



AXIOMTEK

tBOX330-870-FL Series

Embedded System

User's Manual



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Dec. 2014, Version A1
Printed in Taiwan

Safety Precautions

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

1. User should not modify any unmentioned jumper setting without Axiomtek FAE's instruction. Any modification without instruction might cause system to become damage
2. The tBOX330-870-FL does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
3. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
4. Disconnect the power cord from the tBOX330-870-FL before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the tBOX330-870-FL is properly grounded.
5. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
6. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
7. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -40°C or above 85°C . It may damage the equipment.
8. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
 - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
 - When handling boards and components, wear a wrist-grounding strap, available from most electronic component stores.

Classification

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

General Cleaning Tips

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

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

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

Cleaning Tools:

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

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

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



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

Please follow the steps below:

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

Scrap Computer Recycling

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

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CHAPTER 1 INTRODUCTION

This chapter contains general information and detailed specifications of the tBOX330-870-FL. The Chapter 1 includes the following sections:

- General Description
- System Specification
- Dimensions
- I/O Outlets
- Package List

1.1 General Description

The tBOX330-870-FL is an embedded system that supports 3rd Gen. Intel® Core™ i7-3517UE processor (1.7 up to 2.8 GHz) or i3-3217UE processor (1.6 GHz) onboard, to provide Windows® 7 Embedded, Windows® 7, Windows® WinCE Embedded and Linux, optimized for the most endurable operation. It features fanless design with rich I/O, supports onboard 4GB DDR3 memory, and enhanced system dependability by built-in Watchdog Timer.

● Features

- 3rd Generation Intel® Core™ i (17W) processor onboard
- Intel® QM77 PCH
- High performance DDR3-1600 4GB memory onboard
- IEC60945, DNV 2.4 certificate
- Fanless with operating temperature range of -40°C ~ +70°C
- Isolated RS-232/422/485, CANbus and DIO
- Supports USB 3.0 and SATA3
- 2x removable & lockable 2.5" SATA drive bays and 1x CFast™
- 3x internal mini PCIe slots and 1x SIM socket
- Lockable I/O ports, LAN and USB connectors
- Comply to fire protection of vehicles Europe standard PrCEN TS 45545-2

● Reliable and Stable Design

- The tBOX330-870-FL adopts the advanced cooling system and supporting CFast™, which makes it especially suitable for vibration environments, the best for industrial automation, digital signage and gaming application.

● Embedded O/S Supported

- The tBOX330-870-FL is not only supported Windows® 7, but also embedded O/S, such as Windows® 7 Embedded, WinCE and Linux. For storage device, the tBOX330-870-FL is supported 2x 2.5" SATA drive bays, and 1x CFast™ slot.

1.2 System Specifications

1.2.1 CPU

- **CPU**
 - Onboard Intel® Core™ i7-3517UE processor (4M Cache, 1.7 up to 2.8 GHz)
 - Onboard Intel® Core™ i3-3217UE processor (3M Cache, 1.6 GHz)
- **BIOS**
 - American Megatrends Inc. BIOS.
 - “Load Optimized Default” to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
 - Onboard 4GB DDR3-1600 Memory
- **Graphics**
 - Integrated Intel® HD Graphics 4000 for DVI, VGA

1.2.2 System I/O

- 3x 9-pin D-sub male connectors, COM1~3 for isolated RS-232/422/485
- 1x 9-pin D-sub male connector, isolated CANbus
- 1x 15-pin D-sub female connector for VGA
- 1x DVI-D female connector
- 2x screw audio connectors (Mic-IN/Line-OUT)
- 4x isolated RJ-45 connectors for 10/100/1000Base-T
- 2x USB 2.0 connectors(rear side) and 2x USB 3.0 connectors(front side)
- 1x isolated 4-in/4-out DIO connector
- 1x 24VDC power input connector

1.2.3 System Specification

- **Watchdog Timer**
 - Reset supported; 255 levels, 1~255 sec.
- **Power Supply**
 - 24VDC-in power supply
 - Power Rate:1.8A@24Vdc
- **Operation Temperature**
 - -40°C ~ 70°C (- 40°F ~ 158°F)
- **Storage Temperature**
 - -40°C ~ 85°C (- 40°F ~ 176°F)
- **Humidity**
 - 5% ~ 95% (non-condensation)
- **Vibration Endurance**
 - 5Grms w/ SSD,CFast (5 ~ 500Hz, X, Y, Z directions)

- **Weight**
 - 5.5kg (12.12lb) without package
 - 6.5kg (14.33lb) with package
- **Dimensions**
 - 288.5mm(W) x 211.3mm(D) x 85.75mm(H)



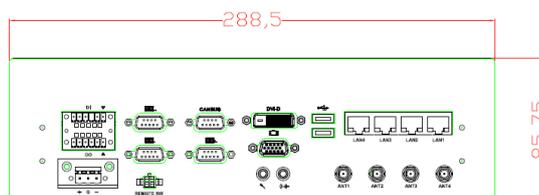
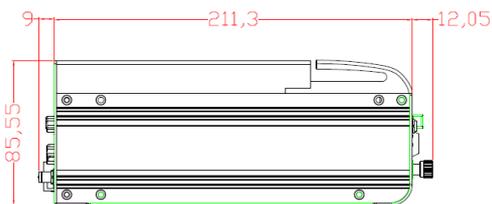
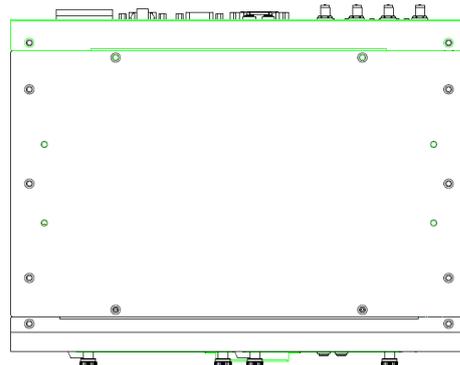
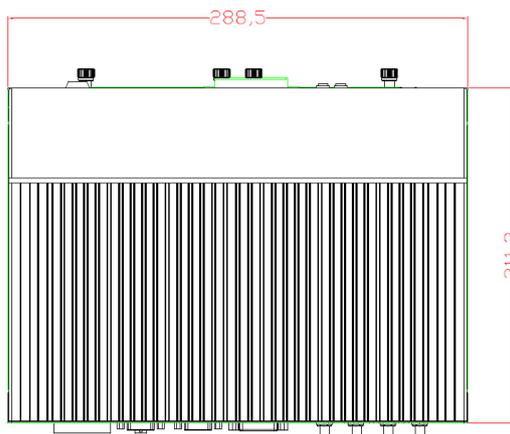
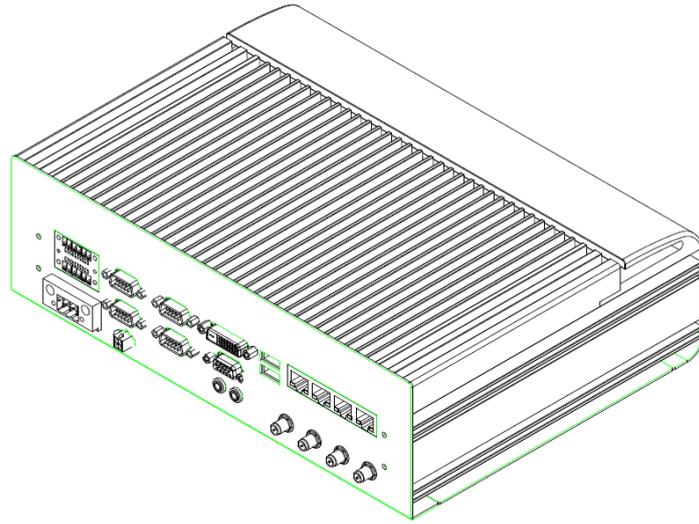
NOTE: All specifications and images are subject to change without notice.

1.2.4 Driver CD Content

- **Chipset Driver**
- **Graphic Drivers**
- **Audio Drivers**
- **Ethernet Driver**
- **User Manual**
- **Quick Manual**
- **CANBUS Command User Manual**
- **CANBUS Programmer's Guide**
- **CANBUS Library**
- **AXCAN CANBUS diagnostic tool**

1.3 Dimensions

The following diagrams show you dimensions and outlines of the tBOX330-870-FL.



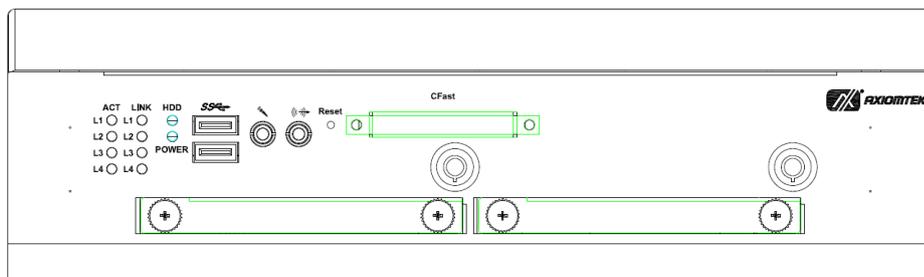
1.4 I/O Outlets

The following figures show you I/O outlets on front view of the tBOX330-870-FL.

