



®

***AXIOMTEK***

**eBOX670-883-FL Series**

**Embedded System**

**User's Manual**



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## Safety Precautions

Before getting started, please read the following important safety precautions.

1. The eBOX670-883-FL does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the eBOX670-883-FL before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the eBOX670-883-FL is properly grounded.
4. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
5. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave this equipment in an uncontrolled environment where the storage temperature is below  $-45^{\circ}\text{C}$  or above  $80^{\circ}\text{C}$ . It may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
  - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
  - When handling boards and components, wear a wrist-grounding strap, available from most electronic component stores.

## **Classification**

1. Degree of protection against electric shock : not classified
2. Degree of protection against the ingress of water : IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
4. Mode of operation : Continuous

## General Cleaning Tips

You may need the following precautions before you begin to clean the computer. When you clean any single part or component for the computer, please read and understand the details below fully.

When you need to clean the device, please rub it with a piece of dry cloth.

1. Be cautious of the tiny removable components when you use a vacuum cleaner to absorb the dirt on the floor.
2. Turn the system off before you start to clean up the component or computer.
3. Never drop the components inside the computer or get circuit board damp or wet.
4. Be cautious of all kinds of cleaning solvents or chemicals when you use it for the sake of cleaning. Some individuals may be allergic to the ingredients.
5. Try not to put any food, drink or cigarette around the computer.

### Cleaning Tools:

Although many companies have created products to help improve the process of cleaning your computer and peripherals users can also use household items to clean their computers and peripherals. Below is a listing of items you may need or want to use while cleaning your computer or computer peripherals.

Keep in mind that some components in your computer may only be able to be cleaned using a product designed for cleaning that component, if this is the case it will be mentioned in the cleaning.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, we still recommend you to rub it with a piece of cloth.
- Water or rubbing alcohol: You may moisten a piece of cloth a bit with some water or rubbing alcohol and rub it on the computer. Unknown solvents may be harmful to the plastics parts.
- Vacuum cleaner: Absorb the dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items can restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and other locations.
- Foam swabs: Whenever possible it is better to use lint free swabs such as foam swabs.



**Note:** *We strongly recommended that you should shut down the system before you start to clean any single components.*

### Please follow the steps below:

1. Close all application programs
2. Close operating software
3. Turn off power switch
4. Remove all device
5. Pull out power cable

## **Scrap Computer Recycling**

If the computer equipment's needs the maintenance or are beyond repair, we strongly recommended that you should inform your Axiomtek distributor as soon as possible for the suitable solution. For the computers that are no longer useful or no longer working well, please contact your Axiomtek distributor for recycling and we will make the proper arrangement.

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# CHAPTER 1

## INTRODUCTION

This chapter contains general information and detailed specifications of the eBOX670-883-FL. The Chapter 1 includes the following sections:

- General Description
- System Specifications
- Dimensions
- I/O Outlets
- Packing List
- Model List

### 1.1 General Description

The eBOX670-883-FL is an embedded system that supports LGA1150 Socket 4<sup>th</sup> generation Intel® Core™ i7/i5/i3/Celeron processor to support Windows 7, Windows 7 Embedded, Windows 8, Windows 8 Embedded or Linux, suitable for the most endurable operation.

It features fan less design with full feature I/O, two 204-pin unbuffered SODIMM socket for dual channel DDR3-1333/1600 MHz memory, and enhanced system dependability by built-in Watchdog Timer.

- **Features**

1. Intel® Haswell Q87 Platform
2. Support LGA1150 Socket Intel® Core™ i7/i5/i3/Celeron processor
3. Maximum to 16GB SO-DIMM DDR3 1333/1600 MHz memory
4. Supports 6 USB 3.0 ports
5. Supports 6 jump-less RS-232/422/485
6. Supports 4 10/100/1000Mbps Ethernet ports
7. Supports ATX power switch with status indicator
8. 32 channel Digital I/O (16 IN & 16 OUT), Programmable
9. Two HDMI
10. One DisplayPort
11. One VGA
12. Two 2.5" SATA HDD drive bay
13. Two PCI Express Mini Card Slots w/ mSATA supported. (By jumper selection)
14. One front access CFast
15. Watchdog timer
16. VDC power input 9~36V
17. One SIM slot
18. Three Antenna openings

- **Reliable and Stable Design**  
The eBOX670-883-FL adopts the advanced cooling system and supporting the CFast™, which makes it especially suitable for vibration environments, best for industrial automation, digital signage and gaming application.
- **Embedded O.S. Supported**  
The eBOX670-883-FL not only supports Windows 7, Windows 8, but also supports embedded OS, such as Windows 7 Embedded, Windows 8 Embedded and Linux.
- **Various Storage devices supported**  
For storage device, the eBOX670-883-FL supports two 2.5" SATA storage drive bay, one CFast™ slot and mSATA device.

## 1.2 System Specifications

### 1.2.1 CPU

- **CPU**
  - LGA1150 Socket Intel® Core™ i7/i5/i3/Celeron processor
  - Working temperature depends on TDP of processor, please refer to 1.2.3 System Specification
- **Chipset**
  - Intel® Haswell Q87 chipset
- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
- **System Memory**
  - Two 204-pin unbuffered DDR3 1333/1600 MHz SO-DIMM socket, max. up to 16GB

### 1.2.2 I/O System

- Six jumper-less RS-232/422/485 9-pin D-Sub male connectors
- Two HDMI for display (Supports HDMI 1.4a, max resolution up to 4K x 2K)
- One VGA connector for display (Supports max resolution up to 1920x1200)
- One DisplayPort for display (Supports max resolution up to 2560x1600)
- One Audio connector (Mic-IN, Line-OUT)
- Four RJ-45 connectors for 10/100/1000 Base-T Ethernet ports (Intel® i210-IT, i217-LM)
- Six USB 3.0 connectors
- 16 Digital Input and 16 Digital Output for digital I/O 44-pin D-Sub female connectors
- Two PCI Express Mini Card Slots w/ mSATA supported.
- DC 9~36V power input connector
- One HDD Active and two programmable indicators
- One Reset switch
- One AT/ATX switch
- One Power switch
- One Remote PWR switch
- Three SMA type connector opening for Antenna

### 1.2.3 System Specification

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.
- **Power Supply**
  - 9-36V wide range DC input connector
- **Operation Temperature**
  - -40°C ~ 55°C (-4 °F ~ 131°F), with W.T. SSD & Memory ;CPU TDP 35W)
  - -40°C ~ 50°C (-4 °F ~ 122°F), with W.T. SSD & Memory ;CPU TDP 45W)

- **Storage Temperature**
  - -45°C ~ 80°C (-49 °F ~ 176°F)
- **Humidity**
  - 10% ~ 90% (non-condensation)
- **Vibration Endurance**
  - 3Grm w/ CFast (5-500Hz, X, Y, Z directions)
- **Weight**
  - 3.8 kg (8.37 lb) without package
  - 4.6 kg (10.14 lb) with package
- **Dimensions**
  - 280mm(11.02") (W) x190mm(7.48") (D) x 70mm(2.75") (H)

#### 1.2.4 Driver CD Content

- **Driver**
  - Audio
  - Chipset
  - Ethernet
  - Graphic
  - Intel Rapid Storage Technology
  - USB 3.0
  - ME 9.0
- **Manual**
  - User Manual
  - Quick Manual

