



**User Manual**

# **DS-980/DS-980GL**

**Video Wall Signage Player by  
Expandable PCI Express x16**

**ADVANTECH**

*Enabling an Intelligent Planet*

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  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

# Warnings, Cautions and Notes

**Warning!** Warnings indicate conditions, which if not observed, can cause personal injury!



**Caution!** Cautions are included to help you avoid damaging hardware or losing data. e.g.



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 manufacturer. Discard used batteries according to the manufacturer's instructions.

**Note!** Notes provide optional additional information.



## Battery Information

Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.

**Caution!** Batteries are at risk of exploding if incorrectly installed. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



## Packing List

Before installation, please ensure the following items have been shipped:

- 1 x DS-980/DS-980GL system
- 1 x 12V DC-in 150W power adaptor
- 1 x accessory box containing the items listed below
  - 1 x Signage Software (WISE-PaaS/RMM & WebAccess/IMM) CD package
  - 1 x China RoHS declaration
  - 1 x Traditional & Simplified Chinese User Manual
  - 2 x mounting brackets with 4 screws
  - 4 x stand rubber with 4 screws
  - 1 x 2nd Storage module including 1 x bracket, 4 x damper, 4 x screws for installing on a bottom layer, 4 x step screws for installing storage on a bracket, 1 x SATA cable (option)
  - 1 x warranty card

## Optional Recommended Parts

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<b>Power Cord</b>	
Part Number	Description
1702002600	3-pin power cord with UL (US)
1700024848-01	3-pin power cord with BSMI (TW)
1700018705	3-pin power cord (EU)
1702031801	3-pin power cord (UK)
1700000237	3-pin power cord with PSE (JPN)
1700000596-11	3-pin power cord with CCC (CN)

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### **Kits for Video Wall up to 6 outputs**

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Part Number	Description
96PSA-A84W12W6-1	ADP A/D 100-240V 84W 12V C14 LOCKABLE D
AEGX-N0A4-V5LMS1	GT730 1G PCI-E VHDCI + HDMI*4 Cable LP(G)

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### **WIFI & 3G module by mini-PCle interface**

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Part Number	Description
AMO-WIFI06E	Realtek/wifi 802.11bgn/ mini PCle, cable, antenna
AMO-WIFI07E	DHXA/wifi802.11abgn+BT4.0/miniPCle,cable,antenna
AMO-HSDPA02E	U-blox/HSDPA 6band/miniPCle,cable,antenna

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### **WIFI module by M.2 E key interface**

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Part Number	Description
EWM-W160M201E	802.11 b/g/n,RTL8188EE,1T1R,2-antenna,M.2 2230
1750007965-01	M.2 cable, 30cm
1750000318	M.2 antenna

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## Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

**DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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# Chapter 1

## General Introduction

This chapter gives background information of DS-980/DS-980GL series.

## 1.1 Introduction

DS-980/DS-980GL is a video wall solution of digital signage players, which is powered by the 6th generation Intel® Core i7/ i5/ i3/ Celeron rPGA processor (LGA 1151), and stackable design for PCI Express 3.0 x16 expansion.

DS-980/DS-980GL delivers the exceptional graphic performance by Intel HD Graphics 530 which supports HEVC/265, AVC/264, MPEG2, VC1/WMV9, VP8, JPEG/ MJPEG, VP9 video format. Additionally, DS-980/DS-980GL adopts the latest interfaces to fulfill the customer's advanced requirements, such as HDMI2.0 supports 4096 x 2160 @60Hz maximum resolution, DDR4 2133MHz SO-DIMM with dual channel (maximum capacity for 32GB, 16GB per SO-DIMM), and M.2 (2230 E key) for wireless function.

Total display outputs on the DS-980/DS-980GL motherboard are 3 x HDMI which are designed for 1 x HDMI2.0 (printed HDMI1); 2 x 1.4 (printed HDMI2 & HDMI 3; HDMI2 supports CEC function). The maximum resolution is true 4K (4096 x 2160 @ 60Hz). Not only 3 x HDMI outputs but also the extra outputs from PCI Express 3.0 x16 slot for optional graphic card further support up to 6 outputs and realize the video wall application in retails, public services, institute and etc..

## 1.2 Product Features

### 1.2.1 General

- Intel® Core i7-6700TE, Quad-core 2.4 GHz/ i5-6500TE, Quad-core 2.3 GHz/ i3-6100TE, Dual-core 2.7 GHz/ Celeron G3900TE, Dual-core 2.3 GHz rPGA processor (LGA 1151), CPU TDP up to 35W.
- Exceptional graphic performance by Intel HD Graphics 530 and supports 3 x HDMI outputs (1 x HDMI2.0 & 2 x HDMI 1.4) and its maximum resolution up to true 4K (4096 x 2160 @ 60Hz).
- Stackable and expandable design for PCI Express x16 slot, and the latest dual channel of DDR4 2133Hz SO-DIMM and 1 x M.2 2230 E key for wireless functions.
- Supports 2 x internal 2.5" SATA III storage drive bay by RAID 0/1.

### 1.2.2 Display

There are 3 x HDMI on DS-980/DS-980GL motherboard for multiple displays which are designed for 1 x HDMI2.0 (printed HDMI1); 2 x HDMI1.4 (printed HDMI2 & HDMI 3; HDMI2 also supports CEC function). The maximum resolution is true 4K (4096 x 2160 @ 60Hz) by HDMI2.0 interface.

Not only 3 x HDMI outputs but also the extra outputs from PCI Express 3.0 x16 slot for optional graphic card further supports up to 6 outputs. The best playing status is to play one true 4K video playback as 6 outputs video wall application like any 1x6, 6x1, 2x3, or 3x2 matrix (but subject to the video media format and playback software).

### 1.2.3 Power Consumption

- **Intel Core i7-6700TE:**
  - Idle mode: 9.56 W (w/o expansion)
  - Max. load: 53.61 W (w/o expansion)
- **Intel Core i5-6500TE:**
  - Idle mode: 9.20 W (w/o expansion)
  - Max. load: 51.68 W (w/o expansion)

- **RISER Card:**
  - Idle/ Max. load: 0.12 W

## 1.3 Hardware Specifications

- **CPU (LGA 1151, TDP up to 35W):**
  - Intel® Core i7-6700TE, Quad-core 2.4 GHz
  - Intel® Core i5-6500TE, Quad-core 2.3 GHz
  - Intel® Core i3-6100TE, Dual-core 2.7 GHz
  - Intel® Core Celeron G3900TE, Dual-core 2.3 GHz
- **System Chipset:** Intel® Q170
- **BIOS:** AMI uEFI 128 Mbit
- **System Memory:**
  - 2 x 260-pin DDR4 2133MHz SO-DIMM sockets
  - Maximum capacity: 32GB (16GB per SO-DIMM)
- **Graphic chipset:** Intel® HD Graphics 530
- **Storage:** (supports RAID 0/1 function)
  - Main layer: 1 x 2.5" SATAIII
  - 2nd layer: 1 x 2.5" SATAIII SSD (option)
  - Option: mSATA by full-size mini-PCIe interface
- **Watchdog Timer:** 1-255 seconds, supported by Advantech SUSI4.0 API
- **I/O Interface:**
  - 3 x HDMI
    - 1 x HDMI2.0 (printed by HDMI1), 2 x HDMI1.4 (printed by HDMI2 & HDMI 3; HDMI2 also supports CEC function)
    - The maximum resolution up to true 4K (4096 x 2160 @ 60Hz).
  - 4 x USB 3.0, 2 x USB 2.0
  - 1x RS-232/ 2x RS-485 & RS-422 with extension cable
  - 1 x SPDIF/ Line-Out (jack sense supported by OS setting), 1 x Mic-in (HD Audio Jack 3.5mm)
  - 2 x RJ-45 (LAN1: Intel I219 with Phy only, LAN2: Intel I211 with Phy & Mac), wake on LAN supported
    - Status: Green: Link (On)/ Active (Flash)
    - Speed: Green: 100Mbps (On)/ 10Mbps (Off), Orange: 1000Mbps (On)
  - 2 x DC-in Jack, 1 x Power LED, 1 x Storage LED, 2 x Antenna hole
- **Internal Expansion:**
  - 1 x PCI Express x16 slot
  - 1 x full-size mini-PCIe, colay mSATA
  - 1 x M.2 2230 E key for wireless
  - 1 x standard SIM slot
- **Operating System:**
  - Microsoft Windows 7 (64bit/32bit), Windows 8.1 (64bit), Windows 10 (64bit)



- Light configuration (without PCI express x16 slot):  
250 (W) x 190 (D) x 53 (H) mm

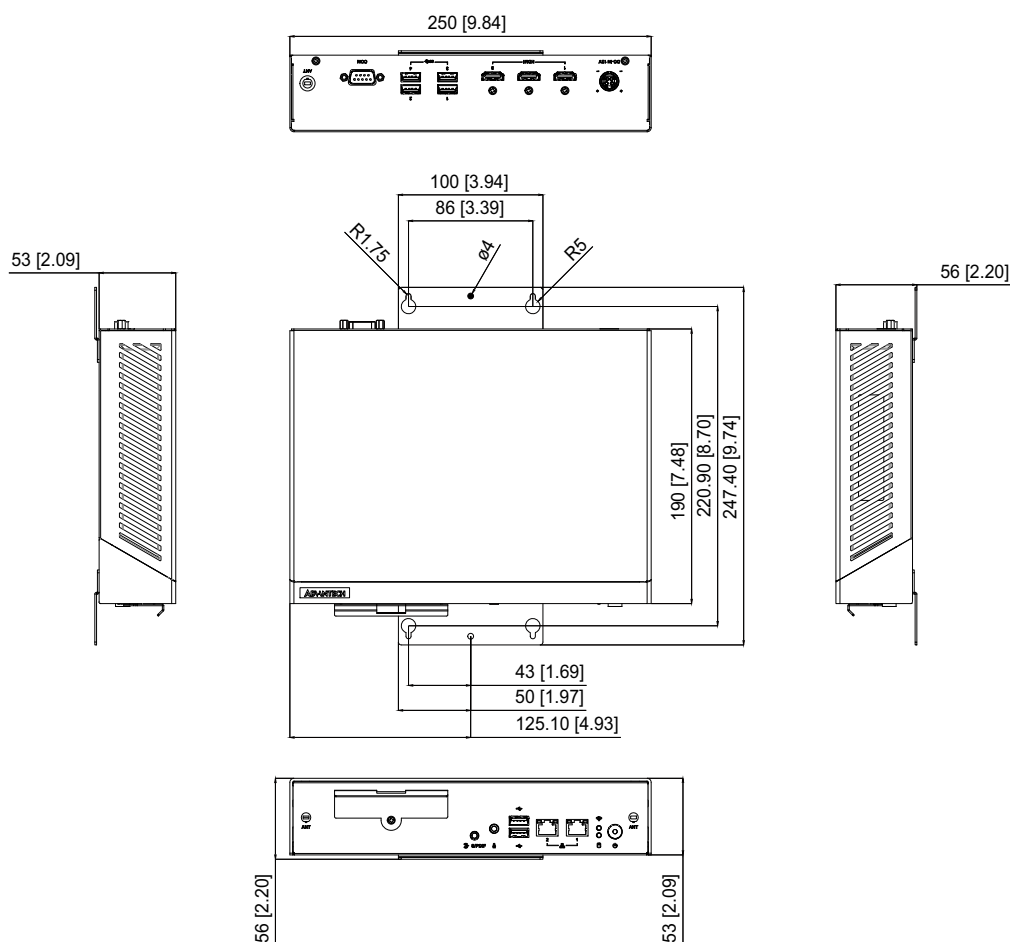


Figure 1.2 DS-980GL (Light) mechanical dimensions

## 1.4.2 Weight

- Expansion configuration (with PCI express x16 slot): 3.8kg
- Light configuration (without PCI express x16 slot): 3.1kg

## 1.5 Power Requirements

### 1.5.1 System Power

- Expansion configuration (with PCI express x16 slot)
  - Minimum power input: 12V DC-in 12.5A (for main layer)
  - Minimum power input: 12V DC-in 7A (optional for bottom layer)
- Light configuration (without PCI express x16 slot)
  - Minimum power input: 12V DC-in 12.5A

### 1.5.2 RTC Battery

3V/ 220mA T BBBCR2032B

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## 1.6 Environment Specification

- **Operating Temperature:** 0° C - 45° C (32 ~ 113° F)
- **Relative Humidity:** 95% @ 40° C (non-condensing)
- **Storage Temperature:** -40° C ~ 85° C (-104 ~ 185° F)
- **Vibration Test:**
  - -Operating mode: 0.8 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis.
  - -Non-operating mode: 2G, IEC60068-2-6, sine, 5 ~ 500Hz, 1 Octave/ min, 1 hr/ axis.
- **Shock During Operation:** 10 G, IEC 60068-2-27, half sine wave, 11 ms duration
- **Certification:**
  - Safety: UL, CB, BSMI, CCC
  - EMC: CE, FCC Class B, BSMI, CCC



# Chapter 2

## External I/O introduction

This chapter introduces DS-980/  
DS-980GL series external I/O.

## 2.1 DS-980/DS-980GL Front and Rear views

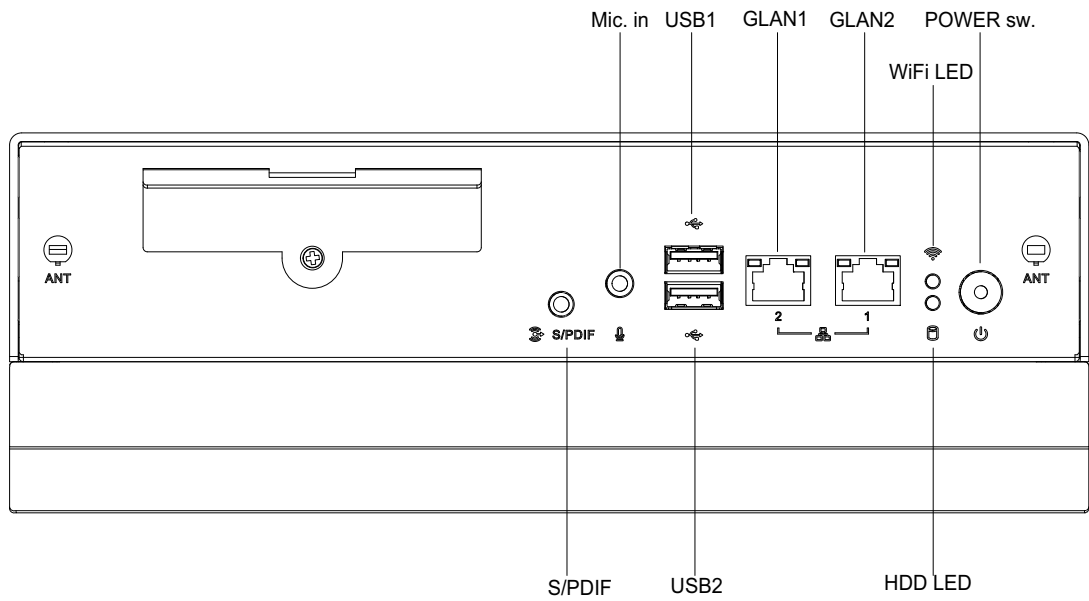


Figure 2.1 DS-980 (Expansion) front view

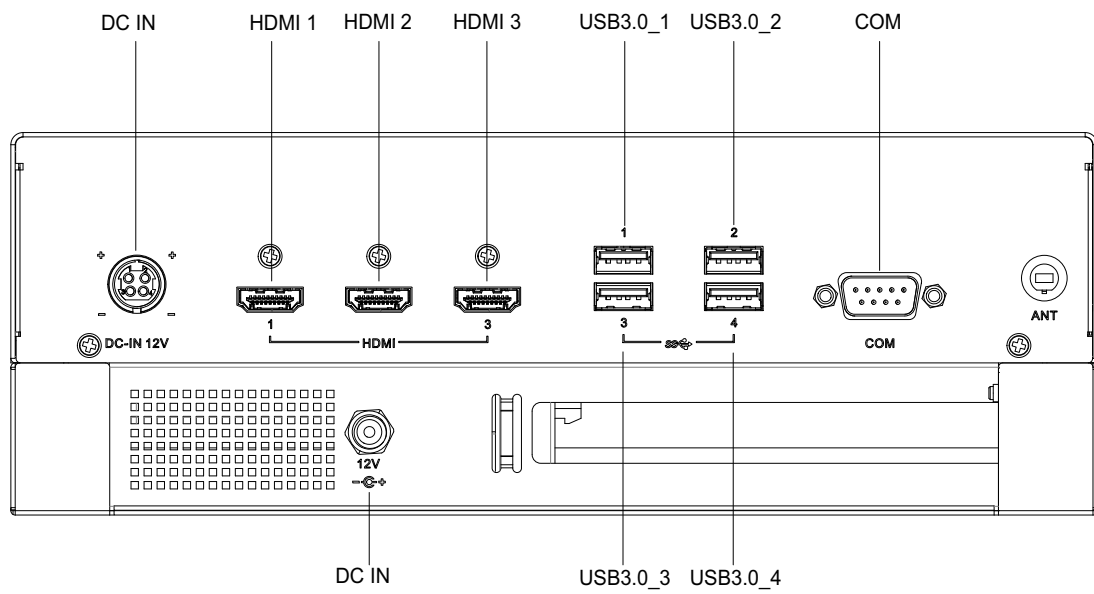


Figure 2.2 DS-980 (Expansion) rear view

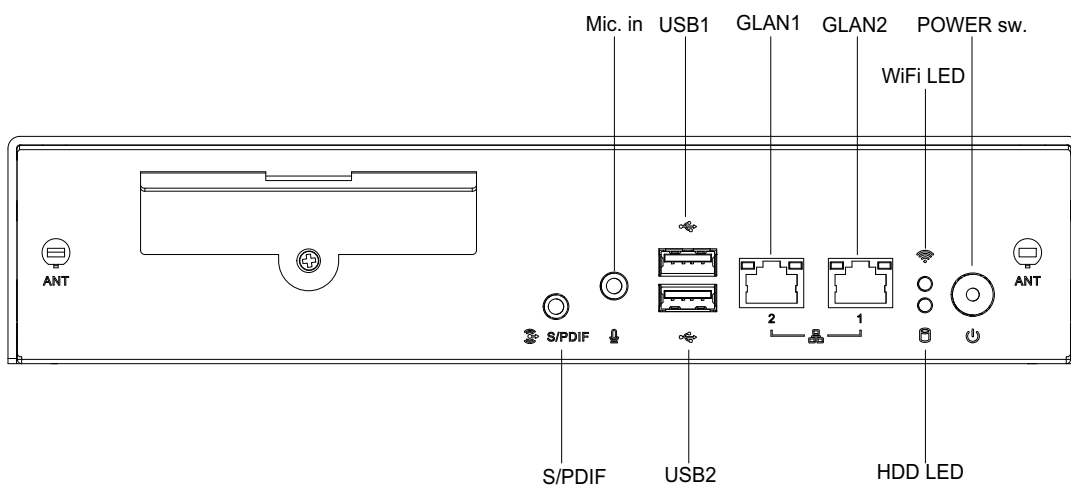


Figure 2.3 DS-980GL (Light) front view

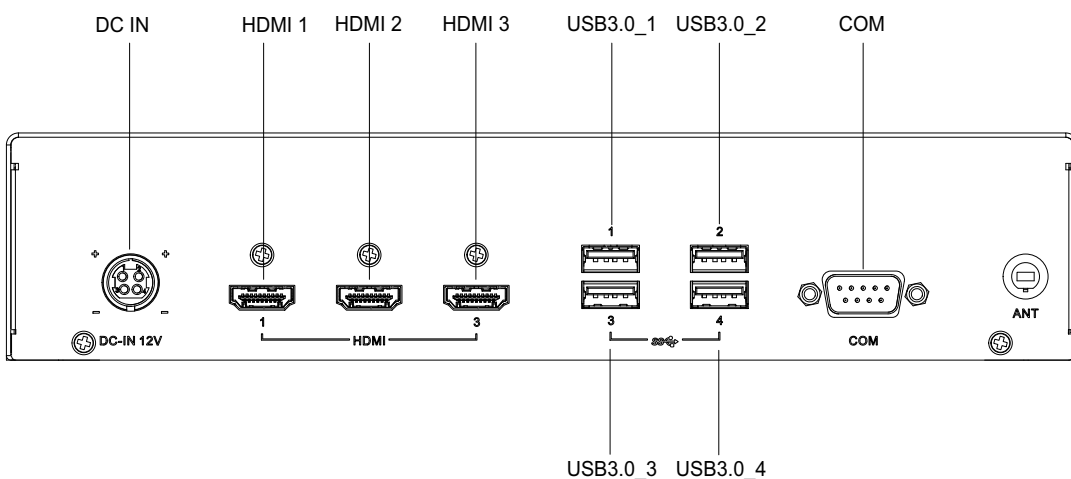


Figure 2.4 DS-980GL (Light) rear view

## 2.2 DS-980/DS-980GL Front External I/O Connectors

### 2.2.1 Power ON/OFF Button

DS-980/DS-980GL has a power ON/OFF button on front side. Push this button to turn the system ON and OFF. It can also support 4 second delay soft power off.



