

Embedded Box

TKS-E21-HD07

TKS-E21-HD07

Fanless Embedded Box

AMD® G-Series™ T56N/T40N Processor

2 GbE LAN, 6 USB2.0, 3 COM

1 VGA or DVI, 1 mSATA

TKS-E21-HD07 Manual 1st Ed.
July 2012

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Packing List

Before you begin operating your PC, please make sure that the following materials are enclosed:

- 1 TKS-E21-HD07 Embedded Box
- 1 CD-ROM for manual (in PDF format) and drivers
- 1 60W Power Adapter
- 1 Wallmount Kit

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could 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 over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If any of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.

- d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 55°C (131°F). IT MAY DAMAGE THE EQUIPMENT.

FCC

Warning!



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

AAEON Boxer/ Industrial System

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
外壳	×	○	○	○	○	○
中央处理器 与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
电源	×	○	○	○	○	○
<p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注： 一、此产品所标示之环保使用期限，系指在一般正常使用状况下。 二、上述部件物质中央处理器、内存、硬盘、电源为选购品。</p>						

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Chapter

1

**General
Information**

1.1 Introduction

The newest EmBox series TKS-E21-HD07 has been introduced by AAeon and it utilizes AMD® G-Series™ T56N/T40N Dual Core processor. Moreover, this model equips AMD® A55E Chipset and two Gigabit Ethernet for faster network communication.

The TKS-E21-HD07 is designed for POS/KIOSK, Gaming, Digital Signage, Industrial Automation, Transportation, Vehicle System and Monitoring Systems. The TKS-E21-HD07 offers low power consumption system that while operating in ambient temperatures ranging from -20° to 60°C. This wide temperature solution is deal for severe environments. The TKS-E21-HD07 is a standalone high performance controller designed for long-life operation and with high reliability. It can replace traditional methods and become the mainstream controller for the vertical markets.

1.2 Features

- AMD® G-Series™ T56N/T40N Dual Core Processor
- AMD® A55E Chipset
- DDR3 1066/1333 SODIMM x 1, Up To 4 GB
- VGA or DVI(Optional)
- 2CH Audio (Mic-in/Line-out)
- Gigabit Ethernet x 2
- mSATA 8G~32G
- USB2.0 x 4, optional up to 6, COM x 1, optional up to 3
- Fanless
- Cost-Effective Solution

1.3 Specifications

CPU		AMD [®] G-Series™ T56N 1.6 GHz/ T40N 1.0 GHz Processor
Chipset		AMD [®] A55E Chipset
System Memory		204-pin DDR3 SODIMM x 1, Max. 4 GB (DDR3 1066/1333)
Display Interface	VGA	D-SUB 15P x 1
	DVI	1 (Optional)
Storage Device	SSD	mSATA 8/16/32 G
Network	LAN	Realtek RTL 8111E, 10/100/1000 Base-TX Ethernet
Front I/O	USB Host	USB2.0 x 2
	Serial Port	COM x 2
	Audio	2CH Line-out/ Mic-in
Rear I/O	USB Host	USB2.0 x 4
	LAN	RJ-45 x 2
	Serial Port	COM x 1
Expansion	Mini Card	Mini Card x 2 (one for Mini Card and the other for mSATA)
Indicator	Front	Power LED x 1, HDD LED x 1
Power Requirement		DC 12V, ATX type
System Cooling		Fanless
Mounting		Wallmount (default) (Optional Desktop/ DIN Rail/ VESA100)
Operating Temperature		-4°F ~ 140°F (-20°C ~ 60°C)
Storage Temperature		-40°F ~ 176°F (-40°C ~ 80°C)

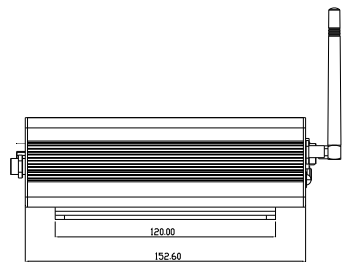
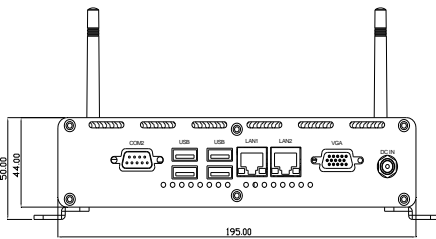
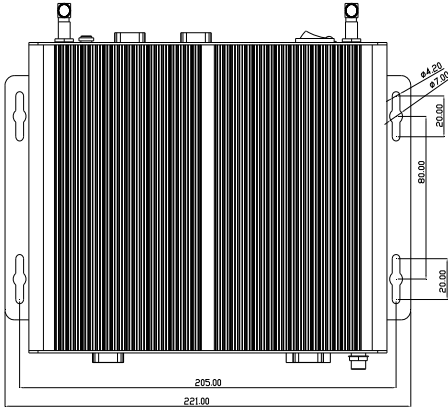
Anti-Vibration	3.5 g rms/ 5 ~ 500Hz/ random operation (mSATA Module)
Anti-Shock	20 G peak acceleration (11 msec. duration) (mSATA Module)
Certification EMC	CE/FCC Class A
Dimension	7.68" x 6.01" x 1.73" (195mm x 152.6mm x 44mm)
Gross Weight	Heavy duty steel (2.06 kg/ 4.53 lb)

Chapter

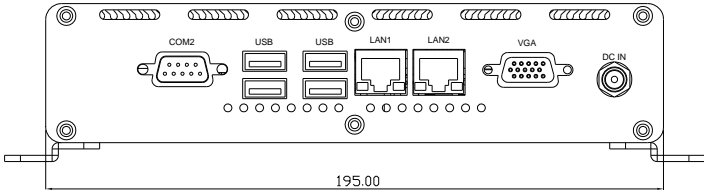
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**Quick
Installation
Guide**

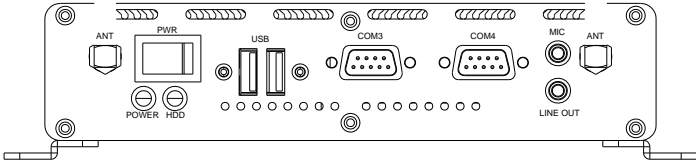
2.1 Dimension and I/O of TKS-E21-HD07



Front side

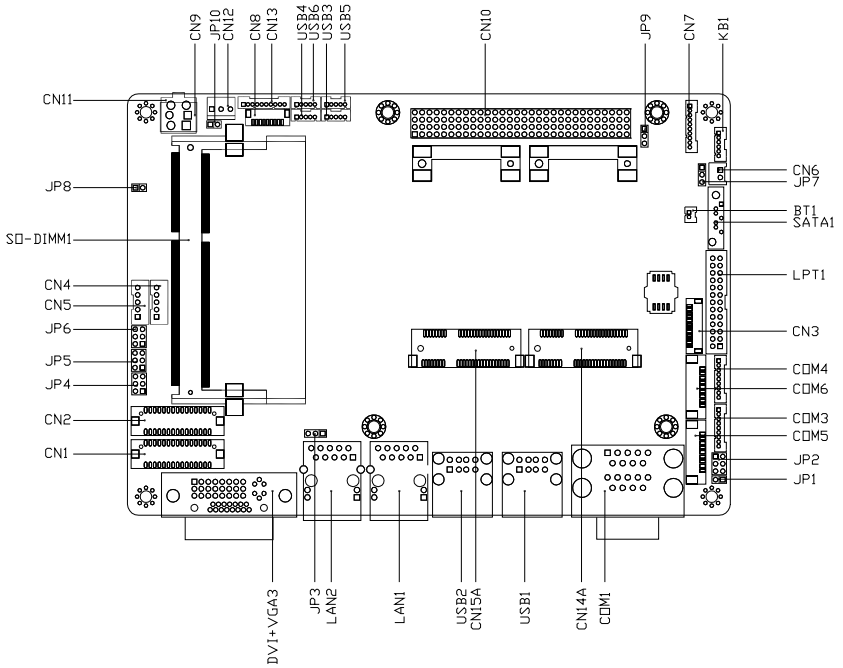


Back side

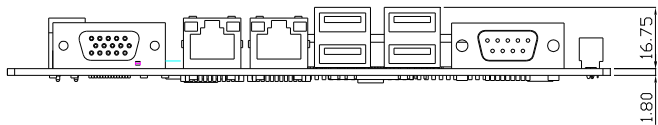


2.2 Location of Connectors and Jumpers of the Main Board

Component Side



Component Side



2.3 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

The table below shows the function of each of the board's jumpers:

Label	Function
JP1	AT/ATX Function Selection
JP2	COM2 Ring/+5V/+12V Selection
JP7	Clear CMOS
JP8	DDR3/DDR3L Voltage Selection

2.4 List of Connectors

The board has a number of connectors that allow you to configure your system to suit your application. The table below shows the function of each board's connectors:

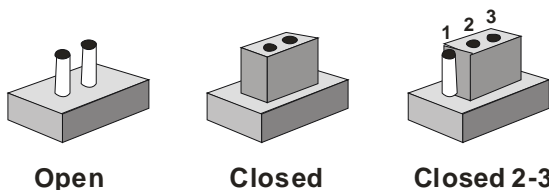
Label	Function
CN3	LPC Connector
CN6	SATA Power Connector
CN7	Audio Connector
CN9	2-Pin Power Connector(optional)
CN11	ATX 4-Pin Power Connector
CN12	FAN Connector
CN13	Front Panel Connector
CN14	Mini Card Port Connector
CN15	mSATA Slot
DVI+VGA3	DVI or VGA Connector

LAN1	1000Base-TX Ethernet Connector
LAN2	1000Base-TX Ethernet Connector
USB1	Dual USB Connector
USB2	Dual USB Connector
USB5	USB Connector
USB6	USB Connector
COM2	COM2 RS-232/422/485 Serial Port Connector
COM3	COM3 RS-232 Serial Port Connector
COM4	COM4 RS-232 Serial Port Connector
LPT1	LPT Port Connector
SATA1	SATA Connector
BT1	Battery Connector

2.5 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric 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 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.

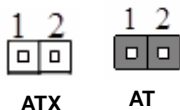


A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.

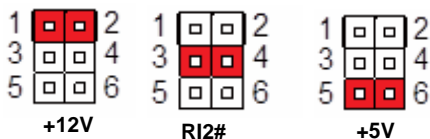
Generally, you simply need a standard cable to make most connections.

