

**AEC-6900**

Fanless Embedded Controller  
Intel® ULV Celeron® Processor  
With 1 / 2 PCI slots, PCMCIA,  
4 COMs, Audio, 2 Ethernet

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## Packing List

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

- 1 AEC-6900 Embedded Controller
- 1 Phoenix Power Connector
- 2 Wallmount Brackets
- 1 Audio Cable
- 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 Safety

### **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.*

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Chapter

1

**General  
Information**

## 1.1 Introduction

---

The **AEC-6900** is the newest product in the line of BOXER S Advanced Embedded Controllers that has the consistent design inherent in the BOXER series but is more user friendly and higher performance. This Embedded Controller increases the compatibility and stability for essential applications.

Customers always strive for high performance and low power consumption in their applications. The AEC-6900 adopts the Intel® Ultra Low Voltage (ULV) Celeron® Processor at 650MHz. The design of AEC-6900 does not compromise the two important elements users care about, thus it is sure to satisfy customer needs. The AEC-6900 was developed in terms of these concepts.

The AEC-6900 supports up to 2 PCI slots (the second one is optional.) and 2 PCMCIA slots. It is a leading-edge product with these PCI and PCMCIA expansion slots onboard and it is a rare design in the industrial PC field as well. AEC-6900's expandable function, compact size combined with fanless design and highly efficient heat conduction mechanism can fulfill any rugged technical application in industrial automation, factory control, test instrumentation and safety surveillance.

The model features 4 COMs, 1 Parallel, 4 USB 1.1, 2 LAN and 1 VGA ports on front and rear panels. It has easy to access for

users. Moreover, it withstands vibration up to 5g rms and has anti-shock capabilities up to 100g since it is designed to operate in rugged environments. The AEC-6900 supports DC 9~30V power input standard and can utilize optional external AC power. It reduces the risk of operation interruption. The AEC-6900 is design to fit critical applications, for example, ITS. In addition, this model supports AC97 Audio for multimedia applications. By integrating multimedia functionality into automation applications, the AEC-6900 will be a killer product for the Automation market and it is definitely a perfect solution for users with critical demands.

## 1.2 Features

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- Fanless Design with Intel® ULV Celeron® 650MHz Processor
- Supports 1 or 2 PCI slots for expansion
- 2 PCMCIA
- 4 COM / 4 USB 1.1 / Dual Ethernet
- Operating Temperature: -15°C~65°C
- Anti-vibration up to 5grms / Anti-shock up to 50 g

## 1.3 Specifications

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### System

- CPU: Intel® ULV Celeron® 650MHz Processor
- System Memory: SDRAM 168-pin DIMM Socket x 1, Max. 512MB
- Expansion: PCI slot x 1 (Optional 2<sup>nd</sup> PCI); PCMCIA x 2
- VGA: DB-15 VGA connector
- Keyboard/Mouse: PS/2 Keyboard & Mouse
- Ethernet: 10/100Base-TX RJ-45 Connector x 2
- SSD: CompactFlash™ slot x 1
- Device Bay: Internal 2.5" HDD Bay
- Serial Port: RS-232 x 3; RS-232/422/485 x 1
- Audio: Line-in / Line-out / MIC-in
- Parallel Port: Parallel Port x 1
- USB: 4 USB 1.1 ports
- Watchdog Timer: Generates a time-out system reset, setting via software
- Power Supply: 1. DC Input -- Internal DC-

- DC Converter (Default)

Input voltage:  
9V DC~30VDC
- 2. AC Input -- External  
Power Adapter (Optional)

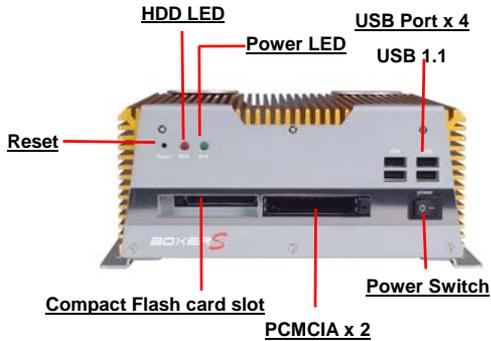
Input voltage: 100V AC ~  
240V AC @ 50 ~ 60Hz
- System Control: Power on / off switch x 1  
Reset button x 1
- Indicators: Power LED x 1  
HDD active LED x 1

