

User Manual

MIC-7700

Embedded IPC

Trusted ePlatform Services

ADVANTECH

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Declaration of Conformity

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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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

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions in which there is a chance of 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.*



Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Use moist sheet or cloth for cleaning.
4. For pluggable equipment, the socket-outlet shall near the equipment and shall be easily accessible.
5. Please keep this equipment from humidity.
6. Lay this equipment on a reliable surface when installing. A drop or fall could cause injury.
7. The openings on the enclosure are for air convection hence protecting the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source when connecting the equipment to the power outlet.
9. Place the power cord such a way 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 long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
12. Never pour any liquid into ventilation openings; this could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
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 -40° C (-40° F) OR ABOVE 85° C (185° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
18. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.

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

Packing List

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

- MIC-7700 bare-bone system x1
- MIC-7700 Startup manual x1 P/N: 2001770000
- MIC-7700 Driver CD x1 P/N: 2061770010
- 4-pin Phoenix connector P/N: 1652003234
- Mounting bracket x2 P/N: 1960070543N001
- SATA cable x1 P/N: 1700013095
- SATA Power cable x1 P/N:1700024372-01
- 2xDB9 Ports cable x1 P/N: 1701200220

Ordering Information

Module Number	PCH	VGA	DVI	2.5' HDD/SSD	CFast	USB3.0/2.0	GbE	COM	PCIe/PCI Exp	Power
MIC-7700Q-00A1	Q170	1	1	1	1	8/0	2	4, up to 6 via cable	i-module (Optional)	DC9~36V
MIC-7700H-00A1	H110	1	1	1	1	4/4	2	4, up to 6 via cable	i-module (Optional)	DC9~36V

Optional i-Module

Module Number	Description
4-slot expansion module	
MIC-75M13-00A1E	1 x PCIe16+3xPCI slot i-module
MIC-75M40-00A1E	1 x PCIe8+3xPCIEx4 slot i-module
2-slot expansion module	
MIC-75M20-00A1E	1 x PCIe16+1xPCIEx4 slot i-module
MIC-75M20-01A1E	2 x PCIe8 slot i-module
MIC-75M11-00A1E	1 x PCIe16+1xPCI slot i-module
2-slot expansion and storage module	
MIC-75S20-00A1E	1 x PCIe 16+ 1 x PCIe 4 slot+ 2x2.5" hot-swap HDD/SSD
1-slot expansion module	
MIC-75M10-00A1	1 x PCIe x16 slot

Optional Accessories

Part Number	Description
96PSA-A220W24P4-1	ADP A/D 100-240V 220W 24V
96PSA-A150W19P4-1	ADP A/D 100-240V 150W 19V
1702002600	Power Cord 3P UL/CSA(USA) 125V 10A 1.83M 180D
1700022940-01	Power cord PSE 7A 125V 3P 3m DAC-ST01
1702002605	Power cord 2P FRANCE 10A/16A 220V 1.83M 90D
AIIS-DIO32-00A1E	AIIS-32bit GPIO module
PCA-TPM-00B1E	TPM 2.0 module
98R1750000E	Secondary DVI cable accessory kit
98R1750020E	Secondary HDMI module
98R1750030E	Secondary Remote power module
98R1750010E	Secondary HDMI cable/Remote power connector accessory kit
98R1790040E	Dual LAN module (MIC-7700Q-00A1 only)
i-Door Module (MOS series module)	Supports i-Door module (MOS series), except PoE Please refer to Advantech website below or search "iDoor Module Mini PCIe Expansion Kit". http://www.advantech.com.tw/products/idoor-module-mini-pcie-expansion-kit/sub_bc858a7f-a52b-441b-a59c-f511289f98bc
i-Door Module (PCM series module)	Supports i-Door module (PCM series) except PoE Please refer to Advantech website below: http://www.advantech.com/products/idoor-technology-mini-pcieexpansion-kit/sub_efdb96af-a8f7-4cde-9592-dbf5c9794d16 Note: A bracket is required to fix PCM series i-door module. Pleaser refer to P/N: 1960065854N001 i Door_bracket

i-module Optional Accessories

Part Number	Description
98R1751300E	1x8cm FAN module (for MIC-75M13/75M40/75S20)
98R1752000E	2x4cm FAN module (for MIC-75M20/MIC-75M11)

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Chapter 1

General Introduction

This chapter gives background information on MIC-7700.

1.1 Introduction

MIC-7700 is a compact, fanless system incorporating late-generation Intel® 14nm platform with the new PCH Q170/H110 on a proprietary form factor M/B. MIC-7700 system design concept is that of “the expansion slot module”, so different applications can integrate the MIC-7700 system to form a complete industrial computer.

The MIC-7700 also can serve as an independent, fanless, Compact Embedded Box and accepts a wide range of DC power inputs. The rugged aluminum case not only provides a great thermal solution, but also resists high EMI/shock/vibration. MIC-7700 is equipped with Intel® 6th/7th Core i desktop CPU featuring 4 cores, making it highly suitable for embedded and industrial PC applications requiring high processor performance within a limited space. It features powerful I/O interfaces, including Ethernet, USB 3.0, serial port, C-Fast slot, and two Mini PCIe.

1.2 Product Features

1.2.1 General

- **CPU:** Intel® 6th/7th Gen Core™ i CPU socket (LGA1151)
- **PCH:** Intel® Q170/H110
- **System Memory:** Dual-channel DDR4 2133/2400 MHz (without ECC), up to 32GB
- **Storage devices:**
 - Supports 1 drive bay space for SATA 2.5" HDD/SSD
 - Supports 1 CFast slot
- **mSATA:** Supports 1 x mSATA by mini-PCIe slot
- **Graphic:** VGA + DVI
- **Ethernet Port:** 2 x RJ45
- **Watchdog Timer:** Single chip watchdog 255-level interval timer, setup by software
- **I/O Interface:** 2 x RS-232/422/485 supports auto flow control; 2 x RS-232; 2x RS-232 via cable
- **USB:**
 - Q170: 8 x USB 3.0 and 1 x internal USB 2.0
 - H110: 4 x USB 3.0 and 4 x USB 2.0
- **Audio:** High Definition Audio (HD), Line-out, Mic-in
- **Expansion interface:**
 - Q170: 1x mini PCIe (via USIM), 1x mini PCIe/mSATA
 - H170: 1x mini PCIe (via USIM), 1x mSATA

1.2.2 Display

- **Chipset:**
 - Q170: Intel® HD Graphics 530, supports DirectX 12
 - H110: Intel® HD Graphics 510, supports DirectX 12
- **Graphics Video Max Memory:** 1.7 GB
- **Resolution:**
 - VGA: Supports up to 2048 x 1152 @ 60 Hz
 - DVI: Supports up to 1920 x 1080 @ 60 Hz

1.2.3 Ethernet

- **Chipset:**
 - Q170 LAN1: Intel® I219LM, LAN2: Intel® i210IT
 - H110 LAN1: Intel® I219V, LAN2: Intel® i210IT
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** Compliant with IEEE 802.3, IEEE802.3u, IEEE 802.ab.

1.3 Chipset

1.3.1 Functional specification

1.3.1.1 Processor

Processor	Intel® 6th/7th Gen Core™ i CPU socket (LGA1151)
------------------	---

1.3.1.2 Chipset

PCH	<ul style="list-style-type: none"> ■ Intel® Q170/H110 chipset
Memory	<ul style="list-style-type: none"> ■ Supports DDR4 2133/2400MHz (without ECC) ■ SODIMM Socket: <ul style="list-style-type: none"> – 260-pin SODIMM socket*2 (up to 16 GB per socket)
Chipset integrated Intel HD Graphic	<ul style="list-style-type: none"> ■ Intel® HD Graphics 530/510 ■ Supports DirectX 12 ■ Supports OpenGL 4.4 ■ Supports Intel® Quick Sync Video ■ IO interface <ul style="list-style-type: none"> – VGA: Supports resolutions up to 2048 x 1152 @ 60 Hz (VGA connector: On-board D-SUB 15P) – DVI: Supports resolution up to 1920 x 1080 @ 60 Hz (DVI Connector: On-board DVI-D 24P)
SATA Interface	<ul style="list-style-type: none"> ■ 3 x SATA3.0 (Q SKU), 1 x SATA3.0 (H SKU) ■ Legacy IED (Including IRQ)/Native AHCI appearance to OS ■ Partial/slumber power management modes with wake ■ Capable of 6Gbit/s transfer rate
USB Interface	<ul style="list-style-type: none"> ■ Q170: 8 x USB 3.0 and 1 x internal USB 2.0 ■ H110: 4 x USB 3.0 and 4 x USB 2.0 ■ Supports high-speed, full-speed, and low-speed capable ■ Supports legacy keyboard/mouse software
Power Management	<ul style="list-style-type: none"> ■ Supports ACPI 5.0 ■ ACPI Power Management Logic supported ■ Power Connector: plug-in block 4Px1
BIOS	<ul style="list-style-type: none"> ■ AMI 16Mb Flash BIOS via SPI

1.3.1.3 Others

Serial ports	<p>Nuvoton NCT 6106D supported</p> <ul style="list-style-type: none"> ■ Up to 6 serial ports by Nuvoton NCT6106D supported ■ High speed NS16C550A compatible UARTs with data rates to 1.5 Mbps ■ Supports IRQ sharing among serial port on XPE ■ COM1/2: Support to RS-232/422/485 and setting mode by BIOS and supports auto flow control ■ COM 3~6: Support for RS-232 <p>Serial ports connector: D-SUB CON.9P</p>
LAN	<p>Q170 LAN1: Intel® I219LM, LAN2: Intel® i210IT H110 LAN1: Intel® I219V, LAN2: Intel® i210IT</p> <ul style="list-style-type: none"> ■ Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.ab. ■ Supports 10/100/1000 Mbps ■ Supports Wake on LAN
Audio	<p>Audio Codec: Realtek ALC888:</p> <ul style="list-style-type: none"> ■ Compliant with HD Audio specifications ■ Supports to 16/20/24-bit DAC and 16/20/24-bit ADC resolution ■ Supports: Line-out, Mic-in ■ DAC supports 16/20/24-bit PCM format, multiple stereo recording
Battery backup	<ul style="list-style-type: none"> ■ BR2032 3 V/190mAh

1.4 Mechanical Specifications

1.4.1 Dimensions

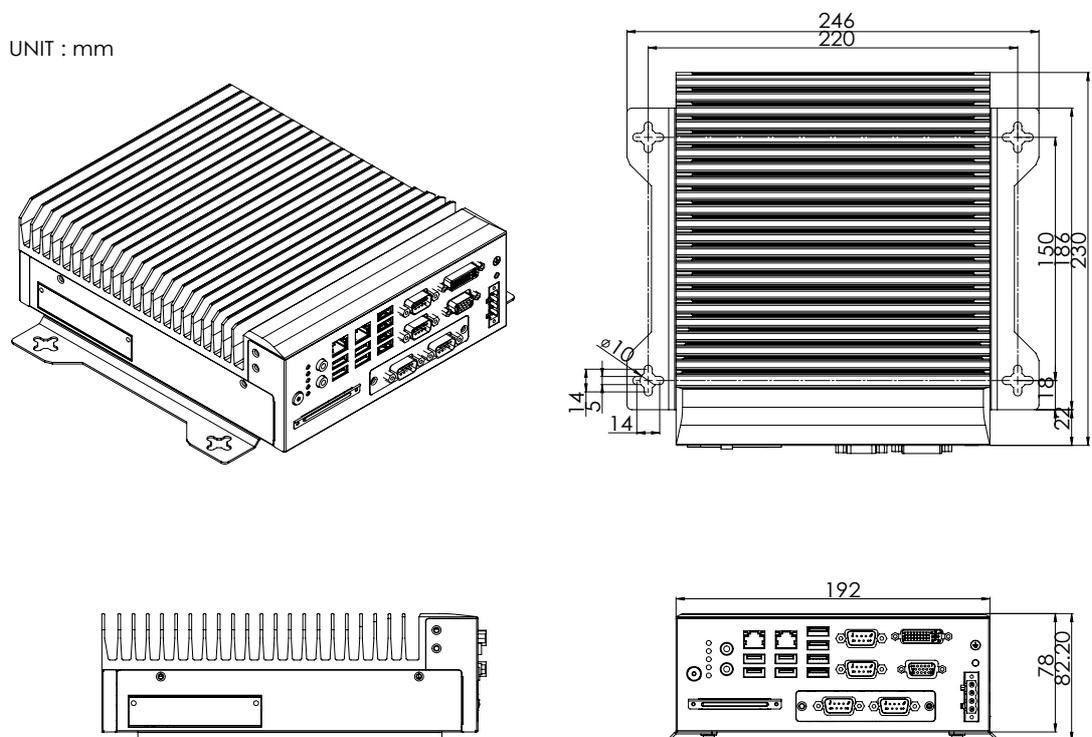


Figure 1.1 MIC-7700 Mechanical Dimension Drawing

1.4.2 Weight

2.8kg (6.17lbs)

1.5 Power Requirements

1.5.1 System power

- Minimum power input: DC12V (-25%) -30V (+20%), Absolute Maximum Ratings Voltage is 9V - 36V

1.5.2 RTC battery

- BR2032 3 V/190 mAh

1.6 Environment Specification

1.6.1 Operating temperature

- -10 ~ 40 °C (65W CPU) & -10 ~ 50 °C(35W CPU) with 0.7m/sec air flow: with 1 x Industrial SSD without PC expansion boards

1.6.2 System safety certification test temperature

- 0 ~ 40 °C with 2.5" HDD

1.6.3 Relative humidity

- 95% @ 40 °C (non-condensing)

1.6.4 Storage temperature

- -40 ~ 85 °C (-40 ~ 185 °F)

1.6.5 Vibration during operation

- When system is equipped with SSD only: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct/min., 1 hr/axis, x,y,z 3 axes.
- When system is equipped with 2.5-inch HDD: 1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct/min., 1 hr/axis, x,y,z 3 axes.

1.6.6 Shock during operation

- When system is equipped with SSD only: 20 G, IEC 60068-2-27, half sine, 11 ms duration.

1.6.7 Safety

- UL/CB, CCC, BSMI

1.6.8 EMC

- CE, FCC, CCC, BSMI

Chapter 2

H/W Installation

This chapter introduces external IO and the installation of MIC-7700 hardware.

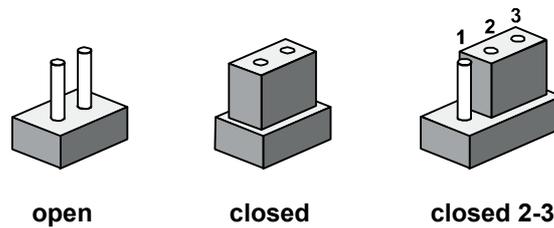
2.1 Introduction

The following sections show the internal jumper settings and the external connectors and pin assignments.

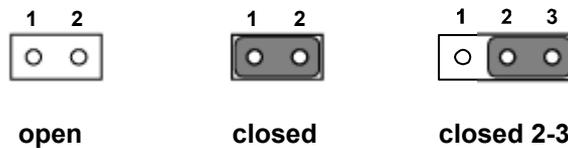
2.2 Jumpers

2.2.1 Jumper description

You may configure the MIC-7700 to match the needs of your application by 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.



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.

2.2.2 Jumper list

Table 2.1: Jumper List

Label	Function
JCMOS1	Clear CMOS
PSON1	System AT/ATX mode option
JME1	ME jumper mode option
JWDT1_JOBS1	Watch-Dog mode option

2.2.2.1 Clear CMOS

MIC-7700 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

CMOS1	Clear CMOS
Footprint	3x1 Pin
Setting	Function
(1-2)	Normal (default)
(2-3)	Clear CMOS

2.2.2.2 System AT/ATX mode function option

MIC-7700 supports AT or ATX mode and default is ATX module. If you want to change to AT mode you can find AT/ATX mode jumper on the motherboard.

PSON1	System AT/ATX mode option
FootPrint	3x1 Pin
Setting	Function
(1-2)	AT module
(2-3)	ATX module

2.2.2.3 System ME mode function option

MIC-7700 supports ME Enable & Disable and the default is "Disable". If you want to change the ME mode you can set ME mode jumper on the motherboard.

JME1	System ME mode option
FootPrint	3x1 Pin
Setting	Function
(1-2)	ME Enable
(2-3)	ME Disable (Default)

2.2.2.4 System Watch-Dog mode function option

MIC-7700 single board computer contains a jumper that can set Watchdog mode.

JWDT1_JOBS1	Watch-Dog mode function option
FootPrint	5x1 pin
Setting	Function
(2-3)	Watch Dog
(4-5)	ERR_BEEP

2.3 Connectors

2.3.1 MIC-7700 External I/O Connectors

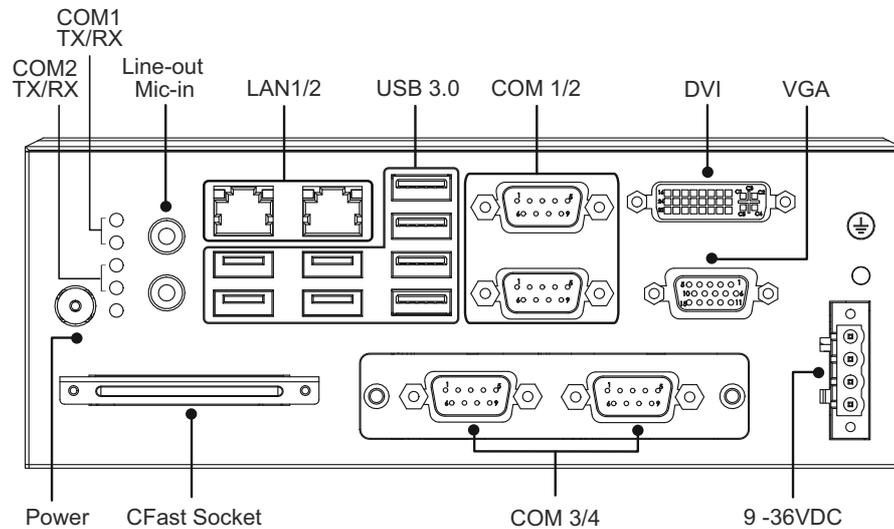


Figure 2.1 MIC-7700 Front View

2.3.1.1 COM connector

MIC-7700 provides four 9-pin D-sub connectors, two of which offer RS-232/422/485 and the other two offer RS-232 serial communication interface ports. Default setting is RS-232, but this can be modified by BIOS setting. You can find detailed setting methods in Chapter 3.

Table 2.2: COM Connector Pin Assignments

Pin	RS-232 Signal Name	RS-422 Signal Name	RS-485 Signal Name
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note! NC represents “No Connection”.



2.3.1.2 Ethernet connector (LAN)

MIC-7700 is equipped with two Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. LAN1 is equipped with Intel i219 and LAN2 is equipped with Intel i210. The Ethernet port provides a standard RJ45 jack connector with LED indicators on the front side to show its Active/Link status and Speed status.

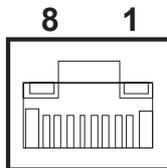


Figure 2.2 Ethernet Connector

Table 2.3: Ethernet Connector Pin Assignments

Pin	10/100/1000BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.3.1.3 Audio connector

MIC-7700 has two stereo audio ports with phone jack connectors, one Line_Out, one Mic_In. The audio chip is controlled by ACL892, and it's compliant with AZALIA standard.

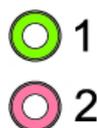


Figure 2.3 Audio Connector

Table 2.4: Audio Connector Pin Assignments

Pin	Audio Signal Name
1	Line_Out
2	Mic_In

2.3.1.4 USB 3.0 connector

MIC-7700 provides USB 3.0 interface connectors, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB XHCI, Rev. 3.0. Please refer to the table below for pin assignments.

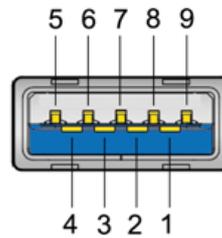


Figure 2.4 USB 3.0 Connector

Table 2.5: USB 3.0 Connector Pin Assignment

Pin 1	+5V
Pin 2	USB Data -
Pin 3	USB Data +
Pin 4	GND
Pin 5	SSRX-
Pin 6	SSRX+
Pin 7	GND
Pin 8	SSTX-
Pin 9	SSTX+

2.3.1.5 VGA Connector

The MIC-7700 provides a high resolution VGA interface with a 15-pin D-sub connector to support a VGA CRT monitor. It supports display resolution of up to 2048 x 1152 @ 60 Hz.

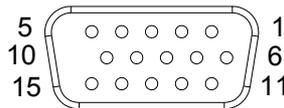


Figure 2.5 VGA Connector

Table 2.6: VGA Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V	10	GND
11	NC	12	DDC_DAT
13	H-SYNC	14	V-SYNC
15	DDC_CLK		

2.3.1.6 DVI Connector

MIC-7700 provides a high resolution DVI-D, powered by Intel® Q170/H110 accelerator. It integrates both analog and digital video signals. It supports display resolution of up to 1920 x 1080 @ 60 Hz.

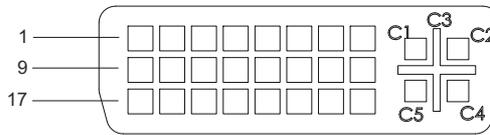


Figure 2.6 Parallel Port Connector

Table 2.7: DVI-D Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS Data 2-	2	TMDS Data 2+
3	GND	4	N/C
5	N/C	6	DDC Clock
7	DDC data	8	N/C
9	TMDS Data 1-	10	TMDS Data 1+
11	GND	12	N/C
13	N/C	14	+5V
15	GND	16	Hot plug detect
17	TMDS Data 0-	18	TMDS Data 0+
19	GND	20	N/C
21	N/C	22	GND
23	TMDS Clock +	24	TMDS Clock -
C1	N/C	C2	N/C
C3	N/C	C4	N/C
C5	N/C		

2.3.1.7 Power Input Connector

MIC-7700 comes with a four-pin header as default that carries 9VDC - 36VDC external power input.

