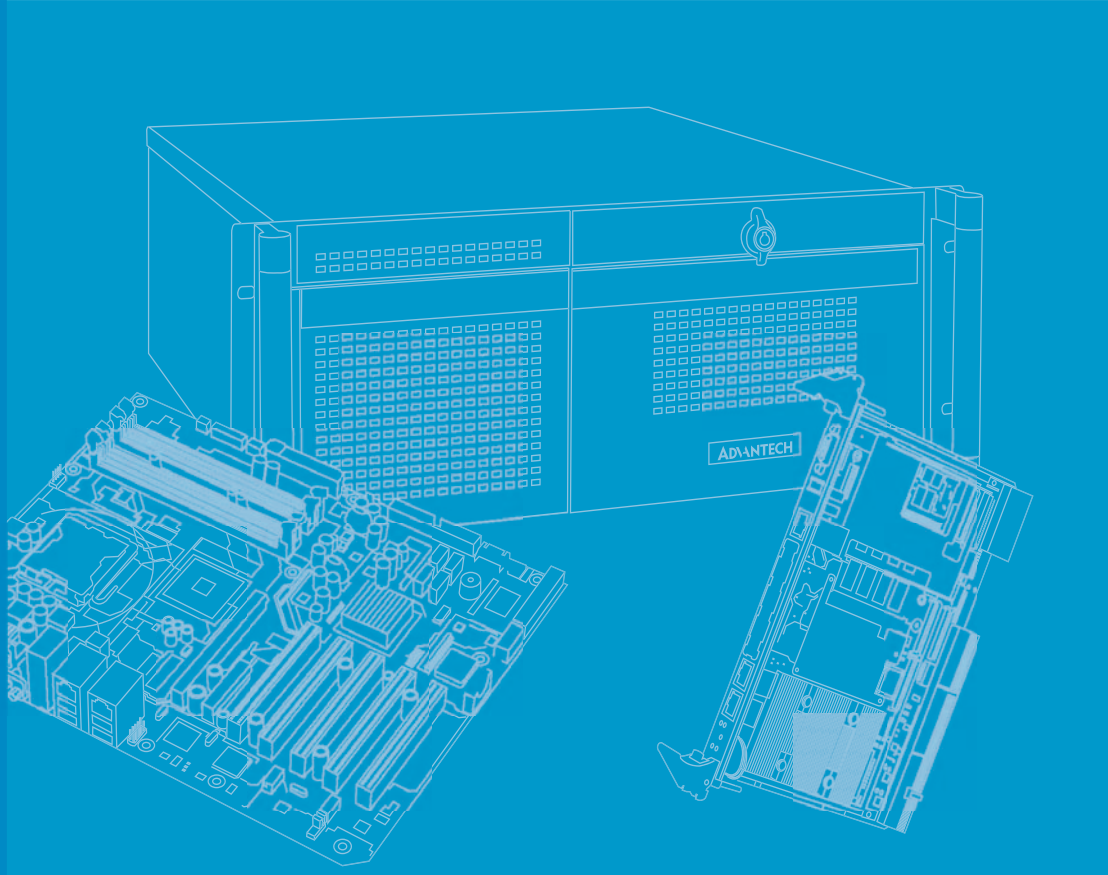


User Manual

MIC-7900

Embedded Fan-less IPC System

ADVANTECH

Enabling an Intelligent Planet

Attention!

Please note:

This package contains a hard-copy user manual in Chinese for China CCC certification purposes, and there is an English user manual included as a PDF file on the CD. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

Copyright

The documentation and the software included with this product are copyrighted 2017 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

Award is a trademark of Award Software International, Inc.

Intel® and Pentium® are trademarks of Intel Corporation.

Microsoft Windows® is a registered trademark of Microsoft Corp.

Cooper is a trademark of Eaton Corporation.

Infineon is a trademark of Infineon Technologies.

TI is a trademark of Texas Instruments.

Asmedia is a trademark of Asmedia Technology INC.

Exar is a trademark of Exar Corporation.

INTERSIL is a trademark of Intersil Corporation.

Nuvoton is a trademark of Nuvoton Technology Corporation.

Vcore is a trademark of International Rectifier

Foxconn is trademark of Foxconn Interconnect Technology

All other product names or trademarks are properties of their respective owners.

For more information about this and other Advantech products, please visit our web-site at:

http://www.advantech.com/

http://www.advantech.com/ePlatform/

For technical support and service, please visit our support website at:

http://support.advantech.com.tw/support/

Part No. 2001790020 Edition 1

Printed in China January 2017

Product Warranty (2 years)

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

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

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

If you think you have a defective product, follow these steps:

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

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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.

Technical Support and Assistance

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

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-7900 bare-bone system x 1
- MIC-7900 Startup manual x 1 P/N: 2001790000
- MIC-7900 Startup manual x1 (CHT) P/N: 2001790010
- MIC-7900 Driver CD x 1 P/N: 2061790000
- 4-pin Phoenix connector P/N: 1652003234
- Mounting bracket x 2 P/N: 1960070543N001
- SATA cable x 1 P/N: 1700013095
- SATA Power cable x 1 P/N: 1700024372-01
- 2xDP9 Ports cable x 2 P/N: 1700019968

Ordering Information

Module Number	CPU	VGA	2.5' HDD	CFast	USB3.0	GbE LAN	COM	PCIE/PCI Exp	Power
MIC-7900-S5A1E	D-1559	1	1	1	4	4	2	i-module (Optional)	DC9~36V
MIC-7900-S6A1E	D-1539	1	1	1	4	4	2	i-module (Optional)	DC9~36V

Optional i-Module

Module Number	Description
4-slot Expansion module	
MIC-75M13-00A1E	1 x PCIEx16+3xPCI slot i-module
MIC-75M40-00A1E	1 x PCIEx8+3xPCIEx4 slot i-module
2-slot Expansion module	
MIC-75M20-00A1E	1 x PCIEx16+1xPCIEx4 slot i-module
MIC-75M20-01A1E	2 x PICEx 8 slot i-module
MIC-75M11-00A1E	1 x PCIEx16+1xPCI slot i-module
2-slot Expansion and Storage Module	
MIC-75S20-00A1E	2 x PCIE slot + 2x2.5” hot-swap HDDs

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
1700018704	Power cord BSI 3PIN UK 1.8M
AIIS-DIO32-00A1E	AIIS-32bit GPIO module
98R2C48510E	Isolation COM module
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-pcieex-pansion-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-75M20-01/MIC-75M11)

Contents

Chapter 1 General Introduction 1

1.1 Introduction 2
1.2 Product Features 2
1.2.1 General 2
1.2.2 Display 2
1.2.3 Ethernet 2
1.3 Chipset 3
1.3.1 Functional specification 3
1.4 Mechanical Specifications 4
1.4.1 Dimensions 4
Figure 1.1 MIC-7900 Mechanical Dimension Drawing 4
1.4.2 Weight 5
1.5 Power Requirements 5
1.5.1 System power 5
1.5.2 RTC battery 5
1.6 Environment Specification 5
1.6.1 Operating temperature 5
1.6.2 System safety certification test temperature 5
1.6.3 Relative humidity 5
1.6.4 Storage temperature 5
1.6.5 Vibration during operation 5
1.6.6 Shock during operation 5
1.6.7 Safety 5
1.6.8 EMC 5

Chapter 2 H/W Installation.....7

2.1 Introduction 8
2.2 Jumpers 8
2.2.1 Jumper Description 8
2.2.2 Jumper List 9
Table 2.1: Jumper List 9
2.3 Connectors 10
2.3.1 MIC-7900 External I/O Connectors 10
Figure 2.1 MIC-7900 Front View 10
Table 2.2: COM Connector Pin Assignments 10
Figure 2.2 Ethernet Connector 11
Table 2.3: Ethernet Connector Pin Assignments 11
Figure 2.3 Audio Connector 11
Table 2.4: Audio Connector Pin Assignments 11
Figure 2.4 USB 3.0 Connector 12
Table 2.5: USB 3.0 Connector Pin Assignment 12
Figure 2.5 VGA Connector 12
Table 2.6: VGA Connector Pin Assignments 12
Figure 2.6 4-pin Header 13
Table 2.7: Pin Assignments for Power Connector Pin Header .. 13
Figure 2.7 Power Button 13
Figure 2.8 LED Indicators 13
2.4 Installation 14
2.4.1 HDD Installation 14
2.4.2 Memory Installation 15
2.4.3 Mini-PCIe Installation 16
2.4.4 Internal USB 2.0 Installation 16
2.4.5 COM 3/4 Ports Installation 16

2.4.6 MIC-7900 MB I/O Connector 17

Chapter 3 AMI BIOS Setup 19

3.1 Introduction 20
3.2 Entering Setup 21
3.2.1 Main Setup 21
3.2.2 Advanced BIOS Features Setup 22
3.2.3 IntelRCSetup 39
3.2.4 Security 63
3.2.5 Boot 64
3.2.6 Save & Exit 66

Chapter 4 Software Installation 67

4.1 Chipset Software Installation Utility 68
4.1.1 Before you begin 68
4.1.2 Introduction 68
4.1.3 Windows Server 2012 / Windows 10 / Windows 8.1 / Windows 7 .. 69
4.2 Integrated Graphic Device Setup 69
4.2.1 Introduction 69
4.2.2 Windows Server 2012 / Windows 10 / Windows 8.1 / Windows 7 / Linux Driver Setup 69
4.3 Install USB 3.0 70
4.3.1 Introduction 70
4.4 LAN Configuration 70
4.4.1 Introduction 70
4.4.2 Features 70
4.4.3 Installation 70
4.4.4 Windows Server 2012 / Windows 10 / Windows 8.1 / Windows 7 .. 71
4.5 TPM 71
4.5.1 Introduction 71
4.5.2 TPM installation 71

Appendix A Programming the Watchdog Timer . 73

A.1 Programming the Watchdog Timer 74
A.1.1 Watchdog Timer Overview 74
A.1.2 Programming the Watchdog Timer 74
Table A.1: Watchdog Timer Registers 76
A.1.3 Example Program 77

Appendix B Programming the GPIO 81

B.1 Supported GPIO Register 82
B.1.1 GPIO Registers 82
B.1.2 GPIO Example Program 83

Chapter 1

General Introduction

This chapter gives background information on MIC-7900.

1.1 Introduction

The MIC-7900 compact fan-less system is the most advanced Intel® Xeon® Broadwell-DE SoC series platform for server-grade IPC applications that require high-performance computing power & flexible expansion slot module (i-module). MIC-7900 supports Intel Xeon D-1559 & D-1539 processor and SO-DIMM DDR4 ECC or non-ECC memory up to 32 GB. MIC-7900 also supports full range of i-module that including MIC-75M13/MIC-75M40/MIC-75M20-01/MIC-75M11 and MIC-75S20. This system total supports a lot off storage space, five for 2.5' storage and one for M.2. MIC-7900 combined with i-module (MIC-75S20) that can support to five 2.5' storage and two for Hot swappable tray.

In addition, the MIC-7900 use a highly flexible modular design that supports a lot of module for different application which including Isolation COM module and DIO module IC-7900 supports 4 Gigabit Ethernet LAN ports for industrial server/networking application.

These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.

1.2 Product Features

1.2.1 General

- **CPU:** Intel® Xeon Processor Broadwell-DE SoC CPU
- **System Memory:** Dual 260pin SODIMM DDR4 socket, up to 32GB, support ECC.
- **HDD:**
  - Supports 1 drive bay space for SATA 2.5" HDD/SSD
  - Supports 1 CFast slot
- **M.2:** Support 1 x M.2 socket (PCIE signal only)
- **Graphic:** VGA
- **Ethernet Port:** 4 x RJ45 (2 by LAN module)
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **I/O Interface:** 2 x RS232/422/485
- **USB:** 4 x USB3.0
- **Audio:** Line-out, Mic-in
- **Expansion interface:** 1 x Mini-PCIe socket with U-SIM

Note! *MIC-7900 does not support m-SATA storage.*

1.2.2 Display

- **Chipset:** ASPEED 1400 controller with 256 MB VGA memory provides basic 2D VGA function.
- **Resolution:**
  - VGA: Supports up to 1920 x 1200 @ 60 Hz

1.2.3 Ethernet

- **Chipset:**
  - LAN 1: Intel® i210IT
  - LAN 2: Intel® i210IT
  - LAN 3: Intel® i210IT
  - LAN 4: Intel® i210IT
- **Speed:** 10/100/1000 Mbps
- **Interface:** 4 x RJ45
- **Standards:** 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® Xeon Processor Broadwell-DE SoC CPU Manufacturing Technology: 14nm

1.3.1.2 Chipset

Memory	■ Support DDR4-2133MHz up to 32 GB ■ SODIMM Socket: – 260-pin SODIMM socket*2 ■ Support ECC
Chipset integrated Intel HD Graphic	■ ASPEED 1400 controller with 256 MB VGA memory provides basic 2D VGA function. ■ IO interface – VGA: Support resolution up to 1920 x 1200 @ 60 Hz (VGA connector: On-board D-SUB 15P)
SATA Interface	**CPU: Intel Xeon Processor Broadwell-DE** ■ Four (4) SATA Revision 3.0 ports ■ Native AHCI appearance to OS ■ Partial/Slumber power management modes ■ Capable of 6Gbit/s transfer rate
Audio Link	**CPU: TI PCM2912** ■ 16-bit DAC and 16-bit ADC
USB Interface	**CPU: Intel Xeon Processor Broadwell-DE** ■ USD host interface for 4 x USB3.0 port ■ Supports high-speed, full-speed, and low-speed capable ■ Supports legacy keyboard/mouse software
Power Management	**CPU: Intel Xeon Processor Broadwell-DE** ■ Supports ACPI 5.0 ■ ACPI Power Management Logic Supported ■ Power Connector: Plug-in block 4Px1
BIOS	■ AMI 128Mb Flash BIOS via SPI

1.3.1.3 Others

Serial ports	**Nuvoton NCT 6106D supported** ■ Up to 6 serial ports by Nuvoton NCT6106D supported ■ High speed NS16C550A compatible UARTs with date 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 to RS-232 Serial ports connector: D-SUB CON.9P
LAN 1/2	**LAN1: Intel® i210IT; LAN2: Intel® i210IT** ■ Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.ab. ■ Supports 10/100/1000 Mbps ■ Supports Wake on LAN
LAN 3/4	**LAN3: Intel® i201IT; LAN4: Intel i210IT** ■ Compliant with IEEE 802.3, IEE 802.3u, IEEE 802.2b. ■ Support 10/100/1000Mbps ■ (note: LAN 3/4 is expanded by LAN module)
Audio	**TI PCM2912** ■ 16-bit DAC and 16-bit ADC ■ Audio Jack (MIC-in & Line-out) ■ mono recording, DAC support 16bit
Battery backup	■ BR2032 3V/190mAh

1.4 Mechanical Specifications

1.4.1 Dimensions

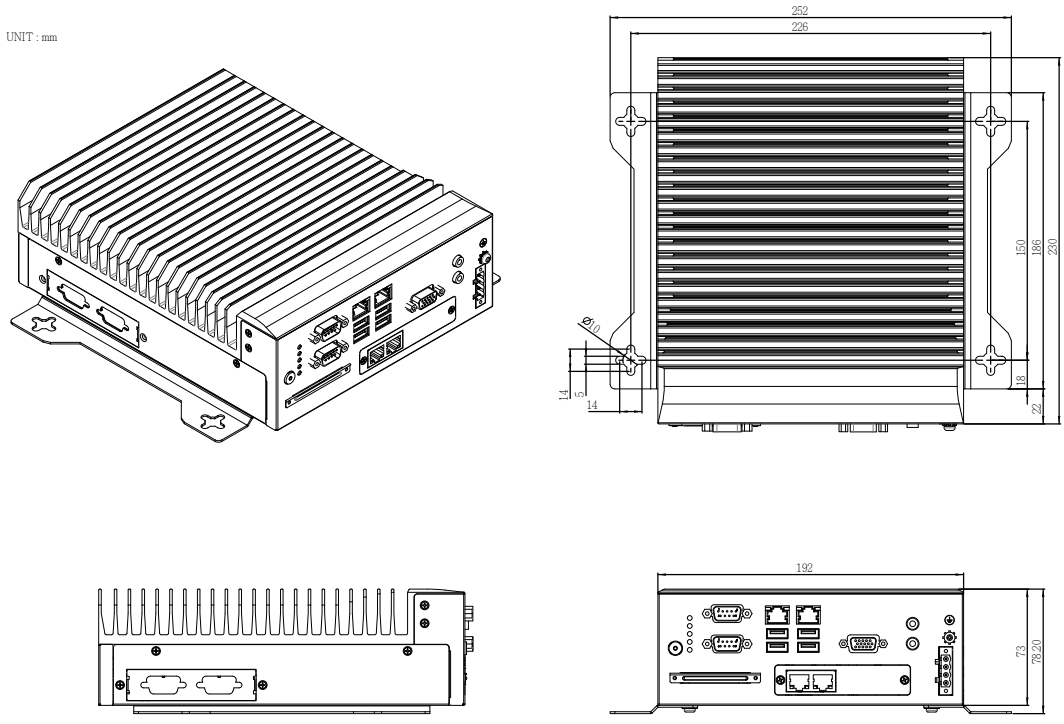


Figure 1.1 MIC-7900 Mechanical Dimension Drawing

1.4.2 Weight

2.9kg (6.39lbs)

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

- -20 ~ 50 °C 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” SSD

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

- CCC, BSMI

1.6.8 EMC

- CE, FCC, CCC, BSMI

Chapter 2

H/W Installation

This chapter introduces external I/O and the installation of MIC-7900 hardware.

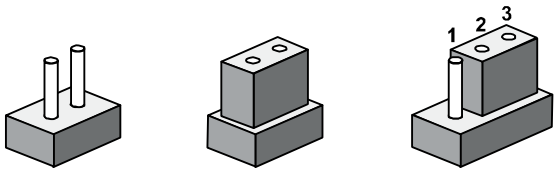
2.1 Introduction

The following sections show the internal jumper settings and the external connectors and pins assignment for applications.

2.2 Jumpers

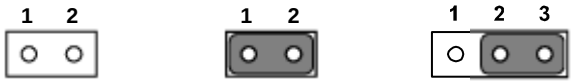
2.2.1 Jumper Description

You may configure the MIC-7900 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, labelled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



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

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



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

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

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-7900 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-7900 support AT or ATX mode and Default is ATX module. if you want to change to AT mode that you can find AT/ATX mode jumper in 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-7900 supports ME Enable & Disable and Default is “Disable”. If you want to change the ME mode that you can set ME mode jumper in Mother-board.

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-7900 single board computer contains a jumper that can set Watch-Dog 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-7900 External I/O Connectors

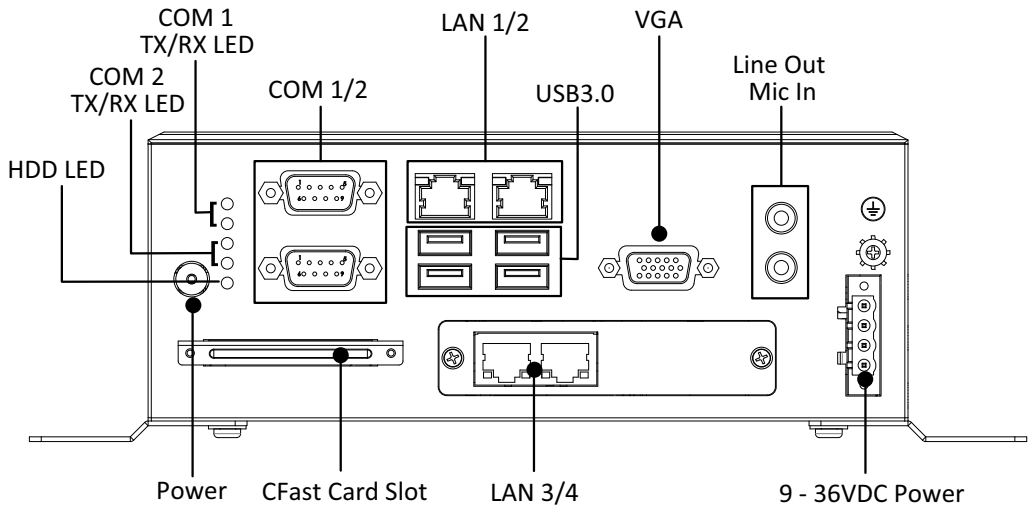


Figure 2.1 MIC-7900 Front View

2.3.1.1 COM Connector

MIC-7900 provides two 9 pin D-Sub connector that offer RS-232/422/485. Default setting is RS-232 and can be modified by BIOS selection table. MIC-7900 also provides 4 more COM RS-232 Pin header inside which expanded by cable. You can find cable in accessory box. Please refer Pin header location in Chapter 3.

Table 2.2: COM Connector Pin Assignments

	RS-232	RS-422	RS-485
Pin	**Signal Name**	**Signal Name**	**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-7900 is equipped with four Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. These four LAN are equipped with intel i210IT.. 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.

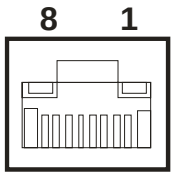


Figure 2.2 Ethernet Connector

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-

Note! *LAN3/4 is expanded by LAN module.*

2.3.1.3 Audio Connector

MIC-7900 has two stereo audio ports with phone jack connectors, one Line_Out, one Mic_In. The audio chip is controlled by TI PCM2912.

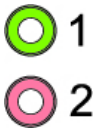


Figure 2.3 Audio Connector

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-7900 provides 4 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.

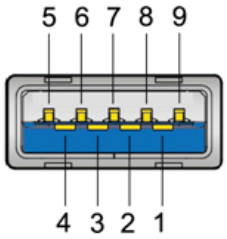


Figure 2.4 USB 3.0 Connector

Table 2.5: USB 3.0 Connector Pin Assignment	
Pin 1	+5V_SB
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-7900 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 1920 x 1200 @ 60 Hz.

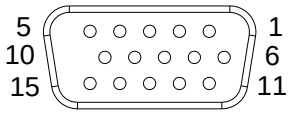


Figure 2.5 VGA Connector

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 Power Input Connector

MIC-7900 comes with a four-pin header as default that carries 9VDC - 36VDC external power input.

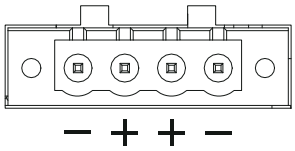


Figure 2.6 4-pin Header

Table 2.7: 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

2.3.1.7 Power ON/OFF Button

MIC-7900 comes with a Power On/Off button with LED indicators on the front side to show its On status (Green LED) and Off/Suspend status (RED LED), that supports dual function of Soft Power-On/Off (instant off or delay 4 seconds), and suspend.

Figure 2.7 Power Button

2.3.1.8 LED Indicators

MIC-7900 provides COM1 & COM2 TX/RX LED for date transmission status monitoring.

