AEC-6511

Compact Embedded Controller

Intel® Atom™ N270 1.6GHz Processor

1 Gigabit LAN, 2 USB2.0, 2 COM, 1 VGA

AEC-6511 Manual 1st Ed.
April 2012

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Packing List

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

- 1 AEC-6511 Embedded Controller (with wallmount Brackets)
- 1 Screw Package
- 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 70°C (158°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。

Appendix B I/O Information

Chapter

1

General Information

1.1 Introduction

The newest Boxer series AEC-6511 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 AEC-6511 is designed for indoor environments due to the following reasons; first, the AEC-6511 offers low power consumption system that while operating in ambient temperatures ranging from -20° to 55°C. The MTBF (Mean Time Before Failure) rating states that the AEC-6511 can operate up to 70,000 hours at 40°C ambient temperature, which indicates its careful and long-life design.

The AEC-6511 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

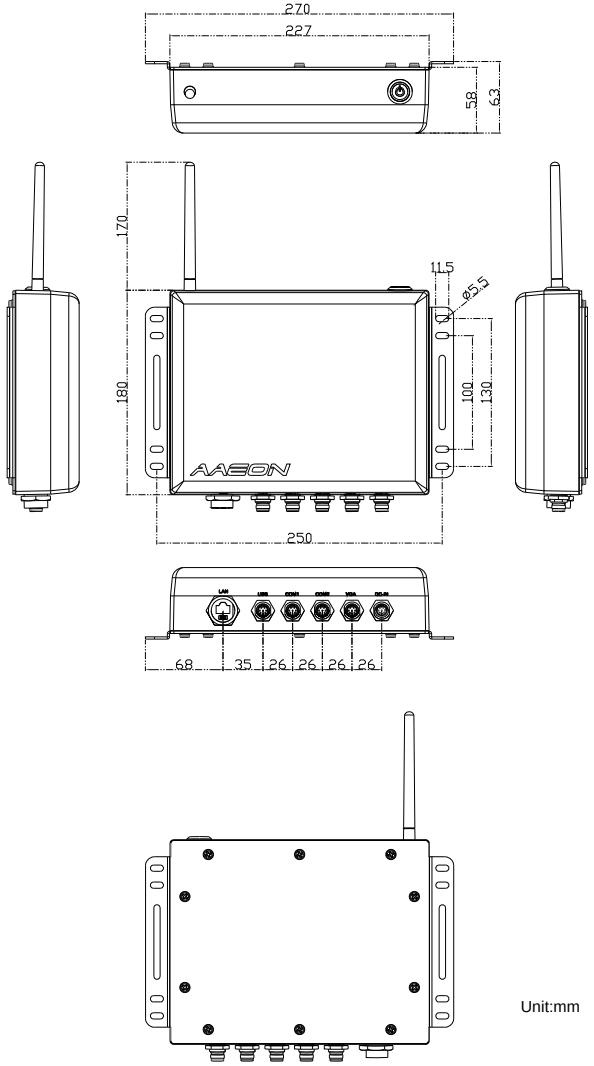
- Intel® Atom™ N270 1.6 GHz Processor
- Water, Dust & Corrosion Proof
- Anti-Shock & Vibration Structure
- Washable IP67 Water Proof Protection
- Stainless Steel Chassis With Water Proof I/O Connector
- Memory, CompactFlash™, HDD Must Be Industrial Grade

1.3 Specifications

● CPU		Intel® Atom™ N270 1.6 GHz Processor
● Chipset		Intel® 945GSE + ICH7M
● System Memory		DDR2 SDRAM SODIMM x 1, Max. 2GB
● Display Interface	VGA	Shared system memory up to 224MB/DVMT 3.0
● Storage Device	SSD	Type 2 CompactFlash™ Slot
	HDD	SATA 1.5 Gb/s HDD Slim Hard Disk Drive Bay
● Network	LAN	Gigabit Ethernet, RJ-45 x 1
	Wireless	Optional by Mini Card
● Front I/O	USB Port	USB2.0 x 2
	LAN	RJ-45 x 1
	Serial Port	RS-232 x 1, RS-232/422/485 x 1
	Others	Power Input x 1
● Rear I/O	Others	Power Switch x 1
● Expansion	Mini Card	1
	Mini PCI	1
● Power Requirement		DC-in 12V input
● Power Consumption		Intel® Atom™ N270 1.6 GHz, 1.12A @ 12V
● System Cooling		Passive cooling

