AXIOMTEK

eBOX530-840-FL Series

Embedded System

User's Manual

RoHS

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Safety Precautions

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

1. The eBOX530-840-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 eBOX530-840-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 eBOX530-840-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 -40℃ or above 80℃. 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 production 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.

<u>*Note:*</u> *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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Other brand names and trademarks are the properties and registered brands of their respective owners.

Table of Contents

CHAPTER 1
INTRODUCTION

This chapter contains general information and detailed specifications of the eBOX530-840-FL. The Chapter 1 includes the following sections:

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

1.1   General Description

The eBOX530-840-FL is an embedded system that supports onboard dual core Intel® Atom™ E3825 (1.33 GHz) single chip design to provide Windows 8.1, Windows 7 , Windows 8 Embedded, Windows 7 Embedded or Linux, suitable for the most endurable operation. It features fan less design with full feature I/O, one 204-pin unbuffered SO-DIMM socket for singe channel DDR3L-1066/1333 MHz memory, and enhanced system dependability by built-in Watchdog Timer.

> **Features**
> 1. Intel® E3825 1.33 GHz dual core SoC
> 2. Maximum to 8GB DDR3L-1066/1333 memory for E3825
> 3. VGA or HDMI for display output
> 4. Supports 4 USB 2.0 ports
> 5. Supports 2 RS-232/422/485
> 6. Supports one 10/100/1000Mbps Ethernet ports (i210IT)
> 7. One 2.5" SATA HDD drive bay
> 8. One Full-Size Mini PCI Express Mini Card w/mSATA supported
> 9. Watchdog timer
> 10. 12V / 36W AC-DC Adapter
> 11. AT/ATX mode quick switch
> 12. Supports TPM 1.2 (ST ST33TPM12LPC)
> 13. Wide temperature: -20°C~60°C supported (with W.T. SSD & Memory)
> 14. Optional VESA/ DIN Rail /Wall Mounting kits

> **Reliable and Stable Design**
> The eBOX530-840-FL adopts the advanced cooling system and supporting the mSATA device, which makes it especially suitable for vibration environments, best for industrial automation, digital signage and gaming application.

> **Embedded O.S. Supported**
> The eBOX530-840-FL not only supports Windows 8.1, Windows 7, but also supports embedded OS, such as Windows 8 Embedded, Windows 7 Embedded, WinCE and Linux.

> **Various Storage devices supported**
> For storage device, the eBOX530-840-FL supports one 2.5" SATA storage drive bay and mSATA supported.

1.2 System Specifications

1.2.1 CPU

- **CPU**
  - Intel® Atom™ dual core E3825 1.33GHz.
- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 16Mbit SPI Flash, DMI, Plug and Play.
  - PXE Ethernet Boot ROM.
- **System Memory**
  - One 204-pin unbuffered **DDR3L** SO-DIMM socket. (DDR3L Only)
  - Maximum to 8GB DDR3L 1066/1333 MHz memory.

1.2.2 I/O System

- Two 9-pin D-Sub male connectors, COM1~COM2 for RS-232/422/485
- One 15-pin D-Sub female connector for VGA, up to 1600 x 1200 @60Hz
  or One HDMI connector, up to 1920 x 1080 @60 Hz
- Two Audio connector (Mic-IN, Line-OUT), HD audio compliant with Realtek ALC662
- One RJ-45 connector for 10/100/1000Base-T Ethernet i-210IT w/Wake-on-LAN and PXE Boot ROM
- Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0.
- One 12V DC Jack for power input connector
- Two Indicators (System Power, HDD Active)
- Two SMA type antenna opening
- One AT/ATX mode quick switch
- One PWR switch
- One Reset button

1.2.3 System Specification

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Power Supply**
  - External 12V@3A, 36W AC/DC power adapter

- **Operation Temperature**
  - -20℃ ~ 60℃ (-4 ºF ~ 140ºF), E3825 with W.T. SSD&RAM

- **Storage Temperature**
  - -40℃ ~ 80℃ (-40 ºF ~ 176ºF)

- **Humidity**
  - 10% ~ 90% (non-condensation)

- **Vibration Endurance**
  - 3Grm w/ SSD™ (5-500Hz, X, Y, Z directions)

- **Weight**
  - 0.5kg(1.1lb) without package/ 0.6kg(1.32lb) with package

- **Dimensions**
  - 132mm (5.19") (W) x 95.4mm (3.75") (D) x 47.5mm(1.87") (H)

1.2.4 Driver CD Content

● **Driver**
   ■ Audio
   ■ Chipset
   ■ Ethernet
   ■ Graphic
   ■ TPM
● **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 eBOX530-840-FL.

1.3.1 System Dimension
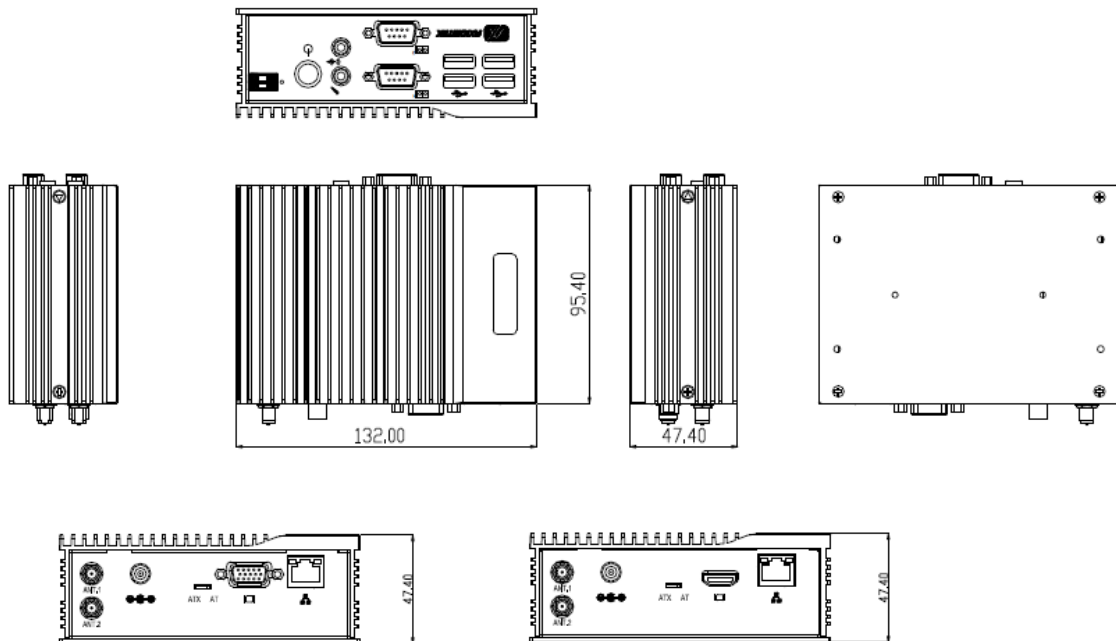
1.3.2 Wall mount Bracket Dimension
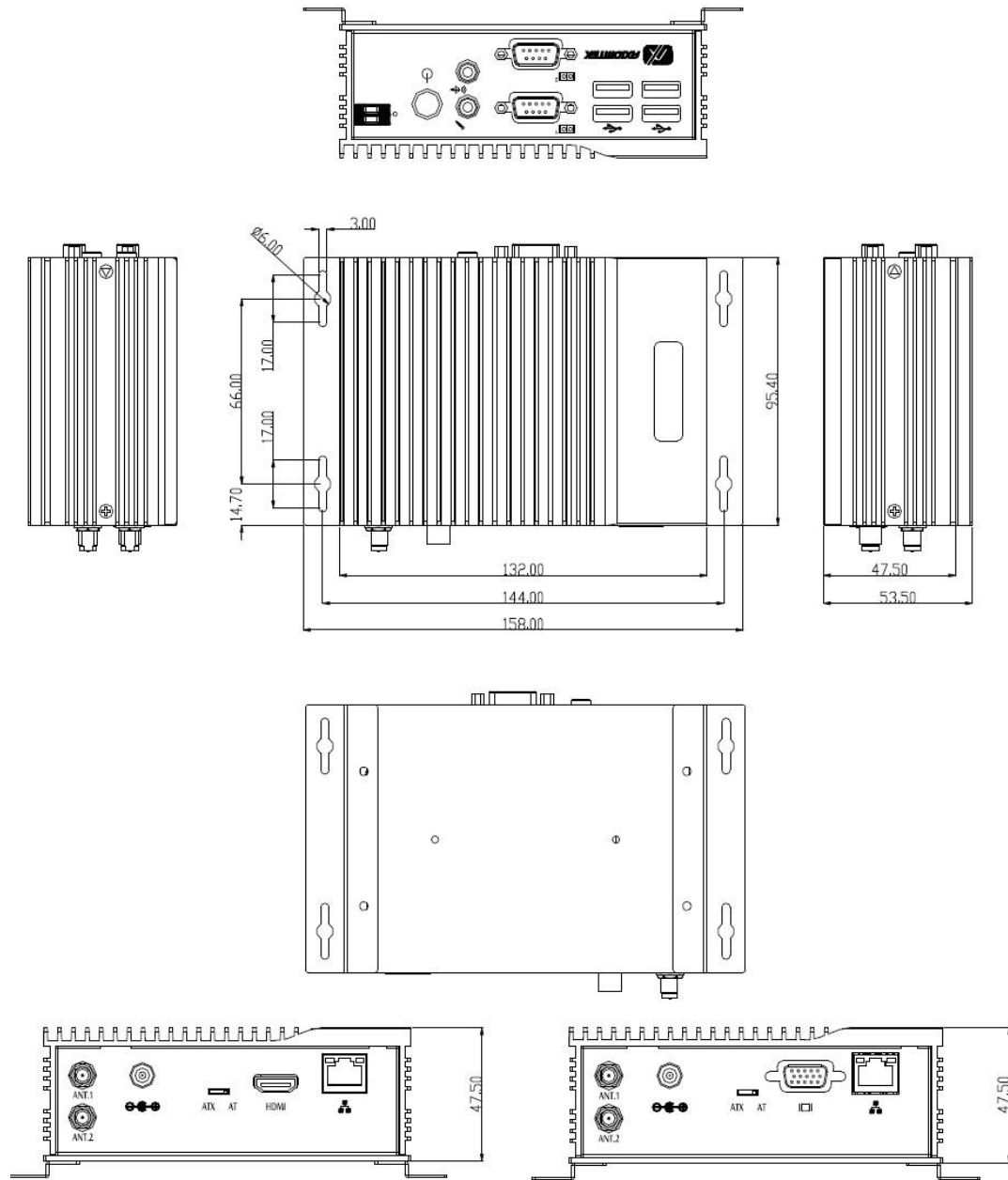
1.4 I/O Outlets

