

User Manual

ARK-2151V

In-Vehicle Full HD NVR w/4 PoE Ports

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Part No. 2006215110 Printed in China Edition 1 April 2015

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

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.

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- Visit the support website at www.emacinc.com/support where you can find 1. 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.

Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x ARK-2151V unit
- 1 x Hard copy user manual (Simplified Chinese)
- 1 x 3 pin phoenix power block 3.81mm
- 1 x GPS ANT active w/ 5M SMA cable
- 1 x 10 pin DIO plug block

Ordering Information

P/N	Description
ARK-2151V-S6A1E	Intel Celeron 2980U DC 1.6 GHz w/4 COM
ARK-2151V-S9A1E	Intel Core i5 4300U DC 1.9 GHz w/4 POE

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. Do not leave this equipment in an environment unconditioned where the storage temperature under -40° C or above 80° C, it may damage the equipment. Operating temperature is -20° C to 60° C.
- 8. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
- 9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet. Cable of Power source should be shielded.
- 10. Position the power cord so that people cannot step on it. Do not place anything over the power cord. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
- 11. All cautions and warnings on the equipment should be noted.
- 12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- 13. Never pour any liquid into an opening. This may cause fire or electrical shock.
- 14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
- 15. 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.
- 16. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturers instructions.
- 17. ATTENTION: L'ordinateur est muni d'un circuit en temps reél de l'horloge alimentée par betterie. Il ya un danger d'explosion si la pile est replacée de façon incorrecte. Remplacez uniquement par un type identique ou équivalent recommandé par le fabricant. Jetez les piles usagées selon les instructions du fabricant.

- 18. 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.
- 19. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
- 20. 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.
- 21. ATTENTION: Tout composant non vérifiée pourrait causer des dommages inattendu. Pour garantir une installation correcte, s'il vous plaît utilisez toujours les composants(vis ex.) fournies avec la boîte d'accessories.

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General Introduction

This chapter gives background information on ARK-2151V series.

1.1 Introduction

ARK-2151V is an industrial grade dual core mobile device for in vehicle computer and in vehicle NVR solution.

ARK-2151V support Full-HD NVR solutions and is fully integrated certified hardware and intelligent management software design. ARK-2151V integrated in-vehicle power (ISO-7637-2), in-vehicle certifications (E-Mark, IEC-60721-3-5 5M3) and well-developed vehicle software SDK and APIs for in-vehicle applications. They also provided extension capability and wireless communication (GPS/G-sensor/Wi-Fi/3G/CANBus) for excellent connectivity, high graphic power (Up to 1080p @120fps) for video preview, and integrated software for manageability and security.

21,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,1,5 Ø 0 ę. **USB 2.0** HDMI VGA **Optional IO 2** ΔN1 I AN2 Digital IO RESET USB 3.0 SSD ON/OFF **PWR LED** SSD LED P \ DC INPUT Optional IO 1 MIC MIC LINE-OUT LINE-OUT LINE-IN RS-232/422/485

ARK-2151V-S6A1E I/O Overview

ARK-2151V-S9A1E I/O Overview



1.2 Features

- Intel® Celeron 2980U 1.6 GHz / Core i5-4300U 1.9 GHz SoC
- 4 PoE Ports to Support Mainstream IP Cameras
- Diversity Communication Abilities, ex. WWAN, WLAN
- Built-in GPS and G-Sensor for GIS application
- Intelligent Vehicle Power Ignition
- 9 ~ 36 Vdc* Wide Power Input w/isolation
 (*: Power input constraint at low power 9 ~ 10.9 V.)
- Dual storage: 1 x removable 2.5" drive bay & 1 x F/S mSATA
- Supports iManager, SUSIAccess and Embedded Software APIs

1.3 Specifications

- CPU:
 - ARK-2151V-S6A1E: Intel Celeron 2980U DC 1.6 GHz
 - ARK-2151V-S9A1E: Intel Core i5 4300U DC 1.9 GHz
- Chipset:
 - ARK-2151V-S6A1E: HD graphics
 - ARK-2151V-S9A1E: GT2-4400 graphics
- BIOS: AMI EFI 128 Mbit
- System memory:
 - ARK-2151V-S6A1E: 1 x 204pin SODIMM, DDR3L 1333 MHz, up to 8 GB
 - ARK-2151V-S9A1E: 1 x 204pin SODIMM, DDR3L 1600 MHz, up to 8 GB
- Storage:
 - 2.5" drive bay: 1 x removable 2.5" drive bay (Max 9.5 mm height)
 - mSATA: 1x full size mSATA storage
- Serial ports:
 - ARK-2151V-S6A1E: 2 x RS-232/422/485 ports w/ 3 KV isolation (support auto flow control, jumper selectable)
- Optional I/O:
 - ARK-2151V-S6A1E: 2 x CANBus 2.0 A/B or 2 x RS-232/422/485
 - ARK-2151V-S9A1E: 2 x CANBus 2.0 A/B or 2 x RS-232/422/485
- Universal serial bus (USB) port: 2 x USB 2.0 & 2 x USB3.0
- LAN port: 2 x Giga LAN 10/100/1000 Mbps, support wake on LAN
- Power over Ethernet, POE (ARK-2151V-S9A1E only): Support 4 x 10/100 Mbps
 - 4ports full-load, IEEE802.3af Class 2 (7 Watt)
 - 2ports full-load, IEEE802.3af Class 3 (15.4 Watt)
- LED: Power LED, SSD LED
- Graphic output:
 - 1 x VGA, up to 1920 x 1200 with 60 Hz, 154 MHz pixel clock rate
 - 1 x lockable HDMI connector, up to 4K at 24 Hz
- Mini PCI express bus expansion slot:
 - 1 x full size mini PCIe slot, support mSATA storage
 - 1 x half size mini PCIe slot, support WLAN module
 - 2 x full size mini PCIe slots w/SIM holder, support WWAN module (USB interface)
- Watchdog timer: 255-level timer interval, setup by software

- **RTC Battery:** 3.0 V @ 200 mAH lithium battery.
- Digital I/O: 6 x DI & 2 x DO w/ 3KV isolation
 - Input Voltage: 0 to 30 VDC at 25 Hz,
 - Output Current: Max. 500 mA per channel
 - On-state Voltage: 24 VDC nominal, open collector to 30 VDC
- Audio:
 - Main system: Realtek ALC888S, High Definition Audio (HD), Line-in, Line out, Mic-in
 - Cellular Voice*: Support WWAN voice function, Line-out, Mic-in (*: Enable cellular voice function should set up AT command which follow module design.)
- **GPS:** On board standalone GPS, support GPS, GLONASS and QZSS signals
- **G-sensor:** On board high resolution G-Sensor, up to 13-bit resolution at ±16g
- Power Requirement:
 - Power type: ATX/AT
 - Input voltage: Support: 9 ~ 36 VDC*