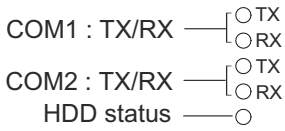
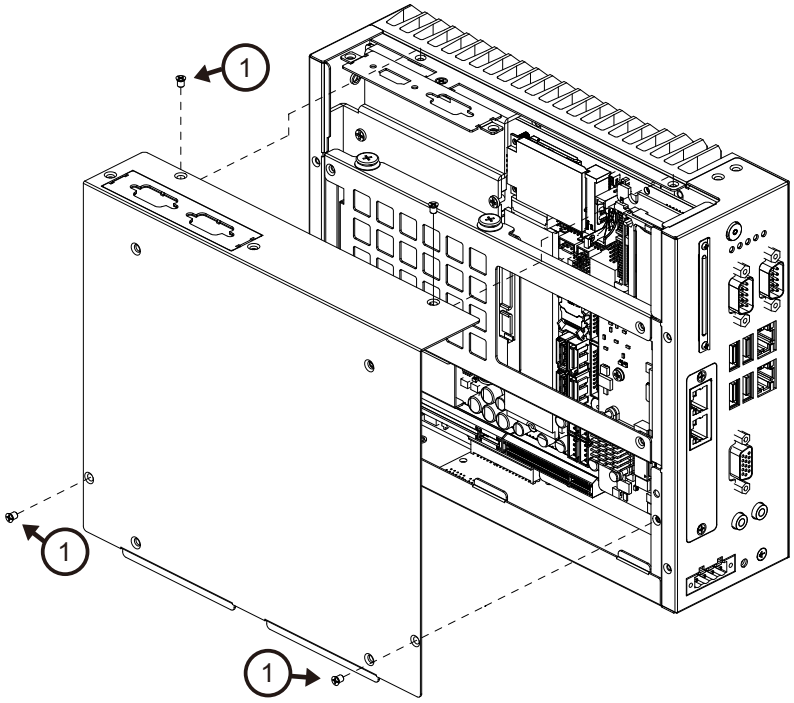


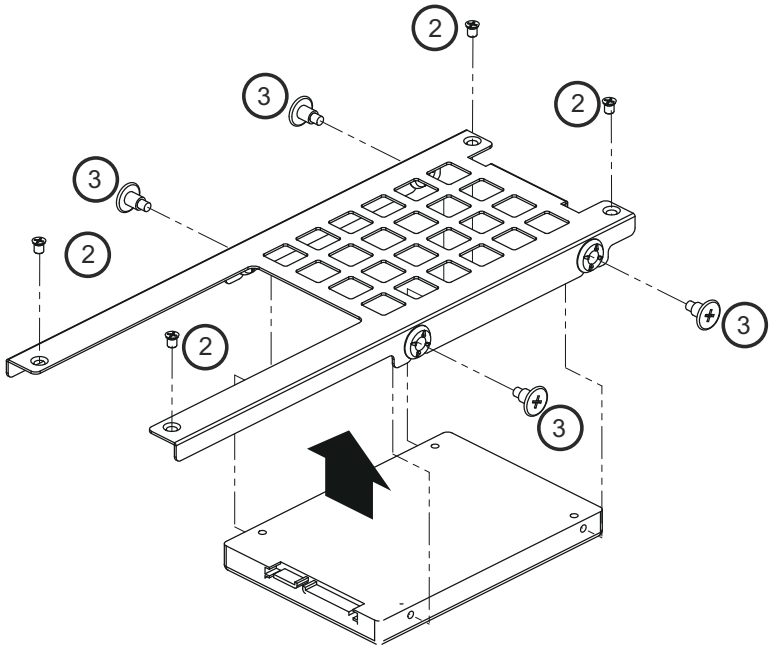
Figure 2.8 LED Indicators

2.4 Installation

2.4.1 HDD Installation

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





3. *Secure the HDD with 4xHDD screws (P/N:1930002235)*
4. *Assemble SATA cable/power cable and replace HDD tray; secure with 4 screws.*

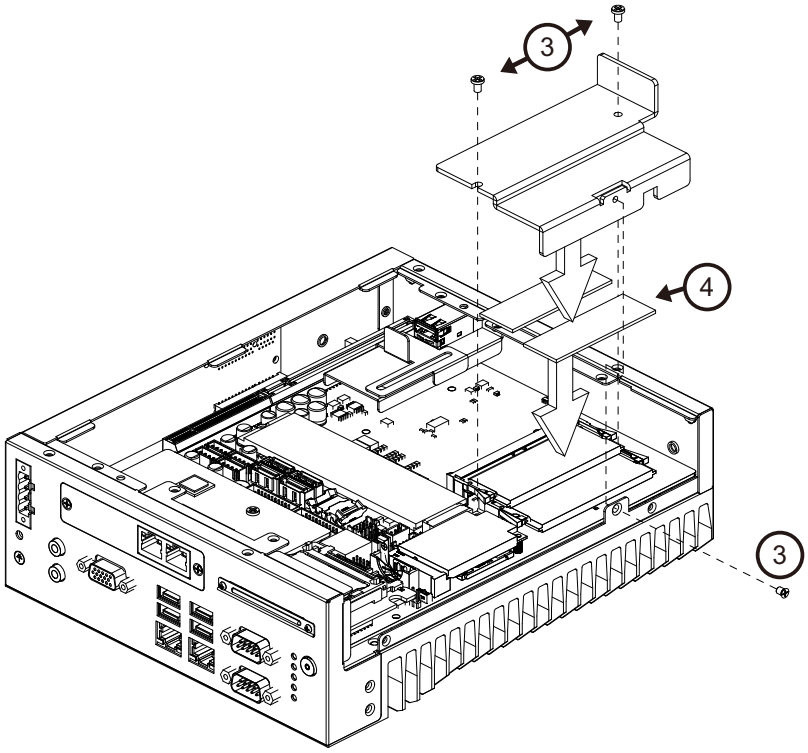
5. *Replace bottom cover.*

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

2.4.2 Memory Installation

MIC-7900 supports DDR4 SO-DIMM ECC or Un-ECC type memory module. If you needs detail memory support list, please connect your distributor or sales representative to order compatible memory modules.

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 on memory, and reassemble memory.*

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

Note! *ECC and Un-ECC memory module are unable compatible in MIC-7900 together.*

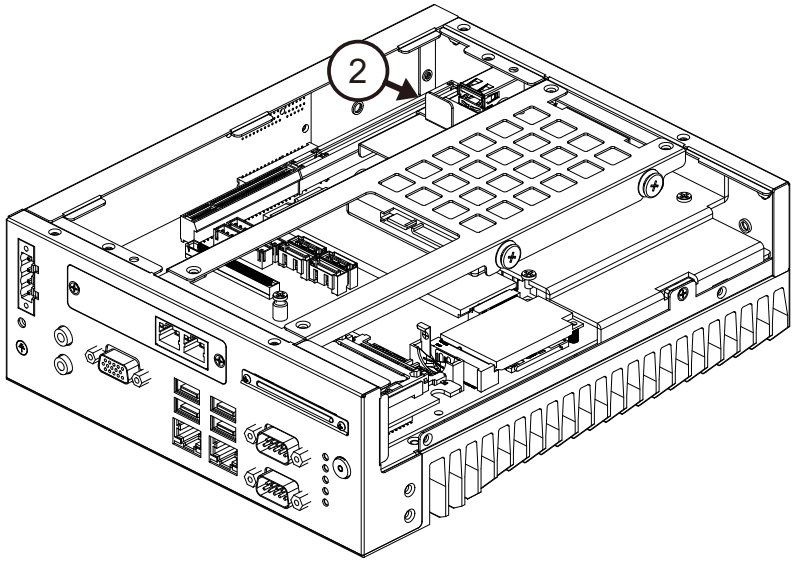
2.4.3 Mini-PCIe Installation

MIC-7900 supports one Mini-PCIE socket. Please note : MIC-7900 does not support m-SATA.

1. *Undo 4 screws and remove the bottom cover.*
2. *Install the module in Mini PCIe socket and secure with screws.*
3. *Replace bottom cover and secure with screws.*

2.4.4 Internal USB 2.0 Installation

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

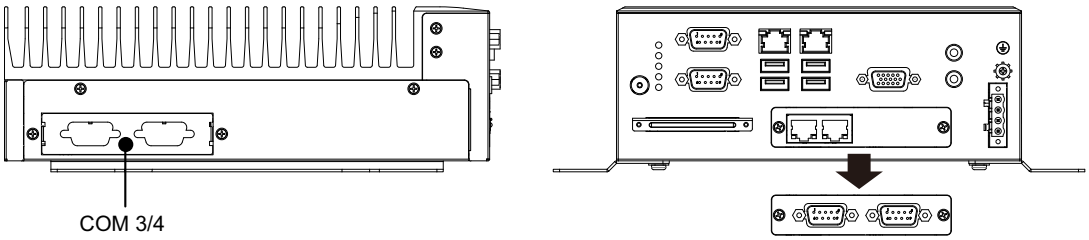


2.4.5 COM 3/4 Ports Installation

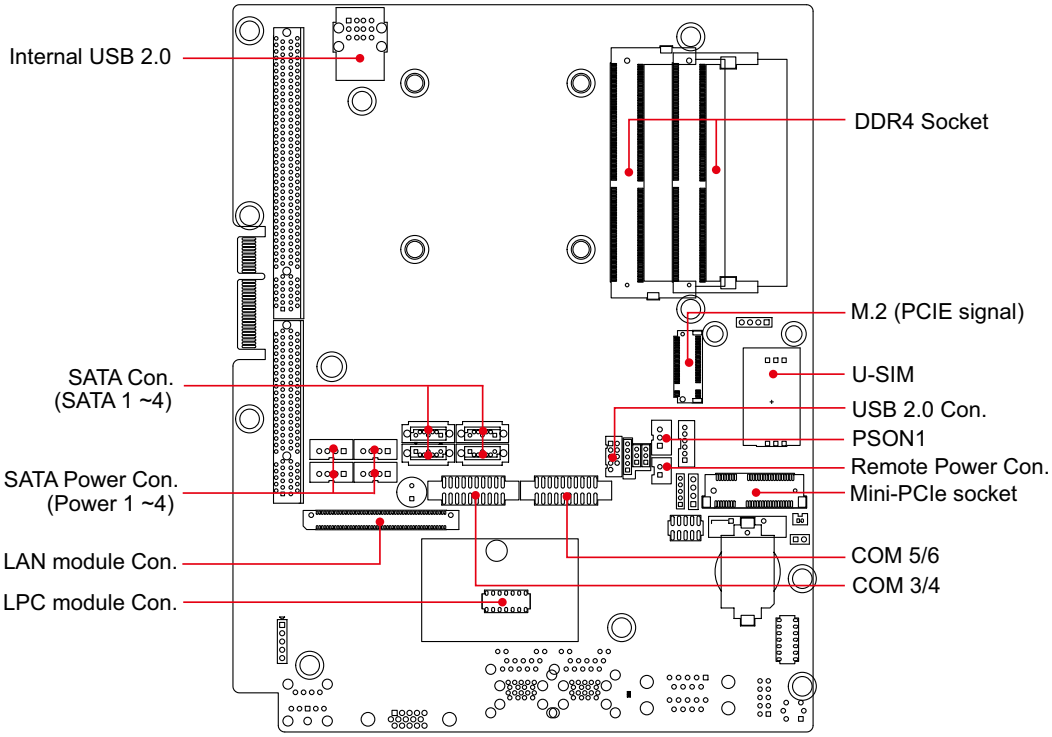
MIC-7900 has four standard serial ports. Two support RS-232/422/485. If more serial ports are needed, MIC-7900 can expand up to six serial ports by cable (RS-232 only). There is one DP9 cable in the accessory box.

1. *Undo 4 screws and remove the bottom cover.*
2. *Replace baffle plate for COMs 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.*

Note! *Replace LAN module for two more come.*



2.4.6 MIC-7900 MB I/O Connector



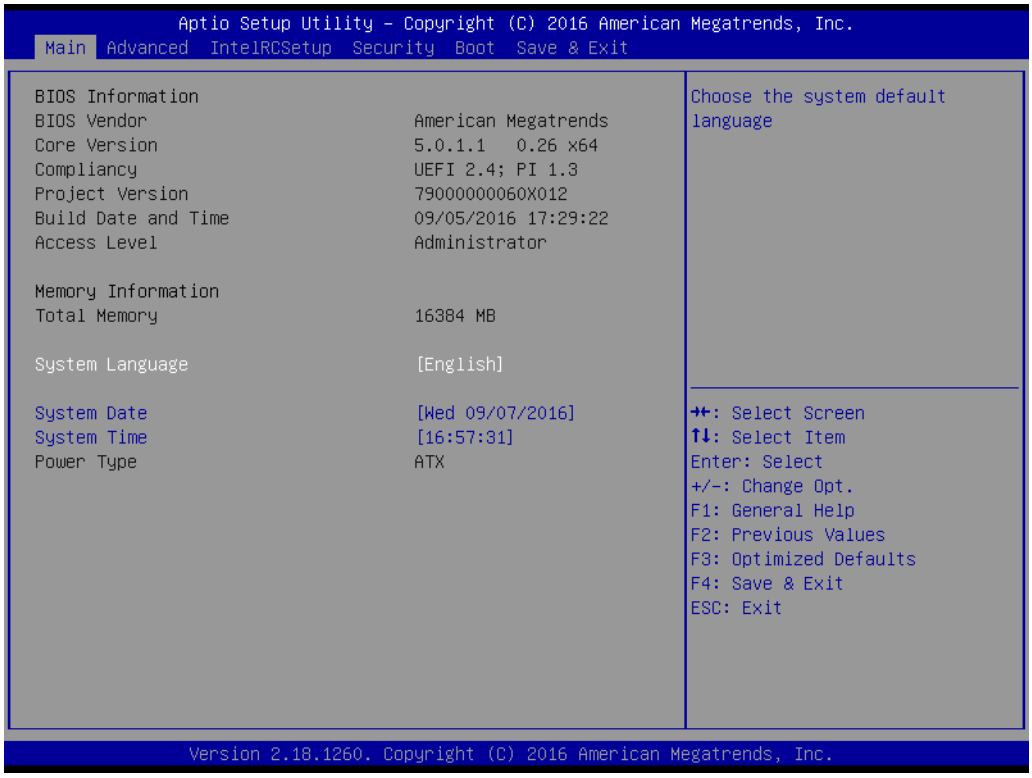
Chapter 3

AMI BIOS Setup

This chapter introduces how to set BIOS configuration data.

3.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the MIC-7900 setup screens.

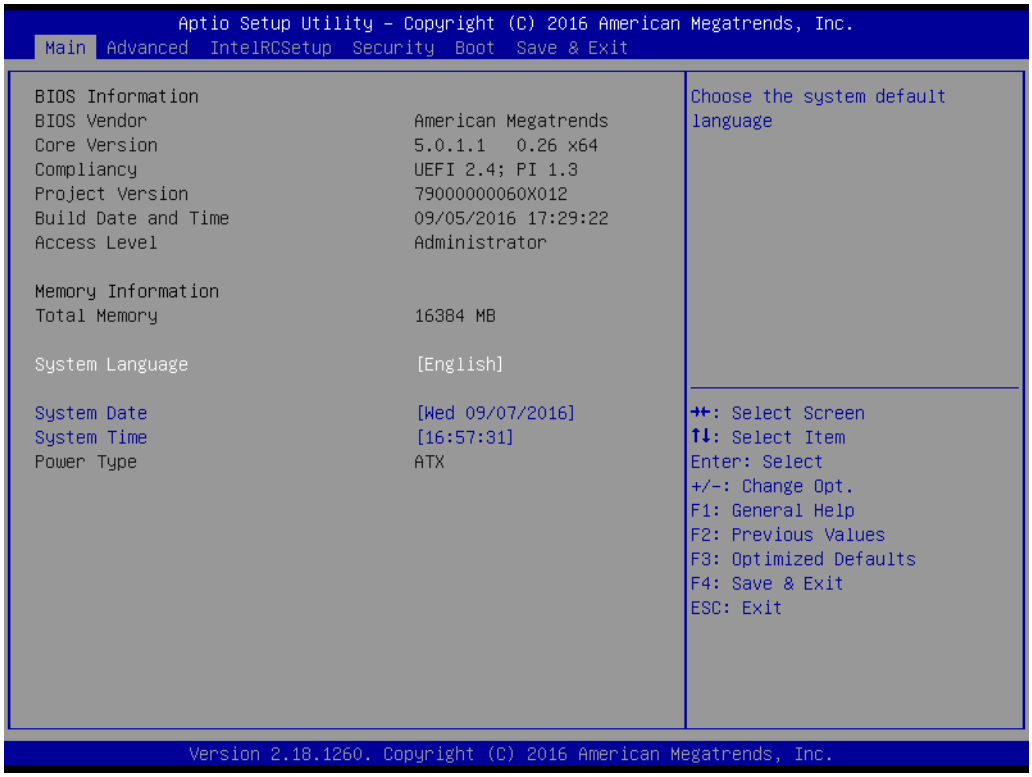


3.2 Entering Setup

Press the "Del" or "Esc." key during the Power On Self Test (POST) process to enter the BIOS setup screen, otherwise the system will continue the POST process.

3.2.1 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. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



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

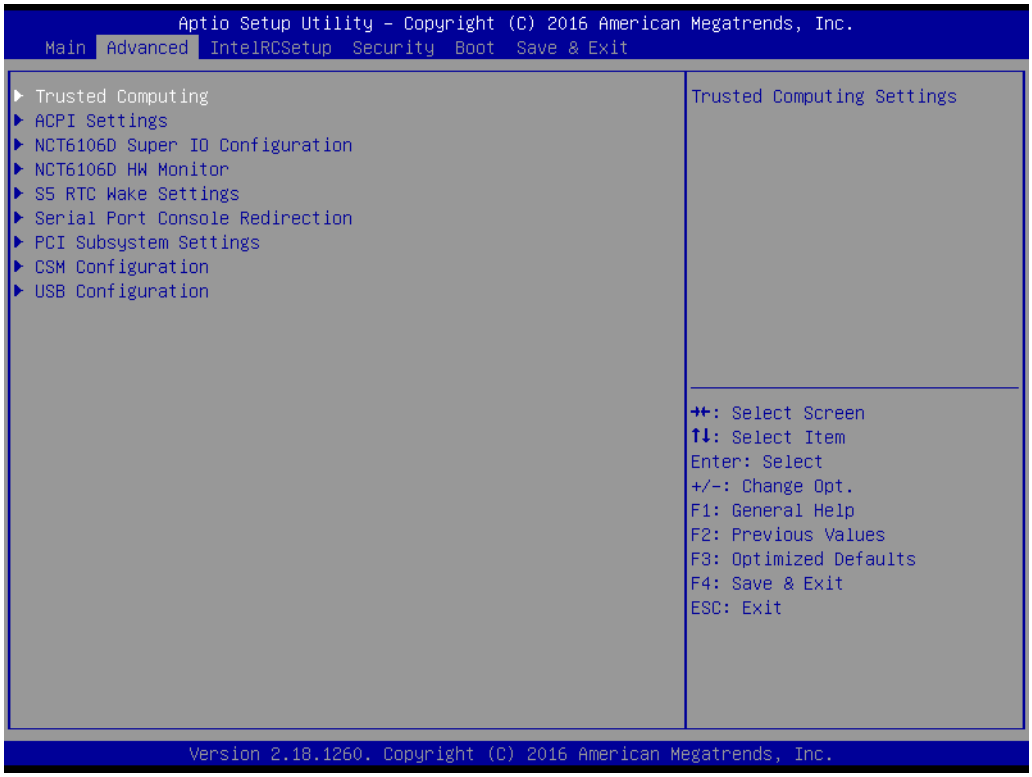
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

3.2.1.1 System Time / System Date

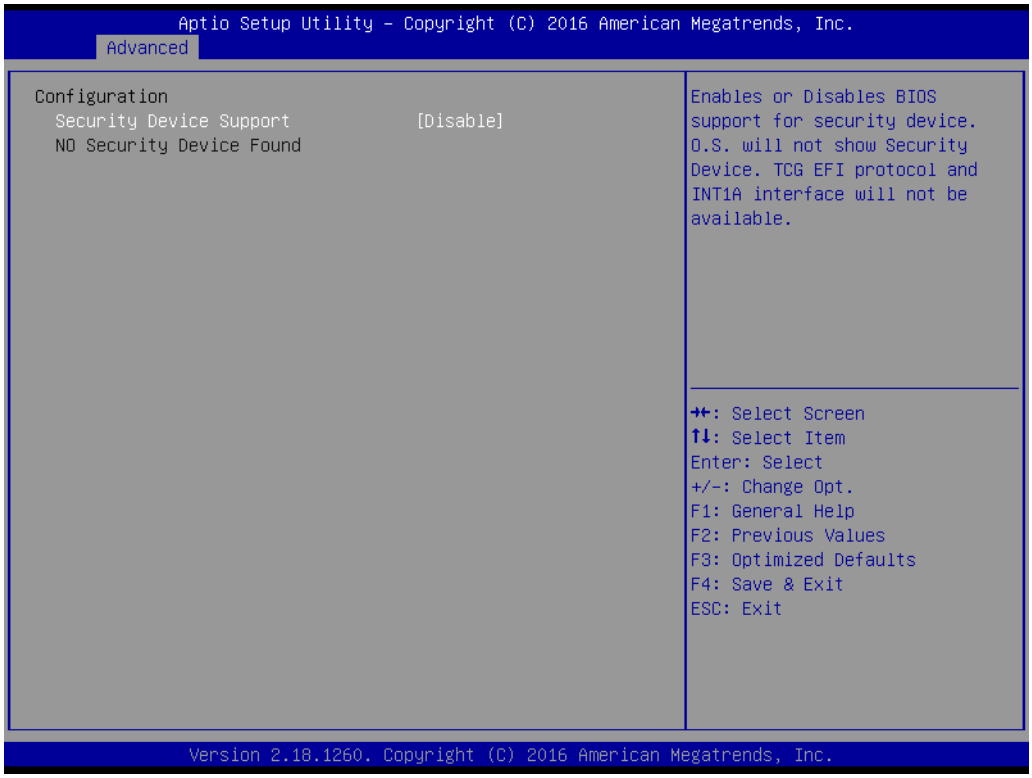
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIC-7900 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 ACPI Settings and hit <enter> 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 screen is shown below. The sub menus are described on the following pages.

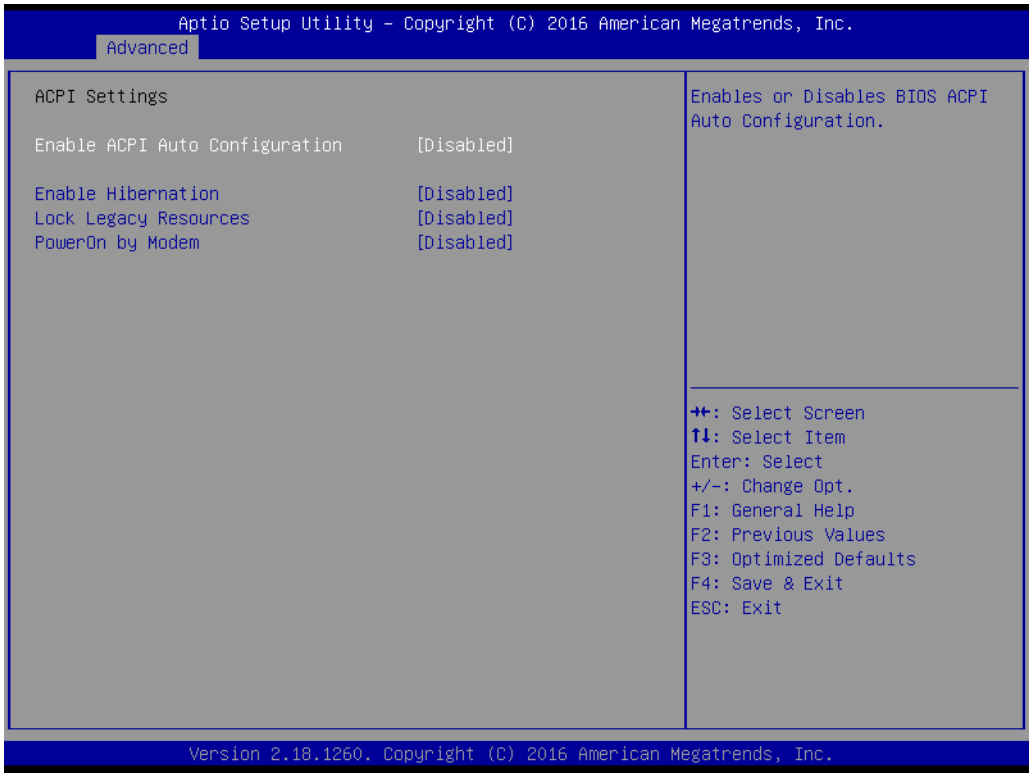


3.2.2.1 Trusted Computing



- Security Device Support
  This item allows users to enable or disable “Security Device Support”.