- **Front View**



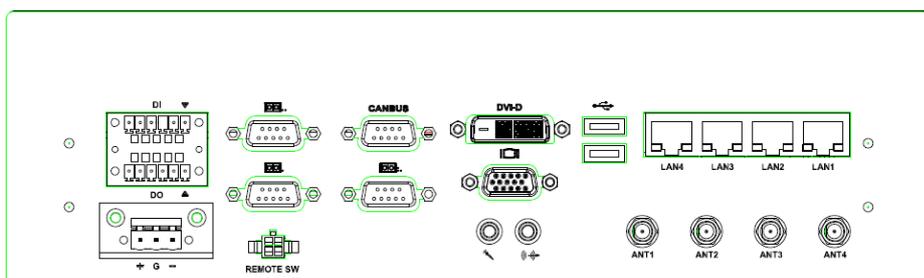
- **Front View Drawing**



- **Rear View**



- **Rear View Drawing**



1.5 Packing List

The package bundled with your tBOX330-870-FL should contain the following items:

- **tBOX330-870-FL System Unit x 1**
- **tBOX330-870-FL Quick Manual x 1**
- **CD x 1 (For Driver and User's Manual)**
- **Screws pack**
- **Foot pad x4**
- **Wall-mount Brackets**
- **DIO female connector**
- **HDD/SSD (optional)**
- **CFast (optional)**
- **Express Mini Card Module (optional)**

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

CHAPTER 2 HARDWARE INSTALLATION

The tBOX330-870-FL is convenient for your various hardware configurations, such as HDD (Hard Disk Drive), CFast™ card and mini PCIe card. The chapter 2 will show you how to install the hardware.

2.1 Installing the swappable HDD/SSD or CFast™ Card

Step 1 Turn off the system, and unplug the power cord. Locate thumb screw at the front side, unlock and loosen screws.



Step 2 Assemble the HDD/SSD bracket together with the SATA HDD/SSD



Step 3 Slide CFast card or HDD/SSD into slot cautiously



Step 4 Fasten screws of HDD/CFast bracket



2.2 Installing the Express Mini Card

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

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



one slot contains an internal SIM card slot which can support 2G/3G/4G modules.

Step 3 Slide SIM or Mini card into slot cautiously.



Step 4 Fasten the screws.



Step 5 Close the cover on the chassis, and fasten all screws.

CHAPTER 3 CONNECTOR

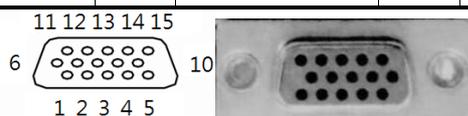
3.1 Connectors

Connectors are connected the CPU board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected before your turn on the system.

3.1.1 VGA & DVI Connector

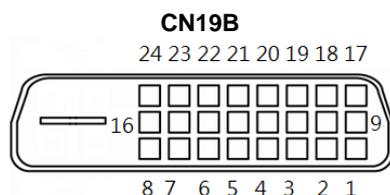
DB15 connector commonly is used for the CRT Monitor.

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



DVI-D connector is for the digital visual interface display.

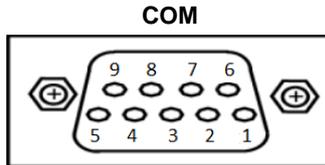
Pin	Signal	Pin	Signal
1	TX2-	2	TX2+
3	Ground	4	No use
5	No use	6	DVI_SPD_CLK
7	DVI_SPD DATA	8	No use
9	TX1-	10	TX1+
11	Ground	12	No use
13	No use	14	VGAVCC
15	Ground	16	FPDETECT
17	TX0-	18	TX0+
19	Ground	20	NO use
21	No use	22	Ground
23	TXC+	24	TXC-



3.1.2 Serial Port Connector

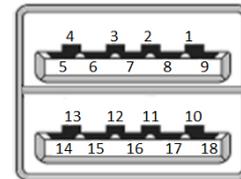
The COM1~COM3 port connector is a standard DB-9 connector. The pin assignment of RS-232/RS-422/RS-485 is listed on the following table. If you need COM port to support RS-422 or RS-485, please set it up in BIOS settings.

Pin	RS-232	RS-422	RS-485
1	DCD, Data carrier detect	TX-	Data-
2	RXD, Receive data	TX+	Data+
3	TXD, Transmit data	RX+	NC
4	DTR, Data terminal ready	RX-	NC
5	GND, ground	GND, ground	GND, ground
6	DSR, Data set ready	NC	NC
7	RTS, Request to send	NC	NC
8	CTS, Clear to send	NC	NC
9	RI, Ring indicator	NC	NC



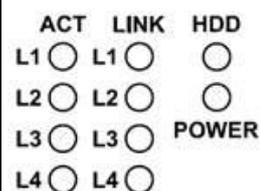
3.1.3 USB3.0 Stack Ports

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



3.1.4 LED Indicators

Status\LED	ACT(L1~L4)	LINK(L1~L4)	HDD	POWER
LAN Linked	Bright			
100Mbps		Green LED		
1000Mbps		Yellow LED		
HDD Active			Flash	
Power on				Bright



3.1.5 DC Power Input connector

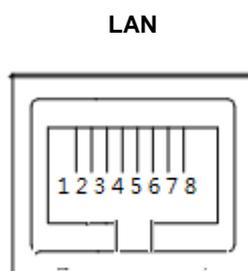
There are three pins of the DC-in connector as below table

Pin	Description	Defination
1	+	For DC power in V+.
2	G	For ACC (Ignition)
3	-	For DC power in V-.

3.1.6 LAN Connector (LAN1~ LAN4)

The RJ-45 LAN connectors which support 10/100/1000Mbps

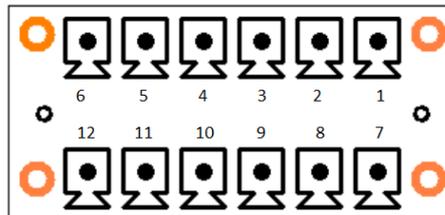
Pin	Description
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI2+
5	MDI2-
6	MDI1-
7	MDI3+
8	MDI3-



3.1.7 Digital I/O Connector

The tBOX330-870-FL is supported an isolated 4-in/4-out Digital I/O (DIO)

Pin	Signal	Pin	Signal
1	EXT POWER	7	COM+
2	IN0	8	OUT0
3	IN1	9	OUT1
4	IN2	10	OUT2
5	IN3	11	OUT3
6	GND	12	COM-

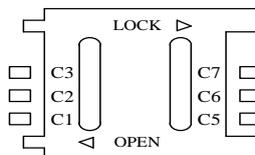


NOTE: Please refer to Appendix B for more information about Digital I/O

3.1.8 SIM Card Connector

The SIM Card slot is an ISO 7816 standard 6-pin connector for PCI Express Mini Card.

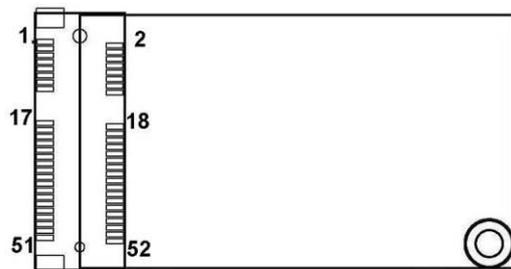
Pin	Signal
C1	SIM_PWR
C2	SIM_RESET
C3	SIM_CLK
C5	GND
C6	SIM_VPP
C7	SIM_DATA



3.1.9 PCI-Express Mini Card Connector

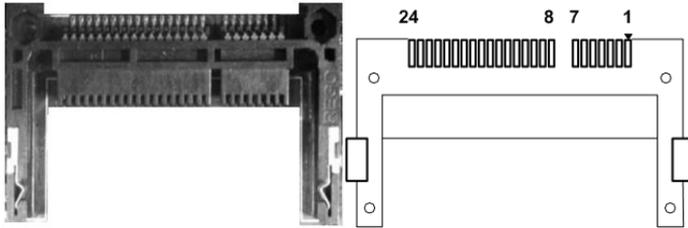
The PCI Express Mini Card connectors are supported 1x PCI Express lane and 2x USB 2.0 lanes. A PCI Express Mini Card can be applied either PCI Express or USB 2.0. It's very helpful that we designed USB 2.0 and PCI Express lane in the same slot once it was been an interface migration. We provide a convenient and low cost solution for you by this friendly design.

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	+3.3VSB
21	GND	22	PERST#
23	PE_RXN4	24	+3.3VSB
25	PE_RXP4	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN4	32	SMB_DATA
33	PE_TXP4	34	GND
35	GND	36	USB_D3-
37	GND	38	USB_D3+
39	+3.3VSB	40	GND
41	+3.3VSB	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	No use	46	LED_WPAN#
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



3.1.10 CFast™ Socket

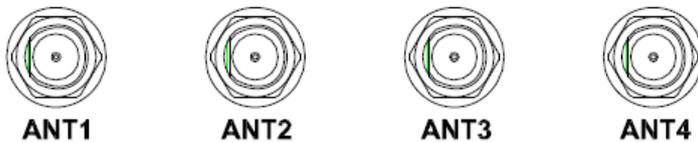
The tBOX330-870-FL is equipped with a CFast™ slot via SATA lane, and supported DMA mode. The socket is especially designed to avoid incorrect installation of the CFast™ card. Please make sure the system power is off while you are installing/uninstalling CFast™ card.