Table 1.1: Power Input / Output Support Information

	Output: 12V (for M/B)	Output: 48 V (for PoE)
Input 11 V ~ 36 V	5 A	0.75 A
Input 10.0 V ~ 10.9 V	4 A	0.5 A
Input 9.0 ~ 9.9 V	3.5 A	N/A

- Vehicle Power Ignition: Selectable boot-up & shut-down voltage, on/off delay time
- Isolation: 1.5 KV Isolated
- Dimensions: (W x H x D): 264.5 x 75.1 x 133.0 mm (10.41" x 2.96" x 5.24")
- **Enclosure:** Ruggedized aluminum housing.
- Operating temperature:
 - With extended temperature peripherals:-20 ~ 60° C with 0.7m/s air flow
 - With standard temperature peripherals:0 ~ 45° C with 0.7m/s air flow
- Storage temperature: -40 ~ 85° C (-40 ~ 185° F)
- Relative humidity: 95% @ 40° C (non-condensing)
- Vibration / Shock: With mSATA/SSD: IEC 60721-3-5 Class 5M3
- Certifications:
 - EMC: CE/FCC Class A, CCC, BSMI
 - Safety: UL, CCC, BSMI, E-Mark (E13)
 - In-Vehicle Power: ISO7637-2 Lev.4

1.4 Dimensions



Figure 1.1 ARK-2151V dimensions

ARK-2151V User Manual



Hardware installation

This chapter introduces the installation of ARK-2151V Hardware.

Overview of Hardware Installation & Upgrading 2.1

Warning! Do not remove the ruggedized aluminum covers until verifying that no power is flowing within the computer. Power must be switched off and the power cord must be unplugged. Take care in order to avoid injury or damage to the equipment.

2.2 **Installing Memory**

Need to remove total 9pcs screws and can install memory on the top side of board. (4pcs on top and 5pcs on side of top cover)



2.3 Installing storage

2.3.1 Installing 2.5" SSD or HDD



2.3.2 Installing mSATA Storage

1. Remove 6pcs screws on bottom cover.



2. Remove 2.5" drive bay and Insert full size mSATA storage in marked place.



2.4 Installing Optional Modules

2.4.1 Installing WLAN module

1. Remove 6pcs screws on bottom cover.



2. Remove 2.5" drive bay and Insert half size WLAN module in marked place.



2.4.2 Installing WWAN module

1. Remove 6pcs screws on bottom cover.



2. Insert full size WWAN module in marked place.





Jumper and Switch Settings

This chapter explains how to set up ARK-2151V Series hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

Be sure to read all the safety precautions before beginning the installation procedure.

3.1 Setting Jumpers and Switches

It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. 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, connect the pins with the clip. To "open" a jumper, remove the clip. Sometimes a jumper has three pins, labeled 1, 2, and 3. In this case, connect either pins 1 and 2, or pins 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers. If there are any doubts about the best hardware configuration for the application, contact the local distributor or sales representative before making any changes.

An arrow is used on the motherboard to indicate the first pin of each jumper.

3.1.1 Main Board



Figure 3.1 Top side of main board



Figure 3.2 Bottom side of main board

3.1.2 I/O Board (ARK-2151V-S6A1E Only)



Figure 3.3 Top side of I/O board



Figure 3.4 Bottom side of I/O board

3.1.3 I/O board (ARK-2151V-S9A1E Only)



Figure 3.5 Bottom side of I/O board

3.1.4 Power Board



Figure 3.6 Top side of power board

3.2 Jumper Lists

3.2.1 Main Board

Jumpers & Sv	vitches
J2	Auto Power On Setting
J3	LCD Power
SW2	mPCIe & mSATA selection
SW3	Clear CMOS

3.2.2 I/O Board (ARK-2151V-S6A1E Only)

Jumper List					
J1	RS232/422/485 Jumper Setting - COM2				
J2	RS232/422/485 Jumper Setting - COM1				
J3	3G Voice audio - PCM data in/out swap				
SW1	3G/4G module Power Selection				

3.2.3 I/O Board (ARK-2151V-S9A1E Only)

Jumper List	
J1	WWAN voice audio - PCM data in/out swap
SW1	3G/4G module Power Selection

3.2.4 Power Board

Jumper List	
SW1	Power Ignition HW Setting

3.3 Jumper Settings

3.3.1 Main Board

3.3.1.1 Auto Power On Setting (J2)





Table 3.1: Auto Power On Setting (J2)		
Setting	Function	
NC	Power Button for Power On	
(1-2)*	Auto Power On (default)	

3.3.1.2 LCD Power (J3)



3.3.1.3 PCIe & mSATA Selection (SW2)







Table 3.3: mPCIe & mSATA Selection (SW2)		
Setting	Function	
(1 & 2)*	mSATA (default)	
(3 & 4)	mPCIe	
(2 & 4)	Auto Detect ¹	

¹ Some of mSATA or mPCIe modules can't be recognized correctly through the Auto Detect setting. Suggest to use mSATA or mPCIe setting directly if meet any compatibility problem.

3.3.1.4 Clear CMOS (SW3)



3.3.2 I/O Board (ARK-2151V-S6A1E Only)

3.3.2.1 RS232/422/485 Jumper Setting - COM1 (J1)



Table 3.5: RS232/422/485 Setting		
Setting	Function	
(1-3), (4-6) *	RS-232	
(1-3), (2-4)	RS-422	
(3-5), (2-4)	RS-485	

3.3.2.2 RS232/422/485 Jumper Setting - COM2 (J2)



Setting Function 1-3), (4-6) * RS-232 1-3), (2-4) RS-422 3-5), (2-4) RS-485	Table 3.6: RS232/422/485 Setting	
1-3), (4-6) * RS-232 1-3), (2-4) RS-422 3-5), (2-4) RS-485	Setting	Function
1-3), (2-4) RS-422 3-5), (2-4) RS-485	(1-3), (4-6) *	RS-232
3-5), (2-4) RS-485	(1-3), (2-4)	RS-422
	(3-5), (2-4)	RS-485

3

5

3.3.2.3 WWAN voice audio - PCM data in/out swap (J3)



1	3	5
\circ	\bigcirc	ullet
\circ	0	

(1-3), (2-4)

