

User Manual

ITA-1710

Fanless Embedded Atom Dual
Core Compact Industrial
Computer

ADVANTECH

Enabling an Intelligent Planet

Copyright

The documentation and the software included with this product are copyrighted 2013 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

The ITA-1710 is trademark of Advantech Co., Ltd.

All other product names or trademarks are properties of their respective owners.

On-line Technical Support

For technical support and service, please visit our support website at:

<http://www.advantech.com/support>

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 merchandise 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-1710 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-1710 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-1710, 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.

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.
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.
13. Do not leave this equipment in an environment unconditioned where the storage temperature under 0° C (32° F) or above 40° C (104° F), it may damage the equipment.
14. 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.
15. Advantech doesn't provide power component for this product, users should purchase power components with CCC certificate.
16. 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.
17. 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
1.1	Introduction	2
1.2	Specifications	2
1.3	Power Information	2
	Table 1.1: Power	2
1.4	Environmental Specifications	2
	Table 1.2: Environmental Specifications	2
1.5	Dimension Diagram	3
	Figure 1.1 Dimension Diagram of ITA-1710	3
	Figure 1.2 Exploded Diagram of ITA-1710	4
	Table 1.3: Part List	4
Chapter 2	H/W Installation	5
2.1	Introduction	6
2.2	System Status Indicators	6
	2.2.1 System Status LED Indicators	6
	Figure 2.1 Front panel indicators	6
	Figure 2.2 Rear panel indicators	6
2.3	Jumpers and Connector	7
	2.3.1 Jumper Description	7
	2.3.2 Jumper and Connector Location	8
	Table 2.1: Jumpers	9
	Table 2.2: JLVDS1: LVDS Voltage Selection	9
	Table 2.3: JCOMS1: CMOS Clear Function	9
	Table 2.4: VCC_GPIO1: GPIO Voltage Selection	9
	Table 2.5: PSON1: Startup-up Mode Selection	10
2.4	I/O Connectors	10
	Figure 2.3 ITA-1710-S0A1E Front I/O Interfaces	10
	Figure 2.4 ITA-1710 Rear I/O Interfaces	10
	2.4.1 COM Connector	11
	2.4.2 USB Connector	11
	2.4.3 VGA Connector	12
	2.4.4 DIO Connector	12
	2.4.5 Audio in Connector	12
	2.4.6 LAN Connector	13
	2.4.7 Phoenix Terminal Connector	13
	2.4.8 PS/2 Connector	14
	2.4.9 LVDS Connector	14
	2.4.10 LPT Connector	15
Chapter 3	System Setup	17
3.1	Introduction	18
	3.1.1 Install Mainboard CF Card	18
	Figure 3.1 Installing Mainboard CF Card	18
	3.1.2 Installing Mini PCIe Card	19
	Figure 3.2 Installing Mini PCIe Card	19
	3.1.3 Installing the HDD Module	20
	Figure 3.3 Installing the HDD Module	20
	3.1.4 Installing the Top Cover	21
	Figure 3.4 Installing the Top Cover	21
	3.1.5 Installing the Foot Stand	22

	Figure 3.5 Installing the Foot Stand.....	22
3.1.6	Installing the CF Card Module	23
	Figure 3.6 Installing the CF Card Module.....	23

Chapter 4 AMI BIOS..... 25

4.1	Introduction	26
	Figure 4.1: Setup Program Initial Screen	26
4.2	Entering Setup	27
	Figure 4.2: Press to Enter Setup	27
4.2.1	Main Setup.....	28
	Figure 4.3: Main Setup Screen.....	28
4.2.2	Advanced BIOS Features Setup.....	29
	Figure 4.4: Advanced BIOS Features Setup Screen.....	29
	Figure 4.5: CPU Configuration	30
	Figure 4.6: IDE Configuration	31
	Figure 4.7: Super I/O Configuration.....	32
	Figure 4.8: Hardware Health Configuration	33
	Figure 4.9: ACPI Settings	34
	Figure 4.10:General ACPI Configuration	35
	Figure 4.11:Advanced ACPI Configuration.....	36
	Figure 4.12:Chipset ACPI configuration	37
	Figure 4.13:AHCI Configuration.....	38
	Figure 4.14:APM Configuration	39
	Figure 4.15:Event Log Configuration	40
	Figure 4.16:USB Configuration.....	41
	Figure 4.17:USB Mass Storage Device Configuration.....	42
4.2.3	PCI/PnP Setup.....	43
	Figure 4.18:PCI/PnP Setup	43
4.2.4	Boot Setup Utility	44
	Figure 4.19:Boot Setup Utility	44
	Figure 4.20:Boot Settings Configuration	45
4.2.5	Security Setup	46
	Figure 4.21:Password Configuration	46
4.2.6	Advanced Chipset Settings.....	47
	Figure 4.22:Advanced Chipset Settings	47
	Figure 4.23:North bridge chipset configuration.....	47
	Figure 4.24:Video Function Configuration	48
	Figure 4.25:South Bridge Chipset Configuration	49
4.2.7	Exit Option	50
	Figure 4.26:Exit Option	50

Chapter 5 Driver Installation..... 53

5.1	Introduction	54
5.2	Driver Installation	54
5.2.1	Chipset Windows Driver Setup	55
5.2.2	VGA Windows Driver Setup.....	55
5.2.3	LAN Windows Driver Setup	56
5.2.4	Audio Windows Driver Installation	56

Chapter 6 GPIO Programming Guide 57

6.1	ITA-1710 Digital DIO Definition.....	58
6.2	Configuration Sequence	58
6.3	Function Call Reference	58

Appendix A Programming the Watchdog Timer..61

- A.1 Programming the Watchdog Timer 62
 - A.1.1 Watchdog Timer Overview..... 62
 - A.1.2 Programming the Watchdog Timer 62
 - Table A.1: Watchdog Timer Registers 62
 - A.1.3 Example Program 63

Chapter 1

Overview

This chapter provides general information about the ITA-1710.

1.1 Introduction

The ITA-1710 is a fanless compact industrial computer chassis with Atom dual core processor and wide voltage input range, which is specially designed for intelligent transportation applications. This powerful computing platform can withstand operation under harsh conditions 24 hours a day, 7 days a week.

1.2 Specifications

- **System Chipset:** Intel® Atom processor D525 + Intel® ICH8M chipset
- **BIOS:** AMI SPI 16 Mb Flash
- **System Memory:** On-board 1 GB/2 GB DDR3 800
- **Display:** Embedded Gen3.5+GFX Core, Frequency 400 MHz
Up to 256 MB SDRAM shared system memory
- **Dual Display:** Single display resolution up to 2048 x 1536 @ 60 Hz
Dual Display resolution up to 1366 x 768 @ 60 Hz
- **Storage:** Supports 2 CF slots, 1 2.5" HDD slot
- **Expansion Slot:** Supports 1 Mini PCIe slot
- **Ethernet:** 2 x 10/100/1000M Ethernet RJ45 port
- **USB:** 6 x USB2.0
- **VGA:** 2 x VGA
- **Serial I/O:** 10 x COM port, RS-232/422/485 switchable (4 COM optional for RS-232 switch)
- **Digital I/O:** 1 x 12-ch GPI, 1 x 12-ch GPO
- **Audio:** 1 x Speaker out with 2 4 w amplifier; 1 Mic input
- **Reserved Zone:** Optional PCA-5650 graphic card expansion for 2 VGA
- **Weight:** 3.6 kg
- **Dimensions (W x H x D):** 200 x 190 x 100 mm

1.3 Power Information

ITA-1710 supports DC 9 ~ 36 V wide voltage input

Table 1.1: Power

DC voltage input	9 V - 36 V
DC current	6.5 A - 3.25 A
DC power interface	2P Phoenix (European Standard)

1.4 Environmental Specifications

Table 1.2: Environmental Specifications

Operating Temperature	With industrial HDD: 0 ~ 40°C With CF card: -25 ~ 60 °C
Storage Temperature	-40 ~ 85°C
Humidity	95% @ 40° C, non-condensing
Vibration	With industrial HDD: 2 Grms @ 5 ~ 500 Hz, random, 1 hr/axis With CF card: 20 G, IEC-68-2-27, half sine wave, 11 ms duration

1.5 Dimension Diagram

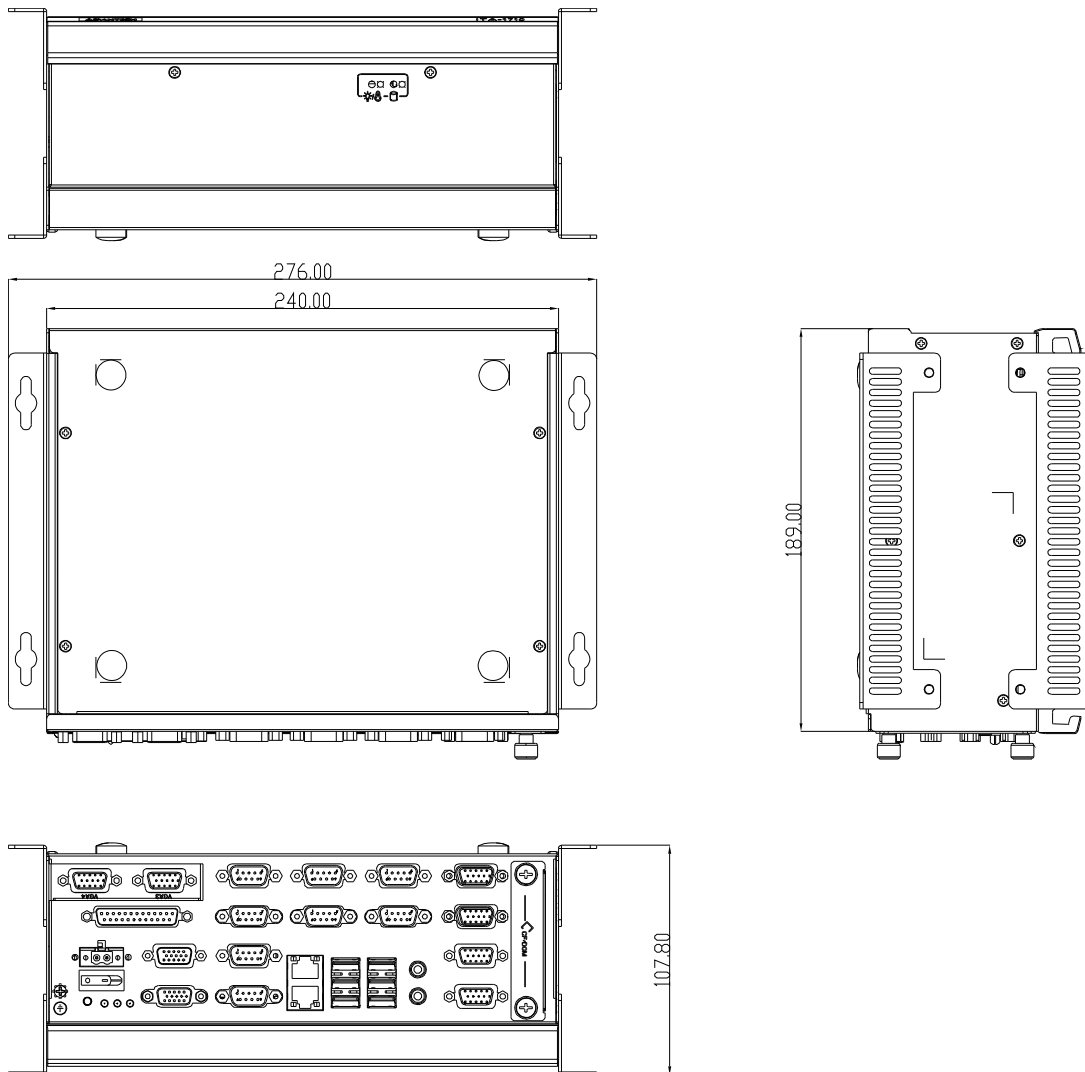


Figure 1.1 Dimension Diagram of ITA-1710

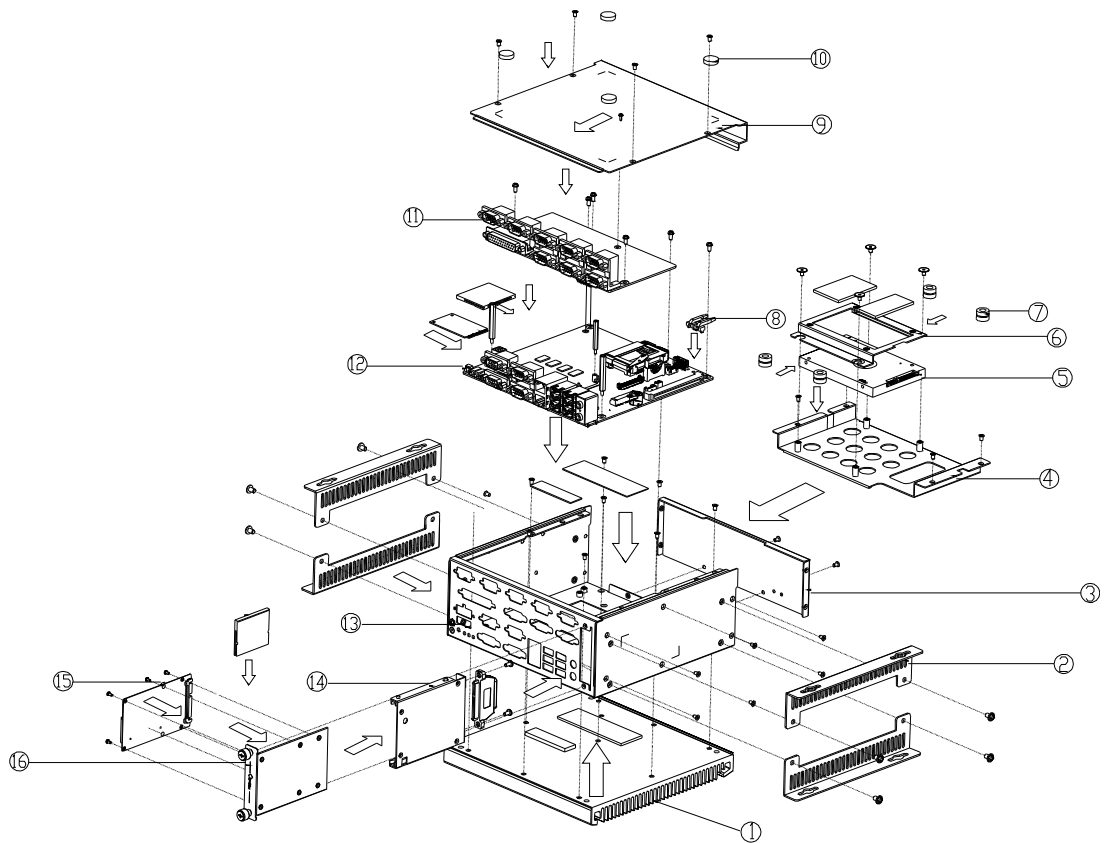


Figure 1.2 Exploded Diagram of ITA-1710

Table 1.3: Part List

1	Heat sink	9	Chassis top cover
2	Chassis foot stand	10	Rubber cushion
3	Front panel	11	I/O board
4	HDD bracket	12	Main board
5	HDD	13	Rear panel
6	HDD fixed bracket	14	CF support bracket
7	HDD buffer cushion	15	CF board
8	Light pipe	16	CF Exaction Frame

Chapter 2

H/W Installation

This chapter provides H/W Installation about the ITA-1710.