### **Mechanical and Environmental**

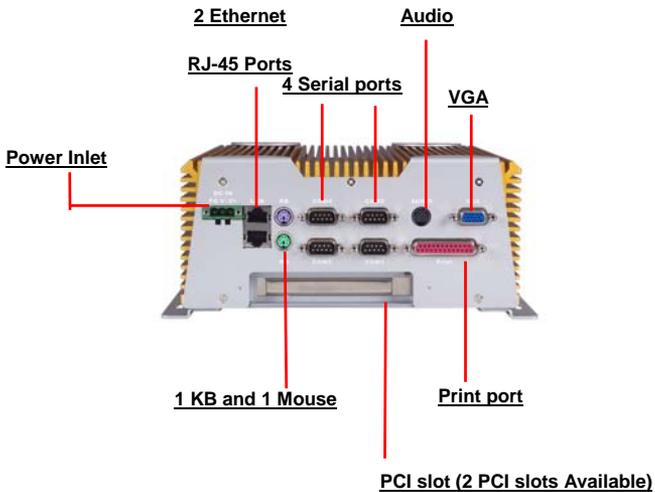
- Construction: Rugged Aluminum Alloy  
chassis
- Color: mustard
- Mounting: Wallmount, Desktop
- Dimension: 1 PCI-214mm(W) x  
94.75mm(H) x 237.8mm(D)  
2 PCI-214mm (W) x  
117.5mm (H) x 237.8mm (D)
- Net Weight: 1 PCI-12.41lb (5.63kg)  
2 PCI-13.69lb (6.21kg)
- Gross Weight: 21.21lb (9.62kg)
- Operating Temperature: 5°F ~ 149°F (-15°C ~

- 65°C) (CFD);  
5°F ~ 140°F (-15°C ~  
60°C) (Automotive HDD);  
32°F ~ 113°F (0°C ~ 45°C)  
(Normal HDD)
- Operating Humidity: 5~95%@40°C, non-  
condensing
- Vibration: 5 g rms / 5~500Hz /  
random operation (CFD);  
1 g / 5~500Hz / random  
operation (HDD)
- Shock: 50g peak acceleration (11  
msec. duration)  
20g peak acceleration (11  
msec. duration) (HDD)
- EMC: CE/FCC class A

## Front Side



## Rear Side



Chapter

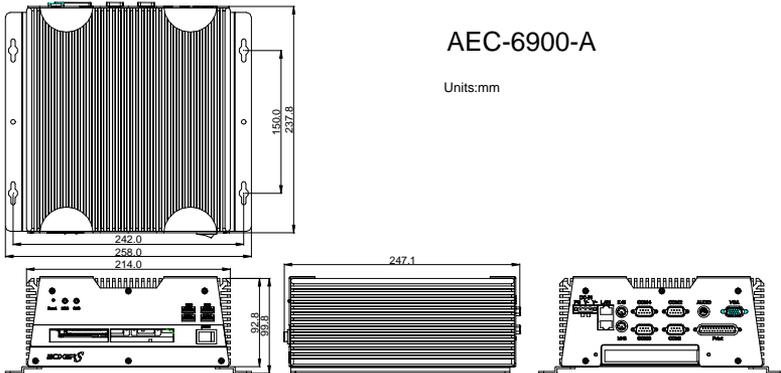
2

**Hardware  
Installation**

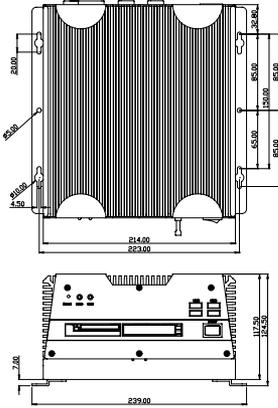
## 2.1 Dimension

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### A) 1 PCI slot version

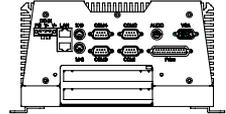


B) 2 PCI slots version



AEC-6900-B

Units:mm



## 2.2 Hard Disk Drive Installation

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### 2.2.1 Disassembling the AEC-6900

For Hard Disk Drive (HDD) installation, you have to disassemble the bottom lid of AEC-6900 and some components and covers in the AEC-6900.

