/ISRock®

SBC-310
SBC-311

User Manual

Version 1.0

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(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Website: http://www.asrock.com

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Chapter 1: Introduction

Thank you for purchasing ASRock *SBC-310 / SBC-311* motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

In this manual, chapter 1 and 2 contain introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contain the configuration guide to BIOS setup and information of the Support CD.

> Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock website without further notice. You may find the latest VGA cards and CPU support lists on ASRock website as well.
> ASRock website   http://www.asrock.com
> If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
> www.asrock.com/support/index.asp

1.1 Package Contents

ASRock *SBC-310 / SBC-311* Motherboard
(3.5" SBC (5.8-in x 4.0-in) / (146 x 102 mm))
ASRock *SBC-310 / SBC-311* Driver CD
ASRock *SBC-310 / SBC-311* Jumper Setting Instruction

1.2 Specifications

Form Factor	Dimensions	3.5" SBC (5.8-in x 4.0-in) / (146 x 102 mm)
Processor System	CPU	**SBC-310:** BGA type for Intel® Core™ i7-4650/i5-4300U Haswell ULT Quad/Dual core MCP processor **SBC-311:** BGA type for Intel® Core™ i3-4010/ Celeron® 2980U Haswell ULT Dual core MCP processor
	Core Number	(By CPU, Max 4)
	Max Speed	(By CPU)
	L2 Cache	(By CPU)
	Chipset	(By CPU)
	BIOS	UEFI
Expansion Slot	PCI	0
	Mini-PCIe	1 (Half Size) + 1 (Full Size) shared with mSATA
	mSATA	1 (Full Size) shared with SATA2
	PCIe	0
	CFast Card Socket	0
Memory	Technology	Single Channel DDR3L 1333/1600 MHz SDRAM
	Max.	8GB
	Socket	1 x SO-DIMM
Graphics	Controller	Intel® HD Graphics (By CPU)
	VRAM	Shared Memory
	VGA	0
	LVDS	1 co-lay with eDP
	HDMI	Supports HDMI 1.4a, supported with Level Shift, resolution up to 4096x2304 (1 x HDMI)
	DVI	0
	DisplayPort	0
	Multi Display	Yes (Three Display)
Ethernet	Interface	10/100/1000 Mbps
	Controller	GbE LAN1: Realtek RTL8111G, LAN2: Intel® I218LM (4300U SKU) GbE LAN1: Realtek RTL8111G, LAN2: Intel® I218V (2980U SKU)
	Connector	2 x RJ-45

SATA	Max Data Transfer Rate	SATA3 (6.0Gb/s)
Rear I/O	VGA	0
	HDMI	2
	DVI-I/D	0
	DisplayPort	0
	Ethernet	2
	USB	4 x USB 3.0
	Audio	0
	Serial	0
	e-SATA	0
	PS/2	0
Internal Connector	USB	4 (2 x USB Header 2.54mm pitch)
	LVDS/ Inverter	24 bit dual channel LVDS co-lay with eDP
	VGA	0
	Serial	4 (2 RS-232/422/485, 2 RS-232)
	SATA	2 x SATA3 (6.0Gb/s)
	m-SATA	1 (shared)
	Mini-PCIe	1
	Parallel	0
	IrDA	0
	GPIO	4 x GPI + 4 x GPO
	SATA PWR Output Con	1
	Speaker Header	1
Watchdog Timer	Output	Output from super I/O to drag RESETCON#
	Interval	256 Segments, 0,1,2…255 Sec/Min
Power Requirements	Input PWR	DC 9-36 input
	Power On	AT/ATX Supported AT: Directly PWR on as power input ready ATX: Press button to PWR on after power input ready
Environment	Temperature	0ºC – 60ºC

