TKS-G21-9455B

Compact Embedded Controller

Intel® Atom™ N270 1.6GHz Processor

Dual LAN, 4 USB2.0, 2 COM, 1 VGA

1 PCI-Express Mini Card

TKS-G21-9455B Manual 1st Ed.
April 2011

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Packing List

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

- 1 TKS-G21-9455B Embedded Controller
- 1 CD-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

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。

Chapter

1

General Information

1.1 Introduction

The newest EmBox series TKS-G21-9455B 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-G21-9455B is designed for indoor environments due to the following reasons; first, the TKS-G21-9455B offers low power consumption system that while operating in ambient temperatures ranging from 0° to 50°C. The MTBF (Mean Time Before Failure) rating states that the TKS-G21-9455B can operate up to 50,000 hours at 50°C ambient temperature, which indicates its careful and long-life design.

The TKS-G21-9455B 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™ N270 Processor With 1.6 GHz
- DDR2 400/ 533 SODIMM x 1, Up To 2 GB
- CRT (VGA) Single View
- AC97 2.3 Codec 2CH Audio
- Gigabit Ethernet x 2
- 2.5" SATA Hard Disk Drive Bay x 1
- USB2.0 x 4, COM x 2, Compact Flash™ x 1
- Optional WiFi Module
- Fanless
- Cost-Effective Solution

1.3 Specifications

System

● CPU	Intel® Atom™ N270 1.6 GHz Processor
● Memory	DDR2 400/533 SODIMM x 1, Max. 2 GB
● VGA	VGA x 1
● Keyboard/Mouse	Through USB Port
● Ethernet	Intel® 82574L, 10/100/1000Base-TX, RJ-45 x 2
● Hard Disk Storage	2.5" SATA HDD Bay x 1
● Expansion	Mini-PCI x 1, Mini Card x 1
● LCD/CRT Controller	Integrated in Processor, shared system memory up to 384MB
● Solid Storage Disk	Type 2 CompactFlash™ slot x 1
● Serial Port	RS-232/422/485 x 1, RS-232 x 1
● USB	USB2.0 x 4
● System Control	ATX mode
● LED Indicator	Power LED x 1, HDD active LED x 1
● Watchdog Timer	Generates a time-out system reset, setting via software
● Others	WiFi & Bluetooth combo module through Mini PCIe slot (optional)
● Power Supply	DC power adaptor input 12V
● OS Support	Windows® XP, Windows® 7, Linux Fedora Core 13

Mechanical and Environmental

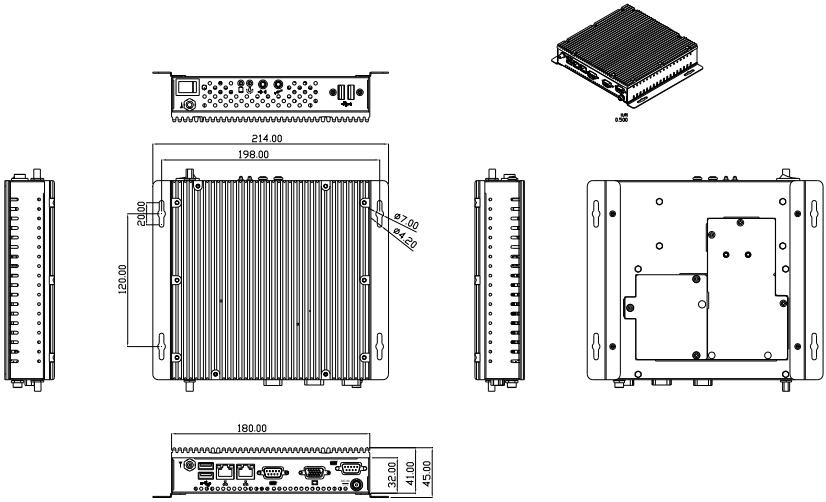
- Construction: Heavy Duty Steel Chassis
- Color: Red
- Mounting: Wallmount
- Dimension: 7" (D) x 7"(W) x 1.57"(H) (180mm x 180mm x 40mm)
- Gross Weight: 5.33 lb (2.42 kg)
- Operating Temperature: 32°F ~ 122°F (0°C ~ 50°C)
- Storage Temperature: -40°F ~ 176°F (-40°C ~ 80°C)
- Vibration: 5g rms/ 5 ~ 500Hz/ random operation (CompactFlash™)
  1g rms/ 5 ~ 500Hz/ random operation (Hard Disk Drive)
- Shock: 50G peak acceleration (11 msec. duration) (CompactFlash™)
  20G peak acceleration (11 msec. duration) (Hard Disk Drive)
- EMC: CE/FCC Class A

