SI-12 Series

User Manual

Revision	Release Date
V0.1	2014/06/20
V0.2	2014/09/23
V1.0	2015/10/06
V1.1	2016/06/08

Table of Contents

Safety Information

Your SI-12 is designed and tested to meet the latest standards of safety for information technology equipment. However, to ensure your safety, it is important that you read the following safety instructions

Setting up your system

- Read and follow all instructions in the documentation before you operate your system.
- Do not use this product near water.
- Set up the system on a stable surface. Do not secure the system on any unstable plane.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the system for ventilation. ***Never insert objects of any kind into the ventilation openings***.
- This system should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Use this product in environments with ambient temperatures between -30˚C and 60˚C.
- If you use an extension cord, make sure that the total ampere rating of the devices plugged into the extension cord does not exceed its ampere rating.
- DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -40° C (-40° F) OR ABOVE 80° C (176° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

Care during use

- Do not walk on the power cord or allow anything to rest on it.
- Do not spill water or any other liquids on your system.
- When the system is turned off, a small amount of electrical current still flows. Always unplug all power, and network cables from the power outlets before cleaning the system.
- If you encounter the following technical problems with the product, unplug the power cord and contact a qualified service technician or your retailer.
  - The power cord or plug is damaged.
  - Liquid has been spilled into the system.
  - The system does not function properly even if you follow the operating instructions.
  - The system was dropped or the cabinet is damaged.

Lithium-Ion Battery Warning

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

NO DISASSEMBLY

The warranty does not apply to the products that have been disassembled by users

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

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CHAPTER 1 INTRODUCTION

1.1 General Description

The “Signature Book™” SI-12 is a professional fanless digital signage system powered by Intel® Atom™ E3845 Quad-Core @ 1.91GHz Processor and Intel® (Gen7-LP) 4EU Graphics. This compact & slim design supports 2x HDMI, 1x RJ45 for LAN, 1x RJ45 for RS232, 2x USB2.0 and 1x USB3.0 port to give a wide selection for data communication functionality in display applications.

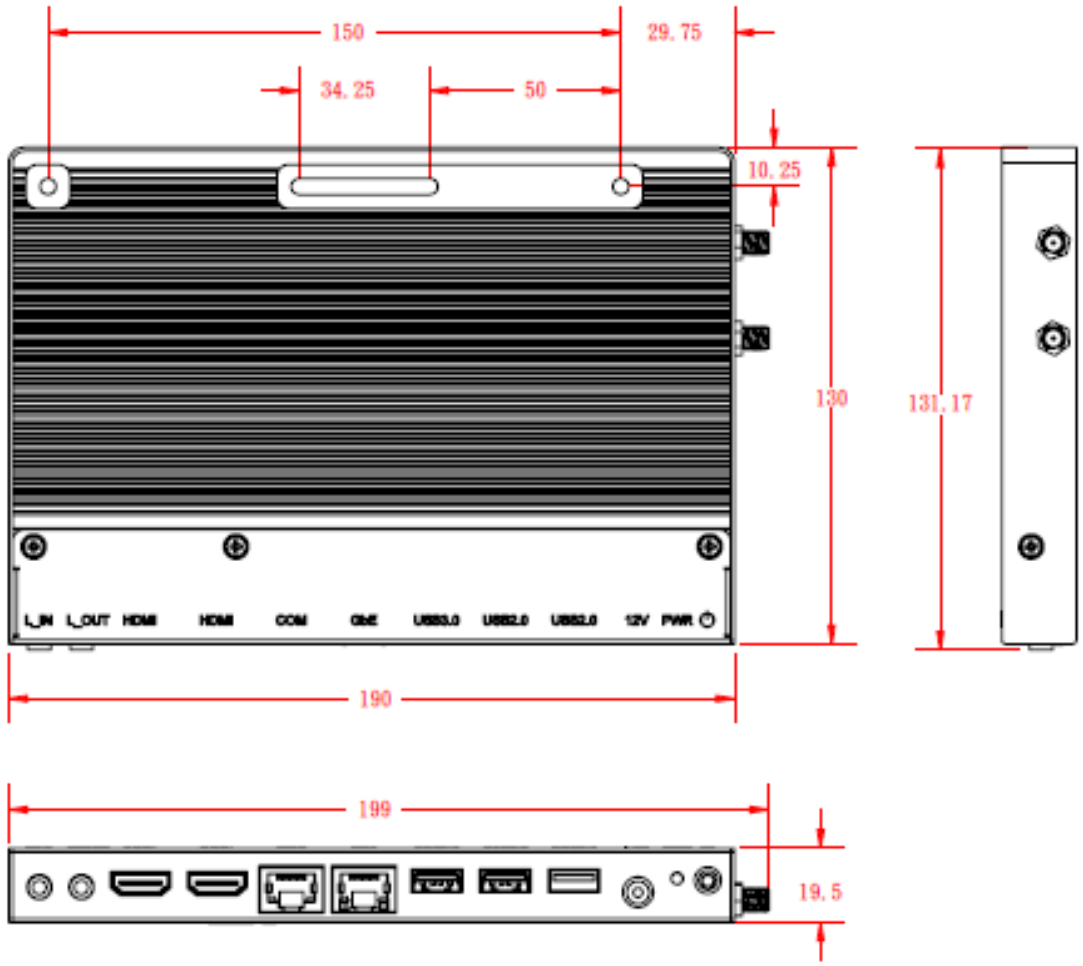
1.2 System Specifications

1.2.1 Hardware Specifications

Model Name	SI-12
System Mainboard	IB812
CPU	Intel Atom E3840 SoC (22nm); 4 Cores @ 1.91 GHz
Chipset	FCBGA package (25mm x 27mm)
Memory	2 x DDR3L@ 1.35V SO-DIMM, Dual Channel (Max. 16GB) ,No-ECC
I/O Interface	2x HDMI 1x USB 3.0 port, 2x USB 2.0 ports 1x RJ45 for LAN, 1x RJ45 for RS232 2x audio connectors for Line-in / Line-out Power / HDD LED, 1x power on/off button 1x DC jack
Storage	1x mSATA
Expansion Slots	1x mPCIe(x1) for WiFi + Bluetooth, 3G, and TV tuner options 1x UIM/SIM card slot (for 3G/LTE adapter in mPCIe slot)
Power Supply	+12V DC-in with 60W power adaptor
Construction	Aluminum + SGCC
Chassis Color	Black & White
Mounting	STD system bracket
Dimensions	190mm(W) x 130mm(D) x 19.5mm(H) 7.5”(W) x 5.1”(D) x 0.77”(H)
Operating Temperature	-30°C ~ 60°C (-22°F~140°F)
Storage Temperature	-40°C ~ 80°C (-40°F~176°F)
Relative Humidity	5~90% @45°C (non-condensing)
Vibration	mSATA: 5 Grms/5~500Hz random operation
RoHS	Available
Certification	CE, FCC, UL, CCC, VCCI Class B

·This specification is subject to change without prior notice.

