TKS-P20-CV01

Fanless Embedded Box

Intel® Atom™ N2600 1.6 GHz Processor

1 GbE LAN, 5 USB2.0, 2 COM

1 VGA, 1 HDMI, 1 Mini Card or mSATA

TKS-P20-CV01 Manual 1st Ed.

July 2013

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Packing List

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

- 1   TKS-P20-CV01 Embedded Controller

- 1   DVD-ROM for manual (in PDF format) and drivers

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	×	○	○	○	○	○

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。

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。

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。

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Chapter 4   Driver Installation

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Appendix D   AHCI Setting

Appendix E   Digital I/O Ports

Chapter

1

General Information

1.1 Introduction

The newest EmBox series TKS-P20-CV01 has been introduced by AAEON and it utilizes Intel® Atom™ processor. In this era of information explosion, the advertising of consumer products will not be confined to the family television, but will also spread to high-traffic public areas, like department stores, the bus, transportation station, the supermarket etc. The advertising marketing industry will resort to every conceivable means to transmit product information to consumers. System integrators will need a multifunction device to satisfy commercial needs for such public advertising.

The TKS-P20-CV01 is designed for indoor environments due to the following reasons; first, the TKS-P20-CV01 offers low power consumption system that while operating in ambient temperatures ranging from 0° to 55°C. The TKS-P20-CV01 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 multimedia entertainment market.

1.2 Features

- Intel® Atom™ N2600 Processor up to 1.6GHz

- SODIMM DDR3 800MHz Memory up to 2 GB

- DIN RAIL and Fanless system

- Mini HDMI and VGA Support

- Gigabit Ethernet LAN x 1

- USB2.0 x 5, COM x 2, 4-bits Digital I/O

- mSATA or Mini Card (Half size) x 1

- DC IN +12 or +7~30V Wide Range DC Input Optional

1.3 Specifications

CPU		Onboard Intel® Atom™ N2600 Processor up to 1.6 GHz
Chipset		Intel® Atom™ N2600 + NM10
System Memory		204-pin DDR3 SODIMM x 1, Max. 2GB
Display Interface	VGA	D-SUB 15 x 1
	HDMI	HDMI type C (Mini HDMI) x 1
Storage Device	SSD	mSATA x 1 (Half-size)
	HDD	Optional by request
Network	LAN	Gigabit Ethernet
	Wireless	Optional by Mini Card
Front I/O	USB Host	USB 2.0 x 2
	LAN	RJ-45 x 1
	Serial Port	RS-232 x 1, RS-232/422/485 x 1
	Others	System & HDD indicator LED x 2, Power Switch, DC-in
Rear I/O	DIO	DIO 4-bit with VCC and ground in
	Audio	Mic-in/ Line-out
Bottom I/O	USB Host	USB2.0 x 3
Expansion	Mini PCIe	Mini Card half size (or mSATA)
Indicator	Front	Power LED x 1, HDD LED x 1
Power Requirement		DC-in +12V ATX or DC-in +7~30V ATX (Optional)
Power Consumption		Intel® Atom™ N2600 1.6 GHz, DDR3 800 2GB, 1.5A @ +12V

Embedded Box	TKS-P20-CV01

System Cooling		Fanless
Mounting		Wallmount, DIN RAIL (optional)
Dimension		4.7" x 2.3" x 4.3" (120mm x 59.5mm x 110mm)
Gross Weight		2.2 lb (1 Kg)
Net Weight		1.8 lb (0.82 Kg)
Operating Temperature		32°F ~ 131°F (0°C ~ 55°C)
Storage Temperature		-40°F ~ 176°F (-40°C ~ 80°C)
Operating Humidity		0%~90% relative humidity, non-condensing
Anti-Vibration		2 g rms/ 5 ~ 500Hz/ operation (mSATA)
Anti-Shock		20 G peak acceleration (11 msec. duration) (mSATA)
Certification	**EMC**	CE/FCC Class A
OS Support		Windows® XP Embedded, Windows® XP, Windows® 7, Linux Fedora

Note: COM1 and COM2's performance will be among 9,600 to 115,200 bps depend on the system loadings.

Chapter

2

Quick Installation Guide

2.1 Safety Precautions

Warning!

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Caution!

Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. 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

2.2   Mechanical Drawing of TKS-P20-CV01

Figure 2.1 Mechanical Drawing of TKS-P20-CV01

Dimension: 120mmx 59.5mmx 110mm
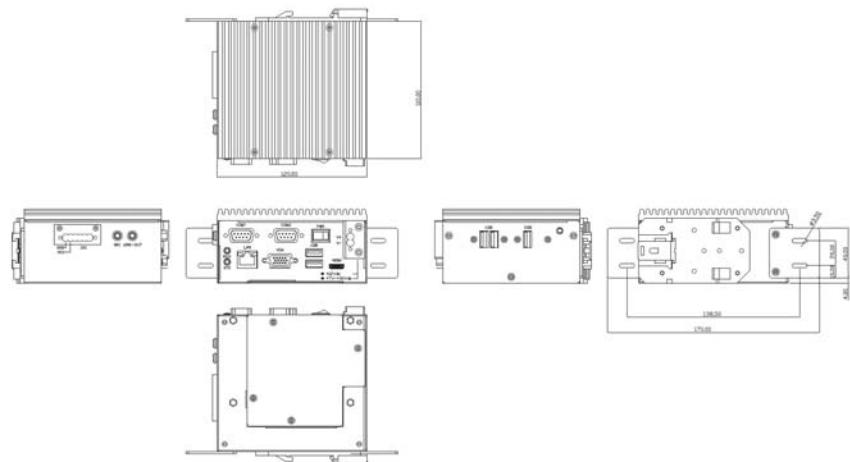
2.3 A Quick Tour of the TKS-P20-CV01

Before you start to set up the TKS-P20-CV01, take a moment to become familiar with the locations and purposes of the controls, drives, connections and ports, which are illustrated in the figures below. When you place the TKS-P20-CV01 upright on the desktop, its front panel appears as Show in Figure 2-1.

Front View

Front View of the Point of Care Terminal
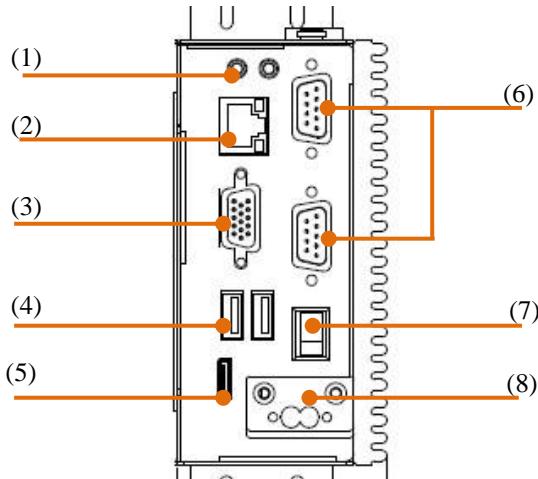
(1). Power and HDD indicator LED

(2). Gigabit Ethernet LAN Port

(3). VGA port

(4). USB x2

(5). Mini HDMI port

(6). COM1 & COM2

(7). Power Switch

(8). Power DC-IN

Remark: Power DC-IN with +12V or option wide range power board for 7-30V DC input

Top Side View

Top side View of the TKS-P20-CV01
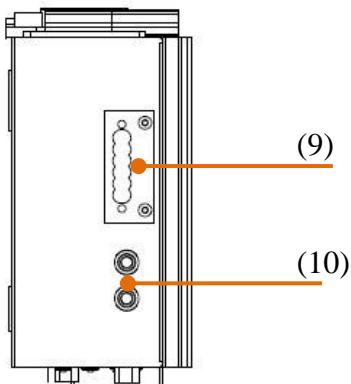
(9). 4 bit Digital IO with VCC and ground pin

(10). Audio port with Mic-in & line-out

UBottom View

Top side View of the TKS-P20-CV01

(11)
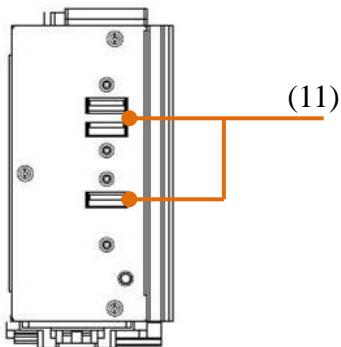
(11). USB x3

Rear side View

Rear side View of the TKS-P20-CV01

(13)

(12)
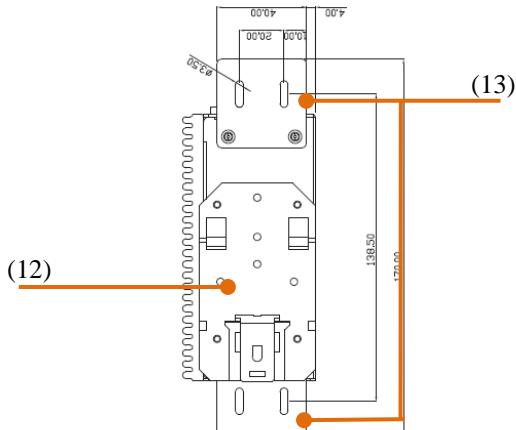
(12). DIN RAIL kit (optional)

(13). Wall mount Kit (optional)

Left side I/O View

Figure 2.4 Left side View of the Point of Care Terminal
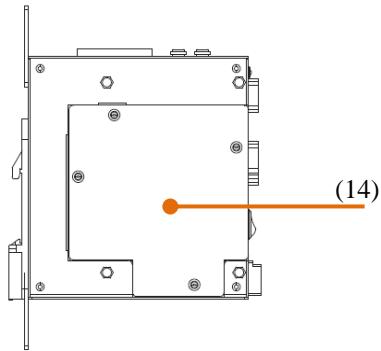
(14). I/O cover

2.4 Installing mSATA and RAM module

Step 1: Unfasten the screws on the I/O cover from Left side
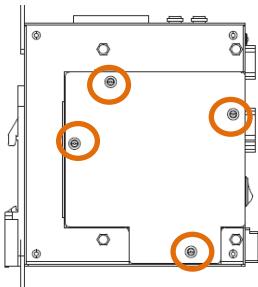
Step 2: Remove the I/O cover then you can see the inside of system

Step 3: Locate the memory module, Insert the gold colored contact into the Memory Socket. Push the module down, until it is firmly seated locking two latches on the sides.