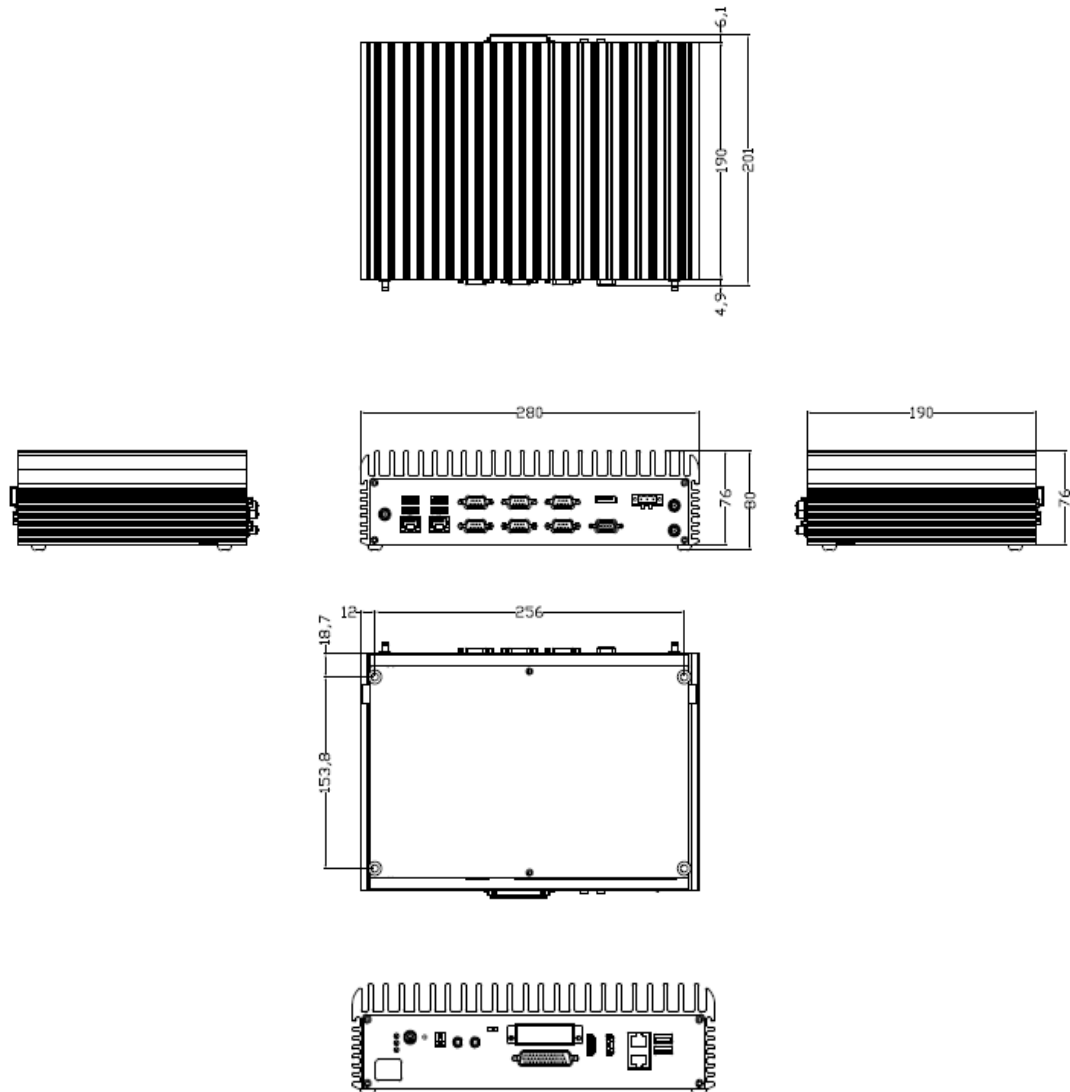


**Note:** All specifications and images are subject to change without notice.

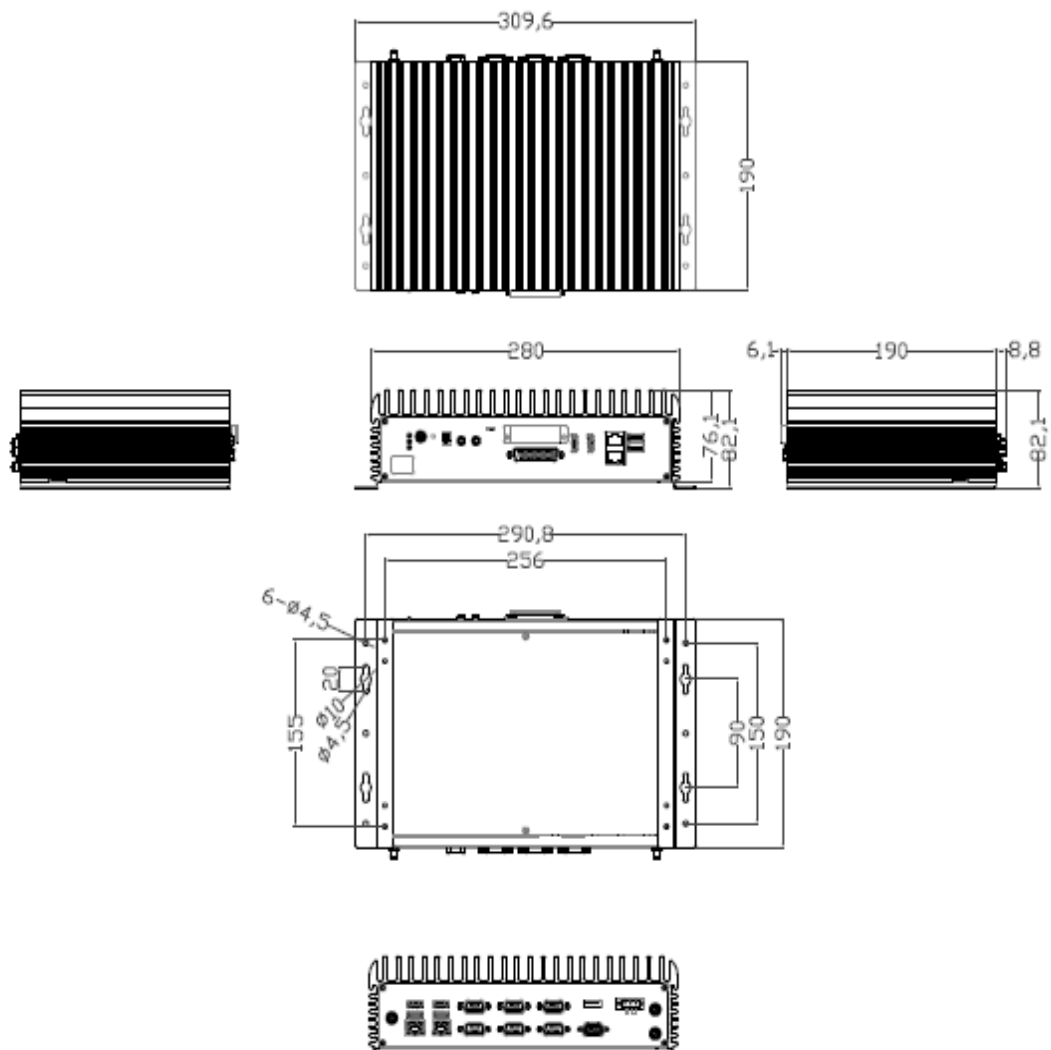
## 1.3 Dimensions

The following diagrams show you dimensions and outlines of the eBOX670-883-FL.

### 1.3.1 System Dimension



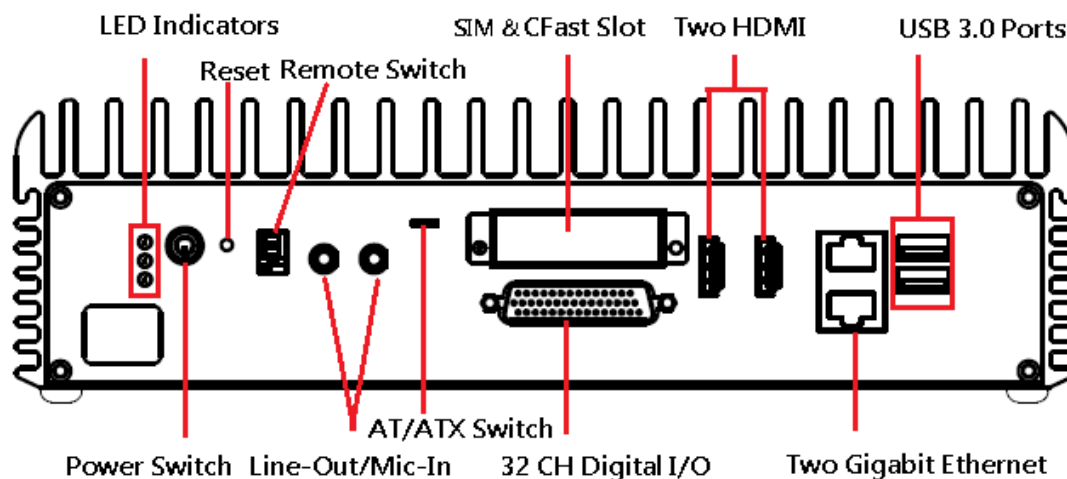
### 1.3.2 Wall mount Bracket Dimension



## 1.4 I/O Outlets

The following figures show you I/O outlets on front view of the eBOX670-883-FL.

- Front View drawing



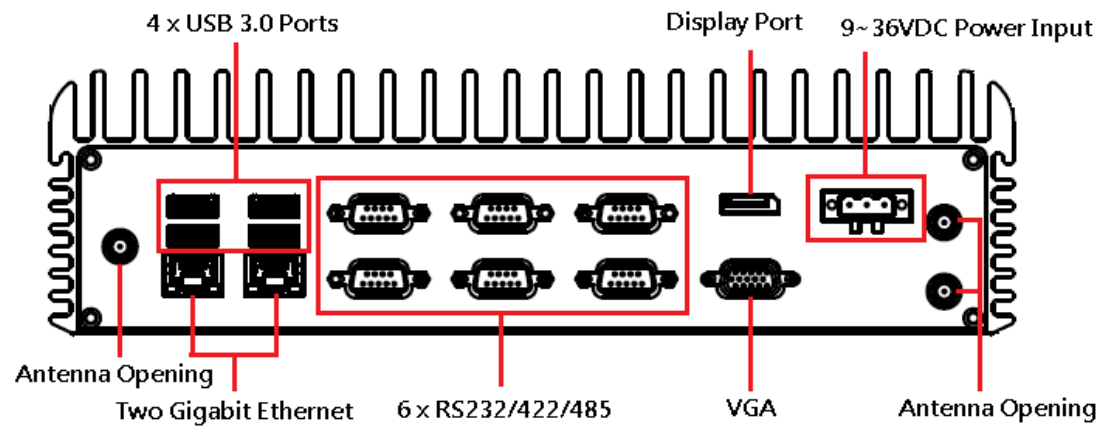
### ※ Indicator Information:

HDD: 1 x Orange LED for HDD active

PL1: Programmable LED (Please refer to Appendix B to set it.)

PL2: Programmable LED (Please refer to Appendix B to set it.)

- **Rear View drawing**





## 1.5 Packing List

The package bundled with your eBOX670-883-FL should contain the following items:

- eBOX670-883-FL System Unit x 1
- eBOX670-883-FL Quick Installation Guide x 1
- CD x 1 (For Driver and Manual)
- Screws Pack x1
- Pre-installed Intel Processor
- Pre-installed DDR3 SO-DIMM
- Pre-installed Foot pad x4
- Optional Wall-mount Brackets
- Optional Antenna
- Optional Mini Card module
- Optional 2.5" SATA Storage
- Optional CFast™ Card
- Optional mSATA

## 1.6 Model List

|                   |  |
|-------------------|--|
| eBOX670-883-FL-DC | Fanless Embedded System with Intel Core i7/i5/i3 & Celeron Processor, Q87 PCH, HDMIx2/VGA/DisplayPort, Dual HDD, GbE LAN*4, USB3.0*6, Audio, RS-232/422/485*6, 32 Channel digital I/O, 9~36VDC |
|-------------------|--|

If you cannot find this package or any items are missing, please contact Axiomtek distributors immediately.

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## CHAPTER 2 HARDWARE INSTALLATION

The eBOX670-883-FL is convenient for your various hardware configurations, such as HDD (Hard Disk Drive), SSD (Solid State Drive), CFast™ card or PCI Express Mini Card modules. The chapter 2 will show you how to install the hardware.

### 2.1 Installing the 2.5" SATA Device

<< HDD-A >>

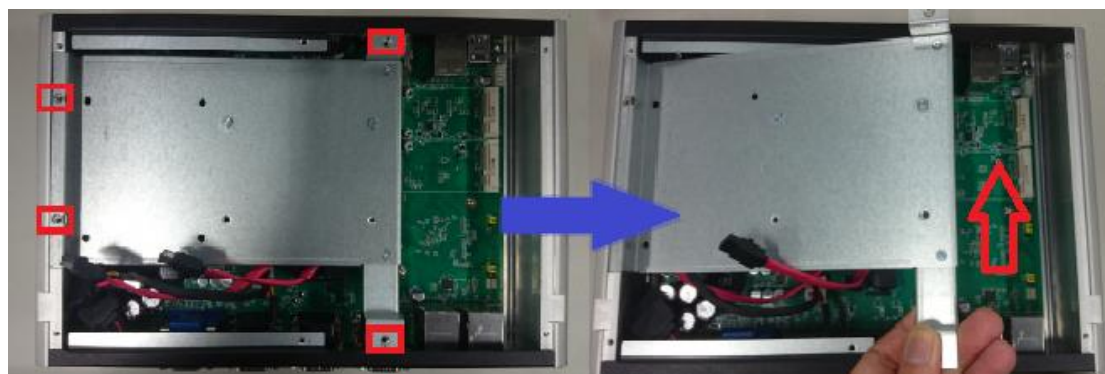
**Step 1** Turn off the system, and unplug the power cord.

**Step 2** Turn the system upside down to locate screws at the bottom, loosen screws.



**Step 3** Remove the bottom cover.

**Step 4** Please find the HDD bracket location then loosen four screws of HDD bracket to take out it.



**Step 5** Please prepare the following items to assemble HDD.



**Step 6 Fasten total four screws between two sides of HDD/SSD.**



※ Please notice that you should base on the photo to check HDD's direction.

**Step 7 Lock the HDD and fasten screws then connect SATA & Power cables.**

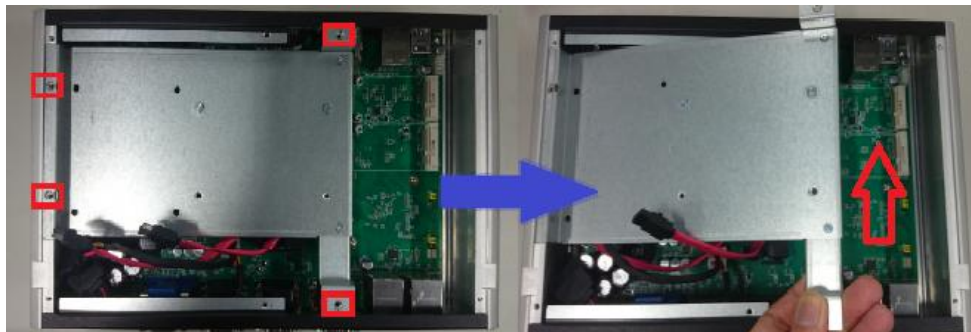


**Step 8 Please fasten screws of HDD bracket to complete first HDD installation.**



<< HDD-B >>

**Step 1** Please find the HDD bracket location then loosen four screws of HDD bracket to take out it.



**Step 2** You can refer to below photo to find out four screw holes and then set your HDD on bracket.



**Step 3** Then turn the bracket upside down then fasten screws with your 2.5" HDD/SSD. Connect SATA and Power cables.



**Step 4** Finally, set the bracket into chassis then fasten screws to fix it.



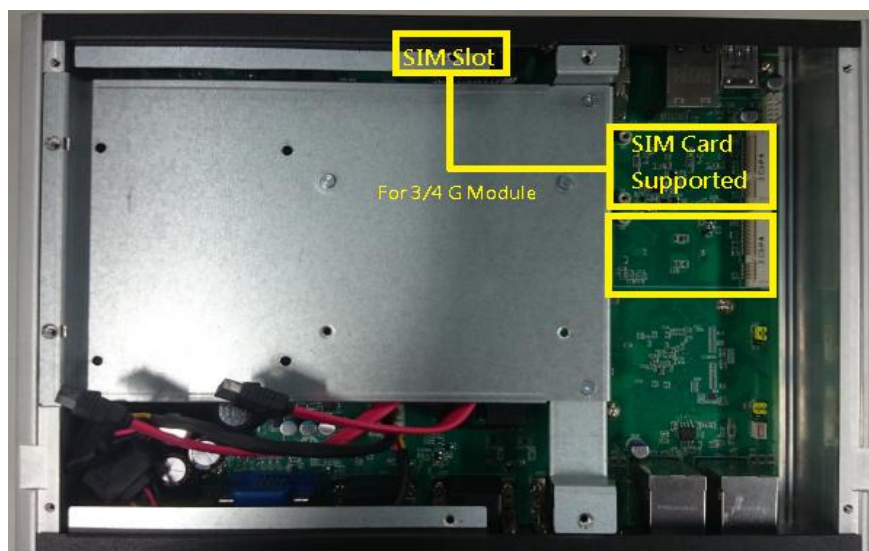
## 2.2 Installing the Express Mini Card

**Step 1** Turn off the system, and unplug the power cord.

**Step 2** Turn the system upside down to locate screws at the bottom, loosen screws.



**Step 3** Remove the top cover then find Mini Card location.



**Step 4** Please follow your requirement to connect PCI Express Mini Card module, EX: 3G/4G, WIFI, mSATA and GPS/Bluetooth modules.