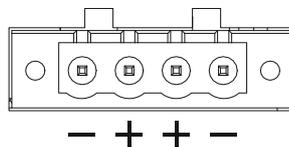
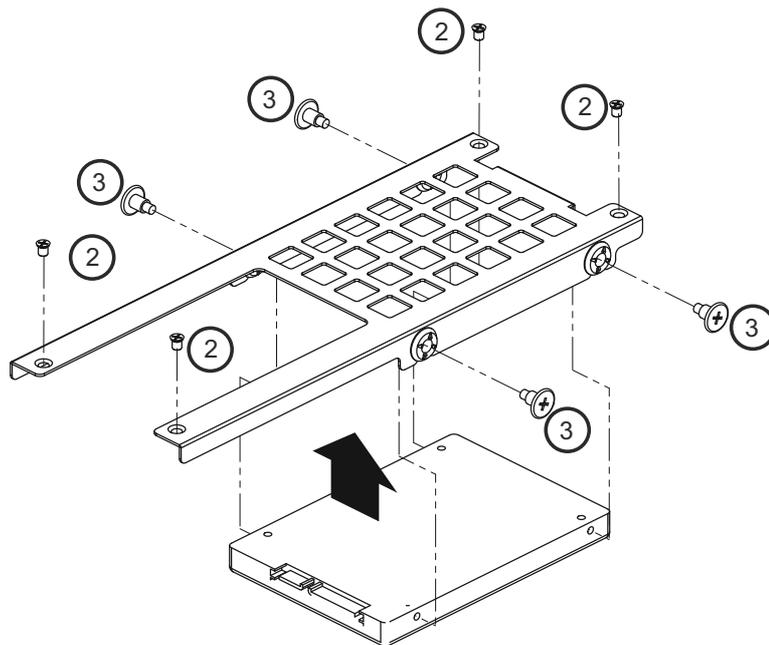


Figure 2.7 4-pin header

Table 2.8: Pin Assignments for Power Connector Pin Header

Pin	Signal Name
1	GND
2	+9 V _{DC} ~ 36 V _{DC}
3	+9 V _{DC} ~ 36 V _{DC}
4	GND



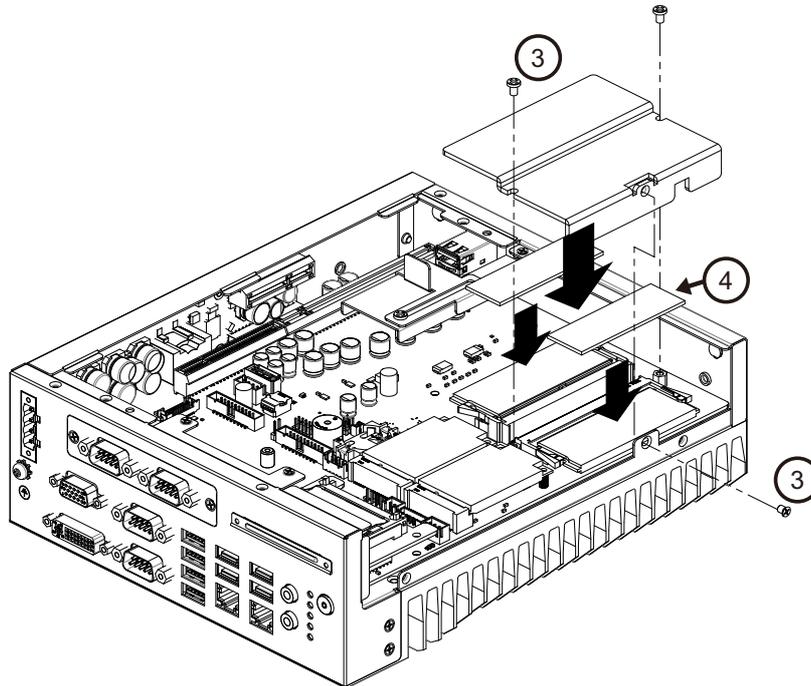
3. Secure the HDD with 4 x HDD screws (P/N:1930002235)
4. Assemble SATA cable/power cable and replace HDD tray; secure with 4 screws.
5. Replace bottom cover.

Note! Please refer to *i-module Manual* for *i-module* assembly.



2.4.2 Memory Installation

1. Undo the 4 screws to remove the bottom cover.
2. Undo 4 screws to remove the HDD tray.



3. Undo 3 screws to remove the memory thermal cover.
4. Affix thermal pad (P/N: 1990019498N000) on memory, and reassemble memory.

Note! Thermal pad and memory thermal cover must be completely covered and secured.

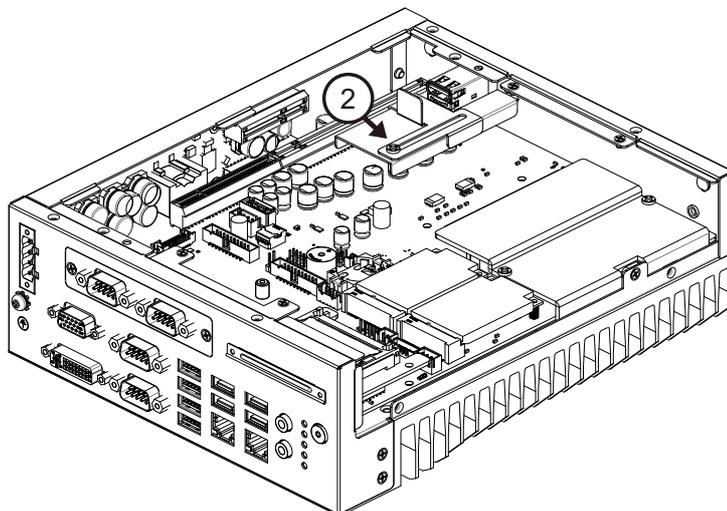


2.4.3 m-SATA/Mini-PCle Installation

- Q170: 1x mini PCIe (via USIM), 1x mini PCIe/mSATA
 - H170: 1x mini PCIe (via USIM), 1x mSATA
1. Undo 4 screws and remove the bottom cover.
 2. Install the module in Mini PCIe socket 1, or m-SATA in Mini PCIe socket 2 and secure with screws.
 3. Replace bottom cover and secure with screws.

2.4.4 Internal USB 2.0 Installation (Q SKU only)

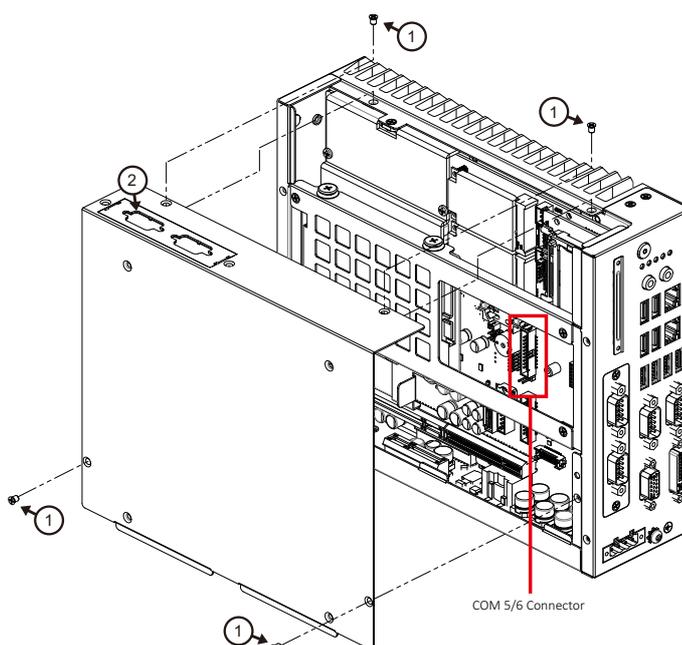
1. Undo 4 screws and remove the bottom cover.
2. Loosen the screws and adjust bracket size in accordance with the USB dongle size.
3. Replace the bottom cover and secure with screws.



2.4.5 COM 5/6 Ports Installation

MIC-7700 has four standard serial ports. Two support RS-232/422/485 and two support RS-232 (expanded by cable). If more serial ports are needed, MIC-7700 can expand up to six serial ports by cable (RS-232 only). There is one DB9 cable in the accessory box.

1. Undo 4 screws and remove the bottom cover.
2. Replace baffle plate for COM 5 and 6.
3. Remove HDD tray.
4. Assemble DP9 connector in baffle, and install cable at COM5/6 connector.
5. Secure COM module in system and replace HDD tray/bottom cover.



2.4.6 Expansion module Installation (Optional)

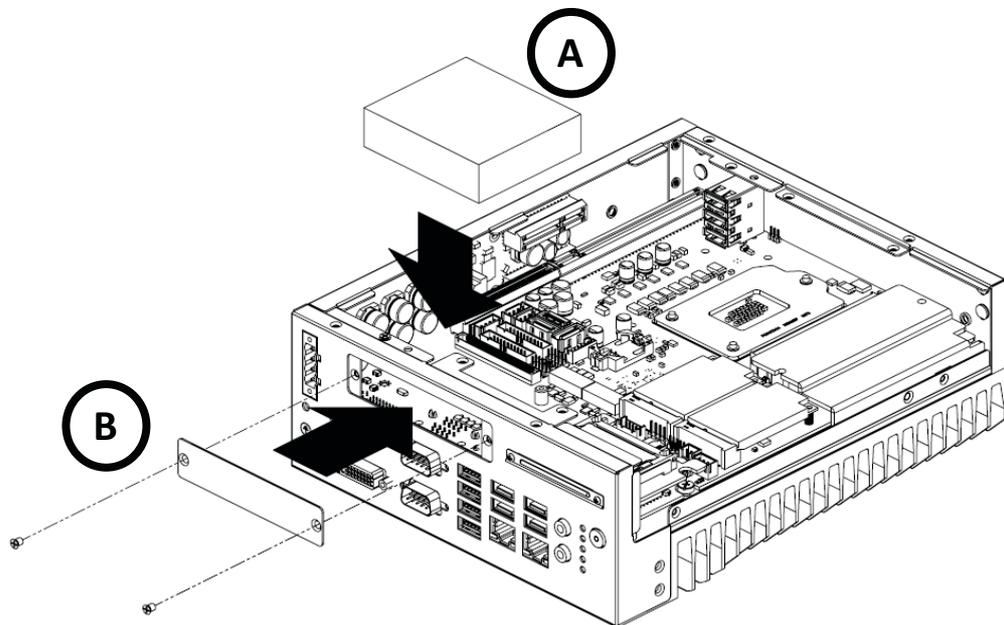
MIC-7700 supports below optional modules for different applications.

A: Expansion module:

1. 32-bit GPIO module, P/N: AIIS-DIO32-00A1E
2. Secondary DVI module, P/N: 98R1750000E
3. HDMI/Remote power module, P/N: 98R1750010E
4. HDMI module, P/N: 98R1750030E
5. Remote power module: 98R1750040E
6. Dual LAN module, P/N: 98R1790040E (MIC-7700Q only)

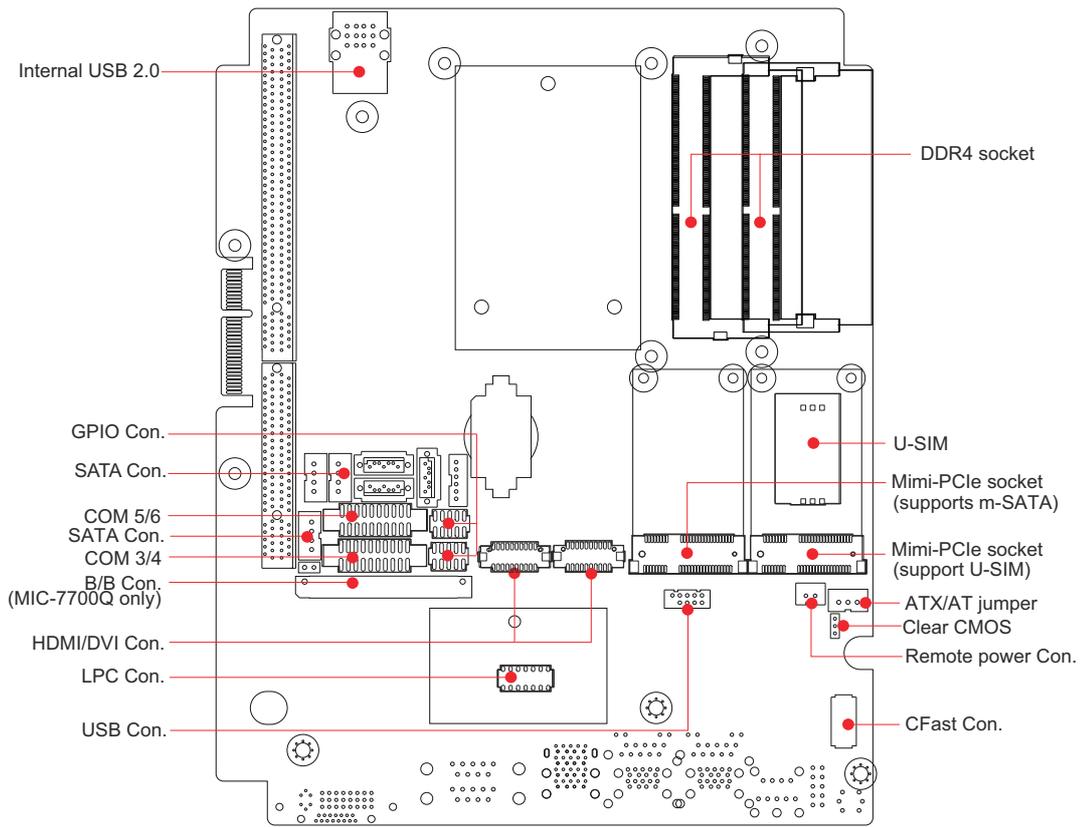
B: Bracket for expansion module

1. Undo the 4 screws and remove the bottom cover.
2. Undo HDD tray & expansion module baffle.



3. Remove COM cable and undo baffle cover.
4. Assemble module on M/B (Note: Optional expansion modules need to connect with a cable. (Please refer to MB internal I/O connector specification at IO connector page for GPIO connector.)
5. Assemble module baffle with screws.
6. Replace bottom cover and secure with screws.

2.4.7 MIC-7700 MB I/O connector



Chapter 3

BIOS Operation

3.1 Introduction

With the AMI BIOS Setup Utility, you can modify BIOS settings and control the specific features of your computer. The Setup Utility uses a number of menus for making changes and turning the specific features on or off. This chapter describes the basic navigation of the MIC-7700 setup screens.



Figure 3.1 Main setup screen

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

3.2 Entering BIOS Setup

Press to enter AMI BIOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

When users first enter the BIOS Setup Utility, they enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options described in this section. The Main BIOS Setup screen is shown below.

3.2.1 Main Menu

Press at bootup to enter AMI BIOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

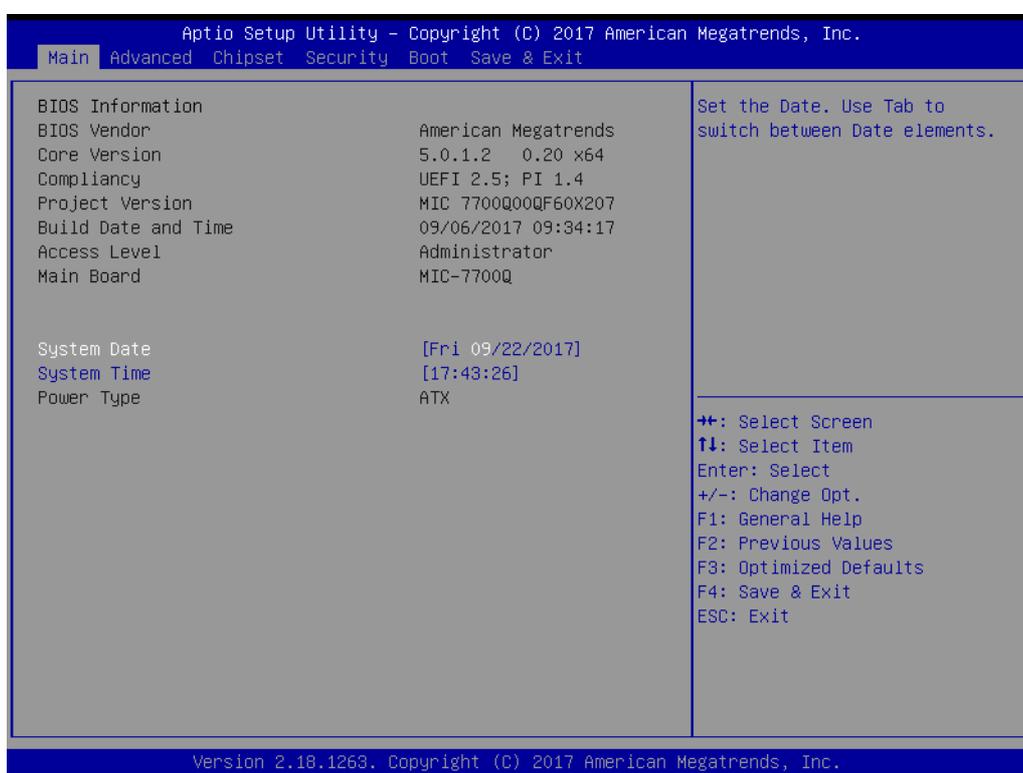


Figure 3.2 Main setup screen

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 be. The right frame displays the key legend.

The key legend above 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.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIC-7700 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.

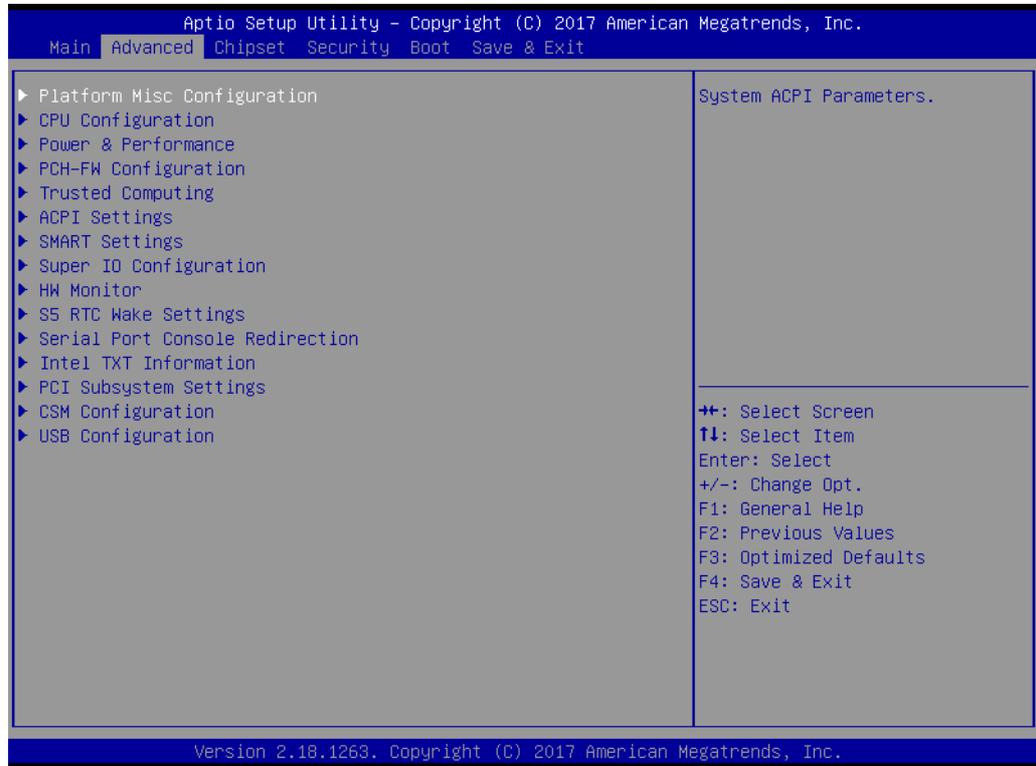


Figure 3.3 Advanced BIOS features setup screen

3.2.2.1 Platform Misc Configuration

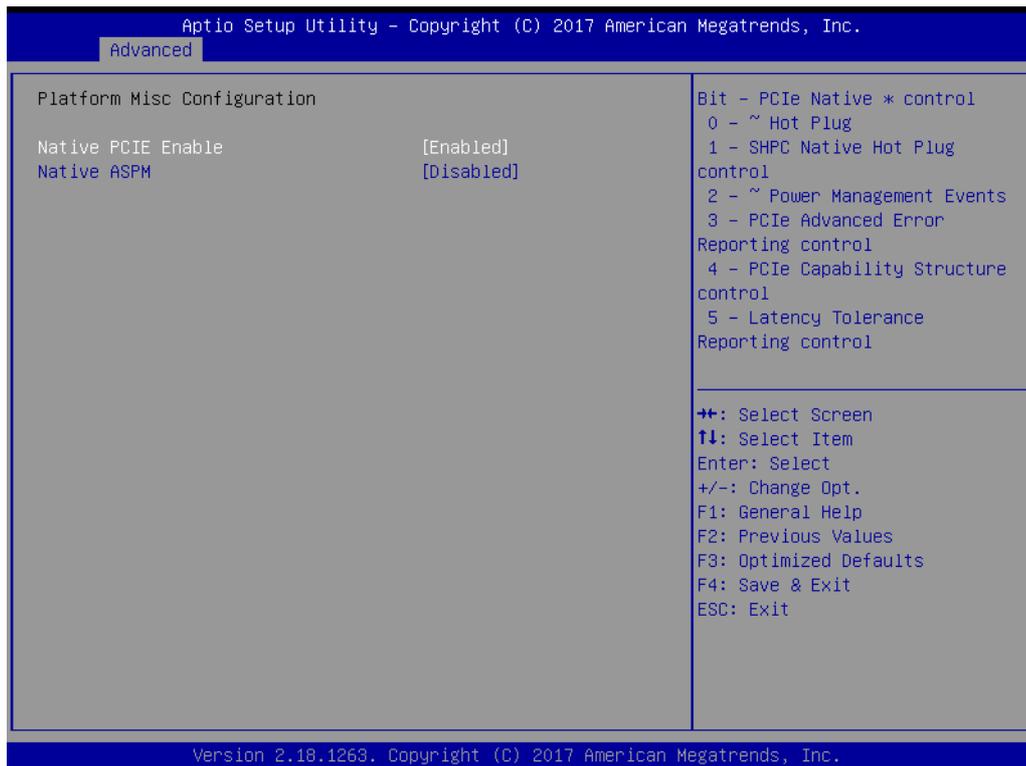


Figure 3.4 Platform Misc Configuration

- **Platform Misc Configuration**
 - **Native PCIE Enable**
PCI Express Native Support Enable/Disable. This is only available in Vista.
 - **Native ASPM**
On enable, Vista will control the ASPM support for the device. If disabled, the BIOS will.