Step 4: Locate the mSATA module(same with mini card module), insert the gold colored contact into the Socket of mSATA mini card. Push the module down, until it is firmly seated by locking two latches on the sides.
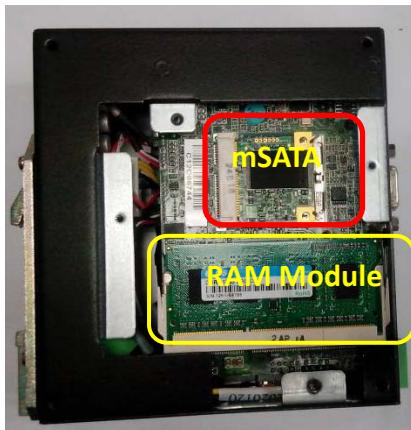
Step 5: Please take the I/O cover back to the chassis. Then fasten the 4 screws of I/O cover.

2.5 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	COM2 RI/+5/+12V Selection
JP2	Clear CMOS
JP6	AT/ATX Power Mode Selection

2.6 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
CN1	COM Port 1
CN2	COM Port 2
CN3	Digital I/O
CN4	+5V Output for SATA HDD
CN5	SATA Port
CN7	RJ-45 Ethernet
CN10	LPC Expansion I/F
CN11	USB Port 5
CN12	Analog CRT Display
CN13	USB Port 3
CN14	USB Port 4
CN16	USB Port 1 and 2

Embedded Box	**T K S - P 2 0 - C V 0 1**
CN17	HDMI Type C
PCIE1	Mini Card

2.7 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.

Open   **Closed**   **Closed 2-3**
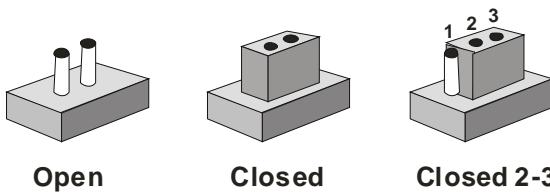
A pair of needle-nose pliers may be helpful when working with jumpers.

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.

2.8 COM2 Pin8 Function Selection (JP1)
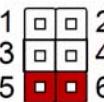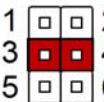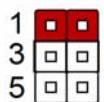
	+12V	Ring	+5V

JP1	Function
1-2	+12V
3-4	Ring (Default)
5-6	+5V

2.9 Clear CMOS Selection (JP2)

Normal   Clear CMOS

JP2	Function
1-2	Normal (Default)
2-3	Clear CMOS

2.10 AT/ATX Power Supply Mode Selection (JP6)

AT Mode   ATX Mode

JP6	Function
1-2	AT Mode
2-3	ATX Mod (Default)

2.11 COM Port 1 Connector (CN)
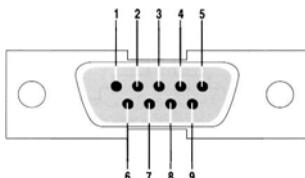
Pin	Pin Name	Signal Type	Signal Level
1	DCD1	IN	
2	RX1	IN	
3	TX1	OUT	±9V
4	DTR1	OUT	±9V
5	GND	GND	
6	DSR1	IN	
7	RTS1	OUT	±9V
8	CTS1	IN	
9	RI1	IN	

2.12 COM Port 2 Connector (CN2)
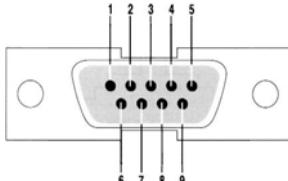
RS-232

Pin	Pin Name	Signal Type	Signal Level
1	DCD2	IN	
2	RX2	IN	
3	TX2	OUT	±9V
4	DTR2	OUT	±9V
5	GND	GND	
6	DSR2	IN	
7	RTS2	OUT	±9V
8	CTS2	IN	
9	RI2/+5V/+12V	IN/ PWR	+5V/+12V

RS-422

Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX-	OUT	±5V
2	RS422_TX+	OUT	
3	RS422_RX+	IN	±5V
4	RS422_RX-	IN	
5	NC		
6	NC		
7	NC		
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

RS-485

Pin	Pin Name	Signal Type	Signal Level
1	RS485_D-	I/O	±5V
2	RS485_D+	I/O	±5V
3	NC		
4	NC		
5	NC		
6	NC		
7	NC		
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

2.13 DIO Connector (CN2)
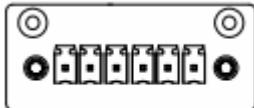
6 5 4 3 2 1

Pin	Pin Name	Signal Type	Signal Level
1	DIO0	I/O	+3.3V
2	DIO1	I/O	+3.3V
3	DIO2	I/O	+3.3V
4	DIO3	I/O	+3.3V
5	DIO_PWR	PWR	+3.3V
6	GND	GND	

GPIO Port	Location (Pin #)	Access Address based on SIO LDN6	
		Input	**Output**
GPIO1	2	Reg 0xD2, bit 0	Reg 0xD1, bit 0
GPIO2	3	Reg 0xD2, bit 1	Reg 0xD1, bit 1
GPIO3	4	Reg 0xD2, bit 2	Reg 0xD1, bit 2
GPIO4	5	Reg 0xD2, bit 3	Reg 0xD1, bit 3

2.14 +5V Output for SATA HDD Connector (CN4)
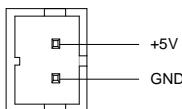
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	

2.15 LPC Port Connector (CN10)
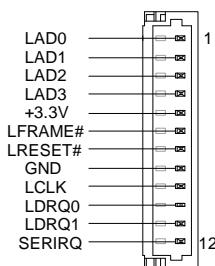
Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	LDRQ0	IN	
11	LDRQ1	IN	
12	SERIRQ	I/O	+3.3V

2.16 USB2.0 Port 1 ~ 5 Connector
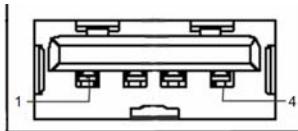
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	USB5_D-	DIFF	
3	USB5_D+	DIFF	
4	GND	GND	

2.17 VGA Port Connector (CN12)
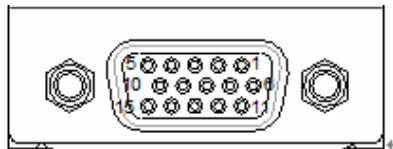
Pin	Pin Name	Signal Type	Signal Level
1	RED	OUT	
2	GREEN	OUT	
3	BLUE	OUT	
4	NC		
5	GND	GND	
6	RED_GND_RTN	GND	
7	GREEN_GND_RTN	GND	
8	BLUE_GND_RTN	GND	
9	+5V	PWR	+5V
10	GND	GND	
11	NC		
12	DDC_DATA	I/O	+5V
13	HSYNC	OUT	
14	VSYNC	OUT	
15	DDC_CLK	I/O	+5V

2.18 HDMI Type C Connector (CN17)
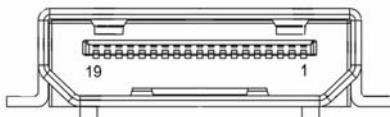
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	HDMI_TX2+	DIFF	
3	HDMI_TX2-	DIFF	
4	GND	GND	
5	HDMI_TX1+	DIFF	
6	HDMI_TX1-	DIFF	
7	GND	GND	
8	HDMI_TX0+	DIFF	
9	HDMI_TX0-	DIFF	
10	GND	GND	
11	HDMI_CLK+	DIFF	
12	HDMI_CLK-	DIFF	
13	GND	GND	
14	NC	NC	
15	HDMI_DDC_CLK	I/O	+5V
16	HDMI_DDC_DATA	I/O	+5V
17	NC	NC	
18	DPD_PWR	RWR	+5V
19	DPD_HPD	IN	

2.19 Mini Card Slot (PCIE1)

Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE#	IN	
2	+3.3VSB/+3.3V	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
8	NC		
9	GND	GND	
10	NC		
11	PCIE_REF_CLK-	DIFF	
12	NC		
13	PCIE_REF_CLK+	DIFF	
14	NC		
15	GND	GND	
16	NC		
17	NC		
18	GND	GND	
19	NC		
20	W_DISABLE#	OUT	+3.3V
21	GND	GND	

	Embedded Box		TKS-P20-CV01
22	PCIE_RST#	OUT	+3.3V
23	PCIE_RX-/ mSATA_RX+	DIFF	
24	+3.3VSB/+3.3V	PWR	+3.3V
25	PCIE_RX+/mSATA_RX-	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V
31	PCIE_TX-/mSATA_TX-	DIFF	
32	SMB_DATA	I/O	+3.3V
33	PCIE_TX+/mSATA_TX+	DIFF	
34	GND	GND	
35	GND	GND	
36	USB8_D-	DIFF	
37	GND	GND	
38	USB8_D+	DIFF	
39	+3.3VSB/+3.3V	PWR	+3.3V
40	GND	GND	
41	+3.3VSB/+3.3V	PWR	+3.3V
42	NC		
43	GND/NC	GND	
44	NC		
45	NC		

Embedded Box		TKS-P20-CV01	
46	NC		
47	NC		
48	+1.5V	PWR	+1.5V
49	NC		
50	GND	GND	
51	NC		
52	+3.3VSB/+3.3V	PWR	+3.3V

Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

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	×	○	○	○	○	○
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。						
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。						
备注：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。						

Chapter

3

AMI

BIOS Setup

3.1 System Test and Iinitialization

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-P20-CV01 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 <Del>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/disable 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) 2012 American Megatrends, Inc.
    Main  Advanced  Chipset  Boot  Security  Save & Exit

    BIOS Information                                          Set the Date. Use Tab to
       TKS-P20-CV01-ASG Rx.y(TZ23AMxy) (MM/DD/YYYY)          switch between Date elements.

