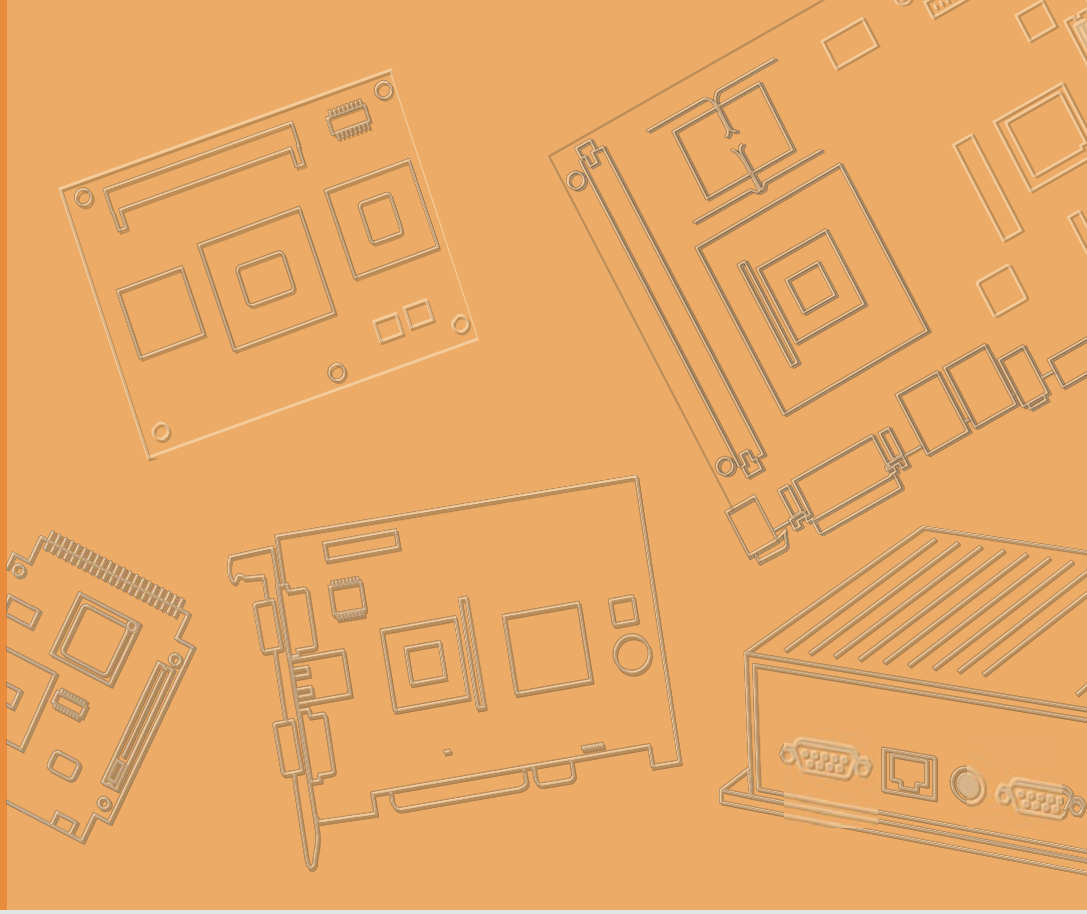


User Manual

ARS-2510T3

Railway Embedded Box PC

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 2010 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.
VIA is a trademark of VIA Technologies, Inc.
IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.
Intel® and Pentium® are trademarks of Intel Corporation.
Microsoft Windows® is a registered trademark of Microsoft Corp.
RTL is a trademark of Realtek Semi-Conductor Co., Ltd.
ESS is a trademark of ESS Technology, Inc.
UMC is a trademark of United Microelectronics Corporation.
SMI is a trademark of Silicon Motion, Inc.
Creative is a trademark of Creative Technology LTD.
CHRONTEL is a trademark of Chrontel Inc.
All other product names or trademarks are properties of their respective owners.

For more information about this and other Advantech products, please visit our website 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. 2006251000 Edition 1
Printed in China September 2013

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.

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 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.

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 and Cautions

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.

Avertissements et Precautions

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.

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 moisture sheet or clothe 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 install. 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.
19. DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all

responsibility for the accuracy of any statements contained herein.

Contents

Chapter 1

General Information

This chapter gives background information on the ARS-2510 Computing Box.

Sections include:

- **Introduction**
- **General Specifications**
- **Dimensions**

1.1 Introduction

The ARS-2510 is a dedicated box computer for railway. ARS-2510 combines various I/O connectors which can be connected to devices such as LED displays (PIDS System). Dual display / dual audio interfaces supporting different resolutions are able to deliver various applications to diverse displays. Built-in multiple communication modules (WWAN, GPS, GSM-R) make ARS-2510 send train position information back to the control center. ARS-2510 is able to work well under extreme conditions such as wide operating temperature range (-25 ° C to 70 °C).

1.2 Production Features

1.2.1 General

- Intel® Core™ i7-3517UE Processor 1.7GHz
- Dual display and support wide screen with high resolution
- Support 2 x GbE , 2 x USB 3.0, 1 x USB 2.0 and 2 x COM ports
- Support 2 x expansion SSD modules for RAID function
- Train grade working temperature range (-25° C to 70° C)

1.2.2 Display

- Controller: Intel HD Graphics 4000
- Resolution:
  - VGA: Support up to 2048x1536 with 32-bit color at 75Hz
  - DVI-D: Support DVI-D up to 1920 x 1200

1.2.3 Power Consumption

- Typical: 23 W (CPU is Intel® Core™ i7-3517UE 1.7GHz and w/o expansion)
- Max: 40 W (CPU is intel® Core™ i7-3517UE 1.7GHz and w/o expansion)

1.3 Hardware Specifications

- **CPU:** Intel® Core™ i7-3517UE Processor 1.7GHz
- **System Chipset:** Intel® QM77 I/O Controller
- **System Memory:** DDR 1600MHz up to 8GB
- **I/O Interface:**
  - 2 x Serial ports (RS-232/422/485)
  - 2 x Giga LAN ports (M12 A-coded)

- **USB:**
  - 2 x USB 3.0 and 1 x USB 2.0(M12 A-coded)
- **Audio:** High Definition Audio (HD), SPK, Line out, Mic-in
- **Storage: 1 x mSATA and 1 x Cfast**
- **Expansion Interface:** Support WWAN with SIM holder, GSM-R with SIM holder and WLAN
- **Software API:** Advantech iManager and SUSIAccess

1.3.1 Block Diagram

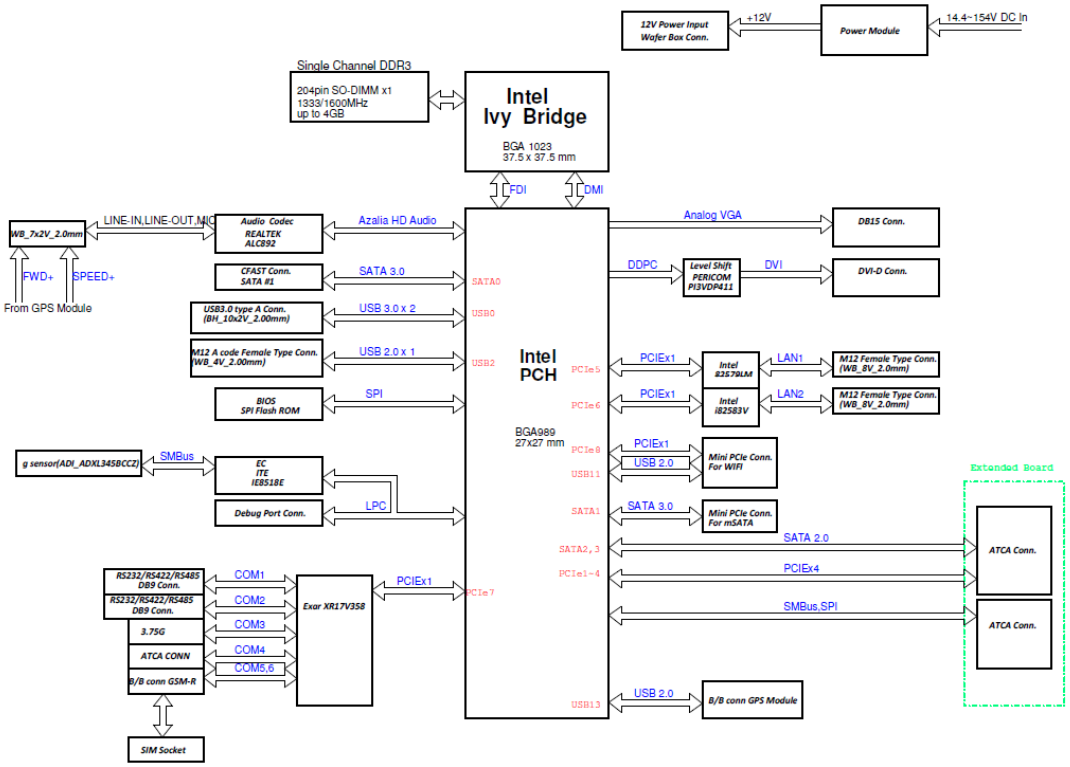


Figure 1.1 ARS-2510 Block Diagram

1.4 Mechanical Specifications

1.4.1 Dimensions

270[10.62] x 126.5[4.98] x 90[3.54] (Unit: mm [Inch])

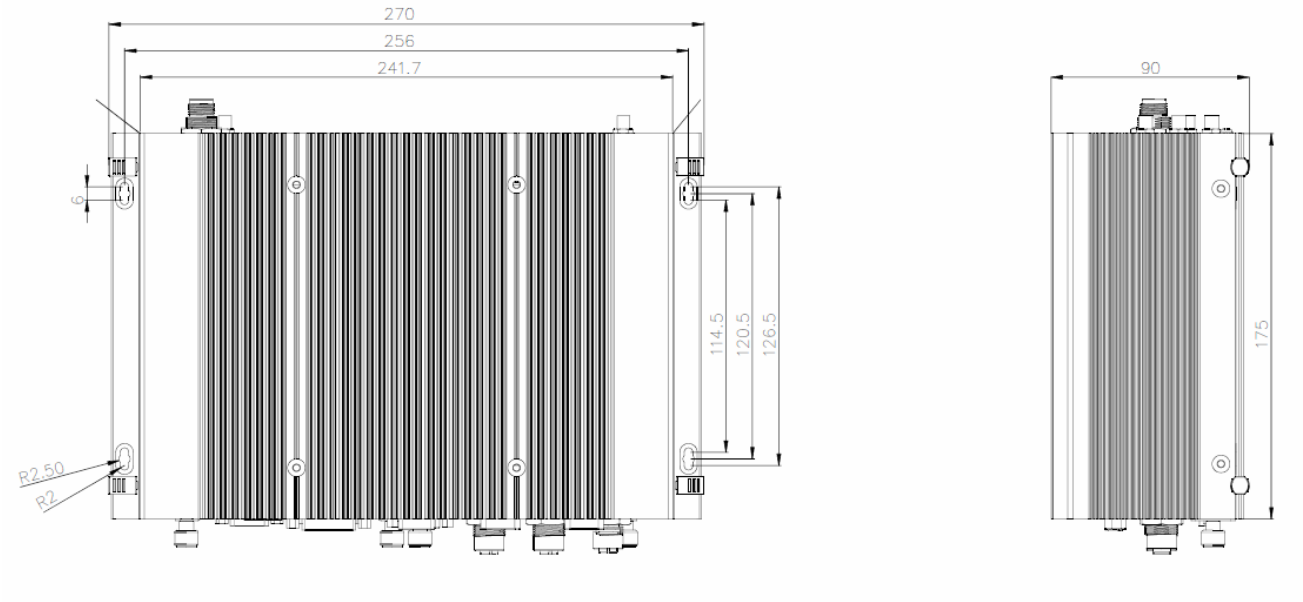


Figure 1.2 ARS-2510 Mechanical dimension drawing

1.4.2 Weight

- 5 kg (11lb)

1.5 Power Requirement

1.5.1 System Power

- Power Input: 24Vdc@ 4.16A
  48Vdc@ 1.56A
  72Vdc@ 2.1A
  110Vdc@ 0.9A

1.5.2 RTC Battery

- Lithium 3V / 210 mAh

1.6 Environment Specification

1.6.1 Operating Temperature

- With Industrial Grade SSD / Cfast: -25 ~ 70 ℃ (-13 ~140 ℉), with air flow. Speed=0.7 m/sec
- Certified Safety Temperature: 50℃ (122℉)

1.6.2 Relative Humidity

- 95%@ 40℃ (non-condensing)

1.6.3 Storage Temperature

- -40 ~ 85℃ (-40 ~ 185℉)

1.6.4 Vibration during Operation

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

1.6.5 Shock during Operation

- When system is equipped with SSD / 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

H/W Installation

This chapter introduces external IO and the installation of ARS-2510 hardware.

2.1 Introduction

The following sections show the internal connectors and the external connectors pin assignment for application.

