2 E-key |
| M2_2 | M.2 M-key |
| M2_3 | M.2 B-key |
| SIM | NANO SIM |
| USB1 | USB2.0+3.0_13H |
| USB2 | USB2.0+3.0_13H |
| USB3 | Internal USB2.0 |
| SATAP1 | SATA Power |
| SATA1 | SATA_7V |
| CN10 | Smart FAN |

## 3.3 Locating connectors

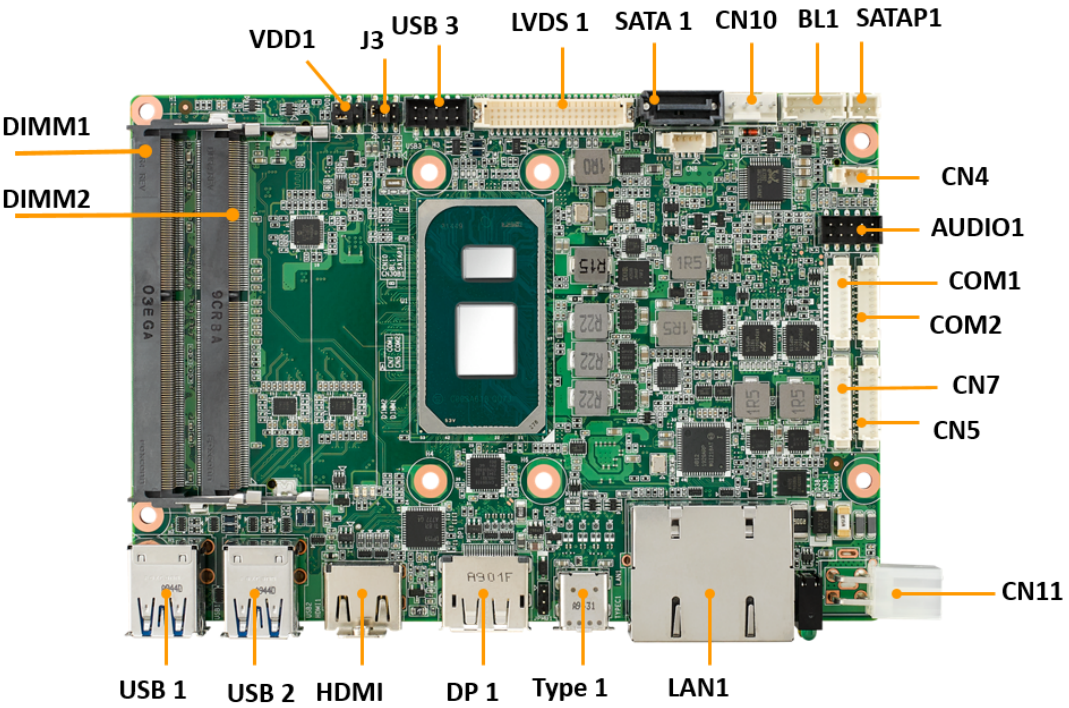



**Figure 3.1 MIO-5375 Connector Locations (Top Side)**

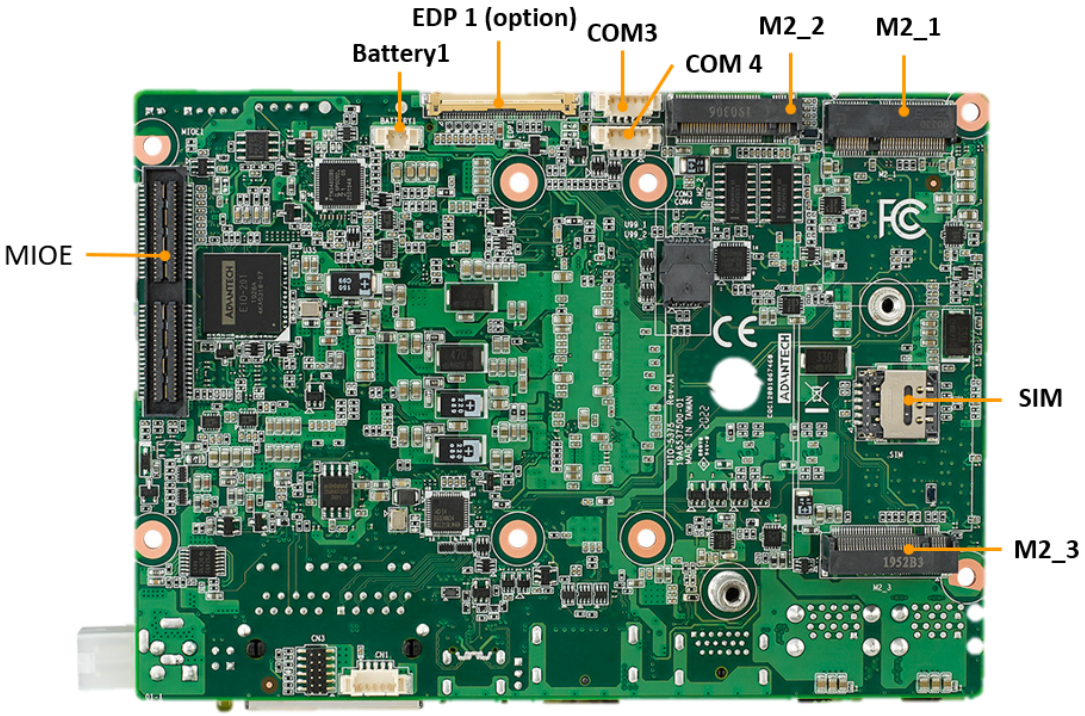
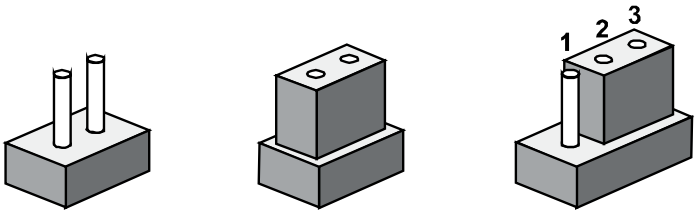



**Figure 3.2 MIO-5375 Connector Locations (Bottom Side)**

## 3.4 Setting Jumpers

A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper, you connect the pins with the clip. To “open” a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.

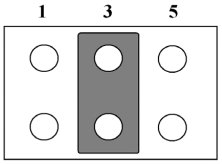
The jumper settings are schematically depicted in this manual as follows:




**open** **closed** **closed 2-3**

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

### 3.4.1 Auto Power On / Load BIOS default (J3)

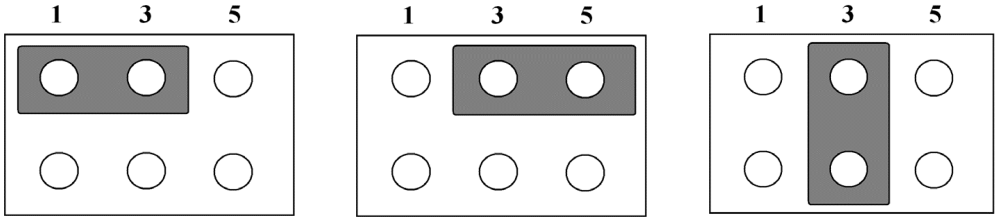



| | |
|---|---|
| **Part Number** | 1653003260 |
| **Footprint** | HD_3x2P_79 |
| **Description** | PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050 |
| **Setting** | **Function** |
| (1-2)* | Auto Power On |
| (3-4)* | Reserve |
| (5-6)* | Short: Load BIOS default Open: Noraml |

***Note!*** ***To load factory defaults, do this:***

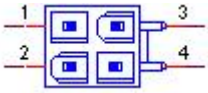
*Step 1 : Power off*
*Step 2 : Remove the Jumper (3-4) and add to (5-6), then power on.*
*BIOS will load factory defaults (does not clear time or clear CMOS), a message will remind user to shut down system and restore Jumper (3-4)*
*Step 3 : Power on again.*
*If you want to Clear CMOS, remove battery (battery 1).*
*System will pop up a message...wait for 3 seconds. RTC time will clear but keep the BIOS settings.*

### 3.4.2 LCD Power (VDD1)




| | |
|---|---|
| **Part Number** | 1653003260 |
| **Footprint** | HD_3x2P_79 |
| **Description** | PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050 |
| **Setting** | **Function** |
| (1-3)* | +3.3V |
| (3-5) | +5V |
| (3-4) | +12V |

### 3.4.3 CN11 12V Power Input




| | |
|---|---|
| **Part Number** | 1655003865 |
| **Footprint** | WF_2x2P_165_BOX_RA_D_740SP |
| **Description** | ATX PWRCONN 2x2P 4.2mm 90D(M) DIP 740-77-04TS50 |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | GND |
| 3 | +12V |
| 4 | +12V |

### 3.4.4 DIMM1 SODIMMDDR4_260 9.2mm

| | |
|---|---|
| **Part Number** | 1651002909-02 |
| **Footprint** | SODIMMDDR4_260P_AS0A826-HARB |
| **Description** | DDR4 SODIMM 260P/0.5mm/LCP/RA/G10u/S/BK/H9.2/RVS |
| **Pin** | **Pin Name** |

### 3.4.5 DIMM2 SODIMMDDR4_260 5.2mm

| | |
|---|---|
| **Part Number** | 1651002908-01 |
| **Footprint** | SODIMMDDR4_260P_AS0A826-H2RB |
| **Description** | DDR4 SODIMM H=5.2mm 260P SMD REV. AS0A826-H2RB-7 |
| **Pin** | **Pin Name** |

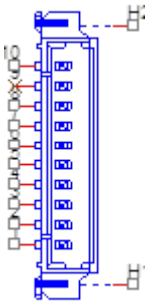
### 3.4.6 Battery1 RTC Battery

| | |
|---|---|
| **Part Number** | 1655005427-01 |
| **Footprint** | WF_2P_49_53398-0271 |
| **Description** | WAFER 2P 1.25mm 180D(M) SMD 53398-0271 |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | VBAT |

### 3.4.7 CN4 CAN BUS

| | |
|---|---|
| **Part Number** | 1654903500 |
| **Footprint** | WHL3VS-125M |
| **Description** | WAFER 3P 1.25mm 90D(M) SMD 85205-03001 |
| **Pin** | **Pin Name** |
| 1 | CAN1_D+ |
| 2 | CAN1_D- |
| 3 | GND |

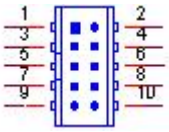
### 3.4.8 CN5 Front Panel



| | |
|---|---|
| **Part Number** | 1653007728-01 |
| **Footprint** | WF_10P_49_BOX_53398-1071 |
| **Description** | Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | BUZZER- |
| 3 | BUZZER+ |

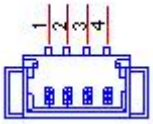
| | |
|---|---|
| 4 | RDC_CASEOPEN |
| 5 | SATA_EXT_LED# |
| 6 | PSIN# |
| 7 | RST# |
| 8 | HD LED +3.3V |
| 9 | NC |
| 10 | Power LED +5V |

### 3.4.9 AUDIO1 Audio



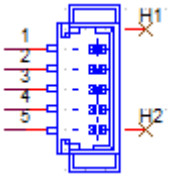

| | |
|---|---|
| **Part Number** | 1653007480-01 |
| **Footprint** | HD_5X2P_79_BOX_H245 |
| **Description** | BOXH 2x5P/2.0mm/LCP/M/VA/G10u/S/BK/H4.83/W |
| **Pin** | **Pin Name** |
| 1 | LOUTR |
| 2 | LINR |
| 3 | GND |
| 4 | GND |
| 5 | LOUTL |
| 6 | LINL |
| 7 | GND |
| 8 | GND |
| 9 | MIC1R |
| 10 | MIC1L |

### 3.4.10 CN8 I2C



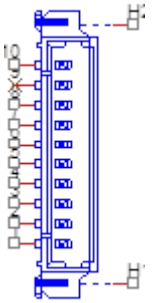
| | |
|---|---|
| **Part Number** | 1655904020 |
| **Footprint** | FPC4V-125M |
| **Description** | WAFER 4P 1.25mm 180D(M) SMD 85205-04001 |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | I2C_DAT |
| 3 | I2C_CLK |
| 4 | +V5_I2C |

## 3.4.11 COM1



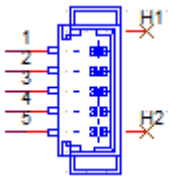

| | |
|---|---|
| **Part Number** | 1654011262-01 |
| **Footprint** | DBCOM-VM5MS |
| **Description** | D-SUB 9P 2.77mm 90D(M) DIP G/F DSB5-09M1-KNR0-90 |
| **Pin** | **Pin Name** |
| 1 | NC |
| 2 | COM_RI# |
| 3 | COM_DTR# |
| 4 | COM_CTS# |
| 5 | COM_TXD |
| 6 | COM_RTS# |
| 7 | COM_RXD |
| 8 | COM_DSR# |
| 9 | COM_DCD# |
| 10 | GND |

## 3.4.12 COM2



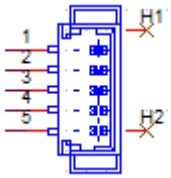
| | |
|---|---|
| **Part Number** | 1653007728-01 |
| **Footprint** | WF_10P_49_BOX_53398-1071 |
| **Description** | Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO |
| **Pin** | **Pin Name** |
| 1 | NC |
| 2 | COM_RI# |
| 3 | COM_DTR# |
| 4 | COM_CTS# |
| 5 | COM_TXD |
| 6 | COM_RTS# |
| 7 | COM_RXD |
| 8 | COM_DSR# |
| 9 | COM_DCD# |
| 10 | GND |

### 3.4.13 COM3



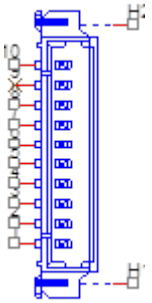

| | |
|---|---|
| **Part Number** | 1655004032 |
| **Footprint** | WF_5P_49_BOX_85205 |
| **Description** | WAFER 5P 1.25mm 180D(M) SMD 85205-05701 |
| **Pin** | **Pin Name** |
| 1 | COM_TXD |
| 2 | COM_RTS# |
| 3 | COM_RXD |
| 4 | COM_CTS# |
| 5 | GND |

### 3.4.14 COM4



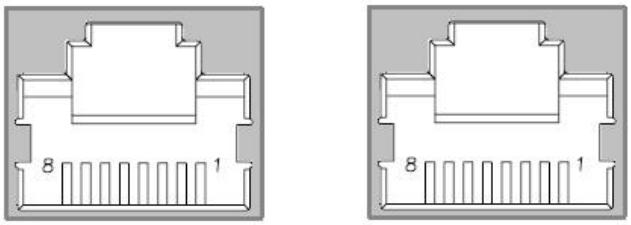

| | |
|---|---|
| **Part Number** | 1655004032 |
| **Footprint** | WF_5P_49_BOX_85205 |
| **Description** | WAFER 5P 1.25mm 180D(M) SMD 85205-05701 |
| **Pin** | **Pin Name** |
| 1 | COM_TXD |
| 2 | COM_RTS# |
| 3 | COM_RXD |
| 4 | COM_CTS# |
| 5 | GND |

## 3.4.15 CN7 GPIO



| | |
|---|---|
| **Part Number** | 1653007728-01 |
| **Footprint** | WF_10P_49_BOX_53398-1071 |
| **Description** | Wafer 1x10P/1.25mm/PA/M/VA/WH/Sn/H4.7mm/WO |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | P0_GPIO7 |
| 3 | P0_GPIO2 |
| 4 | P0_GPIO6 |
| 5 | P0_GPIO1 |
| 6 | P0_GPIO5 |
| 7 | P0_GPIO0 |
| 8 | P0_GPIO4 |
| 9 | +5V |
| 10 | P0_GPIO3 |

## 3.4.16 LAN1 RJ45_2x1_W/XFMR&LED

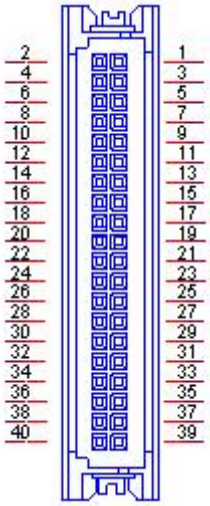



| | |
|---|---|
| **Part Number** | 1652003274 |
| **Footprint** | RJ45_28P_RTB-ZZ-0044 |
| **Description** | RJ45 1x2 28P/PA6T/RA/G-FL/D/BK/W TF/W SP/G,O;G |

### 3.4.17 BL1 Inverter Power Output

| | |
|---|---|
| **Part Number** | 1653007388-01 |
| **Footprint** | WF_5P_79_BOX_D_H240 |
| **Description** | Wafer 1x5P/2.0mm/NY66+30GF/(M)/VA/Sn/D/WH/H6.1mm |
| **Pin** | **Pin Name** |
| 1 | +12V |
| 2 | GND |
| 3 | ENABKL |
| 4 | VBR |
| 5 | +5V |