    BIOS Vendor                    American Megatrends
    Core Version                   4.6.5.3
    Compliancy                     UEFI 2.3; PI 1.2

    System Date                    [Day MM/DD/YYYY]
    System Time                    [hh:mm:ss]

    Access Level                   Administrator

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

              Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

System Date	Day MM:DD:YYYY	
Change the month, year and century. The 'Day' is changed automatically.		
System Time	HH : MM : SS	
Change the clock of the system.		

Setup submenu: Advanced
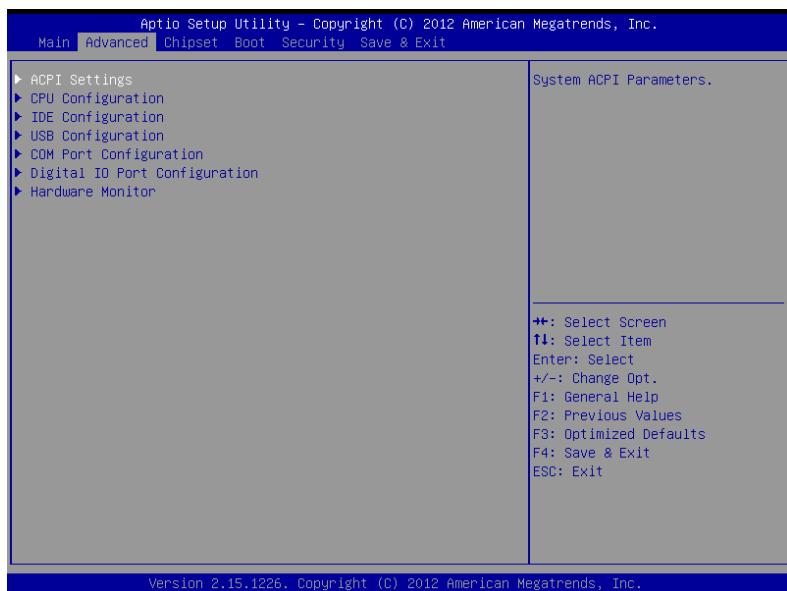
Options summary: (***default setting***)

ACPI Settings		
System ACPI Parameters		
CPU Configuration		
CPU Configuration Parameters		
IDE Configuration		
IDE Device Options Settings		
USB Configuration		
USB Configuration Parameters		
COM Port Configuration		

COM Port Configuration Parameters		
Digital IO Port Configuration		
DIO configuration		
H/W Monitor		
Monitor hardware status		

ACPI Settings
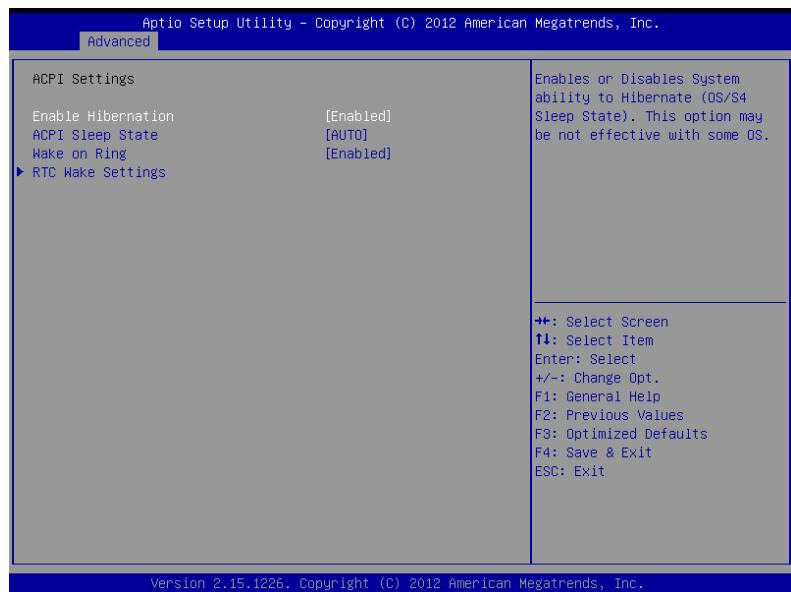
Options summary: (*default setting*)

Enable Hibernation	**Enabled**	
	Disabled	
Enabled or disabled hibernate (OS/S4 Sleep State).		

ACPI Sleep State	Suspend Disabled	
	S1 only(CPU Stop Clock)	
	S3 only(Suspend to RAM)	
	AUTO	
Select the ACPI state used for System Suspend		
Wake on Ring	*Enabled*	
	Disabled	
Enabled or disabled wake on ring function.		
RTC Wake Settings		
Enable system to wake from S5 using RTC alarm.		

RTC Wake Settings

```
            Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
   Advanced

   Wake system with Fixed Time      [Enabled]          Enable or disable System wake
   Wake up day                      0                  on alarm event. When enabled,
   Wake up hour                     0                  System will wake on the
   Wake up minute                   0                  hr::min::sec specified
   Wake up second                   0

   Wake system with Dynamic Time    [Disabled]
   Wake up minute increase          1




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



            Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Wake system with Fixed Time	*Disabled*	
	Enabled	
Enable or disable System wake on alarm event. Wake up time is setting by following settings.		
Wake up day	0-31	
Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up		
Wake up hour	0-23	
Wake up minute	0-59	
Wake up second	0-59	
Wake system with Dynamic Time	*Disabled*	
	Enabled	
Enable or disable System wake on alarm event. Wake up time is current time + Increase minutes.		
Wake up minute increase	1-5	

CPU Configuration

```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
        Advanced

    CPU Configuration                                          Enabled for Windows XP and
                                                               Linux (OS optimized for
    Processor Type              Intel(R) Atom(TM) CPU N2        Hyper-Threading Technology)
    EMT64                       Not Supported                   and Disabled for other OS (OS
    Processor Speed             1600 MHz                        not optimized for
    System Bus Speed            400 MHz                         Hyper-Threading Technology).
    Ratio Status                16
    Actual Ratio                16
    System Bus Speed            400 MHz
    Processor Stepping          30661
    Microcode Revision          269
    L1 Cache RAM                2x56 k
    L2 Cache RAM                2x512 k
    Processor Core              Dual
    Hyper-Threading             Supported                       ++: Select Screen
                                                               ↑↓: Select Item
    Hyper-Threading             [Enabled]                      Enter: Select
    Execute Disable Bit         [Enabled]                      +/-: Change Opt.
    Limit CPUID Maximum         [Disabled]                     F1: General Help
    ► CPU Power Management                                      F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit



                Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Hyper-Threading	Disabled	
	Enabled	
En/Disable CPU Hyper-Threading function		
Execute Disable Bit	Disabled	
	Enabled	
En/Disable XD bit for supporting OS		
Limit CPUID Maximum	*Disabled*	
	Enabled	
Disabled for Windows XP		

CPU Power Management		
Configure CPU PPM parameters		

CPU Power Management
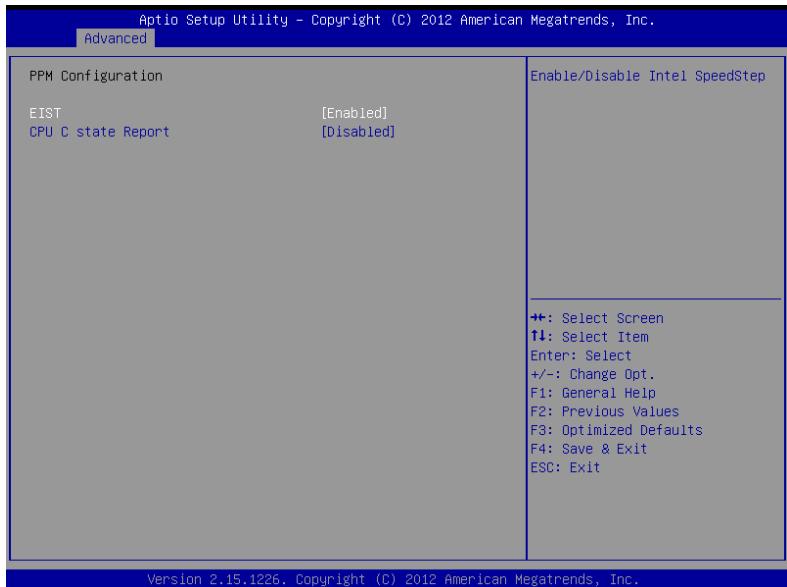
Options summary: (*default setting*)

EIST	Disabled	
	Enabled	
En/Disable Intel SpeedStep		
CPU C State Report	*Disabled*	
	Enabled	

Report C State support for ACPI OS

IDE Configuration

Options summary: (*default setting*)

SATA Controller(s)	Disabled	
	Enabled	
En/Disable SATA controller		
Configure SATA as	**IDE**	
	AHCI	
Configure SATA controller operating as IDE/AHCI mode.		

