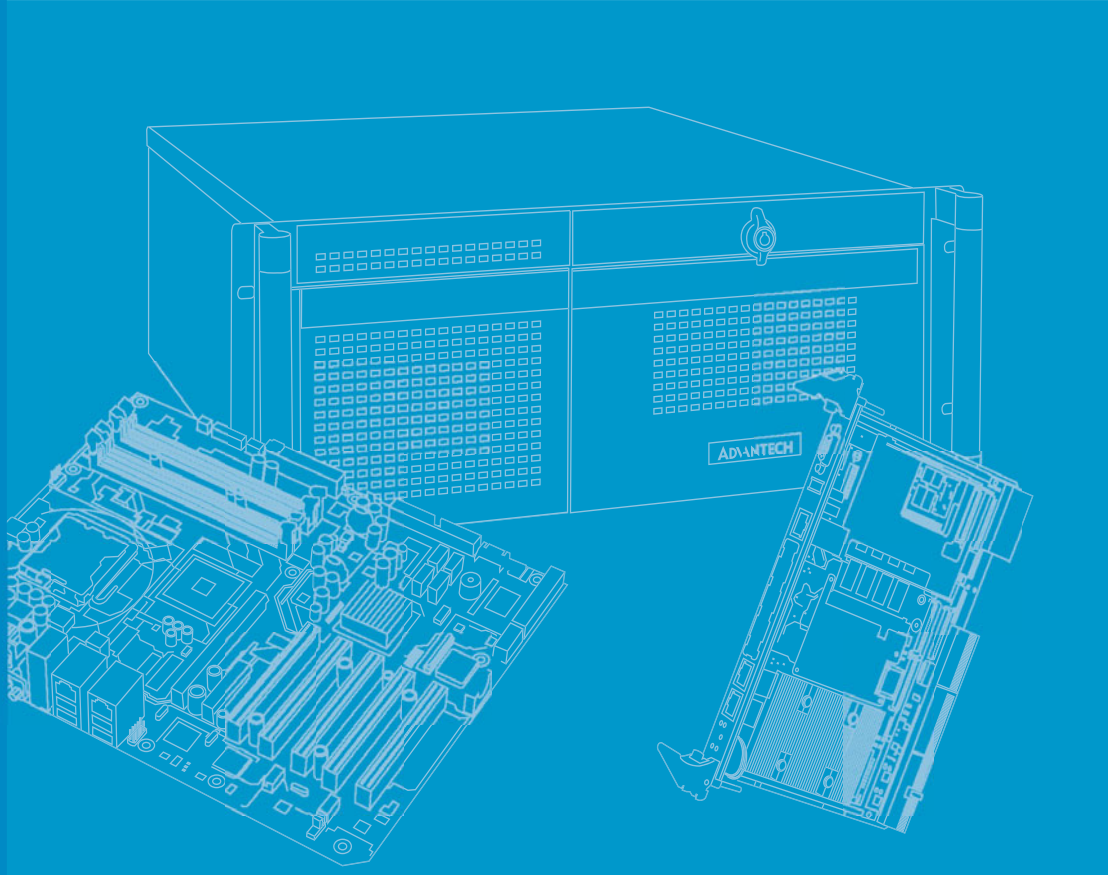

User Manual

ITA-2211 Series

Fanless Embedded Atom Quad Core Rackmount Industrial Computer

ADVANTECH

Enabling an Intelligent Planet

Copyright

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On-line Technical Support

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http://www.advantech.com/support

Part No. Edition 1

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services.

To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the best performance possible from your products. If you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

Please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and can be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice about application requirements or specific information on the installation and operation of any of our products.

Initial Inspection

When you open the carton, please make sure that the following materials have been shipped:

- 1 x ITA-2211 series industrial computer
- 1 x Accessory box
- 1 x Warranty Card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the ITA-2211 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ITA-2211, check it for signs of shipping damage. (For examples: box damage, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also, please notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
11. Never pour any liquid into an opening. This may cause fire or electrical shock.
12. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
13. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
14. Do not leave this equipment in an environment unconditioned where the storage temperature under -25° C (13° F) or above 60° C (140° F), it may damage the equipment.
15. This equipment has been tested and found to comply with the limits for a Class A digital device. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
16. Advantech doesn’t provide power component for this product, users should purchase power components with CCC certificate.
17. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don’t touch any components on the CPU card or other cards while the PC is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1

Overview

1.1 Introduction

The ITA-2211 is a 2U fanless embedded rackmount industrial computer with Atom™ E3845 Quad Core processor and wide voltage input range, which is specially designed for integrated surveillance and communication management systems. This powerful computing platform can operate continuously 24 hours a day, 7 days a week.

1.2 Specifications

- **System Chipset:** Intel® Atom™ E3845 Quad Core processor
- **BIOS:** AMI SPI 64 Mb Flash
- **System Memory:** On-board 4 GB DDR3L 1333
- **Display:** Integrated Graphics Intel® Gen 7, Up to 256 MB SDRAM shared system memory
- **Dual Display:**
  - Single display resolution VGA 2560x1600, DVI 1920x1200
  - Dual Display resolution up to 1920 x 1080 @ 60 Hz
- **Storage:** Supports 1 mSATA slot, 1 x 3.5” or 2 x 2.5” HDD slots
- **Expansion Slot:** Supports 3 x ITAM slots, 1 x PCI104, and 1 x miniPCIe slot
- **Ethernet:** 2 x 10/100/1000M Ethernet RJ45 port
- **USB:** 1 x USB 3.0, 6 x USB2.0
- **VGA:** 1 x VGA
- **Serial I/O:** 2 x DB9 ports, RS-232/422/485 switchable
- **Audio:** 1 x Speaker out with 2 x 4w amplifer; 1 x Mic input
- **Reserved Zone (rear panel, optional):** 1 x PCI104
- **ITAM I/O Module (Optional):**
  - ITA-EM-SR21-10A1E supports 8 x RS-232/422/485 seral ports
  - ITA-EM-SR21-00A1E supports 8 x RS-232/422/485 seral ports with 2.5 KV opto-isolator
  - ITA-EM-NC21-C0A1E supports 8 x 10/100/1000M RJ45 Ethernet ports
  - ITA-EM-NC22-C0A1E supports 4 x 10/100/1000M RJ45 Ethernet ports
  - ITA-EM-NC22-F0A1E supports 4 x 10/100/1000M SFP ports
  - ITA-EM-NC23-00A1Esupports 2 x 10/100/1000M RJ45 Ethernet ports and 2 CAN ports
- **Dimensions (W x H x D):** 483 x 88 x 325 mm
- **Weight:**
  - Single power supply: 7.7 kg
  - Dual power supply: 8 kg

1.3 Power Information

ITA-2211 supports hot swap power module with dual or single power input optional.

Table 1.1: Power

DC/AC voltage input	110 VDC/ 100-240 VAC
Current input	110 VDC --- 1.2 A 100-240 VAC --- 1.2-0.55 A
Power input port	3P Europe port

Table 1.1: Power	
Dual power input methods	1 AC Power+ 2 DC Power or 1 AC Power + 2 AC Power or 1 DC Power + 2 DC Power

1.4 Environmental Specifications

Table 1.2: Environmental Specifications	
Operating Temperature	With industrial HDD: 0 ~ 40°C With SSD card: -25 ~ 60 °C (with 0.7 m/s airflow)
Storage Temperature	-40 ~ 85°C
Humidity	95% @ 40º C, non-condensing
Vibration	With 2.5” SSD: 2 Grms @ 5 ~ 500 Hz, random, 1 hr/axis With 2.5” HDD: 1 Grms @ 5 ~ 500 Hz, random, 1 hr/axis
Shock	10G, IEC-68-2-27, half-sine, 11 ms duration 2.5-inch HDD: 10G, IEC-68-2-27, sine wave, 11 ms duration
Safety	CCC/CE/CB/UL/BSMI compliant

1.5 Dimension Diagram

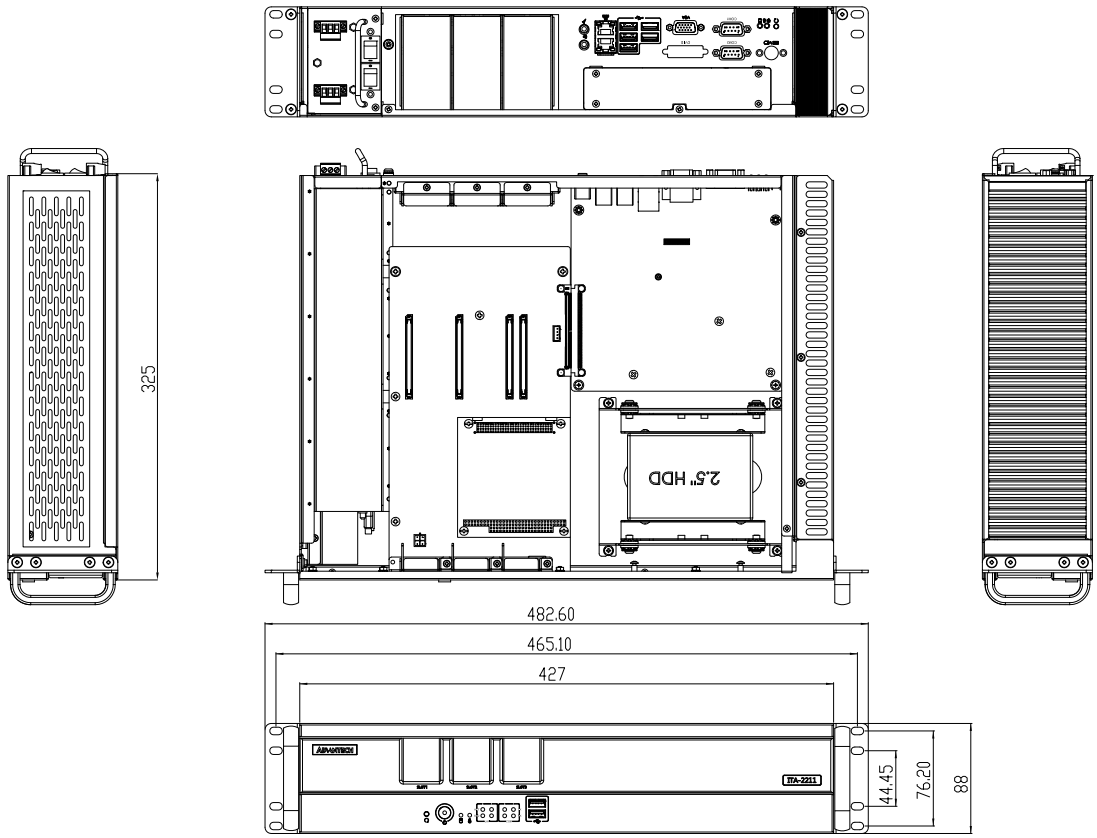


Figure 1.1 Dimension Diagram of ITA-2211

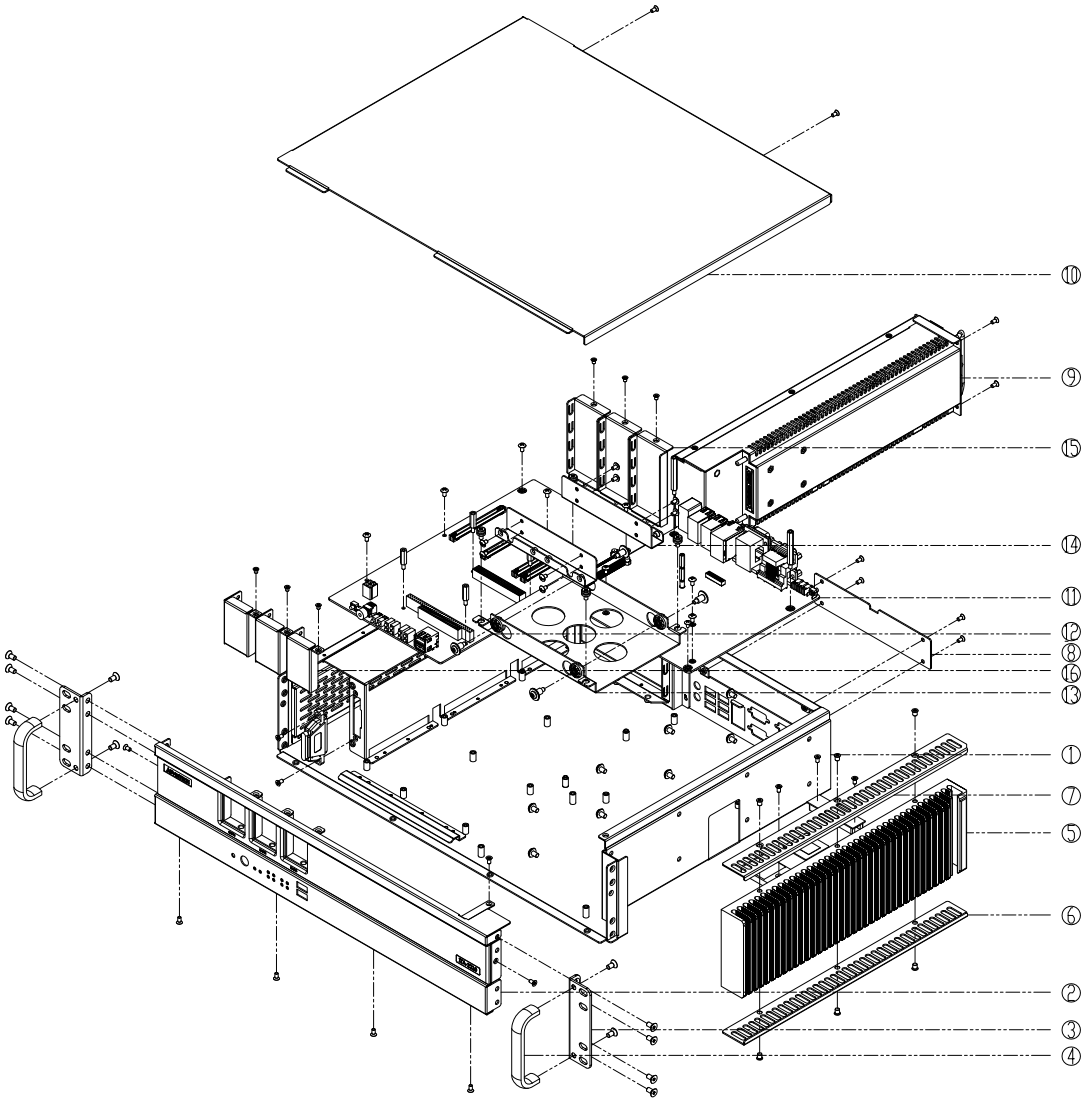


Figure 1.2 Exploded Diagram of ITA-2211

Table 1.3: Part List			
1	Cradle	9	Power module
2	Front panel	10	Top cover
3	Ear	11	Main board
4	Handle	12	Backplane
5	Heat sink	13	3.5” HDD bracket
6	Hand guard (down)	14	3.5” HDD adapter bracket
7	Hand guard (up)	15	Shield (rear)
8	PC104 blank washer	16	Shield (front)

Chapter 2

Industrial Motherboard

2.1 Introduction

The following sections show the internal jumpers setting and the external connectors pin assignments for application integration.

2.2 System Status Indicators

2.2.1 System Overview

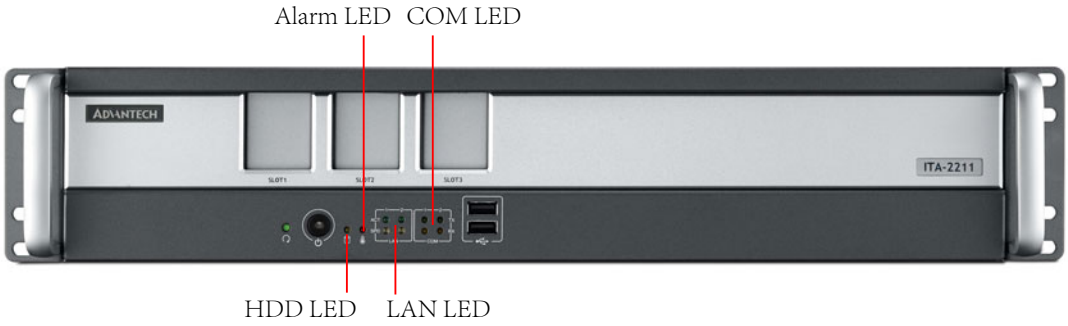


Figure 2.1 Front view

Figure 2.2 Rear view

2.2.2 System Status LED Indicator

The LED indicators located on the lower left side of front panel can be used to show system health and active status.

Refer to below table for a LED definition summary.

Item	LED	Status	Color	Description
1	PWR	On	Green	System power is on, system is safe
		Off		System power is off
2	Fault	On	Red	System is abnormal
3	HDD	Blink	Orange	Data being received/transmitted
		Off		No data being received/transmitted

2.2.3 LAN Status LED Indicator

The LED indicators on the lower left side of front panel can also be used to show system network condition and active status.

Refer to below table for a LED definition summary.

Item	LED	Status	Color	Description
1	1000M	On	Green	1000M network data being received/transmitted
	100M	On	Orange	100M network data being received/transmitted
	10M	Off		100M network data being received/transmitted
	Link	Blink	Green	Network being connected

2.2.4 Serial Port Status LED Indicator

The LED indicators located on the lower left side of front panel can also be used to show system serial port condition and active status.