2.2 Internal Connectors

Table 2.1: Connector List of Main Board			
CN2	Reset Header	CN46	WWLAN SIM Slot
CN3	Power 12V Connector	CN47	GSM-R SIM Slot
CN9	GSM-R Voice Header	CN48	GSM-R Connector
CN12	Memory Socket	CN59	USB Header
CN14	GPS Connector	CN60	LAN1 Header
CN20	Power Switch Header	CN61	LAN2 Header
CN28	mSATA Slot	CN62	Audio Header
CN29	WLAN Slot	CN63	LED Header
CN30	CFast Slot	CN67	USB 3.0 Header
CN45	WWLAN Slot	BH1	Battery Header

2.2.1 Connector List

2.2.2 Connector Location

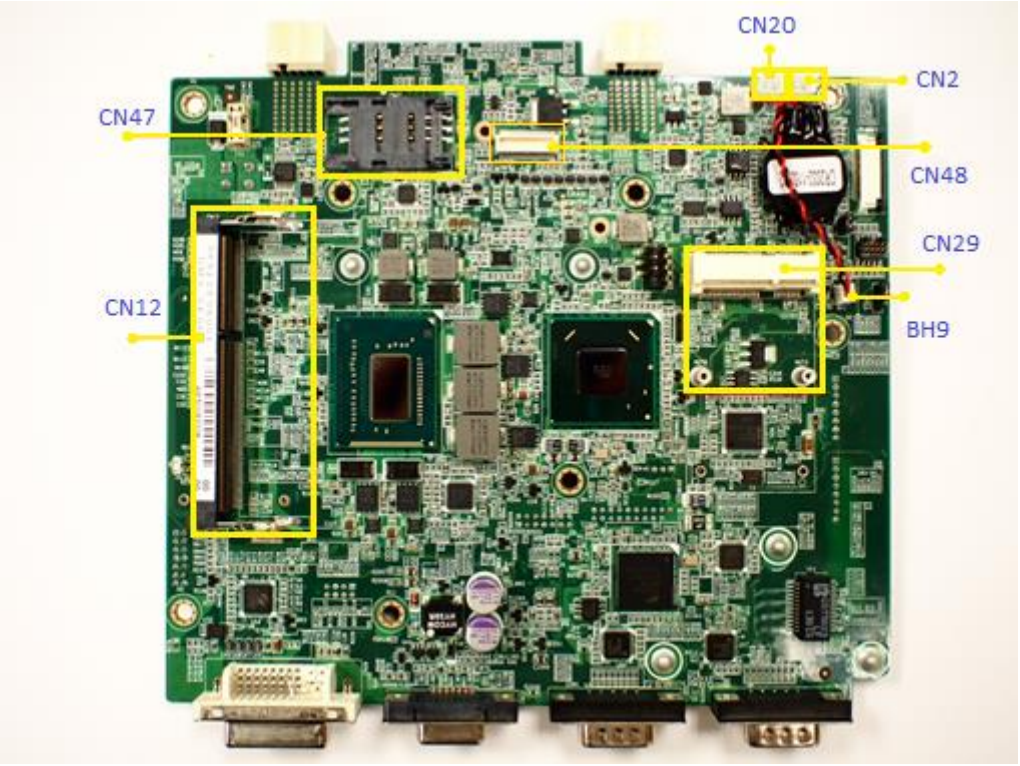


Figure 2.1 Internal Connectors of MB Top Side

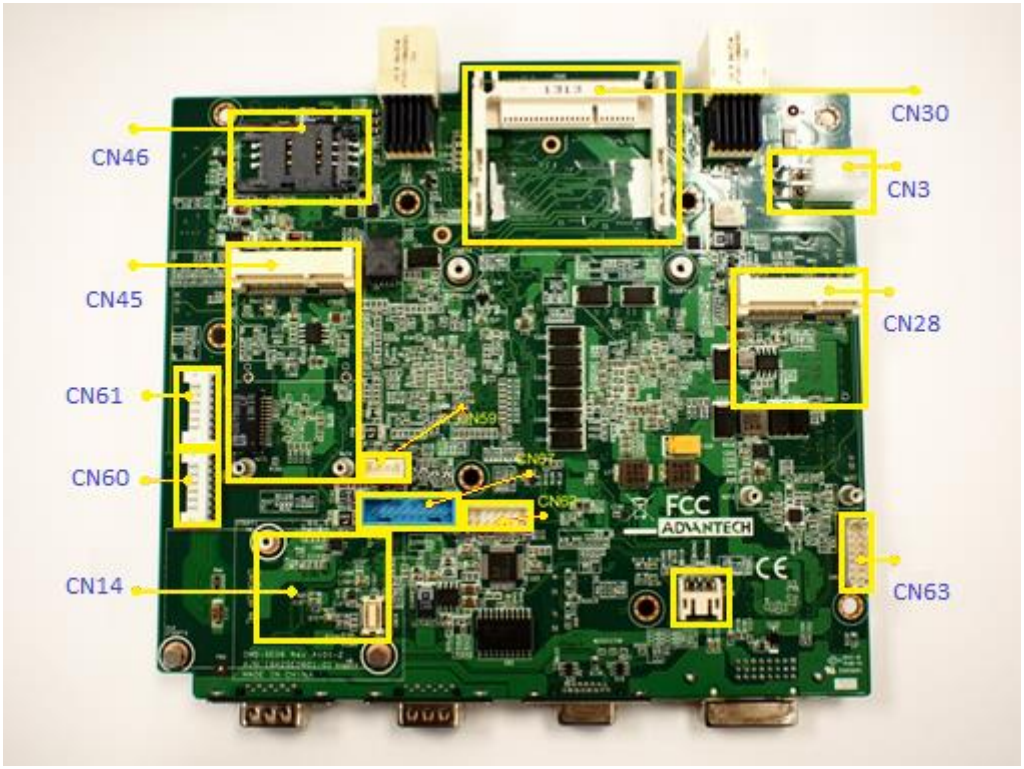


Figure 2.2 Internal Connectors of MB Bottom Side

2.2.3 Connector Pin Assignment

2.2.3.1 Reset header (CN2) / Power Switch Header (CN20)

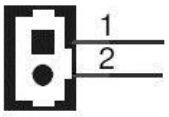


Figure 2.3 Reset Header

Table 2.2 Rest header (CN2)	
Pin	**Signal**
1	Reset /Power Switch
2	GND

2.2.3.2 Power 12V Connector (CN3)

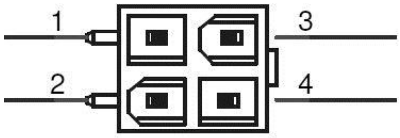


Figure 2.4 Power 12V Connector

Table 2.3 Power 12V Connector (CN3)			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	GND
3	+12V	4	+12V

2.2.3.3 GSM-R Voice Header (CN9)

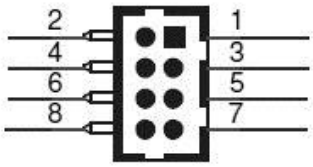


Figure 2.5 GSM-R Voice Header

Table 2.4 GSM-R Voice Header (CN9)			
Pin	**Signal**	**Pin**	**Signal**
1	LOUT_L	2	LOUT_R
3	GND	4	GND
5	MIC_L	6	MIC_R
7	GND	8	GND

2.2.3.4 GPS Connector (CN14)

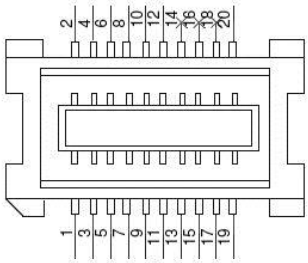


Figure 2.6 GPS connector

Table 2.5 GPS Connector (CN14)			
Pin	**Signal**	**Pin**	**Signal**
1	VCC(5V)	2	VCC(5V)
3	USB -	4	GND
5	USB +	6	SPEED+
7	GND	8	GND_ISO
9	GPS	10	FWS+
11	GPS	12	GND_ISO
13	LED_GPS#	14	NC
15	V_BAT(3.3V)	16	NC
17	EN_USB	18	NC
19	GND	20	GND

2.2.3.5 WLAN Slot (CN29)

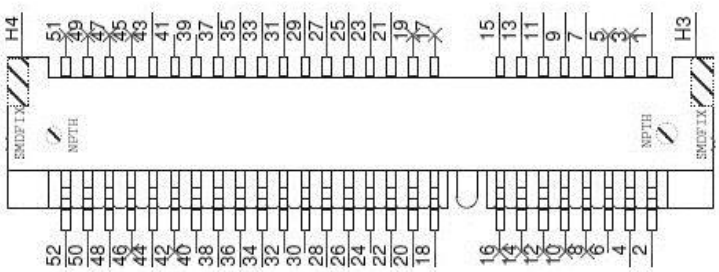


Figure 2.7 WLAN Slot

Table 2.6 WLAN Slot (CN29)			
Pin	**Signal**	**Pin**	**Signal**
1	PCIE_WAKE	2	+3.3V
3	NC	4	GND
5	NC	6	NC
7	CLKREQ4	8	NC
9	GND	10	NC
11	CLK_PCIE-	12	NC
13	CLK-PCIE+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	+3.3V_SB
21	GND	22	RLTRST#
23	PCIE_RX-	24	NC
25	PCIE_RX+	26	GND

27	GND	28	+1.5V
29	GND	30	NC
31	PCEI_TX-	32	NC
33	PCEI_TX+	34	GND
35	GND	36	USB-
37	GND	38	USB+
39	NC	40	NC
41	NC	42	NC
43	GND	44	LED_WLAN
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	VCC3(3.3V)

2.2.3.6 WWLAN Slot (CN45)

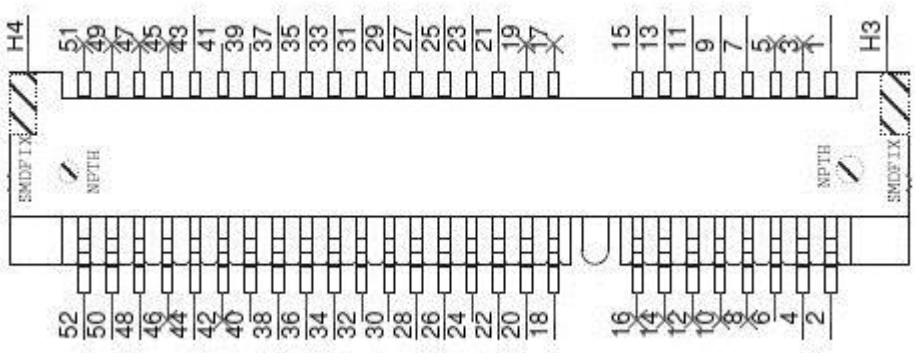


Figure 2.8 WWLAN Slot

Table 2.7 WWLAN slot (3G/LTE)

Pin	Signal	Pin	Signal
1	NC	2	+3.3V
3	UART_RI#	4	GND
5	NC	6	NC
7	GND	8	+VUIM_PWR
9	NC	10	UIM_DATA
11	NC	12	UIM_CLK
13	NC	14	UIM_RESET
15	GND	16	NC
17	+1.8V	18	GND
19	UART_CTS#	20	NC

21	GND	22	PLTRST#
23	UART_RXD	24	+3.3V
25	UART_RTS	26	GND
27	GND	28	NC
29	GND	30	NC
31	UART_TXD	32	NC
33	UART_DCD#	34	GND
35	GND	36	USB-
37	GND	38	USB+
39	+3.3V	40	GND
41	+3.3V	42	LED_WAN
43	NC	44	UART_DTR#
45	NC	46	UART_DSR#
47	NC	48	NC
49	NC	50	GND
51	NC	52	VCC3(3.3V)

2.2.3.7 WWLAN/GSM-R SIM Slot (CN46/CN47)

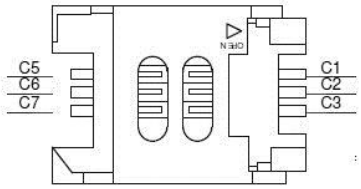


Figure 2.9 SIM slot

Table 2.8 WWLAN SIM Slot (CN46)

Pin	Signal	Pin	Signal
C1	+VUM_PWR	C2	UIM_RESET
C3	UIM_CLK	C5	GND
C6	NC	C7	UIM_DATA

Table 2.9 GSM-R SIM Slot (CN47)

Pin	Signal	Pin	Signal
C1	VSIM	C2	SIM_REST
C3	SIM_CLK	C5	GND_USIM
C6	NC	C7	SIM_DATA

2.2.3.8 GSM-R Connector (CN48)

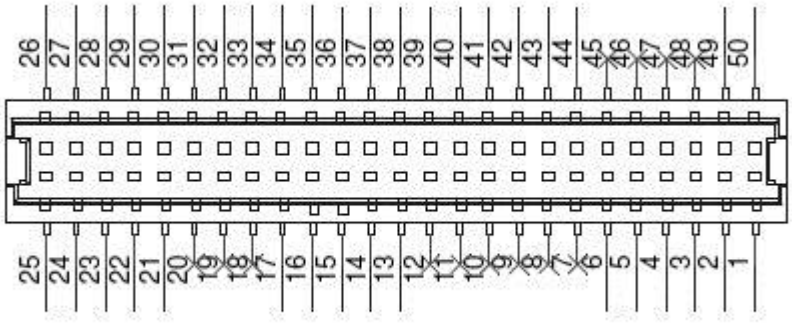


Figure 2.10 GSM-R Connector

Table 2.10 GSM-R Connector

Pin	Signal	Pin	Signal
1	USIM_CLK	2	+VUSIM
3	USIM_DATA	4	USIM_RST
5	USIM_PRSNT	6	GND_USIM
7	NC	8	NC
9	NC	10	NC
11	NC-	12	NC
13	FLASH	14	RXD2_RF
15	RXD1_RF	16	TXD2_RF
17	TXD1_RF	18	NC
19	NC	20	NC
21	GND	22	GND
23	GND	24	GND
25	GND	26	+V3.3_WWAN
27	+V3.3_WWAN	28	+V3.3_WWAN
29	+V3.3_WWAN	30	+V3.3_WWAN
31	+VINT_GPRS	32	RI1#_RF
33	DSR1#_RF	34	RTS1#_RF
35	DTR1#_RF	36	RTS2#_RF
37	CTS1#_RF	38	CTS2#_RF
39	DCD1#_RF	40	EMERGOFF
41	IGT#	42	GND
43	MICN_GSMR	44	MICP_GSMR
45	NC	46	NC
47	NC	48	NC
49	SPK2P	50	SPK2N

2.2.3.9 USB Header (CN59)

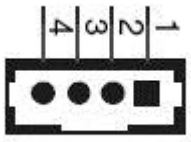


Figure 2.11 USB Header

Table 2.11 USB Header			
Pin	**Signal**	**Pin**	**Signal**
1	+V5_USB	2	USB-
3	USB+	4	GND