The following figures show you I/O outlets on front view of the eBOX530-840-FL.

● **Front View**

● **Front View drawing**
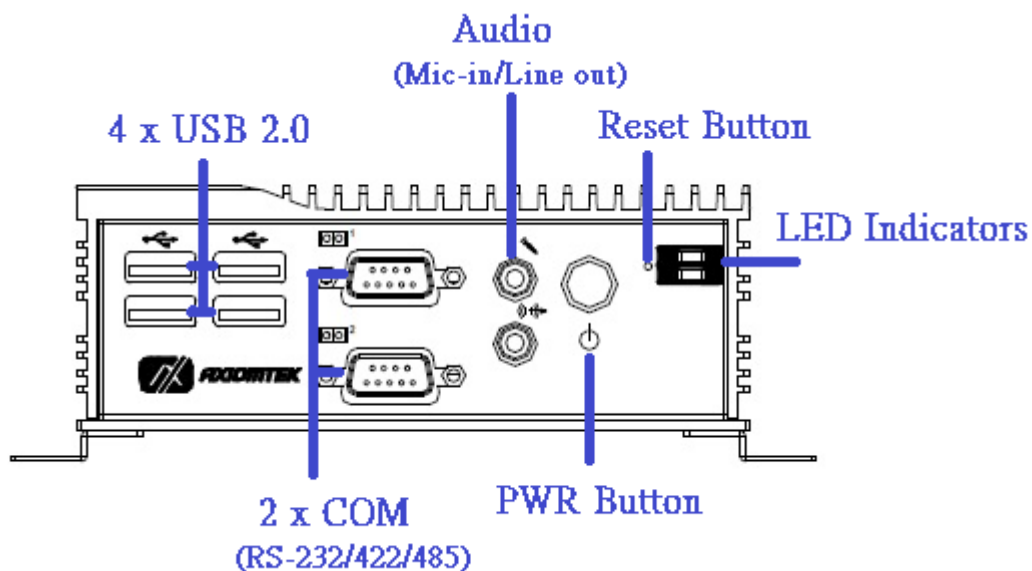
● **Rear View**

● **Rear View drawing**
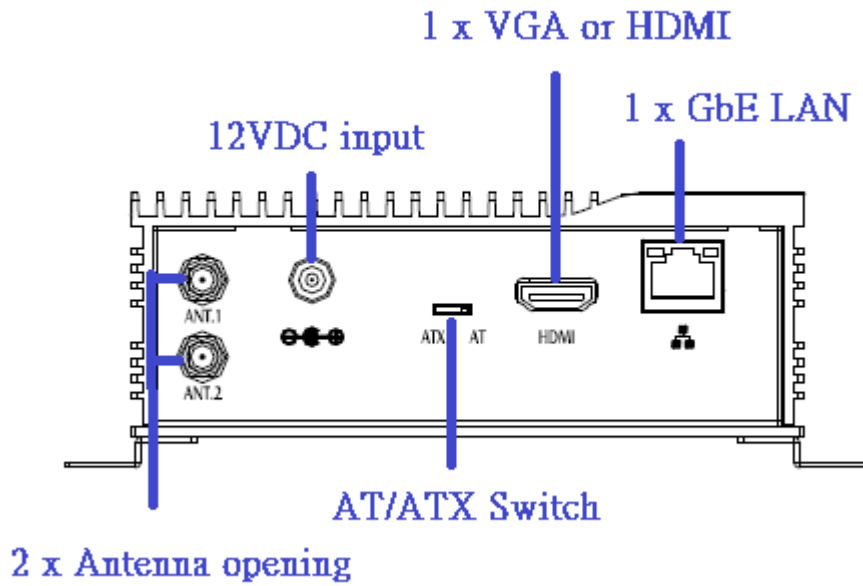
1.5   Packing List

The package bundled with your eBOX530-840-FL should contain the following items:

- **eBOX530-840-FL System Unit x 1**
- **eBOX530-840-FL Quick Manual x 1**
- **CD x 1 (For Driver and User's Manual)**
- **Screws pack x1**
- **Foot pad x4**
- **12V/36W AC-DC Adapter**
- **Wall-mount Brackets (optional)**
- **VESA-mount Bracket (optional)**
- **Din-rail Bracket (optional)**
- **2.5" SATA Storage (optional)**
- **mSATA storage device (optional)**
- **DDR3L SODIMM (optional)**
- **WIFI/ 3G/ GPS Modules (optional)**

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

1.6   Model List

eBOX530-840-FL-E3825-VGA -US	Fanless embedded system with Intel® ATOM® E3825 1.33GHz dual core single chip design, VGA, 2 COM, 4 USB and US power cord
eBOX530-840-FL-E3825-VGA -EU	Fanless embedded system with Intel® ATOM® E3825 1.33GHz dual core single chip design, VGA, 2 COM, 4 USB and EU power cord
eBOX530-840-FL-E3825-HDMI -US	Fanless embedded system with Intel® ATOM® E3825 1.33GHz dual core single chip design, HDMI, 2 COM, 4 USB and US power cord
eBOX530-840-FL-E3825-HDMI -EU	Fanless embedded system with Intel® ATOM® E3825 1.33GHz dual core single chip design, HDMI, 2 COM, 4 USB and EU power cord

CHAPTER 2
HARDWARE INSTALLATION

The eBOX530-840-FL is convenient for your various hardware configurations, such as Memory Module, HDD (Hard Disk Drive), SSD (Solid State Drive) and mSATA. The chapter 2 will show you how to install the hardware.

2.1   Installing the Memory module

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 and the bracket of HDD.

Step 4   Find the DDR3L SO-DIMM position.