3.2.2.2 CPU Configuration

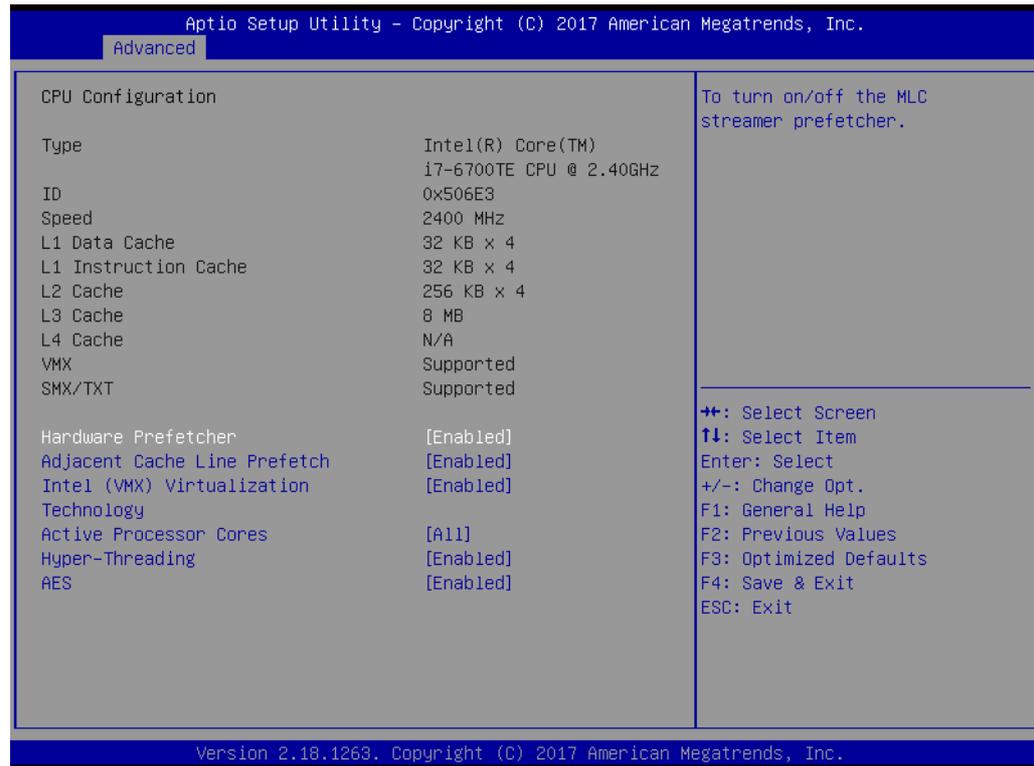
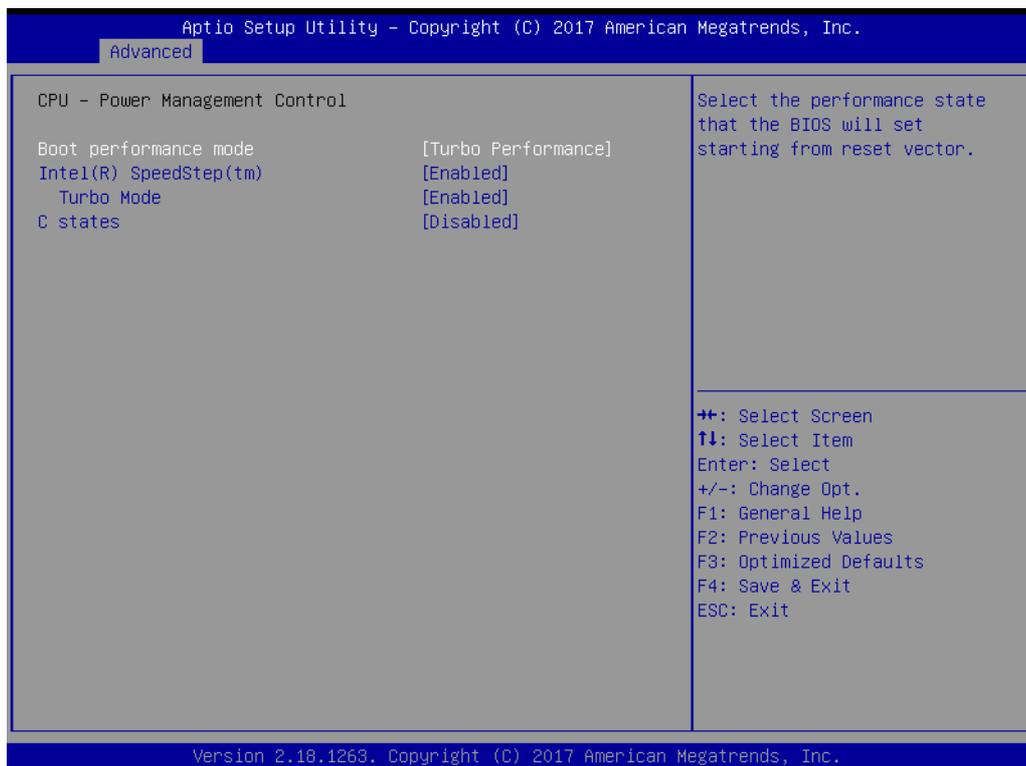
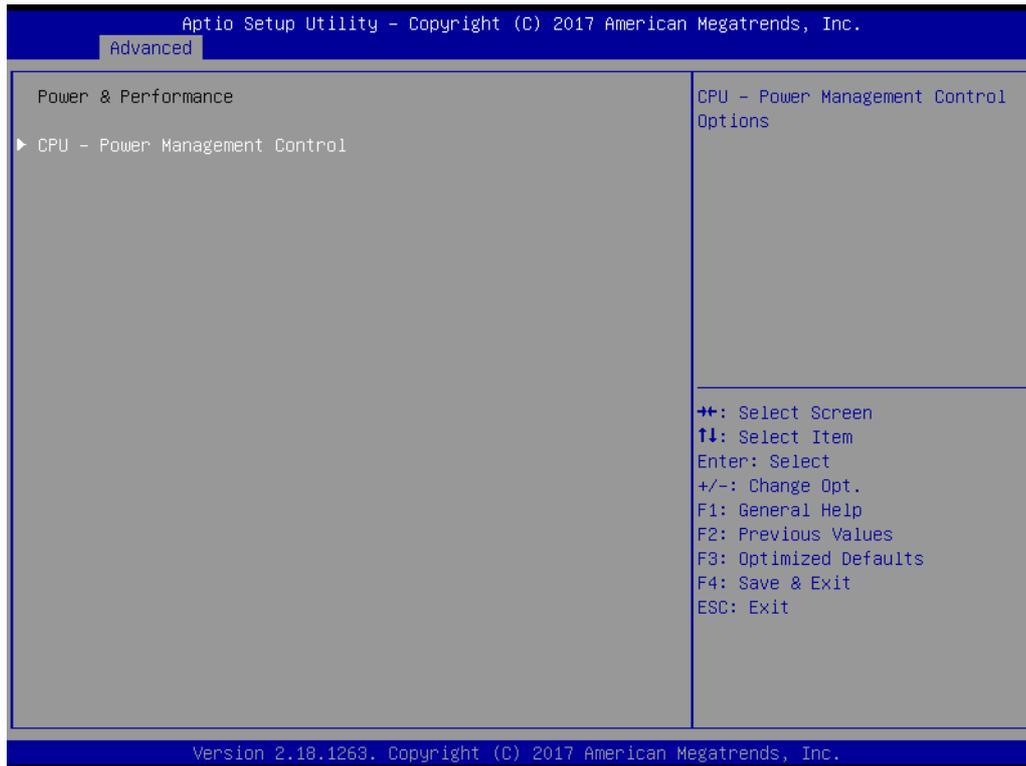


Figure 3.5 CPU Configuration

- **Hardware Prefetcher**
Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it to improve the load-to-use latency. You may choose to Enable or Disable it.
- **Adjacent Cache Line Prefetch**
The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When it is enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to Enable or Disable it.
- **Intel Virtualization Technology**
This feature is used to Enable or Disable Intel Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system by creating virtual machines, each running its own x86 operating system.
- **Active Processor Core**
Use this item to select the number of processor cores you want to activate when you are using a dual or quad core processor.
- **AES**
Enable or Disable CPA advanced encryption standard instruction.

3.2.2.3 Power & Performance



- **Boot Performance**
Select the performance state that the BIOS will set before OS handoff.
- **Intel(R) Speedstep(tm)**
Allows more than two frequency ranges to be supported.

- **Turbo Mode**
Turbo mode.
- **C states**
Intel C states setting for power saving.

3.2.2.4 PCH-FW Configuration



Figure 3.6 PCH-FW Configuration

- **PCH-FW Version**
PCH-FW page shows Intel ME FW information.

■ AMT Configuration

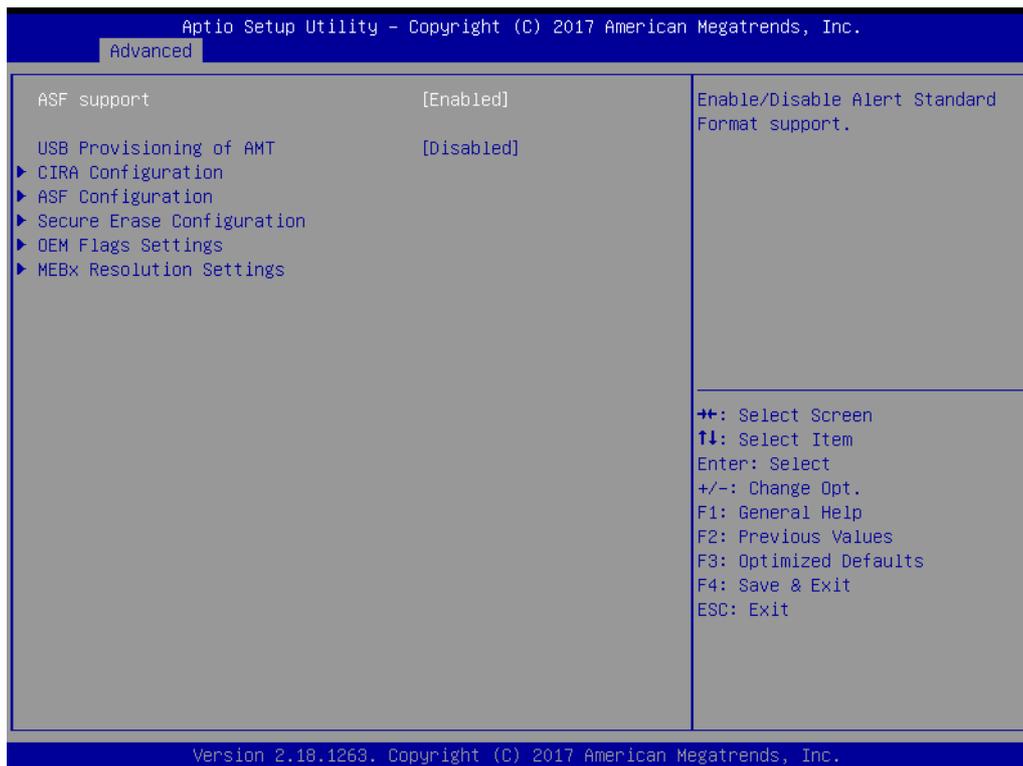


Figure 3.7 AMT Configuration

■ CIRA Configuration

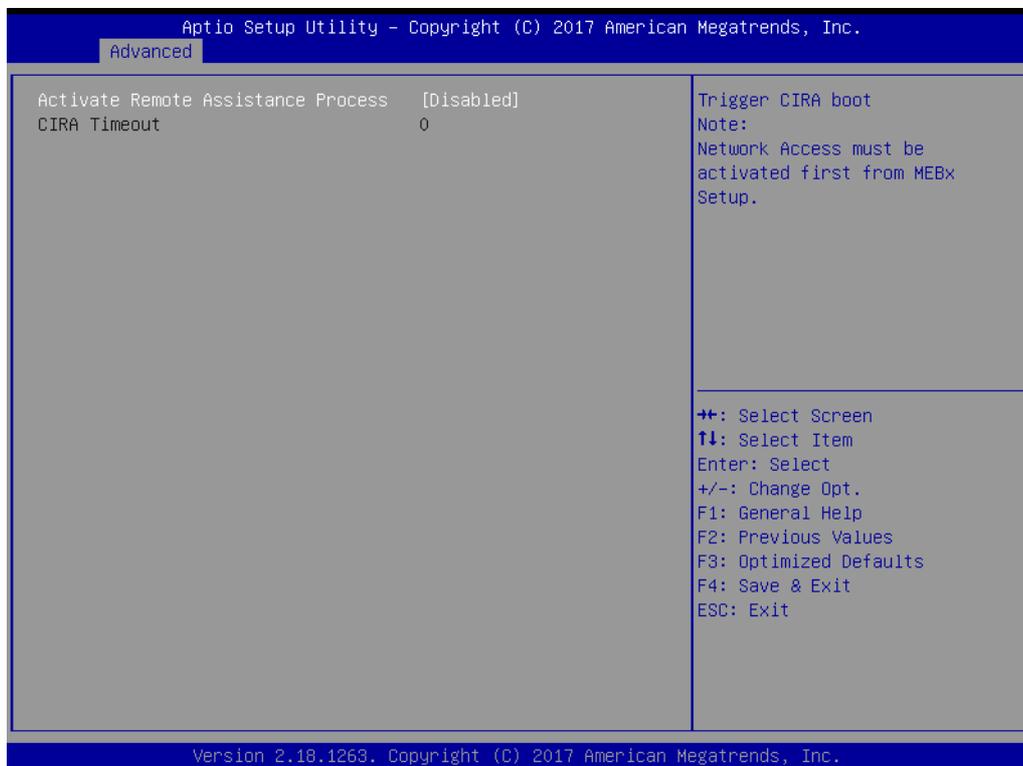


Figure 3.8 CIRA Configuration

- **Activate Remote Assistance Process**
Triggers CIRA boot

■ ASF Configuration

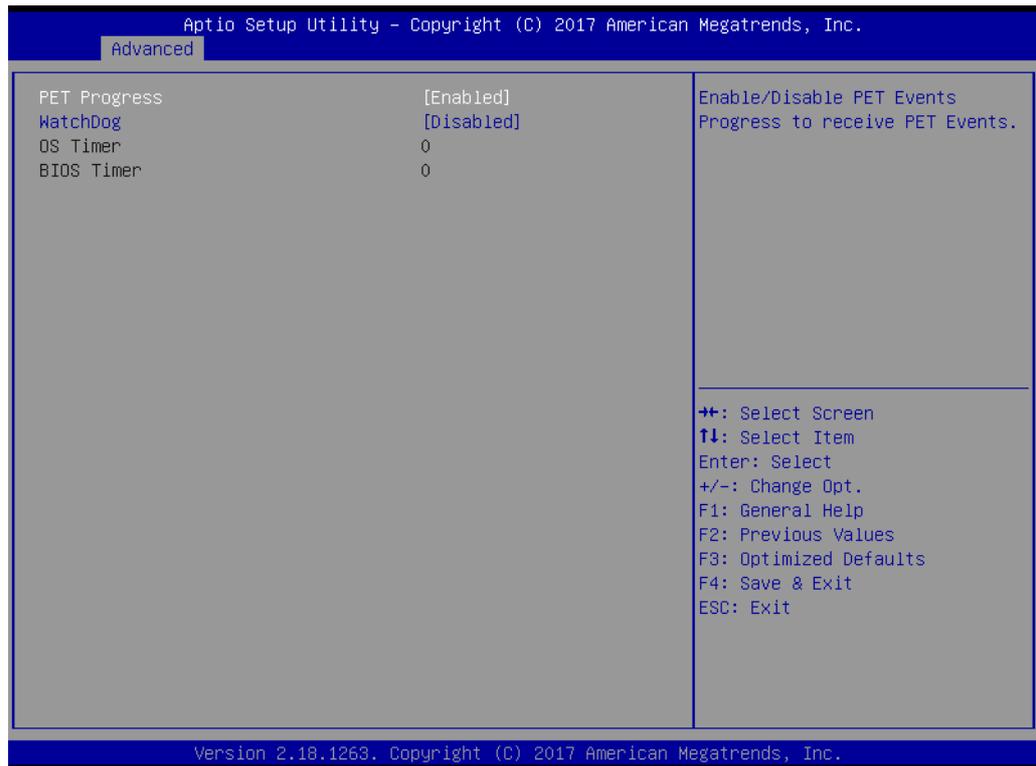


Figure 3.9 ASF Configuration

- **PET Progress**
Enable or Disable PET Progress to receive PET event or not
- **WatchDog**
“Enable or Disable” Watchdog Timer

■ Secure Erase Configuration



Figure 3.10 Secure Erase Configuration

– Secure Erase mode

Change Secure Erase module behavior to “Simulated or Real”

– Force Secure Erase

“Enable or Disable” to force Secure Erase on next boot

■ OEM Flags Settings

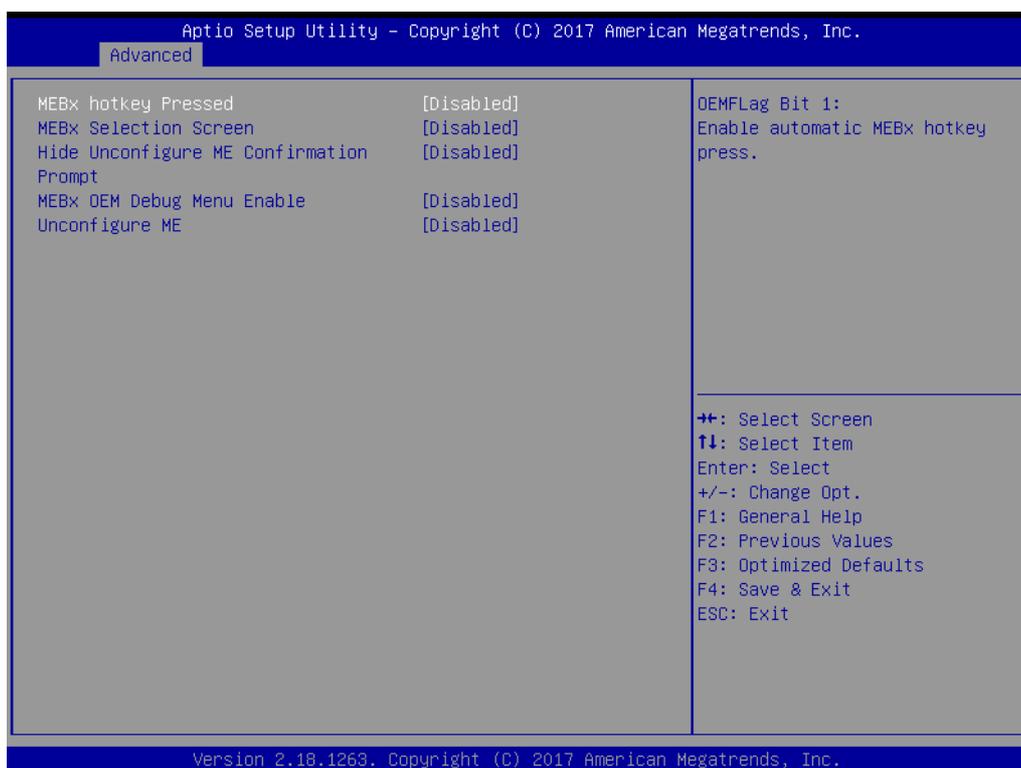


Figure 3.11 OEM Flags Settings

- **BIOS Hotkey Pressed**
Enable or Disable BIOS Hotkey press
- **MEBx Selection Screen**
Enable or Disable MEBx Selection Screen
- **Hide Un-Configure ME Confirmation Prompt**
Hide Un-Configure ME without password confirmation prompt
- **MEBx OEM Debug Menu Enable**
Enable or Disable OEM debug menu in MEBx
- **Unconfigure ME**
Un-Configure ME without password