2.6 AT/ATX Selection (JP1)



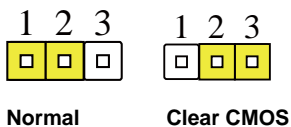
JP1	Function
ATX	OFF (Default)
AT	ON

2.7 COM2 Ring/+5V/+12V Selection (JP2)



JP2	Function
1-2	+12V
3-4	RI2#_SEL (Default)
5-6	+5V

2.8 Clear CMOS (JP7)



JP7	Function
1-2	Protected (Default)
2-3	Clear

2.9 DDR3/DDR3L Voltage Control (JP8)



DDR3

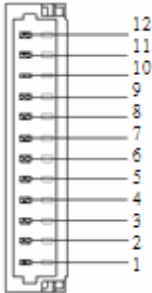


DDR3L

JP8	Function
OFF	DDR3 (Default)
ON	DDR3L

2.10 LPC Connector (CN3)

LPC Mode



Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	
2	LAD1	I/O	
3	LAD2	I/O	
4	LAD3	I/O	
5	+3.3V	PWR	+3.3V

6	LFRAME#	OUT
7	LPC_RST#	OUT
8	GND	GND
9	LPC_CLK33	OUT
10	LDRQ#0	OUT
11	LDRQ#1	OUT
12	SERIRQ	OUT

DIO Mode (DIO co-lay with LPT)

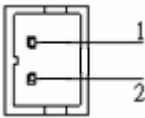
Pin	Pin Name	Signal type	Signal Level
1	GPIO15	I/O	
2	GPIO14	I/O	
3	GPIO0	I/O	
4	GPIO13	I/O	
5	GPIO1	I/O	
6	GPIO12	I/O	
7	GPIO2	I/O	
8	GPIO11	I/O	
9	GPIO3	I/O	
10	GND	GND	
11	GPIO4	I/O	
12	GND	GND	
13	GPIO5	I/O	
14	GND	GND	
15	GPIO6	I/O	

16	GND	GND
17	GPIO7	I/O
18	GPIO6	I/O
19	GPIO10	I/O
20	GND	GND
21	GPIO9	I/O
22	GND	GND
23	GPIO8	I/O
24	GND	GND
25	N.C	
26	N.C	

NO.	Pin Name	Pin Number	Access Address
1	GPIO0	3	
2	GPIO1	5	
3	GPIO2	7	
4	GPIO3	9	
5	GPIO4	11	
6	GPIO5	13	
7	GPIO6	15	
8	GPIO7	17	
9	GPIO8	23	
10	GPIO9	21	
11	GPIO10	19	

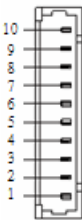
12	GPIO11	8
13	GPIO12	6
14	GPIO13	4
15	GPIO14	2
16	GPIO15	1

2.11 SATA Power Connector (CN6)



Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	GND

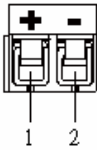
2.12 Audio Connector (CN7)



Pin	Pin Name	Signal Type	Signal Level
1	MIC_L	IN	
2	MIC_R	IN	
3	GND_AUDIO	GND	

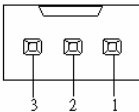
4	LINEIN_L	IN	
5	LINEIN_R	IN	
6	GND_AUDIO	GND	
7	LINEOUT_L	OUT	
8	GND_AUDIO	GND	
9	LINEOUT_R	OUT	
10	+5V_AUDIO	PWR	+5V

2.13 2-Pin Power Connector (CN9)



Pin	Pin Name	Signal Type	Signal Level
1	+12V	PWR	+12V
2	GND	GND	

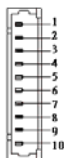
2.14 Fan Connector (CN12)



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	

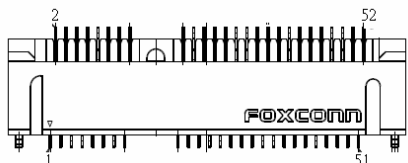
2	Fan Power Control	OUT
3	Fan In	OUT

2.15 Front Panel Connector (CN13)



Pin	Pin Name	Signal Type	Signal Level
1	Power Button(+)	IN	
2	Power Button(-)	IN	
3	External Buzzer(+)	OUT	
4	External Buzzer(-)	OUT	
5	IDE LED(+)	OUT	
6	IDE LED(-)	OUT	
7	Power LED(+)	OUT	
8	Power LED(-)	OUT	
9	Reset Switch(+)	IN	
10	Reset Switch(-)	IN	

2.16 PCI-Express Mini Card Connector (CN14)

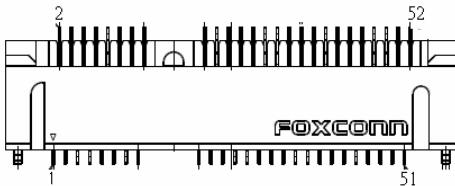


Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE_UP#	I/O	
2	MINI1_3.3V	PWR	3.3V
3	Reserved		
4	GND	GND	
5	Reserved		
6	1.5V	PWR	1.5V
7	PCIE_CLKREQ#	I/O	
8	Reserved		
9	GND	GND	
10	Reserved		
11	PCIE_MINI1_100M#	OUT	
12	Reserved		
13	PCIE_MINI1_100M	OUT	
14	Reserved		
15	GND	GND	
16	Reserved		
17	Reserved		
18	Reserved		
19	Reserved		
20	MINI_CARD_EN		
21	GND	GND	
22	MINI_RST#		
23	MINI_CARD1_RXN	DIFF	

24	MINI1_3.3V	PWR	
25	MINI_CARD1_RXP	DIFF	
26	GND	GND	
27	GND	GND	
28	1.5V	PWR	1.5V
29	GND	GND	
30	SMB_CLK	I/O	
31	MINI_CARD1_TXN	DIFF	
32	SMB_DATA	I/O	
33	MINI_CARD1_TXP	DIFF	
34	GND	GND	
35	GND	GND	
36	USBN2	DIFF	
37	GND	GND	
38	USBP2	DIFF	
39	MINI1_3.3V	PWR	3.3V
40	GND	GND	
41	MINI1_3.3V	PWR	3.3V
42	Reserved		
43	NC		
44	Reserved		
45	VENDOR	I/O	
46	Reserved		
47	Reserved	I/O	

48	1.5V	PWR	1.5V
49	DA/DSS	I/O	
50	GND	GND	
51	PRESENT DETECTION	I/O	
52	MINI1_3.3V	PWR	3.3V

2.17 mSATA Mini Card Connector (CN15)

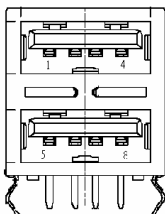


Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE_UP#	I/O	
2	MINI2_3.3V	PWR	3.3V
3	Reserved		
4	GND	GND	
5	Reserved		
6	1.5V	PWR	1.5V
7	PCIE_CLKREQ#	I/O	
8	Reserved		
9	GND	GND	
10	Reserved		
11	PCIE_MINI2_100M#	OUT	

12	Reserved		
13	PCIE_MINI2_100M	OUT	
14	Reserved		
15	GND	GND	
16	Reserved		
17	Reserved		
18	Reserved		
19	Reserved		
20	MINI_CARD_EN		
21	GND	GND	
22	MINI_RST#		
23	SATA_RX1_P	DIFF	
24	MINI2_3.3V	PWR	
25	SATA_RX1_N	DIFF	
26	GND	GND	
27	GND	GND	
28	1.5V	PWR	1.5V
29	GND	GND	
30	SMB_CLK	I/O	
31	SATA_TX1_N	DIFF	
32	SMB_DATA	I/O	
33	SATA_TX1_P	DIFF	
34	GND	GND	
35	GND	GND	

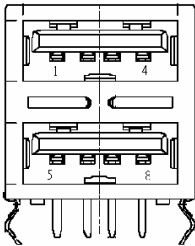
36	USBN6	DIFF	
37	GND	GND	
38	USBP6	DIFF	
39	MINI2_3.3V	PWR	3.3V
40	GND	GND	
41	MINI2_3.3V	PWR	3.3V
42	Reserved		
43	NC		
44	Reserved		
45	Reserved	I/O	
46	Reserved		
47	Reserved	I/O	
48	1.5V	PWR	1.5V
49	Reserved	I/O	
50	GND	GND	
51	Reserved	I/O	
52	MINI2_3.3V	PWR	3.3V

2.18 Dual USB Connector (USB1)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USBD1-	OUT	
3	USBD1+	OUT	
4	GND	GND	
5	+5VSB	PWR	+5V
6	USBD2-	OUT	
7	USBD2+	OUT	
8	GND	GND	

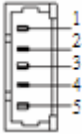
2.19 Dual USB Connector (USB2)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USBD3-	OUT	
3	USBD3+	OUT	
4	GND	GND	
5	+5V	PWR	+5V
6	USBD4-	OUT	

7	USBD4+	OUT
8	GND	GND

2.20 USB Connector (USB5)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USBD5-	OUT	
3	USBD5+	OUT	
4	GND	GND	
5	GND	GND	

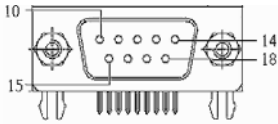
2.21 USB Connector (USB6)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USBD6-	OUT	
3	USBD6+	OUT	
4	GND	GND	

5 GND GND

2.22 RS-232/422/485 Serial Port Connector (COM2)



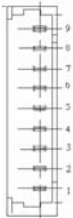
Pin	Pin Name	Signal Type	Signal Level
10	DCD#2 (485D-)(422TXD-)	IN	
11	RXD2(422RXD+)	IN	
12	TXD2 (485D+)(422TXD+)	OUT	
13	DTR#2(422RXD-)	OUT	
14	GND	OUT	
15	DSR#2	IN	
16	RTS#2	OUT	
17	CTS#2	IN	
18	RI#2	IN	

2.23 RS-232 Serial Port Connector (COM3)



Pin	Pin Name	Signal Type	Signal Level
1	DCD#3	IN	
2	DSR#3	IN	
3	RXD3	IN	
4	RTS#3	OUT	
5	TXD3	OUT	
6	CTS#3	IN	
7	DTR#3	OUT	
8	RI#3	IN	
9	GND	GND	

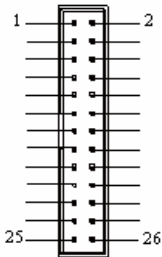
2.24 RS-232 Serial Port Connector (COM4)



Pin	Pin Name	Signal Type	Signal Level
1	DCD#4	IN	
2	DSR#4	IN	
3	RXD4	IN	
4	RTS#4	OUT	
5	TXD4	OUT	

6	CTS#4	IN
7	DTR#4	OUT
8	RI#4	IN
9	GND	GND

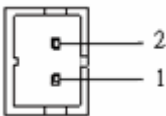
2.25 LPT Port Connector (LPT1)



Pin	Pin Name	Signal Type	Signal Level
1	#STROBE	I/O	
2	#AFD	I/O	
3	DATA0	I/O	
4	#ERROR	I/O	
5	DATA1	I/O	
6	#INIT	I/O	
7	DATA2	I/O	
8	#SLIN	I/O	
9	DATA3	I/O	
10	GND	GND	
11	DATA4	I/O	

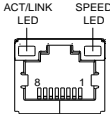
12	GND	GND
13	DATA5	I/O
14	GND	GND
15	DATA6	I/O
16	GND	GND
17	DATA7	I/O
18	GND	GND
19	#ACK	I/O
20	GND	GND
21	BUSY	I/O
22	GND	GND
23	PE	I/O
24	SELECT	I/O
25	GND	GND
26	N.C	

2.26 Battery Connector (BT1)



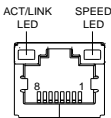
Pin	Pin Name	Signal Type	Signal Level
1	RTCBAT	IN	
2	GND	GND	

2.27 LAN Ethernet RJ-45 Connector (LAN1)



Pin	Pin Name	Signal type	Signal Level
1	LAN1_MDIP0	DIFF.	
2	LAN1_MDIN0	DIFF.	
3	LAN1_MDIP1	DIFF.	
4	LAN1_MDIN1	DIFF.	
5	LAN1_MDIP2	DIFF.	
6	LAN1_MDIN2	DIFF.	
7	LAN1_MDIP3	DIFF.	
8	LAN1_MDIN3	DIFF.	