Figure 2.5 Power button

### 2.2.2 Ethernet Connector (GLAN)

DS-980/DS-980GL provides 2 x RJ-45 (LAN1: Intel I219 with Phy only, LAN2: Intel I211 with Phy & Mac), and wake on LAN supported. They are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Link (On)/ Active (Flash) and speed status which is with its green color by 100Mbps (On)/ 10Mbps (Off) and its orange color by 1000Mbps (On).

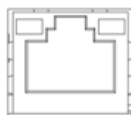


Figure 2.6 GLAN connector

Table 2.1: GLAN Connector Pin Assignments

Pin	Signal Name
1	MDIO+
2	MDIO-
3	MDI1+
4	MDI1-
5	GND
6	GND
7	MDI2+
8	MDI2-
9	MDI3+
10	MDI3-
11	VCC
12	ACT
13	Link100#
14	Link1000#

### 2.2.3 USB2.0 Connector

The front side provides 2x USB 2.0 compliant interfaces, which give complete Plug & Play and hot swapping capability for up to 127 external devices. They are compliant with USB UHCI, Rev. 2.0. The USB ports support Plug and Play, which enables to connect or disconnect a device without turning off the computer.

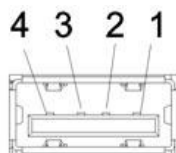


Figure 2.7 USB2.0 connector

Table 2.2: USB Port Pin Assignments

Pin	Signal Name
1	VCC
2	USB Data-
3	USB Data+
4	GND

### 2.2.4 Mic-in Connector

Microphone can be connected to the audio jack. (Pink color) and can be Mic-in input functions.



Figure 2.8 Audio connector

### 2.2.5 SPDIF/ Line-Out Connector

The S/PDIF port is default setting and allows you to transfer digital sound to an amplifier or television. Also, it supports jack-sense by Line-out functions and you can use either SPDIF or Line-out function by plug option.



Figure 2.9 SPDIF/ Line-out connector

## 2.3 DS-980/DS-980GL Rear External I/O Connectors

### 2.3.1 COM Connector

DS-980/DS-980GL provides two D-sub 9-pin connectors serial communication interface port, and supports 1x RS-232 (default setting) or 2x RS-485 & RS-422 with extension cable.

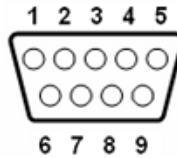


Figure 2.10 COM connector

Table 2.3: COM Port Pin Assignments

Pin	Signal Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

### 2.3.2 USB3.0 Connector

There are 4x USB3.0 compliant interfaces which are compliant with USB UHCI, Rev. 3.0 and support Plug and Play. It is convenient to enable you to connect or disconnect a device without turning off the computer.

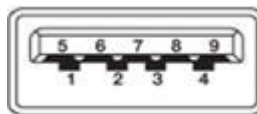


Figure 2.11 USB3.0 connector

Table 2.4: USB 3.0 Connector Pin Assignments

Pin	Signal Name
1	VBUS
2	USB Data-
3	USB Data+
4	GND
5	StdA_SSRX-
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX-
9	StdA_SSTX+

### 2.3.3 HDMI Connector

There are three HDMI connectors, which are HDMI1, HDMI2, HDMI3 respectively, to display the high resolution image/ video. The detailed descriptions are as below.

- HDMI 2.0 (printed HDMI1) is the latest connector to provide all-digital audio/ video interface to transmit the uncompressed audio/ video signals and with HDCP content protection. Also, its maximum resolution enables to carry 4K resolution at 60Hz but the actual resolutions supported depend on the monitor being used.
- HDMI 1.4 (printed HDMI2) also supports CEC (Consumer Electronic Control) feature designed to allow the user to perform remote control functions but the actual functions supported depend on the monitor, and maximum resolution is 4K at 30Hz.
- HDMI 1.4 (printed HDMI3) supports its maximum resolution 4K at 30Hz.

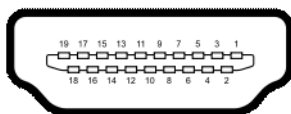


Figure 2.12 HDMI connector

Table 2.5: HDMI Connector Pin Assignments

Pin	Signal Name
1	TMDS Data2+
2	GND
3	TMDS Data2-
4	TMDS Data1+
5	GND
6	TMDS Data1-
7	TMDS Data0+
8	GND
9	TMDS Data0-
10	TMDS Clock+
11	GND
12	TMDS Clock-
13	NC
14	NC
15	SCL
16	SDA
17	GND
18	+5 V Power
19	Detect

### 2.3.4 Power Input Connector

DS-980/DS-980GL comes with a DC-Jack header that takes 12V DC-in external power input at main layer, and optional second 12V DC-in at bottom layer.



**Figure 2.13 DC input connector at main layer**



**Figure 2.14 DC input connector at bottom layer**



# Chapter 3

## Hardware Installation

This chapter introduces DS-980/DS-980GL series Hardware installation.

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## 3.1 Before you begin

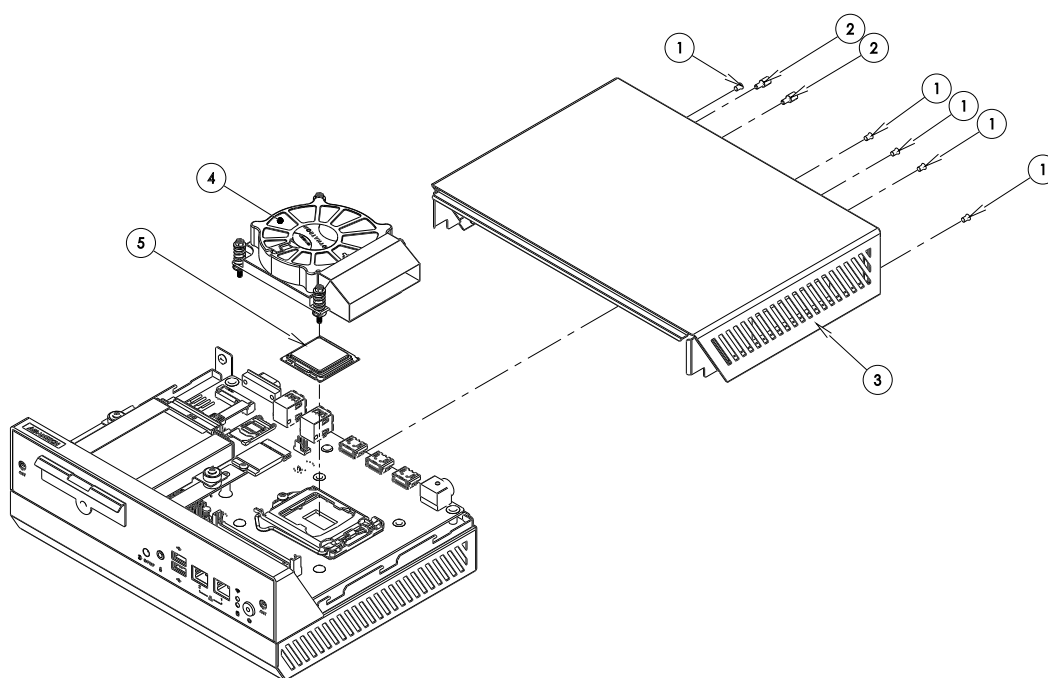
- Turn off the device, disconnect the Ethernet cable, and disconnect the power cord.
- Transfer the device to a clean, flat, stable work surface over a noncarpeted floor.

**Caution!** *Advantech strongly recommends that you look for our global service centers to change any parts which you want in order to ensure our great product quality and make sure the functions well.*



## 3.2 Socket Type CPU & Thermal Module Installation

1. Respectively remove 4 screws with number 1 and 2 six-angle screws with number 2 at the back of the plate.
2. Push DS-980/DS-980GL top case (number 3) back, then remove it.
3. Socket type CPU (number 5) installation
  - 3.1. Unhook the socket lever by pushing down and away from the socket, and gently press socket lever and the load plate will lift from the socket.
  - 3.2. Open the load plate and make sure not to damage any of the pins inside of the socket, and align the notches on the CPU to the notches in the socket.
  - 3.3. Lower the processor straight down into the socket and the load plate back so it is resting on the CPU.
  - 3.4. Press the socket lever to ensure the load plate tip engages under the socket.
  - 3.5. Carefully lock the lever back into place.
4. Thermal module (number 4) installation
  - 4.1. Remove the paper template on the thermal grease first, and gently place the thermal module on CPU socket without any pressure.
  - 4.2. Tighten 4 screws on the thermal module with diagonal directions to balance each pressure on CPU.
  - 4.3. Connect the thermal cable to the connector printed CPUFAN1 on motherboard.
5. After completed 3 & 4 procedures, please push DS-980/DS-980GL top case (number 3) towards the front side and exactly cover the system. Then, tighten all the screws (number 1 & 2) back on the chassis.



**Figure 3.1 Socket type CPU & Thermal module installation**

### 3.3 DDR4 SO-DIMM Memory Installation

1. Respectively remove 4 screws with number 1 and 2 six-angle screws with number 2 at the back of the plate.
2. Push DS-980/DS-980GL top case (number 3) back, then remove it.
3. Install DDR4 SO-DIMM memory into the appropriate SO-DIMM slots.
4. After completed it, please push DS-980/DS-980GL top case (number 3) towards the front side and exactly cover the system. Then, tighten all the screws (number 1 & 2) back on the chassis.

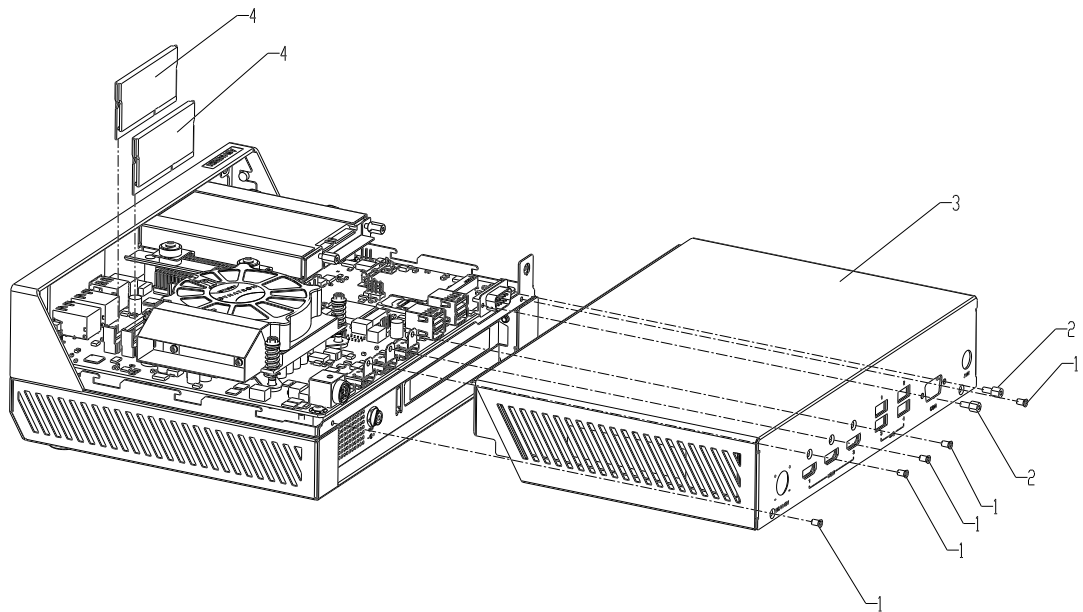


Figure 3.2 DDR4 SO-DIMM memory installation

## 3.4 2.5-inch SATA Storage Installation (Main Layer)

1. Remove 1 screw (number 3) at the front plate, and pull the storage tray out from the device.
2. Please note the 2.5-inch SATA storage direction upside down and assemble on the storage tray with 4 screws (number 1).
3. Push the completed storage module back to the device and exactly ensure the 2.5-inch SATA storage connection with SATA connector inside.
4. Then, tighten 1 screw (number 3) back.

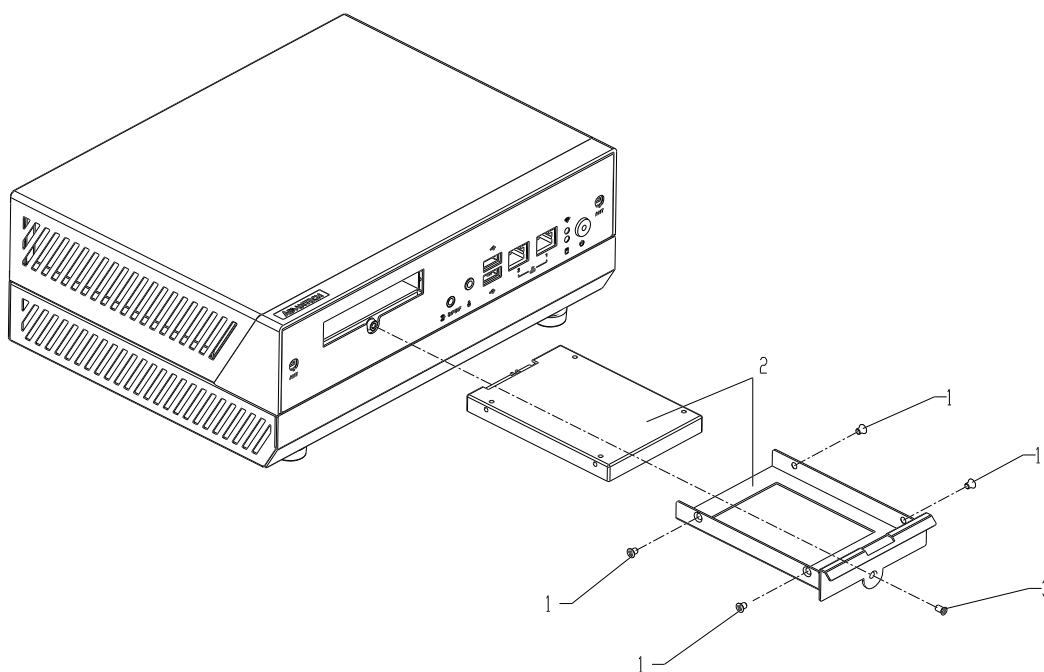


Figure 3.3 2.5-inch SATA storage installation (main layer)

## 3.5 2.5-inch SATA SSD Installation (Bottom Layer)

1. Upside down the device first on a flat and clear floor.
2. If necessary, please remove all the screws (number 1, 2, & 3) at the bottom side including stand rubbers or mounting brackets.
3. Carefully lift up the bottom case (number 4).
4. 2.5-inch SATA module installation
  - 4.1. Gently insert 4 yellow rubbers (number 5) into the storage tray.
  - 4.2. Install 2.5-inch SATA on this storage tray (number 6) by 4 step screws (number 7) from the side.
5. Make sure to connect SATA cable and SATA power cable with 2.5-inch SATA SSD and flatly install this SATA module by 4 screws (number 8). Properly place both cables behind the nuts and keep a clear look.
6. Carefully put the bottom case down and make sure to cover the whole device, then tighten all the screws (number 1, 2, & 3) back.