2.1 Introduction

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

2.2 System Status Indicators

2.2.1 System Status LED Indicators

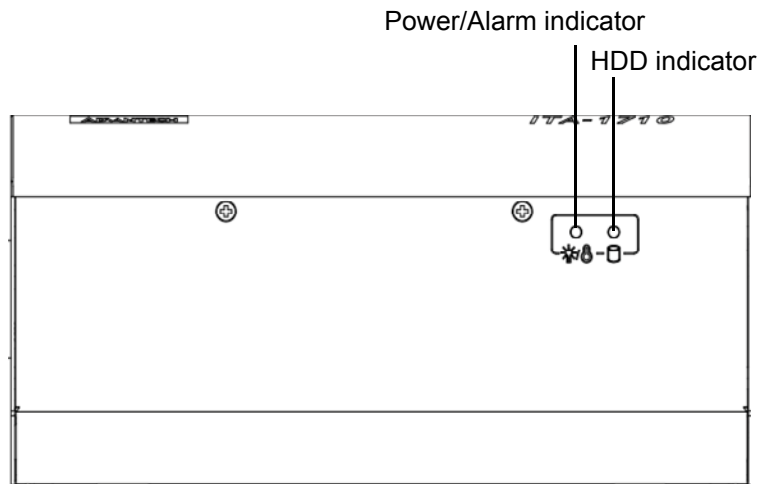


Figure 2.1 Front panel indicators

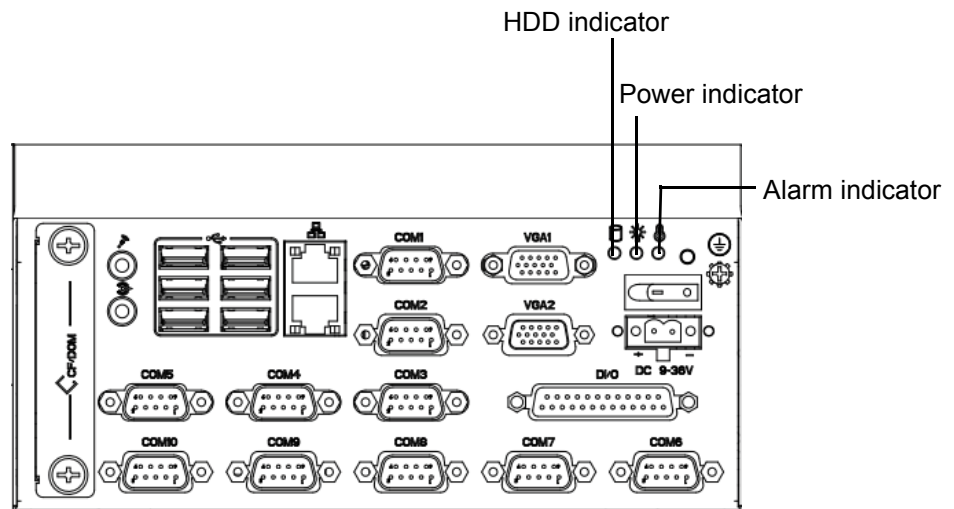


Figure 2.2 Rear panel indicators

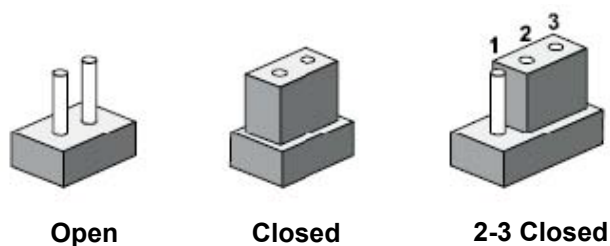
Refer to below table for a LED definition summary.

Item	LED	Status	Color	Description
1	PWR/FAULT	On	Green	System power is on, system is safe
		On	Red	System voltage overheated
2	HDD	On	Yellow	Data being received/transmitted
		Off		No data being received/transmitted

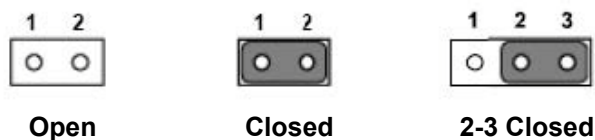
2.3 Jumpers and Connector

2.3.1 Jumper Description

You may configure the ITA-1710 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.



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



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.

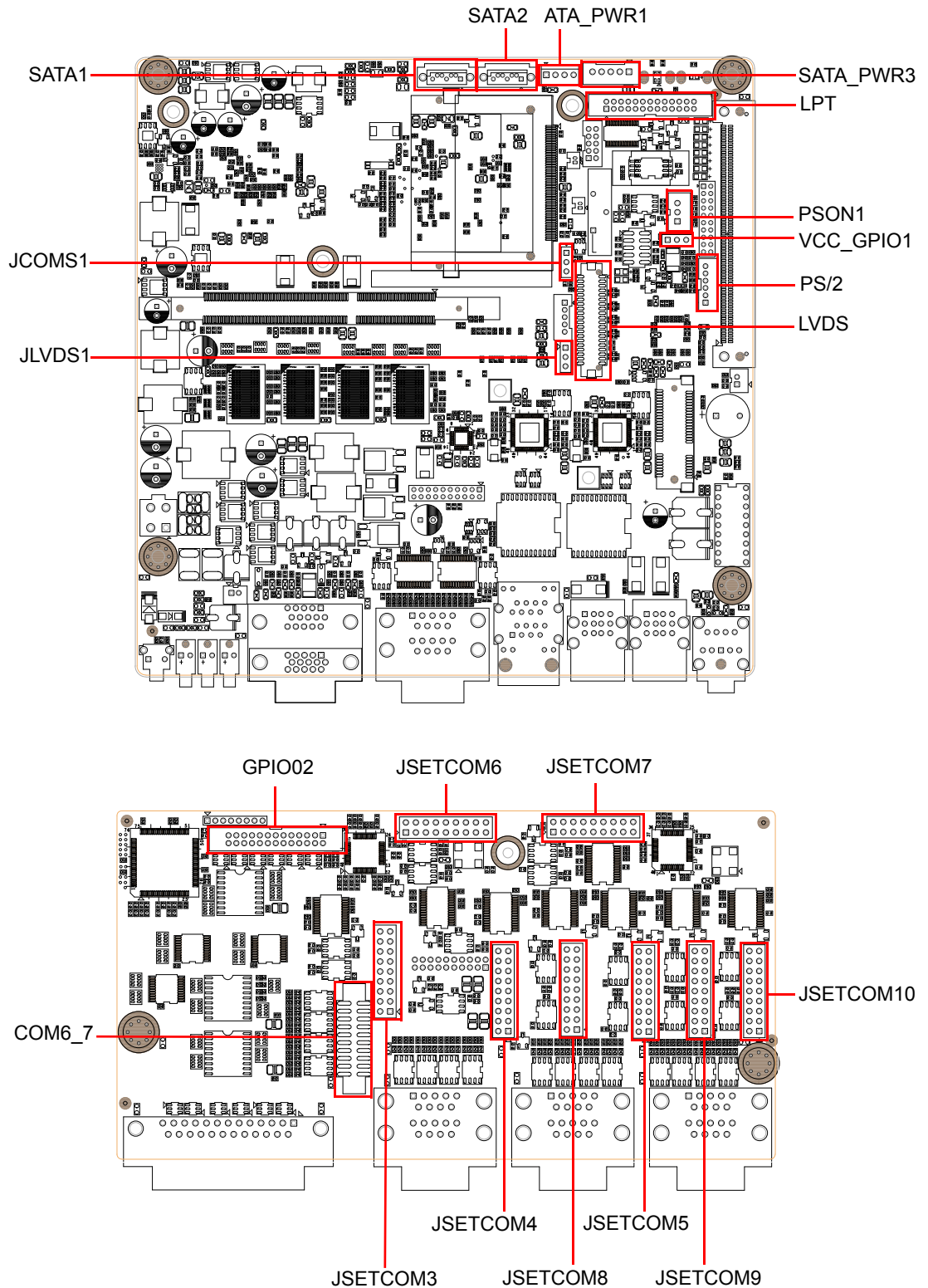


Table 2.1: Jumpers

Label	Function
JLVDS1	LVDS voltage selection
JCOMS1	Clear CMOS settings
VCC_GPIO1	GPIO voltage selection
PSON1	Start-up mode selection
JSETCOM 1~X	COM mode selection
PS2	Keyboard/mouse
LVDS	LVDS interface
SATA1	SATA data interface 1
SATA2	SATA data interface 2
SATA_PWR1	SATA power interface 1
SATA_PWR3	SATA power interface 3

Table 2.2: JLVDS1: LVDS Voltage Selection

Closed Pins	Result
1-2	+V5
2-3	Normal (+3.3 V)*
*Default	

**Table 2.3: JCOMS1: CMOS Clear Function**

Closed Pins	Result
1-2	Normal (+V3.3_SB)
2-3	Clear CMOS
* Default setting	

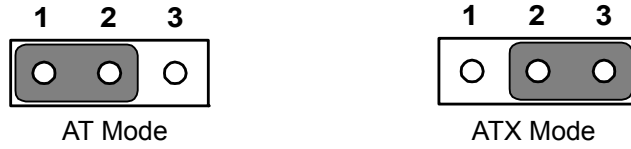
**Table 2.4: VCC_GPIO1: GPIO Voltage Selection**

Closed Pins	Result
1-2	Normal (+V5_SB)*
2-3	+V3.3_SB
*Default	



Table 2.5: PSON1: Startup-up Mode Selection

Closed Pins	Result
1-2	AT Mode
2-3	ATX Mode*
*Default	



2.4 I/O Connectors

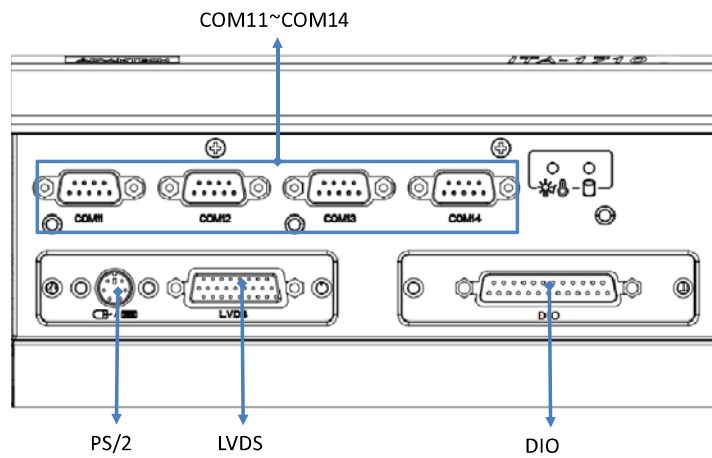


Figure 2.3 ITA-1710-S0A1E Front I/O Interfaces

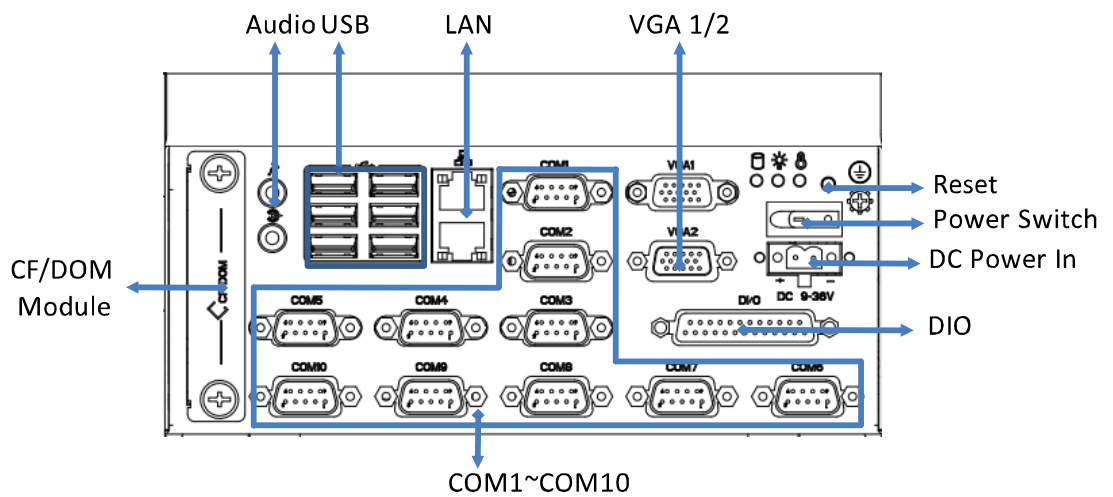


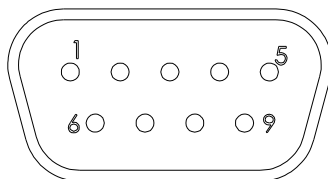
Figure 2.4 ITA-1710 Rear I/O Interfaces

- Note!**
1. ITA-1710 front panel provides no interface.
 2. ITA-1710-S0A1E rear panel is the same as ITA-1710.



2.4.1 COM Connector

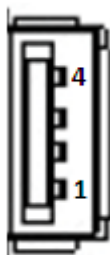
ITA-1710 series provides up to ten D-sub 9-pin connectors for RS-232/422/485.



	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 USB Connector

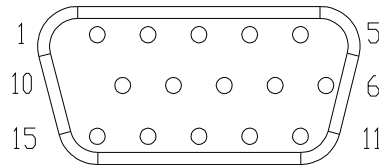
ITA-1710 series provides six USB interface connectors, which are USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup.



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

2.4.3 VGA Connector

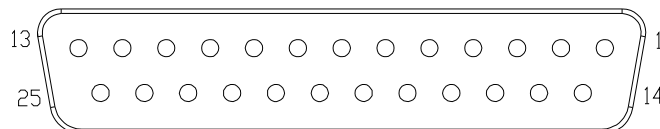
ITA-1710 offers two standard VGA Interface connectors by D-sub 15-pin female connector.



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

2.4.4 DIO Connector

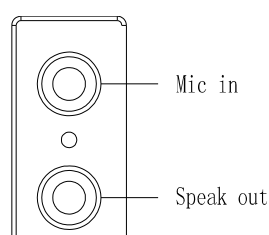
ITA-1710 provides one DIO connector that needs cabling.



Pin	Signal name
1-12	Digital input
13	GND
14-25	Digital output

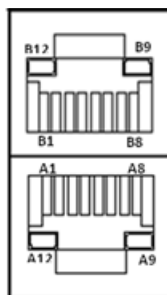
2.4.5 Audio in Connector

ITA-1710 provides one integrated Mic-in/speaker out audio connector.



2.4.6 LAN Connector

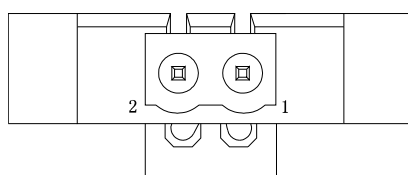
ITA-1710 Series provide two Intel 82583V Ethernet controllers, which are fully compliant with IEEE 802.3u 10/100/1000 Mbps standard.



Pin	Signal name	Signal name
A1/B1	MDIO0+	MDIO0+
A2/B2	MDIO0-	MDIO0-
A3/B3	MDIO1+	MDIO1+
A4/B4	MDIO2+	MDIO2+
A5/B5	MDIO2-	MDIO2-
A6/B6	MDIO1-	MDIO1-
A7/B7	MDIO3+	MDIO3+
A8/B8	MDIO3-	MDIO3-
A9/B9	LED GREEN-	LED GREEN-
A10/B10	LED GREEN+	LED GREEN+
A11/B11	1000M LED	1000M LED
A12/B12	100m/10M LED	100m/10M LED

2.4.7 Phoenix Terminal Connector

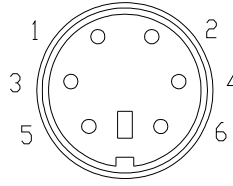
ITA-1710 provides one 2-pin phoenix terminal connectors for power input.



Pin	Signal name
1	Positive pole
2	GND

2.4.8 PS/2 Connector

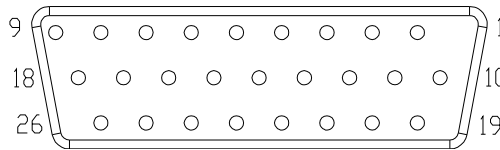
ITA-1710-S0A1E provides one PS/2 interface for mouse or keyboard connection.



Pin	Signal name
1	KB_Z_DAT
2	MS_Z_DAT
3	GND
4	+V5_PS2
5	KB_Z_CLK
6	MS_Z_CLK

2.4.9 LVDS Connector

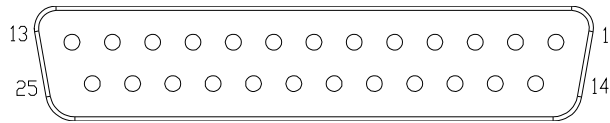
ITA-1710-S0A1E provides one LVDS interface, which could connect a monitor through cables.



Pin	Signal Name	Pin	Signal Name
1	TXL0+	2	TXL1+
3	TXL2+	4	TXL3+
5	NC	6	NC
7	NC	8	NC
9	NC	10	TXLCLK-
11	TXL0-	12	TXL1-
13	TXL2-	14	TXL3-
15	NC	16	INNVCC
17	BLENABLE	18	GND
19	TXLCLK+	20	LCDVCC
21	NC	22	GND
23	GND	24	GND
25	GND	26	NC

2.4.10 LPT Connector

ITA-1710-S0A1E provides one LPT interface (in the accessory box, replace by yourself), which could connect a monitor through cables.



Pin	Signal Name	Pin	Signal Name
1	LPT_z_STB#	14	LPT_AFD#
2	LPT_z_PD0	15	LPT_ERR#
3	LPT_PD1	16	LPT_INIT#
4	LPT_PD2	17	LPT_SLIN#
5	LPT_PD3	18	GND
6	LPT_PD4	19	GND
7	LPT_PD5	20	GND
8	LPT_PD6	21	GND
9	LPT_PD7	22	GND
10	LPT_ACK#	23	GND
11	LPT_BUSY	24	GND
12	LPT_PE	25	GND
13	LPT_SLCT	26	NC

Chapter 3

System Setup

This chapter introduces the installation process of ITA-1710.

3.1 Introduction

The following procedures will instruct you to install all modules into the ITA-1710 system.

3.1.1 Install Mainboard CF Card

ITA-1710 mainboard front panel has a CF card slot, you can insert a CF card into it directly.