2.2.3.10 LAN Header (CN60/CN61)

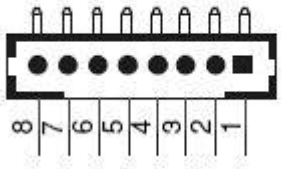


Figure 2.12 LAN Header

Table 2.12 LAN Header (CN60/CN61)			
Pin	**Signal**	**Pin**	**Signal**
1	LAN_DMI3-	2	LAN_DMI3+
3	LAN_DMI2-	4	LAN_DMI2+
5	LAN_DMI1-	6	LAN_DMI1+
7	LAN_DMI0-	8	LAN_DMI0+

2.2.3.11 Audio Header (CN62)

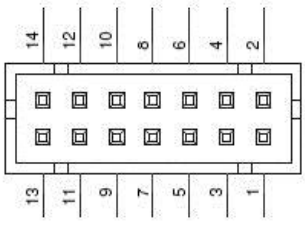


Figure 2.13 Audio Header

Table 2.13 Audio Header (CN62)			
Pin	**Signal**	**Pin**	**Signal**

1	LIN_L	2	LIN_R
3	GND_AUD	4	GND_AUD
5	APORT_L1	6	GND_CAR_BAT
7	APORT_R1	8	IGNTION
9	GND	10	FWD+
11	MIC1L	12	SPEED+
13	MIC1R	14	GND_ISO

2.2.3.12 LED Header (CN63)

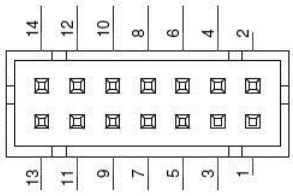


Figure 2.14 LED Header

Table 2.14 LED Header (CN63)

Pin	Signal	Pin	Signal
1	NC	2	NC
3	LAN2_LINK100#	4	LAN2_LINK1000#
5	+3.3VSB	6	LAN2_ACT#
7	LAN1_LINK100#	8	LAN1_LINK1000#
9	+3.3VSB	10	LAN1_ACT#
11	+5V	12	GND
13	+3.3V	14	HDD_LED#

2.2.3.13 USB 3.0 Header (CN67)

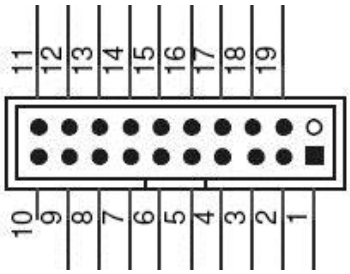


Figure 2.15 USB 3.0 Header

Table 2.15 USB 3.0 Header (CN67)

Pin	Signal	Pin	Signal
1	+V5_USB	2	USB1_SSRX-
3	USB1_SSRX+	4	GND

5	USB1_SSTX-	6	USB1_SSTX+
7	GND	8	USB0_P-
9	USB_P+	10	NC
11	USB1_P+	12	USB1_P-
13	GND	14	USB2_SSTX+
15	USB2_SSTX-	16	GND
17	USB2_SSRX+	18	USB2_SSRX-
19	+V5_USB		

2.3 External Connectors

2.3.1 Front External I/O Connectors

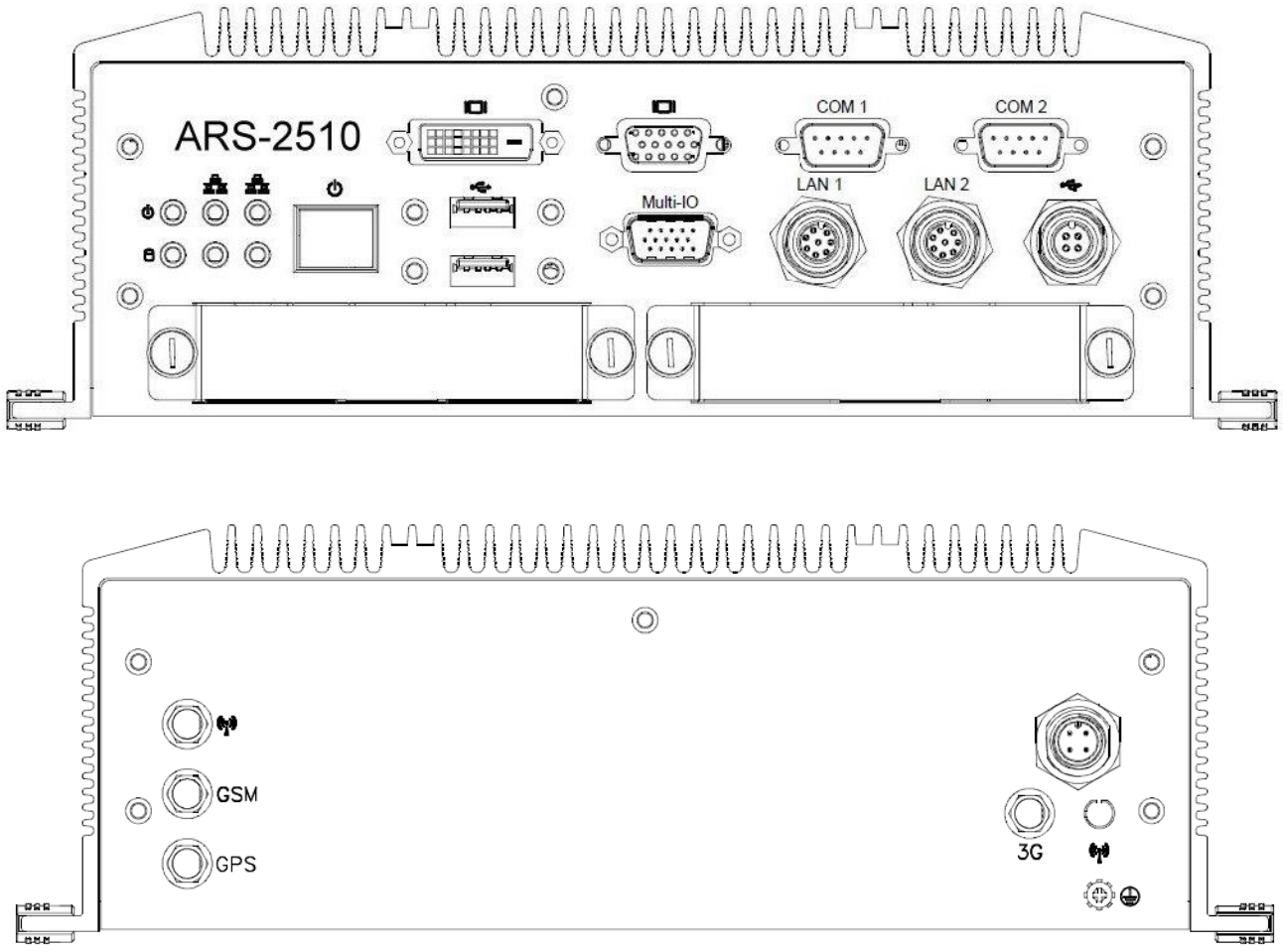


Figure 2.16 ARS-2510 IO Connector Drawing

2.3.1.1 LED Indicators

There are six LEDs on ARS-2510 front metal surface plate for system status indication: PWR LED stands for power status, HDD LED stands for HDD status, and LAN LED stands for LAN speed and active status.

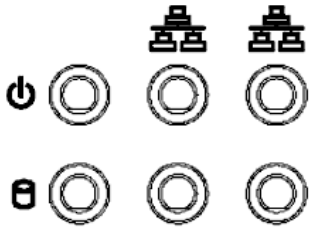


Figure 2.17 LED Indicators

Table 2.16 LAN LED Indicator	
10/100	**Orange**
1000	**Green**

2.3.1.2 Power ON/OFF Button

ARS-2510 comes with a Power ON/OFF button which supports dual functions of Soft Power -ON/OFF (Instant off or 4 Seconds Delay).

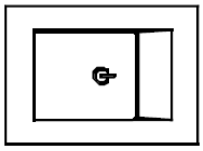


Figure 2.18 Power Button

2.3.1.3 VGA Connector

The ARS-2510 provides a high resolution VGA interface connected by a D-sub 15-pin connector in order to support an external VGA CRT monitor. It supports resolution up to 1900 x 1200.

Figure 2.19 VGA Connector

Table 2.17 VGA Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND

11	NC	12	NC
13	H-SYNC	14	V-SYNC
15	NC		

2.3.1.4 DVI-D Connector

ARS-2510 offers a Digital Visual Interface connector by a D-sub 24-pin female DVI-D connector which is only for digital video signal. The interface supports high-speed and high-resolution digital displays.

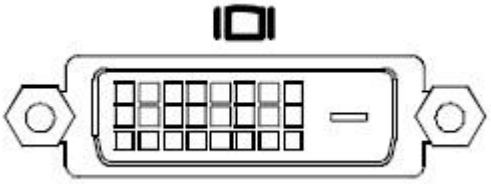


Figure 2.20 DVI Connector

Table 2.18 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-

2.3.1.5 COM Connector

ARS-2510 provides two D-sub 9-pin connectors which offer RS-232/422/485 serial communication interface. The default setting is RS-232 and RS-422/485 can be selected in BIOS. The BIOS setting of RS-232/422/485 can be found in Chapter 3.

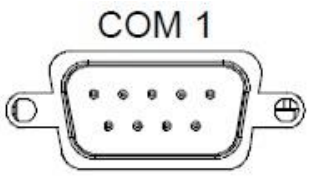


Figure 2.21 COM connector

Table 2.19 COM connector			
Pin	**RS-232**	**RS-422**	**RS-485**
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

2.3.1.6 USB 3.0 Connector

ARS-2510 supports USB3.0 interface which gives a complete Plug & Play and hot swapping with up to 127 external devices.

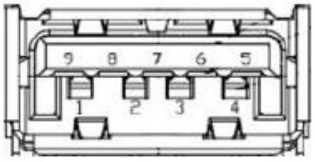


Figure 2.22 USB 3.0 Connector

Table 2.20 USB 3.0 Connector			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	USB_data-
3	USB_data+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+		

2.3.1.7 M12 A-Coded LAN Connector

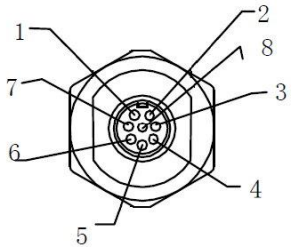


Figure 2.23 M12 LAN Connector

Table 2.21 LAN Connector of M12 A-Coded			
Pin	**Signal**	**Pin**	**Signal**
1	MDI2+	2	MDI3+
3	MDI3-	4	MDI0-
5	MDI1+	6	MDI0+
7	MDI2-	8	MDI1-

2.3.1.8 M12 A-Coded USB 2.0 Connector

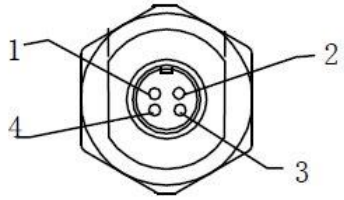


Figure 2.24 M12 USB Connector

Table 2.22 USB Connector of M12 A-Coded			
Pin	**Signal**	**Pin**	**Signal**
1	Data -	2	+5V
3	Data +	4	GND

2.3.1.9 Multi IO Connectors

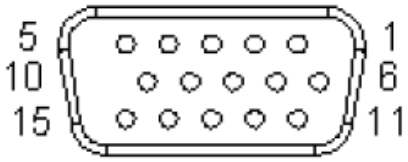


Figure 2.25 Multi IO Connector

Table 2.23 Multi IO Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Line L	2	GND_AUD
3	IGNITION	4	NC
5	FWD+	6	Line R
7	APORT_L1	8	GND_CAR_BAT
9	GND_AUD	10	GND-ISO
11	GND_AUD	12	APORT_R1
13	MIC_L	14	MIC_R
15	SPEED+		

2.3.2 Rear external I/O Connectors

2.3.2.1 Power Input Connector

ARS-2510 comes with a 4-pins M12 A-coded connector which is for VDC external power input.

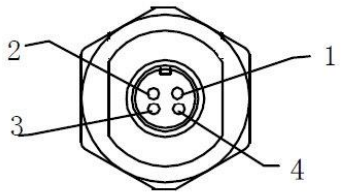


Figure 2.26 M12 Power input connector

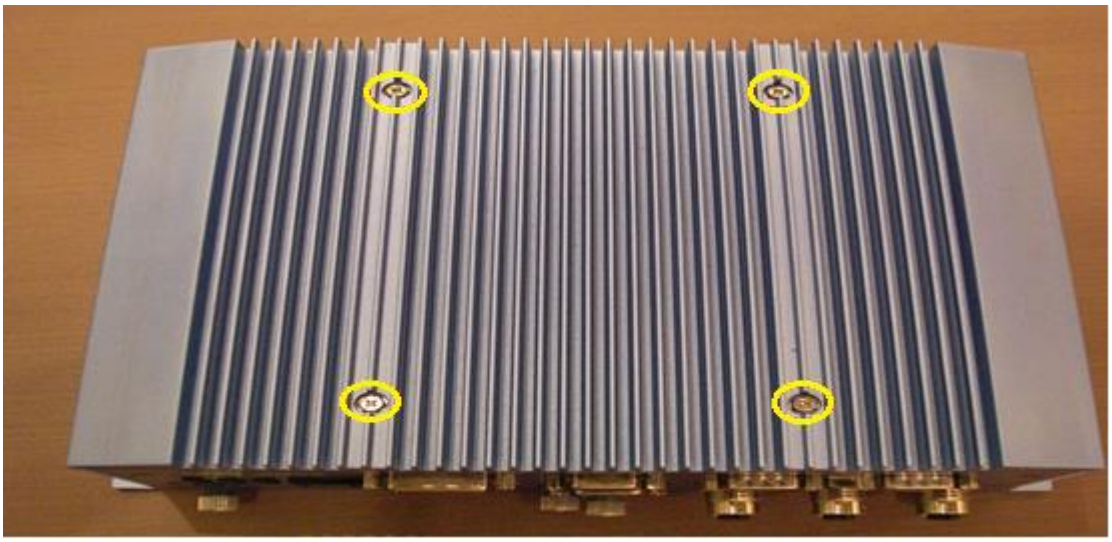
Table 2.24 Power Input Connector			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	VDC
3	VDC	4	GND