Pin	Description	Pin	Description
1	GND	13	N.C
2	SATA_TX+	14	GND
3	SATA_TX-	15	N.C
4	GND	16	CFAST_LED#
5	SATA_RX-	17	N.C
6	SATA_RX+	18	N.C
7	GND	19	N.C
8	N.C	20	+3.3V Level
9	GND	21	+3.3V Level
10	N.C	22	GND
11	N.C	23	GND
12	N.C	24	N.C

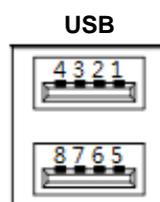
3.1.11 Antenna opening

Profile opening is reserved for Wi-Fi/3G/4G antennas.



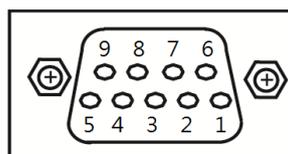
3.1.12 USB2.0 Stack ports

Pin	Signal USB Port 0	Pin	Signal USB Port 6
1	USB VCC (+5V level)	5	USB VCC (+5V level)
2	USB #0_D-	6	USB #6_D-
3	USB #0_D+	7	USB #6_D+
4	Ground (GND)	8	Ground (GND)



3.1.13 CANBus Connector

Pin	Signal
1	N.C.
2	CAN_L Low-Level CAN Voltage I/O
3	GND CAN side GND
4	N.C.
5	N.C.
6	GND CAN side GND
7	CAN_H High-Level CAN Voltage I/O
8	N.C.
9	N.C.



3.1.14 HDD tray locker

Lock and secure the swappable HDD/SSD bay.

Stauts	Diagram
Unlocked	
Locked	

3.1.15 Remote switch Connector

Remote switch is ideal for a remote button which can act as an ATX power on/off button.

Pin	Signal	Description
1	NC	
2	Switch Signal	Low Active. Act as PC's ATX switch when external switch installed (Pin 3 Active) **Internal pull up resistor did not connect to any power source
3	Ext. SW Sensor	Low Active. To detect external power switch install or not. ** Internal pull up resistor did not connect to any power source
4	GND	



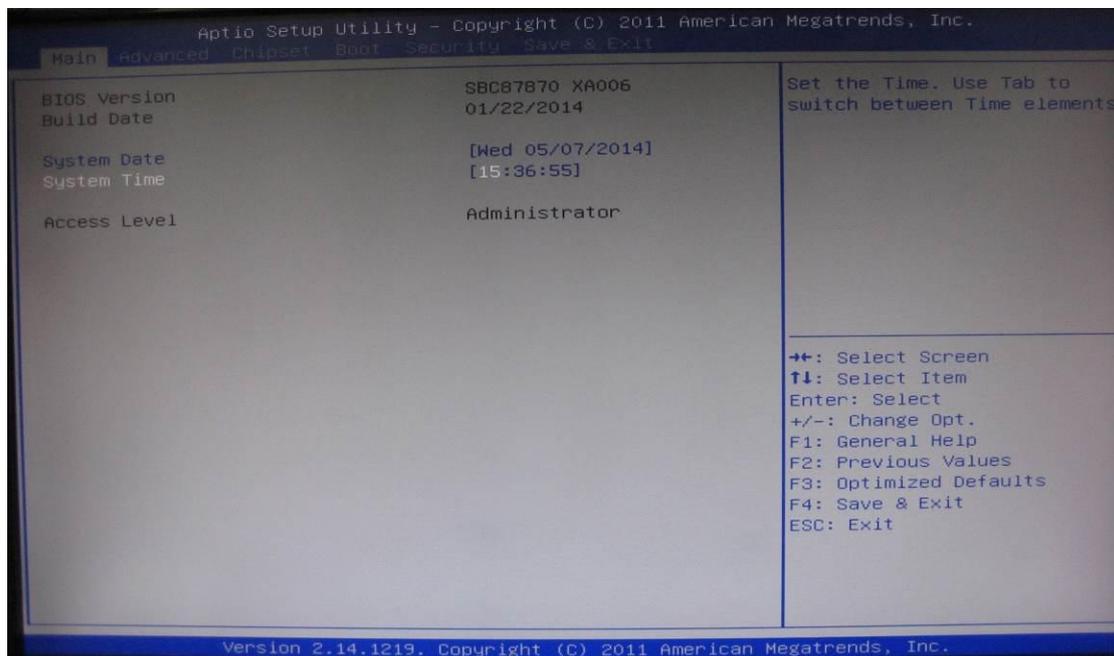
CHAPTER 4 AMI BIOS SETUP UTILITY

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 as below:

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



4.2 Navigation Keys

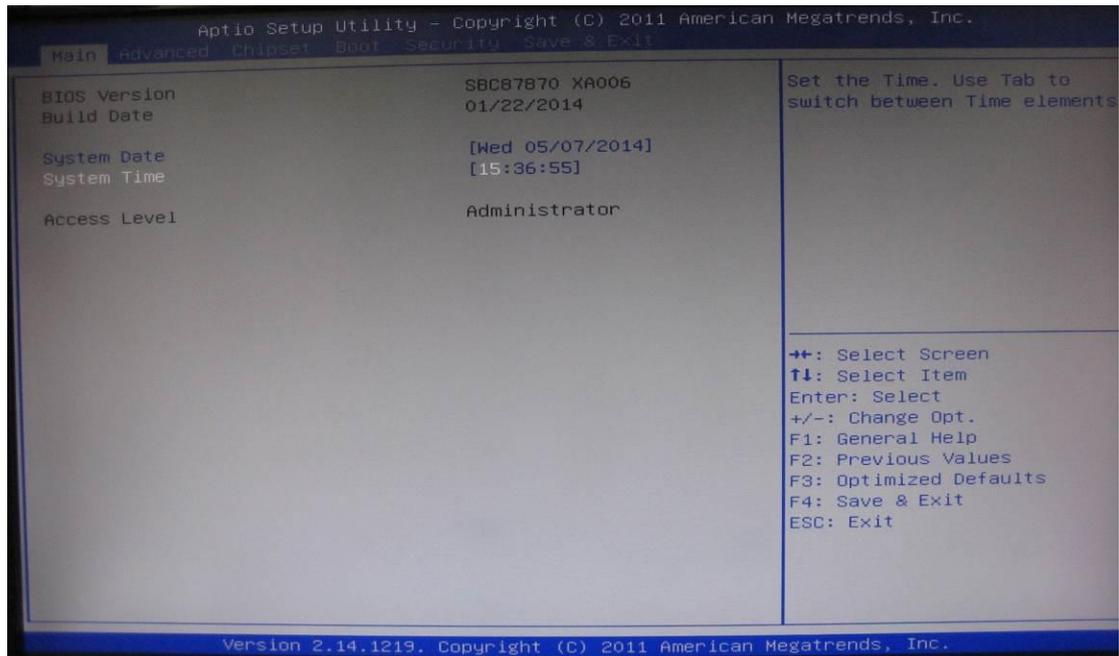
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.



NOTE: Some of 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.
F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> 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



➤ System Time/Date

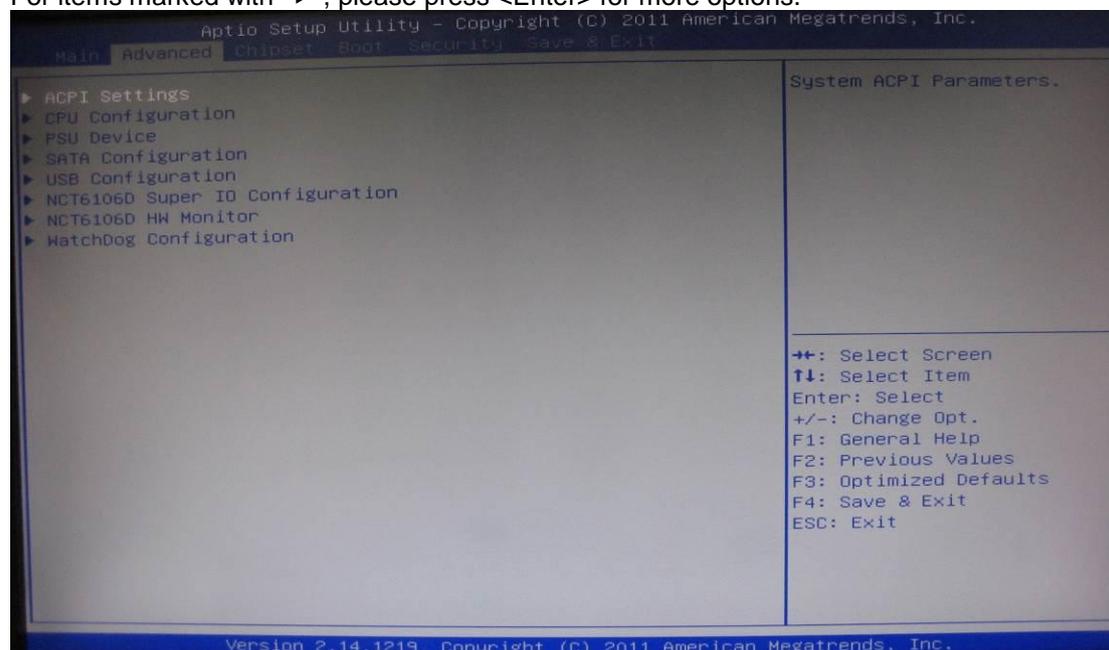
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