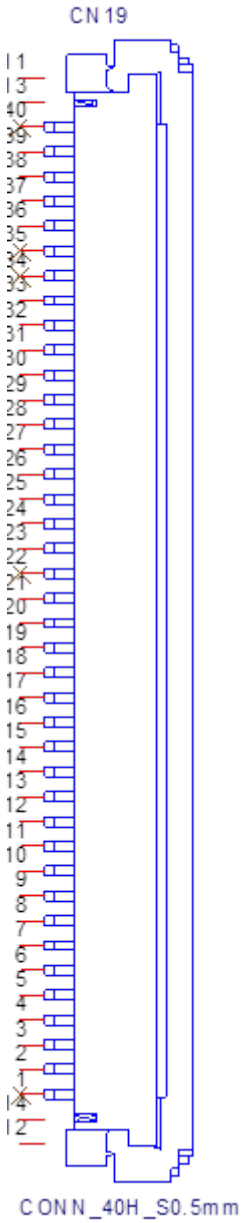
### 3.4.18 LVDS1 48-bit LVDS Panel




| | |
|---|---|
| **Part Number** | 1653006918-01 |
| **Footprint** | SPH20X2 |
| **Description** | Wafer 2x20P/1.25mm/(M)/NY9T/VA/GFL/S/WH/W Post |
| **Pin** | **Pin Name** |
| 1 | +12V or +5V or +3.3V |
| 2 | +12V or +5V or +3.3V |
| 3 | GND |
| 4 | GND |
| 5 | +12V or +5V or +3.3V |
| 6 | +12V or +5V or +3.3V |
| 7 | LVDS0_D0- |
| 8 | LVDS1_D0- |
| 9 | LVDS0_D0+ |
| 10 | LVDS1_D0+ |

| | |
|---|---|
| 11 | GND |
| 12 | GND |
| 13 | LVDS0_D1- |
| 14 | LVDS1_D1- |
| 15 | LVDS0_D1+ |
| 16 | LVDS1_D1+ |
| 17 | GND |
| 18 | GND |
| 19 | LVDS0_D2- |
| 20 | LVDS1_D2- |
| 21 | LVDS0_D2+ |
| 22 | LVDS1_D2+ |
| 23 | GND |
| 24 | GND |
| 25 | LVDS0_CLK- |
| 26 | LVDS1_CLK- |
| 27 | LVDS0_CLK+ |
| 28 | LVDS1_CLK+ |
| 29 | GND |
| 30 | GND |
| 31 | LVDS0_DDCCLK_AUX+ |
| 32 | LVDS0_DDCCLK_AUX- |
| 33 | GND |
| 34 | GND |
| 35 | LVDS0_D3- |
| 36 | LVDS1_D3- |
| 37 | LVDS0_D3+ |
| 38 | LVDS1_D3+ |
| 39 | NC |
| 40 | VCON |

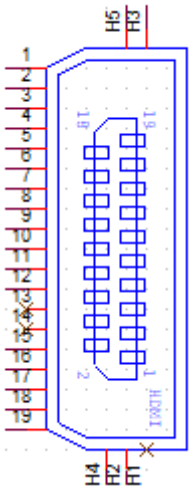
### 3.4.19 EDP1 eDP (option)




| | |
|---|---|
| **Part Number** | 1655005384-01 |
| **Footprint** | LVDS_40P_20_20455-040E_MIO-5373 |
| **Description** | Conn. 40P 0.5mm 90D SMD 20455-040E-12 |
| **Pin** | **Pin Name** |
| 1 | NC |
| 2 | GND |
| 3 | eDP_TX3- |
| 4 | eDP_TX3+ |
| 5 | GND |
| 6 | eDP_TX2- |
| 7 | eDP_TX2+ |
| 8 | GND |
| 9 | eDP_TX1- |

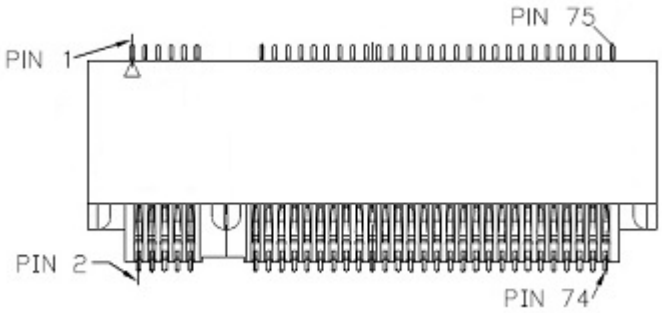
| | |
|---|---|
| 10 | eDP_TX1+ |
| 11 | GND |
| 12 | eDP_TX0- |
| 13 | eDP_TX0+- |
| 14 | GND |
| 15 | eDP_AUX+ |
| 16 | eDP_AUX- |
| 17 | GND |
| 18 | +12V or +5V or +3.3V |
| 19 | +12V or +5V or +3.3V |
| 20 | +12V or +5V or +3.3V |
| 21 | +12V or +5V or +3.3V |
| 22 | NC |
| 23 | GND |
| 24 | GND |
| 25 | GND |
| 26 | GND |
| 27 | eDP_HDP |
| 28 | GND |
| 29 | GND |
| 30 | GND |
| 31 | GND |
| 32 | ENABKL |
| 33 | PWM |
| 34 | DSI_DE_TE_1 |
| 35 | NC |
| 36 | eDP Inverter 12V or 5V |
| 37 | eDP Inverter 12V or 5V |
| 38 | eDP Inverter 12V or 5V |
| 39 | eDP Inverter 12V or 5V |
| 40 | NC |

### 3.4.20 HDMI




| | |
|---|---|
| **Part Number** | 1654014189-02 |
| **Footprint** | HDMI_19P_365FA19-XN024D-H |
| **Description** | HDMI 19P/LCP/RA(F)/G-FL/D/BK/W Flanged |

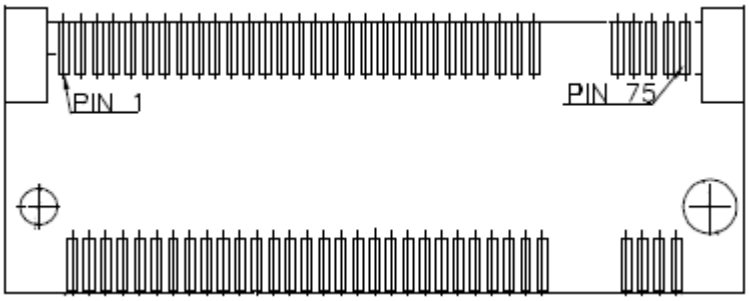
### 3.4.21 M2_1 M.2 E key




| | |
|---|---|
| **Part Number** | 1654012663-01 |
| **Footprint** | NGFF_75P_APCI0163-P001A |
| **Description** | NGFF 75P/0.5mm/(F)/LCP/RA/GFL/S/BK/H8.5mm/E-key |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | +3.3VSB |
| 3 | USB_D+ |
| 4 | +3.3VSB |
| 5 | USB_D- |
| 7 | GND |
| 8 | NC |
| 10 | NC |
| 12 | NC |
| 14 | NC |
| 18 | GND |

| | |
|---|---|
| 33 | GND |
| 35 | PETp0 |
| 37 | PETn0 |
| 39 | GND |
| 41 | PERp0 |
| 43 | PERn0 |
| 45 | GND |
| 47 | REFCLK+ |
| 49 | REFCLK- |
| 50 | SUSCLK |
| 51 | GND |
| 52 | PERESET# |
| 53 | CLKREQ# |
| 54 | BT_DISABLE# |
| 55 | PCIE_WAKE# |
| 56 | W_DISABLE# |
| 57 | GND |
| 58 | NC |
| 60 | NC |
| 63 | GND |
| 69 | GND |
| 72 | +3.3VSB |
| 74 | +3.3VSB |
| 75 | GND |

### 3.4.22 M2_2 M.2 M key

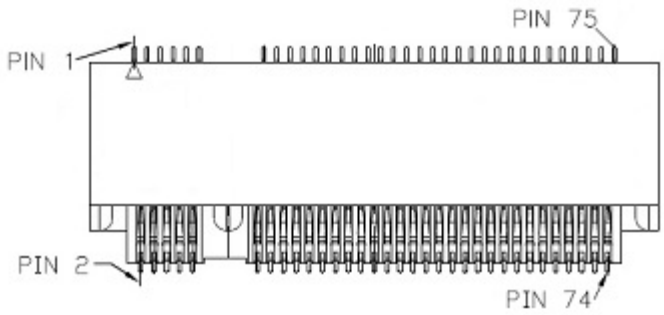



| | |
|---|---|
| **Part Number** | 1654014529-01 |
| **Footprint** | NGFF_75P_AS0BC21-S85BM-7H |
| **Description** | M.2 M KEY 75P/0.5/G-FL/RA/S/BK/H8.50/GEN 4 |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | +3.3VSB |
| 3 | GND |
| 4 | +3.3VSB |
| 5 | PCIe_RX4- |
| 6 | NC |
| 7 | PCIe_RX4+ |

| | |
|---|---|
| 8 | NC |
| 9 | GND |
| 10 | NC |
| 11 | PCIe_TX4- |
| 12 | +3.3VSB |
| 13 | PCIe_TX4+ |
| 14 | +3.3VSB |
| 15 | GND |
| 16 | +3.3VSB |
| 17 | PCIe_RX3- |
| 18 | +3.3VSB |
| 19 | PCIe_RX3+ |
| 20 | NC |
| 21 | GND |
| 22 | NC |
| 23 | PCIe_TX3- |
| 24 | NC |
| 25 | PCIe_TX3+ |
| 26 | NC |
| 27 | GND |
| 28 | NC |
| 29 | PCIe_RX2- |
| 30 | NC |
| 31 | PCIe_RX2+ |
| 32 | NC |
| 33 | GND |
| 34 | NC |
| 35 | PCIe_TX2- |
| 36 | NC |
| 37 | PCIe_TX2+ |
| 38 | NC |
| 39 | GND |
| 40 | NC |
| 41 | PCIe_RX1+/ M2_SATA1_RX+ |
| 42 | NC |
| 43 | PCIe_RX1-/ M2_SATA1_RX- |
| 44 | NC |
| 45 | GND |
| 46 | NC |
| 47 | PCIe_TX1-/ M2_SATA1_TX- |
| 48 | NC |
| 49 | PCIe_TX1+/ M2_SATA1_TX+ |
| 50 | PLTRST# |
| 51 | GND |
| 52 | CLK _REQ# |
| 53 | CLK _PCIE- |
| 54 | PCIE_WAKE# |
| 55 | CLK _PCIE+ |

| | |
|---|---|
| 56 | NC |
| 57 | GND |
| 58 | NC |
| 59 | Key |
| 60 | Key |
| 61 | Key |
| 62 | Key |
| 63 | Key |
| 64 | Key |
| 65 | Key |
| 66 | Key |
| 67 | NC |
| 68 | SUSCLK |
| 69 | M2_SSD_PEDET |
| 70 | +3.3VSB |
| 71 | GND |
| 72 | +3.3VSB |
| 73 | GND |
| 74 | +3.3VSB |
| 75 | GND |

### 3.4.23 M2_3 M.2 B key

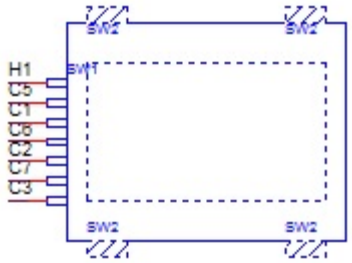



| | |
|---|---|
| **Part Number** | 1654012087-02 |
| **Footprint** | NGFF_75P_APCI0161-P001A |
| **Description** | NGFF 75P/0.5mm/(F)/LCP/RA/GFL/S/BK/H8.50/B-key |
| **Pin** | **Pin Nam** |
| 1 | M.2_B_CONFIG_3 |
| 2 | +3.3VSB |
| 3 | GND |
| 4 | +3.3VSB |
| 5 | GND |
| 6 | POWER_OFF# |
| 7 | USB7_P+ |
| 8 | WWAN_DISABLE# |
| 9 | USB7_P- |
| 10 | NC |
| 11 | GND |

| | |
|---|---|
| 12 | Key |
| 13 | Key |
| 14 | Key |
| 15 | Key |
| 16 | Key |
| 17 | Key |
| 18 | Key |
| 19 | Key |
| 20 | NC |
| 21 | M.2_B_CONFIG_0 |
| 22 | NC |
| 23 | NC |
| 24 | NC |
| 25 | DPR |
| 26 | NC |
| 27 | GND |
| 28 | NC |
| 29 | NC |
| 30 | UIM_RESET |
| 31 | NC |
| 32 | UIM_CLK |
| 33 | GND |
| 34 | UIM_DATA |
| 35 | NC |
| 36 | +VUIM_PWR |
| 37 | NC |
| 38 | NC |
| 39 | GND |
| 40 | NC |
| 41 | NC |
| 42 | NC |
| 43 | NC |
| 44 | NC |
| 45 | GND |
| 46 | NC |
| 47 | NC |
| 48 | NC |
| 49 | NC |
| 50 | NC |
| 51 | GND |
| 52 | NC |
| 53 | NC |
| 54 | NC |
| 55 | NC |
| 56 | NC |
| 57 | GND |
| 58 | NC |
| 59 | NC |

| | |
|---|---|
| 60 | NC |
| 61 | NC |
| 62 | NC |
| 63 | NC |
| 64 | NC |
| 65 | NC |
| 66 | NC |
| 67 | PLTRST_BKEY # |
| 68 | SUSCLK |
| 69 | M.2_B_CONFIG_1 |
| 70 | +3.3VSB |
| 71 | GND |
| 72 | +3.3VSB |
| 73 | GND |
| 74 | +3.3VSB |
| 75 | M.2_B_CONFIG_2 |

### 3.4.24 SIM NANO SIM

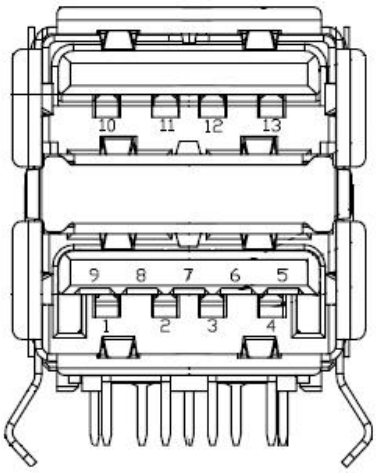



| | |
|---|---|
| **Part Number** | 1654013206-01 |
| **Footprint** | SIM_6P_N080613-SICR10 |
| **Description** | Nano SIM Card 6P/1.27/(F)/LCP/RA/GFL/S/BK/H1.37 |

### 3.4.25 USB1 USB3.0_13H

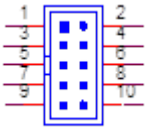
| | |
|---|---|
| **Part Number** | 1654013480-01 |
| **Footprint** | USB_9X2P_USB5-18F5-BNR0-10 |
| **Description** | USB 3.1 2x9P/2.0mm/PA66/(F)/RA/G30u/D/BU/H15.69 |

### 3.4.26 USB2 USB3.0_13H




| | |
|---|---|
| **Part Number** | 1654013480-01 |
| **Footprint** | USB_9X2P_USB5-18F5-BNR0-10 |
| **Description** | USB 3.1 2x9P/2.0mm/PA66/(F)/RA/G30u/D/BU/H15.69 |

### 3.4.27 USB3 Internal USB

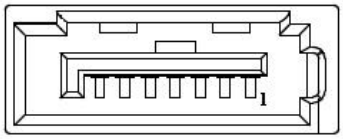



| | |
|---|---|
| **Part Number** | 1653007480-01 |
| **Footprint** | HD_5X2P_79_BOX_H245 |
| **Description** | BOXH 2x5P/2.0mm/LCP/M/VA/G10u/S/BK/H4.83/W |
| **Pin** | **Pin Name** |
| 1 | +5V |
| 2 | +5V |
| 3 | A_D- |
| 4 | B_D- |
| 5 | A_D+ |
| 6 | B_D+ |
| 7 | GND |
| 8 | GND |
| 9 | GND |
| 10 | NC |

## 3.4.28 SATAP1 SATA Power

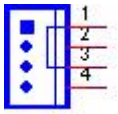
| | |
|---|---|
| **Part Number** | 1653007538-01 |
| **Footprint** | WF_2P_79_BOX_D_721-81-02TW00 |
| **Description** | Wafer 1x2P/2.0mm/NY66+30GF/M/VA/Sn/D/WH/H6.1mm |
| **Pin** | **Pin Name** |
| 1 | +5V |
| 2 | GND |

