

**PFM-530I**

Embedded STPC®

ATLAS 133MHz Processor

With SVGA/LCD Interface

PC/104 CPU Module

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## Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 PFM-530I PC/104 CPU Module
- 1 Quick Installation Guide
- 1 CD-ROM for manual (in PDF format), drivers and utility)
- 1 2mm to 2.54mm IDE flat cable, 44-pin to 40-pin
- 1 PS/2 keyboard & mouse cable
- 1 Serial port cable
- 1 Parallel cable
- 1 FDD flat cable
- 1 VGA flat cable
- 1 USB cable
- 1 Ethernet RJ-45 connector Conversion (for specific version only)

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

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Chapter

1

**General  
Information**

## 1.1 Features

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- STPC® ATLAS 133MHz processor
- Fanless Design
- Onboard 64MB SDRAM
- USB 1.1 compatible, support 2 USB ports
- Both CRT and flat panel simultaneously display
- 10/100Mbps Fast Ethernet
- 18-bit TFT LCD

## 1.2 Specifications

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### System

- CPU Embedded STPC ATLAS 133MHz processor
- Chipset STPC® ATLAS 133MHz processor
- IO Chipset STPC® ATLAS 133MHz processor, Winbond W83977
- BIOS AWARD 256KB Flash ROM
- System Memory Onboard 64MB SDRAM (32/128MB option, SDRAM clock up to 100MHz)
- Ethernet (optional) ADMtek AN983B, 10/100Mbps Ethernet
- Enhanced IDE Interface Supports up to two EIDE devices. BIOS auto-detect, PIO Mode 3 or Mode 4 transfer rate up to 22MB/sec



- FDD Interface Supports 3.5" FDD
- USB Ports USB 1.1 compatible, supports up to two USB devices
- Serial Ports 3 serial RS-232 ports, one serial RS-232/422/485 port
- Parallel port One parallel port, supports SPP/EPP/ECP mode
- Keyboard/mouse connector Mini-DIN connector supports standard PS/2 keyboard and mouse
- Watchdog Timer Generates a system reset, software selectable time-out interval. (15sec ~ 127min 15sec, 30sec/step)
- SSD Type I CompactFlash™ socket
- Digital I/O Provides 16 digital I/O channels for general purpose use
- IR Interface Supports one IrDA Tx/Rx header

## Display

- Display Memory UMA architecture, share system memory up to 4MB
- Display Type Supports CRT and TFT LCDs. Able to display both CRT and Flat Panel simultaneously
- Flat Panel Display Mode Supports 9/12/18-bit TFT flat panels with resolution up to 800 x 600
- CRT Display Mode Interlaced or non-interlaced CRT monitor resolution up to 1024 x 768 x 75Hz@24bpp

© Please note the default BIOS supports “CRT and LCD (640x480)” while users also have two other options of display support mode:

- CRT and LCD (800x600)
- CRT only

Please refer to AAEON web ([www.aaeon.com](http://www.aaeon.com)) to download the latest support BIOS.

### Expansion Interface

- PC/104 Connector                      One 16-bit 104 pin connector onboard for PC/104 module expansion

### Mechanical and Environment

- Board Dimension              96mm x 90mm (3.77" x 3.54")  
(L x W)
- Weight                            0.6lb (0.25kg)
- Operating Temperature        0°C~60°C (32°F~140°F)  
   -25°C~80°C (-13°F~176°F) (Optional)
- Operating Humidity            0% to 90% relative humidity,  
   non-condensing
- Power Supply Voltage        +5V ± 5%

Chapter

2

**Quick  
Installation  
Guide**

*Notice:*

*The Quick Installation Guide is consisted in Chapter 2 of user manual. For other chapters and further installation instructions please refer to the user manual CD-ROM that come with the product.*