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

- ▶ ACPI Settings
- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ USB Configuration
- ▶ NCT6106D Super IO Configuration
- ▶ NCT6106D H/W Monitor
- ▶ WatchDog Configuration

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

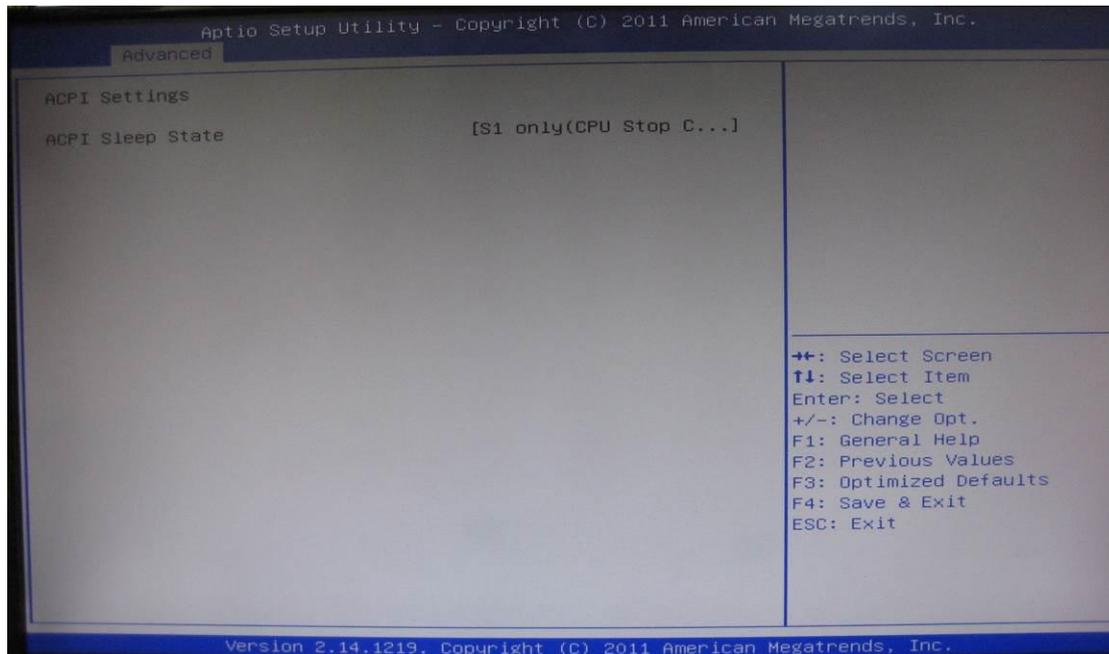


ACPI Settings

Select options for the ACPI Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

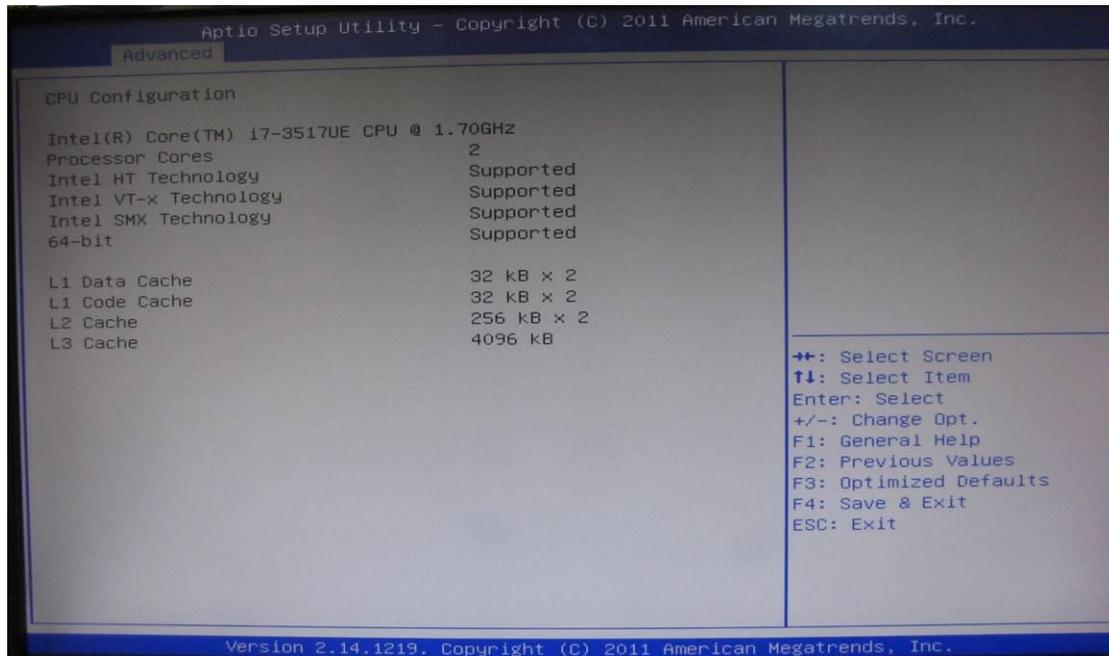
➤ ACPI Sleep State

Allow you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend. Here are the options for your selection, S1 (CPU Stop Clock) and S3 (Suspend to RAM).



➤ **CPU Configuration**

This screen shows the CPU Configuration.



➤ **SATA Configuration**

Set SATA configuration.

➤ **SATA Controller(S)**

Enable or disable the integrated SATA controllers. (Default: Enabled)

➤ **SATA Mode**

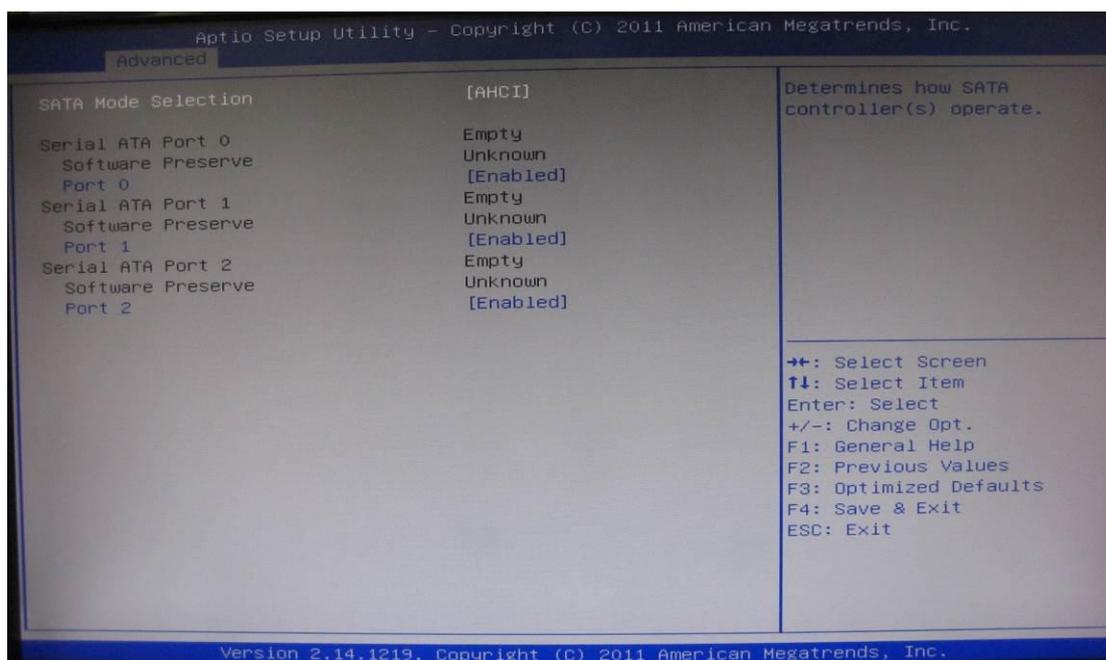
Choose the SATA operation mode. Here are the options for your selection, IDE Mode, AHCI Mode.