Table 3.7: WWAN Voice Audio -PCM Data In/Out Swap		
Setting	Function	
(1-3), (4-6) *	$PCM_{IN} \to PCMA_{OUT}; PCM_{OUT} \to PCMA \to IN$	
(3-5),(2-4)	$PCM_{IN} \to PCMA_{IN}; PCM_{OUT} \to PCMA \to Out$	

3.3.2.4 WWAN module Power Selection (SW1)



Table 3.8: WWAN Module Power Selection		
Setting	Function	
1(On), 2 (On)	3.6 V	
1(Off), 2 (On)	3.5 V	
1(On), 2 (Off)	3.4 V	
1(Off),2 (Off)*	3.3 V	

3.3.3 I/O Board (ARK-2151V-S9A1E Only)

3.3.3.1 WWAN voice audio - PCM data in/out swap (J1)



Table 3.9: 3G Voice Audio -PCM Data In/Out Swap

Setting	Function
(1-3), (4-6) *	$PCM_IN \rightarrow PCMA_OUT; PCM_OUT \rightarrow PCMA \rightarrow IN$
(3-5),(2-4)	$PCM_IN \rightarrow PCMA_IN; PCM_OUT \rightarrow PCMA \rightarrow Out$

3.3.3.2 3G/4G module Power Selection (SW1)



Table 3.10: 3G/4G Module Power Selection		
Setting	Function	
1(On), 2 (On)	3.6 V	
1(Off), 2 (On)	3.5 V	
1(On), 2 (Off)	3.4 V	
1(Off),2 (Off)*	3.3 V	

3.3.4 Power Board

3.3.4.1 Power Ignition HW Setting (SW1_1-3)







On



2 3

4

Off

1



Table 3.11: Power Ignition HW Setting

Setting			Function		
1	2	3	Ignition on Timer	Ignition delay off timer	Ignition hard off timer
Off*	Off*	Off*	7	30	180
On	Off	Off	10	40	180
Off	On	Off	10	60	180
Off	On	On	30	60	180
Off	Off	On	60	120	180
On	Off	On	120	180	180
Off	On	On	180	240	180
On	On	On	7	0	180

3.3.4.2 Power Ignition SW/HW Setting (SW1_4)



Table 3.12: Power Ignition SW/HW Setting Selection

Setting	Function
Off*	Power Ignition SW setting
On	Power Ignition HW setting



Pin Assignments

This chapter explains Pin Assignments of ARK-2151V Series.

4.1 ARK-2151V-S6A1E I/O Connectors

4.1.1 ARK-2151V-S6A1E Front I/O View



4.1.2 ARK-2151V-S6A1E Rear I/O View



4.2 ARK-2151V-S6A1E I/O Pin Definition

4.2.1 VGA Connector

The ARK-2151V 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 1920 x 1200 with 60 Hz.



Figure 4.1 VGA Connector

Table 4.1: 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		
4.2.2 USB Connector

The ARK-2151V provides up to four USB interface connectors - 2 x USB 2.0 & 2 x USB 3.0, which give complete Plug & Play. The USB interface is compliant with USB UHCI, Rev. 2.0 & 3.0. 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 4.2 USB Connector [Upper (black): USB2.0 / Down (blue): USB 3.0]

Table 4.2: USB Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	+5V	2	D-	
3	D+	4	GND	
5	SSRX-	6	SSRX+	
7	GND	8	SSTX-	
9	SSTX+	10	+5V	
11	D-	12	D+	
13	GND			

4.2.3 Ethernet Connector

ARK-2151V provides two RJ45 LAN interface connectors, which are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. LAN1 is equipped with Intel I218 GbE and LAN2 is equipped with Intel I210 GbE. 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 4.3 Ethernet Connector

Table 4.3: Ethernet Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	TX+(10/100),BI_DA+(GHz)	5	BI_DC-(GHz)	
2	TX-(10/100),BI_DA-(GHz)	6	RX-(10/100),BI_DB-(GHz)	
3	RX+(10/100),BI_DB+(GHz)	7	BI_DD+(GHz)	
4	BI_DC+(GHz)	8	BI_DD-(GHz)	

4.2.4 HDMI Connector

ARK-2151V provides 1 x lockable HDMI port which resolution can support up to 4K at 24 Hz.



Figure 4.4 HDMI Connector

Table 4.4: HDMI / Display Port Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	TMDS_Data2+/ DP_Data0+	2	GND	
3	TMDS_Data2-/ DP_Data0-	4	TMDS_Data1+/ DP_Data1+	
5	GND	6	TMDS_Data1-/ DP_Data1-	
7	TMDS_Data0+/ DP_Data2+	8	GND	
9	TMDS_Data0-/ DP_Data2-	10	TMDS_Clock+/ DP_Data3+	
11	GND	12	TMDS_Clock-/ DP_Data3-	
13	NC	14	NC	
15	SCL/ AUX_CH+	16	SDA/ GND	
17	DDC GND/ AUX_CH-	18	+5V/ Hot plug detect	
19	Hot plug detect/ Return	20	DP_PWR	

4.2.5 DIO Connector

ARK-2151V offers an 8-bit phoenix type DIO connector and two ground pin. 6 x DI & 2 x DO w/ 3 KV isolation.

- **Connector Type:** 10-pin screw terminal block (6 DI points, 2 DO points, GND)
- Input Voltage: 0 to 30 VDC at 25 Hz
- **Digital Input Levels for Dry Contacts:**
 - Logic level 0: Close to GND
 - Logic level 1: Open
- **Digital Input Levels for Wet Contacts:**
 - Logic level 0: +3 V max.
 - Logic level 1: +5 V to +30 V
- Output Current: Max. 500 mA per channel
- On-state Voltage: 24 VDC nominal, open collector to 30 VDC



Figure 4.5 DIO Connector

Chapter 4 Pin Assignments

4.2.6 Power Input Connector

ARK-2151V comes with 3-pin phenix type power input connector for 9 \sim 36 VDC input.



Figure 4.6 Power Input Connector

4.2.7 COM Connector

ARK-2151V-S6A1E provides two D-sub 9-pin connectors, which offers 2 x RS-232/ 422/485 serial communication ports w/ 3 KV isolation. (Jumper setting selectable)



Figure 4.7 COM Port Connector

Table 4.5: 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	

4.2.8 System Audio Connector

ARK-2151V offers stereo audio ports by a phone jack connector of Line-out, Mic-in & Line-in. The audio chip controller is by Realtek ALC888, High Definition Audio.



Figure 4.8 System Audio Connector

Table 4.6: Audio Connector Pin Assignments			
Pin	Audio Signal Name		
1	MIC		
2	Line-In		
3	Line-Out		

4.2.9 Cellular Voice Connector

ARK-2151V offers stereo audio ports by a phone jack connector of Line-out & Mic-in.