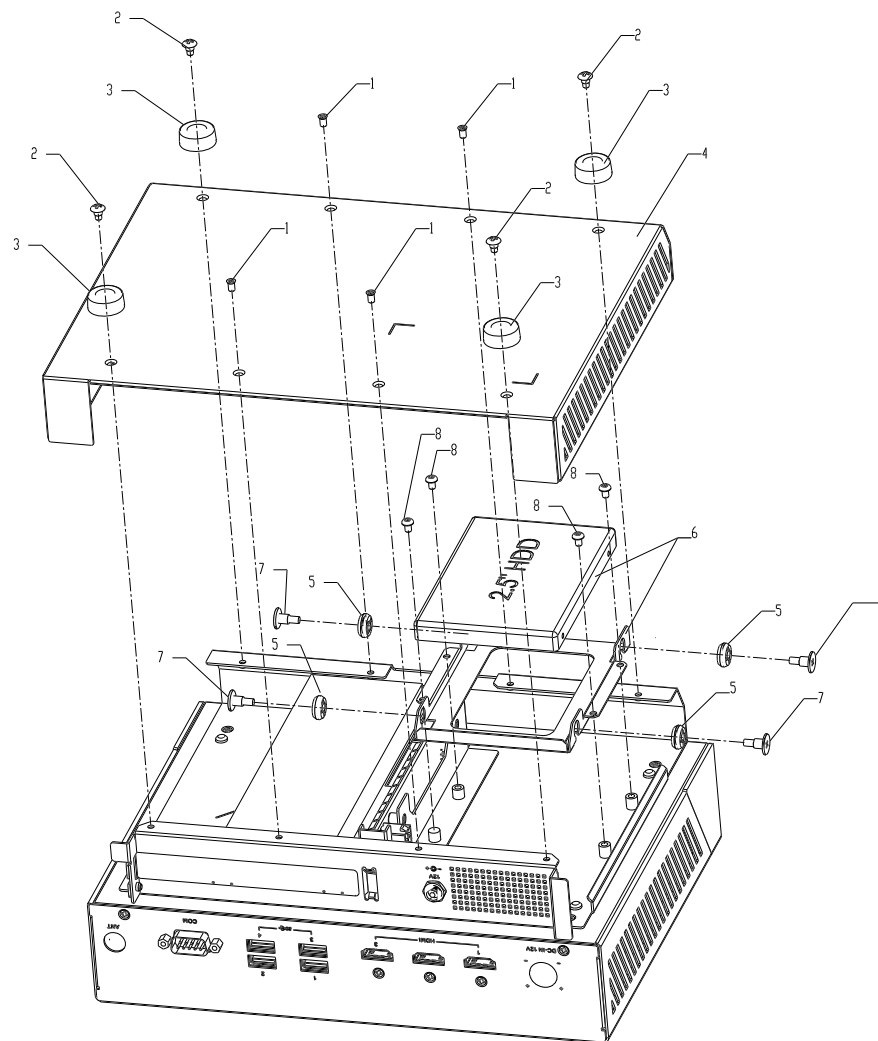


Figure 3.4 2.5-inch SATA SSD installation (bottom layer)

## 3.6 Graphic Card & Fan Duct Installation (option)

1. Upside down the device first on a flat and clear floor.
2. If necessary, please remove all the screws (number 1, 2, & 3) at the bottom side including stand rubbers or mounting brackets.
3. Carefully lift up the bottom case (number 4).
4. First check whether the graphic card bracket size is long or not. If not, please change to the long size with 2 screws (number 7).
5. Insert the graphic card into the slot at the bottom case.
6. Exactly check all the outputs location of the graphic card, and tighten 1 screw (number 5) at the side.
7. Carefully attach a fan duct on T mark on the bottom case following the right directions with below photos.
8. Carefully put the bottom case down and make sure to cover the whole device, then tighten all the screws (number 1, 2, & 3) back.

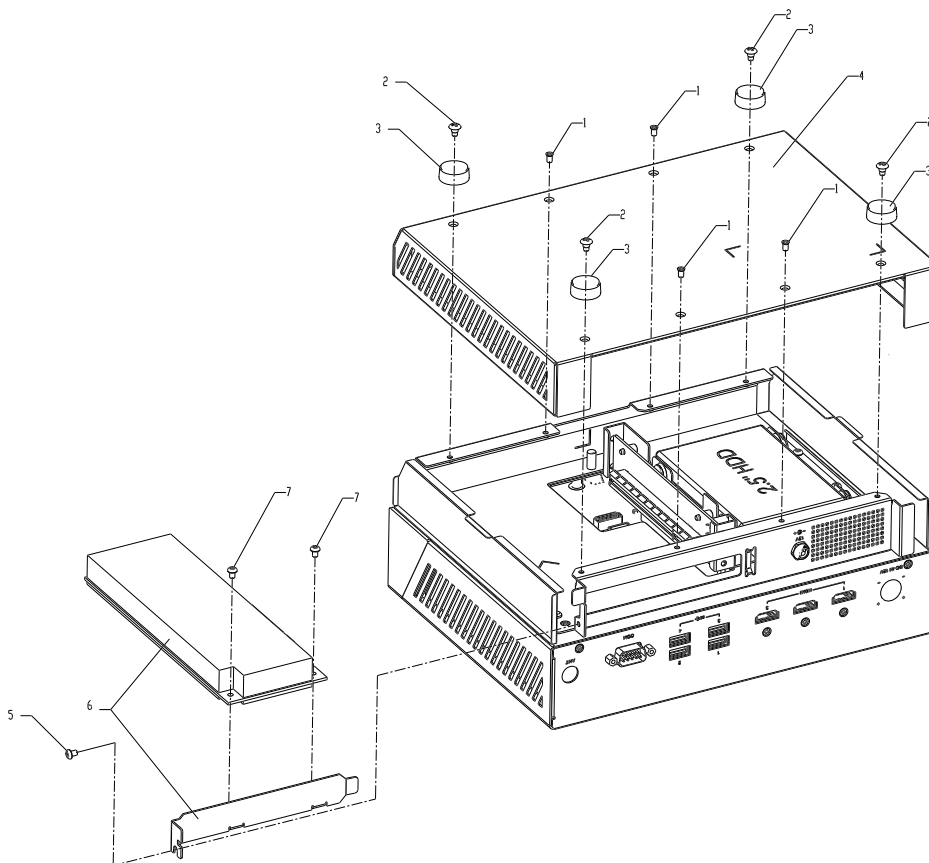


Figure 3.5 Graphic card installation



**Figure 3.6 Fan duct location (1)**



**Figure 3.7 Fan duct location (2)**



### 3.7 Mini-PCle Card/ SIM Card/ M.2 WIFI Module Installation (Options)

1. Respectively remove 4 screws with number 1 and 2 six-angle screws with number 2 at the back of the plate.
2. Push DS-980/DS-980GL top case back, then remove it.
3. Install mini-PCle card on its mini-PCle slot (number 3)/ SIM card on its SIM slot (number 6)/ M.2 WIFI module with 1 screw (number 4) on its M.2 2230 slot (number 5).
4. After completed it, please push DS-980/DS-980GL top case towards the front side and exactly cover the system. Then, tighten all the screws (number 1 & 2) back on the chassis.

**Note!** Mini PCIe slot supports mSATA or mini PCIE card.

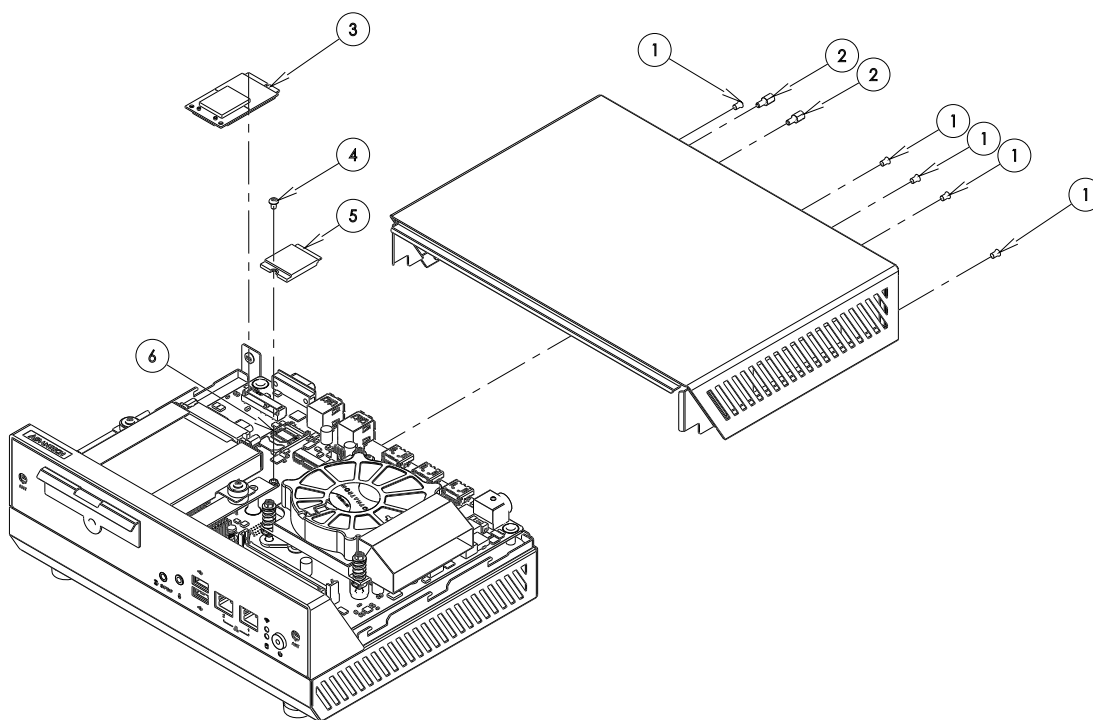


Figure 3.8 Mini-PCle card/ SIM card/ M.2 WIFI module installation

## 3.8 Antenna Installation (Options)

1. Respectively remove 4 screws with number 1 and 2 six-angle screws with number 2 at the back of the plate.
2. Push DS-980/DS-980GL top case back, then remove it.
3. Clean the antenna holes which you want to use and fix the WIFI cable (number 3) on them by rubbers, nuts, and six-angle screws.
4. After completed it, please push DS-980/DS-980GL top case towards the front side and exactly cover the system. Then, tighten all the screws (number 1 & 2) back on the chassis.
5. Install the external antennas (number 4) and make sure to properly tighten them.

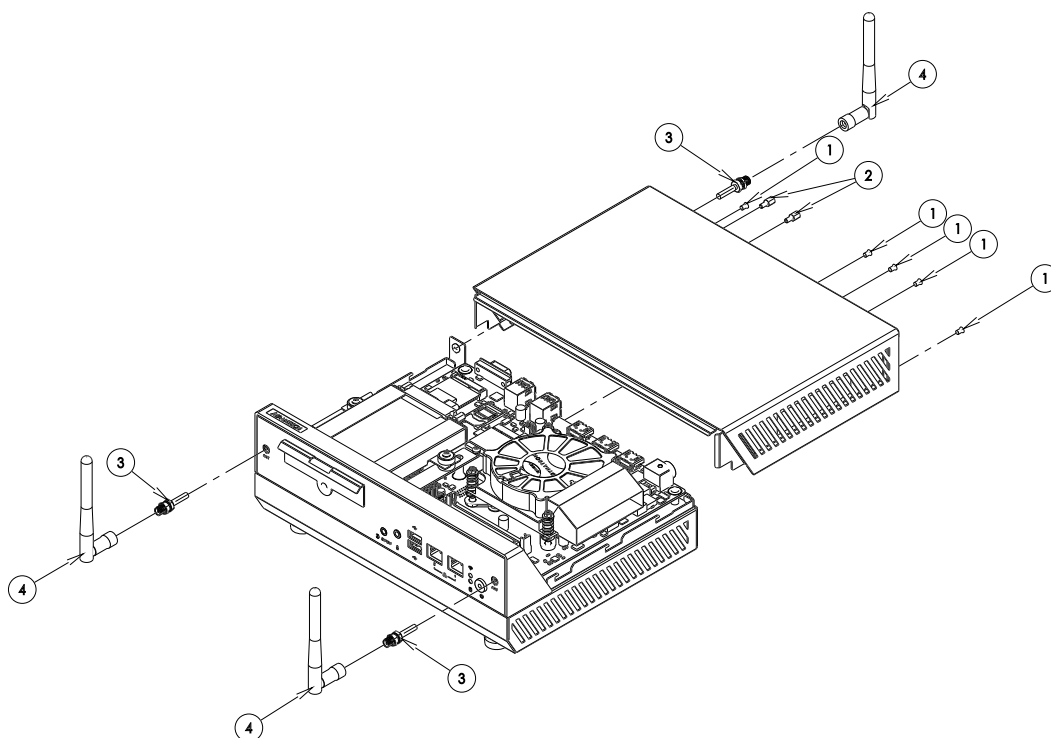
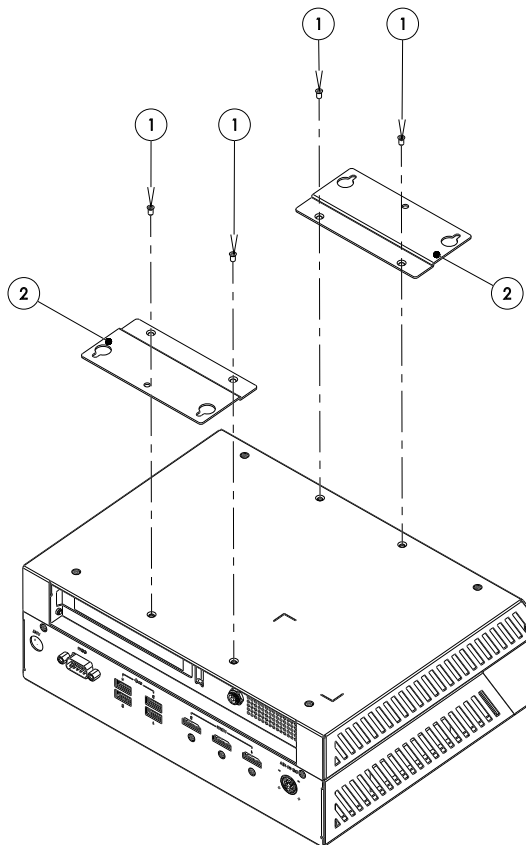



Figure 3.9 Antenna installation

## 3.9 Mounting Brackets Installation

1. Upside down the device first on a flat and clear floor.
2. Both of DS-980/DS-980GL configurations, using the middle of screw holes to install the mounting brackets (number 2) by 4 screws (number 1) (M3x6L).
3. Exactly ensure the mounting brackets are fixed and stable.



**Figure 3.10 Mounting brackets installation**

**Note!**  Please select the suitable screws and consider your loading of the safety value when you install DS-980/DS-980GL behind to the monitor, (DS-980/DS-980GL with expansion configuration weight is 3.8kg; light configuration is 3.1kg)

## 3.10 Stand Rubbers Installation

1. Upside down the device first on a flat and clear floor.
2. Both of DS-980/DS-980GL configurations, using the outer of screw holes to install the stand rubbers (number 2) by 4 screws (number 1).
3. Upside down the device and exactly make sure the stand rubbers are fixed and keep the device balance.

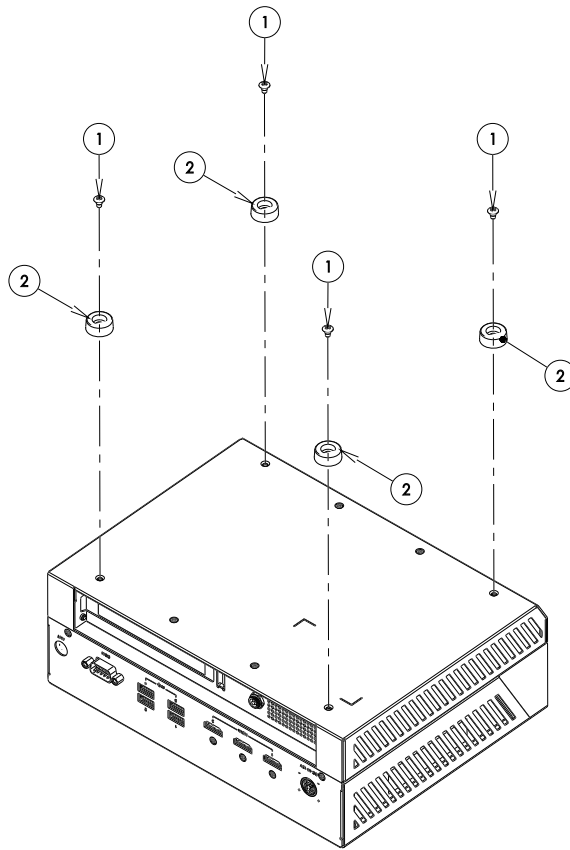


Figure 3.11 Stand rubbers installation

## 3.11 VESA Brackets Installation

1. Upside down the device first on a flat and clear floor.
2. Both of DS-980/DS-980GL configurations, using the middle of screw holes to install the mounting brackets (number 2) by 4 screws (number 1) (M3x6L).
3. Gently place VESA bracket (number 3) on the mounting brackets with the right holes which mark DS-9XX printings and tighten 4 screws (number 4) (M4x 10L) with the opposite directions to the monitor.

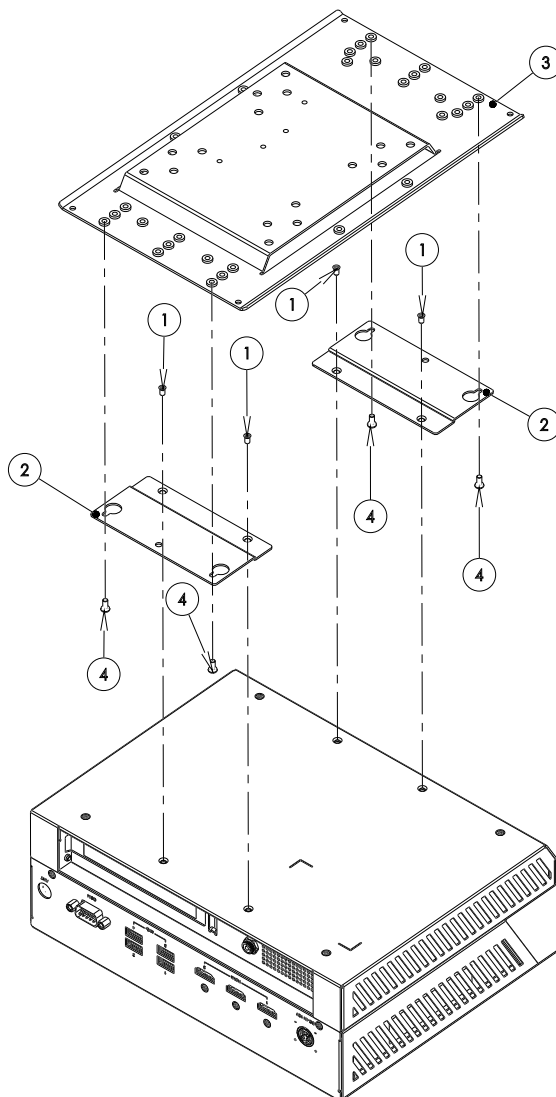


Figure 3.12 VESA brackets installation

**Note!** *Please select the suitable screws and consider your loading of the safety value when you install DS-980/DS-980GL behind to the monitor, (DS-980/DS-980GL with expansion configuration weight is 3.8kg; light configuration is 3.1kg)*



## 3.12 How to Select Suitable Graphic Cards

DS-980/DS-980GL is designed for the expansion slot by PCI Express x16 slot at the bottom layer in order to fulfill video wall solution with triple+ displays which depends on what quantities of its outputs a graphic card is. Due to the limited space of DS-980/DS-980GL bottom layer, there are below criteria to select your suitable graphic card.