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

2.4 Installation

2.4.1 GSM-R and SIM Card Installation

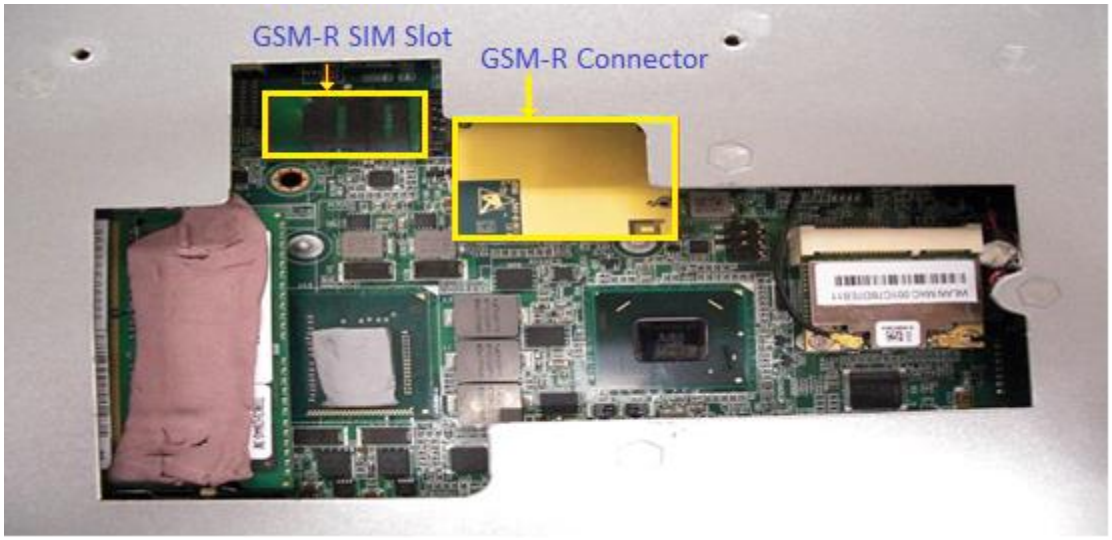
1. Unscrew the four screws at the top cover.



2. Unscrew the four screws at the right and left side of top cover.

3. Remove the top cover.

4. Install the GSM-R module into CN48 and SIM card into CN47.



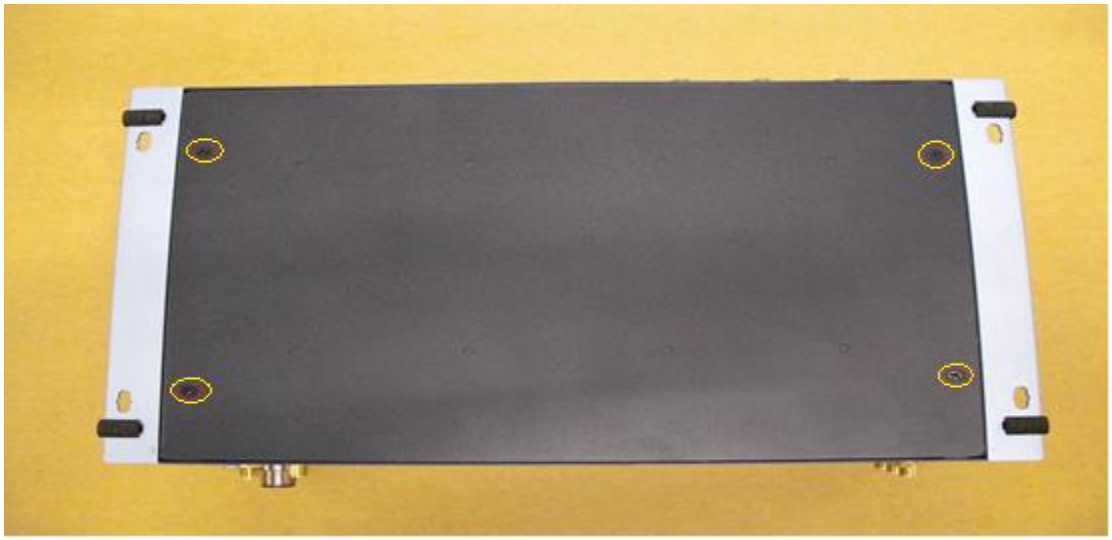
5. Recover the top cover and screws.

2.4.2 3G/LTE SIM Card and mSATA Installation

1. Unscrew the four screws at the front side.

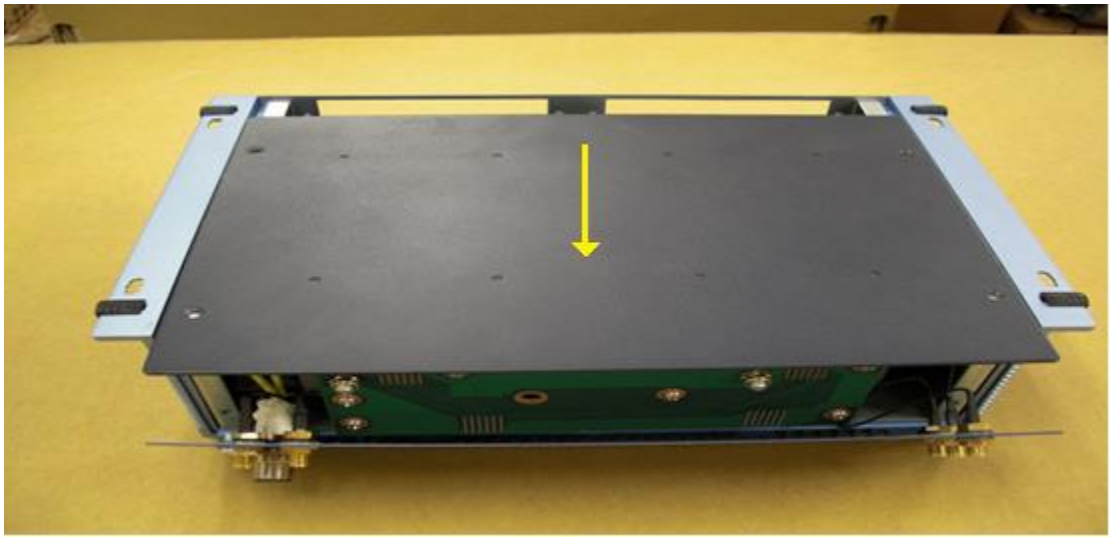
2. Remove the expansion trays from the front side.

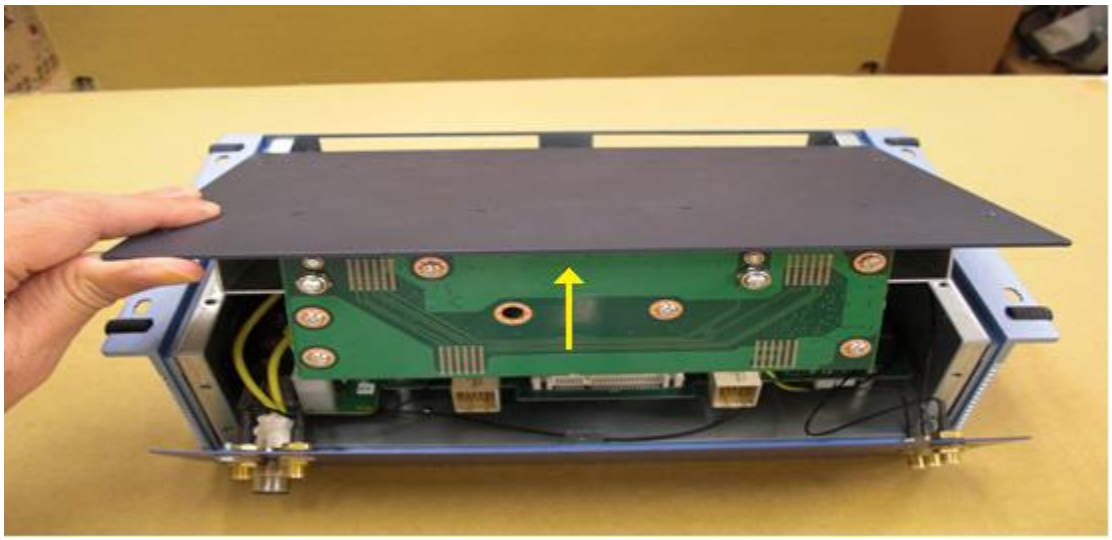
3. Unscrew the four screws at the bottom side.



4. Unscrew five screws at the rear side.

5. Remove the bottom cover.





6. Install mSATA module into CN28 and 3G/LTE SIM card into CN46.

7. Install Cfast card into CN30.

8. Recover the bottom cover and screws.

Chapter 3

BIOS Settings

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the ARS-2510 BIOS setup screens.

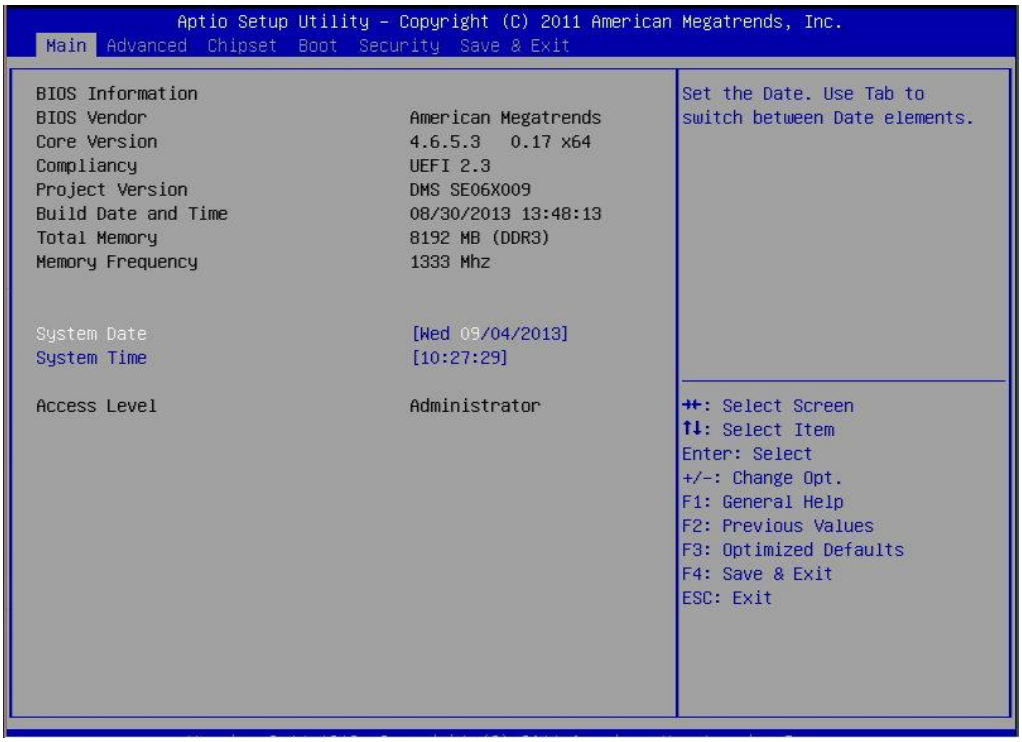


Figure 3.1 Setup Program Initial Screens

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

3.1 Entering Setup

Turn on the computer and then press <F2> or <DEL> to enter Setup menu.

3.2 Main Setup

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

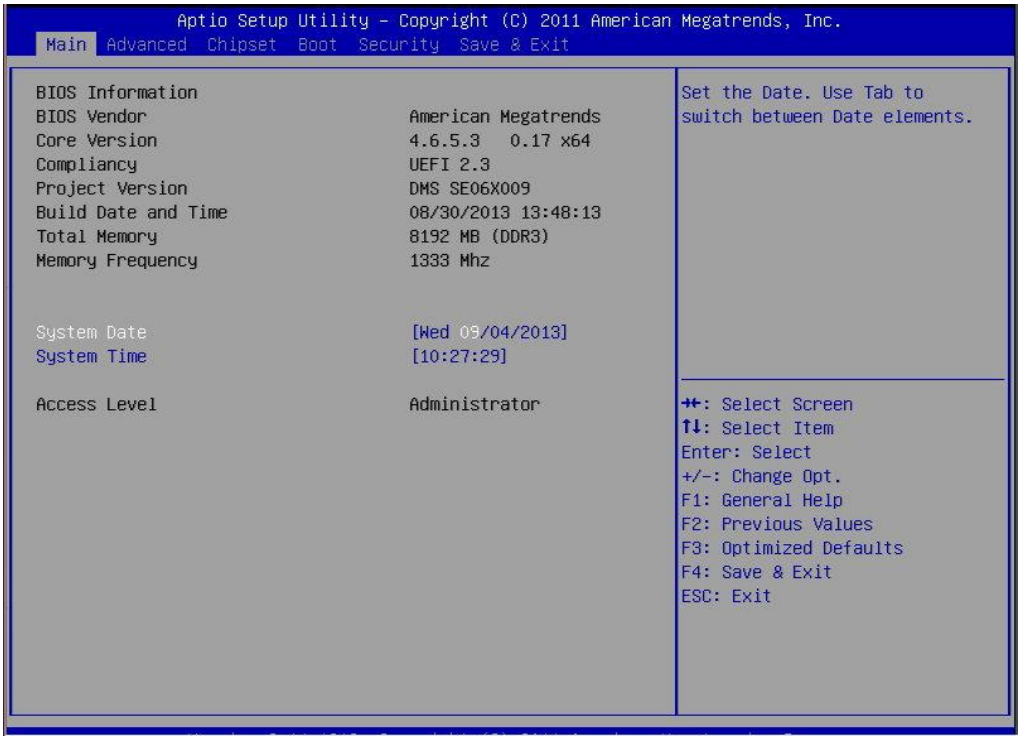


Figure 3.2 Main Setup Screens

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 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.