3.2.2.2 ACPI Settings

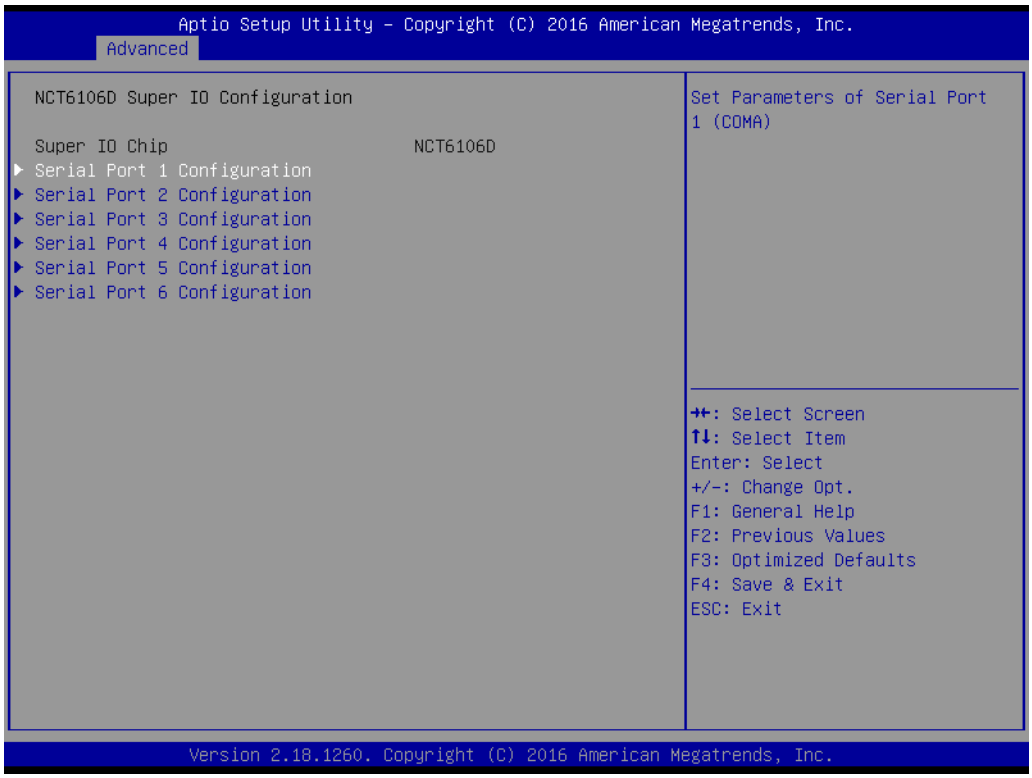


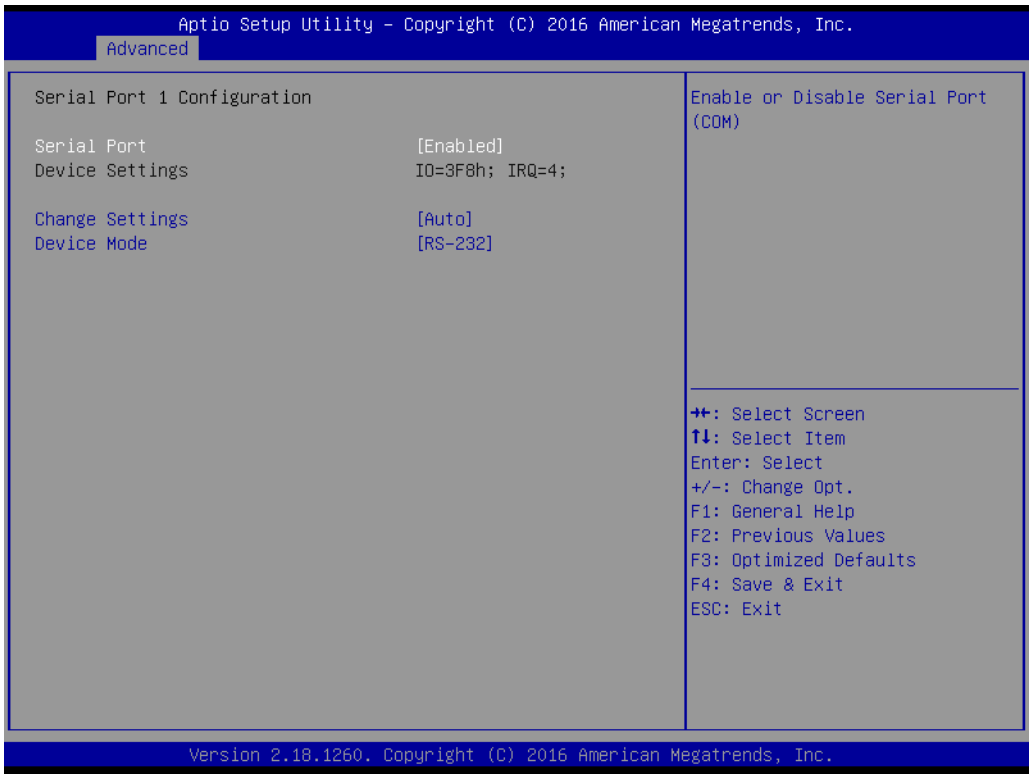
- **Enable ACPI Auto Configuration**
  This item allows users to select Enabled or Disabled.

- **Enable Hibernation**
  This item allows users to select Enabled or Disabled.
- **Lock Legacy Resources**
  This item allows user to select Enabled or Disabled " Lock Legacy Resources".
- **PowerOn by Modem**
  This item allows users to select Enabled or Disabled.

3.2.2.3 NCT 6106D Super IO Configuration

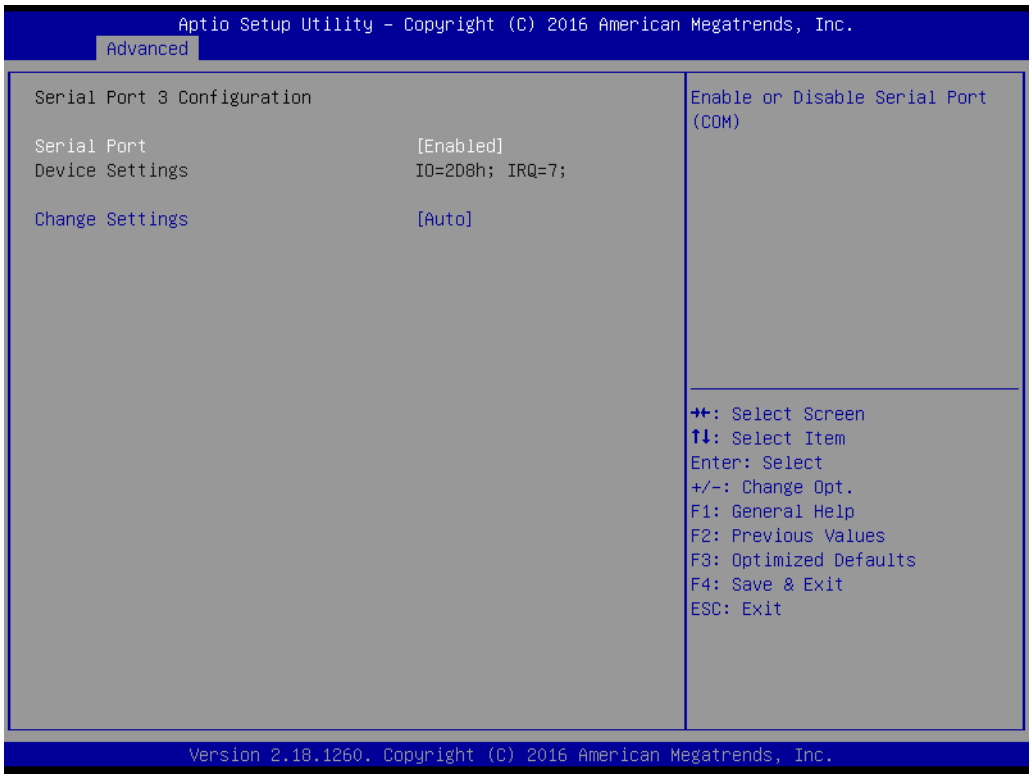
MIC-7900 supports 2xRS-232/422/485 & 2-RS-232 in front side. There are 2 more RS-232s (Serial Ports 5 & 6) signal at M/B, you can find a cable in the accessory box.





- **Serial Port 1 Configuration**
  - Serial Port
    This item allows users to select Enabled or Disabled for "Serial Port".
  - Change Settings
    This item allows users to Change Settings of Serial Ports. The default option is "Auto".
  - Device Mode
    This item allows users to select the mode of serial port. The default option is "RS-232".

- **Serial Port 2 Configuration**
  - Serial Port
    This item allows users to select Enabled or Disabled for "Serial Port".
  - Change Settings
    This item allows users to Change Settings of Serial Ports. The default option is "Auto".
  - Device Mode
    This item allows users to select the mode of serial port. The default option is "RS-232".



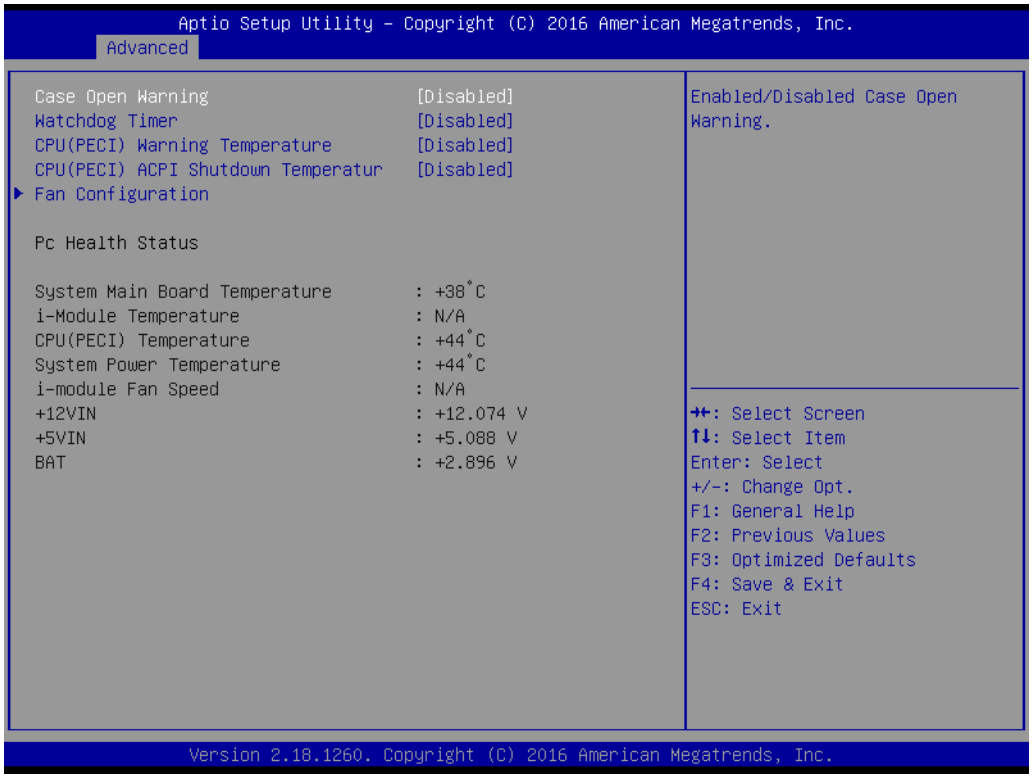
- **Serial Port 3 Configuration**
  - Serial Port
    This item allows users to select Disabled or Enabled "Serial Port".
  - Change Settings
    This item allows users to change settings of serial ports. The default option is "Auto".

- **Serial Port 4 Configuration**
  - Serial Port
    This item allows users to select Disabled or Enabled "Serial Port".
  - Change Settings
    This item allows users to change settings of serial ports. The default option is "Auto".

- **Serial Port 5 Configuration**
  - Serial Port
    This item allows users to select Disabled or Enabled "Serial Port".
  - Change Settings
    This item allows users to change settings of serial ports. The default option is "Auto".

- **Serial Port 6 Configuration**
  - Serial Port
    This item allows users to select Disabled or Enabled "Serial Port".
  - Change Settings
    This item allows users to change settings of serial ports. The default option is "Auto".

3.2.2.4 NCT6106D HW Monitor

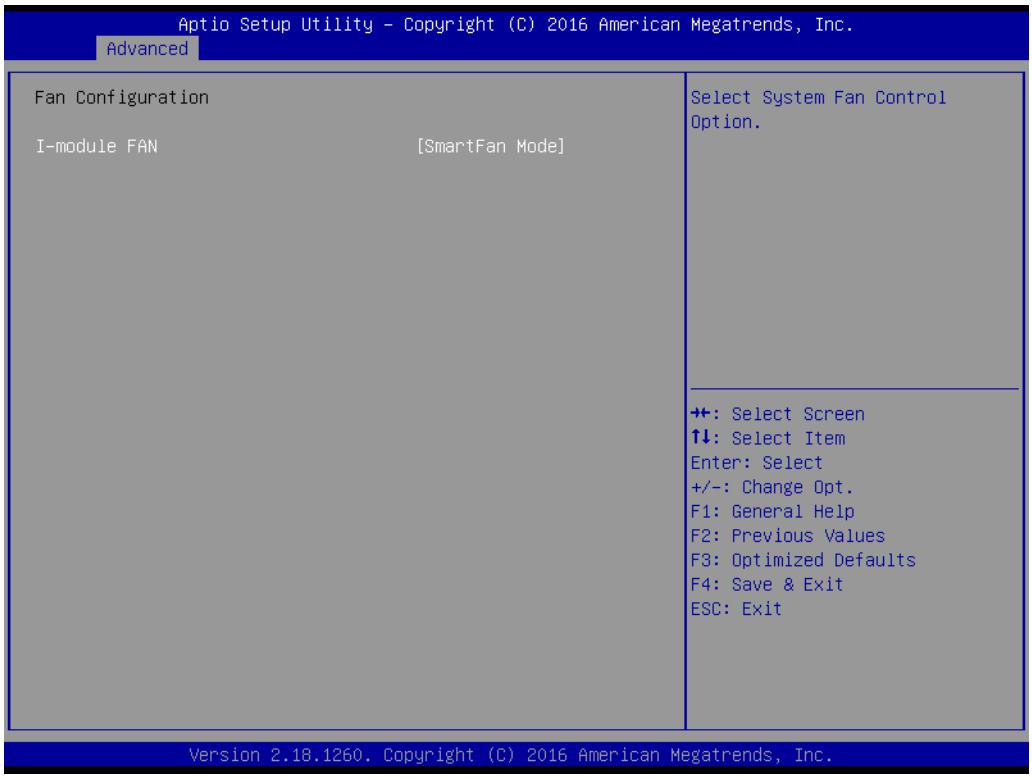


- **Case Open Warning**
  This item allows users to select Enabled or Disabled for "Case Open Warning".

Note! *MIC-7900 system does not support case-open switch in chassis. If your application needs case open function, please connect your distributor or sales representative.*

- **Watchdog Timer**
  This item allows user to select Enabled or Disabled for "Watchdog Timer"
- **CPU(PECI) Warning Temperature**
  This item allows users to change settings of CPU (PECI) Warning Temperature. The default option is "Disabled".
- **CPU(PECI)ACPI Shutdown Temperature**
  This item allows users to change Settings of CPU(PECI) ACPI Shutdown Temperature. The default option is "Disabled".

Fan Configuration

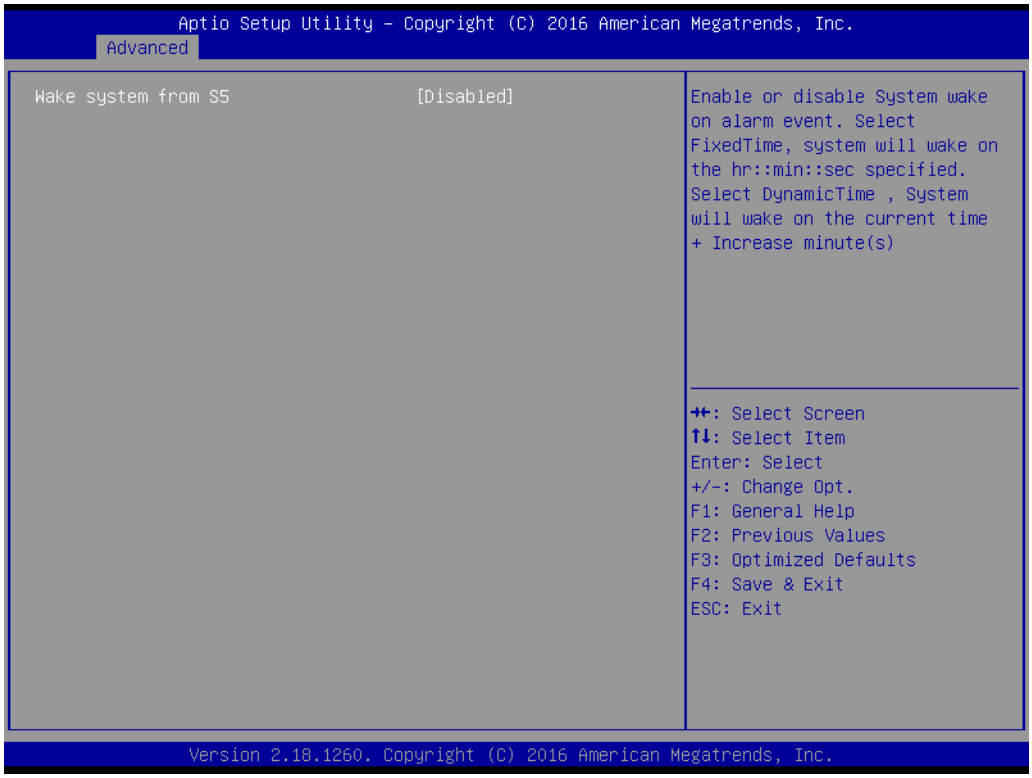


- **i-Module FAN**
  This item allows users to select Manual Mode or SmartFan Mode for i-Module.

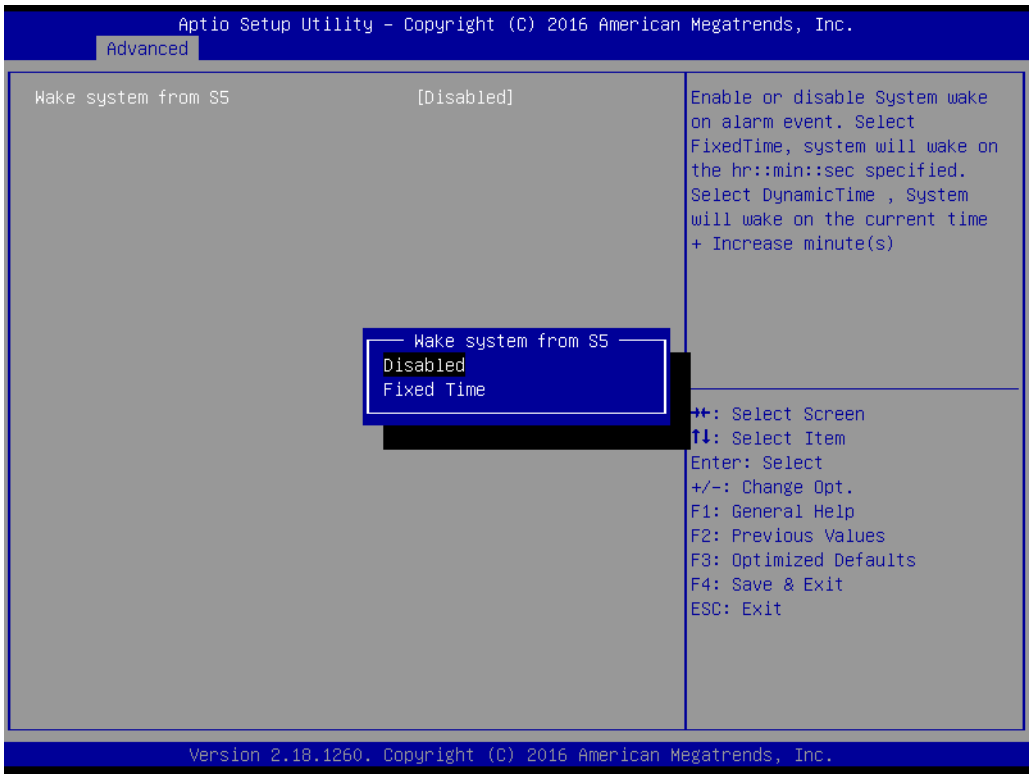
Note! *MIC-7900 system does not support FAN. This function only workable in MIC-7900 with i-Module +FAN.*

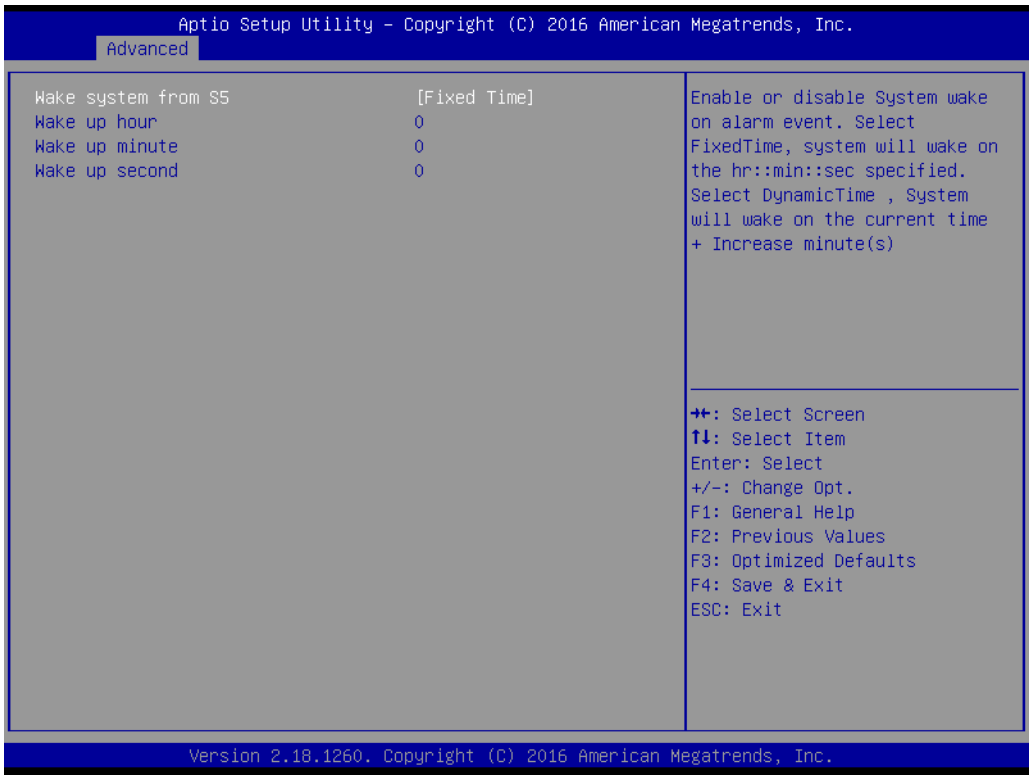
- PC Health Status
  MIC-7900 system has design-in temperature sensor to monitor system temperature. You can clear to read M/B, Power board, or i-Module Temperature status.

3.2.2.5 S5 RTC Wake Settings



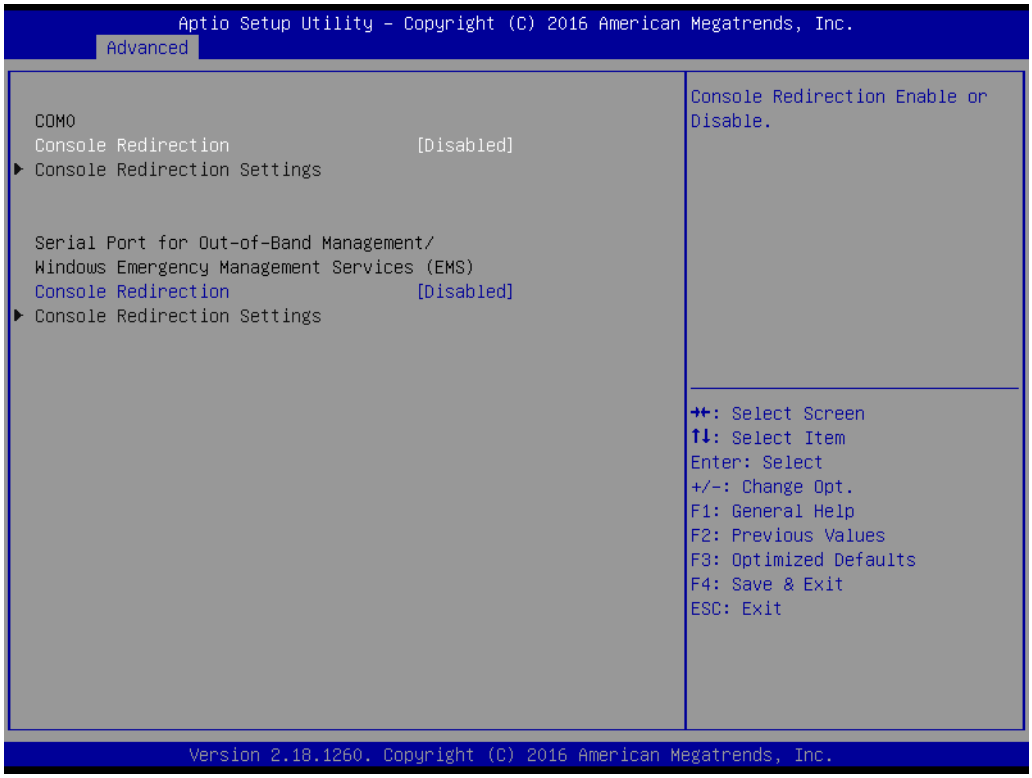
- **Wake System from S5**
  This item allows user to select Disabled or Fixed Time for "Wake System from S5"



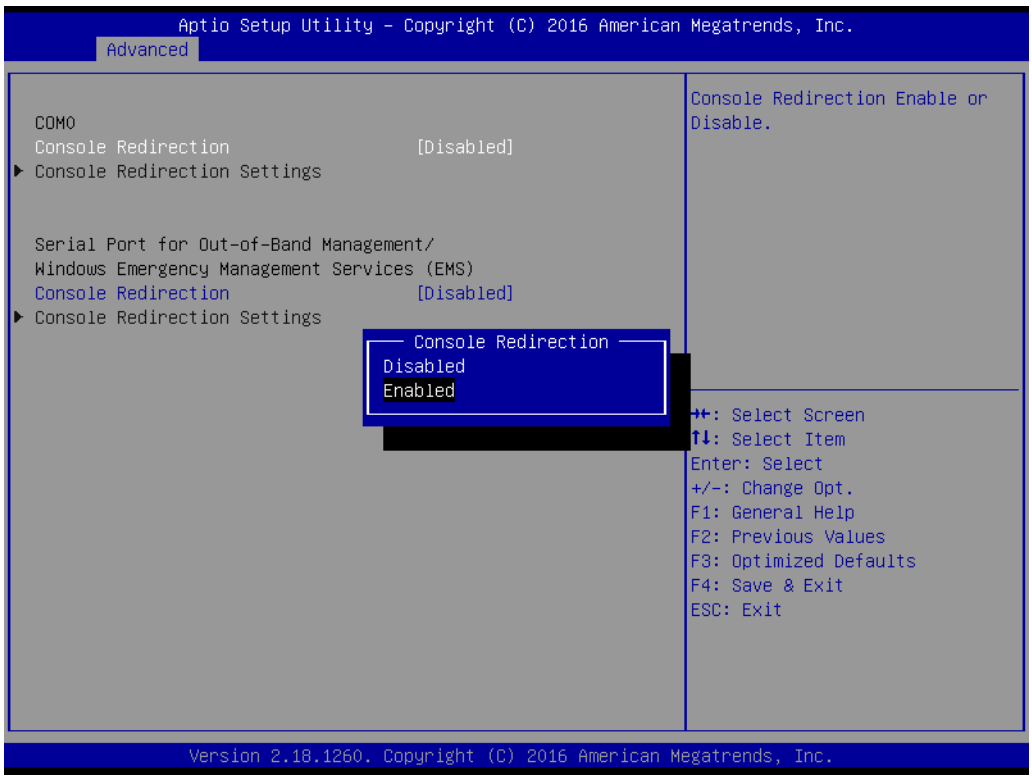


- **Wake system for SW [Fixed Time]**
  Select 0-23 For example enter 3 for 3am and 15 for 3pm.
  - Wake up hour
  - Wake up minute
  - Wake up second