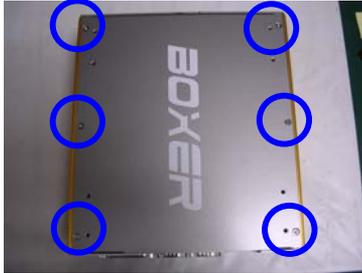
Step 1: Unfasten the two screws on the rear panel.



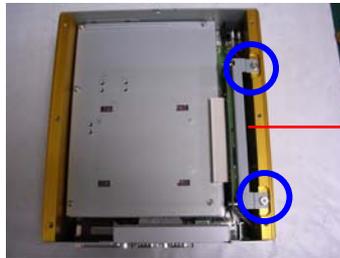
Step 2: Unfasten the screws in blue circle on the front panel.



Step 3: Unfasten the six screws on the bottom lid.

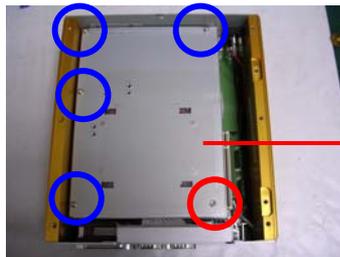


Step 4: Take off the bottom lid and loosen the two screws on the riser card and remove the riser card.



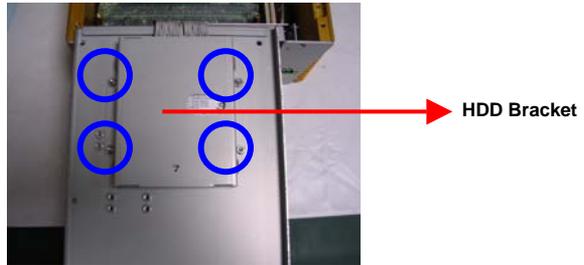
Riser card

Step 5: Unfasten the five screws and open the HDD cover.



HDD Cover

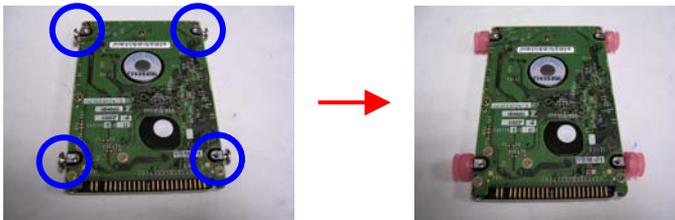
Step 6: Loosen the four screws on the HDD bracket.



### 2.2.2 Assembling the HDD Module

After disassembling the AEC-6900, you have to get the HDD module ready for the proceeding installation.

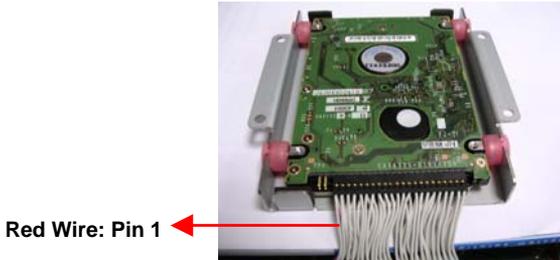
Step 1: Get four pink rubber bumpers from the accessory kit and wrap them around the four screws on the HDD Module.



Step 2: Place the bumpers at the four indentations of the two sides of the HDD bracket



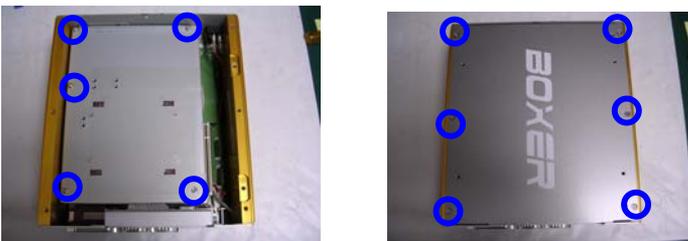
Step 3: Connect the power cable to the HDD module. (Red wire is Pin 1)



Step 4: Get the HDD cover ready and combine the HDD Bracket with the HDD cover; fasten the four screws in the blue circles shown below.