Chapter

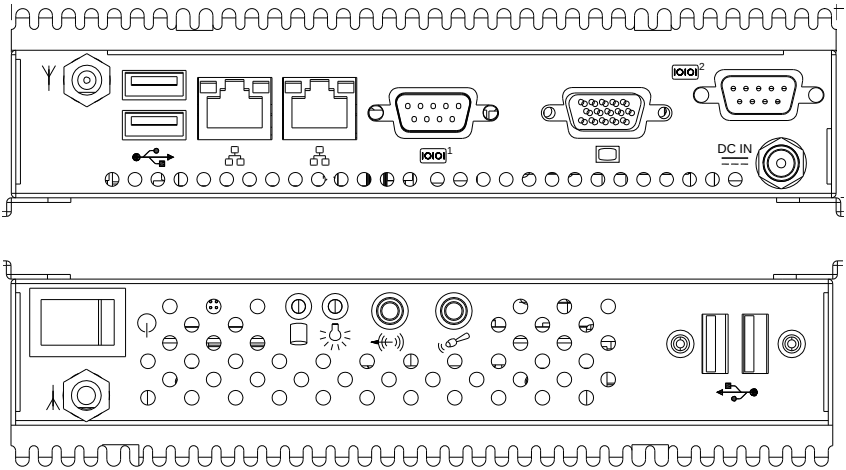
2

Quick Installation Guide

2.1 Dimension and I/O of TKS-G21-9455B

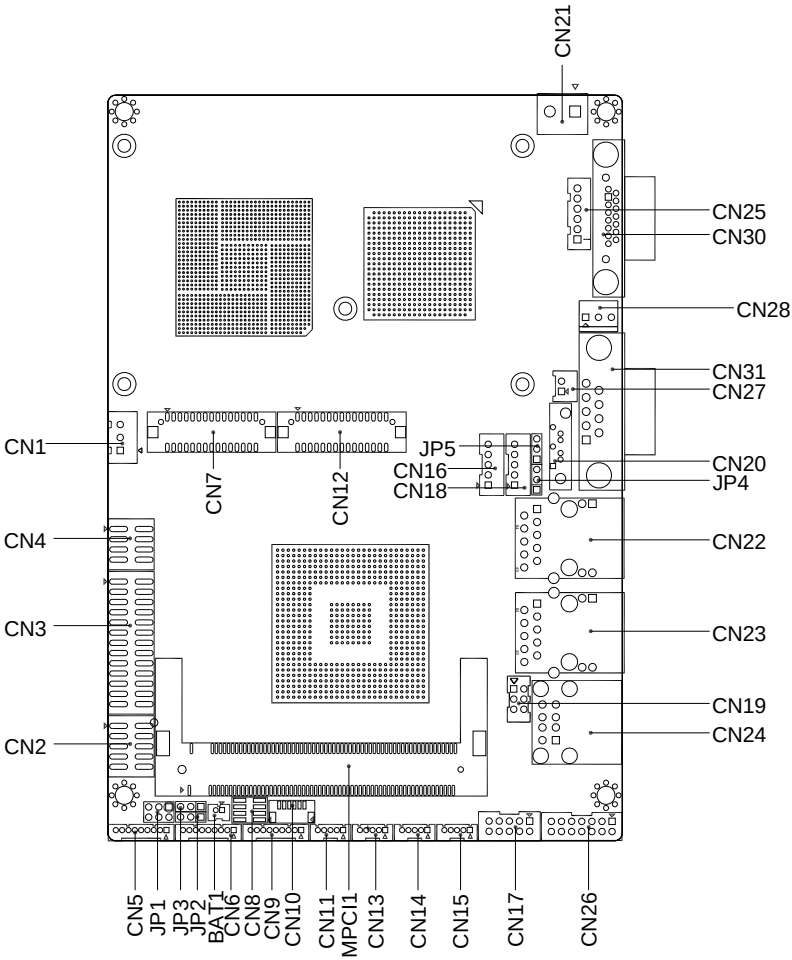


I/O

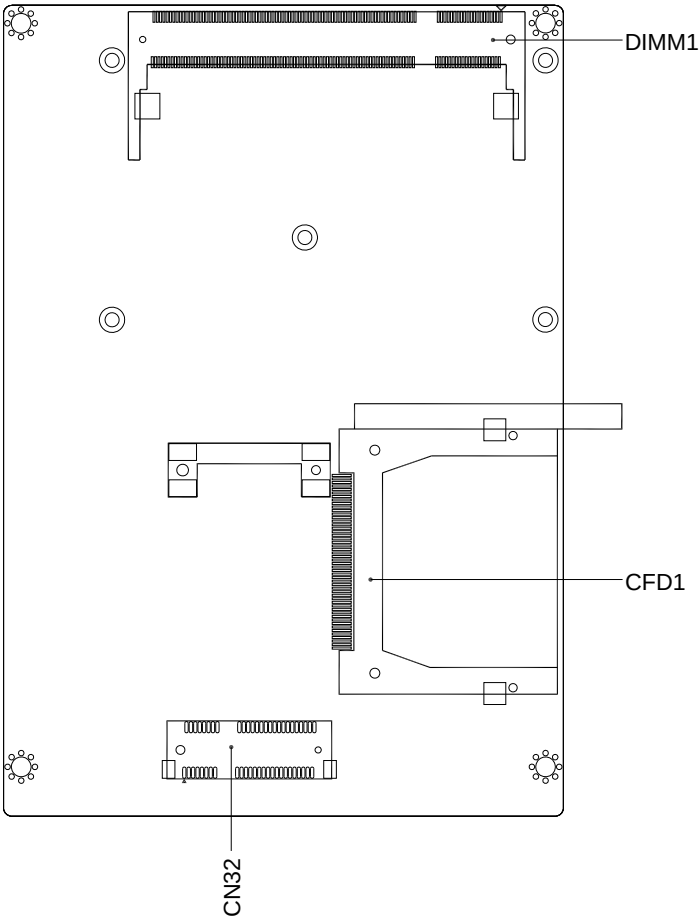


2.2 Location of Connectors and Jumpers of the Main Board

Component Side



Solder 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	COM2 RI/+5/+12V Selection
JP2	Clear CMOS Front Panel
JP3	ATX Power Mode 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 of the board's connectors:

Label	Function
CN1	External +5V Standby Power Input and PS_ON#
CN5	COM Port 2 Connector
CN8	Onboard BIOS Programming I/F (Optional)
CN11	USB Port 1 Connector
CN13	USB Port 2 Connector
CN14	USB Port 3 Connector
CN15	USB Port 4 Connector
CN20	SATA 1 Connector
CN21	+12V Power Input Connector
CN22	RJ-45 Ethernet#1 Connector
CN23	RJ-45 Ethernet#2 Connector
CN25	+5V Standby Power Output w/ PS_ON# & SMBus
CN26	Audio In/Out/CD-in and MIC Connector
CN27	+5V Output Connector for 2.5” SATA Hard Disk
CN31	COM Port 1 Connector
CN32	Mini-Card Slot
CFD1	Compact Flash Disk
MPCI1	Mini-PCI Slot
DIMM1	DDR2 SODIMM Slot

