

User Manual

ARK-1503

Embedded IPC



Attention!

This package contains a hard-copy user manual in Chinese for China CCC certification purposes, and there is an English user manual included as a PDF file on the CD. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

Copyright

The documentation and the software included with this product are copyrighted 2011 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

Award is a trademark of Award Software International, Inc.

VIA is a trademark of VIA Technologies, Inc.

IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.

Intel® and Pentium® are trademarks of Intel Corporation.

Microsoft Windows® is a registered trademark of Microsoft Corp.

RTL is a trademark of Realtek Semi-Conductor Co., Ltd.

ESS is a trademark of ESS Technology, Inc.

UMC is a trademark of United Microelectronics Corporation.

SMI is a trademark of Silicon Motion, Inc.

Creative is a trademark of Creative Technology LTD.

CHRONTEL is a trademark of Chrontel Inc.

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

For more information about this and other Advantech products, please visit our website at:

http://www.advantech.com/

http://www.advantech.com/ePlatform/

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

http://support.advantech.com.tw/support/

Part No. 2006150300 Printed in Taiwan Edition 1 March 2011

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 outof-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.

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.
- Contact your distributor, sales representative, or Advantech's customer service 2. 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.



Notes provide optional additional information.



Note!

ARK-1503 User Manual

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.
- 14. 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.
- 15. 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.
- 16. 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.
- 17. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.
- 18. 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 manufacture. Discard used batteries according to the manufacturers instructions.
- 19. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.

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.

Packing list

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

- 1 x ARK-1503 Unit
- 1 x Driver CD (Drivers and Manual)
- 1 x China RoHS
- 1 x Chinese User Manual for CCC
- 1 x Warranty Card

Ordering information

Model Number	Description
ARK-1503F-D6A1E	Intel Atom D525 1.8 GHz, with DB36 LVDS interface
ARK-1503F-D4A1E	Intel Atom D425 1.8 GHz, with DB36 LVDS interface
ARK-1503P-D6A1E	Intel Atom D525 1.8 GHz, with golden finger interface for ITM-5115

Optional accessories

Part Number	Description
1757003062	AC-to-DC Adapter 100-240 V, 60W, 12 V / 5 A Power Plug, 0 ~ 40°C for Home and Office Use
1702002600	Power Cable 3-pin 180 cm, USA Type
1702002605	Power Cable 3-pin 180 cm, Europe Type
1702031801	Power Cable 3-pin 180 cm, UK Type
1700008921	Power Cable 3-pin 180 cm, PSE Mark
9666K10000E	DIN-Rail mounting kit for ARK-1000 series models
9666K10001E	VESA mounting kit for ARK-1000 series models
WIFI-105E	Wireless IEEE 802.11b/g/n, miniPCIe interface WLAN
1700001854	SMA cable 11CM for WIFI-105E WLAN module
1750003222	802.11b/g 5dBi Dipole Antenna for 968EMW0021 WLAN module
1700019110	3 m DB36 LVDS integrated cable for ITM-5115R-LA1E
ITM-5115R-LA1E	15" XGA LED Industrial Monitor with I-Panel Link
ITM-5115R-PA1E	15" XGA LED Ind. T/S Monitor plugged with ARK

Contents

Chapter	1	Ger	neral Introduction	.1
	1.1	Introdu	iction	2
	1.2	Produc	t Feature	2
		1.2.1	Key features	2
		1.2.2	General	2
		1.2.3	Display	2
		1.2.4	Power consumption	3
	1.3	Hardwa	are Specification	3
	1.4	Mecha	nical Specification	4
		1.4.1	Dimensions	4
			Figure 1.1 ARK-1503 Mechanical dimension drawing	4
		1.4.2	Weight	4
	1.5	Power	requirement	4
		1.5.1	System power	4
		1.5.2	RTC battery	4
	1.6	Enviro	nment specification	5
		1.6.1	Operating temperature	5
		1.6.2	Relative Humidity	5
		1.6.3	Storage Temperature	5
		1.6.4	Vibration loading during operation	5
		1.6.5	Shock during operation	5
		1.0.0		כ ב
		1.0.7		5
Chapter	2	Har	dware installation	.7
	2.1	Introdu	ction	8
	2.2	Jumpe	rs	8
		2.2.1	Jumper list	8
			Table 2.1: Jumper List	8
		2.2.2	Jumper Settings	8
			Table 2.2: J2: COM2 RS-232/422/485 Setting	8
			Table 2.3: J3: AT / ATX Power Setting	8
			Table 2.4: J4: Clear COMS	9
			Table 2.5: J5: LVDS Panel Voltage Setting	9
		2.2.3	Jumper Description	9
	2.3	ARK-1	503 I/O Indication	. 10
			Figure 2.1 ARK-1503 Front View	. 10
	0.4		Figure 2.2 AKK-1503 Kear View	10
	2.4	ARK-1	503 external I/O connectors	.11
		2.4.1	Power ON/OFF Button	.11
		040	Figure 2.3 Power ON/OFF Button	. 1 1
		2.4.2	Fower Input Connector	. 4 4
		242	Figure 2.4 Power input Connector	. 4 4
		2.4.3	Einemet Connector	.
			Table 2.6: Ethernet Connector Din Assignments	. 4
		211	VGA Connector	10
		2.4.4	Figure 2.6 VGA Connector	. 1∠ 12
			Table 2.7: VGA Connector Din Assignments	. ⊺∠ 12
		215	ISB Connectors	. 1∠ 12
		2.4.0	Figure 2.7 LISB Connector	12 12
			Table 2.8: LISB Connector Pin Assignments	12 12
		246	Audio Connector (ARK-1503F only)	12 12
		2.7.0		0

		- · -	Figure 2.8 Line-out Connector	13
		2.4.7	COM Connector	13
			Figure 2.9 COM Port Connector	13
		240	Table 2.9: COM Connector PIN Assignments	13
		2.4.0	DIO Connector (ARK-1503F Only)	14
			Table 2 10: DIO Connector Din Assignments	14
			Figure 2 11 DIO Connector Fin Assignments	14
			Table 2 11: DIO Cable Pin Assignments	14
		249	I-Panel Link (ARK-1503F only)	15
		2	Table 2.12: I-Panel Link Pin Assignments.	15
		2.4.10	Golden Finger Interface for ITM Panels (ARK-1503P only)	16
			Table 2.13: Golden Finger Interface for ITM Panel	16
	2.5	Periph	eral Installation	16
		2.5.1	Compact Flash Installation	16
			Figure 2.12Unscrew the CF door screws	16
			Figure 2.13Pull the CF tray out	17
			Figure 2.14Remove the dummy CF bracket	17
			Figure 2.15Put CF on to the CF tray	18
		2.5.2	RAM and HDD Installation	19
			Figure 2.16Unscrew the screws of bottom cover	19
			Figure 2.17Unscrew the screws of the right HDD bracket	19
			Figure 2.18Install the RAM module	20
			Figure 2.19Unscrew the screws of the left HDD bracket	20
			Figure 2.20Connect the SATA HDD power and signal cables.	21
			Figure 2.21 Secure HDD	21
Chapter	3	BIO	S settings	23
	. (~ .
	3.1	Enterin	ig Setup	24
		044	Figure 3.1 Setup program initial screen	24
		3.1.1	Figure 2.2. Main actus across	20 25
		212	Figure 3.2 Main Setup Screen	25 26
		3.1.2	Figure 3.3 Advanced BIOS features setup screen	20 26
			Figure 3.4 CPU Configuration Setting	20 27
			Figure 3.5 IDE Configuration	27 28
			Figure 3.6 Super I/O Configuration	20
			Figure 3.7 Hardware health configuration	20
			Figure 3.8 ACPI Settings	
			Figure 3.9 General ACPI Configuration	31
			Figure 3.10Advanced ACPI Configuration	32
			Figure 3.11 Chinset ACPI Configuration	30

