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PFM-550S

VIA Mark Processor
PC/104 CPU Module
With LCD, Ethernet,
COM, USB Ports

PFM-550S Manual Rev. A 1st Ed.
Mar. 2006

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Packing List

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

- Cable Kit
  - Keyboard/ Mouse cable x 1
  - COM Port Cable x 2
  - VGA Cable x 1
  - Parallel Port Cable x 1
  - IDE Cable x 1
  - USB Port Cable x 2
  - Ethernet Cable x 1
- 1 Quick Installation Guide
- 1 CD-ROM for manual (in PDF format) and drivers
- 1 PFM-550S CPU Module

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

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Contents

Chapter 1 General Information

1.1 Introduction 1-2
1.2 Features 1-3
1.3 Specifications 1-4

Chapter 2 Quick Installation Guide

2.1 Safety Precautions 2-2
2.2 Location of Connectors and Jumpers 2-3
2.3 Mechanical Drawing 2-5
2.4 List of Jumpers 2-7
2.5 List of Connectors 2-8
2.6 Setting Jumpers 2-10
2.7 Clear CMOS Selection (JP1) 2-11
2.8 COM1, 2 Ring/ VCC5 Selection (JP2) 2-11
2.9 Auxiliary Power Connector (JP3) 2-11
2.10 PC104 plus VIO Voltage Selection (JP4) 2-11
2.11 LVDS Voltage Selection (JP5) 2-12
2.12 TFT ODCK Normal/Inverted Selection (JP6) 2-12
2.13 IDE Connector (CN1) 2-12
2.14 10/100Base-TX Ethernet Connector (CN3) 2-13
2.15 RS-232 Serial Port Connector (CN4) 2-13
2.16 RS-232/485 Serial Port Connector (CN5) 2-14
2.17 Audio Connector (CN6) 2-14

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2.18 USB2 Connector (CN7)..... 2-14
2.19 USB1 Connector (CN8)..... 2-15
2.20 Battery Connector (CN9)..... 2-15
2.21 AT Power Connector (CN10) 2-15
2.22 Front Panel Connector (CN13) 2-15
2.23 Keyboard & Mouse Connector (CN15) 2-16
2.24 VGA Display Connector (CN16)..... 2-16
2.25 LVDS Connector (CN17)..... 2-16
2.26 TTL_LCD Connector (CN18) 2-17

Chapter 3 Award BIOS Setup

3.1 System Test and Initialization. 3-2
3.2 Award BIOS Setup 3-3

Chapter 4 Driver Installation

4.1 Installation 4-3

Appendix A Programming The Watchdog Timer

A.1 Programming A-2

Appendix B I/O Information

B.1 I/O Address Map B-2
B.2 1st MB Memory Address Map B-2
B.3 IRQ Mapping Chart.....B-3
B.4 DMA Channel Assignments.....B-3

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Chapter

1

General Information

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1.1 Introduction

AAEON Technology, the inventor and leading supplier of PC/104 boards, has announced PFM-550S, an ideal replacement for end-of-life modules using None-RoHS compliant components and is the most effective one among choices you have. PFM-550S with VIA Mark 533MHz Processor enables performing low power applications at a real affordable price!

The PFM-550S offers a choice of proven, long life 533MHz VIA Mark processor. It includes popular embedded features such as 10/100Base-TX Fast Ethernet port, one RS-232 port and one RS-232/485 port, USB, a SDRAM-SODIMM socket for up to 512 MByte is a standard feature and PC/104-Plus expansion included. The PFM-550S supports 18/24-bit TTL & 18/36-bit dual LVDS LCD panel, it has a watchdog timer and is Lead-free for RoHS compliance.

The PFM-550S features fanless reliability with a standard operating temperature of 0 to +60 degree Celsius, supporting fully ISA and CFD, WinCE, Linux, WinXPe in terms of embedded OS applications. Overall, this powerful CPU card is a high-end computer board for implementation.