■ **MEBx Resolution Settings**



Figure 3.12 MEBx Resolution Settings

- **Non-UI Mode Resolution**
Set resolution for non-UI text mode
- **UI Mode Resolution**
Set resolution for UI text mode
- **Graphics Mode Resolution**
Set resolution for graphics mode

3.2.2.5 Trusted Computing

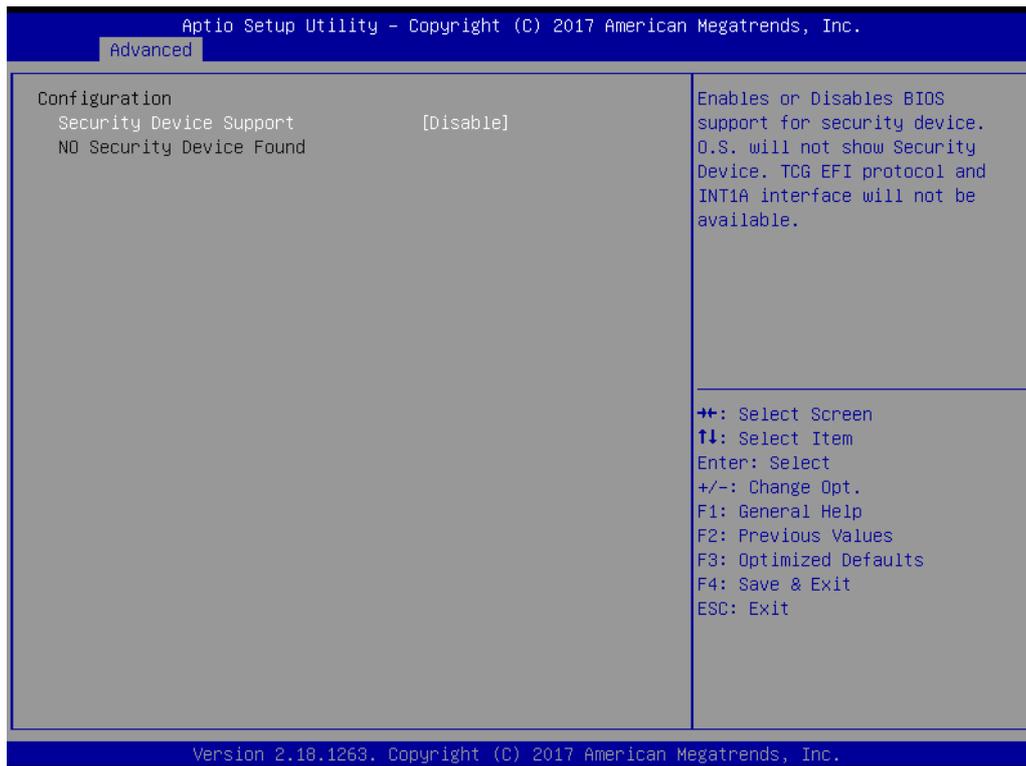


Figure 3.13 TPM Settings

- TPM Support**
 “Enable or Disable” TPM Support. You can purchase Advantech LPC TPM module to enable TPM function. P/N: PCA-TPM-00B1E

3.2.2.6 ACPI Settings

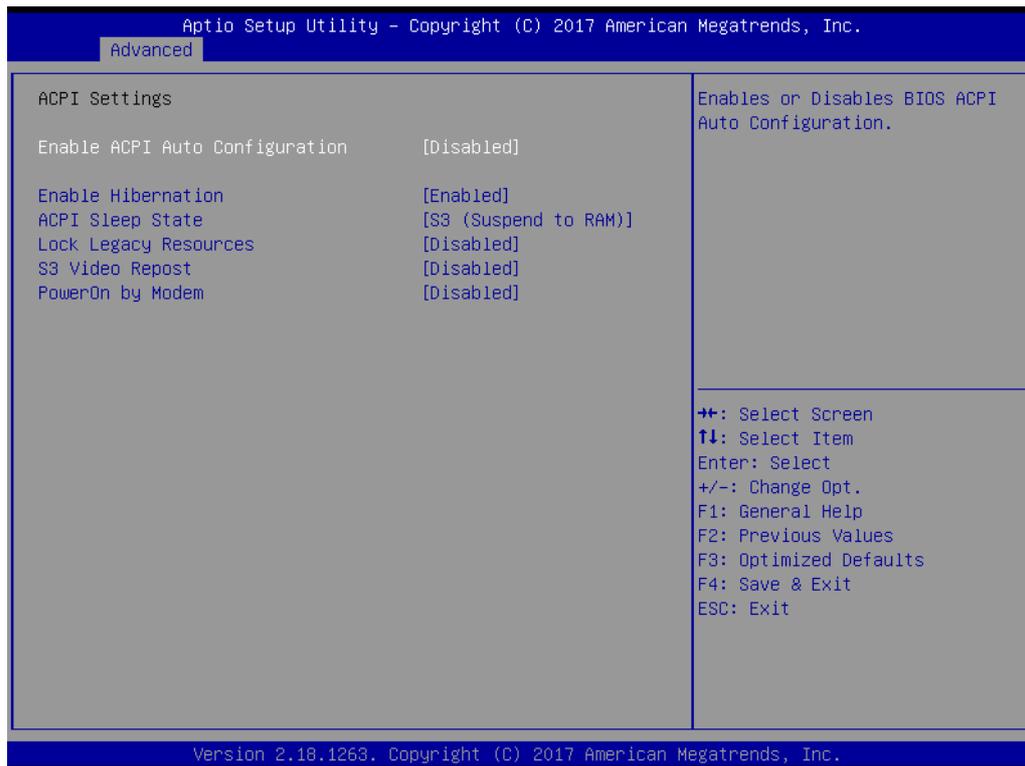


Figure 3.14 ACPI Settings

- **Enable Hibernation**
Enable or Disable Hibernation (OS/S4 Sleep State). This option may not be applied in some OS.
- **ACPI Sleep State**
Auto or S1 only or S3 only ACPI Sleep State
- **Lock Legacy Resources**
Enable or Disable Lock Legacy Resources
- **S3 Video Repost**
Enable or Disable S3 Video Repost
- **PowerOn by Modem**
Enable and Disable PowerOn by Modem

3.2.2.7 SMART Settings

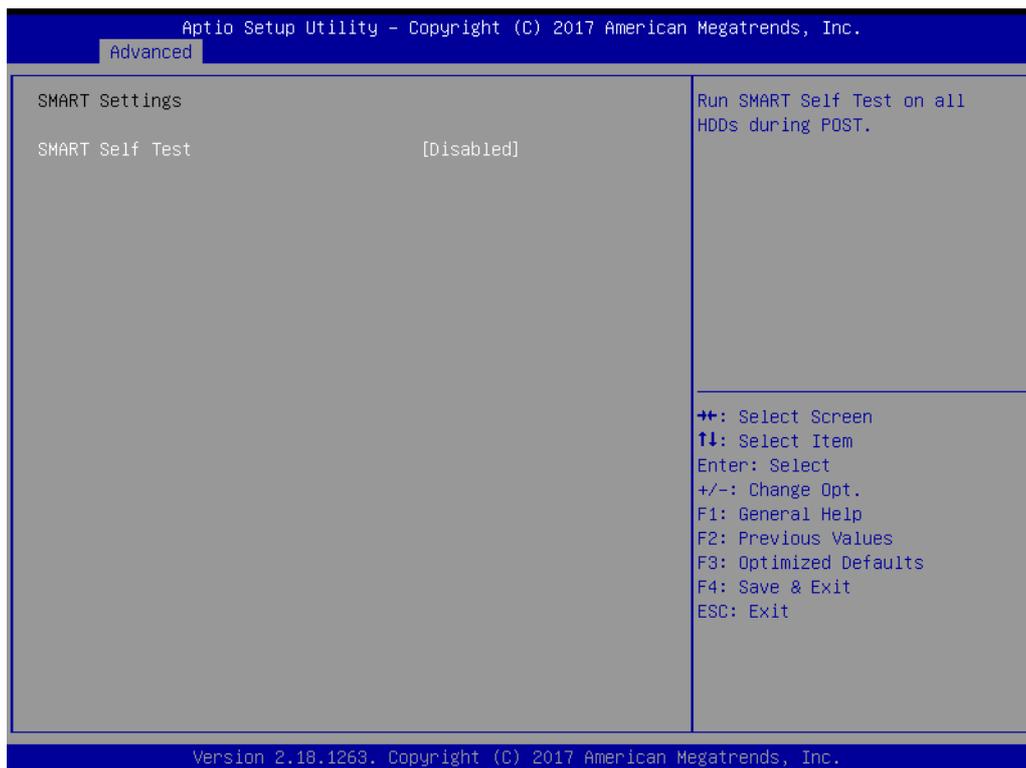


Figure 3.15 SMART Settings

- **SMART Self Test**
Enable or Disable SMART Self Test on all HDDs during POST.

3.2.2.8 Super IO Configuration

MIC-7700 supports 2 x RS-232/422/485 & 2 x RS-232 on the front side. There are 2 more RS-232 (Serial Port 5 & 6) signal on the M/B, you can find a cable in the accessory box.