		-
	Figure 3.2 Main setup screen	25
3.1.2	Advanced BIOS Features Setup	26
	Figure 3.3 Advanced BIOS features setup screen	26
	Figure 3.4 CPU Configuration Setting	27
	Figure 3.5 IDE Configuration	28
	Figure 3.6 Super I/O Configuration	29
	Figure 3.7 Hardware health configuration	30
	Figure 3.8 ACPI Settings	31
	Figure 3.9 General ACPI Configuration	31
	Figure 3.10Advanced ACPI Configuration	32
	Figure 3.11Chipset ACPI Configuration	32
	Figure 3.12AHCI Configuration	33
	Figure 3.13APM Configuration	34
	Figure 3.14Event Log Configuration	35
	Figure 3.15MPS Configuration	35
	Figure 3.16Smbios Configuration	36
	Figure 3.17USB Configuration	36
	Figure 3.18USB Mass storage Device Configuration	37
3.1.3	Advanced PCI/PnP Settings	38
	Figure 3.19PCI/PNP Setup (top)	38
3.1.4	Boot Settings	39
	Figure 3.20Boot Setup Utility	39
	Figure 3.21 Boot Setting Configuration	39
3.1.5	Security Setup	40
	Figure 3.22Password Configuration	40
3.1.6	Advanced Chipset Settings	41
	Figure 3.23Advanced Chipset Settings	41

	Figure 3.24North Bridge Configuration Figure 3.25Video function configuration Figure 3.26South Bridge Configuration 3.1.7 Exit Option Figure 3.27Exit Option	41 42 43 44 44
Appendix A	WDT & GPIO Sample Code	47
A.1 A.2	Watchdog Timer Sample Code GPIO Sample Code	48 49
Appendix B	Installation guide of ARK-1503P Golden Finger Interface for ITM Panels	55
B.1	Installation guide of ARK-1503P Golden Finger Interface for ITM Panels	56



General Introduction

This chapter gives background information on ARK-1503 series.

1.1 Introduction

ARK-1503 Embedded IPC is an application ready system platform solution. All electronics are protected in a compact sealed aluminum case for easy integration in the Customerís own housing, or as a stand-alone application, where space is limited and the environment harsh. Besides ARK-1500 is a new model which integrate display signal into a 36pin I-Panel Link connector or a golden finger connector. These integrated interfaces contain power supply for panels, LVDS signals, Rx/Tx and USB signals for touch panels. The integrated interfaces can decrease the cables and facilitate the integration between embedded systems and panels.

ARK-1503 answers this demand by offering 4 x USB 2.0 ports, 2 x GbE LAN port , 2 x COM ports, 1 x 8-bit GPIO port and integrated display interface; packed into a small rugged unit and powered by an Intel Atom D525/D425 1.8GHz processor. ARK-1503 is also with 1 x miniPCIe interface for expansion. The ARK-1503 Compact Embedded Computer can be equipped with a solid state onboard CF card, so it easily passes 50 and 5 Grms shock and vibration tests. It also can be equipped with a 2.5î SATA HDD (9.5mm height). The system is powered by DC 12V input.

ARK-1000 can be standalone, wall-mounted, DIN-rail mounted or VESA mounted. ARK-1000 series comes in a footprint of only 230.6 x 133.0 x 44.4 mm (9.08" x 5.24" x 1.75"). 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.

1.2 Product Feature

1.2.1 Key features

- Extremely compact, sealed construction with fanless operation, supports Intel® Atom[™] D525/D425 up to 1.8 GHz
- Support integrated LVDS interface, with LVDS / 2*USB / RS-232 signal (compliant with ITM-5115)
- Ultra slim type fanless embedded system, which supports both HDD and CF
- Easily integrated with panel

1.2.2 General

- Intel® AtomTM D525/D425, support up to 1.8 GHz
- Integrated LVDS Interface, which integrate LVDS, 2 x USB, Rx/Tx and backlight control signals
- Supports VGA and 24-bit LVDS dual display
- Supports 1 x RS-232, 1 x RS-232/422/485 and 4 x USB 2.0
- Supports 2 x 10/100/1000 LAN
- 1 x miniPCIe expansion for wireless module

1.2.3 **Display**

- **Chipset:** Intel® Gen 3.5 DX9, MPEG2 Decode in HW
- Display Memory: Optimized Shared Memory Architecture up to 224 MB system memory
- VGA: Supports up to 2048 x 1536 @ 60 Hz
- LVDS: Single channel 24-bit LVDS up to WXGA 1366 x 768
- Dual display: VGA+LVDS

1.2.4 Power consumption

- **Typical:** 12 W (without supplying power to panel)
- **Max.:** 17 W (without supplying power to panel)

1.3 Hardware Specification

- CPU: Intel® AtomTM D525/D425
- System Chipset: Intel® ICH8M
- BIOS: AMI 16Mb SPI Flash
- System Memory: 1 x 204-pin SODIMM DDR3 1066/1333 MHz, support up to 2 GB
- Display:
 - VGA: Supports up to 2048 x 1536 @ 60 Hz
 - LVDS: Single channel 24-bit LVDS up to WXGA 1366 x 768
- HDD: Support 1 x 2.5" SATA HDD (height: 9.5 mm)
- SSD: Supports Compact Flash Card TYPE I/II
- Watchdog Timer: 255-level timer interval, setup by software
- I/O Interface: 1 x RS-232, 1 x RS-232/422/485 (ARK-1503F only ; by jumper setting)
- USB: Up to 4 x USB 2.0 compliant ports (2 x USB 2.0 for ARK-1503P)
- Ethernet Chipset:

LAN1: Intel 82567V Giga-LAN controller

LAN2: Intel 82583V Giga-LAN controller

- Speed: 10/100/1000 Mbps
- Interface: 2 x RJ45 w/ LED
- Standard: Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, IEEE 802.ab
- DIO: 8-bit programmable DIO (ARK-1503F only)
- Integrated LVDS Interface: DB36 with LVDS, 2 x USB, Rx, Tx and backlight control (ARK-1503F only)
- Audio: 1 x Line-out (ARK-1503F only)
- **Expansion:** 1 x miniPCle

1.4 Mechanical Specification

1.4.1 **Dimensions**

230.6 x 133.0 x 44.4 mm (9.08" x 5.24" x 1.75")



Figure 1.1 ARK-1503 Mechanical dimension drawing

1.4.2 Weight

1.9 kg (4.18 lbs)

1.5 Power requirement

1.5.1 System power

Minimum power input: DC 12V 3A (without supplying power to panel)

1.5.2 RTC battery

■ 3V/220 mAh

1.6 Environment specification

1.6.1 Operating temperature

- With Industrial Grade CompactFlash disk: -20 ~ 60° C (-4~131° F), when air flow speed = 0.7 m/sec
- With 2.5-inch extended temperature hard disk -20 to 45° C (-4~113° F), when 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 Compact Flash / 2.5" SATA SSD only: 5 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 Oct./min, 1 hr/axis

1.6.5 Shock during operation

With Compact Flash / 2.5" SATA SSD only: 50 G, IEC 60068-2-27, half sine, 11 ms duration

1.6.6 Safety

CCC, BSMI, KCC

1.6.7 EMC

■ CE, FCC, CCC, BSMI, KCC

ARK-1503 User Manual



Hardware installation

This chapter introduces external IO and the installation of ARK-1503 Hardware.