Step 5 **Locate the memory module, insert the gold colored of memory to contact into the socket.**

Step 6 **Push the module down, until it is firmly seated by locking two latches on the sides.**
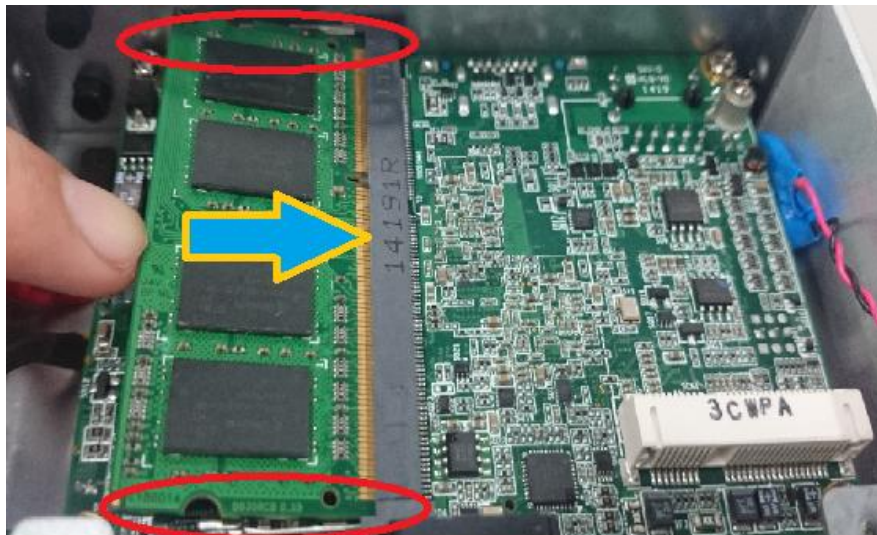
Step 7 **Fasten all screws of bottom cover to finish installation.**

2.2   Installing the 2.5" SATA HDD/SSD

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 and HDD bracket.
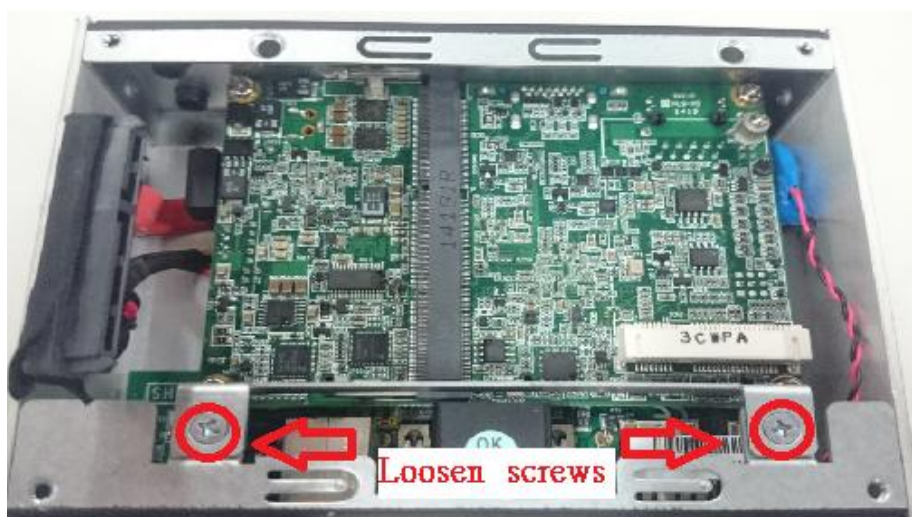
Step 4   Prepare your 2.5" HDD/SSD and HDD bracket.

Step 5   Assembly the HDD bracket with 2.5"SATA SSD/HDD.

Step 6 **Please refer to below photo to connect SATA PWR and SATA signal cables.**

Step 7 **Fasten total four screws to fix HDD with main chassis.**
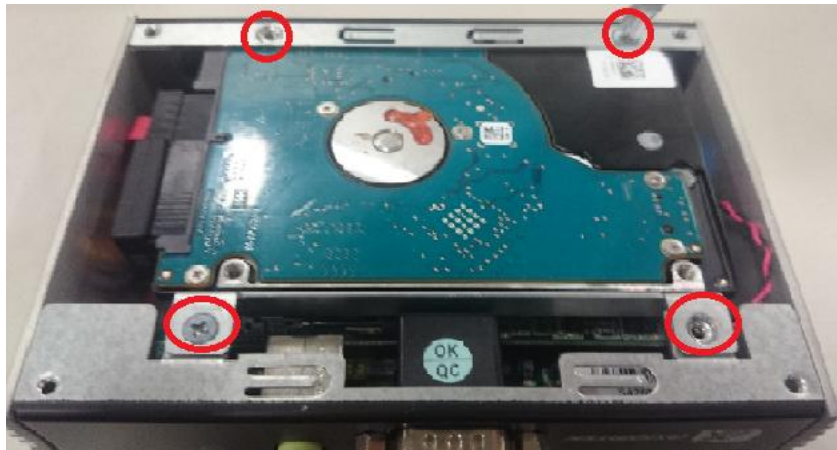
Step 8 **Put the bottom cover back then fasten screws to finish the installation.**

2.3 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 Find the position of Mini card slot.

※**Please notice that eBOX530-840-FL supports one full-size Express Mini card slot and users can assemble Mini PCIe modules or mSATA device via BIOS adjustment.**

Step 4 Slide Mini Card into Mini Card slot with caution and fasten screw of Express Mini Card.
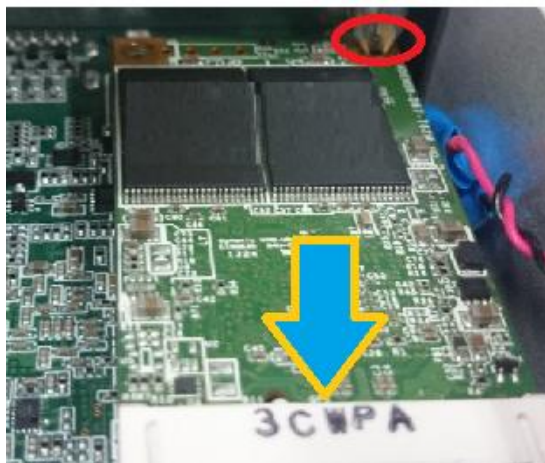
Step 5 Assembly the bottom cover back and fasten all screws to finish installation.

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CHAPTER 3
JUMPER SETTING & CONNECTOR

Proper jumper settings configure the **eBOX530-840-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   SBC Layout