Slide Mini card into Mini Card slot with caution, and fasten screw of Express Mini Card.



**Step 5** Assembly the Bottom Cover back and fasten all screws.



## 2.3 Installing the CFast Card

**Step 1** Turn off the system, and unplug the power cord.

**Step 2** Turn the system to the side with CFast & SIM cover.

**Step 3** Loosen screws to remove the CFast & SIM cover.



**Step4** Slide CFast card into CFast slot with caution.



**Step5** Close the cover to the chassis and fasten all screws.



## 2.4 Installing the SIM Card

**Step 1** Turn off the system, and unplug the power cord.

**Step 2** Turn the system to the side with CFast & SIM cover.

**Step 3** Loosen screws to remove the CFast & SIM cover.



**Step 4** Insert SIM card into SIM slot with caution.



**Step 5** Close the cover to the chassis and fasten all screws.





## 2.5 Installing the SO-DIMM Memory

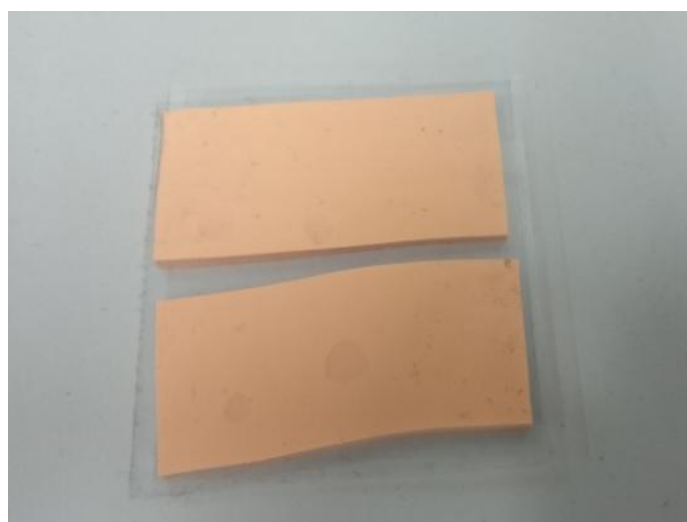
Basically, we strongly recommend you to order SO-DIMM memory from Axiomtek, since we can follow your requirement to assemble compatible SO-DIMM memory to avoid any unexpected problems. If you would like to assemble memory or upgrade memory; please refer to the following information to add thermal pad by yourself.

**Step 1** Turn off the system, and unplug the power cord.

**Step 2** Please loosen all of screws and hexagon copper pillars, since two SO-DIMM slots are on the top side of main board.

**Step 3** You can get thermal pad of memory from accessory box.

(If you don't order memory from Axiomtek, you will get them from accessory box.)



**Step 4** Stick the thermal pad onto motherboard then insert your memory to the slot.



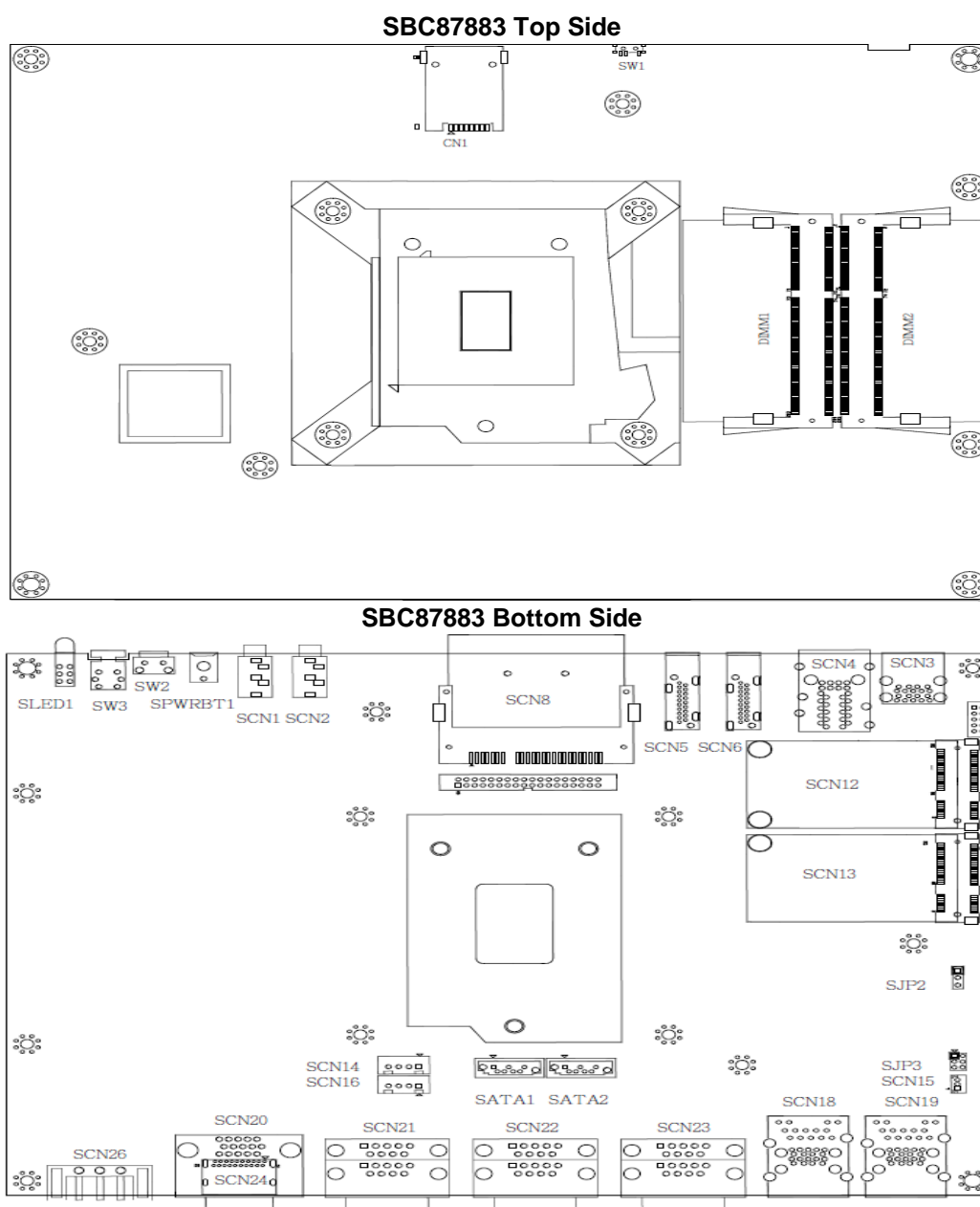
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## CHAPTER 3

# JUMPER SETTING & CONNECTOR

Proper jumper settings configure the **eBOX670-883-FL** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

### 3.1 Jumper & Connector Location



**Note:** We strongly recommended that you should not modify any unmentioned jumper setting without Axiomtek FAE's instruction. Any modification without instruction might cause system to become damage.

## 3.2 Jumper Setting Summary

Proper jumper settings configure the eBOX670-883-FL to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

| Jumper | Function/Default Setting                                   | Jumper Setting                       |
|--------|--|--------------------------------------|
| SJP2   | Restore BIOS Optimal Defaults<br>Default: Normal Operation | Short 1-2                            |
| SJP3   | mSATA / PCIe Selection                                     | SCN12: 3-5 Short<br>SCN13: 4-6 Short |



### **Note:** How to setup Jumpers

The illustration shows how to set up jumpers. When the jumper cap is placed on pins, the jumper is “close”, if not, that means the jumper is “open”.



[Open]



[Closed]

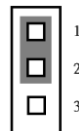


[Pin1-2 Closed]

### 3.2.1 Restore BIOS Optimal Defaults (SJP2)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

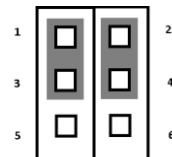
| Function         | Setting |
|------------------|---------|
| Normal (Default) | 1-2     |
| Clear RTC        | 2-3     |



### 3.2.2 Mini Card Selection (SJP3)

Select mSATA or PCI-Express x1 support on PCI-Express Mini Card socket.

| Function  | SCN12     | SCN13     |
|-----------|-----------|-----------|
| mSATA     | 1-3 Short | 2-4 Short |
| PCI-E/USB | 3-5 Short | 4-6 Short |



### 3.3 Connectors

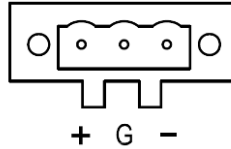
Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors and button on the eBOX670-883-FL Series.

| External Connectors / Buttons       | Section |
|-------------------------------------|---------|
| DC-in Phoenix Power Connector       | 3.3.1   |
| VGA Connector                       | 3.3.2   |
| HDMI Connector                      | 3.3.3   |
| DisplayPort Connector               | 3.3.4   |
| COM Serial Port Connector           | 3.3.5   |
| USB 3.0 Connector                   | 3.3.6   |
| Ethernet Connector                  | 3.3.7   |
| Audio Connector                     | 3.3.8   |
| ATX Power On/OFF Button             | 3.3.9   |
| Rest Button                         | 3.3.10  |
| Remote Power Switch Connector       | 3.3.11  |
| AT/ATX Switch                       | 3.3.12  |
| SIM Card Slots                      | 3.3.13  |
| Serial ATA Connectors (SATA1-SATA2) | 3.3.14  |
| CFast Socket                        | 3.3.15  |
| Digital I/O Connector               | 3.3.16  |
| PCI Express Mini Card interface     | 3.3.18  |

### 3.3.1 DC-in Phoenix Power Connector

The system supports a wide range 9~36V Phoenix DC-in connector for system power input.

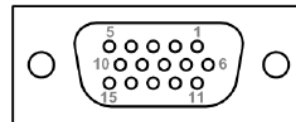
| Pin | Signal |
|-----|--------|
| 1   | DC+    |
| 2   | GND    |
| 3   | DC-    |



### 3.3.2 VGA Connector

The VGA connector is a slim type 15-pin D-Sub connector which is common for the CRT VGA display. The VGA interface configuration can be configured via the software utility.

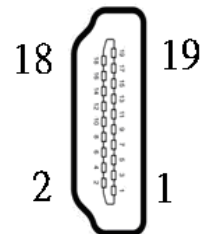
| Pin | Signal          | Pin | Signal        |
|-----|-----------------|-----|---------------|
| 1   | Red             | 2   | Green         |
| 3   | Blue            | 4   | N.C.          |
| 5   | GND             | 6   | DETECT        |
| 7   | GND             | 8   | GND           |
| 9   | VCC             | 10  | GND           |
| 11  | N.C.            | 12  | DDC DATA      |
| 13  | Horizontal Sync | 14  | Vertical Sync |
| 15  | DDC CLK         |     |               |



### 3.3.3 HDMI Connector

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.

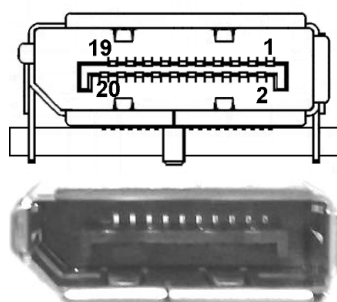
| Pin | Signal          | Pin | Signal          |
|-----|-----------------|-----|-----------------|
| 1   | HDMI OUT_DATA2+ | 11  | GND             |
| 2   | GND             | 12  | HDMI OUT Clock- |
| 3   | HDMI OUT_DATA2- | 13  | N.C.            |
| 4   | HDMI OUT_DATA1+ | 14  | N.C.            |
| 5   | GND             | 15  | HDMI OUT_SCL    |
| 6   | HDMI OUT_DATA1- | 16  | HDMI OUT_SDA    |
| 7   | HDMI OUT_DATA0+ | 17  | GND             |
| 8   | GND             | 18  | +5V             |
| 9   | HDMI OUT_DATA0- | 19  | HDMI_HTPLG      |
| 10  | HDMI OUT Clock+ |     |                 |



### 3.3.4 DisplayPort Connector

DisplayPort interface is also called DP port.