➤ **SATA Controller Speed**

Change the SATA transfer rate

➤ **Serial-ATA Port 0-2**

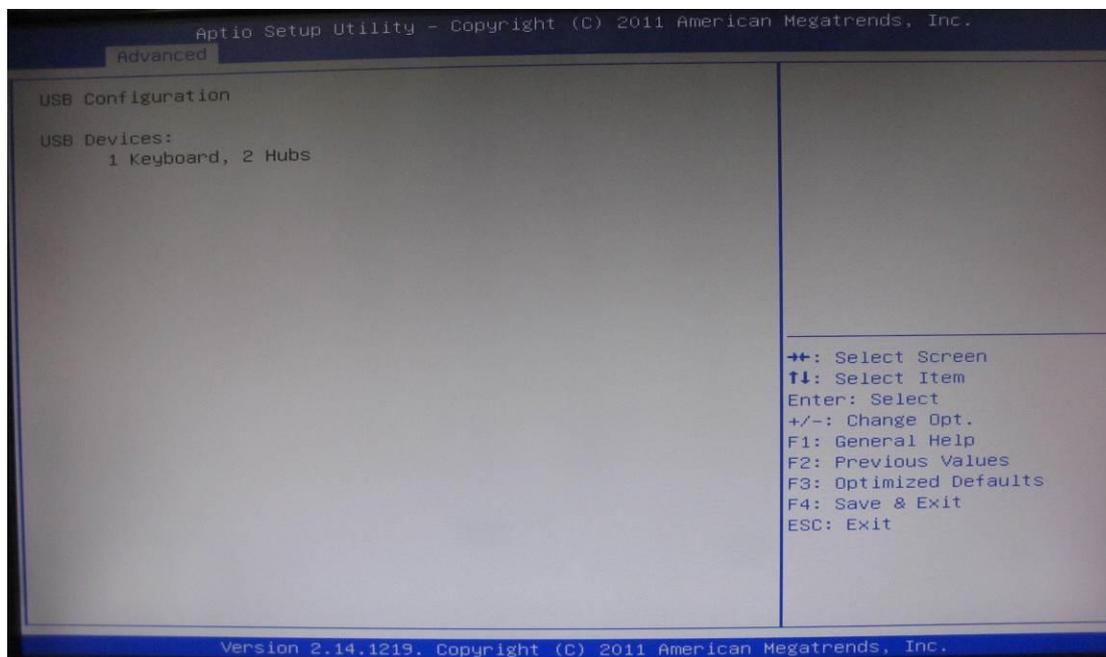
Control the onboard SATA port. Here are the options for your selection, enabled and disabled.



USB Configuration

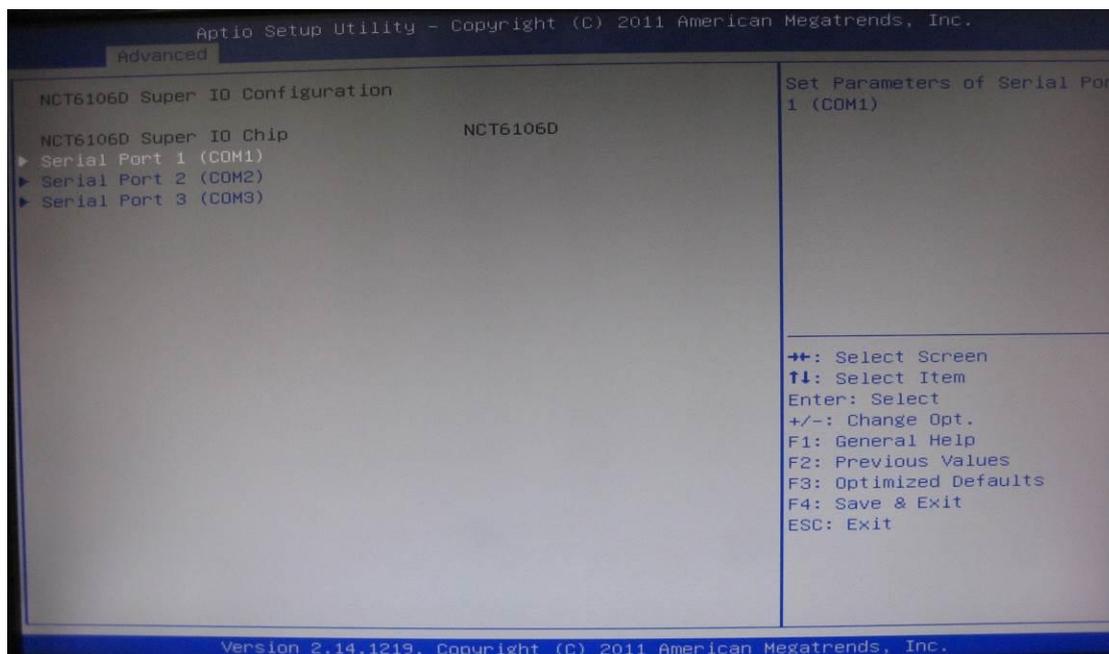
This screen shows the USB Device.

This is for supporting USB device on legacy OS, the system will automatically detect any USB device is connected with the computer and enable USB legacy mode.



NCT6106D Super IO Configuration

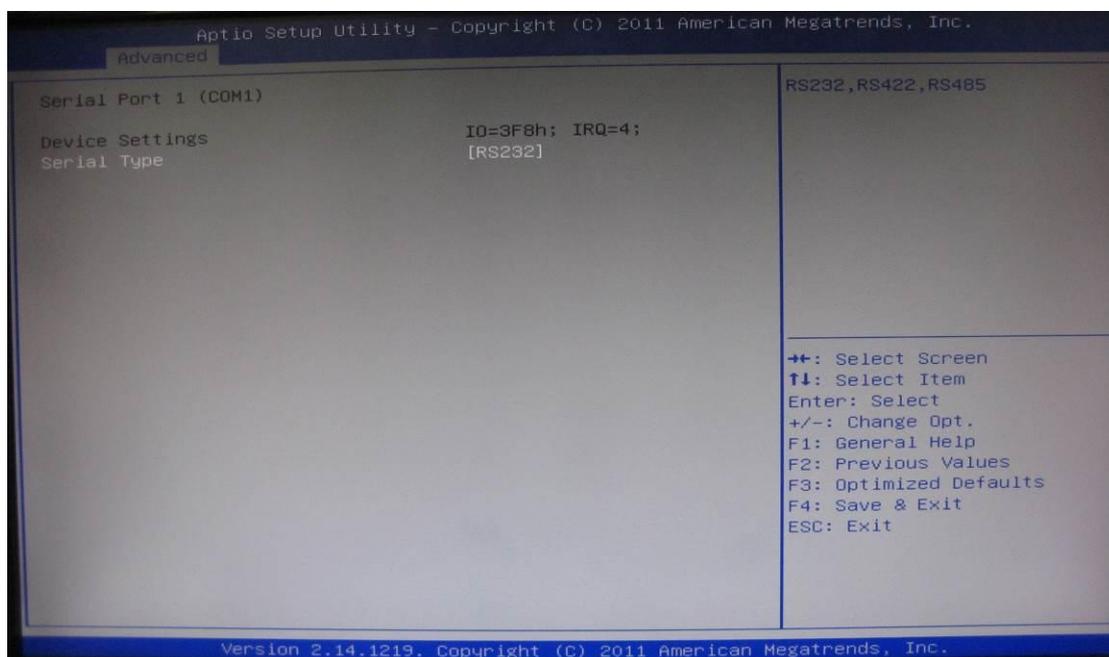
Set up options for the Super IO Configuration, and change the value of the selected option



Serial Port 0-3 configuration

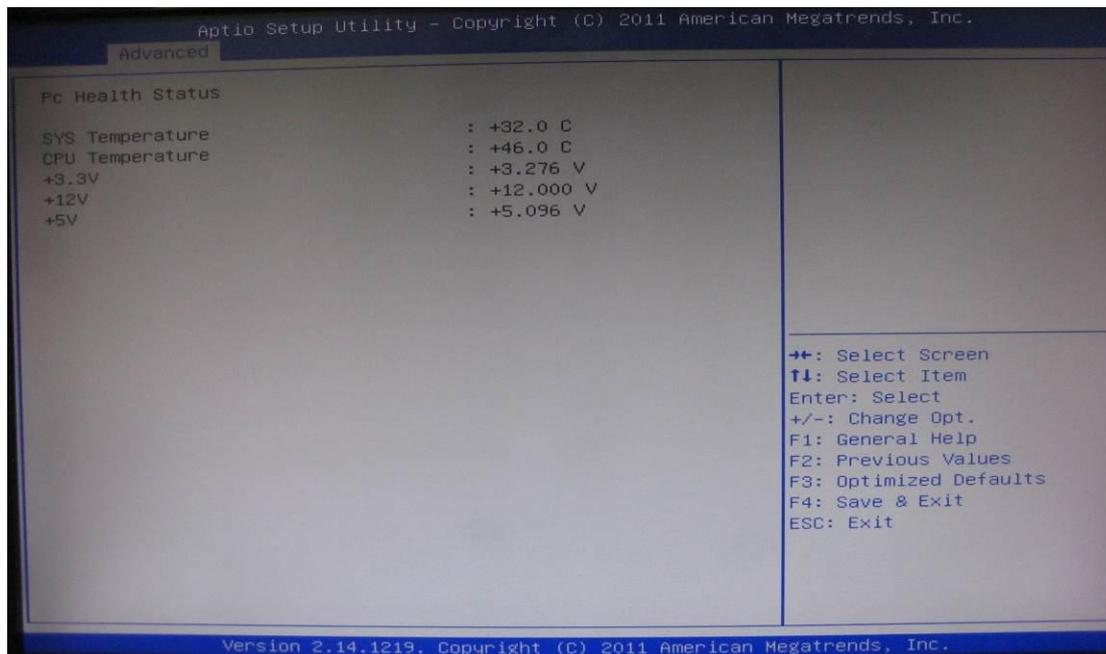
1. Serial port:

This option used to select RS-232/422/485 function.