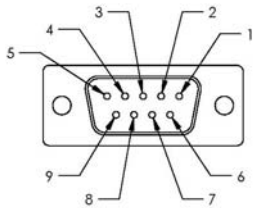
2.5 COM2 RS-232/422/485 Selection (CN5)

COM2 RS-232/422/485 selection for AAEON TKS series is set in BIOS setting as following:

Entering BIOS Setting Menu: Choose "Integrated Peripherals→ Super IO device →COM2 select". (Default setting is at "RS-232")

2.6 COM Port #2 RS-232/422/485 Port Connector (CN5)

Different devices implement the RS-232/422/485 standard in different ways. If you have problems with a serial device, check the pin assignments below for the connector.



RS-232 Mode

Pin	Signal	Pin	Signal
1	DCDB	2	DSRB
3	RXB	4	RTSB
5	TXB	6	CTSB
7	DTRB	8	RIB / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

RS-422 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	RXD+	4	N/C
5	TXD+	6	N/C
7	RXD-	8	N/C / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

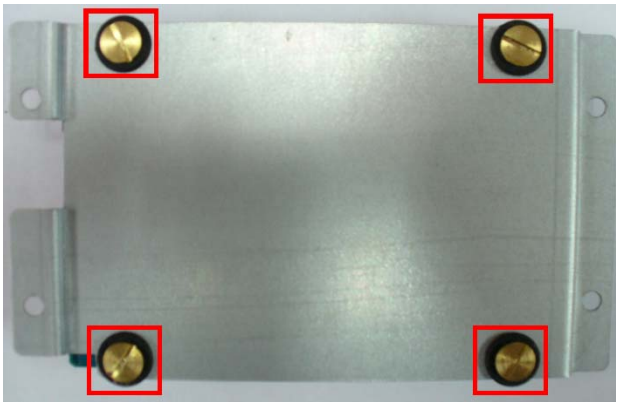
RS-485 Mode

Pin	Signal	Pin	Signal
1	TXD-	2	N/C
3	N/C	4	N/C
5	TXD+	6	N/C
7	N/C	8	N/C / +5 Volt. / (+12 Volt.)
9	Ground	10	N/C

2.7 Hard Disk Installation

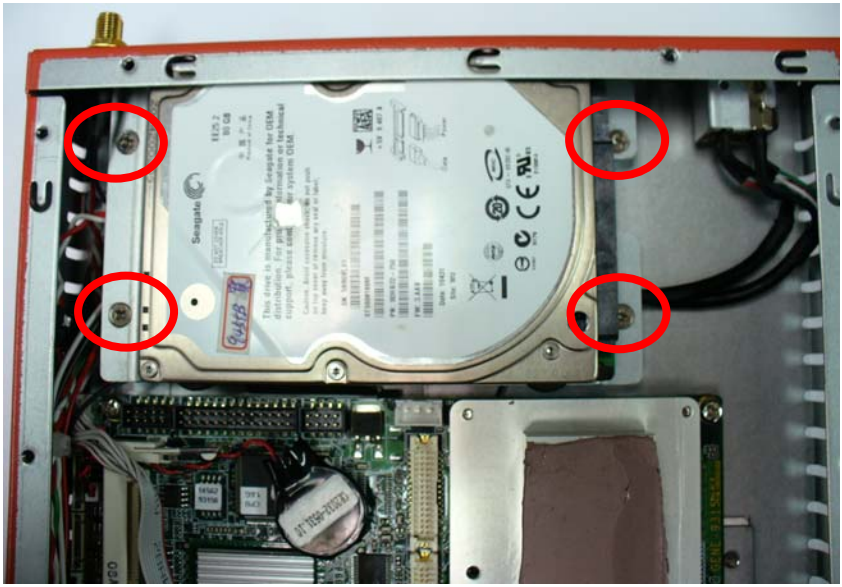
Step 1: Unfasten the screws on the top of the heat-sink and you will see the inside of the system.

