



User Manual

ARK-3400

Compact Embedded IPC

Trusted ePlatform Services

ADVANTECH

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. 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.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

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. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. 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.
14. Do not leave this equipment in an environment where the storage temperature may go below -20°C (-4°F) or above 60°C (140°F). This could damage the equipment. The equipment should be in a controlled environment.
15. **CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer, discard used batteries according to the manufacturer's instructions.
16. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
17. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.
18. **DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Wichtige Sicherheitshinweise

1. Bitte lesen sie Sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie Keine Flüssig-oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlussteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor überhit-zung schützt. Sorgen Sie dafür, daB diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim. AnschluB an das Stromnetz die AnschluBwerte.
9. Verlegen Sie die Netzanschlusbleitung so, daB niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
 - Netzkabel oder Netzstecker sind beschädigt.
 - Flüssigkeit ist in das Gerät eingedrungen.
 - Das Gerät war Feuchtigkeit ausgesetzt.
 - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
 - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
 - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
14. VORSICHT: Explosionsgefahr bei unsachgemaben Austausch der Batterie.Ersatz nur durch denselben oder einem vom Hersteller empfohlene-mahnlichen Typ. Entsorgung gebrauchter Batterien navh Angaben des Herstellers.
15. ACHTUNG: Es besteht die Explosionsgefahr, falls die Batterie auf nicht fach-männische Weise gewechselt wird. Verfangan Sie die Batterie nur gleicher oder entsprechender Type, wie vom Hersteller empfohlen. Entsorgen Sie Batterien nach Anweisung des Herstellers.
16. Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weiger.
17. Montageort: Das Gerät sollte nur in einem Bereich mit eingeschränktem Zugang montiert werden.
18. Haftungsausschluss: Die Bedienungsanleitungen wurden entsprechend der IEC-704-1 erstellt. Advantech lehnt jegliche Verantwortung für die Richtigkeit der in diesem Zusammenhang getätigten Aussagen ab.

Packing List

Before installation, please ensure the following items have been shipped:

- 1 x ARK-3400 Unit
- 1 x DVI to CRT adapter connector
- 1 x Rubber foot kit
- 2 x Desk/Wall mount plate
- 1 x 4-pin Phoenix DC power connector
- 1 x Utility CD
- 1 x Registration and 2 years Warranty card

Ordering information

Model Number Description

ARK-3400F-S5A1E	Intel® Celeron® M 370 1.5GHz Box IPC
ARK-3400F-S0A1E	Intel® Celeron® M 373 1.0GHz Box IPC

Optional accessories

Part Number	Description
1757002161	AC-to-DC Adapter, DC19 V/7.89A 150W, with Phoenix Power Plug, 0 ~ 40° C for Home and Office Use
1702002600	Power cable 3-pin 180 cm, USA type
1702002605	Power Cable 2-pin 180 cm, Europe Type
1702031801	Power Cable 2-pin 180 cm, UK Type
1700004713	Cable DVI-I to DVI and CRT
1700009398	LVDS cable for ARK-3400
1700009396	LVDS power cable for ARK-3400
1700009407	Digital IO cable for ARK-3400 (Internal)
1700009405	LPT cable for ARK-3400

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Chapter 1

General Introduction

This chapter gives background information on ARK-3400 series.

1.1 Introduction

ARK-3400 Box IPC is an ideal application ready system platform solution. All electronics are protected in a compact sealed aluminum case for easy embedding in customers own housing, or as a stand-alone application, where space is limited and the environment harsh.

A solid sealed aluminum case provides vibration and dust resistance while also providing a passive cooling solution. The ARK-3400 provides system integrators with a turn-key solution and versatile application development path without breaking the bank or missing time to market deadlines.

The ARK-3400 can be used as a standalone system, wall-mounted and desktop mounted. The system accepts a wide range of power supplies (DC power in) and comes in a footprint of only 220 mm x 102.5 mm x 200 mm (8.66" x 4.04" x 7.87"). The rugged cast aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but also passive cooling for quiet fanless operation.

The ARK-3400 answers this demand by offering 1 x DVI-I interface for dual display, 6 x USB 2.0 ports, 2 x Giga LAN port, audio function, 4 x COM ports, 1 x Mini PCI socket and 2 PCI expansion slots; packed into a small rugged unit and powered by an Celeron M processor. It also supports a wide range of input voltages from 12 VDC to 24 VDC. The ARK-3400 IPC supports 1 x 2.5" SATA HDD and 1 x Compact Flash card for storage options and it can provide the diversified application field.

1.2 Product Feature

1.2.1 General

- Intel® Mobile Celeron® at 1.5 GHz/1.0 GHz
- Dual display and support for wide screen with high resolution
- Support 2 GbE, eSATA, 6 USB 2.0 and 4 COMs
- Internal one 2.5-inch SATA HDD drive bay
- Various expansion interfaces for diverse applications
- Easy integration, easy maintenance, and wide input voltage range

1.2.2 Display

- **CRT display:** Using a DVI to CRT adapter connector
- **Dual display:** CRT + DVI-D extended by DVI-I Y-cable (Optional)
- **LVDS support:** Support 48-bit LVDS interface (Optional)

1.2.3 Power Consumption

- **Typical:** 21 W (CPU is Intel® Mobile Celeron® at 1.5 GHz and w/o expansion)
- **Max.:** 26 W (CPU is Intel® Mobile Celeron® at 1.5 GHz and w/o expansion)

1.3 Hardware Specification

- **CPU:** Intel® Celeron® M 370, 1.5 GHz/ Celeron® M 373, 1.0 GHz
- **System Chipset:** Intel® 910GMLE + ICH6M
- **BIOS:** AWARD™ 4 Mbit, FWH
- **System Memory:** 1 x 200-pin SODIMM socket, Support DDR2 333/400 MHz, up to 2 GB
- **SSD:** Supports 1 x CF Card TYPE I/II
- **HDD:** Supports 1 x industrial extend temperature grade 2.5" SATA HDD
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **I/O Interface:** 2 x RS232, 2 x RS232/422/485 (w/ auto flow control)
- **USB:** 6 x USB 2.0 compliant Ports
- **Audio:** Supports Line-in, Line-out, Microphone-in
- **Ethernet Chipset:** 2 x Realtek 8111B (Gigabit LAN)
 - Speed: 10/100/1000 Mbps
 - Interface: 2 x RJ45 w/ LED
 - Standard: IEEE 802.3z/ab (1000 Mbps) or IEEE 802.3u 100 Mbps compliant
- **Expansion:**
 - PCI: 2 slots
 - Mini PCI: 1 socket
- **Chipset:** Integrated graphics built in Intel® 910GMLE, Mobile Intel® Graphics Media Accelerator 900
- **Memory Size:** Dynamic Video Memory Technology (DVMT 3.0; Support up to 128 MB)
- **Resolution:**
 - CRT: Up to 1920x1080 with 2 vertical taps
 - DVI: Support up to UXGA (1600X1200 @ 75 Hz)
- **Dual Independent:** CRT + DVI-D (Extended by DVI-I Y-cable)

1.4 Mechanical Specification

1.4.1 Dimensions

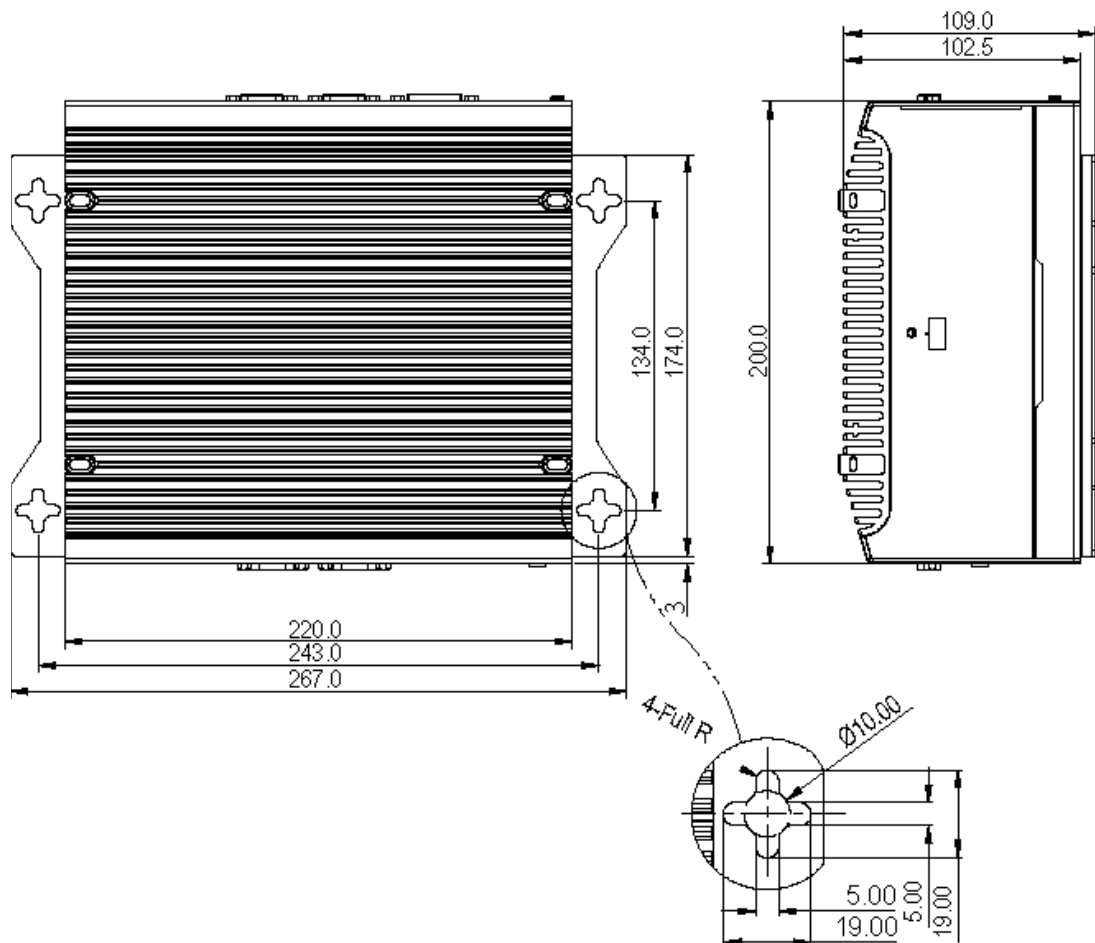


Figure 1.1 ARK-3400 Mechanical Dimension Drawing

1.4.2 Weight

3.8 kg (8.36 lb)

1.5 Power requirement

1.5.1 System power

Minimum power input: DC 14 V-24 V 4.8 A-2.8 A

1.5.2 RTC battery

3 V / 195 mAH BR2032

1.6 Environmental Specifications

1.6.1 Operation temperature

- With Industrial Grade CompactFlash disk: -20 ~ 55° C
- With 2.5-inch extended temperature hard disk -20 to 45° C, with air flow, speed=0.7 m/sec

1.6.2 Relative Humidity

95% @ 40° C (non-condensing)

1.6.3 Storage temperature

-40 ~ 85° C (-40 ~ 185° F)

1.6.4 Vibration loading during operation

- With CompactFlash disk: 5 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct./min, 1 hr/axis.
- With 2.5-inch hard disk: 1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct./min, 1 hr/axis.

1.6.5 Shock during operation

- With CompactFlash disk: 50 G, IEC 60068-2-27, half sine, 11 ms duration
- With hard disk: 20 G, IEC 60068-2-27, half sine, 11 ms duration

1.6.6 Safety

UL, CCC, BSMI

1.6.7 EMC

CE, FCC, CCC, BSMI

Chapter 2

Hardware installation

This chapter introduces external IO and the installation of ARK-3400 Hardware.

2.1 ARK-3400 I/O Indication

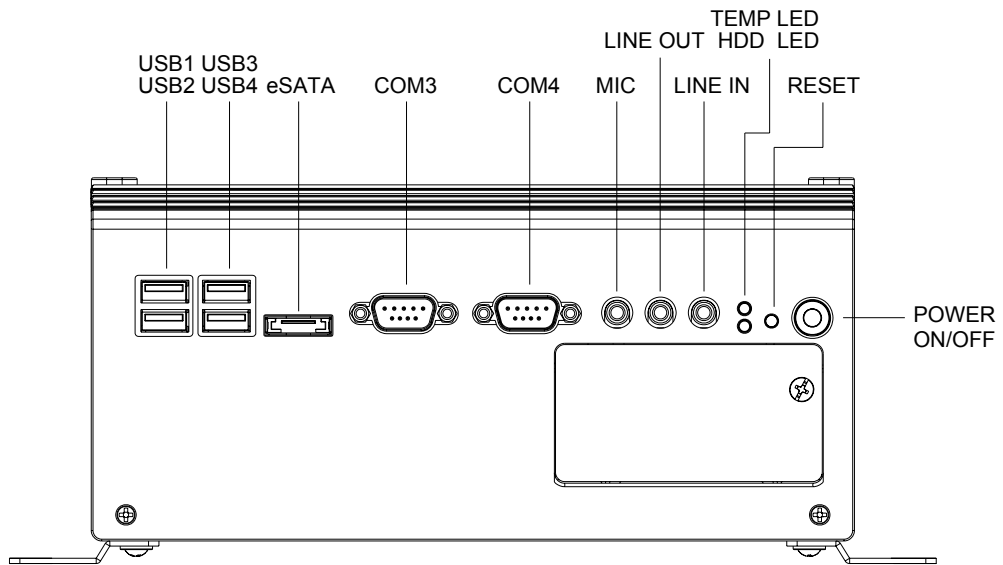


Figure 2.1 ARK-3400 Front View

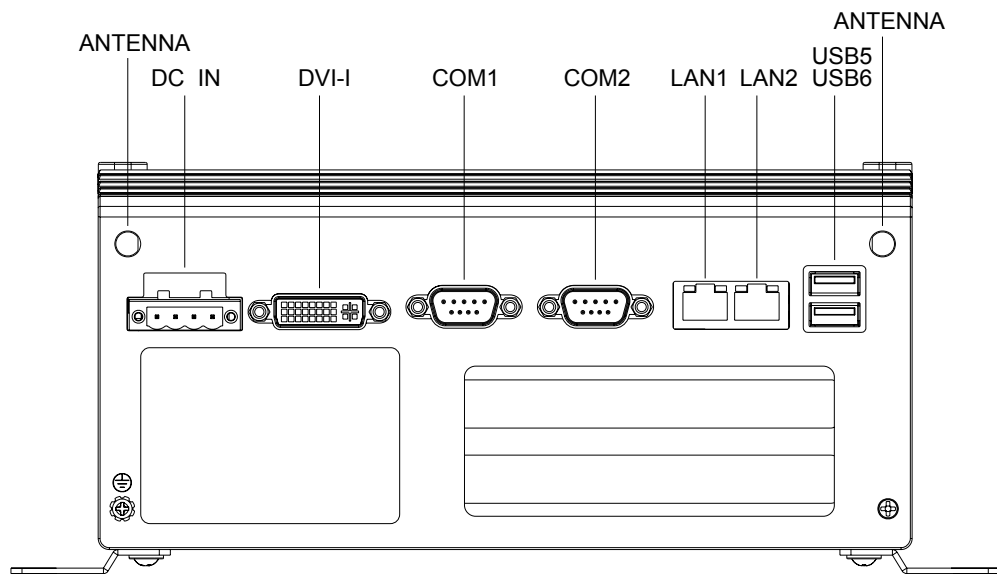


Figure 2.2 ARK-3400 Rear View

2.2 ARK-3400 Front Side External I/O Connectors

2.2.1 Power ON/OFF Button

ARK-3400 comes with a Power On/Off button with LED indicators on the front side to show its On status (Green LED) and Off/Suspend status (Orange LED), that support dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

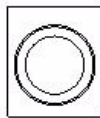


Figure 2.3 Power ON/OFF Button

2.2.2 Reset Button

ARK-3400 has a Reset button on front side. Press the button can to activates the reset function.



Figure 2.4 Reset Button

2.2.3 LED Indicators

There are two LED on ARK-3400 front metal face plate for indicating system status: Thermal LED is for system thermal alarm status; and HDD LED is for HDD & compact flash disk status.

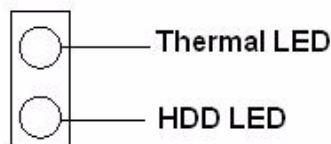


Figure 2.5 LED Indicators

2.2.4 Audio Connector

ARK-3400 offers stereo audio ports by three phone jack connectors of Line_Out, Line_In, Mic_In. The audio chip controller is ALC203, Which is compliant with Azalea standard.

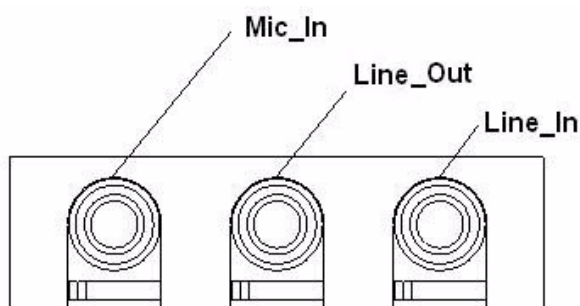


Figure 2.6 Audio jack connectors

2.2.5 COM Connector

ARK-3400 provides four D-sub 9-pin connectors that are serial communication interface ports. The COM1/2 in the rear side support RS-232/422/485 by jumper setting, the COM3/4 in the front side support RS-232 only. Default setting of these four ports are RS-232.

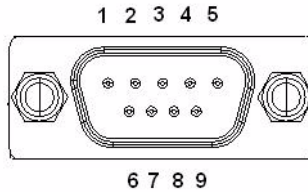


Figure 2.7 COM port connector

Table 2.1: COM standard serial port pin assignments

	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

Note: NC represents "No Connection".