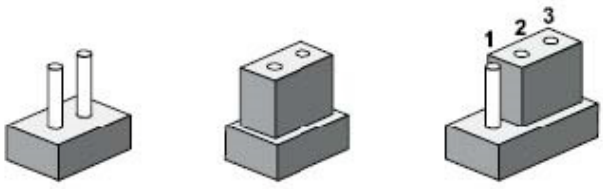
Refer to below table for a LED definition summary.

Item	LED	Status	Color	Description
1	TX Active	Blink	Green	Serial port data being transmitted
	TX No Data	Off		No serial port data being transmitted
	RX Active	Blink	Orange	Serial port data being received
	RX No Data	Off		No serial port data being received

2.3 Jumpers and Connector

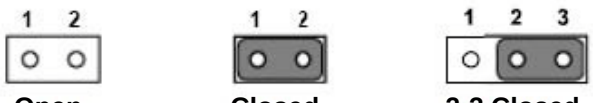
2.3.1 Jumper Description

You may configure the ITA-2211 to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you remove the clip. Sometime a jumper will have three pins, labelled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



Open **Closed** **2-3 Closed**

The jumpers setting are schematically depicted in this manual as follows.



Open **Closed** **2-3 Closed**

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

2.3.2 Jumper and Connector Location

The board has a number of connectors and jumpers that allow you to configure your system to suit your application. The table below lists the function of each of the connectors and jumpers.The locations of jumpers and connector on the board are shown in Fig 2.3 and Fig 2.4.

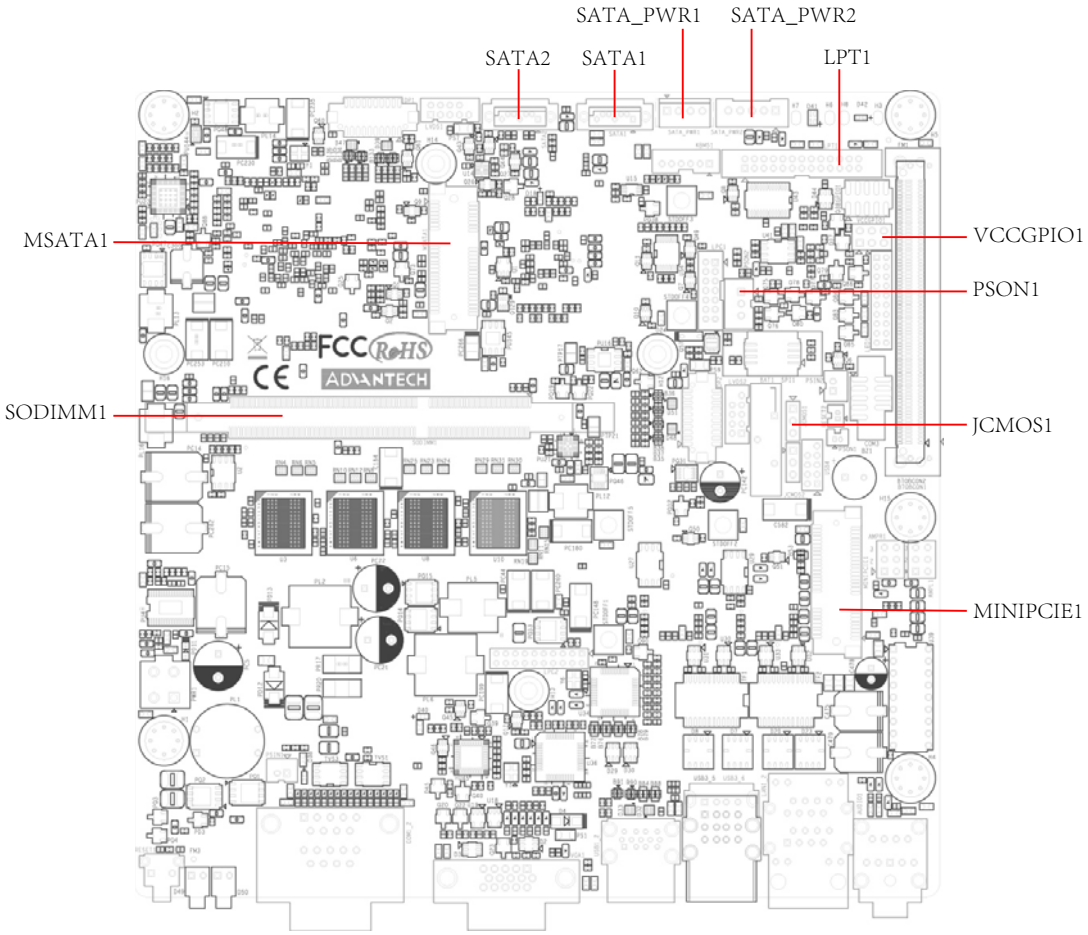


Figure 2.3 Mainboard jumper and connector locations

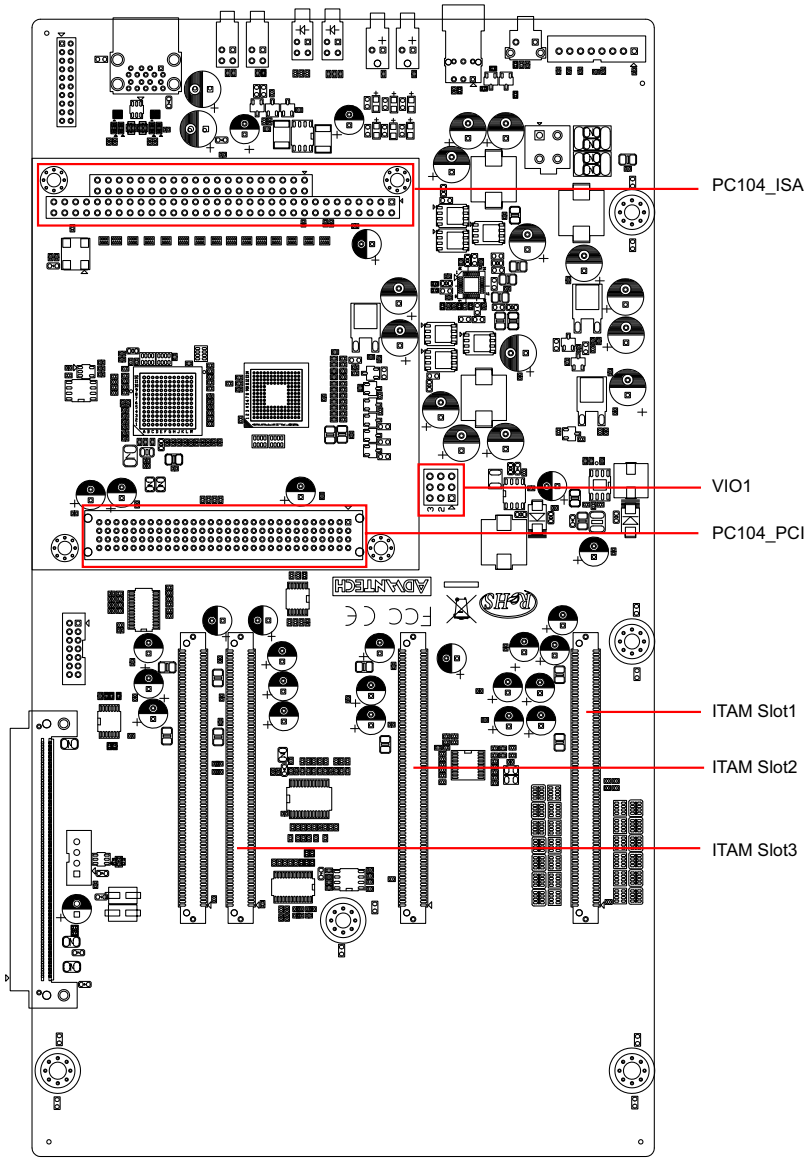
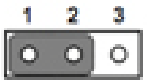


Figure 2.4 Backplane jumper and connector locations

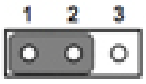
Table 2.1: Jumpers	
Label	**Function**
JCMOS1	Clear CMOS settings
PSON1	Boot mode configuration
VCCGPIO1	GPIO voltage configuration



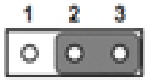
Default

Clear CMOS settings

Table 2.2: JCMOS1: Clear COMS Configuration	
Closed Pins	**Settings**
1-2	Normal (+V3.3_SB)*
2-3	Clear CMOS settings
* Default	



AT Mode



ATX Mode

Table 2.3: PSON1: Boot Mode Configuration	
Closed Pins	**Settings**
1-2	AT Mode
2-3	ATX Mode*
* Default	

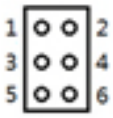


Table 2.4: VCCGPIO1: GPIO Voltage Configuration	
Closed Pins	**Settings**
1-3	+V5_SB*
2-4	+V3.3_SB
3-5	+V5
4-6	+V3.3
* Default	

2.4 I/O Connectors

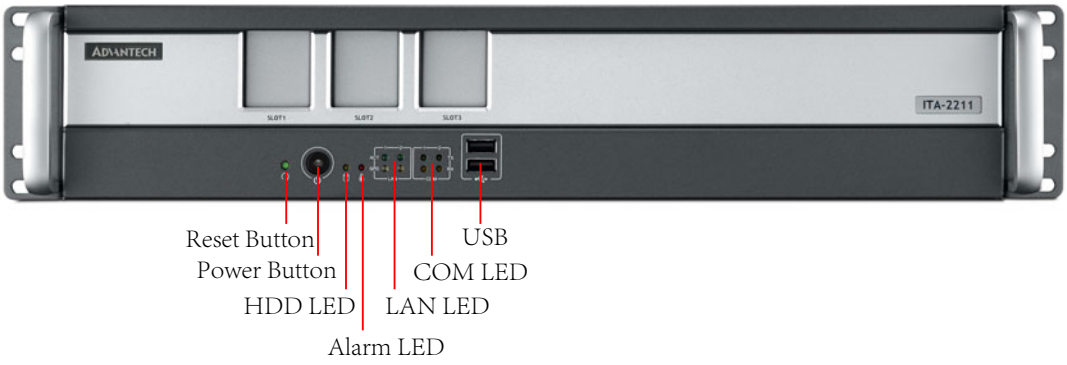


Figure 2.5 ITA-2211 front I/O connectors

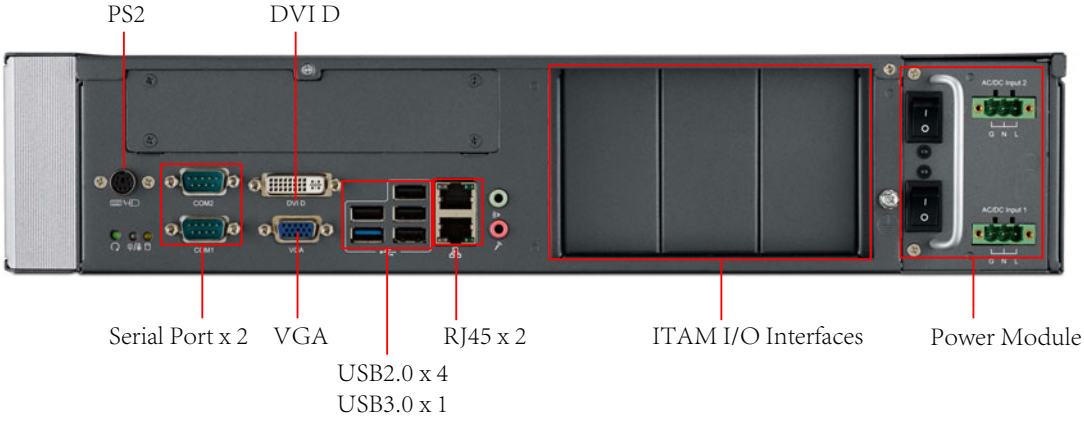


Figure 2.6 ITA-2211 rear I/O connectors

2.4.1 COM Port

ITA-2211 provides 2 DB9 RS-232/RS-422/RS-485 ports.

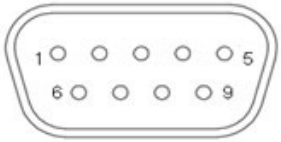


Table 2.5: COM Port

	RS-232	RS-422	RS-485
Pin	**Signal Name**	**Signal Name**	**Signal Name**
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.4.2 DVI-D Connector

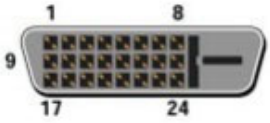


Table 2.6: DVI-D Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	T.M.D.S. Data2-	13	T.M.D.S. Data3+
2	T.M.D.S. Data2+	14	+5V Power
3	T.M.D.S. Data2/4 Shield	15	Ground (for +5V)
4	T.M.D.S. Data4-	16	Hot Plug Detect
5	T.M.D.S. Data4+	17	T.M.D.S. Data0-
6	DDC Clock	18	T.M.D.S. Data0+
7	DDC Data	19	T.M.D.S. Data0/5 Shield
8	No Connect	20	T.M.D.S. Data5-
9	T.M.D.S. Data1-	21	T.M.D.S. Data5+
10	T.M.D.S. Data1+	22	T.M.D.S. Clock
11	T.M.D.S. Data1/3 Shield	23	T.M.D.S. Clock+
12	T.M.D.S. Data3-	24	T.M.D.S. Clock-

2.4.3 VGA Connector

ITA-2211 provides 1 D-SUB 15-pin female Connector.

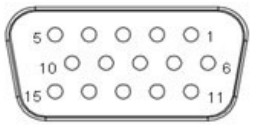


Table 2.7: VGA Connector

Pin	Signal Name
1	Red
2	Green
3	Blue
4	NC
5	GND
6	GND
7	GND
8	GND
9	+5V
10	GND
11	NC
12	DDC-DATA
13	H-SYNC
14	V-SYNC
15	DDC-CLK

2.4.4 USB 2.0 Connector

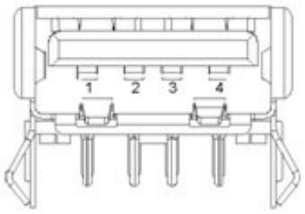


Table 2.8: USB2.0 Pin Definition

Pin	Signal Name	Pin	Signal Name
1	+V5(VCC)	3	USB DATA+
2	USB DATA-	4	GND

2.4.5 USB3.0 Connector

ITA-2211 provides 1 USB3.0 Connector which is USB UHCI Rev. 3.0 compliant. The port can be disabled from BIOS.

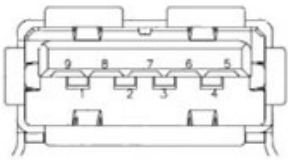
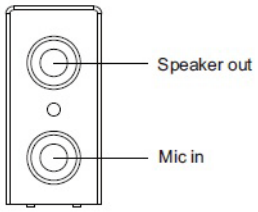


Table 2.9: USB3.0 Pin Definition

Pin	Signal Name	Pin	Signal Name
1	+V5(VCC)	6	StdA_SSRX+
2	D-	7	GND_DRAIN
3	D+	8	StdA_SSTX-
4	GND	9	StdA_SSTX+
5	StdA_SSRX-		

2.4.6 Audio in Connector

ITA-2211 provides 1 integrated mic in/speaker out audio Connector.



2.4.7 LAN Port

The board comes with 2 RJ45 Ethernet connectors with LED indicators to show network status and IEEE 802.3U 10/100/1000 Mbps compliant.

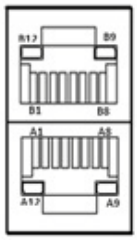


Table 2.10: LAN Port

Pin	Signal Name
A1/B1	MDIO0+
A2/B2	MDIO0-
A3/B3	MDIO1+
A4/B4	MDIO2+
A5/B5	MDIO2-

Table 2.10: LAN Port	
A6/B6	MDIO1-
A7/B7	MDIO3+
A8/B8	MDIO3-
A9/B9	LED GREEN-
A10/B10	LED GREEN+
A11/B11	1000M LED
A12/B12	100m/10M LED

2.4.8 Phoenix Terminal Connector

ITA-2211 provides one 3pin Phoenix terminal power input Connector.

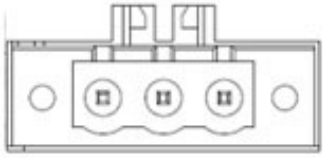


Table 2.11: Phoenix Terminal Connector	
Pin	**Signal Name**
1	GND
2	N
3	L

Note A:

Make sure that the wiring personnel follows the installation method explained in the NEC American electrician convention.

“Power installation must be performed with qualified electrician and followed with National Electrical Code, ANSI/NFPA 70 and Canadian Electrical Code, Part I, CSA C22.1.”

Note B:

Make sure that the wiring complies with NEC American electrician convention, FW2 material use will affect the cable type and thickness (Note 2).

“Use No. 18 AWG min, 75°C copper wire with set-screw type pressure terminal connector and 10lb-in Torque force when connecting to terminal block.”

Note C:

Must install Branch Circuit Breaker and specify the current rating (20A recommended) (Note 3)

“Connected mains shall be built branch circuit breaker which possessed 20 A of current rating.”

(Note 1) According to UL 60950-1 Annex NAE 3.3

(Note 2) According to UL 60950-1 Annex NAE 3.3.4 & NEC Standard Table 310.16

(Note 3) According to UL 60950-1 Clause 1.7.2.2

Chapter 3

System Setup

3.1 Introduction

The following procedures will instruct you to install all modules into the ITA-2211 system.

