User Manual

ARK-1550

Embedded IPC

ADVANTECH

Enabling an Intelligent Planet

Attention!

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.

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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 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, 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.*

Note! *Notes provide optional additional information.*

Safety Instructions

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

    ATTENTION: Tout composant non vérifiée pourrait causer des dommages inattendu. Pour garantir une installation correcte, s'il vous plaît utilisez toujours les composants (vis ex.) fournies avec la boîte d'accessoires.
17. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturers instructions.

    ATTENTION: L'ordinateur est muni d'un circuit en temps réel de l'horloge alimentée par batterie. Il ya un danger d'explosion si la pile est remplacée de façon incorrecte. Remplacez uniquement par un type identique ou équivalent

recommandé par le fabricant. Jetez les piles usagées selon les instructions du fabricant.

18. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.

ATTENTION: Toujours débrancher complètement le cordon d'alimentation de votre châssis lorsque vous travaillez avec le matériel. Ne pas effectuer les raccordements lorsque l'appareil est sur. Composants électroniques sensibles peuvent être endommagés par les surtensions soudaines.

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.

Packing List

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

- 1 x ARK-1550 Unit
- 1 x China RoHS
- 1 x Chinese User Manual for CCC
- 1 x Warranty Card
- 1 x Power Bracket
- 1 x CPU Thermal Pad

Ordering Information

Model Number	Description
ARK-1550-S6A1E	Intel Celeron DC 2980U 1.6 GHz w/HDMI+LAN+GPIO
ARK-1550-S9A1E	Intel Core i5 DC 4300U 1.9 GHz w/HDMI+LAN+GPIO

Optional Accessories

1757003934	AC-to-DC Adapter, DC 12V/5A 60W, with DC Jack Plug, 0 ~ 40° C for Home and Office Use
1757004522-01	AC-to-DC Wide Temperature Adapter, DC 12V/3.33A 40W, -20° C ~ 70° C
1702002600-01	Power cable 3-pin 183 cm, USA type (For power adapter 1757003934 & 1757004522-01)
1700018705	Power cable 3-pin 183 cm, Europe type (For power adapter 1757003934 & 1757004522-01)
1700018704	Power cable 3-pin 183 cm, UK type (For power adapter 1757003934 & 1757004522-01)
1700000237-01	Power cable 3-pin 183 cm, PSE type (For power adapter 1757003934 & 1757004522-01)
1960064584N000	Power bracket for 1757004522-01
AMK-V004E	VESA mounting kit
AMK-R002E	DIN-rail mounting kit
AMK-V006E	Panel mounting kit

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Chapter **1**

General Introduction

This chapter gives background information on ARK-1550 series.

1.1 Introduction

ARK-1550 Fanless Embedded Box PC is an application ready system platform solution. All electronics are protected in a compact sealed aluminum case for easy integration in the customer's own housing, or as a stand-alone application, where space is limited and the environment harsh. ARK-1550 is a new single board design made very slim. The dimensions are only 223 x 46.6 x 133.0 mm. ARK-1550 can be easily integrated with panel/displays within limited spaces and can be installed anywhere due to its slim dimensions with optional DIN rail and VESA mounting solutions.

ARK-1550 optimizes space and offers 2*USB 2.0, 2*USB 3.0, 1*VGA, 1*HDMI, 1*LVDS(optional), 3*COM, 1*DIO, 2*GbE LANs and 1*hot swappable 2.5" drive bay. Also, ARK-1550 can provide 2*MiniPCIe slot for future extensions. The ARK-1550 compact design can provide up to 5 Grms vibration and 50G shock protections and wide temperature support from -20-55 °C under harsh environment.

ARK-1550 is powered by 12V DC input and adopts the latest Intel 4th generation core i5 4300U DC 1.9 GHz and Celeron 2980U DC 1.6 GHz CPUs which meet most requirements. ARK-1550 is the ideal choice for cost/performance value for customers.

1.2 Product Features

1.2.1 Key Features

- Intel Celeron 2980U DC 1.6 GHz / Core i5 4300U DC 1.9 GHz SoC
- Optimized spaces by slim dimension : 223 x 46.6 x 133.0 mm
- One Hot Swappable 2.5" SATA HDD Bay and one mSATA slot
- Triple Independent Displays by VGA + HDMI + LVDS (optional)
- Optional VESA / DIN Rail Mounting kits with lockable DC jack design
- Built-in 1 x full size MiniPCIe (i.e.: 3G module) and 1 x half size MiniPCIe slot (i.e.: WIFI module)

1.2.2 Graphics

- **Chipset:** Intel HD Graphics (Celeron) / Intel HD Graphics 4400 (Core i5)
- **Graphic Engine:** DirectX* 11.1, OpenGL* 4.0 support. Full AVC/VC1/MPEG2 HW Decode
- **VGA:** DB15, resolution up to 1920 x 1200.
- **HDMI:** Lockable HDMI connector, resolution up to 4096 x 2304
- **LVDS (Option):** Resolution up to 1920 x 1200

1.2.3 Power Consumption

- **Burn-in test (Full Loading):** 16.8 W (Core i5)
- **OS Idle mode (Typical):** 2.64 W (Core i5)

1.3 Hardware Specification

- **CPU:** Intel® 4th generation DC Core i5 4300U 1.91GHz / DC Celeron 2980U 1.66 GHz
- **System Chipset:** Intel® HD Graphics 4400
- **BIOS:** AMI EFI 128 Mbit
- **System Memory:** 1 x 204-pin SO-DIMM DDR3L 1333/1600 MHz, support up to 8GB
- **Display:**
  - VGA: Up to 1920 x 1200 at 60 Hz
  - HDMI: Up to 4096 x 2304 at 24 Hz
  - LVDS (optional by T-PN): Up to 1920 x 1200 at 60 Hz
- **Storage:**
  - 1 x hot swappable 2.5" SATA HDD (maximum height: 9.5 mm)
  - 1 x Full size mSATA
- **Watchdog Timer:** 255-level timer interval, setup by software
- **I/O Interface:**
  - COM: 1 x RS-232, 2 x RS-232/422/485 (BIOS selectable)
  - USB: 2 x USB 2.0, 2 x USB 3.0
  - LAN1: Intel I218 GbE, support wake on LAN
  - LAN2: Intel I210 GbE, support wake on LAN
  - DIO: 8-bit DIO
  - Audio: Realtek ALC888S, High Definition Audio. Line-out, Mic-in, Line-in
- **Expansion:**
  - 1 x Full-size Mini PCIe slot w/ SIM holder, support mSATA storage or WWAN module
  - 1 x Half-size Mini PCIe slot, support WLAN module

1.4 Mechanical Specification

1.4.1 Dimensions

■ 223 x 46.6 x 133.0 mm (8.69" x 1.81" x 5.18")
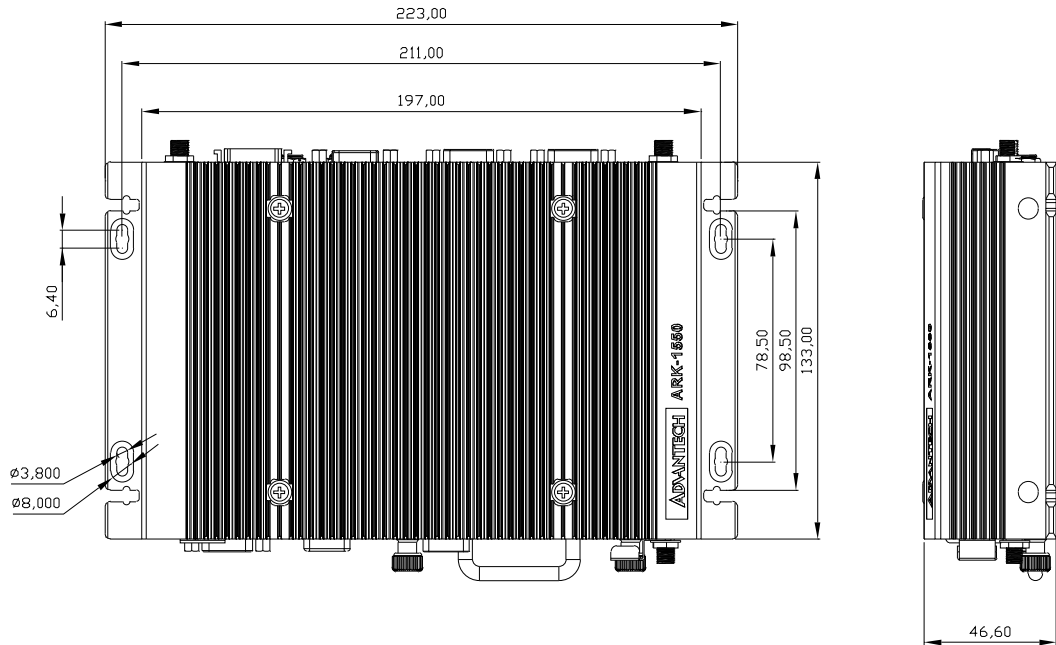
Figure 1.1 ARK-1550 Mechanical dimension drawing

1.4.2 Weight

■ 1.9 kg (4.18 lbs)

1.5 Power Requirement

1.5.1 System Power

■ **Minimum power input:** DC 12 V/5 A 60 W

1.5.2 RTC Battery

■ **Typical Voltage:** 3.0 V
■ **Normal discharge capacity:** 210 mAh

1.6 Environmental Specification

1.6.1 Operating Temperature

- With extended temperature SSD/ mSATA /RAM :-20 ~ 55 °C with 0.7m/s air flow
- With standard temperature HDD/ SSD/ mSATA/ RAM : 0 ~ 40 °C with 0.7m/s air flow

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

- With mSATA/ SSD: 5 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis

1.6.5 Shock during Operation

- With mSATA/SSD: 50 G, IEC 60068-2-27, half sine, 11 ms duration

1.6.6 Safety

- UL, CCC, BSMI, CB

1.6.7 EMC

- CE/FCC Class A, CCC, BSMI

Chapter 2

Hardware installation

This chapter introduces external IO and the installation of ARK-1550 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 List

The ARK-1550 has a number of jumpers that allow you to configure your system to suit your application. The table below lists the functions of the various jumpers.

Jumpers & Switches	
J2	Auto Power On Setting
J3	LCD Power
SW2	mPCIe & mSATA selection
SW3	Clear CMOS

2.2.2 Jumper Settings

Cards can be configured by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.
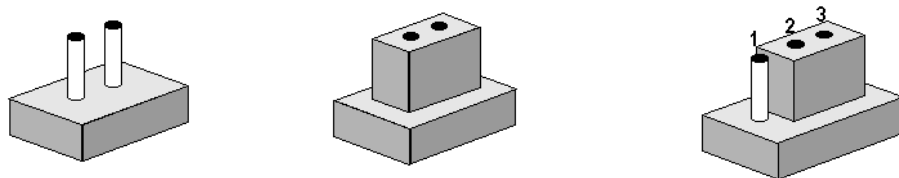
The jumper settings are schematically depicted in this manual as follows.