3.2.2.6 Serial Port Console Redirection

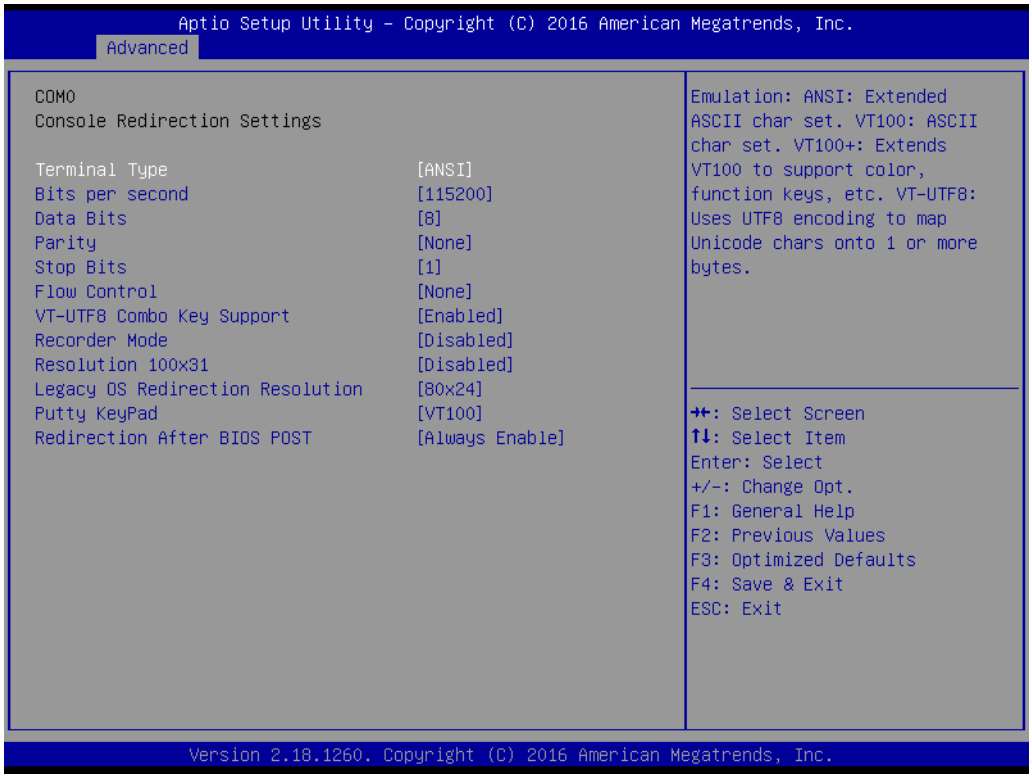


- **Console Redirection**
  This item allows user to select Enabled or Disabled for "Console Redirection"



Console Redirection Settings

The setting specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.



– Terminal Type

  This item allows user to select VT100 or VT100+ or VT-UTF8 or ANSI for "Terminal Type". The default option is "ANSI".

– Bits per second

  This item allows user to select for "Bits per second". The default option is "115200".

– Data Bits

  This item allows user to select for "Data Bits". The default option is "8".

– Parity

  This item allows user to select None or Even or Odd or Mark or Space for "Parity". The default option is "None".

– Stop Bits

  This item allows user to select for "Stop Bits". The default option is "1".

– Flow Control

  This item allows user to select None or Hardware RTS/CTS for "Flow Control". The default option is "None".

– VT-UTF8 Combo Key Support

  This item allows user to select Enabled or Disabled for "VT-UTF8 Combo Key Support"

– Recorder Mode

  This item allows user to select Enabled or Disabled for "Recorder Mode"

– Resolution 100x31

  This item allows user to select Enabled or Disabled for "Resolution 100x31"

– Legacy OS Redirection Resolution

This item allows user to select for "Legacy OS Redirection Resolution". The default option is "80x24".

– Putty KeyPad

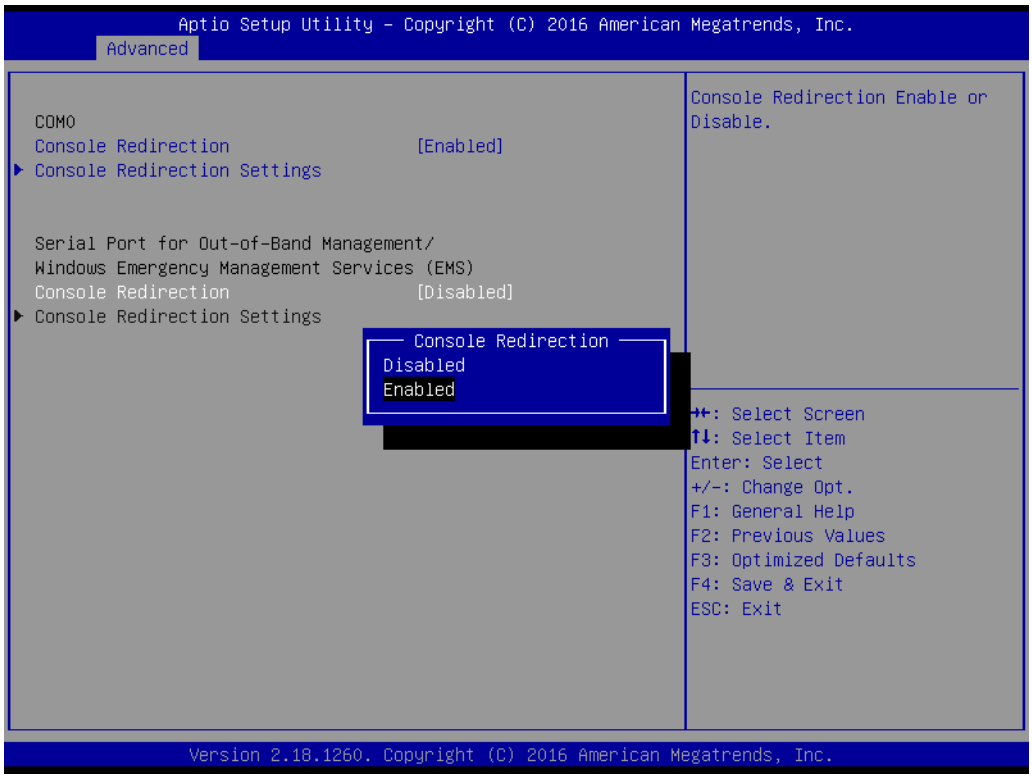
This item allows user to select VT100 or LINUX or XTERMR6 or SCO or ESCN or VT400 for "Flow Control". The default option is "VT100".

– Redirection After BIOS POST

This item allows user to select Always Enable or BootLoader for "Redirection After BIOS POST"

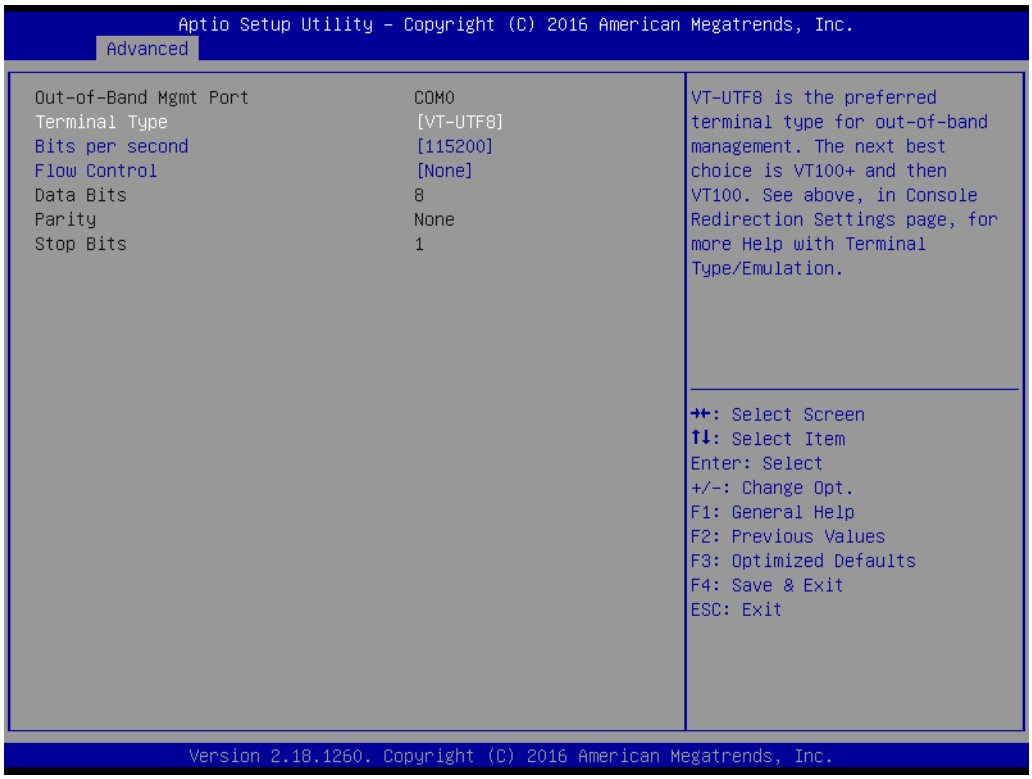
■ **Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS) Console Redirection**

This item allows user to select Enabled or Disabled for "Console Redirection"



■ Console Redirection Settings

The setting specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.



– Thermal type

  This item allows user to select VT100 or VT100+ or VT-UTF8 or ANSI for "Terminal Type". The default option is "VT-UTF8".

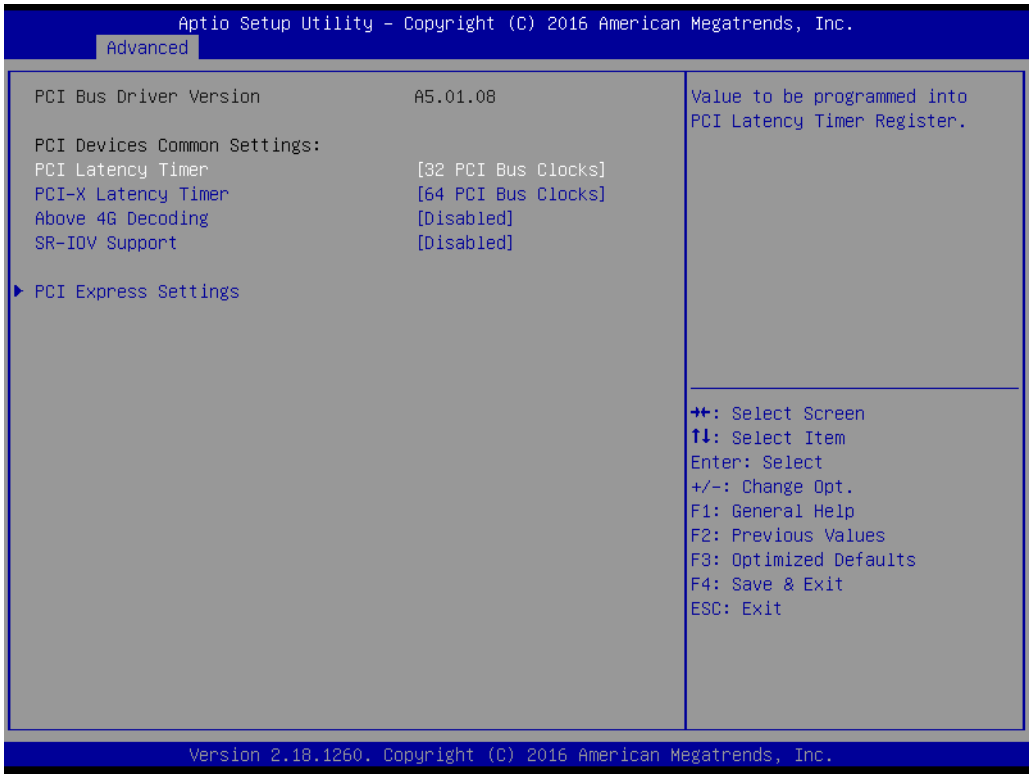
– Bits per second

  This item allows user to select for "Bits per second". The default option is "115200".

– Flow Control

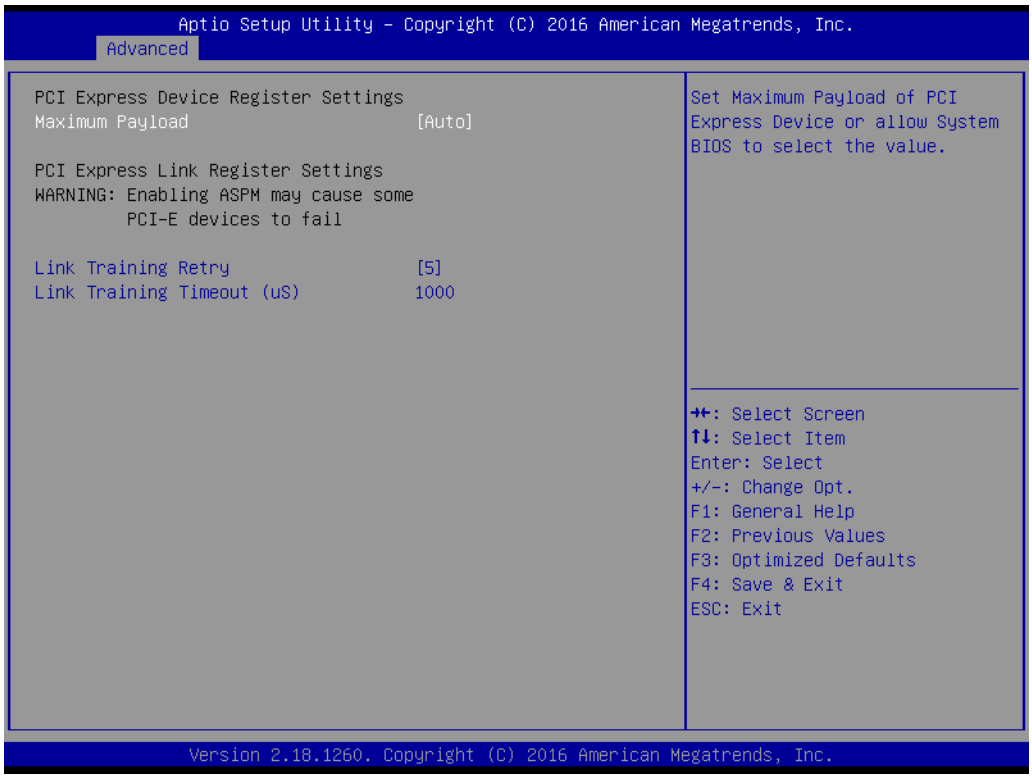
  This item allows user to select None or Hardware RTS/CTS or Software Xon/Xoff for "Flow Control". The default option is "None".

3.2.2.7 PCI Subsystem Settings



- **PCI Latency Timer**
  This item allows user to select for "PCI Latency Timer". The default option is "32 PCI Bus Clocks".
- **PCI-X Latency Timer**
  This item allows user to select for "PCI-X Latency Timer". The default option is "64 PCI Bus Clocks".
- **Above 4G Decoding**
  This item allows user to select Enabled or Disabled for "Above 4G Decoding"
- **SR-IOV Support**
  This item allows user to select Enabled or Disabled for "SR-IOV Support"

PCI Express Settings

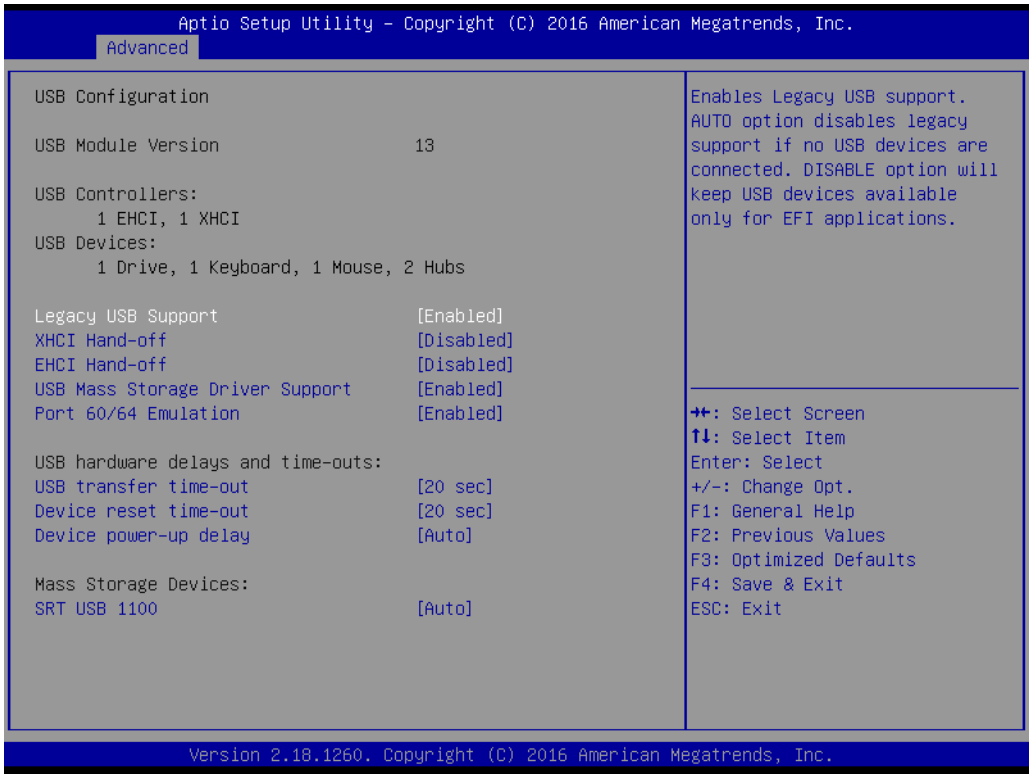


- **Maximum Payload**
  This item allows user to select for "Maximum Payload". The default option is "Auto".
- **Link training Retry**
  This item allows user to select for "Link training Retry". The default option is "5".
- **Link Training Timeout (uS)**
  Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 10 to 10000 uS.

3.2.2.8 CSM Configuration

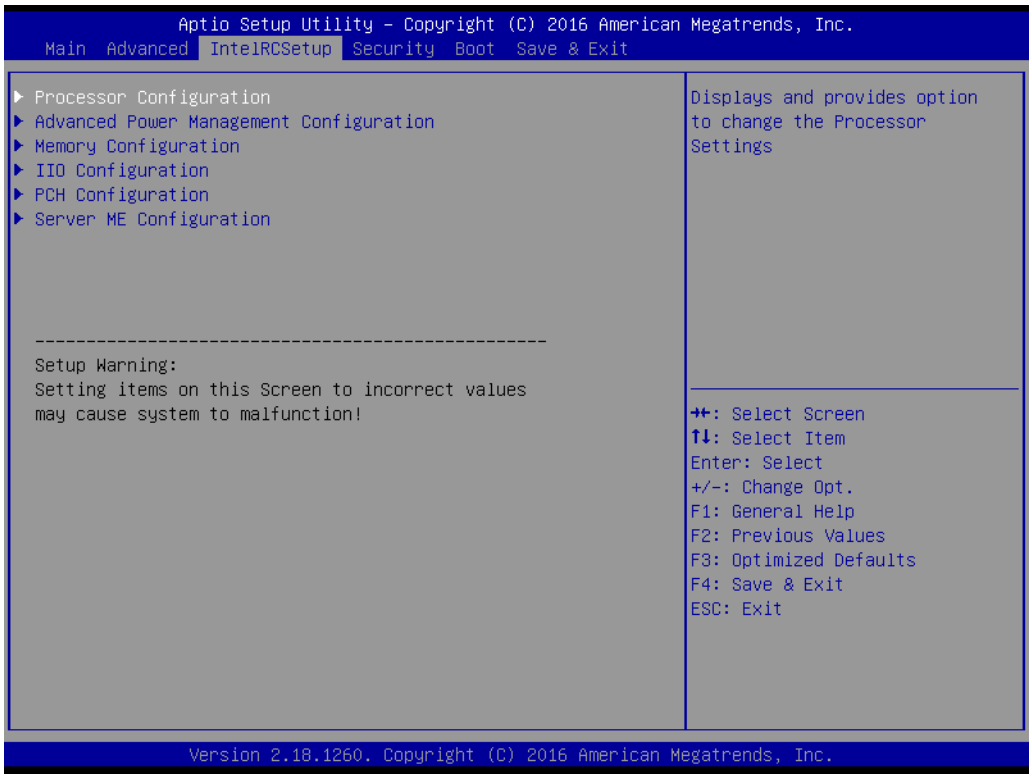
- **CSM Support**
  This item allows user to select Enabled or Disabled for "CSM Support"
- **Boot option filter**
  This item allows user to select UEFI and Legacy or Legacy only or UEFI only for "Boot option filter". The default option is "UEFI and Legacy".
- **Network**
  This item allows user to select Do not launch or UEFI or Legacy for "Network". The default option is "Legacy".
- **Storage**
  This item allows user to select Do not launch or UEFI or Legacy for "Storage". The default option is "Legacy".
- **Video**
  This item allows user to select Do not launch or UEFI or Legacy for "Video". The default option is "Legacy".
- **Other PCI devices**
  This item allows user to select Do not launch or UEFI or Legacy for "Other PCI devices". The default option is "Legacy".

