AEC-6841

Fanless Embedded Controller

Intel® Atom™ N270 Processor

Dual LAN/ 8DIO

4 COM/ Audio/ 4 USB

Copyright Notice

Acknowledgments

All other products' name or trademarks are properties of their respective owners.

- Award is a trademark of Award Software International, Inc.

- CompactFlash™ is a trademark of the Compact Flash Association.

- Intel®, and Core™ 2 Duo are trademarks of Intel® Corporation.

- Microsoft Windows® is a registered trademark of Microsoft Corp.

- PC/AT, PS/2, and VGA are trademarks of International Business Machines Corporation.

All other product names or trademarks are properties of their respective owners.

Packing List

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

- 1   AEC-6841 Embedded Controller
- 1   Phoenix Power Connector
- 2   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 60°C (140°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.

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。

Contents

Chapter

1

General Information

1.1 Introduction

The AEC-6841 is an Embedded Control PC with Mini-card or Mini-PCI socket that supports different interfaces. Multiple IO ports and Anti-vibration are the main design features of the AEC-6841. This allows the AEC-6841 to be installed in a rugged transportation environment despite high ambient vibration.

In addition to the fanless CPU, the AEC-6841 was use the Intel® Atom™ N270 1,6GHz CPU, features one Mini-card or Mini-PCI expansion socket for devices expansion. A DC power supply is commonly used in most vehicles and factory equipments.   The AEC-6841 can supply by a DC 9~30V input with low power consumption and high performance.   You can also choose an additional external AC power adapter for power redundancy purposes.   AAEON provides flexible power choices for customers who choose the AEC-6841.

Transportation has become part of most people's life and forms a necessary part of their lifestyle.   From cars to trains to ships and airplanes, we rely on those tools a lot.   The AEC-6841 is designed to improve transportation control and enhance the quality of our lives.

1.2 Features

- Intel® Atom™ N270 Processor, 1.6 GHz
- DDRII SODIMM x 1, Max. 2 GB
- COM x 4 (1 Isolated), USB2.0 x 4
- 10/100Base-TX x 1, Gigabit Ethernet x 1
- SATA/ IDE Interfaces
- Mini-PCI x 1 (Rev.B) Or Mini Card x 1 (Rev.A)
- VGA Output
- AT Power Function
- DIO Support

1.3 Specifications

System

- CPU: Intel® Atom™ N270 1.6GHz
- Memory: DDRII SDRAM SODIMM x 1, Max. 2GB; Installed 1GB
- Expansion: Mini-card(Rev.A) or Mini-PCI(Rev.B)
- VGA: D-sub 15 VGA Connector
- Keyboard/Mouse: PS/2 Keyboard & Mouse
- Ethernet: 10/100Base-TX Ethernet x 1, Gigabit Ethernet x 1; RJ-45 connector x 2
- SSD: Onboard Type II CompactFlash™ slot x 1
- Hard Disk Storage: SATA/IDE HDD kit (optional)
- Serial Port: RS-232 x 3 (COM1/3/4); RS-232/422/485 x 1 (COM2, isolation)
- Audio: Mic-in / Line-in / Line-out, by an extension cable
- USB: USB 2.0 x 4
- Watchdog Timer: Generates a time-out system reset
- Power Supply: AT power function;

DC Input: 9V DC~30V DC

(Phoenix connector 2-pin);

Power board support (80W)

operation output;

AC Input: External Power Adapter

(Optional), input range 100~240V

- System Control: Power on / off switch x 1;

Reset button x 1

- Indicator: Power LED x 1

HDD active LED x 1

Mechanical and Environmental

- Construction: Aluminum Alloy chassis
- Color: Dark Blue
- Mounting: Wallmount (Default), DIN-Rail
- Dimension: 8.35" (W) x 2.52" (H) x 4.21" (D)

(212mm x 64mm x 107mm)

- Carton Dimension: 12" (W) x 7.87" (H) x 9.45" (D)

(305mm x 200mm x 240mm)

- Net Weight: 4.75 lb (2.16 kg)
- Gross Weight: 8.36 lb (3.8 kg)
- Operation Temperature:

5°F~122°F (-15°C~50°C)(CFD)

14°F~122°F(-10°C~50°C)(HDD)

- Operation Humidity: 5~95% @ 40°C,

non-condensing

- Vibration: 5g rms / 5~500Hz / operation (CompactFlash Disk); 1g / 5~500Hz / operation (w/ Hard Disk Drive)

- Shock: 50g peak acceleration (11 msec. duration)--CompactFlash Disk

- EMC CE/FCC Class A

Front Side
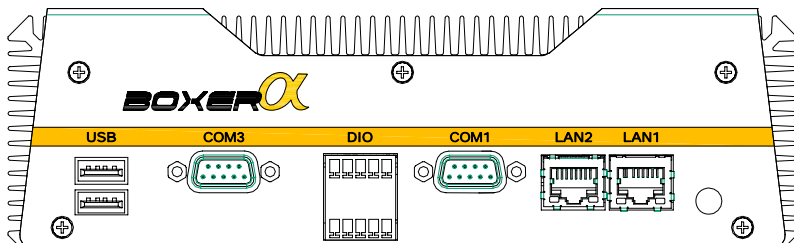
Rear Side
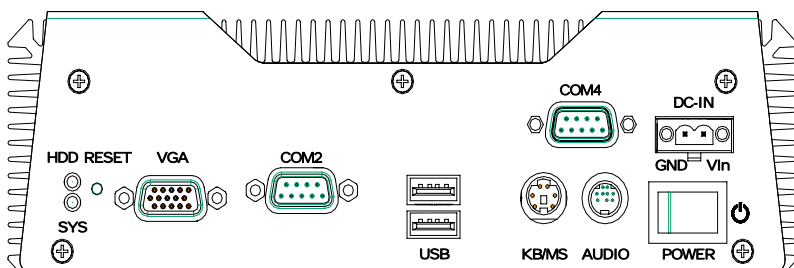
Chapter

2

Hardware Installation

2.1 Dimension
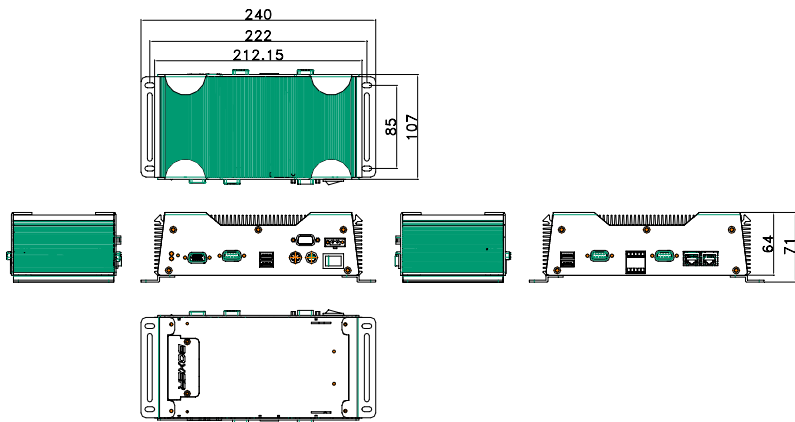
Units: mm

2.2 Wallmount Installation

Fasten the brackets by screws.
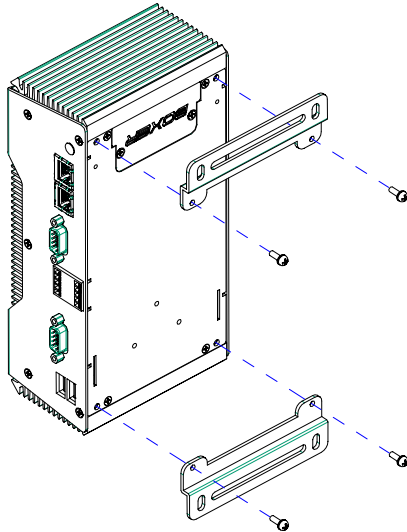
2.3 DIN Rail Installation