1.3 Motherboard Layout
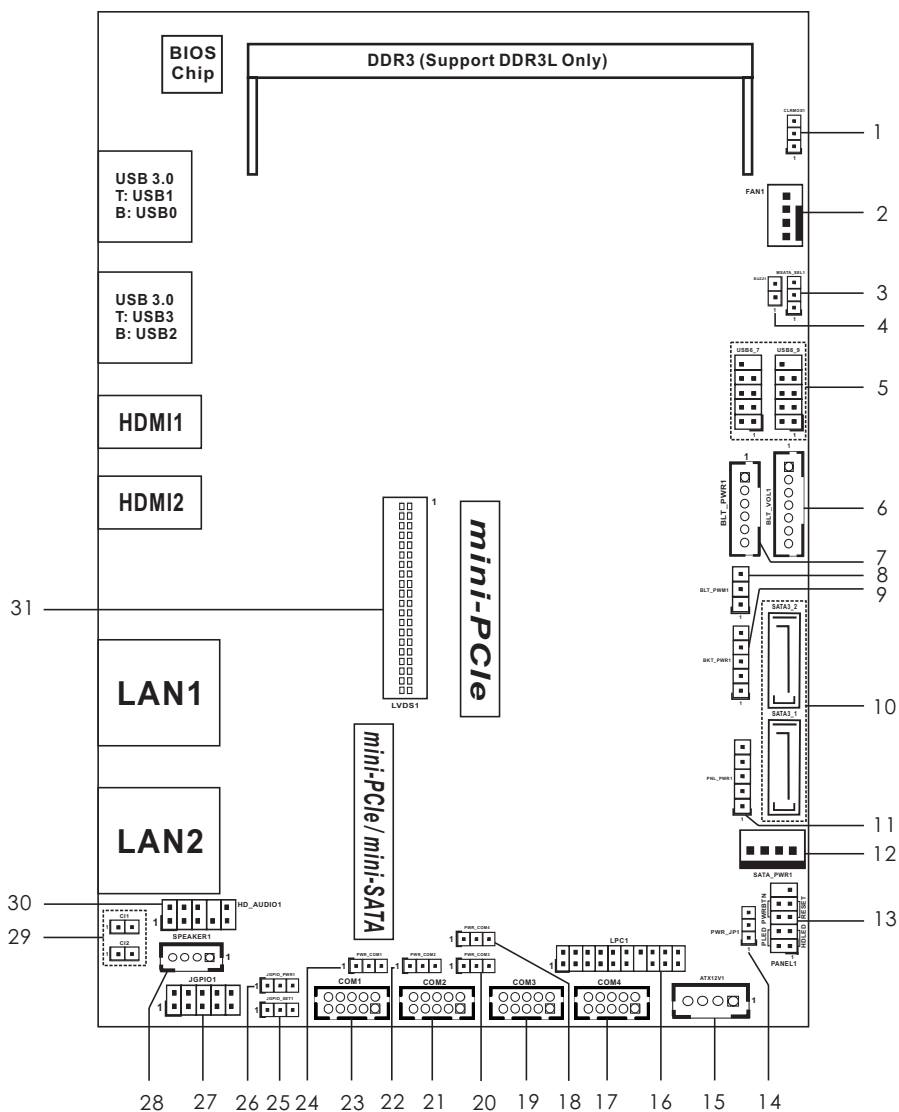
1 : Clear CMOS Header

2 : 4-Pin FAN Connector (+12V)

3 : mSATA Select

4 : 2-Pin Buzzer Header

5 : USB2.0 Headers (USB6_7, USB8_9)

6 : Backlight & Amp Volume Control (BLT_VOL1)

7 : Inverter Power Control Wafer (BLT_PWR1)

8 : Backlight Control Level (BLT_PWM1)

9 : Backlight Power Select (LCD_BLT_VCC) (BKT_PWR1)

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21 : COM Port Header (COM2)

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23 : COM Port Header (COM1)

24 : COM Port Pin9 PWR Setting Jumper (PWR_COM1 (For COM Port1))

25 : GPIO Default Setting

26 : Digital Input / Output Power Select

27 : Digital Input / Output Pin Header

28 : 3W Audio AMP Output Wafer

29 : Chassis Intrusion Headers (CI1, CI2)

30 : Front Panel Audio Header

31 : LVDS Panel Connector

1.4 I/O Panel
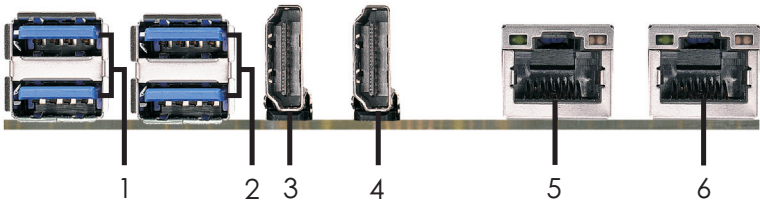
1	**USB 3.0 Ports (USB01)**	**4**	**HDMI Port (HDMI2)**
2	**USB 3.0 Ports (USB23)**	**5**	**LAN RJ-45 Port (LAN1)***
3	**HDMI Port (HDMI1)**	**6**	**LAN RJ-45 Port (LAN2)***

* There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.

LAN Port LED Indications

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED

Status	Description
Off	10Mbps connection
Orange	100Mbps connection
Green	1Gbps connection

ACT/LINK LED   SPEED LED

LAN Port
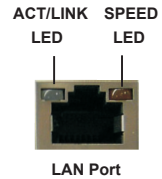
Chapter 2: Installation

This is a 3.5" SBC (5.8-in x 4.0-in) form factor (146 x 102 mm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

> Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

2.1 Screw Holes

Place screws into the holes to secure the motherboard to the chassis.

> Do not over-tighten the screws! Doing so may damage the motherboard.

2.2 Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component.

> Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply.
> Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Installation of Memory Modules (SO-DIMM)

SBC-310 / SBC-311 provides one 204-pin DDR3 (Double Data Rate 3) SO-DIMM slot, which supports single channel DDR3L SDRAM only.