2.1 Introduction

The following sections show the internal jumper settings and the external connectors and pins assignment for applications.

2.2 Jumpers

2.2.1 Jumper list

Table 2.1: Jumper List			
J2	COM2 Setting		
J3	AT / ATX Power SEL		
J4	Clear CMOS		
J5	Panel Voltage SEL		

2.2.2 Jumper Settings

Table 2.2: J2: COM	2 RS-232/422/485 Setting
Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3*2P 180D(M) 2.0mm SMD SOUARE PIN
Setting	Function
Setting (1-2) (default)	Function RS232
Setting (1-2) (default) (3-4)	Function RS232 RS485



Table 2.3: J3: AT / ATX Power Setting				
Part Number	1653002101			
Footprint	HD_2x1P_79_D			
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb			
Setting	Function			
(1-2) (default)	AT Power SEL			
EMPTY	ATX Power			



Table 2.4: J4: Clear COMS			
Part Number	1653003101		
Footprint	HD_3x1P_79_D		
Description	PIN HEADER 3*1P 180D(M) 2.0mm DIP SQUARE W/O Pb		
Setting	Function		
(1-2) (default)	Normal		
(2-3)	Clear CMOS		



Table 2.5: J5: LVDS Panel Voltage Setting				
Part Number	1653003101			
Footprint	HD_3x1P_79_D			
Description	PIN HEADER 3*1P 180D(M) 2.0mm DIP SQUARE W/O Pb			
Setting	Function			
(1-2)	+5V			
(2-3) (default)	+3V			



2.2.3 Jumper Description

0

Cards can be configured 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 connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.





The jumper settings 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.



Warning! To avoid damaging the computer, always turn off the power supply before setting jumpers. Clear CMOS. Before turning on the power supply, set the jumper back to 3.0 V Battery On.

ARK-1503 I/O Indication 2.3



2.4 ARK-1503 external I/O connectors

2.4.1 Power ON/OFF Button

ARK-1503 comes with a Power On/Off button, that support dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.



Figure 2.3 Power ON/OFF Button

2.4.2 Power Input Connector

ARK-1503 comes with a DC-Jack header that carries 12 V_{DC} external power input. The power connector can be fixed by a bracket which is in the accessary box. The bracket can avoid power connector to fall off.



Figure 2.4 Power Input Connector

2.4.3 Ethernet Connector (LAN)

ARK-1503 provides two RJ45 LAN interface connectors, they are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. LAN1 is equipped with 82567 and LAN2 is equipped with 82583V. The Ethernet ports use standard RJ-45 jack connectors with LED indicators on the front side to show Active/Link status and Speed status.



Figure 2.5 Ethernet Connector

Table 2.6: Ethernet Connector Pin Assignments			
Pin	10/100/1000 BaseT Signal Name		
1	TX+		
2	TX-		
3	RX+		
4	MDI2+		
5	MDI2-		
6	RX-		
7	MDI3+		
8	MDI3-		

2.4.4 VGA Connector

The ARK-1503 provides a high resolution VGA interface connected by a D-sub 15pin connector to support a VGA CRT monitor. It supports display resolution of up to 2048 x 1536 @ 60 Hz.



Figure 2.6 VGA Connector

Table 2.7: VGA Connector Pin Assignments						
Pin	Signal Name	Pin	Signal Name			
1	Red	2	Green			
3	Blue	4	NC			
5	GND	6	GND			
7	GND	8	GND			
9	NC	10	GND			
11	NC	12	DDC Date			
13	H-SYNC	14	V-SYNC			
15	DDC Clock					

2.4.5 USB Connectors

The ARK-1503 provides up to four USB interface connectors, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface is compliant with USB UHCI, Rev. 2.0. 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 2.7 USB Connector

Table 2.8: USB Connector Pin Assignments						
Pin	Signal Name	Pin	Signal Name			
1	VCC	2	USB_data-			
3	USB_data+	4	GND			

2.4.6 Audio Connector (ARK-1503F only)

ARK-1503 offers stereo audio ports by a phone jack connector of Line_Out. The audio chip controller is by ALC892 which is compliant with the Azalea standard.



Line-out

Figure 2.8 Line-out Connector

2.4.7 COM Connector

ARK-1503 provides maximum up to two D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. Default setting is RS-232, if you want to use RS-422/485, you can find the jumper installation in Chapter 2.2.2.

The RS-422/485 mode of ARK-1503F COM2 can be supported via replacing the internal COM 2 cable by using the new cable (Part Number 1700001967), and adjusting the jumper inside the system. The extra cable (pn.1700001967) has been

stored in the accessory box of the product carton.

ARK-1503P can only support 1 x RS-232.



6789

Figure 2.9 COM Port Connector

Table 2.9: COM Connector 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		

2.4.8 DIO Connector (ARK-1503F only)

ARK-1503 offers an 8-bit DIO connector and one ground pin. Each bit of DIO can be set as digital input or output independently. The direction of each bit can be set by Advantech SUSI utility in Windows XP environment.



Figure 2.10 DIO Connector

Table 2.10: DIO Co	nnector Pin Assignments
Pin	Signal Name
1	DIO bit0
2	DIO bit1
3	DIO bit2
4	DIO bit3
5	DIO bit4
6	DIO bit5
7	DIO bit6
8	DIO bit7
9	GND

To connect with your devices, please use cable P/N: 1700012536 which is D-sub to 10-pin phoenix connector.



Figure 2.11 DIO Cable

Table 2.11: DIO Cable Pin Assignments					
Phenix Connector Pin	Cable color	Signal Name			
1	Black	DIO bit0			
2	Brown	DIO bit5			
3	Red	DIO bit1			
4	Orange	DIO bit6			
5	Yellow	DIO bit2			
6	Green	DIO bit7			
7	Blue	DIO bit3			
8	Purple	GND			
9	Grey	DIO bit4			

2.4.9 I-Panel Link (ARK-1503F only)

ARK-1503 offers a 36-pin I-Panel Link connector which is an integrated signal for panel. I-Panel integrates 12V power, LVDS signal, 2 x USB signal and Tx/Rx signal. A touch panel can easily integrate with ARK-1503 by only one cable.



Table 2.12: I-Panel Link Pin Assignments						
Pin	Signal Name	Pin	Signal Name			
1	+V12	2	+V12			
3	GND	4	LVDSA_D0-			
5	LVDSA_D0+	6	LVDSA_D1-			
7	LVDSA_D1+	8	LVDSA_D2-			
9	LVDSA_D2+	10	LVDSA_D3-			
11	LVDSA_D3+	12	LVDSA_CLK-			
13	LVDSA_CLK+	14	GND			
15	COM_TX	16	COM_RX			
17	LVDS Enable pin	18	SYS_ON			
19	+V12	20	+V12			
21	GND	22	LVDSB_D0-			
23	LVDSB_D0+	24	LVDSB_D1-			
25	LVDSB_D1+	26	LVDSB_D2-			
27	LVDSB_D2+	28	LVDSB_D3-			
29	LVDSB_D3+	30	LVDSB_CLK-			
31	LVDSB_CLK+	32	GND			
33	USB_P0-	34	USB_P0+			
35	USB_P1-	36	USB_P1+			

2.4.10 Golden Finger Interface for ITM Panels (ARK-1503P only)

ARK-1503P provides a 164 pin golden finger interface which integrate LVDS/HDMI/ Display Port/UART/USB/Audio signals. This interface is compatible with the panels of Advantech ITM series products.

