



***AXIOMTEK***

## **NANO840/842**

**Intel<sup>®</sup> Atom<sup>™</sup> Processor  
E3845/E3827**

**Intel<sup>®</sup> Celeron<sup>®</sup> Processor  
J1900/N2807 Nano-ITX Board**

**User's Manual**



## **Disclaimers**

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## **CAUTION**

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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## **ESD Precautions**

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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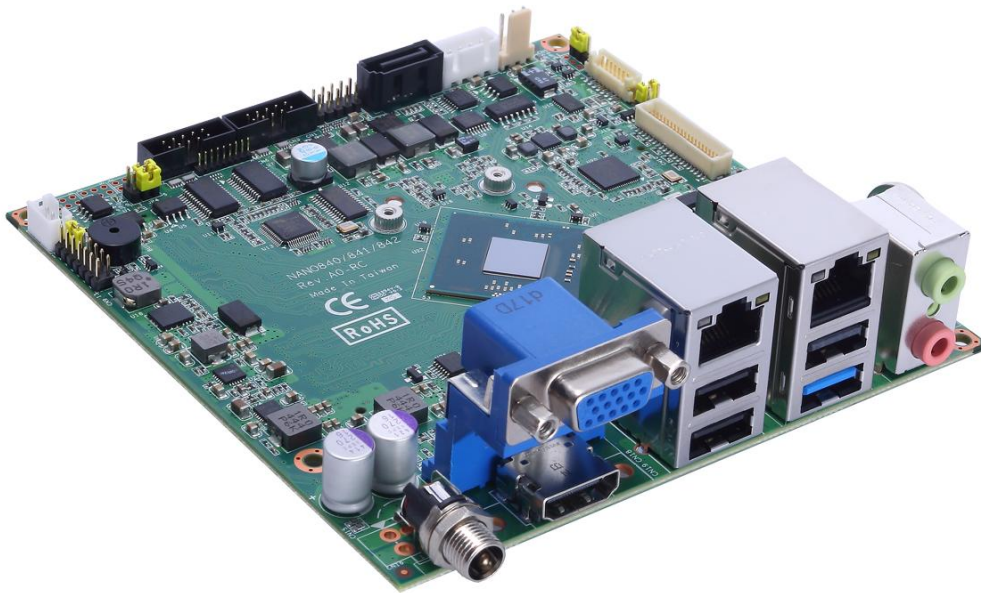
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# Chapter 1

## Introduction



The NANO840, a Nano-ITX board, supports Intel® Atom™ E3845/E3827 processors. Meanwhile NANO842, a Nano-ITX board, supports Intel® Celeron® J1900/N2807 processors. Both of them deliver outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The NANO840/842 have one 204-pin SO-DIMM socket for single channel DDR3L 1333/1066MHz memory with maximum capacity up to 8GB. It also features two Gigabit/Fast Ethernet ports, one SATA port with transfer rate up to 3Gb/s, five USB 2.0, one USB 3.0, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as two serial ports and Nano-ITX form factor that applies an extensive array of PC peripherals.

## 1.1 Features

- NANO840 - Intel® Atom™ quad core E3845 (1.91GHz) and dual core E3827 (1.75GHz)
- NANO842 - Intel® Celeron® quad core J1900 (2GHz) and dual core N2807 (1.58GHz)
- 1 DDR3L SO-DIMM supports up to 8GB memory capacity
- 5 USB 2.0 ports and 1 USB 3.0 port
- 2 COM ports
- 2 PCI-Express Mini Card
- +12V only DC-in supported
- Wide operating temperature supported

## 1.2 Specifications

- **CPU**
  - NANO840
    - Intel® Atom™ processor quad core E3845 1.91GHz.
    - Intel® Atom™ processor dual core E3827 1.75GHz.
  - NANO842
    - Intel® Celeron® processor quad core J1900 2GHz.
    - Intel® Celeron® processor dual core N2807 1.58GHz.
- **Thermal Solution**
  - Passive
- **Operating Temperature**
  - NANO840: -40°C~80°C.
  - NANO842: -20°C~70°C.
- **System Chipset**
  - SoC integrated.
- **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 DDR3L SO-DIMM socket.
  - Maximum up to 8GB DDR3L 1333/1066MHz memory.
- **Onboard Multi I/O**
  - Controller: Fintek F81803.
  - Serial Ports: COM1 supports RS-232/422/485 and COM2 supports RS-232 only.
- **Serial ATA**
  - One SATA-300 connector.
  - mSATA supported.
- **USB Interface**
  - Five USB ports with fuse protection and complies with USB Spec. Rev. 2.0.
  - One USB port with fuse protection and complies with USB Spec. Rev. 3.0.



- **Display**
  - One 15-pin D-Sub as VGA connector.
  - One 2x20-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter connector. LVDS resolution is up to 1920x1200 in 24-bit dual channels.
  - One HDMI.
- **Trusted Platform Module (TPM)**
  - Controller: ST ST33TPM12LPC via LPC bus interface.
  - Complies with TPM1.2 main and PC client specification.
- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.
- **Ethernet**
  - NANO840
    - Two RJ-45 LAN ports: Intel® i210IT supports 1000/100/10Mbps Gigabit/Fast Ethernet with Wake-on-LAN and PXE Boot ROM.
  - NANO842
    - Two RJ-45 LAN ports: Intel® i211AT supports 1000/100/10Mbps Gigabit/Fast Ethernet with Wake-on-LAN and PXE Boot ROM.
- **Audio**
  - HD Codec audio with Realtek ALC662.
  - Line-out and MIC-in audio jack.
- **Digital I/O**
  - 8 channels input/output programmable.
- **Expansion Interface**
  - One full-size PCI-Express Mini Card (w/mSATA supported) which complies with PCI-Express Mini Card Spec. V1.2.
  - One half-size PCI-Express Mini Card which complies with PCI-Express Mini Card Spec. V1.2.
- **Power Input**
  - DC power jack.
  - +12V only DC-in.
  - AT auto power on function supported.
- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).
- **Form Factor**
  - Nano-ITX form factor.



Note

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

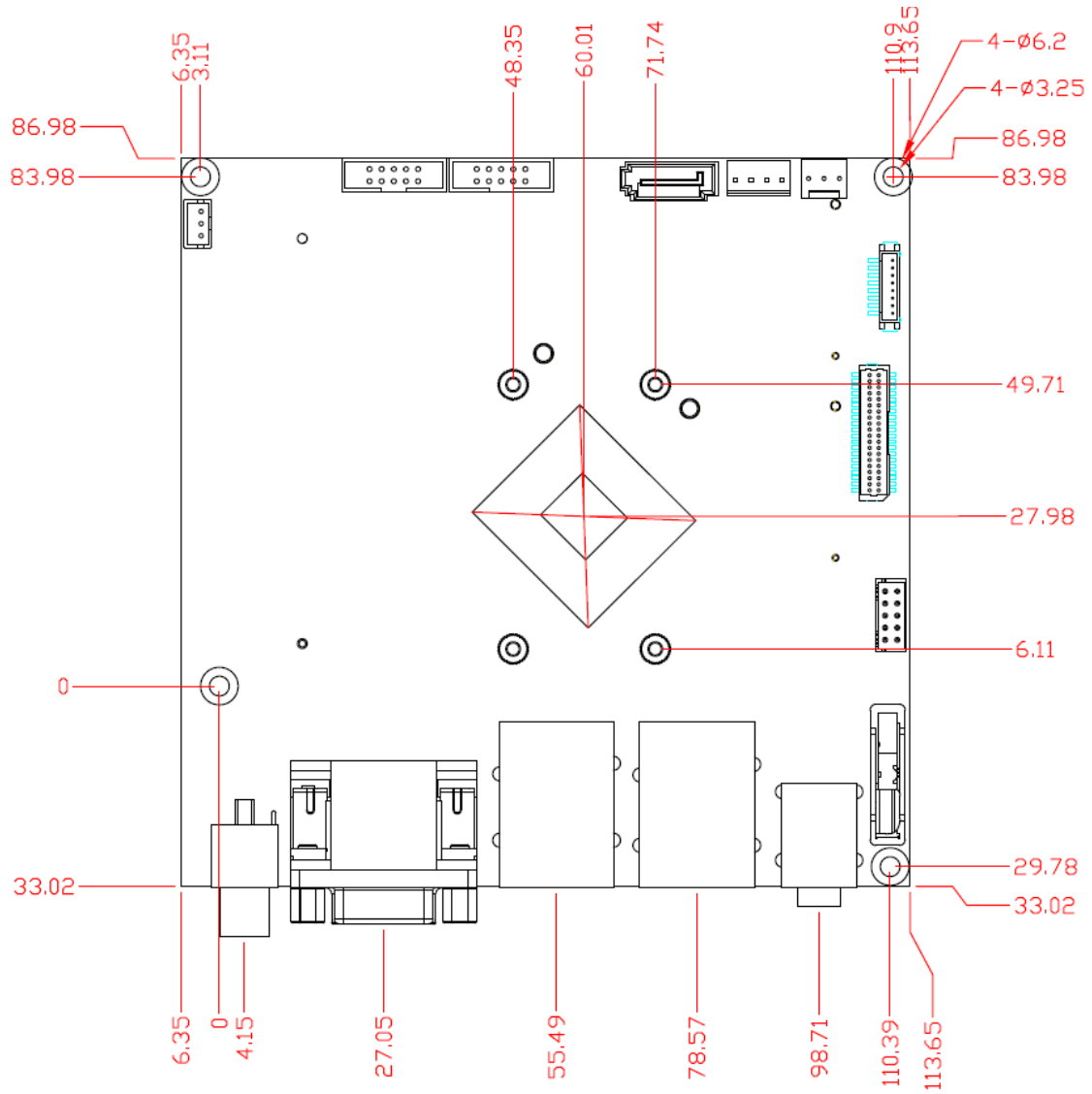
## 1.3 Utilities Supported

- Chipset and graphics driver
- Ethernet driver
- Audio driver
- XHCI driver
- Sideband Fabric Device
- Trusted Execution Engine

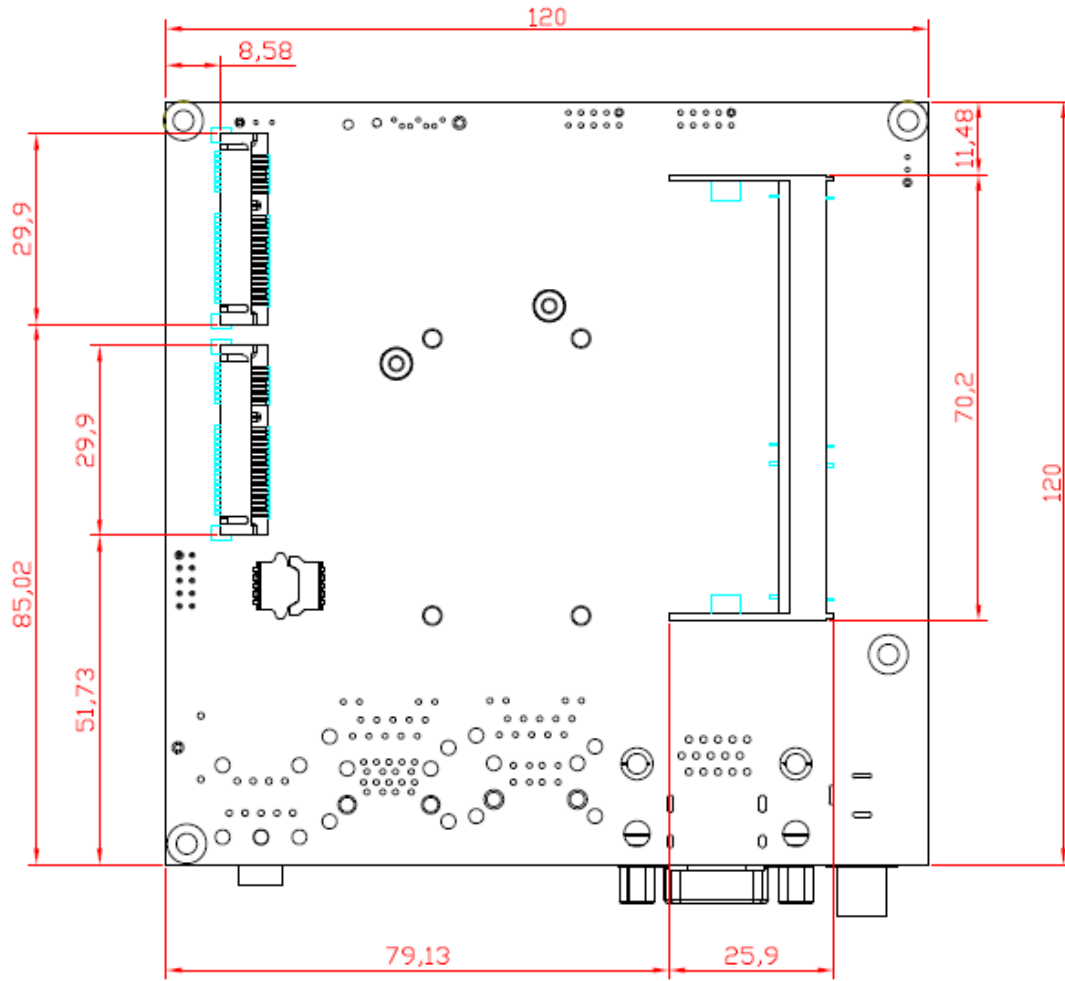
# Chapter 2

## Board and Pin Assignments

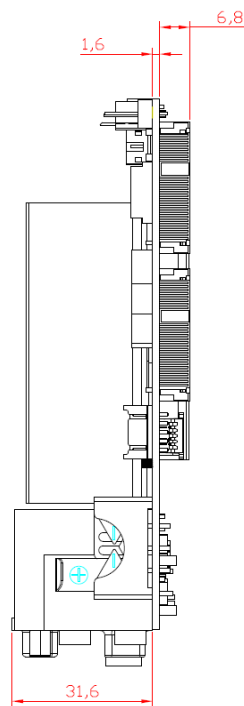
### 2.1 Board Dimensions and Fixing Holes



