P8F216

Mini-ITX Motherboard
User's Manual
Edition 1.1

2004/3/19

Copyright Notice

.

Packing List

Hardware

P8F216 Motherboard .... X 1

Cable Kit

40-pin Ultra100 IDE Flat Cable .... X 1
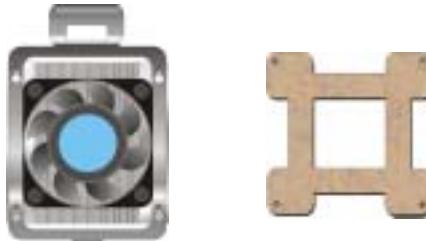
26-pin slim Floppy Cable.. X 1

4-pin to 4-pin power cable .... X 1

CPU Cooler .... X 1

Dual-USB Port Cable (optional) .... X 2
Audio Cable (optional).. X 1

Printed Matter and Software

User's Manual .... X 1
Driver CD.. X 1

Index

(This page is left for blank)

Chapter 1 < Introduction >

1.1 < Product Overview >

   P8F216 is an all-in-one industrial compact Pentium-M level motherboard based on Mini-ITX form factor at 170 x 170 mm of dimension. Based on Intel **855GME** and **ICH4** chipset, **P8F216** offers the compact, embedded, value and high performance solution with Intel Pentium-M CPU, 400 MHz of FSB, 1GBytes DDR200/266/333 SDRAM with ECC, Intel 855GME GMCH built-in Intel Extreme Graphics 2, Intel PRO/1000+ LAN, Hi-Speed USB 2.0, 5.1 channel and S/P DIF 3D audio, **18/24-bit** dual channel LVDS, GPIO and embedded flash disk interfaces.

Compact Mini-ITX Form Factor @ 170 x 170 mm

   P8F216 is based on the ultra compact mini-ITX form factor at only 170 x 170 mm of dimension, meets the demand of compact and powerful computing platform. With this feature, **P8F216** should be the ideal solution for the high-end, Pentium-M level book-size, slim type and other embedded PC systems.

Powerful Pentium 4 Computing Platform

   With Intel Socket 479 Pentium-M CPU at 400 MHz FSB and 1GBytes DDR200/266/333 SDRAM of system memory, **P8F216** offers the high-end industrial computing platform with low cost Intel integrated solutions.

Value / High Performance Multi-media Solution

   The Intel 855GME GMCH chipset built-in Intel Extreme Graphics 2, 6 channel and S/P DIF AC97 3D audio make **P8F216** be the high performance but low cost multi-media AV platform. With this feature,

   P8F216 should be the ideal solution for VoD (Video on Demand), DVR (Digital Video Recorder), digital video broadcasting (DVB), streaming, surveillance, compression (MPEG), interaction server, POS, Kiosk, ATM, Panel PC, transaction workstation and terminal applications.

Hi-Speed USB 2.0 Interface

   Intel ICH4 built-in Hi-Speed USB 2.0 controller let **P8F216** offer up to 480 Mbps of Hi-Speed USB 2.0 interfaces.

Card Bus and Embedded Flash Disk (Optional)

   The **P8F216** support PCMCIA Type I/II enable you can simply use the wireless LAN module or other extended devices, the Compact Flash interface and IDE1 with DOM support can let you port any embedded system onboard.

1.2 < Product Specification >

General Specification	
Form Factor	Mini-ITX at 170 x 170 mm (L x W)
CPU	Intel Socket 479 Pentium® -M Processor @ 400 MHz FSB (no support battery mode)
Memory	1GBytes DDR200/266/333 SDRAM on one 184-pin DIMM socket ECC is supported
Chipset	Intel 82855GME GMCH and 82801DB ICH4
BIOS	Phoenix-Award v6.00PG 4Mb PnP flash BIOS
Green Function	Power saving mode includes doze, standby and suspend modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	System reset programmable watchdog timer with 1 ~ 255 sec./min. of timeout value
Real Time Clock	Intel ICH4 built-in RTC with lithium battery
Enhanced IDE	PCI enhanced IDE interface supports dual channels and up to 4 ATAPI devices at UltraATA/100 One 40-pin and one 44-pin IDE port DiskOnModule (DOM) embedded flash disk up to 1GBytes
Expansion Slot	One slim PCI slot supports up to 2 bus master PCI bus interface via the additional riser card Optional one MINI-PCI or MINI-AGP slot