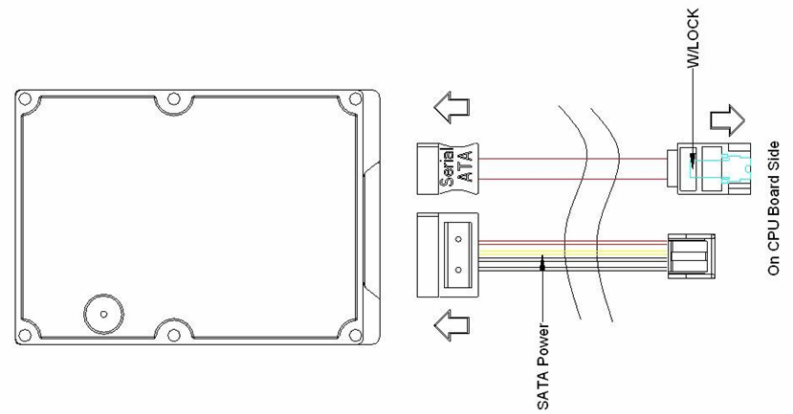
Step 2: Fasten the four HDD screws and black damper and then you can put the HDD on the opposite side for screwing it up.



Step 3: Putting the HDD with HDD bracket in by 30 degree height and make sure the bracket holes are matched with the chassis stand.

Step 4: Screwing the HDD bracket up and connecting the HDD cables with the main board.

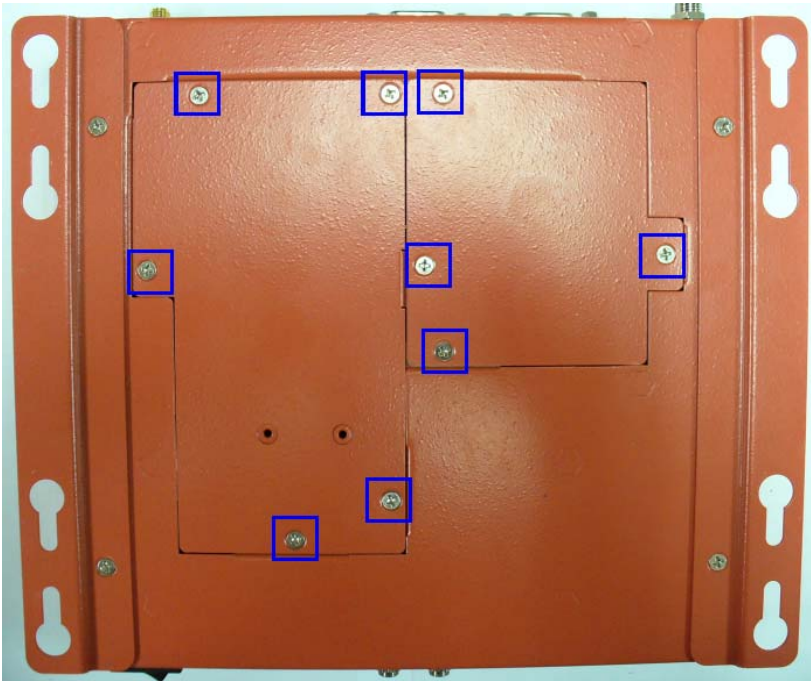




Step 5: Putting the chassis heatsink on the top and fastening the screws.

2.8 Accessory Installation

Step 1: Unfasten the screws on the rear panel



Step 2: You can see the inside placement of RAM, CF card, PCIe slot for you installation.