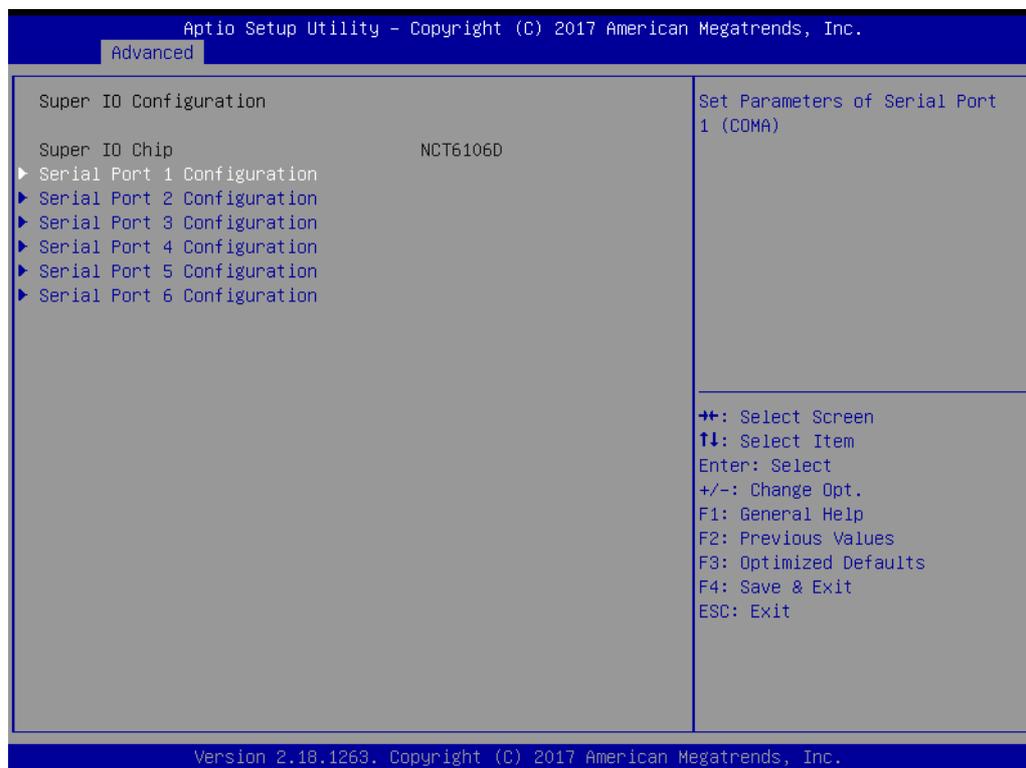


Figure 3.16 Super IO Configuration



Figure 3.17 Serial Port 1 Configuration

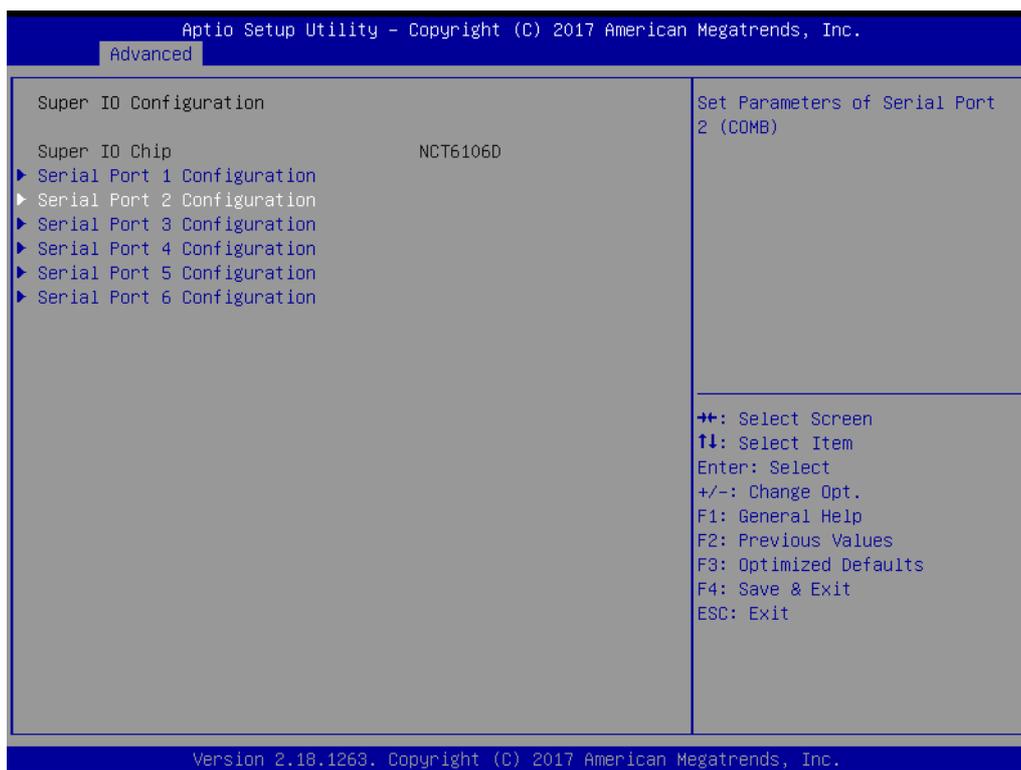


Figure 3.18 Serial Port 2 Configuration

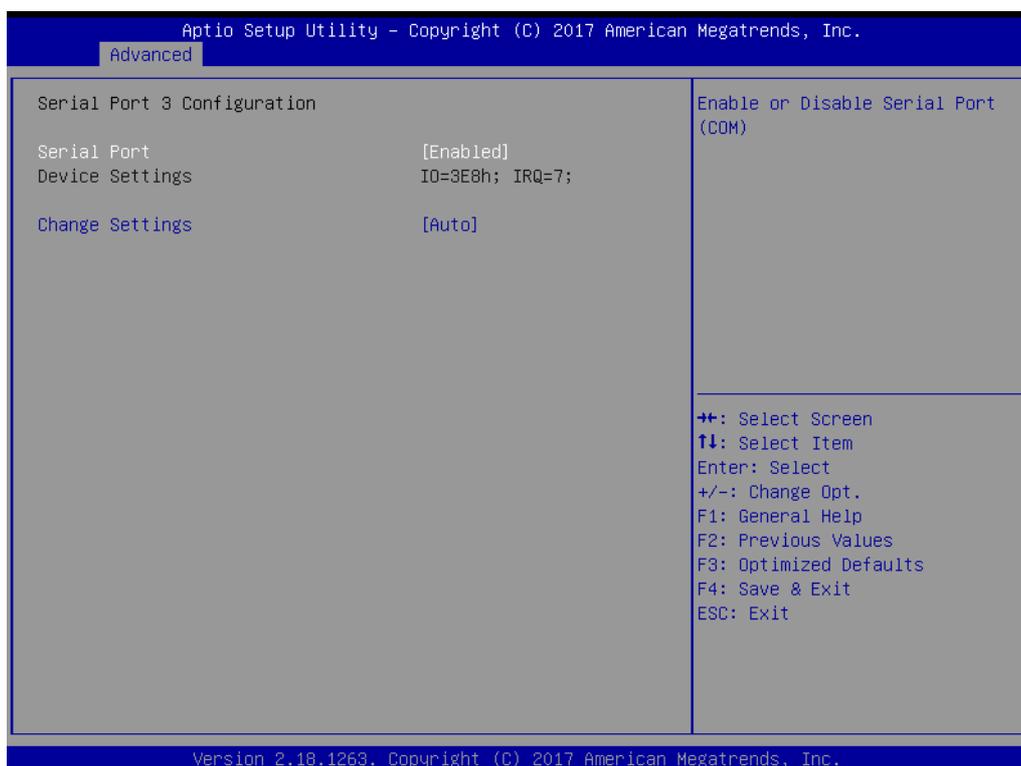


Figure 3.19 Serial Port 3 Configuration

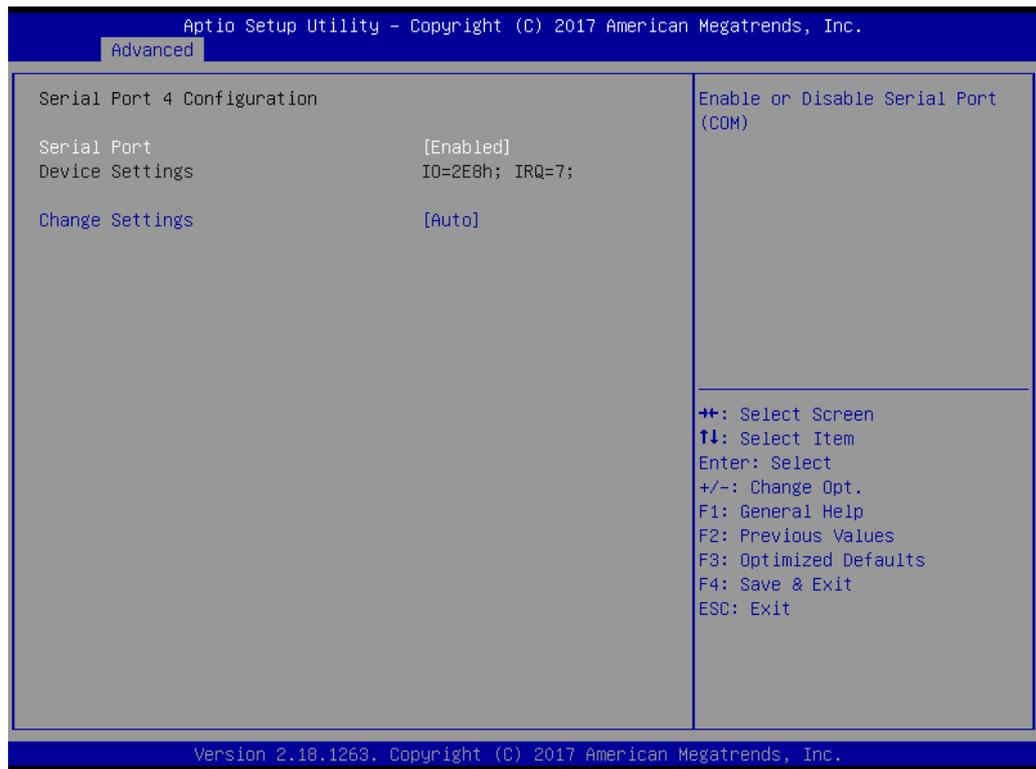


Figure 3.20 Serial Port 4 Configuration

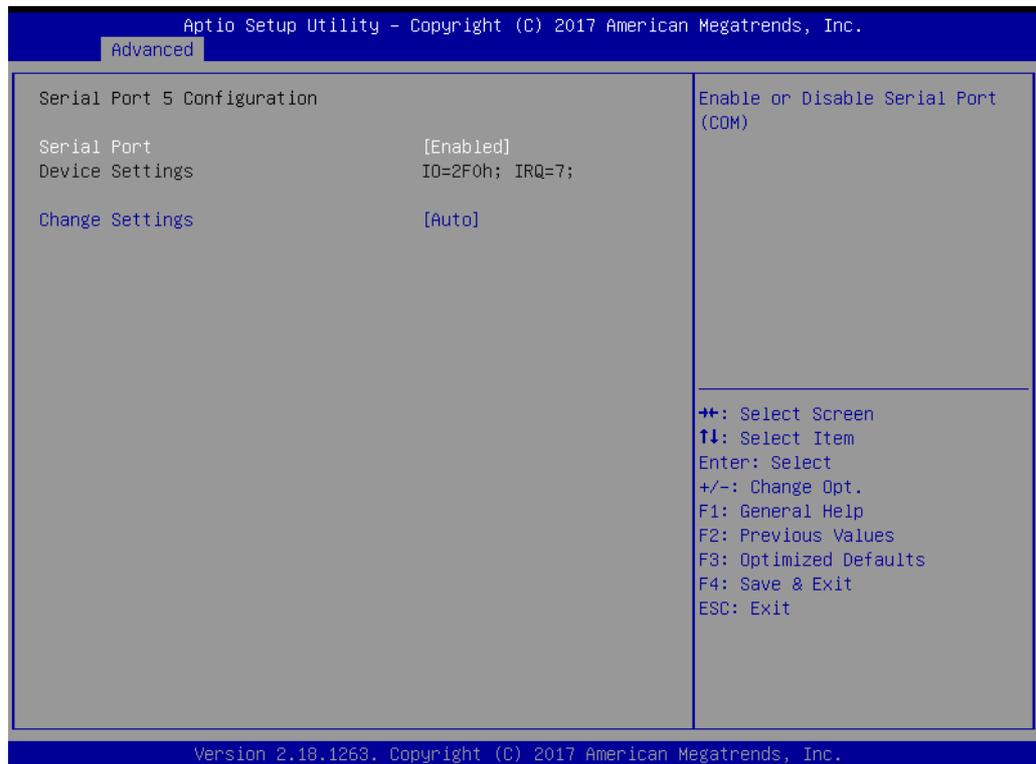


Figure 3.21 Serial Port 5 Configuration

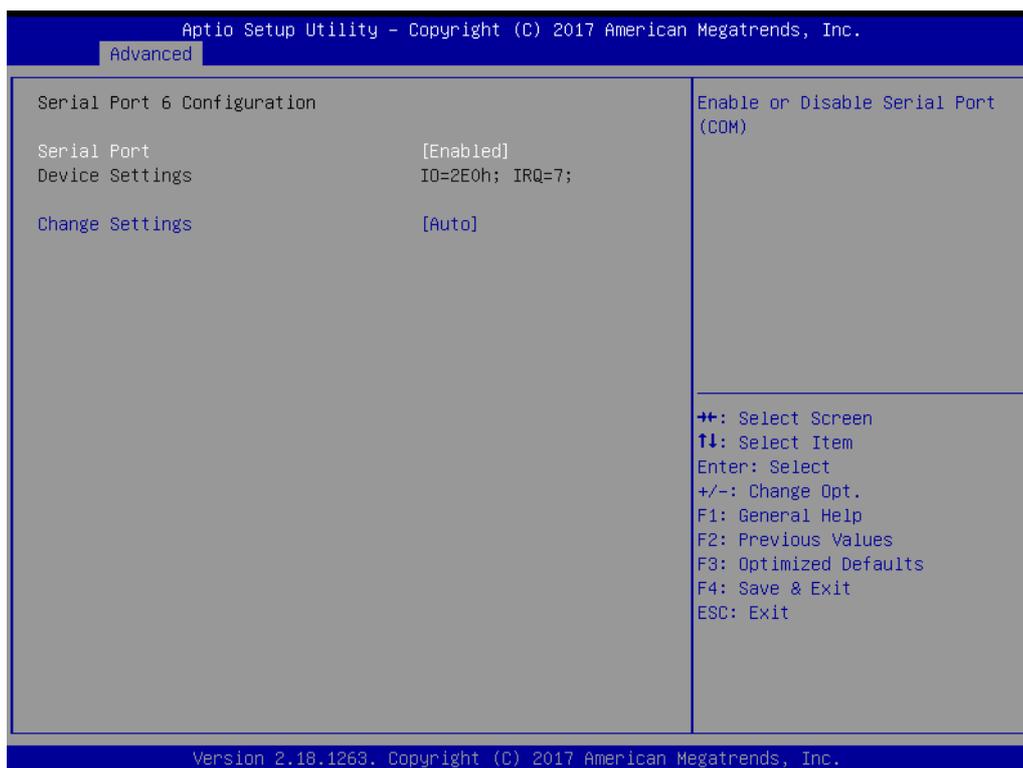


Figure 3.22 Serial Port 6 Configuration

- **Serial Port 1 Configuration**
 - **Serial Port**
This item allows users to enable or disable Serial Port.
 - **Change Settings**
This item allows users to Change Settings of the Serial Ports. The default setting is Auto.
 - **Device Mode**
This item allows users to set the mode of serial port. The default setting is RS-232.
- **Serial Port 2 Configuration**
 - **Serial Port**
This item allows users to enable or disable Serial Port.
 - **Change Settings**
This item allows users to Change Settings of Serial Ports. The default setting is Auto.
 - **Device Mode**
This item allows users to set the mode of serial port. The default setting is RS-232.
- **Serial Port 3 Configuration**
 - **Serial Port**
This item allows users to disable or enable Serial Port.
 - **Change Settings**
This item allows users to change settings of serial ports. The default setting is Auto.

- **Serial Port 4 Configuration**
 - **Serial Port**
This item allows users to disable or enable the Serial Port.
 - **Change Settings**
This item allows users to change settings of the serial ports. The default setting is Auto.
- **Serial Port 5 Configuration**
 - **Serial Port**
This item allows users to disable or enable the Serial Port.
 - **Change Settings**
This item allows users to change settings of the serial ports. The default setting is Auto.
- **Serial Port 6 Configuration**
 - **Serial Port**
This item allows users to disable or enable the Serial Port.
 - **Change Settings**
This item allows users to change settings of the serial ports. The default setting is Auto.

3.2.2.9 H/W Monitor

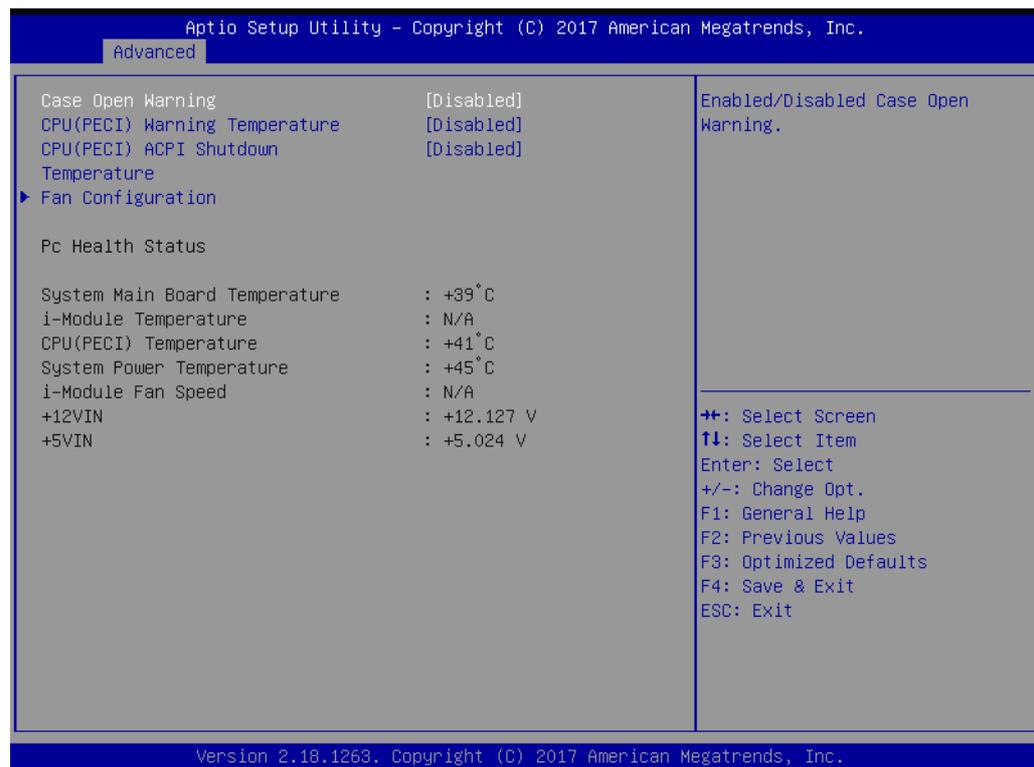


Figure 3.23 PC Health Status

- **Case Open Warning**
To Enable or Disable the Chassis Intrusion monitoring function. When it is enabled and the case is opened, the speaker beeps.
- **CPU Warning Temperature**
Use this item to set the CPU warning temperature. When the system reaches the warning temperature, the speaker will beep.

- **ACPI Shutdown Temperature**
Use this item to set the ACPI shutdown temperature. When the system reaches the shutdown temperature, it will be automatically shut down by the ACPI OS to protect the system from overheating damage.
- **SYSFAN Mode Setting**
Enable or Disable SYSFAN Mode to SMART FAN setting.
- **SYSFAN2 Mode Setting**
Enable or Disable SYSFAN Mode to SMART FAN setting.

3.2.2.10 S5 RTC Wake Settings



Figure 3.24 S5 RTC Wake Settings

- **Wake system with Fixed Time**
To Enable or Disable System wake on alarm event. The system will wake on the hr:min:sec as specified.

3.2.2.11 Serial Port Console Redirection

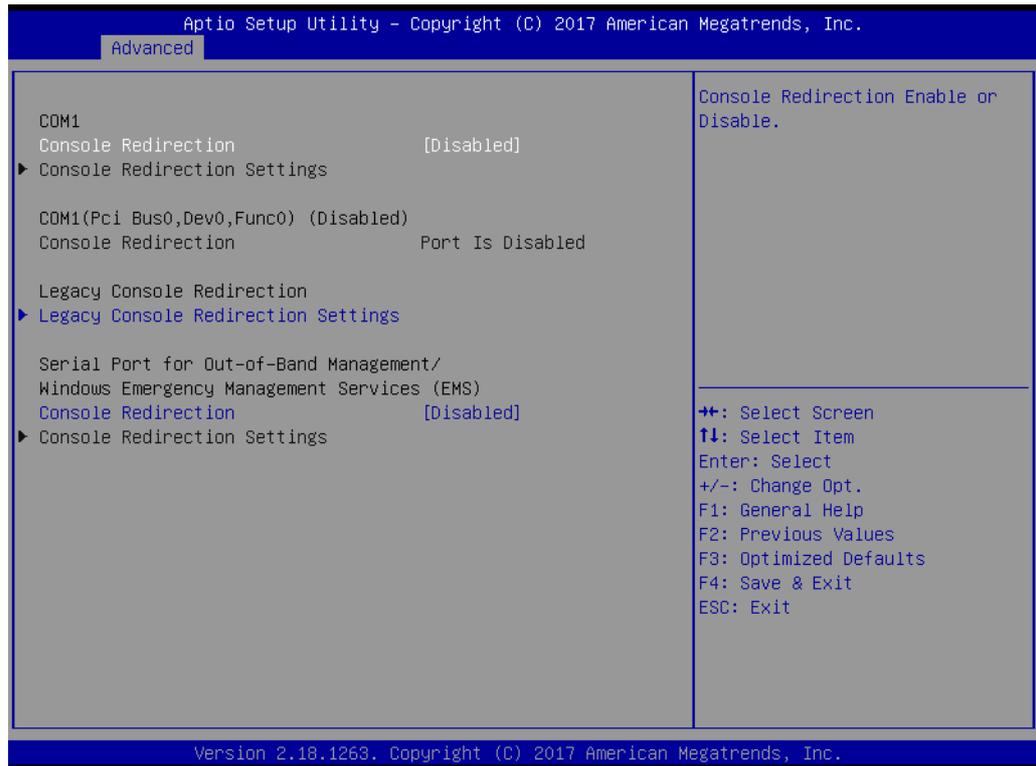


Figure 3.25 Serial Port Console Redirection

- **COM1**
 - **Console Redirection Settings**
 - Console Redirection Enable or Disable
- **Legacy Console Redirection**
 - **Legacy Console Redirection Settings**
 - Legacy Console Redirection Settings
- **Serial Port for Out-of-Band Management/ Windows Emergency Management services (EMS)**
 - **Console Redirection**
 - Console Redirection Enable or Disable

3.2.2.12 Intel TXT Information

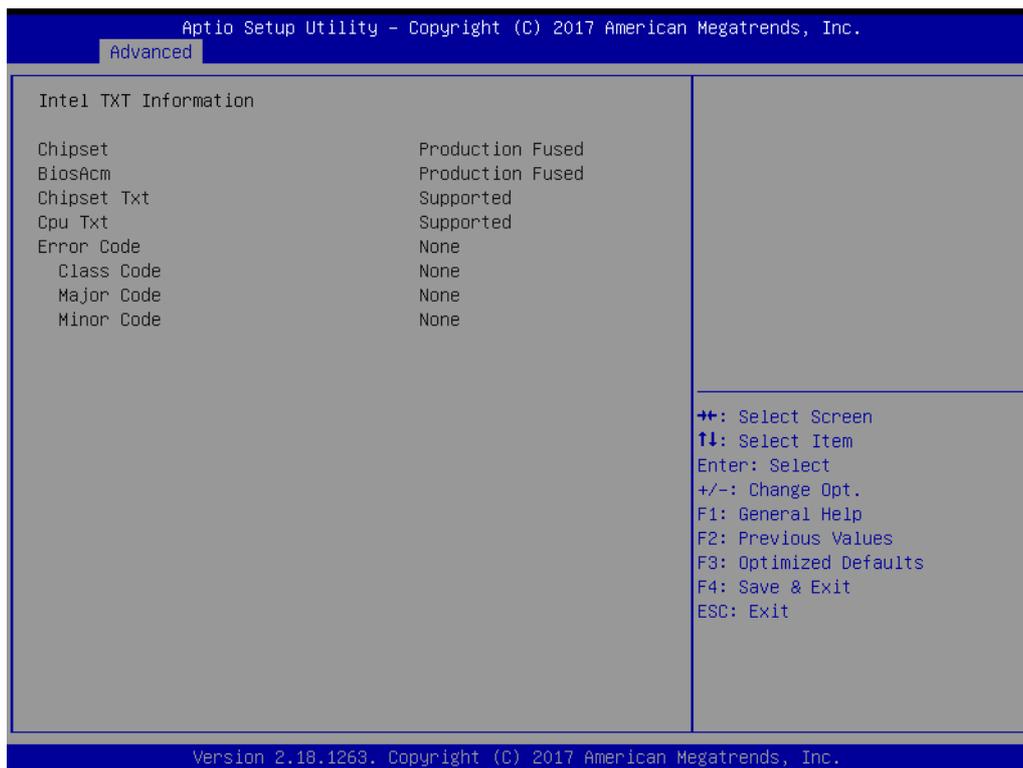


Figure 3.26 Intel TXT Information

3.2.2.13 PCI Subsystem Settings

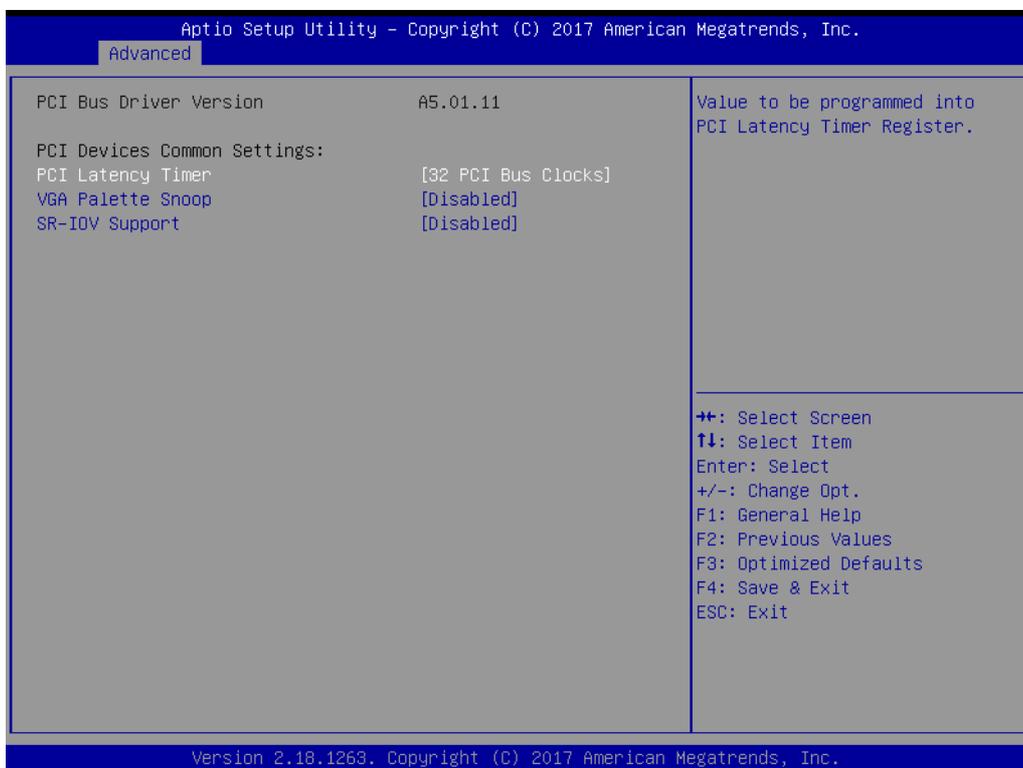


Figure 3.27 PCI Subsystem Settings

- PCI Common Settings
 - PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.

VGA Palette Snoop

Enable or Disable VGA palette registers snooping.

3.2.2.14 CSM Configuration

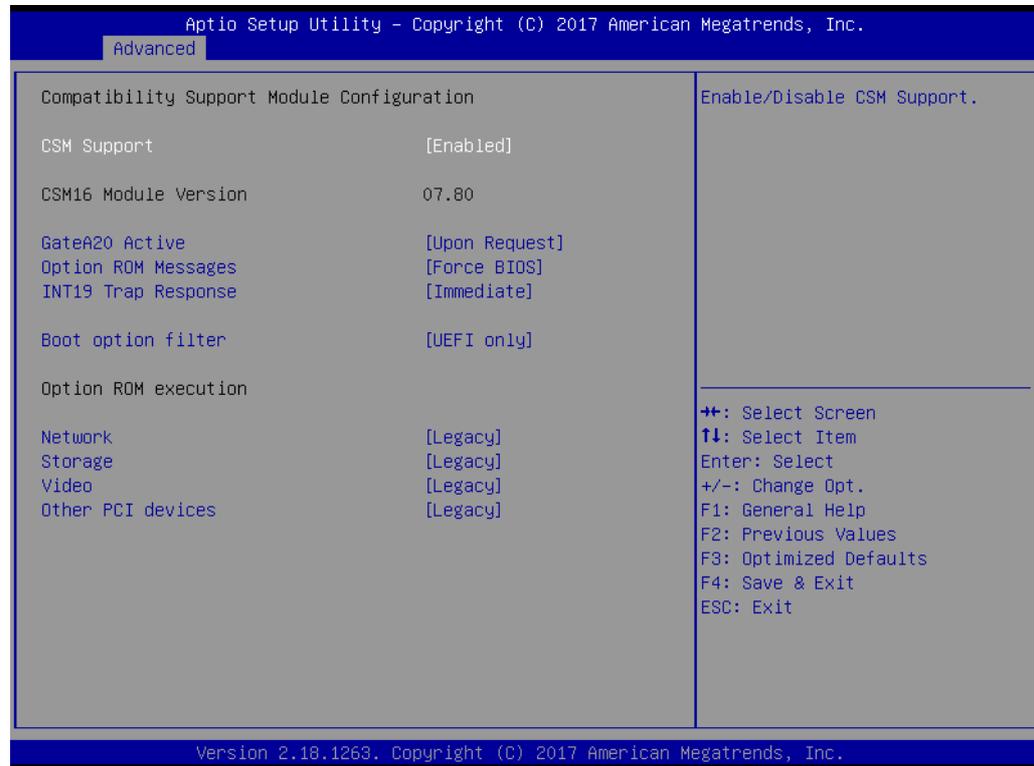


Figure 3.28 CSM Configuration

- **Compatibility Support Module Configuration**
 - **CSM Support**
Enable/Disable CSM Support.
- **CSM16 Module Version**
 - **GateA20 Active**
Upon Request - GA20 can be disabled using BIOS services. Do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
 - **Option ROM Message**
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 ROMs Priority.
- **Option ROM execution**
 - **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.