## 2.1 Safety Precautions

---

**Warning!**

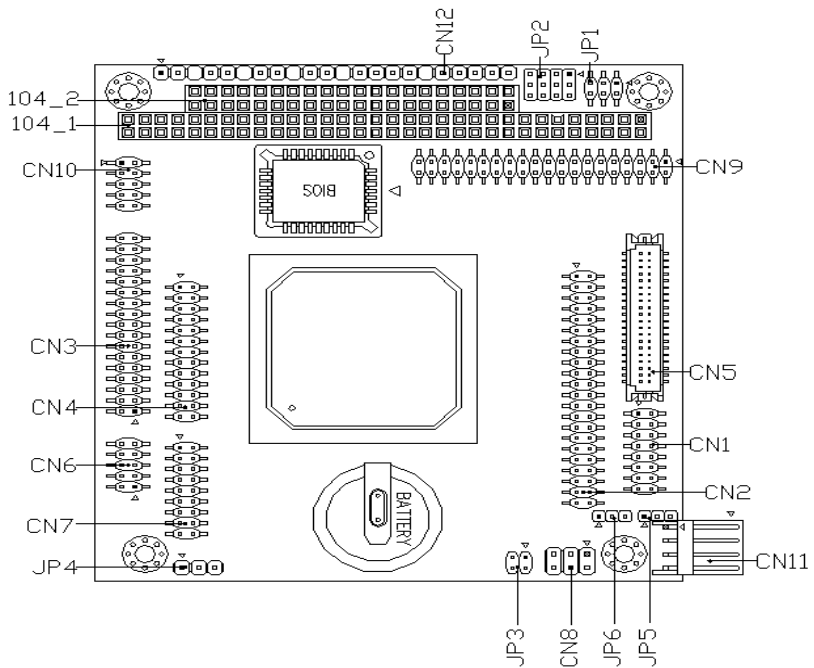
*Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because sensitive electronic components can be damaged by a sudden rush of power.*

**Caution!**

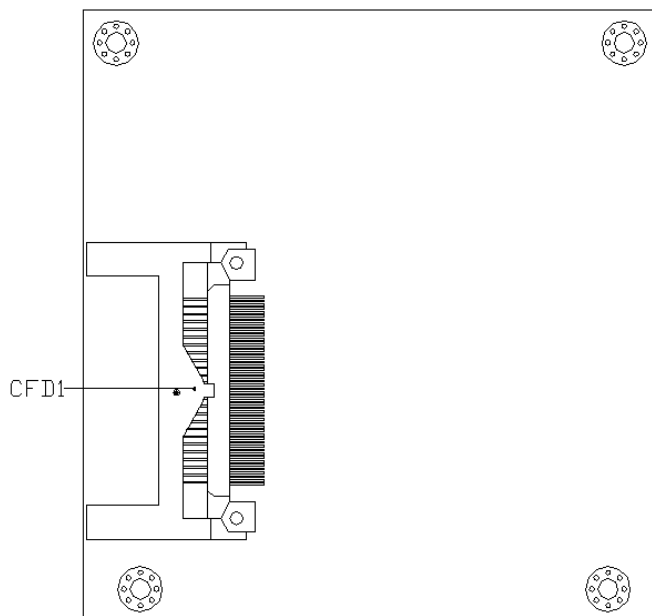
*Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis*