3.1.1 Installing Mainboard mini-PCIe Card and mini SATA Card

1. ITA-2211 mainboard has a mini-PCIe slot and a mini SATA slot. Each one has a label for users to distinguish.
2. Insert mini-PCIe card and mSATA card to the respective slot and fix with two screws.

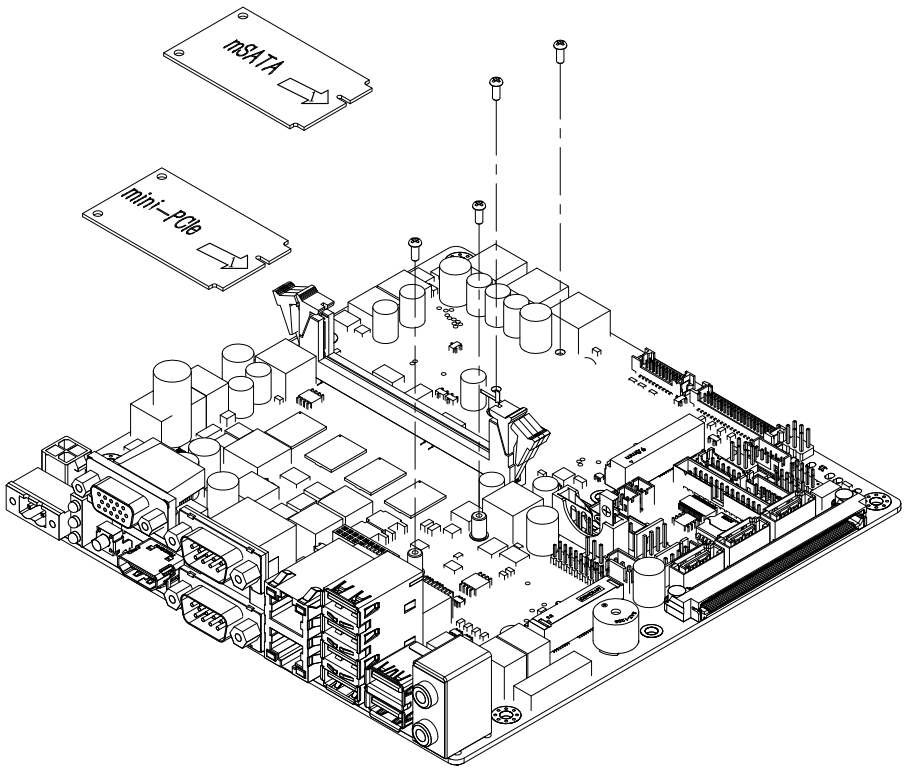


Figure 3.1 Installing Mainboard mini-PCIe card and mini SATA

3.1.2 Installing HDD Module

The ITA-2211 reserves space for two 2.5” HDD modules and 3.5” HDD module. Please refer to the following instructions.

3.1.2.1 Installing 3.5” HDD

1. Open the chassis top cover and remove the HDD bracket in the front of main-board.
2. Take out HDD rubbers from the accessory box and insert into 4 holes of the HDD bracket.
3. Put the 3.5” HDD in the HDD bracket (steel casing upwards), and align the screw holes in the two sides of HDD with center of open circles, then fix with the screws.
4. Place the HDD module in the chassis in the right direction (HDD Connectors downwards), and connect the HDD cable.

3.1.2.2 Installing 2.5” HDD

1. Attach the HDD to the 2.5” HDD bracket which can be found in the accessory box (steel casing side upward). Up to two 2.5” HDDs are supported.
2. Open the chassis top cover and remove the HDD bracket in the front of main-board.
3. Take out HDD rubbers from the accessory box and insert into 4 holes of the HDD bracket.
4. Put the 2.5” HDD module in the HDD bracket and fix with the screws.
5. Place the HDD module in the chassis in the right direction (HDD Connectors downwards), and connect the HDD cable.

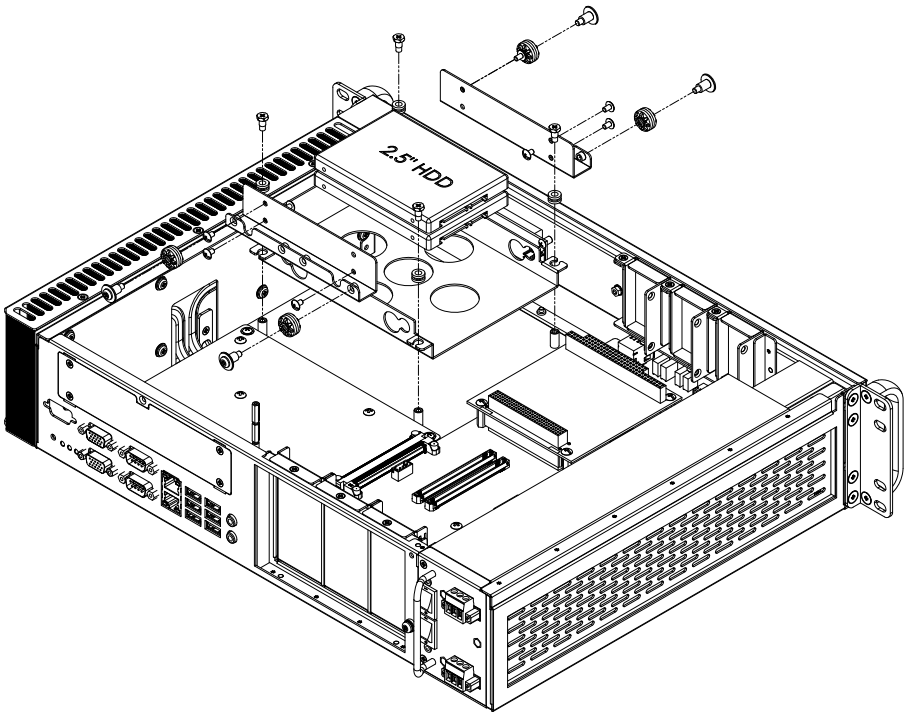


Figure 3.2 Installing HDD module

3.1.3 Installing the Top Cover

Please follow the below procedures to install chassis top cover.

1. Place the top cover as shown below.
2. Fix the chassis top cover with 2 screws.

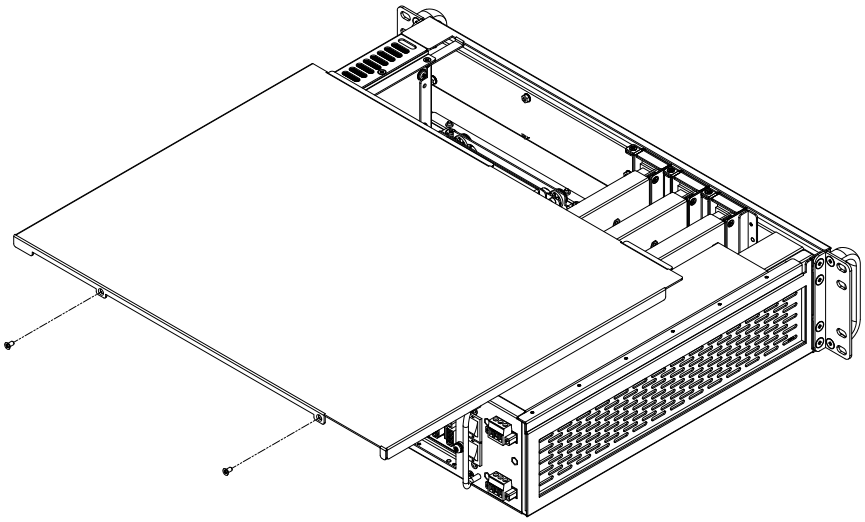


Figure 3.3 Installing top cover

3.1.4 Installing Ear and Handle

Align the two ears with the screw holes in the side of chassis and fix with screws. Align the two handles with the screw holes in the front of ears and fix with screws.

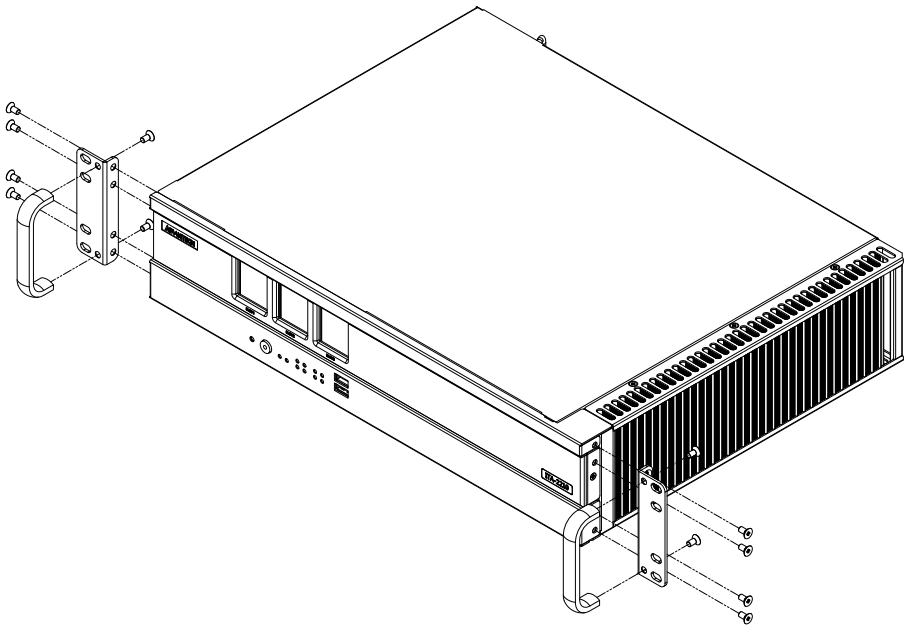


Figure 3.4 Installing Ear and Handle

3.1.5 Installing ITAM Card Module

Please follow the below procedures to install ITAM card module.

1. Remove the top cover of the chassis.
2. Please insert the ITAM module, see figure below.
   a. First insert the module I/O into the front I/O panel of the chassis.
   b. Then fix the front of the module onto front panel of the chassis.
   c. Check if ITAM module Connectors parallel with ITAM slot of the backplane.
   d. Check if the module is completely inserted in.
5. Fix the ITAM module to the system with screws.

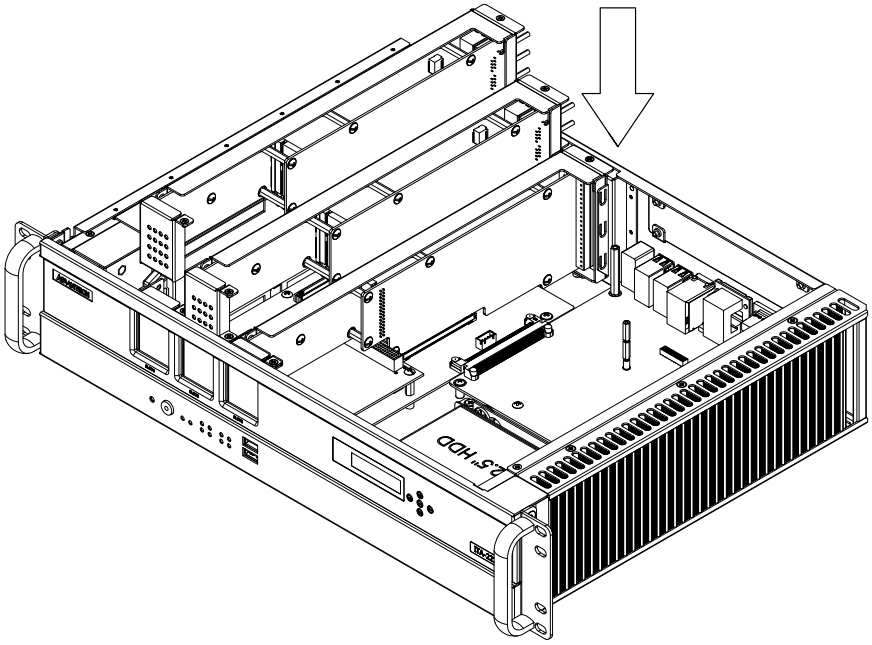


Figure 3.5 Installing ITAM Card Module

Chapter 4

AMI BIOS Configuration

4.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. This chapter introduces how to configure BIOS for ITA-2211 series.With the AMIBIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus formaking changes and turning the special features on or off. This chapter describes the basic navigation of the ITA-2211 setup screens.

Figure 4.1: Setup Program Initial Screen

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed up CMOS so it retains the Setup information when the power is turned off.

4.2 Entering Setup

Turn on the computer to enter POST screen, and BIOS and CPU information will be shown. Press <DEL> and you will immediately be allowed to enter Setup.

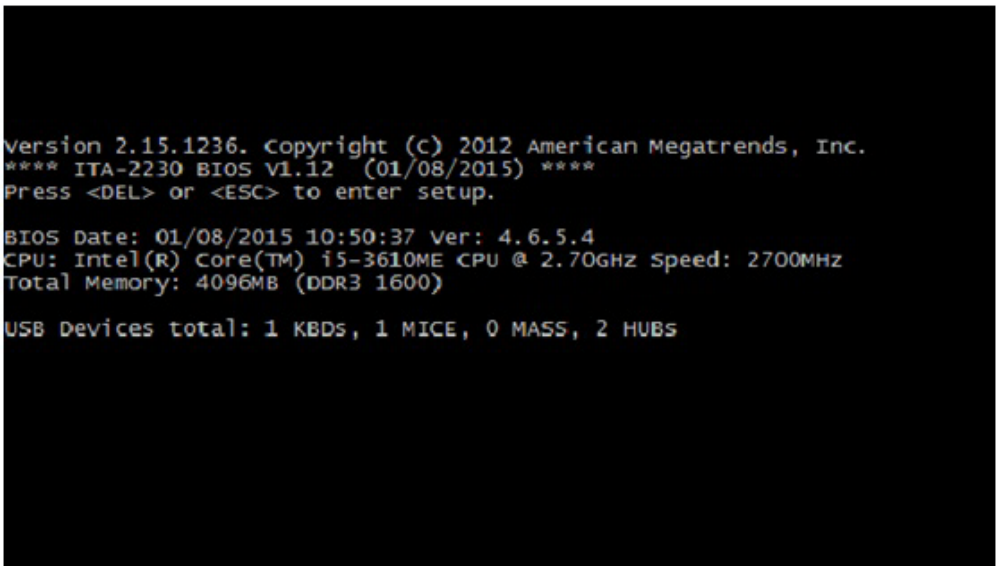


Figure 4.2: Press <DEL> to Enter Setup

4.2.1 Main Setup

When you first enter the BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

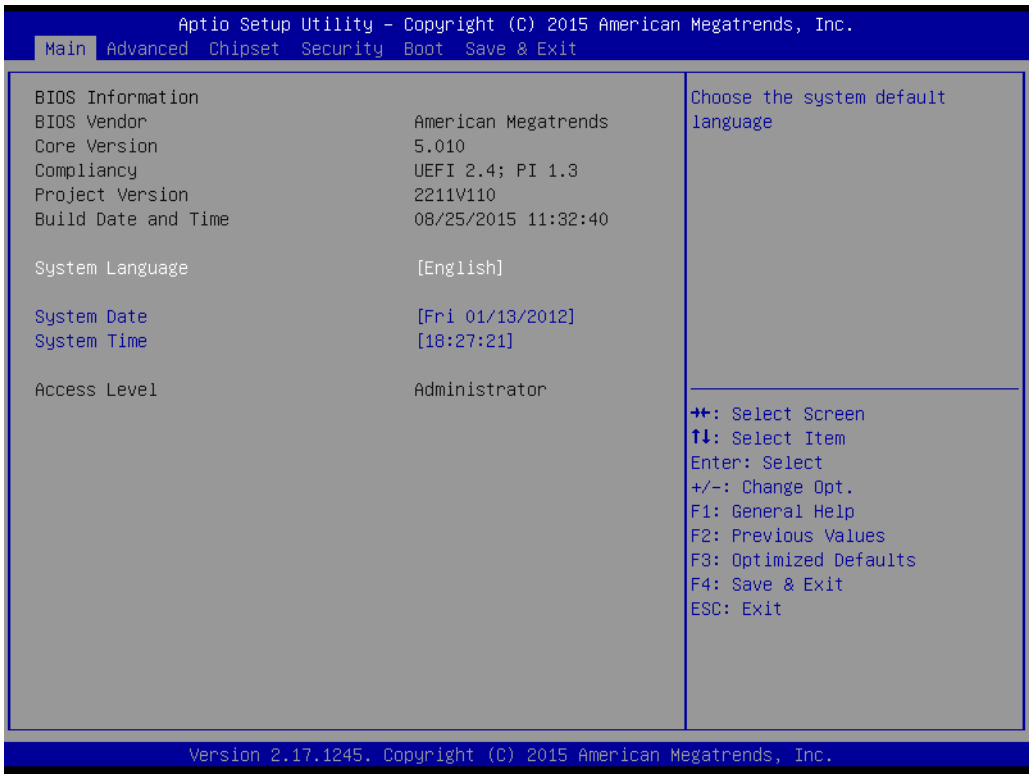


Figure 4.3: Main Setup Screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Time / System 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 must be entered in HH:MM:SS format.