Fix the DIN Rail kit with the screws on the chassis as the illustration shown.
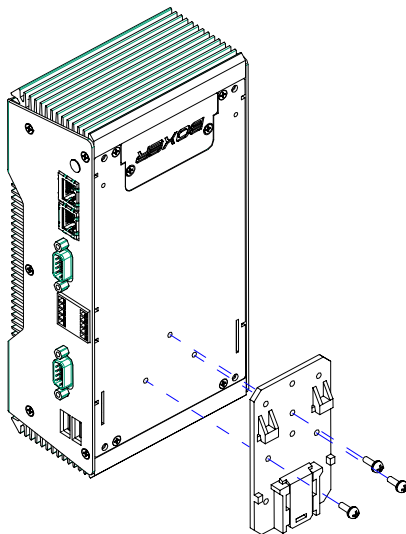
2.4 Jumper Setting of AEC-6841
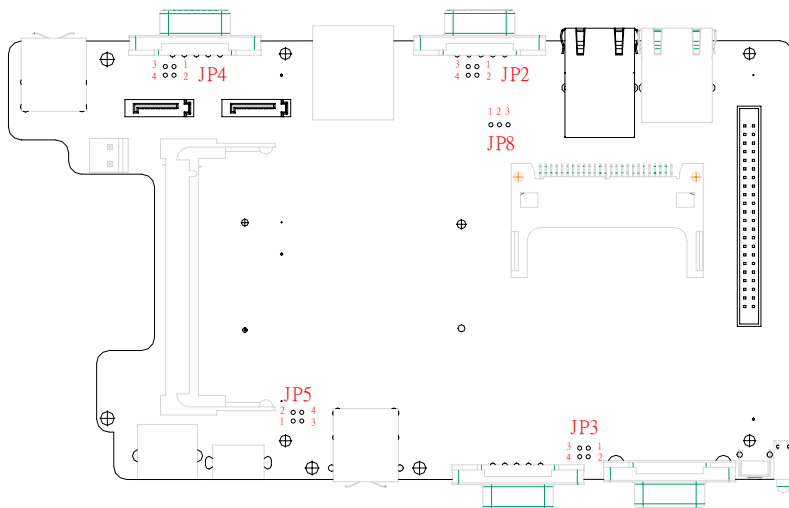
RS-232/422/485 Serial Port Connector
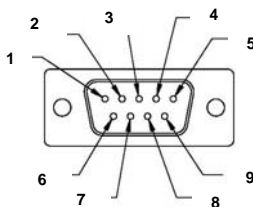
Pin	Signal	Pin	Signal
1	DCD (422TXD-/485DATA-)	2	RXD (422RXD+)
3	TXD (422TXD+/485DATA+)	4	DTR (422RXD-)
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

COM1 Pin 9 Selection (JP2)

Pin	Function
1-2	+5V
3-4	RI1X for COM1 (Default)

COM2 Pin 9 Selection (JP3)

Pin	Function
1-2	+5V
3-4	RI2X for COM2 (Default)

COM3 Pin 9 Selection (JP4)

Pin	Function
1-2	+5V
3-4	RI3X for COM3 (Default)

COM4 Pin 9 Selection (JP5)

Pin	Function
1-2	+5V
3-4	RI4X for COM4 (Default)

RTC Battery Selection (JP8)

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

Digital I/O Connector (CN2) (DIO Address is 2A1H)
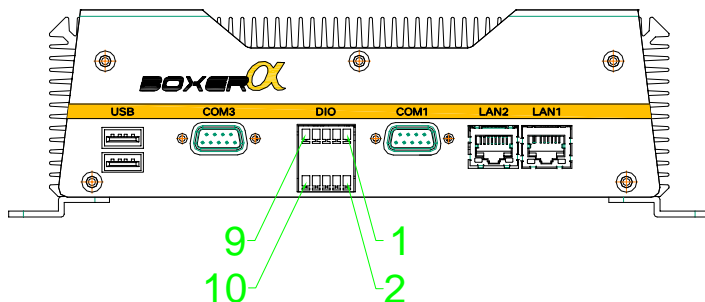
Pin	Signal	Pin	Signal
1	DIO1-1	2	DIO1-2
3	DIO1-3	4	DIO1-4
5	DIO1-5	6	DIO1-6
7	DIO1-7	8	DIO1-8
9	+5V	10	GND