## 2.2 Location of Connectors and Jumpers

### Component side

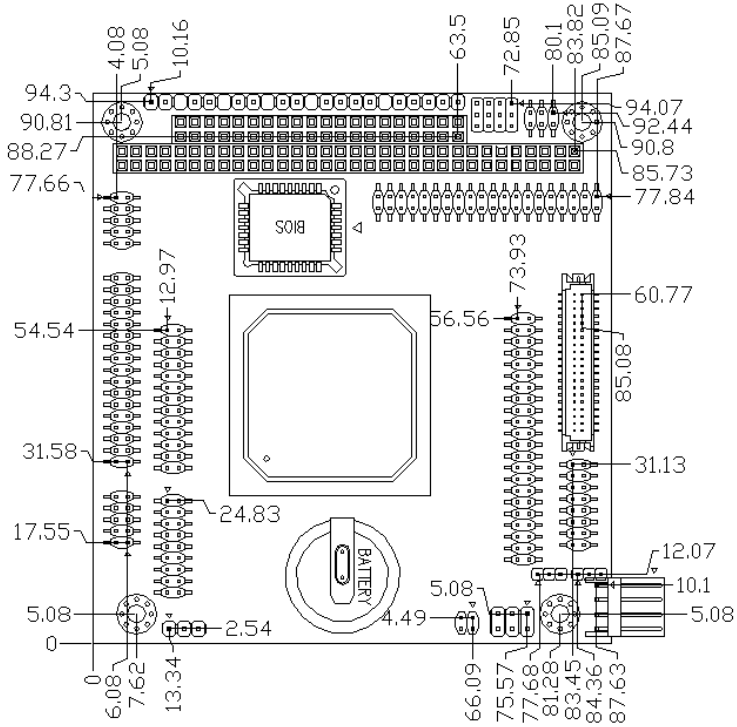


**Soldering side**

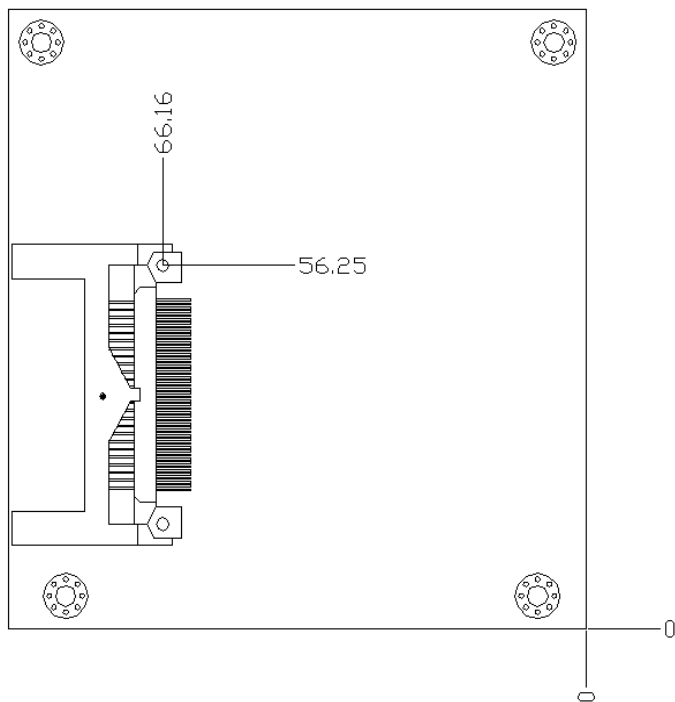


### 2.3 Mechanical Drawing

#### Component side



Solder side





## 2.4 List of Jumpers

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The number of jumpers ideally allow users to manually customize the system configurations to meet their application requirements.

The following chart consists the list of each jumper function:

### Jumpers

<b>Label</b>	<b>Function</b>
JP1	COM2 RS-232/422/485 Selection
JP2	COM2 RS-232/422/485 Selection
JP3	COM1/2 Enable/Disable Selection
JP4	Clear CMOS
JP5	LCD Voltage Selection
JP6	TTL_LCD Clock Selection

## 2.5 List of Connectors

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The board has a number of connectors that allow you to configure your system to suit your application. Connectors on board link to external devices such as hard disk drives, keyboard, or floppy drives.

The table below shows the function of each of the board's connectors:

### Connectors

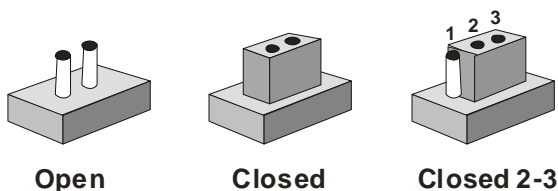
Label	Function
CN1	VGA Display Connector
CN2	IDE Connector
CN3	Floppy Connector
CN4	LPT Port Connector
CN5	TTL_LCD Connector
CN6	USB 1/USB 2 Connector
CN7	GPIO Connector
CN8	PS2 Keyboard/Mouse Connector
CN9	Serial Port Connector
CN10	10/100Base-T Ethernet Connector
CN11	Power Connector
CN12	Front Panel Connector
CFD1	CompactFlash Slot
104_1/2	PC/104 Connector

## 2.6 Setting Jumpers

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You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.