Figure 4.9 Cellular Voice Connector

Table 4.7: Cellular Voice Connector Pin Assignments			
Pin	Cellular Signal Name		
1	MIC		
2	Line Out		

4.2.10 Optional I/O

ARK-2151V-S6A1E provides two optional DB9 connectors which can have possible combination as below.

- 2 x DB9 connectors for RS-232/422/485 signal (Default)
- CANBus 2.0A/B (Module option)

DB9_1	DB9_2
COM	СОМ
1 x CANBus	1 x CANBus
COM	2 x CANBus
2 x CANBus	СОМ

4.2.11 Power Input Mode

ARK-2151V provides two power input mode. One is P and the other one is V. P means for power adapter; V means for in-vehicle purpose.

Mode





Figure 4.10 Power Input Mode

4.2.12 Power On/Off Button

ARK-2151V 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 4.11 Power ON/OFF Button

4.2.13 Reset

ARK-2151V comes with reset function for users to reset the unit if necessary.



Figure 4.12 Reset

4.2.14 LED Indicator

There are two LEDs on ARK-2151V front metal face plate for indicating system status: PWR LED is for power status; and SSD LED is for SSD flash disk status.



Figure 4.13 LED Indicator

4.3 ARK-2151V-S9A1E I/O Connectors

4.3.1 ARK-2151V-S9A1E Front I/O View



4.3.2 ARK-2151V-S9A1E Rear I/O View



4.4 ARK-2151V-S9A1E I/O Pin Definition

4.4.1 VGA Connector

The ARK-2151V 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 1920 x 1200 with 60 Hz.

Figure 4.14 VGA Connector

Table	Table 4.8: 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					

4.4.2 USB Connector

The ARK-2151V provides up to four USB interface connectors - $2 \times USB 2.0 \& 2 \times USB 3.0$, which give complete Plug & Play. The USB interface is compliant with USB UHCI, Rev. 2.0 & 3.0. 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 4.15 USB Connector [Upper (black): USB2.0 / Down (blue): USB 3.0]

Table 4.9: USB Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	+5V	2	D-	
3	D+	4	GND	
5	SSRX-	6	SSRX+	
7	GND	8	SSTX-	
9	SSTX+	10	+5V	
11	D-	12	D+	
13	GND			

4.4.3 Ethernet Connector

ARK-2151V provides two RJ45 LAN interface connectors, which are fully compliant with IEEE 802.3u 10/100/1000 Base-T CSMA/CD standards. LAN1 is equipped with Intel I218 GbE and LAN2 is equipped with Intel I210 GbE. 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 4.16 Ethernet Connector

Table 4.10: Ethernet Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	TX+(10/100),BI_DA+(GHz)	5	BI_DC-(GHz)	
2	TX-(10/100),BI_DA-(GHz)	6	RX-(10/100),BI_DB-(GHz)	
3	RX+(10/100),BI_DB+(GHz)	7	BI_DD+(GHz)	
4	BI_DC+(GHz)	8	BI_DD-(GHz)	

4.4.4 HDMI Connector

ARK-2151V provides 1 x lockable HDMI port which resolution can support up to 4K at 24 Hz.



Figure 4.17 HDMI Connector

Table 4.11: HDMI / Display Port Connector Pin Assignments				
Pin	Signal Name	Pin	Signal Name	
1	TMDS_Data2+/ DP_Data0+	2	GND	
3	TMDS_Data2-/ DP_Data0-	4	TMDS_Data1+/ DP_Data1+	
5	GND	6	TMDS_Data1-/ DP_Data1-	
7	TMDS_Data0+/ DP_Data2+	8	GND	
9	TMDS_Data0-/ DP_Data2-	10	TMDS_Clock+/ DP_Data3+	
11	GND	12	TMDS_Clock-/ DP_Data3-	
13	NC	14	NC	
15	SCL/ AUX_CH+	16	SDA/ GND	
17	DDC GND/ AUX_CH-	18	+5V/ Hot plug detect	
19	Hot plug detect/ Return	20	DP_PWR	

4.4.5 DIO Connector

ARK-2151V offers an 8-bit phenix type DIO connector and two ground pin. 6 x DI & 2 x DO w/ 3 KV isolation.

- **Connector Type:** 10-pin screw terminal block (6 DI points, 2 DO points, GND)
- Input Voltage: 0 to 30 VDC at 25 Hz
- Digital Input Levels for Dry Contacts:
 - Logic level 0: Close to GND
 - Logic level 1: Open
- Digital Input Levels for Wet Contacts:
 - Logic level 0: +3 V max.
 - Logic level 1: +5 V to +30 V
- Output Current: Max. 500 mA per channel
- On-state Voltage: 24 VDC nominal, open collector to 30 VDC



Chapter 4 Pin Assignments

4.4.6 Power Input Connector

ARK-2151V comes with 3-pin phoenix type power input connector for 9 \sim 36 VDC input.



Figure 4.19 Power Input Connector

4.4.7 Power Over Ethernet

ARK-2151V-S9A1E provides 4 x 10/100 PoE ports.

- 4ports full-load, IEEE802.3af Class 2 (7 Watt)
- 2ports full-load, IEEE802.3af Class 3 (15.4 Watt)



Figure 4.20 Power Over Ethernet Connector

Table 4.12: Power Over Ethernet (PoE) Pin Definition				
Pin	Signal Name	Pin	Signal Name	
1	Rx + / DC +	5	unused	
2	RX - / DC +	6	Tx - / DC -	
3	Tx + / DC -	7	Unused	
4	Unused	8	Unused	

4.4.8 System Audio Connector

ARK-2151V offers stereo audio ports by a phone jack connector of Line-out, Mic-in & Line-in. The audio chip controller is by Realtek ALC888, High Definition Audio.



Figure 4.21 System Audio Connector

Table 4.13: Audio Connector Pin Assignments		
Pin	Audio Signal Name	
1	MIC	
2	Line-In	
3	Line-Out	

4.4.9 Cellular Voice Connector

ARK-2151V offers stereo audio ports by a phone jack connector of Line-out & Mic-in.



Figure 4.22 Cellular Voice Connector

Table 4.14: Cellular Voice Connector Pin Assignments		
Pin	Cellular Signal Name	
1	MIC	
2	Line Out	

4.4.10 Optional I/O

ARK-2151V-S9A1E provides two optional DB9 connectors which can have possible combination as below.