## 3.4.29 SATA1 SATA_7V



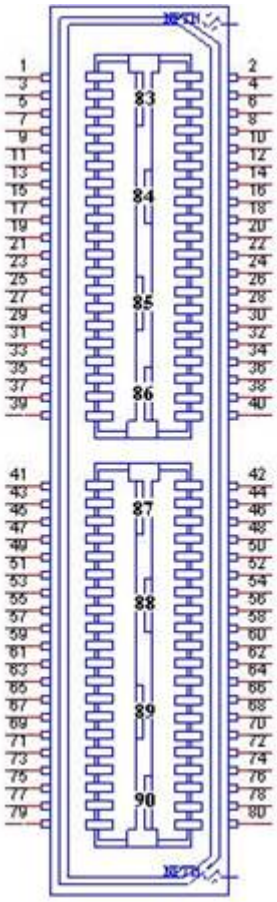

| | |
|---|---|
| **Part Number** | 1654013615-01 |
| **Footprint** | SATA_7P_WATF-07DBN6SB1U |
| **Description** | SATA 7P/1.27mm/LCP/F/VA/G15u/S/BK/H8.41/W |

## 3.4.30 CN10 SMART FAN




| | |
|---|---|
| **Part Number** | 1655004347 |
| **Footprint** | WF_4P_100_D_744-81-04TW30 |
| **Description** | WAFER 2.54 1*4P 180D(M) DIP 744-81-04TW30 |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | +V12_FAN |
| 3 | FAN_SPEED |
| 4 | FAN_PWM |

### 3.4.31 MIOE MIOe



| Part Number | 1654006235 |
|---|---|
| Footprint | BB_40x2P_32_1625x285_2HOLD |
| Description | B/B Conn. 40x2P 0.8mm 180D(F) SMD QSE-040-01-L-D |
| **Pin** | **Pin Name** |
| 1 | GND |
| 2 | GND |
| 3 | PCIE_RX0+ |
| 4 | PCIE_TX0+ |
| 5 | PCIE_RX0- |
| 6 | PCIE_TX0- |
| 7 | GND |
| 8 | GND |
| 9 | PCIE_RX1+ |
| 10 | PCIE_TX1+ |
| 11 | PCIE_RX1- |
| 12 | PCIE_TX1- |
| 13 | GND |
| 14 | GND |
| 15 | PCIE_RX2+ |
| 16 | PCIE_TX2+ |
| 17 | PCIE_RX2- |

| | |
|---|---|
| 18 | PCIE_TX2- |
| 19 | GND |
| 20 | GND |
| 21 | PCIE_RX3+ |
| 22 | PCIE_TX3+ |
| 23 | PCIE_RX3- |
| 24 | PCIE_TX3- |
| 25 | GND |
| 26 | GND |
| 27 | PCIE_CLK+ |
| 28 | LOUTL |
| 29 | PCIE_CLK- |
| 30 | LOUTR |
| 31 | GND |
| 32 | AGND |
| 33 | SMB_CLK |
| 34 | NC |
| 35 | SMB_DAT |
| 36 | NC |
| 37 | PCIE_WAKE# |
| 38 | NC |
| 39 | RESET# |
| 40 | NC |
| 41 | SLP_S3# |
| 42 | CLK24M |
| 43 | NC |
| 44 | LPC_AD0 |
| 45 | DDP_HPD |
| 46 | LPC_AD1 |
| 47 | GND |
| 48 | LPC_AD2 |
| 49 | DDP_AUX+ |
| 50 | LPC_AD3 |
| 51 | DDP_AUX- |
| 52 | NC |
| 53 | GND |
| 54 | LPC_SERIRQ |
| 55 | DDP_D0+ |
| 56 | LPC_FRAME# |
| 57 | DDP_D0- |
| 58 | GND |
| 59 | GND |
| 60 | USB0_D+ |
| 61 | DDP_D1+ |
| 62 | USB0_D- |
| 63 | DDP_D1- |
| 64 | GND |
| 65 | GND |

| | |
|---|---|
| 66 | NC |
| 67 | DDP_D2+ |
| 68 | NC |
| 69 | DDP_D2- |
| 70 | GND |
| 71 | GND |
| 72 | NC |
| 73 | DDP_D3+ |
| 74 | NC |
| 75 | DDP_D3- |
| 76 | GND |
| 77 | GND |
| 78 | USB_OC# |
| 79 | +12VSB |
| 80 | +12VSB |
| 83 | GND |
| 84 | GND |
| 85 | GND |
| 86 | GND |
| 87 | +5VSB |
| 88 | +5VSB |
| 89 | +5VSB |
| 90 | +5VSB |

# Chapter 4

## AMI BIOS Setup

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the MIO-5375 BIOS setup screens.

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in battery-backed CMOS so it retains the Setup information when the power is turned off.

## 4.1 Entering Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

### 4.1.1 Main Setup

When you first enter the BIOS Setup Utility, you will encounter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

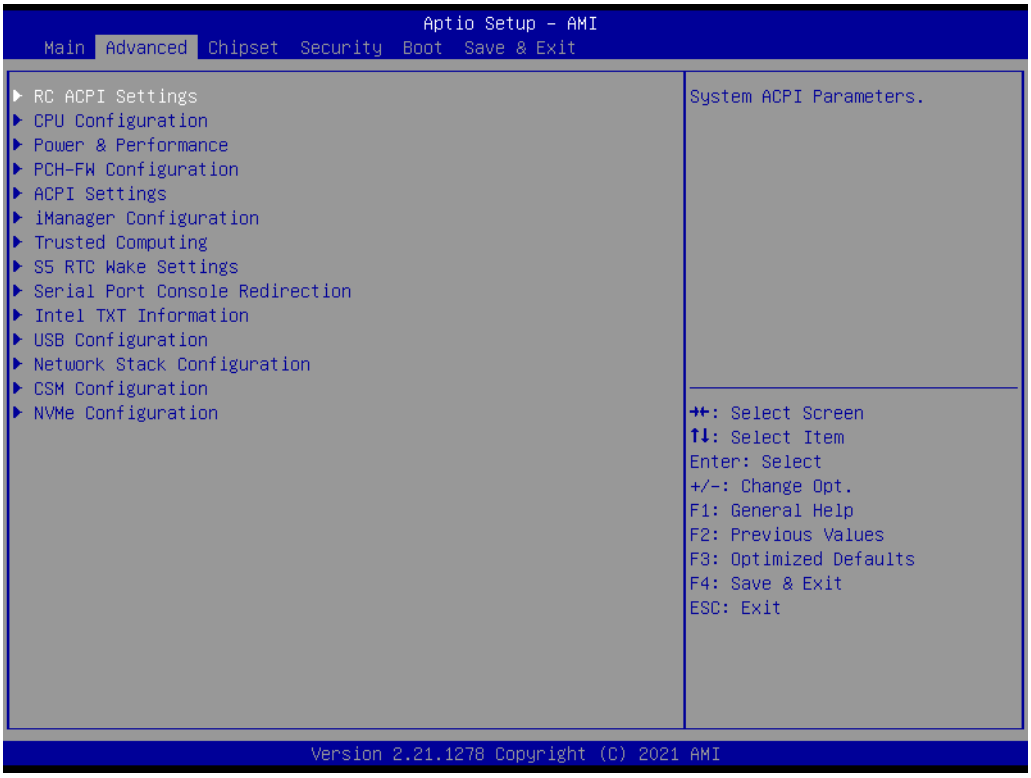
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System time / System date**

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

## 4.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-5375 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens is shown below. The sub menus are described on the following pages.



### 4.1.2.1 RC ACPI Settings

```
Aptio Setup - AMI
Advanced

RC ACPI Settings                                  PTID Support will be loaded if
                                                  enabled.
PTID Support                    [Enabled]
Native PCIE Enable              [Enabled]
Native ASPM                     [Disabled]
BDAT ACPI Table Support         [Disabled]

Low Power S0 Idle Capability    [Disabled]

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

Version 2.21.1278 Copyright (C) 2021 AMI
```

**Low Power S0 Idle Capability**

Determine if Enable ACPI Low Power S0 Idle Capability.

### 4.1.2.2 CPU Configuration

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
Advanced

CPU Configuration                                 Enable/Disable Software Guard
                                                  Extensions (SGX)
Type                            Intel(R) Core(TM)
                                i5-8400H CPU @ 2.50GHz
ID                              0x906EA
Microcode Revision              B4
Speed                           2500 MHz
L1 Data Cache                   32 KB x 4
L1 Instruction Cache            32 KB x 4
L2 Cache                        256 KB x 4
L3 Cache                        8 MB
L4 Cache                        N/A
VMX                             Supported
SMX/TXT                         Supported

Software Guard Extensions (SGX) [Software Controlled]     →←: Select Screen
Select Owner EPOCH input type   [No Change in Owner       ↑↓: Select Item
                                EPOCHs]                   Enter: Select
CPU Flex Ratio Override         [Disabled]                +/-: Change Opt.
CPU Flex Ratio Settings         25                        F1: General Help
Hardware Prefetcher             [Enabled]                 F2: Previous Values
Adjacent Cache Line Prefetch    [Enabled]                 F3: Optimized Defaults
Intel (VMX) Virtualization      [Enabled]                 F4: Save & Exit
Technology                                                ESC: Exit
Active Processor Cores          [All]

Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.
```

**SW Guard Extension (SGX)**

Enable/Disable Software Guard Extensions (SGX).

**Select Owner EPOCH input type**

Choose Owner EPOCH modes.

**CPU Flex Ratio Override**

Enable/Disable CPU Flex Ratio Programming.

**Hardware Prefetcher**

This item allows users to enable or disable the hardware prefetcher feature.

**Adjacent Cache Line Prefetch**

This item allows users to enable or disable the adjacent cache line prefetch feature.

**Intel (VMX) Virtualization Technology**

When Enabled, a VMM can utilize the additional hardware capability provided by Vanderpool Technology.

**Active Processor Cores**

This item allows users to set how many processor cores should be active.

**AES**

Enable/Disable AES (Advanced Encryption Standard).

**MachineCheck**

Enable/Disable Machine Check.

**MonitorMWait**

Enable/Disable MonitorMWait.

**Intel Trusted Execution Technology**

Enables utilization of additional hardware capability provided by Intel® Trusted Execution Technology.

#### 4.1.2.3 Power & Performance

**CPU – Power Management Control**

CPU – Power Management Control Options.

**GT – Power Management Control**

GT – Power Management Control Options.

## CPU - Power Management Control

```
                          Aptio Setup - AMI
 Advanced

 CPU - Power Management Control                  Select the performance state
                                                 that the BIOS will set
 Boot performance mode              [Max Non-Turbo  starting from reset vector.
                                    Performance]
 Intel(R) SpeedStep(tm)             [Enabled]
 Intel(R) Speed Shift Technology    [Enabled]
 HDC Control                        [Enabled]
   Turbo Mode                       [Enabled]
 ▶ View/Configure Turbo Options
 ▶ Config TDP Configurations
 Platform PL1 Enable                [Disabled]
 Platform PL2 Enable                [Disabled]
 Power Limit 4 Override             [Disabled]
 C states                           [Disabled]
 ▶ Power Limit 3 Settings                        →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

                 Version 2.21.1278 Copyright (C) 2021 AMI
```

**Boot Performance mode**

Select the performance state that the BIOS will set before OS handoff.

**Intel® SpeedStep®**

Allows more than two frequency ranges to be supported.

**Intel® Speed Shift Technology**

Enable/Disable Intel® Speed Shift Technology support.

**HDC Control**

Enable/Disable Intel HDC.

**Turbo Mode**

Enable/Disable processor turbo mode.

**Platform PL1 Enable**

Enable/Disable Platform Power Limit 1 programming.

**Platform PL2 Enable**

Enable/Disable Platform Power Limit 1 programming.

**Power Limit 4 Override**

Enable/Disable Power Limit 4 override.

**C states**

Enable/Disable CPU Power Management.

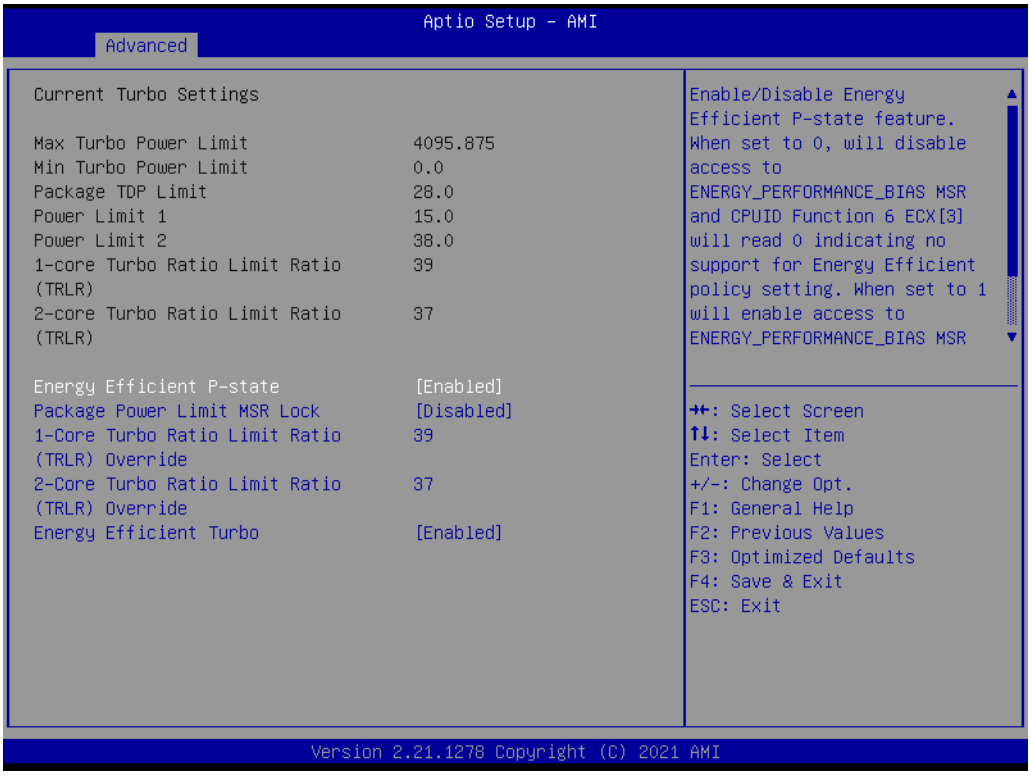
**PowerLimit 3 Settings**

Power Limit 3 Settings.

**CPU Lock Configuration**

CPU Lock Configuration.

## View/Configure Turbo Options




**Energy Efficient P-state**

Enable/Disable Energy Efficient P-state feature.

**Package Power Limit MSR Lock**

Enable/Disable locking of Package Power Limit settings.

**Energy Efficient Turbo**

Enable/Disable Energy Efficient Turbo feature.

## Config TDP Configurations

```
                          Aptio Setup - AMI
        Advanced
Config TDP Configurations                          Applies TDP initialization
                                                   settings based on non-cTDP or
Enable Configurable TDP            [Applies to cTDP]  cTDP. Default is 1: Applies to
Configurable TDP Boot Mode         [Up]            cTDP; if 0 then applies
Configurable TDP Lock              [Disabled]      non-cTDP and BIOS will bypass
CTDP BIOS control                  [Disabled]      cTDP initialzation flow
ConfigTDP Levels                   3
ConfigTDP Turbo Activation Ratio   21 (Unlocked)
Power Limit 1                      15.0W (MSR:15.0)
Power Limit 2                      38.0W (MSR:38.0)