3.2.2.9 USB Configuration

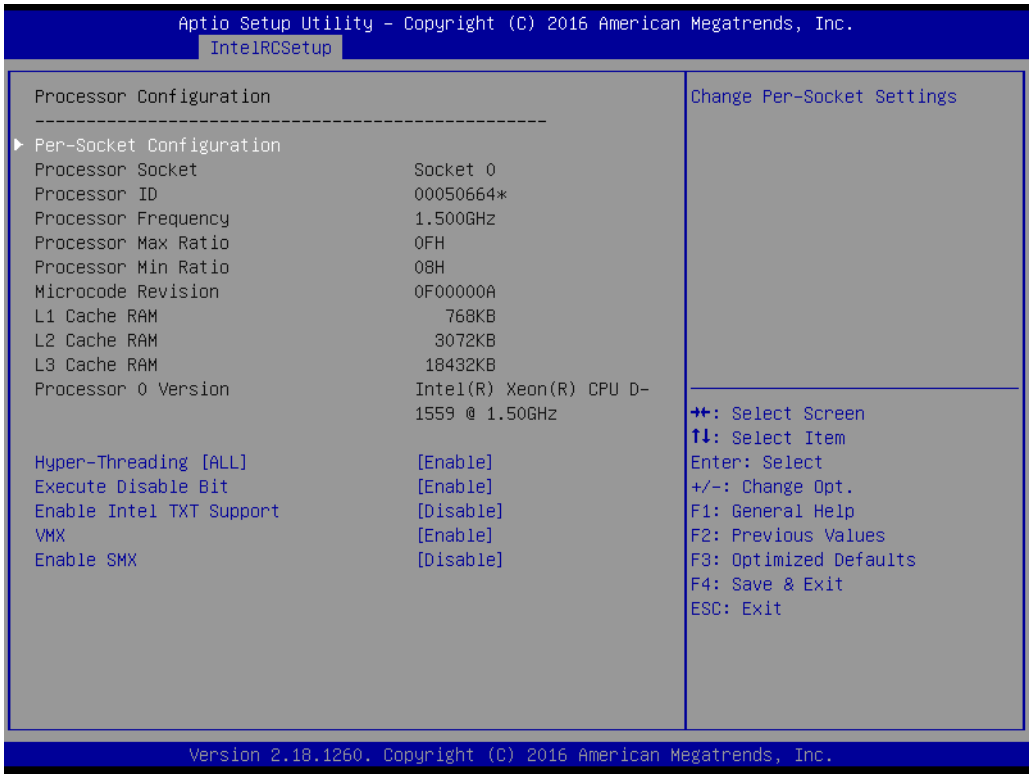


- **Legacy USB Support**
  This item allows user to select Enabled or Disabled or Auto for "Legacy USB Support"
- **XHCI Hand-off**
  This item allows user to select Enabled or Disabled for "XHCI Hand-off"
- **EHCI Hand-off**
  This item allows user to select Enabled or Disabled for "EHCI Hand-off"
- **USB Mass Storage Driver Support**
  This item allows user to select Enabled or Disabled for "USB Mass Storage Driver Support"
- **Port 60/64 Emulation**
  This item allows user to select Enabled or Disabled for "Port 60/64 Emulation"
- **USB hardware delays and time-outs:**
  - USB transfer time-out
    This item allows user to select for "USB transfer time-out ". The default option is "20 sec".
  - Device reset time-out
    This item allows user to select for "Device reset time-out ". The default option is "20 sec".
  - Device power-up delay
    This item allows user to select Auto or Manual for "Device power-up delay"

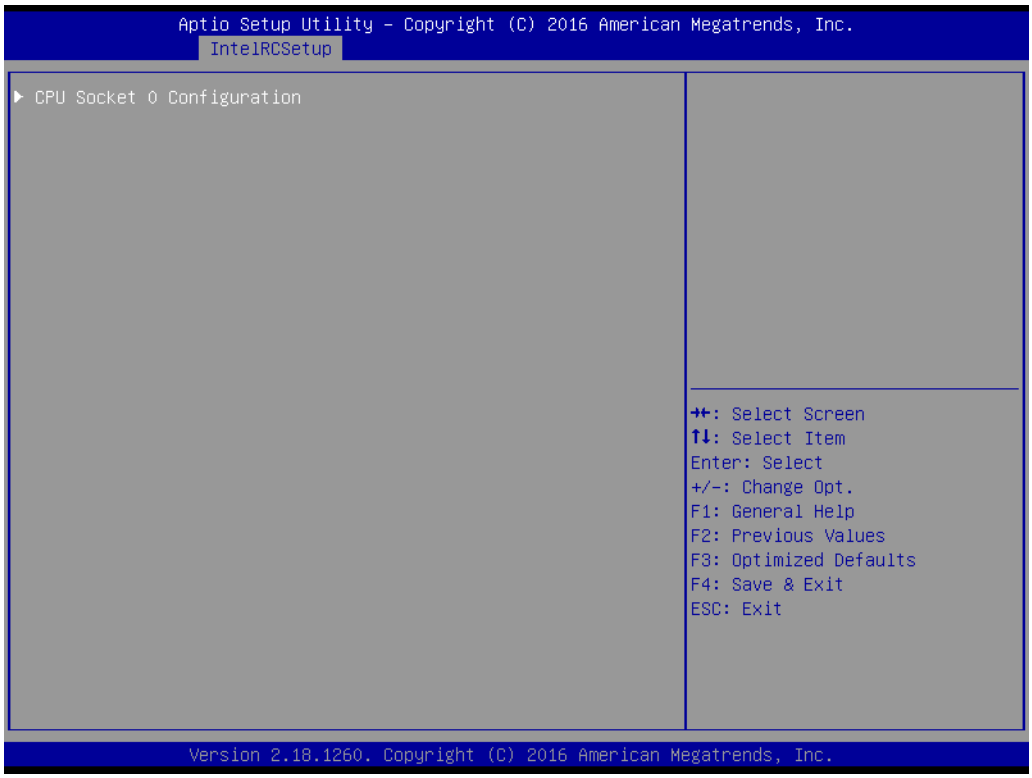
3.2.3 IntelRCSetup



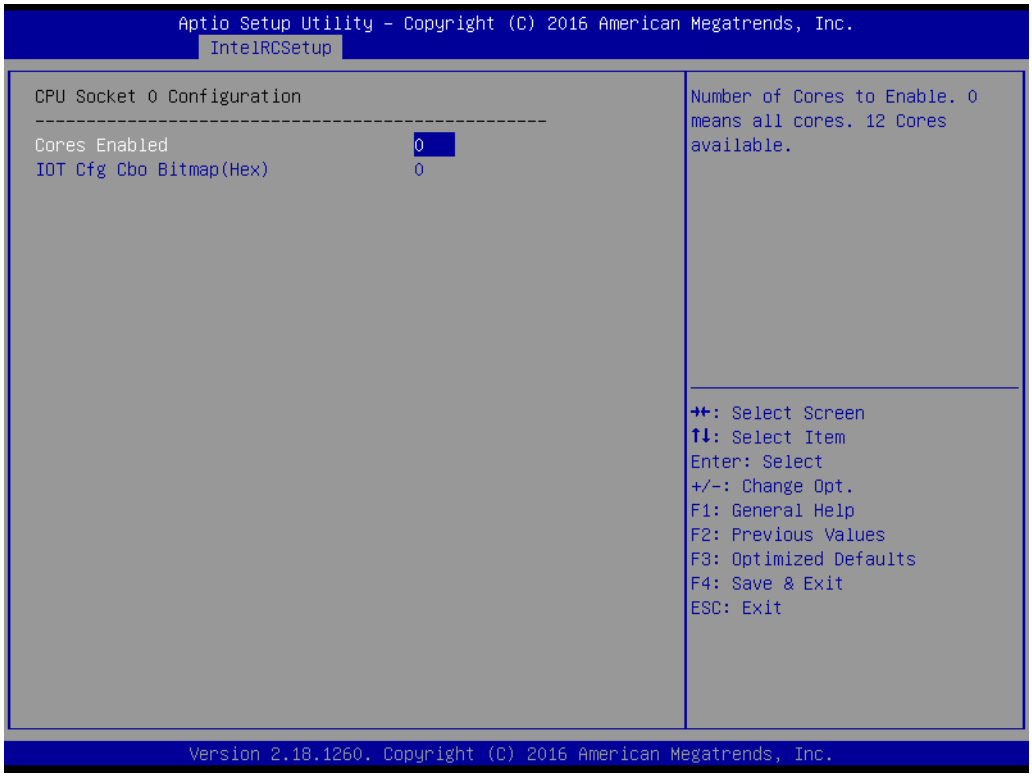
3.2.3.1 Processor Configuration



Per-Socket Configuration



- **CPU Socket 0 Configuration**

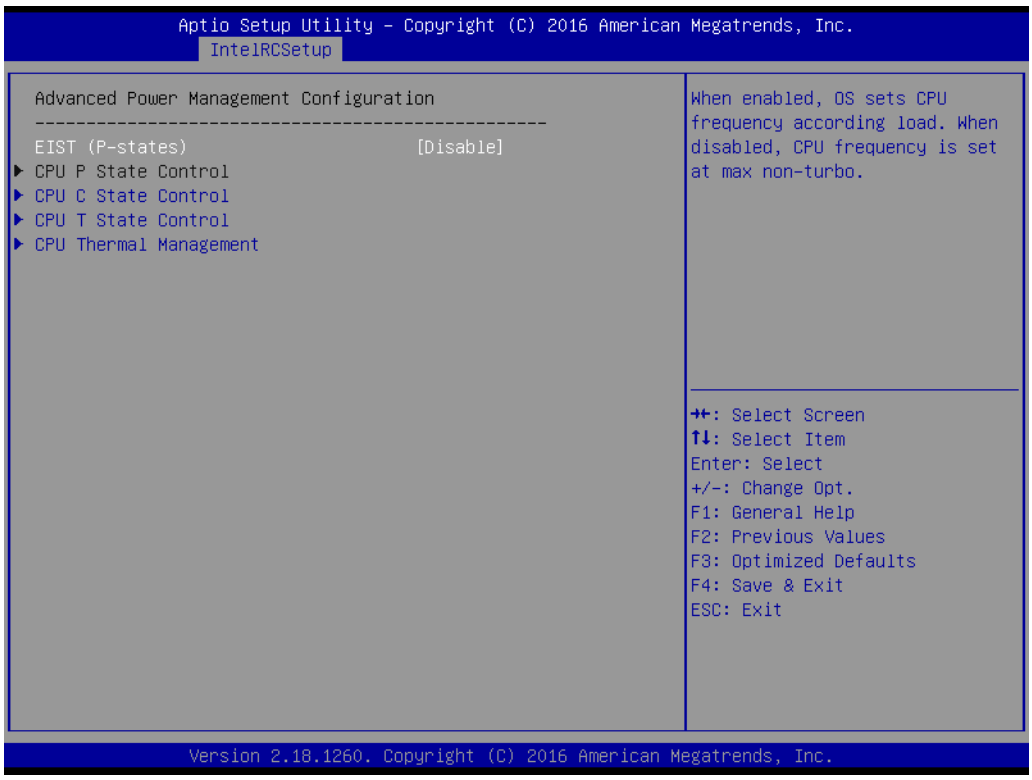


- **Cores Enabled**
  Number of Cores to Enable. O means all cores. 12 cores available.
- **IOT Cfg Cbo Bitmap (Hex)**

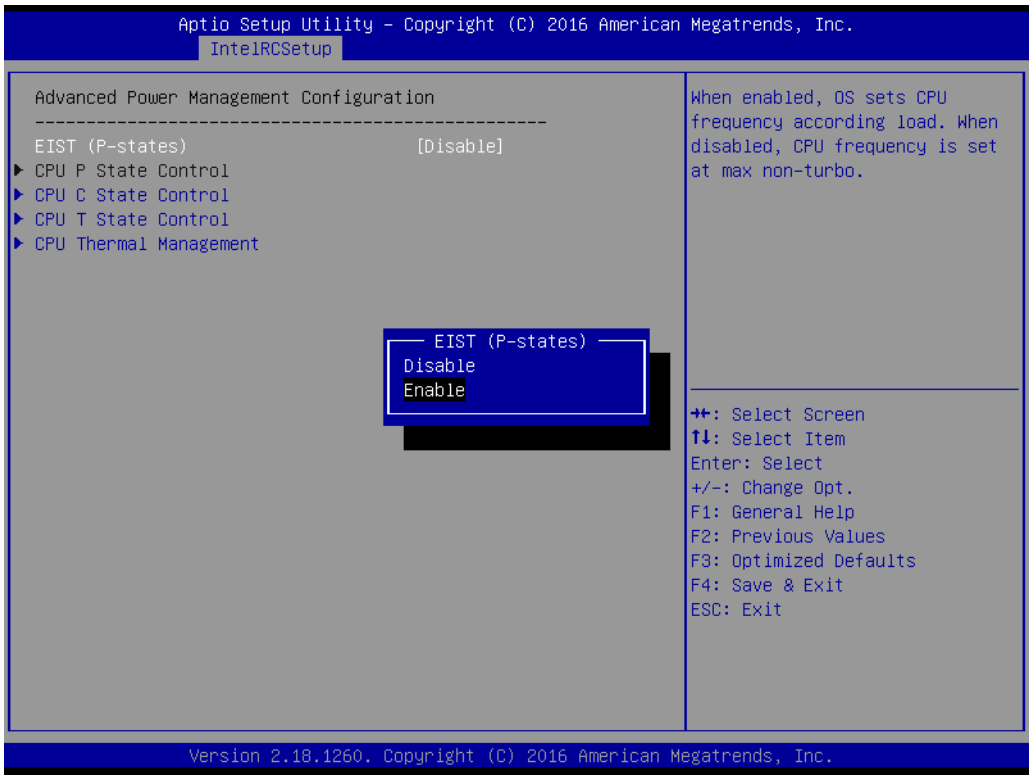
Each bit enables IOT/OCLA for a CBo.

- **Hyper-Threading [ALL]**
  This item allows user to select Enable or Disable for "Hyper-Threading [ALL]"
- **Execute Disable Bit**
  This item allows user to select Enable or Disable for "Execute Disable Bit"
- **Enable Intel TXT Support**
  This item allows user to select Enable or Disable for "Enable Intel TXT Support"
- **VMX**
  This item allows user to select Enable or Disable for "VMX"
- **Enable SMX**
  This item allows user to select Enable or Disable for "SMX"

Advanced Power Management Configuration

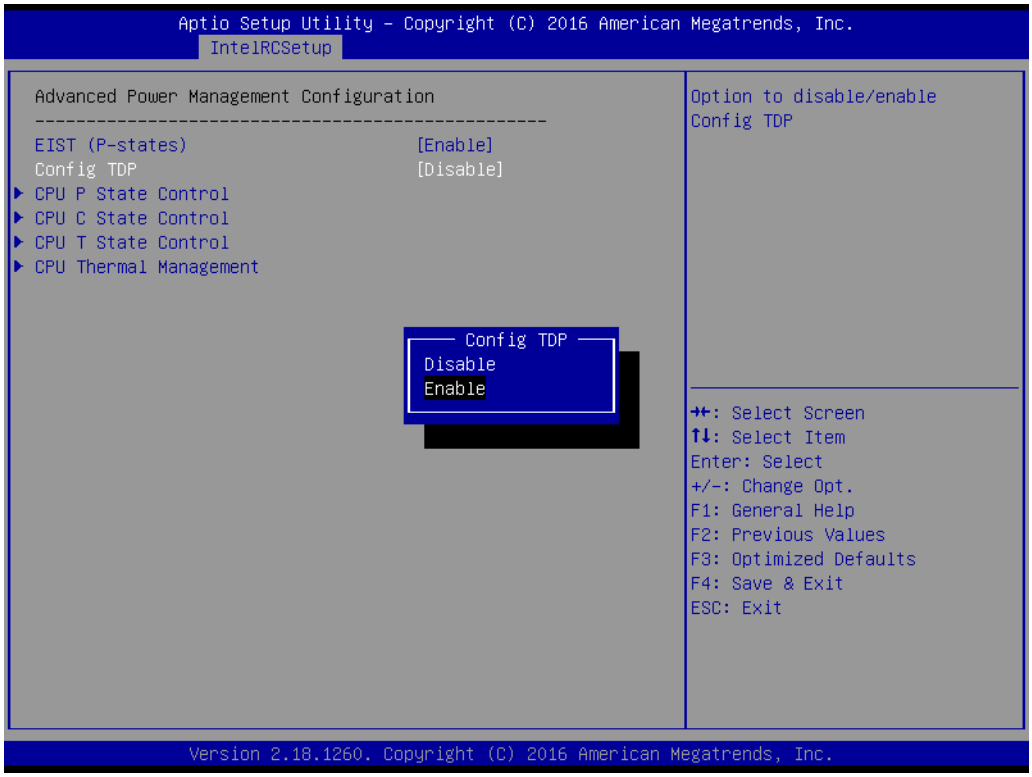


- **EIST (P-states)**
  When enabled, OS sets CPU frequency according load. When disabled, CPU frequency is set at max non-turbo.



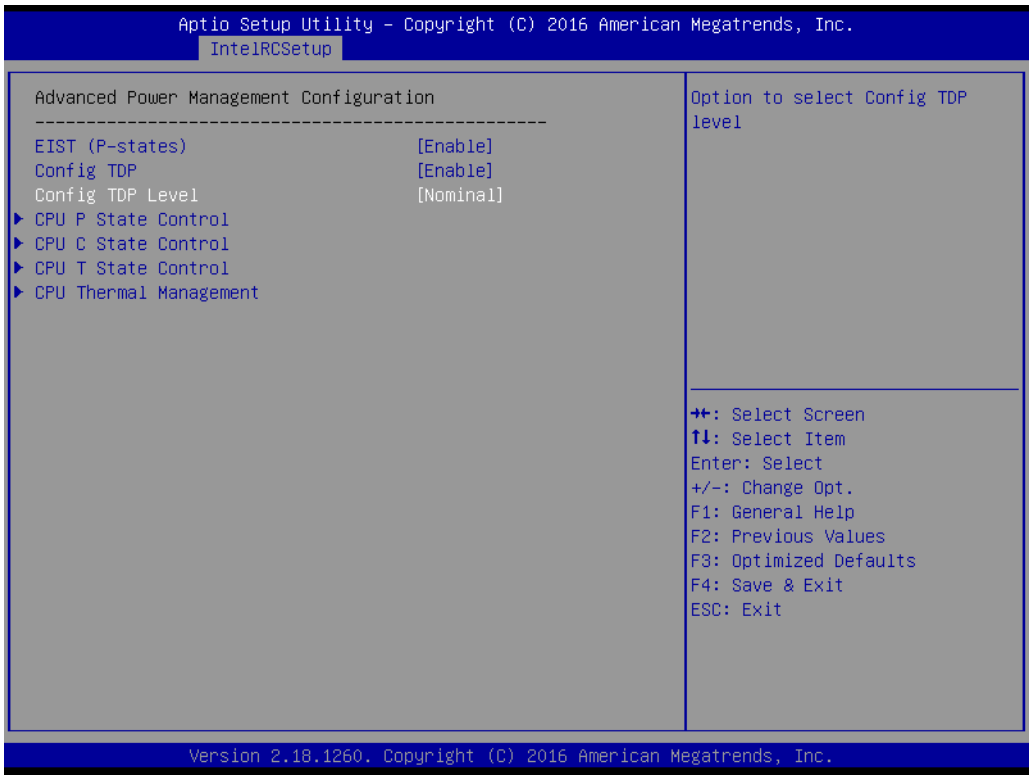
- **Config TDP**

  This item allows user to select Enable or Disable for "Config TDP"

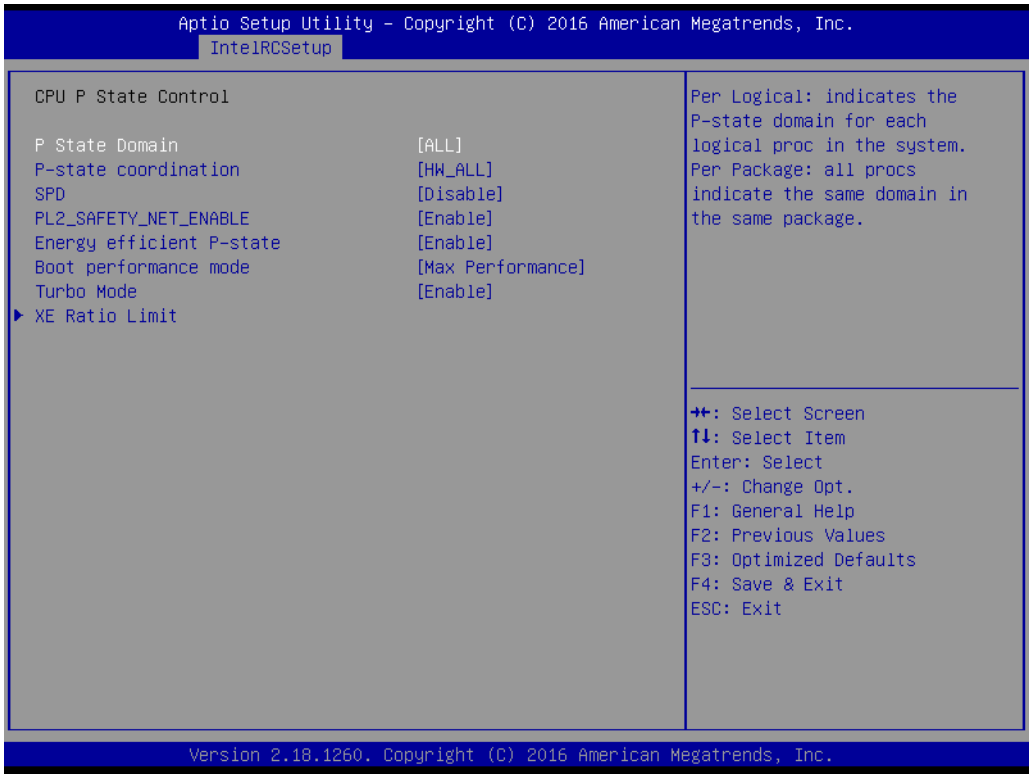


  – Config TDP Level

    This item allows user to select Level for "Config TDP Level". The default option is "Nominal".



CPU P State Control



– P State Domain
  This item allows user to select ALL or ONE for "P State Domain"
– P-state coordination

This item allows user to select HW_ALL or AW_ALL or SW_ANY for "P-state coordination"

- SPD

  This item allows user to select Enable or Disable for "SPD"

- PL2_SAFETY_NET_ENABLE

  This item allows user to select Enable or Disable for "PL2_SAFETY_NET_ENABLE"

- Energy efficient P-state

  This item allows user to select Enable or Disable for "Energy efficient P-state"

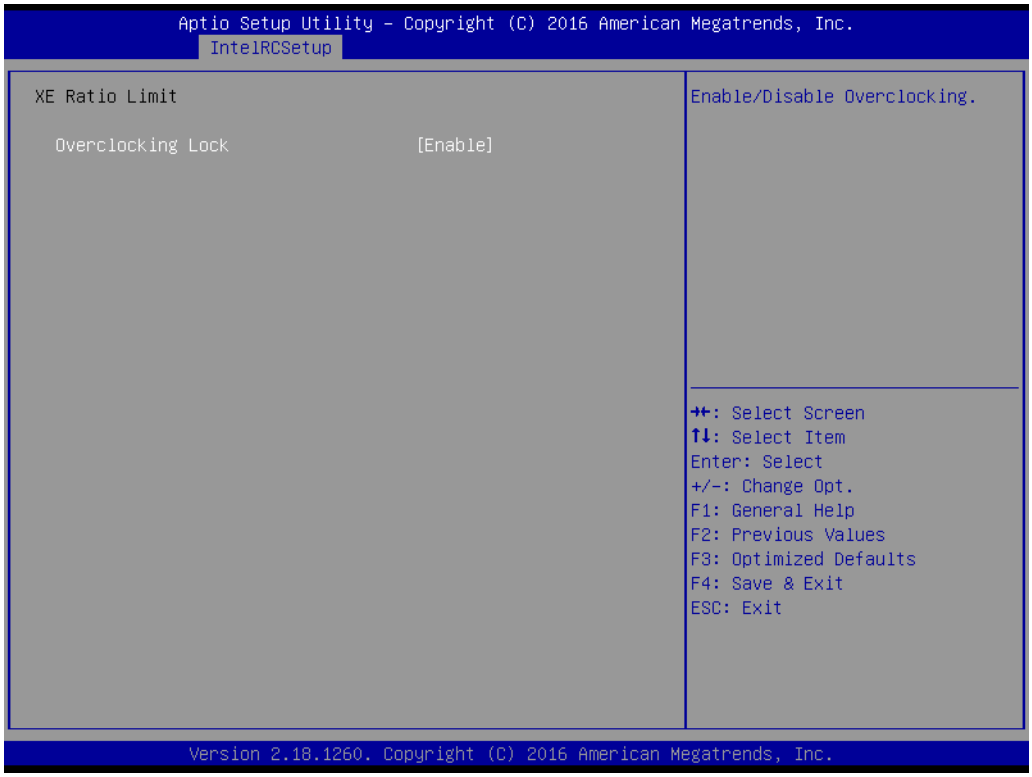
- Boot performance mode

  This item allows user to select Max Performance or Max Efficient for "Boot performance mode"

- Turbo Mode

  This item allows user to select Enable or Disable for "Turbo Mode"