- 2 x DB9 connectors for RS-232/422/485 signal (Default)
- CANBus 2.0A/B (Module option)

DB9_1	DB9_2
COM	СОМ
1 x CANBus	1 x CANBus
COM	2 x CANBus
2 x CANBus	СОМ

4.4.11 Power Input Mode

ARK-2151V provides two power input mode. One is P and the other one is V. P means for power adapter; V means for in-vehicle purpose.

Mode			
PV			

Figure 4.23 Power Input Mode

Chapter 4 Pin Assignments

4.4.12 Power On/Off Button

ARK-2151V 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 4.24 Power ON/OFF Button

4.4.13 Reset

ARK-2151V comes with reset function for users to reset the unit if necessary.



Figure 4.25 Reset

4.4.14 LED Indicator

There are two LEDs on ARK-2151V front metal face plate for indicating system status: PWR LED is for power status; and SSD LED is for SSD flash disk status.



Figure 4.26 LED Indicator

ARK-2151V User Manual



BIOS settings

This chapter introduces how to set BIOS configuration data.

5.1 Introduction

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-2151V BIOS setup screens.

Aptio Setup Utility – Main Advanced Chipset Boot Secu	Copyright (C) 2012 American rity Save & Exit	Megatrends, Inc.
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time	American Megatrends 4.6.5.4 0.32 x64 UEFI 2.3.1; PI 1.2 ARK L510X019 12/24/2014 17:09:30	Set the Date. Use Tab to switch between Date elements.
Memory Information Memory Frequency Total Memory System Date	1600 Mhz 8192 MB (DDR3) [Sat 12/27/2014]	
System Time	[13:45:06]	
Access Level	Administrator	<pre>†↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Figure 5.1 Setup program initial screen

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

5.2 Entering Setup

Turn on the computer and then press <F2> or to enter the Setup menu.

5.2.1 Main Setup

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

Aptio Setup Utili Main Advanced Chipset Boot	lt <mark>y – Copyright (C) 2012 Ameri</mark> Security Save & Exit	can Megatrends, Inc.
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time	American Megatrends 4.6.5.4 0.32 x64 UEFI 2.3.1; PI 1.2 ARK L510X019 12/24/2014 17:09:30	Set the Date. Use Tab to switch between Date elements.
Memory Information Memory Frequency Total Memory System Date	1600 Mhz 8192 MB (DDR3) [Sat 12/27/2014]	
Access Level	(13:45:06) Administrator	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.123	Эб. Copyright (C) 2012 <u>America</u>	n Megatrends, Inc.

Figure 5.2 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.

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.

5.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ARK-2151V 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.



Figure 5.3 Advanced BIOS features setup screen

Chapter 5 BIOS settings

5.2.2.1 PCI Subsystem Settings

Aptio Setup Utility) – Copyright (C) 2012 Americar) Megatrends, Inc.
PCI Bus Driver Version	V 2.05.02	Value to be programmed into PCI Latency Timer Register.
 PCI Common Settings PCI Latency Timer VGA Palette Snoop PERR# Generation SERR# Generation PCI Express Settings 	[32 PCI Bus Clocks] [Disabled] [Disabled] [Disabled]	++: Select Screen 14: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Figure 5.4 PCI Subsystem Settings

PCI Latency Timer

This item allows users to program the PCI Latency timer.

VGA Palette Snoop

This item allows users to enable or disable VGA Palette Snoop.

PERR# Generation

This item allows users to enable or disable PERR# Generation.

SERR# Generation

This item allows users to enable or disable SERR# Generation

5.2.2.2 PCI Express Device Register Settings

Aptio Setup Utility – C Advanced	opyright (C) 2012 American	Megatrends, Inc.
PCI Express Device Register Settings Relaxed Ordering Extended Tag No Snoop Maximum Payload Maximum Read Request	[Disabled] [Disabled] [Enabled] [Auto] [Auto]	Enables or Disables PCI Express Device Relaxed Ordering.
PCI Express Link Register Settings ASPM Support WARNING: Enabling ASPM may cause some PCI-E devices to fail Extended Synch	[Disabled] [Disabled]	
Link Training Retry Link Training Timeout (uS) Unpopulated Links Restore PCIE Registers	[5] 100 [Keep Link ON] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Cop	yright (C) 2012 American Me	egatrends, Inc.

Figure 5.5 PCI Express Device Register Settings

Relaxed Ordering
Enable or disable Relaxed Ordering.
Extended Tag
Enable or disable Extended Tag.
No Snoop
Enable or disable No Snoop.
Maximum Payload
This item allows users to set the Maximum Payload.
Maximum Read Request
This item allows users to set the Maximum Read Request.
ASPM Support
Enable or disable ASPM Support.
Extended Synch
Enable or disable Extended Synch.
Link Training Retry
This item allows users to set the Link Training Retry.
Link Training Timeout (uS)
This item allows users to set the Link Training Timeout (uS).
Unpopulated Links
This item allows users to set the Unpopulated Links.
Restore PCIE Registers
Enable or disable Restore PCIE Registers.

5.2.2.3 ACPI Settings

Aptio Setup Utility - Advanced	Copyright (C) 2012 American	Megatrends, Inc.
ACPI Settings		Enables or Disables BIOS ACPI
Enable ACPI Auto Configuration	[Disabled]	nuto configuration.
Enable Hibernation ACPI Sleep State Lock Legacy Resources S3 Video Repost ACPI Low Power S0 Idle	[Enabled] [S3 only(Suspend to] [Disabled] [Disabled] [Disabled]	
		<pre> ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Co	pyright (C) 2012 American M	egatrends, Inc.

Figure 5.6 ACPI Setting

Enable ACPI Auto Configuration

This item allows users to enable or disable BIOS ACPI auto configuration.

Enable Hibernation

This item allows users to enable or disable hibernation.

 ACPI Sleep State This item allows users to set the ACPI sleep state.

Lock Legacy Resources

This item allows users to lock legacy devices' resources.

S3 Video Repost

This item allows users to enable or disable VBIOS run after S3 resume.

ACPI Low Power S0 Idle

This item allows users to enable or disable system wake on alarm event by Items setting.

5.2.2.4 Trusted Computing



Figure 5.7 Trusted Computing Configuration

Security Device Support

Enable or disable BIOS support for security device.

Chapter 5 BIOS settings

5.2.2.5 S5 RTC Wake Settings

Aptio Setup Utility - Advanced	- Copyright (C) 2012 American	Megatrends, Inc.
Wake system with Fixed Time	[Disabled]	Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. (Copyright (C) 2012 American M	egatrends, Inc.

Figure 5.8 S5 RTC Wake Settings

Wake system with fixed time

Enable or disable system wake on alarm event.