1. Foam factor: Low Profile
2. Bracket side: Long
3. Maximum GPU, TDP (Watt): 75W
4. Maximum board dimension (Unit: mm): 167.65(L) x 68.9(W)

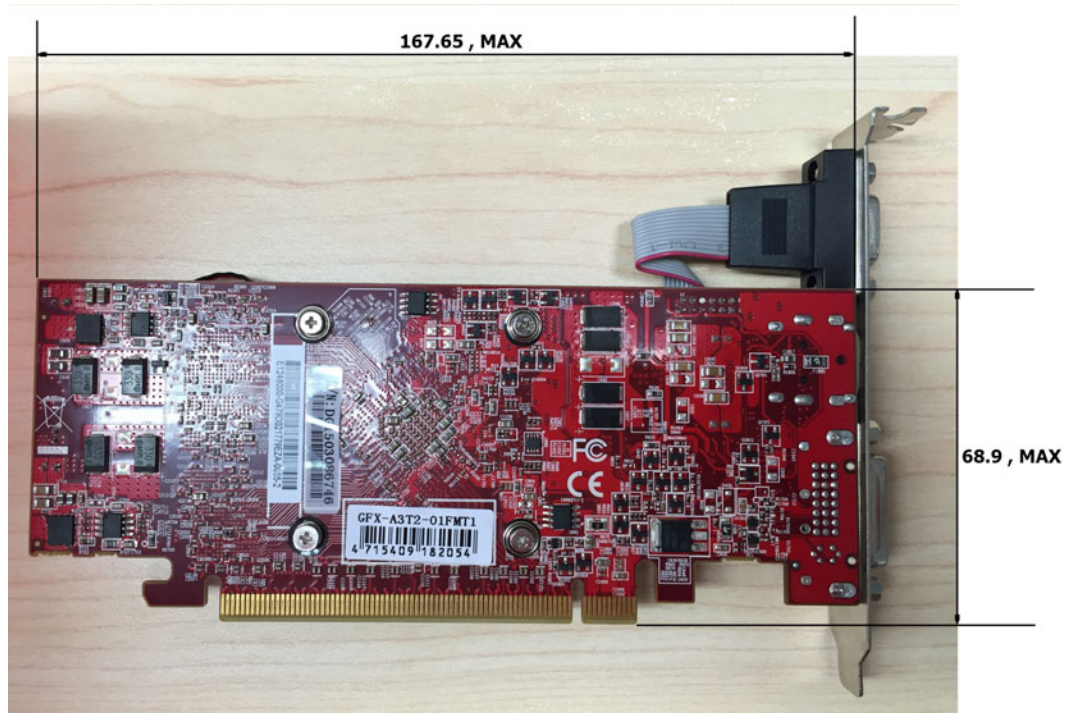
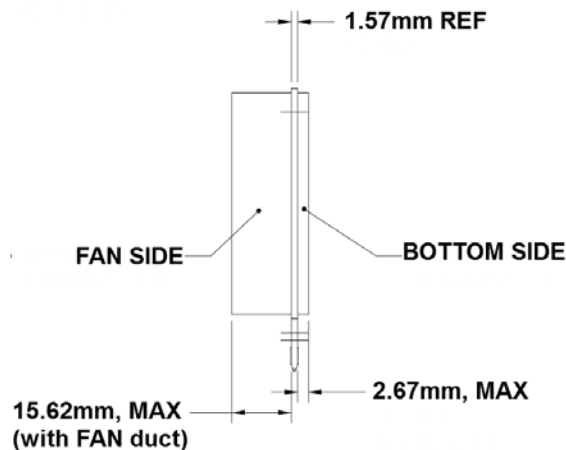


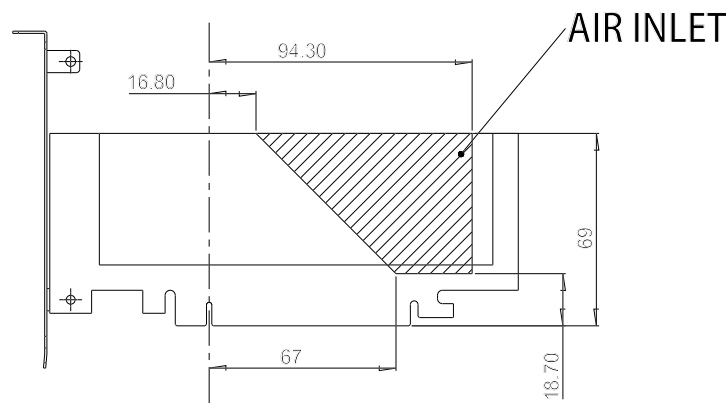
Figure 3.13 Maximum board dimension (Unit: mm)

5. Maximum a graphic card dimension:
- Top side with thermal mechanism: 15.62mm
  - PCBA: 1.57mm
  - Bottom side: 2.67mm



**Figure 3.14** Maximum a graphic card dimension (Unit: mm)

6. Air Inlet Location:  
To efficiently enhance the airflow road inside, so please notice air inlet location should be “at the slash location” following a below picture so that it is able to attach fan duct properly.



**Figure 3.15** Air inlet location

**Note!** To ensure DS-980/DS-980GL operation smoothly, it is better to use second 12V DC-in AC adapter which we recommended when a graphic card is installed.







# Chapter 4

## BIOS Settings

This chapter introduces how to set BIOS configuration data.

---

## 4.1 BIOS Introduction

AMI BIOS has been integrated into many motherboards for over two decades. With the AMI BIOS Setup program, you can modify BIOS settings and control various system features. This chapter describes the basic navigation of the DS-980/DS-980GL series BIOS setup screens.

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

There are some different settings with 6th Intel processor compared with the previous platform, so please notice these following procedures of DS-980/DS-980GL series BIOS.

## 4.2 Entering Setup

### 4.2.1 Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab.

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

The key legend in the top 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.

You can use main setup to check BIOS related information and DS-980/DS-980GL hardware settings, such as project version, build date and time, power type, total memory, memory frequency, ME FW version, and system date/ time.

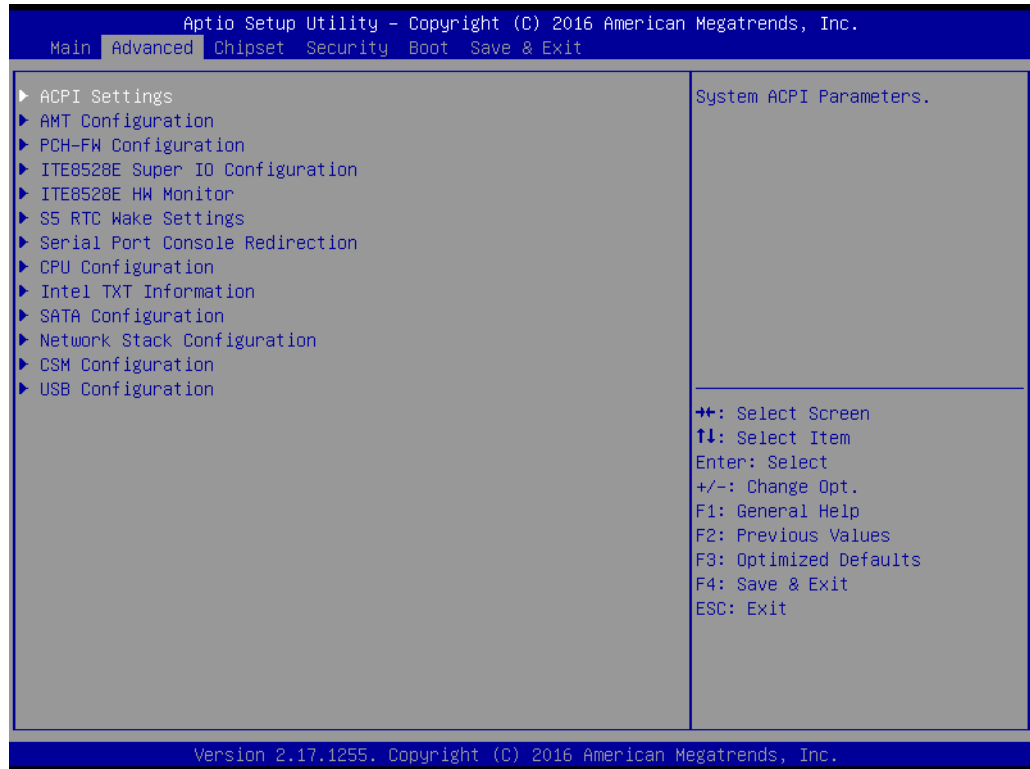
In this screen, only system date and time can be adjusted if you wanted. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.



Figure 4.1 Main setup

## 4.2.2 Advanced Features Setup

Select the Advanced tab from the DS-980/DS-980GL 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 are shown below. The sub-menus are described on the following pages.

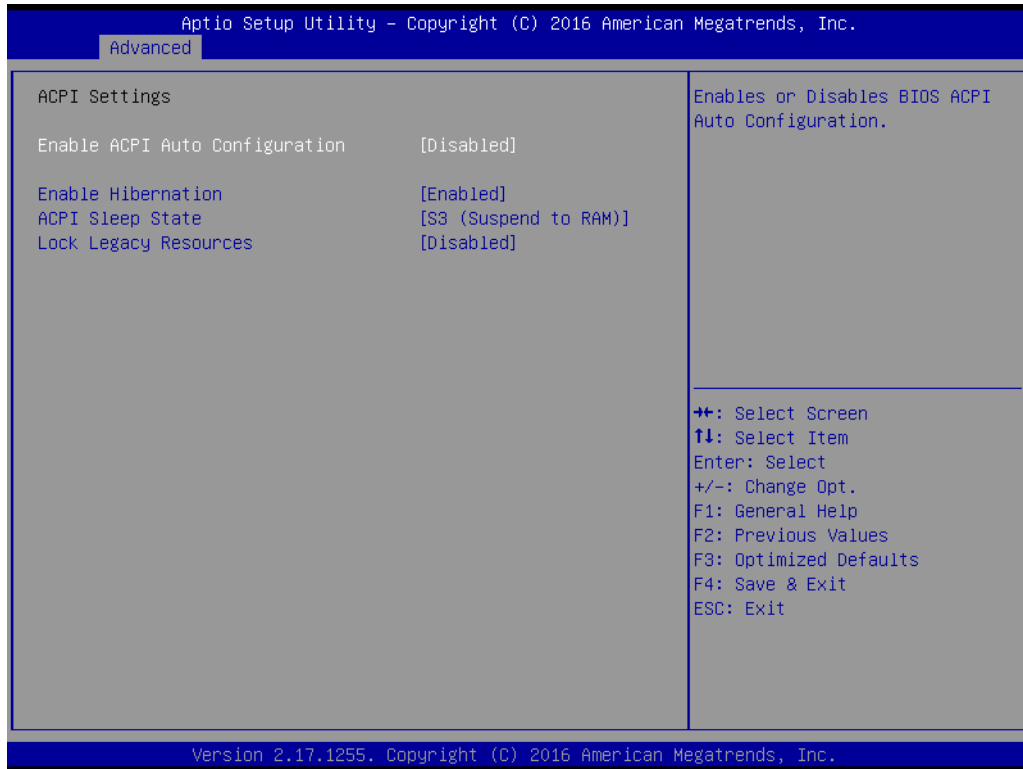


**Figure 4.2 Advanced features setting**

#### 4.2.2.1 ACPI Settings

ACPI is a subsystem which controls hardware states (thermal control, motherboard configuration, power states like sleep and suspend, and functions that may have previously been in the BIOS configuration.

If want to change ACPI sleep state, you can select the highest ACPI sleep state the system will enter the SUSPEND button is pressed. Configuration options: [Suspend Disable][S1 (CPU Stop Clock)][S3 (suspend to RAM)].



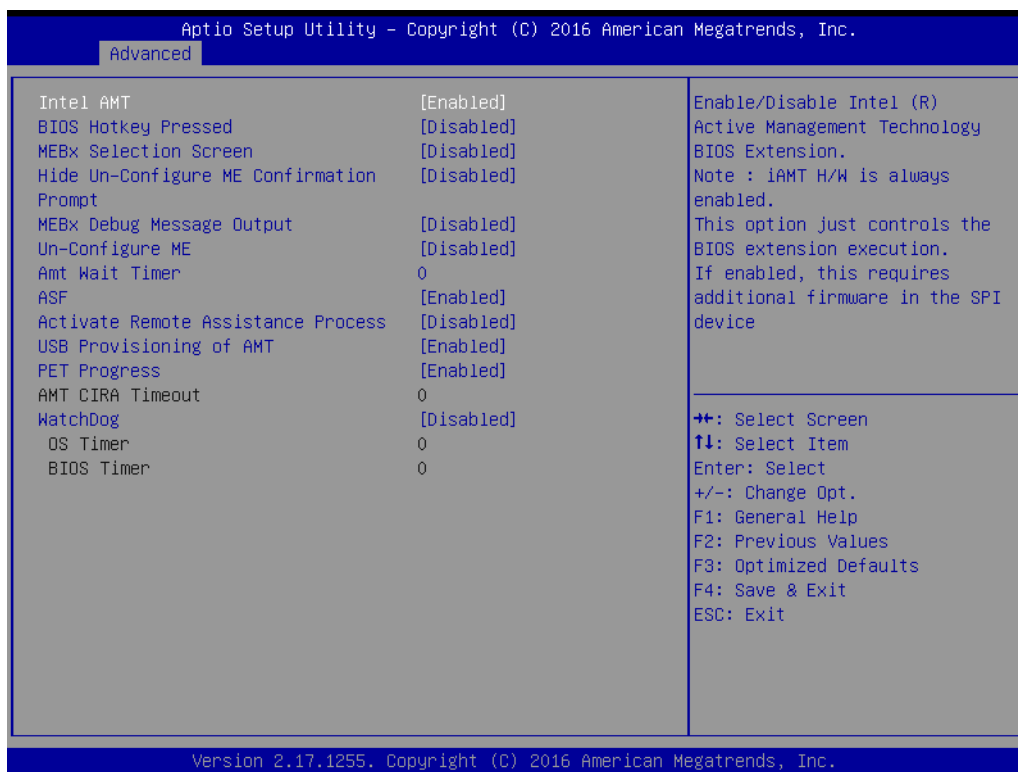
**Figure 4.3 ACPI Setup Screen**

#### 4.2.2.2 AMT Configuration

Intel AMT includes hardware-based remote management, security, power management, and remote configuration features that enable independent remote access to AMT-enabled PCs. Intel AMT is security and management technology that is built into PCs with Intel vPro technology. PCs with Intel vPro include many other "platform" (general PC) technologies and features.

Configuration AMT Parameters:

- Intel AMT [Enabled]: Enabled/ Disabled AMT; Configuration options: [Disabled][Enabled].
- BIOS Hotkey Pressed [Disabled]: Enabled/ Disabled BIOS hotkey pressed; Configuration options: [Disabled][Enabled].
- MEBx Selection Screen [Disabled]: Enabled/ Disabled MEBx selection screen; Configuration options: [Disabled][Enabled].
- Hide Un-Configure ME Confirmation Prompt [Disabled]: Hide Un-configure ME without password configuration prompt; Configuration options: [Disabled][Enabled].
- MEBx Debug Message Output [Disabled]: Enabled/ Disabled MEBx debug message output; Configuration options: [Disabled][Enabled].
- Un-Configure ME [Disabled]: Un-Configure ME without password; Configuration options: [Disabled][Enabled].
- AMT Wait timer [0]: Set timer to wait before sending ASF\_GET\_BOOT\_OPTION.
- ASF [Enabled]: Enabled/ Disabled alert specification format; Configuration options: [Disabled][Enabled].
- Active Remote Assistance Process [Disabled]: Trigger CIRA boot; Configuration options: [Disabled][Enabled].
- USB Provisioning of AMT [Enabled]: Enabled/ Disabled USB provisioning of AMT; Configuration options: [Disabled][Enabled].
- PET [Enabled]: User can Enabled/ Disabled PET Events progress to receive PET events or not; Configuration options: [Disabled][Enabled].
- AMT CIRA Timeout [0].
- WatchDog Timer [Disabled]: Enabled/ Disabled WatchDog Timer; Configuration options: [Disabled][Enabled]. When [Enabled], OS and BIOS WatchDog Timers can be set.

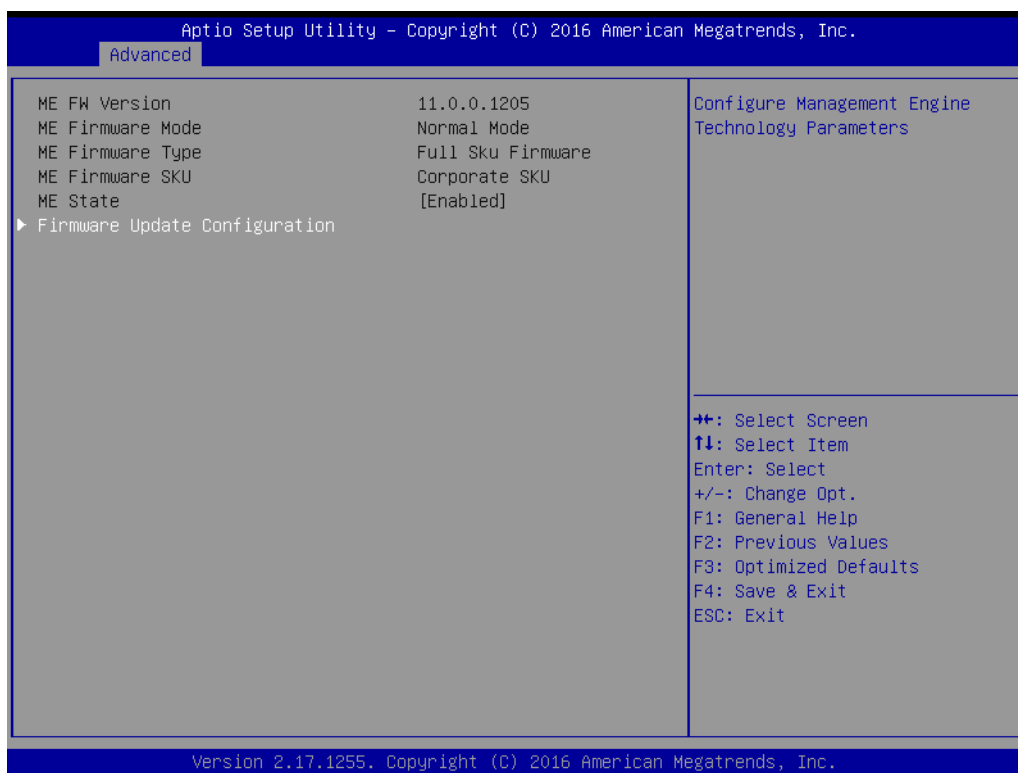


**Figure 4.4 AMT Configuration**

#### 4.2.2.3 PCH-FW Configuration

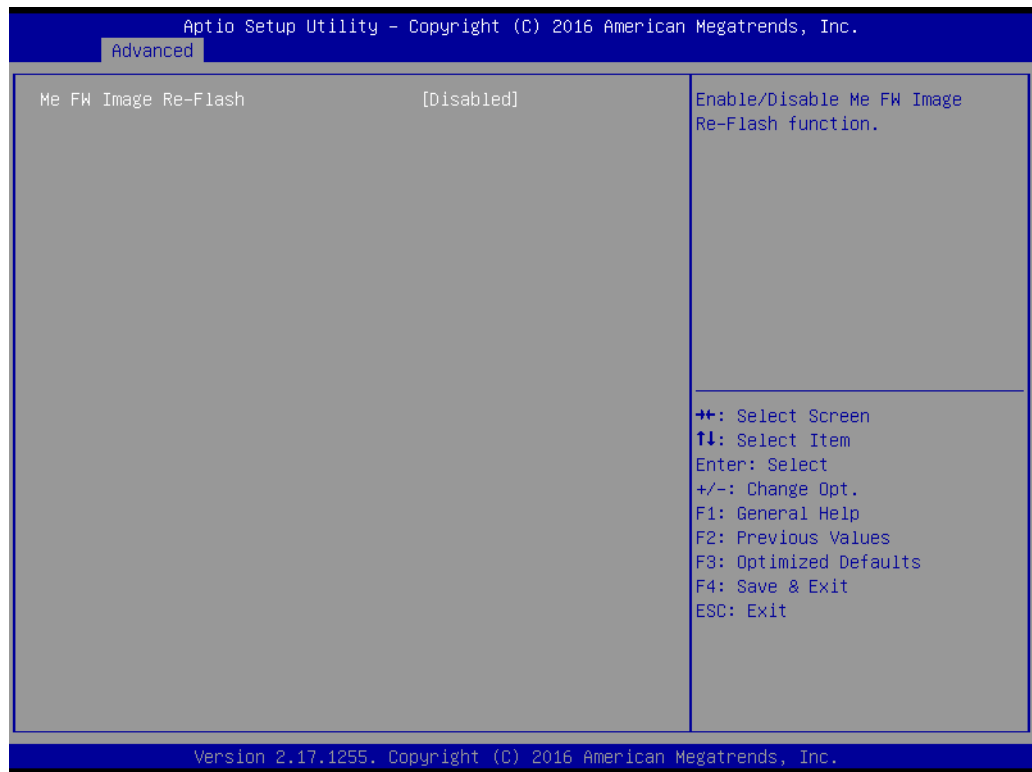
Configuration Management Engine Technology Parameter.