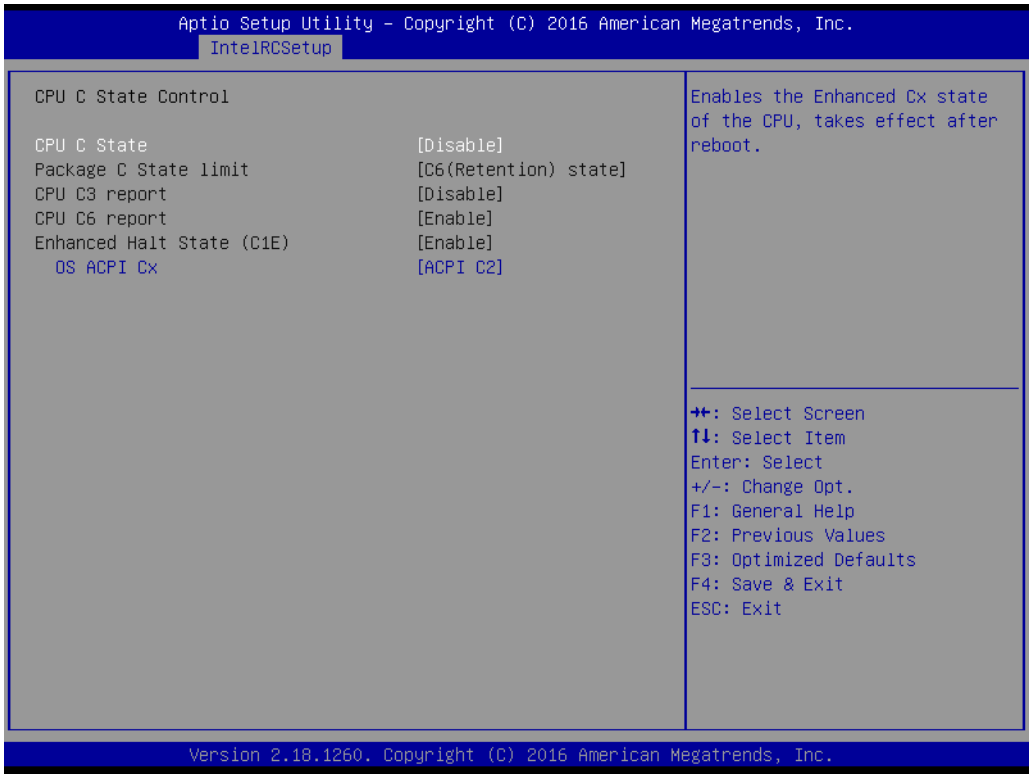
- XE Ratio Limit



Overclocking Lock

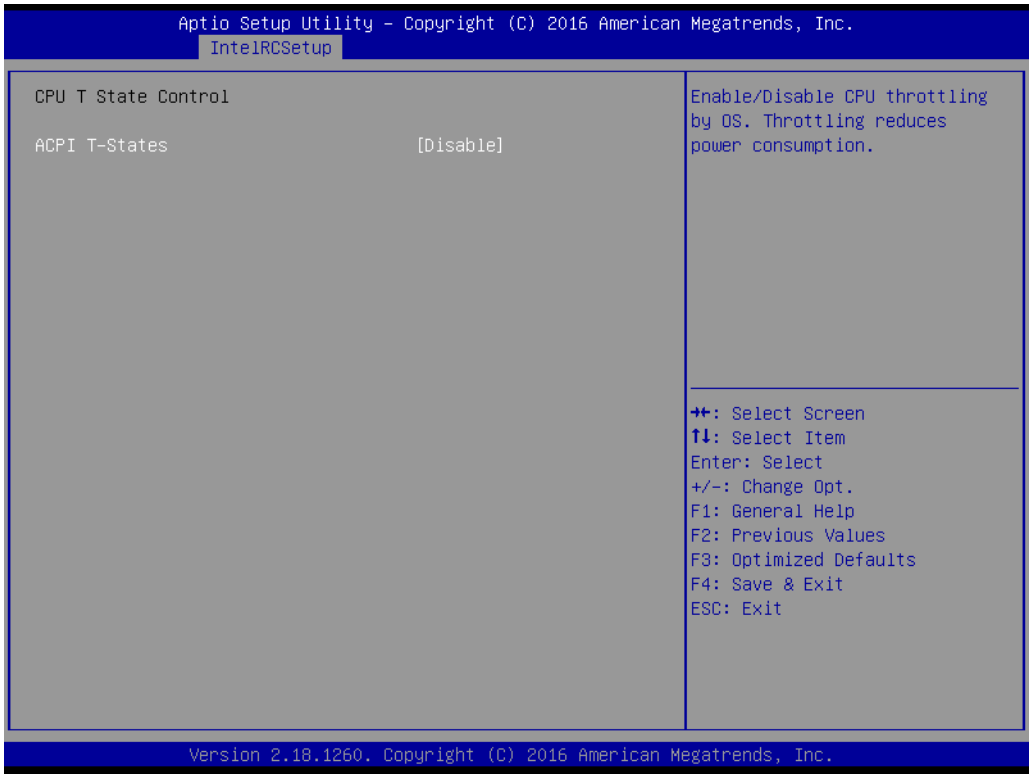
This item allows user to select Enable or Disable for "Overclocking Lock"

CPU C State Control



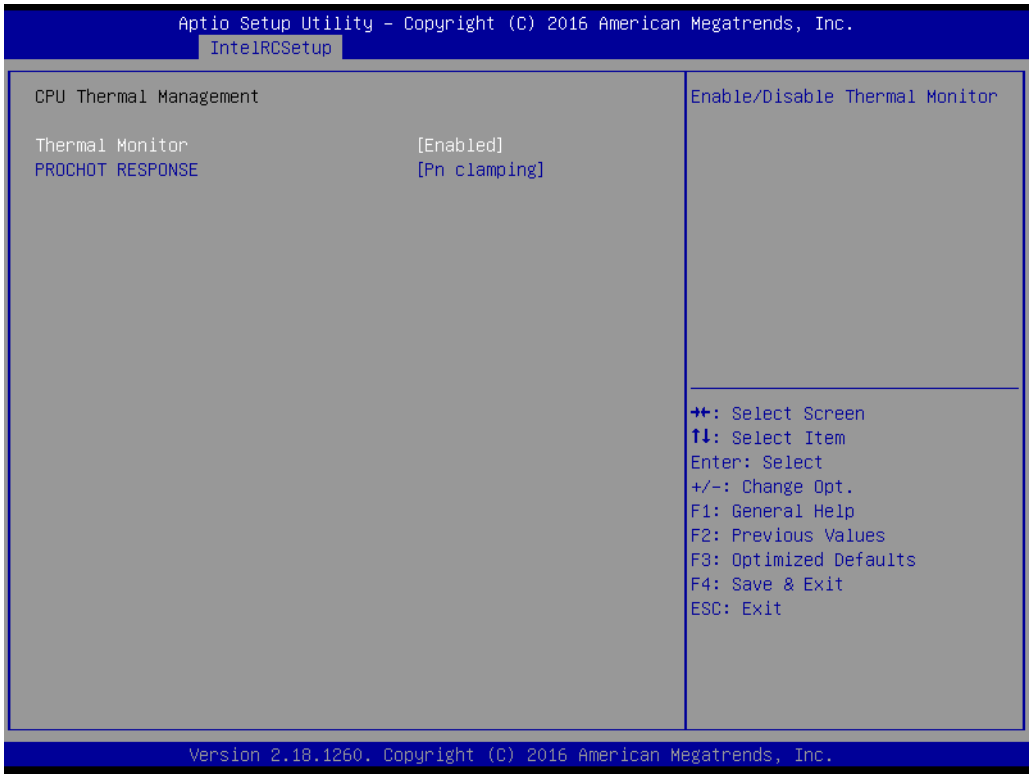
- CPU C state
  This item allows user to select Enable or Disable for "CPU C state"
- Package C State Limit
  This item allows user to select for "Package C State Limit". The default option is "C6 (Retention) state".
- CPU C3 report
  This item allows user to select Enable or Disable for "CPU C3 report"
- CPU C6 report
  This item allows user to select Enable or Disable for "CPU C6 report"
- Enhanced Halt State (C1E)
  This item allows user to select Enable or Disable for "Enhanced Halt State (C1E)"
- OS ACPI Cx
  This item allows user to select ACPI C2 or ACPI C3 for "OS ACPI Cx"

CPU T State Control



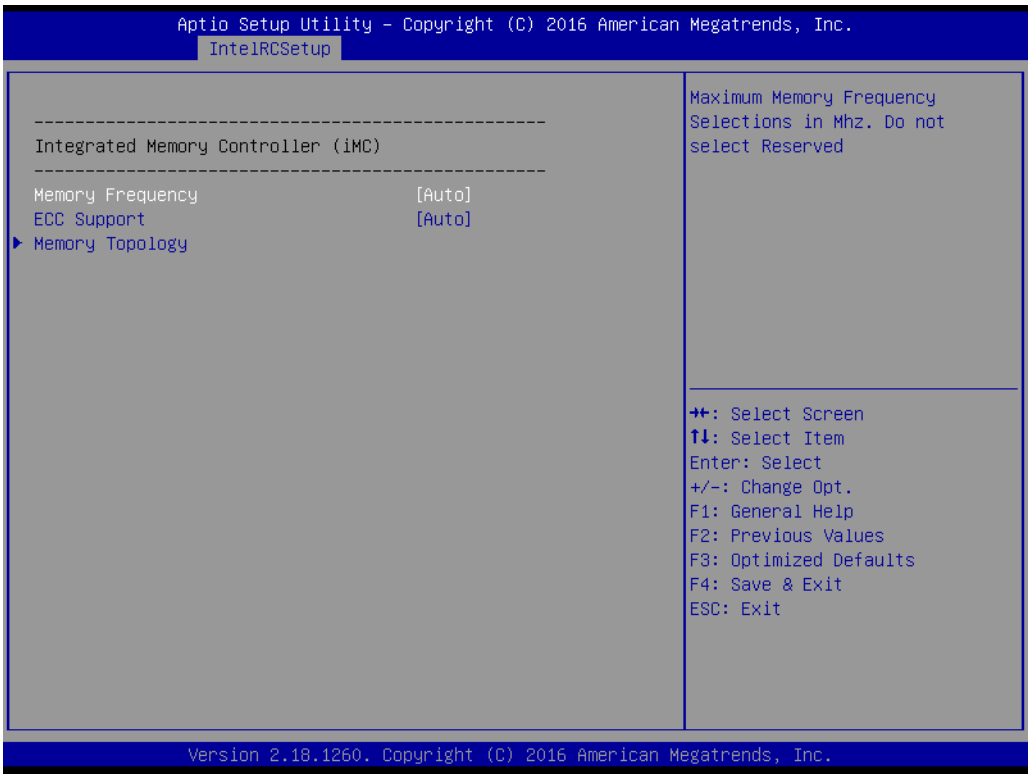
– ACPI T-States
  This item allows user to select Enable or Disable for "ACPI T-States"
– T-State Throttle
  This item allows user to select for "T-State Throttle". The default option is "default".

CPU Thermal Management



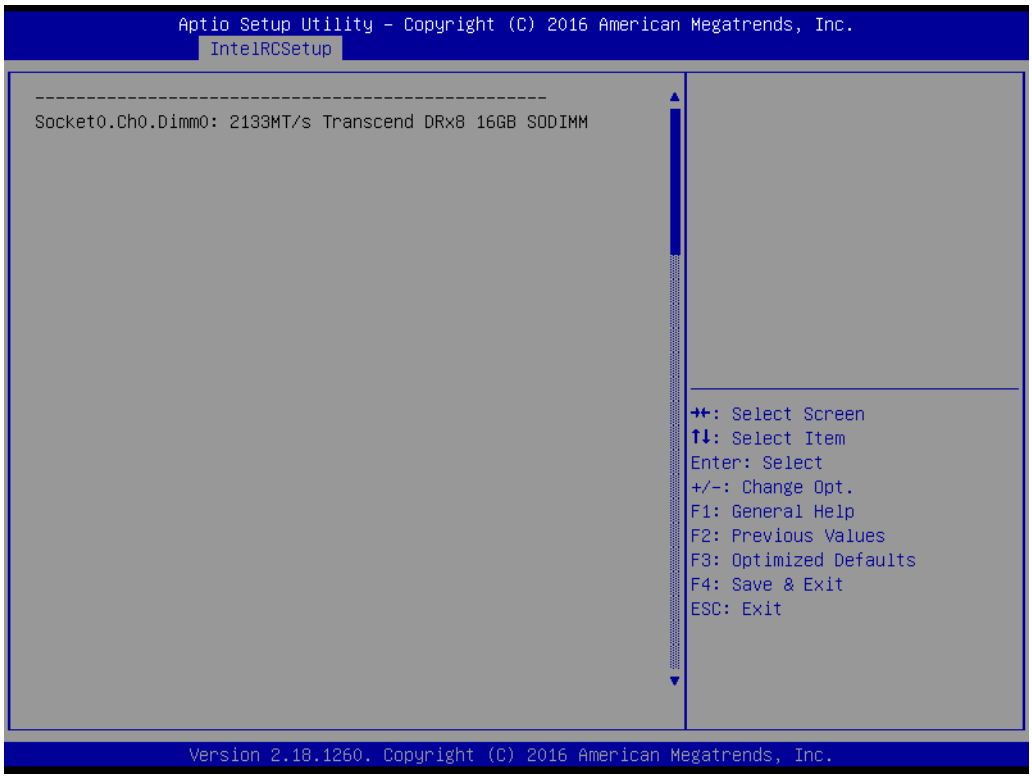
– Thermal Monitor
  This item allows user to select Enabled or Disabled for "Thermal Monitor".
– PROCHOT RESPONSE
  This item allows user to select Pn clamping or Pm clamping for "PROCHOT RESPONSE".

3.2.3.2 Memory Configuration

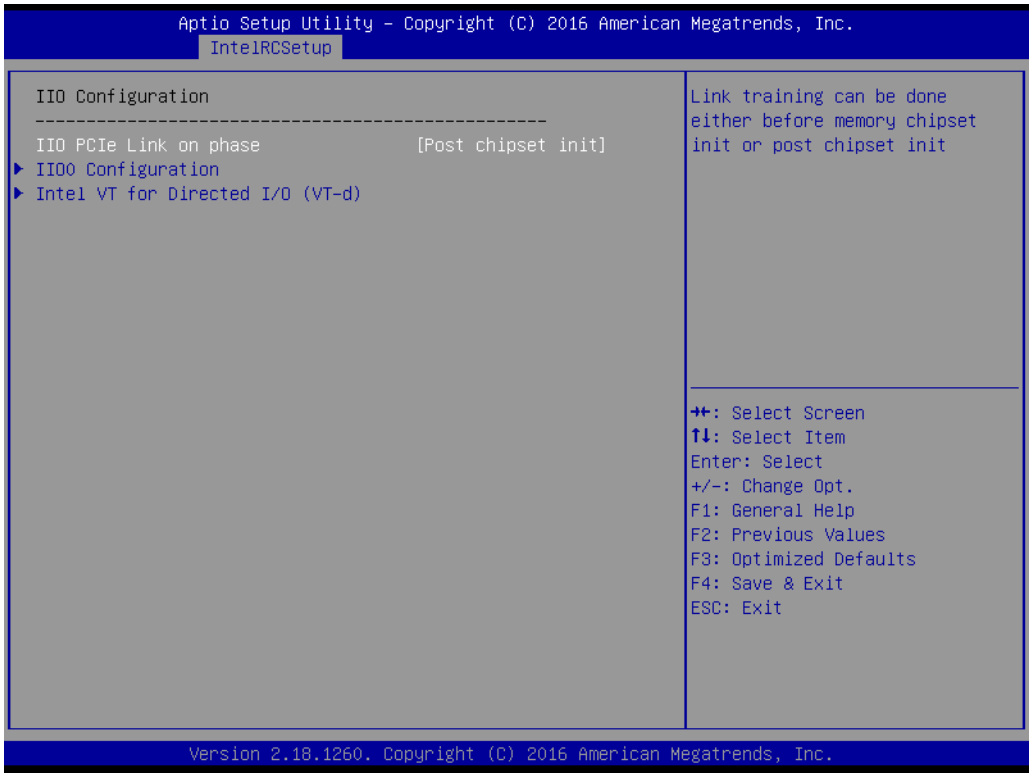


- **Memory Frequency**
  This item allows user to select for "Memory Frequency". The default option is "Auto".
- **ECC Support**
  This item allows user to select Auto or Disable or Enable for "ECC Support". The default option is "Auto".

Memory topology

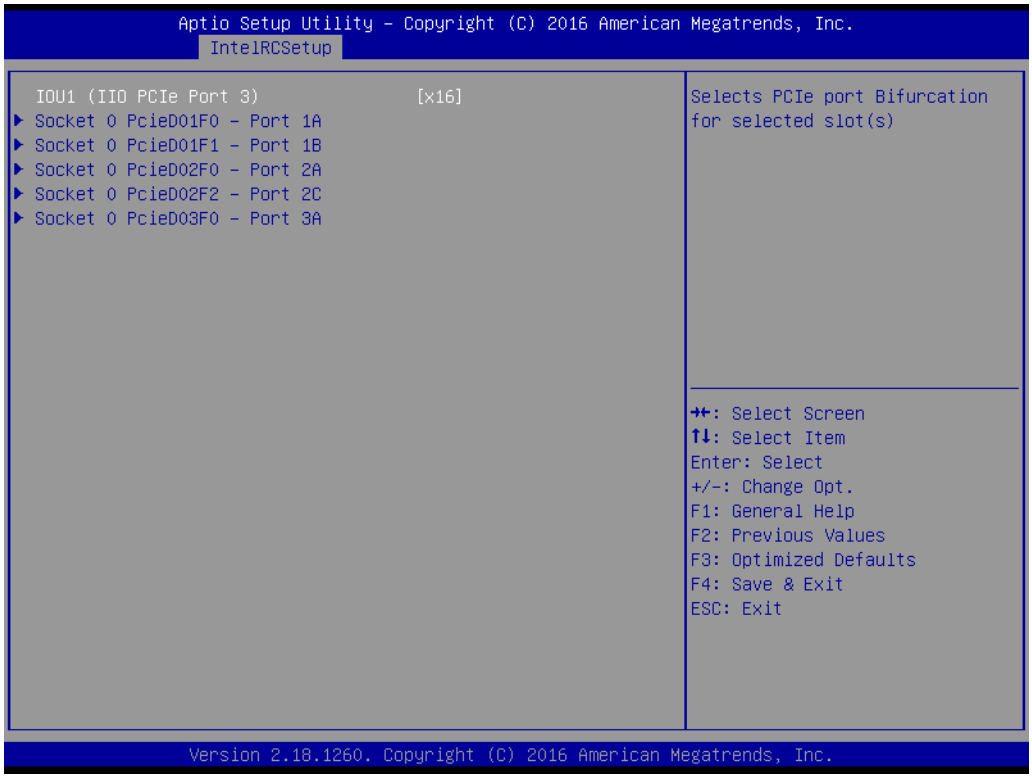


3.2.3.3 IIO Configuration



- **IIO PCIe Link on phase**
  This item allows user to select for "IIO PCIe Link on phase".

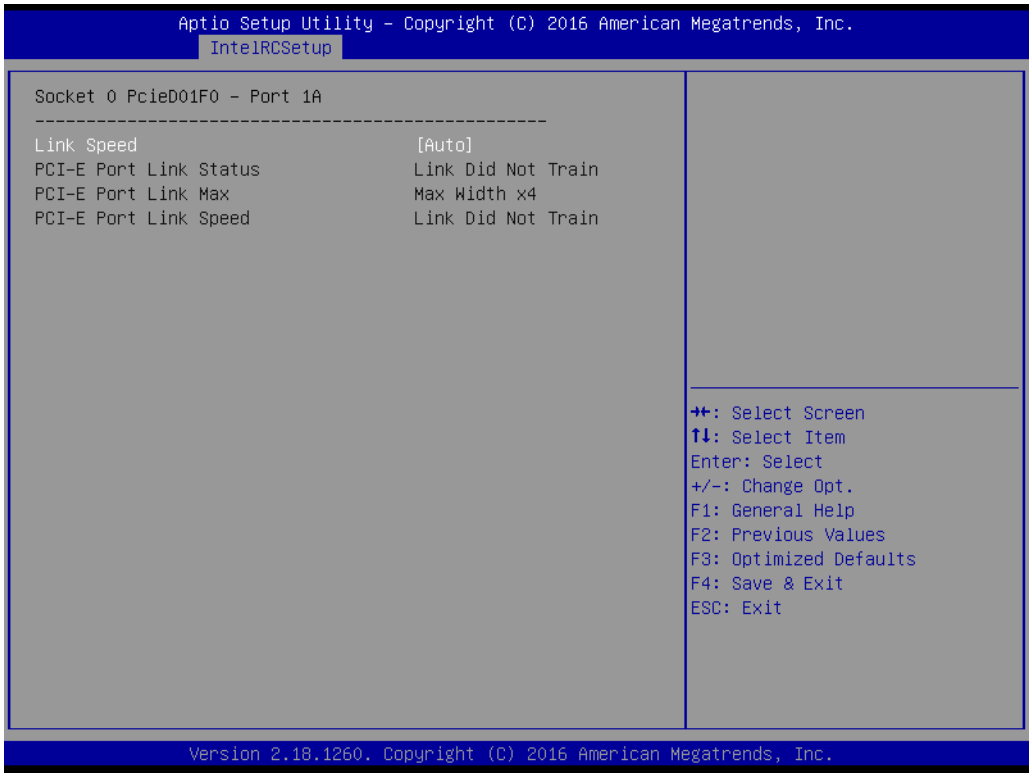
IIO0 Configuration



IOU1 (IIO PCIe Port 3)

This item allows user to select for "IIOU1 (IIO PCIe Port 3)".

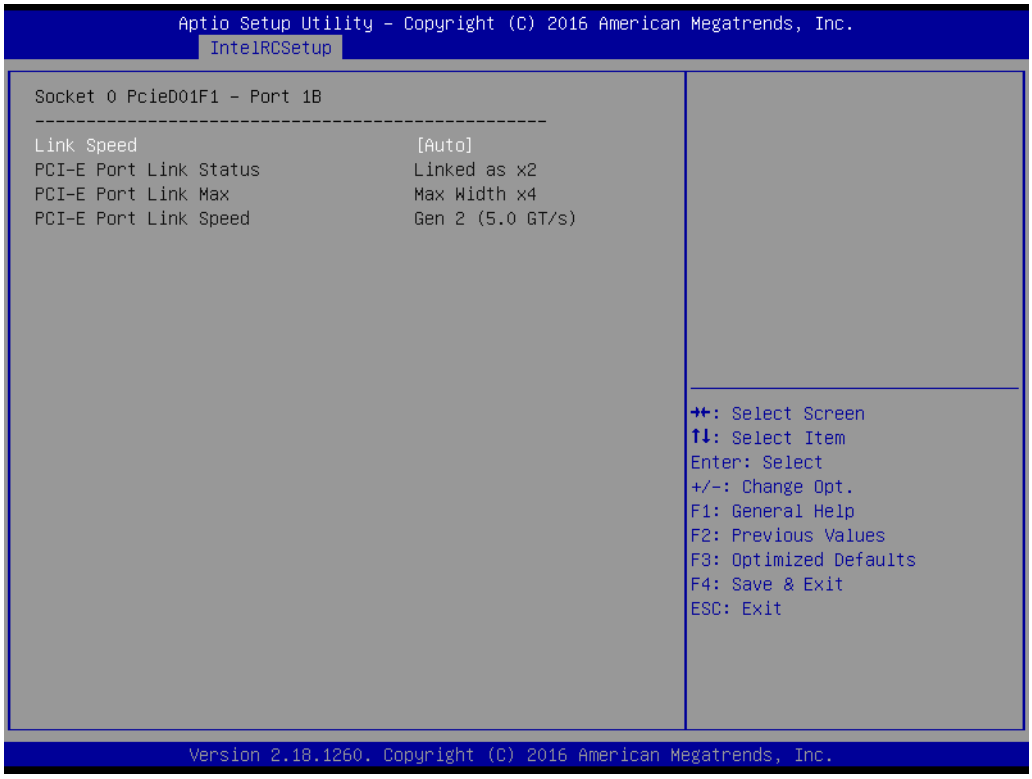
– Socket 0 PcieD01F0 - Port 1A



Link Speed

This item allows user to select for "Link Speed". The default option is "Auto".

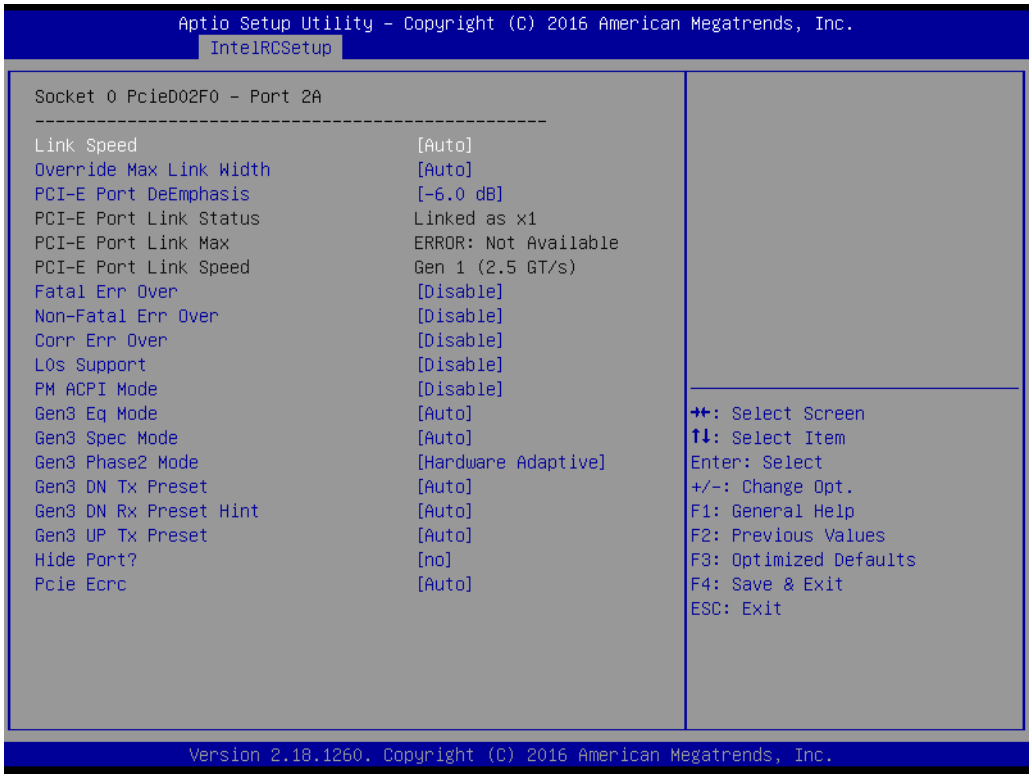
– Socket 0 PcieD01F0 - Port 1B



Link Speed

This item allows user to select for "Link Speed". The default option is "Auto".

– Socket 0 PcieD02F0 - Port 2A



Line Speed

This item allows user to select for "Link Speed". The default option is "Auto".

Override Max Lin Width

This item allows user to select for "Override Max Lin Width". The default option is "Auto".

PCI-E Port DeEmphasis

This item allows user to select -6.0 dB or -3.5 dB for "Override Max Lin Width".pport

Fatal Err Over

This item allows user to select Disable or Enable for "Fatal Err Over".

