



AXIOMTEK

eBOX635-881-FL Series

Embedded System

User's Manual



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Safety Precautions

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

1. The eBOX635-881-FL does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the eBOX635-881-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 eBOX635-881-FL is properly grounded.
4. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
5. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -40°C or above 80°C . It may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
 - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
 - When handling boards and components, wear a wrist-grounding strap, available from most electronic component stores.

Classification

1. Degree of 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 eBOX635-881-FL. The Chapter 1 includes the following sections:

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

1.1 General Description

The eBOX635-881-FL is an embedded system that supports LGA1150 Socket 4th generation Intel® Core™ i7/i5/i3/Celeron processor to support Windows 7, Windows 7 Embedded, Windows 8, Windows 8 Embedded Windows 10 or Linux, suitable for the most durable operation.

It features fan less design with full feature I/O, one 204-pin unbuffered SODIMM socket for single channel DDR3-1333/1600 MHz memory, and enhanced system dependability by built-in Watchdog Timer.

➤ Features

1. Intel® Haswell / Haswell-Refresh H81 Platform
2. Support LGA1150 Socket Intel® Core™ i7/i5/i3/Celeron processor
3. Maximum to 8GB DDR3 1333/1600 MHz memory
4. Compact and fan-less design
5. Supports 2 USB 3.0 ports and 4 USB 2.0 ports
6. Supports 6 jump-less RS-232/422/485
7. Supports 2 10/100/1000Mbps Ethernet ports
8. Supports ATX power switch with status indicator (AT/ATX mode selection)
9. 16 DI/DO (8 IN & 8 OUT)
10. Two HDMI
11. One DisplayPort
12. One VGA
13. One 2.5" SATA HDD drive bay
(Supports 9.5mm height HDD/SSD, power provides +5V to the drive only)
14. One front access CFast™
15. Watchdog timer
16. AC to 19V/12V DC adapter
17. Dual Express Mini Card slot with one SIM slot
18. Three Antenna openings

➤ Reliable and Stable Design

The eBOX635-881-FL adopts the advanced cooling system and supporting the CFast™, which makes it especially suitable for vibration environments, best for industrial automation, digital signage and gaming application.

➤ Embedded O.S. Supported

The eBOX635-881-FL not only supports Windows 7, Windows 8, Window 8.1, and Windows 10, but also supports embedded OS, such as Windows 7 Embedded, Windows 8 Embedded and Linux.

➤ Various Storage devices supported

For storage device, the eBOX635-881-FL supports one 2.5" SATA storage drive bay, mSATA and one CFast™ slot.

1.2 System Specifications

1.2.1 CPU

- **CPU**
 - LGA1150 Socket Intel® Core™ i7/i5/i3/Celeron processor
 - Working temperature depends on TDP of processor, please refer to 1.2.3 System Specification
- **Chipset**
 - Intel® Haswell H81 chipset
- **BIOS**
 - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
- **System Memory**
 - One 204-pin unbuffered DDR3 1333/1600MHz SO-DIMM socket, max. up to 8GB

1.2.2 I/O System

- Six jumper-less RS-232/422/485. COM1~COM6 for full function 9-pin D-Sub male connectors
- One VGA connector for display (Supports max resolution up to 1920x1200)
- One DisplayPort for display (Supports max resolution up to 2560x1600)
- Two HDMI for display (Supports HDMI 1.4a, max resolution up to 4K × 2K)
- Two Audio connectors (Mic-IN, Line-OUT)
- Two RJ-45 connectors for 10/100/1000Base-T Ethernet ports
- Two USB 3.0 connectors
- Four USB 2.0 connectors
- Eight Digital Input and Eight Digital Output for digital I/O 9-pin D-Sub female connectors
- One 19/12V DC-IN Power Input connector
- One Indicator for HDD Active
- One Reset switch
- One AT/ATX switch
- One Power switch
- One Remote PWR switch

1.2.3 System Specification

- **Watchdog Timer**
 - 1~255 seconds or minutes; up to 255 levels.
- **Power Supply**
 - 19V/12V DC input connector
- **Operation Temperature**
 - -20°C ~50°C (-4 °F ~ 122°F), with TDP 35W
- **Storage Temperature**
 - -40°C ~ 80°C (-4 °F ~ 176°F)
- **Humidity**
 - 10% ~ 90% (non-condensation)

- **Vibration Endurance**
 - 3Grm w/ CFast™ (5-500Hz, X, Y, Z directions)
- **Weight**
 - 2.5 kg (5.51 lb) without package
 - 4.5 kg (9.92 lb) with package
- **Dimensions**
 - 280mm(11.02") (W) x150mm(5.91") (D) x 76mm(2.99") (H)

1.2.4 Driver CD Content

- **Driver**
 - Audio
 - Chipset
 - Ethernet
 - Graphic
 - Intel Rapid Storage Technology
 - USB 3.0
 - ME 9.0
 - TPM
- **Manual**
 - User Manual
 - Quick Manual

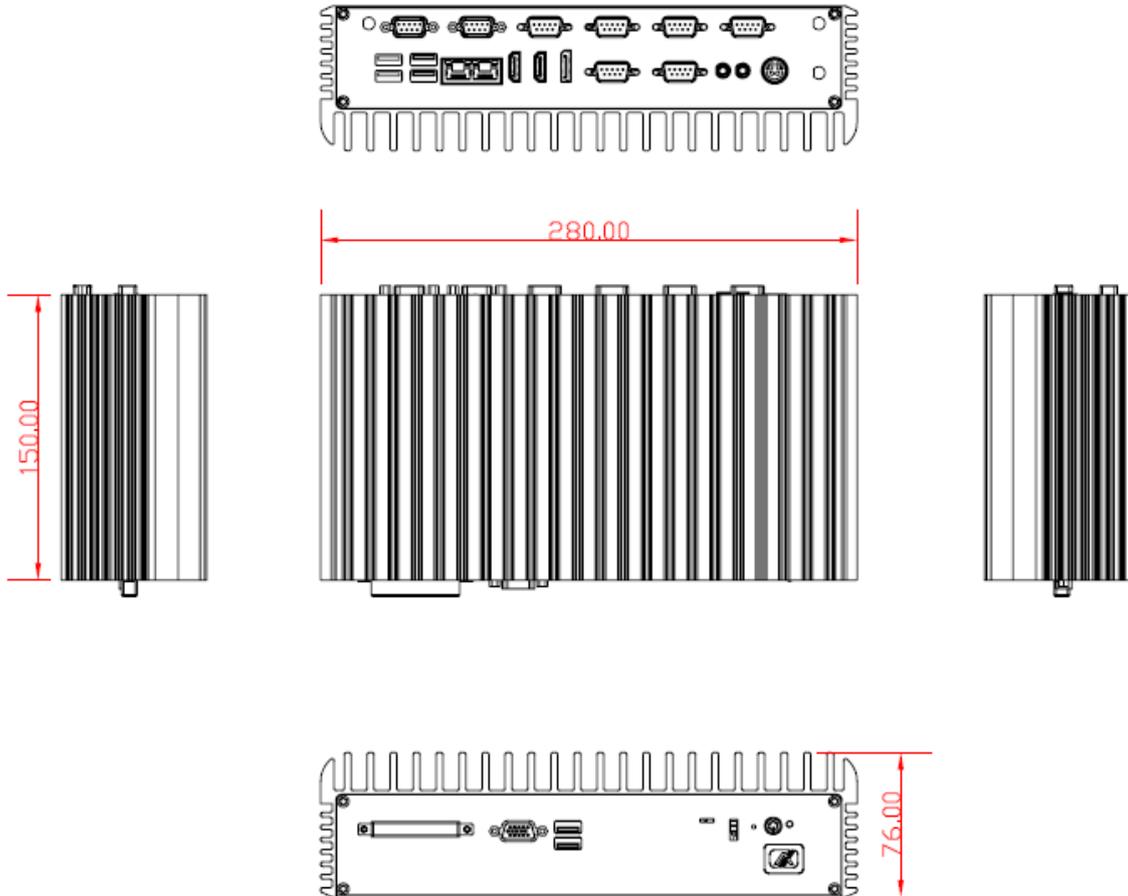


Note: All specifications and images are subject to change without notice.

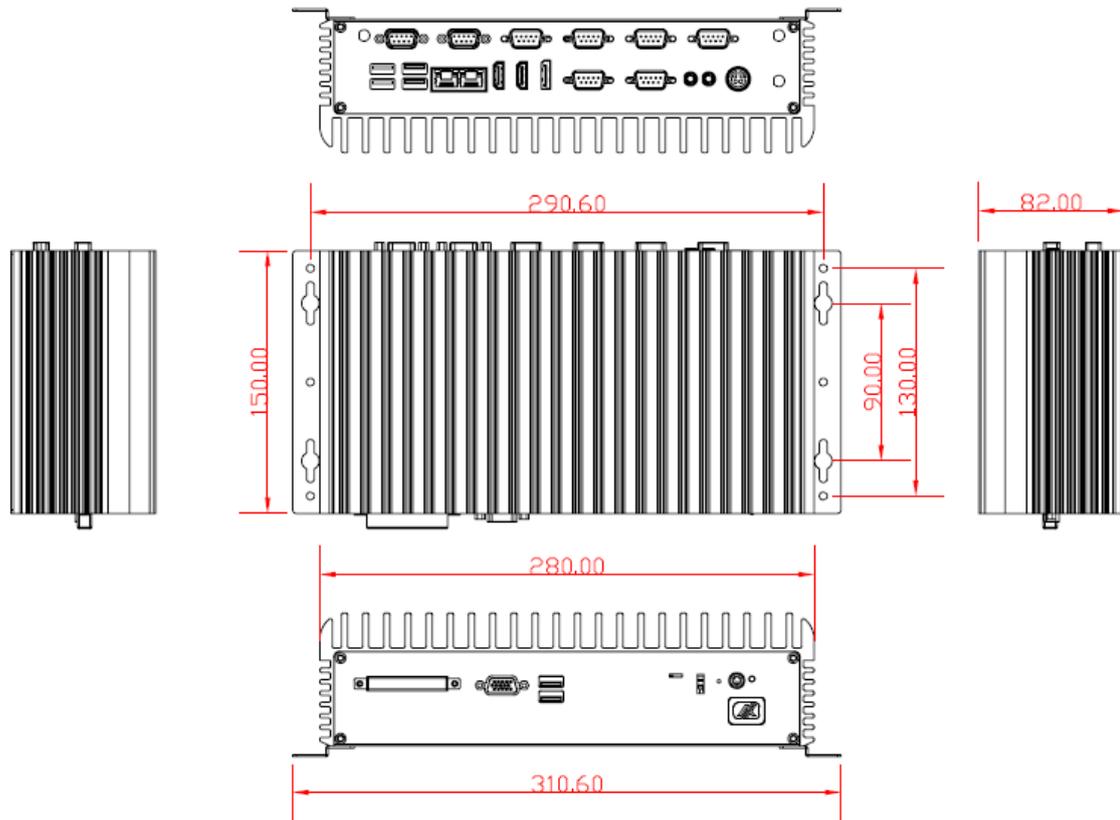
1.3 Dimensions

The following diagrams show you dimensions and outlines of the eBOX635-881-FL.