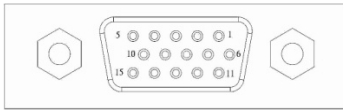
2.28 LAN Ethernet RJ-45 Connector (LAN2)



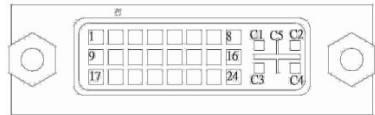
Pin	Pin Name	Signal Type	Signal Level
1	LAN2_MDIP0	DIFF.	
2	LAN2_MDIN0	DIFF.	
3	LAN2_MDIP1	DIFF.	
4	LAN2_MDIN1	DIFF.	
5	LAN2_MDIP2	DIFF.	

6	LAN2_MDIN2	DIFF.
7	LAN2_MDIP3	DIFF.
8	LAN2_MDIN3	DIFF.

2.29 VGA or DVI-I Connector (DVI / VGA3)



VGA



DVI

VGA

Pin	Pin Name	Signal Type	Signal Level
1	RED	I/O	
2	GREEN	I/O	
3	BLUE	I/O	
4	NC		
5	GND	GND	
6	GND	GND	
7	GND	GND	
8	GND	GND	
9	VGA_5V	PWR	5V
10	CRT_PLUG	IN	
11	NC		
12	DDC_SDA	I/O	
13	HSYNC	I/O	
14	VSYNC	I/O	

15	DDC_SCL	I/O
----	---------	-----

DVI

Pin	Pin Name	Signal Type	Signal Level
1	DVI_TX2_N	I/O	
2	DVI_TX2_P	DVI_TX2_P	
3	GND	GND	
4	NC	NC	
5	NC	NC	
6	DVI_AUXP	DVI_AUXP	
7	DVI_AUXN	I/O	
8	VSYNC	VSYNC	
9	DVI_TX1_P	I/O	
10	DVI_TX1_N	DVI_TX1_N	
11	GND	GND	
12	NC	NC	
13	NC	NC	
14	VGA_5V	VGA_5V	5V
15	GND	GND	
16	DVI_HPDP	DVI_HPDP	
17	DVI_TX0_N	I/O	
18	DVI_TX0_P	DVI_TX0_P	
19	GND	GND	
20	NC	NC	
21	NC	NC	

22	GND	GND
23	DVI_CLK_P	I/O
24	DVI_CLK_N	DVI_CLK_N
C1	RED	I/O
C2	GREEN	GREEN
C3	BLUE	I/O
C4	HSYNC	HSYNC
C5	GND	GND

2.30 SATA Connector (SATA1)

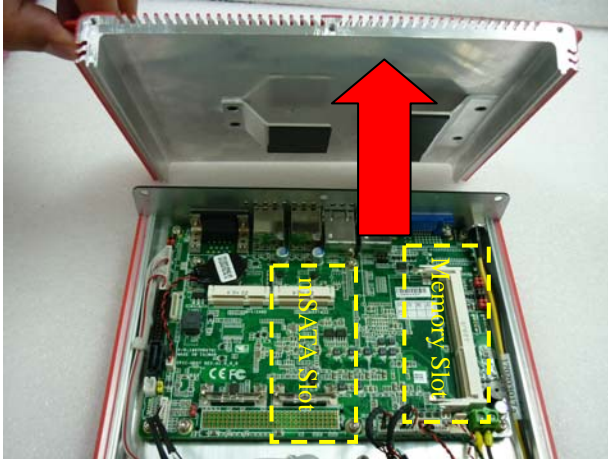
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX0_P	DIFF	
3	SATA_TX0_N	DIFF	
4	GND	GND	
5	SATA_RX0_N	DIFF	
6	SATA_RX0_P	DIFF	
7	GND	GND	

2.31 mSATA and Memory Installation

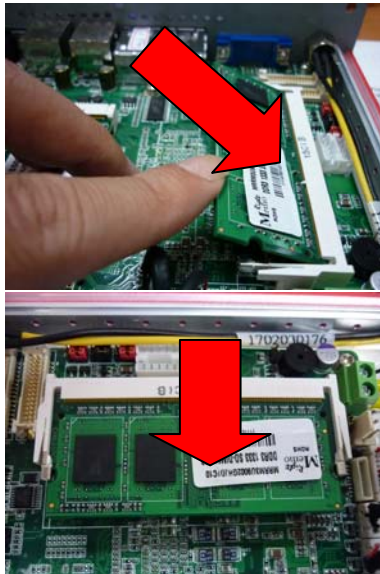
Step 1: Loosen the six screws



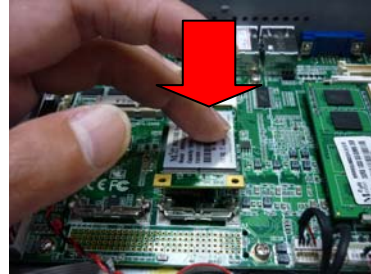
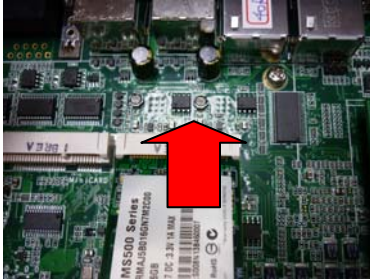
Step 2: Remove the top cover of the chassis



Step 3: Insert the memory module to memory slot and then press it down



Step 4: Insert the mSATA module to mSATA slot and then press it down



Chapter

3

AMI BIOS Setup

3.1 System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors.

System configuration verification

These routines check the current system configuration stored in the CMOS memory and BIOS NVRAM. If system configuration is not found or system configuration data error is detected, system will load optimized default and re-boot with this default system configuration automatically.

There are four situations in which you will need to setup system configuration:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The system configuration is reset by Clear-CMOS jumper
4. The CMOS memory has lost power and the configuration information has been erased.

The TKS-E21-HD07 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 AMI BIOS Setup

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

Entering Setup

Power on the computer and press or <F2> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable/disable boot option for legacy network devices.

Chipset

Host bridge parameters.

Boot

Enables/disables quiet boot option.

Security

Set setup administrator password.

Save&Exit

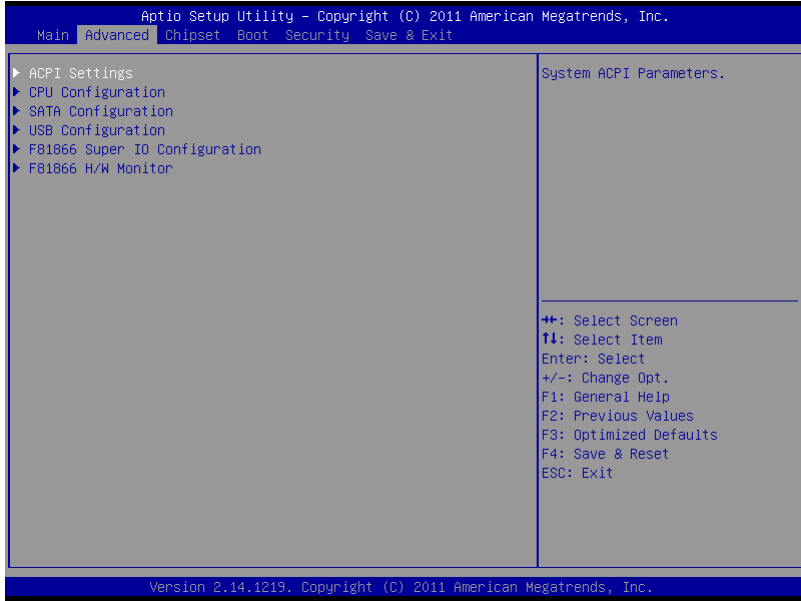
Exit system setup after saving the changes.

Setup Menu

Setup submenu: Main

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Main Advanced Chipset Boot Security Save & Exit	
BIOS Information TKS-E21-HD07 R1.1(TKHDAM11) (04/05/2012)	Set the Time. Use Tab to switch between Time elements.
BIOS Vendor: American Megatrends Core Version: 4.6.4.1 Compliancy: UEFI 2.1	
System Date: [Sat 06/23/2012] System Time: [19:00:02]	
Access Level: Administrator	
	+/: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.	