Custom Settings Nominal
ConfigTDP Nominal                  Ratio:22 TAR:21
                                   PL1:28.0W       →←: Select Screen
Power Limit 1                      0               ↑↓: Select Item
Power Limit 2                      0               Enter: Select
Power Limit 1 Time Window          [0]             +/-: Change Opt.
ConfigTDP Turbo Activation Ratio   0               F1: General Help
                                                   F2: Previous Values
Custom Settings Down                               F3: Optimized Defaults
ConfigTDP Level1                   Ratio:17 TAR:16 F4: Save & Exit
                                   PL1:12.0W       ESC: Exit
Power Limit 1                      0
Power Limit 2                      0
Power Limit 1 Time Window          [0]
                          Version 2.21.1278 Copyright (C) 2021 AMI
```

**Configurable TDP Boot Mode**

Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection.

**Configurable TDP Lock**

Configurable TDP Mode Lock sets the Lock bit.

**CTDP BIOS Control**

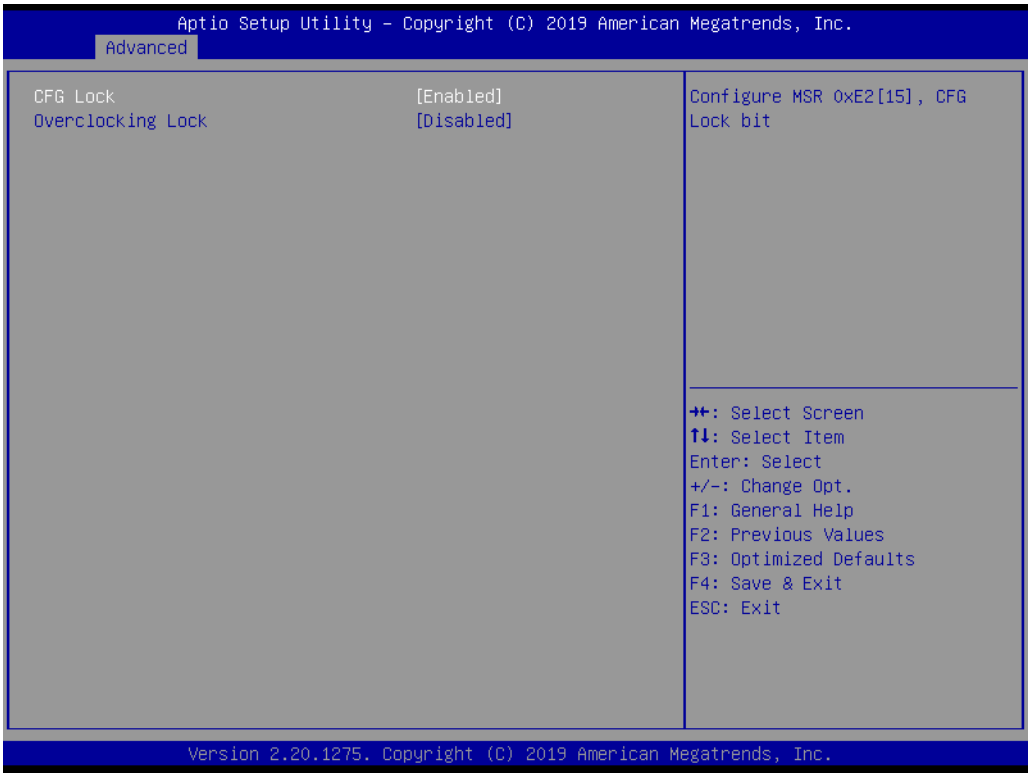
Enables CTDP control via runtime ACPI BIOS method.

## Power Limit 3 Settings

**Power Limit 3 Override**

Enable/Disable Power Limit 3 override.

## CPU Lock Configuration



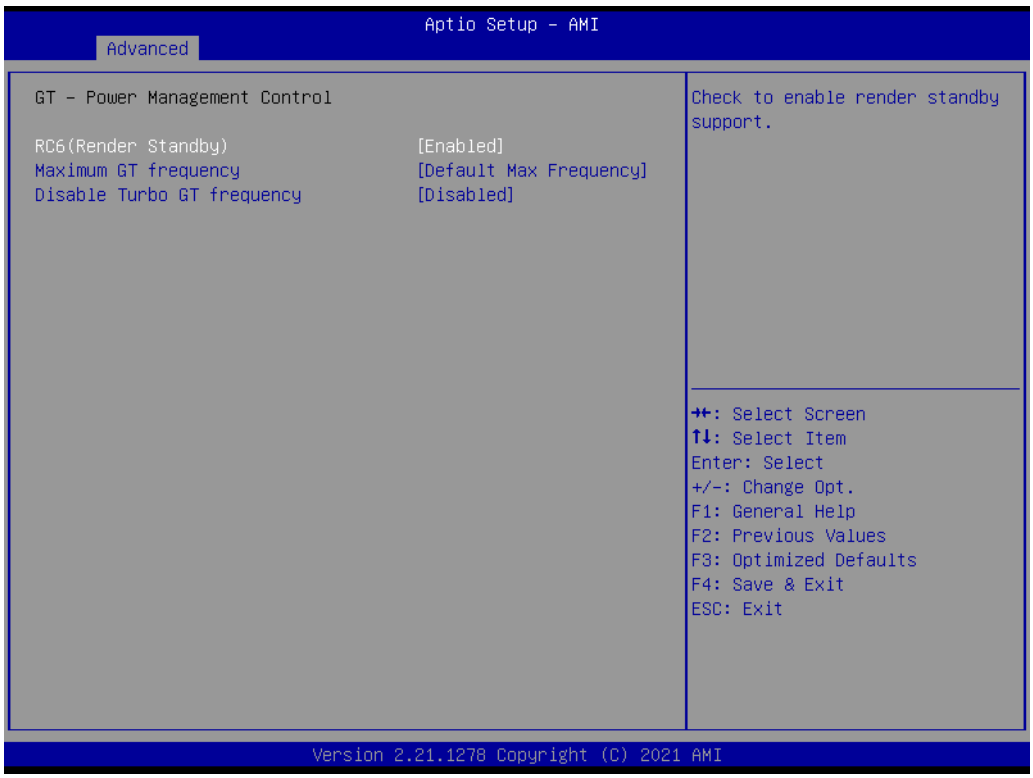

**CFG Lock**

Configure MSR 0xE2[15], CFG Lock bit.

**Overclocking Lock**

Enable/Disable Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR.

## GT - Power Management Control




**RC6(Render Standby)**

Check to enable render standby support.

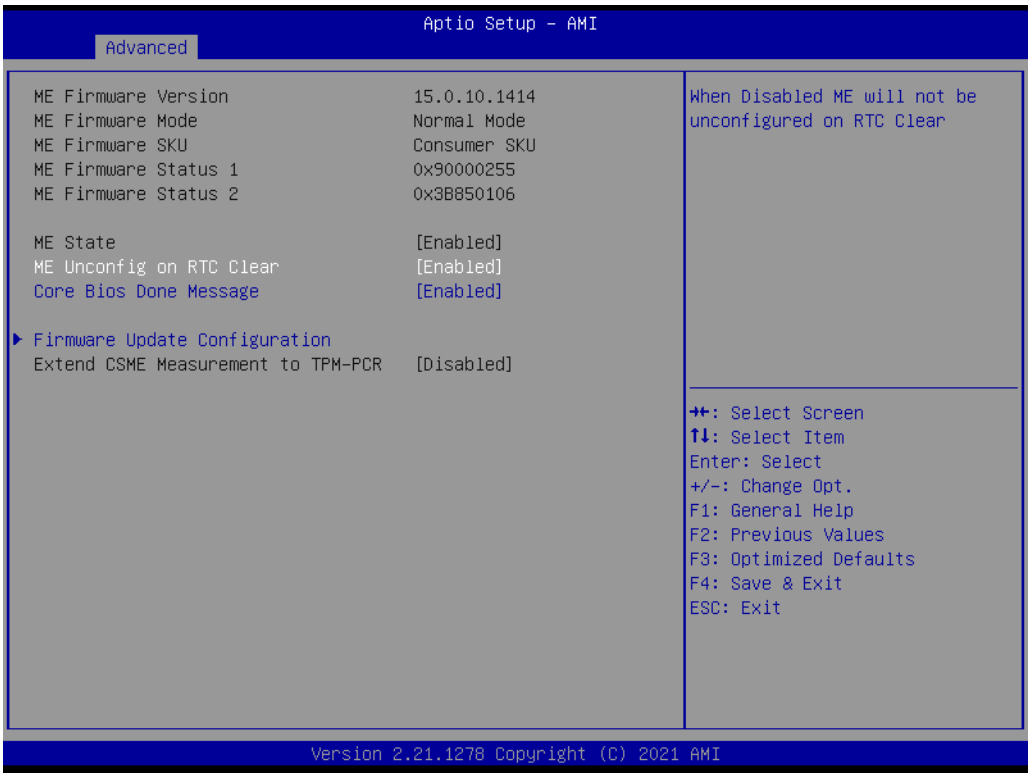
**Maximum GT Frequency**

Maximum GT frequency limited by user.

**Disable Turbo GT Frequency**

Enabled/Disabled Turbo GT frequency.

### 4.1.2.4 PCH-FW Configuration




**ME State**

When disabled ME will be put ME into temporarily disabled mode.

**Manageability Features State**

Enable/disable Intel Manageability features.

**AMT BIOS Features**

When disabled, AMT BIOS Features are no longer supported and user is no longer able to access MEBx setup.

**AMT Configuration**

Configure Intel® Active Management Technology parameters.

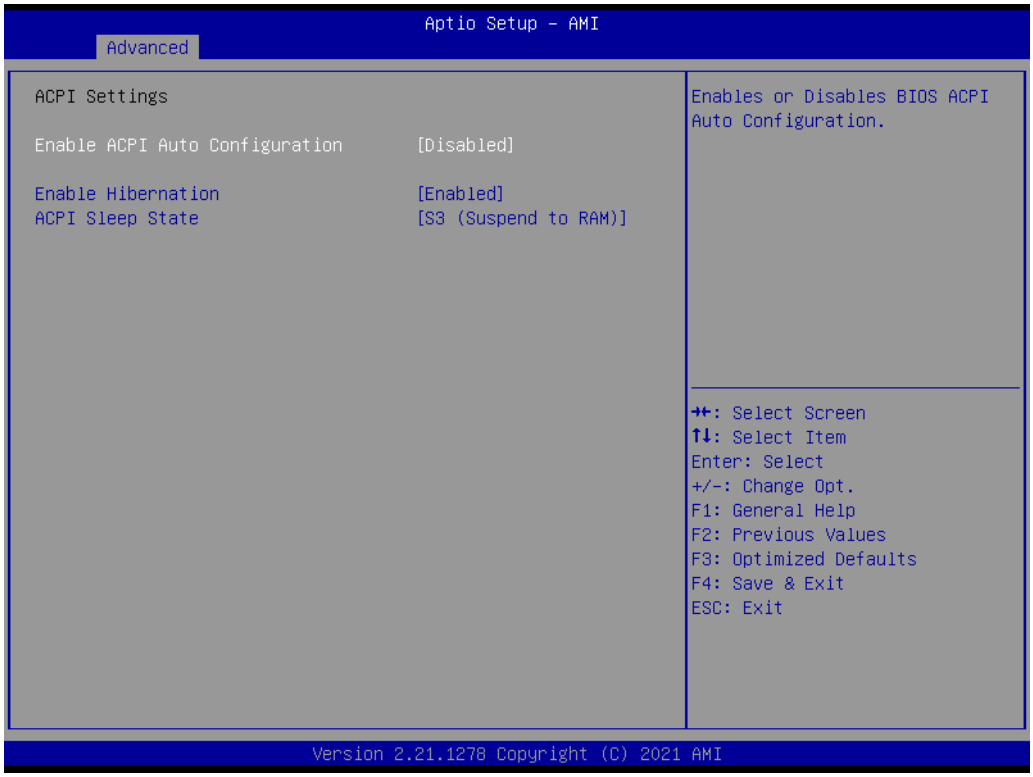
**ME Unconfig on RTC Clear**

When disabled, ME will not be unconfigured on RTC Clear.

**Firmware Update Configuration**

Configure management engine technology parameters.

### 4.1.2.5 ACPI Settings




**Enable ACPI Auto Configuration**

Enable or disable BIOS ACPI auto configuration.

**Enable Hibernation**

Enables or disables the ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

**ACPI Sleep State**

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

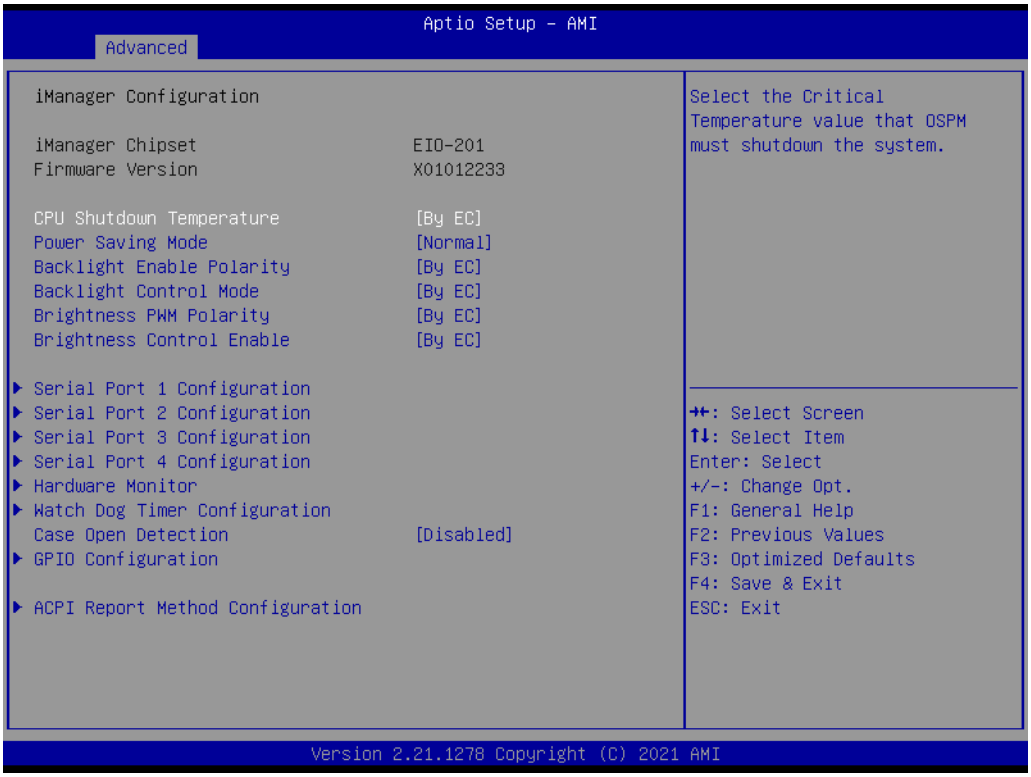
**Lock Legacy Resources**

Enables or disables lock of Legacy Resources.

**S3 Video Repost**

Enable or disable S3 Video Repost.

### 4.1.2.6 iManager Configuration




**CPU Shutdown Temperature**

Enable/disable CPU Shutdown Temperature.

**Backlight Enable Polarity**

Switch backlight enable polarity for native or invert.

**Backlight Mode Selection**

Switch backlight control to PWM or DC mode.

**Brightness PWM Polarity**

Switch brightness PWM polarity for native or invert.

**Power Saving Mode**

Enable/disable power saving mode.

**Serial Port 1 Configuration**

Set parameters of serial port 1.

**Serial Port 2 Configuration**

Set parameters of serial port 2.

**Wake On Ring Control**

Enable/disable Wake on Ring Function.

**Hardware Monitor**

Monitor hardware Status.

**Watch Dog Timer Configuration**

Watch Dog Timer Configuration page.

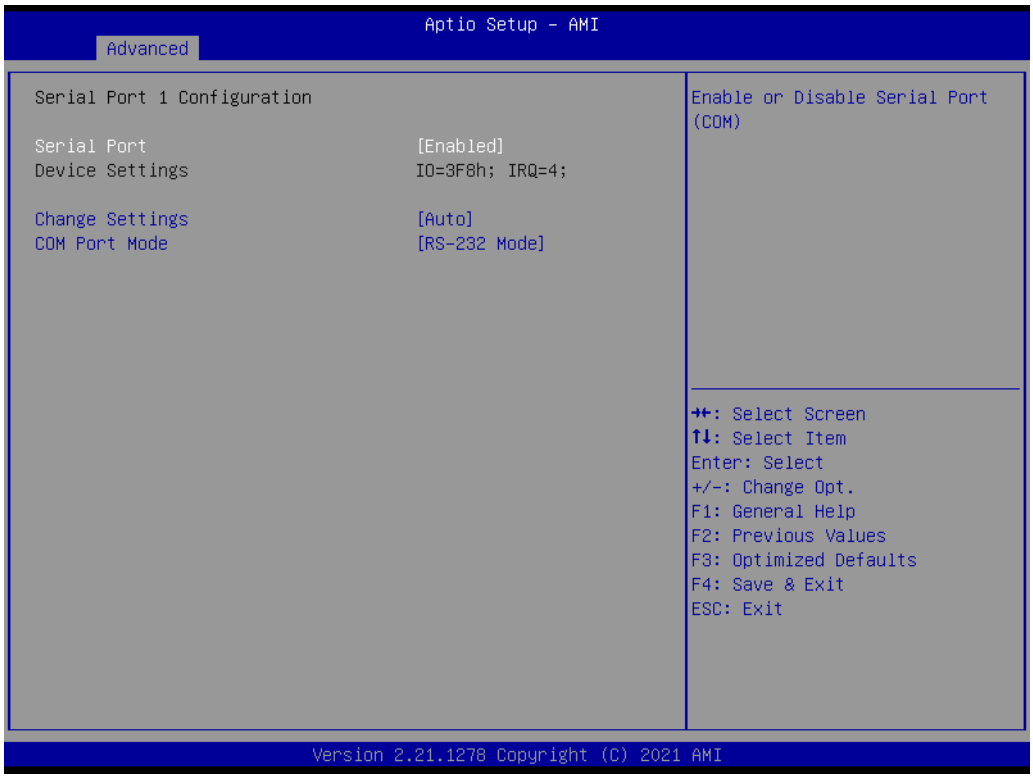
**Case Open Detection**

Enable or disable Case Open Detect function.

**GPIO Configuration**

GPIO Configuration settings.

## Serial Port 1 Configuration




**Serial Port**

Enable or disable Serial Port (COM).

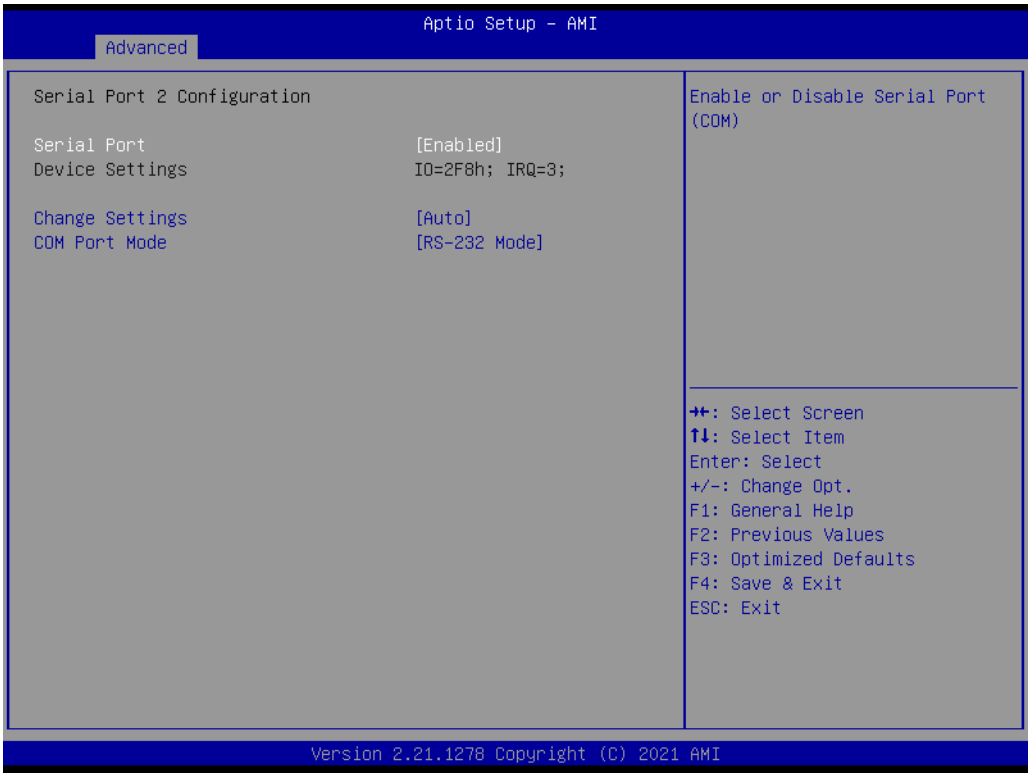
**Change Settings**

Select an optimal settings for Super IO device.

**COM1 Mode**

COM1 port mode select.

## Serial Port 2 Configuration




**Serial Port**

Enable or disable Serial Port (COM).

**Change Settings**

Select an optimal settings for Super IO device.

**COM2 Mode**

COM2 port mode select.

## Hardware Monitor