Multi-I/O Port	
Chipset	Intel 82801DB ICH4 (USB) and Winbond W83627HF-AW LPC Super I/O controller
Serial Port	Two external RS-232 serial port with 16C550 compatible UART and 16 bytes FIFO
USB Port	Six Hi-Speed USB 2.0 ports with 480 Mbps of transfer rate Two external and four internal USB ports
Parallel Port	One external bi-direction parallel port with SPP/ECP/EPP mode
Floppy Port	One slim-type FDD port supports up to two FDD
IrDA Port	One IrDA compliant Infrared interface supports SIR
K/B & Mouse	External PS/2 keyboard and mouse ports on rear I/O panel
GPIO	One 20-pin Digital I/O connector with 15-bit programmable I/O interface
Card Bus (Optional)	
PCMCIA	One PCMCIA Type I/II slot

VGA Display Interface

Chipset	Intel 855GME GMCH built-in Intel Extreme Graphics 2
	With 266 MHz VGA core and 256-bit 3D engine
Memory	Intel dynamic video memory up to 64Mbytes shared with system
Display Type	CRT, LCD monitor and analog display
	Up to 4 textures / pixel on a single pass and 2048x2048 texture size
Connector	External DB15 female connector on rear I/O panel
	Internal 40-pin LVDS connector

Ethernet Interface

Chipset	Intel PRO/1000+ LAN interface with Intel 82540EM
Type	10Base-T / 100Base-TX/1000Base-T,
	auto-switching Fast Ethernet
	Full duplex, IEEE802.3U compliant
Connector	External RJ45 connector with LED on rear I/O panel

Audio Interface

Chipset	Intel ICH4 with Realtek ALC655 AC97 3D audio codec
Interface	5.1 channel 3D audio with front (R/L), rear (R/L), center and bass
	Optical Fiber digital audio encoding signal output
Connector	Optional external three phone jack for 5.1 channel audio on front panel
	External Amplified Speaker output jack on rear panel
	External Optical Fiber connector on rear panel
	Internal 10-pin header for line-in/-out, MIC-out, 4-pin header for CD-in

Solid State Disk Interface

Flash Type	CompactFlash Type-I/II for CFC (Compact Flash Card) or IBM MicroDrive
Capacity	Up to 1 GB flash memory