5.2.2.6 CPU Configuration

Aptio Setup Utilit Advanced	y – Copyright (C) 201	2 American Megatrends, Inc.
CPU Configuration		▲ Enabled for Windows XP and
Intel(R) Core(TM) i5–4300U CPU @	1.90GHz	Hyper-Threading Technology)
CPU Signature	40651	and Disabled for other OS (OS
Processor Family	6	not optimized for
Microcode Patch	16	Hyper-Threading Technology).
FSB Speed	100 MHz	When Disabled only one thread
Max CPU Speed	1900 MHz	per enabled core is enabled.
Min CPU Speed	800 MHz	
CPU Speed	2600 MHz	
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT–x Technology	Supported	
Intel SMX Technology	Supported	++: Select Screen
64-bit	Supported	14: Select Item
EIST Technology	Supported	Enter: Select
CPU C3 state	Supported	+/-: Change Opt.
CPU C6 state	Supported	F1: General Help
CPU C7 state	Supported	F2: Previous Values
		F3: Optimized Defaults
L1 Data Cache	32 kB x 2	F4: Save & Exit
L1 Code Cache	32 kB x 2	ESC: Exit
L2 Cache	256 kB x 2	
L3 Cache	3072 kB	
Version 2.15.1236	. Copyright (C) 2012	American Megatrends, Inc.

Figure 5.9 CPU Configuration Setting

Hyper Threading Technology

This item allows users to enable or disable Intel Hyper Threading technology.

Active Processor Cores

This item allows users to set how many processor cores should be active.

Limit CPUID Maximum

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

Execute Disable Bit

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

Intel Virtualization Technology

This item allows users to enable or disable intel's virtualization technology.

Hardware Prefetcher

This item allows users to enable or disable the hardware prefetcher feature.

Adjacent Cache Line Prefetch

This item allows users to enable or disable the adjacent cache line prefetch feature.

5.2.2.7 SATA Configuration

Aptio Setup Utility – Advanced	Copyright (C) 2012 American	Megatrends, Inc.
SATA Controller(s) SATA Mode Selection Aggressive LPM Support SATA Controller Speed Software Feature Mask Configuration Serial ATA Port 0 Software Preserve Port 0 Hot Plug External SATA SATA Device Type Serial ATA Port 1 Software Preserve Port 1 Hot Plug External SATA SATA Device Type Serial ATA Port 2 Software Preserve Port 2 Hot Plug External SATA SATA Device Type	[Enabled] [AHC1] [Enabled] [Default] Empty Unknown [Enabled] [Disabled] [Hard Disk Drive] Empty Unknown [Enabled] [Disabled] [Disabled] [Hard Disk Drive] Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Hard Disk Drive]	Enable or disable SATA Device. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2 15 1236 P	opuniaht (C) 2012 American M	egatranda Inc

Figure 5.10 SATA Configuration

SATA Controller(s)
This item allows users to enable or disable the SATA controller(s).
SATA Mode Selection
This item allows users to select mode of SATA controller(s).
SATA Controller(s)
This item allows users to enable or disable the SATA controller(s).
SATA Mode Selection
This item allows users to select mode of SATA controller(s).
Aggressive LPM Support
This item allows users to enable or disable the Aggressive LPM Support.
SATA Controller Speed
This item allows users to select mode of SATA Controller Speed.
Serial ATA Port 1/2/3
This item allows users to enable or disable the SATA Port.
Hot Plug
This item allows users to enable or disable the Hot Plug.
External SATA
This item allows users to enable or disable the External SATA.
SATA Device type
This item allows users to select mode of SATA Device type.

5.2.2.8 Intel® Rapid Start Technology



Figure 5.11 Intel® Rapid Technology

Intel® Rapid Start Technology

This item allows users to enable or disable Rapid Start Technology, if supported.

5.2.2.9 AMT Configuration

Aptio Setup Utility – Advanced	Copyright (C) 2012 American	Megatrends, Inc.
Intel AMT BIOS Hotkey Pressed MEBX Selection Screen Hide Un-Configure ME Confirmation MEBX Debug Message Output Un-Configure ME Amt Wait Timer Disable ME ASF Activate Remote Assistance Process USB Configure PET Progress AMT CIRA Timeout WatchDog OS Timer BIOS Timer	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] 0 0 [Disabled] 0 0	Enable/Disable Intel (R) Active Management Technology BIOS Extension. Note : iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Co	pyright (C) 2012 American M	egatrends, Inc.

Figure 5.12 AMT Configuration

Intel AMT

This item allows users to enable or disable Intel AMT BIOS extension.

BIOS Hotkey Pressed

This item allows users to enable or disable BIOS hotkey press.

- MEBx Selection Screen This item allows users to enable or disable MEBx selection screen.
- Hide Un-Configuration ME Confirmation
 This item allows users to hide un-configure ME without password confirmation prompt.
- MEBx Debug Message Output

This item allows users to enable or disable MEBx debug message.

Un-Configure ME

This item allows users to un-configure ME without password.

Amt Wait Timer Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

Disable ME

This item allows users to enable or disable Intel ME.

ASF

This item allows users to enable or disable Alert Specification Format.

Activate Remote Assistance Process

This item allows users to enable or disable trigger CIRA boot.

USB Configure

This item allows users to enable or disable USB configure function.

PET Progress

This item allows users to enable or disable PET events progress to receive PET events or not.

AMT CIRA Timeout

OEM defined timeout for MPS connection to be established.

WatchDog

This item allows users to enable or disable WatchDog Timer.

- OS Timer Set OS watchdog timer.
- BIOS Timer Set BIOS watchdog timer.

5.2.2.10 PCH-FW Configuration

Aptio Setup Utility – Advanced	Copyright (C) 2012 American	Megatrends, Inc.
ME FW Version ME Firmware Mode ME Firmware Type ME Firmware SKU PTT Capability / State ▶ Firmware Update Configuration	9.5.13.1706 Normal Mode Full Sku Firmware 5MB 0 / 0	Configure Management Engine Technology Parameters
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Co	opyright (C) 2012 American M	egatrends, Inc.

Figure 5.13 PCH-FW Configuration

Firmware Update Configuration

This item allows users to enable or disable ME FW image re-flash function.

5.2.2.11 USB Configuration

Aptio Setup Utility — Advanced	Copyright (C) 2012 American	Megatrends, Inc.
USB Configuration		Enables Legacy USB support.
USB Module Version	8.10.28	support if no USB devices are connected. DISABLE option will
USB Devices: 1 Drive, 2 Keyboards, 1 Hub		keep USB devices available only for EFI applications.
Legacy USB Support	[Enabled] [Enabled]	
XHCI Hand-off	[Enabled]	
EHCI Hand-off	[Disabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time–outs:		↔+: Select Screen
USB transfer time-out	[20 sec]	†↓: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	[Auto]	+/−: Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
USB FLASH DRIVE PMAP	[Auto]	F3: Optimized Defaults
		F4: Save & Exit
		ESU: EXIT
Wersion 2 15 1236 Co	nuniaht (C) 2012 American M	edatrends Inc
VC(310H 2.13.1230, CO	pgr 18/16 (C) 2012 Miler Itali M	egutienus, inc.