Step 1.   Align a SO-DIMM on the slot such that the notch on the SO-DIMM matches the break on the slot.
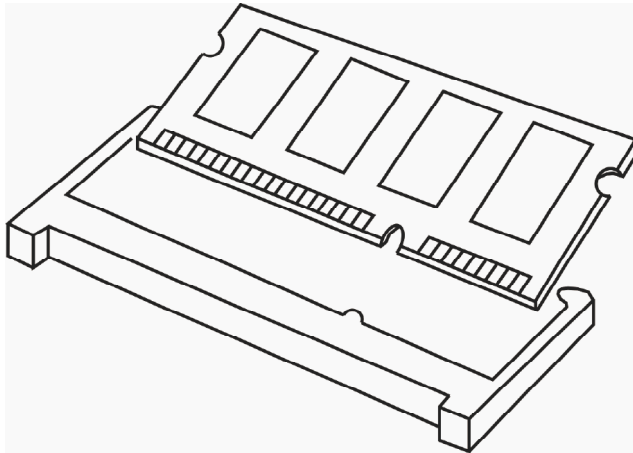
The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the slot at incorrect orientation.

Step 2.   Firmly insert the SO-DIMM into the slot until the retaining clips at both ends fully snap back in place and the SO-DIMM is properly seated.

2.4 Expansion Slots (mini-PCIe and mini-PCIe/mini-SATA Slots)

There is 1 mini-PCIe slot and 1 mini-PCIe/mini-SATA slot on this motherboard.

mini-PCIe slot:
> MINI_PCIE1 (mini-PCIe slot; half size) is used for PCI Express mini cards.

mini-PCIe/mini-SATA slot:
> MINI_PCIE2 (mini-PCIe/mini-SATA slot; full size) is used for PCI Express mini cards or mSATA cards.

Installing an expansion card

Step 1.   Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2.   Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3.   Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

Step 4.   Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5.   Fasten the card to the chassis with screws.

Step 6.   Replace the system cover.

2.5 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is "Short". If no jumper cap is placed on pins, the jumper is "Open". The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when jumper cap is placed on these 2 pins.

Short   Open
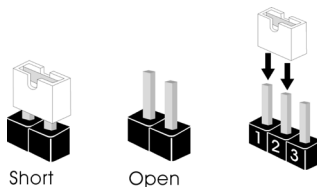
Clear CMOS Jumper
(CLRCMOS1)
(see p.8, No. 1)

1_2   2_3

Default   Clear CMOS

Note: CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile and MAC address will be cleared only if the CMOS battery is removed.

Digital Input/Output Power Select
(3-pin JGPIO_PWR1)
(see p.8 No. 26)

1 2 3

1-2: +12V
2-3: +5V

ATX/AT Mode Select
(3-pin PWR_JP1)
(see p.8 No. 14)

1-2: AT Mode
2-3: ATX Mode

Panel Power Select (LCD_VCC)
(5-pin PNL_PWR1)
(see p.8 No. 11)

1

Use this to set up the VDD power of the LVDS connector.
1-2: +3V
2-3: +5V
3-4: +5V
4-5: +12V

Backlight Power Select
(LCD_BLT_VCC)
(5-pin BKT_PWR1)
(see p.8 No. 9)

Use this to set up the backlight
power of the LVDS connector.
1-2: +5V
2-3: +12V
3-4: +12V
4-5: DC_IN Power

Backlight Control Level
(3-pin BLT_PWM1)
(see p.8 No. 8)

1-2: +3V
2-3: +5V

COM1 Pin9 PWR Setting Jumpers
(3-pin PWR_COM1)
(see p.8 No. 24)

1-2: +5V
2-3: +12V

(3-pin PWR_COM2)
(see p.8 No. 22)

(3-pin PWR_COM3)
(see p.8 No. 20)

(3-pin PWR_COM4)
(see p.8 No. 18)

mSATA Select
(3-pin MSATA_SEL1)
(see p.8 No. 3)

1-2: mini-PCIe
2-3: mSATA

GPIO Default Setting
(3-pin JGPIO_SET1)
(see p.8 No. 25)

1-2: Pull-High
2-3: Pull-Low

2.6 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard!

SATA3 Connectors
(SATA3_1, SATA3_2: see p.8, No. 10)

SATA3_2

SATA3_1

These two Serial ATA3 (SATA3) connectors support SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate.

USB 2.0 Headers
(see p.8 No. 5)
(9-pin USB6_7, USB8_9)

DUMMY
GND   GND
+B   +A
-B   -A
USB_PWR   USB_PWR
1
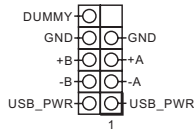
There are two USB 2.0 headers on this motherboard.

System Panel Header
(9-pin PANEL1)
(see p.8 No. 13)

GND
GND   RESET#
PWRBTN#   GND
PLED-   HDLED-
PLED+   HDLED+
1
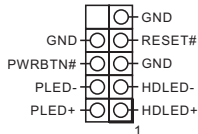
This header accommodates several system front panel functions.

Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1 sleep state. The LED is off when the system is in S3/S4 sleep state or powered off (S5).

> **HDLED (Hard Drive Activity LED):**
>
> Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.
>
> The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assign-ments are matched correctly.

3W Audio AMP Output Wafer

(4-pin SPEAKER1)

(see p.8 No. 28)

PIN	Signal Name
1	SPK L-
2	SPK L+
3	SPK R+
4	SPK R-

Fan Connector

(4-pin FAN1)

(see p.8 No. 2)

FAN_SPEED_CONTROL — 4
FAN_SPEED — 3
+12V — 2
GND — 1
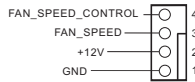
Please connect the fan cable to the fan connector and match the black wire to the ground pin.

ATX Power Connector (Input 9V-36V)

(4-pin ATX12V1)

(see p.8 No. 15)

Please connect a DC power supply (9V-36V) to this connector.
1-4 : GND
2-3 : DC Input

SATA Power Output Connector

(4-pin SATA_PWR1)

(see p.8 No. 12)

+12V GND GND +5V
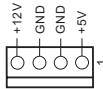
Inverter Power Control Wafer

(6-pin BLT_PWR1)

(see p.8 No. 7)

PIN	Signal Name
1	GND
2	GND
3	CON_LBKLT_CTL
4	CON_LBKLT_EN
5	LCD_BLT_VCC
6	LCD_BLT_VCC

COM Port Headers

(10-pin COM1)
(see p.8 No. 23)
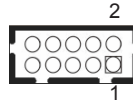
(10-pin COM2)
(see p.8 No. 21)

(10-pin COM3)
(see p.8 No. 19)

(10-pin COM4)
(see p.8 No. 17)

PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
10	DUMMY	8	CCTS#	6	DDSR#	4	DDTR#	2	RRXD
9	DUMMY	7	RRTS#	5	GND	3	TTXD	1	DDCD#

This motherboard supports RS232/422/485 on COM1/COM2 port. Please refer to below table for the pin definition. In addition, COM1/COM2 port (RS232/422/485) can be adjusted in BIOS setup utility > Advanced Screen > Super IO Configuration. You may refer to page 31 for details.

COM1/COM2 Port Pin Definition

PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	RX+	N/A
3	TXD	TX+	RTX+
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	NA/+5V/+12V	N/A	N/A

Buzzer Header

(2-pin BUZZ1)
(see p.8 No. 4)

Chassis Intrusion Headers

(2-pin CI1, CI2)
(see p.8 No. 29)

This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

LVDS Connector

(40-pin LVDS1)

(see p.8 No. 31)
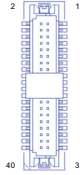
PIN	Signal Name	PIN	Signal Name
2	LCD_VCC	1	LCD_VCC
4	LDDC_CLK	3	+3.3V
6	LVDS_A_DATA0#	5	LDDC_DATA
8	GND	7	LVDS_A_DATA0
10	LVDS_A_DATA1	9	LVDS_A_DATA1#
12	LVDS_A_DATA2#	11	GND
14	GND	13	LVDS_A_DATA2
16	LVDS_A_DATA3	15	LVDS_A_DATA3#
18	LVDS_A_CLK#	17	GND
20	GND	19	LVDS_A_CLK
22	LVDS_B_DATA0	21	LVDS_B_DATA0#
24	LVDS_B_DATA1#	23	GND
26	GND	25	LVDS_B_DATA1
28	LVDS_B_DATA2	27	LVDS_B_DATA2#
30	LVDS_B_DATA3#	29	DPLVDD_EN
32	GND	31	LVDS_B_DATA3
34	LVDS_B_CLK	33	LVDS_B_CLK#
36	CON_LBKLT_EN	35	GND
38	LCD_BLT_VCC	37	CON_LBKLT_CTL
40	LCD_BLT_VCC	39	LCD_BLT_VCC

Digital Input/Output Pin Header

(10-pin JGPIO1)

(see p.8 No. 27)
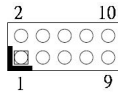
PIN	Signal Name	PIN	Signal Name
1	SIO_GP34	2	SIO_GP30
3	SIO_GP35	4	SIO_GP31
5	SIO_GP36	6	SIO_GP32
7	SIO_GP37	8	SIO_GP33
9	JGPIO_PWR	10	GND

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.8 No. 30)

GND
PRESENCE#
MIC_RET
OUT_RET
OUT2_L
J_SENSE
OUT2_R
MIC2_R
MIC2_L
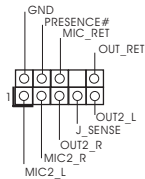
Backlight & Amp Volume Control

(7-pin BLT_VOL1)

(see p.8 No. 6)

PIN	Signal Name
1	GPIO_VOL_UP
2	GPIO_VOL_DW
3	PWRDN
4	GPIO_BLT_UP
5	GPIO_BLT_DW
6	GND
7	GND

LPC Header

(19-pin LPC1)