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1.2 Features

- Supports VIA Mark Processor
- SODIMM SDRAM up to 512MB
- Supports ATA33 and CFD storage
- One 10/100 Base-TX Fast Ethernet
- Supports 18/24-bit TTL & 18/36-bit dual channel LVDS LCD Panel
- 4 USB1.1 ports / Parallel Port / 2 Serial Ports / IrDA Port
- Supports AC97 Audio via Audio Daughter Board
- PC/104 Plus Socket
- Watchdog Timer
- Lead-free & ROHS Compliance

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1.3 Specifications

System

- CPU: VIA Mark Processor
- Memory: SODIMM SDRAM up to 512MB
- Chipset: VIA VT82C686B
- BIOS: AWARD Plug & Play ISA BIOS 256KB ROM
- Ethernet: Realtek RTL8100BL, 10/100Base-TX RJ-45 connector x 1
- Watchdog Timer: Generates a time-out system Reset; 1~255 sec.
- H/W Status Monitoring: VT82C686B, supports power supply voltage and temperature monitoring
- SSD: Type I CompactFlash™ Slot x 1
- Expansion Interface: PC/104+
- Battery: Lithium battery
- Power Requirement: AT power connector, +5V only input
- Board Size: 4.53”(L) x 3.78”(W) (115mm x 96mm)
- Gross Weight: 0.66 lb (0.3 kg)
- Operating Temperature: 32°F~140°F(0°C~60 °C)

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Display

- Chipset: Mark + VT82C686B
- VGA Controller: Integrated on Mark, 32MB frame buffer share system memory
- Memory size: Shared system memory up to 32 MB

I/O

- MIO: EIDE (UDMA33) x 1, Keyboard + Mouse x 1, Parallel x 1 RS-232 x 1 (COM1), RS-232/485 x 1 (COM2)
- IrDA: One IrDA Tx/Rx header
- IDE Interface: P-ATA-33 x 1
- Audio: Supports AC97 Audio via Audio Daughter Board
- USB: Four USB 1.1 ports

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Chapter 2

Quick Installation Guide

Notice:

The Quick Installation Guide is derived from Chapter 2 of user manual. For other chapters and further installation instructions, please refer to the user manual CD-ROM that came with the product.

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Part No. 2007550S10 Printed in Taiwan Mar. 2006

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2.1 Safety Precautions



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 a sudden rush of power can damage sensitive electronic components.

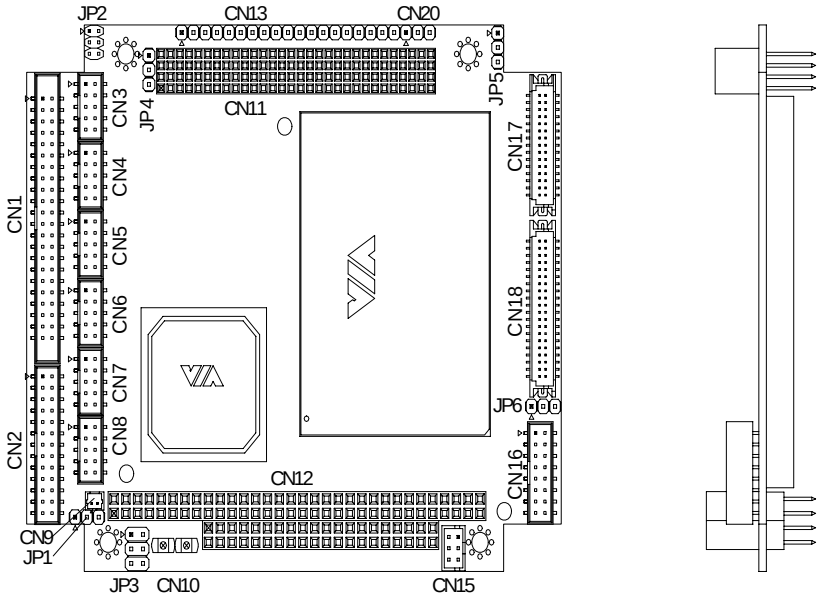


Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not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