2.2.6 eSATA Connector

ARK-3400 has a 7 pin external connector for eSATA device. That is fully compliant with SATA I/SATA II standards, its can be access with external SATA I/SATA II device then up to 300MB/sec.

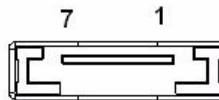


Figure 2.8 eSATA connector

2.2.7 USB Connector

ARK-3400 provides six connectors of USB interface, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Table. 2.2 for its pin assignments

The USB connectors are used for connecting any device that conforms to the USB interface. Many recent digital devices conform to this standard. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.

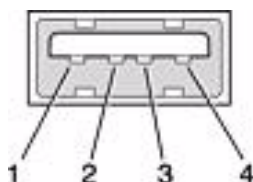


Figure 2.9 USB connector

Table 2.2: USB Connector

Pin	Signal name	Pin	Signal name
1	VCC	2	USB_data-
3	USB_data+	4	GND

2.2.8 Compact Flash Card

ARK-3400 is equipped with an external CF card. You can find the installation in Chapter 2.5.

2.3 ARK-3400 rear side external I/O connectors

2.3.1 Power Input Connector

ARK-3400 comes with a four pins header that carries +14 ~ 24 VDC external power input.

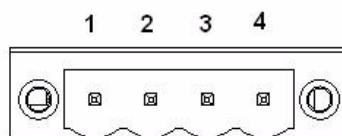


Figure 2.10 Power Input Connector

Table 2.3: Power connector pin assignments

Pin	Signal Name
1	GND
2	+14 ~ 24 VDC
3	+14 ~ 24 VDC
4	GND

2.3.2 Digital Visual Interface Connector (DVI-I)

The ARK-3400 offers a integrate Digital Visual Interface connector by a D-sub 24-pin female DVI-I connector, it integrates analog and digital video signal. This supports high-speed, high-resolution digital display and traditional analog display.

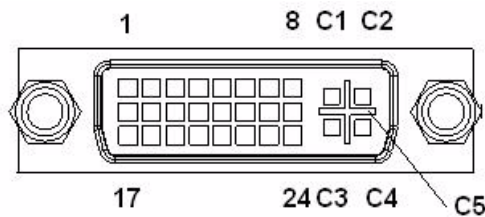


Figure 2.11 DVI-I connector

Table 2.4: DVI-I Connector pin assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS Data 2-	2	TMDS Data 2+
3	TMDS Data 2/4 shield	4	TMDS Data 4-
5	TMDS Data 4+	6	DDC clock
7	DDC data	8	Analog vertical sync
9	TMDS Data 1-	10	TMDS Data 1+
11	TMDS Data 1/3 shield	12	TMDS Data 3-
13	TMDS Data 3+	14	+5 V
15	Ground	16	Hot plug detect
17	TMDS data 0-	18	TMDS data 0+
19	TMDS data 0/5 shield	20	TMDS data 5-
21	TMDS data 5+	22	TMDS clock shield
23	TMDS clock+	24	TMDS clock-
C1	Analog red	C2	Analog green
C3	Analog blue	C4	Analog horizontal sync
C5	Analog ground		

2.3.3 Ethernet Connector (LAN)

ARK-3400 provides two RJ45 connectors of Gb LAN interface, they are equipped with two Realtek 8111B Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Yellow LED).

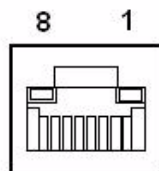


Figure 2.12 Ethernet connector

Table 2.5: RJ-45 Connector pin assignments

Pin	10/100/1000BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.3.4 LVDS Connector

The ARK-3400 comes with a D-Sub 26-pin connector that carries LVDS signal output, and can direct connect to LVDS LCD Display via external cable.

The system also provide a jumper of JP3 on internal motherboard for selecting the LCD signal power of 5V or 3.3V, please refer to the jumper table of JP3, and °×Full Disassembly Procedure°± to adjust it. Up. The default setting of JP3 is 3.3V.

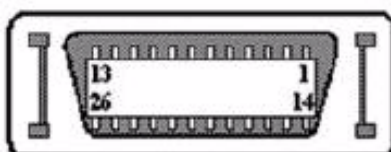


Figure 2.13 LVDS Connector

Table 2.6: LVDS Connector Pin Assignment

Pin	Signal Name	Pin	Signal name
1	LVDS_CLKBP	14	LVDS_CLKBM
2	GND	15	LVDS_YAM0
3	LVDS_YAP0	16	LVDS_YAM1
4	LVDS_YAP1	17	LVDS_YAM2
5	LVDS_YAP2	18	LVDS_CLKAM
6	LVDS_CLKAP	19	GND
7	+3.3 or +5 V	20	+3.3 or +5 V

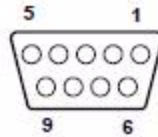
Table 2.6: LVDS Connector Pin Assignment

8	GND	21	LVDS_YAM3
9	LVDS_YAP3	22	LVDS_YBM0
10	LVDS_YBP0	23	LVDS_YBM1
11	LVDS_YBP1	24	LVDS_YBM2
12	LVDS_YBP2	25	LVDS_YBM3
13	LVDS_YBP3	26	GND

2.3.5 LCD Backlight On/Off control Connector

The ARK-3400 comes with a D-Sub 9-pin connector which provides BKLTEN signal as well as +12 V, +5 V and Ground Pin signals that allow the user to connect these signals to LCD Inverter to implement the LCD On/Off control.

- Provides BKLTEN signal that inverter Module requires for inverter on/off control.
- Provides +12 V, + 5 V as the Inverter Power Source. The additional VBR signal pin could be connected to the LCD Inverter that allows the user to achieve brightness adjustment through customer's software utility.

**Figure 2.14 LCD Backlight connector****Table 2.7: LCD Backlight Connector Pin Assignment**

Pin	Signal name
1	+12 V
2	GND
3	BKLTEN
4	VBR
5	+5 V
6	Reserved
7	Reserved
8	Reserved
9	Reserved

2.3.6 LPT Connector

The ARK-3400 provides one D-sub 25-pin female connector, which offers printers or other communication interface port. If you want to use LPT port, you can find the Pin assignment as following.

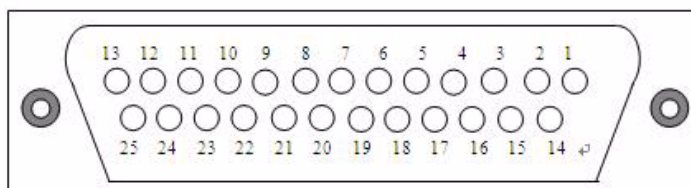
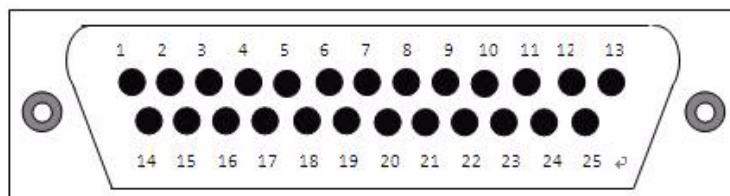
**Figure 2.15 LPT Connector**

Table 2.8: LPT Connector Pin Assignment

Pin	Signal Name	Pin	Signal name
1	STROBE	14	ALF
2	PD0	15	ERROR
3	PD1	16	INIT
4	PD2	17	SLCTIN
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT		

2.3.7 DIO Connector

The ARK-3400 provides one D-sub 25-pin male connector, which offers Digital I/O communication interface port. If you want to use DIO port, you can find the Pin assignment as following.

**Figure 2.16 DIO Connector****Table 2.9: DIO Connector Pin Assignment**

Pin	Signal Name	Pin	Signal name
1	DIO0-0	14	DIO1-0
2	DIO0-1	15	DIO1-1
3	DIO0-2	16	DIO1-2
4	DIO0-3	17	DIO1-3
5	DIO0-4	18	DIO1-4
6	DIO0-5	19	DIO1-5
7	DIO0-6	20	DIO1-6
8	DIO0-7	21	DIO1-7
9	GND	22	GND
10	GND	23	GND
11	GND	24	GND
12	+5 V	25	+5 V
13	+5 V		

2.4 Memory Installation

1. Flip the system upside down, and open the bottom cover by unscrewing the 4 screws.
2. Insert the memory module into the SODIMM socket.
3. Replace cover with screws.

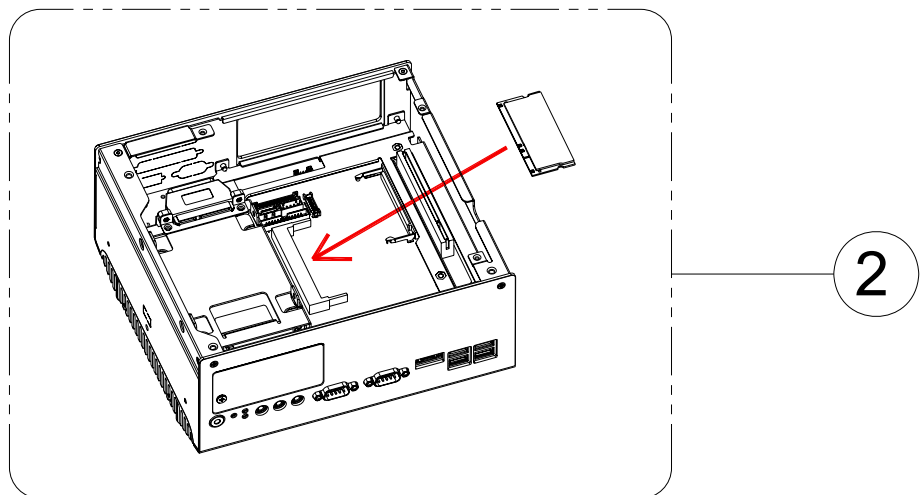
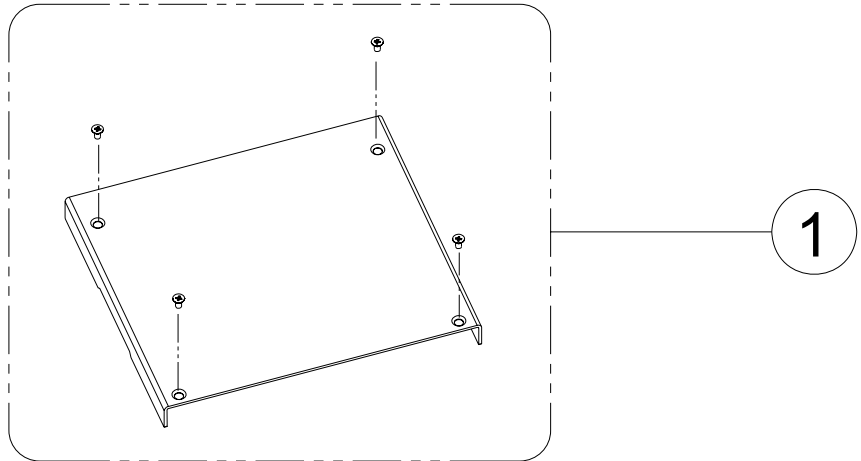


Figure 2.17 Memory Installation

2.5 Compact Flash installation

1. Open the front CF/HDD door by loosening the door screw.
2. Insert the CF card into the CF socket.
3. Reassemble.

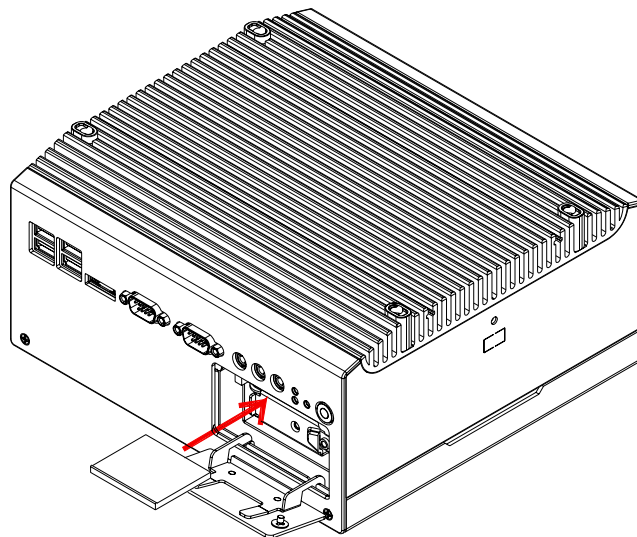


Figure 2.18 CF Card installation

2.6 HDD installation

1. Remove the bottom cover by unscrewing the 4 screws. (Refer to Chapter 2.4)
2. Install the 2.5-inch SATA HDD with 4 HDD screws.
3. Connect the SATA signal cable and power cable to the connectors.

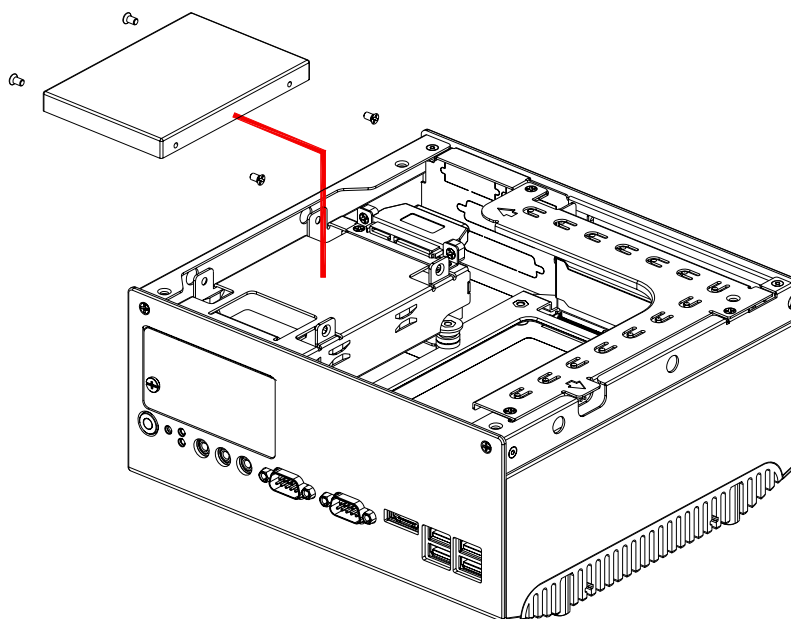


Figure 2.19 HDD Installation

2.7 PCI card installation

1. Remove the bottom cover by unscrewing the 4 screws. (Refer to Chapter 2.4)
2. Remove the Riser card module.
3. Insert the PCI extension card into the PCI slot of the riser card module.
4. Reassemble the Riser card module.
5. Reattach the bottom cover.

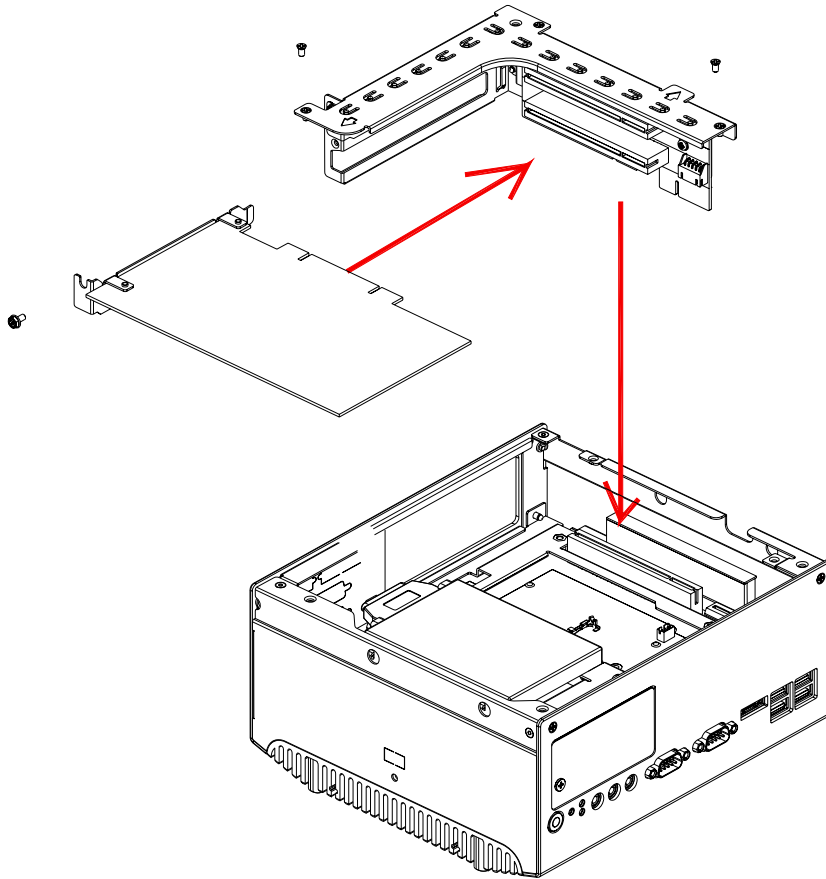


Figure 2.20 PCI Card Installation

2.8 Mini PCI installation

1. Open the bottom cover and remove the Riser card module. (Refer Chapter 2.4)
2. Insert the Mini PCI card into the Mini PCI socket and latch it into place.