PICO840
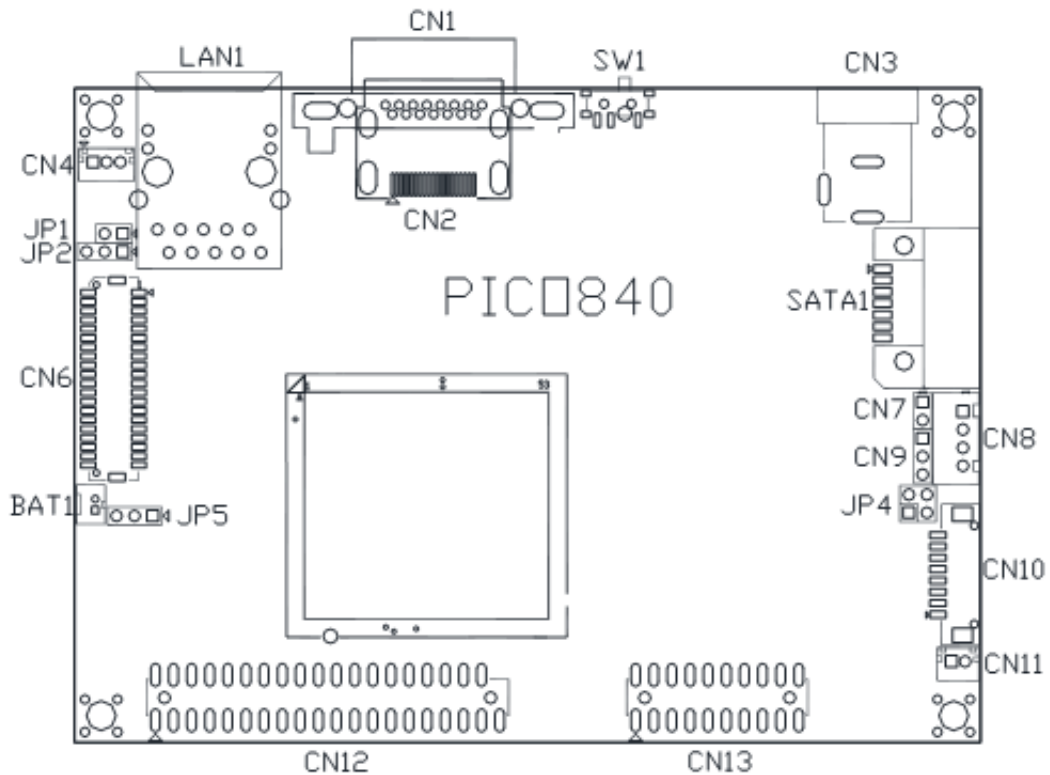
Top View
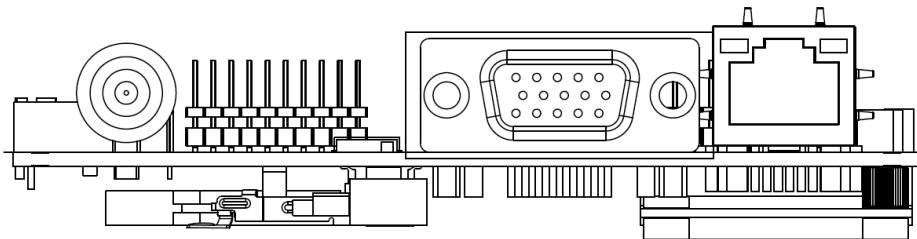
Side View
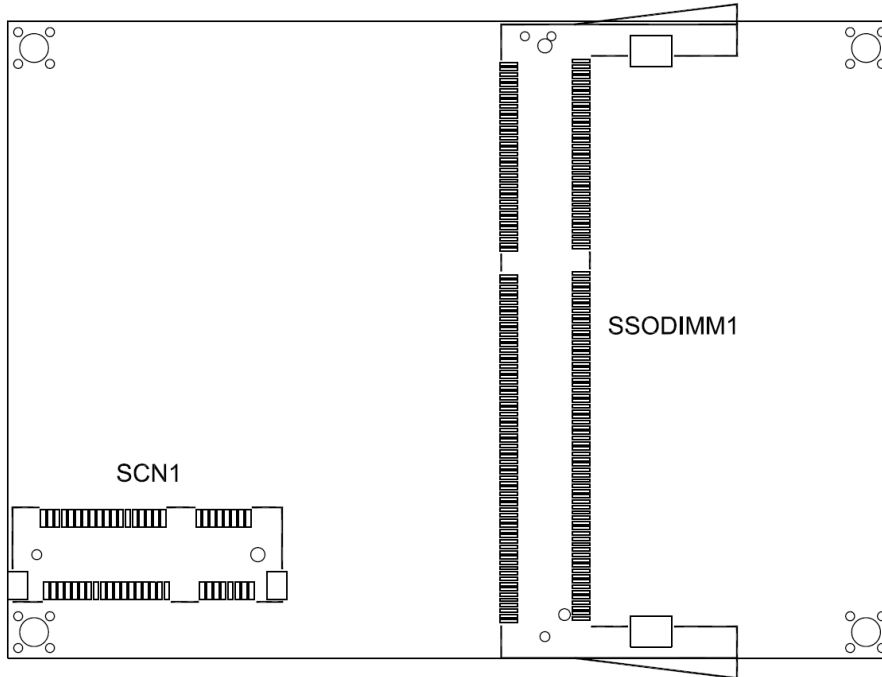
Bottom View

AX93283 I/O Module
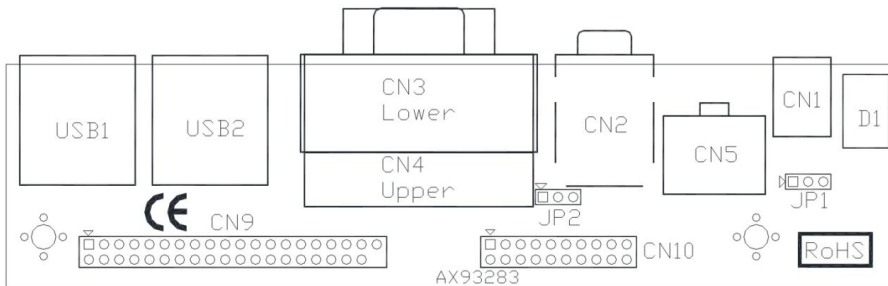
Top View
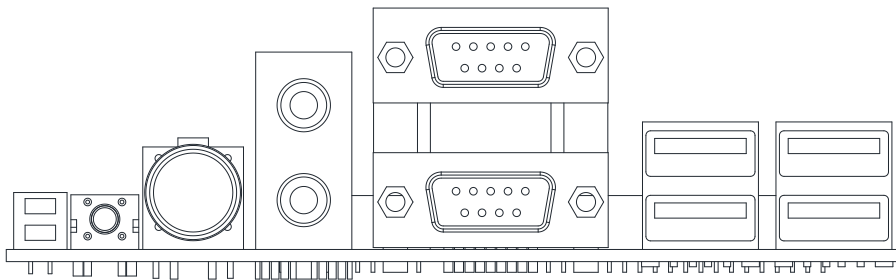
Side View

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 eBOX530-840-FL to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

PICO840 Main board

Jumper	Description	Jumper Setting
JP5	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close
SW1	Auto Power On Default: Disable	1-2 Close

Properly configure jumper settings on the AX93283 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

AX93283 I/O board

Jumper	Description		Setting
JP1	COM1 Data/+12V Power Selection Default: RS-232 Data	CN3 Pin 18: RI	1-2 Close
JP2	COM1 Data/+5V Power Selection Default: RS-232 Data	CN3 Pin 10: DCD	1-2 Close

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]
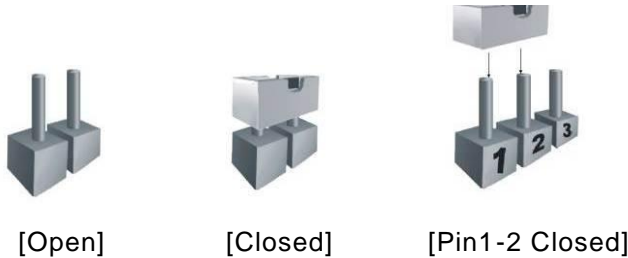
3.2.1 Restore BIOS Optimal Defaults (JP5)

> 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 close
Restore BIOS optimal defaults	2-3 close
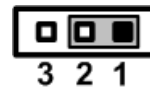
3.2.2 Auto Power On (SW1)

If SW1 is enabled for power input, the system will be automatically power on without pressing soft power button. If SW1 is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close
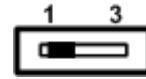
3.2.3 COM1 Data/Power Selection (JP1 and JP2 by AX93283)

The COM1 port has +12V level power capability on RI and +5V level on DCD by setting JP1 and JP2, respectively. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232.

Function	JP1 Setting
Data: Set CN3 pin 18 to RI (Default)	1-2 close
Power: Set CN3 pin 18 to +12V level	2-3 close

Function	JP2 Setting
Data: Set CN3 pin 10 to DCD (Default)	1-2 close
Power: Set CN3 pin 10 to +5V level	2-3 close

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 **eBOX530-840-FL** Series.

Connectors	Section
AC-DC Jack Power In Connector	3.3.1
COM1 Serial Port Connector	3.3.2
COM2 Serial Port Connector	3.3.3
System Power Switch	3.3.4
USB Connector	3.3.5
LED Indicator	3.3.6
Audio Connector	3.3.7
System Reset Switch	33.8
VGA Connector	3.3.9
HDMI Connector (Optional)	3.3.10
Ethernet Connector (LAN1)	3.3.11
Serial ATA (SATA) Connector	3.3.12
SATA Power Connector	3.3.13
Full-Size Express Mini Card slot	3.3.14

3.3.1 AC-DC Jack Power In Connector

The system supports a DC12V DC-in Jack connector for system power input. Connect it to the power AC-DC 36W Adapter

Pin	Signal
1	+12V
2	GND
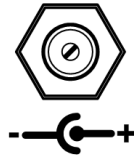
3.3.2 COM1 Serial Port Connector

CN3 is the lower connector of the double-deck DB-9 connector. Only COM1 comes with power capability on DCD and RI pins by setting jumpers. The pin assignments of RS-232/422/485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to section 4.4.
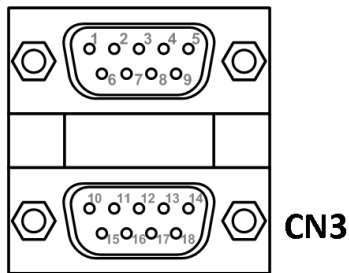
Pin	RS-232	RS-422	RS-485
10	DCD	TX-	Data-
11	RXD	TX+	Data+
12	TXD	RX+	N.C
13	DTR	RX-	N.C.
14	GND	No use	No use
15	DSR	No use	No use
16	RTS	No use	No use
17	CTS	No use	No use
18	RI	No use	No use

3.3.3 COM2 Serial Port Connector

CN4 is the upper connector of the double-deck DB-9 connector. The pin assignments of RS-232/422/485 are listed in table below. If you need COM2 port to support RS-422 or RS-485, please refer to section 4.4.
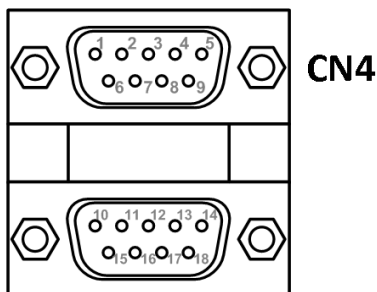
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	N.C
4	DTR	RX-	N.C.
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use

3.3.4 System Power Switch

This switch is for turning on/off the system power.