Top View

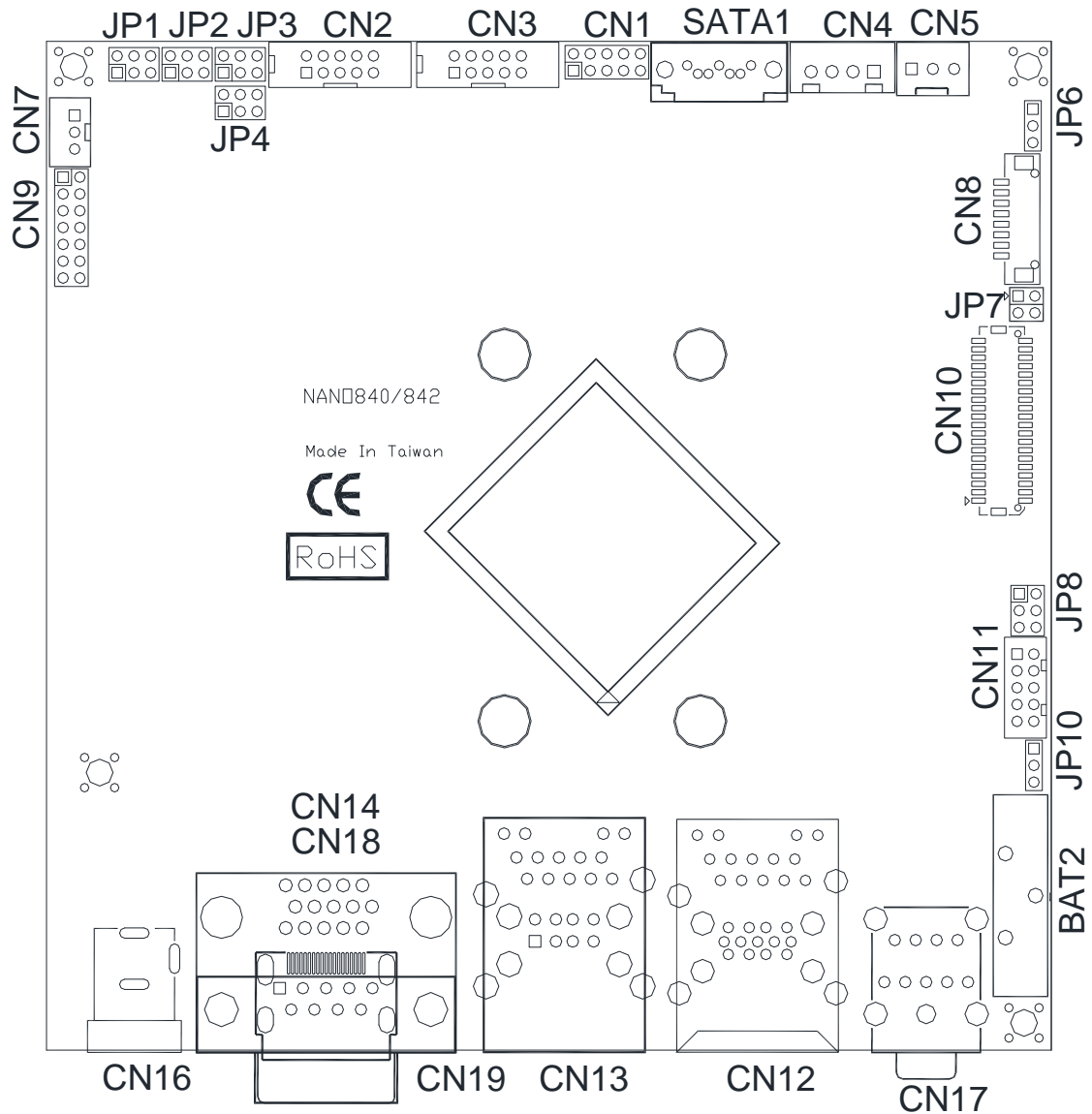


Bottom View

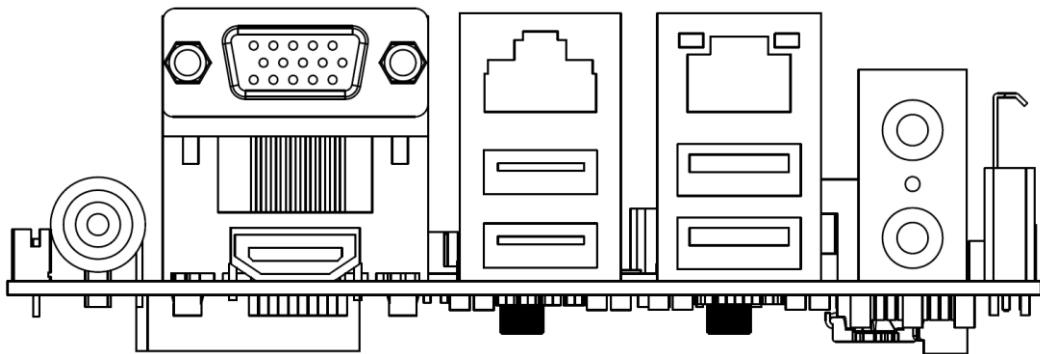


Side View

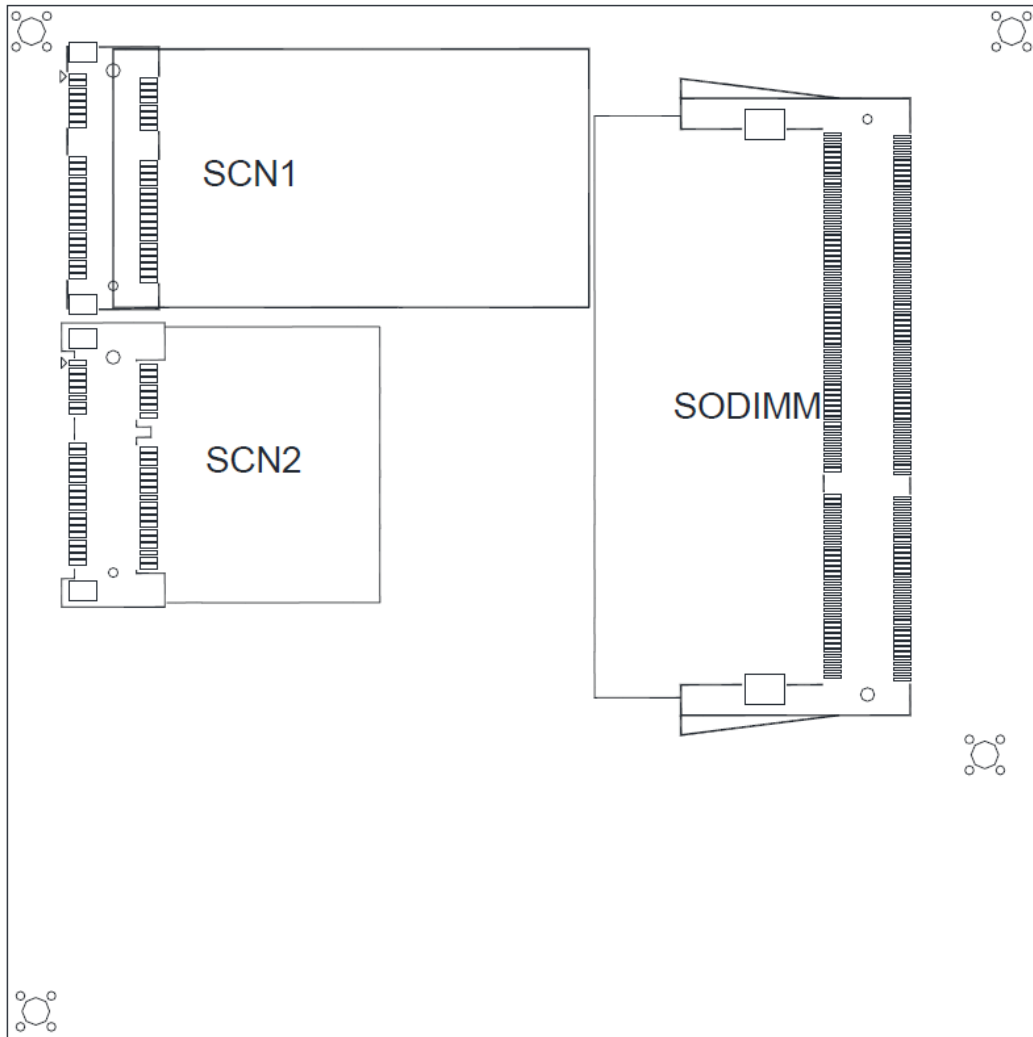
## 2.2 Board Layout



Top View



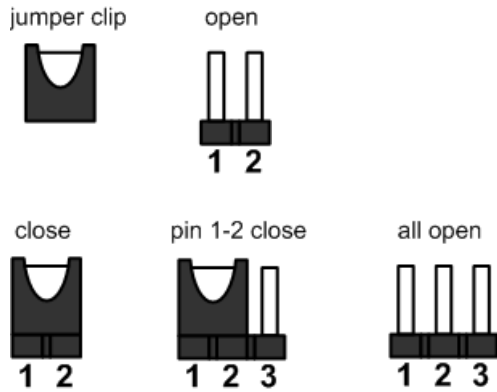
Side View



**Bottom View**

## 2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper settings on the NANO840/842 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.



**Note**

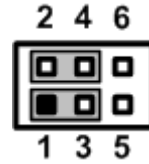
*Once the default jumper setting needs to be changed, please do it under power-off condition.*

Jumper	Description	Setting
JP1	COM1 Data/Power Selection Default: RS-232 Data	CN2 Pin 1: DCD 1-3 Close
		CN2 Pin 8: RI 2-4 Close
JP2	COM1 RS-232/422/485 Mode Setting Default: RS-232	3-5, 4-6 Close
JP3		1-2 Close
JP4		3-5, 4-6 Close
JP6	Auto Power On Default: Disable	1-2 Close
JP7	LVDS Brightness Control Mode Setting Default: PWM Mode	1-2 Close
JP8	LVDS Voltage Selection Default: +3.3V level	5-6 Close
JP10	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close

### 2.3.1 COM1 Data/Power Selection (JP1)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When COM1 is set to +5V or +12V level, please make sure its communication mode is RS-232 (see section 2.3.2).

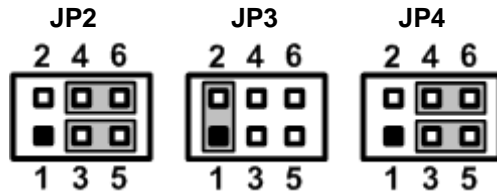
Function	Setting
Power: Set CN2 pin 1 to +5V level	1-3 close
Data: Set CN2 pin 1 to DCD (Default)	3-5 close
Power: Set CN2 pin 8 to +12V level	2-4 close
Data: Set CN2 pin 8 to RI (Default)	4-6 close



### 2.3.2 COM1 RS-232/422/485 Mode Setting (JP2, JP3, JP4)

Use these jumpers to set COM1 port to operate as RS-232, RS-422 or RS-485 communication mode. When COM1 is set to RS-422 or RS485, please make sure it is also on data mode (see section 2.3.1)

Function	Setting
RS-232 mode (Default)	JP2 3-5, 4-6 close JP3 1-2 close JP4 3-5, 4-6 close
RS-422 mode	JP2 1-3, 2-4 close JP3 3-4 close JP4 1-3, 2-4 close
RS-485 mode	JP2 1-3, 2-4 close JP3 5-6 close JP4 1-3, 2-4 close



### 2.3.3 Auto Power On (JP6)

If JP6 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP10 is disabled for AC 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



### 2.3.4 LVDS Brightness Control Mode Setting (JP7)

This jumper enables you to select PWM or voltage control mode for inverter connector (CN8). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	3-4 close

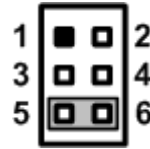




### 2.3.5 LVDS Voltage Selection (JP8)

The board supports voltage selection for flat panel displays. Use JP8 to set LVDS connector (CN10) pin 1~6 VCCM to +3.3V, +5V or +12V voltage level. To prevent hardware damage, before connecting please make sure that input voltage of the flat panel is correct.

Function	Setting
+12V level	1-2 close
+5V level	2-3 close
+3.3V level (Default)	5-6 close



### 2.3.6 Restore BIOS Optimal Defaults (JP10)

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



## 2.4 Connectors

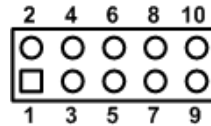
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	Digital I/O Connector
CN2~CN3	COM Connectors
CN4	SATA Power Connector
CN5	Fan Connector
CN7	SMBus Connector
CN8	Inverter Connector
CN9	Front Panel Connector
CN10	LVDS Connector
CN11	Internal USB 2.0 Port 3 and 6
CN12	LAN1, USB 3.0 port 0 and USB 2.0 port 2
CN13	LAN2, USB 2.0 port 4 and 5
CN14	VGA Connector
CN16	DC Power Jack
CN17	Audio Jack
CN18	HDMI Connector
CN19 (Optional)	COM2 Connector
SATA1	SATA Connector
SCN1	Full-size PCI-Express Mini Card Connector
SCN2	Half-size PCI-Express Mini Card Connector
SODIMM	DDR3L SO-DIMM Socket

### 2.4.1 Digital I/O Connector (CN1)

The board is equipped with an 8-channel digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

Pin	Signal	Pin	Signal
1	DIO1	2	DIO8
3	DIO2	4	DIO7
5	DIO3	6	DIO6
7	DIO4	8	DIO5
9	+V5S	10	GND

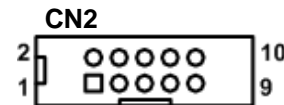


### 2.4.2 COM Connectors (CN2 and CN3)

The CN2 and CN3 are 2x5-pin box headers which are compliant with Molex 78046-1020 for COM1 and COM2. Only COM1 is equipped with +5V level power capability on DCD and +12V level on RI by setting JP1 (see section 2.3.1). The COM1 also supports RS-232/422/485 communication mode, see pin assignments given in table below. If you need COM1 to support RS-422 or RS-485, please refer to section 2.3.2.

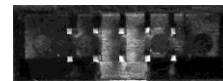
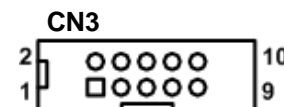
#### COM1 (RS-232/422/485):

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	DSR	No use	No use
3	RXD	TX+	Data+
4	RTS	No use	No use
5	TXD	RX+	No use
6	CTS	No use	No use
7	DTR	RX-	No use
8	RI	No use	No use
9	GND	No use	No use
10	No use	No use	No use



#### COM2 (RS-232 only):

Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	N.C.



### 2.4.3 SATA Power Connector (CN4)

This is a 4-pin p=2.5mm wafer connector which is compliant with JST B4B-XH-K-S for interfacing to SATA 2.5" HDD power supply.

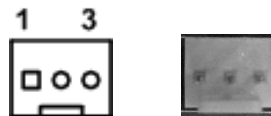
Pin	Signal
1	+12V level
2	GND
3	GND
4	+5V level



### 2.4.4 Fan Connector (CN5)

This is a 3-pin p=2.54mm wafer connector which is compliant with Molex 5045 for fan interface. Fan is needed for cooling down temperature. You can find fan speed within BIOS Setup Utility if fan is installed. For further information, see BIOS Setup Utility: Advanced\H/W Monitor\PC Health Status (see section 4.4).

