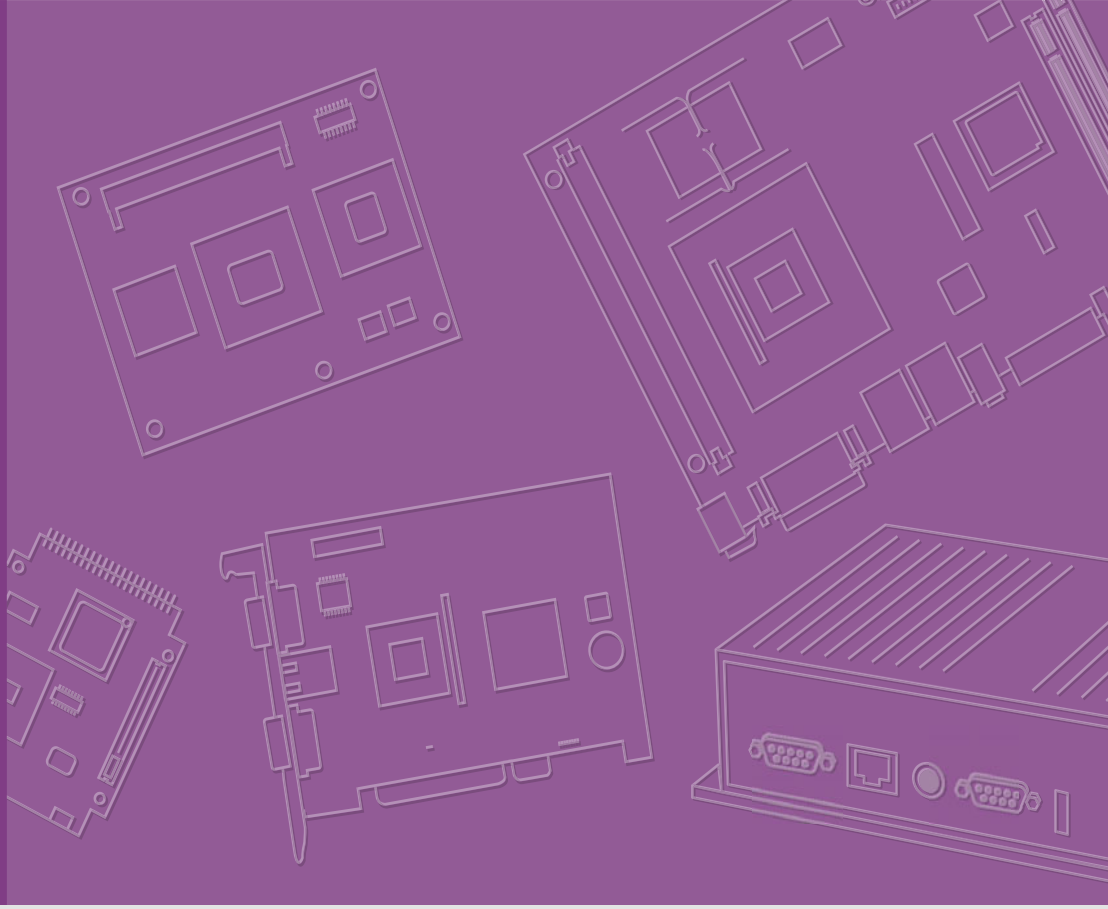

User Manual

ARK-5261

Embedded IPC
電腦（微型计算机）

ADVANTECH
Enabling an Intelligent Planet

ARK-5261S-J0A1E	ARK-5261I-J0A1E	ARK-5261IVS-J0A1E
ARK5261SJ201E-T	ARK5261IJ201E-T	ARK5261IVSJ201E-T
ARK5261SJ202E-T	ARK5261IJ202E-T	ARK5261IVSJ202E-T
ARK5261SJ203E-T	ARK5261IJ203E-T	ARK5261IVSJ203E-T
ARK5261SJ204E-T	ARK5261IJ204E-T	ARK5261IVSJ204E-T
ARK5261SJ205E-T	ARK5261IJ205E-T	ARK5261IVSJ205E-T
ARK5261SJ301E-T	ARK5261IJ301E -T	ARK5261IVSJ301E-T
ARK5261SJ302E-T	ARK5261IJ302E-T	ARK5261IVSJ302E-T
ARK5261SJ303E-T	ARK5261IJ303E-T	ARK5261IVSJ303E-T
ARK5261SJ304E-T	ARK5261IJ304E-T	ARK5261IVSJ304E-T
ARK5261SJ305E-T	ARK5261IJ305E-T	ARK5261IVSJ305E-T
ARK5261SJ401E-T	ARK5261IJ401E-T	ARK5261IVSJ401E-T
ARK5261SJ402E-T	ARK5261IJ402E-T	ARK5261IVSJ402E-T
ARK5261SJ403E-T	ARK5261IJ403E-T	ARK5261IVSJ403E-T
ARK5261SJ404E-T	ARK5261IJ404E-T	ARK5261IVSJ404E-T
ARK5261SJ405E-T	ARK5261IJ405E-T	ARK5261IVSJ405E-T
ARK5261SJ501E-T	ARK5261IJ501E-T	ARK5261IVSJ501E-T
ARK5261SJ502E-T	ARK5261IJ502E-T	ARK5261IVSJ502E-T
ARK5261SJ503E-T	ARK5261IJ503E-T	ARK5261IVSJ503E-T
ARK5261SJ504E-T	ARK5261IJ504E-T	ARK5261IVSJ504E-T
ARK5261SJ505E-T	ARK5261IJ505E-T	ARK5261IVSJ505E-T

Attention!

Please note:

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Product Warranty (2 years)

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

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

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

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

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

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. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Use moist sheet or cloth for cleaning.
4. For pluggable equipment, the socket-outlet shall near the equipment and shall be easily accessible.
5. Please keep this equipment from humidity.
6. Lay this equipment on a reliable surface when 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.

DISCLAIMER: This set of instructions is given accord ing 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-5261 unit
- 1 x Driver/Utility CD
- 1 x Registration and 2 years Warranty card
- 1x DB37 to 4x DB9 transfer cable (Only for Isolation version)

Ordering Information

Model Number	Description
ARK-5261S Series ARK-5261S-J0A1E	Intel Celeron J1900 2.4 GHz, On-board 4Gb Memory, VGA, 2xGbE, 6xUSB ports, 4xCOM ports, audio, PCIex1 and 2xPCI expansion slots, 9V~30V DC power with 2pin Phonenix connector
ARK-5261I Series ARK-5261I-J0A1E	Intel Celeron J1900 2.4 GHz, On-board 4Gb Memory,VGA, 2xGbE, 6xUSB ports, 4x Isolation COM port, audio, PCIex1 and 2xPCI expansion slots, 9V~30V DC power with 2pin Phonenix connector

Optional Accessories

Part Number	Description
1757003659	AC-to-DC Adapter, DC19 V/3.42 A 65 W, with Phoenix Power Plug
1700060202	PS/2 Keyboard/Mouse cable
1700001947	Power cable 2-pin 180 cm, USA
1700001948	Power cable 2-pin 180 cm, Europe
1700001949	Power cable 2-pin 180 cm, UK
1700021831-01	DP to DVI-D cable w/BKT
PCA-TPM-00A1E	TPM Module

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Chapter 1

General Introduction

This chapter gives background information on ARK-5261.

1.1 Introduction

ARK-5261 is a powerful, robust and fanless Embedded Box Computer. All electronic are protected in a compact, sealed, aluminum case for easy embedding in the customer's own housing, or as a stand-alone application where the environment is harsh.

The ARK-5261 can be used as a standalone system or wall-mounted. The system accepts a wide range of DC power in and comes in a footprint of 137 x 189 x 221 mm. The rugged cast aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but, as we mentioned before, passive cooling for quiet fanless operation.

The ARK-5261 is equipped with Intel® Celeron® Processor J1900 at 2GHz (up to 2.41 GHz), 4 of cores processor, which is highly suitable for embedded and industrial PC applications requiring high processor performance within a limited space. Featuring two PCI and one PCIe x1 slots for application expansion and system integration, ARK-5261 also carries one USB3.0 and five USB 2.0 (one internal type A connector) and two gigabit LAN ports. It can support up to 8 GB DDR3L (Low power DDR3) SDRAM of main memory and two easily maintaining 2.5" SATA HDD capacities. ARK-5261 offers four serial ports, and all can support RS-232/422/485 by BIOS setting and COM1 & COM 2 supports 5V& 12V power that customer can be connecting the device the need power support. For COM function, ARK-5261 alos support Isolation version, that supports 4x RS-422/485. ARK-5261 is ideal for embedded system applications such as machine automation, and industrial plant and cabinet integration.

1.2 Product Feature

1.2.1 General

- **CPU:** Intel Celeron Processor J1900 at 2 GHz
- **BIOS:** AMI 16 Mbit Flash BIOS
- **System Memory:** Dual 204-pin SO-DIMM DDR3L-1333 MHz up to 8GB
- **HDD: Support 2 drive bays space for SATA 2.5" HHD/SSD**
- **mSATA:** Support 1 mSATA by mini-PCIE slot (shared with SATA II)
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **I/O Interface:** 4 x RS-233/422/485, COM 1 & COM 2 with 5V/12V power, support Auto-flow control
- **USB:** 1 x USB3.0; 4 x USB 2.0 and 1 x Internal USB 2.0
- **Audio:** High Definition Audio (HD), Line-out, Mic-in
- **DIO:** 8-bit general purpose input/output (DB9 Connector)
- **Expansion Interface:** Supports maximum 15W power for each expansion slot
- **Mini-PCIe:** Supports m-SATA only, does not support PCIE signal

Note! *When system is using mSATA by mini-PCIe socket that SATAII function will be not workable.*

1.2.2 Display

- **Chipset:** Chipset integrated Intel HD Graphic
- **Memory Size:** Up to 224 MB of dynamic video memory allocation
- **Resolution:**
  - VGA: Supports up to 2560 x 1600 @ 60 Hz

1.2.3 Ethernet

- **Chipset:**
  - LAN1:Intel I211
  - LAN2: Intel I211
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.ab.

1.3 Chipset

1.3.1 Functional Specification

1.3.1.1 Processor

Processor	Intel® Celeron® Processor J1900 at 2GHz with 2M Cache, up to 2.41 GHz) Manufacturing Technology: 22nm

1.3.1.2 Chipset

Memory	■ Intel® Celeron® Processor J1900 ■ Support DDR3L-1333 MHz (1.35V) up to 8GB ■ SODIMM Socket: – 204-pin SO-DIMM sockets*2
Graphic and Video Controllers	**Chipset integrated Intel HD Graphic** ■ Support Intel® Quick Sync Video ■ Support Intel® Virtualization Technology (VT-x) ■ Support Intel® 64 ■ Support Enhanced Intel SpeedStep® Technology ■ VGA: supports resolution up to 2560 x 1600 @ 60Hz VGA Connector on board: D-SUB 15P
SATA Interface	**SOC: Intel Baytrail J1900** ■ Two (2) SATA Revision 2.0 ports (eSATA capable) ■ Legacy IED(indluding IRQ)/Native IDE/AHCI appearance to OS ■ Partial/ Slumber power management modes with wake ■ Capable of 3Gbit/s transfer rate
Audio Link	**SOC: Intel Baytrail J1900** ■ Supports HD Codec ■ Supports Link for Audio and Telephony CODECS
USB Interface	**SOC: Intel Baytrail J1900** ■ USB host interface with support for 1 USB3.0 port and 5 USB2.0 ports ■ Supports high-speed, full-speed, and low-speed capable ■ Supports legacy keyboard/mouse software
Power Management	**SOC: Intel Baytrail J1900** ■ Supports ACPI 5.0 ■ ACPI Power Management Logic Support ■ Power connector: Plug-In block 2P x 1
BIOS	■ AMI 16Mb Flash BIOS via SPI

1.3.1.3 Others

Serial ports	**Novton NCT6106D support** ■ Up to 4 serial ports by Novton NCT6106D support ■ High Speed NS16C550A Compatible UARTs with Data rates to 1.5 Mbps ■ Support IRQ Sharing among serial ports on XPE ■ COM1 ~ COM4: Supports to RS-232/422/485 and setting by BIOS setting ■ COM1 ~ COM4: RS-485 support Auto flow control ■ COM 1~ COM 2: Support 5V/12V power and setting by Jumper (Default setting is no power) COM connector: D-SUB CON. 9P
Serial ports (Isolation Ports)	■ COM 1 ~ COM4: Supports to RS-232/422/485 with Auto-flow control and setting by BIOS setting ■ ESD Protection: 15Kv ■ Surge production: 2Kv ■ Electrical Isolation: 2Kv COM connector: D-SUB CON. 37P with Transfer cable
LAN	**LAN 1 Intel I211, LAN2 Intel I211** ■ Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.ab. ■ Support 10/100/1000 Mbps ■ Support Wake on LAN
Audio	**Audio Codec: Realtek ACL892:** ■ Compliant with HD Audio specifications ■ Supports to 16/20/24-bit DAC and 16/20/24-bit ADC resolution ■ Support: Line-out, Mic-in ■ DAC supports 16/20/24-bit PCM format, multiple stereo recording
DIO	**Novton NCT6106D support** ■ 10 I/O pins with one 5 V power ping and one ground pin ■ 5 V tolerance I/Os. **DIO Connectors:** ■ 9 pins DSUB connector
Battery backup	■ BR2032 3 V/190mAh

1.4 Mechanical Specifications

1.4.1 Dimensions

137.0 [5.39] x 189.0 [7.44] x 221.0 [8.70]

Unit: mm [Inch]

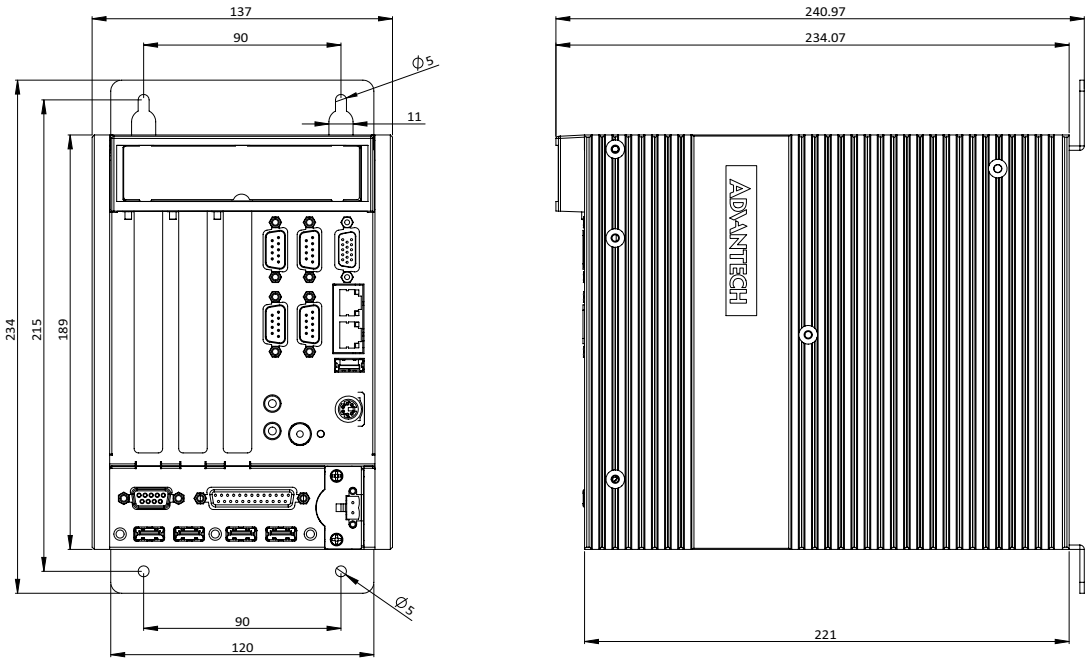


Figure 1.1 ARK-5261 Mechanical Dimension Drawing

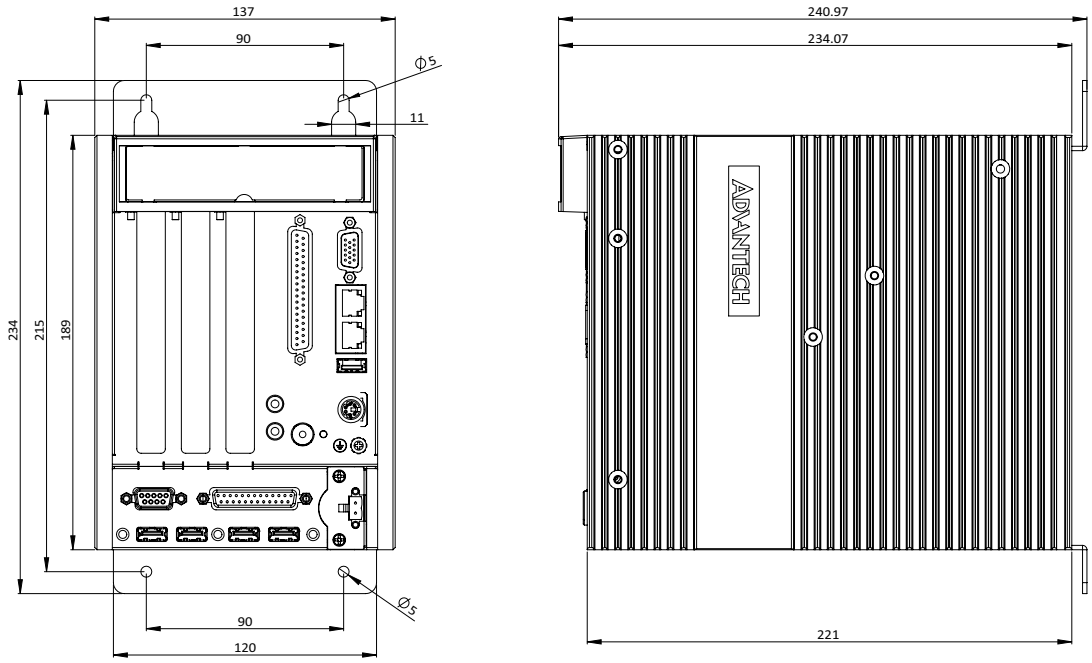


Figure 1.2 ARK-5261I Mechanical Dimension Drawing

1.4.2 Weight

4.2 kg (9.24 lbs)

1.5 Power Requirement

1.5.1 System Power

- **Minimum power input:** DC 9V(-5%) ~ 30V(+10%), 6.6A~2A

1.5.2 RTC Battery

- BR2032 3 V/190 mAh

1.6 Environment Specification

1.6.1 Operating Temperature

- -10 ~ 60° C with 0.7m/sec air flow: with 2 x Industrial SSD without PC expansion boards (Advantech Lab test specification)

1.6.2 System Safety Certification Test Temperature

- 0 ~ 50° C with 2.5” HDD/SSD

1.6.3 Relative Humidity

- 95% @ 40° C (non-condensing)

1.6.4 Storage Temperature

- -40 ~ 85° C (-40 ~ 185° F)

1.6.5 Vibration during Operation

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

1.6.6 Shock during Operation

- When system is equipped with Compact Flash card only: 50 G, IEC 60068-2-27, half sine, 11 ms duration.
- When system is equipped with 2.5-inch: 20 G, IEC 60068-2-27, half sine, 11 ms duration.