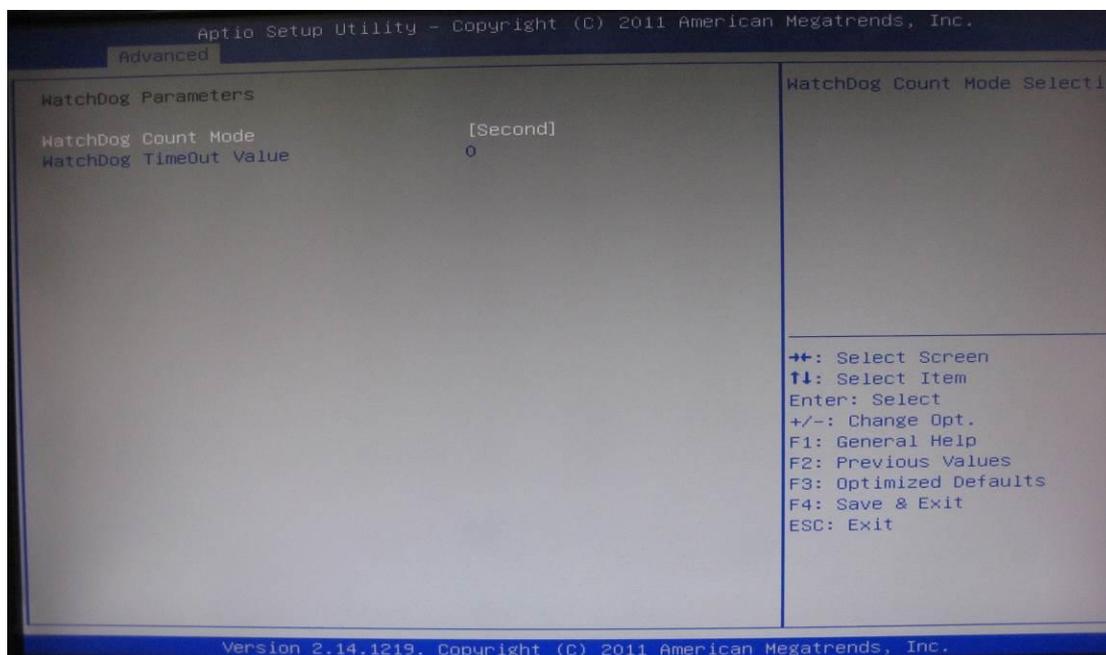
NCT6106D H/W Monitor

This screen shows the Hardware Health Configuration.



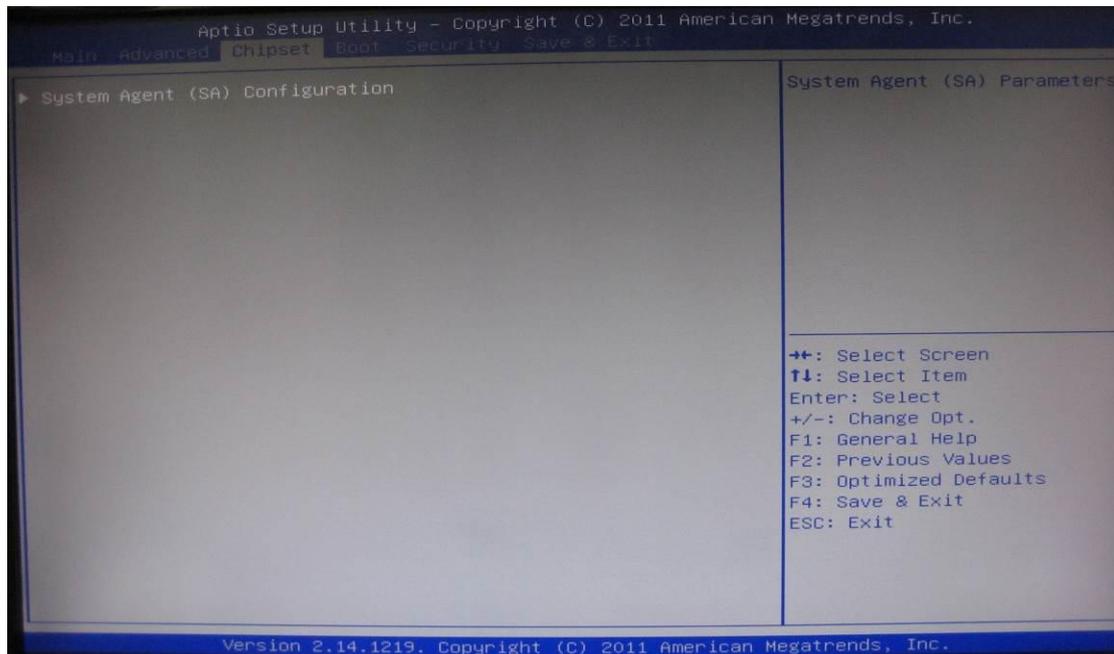
➤ WatchDog Configuration

After the system stopped working for a while, it will be reset automatically by the Watchdog Timer. You may set up Watchdog Timer in system reset mode by this option.



4.5 Chipset Menu

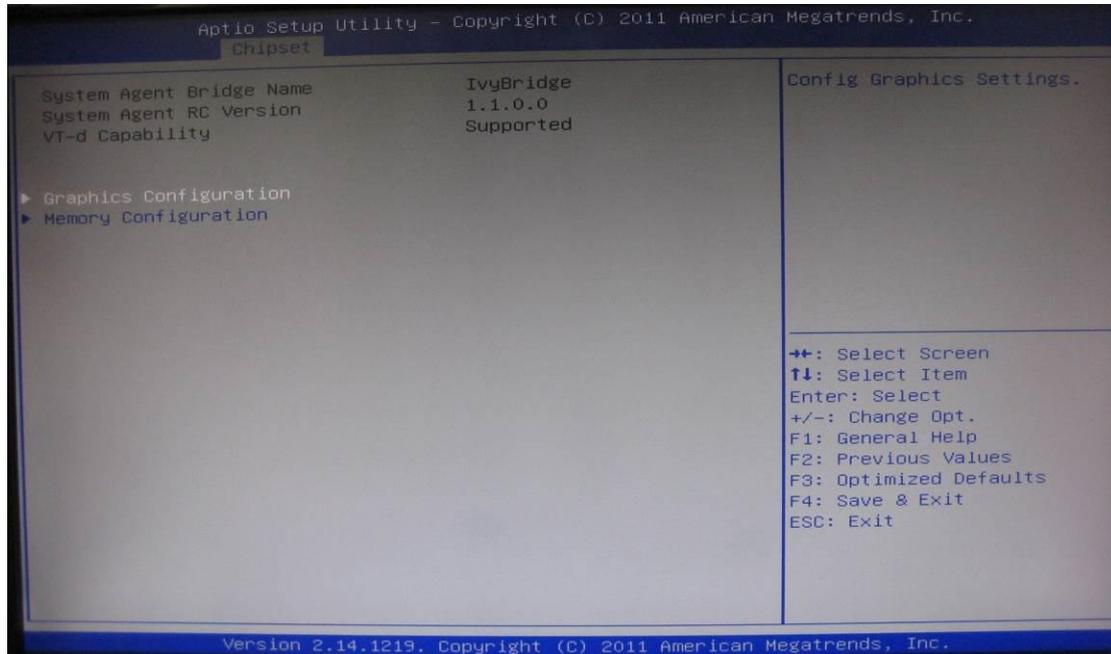
The Chipset menu allows users to change the advanced chipset settings.



➤ **System Agent (SA) Configuration**

1. Graphics Configuration

This option allows users to change the integrated graphic device settings.