● Mounting		Wallmount
● Operating Temperature		-4°F ~ 122°F (-20°C ~ 50°C)
● Storage Temperature		-4°F ~ 158°F (-20°C ~ 70°C)
● Anti-Vibration		5 g rms/ 5~500 Hz/ operation-CFD 1 g rms/ 5~500 Hz/ operation-HDD
● Anti-Shock		50 G peak acceleration (11 msec. duration) – CFD 20 G peak acceleration (11 msec. duration) – HDD
● Certification	EMC	CE/FCC Class A
● Dimension (W x H x D)		13.23” x 11.57” x 10.24” (336mm x 294mm x 260mm)
● Gross Weight		6.4 lb (2.9 Kg)
● OS Support		Windows® XP Embedded, Windows® XP, Windows® 7, CENTOS 6.0-2.6.32

1.4 Dimension



Unit:mm

Front side

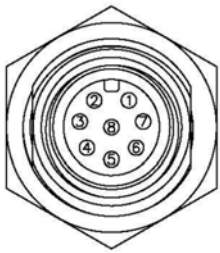
Rear side

Chapter

2

Hardware Installation

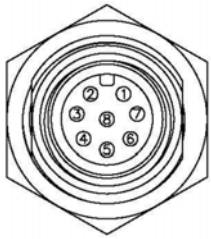
2.1 USB 1/2 Connecter



Pin Assignments
Front View

Pin	Signal	Pin	Signal
1	USB1 V+	2	USB0 V+
3	USB D0+	4	USB D0-
5	USB0 GND	6	USB D1+
7	USB D1-	8	USB1 GND