1.6.7 Safety

- CCC, BSMI

1.6.8 EMC

- CE, FCC, CCC, BSMI

Chapter 2

H/W Installation

This chapter introduces external IO and the installation of ARK-5261 hardware.

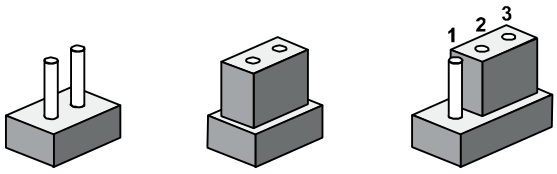
2.1 Introduction

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

2.2 Jumpers

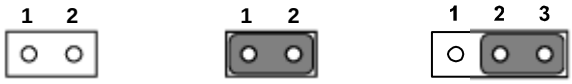
2.2.1 Jumper Description

You may configure the ARK-5261 to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



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

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



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

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

2.2.2 Jumper List

Table 2.1: Jumper List	
Label	**Function**
JCMOS1	Clear CMOS
JCOMPWR1/JCOMPWR2	COM1 & COM2 power 5V & 12V option
PSON1	System AT/ATX mode option

2.2.2.1 Clear CMOS

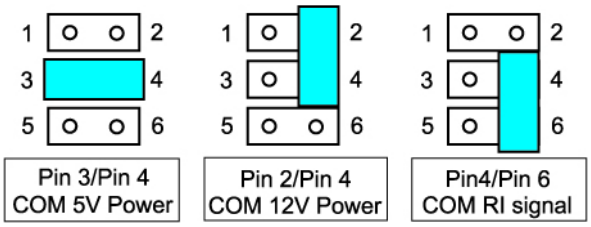
ARK-5261 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

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

2.2.2.2 COM power function option

ARK-5261 Supports COM1 & COM2 with power, the default is not power (RI). If you want to option COM 1 or COM 2 power, you should make sure your device power specification first.

JCOMPWR1/JCOMPWR2	**COM1 & COM2 Power Option**
FootPrint	3x2 Pin
Setting	**Function**
(4-6)	RI (Default No Power)
(3-4)	5V Power
(4-6)	12V Power



2.2.2.3 System AT/ATX module function option

ARK-5261 support AT or ATX module and Default is ATX module. if you want to change to AT module that you can find AT/ATX module jumper in backplane.

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

2.3 Connectors

2.3.1 ARK-5261 External I/O Connectors

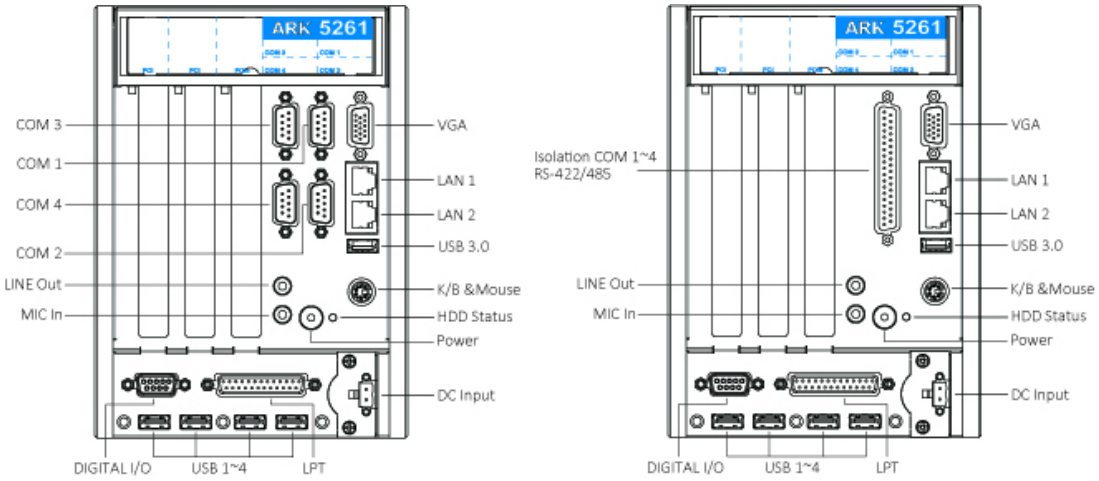


Figure 2.1 ARK-5261 & ARK-5261I Front View

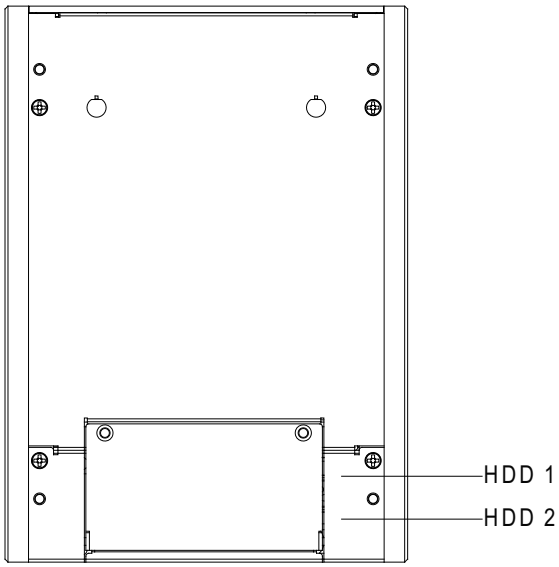


Figure 2.2 ARK-5261 & ARK-5261I Rear View

2.3.1.1 COM Connector

ARK-5261 provides four D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. Default setting is RS-232, if you want to use RS-422/485, you can change the mode in BIOS setting. You can find the detail setting method in Chapter 3.

Table 2.2: COM Connector Pin Assignments

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

Note! *NC represents "No Connection".*

2.3.1.2 Isolation COM Connector (Support by Isolation version)

ARK-5261 Isolation version provides four RS-422/485 isolation serial communication interface port and it is transfer form DB37 connector to DB9 connector.

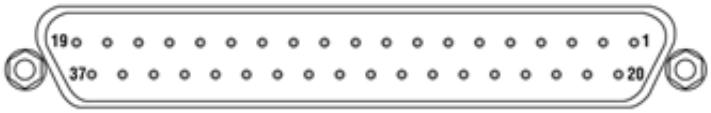


Table 2.3: Isolation COM connector Pin Assignments

Pin 1	NC	Pin 20	NC
Pin 2	COM 1_422/485 TX-	Pin 21	COM 1_422RX-
Pin 3	COM1_GND	Pin 22	NC
Pin 4	NC	Pin 23	NC
Pin 5	COM 1_422/485 TX+	Pin 24	COM 1_422RX+
Pin 6	NC	Pin 25	COM 2_422/485 TX-
Pin 7	COM 2_422RX-	Pin 26	COM2_GND
Pin 8	NC	Pin 27	NC
Pin 9	NC	Pin 28	COM 2_422/485 TX+
Pin 10	COM 2_422RX+	Pin 29	NC
Pin 11	COM 3_422/485 TX-	Pin 30	COM 3_422RX-
Pin 12	COM 3_GND	Pin 31	NC
Pin 13	NC	Pin 32	NC
Pin 14	COM 3_422/485 TX-	Pin 33	COM 3_422RX-
Pin 15	NC	Pin 34	COM 4_422/485 TX-
Pin 16	COM 4_422RX-	Pin 35	COM4_GND
Pin 17	NC	Pin 36	NC
Pin 18	NC	Pin 37	COM 4_422/485 TX+
Pin 19	COM 4_422RX+		

2.3.1.3 Ethernet Connector (LAN)

ARK-5261 is equipped two Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. LAN1 is equipped with Intel I211 and LAN2 is equipped with Intel I211. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status and Speed status.

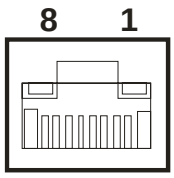


Figure 2.3 Ethernet Connector

Table 2.4: Ethernet Connector Pin Assignments

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

2.3.1.4 Audio Connector

ARK-5261 offers stereo audio ports by three phone jack connectors of Line_Out, Mic_In. The audio chip is controlled by ACL892, and it's compliant with AZALIA standard.

Figure 2.4 Audio Connector

Table 2.5: Audio Connector Pin Assignments

Pin	Audio Signal Name
1	Line_Out
2	Mic_In

2.3.1.5 DIO Connector

ARK-5261 provides one DSUB 9-pin female connectors, which offer Digital Input/ Output communication interface. If client want to use DIO, please find the Pin assignment as following.

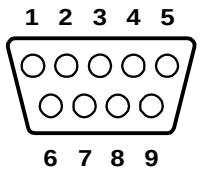


Figure 2.5 DIO Connector

Table 2.6: DIO Connector Pin Assignments

Pin	Signal Name
1	DIO bit0
2	DIO bit1
3	DIO bit2
4	DIO bit3
5	VCC
6	DIO bit4
7	DIO bit5
8	DIO bit6
9	DIO bit7

2.3.1.6 USB 3.0 Connector

ARK-5261 provides one USB 3.0 interface connector, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB XHCI, Rev. 3.0 compliant. Please refer to below table for its pin assignments. USB 3.0 connectors contain legacy pins to interface to USB 2.0 devices, and a new set of pins for USB 3.0 connectivity.

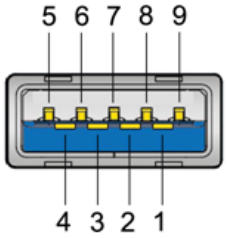


Figure 2.6 USB 3.0 Connector

Table 2.7: USB 3.0 Connector Pin Assignment

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

2.3.1.7 USB 2.0 Connector

ARK-5261 provides five USB 2.0 interface connectors, 4 at front side and 1 at internal, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliant. Please refer to Table 2.7 for its pin assignments. The USB connectors are used to connect any device that conforms to the USB interface. Most digital devices conform to this standard. The USB interface supports Plug and Play without turning off computers.

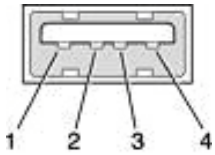


Figure 2.7 USB Connector

Table 2.8: USB 2.0 Connector Pin Assignment

Pin	Signal name	Pin	Signal name
1	VCC	2	USB_data-
3	USB_data+	4	GND

2.3.1.8 VGA Connector

The ARK-5261 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 2560 x 1600 @ 60 Hz.

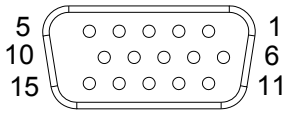


Figure 2.8 VGA Connector

Table 2.9: 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	NC
13	H-SYNC	14	V-SYNC
15	NC		

2.3.1.9 Parallel Port Connector (LPT)

The parallel port is normally used to connect Embedded IPC to a printer. The ARK-5261 includes a parallel port, accessed thr ough a D-Sub 25-pin connector. Please find the pin assignment as following.

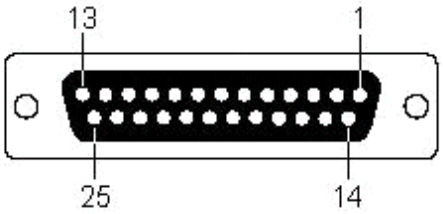


Figure 2.9 Parallel Port Connector

Table 2.10: Parallel Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	PIO_STB	2	LPT_AFD#
3	PIO_PD0	4	LPT_ERR#
5	PIO_PD1	6	LPT_INIT#
7	PIO_PD2	8	LPT_SLIN#
9	PIO_PD3	10	GND
11	PIO_PD4	12	GND
13	PIO_PD5	14	GND
15	PIO_PD6	16	GND
17	PIO_PD7	18	GND
19	LPT_ACK#	20	GND
21	LPT_BUSY	22	GND
23	LPT_PE	24	GND
25	LPT_SLCT		

2.3.1.10 PS/2 Keyboard and Mouse Connector

The ARK-5261 provides a PS/2 keyboard/mouse connector. A 6-pin mini-DIN connector is located on the front panel of the ARK-5261.

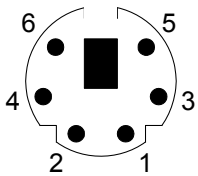


Figure 2.10 PS/2 Connector

Table 2.11: PS/2 Connector Pin Assignments

Pin	Signal Name
1	PS2_KBDAT
2	PS2_MSDAT
3	GND
4	VCC
5	PS2_KBCLK
6	PS2_MSCLK

2.3.1.11 Power Input Connector

ARK-5261 comes with a two pins header as default that carries 9 V_{DC} (-5%) ~ 30 V_{DC} (+10%) external power input.

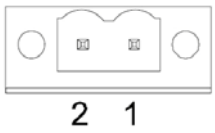


Figure 2.11 2-pins header

Table 2.12: Power Connector for Pin Header Pin Assignments

Pin	Signal Name
1	GND
2	+9 V_{DC} ~ 30 V_{DC}

2.3.1.12 Power ON/OFF Button

ARK-5261 comes with a Power On/Off button with LED indicators on the front side to show its On status (Green LED) and Off/Suspend status (Orange LED), that support dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

Figure 2.12 Power Button

2.3.1.13 LED Indicators

ARK-5261 has one LED for System Storage status on fornt metal face.