1.3.1 System Dimension



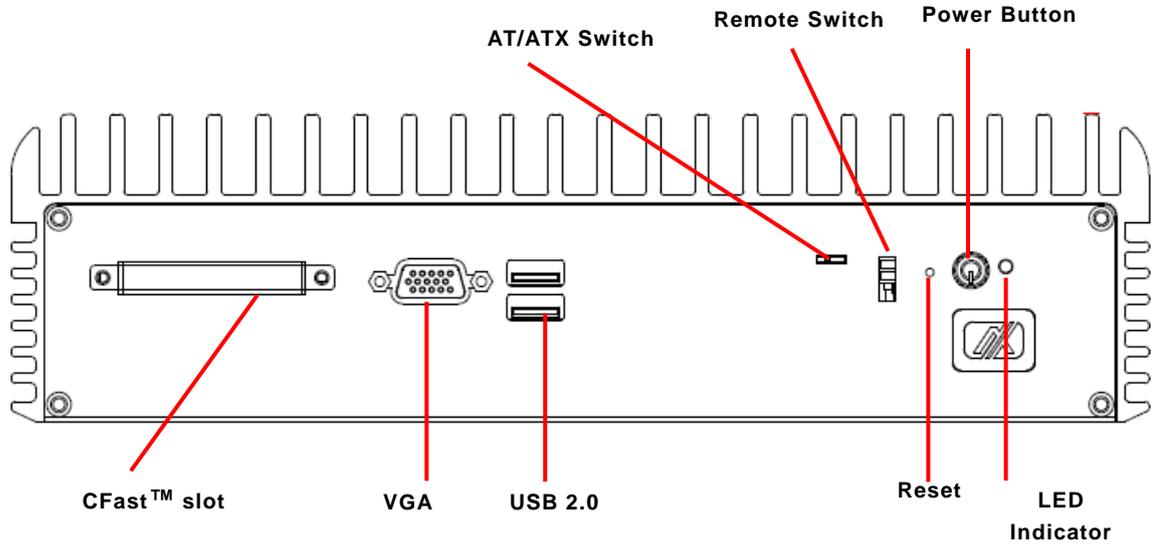
1.3.2 Wall mount Dimension



1.4 I/O Outlets

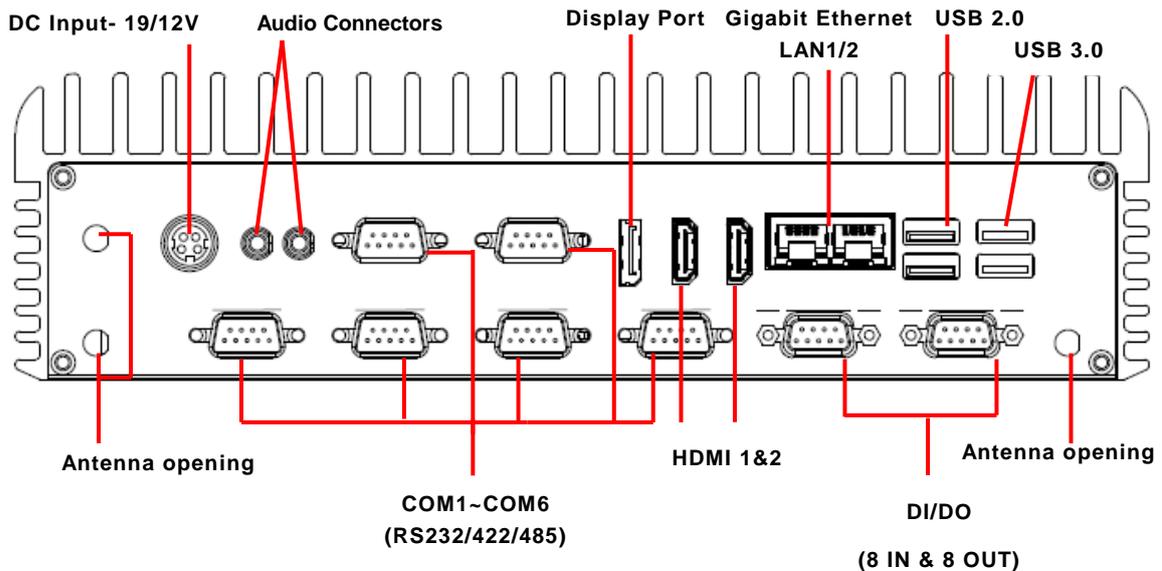
The following figures show you I/O outlets on front view of the eBOX635-881-FL.

- Front View drawing



Note: If you set AT/ATX switch to AT mode, the system will be automatically power on without pressing soft power button during power input. If you set AT/ATX switch to ATX mode, it is necessary to manually press soft power button to power on the system.

- Rear View drawing



1.5 Packing List

The package bundled with your eBOX635-881-FL should contain the following items:

- eBOX635-881-FL System Unit x 1
- eBOX635-881-FL Quick Installation Guide x 1
- AC to 19/12V DC adapter (By selection)
- CD x 1 (For Driver and Manual)
- Screws Pack x1
- DRAM Thermal pad
- Spare parts: CPU, PCH of thermal pad
- Pre-install Intel Processor
- Pre-install Foot pad x4
- Optional DDR3 SODIMM
- Optional Wall-mount Brackets
- Optional Antenna
- Optional Mini Card Module
- Optional 2.5" SATA Storage
- Optional CFast™ Card
- Optional Power Cord



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

1.6 Model List

eBOX635-881-FL-i7-4770TE	Fanless Embedded System with Intel Core i7-4770TE (4 Cores) 2.3G, max. up to 3.3G Processor, HDMIx2/VGA, DisplayPort, GbE LAN*2, USB3.0*2, Audio, RS-232/422/485*6, DI*8/DO*8, 19/12V AC/DC Power Adapter
eBOX635-881-FL-i5-4570TE	Fanless Embedded System with Intel Core i5-4570TE (2 Cores) 2.3G, max. up to 3.3G Processor, HDMIx2/VGA, DisplayPort, GbE LAN*2, USB3.0*2, Audio, RS-232/422/485*6, DI*8/DO*8, 19/12V AC/DC Power Adapter
eBOX635-881-FL-i3-4330TE	Fanless Embedded System with Intel Core i3-4330TE (2 Cores) 2.4G Processor, HDMIx2/VGA, DisplayPort, GbE LAN*2, USB3.0*2, Audio, RS-232/422/485*6, DI*8/DO*8, 19/12V AC/DC Power Adapter
eBOX635-881-FL-G3320TE	Fanless Embedded System with Intel Pentium G3320TE (2 Cores) 2.3G Processor, HDMIx2/VGA, DisplayPort, GbE LAN*2, USB3.0*2, Audio, RS-232/422/485*6, DI*8/DO*8, 19/12V AC/DC Power Adapter

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

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CHAPTER 2 HARDWARE INSTALLATION

The eBOX635-881-FL is convenient for your various hardware configurations, such as HDD (Hard Disk Drive), SSD (Solid State Drive) CFast™ card or PCI Express Mini Card modules. The chapter 2 will show you how to install the hardware.

2.1 Installing the 2.5" SATA Device

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

Step 2 Turn the system upside down to locate screws at the Bottom, loosen screws.



Step 3 Remove the cover and then loosen four screws of 2.5" HDD drive bay.

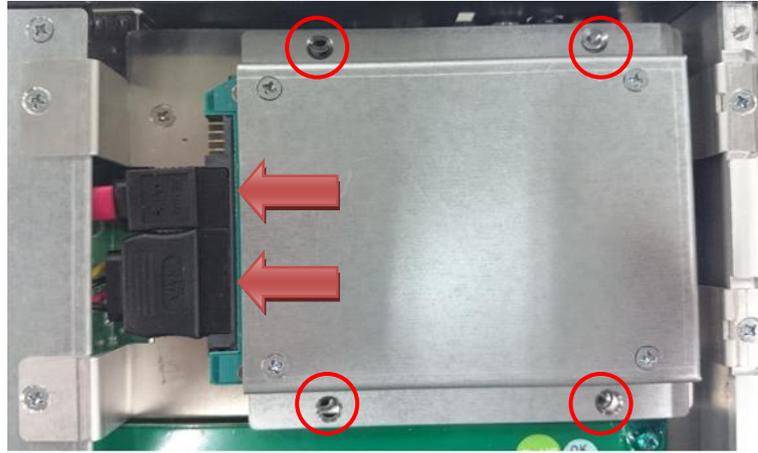


Step 4 Assembly your 2.5" HDD/SSD into drive bay, fasten it with four screws.



Step 5 Please refer to the following photo to connect SATA power and signal cables.

Step 6 Fasten screws of HDD drive bay.



2.2 Installing the Memory Module

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

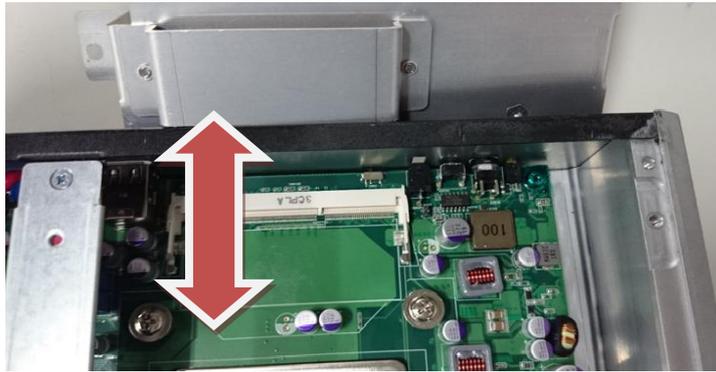
Step 2 Turn the system upside down to locate screws at the Bottom, loosen screws.



Step 3 Remove the bottom cover to locate the bracket screws. Then loosen four screws to take out the bracket directly.



Step 4 You will see the DRAM slot under bracket



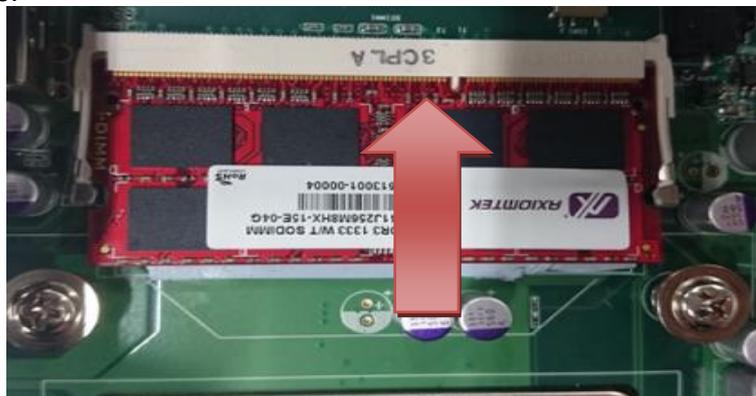
Step 5 Take out the thermal pad from accessory kit



Step 6 Remove transparent plastic Mylar from thermal pad, and stick the thermal pad onto motherboard.