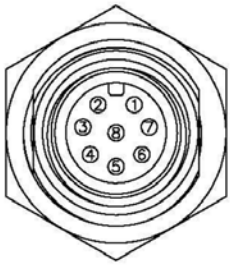
2.2 COM1 Connector for RS-232



Pin Assignments
Front View

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS

2.3 COM2 Connector for RS-232/422/485



Pin Assignments
Front View

RS-232

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS

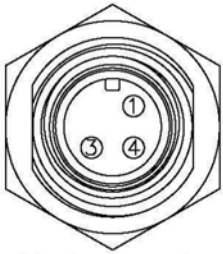
RS-422

Pin	Signal	Pin	Signal
1	TXD-	2	RXD+
3	TXD+	4	RXD-

RS-485

Pin	Signal	Pin	Signal
1	TXD-	2	NC
3	TXD+	4	NC

2.4 DC-IN 12V DC Connecter

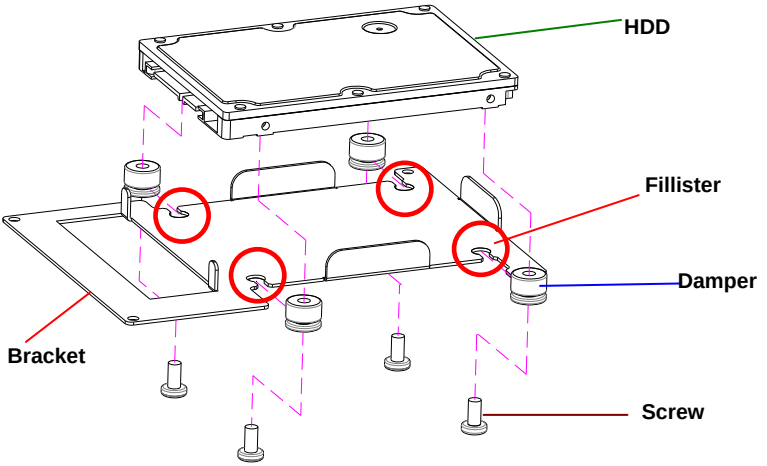


Pin Assignments
Front View

Pin	Signal	Pin	Signal
1	DC V+	2	N/A
3	GND	4	NC

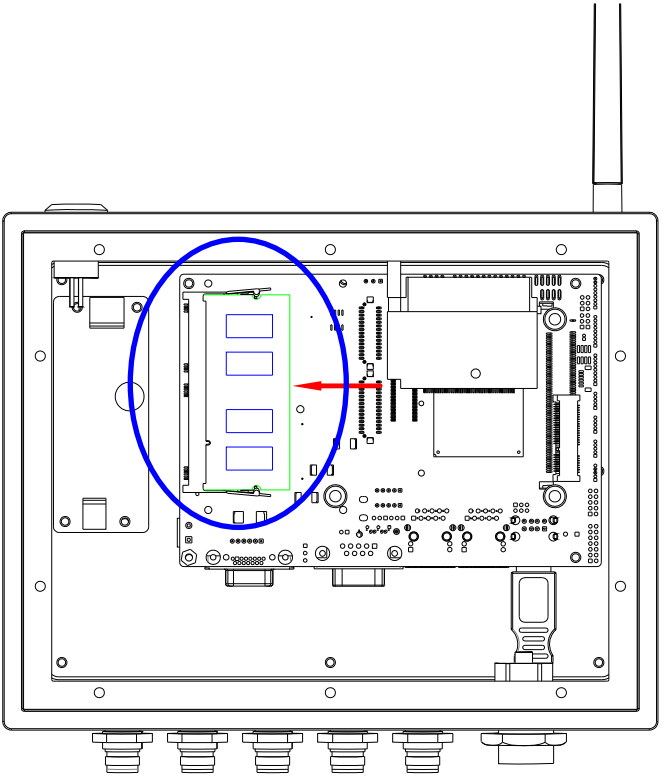
2.5 HDD Installation

Lock the dampers to the fillisters of the bracket, and use the four screws and dampers to fasten the HDD and HDD bracket