Power and Environment
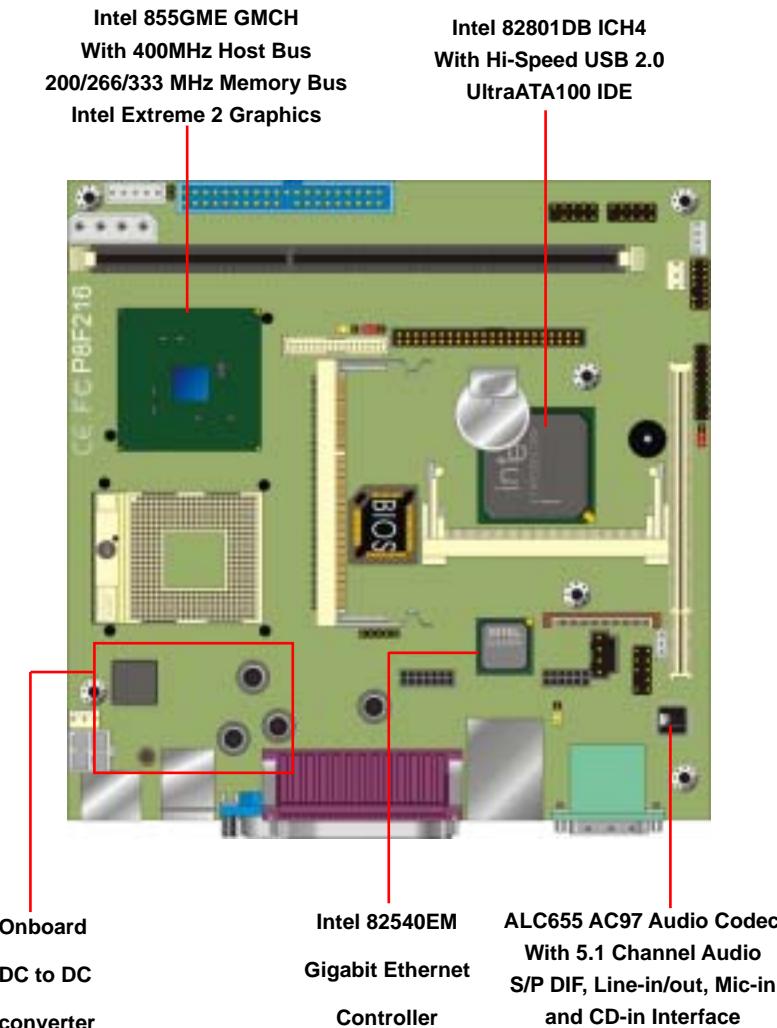
Power Requirement	One external 19V/12V DC Adapter connector on rear panel
	4-pin onboard P4 4-pin power connector
Input Voltage Range	11V ~ 13V
	16V ~ 20V
Input Current	12V/60W (with one 5.25" CDROM and 3.5" HDD)
	19V/60W (with one 5.25" CDROM and 3.5" HDD)
Dimension	170 (L) x 170 (H) mm, Mini-ITX form factor
Temperature	Operating within $0 \sim 60^{o}C$ ($32 \sim 140^{o}F$)
	Storage within $-20 \sim 85^{o}C$ ($-4 \sim 185^{o}F$)

Ordering Code
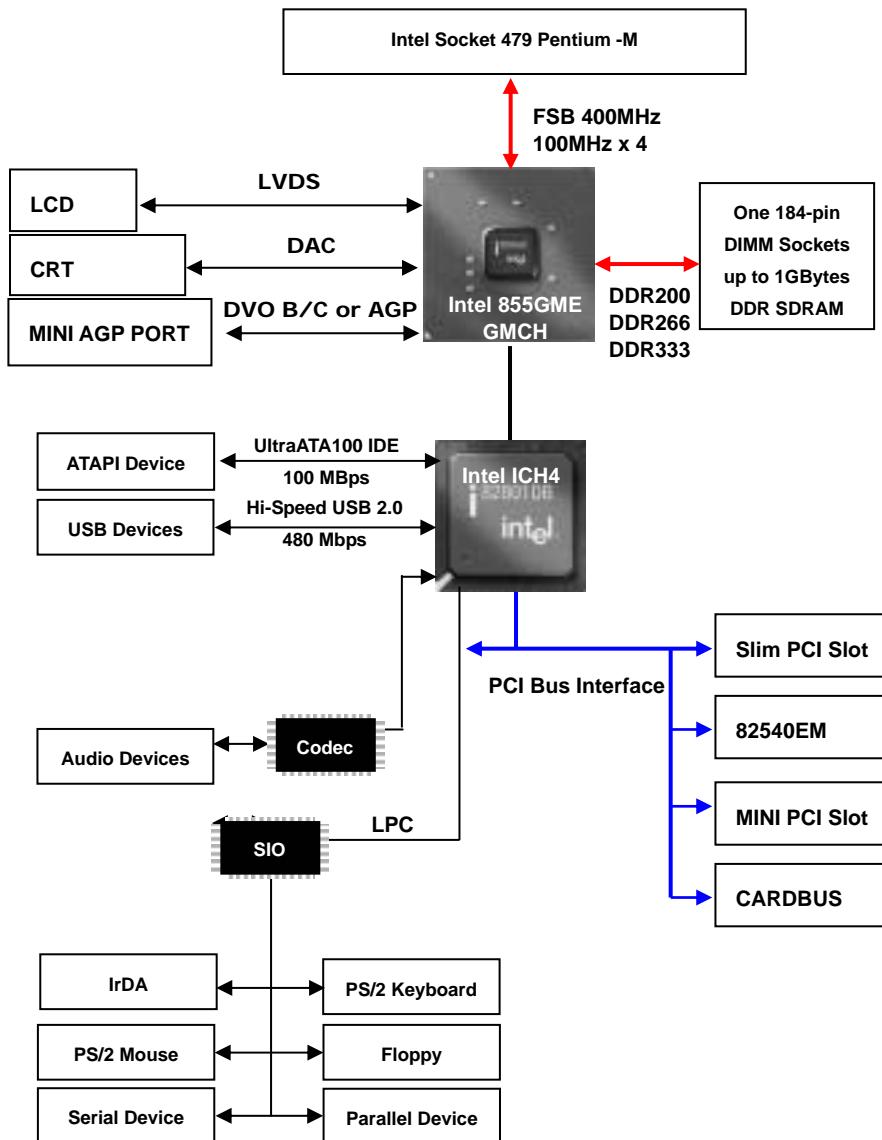
P8F216P	Pentium M, 855GM/ICH4,PCMCIA,CF,Mini-PCI
P8F216A	Pentium M, 855GM/ICH4,PCMCIA,CF,Mini-AGP
P8F216NP	Pentium M, 855GM/ICH4,Mini-PCI,w/o PCMCIA/CF
P8F216NA	Pentium M, 855GM/ICH4,Mini-AGP,w/o PCMCIA/CF