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

2.2.3 Auto Power On Setting (J2)

OPEN   Closed

Table 2.1: Auto Power On Setting (J2)	
Setting	**Function**
NC	Power Button for Power On
(1-2)*	Auto Power On (default)

2.2.4 LCD Power (J3)

(1-3)*   (3-5)   (3-4)
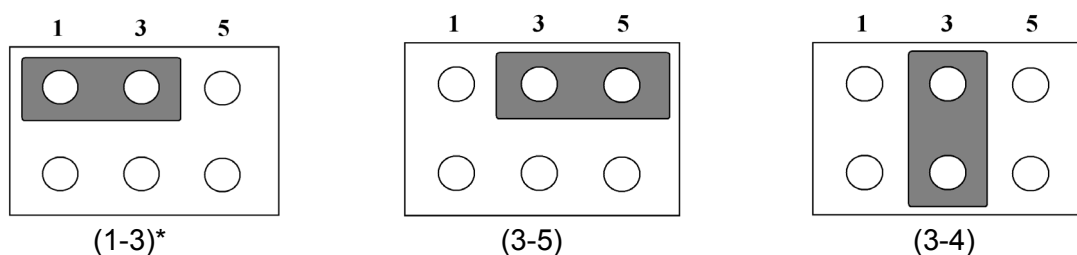
Table 2.2: LCD Power (J3)	
Setting	Function
(1-3)*	+3.3V (default)
(3-5)	+5V
(3-4)	+12V

2.2.5 PCIe & mSATA Selection (SW2)

(1 & 2)*   (3 & 4)   (2 & 4)
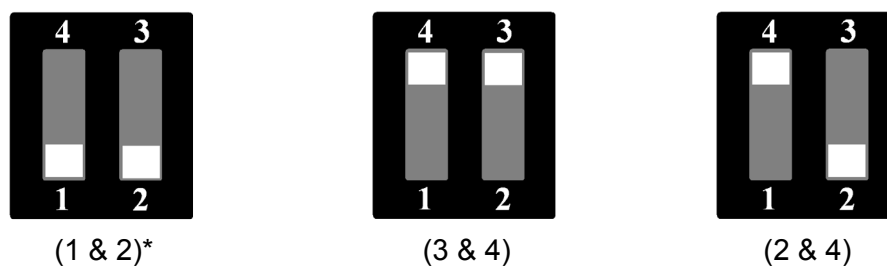
Table 2.3: mPCIe & mSATA Selection (SW2)	
Setting	**Function**
(1 & 2)*	mSATA (default)
(3 & 4)	mPCIe
(2 & 4)	Auto Detect[1]

[1] Some of mSATA or mPCIe modules can't be recognized correctly through the Auto Detect setting. Suggest to use mSATA or mPCIe setting directly if meet any compatibility problem.

2.2.6 Clear CMOS (SW3)

(1-2)*   (2-3)

Table 2.4: Clear CMOS (SW3)	
Setting	**Function**
(1-2)*	Normal
(2-3)	Clear CMOS

2.3 ARK-1550 I/O Indication
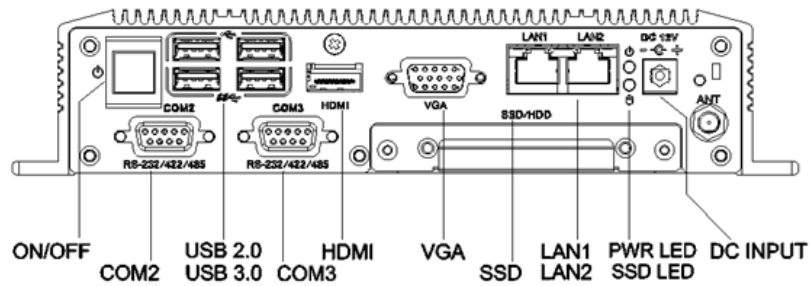
Figure 2.1 ARK-1550 Front View
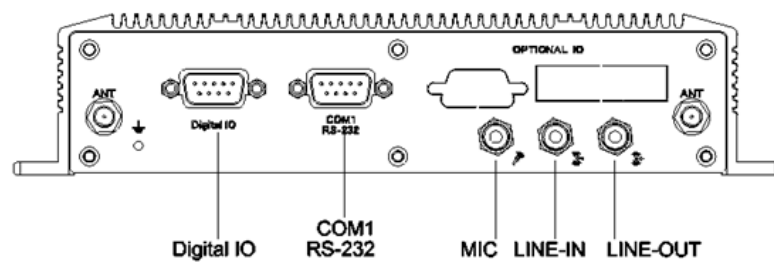
Figure 2.2 ARK-1550 Rear View

2.4 ARK-1550 External I/O Connectors

2.4.1 Power ON/OFF Button

ARK-1550 comes with a Power On/Off button, that support dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.
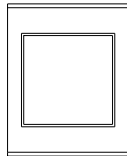
Figure 2.3 Power ON/OFF Button

2.4.2 Power Input Connector

ARK-1550 comes with a DC-Jack header that carries 12 V_{DC} external power input. The power connector can be fixed by a bracket which is in the accessory box. The bracket can avoid power connector to fall off.
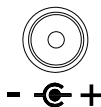
Figure 2.4 Power Input Connector

2.4.3 Ethernet Connector (LAN)

ARK-1550 provides two RJ45 LAN interface connectors, which are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. LAN1 is equipped with Intel I218 GbE and LAN2 is equipped with Intel I210 GbE. The Ethernet ports use standard RJ-45 jack connectors with LED indicators on the front side to show Active/Link status and Speed status.
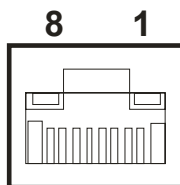
Figure 2.5 Ethernet Connector

Table 2.5: Ethernet Connector Pin Assignments			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	TX+(10/100),BI_DA+(GHz)	5	BI_DC-(GHz)
2	TX-(10/100),BI_DA-(GHz)	6	RX-(10/100),BI_DB-(GHz)
3	RX+(10/100),BI_DB+(GHz)	7	BI_DD+(GHz)
4	BI_DC+(GHz)	8	BI_DD-(GHz)

2.4.4 VGA Connector

The ARK-1550 provides a high resolution VGA interface connected by a D-sub 15-pin connector to support a VGA CRT monitor. It supports display resolution of up to 1920 x 1200 with 60 Hz.
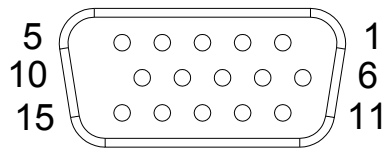
Figure 2.6 VGA Connector

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	NC	10	GND
11	NC	12	DDC Date
13	H-SYNC	14	V-SYNC
15	DDC Clock		

2.4.5 USB Connectors

The ARK-1550 provides up to four USB interface connectors – 2 x USB 2.0 & 2 x USB 3.0, which give complete Plug & Play. The USB interface is compliant with USB UHCI, Rev. 2.0 & 3.0. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.
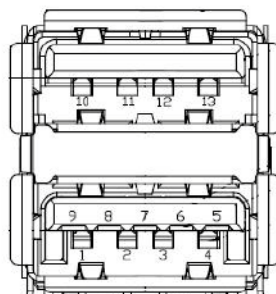
Figure 2.7 USB Connector [Upper (black): USB2.0 / Down (blue): USB 3.0]

Table 2.7: USB Connector Pin Assignments			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	+5V	2	D-
3	D+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+	10	+5V

11	D-			12	D+
13	GND				

2.4.6 Audio Connector (ARK-1550F only)

ARK-1550 offers stereo audio ports by a phone jack connector of Line-out, Mic-in & Line-in. The audio chip controller is by Realtek ALC888, High Definition Audio.
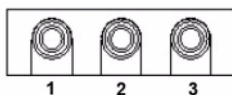
Figure 2.8 Line-out Connector

Table 2.8: Audio Connector Pin Assignments	
Pin	**Audio Signal Name**
1	MIC
2	Line-In
3	Line-Out

2.4.7 COM Connector

ARK-1550 provides three D-sub 9-pin connectors, which offers 1 x RS-232 & 2 x RS-232/422/485 serial communication ports (BIOS selectable).

COM 1: RS-232

COM 2: RS-232/422/485

COM3: RS-232/422/485
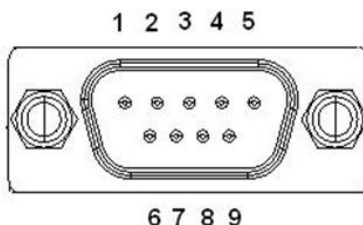
Figure 2.9 COM Port Connector

Table 2.9: 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

2.4.8 DIO Connector

ARK-1550 offers an 8-bit DIO connector and one ground pin. Each bit of DIO can be set as digital input or output independently. The direction of each bit can be set via Advantech SUSI utility.
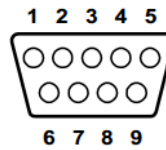
Figure 2.10 DIO Connector

Table 2.10: DIO Connector Pin Assignments	
Pin	Signal Name
1	DIO bit0
2	DIO bit1
3	DIO bit2
4	DIO bit3
5	DIO bit4
6	DIO bit5
7	DIO bit6
8	DIO bit7
9	GND

2.4.9 HDMI Connector

ARK-1550 provides 1 x lockable HDMI port which resolution can support up to 4096 x 2304 at 24 Hz.
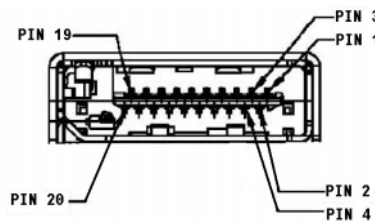
Figure 2.11 HDMI Connector

Table 2.11: HDMI / Display Port Connector Pin Assignments			
Pin	Signal Name	Pin	Signal Name
1	TMDS_Data2+/ DP_Data0+	2	GND
3	TMDS_Data2−/ DP_Data0-	4	TMDS_Data1+/ DP_Data1+
5	GND	6	TMDS_Data1−/ DP_Data1-
7	TMDS_Data0+/ DP_Data2+	8	GND
9	TMDS_Data0-/ DP_Data2-	10	TMDS_Clock+/ DP_Data3+
11	GND	12	TMDS_Clock−/ DP_Data3-
13	NC	14	NC
15	SCL/ AUX_CH+	16	SDA/ GND
17	DDC GND/ AUX_CH-	18	+5V/ Hot plug detect
19	Hot plug detect/ Return	20	DP_PWR

2.4.10 LED Indicator

There are two LEDs on ARK-1550 front metal face plate for indicating system status: PWR LED is for power status; and HDD LED is for HDD flash disk status.

