

User Manual

ARS-P2800 Series

Passenger Information System
Computer for Railway
Applications

ADVANTECH

Enabling an Intelligent Planet

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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.

Technical Support and Assistance

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

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services.

To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the best performance possible from your products. If you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

Please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and can be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice about application requirements or specific information on the installation and operation of any of our products.

Initial Inspection

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x ARS-P2800 series industrial computer
- 1 x ARS-P2800 accessory box

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the ARS-P2800 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ARS-P2800, check it for signs of shipping damage. (For examples: box damage, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also, please notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Order information

| Model number | Description |
|------------------|--|
| ARS-P2800-XXXXX | 28" PIS, Intel Bay Trail J1900, 4G , 64GB mSATA, LANx1 |
| ARS-P2800F-XXXXX | 28" PIS, Intel Bay Trail J1900, 4G , 64GB mSATA, LANx2 |

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.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -40° C (-104° 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.**

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

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

17. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.
18. This product is intended to be supplied by a Listed DC power source, rate 24Vdc, 2.1A; 48Vdc, 1A; 72Vdc, 0.7A; 110Vdc, 0.45A minimum and Tma 60 degree C, if need further assistance, please contact Advantech for further information.

Consignes de sécurité

1. Veuillez lire attentivement ces instructions de sécurité.
2. Veuillez conserver ce manuel de l'utilisateur pour référence ultérieure.
3. Veuillez débrancher cet équipement de la prise secteur avant le nettoyage. Utilisez un chiffon humide. N'utilisez pas de détergent liquide ou pulvérisé pour le nettoyage. Utilisez une feuille d'humidité ou un vêtement pour le nettoyage.
4. Pour les équipements enfichables, la prise de courant doit se trouver à proximité de l'équipement et doit être facilement accessible.
5. Veuillez garder cet équipement de l'humidité.
6. Posez cet équipement sur une surface fiable lors de l'installation. Une chute ou une chute pourrait causer des blessures.
7. Les ouvertures sur l'enceinte sont destinées à la convection de l'air, protégeant ainsi l'équipement contre la surchauffe. **NE COUVREZ PAS LES OUVERTURES.**
8. Assurez-vous de la tension de la source d'alimentation lorsque vous connectez l'équipement à la prise secteur.
9. Placez le cordon d'alimentation de manière à ce que personne ne puisse marcher dessus. Ne placez rien sur le cordon d'alimentation.
10. Toutes les mises en garde et avertissements sur l'équipement doivent être notés.
11. Si l'équipement n'est pas utilisé pendant longtemps, débranchez l'équipement du secteur pour éviter d'être endommagé par une surtension transitoire.
12. Ne jamais verser de liquide dans les ouvertures de ventilation, cela pourrait causer un choc électrique.
13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir le matériel.
14. Si l'une des situations suivantes se présente, faites vérifier l'équipement par le personnel de service:
 - Le cordon d'alimentation ou la prise est endommagé.
 - Le liquide a pénétré dans l'équipement.
 - L'équipement a été exposé à l'humidité.
 - Le matériel ne fonctionne pas correctement ou vous ne pouvez pas le faire fonctionner conformément au manuel d'utilisation.
 - L'équipement est tombé et est endommagé.
 - L'équipement présente des signes évidents de rupture.
15. Ne laissez pas cet équipement dans un environnement où la température de stockage peut être inférieure à -40°C (-104°F) ou supérieure à 85°C (185°F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.
16. Attention: Danger d'explosion si la pile est remplacée de manière incorrecte. Remplacez-les uniquement par un type identique ou équivalent recommandé par le fabricant, jetez les piles usagées conformément aux instructions du fabricant.
17. Le niveau de pression sonore à la position de l'opérateur conformément à la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).
18. **ZONE D'ACCÈS RESTREINTE:** L'équipement ne doit être installé que dans une zone d'accès restreint.
19. **DISCALIMER:** Cet ensemble d'instructions est conforme à la norme IEC 704-1. Advantech décline toute responsabilité quant à l'exactitude et aux déclarations contenues dans ce document.

20. Ce produit est destiné à être alimenté par une source d'alimentation CC répertoriée, débit 24Vdc, 2.1A; 48Vdc, 1A; 72Vdc, 0,7A; 110Vdc, 0.45A minimum et Tma 60 degree C, si besoin d'aide, veuillez contacter Advantech pour plus d'informations.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Battery Information

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



Warnings, Cautions and Notes

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



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g. There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



Note! Notes provide optional additional information.

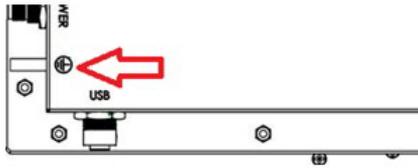


Avertissements et Précautions

Attention! Consignes à respecter afin d'éviter des blessures!

Danger! Les précautions à suivre sont indiquées pour éviter la perte des données et éviter d'endommager le matériel. Il y a un danger d'explosion de la batterie si celle-ci est mal installée. Ne pas essayer de recharger, d'ouvrir de force ou de chauffer la batterie. Remplacez la batterie uniquement avec le même type ou équivalent recommandé par le fabricant. Jetez les batteries usagées selon les instructions du fabricant.

Ground Screw



Ground Screw:

Please make the earth lead well locked at the ground screw.

Connection for DC Power Source

Connection for DC Power Source:

Attention:

Only trained service personnel are authorized to install and remove the DC power supply, and make the connections to and disconnections from the DC power source. The customer is responsible for ensuring that only trained service personnel install or remove the power cable.

To Connect Power supply:

Note:

The DC supply source for the equipment power supplied shall be an UL certified power source and suitable for specification provided by the manufacturer. Please use the Jacketed power cable with 120 Volt, 18AWG or 6Amp. To connect between the equipment and the DC power source.

Turn OFF DC power source and equipment that is to be connected to this product.

Endure DC power source connected earthed cable.

Connect the earthed cable which is of AWG18 min. green-and-yellow wire of earth of building to the protective earthed terminal of the equipment.

Connect signal cables to the product.

Connect power cable to the product.

Ensure correct polarity of DC connections: DC is + and RTN is -.

Turn ON the DC power source.

To Disconnect Power supply:

Turn OFF DC power source.

Disconnect the power cord from equipment.

Remove the signal cables from equipment.

Remove the earth cable from the protective earthed terminal of the equipment.

Contents

| | | |
|------------------|---|-----------|
| Chapter 1 | General Information | 1 |
| 1.1 | Introduction | 2 |
| 1.2 | Production Features | 2 |
| 1.2.1 | General | 2 |
| 1.2.2 | Display | 2 |
| 1.2.3 | Power Consumption | 2 |
| 1.3 | Hardware Specifications | 2 |
| 1.3.1 | System Block Diagram | 3 |
| | Figure 1.1 ARS-P2800 System Block Diagram | 3 |
| 1.4 | Mechanical Specifications | 4 |
| 1.4.1 | Dimensions | 4 |
| | Figure 1.2 ARS-P2800 Mechanical dimension drawing | 4 |
| 1.4.2 | Weight | 4 |
| 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 | Operation Temperature | 5 |
| 1.6.2 | Relative Humidity | 5 |
| 1.6.3 | Storage Temperature | 5 |
| 1.6.4 | Vibration during operation | 5 |
| 1.6.5 | Shock during operation | 5 |
| 1.6.6 | Safety | 5 |
| 1.6.7 | EMC | 5 |
| Chapter 2 | Hardware Information | 7 |
| 2.1 | ARS-P2800 I/O Connectors | 8 |
| 2.2 | ARS-P2800 External I/O Connectors | 8 |
| 2.2.1 | Power Input Connector | 8 |
| | Figure 2.1 Power Input Connector | 8 |
| | Table 2.1: Power Input Connector | 8 |
| 2.2.2 | USB M12 Connector | 9 |
| | Figure 2.2 M12 USB connector | 9 |
| | Table 2.2: USB connector of M12 A-Coded | 9 |
| 2.2.3 | M12 X-Coded LAN Connector | 9 |
| | Figure 2.3 M12 X -coded connector | 9 |
| | Table 2.3: LAN Connector of M12 X-Coded | 9 |
| 2.2.4 | USB Connector | 10 |
| | Figure 2.4 USB Connector | 10 |
| | Table 2.4: USB connector pin assignments | 10 |
| 2.2.5 | DVI-D Connector | 10 |
| | Figure 2.5 DVI Connector | 10 |
| | Table 2.5: DVI-D Connector | 10 |
| Chapter 3 | BIOS Settings | 11 |
| 3.1 | BIOS Setup | 12 |
| 3.2 | Entering the Setup Menu | 12 |
| 3.2.1 | Main Setup Menu | 12 |
| 3.2.2 | Advanced BIOS Features | 14 |
| 3.2.3 | Chipset Configuration | 25 |
| 3.2.4 | Security Configuration | 33 |

| | | |
|-------|-------------------|----|
| 3.2.5 | Boot | 34 |
| 3.2.6 | Save & Exit | 35 |

Appendix A **Exploded & Setting Diagram..... 37**

| | | |
|-----|------------------------------------|----|
| A.1 | Exploded Diagram | 38 |
| | Figure A.1 Exploded Diagrams | 38 |
| A.2 | Setting Diagram | 38 |
| | Figure A.2 Setting Diagrams | 38 |

Appendix B **Watchdog Timer Sample Code 39**

| | | |
|-----|----------------------------------|----|
| B.1 | Watchdog Timer sample code | 40 |
|-----|----------------------------------|----|

Chapter 1

General Information

This chapter gives background information on the ARS-P2800 Passenger Information System.

Sections include:

- Introduction
- General Specifications
- Power Information
- Dimensions

1.1 Introduction

The ARS-P2800 is a dedicated panel computer for rolling stock passenger information systems. ARS-P2800 has IO ports, such as LAN, USB, etc. and wide temperature range (-25 ° C to + 55 ° C) support.

1.2 Production Features

1.2.1 General

- Intel® Celeron™ J1900 Quad-core 2.0GHz
- Supports wide screens with high resolution
- Supports 2 x GbE, 2 x USB 2.0 ports
- Train grade working temperature range (-25° C to 55° C)

1.2.2 Display

- Display type: 28-inch TFT LCD panel
- Resolution: 1920 x 357
- Brightness: 1000 nits (type)
- Contrast Ratio: 6500:1

1.2.3 Power Consumption

- Typical: 32 W
- Max: 50 W

1.3 Hardware Specifications

- **CPU:** Intel® Celeron™ J1900 Quad-core 2.0GHz Processor
- **System Memory:** SODIMM DD3L 1600MHz up to 8GB
- **Graphic engine:** Intel® HD Graphics
- **Ethernet controller:** GbE 10/100/1000Mbps
- **I/O Interface:**
 - 1 x DVI-D
 - 1 x Giga LAN ports (M12 X-coded)
 - 1 x Giga LAN ports (M12 X-coded) (Reserve)
 - 1 x USB 2.0 and 1 x USB 2.0(M12 A-coded)
- **Storage:** 1 x mSATA (full size miniPCIe slot)

1.3.1 System Block Diagram

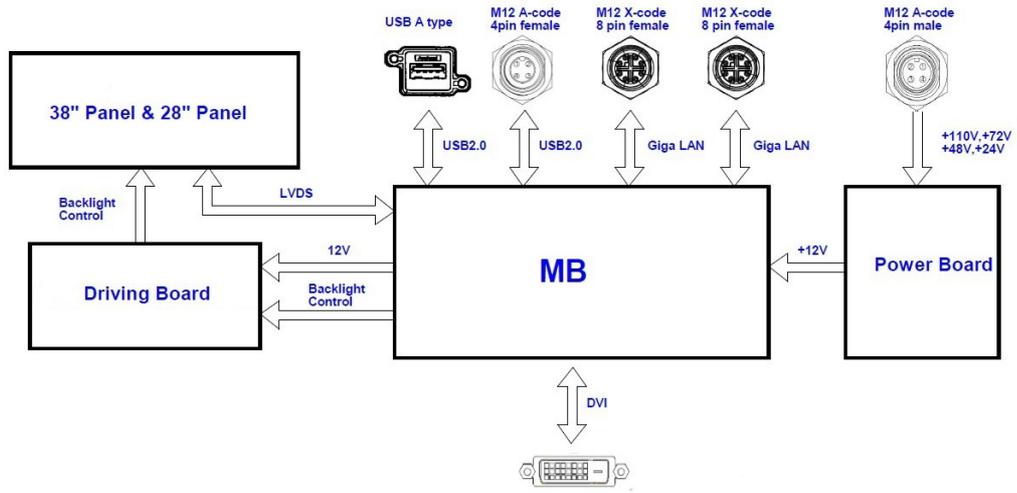


Figure 1.1 ARS-P2800 System Block Diagram

1.4 Mechanical Specifications

1.4.1 Dimensions

814 x 178 x 56 (Unit: mm)