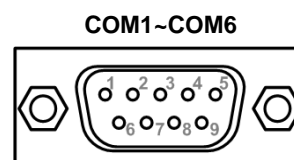
| Pin | Signal     |
|-----|------------|
| 1   | DPB_LANE0  |
| 2   | GND        |
| 3   | DPB_LANE0# |
| 4   | DPB_LANE1  |
| 5   | GND        |
| 6   | DPB_LANE1# |
| 7   | DPB_LANE2  |
| 8   | GND        |
| 9   | DPB_LANE2# |
| 10  | DPB_LANE3  |
| 11  | GND        |
| 12  | DPB_LANE3# |
| 13  | Detect Pin |
| 14  | GND        |
| 15  | DPB_AUX    |
| 16  | GND        |
| 17  | DPB_AUX#   |
| 18  | DPB_HPDE   |
| 19  | GND        |
| 20  | +3.3V      |



### 3.3.5 COM1~COM6 Serial Port Connector

The system has six serial ports. COM1~COM6 are RS-232/422/485 ports. Please refer to Chapter 4 for the detail of BIOS setting.

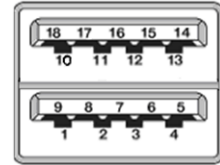
| Pin | RS-232                   | RS-422 | RS-485 |
|-----|--------------------------|--------|--------|
| 1   | DCD, Data Carrier Detect | TX-    | Data-  |
| 2   | RXD, Receive Data        | TX+    | Data+  |
| 3   | TXD, Transmit Data       | RX+    | No use |
| 4   | DTR, Data Terminal Ready | RX-    | No use |
| 5   | GND, Ground              | No use | No use |
| 6   | DSR, Data Set Ready      | No use | No use |
| 7   | RTS, Request To Send     | No use | No use |
| 8   | CTS, Clear To Send       | No use | No use |
| 9   | RI, Ring Indicator       | No use | No use |



### 3.3.6 USB 3.0 Connector

The Universal Serial Bus connectors are compliant with USB 3.0 (5Gb/s), and ideally for installing USB peripherals such as keyboard, mouse, scanner, etc.

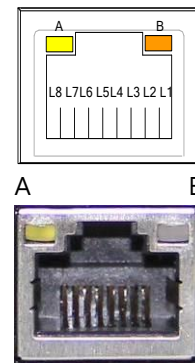
| Pin | Signal USB Port 0                 | Pin | Signal USB Port 1                 |
|-----|-----------------------------------|-----|-----------------------------------|
| 1   | USB_VCC (+5V level standby power) | 10  | USB_VCC (+5V level standby power) |
| 2   | USB_Data2-                        | 11  | USB_Data3-                        |
| 3   | USB_Data2+                        | 12  | USB_Data3+                        |
| 4   | GND                               | 13  | GND                               |
| 5   | SSRX2-                            | 14  | SSRX3-                            |
| 6   | SSRX2+                            | 15  | SSRX3+                            |
| 7   | GND                               | 16  | GND                               |
| 8   | SSTX2-                            | 17  | SSTX3-                            |
| 9   | SSTX2+                            | 18  | SSTX3+                            |



### 3.3.7 Ethernet Connector (LAN1~LAN4)

The RJ-45 connector is for Ethernet-(Intel i210-IT, i217-V). To connect the board to a 1000/100/10 Base-T hub, just plug one end of the cable into connector and connect the other end (phone jack) to a 1000/100/10-Base-T hub.

| Pin | Signal                                     | Pin | Signal |
|-----|--|-----|--------|
| L1  | MDI0+                                      | L5  | MDI2-  |
| L2  | MDI0-                                      | L6  | MDI1-  |
| L3  | MDI1+                                      | L7  | MDI3+  |
| L4  | MDI2+                                      | L8  | MDI3-  |
| A   | Active LED (Yellow)                        |     |        |
| B   | 100 LAN LED (Green)/ 1000 LAN LED (Orange) |     |        |

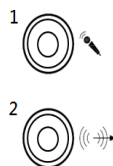




### 3.3.8 Audio Connector (SCN2, SCN1)

These two audio jacks ideal are for Audio Mic-In and Audio Line-out.

| Pin | Signal        |
|-----|---------------|
| 1   | Line Out      |
| 2   | Microphone In |



### 3.3.9 ATX Power On/OFF Button

The ATX power button is on the I/O side. It can allow users to control eBOX635-881-FL power on/off.

| Function | Description        |
|----------|--------------------|
| On       | Turn on/off system |
| Off      | Keep system status |



### 3.3.10 Reset Button

The Reset button can allow users to reset eBOX635-881-FL.

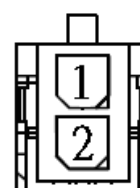
| Function | Description        |
|----------|--------------------|
| On       | Reset system       |
| Off      | Keep system status |



### 3.3.11 Remote Power Switch Connector (SPWRBT1)

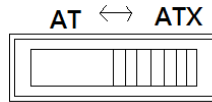
One 2-pin connector output for remote power on/off switch.

| Function   | Description        |
|------------|--------------------|
| Short(1-2) | Turn on/off system |
| Open       | Keep system status |



### 3.3.12 AT/ATX Switch

If you set AT/ATX switch to AT mode, the system will be automatically power on without pressing soft power button during power input; we can use this switch to achieve auto power on demand.



### 3.3.13 SIM Card Slots

eBOX670-883-FL includes one SIM slots on the bottom side of the system for inserting SIM Card. It is mainly used in 3G wireless network application.

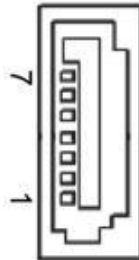
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | PWR    | 5   | GND    |
| 2   | RST    | 6   | VPP    |
| 3   | CLK    | 7   | IO     |
| 4   | NC     | 8   | NC     |



### 3.3.14 Serial ATA Connectors (SATA1-SATA2)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives. This board has two SATA 3.0 ports with 6Gb/s performance.

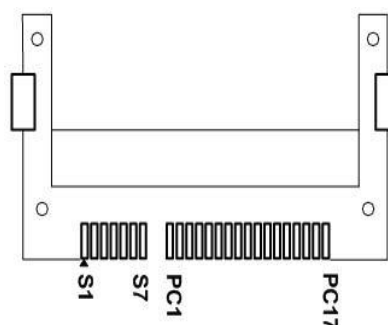
| Pin | Signal   |
|-----|----------|
| 1   | GND      |
| 2   | SATA_TX+ |
| 3   | SATA_TX- |
| 4   | GND      |
| 5   | SATA_RX- |
| 6   | SATA_RX+ |
| 7   | GND      |



### 3.3.15 CFast™ Socket

The system is equipped with a CFast™ socket on the bottom side to support a CFast™ card which is based on the Serial ATA bus. The socket is specially designed to avoid incorrect installation of the CFast™ card. When installing or removing the CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

| Pin | Signal | Pin  | Signal |
|-----|--------|------|--------|
| S1  | GND    | PC1  | NC     |
| S2  | TX+    | PC2  | GND    |
| S3  | TX-    | PC3  | NC     |
| S4  | GND    | PC4  | NC     |
| S5  | RX-    | PC5  | NC     |
| S6  | RX+    | PC6  | NC     |
| S7  | GND    | PC7  | GND    |
|     |        | PC8  | NC     |
|     |        | PC9  | NC     |
|     |        | PC10 | NC     |
|     |        | PC11 | NC     |
|     |        | PC12 | NC     |
|     |        | PC13 | 3.3V   |
|     |        | PC14 | 3.3V   |
|     |        | PC15 | GND    |
|     |        | PC16 | GND    |
|     |        | PC17 | NC     |

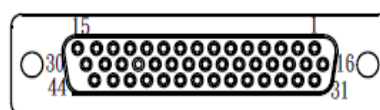


### 3.3.16 Digital I/O Connector

The system is equipped with 32bit Programmable Digital I/O for 44-pin D-Sub female connectors, please refer to the following table to get default pin define. Default is 16in/16out.

The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

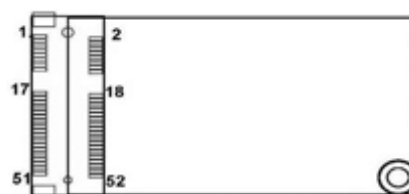
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | VCC    | 2   | VCC    |
| 3   | Din    | 4   | Dout   |
| 5   | Din    | 6   | Dout   |
| 7   | Din    | 8   | Dout   |
| 9   | Din    | 10  | Dout   |
| 11  | Din    | 12  | Dout   |
| 13  | Din    | 14  | Dout   |
| 15  | Din    | 16  | Dout   |
| 17  | Din    | 18  | Dout   |
| 19  | Din    | 20  | Dout   |
| 21  | Din    | 22  | Dout   |
| 23  | Din    | 24  | Dout   |
| 25  | Din    | 26  | Dout   |
| 27  | Din    | 28  | Dout   |
| 29  | Din    | 30  | Dout   |
| 31  | Din    | 32  | Dout   |
| 33  | Din    | 34  | Dout   |
| 35  | GND    | 36  | GND    |
| 37  | N/A    | 38  | N/A    |
| 39  | N/A    | 40  | N/A    |
| 41  | N/A    | 42  | N/A    |
| 43  | N/A    | 44  | N/A    |



### 3.3.17 Express Mini Card Slot (SCN12, SCN13)

eBOX670-883-FL provides two PCI Express Mini Card slots and they all supports a PCI Express x1 link and a USB 2.0 link with mSATA function. **You can adjust SJP3 to set mSATA function for SCN12 or SCN13.**

| Pin <sub>1</sub> | Signal <sub>1</sub> | Pin <sub>2</sub> | Signal <sub>2</sub>   |
|------------------|---------------------|------------------|-----------------------|
| 1                | WAKE#               | 2                | +3.3VSB               |
| 3                | No use              | 4                | GND                   |
| 5                | No use              | 6                | +1.5V                 |
| 7                | CLKREQ#             | 8                | No use                |
| 9                | GND                 | 10               | No use                |
| 11               | REFCLK-             | 12               | No use                |
| 13               | REFCLK+             | 14               | No use                |
| 15               | GND                 | 16               | No use                |
| 17               | No use              | 18               | GND                   |
| 19               | No use              | 20               | No use                |
| 21               | GND                 | 22               | PERST#                |
| 23               | PE_RXN3             | 24               | +3.3VSB               |
| 25               | PE_RXP3             | 26               | GND                   |
| 27               | GND                 | 28               | +1.5V                 |
| 29               | GND                 | 30               | SMB_CLK               |
| 31               | PE_TXN3             | 32               | SMB_DATA <sub>1</sub> |
| 33               | PE_TXP3             | 34               | GND                   |
| 35               | GND                 | 36               | USB_D8-               |
| 37               | GND                 | 38               | USB_D8+               |
| 39               | +3.3VSB             | 40               | GND <sub>1</sub>      |
| 41               | +3.3VSB             | 42               | No use                |
| 43               | GND                 | 44               | No use                |
| 45               | No use              | 46               | No use                |
| 47               | No use              | 48               | +1.5V                 |
| 49               | No use              | 50               | GND                   |
| 51               | No use              | 52               | +3.3VSB               |



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## CHAPTER 4

# BIOS SETUP UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the BIOS setup utility.

### 4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

### 4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.



**Note:** Some of the navigation keys differ from one screen to another.

| Hot Keys      | Description  |
|---------------|--|
| →← Left/Right | The Left and Right <Arrow> keys allow you to select a setup screen.  |
| ↑↓ Up/Down    | The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.   |
| +– Plus/Minus | The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.  |
| Tab           | The <Tab> key allows you to select setup fields.   |
| F1            | The <F1> key allows you to display the General Help screen.  |
| F2            | The <F2> key allows you to Load Previous Values.   |
| F3            | The <F3> key allows you to Load Optimized Defaults.  |
| F4            | The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.   |
| Esc           | The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.                       |
| Enter         | The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens. |

## 4.3 Main Menu

The first time you enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



### BIOS Information

Display the auto-detected BIOS information.

### System Date/Time

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 is entered in HH:MM:SS format.

### Access Level

Display the access level of current user.