2.4 Installation

2.4.1 HDD Installation

1. Unscrew the HDD door screws.

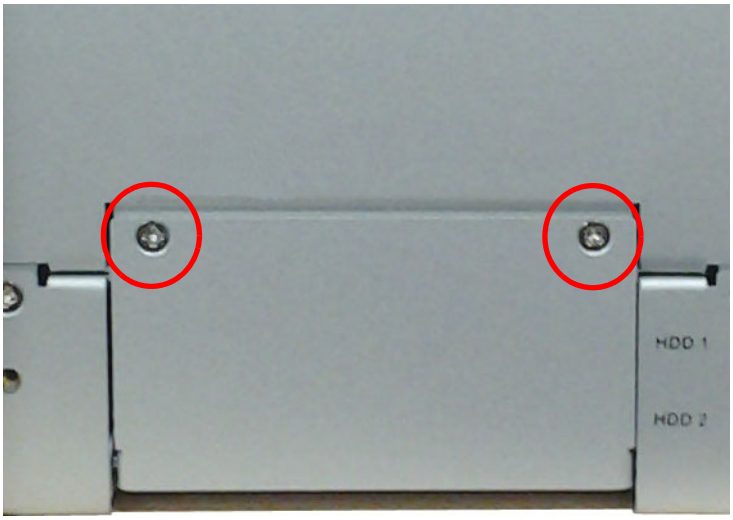


Figure 2.13 Unscrew the HDD door screws

2. Unscrew the HDD tracy's screw.

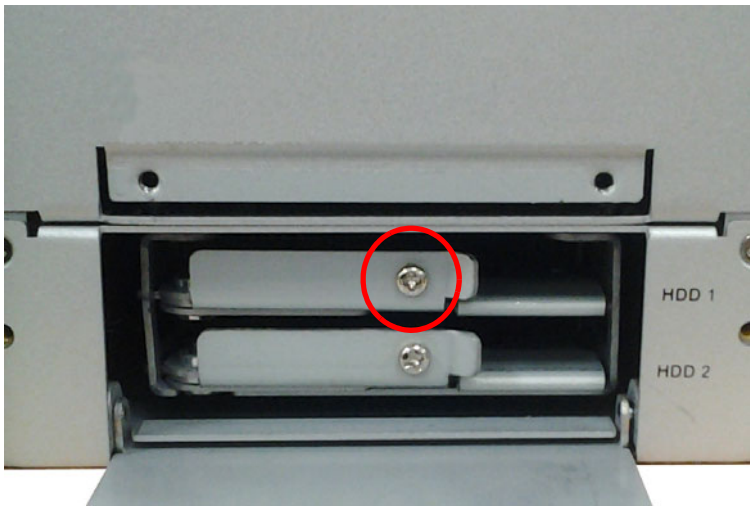


Figure 2.14 Unscrew the HDD tracy's screw

3. Pull out the HDD bracket.

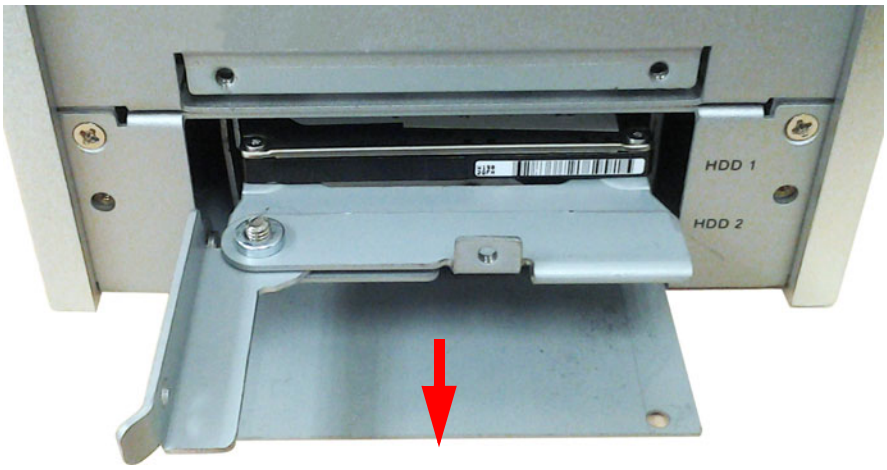


Figure 2.15 Pull out the HDD bracket

4. Assemble 2.5' STAT HDD with four screws on bottom side of bracket.

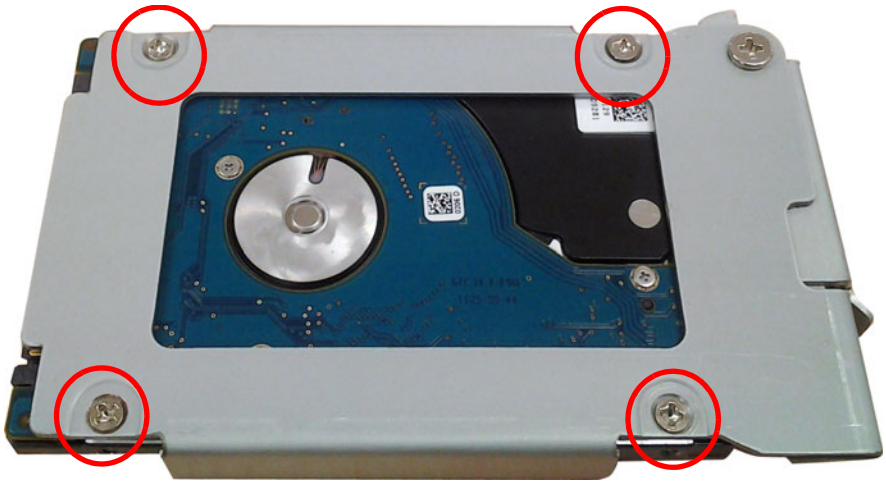


Figure 2.16 Assembly 2.5" SATA HDD and HDD bracket

5. Secure the HDD housing with screw.

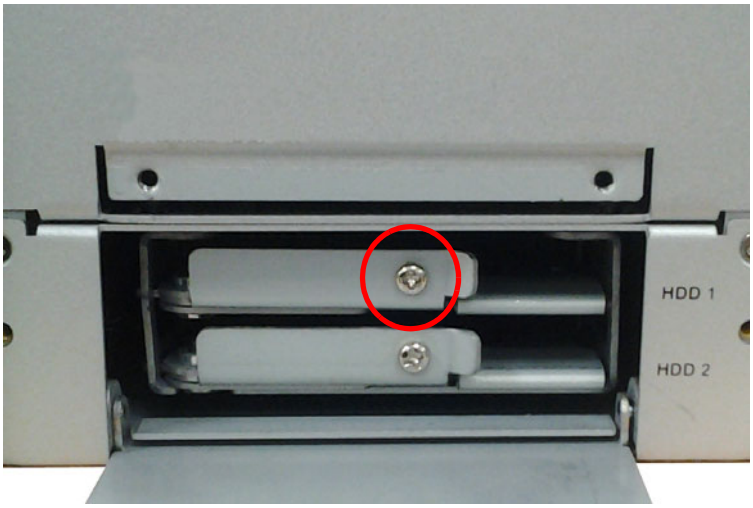


Figure 2.17 Secure the HDD housing with screw

2.4.2 m-SATA module Installation

1. Unscrew 2 screws and remove the top cover.

Figure 2.18 Unscrew 2 screws and remove the top cover

2. Unscrew and remove top bracket & left side case cover.

Left side cover

Top Bracket

Figure 2.19 Unscrew and remove top bracket & left side case cover

3. Install the m-SATA and Secure screw.

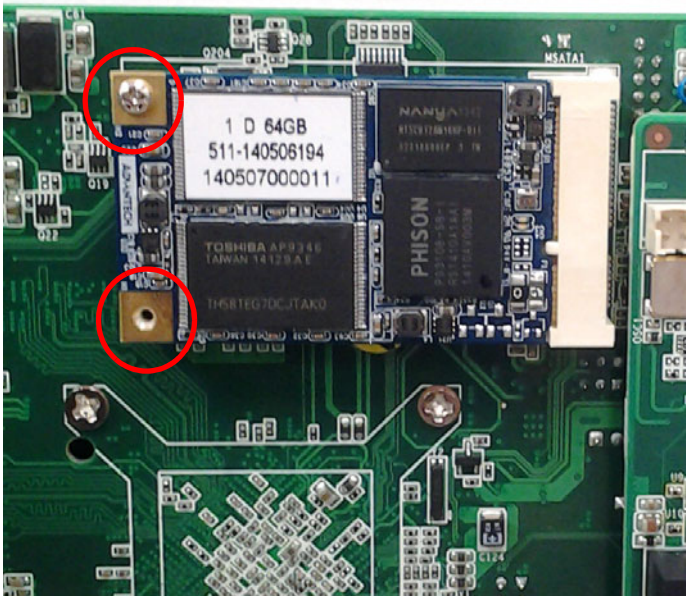


Figure 2.20 Install the m-SATA and secure screw

4. Replace the left side cover first and top bracket/cover and secure with screws.

2.4.3 PCI / PCIex1 Card Installation

ARK-5261 provides two PCI slots and one PCIex1 slot for expansion. The procedure of installing the PCI / PCIex1 expansion card into ARK-5261 is instructed below.

1. Refer to 2.4.2 step 1~2 to remove the top cover and top bracket.
2. Remove the PCI dummy bracket.
3. Insert the PCI Card and fasten the screw.

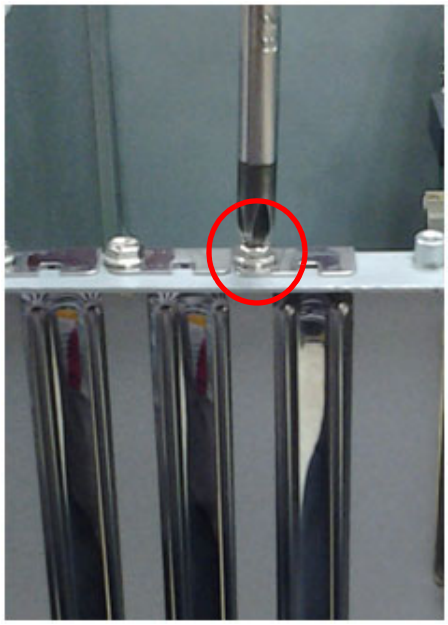


Figure 2.21 Insert the PCI Card and fasten the screw

4. Adjust the depressed rubber height on top bracket, to fit the PCI expansion card.

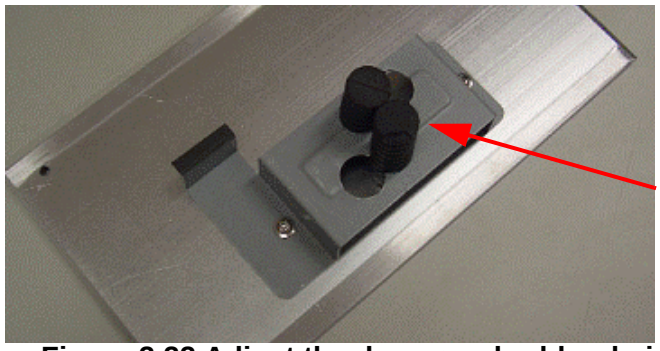
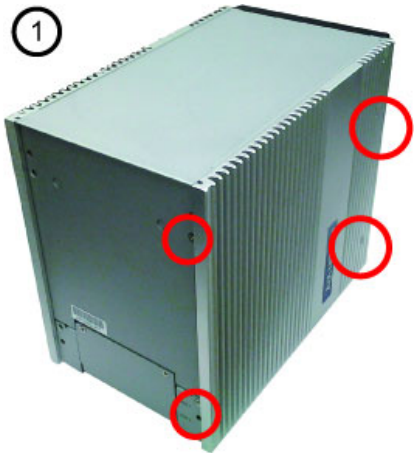


Figure 2.22 Adjust the depressed rubber height

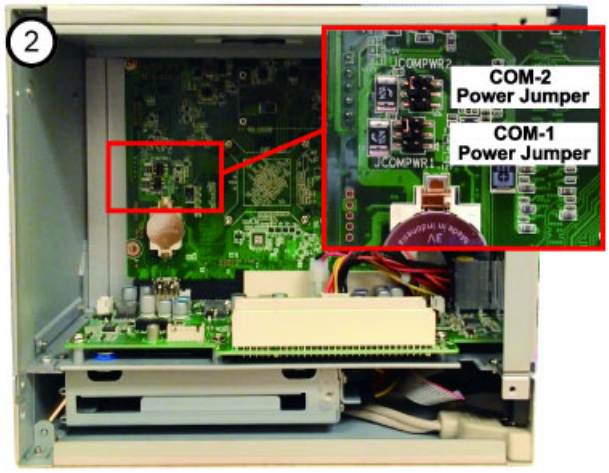
5. Replace the top bracket and top cover and secure with screws.\

2.4.4 COM Power Jumper selection

1. Unscrew and remove left cover.



2. Setting COM1 & COM2 5V or 12V Power by jumper.



Warning! *Please make sure your device power specification before setting COM power.*

Chapter 3

AMI BIOS Setup

This chapter introduces how to set BIOS configuration data.

3.1 Introduction

AMI BIOS has been integrated into many motherboards, and has been very popular for over a decade. People sometimes refer to the AMI BIOS setup menu as BIOS, BIOS setup or CMOS setup.

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the ARK-5261 setup screens.

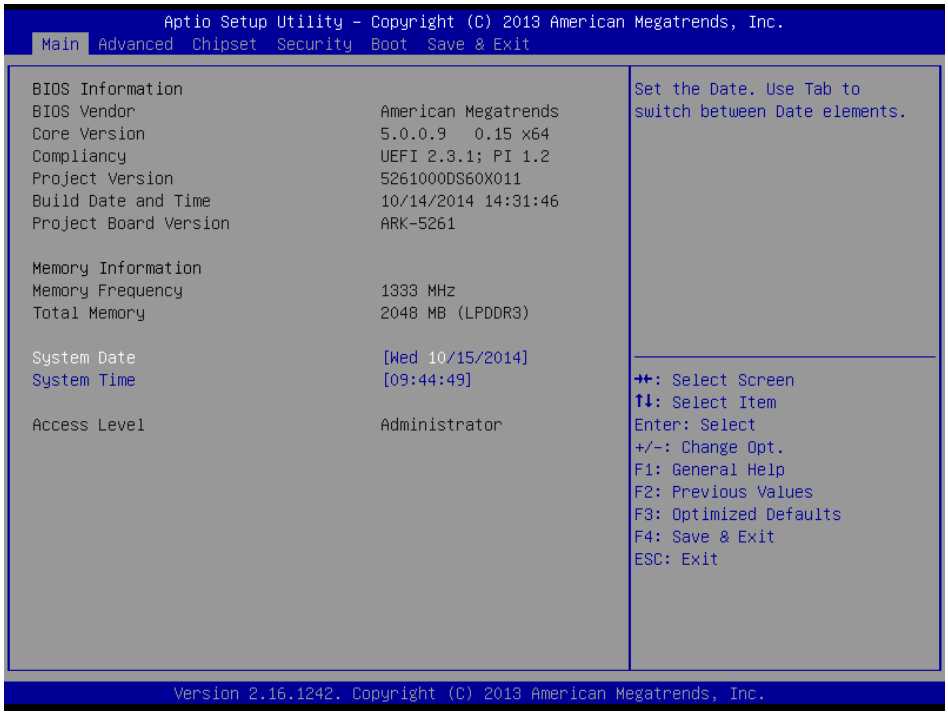


Figure 3.1 Setup Program Initial Screen

3.2 Entering Setup

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

3.2.1 Main Setup

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

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.

3.2.1.1 System Time / System Date

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

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-5261 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as ACPI Settings, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

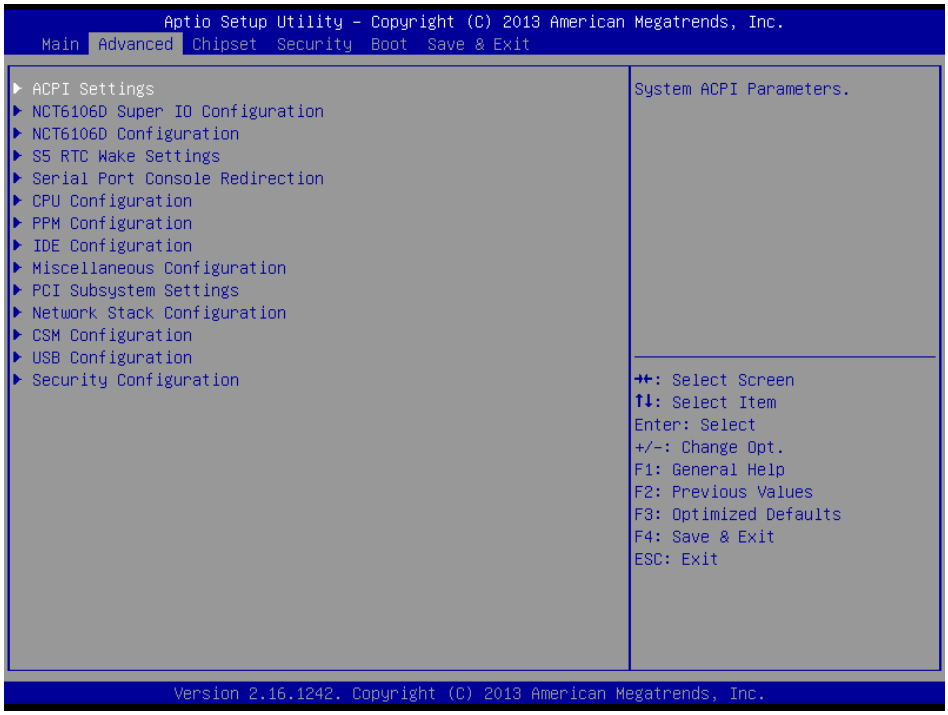


Figure 3.3 Advanced BIOS Features Setup Screen

3.2.2.1 ACPI Settings

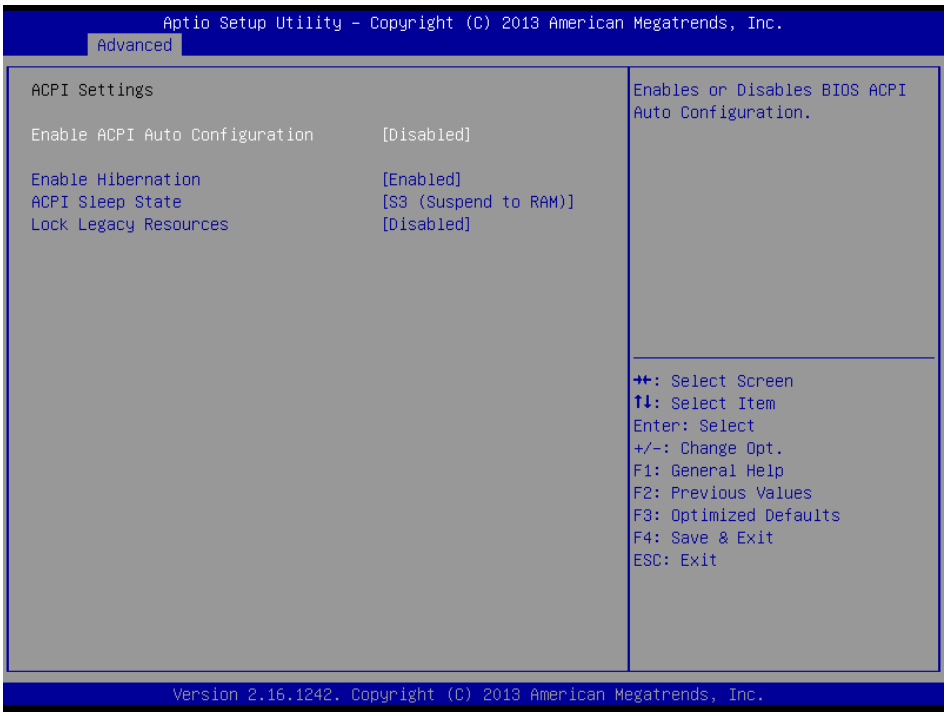


Figure 3.4 ACPI Settings

- **Enable ACPI Auto Configuratoin**
  This item allows users to enable or disable 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. S3 is default setting.
- **Lock Legacy Resources**
  This item allows users to lock legacy device resources.