(see p.8 No. 16)
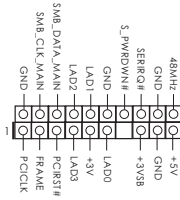
This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

SMB_DATA_MAN
SMB_CLK_MAN
GND
LAD2
LAD1
GND
S_PWRDWN#
SERIRQ#
GND
48MHz
GND
+5V

PCICLK
FRAME
PCIRST#
LAD3
+3V
LAD0
+3V3B
GND
+5V

Chapter 3: UEFI SETUP UTILITY

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

> Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
H/W Monitor	To display current hardware status
Boot	To set up the default system device to locate and load the Operating System
Security	To set up the security features
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use < ← > key or < → > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Enter>	To bring up the selected screen
<F1>	To display the General Help Screen
<F7>	Discard changes
<F9>	To load optimal default values for all the settings
<F10>	To save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	To jump to the Exit Screen or exit the current screen

3.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.

SBC-310

SBC-311

```
              Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
  Main  Advanced  H/W Monitor  Boot  Security  Exit

  UEFI Version       : SBC-311 L0.10              Set the Date. Use Tab to
  Processor Type     : Intel(R) Core(TM) i5-4300U CPU @ 1.90GHz  switch between Date elements.
  Processor Speed    : 1900MHz
  Microcode Update   : 40651/10
  Cache Size         : 3072KB

  Total Memory       : 4096MB with 256MB Shared Memory
                       and 2MB GTT memory
                       Single-Channel Memory Mode

  DDR3_A1            : 4096MB(DDR3-1600)


  LVDS Rom Version : Default                       →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
  System Date                       [Fri 02/06/2015]  +/-: Change Option
  System Time                       [18:10:09]      F1: General Help
                                                    F7: Discard Changes
                                                    F9: Load UEFI Defaults
                                                    F10: Save and Exit
                                                    ESC: Exit




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```

3.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Storage Configuration, Intel(R) Rapid Start Technology, AMT Configuration, Super IO Configuration, ACPI Configuration, USB Configuration and Voltage Configuration.
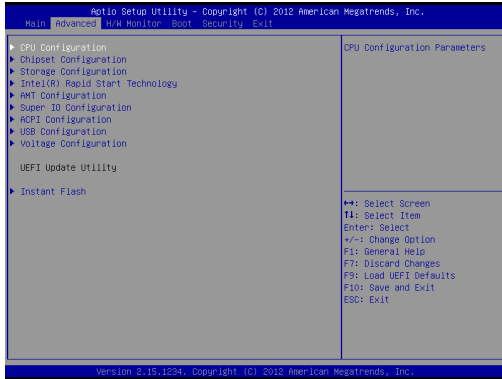
Setting wrong values in this section may cause the system to malfunction.

Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after UEFI update process completes.

3.3.1 CPU Configuration

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

Intel(R) Core(TM) i5-4300U CPU @ 1.90GHz            Intel Hyper Threading
Max CPU Speed                         1900 MHz      Technology allows multiple
Min CPU Speed                         800 MHz       threads to run on each core,
Processor Cores                       2             so that the overall
Intel HT Technology                   Supported     performance on threaded
Intel VT-x Technology                 Supported     software is improved.
Intel SMX Technology                  Supported
64-bit                                Supported

Intel Hyper Threading Technology      [Enabled]
Active Processor Cores                [All]
CPU C States Support                  [Auto]
Enhanced Halt State(C1E)              [Auto]
CPU C3 State Support                  [Auto]        ↔: Select Screen
CPU C6 State Support                  [Auto]        ↑↓: Select Item
CPU C7 State Support                  [Auto]        Enter: Select
Package C State Support               [Disabled]    +/-: Change Option
                                                    F1: General Help
Intel SpeedStep Technology            [Enabled]     F7: Discard Changes
Intel Turbo Boost Technology          [Enabled]     F9: Load UEFI Defaults
CPU Thermal Throttling                [Enabled]     F10: Save and Exit
No-Execute Memory Protection          [Enabled]     ESC: Exit
Intel Virtualization Technology       [Enabled]
Hardware Prefetcher                   [Enabled]
Adjacent Cache Line Prefetch          [Enabled]


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```

Intel Hyper Threading Technology

   To enable this feature, a computer system with an Intel processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology, such as Microsoft® Windows® 7 / 8 is required. Set to [Enabled] if using Microsoft® Windows® 7, 8, or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

Active Processor Cores

   Select the number of cores to enable in each processor package.

CPU C States Support

   Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Enhanced Halt State (C1E)

   Enable Enhanced Halt State (C1E) for lower power consumption.

CPU C3 State Support

   Enable C3 sleep state for lower power consumption.

CPU C6 State Support

   Enable C6 deep sleep state for lower power consumption.

CPU C7 State Support

   Enable C7 deep sleep state for lower power consumption.

Package C State Support

   Enable CPU, PCIe, Memory, Graphics C State Support for power saving.

Intel SpeedStep Technology

   Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options:

[Enabled] and [Disabled]. If you install Windows® 7 / 8 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Use this item to enable or disable Intel Turbo Boost Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheating.

No-Execute Memory Protection

No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with "No Execute (NX) Memory Protection" can prevent data pages from being used by malicious software to execute codes. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

Hardware Prefetcher

Use this item to turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

3.3.2 Chipset Configuration

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

VT-d Capability                      Supported              If [Auto] is selected, the
                                                            motherboard will detect the
DRAM Frequency                       [Auto]                 memory module(s) inserted and
                                                            assign the appropriate
VT-d                                 [Disabled]             frequency automatically.

Share Memory                         [Auto]
Render Standby                       [Enabled]

Onboard HD Audio                     [Enabled]
  Front Panel                        [Auto]
Onboard HDMI HD Audio                [Enabled]
Onboard LAN 1(Intel)                 [Enabled]
Onboard LAN 2(Realtek)               [Enabled]              →←: Select Screen
                                                            ↑↓: Select Item
Deep Sleep                           [Disabled]             Enter: Select
Restore on AC/Power Loss             [Power Off]            +/-: Change Option
                                                            F1: General Help
Active LVDS                          [Disabled]             F7: Discard Changes
Primary IGFX Boot Display            [VBIOS Default]        F9: Load UEFI Defaults
                                                            F10: Save and Exit
                                                            ESC: Exit




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```

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

VT-d

Intel® Virtualization Technology for Directed I/O helps your virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

Share Memory

Configure the size of memory that is allocated to the integrated graphics processor when the system boots up.

Render Standby

Use this to enable or disable Render Standby by Internal Graphics Device. The default value is [Enabled].

Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto].

Front Panel

Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

Onboard HDMI HD Audio

This allows you to enable or disable the Onboard HDMI HD Audio feature.

Onboard LAN 1 (Intel)

This allows you to enable or disable the Onboard LAN 1 feature.

Onboard LAN 2 (Realtek)

This allows you to enable or disable the Onboard LAN 2 feature.

Deep Sleep

Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. The default value is [Disabled].

Restore on AC/Power Loss

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. If [LAST STATE] is selected, the AC/power restores to the last power state when the power recovers.

Active LVDS

Use this to enable or disable the LVDS. The default value is [Enabled].

Primary IGFX Boot Display

Use this to select primary internal graphics boot display. The default value is [VBIOS Default].

3.3.3 Storage Configuration