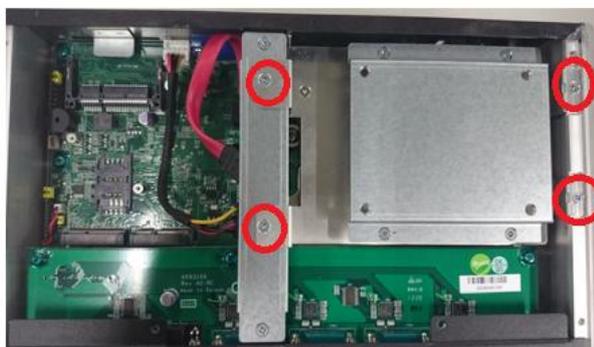
Step 7 Locate the memory module, insert the gold colored contact into the socket, and push the module down, until it is firmly seated by locking two latches on the sides.



Step 8 Take 2nd thermal pad, remove the transparent plastic mylar and stick it onto memory.



Step 9 Assembly the memory bracket and fasten all screws.



Step 10 Assembly the Top Cover back and fasten all screws.



2.3 Installing the CFast™

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

Step 2 Turn the system to the side with CFast™ cover.

Step 3 Loosen screws to remove the CFast™ cover.



Step 4 Slide CFast™ card into CFast™ slot with caution.



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



2.4 Installing the Express Mini Card

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

Step 2 Turn the system upside down to locate screws at the Bottom, loosen screws.

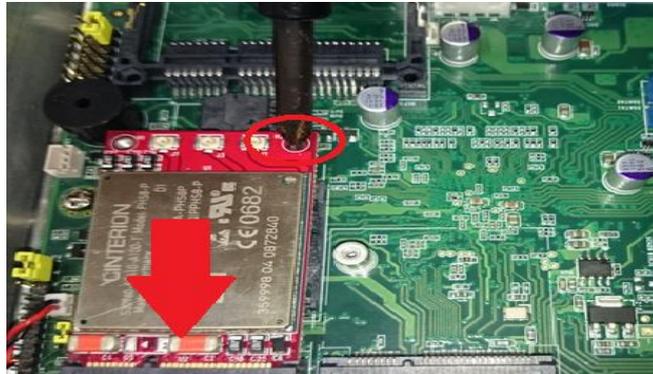


Step 3 Remove the bottom cover to locate the Express Mini Card slot.



Step 4 Slide Mini Card into Mini Card slot with caution, and fasten screw of express Mini Card.

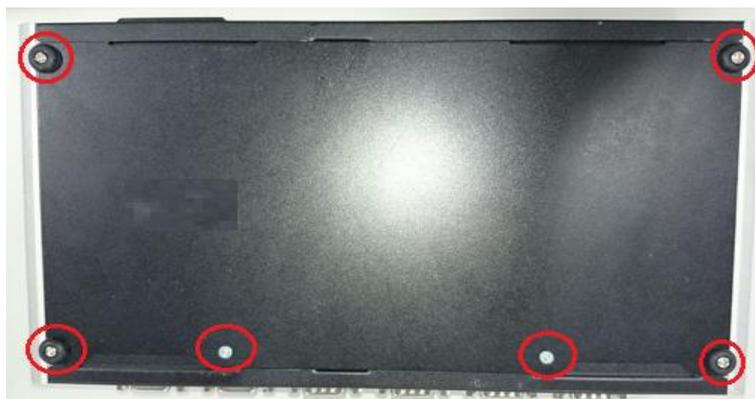
Full Size Mini Card



Half Size Mini Card



Step 5 Assembly the Top Cover back and fasten all screws.

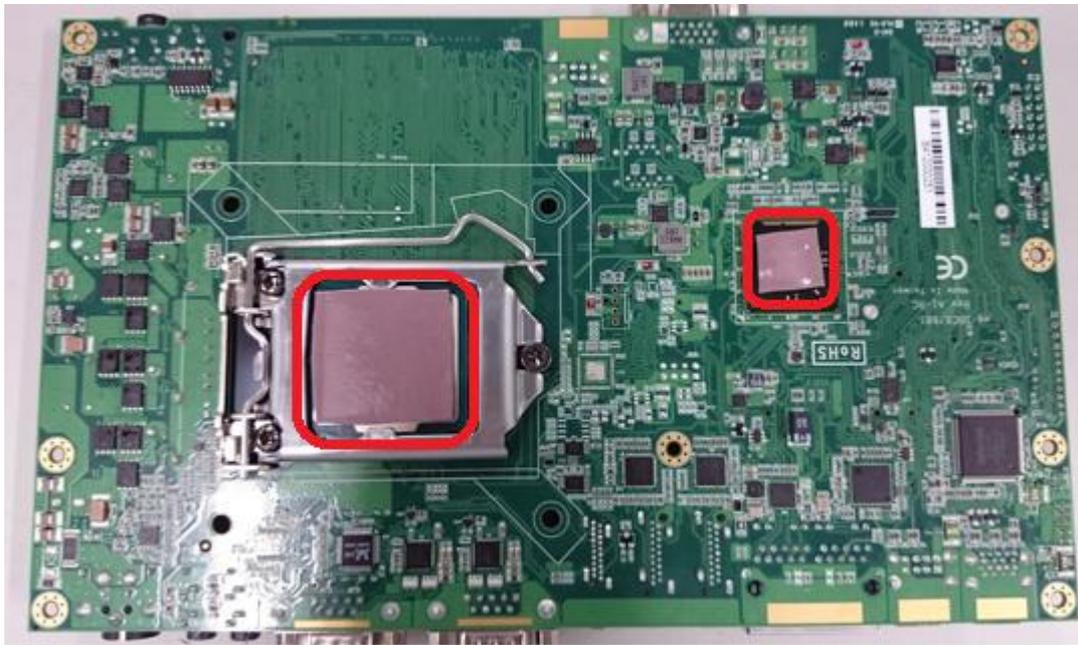


2.5 Installing CPU and PCH Thermal Pad

The eBOX635-881-FL also offers two CPU & PCH thermal pad for spare parts, thus you can get them from your accessory box. Please refer to the following information to replace your thermal pad if original thermal pad is damaged.

Step 1 The main board of eBOX635-881-FL picture is showing as below, there are CPU and PCH locations on bottom site.

Step 2 Please remove original thermal pad and set new one on CPU and PCH, you can refer to below picture.



Note: We have installed thermal pad for eBOX635-881-FL already and this chapter just to let you know how to replace new thermal pad by yourself. If any further information is requested, please feel free to contact Axiomtek distributors or FAE immediately.

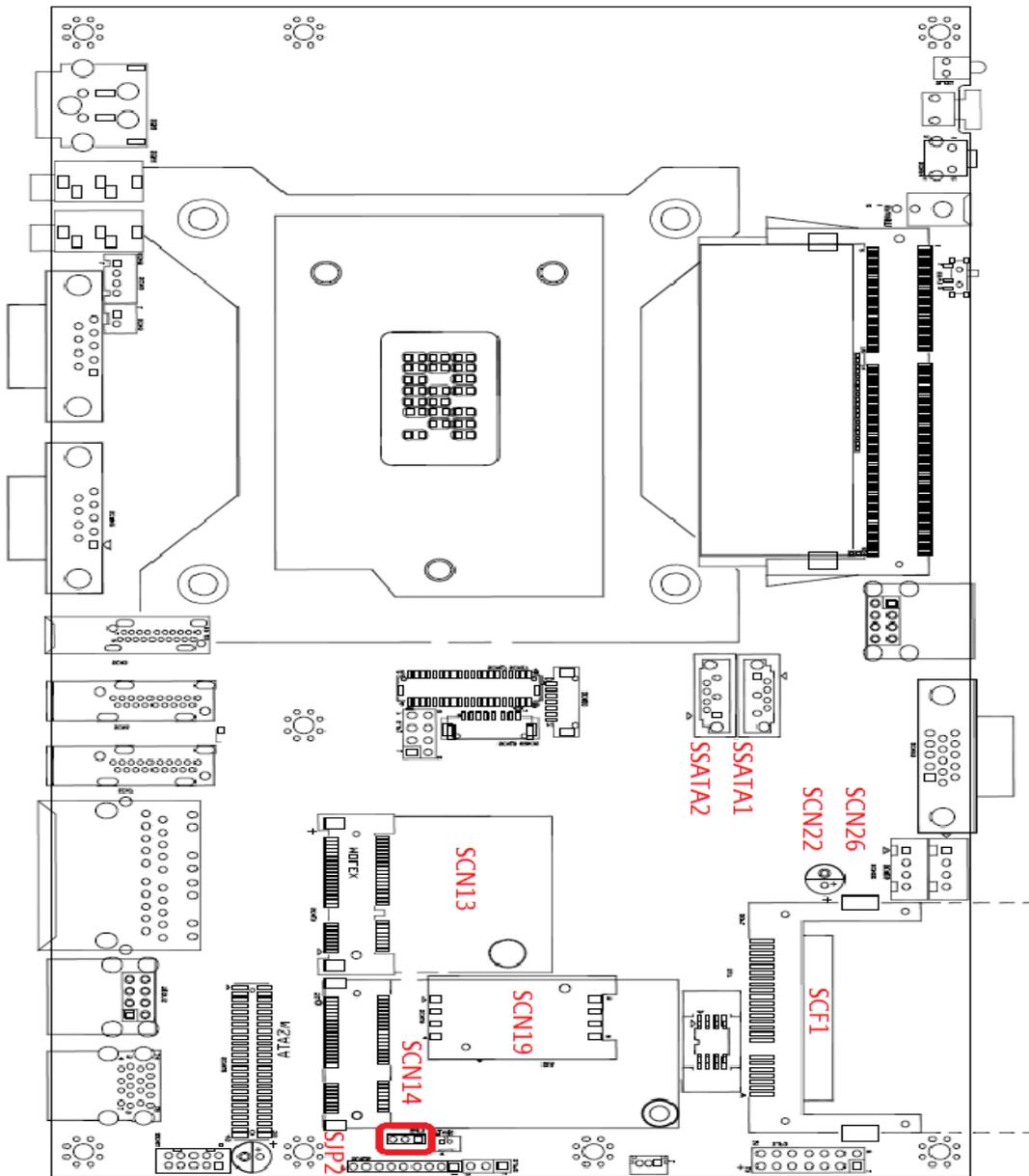
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CHAPTER 3 JUMPER SETTING & CONNECTORS