4.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ITA-2211 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

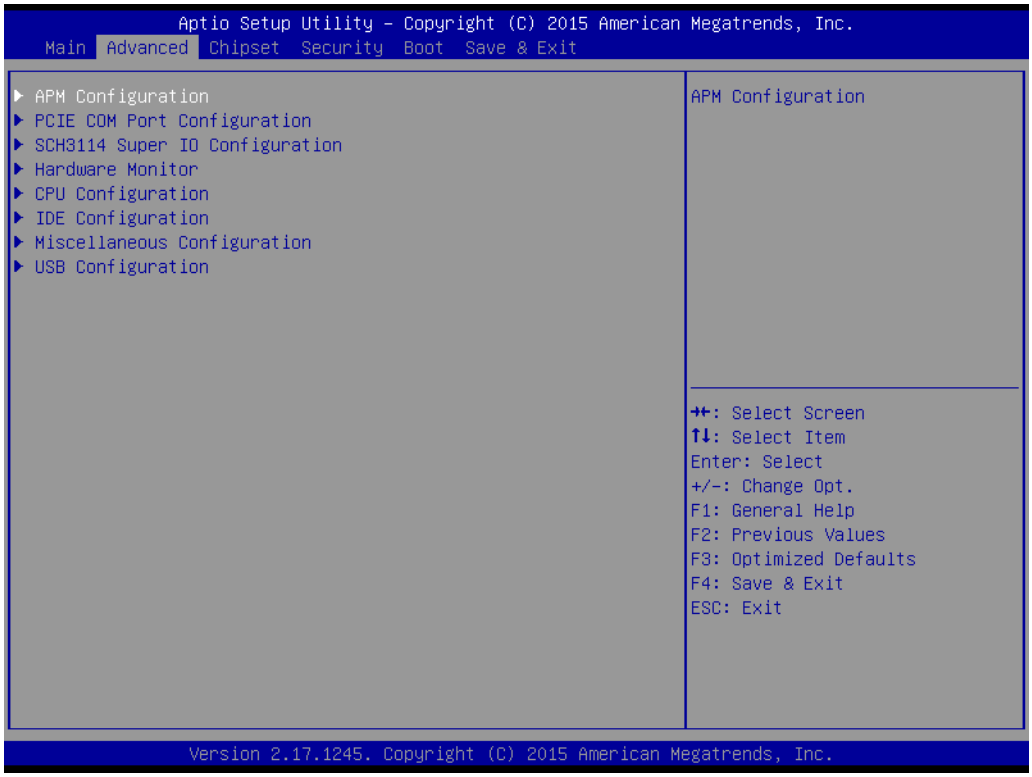


Figure 4.4: Advanced BIOS Features Setup Screen

4.2.2.1 APM Configuration

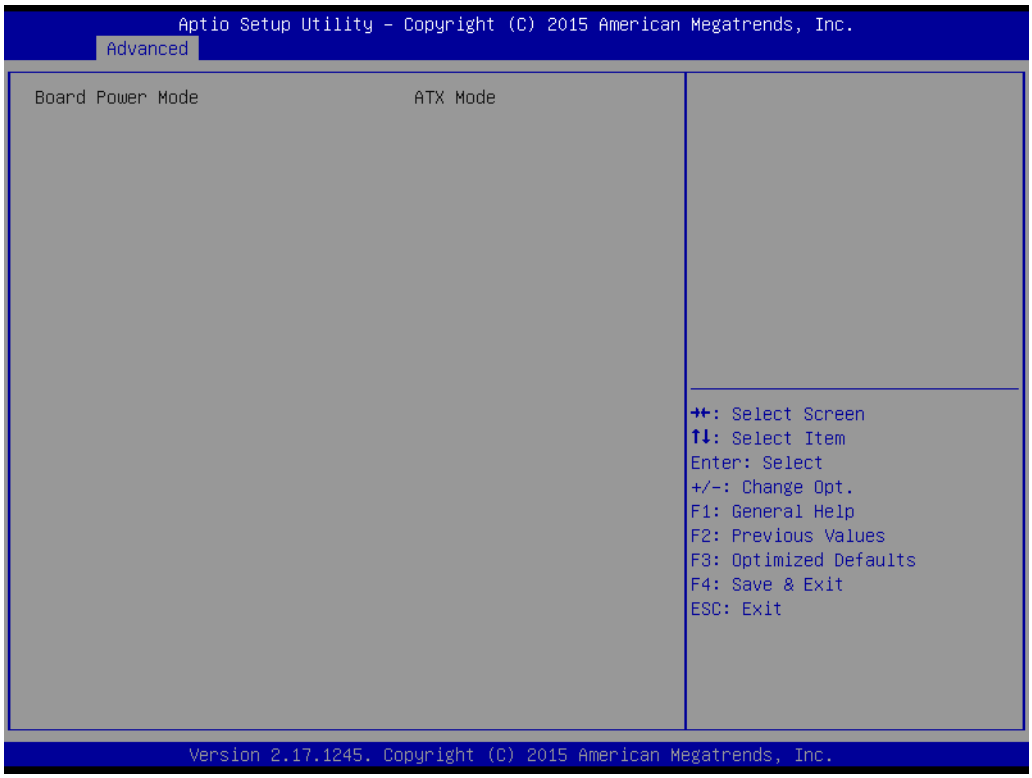


Figure 4.5: APM Configuration

- **Board Power Mode**
  This item displays the current power mode: “AT mode” or “ATX mode”.

4.2.2.2 PCIE COM Port Configuration

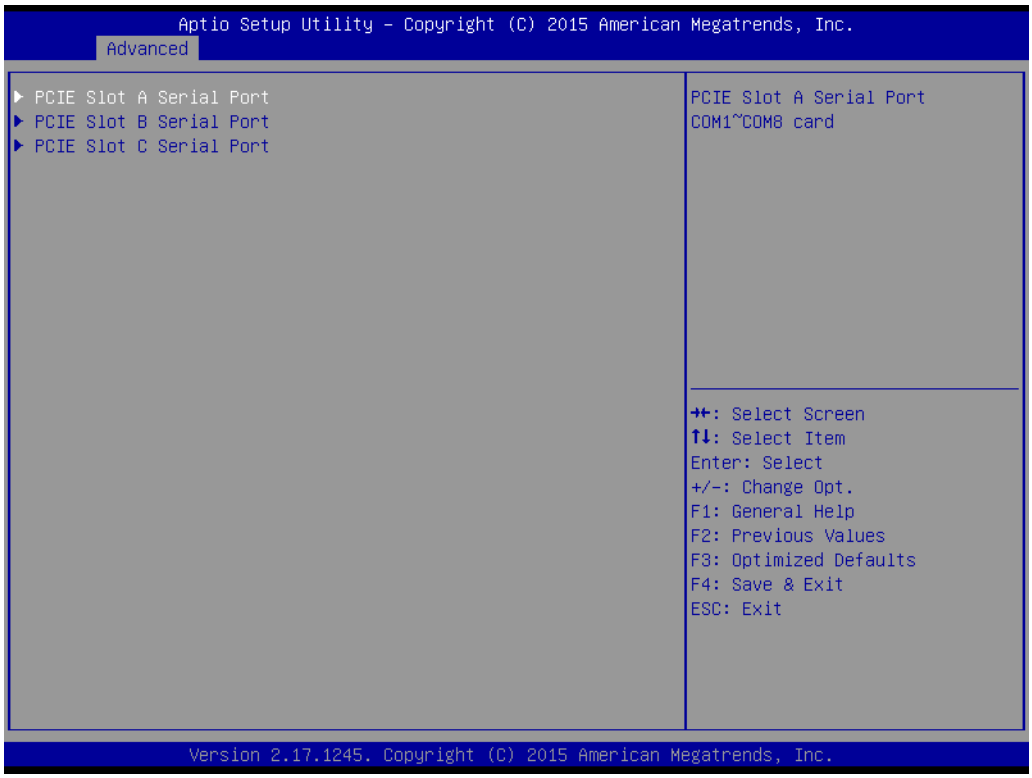


Figure 4.6: PCIE COM Port Configuration 1

This item shows the three PCIE slot seral port information. ITA-2211 has three PCIE slots for ITAM I/O card expansion.

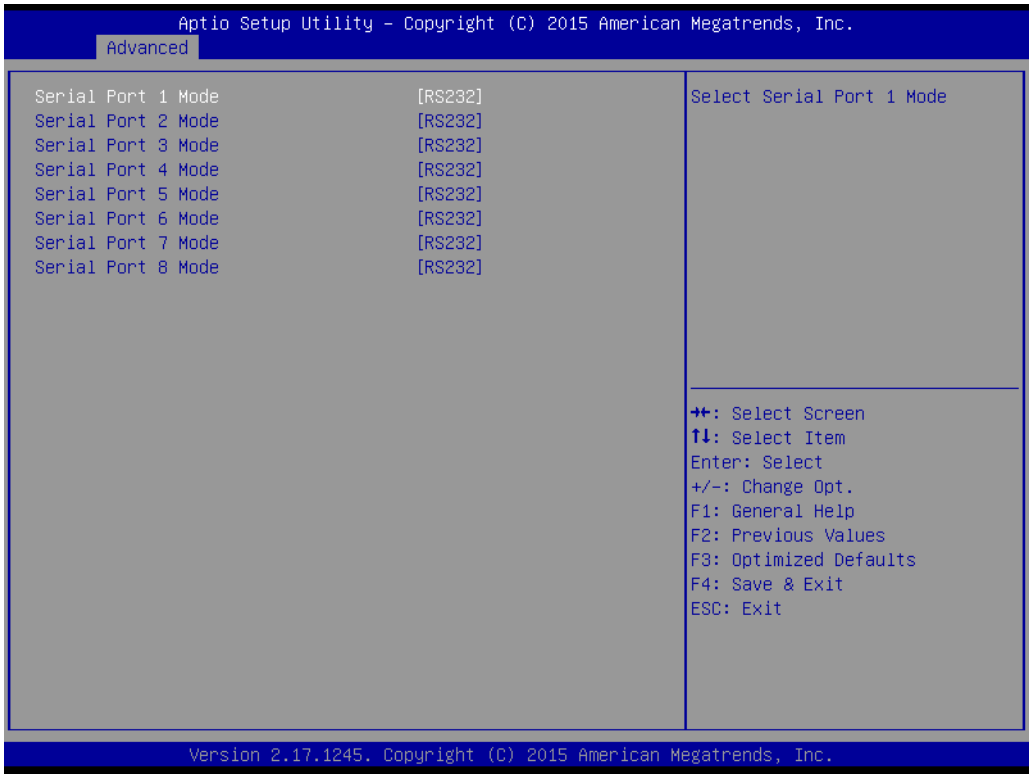


Figure 4.7: PCIE COM Port Configuration 2

- **PCIE SLOT1 Serial Port**

  This item shows the PCIE SLOT1 seral port information. Select Serial Port / Serial Port 2-1 to 2-8 mode for RS232/RS422/RS485 mode configuration. RS485 protocol supports flow control.

4.2.2.3 Super I/O Configuration

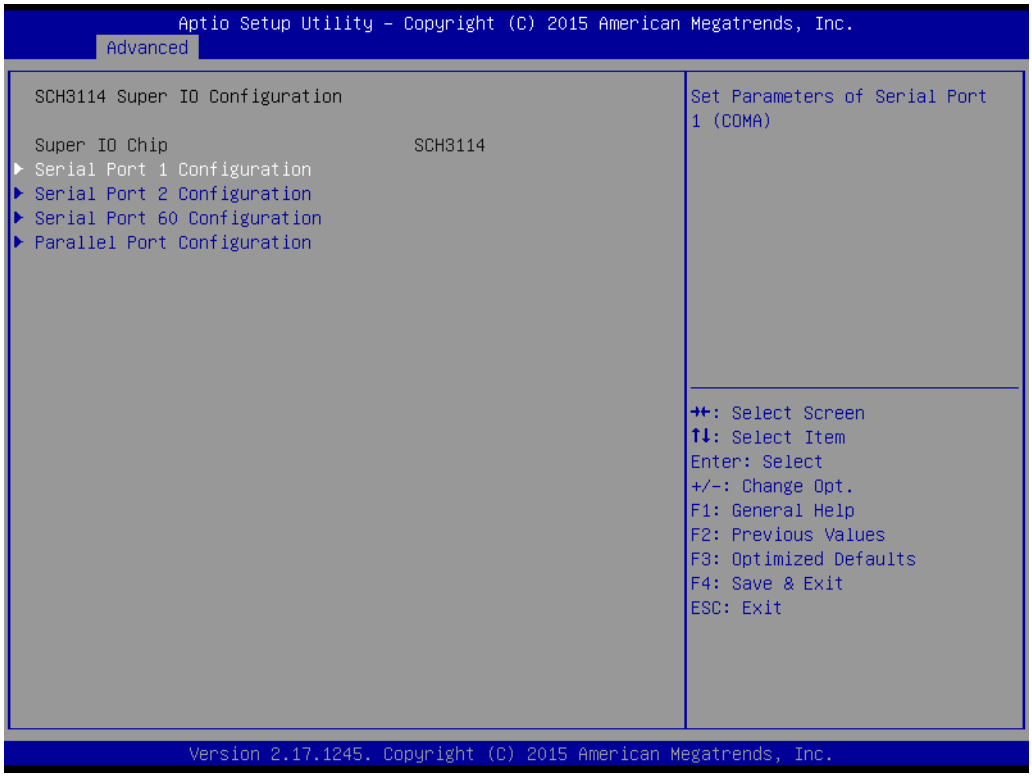


Figure 4.8: Super I/O Configuration

- **Serial Port1/2/60**

  Select the base ddress and IRQ of Serial Port 1/2 and configure RS232/RS422/RS485 mode. The RS232/RS422/RS485 mode of Serial Port 3~10 can be configured by jumper.

- **Parallel Port Configuration**

  Select the base address and IRQ of Parallel Port and configure the mode.

- **Serial Port 0 Configuration**

  – **Serial Port**

  This item allows users to enable or disable serial port. The default setting is “Enabled”.

  – **Serial Port Mode**

  This item allows users to set serial port as RS232/422/485. The default setting is “RS232”.

  – **Change settings**

  IO=3F8h; IRQ=4;

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

  This item allows users to select IO address and IRQ to change serial port settings.

  – **Device mode**

  This item allow users to select device mode as “High Speed” or “Normal mode”. The default setting is “Normal Mode”.

4.2.2.4 H/W Monitor

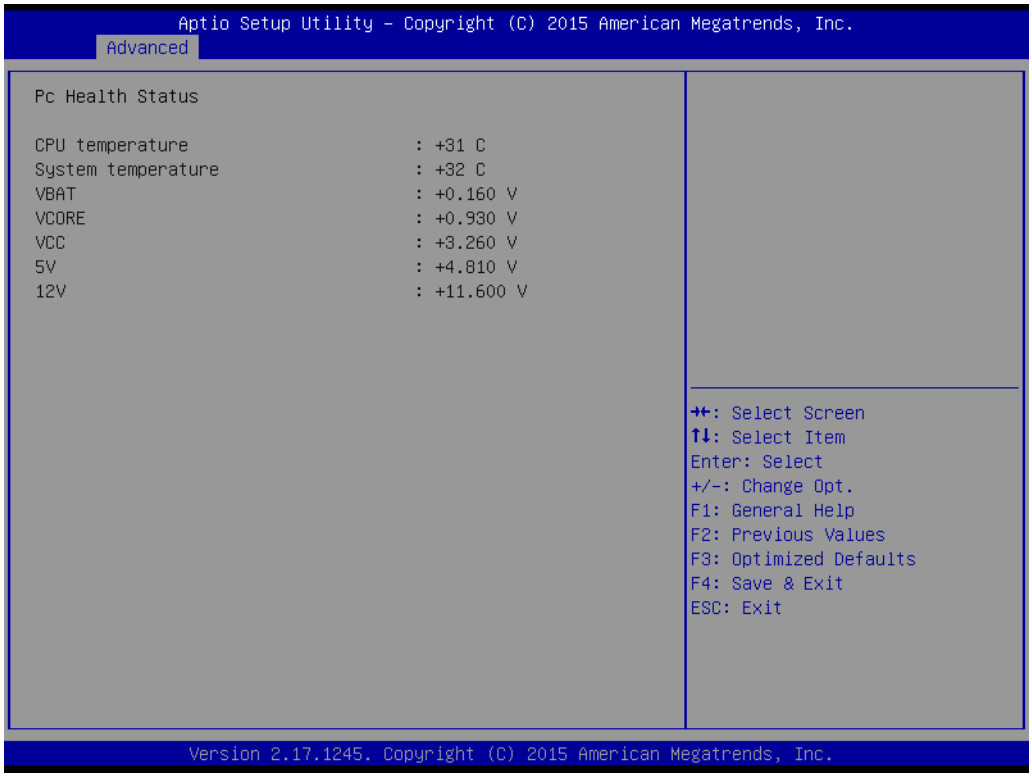


Figure 4.9: H/W Monitor COnfiguration

- **PC Health Status**

  This item is used for hardware safety detection. BIOS will display the current system temperature, CPU temperature and other related voltage values. All these parameters have a certain range, so operations out of the range should be avoided.