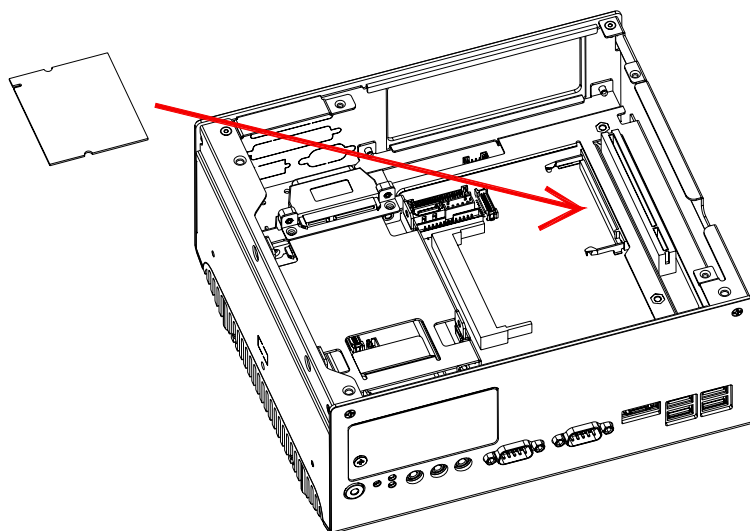


Figure 2.21 Mini PCI Card Installation

2.9 Antenna installation

1. Remove the heatsink by loosening the fixing screws.
2. Pass the internal antenna cable jack through the antenna hole on the rear panel and fix it by tightening the matched nut.
3. Put on the external antenna cable.

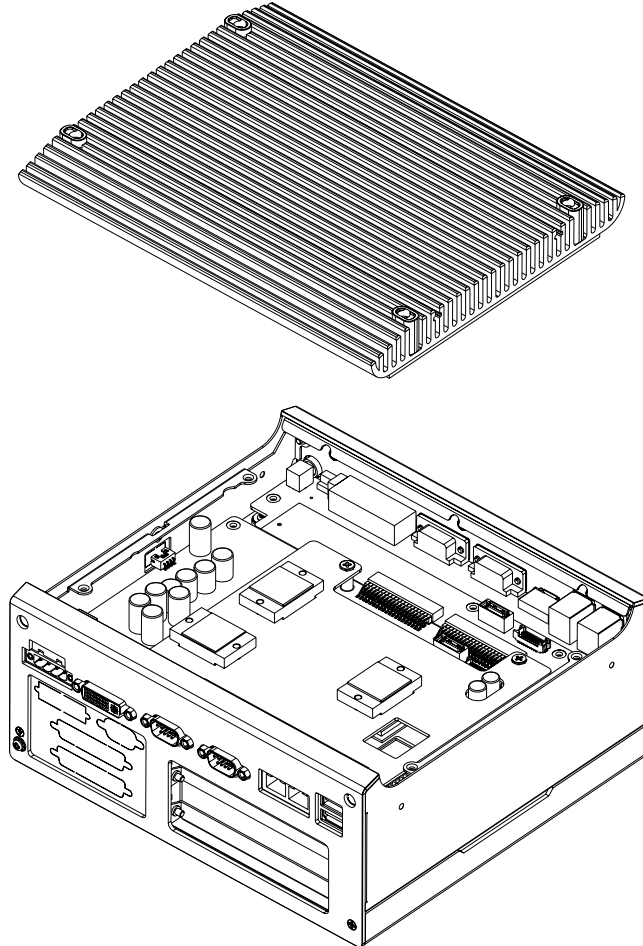


Figure 2.22 Remove the cover

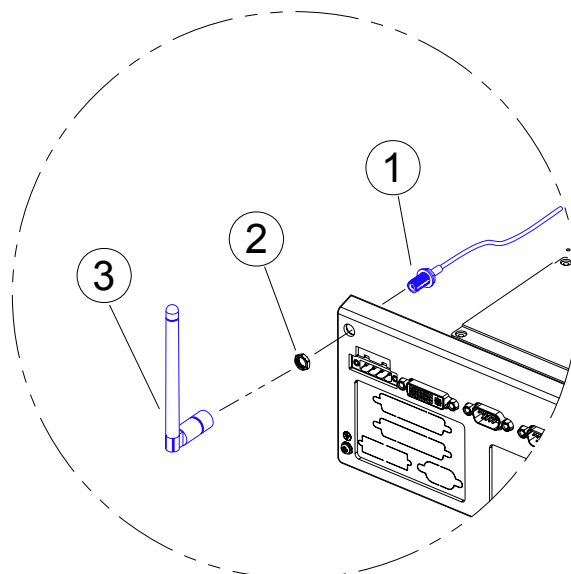


Figure 2.23 Antenna installation

2.10 Optional Cable Installation

Open the bottom cover and follow the illustration and table below for optional cable installation and connection.

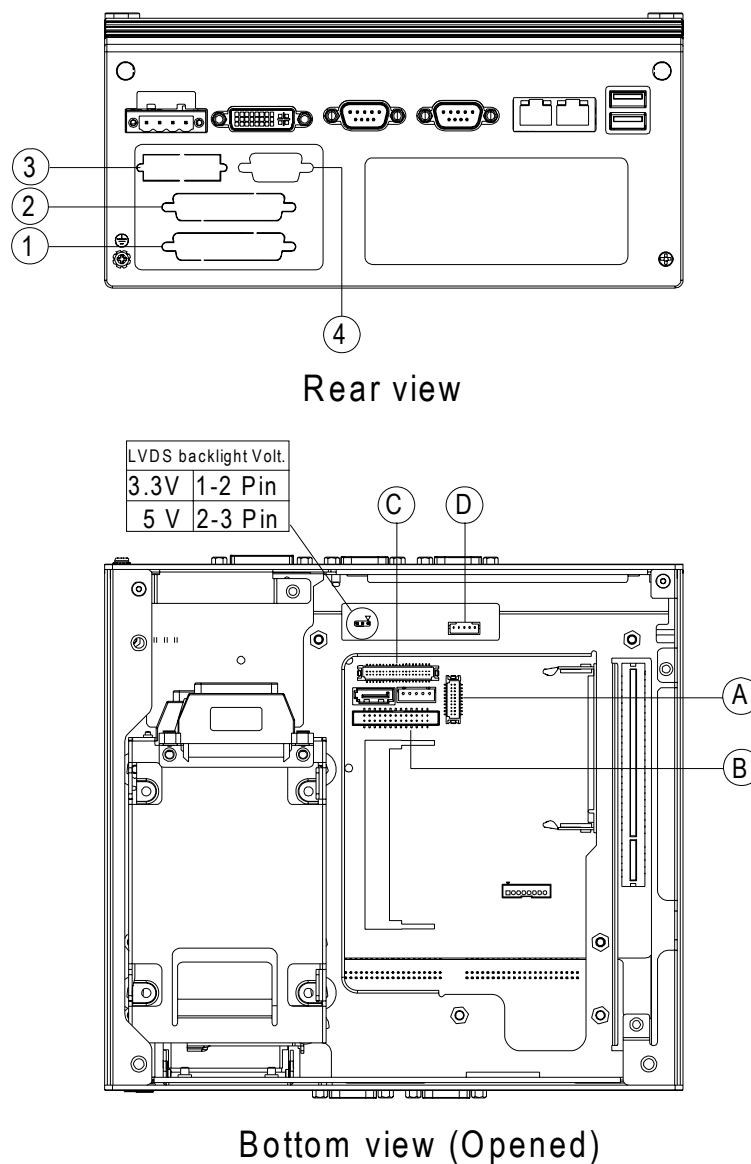


Figure 2.24 Removable HDD Installation

	Outer connector fixing(connection)	Inner connector fixing(connection)
DIO cable (P/N: 1700009407)	1	A
LPT cable (P/N: 1700009405)	2	B
LVDS cable (P/N: 1700009398)	3	C
LVDS power cable (P/N: 1700009396)*	4	D

Note! When the LVDS panel power source is provided from the system, the LVDS voltage jumper needs to be selected.



Chapter 3

BIOS settings

This chapter introduces how to set BIOS configuration data.

3.1 BIOS Introduction

Advantech provides full-featured Award BIOS that delivers the superior performance, compatibility and functionality that system integrators demand.

The modular, adaptable AwardBIOS supports the broadest range of third-party peripherals and all popular chipsets, plus Intel, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium and AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPU.

You can use Advantech's utilities to select and install features as needed.

3.2 BIOS Setup

The ARK-3400 series system has build-in AwardBIOS with a CMOS SETUP utility which allows the user to configure required settings or to activate certain system features.

The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to the CMOS RAM.

When the power is turned on, press the button during the BIOS POST (Power-On Self Test) will take you to the CMOS SETUP screen.

CONTROL KEYS

< ↑ >< ↓ >< ← >< → >	Move to highlight item
----------------------	------------------------

<Enter>	Select Item
---------	-------------

<Esc>	Main Menu - Quit and not save changes into CMOS
-------	---

	Sub Menu - Exit current page and return to Main Menu
--	--

<Page Up/+>	Increase the numeric value or make changes
-------------	--

<Page Down/->	Decrease the numeric value or make changes
---------------	--

<F1>	General help, for Setup Sub Menu
------	----------------------------------

<F2>	Item Help
------	-----------

<F5>	Load Previous Values
------	----------------------

<F7>	Load Optimized Default
------	------------------------

<F10>	Save all CMOS changes
-------	-----------------------

3.2.1 Main Menu

Press to enter AwardBIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

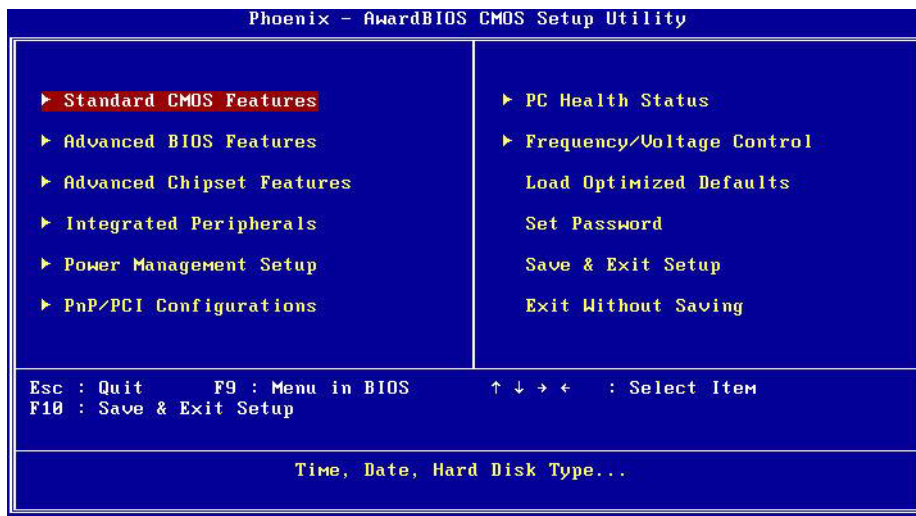


Figure 3.1 Award BIOS CMOS Setup Utility

- **Standard CMOS Features**
This setup page includes all the items in standard compatible BIOS.
- **Advanced BIOS Features**
This setup page includes all the items of Award BIOS enhanced features.
- **Advanced Chipset Features**
This setup page includes all the items of Chipset configuration features.
- **Integrated Peripherals**
This setup page includes all onboard peripheral devices.
- **Power Management Setup**
This setup page includes all the items of Power Management features.
- **PnP/PCI Configurations**
This setup page includes PnP OS and PCI device configuration.
- **PC Health Status**
This setup page includes the system auto detect CPU and system temperature, voltage, fan speed.
- **Frequency/Voltage Control**
This setup page includes CPU host clock control, frequency ratio and voltage.
- **Load Optimized Defaults**
This setup page includes Load system optimized value, and the system would be in best performance configuration.
- **Set Password**
Establish, change or disable password.
- **Save & Exit Setup**
Save CMOS value settings to CMOS and exit BIOS setup.
- **Exit Without Saving**
Abandon all CMOS value changes and exit BIOS setup.

3.2.2 Standard CMOS Features

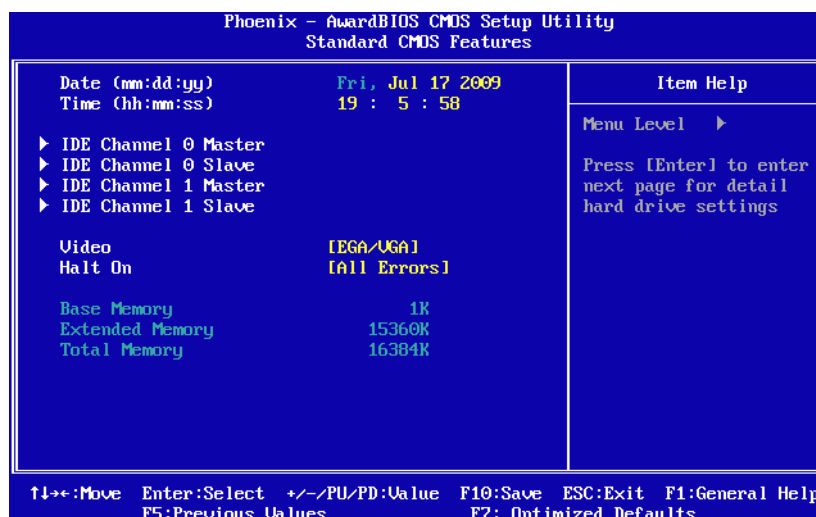


Figure 3.2 Award BIOS Standard CMOS Features

- **Date**

The date format is <weekday>, <month>, <day>, <year>.

 - Weekday From Sun to Sat, determined and display by BIOS only
 - Month From Jan to Dec.
 - Day From 1 to 31
 - Year From 1999 through 2098
- **Time**

The time format in <hour> <minute> <second>, is based on 24-hour time.
- **IDE Channel 0 Master**

CF Card Auto-Detection Press "Enter" for automatic device detection.
- **IDE Channel 2 Master**

eSATA HDD Auto-Detection Press "Enter" for automatic device detection.
- **IDE Channel 2 Slave**

SATA HDD Auto-Detection Press "Enter" for automatic device detection.
- **Video**

The item determines that VGA display support type.

 - EGA/VGA Support VGA color mode.
 - CGA 40 Support VGA color mode.
 - CGA 80 Support VGA color mode.
 - MONO Support VGA mono mode.

- **Halt on**

The item determines whether the computer will stop if an error is detected during power up.

No Errors	The system boot but will not stop for any error
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped.
All, But Keyboard	The system boot will not stop for a keyboard error, but it will stop for all other errors.
Base Memory	

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

- **Extended Memory**

The POST of the BIOS will detect the amount of extended memory (above 1 MB in CPU's memory address map) installed in the system.

- **Total Memory**

This item displays the total system memory size.

3.2.3 Advanced BIOS Features

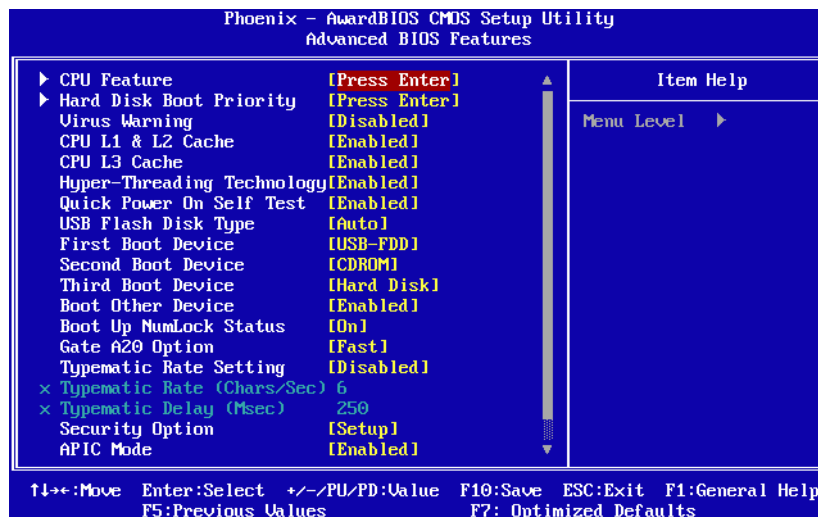


Figure 3.3 Award BIOS Advanced CMOS Features

- **CPU Feature**
This item allows user to adjust CPU features, CPU ratio, VID and Thermal and special features like XD flag.
- **Hard Disk Boot Priority**
This item allows user to select boot sequence for system device HDD, SCSI, RAID.
- **Virus Warning [Disabled]**
This item allows user to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection.
- **CPU L1 & L2 Cache [Enabled]**
This item allows user to enable CPU L2 cache and ECC checking function.
- **Quick Power On Self Test [Enabled]**
This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third and fourth time. Setup setting default is enabled.
- **USB Flash Disk Type [Auto]**
This item allows user to changed flash disk format. Setup setting default is auto.
- **First / Second / Third / Other Boot Drive**

Hard Disk	Assign this boot device priority to Hard Disk.
CDROM	Assign this boot device priority to CDROM.
USB-FDD	Assign this boot device priority to USB-FDD.
USB-ZIP	Assign this boot device priority to USB-ZIP.
USB-CDROM	Assign this boot device priority to USB-CDROM.
LAN1	Assign this boot device priority to LAN.
LAN2	Assign this boot device priority to LAN.
Disabled	Disable this boot function.
- **Boot Up NumLock Status [On]**
This item enables users to activate the Number Lock function at system boot.
- **Gate A20 Option [Fast]**
This item enables users to switch A20 control by port 92 or not.
- **Typematic Rate Setting [Disabled]**

This item enables users to set the two typematic control items.

– Typematic Rate (Chars/Sec)

The speed at which the system registers repeated keystrokes.

Eight settings are 6, 8, 10, 12, 15, 20, 24 and 30.

– Typematic Delay (Msec)

This item sets the keypress delay before typematic repetition kicks in.

Four delay options are 250, 500, 750 and 1000.

■ **Security Option [Setup]**

System Correct password must be supplied for both System boot, and for Setup page access.

Setup Correct password must be supplied for access to Setup page. (Default value)

■ **APIC Mode [Enabled]**

This item allows user to enable or disable “Advanced Programmable Interrupt Controller”. APIC is implemented in the motherboard and must be supported by the operating system, and it extends the number of IRQs available.