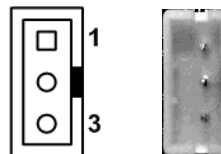
Pin	Signal
1	GND
2	+12V level
3	Fan speed feedback



### 2.4.5 SMBus Connector (CN7)

This connector is a 3-pin p=2.0mm wafer connector which is compliant with JST B3B-PH-K-S for SMBus interface. The SMBus (System Management Bus) is a simple bus for the purpose of lightweight communication.

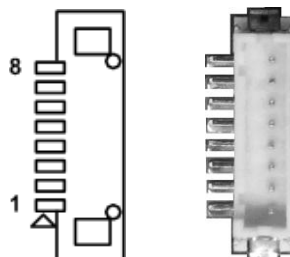
Pin	Signal
1	CLK
2	DATA
3	GND



### 2.4.6 Inverter Connector (CN8)

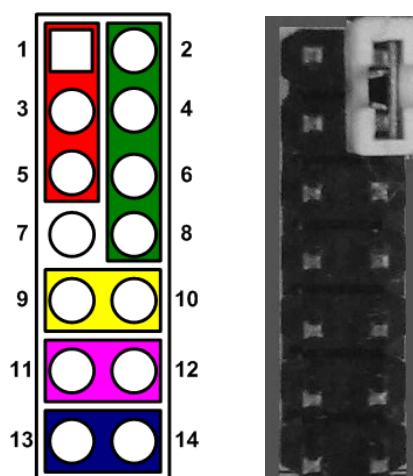
This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	VBL Brightness Control



## 2.4.7 Front Panel Connector (CN9)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	N.C.
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+



### Power LED

Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on.

### External Speaker and Internal Buzzer

Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

### Power On/Off Button

Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

### System Reset Switch

Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

### HDD Activity LED

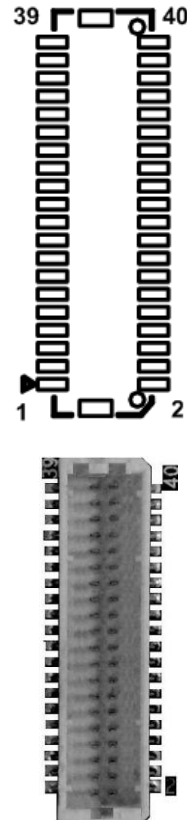
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

### 2.4.8 LVDS Connector (CN10)

This board has a 2x20-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP8 (see section 2.3.5).

#### 18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



**24-bit single channel**

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

**18-bit dual channel**

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	N.C.	12	Channel B D0-
13	N.C.	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

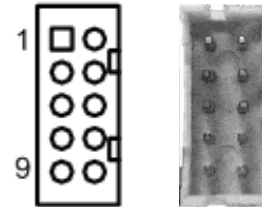
**24-bit dual channel**

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

### 2.4.9 Internal USB Connector (CN11)

This is a 2x5-pin Universal Serial Bus (USB) connector for installing versatile USB 2.0 compliant interface peripherals. The CN11 is designed with +5V level standby power which can provide power when system is in suspend mode.

Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	2	USB VCC (+5V level standby power)
3	USB #6_D-	4	USB #3_D-
5	USB #6_D+	6	USB #3_D+
7	GND	8	GND
9	GND	10	GND



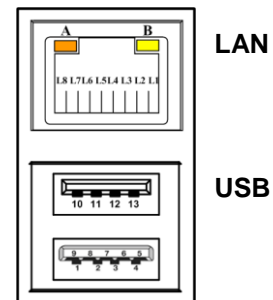
### 2.4.10 Ethernet and USB Port (CN12 and CN13)

The board has two RJ-45 connectors. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

The lower Universal Serial Bus connectors on the rear I/O are for installing USB peripherals such as keyboard, mouse, scanner, etc.

#### CN12 (for LAN1, USB 3.0 port 0 and USB 2.0 port 2):

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



Pin	USB 3.0 Port 0	Pin	USB 2.0 Port 2
1	USB VCC (+5V level)	10	USB VCC (+5V level)
2	USB #0_D-	11	USB #2_D-
3	USB #0_D+	12	USB #2_D+
4	GND	13	GND
5	SSRX0-		
6	SSRX0+		
7	GND		
8	SSTX0-		
9	SSTX0+		

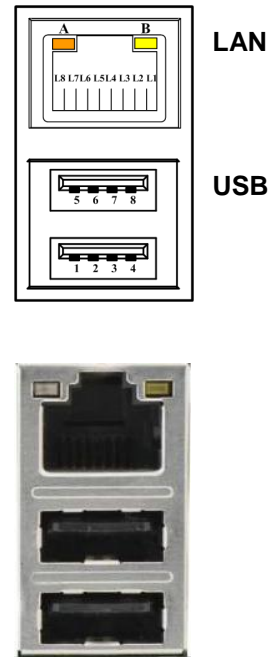




**CN13 (for LAN2, USB 2.0 port 4 and 5):**

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

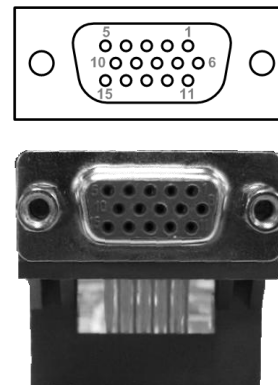
Pin	USB Signal	Pin	USB Signal
1	USB VCC (+5V level)	5	USB VCC (+5V level)
2	USB #4_D-	6	USB #5_D-
3	USB #4_D+	7	USB #5_D+
4	GND	8	GND



**2.4.11 VGA Connector (CN14)**

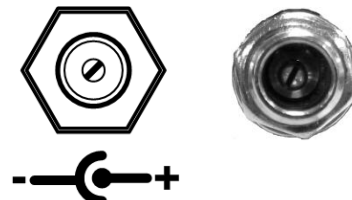
This is a 15-pin D-Sub connector which is commonly used for VGA display. This VGA interface configuration can be configured via software utility.

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



**2.4.12 DC Power Jack (CN16)**

This is a DC power jack with lock. Firmly insert at least 60W adapter into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting this power jack.



### 2.4.13 Audio Jack (CN17)

This is audio jack with HD audio support. Install audio driver, and then attach audio devices to CN17.

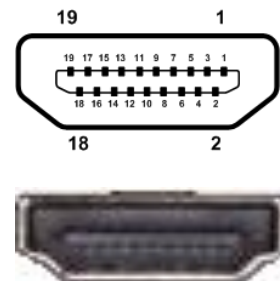
Pin Color	Signal
Green	Line_OUT
Pink	Mic_IN



### 2.4.14 HDMI Connector (CN18)

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 CN18.

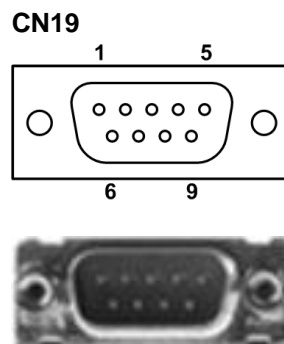
Pin	Signal	Pin	Signal
1	HDMI DATA2+	2	GND
3	HDMI DATA2-	4	HDMI DATA1+
5	GND	6	HDMI DATA1-
7	HDMI DATA0+	8	GND
9	HDMI DATA0-	10	HDMI Clock+
11	GND	12	HDMI Clock-
13	N.C.	14	N.C.
15	HDMI SCL	16	HDMI SDA
17	GND	18	+5V
19	HDMI_HTPLG		



### 2.4.15 COM2 Connector (CN19) (Optional)

The CN19 is a standard 9-pin D-Sub connector on the rear IO. This connector is co-layout with HDMI connector (CN18).

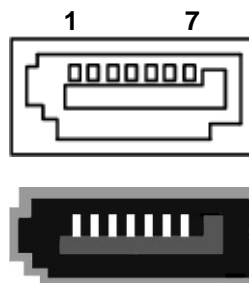
Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



### 2.4.16 SATA Connector (SATA1)

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

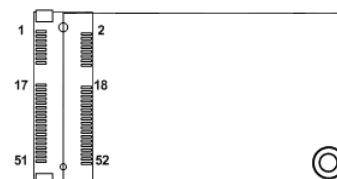
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



### 2.4.17 Full-size PCI-Express Mini Card Connector (SCN1)

This is a full-size PCI-Express Mini Card connector on the bottom side applying to either PCI-Express, USB 2.0 or SATA (mSATA). It also complies with PCI-Express Mini Card Spec. V1.2. Please refer to BIOS setting in section 4.4 to enable or disable mSATA support.

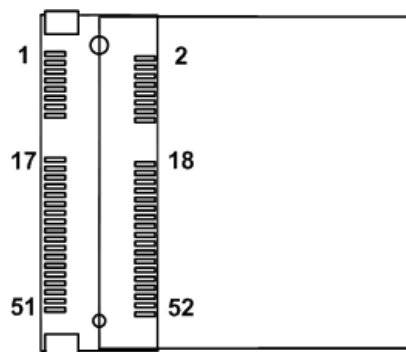
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/SATA_RXP1	24	+3.3VSB
25	PE_RXP3/SATA_RXN1	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3/SATA_TXN1	32	SMB_DATA
33	PE_TXP3/SATA_TXP1	34	GND
35	GND	36	USB_D7-
37	GND	38	USB_D7+
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



### 2.4.18 Half-size PCI-Express Mini Card Connector (SCN2)

This is a half-size PCI-Express Mini Card connector on the bottom side applying to either PCI-Express or USB 2.0. It also complies with PCI-Express Mini Card Spec. V1.2.

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_RXN2	24	+3.3VSB
25	PE_RXP2	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN2	32	SMB_DATA
33	PE_TXP2	34	GND
35	GND	36	USB_D1-
37	GND	38	USB_D1+
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



# Chapter 3

## Hardware Description

### 3.1 Microprocessors

The NANO840 supports Intel® Atom™ E3845/E3827, and NANO842 supports Intel® Celeron® J1900/N2807 processors, which enable your system to operate under Windows® 7 and Windows® 8.1 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

### 3.2 BIOS

The NANO840/842 uses AMI Plug and Play BIOS with a single SPI Flash.

### 3.3 System Memory

The NANO840/842 supports one 204-pin DDR3L SO-DIMM socket for maximum memory capacity up to 8GB DDR3L SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

### 3.4 I/O Port Address Map

The Intel® Atom™ E3845/E3827 and Intel® Celeron® J1900/N2807 processors communicate via I/O ports.

<ul style="list-style-type: none"> <li>Input/output (IO) <ul style="list-style-type: none"> <li>[0000000000000000 - 000000000000006F] PCI Express Root Complex</li> <li>[0000000000000020 - 0000000000000021] Programmable interrupt controller</li> <li>[0000000000000024 - 0000000000000025] Programmable interrupt controller</li> <li>[0000000000000028 - 0000000000000029] Programmable interrupt controller</li> <li>[000000000000002C - 000000000000002D] Programmable interrupt controller</li> <li>[000000000000002E - 000000000000002F] Motherboard resources</li> <li>[0000000000000030 - 0000000000000031] Programmable interrupt controller</li> <li>[0000000000000034 - 0000000000000035] Programmable interrupt controller</li> <li>[0000000000000038 - 0000000000000039] Programmable interrupt controller</li> <li>[000000000000003C - 000000000000003D] Programmable interrupt controller</li> <li>[0000000000000040 - 0000000000000043] System timer</li> <li>[000000000000004E - 000000000000004F] Motherboard resources</li> <li>[0000000000000050 - 0000000000000053] System timer</li> <li>[0000000000000061 - 0000000000000061] Motherboard resources</li> <li>[0000000000000063 - 0000000000000063] Motherboard resources</li> <li>[0000000000000065 - 0000000000000065] Motherboard resources</li> <li>[0000000000000067 - 0000000000000067] Motherboard resources</li> <li>[0000000000000070 - 0000000000000070] Motherboard resources</li> <li>[0000000000000070 - 0000000000000077] System CMOS/real time clock</li> <li>[0000000000000078 - 00000000000000CF7] PCI Express Root Complex</li> <li>[0000000000000080 - 000000000000008F] Motherboard resources</li> <li>[0000000000000092 - 0000000000000092] Motherboard resources</li> <li>[00000000000000A0 - 00000000000000A1] Programmable interrupt controller</li> <li>[00000000000000A4 - 00000000000000A5] Programmable interrupt controller</li> <li>[00000000000000A8 - 00000000000000A9] Programmable interrupt controller</li> <li>[00000000000000AC - 00000000000000AD] Programmable interrupt controller</li> <li>[00000000000000B0 - 00000000000000B1] Programmable interrupt controller</li> <li>[00000000000000B2 - 00000000000000B3] Motherboard resources</li> <li>[00000000000000B4 - 00000000000000B5] Programmable interrupt controller</li> <li>[00000000000000B8 - 00000000000000B9] Programmable interrupt controller</li> <li>[00000000000000BC - 00000000000000BD] Programmable interrupt controller</li> <li>[00000000000002F8 - 00000000000002FF] Communications Port (COM2)</li> <li>[00000000000003B0 - 00000000000003BB] Intel(R) HD Graphics</li> <li>[00000000000003C0 - 00000000000003DF] Intel(R) HD Graphics</li> <li>[00000000000003F8 - 00000000000003FF] Communications Port (COM1)</li> <li>[0000000000000400 - 000000000000047F] Motherboard resources</li> <li>[00000000000004D0 - 00000000000004D1] Programmable interrupt controller</li> <li>[0000000000000500 - 00000000000005FE] Motherboard resources</li> <li>[0000000000000600 - 000000000000061F] Motherboard resources</li> <li>[0000000000000680 - 000000000000069F] Motherboard resources</li> <li>[0000000000000A00 - 0000000000000A0F] Motherboard resources</li> <li>[0000000000000A10 - 0000000000000A1F] Motherboard resources</li> <li>[0000000000000A20 - 0000000000000A2F] Motherboard resources</li> <li>[0000000000000D00 - 000000000000FFFF] PCI Express Root Complex</li> <li>[000000000000C000 - 000000000000CFFF] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A</li> <li>[000000000000D000 - 000000000000DFFF] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48</li> <li>[000000000000E000 - 000000000000E01F] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12</li> <li>[000000000000E020 - 000000000000E03F] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23</li> <li>[000000000000E040 - 000000000000E043] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23</li> <li>[000000000000E050 - 000000000000E057] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23</li> <li>[000000000000E060 - 000000000000E063] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23</li> <li>[000000000000E070 - 000000000000E077] Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23</li> <li>[000000000000E080 - 000000000000E087] Intel(R) HD Graphics</li> </ul> </li> </ul>
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## 3.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