USB Configuration

```
            Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
       Advanced

   USB Configuration                                      Enables Legacy USB support.
                                                          AUTO option disables legacy
   USB Devices:                                           support if no USB devices are
        1 Drive, 1 Keyboard, 1 Mouse                      connected. DISABLE option will
                                                          keep USB devices available
   Legacy USB Support              [Enabled]              only for EFI applications.

   Mass Storage Devices:
     USB Device Modelname          [Auto]


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


            Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Legacy USB Support	**Enabled**	
	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. DISABLE option will keep USB devices available only for EFI application		
Device Name (Emulation Type)	**Auto**	
	Floppy	

	Forced FDD	
	Hard Disk	
	CD-ROM	
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)		

COM Port Configuration

```
          Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
    Advanced

    COM Port Configuration                          Set Parameters of Serial Port
                                                    1 (COMA)
    F81801 Super IO Chip            F81801
  ▶ Serial Port 1 Configuration
  ▶ Serial Port 2 Configuration




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


          Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Serial Port 1/2 Configuration		
Set Parameters of Serial Port 1/2		

Serial Port 1 Configuration
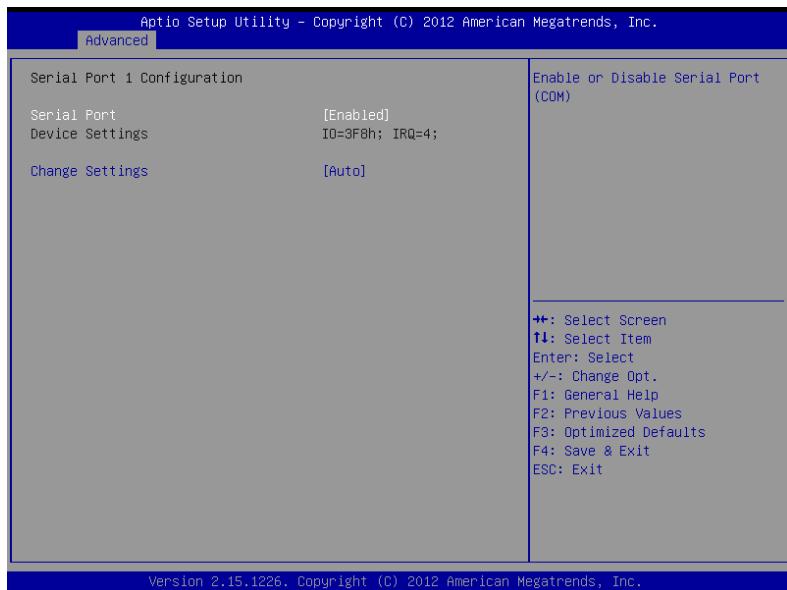
```
         Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
     Advanced

  Serial Port 1 Configuration                              Enable or Disable Serial Port
                                                           (COM)
  Serial Port                      [Enabled]
  Device Settings                  IO=3F8h; IRQ=4;

  Change Settings                  [Auto]




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



         Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Serial Port	Disabled	
	Enabled	
En/Disable specified serial port.		
Change Settings	**Auto**	
	IO=3F8h; IRQ=4;	
	IO=3F8h; IRQ=3,4,5,7,10,11,12;	
	IO=2F8h; IRQ=3,4,5,7,10,11,12;	
	IO=3E8h; IRQ=3,4,5,7,10,11,12;	
	IO=2E8h; IRQ=3,4,5,7,10,11,12;	

Select a resource setting for Super IO device.

Serial Port 2 Configuration
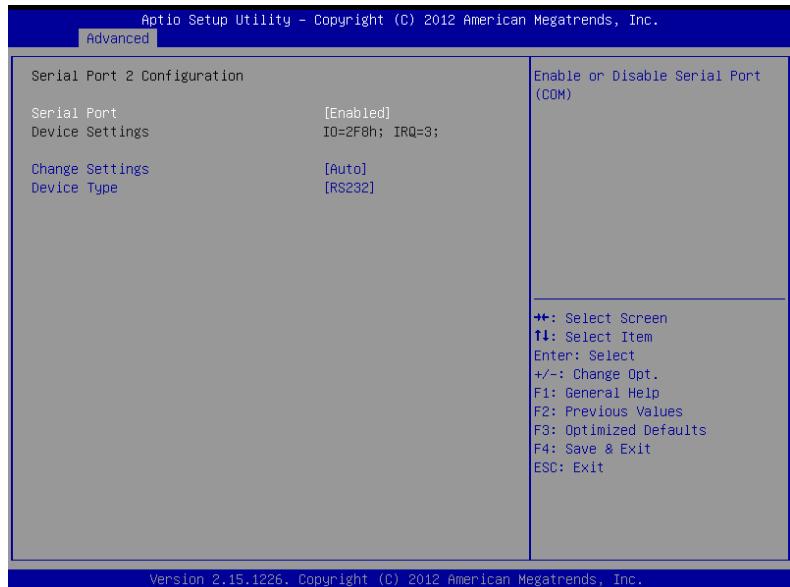
```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
  Advanced

  Serial Port 2 Configuration                           Enable or Disable Serial Port
                                                        (COM)
  Serial Port                       [Enabled]
  Device Settings                   IO=2F8h; IRQ=3;

  Change Settings                   [Auto]
  Device Type                       [RS232]




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


          Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (***default setting***)

Serial Port	Disabled	
	Enabled	
En/Disable specified serial port.		
Change Settings	***Auto***	
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4,5,7,10,11,12;	
	IO=2F8h; IRQ=3,4,5,7,10,11,12;	

	IO=3E8h; IRQ=3,4,5,7,10,11,12;	
	IO=2E8h; IRQ=3,4,5,7,10,11,12;	
Select a resource setting for Super IO device.		
Device Type	*RS232*	
	RS422	
	RS485	
Configure COM2 operated as RS232, RS422 or RS485.		

Digital IO Port Configuration

```
           Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
   Advanced

  Digital IO Port Configuration                          Set GPIO as Input or Output
  GPIO1-4: 0xD1h[0-3]@SIO LDN6

  GPIO1  Direction              [Input ]
  GPIO2  Direction              [Input ]
  GPIO3  Direction              [Output]
    Output Level                [Low   ]
  GPIO4  Direction              [Output]
    Output Level                [Low   ]


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


           Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

GPIO1/GPIO2	*Input*	

Direction	Output	
Set GPIO1/GPIO2 as Input or Output		
GPIO3/GPIO4 Direction	Input *Output*	
Set GPIO3/GPIO4 as Input or Output		
Output Level	Hi *Low*	
Set GPIO Level when used as Output		

H/W Monitor

Setup submenu: Chipset

```
              Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
      Main  Advanced  Chipset  Boot  Security  Save & Exit

 ▶ Host Bridge                                              Host Bridge Parameters
 ▶ South Bridge



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



              Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```
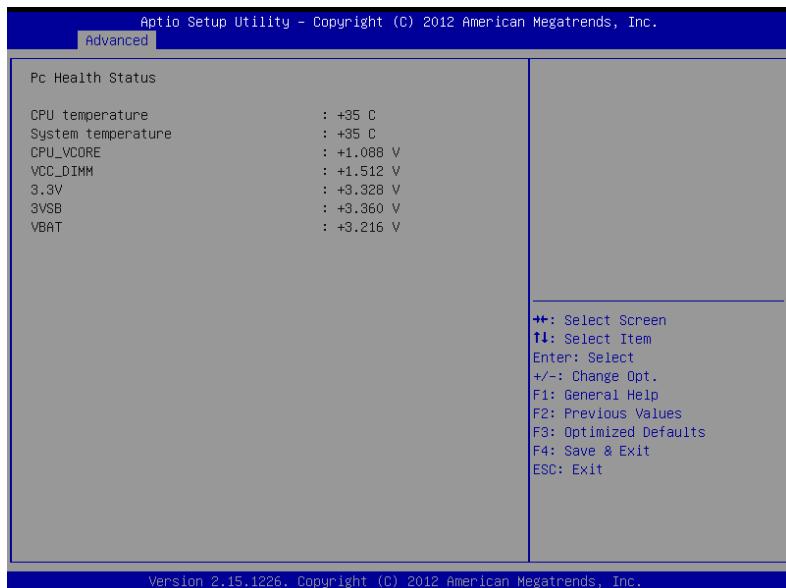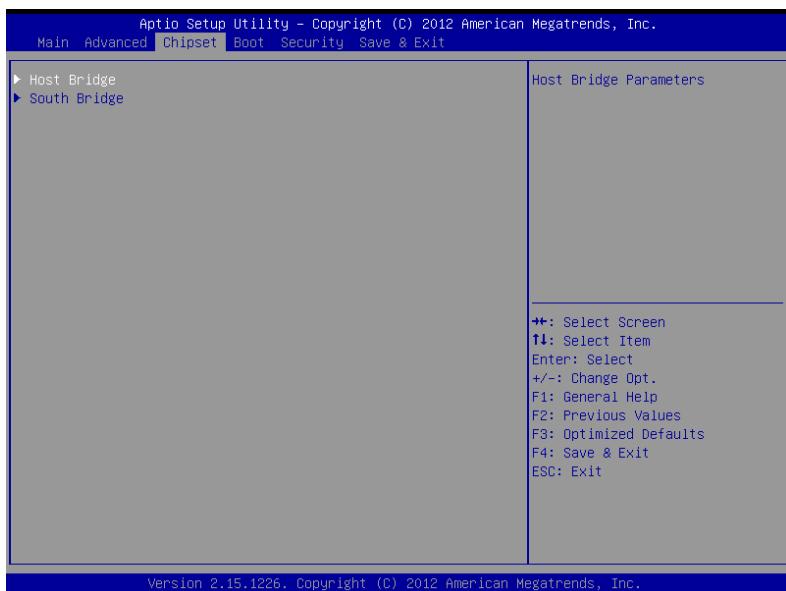
Options summary: (*default setting*)