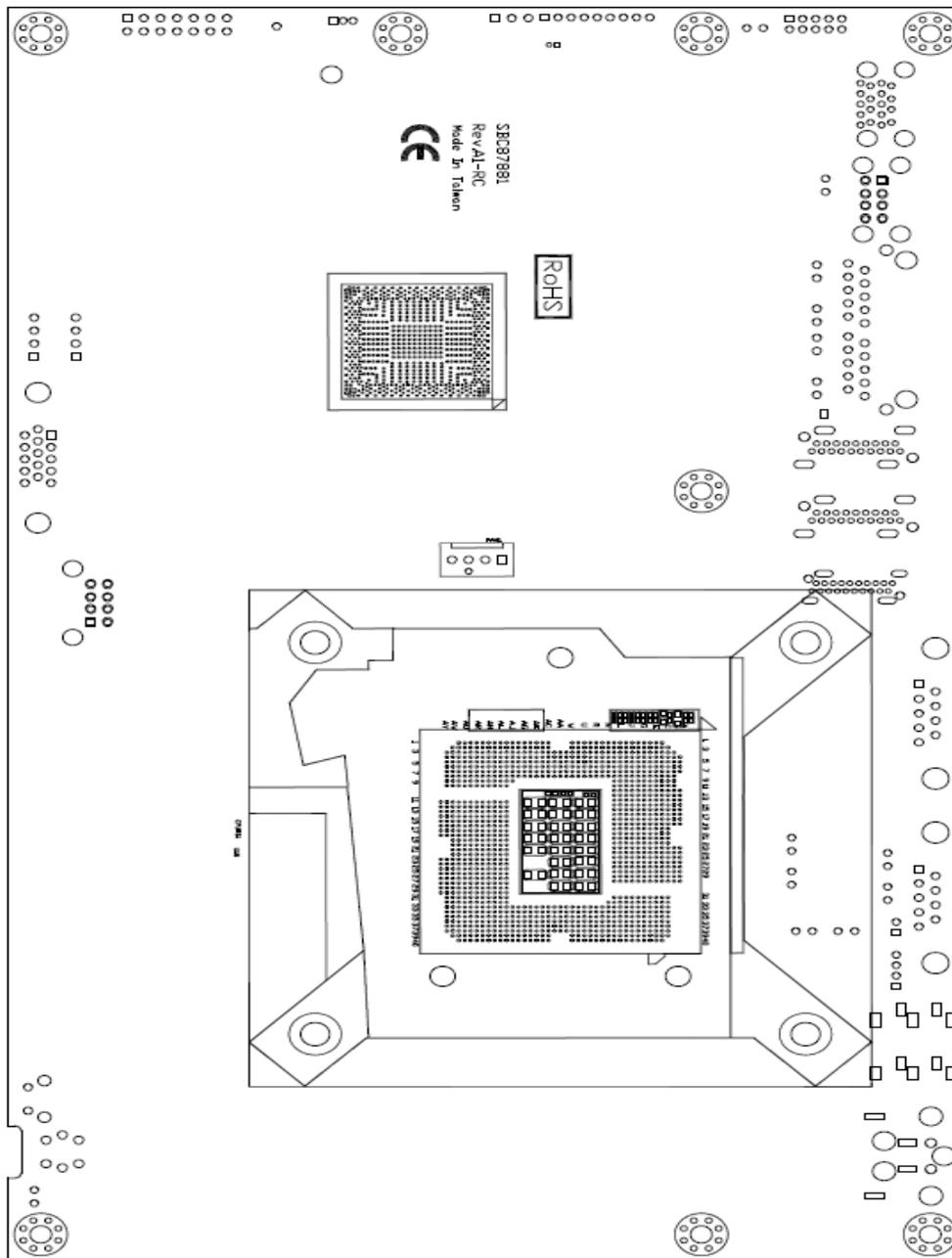
Proper jumper settings configure the eBOX635-881-FL to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

3.1 SBC Placement

SBC87881 Top Side



SBC87881 Bottom Side



Note: We strongly recommended that you should not modify any unmentioned jumper setting without Axiomtek FAE's instruction. Any modification without instruction might cause system to become damage.

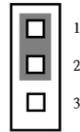
3.2 Jumper Settings and Connectors

Connectors connect the system with other parts/devices. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Below summary table shows you all connectors on the eBOX635-881-FL.

Jumper & Switch Setting	Section
CMOS Clear Jumper	3.2.1
External Connectors	Section
DC Power In Connector	3.2.2
Digital Input Connector	3.2.3
Digital Output Connector	3.2.4
VGA Connector	3.2.5
DisplayPort Connector	3.2.6
HDMI Connector	3.2.7
USB 3.0 Connector	3.2.8
USB 2.0 Connector	3.2.9
COM 1~6 Serial Port Connector	3.2.10
Audio Connector	3.2.11
Ethernet Connector	3.2.12
ATX Power On/Off Button	3.2.13
Reset Button	3.2.14
Remote Power Switch Connector	3.2.15
AT/ATX Switch	3.2.16
Internal Connectors	Section
Serial ATA Connectors	3.2.17
SIM Card Slot	3.2.18
CFast™ Socket	3.2.19
Half-Size Mini Card Slot	3.2.20
Full-Size Mini Card w/ SIM Slot/ mSATA	3.2.21
Power Output Connector	3.2.22

3.2.1 CMOS Clear Jumper (SJP2 on SBC87881)

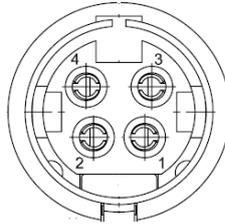
Function	Setting
Normal (Default)	1-2
Clear RTC	2-3



3.2.2 DC Power In Connector (SCN1)

The system supports a DC 19V power-din connector for system power input.

Pin	Signal
1	GND
2	GND
3	DC 19V
4	DC 19V

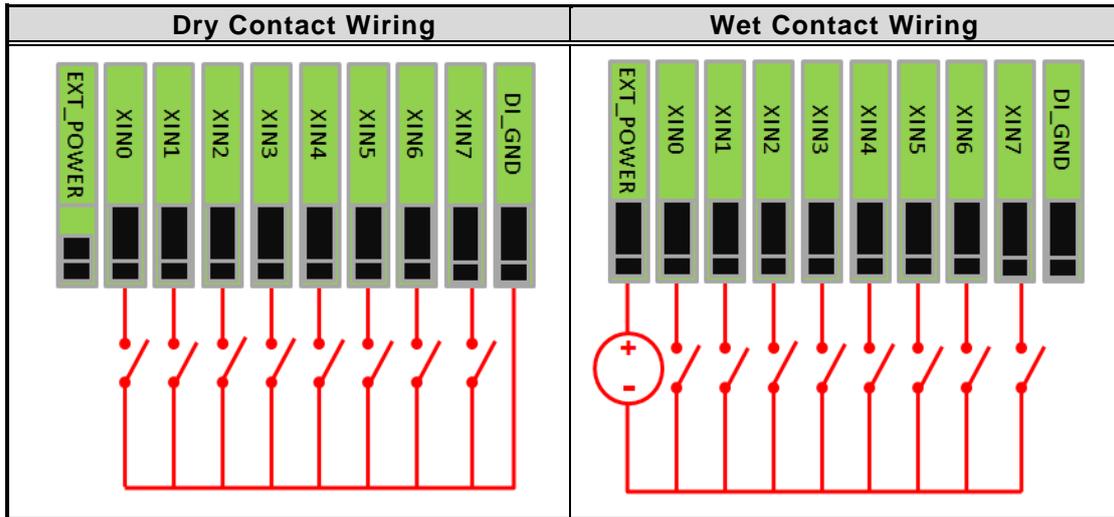


3.2.3 Digital Input Connector

The system is equipped with an 8-channel digital Input 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
1	DI0
2	DI1
3	DI2
4	DI3
5	DI4
6	DI5
7	DI6
8	DI7
9	GND

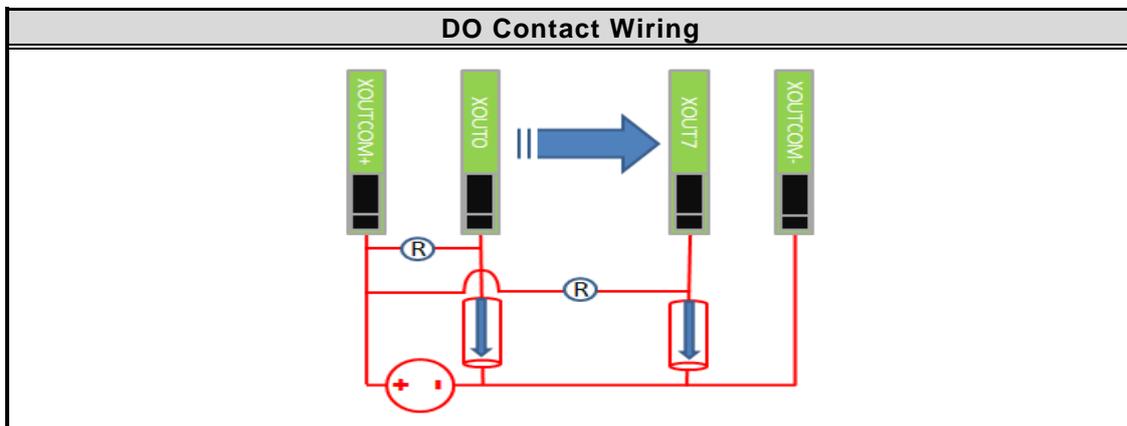




3.2.4 Digital Output Connector

The system is equipped with an 8-channel digital output 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.

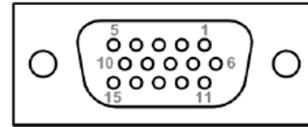
Pin	Signal
1	DO0
2	DO1
3	DO2
4	DO3
5	DO4
6	DO5
7	DO6
8	DO7
9	GND



3.2.5 VGA Connector

The VGA connector is a slim type 15-pin D-Sub connector which is common for the CRT VGA display. The VGA interface configuration can be configured via the software utility.

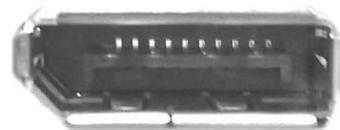
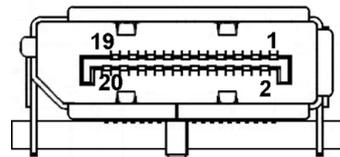
Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		



3.2.6 DisplayPort Connector

DisplayPort interface is also called DP port.