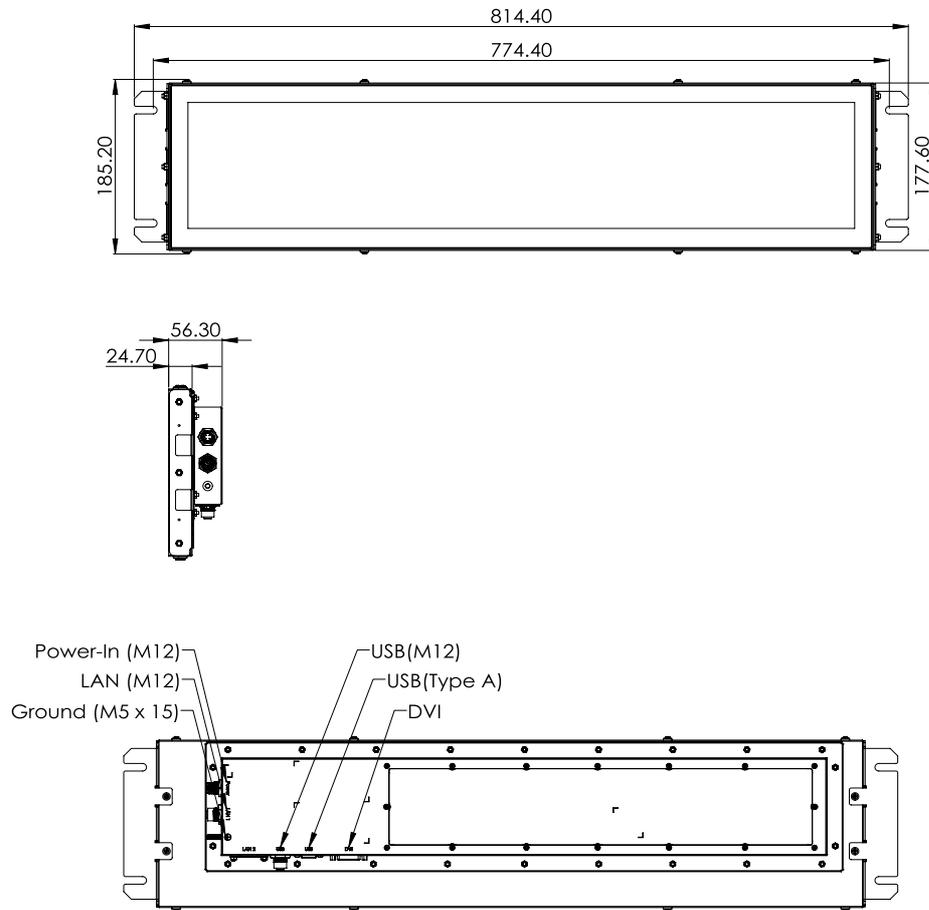


Figure 1.2 ARS-P2800 Mechanical dimension drawing

1.4.2 Weight

- 8.3 kg

1.5 Power Requirements

1.5.1 System Power

- Power Input: 24Vdc@ 2.1A
- Power Input: 48Vdc@ 1A
- Power Input: 72Vdc@ 0.7A
- Power Input: 110Vdc@ 0.45A

1.5.2 RTC Battery

- Lithium 3V/210mAh

1.6 Environment Specification

1.6.1 Operation Temperature

- With Industrial Grade SSD: -25 ~ 55 °C (-13 ~131 °F), with air flow. Speed=0.7 m/sec

1.6.2 Relative Humidity

- 95%@ 40 °C (non-condensing)

1.6.3 Storage Temperature

- -40 ~ 85 °C (-40 ~ 185 °F)

1.6.4 Vibration during operation

- When the system is equipped with mSATA: 5Grms, IEC 60068-2-64, random, 5 - 500 Hz 1hr/axis, x,y,z 3 axes.

1.6.5 Shock during operation

- When the system is equipped with mSATA: 5Grms, IEC 60068-2-27, half sine 11 ms duration.

1.6.6 Safety

UL, CCC,EN50155 compliant

1.6.7 EMC

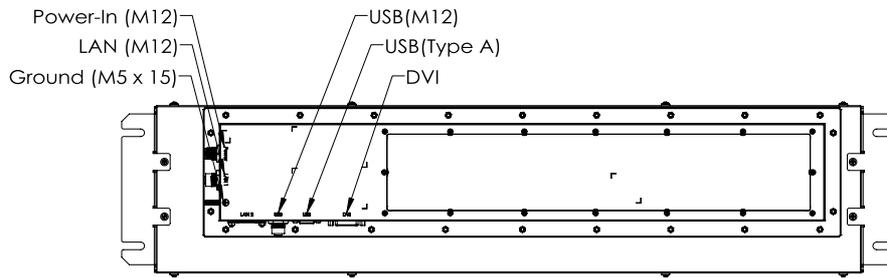
CE/FCC Class A, CCC, EN50155 compliant

Chapter 2

Hardware Information

This chapter introduces external I/O and the installation of the ARS-P2800 Hardware.

2.1 ARS-P2800 I/O Connectors



2.2 ARS-P2800 External I/O Connectors

2.2.1 Power Input Connector

ARS-P2800 comes with a M12 A-coded connector that carries VDC external power input.

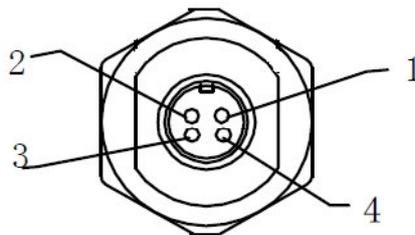


Figure 2.1 Power Input Connector

Table 2.1: Power Input Connector

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | GND | 2 | VDC |
| 3 | VDC | 4 | GND |

2.2.2 USB M12 Connector

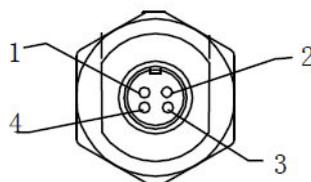


Figure 2.2 M12 USB connector

Table 2.2: USB connector of M12 A-Coded

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | Data - | 2 | +5V |
| 3 | Data + | 4 | GND |

2.2.3 M12 X-Coded LAN Connector

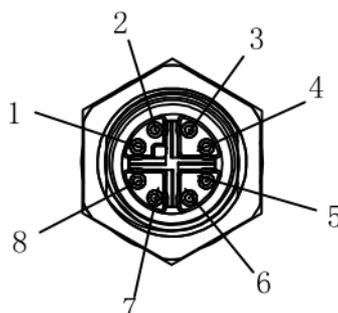


Figure 2.3 M12 X -coded connector

Table 2.3: LAN Connector of M12 X-Coded

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1 | MDX0+ | 2 | MDX0- |
| 3 | MDX1+ | 4 | MDX1- |
| 5 | MDX3+ | 6 | MDX3- |
| 7 | MDX2- | 8 | MDX2+ |

2.2.4 USB Connector

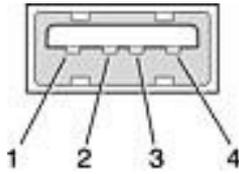


Figure 2.4 USB Connector

Table 2.4: USB connector pin assignments

| Pin | Signal | Pin | Signal |
|-----|-----------|-----|-----------|
| 1 | VCC | 2 | USB data- |
| 3 | USB data+ | 4 | GND |

2.2.5 DVI-D Connector

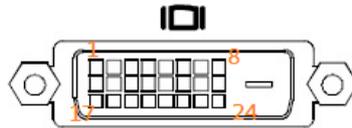


Figure 2.5 DVI Connector

Table 2.5: DVI-D Connector

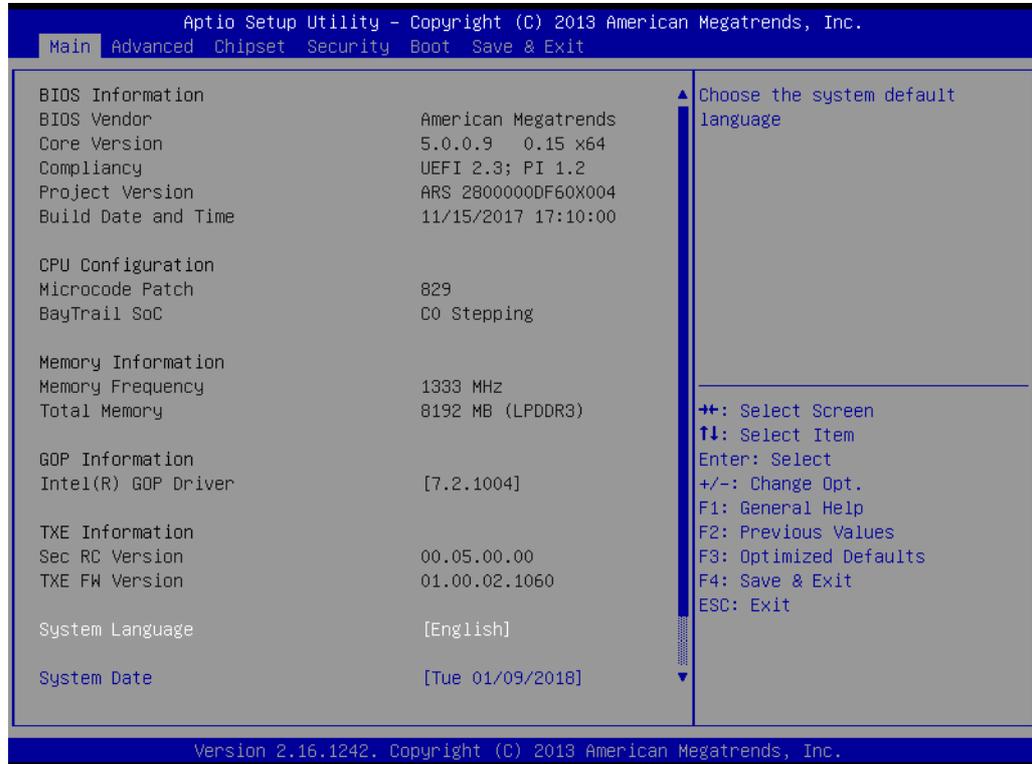
| Pin | Signal | Pin | Signal |
|-----|--------------|-----|-----------------|
| 1 | TMDS Data 2- | 2 | TMDS data 2+ |
| 3 | GND | 4 | NC |
| 5 | NC | 6 | DDC clock |
| 7 | DDC data | 8 | NC |
| 9 | TMDS Data 1- | 10 | TMDS Data 1+ |
| 11 | GND | 12 | NC |
| 13 | NC | 14 | +5V |
| 15 | GND | 16 | Hot plug detect |
| 17 | TMDS Data 0- | 18 | TMDS Data 0+ |
| 19 | GND | 20 | NC |
| 21 | NC | 22 | GND |
| 23 | TMDS clock+ | 24 | TMDS clock- |

Chapter 3

BIOS Settings

3.1 BIOS Setup

AMIBIOS has been integrated into numerous motherboards over the last decade. With the AMIBIOS Setup program, users can modify the BIOS settings and control various system features. This chapter describes the basic navigation of the ARS-P2800 BIOS Setup Utility menu.