Function	Description
On	Turn on/off system
Off	Keep system status
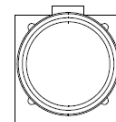
3.3.5 USB Connector

The Universal Serial Bus connectors are compliant with USB 2.0 (480Mbps), 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)	5	USB VCC (+5V level)
2	USB #0_D-	6	USB #1_D-
3	USB #0_D+	7	USB #1_D+
4	Ground (GND)	8	Ground (GND)
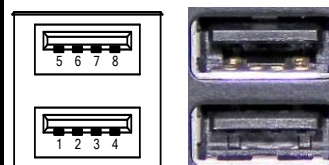
3.3.6 LED Indicator

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

LED Color	Description
Red	Hard disk drive activity
Green	Power on/off

The power LED (green) lights up and will remain steady while the system is powered on.

3.3.7 Audio Connector

This is audio jack with HD audio support. Install audio driver, and then attach audio devices to CN2.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

3.3.8 System Reset Switch

This switch reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

3.3.9 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	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
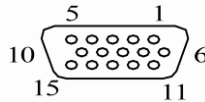
3.3.10 HDMI Connector (Optional)

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. Its interface is available through connector CN10.

Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	CEC	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		
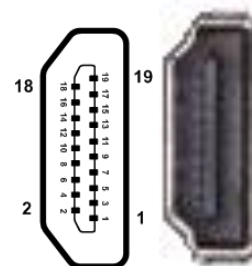
3.3.11 LAN Connector (LAN1)

The RJ-45 connector is for Ethernet. 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)		
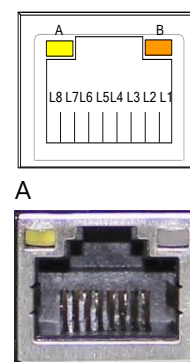
3.3.12 SATA Connector

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface. It is a computer bus interface for connecting to devices such as hard disk drive.

Pin	Signal
1	GND
	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND
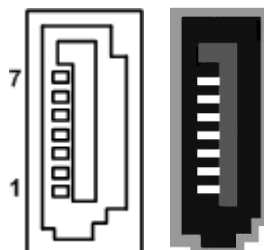
3.3.13 SATA Power Connector

Use CN8 for interfacing to SATA 2.5" HDD power supply.

Pin	Signal
1	+12V level
2	GND
3	GND
4	+5V level
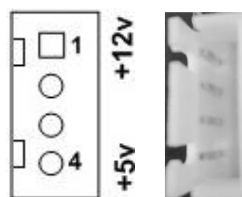
3.3.14 Full-Size PCI Express Mini Card Slot (SCN1)

This is a PCI-Express Mini Card connector on the bottom side applying to either PCI-Express or USB 2.0 or **SATA (mSATA)**. It complies with PCI-Express Mini Card Spec. V1.2. It can also support mSATA cards. Please refer to BIOS setting to enable or disable mSATA support.

Pin	Signal	Pin	Signal
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	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/ SATA_RXP	24	+3.3VSB
25	PE_RXP3/ SATA_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/ SATA_TXN	32	SMB_DATA
33	PE_TXP3/ SATA_TXP	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
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
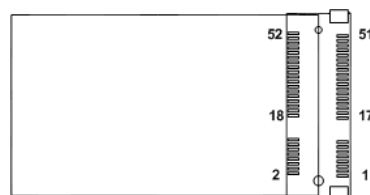
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CHAPTER 4
BIOS SETUP UTILITY

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

When you first 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.

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main   Advanced   Chipset   Security   Boot   Save & Exit

   BIOS Version                PICO840 X105          Choose the system default
   Build Date                  11/05/2014            language.

   System Language             [English]

   System Date                 [Wed 12/10/2014]
   System Time                 [14:04:22]

   Access Level                Administrator

                                                     →←: 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.
```

BIOS/Memory Information

Display the auto-detected BIOS/memory information.

System Language

Choose the system default language.

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.

4.4 Advanced Menu

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
  ► F81803 Super IO Configuration
  ► F81803 HW Monitor
  ► CPU Configuration
  ► IDE Configuration
  ► Trusted Computing
  ► USB Configuration

For items marked with "►", please press <Enter> for more options.

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main    Advanced    Chipset    Security    Boot    Save & Exit
  ────────────────────────────────────────────────────┬──────────────────────────
  ▶ ACPI Settings                                      │ System ACPI Parameters.
  ▶ F81803 Super IO Configuration                      │
  ▶ F81803 HW Monitor                                  │
  ▶ CPU Configuration                                  │
  ▶ IDE Configuration                                  │
  ▶ Trusted Computing                                  │
  ▶ USB Configuration                                  │
                                                       │
                                                       │
                                                       │
                                                       │
                                                       ├──────────────────────────
                                                       │ →←: Select Screen
                                                       │ ↑↓: Select Item
                                                       │ Enter: Select
                                                       │ +/-: Change Opt.
                                                       │ F1: General Help
                                                       │ F2: Previous Values
                                                       │ F3: Optimized Defaults
                                                       │ F4: Save & Exit
                                                       │ ESC: Exit
                                                       │
                                                       │
  ────────────────────────────────────────────────────┴──────────────────────────
          Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

● **ACPI Settings**

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Advanced

 ACPI Settings                                              Select the highest ACPI sleep
                                                            state the system will enter
 ACPI Sleep State                    [S3 (Suspend to RAM)]  when the SUSPEND button is
                                                            pressed.



                    ┌───────  ACPI Sleep State  ───────┐
                    │ Suspend Disabled                  │
                    │ S3 (Suspend to RAM)               │
                    └───────────────────────────────────┘
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



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```

ACPI Sleep State

When the sleep button is pressed, the system will be in the ACPI sleep state. The default is S3 (Suspend to RAM).

● **F81803 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.

```
         Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

  F81803 Super IO Configuration                       Set Parameters of Serial Port
                                                      1 (COMA)
  Super IO Chip                    F81803
 ▶Serial Port 1 Configuration
 ▶Serial Port 2 Configuration




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


         Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```

Serial Port 1~2 Configuration

Use these items to set parameters related to serial port 1~2.

● **Serial Port 1 (COM1) Configuration**

```
        Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
     Advanced

  Serial Port 1 Configuration                            COM Port Type: RS232, RS422,
                                                         RS485
  Serial Port                        [Enabled]
  Device Settings                    IO=3F8h; IRQ=4;

  COM Port Type                      [RS232]

                            ┌───── COM Port Type ─────┐
                            │ RS232                    │
                            │ RS422                    │
                            │ RS485                    │
                            └──────────────────────────┘
                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

Serial Port

Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

COM Port Type

Use this option to set RS-232/RS-422/RS-485 mode.

● **Serial Port 2 (COM2) Configuration**

```
         Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

 Serial Port 2 (COM2)                                    COM Port Type: RS232, RS422,
                                                         RS485
 Serial Port                      [Enabled]
 Device Settings                  IO=2F8h; IRQ=3;

 COM Port Type                    [RS232]

                              ┌──── COM Port Type ────┐
                              │ RS232                  │
                              │ RS422                  │
                              │ RS485                  │
                              └────────────────────────┘
                                                         →←: 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.
```

Serial Port

Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

COM Port Type

Use this option to set RS-232/RS-422/RS-485 mode.

● **F81801 H/W Monitor**

This screen monitors hardware health status.