■ **MPS Version Control for OS [1.4]**

This item sets the operating system multiprocessor support version.

■ **OS Select For DRAM > 64 MB [Non-OS2]**

Select OS2 only if the system is running the OS/2 operating system with greater than 64 MB of RAM on the system.

3.2.4 Advanced Chipset Features

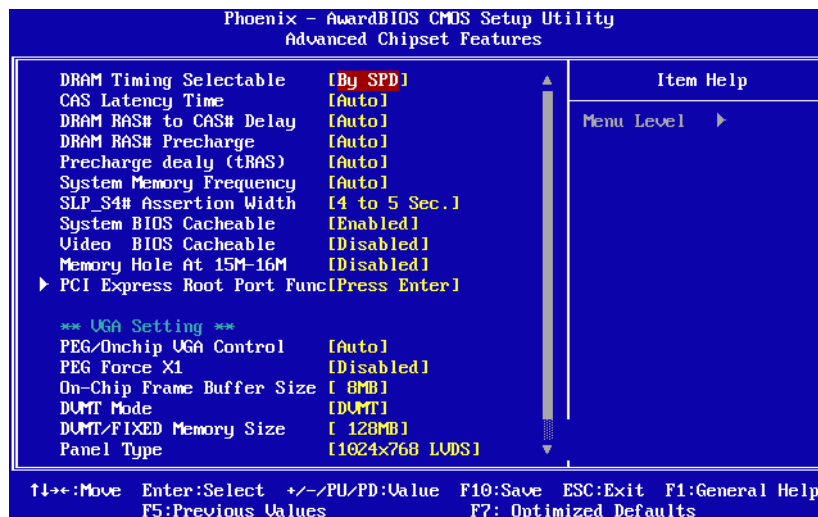


Figure 3.4 Award BIOS Advanced Chipset Features

Note! This “Advanced Chipset Features” screen controls the configuration of the board’s chipset for fine-tuning system performance. Screen options depend on the specific chipset. It is strongly recommended that only technical users make changes to the default settings.

- **DRAM Timing Selectable [By SPD]**
This item allows the user to set optimal timings for items 2 through 5. The system default setting of “By SPD” follows the SPD information on the ROM chip and ensures the system runs stably, with optimal performance.
- **CAS Latency Time [Auto]**
This item allows the user to set the timing delay in clock cycles before SDRAM starts a read command after receiving it.
- **DRAM RAS# to CAS# Delay [Auto]**
This item allows the user to set the timing of the transition from RAS (row address strobe) to CAS (column address strobe) as both rows and columns are separately addressed shortly after the DRAM is refreshed.
- **DRAM RAS# Precharge [Auto]**
This item allows the user to set the DRAM RAS# precharge timing. The system default is set to “Auto” to reference the data from the SPD ROM.
- **Precharge delay (tRAS) [Auto]**
This item allows the user to adjust memory precharge time.
- **System Memory Frequency [Auto]**
This item allows the user to adjust memory frequency to improve performance.
- **SLP_S4# Assertion Width [4 to 5 sec.]**
This item allows user to adjust SLP_S4# signal. This field indicates the minimum assertion width of the SLP_S4# signal to ensure that the DRAMs have been safely power-cycled.
- **System BIOS Cacheable [Enabled]**
This item allows the system BIOS to be cached to allow faster execution and better performance.
- **Video BIOS Cacheable [Disabled]**

This item allows the video BIOS to be cached to allow faster execution and better performance.

- **Memory Hole At 15 M-16 M [Disabled]**

This item reserves 15MB-16MB memory address space to ISA expansion cards that specifically require the setting. Memory from 15MB-16MB will be unavailable to the system because only the expansion cards can access memory in this area.

- **PCI Express Root port Func [Press Enter]**

This item allows the user to adjust PCIE port on, off, or auto.

- **PEG/Onboard VGA Control [Auto]**

This item allows the user to select whether onboard graphics processor or the PCI card.

- **On-Chip Frame Buffer Size [8 MB]**

This item allows the user to adjust on-chip graphics of memory buffer.

- **DVMT Mode [DVMT]**

Intel's Dynamic Video Memory Technology (DVMT) takes that concept further by allowing the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.

The BIOS feature that controls all this is the DVMT Mode BIOS feature. It allows you to select the DVMT operating mode.

Fixed	The graphics driver will reserve a fixed portion of the system memory as graphics memory. This ensures that the graphics processor has a guaranteed amount of graphics memory but the downside is once allocated, this memory cannot be used by the operating system even when it is not in use.
DVMT	The graphics chip will dynamically allocate system memory as graphics memory, according to system and graphics requirements. The system memory is allocated as graphics memory when graphics-intensive applications are running but when the need for graphics memory drops, the allocated graphics memory can be released to the operating system for other uses.
BOTH	The graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

- **DVMT/FIXED Memory Size [128 MB]**

This item allows the user to adjust DVMT/FIXED graphics memory size.

- **Panel Type [1024 x 768 LVDS]**

These fields allow you to select the LCD Panel type. The default values for these ports are:

- 640 x 480 LVDS
- 800 x 600 LVDS
- 1024 x 768 LVDS
- 1280 x 1024 LVDS
- 1400 x 1050 RB LVDS(LFP1)
- 1400 x 1050 Non-RB (LFP1)

- 1600 x 1200 LVDS (LFP1)
- **Boot Display [CRT+EFP]**
This item allows the user to adjust panel resolution.

3.2.5 Integrated Peripherals

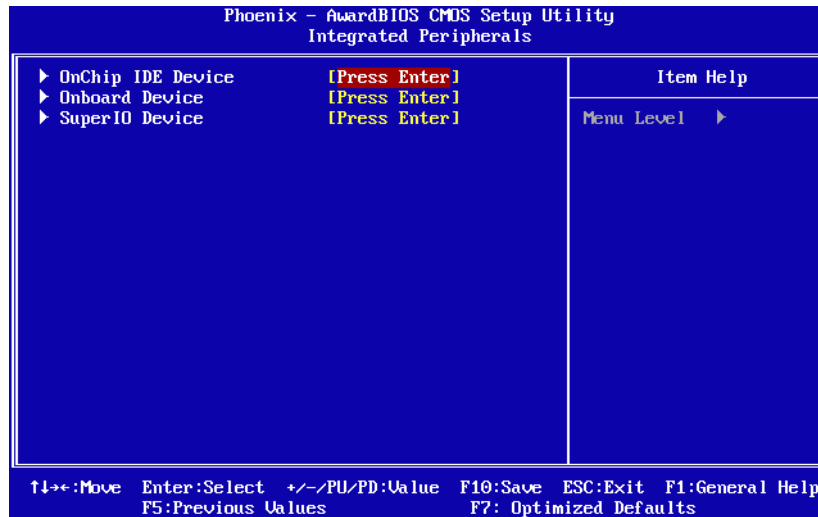


Figure 3.5 Award BIOS Integrated Peripherals

Note! *This "Integrated Peripherals" option controls the configuration of the board's chipset, includes IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices; this page depends on the particular chipset installed.*



- **OnChip IDE Device**
This item enables users to set the OnChip IDE device status, includes enable IDE devices and setting PIO and DMA access mode, and some of new chipset also support for SATA device (Serial-ATA).
- **Onboard Device**
This item enables users to set the USB, Azalia/AC97, LAN status enable or disable.
- **Super IO Device**
This item enables users to set the Super IO device status, includes enable Floppy, COM, LPT, IR and control GPIO and Power fail status.
- **Onboard Serial port 1 [3F8]**
This item allows user to adjust serial port 1 address.
- **Serial port 1 Use IRQ [IRQ3]**
This item allows user to adjust serial port 1 IRQ.
- **SP 1 AutoFlow Control [Disabled]**
Auto flow control is used in RS-485, is used to tri-state the transmitter when no other data is available, so that other nodes can use the shared lines.
When auto flow control is enable, the device monitors the local output buffer for not empty and empty conditions. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.
- **Onboard Serial port 2 [3E8]**
This item allows user to adjust serial port 2 address.

- **Serial port 2 Use IRQ [IRQ4]**
This item allows user to adjust serial port 2 IRQ.
- **SP 2 AutoFlow Control [Disabled]**
Auto flow control is used in RS-485, is used to tri-state the transmitter when no other data is available, so that other nodes can use the shared lines.
When auto flow control is enable, the device monitors the local output buffer for not empty and empty conditions. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.
- **Onboard Serial port 3 [2F8]**
This item allows user to adjust serial port 3 address.
- **Serial port 3 Use IRQ [IRQ5]**
This item allows user to adjust serial port 3 IRQ.
- **Onboard Serial port 4 [2E8]**
This item allows user to adjust serial port 4 address.
- **Serial port 4 Use IRQ [IRQ10]**
This item allows user to adjust serial port 4 IRQ.
- **Onboard Parallel Port [378/IRQ7]**
This item allows user to adjust Parallel port address and IRQ.
- **Parallel Port Mode [Standard]**
This item allows user to adjust parallel port mode of standard/SPP/EPP and ECP.
- **ECP Mode Use DMA [3]**
This item allows user to adjust ECP DMA resource.

3.2.6 Power Management Setup

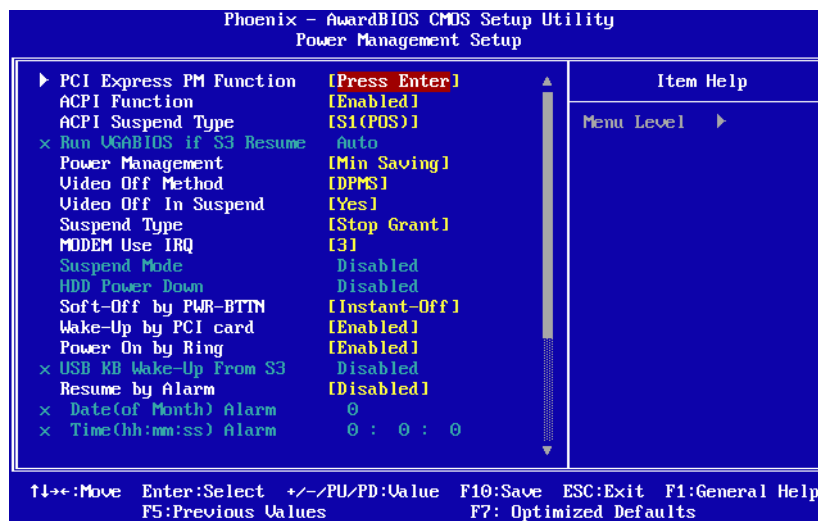


Figure 3.6 Award BIOS Power Management Setup

Note! This “Power Management Setup” screen configures the system to most effectively save energy while operating in a manner consistent with your computer use.

- **PCI Express PM Function [Press Enter]**
- **PCI Express PME [Enabled]**
This item allows user to select boot sequence for Enabled(default)/Disable .
- **ACPI Function [Enabled]**
This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicate PC and system devices for improving the power management.
- **ACPI Suspend Type [S1 (POS)]**
This item allows user to select sleep state when suspend.
S1(POS) The suspend mode is equivalent to a software power down;
S3(STR) The system shuts down with the exception of a refresh current to the system memory.
- **Run VGA BIOS if S3 Resume [Auto]**
This item allows system to reinitialize VGA BIOS after system resume from ACPI S3 mode.
- **Power Management [User Define]**
This item allows user to select system power saving mode.
Min Saving Minimum power management. Suspend Mode=1 hr.
Max Saving Maximum power management. Suspend Mode=1 min.
User Define Allows user to set each mode individually.
Suspend Mode= Disabled or 1 min ~1 hr.
- **Video Off Method [DPMS]**
This item allows user to determine the manner is which the monitor is blanked.
V/H SYNC+Blank This option will cause system to turn off vertical and horizontal synchronization ports and write blanks to the

- video buffer.
- Blank Screen This option only writes blanks to the video buffer.
- DPMS Initial display power management signaling.
- **Video Off In Suspend [Yes]**
This item allows user to turn off Video during system enter suspend mode.
 - **Suspend Type [Stop Grant]**
This item allows user to determine the suspend type.
 - **Modem use IRQ [3]**
This item allows user to determine the IRQ which the MODEM can use.
 - **Suspend Mode [Disabled]**
This item allows user to determine the time of system inactivity, all devices except the CPU will be shut off.
 - **HDD Power Down Mode [Disabled]**
This item allows user to determine the time of system inactivity, the hard disk drive will be powered down.
 - **Soft-Off by PWR-BTTN [Instant-Off]**
This item allows user to define function of power button.

Instant-Off	Press power button then Power off instantly.
Delay 4 Sec	Press power button 4 sec. to Power off.
 - **Wake-Up by PCI card [Enabled]**
This item allows user to defines PCI cards to wake up the system from the suspend mode.
 - **Power On by Ring [Enabled]**
This item allows the user to enable and define how the system will resume by activation of the modem ring.
 - **Resume by Alarm [Disabled]**
This item allows user to enable and key in Date/time to power on system

Disabled	Disable this function.
Enabled	Enable alarm function to power on system
Data (of month)	Alarm1-31
Time (HH:MM:SS)	Alarm(0-23) : (0-59) : 0-59)
 - **Reload Global Timer Events**

Primary IDE 0	[Disabled]
Primary IDE 1	[Disabled]
Secondary IDE 0	[Disabled]
Secondary IDE 1	[Disabled]
FDD,COM,FPT Port	[Disabled]
PCI PIRQ[A-D]#	[Disabled]
Power Fail Function	[Always Off]

3.2.7 PnP/PCI Configurations

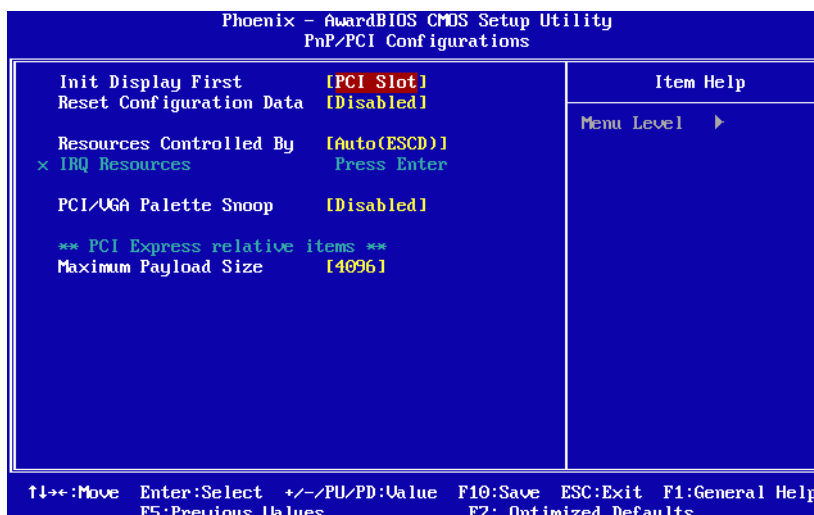


Figure 3.7 Award BIOS PnP/PCI Configurations

Note! Use this "PnP/PCI Configurations" option for setting up the IRQ and DMA (both PnP and PCI) bus assignments.



- **Init Display First [PCI Slot]**
This item is setting for start up Video output from PCI or Onboard device.
- **Reset Configuration Data [Disabled]**
This item allow user to clear any PnP configuration data stored in the BIOS.
- **Resources Controlled By [Auto (ESCD)]**
 - IRQ Resources
This item allows you respectively assign an interruptive type for IRQ-3, 4, 5, 7, 9, 10, 11, 12, 14, and 15.
- **PCI VGA Palette Snoop [Disabled]**
The item is designed to solve problems caused by some non-standard VGA cards. A built-in VGA system does not need this function.
- **Maximum payload Size [4096]**
The item allows user to adjust maximum TLP (Transaction Layer Packet) payload size.

3.2.8 PC Health Status

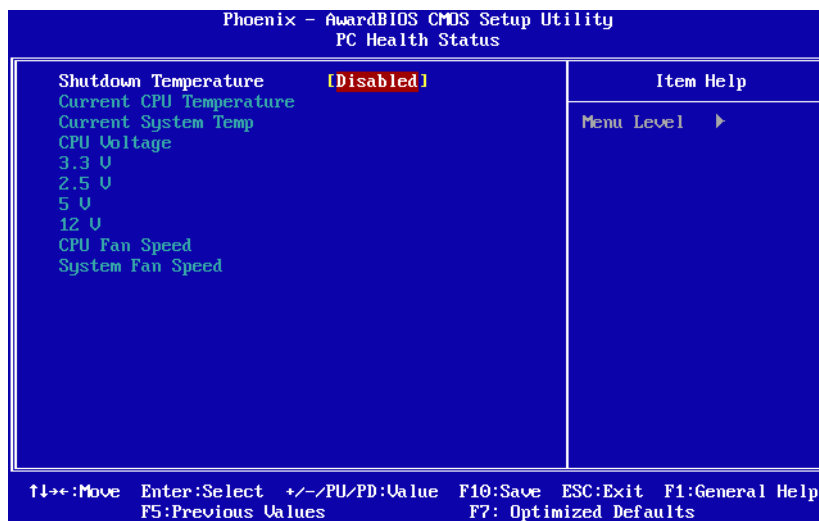


Figure 3.8 Award BIOS PC Health Status

Note! This “PC Health Status” screen reports the thermal, fan and voltage status of the board. This page depends on the particular chipset installed.



- **Shutdown Temperature [Disabled]**
This item control when to notify ACPI OS to shut down the system.
- **Current CPU Temperature [Show Only]**
This item displays current CPU temperature.
- **Current System Temperature [Show Only]**
This item displays current System temperature.
- **VCC Core /+3.3V /+2.5V /+5V/ +12V [Show Only]**
This item displays current CPU and system voltage.
- **CPU/System Fan Speed [Show Only]**
This item displays CPU/System fan speed.