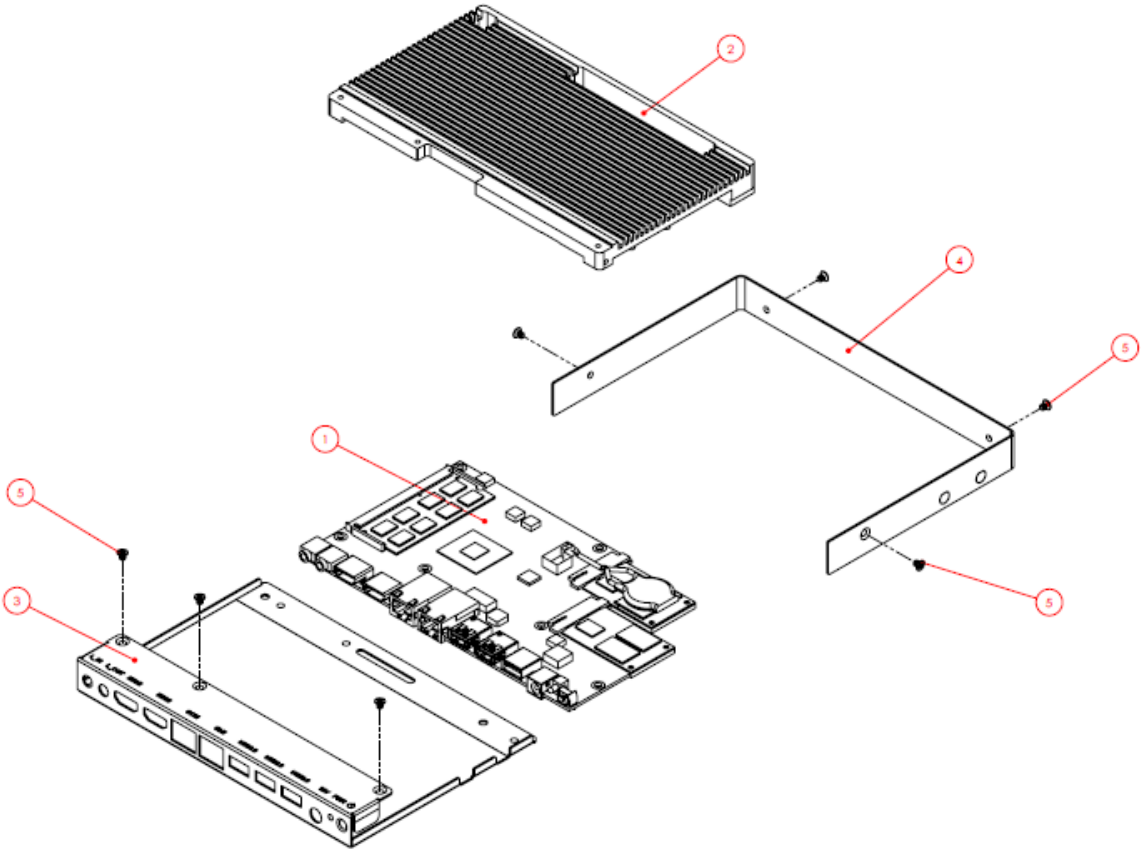
1.2.2 Dimensions



1.2.3 I/O View

Item	Connector	Item	Connector
1	Line-in	6	1x USB 3.0
2	Line-out	7	2x USB 2.0
3	2x HDMI	8	DC jack
4	1x RJ45 for RS232	9	Power LED
5	1x RJ45 for LAN	10	Power on/off button

1.3 Exploded View of the SI-12 Assembly



1.3.1 Parts Description

Part No.	Description	Part No.	Description
1	IB812 motherboard	2	SI-12 heat sink
3	SI-12 Base	4	SI-12 Cover

1.4 Packing List

Item No.	Description	Qty
1	Driver CD	1
2	Power adaptor	1
3	Power Cord	1

1.4.1 Optional Items

WiFi Solution	Description	
QCOM WiFi Module	WIRELESS;PCI-E MINI CARD 802.11B/G/N [AW-NE238H] (A008WLAWNE238H000P)	
External Antenna -2pcs	WiFi Antenna (A055RFA02C2M20800P)	
Internal Cable -2pcs	Internal Antenna 100mm[BTC130-1-70B-100]RoHS (A055RFA0000021000P)	 
Bracket	COMPONENT BOM;MPCIE-EXT V-B2 BRACKET BOM RoHS (SC2MPCIEEXT0B2100P)	
3G Solution	**Description**	
ZU 202	Wireless; 3.75G UMTS/HSPA [ZU202] RoHS (A008WIRELESS00520P)	
ZU 200	Wireless; 3.75G UMTS/HSPA & GPS Module [ZU200] RoHS (A008WIRELESS00510P)	
Cable	Cable; Antenna-2 30CM P 2pcs (C501ANT0200300000P)	
Antenna	Antenna; 3G, P, 2pcs (A055ANT0921Q2P000P)	
COM Port Cable	**Description**	
EXT-424	Cable; EXT-424 2-HD 8C 90CM; RJ45 Jack-8M=>DSU-9F RoHS (C501EXT4240902000P)	
EDID Dongle	**Description**	
H8246JT021-001	EDID emulator dongle (HDMI), adapter; HDMI 19P A/M TO A/F (A025HDMI001010000P)	
Mounting Kit	**Description**	
HDMI Cable Holder	Component BOM; SI-12 & SI-22 V-A1 HDMI cable holder with screw RoHS (SC2SI12----0A1100P)	

1.5 HARDWARE INSTALLATION

1.5.1 Installing the optional Wireless Module

1. Remove the ten screws on the sides that are used to secure the cover to the chassis. Once all the screws are removed, from the side, push the cover forward to remove it.

2. Push the WIFI module into the slot. Screw two screws to secure the module into the slot.

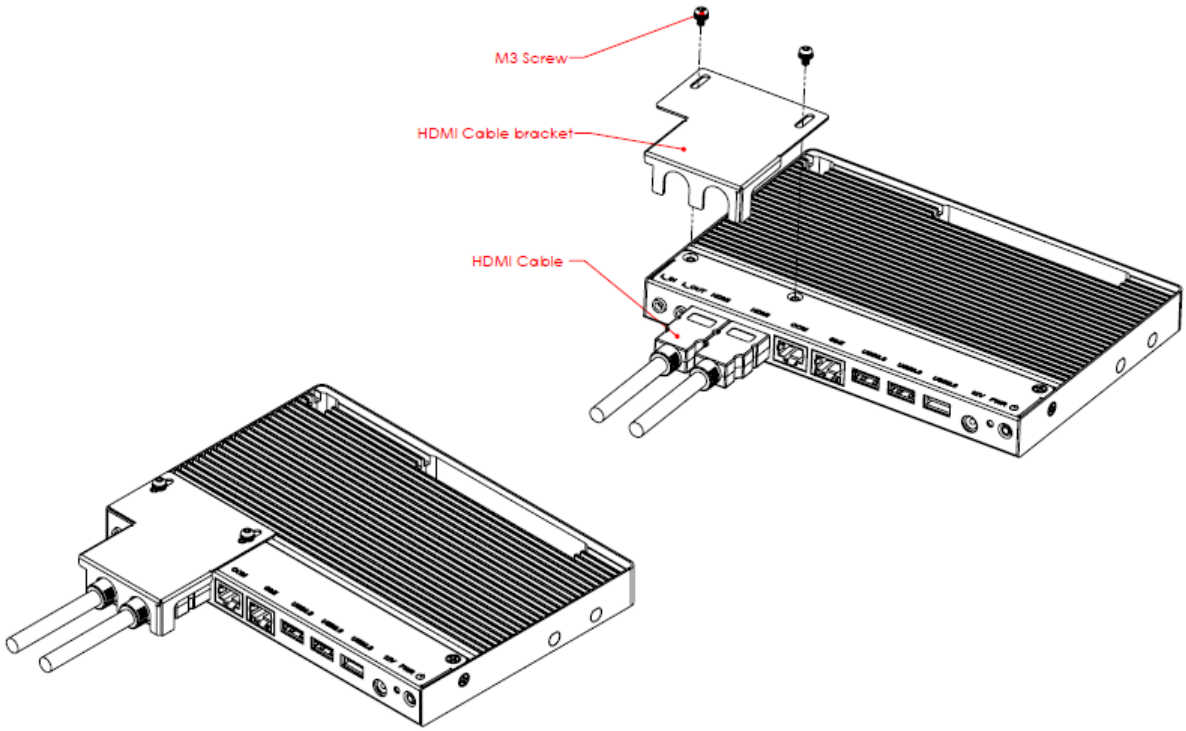
1.5.2 Installing the mSATA Module

1. Remove the six screws on the sides that are used to secure the white cover to the chassis. Once all the screws are removed, from the side, push the cover forward to remove it.

2. First, put the thermal pad and push the mSATA module into the slot. Screw two screws to secure the module into the slot.

1.5.3 Installing the optional HDMI Cable Holder

Install the HDMI cable holder and screw two M3 screws as shown.



CHAPTER 2 MOTHERBOARD INTRODUCTION

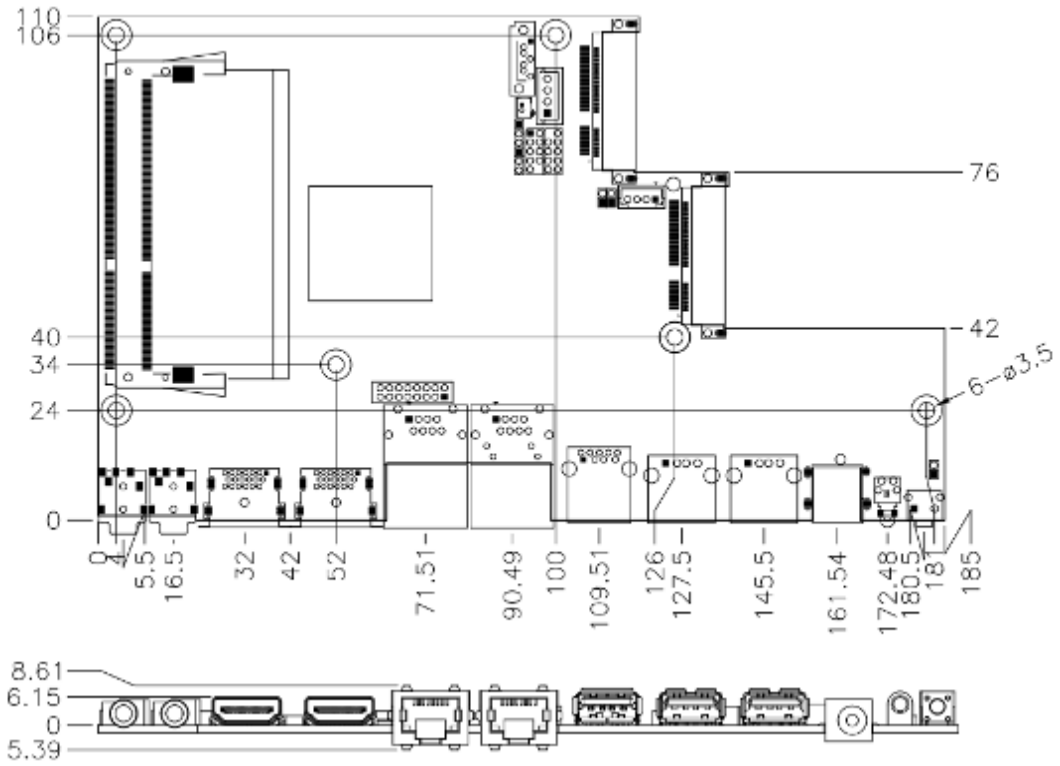
2.1 Introduction

The IB812 is a single board computer based on the Intel® Embedded system-on-chip solution (SoC). The Bay Trail SoC is the Intel Architecture (IA) SoC that integrates the next generation Intel processor core, graphics, memory controller, and I/O interfaces into a single system-on-chip solution.