BIOS Setting	Connector Definition	IT8712 GPIO Setting
DIO1-1	Pin 1	U1 Pin27 (GPI 20)
DIO1-2	Pin 2	U1 Pin26 (GPI 21)
DIO1-3	Pin 3	U1 Pin25 (GPI 22)
DIO1-4	Pin 4	U1 Pin24 (GPI 23)
DIO1-5	Pin 5	U1 Pin23 (GPI 24)
DIO1-6	Pin 6	U1 Pin22 (GPI 25)
DIO1-7	Pin 7	U1 Pin21 (GPI 26)
DIO1-8	Pin 8	U1 Pin20 (GPI 27)

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-6841 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.

Frequency/Voltage Control

Use this menu to specify your settings for auto detect DIMM/PCI clock and spread spectrum.

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-6841 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 INF Driver

Step 2 – Install VGA Driver

Step 3 – Install LAN Driver

Step 4 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation

Insert the AEC-6841 CD-ROM into the CD-ROM Drive. The Autorun program will run automatically. You also can choose the drivers to install from step 1 to step 4 in order as following instructions.

Step 1 – Install INF Driver

1. Click on the *Step 1-INF* folder and then double click on the *Setup.exe*

2. Follow the instructions that the window will show you

3. The system will help you install the driver automatically

Step 2 – Install VGA Driver

1. Click on the *Step 2-VGA* folder and select the OS your system is

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

3. Follow the instructions that the window shows you

4. The system will help you install the driver automatically

Step 3 – Install LAN Driver

1. Click on the *Step 3-LAN* folder and install the LAN1 and LAN 2 drivers accordingly.

2. When you install the *LAN1* driver, select the *LAN1* folder and double click on the *Setup.exe*;

   When you install the *LAN2* driver, click on the *LAN2* folder and select the OS your system is, and then double click on the *.exe* file located in each OS folder

3. Follow the instructions that the window shows you

4.　The system will help you install the driver automatically

Step 4 – Install Audio Driver

1. Click on the *Step 4-Audio* folder and select the OS your system is

2. Double click on the *.exe* file

3. Follow the instructions that the window shows you

4. The system will help you install the driver automatically

Appendix

A

Programming the Watchdog Timer

A.1 Programming

AEC-6841 utilizes W83627EHG 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

```
┌─────────────────────┐
│  Unlock W83627EHG   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Select register of │
│    watchdog timer   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Enable the function of │
│   the watchdog timer │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Use the function of the │
│    watchdog timer   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   Lock W83627EHG    │
└─────────────────────┘
```
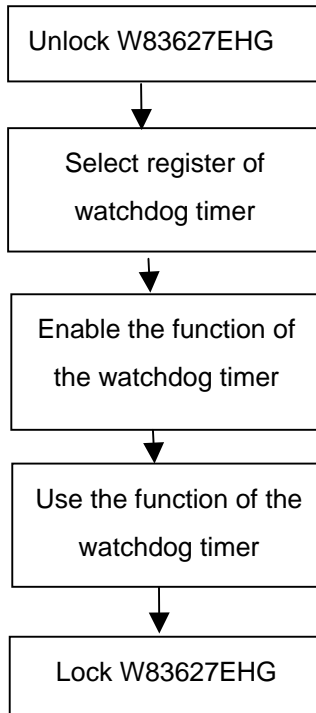
There are three steps to complete the configuration setup:

   (1) Enter the W83627EHG config Mode

   (2) Modify the data of configuration registers

(3) Exit the W83627EHG config Mode. Undesired result may occur if the config Mode is not exited normally.

(1) Enter the W83627EHG config Mode

To enter the W83627EHG 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 W83627EHG 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 mode register. Default 0 x 00)

Bit 7-6   : select PLED mode

= 00   Power LED pin is tri-stated.

= 01   Power LED pin is drived low.

= 10 Power LED pin is a 1Hz toggle pulse with 50 duty cycle.

= 11 Power LED pin is a 1/4Hz toggle pulse with 50 duty cycle.