Step 5: Close the HDD cover and fasten the five screws on the HDD cover. Close the bottom lid of the AEC-6900 and fasten six screws on the bottom lid; the HDD installation is now finished.



## 2.3 PCI Card Installation

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Step 1: Unfasten the two screws on the rear panel.



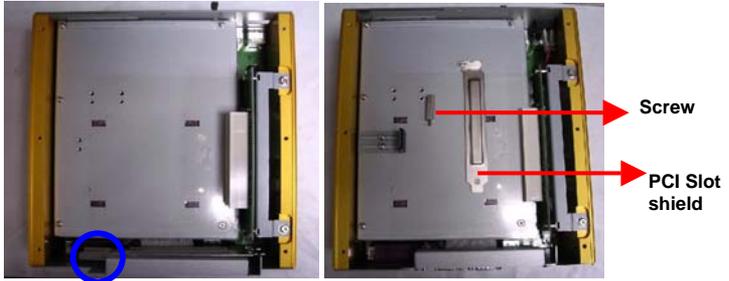
Step 2: Unfasten three screws on the front panel.



Step 3: Unfasten the six screws on the bottom lid.



**Step 4:** Remove the screw with your finger (figure 1) and get the PCI card ready to install. You should keep the shield and screw for use later.

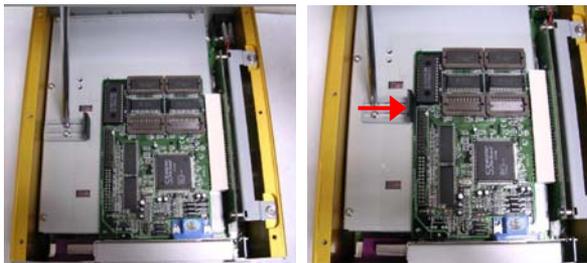


(Figure 1)

**Step 5:** Insert the PCI card into the PCI slot and reattach the screw.



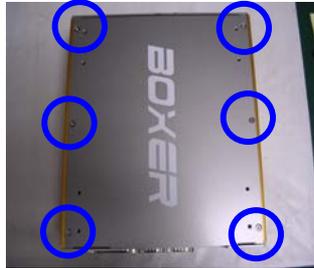
**Step 6:** Unfasten the screws (Figure 1) and push the tenon to lock the PCI card in position (Figure 2).



(Figure 1)

(Figure 2)

Step 7: Close the bottom lid of the AEC-6900 and fasten six screws on bottom lid.



Step 8: Fasten the three screws on the front panel and the two screws on the rear panel.



## 2.4 Wallmount kit Installation

---

Step 1: Get the brackets ready and fasten appropriate four screws on each bracket.



Step 2: After fastening the two brackets on the bottom lid of AEC-6900, the wallmount kit installation is 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 AEC-6900 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.

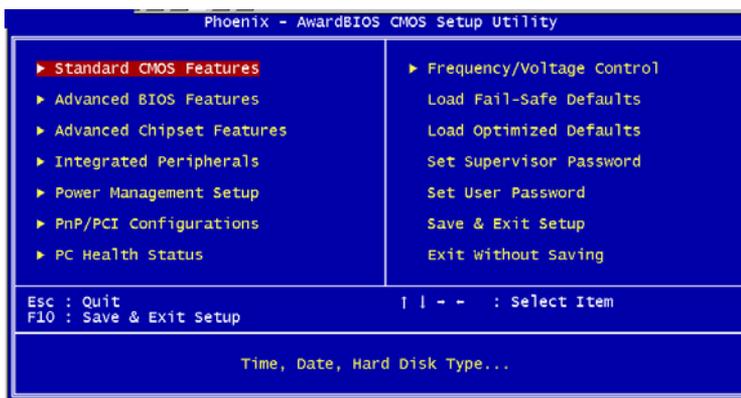
## 3.2 Award BIOS Setup

---

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-6900 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 4 in 1 Driver

Step 2 – Install Audio Driver

Step 3 – Install LAN Driver

Step 4 – Install VGA Driver

**Note:**

PCMCIAfix driver can be installed on Windows 9x/ ME only.