3.3 Advanced BIOS Features Setup

Select the Advanced tab from the ARS-2510 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

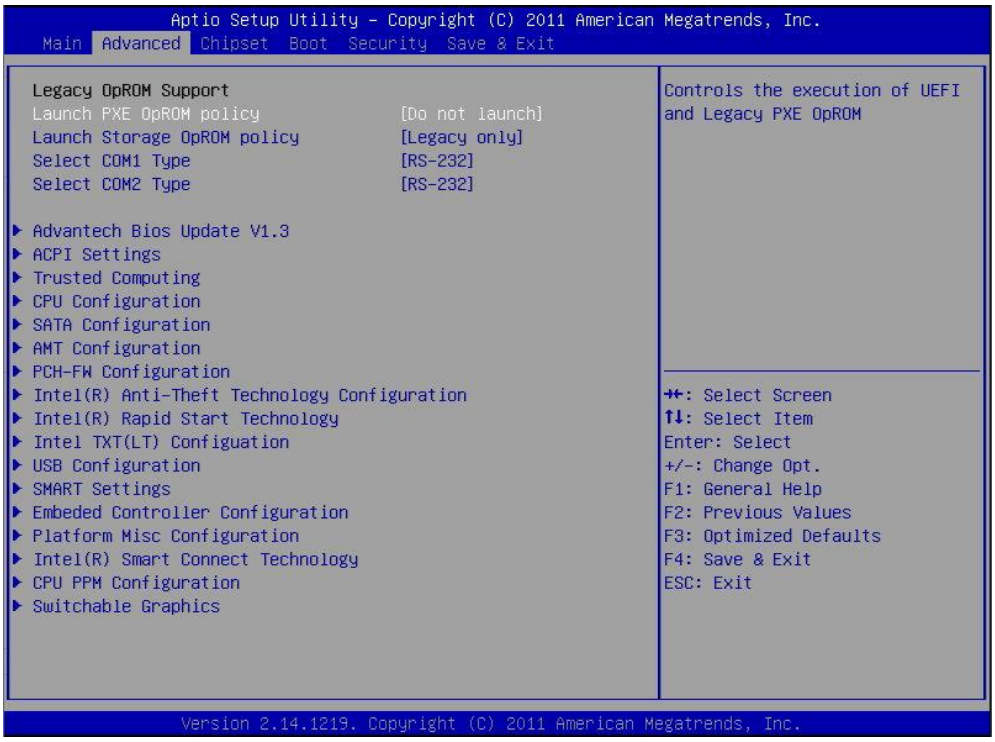


Figure 3.3 Advanced BIOS Features Setup Screen

3.3.1 Select COM1/COM2 Type

This item allows users to select RS-232/RS-422/RS-485 for COM1&COM2.

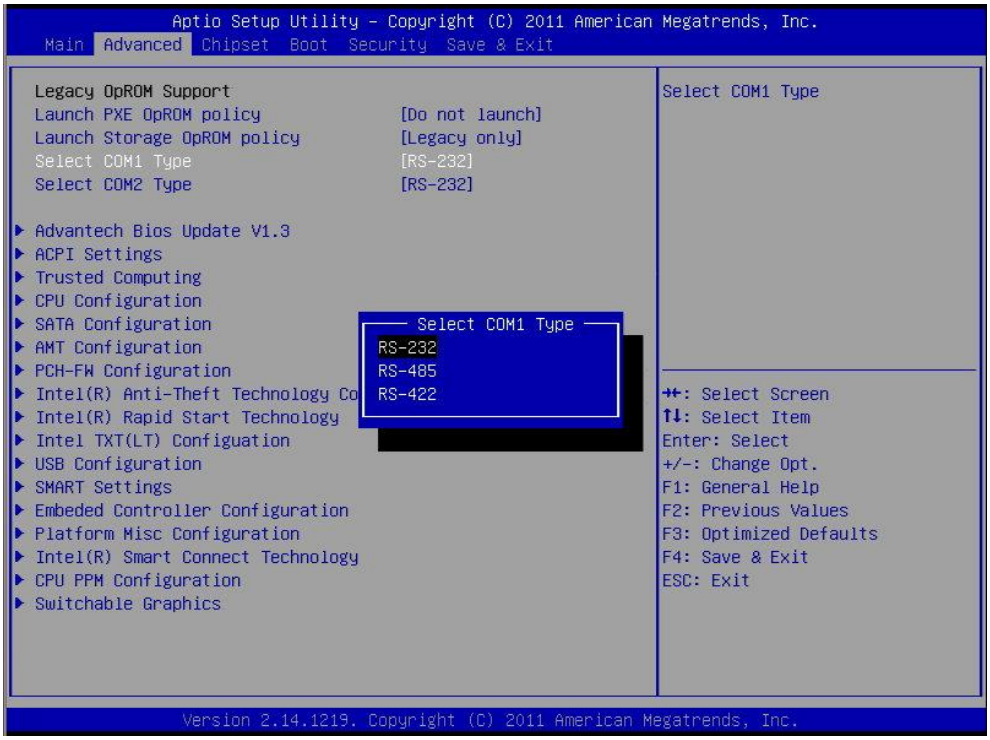


Figure 3.4 Select COM1/COM2 Type

3.3.2 ACPI Settings

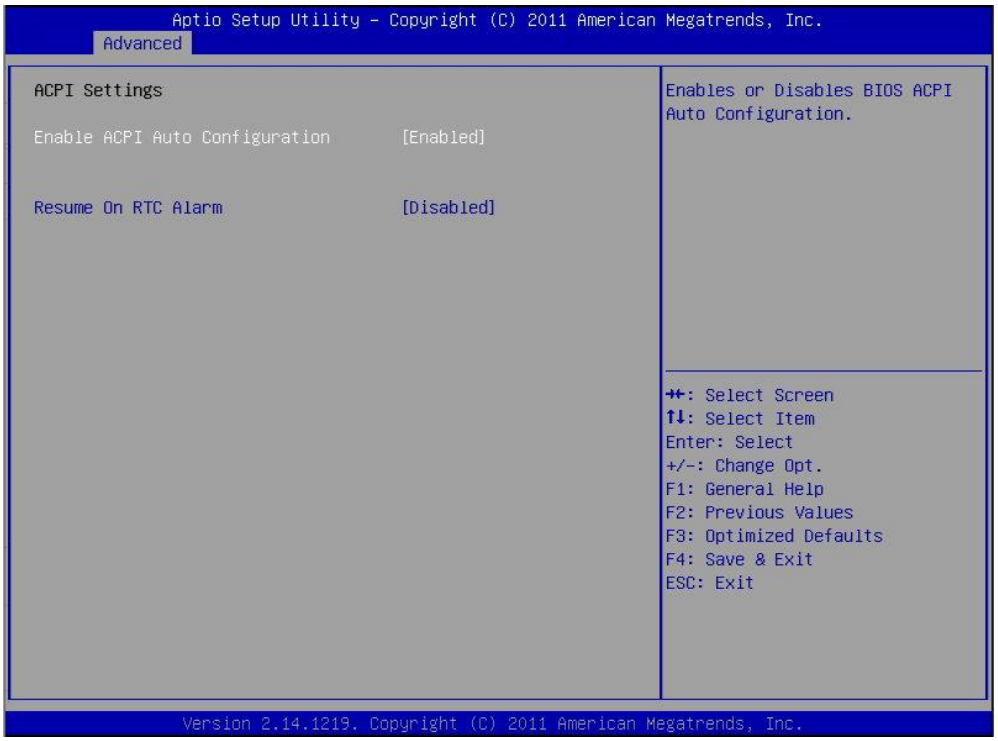


Figure 3.5 ACPI Setting

Enable ACPI Auto Configuration

This item allows users to enable or disable BIOS ACPI auto configuration.

Resume On RTC Alarm

This item allows users to enable or disable System wake on alarm event. When enabled, hr:: min::sec specified

3.3.3 CPU Configuration

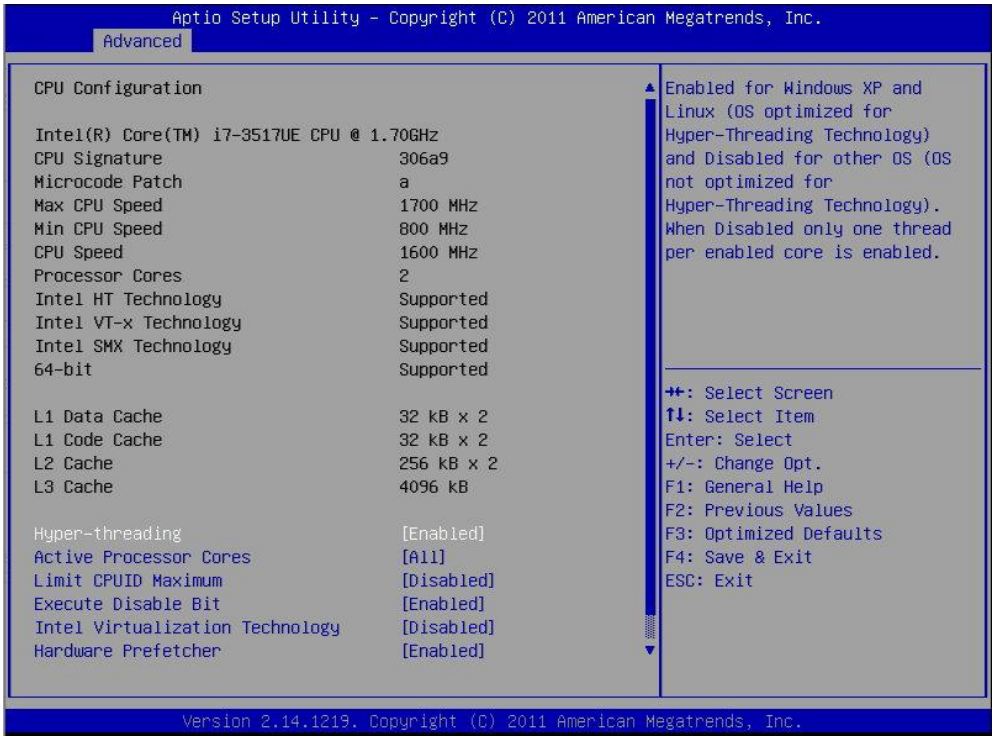


Figure 3.6 CPU Configuration

Hyper Threading Technology

This item allows users to enable or disable Intel® Hyper Threading technology.

Active Processor Cores

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

Limit CPUID Maximum

This item allows users to limit the maximum value of CPUID.

Execute Disable Bit

This item allows users to enable or disable the No-Execution page protection technology.

Intel Virtualization Technology

This item allows users to enable or disable the intel virtualization technology.

Hardware Prefetcher

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

Adjacent Cache Line Prefetch

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

3.3.4 SATA Configuration

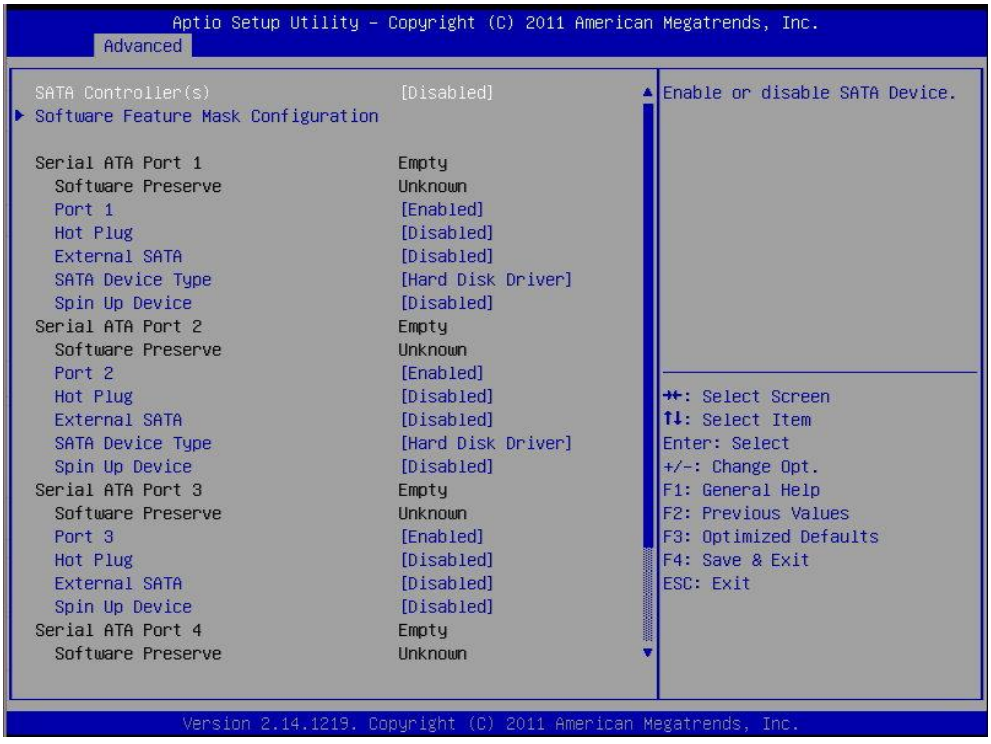


Figure 3.7 SATA Configuration

SATA Controller(s)

This item allows users to enable or disable the SATA controller(s).

SATA Mode Selection

This item allows users to select mode of SATA controller(s).