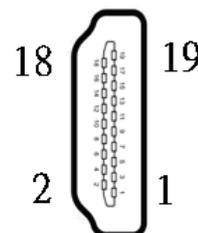
Pin	Signal
1	DPB_LANE0
2	GND
3	DPB_LANE0#
4	DPB_LANE1
5	GND
6	DPB_LANE1#
7	DPB_LANE2
8	GND
9	DPB_LANE2#
10	DPB_LANE3
11	GND
12	DPB_LANE3#
13	Detect Pin
14	GND
15	DPB_AUX
16	GND
17	DPB_AUX#
18	DPB_HPDE
19	GND
20	+3.3V



3.2.7 HDMI Connector (SCN6-SCN7)

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 SCN6 or SCN7.

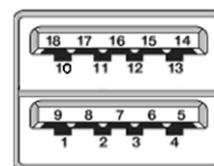
Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	11	GND
2	GND	12	HDMI OUT Clock-
3	HDMI OUT_DATA2-	13	N.C.
4	HDMI OUT_DATA1+	14	N.C.
5	GND	15	HDMI OUT_SCL
6	HDMI OUT_DATA1-	16	HDMI OUT_SDA
7	HDMI OUT_DATA0+	17	GND
8	GND	18	+5V
9	HDMI OUT_DATA0-	19	HDMI_HTPLG
10	HDMI OUT Clock+		



3.2.8 USB 3.0 Connector (SCN10)

The Universal Serial Bus connectors are compliant with USB 3.0 (5Gb/s), and ideally for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal USB Port 0	Pin	Signal USB Port 1
1	USB_VCC (+5V level 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+



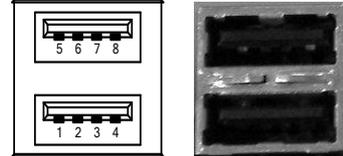
3.2.9 USB 2.0 Connector (SUSB1 and SUSB2)

The Universal Serial Bus connectors are compliant with USB 2.0 (480Mbps), and ideally for installing USB peripherals such as keyboard, mouse, scanner, etc.

SUSB1 carries USB port 1 and 2.

SUSB2 carries USB port 3 and 4.

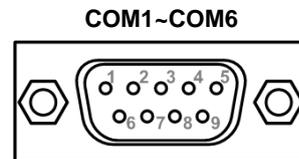
Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	5	USB VCC (+5V level standby power)
2	USB _D-	6	USB _D-
3	USB _D+	7	USB _D+
4	GND	8	GND



3.2.10 COM1~COM6 Serial Port Connector

The system has six serial ports. COM1~COM6 are RS-232/422/485 ports. Please refer to Chapter 3 for the detail of BIOS setting.

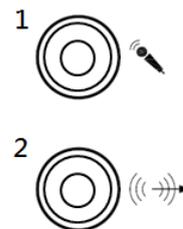
Pin	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	Data-
2	RXD, Receive Data	TX+	Data+
3	TXD, Transmit Data	RX+	No use
4	DTR, Data Terminal Ready	RX-	No use
5	GND, Ground	No use	No use
6	DSR, Data Set Ready	No use	No use
7	RTS, Request To Send	No use	No use
8	CTS, Clear To Send	No use	No use
9	RI, Ring Indicator	No use	No use



3.2.11 Audio Connector

These two audio jacks ideal are for Audio Mic-In and Audio Line-out.

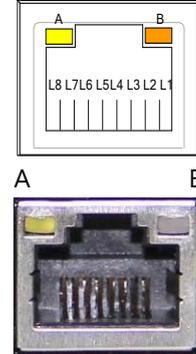
Pin	Signal
1	Microphone In
2	Line Out



3.2.12 Ethernet Connector (LAN1~LAN2)

The RJ-45 connector is for Ethernet. To connect the board to a 1000/100/10 Base-T hub, just plug one end of the cable into connector and connect the other end (phone jack) to a 1000/100/10-Base-T hub.

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



3.2.13 ATX Power On/OFF Button

The ATX power button is on the I/O side. It can allow users to control eBOX635-881-FL power on/off.

Function	Description
On	Turn on/off system
Off	Keep system status



3.2.14 Reset Button

The Reset button can allow users to reset eBOX635-881-FL.

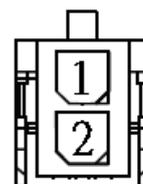
Function	Description
On	Reset system
Off	Keep system status



3.2.15 Remote Power Switch Connector (SPWRBT1)

One 2-pin connector output for remote power on/off switch.

Function	Description
Short(1-2)	Turn on/off system
Open	Keep system status



3.2.16 AT/ATX Switch

If you set AT/ATX switch to AT mode, the system will be automatically power on without pressing soft power button during power input; we can use this switch to achieve auto power on demand.

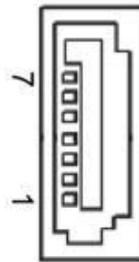


3.2.17 Serial ATA Connectors (SATA1-SATA2)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives. This board has two SATA 3.0 ports with 6Gb/s performance.

The sata power cable provides +5V, and ground to the drive only.

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



3.2.18 SIM Card Slots (SCN19)

eBOX635-881-FL includes one SIM slots on the bottom side of the system for inserting SIM Card. It is mainly used in 3G wireless network application.

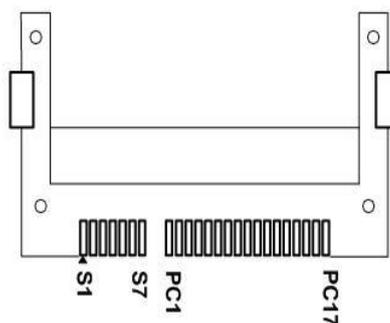
Pin	Signal
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC



3.2.19 CFast™ Socket

The system is equipped with a CFast™ socket on the bottom side to support a CFast™ card which is based on the Serial ATA bus. The socket is specially designed to avoid incorrect installation of the CFast™ card. When installing or removing the CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

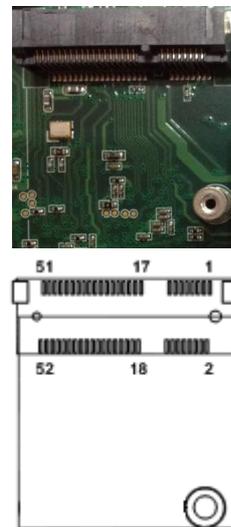
Pin	Signal	Pin	Signal
S1	GND	PC1	NC
S2	TX+	PC2	GND
S3	TX-	PC3	NC
S4	GND	PC4	NC
S5	RX-	PC5	NC
S6	RX+	PC6	NC
S7	GND	PC7	GND
		PC8	NC
		PC9	NC
		PC10	NC
		PC11	NC
		PC12	NC
		PC13	3.3V
		PC14	3.3V
		PC15	GND
		PC16	GND
		PC17	NC



3.2.20 Half-Size Express Mini Card Slot (SCN13)

PCI Express Mini Card connector supports a PCI Express x1 link and a USB 2.0 link. A PCI Express Mini Card can be applied to either PCI Express or USB 2.0. It 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_RXN3	24	+3.3VSB
25	PE_RXP3	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN3	32	SMB_DATA
33	PE_TXP3	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB

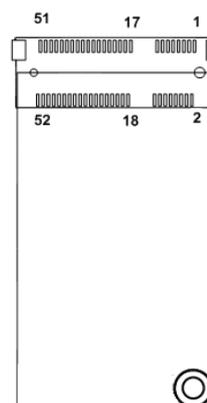


3.2.21 Full-Size Express Mini Card (w/ SIM Slot)/ mSATA (SCN14)

You may need to adjust the BIOS setting to select mSATA or Mini card PCI-E interface.

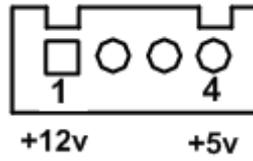
This is a PCI-Express Mini Card connector which supports PCI-Express x1 link, SATA link, USB 2.0 link and 3G wireless network application(SCN19). A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0 or SATA. It complies with PCI-Express Mini Card Spec. V1.2.

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN4/ SATA4_RXP	24	+3.3VSB
25	PE_RXP4/ SATA4_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN4/ SATA4_TXN	32	SMB_DATA
33	PE_TXP4/ SATA4_TXP	34	GND
35	GND	36	USB #10_D-
37	GND	38	USB #10_D+
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



3.2.22 Power Output Connector (SCN22, SCN26)

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



CHAPTER 4

AMI BIOS SETUP UTILITY

The AMI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a battery-backed CMOS 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 key immediately.
2. After you press the key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