4.2.2.5 CPU Configuration

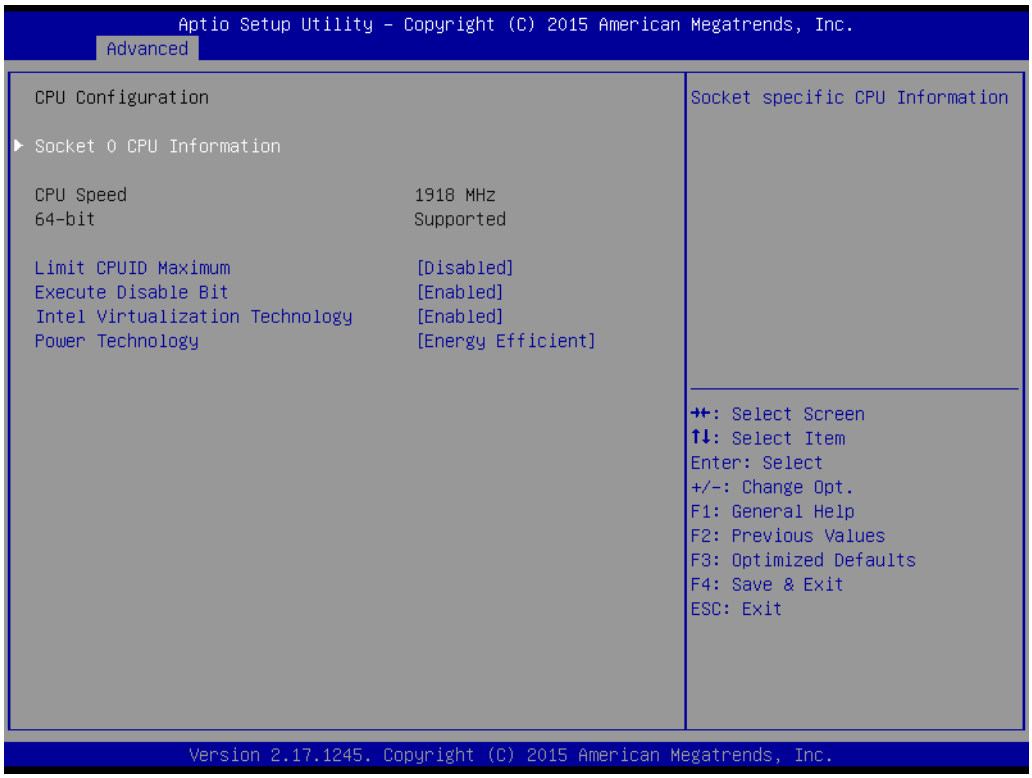


Figure 4.10: CPU Configuration 1

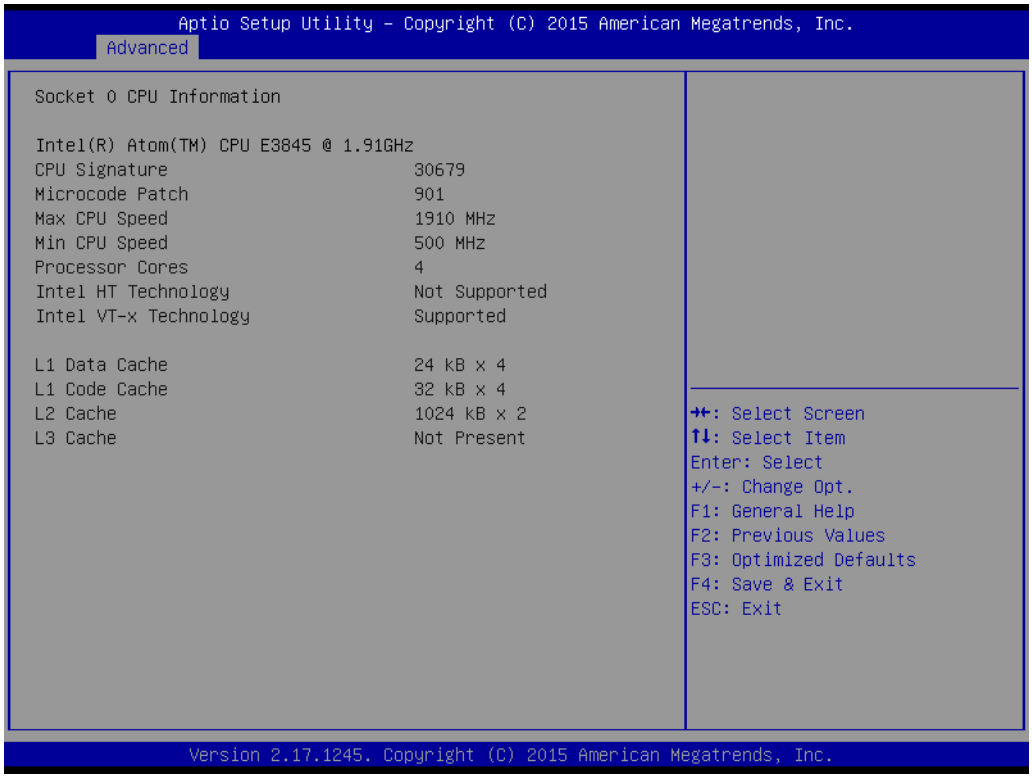


Figure 4.11: CPU Configuration 2

- **Socket 0 CPU Information**
  This item allows users to check relative CPU information.
- **Limit CPUID Maximum**

This item allows users to set the limit CPUID maximum value.

- **Execute Disable Bit**

  This item allows users to enable or disable Execute Disable Bit function. The default setting is “Enabled”.

- **Intel Virtualization Technology**

  This item allows users to enable or disable Intel Virtualization Technology. The default setting is “Enabled”.

- **Power Technology**

  This item allows users to enable or disable power management technology. The default setting is “Energy Efficient".

4.2.2.6 IDE Configuration

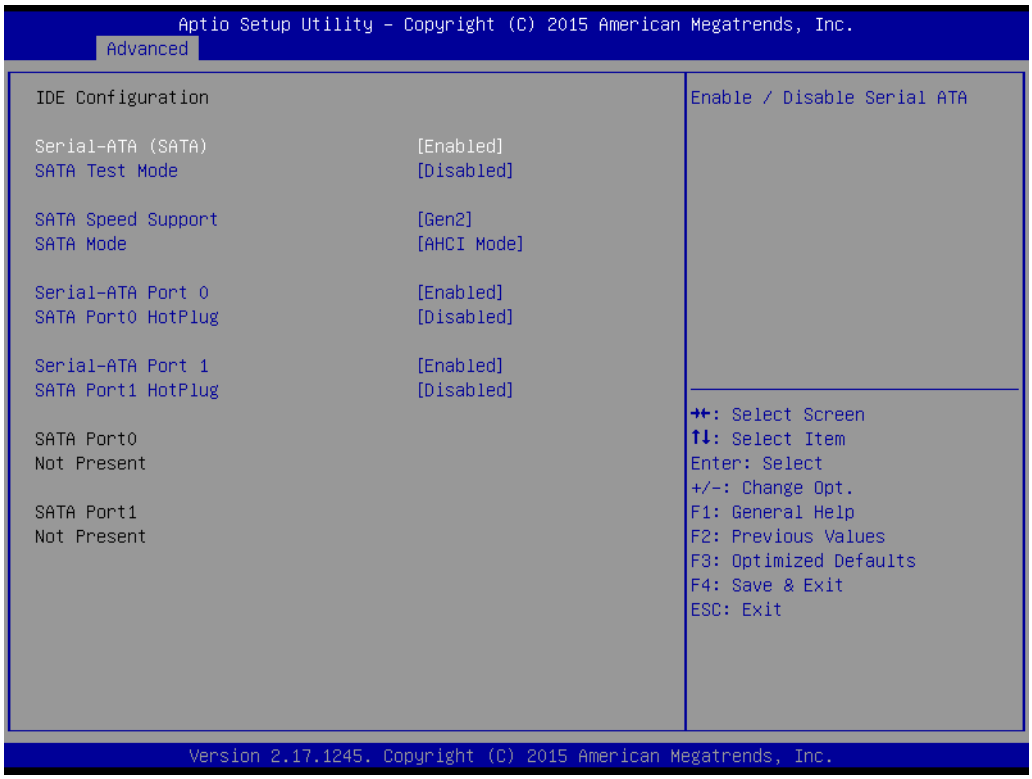


Figure 4.12: IDE Configuration

- **Serial-ATA**

  The default setting is “Enabled”. Select “Enabled” to enable all SATA resources.

- **SATA Test ModeX**

  The default setting is “Diabled”. Select “Enabled” to enable SATA signal test mode.

- **SATA Speed Support**

  The default setting is “Gen2”. Select “Gen1” or“Gen2” to change SATA transfer rate.

- **SATA Mode**

  The default setting is “AHCI Mode”. Options include "IDE Mode" or “AHCI Mode”.

4.2.2.7 Miscellaneous Configuration

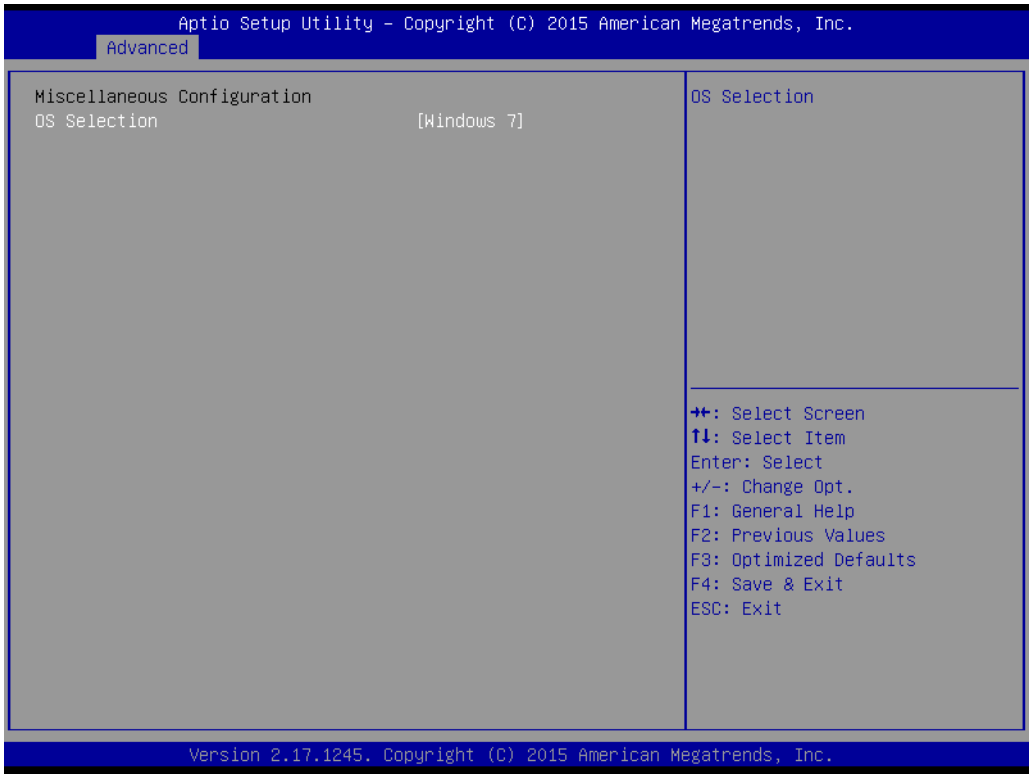


Figure 4.13: Miscellaneous Configuration

This item allows users to view and select the available OS version.

4.2.2.8 USB Configuration

Figure 4.14: USB Configuration

- **Legacy USB Support**
  This item allows users to enable support for legacy USB. The default setting is “Enabled”.
- **EHCI Hand-off**
  This item allows users to enable EHCI Hand-off feature.
- **XHCI Hand-off**
  This item allows users to enable XHCI Hand-off feature.
- **USB Mass Storage Driver Support**
  Select “Enabled” to support USB mass storage driver feature. The default setting is “Enabled”.
- **USB Transfer Timeouts**
  This item allows users to determine the timeout values for control, bulk, and interrupt transfers.
- **Device Reset Timeout**
  This item allows users to set the USB mass storage device unit command timeout value.
- **Device Power-up Delay**
  This item is used to set USB device power-up delay feature. The default setting is “Manual”.
- **Device power-up delay in seconds**
  This item is used to set USB device power-up delay time. The default setting is “3 sec”.

Caution! *If no USB driver/keyboard is detected, the delay time is recommended to be set as “8 sec”.*

4.2.3 Advanced Chipset Features Setup

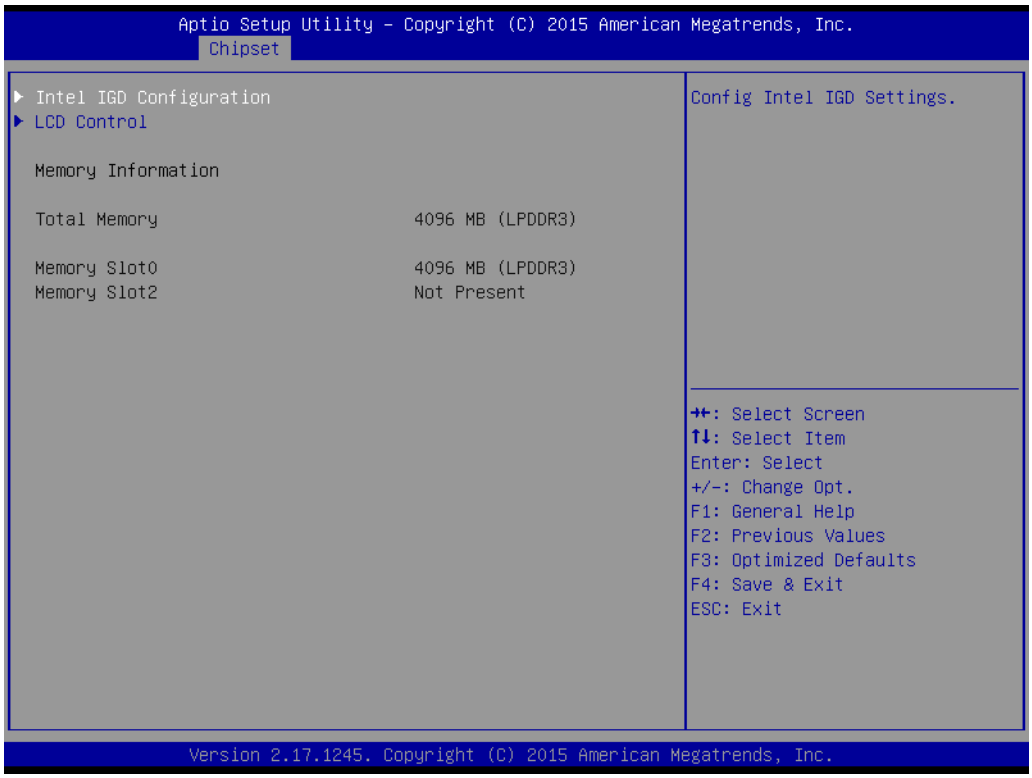


Figure 4.15: Advanced Chipset Features Setup

4.2.3.1 Intel IGD Configuration

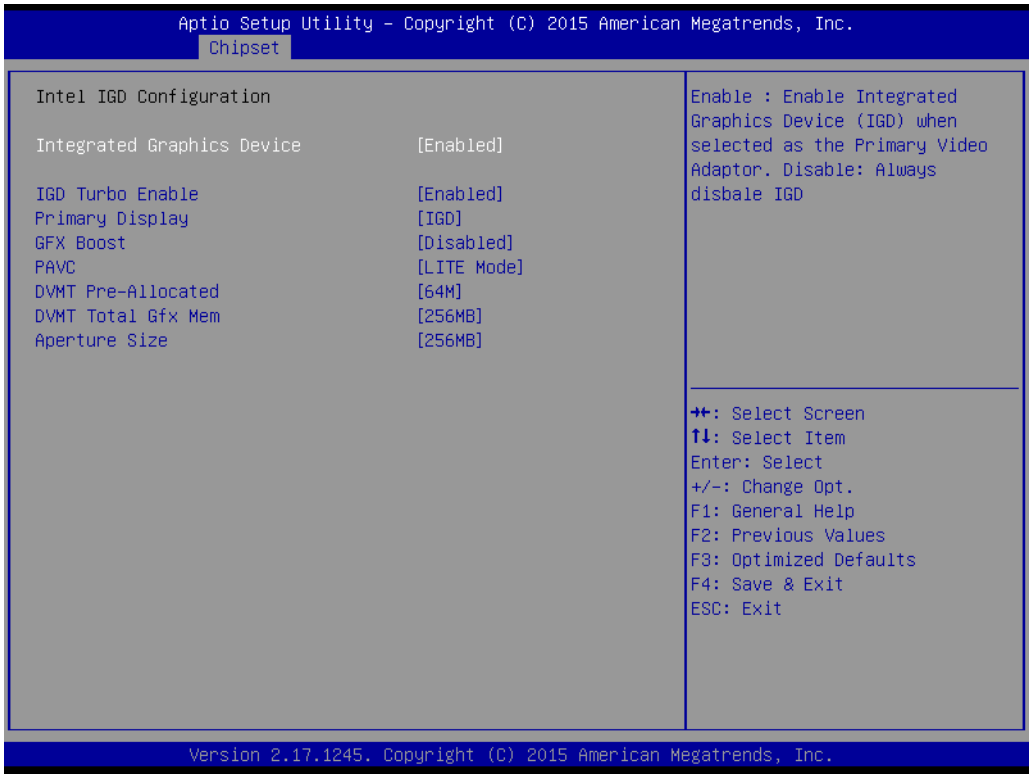


Figure 4.16: Intel IGD Configuration

- **Intergrated Graphics Device**

  This item allows users to enable or disable an integrated graphics device. The default setting is “Enabled”.