▲	Interrupt request (IRQ)	
▶	(ISA) 0x00000000 (00)	System timer
▶	(ISA) 0x00000003 (03)	Communications Port (COM2)
▶	(ISA) 0x00000004 (04)	Communications Port (COM1)
▶	(ISA) 0x00000008 (08)	High precision event timer
▶	(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
▶	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
▶	(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System






































































	(ISA) 0x000001DB (475)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DC (476)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DD (477)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DE (478)	Microsoft ACPI-Compliant System
	(ISA) 0x000001DF (479)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E0 (480)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E1 (481)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E2 (482)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E3 (483)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E4 (484)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E5 (485)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E6 (486)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E7 (487)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E8 (488)	Microsoft ACPI-Compliant System
	(ISA) 0x000001E9 (489)	Microsoft ACPI-Compliant System
	(ISA) 0x000001EA (490)	Microsoft ACPI-Compliant System
	(ISA) 0x000001EB (491)	Microsoft ACPI-Compliant System
	(ISA) 0x000001EC (492)	Microsoft ACPI-Compliant System
	(ISA) 0x000001ED (493)	Microsoft ACPI-Compliant System
	(ISA) 0x000001EE (494)	Microsoft ACPI-Compliant System
	(ISA) 0x000001EF (495)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F0 (496)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F1 (497)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F2 (498)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F3 (499)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F4 (500)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F5 (501)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F6 (502)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F7 (503)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F8 (504)	Microsoft ACPI-Compliant System
	(ISA) 0x000001F9 (505)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FA (506)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FB (507)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FC (508)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FD (509)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FE (510)	Microsoft ACPI-Compliant System
	(ISA) 0x000001FF (511)	Microsoft ACPI-Compliant System
	(PCI) 0x0000000B (11)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
	(PCI) 0x00000010 (16)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
	(PCI) 0x00000011 (17)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
	(PCI) 0x00000012 (18)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 3 - 0F4C
	(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
	(PCI) 0x00000013 (19)	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 4 - 0F4E
	(PCI) 0x00000016 (22)	High Definition Audio Controller
	(PCI) 0xFFFFFFF0 (-16)	Intel(R) Trusted Execution Engine Interface
	(PCI) 0xFFFFFFF1 (-15)	Intel(R) USB 3.0 eXtensible Host Controller - 0100 (Microsoft)
	(PCI) 0xFFFFFFF2 (-14)	Intel(R) HD Graphics
	(PCI) 0xFFFFFFF3 (-13)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF4 (-12)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF5 (-11)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF6 (-10)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF7 (-9)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF8 (-8)	Intel(R) I210 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF9 (-7)	Intel(R) I210 Gigabit Network Connection
	(PCI) 0xFFFFFFFA (-6)	Intel(R) I210 Gigabit Network Connection
	(PCI) 0xFFFFFFFB (-5)	Intel(R) I210 Gigabit Network Connection
	(PCI) 0xFFFFFFF4 (-4)	Intel(R) I210 Gigabit Network Connection
	(PCI) 0xFFFFFFF3 (-3)	Intel(R) I210 Gigabit Network Connection
	(PCI) 0xFFFFFFF2 (-2)	Intel(R) I210 Gigabit Network Connection

## 3.6 Memory Map

The memory mapping list is shown as follows:

Address Range	Device Name
[0000000000A0000 - 0000000000BFFFFF]	Intel(R) HD Graphics
[0000000000A0000 - 0000000000BFFFFF]	PCI Express Root Complex
[0000000000C0000 - 0000000000DFFFFF]	PCI Express Root Complex
[0000000000E0000 - 0000000000FFFFFF]	PCI Express Root Complex
[00000000C0000000 - 00000000CFFFFFFF]	Intel(R) HD Graphics
[00000000C0000000 - 00000000D0815FFE]	PCI Express Root Complex
[00000000D0000000 - 00000000D03FFFFFFF]	Intel(R) HD Graphics
[00000000D0400000 - 00000000D04FFFFFFF]	Intel(R) Trusted Execution Engine Interface
[00000000D0500000 - 00000000D05FFFFFFF]	Intel(R) Trusted Execution Engine Interface
[00000000D0600000 - 00000000D067FFFFFFF]	Intel(R) I210 Gigabit Network Connection
[00000000D0600000 - 00000000D06FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 2 - 0F4A
[00000000D0680000 - 00000000D0683FFFFF]	Intel(R) I210 Gigabit Network Connection
[00000000D0700000 - 00000000D077FFFFFFF]	Intel(R) I210 Gigabit Network Connection #2
[00000000D0700000 - 00000000D077FFFFFFF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor PCI Express - Root Port 1 - 0F48
[00000000D0780000 - 00000000D0783FFF]	Intel(R) I210 Gigabit Network Connection #2
[00000000D0800000 - 00000000D080FFFFFFF]	Intel(R) USB 3.0 eXtensible Host Controller - 0100 (Microsoft)
[00000000D0810000 - 00000000D0813FFF]	High Definition Audio Controller
[00000000D0814000 - 00000000D081401F]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor Platform Control Unit - SMBus Port - 0F12
[00000000D0815000 - 00000000D08157FF]	Intel(R) Atom(TM)/Celeron(R)/Pentium(R) Processor AHCI - 0F23
[00000000E0000000 - 00000000EFFFFFFF]	Motherboard resources
[00000000E00000D0 - 00000000E00000DB]	Intel(R) Sideband Fabric Device
[00000000FED00000 - 00000000FED003FF]	High precision event timer
[00000000FED01000 - 00000000FED01FFF]	Motherboard resources
[00000000FED03000 - 00000000FED03FFF]	Motherboard resources
[00000000FED04000 - 00000000FED04FFF]	Motherboard resources
[00000000FED08000 - 00000000FED08FFF]	Motherboard resources
[00000000FED1C000 - 00000000FED1CFFF]	Motherboard resources
[00000000FED40000 - 00000000FED44FFF]	Trusted Platform Module 1.2
[00000000FEE00000 - 00000000FEEFFFFFFF]	Motherboard resources
[00000000FEF00000 - 00000000FEFFFFFFF]	Motherboard resources
[00000000FF000000 - 00000000FFFFFFFF]	Intel(R) 82802 Firmware Hub Device

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# Chapter 4

## AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI 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.



**Note**

*If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP10 (see section 2.3.6).*

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.



### BIOS Information

Display the BIOS 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

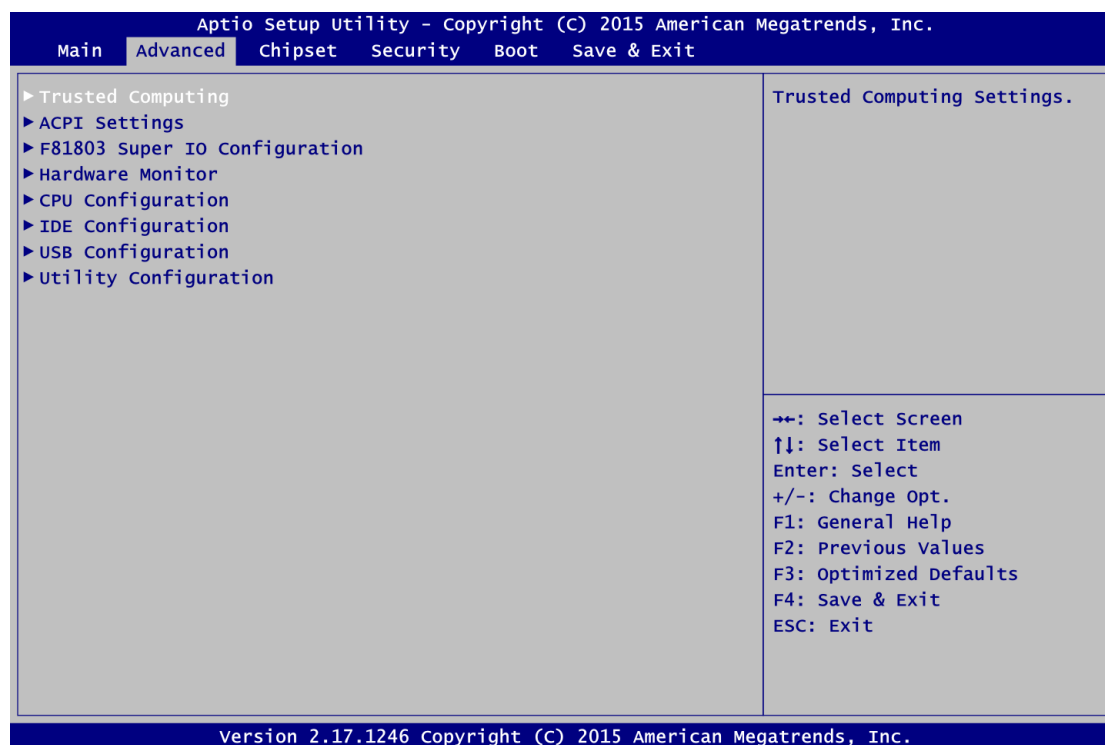
Display the access level of current user.

## 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:

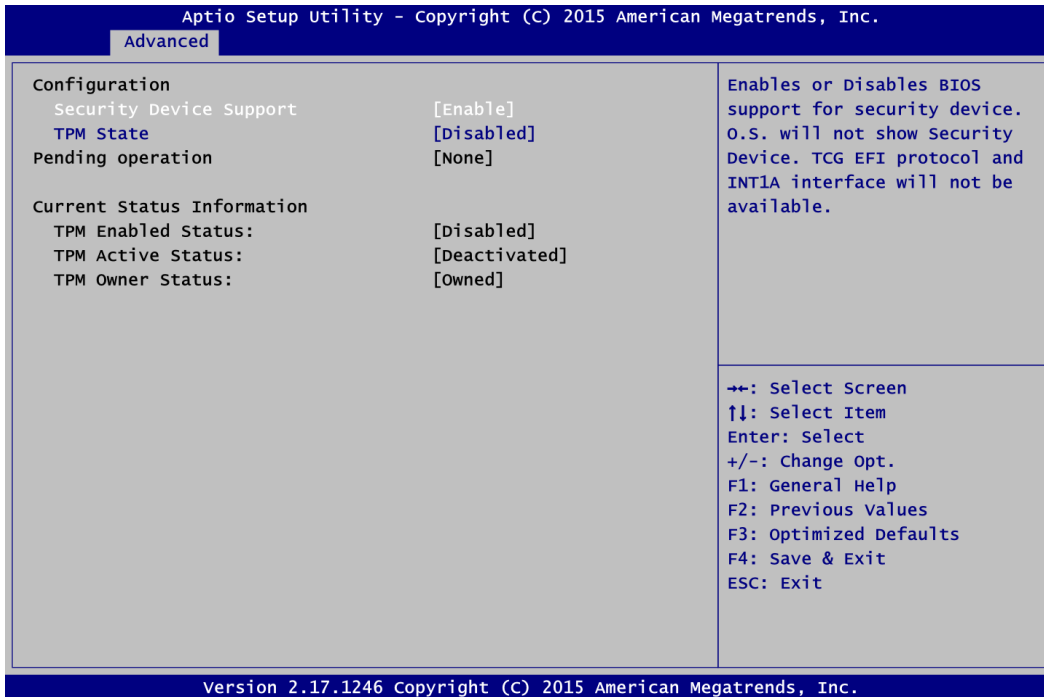
- ▶ Trusted Computing
- ▶ ACPI Settings
- ▶ F81803 Super IO Configuration
- ▶ Hardware Monitor
- ▶ CPU Configuration
- ▶ IDE Configuration
- ▶ USB Configuration
- ▶ Utility Configuration

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



- **Trusted Computing**

This screen provides function for specifying the TPM settings.



**Security Device Support**

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

**TPM State**

Once the Security Device Support is Enabled, TPM can be used by the operating system.

**Pending Operation**

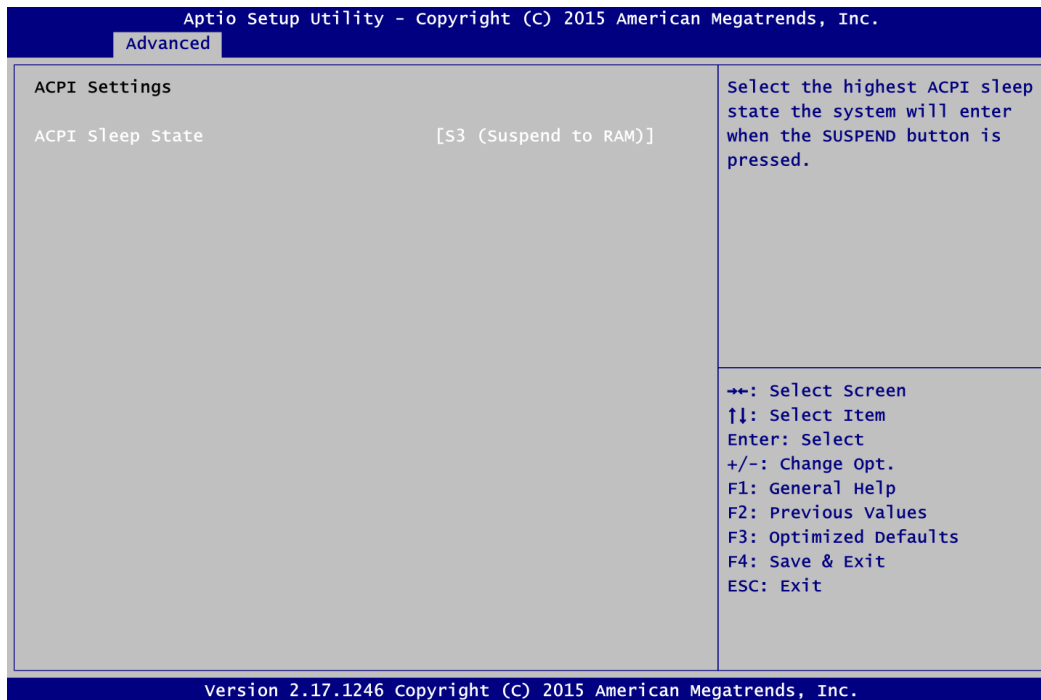
Schedule a TPM operation which will take effect at the next bootup process.

**Current Status Information**

Display current TPM status information.

- **ACPI Settings**

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



**ACPI Sleep State**

Select the ACPI (Advanced Configuration and Power Interface) sleep state. Configuration options are Suspend Disabled and S3 (Suspend to RAM). The default setting is S3 (Suspend to RAM); this option selects ACPI sleep state the system will enter when suspend button is pressed.