The IB812 platform is well-suited for low-power and high-performance designs in a broad range of markets including Industrial Control & Automation, Digital Signage, Thin Client, Electronic Gaming Machines, and SMB storage appliances.

Specifications – Mainboard	
Product Name	IB812
CPU Type/Speed	Intel Atom E3840 SoC (22nm); 4 Cores @ 1.91 GHz
Chipset	FCBGA package (25mm x 27mm)
BIOS	AMI BIOS, supports ACPI Function
Memory	2 x DDR3L@ 1.35V SO-DIMM, Dual Channel (Max. 16GB), No-ECC
VGA	- Intel Embedded SoC built-in (Gen 7) GPU, supports 2 independent displays, DirectX®11, HDMI - HDMI x2
LAN	Realtek RTL8111G-CG PCIe GbE QFN package
USB	1 x USB 3.0 Ports – via SoC built-in XHCIs 2 x USB 2.0 Ports – via SoC built-in EHCIs
Serial ATA Ports	M-SATA SoC Integral SATA II controller
Audio	SoC Integral HDA + Realtek ALC269Q-VC2 Codec [6mm x 6mm @ MQFN48] Supports 2-channel audio line_out + line_in
LPC I/O	Nuvoton NCT55**23**D - COM#1 - Hardware Monitor (2 thermal inputs, 4 voltage monitor inputs)
Expansion Slots	Mini PCI-e socket x 2 (Full-sized) **Full-sized MiniPCIe(1x) supports mSATA**
Edge Connector	2x HDMI, 1x RJ45(G_LAN), 3x USB, 1x RJ45(COM1)
[**Watchdog Timer**	Yes (256 segments, 0, 1, 2…255 sec/min)
Power Connector	+12V DC-in
Others	- i-Smart function
OS Supported	- Windows 7, Windows 8, Linux
RoHS	Yes
Board Size	185mm x 110mm

Board Dimensions



2.2 Installing the Memory

The IB812 board supports two DDR3L memory sockets for maximum total memory of 16GB DDR3L memory type.

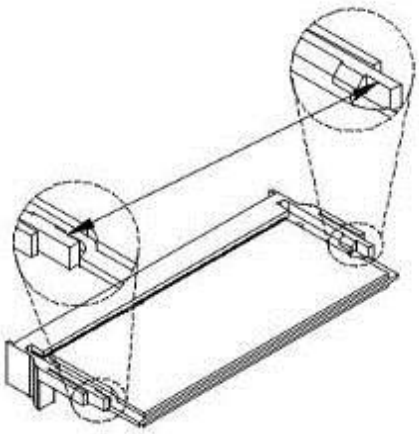
Installing and Removing Memory Modules

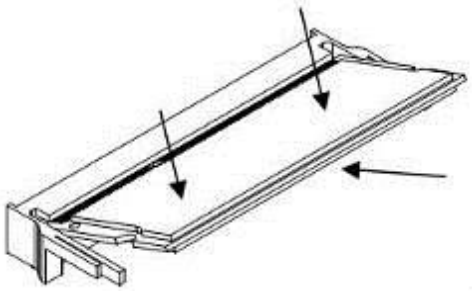
To install the DDR3L modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3L module so that the key of the DDR3L module aligned with that on the memory slot.
2. Gently push the DDR3L module in an upright position until the clips of the slot close to hold the DDR3L module in place when the DDR3L module touches the bottom of the slot.
3. To remove the DDR3L module, press the clips with both hands.

J6: Primary DDR3L SO-DIMM Socket

J12: Secondary DDR3L SO-DIMM Socket

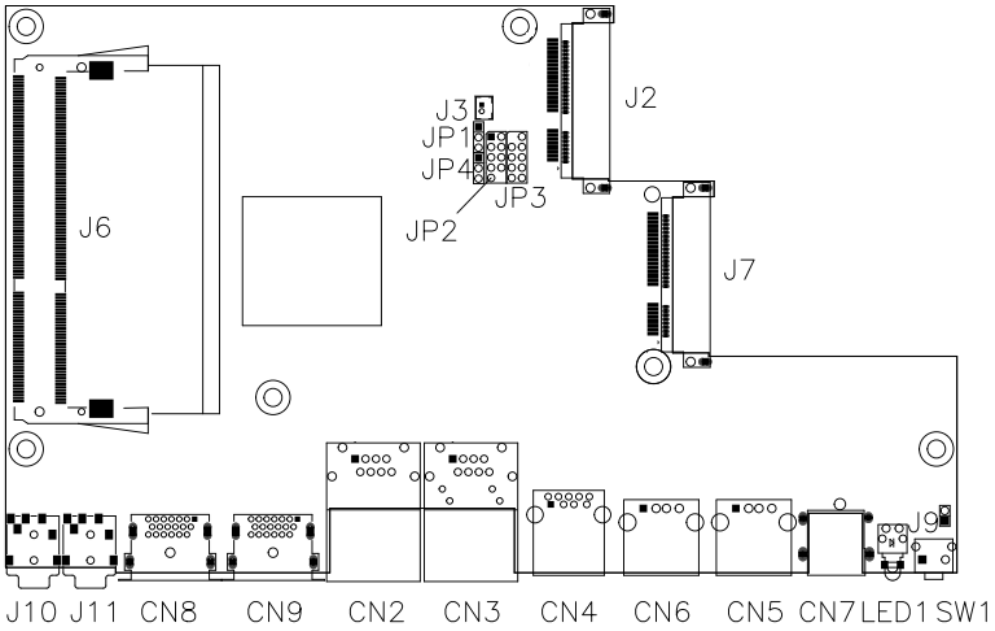




2.3 Setting the Jumpers

Jumpers are used on IB812 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB812 and their respective functions.

Jumper Locations on IB812



SW1: Power On Button

LED1: Power On LED

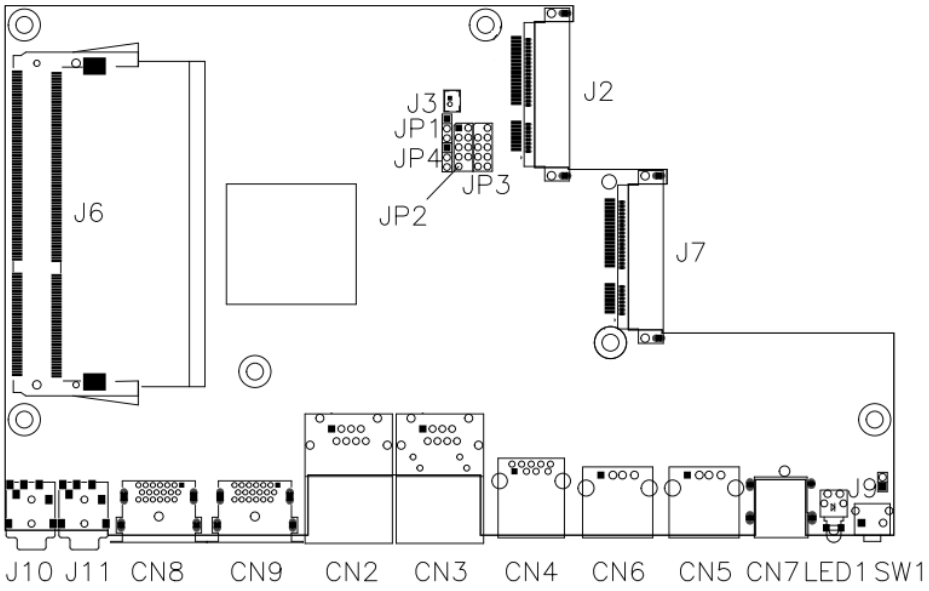
JP1: Clear CMOS Contents

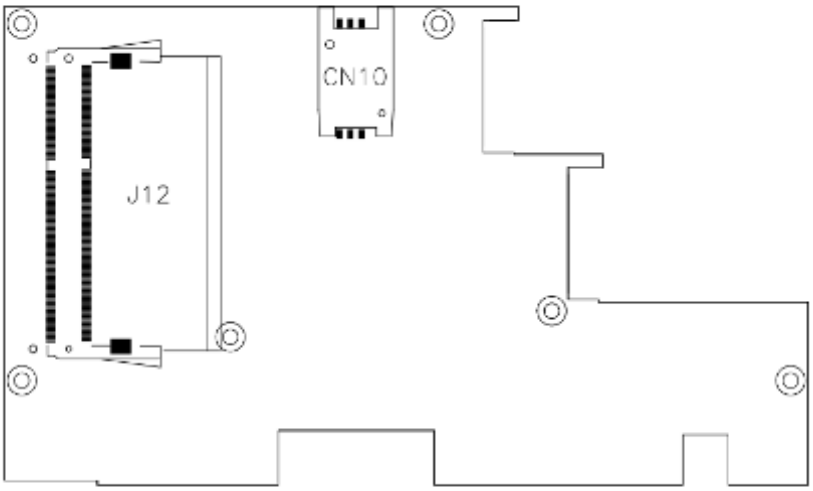
JP1	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