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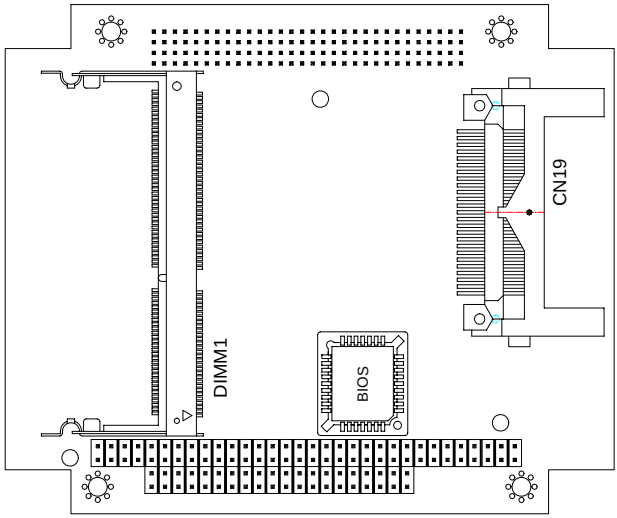
2.2 Location of Connectors and Jumpers

Component Side



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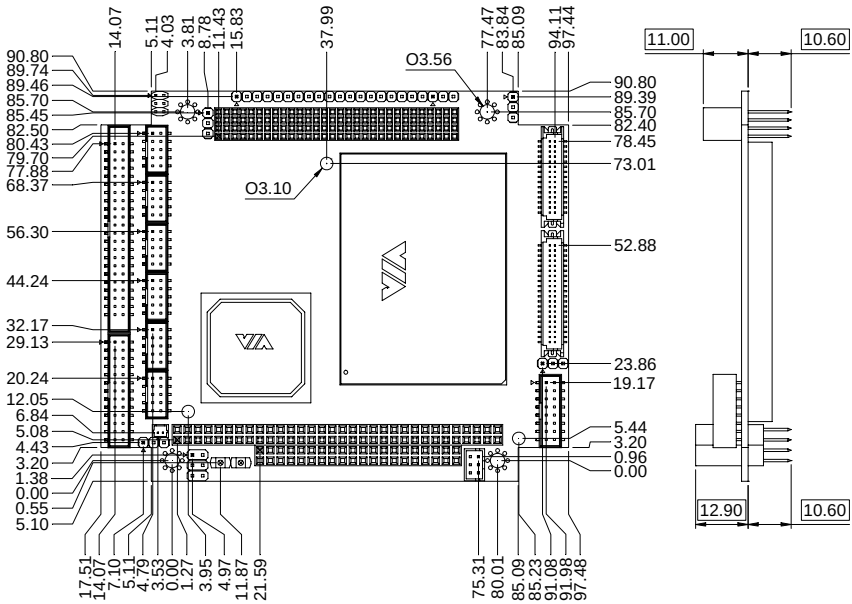
Solder Side



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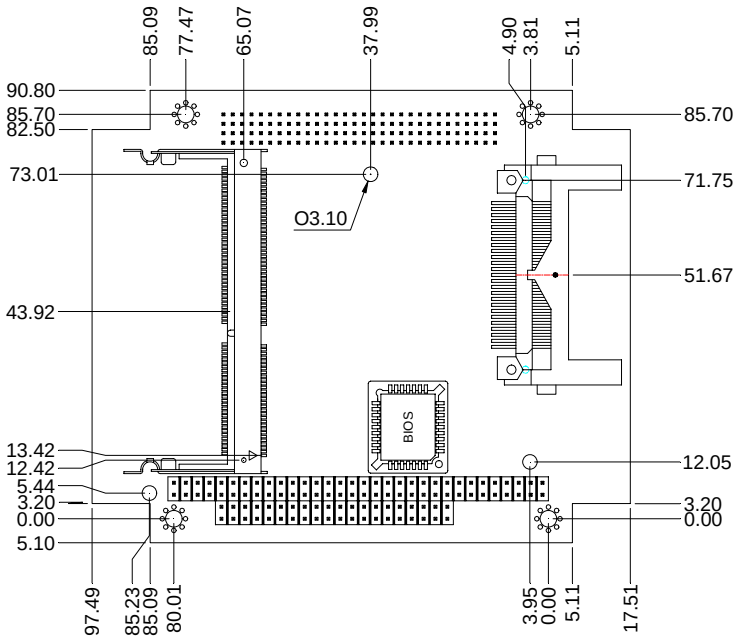
2.3 Mechanical Drawing

Component Side



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Solder Side



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2.4 List of Jumpers

There are a number of jumpers in the board that allow you to configure your system to suit your application.