Bit 5-4   : Reserved

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 1-0   : 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 W83627EHG Watchdog Timer Initial Program

Example: Setting 10 sec. as Watchdog timeout interval

;///

Mov dx,2eh   ;Enter W83627EHG 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 W83627EHG config mode

Mov al,0aah                  (out 0aah to 2eh once)

Out dx,al

;///////////////////////////////////////////////////////////////////////////////////
```

Appendix

B

I/O Information
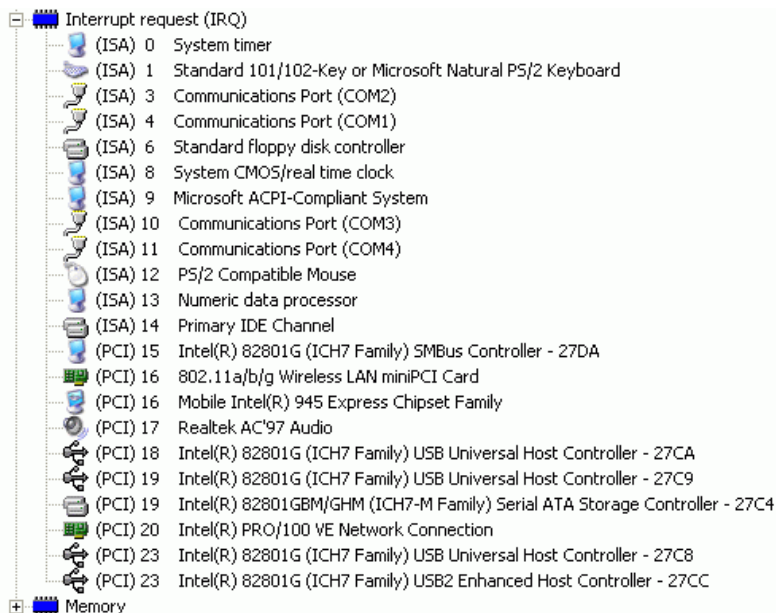
B.1 I/O Address Map

```
Input/output (IO)
     [00000000 - 0000000F]  Direct memory access controller
     [00000000 - 00000CF7]  PCI bus
     [00000010 - 0000001F]  Motherboard resources
     [00000020 - 00000021]  Programmable interrupt controller
     [00000022 - 0000003F]  Motherboard resources
     [00000040 - 00000043]  System timer
     [00000044 - 0000004D]  Motherboard resources
     [0000004E - 0000004F]  Infineon Trusted Platform Module
     [00000050 - 0000005E]  Motherboard resources
     [00000060 - 00000060]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     [00000061 - 00000061]  System speaker
     [00000062 - 00000063]  Motherboard resources
     [00000064 - 00000064]  Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     [00000065 - 0000006F]  Motherboard resources
     [00000070 - 00000073]  System CMOS/real time clock
     [00000074 - 0000007F]  Motherboard resources
     [00000080 - 00000090]  Direct memory access controller
     [00000091 - 00000093]  Motherboard resources
     [00000094 - 0000009F]  Direct memory access controller
     [000000A0 - 000000A1]  Programmable interrupt controller
     [000000A2 - 000000BF]  Motherboard resources
     [000000C0 - 000000DF]  Direct memory access controller
     [000000E0 - 000000EF]  Motherboard resources
     [000000F0 - 000000FF]  Numeric data processor
     [000001F0 - 000001F7]  Primary IDE Channel
     [00000274 - 00000277]  ISAPNP Read Data Port
     [00000279 - 00000279]  ISAPNP Read Data Port
     [00000294 - 00000297]  Motherboard resources
     [000002E8 - 000002EF]  Communications Port (COM4)
     [000002F8 - 000002FF]  Communications Port (COM2)
     [00000378 - 0000037F]  Printer Port (LPT1)
     [000003B0 - 000003BB]  Mobile Intel(R) 945 Express Chipset Family
     [000003C0 - 000003DF]  Mobile Intel(R) 945 Express Chipset Family
     [000003E8 - 000003EF]  Communications Port (COM3)
     [000003F0 - 000003F5]  Standard floppy disk controller
     [000003F6 - 000003F6]  Primary IDE Channel
     [000003F7 - 000003F7]  Standard floppy disk controller
     [000003F8 - 000003FF]  Communications Port (COM1)
     [00000400 - 000004BF]  Motherboard resources
     [000004D0 - 000004D1]  Motherboard resources
     [00000500 - 0000051F]  Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
     [00000778 - 0000077B]  Printer Port (LPT1)
     [00000880 - 0000088F]  Motherboard resources
     [00000A78 - 00000A7B]  Motherboard resources
     [00000B78 - 00000B7B]  Motherboard resources
     [00000BBC - 00000BBF]  Motherboard resources
     [00000D00 - 0000FFFF]  PCI bus
     [00000E78 - 00000E7B]  Motherboard resources
     [00000F78 - 00000F7B]  Motherboard resources
     [00000FBC - 00000FBF]  Motherboard resources
     [00004700 - 0000470B]  Infineon Trusted Platform Module
     [0000DF00 - 0000DF3F]  Intel(R) PRO/100 VE Network Connection
     [0000F000 - 0000F0FF]  Realtek AC'97 Audio
     [0000F300 - 0000F30F]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
     [0000F400 - 0000F403]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
     [0000F500 - 0000F507]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
     [0000F600 - 0000F603]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
     [0000F700 - 0000F707]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
     [0000F800 - 0000F80F]  Intel(R) 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
     [0000FA00 - 0000FA3F]  Realtek AC'97 Audio
     [0000FC00 - 0000FC1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
     [0000FD00 - 0000FD1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
     [0000FE00 - 0000FE1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
     [0000FF00 - 0000FF07]  Mobile Intel(R) 945 Express Chipset Family
```

B.2 1st MB Memory Address Map