Please read instructions below for further detailed Installations.

## 4.1 Installation

---

Insert the AEC-6900 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 4 in 1 Driver

1. Click on the **4 in 1** folder and then double click on the **VIAHyperion4in1451v.exe**
2. Follow the instructions that the window shows you
3. The system will help you install the driver automatically

### Step 2 – Install Audio Driver

1. Click on the **Audio** folder and then double click on the **setup.exe**
2. Follow the instructions that the window shows you
3. The system will help you install the driver automatically

### Step 3 – Install LAN Driver

1. Click on the **Ethernet** folder and then double click on the **setup.exe**
2. Follow the instructions that the window shows you
3. The system will help you install the driver automatically

### Step 4 – Install VGA Driver

1. Click on the **VGA** folder
2. Select the OS your system is and then double click on the **setup.exe**

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

**Note:**

Under the Window OS environment, if the CRT connector is connected to display monitor by the data switch device, the user need to set the color and resolution from Intel Graphic utility (VGA driver) instead of setting from the control panel in case of the wrong display appearance.

Appendix

A

## I/O Information

### A.1 I/O Address Map

Address	Description	User Address
000-01F	DMA Controller #1	000-000F
020-03F	Interrupt Controller #1, Master	020-021
040-05F	System Time	040-043
060-06F	8042 (Keyboard Controller)	060-064
070-07F	Real time Clock, NMI (non-maskable Interrupt) Mask	070-073
080-09F	DMA Page Register	080-08F
0A0-0BF	Interrupt Controller #2	0A0-0A1
0C0-0DF	DMA Controller #2	0C0-0DF
0F0-0FF	Math Coprocessor	0F0-0FF
170-177	Secondary IDE Channel	170-177
1F0-1F7	Primary IDE Channel	1F0-1F7
278-27F	Parallel Printer Port 2 (LPT3)	278-27F
2E8-2EF	Serial Port 4	2E8-2EF
2F8-2FF	Serial Port 2	2F8-2FF
378-37F	Parallel Printer Port 1 (LPT2)	378-37F
3B0-3BF	Monochrome Display and Printer Adapter (LPT1)	3B0-3BF
3D0-3DF	EGA / VGA card	3D0-3DF
3E8-3EF	Serial Port 3	3E8-3EF
3F0-3F7	Diskette Controller	3F2-3F7
3F8-3FF	Serial Port 1	3F8-3FF

### A.2 1<sup>st</sup> MB Memory Address Map

Memory Address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
C0000-CFFFF	VGA BIOS
E0000-FFFFF	System BIOS

### A.3 IRQ Mapping Chart

IRQ0	System Timer	IRQ8	System CMOS / Real time clock
IRQ1	Keyboard	IRQ10	COM3
IRQ2	Cascade to IRQ Controller	IRQ11	COM4
IRQ3	COM2	IRQ12	PS/2 mouse
IRQ4	COM1	IRQ13	FPU
IRQ5	Unused	IRQ14	Primary IDE
IRQ6	Floppy Disk Controller	IRQ15	Secondary IDE
IRQ7	Printer		

### A.4 DMA Channel Assignments

DMA Channel	Function
0	Available
1	Available
2	Standard Floppy Disk Controller
3	Available
4	Direct Memory Access Controller
5	Available
6	Available
7	Available

Appendix

B

# Programming the Watchdog Timer

## B.1 Programming the Watchdog Timer

---

AEC-6900 contains a watchdog timer reset pin. (GP16)

All reference material can be found in the followings.

```

=====*
```

\*

```

** Title : WatchDog Timer Setup Utility (for W83977 GP16) **
** Company : AAEON Technology Inc. **
** Compiler : Borland C ++ Version 3.0 **
** =====
```

```

===== */
#include <dos.h>
#include <io.h>
#include <bios.h>
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>

/* Set I/O Address : 370/371 or 3F0/3F1 */
#define IO_INDEX_PORT 0x370
#define IO_DATA_PORT 0x371

/* Set Watchdog reset pin : 12/13/16 */
#define watch_dog_output_GP 16
#define UNLOCK_DATA 0x87
#define LOCK_DATA 0xAA
#define DEVICE_REGISTER 0x07
```