Non-Fatal Err Over

This item allows user to select Disable or Enable for "Non-Fatal Err Over".

Corr Err Over

This item allows user to select Disable or Enable for "Corr Err Over".

L0S Support

This item allows user to select Disable or Enable for "L0S Support".

PM ACPI Mode

This item allows user to select Disable or Enable for "PM ACPI Mode".

Gen3 Eq Mode

This item allows user to select for "Gen3 Eq Mode". The default option is "Auto".

Gen3 Spec Mode

This item allows user to select for "Gen3 Spec Mode". The default option is "Auto".

Gen3 Phase2 Mode

This item allows user to select Hardware Adaptive or Manual for "Gen3 Phase2 Mode".

Gen3 DN Tx Preset

This item allows user to select for "Gen3 DN Tx Preset". The default option is *"Auto".*

Gen3 DN Rx Preset Hint

This item allows user to select for "Gen3 DN Rx Preset Hint". The default option is "Auto".

Gen3 UP TX Preset

This item allows user to select for "Gen3 UP TX Preset". The default option is "Auto".

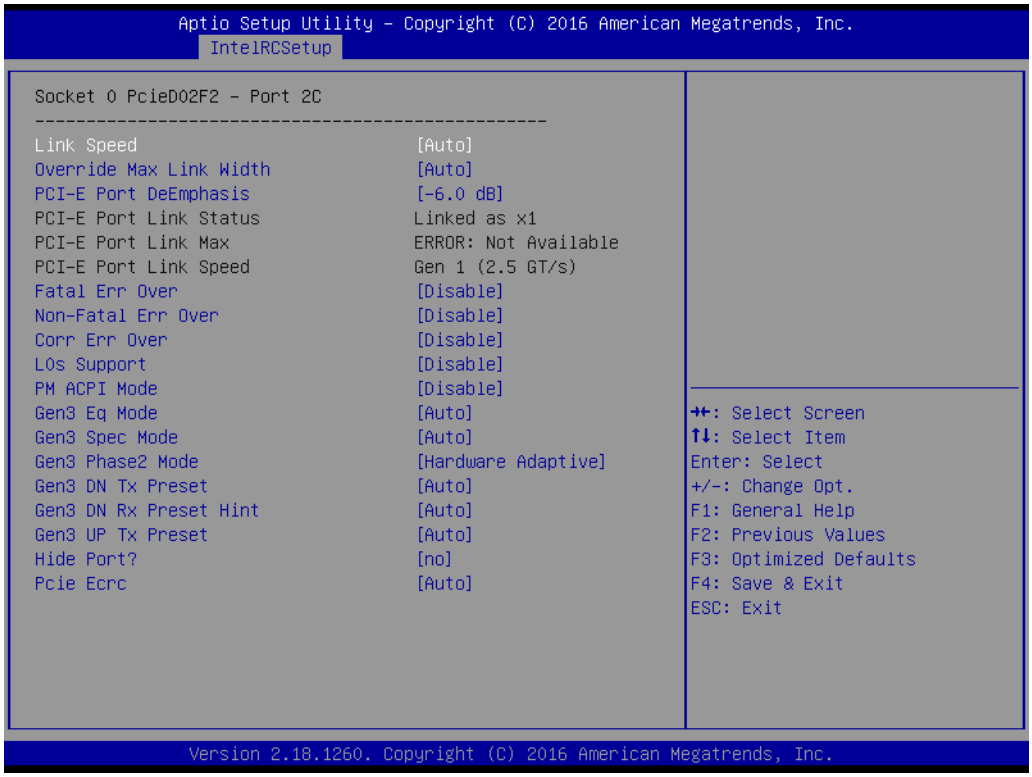
Hide Port

This item allows user to select yes or no for "Hide Port?".

Pcie Ecrc

This item allows user to select Auto or Disable or Enable for "Pcie Ecrc".

– Socket 0 PcieD02F2 - Port 2C



Line Speed

This item allows user to select for "Link Speed". The default option is "Auto".

Override Max Lin Width

This item allows user to select for "Override Max Lin Width". The default option is "Auto".

PCI-E Port DeEmphasis

This item allows user to select -6.0 dB or -3.5 dB for "Override Max Lin DeEmphasisWidth".pport

Fatal Err Over

This item allows user to select Disable or Enable for "Fatal Err Over".

Non-Fatal Err Over

This item allows user to select Disable or Enable for "Non-Fatal Err Over".

Corr Err Over

This item allows user to select Disable or Enable for "Corr Err Over".

L0S Support

This item allows user to select Disable or Enable for "L0S Support".

PM ACPI Mode

This item allows user to select Disable or Enable for "PM ACPI Mode".

Gen3 Eq Mode

This item allows user to select for "Gen3 Eq Mode". The default option is "Auto".

Gen3 Spec Mode

This item allows user to select for "Gen3 Spec Mode". The default option is "Auto".

Gen3 Phase2 Mode

This item allows user to select Hardware Adaptive or Manual for "Gen3 Phase2 Mode".

Gen3 DN Tx Preset

This item allows user to select for "Gen3 DN Tx Preset". The default option is "Auto".

Gen3 DN Rx Preset Hint

This item allows user to select for "Gen3 DN Rx Preset Hint". The default option is "Auto".

Gen3 UP TX Preset

This item allows user to select for "Gen3 UP TX Preset". The default option is "Auto".

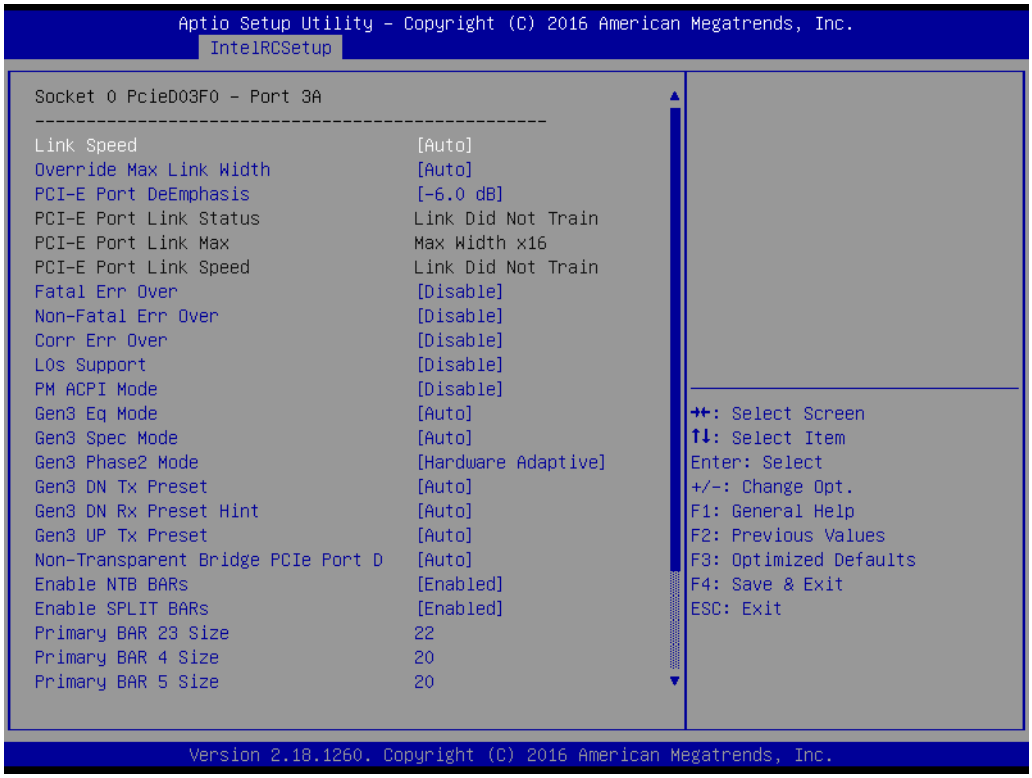
Hide Port

This item allows user to select yes or no for "Hide Port?".

Pcie Ecrc

This item allows user to select Auto or Disable or Enable for "Pcie Ecrc".

– Socket 0 PcieD03F0 - Port 3A



Line Speed

This item allows user to select for "Link Speed". The default option is "Auto".

Override Max Lin Width

This item allows user to select for "Override Max Lin Width". The default option is "Auto".

PCI-E Port DeEmphasis

This item allows user to select -6.0 dB or -3.5 dB for "Override Max Lin Width".pport

Fatal Err Over

This item allows user to select Disable or Enable for "Fatal Err Over".

Non-Fatal Err Over

This item allows user to select Disable or Enable for "Non-Fatal Err Over".

Corr Err Over

This item allows user to select Disable or Enable for "Corr Err Over".

L0S Support

This item allows user to select Disable or Enable for "L0S Support".

PM ACPI Mode

This item allows user to select Disable or Enable for "PM ACPI Mode".

Gen3 Eq Mode

This item allows user to select for "Gen3 Eq Mode". The default option is "Auto".

Gen3 Spec Mode

This item allows user to select for "Gen3 Spec Mode". The default option is "Auto".

Gen3 Phase2 Mode

This item allows user to select Hardware Adaptive or Manual for "Gen3 Phase2 Mode".

Gen3 DN Tx Preset

This item allows user to select for "Gen3 DN Tx Preset". The default option is "Auto".

Gen3 DN Rx Preset Hint

This item allows user to select for "Gen3 DN Rx Preset Hint". The default option is "Auto".

Gen3 UP TX Preset

This item allows user to select for "Gen3 UP TX Preset". The default option is "Auto".

Non-Transparent Bridge PCIe Port D

This item allows user to select for "Non-Transparent Bridge PCIe Port D". The default option is "Auto".

Enable NTB BARs

This item allows user to select Enabled or Disabled for "Enable NTB BARs".

Enable SPLIT BARs

This item allows user to select Enabled or Disabled for "Enable SPLIT BARs".

Primary BAR 23 Size

Used to set the prefetchable BAR 23 size on primary side of NTB. Value < than 12 or > 29 (39 for BIOS supporting > 4G PCI) disables BAR.

Primary BAR 4 Size

Used to set the prefetchable BAR 4 size on primary side of NTB. Value < than 12 or > 29 (39 for BIOS supporting > 4G PCI) disables BAR.

Primary BAR 5 Size

Used to set the prefetchable BAR 5 size on primary side of NTB. Value < than 12 or > 29 (39 for BIOS supporting > 4G PCI) disables BAR.

Secondary BAR 23 Size

Used to set the prefetchable BAR 23 size on secondary side of NTB. Value < than 12 or > 39 disables BAR.

Secondary BAR 4 Size

Used to set the prefetchable BAR 4 size on secondary side of NTB. Value < than 12 or > 29 (39 for BIOS supporting > 4G PCI) disables BAR.

Secondary BAR 5 Size

Used to set the prefetchable BAR 4 size on secondary side of NTB. Value < than 12 or > 29 (39 for BIOS supporting > 4G PCI) disables BAR.

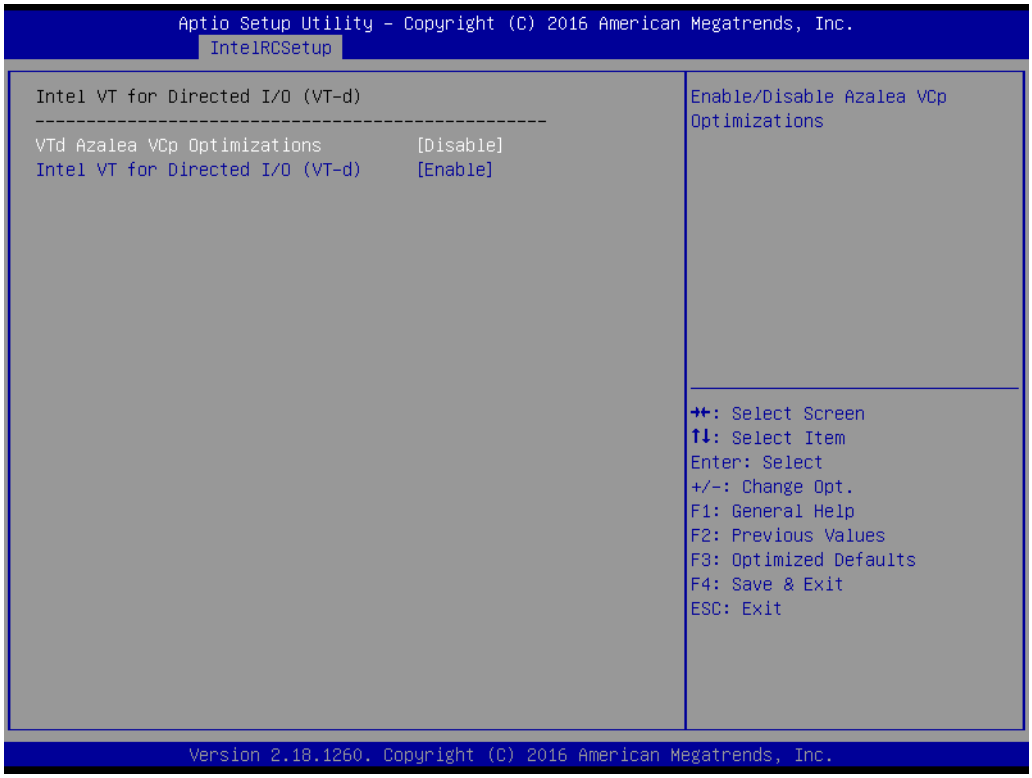
Crosslink control Override

This item allows user to select Auto or DSD/USP or USD/DSP for "Crosslink control Override".

Hide Port

This item allows user to select yes or no for "Hide Port?".

– Intel VT for Directed I/O (VT-D)



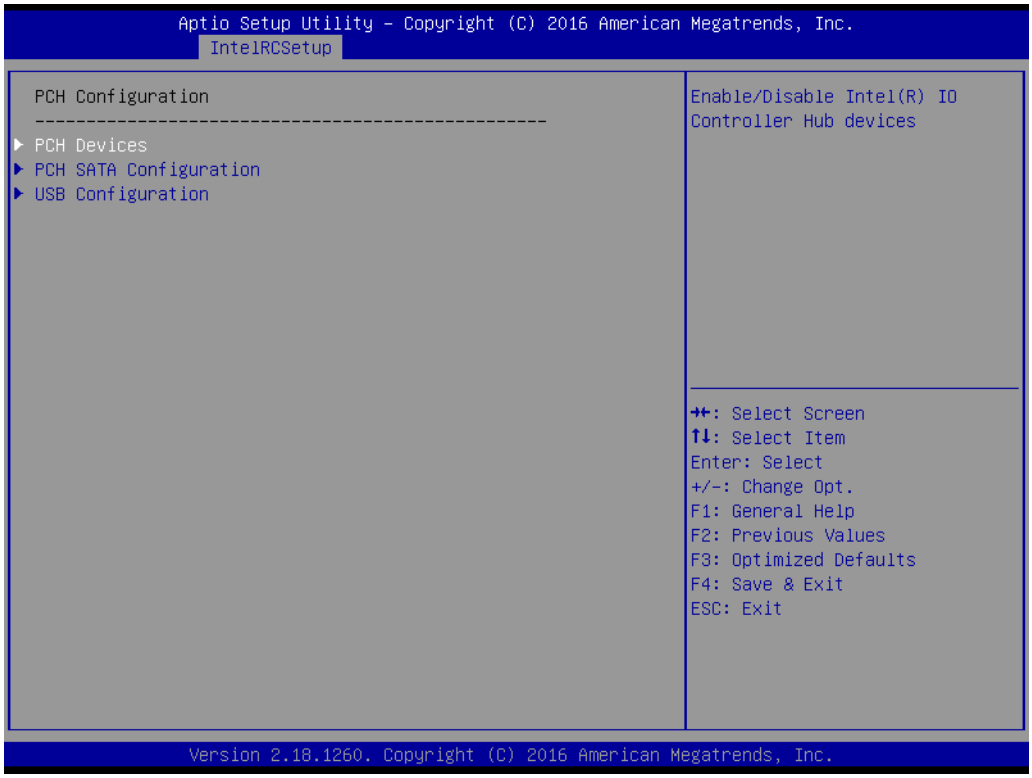
VTd Azalea VCp Optimizations

This item allows user to select Enable or Disable for "VTd Azalea VCp Optimizations".

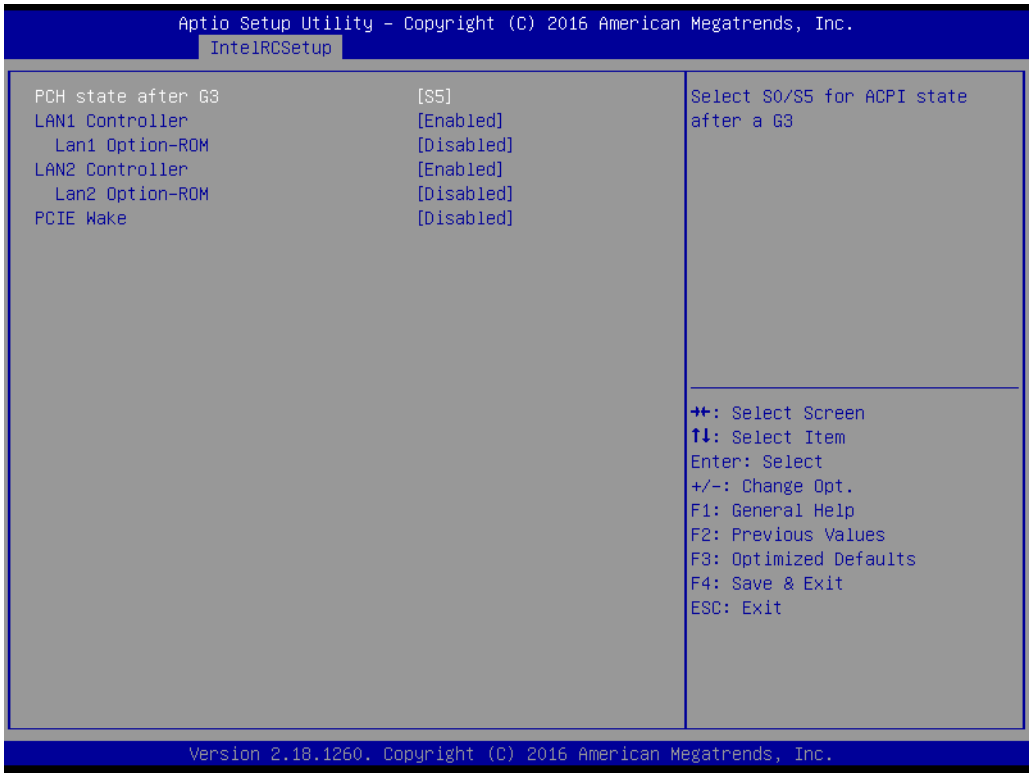
Intel VT for Directed I/O (VT-d)

This item allows user to select Enable or Disable for "Intel VT for Directed I/O (VT-d)".

3.2.3.4 PCH Configuration



PCH Devices

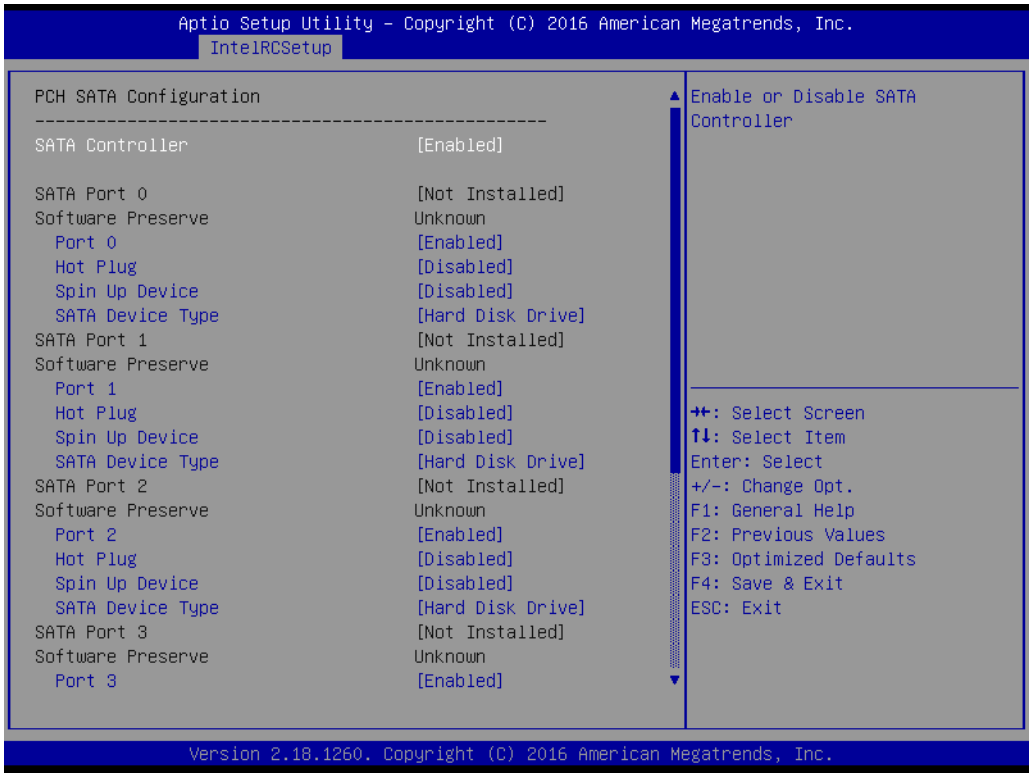


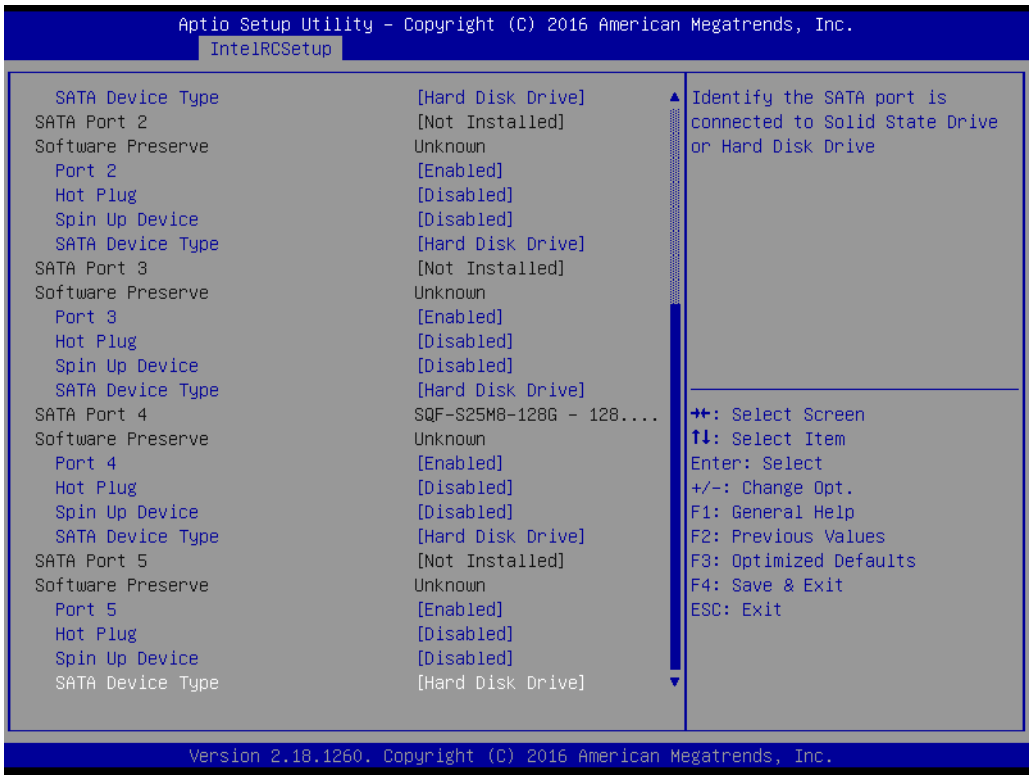
- **PCH stated after G3**
  This item allows user to select S0 or S5 or Last State for "PCH stated after G3".
- **LAN1 Controller**

This item allows user to select Enabled or Disabled for "LAN1 Controller".

- **Lan1 Option-ROM**
  This item allows user to select Enabled or Disabled for "Lan1 Option-ROM".
- **LAN2 Controller**
  This item allows user to select Enabled or Disabled for "LAN2 Controller".
- **Lan2 Option-ROM**
  This item allows user to select Enabled or Disabled for "Lan2 Option-ROM".
- **PICE Wake**
  This item allows user to select Enabled or Disabled for "PICE Wake".

PCH SATA Configuration





SATA Controller

- **SATA Port 0**
  - Port 0
    This item allows user to select Enabled or Disabled for "SATA Port 0".
  - Hot Plug
    This item allows user to select Enabled or Disabled for "Hot Plug".
  - Spin Up Device
    This item allows user to select Enabled or Disabled for "Spin Up Device".
  - SATA Device Type
    This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

- **SATA Port 1**
  - Port 1
    This item allows user to select Enabled or Disabled for "SATA Port 1".
  - Hot Plug
    This item allows user to select Enabled or Disabled for "Hot Plug".
  - Spin Up Device
    This item allows user to select Enabled or Disabled for "Spin Up Device".
  - SATA Device Type
    This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

- **SATA Port 2**
  - Port 2
    This item allows user to select Enabled or Disabled for "SATA Port 2".