Figure 2.12 LED Indicator

2.4.11 LVDS Connector (Optional)

The ARK-1550 comes with a D-Sub 26-pin connector that carries LVDS signal output, and can direct connect to LVDS LCD Display via external cable. The system also provides a jumper J3 on the internal motherboard for selecting the LCD signal power of 3.3V, 5V or 12V, please refer to the jumper table of J3 to adjust it. The default setting of J3 is 3.3V.
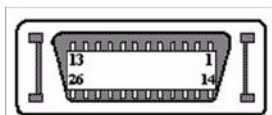
Figure 2.13 LVDS Connector

Table 2.12: LVDS Connector Pin Assignment			
Pin	**Signal Name**	**Pin**	**Signal name**
1	LVDS_CLKBP	14	LVDS_CLKBM
2	GND	15	LVDS_YAM0
3	LVDS_YAP0	16	LVDS_YAM1
4	LVDS_YAP1	17	LVDS_YAM2
5	LVDS_YAP2	18	LVDS_CLKAM
6	LVDS_CLKAP	19	GND
7	3.3V, 5V or 12V	20	3.3V, 5V or 12V
8	GND	21	LVDS_YAM3
9	LVDS_YAP3	22	LVDS_YBM0
10	LVDS_YBP0	23	LVDS_YBM1
11	LVDS_YBP1	24	LVDS_YBM2
12	LVDS_YBP2	25	LVDS_YBM3
13	LVDS_YBP3	26	GND

2.4.12 LCD Backlight On/Off Control Connector (Optional)

ARK-1550 comes with a D-Sub 9-pin connector which provides BKLTEN signal as well as +12 V, +5 V and Ground Pin signals that allow the user to connect these signals to LCD Inverter to implement the LCD On/Off control.

- Provides BKLTEN signal that inverter Module requires for inverter on/off control
- Provides 12 V, 5 V as the Inverter Power Source. The additional VBR signal pin could be connected to LCD's Inverter that allows the user to achieve brightness adjustment through customer's software utility.
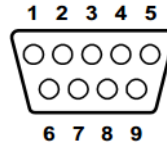
Figure 2.14 LCD Backlight connector

Table 2.13: LCD Backlight Connector Pin Assignment	
Pin	**Signal name**
1	+12 V
2	GND
3	BKLTEN
4	VBR
5	+5 V
6	LVDS_DCLK
7	LVDS_DDAT
8	GND
9	Reserved

2.5 Optional Peripheral Installation

2.5.1 RAM Installation

1. Remove top cover screw * 4pcs and right/left side screws * 4pcs.
2. Remove top cover and then see memory socket.

3. Install memory. (memory is for optional, not in standard shipment)
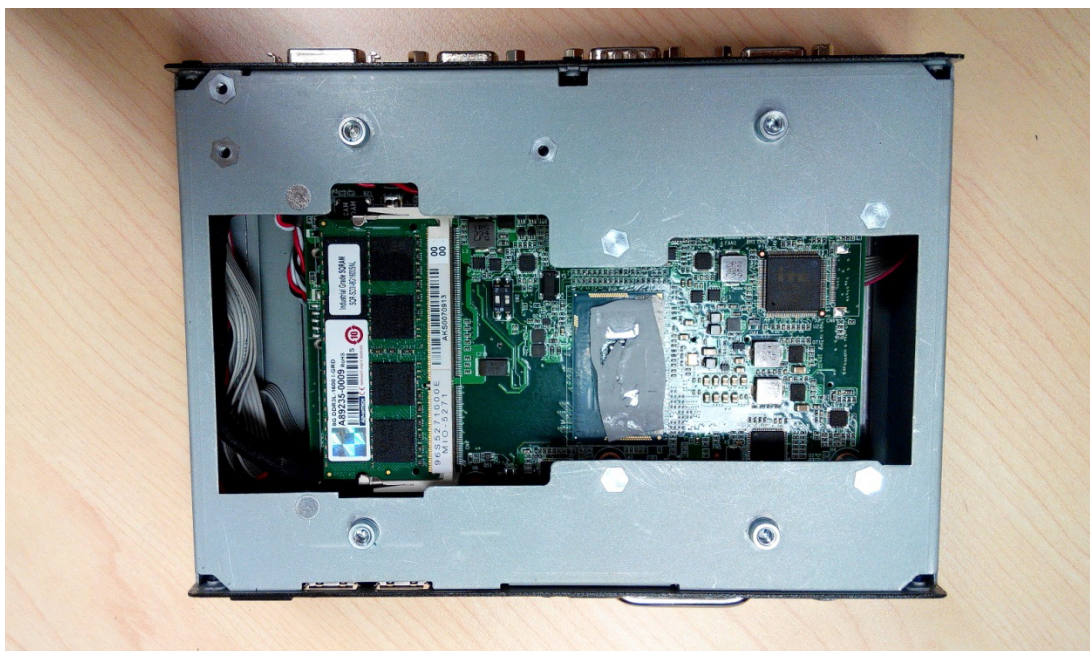
2.5.2 HDD Installation

1. Loosen the screws marked in red and take out the hard drive tray.

2. Install the hard drive on the tray (screws are included in accessory box).
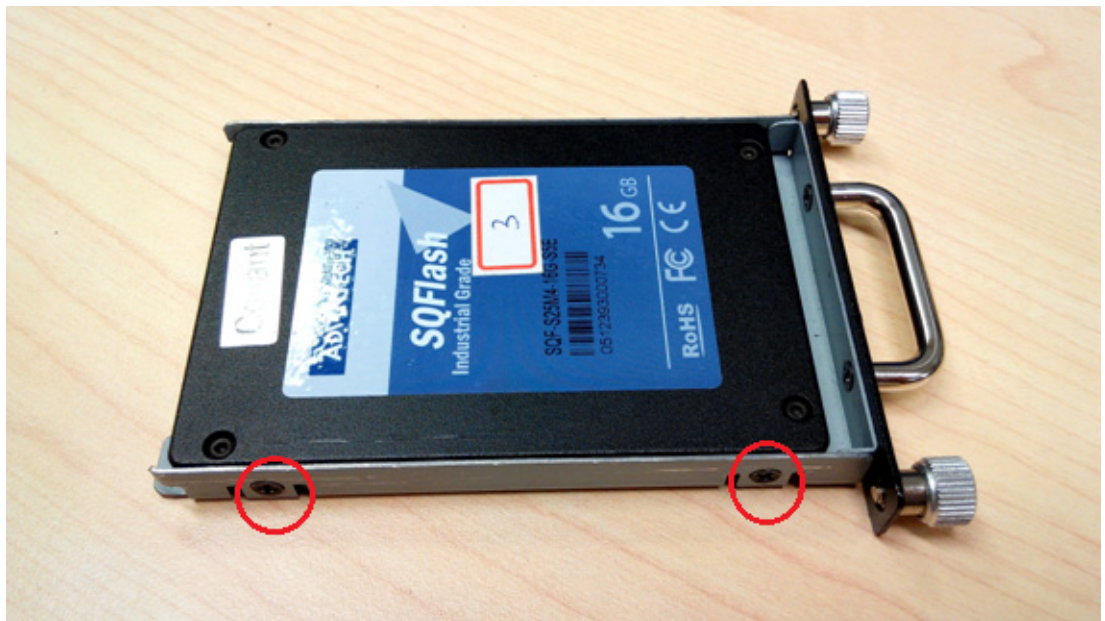
3. Secure the screws on the hard drive tray and push the tray back into the unit.

2.5.3 mSATA Installation

1. Remove the bottom cover screws and then remove the bottom cover.
2. mSATA storage can be installed in the full-size mini PCIe slot marked in red. (screws are included in accessory box)
3. Replace bottom cover and secure the bottom cover screws.

** mSATA storage and 3G module cannot be installed at the same time.
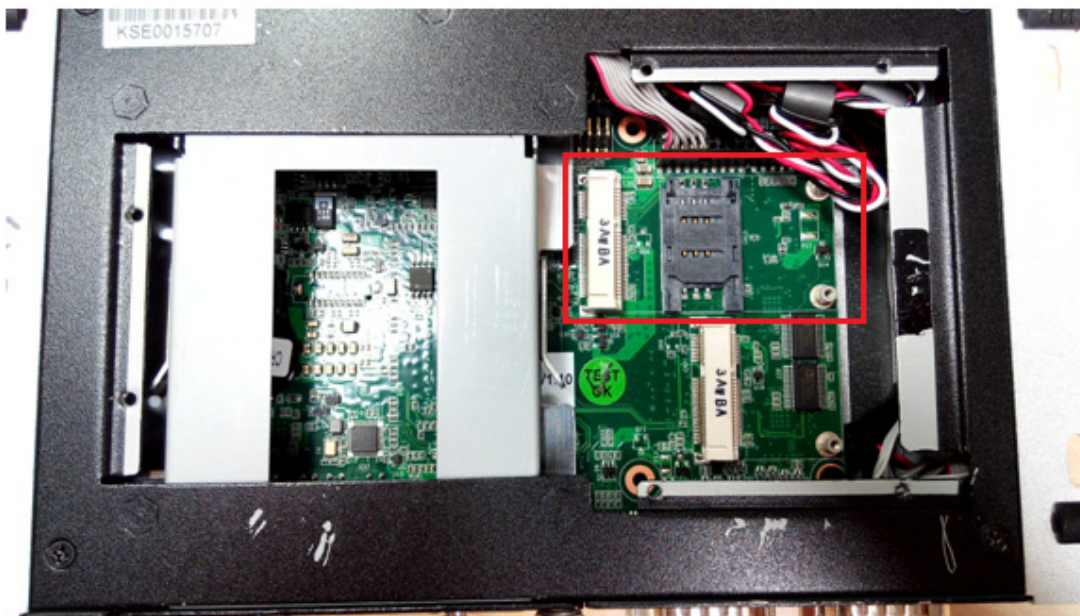
2.5.4 WIFI / 3G Module Installation

1. Remove the bottom cover screws and then remove the bottom cover.
2. The 3G module can be installed in the full-size mini PCIe slot marked in red. (screws are included in accessory box)
3. The WIFI module can be installed in the half-size mini PCIe slot marked in yellow. (screws are included in accessory box)
4. Replace the bottom cover and secure the bottom cover screws.
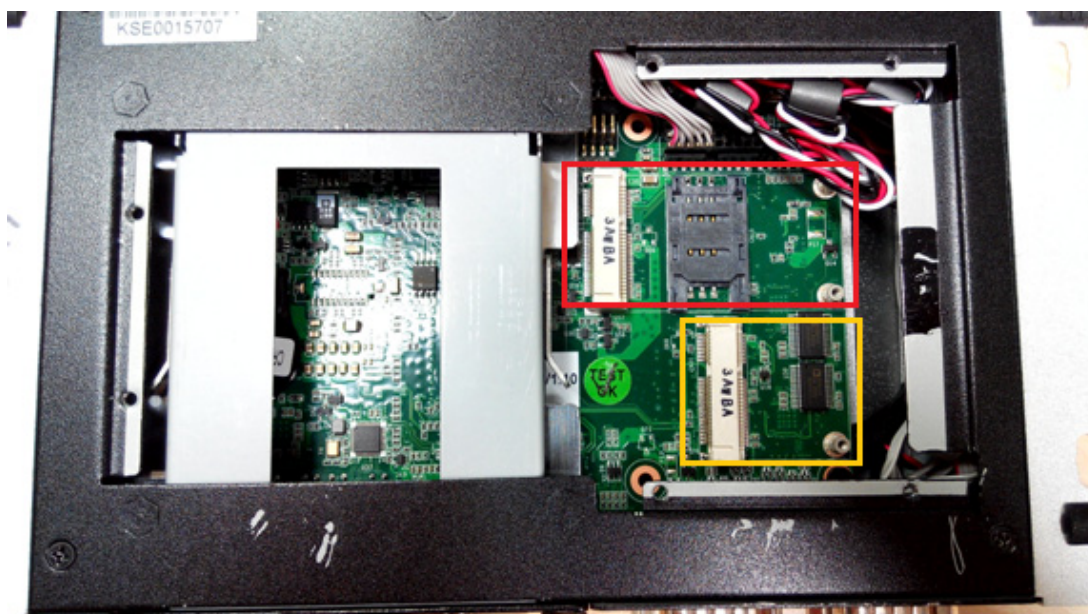
Chapter 3

BIOS settings

This chapter introduces how to set BIOS configuration data.