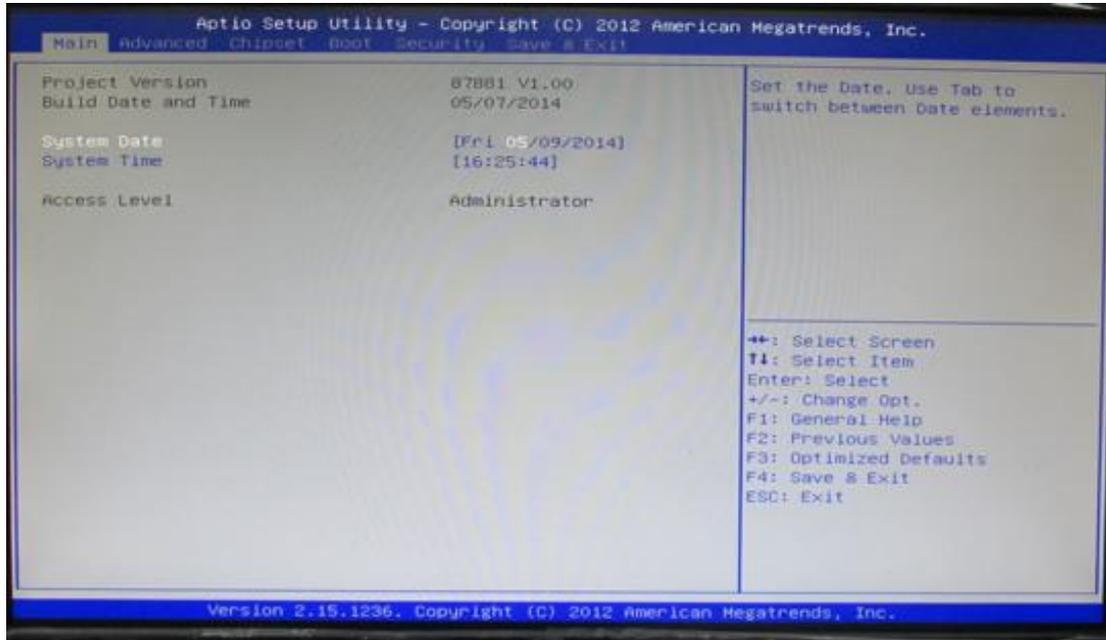


Note: *Some of the navigation keys differ from one screen to another.*

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

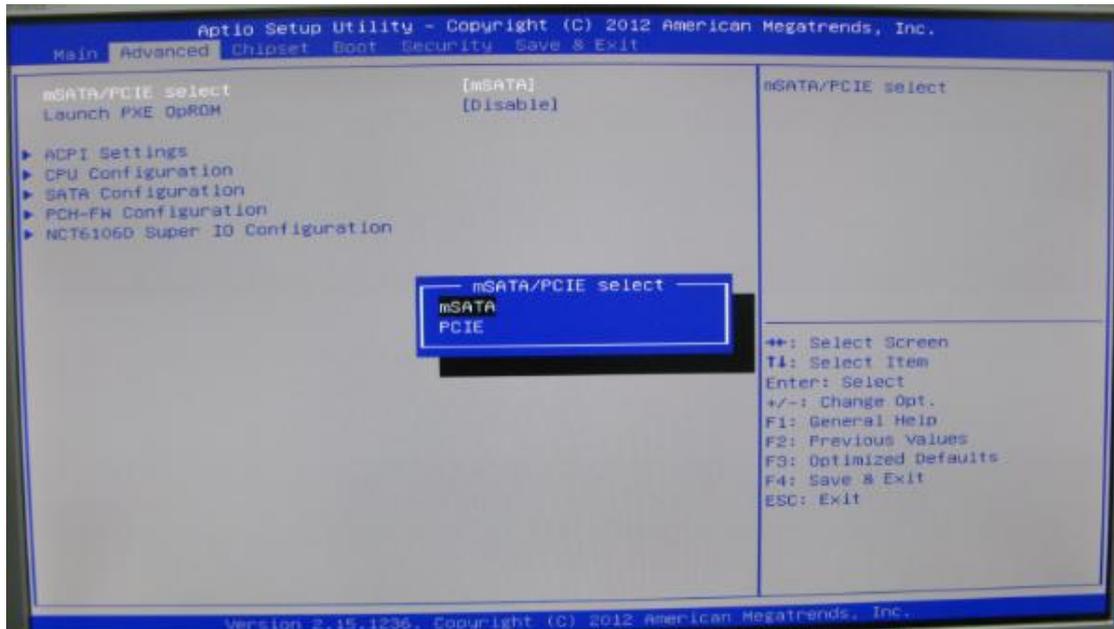
When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- **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.

4.4 Advanced Menu



- **mSATA/PCIE select**

Use this item to select the SCN14 to mSATA or Mini-PCIE mode.

- **Launch PXE OpROM**

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

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

- ▶ ACPI Settings
- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ PCH-FW Configuration
- ▶ NCT6106D Super IO Configuration

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

- **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

Allow you to select the Advanced Configuration and Power Interface (ACPI) sleep state. Here are the options for your selection: Suspend Dissabled and S3 (Suspend to RAM). The S3 (Suspend to RAM) option selects the highest ACPI sleep state the system will enter when SUSPEND button is pressed.

S3 Video Repost

Determine whether to invoke VGA BIOS POST on S3/STR resume.

[Disabled] When set to [No], the system will not invoke VGA BIOS POST on S3/STR resume.

[Enabled] When set to [Yes], the system invokes VGA BIOS POST on S3/STR resume.

- **CPU Configuration**

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

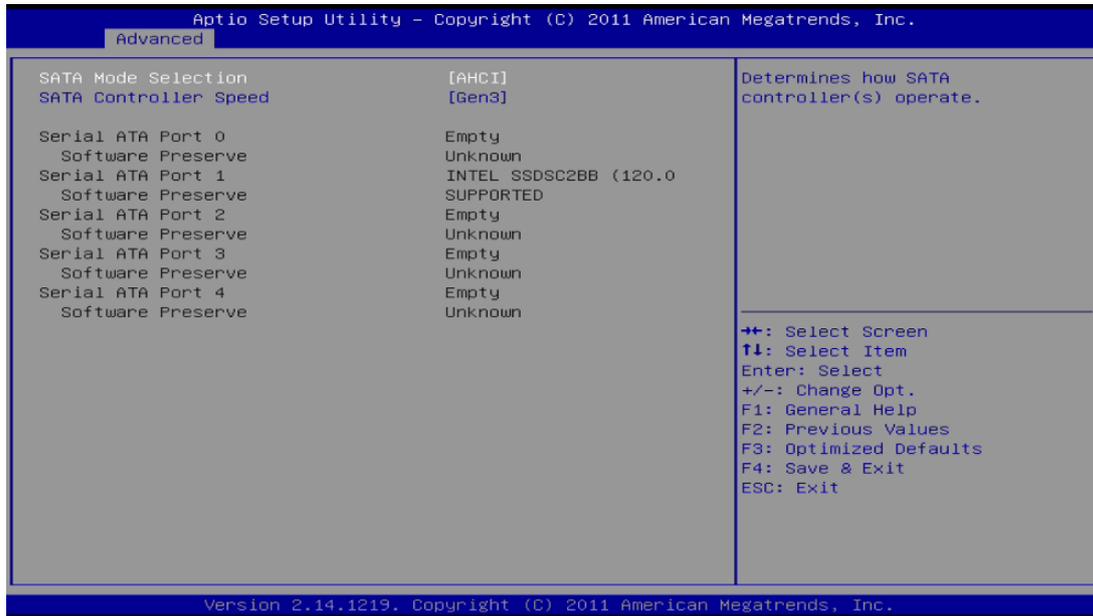


Intel Virtualization Technology

Allow you to enable or disable Intel Virtualization Technology. When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology .

- **SATA Configuration**

In the SATA 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.



SATA Mode Selection

Use this item to choose the SATA operation mode. Here are the options for your selection: IDE Mode and AHCI Mode.

SATA Controller Speed

Use this item to choose the SATA speed. Here are the options for your selection: Auto Gen1, Gen2 and Gen3.

- **PCH-FW Configuration**

This screen shows the ME Firmware version, and its detail information.



- **NCT6106D 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 Configuration



Serial Port

Use this item to enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request line is IRQ4.

Change Settings

Here are the options for your selection;

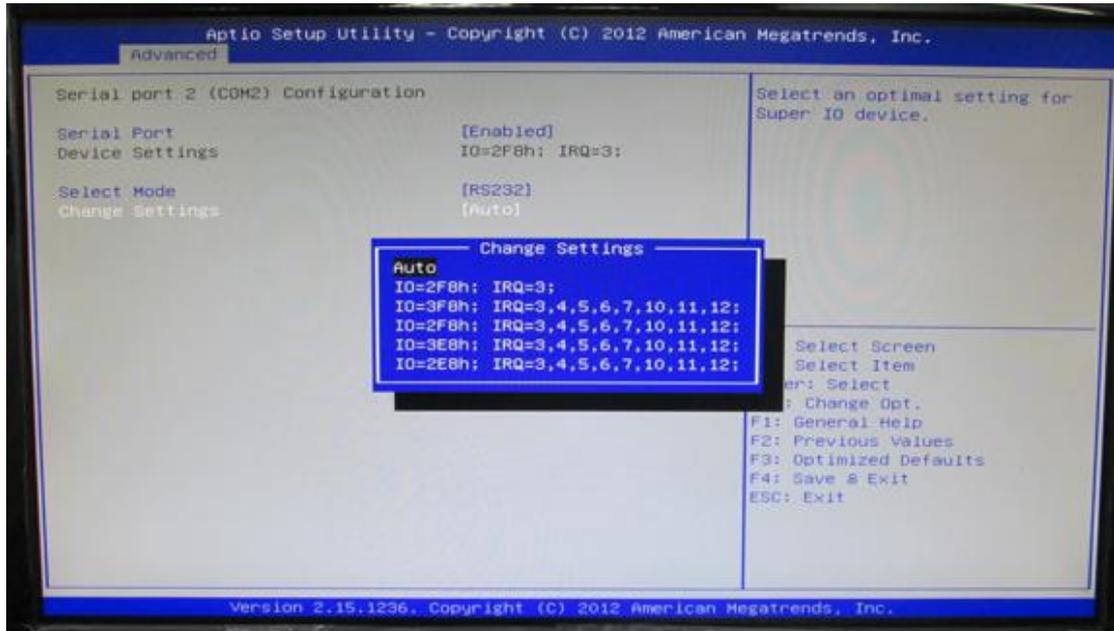
- Auto;
- IO=3F8h; IRQ=4;
- IO=3F8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2F8h; IRQ=3,4,5,6,7,10,11,12;
- IO=3E8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2E8h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

- RS232
- RS422
- RS485.

- Serial Port 2 Configuration



Serial Port

Use this item to enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request line is IRQ3.

Change Settings

Here are the options for your selection;

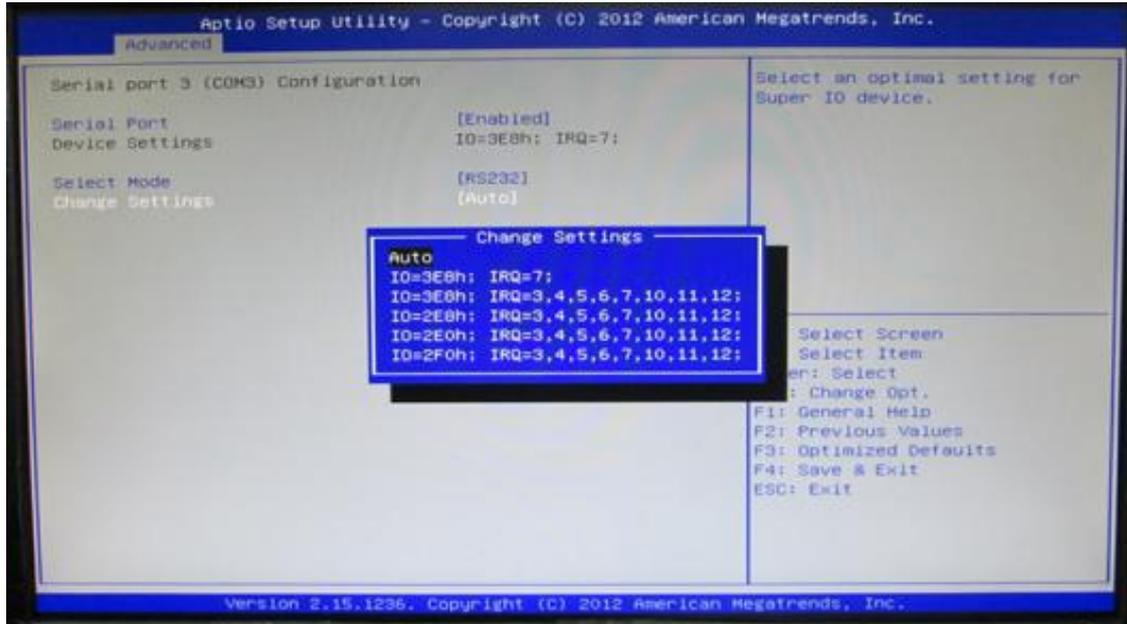
Auto;
 IO=2F8h; IRQ=3;
 IO=3F8h; IRQ=3,4,5,6,7,10,11,12;
 IO=2F8h; IRQ=3,4,5,6,7,10,11,12;
 IO=3E8h; IRQ=3,4,5,6,7,10,11,12;
 IO=2E8h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

RS232
 RS422
 RS485.