Host Bridge		
Host Bridge Parameters		
South Bridge		
South Bridge Parameters		

Host Bridge

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
 Chipset

******* Memory Information *******                        Configure Fixed Graphics
Memory Frequency              800 MHz(DDR3)               Memory Size
Total Memory                  2048 MB

Intel IGD Configuration
Fixed Graphics Memory Size    [128MB]

IGFX - Boot Type              [Auto Detect]


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




        Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Fixed Graphics Memory Size	*128MB*	
	256MB	
Configure Fixed Graphics Memory Size		
IGFX - Boot Type	*Auto Detect*	
	CRT	
	HDMI	
Select Primary boot display device		

South Bridge

```
                 Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                    Chipset

▶ Onboard Devices                                              Enable/Disable Intel(R) IO
  MiniCard Function                   [mSATA]                  Controller Hub (TPT) devices
  PCIe MiniCard Slot                  [Auto]


  High Precision Event Timer Configuration
  High Precision Timer                [Enabled]

  SLP_S4 Assertion Width              [1-2 Seconds]
  Restore AC Power Loss               [Last State]

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



                 Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Onboard Devices		
Onboard devices parameters configurations		
MiniCard Function	*mSATA*	
	PCIe	
Switch miniCard function to mSATA or PCIe		
PCIe MiniCard Slot	*Auto*	
	Enabled	
	Disabled	
Control the PCI Express Root Port.		

High Precision Timer	*Enabled*	
	Disabled	
Enable or Disable the High Precision Event Timer		
SLP_S4 Assertion Width	*1-2 Seconds*	
	2-3 Seconds	
	3-4 Seconds	
	4-5 Seconds	
Select a minimum assertion width of the SLP_S4# signal		
Restore AC Power Loss	Power On	
	Power Off	
	Last State	
Select AC power state when power is re-applied after a power failure.		

Onboard Devices

```
             Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                    Chipset

   Azalia Controller            [HD Audio]          Azalia Controller
   LAN Controller               [Enabled]
   SMBus Controller             [Enabled]




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



             Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```
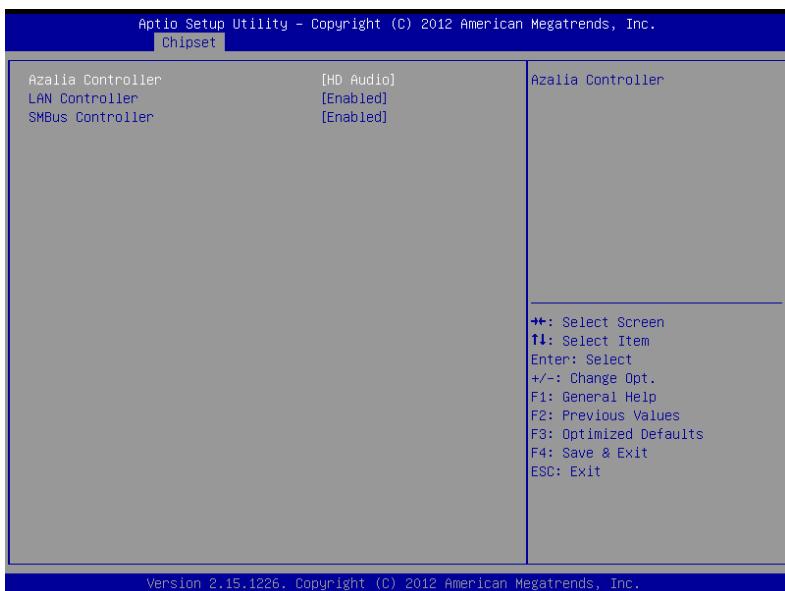
Options summary: (*default setting*)

Azalia Controller	Disabled	
	HD Audio	
Enable or disabled Azalia controller		
LAN Controller	Disabled	
	Enabled	
Enable or disable Realtek R8111E PCIE Lan Device		
SMBus Controller	Disabled	
	Enabled	
Enable or Disable OnChip SMBus Controller		

Setup submenu: Boot

```
         Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
      Main  Advanced  Chipset  Boot  Security  Save & Exit

    Boot Configuration                                    Enables or disables Quiet Boot
    Quiet Boot                      [Enabled]             option
    Launch LAN PXE OpROM            [Disabled]


    Boot Option Priorities
    Boot Option #1                  [Device Modelname]
    Boot Option #2                  [Device Modelname]
    Boot Option #3                  [Device Modelname]
    Boot Option #4                  [Device Modelname]
    Boot Option #5                  [Device Modelname]

    CD/DVD ROM Drive BBS Priorities
    Hard Drive BBS Priorities                             →←: Select Screen
    Floppy Drive BBS Priorities                           ↑↓: Select Item
    Network Device BBS Priorities                         Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit


         Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Quiet Boot	Disabled	
	Enabled	
En/Disable showing boot logo.		
Launch LAN PXE OpROM	***Disabled***	
	Enabled	
En/Disable PXE boot for RTL8111E LAN		
Boot Option #X/ XXXX Drive BBS Priorities		
The order of boot priorities.		

BBS Priorities

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                           Boot

    Boot Option #1              [Device Modelname]        Sets the system boot order
    Boot Option #2              [Device Modelname]
    Boot Option #3              [Device Modelname]
    Boot Option #4              [Device Modelname]
    Boot Option #5              [Device Modelname]
    Boot Option #6              [Device Modelname]



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



          Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (**default setting**)

Boot Option #x	Disabled	
	Device name	
Sets the system boot order		

Setup submenu: Security

```
                 Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
      Main  Advanced  Chipset  Boot  Security  Save & Exit

      Password Description                               Set Administrator Password

      If ONLY the Administrator's password is set,
      then this only limits access to Setup and is
      only asked for when entering Setup.
      If ONLY the User's password is set, then this
      is a power on password and must be entered to
      boot or enter Setup. In Setup the User will
      have Administrator rights.
      The password length must be
      in the following range:
      Minimum length              3
      Maximum length              20

                                                        →←: Select Screen
                                                        ↑↓: Select Item
      Administrator Password                            Enter: Select
      User Password                                     +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
      HDD Security Configuration:                       F3: Optimized Defaults
      HDD O:HDD Modelname                               F4: Save & Exit
                                                        ESC: Exit


                 Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Administrator Password/ User Password	*Not set*	
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. *Install the Password:* Press Enter on this item, 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.

HDD Security

```
          Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                                Security

  HDD Password Description :

  Allows  Access to  Set, Modify  and  Clear
  HardDisk User and Master Passwords.
  User Password need to be installed for
  Enabling Security. Master Password can
  be Modified only when successfully unlocked
  with Master Password in POST.

  HDD PASSWORD CONFIGURATION:

  Security Supported       :       Yes
  Security Enabled         :       No
  Security Locked          :       No             →←: Select Screen
  Security Frozen          :       No             ↑↓: Select Item
  HDD User Pwd Status              NOT INSTALLED   Enter: Select
  HDD Master Pwd Status            INSTALLED       +/-: Change Opt.
                                                   F1: General Help
  Set User Password                                F2: Previous Values
  Set Master Password                              F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

          Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Set User Password/	*Not set*	
Set Master Password		
You can install a Master and User password. Before booting to OS, HDD will be set to frozen state. On S3 resume HDD will be unlocked using the HDD Password we		

entered while system booting.

Install the Password:

Press Enter on this item, 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.

Setup submenu: Exit

```
                Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
      Main   Advanced   Chipset   Boot   Security   Save & Exit

    Save Changes and Reset                                    Reset the system after saving
    Discard Changes and Reset                                 the changes.

    Restore Defaults
    Save as User Defaults
    Restore User Defaults




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



                Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

Options summary: (*default setting*)

Save Changes and Reset		
Reset the system after saving the changes		
Discard Changes and Reset		
Reset system setup without saving any changes		
Restore Defaults		
Restore/Load Default values for all the setup options.		
Save as User Defaults		
Save the changes done so far as User Defaults		
Restore User Defaults		

Restore the User Defaults to all the setup options

Chapter

4

Driver Installation

.

The TKS-P20-CV01 comes with an AutoRun DVD-ROM that contains all drivers and utilities that can help you to install the driver automatically.

Insert the driver DVD, the driver DVD-title will auto start and show the installation guide. If not, please follow the sequence below to install the drivers.

Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install AHCI Driver

Step 4 – Install LAN Driver

Step 5 – Install Audio Driver

Step 6 – Serial Port Driver (Optional)

Please read instructions below for further detailed installations.

4.1   Installation:

Insert the TKS-P20-CV01 DVD-ROM into the DVD-ROM drive. And install the drivers from Step 1 to Step 6 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 *infinst_autol_1034.exe* file 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 VGA Driver
For Windows® 7

1. Click on the *STEP2-VGA* folder and select the folder of *WIN7_32*
2. Double click on the *Setup.exe* file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

For Windows® XP

1. Install Framework 3.5

   ● Double click on the *dotnetfx35.exe*
   ● Follow the instructions that the window shows
   ● The system will help you install the driver automatically

2. Install IEMGD

- Double click on the *SETUP.exe*
- Select the configuration
- Follow the instructions that the window shows
- The system will help you install the driver automatically
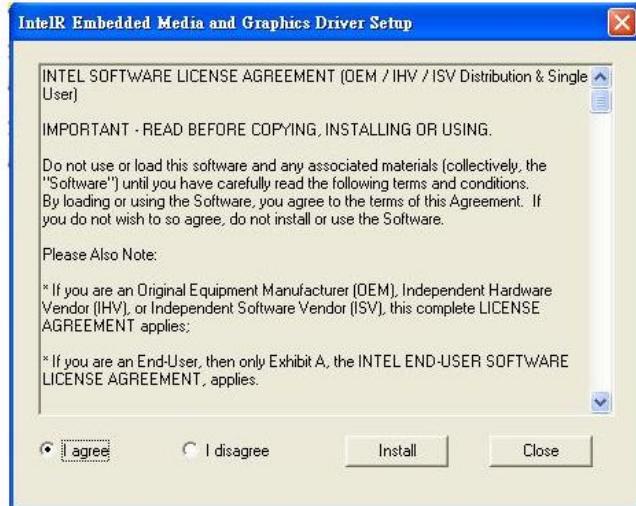
If you want to update driver, please uninstall driver first.