3.3.5 AMT Configuration

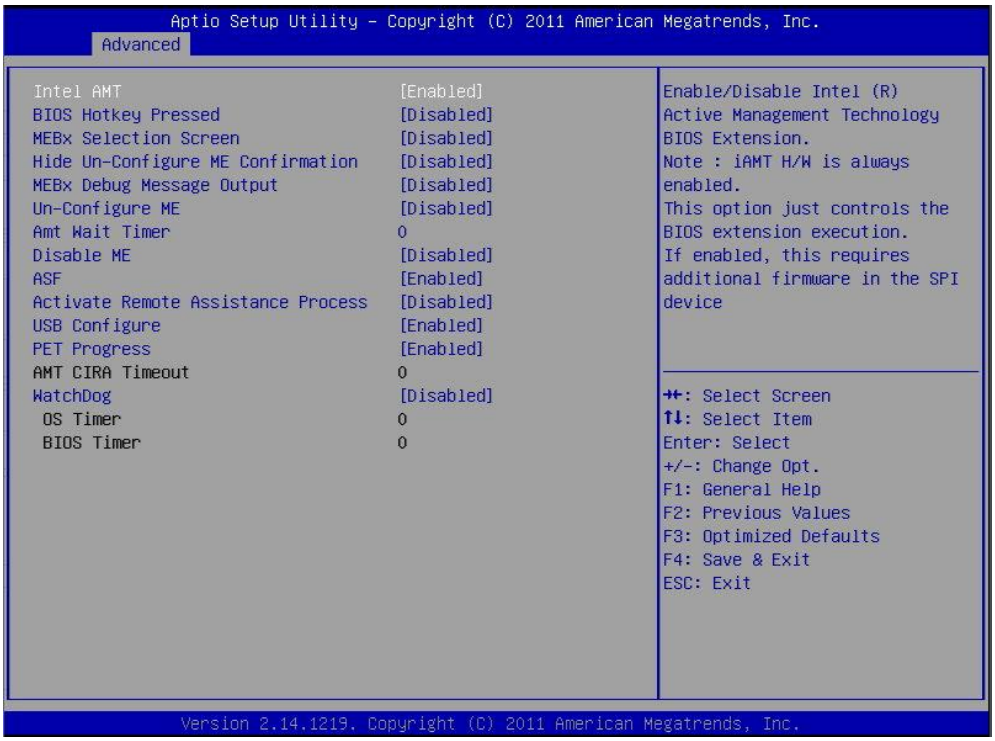


Figure 3.8 AMT Configuration

Intel AMT

This item allows users to enable or disable Intel AMT BIOS extension.

BIOS Hotkey Pressed

This item allows users to enable or disable BIOS hotkey press.

MEBx Selection Screen

This item allows users to enable or disable MEBx selection screen.

Hide Un-Configuration ME Confirmation

This item allows users to hide un-configure ME without password confirmation prompt.

MEBx Debug Message Output

This item allows users to enable or disable MEBx debug message.

Un-Configure ME

This item allows users to un-configure ME without password.

Amt Wait Timer

Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

Disable ME

This item allows users to enable or disable Intel ME.

ASF

This item allows users to enable or disable Alert Specification Format.

Activate Remote Assistance Process

This item allows users to enable or disable trigger CIRA boot.

USB Configure

This item allows users to enable or disable USB configure function.

PET Progress

This item allows users to enable or disable PET events progress to recieve PET events or not.

AMT CIRA Timeout

OEM defined timeout for MPS connection to be established.

WatchDog

This item allows users to enable or disable WatchDog Timer.

OS Timer

Set OS watchdog timer.

BIOS Timer

Set BIOS watchdog timer.

3.3.6 PCH-FW Configuration

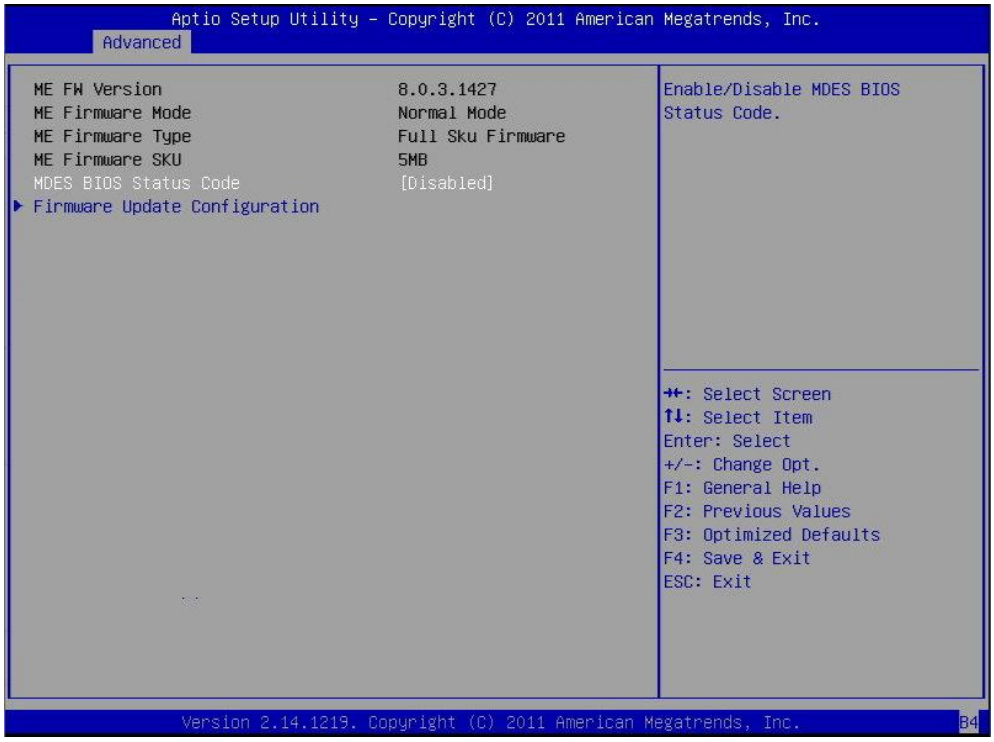


Figure 3.9 PCH-FW Configuration

MDES BIOS Status Code

This item allows users to enable or disable MDES BIOS Status Code function.

Firmware Update Configuration

This item allows users to enable or disable ME FW image re-flash function.

3.3.7 Intel® Anti-Theft Technology Configuration

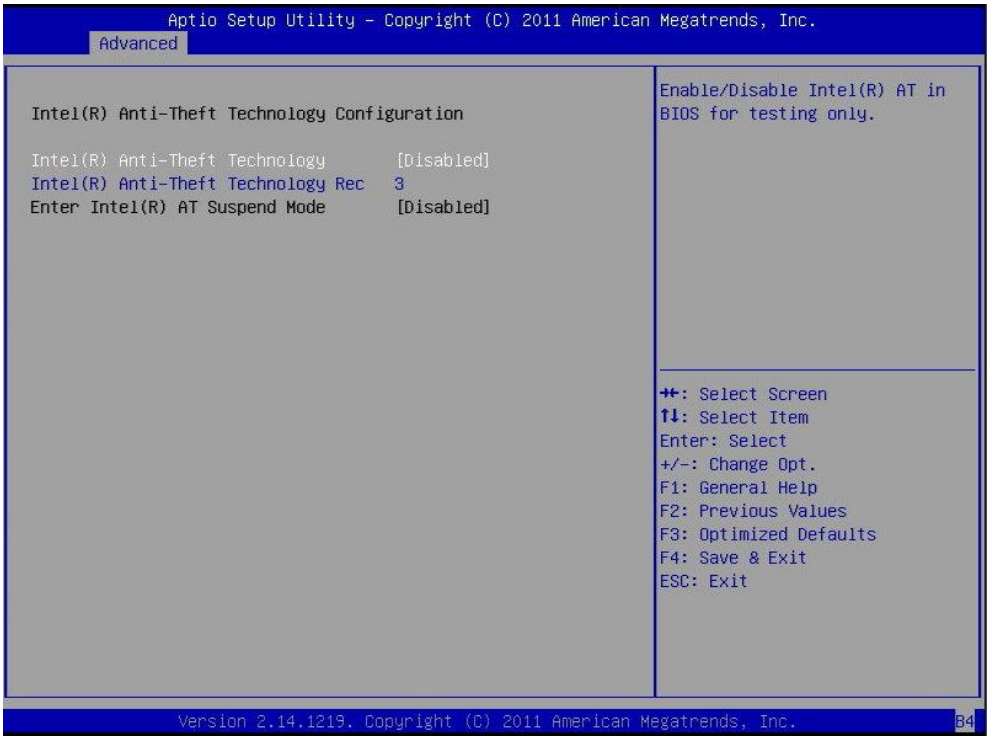


Figure 3.10 Intel® Anti-Theft Technology Configuration

Intel ® Anti-Theft Technology

This item allows users to enable or disable Intel ® AT in BIOS for testing only.

Intel ® Anti-Theft Technology Rec

This item allows users to set the number of times Recovery at temped will be allowed

3.3.8 USB Configuration

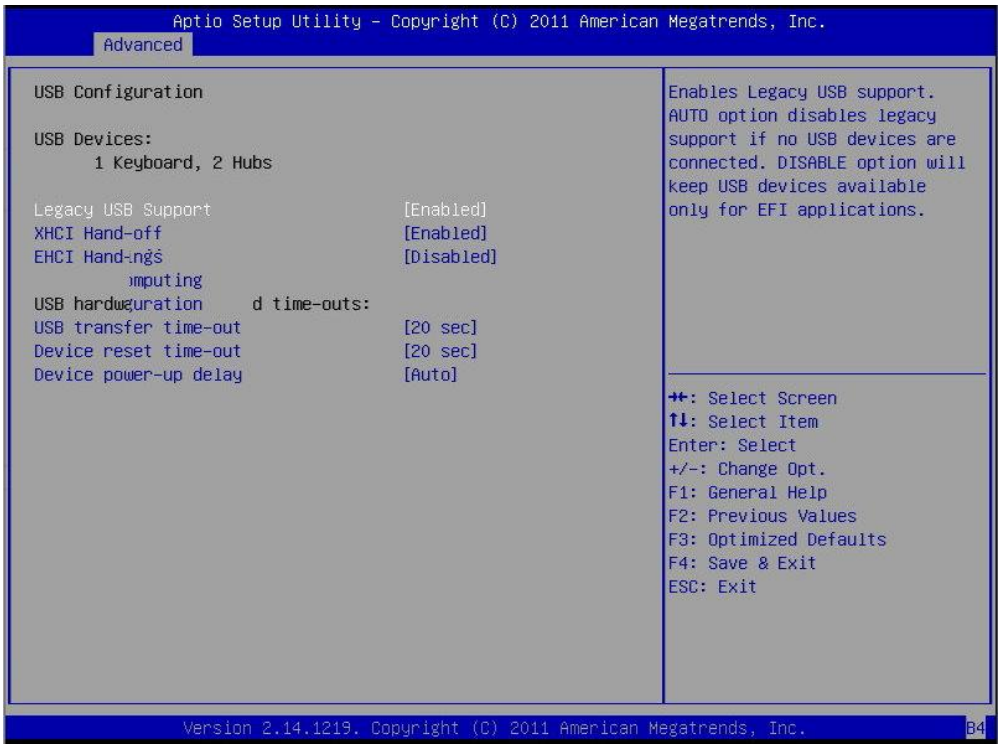


Figure 3.11 USB Configuration

Legacy USB Support

Enable the support for legacy USB. Auto option disables legacy support if no USB devices are connected.

XHCI Hand-Off

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

EHCI Hand-Off

This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver

USB Transfer Time-Out

Set the time-out value for Control, Bulk, and Interrupt transfers.

Device Reset Time-Out

Set USB mass storage device Start Unit command time-out value.

Device Power-Up Delay

Set the maximum time of the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.3.9 SMART Settings

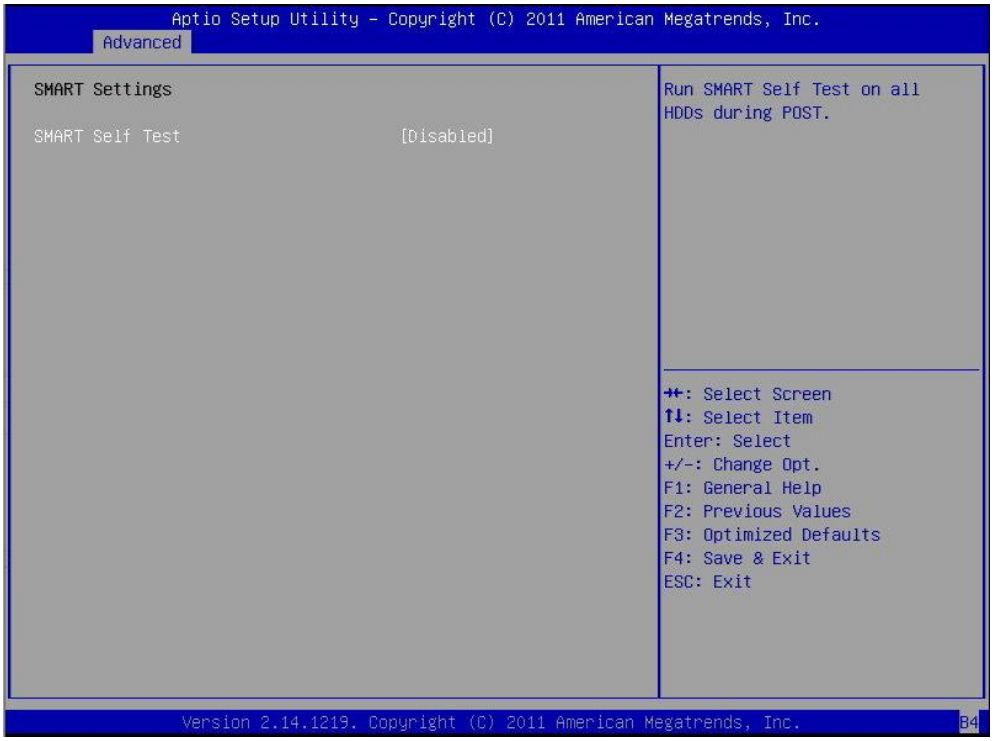


Figure 3.12 Smart Setting

SMART Self Test

This item allows users to enable or disable SMART Self Test.