JP4: Clear SRTC Register Contents

JP4	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear

2.4 Connectors on IB812





CN2: COM1/RS232 Serial Port (RJ45 TYPE)

Signal Name	Pin #	Pin #	Signal Name
RTS, Request to send	1	2	Data terminal ready
TXD, Transmit data	3	4	GND, ground
GND, ground	5	6	RXD, Receive data
DSR, Data set ready	7	8	CTS, Clear to send

CN3: Gigabit LAN (RTL8111G-CG)

CN4: USB 3.0 Connector

CN5, CN6: USB 2.0 Connector

CN7: Board Input Power Connector

CN8, CN9: HDMI Connector

JP3: SPI Flash Connector (factory use only)

J2: Mini PCIE Connector (w/ USB SIMM support)

J3: Battery Connector

J7: Mini PCIE Connector (w/ M-SATA support)

J10: Audio LINE_IN Connector

J11: Audio LINE_OUT Connector

CHAPTER 3 BIOS SETUP

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

3.1 BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

3.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

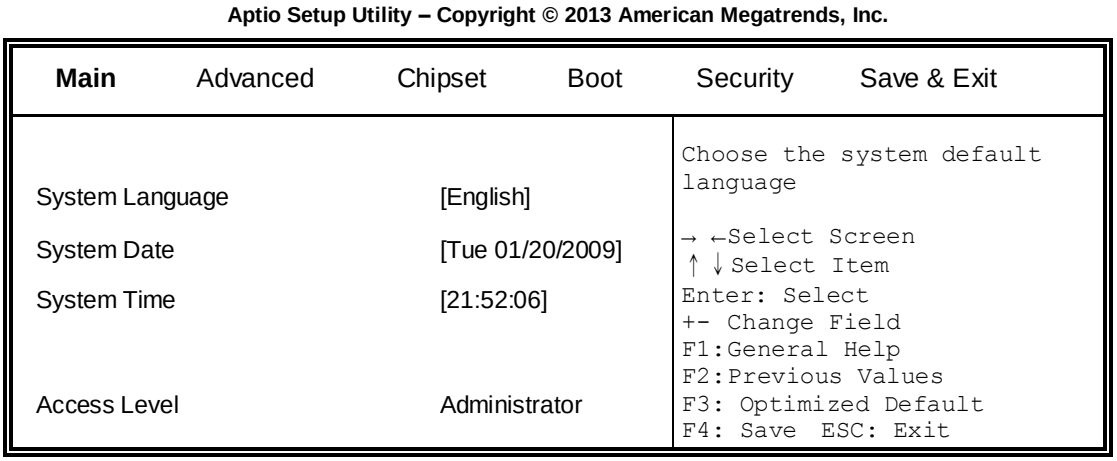
```
Press <DEL> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

Main Settings



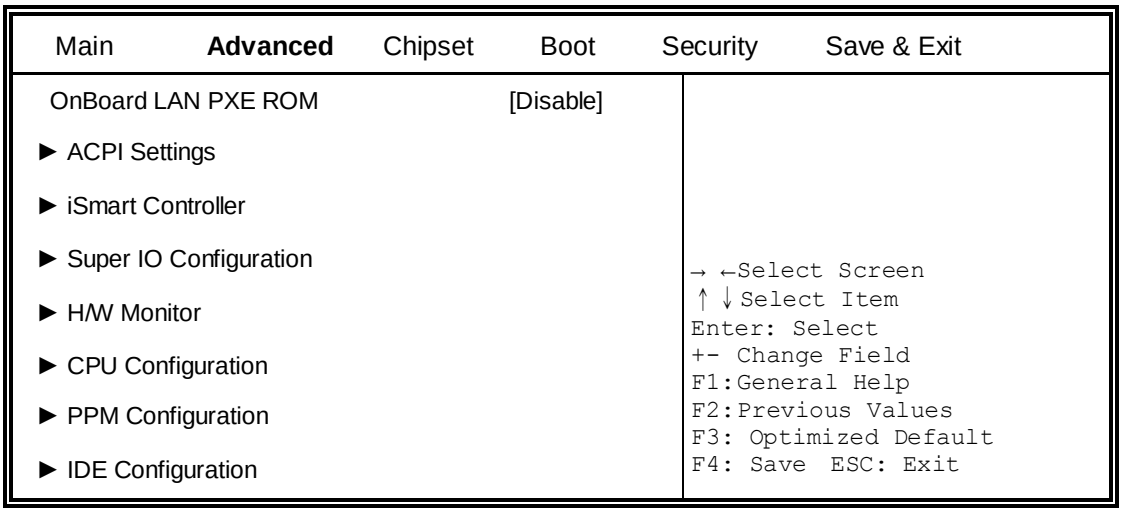
System Language
Choose the system default language.

System Date
Set the Date. Use Tab to switch between Data elements.

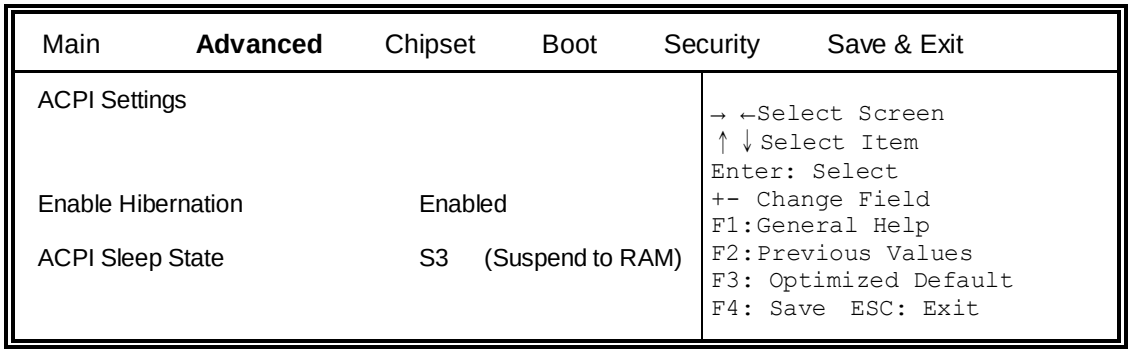
System Time
Set the Time. Use Tab to switch between Data elements.

Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



ACPI Settings



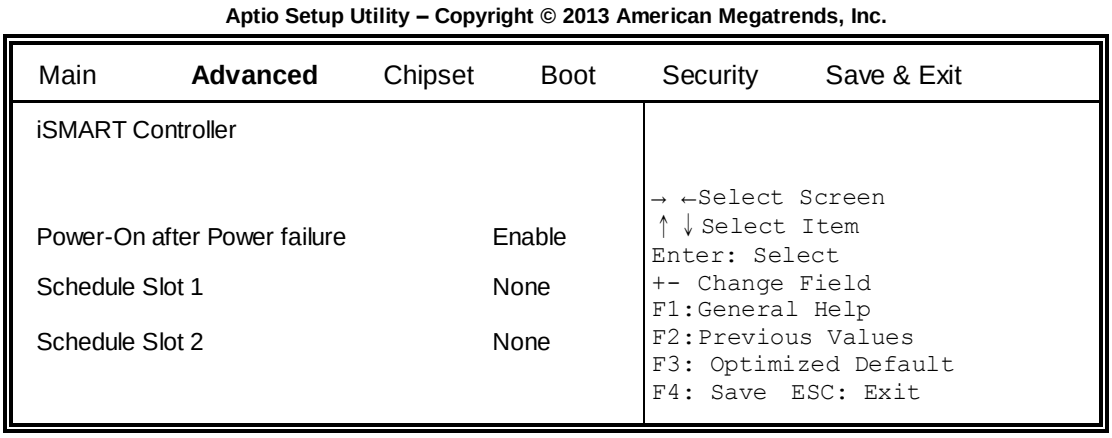
Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

ACPI Sleep State

Select ACPI sleep state the system will enter when the SUSPEND button is pressed.

iSmart Controller



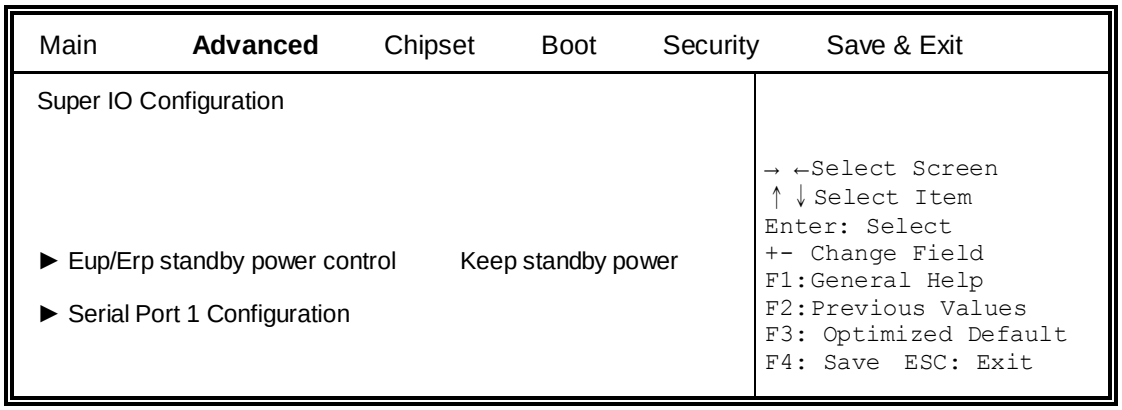
Power-On after Power failure

This field sets the system power status whether *Disable or Enable* when power returns to the system from a power failure situation.

Schedule Slot 1 / 2

Setup the hour/minute for system power on.

Super IO Configuration



Eup/Erp standby power control

Eup/Erp control on S5

[Keep Standby power] Enable all of the standby power and ignore Eup/Erp specification.

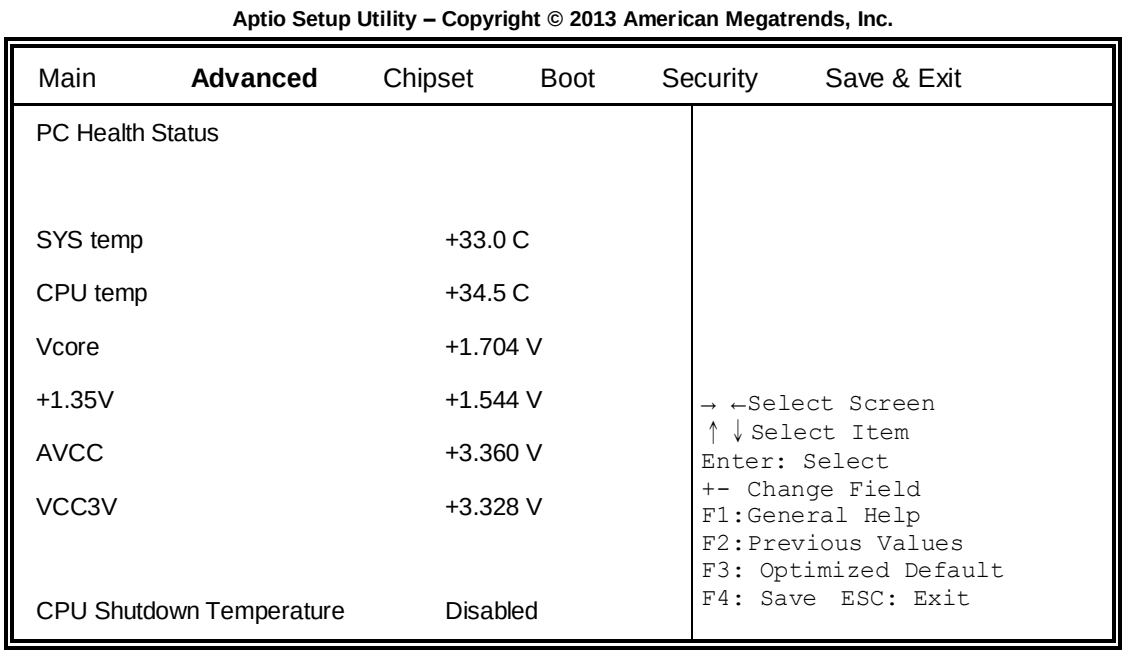
[Ethernet only [WOL] Only provide the standby power for Ethernet chip.

[NO standby power] Shutdown all of the standby power.

Serial Port 1 Configuration

Set parameters of serial port 1(COMA)