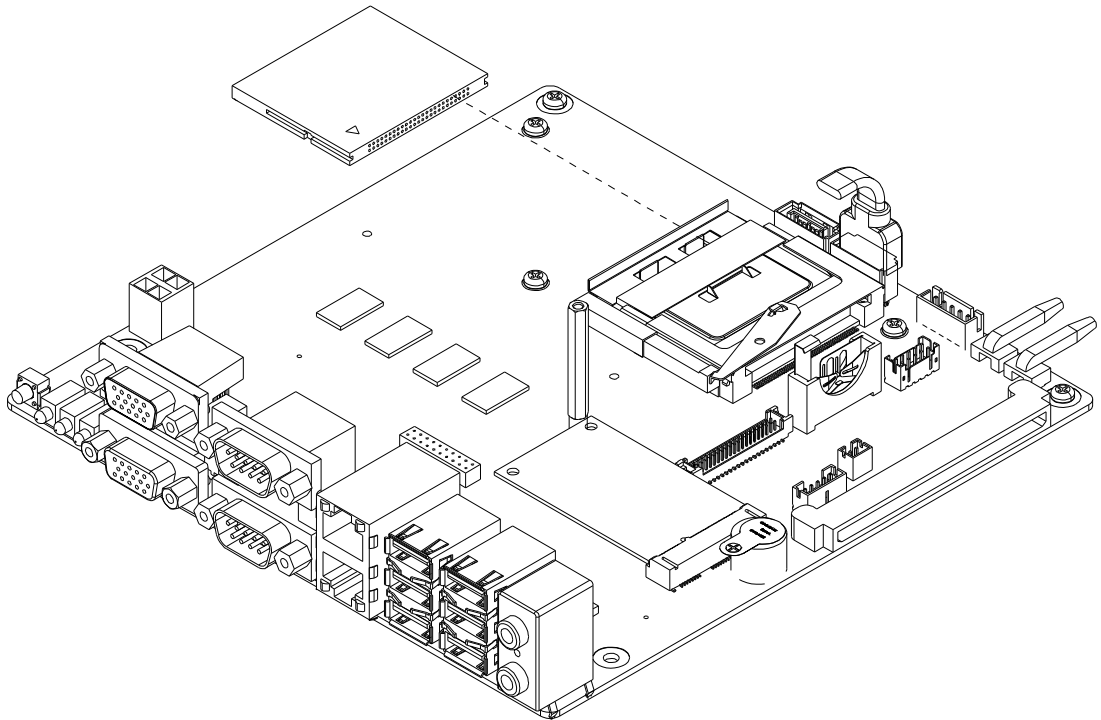


Figure 3.1 Installing Mainboard CF Card

3.1.2 Installing Mini PCIe Card

The ITA-1710 mainboard support a Mini PCIe expansion card. please refer the below installation procedure.

1. Insert a Mini PCIe card into mainboard PCIe slot.
2. Lock and fix the Mini PCIe card by a copper pillar.

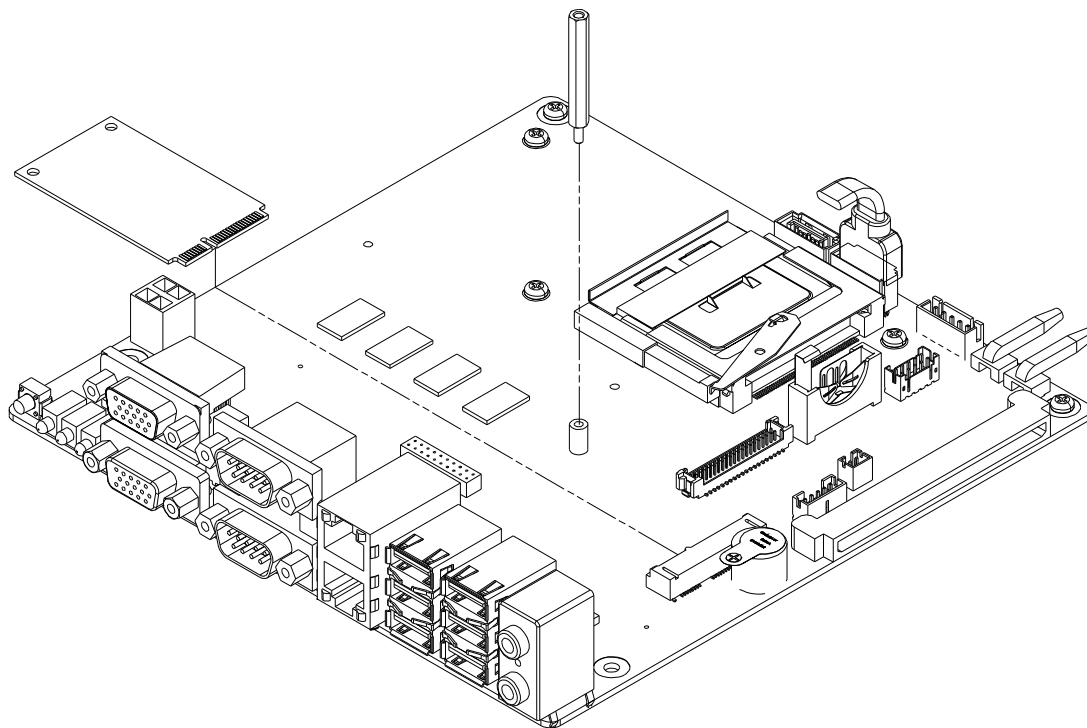


Figure 3.2 Installing Mini PCIe Card

3.1.3 Installing the HDD Module

The ITA-1710 reserves a space for a 2.5" HDD module. Please refer to the following instructions to install the hard disk drive.

1. Place the HDD into 2.5" HDD holder, and lock it with 4 screws.
2. HDD holder has 4 semi-circles (2 bigger and 2 smaller) on both sides, which are used to place rubber cushions, the black ones for bigger semi-circles and transparent ones for smaller semi-circles.
3. Place the HDD holder onto HDD bracket, and secure it with 4 screws.
4. Connect the complete HDD module to the chassis and fix it with 4 screws.
5. Stick the cooling pad onto the PCB panel of HDD. Please align the cooling pad with the magnetic head to protect the head from being covered.

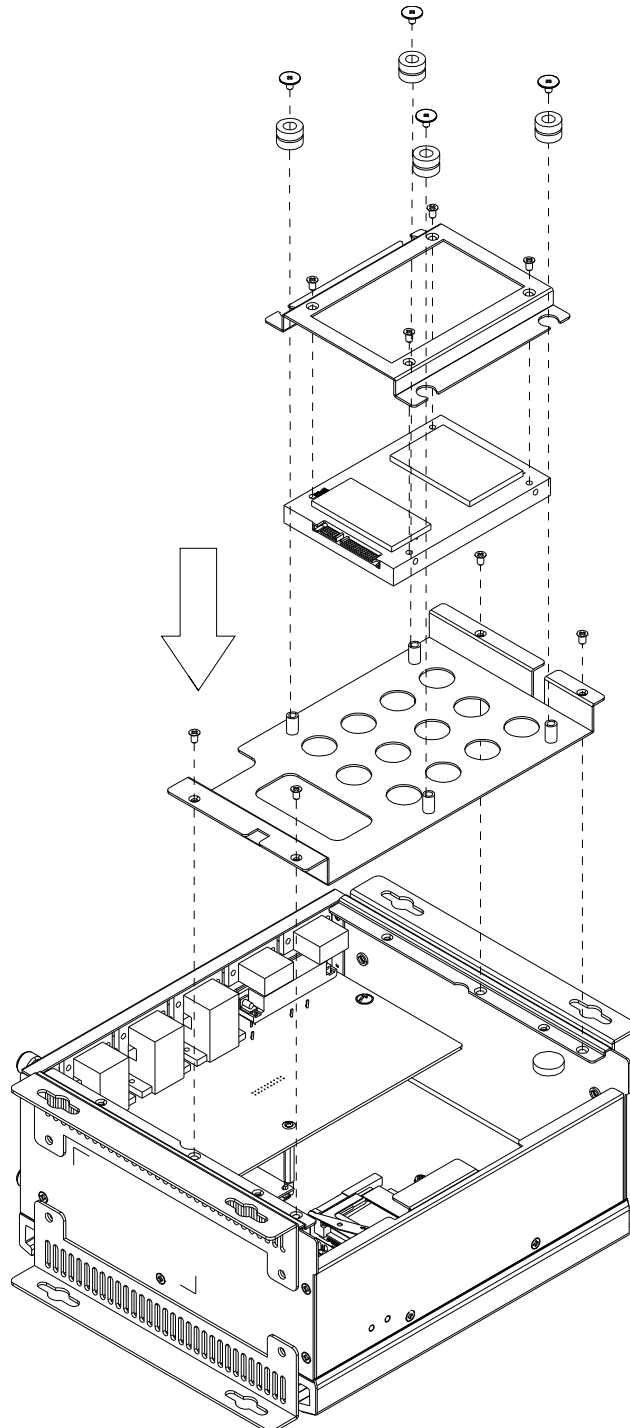


Figure 3.3 Installing the HDD Module

3.1.4 Installing the Top Cover

Please follow the procedures below to install chassis top cover.

1. Insert the top cover on the chassis front panel from the opening point and place it well.
2. Fix the chassis top cover with 2 screws.

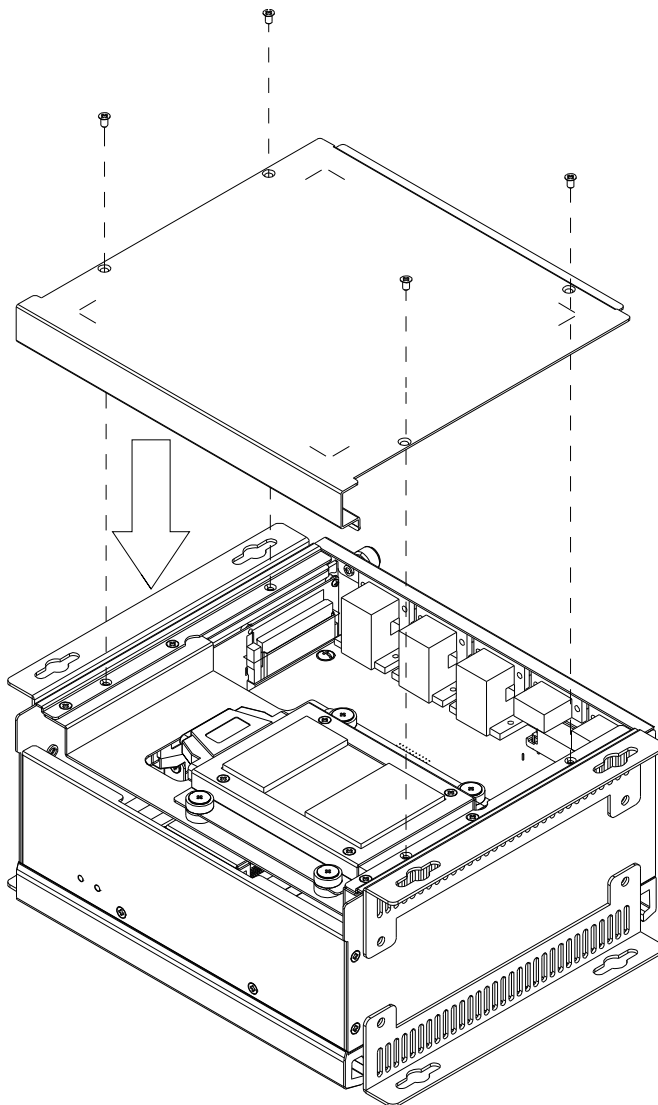


Figure 3.4 Installing the Top Cover

3.1.5 Installing the Foot Stand

Align the 2 foot stands with the screw holes in the chassis side panel, and secure them with screws. Top and bottom installation are both supported. (See Fig 3.5)

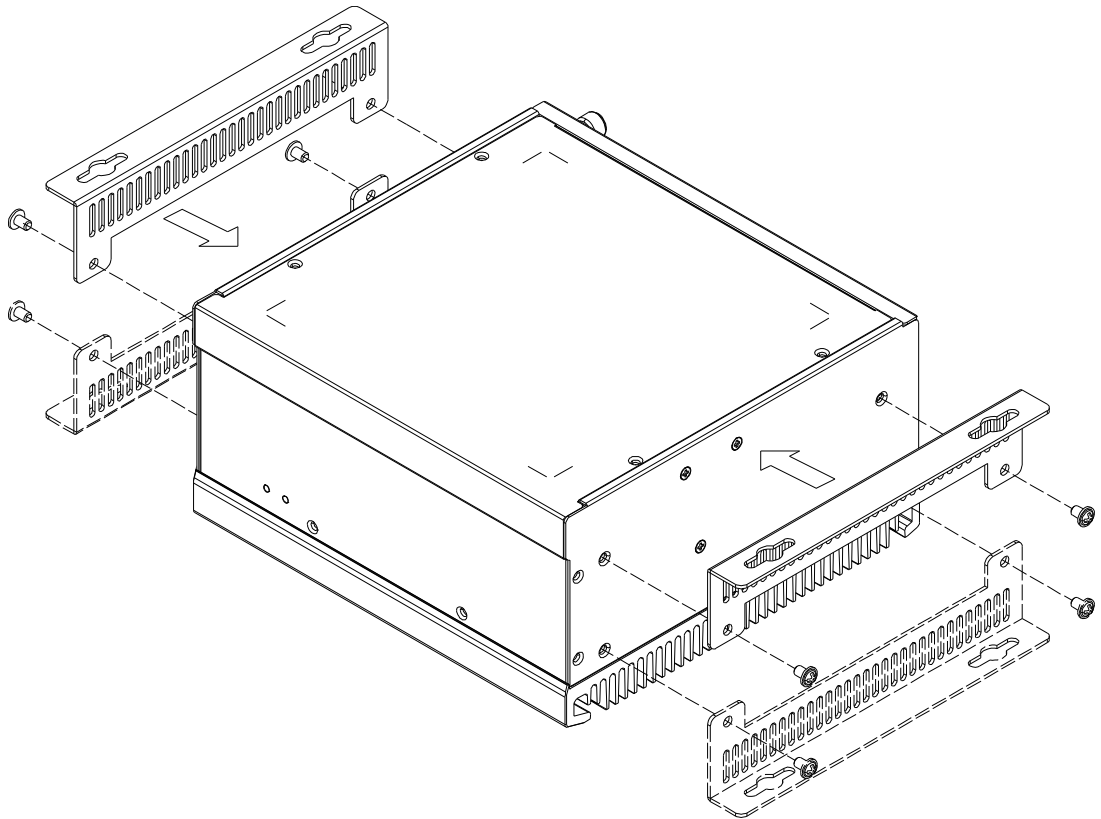


Figure 3.5 Installing the Foot Stand

3.1.6 Installing the CF Card Module

Please follow the steps below to install CF card module.

1. Loosen the 2 screws in the CF module,
2. Insert the CF card into the slot and install the CF fixed cover.
3. Return and screw the CF card module.

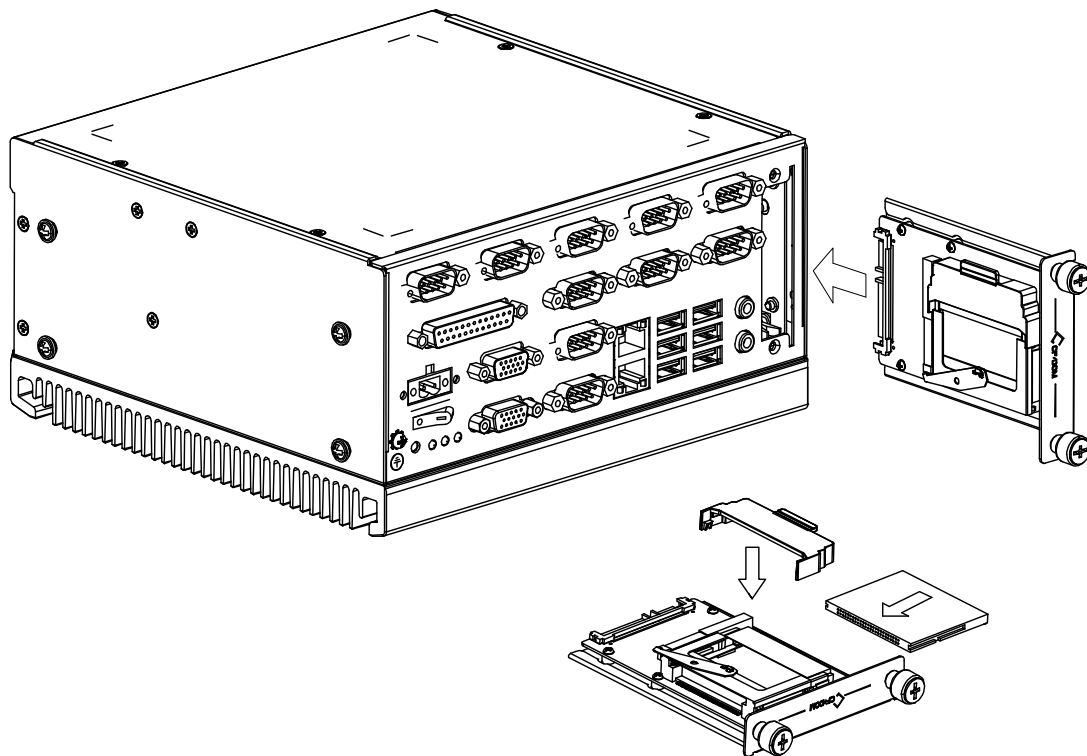


Figure 3.6 Installing the CF Card Module

Chapter 4

AMI BIOS

This chapter introduces how to configure AMI BIOS.

4.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. This chapter introduces how to configure BIOS for ITA-1710 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 for making changes and turning the special features on or off. This chapter describes the basic navigation of the ITA-1710 setup screens.