- Display ME Firmware Information



**Figure 4.5 PCH-FW Configuration**

- Firmware Update Configuration  
Enabled/ Disabled ME FW image Re-Flash function: Configuration options:  
[Disable][Enhanced].



**Figure 4.6 ME FW image**



#### 4.2.2.4 ITE8528E Super IO Configuration

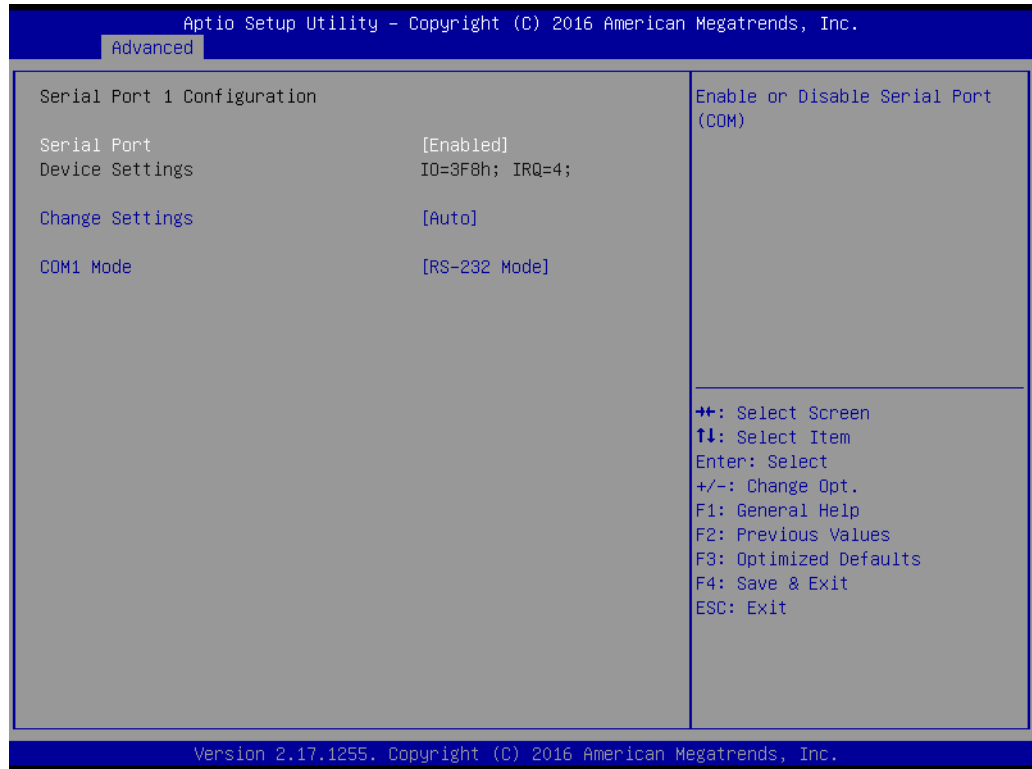
System Super IO Chip Parameters.

- Super IO Configuration: Super IO Chip [ITE8528E].



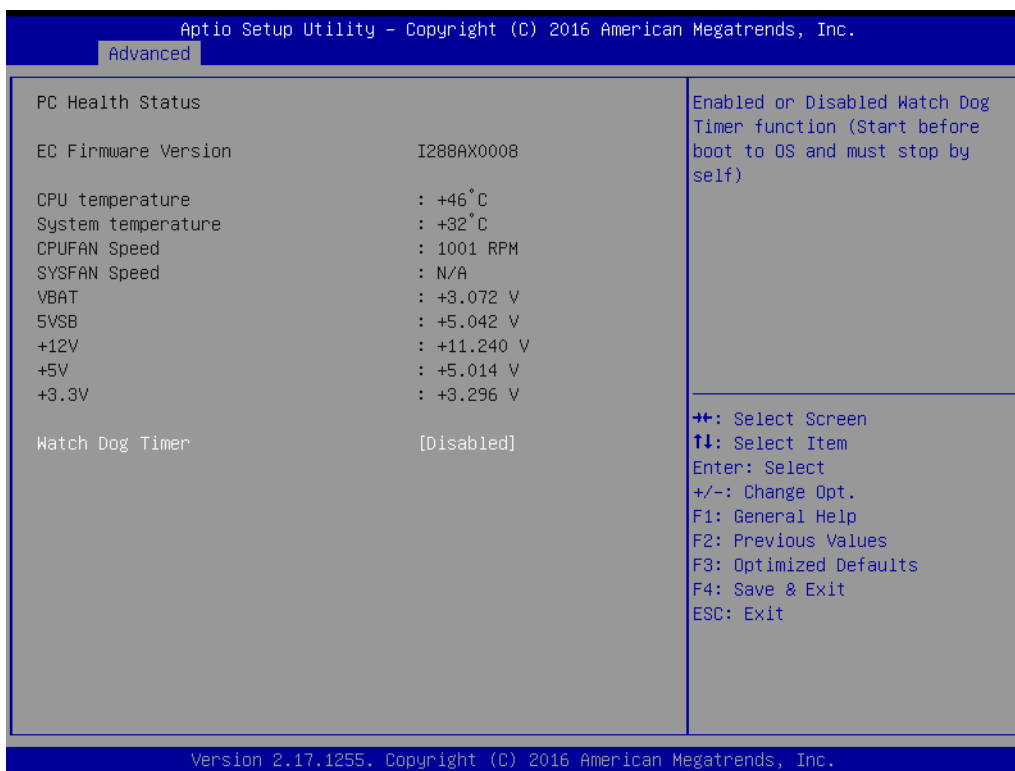
**Figure 4.7 ITE8528E Super IO Configuration**

- Serial Port 1 Configuration: Set Parameters of Serial Port 1.
  - Serial Port [Enabled]: Enabled/ Disabled Serial Port; Configuration options: [Disabled][Enabled].
  - Device Setting [IO=3F8h; IRQ=4].
  - Change Setting [Auto]: Select an optimal setting for Super IO device.



#### 4.2.2.5 ITE8528E HW Monitor

Monitor hardware status (PC health status): Display system health status.



**Figure 4.8 ITE8528E HW monitor**

WatchDog Timer [Disabled]: Enabled/ Disabled WatchDog Timer; When [Enabled], you can change WatchDog Timer Mode is based on [Second] and Time out Value [30] you want.



**Figure 4.9 WatchDog Timer setting**

#### 4.2.2.6 S5 RTC wake setting

Enable system to wake from S5 using RTC alarm.

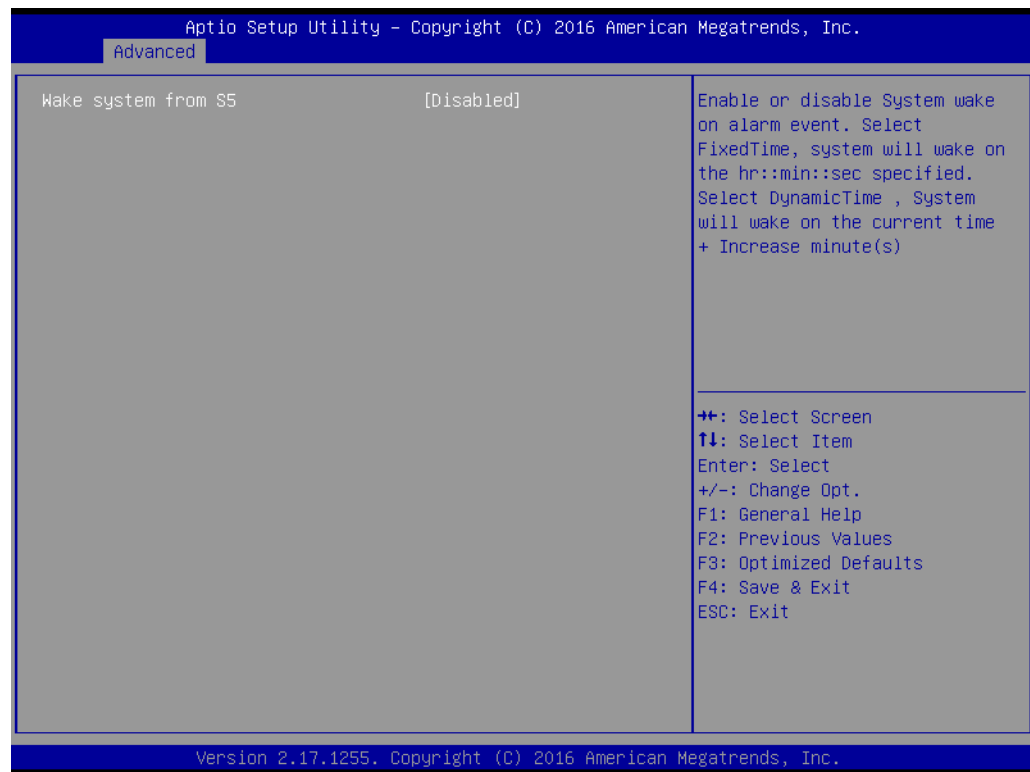


Figure 4.10 S5 RTC wake setting

Wake system from S5 [Disabled]: Enabled/ Disabled Wake system from S5; Configuration options [Disabled][Enabled] and set up Wake up by day/ hour/ minute/ second [0] you want.

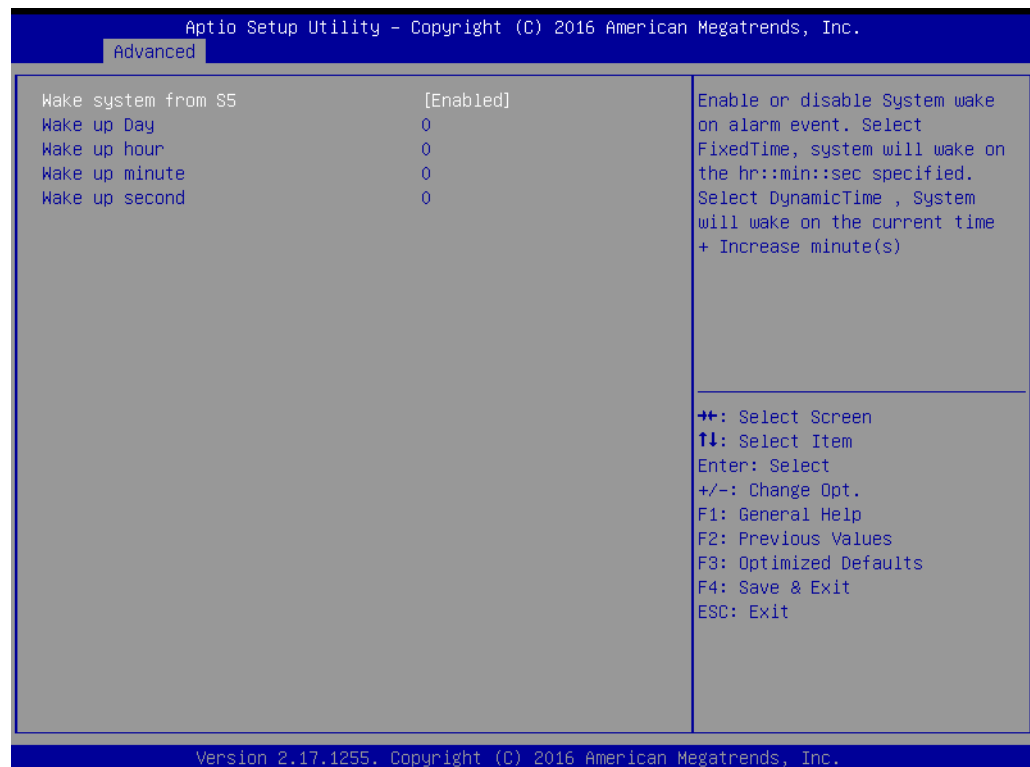
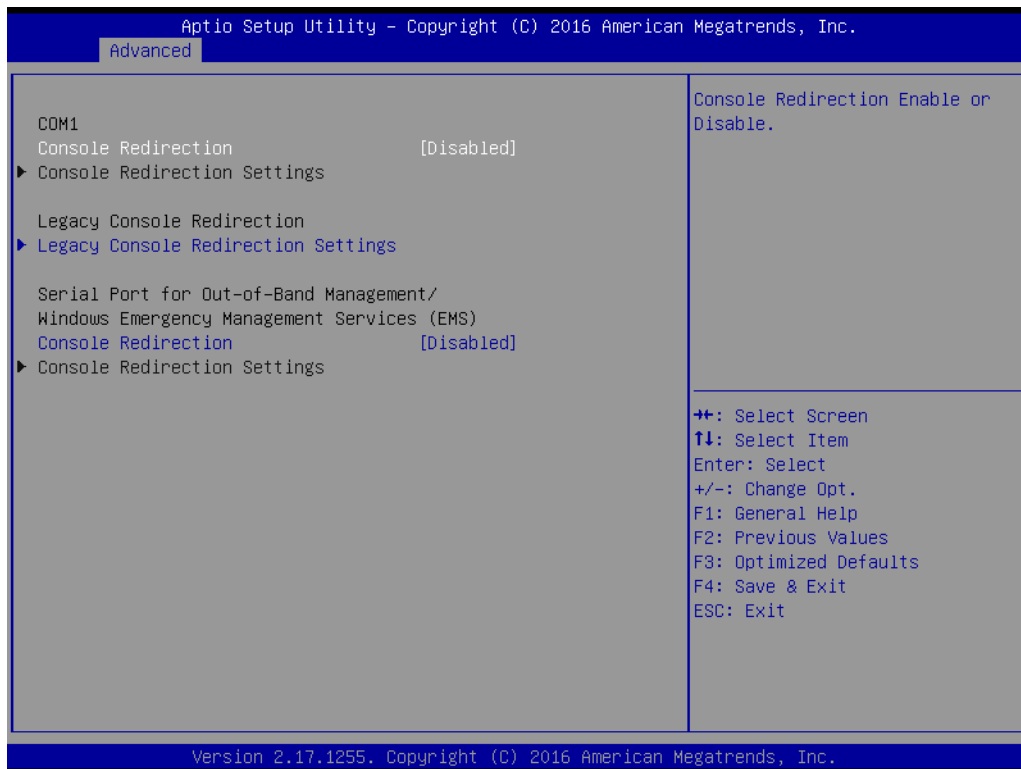


Figure 4.11 S5 RTC wake setting

#### 4.2.2.7 Serial port console redirection

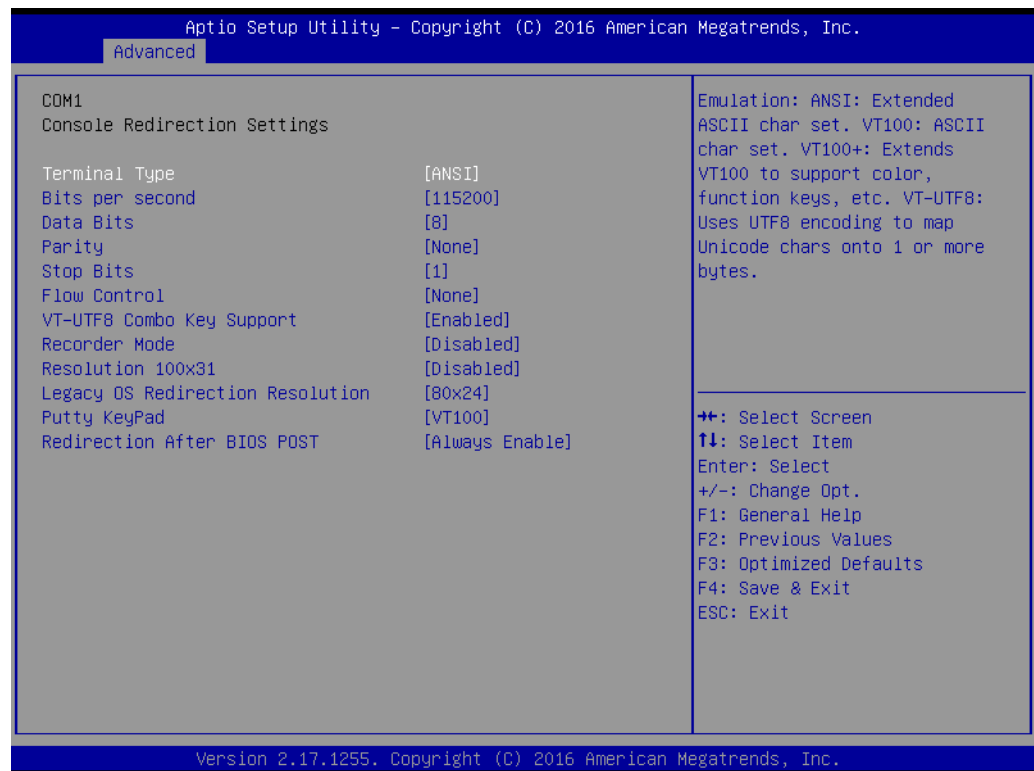
Display COM console information.