```
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        Advanced

    SATA Controller(s)                    [Enabled]           Enable/disable the SATA
    SATA Mode Selection                   [AHCI]              controllers.
    SATA Aggressive Link Power Mgmt       [Disabled]
    Hard Disk S.M.A.R.T                   [Enabled]

  ▶ SATA3_1          : Not Detected
  ▶ SATA3_2          : Not Detected
  ▶ MINI_SATA1       : Not Detected

                                                              ↔: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Option
                                                              F1: General Help
                                                              F7: Discard Changes
                                                              F9: Load UEFI Defaults
                                                              F10: Save and Exit
                                                              ESC: Exit

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```

SATA Controller(s)

Use this item to enable or disable the SATA Controller feature.

SATA Mode Selection

Use this to select SATA mode. Configuration options: [IDE Mode] and [AHCI Mode]. The default value is [AHCI Mode].

> AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

SATA Aggressive Link Power Management

Use this item to configure SATA Aggressive Link Power Management.

Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].

3.3.4 Intel(R) Rapid Start Technology

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

                                                        Intel(R) Rapid Start
  Intel(R) Rapid Start Technology      [Disabled]        Technology is a new zero power
                                                        hibernation mode which allows
                                                        users to resume in just 5-6
                                                        seconds.




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Option
                                                        F1: General Help
                                                        F7: Discard Changes
                                                        F9: Load UEFI Defaults
                                                        F10: Save and Exit
                                                        ESC: Exit




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```

Intel(R) Rapid Start Technology

Use this item to enable or disable Intel(R) Rapid Start Technology. Intel(R) Rapid Start Technology is a new zero power hibernation mode which allows users to resume in just 5-6 seconds. The default is [Disabled].

3.3.5 AMT Configuration

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

Intel AMT                             [Enabled]          Enable/Disable Intel (R)
BIOS Hotkey Pressed                   [Disabled]         Active Management Technology
MEBx Selection Screen                 [Disabled]         BIOS Extension.
Hide Un-Config ME Confirm Prompt      [Disabled]         Note : iAMT H/W is always
MEBx Debug Message Output             [Disabled]         enabled.
Un-Configure ME                       [Disabled]         This option just controls the
Amt Wait Timer                        0                  BIOS extension execution.
ASF                                   [Enabled]          If enabled, this requires
Activate Remote Assistance Process    [Disabled]         additional firmware in the SPI
USB Configure                         [Enabled]          device
PET Progress                          [Enabled]
AMT CIRA Timeout                      0
                                                         ↔: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Option
                                                         F1: General Help
                                                         F7: Discard Changes
                                                         F9: Load UEFI Defaults
                                                         F10: Save and Exit
                                                         ESC: Exit


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```

Intel AMT

Use this to enable or disable Intel(R) Active Management Technology.