3.2.2.2 NCT6106D Super IO Configuration

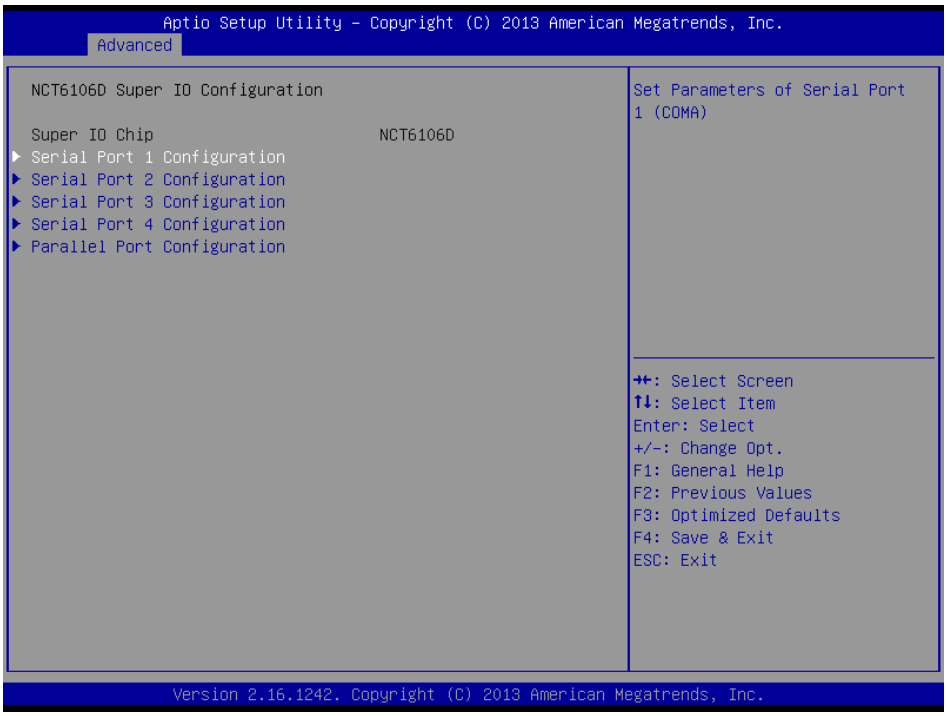
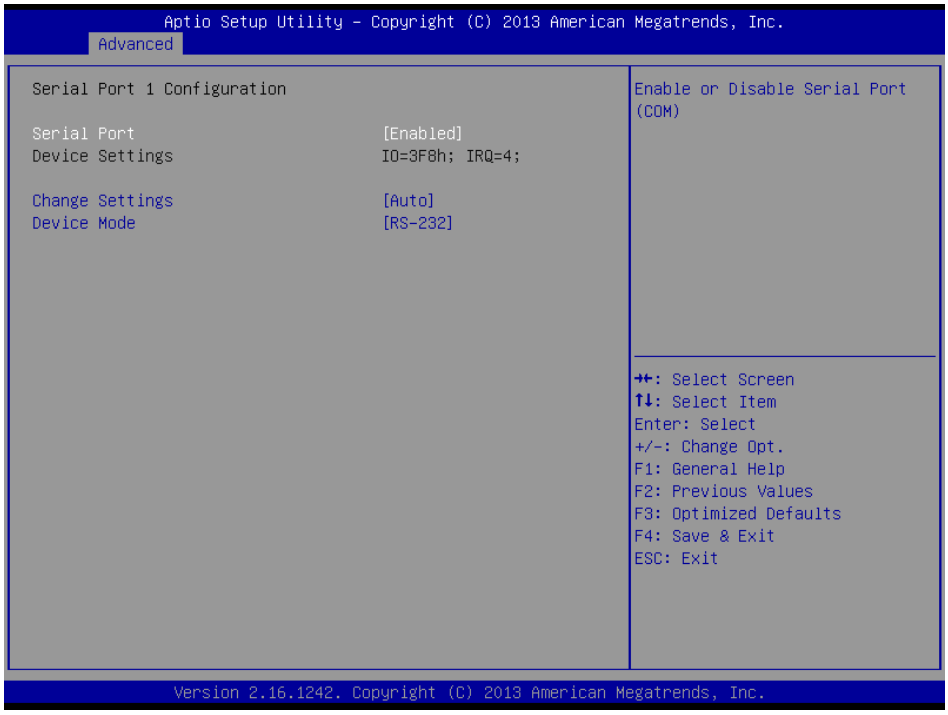
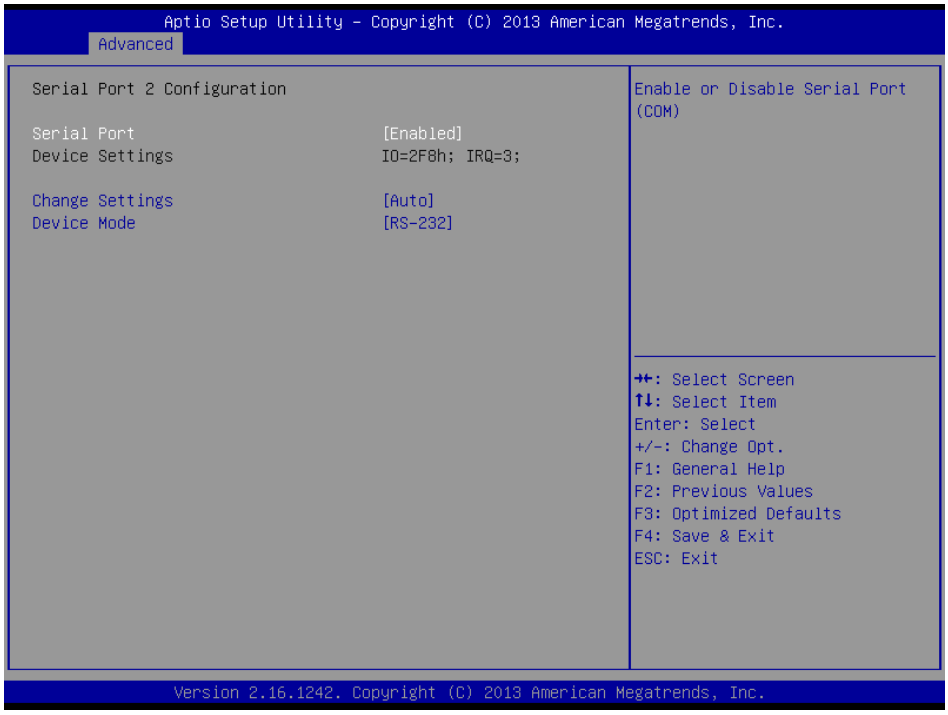
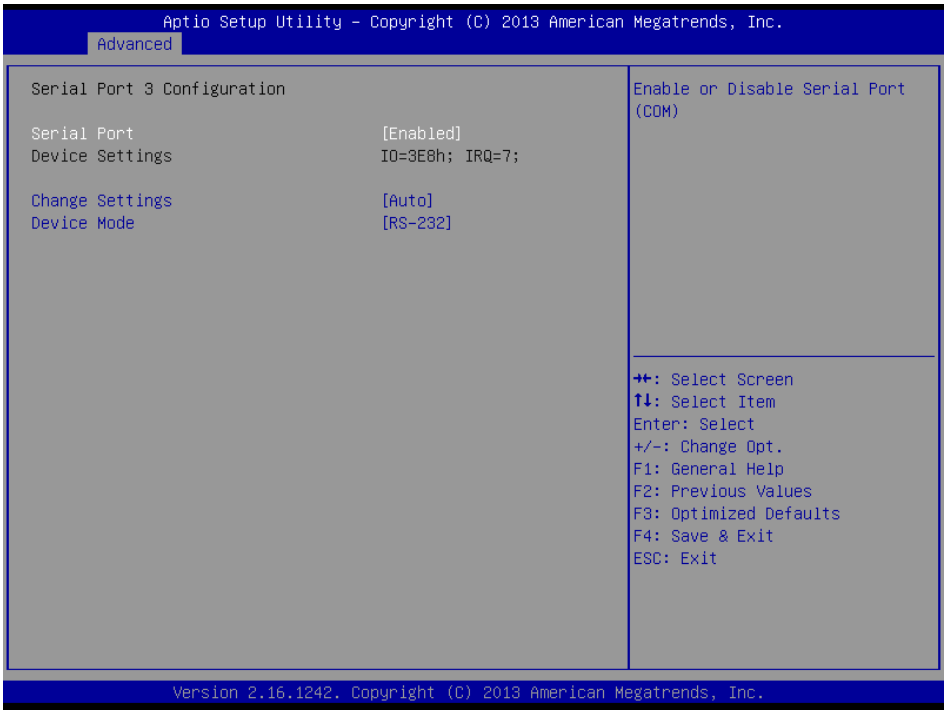


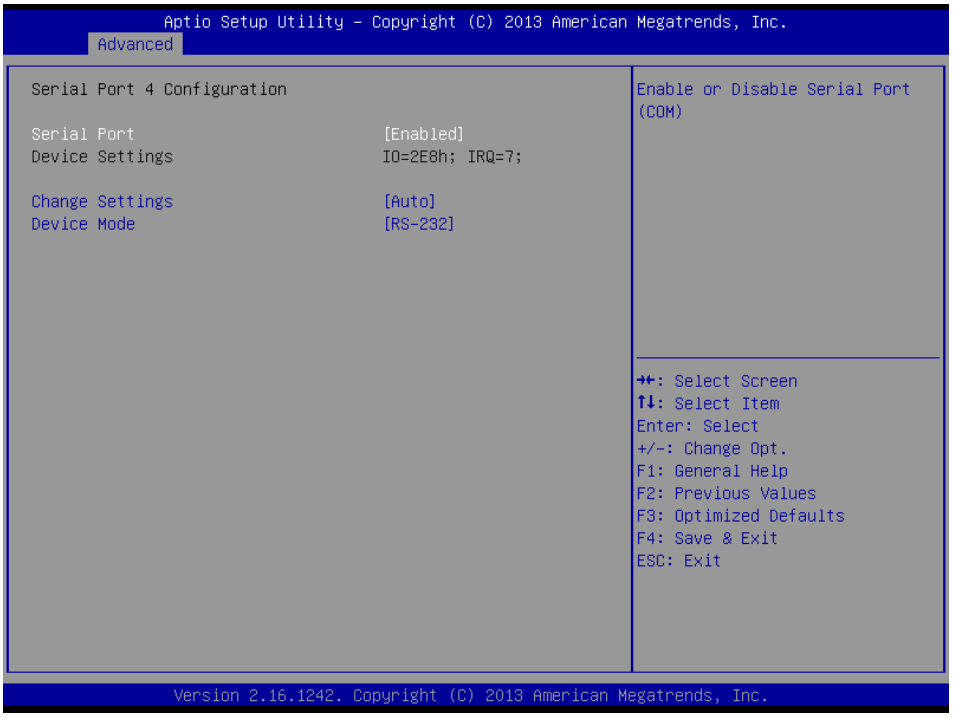
Figure 3.5 NCT6106D Super IO Configuration

- **Serial Port 1/2/3/4 Configurarion**
  This item allows users to enable or disable serial Ports 1/2/3/4.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Serial Port [Enabled]
Device Settings IO=3F8h; IRQ=4;
Change Settings [Auto]
Device Mode [RS-232]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

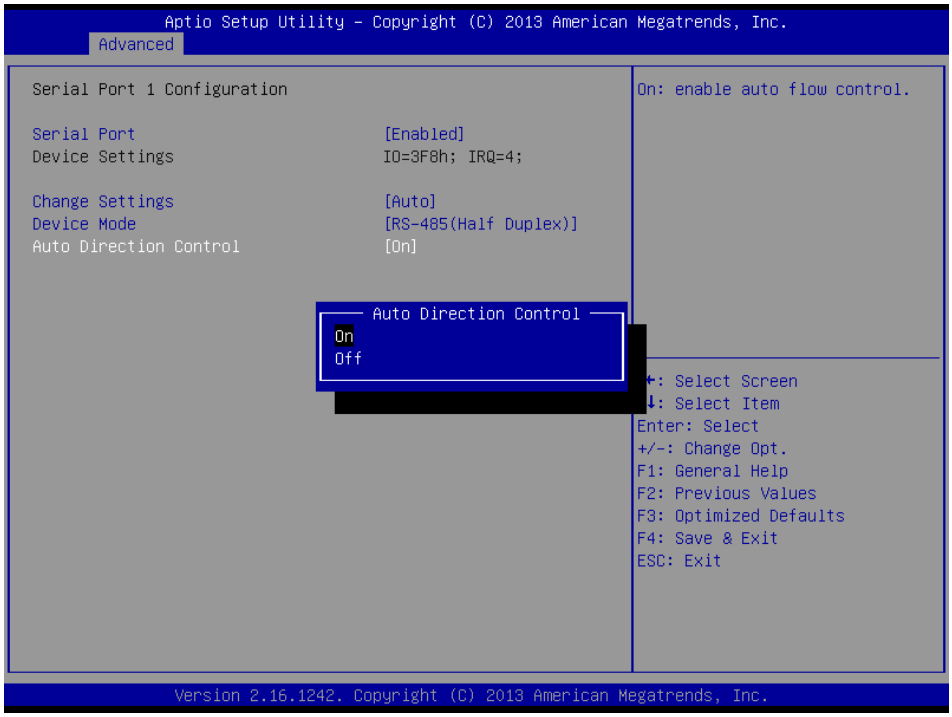

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 2 Configuration
Serial Port [Enabled]
Device Settings IO=2F8h; IRQ=3;
Change Settings [Auto]
Device Mode [RS-232]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

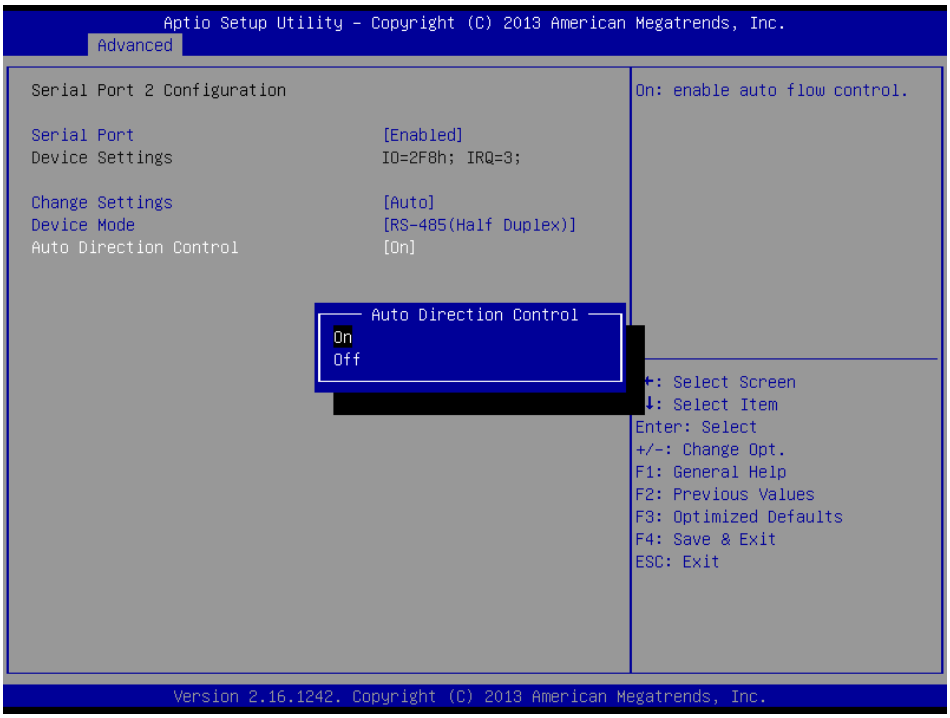


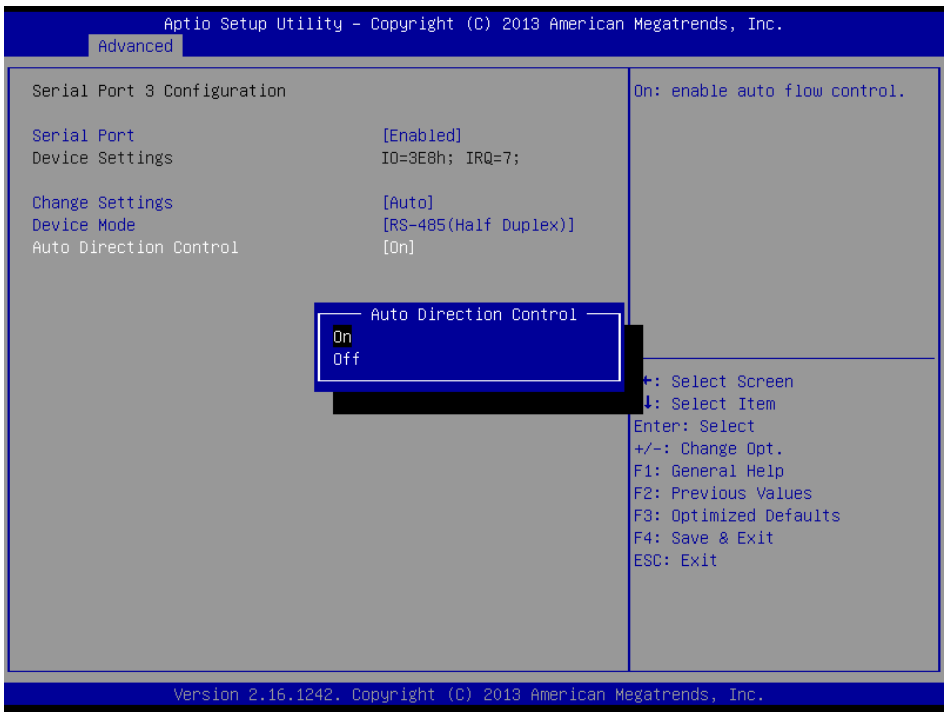


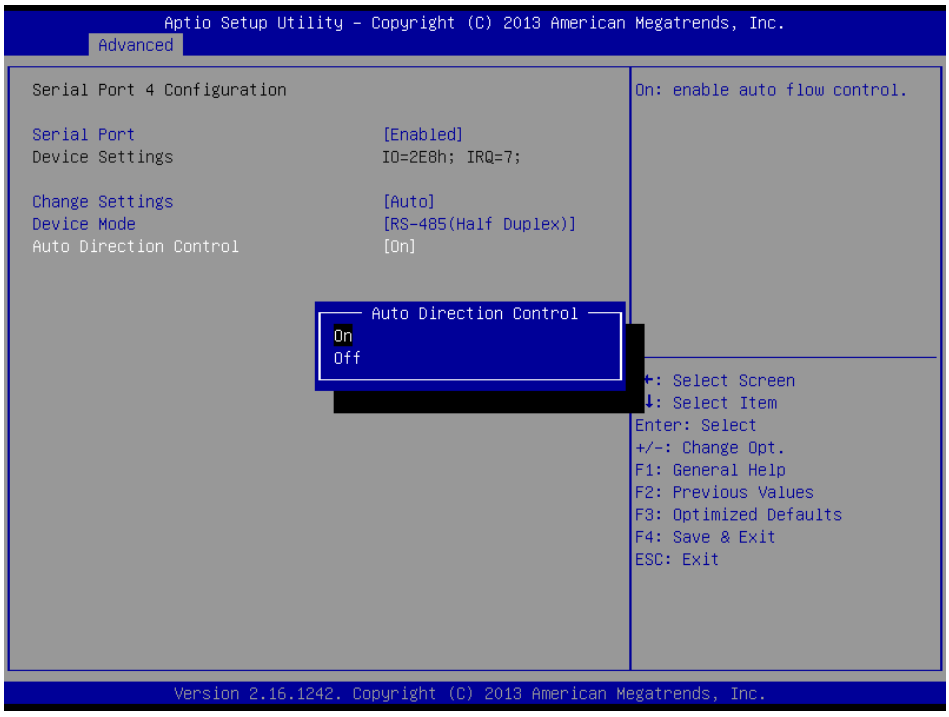
- **Change Settings**
  This item allows users to change the settings for serial Ports 1/2/3/4.
- **Device mode**
  This item allows user to change device mode for serial ports 1/2/3/4.

- **Auto Direction Control**
  When you modify Serial port function "Device Mode" Setting to [RS-485 (Half Duplex)], the "Auto Direction Control" manu will be showed out. This item allows user to on or off for "Auto Direction Control".