- **F81803 Super IO Configuration**

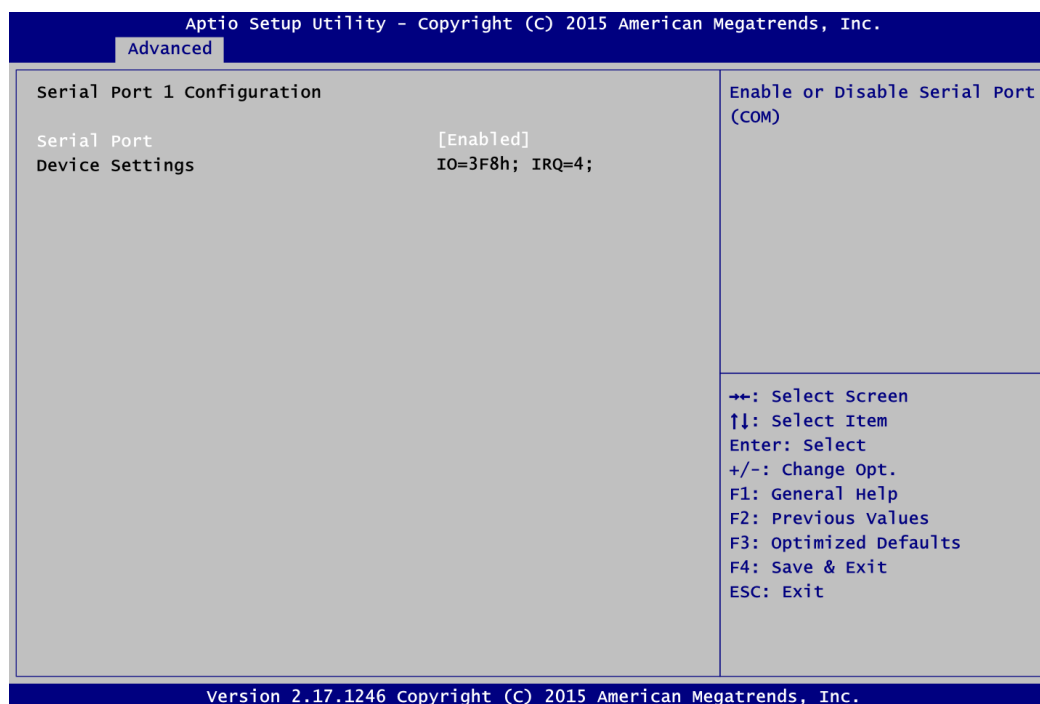
You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.



**Serial Port 1~2 Configuration**

Set parameters related to serial port 1~2.

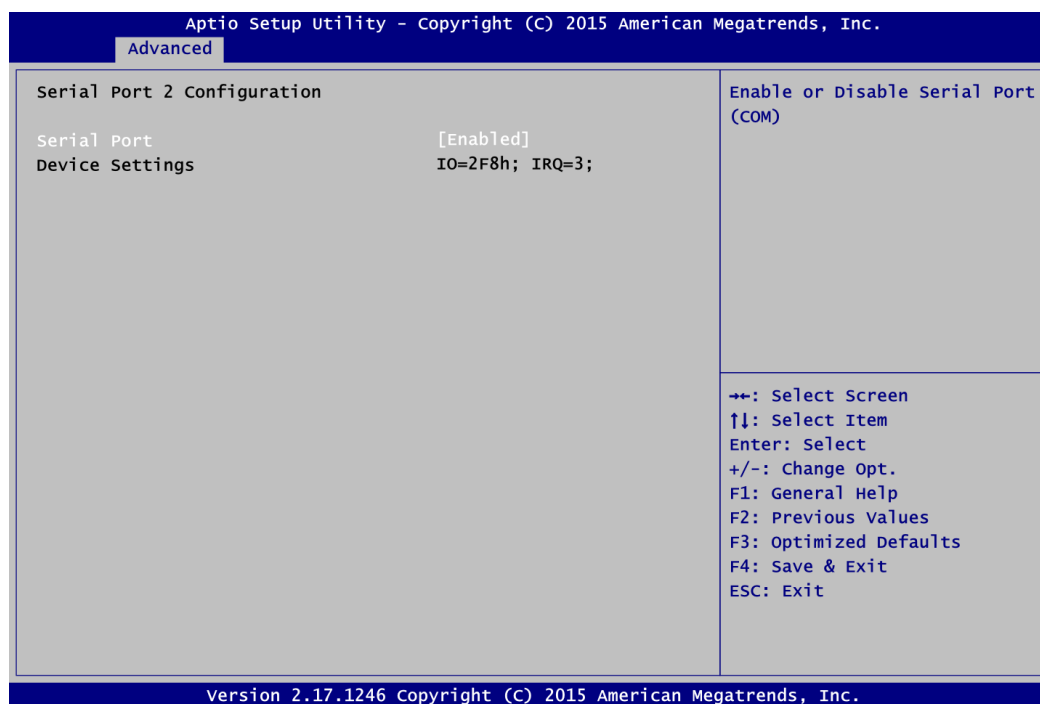
- **Serial Port 1 Configuration**



**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.

- **Serial Port 2 Configuration**

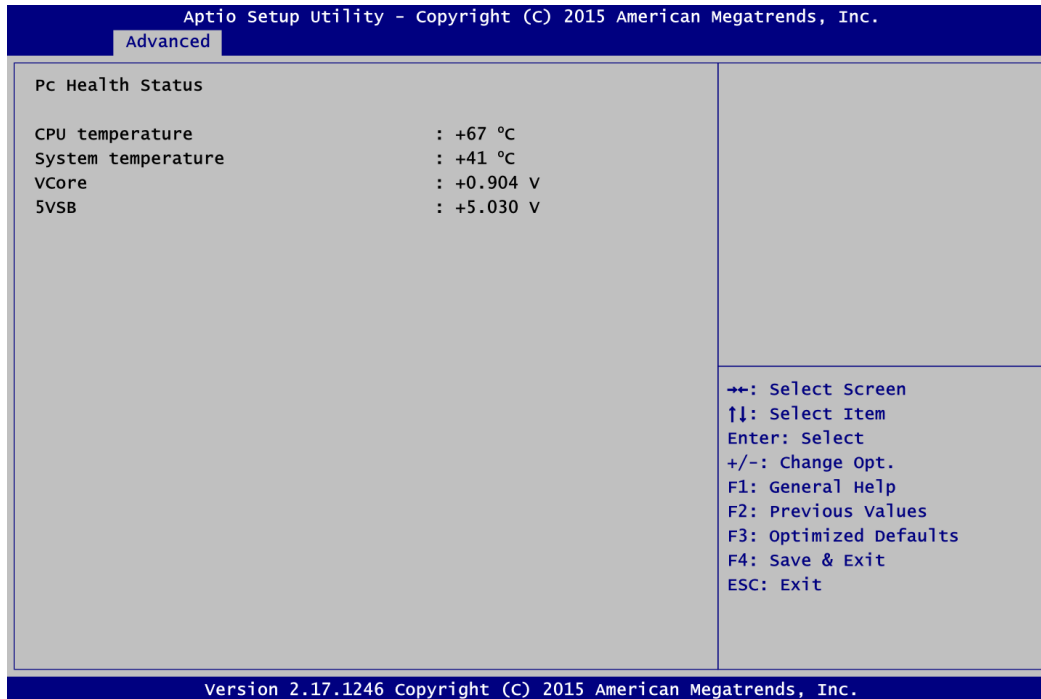


**Serial Port**

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

- **Hardware Monitor**

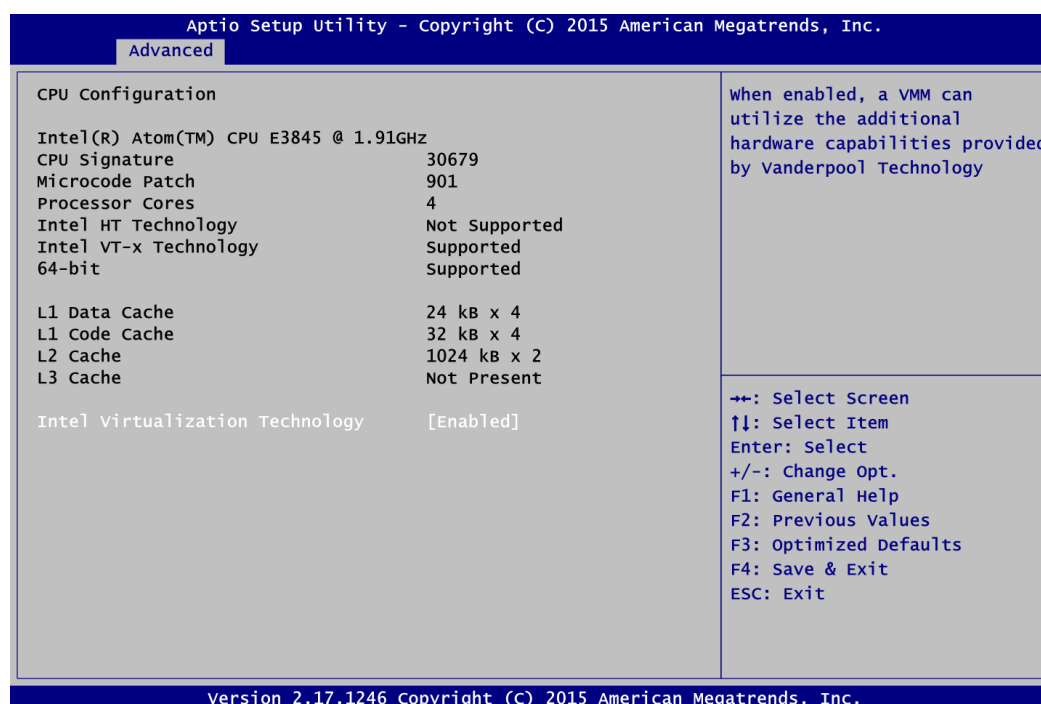
This screen monitors hardware health status.



This screen displays the temperature of system and CPU, system voltages (VCore and 5VSB).

- **CPU Configuration**

This screen shows the CPU information, and you can change the value of the selected option.



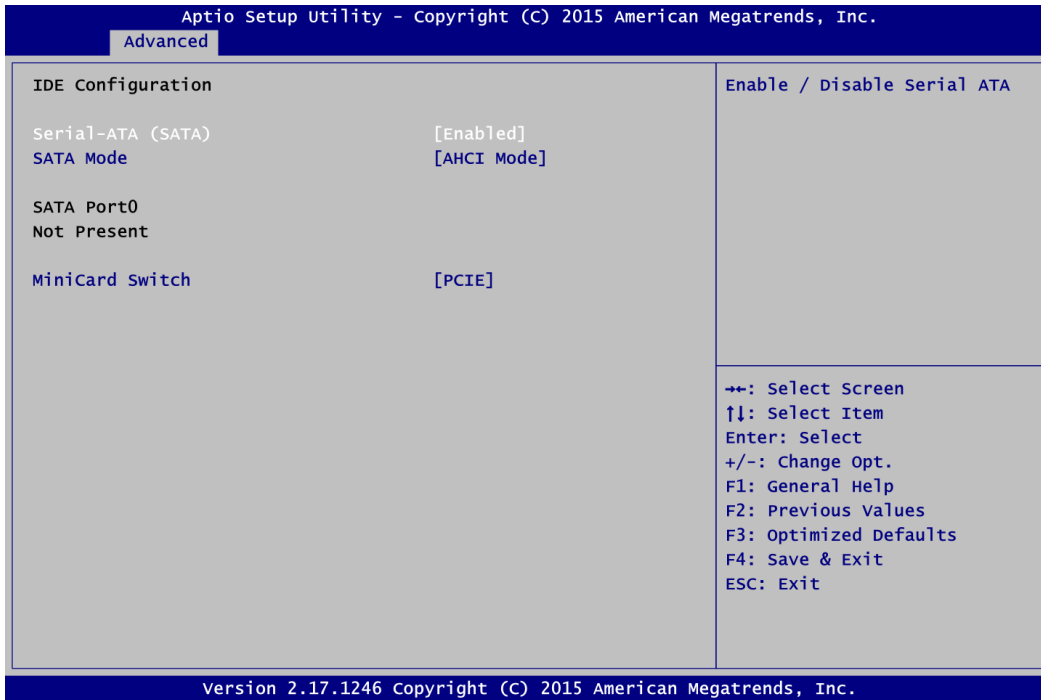
**Intel Virtualization Technology**

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



- **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.