BIOS Hotkey Pressed

Use this to enable or disable BIOS Hotkey Pressed.

MEBx Selection Screen

Use this to enable or disable MEBx selection screen.

Hide Un-Configure ME Configuration

Use this to hide Un-Configure ME without password confirmation prompt.

MEBx Debug Message Output

Use this to enable or disable MEBx debug message output.

Un-Configure ME

Use this to enable or disable Un-Configure ME without password.

AMT Wait Timer

Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

ASF

Use this to enable or disable Alert Specification Format.

Activate Remote Assistance Process
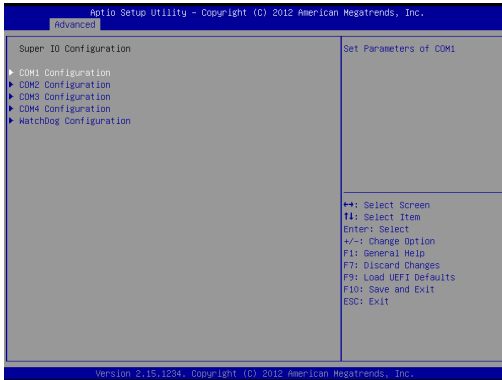
Use this to enable or disable trigger CIRA boot.

USB Configure

Use this to enable or disable USB Configure.

PET Progress

Use this to enable or disable PET Events progress to recieve PET events.

3.3.6 Super IO Configuration

COM1 Configuration

Use this to set parameters of COM1. Select COM1 port type: [RS232], [RS422] or [RS485].

COM2 Configuration

Use this to set parameters of COM2. Select COM2 port type: [RS232], [RS422] or [RS485].

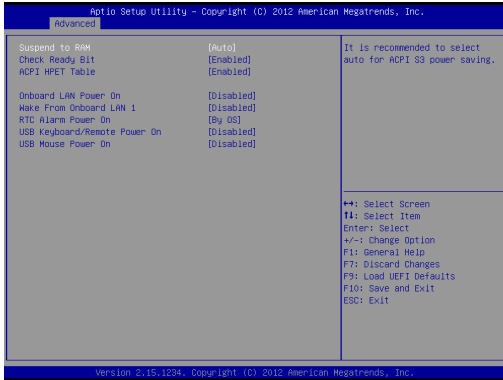**COM3 Configuration**

Use this to set parameters of COM3.

COM4 Configuration

Use this to set parameters of COM4.

WDT Timeout Reset

This allows users to enable/disable the Watch Dog Timer timeout to reset system. The default value is [Disabled].

3.3.7 ACPI Configuration

Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it.

ACPI HPET Table

Use this item to enable or disable ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® certification.

Onboard LAN Power On

Use this item to enable or disable onboard LAN to turn on the system from the power-soft-off mode.

Wake From Onboard LAN 1

Use this item to enable or disable the Wake From Onboard LAN 1 feature.

RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.
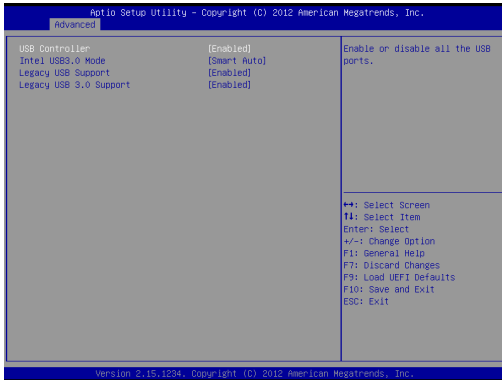
USB Keyboard/Remote Power On

Use this item to enable or disable USB Keyboard/Remote to power on the system.

USB Mouse Power On

Use this item to enable or disable USB Mouse to power on the system.

3.3.8 USB Configuration

USB Controller

Use this item to enable or disable the use of USB controller.

Intel USB 3.0 Mode

Use this item to enable or disable the use of Intel USB 3.0 mode.

Legacy USB Support

Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto] and [UEFI Setup Only]. The default value is [Auto]. Please refer to below descriptions for the details of these four options:

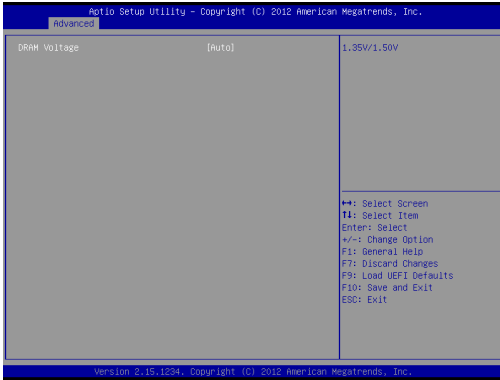[Enabled] - Enables support for legacy USB.