Figure 5.14 USB Configuration

Legacy USB Support

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

USB3.0 Support

This item allows users to enable or disable USB 3.0 support.

XHCI Hand-Off

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

EHCI Hand-Off

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

USB transfer time-out

Set the time-out value for Control, Bulk, and Interrupt transfers.

Device reset time-out

Set USB mass storage device Start Unit command time-out value.

Device power-up delay

Set the maximum time of the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

5.2.2.12 Embedded Controller Configuration

Aptio Setup Utility - Advanced	Copyright (C) 2012 American	Megatrends, Inc.
EC Firmware Version EC Power Saving Mode	I2865X0103 [Normal]	Select EC Power Saving Mode
EC Hardware Monitor CPU Temperature	: +43°C∕ +109°F	
VBAT +VSSB +Vin Vcore Current EC Watch Dog Function	: +2.970 V : +5.072 V : +11.886 V : +1.718 V : +1.327 A [Disable]	
		<pre>→+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
		F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. C	opyright (C) 2012 American M	egatrends, Inc.

Figure 5.15 Embedded Controller Configuration

EC iManager WatchDog IRQ

This item allows users to set the IRQ number of EC watchdog.

EC Power Saving Mode

This item allows users to set board's power saving mode when off.

Backlight Mode

This item allows users to set backlight Function.

EC Watchdog Function

This item allows users to select EC watchdog timer.

Chapter 5 BIOS settings

5.2.2.13 Super IO Configuration

	Aptio Setup Utility Advanced	– Copyright (C) 2012 f	American Megatrends, Inc.
IT8768 IT8768 ≻ Serial ▶ Serial	Super IO Configuration Super IO Chip Port 3 Configuration Port 4 Configuration	IT8768	Set Parameters of Serial Port 3 (COMC)
			++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.15.1236.	Copyright (C) 2012 Ame	erican Megatrends, Inc.
	Aptio Setup Utility Advanced	– Copyright (C) 2012 f	American Megatrends, Inc.
SCH3106 SCH3106 > Serial	Aptio Setup Utility Advanced 5 Second Super IO Configurat 5 Second Super IO Chip Port 1 Configuration Port 2 Configuration	- Copyright (C) 2012 A ion SCH3106 SecondIo	American Megatrends, Inc. Set Parameters of Serial Port 1 (COMA)
SCH3106 SCH3106 > Serial > Serial	Aptio Setup Utility Advanced 5 Second Super IO Configurat 5 Second Super IO Chip Port 1 Configuration Port 2 Configuration	- Copyright (C) 2012 A	American Megatrends, Inc. Set Parameters of Serial Port 1 (COMA) ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Figure 5.16 Super IO Configuration

- Serial Port 1 Configuration
 This item allows users to configure serial port 1.
- Serial Port 2 Configuration
 This item allows users to configure serial port 2.

Serial Port 3 Configuration

This item allows users to configure serial port 3.

Serial Port 4 Configuration

This item allows users to configure serial port 4.

5.2.2.14 Serial Port Console Redirection

Aptio Setup Utility – Copyright (C) 2012 American Advanced	Megatrends, Inc.
COM3 Console Redirection [Disabled] Console Redirection Settings Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS) Console Redirection [Disabled] Console Redirection Settings	Console Redirection Enable or Disable.
	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Copyright (C) 2012 American Me	egatrends, Inc.

Figure 5.17 Serial Port Console Redirection

Console Redirection

This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

Console Redirection

This item allows users to configuration console redirection detail settings.

5.2.3 Chipset

Select the Chipset tab from the ARK-2151V setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset 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.

Aptio Setup Utility – Copyright (C) 2012 American Main Advanced <mark>Chipset</mark> Boot Security Save & Exit	Megatrends, Inc.
▶ PCH-IO Configuration ▶ System Agent (SA) Configuration	PCH Parameters
	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Copyright (C) 2012 American Me	gatrends, Inc.

Figure 5.18 Chipset Setup

5.2.3.1 System Agent (SA) Configuration



Figure 5.19 System Agent (SA) Configuration

VT-d

This item allows users to enable or disable VT-d.

Intel IGFX Configuration

Aptio Setup Utility - Chipset	Copyright (C) 2012 American	Megatrends, Inc.
Graphics Configuration IGFX VBIOS Version IGfx Frequency Graphics Turbo IMON Current Primary Display Internal Graphics Aperture Size DVMT Pre-Allocated DVMT Total Gfx Mem Gfx Low Power Mode Panel Power Enable	2170 400 MHz 31 [Auto] [Auto] [256MB] [32M] [256M] [Enabled]	Graphics turbo IMON current values supported (14–31)
► LCD Control		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Co	pyright (C) 2012 American M	egatrends, Inc.

Figure 5.20 Intel IGFX Configuration

- Graphics Turbo IMON Current

This item allows users to select which Graphics Turbo IMON Current.

- Primary Display

This item allows users to select Primary Display.

- Internal Graphics

This item allows users to enable or disable IGD.

- Aperture Size
 This item allows users to select aperture size.
- DVMT Pre-Allocated

This item allows users to select DVMT pre-allocated memory size.

- DVMT Total Gfx Mem

This item allows users to select DVMT total memory size.

- Panel Power Enable

This item allows users to enable or disable Panel Power. Graphics Performance.

Analyzers

This item allows users to enable or disable Graphics Performance Analyzers.

- LCD Control



Figure 5.21 LCD Control

Primary IGFX Boot Display

Select boot display device at post stage. **LVDS** This item allows user to enable or disable LVDS. **LCD Panel Type** This item allows users to select panel resolution.

Chapter 5 BIOS settings

Memory Configuration



Figure 5.22 Memory Configuration

- Memory Information

This item shows memory configuration parameters.

5.2.3.2 PCH-IO Configuration

Aptio Setup Chipset	Jtility – Copyright (C) 2012 American	Megatrends, Inc.
Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID	1.6.2.0 Premium SKU 04/B2	PCI Express Configuration settings
 PCI Express Configuration USB Configuration PCH Azalia Configuration 		
LAN1 Controller LAN1 PXE Rom Wake on LAN LAN2 Controller LAN2 PXE Rom PCIE Wake From S5 USB Wake From S4 Support SLP_S4 Assertion Width Restore AC Power Loss	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] [1-2 Seconds] [Power Off]	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit</pre>
Version 2.1	5 1236 - Conucidat (C) 2012 American M	egatrends Inc

Figure 5.23 PCH-IO Configuration

PCI Express Clock Gating

This item allows users to enable or disable PCI Express Clock Gating for each root port.