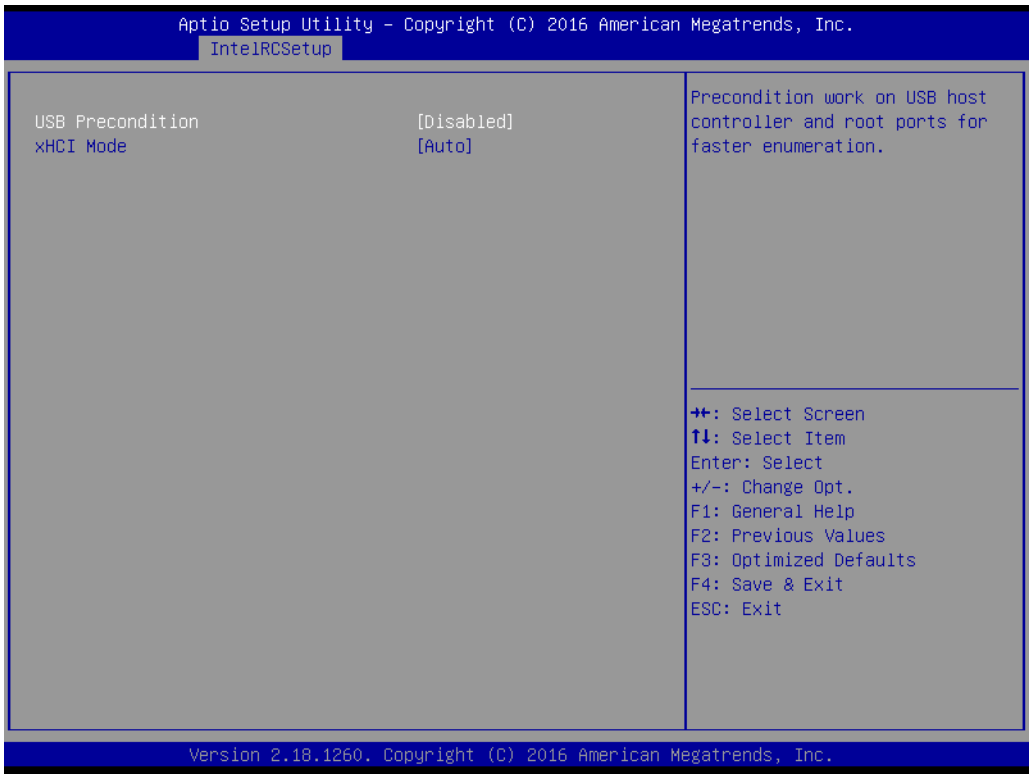
– Hot Plug
  This item allows user to select Enabled or Disabled for "Hot Plug".
– Spin Up Device
  This item allows user to select Enabled or Disabled for "Spin Up Device".
– SATA Device Type
  This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

■ **SATA Port 3**
– Port 3
  This item allows user to select Enabled or Disabled for "SATA Port 3".
– Hot Plug
  This item allows user to select Enabled or Disabled for "Hot Plug".
– Spin Up Device
  This item allows user to select Enabled or Disabled for "Spin Up Device".
– SATA Device Type
  This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

■ **SATA Port 4**
– Port 4
  This item allows user to select Enabled or Disabled for "SATA Port 4".
– Hot Plug
  This item allows user to select Enabled or Disabled for "Hot Plug".
– Spin Up Device
  This item allows user to select Enabled or Disabled for "Spin Up Device".
– SATA Device Type
  This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

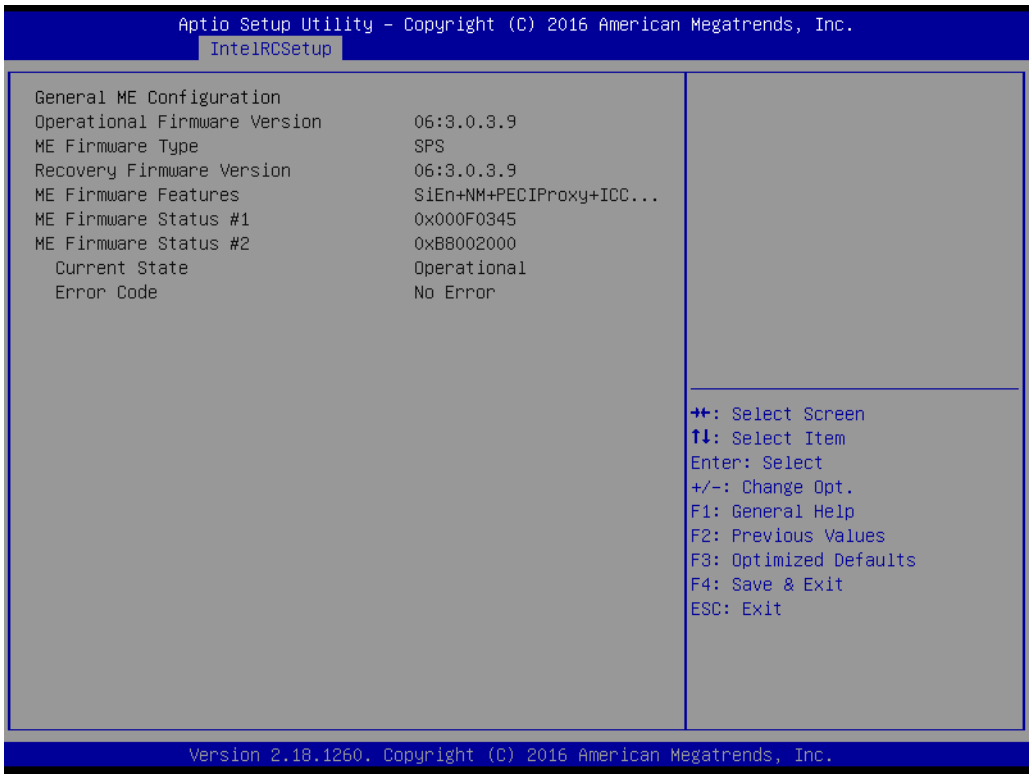
■ **SATA Port 5**
– Port 5
  This item allows user to select Enabled or Disabled for "SATA Port 5".
– Hot Plug
  This item allows user to select Enabled or Disabled for "Hot Plug".
– Spin Up Device
  This item allows user to select Enabled or Disabled for "Spin Up Device".
– SATA Device Type
  This item allows user to select Hard Disk Drive or Solid State Drive for "SATA Device Type".

USB Configuration

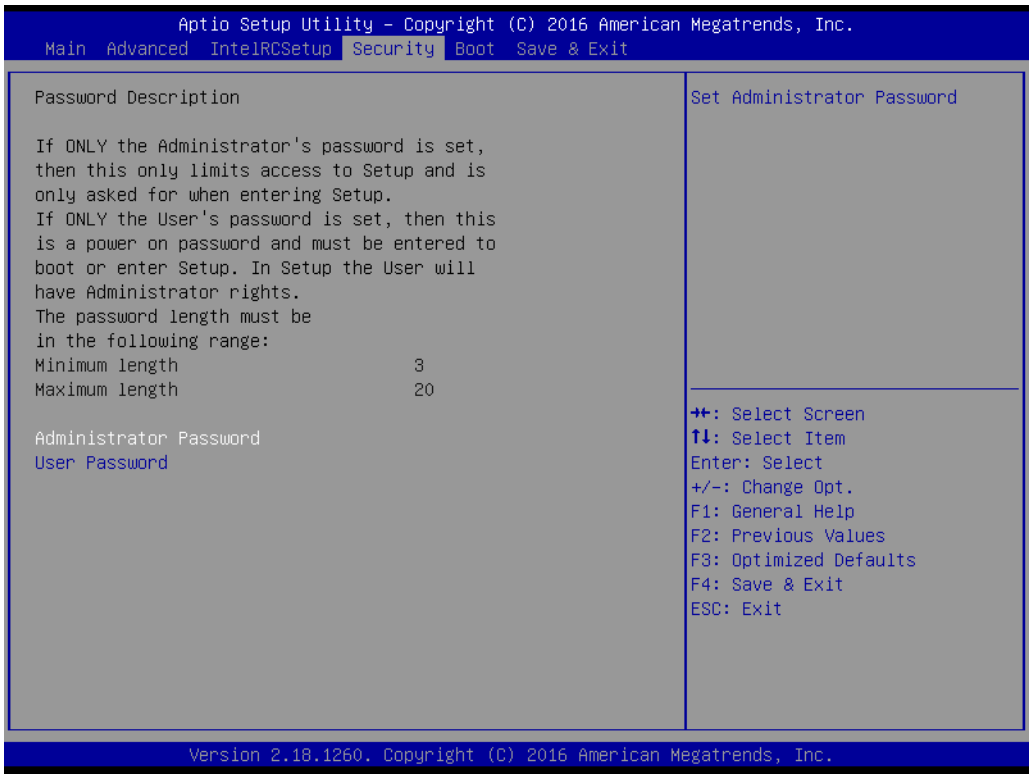


- **USB Precondition**
  This item allows user to select Enabled or Disabled for "USB Precondition".
- **xHCI Mode**
  This item allows user to select for "xHCI Mode". The default option is "Auto".

3.2.3.5 Server ME Configuration

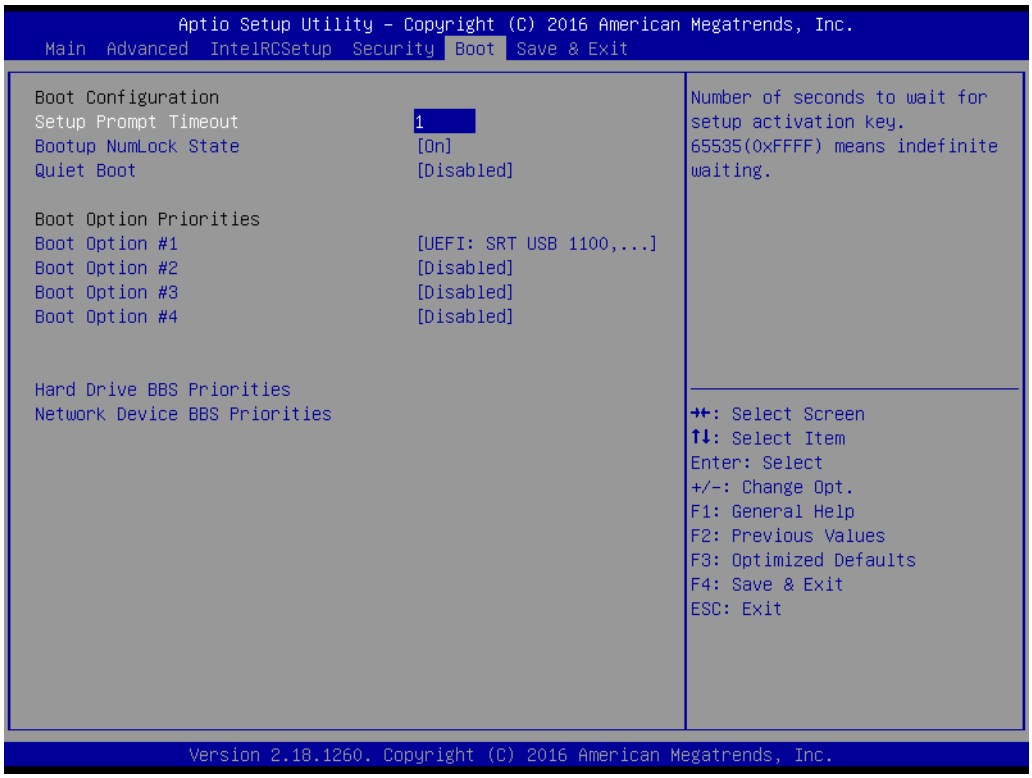


3.2.4 Security



- **Administrator Password**
  This item allows user to set Administrator Password.
- **User Password**
  This item allows user to set User Password.

3.2.5 Boot

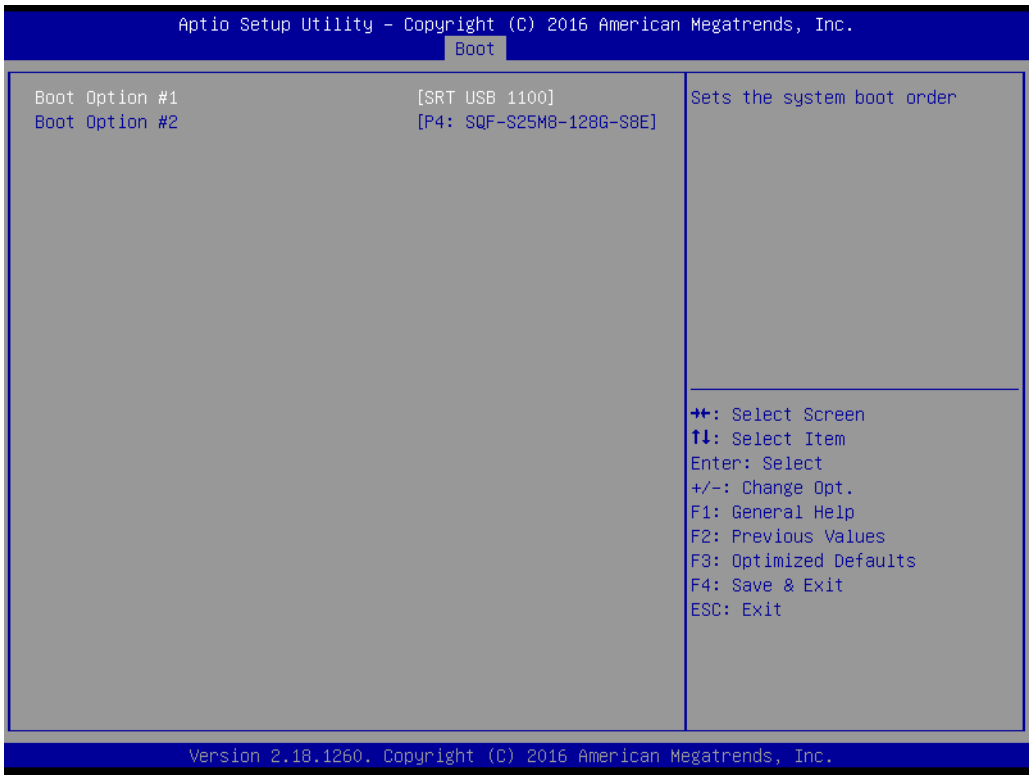


- **Setup Prompt Timeout**
  This item allows user to set "Setup Prompt Timeout".
- **Bootup NumLock State**
  This item allows user to set "Bootup NumLock State".
- **Quiet Boot**
  This item allows user to set "Quiet Boot".

Boot Option Priorities

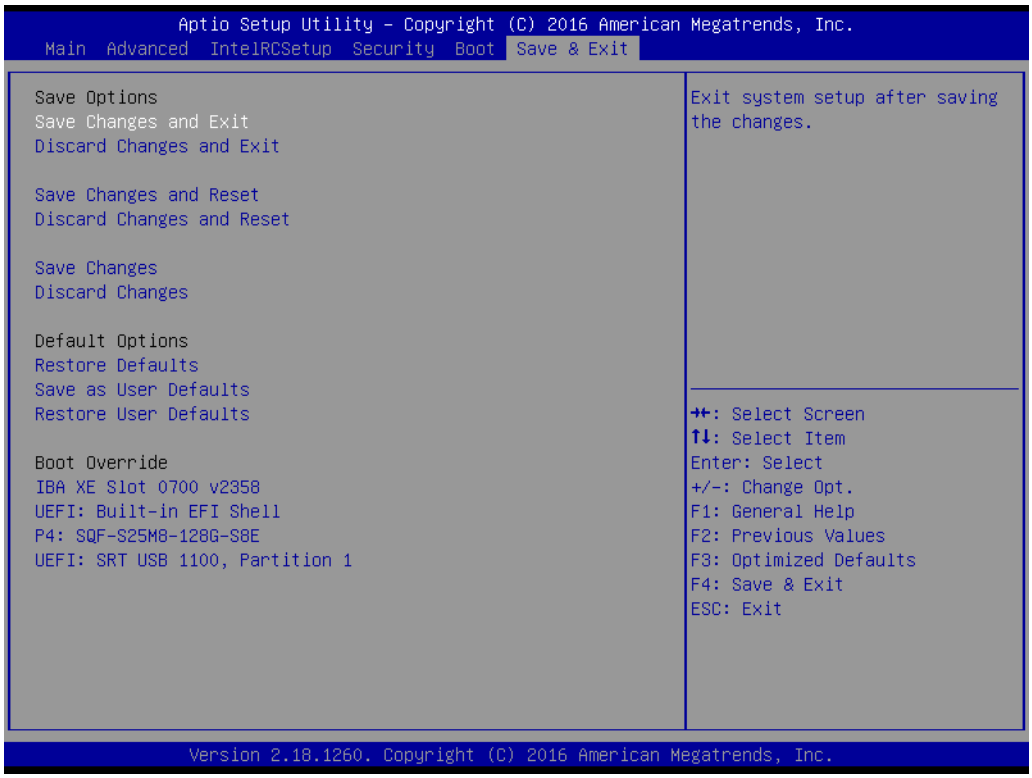
- **Boot Option #1**
  This item allows user to set "Boot Option #1". The default option is "Disabled".
- **Boot Option #2**
  This item allows user to set "Boot Option #2". The default option is "Disabled".
- **Boot Option #3**
  This item allows user to set "Boot Option #3". The default option is "Disabled".

- **Network Device BBS Priorities**



- **Boot Option #1**
  This item allows user to set "Boot Option #1".
- **Boot Option #2**
  This item allows user to set "Boot Option #2".
- Hard Drive BBS Priorities
- **Boot Option #1**
  This item allows user to set "Boot Option #1".

3.2.6 Save & Exit



- **Save Changes and Exit**
  This item allows users to select for Save Changes and Exit.
- **Discard Changes and Exit**
  This item allows users to select for Discard Changes and Exit.
- **Save Changes and Reset**
  This item allows users to select for Save Changes and Reset.
- **Discard Changes and Reset**
  This item allows users to select for Discard Changes and Reset.
- **Save Changes**
  This item allows users to select for Save Changes.
- **Discard Changes**
  This item allows users to select for Discard Changes.

Default Options:

- **Restore Defaults**
  This item allows users to select for restore factory defaults.
- **Save as User Defaults**
  This item allows users to select for Save as User Defaults.
- **Restore User Defaults**
  This item allows users to select for Restore User Defaults.

Boot Override:

This item allows users to set Override and it is based on user's configuration.

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-7900 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:*

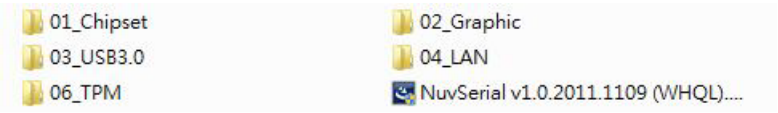
Windows Server 2012 R2 Standard	*X64*
Windows Server 2008 Enterprise Edition R2(SP1)	*X64*
Windows 10	*X64*
Windows 7(Ultimate SP1)	*X64*
Windows 8.1 Ultimate	*X64*

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.*

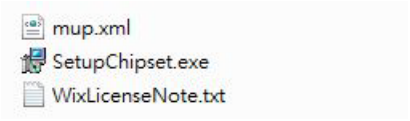
Note! *It is necessary to update all the latest Microsoft hotfix files when using this OS.*

4.1.3 Windows Server 2012 / 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

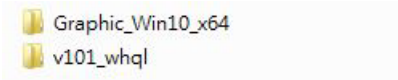
4.2.1 Introduction

Install the ASPEED VGA driver to enable this function, which includes the following features:

- 32bit 2D graphics engine on board for normal use.
- 64MB Ram for this chip, the highest resolution is 1920x1200.

4.2.2 Windows Server 2012 / Windows 10 / Windows 8.1 / Windows 7 / Linux Driver Setup

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 Server 2012 / Windows 10 / Windows 8.1 / Windows 7 / Linux.

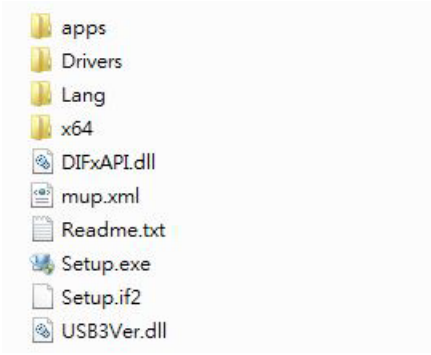


Note! *If you system wants to install Win 10, please select "Graphic_Win10_x64 file.*

4.3 Install USB 3.0

4.3.1 Introduction

MIC-7900 provides 4x USB 3.0 and the data transfer rate of USB3.0 (5Gb/s) is 10 times to USB2.0 (480 Mbps). These 4 USB 3.0 port supports 5v standby power. Insert the driver CD into your system's CD-ROM drive. Navigate to the "03 USB3.0" to install the drier.



4.4 LAN Configuration

4.4.1 Introduction

The MIC-7900 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Intel® I210IT (LAN1) and I210IT (LAN2)) 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

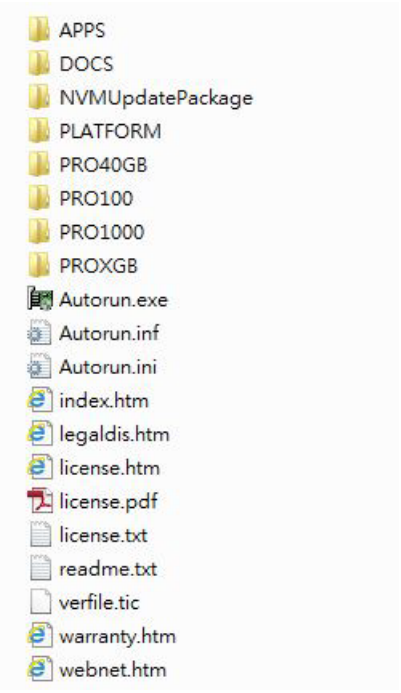
4.4.3 Installation

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 Server 2012 / Windows 10 / Windows 8.1 / Windows 7

Insert the driver CD into your system's CD-ROM drive. Select folder "04_LAN" then click the "Rel_20.7_PV_OEM Gene_205241".



4.5 TPM

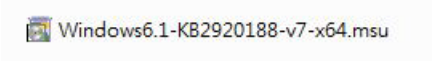
4.5.1 Introduction

MIC-7900 supports TPM 2.0. TPM IC is INFINEON SLB9665XQ2.0.

Trusted Platform Module (TPM) technology is designed to provide hardware-based, security-related functions. It has a security-related crypto-processor that is designed to carry out cryptographic operations in a variety of devices and form factors. It includes multiple physical security mechanisms to help prevent malicious software from tampering with the security functions of the TPM.

4.5.2 TPM installation

The installation utility is in the CD's "06_TPM". Go to the directory of the CD and follow these steps to install.



Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The MIC-7900'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).

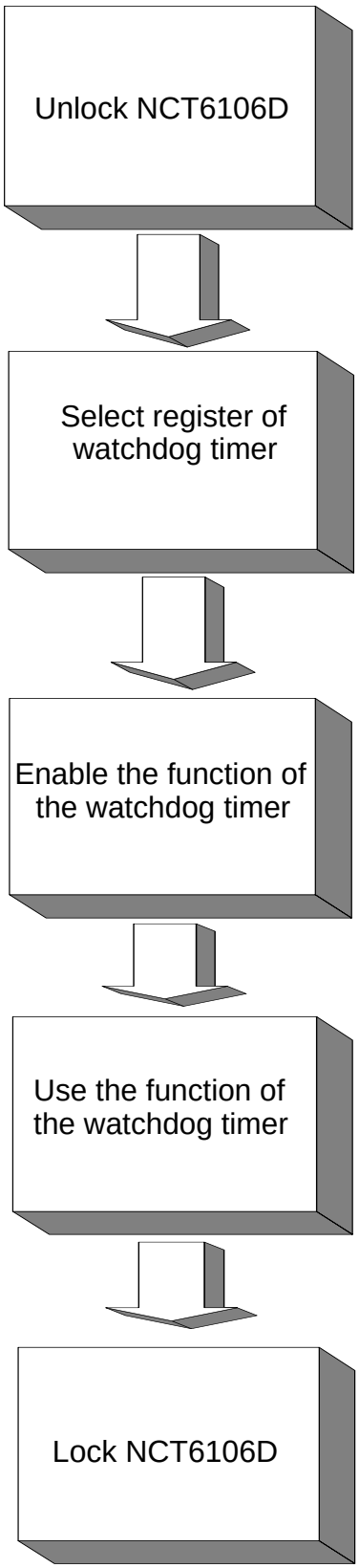

Unlock NCT6106D
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6106D

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

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

B.1.1 GPIO Registers

CRF0 (GP40-GP47 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.

CRF1 (GP40-GP47 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.

CRF2 (GP40-GP47 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(GP40~GP47), configuration register CRF0, CRF1, CRF2
---------------------------------------------------------
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, F0H
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, F2H
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, F1H
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
```

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission of the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2017