---

```
void EnterConfigMode()
{
  outputb(IO_INDEX_PORT, UNLOCK_DATA);
  outputb(IO_INDEX_PORT, UNLOCK_DATA);
}

void ExitConfigMode()
{
  outputb(IO_INDEX_PORT, LOCK_DATA);
}

void SelectDevice(unsigned char device)
{
  outputb(IO_INDEX_PORT, DEVICE_REGISTER);
  outputb(IO_DATA_PORT, device);
}

unsigned char ReadAData(short int reg)
{
  outputb(IO_INDEX_PORT, reg);
  return (inportb(IO_DATA_PORT));
}

void WriteAData(unsigned char reg, unsigned char data)
{
  outputb(IO_INDEX_PORT, reg);
  outputb(IO_DATA_PORT, data);
}

void SetWatchDogTime(unsigned char time_val)
```

```
{
EnterConfigMode();
SelectDevice(8);
WriteData(0x30, 0x01);
//Set Register F2
//Set Watch-Dog Timer 1~ 256
WriteAData(0xF2, time_val);
// set counter counts in second (or minute)
// Register F4 Bit 6 = 0/1 (minutes/seconds)
// For w83977EF only
WriteAData(0xF4, 0x40);
ExitConfigMode();
    }

void init_w83977f_aw_watchdog()
{
short int value;
//Enter W83977 Configure Mode
EnterConfigMode();
//Select Device 7
SelectDevice(7);
//Set Device Active
WriteAData(0x30, 0x01);
//caution:skip this step will be a mistake!!
if (watch_dog_output_GP==12)
{
```

```
//Set Register E2 to define GP12
WriteADData(0xE2, 0x0A);
}
else if(watch_dog_output_GP==13)
{
//Set Register E3 to define GP13
WriteADData(0xE3, 0x0A);
}
else if(watch_dog_output_GP==16)
{
//Set Register E6 to define GP16
WriteADData(0xE6, 0x0A);
}
//Select Device 8
SelectDevice(8);
WriteData(0x30, 0x01);
//Set Register F3
//keyboard and mouse interrupt reset Enable
//When Watch-Dog Time-out occurs,Enable POWER LED
output
    WriteADData(0xF3, 0x0E);

//caution:skip this step will be a mistake!!
if (watch_dog_output_GP==12)
{
//Set Register 2A (PIN 57) Bit 7 = 0/1 (KBLOCK/GP12)
```

```
//set to GP12 for WD Rst
WriteAData(0x2A,ReadAData(0x2A)|0x80);
}
else if(watch_dog_output_GP==13)
{
//Set Register 2B (PIN 58) Bit 0 = 0/1 (KBLOCK/GP13)
//set to GP13 for WD Rst
WriteAData(0x2B,ReadAData(0x2B)|0x01);
}
else if(watch_dog_output_GP==16)
{
//Set Register 2C (PIN 119) Bit 5-4 = 01 (GP16)
//set to GP16 for WD Rst
WriteAData(0x2C,ReadAData(0x2C)|0x10);
}
//Exit W83977 Configure mode
ExitConfigMode();
}
void main(int argc, char* argv[])
{
int time_value=0;
char *ptr;
printf( inBond 83977 WatchDog Timer Setup Utility w
Version 1.0 \n" );
printf( copyright (c) 2000 AAEON Technology Inc.\n");C
```

```
printf( this version only for W83977 that using GP%d to T
        Reset System.\n",watch_dog_output_GP);

if (argc == 1)
{
printf( n Syntax: WATCHDOG [time] \n" );\
printf(" time range : 1 ~ 256 \n\n" );
return ;
}
if (argc > 1)
{
ptr = argv[1];
time_value = atoi(ptr);
}
if (time_value > 0 && time_value < 256)
{
SetWatchDogTime((unsigned char) time_value);
init_w83977f_aw_watchdog();
printf( atch Dog Timer set up : %d \n",time_value);W
}
}
```