3.2.2.15 USB Configuration

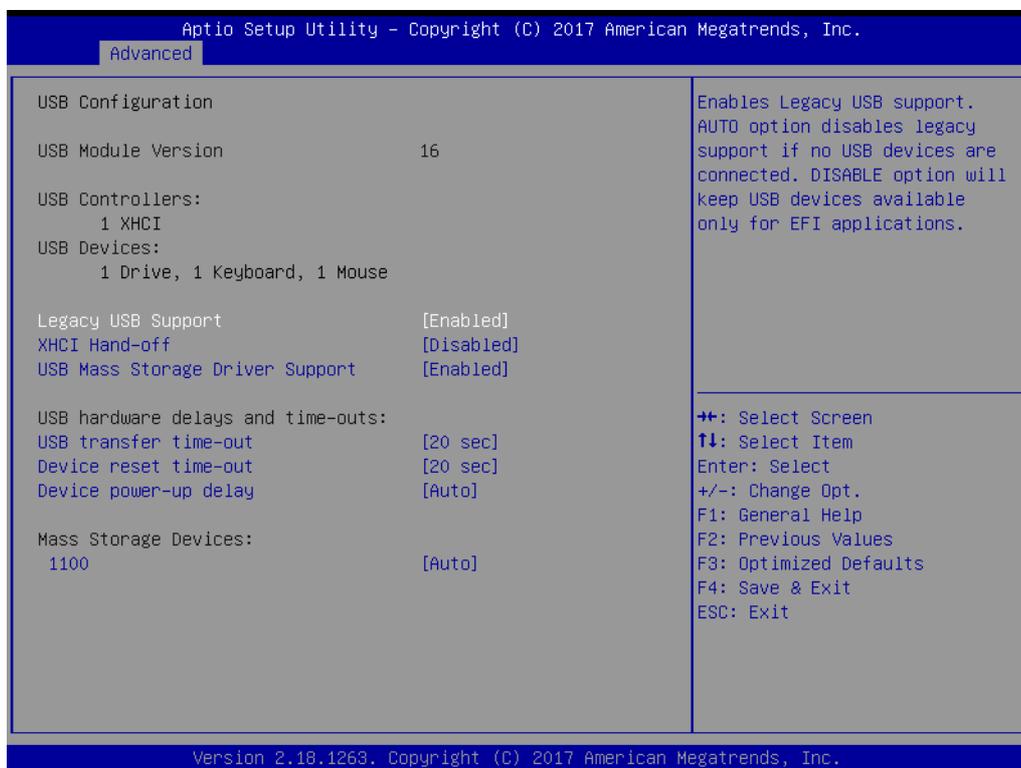


Figure 3.29 USB Configuration

- **Legacy USB Support**
This is for supporting USB device under legacy OS such as DOS. When choosing Auto, the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged and disable USB legacy mode when no USB device is plugged.
- **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 or Disable USB Mass Storage driver support.
- **USB transfer time-out**
Allows you to select the USB transfer time-out value. [1,5,10,20sec]
- **Device reset time-out**
Allows you to select the USB device reset time-out value. [10,20,30,40sec]
- **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 take from Hub descriptor.
- **Generic Flash disk 8.07**
Mass storage device emulation type. Auto enumerates device according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.2.3 Chipset

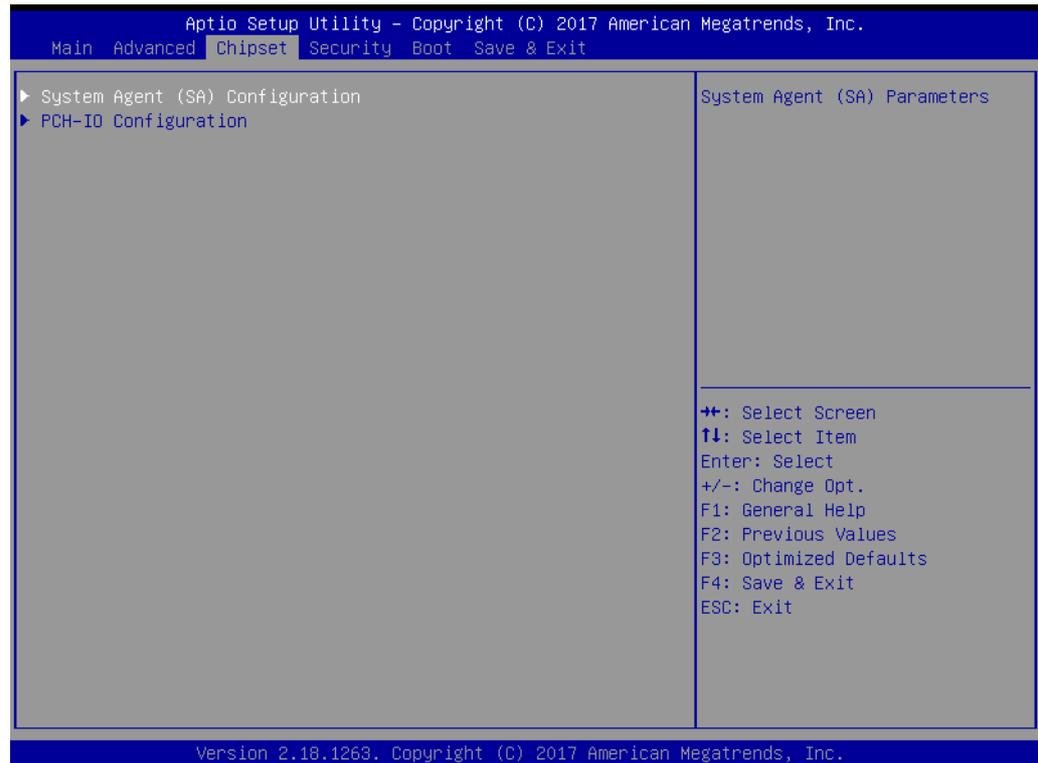


Figure 3.30 Chipset

This page provides information of the chipset on MIC-7700.

3.2.3.1 System Agent (SA) Configuration

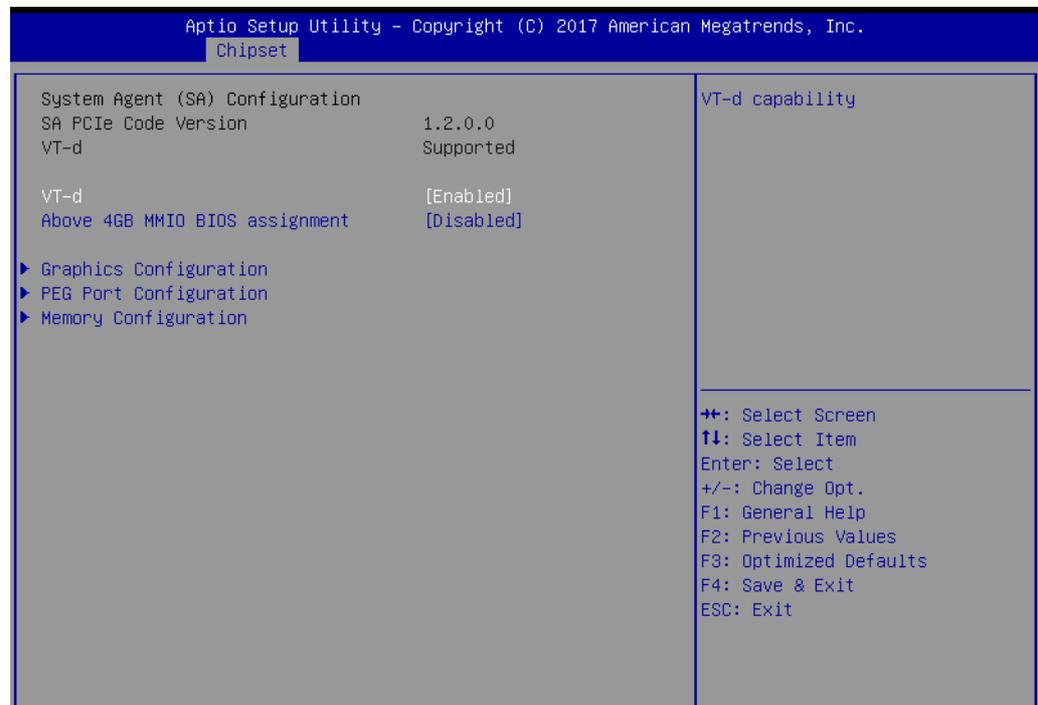


Figure 3.31 System Agent (SA) Configuration

- **VT-d**
Enable or Disable VT-d function.

3.2.3.2 Graphics Configuration

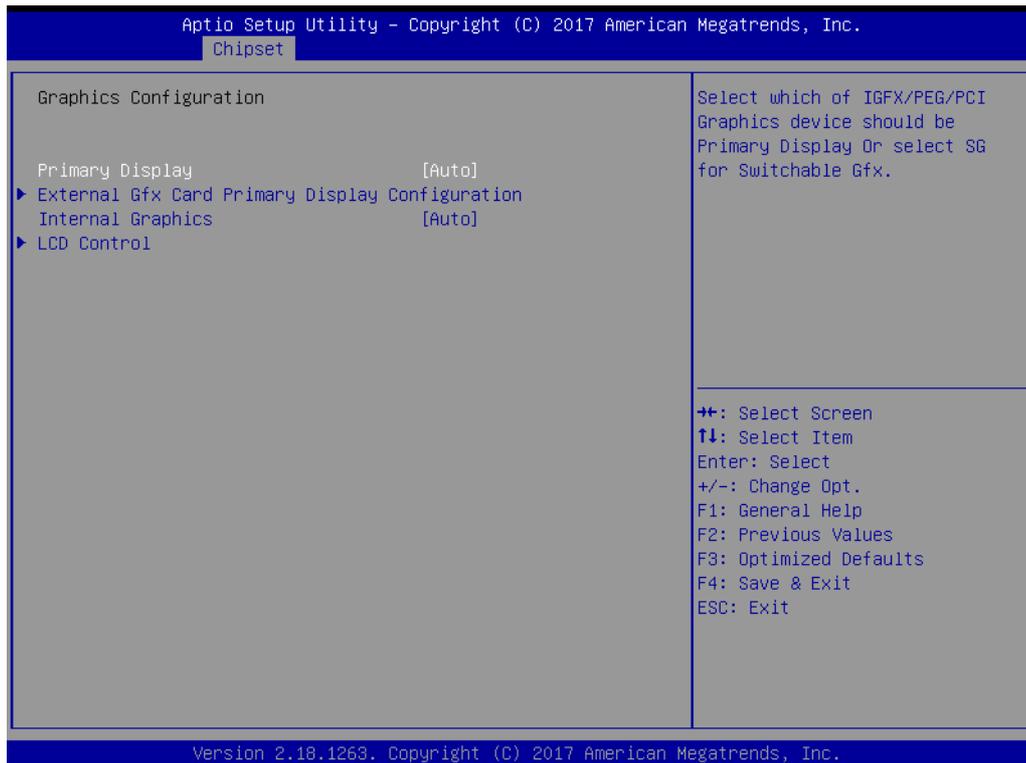


Figure 3.32 Graphics Configuration

- **Primary Display**
"Auto or IGFX or PEG or PCI or SG" optimal to Primary Display
- **Primary PEG**
Select PEG0/PEG1/PEG2/PEG3 graphics device should be Primary PEG.

- **Primary PCIE**
Select Auto/ PCIE1/ PCIE2/ PCIE3/ PCIE4/ PCIE5/ PCIE6/ PCIE7 of D28: F0/ F1/ F2/ F3/ F4/ F5/ F6/ F7, PCIE8/PCIE9/PCIE10/PCIE11/PCIE12/PCIE13/ PCIE14/PCIE15 of D29: F0/ F1/ F2/ F3/ F4/ F5/ F6/ F7/, PCIE16/ PCIE17/ PCIE18/ PCIE19 of D27: F0/ F1/ F2/ F3, graphics device should be primary PCIE.
- **Internal Graphics**
Auto or Disable or Enable Internal Graphics.
- **LCD Control**



Figure 3.33 LCD Control

- **LCD Control**
Select Primary IGFX Boot Display (VBIOS Default, VGA, DVI1, DVI2).

3.2.3.3 PEG Port Configuration

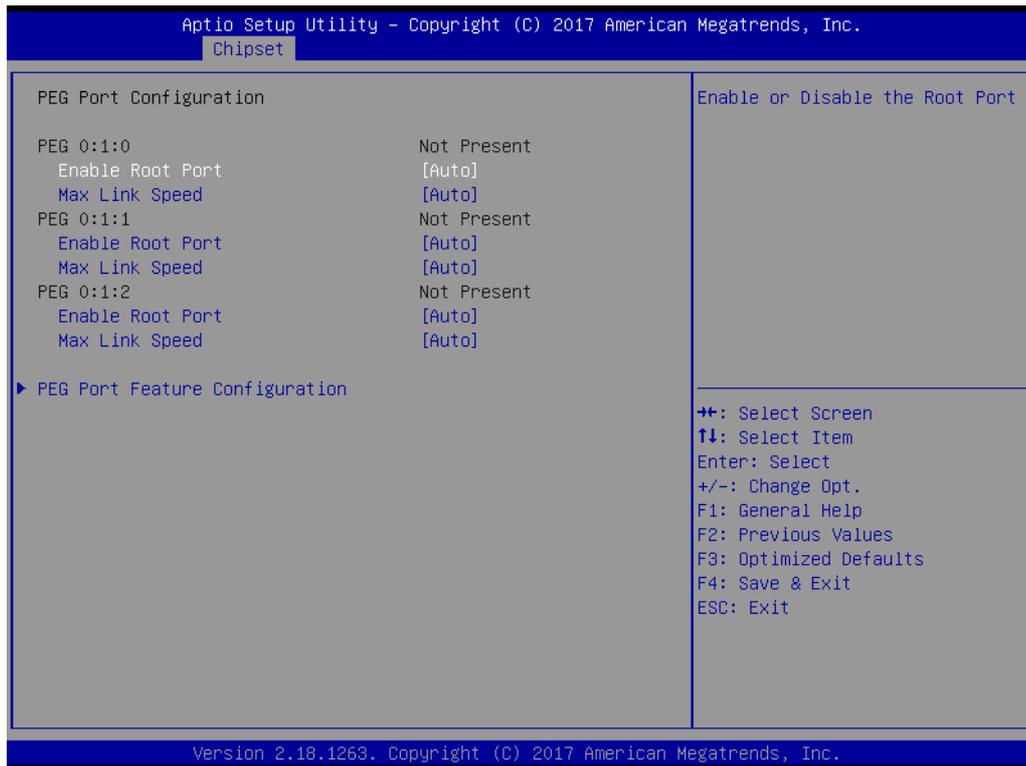


Figure 3.34 PEG Port Configuration

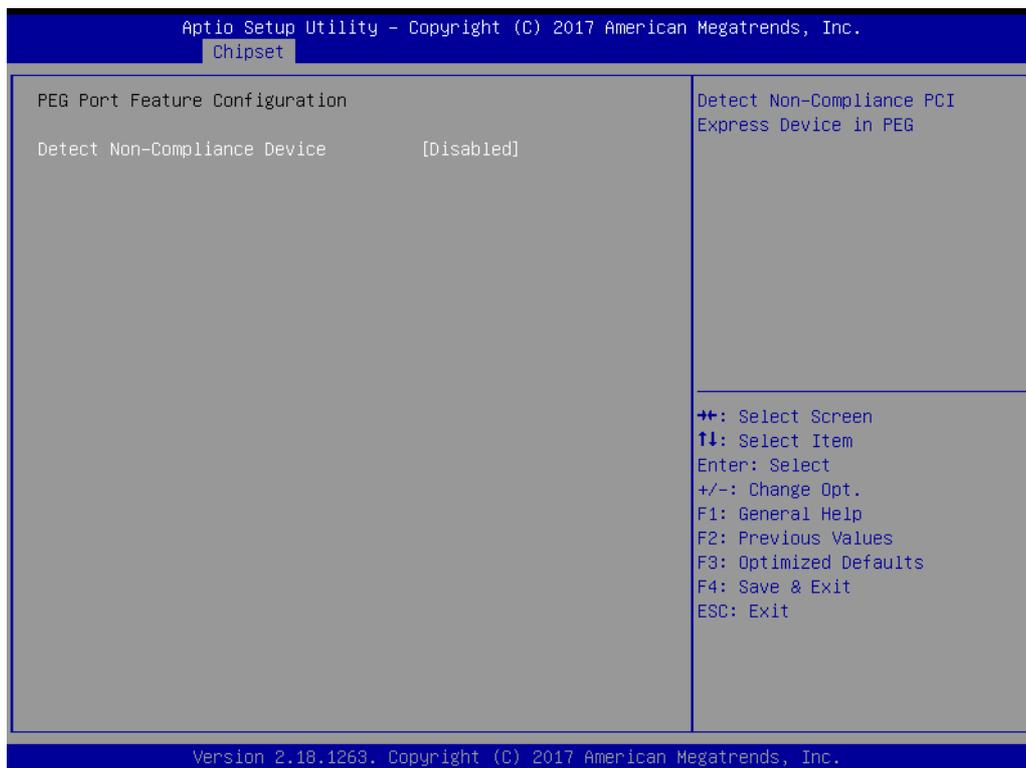


Figure 3.35 PEG Port Feature Configuration

- **Enable Root Port**
Enable or disable the root port
- **Max Link speed**
Configure PEG 0:1:0 max speed

- **Detect Non-compliance device**
Detects Non-Compliance PCI express Device in PEG

3.2.3.4 Memory Configuration

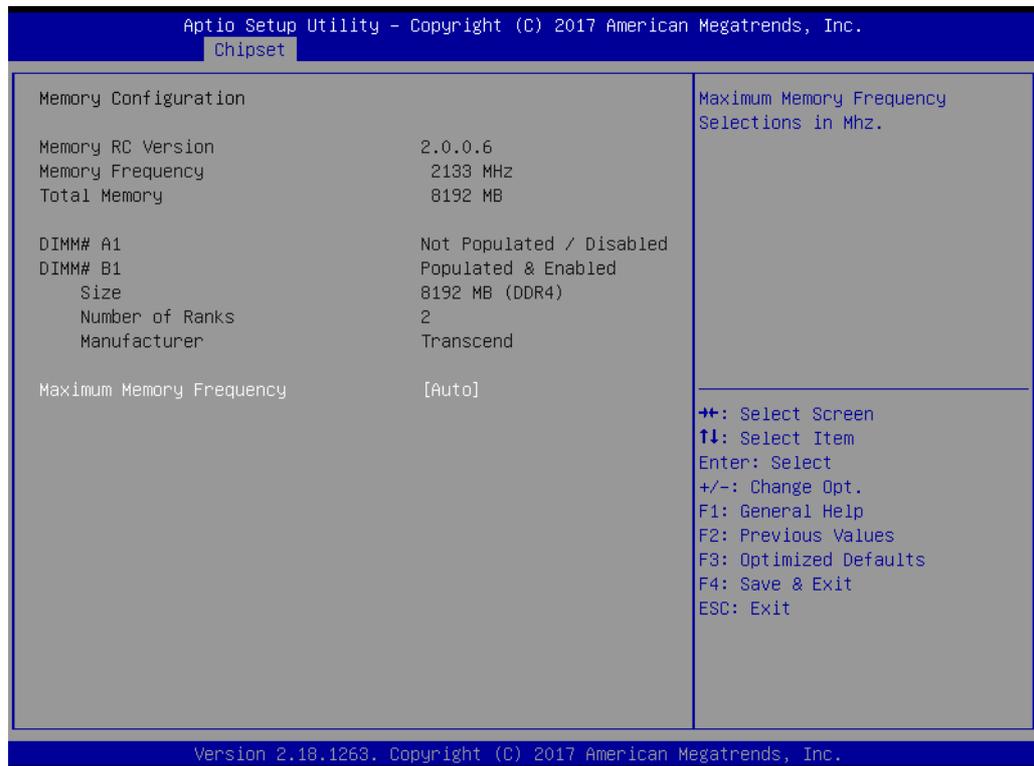


Figure 3.36 Memory Configuration

- **Maximum Memory Frequency**
Maximum memory frequency selections in Mhz.

3.2.3.5 PCH-IO Configuration

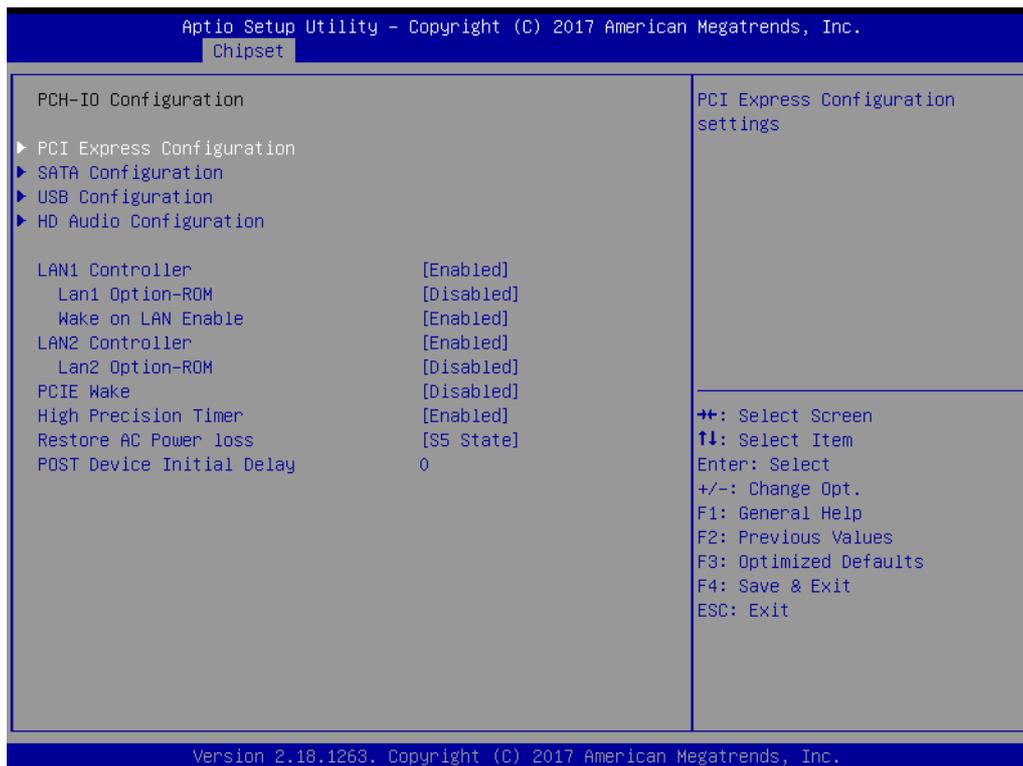
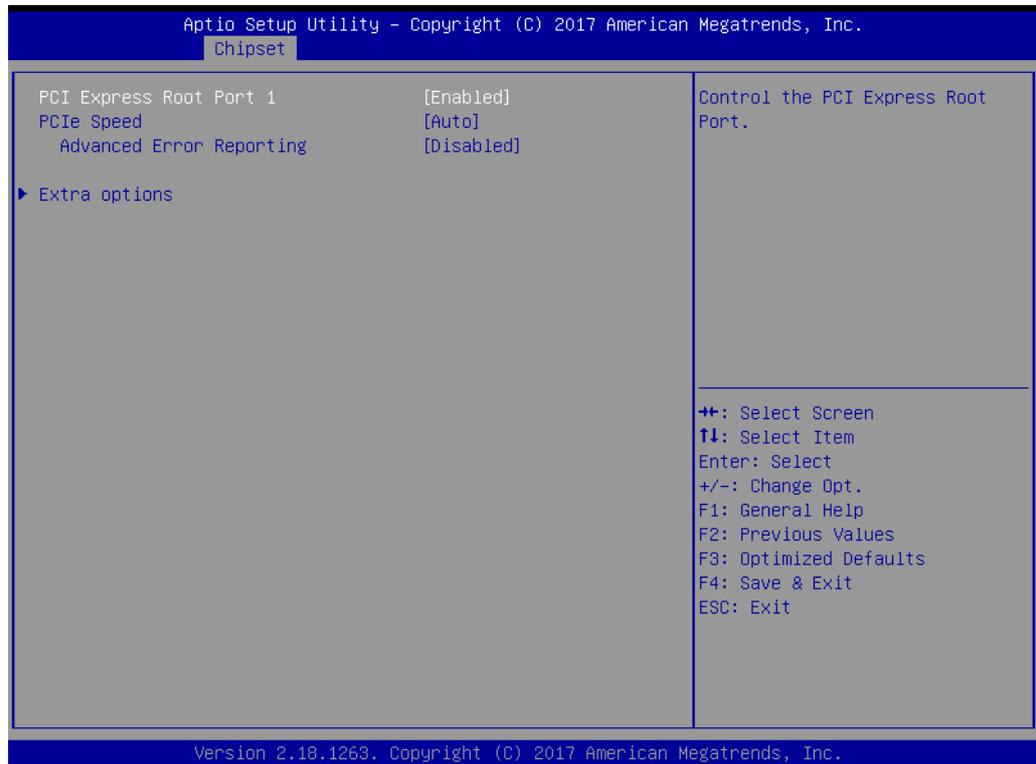
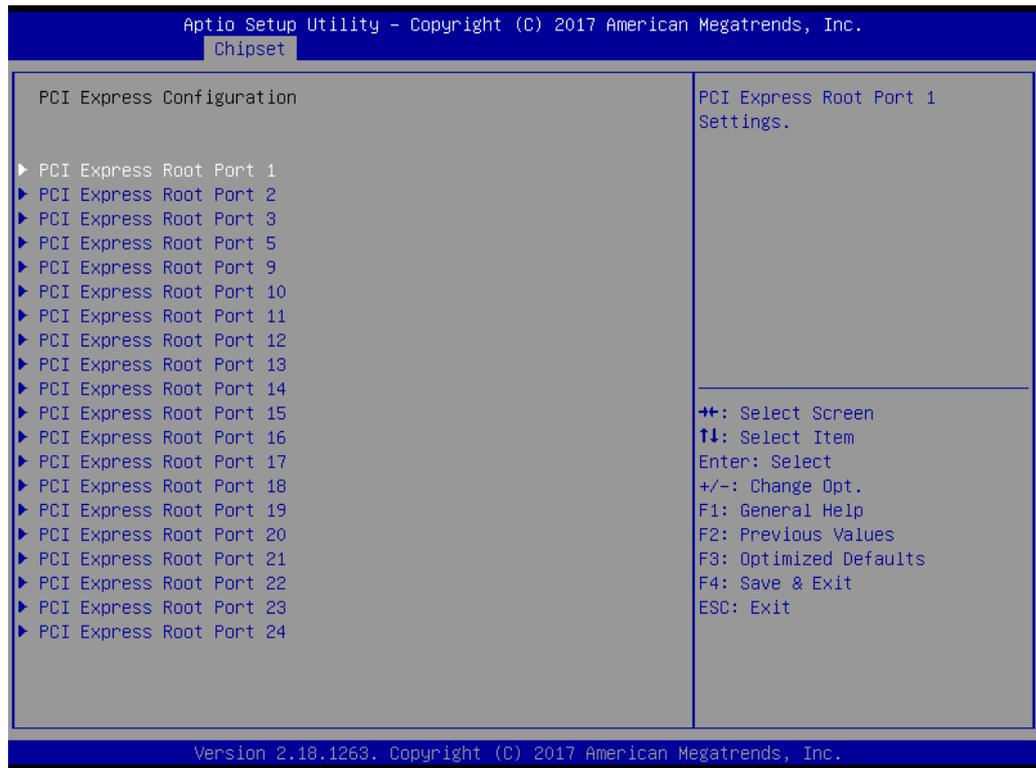