Setup submenu: Advanced



ACPI Settings

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<p>ACPI Settings</p> <p>ACPI Sleep State [S3 (Suspend to RAM)]</p>	<p>Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit </p>
--	---

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Options summary :

Suspend mode	S3 (Suspend to RAM)	Optimal Default, Failsafe Default
Select the ACPI state used for System Suspend		

CPU Configuration

```
Apilo Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
Node0: AMD G-T44R Processor
Single Core Running @ 1217 MHz  1312 mV
Max Speed:1200 MHz  Intended Speed:1200 MHz
Min Speed:600 MHz
Microcode Patch Level: 5000101

----- Cache per Core -----
L1 Instruction Cache: 32 KB/8-way
      L1 Data Cache: 32 KB/2-way
      L2 Cache: 512 KB/16-way
No L3 Cache Present

+/: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit

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```

IDE Configuration (IDE)

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

OnChip SATA Channel	[Enabled]	Enable Or Disable Serial ATA
OnChip SATA Type	[Legacy IDE]	
SATA Port0	Not Present	

⇧⇧: Select Screen
 ⇧1: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Reset
 ESC: Exit

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IDE Configuration (AHCI)

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

OnChip SATA Channel	[Enabled]	AHCI
OnChip SATA Type	[AHCI]	Legacy IDE
SATA Port0	Not Present	

⇧+: Select Screen
 ⇩: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Reset
 ESC: Exit

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Options summary :

SATA Controllers	Disabled	Default
	Enabled	
En/Disable SATA Controller.		
SATA Mode	IDE	Default
	AHCI	
IDE: Configure SATA controllers as legacy IDE AHCI: Configure SATA controllers to operate in AHCI mode		

USB Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

USB Configuration USB Devices: 1 Drive, 1 Keyboard Legacy USB Support [Enabled] Mass Storage Devices: UFD 3.0 Silicon-Power8G 1.00 [Auto]	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. +/: Select Screen ↑: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
--	--

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Options summary :

Legacy USB Support	Enabled	Optimal Default, Failsafe Default
	Disabled	
	Auto	
Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected		
Device Name (Emulation Type)	Auto	Optimal Default, Failsafe Default
	Floppy	
	Forced FDD	
	Hard Disk	
	CDROM	
If Auto. USB devices less than 530MB will be emulated as Floppy and remaining as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD(Ex. ZIP drive)		

F81866 Super IO Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

<p>F81866 Super IO Configuration</p> <p>F81866 Super IO Chip F81866</p> <ul style="list-style-type: none"> ▶ Serial Port 2 Configuration ▶ Serial Port 3 Configuration ▶ Serial Port 4 Configuration <p>Power Failure [Keep last state]</p> <p>ERP Fucntion [Disabled]</p>	<p>Set Parameters of Serial Port 2</p> <hr/> <p> ⇧+: Select Screen ⇧↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit </p>
--	---

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Serial Port Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

Serial Port 2 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Device Settings	IO=2F8h; IRQ=3;	
Change Settings	[Auto]	
RS232/422,485	[RS232]	

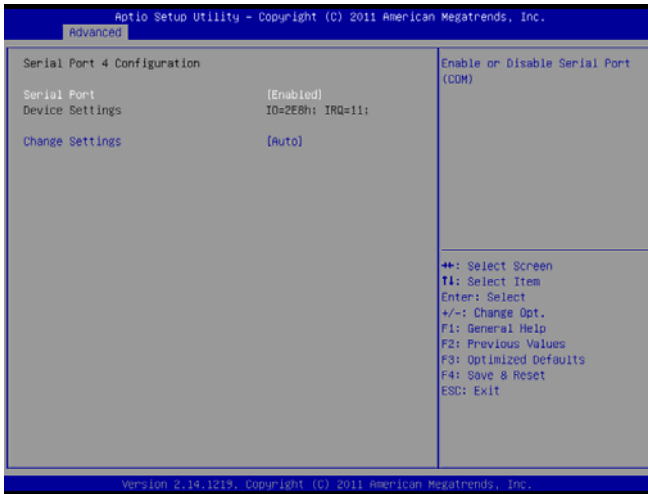
Version 2.14.1219, Copyright (C) 2011 American Megatrends, Inc.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Advanced

Serial Port 3 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Device Settings	IO=3E8h; IRQ=11;	
Change Settings	[Auto]	

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Options summary :

Serial Port	Disabled	Default
	Enabled	
Allows BIOS to En/Disable correspond serial port.		
Change Settings (Serial Port 2)	Auto	Default
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4; IO=2F8h; IRQ=3,4;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port 3)	Auto	Default
	IO=3E8h; IRQ=11;	
	IO=3E8h; IRQ=10,11; IO=2E8h; IRQ=10,11;	
Allows BIOS to Select Serial Port resource.		
Change Settings (Serial Port 4)	Auto	Default
	IO=2E8h; IRQ=10;	
	IO=3E8h; IRQ=10,11; IO=2E8h; IRQ=10,11;	
Allows BIOS to Select Serial Port resource.		
Power Failure	Keep last state	Default
	Always on	
	Always off	
Select the action system to take when restoring from power loss.		
ERP Function	Disabled	Default
	Enabled	
En/Disable ERP power saving function.		

F81866 H/W Monitor

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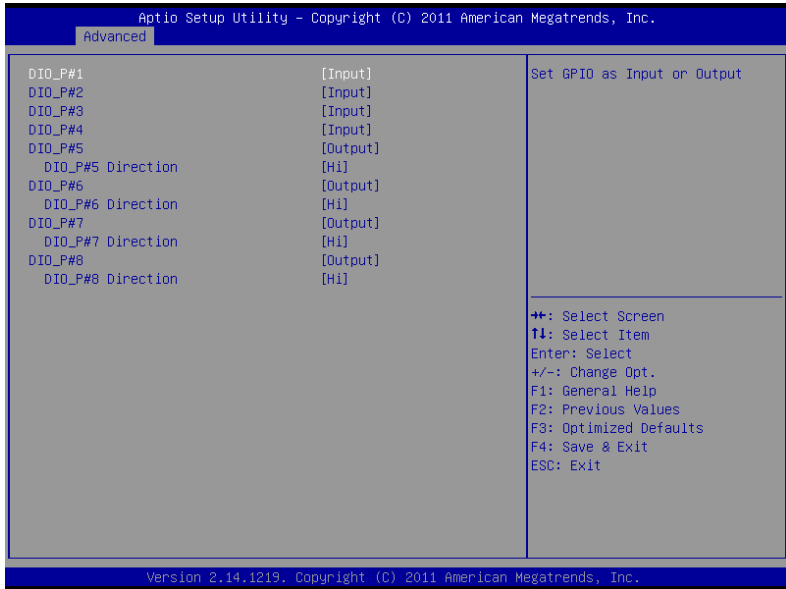
Advanced

Pc Health Status	
CPU Temperature	: +40 %
System Temperature	: +37 %
Fan1 Speed	: N/A
CPU Vcore	: +1.328 V
5VSB	: +5.087 V
5V	: +5.087 V
12V	: +12.320 V
VSB5V	: +5.088 V
3.3V	: +3.392 V
VSB3.3V	: +3.360 V
VBAT	: +3.344 V

⇧⇩: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Reset
 ESC: Exit

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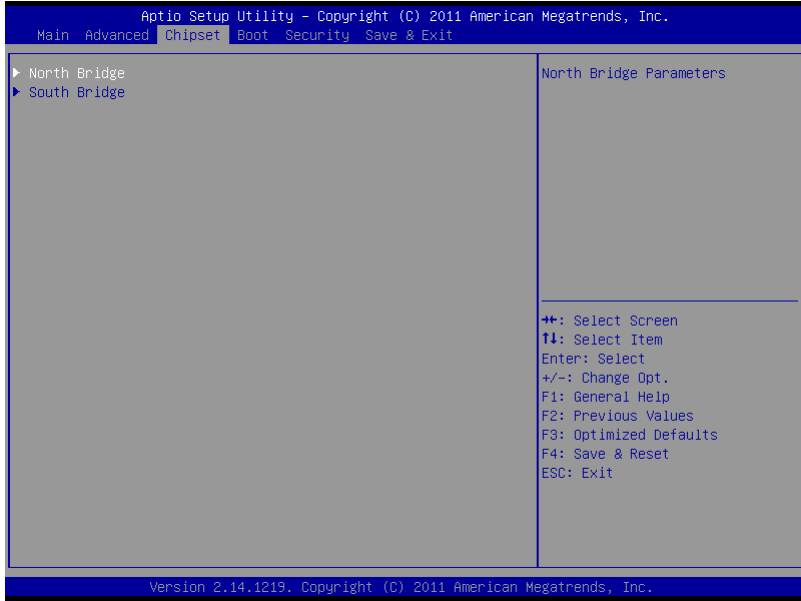
Digital IO



Options summary :

DIO_P#1~4	Input	Default
	Output	
Allows BIOS to select input/output function to corresponding DIO ping.		
DIO_P#5~8	Input	Default
	Output	
Allows BIOS to select input/output function to corresponding DIO ping.		
DIO_P#1~8 Direction	Low	Default
	Hi	
Allows BIOS to select high/low voltage level to output to corresponding DIO ping.		

Setup submenu: Chipset



Host Bridge

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Chipset

<p>Total Memory Dimm0: size=2048 MB, speed=1066 MHz</p>	<p>Total Memory: 2032 MB</p>	<p>Config Graphics Settings.</p>
<p>▶ Graphics Configuration</p>		<p> ⇧+: Select Screen ⇧1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit </p>

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Graphics Configuration

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Chipset

DP0 Output Mode	[Disabled]	NB PCIe Connect Type (Display device)
DP1 Output Mode	[Disabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

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Options summary :

DP0 Output Mode	Disable	Default
Disable DP0 output		
DP1 Output Mode	Disable	Default
Single Link DVI-I		
Enable \ Disable DP1 output		

South Bridge

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Chipset

Power Mode [ATX Type]	Select power supply mode.
▶ SB HD Azalia Configuration	
	⇧⇧: Select Screen ⇧1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Options summary :

Power Mode	ATX Type	Default
	AT Type	
Select Power Mode: ATX Type: Normal ACPI support AT Type: Suspend/Sleep disabled, and Always On when restoring from power failure.		

SB HD Azalia Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.

Chipset

HD Audio Azalia Device	[Enabled]	Enable Or Disable HD Audio Azalia Device
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

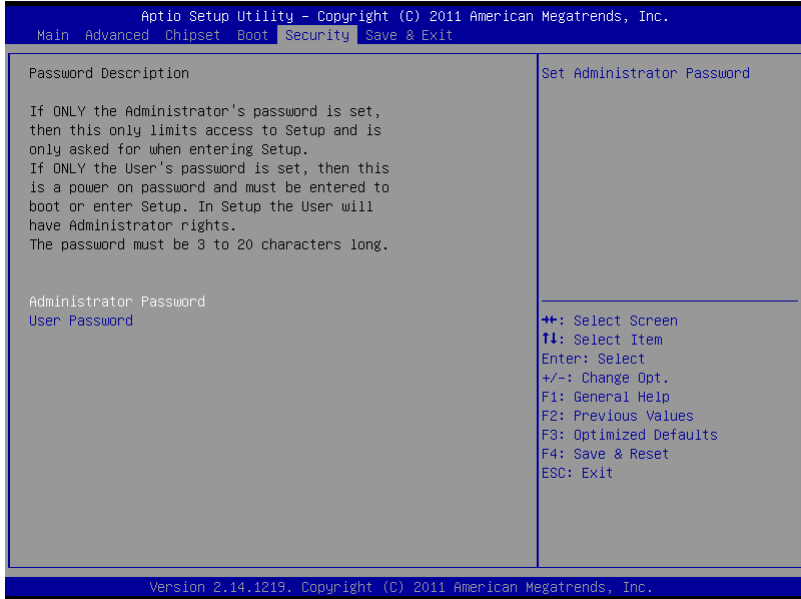
Options summary :

HD Audio Azalia Device	Enable	Default
	Disable	
Enable / Disable HD Audio controller		

BBS Priorities

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Boot		
Boot Option #1	[UFD 3.0 Silicon-Po...]	Sets the system boot order
		⇧+: Select Screen ⇩: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		

Security



Change User/Supervisor Password

You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

Chapter

4

**Driver
Installation**

The TKS-E21-HD07 comes with a DVD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:

- Step 1 – Install Chipset Driver
- Step 2 – Install Audio Driver
- Step 3 – Install LAN Driver
- Step 4 – Install AHCI Driver
- Step 5 – Install Serial Port Driver (Optional)

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the TKS-E21-HD07 DVD-ROM into the DVD-ROM Drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Chipset Driver

1. Click on the **STEP1-CHIPSET** folder and select the OS folder your system is
2. Double click on the **Setup.exe** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 2 – Install Audio Driver

1. Click on the **STEP2-Audio** folder and select the OS folder your system is
2. Double click on the **.exe** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 – Install LAN Driver

1. Click on the **STEP3-LAN** folder and select the OS folder your system is
2. Double click on the **setup.exe** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 – Install AHCI Driver

Please refer to the Appendix D AHCI Settings

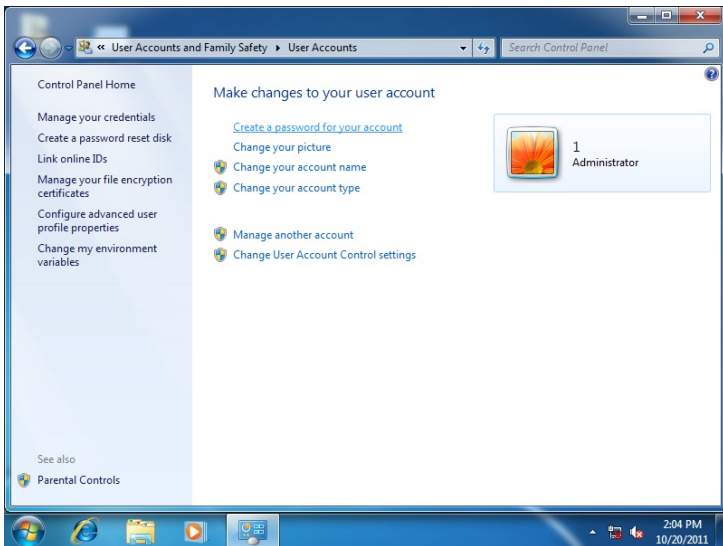
Step 5 – Serial Port Driver (Optional)

For Windows® XP:

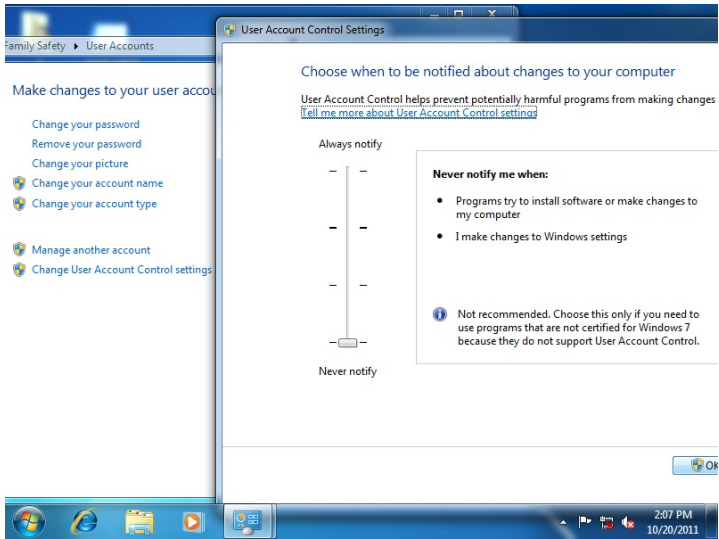
1. Click on the **STEP5-Serial Port Driver (Optional)** and select the folder of **WINXP_32**
2. Double click on **patch.bat** file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

For Windows® 7:

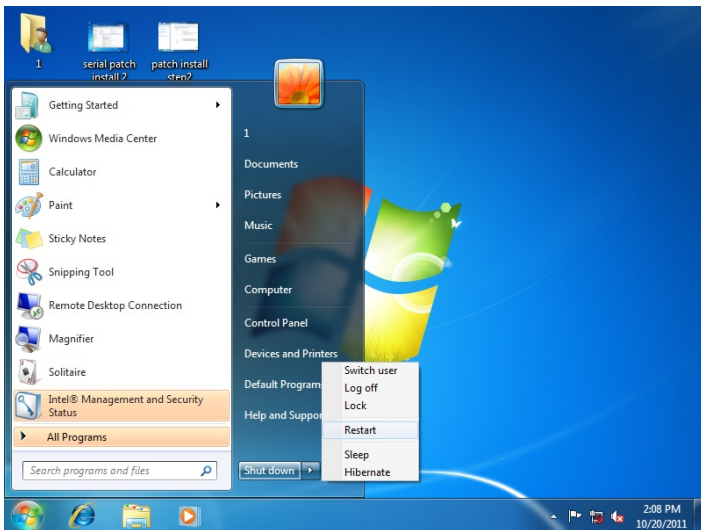
1. Create a password for Administrator account.



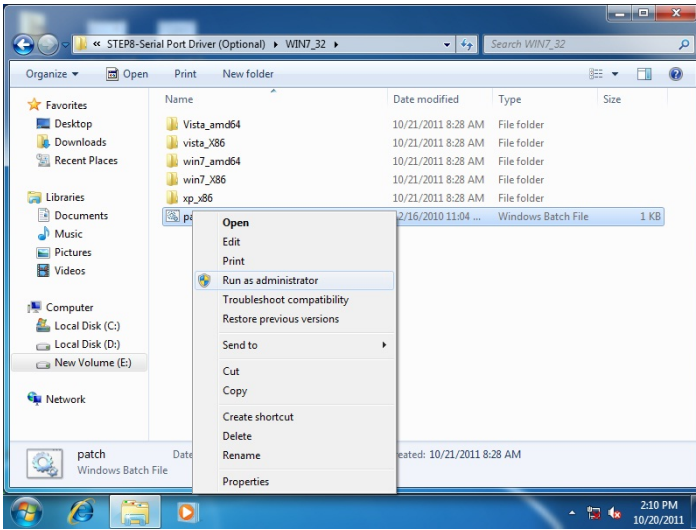
2. Change User Account Control Settings to [Never notify]



3. Reboot and Administrator login.



4. To run patch.bat with [Run as administrator].



Appendix

A

Programming the Watchdog Timer

A.1 Watchdog Timer Initial Program

Table 1 : SuperIO relative register table		
	Default Value	Note
Index	0x2E(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Watchdog relative register table					
	LDN	Register	BitNum	Value	Note
Timer Counter	0x07(Note3)	0xF6(Note4)		(Note24)	Time of watchdog timer (0~255) This register is byte access
Counting Unit	0x07(Note5)	0xF5(Note6)	3(Note7)	0(Note8)	Select time unit. 0: second 1: minute
Watchdog Enable	0x07(Note9)	0xF5(Note10)	5(Note11)	1(Note12)	0: Disable 1: Enable
Timeout Status	0x07(Note13)	0xF5(Note14)	6(Note15)	1	1: Clear timeout status
Output Mode	0x07(Note16)	0xF5(Note17)	4(Note18)	1(Note19)	Select WDTRST# output mode 0: level 1: pulse
WDTRST output	0x07(Note20)	0xFA(Note21)	0(Note22)	1(Note23)	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable


```
*****
// SuperIO relative definition (Please reference to Table 1)
#define byte SIOIndex //This parameter is represented from Note1
#define byte SIOData //This parameter is represented from Note2
#define void IOWriteByte(byte IOPort, byte Value);
#define byte IOReadByte(byte IOPort);
// Watch Dog relative definition (Please reference to Table 2)
#define byte TimerLDN //This parameter is represented from Note3
#define byte TimerReg //This parameter is represented from Note4
#define byte TimerVal // This parameter is represented from Note24
#define byte UnitLDN //This parameter is represented from Note5
#define byte UnitReg //This parameter is represented from Note6
#define byte UnitBit //This parameter is represented from Note7
#define byte UnitVal //This parameter is represented from Note8
#define byte EnableLDN //This parameter is represented from Note9
#define byte EnableReg //This parameter is represented from Note10
#define byte EnableBit //This parameter is represented from Note11
#define byte EnableVal //This parameter is represented from Note12
#define byte StatusLDN // This parameter is represented from Note13
#define byte StatusReg // This parameter is represented from Note14
#define byte StatusBit // This parameter is represented from Note15
#define byte ModeLDN // This parameter is represented from Note16
#define byte ModeReg // This parameter is represented from Note17
#define byte ModeBit // This parameter is represented from Note18
#define byte ModeVal // This parameter is represented from Note19
#define byte WDRstLDN // This parameter is represented from Note20
#define byte WDRstReg // This parameter is represented from Note21
#define byte WDRstBit // This parameter is represented from Note22
#define byte WDRstVal // This parameter is represented from Note23
*****
```

```
*****
VOID Main() {
    // Procedure : AaeonWDTConfig
    // (byte)Timer : Time of WDT timer.(0x00~0xFF)
    // (boolean)Unit : Select time unit(0: second, 1: minute).
    AaeonWDTConfig();

    // Procedure : AaeonWDTEnable
    // This procedure will enable the WDT counting.
    AaeonWDTEnable();
}
*****
```

```

*****
// Procedure : AaeonWDTEnable
VOID AaeonWDTEnable (){
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 1);
}

// Procedure : AaeonWDTConfig
VOID AaeonWDTConfig (){
    // Disable WDT counting
    WDTEnableDisable(EnableLDN, EnableReg, EnableBit, 0);
    // Clear Watchdog Timeout Status
    WDTClearTimeoutStatus();
    // WDT relative parameter setting
    WDTParameterSetting();
}

VOID WDTEnableDisable(byte LDN, byte Register, byte BitNum, byte Value){
    SIOBitSet(LDN, Register, BitNum, Value);
}

VOID WDTParameterSetting(){
    // Watchdog Timer counter setting
    SIOByteSet(TimerLDN, TimerReg, TimerVal);
    // WDT counting unit setting
    SIOBitSet(UnitLDN, UnitReg, UnitBit, UnitVal);
    // WDT output mode setting, level / pulse
    SIOBitSet(ModeLDN, ModeReg, ModeBit, ModeVal);
    // Watchdog timeout output via WDTRST#
    SIOBitSet(WDTRstLDN, WDTRstReg, WDTRstBit, WDTRstVal);
}