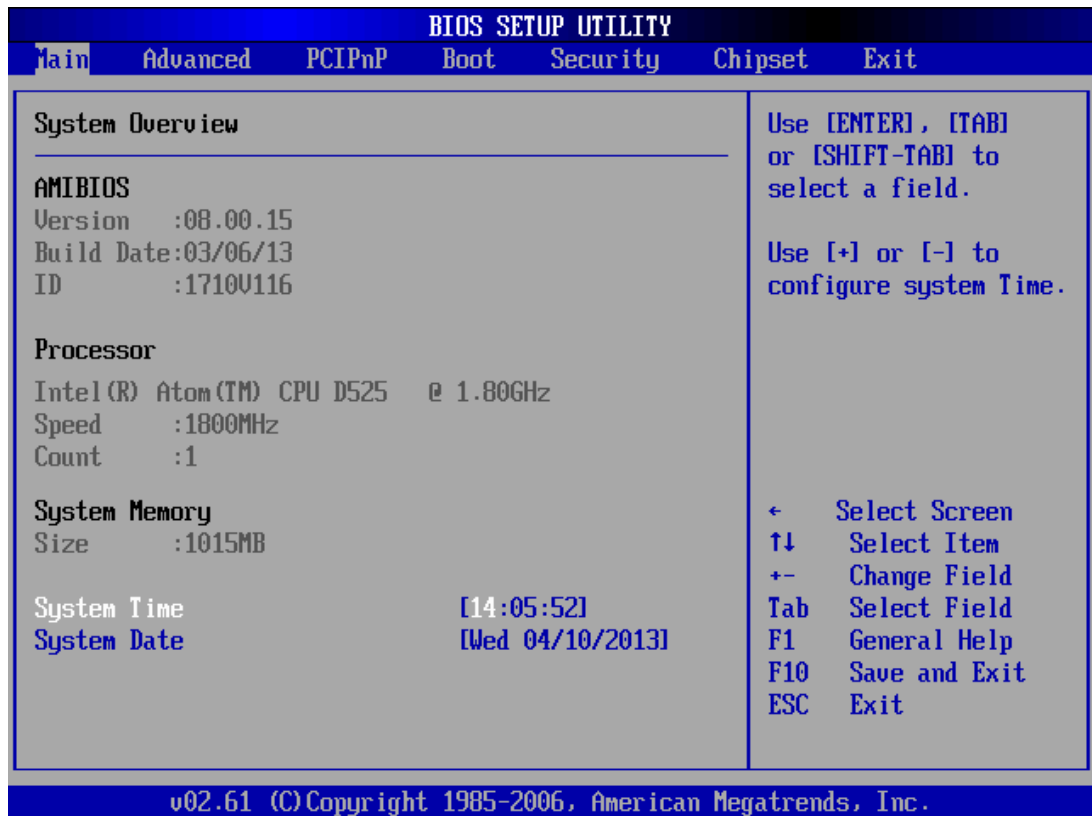


Figure 4.1: Setup Program Initial Screen

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 where BIOS and CPU information will be shown. Press and you will immediately be allowed to enter Setup.

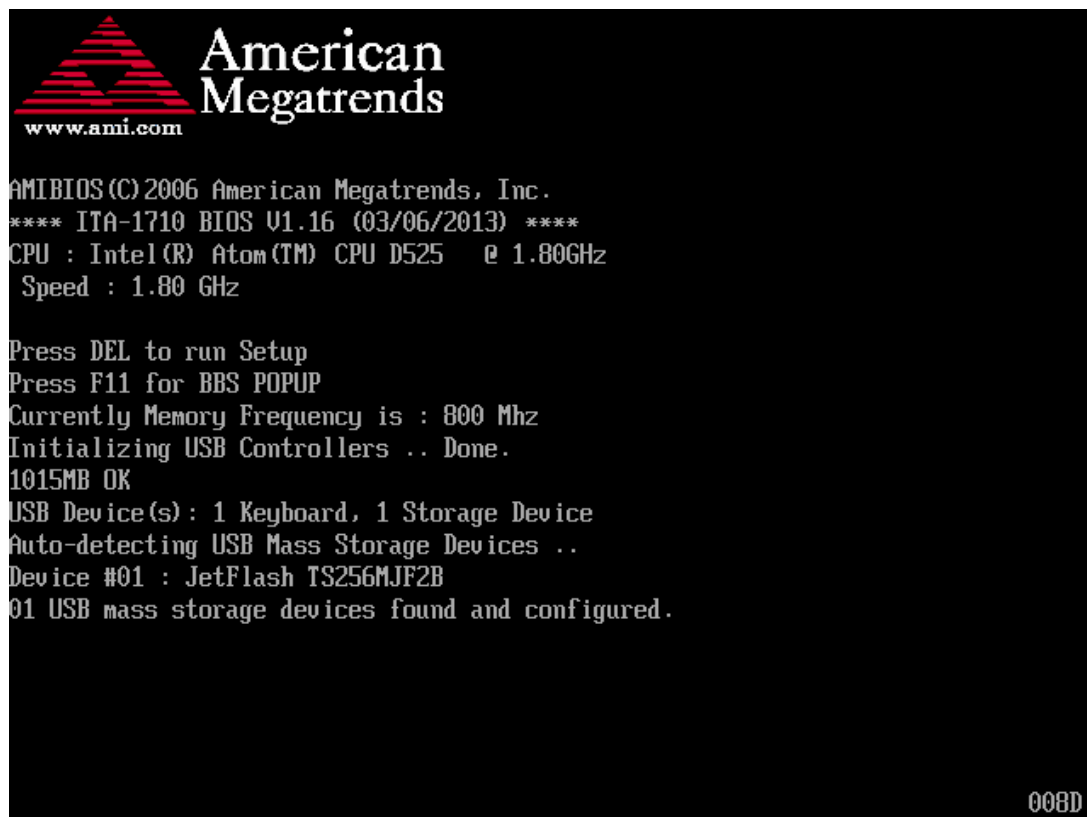


Figure 4.2: Press to Enter Setup

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.

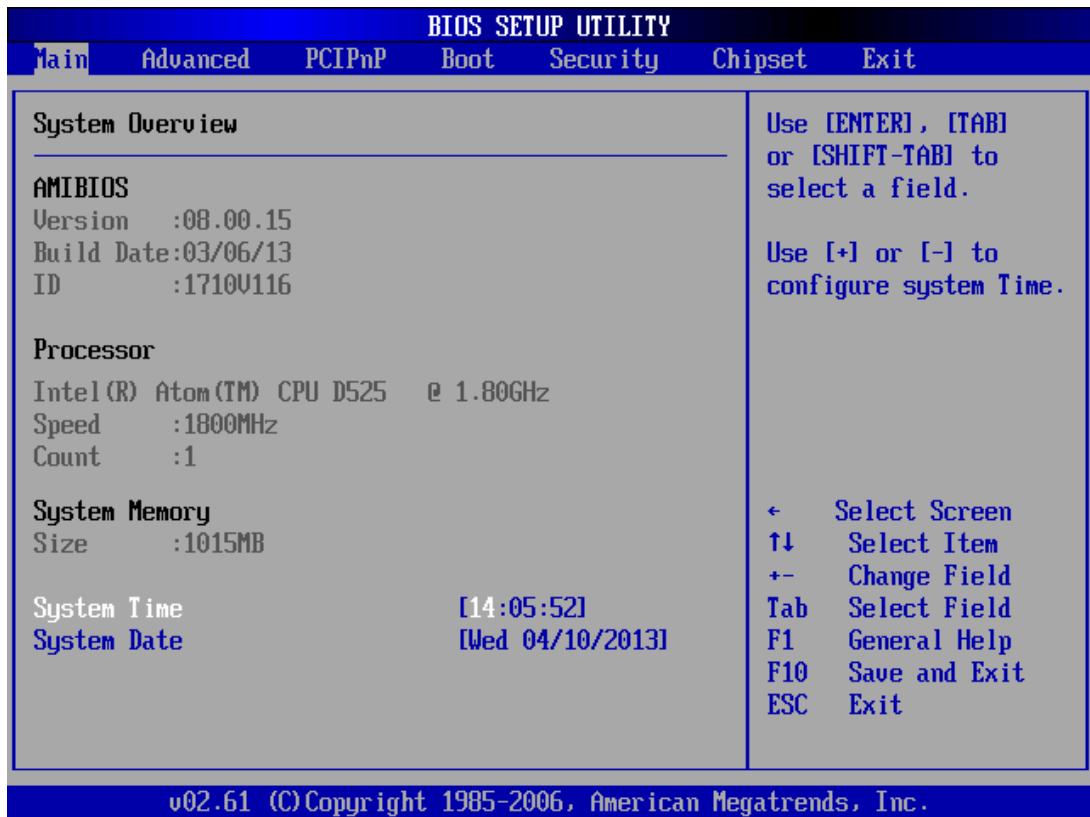


Figure 4.3: Main Setup Screen

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-1710 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 CPU Configuration

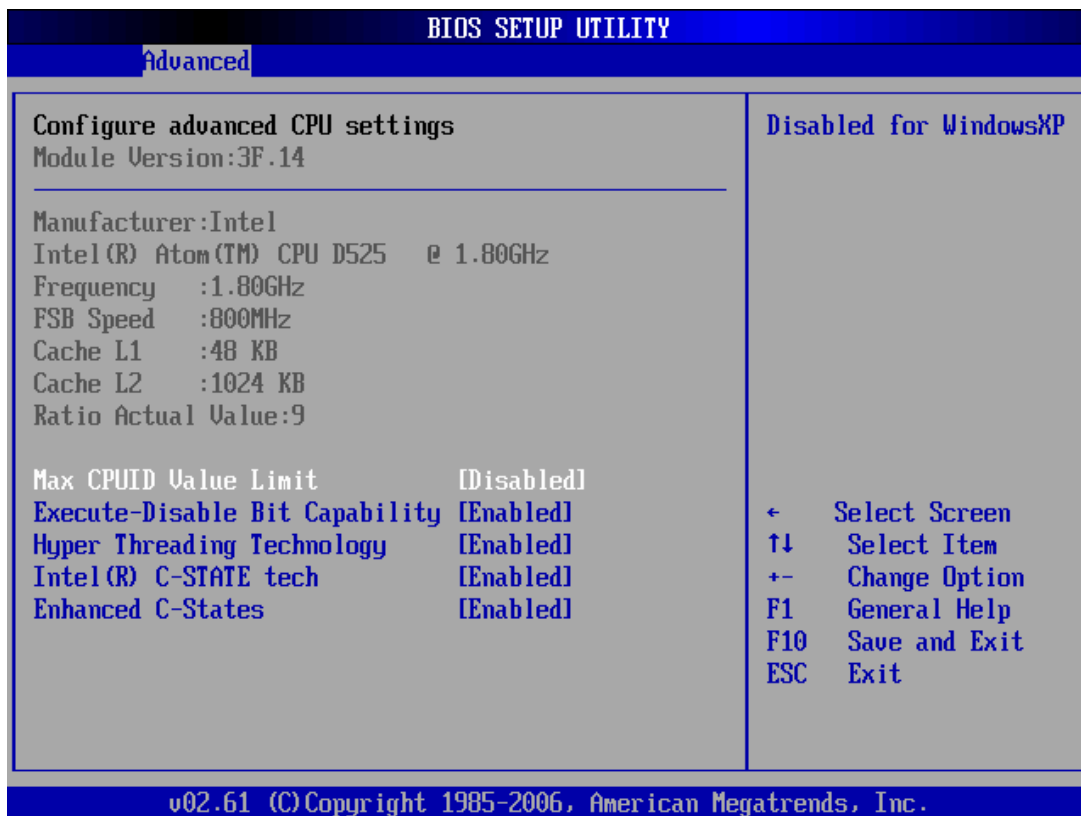


Figure 4.5: CPU Configuration

- **Max CPUID Value Limit**
This item allows users to configure max CPUID Value Limit.
- **Execute-Disable Bit Capability**
This item allows users to enable or disable Execute Disable Bit Feature. The default setting is "Enabled".
- **Hyper Threading Technology**
This item allows users to enable or disable Intel Hyper Threading Technology. The default setting is "Enabled".
- **Intel(R) C-STATE tech**
This function is to save CPU power consumption in system halt state.
- **Enhanced C-States**
This item is used to configure CPU halt state, but is disabled by Intel C-STATE. The default setting is "Enabled".

4.2.2.2 IDE Configuration

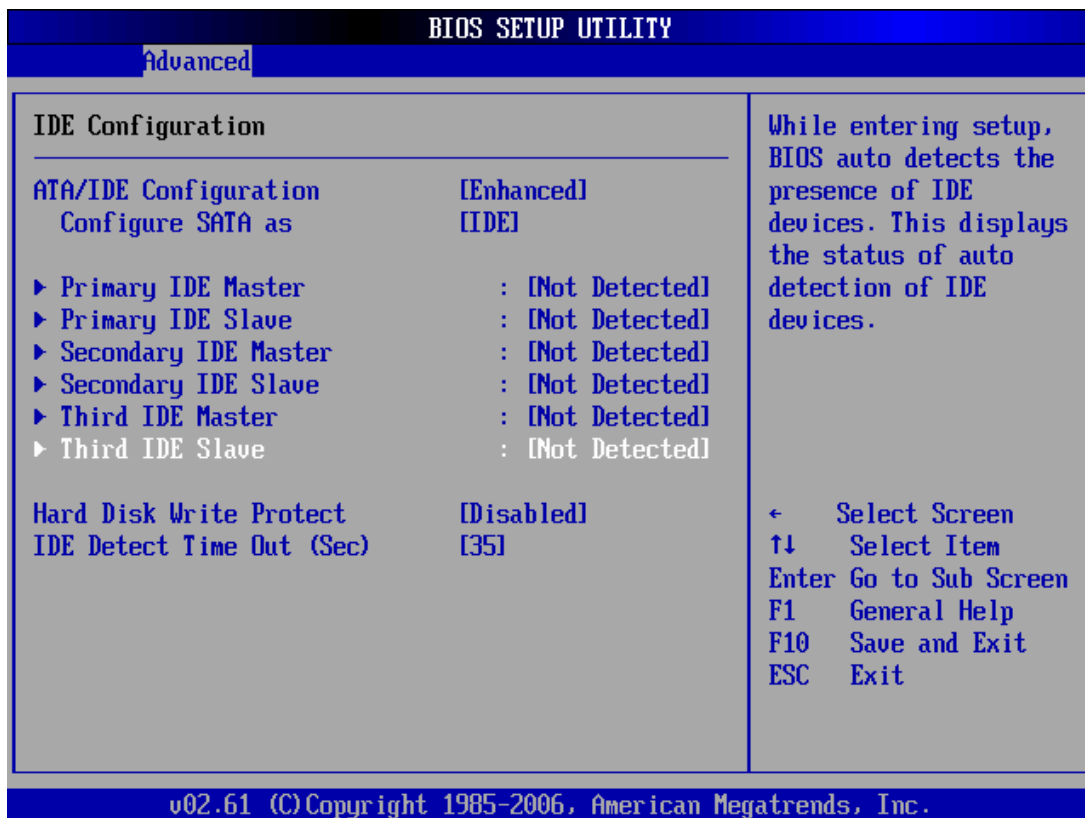


Figure 4.6: IDE Configuration

- **IDE Configuration**
The default setting is “Enabled”. It will enable all SATA resources when enabled.
- **Enhanced Mode**
This has two options: IDE and AHCI. The default setting is “IDE”, Legacy IDE Mode Setting.
- **Primary/Secondary/Third/Fourth IDE Master and Slave**
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
 - **Type: Select SATA driver type.** The options are [Not installed], [Auto], [CD/DVD] and [ARMD].
 - **LBA/Large Mode: Enable or disable LBA mode.**
 - **Block (Multi-Sector Transfer): Enable or disable multi-sector data transfer.**
 - **PIO Mode: Select PIO mode.**
 - **DMA Mode: Select DMA mode.**
 - **S.M.A.R.T.: Select intelligent monitoring, analysis and report technology**
 - **32Bit Data Transfer: Enable or disable 32-bit data transfer.**
- **Hard Disk Write Protect**
Enable or disable device write protect feature. This item is only available when the device is visited through BIOS. And it is only effective under DOS. The default configuration is “Disabled”.
- **IDE Detect Time Out (Sec)**
This item allows users to detect ATA/ATAPI device’s time out value. The default value is “35”.