Uninstall IEMGD

1. Double click on the *SETUP.exe*

2. Follow the instructions that the window shows

3. The system will help you uninstall the driver automatically

Step 3 – Install AHCI Driver

   Please refer to the Appendix D AHCI Setting

Step 4 – Install LAN Driver

   1. Click on the **STEP4-LAN** folder and select the OS folder
      your system is

   2. Double click on the **setup.exe** file located in each OS
      folder

   3. Follow the instructions that the window shows

   4. The system will help you install the driver automatically

Step 5 – Install Audio Driver

   1. Click on the **STEP5-AUDIO** folder and select the OS
      folder your system is

   2. Double click on the **Setup.exe** file located in each OS
      folder

   3. Follow the instructions that the window shows

   4. The system will help you install the driver automatically

Step 6– Serial Port Driver (Optional)

For Windows® XP:

   1. Click on the **STEP6-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.
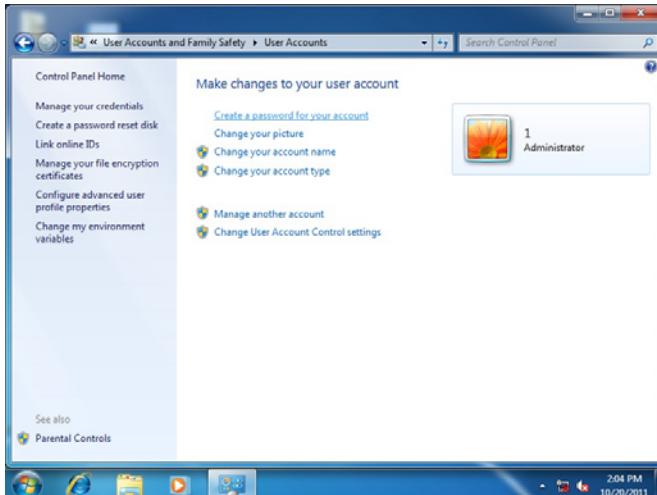
2.   Change User Account Control Settings to [Never notify]
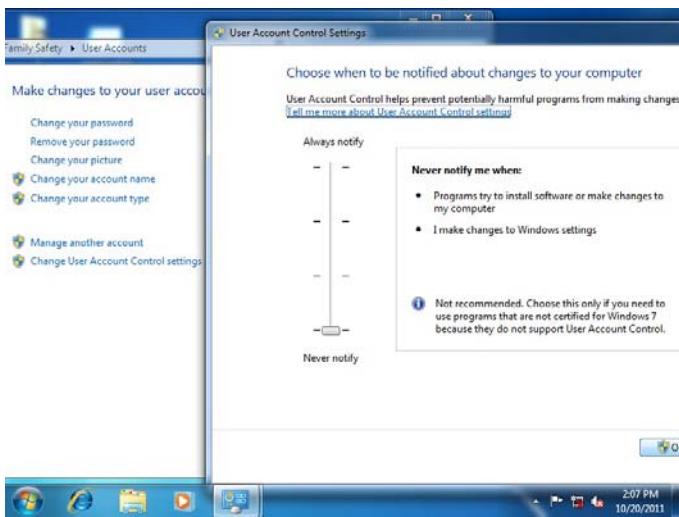
3. Reboot and Administrator login.
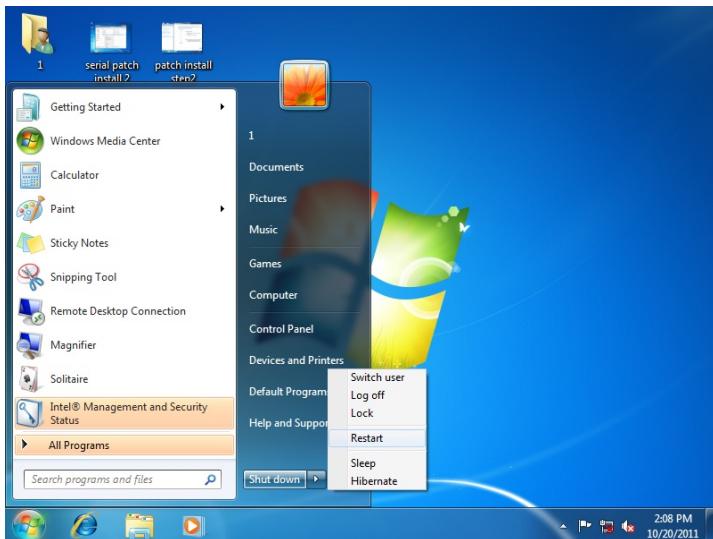
4. To run patch.bat with [Run as administrator].

Appendix

A
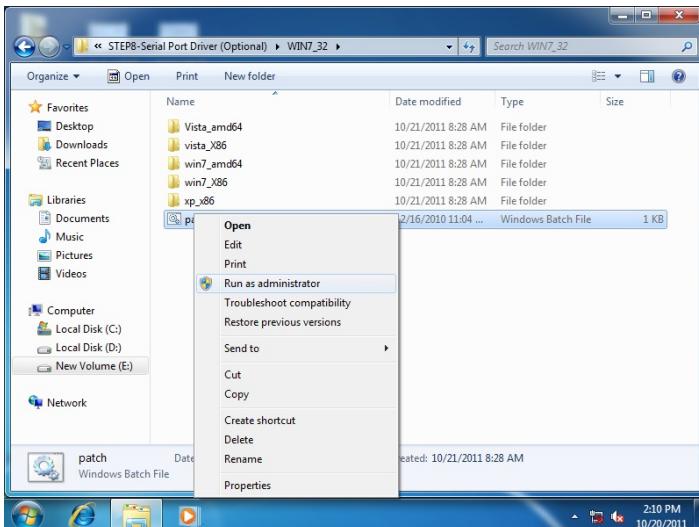
Programming the Watchdog Timer

A.1 Watchdog Timer Registers

Table 1 : Watch dog relative IO address		
	Default Value	**Note**
I/O Base Address	0xA00	I/O Base address for Watchdog operation. This address is assigned by SIO LDN7, register 0x60-0x61.

Table 2 : Watchdog relative register table				
Register	**Offset**	**BitNum**	**Value**	**Note**
Watchdog WDTRST# Enable	0x00	7	1	Enable/Disable time out output via WDTRST# 0: Disable 1: Enable
Pulse Width	0x05	0:1	01	Width of Pulse signal 00: 1ms (do not use) 01: 25ms 10: 125ms 11: 5s *Pulse width is must longer then 16ms.*
Signal Polarity	0x05	2	0	0: low active 1: high active *Must set this bit to 0*
Counting Unit	0x05	3	0	Select time unit. 0: second 1: minute
Output Signal Type	0x05	4	1	0: Level 1: Pulse *Must set this bit to 1*
Watchdog Timer Enable	0x05	5	1	0: Disable 1: Enable
Timeout Status	0x05	6	1	1: timeout occurred. Write a 1 to clear timeout status
Timer Counter	0x06			Time of watchdog timer (0~255)

A.2 WatchDog Sample Program

```
********************************************************************************
// WDT I/O operation relative definition (Please reference to Table 1)
#define  WDTAddr      0xA00  // WDT I/O base address
Void  WDTWriteByte(byte Register, byte Value);
byte  WDTReadByte(byte Register);
Void  WDTSetReg(byte Register, byte Bit, byte Val);
// Watch Dog relative definition (Please reference to Table 2)
#define  DevReg       0x00  // Device configuration register
    #define  WDTRstBit  0x80  // Watchdog WDTRST# (Bit7)
    #define  WDTRstVal  0x80  // Enabled WDTRST#
#define  TimerReg     0x05  // Timer register
    #define  PSWidthBit   0x00    // WDTRST# Pulse width (Bit0:1)
    #define  PSWidthVal   0x01    // 25ms for WDTRST# pulse
    #define  PolarityBit  0x02    // WDTRST# Signal polarity (Bit2)
    #define  PolarityVal  0x00    // Low active for WDTRST#
    #define  UnitBit      0x03    // Unit for timer (Bit3)
    #define  ModeBit      0x04    // WDTRST# mode (Bit4)
    #define  ModeVal      0x01    // 0:level 1: pulse
    #define  EnableBit    0x05    // WDT timer enable (Bit5)
    #define  EnableVal    0x01    // 1: enable
    #define  StatusBit    0x06    // WDT timer status (Bit6)
#define  CounterReg  0x06  // Timer counter register
********************************************************************************


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

      // Procedure : AaeonWDTEnable
      // This procudure will enable the WDT counting.
```

```
        AaeonWDTEnable();
}
*******************************************************************************

*******************************************************************************
// Procedure : AaeonWDTEnable
VOID  AaeonWDTEnable (){
        WDTEnableDisable(1);
}

// Procedure : AaeonWDTConfig
VOID  AaeonWDTConfig (byte Counter, BOOLEAN Unit){
        // Disable WDT counting
        WDTEnableDisable(0);
        // Clear Watchdog Timeout Status
        WDTClearTimeoutStatus();
        // WDT relative parameter setting
        WDTParameterSetting(Timer, Unit);
}

VOID  WDTEnableDisable(byte Value){
        If (Value == 1)
            WDTSetBit(TimerReg, EnableBit, 1);
        else
            WDTSetBit(TimerReg, EnableBit, 0);
}

VOID  WDTParameterSetting(byte Counter, BOOLEAN Unit){
        // Watchdog Timer counter setting
        WDTWriteByte(CounterReg, Counter);
        // WDT counting unit setting
        WDTSetBit(TimerReg, UnitBit, Unit);
        // WDT output mode set to pulse
        WDTSetBit(TimerReg, ModeBit, ModeVal);
        // WDT output mode set to active low
        WDTSetBit(TimerReg, PolarityBit, PolarityVal);
        // WDT output pulse width is 25ms
```

```
        WDTSetBit(TimerReg, PSWidthBit, PSWidthVal);
        // Watchdog WDTRST# Enable
        WDTSetBit(DevReg, WDTRstBit, WDTRstVal);
}

VOID   WDTClearTimeoutStatus(){
        WDTSetBit(TimerReg, StatusBit, 1);
}
********************************************************************************


********************************************************************************
VOID   WDTWriteByte(byte Register, byte Value){
        IOWriteByte(WDTAddr+Register, Value);
}

byte   WDTReadByte(byte Register){
        return IOReadByte(WDTAddr+Register);
}

VOID   WDTSetBit(byte Register, byte Bit, byte Val){
        byte TmpValue;

        TmpValue = WDTReadByte(Register);
        TmpValue &= ~(1 << Bit);
        TmpValue |= Val << Bit;
        WDTWriteByte(Register, TmpValue);
}


********************************************************************************
```