To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Generally, you simply need a standard cable to make most connections.

## 2.7 COM2 RS-232/422/485 Selection (JP1 & JP2)

The COM2 port can be selected as RS-232, RS-422 or RS-485 by setting JP1, JP2 and JP3. The following chart shows the jumper setting.

JP1	JP2	Function
1-2, 4-5, 7-8, 10-11	1-2	RS-232 *
2-3, 5-6, 8-9, 11-12	3-4	RS-422
2-3, 5-6, 8-9, 11-12	5-6	RS-485

\* Default

## 2.8 COM1/2 Enable/Disable Selection (JP3)

JP3	Function	JP3	Function
1-2(COM1)	Disable	1-2(COM1)	Enable
3-4(COM2)		3-4(COM2)	
Close		Open *	

\*Default

## 2.9 Clear CMOS (JP4)

JP4	Function	JP4	Function
1-2*	Protected	2-3	Clear

\* Default

## 2.10 LCD Voltage Selection (JP5)

JP5	Function	JP5	Function
1-2*	+3.3V	2-3	+5V

\* Default

## 2.11 TTL-LCD Clock Selection (JP6)

JP6	Function	JP6	Function
1-2	Reverse CLK	2-3*	CLK

\* Default

## 2.12 VGA Display Connector (CN1)

Pin	Signal	Pin	Signal
1	RED	2	+5V
3	GREEN	4	GND
5	BLUE	6	N.C
7	N.C	8	DDCDAT
9	GND	10	HSYNC
11	GND	12	VSYNC
13	GND	14	DDCCLK
15	GND	16	GND

## 2.13 IDE Connector (CN2)

Pin	Signal	Pin	Signal
1	IDE RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12

13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N.C
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ14	32	N.C
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	LED	40	GND
41	+5V	42	+5V
43	GND	44	N.C

## 2.14 Floppy Connector (CN3)

Pin	Signal	Pin	Signal
1	GND	2	#REDWC
3	GND	4	N.C
5	GND	6	#DS1
7	GND	8	#INDEX
9	GND	10	#MOTOR A

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11	GND	12	#DRIVE SELECT B
13	GND	14	#DRIVE SELECT A
15	GND	16	#MOTOR B
17	GND	18	#DIR
19	GND	20	#STEP
21	GND	22	#WRITE DATA
23	GND	24	#WRITE GATE
25	GND	26	#TRACK0
27	GND	28	#WRITE PROTECT
29	GND	30	#READ DATA
31	GND	32	#SIDE1
33	GND	34	#DISK CHANGE

**2.15 LPT Port Connector (CN4)**

Pin	Signal	Pin	Signal
1	#STROBE	2	#AFD
3	DATA0	4	#ERROR
5	DATA1	6	#INIT
7	DATA2	8	#SLIN
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND

19	#ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SELECT	26	N.C

## 2.16 TTL\_LCD Connector (CN5)

Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	GND	4	GND
5	+3.3V	6	+3.3V
7	ENBKL	8	GND
9	BLUE0	10	BLUE1
11	BLUE2	12	BLUE3
13	BLUE4	14	BLUE5
15	BLUE6	16	BLUE7
17	GREEN0	18	GREEN1
19	GREEN2	20	GREEN3
21	GREEN4	22	GREEN5
23	GREEN6	24	GREEN7
25	RED0	26	RED1
27	RED2	28	RED3
29	RED4	30	RED5
31	RED6	32	RED7
33	GND	34	GND