The table below shows the function of each jumper in the board:

Jumpers

Label	Function
JP1	Clear CMOS Select
JP2	COM1, 2 Ring/+5V Selection
JP3	Auxiliary Power Connector
JP4	PC104 plus VIO Voltage Selection
JP5	LVDS Voltage Selection
JP6	TFT ODCK Normal/ Inverted Selection

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2.5 List of Connectors

There are a number of connectors in the board that allow you to configure your system to suit your application. The table below shows the function of each connector in the board:

Connectors

Label	Function
CN1	IDE Connector
CN2	LPT PORT Connector
CN3	10/100 Base-TX Ethernet Connector
CN4	RS-232 Serial Port Connector
CN5	RS-232/485 Serial Port Connector
CN6	Audio Connector
CN7	USB2 Connector
CN8	USB1 Connector
CN9	Battery Connector
CN10	AT Power Connector
CN11	PC104+ Connector
CN12	PC/104 Connector
CN13	Front Panel Connector
CN15	Key Board/Mouse Connector
CN16	VGA Display Connector
CN17	LVDS Connector
CN18	TTL_LCD Connector

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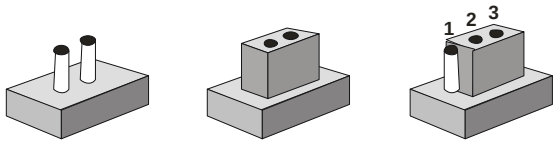
CN19	CompactFlash Slot
DIMM1	SODIMM Slot

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2.6 Setting Jumpers

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.



Open Closed Closed 2-3

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 change.

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

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2.7 Clear CMOS Selection (JP1)

JP1	Function
1-2	Protected (Defaults)
2-3	Clear

2.8 COM1, 2 Ring/ VCC5 Selection (JP2)

JP2	Function
1-3	+5V(COM1)
3-5	RING (COM1 Defaults)
2-4	+5V(COM2)
4-6	RING (COM2 Defaults)

2.9 Auxiliary Power Connector (JP3)

JP3	Function
1-2	+12V
3-6	GND
4	-12V
5	-5V

2.10 PC104 plus VIO Voltage Selection (JP4)

JP4	Function
1-2	+5V
2-3	+3.3V

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2.11 LVDS Voltage Selection (JP5)

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

2.12 TFT ODCK Normal/Inverted Selection (JP6)

JP6	Function
1-2	FPCLK Inverted Output
2-3	FPCLK Normal Output

2.13 IDE Connector (CN1)

Pin	Signal	Pin	Signal
1	IDE_RESET	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	N.C.
21	HPDREQ	22	GND
23	#HPDIOW	24	GND
25	#HPDIOR	26	GND

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27	HPIORDY	28	GND
29	#HPDACK	30	GND
31	HIRQ14	32	N.C.
33	HPDA1	34	PD_80P
35	HPDA0	36	HPDA2
37	#HPCS1	38	#HPCS3
39	-DASP0	40	GND
41	+5V	42	+5V
43	GND	44	N.C.

2.14 10/100Base-TX Ethernet Connector (CN3)

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

2.15 RS-232 Serial Port Connector (CN4)

Pin	Signal	Pin	Signal
1	DCD	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI/+5V	10	N.C

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2.16 RS-232/485 Serial Port Connector (CN5)

Pin	Signal	Pin	Signal
1	DCD	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI/+5V	10	N.C.