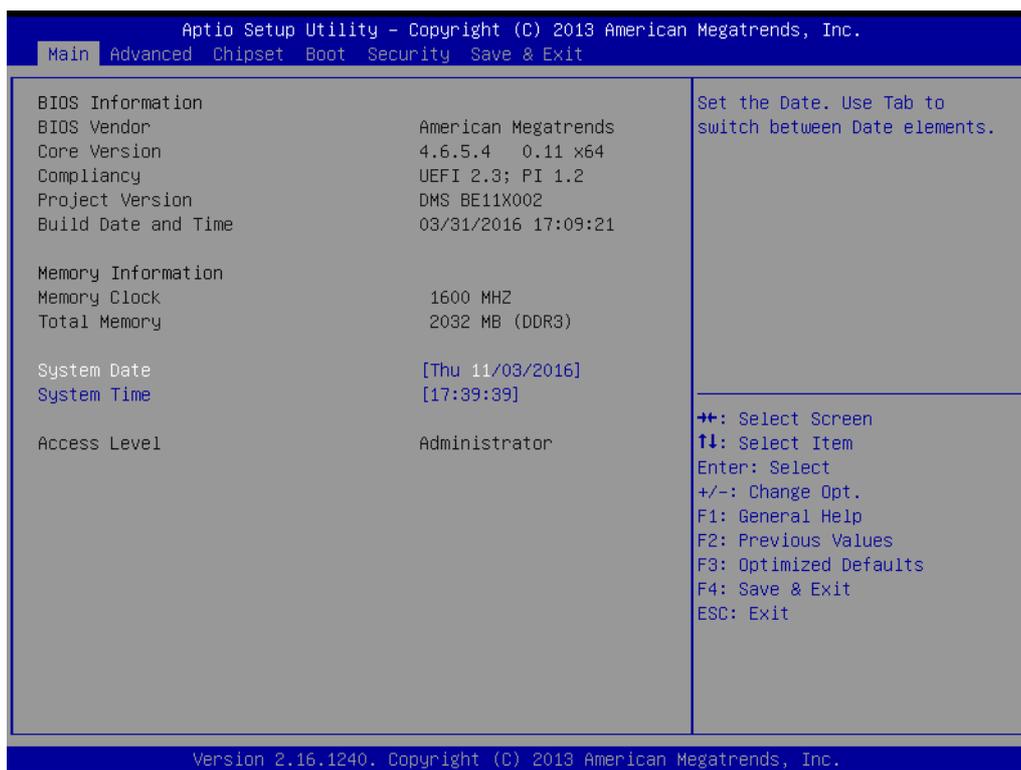
AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is then stored in flash ROM to ensure that the setup information is retained even when the system is powered off.

3.2 Entering the Setup Menu

Power on the computer and press <F2> or to enter the setup menu.

3.2.1 Main Setup Menu

When first entering the BIOS Setup Utility, users are directed to the Main setup page. Users can return to the Main setup page at any time by selecting the Main tab. The Main setup menu features two options, which are explained in this section. The Main BIOS setup page is shown below.



The Main BIOS setup page comprises two main frames. All configurable options are displayed in the left frame. Grayed-out options cannot be configured, whereas the options presented in blue can be configured. The key legend is displayed in the right frame.

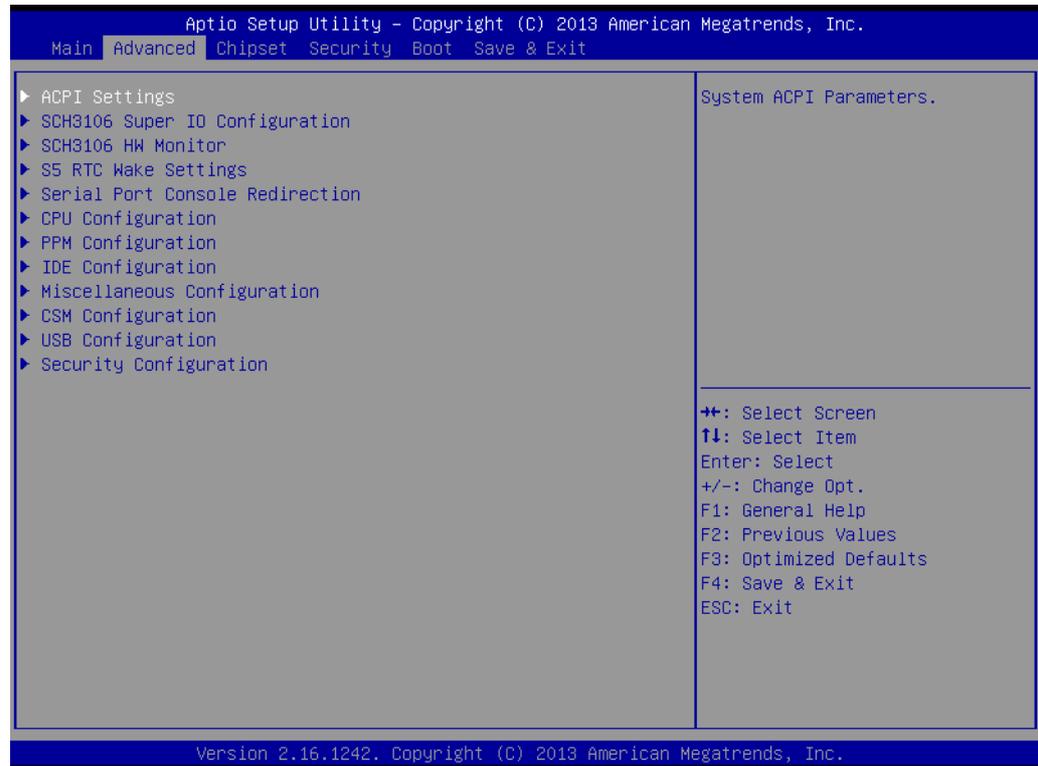
Above the key legend is an area reserved for text messages. When an option is selected in the left frame, the color of the text changes to white and is typically accompanied by a text message.

- **System Time / System Date**

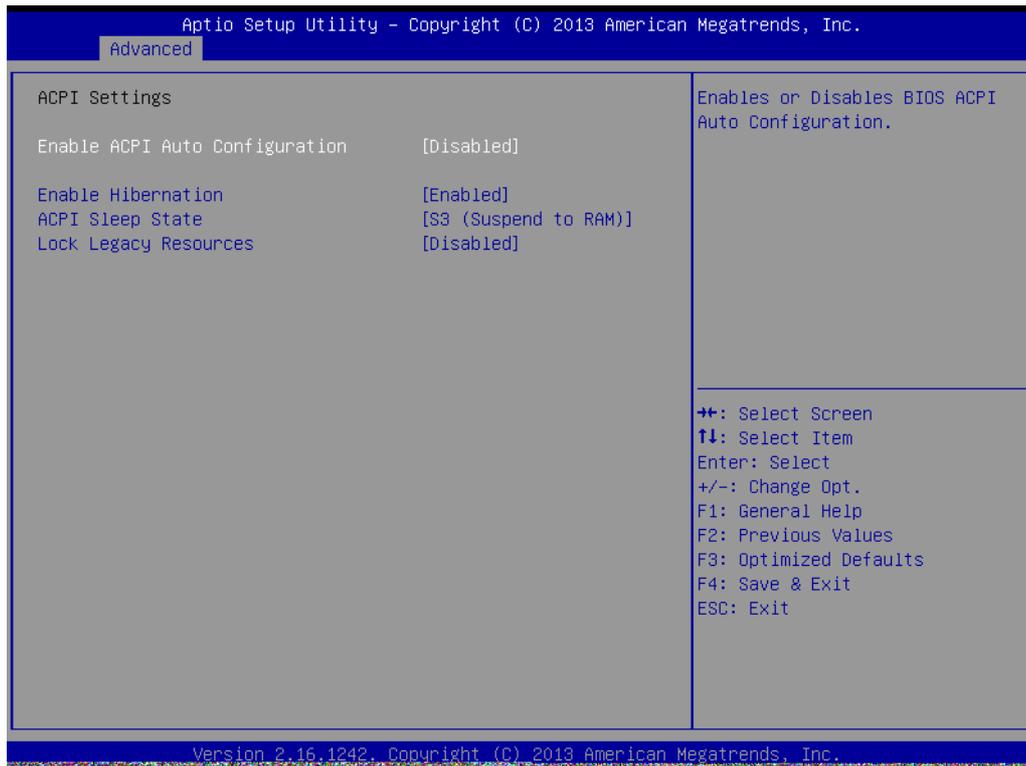
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values using the keyboard. Press the <Tab> or <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features

Select the Advanced tab of the BIOS Setup Utility menu to access the Advanced BIOS setup page. Users can select any item, such as CPU Configuration, in the left frame of the screen to access the submenu for that item. Users can view the Advanced BIOS setup options by highlighting various items using the <Arrow> keys. All Advanced BIOS setup options are described in this section. The Advanced BIOS setup screens are shown below, and the submenus are described in subsequent sections.

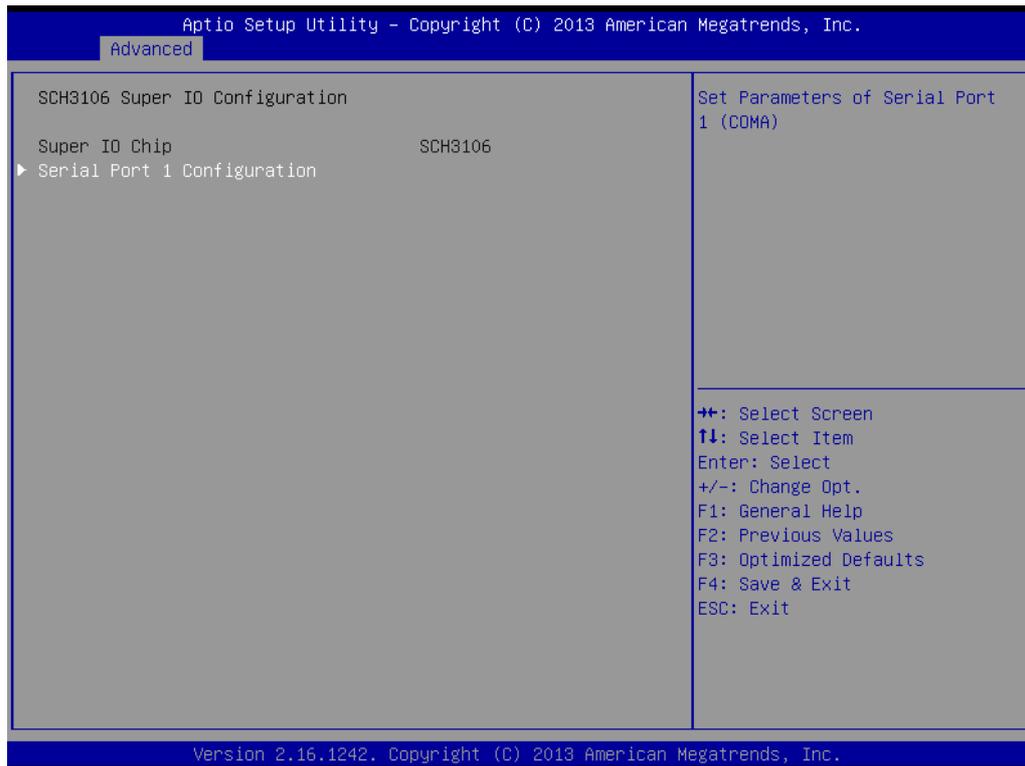


3.2.2.1 ACPI Settings Configuration



- **Enable ACPI Auto Configuration**
Enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
- **ACPI Sleep State**
Select the highest ACPI sleep state the system will enter when the Suspend button is pressed.
- **Lock Legacy Resources**
Enables or Disables Lock of Legacy Resources.

3.2.2.2 Super I/O Configuration



- **Serial Port 1 Configuration**
Set Parameters of Serial Port 1.

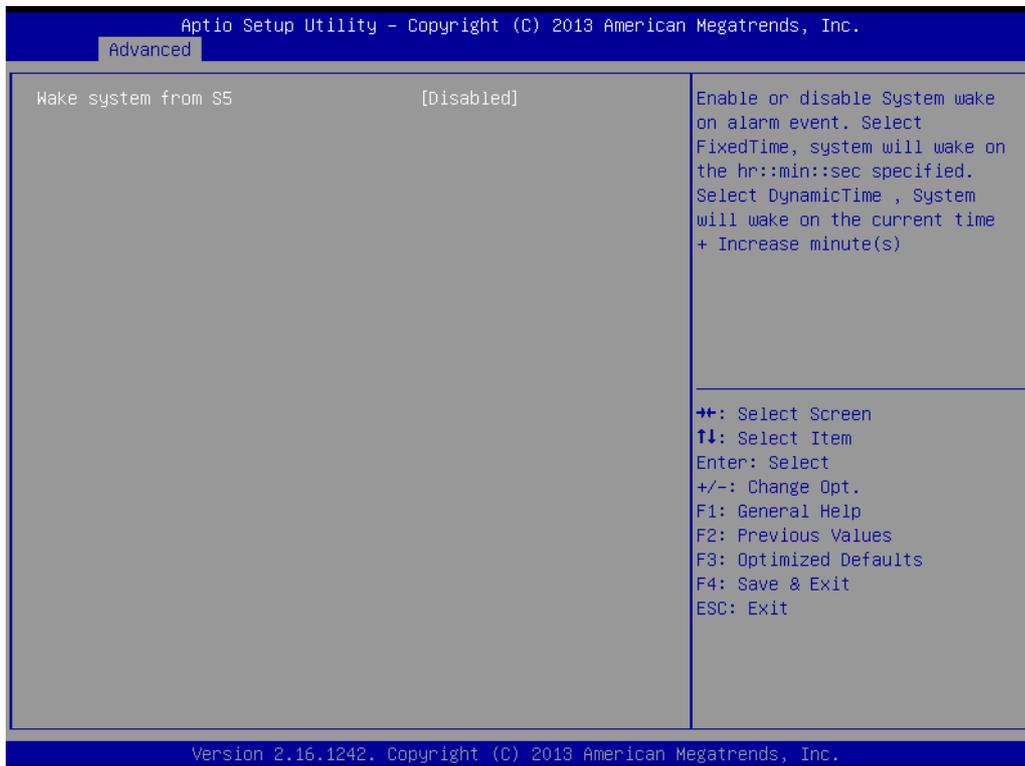
3.2.2.3 H/W Monitor



- **Pc Health Status**

This page displays all the information about system Temperature/Voltage.