Primary IGFX Boot Display

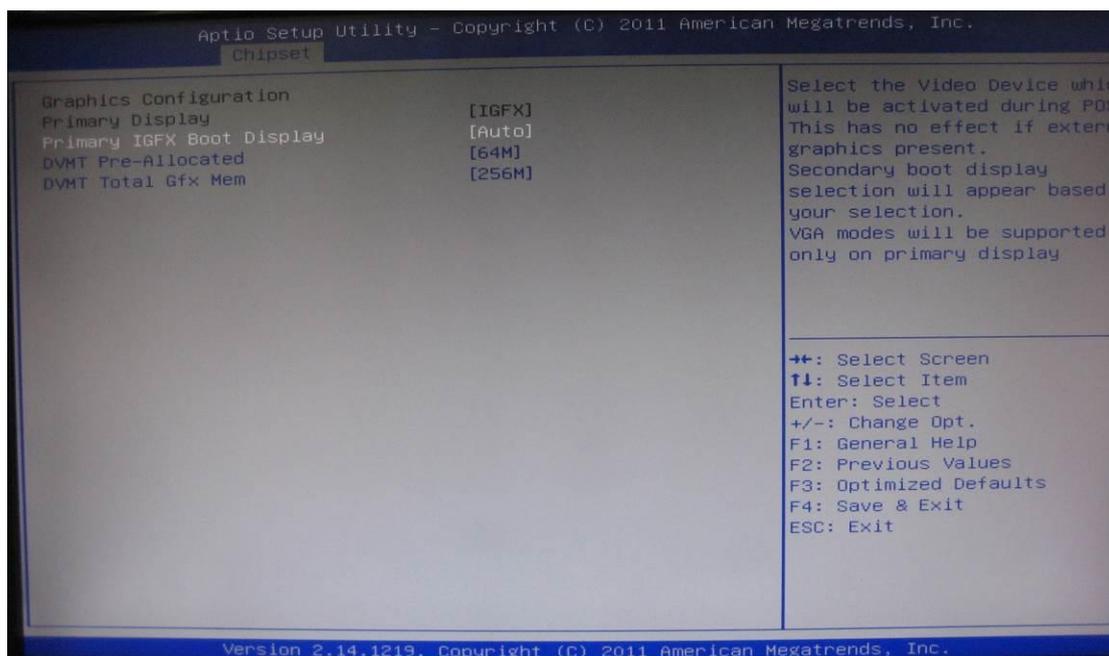
Select the video device which will be activated during POST.

DVMT Pre-Allocated

Pre-allocated memory is the small amount of system memory made available at boot time by the system BIOS for video. Pre-allocated memory is also known as locked memory. This is because it is "locked" for video use only and as such, is invisible and unable to be used by the operating system.

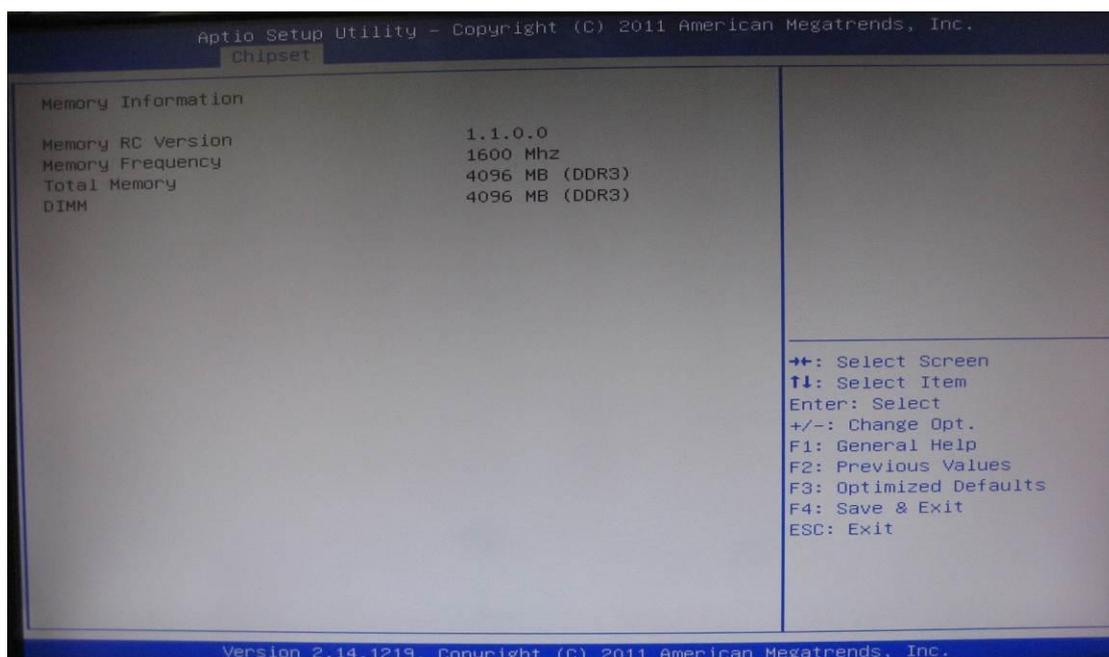
DVMT Total Gfx Mem

Allow you to allocate a fixed amount of system memory as graphics memory. Here are the options for your selection, 128MB, 256MB and Maximum DVMT.



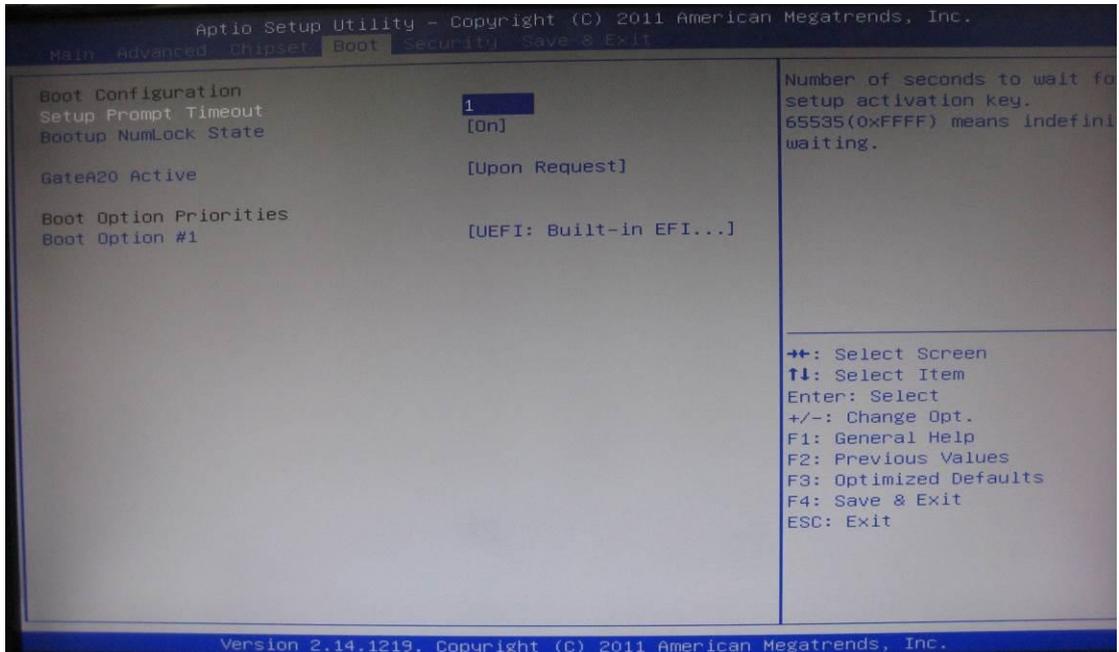
2. Memory Configuration

This screen shows the memory information.



4.6 Boot Menu

The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:



➤ Setup Prompt Timeout

Set the timeout for idle time of booting post while system power on.

➤ Bootup NumLock State

This option provides NumLock activation while system power on, the default setting is on.

➤ Quiet Boot

Enable or disable the Quiet Boot status. The default setting is disabled.

➤ Fast Boot

Enable or disable the Fast Boot status. The default setting is disabled.

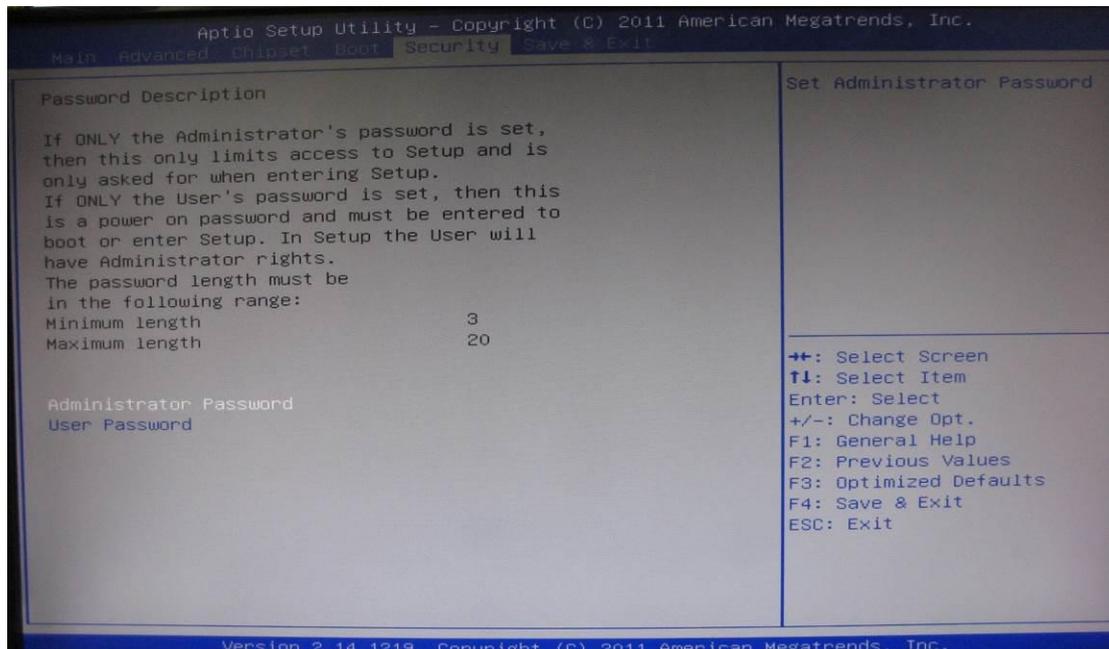
➤ GateA20 Active

➤ Boot Option Priorities

This option provides you to specify the overall boot order from the available devices.