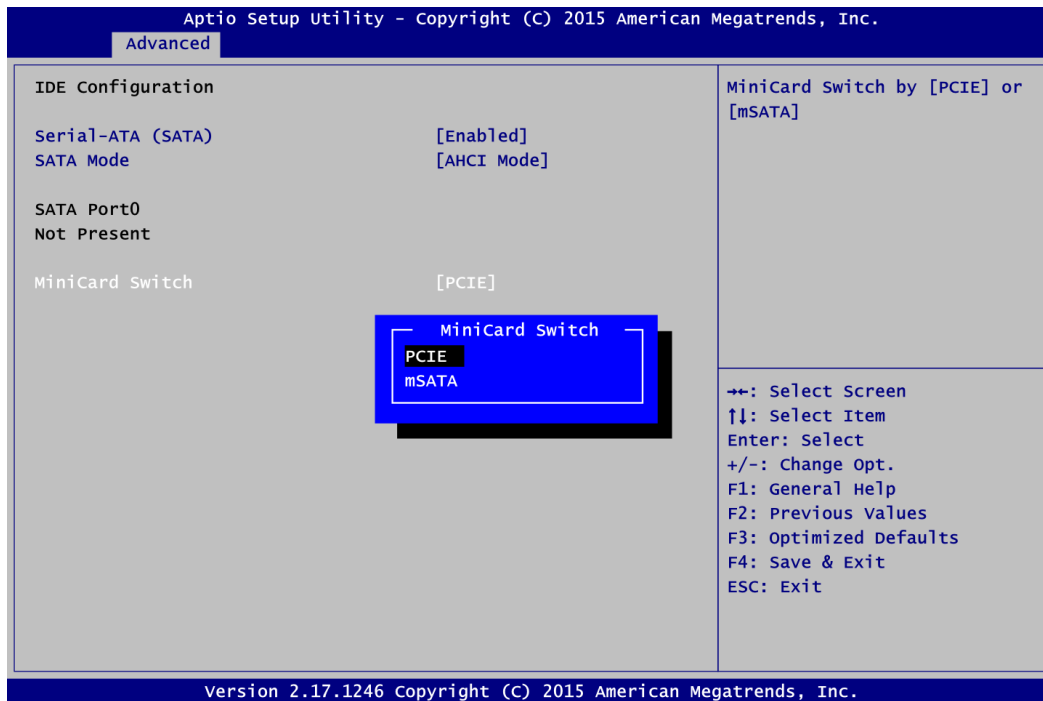


**Serial-ATA (SATA)**

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

**SATA mode**

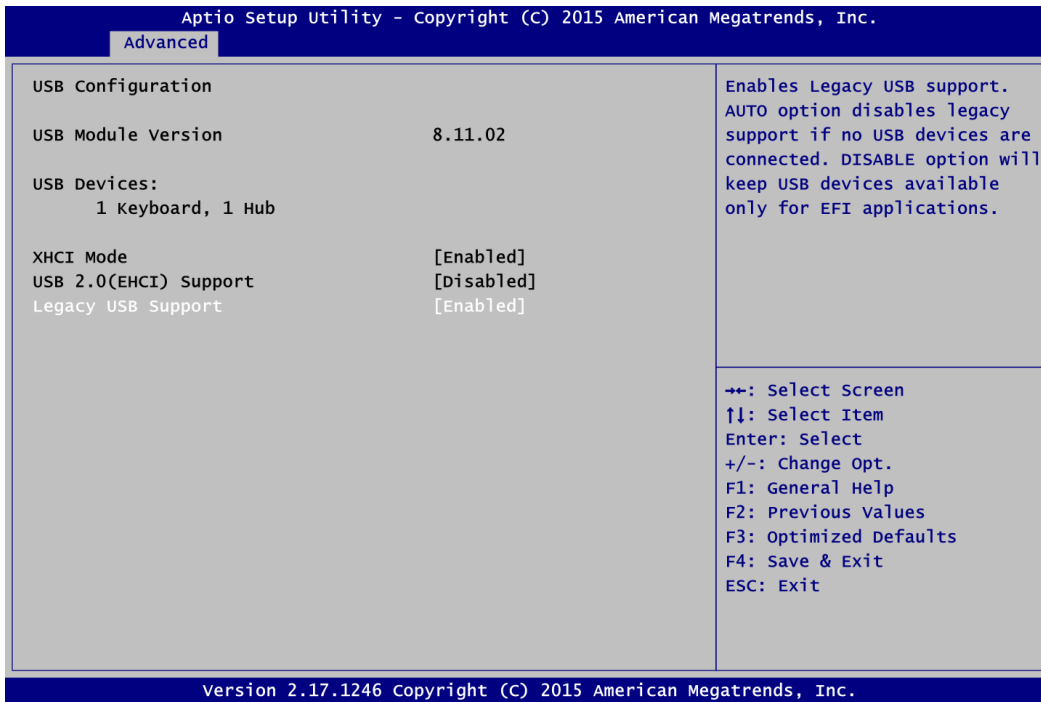
Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode. The default is AHCI Mode.



### MiniCard Switch

This option appears only after SATA port is enabled. The default is PCIE. If you want to insert mSATA card to SCN1 (see section 2.4.18), please change setting to mSATA.

- **USB Configuration**



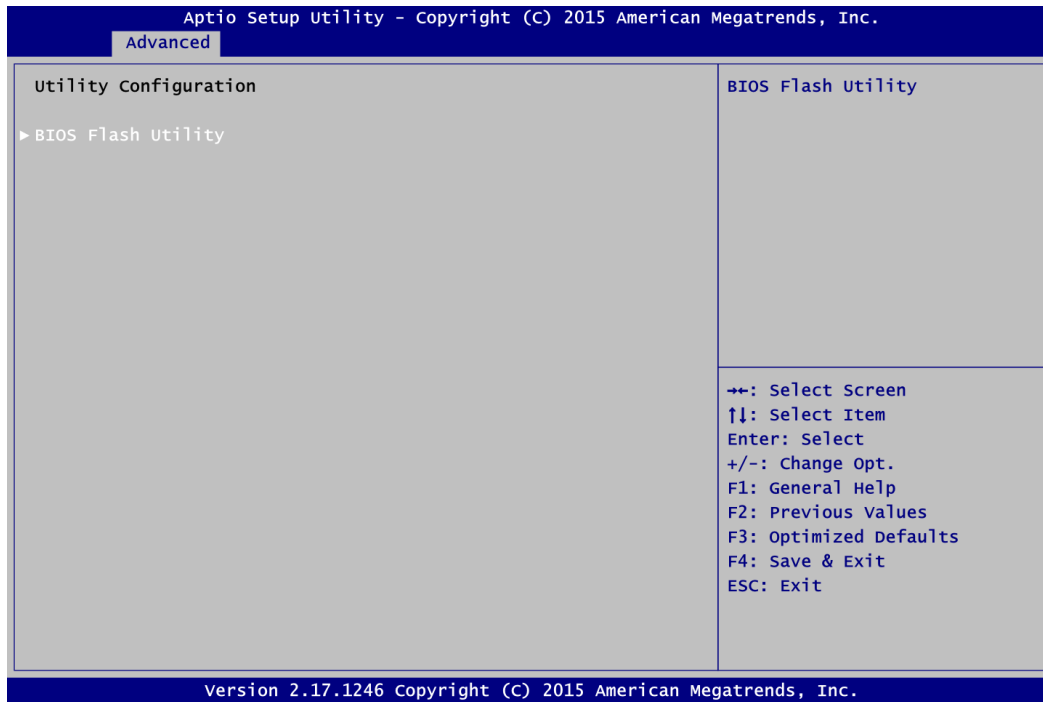
**USB Devices**

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.

- **Utility Configuration**



**BIOS Flash Utility**

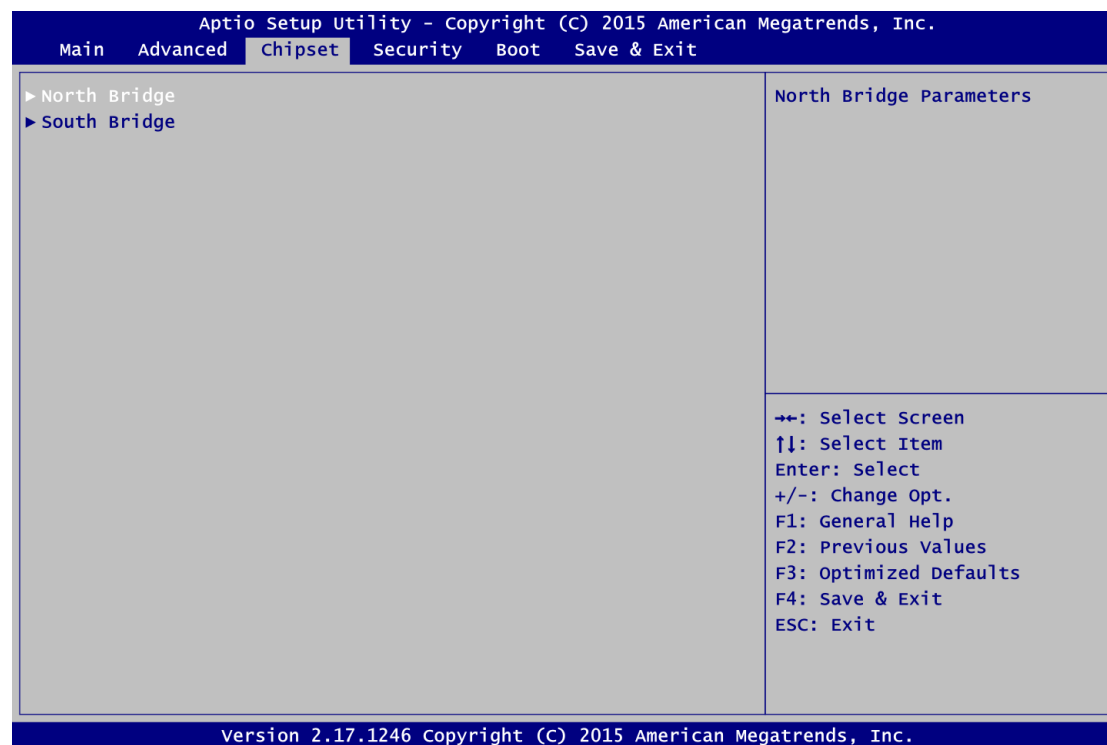
BIOS flash utility configuration. For more detailed information, please refer to Appendix C.

## 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:

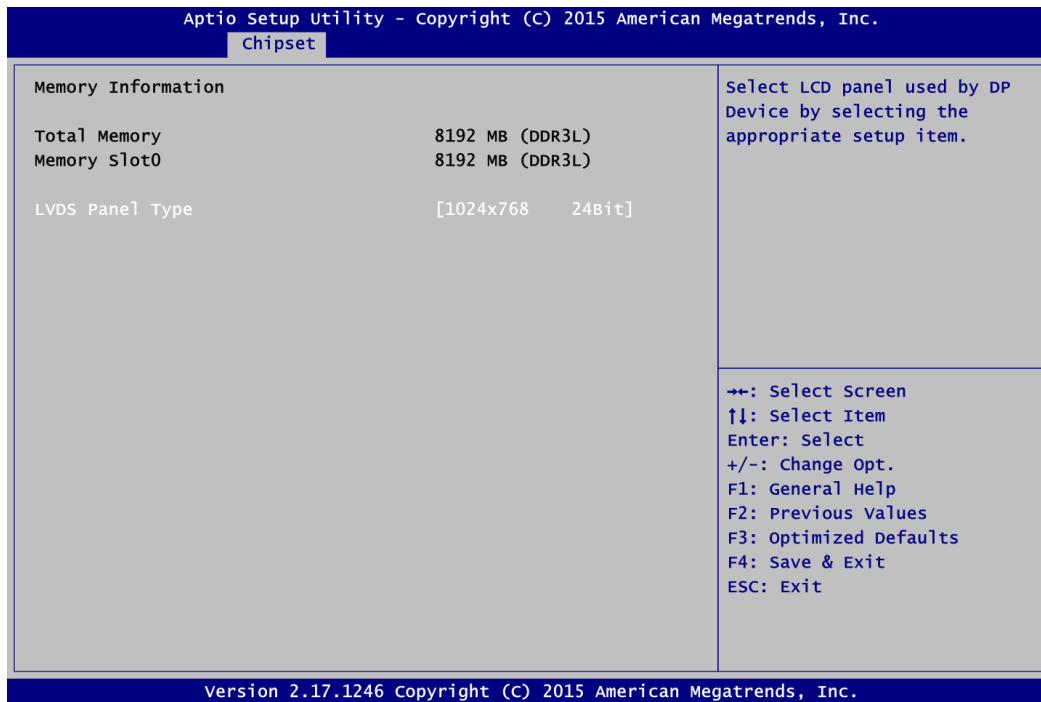
- ▶ North Bridge
- ▶ South Bridge

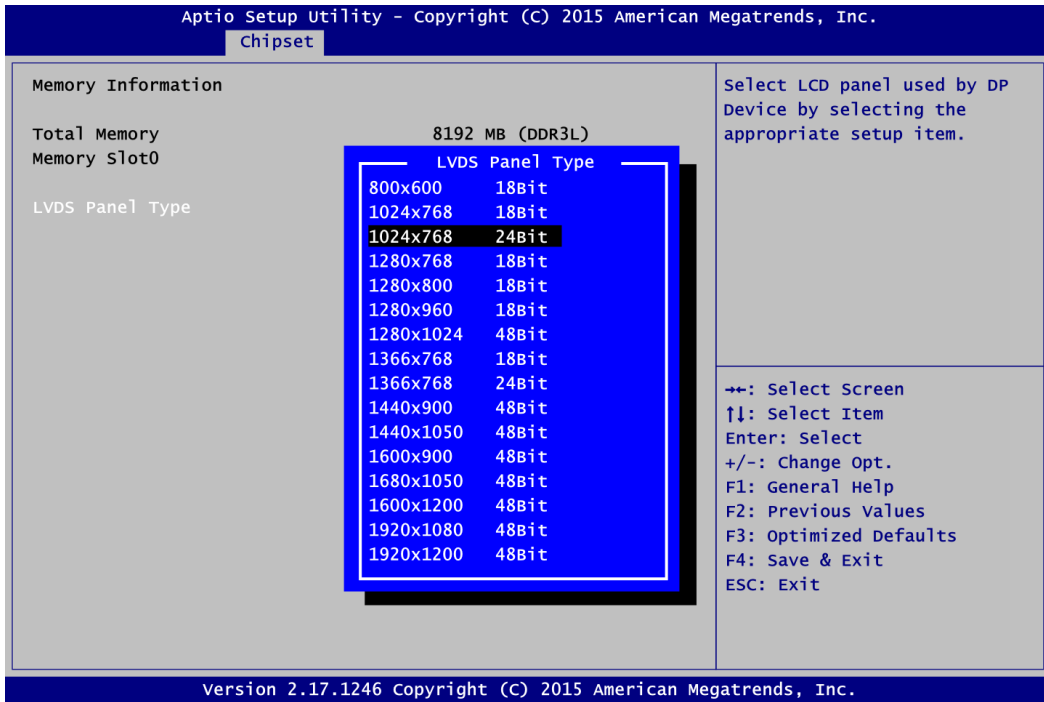
For items marked with “▶”, please press <Enter> for more options.



- **North Bridge**

This screen shows system memory information and allows users to configure parameters of North Bridge chipset.



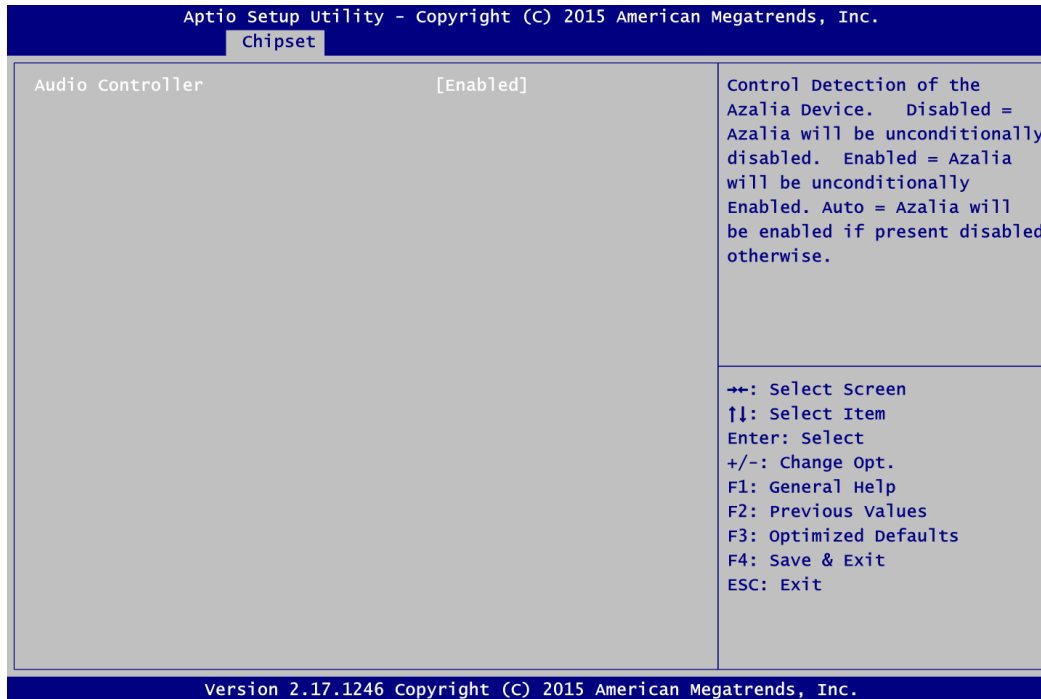


**LVDS Panel Type**

Select LVDS panel resolution; see the selection options in image above.