3.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the ARK-1550 BIOS setup screens.


```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
    Main  Advanced  Chipset  Boot  Security  Save & Exit

    BIOS Information                                          Set the Date. Use Tab to
    BIOS Vendor                     American Megatrends       switch between Date elements.
    Core Version                    4.6.5.4   0.32 x64
    Compliancy                      UEFI 2.3.1; PI 1.2
    Project Version                 ARK C500X004
    Build Date and Time             04/17/2014 15:34:59

    Memory Information
    Memory Frequency                1600 Mhz
    Total Memory                    8192 MB (DDR3)

    System Date                     [Thu 04/17/2014]
    System Time                     [15:56:04]
                                                             →←: Select Screen
    Access Level                    Administrator            ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit




                Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.1 Setup program initial screen

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

3.2 Entering Setup

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

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.

```
                  Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
  Main  Advanced  Chipset  Boot  Security  Save & Exit

  BIOS Information                                          Set the Date. Use Tab to
  BIOS Vendor                   American Megatrends         switch between Date elements.
  Core Version                  4.6.5.4   0.32 x64
  Compliancy                    UEFI 2.3.1; PI 1.2
  Project Version               ARK C500X004
  Build Date and Time           04/17/2014 15:34:59

  Memory Information
  Memory Frequency              1600 Mhz
  Total Memory                  8192 MB (DDR3)

  System Date                   [Thu 04/17/2014]
  System Time                   [15:56:04]
                                                           →←: Select Screen
  Access Level                  Administrator              ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit




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```

Figure 3.2 Main setup screen

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

■ **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 ARK-1550 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

```
             Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
       Main  Advanced  Chipset  Boot  Security  Save & Exit

     ▶ PCI Subsystem Settings                          PCI, PCI-X and PCI Express
     ▶ ACPI Settings                                   Settings.
     ▶ Trusted Computing
     ▶ S5 RTC Wake Settings
     ▶ CPU Configuration
     ▶ SATA Configuration
     ▶ Intel(R) Rapid Start Technology
     ▶ PCH-FW Configuration
     ▶ AMT Configuration
     ▶ USB Configuration
     ▶ Embeded Controller Configuration
     ▶ IT8768 Super IO Configuration
     ▶ Serial Port Console Redirection
                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

             Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.3 Advanced BIOS features setup screen

3.2.2.1 PCI Subsystem Settings


```
                  Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
          Advanced

  PCI Bus Driver Version        V 2.05.02                    Value to be programmed into
                                                             PCI Latency Timer Register.

  PCI Common Settings
  PCI Latency Timer             [32 PCI Bus Clocks]
  VGA Palette Snoop             [Disabled]
  PERR# Generation              [Disabled]
  SERR# Generation              [Disabled]

▶ PCI Express Settings

                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

                  Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.4 PCI Subsystem Settings

■ **PCI Latency Timer**
  This item allows users to program the PCI Latency timer.

■ **VGA Palette Snoop**
  This item allows users to enable or disable VGA Palette Snoop.

■ **PERR# Generation**
  This item allows users to enable or disable PERR# Generation.

■ **SERR# Generation**
  This item allows users to enable or disable SERR# Generation

3.2.2.2 PCI Express Device Register Settings
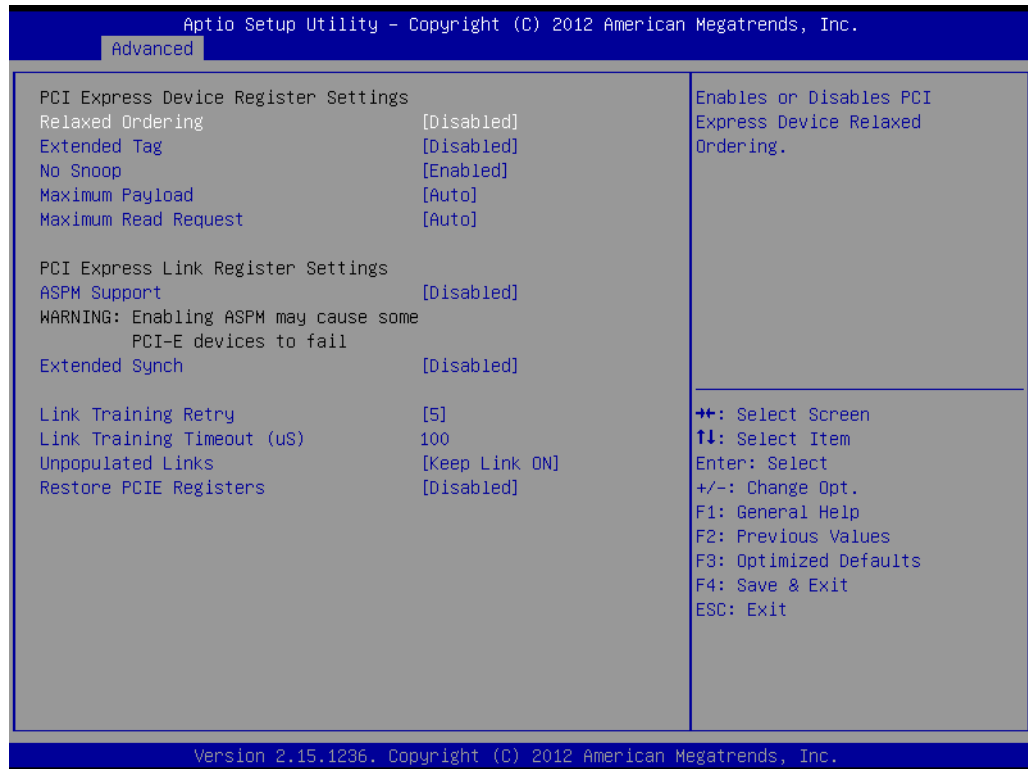
Figure 3.5 PCI Express Device Register Settings

- ◼ **Relaxed Ordering**
  Enable or disable Relaxed Ordering
- ◼ **Extended Tag**
  Enable or disable Extended Tag
- ◼ **No Snoop**
  Enable or disable No Snoop
- ◼ **Maximum Payload**
  This item allows users to set the Maximum Payload
- ◼ **Maximum Read Request**
  This item allows users to set the Maximum Read Request
- ◼ **ASPM Support**
  Enable or disable ASPM Support
- ◼ **Extended Synch**
  Enable or disable Extended Synch
- ◼ **Link Training Retry**
  This item allows users to set the Link Training Retry
- ◼ **Link Training Timeout (uS)**
  This item allows users to set the Link Training Timeout (uS)
- ◼ **Unpopulated Links**
  This item allows users to set the Unpopulated Links
- ◼ **Restore PCIE Registers**
  Enable or disable Restore PCIE Registers

3.2.2.3 ACPI Settings


```
                  Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
      Advanced

  ACPI Settings                                              Enables or Disables BIOS ACPI
                                                             Auto Configuration.
  Enable ACPI Auto Configuration        [Disabled]

  Enable Hibernation                    [Enabled]
  ACPI Sleep State                      [S3 only(Suspend to ...]
  Lock Legacy Resources                 [Disabled]
  S3 Video Repost                       [Disabled]
  ACPI Low Power S0 Idle                [Disabled]



                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit




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```

Figure 3.6 ACPI Setting

- **Enable ACPI Auto Configuration**
  This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  This item allows users to enable or disable hibernation.
- **ACPI Sleep State**
  This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**
  This item allows users to lock legacy devices' resources.
- **S3 Video Repost**
  This item allows users to enable or disable VBIOS run after S3 resume.
- **ACPI Low Power S0 Idle**
  This item allows users to enable or disable system wake on alarm event by Items setting.

3.2.2.4 Trusted Computing
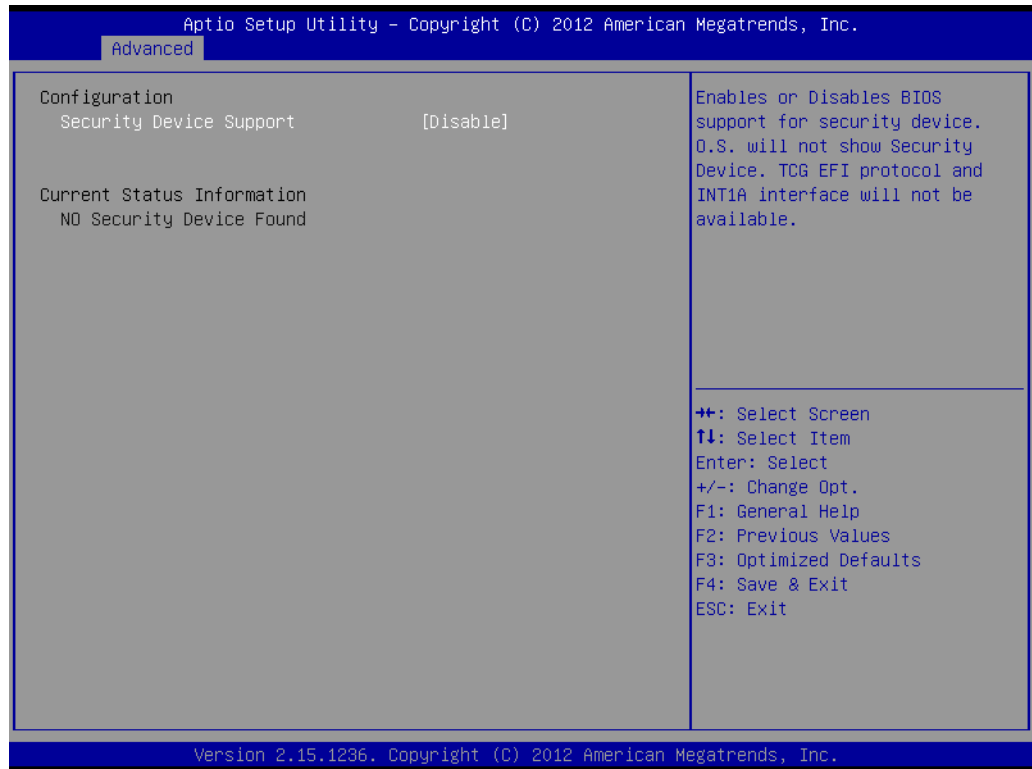
Figure 3.7 Trusted Computing Configuration

■ **Security Device Support**

Enable or disable BIOS support for security device.

3.2.2.5 S5 RTC Wake Settings

Figure 3.8 S5 RTC Wake Settings

■ **Wake system with fixed time**
Enable or disable system wake on alarm event

3.2.2.6 CPU Configuration