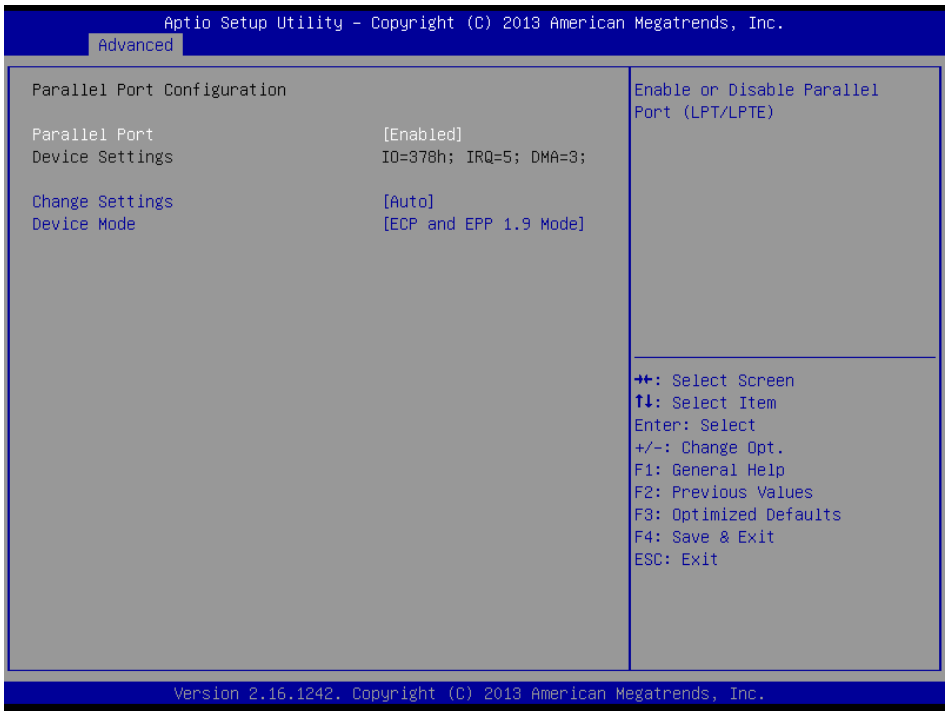





Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 3 Configuration
Serial Port [Enabled]
Device Settings IO=3E8h; IRQ=7;
Change Settings [Auto]
Device Mode [RS-485(Half Duplex)]
Auto Direction Control [On]
Auto Direction Control
On
Off
On: enable auto flow control.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

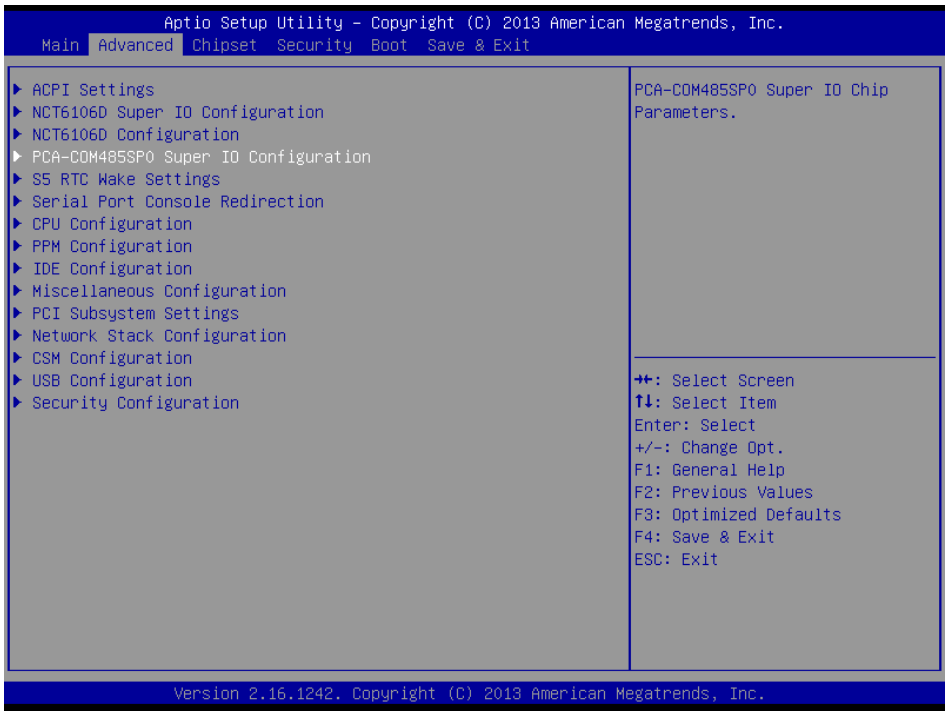

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 4 Configuration
Serial Port [Enabled]
Device Settings IO=2E8h; IRQ=7;
Change Settings [Auto]
Device Mode [RS-485(Half Duplex)]
Auto Direction Control [On]
Auto Direction Control
On
Off
On: enable auto flow control.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

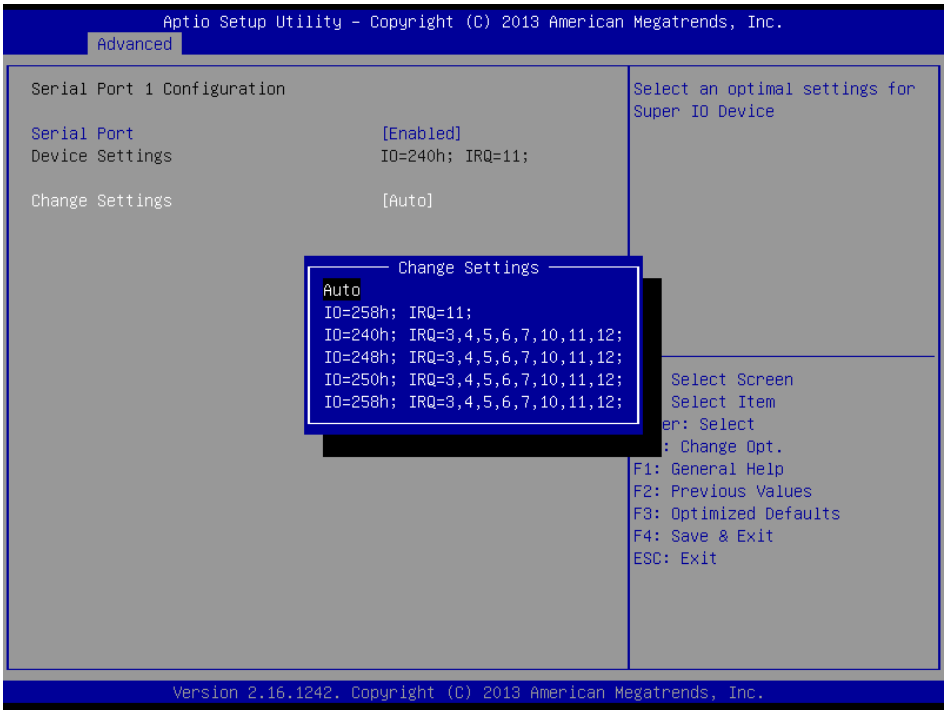
- **Parallel Port Confiuration**
  This item allows user to enable or disable Parallel Port.
- **Change Settings**
  This item allows users to change the settings for Parallel Port.
- **Device mode**
  This item allows user to change device mode for Parallel Port.

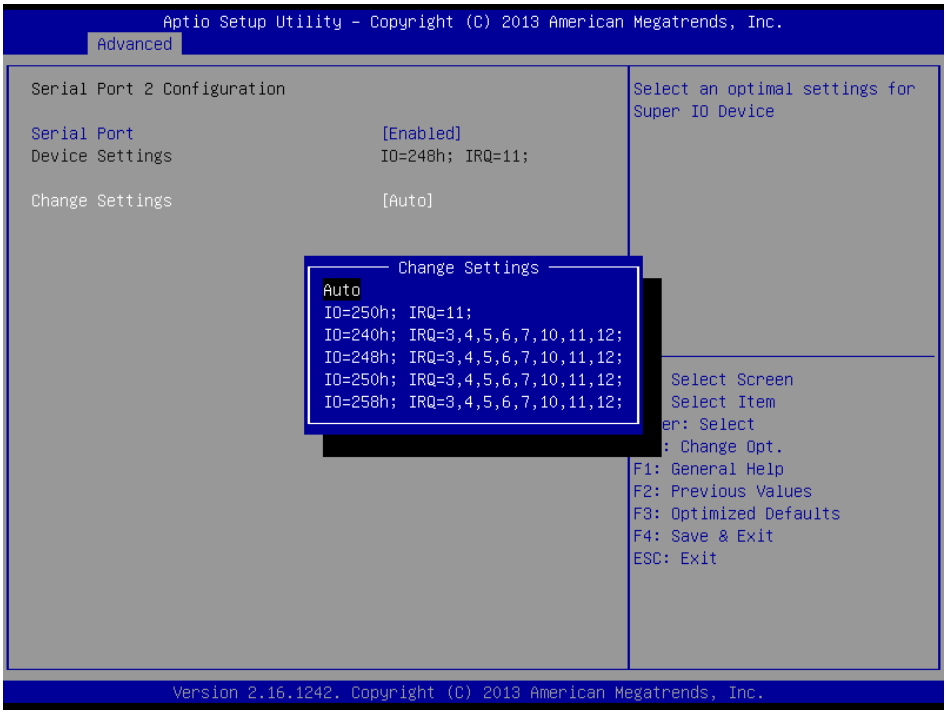


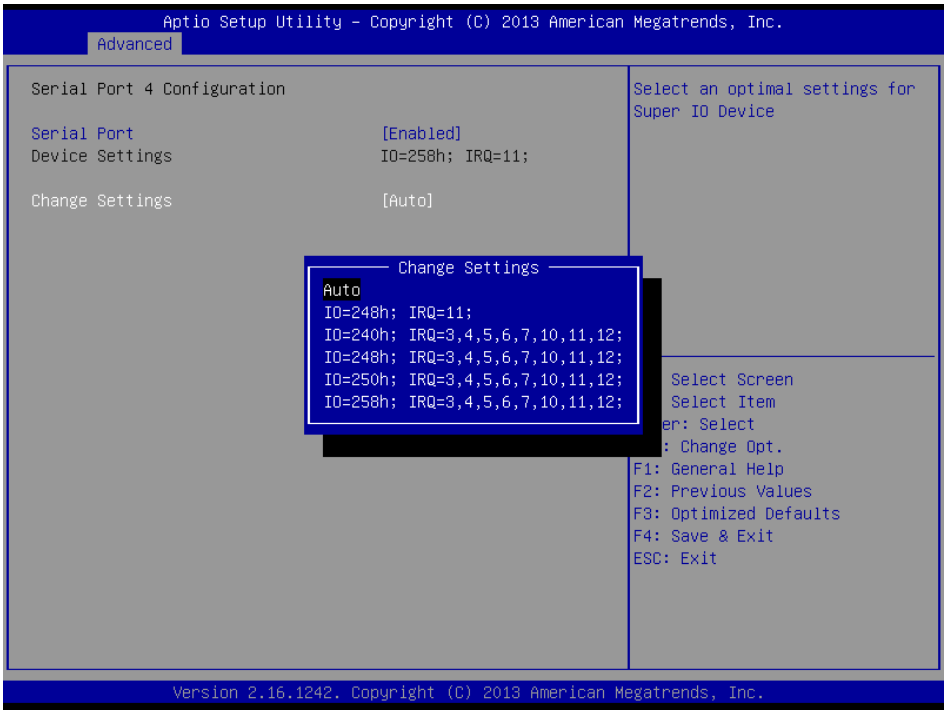
3.2.2.3 PCA-COM485SP0 Super I/O Configuration

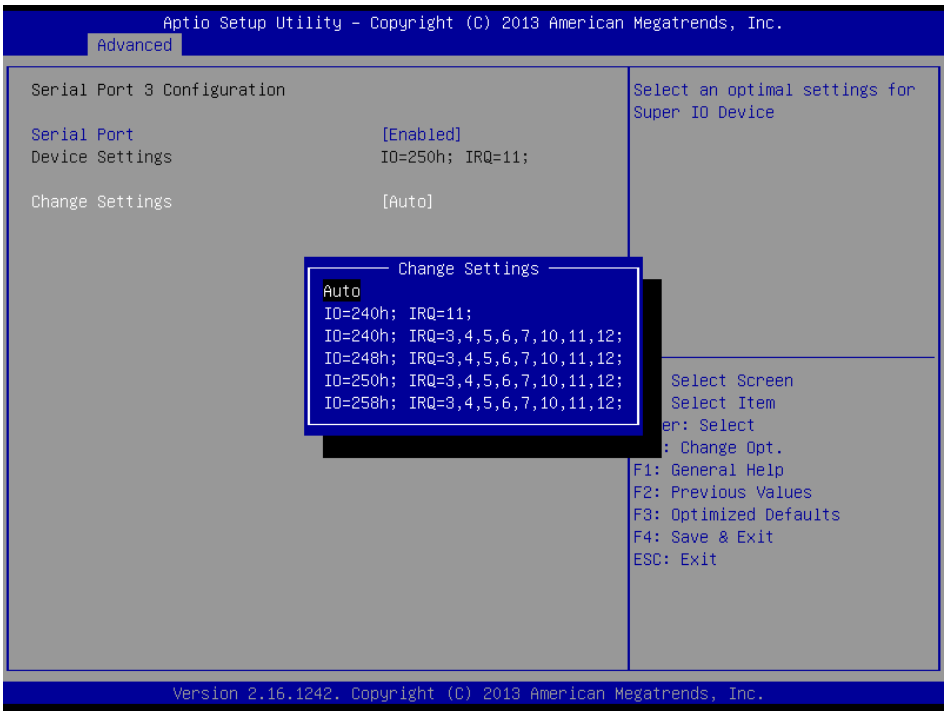
This manu only for ARK-5261I (Isolation Version). ARK-5261I Serial Ports support RS-422 & RS-485 and it is auto detect by your device specification.




Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Serial Port [Enabled]
Device Settings IO=240h; IRQ=11;
Change Settings [Auto]
Change Settings
Auto
IO=258h; IRQ=11;
IO=240h; IRQ=3,4,5,6,7,10,11,12;
IO=248h; IRQ=3,4,5,6,7,10,11,12;
IO=250h; IRQ=3,4,5,6,7,10,11,12;
IO=258h; IRQ=3,4,5,6,7,10,11,12;
Select an optimal settings for Super IO Device
Select Screen
Select Item
er: Select
: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Serial Port 2 Configuration
Serial Port [Enabled]
Device Settings IO=248h; IRQ=11;
Change Settings [Auto]
Change Settings
Auto
IO=250h; IRQ=11;
IO=240h; IRQ=3,4,5,6,7,10,11,12;
IO=248h; IRQ=3,4,5,6,7,10,11,12;
IO=250h; IRQ=3,4,5,6,7,10,11,12;
IO=258h; IRQ=3,4,5,6,7,10,11,12;
Select an optimal settings for Super IO Device
Select Screen
Select Item
er: Select
: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.





- **Serial Port**
  This item allows users to set Serial Port to Enable or Disable.
- **Change Setting**
  This item allows user to change setting Serial Port IO & IRQ functions.

3.2.2.4 PC Health Status

This Page shows the ARK-5261 System health status.

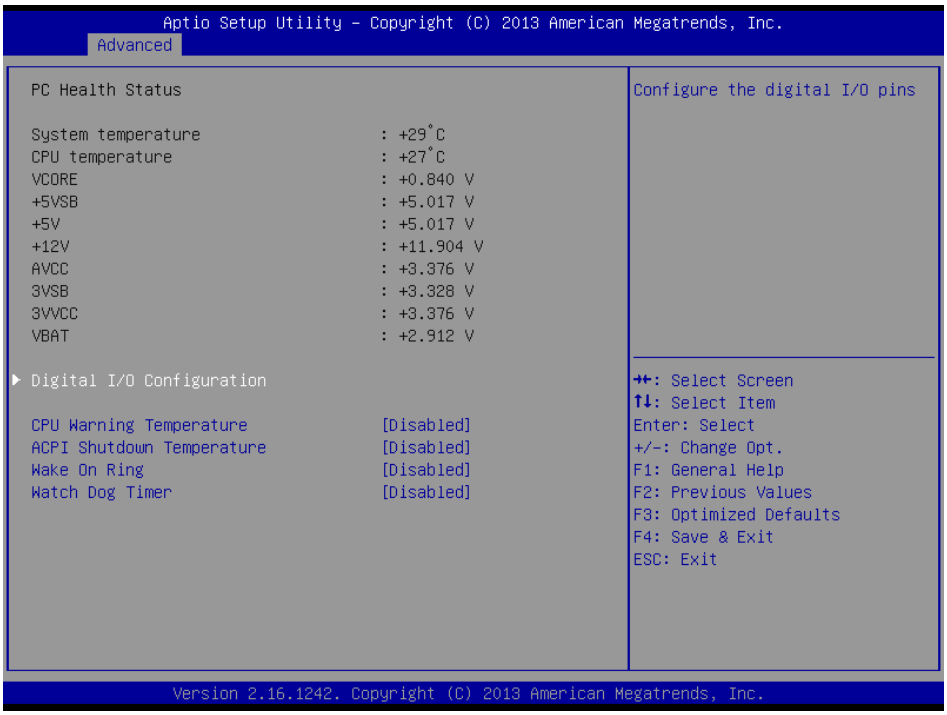


Figure 3.6 PC Health Status

- **CPU Warning Temperature**
  This item allows users to set the CPU temperature threshold. When the system CPU reaches the threshold temperature, a buzzer will emit a warning alert.
- **ACPI Shutdown Temperature**
  This item allows users to set the CPU temperature threshold at which the system automatically shuts down to prevent the CPU from overheating.
- **Wake On Ring**
  This item allows users to enable or disable Wake On Ring functionality.
- **Watchdog Timer**
  This item allows users to enable or disable the Watchdog timer.

3.2.2.5 S5 RTC Wake Settings

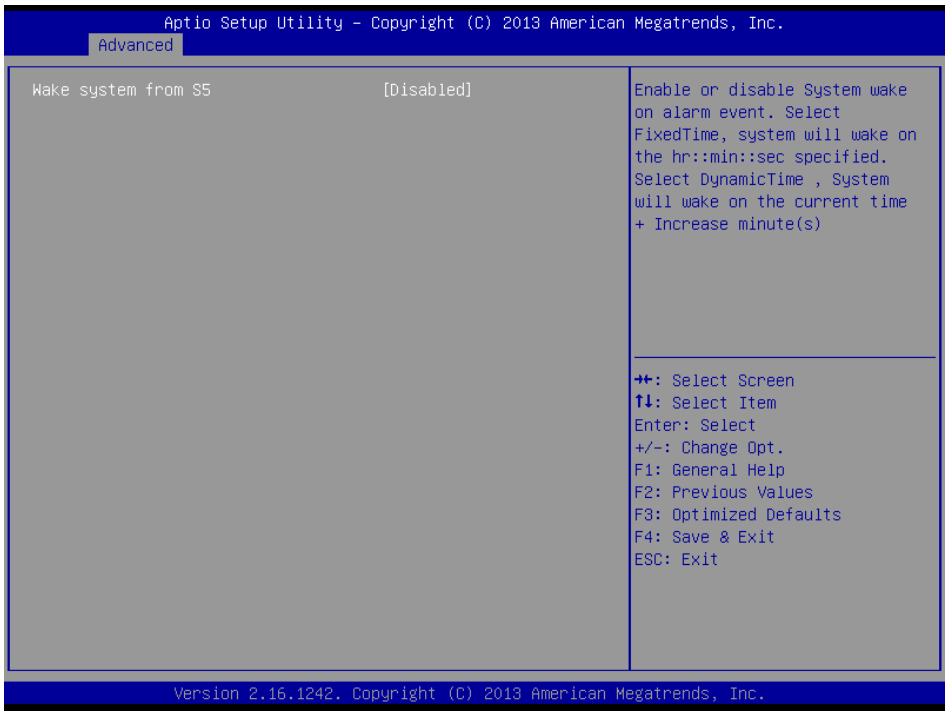


Figure 3.7 S5 RTC Wake Settings

- **Wake System From S5**
  This item allows users to enable or disable system wake on alarm event.

3.2.2.6 Serial Port Console Redirection

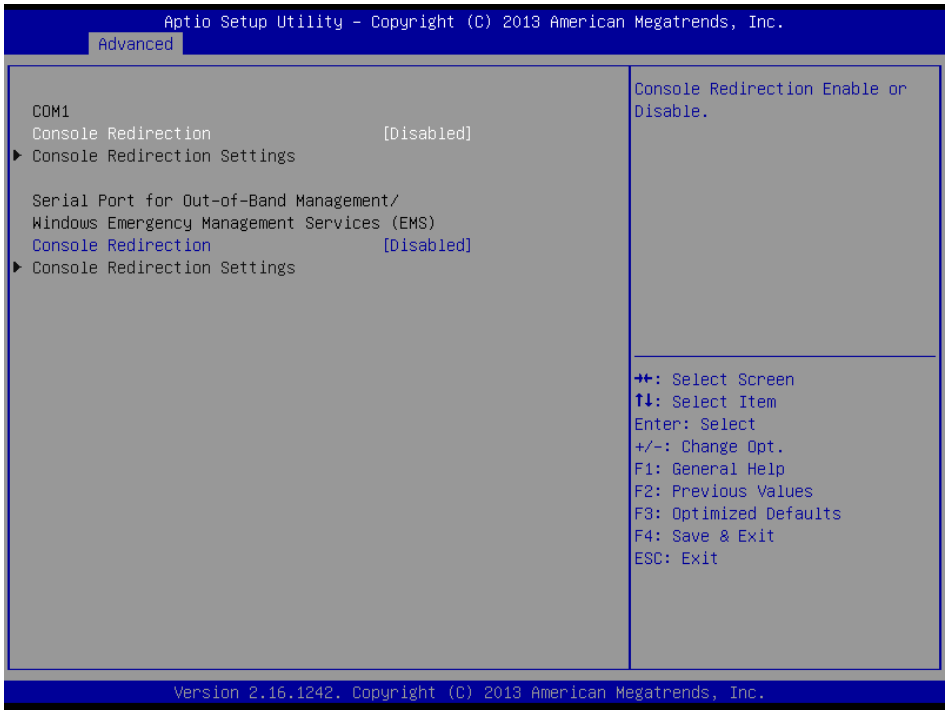


Figure 3.8 Serial Port Console Redirection

- **Console Redirection**
  This item allows users to enable or disable console redirection.