- COM1 – Console Redirection [Disabled]: Enabled/ Disabled COM1 – Console Redirection; Configuration options: [Disabled][Enabled].
- Serial Port for Out-of-Band Management [Disabled]: Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.



**Figure 4.12 Serial port console redirection**

- Emulation: [ANSI] Extended ASCII Char set.
- VT100: ASCII char set.
- VT100+: Extends VT100 to support color, functional keys, etc.
- VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.



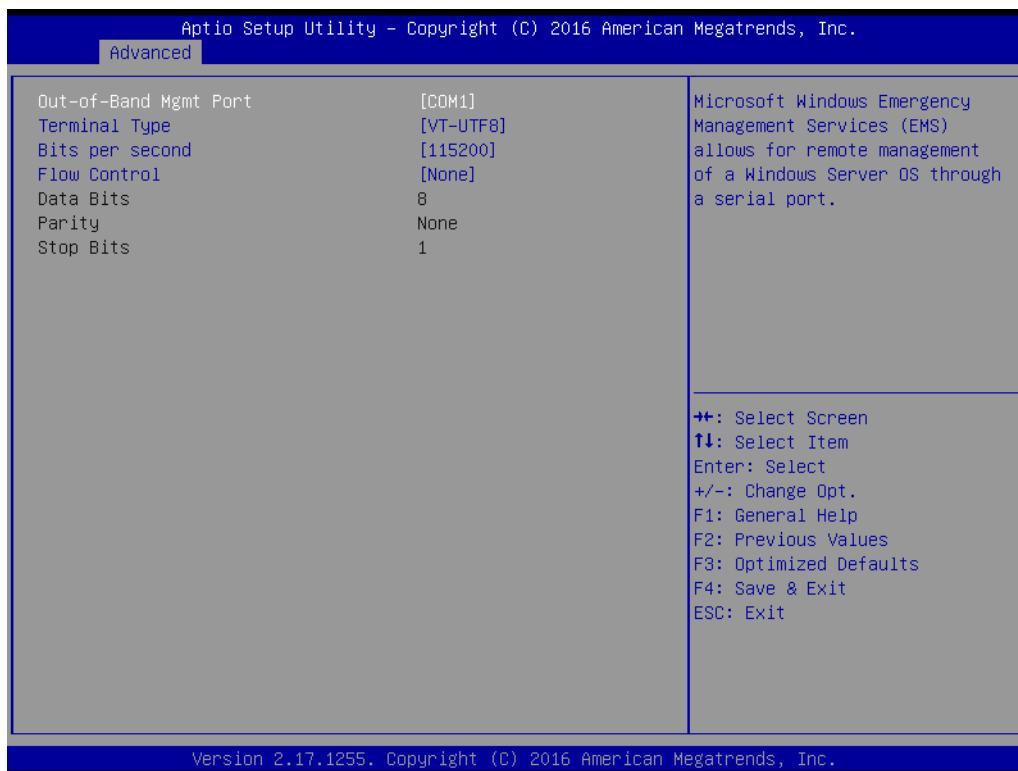
**Figure 4.13 COM1 - Console redirection setting**

Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.



**Figure 4.14 Legacy console redirection setting**

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.



**Figure 4.15 Serial Port-console redirection setting**

#### 4.2.2.8 CPU Configuration

Displays CPU Configuration Parameters:

- Hyper Threading Technology [Not Supported]
- Intel VT-x Technology [Supported]
- Intel SMX Technology [Supported]
- 64-bit [Supported]
- EIST Technology [Supported]
- CPU C3 state [Supported]
- CPU C6 state [Supported]
- CPU C7 state [Supported]
- CPU C8 state [Supported]
- CPU C9 state [Not Supported]
- CPU C10 state [Not Supported]

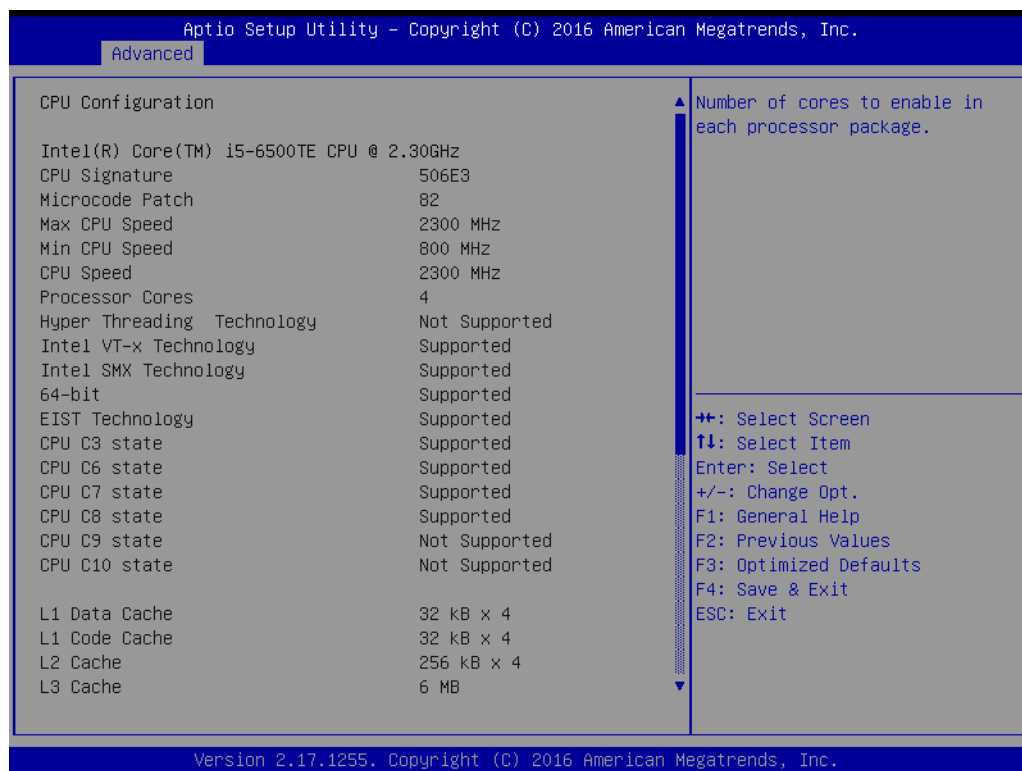


Figure 4.16 CPU Configuration (1)



- Active Processor Cores [All]: Select the numbers of cores in each processor package; Configuration options [All][1][2][3][4][5][6][7] which are subject to each processor type.
- Intel Virtualization Technology [Enabled]: When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology; Configuration options: [Disabled][Enabled].
- Hardware Prefetcher [Enabled]: To turn on/ off the Mid Level Cache (L2) steamer Prefetcher; Configuration options: [Disabled][Enabled].
- Adjacent Cache Line Prefetch [Enabled]: To turn on/ off prefetching of adjacent cache lines; Configuration options: [Disabled][Enables].
- Boot Performance Mode [Max Non-Turbo Performance]
- Intel ® Speed Shift Technology [Enabled]
- Intel ® SpeedStep™ Turbo Mode [Enabled]
- CPU C States [Enabled]
- Package C State Limit [Auto]
- SW Guard Extensions (SGX) [Software Controlled]
- Select Owner EPOCH input type [No Change in Owner EPOCHs]
- PRMRR Size [Auto]



Figure 4.17 CPU Configuration (2)

### 4.2.2.9 Intel TXT information

Display Intel TXT Parameters.

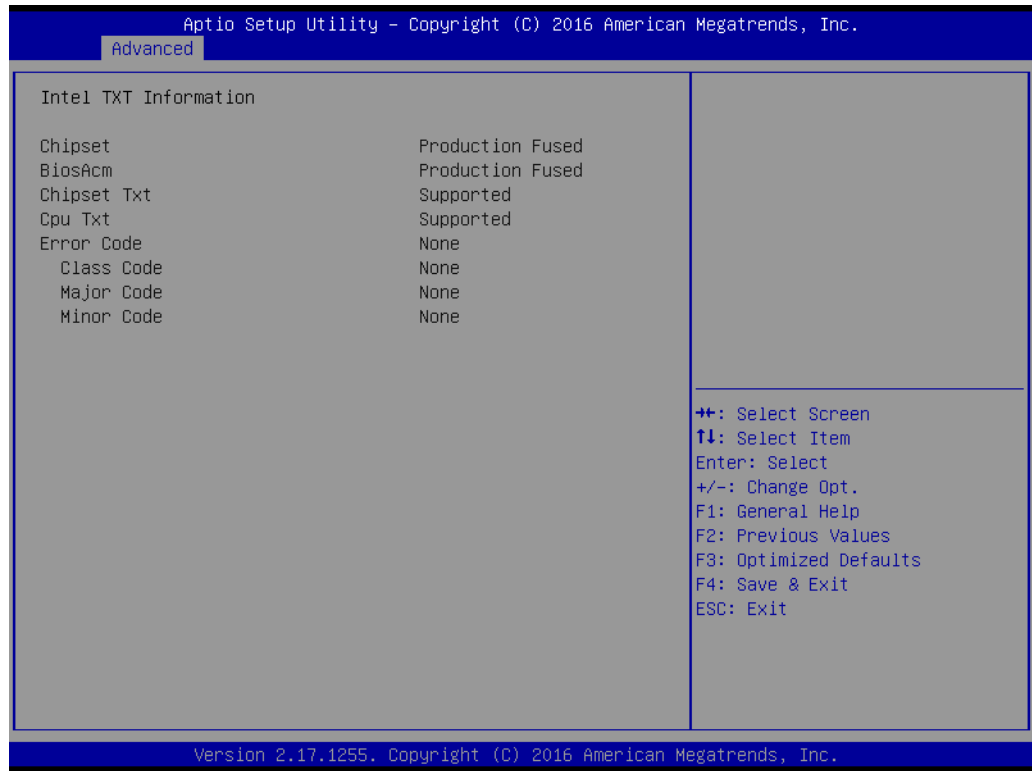


Figure 4.18 Intel TXT information

#### 4.2.2.10 SATA configuration

- SATA Mode [AHCI]: Support IDE, AHCI, or RAID mode; Configuration options: [Disabled][IDE][AHCI][RAID].
- Serial ATA Port 1: Enabled/ Disabled SATA Device; Configuration options: [Disabled][Enabled]



Figure 4.19 SATA configuration

#### 4.2.2.11 Network Stack Configuration

Enabled/ Disabled UEFI Network Stack; Configuration options: [Disabled][Enabled].



Figure 4.20 Network Stack Configuration – Disabled

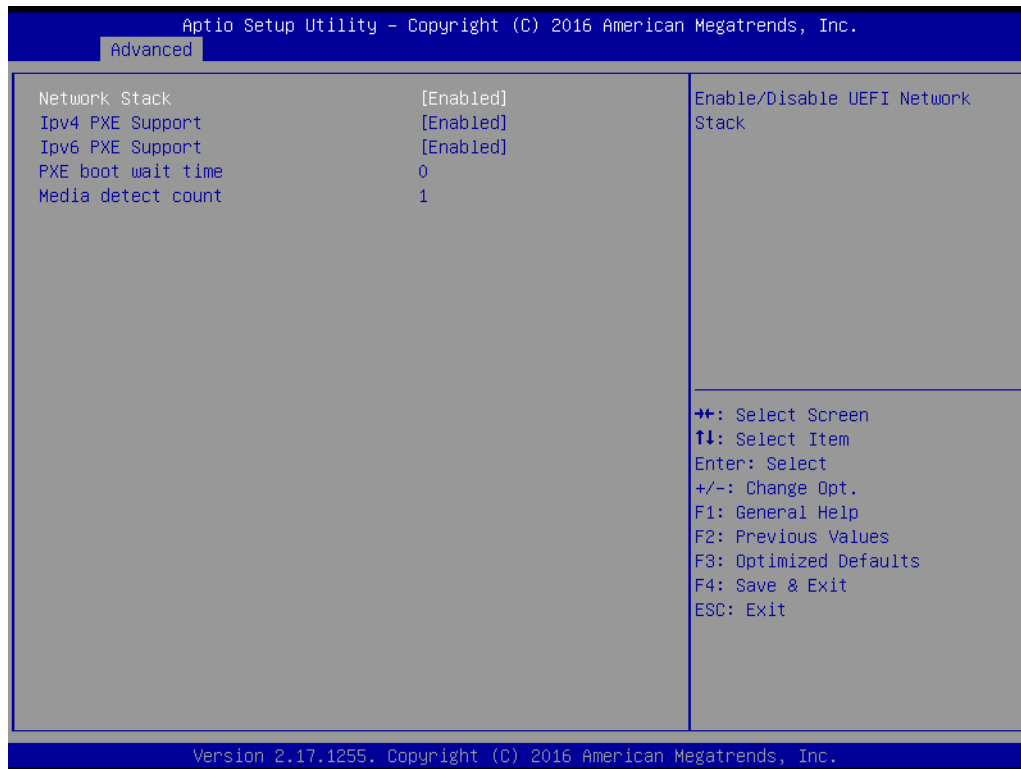
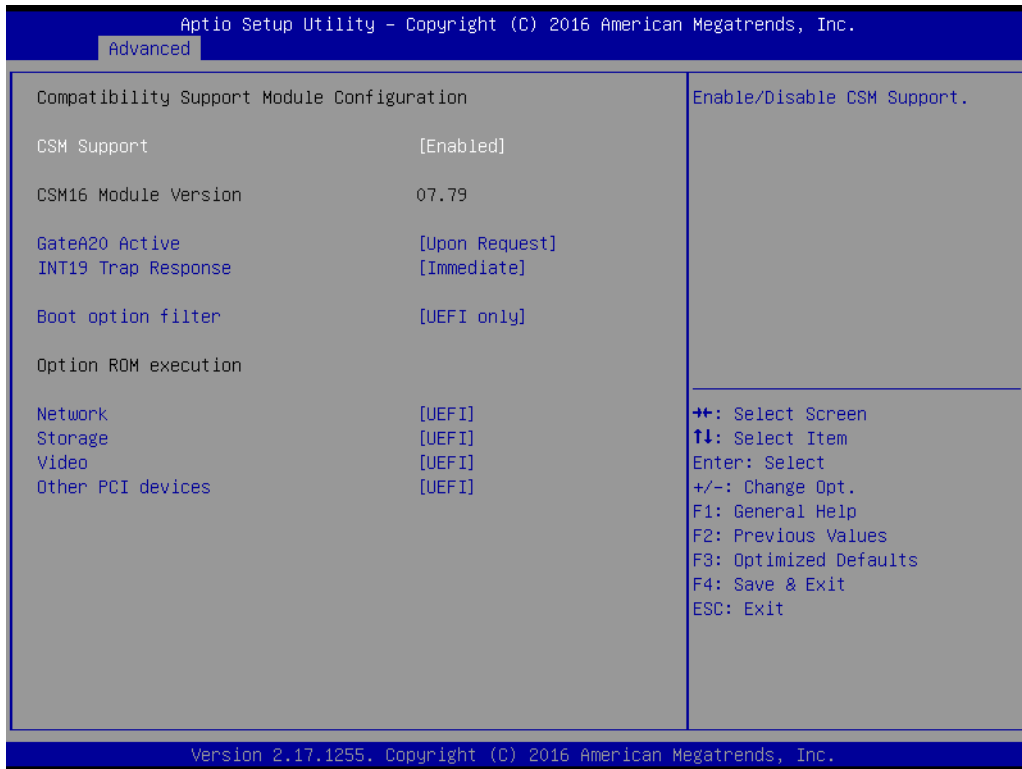


Figure 4.21 Network Stack – enable

#### 4.2.2.12 CSM configuration

Disabled/ Enabled CSM support; Configuration options: [Disabled][Enabled].



**Figure 4.22 CSM Configuration**

#### 4.2.2.13 USB configuration

Disabled/ AUTO/ Disabled USB Configuration; Configuration options: [Enabled][Disabled][AUTO].

- [Enabled] Legacy USB support.
- [AUTO] disables legacy support if no USB devices are connected.
- [Disabled] option will only for EFI application.