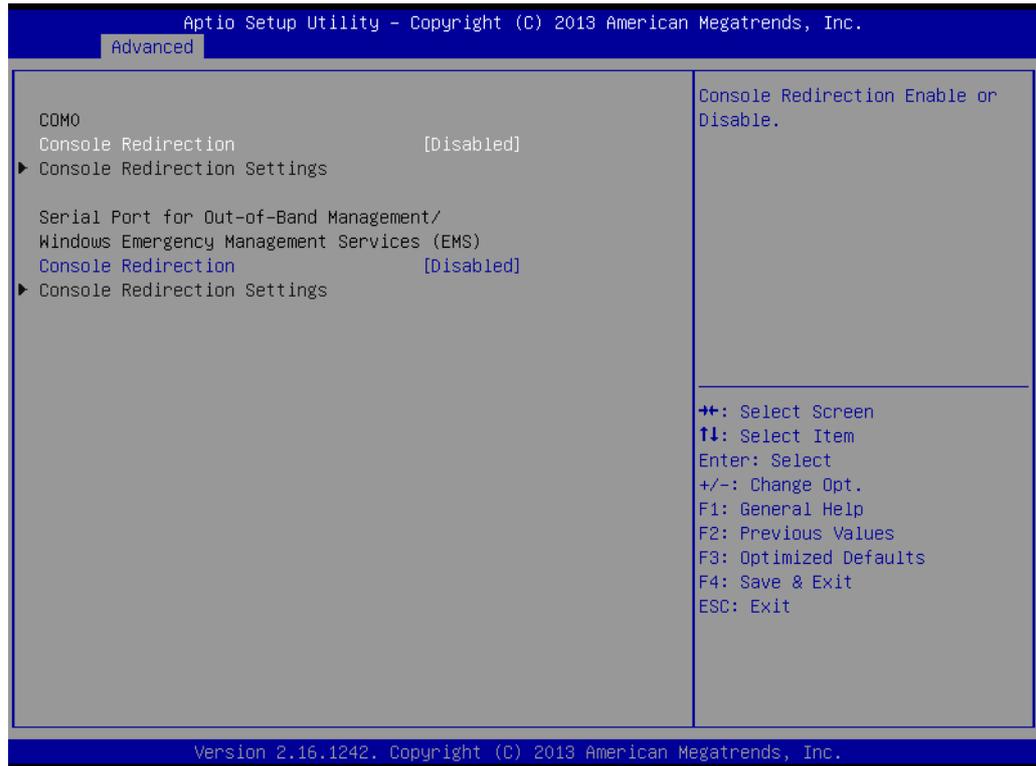
3.2.2.4 S5 RTC Wake Settings



- **Wake system with Fixed Time**

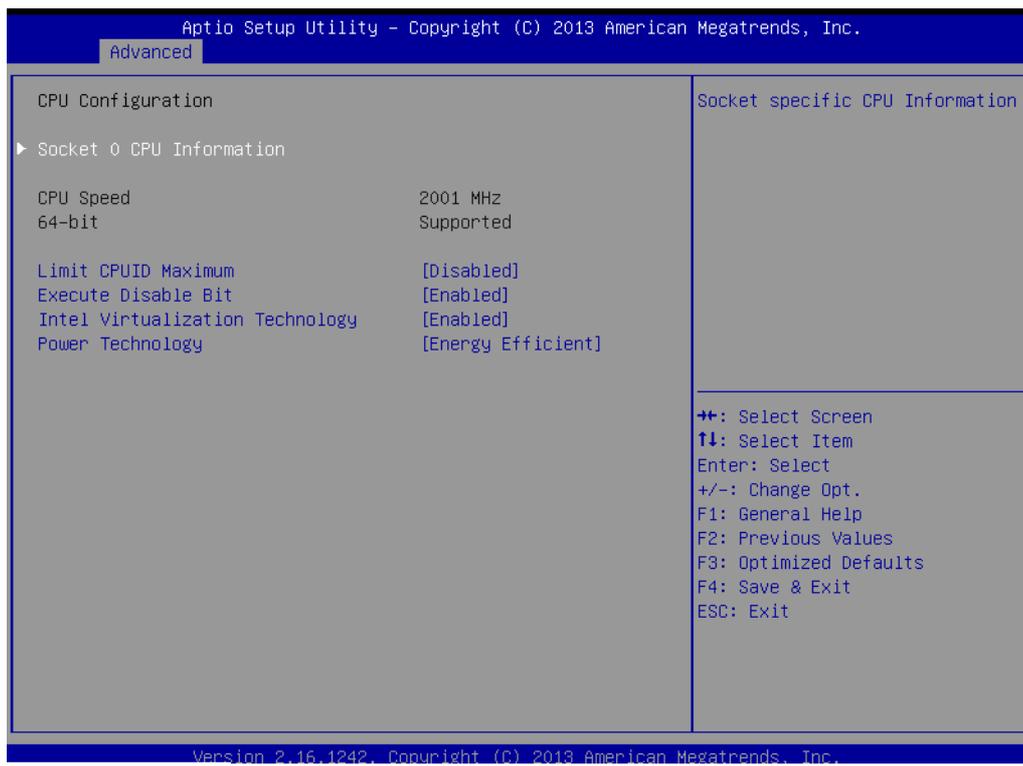
Enable or disable System wake on alarm event. Selecting FixedTime, system will wake on the hr:min:sec specified. Selecting DynamicTime, System will wake on the current time + Increase minute(s).

3.2.2.5 Serial Port Console Redirection



- **Console Redirection**
This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).
- **Console Redirection**
This item allows users to configure console redirection detail settings.

3.2.2.6 CPU Configuration



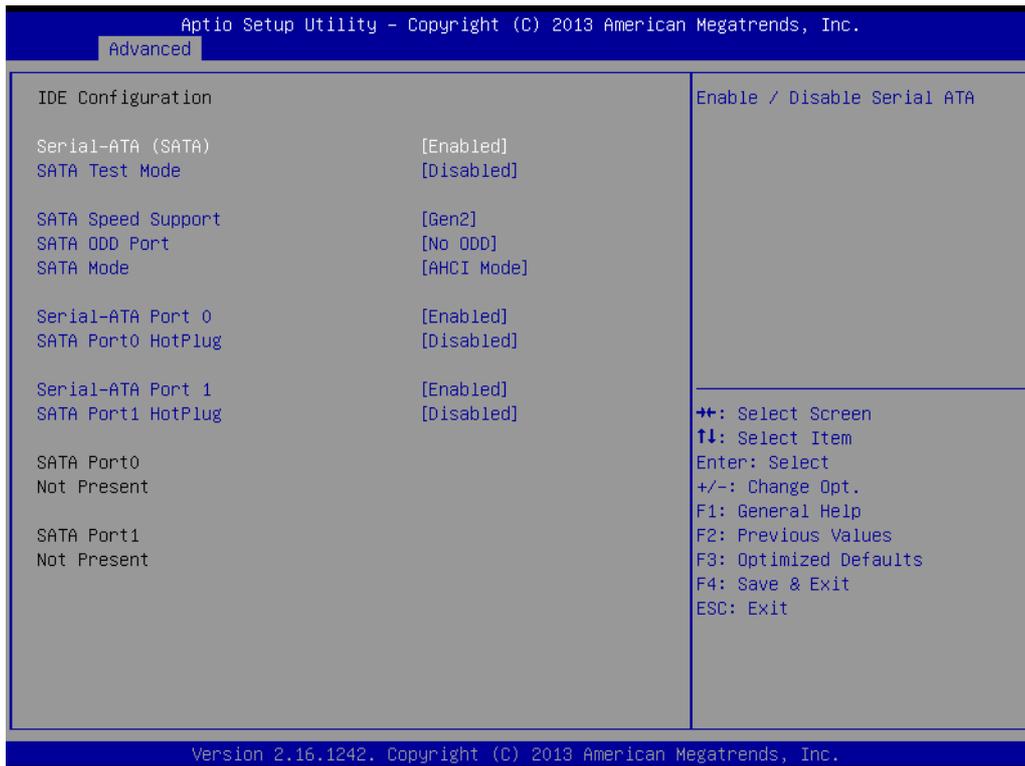
- **PPS Support**
This item allows you to enable or disable the ACPI _PPC, _PSS, and _PCT objects.
- **Limit CPUID Maximum**
Disabled for Windows XP.
- **Execute Disable Bit**
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)
- **Intel Virtualization Technology**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Power Technology**
Enables power management features.

3.2.2.7 PPM Configuration



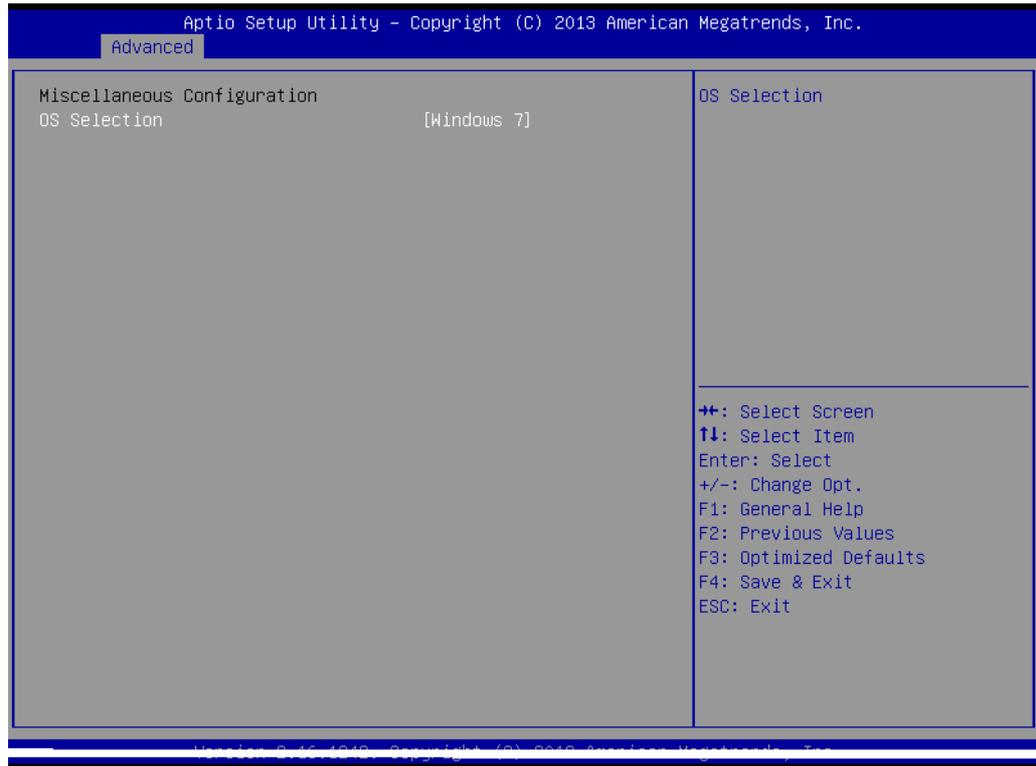
- **CPU C state Report**
Enable/Disable CPU C state report to OS.
- **Max CPU C-state**
This option controls Max C states that the processor will support.
- **S0ix**
Enable/Disable CPU S0ix state.