## 4.2 Advanced Menu

- **Launch PXE OpROM**

Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

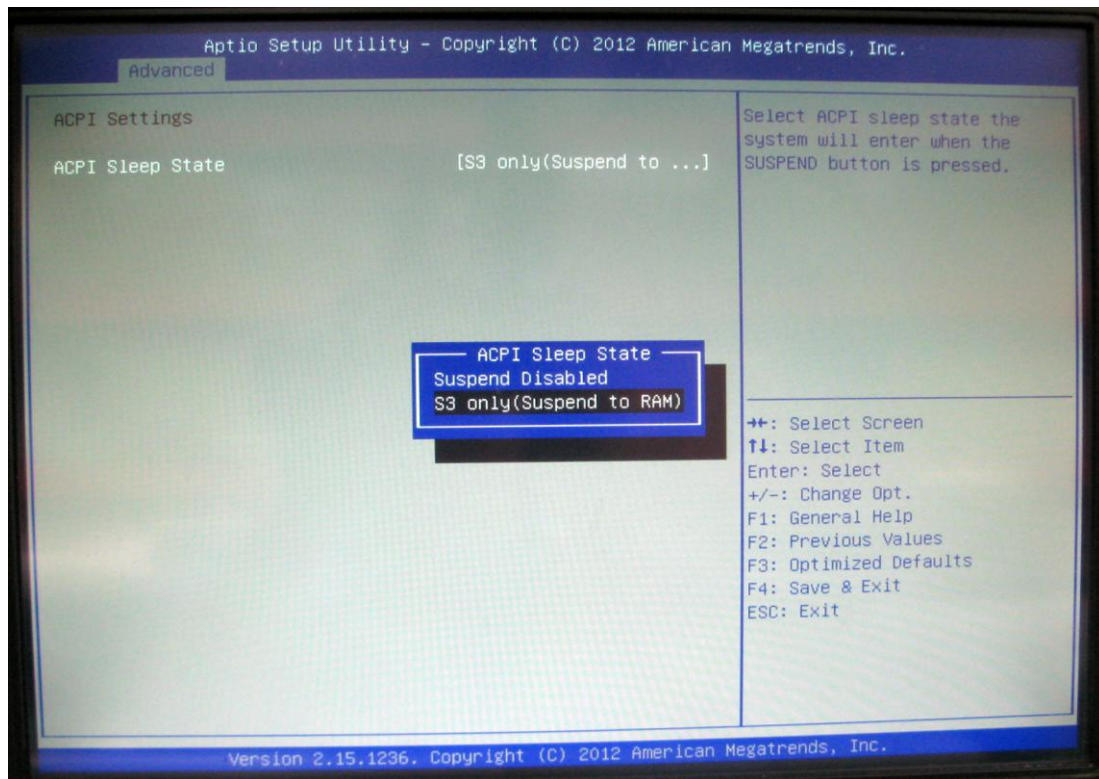
- ▶ ACPI Settings
- ▶ CPU Configuration
- ▶ IDE Configuration
- ▶ NCT6627UD Super IO Configuration
- ▶ NCT6627UD HW Monitor

For items marked with “▶”, please press <Enter> for more options.



- **ACPI Settings**

You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

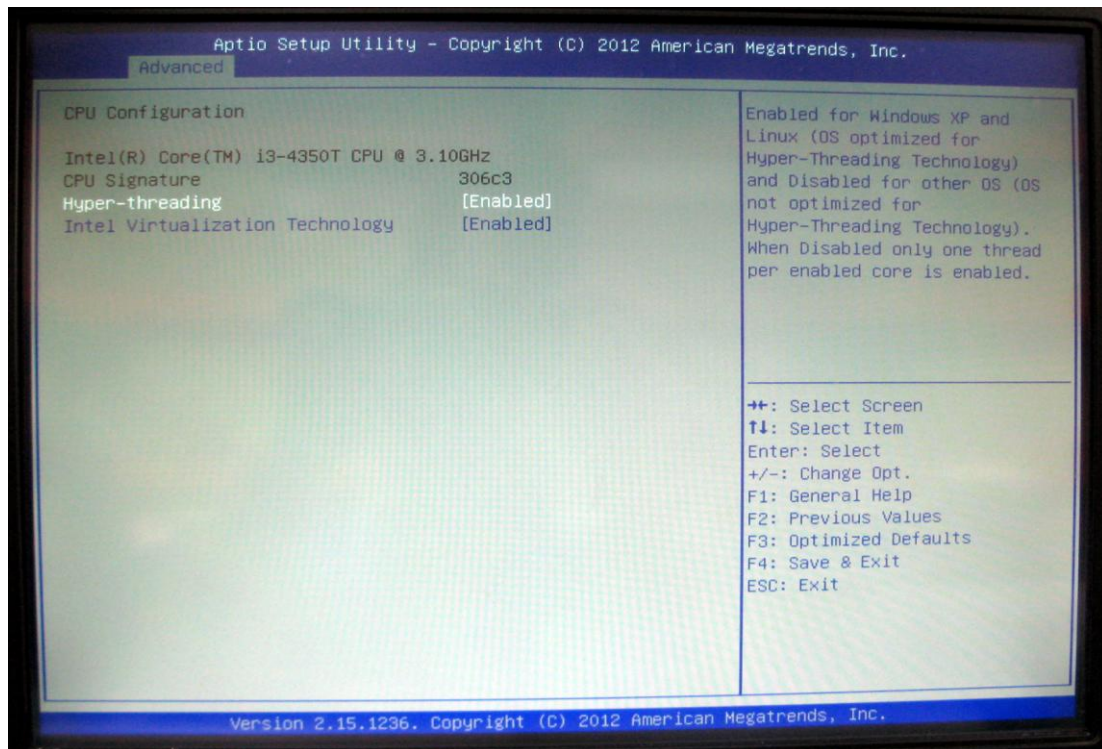


### **ACPI Sleep State**

Allow you to select the Advanced Configuration and Power Interface (ACPI) sleep state. Here are the options for your selection: Suspend Dissabled and S3 (Suspend to RAM). The S3 (Suspend to RAM) option selects the highest ACPI sleep state the system will enter when SUSPEND button is pressed.

- **CPU Configuration**

This screen shows the CPU information.



### **Hyper-threading**

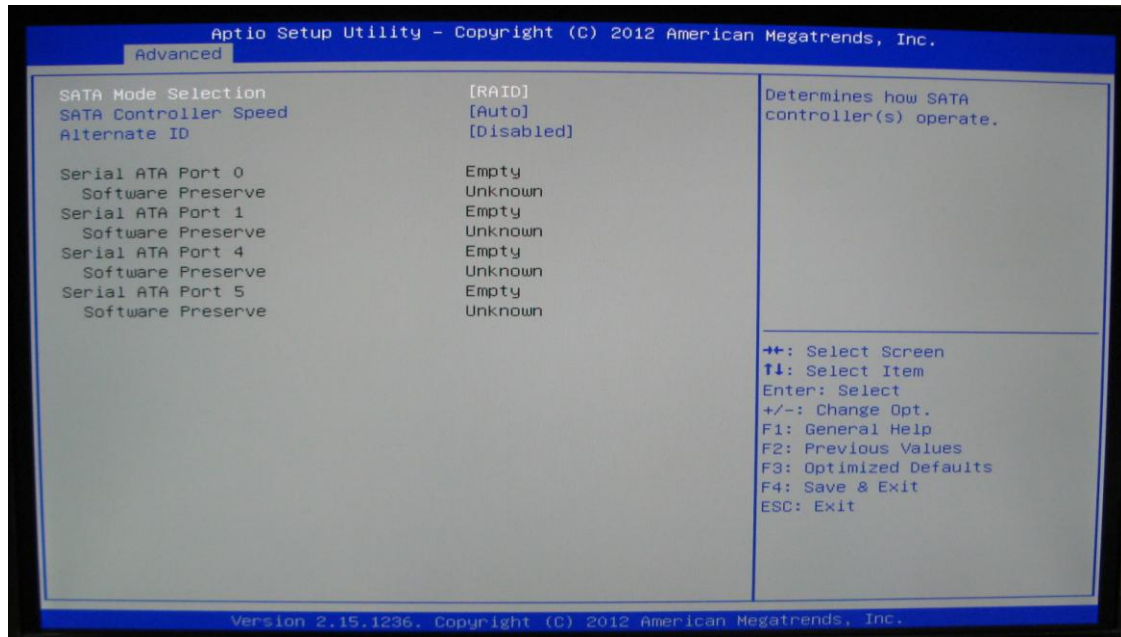
To enable hyperthreading you must first enable it in your system's BIOS settings, the default is enabled.

### **Intel Virtualization Technology**

If you want to enable or disable Intel Virtualization Technology function through BIOS, please adjust this item.

## • SATA Configuration

In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



### SATA Mode Selection

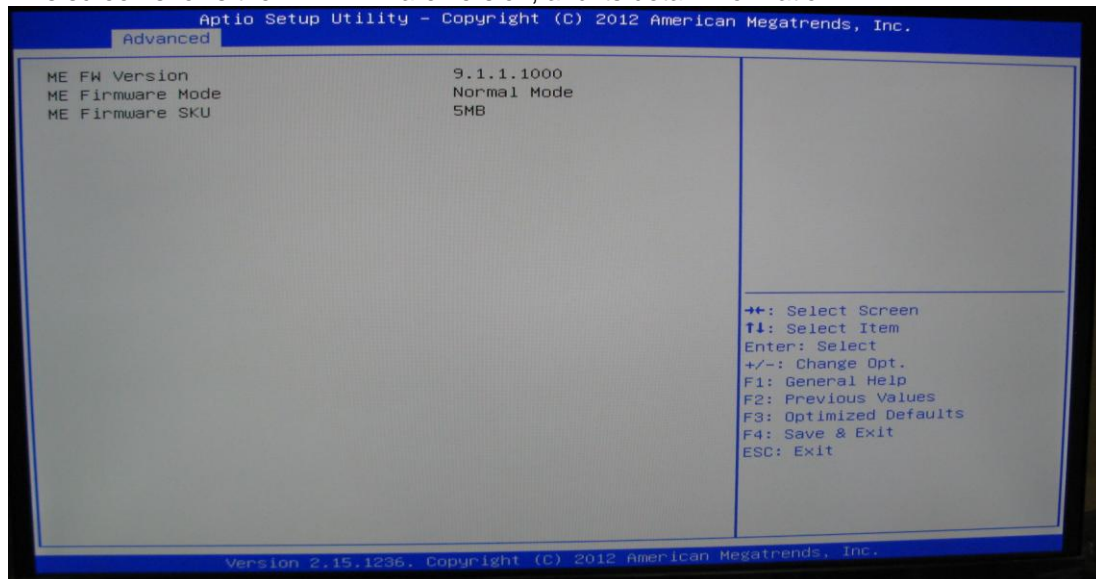
Determine how SATA controller(s) operate. Operation mode options are **RAID Mode**, **IDE Mode** and **AHCI Mode**.

### SATA Control Speed

Use this item to choose the SATA speed. Here are the options for your selection: Auto Gen1, Gen2 and Gen3.

## • PCH-FW Configuration

This screen shows the ME Firmware version, and its detail information.

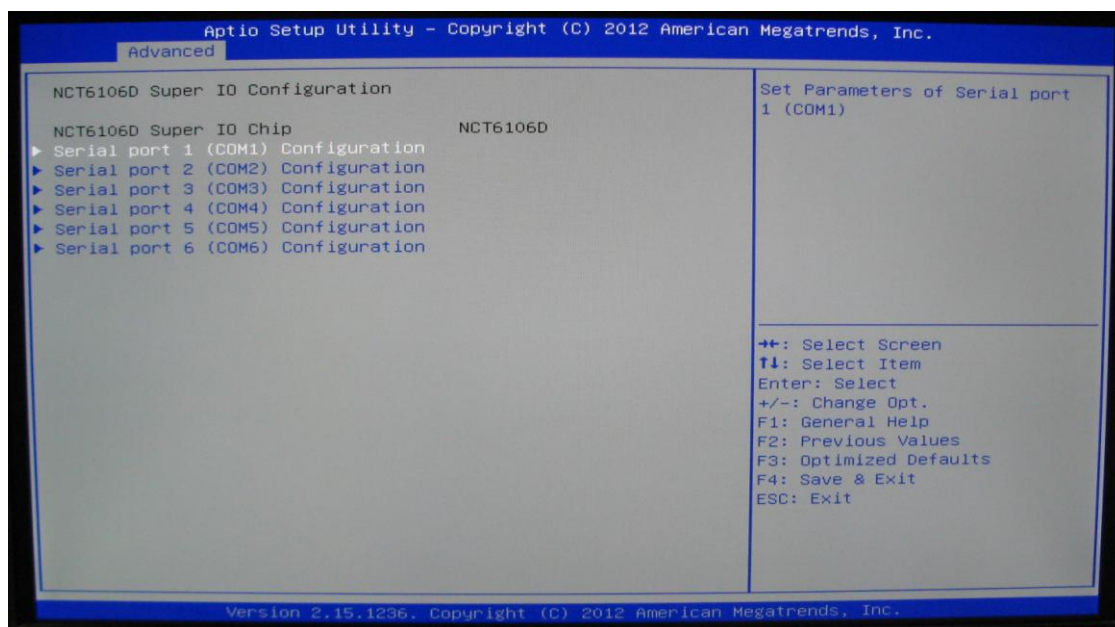




- **NCT6627UD Super IO Configuration**

You can use this screen to select options for the Super IO Configuration, and change the value of the selected option.