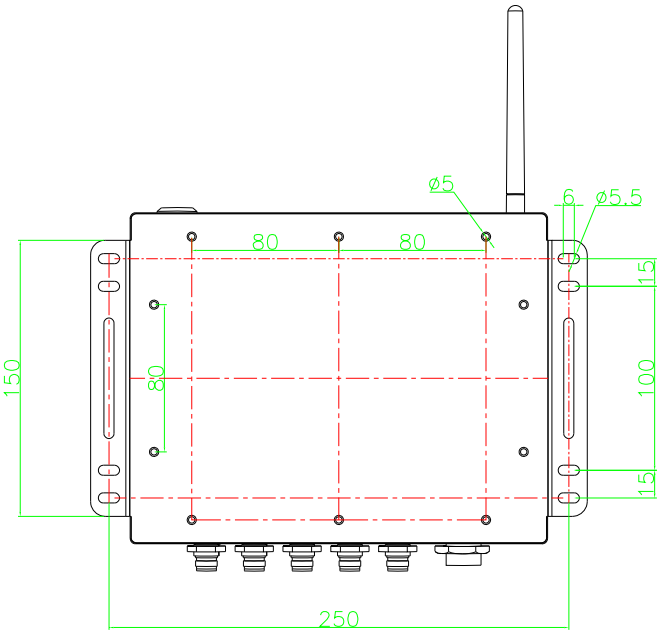


2.6 Memory Card Installation

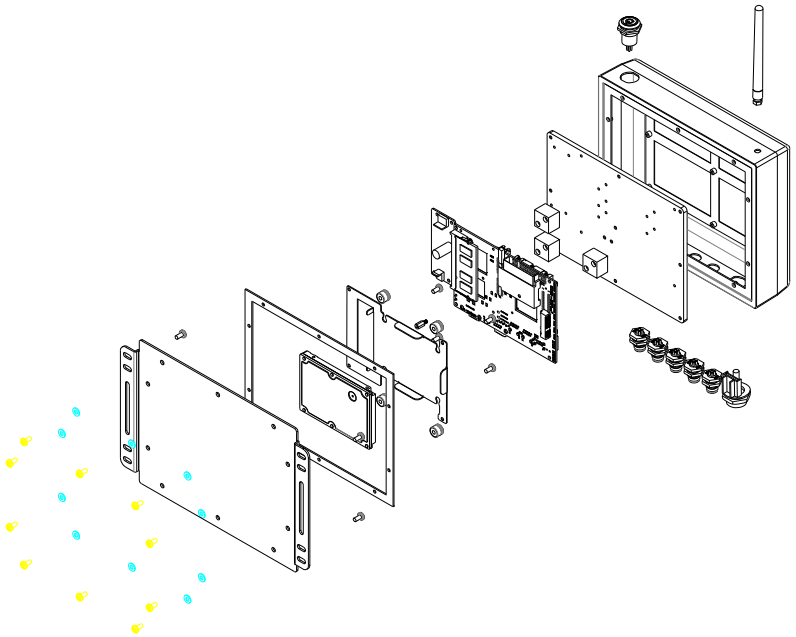
Insert the DRAM to the memory slot



2.7 Mounting Drawing



2.8 Expanded View



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 AEC-6511 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.)

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 AEC-6511 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 Wireless LAN Driver

4.1 Installation:

Insert the AEC-6511 CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 4 in order.

Step 1 – Install Chipset Driver

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

Step 2 – Install VGA Driver

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

Step 3 – Install LAN Driver

1. Click on the ***STEP3-LAN*** folder and select the OS folder your system is
2. Double click on the ***.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 Wireless LAN Driver