3.2.2.8 IDE Configuration



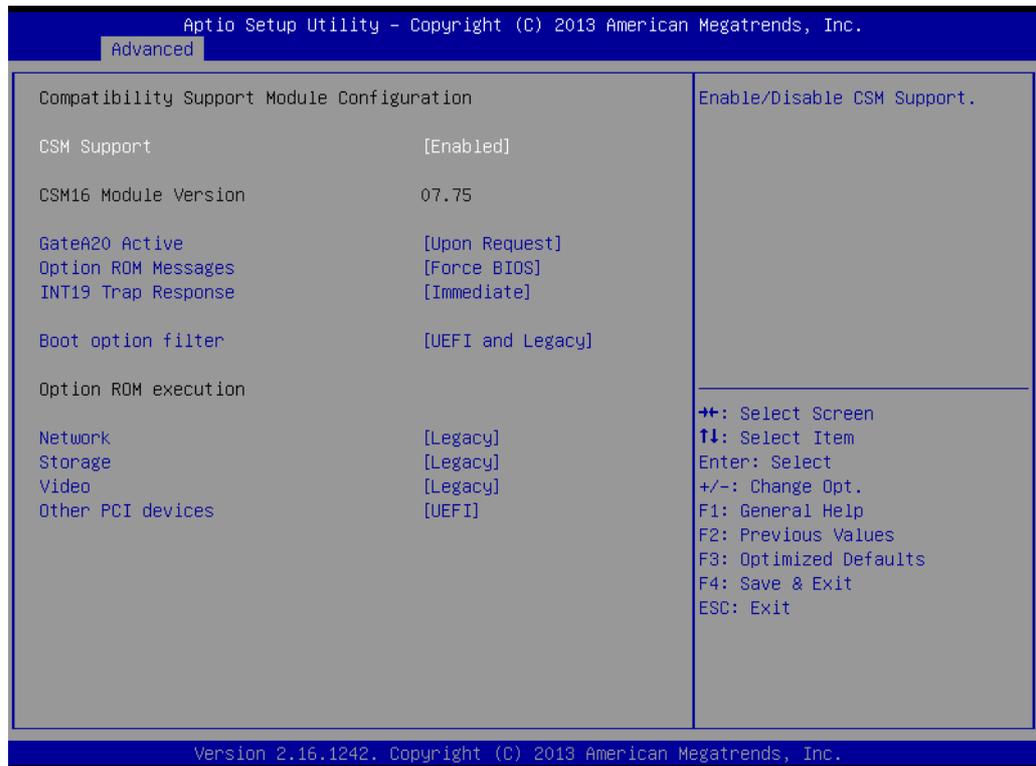
- **Serial-ATA (SATA)**
Enable / Disable Serial ATA.
- **SATA Test Mode**
Test Mode Enable / Disable.
- **SATA Speed Support**
SATA Speed Supports Gen1 or Gen2.
- **SATA ODD Port**
SATA ODD is Port0 or Port1.
- **SATA Mode**
Select IDE / AHCI.
- **Serial-ATA Port 0**
Enable / Disable Serial ATA Port 0.

3.2.2.9 Miscellaneous Configuration



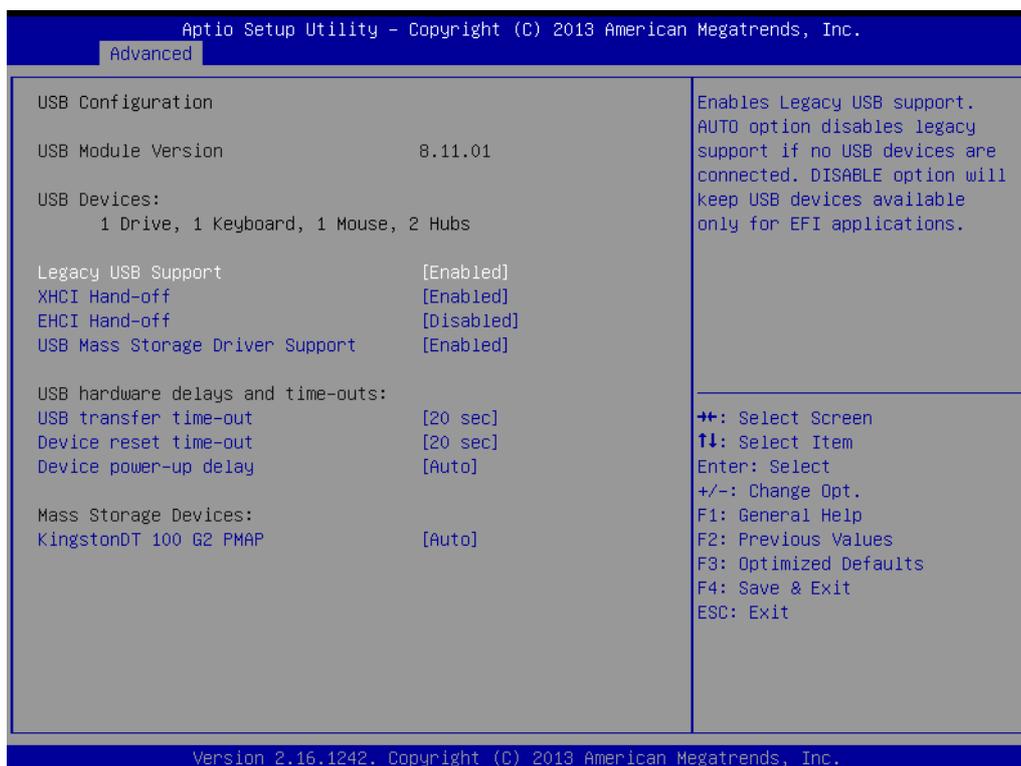
- **OS Selection**
OS Selection to choose Windows 8.x / Windows 7.

3.2.2.10 CSM Configuration



- **CSM Support**
Enable/Disable CSM Support.
- **GateA20 Active**
UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1 MB.
- **Option ROM Messages**
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.
- **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.

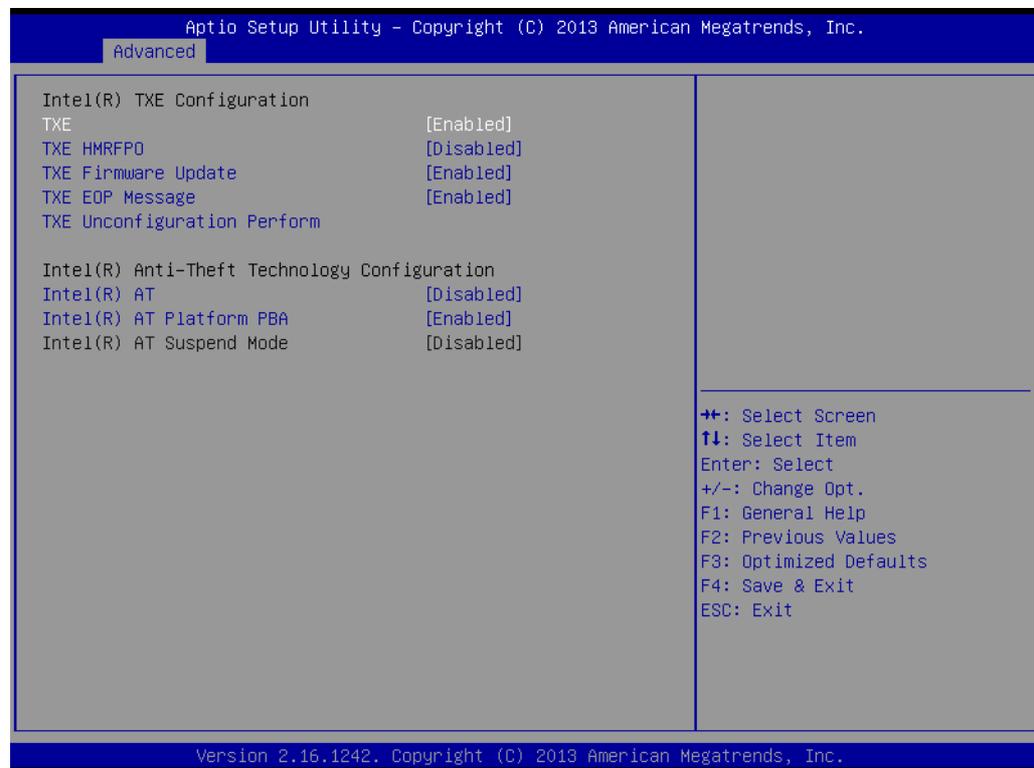
3.2.2.11 USB Configuration



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

- **XHCI Hand-Off**
This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.
- **EHCI Hand-Off**
This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
- **USB Mass Storage Driver Support**
This item allows you to enable or disable the USB mass storage device support.
- **Device reset time-out**
USB mass storage device start unit command time-out.
- **Device power-up delay**
Maximum time the device will take before it properly report itself to the host controller. "Auto" uses default value: for a Root port it is 100 ms, for a hub port the delay is taken from hub descriptor.

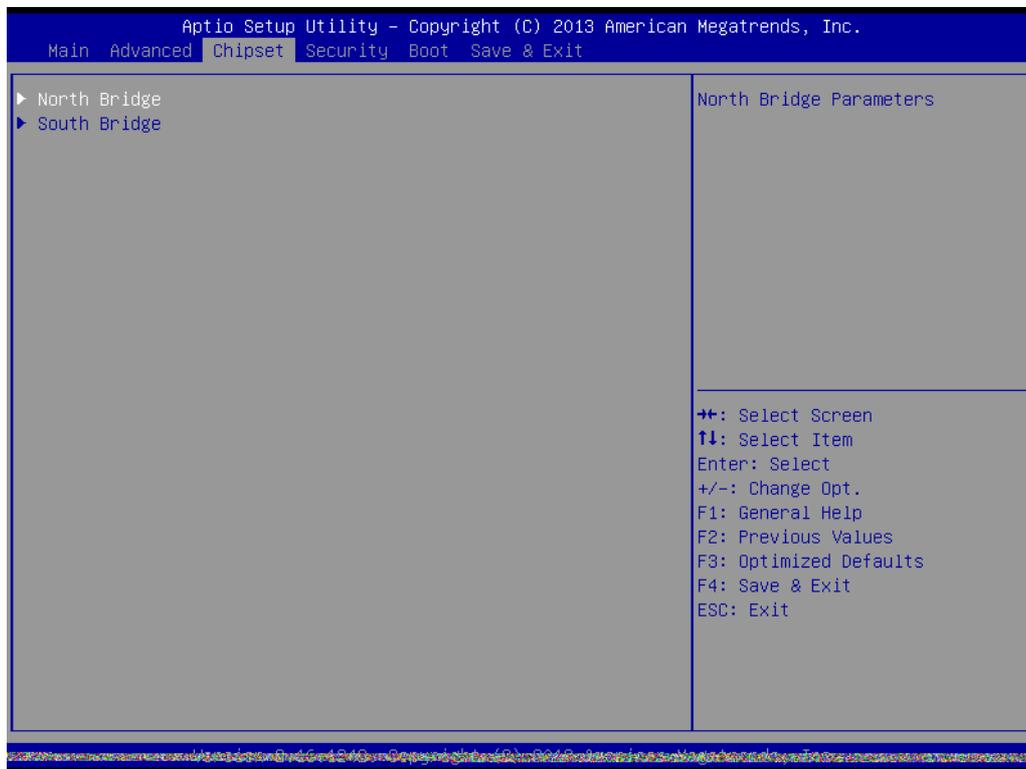
3.2.2.12 Security Configuration



- **SMART Self Test**
This item allows you to enable or disable the SMART self test function.
- **TXE**
Test Mode Enable / Disable.
- **TXE HMRFPD Disable**
- **TXE Firmware Update**
- **TXE EOP Message**
Send EOP Message before entering the OS.
- **TXE Unconfiguration Perform**
Revert TXE settings to factory defaults.
- **Intel(R) AT**
Enable/Disable BIOS AT code from running.