Table 2.13: Golden Finger Interface for ITM Panel						
Pin	Side A	Pin	Side B			
1~3	Detect/Power Switch Signal	1~3	SMBus			
4~10	DC Power	4~9	DC Power			
11~29	LVDS	10~29	LVDS			
30~44	HDMI/Display Port	30~43	HDMI/Display Port			
45~49	GPIO	44~49	GPIO			
50~59	USB 0/1	50~59	USB 2/3			
60~64	Audio	60~66	Audio			
65~79	UART1	67~75	UART2			
80~81	Reserved	76~77	DC Power			
82	Detect	78~82	LED Signal			

2.5 Peripheral Installation

2.5.1 Compact Flash Installation

1. Unscrew the CF door screws



Figure 2.12 Unscrew the CF door screws

2. Pull the CF tray out.



Figure 2.13 Pull the CF tray out

3. Remove the dummy CF bracket.



Figure 2.14 Remove the dummy CF bracket

4. Put compact flash onto the CF tray.

Figure 2.15 Put CF on to the CF tray

5. Push the CF tray back and secure with screws.

2.5.2 RAM and HDD Installation

1. Unscrew the screws of bottom cover.

Figure 2.16 Unscrew the screws of bottom cover

2. Unscrew the screws of the right HDD bracket.

Figure 2.17 Unscrew the screws of the right HDD bracket

3. Install the RAM module into the DDR3 SO-DIMM socket at the bottom side of the main board.

Figure 2.18 Install the RAM module

4. Unscrew the screws of the left HDD bracket.

Figure 2.19 Unscrew the screws of the left HDD bracket

5. Connect the SATA HDD power and signal cables.

Figure 2.20 Connect the SATA HDD power and signal cables.

6. Put the HDD with bracket back to the bottom of ARK-1503 and secure the screws.

Figure 2.21 Secure HDD

7. Cover the bottom cover and secure the screws.

BIOS settings

This chapter introduces how to set BIOS configuration data.

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the ARK-1503 BIOS setup screens.

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

3.1 Entering Setup

Turn on the computer and check for the "patch" code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press and you will immediately be allowed to enter setup.

		BIOS SET	UP UTILITY			
Main Advanced	PCIPnP	Boot	Secur i ty	Chi	pset	Exit
System Overview					Use or [CENTERI, (TAB) SHIFT-TABI to
AMIBIOS					sele	ct a field.
Build Date:11/24/10 ID :1503X036					Use conf	[+] or [-] to igure system Time.
Processor Intel(R) Atom(TM) CJ Speed :1800MHz Count :1	PU D525 (₽ 1.80G	łz			
System Memory Size :2039MB					€ 11 +-	Select Screen Select Item Change Field
System Time System Date		[14:4] [Fri]	3:42] [1/26/2010]		Tab F1 F10 ESC	Select Field General Help Save and Exit Exit
u02.61 (C)	Comminst	1985-20	106. America	n Merr	atren	ls, Inc.

Figure 3.1 Setup program initial screen

3.1.1 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.

System Overview		Use [ENTER], [TAB]	
AMIBIOS Version :08.00.15 Build Date:11/24/10 ID :1503X036		or contribution select a field. Use [+] or [-] to configure system Time.	
Processor Intel(R) Atom(TM) CPU D525 Speed :1800MHz Count :1	@ 1.80GHz		
System Memory Size :2039MB		← Select Screen 1↓ Select Item +- Change Field	
System Tine System Date	[14:48:42] [Fri 11/26/2010]	Tab Select Field F1 General Help F10 Save and Exit ESC Exit	

Figure 3.2 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.

3.1.1.1 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.

3.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-1503 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 screens are shown below. The sub menus are described on the following pages.

HainRdwancedPCIPnPBootSecurityChipsetExitAdvanced Settings				BIOS SE	TUP UTILITY			
Advanced SettingsConfigure CPU.WARNING: Setting wrong values in below sections may cause system to malfunction.Configure CPU.• CPU Configuration • IDE Configuration • Hardware Health Configuration • APM Configuration • APM Configuration • Event Log Configuration • Subios Configuration • USB Configuration • USB Configuration • USB Configuration• Subios Configuration • IDE Configuration • Subios Configuration • USB Configuration • USB Configuration	Main	Advanced	PCIPnP	Boot	Security	Chip	set	Exit
WARNING: Setting wrong values in below sections may cause system to malfunction.> CPU Configuration > IDE Configuration > SuperIO Configuration > ACPI Configuration > APM Configuration > Event Log Configuration > Event Log Configuration > Subios Configuration > Subios Configuration > USB Configuration > USB Configuration* Select Screen tt Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit	Advance	ed Settings					Confi	igure CPU.
 CPU Configuration DE Configuration SuperIO Configuration Hardware Health Configuration ACPI Configuration AHCI Configuration AHCI Configuration Event Log Configuration MPS Configuration Subios Configuration USB Configuration USB Configuration USB Configuration Hardware Health Configuration Superior Configuration Health Configuration Superior Configuration Health Configuration MPS Configuration Superior Configuration Health Configuration Superior Configuration Health Configuration	VARNIN	G: Setting w	rong value	s in bel	ow sections			
 CPU Configuration IDE Configuration SuperIO Configuration Hardware Health Configuration ACPI Configuration AHCI Configuration APM Configuration Event Log Configuration MPS Configuration Smbios Configuration USB Configuration USB Configuration Hear Configuration F1 General Help Save and Exit ESC Exit 		may cause	system to	mairunc				
 IDE Configuration SuperIO Configuration Hardware Health Configuration ACPI Configuration APM Configuration Event Log Configuration MPS Configuration Smbios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	► CPU (Configuratio						
 SuperIO Configuration Hardware Health Configuration ACPI Configuration APM Configuration Event Log Configuration MPS Configuration Subios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	► IDE	Configuratio	n					
 Hardware Health Configuration ACPI Configuration AHCI Configuration APM Configuration Event Log Configuration MPS Configuration Smbios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	Super	rIO Configur	ation					
 HCP1 Configuration AHCI Configuration APM Configuration Event Log Configuration MPS Configuration Smbios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	► Hard	ware Health	Configurat	ion				
 APM Configuration Event Log Configuration MPS Configuration Subios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	► HUPI	Configurati	on					
 Event Log Configuration MPS Configuration Subios Configuration USB Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	> ADM	Configuratio	un n					
 MPS Configuration Subics Configuration USB Configuration USB Configuration F10 Save and Exit ESC Exit 	> Fuen	t Log Config	" uration				e .	Select Screen
 Smbios Configuration USB Configuration F1 General Help F10 Save and Exit ESC Exit 	► MPS	Configuratio	n			1.1	t1	Select Item
► USB Configuration F1 General Help F10 Save and Exit ESC Exit	► Smbi	os Configura	tion				Enter	Go to Sub Screen
F10 Save and Exit ESC Exit	► USB	Configuratio	n				F1	General Help
ESC Exit							F10	Save and Exit
							ESC	Exit
u82.61 (f)Comunight 1985-2006, American Megatrends, Inc.		u02.61 (C) Conur inh	it 1985-2	1006. America	n Merra	trend	ls. Inc.