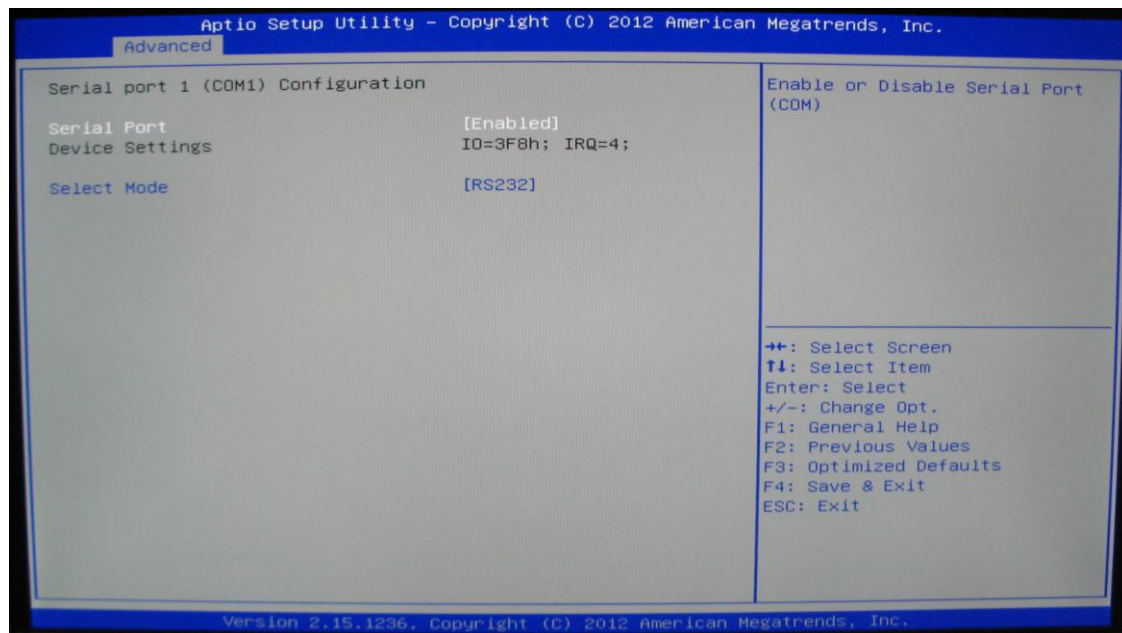
A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



### **Serial Port 1~6 Configuration**

Use these items to set parameters of Serial Port 1~6.

- **Serial Port 1 Configuration**



### **Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request line is IRQ4.

### **Select Mode**

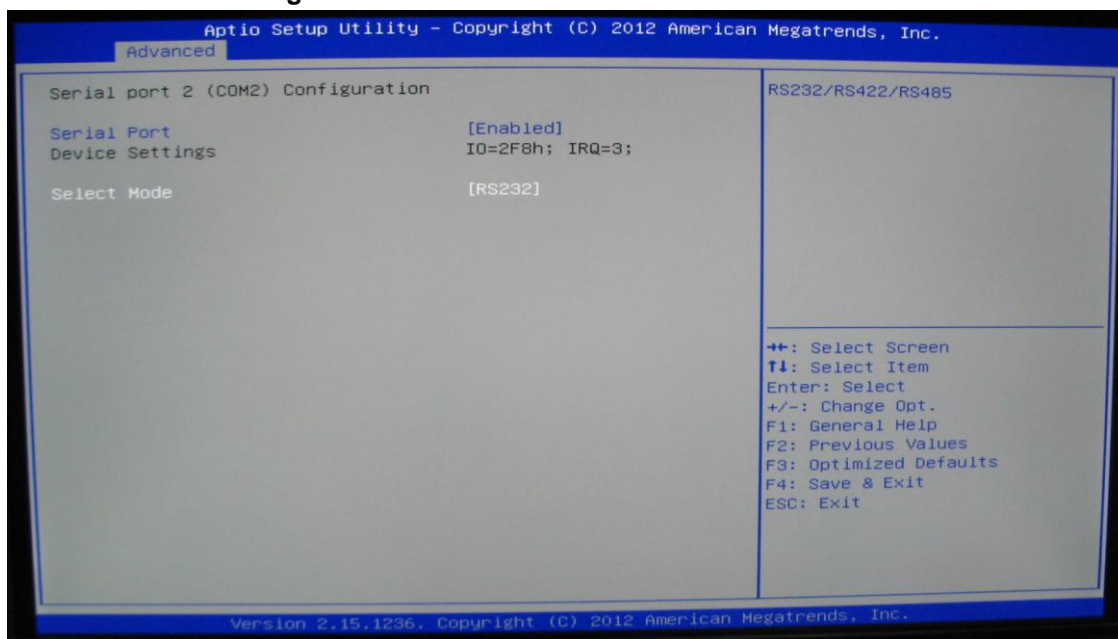
Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

RS485.

- **Serial Port 2 Configuration**

**Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 2F8h and for interrupt request line is IRQ3.

**Select Mode**

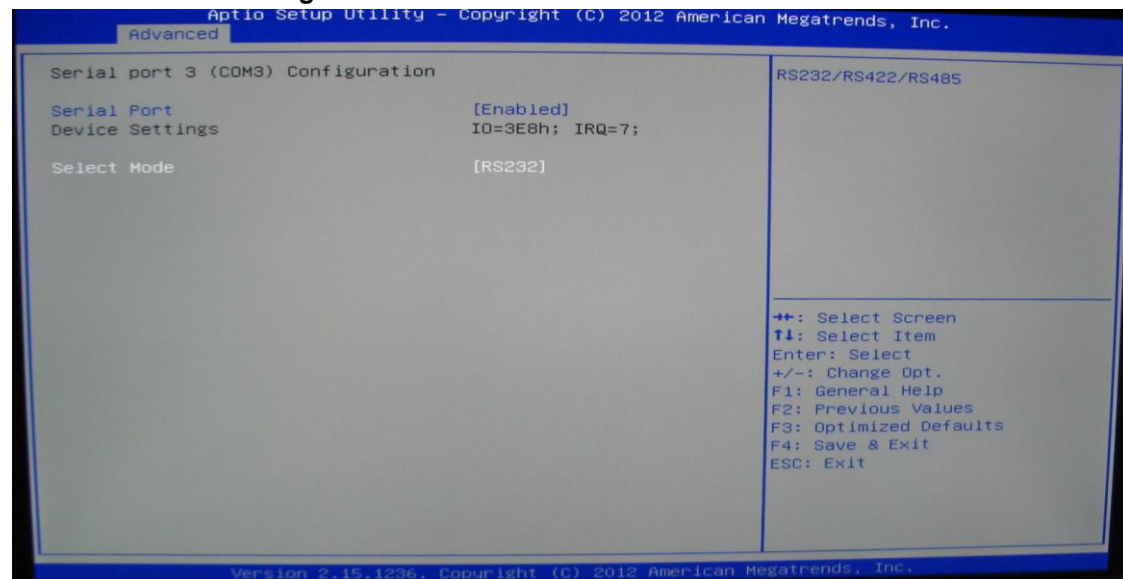
Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

RS485.

- **Serial Port 3 Configuration**



**Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 3E8h and for interrupt request line is IRQ7.

**Select Mode**

Use this item to configure serial port 0. Here are the options for your selection:

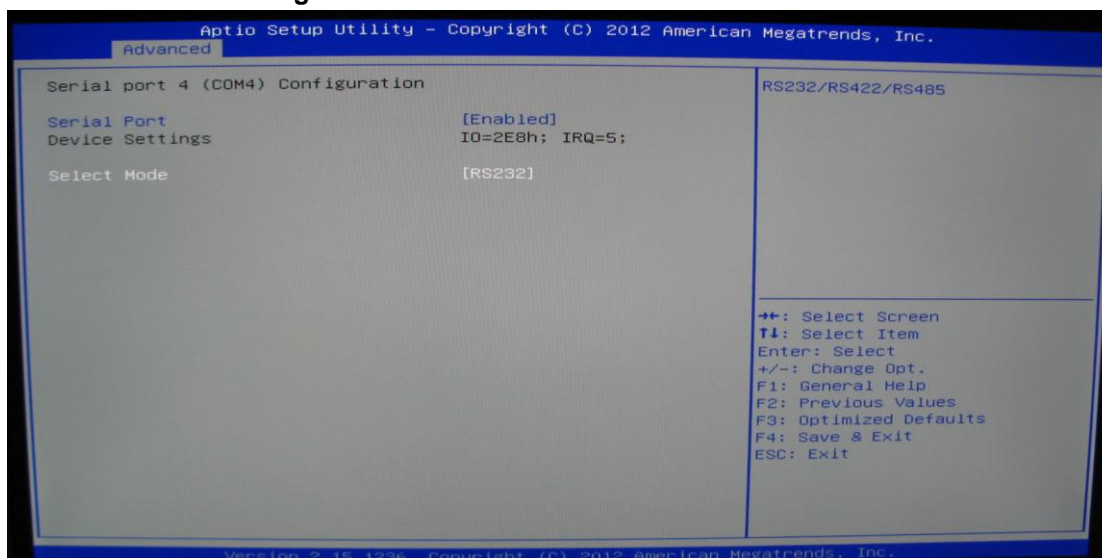
RS232

RS422

RS485.



- **Serial Port 4 Configuration**

**Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 2E8h and for interrupt request line is IRQ5.

**Select Mode**

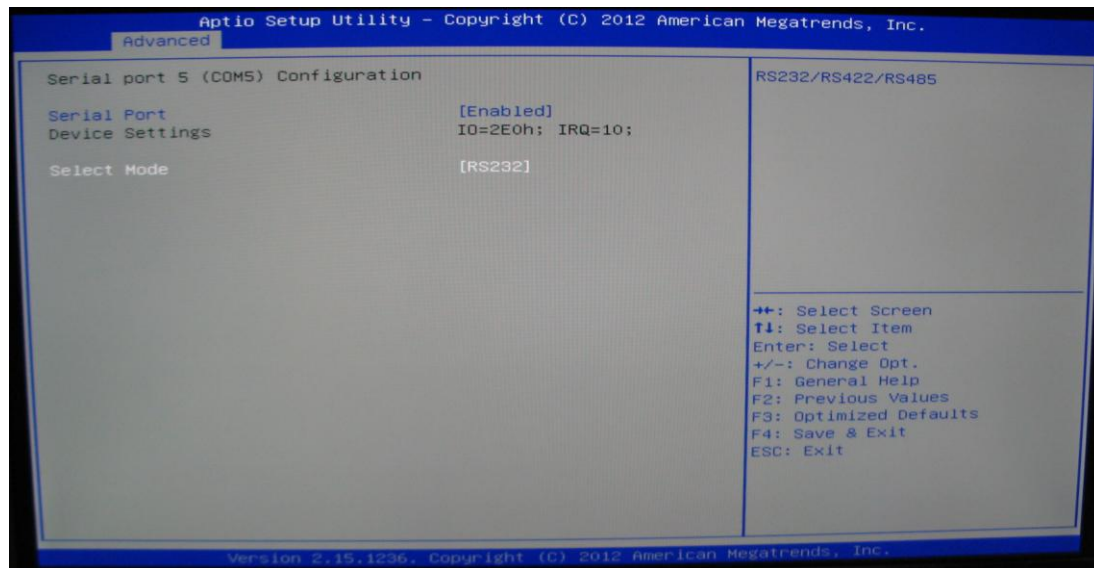
Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

RS485.