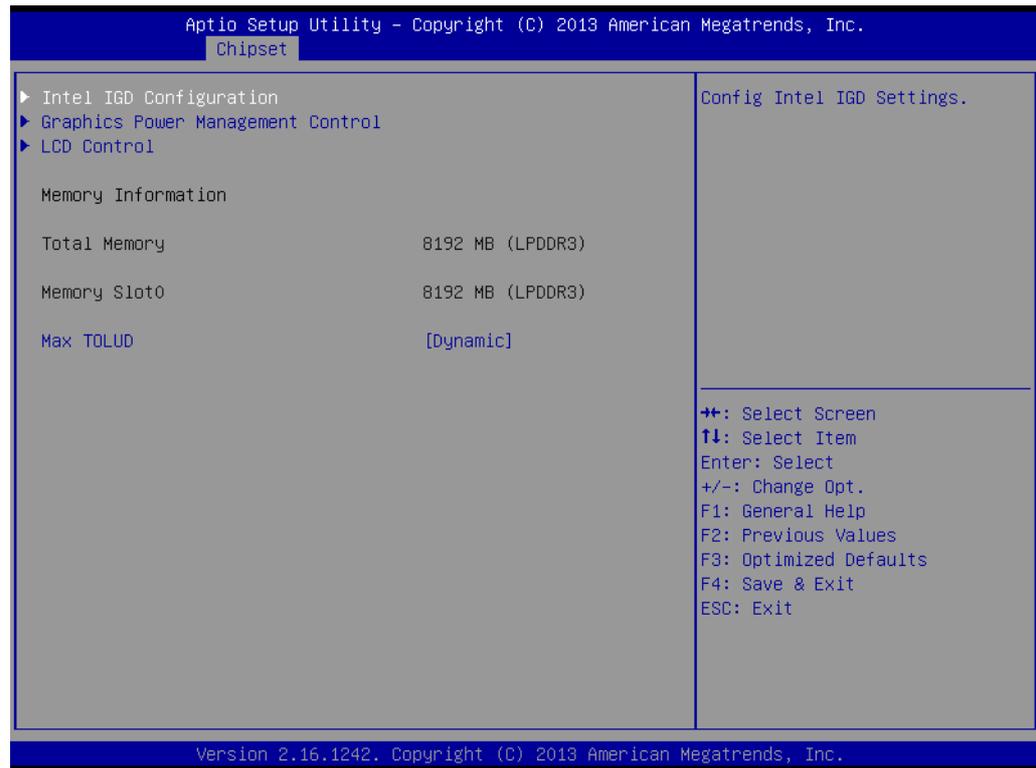
- **Intel (R) AT Platform PBA**
Enable/Disable BIOS AT code from running.

3.2.3 Chipset Configuration



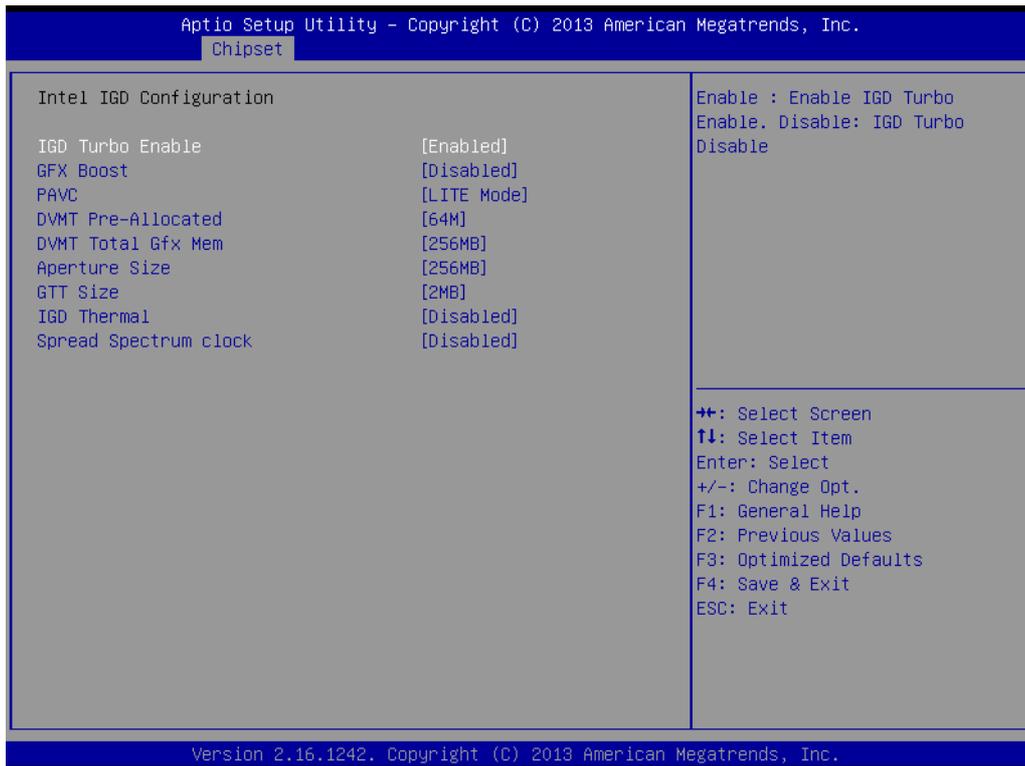
- **North Bridge**
Details for North Bridge items.
- **South Bridge**
Details for South Bridge items.

3.2.3.1 North Bridge



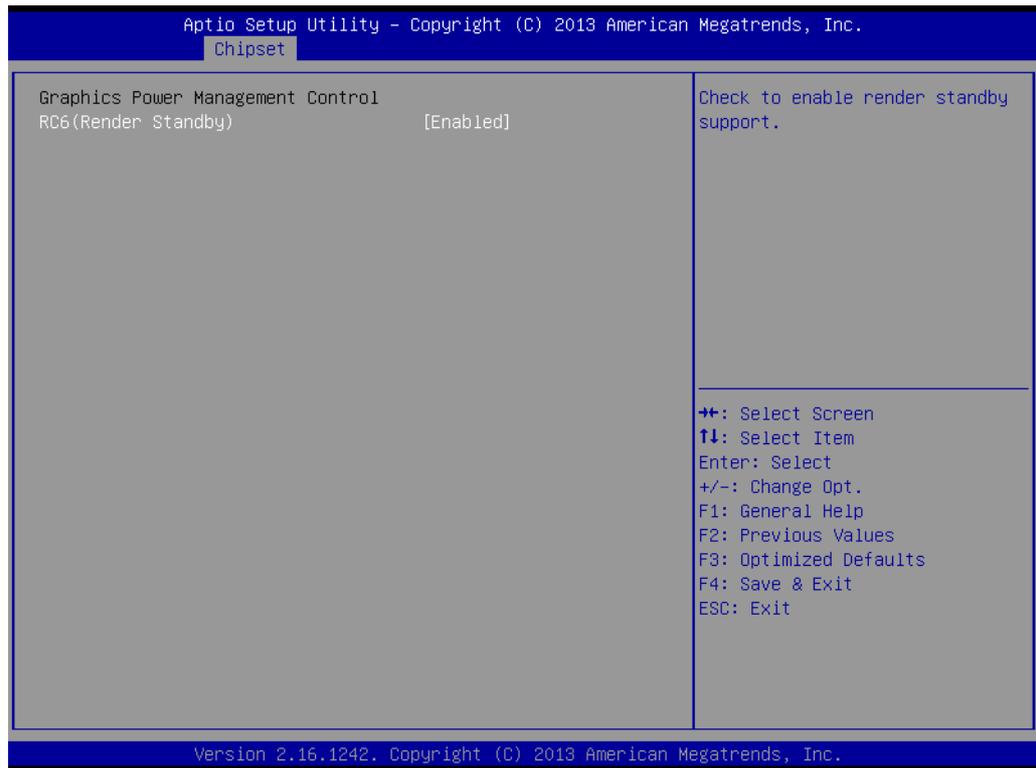
- **Intel IGD Configuration**
Config Intel IGD settings.
- **Graphics Power Management Control**
Graphics Power Management Control options.
- **LCD Control**
LCD Control.
- **Max TOLUD**
Maximum value of TOLUD.

3.2.3.2 Intel IGD Configuration



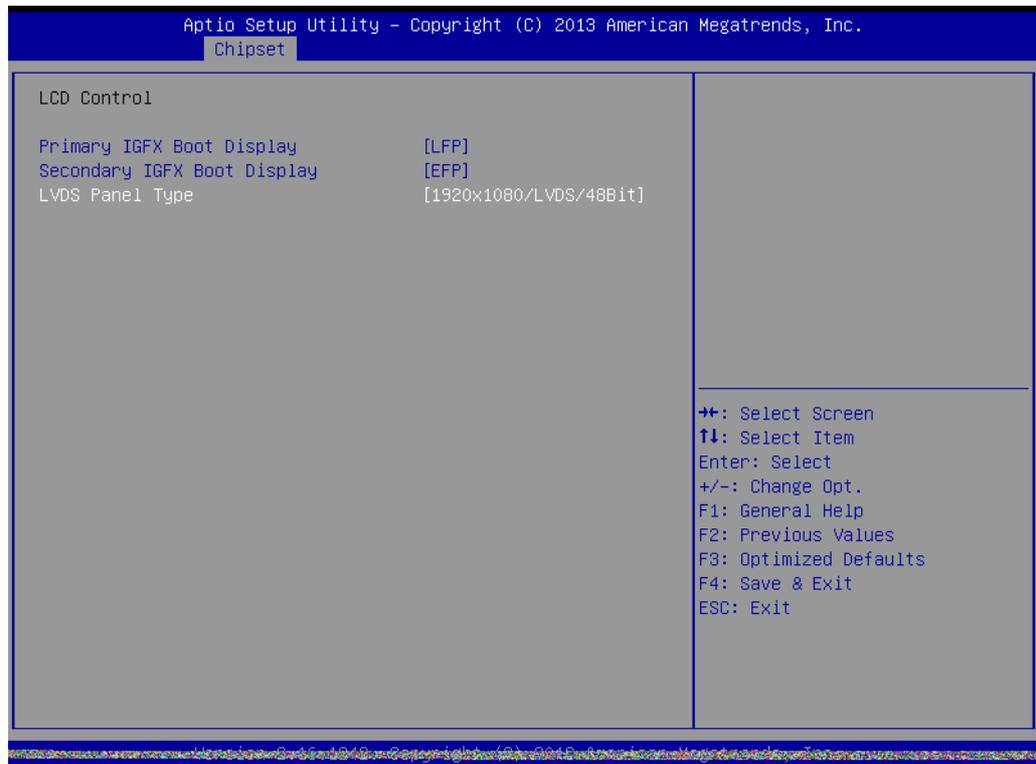
- **Intel IGD Configuration**
Config Intel IGD settings.
- **IGD Turbo Enable**
Enable: Enable IGD Turbo Enable. Disable: IGD Turbo Disable.
- **GFX Boost**
Enable/Disable GFX boost.
- **PAVC**
Enable/Disable protected audio video control.
- **DVMT Pre-Allocated**
Select DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the Internal graphics device.
- **DVMT Total Gfx Mem**
Select DVMT 5.0 total graphic memory size used by the internal graphics device.
- **Aperture Size**
Select the aperture size.
- **GTT Size**
Select the GTT size.
- **IGD Thermal**
Enable/Disable IGD thermal.
- **Spread Spectrum clock**
Enable/Disable spread spectrum clock.

3.2.3.3 Graphics Power Management Control



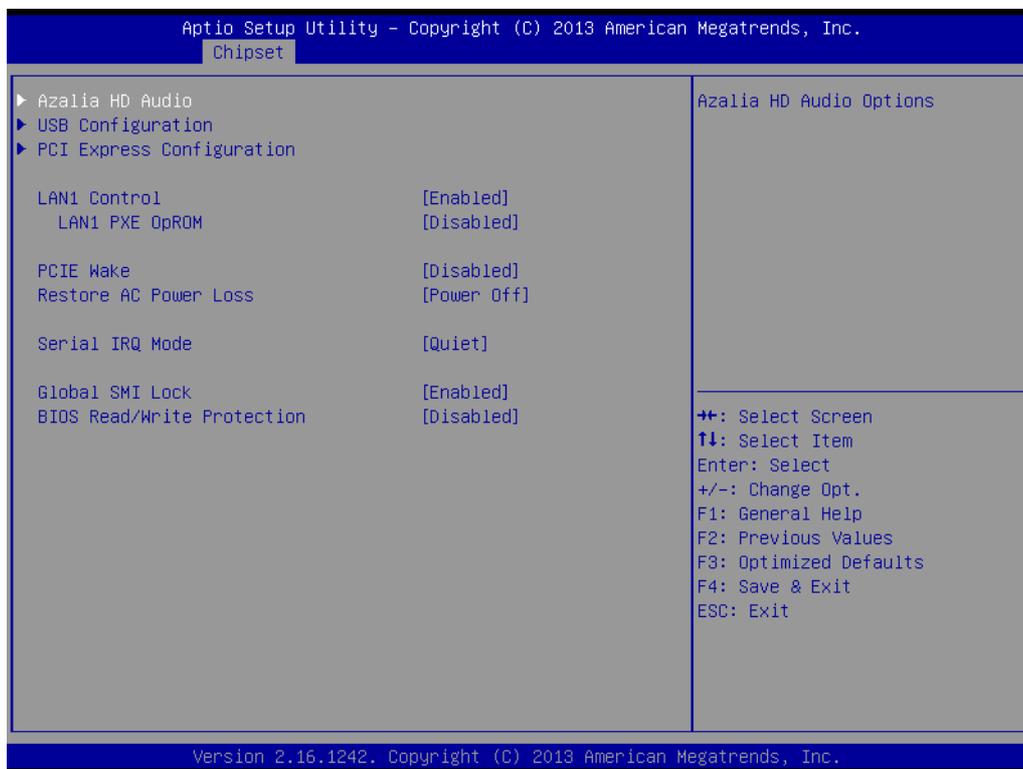
- **RC6 (Render Standby)**
Check to enable render standby support.