VOID WDTClearTimeoutStatus(){
    SIOBitSet(StatusLDN, StatusReg, StatusBit, 1);
}
*****

```

```

VOID SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

VOID SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}

```
































Appendix

B

I/O Information

B.1 I/O Address Map

Address Range	Device Name
[00000000 - 0000000F]	Direct memory access controller
[00000000 - 0000000F]	Motherboard resources
[00000000 - 00003AF]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[00000060 - 00000060]	Standard PS/2 Keyboard
[00000061 - 00000061]	System speaker
[00000062 - 00000063]	Motherboard resources
[00000064 - 00000064]	Standard PS/2 Keyboard
[00000065 - 0000006F]	Motherboard resources
[00000070 - 00000071]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000083]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000087 - 00000087]	Direct memory access controller
[00000088 - 00000088]	Motherboard resources
[00000089 - 0000008B]	Direct memory access controller
[0000008C - 0000008E]	Motherboard resources
[0000008F - 0000008F]	Direct memory access controller
[00000090 - 0000009F]	Motherboard resources
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000C0 - 000000DF]	Direct memory access controller
[000000E0 - 000000EF]	Motherboard resources
[000000F0 - 000000FF]	Numeric data processor
[00000170 - 00000177]	ATA Channel 1
[000001F0 - 000001F7]	ATA Channel 0
[000002E8 - 000002EF]	Communications Port (COM4)
[000002F8 - 000002FF]	Communications Port (COM2)
[00000376 - 00000376]	ATA Channel 1
[000003B0 - 000003BB]	AMD Radeon HD 6250 Graphics
[000003B0 - 000003DF]	PCI bus
[000003C0 - 000003DF]	AMD Radeon HD 6250 Graphics
[000003E0 - 00000CF7]	PCI bus
[000003E8 - 000003EF]	Communications Port (COM3)
[000003F6 - 000003F6]	ATA Channel 0
[0000040B - 0000040B]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[000004D6 - 000004D6]	Motherboard resources



















































	[00000500 - 0000050F]	Motherboard resources
	[00000510 - 0000051F]	Motherboard resources
	[00000520 - 0000052F]	Motherboard resources
	[00000800 - 0000089F]	Motherboard resources
	[00000900 - 0000090F]	Motherboard resources
	[00000910 - 0000091F]	Motherboard resources
	[00000B20 - 00000B3F]	Motherboard resources
	[00000C00 - 00000C01]	Motherboard resources
	[00000C14 - 00000C14]	Motherboard resources
	[00000C50 - 00000C51]	Motherboard resources
	[00000C52 - 00000C52]	Motherboard resources
	[00000C6C - 00000C6C]	Motherboard resources
	[00000C6F - 00000C6F]	Motherboard resources
	[00000CD0 - 00000CD1]	Motherboard resources
	[00000CD2 - 00000CD3]	Motherboard resources
	[00000CD4 - 00000CD5]	Motherboard resources
	[00000CD6 - 00000CD7]	Motherboard resources
	[00000CD8 - 00000CDF]	Motherboard resources
	[00000D00 - 0000FFFF]	PCI bus
	[0000D000 - 0000D0FF]	Realtek PCIe GBE Family Controller
	[0000D000 - 0000DFFF]	PCI standard PCI-to-PCI bridge
	[0000E000 - 0000E0FF]	Realtek PCIe GBE Family Controller #2
	[0000E000 - 0000EFFF]	PCI standard PCI-to-PCI bridge
	[0000F000 - 0000F0FF]	AMD Radeon HD 6250 Graphics
	[0000F100 - 0000F10F]	Standard Dual Channel PCI IDE Controller
	[0000F110 - 0000F113]	Standard Dual Channel PCI IDE Controller
	[0000F120 - 0000F127]	Standard Dual Channel PCI IDE Controller
	[0000F130 - 0000F133]	Standard Dual Channel PCI IDE Controller
	[0000F140 - 0000F147]	Standard Dual Channel PCI IDE Controller
	[0000F150 - 0000F15F]	Standard Dual Channel PCI IDE Controller
	[0000FE00 - 0000FEFE]	Motherboard resources









































B.2 1st MB Memory Address Map

Address Range	Device
[000A0000 - 000BFFFF]	AMD Radeon HD 6250 Graphics
[000A0000 - 000BFFFF]	PCI bus
[000C0000 - 000DFFFF]	PCI bus
[67000000 - 7EFFFFFF]	Motherboard resources
[7F000000 - FFFFFFFF]	PCI bus
[C0000000 - CFFFFFFF]	AMD Radeon HD 6250 Graphics
[D0000000 - D0003FFF]	Realtek PCIe GBE Family Controller
[D0000000 - D00FFFFFF]	PCI standard PCI-to-PCI bridge
[D0004000 - D0004FFF]	Realtek PCIe GBE Family Controller
[D0100000 - D0103FFF]	Realtek PCIe GBE Family Controller #2
[D0100000 - D01FFFFFF]	PCI standard PCI-to-PCI bridge
[D0104000 - D0104FFF]	Realtek PCIe GBE Family Controller #2
[E0000000 - EFFFFFFF]	System board
[FEB00000 - FEB3FFFF]	AMD Radeon HD 6250 Graphics
[FEB40000 - FEB43FFF]	High Definition Audio Controller
[FEB44000 - FEB47FFF]	High Definition Audio Controller
[FEB48000 - FEB480FF]	Standard Enhanced PCI to USB Host Controller
[FEB49000 - FEB49FFF]	Standard OpenHCD USB Host Controller
[FEB4A000 - FEB4AFFF]	Standard OpenHCD USB Host Controller
[FEB4B000 - FEB4B0FF]	Standard Enhanced PCI to USB Host Controller
[FEB4C000 - FEB4CFFF]	Standard OpenHCD USB Host Controller
[FEB4D000 - FEB4D0FF]	Standard Enhanced PCI to USB Host Controller
[FEB4E000 - FEB4EFFF]	Standard OpenHCD USB Host Controller
[FEB4F000 - FEB4F3FF]	Standard Dual Channel PCI IDE Controller
[FEC00000 - FEC00FFF]	Motherboard resources
[FEC10000 - FEC10FFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED00000 - FED00FFF]	Motherboard resources
[FED61000 - FED70FFF]	Motherboard resources
[FED80000 - FED8FFFF]	Motherboard resources
[FEE00000 - FEE00FFF]	Motherboard resources
[FFC00000 - FFFFFFFF]	Motherboard resources



B.3 IRQ Mapping Chart

Interrupt request (IRQ)	Description
(ISA) 0x00000000 (00)	System timer
(ISA) 0x00000001 (01)	Standard PS/2 Keyboard
(ISA) 0x00000003 (03)	Communications Port (COM2)
(ISA) 0x00000008 (08)	System CMOS/real time clock
(ISA) 0x0000000B (11)	Communications Port (COM3)
(ISA) 0x0000000B (11)	Communications Port (COM4)
(ISA) 0x0000000C (12)	Microsoft PS/2 Mouse
(ISA) 0x0000000D (13)	Numeric data processor
(ISA) 0x0000000E (14)	ATA Channel 0
(ISA) 0x0000000F (15)	ATA Channel 1
(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System

	(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
	(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
	(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
	(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
	(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
	(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
	(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
	(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
	(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
	(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
	(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
	(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
	(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
	(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
	(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
	(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
	(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System

	(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
	(PCI) 0x00000010 (16)	High Definition Audio Controller