```
             Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced

  Pc Health Status

  CPU temperature                        : +41 C
  System temperature                     : +43 C
  VCORE                                  : +0.912 V
  +5V                                    : +5.080 V




                                                        →←: 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.
```
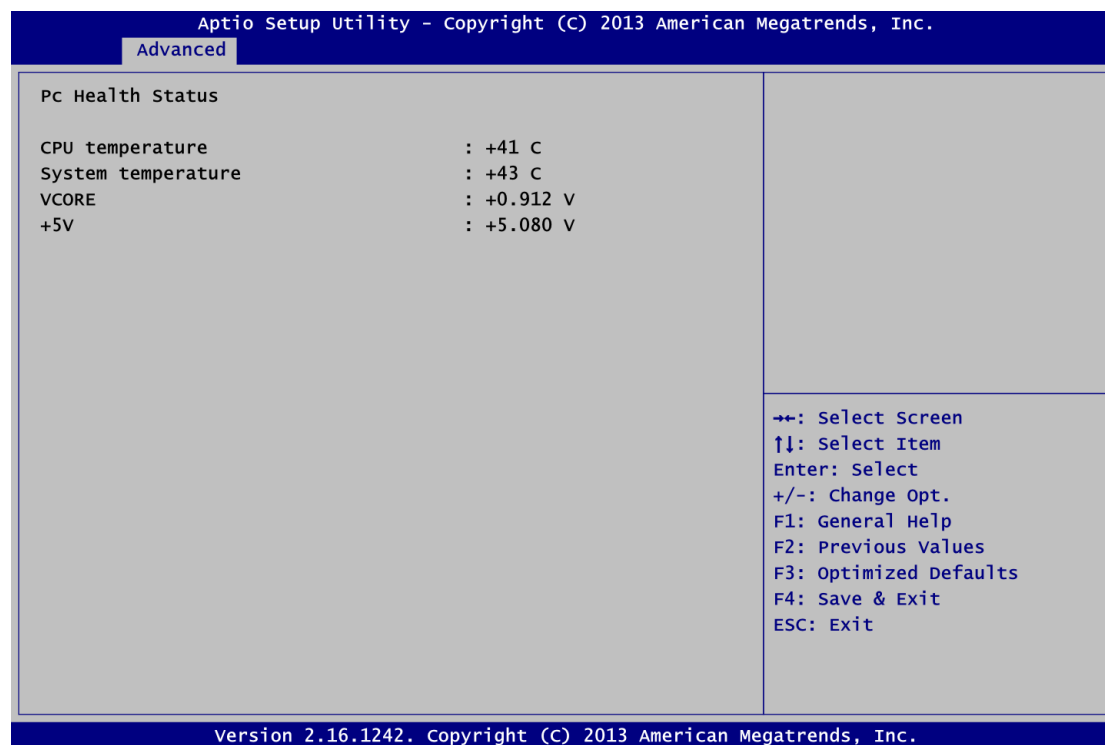
This screen displays the temperature of system and CPU, system voltages (VCORE and +5V).

● **CPU Configuration**

This screen shows the CPU Configuration.

```
                 Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
           Advanced

  CPU Configuration                                              Socket specific CPU
                                                                 Information.
 ▶ Socket 0 CPU Information

  CPU Speed                          1918 MHz
  64-bit                             Supported

  Intel Virtualization Technology    [Enabled]



                                                                 →←: 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.
```

Socket 0 CPU Information

This item is for socket 0 CPU information.

Intel Virtualization Technology

Enable or disable Intel Virtualization Technology. When enabled, a VMM can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a single computer system to work as several virtual systems.

● **Socket 0 CPU Information**

This screen shows socket 0 CPU information.

```
            Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
    Advanced

 Socket 0 CPU Information

 Intel(R) Atom(TM) CPU E3845  @ 1.91GHz
 CPU Signature                    30679
 Microcode Patch                  901
 Max CPU Speed                    1910 MHz
 Min CPU Speed                    500 MHz
 Processor Cores                  4
 Intel HT Technology              Not Supported
 Intel VT-x Technology            Supported

 L1 Data Cache                    24 kB x 4
 L1 Code Cache                    32 kB x 4            →←: Select Screen
 L2 Cache                         1024 kB x 2         ↑↓: Select Item
 L3 Cache                         Not Present         Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit



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```

● **IDE Configuration**

In the IDE 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.

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          Advanced

 IDE Configuration                                      Enable / Disable Serial ATA.

 Serial-ATA (SATA)                 [Enabled]
 SATA Mode                         [AHCI Mode]

 Serial-ATA Port 0                 [Enabled]
 Serial-ATA Port 1                 [Enabled]


 SATA Port0
 Not Present

 SATA Port1                                            →←: Select Screen
 Not Present                                           ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

Serial-ATA (SATA)

Enable or disable the SATA Controller feature. The default is Enabled.

SATA Mode

Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode. The default is AHCI Mode.

Serial-ATA Port 0~1

Enable or disable the onboard SATA port 0~1.

MiniCard Switch

This option appears only after SATA Port 1 is enabled. The default is PCIE. If you intend to insert mSATA card to SCN1, **please change setting to mSATA.**

● **Trusted Computing**

This screen provides function for specifying the TPM settings.

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced

  Configuration                                          Enables or Disables BIOS
    Security Device Support            [Disabled]        support for security device
                                                         O.S. will not show Security
                                                         Device. TCG EFI protocol and
  Current Status Information                             INT1A interface will not be
    SUPPORT TURNED OFF                                   available.




                                                         →←: 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.
```

Security Device Support

Enable or disable BIOS support for security device. The default setting is Enabled.

Current Status Information

Display current TPM status information.

●   **USB Configuration**

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

 USB Configuration                                         Enables Legacy USB support.
                                                           AUTO option disables legacy
 USB Module Version                  8.10.27               support if no USB devices are
                                                           connected. DISABLE option will
 USB Devices:                                              keep USB devices available
       2 Keyboards, 3 Hubs                                 only for EFI applications.

 Legacy USB Support                  [Enabled]

                          ┌──────  Legacy USB Support ──────┐
                          │ Enabled                         │
                          │ Disabled                        │   →←: Select Screen
                          │ Auto                            │   ↑↓: 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.
```

USB Devices

Display all detected USB devices.

Legacy USB Support

Use this item to enable or disable support for USB device on legacy operating system. The default setting is Enabled. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

4.5   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:
►   North Bridge
►   South Bridge

For items marked with "►", please press <Enter> for more options.
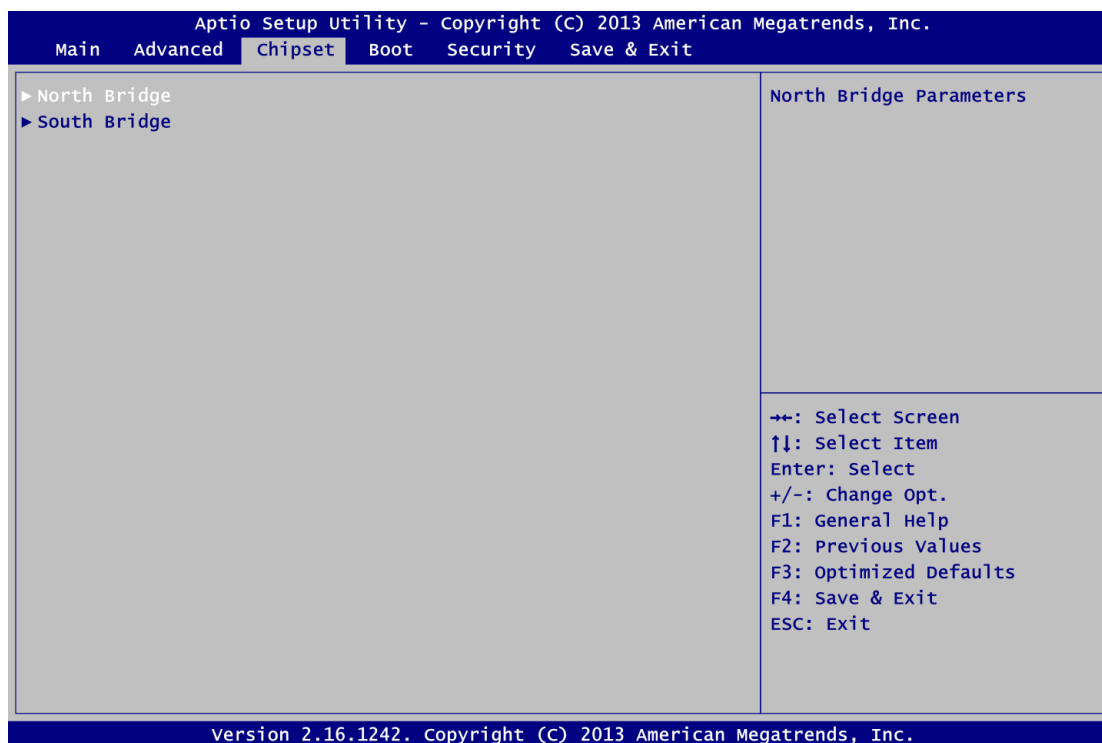
```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main    Advanced   Chipset    Boot    Security    Save & Exit

  ▶ North Bridge                                    North Bridge Parameters
  ▶ South Bridge






                                                   ↦←: 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.
```