For further product information please visit the website at http://www.freetech.com

1.3 < Component Placement >

Intel 855GME GMCH
With 400MHz Host Bus
200/266/333 MHz Memory Bus
Intel Extreme 2 Graphics

Intel 82801DB ICH4
With Hi-Speed USB 2.0
UltraATA100 IDE

Onboard

DC to DC

converter

Intel 82540EM

Gigabit Ethernet

Controller

ALC655 AC97 Audio Codec
With 5.1 Channel Audio
S/P DIF, Line-in/out, Mic-in
and CD-in Interface

1.4 < Block Diagram >

Intel Socket 479 Pentium -M

FSB 400MHz
100MHz x 4

LCD

LVDS

CRT

DAC

MINI AGP PORT

DVO B/C or AGP

Intel 855GME
GMCH

DDR200
DDR266
DDR333

One 184-pin
DIMM Sockets
up to 1GBytes
DDR SDRAM

ATAPI Device

UltraATA100 IDE
100 MBps

USB Devices

Hi-Speed USB 2.0
480 Mbps

Intel ICH4

Slim PCI Slot

PCI Bus Interface

82540EM

Audio Devices

Codec

MINI PCI Slot

SIO

LPC

CARDBUS

IrDA

PS/2 Keyboard

PS/2 Mouse

Floppy

Serial Device

Parallel Device

Chapter 2 < Hardware Setup >
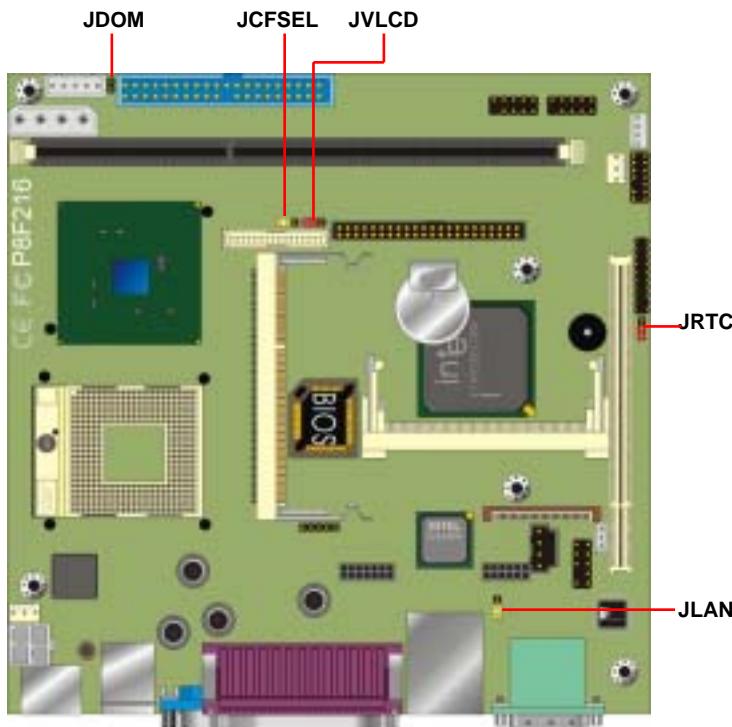
　　This chapter contains the information for installation of hardware. The install procedure includes jumper settings, CPU and memory installation, fan, I/O and panel connections.