2.9 Wallmount Kit Installation

Get the brackets ready and fasten appropriate four screws on each bracket. After fastening the two brackets on the bottom lid of, the wall mount kit installation has been finished.

Chapter

3

Award 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. Non-fatal error messages usually appear on the screen along with the following instructions:

Press <F1> to RESUME

Write down the message and press the F1 key to continue the boot up sequence.

System configuration verification

These routines check the current system configuration against the values stored in the CMOS memory. If they do not match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

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

The TKS-G21-9455B 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 Award BIOS Setup

Awards 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 so that it retains the Setup information when the power is turned off.

Entering Setup

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

Standard CMOS Features

Use this menu for basic system configuration. (Date, time, IDE, etc.)

Advanced BIOS Features

Use this menu to set the advanced features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals. (Primary slave, secondary slave, keyboard, mouse etc.)

Security Chip Configuration

Use this menu to specify your settings for Security Chip Configuration.

(Enable/Disable Trusted Platform Module.)

Power Management Setup

Use this menu to specify your settings for power management.

(HDD power down, power on by ring, KB wake up, etc.)

PnP/PCI Configurations

This entry appears if your system supports PnP/PCI.

PC Health Status

This menu allows you to set the shutdown temperature for your system.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While AWARD has designated the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Set Supervisor/User Password

Use this menu to set Supervisor/User Passwords.

Save and Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

You can refer to the " AAEON BIOS Item Description.pdf" file in the CD for the meaning of each setting in this chapter.

Chapter

4

Driver Installation

The TKS-G21-9455B comes with a CD-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 VGA Driver

Step 3 – Install LAN Driver

Step 4 – Install Audio Driver

Step 5 – Install Wireless LAN Driver (Optional)

4.1 Installation:

Insert the TKS-G21-9455B CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Chipset Driver

1. Click on the ***Step 1 - INF Update Utility*** 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 VGA Driver

1. Click on the ***Step 2 - Intel Graphics Media Accelerator Driver*** 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 ***Step 3 - Intel Ethernet Driver*** 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 4 – Install Audio Driver

1. Click on the ***Step 4 - Realtek ALC655 Audio Driver***

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 5 – Install Wireless LAN Driver (Optional)

1. Click on the ***Step 5- wifi and bluetooth*** folder and select the OS folder your system is
2. Select the folder of ***Install_CD***, and 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

Appendix

A

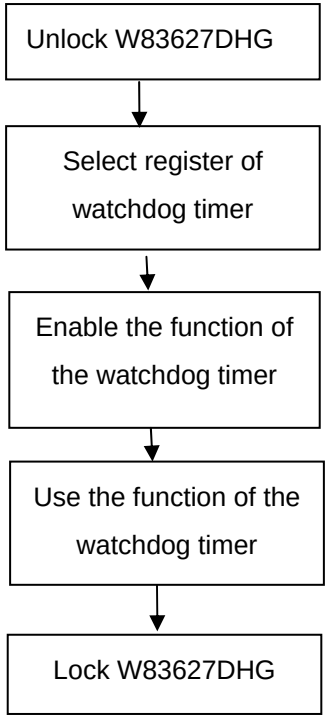
Programming the Watchdog Timer

A.1 Programming

TKS-G21-9455B utilizes W83627DHG-P chipset as its watchdog timer controller.

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

Configuring Sequence Description



There are three steps to complete the configuration setup:

(1) Enter the W83627DHG config Mode

(2) Modify the data of configuration registers

(3) Exit the W83627DHG config Mode. Undesired result may occur if the config Mode is not exited normally.

(1) Enter the W83627DHG config Mode

To enter the W83627DHG config Mode, two special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform two write operations to the Special Address port (2EH). The different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
87h,87h:	2Eh	2Fh

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the config Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the W83627DHG config Mode

The exit key is provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
0aah:	2Eh	2Fh

WatchDog Timer Register I (Index=F5h, Default=00h)

CRF5 (PLED and KBC P20 Control Mode Register)

Bit 7-5 : select PLED mode

= 000 Power LED pin is driven high.