2.17 Audio Connector (CN6)

Pin	Signal	Pin	Signal
1	AC_RST#	2	AC_SYNC
3	SDIN	4	SDOUT
5	GND	6	BITCLK
7	GND	8	+5V
9	N.C.	10	+3.3V

2.18 USB2 Connector (CN7)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD2-	4	GND
5	USBD2+	6	USBD3+
7	GND	8	USBD3-
9	GND	10	+5V

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2.19 USB1 Connector (CN8)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD0-	4	GND
5	USBD0+	6	USBD1+
7	GND	8	USBD1-
9	GND	10	+5V

2.20 Battery Connector (CN9)

Pin	Signal	Pin	Signal
1	+3V	2	GND

2.21 AT Power Connector (CN10)

Pin	Signal	Pin	Signal
1	+5V	2	GND

2.22 Front Panel Connector (CN13)

Pin	Signal	Pin	Signal
1	PWRLED(+)	2	PWRLED(-)
3	SPK(+)	4	SPK(-)
5	IDELED(+)	6	IDELED(-)
7	RESET(+)	8	RESET(-)
9	SPEED LED(+)	10	SPEED LED(-)
11	ACTIVE LED(+)	12	ACTIVE LED(-)
13	VCC	14	N.C.
15	IRRX	16	GND

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17	IRTX	18	N.A
19	N.A	20	N.A
21	N.A	22	N.A

2.23 Keyboard & Mouse Connector (CN15)

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

2.24 VGA Display Connector (CN16)

Pin	Signal	Pin	Signal
1	RED	2	VGAVCC
3	GREEN	4	GND
5	BLUE	6	N.C.
7	N.C.	8	SDATA
9	GND	10	HS
11	GND	12	VS
13	GND	14	SCLK
15	GND	16	N.C.

2.25 LVDS Connector (CN17)

Pin	Signal	Pin	Signal
1	ENVDD	2	N,C,
3	PPVCC	4	GND
5	LVDS_CH1_TXCLK-	6	LVDS_CH1_TXCLK+

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7	PPVCC	8	GND
9	LVDS_CH1_TX0-	10	LVDS_CH1_TX0+
11	LVDS_CH1_TX1-	12	LVDS_CH1_TX1+
13	LVDS_CH1_TX2-	14	LVDS_CH1_TX2+
15	N.C.	16	N.C.
17	I2C_DATA	18	I2C_CLK
19	LVDS_CH2_TX0-	20	LVDS_CH2_TX0+
21	LVDS_CH2_TX1-	22	LVDS_CH2_TX1+
23	LVDS_CH2_TX2-	24	LVDS_CH2_TX2+
25	N.C.	26	N.C.
27	PPVCC	28	GND
29	LVDS_CH2_TXCLK-	30	LVDS_CH2_TXCLK+

2.26 TTL_LCD Connector (CN18)

Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	GND	4	GND
5	+3.3V	6	+3.3V
7	ENBKL	8	GND
9	BLUE 0	10	BLUE 1
11	BLUE 2	12	BLUE 3
13	BLUE 4	14	BLUE 5
15	BLUE 6	16	BLUE 7
17	GREEN 0	18	GREEN 1
19	GREEN 2	20	GREEN 3
21	GREEN 4	22	GREEN 5
23	GREEN 6	24	GREEN 7
25	RED 0	26	RED 1

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27	RED 2	28	RED 3
29	RED 4	30	RED 5
31	RED 6	32	RED 7
33	GND	34	GND
35	DOT_CLOCK	36	VSYNC
37	DE	38	HSYNC
39	N.C.	40	ENAEE

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Chapter

3

Award BIOS Setup

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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.