```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
         Advanced

 CPU Configuration                                               ▲  Enabled for Windows XP and
                                                                    Linux (OS optimized for
 Intel(R) Core(TM) i5-4300U CPU @ 1.90GHz                           Hyper-Threading Technology)
 CPU Signature                         40651                        and Disabled for other OS (OS
 Processor Family                      6                            not optimized for
 Microcode Patch                       16                           Hyper-Threading Technology).
 FSB Speed                             100 MHz                      When Disabled only one thread
 Max CPU Speed                         1900 MHz                     per enabled core is enabled.
 Min CPU Speed                         800 MHz
 CPU Speed                             2600 MHz
 Processor Cores                       2
 Intel HT Technology                   Supported
 Intel VT-x Technology                 Supported
 Intel SMX Technology                  Supported               →←: Select Screen
 64-bit                                Supported               ↑↓: Select Item
 EIST Technology                       Supported               Enter: Select
 CPU C3 state                          Supported               +/-: Change Opt.
 CPU C6 state                          Supported               F1: General Help
 CPU C7 state                          Supported               F2: Previous Values
                                                               F3: Optimized Defaults
 L1 Data Cache                         32 kB x 2               F4: Save & Exit
 L1 Code Cache                         32 kB x 2               ESC: Exit
 L2 Cache                              256 kB x 2
 L3 Cache                              3072 kB                 ▼

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```

Figure 3.9 CPU Configuration Setting

- ■ **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 intel's 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.

3.2.2.7 SATA Configuration
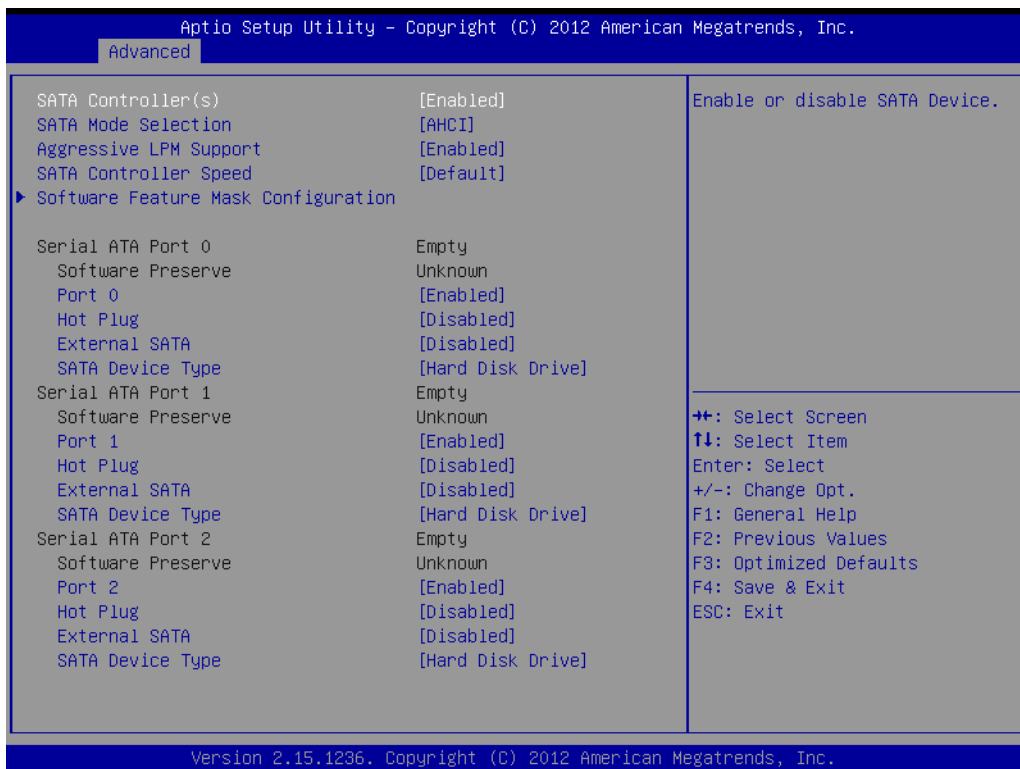
Figure 3.10 SATA Configuration

- ■ **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).

- ■ **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).

- ■ **Aggressive LPM Support**
  This item allows users to enable or disable the Aggressive LPM Support.

- ■ **SATA Controller Speed**
  This item allows users to select mode of SATA Controller Speed.

- ■ **Serial ATA Port 1/2/3**
  This item allows users to enable or disable the SATA Port.

- ■ **Hot Plug**
  This item allows users to enable or disable the Hot Plug.

- ■ **External SATA**
  This item allows users to enable or disable the External SATA.

- ■ **SATA Device type**
  This item allows users to select mode of SATA Device type.

3.2.2.8 Intel® Rapid Start Technology
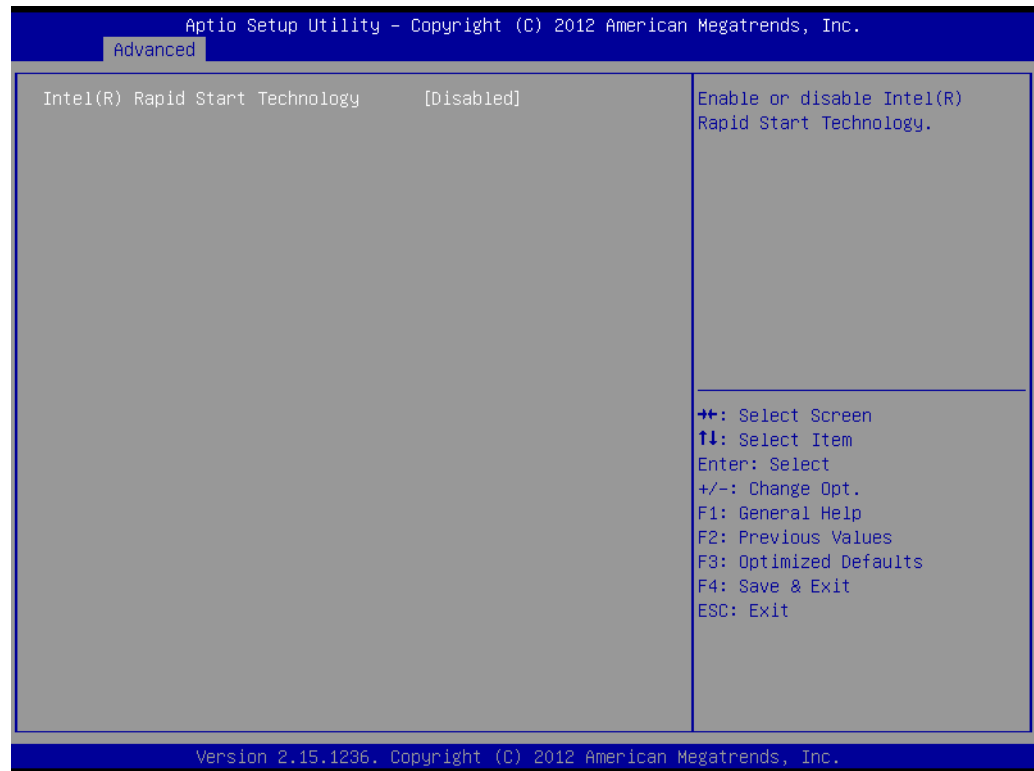
Figure 3.11 Intel® Rapid Technology

■ **Intel® Rapid Start Technology**
This item allows users to enable or disable Rapid Start Technology, if supported.

3.2.2.9 AMT Configuration


```
                    Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
         Advanced

  Intel AMT                               [Enabled]            Enable/Disable Intel (R)
  BIOS Hotkey Pressed                     [Disabled]           Active Management Technology
  MEBx Selection Screen                   [Disabled]           BIOS Extension.
  Hide Un-Configure ME Confirmation       [Disabled]           Note : iAMT H/W is always
  MEBx Debug Message Output               [Disabled]           enabled.
  Un-Configure ME                         [Disabled]           This option just controls the
  Amt Wait Timer                          0                    BIOS extension execution.
  Disable ME                              [Disabled]           If enabled, this requires
  ASF                                     [Enabled]            additional firmware in the SPI
  Activate Remote Assistance Process      [Disabled]           device
  USB Configure                           [Enabled]
  PET Progress                            [Enabled]
  AMT CIRA Timeout                        0
  WatchDog                                [Disabled]           →←: Select Screen
   OS Timer                               0                    ↑↓: Select Item
   BIOS Timer                             0                    Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


                    Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.12 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 receive 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.

3.2.2.10 PCH-FW Configuration


```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
 Advanced

 ME FW Version                 9.5.13.1706              Configure Management Engine
 ME Firmware Mode              Normal Mode              Technology Parameters
 ME Firmware Type              Full Sku Firmware
 ME Firmware SKU               5MB
 PTT Capability / State        0 / 0
 ▶ Firmware Update Configuration




                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit


           Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.13 PCH-FW Configuration

■ **Firmware Update Configuration**

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

3.2.2.11 USB Configuration
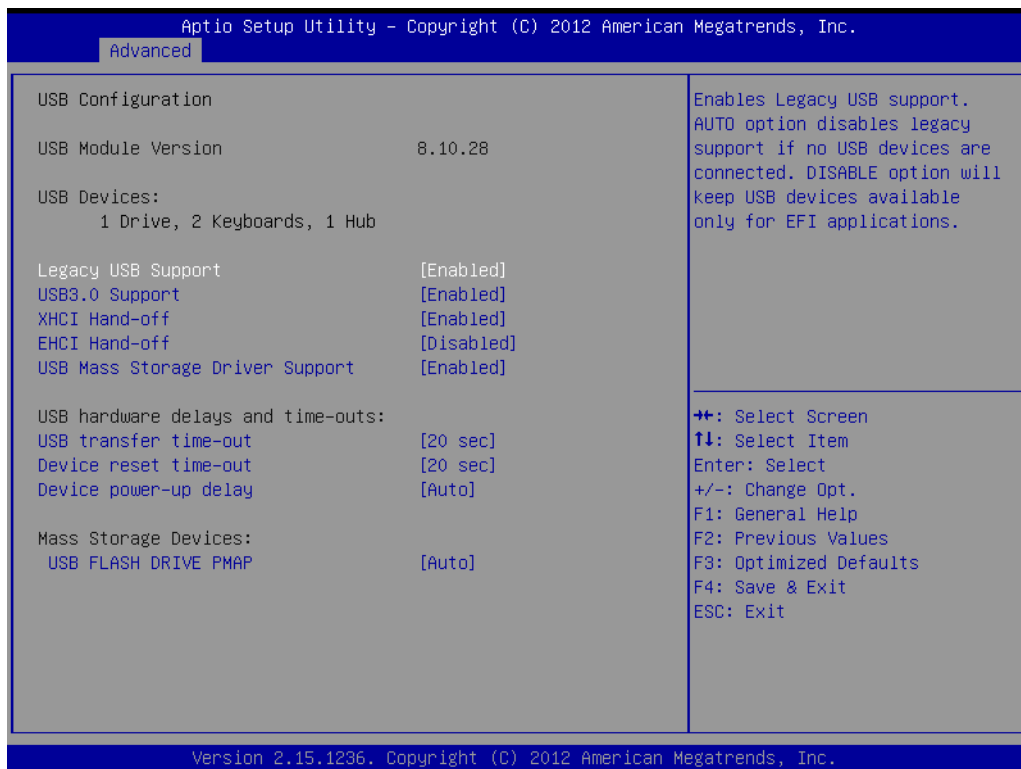
Figure 3.14 USB Configuration

■ **Legacy USB Support**

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

■ **USB3.0 Support**

This item allows users to enable or disable USB 3.0 support.