```
Aptio Setup - AMI
Advanced

PC Health Status

CPU Temperature                    : +31.4°C/ +88.5°F

CPU FAN Speed                      :  4884 RPM

+12V                               : +11.85 V
+ 5V                               : +5.00 V
VBAT                               : +2.29 V
Vcore                              : +1.27 V
Current                            :  555 mA

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

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```

## Watch Dog Timer Configuration

```
Aptio Setup - AMI
Advanced

Watch Dog Timer Configuration

Watch Dog Timer                    [Disabled]

Enabled or Disabled Watch Dog
Timer function (Start before
boot to OS and must stop by
self)

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

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```
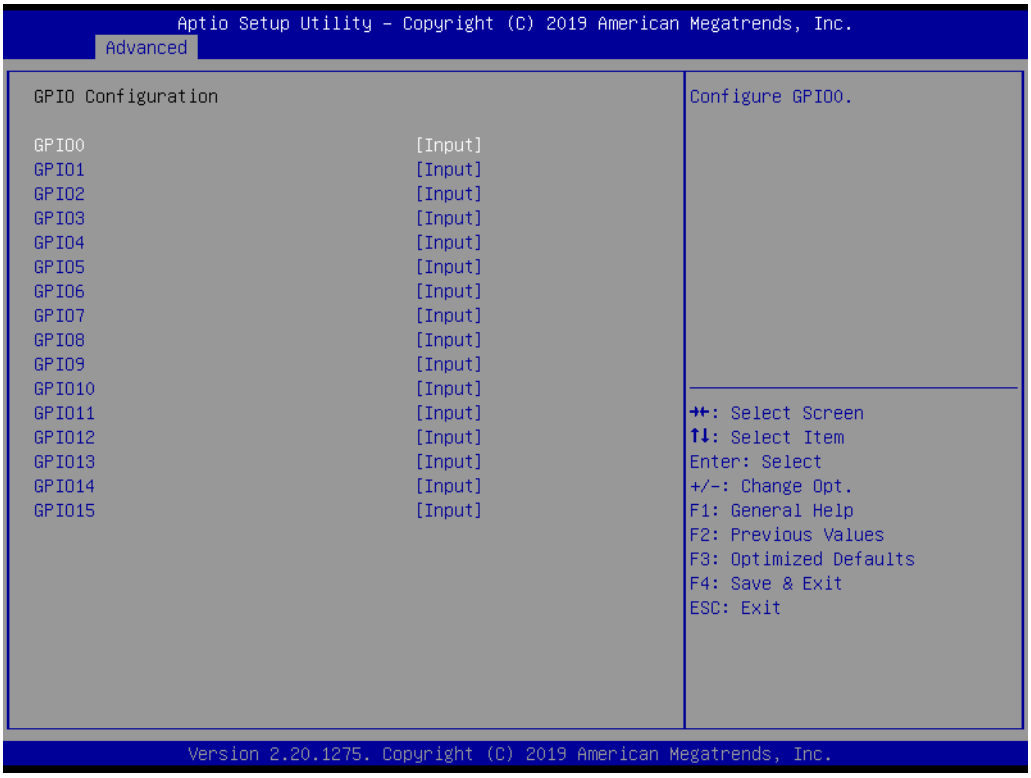

### Watch Dog Timer

Enable or disable Watch Dog Timer function.

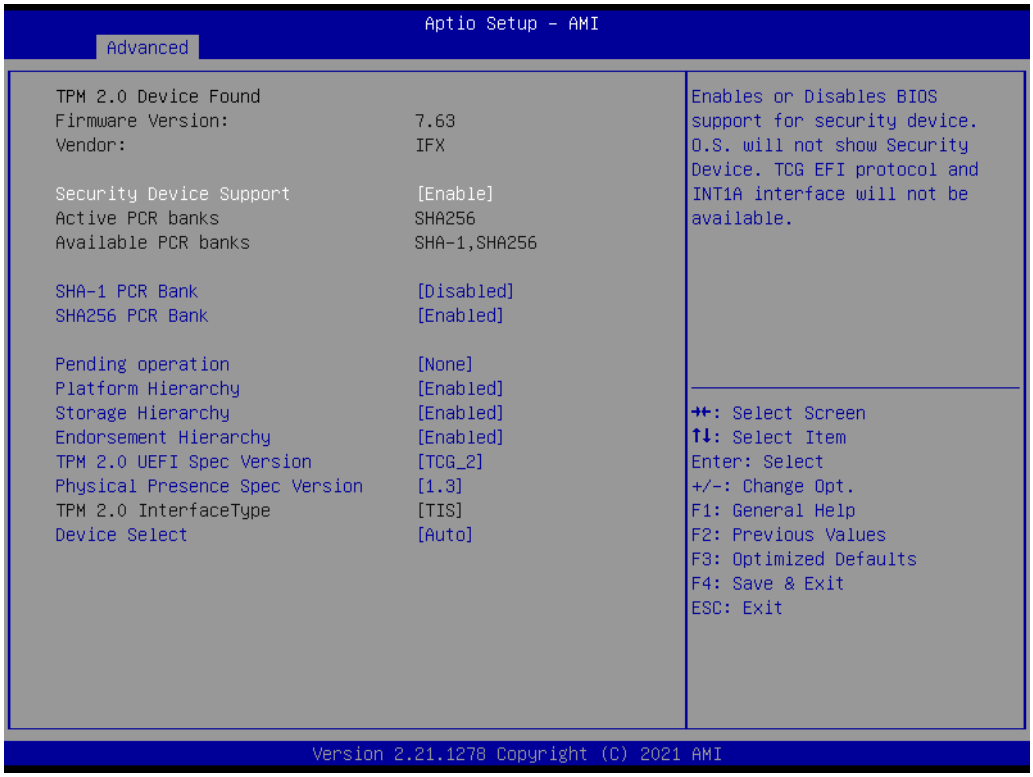
## GPIO Configuration




**GPIO0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15**

Configure GPIO0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15.

### 4.1.2.7 Trusted Computing




**Security Device Support**

Enable or disable BIOS support for security device.

**SHA-1 PCR Bank**

Enable or disable SHA-1 PCR Bank.

**SHA256 PCR Bank**

Enable or disable SHA256 PCR Bank.

**Pending operation**

Schedule an operation for the security device.

**Platform Hierarchy**

Enable or disable Platform Hierarchy.

**Storage Hierarchy**

Enable or disable Storage Hierarchy.

**Endorsement Hierarchy**

Enable or disable Endorsement Hierarchy.

**TPM 2.0 UEFI Spec Version**

Select the TCG2 Spec Version support.

**Physical Presence Spec Version**

Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3.

**Device Select**

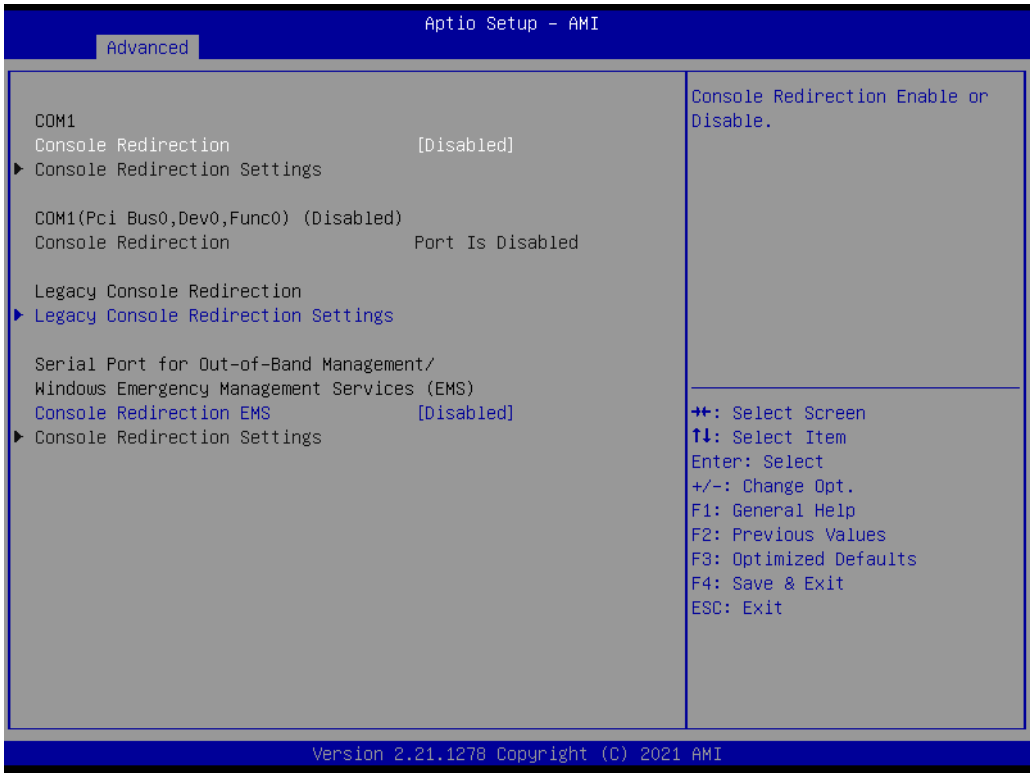
TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices.

### 4.1.2.8 S5 RTC Wake Settings

**Wake system from S5**

Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr:min:sec specified.

### 4.1.2.9 Serial Port Console Redirection




**Console Redirection**

This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

**Console Redirection**

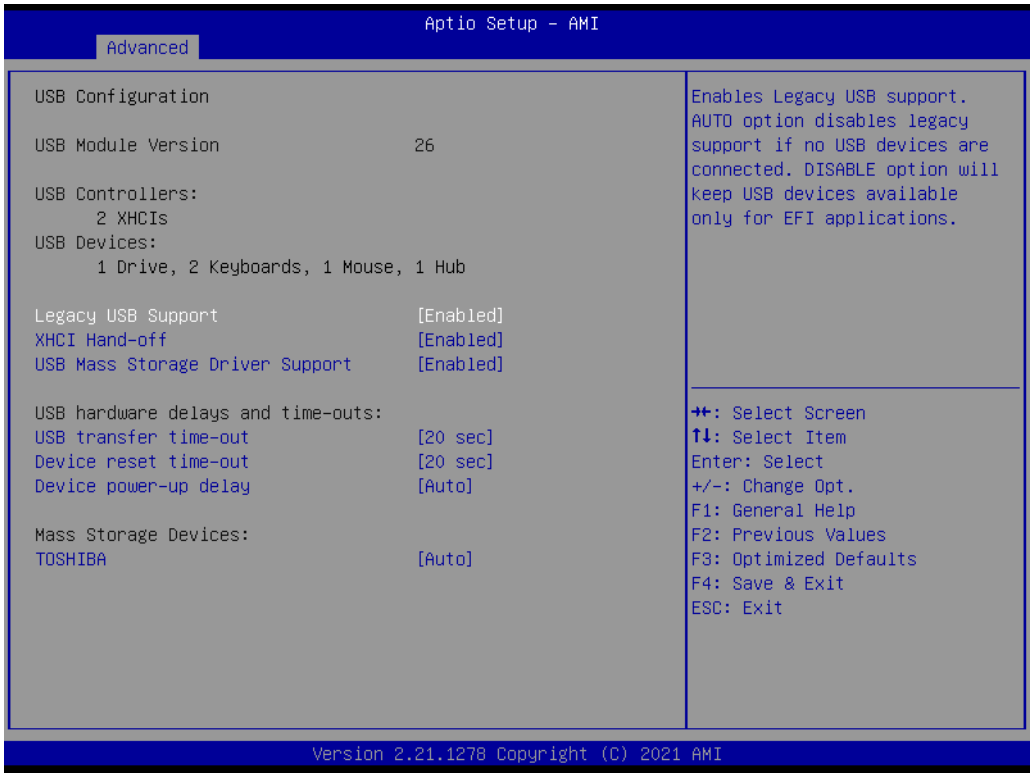
This item allows users to configure console redirection detail settings.

### 4.1.2.10 Intel TXT Information

**Intel TXT Information**

Display Intel TXT information.

### 4.1.2.11 USB Configuration




**Legacy USB Support**

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

**XHCI Hand-off**

This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

**USB Mass Storage Driver Support**

Enable/disable USB Mass Storage Driver Support.

**USB Transfer Time-out**

Time-out value for control, bulk, and interrupt transfers.

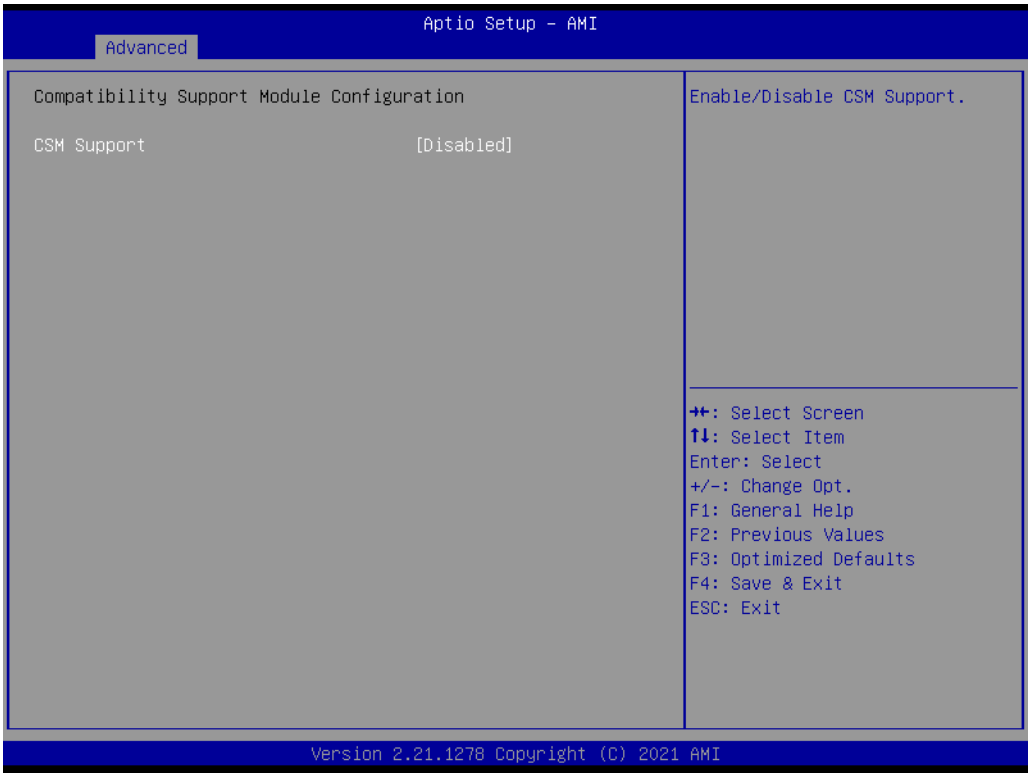
**Device Reset Time-out**

USB mass storage device start unit command time-out.

**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.

### 4.1.2.12 CSM Configuration




**CSM Support**

Enable/disable CSM Support.

**GateA20 Active**

UPON REQUEST - GA20 can be disabled using BIOS services. ALLWAYS - Do not allow disabling of GA20; this option is useful when any RT code is executed above 1MB.

**Option ROM Message**

BIOS Set display mode for Option ROM.

**INT19 Trap Response**

BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

**Boot Option Filter**

This option controls legacy/UEFI ROM priority.

**Network**

Controls the execution of UEFI and legacy PXE OpROM.

**Storage**

Controls the execution of UEFI and legacy storage OpROM.

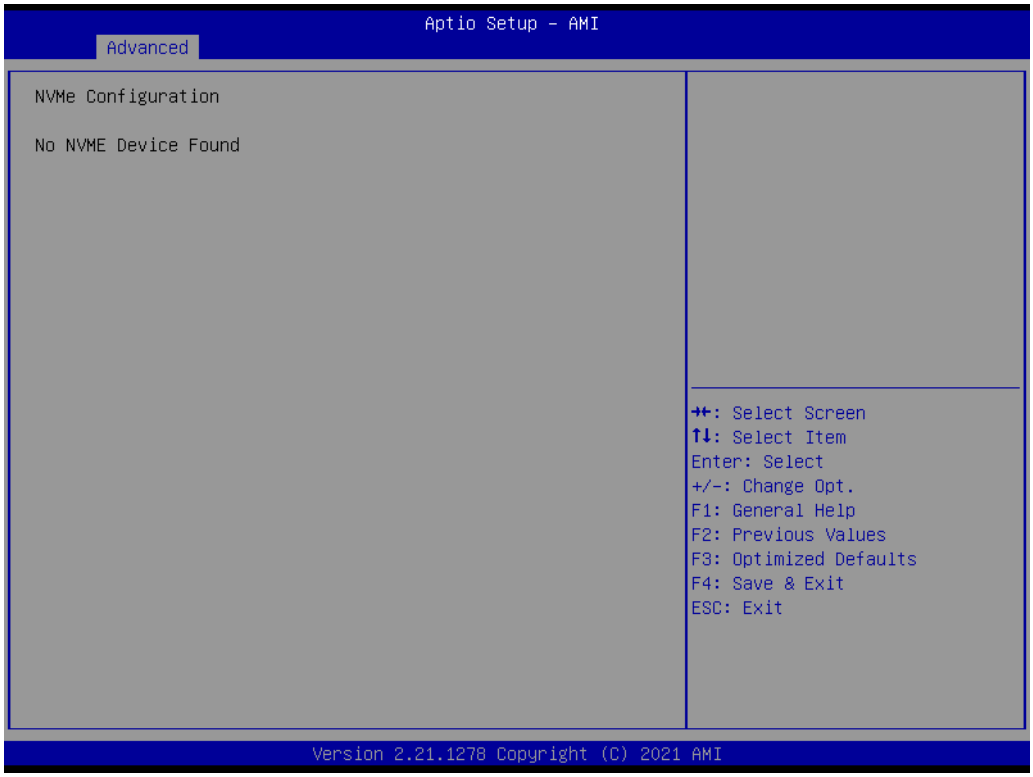
**Video**

Controls the execution of UEFI and legacy video OpROM.

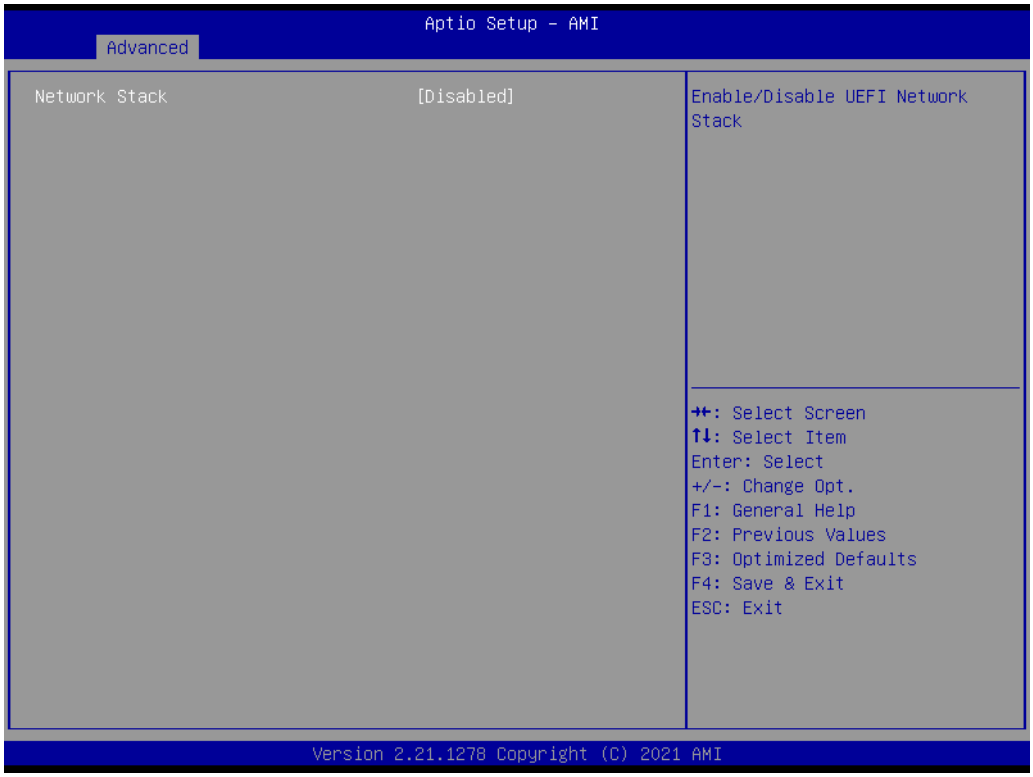
**Other PCI Devices**

Determines OpROM execution policy for devices other than network, storage, or video.

### 4.1.2.13 NVMe Configuration




### 4.1.2.14 Network Stack Configuration



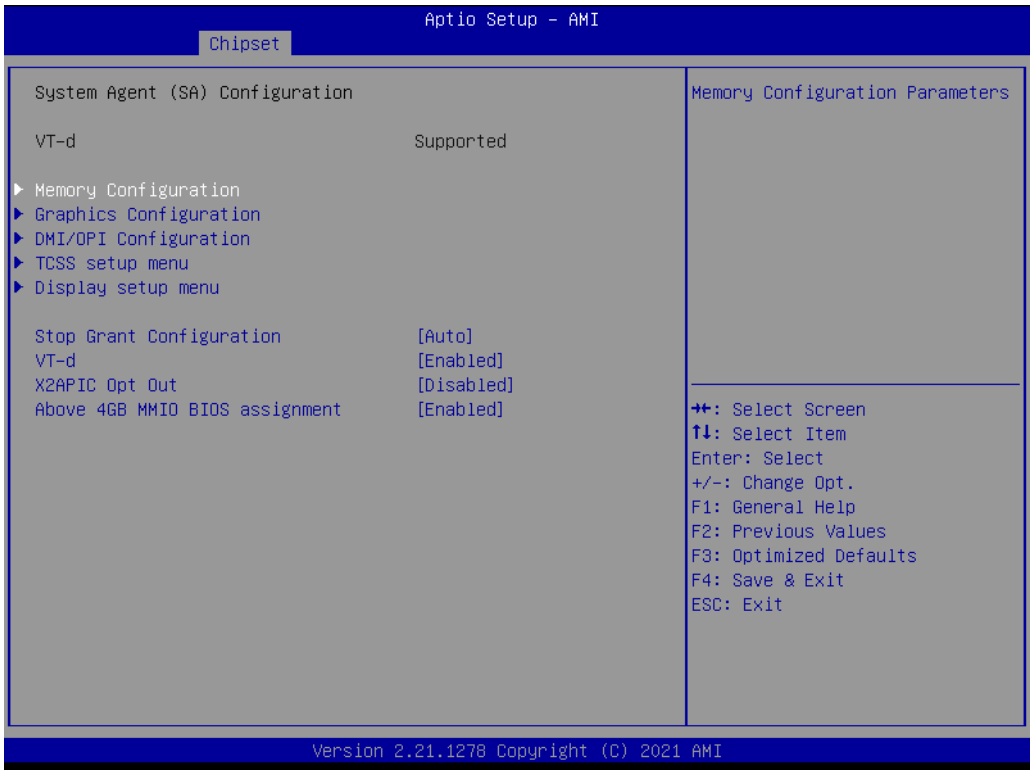

**Network Stack**

Enable/disable UEFI Network stack.

### 4.1.3 Chipset Configuration

Select the Chipset tab from the MIO-5375 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS setup screen is shown below.

### 4.1.3.1 System Agent (SA) Configuration




**Memory Configuration**

Memory Configuration parameters.

**Graphics Configuration**

Graphics Configuration parameters.

**VT-d**

VT-D capability.

**Above 4GB MMIO BIOS Assignment**

Enable/disable above 4GB memory mapped IO BIOS assignment.

**X2APIC Opt Out**

Enable/disable X2APIC Opt Out bit.

## Memory Configuration