3.2.3.4 LCD Control



- **Primary IGFX Boot Display**
Select the video device which will be activated during POST. This has no effect if external graphics are present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on the primary display.
- **LVDS Panel Type**

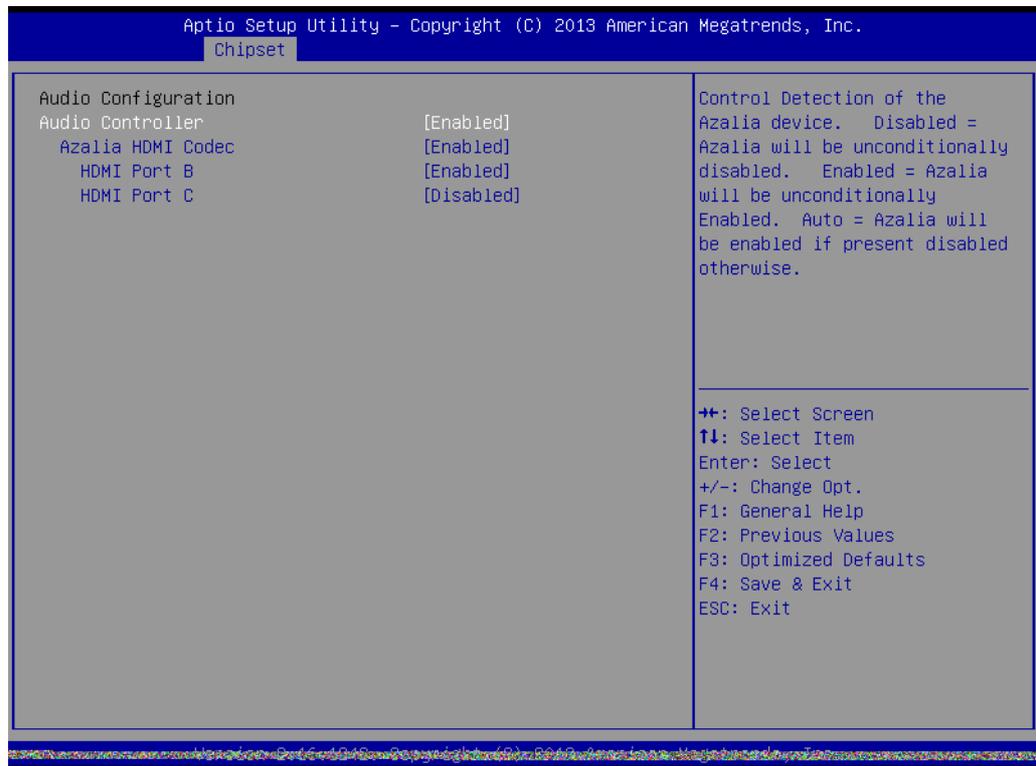
3.2.3.5 South Bridge



- **Azalia HD Audio**
Azalia HD audio options.
- **USB Configuration**
USB configuration settings.
- **PCI Express Configuration**
PCI Express configuration settings.
- **LAN1 Control**
Enable or Disable the LAN1.
- **LAN1 PXE OpROM**
Enable or Disable boot option for LAN controller.
- **DVMT Total Gfx Mem**
Select DVMT 5.0 total graphic memory size used by the internal graphics device.
- **PCIE Wake**
Enable or Disable PCIE to wake the system from S5.
- **Restore AC Power Loss**
Select AC power state when the power is re-applied after a power failure.
- **Serial IRQ Mode**
Configure Serial IRQ Mode.
- **Global SMI Lock**
Enable or Disable SMI lock.

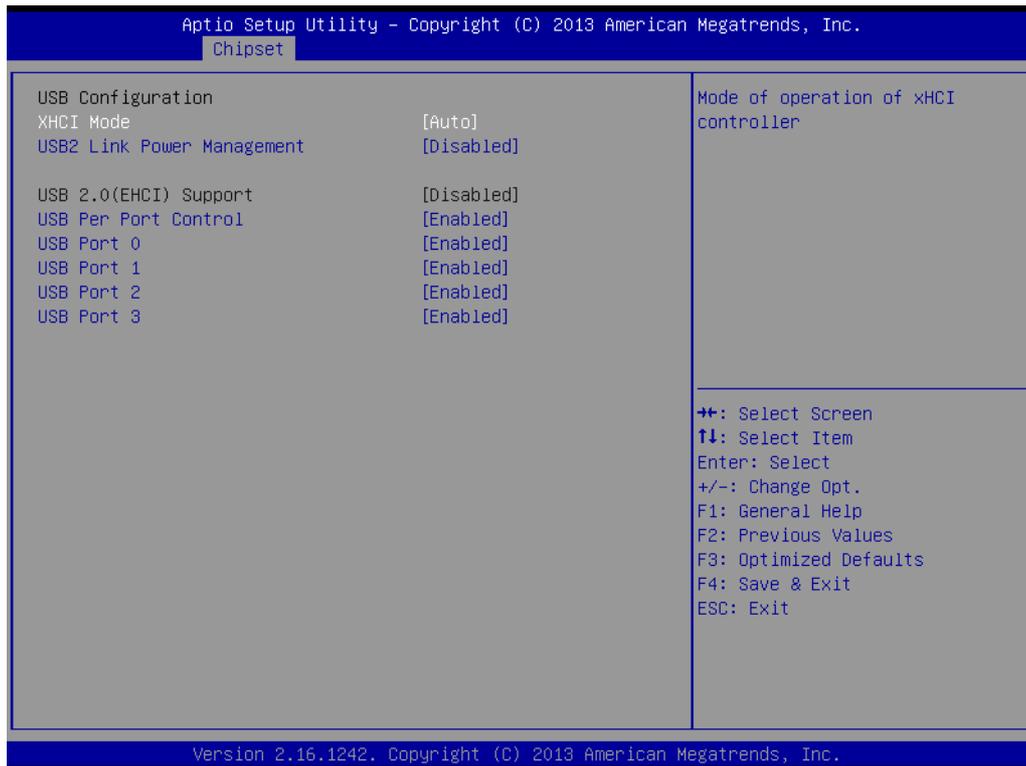
- **BIOS Read/Write Protection**
Enable or Disable BIOS SPI region read/write protect.

3.2.3.6 Azalia HD Audio



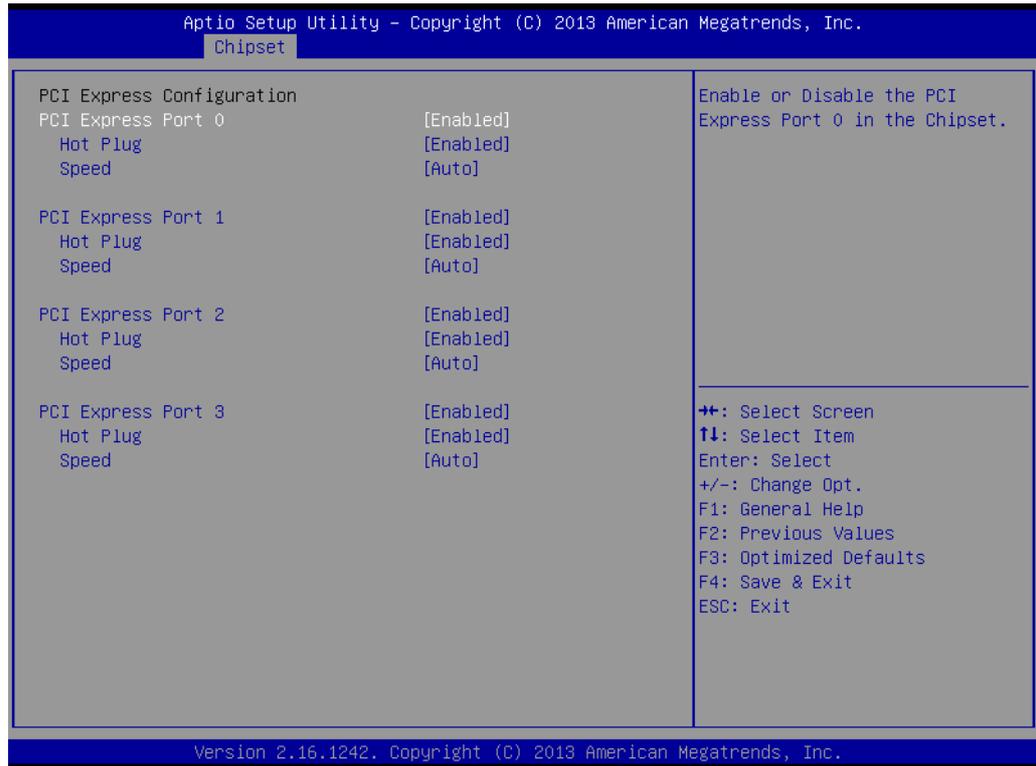
- **Audio Controller**
Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present disabled otherwise.
- **Azalia HDMI Codec**
Enable/Disable internal HDMI codec for Azalia
- **HDMI Port B**
Enable/Disable HDMI Port B
- **HDMI Port C**
Enable/Disable HDMI Port C

3.2.3.7 USB Configuration



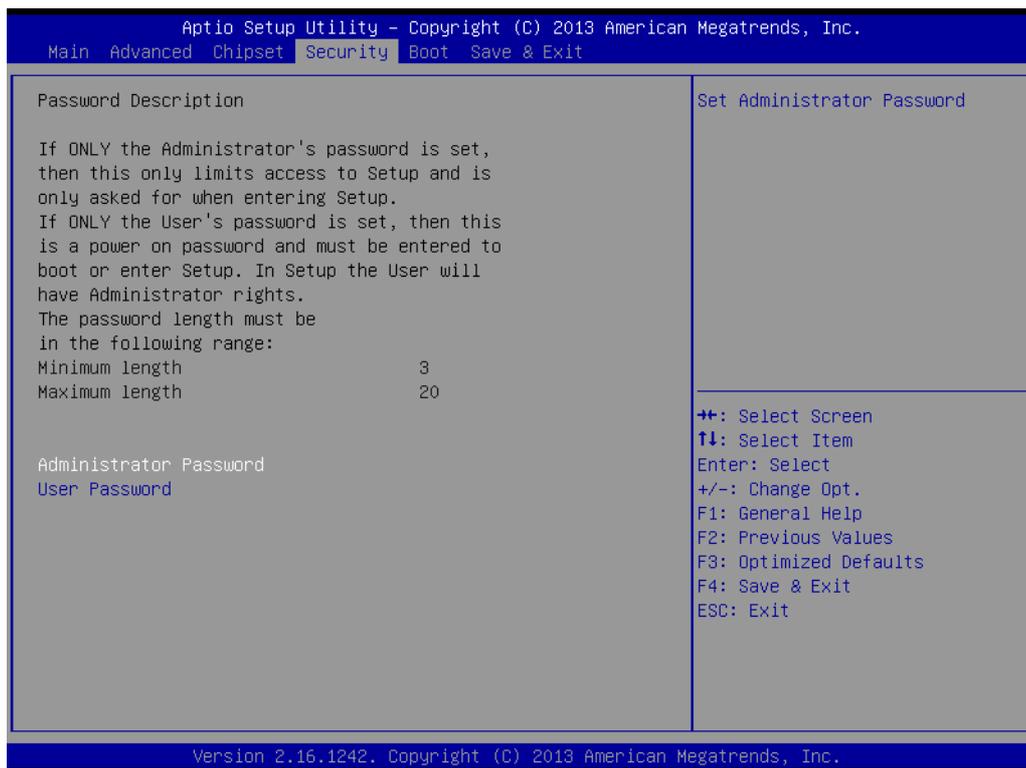
- **XHCI Mode**
Mode of operation of xHCI controller.
- **USB2 Link Power Management**
Enable/Disable USB2 Link Power Management.
- **USB 2.0(EHCI) Support**
Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.
- **USB Per Port Control**
Control each of the USB ports (0~3). Enable: Enable USB per port; Disable: Use USB port X settings.