- **IGD Turbo Enable**

  This item allows users to enable or disable IGD Turbo function. The default setting is “Enabled”.

- **GFX Boost**

  This item allows users to enable or disable GFX Boost. The default setting is “Disabled”.

- **PAVC**

  This item allows users to enable or disable Protected Audio Video Control. The default setting is “LITE Mode”.

- **DVMT Pre-Allocated**

  This item allows users to select DVMT pre-allocated memory size. The default setting is “64M”.

- **DVMT Total Gfx Mem**

  This item allows users to select DVMT total memory size. The default setting is “256M”.

- **Aperture Size**

  This item allows users to select aperture size.

4.2.3.2 PCH Azalia Configuration

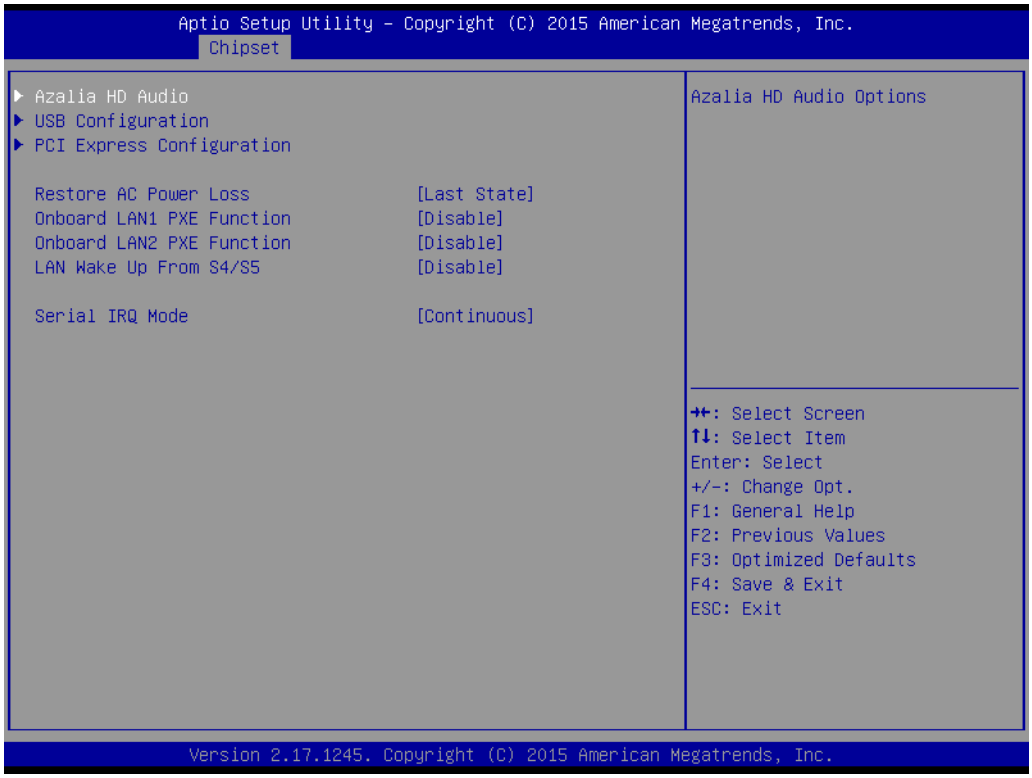


Figure 4.17: Azalia Configuration

- **Azalia HD Audio**
  - **LPE Audio Support**

    This item allows users to enable or disable LPE Audio Support. The default setting is “Enabled”.
  - **Audio Controller**

    This item allows users to specify Azalia device detect option. The default setting is “Enabled”.

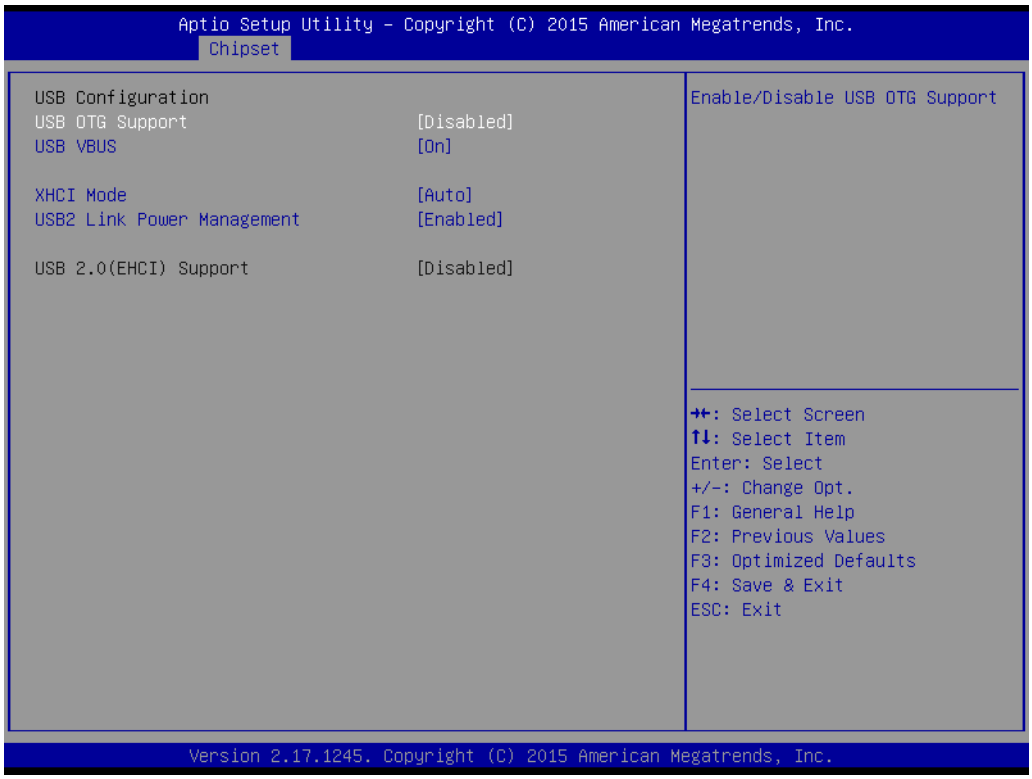


Figure 4.18: USB Configuration

- **USB Configuration**
  - **USB OTG Support**

    This item allows users to enable or disable USB OTG Support. The default setting is “Disabled”.
  - **USB VBUS**

    This item allows users to specify VBUS mode. The default setting is “on”.
  - **XHCI Mode**

    This item allows users to specify XHCI Mode. The default setting is “Auto”.
  - **USB2 Link Power Management**

    This item allows users to enable or disable USB2 Link Power Management. The default setting is “Enabled”.

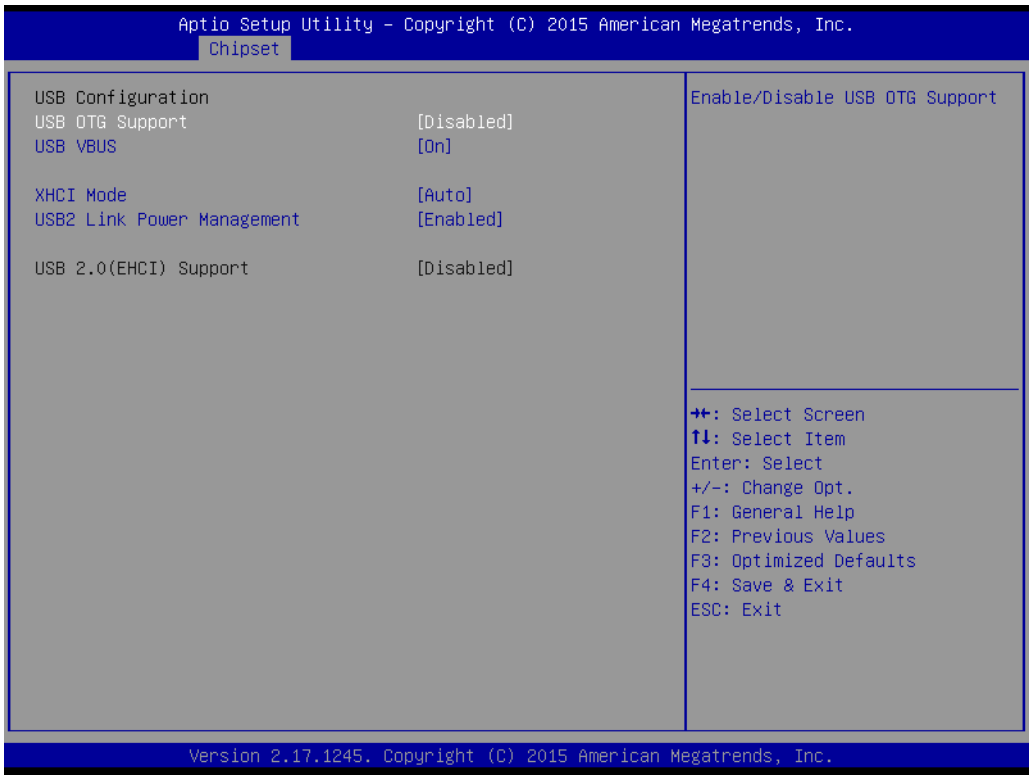


Figure 4.19: PCI Express Configuration

- **PCI Express Configuration**
  - **PCI Express Port 0**

    This item allows users to enable or disable PCI Express port. The default setting is “Enabled”.
  - **Hot Plug**

    This item allows users to enable or disable the PCI Express hot plug. The default setting is “Enabled”.
  - **Speed**

    This item allows users to configure the PCIe port speed. The default setting is “Auto”.
  - **Extra Bus Reserved**

    This item allows users to configure extra bus reserved. The default setting is “1”.
  - **Reserved Memory**

    This item allows users to configure reserved memory. The default setting is “10”.
  - **Reserved Memory Alignment**

    This item allows users to configure reserved memory alignment. The default setting is “1”.
  - **Prefetchable Memory**

    This item allows users to configure prefetchable memory. The default setting is “10”.
  - **Prefetchable Memory Alignment**

    This item allows users to configure prefetchable memory alignment. The default setting is “1”.
  - **Reserved I/O**

    This item allows users to configure reserved I/O. The default setting is “4”.

- **Restore AC Power Loss**

  This item allows users to configure power status when the power in on. The default setting is “Last State”.

- **Onboard LAN1 PXE Funtion**

  This item allows users to configure onboard LAN1 PXE funtion. The default setting is “Disabled”.

- **Onboard LAN2 PXE Funtion**

  This item allows users to configureonboard LAN2 PXE funtion. The default setting is “Disabled”.

- **PCIE LAN Wake up From S4/S5**

  This item allows users to configure LAN Wake up function. The default setting is “Disabled”.

4.2.3.3 LCD Control

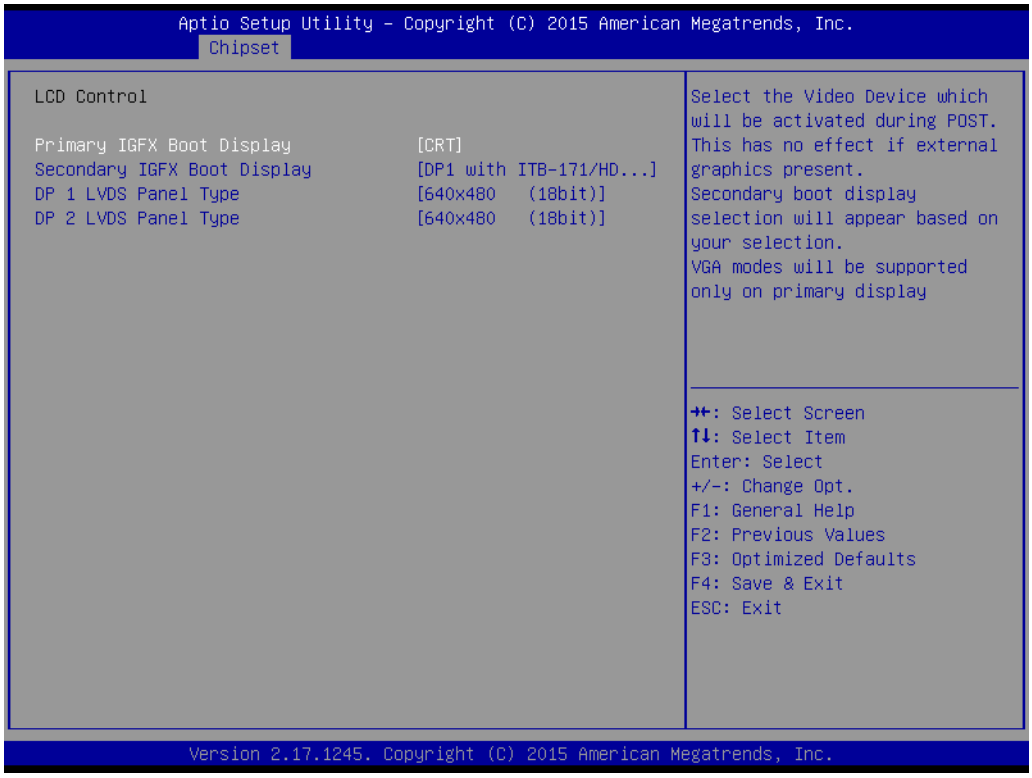


Figure 4.20: LCD Control

- **Primary IGFX Boot Display**

  This item allows users to configure primary IGFX. The default setting is “CRT”. Users can select the options based on the display module actual installed.

- **Secondary IGFX Boot Display**

  This item allows users to configure secondary IGFX. Users can select the options based on the display module actual installed.

- **DP 1 LVDS Panel Type**

  This item allows users to configure DP 1 LVDS Panel resolution.

4.2.4 Boot Setup

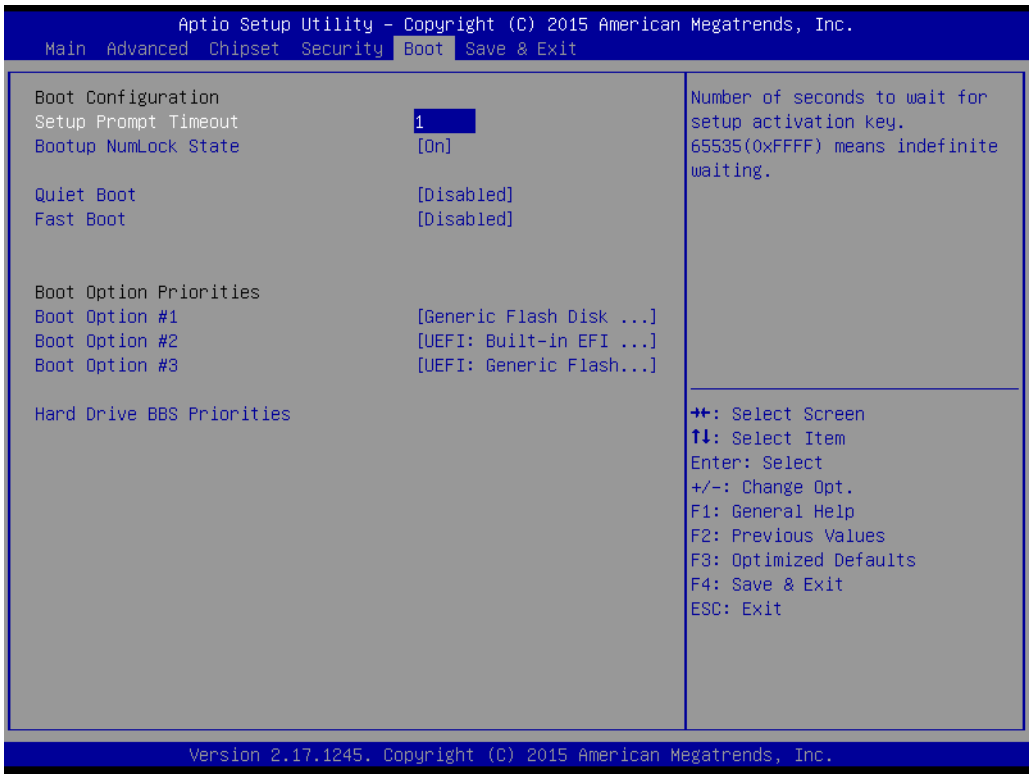


Figure 4.21: Boot

4.2.4.1 Boot Configuration

- **Setup Prompt Timeout**

  This item allows users to specify the number of seconds the system should wait for a setup activation key. The system will continue to boot if setup hotkey is not pressed within the specified period.

- **Bootup NumLock State**

  This item allows users to select the power-on state for Numlock. The default setting is “On”.

  On: NumLock function is on when system boots.

  Off: Cursor control is activated for keypad when system boots.

- **Quiet Boot**

  If this item is set to “Disabled”, the BIOS displays standard POST messages. If set to “Enabled”, an OEM logo is shown instead of POST messages.

- **Fast Boot**

  This item allows BIOS to skip some testing procedures during booting so as to reduce system boot-up time. The default setting is “Disabled”.