```
Aptio Setup - AMI
Chipset

Memory Configuration                                  Enable Or Disable Base Memory
                                                      Test Run on Warm Boot
Memory RC Version                    1.0.6.0
Memory Frequency                      2400 MT/s
Memory Timings (tCL-tRCD-tRP-tRAS)   17-17-17-39
Controller 0 Channel 0 Slot 0        Not Populated / Disabled
Controller 1 Channel 0 Slot 0        Populated & Enabled
    Size                             8192 MB (DDR4)
    Number of Ranks                  1
    Manufacturer                     Transcend Information

Memory Test on Warm Boot             [Enabled]
Max TOLUD                            [Dynamic]
SA GV                                [Disabled]          →←: Select Screen
Sets the gear ratio when SAGV is     0                   ↑↓: Select Item
disabled                                                 Enter: Select
Enable RH Prevention                 [Disabled]          +/-: Change Opt.
Memory Scrambler                     [Enabled]           F1: General Help
Force ColdReset                      [Disabled]          F2: Previous Values
In-Band ECC Support                  [Disabled]          F3: Optimized Defaults
Memory Remap                         [Enabled]           F4: Save & Exit
                                                         ESC: Exit

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```

**Max TOLUD**

Maximum value of TOLUD.

**Memory Scrambler**

Enable/disable Memory Scrambler support.

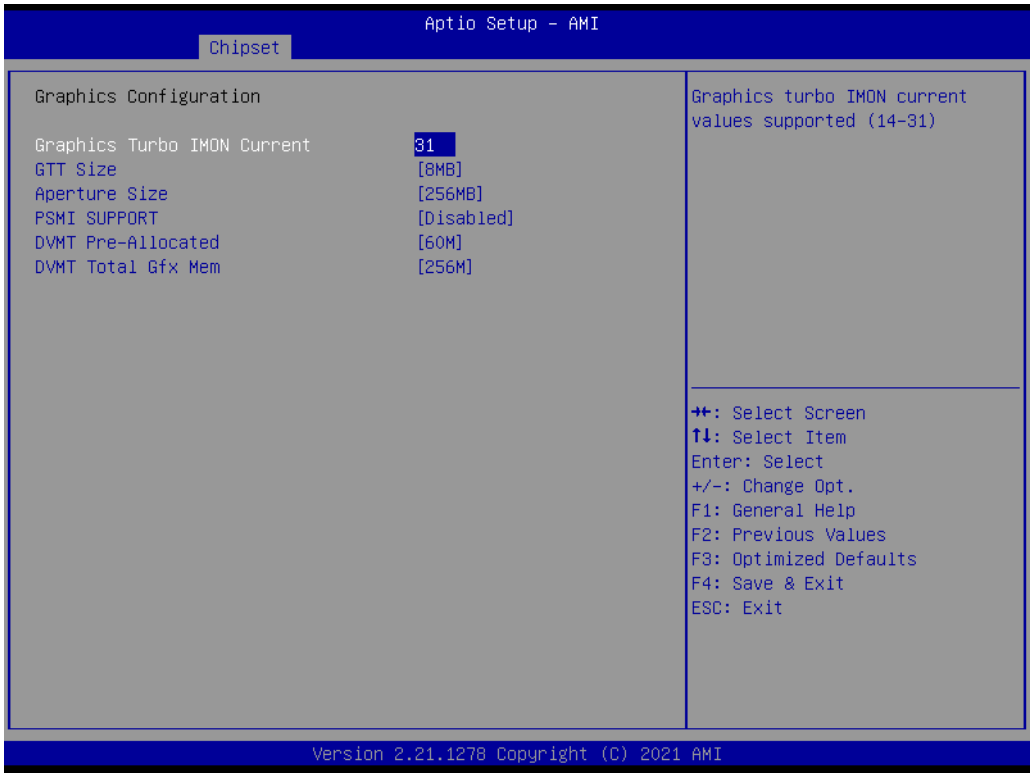
**Force ColdReset**

Force ColdReset or choose MrcColdBoot mode.

**Memory Remap**

Enable/disable Memory Remap above 4GB.

## Graphics Configuration




**Graphics Turbo IMON Current**

Graphics turbo IMON current values supported.

**Internal Graphics**

Keep IGFX enabled based on the setup options.

**GTT Size**

Select the GTT Size.

**Aperture Size**

Select the Aperture Size.

**DVMT Pre-Allocated**

Select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the Internal Graphics Device.

**DVMT Total Gfx Mem**

Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.

**Gfx Low Power Mode**

This option is applicable for SFF only.

**PM Support**

Enable/disable PM support.

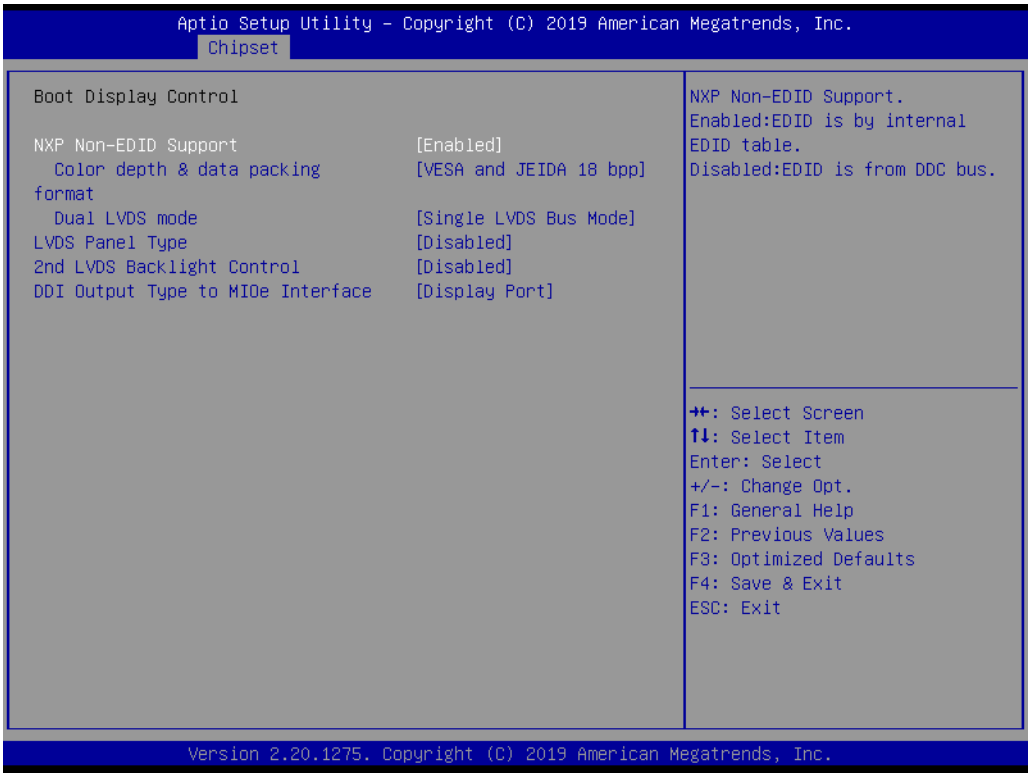
**PAVP Enable**

Enable/disable PAVP.