H/W Monitor



Shutdown Temperature

This field enables or disables the Shutdown Temperature

Disabled (default)

70 ℃/158 F

75 ℃/167 F

80 ℃/176 F

85 ℃/185 F

90 ℃/194 F

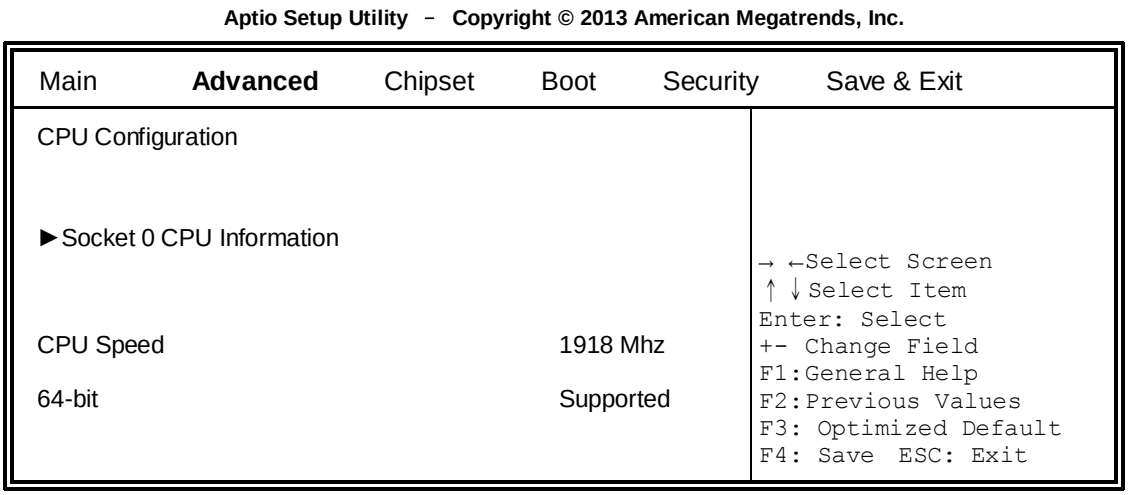
95 ℃/203 F

Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status

CPU Configuration

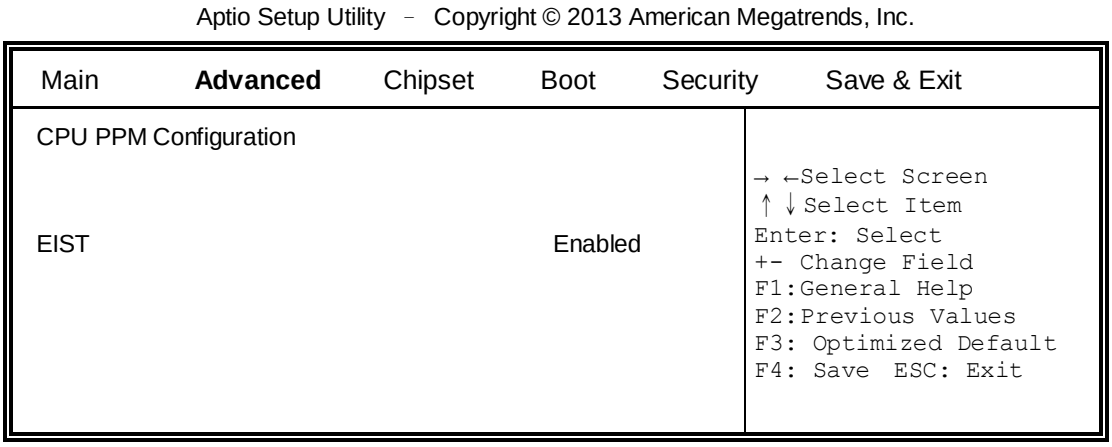
This section shows the CPU configuration parameters.



Socket 0 CPU Information

Socket specific CPU Information.

CPU PPM Configuration

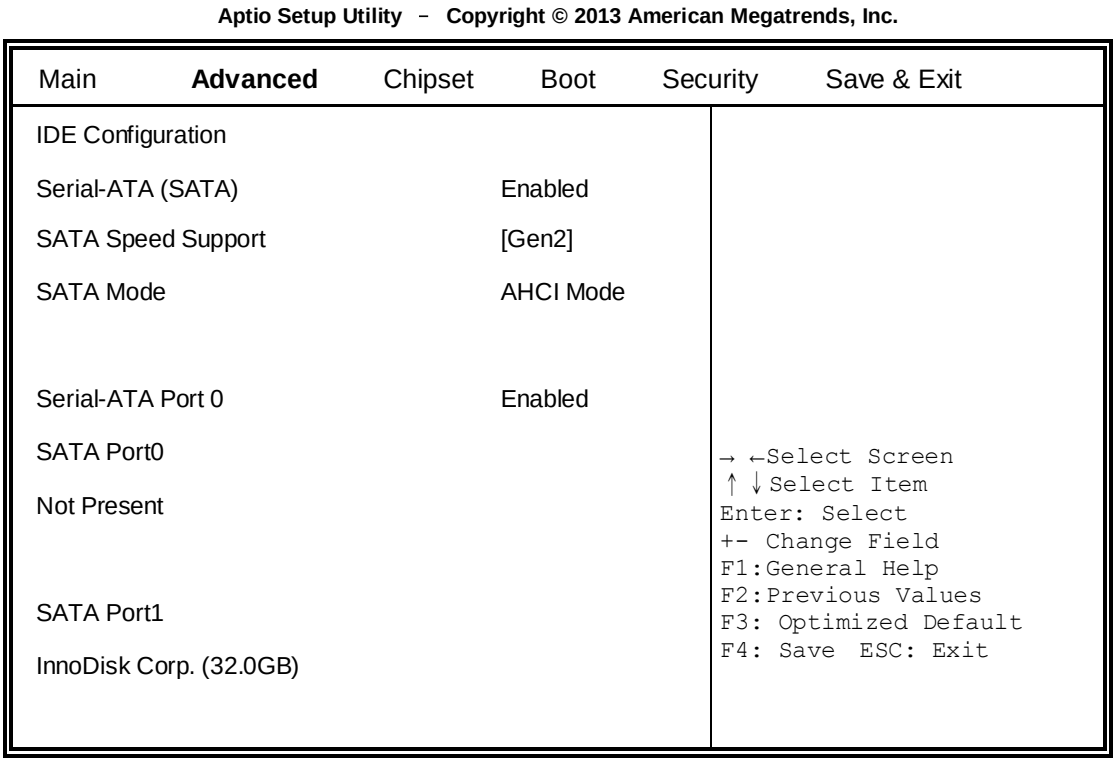


EIST

Enable/Disable Intel SpeedStep.

IDE Configuration

SATA Devices Configuration.



Serial-ATA(SATA)

Enabled / Disabled Serial ATA

SATA Mode

Select IDE / AHCI Mode

Serial –ATA Port 0

Enabled / Disabled Serial Port 0

Chipset Settings

Aptio Setup Utility – Copyright © 2013 American Megatrends, Inc.

Main	Advanced	**Chipset**	Boot	Security	Save & Exit
► North Bridge				→ ←Select Screen ↑ ↓Select Item Enter: Select +- Change Field F1:General Help F2:Previous Values F3: Optimized Default F4: Save ESC: Exit	

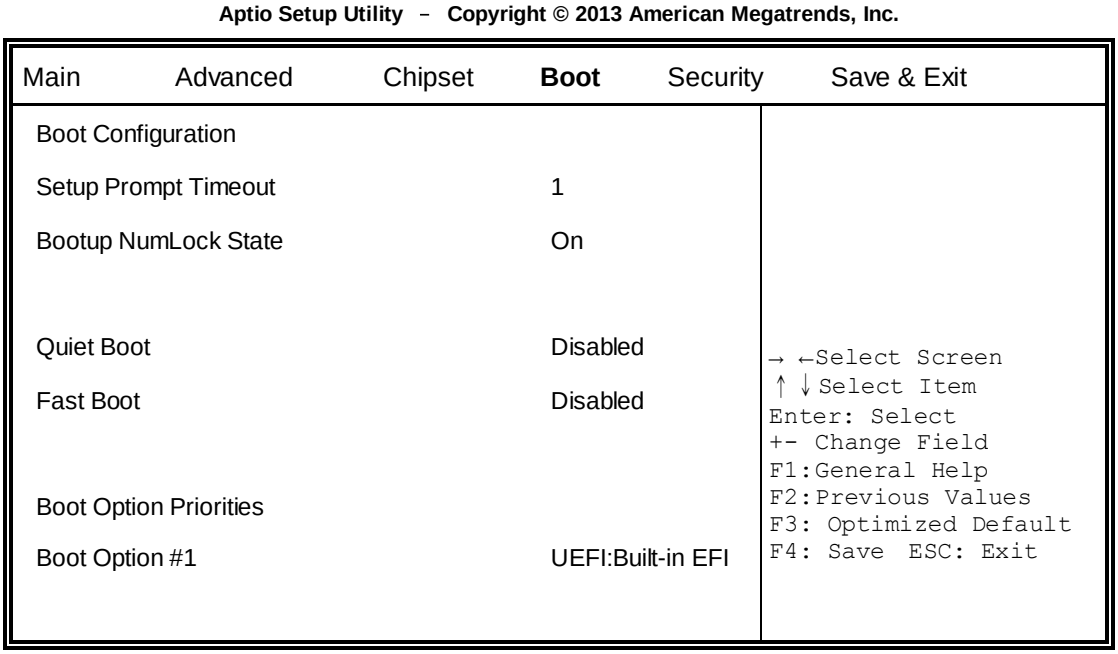
North Bridge

Aptio Setup Utility – Copyright © 2013 American Megatrends, Inc.

Main	Advanced	**Chipset**	Boot	Security	Save & Exit
Memory Information					
Total Memory		4096 MB (LPDDR3)		→ ←Select Screen ↑ ↓Select Item Enter: Select +- Change Field F1:General Help F2:Previous Values F3: Optimized Default F4: Save ESC: Exit	
Memory Slot0		4096 MB (LPDDR3)			
Memory Slot2		Not Present			

Boot Settings

This section allows you to configure the boot settings.



Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables or disables Quiet Boot option.

Fast Boot

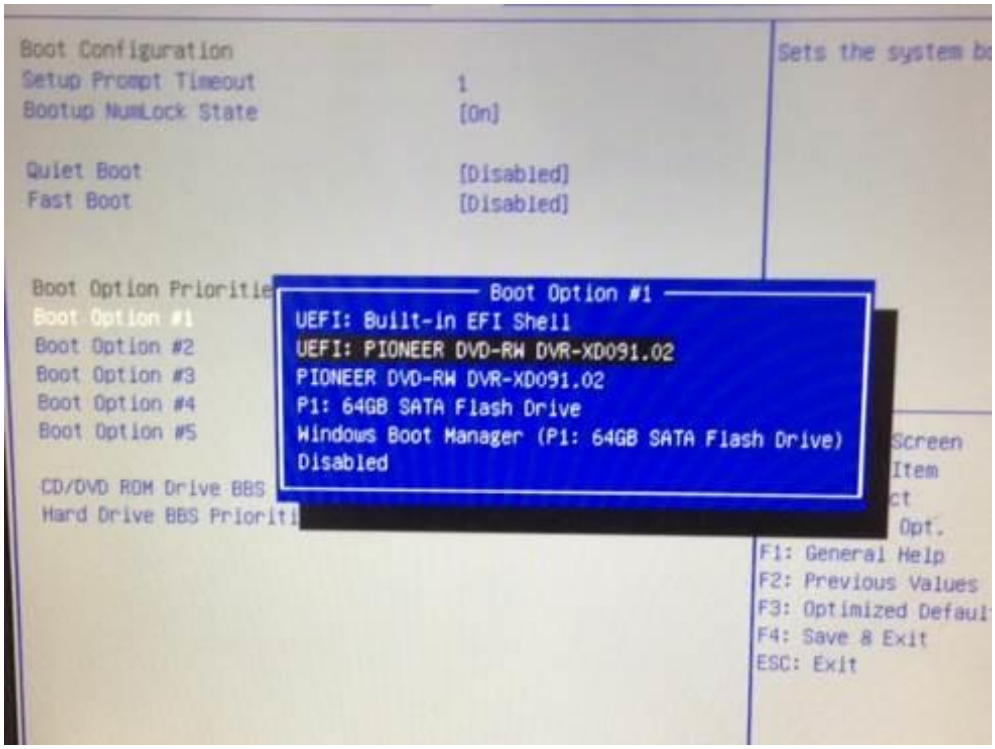
Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Boot Option Priorities

Sets the system boot order.

REMARKS:

Before the installation of Windows 8, go to the BIOS Setup to check that the Boot Option #1 of the Boot Option Priorities field is set as UEFI MODE (DVD drive).



Security Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility – Copyright © 2013 American Megatrends, Inc.

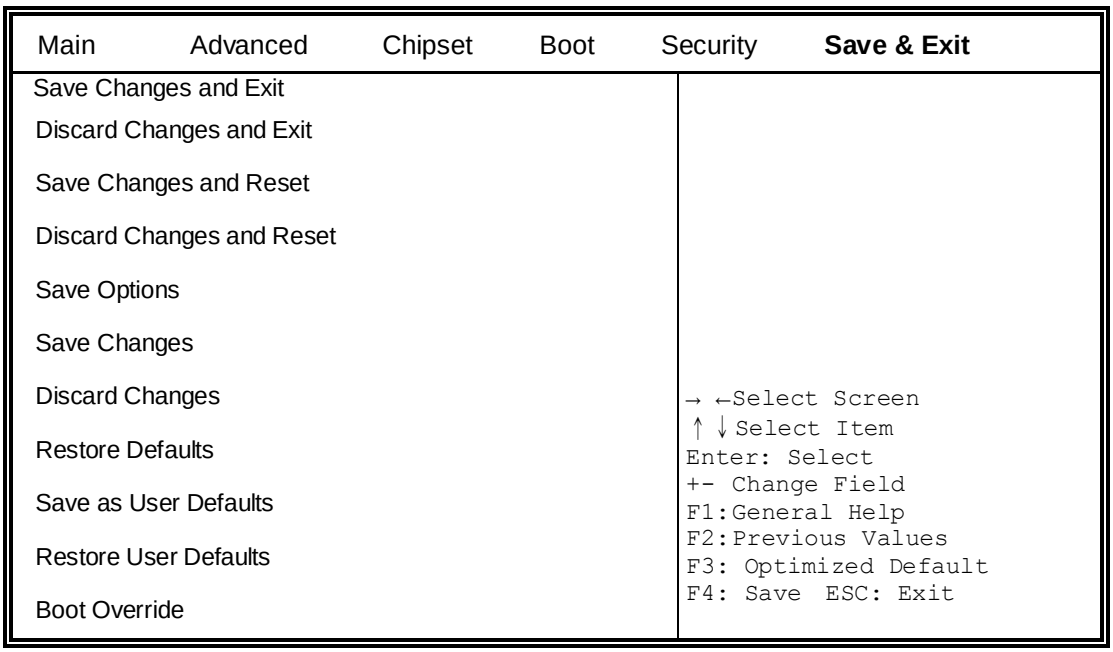
Main	Advanced	Chipset	Boot	**Security**	Save & Exit

Password Description	
If ONLY the Administrator's password is set, then this only limit 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