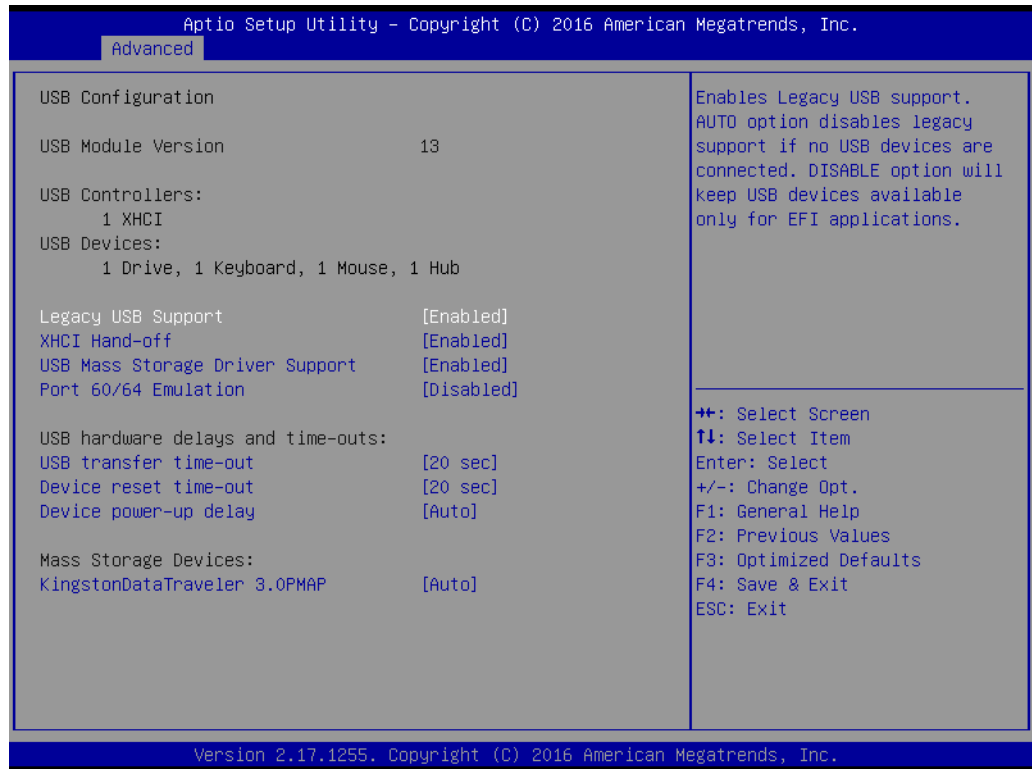
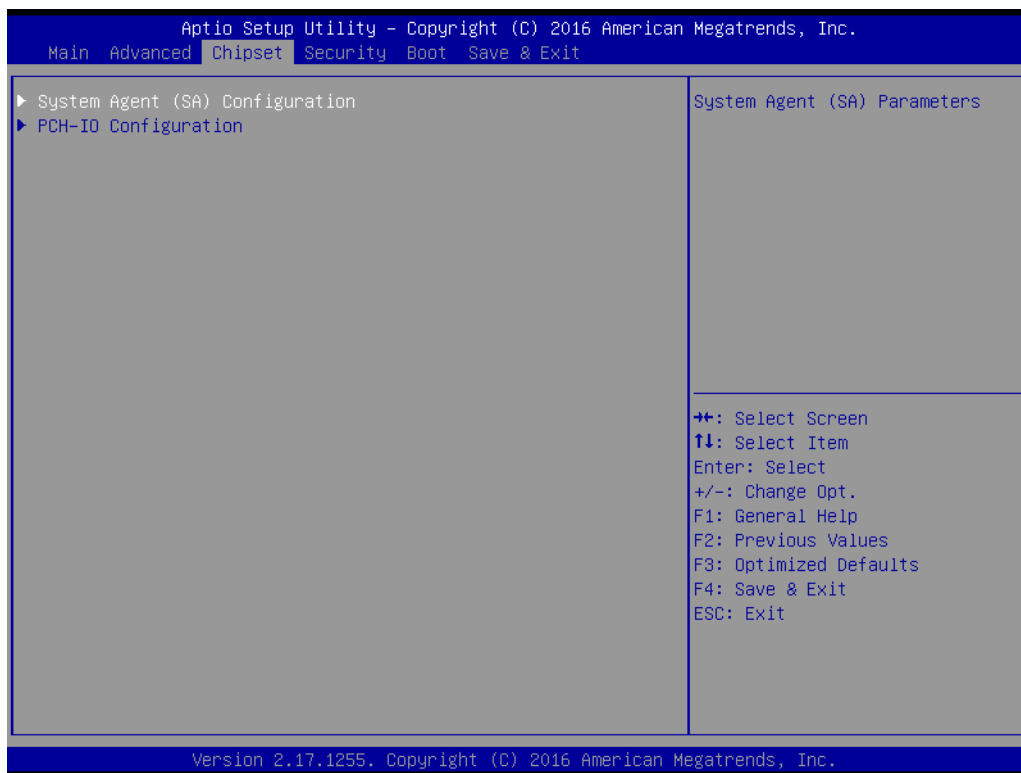


Figure 4.23 USB configuration

### 4.2.3 Chipset

Display System Agent (SA) Parameters.



**Figure 4.24** Chipset

## 4.2.4 System Agent

- VT-d [Enabled]: Set VT-d Enabled/ Disabled; Configuration options: [Disabled][Enabled].
- Graphics Configuration, PEG Port Configuration, and GT – Power Management Control setting options.
- Display Memory Configuration information.

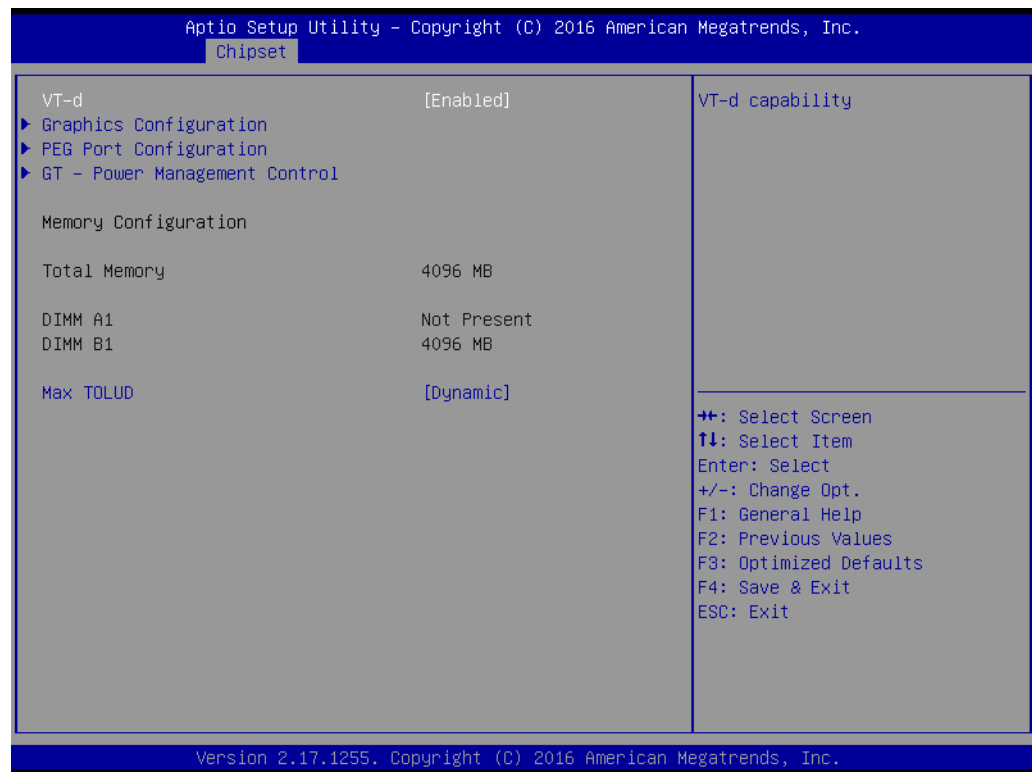
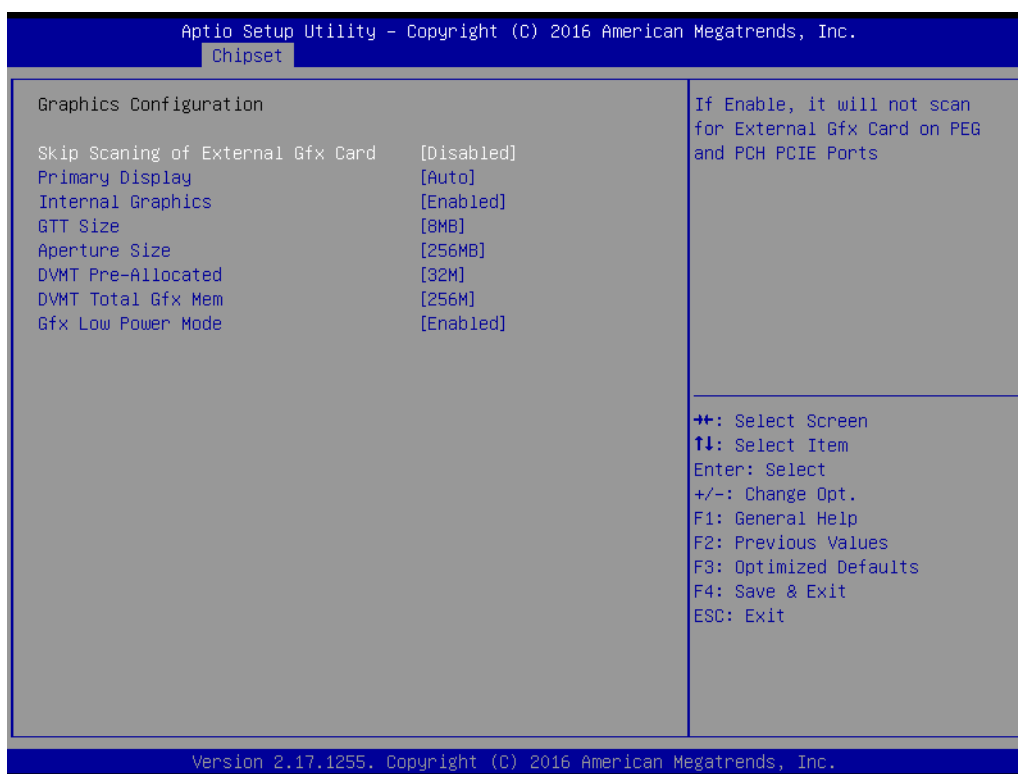


Figure 4.25 System Agent

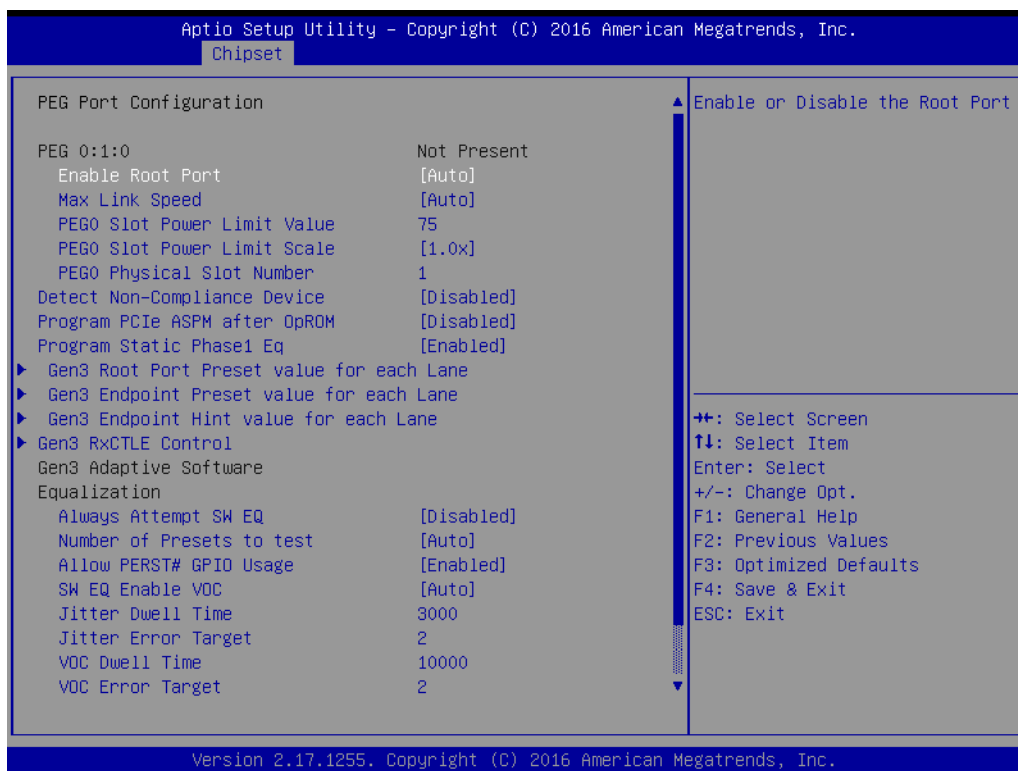


Graphic Configuration: if enabled, it will not scan for external Gfx Card on PEG and PCH PCIE Ports.



**Figure 4.26 Graphic Configuration**

PEG Port Configuration: Enabled/ Disabled the Root Port.



**Figure 4.27 PEG Port Configuration**

#### 4.2.4.1 PCH-IO configuration

Display PCH Parameters. Check to enable render standby support.

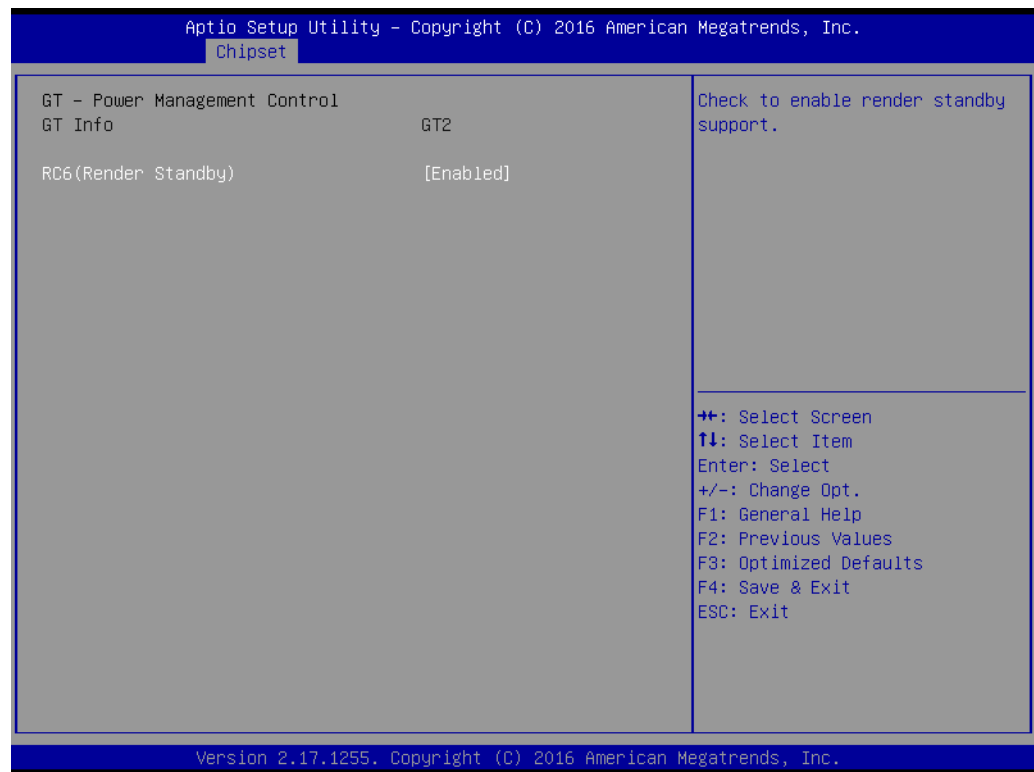
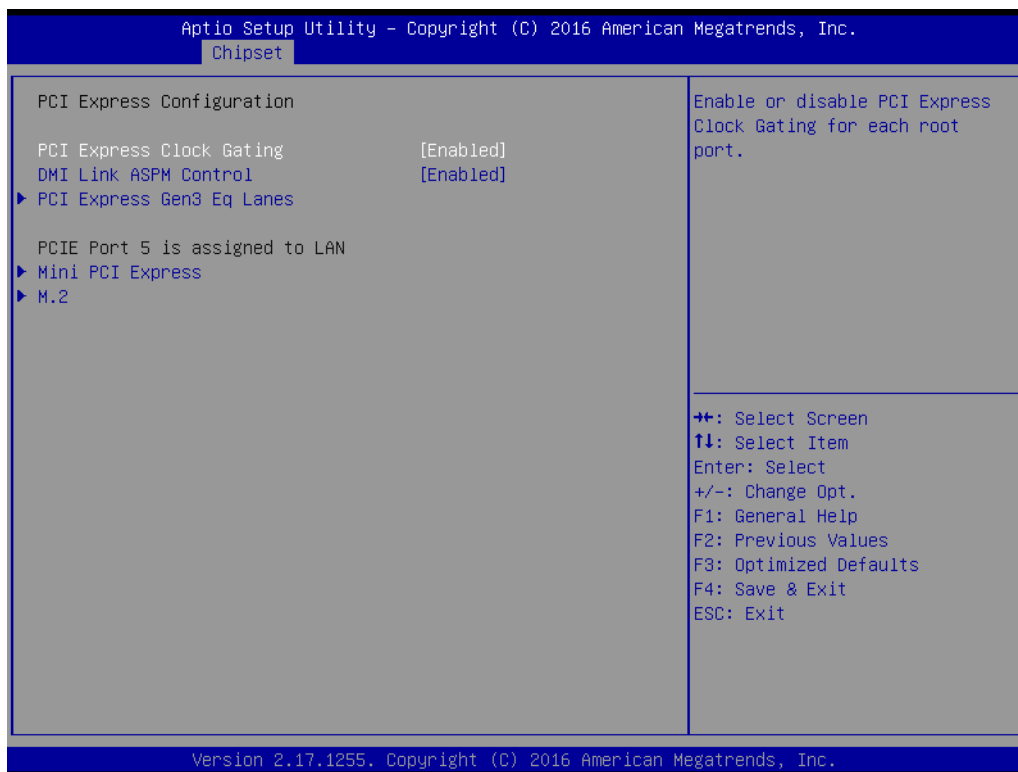


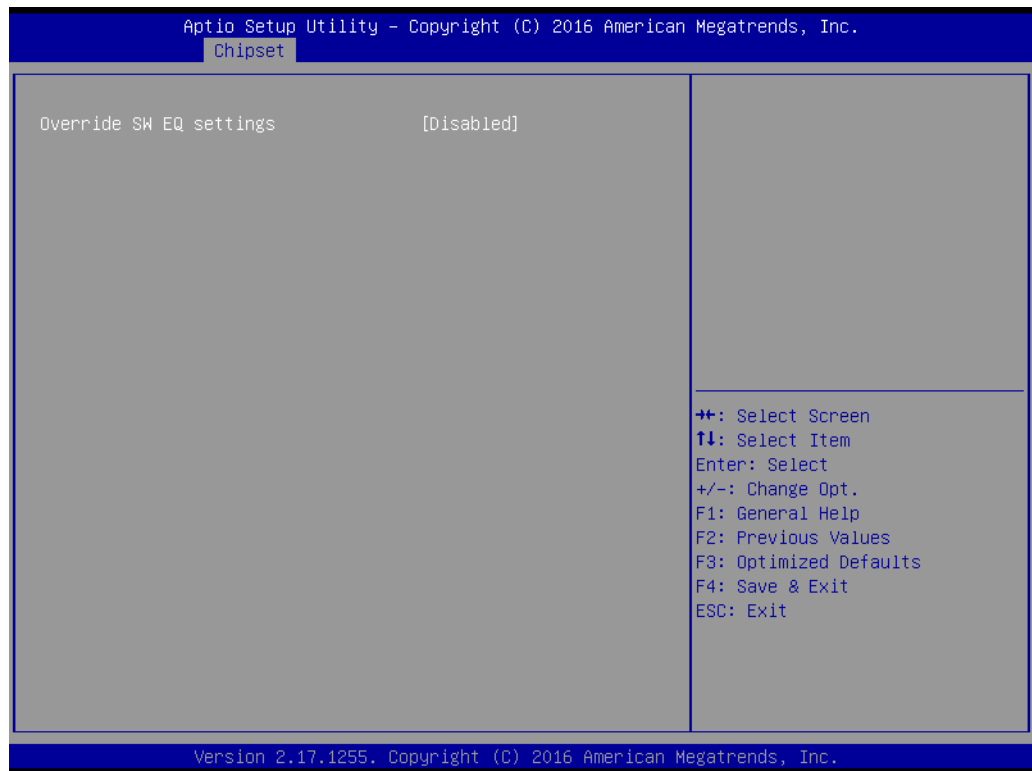
Figure 4.28 PCH-IO configuration

- PCI Express Clock Gating [Enabled]: Enable/ Disabled PCI Express clock gating for each root port; Configuration options: [Disabled][Enabled].
- DMI Link ASPM Control [Enabled]: Enabled/ Disabled the control of active state power management on SA side of the DMI link; Configuration options: [Disabled].
- PCIE Port 5 is assigned to LAN: Mini PCI Express & M.2.