4.2.2.3 Super I/O Configuration

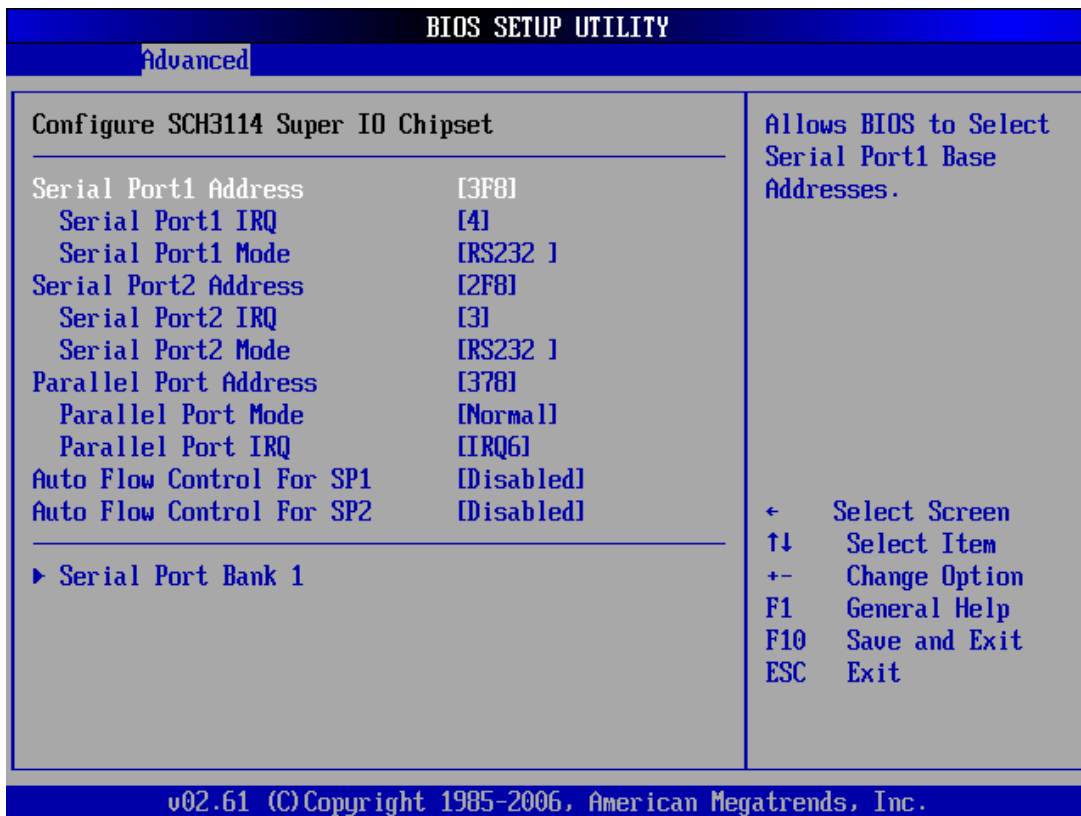


Figure 4.7: Super I/O Configuration

- **Serial Port1/2/ Address and IRQ and Mode setting**
This option configures serial port 1/2 base addresses and IRQ, as well as RS-232/422/485 mode. Serial Port 3 ~ 10 RS-232/422/485 mode configurations are decided by jumper setting.
- **Parallel Port Address and IRQ and Mode setting**
This option configures parallel port base addresses and IRQ, as well as RS-232/422/485 mode.
- **Auto Flow Control For Serial Port1**
This option configures serial port 1's 485 protocol. Options are "Enabled" and "Disabled".
- **Auto Flow Control For Serial Port2**
This option configures serial port 2's 485 protocol. Options are "Enabled" and "Disabled".

4.2.2.4 Hardware Health Configuration

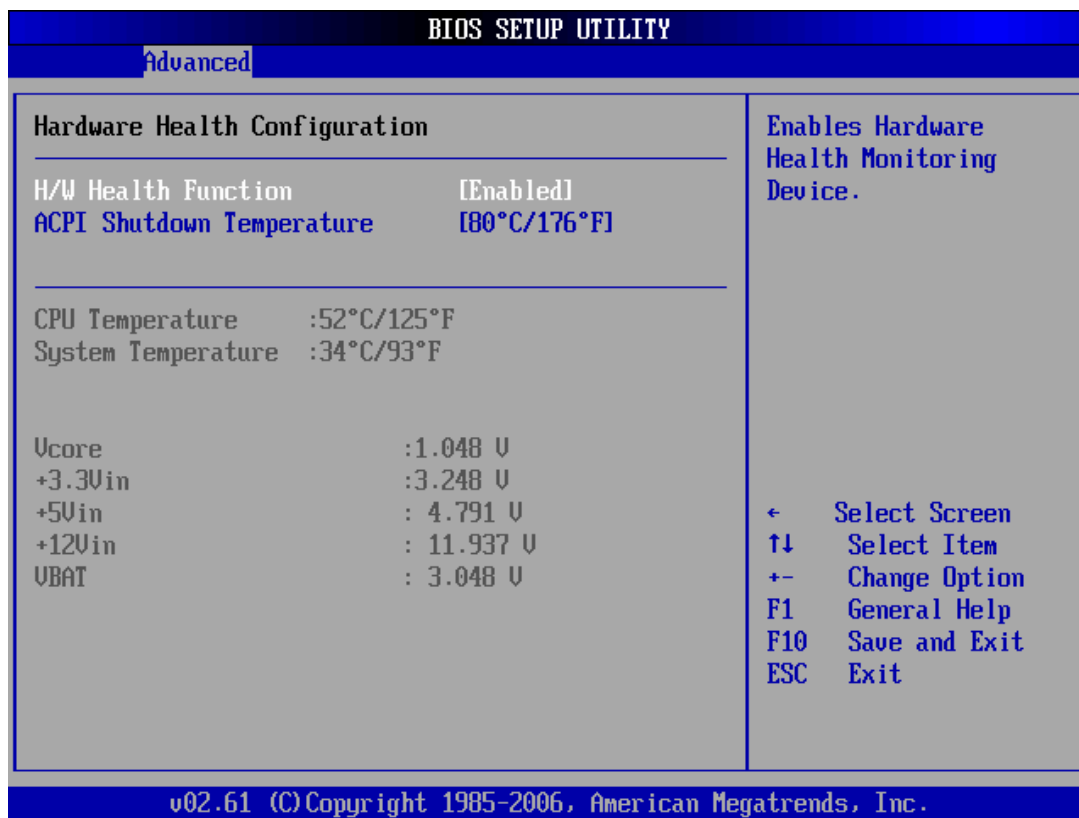


Figure 4.8: Hardware Health Configuration

- **H/W Health Function**
This item is used to enable hardware monitoring function.
- **ACPI Shutdown Temperature**
Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will automatically shutdown to protect the system from over heat damage. Users can view system temperature, CPU temperature and fan state here.

4.2.2.5 ACPI Configuration

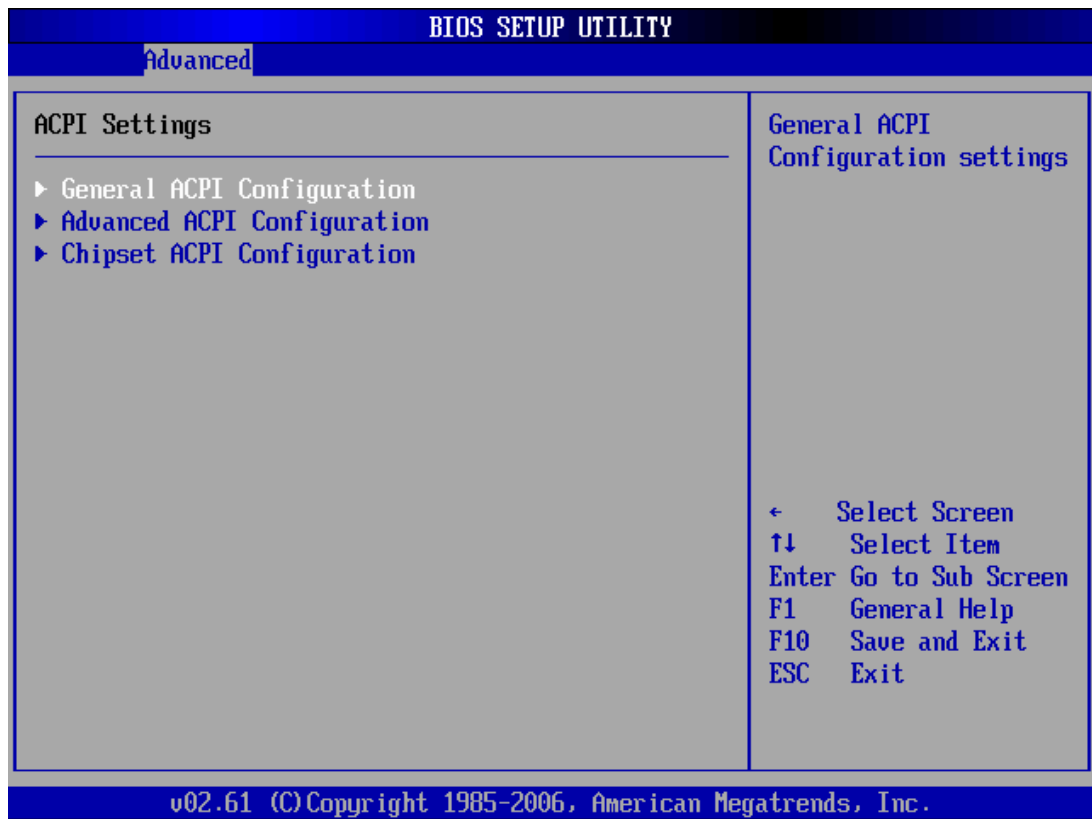


Figure 4.9: ACPI Settings

Note! The power mode is set as "ATX" by default. Only Advanced ACPI Configuration option is available when being changed as "AT".



■ General ACPI Configuration

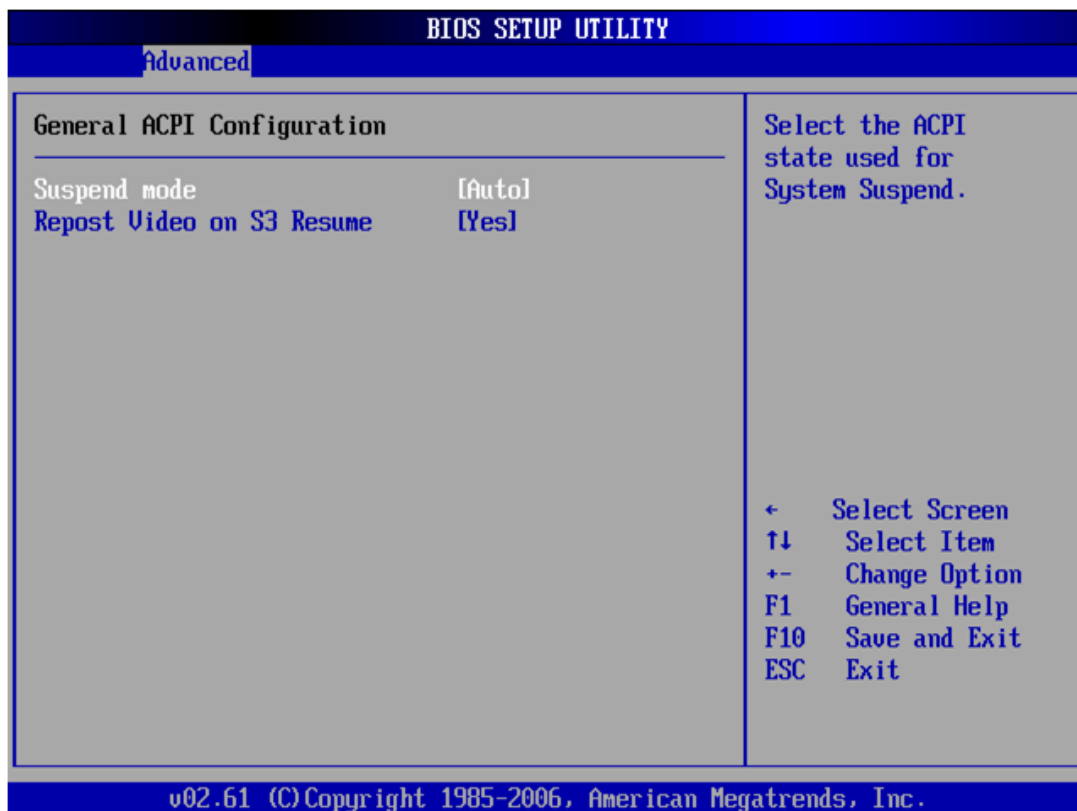


Figure 4.10: General ACPI Configuration

- **Suspend mode**
Select ACPI state for system hibernation. The default setting is “Auto”.
- **Repost Video on S3 Resume**
Confirm whether to call VGA BIOS when system recovers from S3/SRT. The default setting is “Yes”.

■ Advanced ACPI Configuration

Users can configure other ACPI items here.



Figure 4.11: Advanced ACPI Configuration

– ACPI version features

This item allows users to enable RSDP pointer for 64-bit fixed system specification table. Set this item to allow or forbid system to comply with ACPI 1.0/2.0/3.0 specification.

– ACPI APIC Support

Enable or disable table pointer to align RSDT pointer. The default setting is "Enabled".

– AMI OEMB table

Enable or disable ACPI OEMB table pointer to align RSDT pointer. The default setting is "Enabled".

– Headless mode

Enable or disable Headless operation mode by ACPI. The default setting is "Disabled".

■ Chipset ACPI Configuration

This item is used to configure other ACPI options.

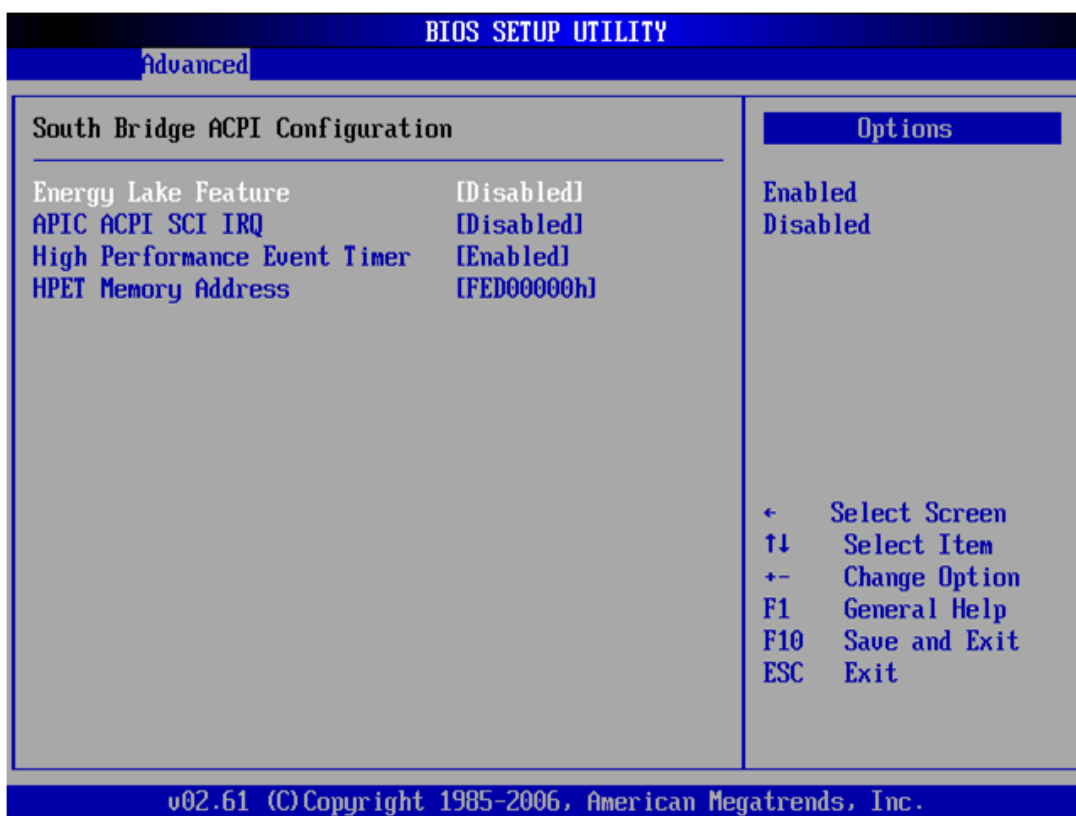


Figure 4.12: Chipset ACPI configuration

- **Energy Lake Feature**
Can be enabled or disabled. The default setting is “Disabled.”
- **APIC ACPI SCI IRQ**
Can be enabled or disabled. The default setting is “Disabled.”
- **USB Device Wakeup From S3**
Can be enabled or disabled. The default setting is “Disabled.”
- **High performance Event Timer**
Can be enabled or disabled. The default setting is “Disabled.”
- **HPET Memory Address**
Set HPET memory address. The default setting is “FED00000h”.