35	DOT_CLOCK	36	VSYNC
37	DE	38	HSYNC
39	N.C	40	ENAVEE

## 2.17 USB 1/USB2 Connector (CN6)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD1-	4	GND
5	USBD1+	6	USBD2+
7	GND	8	USBD2-
9	GND	10	+5V

## 2.18 GPIO Connector (CN7)

The I/O address is 326h for GPIO Master Port (GP0~GP7) and 32Eh for GPIO Slave Port (GP8~15)

Pin	Signal	Pin	Signal
1	GPIO0	2	GPIO8
3	GPIO1	4	GPIO9
5	GPIO2	6	GPIO10
7	GPIO3	8	GPIO11
9	GPIO4	10	GPIO12
11	GPIO5	12	GPIO13
13	GPIO6	14	GPIO14
15	GPIO7	16	GPIO15
17	GND	18	+5V

## 2.19 PS2 Keyboard/Mouse Connector (CN8)

Pin	Signal
1	KB_DATA
2	KB_CLK
3	GND
4	+5V
5	MS_DATA
6	MS_CLK

## 2.20 Serial Port Connector (CN9)

PFM-530I offers four serial ports, 3 serial RS-232 ports, one serial RS-232/422/485 port, which allows you to connect them to serial devices (mouse, printer, etc.).

Pin	Signal	Pin	Signal
1	DCD1	2	DSR1
3	RXD1	4	RTS1
5	TXD1	6	CTS1
7	DTR1	8	RI1
9	GND	10	N.C
11	DCD2(422TXD-/485DATA-)	12	DSR2
13	RXD2(422RXD+)	14	RTS2
15	TXD2(422TXD+/485DATA+)	16	CTS2
17	DTR2(422RXD-)	18	RI2
19	GND	20	N.C

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21	DCD3	22	DSR3
23	RXD3	24	RTS3
25	TXD3	26	CTS3
27	DTR3	28	RI3
29	GND	30	N.C
31	DCD4	32	DSR4
33	RXD4	34	RTS4
35	TXD4	36	CTS4
37	DTR4	38	RI4
39	GND	40	N.C

**2.21 10/100Base-TX Ethernet Connector (CN10)**

Pin	Signal	Pin	Signal
1	RX-	2	RX+
3	Temp_GND	4	Temp_GND
5	GND	6	GND
7	Temp_GND	8	Temp_GND
9	TX+	10	TX-

**2.22 Power Connector (CN11)**

Pin	Signal
1	+5V
2	GND
3	GND

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4	+12V
---	------

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## 2.23 Front Panel Connector (CN12)

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Pin	Signal
1	Power LED(+)
2	Power LED(-)
3	External Buzzer(+)
4	External Buzzer(-)
5	IDE LED(+)
6	IDE LED(-)
7	Reset Switch(+)
8	Reset Switch(-)
9	+5V
10	Speed LED
11	Active LED
12	Link LED
13	+5V
14	N.C
15	IRRX
16	GND
17	IRTX

---

## 2.24 CompactFlash Connector (CFD1)

The PFM-5301 is equipped with a CompactFlash type I socket on the solder side, which supports the IDE interface CompactFlash card. The socket itself is specially designed to prevent any incorrect installation of the CompactFlash card. When installing or removing the CompactFlash card, please make sure that the system power is off.

The CompactFlash card is acted as a disk drive in your PC system. To fit the AAEON CompactFlash card into the PFM-5301, simply plug it into the designated connector. It will only fit when the red triangle on the CompactFlash card is aligned with the triangle on the connector. The card will not fit any other way (do NOT use excessive force).