3.3.10 Embedded Controller Configuration

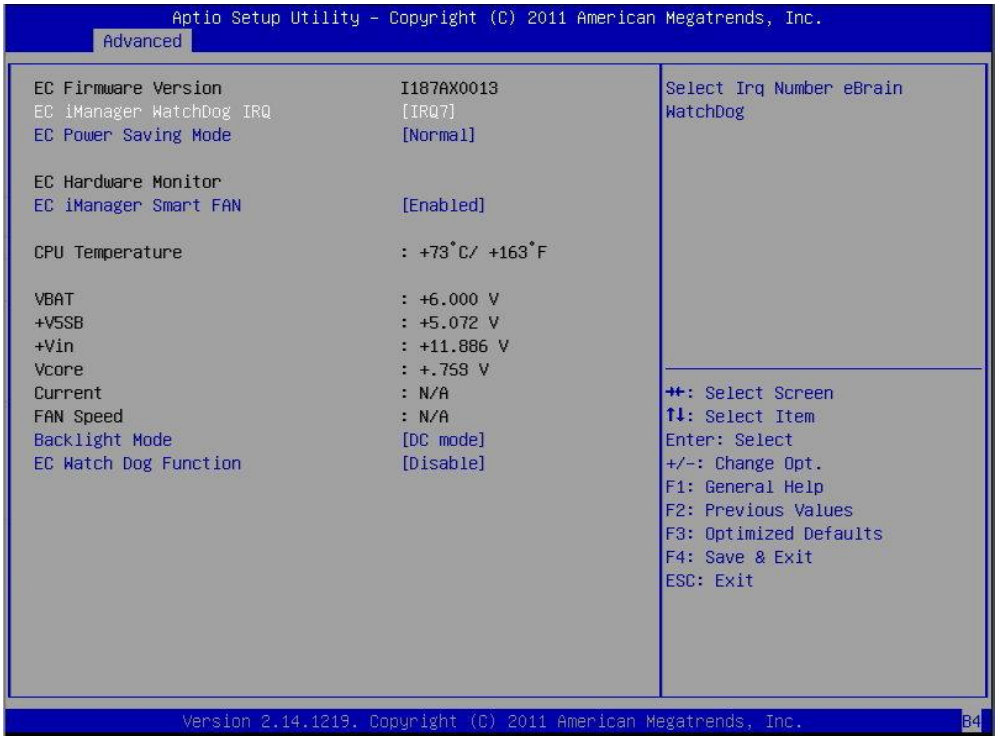


Figure 3.13 Embedded Controller Configuration

EC iManager WatchDog IRQ

This item allows users to select Irq number eBrain Watchdog.

EC Power Saving Mode

This item allows users to select EC Power Saving Mode.

EC iManager Smart FAN

This item allows users to Control iManager Smart FAN function

Backlight Mode

This item allows users to switch backlight mode to PWM or DC mode

EC Watch Dog Function

This item allows users to select watch dog timer you needs.

3.3.11 Platform Misc Configuration

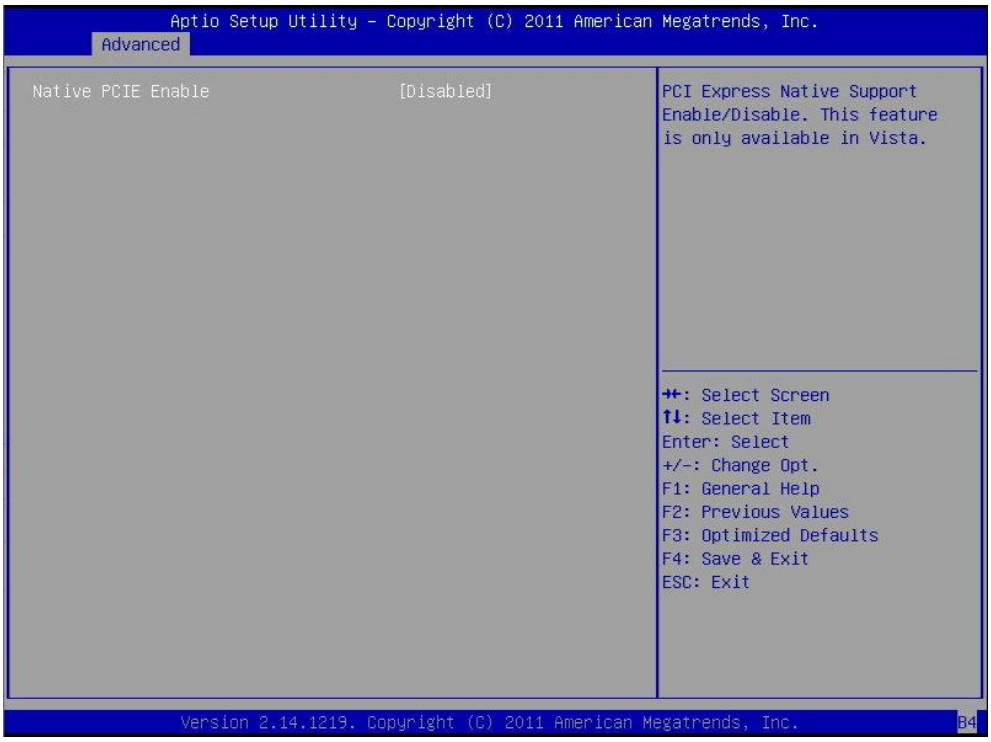


Figure 3.14 Platform Misc Configuration

Native PCIE Enable

This item allows users to enable or disable native PCIE support feature.

3.3.12 Intel (R) Smart Connect Technology

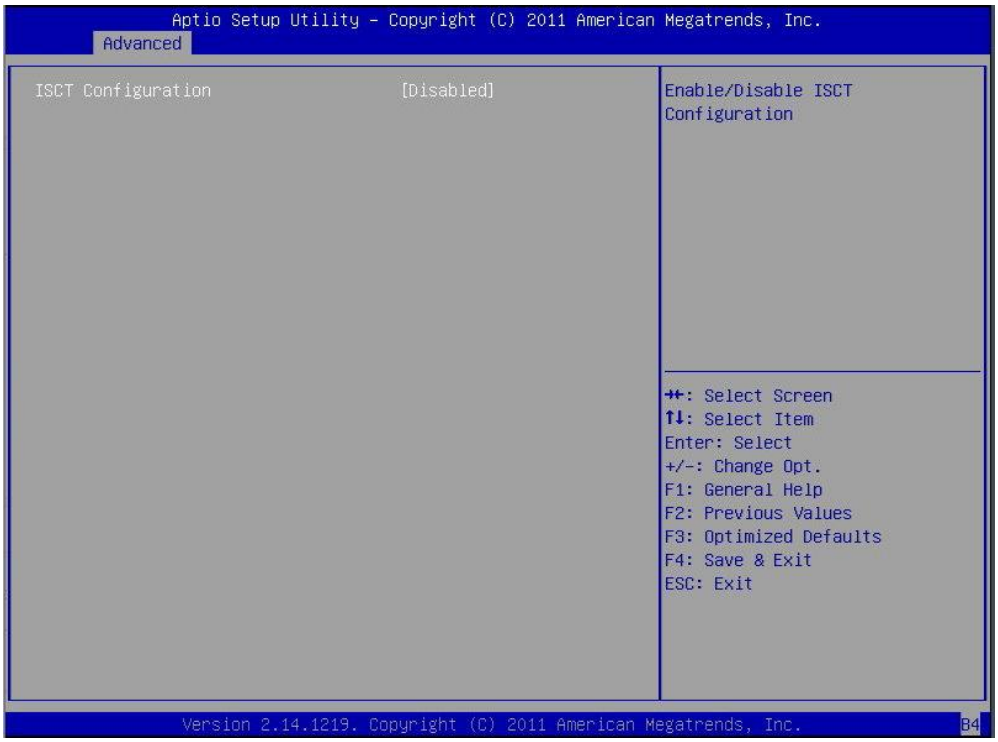


Figure 3.15 Intel® Smart Connect Technology

ISCT Configuration.

This item allows users to enable or disable ISCT Configuration

3.3.13 CPU PPM Configuration

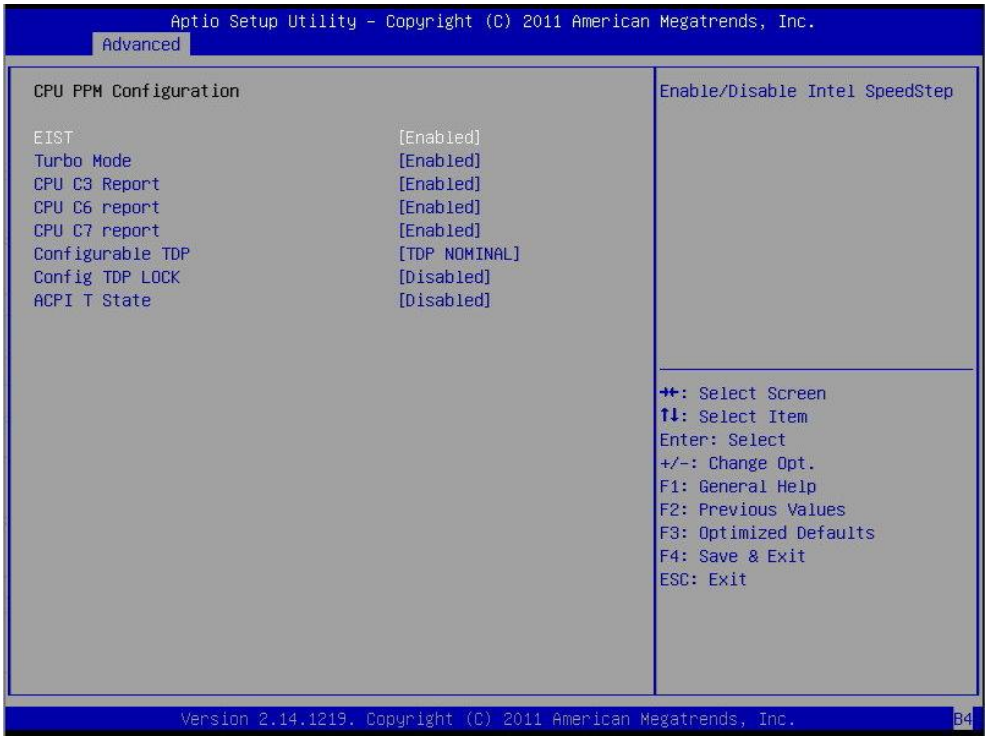


Figure 3.16 CPU PPM Configuration

EIST

CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.

Turbo Mode

This item allows users to enable or disable turbo mode.

CPU C3/C6/C7 Report

This item allows users to enable or disable CPU C-state support.

Configurable TDP

This item allows users to select TDP levels.

Config TDP LOCK

This item allows users to enable or disable Config TDP LOCK.

ACPI T State

This item allows users to enable or disable ACPI T State.

3.4 Chipset

Select the Chipset tab from the ARS-2510 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

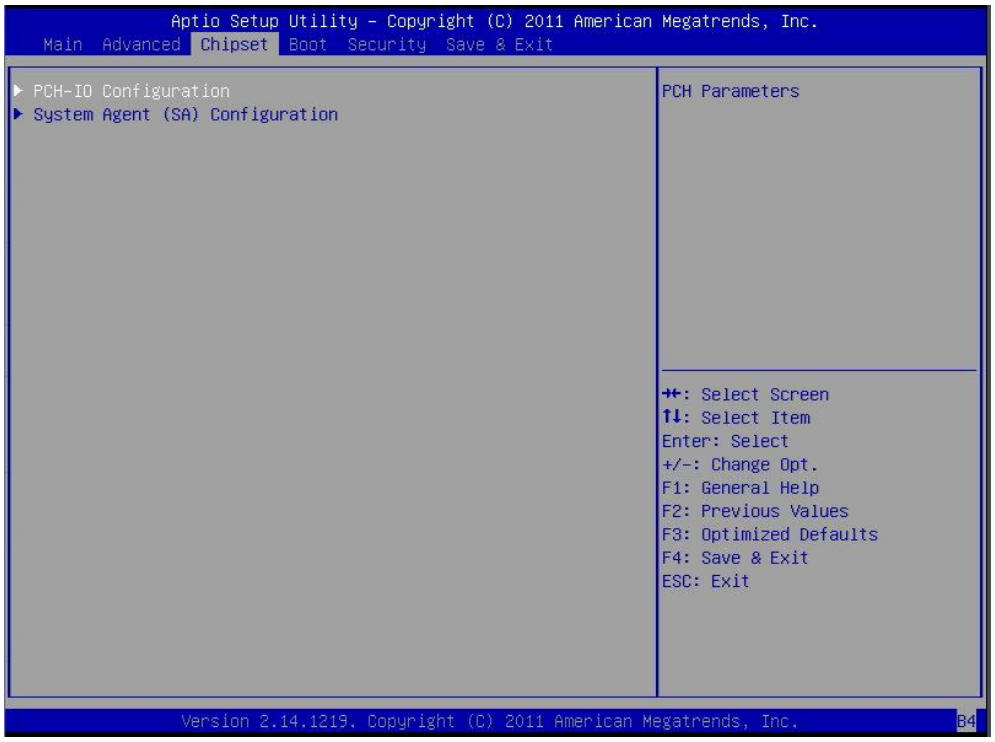


Figure 3.17 Chipset Setup

3.4.1 PCH-IO Configuration

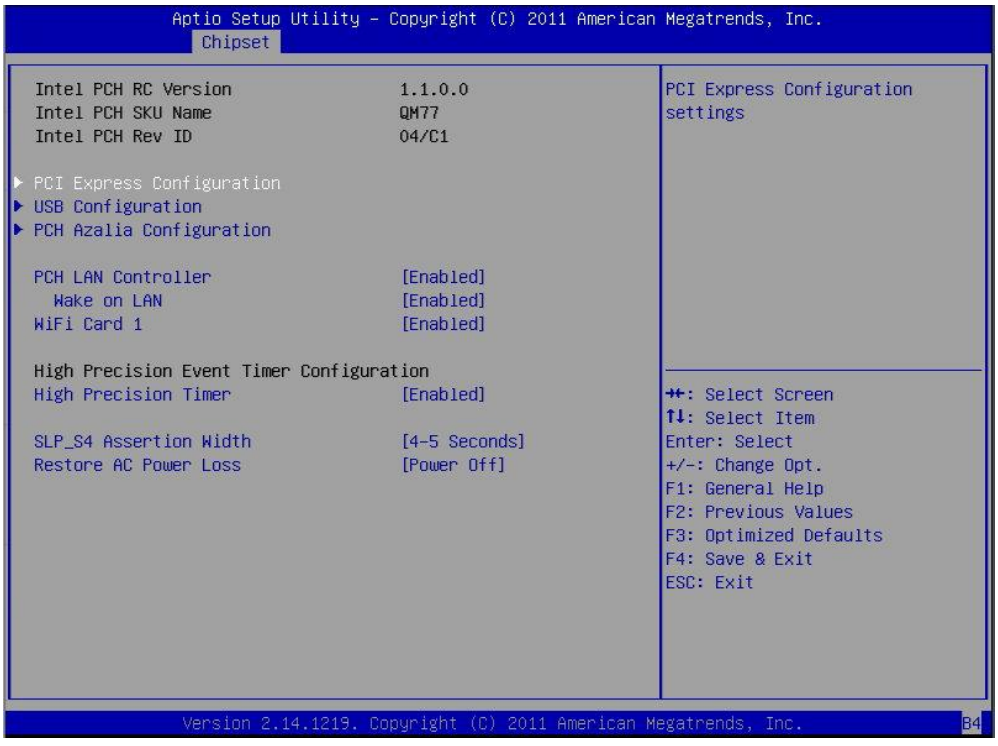


Figure 3.18 PCH-IO Configuration

PCI Express Configuration

This item allows users to configuration PCIE1~PCIE8 root port detail settings.