Administrator Password	→ ←Select Screen ↑ ↓Select Item Enter: Select +- Change Field F1:General Help F2:Previous Values F3: Optimized Default F4: Save ESC: Exit
User Password	
HDD Security Configuration:	
P1:InnoDisk Cor	

Administrator Password

Set Administrator Password.

Save & Exit Settings



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

Discard Changes and Exit
Exit system setup without saving any changes.

Save Changes and Reset
Reset the system after saving the changes.

Discard Changes and Reset
Reset system setup without saving any changes.

Save Changes
Save Changes done so far to any of the setup options.

Discard Changes
Discard Changes done so far to any of the setup options.

Restore Defaults
Restore/Load Defaults values for all the setup options.

Save as User Defaults
Save the changes done so far as User Defaults.

Restore User Defaults
Restore the User Defaults to all the setup options.

CHAPTER 4 DRIVERS INSTALLATION

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase

IMPORTANT NOTE:

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

4.1 Intel Chipset Software Installation Utility

1. Insert the DVD that comes with the board. Click ***System*** and then ***SI-12 Series Products***. Click ***Intel(R) Chipset Software Installation Utility.***

3. When the Welcome screen to the Intel® Chipset Device Software appears, click ***Next*** to continue.

4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

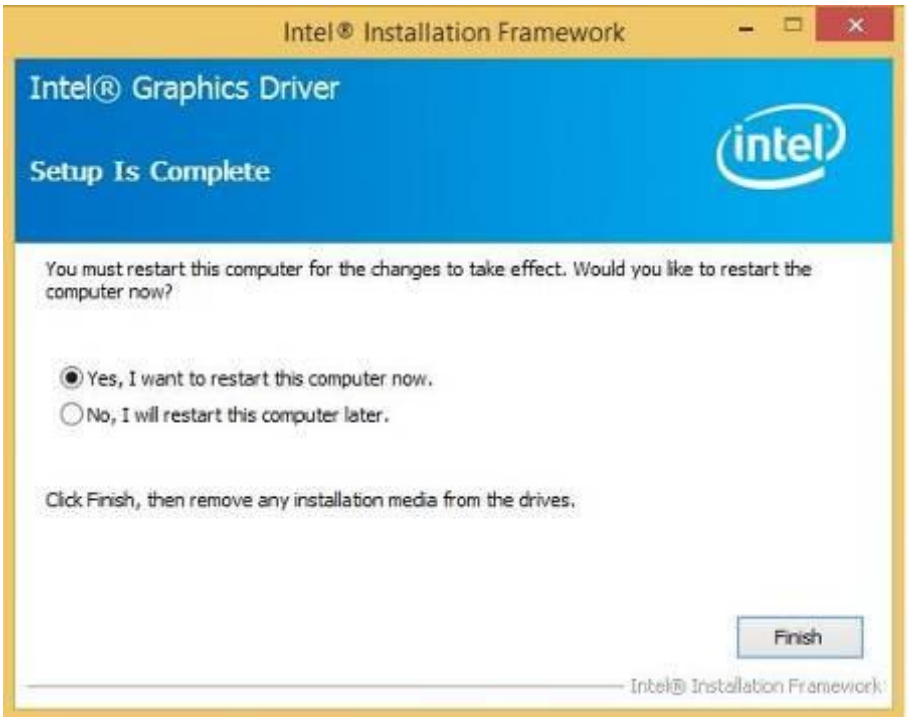
4.2 VGA Drivers Installation

1. Insert the DVD that comes with the board. Click ***System*** and then ***SI-12 Series Products***. Click ***Intel(R) Baytrail Graphics Driver.***

2. When the Welcome screen appears, click ***Next*** to continue.

3. Click ***Yes*** to accept the license agreement and continue the installation.

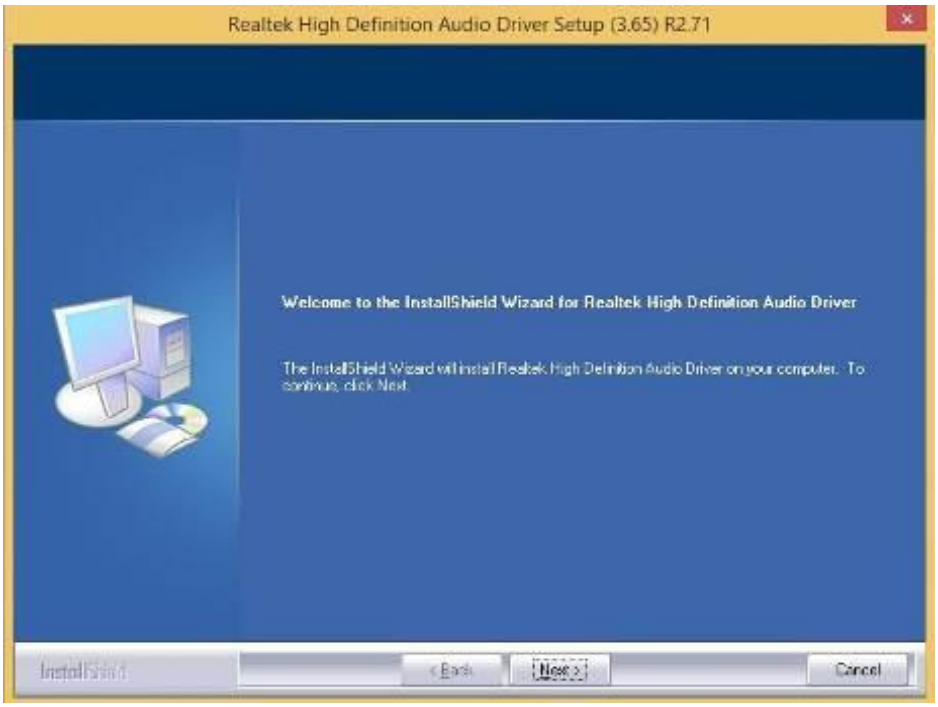
4. Setup complete. Click ***Finish*** to restart the computer and for changes to take effect.



4.3 Realtek High Definition Audio Driver Installation

1. Insert the DVD that comes with the board. Click ***System*** and then ***SI-12 Series Products***. Click ***Realtek High Definition Audio Driver.***

2. On the Welcome screen, click ***Next*** to proceed with the installation.