- **Serial Port 5 Configuration**



### **Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 2E0h and for interrupt request line is IRQ10.

### **Select Mode**

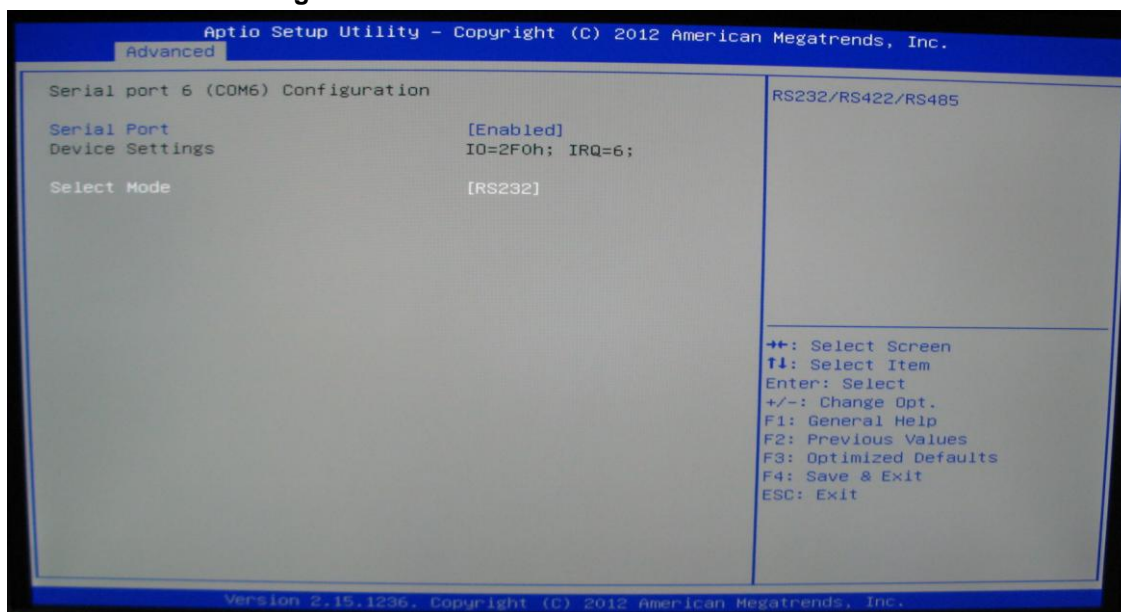
Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

RS485.

- **Serial Port 6 Configuration**

**Serial Port**

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 2F0h and for interrupt request line is IRQ6.

**Select Mode**

Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

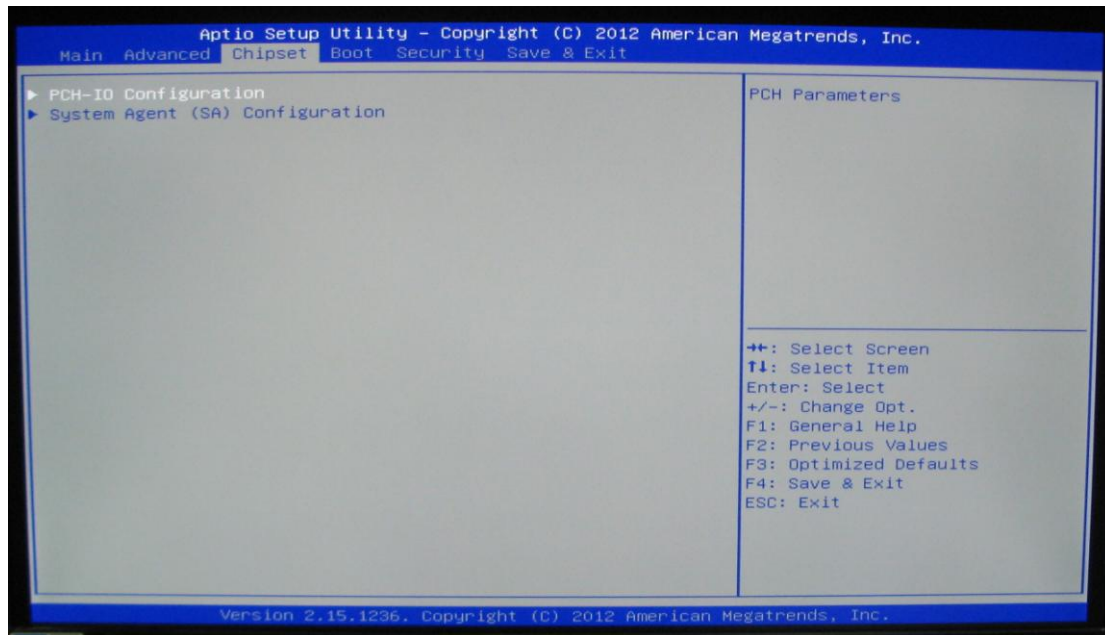
RS485.

## 4.3 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

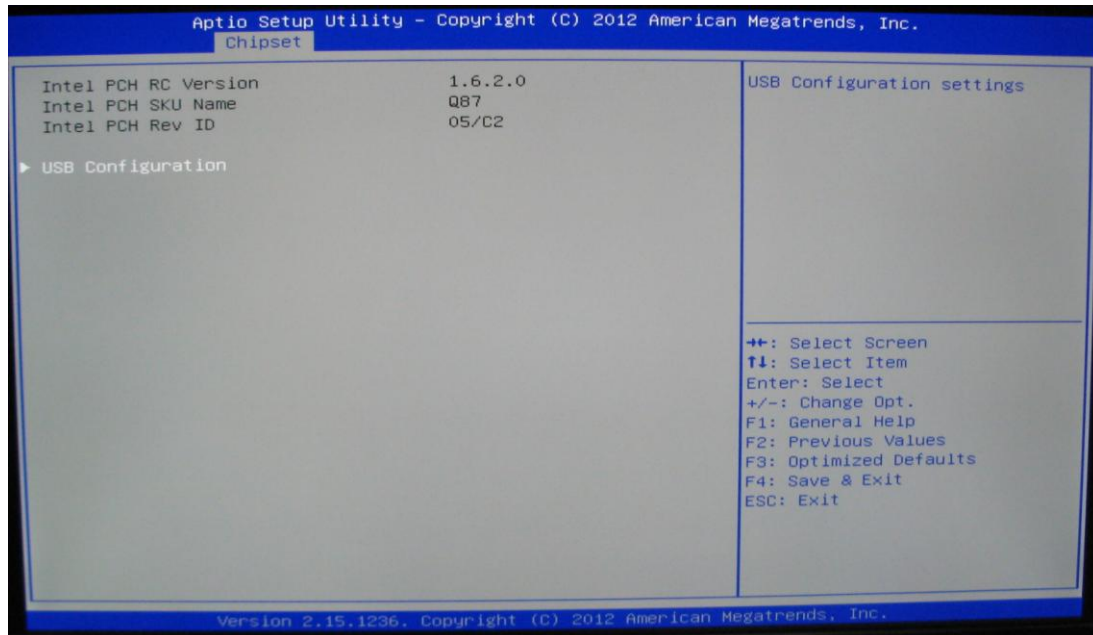
- ▶ PCH-IO Configuration
- ▶ System Agent (SA) Configuration

For items marked with “▶”, please press <Enter> for more options.

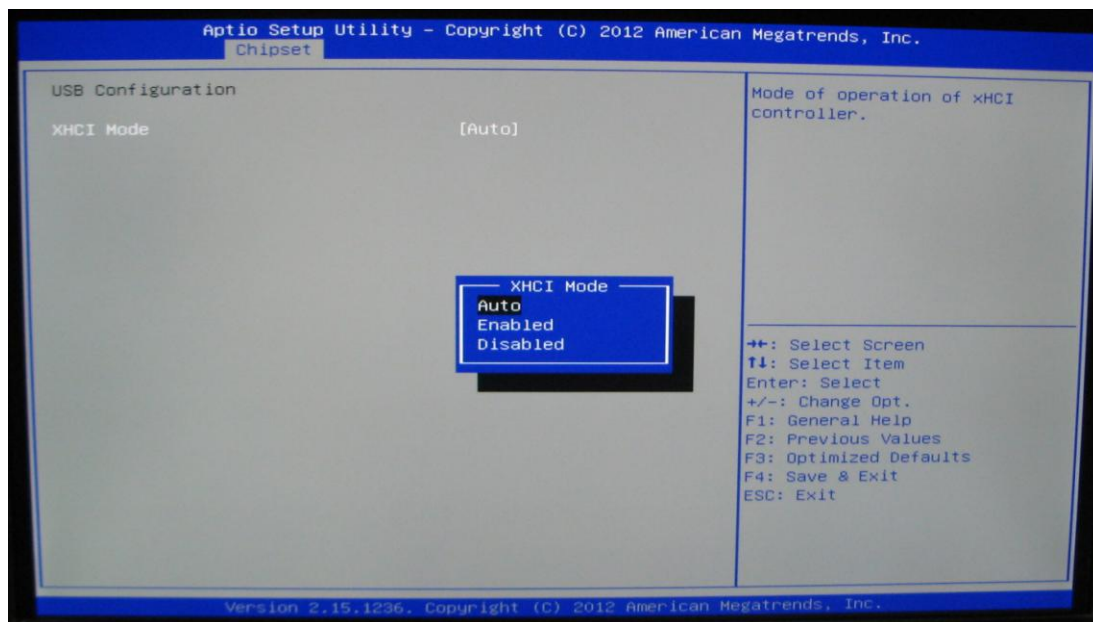


- **PCH-IO Configuration**

This screen shows memory information. For items marked with “►”, please press <Enter> for more options.



### USB Configuration

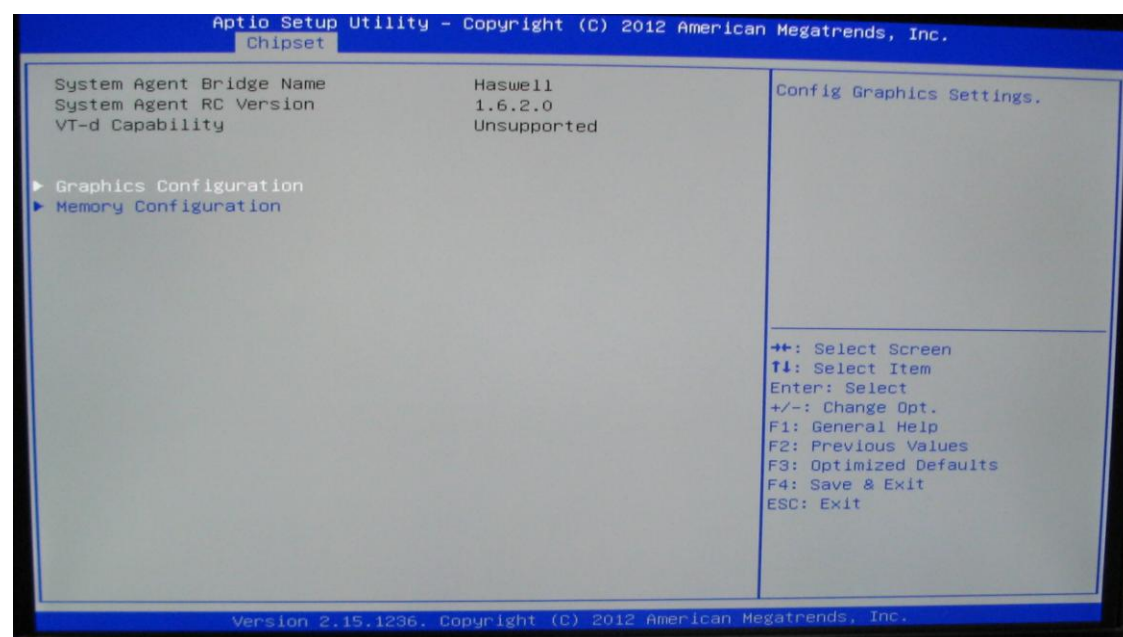


### XHCI Mode

Use this item to enable, disable or Auto mode for XHCI, it is one USB Spec compatible and provide an interface to different hardware host controller implementations.

## ● System Agent (SA) Configuration

This screen provides function for specifying internal graphics controller and memory related parameters.



## Graphics Configuration

### Internal Graphics

You can use this item to select internal graphics to enable or disable.