	(PCI) 0x00000010 (16)	PCI standard PCI-to-PCI bridge
	(PCI) 0x00000011 (17)	PCI standard PCI-to-PCI bridge
	(PCI) 0x00000011 (17)	Standard Dual Channel PCI IDE Controller
	(PCI) 0x00000011 (17)	Standard Enhanced PCI to USB Host Controller
	(PCI) 0x00000011 (17)	Standard Enhanced PCI to USB Host Controller
	(PCI) 0x00000011 (17)	Standard Enhanced PCI to USB Host Controller
	(PCI) 0x00000012 (18)	Standard OpenHCD USB Host Controller
	(PCI) 0x00000012 (18)	Standard OpenHCD USB Host Controller
	(PCI) 0x00000012 (18)	Standard OpenHCD USB Host Controller
	(PCI) 0x00000012 (18)	Standard OpenHCD USB Host Controller
	(PCI) 0x00000013 (19)	High Definition Audio Controller
	(PCI) 0xFFFFFFF0 (-4)	Realtek PCIe GBE Family Controller
	(PCI) 0xFFFFFFF1 (-3)	Realtek PCIe GBE Family Controller #2
	(PCI) 0xFFFFFFF2 (-2)	AMD Radeon HD 6250 Graphics

B.4 DMA Channel Assignments

	Direct memory access (DMA)
	4 Direct memory access controller

Appendix

C

Mating Connector

C.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model number		
CN1	LVDS1	CST Master	CSI-4585-300R-NH	N/A	N/A
CN2	LVDS2	CST Master	CSI-4585-300R-NH	N/A	N/A
CN3	LPC	CATCH	1204-700-12SMP	N/A	N/A
CN4	BACKLIGHT1 CN	CATCH	1192-700-05S	N/A	N/A
CN5	BACKLIGHT2 CN	CATCH	1192-700-05S	N/A	N/A
CN6	SATA POWER	CATCH	1192-700-02S	CATCH	1702150155
CN7	AUDIO	CATCH	1201-700-10S	CATCH	1709100254
CN8	TOUCH SCREEN	CATCH	1204-700-09S MR	N/A	N/A
CN9	2PIN PWR-IN(OPTION)	DINKLE	DT-126VP-S2016002P	CATCH	1702002010
CN10	PCI-104	CATCH	1243-111-120S	N/A	N/A
CN11	ATX 4PIN PWR-IN	CATCH	1121-700-04S	N/A	N/A
CN12	FAN	CATCH	1190-700-03S	N/A	N/A
CN13	FRONT	CATCH	1201-700-10S	CATCH	1701010150

Embedded Box

TKS-E21-HD07

	PANEL				
CN14	MINICARD	FOXCONN	AS0B226-S68K-7 F	N/A	N/A
CN15	mSATA	FOXCONN	AS0B226-S68K-7 F	N/A	N/A
DVI+VGA3	DVI/VGA	ASTRON	1860044-006-R	N/A	N/A
LAN1/LAN2	LAN	UDE	RT7-17FAAM1A	N/A	N/A
USB1/2	USB	TECHBEST	KS-002D-ANB(2.0)-L	N/A	N/A
USB3/4/5/6	USB	CATCH	1201-700-05S	CATCH	1700050207
COM1	COM PORT	TECHBEST	A20+9191-4208L	N/A	N/A
COM3/4/	COM PORT	CATCH	1201-700-09S	CATCH	1701090150
COM5/6/	COM PORT	CATCH	1201-700-09SM	CATCH	1701090150
LPT1	PRINT PORT	CATCH	1147-000-26SS	Ho-Base/ CATCH	1701260200
SATA1	SATA	TECHBEST	161S01-025A	N/A	N/A
KB1	KB/MS	CATCH	1201-700-06S	CATCH	1700060155

Appendix

D

AHCI Settings

D.1 Setting AHCI

OS installation to setup AHCI Mode.

Step 1: Copy the files below from “Driver DVD -> STEP4-

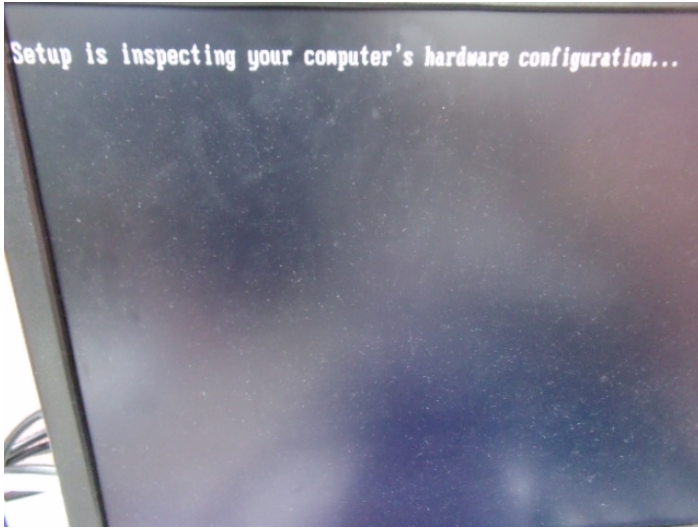
AHCI\WinXP\SB8xx_RAID_XP_3.2.1540.92” to Disk



Step 2: Connect the USB Floppy to the board (The board on the photo is just for reference)



Step 3: Setup OS



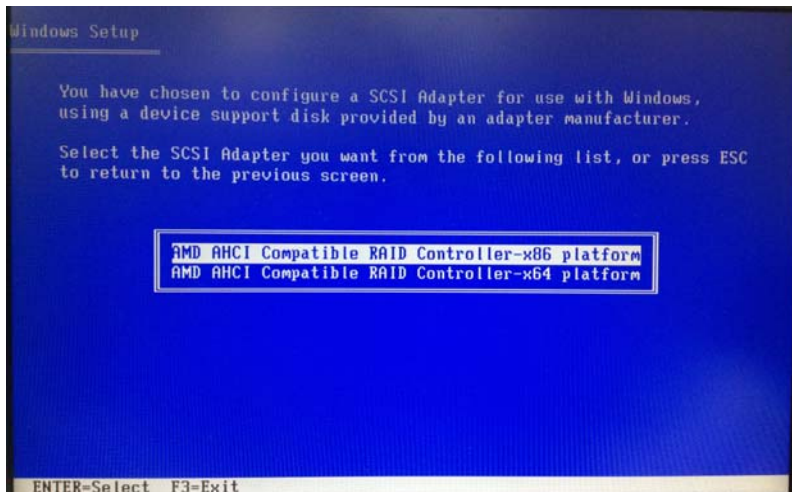
Step 4: Press "F6"



Step 5: Choose “S”

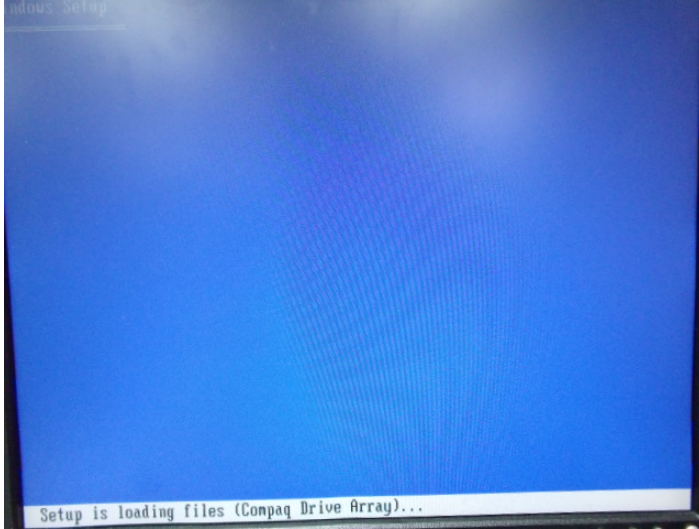


Step 6: Choose “AMD AHCI Compatible RAID Controller-x86 platform”



Step 7: It will show the model number you select and then press “**ENTER**”

Step 8: Setup is loading files



Appendix

E

Electrical Specifications for I/O Ports

E.1 Electrical Specifications for I/O Ports

I/O	Reference	Signal Name	Rate Output
LVDS Port 1	CN1	VCC	+3.3V/1A or +5V/1A
LVDS Port 2	CN2	VCC	+3.3V/1A or +5V/1A
LPC Port	CN3	+3.3V	+3.3V/0.5A
LVDS Port 1 Inverter / Backlight Connector	CN4	VDD	+5V/2A or +12V/2A
LVDS Port 2 Inverter / Backlight Connector	CN5	VDD	+5V/2A or +12V/2A
+5V Output for SATA HDD	CN6	+5V	+5V/1A
Audio I/O Port	CN7	+5V	+5V/0.5A
2Pin PWRIN (Optional)	CN9	+12V	+12V/3A
ATX 4Pin PWRIN	CN11	+12V	+12V/6A
FAN	CN12	+5V	+5V/0.5A
Mini Card Slot	CN14	+3.3VSB +1.5V	+3.3V/1A +1.5V/0.375A
mSATA Slot	CN15	+3.3VSB +1.5V	+3.3V/1A +1.5V/0.375A
USB 2.0 Ports 1 and 2	USB1	+5VSB	+5V/0.5A (per channel)
USB 2.0 Ports 3 and 4	USB2	+5VSB	+5V/0.5A (per channel)
USB 2.0 Ports 5,6,7,8	USB3/USB4 USB5/USB6	+5VSB	+5V/0.5A (per channel)
COM Port 2	COM1B	+5V/+12V	+5V/1A or +12V/1A
Digital IO Port	LPT1	GPIO0~GPIO15	+5V (Ext. Pull Up)

Embedded Box

TKS-E21-HD07

VGA / DVI Ports	DVI+VGA	VGA: +5V DVI : +5V	+5V/0.5A
-----------------	---------	-----------------------	----------

E.2 DIO Programming

TKS-E21-HD07 utilizes FINTEK 81866 chipset as its Digital I/O controller.

Below are the procedures to complete its configuration and the AAeon initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally. (These three steps are the same as programming WDT)

E.3 Digital I/O Register

Table 1 : SuperIO relative register table		
	Default Value	Note
Index	0x2E(Note1)	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	0x2F(Note2)	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 2 : Digital Input relative register table					
	LDN	Register	BitNum	Value	Note
DIO-1 Pin Status	0x06(Note3)	0x82(Note4)	0(Note5)		GPIO70
DIO-2 Pin Status	0x06(Note6)	0x82(Note7)	1(Note8)		GPIO71
DIO-3 Pin Status	0x06(Note9)	0x82(Note10)	2(Note11)		GPIO72
DIO-4 Pin Status	0x06(Note12)	0x82(Note13)	3(Note14)		GPIO73
DIO-5 Pin Status	0x06(Note15)	0x82(Note16)	4(Note17)		GPIO74
DIO-6 Pin Status	0x06(Note18)	0x82(Note19)	5(Note20)		GPIO75
DIO-7 Pin Status	0x06(Note21)	0x82(Note22)	6(Note23)		GPIO76
DIO-8 Pin Status	0x06(Note24)	0x82(Note25)	7(Note26)		GPIO77
DIO-9 Pin Status	0x06(Note27)	0x8A(Note28)	0(Note29)		GPIO80
DIO-10 Pin Status	0x06(Note30)	0x8A(Note31)	1(Note32)		GPIO81
DIO-11 Pin Status	0x06(Note33)	0x8A(Note34)	2(Note35)		GPIO82
DIO-12 Pin Status	0x06(Note36)	0x8A(Note37)	3(Note38)		GPIO83
DIO-13 Pin Status	0x06(Note39)	0x8A(Note40)	4(Note41)		GPIO84
DIO-14 Pin Status	0x06(Note42)	0x8A(Note43)	5(Note44)		GPIO85
DIO-15 Pin Status	0x06(Note45)	0x8A(Note46)	6(Note47)		GPIO86
DIO-16 Pin Status	0x06(Note48)	0x8A(Note49)	7(Note50)		GPIO87

Table 3 : Digital Output relative register table

	LDN	Register	BitNum	Value	Note
DIO-1 Output Data	0x06 (Note51)	0x81 (Note52)	0 (Note53)	(Note54)	GPIO70
DIO-2 Output Data	0x06 (Note55)	0x81 (Note56)	1 (Note57)	(Note58)	GPIO71
DIO-3 Output Data	0x06 (Note59)	0x81 (Note60)	2 (Note61)	(Note62)	GPIO72
DIO-4 Output Data	0x06 (Note63)	0x81 (Note64)	3 (Note65)	(Note66)	GPIO73
DIO-5 Output Data	0x06 (Note67)	0x81 (Note68)	4 (Note69)	(Note70)	GPIO74
DIO-6 Output Data	0x06 (Note71)	0x81 (Note72)	5 (Note73)	(Note74)	GPIO75
DIO-7 Output Data	0x06 (Note75)	0x81 (Note76)	6 (Note77)	(Note78)	GPIO76
DIO-8 Output Data	0x06 (Note79)	0x81 (Note80)	7 (Note81)	(Note82)	GPIO77
DIO-9 Output Data	0x06 (Note83)	0x89 (Note84)	0 (Note85)	(Note86)	GPIO80
DIO-10 Output Data	0x06 (Note87)	0x89 (Note88)	1 (Note89)	(Note90)	GPIO81
DIO-11 Output Data	0x06 (Note91)	0x89 (Note92)	2 (Note93)	(Note94)	GPIO82
DIO-12 Output Data	0x06 (Note95)	0x89 (Note96)	3 (Note97)	(Note98)	GPIO83
DIO-13 Output Data	0x06 (Note99)	0x89 (Note100)	4 (Note101)	(Note102)	GPIO84
DIO-14 Output Data	0x06 (Note103)	0x89 (Note104)	5 (Note105)	(Note106)	GPIO85
DIO-15 Output Data	0x06 (Note107)	0x89 (Note108)	6 (Note109)	(Note110)	GPIO86
DIO-16 Output Data	0x06 (Note111)	0x89 (Note112)	7 (Note113)	(Note114)	GPIO87

E.4 Digital I/O Sample Program