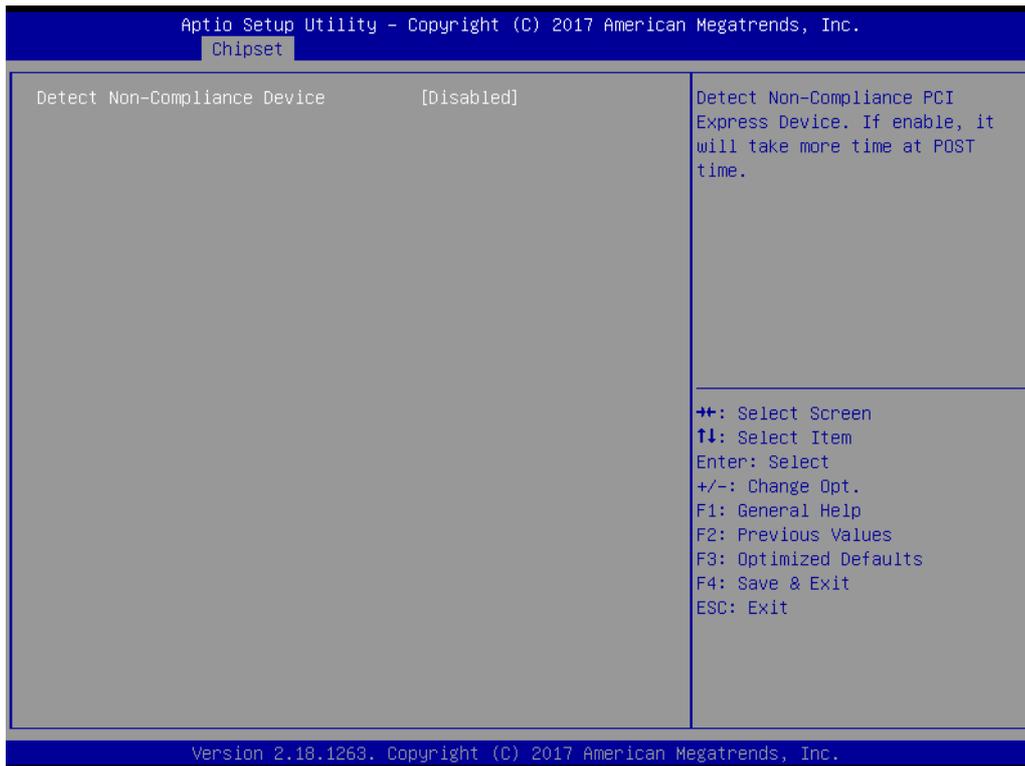
Figure 3.37 PCH-IO Configuration

- **LAN1 Controller**
Enable or Disable LAN1 controller.
- **LAN 1 Option-ROM**
Enable or Disable LAN 1 boot option for legacy network devices.
- **Deep Sleep**
Enable or Disable Deep Sleep.
- **Wake on LAN Enable**
Enable or Disable LAN1 to wake the system.
- **LAN2 Controller**
Enable or Disable LAN2 controller.
- **LAN 2 Option-ROM**
Enable or Disable LAN 2 boot option for legacy network devices.
- **PCIE Wake**
Enable or Disable PCIE to wake the system from S5.
- **High Precision timer**
Enable or Disable the high precision event timer
- **Restore AC Power Loss**
Power off or Power on or Last State to restore AC Power Loss

3.2.3.6 PCI Express Configuration

PCI Express Root Port 1 to 8 Setting.





- **PCI Express Root Port 1**
Enable or Disable PCI Express Root Port.
- **PCIe Speed**
Select "Auto, Gen1, Gen2, Gen3" for PCIe Speed
- **Advanced Error Reporting**
Enable or Disable advanced error reporting
- **Detect Non-Compliance Device**
Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

3.2.3.7 SATA Configuration

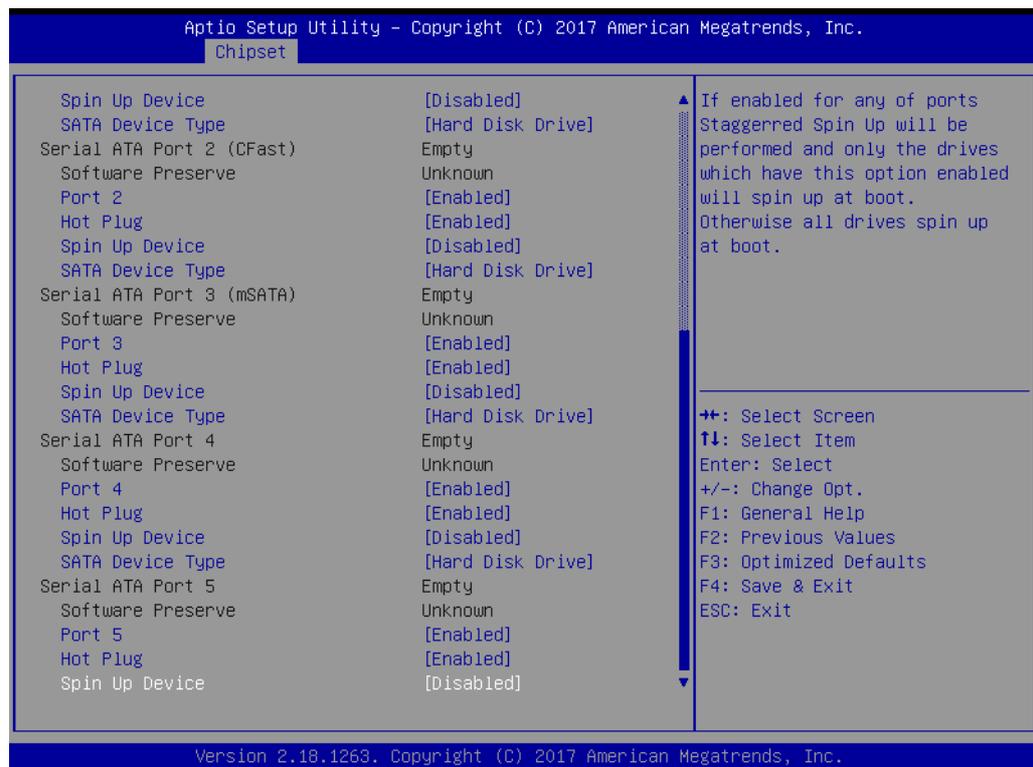
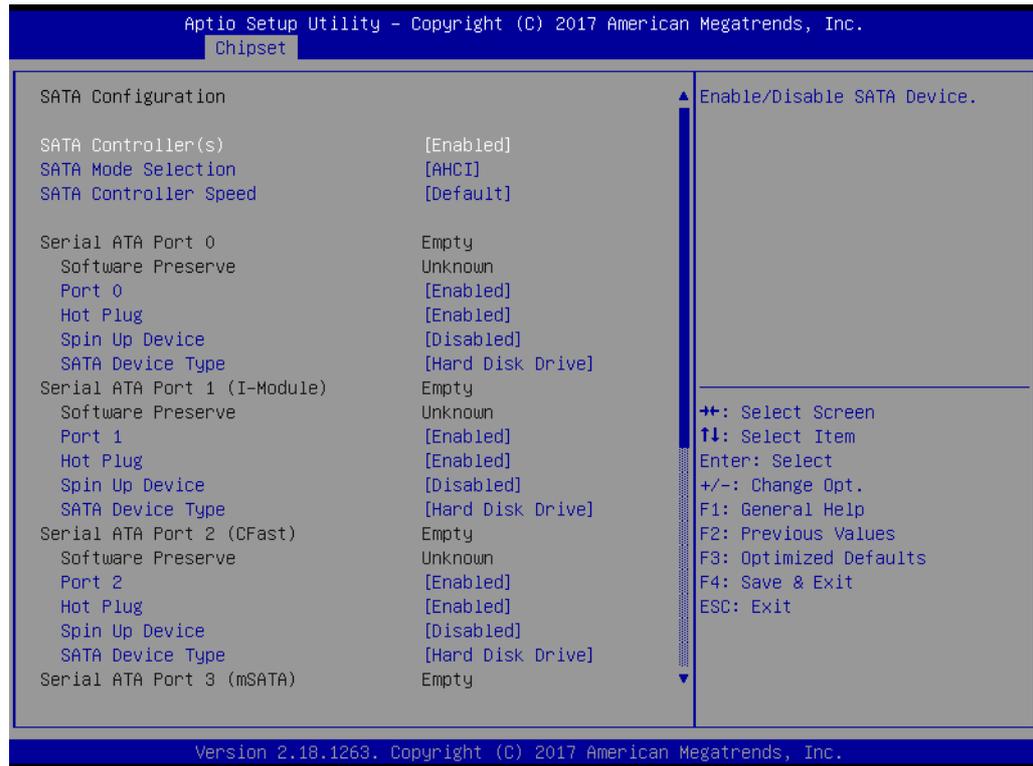
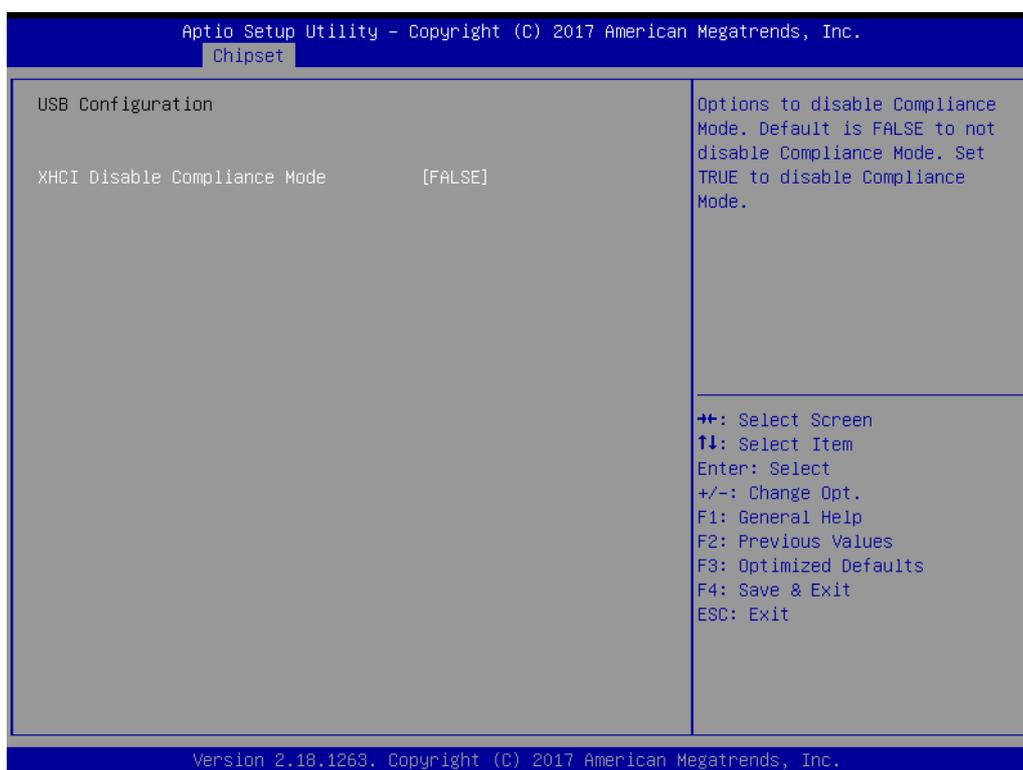


Figure 3.38 SATA Configuration

- **SATA Controller(s)**
Enable or Disable SATA Controller
- **SATA Mode Selection**
This can be configured as RAID or AHCI.

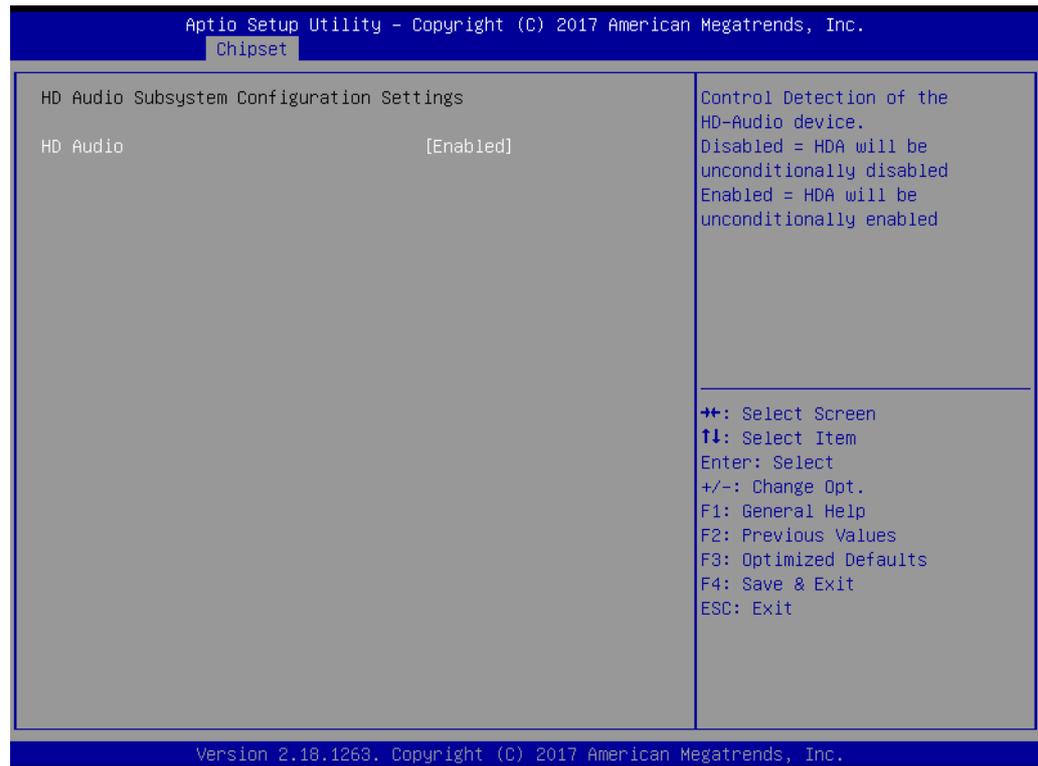
- **SATA Controller Speed**
Indicates the maximum speed the SATA controller can support by selecting Default, Gen1, Gen2, Gen3.
- **Port 2~5**
Enable or Disable SATA port 2~5.
- **Hot Plug**
Enable or Disable SATA Hot-Plug
- **Spin up Device**
Enable or Disable spin up device
- **SATA Device Type**
To identify the SATA that is connected to a Solid State or Hard Disk Drive.

3.2.3.8 USB Configuration



- **XHCI Disable Compliance mode**
Options to disable compliance mode. Default is FALSE enable compliance mode. Set TRUE to disable compliance mode.

3.2.3.9 HD Audio Configuration



- **HD Audio**
Control detection of the HD-Audio device.
Disable = HDA will be unconditionally disabled
Enable=HDA will be unconditionally enabled

3.2.4 Security

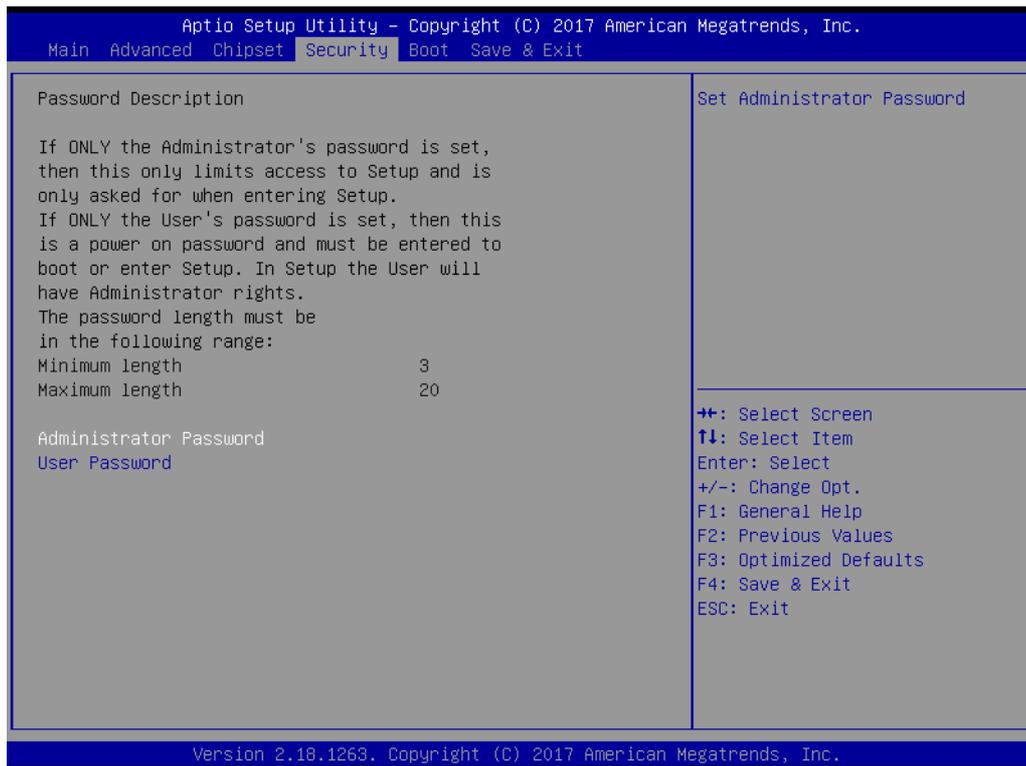


Figure 3.39 Security

Select Security Setup from the MIC-7700 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>.