[Auto] - Enables legacy support if USB devices are connected.

[UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS.

Legacy USB 3.0 Support

Use this option to enable or disable legacy support for USB 3.0 devices. The default value is [Enabled].

3.3.9 Voltage Configuration

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

  DRAM Voltage                    [Auto]                  1.35V/1.50V




                                                         ↔: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Option
                                                         F1: General Help
                                                         F7: Discard Changes
                                                         F9: Load UEFI Defaults
                                                         F10: Save and Exit
                                                         ESC: Exit


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```
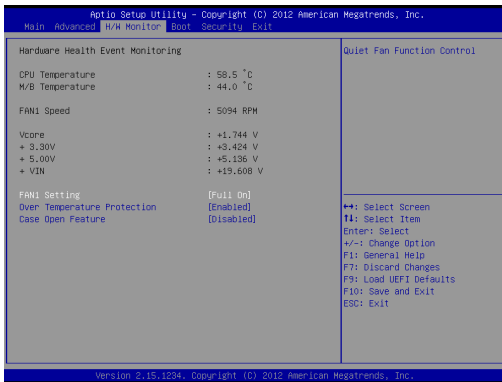
DRAM Voltage

Use this to select DRAM Voltage. The default value is [Auto].

3.4 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.

FAN1 Setting

This allows you to set fan 1's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

Over Temperature Protection

Use this to enable or disable Over Temperature Protection. The default value is [Enabled].

Case Open Feature

This allows you to enable or disable case open detection feature. The default is value [Disabled].

Clear Status

This option appears only when the case open has been detected. Use this option to keep or clear the record of previous chassis intrusion status.

3.5 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.
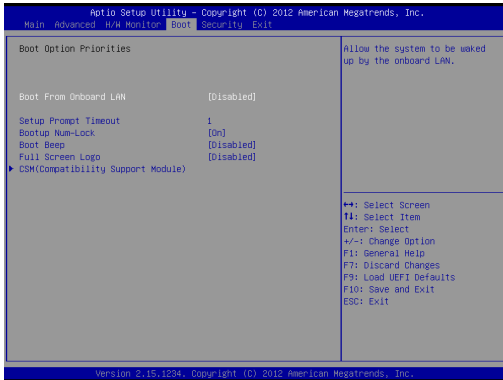
Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key. 65535(0XFFFF) means indefinite waiting.

Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Boot Beep

Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Disabled].

CSM (Compatibility Support Module)

CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows® 8 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.

Launch PXE OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Do not launch?

Launch Video OpROM Policy
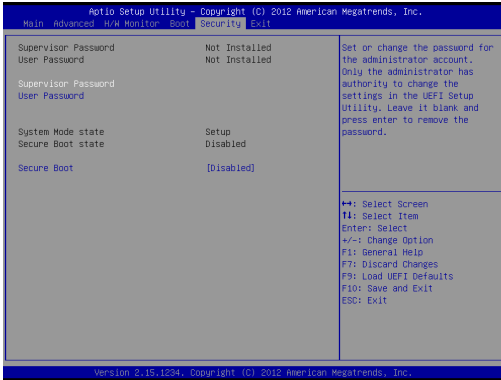
Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Do not launch?

3.6 Security Screen

In this section, you may set, change or clear the supervisor/user password for the system.

```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
       Main  Advanced  H/W Monitor  Boot  Security  Exit

     Supervisor Password                Not Installed            Set or change the password for
     User Password                      Not Installed            the administrator account.
                                                                 Only the administrator has
     Supervisor Password                                         authority to change the
     User Password                                               settings in the UEFI Setup
                                                                 Utility. Leave it blank and
                                                                 press enter to remove the
     System Mode state                  Setup                    password.
     Secure Boot state                  Disabled

     Secure Boot                        [Disabled]

                                                                 ↔: Select Screen
                                                                 ↑↓: Select Item
                                                                 Enter: Select
                                                                 +/-: Change Option
                                                                 F1: General Help
                                                                 F7: Discard Changes
                                                                 F9: Load UEFI Defaults
                                                                 F10: Save and Exit
                                                                 ESC: Exit

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```

Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Enable to support Windows 8 Secure Boot.

3.7 Exit Screen

Save Changes and Exit

When you select this option, it will pop-out the following message, "Save configuration changes and exit setup?" Select [OK] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option, it will pop-out the following message, "Discard changes and exit setup?" Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, it will pop-out the following message, "Discard changes?" Select [OK] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.

Chapter 4: Software Support

4.1 Install Operating System

This motherboard supports Microsoft® Windows® operating systems: 8 / 7. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu did not appear automatically, locate and double click on the file "ASRSETUP.EXE" from the BIN folder in the Support CD to display the menus.

4.2.2 Drivers Menu

The Drivers Menu shows the available device's drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

4.2.3 Utilities Menu

The Utilities Menu shows the application software that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

4.2.4 Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information.