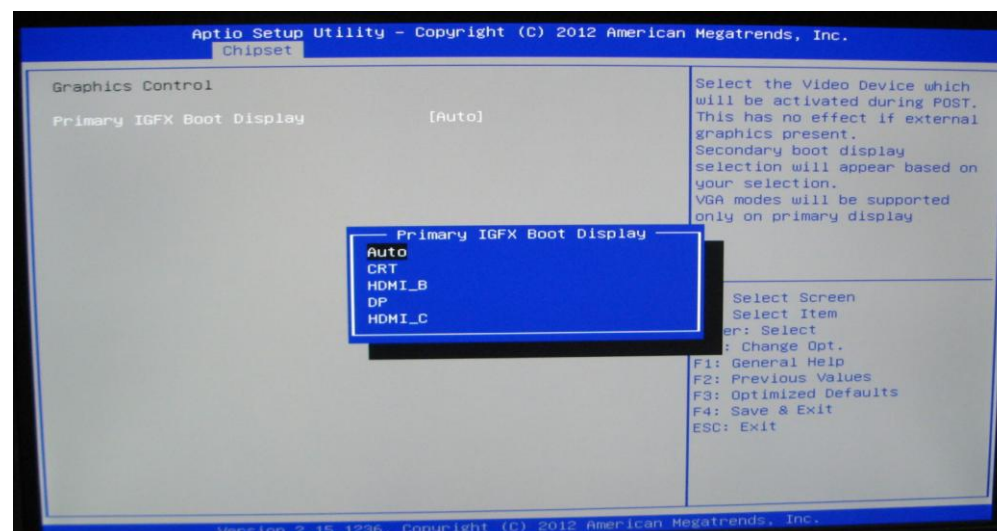
### Graphics Control

Use this item for further setting of graphics control; we can get the following items to choose your display interface, default is auto mode.

### Primary IGFX Boot Display

Select the video device which will be activated during POST (Power-On Self Test).

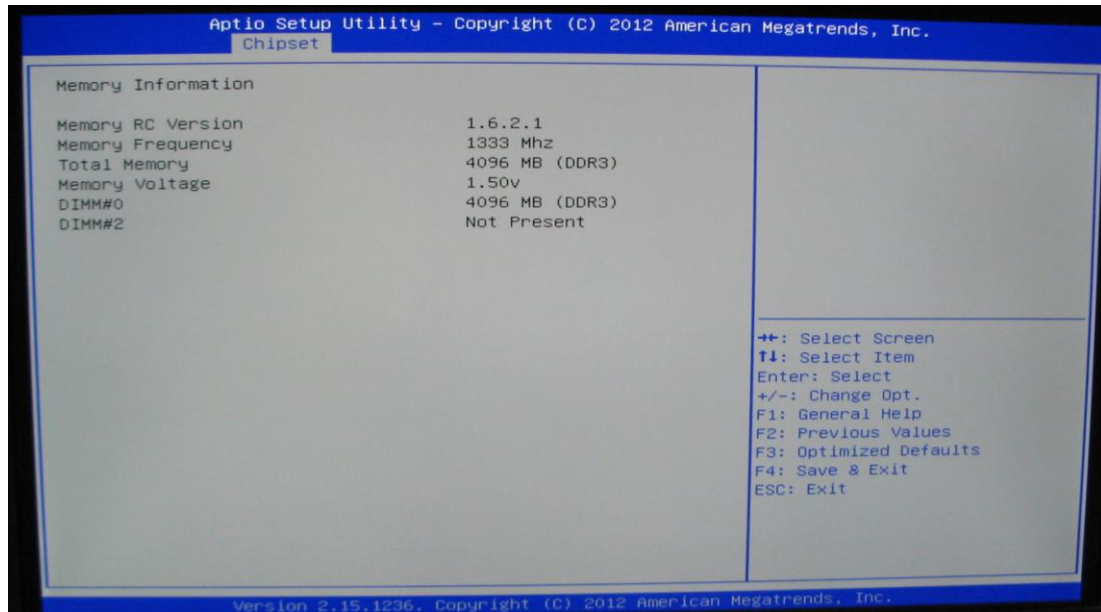
This has no effect if external graphics present.





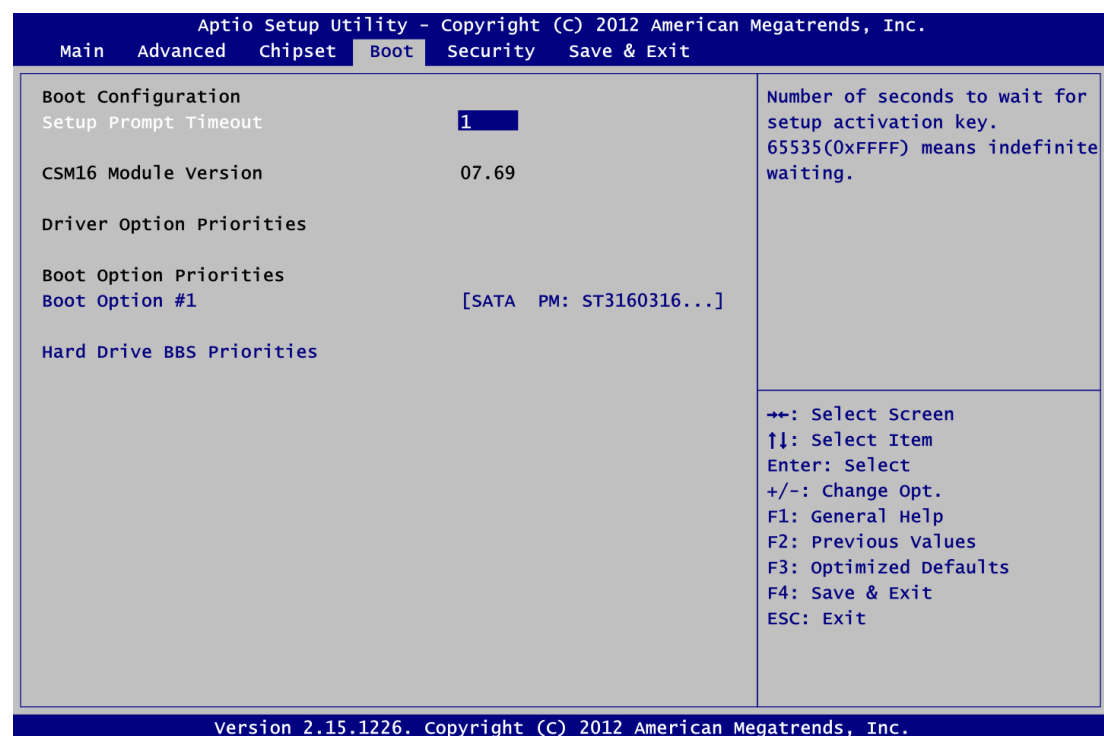
- **Memory Configuration**

Use this item for further setting of memory configuration, this screen displays memory information, and allows user to set memory configuration.



## 4.4 Boot Menu

The Boot menu allows users to change boot options of the system.



### Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### Boot Option Priorities

These are settings for boot priority. Specify the boot device priority sequence from the available devices.

### Hard Drive BBS Priorities

This item is for configuring the boot order for a specific device class. Its option(s) is only visible if at least one device for this class is detected.



## 4.5 Security Menu

The Security menu allows users to change the security settings for the system.

| Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.  |          |         |      |  |             |                |    |  |  |
|---|----------|---------|------|--|-------------|----------------|----|--|--|
| Main  | Advanced | Chipset | Boot | <b>Security</b>  | Save & Exit |                |    |  |  |
| Password Description  |          |         |      | Set Administrator Password   |             |                |    |  |  |
| <p>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>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.</p> <p>The password length must be in the following range:</p> <table> <tr> <td>Minimum length</td> <td>3</td> </tr> <tr> <td>Maximum length</td> <td>20</td> </tr> </table> |          |         |      | Minimum length   | 3           | Maximum length | 20 |  |  |
| Minimum length  | 3        |         |      |  |             |                |    |  |  |
| Maximum length  | 20       |         |      |  |             |                |    |  |  |
| Administrator Password  |          |         |      |  |             |                |    |  |  |
| User Password   |          |         |      |  |             |                |    |  |  |
| HDD Security Configuration:   |          |         |      |  |             |                |    |  |  |
| HDD0:ST3160316AS  |          |         |      |  |             |                |    |  |  |
|   |          |         |      | →+: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>ESC: Exit |             |                |    |  |  |
| Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.   |          |         |      |  |             |                |    |  |  |

## Administrator Password

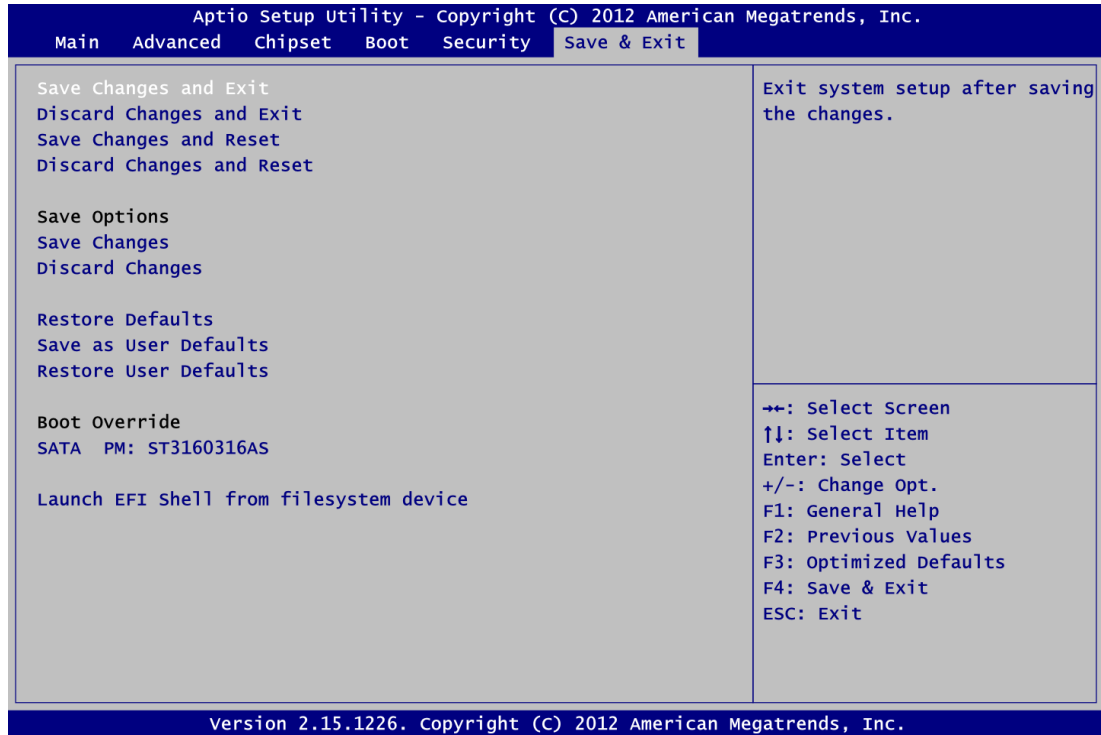
This item indicates whether an administrator password has been set (installed or uninstalled).

## User Password

This item indicates whether an user password has been set (installed or uninstalled).

## 4.6 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



### Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

### Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

### Save Changes and Reset

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

### Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

### **Save Changes**

When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

### **Discard Changes**

Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

### **Restore Defaults**

It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

### **Save as User Defaults**

Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

### **Restore User Defaults**

It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

### **Boot Override**

Select a drive to immediately boot that device regardless of the current boot order.

### **Launch EFI Shell from filesystem device**

Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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## **APPENDIX A**

### **WATCHDOG TIMER**

#### **About Watchdog Timer**

Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

## Sample Program

Following is example to enable configuration by using debug tool.

- **Enable WDT**

- 1. Enable configuration

- O 2E 87
    - O 2E 87

- 2. Select Logic device:

- O 2E 07
    - O 2F 08

- 3. WDT Device Enable

- O 2E 30
    - O 2F 01

- 5. Set timer unit

- O 2E F0
    - O 2F 00 ➔ (00: Sec; 08: Minute)

- 4. Set base timer:

- O 2E F1
    - O 2F 0A ➔ Set Reset Time (Ex.0A:10 Sec)

- **Disable WDT**

- 1. Enable configuration

- O 2E 87
    - O 2E 87

- 2. Select Logic device:

- O 2E 07
    - O 2F 08

- 3. WDT Device Disable

- O 2E 30
    - O 2F 00

## APPENDIX B

### PROGRAMMABLE LED

#### About Programmable LED

eBOX670-883-FL supports two programmable LED which allows user to program the LED status. It can do as special indicator or alarm. Below is the way to program the LED.

#### Sample Code

##### 1.Enable configuration

-O 2E 87

-O 2E 87

##### 2. Select Logic device:

-O 2E 07

-O 2F 07

##### 3. Enable GPIO 3x

-O 2E 30

-O 2F 08 -> Set Bit 4 to high.

##### 4. Program Output Status

-O 2E ED

-O 2F 03 -> Set LEDs to light. ( Set Bit 0 & Bit 1 to high)



**Note:** The N has 8 bits. Only bit 0 and bit 1 are for programmable LED and bits 2 to 7 are for other function registers, so please don't set to this range to cause unexpected issues.

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