4.2.2.6 AHCI Configuration

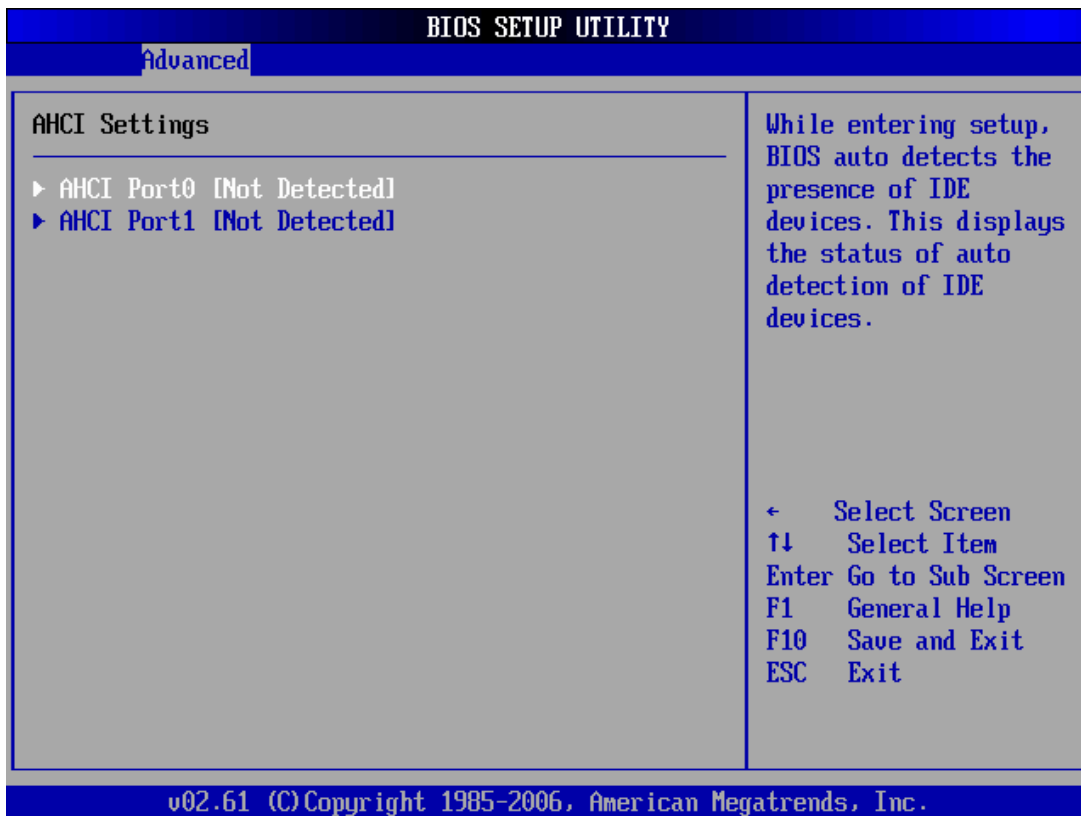


Figure 4.13: AHCI Configuration

■ AHCI Port0 /Port1 Detect

When entering setup screen, BIOS will automatically detect SATA device, and show the state of existing SATA devices.

- **Type:** Select the device type connected to system: [Not Installed], [Auto].
- **S.M.A.R.T.:** Select intelligent monitoring, analysis and report technology.

4.2.2.7 APM Configuration

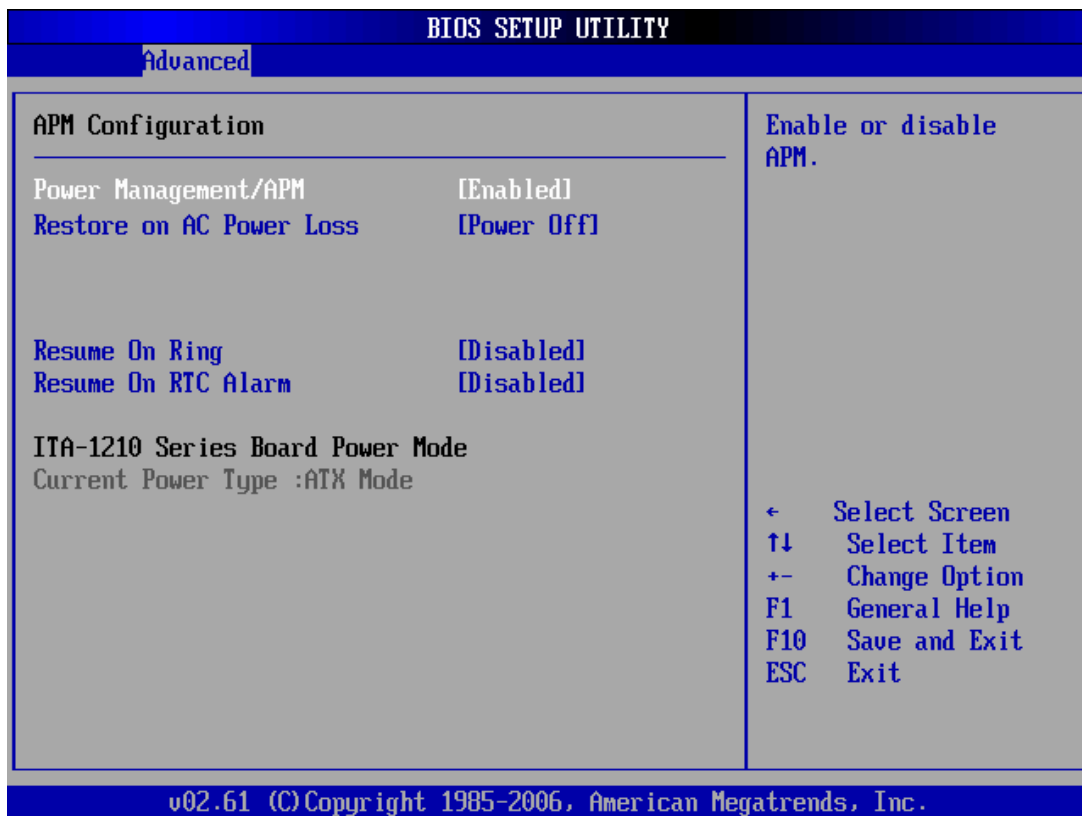


Figure 4.14: APM Configuration

- **APM Configuration**

Includes 5 options.

- **Power Management /APM**

Options are “Disabled” and “Enabled”. The default setting is “Enabled”.

- **Restore on AC Power Loss**

Options are Power off/Power on/Last state. The default setting is “Power Off”.

- **Resume on Ring**

Options are “Disabled” and “Enabled”. The default setting is “Disabled”

- **Resume on RTC Alarm**

Options are “Disabled” and “Enabled”. The default setting is “Disabled”

- **ITA-1710 Series Power Mode**

Detects current power mode: “AT mode” or “ATX mode”.

4.2.2.8 Event Log Configuration

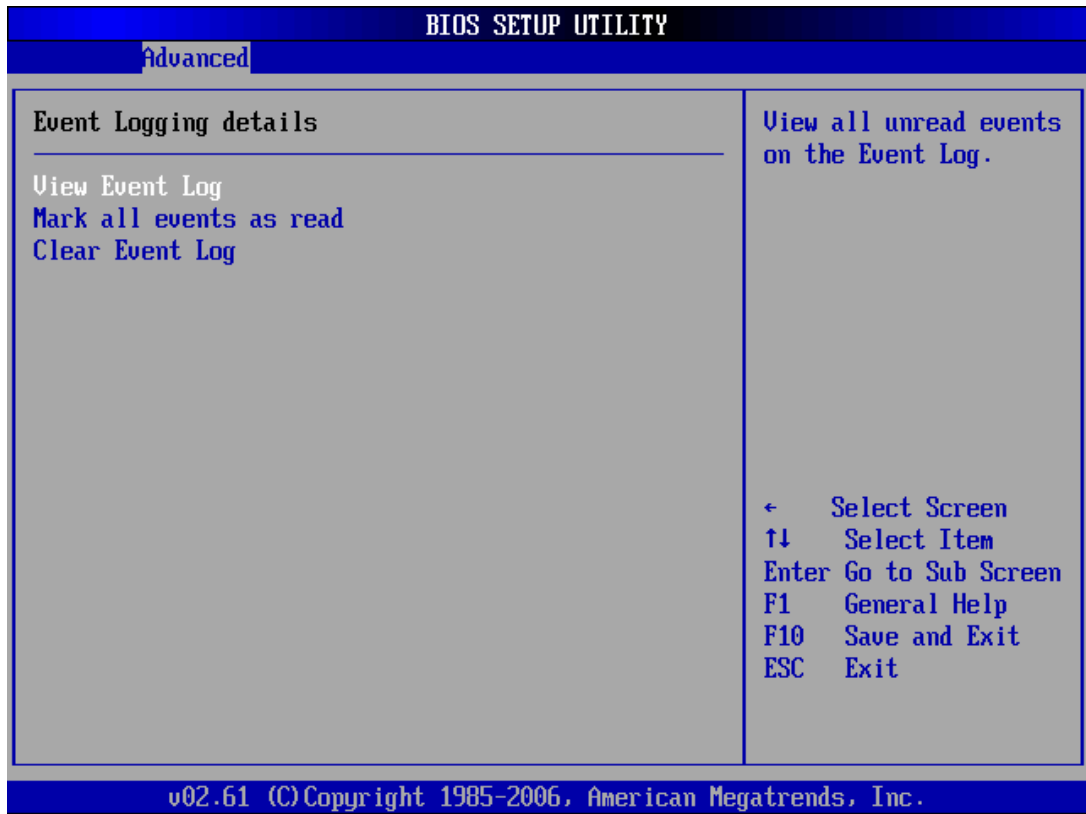


Figure 4.15: Event Log Configuration

- **View Event log**
Users can view all unread event in the event log, including the errors and warnings appearing in BIOS startup process.
- **Mark all events as read**
Mark all unread events as read. The last option is “No Unread Log”.
- **Clear Event log**
Give up all unread logs, and consider them as read. The first option is “No Unread Log”.

4.2.2.9 USB Configuration

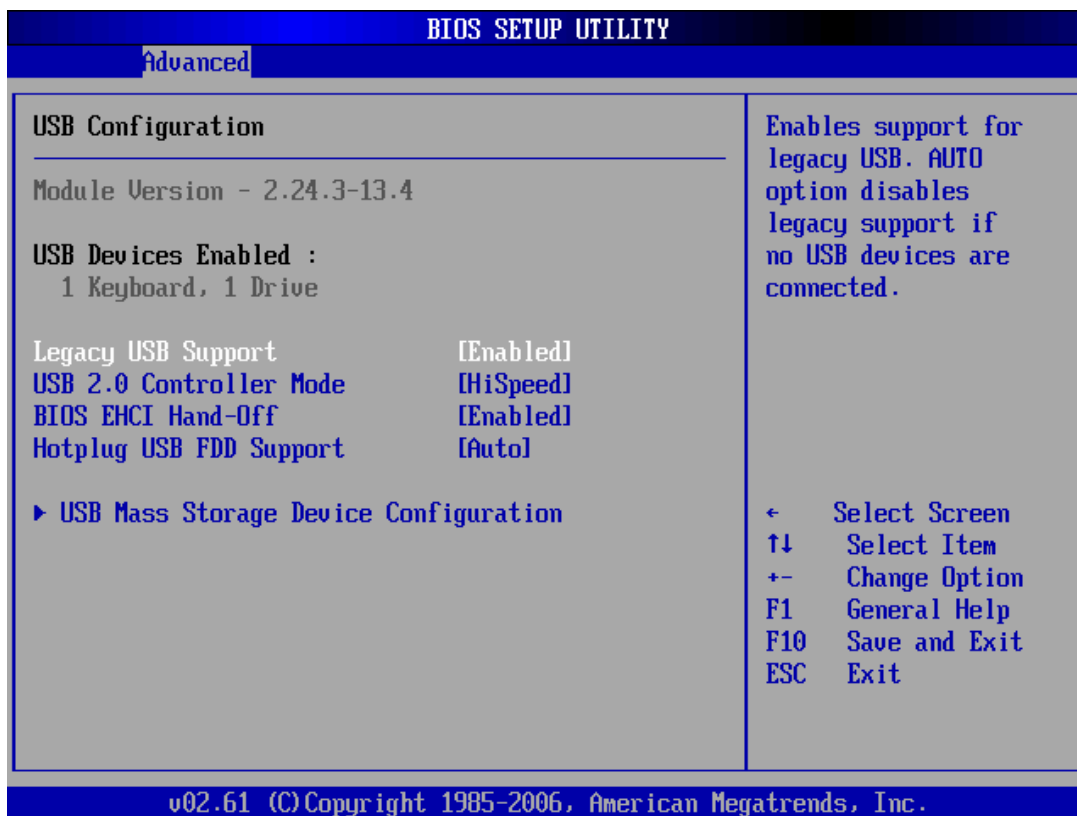


Figure 4.16: USB Configuration

- **Legacy USB Support**
Enable support for traditional USB. It will be automatically set as “Disabled” when no USB device is connected. The default setting is “Enabled”.
- **USB 2.0 Controller Mode**
Options are HiSpeed/ Fullspeed. The default setting is “HiSpeed”.
- **BIOS EHCI Hand-Off**
Enables operating system without hand-off feature.
- **Hotplug USB FDD Support**
System will create a virtual FDD device connected with hot swap FDD. The virtual device is only automatically generated when no USB FDD exists.

■ **USB Mass Storage Device Configuration**

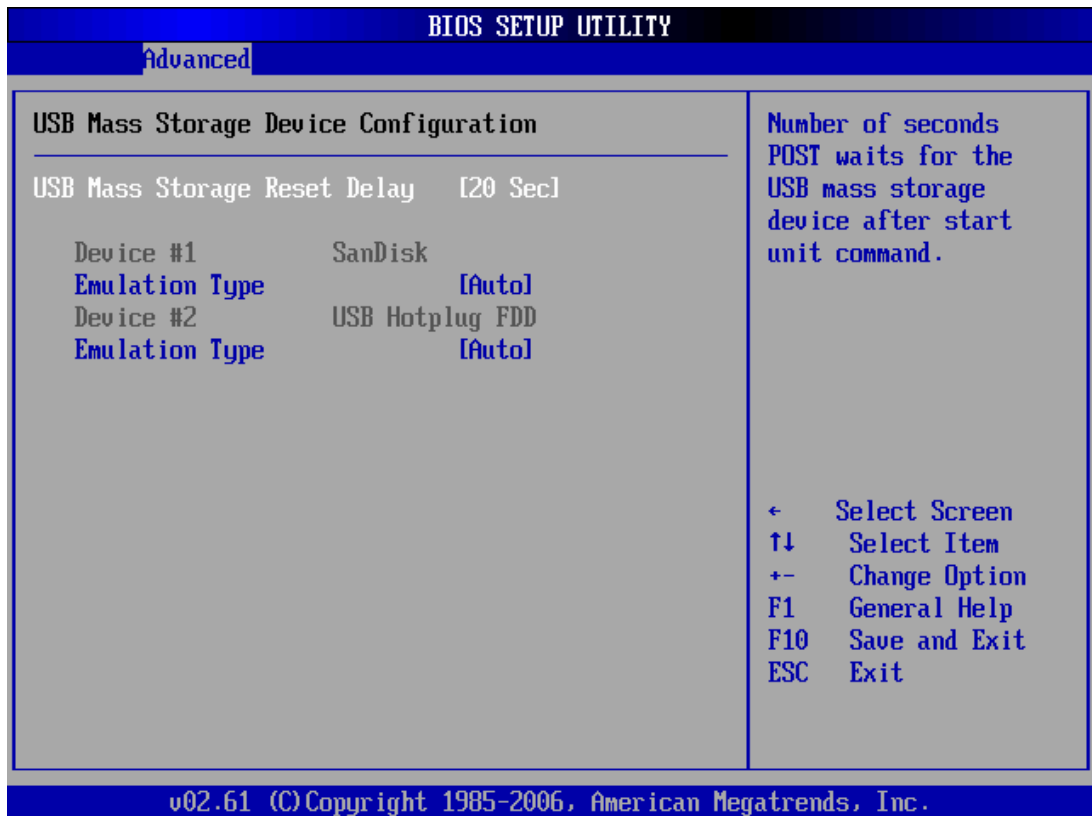


Figure 4.17: USB Mass Storage Device Configuration

- **USB Mass Storage Reset Delay**
POST time (seconds) of USB mass storage after starting the unit command.
- **USB Devices Emulation Type**
Set the simulation type of current USB device: [Auto], [Floppy], [Forced FDD], [Hard Disk] and [CDROM].
If set as “Auto”, USB device smaller than 530 MB will be simulated as FDD, and others as HDD. If set as “Forced FDD”, FDD format drivers can be started as FDD, such as ZIP driver.