■ **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.

3.2.2.12 Embedded Controller Configuration
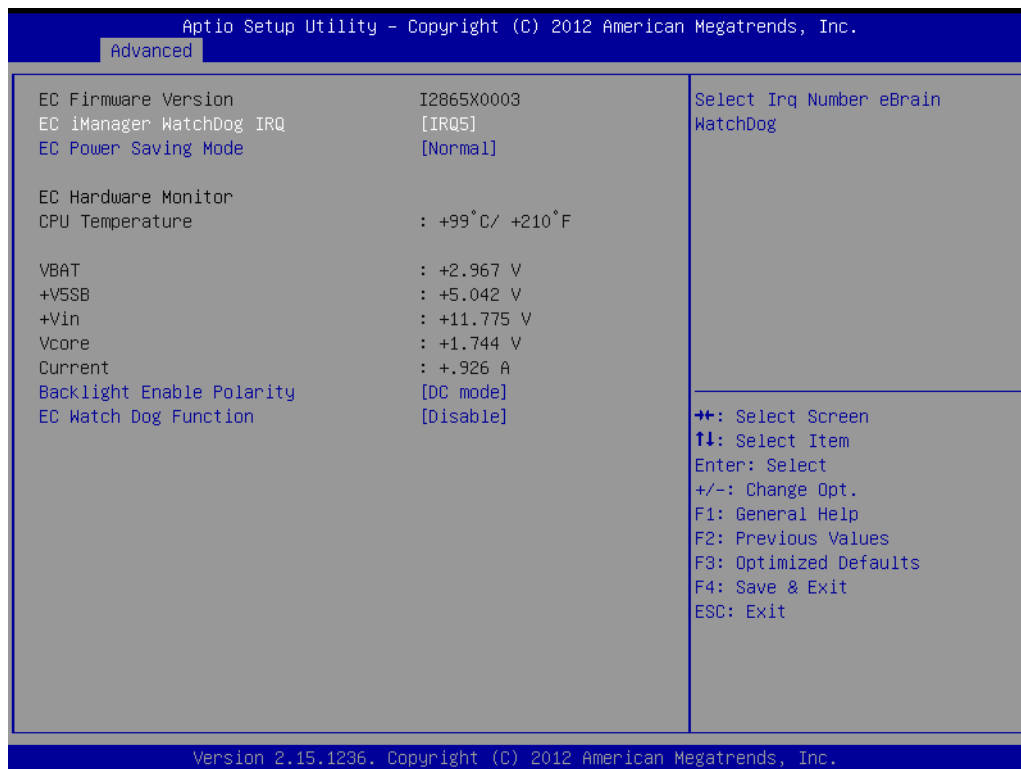
Figure 3.15 Embedded Controller Configuration

■ **EC iManager WatchDog IRQ**

This item allows users to set the IRQ number of EC watchdog.

■ **EC Power Saving Mode**

This item allows users to set board's power saving mode when off.

■ **Backlight Mode**

This item allows users to set backlight Function.

■ **EC Watchdog Function**

This item allows users to select EC watchdog timer.

3.2.2.13 Super IO Configuration


```
              Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
         Advanced

           IT8768 Super IO Configuration                        Set Parameters of Serial Port
                                                                1 (COMA)
           IT8768 Super IO Chip                   IT8768
        ▶ Serial Port 1 Configuration
        ▶ Serial Port 2 Configuration
        ▶ Serial Port 3 Configuration




                                                                �Ⓘ: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/–: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit


              Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.16 Super IO Configuration

■   **Serial Port 1 Configuration**
    This item allows users to configure serial port 1.
■   **Serial Port 2 Configuration**
    This item allows users to configure serial port 2.
■   **Serial Port 3 Configuration**
    This item allows users to configure serial port 3.

3.2.2.14 Serial Port Console Redirection
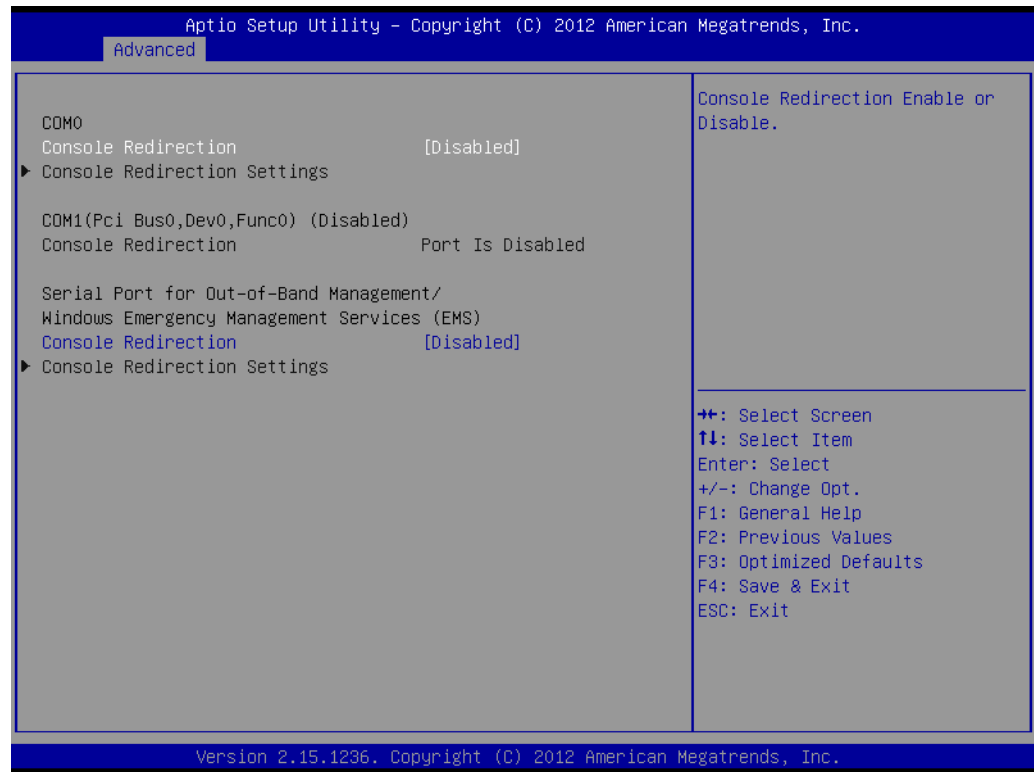
Figure 3.17 Serial Port Console Redirection

■ **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 configuration console redirection detail settings

3.2.3 Chipset

Select the Chipset tab from the ARK-1550 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.

```
                 Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
          Main  Advanced  Chipset  Boot  Security  Save & Exit

        ▶ PCH-IO Configuration                              PCH Parameters
        ▶ System Agent (SA) Configuration




                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



                 Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
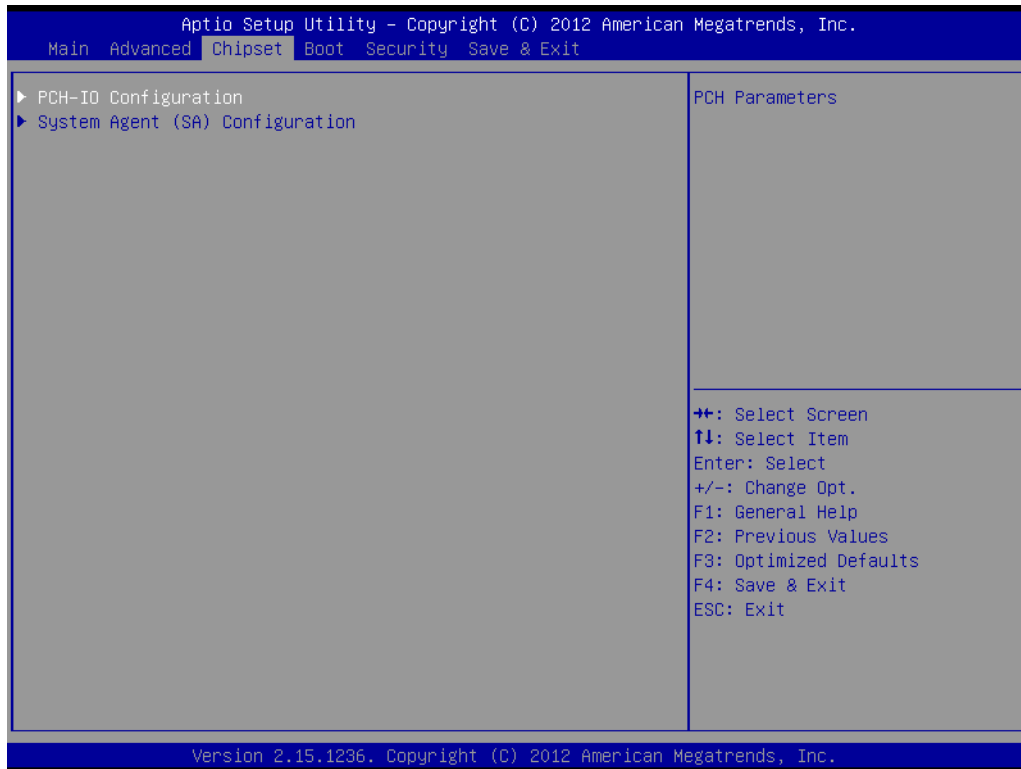
Figure 3.18 Chipset Setup

3.2.3.1 System Agent (SA) Configuration


```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
          Chipset

System Agent Bridge Name        Haswell              Check to enable VT-d function
System Agent RC Version         1.6.2.0              on MCH.
VT-d Capability                 Supported

VT-d                            [Enabled]

▶ Graphics Configuration
▶ Memory Configuration




                                                     ↔: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit



        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.19 System Agent (SA) Configuration

■ **VT-d**
This item allows users to enable or disable VT-d.

■ **Intel IGFX Configuration**

```
                 Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                 Chipset

Graphics Configuration                                    Graphics turbo IMON current
IGFX VBIOS Version            2170                         values supported (14-31)
IGfx Frequency               400 MHz
Graphics Turbo IMON Current  31

Primary Display              [Auto]
Internal Graphics            [Auto]
Aperture Size                [256MB]
DVMT Pre-Allocated           [32M]
DVMT Total Gfx Mem           [256M]
Gfx Low Power Mode           [Enabled]
Panel Power Enable           [Disabled]
▶ LCD Control
                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



                 Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.20 Intel IGFX Configuration

– **Graphics Turbo IMON Current**

This item allows users to select which Graphics Turbo IMON Current.