3.2.9 Frequency/voltage Control

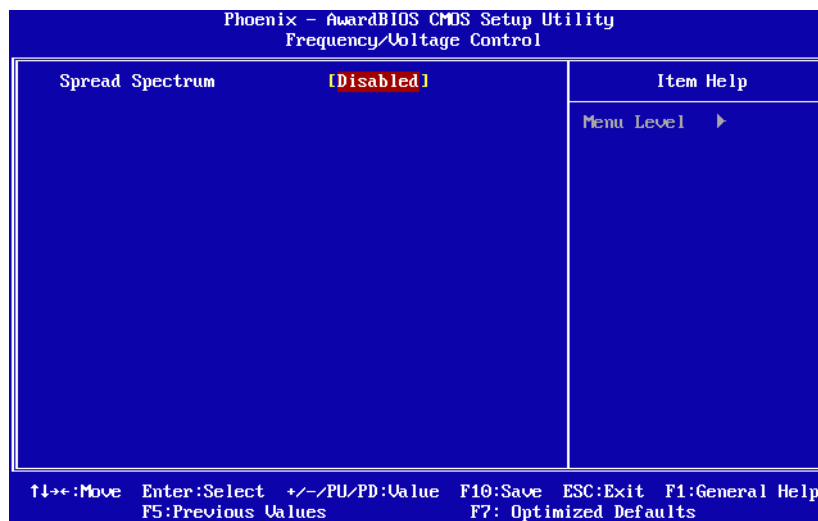


Figure 3.9 Award BIOS Frequency/Voltage Control

Note! *This “Frequency/Voltage Control” screen controls the CPU Host and PCI frequency, this page this page depends on the particular CPU and chipset installed; some items will only show up when you install a processor which supports those functions.*



- **Spread Spectrum [Disabled]**
This item enables users to set the spread spectrum modulation.

3.2.10 Load Optimized Defaults

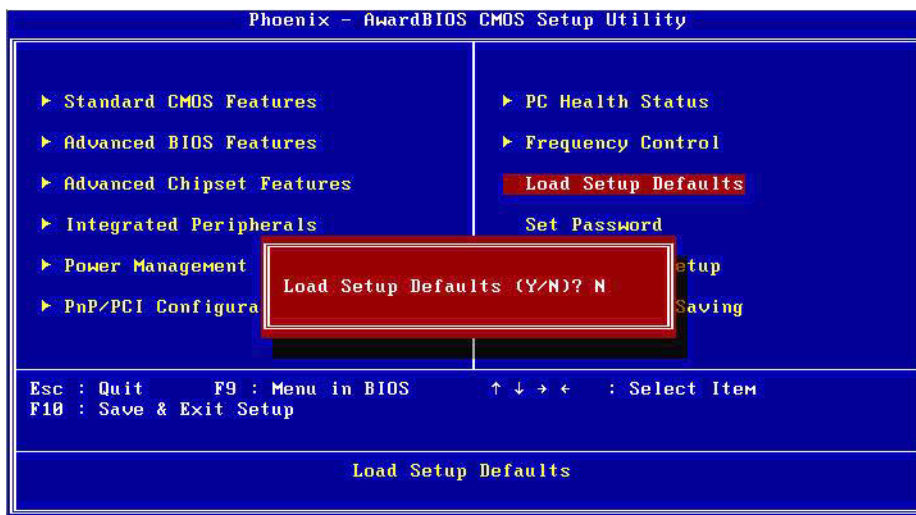


Figure 3.10 Award BIOS Load Setup Defaults

Note! *Load Optimized Defaults loads the default system values directly from ROM. If the stored record created by the Setup program should ever become corrupted (and therefore unusable), these defaults will load automatically when you turn the ARK-3400 Series system on.*



3.2.11 Set Password

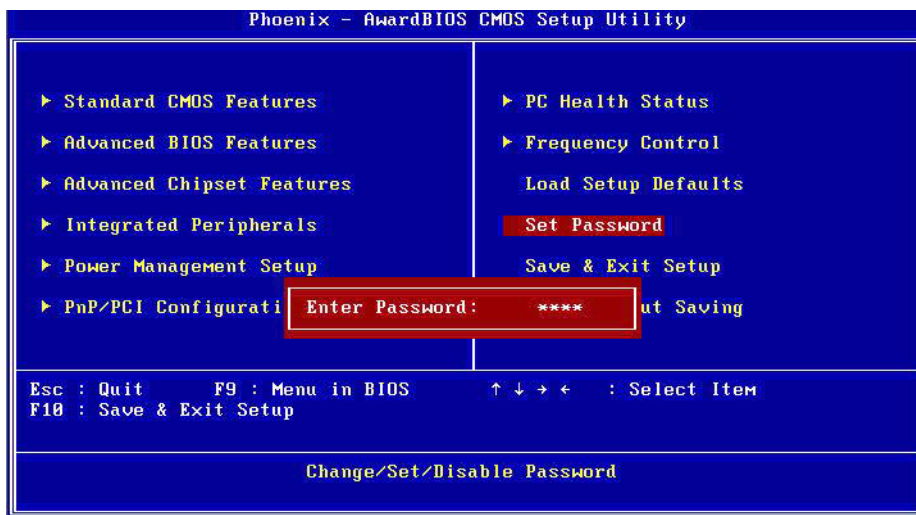


Figure 3.11 Award BIOS Set Password

Note! *To enable this feature, you should first go to the Advanced BIOS Features menu, choose the Security Option, and select either Setup or System, depending on which aspect you want password protected. Setup requires a password only to enter Setup. System requires the password either to enter Setup or to boot the system. A password may be at most 8 characters long.*



To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the desired password and press <Enter>.
3. At the “Confirm Password” prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, enter the new password and press <Enter>.
5. At the “Confirm Password” prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Disable Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, please don’t enter anything; just press <Enter>.
5. At the “Confirm Password” prompt, again, don’t type in anything; just press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

3.2.12 Save & Exit Setup

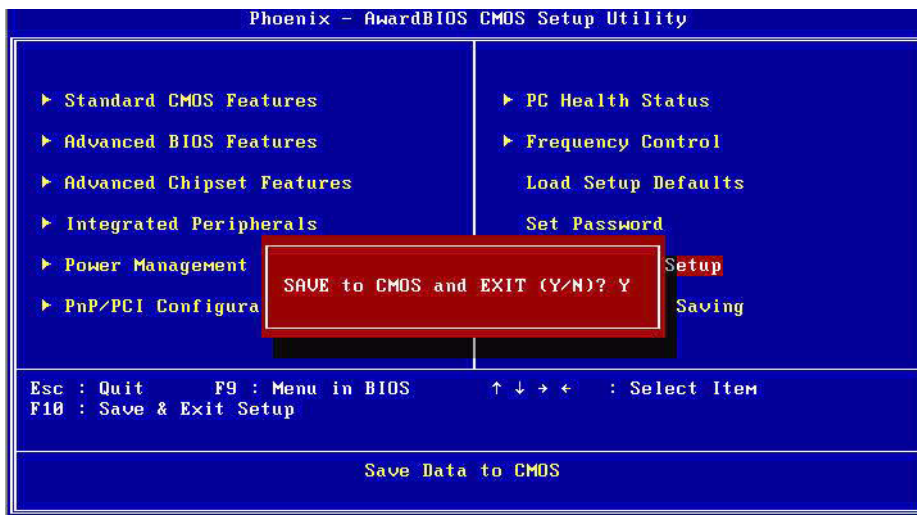


Figure 3.12 Award BIOS SAVE to CMOS and EXIT

Note! Typing "Y" will quit the BIOS Setup Utility and save user setup values to CMOS.



Typing "N" will return to BIOS Setup Utility.

3.2.13 Quit Without Saving

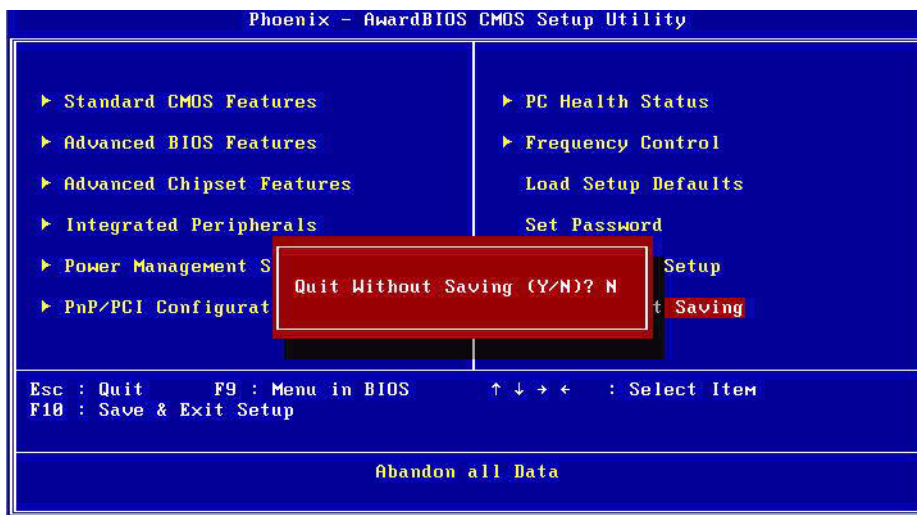


Figure 3.13 Award BIOS Quit without Saving

Note! Typing "Y" will quit the BIOS Setup Utility and save user setup values to CMOS.



Typing "N" will return to BIOS Setup Utility.

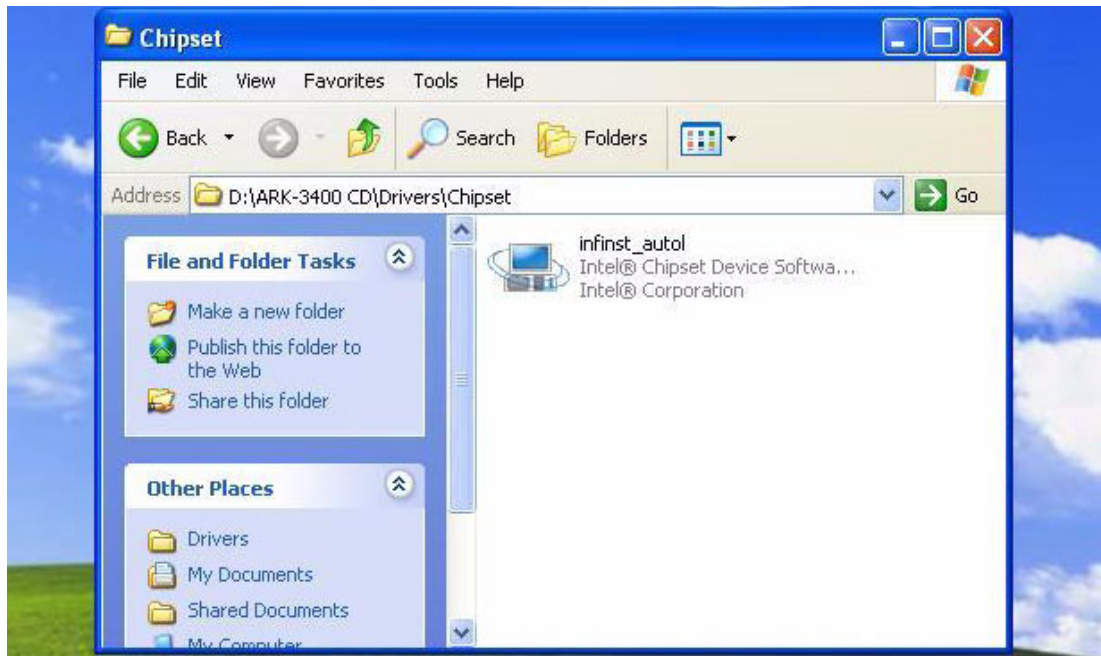
Chapter 4

Software Installation

4.1 Driver Installation

4.1.1 Chipset driver installation

1. Change folder address to \Drivers\Chipset, and double click to execute infirst_autol.exe.



2. Click Next; go to the next step.



3. Click Yes to accept the License Agreement.



4. Click Next to exit Readme File Information window.



5. Click Next button to continue.

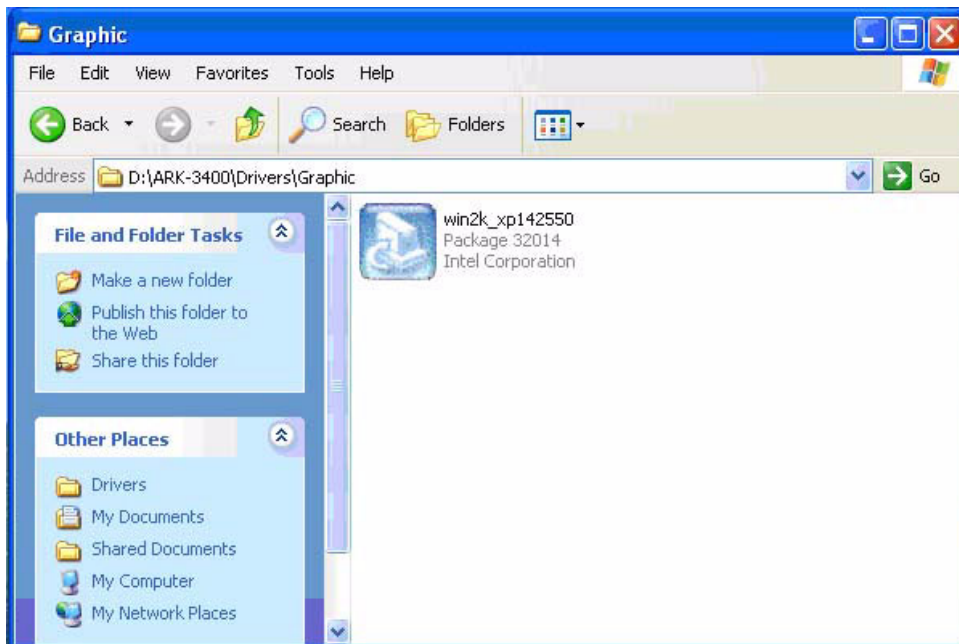


6. Select Yes, I want to restart this computer now, and then click the Finish button. The computer will restart automatically. The driver installation is completed.

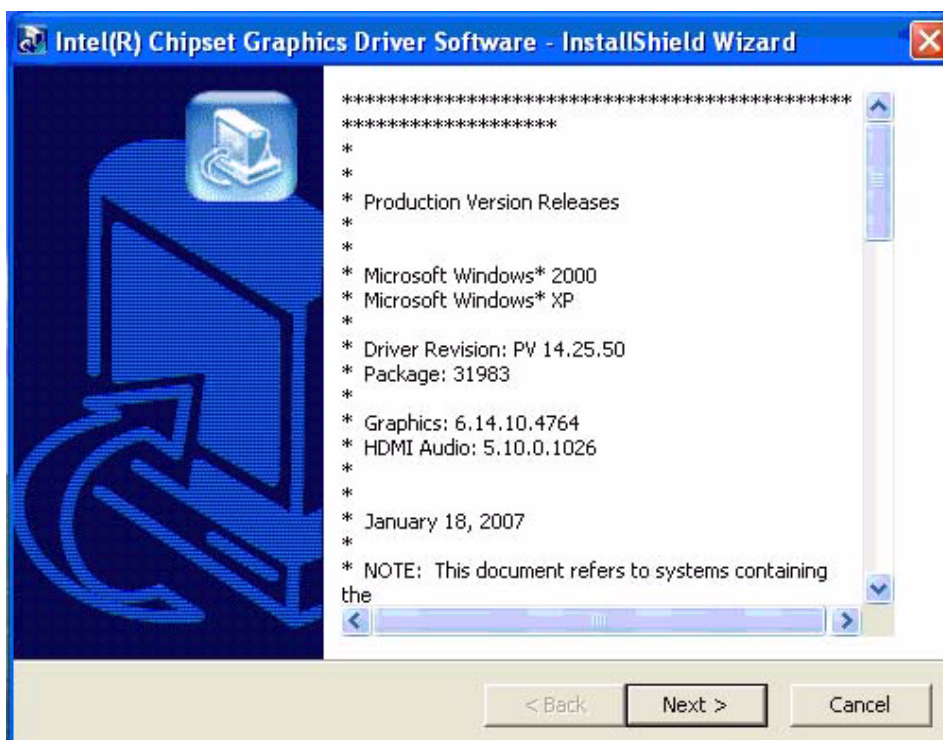


4.1.2 Graphic driver installation

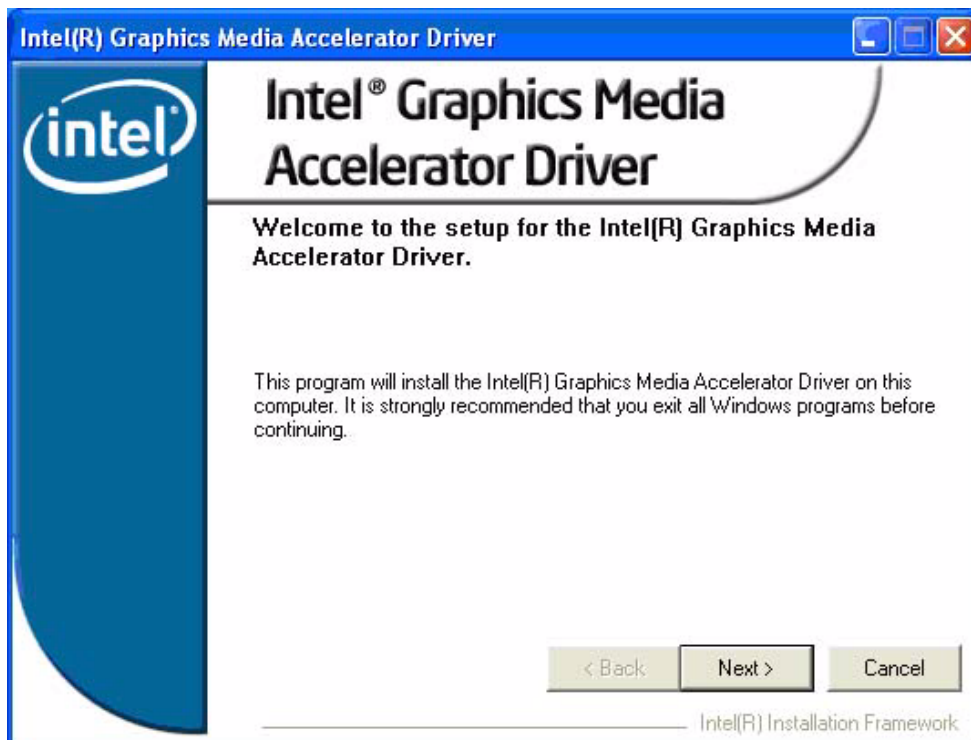
1. Change folder address to \Drivers\Graphic. And double click to execute win2k_xp142550.exe.