- **South Bridge**

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



**Audio Controller**

Control detection of the HD Audio device.

- Disabled: Audio device will be unconditionally disabled.
- Enabled: Audio device will be unconditionally enabled.



## 4.6 Security Menu

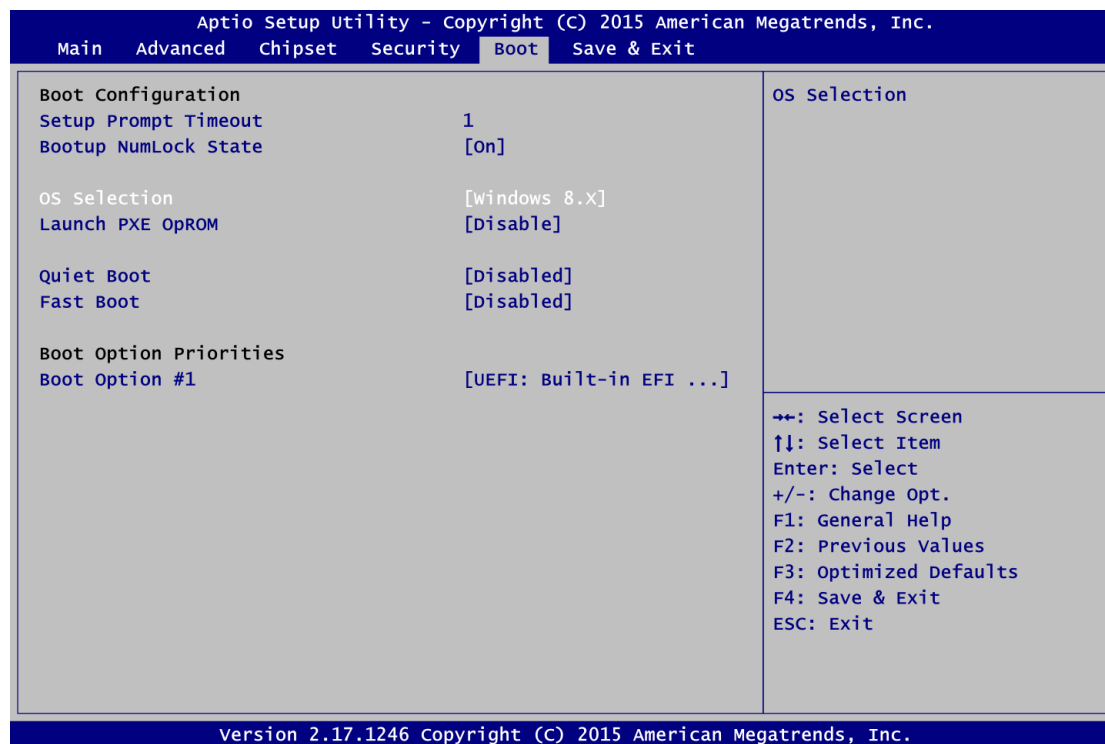
The Security menu allows users to change the security settings for the system.



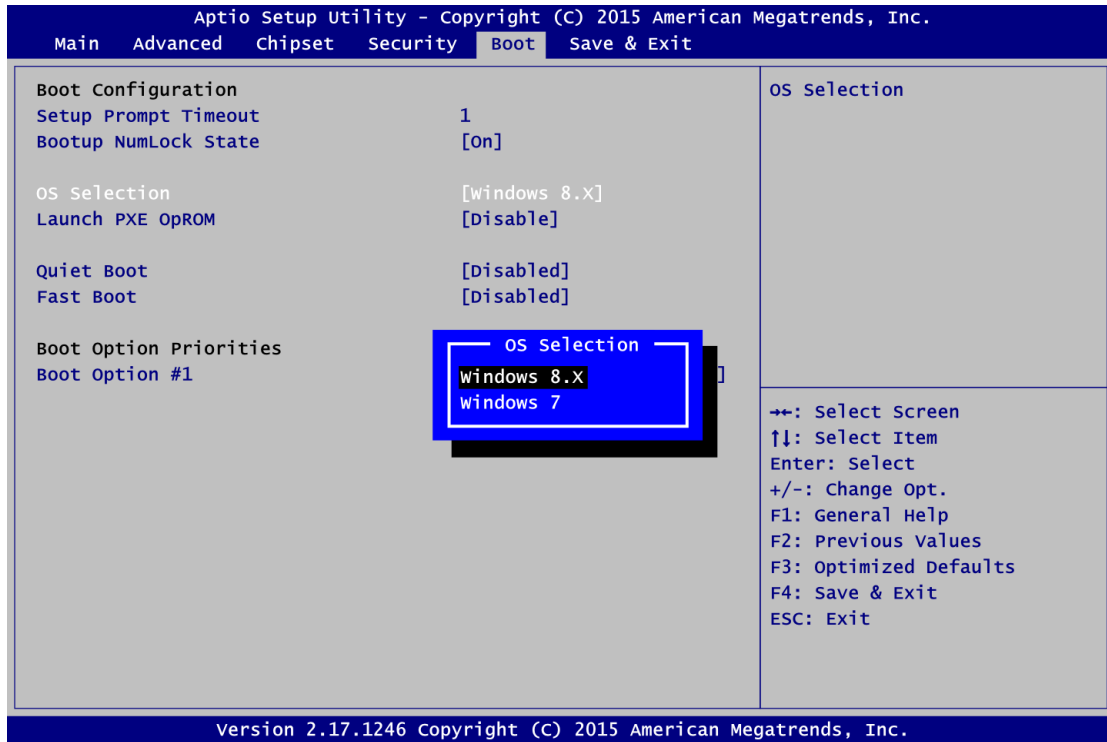
- **Administrator Password**  
This item indicates whether an administrator password has been set (installed or uninstalled).
- **User Password**  
This item indicates whether a user password has been set (installed or uninstalled).

## 4.7 Boot Menu

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



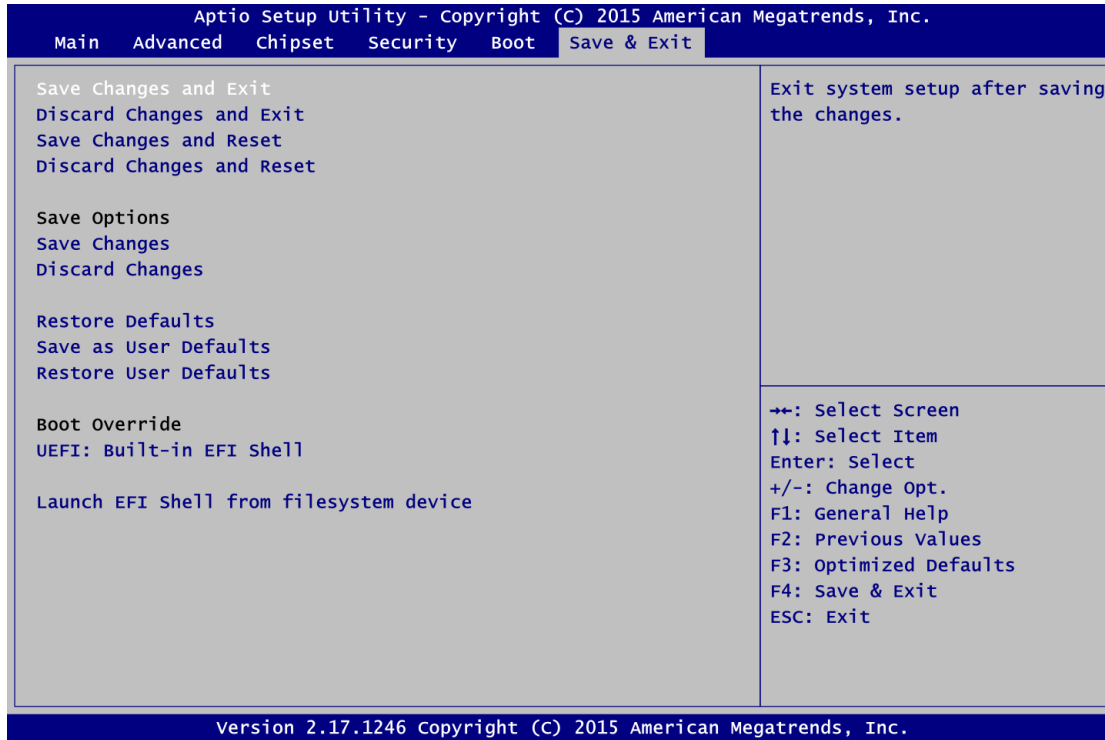
- Setup Prompt Timeout**  
 Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- Bootup NumLock State**  
 Use this item to select the power-on state for the NumLock.



- OS Selection**  
Use this item to select Windows® 8.x or Windows® 7 operating system. The default is Windows® 8.x.
- Legacy PXE OpROM**  
Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.
- Quiet Boot**  
Select to display either POST output messages or a splash screen during boot up.
- Fast Boot**  
Enable or disable fast boot feature. BIOS skips some certain steps to decrease time needed for booting up.
- Boot Option Priorities [Boot Option #1, ...]**  
These are settings for boot priority. Specify the boot device priority sequence from the available devices.

## 4.8 Save & Exit Menu

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



- **Save Changes and Exit**  
When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.
- **Discard Changes and Exit**  
Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.
- **Save Changes and Reset**  
When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.
- **Discard Changes and Reset**  
Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.
- **Save Changes**  
When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**  
Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.
- **Restore Defaults**  
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.
- **Save as User Defaults**  
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.
- **Restore User Defaults**  
It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.
- **Boot Override**  
Select a drive to immediately boot that device regardless of the current boot order.
- **Launch EFI Shell from filesystem device**  
Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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# Appendix A

## Watchdog Timer

### A.1 About Watchdog Timer

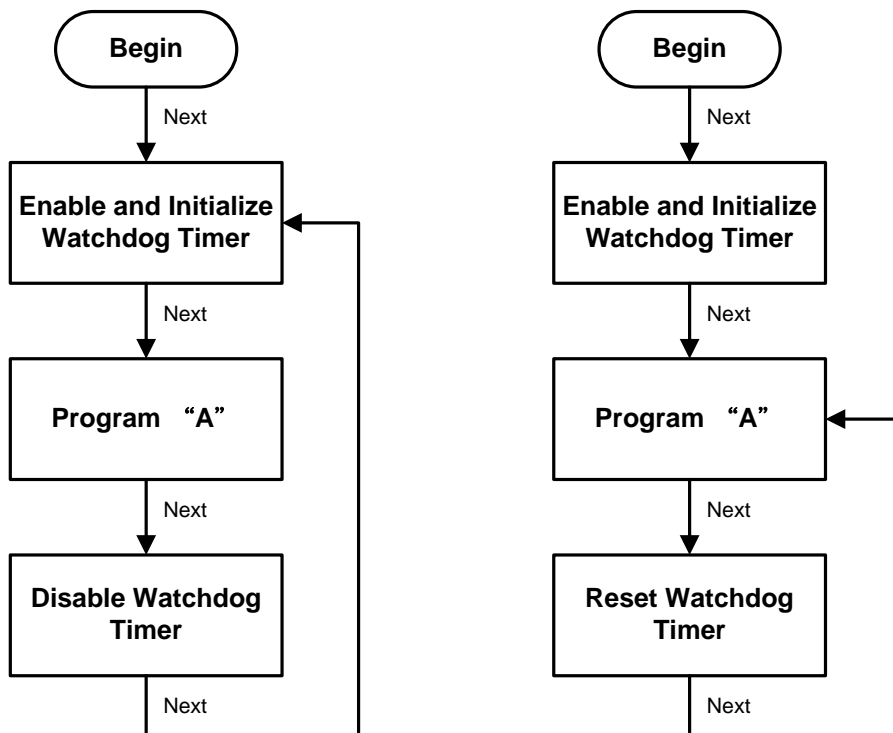
Software stability is major issue in most application. Some embedded systems are not watched by operator for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

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.

### A.2 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.



## A.3 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  Note below)

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh             ;N=71h or 79h(see  Note below)
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

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# Appendix B

## Digital I/O

### B.1 Digital I/O Software Programming

- I<sup>2</sup>C to GPIO PCA9554PW GPIO.
- I<sup>2</sup>C address: 01001000.

#### Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

#### Register 0: Input port register.

This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect.

The default 'X' is determined by the externally applied logic level, normally '1' when no external signal externally applied because of the internal pull-up resistors.

#### Register 0 – Input port register bit description

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	Determined by externally applied logic level.
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

**Register 1: Output port register.**

This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

**Register 1 – Output port register bit description**

Bit	Symbol	Access	Default Value	Description
7	O7	R	1	Reflects outgoing logic levels of pins defined as outputs by Register 3.
6	O6	R	1	
5	O5	R	1	
4	O4	R	1	
3	O3	R	1	
2	O2	R	1	
1	O1	R	1	
0	O0	R	1	

**Register 2: Polarity Inversion register.**

This register allows the user to invert the polarity of the Input port register data. If a bit in this register is set (written with '1'), the corresponding Input port data is inverted. If a bit in this register is cleared (written with '0'), the Input port data polarity is retained.

**Register 2 – Polarity inversion register bit description**

Bit	Symbol	Access	Default Value	Description
7	N7	R/W	0	Inverts polarity of Input port register data. 0 = Input port register data retained (default value). 1 = Input port register data inverted.
6	N6	R/W	0	
5	N5	R/W	0	
4	N4	R/W	0	
3	N3	R/W	0	
2	N2	R/W	0	
1	N1	R/W	0	
0	N0	R/W	0	

**Register 3: Configuration register.**

This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to  $V_{DD}$ .