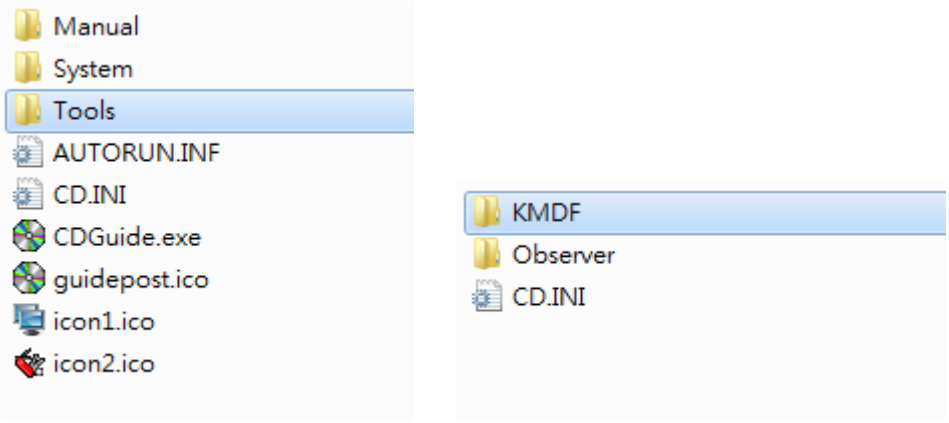
3. InstallShield Wizard is complete. Click ***Finish*** to restart the computer and for changes to take effect.

4.4 Intel Trusted Execution Engine Installation

IMPORTANT NOTE:

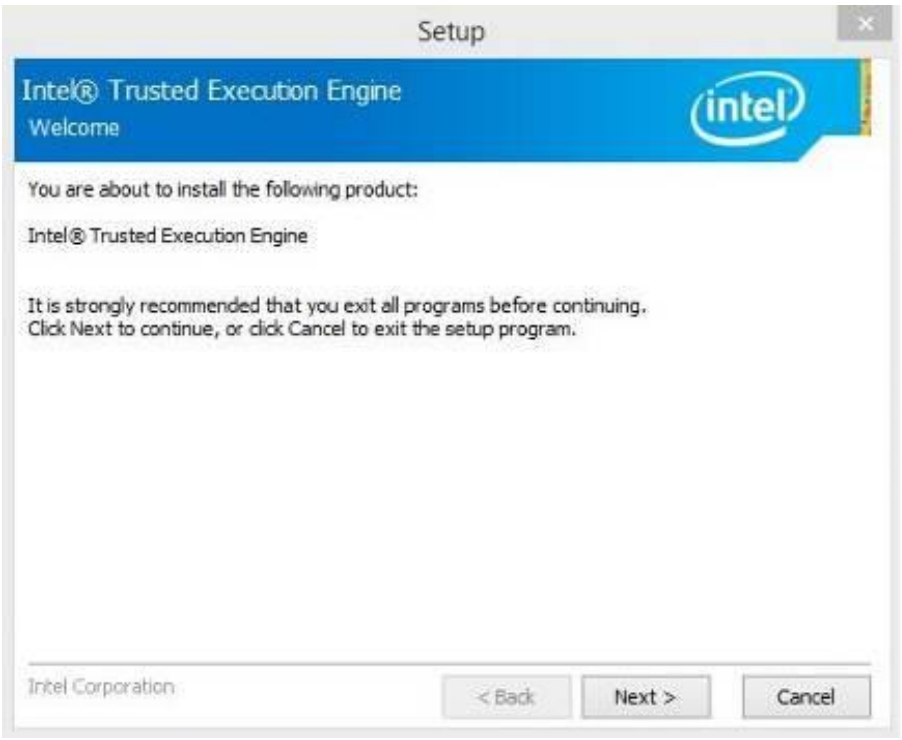
After installing your Windows operating system, you must install first the Kernel-Mode Driver Framework (KMDF) Version 1.11 before installing Intel(R) Trusted Execution Engine Driver.

1. Insert the DVD that comes with the system. Click ***Tools*** and then ***KMDF***.



2. Insert the DVD that comes with the system. Click ***System*** and then ***SI-12 Series Products***. Click ***Intel(R) Trusted Execution Engine(TXE) Driver.***

3. On the Setup Welcome screen, click ***Next*** to proceed with the installation process.



3. Click ***Next*** accept the license agreement and continue the installation.

4. Installation of the Intel Trusted Execution Engine is now complete. Click ***Finish***.

4.5 Intel® USB 3.0 Drivers

1. Insert the DVD that comes with the board. Click ***System*** and then ***SI-12 Series Products***. Click ***Intel(R) USB 3.0 eXtensible Host Controller Driver.***

2. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click ***Next***.

3. Click ***Yes*** to to agree with the license agreement and continue the installation.

4. On the Readme File Information screen, click ***Next*** to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.

5. Setup complete. Click Finish to restart the computer and for changes to take effect.

4.6 Realtek LAN driver

1. Insert the DVD that comes with the board. Click ***System*** and then ***SI-12 Series Products***. Click ***Realtek RTL8111G LAN Driver.***

3. In the Welcome screen, click ***Next***.

4. In the License Agreement screen, click ***I accept the terms in license agreement*** and ***Next*** to accept the software license agreement and proceed with the installation process.

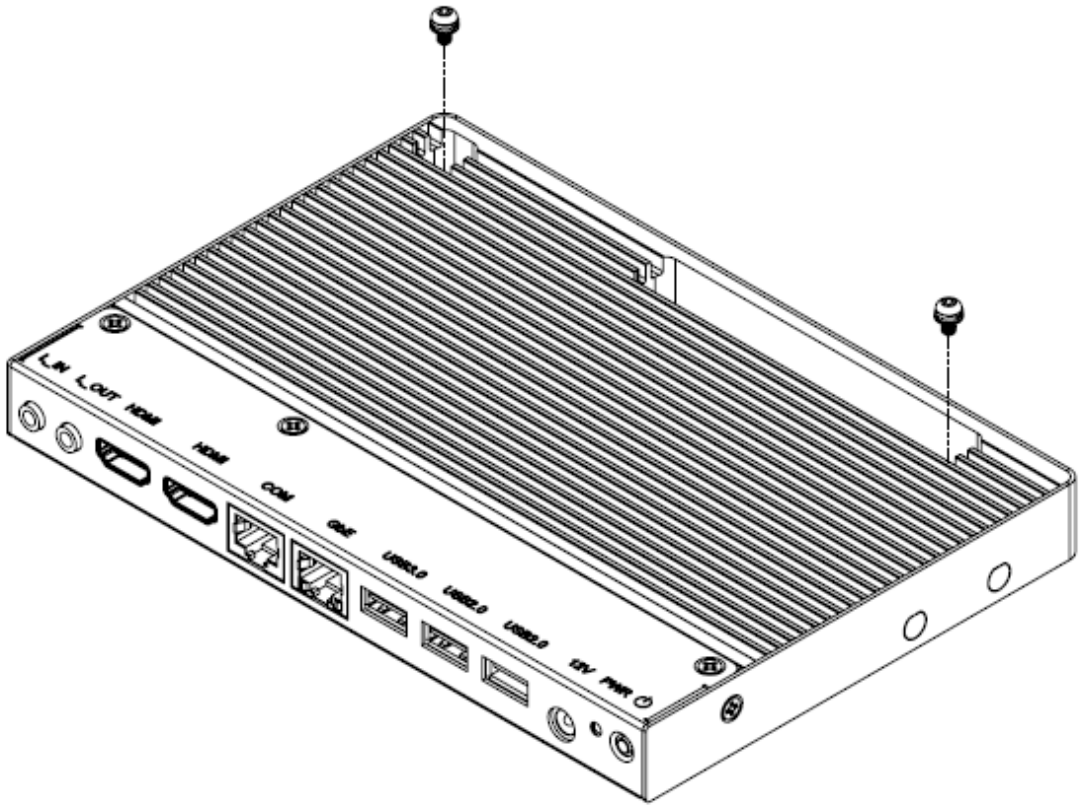
5. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.

6. When the Ready to Install the Program screen appears, click ***Install*** to continue.

7. When InstallShield Wizard is complete, click ***Finish***.

Appendix

Mounting SI-12 to the Wall