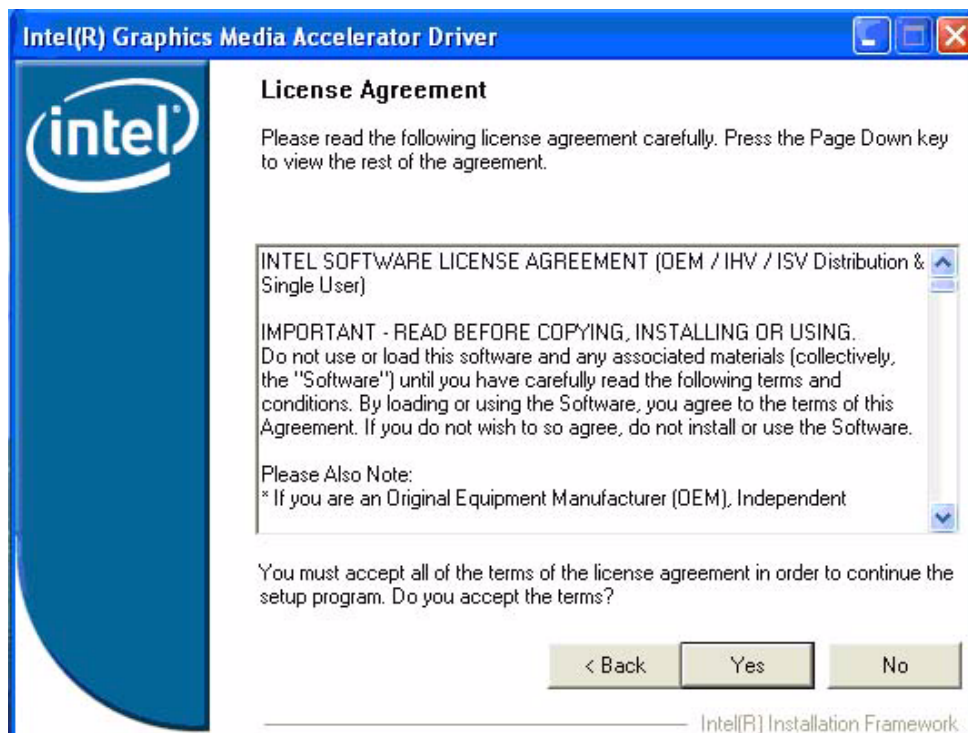
2. Click "Next" button to continue installation.



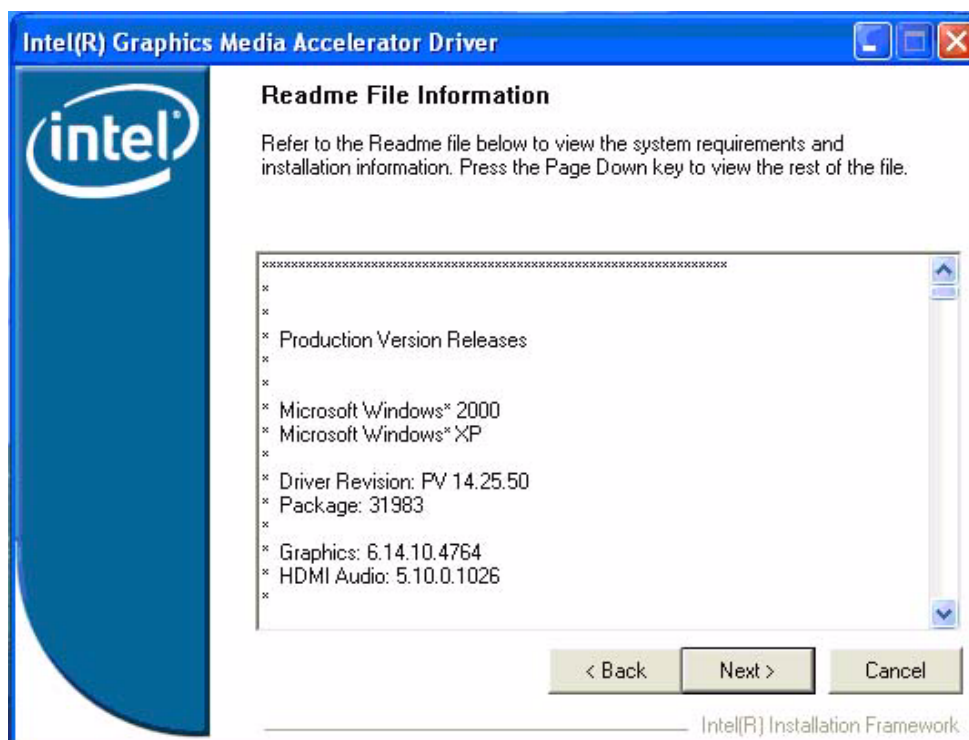
3. Click "Next" button to skip through welcome window.



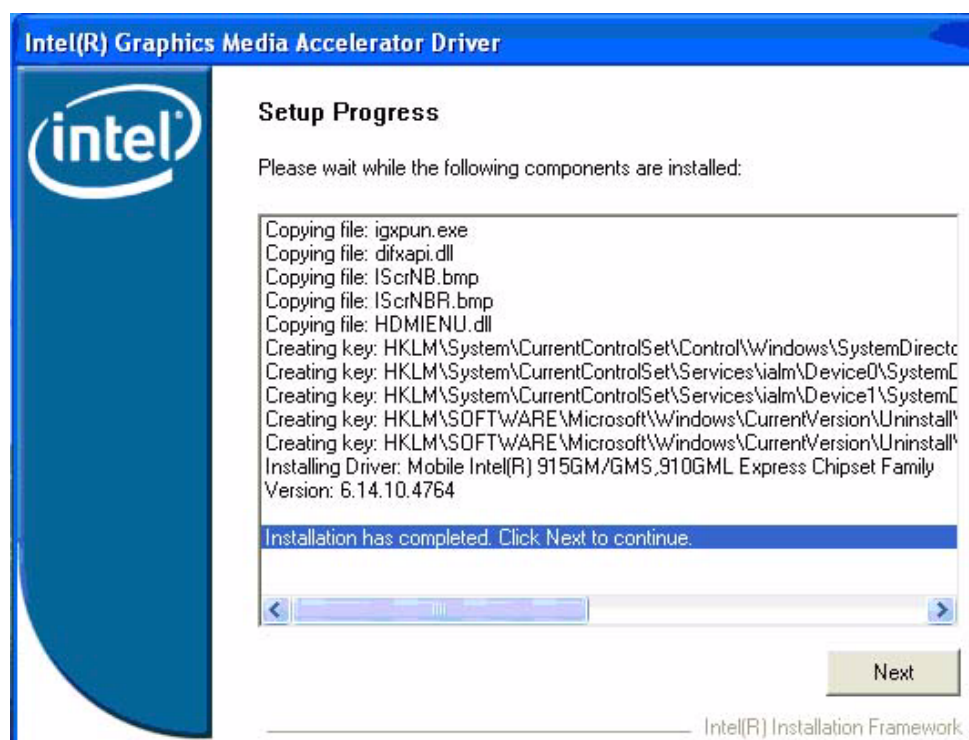
4. Click "Yes" to accept License Agreement.



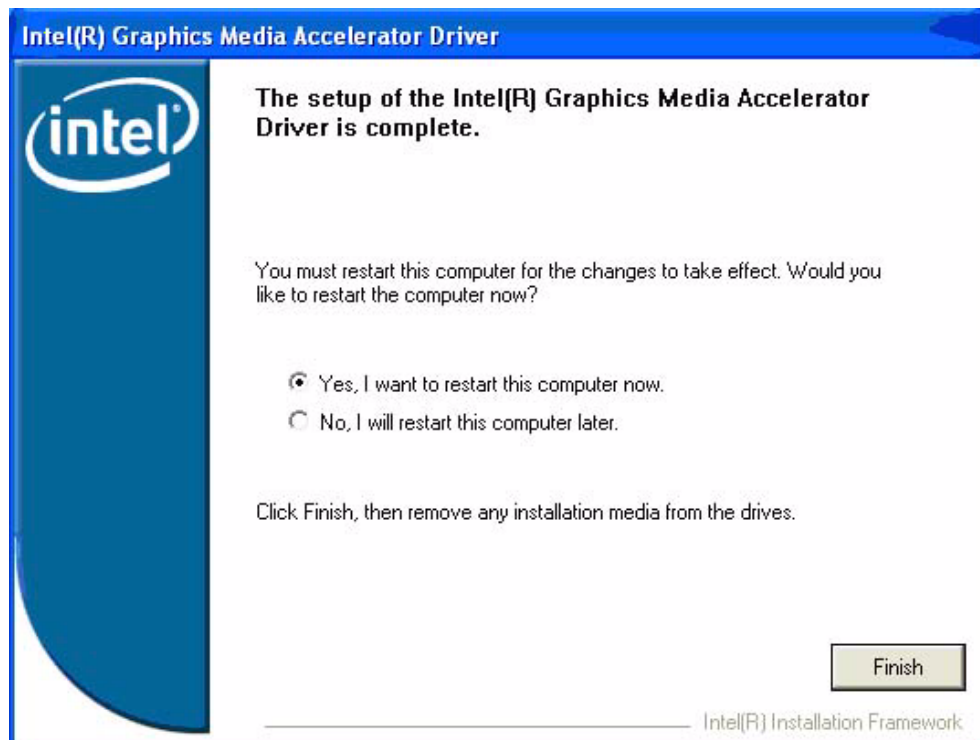
5. Click "Next" to exit Readme File Information window.



6. Click "Next" button to continue.

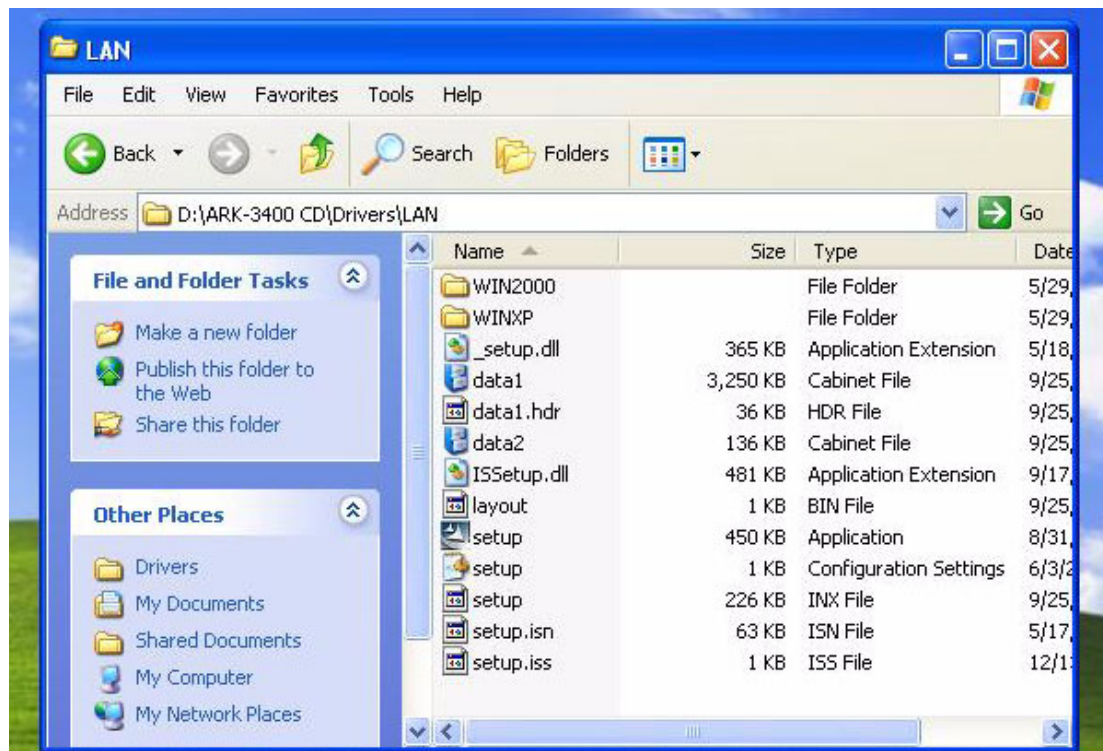


7. Select “Yes, I want to restart this computer now” and click “Finish” button. The computer will restart automatically. Then the driver installation is completed.

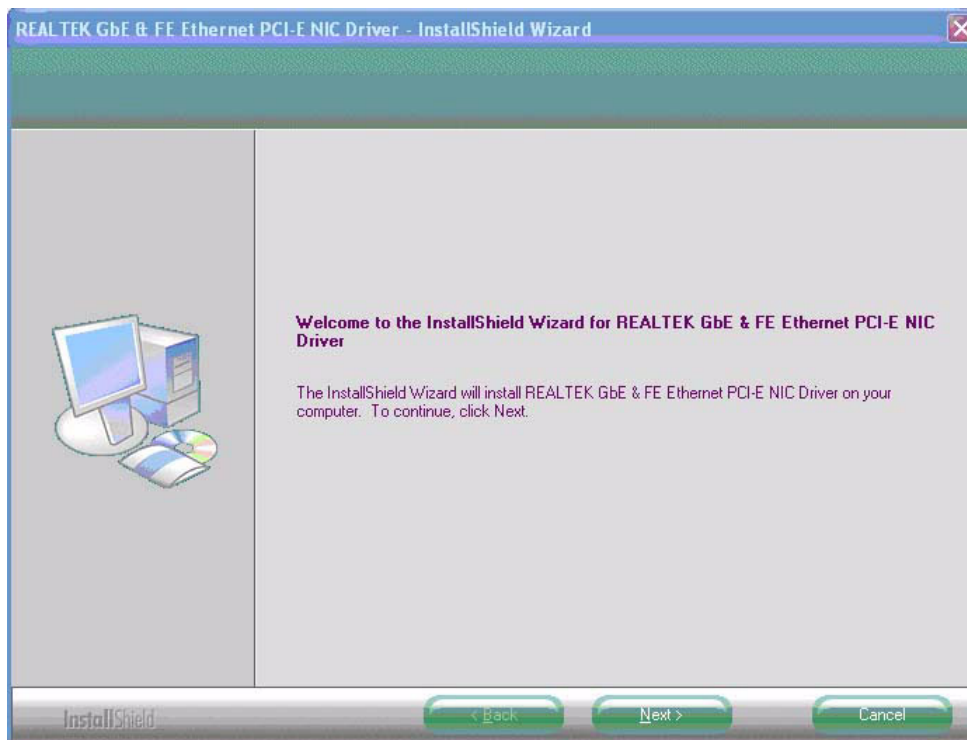


4.1.3 LAN driver installation

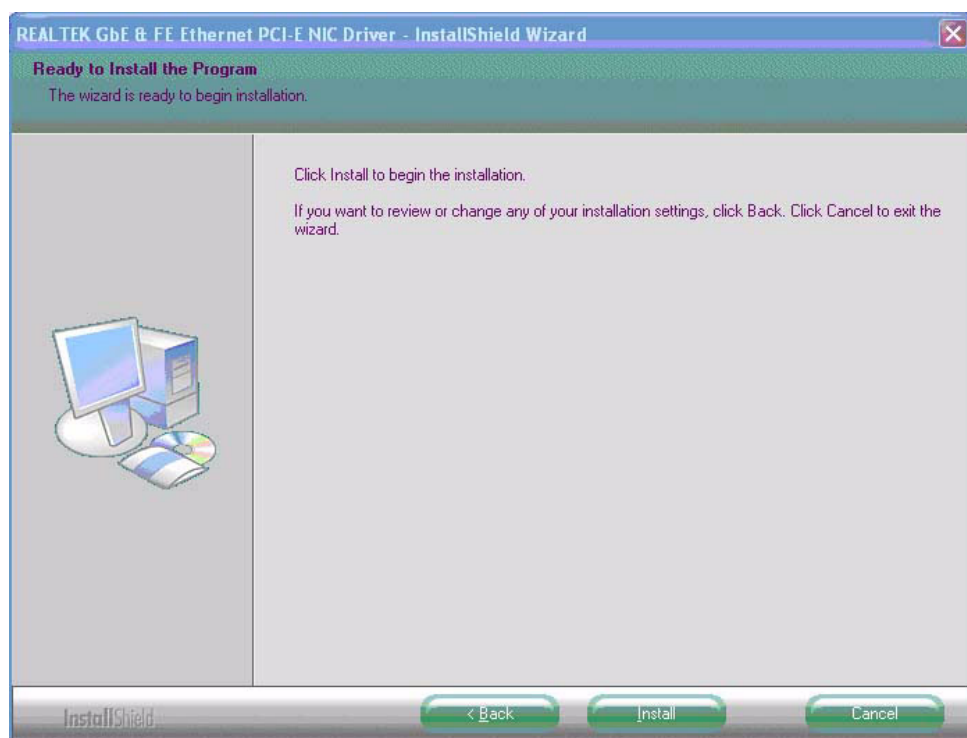
1. Change folder address to \Drivers\LAN. And double click to execute setup.exe.