Pin	Signal	Pin	Signal
1	GND	26	GND
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	CS#1	32	CS#3
8	GND	33	GND
9	GND	34	IO READ
10	GND	35	IO WRITE
11	GND	36	+5V
12	GND	37	IRQ15
13	+5V	38	+5V
14	GND	39	CSEL

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15	GND	40	N.C.
16	GND	41	IDE RESET
17	GND	42	IO READY
18	ADDR 2	43	N.C.
19	ADDR 1	44	+5V
20	ADDR 0	45	DASP
21	DATA 0	46	DIAG
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N.C.	49	DATA 10
25	GND	50	GND

## Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

## AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
<p><b>O:</b> 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。</p> <p><b>X:</b> 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。</p> <p>备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。</p>						

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 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 PFM-530I comes with a CD-ROM which contains most of drivers and utilities of your needs.

***We recommend that the system driver installation procedure must be performed first.***

#### 4.1 Installation:

---

##### **Applicable for Windows 98SE**

1. Insert the **PFM-530I CD-ROM** into the CD-ROM Drive.
2. Click on **Start** button, select the **Settings**, and then click on the **Control Panel** icon.
3. Double click on the **Add/Remove Hardware** icon and **Add New Hardware Wizard** will appear. Click on the **Next** button.
4. Select **Search for the best driver for your device (Recommended)** and click on the **Next** button.
5. Select **Specify a location**, click on **Have Disk** button then key in the CD-ROM path and specify component drivers and OS folders. Then click on the **Next** button.
6. The Wizard shows that Windows driver file search for the device: (For example, VGA devices of the board). Click on the **Next** button.
7. The system will ask you to insert Windows 98 CD Diskette. Click on the **OK** button to insert Diskette and key in path.
8. Click on the **OK** button.
9. Click on the **Finish** button to finish installation process. And allow the system to reboot.

Appendix

A

# Programming the Watchdog Timer

## A.1 Programming the watchdog timer

---

The PFM-5301 contains a watchdog timer reset pin (GP16). All reference material can be found below.

```
=====
** 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 */
#define IO_INDEX_PORT    0x370
#define IO_DATA_PORT    0x371

/* Set Watchdog reset pin : 16 */
#define watch_dog_output_GP 16

#define UNLOCK_DATA      0x87
#define LOCK_DATA        0xAA
#define DEVICE_REGISTER  0x07

void EnterConfigMode()
```



```
{
    outportb(IO_INDEX_PORT, UNLOCK_DATA);
    outportb(IO_INDEX_PORT, UNLOCK_DATA);
}

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

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

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

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

void SetWatchDogTime(unsigned char time_val)
{
    EnterConfigMode();
    SelectDevice(8);
    //Set Register F2
```

```
//Set Watch-Dog Timer 1~ 256
WriteAData(0xF2, time_val);
//Set Register F3
//keyboard and mouse interrupt reset Enable
//When Watch-Dog Time-out occurs,Enable POWER LED
output
WriteAData(0xF3, 0x0E);
// set counter counts in second (or minute)
// Register F4 Bit 6 = 0/1 (minutes/seconds)
// For w83977EF only
WriteAData(0xF4, 0x42);
// ExitConfigMode();
}

void init_w83977f_aw_watchdog()
{
    short int value;

    //Enter W83977 Configure Mode
    // EnterConfigMode();

    //Set Device Active
    WriteAData(0x30, 0x01);

    //Select Device 7
    SelectDevice(7);

    //caution:skip this step will be a mistake!!
    if (watch_dog_output_GP==12)
    {
        //Set Register E2 to define GP12
        WriteAData(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);
}

//Set Device Active
WriteADData(0x30, 0x01);

//Select Device 8
// SelectDevice(8);

//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
    WriteADData(0x2A,ReadADData(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
    WriteADData(0x2B,ReadADData(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
    WriteADData(0x2C,ReadADData(0x2C)|0x10);
}
```

```
//Exit W83977 Configure mode
ExitConfigMode();
}

void main(int argc, char* argv[])
{
    int time_value=0;
    char *ptr;
    printf("WinBond 83977 WatchDog Timer Setup Utility Version
1.0 \n");
    printf("Copyright (c) 2000 AAEON Technology Inc.\n");
    printf("This version only for W83977 that using GP%d to
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("Watch Dog Timer set up : %d \n",time_value);
    }
}
```