Figure 3.3 Advanced BIOS features setup screen

3.1.2.1 CPU Configuration

Advanced	BIOS SETUP UTILITY	
Configure advanced CPU setting Module Version:3F.14	lle	Disabled for WindowsXP
Manufacturer:Intel Intel(R) Atom(TM) CPU D525 Frequency :1.80GHz FSB Speed :800MHz Cache L1 :48 KB Cache L2 :1024 KB Ratio Actual Value:9	₽ 1.80GHz	
Max CPUID Value Limit	[Disabled]	
Execute-Disable Bit Capability	y [Enabled]	← Select Screen
Hyper Threading Technology	[Enabled]	†↓ Select Item
Intel(R) SpeedStep(tm) tech	[Disabled]	+- Change Option
Intel(R) C-STATE tech	[Enabled]	F1 General Help
Enhanced C-States	(Enabled)	F10 Save and Exit
		ESC Exit
u02.61 (C)Commight	1985-2006, American Mer	ratrends. Inc

Figure 3.4 CPU Configuration Setting

Max CPUID Value Limit

This item allows you to limit CPUID maximum value.

Execute-Disable Bit Capability

This item allows you to enable or disable the No-Execution page protection technology.

- Hyper Threading Technology This item allows you to enable or disable Intel® Hyper Threading technology.
- Intel® SpeedStep® tech When set to disabled, the CPU runs at its default speed, when set to enabled, the CPU speed is controlled by the operating system.
- Intel® C-STATE tech This item allows the CPU to save more power under idle mode.
- Enhanced C-States CPU idle set to enhanced C-States, disabled by Intel® C-STATE tech item.

3.1.2.2 IDE Configuration

Advanced	BIOS SETUP UTILITY	
IDE Configuration		Options
ATA/IDE Configuration Legacy IDE Channels	[Compatible] [SATA Pri, PATA Sec]	Disabled Compatible Enhanced
 Primary IDE Master Primary IDE Slave Secondary IDE Master Secondary IDE Slave Third IDE Master Third IDE Slave 	: [Not Detected] : [Not Detected] : [Not Detected] : [Not Detected] : [Not Detected] : [Not Detected]	
Hard Disk Write Protect IDE Detect Time Out (Sec)	(Disabled) [35]	 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit ESC Exit
	ht 1985-2006, American Mer	watrends. Inc.

Figure 3.5 IDE Configuration

ATA/IDE Configuration

This item allows you to select Disabled / Compatible / Enhanced.

Legacy IDE Channels

When set to Enhanced mode you can select IDE or AHCI mode. When select Compatible mode you can select SATA only / SATA pri, PATA sec or PATA only.

Primary/Secondary/Third IDE Master/Slave

BIOS auto detects the presence of IDE device, and displays the status of auto detection of IDE device.

- **Type:** Select the type of SATA driver.[Not Installed][Auto][CD/DVD][ARMD]
- LBA/Large Mode: Enables or Disables the LBA mode.
- Block (Multi-Sector Transfer): Enables or disables data multi-sectors transfers.
- PIO Mode: Select the PIO mode.
- **DMA Mode:** Select the DMA mode.
- **S.M.A.R.T.:** Select the smart monitoring, analysis, and reporting technology.
- **32Bit Data Transfer:** Enables or disables 32-bit data transfer.

Hard Disk Write Protect

Disable/Enable device write protection. This will be effective only if the device is accessed through BIOS.

■ IDE Detect Time Out (Sec)

This item allows you to select the time out value for detecting ATA/ATAPI device(s).

Chapter 3 BIOS settings

3.1.2.3 Super I/O Configuration

Configure SCH3114 Super IO C	hipset	Allows BIOS to Select
Serial Portl Address Serial Portl IRQ Serial Port2 Address Serial Port2 IRQ Parallel Port Address Parallel Port Mode Parallel Port IRQ Auto Flow Control For SP2	(3)F8) [4] [2]F8] [3] [3]78] [Norma 1] [1]RQ7] [D] i sab led]	Addresses.
		 Select Screen Select Item Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 3.6 Super I/O Configuration

- Serial Port1 / Port2 address
 This item allows you to select serial port1 ~ port2 of base addresses.

 Serial Port1 / Port2 IRQ
- This item allows you to select serial port1 ~ port2 of IRQ.
 Parallel Port Address
- This item allows you to select parallel of base addresses.
- Parallel Port Mode This item allows you to select parallel of mode.
- Parallel Port IRQ This item allows you to select parallel of IRQ.
- Auto Flow Control For SP2

This item allows you to enable or disable auto flow control function.

3.1.2.4 Hardware Health Configuration

BIOS SETUP UTILITY Advanced		
Hardware Health Conf	figuration	Enables Hardware
H/W Health Function	[Enabled]	Device.
CPU Temperature System Temperature	:36°C/96°F :35°C/95°F	
Fan1 Speed	: 6826 RPM	
Vcore +3.3Vin +5Vin +12Vin VBAT	:1.156 U :3.317 U : 4.922 U : 11.875 U : 3.048 U	 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit
u02_61_(0)	Commight 1985-2006 America	Du Magatrande Tue

Figure 3.7 Hardware health configuration

- H/W Health Function
 This item allows you to control H/W monitoring.
- Temperature & Voltage show CPU/System Temperature Vcore / +3.3 Vin / +5 Vin / +12 Vin / VBAT
- Fan1 Speed show
 Display Fan1 Speed RPM.

3.1.2.5 ACPI Settings

Figure 3.8 ACPI Settings

General ACPI Configuration

Advanced	BIOS SETUP UTILITY	
General ACPI Configuration		Select the ACPI
Suspend mode Repost Video on S3 Resume	[Auto] [No]	System Suspend.
		← Select Screen 11 Select Item
		+- Change Option F1 General Help F10 Save and Exit ESC Exit
v02.61 (C) Copyrig	ht 1985-2006, American Me	egatrends, Inc.

Figure 3.9 General ACPI Configuration

- Suspend mode

Select the ACPI state used for system suspend.

- Report Video on S3 Resume

This item allows you to invoke VA BIOS POST on S3/STR resume.

Advanced ACPI Configuration

Advanced	BIOS SETUP UTILITY	
Advanced ACPI Configuration		Enable RSDP pointers
ACPI Version Features ACPI APIC support AMI OEMB table Headless mode	IACPI v3.01 [Enabled] [Enabled] [Disabled]	Description Tables. Di ACPI version has some
		 Select Screen Select Item Change Option General Help Gave and Exit ESC Exit
v02.61 (C) Copurian	t 1985-2006, American Me	gatrends, Inc.

Figure 3.10 Advanced ACPI Configuration

- ACPI Version Features

This item allows you to enable RSDP pointers to 64-bit fixed system description tables.

- ACPI APIC support

Include APIC table pointer to RSDT pointer list.

- AMI OEMB table

Include OEMB table pointer to R(x)SDT pointer lists.

Headless mode

Enable / Disable Headless operation mode through ACPI.