Note! *If only the User's password is set, the User will have Administrator rights. To set Administrator password is strongly recommended if you have security concerns.*



3.2.5 Boot

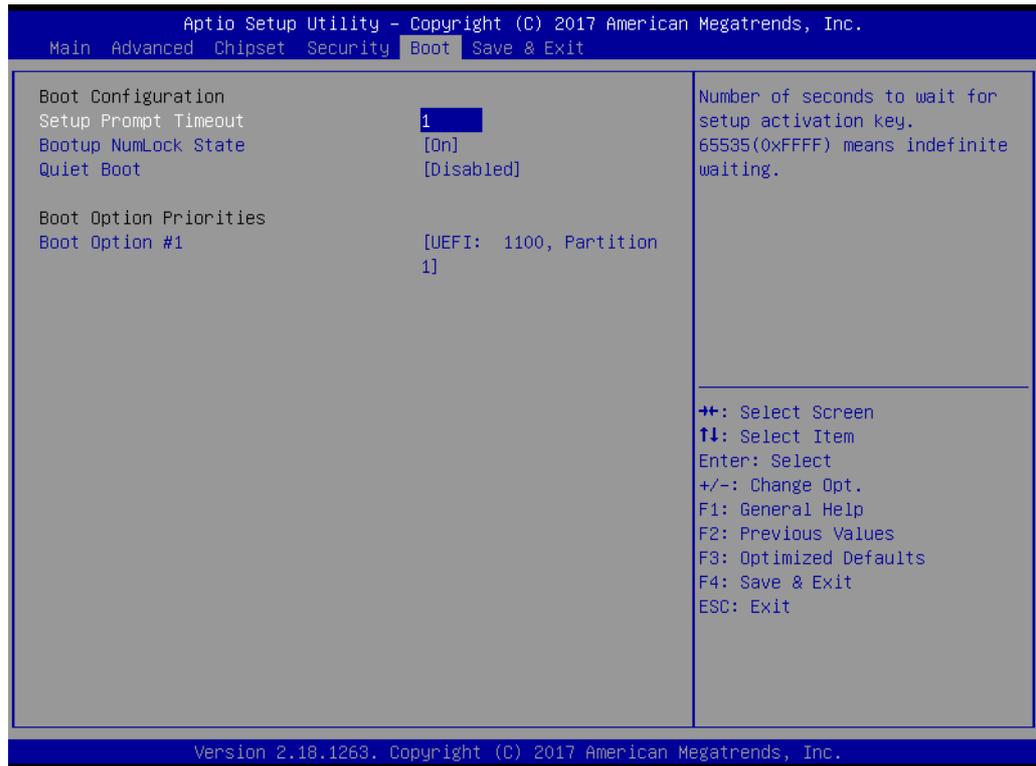


Figure 3.40 Boot

- **Setup Prompt Timeout**
Use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
“On or Off” power-on state for the NumLock
- **Quiet Boot**
Enable or Disable Quiet Boot option
- **Boot Option #1/2**
Sets the boot order
- **Hard Drive BBS Priorities**
Sets the order of the legacy devices on this group

3.2.6 Save & Exit

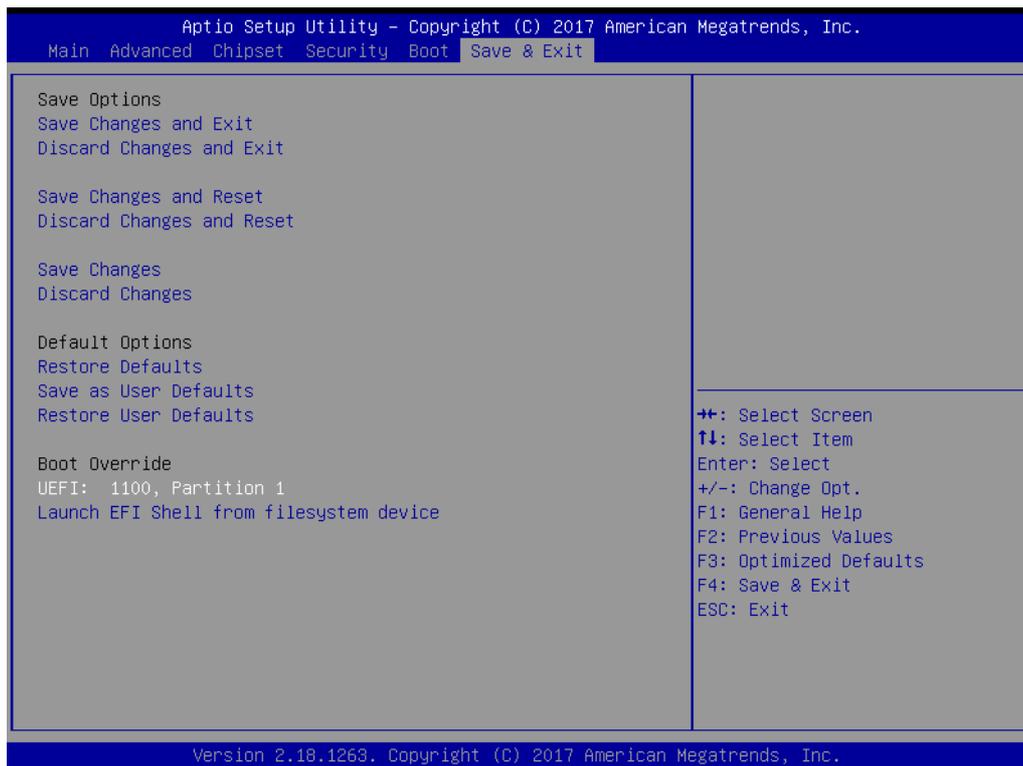


Figure 3.41 Save & Exit

Save Changes and Exit

When you complete system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears:
 Save Configuration Changes and Exit Now?
 [Yes] [No]
2. Select Yes or No.

Discard changes and exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears:
 Quit without saving?
 [Yes] [No]
2. Select Yes to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press <Enter>.

Chapter 4

Software Installation

This chapter introduces driver installation.

4.1 Chipset Software Installation Utility

4.1.1 Before you begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the MIC-7700 are located on the software installation CD.

Note! *The files on the software installation CD are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.*



Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

4.1.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0 support
- Identification of Intel chipset components in the Device Manager.

Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*



- Windows 10 (64bit)
- Windows 8.1 (64-bit)
- Windows 7 (32-bit)
- Windows 7 (64-bit)
- Remark: Kabylake CPU doesn't support Windows 7 and Windows 8.1 anymore.

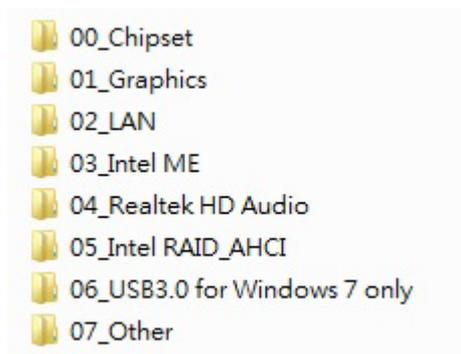
Caution! *Intel® Skylake Platform does not include a USB3.0 driver. The user can use a SATA interface driver (SATA CD-RAM or CFast or m-SATA) to install Windows 7 OS.*



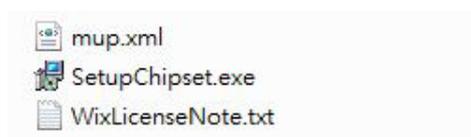
Advantech supports a powerful Windows 7 OS that includes USB3.0 (EFI OS not supported). If you need this option, please contact your distributor or sales representative.

4.1.3 Windows 10 / Windows 8.1/ Windows 7

1. Put the driver CD into the system's CD-ROM drive. You will see driver folder items. Select "01 Chipset" folder. In CSI folder, click the executable file to complete driver installation.



2. Click setup to execute program.



4.2 Integrated Graphic Device Setup

4.2.1 Introduction

The 6th/7th Gen Intel® Core™ i processors are embedded with integrated graphics controller. You need to install the VGA driver to enable this function, which includes the following features:

- Optimized integrated graphic solution: Intel® Graphics Flexible Display Interface supports versatile display options and 32-bit 3D graphics engine for dual independent displays, enhanced display modes for widescreen flat panels for extended, twin, and cloned dual display modes, and optimized 3D support delivers an intensive and realistic visual experience.

Caution! Intel® Graphic Device does not support Windows 10 (32bit) and Windows 8.1 (32.bit)

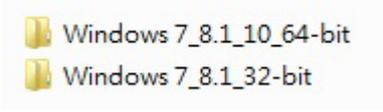


4.2.2 Windows 10 /Windows 8.1 /Windows 7 Driver Setup

Note! *Before installing these drivers, make sure the INF driver has been installed in your system. See Chapter 4 for information on installing the INF driver.*



Insert the driver CD into your system's CD-ROM drive. You can see the driver folders. Navigate to the "02 Graphic" folder and click the executable file to complete the installation of the drivers for Windows 7, Windows 8 and Windows 10.

A screenshot showing two folders: "Windows 7_8.1_10_64-bit" and "Windows 7_8.1_32-bit".

Windows 7_8.1_10_64-bit
Windows 7_8.1_32-bit

4.3 Intel® ME

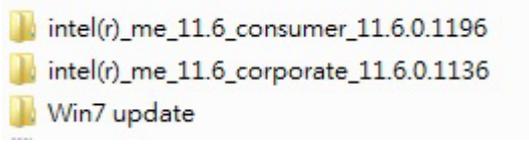
4.3.1 Introduction

The Intel® ME software components that need to be installed depend on the system's specific hardware and firmware features. The installer detects the system's capabilities and installs the relevant drivers and applications.

4.3.2 Installation

Insert the driver CD into your system's CD-ROM drive. Navigate to the "03_Intel ME" folder and find folder "Intel ME" to install the driver.

Note! *If the Intel® Management Engine (Intel® ME) driver has not been successfully installed in Win7, please refer to the Win7 ME install process below.*

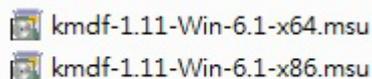
A screenshot showing three folders: "intel(r)_me_11.6_consumer_11.6.0.1196", "intel(r)_me_11.6_corporate_11.6.0.1136", and "Win7 update".

intel(r)_me_11.6_consumer_11.6.0.1196
intel(r)_me_11.6_corporate_11.6.0.1136
Win7 update

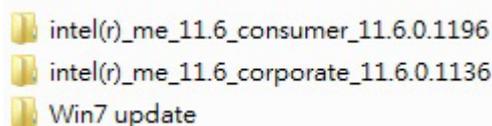
4.3.3 Install Intel® ME for Windows 7

Please follow this processor to install Intel® ME for Windows 7.

1. Install hot fix first.



2. Install ME.
MIC-7700H: ME Version ME_11.6_Consumer_11.6.10.1196
MIC-7700Q: ME Version ME_11.6_Corporate_11.6.0.1136



4.4 LAN Configuration

4.4.1 Introduction

The MIC-7700 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

4.4.2 Features

- 10/100/1000Base-T Ethernet controller
- 10/100/1000Base-T triple-speed MAC
- Full duplex at 10, 100, or 1000 Mbps and half duplex at 10 or 100 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host interface

4.4.3 Installation

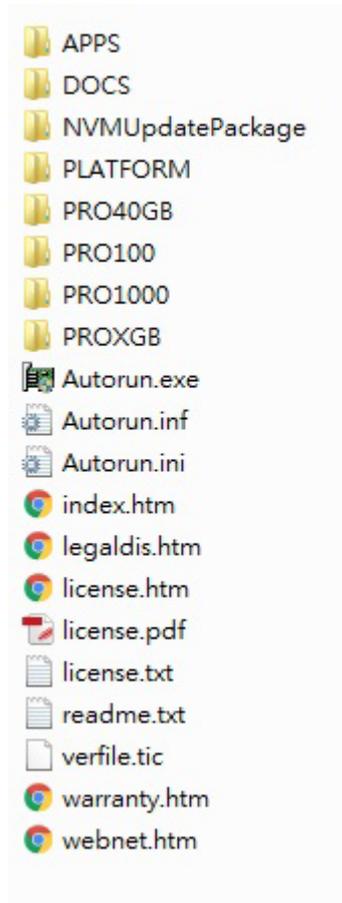
Note! *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 4 for information on installing the CSI utility.*



The integrated Intel® gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

4.4.4 Windows 10 /Windows 8.1 /Windows 7

Insert the driver CD into your system's CD-ROM drive. Select folder "02_LAN" then click the "Autorun.exe"



4.5 SATA RAID Setup

4.5.1 Introduction

To support demanding disk I/O, Intel® Q170 chipset integrates six Serial ATA controllers with software RAID 0, 1, 5, 10 capabilities.

RAID 0 striping increases the storage performance and is designed to speed up data transfer rates for disk-intensive applications.

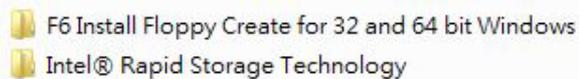
RAID 1 mirroring protects valuable data that might be lost in the event of a hard drive failure.

RAID 5 array contains three or more hard drives where the data is divided into manageable blocks called strips. Parity is a mathematical method for recreating data that was lost from a single drive, which increases fault-tolerance. The data and parity are striped across all the hard drives in the array. The parity is striped in a rotating sequence to reduce bottlenecks associated with the parity calculations.

RAID 10 array uses four hard drives to create a combination of RAID levels 0 and 1. The data is striped across a two-drive array forming the RAID 0 component. Each of the drives in the RAID 0 array is then mirrored by a RAID 1 component.

4.5.2 SATA RAID Driver and Utility Setup

The installation utility is in the CD's "05_Intel RAID_AHCI" folder. Go to the directory of the CD and follow these steps to install.



Note! Please install ".NET 4.5" before installing "Intel Rapid Storage Technology".

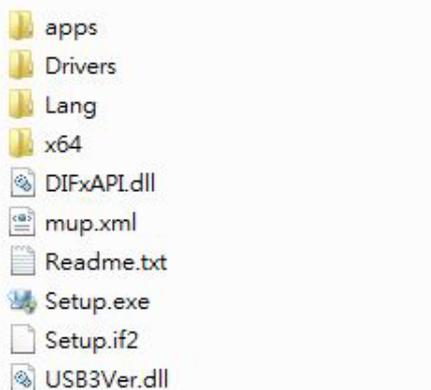


4.6 Install USB3.0

4.6.1 Introduction

MIC-7700 provides USB 3.0 and the data transfer rate of USB3.0 (5Gb/s) is 10 times to USB2.0 (480 Mbps).

Insert the driver CD into your system's CD-ROM drive. Navigate to the "06_USB3.0 for Windows 7 only" to install the driver.



Appendix **A**

Programming the
Watchdog Timer

A.1 Programming the Watchdog Timer

The MIC-7700's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1.1 Watchdog Timer Overview

The watchdog timer is built into the super I/O controller NCT6106D. It provides the following user-programmable functions:

- It can be enabled and disabled by user program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- Generates an interrupt or resets signal if the software fails to reset the timer before time-out

A.1.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. You must first assign the address of register by writing an address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

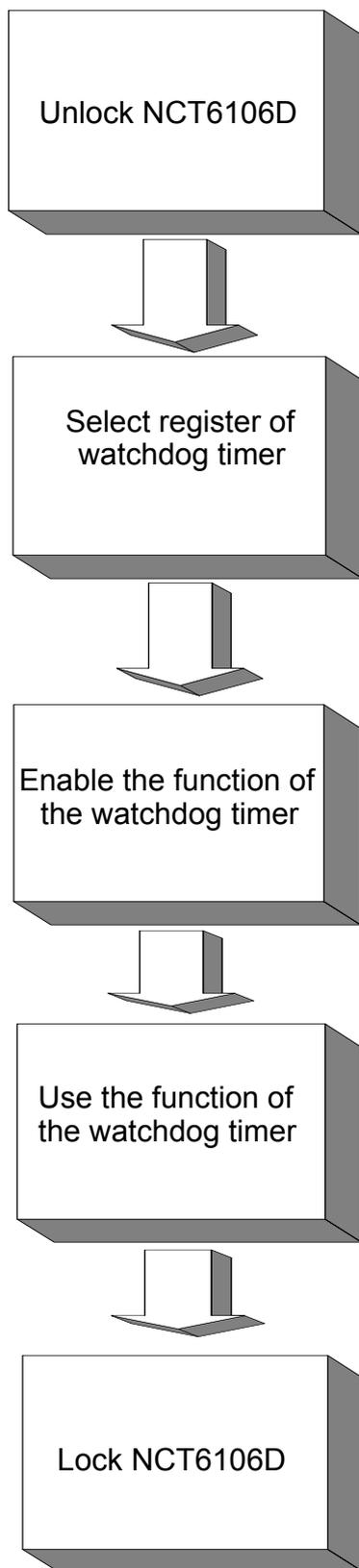


Table A.1: Watchdog Timer Registers

Address of Register (2E) Attribute	
Read/Write	Value (2F) & description
87 (hex)	----- Write this address to I/O address port 2E (hex) twice to unlock the NCT6106D.
07 (hex)	write Write 08 (hex) to select register of watchdog timer.
30 (hex)	write Write 01 (hex) to enable the function of the watchdog timer. Disabled is set as default.
F0 (hex)	write Set seconds or minutes as units for the timer. Write 0 to bit 3: set second as counting unit. [default] Write 1 to bit 3: set minutes as counting unit.
F1 (hex)	write 0: stop timer [default] 01~FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F5 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.
F2 (hex)	read/write Bit 7: Write 1 to enable mouse to reset the timer, 0 to disable [default]. Bit 6: Write 1 to enable keyboard to reset the timer, 0 to disable. [default] Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0] Bit 4: Read status of watchdog timer, 1 means timer is "timeout".
AA (hex)	----- Write this address to I/O port 2E (hex) to lock the watchdog timer 2.

A.1.3 Example Program

1. Enable watchdog timer and set 10 sec. as timeout interval

```

;-----
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;-----
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;-----
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;-----
Dec dx ; Set second as counting unit
Mov al,0f0h
Out dx,al
Inc dx
In al,dx
And al,not 08h
Out dx,al
;-----
Dec dx ; Set timeout interval as 10 seconds and start counting
Mov al,0f1h
Out dx,al
Inc dx
Mov al,10
Out dx,al
;-----
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al

```

2. Enable watchdog timer and set 5 minutes as timeout interval

```

;-----
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al

```

```

;-----
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;-----
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;-----
Dec dx ; Set minute as counting unit
Mov al,0f0h
Out dx,al
Inc dx
In al,dx
Or al,08h
Out dx,al
;-----
Dec dx ; Set timeout interval as 5 minutes and start counting
Mov al,0f1h
Out dx,al
Inc dx
Mov al,5
Out dx,al
;-----
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
3. Enable watchdog timer to be reset by mouse
;-----
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;-----
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;-----

```

```

Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;-----
Dec dx ; Enable watchdog timer to be reset by mouse
Mov al,0f2h
Out dx,al
Inc dx
In al,dx
Or al,80h
Out dx,al
;-----
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
4. Enable watchdog timer to be reset by keyboard
;-----
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;-----
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;-----
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;-----
Dec dx ; Enable watchdog timer to be strobed reset by keyboard
Mov al,0f2h
Out dx,al
Inc dx
In al,dx
Or al,40h
Out dx,al

```

```

;-----
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
5. Generate a time-out signal without timer counting
;-----
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;-----
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;-----
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;-----
Dec dx ; Generate a time-out signal
Mov al,0f2h
Out dx,al ;Write 1 to bit 5 of F7 register
Inc dx
In al,dx
Or al,20h
Out dx,al
;-----
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al

```

Appendix **B**

Programming the
GPIO

B.1 Supported GPIO Register

Bellow are detailed description of the GPIO addresses and programming sample.

B.1.1 GPIO Registers

CRE4 (GP10-GP17 I/O selection register. Default 0xFF)

When set to '1', the respective GPIO port is programmed as an input port.

When set to '0', the respective GPIO port is programmed as an output port.

CRE5 (GP10-GP17 data register. Default 0x00)

If a port is programmed to be an output port, then its respective bit can be read/written.

If a port is programmed to be an input port, then its respective bit can only be read.

CRE6 (GP10-GP17 inversion register. Default 0x00)

When set to '1', the incoming/outgoing port value is inverted.

When set to '0', the incoming/outgoing port value is the same as in data register.

Extended Function Index Registers (EFIRs)

The EFIRs are write-only registers with port address 2Eh or 4Eh on PC/AT systems.

Extended Function Data Registers (EFDRs)

The EFDRs are read/write registers with port address 2Fh or 4Fh on PC/AT systems

B.1.2 GPIO Example Program

 Enter the extended function mode, interruptible double-write

```
MOV DX, 2EH
MOV AL, 87H
OUT DX, AL
OUT DX, AL
```

 Configure logical device 7(GP10~GP17), configuration register CRE4,CRE5,CRE6

```
MOV DX, 2EH
MOV AL, 07H ; Point to Logical Device Number Reg.
OUT DX, AL
MOV DX, 2FH
MOV AL, 07H ; Select logical device 7
OUT DX, AL
```

 Configure GPIO1 I/O Register

```
MOV DX, 2EH
MOV AL, E4H
OUT DX, AL
MOV DX, 2FH
MOV AL, ??H ; 0: The respective GPIO1 PIN is programmed as an output port
              ;1: The respective GPIO1 PIN is programmed as an input port.
OUT DX, AL
```

 Configure GPIO1 Inversion Register

```
MOV DX, 2EH
MOV AL, E6H
OUT DX, AL
MOV DX, 2FH
MOV AL, 00H ; Set GPIO is normal not inverter
OUT DX, AL
```

 Configure GPIO1 Data Register

```
MOV DX, 2EH
MOV AL, E5H
OUT DX, AL
MOV DX, 2FH
MOV AL, ??H ; Put the output value into AL
OUT DX, AL
```

Exit extended function mode

```
MOV DX, 2EH
MOV AL, AAH
OUT DX, AL
```

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