**CD Clock Frequency**

Select the highest CD clock frequency supported by this platform.

## Boot Display Control




**NXP Non-EDID Support**

NXP non-EDID support.

**Color Depth & Data Packing**

Color depth and data packing format for Non-EDID support.

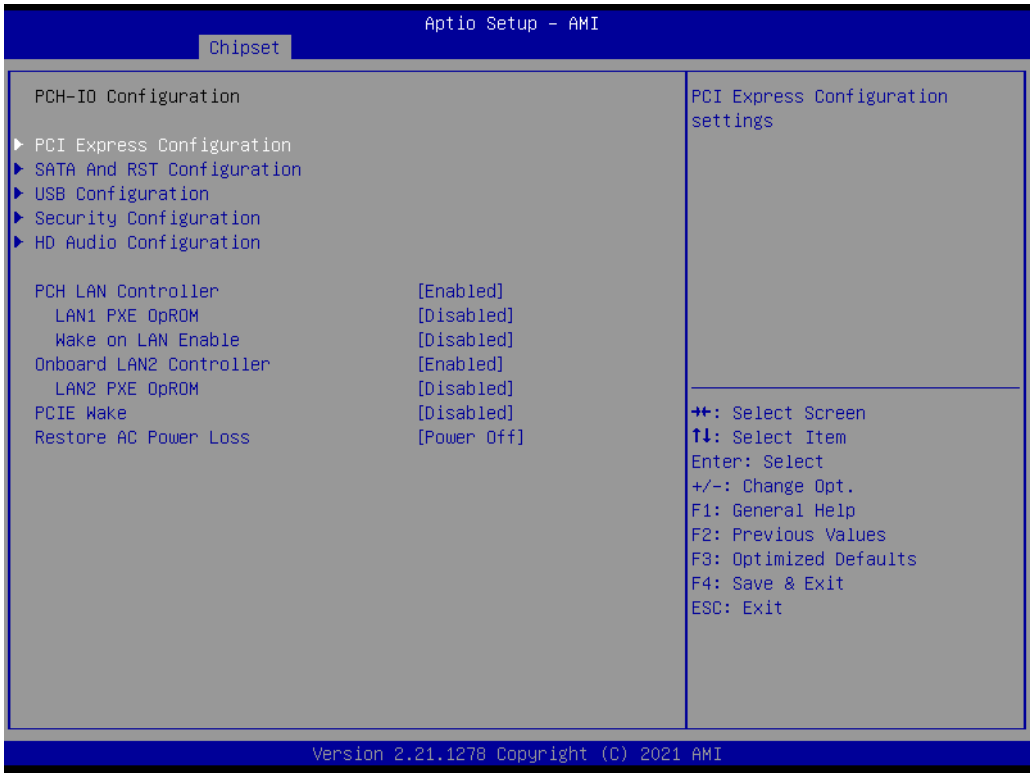
**Dual LVDS Mode**

Select LVDS bus to single bus mode or dual bus mode.

**LVDS Panel Type**

This item allow user to select LVDS panel type.

### 4.1.3.2 PCH-IO Configuration




**PCI Express Configuration**

PCI Express Configuration settings.

**SATA And RST Configuration**

SATA device options settings.

**USB Configuration**

USB Configuration settings.

**Security Configuration**

Security Configuration settings.

**HD Audio Configuration**

HD Audio susbsystem configuration settings.

**SerialIO Configuration**

SerialIO configuration settings.

**PCH LAN Controller**

Enable or disable onboard NIC.

**LAN1 PXE ROM**

Enable or disable onboard LAN's PXE option ROM.

**Wake on LAN**

Enable or disable Integrated LAN to wake the system from S5.

**Onboard LAN2 Controller**

Enable or disable onboard NIC.

**LAN2 PXE ROM**

Enable or disable onboard LAN's PXE option ROM.

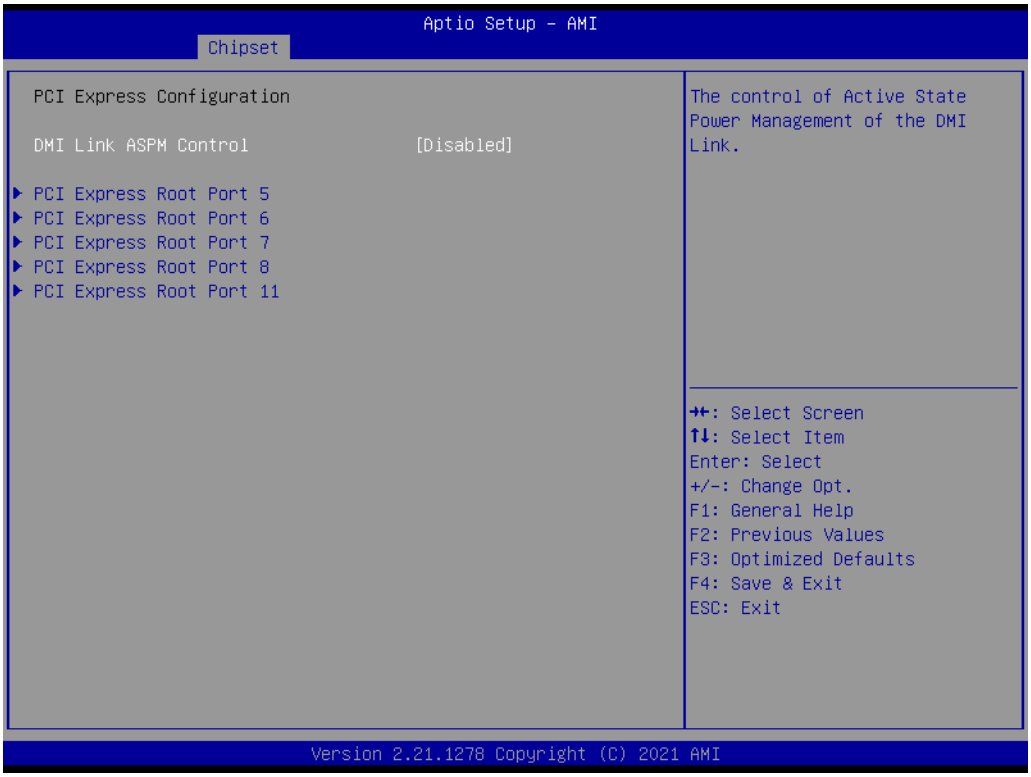
**PCIE Wake**

Enable or disable PCIE to wake the system from S5.

### State After S3

Specify what state to go to when power is re-applied after a power failure (G3 state).

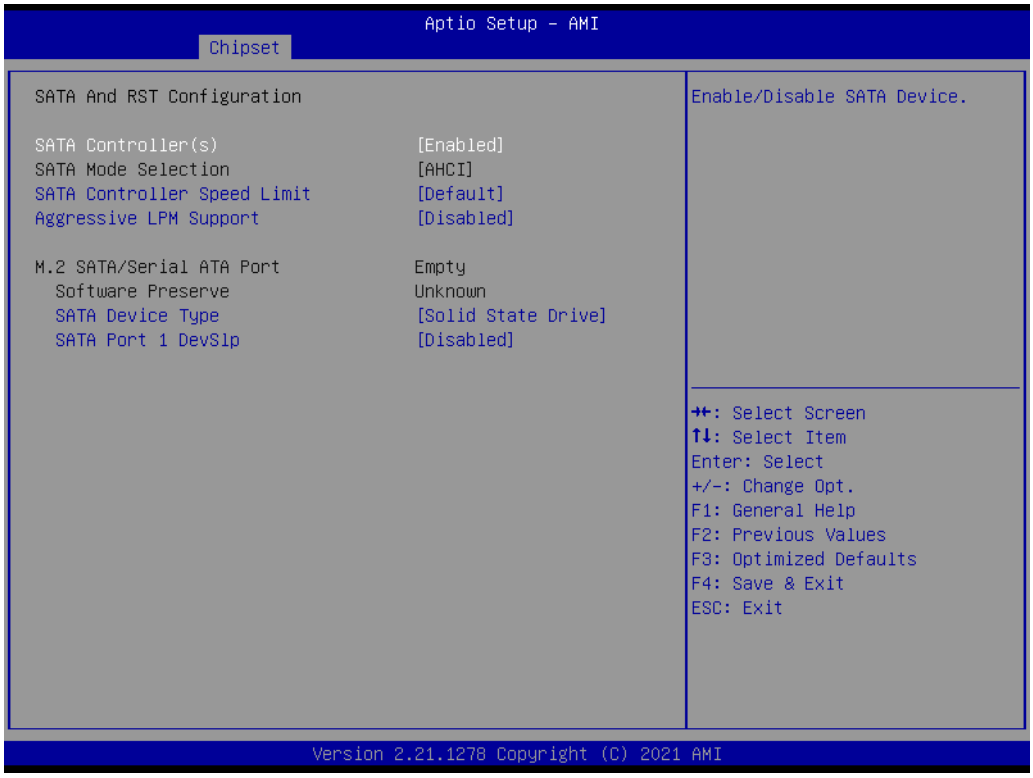
## PCI Express Configuration




### PCI Express Root Port 7/9/10/11/12/17

PCI Express Port 5/6/7/8/12/13 settings.

## SATA and RST Configuration




**SATA Controller(s)**

Enable/disable SATA device.

**SATA Mode Selection**

Determine how SATA controller operate.

**SATA Controller Speed**

Indicates the maximum speed the SATA controller can support.

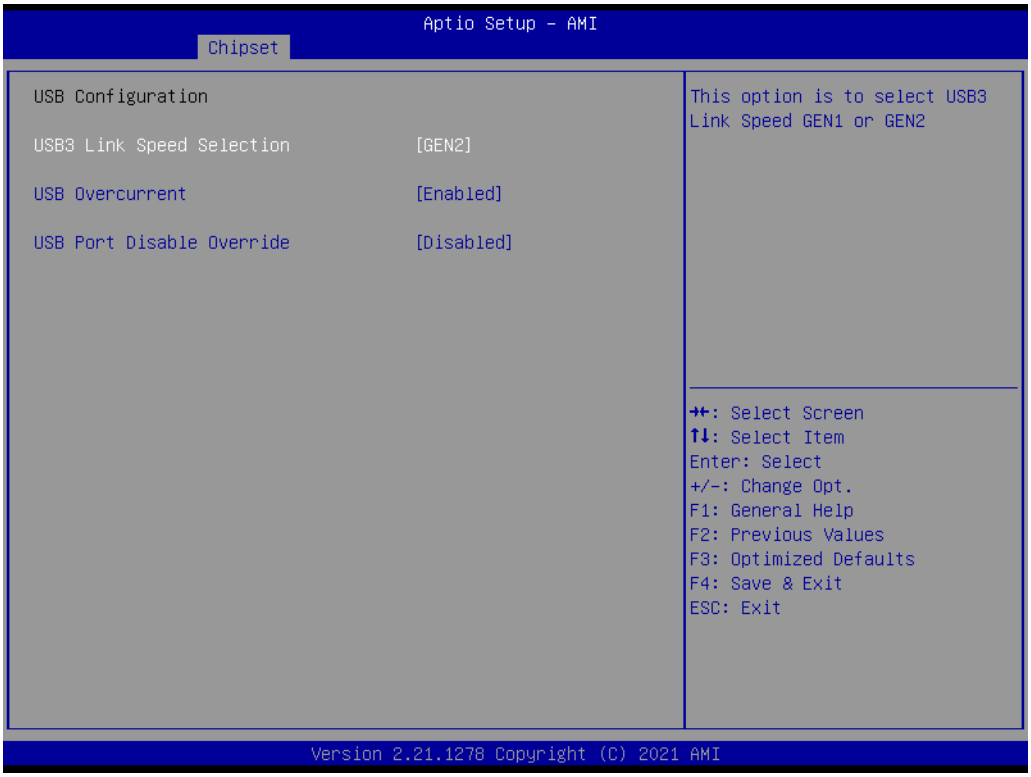
**Software Feature Mask Configuration**

RST Legacy ROM/RST UEFI driver will refer to the SWFM configuration to enable/disable the storage feature.

**Aggressive LPM Support**

Enabled PCH to aggressively enter link power state.

## USB Configuration



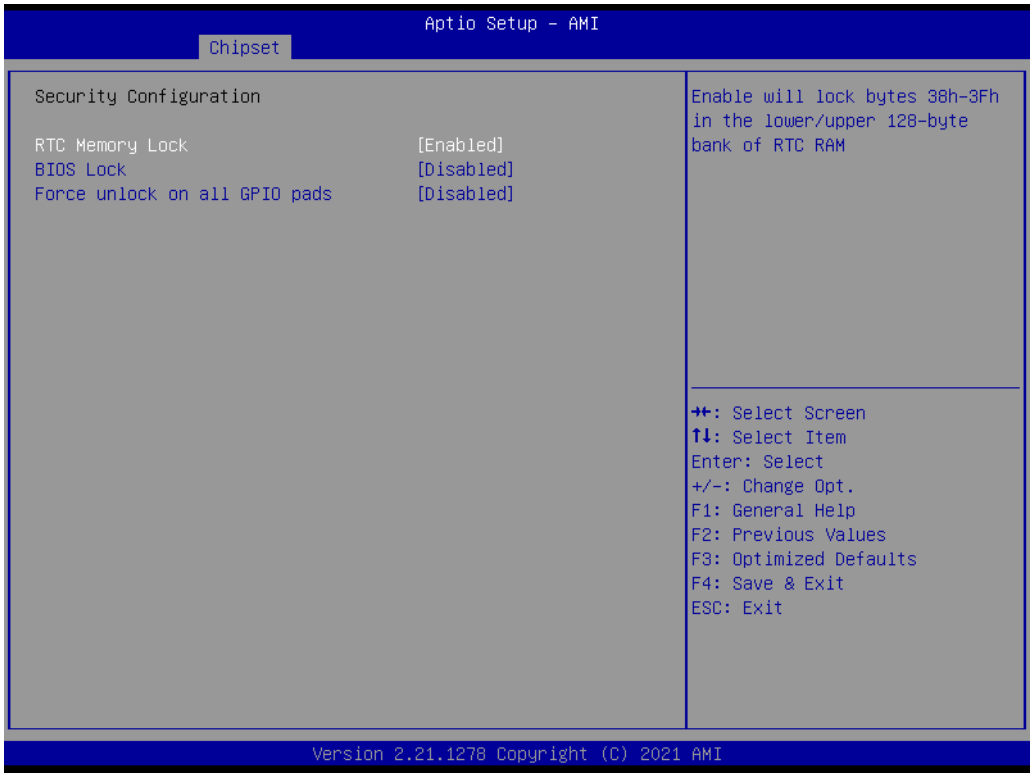

**XHCI Disable Compliance mode**

Option to disable compliance mode.

**USB Port Disable Override**

Selectively enable/disable the corresponding USB port from reporting a device connection to the controller.