4.7 Security Menu

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



➤ Supervisor Password

This item indicates whether a supervisor password has been set. It will show "Installed" while the password has been set, or show "Not Installed" .

➤ User Password

This item indicates whether a user password has been set. It will show "Installed" while the password has been set, or show "Not Installed".

➤ Change Supervisor Password

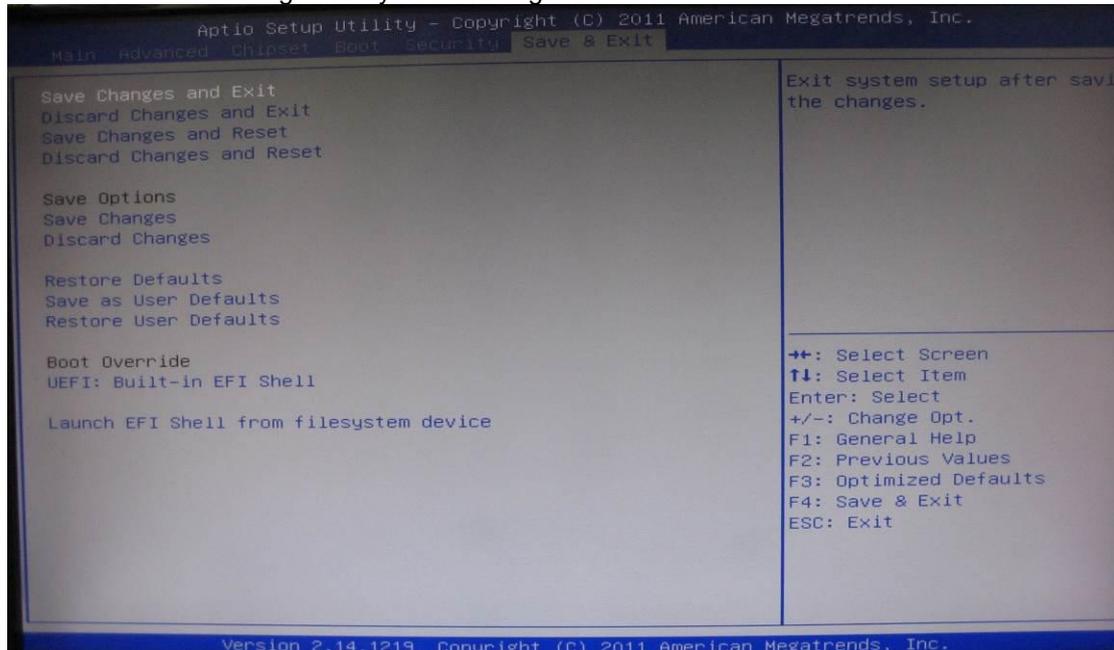
Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the supervisor password.

➤ Change User Password

Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the user password.

4.8 Save & Exit Menu

This option allows users to operate optimized settings, customized settings and restore default settings for system configuration.



➤ Save Changes and Exit

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 Exit* from the Exit menu and press <Enter>. Select Ok to save changes and exit.

➤ Discard Changes and Exit

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

➤ Discard Changes

This option assist you to adndon all the values changes you set.

➤ Load Optimal Defaults

It automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

➤ Load Fail-Safe Defaults

It automatically sets all Setup options to a complete set of default settings when you select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. Select Ok to load Fail-Safe defaults.

APPENDIX A WATCHDOG TIMER

What is Watchdog Timer

The integrated Watchdog Timer can be set up by programming. There are 1~255 levels available. As long as the value of timer is set, after enabling, the countdown of the value is starting. It needs to reset or disable watchdog, otherwise auto-reset will be running when the value is counted to 0.

How to Use the Watchdog Timer

(Following is example to enable configuration by using debug tool)

Enable WDT

1.Enable configuration

-O 2E 87

-O 2E 87

2. Select Logic device:

-O 2E 07

-O 2F 08

3. WDT Device Enable

-O 2E 30

-O 2F 01

5. Set timer unit

-O 2E F0

-O 2F 00 → (00: Sec; 08: Minute)

4. Set base timer:

-O 2E F1

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

Disable WDT

1.Enable configuration

-O 2E 87

-O 2E 87

2. Select Logic device:

-O 2E 07

-O 2F 08

3. WDT Device Disable

-O 2E 30

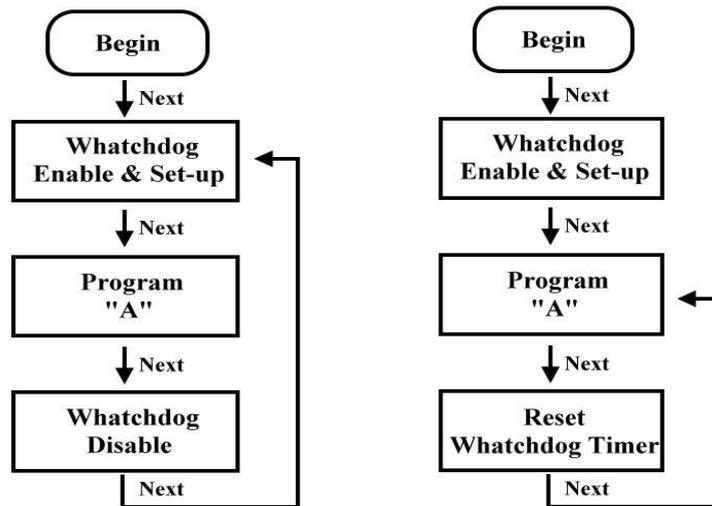
-O 2F 00

Sample of Watchdog application

Assume there is program A which needs to maintain running in a system. The value of Watchdog Timer must be set bigger than the running time of program A. Then, after the running time of program A is finished, either to disable or to reset watchdog timer.

When program A has problems to make system shut down, the system can be rebooted by Watchdog timer when the value of watchdog timer is countdowned to 0.

The below flowchart can be referred to edit program A



APPENDIX B DIGITAL I/O

Digital I/O Specification

Digital Input:

Input channels: 4, sink/source type

Input voltage: 0 to 30VDC at 25Hz

Input level for dry contacts:

Logic level 0: close to ground

Logic level 1: open

Input level for wet contacts:

Logic level 1: +/-3VDC max.

Logic level 0: +/- 10VDC min. to +/-30VDC max. (source to digital input)

Digital output:

output channels: 4, sink type

output current: 200mA max. per channel

on-state voltage: 12~ 24VDC nominal

max. voltage on COM+: 30VDC

Digital I/O Software Programming

- I2C to GPIO PCA9554PW GPIO Group0[3:0] is Output, Group0[7:4] is Input.
- I2C address: 0b0100100x.
- Registers:

Register 0: Input Group0 register.

Table 4. 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 2: Output Group0 register.

Table 5. Register 1 - Output Port register bit description

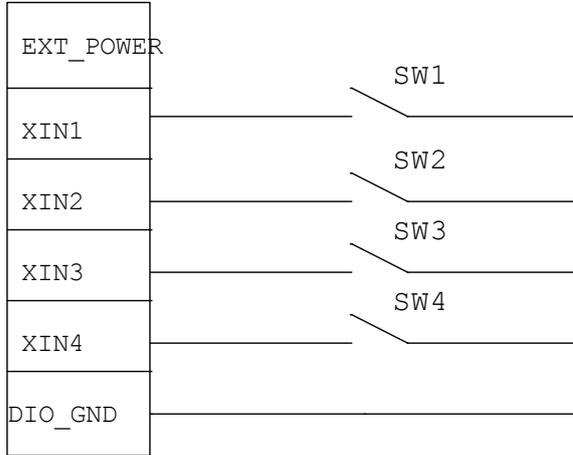
Legend: * default value.

Bit	Symbol	Access	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*	

Digital Input Wiring

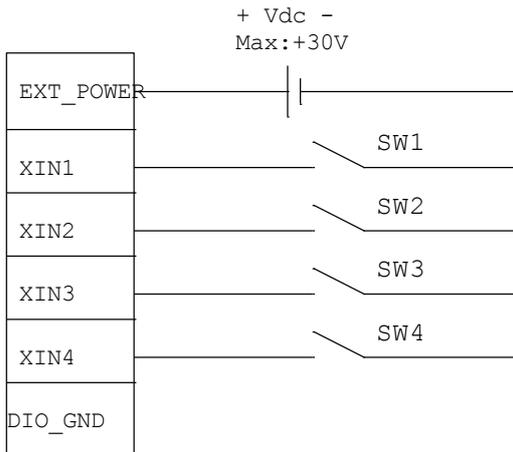
DRY contact

Logic level 0: close to ground
 Logic level 1: open



WET contact

Logic level 1: +/-3VDC max.
 Logic level 0: +/- 10VDC min. to +/-30VDC max



Digital Output Wiring