Chipset ACPI Configuration

Advanced	BIOS SETUP UTILITY	
South Bridge ACPI Configuration	on	Options
Energy Lake Feature APIC ACPI SCI IRQ USB Device Wakeup From S3 High Performance Event Timer HPET Memory Address	[Disabled] [Disabled] [Disabled] [Enabled] [FED00000h]	Enabled Disabled
		 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 3.11 Chipset ACPI Configuration

- Energy Lake Feature

Allows you to configure Intel's Energy Lake power management technology.

- APIC ACPI SCI IRQ
 Enable/Disable APIC ACPI SCI IRQ.
- USB Device Wakeup From S3
 Enable/Disable USB Device Wakeup from S3.

High Performance Event Timer

Enable/Disable High performance Event timer.

3.1.2.6 AHCI Configuration

BIOS SETUP UTILITY Advanced	
AHCI Settings	While entering setup,
 AHCI Port0 [Not Detected] AHCI Port1 [Not Detected] 	presence of IDE devices. This displays the status of auto detection of IDE devices.
	 ← Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
u02.61 (C)Comminst 1995-2006- American Ma	vatrando Inc

Figure 3.12 AHCI Configuration

AHCI Port0 / Port1

While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE device.

3.1.2.7 APM Configuration

Advanced	BIOS SETUP UTILITY	
APM Configuration		Enable or disable
Power Management/APM Power Button Mode Restore on AC Power Loss	lEnabled] [On/Off] [Power Off]	nen.
Resume On Ring Resume On RTC Alarm	Disabled] Disabled]	
		 Select Screen Select Item Change Option General Help Save and Exit ESC Exit
v02.61 (C) Copyrig	ht 1985-2006, America	n Megatrends, Inc.

Figure 3.13 APM Configuration

Power Management/APM

Enable or disable APM.

Power Button Mode

Power on, off, or enter suspend mode when the power button is pressed. The following options are also available.

Restore on AC power Loss

Use this to set up the system response after a power failure. The "Off" setting keeps the system powered off after power failure, the "On" setting boots up the system after failure, and the "Last State" returns the system to the status just before power failure.

Video Power Down Mode

Power down video in suspend or standby mode.

Hard Disk Power Down Mode

Power down Hard Disk in suspend or standby mode.

Resume On Ring

Enable / Disable RI to generate a wake event.

Resume On RTC Alarm

Enable / Disable RTC to generate a wake event.

Chapter 3 BIOS settings

3.1.2.8 Event Log Configuration

Figure 3.14 Event Log Configuration

View Event Log

View all unread events on the event Log.

- Mark all events as read
 Mark all unread events as read.
- Clear Event Log
 Discard all events in the event Log.

3.1.2.9 MPS Configuration

Advanced	BIOS SETUP UTILITY	
MPS Configuration		Select MPS
MPS Revision	[1.4]	
		← Select Screen 11 Select Item
		+- Change Option F1 General Help F10 Save and Exit
		LOU LAIL
v02.61 (C) Cop	yright 1985-2006, American	Megatrends, Inc.

Figure 3.15 MPS Configuration

MPS Revision

This item allows you to select MPS reversion.

3.1.2.10 Smbios Configuration

Advanced	Smbios Configuration Screen	
Smbios Configuration		SMBIOS SMI Wrapper support for PnP Func
Sabios Sai Support	(Enab led)	50h-54h
		 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help
		F10 Save and Exit ESC Exit

Figure 3.16 Smbios Configuration

SMBIOS SMI Support

SMBIOS SMI wrapper support for PnP function 50h-54h.

3.1.2.11 USB Configuration

BIOS SETUP UTILITY	
Advanced	
USB Configuration	Enables support for
Module Version - 2.24.3-13.4	option disables
USB Devices Enabled : 1 Keyboard, 1 Mouse	no USB devices are connected.
LegacyUSB SupportEnabledUSB 2.0 Controller Mode[HiSpeed]BIOS EHCI Hand-Off[Enabled]HotplugUSB FDD Support[Auto]	
▶ USB Mass Storage Device Configuration	 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit ESC Exit
u02.61 (C)Comunight 1985-2006 - Amonican Me	astronde. Inc.
voz.ur vozcupyright 1003-20005 nileritan ne	gatrenus, inc.

Figure 3.17 USB Configuration

Legacy USB Support

Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected.

- USB 2.0 Controller Mode This item allows you to select HiSpeed(480Mbps) or FullSpeed (12Mpbs).
- BIOS EHCI Hand-Off

This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.

Hotplug USB FDD Support

A dummy FDD device is created that will be associated with the hotplugged FDD later. Auto option creates this dummy device only if there is no USB FDD present.

■ USB Mass Storage Device Configuration

BIOS SETUP UTILITY Advanced	
USB Mass Storage Device Configuration USB Mass Storage Reset Delay [28 Sec] Device #1 USB Hotplug FDD Emulation Type [Auto]	Mumber of seconds POST waits for the USB mass storage device after start unit command.
	 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit ESC Exit
v02.61 (C)Copyright 1985-2006, America	an Megatrends, Inc

Figure 3.18 USB Mass storage Device Configuration

- USB Mass Storage Reset Delay

Number of sends POST wait for the USB mass storage device after start unit command.

Emulation Type

If Auto, USB devices less than 530MB will be emulated as a floppy drive and the remaining as hard drive. Force FDD option can be used to force a FDD formatted drive to boot as FDD (Ex. ZIP drive).

3.1.3 Advanced PCI/PnP Settings

Select the PCI/PnP tab from the ARK-1503 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.

BIOS SETUP UTILITY					
Main Advanced <mark>PCIPnP</mark>	Boot Security	Chipset Exit			
Advanced PCI/PnP Settings		Clear NURAM during			
WARNING: Setting wrong value may cause system to	s in below sections malfunction				
Clear NURAM	INO1				
Plug & Play O/S	[No]				
PCI Latency Timer	[64]				
Allocate IRQ to PCI VGA	[Yes]	and the second second second second			
Palette Snooping	[Disabled]	and the second			
PCI IDE BusMaster	[Enabled]				
OffBoard PCI/ISA IDE Card	[Auto]				
		🖌 🗧 🗧 🗧 🗧			
IRQ3	[Ava i lable]	↑↓ Select Item			
IRQ4	[Ava i lable]	+- Change Option			
IRQ5	[Ava i lable]	F1 General Help			
IRQ7	[Ava i lable]	F10 Save and Exit			
IRQ9	[Ava i lable]	ESC Exit			
IRQ10	[Ava i lable]				
IRQ11	[Available]	1			
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.					

Figure 3.19 PCI/PNP Setup (top)

3.1.3.1 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.

3.1.3.2 Plug & Play O/S

When set to No, BIOS configures all the device in the system. When set to Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play device not required for boot.

3.1.3.3 PCI Latency Timer

Value in units of PCI clocks for PCI device latency timer register.

3.1.3.4 Allocate IRQ to PCI VGA

When set to Yes will assigns IRQ to PCI VGA card if card requests IRQ. When set to No will not assign IRQ to PCI VGA card even if card requests an IRQ.

3.1.3.5 Palette Snooping

This item is designed to solve problems caused by some non-standard VGA card.

3.1.3.6 PCI IDE BusMaster

When set to enabled BIOS uses PCI busmastering for reading/writing to IDE drives.