● **North Bridge**

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                Chipset

    Memory Information                                    Select LCD panel used by DP
                                                          Device by selecting the
    Total Memory                    8192 MB (LPDDR3)      appropriate setup item.
    Memory Slot0                    8192 MB (LPDDR3)



                                                          →←: 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.
```

Memory Information

Use this item to refer to the information related to system memory.

●   **South Bridge**

This screen allows users to configure parameters of South Bridge chipset.

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
              Chipset

 Audio Controller                    [Enabled]        Control Detection of the
                                                      Azalia Device.   Disabled =
                                                      Azalia will be unconditionally
                                                      disabled.  Enabled = Azalia
                                                      will be unconditionally
                                                      Enabled.




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



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```

Audio Controller

Control detection of the Azalia device.
Disabled - Azalia will be unconditionally disabled.
Enabled - Azalia will be unconditionally enabled.

4.6   Boot Menu

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

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main   Advanced   Chipset   Boot   Security   Save & Exit

   Boot Configuration                                           Number of seconds to wait for
   Setup Prompt Timeout             1                           setup activation key.
   Bootup Numlock State             [On]                        65535(0xFFFF) means indefinite
                                                                waiting.
   Quiet Boot                       [Disabled]
   Legacy PXE OpROM                 [Disabled]


   Boot Option Priorities
   Boot Option #1                   [UEFI: Built-in EFI ...]


                                                                →←: 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.
```
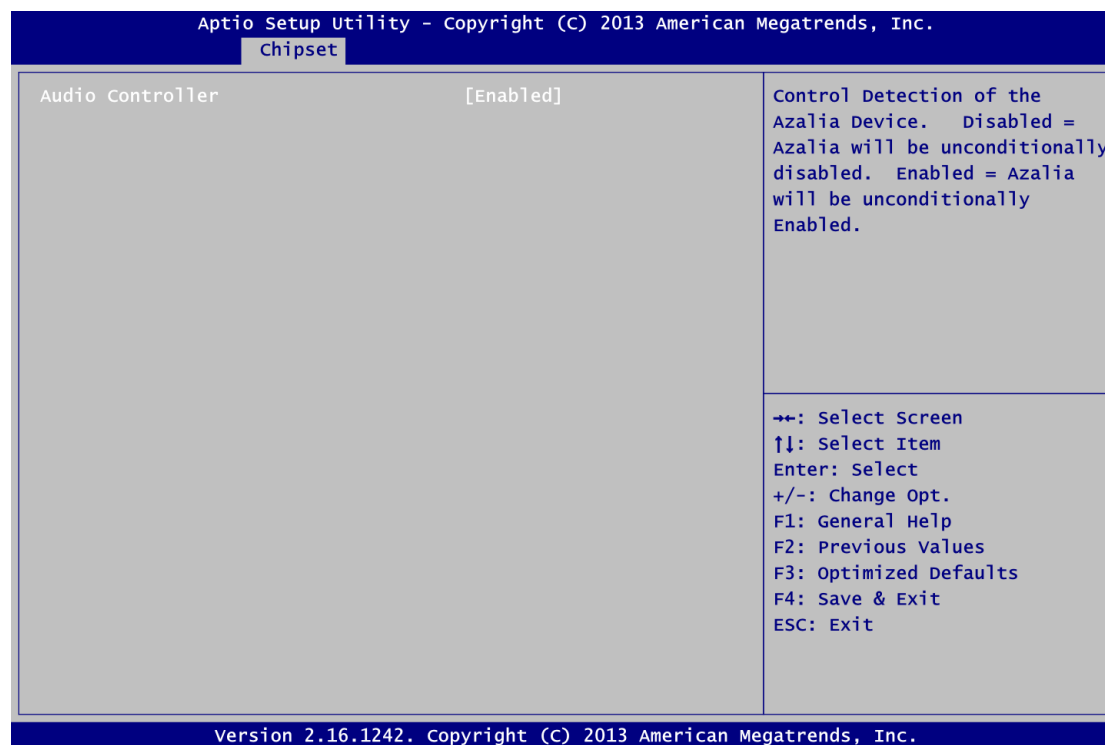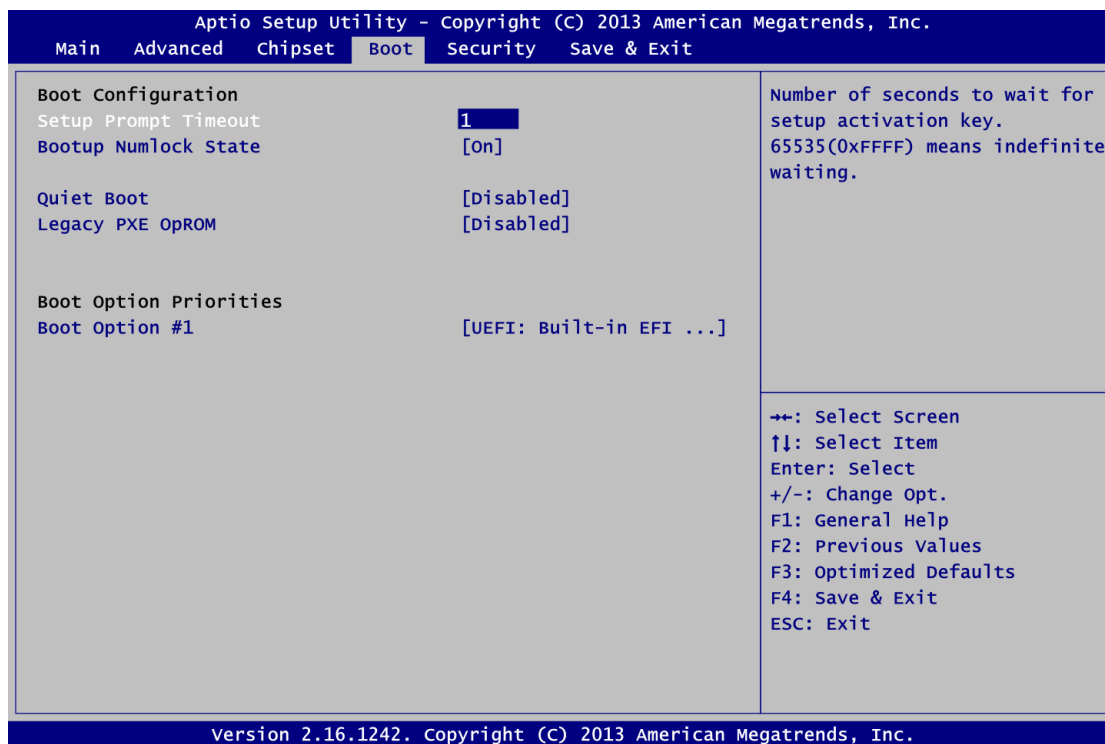
Setup Prompt Timeout

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

Bootup NumLock State

Use this item to select the power-on state for the keyboard NumLock.