## Security Configuration



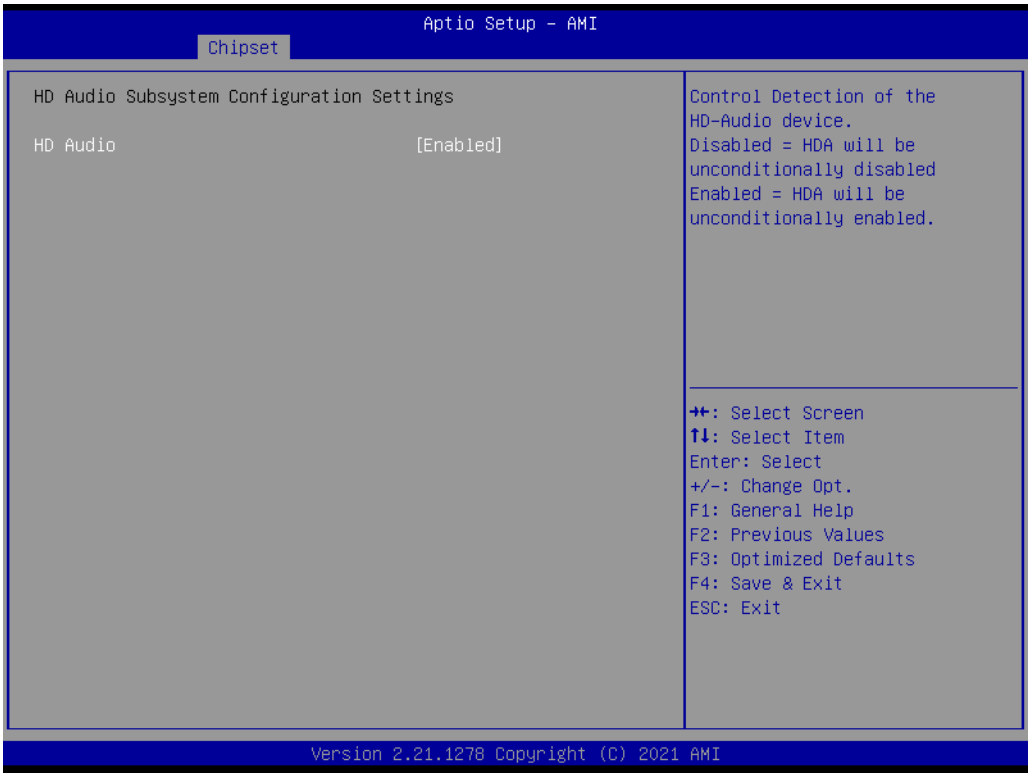

**RTC Lock**

Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.

**BIOS Lock**

Enable or disable the PCH BIOS Lock enable feature.

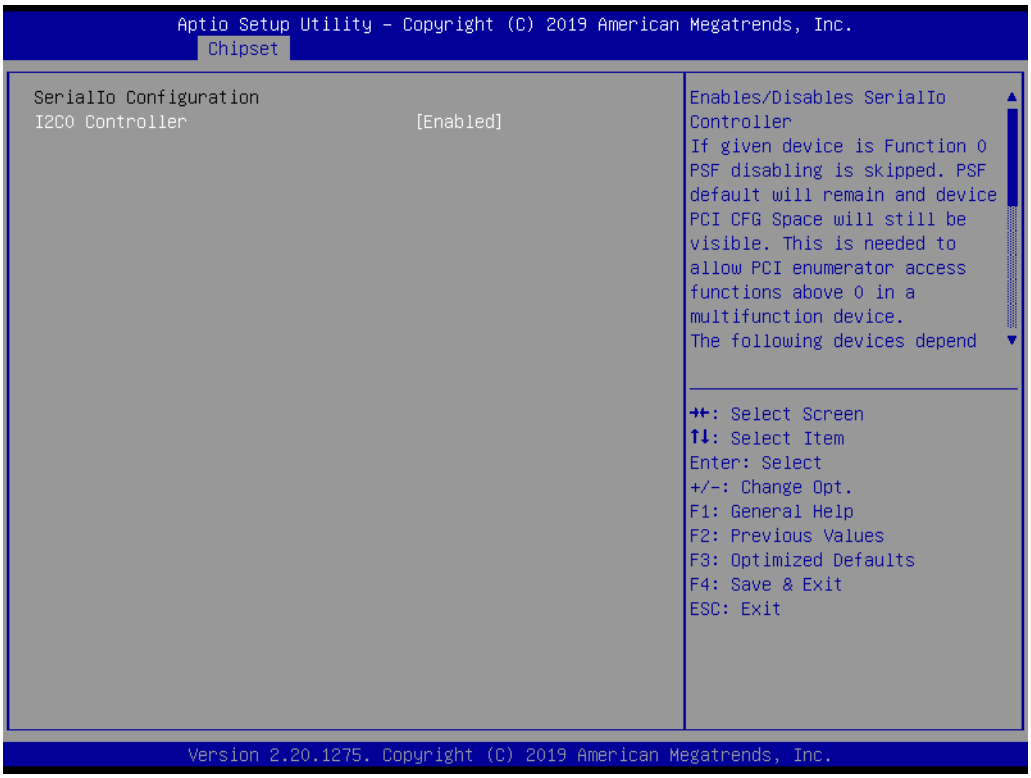
## HD Audio Configuration




### HD Audio

Control detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.

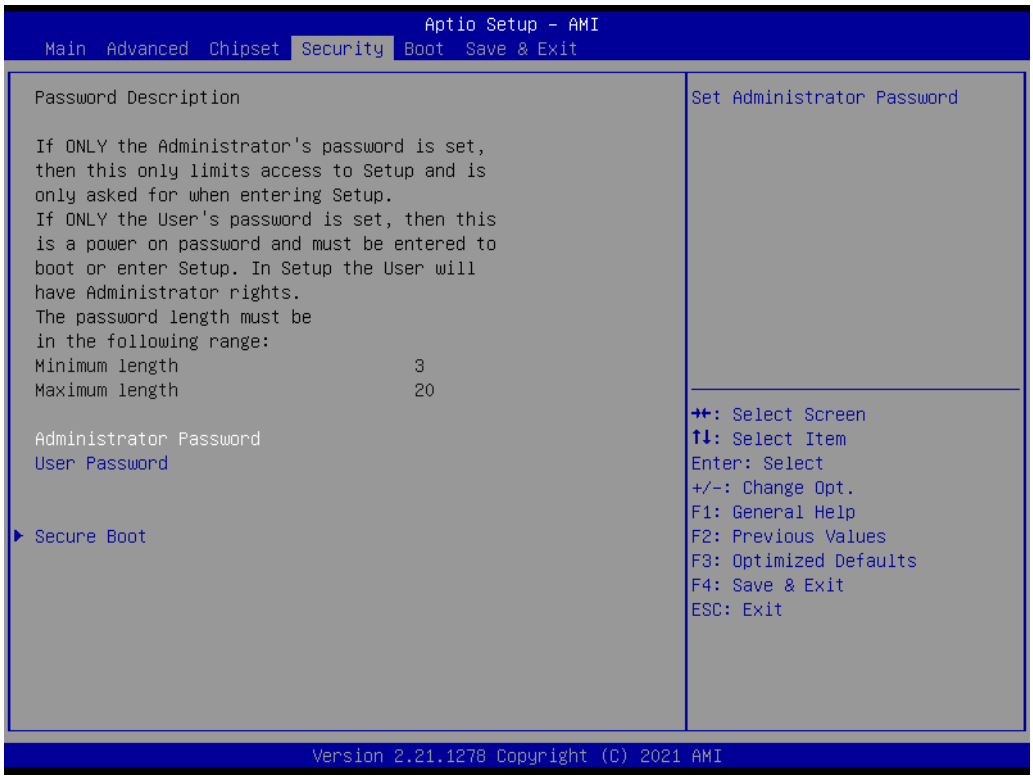
## Serial IO Configuration




### I2C0 Controller

Enable/Disables Serial IO Controller.

### 4.1.4 Security

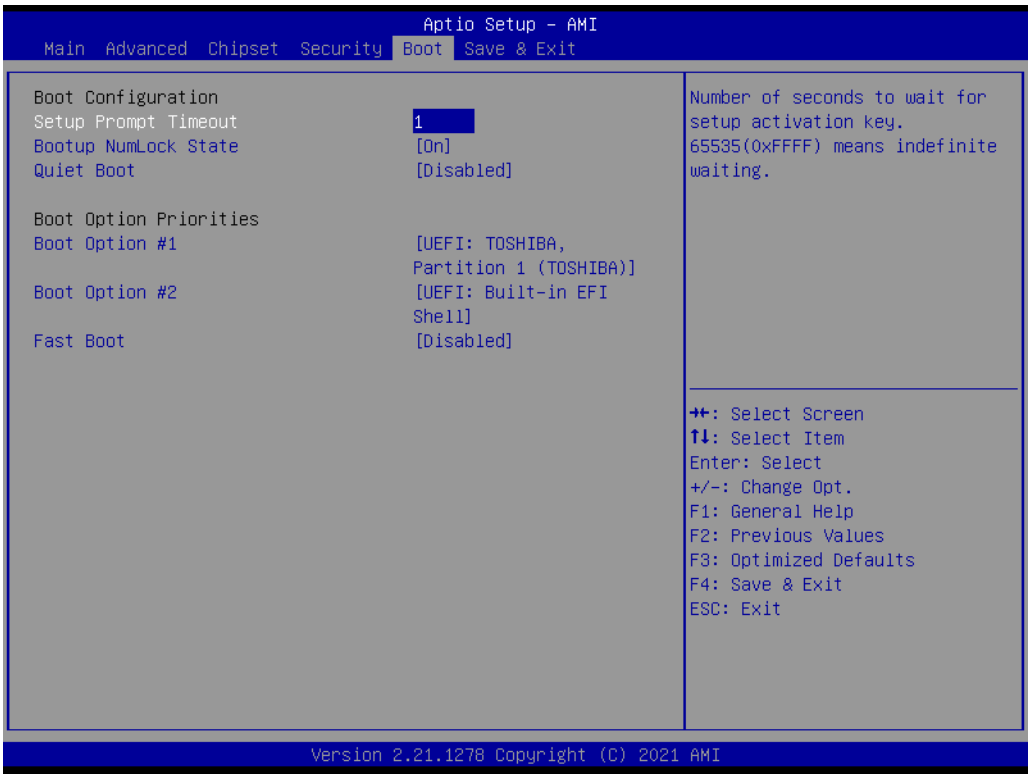



Select security setup from the MIO-5375 setup main BIOS setup menu. All Security setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

**Change Administrator / User Password**

Select this option and press <ENTER> to access the sub menu, and then type in the password.

## 4.1.5 Boot




**Setup Prompt Timeout**

Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.

**Bootup NumLock State**

Select the keyboard NumLock state.

**Quiet Boot**

Enables or disables Quiet Boot option.

**Boot Option #1**

Sets the system boot order.

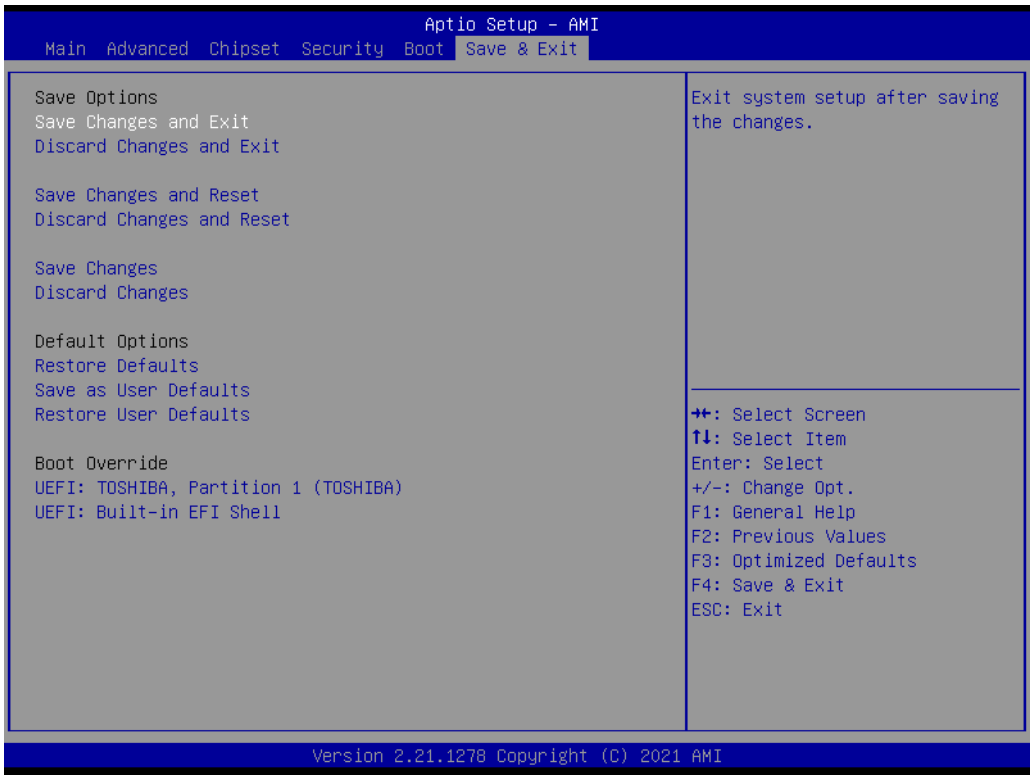
**Fast Boot**

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

**New Boot Option Policy**

Controls the placement of newly detected UEFI boot options.

### 4.1.6 Save & Exit




**Save Changes and Exit**

This item allows you to exit system setup after saving the changes.

**Discard Changes and Exit**

This item allows you to exit system setup without saving any changes.

**Save Changes and Reset**

This item allows you to reset the system after saving the changes.

**Discard Changes and Reset**

This item allows you to rest system setup without saving any changes.

**Save Changes**

This item allows you to save changes done so far to any of the options.

**Discard Changes**

This item allows you to discard changes done so far to any of the options.

**Restore Defaults**

This item allows you to restore/load default values for all the options.

**Save as User Defaults**

This item allows you to save the changes done so far as user defaults.

**Restore User Defaults**

This item allows you to restore the user defaults to all the options.

**Boot Override**

Boot device select can override your boot priority.

# Appendix A

## System Assignments

This appendix contains information of a detailed nature. Sections include:

- System I/O Ports
- DMA Channel Assignments
- 1st MB Memory Map
- Interrupt Assignments

# A.1 System I/O Ports

| Table A.1: System I/O Ports | |
|---|---|
| **Addr. Range (Hex)** | **Device** |
| 00h-1Fh | DMA Controller |
| 20h-2Dh | Interrupt Controller |
| 2Eh-2Fh | Motherboard Resources |
| 30h-3Dh | Interrupt Controller |
| 40h-43h | Timer/Counter |
| 4Eh-4Fh | Motherboard Resources |
| 50h-53h | Timer/Counter |
| 60h-6Fh | 8042 (keyboard controller)/NMI Controller/Microcontroller |
| 70h-7Fh | Real-time Controller |
| 80h-8Fh | Debug Port/Reserved |
| 90h-9Fh | Debug Port/Reset Generator |
| A0h-ADh | Interrupt Controller |
| B0h-B1h | Interrupt Controller |
| B4h-BDh | Power Management |
| 200h-27Fh | CANBus Controller |
| 280h-28Fh | I2C Controller |
| 290h-29Fh | EC Index Port and Data Port |
| 2A0h-2BFh | GPIO Controller |
| 2C0h-2DFh | SMBus Controller |
| 2E8h-2EFh | Communications Port (COM4) |
| 2F0h-2F7h | EC/PMC Controller |
| 2F8h-2FFh | Communications Port (COM2) |
| 3E8h-3EFh | Communications Port (COM3) |
| 3F8h-3FFh | Communications Port (COM1) |
| 480h-4CFh | Motherboard Resources |
| 4D0h-4D1h | Interrupt Controller |
| 680h-69Fh | Motherboard Resources |
| A00h-AFFh | Motherboard Resources |
| 164Eh-164Fh | Motherboard Resources |
| 1800h-18FFh | Motherboard Resources |
| CF9h-CF9h | Reset Generator |

## A.2 DMA Channel Assignments

**Table A.2: DMA Channel Assignments**

| Channel | Function |
|---|---|
| 0 | Available |
| 1 | Available |
| 2 | Available |
| 3 | Available |
| 4 | Direct memory access controller |
| 5 | Available |
| 6 | Available |
| 7 | Available |

## A.3 1st MB Memory Map

**Table A.3: 1st MB Memory Map**

| Addr. Range (Hex) | Device |
|---|---|
| E0000h - FFFFFh | System board |
| D0000h - DFFFFh | PCI Bus |
| C0000h - CFFFFh | System board |
| A0000h - BFFFFh | PCI Bus |
| A0000h - BFFFFh | Intel® HD Graphic |
| 00000h - 9FFFFh | System board |

## A.4 Interrupt Assignments

**Table A.4: Interrupt Assignments**

| Interrupt# | Interrupt source |
|---|---|
| NMI | Parity error detected |
| IRQ0 | System timer |
| IRQ1 | Using SERIRQ, Keyboard Emulation |
| IRQ2 | Interrupt from controller 2 (cascade) |
| IRQ3 | Communications Port (COM2) |
| IRQ4 | Communications Port (COM1) |
| IRQ5 | EC Watch DOG |
| IRQ6 | CANBus Controller |
| IRQ7 | Available |
| IRQ8 | System CMOS/real time clock |
| IRQ9 | Microsoft ACPI-Compliant System |
| IRQ10 | Available |
| IRQ11 | Display Controller |
| IRQ12 | Available |
| IRQ13 | Numeric data processor |
| IRQ14 | GPIO Controller |
| IRQ15 | Reserved |

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