1. Click on the ***STEP4-WIRELESS LAN*** folder and double

click on the ***Setup.exe***

2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Appendix

A

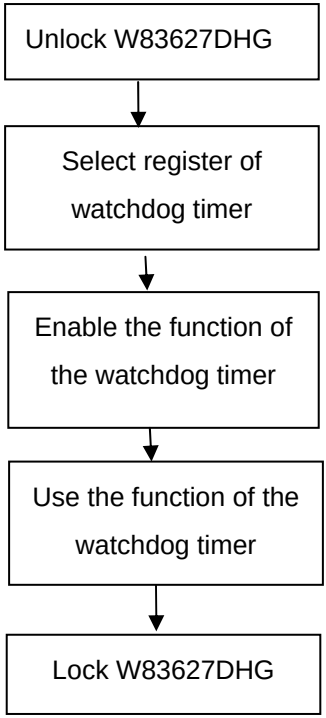
Programming the Watchdog Timer

A.1 Programming

AEC-6511 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
```

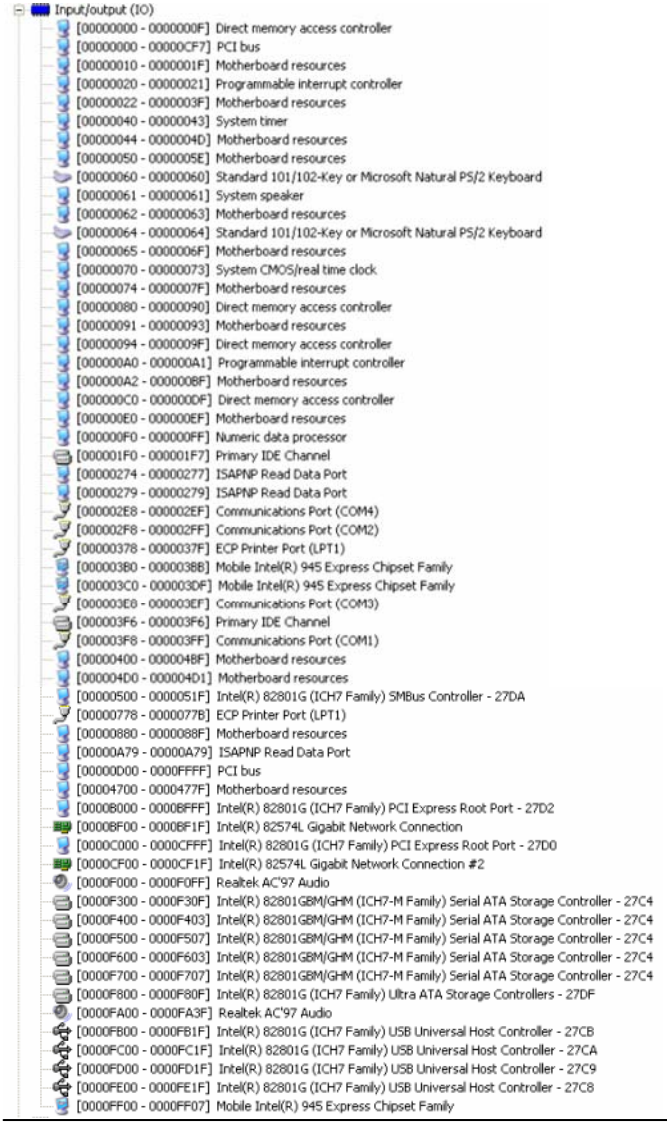
```
;////////////////////////////////////////////////////////////////////////////////////////
Dec dx
Mov al,0f5h             ;CRF5 (PLED mode register)
Out dx,al
Inc dx
In al,dx
And al,not 08h          ;Set second as counting unit
Out dx,al
;////////////////////////////////////////////////////////////////////////////////////////
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
;////////////////////////////////////////////////////////////////////////////////////////
```

Appendix

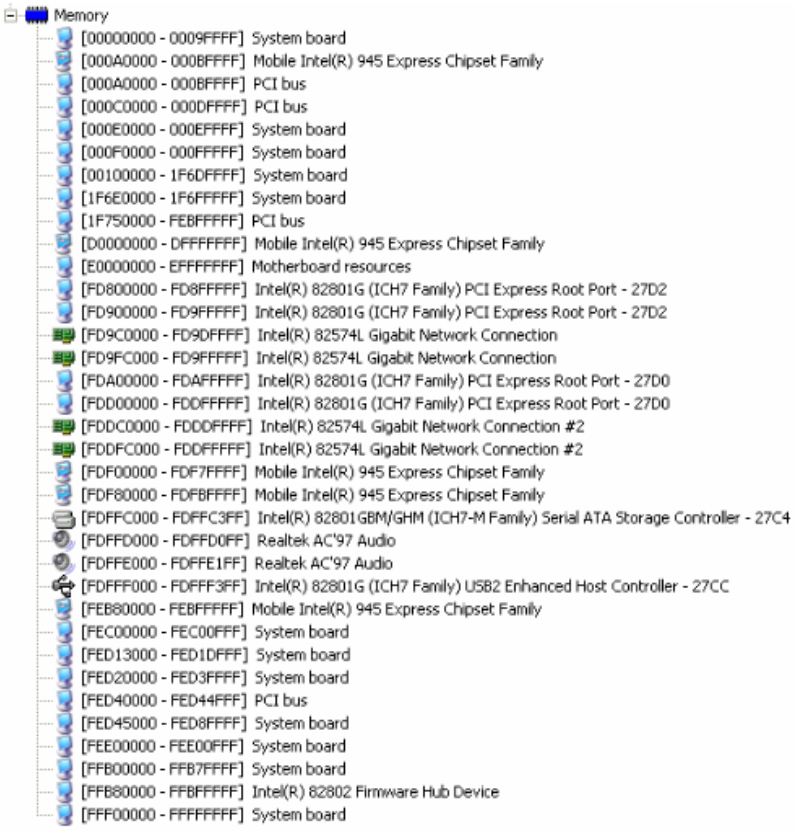
B

I/O Information

B.1 I/O Address Map



B.2 1st MB Memory Address Map



B.3 IRQ Mapping Chart

B.4 DMA Channel Assignments