3.1.3.7 OffBoard PCI/ISA IDE Card

Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card. When set to Auto will works for most PCI IDE cards.

3.1.3.8 IRQ3/4/5/7/9/10/11

This item allows you respectively assign an interruptive type for IRQ-3, 4, 5, 7, 9, 10, 11.

3.1.3.9 DMA Channel 0 / 1 / 3 / 5 / 6 / 7

When set to Available will specify which DMA is available to be used by PCI/PnP devices. When set to Reserved will specify which DMA will be reserved for use by legacy ISA devices.

3.1.3.10 Reserved Memory Size

This item allows you to reserve the size of memory block for legacy ISA device.

3.1.4 Boot Settings

Main	Advanced	PCIPnP	BIOS SET Boot	T <mark>UP UTILITY</mark> Security	Ch	ipset Exit
Boot S	ettings					Configure Settings
► Boot	: Settings Co	nfiguratio				uuring system boot.
► Boot ► Remo	Device Prio wable Drives	rity				
						← Select Screen 1↓ Select Item
						F1 General Help F10 Save and Exit F20 Evit
						LOC LAIL
	v02.61 (C) Conur iah	t 1985-20	006, America	n Mer	ratrends, Inc.

Figure 3.20 Boot Setup Utility

3.1.4.1 Boot settings Configuration

	BIOS SETUP UTILITY Boot	
Boot Settings Configuration Quick Boot Quiet Boot AddOn ROM Display Mode Bootup Num-Lock	Enabledi Disabledi (Force BIOS) (On)	Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
PS/2 Mouse Support Wait For 'F1' If Error Hit 'DEL' Message Display Interrupt 19 Capture Bootsafe function	lAutoJ (Enabled) (Enabled) (Disabled) (Disabled)	
		 ← Select Screen ↑↓ Select Item ← Change Option F1 General Help F10 Save and Exit ESC Exit
v02.61 (C) Copyrigh	t 1985-2006, American Me	egatrends, Inc.

Figure 3.21 Boot Setting Configuration

Quick Boot

This item allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

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

Set display mode for option ROM.

- Bootup Num-Lock Select the Power-on state for Numlock.
- PS/2 Mouse Support
 Select support for PS/2 Mouse.
- 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

This item allows options for ROMs to trap interrupt 19.

Bootsafe function

This item allows you to enable or disable the bootsafe function.

3.1.5 Security Setup

			BIOS SE	TUP UTILITY		
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Securit	y Settings				Inst	all or Change the word.
Supervi User Pa	sor Passwor ssword	d :Not Ins :Not Ins	talled talled			
Change Change	Supervisor User Passwo	Password r d				
Boot Se	ctor Virus	Protection	Disa	bledl		
						Select Screen
					†↓ Ente	Select Item r Change
					F1 F10 ESC	General Help Save and Exit Exit
	v02.61 (C) Copyr igh	t 1985-2	006, America	n Megatren	ds, Inc.

Figure 3.22 Password Configuration

Select Security Setup from the ARK-1503 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>:

3.1.5.1 Change Supervisor / User Password

Boot Sector Virus protection

The boot sector virus protection will warn if any program tries to write to the boot sector.

3.1.6 Advanced Chipset Settings

Figure 3.23 Advanced Chipset Settings

3.1.6.1 North Bridge Chipset Configuration

BIOS SETUP UTILITY				
Chipset				
North Bridge Chipset Configuration	Options			
PCI MMID Allocation: 46B To 3072MB DRAM Frequency [Auto] Configure DRAM Timing by SPD [Enabled]	 Auto Max MHz			
Initate Graphic Adapter EIGDI Internal Graphics Mode Select (Enabled, 8MB)				
PEG Port Configuration				
Video Function Configuration	이는 말 이 같은 이 같은 것을 수요.			
	 ← Select Screen ↑↓ Select Iten ← Change Option F1 General Help F10 Save and Exit 			

Figure 3.24 North Bridge Configuration

DRAM Frequency

This item allows you to manually change DRAM frequency.

Configure DRAM Timing by SPD

This item allows you to enables or disable detection by DRAM SPD.

Initate Graphic Aadapter

This item allows you to select which graphics controller to use as the primary boot device.

Internal Graphics Mode Select Select the amount of system memory used by the Internal graph

Select the amount of system memory used by the Internal graphics device.

Video Function Configuration

Video Function Configuration	n	Options
DVMT Mode Select DVMT/FIXED Memory	EDVMT Model E256MBJ	Fixed Mode DVMT Mode
Boot Display Device Flat Panel Type Spread Spectrum Clock	ELUDS+CRT] [1024x768 (24bit)] [Disabled]	
Backlight Control 1 Type Backlight 1 Level Backlight Control 2 Type	EPWMD ELevel 101 EPWMD Elevel 101	
backright 2 Level	LEVET 101	Select Screen Select Item Change Option F1 Compared Holm
		F10 Save and Exit ESC Exit

Figure 3.25 Video function configuration

- DVMT Mode Select

Displays the active system memory mode.

- DVMT/FIXED Memory

Specify the amount of DVMT / FIXED system memory to allocate for video memory.

Boot Display Device

Select boot display device at post stage.

- Flat Panel Type

This item allows you to select which panel resolution you want.

- Spread Spectrum Clock

This item allows you to enable or disable the spread spectrum clock.

- Backlight Control1/2 Type
 This item allows you to select backlight control type.
- Backlight 1/2 Level

This item allows you to select backlight level.

3.1.6.2 South Bridge Chipset Configuration

	BIOS SETUP UTILITY	Thinsof
South Bridge Chipset Configura	Options	
USB Functions	[10 USB Ports]	Disabled
USB 2.0 Controller	[Enabled]	2 USB Ports
LAN1 Intel 82567V Controller	[Enabled]	4 USB Ports
LAN1 Boot Rom	[Disabled]	6 USB Ports
LAN1 Wake Up From S5	[Disabled]	8 USB Ports
LAN2 Intel 82583V Controller	[Enabled]	10 USB Ports
LAN2 Boot Rom	[Disabled]	방법 <mark> 2011년 18일 - 18일 전</mark> 문에 관하는 것이 있는 것이 있다.
LAN2 Wake Up From S3/S4/S5	[Disabled]	:
DA Controller [Enabled]		이 귀엽감하는 소리는 것 못한 정말했다.
SMBUS Controller	[Enabled]	요 흙 것 이 것 물건 책이 있는 것 같아.
		← Select Screen
SLP_S4# Min. Assertion Width	[1 to 2 seconds]	↑↓ Select Item
		+- Change Ontion
		F1 General Heln
승규가 안 있는 그렇는 것 같아요?		FIA Save and Exit
선물은 그는 것은 것을 알았다. 것을 가지?		FSC Fxit
		김 친구 가지 아파는 것을 하는 것이 같아.
u02.61 (C)Comuriant	1985-2006, American 1	Menatrends. Inc.

Figure 3.26 South Bridge Configuration

USB Functions

Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports or 8 USB Ports or 10 USB Ports.