Appendix

B

I/O Information

B.1 I/O Address Map

Input/output (IO)
- [00000000 - 0000001F] Direct memory access controller
- [00000000 - 00000CF7] PCI bus
- [00000010 - 0000001F] Motherboard resources
- [00000020 - 00000021] Programmable interrupt controller
- [00000022 - 0000003F] Motherboard resources
- [00000024 - 00000025] Programmable interrupt controller
- [00000028 - 00000029] Programmable interrupt controller
- [0000002C - 0000002D] Programmable interrupt controller
- [0000002E - 0000002F] Motherboard resources
- [00000030 - 00000031] Programmable interrupt controller
- [00000034 - 00000035] Programmable interrupt controller
- [00000038 - 00000039] Programmable interrupt controller
- [0000003C - 0000003D] Programmable interrupt controller
- [00000040 - 00000043] System timer
- [00000044 - 0000005F] Motherboard resources
- [0000004E - 0000004F] Motherboard resources
- [00000050 - 00000053] System timer
- [00000060 - 00000060] Standard PS/2 Keyboard
- [00000061 - 00000061] Motherboard resources
- [00000062 - 00000063] Motherboard resources
- [00000063 - 00000063] Motherboard resources
- [00000064 - 00000064] Standard PS/2 Keyboard
- [00000065 - 00000065] Motherboard resources
- [00000065 - 0000006F] Motherboard resources
- [00000067 - 00000067] Motherboard resources
- [00000070 - 00000070] Motherboard resources
- [00000070 - 00000077] System CMOS/real time clock
- [00000072 - 0000007F] Motherboard resources
- [00000080 - 00000080] Motherboard resources
- [00000080 - 00000080] Motherboard resources
- [00000081 - 00000091] Direct memory access controller
- [00000084 - 00000086] Motherboard resources
- [00000088 - 00000088] Motherboard resources
- [0000008C - 0000008E] Motherboard resources
- [00000090 - 0000009F] Motherboard resources
- [00000092 - 00000092] Motherboard resources
- [00000093 - 0000009F] Direct memory access controller
- [000000A0 - 000000A1] Programmable interrupt controller
- [000000A2 - 000000BF] Motherboard resources
- [000000A4 - 000000A5] Programmable interrupt controller
- [000000A8 - 000000A9] Programmable interrupt controller
- [000000AC - 000000AD] Programmable interrupt controller

[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources
[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000F0] Numeric data processor
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) Graphics Media Accelerator 3600 Series
[000003C0 - 000003DF] Intel(R) Graphics Media Accelerator 3600 Series
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 0000047F] Motherboard resources
[00000400 - 0000047F] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000500 - 0000053F] Motherboard resources
[00000500 - 0000057F] Motherboard resources
[00000600 - 0000061F] Motherboard resources
[00000680 - 0000069F] Motherboard resources
[000006A0 - 000006AF] Motherboard resources
[000006B0 - 000006EF] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A10 - 00000A1F] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[00001000 - 0000100F] Motherboard resources
[0000E000 - 0000E0FF] Realtek PCIe GBE Family Controller
[0000E000 - 0000EFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[0000F000 - 0000F01F] Intel(R) N10/ICH7 Family SMBus Controller - 27DA
[0000F020 - 0000F02F] Intel(R) ICH7R/DH SATA AHCI Controller

B.2 Memory Address Map

Memory
- [00000000 - 00000FFF] Motherboard resources
- [00000000 - 00000FFF] Motherboard resources
- [00000000 - 00003FFF] Motherboard resources
- [000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator 3600 Series
- [000A0000 - 000BFFFF] PCI bus
- [000C0000 - 000DFFFF] PCI bus
- [000E0000 - 000EFFFF] PCI bus
- [000F0000 - 000FFFFF] PCI bus
- [7F800000 - 7FFFFFFF] PCI bus
- [80000000 - FEBFFFFF] PCI bus
- [DFD00000 - DFDFFFFF] Intel(R) Graphics Media Accelerator 3600 Series
- [DFE00000 - DFE03FFF] Realtek PCIe GBE Family Controller
- [DFE00000 - DFEFFFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
- [DFE04000 - DFE04FFF] Realtek PCIe GBE Family Controller
- [DFF00000 - DFF03FFF] High Definition Audio Controller
- [DFF04000 - DFF043FF] Intel(R) ICH7R/DH SATA AHCI Controller
- [DFF05000 - DFF053FF] Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
- [E0000000 - EFFFFFFF] System board
- [FEC00000 - FEC00FFF] Motherboard resources
- [FED00000 - FED003FF] High precision event timer
- [FED14000 - FED19FFF] System board
- [FED1C000 - FED1FFFF] Motherboard resources
- [FED1C000 - FED1FFFF] Motherboard resources
- [FED20000 - FED8FFFF] Motherboard resources
- [FED45000 - FED8FFFF] Motherboard resources
- [FEE00000 - FEE00FFF] Motherboard resources
- [FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
- [FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
- [FFC00000 - FFFFFFFF] Motherboard resources

B.3 IRQ Mapping Chart

```
Interrupt request (IRQ)
    (ISA) 0x00000000 (00)    System timer
    (ISA) 0x00000001 (01)    Standard PS/2 Keyboard
    (ISA) 0x00000003 (03)    Communications Port (COM2)
    (ISA) 0x00000004 (04)    Communications Port (COM1)
    (ISA) 0x00000008 (08)    System CMOS/real time clock
    (ISA) 0x0000000C (12)    Microsoft PS/2 Mouse
    (ISA) 0x0000000D (13)    Numeric data processor
    (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) 0x00000007 (07)   Intel(R) N10/ICH7 Family SMBus Controller - 27DA
(PCI) 0x00000010 (16)   Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
(PCI) 0x00000010 (16)   Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
```

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	COM1 Port	CATCH	1201-700-09S	Serial Port Cable	1701090150
CN2	COM2 Port	CATCH	1201-700-09S	Serial Port Cable	1701090150
CN3	Digital I/O	CATCH	1201-700-06S	AAEON DIO Extension Cable	1701060150
CN4	+5V Output for SATA HDD	CATCH	1192-700-02S	2 Pins for SATA PWR Cable	1702150155
CN5	SATA Port	ASTRON	97-0912HA-7-R	7-Pin 50cm SATA Cable	1709070500
CN6	External 12V Input	CATCH	1191-700-04S	PWR Cable	170204010S
CN7	RJ-45 Ethernet	UDE	RT7-17FAAM1A	N/A	N/A
CN8	Buzzer	CATCH	1201-700-02S	Buzzer Cable	170302010C
CN9	Audio Line In/Out and MIC Connector	CATCH	1201-700-10S	Audio Cable	1709100254
CN10	LPC Expansion I/F	CATCH	1204-700-12S	AAEON LPC Cable	1703120130

CN11	USB Port 5	CATCH	1201-700-05S	USB Port Cable	1700050207
CN12	Analog CRT Display	ASTRON	HDLH-B15-CFHN1T-1-R	N/A	N/A
CN13	USB Port 3	CATCH	1201-700-05S	USB Port Cable	1700050207
CN14	USB Port 4	CATCH	1201-700-05S	USB Port Cable	1700050207
CN15	18-bit LVDS Output	E-Call	0110-01-553-200	N/A	N/A
CN16	USB Port 1 and 2	TechBest	KS-002D-ANB(2.0)-L	N/A	N/A
CN17	HDMI Type C	ASTRON	360FC19-0N002T-R	N/A	N/A
CN18	LVDS Inverter/ Backlight Connector	CATCH	1192-700-05S	N/A	N/A
CN19	Front Panel	JVE	21B22050-XXS 10B-01G-4/2	AAEON Front Panel Cable	1701100156
BAT1	External RTC Battery Connector	CATCH	1201-700-02S	Battery Cable	175011901M

Appendix

D

AHCI Setting

D.1 Setting AHCI

OS installation to SETUP AHCI Mode

Step 1: Copy below files from "Driver CD -> STEP3-AHCI \WinXP_32" and

to diskette.
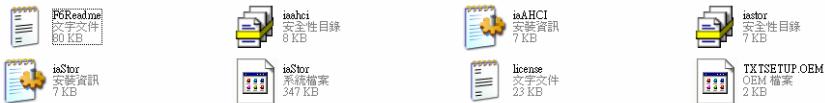
Step 2: Connect the USB Floppy drive to the board and insert the diskette

from previous step.