```
☐ ▓▓ Memory
      🖳 [00000000 - 0009FFFF]  System board
      🖳 [000A0000 - 000BFFFF]  Mobile Intel(R) 945 Express Chipset Family
      🖳 [000A0000 - 000BFFFF]  PCI bus
      🖳 [000C0000 - 000DFFFF]  PCI bus
      🖳 [000E0000 - 000EFFFF]  System board
      🖳 [000F0000 - 000FFFFF]  System board
      🖳 [00100000 - 1F6DFFFF]  System board
      🖳 [1F6E0000 - 1F6FFFFF]  System board
      🖳 [1F750000 - FEBFFFFF]  PCI bus
      🖳 [D0000000 - DFFFFFFF]  Mobile Intel(R) 945 Express Chipset Family
      🖳 [E0000000 - EFFFFFFF]  Motherboard resources
      🖳 [FDCF0000 - FDCF7FFF]  802.11a/b/g Wireless LAN miniPCI Card
      🖳 [FDCFF000 - FDCFFFFF]  Intel(R) PRO/100 VE Network Connection
      🖳 [FDF00000 - FDF7FFFF]  Mobile Intel(R) 945 Express Chipset Family
      🖳 [FDF80000 - FDFBFFFF]  Mobile Intel(R) 945 Express Chipset Family
      🖳 [FDFFC000 - FDFFC3FF]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27
      🖳 [FDFFD000 - FDFFD0FF]  Realtek AC'97 Audio
      🖳 [FDFFE000 - FDFFE1FF]  Realtek AC'97 Audio
      🖳 [FDFFF000 - FDFFF3FF]  Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
      🖳 [FEB80000 - FEBFFFFF]  Mobile Intel(R) 945 Express Chipset Family
      🖳 [FEC00000 - FEC00FFF]  System board
      🖳 [FED13000 - FED1DFFF]  System board
      🖳 [FED20000 - FED3FFFF]  System board
      🖳 [FED40000 - FED44FFF]  Infineon Trusted Platform Module
      🖳 [FED40000 - FED44FFF]  PCI bus
      🖳 [FED45000 - FED8FFFF]  System board
      🖳 [FEE00000 - FEE00FFF]  System board
      🖳 [FFB00000 - FFB7FFFF]  System board
      🖳 [FFB80000 - FFBFFFFF]  Intel(R) 82802 Firmware Hub Device
      🖳 [FFF00000 - FFFFFFFF]  System board
```

B.3 IRQ Mapping Chart

B.4 DMA Channel Assignments