3.2.2.7 CPU Configuration

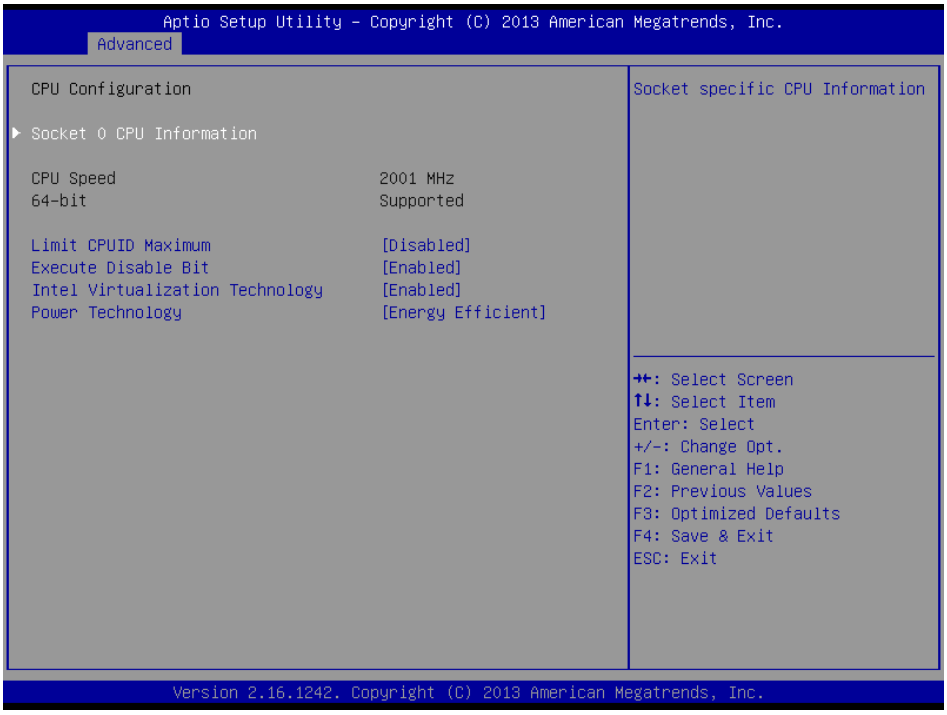


Figure 3.9 CPU Configuration

- **Limit CPUID Maximum**
  This item allows users to enable or disable the ability to limit the CPUID maximum.
- **Execute Disable Bit**
  This item allows users to enable or disable the Execute Disable Bit function.
- **Intel Virtualization Technology**
  This item allows users to enable or disable Intel® Virtualization Technology.
- **Power Technology**
  This item allows users to setting ARK-5261 system power energy.

3.2.2.8 PPM Configuration

Figure 3.10 PPM Configuration

- **CPU C Stat Report**
  This item allows users to enable or disable the ability CPU C state.
- **Max CPU C-state**
  This item allows user to setting CPU C-state.

3.2.2.9 IDE Configuration

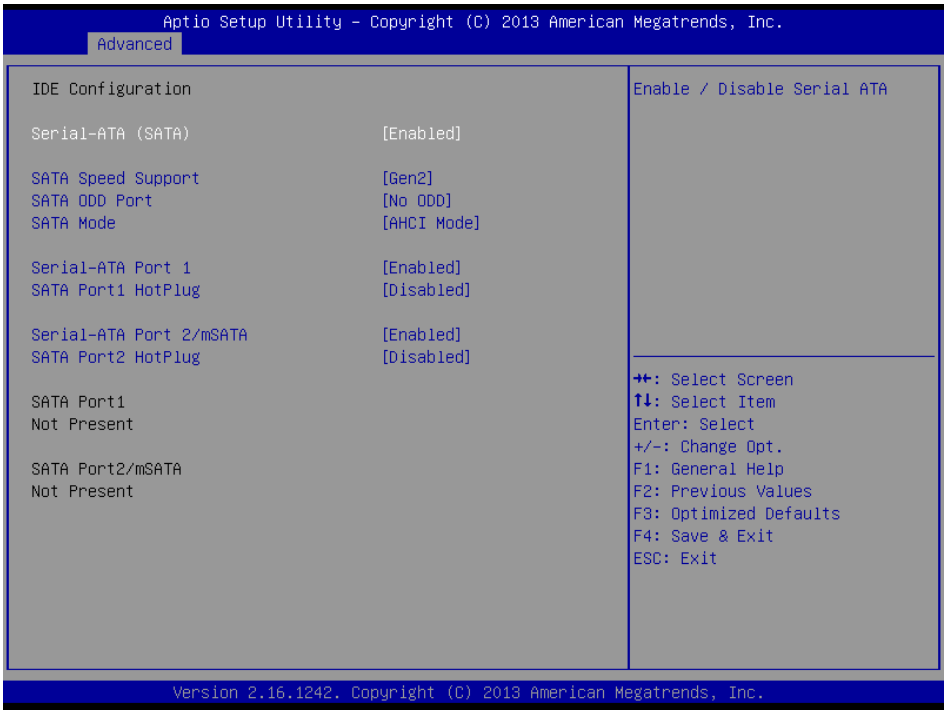


Figure 3.11 IDE Configuration

- **Serial-ATA (SATA)**
  This item allows users to enable or disable the SATA device.
- **SATA Speed Support**
  This item allows users to select the SATA speed (Gen1 or Gen2).
- **SATA ODD Port**
  This item allows users to set Port 1 or 2 to have ODD functionality.
- **SATA Mode**
  This item allows users to select the mode for SATA controller(s).
- **Serial-ATA Port 1**
  This item allows users to enable or disable the Serial-ATA Port 1 device.
- **SATA Port 1 Hot Plug**
  This item allows users to enable or disable the SATA Port 1 hot plug.
- **Serial-ATA Port 2 /mSATA**
  This item allows users to enable or disable the Serial-ATA Port 2 /mSATA device.
- **SATA Port 2 Hot Plug**
  This item allows users to enable or disable the SATA Port 2 hot plug.

3.2.2.10 Miscellaneous Configuration

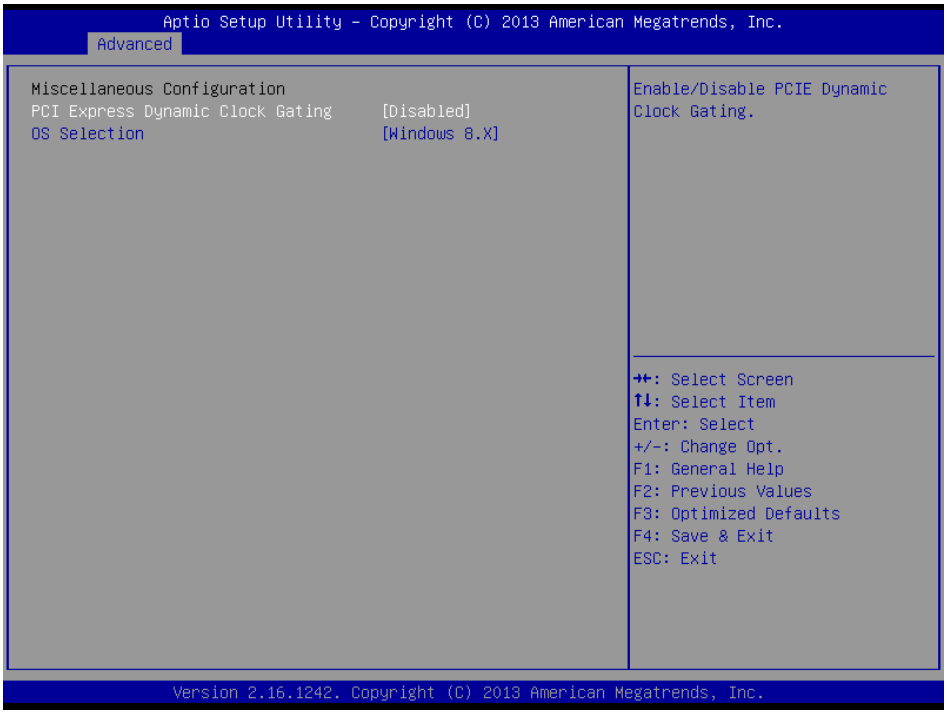


Figure 3.12 Miscellaneous Configuration

- **PCI Express Dynamic Clock Gating**
  This item allows users to enable or disable the PCI Express Dynamic Clock Gating function.
- **OS Selection**
  This item allows users to set the OS as Windows 7 or Windows 8.

3.2.2.11 PCI Subsystem Setting

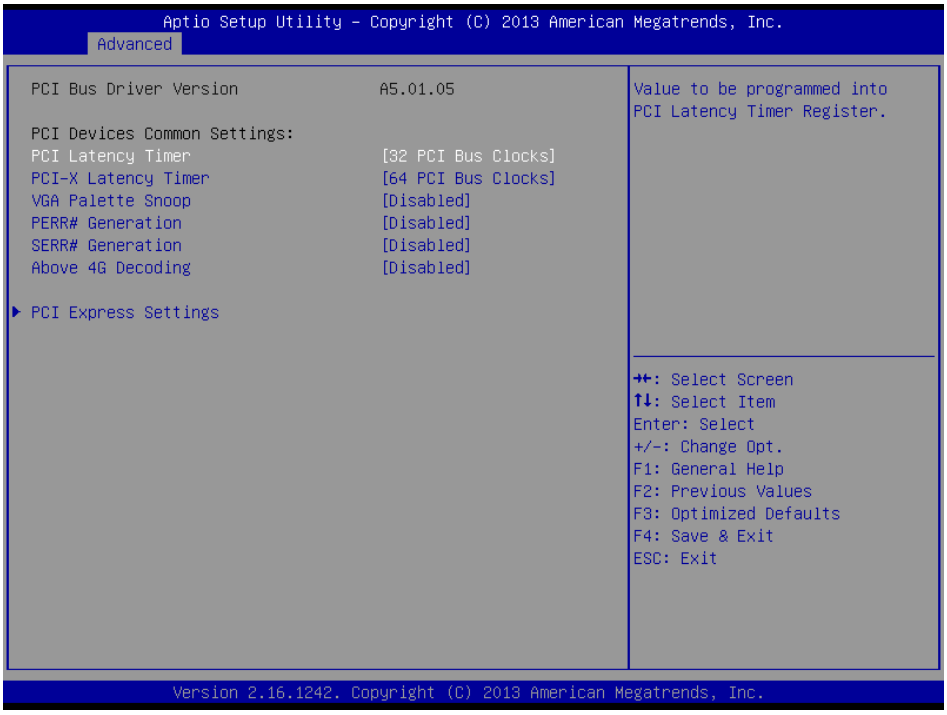
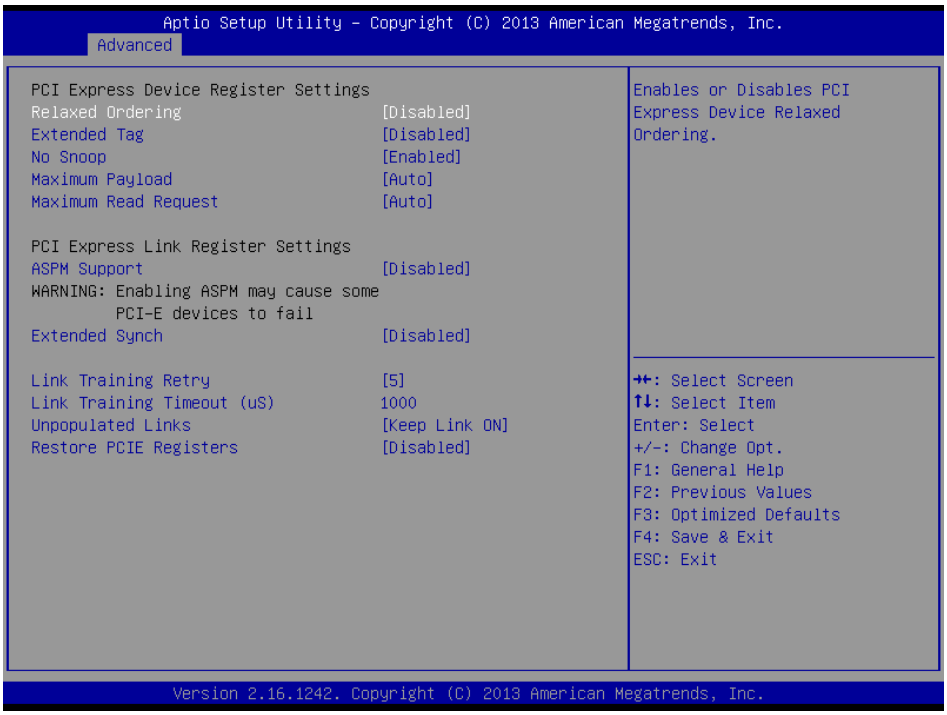


Figure 3.13 PCI Subsystem Setting

PCI Devices Common Settings:

- **PCI Latency Timer**
  This item allows users to program the timer value into the PCI Latency Timer Register.
- **PCI-X Latency Timer**
  This item allows users to program the timer value into the PCI-X Latency Timer.
- **VGA Palette Snooping**
  This item allows users to enable or disable VGA palette register snooping.
- **PERR# Generation**
  This item allows users to enable or disable PERR# Generation.
- **SERR# Generation**
  This item allows users to enable or disable SERR# Generation.
- **Above 4G Decoding**
  This item allows users to enable or disable 64-bit-capable device decoding in above 4G address spaces (if the system supports 64-bit PCI decoding).

PCI Express Settings:



PCI Express Device Register Settings:

- **Relaxed Ordering**
  This item allows users to enable or disable relaxed ordering.
- **Extended Tag**
  This item allows users to enable or disable extended tags.
- **No Snooping**
  This item allows users to enable or disable the No Snooping function.
- **Maximum Payload**
  This item allows users to set the maximum payload for PCI Express devices or authorize the system BIOS to select the value.
- **Maximum Read Request**
  This item allows users to set the maximum read request size for PCI Express devices or authorize the system BIOS to select the value.

PCI Express Link Register Settings:

- **ASPM Support**
  This item allows users to enable or disable ASPM support.
- **Extended Synch**
  This item allows users to enable or disable the Extended Synch function.
- **Link Training Retry**
  This item allows users to define the number of retry attempts for software link training.
- **Link Training Timeout (uS)**
  This item allows users to define the number of microseconds the software will wait before polling the “Link Training” bit in the link status register. Values range from 10 to 10000 uS.
- **Unpopulated Links**
  To save power, the software will disable unpopulated PCI Express links if this option set as “Disable Link”.

- **Restore PCIE Registers**
  On non-PCI Express aware OS (pre-Windows Vista), some devices may not be correctly reinitialized after S3. Enabling this item restores PCI Express device configurations upon S3 resume. Warning: Enabling this item can cause issues with other hardware after S3 resume.

3.2.2.12 Network Stack

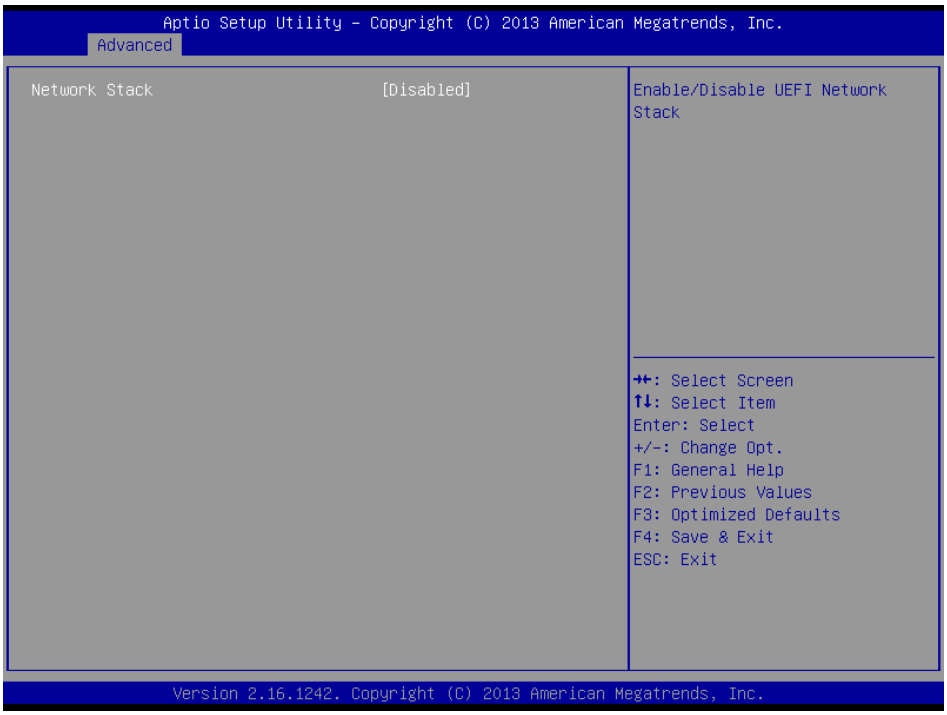


Figure 3.14 Network Stack

- **Network Stack**
  This item allows users to enable or disable the UEFI Network Stack function.