Step 3: Configure SATA Controller to RAID mode in **BIOS SETUP Menu:**

Advanced -> IDE Configuration -> SATA Mode -> AHCI Mode
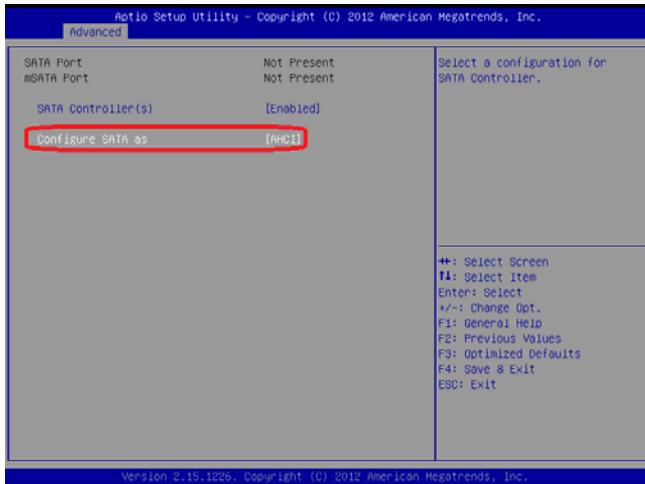
Step 4: Configure DVD/CD-ROM drive as the first boot device.
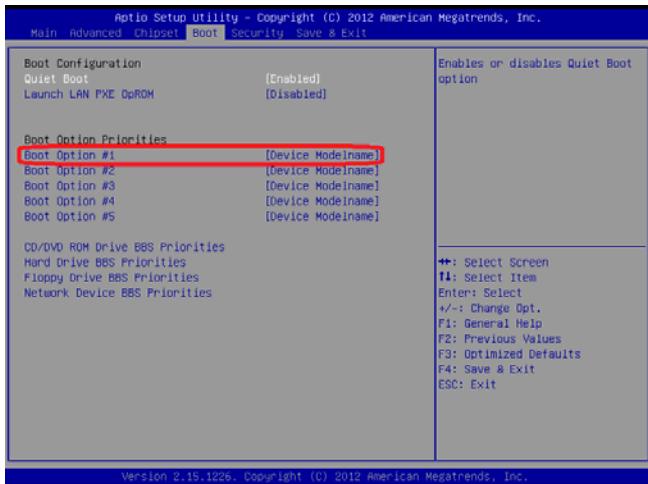
Step 5: Save changes and exit BIOS SETUP
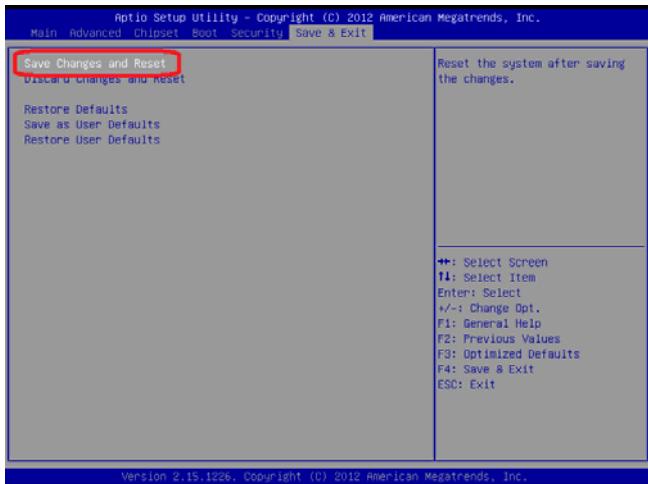
Step 6 – Boot to DVD/CD-ROM device to install OS

Step 7 – Press **"F6"** to install AHCI driver
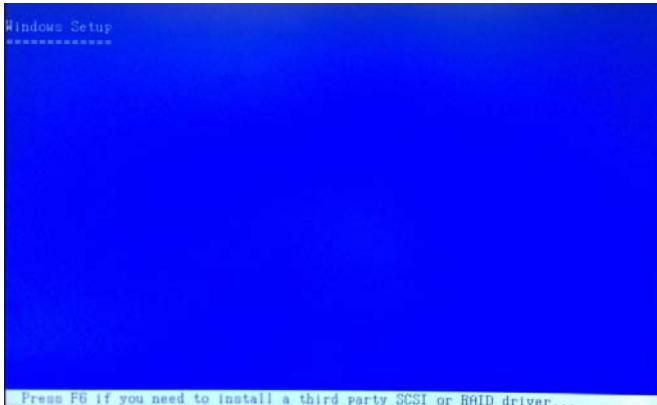
Step 8 – Press **"S"** to install AHCI driver
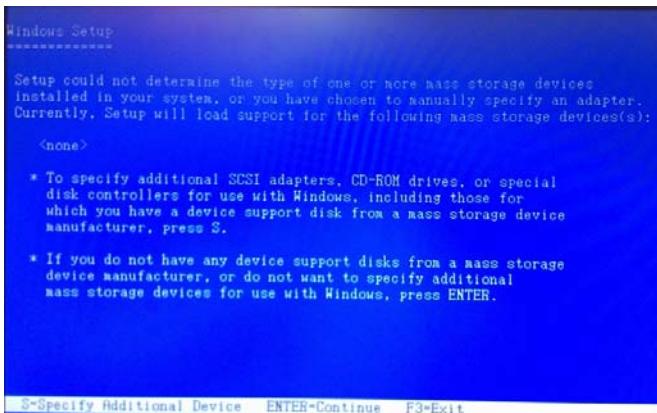
Step 9 – Choose **"Intel(R) ICH7R/DH SATA AHCI Controller"**

Step 10 – Windows Setup will display the controller name you selected in

previous step and continue to install OS when **"ENTER"** pressed.

Appendix

E

Digital I/O Ports

E.1 Electrical Specifications for Digital I/O Ports

Table 1 : Digital Input/Output Pin Electrical Specification						
Pin	Type	Input Threshold Voltage		Output Voltage		Note
		Low	High	Low	High	
DIO1	I/O	0.8	2.0	0	3.3	
DIO2	I/O	0.8	2.0	0	3.3	
DIO3	I/O	0.8	2.0	0	3.3	
DIO4	I/O	0.8	2.0	0	3.3	

Note: All DIO pins are 5V tolerance in input mode.

E.2 DIO Programming

TKS-P20-CV01 utilizes FINTEK F81801U chipset as its Digital I/O controller. Below are the procedures to complete its configuration and the AAEON initial DIO 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.

E.3 Digital I/O Register

Table 2 : SuperIO relative register table		
	Default Value	**Note**
Index	**0x2E**	SIO MB PnP Mode Index Register 0x2E or 0x4E
Data	**0x2F)**	SIO MB PnP Mode Data Register 0x2F or 0x4F

Table 3 : Digital Input/Output relative register table				
	LDN	**Register**	**BitNum**	**Note**
GPIO1 Direction	**0x06**	**0xD0**	**0**	0:input, 1: output
GPIO2 Direction	**0x06**	**0xD0**	**1**	
GPIO3 Direction	**0x06**	**0xD0**	**2**	
GPIO4 Direction	**0x06**	**0xD0**	**3**	
GPIO1 Output Level	**0x06**	**0xD1**	**0**	0:low, 1: high
GPIO2 Output Level	**0x06**	**0xD1**	**1**	
GPIO3 Output Level	**0x06**	**0xD1**	**2**	
GPIO4 Output Level	**0x06**	**0xD1**	**3**	
GPIO1 Status	**0x06**	**0xD2**	**0**	0:low, 1: high
GPIO2 Status	**0x06**	**0xD2**	**1**	
GPIO3 Status	**0x06**	**0xD2**	**2**	
GPIO4 Status	**0x06**	**0xD2**	**3**	

E.4 Digital I/O Sample Program

```
*******************************************************************************
// SuperIO relative definition (Please reference to Table 2)
#define  SIOIndex   0x2E
#define  SIOData    0x2F
#define  DIOLDN     0x06
IOWriteByte(byte IOPort, byte Value);
IOReadByte(byte IOPort);
// DIO relative definition (Please reference to Table 3)
#define  DirReg       0xD0        // 0:input, 1: output
    #define  InputPin    0x00
    #define  OutputPin   0x01
#define  OutputReg     0xD1       // 0:low, 1: high
#define  StatusReg     0xD2       // 0:low, 1: high
    #define  PinLow      0x00
    #define  PinHigh     0x01
#define  Pin1Bit      0x00
#define  Pin2Bit      0x01
#define  Pin3Bit      0x02
#define  Pin4Bit      0x03
*******************************************************************************


*******************************************************************************
VOID  Main(){
     Boolean PinStatus ;

     // Procedure : AaeonReadPinStatus
     // Input :
     //     Example, Read Digital I/O Pin 3 status
     // Output :
     //     InputStatus :
     //           0: Digital I/O Pin level is low
     //           1: Digital I/O Pin level is High
     PinStatus = AaeonReadPinStatus(Pin3Bit);

     // Procedure : AaeonSetOutputLevel
```

```
        // Input :
        //     Example, Set Digital I/O Pin 2 to high level
        AaeonSetOutputLevel(Pin2Bit, PinHigh);
}
*****************************************************************************


*****************************************************************************
Boolean   AaeonReadPinStatus(byte PinBit){
        Boolean PinStatus ;

        PinStatus = SIOBitRead(DIOLDN, StatusReg, PinBit);
        Return PinStatus ;
}
VOID  AaeonSetOutputLevel(byte PinBit, byte Value){
        ConfigDioMode(PinBit, OutputPin);
        SIOBitSet(DIOLDN, OutputReg, PinBit, 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(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();
}
```

****

******