Quiet Boot

Select to display either POST output messages or a splash screen during boot-up.
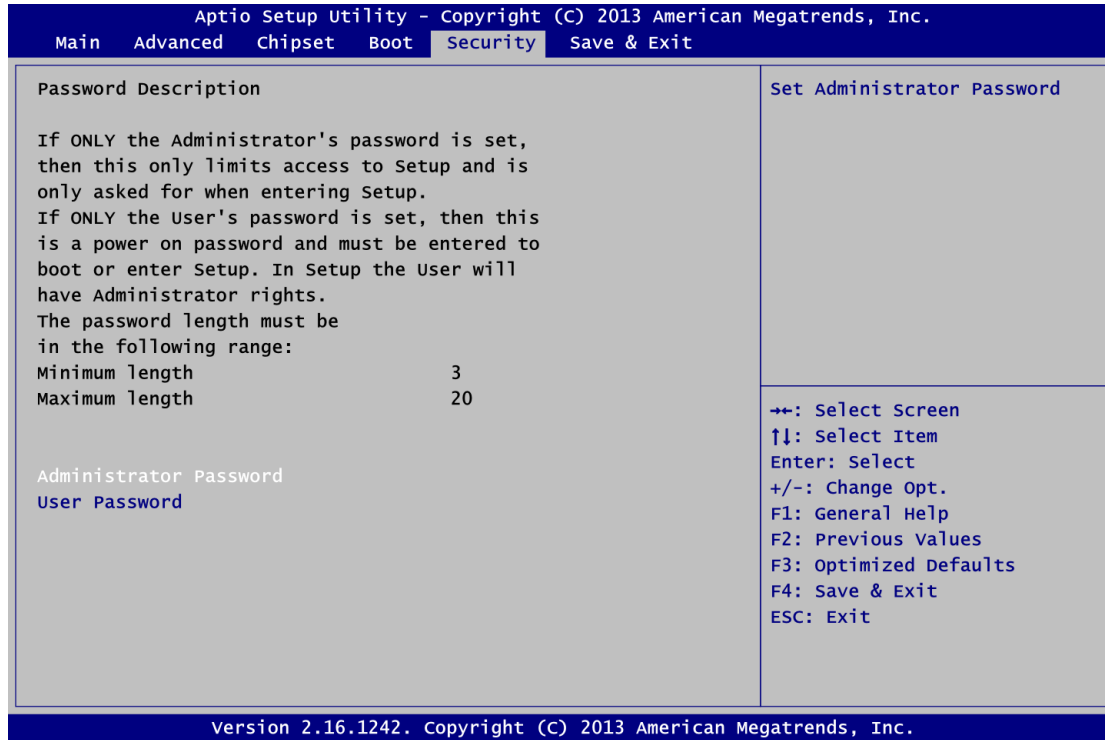

Launch PXE OpROM

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

Boot Option Priorities

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

4.7 Security Menu

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

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Main   Advanced   Chipset   Boot   Security   Save & Exit

  Password Description                              Set Administrator Password

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



          Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.
```
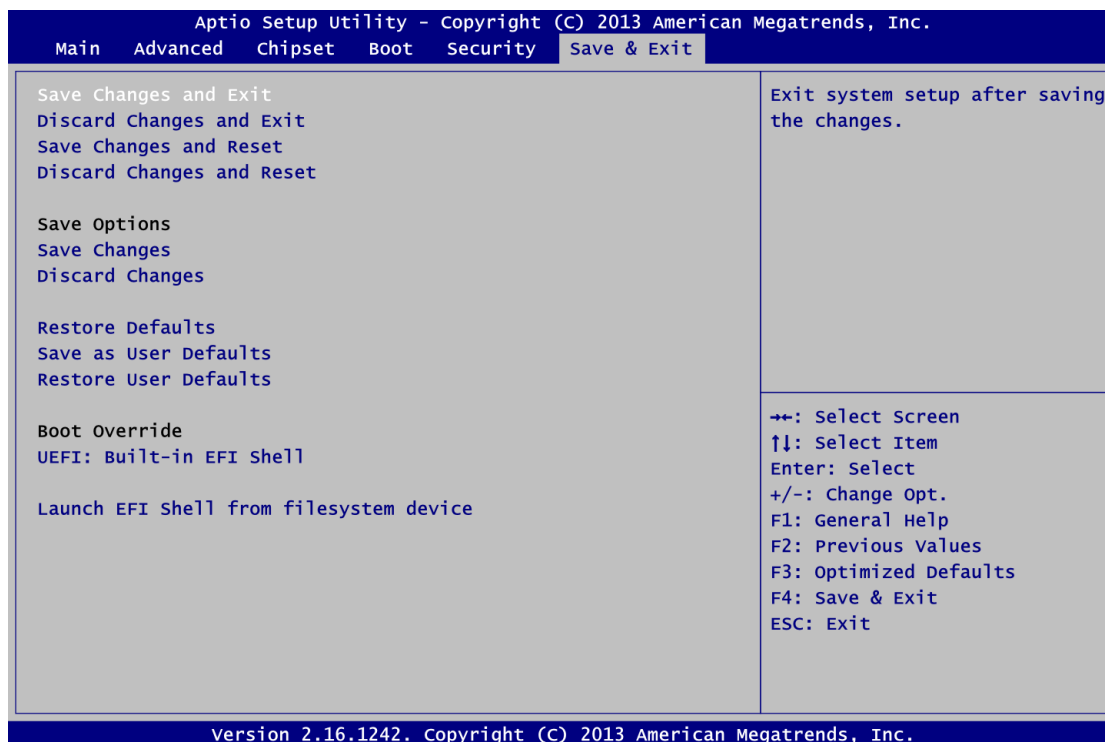
Administrator Password

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).

4.8   Save & Exit Menu

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

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main    Advanced    Chipset    Boot    Security    Save & Exit

  Save Changes and Exit                                      Exit system setup after saving
  Discard Changes and Exit                                   the changes.
  Save Changes and Reset
  Discard Changes and Reset

  Save Options
  Save Changes
  Discard Changes

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


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```

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.

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.

How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems; watchdog timer will never expire because software will always restart the counter before it reaches zero.
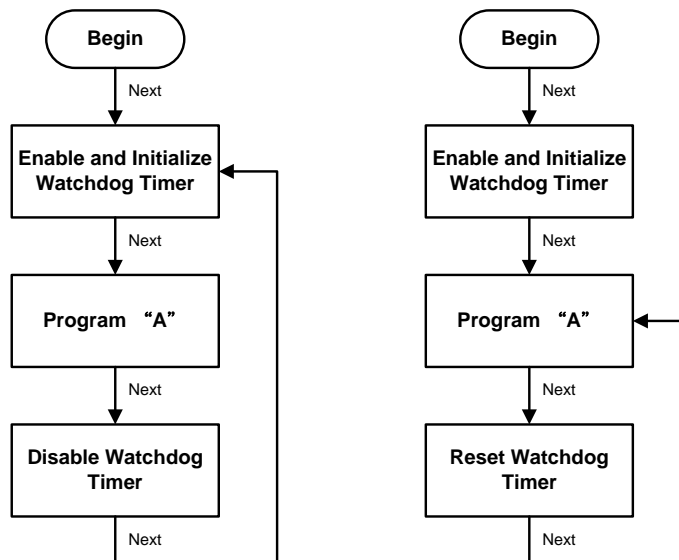
Sample Program

Assembly sample code :

```
;Enable WDT:
mov     dx,2Eh
mov     al,87            ;Un-lock super I/O
out     dx,al
out     dx,al


;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,07h
out     dx,al


;Enable WDT base address:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al


;Activate WDT:
mov     dx,2Eh
mov     al,0F0h
out     dx,al
mov     dx,2Fh
mov     al,80h
out     dx,al


;Set base timer :
mov     dx,2Eh
```

```
mov    al,0F6h

out    dx,al

mov    dx,2Fh

mov    al,Mh          ;M=00h,01h,...FFh (hex),Value=0 to 255

out    dx,al          ;(see below 📝 Note)


;Set Second or Minute :
mov    dx,2Eh

mov    al,0F5h

out    dx,al

mov    dx,2Fh

mov    al,Nh          ;N=71h or 79h(see below 📝 Note)

out    dx,al
```

📝 *Note:*

If **N**=71h, the time base is set to second.

M = time value

    00: Time-out Disable

    01: Time-out occurs after 1 second

    02: Time-out occurs after 2 seconds

    03: Time-out occurs after 3 seconds

     .

     .

    FFh: Time-out occurs after 255 seconds

If **N**=79h, the time base is set to minute.

M = time value

    00: Time-out Disable

    01: Time-out occurs after 1 minute

    02: Time-out occurs after 2 minutes

    03: Time-out occurs after 3 minutes

     .

     .

    FFh: Time-out occurs after 255 minutes