**Figure 4.29 PCI express Configuration**

Override SW EQ settings [Disabled]: Disabled/ Enabled Override SW EQ settings;  
Configuration options: [Disabled][Enabled].

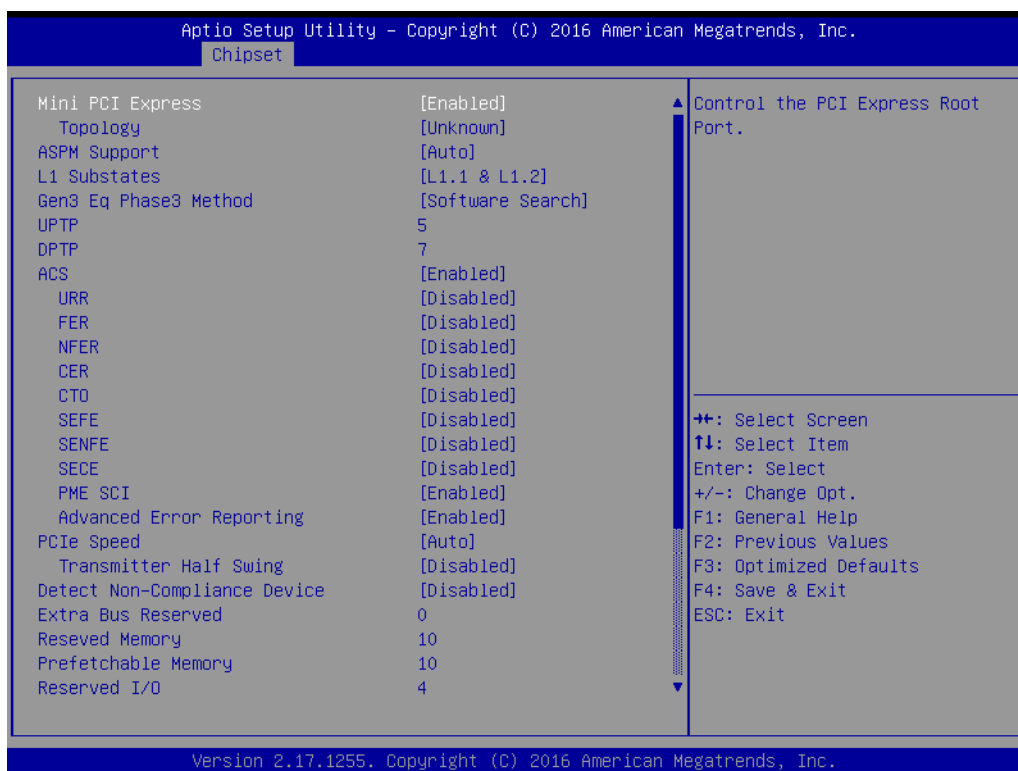


**Figure 4.30 PCI express Gen3 EQ Lanes**

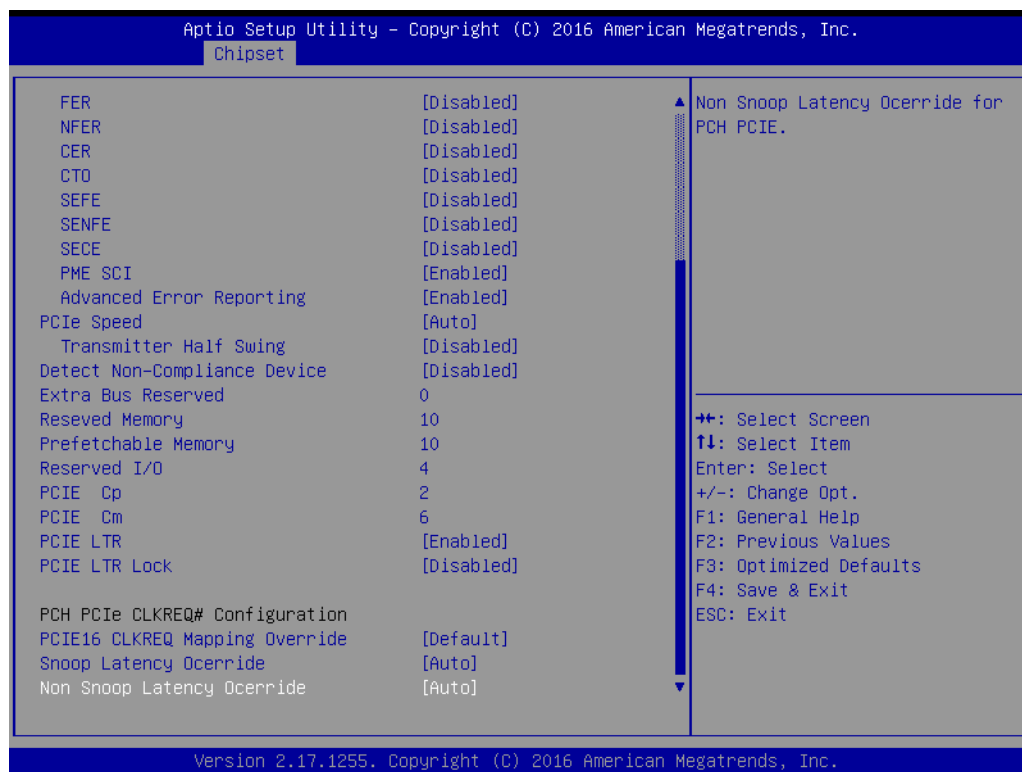
Mini PCI Express settings, and control the PCI Express Root Port.

- Mini PCI Express [Enabled]: Enabled/ Disabled to control Mini PCI Express;  
Configuration options: [Disabled][Enabled][Auto]
- ASPM Support [Auto]
- L1 Substates [L1.1 & L1.2]
- Gen3 Eq Phase3 Method [Software Search]
- UPTP [5]
- DPTP [7]
- ACS [Enabled]
  - URR [Disabled]
  - FER [Disabled]
  - NFER [Disabled]
  - CER [Disabled]
  - CTO [Disabled]
  - SEFE [Disabled]
  - SENFE [Disabled]
  - SECE [Disabled]
  - PME SCI [Enabled]
  - Advanced Error Reporting [Enabled]

- PCIe Speed [Auto]
- Detect Non-Compliance Device [Disabled]
- Extra Bus Reserved [0]
- Reserved Memory [10]
- Prefetchable Memory [10]
- Reserved I/O [4]
- PCIE Cp [2]
- PCIE Cm [6]
- PCIE LTR [Enabled]
- PCIE LTR Lock [Disabled]
- PCH PCIe CLKREQ# Configuration: PCIE16 CLKREQ Mapping Override [Default], Snoop Latency Ocerrice [Auto], Non Snoop Latency Ocerride [Auto]



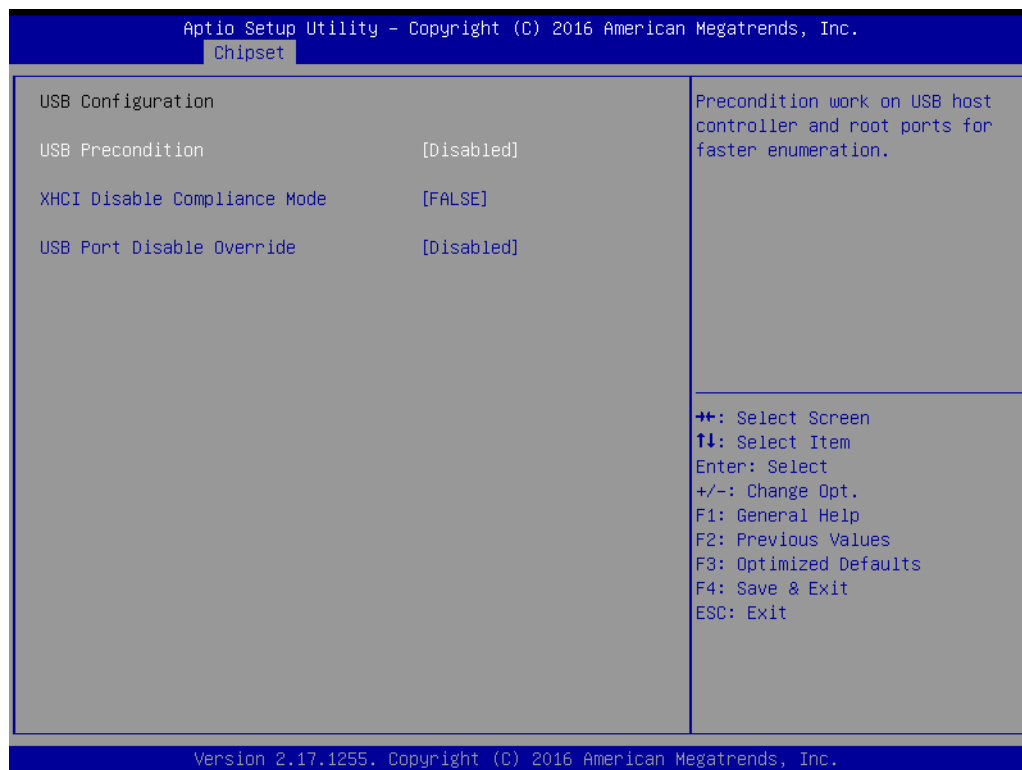
**Figure 4.31 Mini PCI Express/ M.2 (1)**



**Figure 4.32 Mini PCI Express/ M.2 (2)**

Precondition work on USB host controller and root ports for faster enumeration.

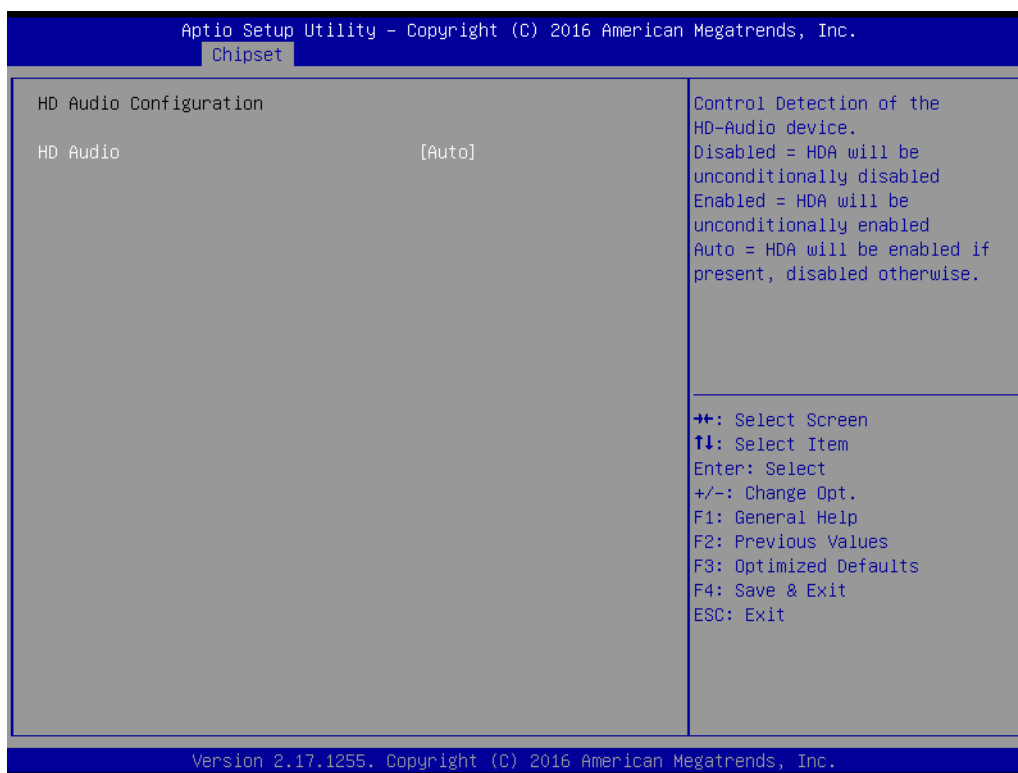
- USB Precondition [Disabled]
- XHCI Disable Compliance Mode [FALSE]
- USB Port Disable Override [Disabled]



**Figure 4.33 USB configuration**

### Control Detection of HD-Audio device [Auto]

- [Disabled] HDA will be unconditionally disabled.
- [Enabled] HDA will be unconditionally enabled.
- [Auto] HDA will be enabled if present, disabled otherwise.



**Figure 4.34 HD Audio Configuration**

## 4.2.5 Security

- Administrator Password: Set up Administrator password.
- User Password: set up User password.

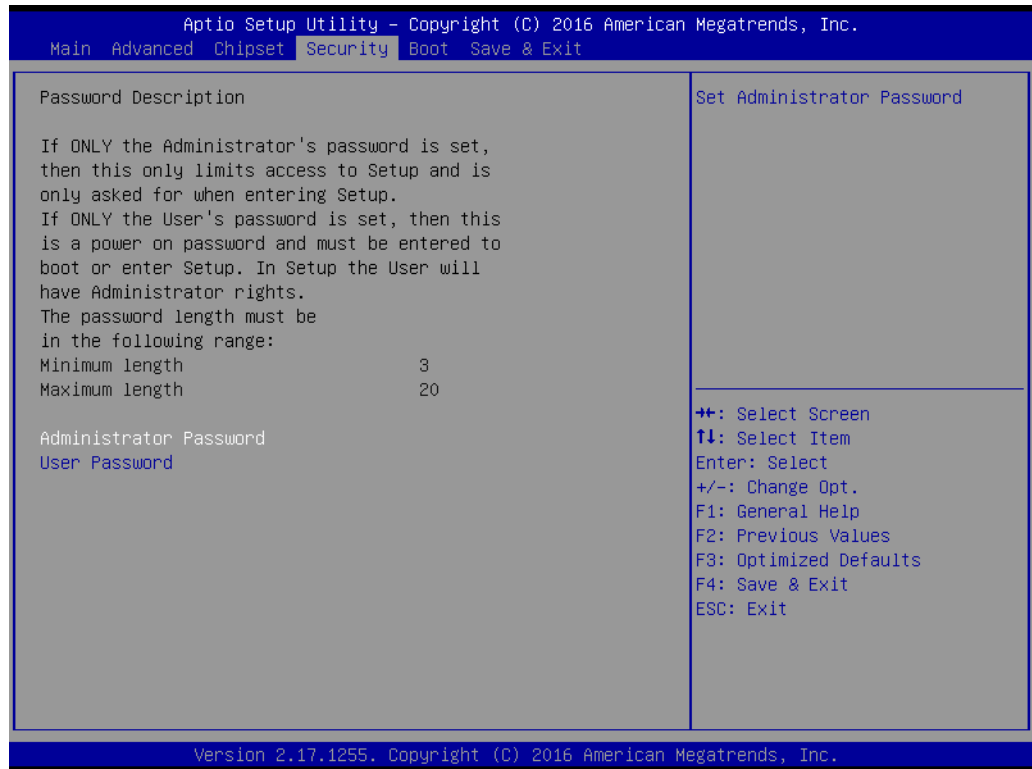


Figure 4.35 Security



## 4.2.6 Boot

- Setup Prompt Timeout [1]: Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
- Bootup NumLock State [On]: Select the keyboard NumLock State; Configuration options: [On][Off].
- Quick Boot [Disabled]: Configuration options: [Disabled][Enabled].
- Boot Option Priorities: Select the system boot order.
- Fast Boot [Disabled]: Enabled/ Disabled boot with initialization of minimal set of devices required to launch active boot option. Has no effect for BBS boot options; Configuration options: [Disabled][Enabled].
- New Boot Option Policy [Default].



Figure 4.36 Boot

## 4.2.7 Save & Exit

- Save Changes and Exit: Exit system setup after saving the changes.
- Discard changes and Exit: Exit system setup without saving the changes.
- Save changes and Reset: Reset the system after saving the changes.
- Discard Changes and Reset: Reset the system without saving the changes.
- Save Changes: Save changes done with any of the setup option.
- Discard Changes: Discard changes done with any of the setup option.
- Restore Defaults: Restore/ Load default values for all the setup option.
- Save as User Defaults: Save the changes done as User Defaults.
- Restore User Defaults: Restore the user defaults to all the setup options.

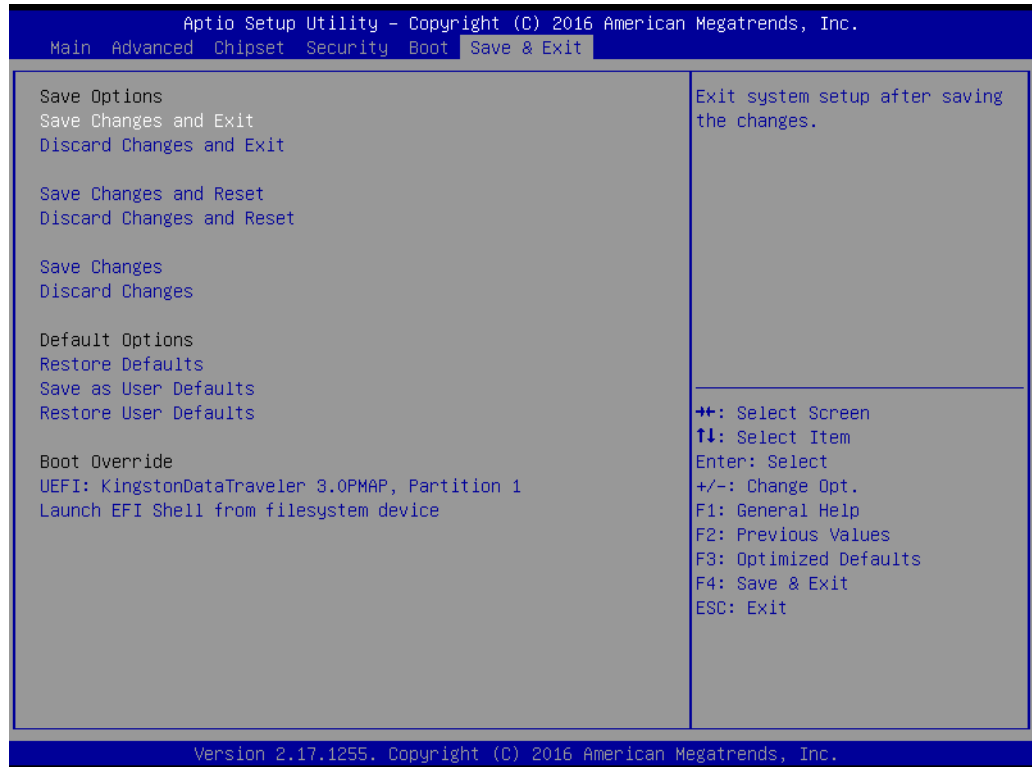


Figure 4.37 Save & Exit



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