- USB 2.0 Controller
 Enables or disables the USB 2.0 controller.
- LAN1 Intel 82576V controller
 Enables or disables the Intel LAN1 controller.
- LAN1 Boot Rom
 Enables or disables internal LAN1 boot.
- LAN1 Wake Up From S5 Enables or disables LAN1 wake up from S5 function.
- LAN2 Intel 82583V controller
 Enables or disables the LAN2 controller.
- LAN2 Boot Rom Enables or disables LAN2 boot.
- LAN2 Wake Up From S3/S4/S5
 Enables or disables LAN2 wake up from S3/S4S5 function.
- HDA Controller
 Enables or disables the HDA controller.
- SMBUS Controller
 Enables or disables the SMBUS controller.
- SLP_S4# Min. Assertion Width This item allows you to set a delay of sorts.

3.1.7 Exit Option

Main Advanced PCIPr	BIOS SE nP Boot	TUP UTILITY Security	Chipset	Exit
Exit Options			— Exi	t system setup hout ving the
Discard Changes and Exit Discard Changes			F10	key can be used
Load Optimal Defaults Load Failsafe Defaults			IU	
			+ 11 Ent	Select Screen Select Item
			F1 F10 FSC	General Help Save and Exit
				LINE C
v02.61 (C) Copyr	ight 1985-20	006, America	n Megatre	nds, Inc.

Figure 3.27 Exit Option

3.1.7.1 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.

- 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.

3.1.7.2 Discard Changes and Exit

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

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

3.1.7.3 Load Optimal Defaults

The ARK-1503 automatically configures all setup items to optimal settings when you select this option. Optimal defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

3.1.7.4 Load Fail-Safe Defaults

The ARK-1503 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 if your computer is experiencing system configuration problems.

- Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The following message appears:
 - Load Fail-Safe Defaults? [OK] [Cancel]
- 2. Select OK to load Fail-Safe defaults.

WDT & GPIO Sample Code

A.1 Watchdog Timer Sample Code

Watchdog function:

;The SCH3114 Runtime base I/O address is A00h ;Setting WatchDog time value location at offset 66h ;If set value "0", it is mean disable WatchDog function. Superio_GPIO_Port = A00h mov dx,Superio_GPIO_Port + 66h mov al,00h out dx,al .model small .486p .stack 256 .data SCH3114_IO EQU A00h .code org 100h .STARTup ;47H ;enable WDT function bit [0]=0Ch 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 out dx,al ;bit[0] status bit R/W ;WD timeout occurred =1

```
;WD timer counting = 0
```

```
mov dx,SCH3114_IO + 68h
mov al,01h
out dx,al
.exit
END
```

A.2 GPIO Sample Code

```
_____
   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 = \text{gpio } 0, 0 \Rightarrow \text{output pin}; 1 \Rightarrow \text{input pin}
     bit 1 = \text{gpio } 1, 0 => \text{output pin}; 1 => \text{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
-

```
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 = \text{gpio } 0, 0 \Rightarrow \text{Low}; 1 \Rightarrow \text{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 = \text{gpio } 0, 0 \Rightarrow \text{Low}; 1 \Rightarrow \text{High}
        bit 1 = \text{gpio } 1, 0 = \text{Low}; 1 = \text{High}
           ....
        bit 7 = gpio 7, 0 => Low; 1 => High
; output:
     ax=5E78
                     ;function success, other value means function fail
                   ax,5e87h
           mov
                   bh,00h
           mov
           int
                 15h
                   ax,5e78h
           cmp
                 next_test
           je
           lea
                  dx, Error_Str1
           mov
                   ah,09h
           int
                 21h
                  Finish_Test
           jmp
next_test:
```

ch,ch xor ;save NO. of GPIO chip push cx ;1.Set GPIO 0,2,4,6 as output, GPI 1,3,5,7 as input mov ax,5e87h mov bx,02aah int 15h ;2. Set GPIO 0,2,4,6 Output Low pop сх ;restore NO. of GPIO chip push ;save NO. of GPIO chip СХ ax.5e87h mov mov bx,0400h int 15h ;3. Check GPI 1,3,5,7 value ;restore NO. of GPIO chip pop сх ;save NO. of GPIO chip push СХ mov ax,5e87h bx,03FFh mov int 15h ;restore NO. of GPIO chip pop сх ;save NO. of GPIO chip push СХ dec СХ al,Fail_lenght mov mul cl dx, Fail_Str lea add dx.ax bl,00 cmp jne test_result ;4. Set GPIO 0,2,4,6 Output differential ;restore NO. of GPIO chip pop сх push ;save NO. of GPIO chip СХ ax,5e87h mov mov bx,0411h 15h int ;5. Check GPI 1,3,5,7 value ;restore NO. of GPIO chip pop СХ ;save NO. of GPIO chip push СХ mov ax,5e87h mov bx,03FFh int 15h ;restore NO. of GPIO chip pop СХ

;save NO. of GPIO chip push СХ dec СХ mov al,Fail_lenght mul cl dx, Fail_Str lea add dx,ax cmp bl,33h test_result jne cmp al,00h jne test_fail ;4.Set GPIO 1,3,5,7 as output,GPIO 0,2,4,6 as input pop СХ push СХ mov ax,5e87h bx,0255h mov int 15h ;5. Set GPIO 1,3,5,7 Output High ;restore NO. of GPIO chip pop сх ;save NO. of GPIO chip push СХ ax,5e87h mov mov bx,04ffh int 15h ;6. Check GPIO 0,2,4,6 value ;restore NO. of GPIO chip рор СХ push ;save NO. of GPIO chip СХ ax,5e87h mov mov bx,0300h int 15h ;restore NO. of GPIO chip рор сх ;save NO. of GPIO chip push СХ dec СХ mov al,Fail_lenght mul cl lea dx, Fail_Str add dx,ax bl.0ffh cmp test_result jne

;4. Set GPIO 1,3,5,7 Output differential pop cx ;restore NO. of GPIO chip

```
push
                    ;save NO. of GPIO chip
         СХ
         ax,5e87h
  mov
         bx,0422h
  mov
        15h
  int
;5. Check GPI 0,2,4,6 value
                    ;restore NO. of GPIO chip
  pop
         сх
                    ;save NO. of GPIO chip
  push
         СХ
  mov
         ax,5e87h
         bx,03FFh
  mov
        15h
  int
                   ;restore NO. of GPIO chip
  pop
         сх
                    ;save NO. of GPIO chip
  push
         СХ
  dec
         сх
  mov
         al,Fail_lenght
  mul
         cl
        dx, Fail_Str
  lea
  add
         dx,ax
         bl,33h
  cmp
  jne test_result
  pop
         сх
                    ;restore NO. of GPIO chip
                    ;save NO. of GPIO chip
  push
         СХ
  dec
         СХ
  mov
         al,Success_lenght
  mul
         cl
        dx, Success1_Str
  lea
  add
         dx,ax
 ;Do Second PCA9554 test
 ;1.Set GPIO 0,2,4,6 as output, GPI 1,3,5,7 as input
```

```
test_result:
```

```
mov ah,09h
int 21h
pop cx
dec cx
jnz next_test
Finish_Test:
popa
.exit
```


Installation guide of ARK-1503P Golden Finger Interface for ITM Panels

B.1 Installation guide of ARK-1503P Golden Finger Interface for ITM Panels

1. Put ARK-1503P onto the tray at the back of ITM.

2. Push ARK-1503P to connect the golden finger interfaces of ARK-1503P and ITM panel.

- endix 'anels Ο Installation guide of ARK-1503P Golden Finger Interface for
- 3. Secure the four screws between ARK-1503P and ITM panel. (The screws are in the accessory box of ITM series products.)

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission of the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2011