PCI Express Configuration

This item allows users to configuration PCIE1~PCIE8 root port detail settings.

USB Configuration

This item allows users to configuration detail of USB functions.

PCH Azalia Configuration

This item allows users to configuration detail of azalia functions.

■ LAN 1/2 controller

Enables or disables the LAN 1/2 controller.

Wake on LAN

Enables or disables LAN1 wake up from sleep state.

LAN 1/2 PXE Rom

This item allows users to enable or disable PXE Rom for LAN 1/2.

PCIE Wake from S5

Enables or disables PCIE device wake up from S5.

USB Wake From S4 Support Enable or disable USB to wake the system from S4.

SLP_S4 Assertion Width This item allows users to set a delay of sorts.

Restore AC Power Loss

This item allows users to select off, on and last state.
PCI Express Configuration

Aptio Setup Utility - Chipset	Copyright (C) 2012 American	Megatrends, Inc.
PCI Express Configuration		Enable or disable PCI Express Clock Gating for each root
PCI Express Clock Gating DMI Link ASPM Control DMI Link Extended Synch Control	(Enabled) (Enabled) (Disabled)	port.
PCIE-USB Glitch W/A PCIE Root Port Function Swapping Subtractive Decode	[Disabled] [Disabled] [Disabled]	
 PCI Express Root Port 1 PCI Express Root Port 2 PCI Express Root Port 3 		
 PCIE Port 4 is assigned to LAN2 PCIE Port 5 is assigned to LAN1 PCI Express Root Port 6 		
		Enter: Select +/−: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit FSC: Evit
		LOU. LAIL
Version 2.15.1236. Co	pyright (C) 2012 American Mu	egatrends, Inc.

Figure 5.24 PCI Express Configuration

- PCI Express Clock Gating

This item allows users to enable or disable PCI Express Clock Gating for each root port.

- DMI Link ASPM Control

This item allows users to enable or disable the DMI Link ASPM Control.

- DMI Link Extended Synch Control
 This item allows users to configure Mini PCI Express setting.
- PCIe-USB Glitch W/A

This item allows users to enable or disable PCIe-USB Glitch W/A. PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG Port.

Subtractive Decode

This item allows users to enable or disable Subtractive Decode.

- PCI Express Root Port 1/2/3/6

This item allows users to configure PCI Express Root port 1/2/3/6 setting.

USB Configuration



Figure 5.25 USB Configuration

- USB Precondition

This item allows users to enable or disable USB Precondition. Precondition work on the USB host controller and root ports for faster enumeration.

- XHCI Mode

This item allows users to select mode of operation of XHCI mode.

– XHCI Idle L1

This item allows users to enable or disable XHCI Idle L1. XHCIIDLE L1 can be set to disable for LPT-LP Ax stepping to workaround USB3 hot plug will fail after 1 hot plug removal.

- BTCG

This item allows users to enable or disable trunk clock gating.

- USB Ports Per-Port Disable Control

This item allows users to enable or disable USB Ports Per-Port Disable Control. Control each of the USB ports (0~13) disabling.

PCH Azalia Configuration

	Aptio Setup Utility - Chipset	Copyright ((C) 2012 American	Megatrends, Inc.	
PCH Azalia Cor	nfiguration			Control Detection of the	
Azalia				Azalia device. Disabled = Azalia will be unconditionally disabled Enabled = Azalia will be unconditionally Enabled Auto = Azalia will be enabled if present, disabled otherwise. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.					
Figure 5.26 PCH Azalia Configuration					

– Azalia

This item allows users to change Azalia settings.

Control detection of the Azalia device
 Disable- Azalia will be unconditionally Disabled.
 Enabled- Azalia will be unconditionally Enabled.
 Auto- Azalia will be enabled if present, disabled otherwise.

5.2.4 Boot Settings



Figure 5.27 Boot Setup Utility

Setup Prompt Timeout

This item allows users to select the number of seconds to wait for setup activation key.

Bootup NumLock State

Select the Power-on state for Numlock.

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.

Boot Option #1

This item allows users to set the system boot order.

Hard Drive BBS Priorities

This item allows users to set the order of the legacy devices in this group.

CSM Support

This item allows users to enable or disable CSM support.

Chapter 5 BIOS settings

5.2.5 Security Setup



Figure 5.28 Password Configuration

Select Security Setup from the MIO-5271 Setup main BIOS setup menu. All Security

Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

Change Administrator / User Password: Select this option and press <ENTER> to access the sub menu, and then type in the password.

5.2.6 Save & Exit



Figure 5.29 Save & Exit

Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect of all system configuration parameters.

Discard Changes and Exit

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

Save Changes and Reset

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

Discard Changes and Reset

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

Save Changes

When users have completed system configuration, select this option to save changes without exit BIOS setup menu.

Discard Changes

Select this option to discard any current changes and load previous system configuration.

Restore Defaults

The ARK-2151V automatically configures all setup items to optimal settings when users 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 the user's computer is experiencing system configuration problems.

Save as User Defaults

When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

Restore User Defaults

The users can select this option to restore user defaults.

Boot Override

This item allows users to choose boot device.

ARK-2151V User Manual



WDT Sample Code

A.1 Watchdog Timer Sample Code

```
EC Command Port = 0x29Ah
EC Data Port = 0x299h
Write EC HW ram = 0x89
Watch dog event flag = 0x57
Watchdog reset delay time = 0x5E
Reset event = 0x04
Start WDT function = 0x28
.model small
.486p
.stack 256
.data
.code
org 100h
.STARTup
mov dx, EC Command Port
mov al,89h ; Write EC HW ram.
out dx,al
mov dx, EC Data Port
mov al, 5Fh ; Watchdog reset delay time low byte (5Eh is high
byte) index.
out dx,al
mov dx, EC Data Port
mov al, 30h ;Set 3 seconds delay time.
out dx,al
mov dx, EC Command Port
mov al,89h ; Write EC HW ram.
out dx,al
mov dx, EC EC Data Port
mov al, 57h ; Watch dog event flag.
out dx,al
mov dx, EC Data Port
mov al, 04h ; Reset event.
out dx,al
mov dx, EC Command Port
mov al,28h ; start WDT function.
out dx,al
.exit
```



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