= 001 Power LED pin outputs 0.5Hz pulse with 50% duty cycle.

= 010 Power LED pin is driven low.

= 011 Power LED pin outputs 2Hz pulse with 50% duty cycle.

= 100 Power LED pin outputs 1Hz pulse with 50% duty cycle.

= 101 Power LED pin outputs 4Hz pulse with 50% duty cycle.

= 110 Power LED pin outputs 0.25Hz pulse with 50% duty cycle.

=111 Power LED pin outputs 0.25Hz pulse with 50% duty cycle..

Bit 4 : WDTO# count mode is 1000 times faster.

= 0 Disable.

= 1 Enable.

Bit 3 : select WDTO# count mode.

= 0 second

= 1 minute

Bit 2 : Enable the rising edge of keyboard Reset (P20) to force Time-out event.

= 0 Disable

= 1 Enable

Bit 1 : Disable / Enable the WDTO# output low pulse to the KBRST# pin (PIN60)

= 0 Disable

= 1 Enable

Bit 0 : Reserved.

WatchDog Timer Register II (Index=F6h, Default=00h)

Bit 7-0 = 0 x 00 Time-out Disable

= 0 x 01 Time-out occurs after 1 second/minute

= 0 x 02 Time-out occurs after 2 second/minutes

= 0 x 03 Time-out occurs after 3 second/minutes

……..

= 0 x FF Time-out occurs after 255 second/minutes

WatchDog Timer Register III (Index=F7h, Default=00h)

Bit 7 : Mouse interrupt reset Enable or Disable

= 1 Watchdog Timer is reset upon a Mouse interrupt

= 0 Watchdog Timer is not affected by Mouse interrupt

Bit 6 : Keyboard interrupt reset Enable or Disable

= 1 Watchdog Timer is reset upon a Keyboard interrupt

= 0 Watchdog Timer is not affected by Keyboard interrupt

Bit 5 : Force Watchdog Timer Time-out. Write Only

= 1 Force Watchdog Timer time-out event: this bit is self-clearing

Bit 4 : Watchdog Timer Status. R/W

= 1 Watchdog Timer time-out occurred

= 0 Watchdog Timer counting

Bit 3-0 : These bits select IRQ resource for Watchdog. Setting of 2 selects SMI.

A.2 W83627DHG Watchdog Timer Initial Program

Example: Setting 10 sec. as Watchdog timeout interval

```
;//////////////////////////////////////////////////////////////////////////////////////
Mov dx,2eh              ;Enter W83627DHG config mode
Mov al,87h              (out 87h to 2eh twice)
Out dx,al
Out dx,al
;//////////////////////////////////////////////////////////////////////////////////////
Mov al,07h
Out dx,al
Inc dx
Mov al,08h              ;Select Logical Device 8 (GPIO Port 2)
Out dx,al
;//////////////////////////////////////////////////////////////////////////////////////
Dec dx
Mov al,30h              ;CR30 (GP20~GP27)
Out dx,al
Inc dx
Mov al,01h              ;Activate GPIO2
Out dx,al
```

```
;////////////////////////////////////////////////////////////////////////////////////////
Dec dx
Mov al,0f5h             ;CRF5 (PLED mode register)
Out dx,al
Inc dx
In al,dx
And al,not 08h          ;Set second as counting unit
Out dx,al
;////////////////////////////////////////////////////////////////////////////////////////
Dec dx
Mov al,0f6h             ; CRF6
Out dx,al
Inc dx
Mov al,10               ;Set timeout interval as 10 sec.
Out dx,al
;////////////////////////////////////////////////////////////////////////////////////////
Dec dx                  ;Exit W83627DHG config mode
Mov al,0aah                     (out 0aah to 2eh once)
Out dx,al
;////////////////////////////////////////////////////////////////////////////////////////
```