3.2.2.13 CSM Configuration

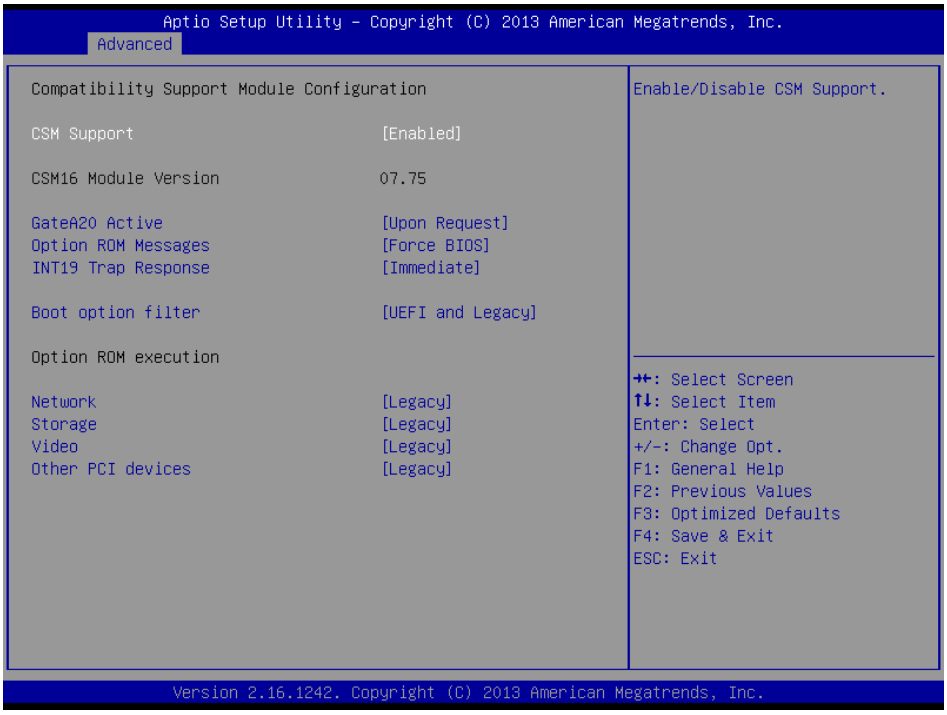


Figure 3.15 CSM Configuration

Compatibility Support Module Configuration:

- **CSM Support**
  This item allows users to enable or disable CSM support.
- **GateA20 Active**
  Upon request - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
- **Option ROM Messages**
  This item allows users to set the display mode for Option ROM.
- **INT19 Trap Response**
  This item allows users to set the BIOS reaction to INT19 trapping by Option. ROM: “Immediate” - execute the trap right away; “postponed” - execute the trap during legacy boot.
- **Boot Options Filter**
  This item allows users to control the Legacy/UEFI ROM priority.
- **Option ROM Execution**
  - Network
    Controls the execution of UEFI and Legacy PXE OpROM.
  - Storage
    Controls the execution of UEFI and Legacy Storage OpROM.
  - Video
    Controls the execution of UEFI and Legacy Video OpROM.
  - Other PCI devices
    Determines the OpROM execution policy for devices other than network, storage, and/or video devices.

3.2.2.14 USB Configuration

Figure 3.16 USB Configuration

- **Legacy USB support**
  This item allows users to enable or disable support for legacy USB. The “Auto” option disables legacy support if no USB devices are connected.
- **XHCI Hands Off**
  This is a workaround for OS without XHCI hands-off support. The change in XHCI ownership should be claimed by the XHCI driver.
- **EHCI Hands Off**
  This is a workaround for OS without EHCI hands-off support. The change in EHCI ownership should be claimed by the EHCI driver.
- **USB Mass Storage Driver Support**
  This item allows users to enable or disable the USB mass storage driver.
- **USB Transfer Timeouts**
  This item allows users to determine the timeout values for control, bulk, and interrupt transfers.
- **Device Reset Timeout**
  This item allows users to set the USB mass storage device unit command time-out value.
- **Device Power-up Delay**
  Maximum time before the device issues a self-report to the host controller.

3.2.3 Chipset

This page provides information of the chipset on ARK-5261.

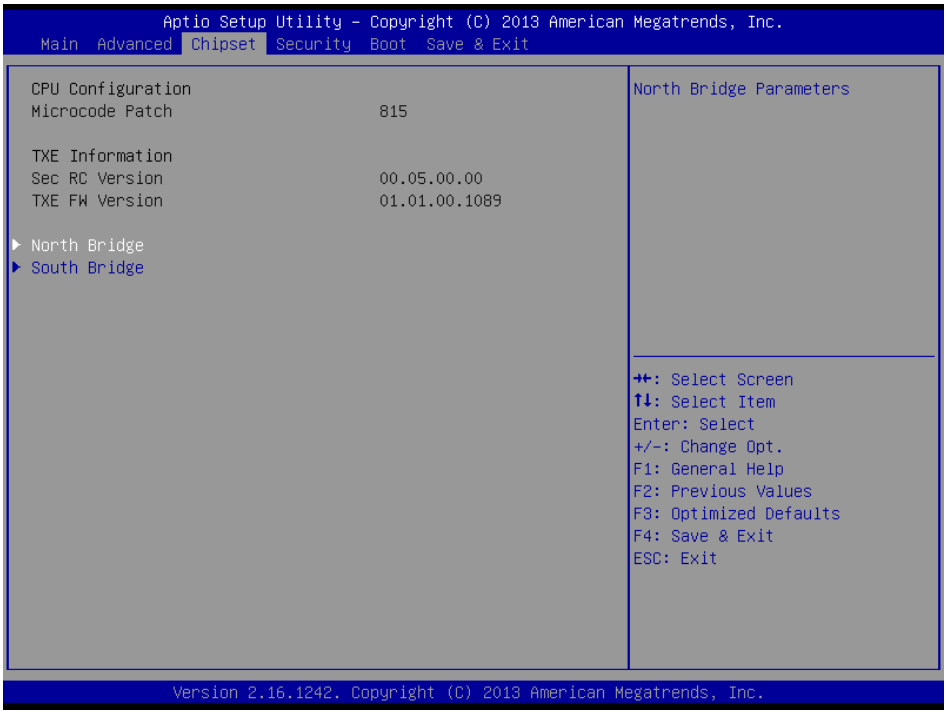


Figure 3.17 Chipset

- **North Bridge**
  This item provides details of the North Bridge parameters.
- **South Bridge**
  This item provides details of the South Bridge parameters.

3.2.3.1 Intel IGD Configuration

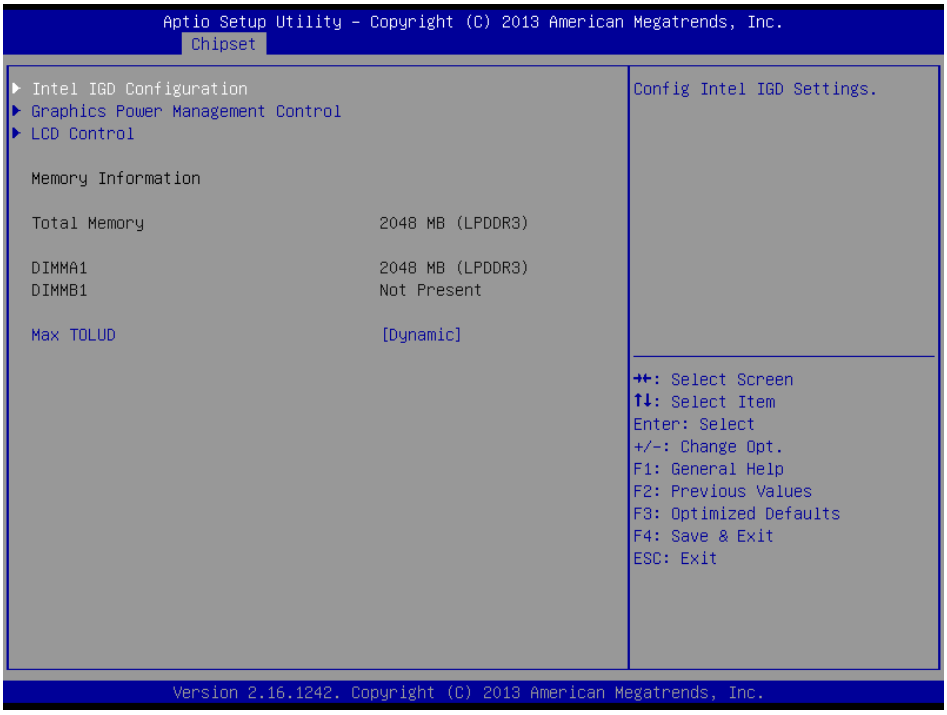


Figure 3.18 Intel IGD Configuration

GOP Driver:

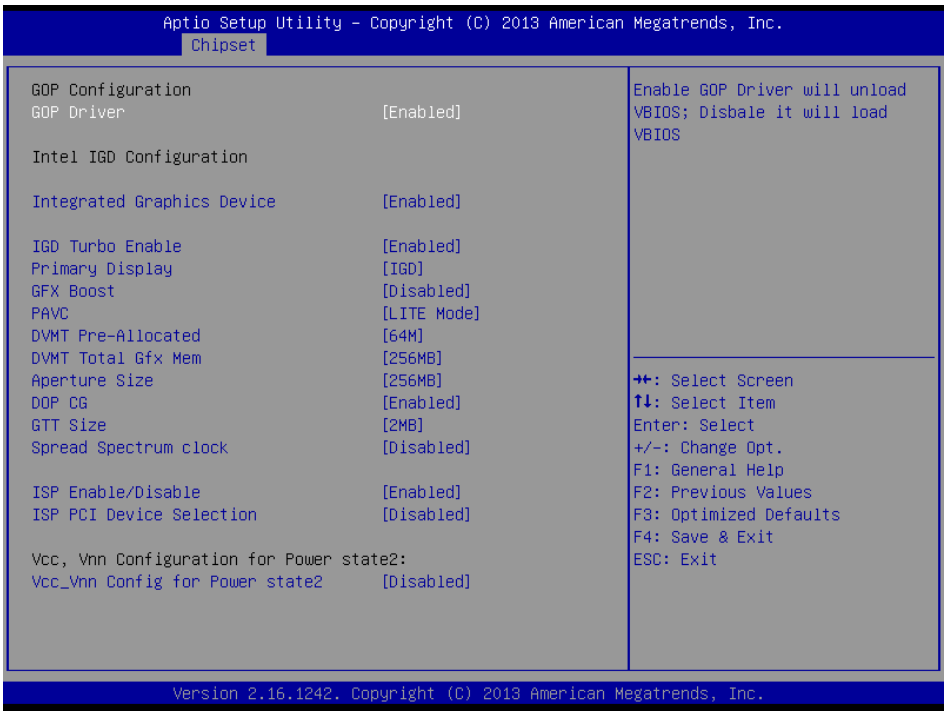


Figure 3.19 GOP Driver

- **GOP Driver**
  This item allows users to enable or disable the GOP driver.
- **Integrated Graphics Device**
  This item allows users to enable or disable an integrated graphics device.
- **IGD Turbo Enable**
  This item allows users to enable or disable the IGD Turbo Enable function.
- **Primary Display**
  This item allows users to select which IGD/PCI graphics device should be used as the primary display.
- **GFX Boost**
  This item allows users to enable or disable GFX Boost.
- **PAVC**
  This item allows users to enable or disable Protected Audio Video Control.
- **DVMT Pre-Allocated**
  This item allows users to specify the DVMT 5.0 pre-allocated (fixed) graphics memory size to be used by the internal graphics device.
- **DVMT Total Gfx Mem**
  This item allows users to specify the DVMT 5.0 total graphics memory size to be used by the internal graphics device.
- **Aperture Size**
  This item allows users to select the aperture size.
- **DOP CG**
  This item allows users to enable or disable DOP CG.
- **GTT Size**
  This item allows users to select the GTT size.
- **Spread Spectrum clock**
  This item allows users to enable or disable the spread spectrum clock.
- **ISP Enable/Disable**
  This item allows users to enable or disable ISP function.
- **ISP PCI Device Selection**
  This item allows users to enable or disable ISP PCI device selection.

VCC and VNN Configuration for Power State 2:

- **Vcc_Vnn Config for Power State 2**
  This item allows users to enable or disable VCC and VNN Configuration for Power State 2.

3.2.3.2 Graphics Power Management Control

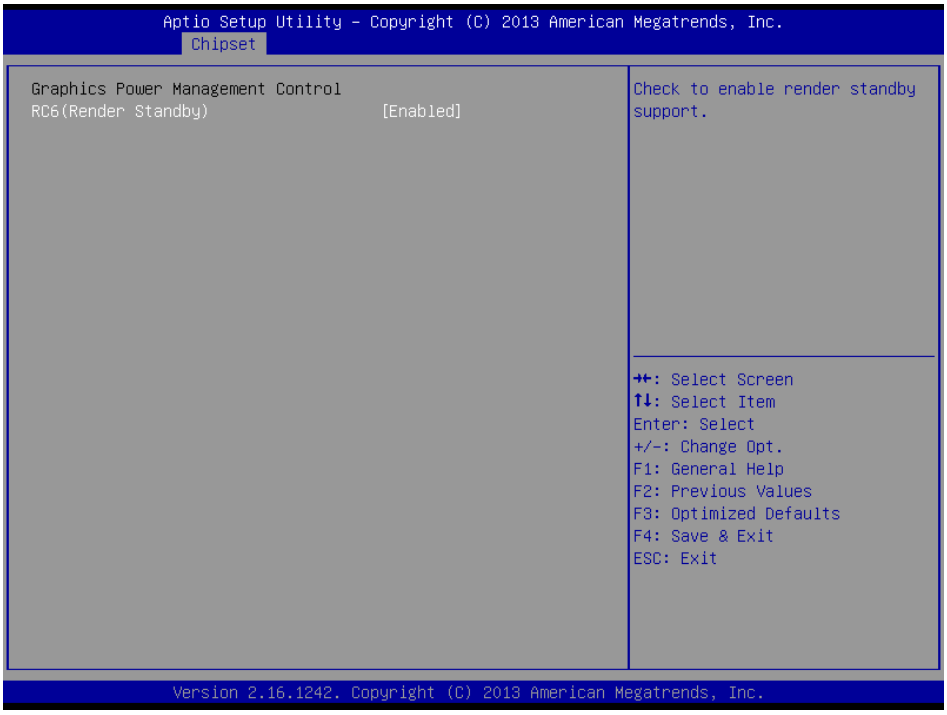


Figure 3.20 Graphics Power Management Control

- **RC6 (Render Standby)**
  This item allows users to enable render standby support.

3.2.3.3 LCD Control

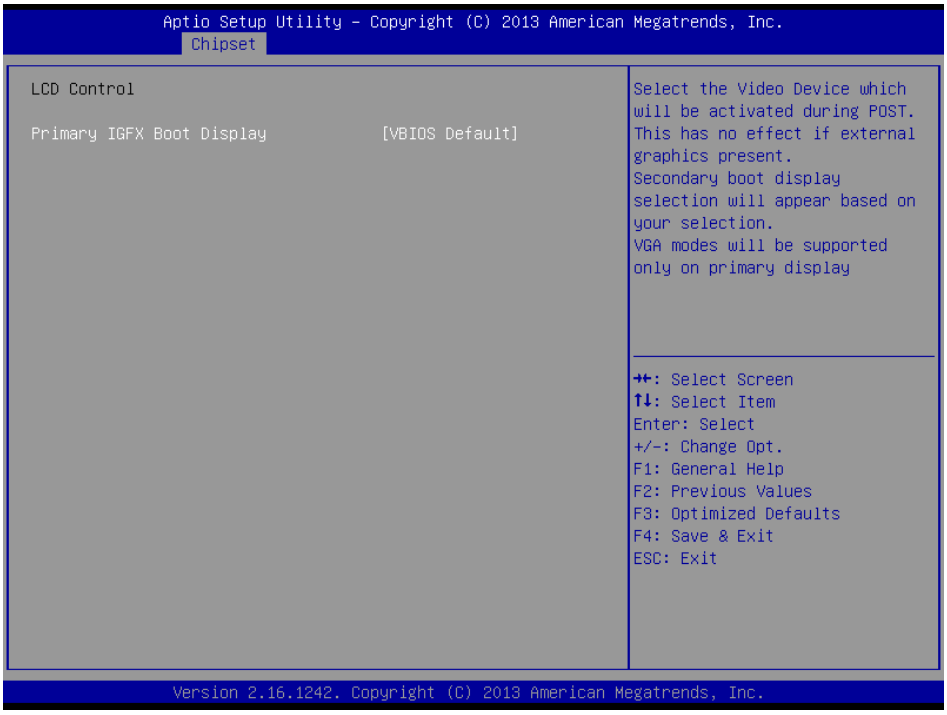


Figure 3.21 LCD Control

- **Primary IGFX Boot Display (VBIOS Default)**
  This item allows users to select the video device activated during POST. Secondary boot display options are presented according to users' selection.

3.2.3.4 AZALIA HD Audio

This item allows users to adjust the AZALIA HD audio options.

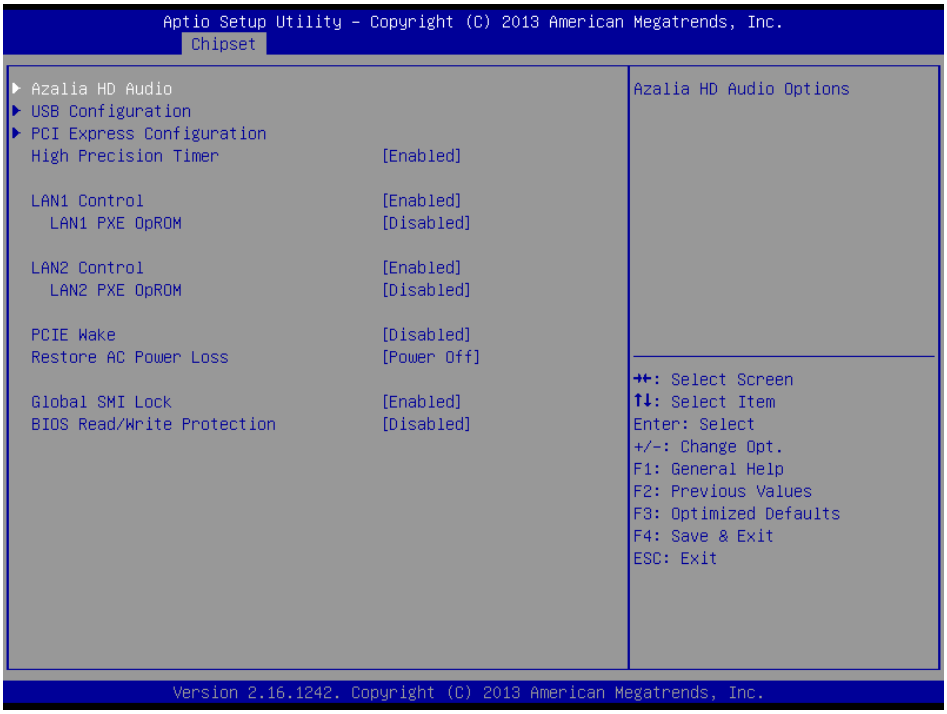


Figure 3.22 Azalia HD Audio

- **USB Configuration**
  This item allows users to adjust the USB configuration.
- **PCI Express Configuration**
  This item allows users to adjust the PCI Express configuration.
- **High Precision Timer**
  This item allows users to enable or disable the high-precision timer.
- **LAN 1controller**
  This item allows users to enable or disable the LAN 1 controller.
- **LAN 1 PXE OpROM**
  This item allows users to enable or disable the LAN 1 option-ROM.
- **LAN 2 controller**
  This item allows users to enable or disable the LAN 2 controller.
- **LAN 2 PXE OpROM**
  This item allows users to enable or disable the LAN 2 option-ROM.
- **PCIe Wake**
  This item allows users to enable or disable the Wake up on LAN function.
- **Restore AC Power Loss**
  The configuration options for this item are “Off”, “On”, and “Last State”.
- **Global SMI Lock**
  This item allows users to enable or disable the Global SMI Lock function.
- **BIOS Read/Write Protection**
  This item allows users to enable or disable BIOS Read/Write Protection.