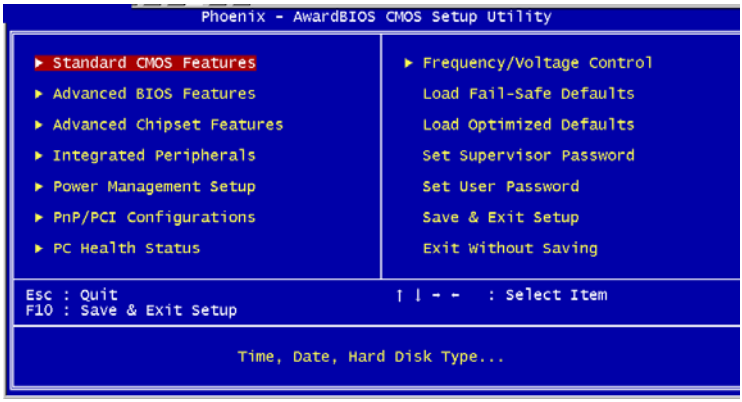
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3.2 Award BIOS Setup

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

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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.

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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.

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Chapter

4

Driver Installation

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The PFM-550S comes with a CD-ROM that contains all drivers and utilities that you need for setup the system.

Follow the sequence below to install the drivers:

Step 1 – Install VIA 4 in 1 Driver

Step 2 – Install Ethernet Driver

Step 3 – Install VGA Driver

Insert the PFM-550S CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 3 in order.

Please read instructions below for further detailed installations.

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4.1 Installation:

Insert the PFM-550S 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 3 in order as following instructions.

Step 1 – Install VIA 4 in 1 for Windows 98SE/2000/XP

1. Double click on the ***VIAHyperion4in1455v*** file
2. Follow the instructions that the window will show you
3. The system will help you to install the driver automatically

Step 2 –Install Ethernet Driver for Windows 98SE /2000/XP

1. Double click on the ***Setup*** file
2. Follow the instructions that the window shows you
3. The system will help you install the driver automatically

Step 3 – Install VGA Driver for Windows 98SE /2000/XP

1. Double click on the ***Setup*** file
2. Follow the instructions that the window shows you
3. The system will help you to install the driver automatically
4. Please re-start your computer

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Appendix

A

Programming the Watchdog Timer

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A.1 Programming

An onboard watchdog timer reduces the chance of disruptions which CPLD (Compact Programmable Logical Device) interface can cause. This is an invaluable protective device for standalone or punmanned applications. When the watchdog timer activates (CPU processing has come to a halt), it can reset the system, or generate an interrupt on IRQ10, IRQ11, IRQ15, and NM1. This can be set via I/O Port 444, the function as following:

0: RESET
1: NM1
2: IRQ10
3: IRQ11
4: IRQ15

If you decide to program the watchdog timer, you must write data to I/O port 443 (hex). The output data is a value timer. You can write form 01 (hex) to FF (hex) while simultaneously setting it. When you want to disable the watchdog timer, your program should read a Hex value from I/O port 80 (hex).

The following procesude is a sample program for the watchdog timer:

- Type C:\DOS\Debug <ENTER>
- To start watchdog timer and set function “Reset” type;
  - o 444 0<Enter>; out 444h data 0
- To input Watchdog timers time-out interval of 5 seconds type; o 443 05<Enter>; out 443h data 05
- To disable the watch timer type; i80 <Enter>

The time interval data of the watchdog timer is shown in binary code (8 bits). Sample 2: 5 seconds

0	0	0	0	0	1	0	1

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Appendix

B

I/O Information

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B.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 Coprpcessor	0F0-0FF
170-177	Secondary IDE Channel	170-177
1F0-1F7	Primary IDE Channel	1F0-1F7
2F8-2FF	Serial Port 2	2F8-2FF
378-37F	Parallel Printer Port 1	378-37F
3B0-3DF	EGA / VGA card	3B0-3DF
3F8-3FF	Serial Port 1	3F8-3FF

B.2 1st MB Memory Address Map

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

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B.3 IRQ Mapping Chart

IRQ0	System Timer	IRQ8	System CMOS / Real time clock
IRQ1	Keyboard	IRQ9	Unused
IRQ2	Cascade to IRQ Controller	IRQ10	Unused
IRQ3	COM2	IRQ11	Unused
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	Unused	IRQ13	FPU
IRQ6	Unused	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Secondary IDE

B.4 DMA Channel Assignments

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

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