- **Serial Port 3 Configuration**



Serial Port

Use this item to enable or disable serial port 3. The optimal setting for base I/O address is 3E8h and for interrupt request line is IRQ7.

Change Settings

Here are the options for your selection;

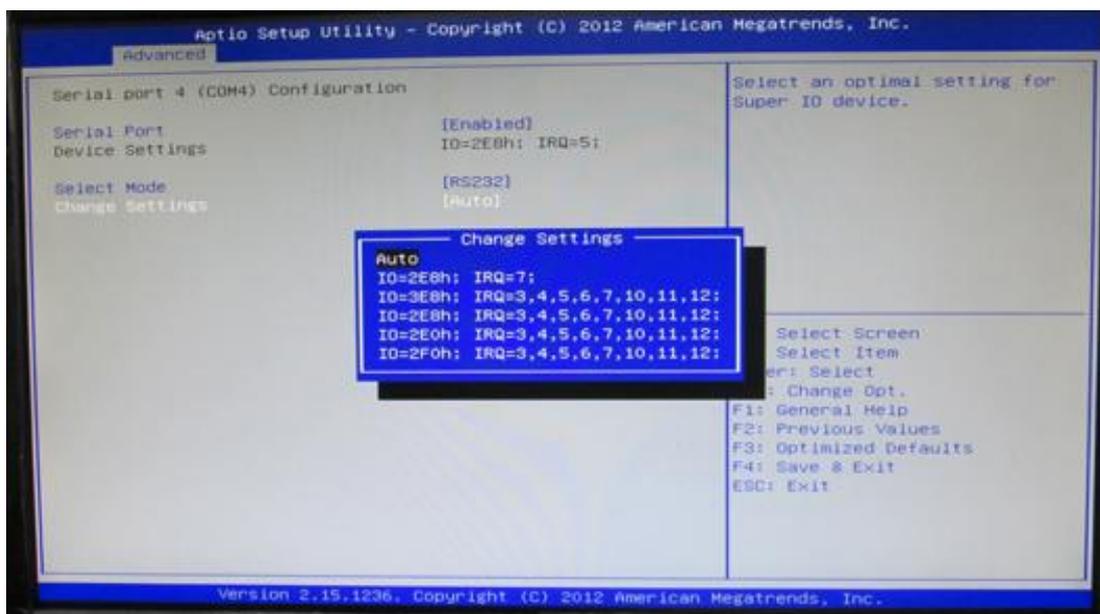
- Auto;
- IO=3E8h; IRQ=7;
- IO=3E8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2E8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2E0h; IRQ=3,4,5,6,7,10,11,12;
- IO=2F0h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

- RS232
- RS422
- RS485.

- Serial Port 4 Configuration



Serial Port

Use this item to enable or disable serial port 4. The optimal setting for base I/O address is 2E8h and for interrupt request line is IRQ5.

Change Settings

Here are the options for your selection;

Auto;

IO=2E8h; IRQ=7;

IO=3E8h; IRQ=3,4,5,6,7,10,11,12;

IO=2E8h; IRQ=3,4,5,6,7,10,11,12;

IO=2E0h; IRQ=3,4,5,6,7,10,11,12;

IO=2F0h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

RS232

RS422

RS485.

- **Serial Port 5 Configuration**



Serial Port

Use this item to enable or disable serial port 5. The optimal setting for base I/O address is 2E0h and for interrupt request line is IRQ10.

Change Settings

Here are the options for your selection;

- Auto;
- IO=2E0h; IRQ=10;
- IO=3E8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2E8h; IRQ=3,4,5,6,7,10,11,12;
- IO=2E0h; IRQ=3,4,5,6,7,10,11,12;
- IO=2F0h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

- RS232
- RS422
- RS485.

- Serial Port 6 Configuration



Serial Port

Use this item to enable or disable serial port 6. The optimal setting for base I/O address is 2F0h and for interrupt request line is IRQ6.

Change Settings

Here are the options for your selection;

Auto;
 IO=2F0h; IRQ=10;
 IO=3E8h; IRQ=3,4,5,6,7,10,11,12;
 IO=2E8h; IRQ=3,4,5,6,7,10,11,12;
 IO=2E0h; IRQ=3,4,5,6,7,10,11,12;
 IO=2F0h; IRQ=3,4,5,6,7,10,11,12;

Transmission Mode

Use this item to configure serial port 0. Here are the options for your selection:

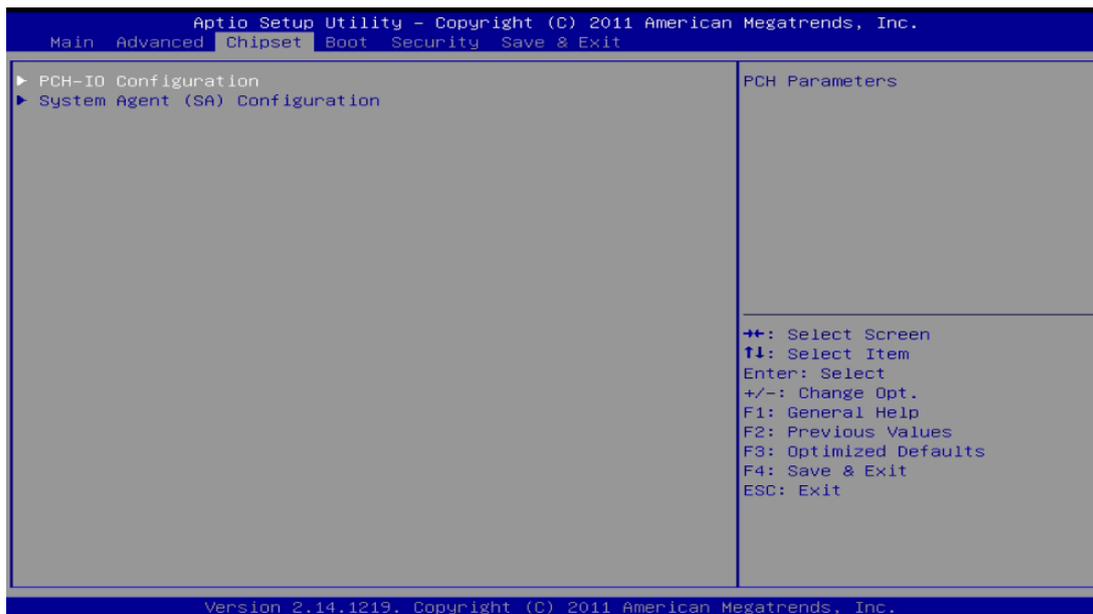
RS232
 RS422
 RS485.

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:

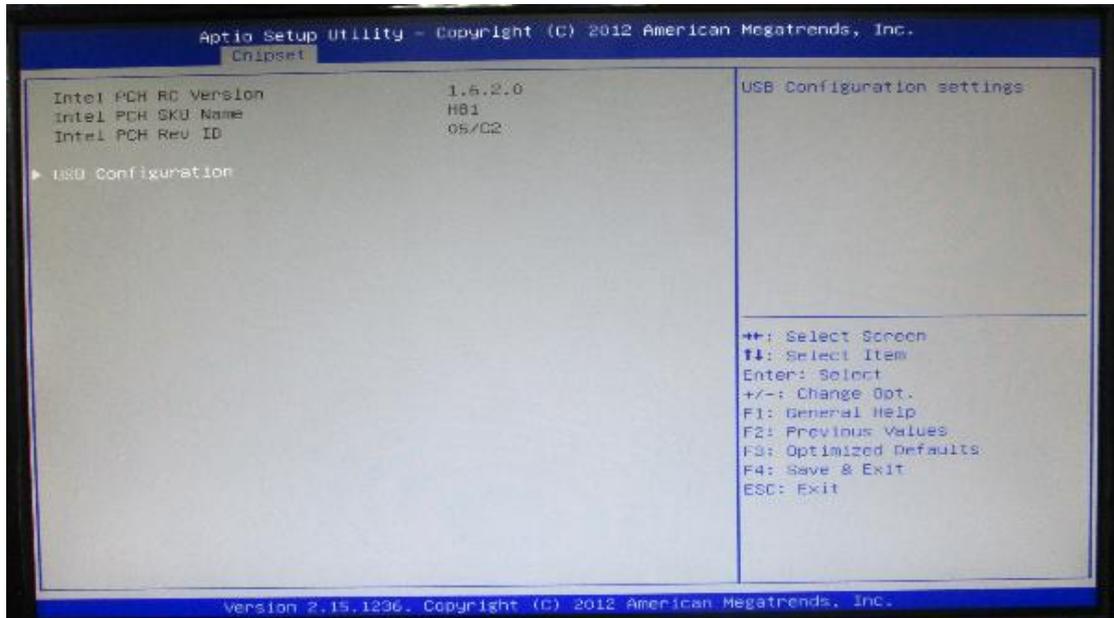
- ▶ PCH - IO Configuration
- ▶ System Agent (SA) Configuration

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



- **PCH - IO Configuration**

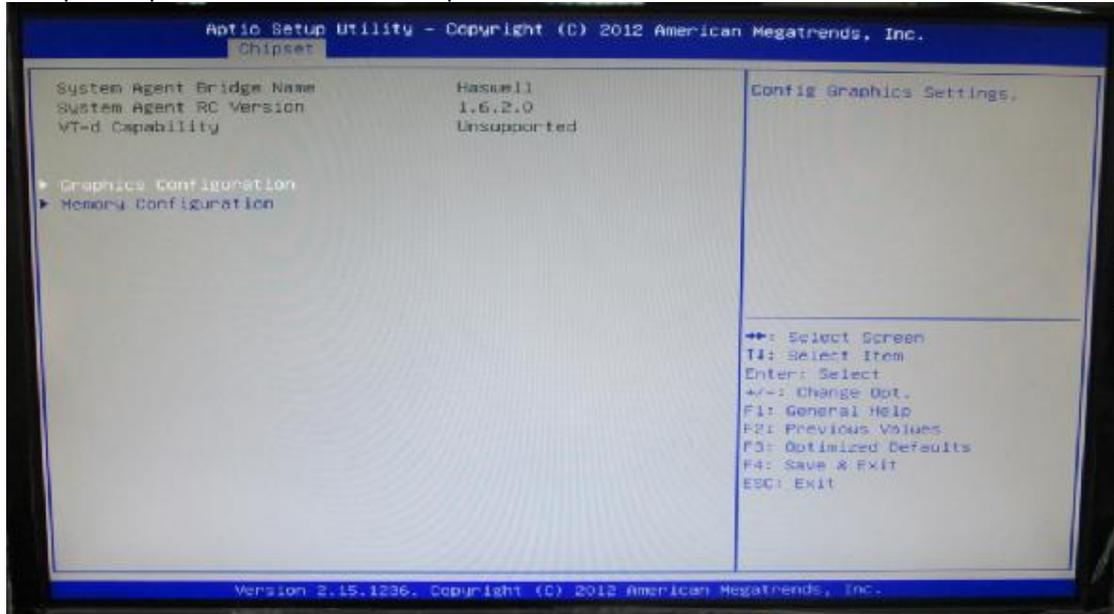
This screen allows users to configure PCH – IO Configuration parameters. For items marked with “▶”, please press <Enter> for more options.