4.2.4.2 Boot Option Preconfiguration

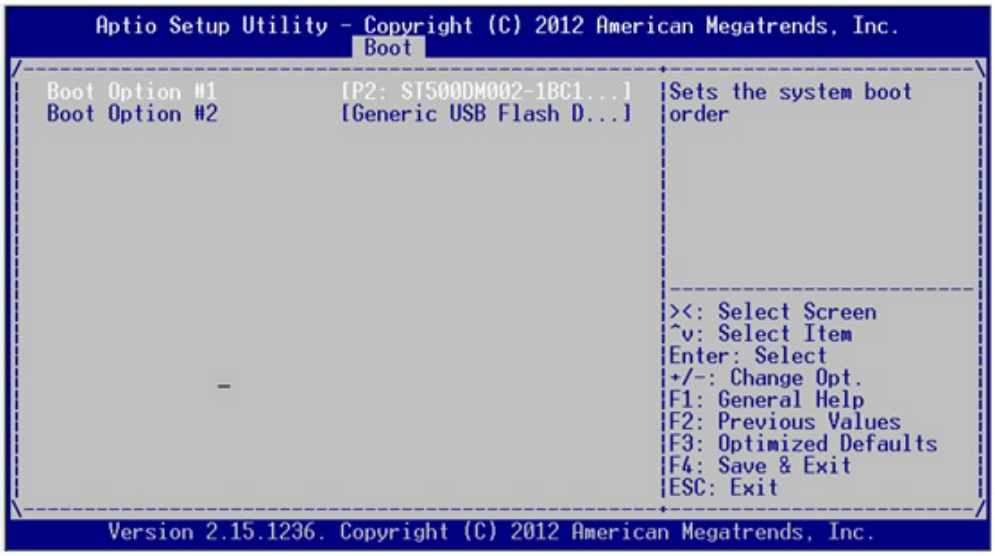


Figure 4.22: Boot Option Preconfiguration

This item allows users to specify the boot priority for devices.

4.2.5 Security Setup

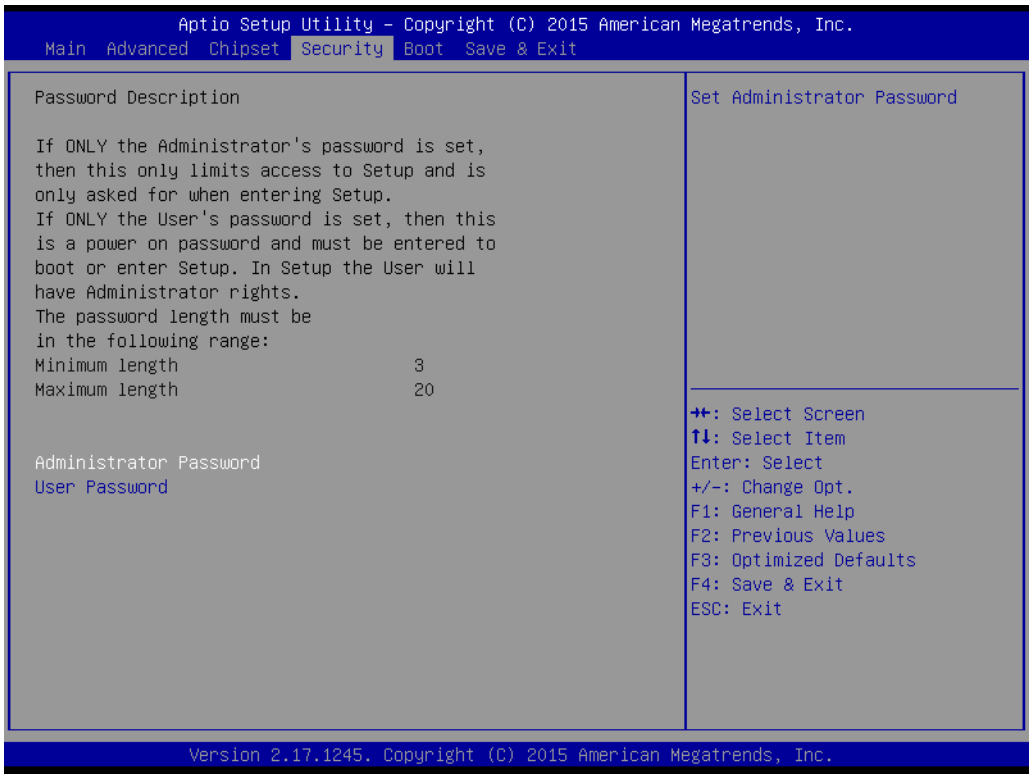


Figure 4.23: Security

- **Administrator Password**
  This item allows users to specify administrator password.
- **User Password**
  This item allows users to specify user password.

4.2.6 Save & Exit Setup

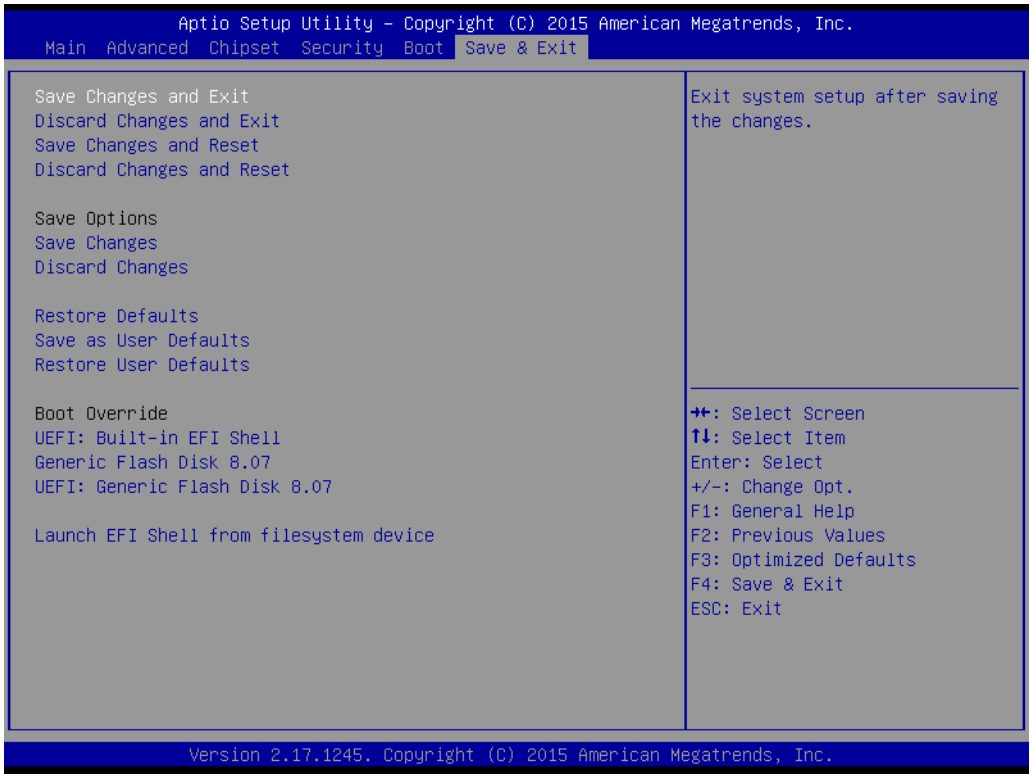


Figure 4.24: Save and Exit

- **Save Changes and Exit**

  When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

  1. Select Save Changes and Exit from the Exit menu and press <Enter>. The following message appears:
     Save Configuration Changes and Exit Now?
     [Ok] [Cancel]
  2. Select Ok or Cancel.

- **Discard Changes and Exit**

  Select this option to quit Setup without making any permanent changes to the system configuration.

  1. Select Exit Discard Changes and Exit from the Exit menu and press <Enter>. The following message appears:
     Discard Changes and Exit Setup Now?
     [Ok] [Cancel]
  2. Select Ok to discard changes and exit.

- **Save Changes and Reset**

  When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

  1. Select Save Changes and Reset and press <Enter>. The following message appears:

Save configuration and Reset?
[Yes] [No]

2. Select Ok or Cancel.

- **Discard Changes and Reset**

  Select this option to quit Setup without making any permanent changes to the system configuration.

  1. Select Discard Changes and Reset from the Exit menu and press <Enter>.
     The following message appears:
     Discard Changes and Reset Setup Now?
     [Ok] [Cancel]
  2. Select Ok to discard changes and exit.

- **Save Changes**

  This item allows users to save changes done so far to any of the options.

- **Discard Changes**

  This item allows users to discard changes done so far to any of the options.

- **Restore Defaults**

  This item allows users to restore/load default values for all the options.

- **Save as User Defaults**

  This item allows users to save the changes done so far as user defaults.

- **Restore User Defaults**

  This item allows users to restore the user defaults to all the options.

- **Boot Override**

  This item allows users to set boot device.

- **Launch EFI Shell from filesystem device**

  This item allows to boot EFI shell from system file device.

Chapter 5

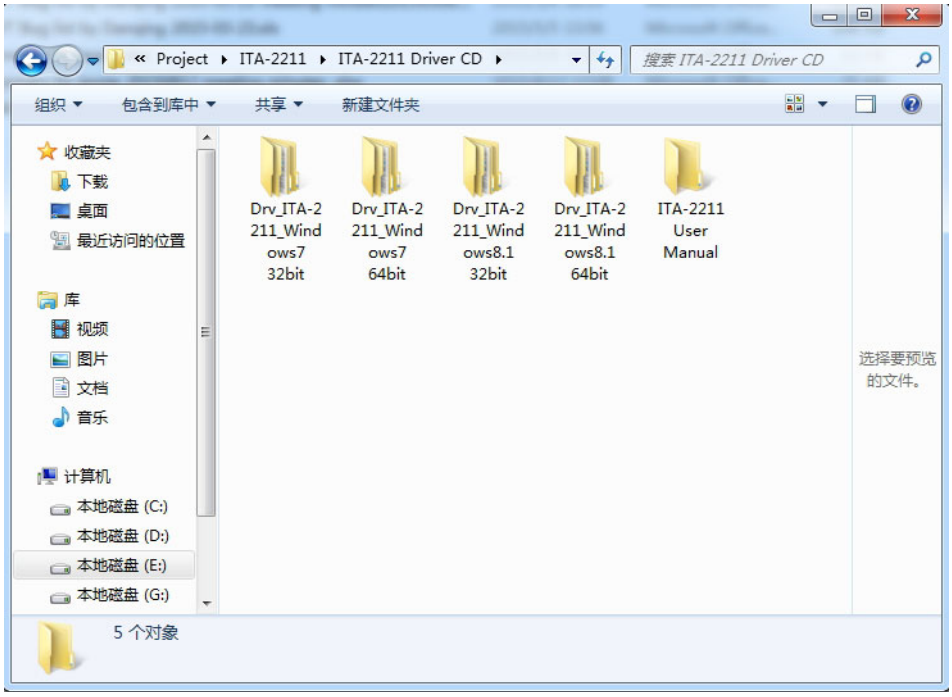
Driver Installation

5.1 Introduction

Advantech offers a complete range of Device Driver and software supports for Windows programming developers. You can apply the Windows Device Drivers to the most popular Windows Programming tools, such as Visual C++, Visual Basic, Borland C++ Builder and Borland Delphi.

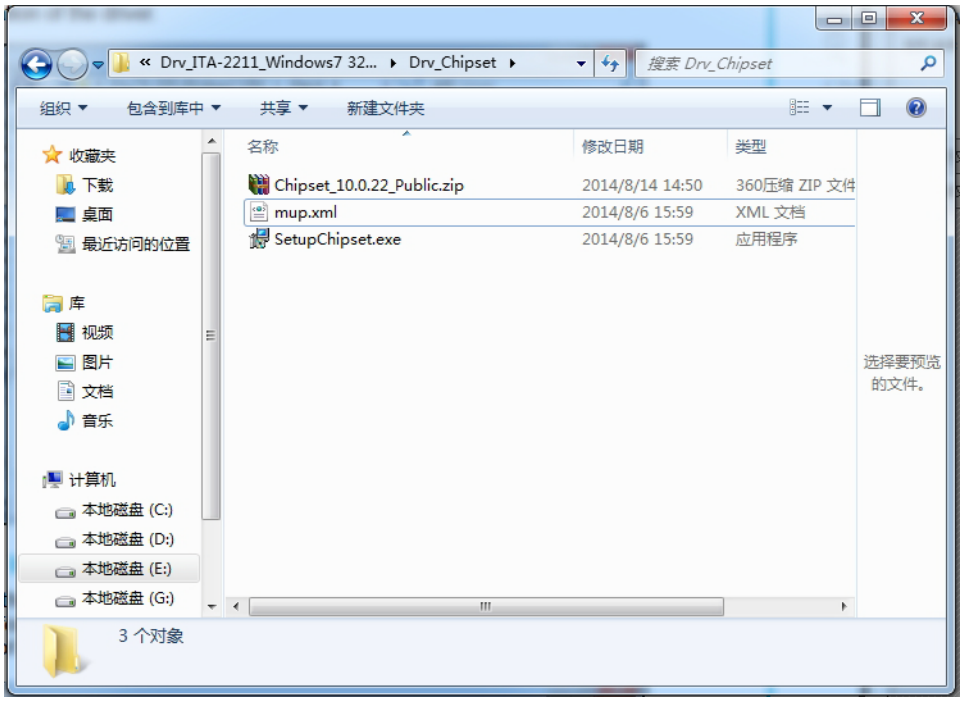
5.2 Driver Installation

Insert the driver CD into your system's CD-ROM drive. You can see the ITA-2211 driver folder items.



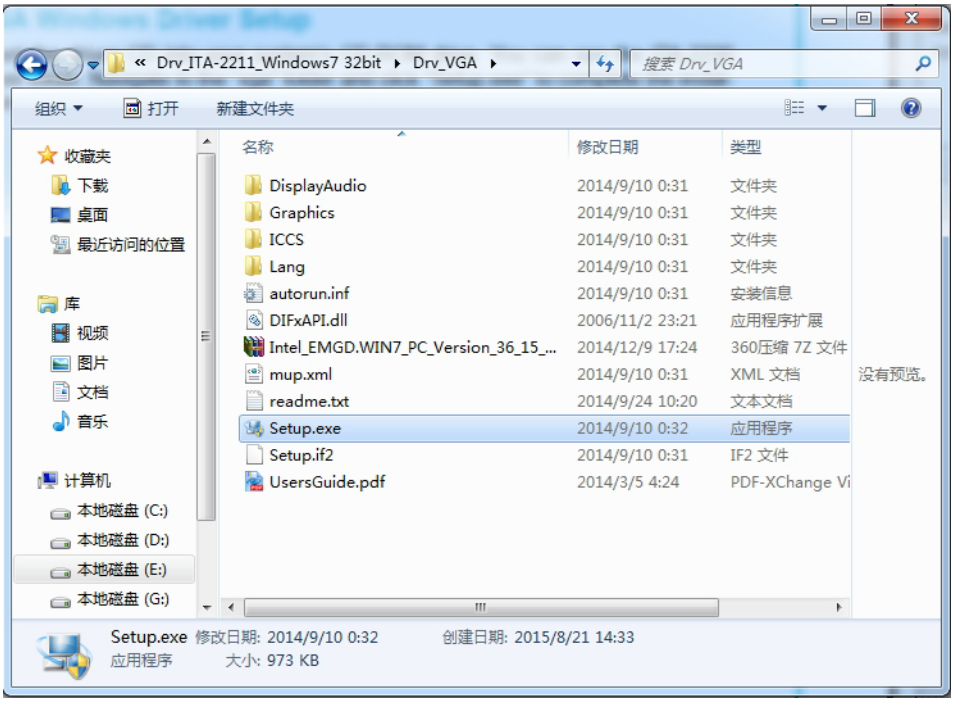
5.2.1 Chipset Windows Driver Setup

Insert the driver CD into your system's CD-ROM drive. You can see the driver folder items. Navigate to the "chipset" folder and click "Setup.exe" to complete the installation of the driver.



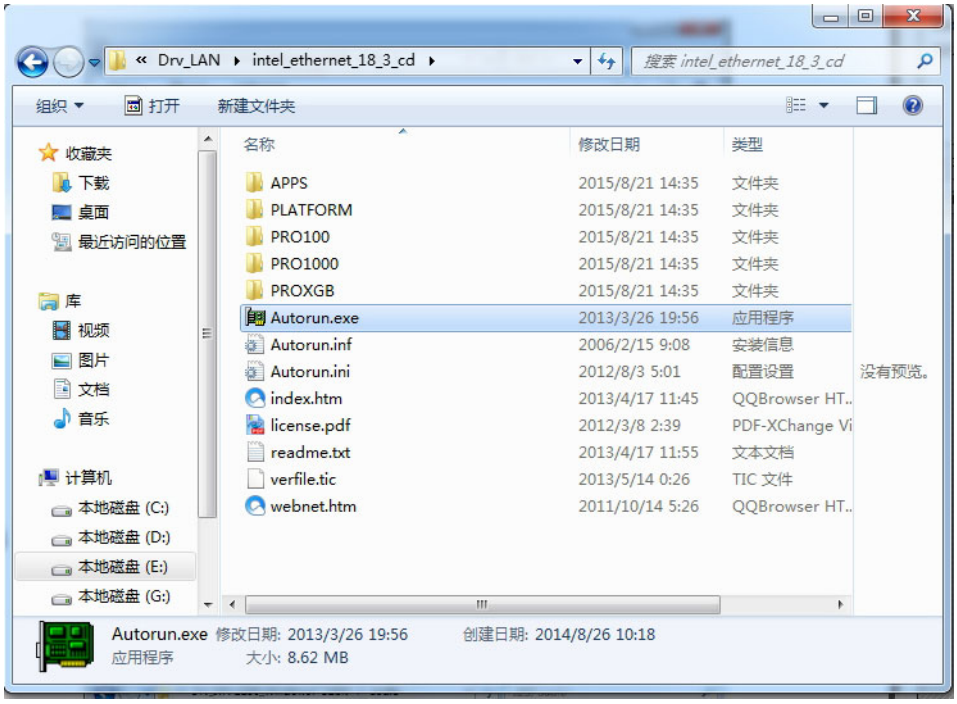
5.2.2 VGA Windows Driver Setup

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "vga" folder and click "Setup.exe" to complete the installation of the driver.