4.2.3 PCI/PnP Setup

Select the PCI/PnP tab from the ITA-1710 setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

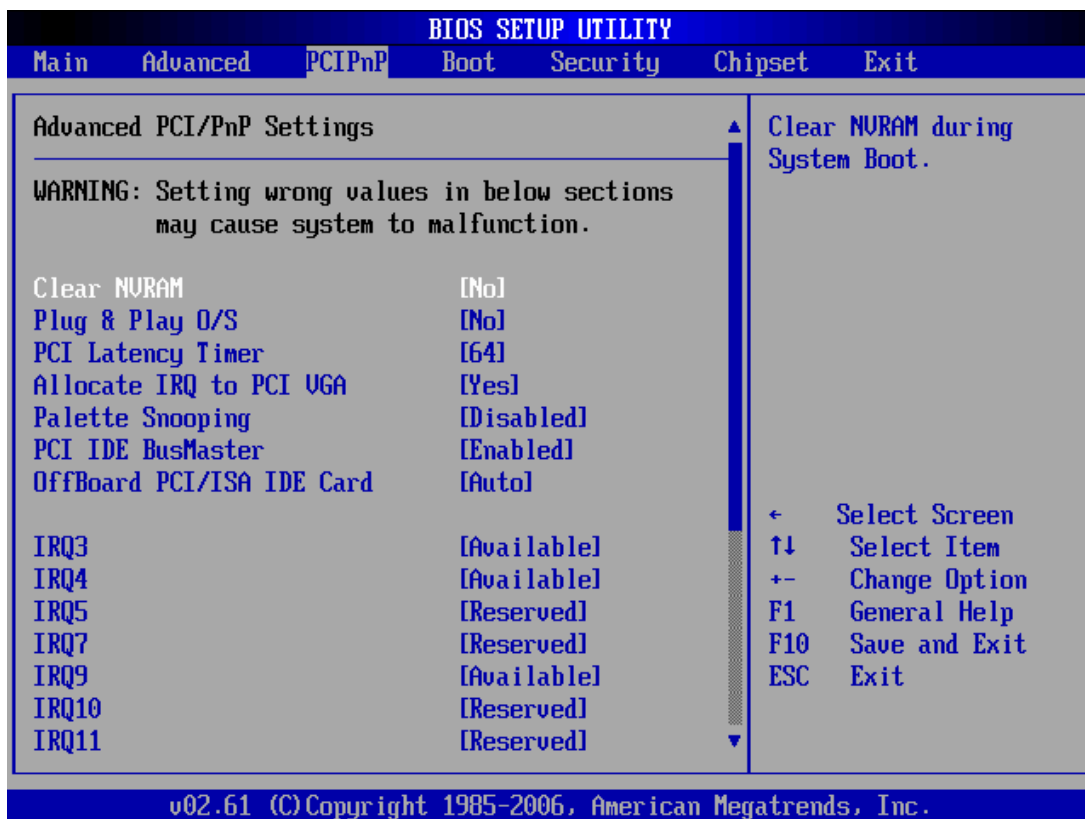


Figure 4.18: PCI/PnP Setup

- **Clear NVRAM**

Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM). The Optimal and Fail-Safe default setting is No.
- **Plug and Play O/S**

When set as “No”, BIOS will configure all devices in the system. When set as “Yes”, if users have installed plug and play O/S, O/S will configure plug and play devices that don’t need to start. The default setting is No.
- **PCI Latency Timer**

Use this to adjust the PCI Latency Timer. This option sets the latency of all PCI devices on the PCI bus. The Optimal and Fail-Safe default setting is 64.
- **Allocate IRQ to PCI VGA**

Set this value to allow or stop the system from giving the VGA adapter card an interrupt address. The Optimal and Fail-Safe default setting is Yes.
- **Palette Snooping**

Set this value to allow the system to modify the Palette Snooping settings. The Optimal and Fail-Safe default setting is Disabled.
- **PCI IDE BusMaster**

Set this value to allow or prevent the use of PCI IDE Busmastering. The Optimal and Fail-Safe default setting is Disabled.

- **OffBoard PCI/ISA IDE Card**
Set this value to allow an add-on PCI/ISA IDE card to be selected. The Optimal and Fail-Safe default setting is Auto.
- **IRQ3/4/5/7/10/11/15**

Available	Specified IRQ is available to be used by PCI/PnP devices.
Reserved	Specified IRQ is reserved for use by Legacy ISA devices.

4.2.4 Boot Setup Utility

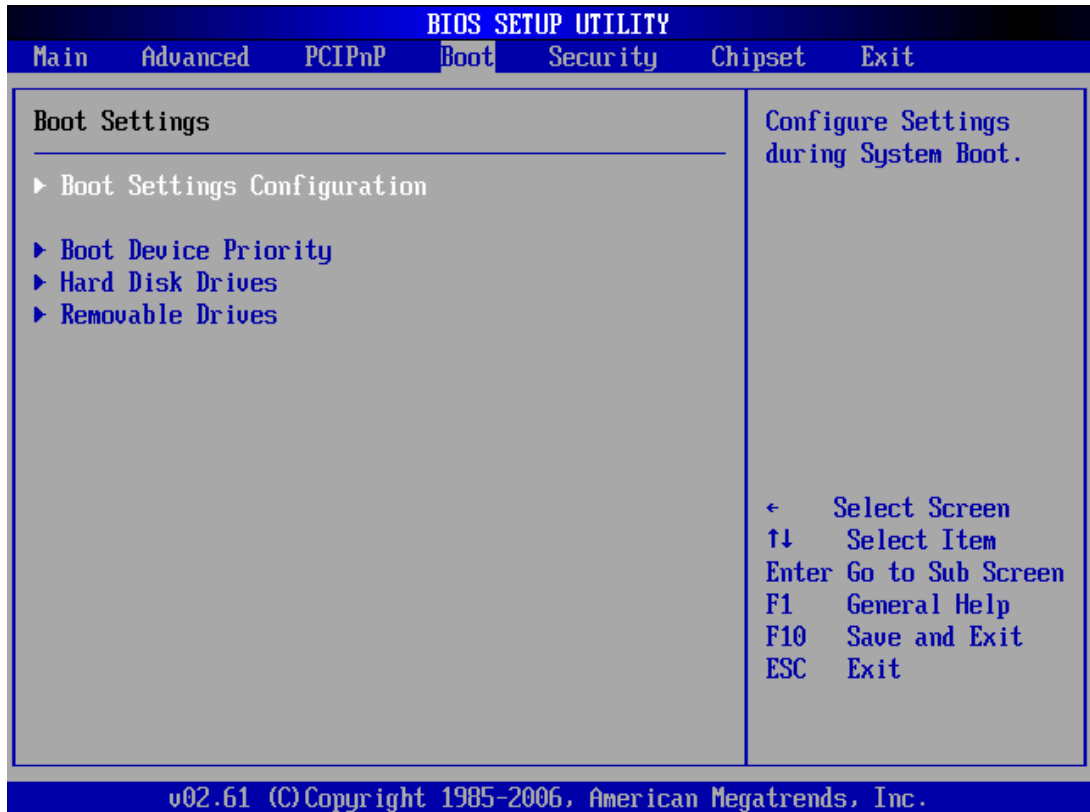


Figure 4.19: Boot Setup Utility

Note! Only when at least one HDD is connected to ITA-1710, “Hard Disk Drives” option will be shown in the setup screen.



4.2.4.1 Boot Settings Configuration

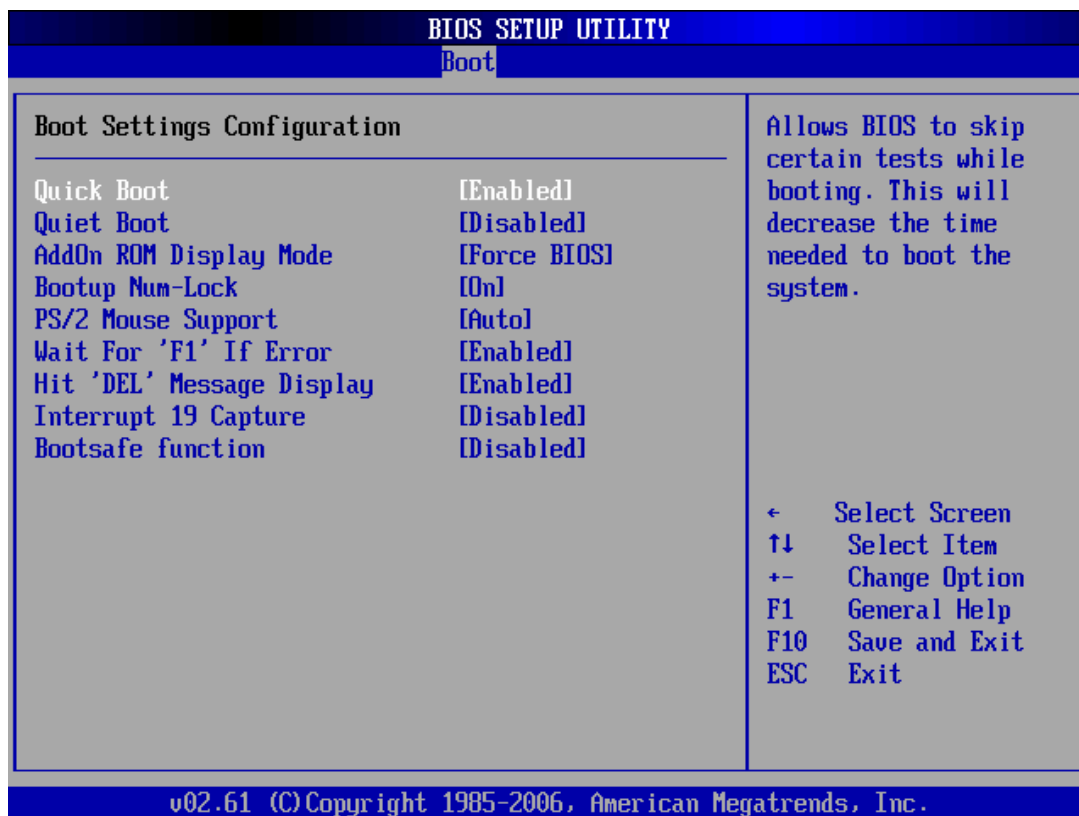


Figure 4.20: Boot Settings Configuration

- **Quick Boot**
Allows the BIOS to skip certain tests while booting. The default setting is “Enabled”.
- **Quiet Boot**
If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **AddON Rom Display Mode**
Sets the display mode of optional ROM.
- **Bootup Num-Lock**
Select the Power-on state for Numlock.
- **PS/2 Mouse Support**
Selects support for PS/2 Mouse. (Only available under DOS)
- **Wait For 'F1' If Error**
Wait for the F1 key to be pressed if an error occurs.
- **Hit 'DEL' Message Display**
Displays “Press DEL to run Setup” in POST.
- **Interrupt 19 Capture**
Some add-on cards' ROM options need Interrupt 19, this is to enable or disable supporting this kind of add-on cards. This setting is required by PCI card based on ROM configuration utility.
- **Bootsafe function**
This option allows users to enable or disable bootsafe function.
- **Boot Device Priority**
Configures the boot priority of available devices: [Hard Disk Device], [Removable Device], [CD-DVD ROM].

4.2.5 Security Setup

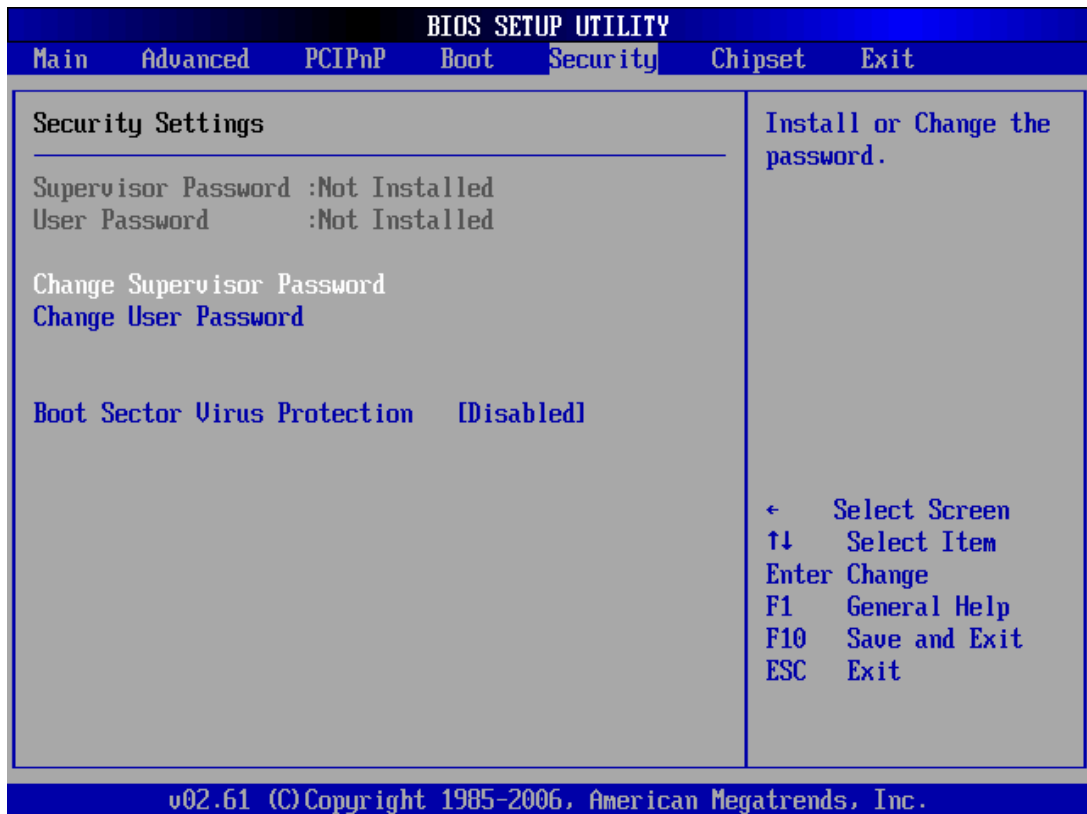


Figure 4.21: Password Configuration

Select Security Setup from the ITA-1710 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- **Change administrator password**
- **Change user password**
- **Boot sector Virus protection**

The boot sector virus protection will warn if any program tries to write to the boot sector. The default setting under DOS is "Disabled".

4.2.6 Advanced Chipset Settings



Figure 4.22: Advanced Chipset Settings

4.2.6.1 North Bridge Chipset Configuration

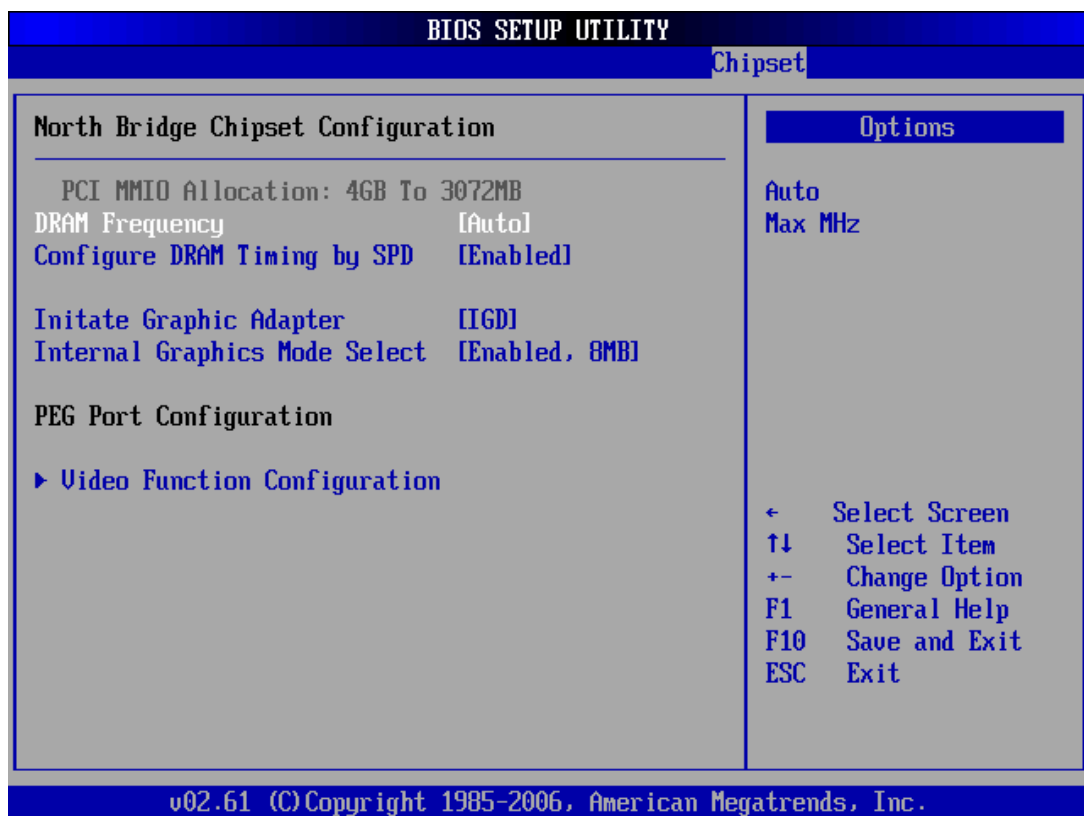


Figure 4.23: North bridge chipset configuration

- **DRAM Frequency**
This setting allows user to select DRAM frequency. The default setting is “Auto” by SPD.
- **Configure DRAM Timing by SPD**
This setting allows user to select DRAM Timing by SPD or manually, and enable or disable DRAM SPD detect.
- **Initate Graphic Adapter**
This setting allows user to select which graphics controller to be the primary graphic device when booting up. Recommend not to modify this option.
- **Internal Graphics Mode Select**
Allows the built-in graphic card to occupy certain system memory.

- **Video Function Configuration**



Figure 4.24: Video Function Configuration

- **DVMT Mode select**
Sets the available video mode of system: “DVMT Mode” or “Fixed Mode”.
- **DVMT/Fixed memory**
Sets the memory capacity of video in “Fixed Mode”.
- **Boot Display Device**
Sets the boot display device in POST process. The default setting is “CRT+LVDS”.
- **Flat Panel Type**
Sets the panel resolution, the default setting is “1024x768 (24-bit)”.