– **Primary Display**

This item allows users to select Primary Display.

– **Internal Graphics**

This item allows users to enable or disable IGD.

– **Aperture Size**

This item allows users to select aperture size.

– **DVMT Pre-Allocated**

This item allows users to select DVMT pre-allocated memory size.

– **DVMT Total Gfx Mem**

This item allows users to select DVMT total memory size.

– **Panel Power Enable**

This item allows users to enable or disable Panel Power. Graphics Performance.

– **Analyzers**

This item allows users to enable or disable Graphics Performance Analyzers.

– **LCD Control**
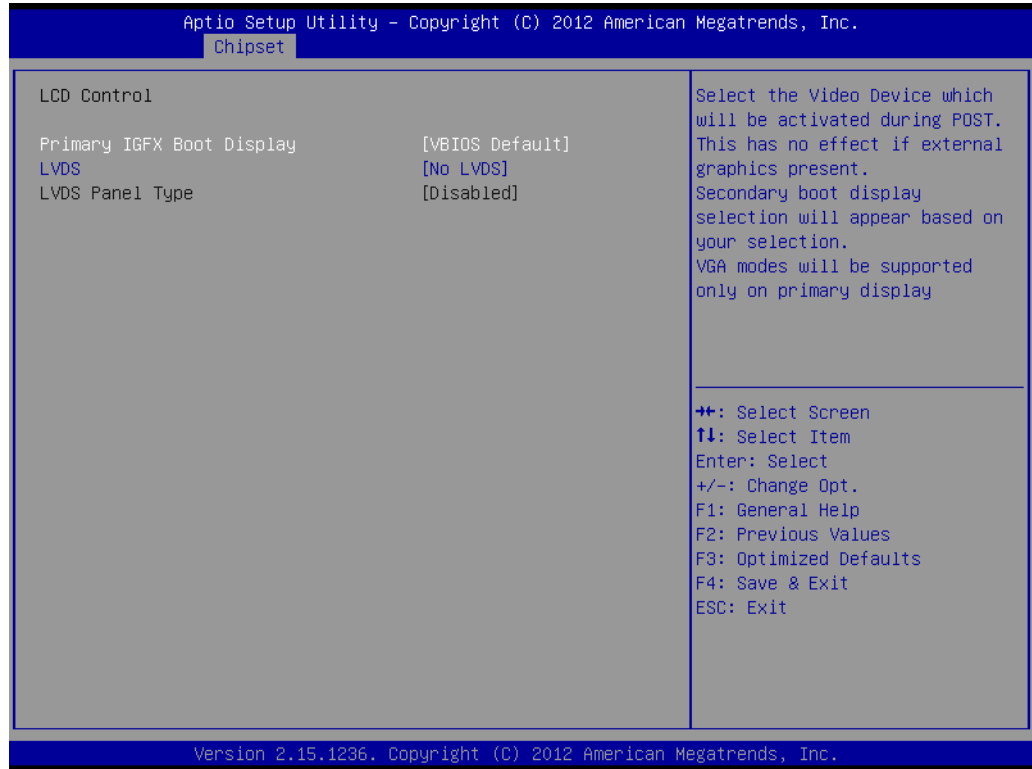
Figure 3.21 LCD Control

Primary IGFX Boot Display

Select boot display device at post stage.

LVDS

This item allows user to enable or disable LVDS

LCD Panel Type

This item allows users to select panel resolution.

■ **Memory Configuration**

```
           Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
            Chipset

 Memory Information

 Memory Frequency              1600 Mhz
 Total Memory                  2048 MB (DDR3)
 Memory Voltage                1.35v




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
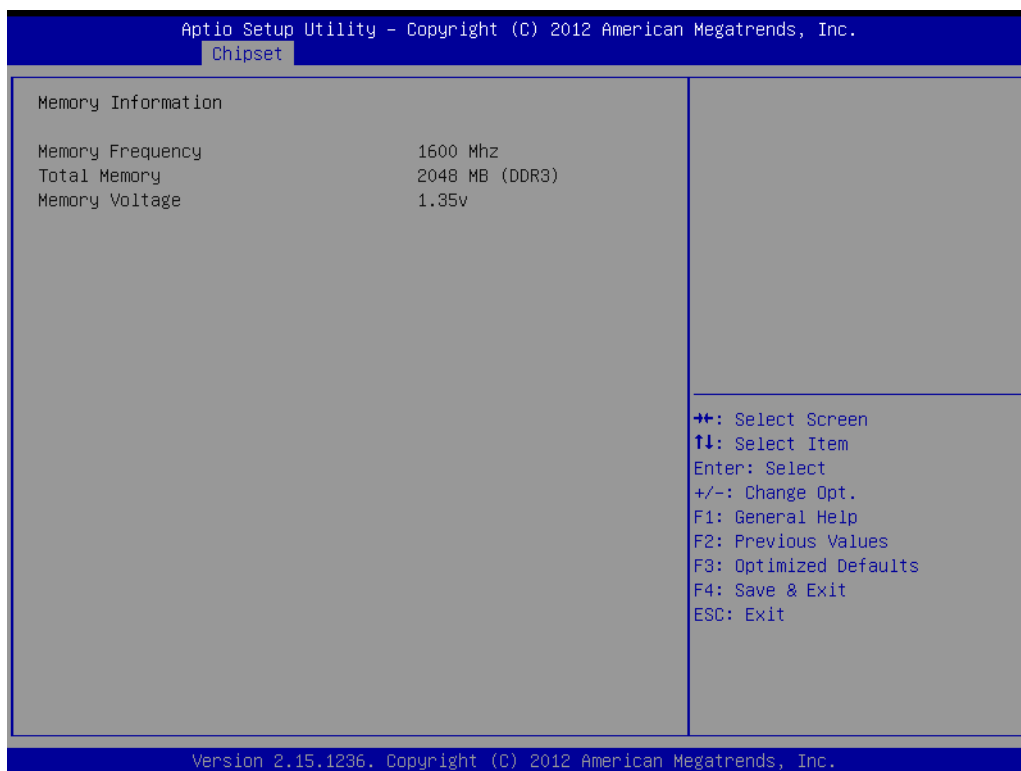
Figure 3.22 Memory Configuration

– **Memory Information**
 This item shows memory configuration parameters.

3.2.3.2 PCH-IO Configuration
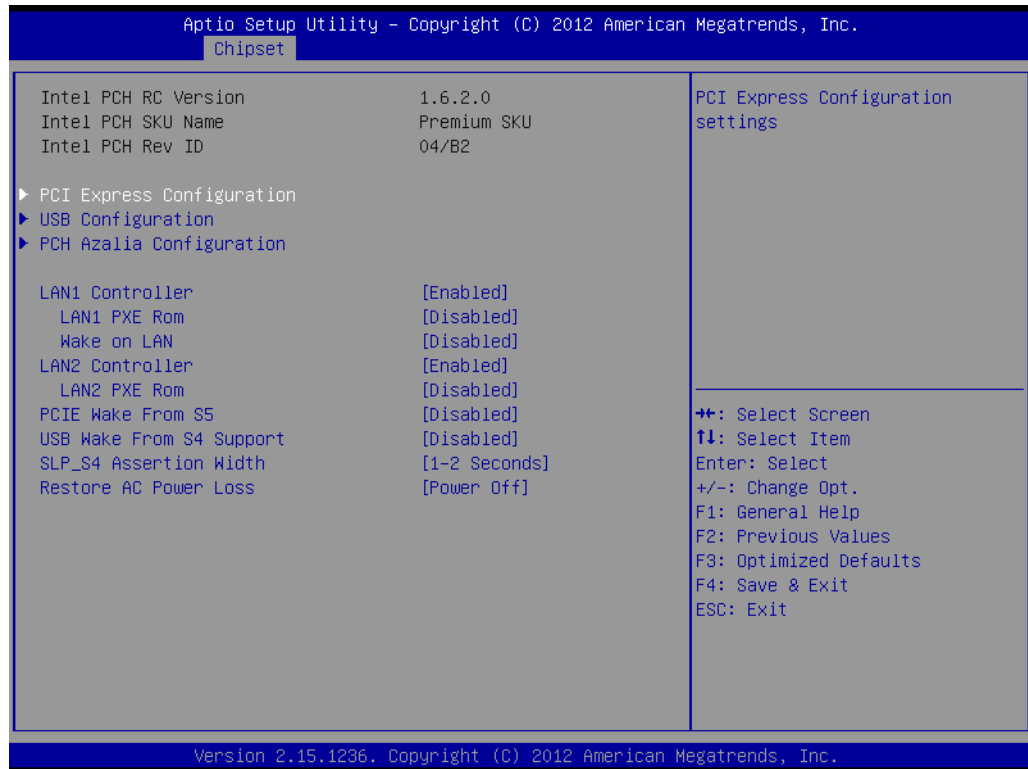
Figure 3.23 PCH-IO Configuration

■ **PCI Express Clock Gating**
This item allows users to enable or disable PCI Express Clock Gating for each root port.

■ **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.

■ **LAN 1/2 controller**
Enables or disables the LAN 1/2 controller.

■ **Wake on LAN**
Enables or disables LAN1 wake up from sleep state.

■ **LAN 1/2 PXE Rom**
This item allows users to enable or disable PXE Rom for LAN 1/2.

■ **PCIE Wake from S5**
Enables or disables PCIE device wake up from S5.

■ **USB Wake From S4 Support**
Enable or disable USB to wake the system from S4.

■ **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.

■ **PCI Express Configuration**
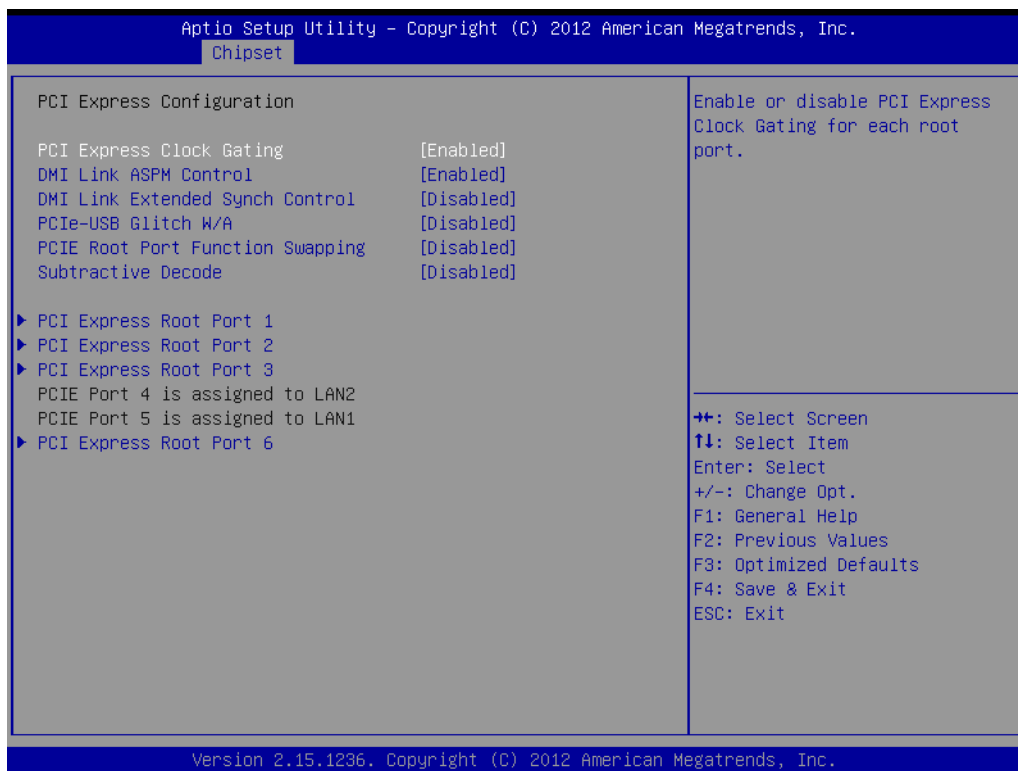
Figure 3.24 PCI Express Configuration

– **PCI Express Clock Gating**

This item allows users to enable or disable PCI Express Clock Gating for each root port.

– **DMI Link ASPM Control**

This item allows users to enable or disable the DMI Link ASPM Control.

– **DMI Link Extended Synch Control**

This item allows users to configure Mini PCI Express setting.

– **PCIe-USB Glitch W/A**

This item allows users to enable or disable PCIe-USB Glitch W/A. PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG Port.

– **Subtractive Decode**

This item allows users to enable or disable Subtractive Decode.

– **PCI Express Root Port 1/2/3/6**

This item allows users to configure PCI Express Root port 1/2/3/6 setting.

■ **USB Configuration**