```

*****
// SuperIO relative definition (Please reference to Table 1)
#define byte SIOIndex //This parameter is represented from Note1
#define byte SIOData //This parameter is represented from Note2
#define void IOWriteByte(byte IOPort, byte Value);
#define byte IOReadByte(byte IOPort);
// Digital Input Status relative definition (Please reference to Table 2)
#define byte DInput1LDN // This parameter is represented from Note3
#define byte DInput1Reg // This parameter is represented from Note4
#define byte DInput1Bit // This parameter is represented from Note5
#define byte DInput2LDN // This parameter is represented from Note6
#define byte DInput2Reg // This parameter is represented from Note7
#define byte DInput2Bit // This parameter is represented from Note8
#define byte DInput3LDN // This parameter is represented from Note9
#define byte DInput3Reg // This parameter is represented from Note10
#define byte DInput3Bit // This parameter is represented from Note11
#define byte DInput4LDN // This parameter is represented from Note12
#define byte DInput4Reg // This parameter is represented from Note13
#define byte DInput4Bit // This parameter is represented from Note14
#define byte DInput5LDN // This parameter is represented from Note15
#define byte DInput5Reg // This parameter is represented from Note16
#define byte DInput5Bit // This parameter is represented from Note17
#define byte DInput6LDN // This parameter is represented from Note18
#define byte DInput6Reg // This parameter is represented from Note19
#define byte DInput6Bit // This parameter is represented from Note20
#define byte DInput7LDN // This parameter is represented from Note21
#define byte DInput7Reg // This parameter is represented from Note22
#define byte DInput7Bit // This parameter is represented from Note23
#define byte DInput8LDN // This parameter is represented from Note24
#define byte DInput8Reg // This parameter is represented from Note25
#define byte DInput8Bit // This parameter is represented from Note26
*****

```

```

*****
#define byte DInput9LDN // This parameter is represented from Note27
#define byte DInput9Reg // This parameter is represented from Note28
#define byte DInput9Bit // This parameter is represented from Note29
#define byte DInput10LDN // This parameter is represented from Note30
#define byte DInput10Reg // This parameter is represented from Note31
#define byte DInput10Bit // This parameter is represented from Note32
#define byte DInput11LDN // This parameter is represented from Note33
#define byte DInput11Reg // This parameter is represented from Note34
#define byte DInput11Bit // This parameter is represented from Note35
#define byte DInput12LDN // This parameter is represented from Note36
#define byte DInput12Reg // This parameter is represented from Note37
#define byte DInput12Bit // This parameter is represented from Note38
#define byte DInput13LDN // This parameter is represented from Note39
#define byte DInput13Reg // This parameter is represented from Note40
#define byte DInput13Bit // This parameter is represented from Note41
#define byte DInput14LDN // This parameter is represented from Note42
#define byte DInput14Reg // This parameter is represented from Note43
#define byte DInput14Bit // This parameter is represented from Note44
#define byte DInput15LDN // This parameter is represented from Note45
#define byte DInput15Reg // This parameter is represented from Note46
#define byte DInput15Bit // This parameter is represented from Note47
#define byte DInput16LDN // This parameter is represented from Note48
#define byte DInput16Reg // This parameter is represented from Note49
#define byte DInput16Bit // This parameter is represented from Note50
*****

```

```

*****
// Digital Output control relative definition (Please reference to Table 3)
#define byte DOutput1LDN // This parameter is represented from Note51
#define byte DOutput1Reg // This parameter is represented from Note52
#define byte DOutput1Bit // This parameter is represented from Note53
#define byte DOutput1Val // This parameter is represented from Note54
#define byte DOutput2LDN // This parameter is represented from Note55
#define byte DOutput2Reg // This parameter is represented from Note56
#define byte DOutput2Bit // This parameter is represented from Note57
#define byte DOutput2Val // This parameter is represented from Note58
#define byte DOutput3LDN // This parameter is represented from Note59
#define byte DOutput3Reg // This parameter is represented from Note60
#define byte DOutput3Bit // This parameter is represented from Note61
#define byte DOutput3Val // This parameter is represented from Note62
#define byte DOutput4LDN // This parameter is represented from Note63
#define byte DOutput4Reg // This parameter is represented from Note64
#define byte DOutput4Bit // This parameter is represented from Note65
#define byte DOutput4Val // This parameter is represented from Note66
#define byte DOutput5LDN // This parameter is represented from Note67
#define byte DOutput5Reg // This parameter is represented from Note68
#define byte DOutput5Bit // This parameter is represented from Note69
#define byte DOutput5Val // This parameter is represented from Note70
#define byte DOutput6LDN // This parameter is represented from Note71
#define byte DOutput6Reg // This parameter is represented from Note72
#define byte DOutput6Bit // This parameter is represented from Note73
#define byte DOutput6Val // This parameter is represented from Note74
#define byte DOutput7LDN // This parameter is represented from Note75
#define byte DOutput7Reg // This parameter is represented from Note76
#define byte DOutput7Bit // This parameter is represented from Note77
#define byte DOutput7Val // This parameter is represented from Note78
#define byte DOutput8LDN // This parameter is represented from Note78
#define byte DOutput8Reg // This parameter is represented from Note80
#define byte DOutput8Bit // This parameter is represented from Note81
#define byte DOutput8Val // This parameter is represented from Note82
*****

```

```

*****
#define byte DOutput9LDN // This parameter is represented from Note83
#define byte DOutput9Reg // This parameter is represented from Note84
#define byte DOutput9Bit // This parameter is represented from Note85
#define byte DOutput9Val // This parameter is represented from Note86
#define byte DOutput10LDN // This parameter is represented from Note87
#define byte DOutput10Reg // This parameter is represented from Note88
#define byte DOutput10Bit // This parameter is represented from Note89
#define byte DOutput10Val // This parameter is represented from Note90
#define byte DOutput11LDN // This parameter is represented from Note91
#define byte DOutput11Reg // This parameter is represented from Note92
#define byte DOutput11Bit // This parameter is represented from Note93
#define byte DOutput11Val // This parameter is represented from Note94
#define byte DOutput12LDN // This parameter is represented from Note95
#define byte DOutput12Reg // This parameter is represented from Note96
#define byte DOutput12Bit // This parameter is represented from Note97
#define byte DOutput12Val // This parameter is represented from Note98
#define byte DOutput13LDN // This parameter is represented from Note99
#define byte DOutput13Reg // This parameter is represented from Note100
#define byte DOutput13Bit // This parameter is represented from Note101
#define byte DOutput13Val // This parameter is represented from Note102
#define byte DOutput14LDN // This parameter is represented from Note103
#define byte DOutput14Reg // This parameter is represented from Note104
#define byte DOutput14Bit // This parameter is represented from Note105
#define byte DOutput14Val // This parameter is represented from Note106
#define byte DOutput15LDN // This parameter is represented from Note107
#define byte DOutput15Reg // This parameter is represented from Note108
#define byte DOutput15Bit // This parameter is represented from Note109
#define byte DOutput15Val // This parameter is represented from Note110
#define byte DOutput16LDN // This parameter is represented from Note111
#define byte DOutput16Reg // This parameter is represented from Note112
#define byte DOutput16Bit // This parameter is represented from Note113
#define byte DOutput16Val // This parameter is represented from Note114
*****

```

```
*****
```

```
VOID Main(){\n    Boolean PinStatus ;\n\n    // Procedure : AaeonReadPinStatus\n    // Input :\n    //     Example, Read Digital I/O Pin 3 status\n    // Output :\n    //     InputStatus :\n    //         0: Digital I/O Pin level is low\n    //         1: Digital I/O Pin level is High\n    PinStatus = AaeonReadPinStatus(DInput3LDN, DInput3Reg, DInput3Bit);\n\n    // Procedure : AaeonSetOutputLevel\n    // Input :\n    //     Example, Set Digital I/O Pin 6 level\n    AaeonSetOutputLevel(DOutput6LDN, DOutput6Reg, DOutput6Bit, DOutput6Val);\n}\n*****
```

```
*****
Boolean AaeonReadPinStatus(byte LDN, byte Register, byte BitNum){
    Boolean PinStatus ;

    PinStatus = SIOBitRead(LDN, Register, BitNum);
    Return PinStatus ;
}
VOID AaeonSetOutputLevel(byte LDN, byte Register, byte BitNum, byte Value){
    ConfigToOutputMode(LDN, Register, BitNum);
    SIOBitSet(LDN, Register, BitNum, Value);
}
*****
```

```

VOID SIOEnterMBPnPMode(){
    IOWriteByte(SIOIndex, 0x87);
    IOWriteByte(SIOIndex, 0x87);
}

VOID SIOExitMBPnPMode(){
    IOWriteByte(SIOIndex, 0xAA);
}

VOID SIOSelectLDN(byte LDN){
    IOWriteByte(SIOIndex, 0x07); // SIO LDN Register Offset = 0x07
    IOWriteByte(SIOData, LDN);
}

VOID SIOBitSet(byte LDN, byte Register, byte BitNum, byte Value){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(byte LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= ~(1 << BitNum);
    TmpValue |= (Value << BitNum);
    IOWriteByte(SIOData, TmpValue);
    SIOExitMBPnPMode();
}

VOID SIOByteSet(byte LDN, byte Register, byte Value){
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    IOWriteByte(SIOData, Value);
    SIOExitMBPnPMode();
}

```

```

Boolean SIOBitRead(byte LDN, byte Register, byte BitNum){
    Byte TmpValue;

    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, Register);
    TmpValue = IOReadByte(SIOData);
    TmpValue &= (1 << BitNum);
    SIOExitMBPnPMode();
    If(TmpValue == 0)
        Return 0;
    Return 1;
}
VOID ConfigToOutputMode(byte LDN, byte Register, byte BitNum){
    Byte TmpValue, OutputEnableReg;

    OutputEnableReg = Register-1;
    SIOEnterMBPnPMode();
    SIOSelectLDN(LDN);
    IOWriteByte(SIOIndex, OutputEnableReg);
    TmpValue = IOReadByte(SIOData);
    TmpValue |= (1 << BitNum);
    IOWriteByte(SIOData, OutputEnableReg);
    SIOExitMBPnPMode();
}

```