4.2.6.2 South Bridge Chipset Configuration

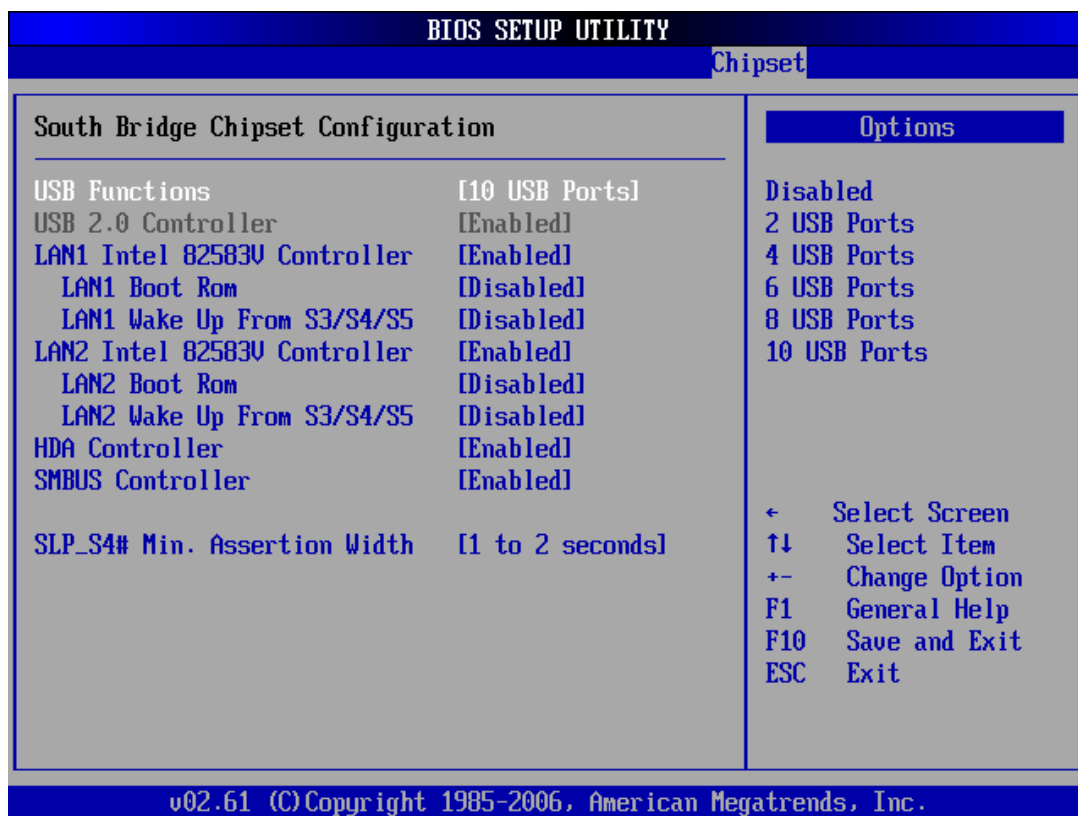


Figure 4.25: South Bridge Chipset Configuration

- **USB Functions**
The default setting is “10 USB Ports”.
- **USB 2.0 Controller**
Enable or Disable USB 2.0 controller. When set 10 ports, this option will become grey.
- **LAN1 Intel 82583V Controller**
Enable or disable Intel LAN1 controller.
- **LAN1 Boot ROM**
Set to boot from “PCI ROM” or “Not for LAN1”.
- **LAN1 Wake Up from s3/s4/s5**
Enable or diable LAN1 wake up from S3/S4/S5.
- **LAN2 Intel 82583V Controller**
Enable or diable Intel LAN2 controller.
- **LAN2 Boot ROM**
Set boot from “PCI ROM” or “Not for LAN2”.
- **LAN2 Wake Up from s3/s4/s5**
Enable or disable LAN2 wake up from S3/S4/S5.
- **HDA Controller**
Enable or disable HD audio controller.
- **SMBUS Controller**
Enable or disable SMBus controller.
- **SLP_S4# Min. Assertion Width**
Set the minimum assertion width of Slp_S4# when booting up. The default setting is “1-2 seconds”.

4.2.7 Exit Option



Figure 4.26: Exit Option

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

4.2.7.2 Discard Changes and Exit

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

1. Select Exit Discarding Changes 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.

4.2.7.3 Discard Changes

Select Discard Changes from the Exit menu and press <Enter>.

4.2.7.4 Load Optimal Defaults

The ITA-1710 automatically configures all setup items to optimal settings when you select this option. Select Load Optimal Defaults from the Exit menu and press <Enter>.

4.2.7.5 Load Failsafe Defaults

The ITA-1710 automatically configures all setup options to fail-safe settings when you select this option. Fail-Safe Defaults are designed for maximum system stability, but not maximum performance. Select Fail- Safe Defaults from the Exit menu and press <Enter>.

Chapter 5

Driver Installation

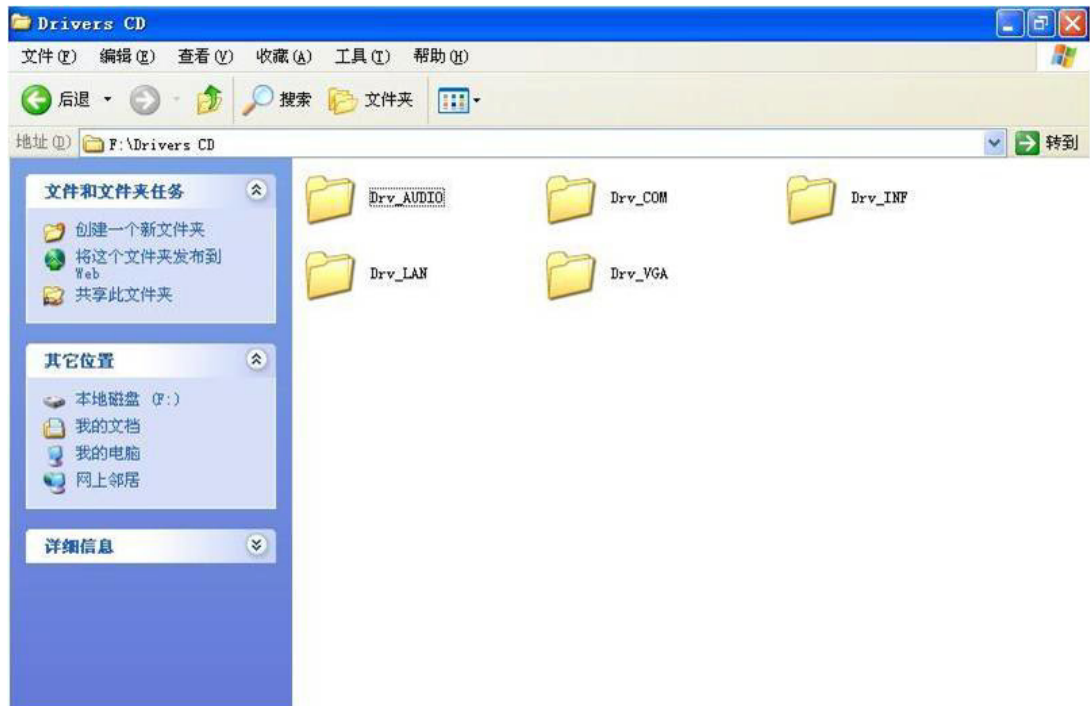
This chapter describes how to install drivers.

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.

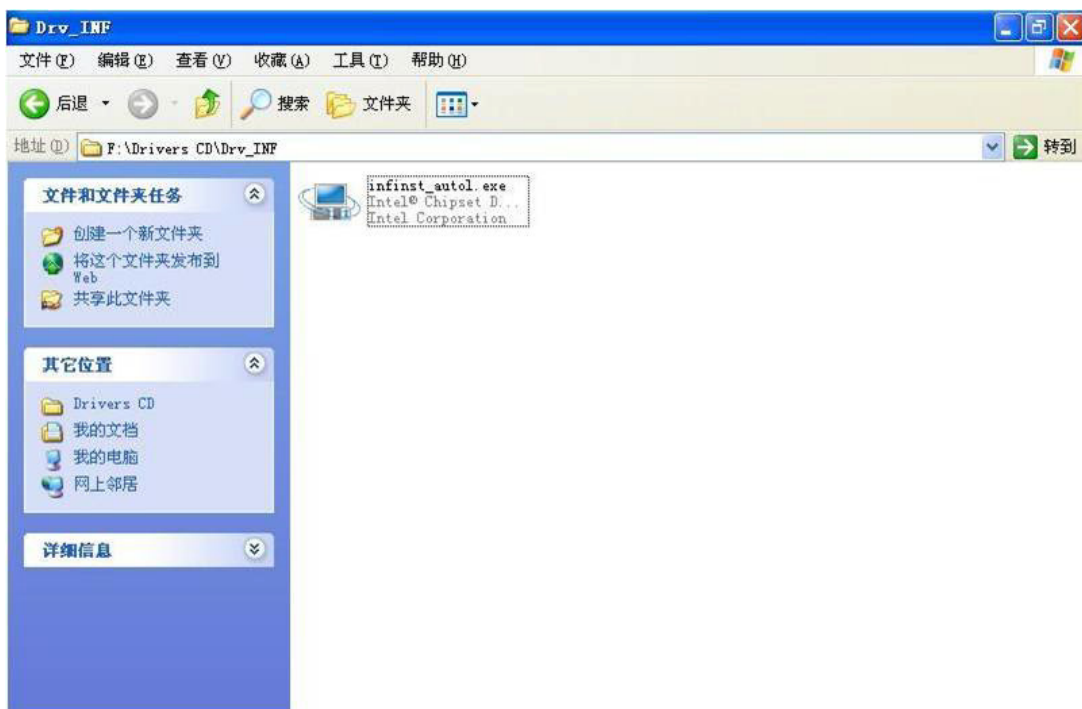
5.2 Driver Installation

Insert the driver CD into your system's CD-ROM drive. You can see the ITA-1710 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 "Drv_INF" folder and click "infinst_autol.exe" to complete the installation of the driver.



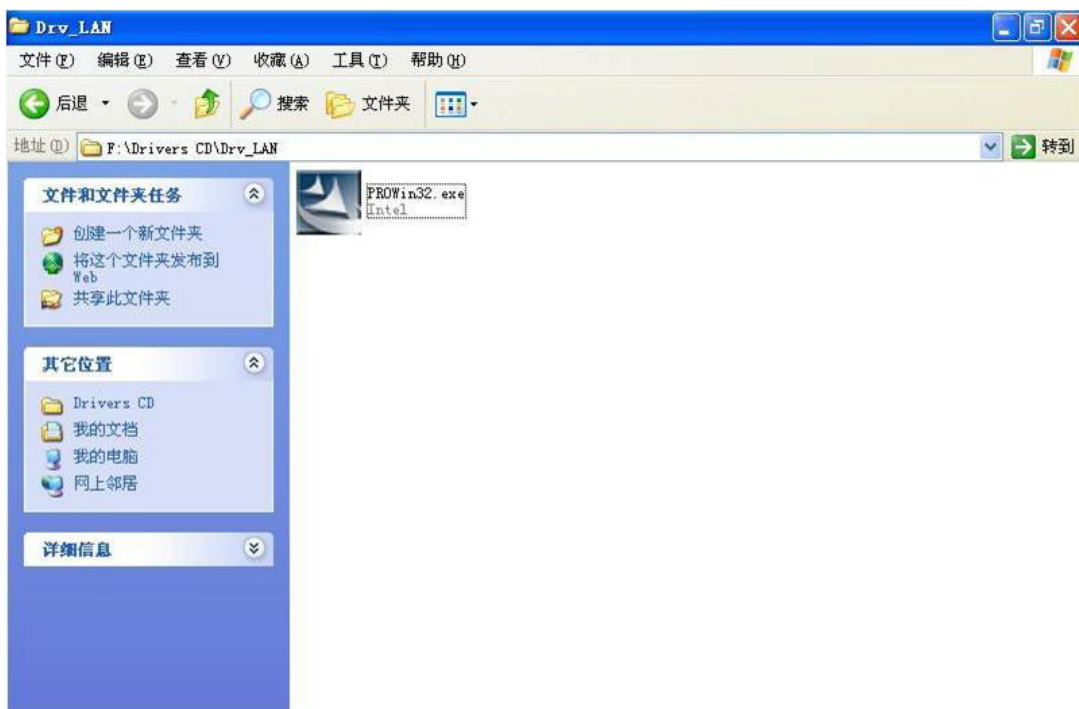
5.2.2 VGA Windows Driver Setup

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



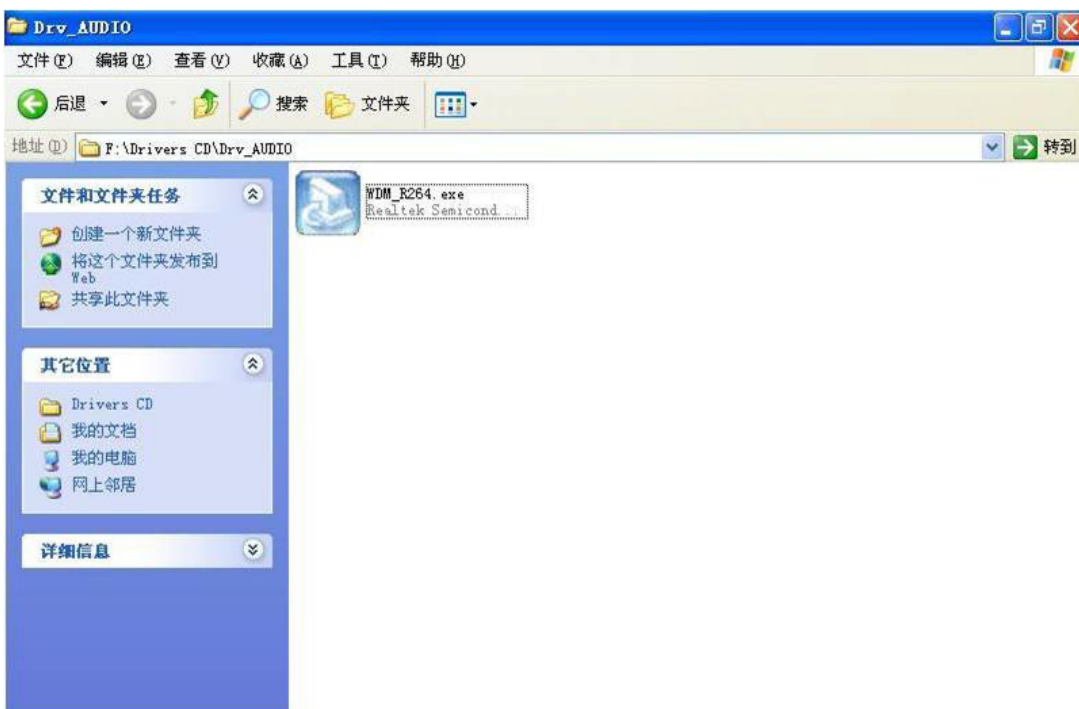
5.2.3 LAN Windows Driver Setup

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "Drv_LAN" folder and click "PROWin32.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 "Drv_AUDIO" folder and click "WDM_R264.exe" to complete the installation of the drivers.



Chapter 6

GPIO Programming Guide

This chapter introduces GPIO programming Guide.

6.1 ITA-1710 Digital DIO Definition

See Section 2.4.8.

6.2 Configuration Sequence

ITA-1710's on-board GPIO with LPC bus operates by Lattice CPLD.

The configuration and access to CPLD GPIO IC is completed by IO Space accessing to the system.

Mapping between GPIO IO Space and corresponding GPIO pins:

Port GPO : IO 0xC10~0xC12 (bit0-bit23) R/W

0xC10:bit0~bit7 GPO(1~8)

0xC11:bit0~bit7 GPO(9~16)

0xC12:bit0~bit7 GPO(17~24)

Port GPI : IO 0xC13~0xC15 (bit0-bit23) R

0xC13:bit0~bit7 GPI(1~8)

0xC14:bit0~bit7 GPI(9~16)

0xC15:bit0~bit7 GPI(17~24)

Note! *ITA-1210 uses 48 bit CPLD for GPIO control, 24 GPI and 24 GPO totally.*



If a GPIO Pin is Input, users can read the corresponding input value from bit of IO Space register.

If a GPIO Pin is Output, users can read the corresponding input value from bit of IO Space register.

6.3 Function Call Reference

GPIO Analog Code (C language pseudocode)

GPO 4 High Output:

```
unsigned char data;  
data = inportb(0xC10); //first read corresponding IO Space register value  
data |= 0x08; //00001000B, set bit 03 as '1', meaning output High  
outportb(0xC10, data); //output value
```

Read GPI 9 Input Value:

```
unsigned char data;  
data = inportb(0xC14); //first read corresponding IO Space register value  
if (data & 0x01); //00000001B, judge value of bit 0  
    High // 1 = High  
else  
    Low // 0 = Low
```

Note! Please examine the current BIOS version. If it is X006 version or earlier, please open IO decode manually. The opening method is as follows:



Use Adu.exe in DOS or RW in XP. The following operation takes DOS as an example.

Run Adu, select PCI menu and find ISA Bridge line, then press "Enter" to configure.

Modify 90h, 91h and 92h registers under the 256 byte table in ISA configuration page.

Modified value: 01h in 90h, 0ch in 91h, and 1Ch in 92h.

Ready for IO operation of GPIO.

Appendix **A**

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The ITA-1710'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 A00h (hex).

Table A.1: Watchdog Timer Registers

Address: A00h (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
;-----

```