3.2.3.5 Audio Configuration

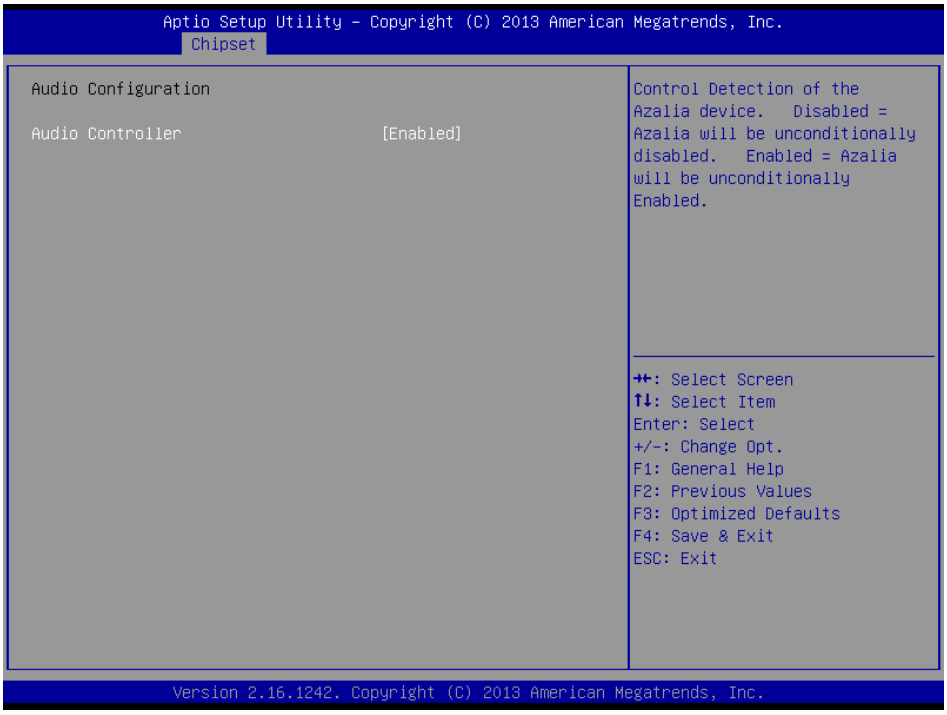


Figure 3.23 Audio Configuration

- **Audio Controller**
  This item allows users to enable or disable the audio controller.

3.2.3.6 USB Configuration

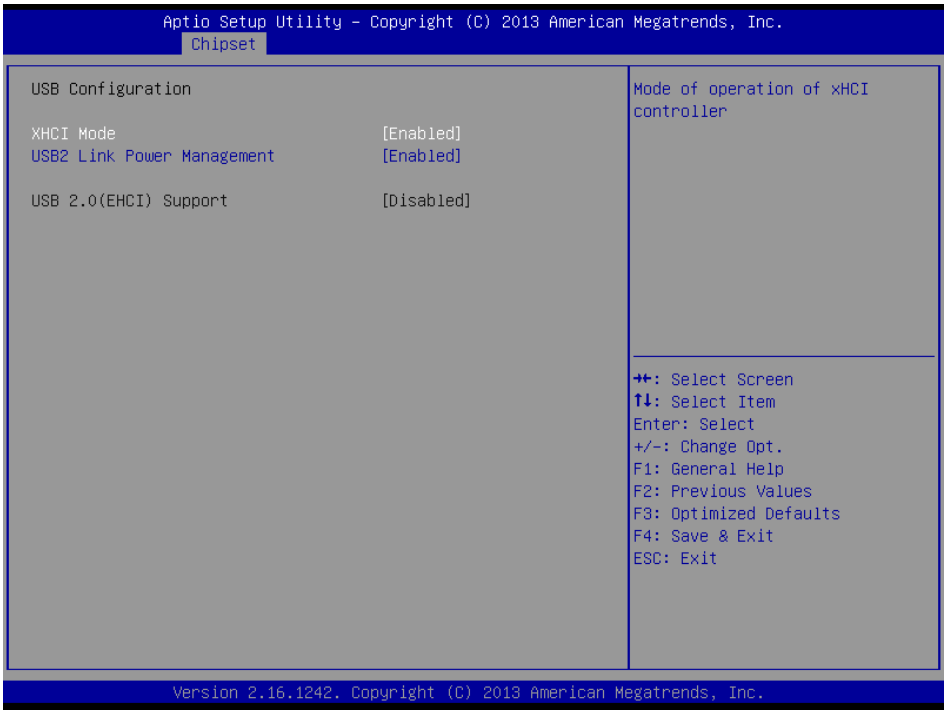


Figure 3.24 USB Configuration

- **XHCI Mode**
  This item allows users to enable or disable XHCI mode.

- **USB2 Link Power Management|**
  This item allows users to enable or disable USB2 link power management.
- **USB 2.0 (EHCI) Support**
  This item allows users to enable or disable USB 2.0 (EHCI) support.

3.2.3.7 PCI Express Configuration

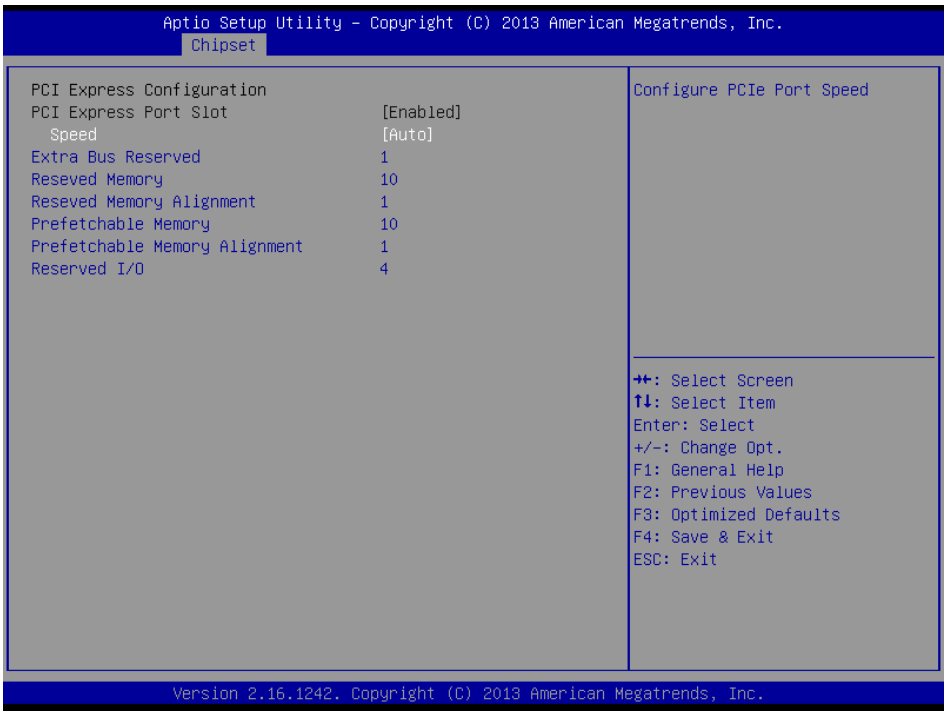


Figure 3.25 PCI Express Configuration

- **PCI Express Port Slot**
  This item allows users to enable or disable the PCI Express port slot.
- **Speed**
  This item allows users to configure the PCIe port speed.

3.2.4 Security

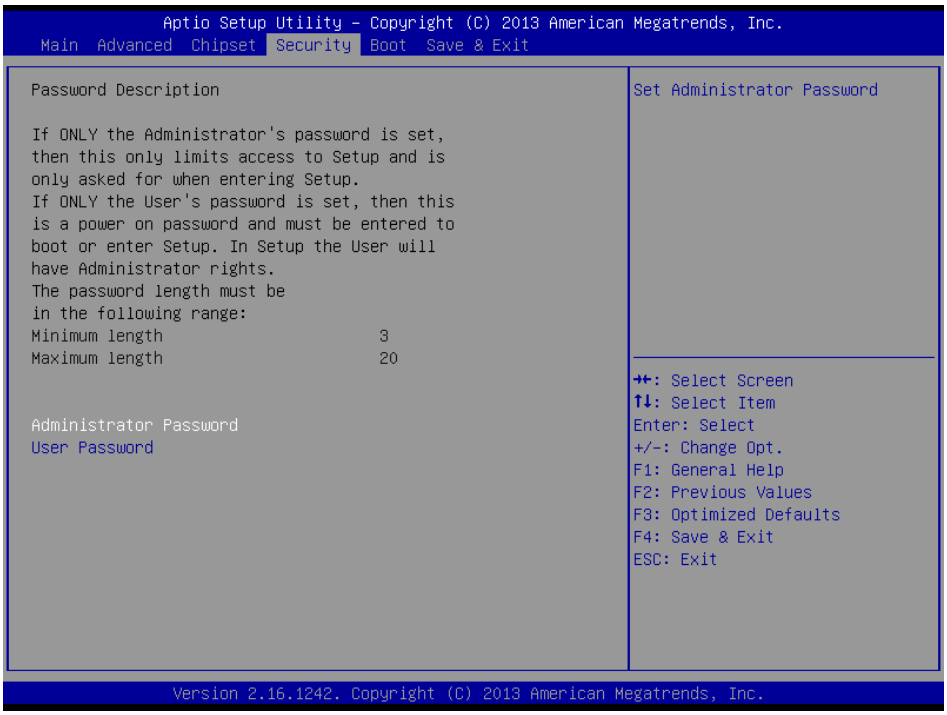


Figure 3.26 Security

Select the Security tab from the ARK-5261 BIOS Setup Utility main setup menu. All Security options, such as password protection and virus protection, are described in this section. To access the submenus for the "Change Administrator" and "User Password" items, select the item and press <Enter>.

3.2.5 Boot

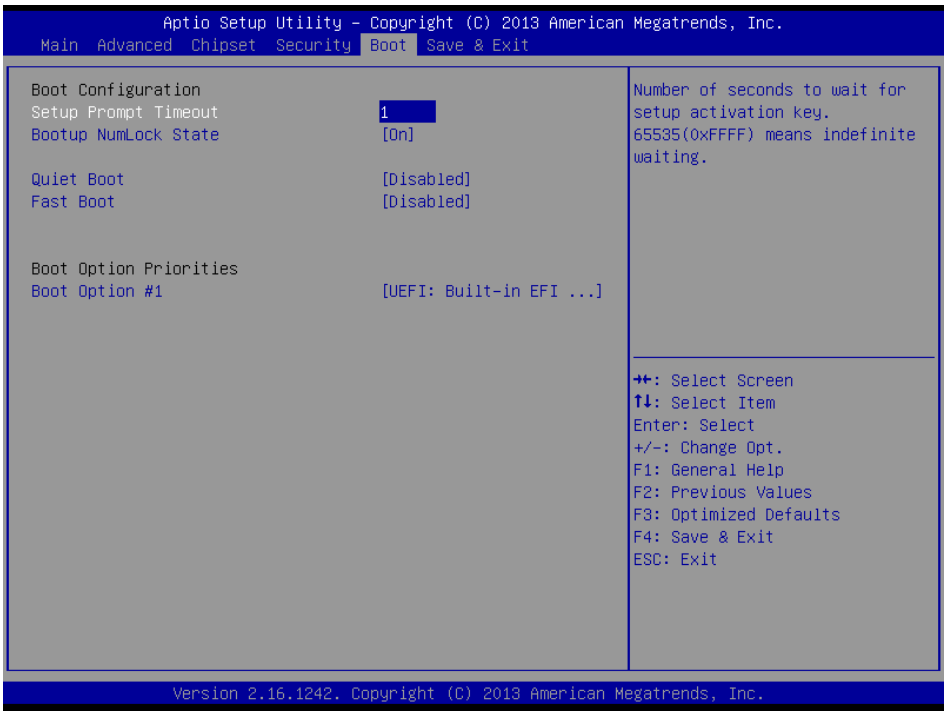


Figure 3.27 Boot

- **Setup Prompt Timeout**
  This item allows users to specify the number of seconds the system should wait for a setup activation key.
- **Bootup NumLock State**
  This item allows users to select the power-on state for Numlock.
- **Quiet Boot**
  If this item is set to “Disabled”, the BIOS displays standard POST messages. If set to “Enabled”, an OEM logo is shown instead of POST messages.
- **Fast Boot**
  This item allows users to enable or disable boot initialization with the minimum number of devices necessary to launch the active boot option. These settings have no effects for BBS boot options.
- **Boot Option Priorities**
  This item allows users to set the system boot order.

3.2.6 Save & Exit

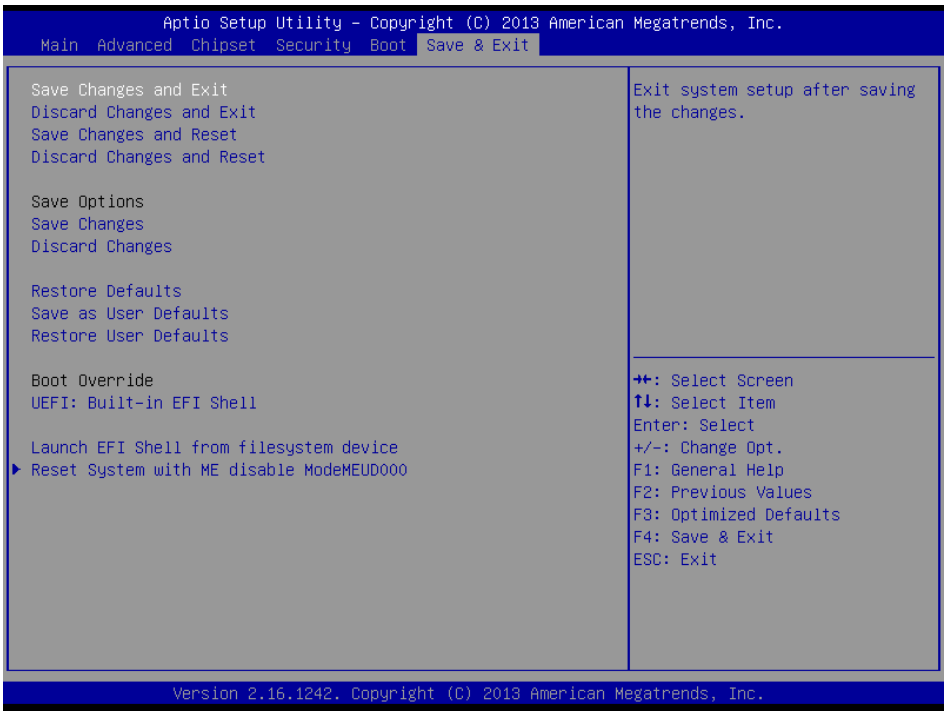


Figure 3.28 Save & Exit

- **Save Changes and Exit**
  This item allows users to save changes and exit the system setup page.
- **Discard Changes and Exit**
  This item allows users to exit the system setup without saving changes.
- **Save Changes and Reset**
  This item allows users to reset the system setup after saving changes.
- **Discard Changes and Reset**
  This item allows users to reset the system setup without saving changes.
- **Save Changes**
  This item allows users to save changes to all options.
- **Discard Changes**
  This item allows users to discard changes to all options.
- **Restore Defaults**
  This item allows users to restore/load the default values for all options.
- **Save as User Defaults**
  This item allows users to save changes as user defaults.
- **Restore User Defaults**
  This item allows users to restore the user defaults for all options.
- **Boot Override**
  This item allows users to override boot priority with a selected boot device.
- **Launch EFI Shell From a Filesystem Device**
  This item allows users to launch an EFI Shell application (Shellx64.efi) from an available filesystem device.

Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The PCI-7032's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1.1 Watchdog Timer Overview

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

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

A.1.2 Programming the Watchdog Timer

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

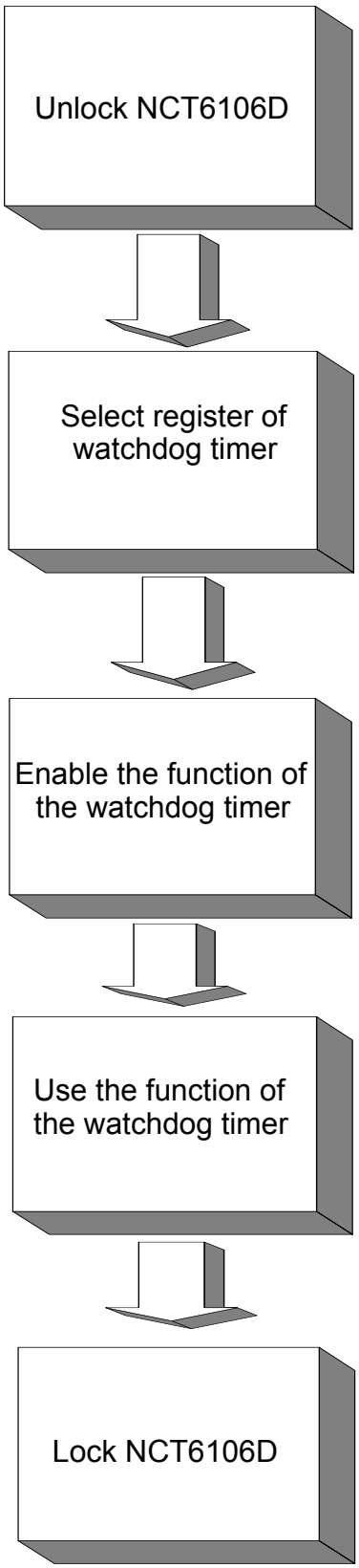

Unlock NCT6106D
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6106D

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

A.1.3 Example Program

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

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

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

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

```
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Set minute as counting unit
Mov al,0f0h
Out dx,al
Inc dx
In al,dx
Or al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Set timeout interval as 5 minutes and start counting
Mov al,0f1h
Out dx,al
Inc dx
Mov al,5
Out dx,al
;--------------------------------------------------------
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
```

3. Enable watchdog timer to be reset by mouse

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
```

```
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable watchdog timer to be reset by mouse
Mov al,0f2h
Out dx,al
Inc dx
In al,dx
Or al,80h
Out dx,al
;--------------------------------------------------------
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
```

4. Enable watchdog timer to be reset by keyboard

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

```
;--------------------------------------------------------
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
```

5. Generate a time-out signal without timer counting

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6106D
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Generate a time-out signal
Mov al,0f2h
Out dx,al ;Write 1 to bit 5 of F7 register
Inc dx
In al,dx
Or al,20h
Out dx,al
;--------------------------------------------------------
Dec dx ; Lock NCT6106D
Mov al,0aah
Out dx,al
```

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