3.2.3.8 PCI Express Configuration



- **PCI Express Port 0**
Enable or Disable the PCI Express Port 0 in the chipset.
- **Hot Plug**
Enable or disable PCI Express Hot Plug.
- **Speed**
Configure PCIe port speed.

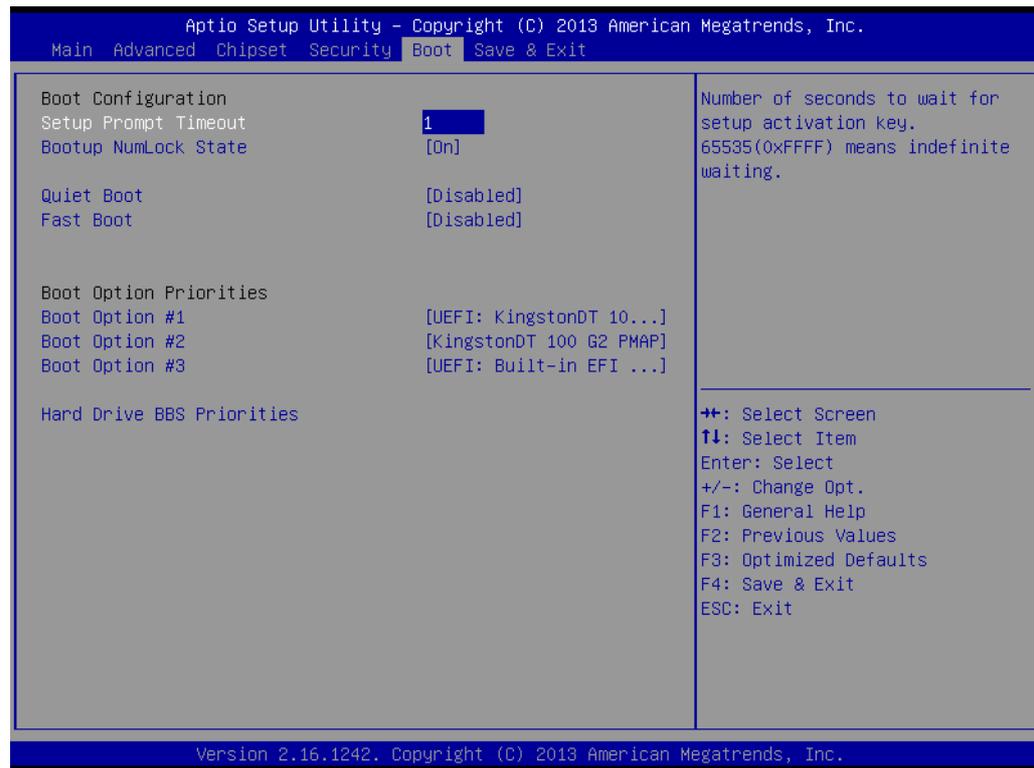
3.2.4 Security Configuration



Select the Security tab from the main BIOS Setup Utility menu. All security setup options, such as password and virus protection, can be accessed from this menu. To access the submenu of any item, select the item and press <Enter>:

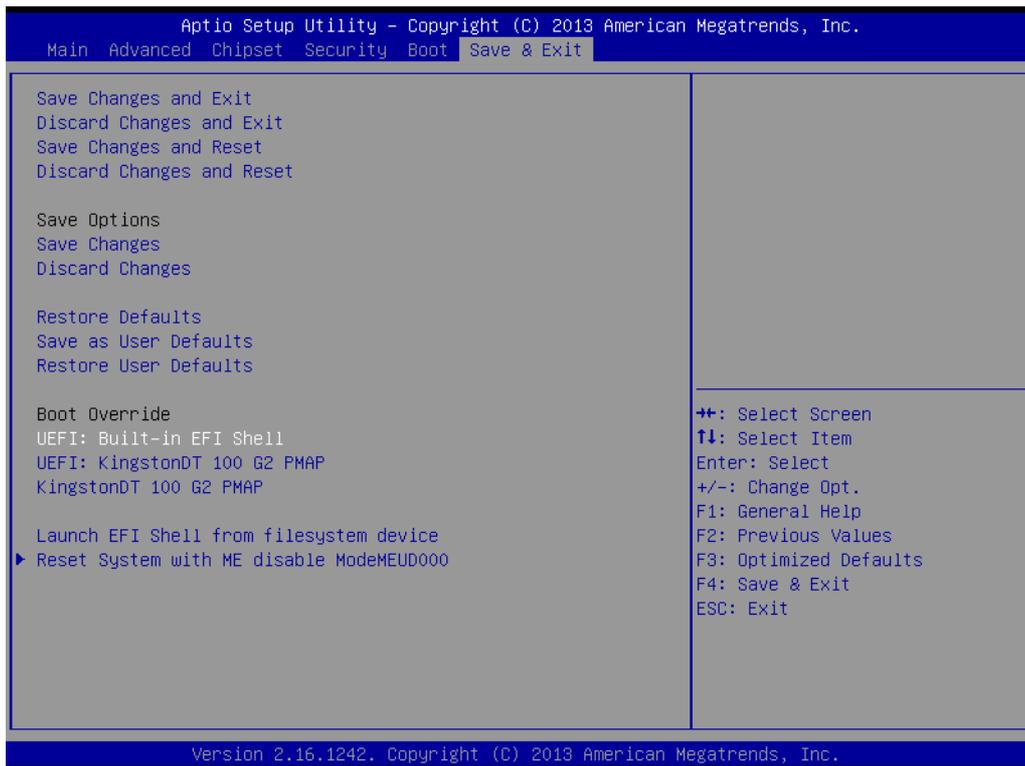
- **Change Administrator / User Password**

3.2.5 Boot



- **Setup Prompt Timeout**
Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.
- **Bootup NumLock State**
Select the keyboard NumLock state.
- **Quiet Boot**
Enables or disables the Quiet Boot option.
- **Fast Boot**
Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
- **Boot Option #1**
Sets the system boot order.

3.2.6 Save & Exit



- **Save Changes and Exit**
This item allows you to exit system setup after saving the changes.
- **Discard Changes and Exit**
This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**
This item allows you to reset the system after saving the changes.
- **Discard Changes and Reset**
This item allows you to rest system setup without saving any changes.
- **Save Changes**
This item allows you to save changes done so far to any of the options.
- **Discard Changes**
This item allows you to discard changes done so far to any of the options.
- **Restore Defaults**
This item allows you to restore/load default values for all the options.
- **Save as User Defaults**
This item allows you to save the changes done so far as user defaults.
- **Restore User Defaults**
This item allows you to restore the user defaults to all the options.
- **Boot Override**
Boot device select can override your boot priority.

Appendix **A**

Exploded & Setting
Diagram

A.1 Exploded Diagram

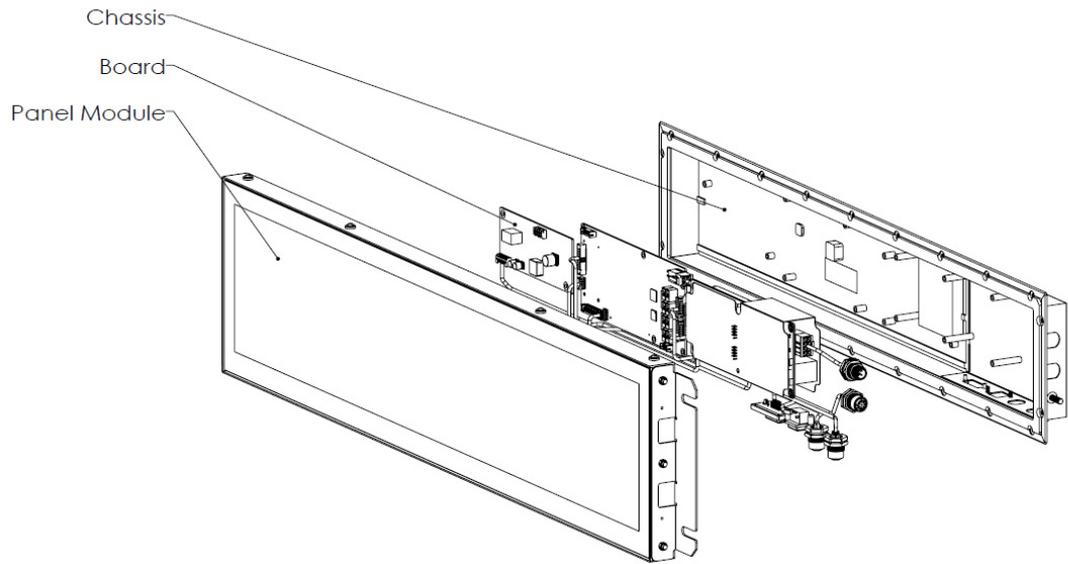


Figure A.1 Exploded Diagrams

A.2 Setting Diagram

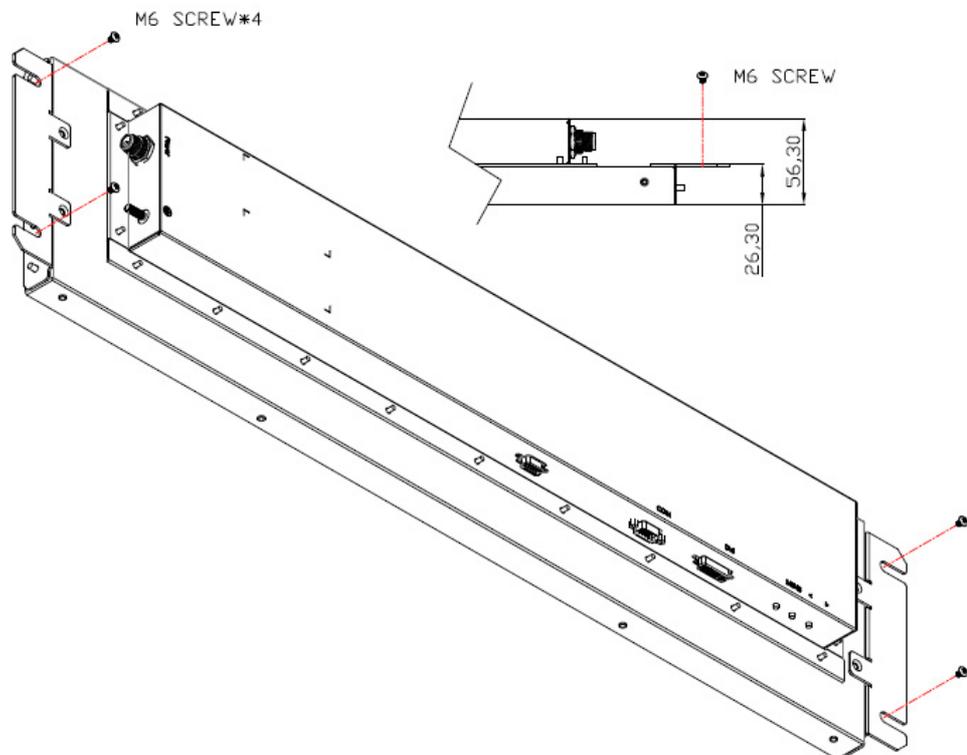


Figure A.2 Setting Diagrams

Appendix **B**

Watchdog Timer
Sample Code

B.1 Watchdog Timer sample code

```
#include <cstdlib>
#include <cstdio>
#include <sys/io.h>
#include <unistd.h>

using namespace std;

const unsigned int baseAddress = 0xA00;

void setWDT(unsigned char);

int main(int argc, char** argv)
{
    unsigned char inputData;

    printf("Please enter a number(1 ~ 255):");
    scanf("%d", &inputData);

    setWDT(inputData);
    return 0;
}
```


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