**USB Configuration**

Use this item for further setting of USB configuration.

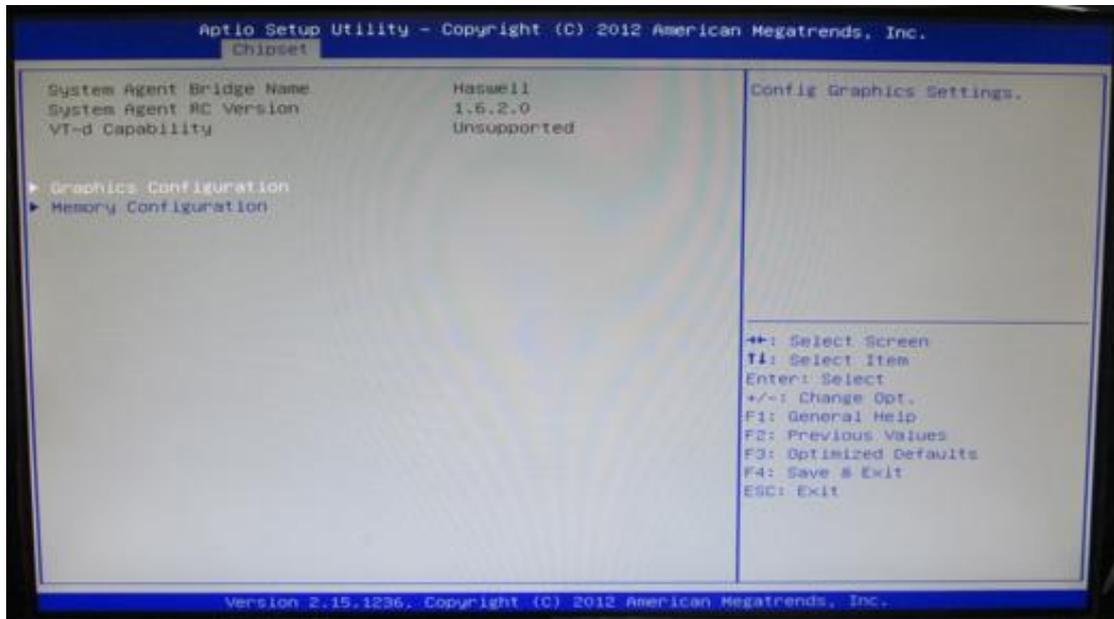
- **System Agent (SA) Configuration**

This screen allows users to configure System Agent (SA) parameters. For items marked with “▶”, please press <Enter> for more options.



- **Graphics Configuration**

Use this item for further setting of graphics configuration.



Internal Graphics

You can use this item to select internal graphics to enable or disable.

Graphics Control

Use this item for further setting of graphics control; we can get the following items to choose your display interface, default is auto mode.

Primary IGFX Boot Display

Select the video device which will be activated during POST (Power-On Self Test). This has no effect if external graphics present.



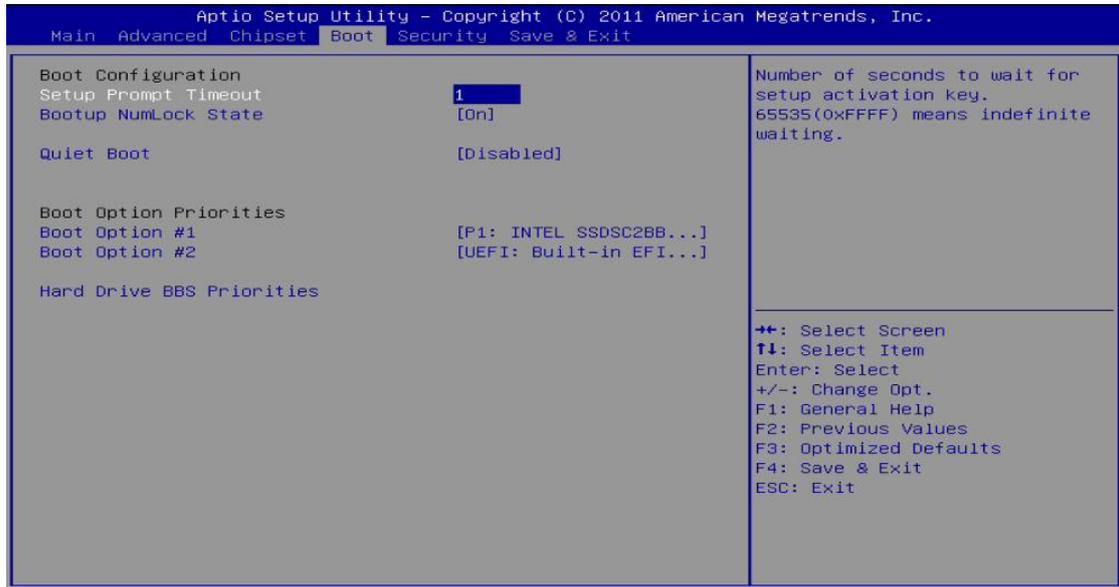
- **Memory Configuration**

Use this item for further setting of memory configuration, this screen displays memory information, and allows user to set memory configuration.



4.6 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.

- **Quiet Boot**

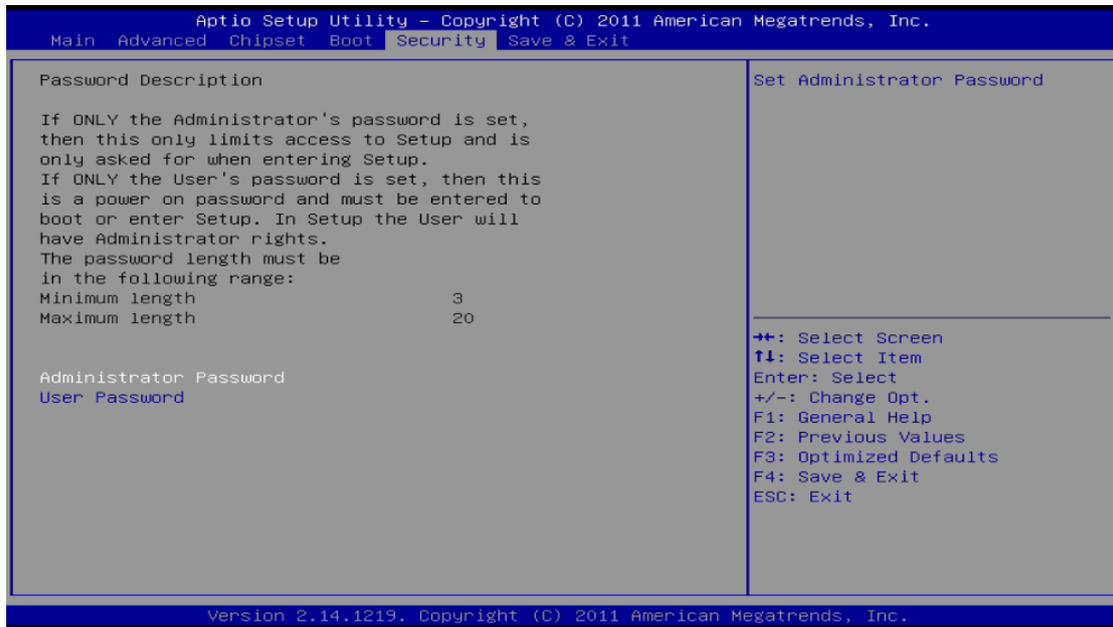
Enable or disable Quiet Boot option.

- **Boot Option Priorities**

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

4.7 Security Menu

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



- **Administrator Password**

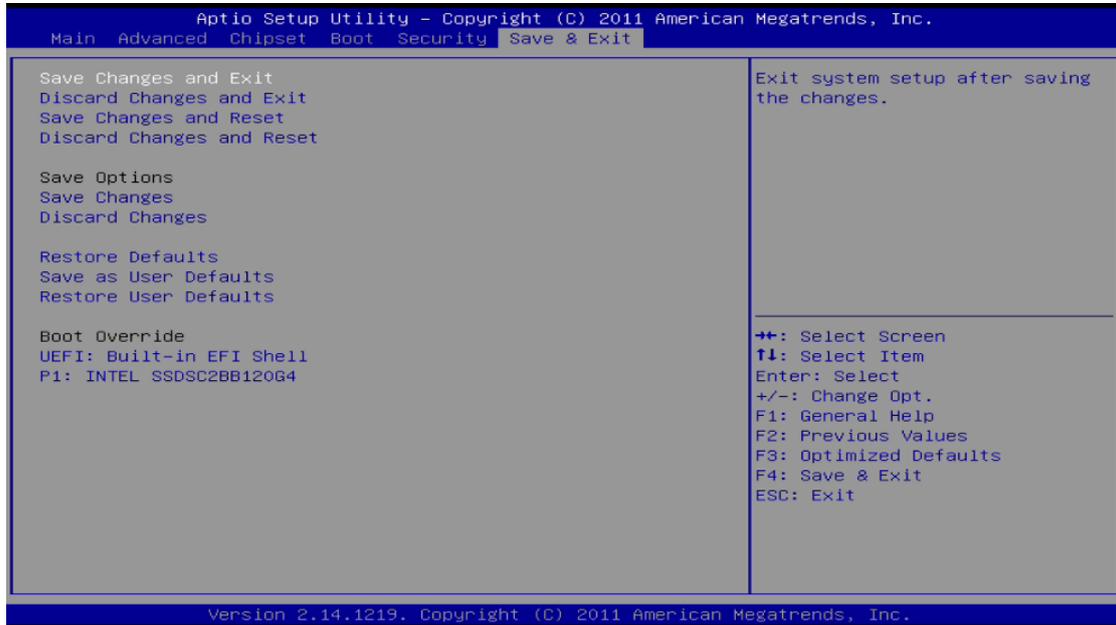
This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**

This item indicates whether an user password has been set (installed or uninstalled).

4.8 Save & Exit Menu

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



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.

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APPENDIX WATCHDOG TIMER

About Watchdog Timer

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

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

Assembler Sample Program

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