```
           Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
             Chipset

   USB Configuration                                        Precondition work on USB host
                                                            controller and root ports for
   USB Precondition            [Disabled]                   faster enumeration.
   XHCI Mode                   [Auto]
   XHCI Idle L1                [Enabled]
   BTCG                        [Enabled]

   USB Ports Per-Port Disable Control   [Disabled]

                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

           Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.25 USB Configuration

– **USB Precondition**

This item allows users to enable or disable USB Precondition. Precondition work on the USB host controller and root ports for faster enumeration.

– **XHCI Mode**

This item allows users to select mode of operation of XHCI mode.

– **XHCI Idle L1**

This item allows users to enable or disable XHCI Idle L1. XHCIIDLE L1 can be set to disable for LPT-LP Ax stepping to workaround USB3 hot plug will fail after 1 hot plug removal.

– **BTCG**

This item allows users to enable or disable trunk clock gating.

– **USB Ports Per-Port Disable Control**

This item allows users to enable or disable USB Ports Per-Port Disable Control. Control each of the USB ports (0~13) disabling

■ **PCH Azalia Configuration**

```
             Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
             Chipset

PCH Azalia Configuration                              Control Detection of the
                                                      Azalia device.
Azalia                            [Auto]              Disabled = Azalia will be
                                                      unconditionally disabled
                                                      Enabled = Azalia will be
                                                      unconditionally Enabled
                                                      Auto = Azalia will be enabled
                                                      if present, disabled otherwise.


                                                      ─────────────────────────
                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit




             Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.26 PCH Azalia Configuration

– **Azalia**

This item allows users to change Azalia settings.

– **Control detection of the Azalia device.**

Disable- Azalia will be unconditionally Disabled

Enabled- Azalia will be unconditionally Enabled

Auto- Azalia will be enabled if present, disabled otherwise.

3.2.4 Boot Settings
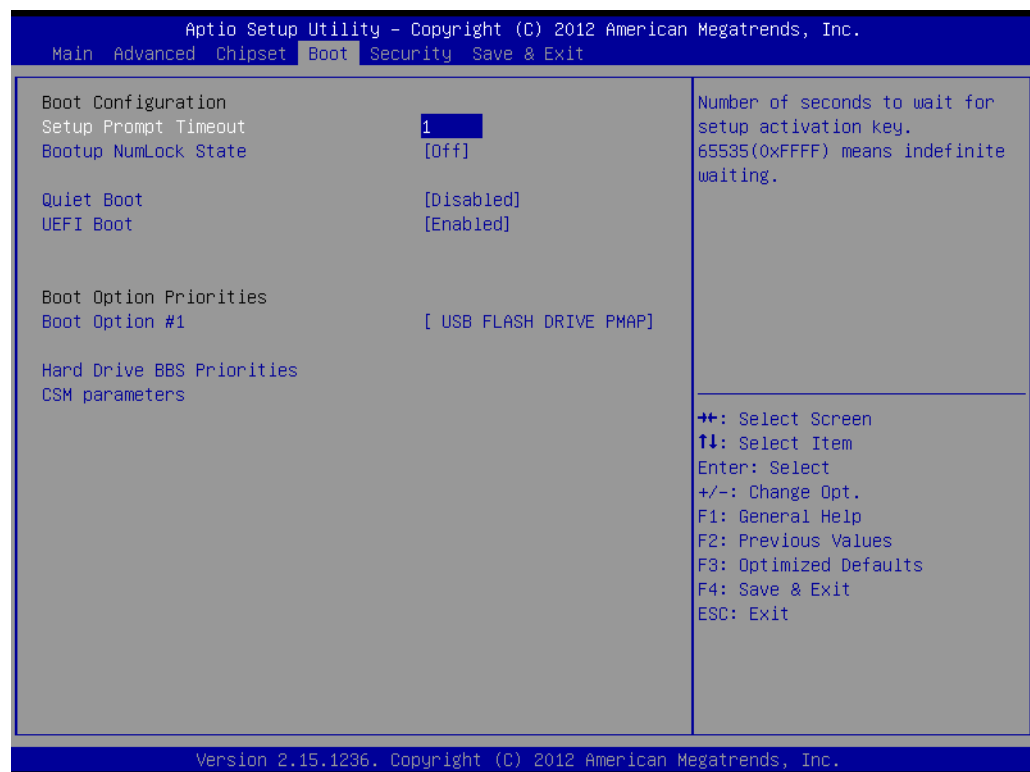
Figure 3.27 Boot Setup Utility

■ **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.

■ **Boot Option #1**

This item allows users to set the system boot order.

■ **Hard Drive BBS Priorities**

This item allows users to set the order of the legacy devices in this group.

■ **CSM Support**

This item allows users to enable or disable CSM support.

3.2.5 Security Setup


```
              Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
    Main  Advanced  Chipset  Boot  Security  Save & Exit

 Password Description                                  Set Administrator Password

 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup.
 If ONLY the User's password is set, then this
 is a power on password and must be entered to
 boot or enter Setup. In Setup the User will
 have Administrator rights.
 The password length must be
 in the following range:
 Minimum length                       3
 Maximum length                      20
                                                      →←: Select Screen
                                                      ↑↓: Select Item
 Administrator Password                               Enter: Select
 User Password                                        +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


              Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.28 Password Configuration

Select Security Setup from the MIO-5271 Setup main BIOS setup menu. All Security

Setup options, such as password protection and virus protection are 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.
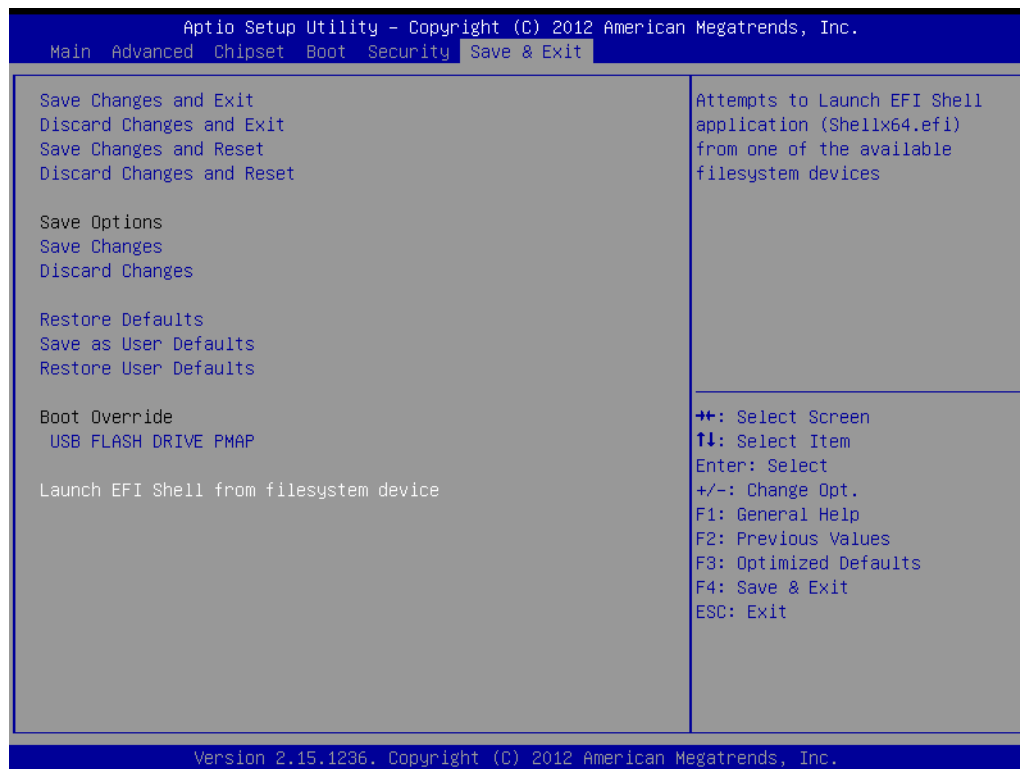
3.2.6 Save & Exit


```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
         Main  Advanced  Chipset  Boot  Security  Save & Exit

         Save Changes and Exit                              Attempts to Launch EFI Shell
         Discard Changes and Exit                           application (Shellx64.efi)
         Save Changes and Reset                             from one of the available
         Discard Changes and Reset                          filesystem devices

         Save Options
         Save Changes
         Discard Changes

         Restore Defaults
         Save as User Defaults
         Restore User Defaults
                                                            →←: Select Screen
         Boot Override                                      ↑↓: Select Item
          USB FLASH DRIVE PMAP                              Enter: Select
                                                            +/-: Change Opt.
         Launch EFI Shell from filesystem device            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


                Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Figure 3.29 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 of 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 ARK-1550 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 as 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.

■ **Boot Override**
This item allows users to choose boot device.

Appendix A

WDT Sample Code

A.1 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_Data_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_ EC_Data_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
```

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