You can install SI-12 on plastic (LCD monitor), wood, drywall surface over studs, or a solid concrete or metal plane directly. Ensure the installer uses at least two M3 length 6mm screws to secure the system on the wall. ***Two M3 length 6mm screws are recommended to secure the system onto the wall.***

Fasteners are not included with the unit, and must be supplied by the installer. The types of fasteners required are dependent on the type of wall construction. Choose fasteners that are rated either ”Medium Duty“ or ”Heavy Duty.“ To assure proper fastener selection and installation, follow the fastener manufacturer’s recommendations.

Wall Mounting Requirements

Note: *Before mounting the system onto the wall, ensure that you are following all applicable building and electric codes.*

When mounting, ensure that you have enough room for power and signal cable routing and have good ventilation for power adapter. The method of mounting must be able to support the weight of SI-12 plus the suspend weight of all the cables to be attached to the system. Use the following methods for mounting your system:

Mounting to hollow walls

- **Method 1: Wood surface** – A minimum wood thickness – 38mm (1.5in.) by 25.4 cm (10in.) – of high, construction – grade wood is recommended.
  Note: This method provides the most reliable attachment of the unit with little risk that the unit will come loose or require ongoing maintenance.
- **Method 2: Drywall walls** - Drywall over wood studs is acceptable.

Mounting to a solid concrete or brick wall - Mounts on a flat smooth surface.

Selecting the Location

Plan the mounting location thoroughly. Locations such as walkway areas, hallways, and crowded areas are not recommended. Mount the unit to a flat, sturdy, structurally sound column or wall surface.

The best mounting surface is a standard countertop, cabinet, table, or other structure that is minimally the width and length of the unit. This recommendation reduces the risk that someone may accidentally walk into and damage the device. Local laws governing the safety of individuals might require this type of consideration.

SI-12 Mounting Bracket Solution

SI-12 mounting bracket (IBASE) part number: SC2SIMK1---0A1100P

Install SI-12 to the mounting bracket using 2 screws, as shown in the picture.