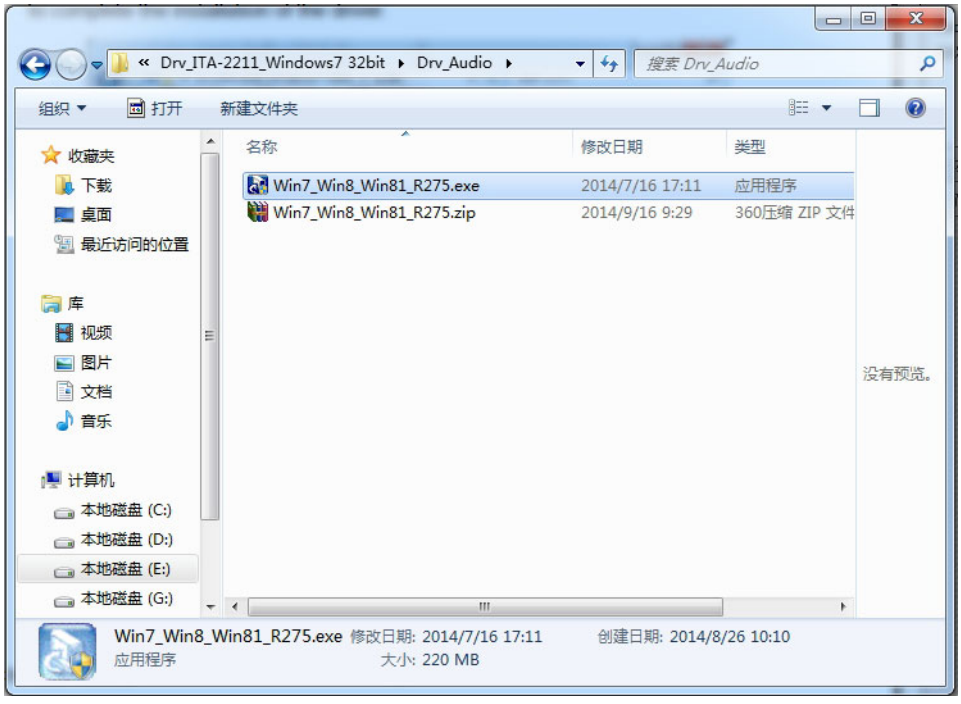
5.2.3 LAN Windows Driver Setup

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "lan" folder and click "Autorun.exe" to complete the installation of the drivers.



5.2.4 Audio Windows Driver Installation

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "audio" folder and click "Win7_Win8_Win81_R275.exe" to complete the installation of the drivers.



Chapter 6

GPIO Programming Guide

Please carefully read and study the below screenshots and source codes in blue.

Please download specification of NXP Semiconductors PCA9554 for programming.

6.1 ITA-2211 Digital DIO Definition

See Section 2.3.6.

6.2 Configuration Sequence

ITA-2211's GPIO is realized through PCA9554 GPIO IC connected to ICH SMBUS.

Therefore, the configuration and access to GPIO IC is completed by IO Space accessing to ICH SMBUS controller.

Below is the table of ICH SMBUS IO Space:

SMB_BASE + Offset	Mnemonic	REgister Name	Default	Type
00h	HST_STS	Host Status	00h	R/WC, RO, R/WC (special)
02h	HST_CNT	Host Control	00h	R/W, WO
03h	HST_CMD	Host Command	00h	R/W
04h	XMIT_SLVA	Transmit Slave Address	00h	R/W
05h	HST_D0	Host Data 0	00h	R/W
06h	HST_D1	Host Data 1	00h	R/W

For ITA-2211, IO address of the above SMB_BASE is 0xF040.

The detailed SMBUS IO control access code, please refer to Chapter 3.

The corresponding SMBUS slave address of PCA9554 of GPIO 00 - GPIO 07 on ITA-2211 is 0x40 (8bit address):

GPIO 00 – GPIO 07: PCA9554 0x40 (IO0 – IO7)

Below is the sketch of PCA9554:

Table 6.1: Pin Description

Symbol	Pin			Description
	DIP16, SO16, SSOP16, TSSOP16	HVQFN16	SSOP20	
A0	1	15	6	address input 0
A1	2	16	7	address input 1
A2	3	1	9	address input 2
IO0	4	2	10	input/output 0
IO1	5	3	11	input/output 1
IO2	6	4	12	input/output 2
IO3	7	5	14	input/output 3
Vss	8	6	15	supply ground
IO4	9	7	16	input/output 4
IO5	10	8	17	input/output 5
IO6	11	9	19	input/output 6
IO7	12	10	20	input/output 7
INT	13	11	1	interrupt output (open-drain)

Below is the diagram of PCA9554 register:

Table 6.2: 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.

PCA9554 has in all 4 registers to control GPIO.

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.

Table 6.3: 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	

If one GPIO Pin is set to Input, you can read input value from the bit that register 0 corresponds to.

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.

Table 6.4: Register 1 - Output Port Register Bit Description				
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*	

If one GPIO Pin is set to Output, you can read input value from the bit that register 1 corresponds to.

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 a ‘0’), the Input Port data polarity is retained.

Table 6.5: Register 2 - Polarity Inversion Register Bit Description				
Bit	**Symbol**	**Access**	**Value**	**Description**
7	N7	R/W	0*	inverts polarity of Input Port register data
6	N6	R/W	0*	0 = Input Port register data retained (default value)
5	N5	R/W	0*	1 = Input Port register data inverted
4	N4	R/W	0*	
3	N3	R/W	0*	
2	N2	R/W	0*	
1	N1	R/W	0*	

Table 6.5: Register 2 - Polarity Inversion Register Bit Description			
0	N2	R/W	0*

If one GPIO Pin is set to Input, you can control the polarity of input pin from the bit that register 2 corresponds to.

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 VDD.

Table 6.6: Register 3 - Configuration Register Bit Description

Bit	Symbol	Access	Value	Description
7	C7	R/W	1*	configures the directions of the I/O pins
6	C6	R/W	1*	0 = corresponding port pin enabled as an output
5	C5	R/W	1*	1 = corresponding port pin configured as input
4	C4	R/W	1*	
3	C3	R/W	1*	
2	C2	R/W	1*	
1	C1	R/W	1*	
1	C0	R/W	1*	

Register 3 is used to set each GPIO as Input or Output:

If the bit is ‘0’, the corresponding GPIO pin is set as Ouput; If the bit is ‘1’, the corresponding GPIO pin is set as Input.

Example:

Here take ITA-2211 as an example. Assume GPIO 00 is set as Output and GPIO 7 is set as Input, with two pins interconnected, how to set the corresponding register? GPIO 00 corresponds to PCA9554 0x40 IO0, while GPIO 07 corresponds to PCA9554 0x40 IO7.

- **Set GPIO 00 as Output:**

1. Read SMBUS slave 0x40 register 3 byte value;
2. Set bit 0 of the value read in step 1 as 0 and write it to SMBUS slave 0x40 register 3;
3. Read SMBUS slave 0x40 register 1 byte value;
4. Set bit 0 of the value read in step 3 as 0 or 1 according to low or high of the output value, then write it back to SMBUS slave 0x40 register 1.

- **Set GPIO 07 as Input:**

1. Read SMBUS slave 0x40 register 3 byte value;
2. Set bit 7 of the value read in step 1 as 1 and write it to SMBUS slave 0x40 register 3;
3. Read SMBUS slave 0x40 register 0 byte value;
4. Decide low or high of the input value through bit7 value read in step3.

6.3 Function Call for Reference

ICH SMBUS Access Code

(The following code is realized by simulating the access of BIOS to SMBUS. It uses Borand C++ 3.1 for compiling and is successfully tested under DOS (So far, it is not tested under other OS).

```
#define SMBUS_PORT 0xF040//SMB_BASE?0xF040
typedefunsigned char BYTE;

////////////////////////////////////////////////////////////////
////////////////////////////////////
BYTE   smbus_read_byte(BYTE addr, BYTE offset)
// Read SMBUS Register byte value. Read one byte value each
time. addr is slave address (such as 0x40), and offset is
register offset.
{
      int i;
      BYTE data;

      outportb(SMBUS_PORT + 4, (addr | 1));//   Write   slave
address to SMB_BASE + 4 (When reading, bit 0 of slave address
should be set as 1, so here  addr|1 is available)
      newiodelay();//delay
      newiodelay();//delay

      chk_smbus_ready();// Whether SMBUS is ready

      outportb(SMBUS_PORT + 3, offset);// Write register off-
set to SMB_BASE + 3
      newiodelay();//delay
      newiodelay();//delay

      outportb(SMBUS_PORT + 2, 0x48);// Write SMBUS command to
SMB_BASE + 2. 0x48 means starting byte data transmission
      newiodelay();//delay
      newiodelay();//delay

      for (i = 0; i <= 0x100; i++)
      {
          newiodelay();//longer delay
      }

      chk_smbus_ready();//Whether SMBUS is ready
      return(inportb(SMBUS_PORT + 5));// Byte value read from
SMB_BASE + 5
}
```

```
//////////////////////////////////////////////////////////////
//////////////////////////////////////
void  smbus_write_byte(BYTE addr, BYTE offset, BYTE value)
// Write SMBUS Register byte value. Write one byte value each
time. addr is slave address (such as 0x40), and offset is
register offset.
{
      int i;

      outportb(SMBUS_PORT + 4, addr);// Write slave address to
SMB_BASE + 4 (When writing, slave address bit 0 should be set
as 0)
      moredelay();//longer delay
      moredelay();//longer delay

      chk_smbus_ready();//Whether SMBUS is ready

      outportb(SMBUS_PORT + 3, offset);// Write register off-
set to SMB_BASE + 3
      moredelay();//longer delay
      moredelay();//longer delay

      outportb(SMBUS_PORT + 5, value);//Write  data  value  to
SMB_BASE + 5
      moredelay();//longer delay
      moredelay();//longer delay

      outportb(SMBUS_PORT + 2, 0x48);// Write SMBUS command to
SMB_BASE + 2. 0x48 means starting byte data transmission.
      moredelay();//longer delay
      moredelay();//longer delay

      for (i = 0; i <= 0x100; i++)
      {
          newiodelay();//longer delay
      }

      chk_smbus_ready();//?Whether SMBUS is ready
}

//////////////////////////////////////////////////////////////
//////////////////////////////////////
int   chk_smbus_ready()
//To decide whether SMBUS is ready or has completed the action,
you should wait for a long time to check whether SMBUS has
successfully transmitted the command. Since error may rarely
occurs, BIOS code does not make judgement on the return value
of this function in read and write of SUMBUS byte.
```

```
{
	int i, result = 1;
	BYTE data;

	for (i = 0; i <= 0x800; i++)
	{
	    //SMB_BASE + 0 is SMBUS status value
	    data = inportb(SMBUS_PORT);//Read    SMBUS    status
value once
	    data = check_data(SMBUS_PORT);//Read  SMBUS  status
value several timesoutportb(SMBUS_PORT, data);//?Write    back
SMBUS status value which will clear status value (Write 1 to
the corresponding bit means clearing status)

	    if (data & 0x02)
	    {   //If bit 1 is set (which means the command is
completed), SMBUS is ready
	        result = 0;//SMBUS ready
	        break;
	    }

	    if (!(data & 0xBF))
	    {   //If all bits are 0 except bit 2 (which means
error occurs on SMBUS), SMBUS is ready
	        result = 0;//SMBUS ready
	        break;
	    }

	    if (data & 0x04)
	    {   //If bit 2 is set (which means error occurs on
SMBUS), error occurs on SMBUS which is rarely the case
	        result = 1;//SMBUS error
	        break;
	    }
	}

	returnresult;
}

////////////////////////////////////////////////////////////
////////////////////////////////////
BYTE   check_data(WORD addr)
{
	int i;
	BYTE data;

	for(i = 0; i <= 6; i++)
```

```
        {
            data = inportb(addr);
            if (data != 0)
                break;
        }

        returndata;
}

////////////////////////////////////////////////////////////////
////////////////////////////////////
void  newiodelay()
//Shorter delay
{
        outportb(0xeb, 0);//IO port 0xeb No real device occupies. Write a value to this port can realize delay function. You can also choose other method according to the real situation.
}
////////////////////////////////////////////////////////////////
////////////////////////////////////
void  moredelay()
//Longer delay
{
        int i;
        for (i = 0; i < 20; i++)
        {
            outportb(0xeb, 0);//IO port 0xeb No real device occupies. Write a value to this port can realize delay function. You can also choose other method according to the real situation.
        }
}

************************************************************
**********
```

GPIO Simcodes

(Here GPIO 00 and GPIO 07 in Chapter 2 are taken as examples)

```
Output High to GPIO 00:
        data = smbus_read_byte(0x40, 0x03);//  Read  slave  0x40 register 3 byte
        data &= 0xfe;//bit 0 is set as 0
        smbus_write_byte(0x40, 0x03, data)//Write back. GPIO 00 is set for output
        data = smbus_read_byte(0x40, 0x01)//Read   slave   0x40 register 1
        data |= 0x01;//bit 0 is set as 1 which stands for high
```

```
      smbus_write_byte(0x40, 0x01, data)//Write  back.  Output
high value


Read Input Value from GPIO 07:
      data = smbus_read_byte(0x40, 0x03);//Read   slave   0x40
register 3 byte
      data |= 0x80;//bit 7??1
      smbus_write_byte(0x40, 0x03, data)//Write back. GPIO 07
is set for input
      data = smbus_read_byte(0x40, 0x00)//Read   slave   0x40
register 0. Then, the response value of bit 7 should know
whether the input is low or high
```

Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The ITA-2211's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1.1 Watchdog Timer Overview

The watchdog timer is built into the super I/O controller SMSC SCH3114. It provides the following user-programmable functions:

- Can be enabled or disabled via user program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- Generates an interrupt or resets signal if the software fails to reset the timer before time-out

A.1.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 680h (hex).

Table A.1: Watchdog Timer Registers

Address: 680h (hex)

Register Shift	Read/Write	Description
65 (hex)	write	Set seconds or minutes as units for the timer. Write 0 to bit 7: set second as counting unit. [default] Write 1 to bit 7: set minutes as counting unit.
66 (hex)	write	0: Stop timer [default] 01~FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register 65 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.
67 (hex)	read/write	Configure watchdog timer Bit 1:Write 1 to enable keyboard to reset the timer, 0 to disable. [default] Bit 2: Write 1 to enable mouse to reset the timer, 0 to disable.[default] Bit 7~4: Set the interrupt mapping of watchdog timer: 1111=IRQ15 …… 0011=IRQ3 0010=IRQ2 0001=IRQ1 0000=Disable [default]
68 (hex)	read/write	Control watchdog timer Bit0: Read watchdog state; 1=Timer timeout Bit2: Write 1 to immediately generate timeout signal, and automatically return to 0 (Write only). Bit3: Writer 1 to allow triggering of timer timeout when P20 is effective, 0 to disable. [default]

A.1.3 Example Program

1. Enable watchdog timer and set 10 sec. as timeout interval

```
Mov dx,A65h ; Select register 65h, watchdog timer I/O port address A00h+ register shifts 65h
Mov al,80h  ; Set second as counting unit
Out dx,al

Mov dx,A66h ; Select register 66h, watchdog timer I/O port address A00h+ register shift 66h
Mov al,10   ; Set timeout interval as 10 seconds and start counting
Out dx,al
```

;----------

2. Enable watchdog timer and set 5 min. as timeout interval

;----------

```
Mov dx,A65h ; Select register 65h, watchdog timer I/O port address A00h+ register shifts 65h
Mov al,00h  ; Set minute as counting unit
Out dx,al

Mov dx,A66h ; Select register 66h, watchdog timer I/O port address A00h+ register shifts 66h
Mov al,5   ;Set timeout interval as 5 minutes and start counting
Out dx,al
```

;----------

3. Enable watchdog timer to be reset by mouse

;----------

```
Mov dx,A67h ; Select register 67h, watchdog timer I/O port address A00h+ register shifts 67h
In al,dx
Or al,4h    ; Enable watchdog timer to be reset by mouse
Out dx,al
```

;----------

4. Enable watchdog timer to be reset by keyboard

;----------

```
Mov dx,A67h ; Select register 67h, watchdog timer I/O port address A00h+ register shifts 67h
In al,dx
Or al,2h    ; Enable watchdog timer to be reset by keyboard
Out dx,al
```

;----------

5. Generate a time-out signal without timer counting

;----------

```
Mov dx,A68h ; Select register 68h, watchdog timer I/O port address A00h+ register shifts 68h
In al,dx
Or al,4h    ; Generate a time-out signal
Out dx,al
```

;----------

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