2.1 < Connector Location >

2.2 < Jumper Reference >

Jumper	Function
JRTC	COMS Operate / Clear Setting
JLAN	LAN1 Enable/Disable
JVLCD	LCD Panel Voltage Setting
JCFSEL	Compact Flash Address Setting
JDOM	IDE1 5V Voltage Enable/Disable

JDOM   JCFSEL   JVLCD

JRTC

JLAN

2.3 < Connector Reference >

Internal Onboard Connector

Connector	Function	Remark
CPU	MicroPGA479 CPU Socket	Standard
DIMM	184-pin DIMM Socket	Standard
IDE1	40-pin Primary IDE Port	Standard
IDE2	44-pin Secondary IDE Port	Standard
FDD	26-pin slim type FDD Port	Standard
CN_USB1	10-pin 3rd / 4th Hi-Speed USB 2.0 Port	Standard
CN_USB2	10-pin 5th / 6th Hi-Speed USB 2.0 Port	Standard
CN_IR	5-pin SIR IrDA Port	Standard
CN_12V	4-pin AT Power Connector	Standard
CN_BPWR	4-pin 5V&12V output connector	Standard
CN_SPWR	4-pin 5V&12V output connector	Standard
JFRNT	14-pin Switch and Indicator Connector	Standard
CPUFAN	3-pin +12V CPU Fan Connector	Standard
SYSFAN	3-pin +12V System Fan Connector	Standard
CN_AUDIO	10-pin Audio Port	Standard
CDIN	4-pin CD-in Interface	Standard
CN_WOL	3-pin Wake-On-LAN Interface	Standard
CN_LVDS	40-pin LVDS connector	Standard
CN_INV	5-pin LCD Inverter Power Connector	Standard
CN_DIO	20-pin programmable I/O connector	Standard
CN_LAN2	Additional Ethernet Controller Interface	Standard
CN_2ND_IO	Additional I/O module interface	Standard
CF	Compact Flash Card Interface	Standard
PCMCIA	PCMCIA Card bus interface	Standard
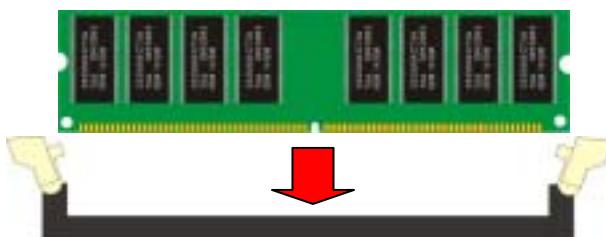
2.4 < System Setup >

2.4.1 < CPU and Memory Setup >

The board is based on Intel Socket 479 architecture with Intel 855GME chipset, supports Intel 479 pin **PPGA FC-PGA2** Pentium–M processor at 400 MHz FSB.

System memory of this board supports up to 1GBytes DDR200/266/333 SDRAM on one 184-pin DIMM sockets with ECC function.