USB Configuration

This item allows users to configuration detail of USB functions.

PCH Azalia Configuration

This item allows users to configuration detail of azalia functions.

PCH LAN controller

Enables or disables the PCH LAN controller.

WiFi Card1

This item allows users to enables or disables the WiFi Card1 if device exist.

High Precision Timer

Enables or disables the high precision timer.

SLP_S4 Assertion Width

This item allows users to set a delay of sorts.

Restore AC Power Loss

This item allows users to select off, on and last state.

3.4.2 System Agent (SA) Configuration

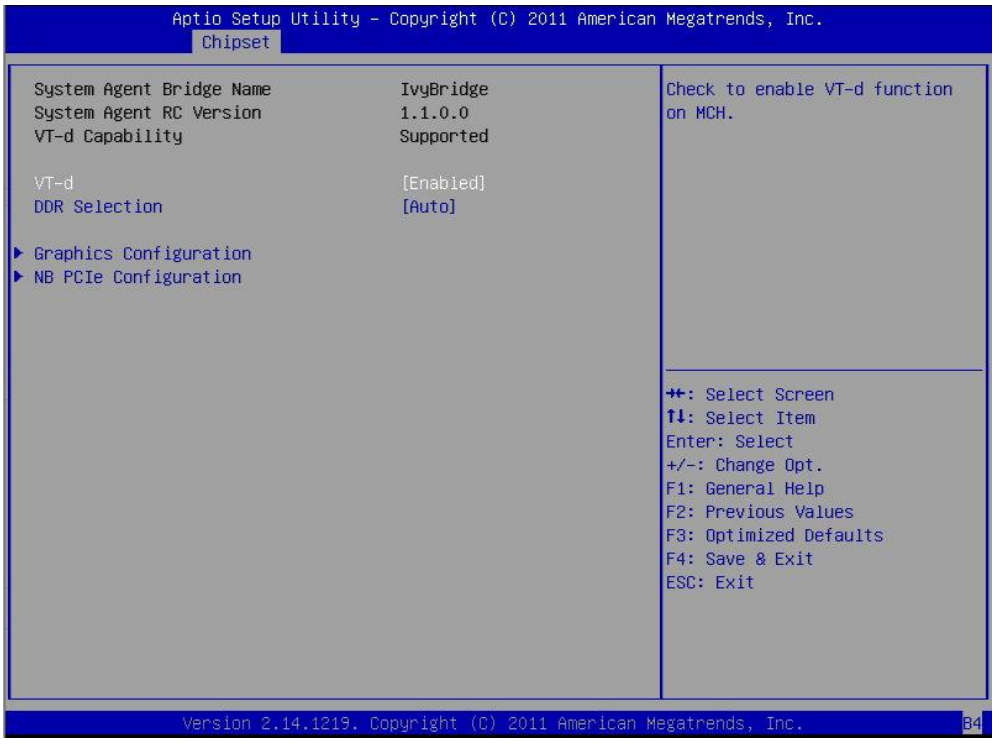


Figure 3.19 System Agent (SA) Configuration

VT-d

This item allows users to select Enable VT-d function on MCH.

DDR Selection

This item allows users to select Auto, DDR3 or DDR3L.

3.5 Boot Settings

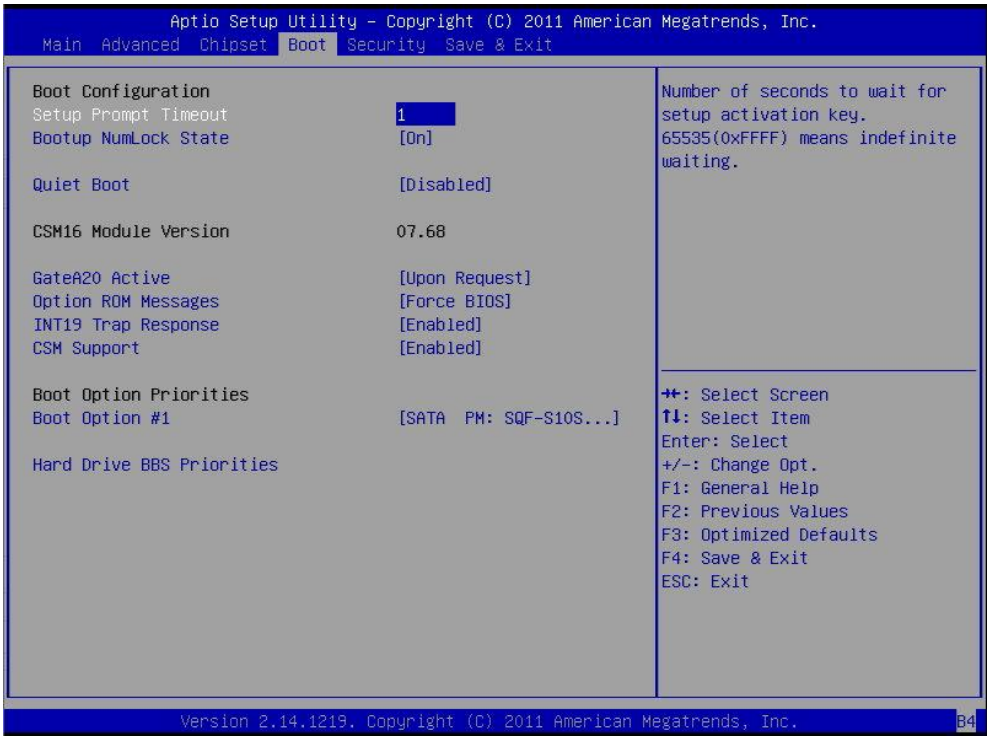


Figure 3.20 Boot Setup Utility

Setup Prompt Timeout

This item allows users to select the number of seconds to wait for setup activation key.

Bootup NumLock State

Select the Power-on state for Numlock.

Quiet Boot

If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.

Option ROM Message

Set display mode for option ROM.

INT19 Trap Response

This item allows option ROMs to trap interrupt 19.

3.6 Security Setup

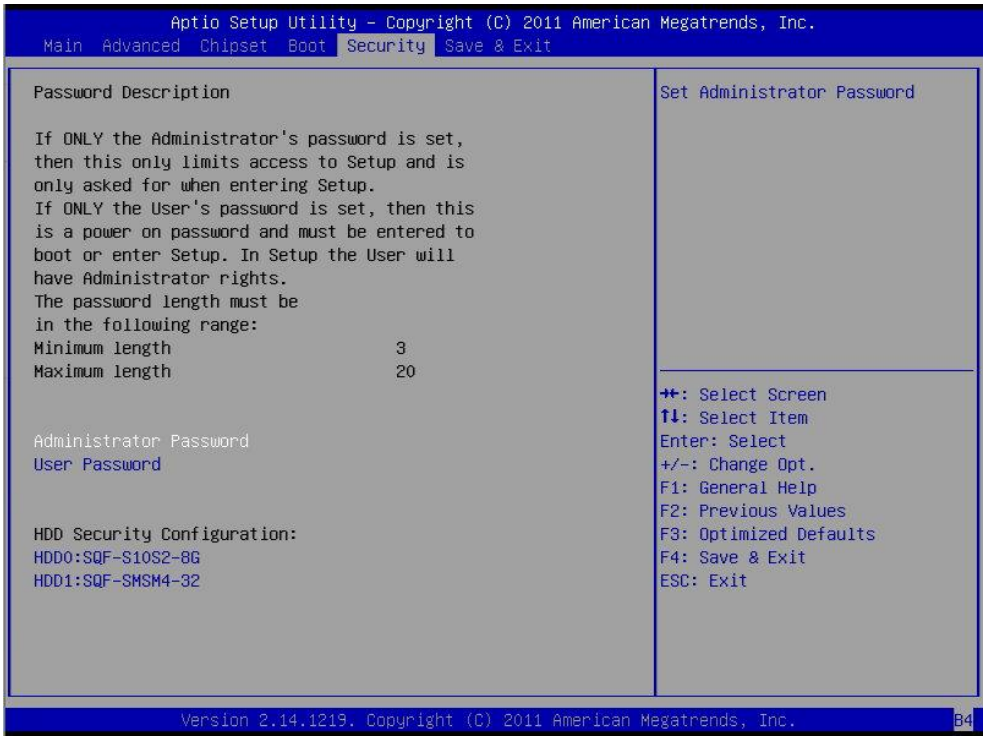


Figure 3.21 Password Configuration

Select Security Setup from the ARS-2510 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

Change Administrator / User Password: Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.7 Save & Exit

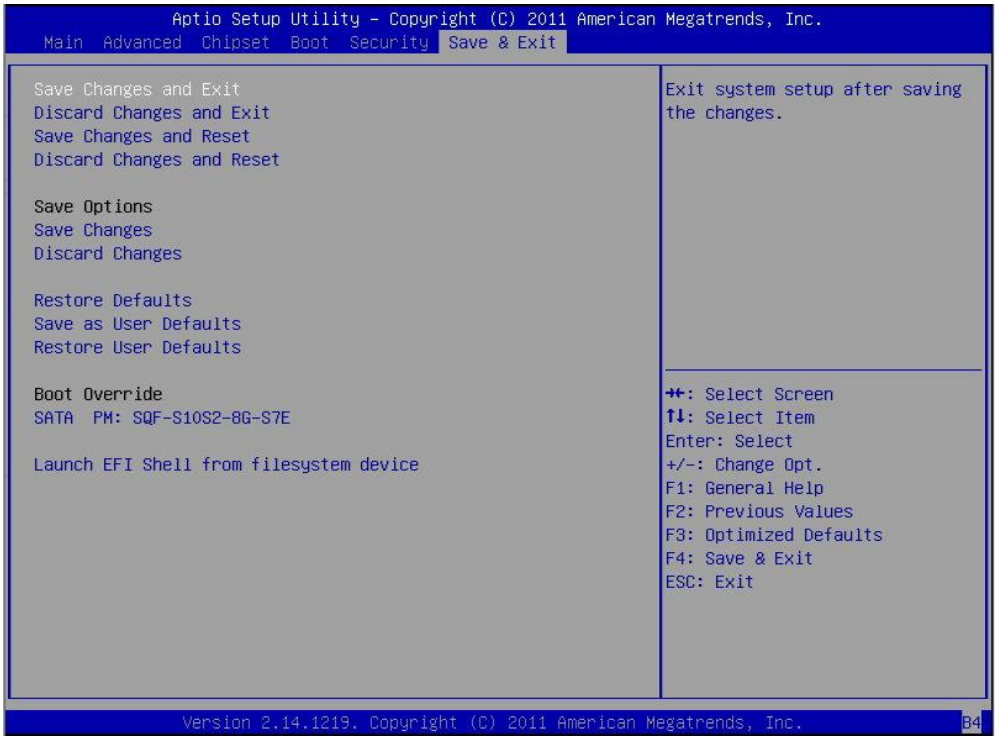


Figure 3.22 Save & Exit

Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect all system configuration parameters.

Discard Changes and Exit

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

Save Changes and Reset

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

Discard Changes and Reset

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

Save Changes

When users have completed system configuration, select this option to save changes without exit BIOS setup menu.

Discard Changes

Select this option to discard any current changes and load previous system configuration.

Restore Defaults

The ARS-2510 automatically configures all setup items to optimal settings when users select

this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

Save User Defaults

When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

Restore User Defaults

The users can select this option to restore user defaults.

Appendix A

Watchdog Timer Sample Code

A.1 EC Watchdog Timer Sample Code

```
EC_Command_Port = 0x29Ah
EC_Data_Port = 0x299h
Write EC HW ram = 0x89
Watch dog event flag = 0x57
Watchdog reset delay time =
0x5E Reset event = 0x04
Start WDT function = 0x28
=====================================================
.model small
.486p
.stack 256
.data
.code
org 100h
.STARTup

mov dx, EC_Command_Port
mov al,89h          ; Write EC HW
ram. out dx,al

mov dx, EC_Command_Port
mov al, 5Fh         ; Watchdog reset delay time low byte (5Eh is high byte)
index. out dx,al

mov dx, EC_Data_Port
mov al, 30h         ;Set 3 seconds delay
time. out dx,al

mov dx, EC_Command_Port
mov al,89h          ; Write EC HW
ram. out dx,al

mov dx, EC_Command_Port
mov al, 57h         ; Watch dog event
flag. out dx,al

mov dx, EC_Data_Port
mov al, 04h          ; Reset
event. out dx,al

mov dx, EC_Command_Port
mov al,28h          ; start WDT
function. out dx,al

.exit
END
```