**Register 3 – Configuration register bit description**

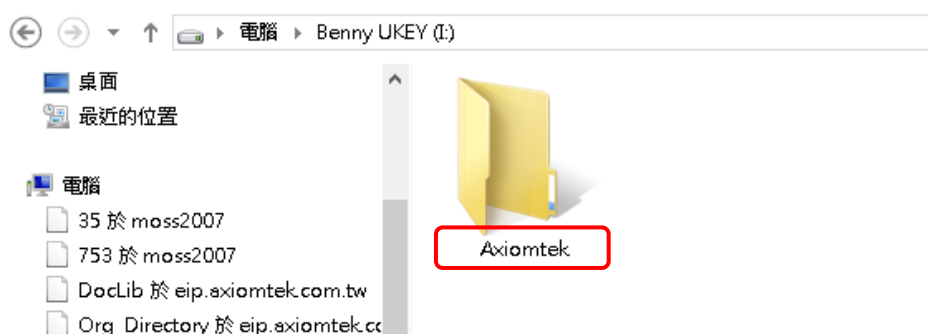
Bit	Symbol	Access	Default Value	Description
7	C7	R/W	1	Configures the directions of the I/O pins. 0 = Corresponding port pin enabled as an output. 1 = Corresponding port pin configured as input (default value).
6	C6	R/W	1	
5	C5	R/W	1	
4	C4	R/W	1	
3	C3	R/W	1	
2	C2	R/W	1	
1	C1	R/W	1	
0	C0	R/W	1	

# Appendix C

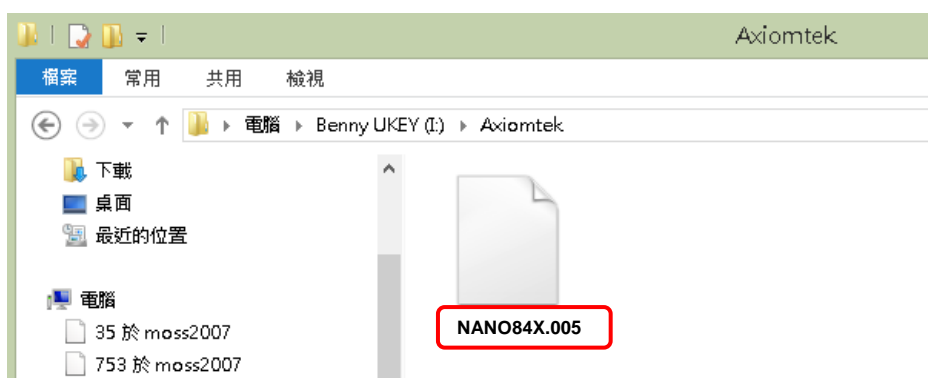
## BIOS Flash Utility

The BIOS Flash utility is a new helpful function in BIOS setup program. With this function you can easily update system BIOS without having to enter operating system. In this appendix you may learn how to do it in just a few steps. Please read and follow the instructions below carefully.

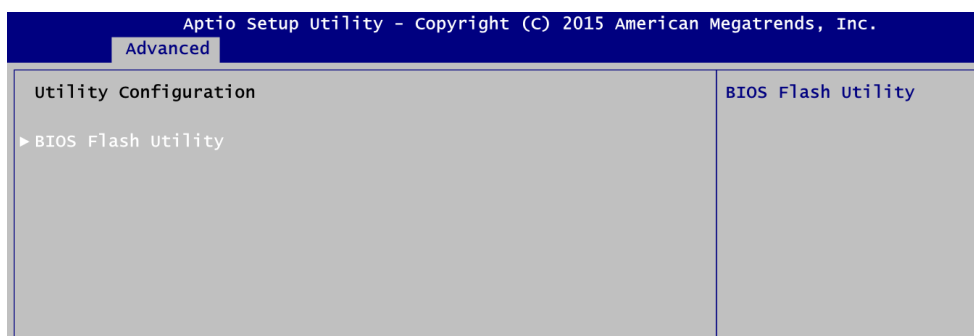
1. In your USB flash drive, create a new folder and name it “Axiomtek”, see figure below.



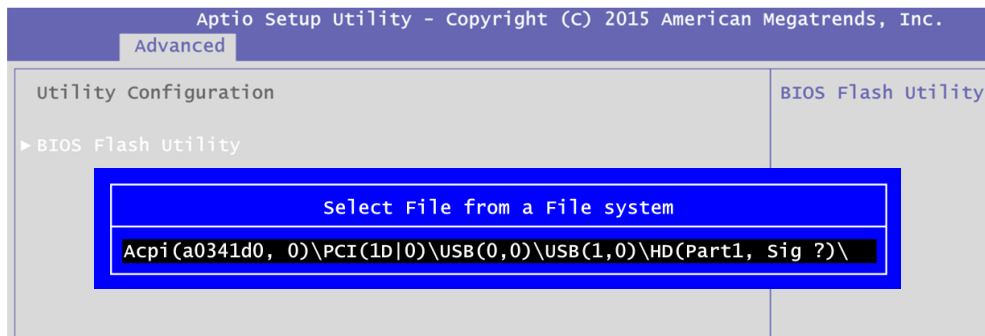
2. Copy BIOS ROM file (e.g. NANO84X.005) to “Axiomtek” folder.



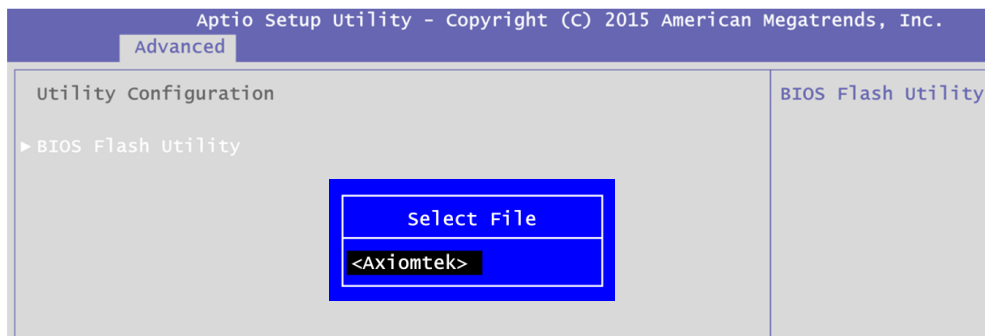
3. Insert the USB flash drive to your system.
4. Enter BIOS setup menu and go to Advanced\Utility Configuration. Select BIOS Flash Utility and press <Enter>.



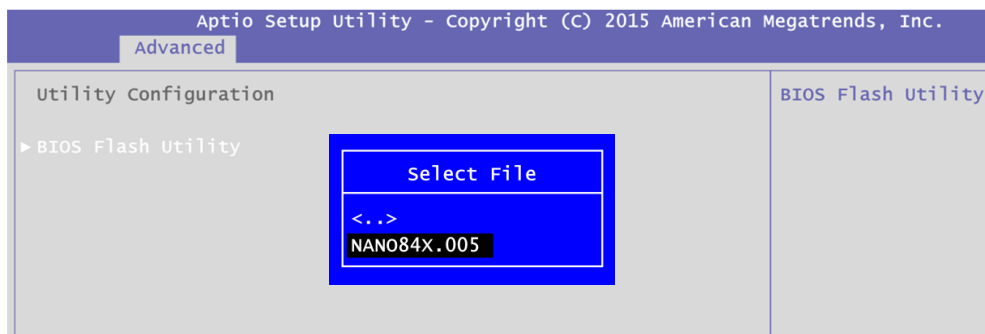
5. BIOS automatically detect all USB drive(s) attached to the system. In this example only one USB drive is attached to the system. That's why, you can see only one device is displayed in figure below.



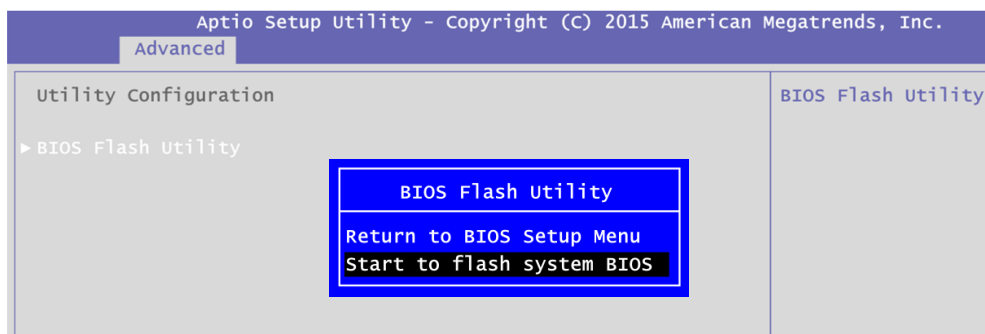
6. Select the USB drive containing BIOS ROM file you want to update using the `<↑>` or `<↓>` key. Then press `<Enter>` to get into "Axiomtek" folder.



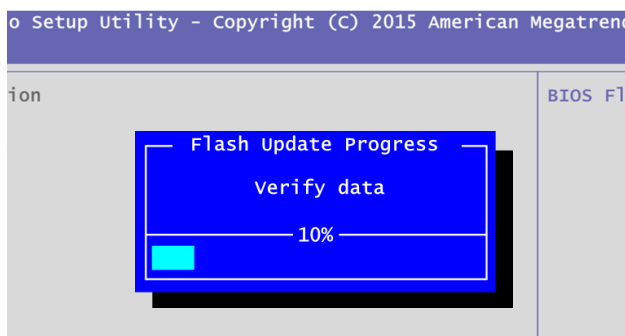
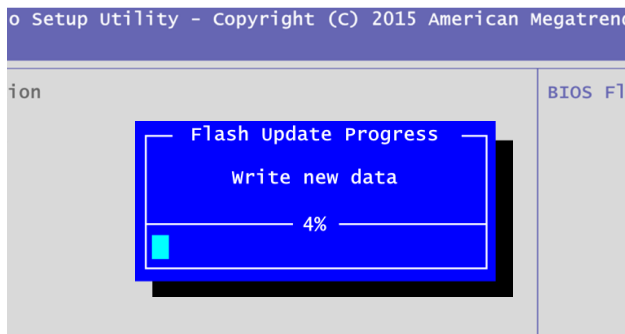
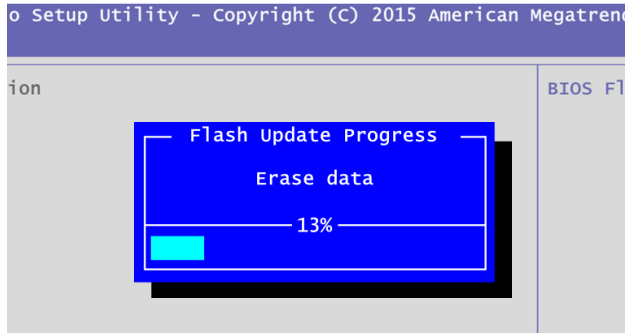
7. Now you can see the BIOS ROM file on the screen, press `<Enter>` to select.



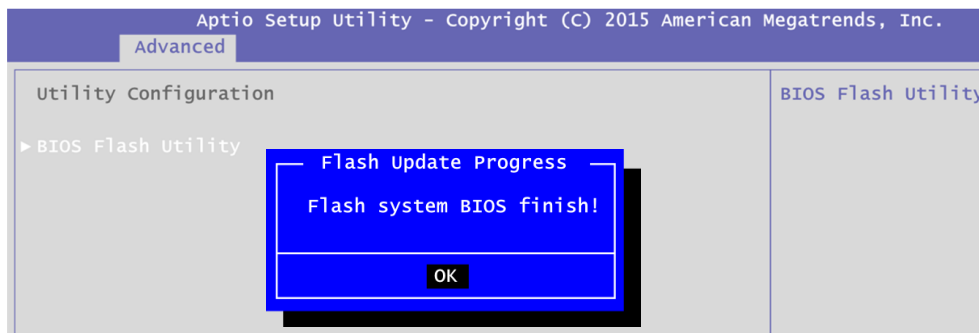
8. Select Start to flash system BIOS option to begin updating procedure.



- Please wait while BIOS completes the entire flash update process: erase data, write new data and verify data.



- When you see the following figure, press <Enter> to finish the update process. After that the system will shut down and restart immediately.



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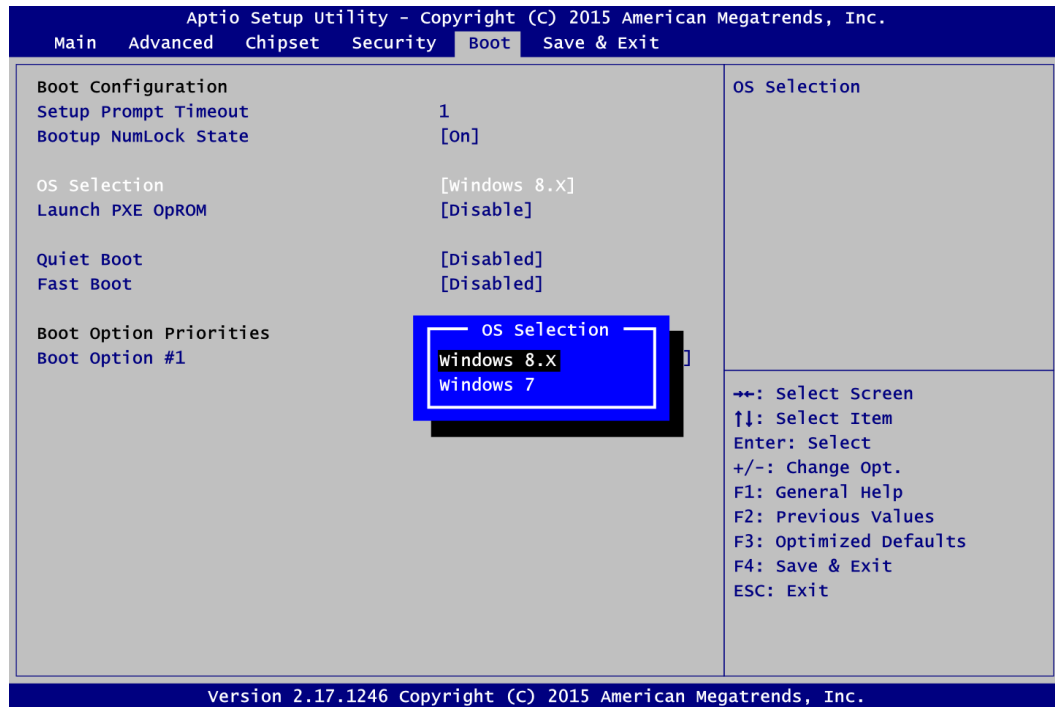


# Appendix D

## Windows<sup>®</sup> 7 Installation Guide

Before you install Windows<sup>®</sup> 7, please follow the instructions below:

1. Enter BIOS setup utility, and ensure that Boot\OS Selection option is set to Windows<sup>®</sup> 7 (see section 4.7).



2. Save changes and exit BIOS utility.
3. Reboot and you may begin to install Windows<sup>®</sup> 7 on your computer. But please note that during installation, only the two USB ports (pin 1~13) at CN12 and USB3 at CN11 can be used.
4. After Windows<sup>®</sup> 7 installation is complete, install XHCI driver (USB3.0 and HSIC) from the product information CD. After installing driver, all of the four USB ports can work properly.