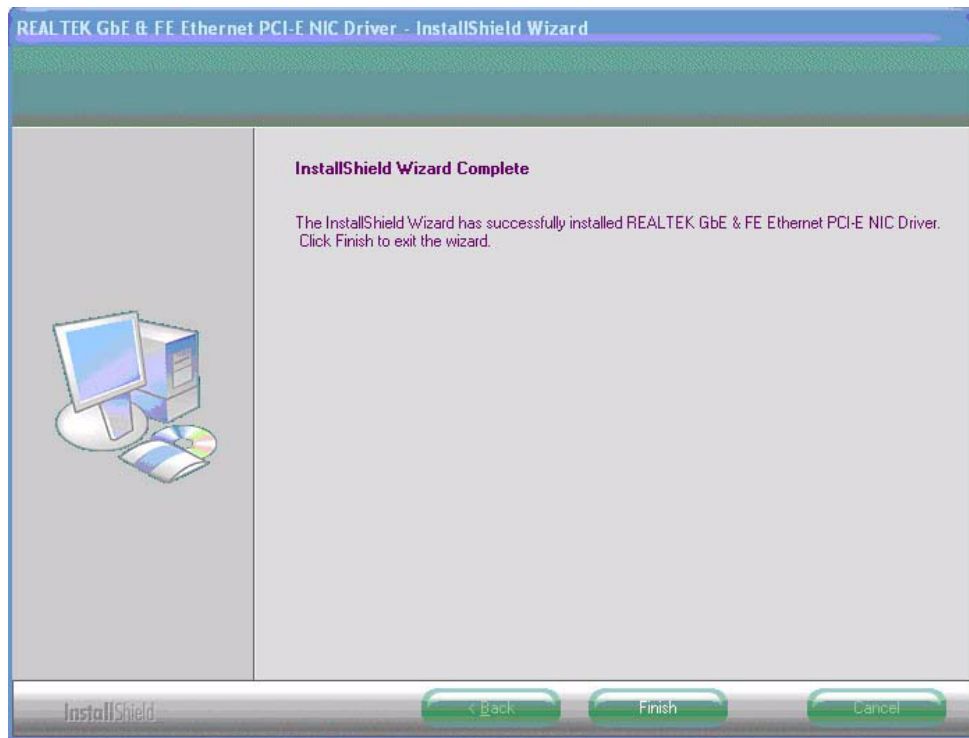
2. Click "Next" button to the next step.



3. Click "Install" button to start installation.

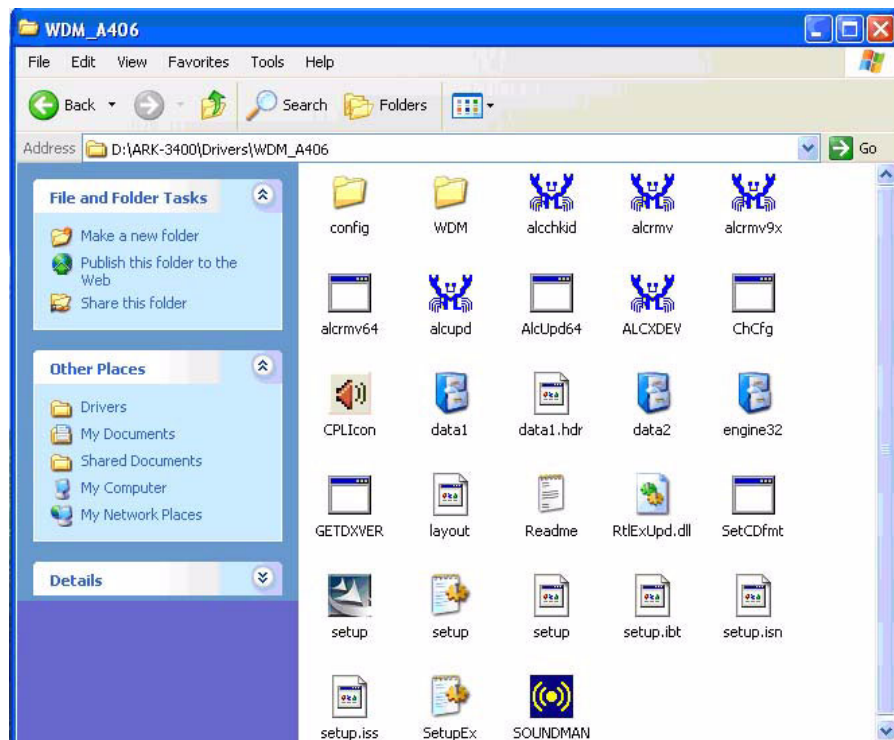


4. The network driver installation is completed. Click “Finish”.

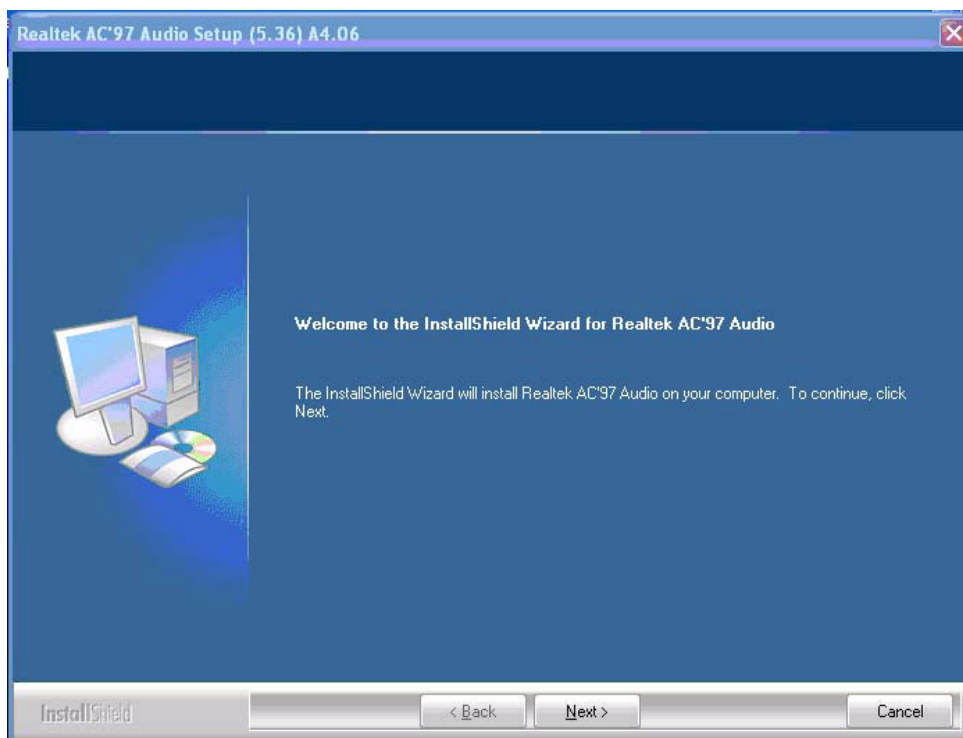


4.1.4 Audio driver installation

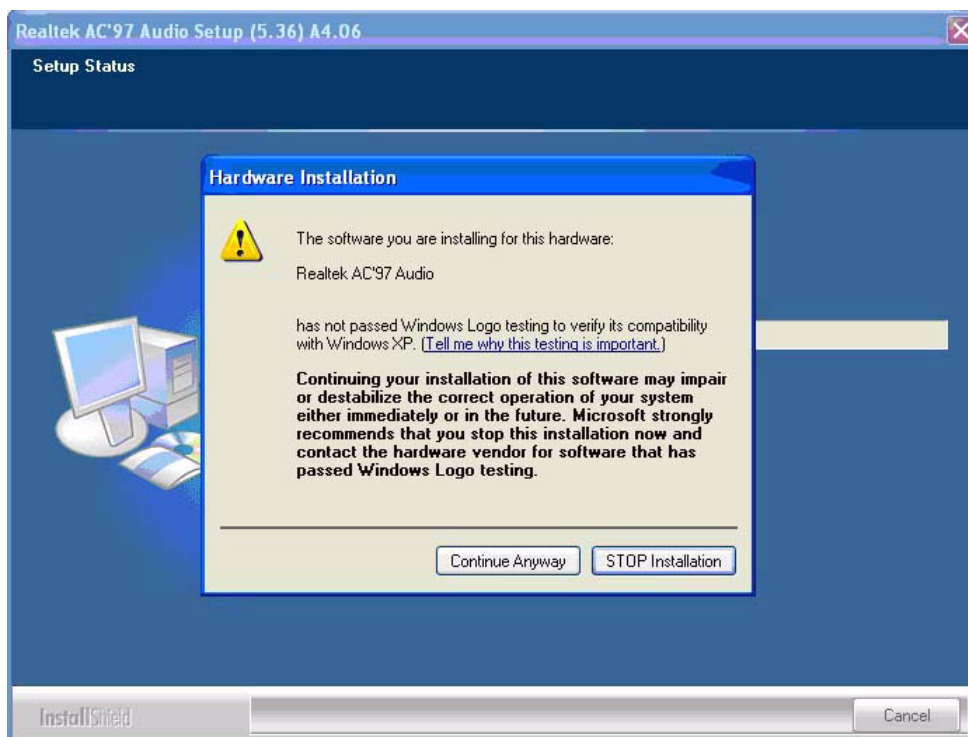
1. Change folder address to \Drivers\Audio. And double click to execute.



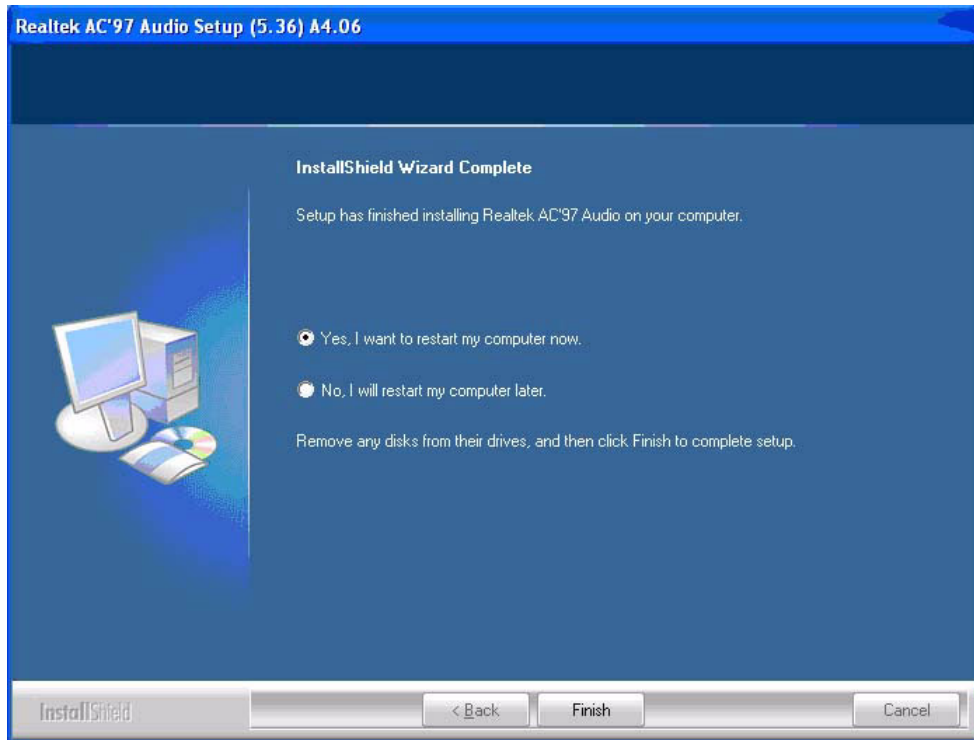
2. Click "Next" button to skip welcome message.



3. Click "Continue Anyway" button to install.



4. Select “Yes, I want to restart this computer now” and click “Finish” button. The computer will restart automatically. Then the driver installation is completed.



Appendix **A**

Function Settings

A.1 Function Setting

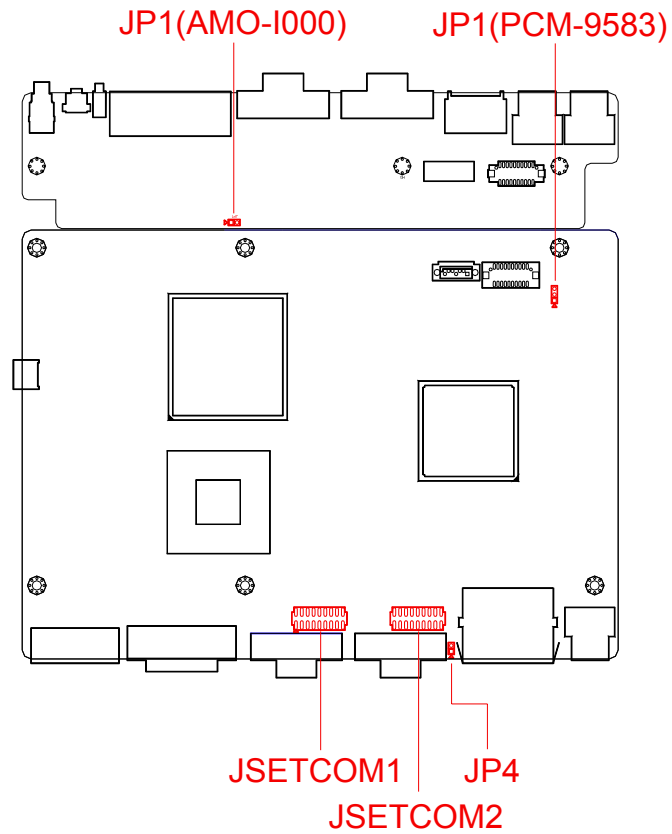


Figure A.1 Internal board top view

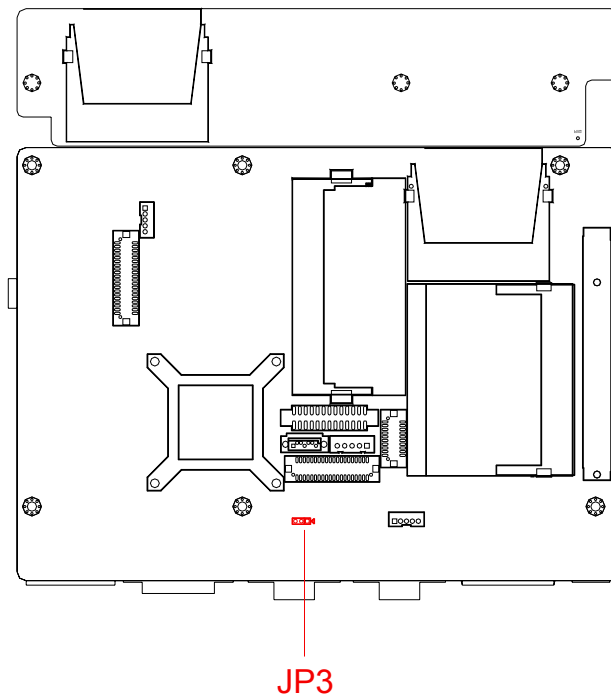


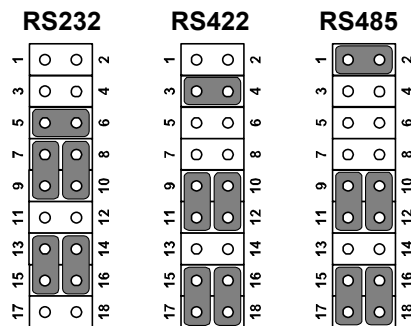
Figure A.2 Internal board bottom view

Table A.1: Setting Table**For PCM-9583 Setting**

JP1	CLEAR CMOS
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D(M) 2.0mm DIP SQUARE W/ O Pb
Setting	Function
(1-2)	NORMAL (Default)
(2-3)	CLEAR CMOS
JP3	Internal LVDS PANEL POWER Select
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D(M) 2.0mm DIP SQUARE W/ O Pb
Setting	Function
(1-2)	5 V for +VLVDS2_PANEL POWER Select
(2-3)	3.3 V for +VLVDS2_PANEL POWER Select (Default)
JP4	ATX / AT Mode switch
Part Number	1653002101
Footprint	JH2X1V-2M
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/ O Pb
Setting	Function
NL	ATX Mode(default)
ON	AT Mode

JSETCOM1	COM1 RS232/422/485 Select
Part Number	1653009260
Footprint	HD_9x2P_79_JVE
Description	PIN HEADER SMD 9*2P 180D(M) 2.0mm
Setting	Function
(5-6),(7-9),(8-10),(13-15),(14-16)	RS232
(3-4),(9-11),(10-12),(15-17),(16-18)	RS422
(1-2),(9-11),(10-12),(15-17),(16-18)	RS485

JSETCOM2	COM2 RS232/422/485 Select
Part Number	1653009260
Footprint	HD_9x2P_79_JVE
Description	PIN HEADER SMD 9*2P 180D(M) 2.0mm
Setting	Function
(5-6),(7-9),(8-10),(13-15),(14-16)	RS232
(3-4),(9-11),(10-12),(15-17),(16-18)	RS422
(1-2),(9-11),(10-12),(15-17),(16-18)	RS485



For AMO-I000 Setting

JP1	CF MASTER / SLAVE Select
Part Number	1653002101
Footprint	JH2X1V-2M
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
Setting	Function
NL	SLAVE
ON	MASTER (default)

Appendix **B**

Display Application

B.1 Introduction

The ARK-3400 has an onboard Intel 910GMLE chipset for its PCIE controller. It supports LVDS & DVI displays and conventional analog CRT monitors with 128 MB frame buffer shared with system memory. The VGA controller can drive CRT displays with resolutions up to 1600 x 1200 @ 85 Hz and 2048 x 1536 @ 75 Hz and support 24/48 bits LVDS display mode up to UXGA panel resolution with frequency range from 25 MHz to 112 MHz.

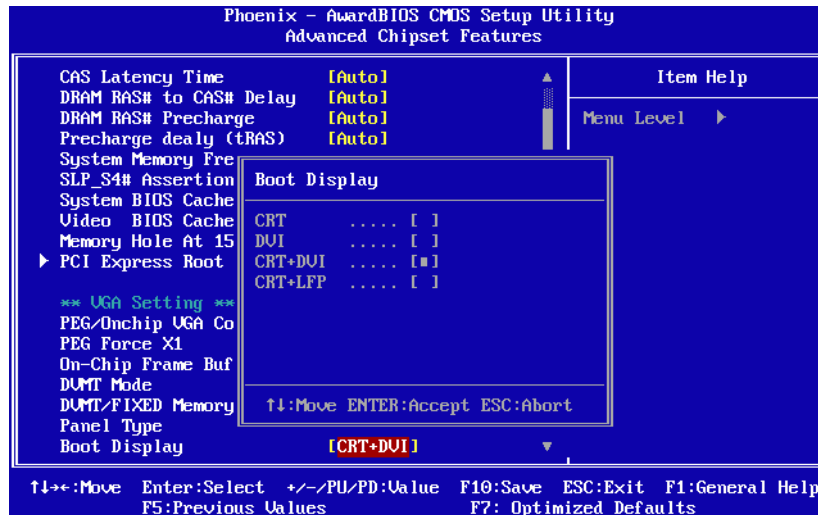


Figure B.1 BIOS VGA setting

B.2 LVDS

Low-voltage differential signaling, or LVDS, is an electrical signaling system that can run at very high speeds over inexpensive twisted-pair copper cables. It was introduced in 1994, and has since become very popular in computers, where it forms part of very high-speed networks and computer buses.

The ARK-3400 support 24/48 bits LVDS display mode up to UXGA panel resolution with frequency range from 25-MHz to 112-MHz. Refer to Chapter 3 “BIOS Operation” to find out how to change this setting. The default setting of “Boot Display” is “CRT”.

B.3 Dual Display

A multiple monitor setup increases the net display area of a system and can be an inexpensive way of improving computer usage. Resulting display area after upgrading to a multi-monitor configuration is limited by the size, resolution and number of monitors. The monitors used for multi-monitor can be different types (CRT+LFP or CRT+DVI) and sizes. The operating system manages the monitors' resolutions independently.

B.3.1 Display modes

■ Clone mode

Initially on PCs, the multiple output interface was designed to display the same image on all output interfaces (sometimes referred to as mirroring or cloning). This reflected the fact that these video cards were originally used in presentations where the user typically had his or her face to the audience with a duplicate of the projected image available to the presenter.

■ Extended mode

In "extended" mode, additional desktop area is created on additional monitors. Each monitor can use different settings (resolution, color, refresh rate). Macintosh computers have supported the "extended desktop" concept since the late 1980s, increasing the platform's utility for professional media and software developers such as graphic designers, video editors, and game developers.

The concept was further developed by PC manufacturers and led to the "extended" or "independent displays" mode and the "spanning" or "stretched" display mode. In both of these modes, display devices are positioned next to each other in order to create the illusion that the two displays are logically contiguous.

B.4 Display Resolution Setting

The ARK-3400 can drive CRT displays with resolutions up to 1600 x 1200 @ 85 Hz and 2048 x 1536 @ 75 Hz and support 24/48 bits LVDS display mode up to UXGA panel resolution with frequency range from 25 MHz to 112 MHz.

Appendix **C**

Application Notes

C.1 RS-485 Auto Flow Control

The COM1 & COM2 port connector located on the rear face plate of ARK-3400 unit can be configured to operate in RS-232, RS-422 or RS-485 mode by jumpers.

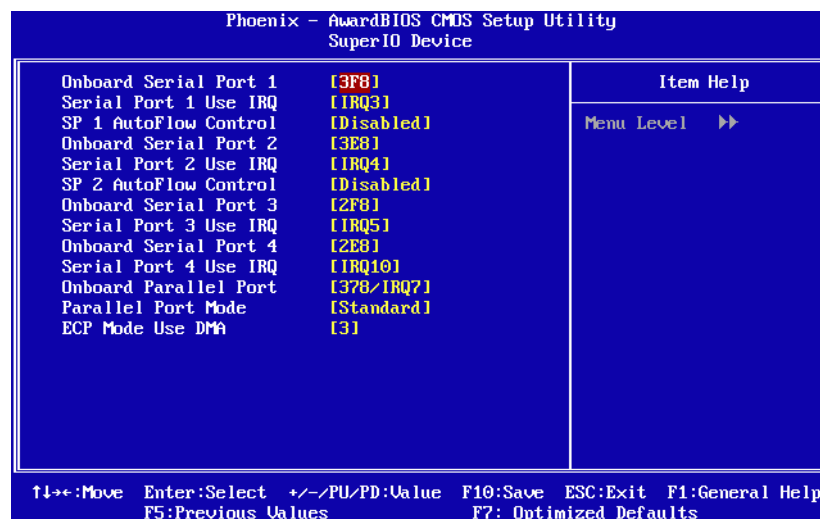


Figure C.1 BIOS COM port setting

C.1.1 Flow control, introduction

Consider the situation where someone is helping you harvest apples from a tree. Your helper climbs up the tree and throws all the apples down to you. You have to put them in buckets. In the normal situation, you can easily catch all the apples, but when one bucket is full and it has to be replaced by an empty one, this action takes more time than is available between two apples thrown by your helper.

Two different things can occur. Your helper stops until the new bucket is in position, or some apples are damaged because they fall on the (rock hard, as it happens) ground in the small period you are not able to catch them.

You would probably prefer the first method where your helper stops for a small period. To achieve this, there will be some communication, eye-contact, a yell, or something like that to stop him/her from throwing new apples. How simple, but is it always this simple? Consider the situation where one computer device sends information to another using a serial connection. Now and then, the receiver needs to do some other actions, to write the contents of its buffers to disk for example. In this period of time no new information can be received. Some communication back to the sender is needed to stop the flow of bytes on the line. A method must be present to tell the sender to pause. To do this, both software and hardware protocols have been defined.

C.1.2 Software flow control

Both software and hardware flow control need software to perform the handshaking task. This makes the term software flow control somewhat misleading. What is meant is that with hardware flow control, additional lines are present in the communication cable which signal handshaking conditions. With software flow control, which is also known under the name XON-XOFF flow control, bytes are sent to the sender using the standard communication lines.

Using hardware flow control implies, that more lines must be present between the sender and the receiver, leading to a thicker and more expensive cable. Therefore, software flow control is a good alternative if it is not needed to gain maximum performance in communications. Software flow control makes use of the data channel

between the two devices which reduces the bandwidth. The reduction of bandwidth is in most cases however not so astonishing that it is a reason to not use it.

Two bytes have been predefined in the ASCII character set to be used with software flow control. These bytes are named XOFF and XON, because they can stop and restart transmitting. The byte value of XOFF is 19, it can be simulated by pressing Ctrl-S on the keyboard. XON has the value 17 assigned which is equivalent to Ctrl-Q.

Using software flow control is easy. If sending of characters must be postponed, the character XOFF is sent on the line, to restart the communication again XON is used. Sending the XOFF character only stops the communication in the direction of the device which issued the XOFF.

This method has a few disadvantages. One is already discussed: using bytes on the communication channel takes up some bandwidth. One other reason is more severe. Handshaking is mostly used to prevent an overrun of the receiver buffer, the buffer in memory used to store the recently received bytes. If an overrun occurs, this affects the way new incoming characters on the communication channel are handled. In the worst case where software has been designed badly, these characters are thrown away without checking them. If such a character is XOFF or XON, the flow of communication can be severely damaged. The sender will continuously supply new information if the XOFF is lost, or never send new information if no XON was received.

This also holds for communication lines where signal quality is bad. What happens if the XOFF or XON message is not received clearly because of noise on the line? Special precaution is also necessary that the information sent does not contain the XON or XOFF characters as information bytes.

Therefore, serial communication using software flow control is only acceptable when communication speeds are not too high, and the probability that buffer overruns or data damage occur are minimal.

C.1.3 Hardware flow control

Hardware flow control is superior compared to software flow control using the XON and XOFF characters. The main problem is, that an extra investment is needed. Extra lines are necessary in the communication cable to carry the handshaking information.

Hardware flow control is sometimes referred to as RTS / CTS flow control. This term mentions the extra input and outputs used on the serial device to perform this type of handshaking. RTS / CTS in its original outlook is used for handshaking between a computer and a device connected to it such as a modem.

First, the computer sets its RTS line to signal the device that some information is present. The device checks if there is room to receive the information and if so, it sets the CTS line to start the transfer. When using a null modem connection, this is somewhat different. There are two ways to handle this type of handshaking in that situation.

One is, where the RTS of each side is connected with the CTS side of the other. In that way, the communication protocol differs somewhat from the original one. The RTS output of computer A signals computer B that A is capable of receiving information, rather than a request for sending information as in the original configuration. This type of communication can be performed with a null modem cable for full handshaking. Although using this cable is not completely compatible with the original way hardware flow control was designed, if software is properly designed for it, it can achieve the highest possible speed because no overhead is present for requesting on the RTS line and answering on the CTS line.

In the second situation of null modem communication with hardware flow control, the software side looks quite similar to the original use of the handshaking lines. The CTS and RTS lines of one device are connected directly to each other. This means,

that the request to send query answers itself. As soon as the RTS output is set, the CTS input will detect a high logical value indicating that sending of information is allowed. This implies, that information will always be sent as soon as sending is requested by a device if no further checking is present. To prevent this from happening, two other pins on the connector are used, the data set ready DSR and the data terminal ready DTR. These two lines indicate if the device attached is working properly and willing to accept data. When these lines are cross-connected (as in most null modem cables) flow control can be performed using these lines. A DTR output is set, if that computer accepts incoming characters.

C.1.4 How to implement

Implementing proper flow control can give some headaches. The main problems are the numerous ways it can be done and especially for null modem connections, the lack of a standard way of doing. The best way to implement rigid flow control in your software is to use preprogrammed routines from a reliable source. The problems involved in the own development of communication routines is often not worth the effort compared to the relative low prices of professional communication libraries. A good library is the COMM-DRV/Lib from Willies Computer Software Co. This library supports all versions of Windows and MS-DOS. XModem, YModem and ZModem file transfer routines are provided and all source code is included. Includes also Modem handling and string handling routines.

C.2 WOL Setting

C.2.1 Introduction

Wake on LAN (WOL, sometimes WoL) is an Ethernet computer networking standard that allows a computer to be turned on or woken up remotely by a network message.

C.2.2 System requirements - PC Compatible

Wake on LAN (WoL) support is implemented on the motherboard of a computer. Most modern motherboards with an embedded Ethernet controller support WoL without the need for an external cable. Older motherboards must have a WAKEUP-LINK header onboard and connected to the network card via a special 3-pin cable; however, systems supporting the PCI 2.2 standard coupled with a PCI 2.2 compliant network adapter typically do not require a WoL cable as the required standby power is relayed through the PCI bus.

PCI version 2.2 has PME (Power Management Events). What this means is that PCI cards can send and receive PME via the PCI socket directly, without the need for a WOL cable.

Laptops powered by the Intel 3945 chipset or newer (with explicit BIOS support) allow waking up the machine using wireless (802.11 protocol). This is called Wake on Wireless LAN (WoWLAN).

Wake on LAN must be enabled in the Power Management section of the motherboard's BIOS. It may also be necessary to configure the computer to reserve power for the network card when the system is shutdown.

In addition, in order to get WoL to work it is sometimes required to enable this feature on the card. This can be done in Microsoft Windows from the properties of the network card in the device manager, on the "Power Management" tab. Check "Allow this device to bring the computer out of standby" and then "Only allow management stations to bring the computer out of standby" to make sure it does not wake up on all network activity.

C.2.3 How it works

Wake-on-LAN is not restricted to LAN (Local area network) traffic.

The general process of waking a computer up remotely over a network connection can be explained thusly:

The target computer is shut down (Sleeping, Hibernating or Soft Off, i.e. ACPI state G1 or G2), with power reserved for the network card. The network card listens for a specific packet, called the "Magic Packet." The Magic Packet is broadcast on the broadcast address for that particular subnet (or an entire LAN, though this requires special hardware and/or configuration). When the listening computer receives this packet, the network card checks the packet for the correct information. If the Magic Packet is valid, the network card turns on the computer to full power and boots the operating system.

The magic packet is sent on the data link or OSI-2 layer and broadcast to all NICs (within the network of the broadcast address). Therefore, it does not matter whether the remote host has a fixed or dynamic IP-address (OSI-3 layer).

In order for Wake on LAN to work, parts of the network interface need to stay on. This increases the standby power used by the computer. If Wake on LAN is not needed, turning it off may reduce power consumption while the computer is off but still plugged in.

C.2.4 Magic Packet

The Magic Packet is a broadcast frame containing anywhere within its payload 6 bytes of ones (resulting in hexadecimal FF FF FF FF FF FF) followed by sixteen repetitions of the target computer's MAC address.

Since the Magic Packet is only scanned for the string above, and not actually parsed by a full protocol stack, it may be sent as a broadcast packet of any network- and transport-layer protocol. It is typically sent as a UDP datagram to port 0, 7 or 9, or, in former times, as an IPX packet.

Appendix **D**

Watchdog Timer

D.1 Watchdog Timer

The SCH3114 Runtime base I/O address is 800h
Setting WatchDog time value location at offset 66h
If set value "0", it is mean disable WatchDog function.

```
Superio_GPIO_Port = 800h
```

```
mov dx,Superio_GPIO_Port + 66h
```

```
mov al,00h
```

```
out dx,al
```

```
.model small
```

```
.486p
```

```
.stack 256
```

```
.data
```

```
SCH3114_IO EQU 800h
```

```
.code
```

```
org 100h
```

```
.STARTup
```

```
;=====
```

```
;47H
```

```
;enable WDT function bit [3:2]=11
```

```
;=====
```

```
mov dx,SCH3114_IO + 47h
```

```
mov al,0ch
```

```
out dx,al
```

```
;=====
```

```
;65H
```

```
;bit [1:0]=Reserved
```

```
;bit [6:2]Reserve=00000
```

```
;bit [7] WDT time-out Value Units Select
```

```
;Minutes=0 (default) Seconds=1
```

```
;=====
```

```
mov dx,SCH3114_IO + 65h ;
```

```
mov al,080h
```

```
out dx,al
```

```
;=====
```

```
;66H
```

```
;WDT timer time-out value
```

```
;bit[7:0]=0~255
```

```
;=====
```

```
mov dx,SCH3114_IO + 66h
```

```
mov al,01h
```

Appendix **E**

Programming GPIO

E.1 Programming GPIO

Advantech provides SUSI (Secure & Unified Smart Interface) API for customers. It is a set of user-friendly, intelligent and integrated application programming interfaces, which shortens development time, enhances security and offers add-on value for Advantech platform users. SUSI makes applications easier and simpler to build and operate. For the detailed GPIO register, please refer to below contents.

E.2 GPIO Programming

For DOS GPIO control is through INT 15 Hook

In windows XP system please use SUSI

Below is an example of how to call sub routine °×Get Number of GPIO group°±

=====

```
mov ax,5e87h
mov bh,00h
int 15h
```

Detail information of INT 15 sub routine£½

=====

```
; Get Number of GPIO group
; one group mean 8 gpio pins (one GPIO Chip)
; Input:
; ax=5E87h
; bh=00h
; output:
; ax=5E78 ;function success, other value means function fail
; cl= n group of gpio
```

=====

=====

```
; Get GPIO Config
; Input:
; ax=5E87h
; bh=01h
; cl= n ; n means which group of GPIO you want to get
; output:
; ax=5E78 ;function success, other value means function fail
; bl= the n group of gpio config
; bit 0 = gpio 0 , 0 => output pin; 1 => input pin
; bit 1 = gpio 1 , 0 => output pin; 1 => input pin
; .....
; bit 7 = gpio 7 , 0 => output pin; 1 => input pin
```

=====

=====

```
; Set GPIO Config
; Input:
; ax=5E87h
```

```

; bh=02h
; cl= n ; n means which group of GPIO you want to set
; bl= the n group of gpio config
; bit 0 = gpio 0 , 0 => output pin; 1 => input pin
; bit 1 = gpio 1 , 0 => output pin; 1 => input pin
; .....
; bit 7 = gpio 7 , 0 => output pin; 1 => input pin
; output:
; ax=5E78 ;function success, other value means function fail
;=====
;=====
; Get GPIO status
; Input:
; ax=5E87h
; bh=03h
; cl= n ; n means which group of GPIO you want to get
; output:
; ax=5E78 ;function success, other value means function fail
; bl= the n group of gpio status
; bit 0 = gpio 0 , 0 => Low; 1 => High
; bit 1 = gpio 1 , 0 => Low; 1 => High
; .....
; bit 7 = gpio 7 , 0 => Low; 1 => High
;=====
;=====
; Set GPIO status
; Input:
; ax=5E87h
; bh=04h
; cl= n ; n means which group of GPIO you want to set
; bl= the n group of gpio status
; bit 0 = gpio 0 , 0 => Low; 1 => High
; bit 1 = gpio 1 , 0 => Low; 1 => High
; .....
; bit 7 = gpio 7 , 0 => Low; 1 => High
; output:
; ax=5E78 ;function success, other value means function fail
;=====

```

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