2.4.2 < Memory Module Installation Guide >

Before you install the DIMM onto the socket, please check the pin number well to fit the socket
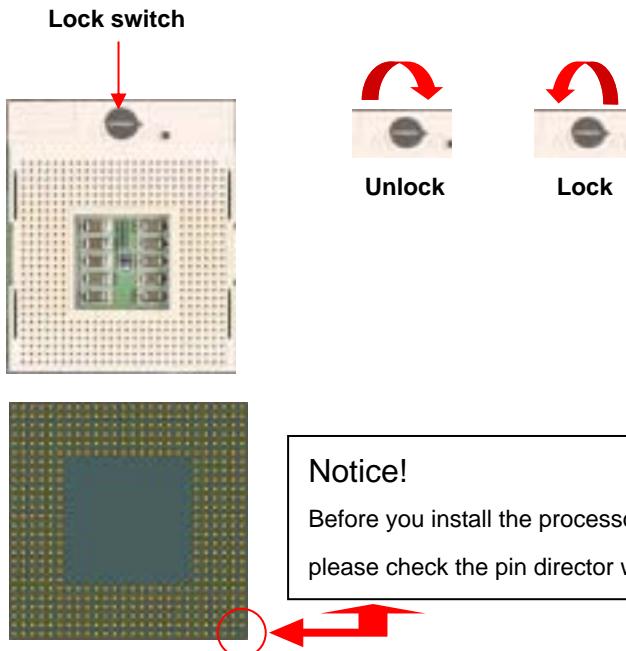
Please check if the hock locks the DIMM well.

2.4.3 < CPU Installation Guide >

To install the Intel Pentium -M Mobile Processor properly,
Please follow the steps blow.

1. Unlock the processor socket.
2. Install the processor onto the socket well.
3. Lock the processor socket.

Unless you lock the processor well, the board will not work properly.

Lock switch

Unlock   **Lock**

Notice!

Before you install the processor on the socket,

please check the pin director well
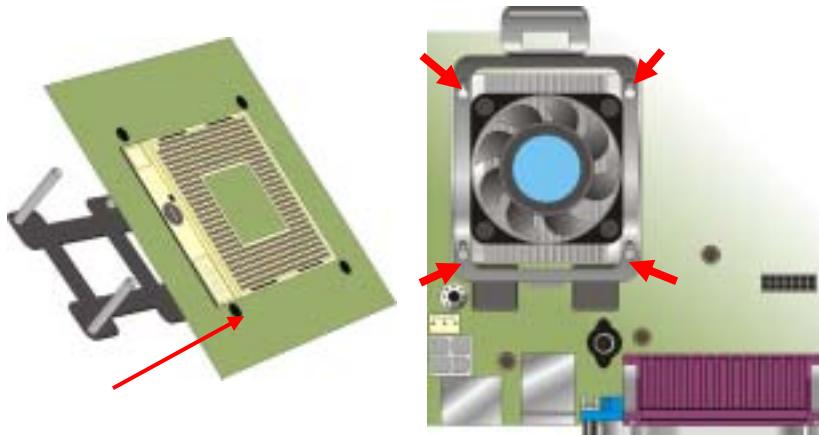
2.4.4 < CPU Fan Installation Guide >

To install the CPU cooler properly, please follow the steps below:

1.   Remove the sticker on the cooler base.
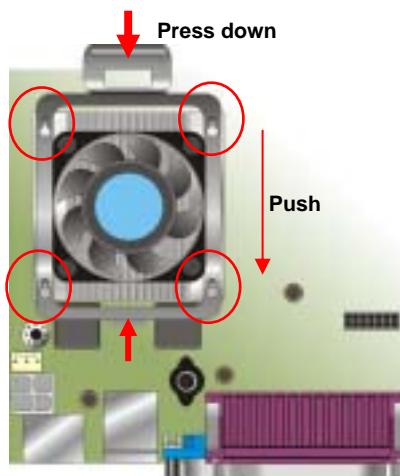
2.   Put the cooler base through the board and paste on.

3. Put the cooler on the processor and let the fixed pillar through the hole on the corner of the cooler.
4. Press the both sides of the cooler shield down and push it to move front.

Press down

Push
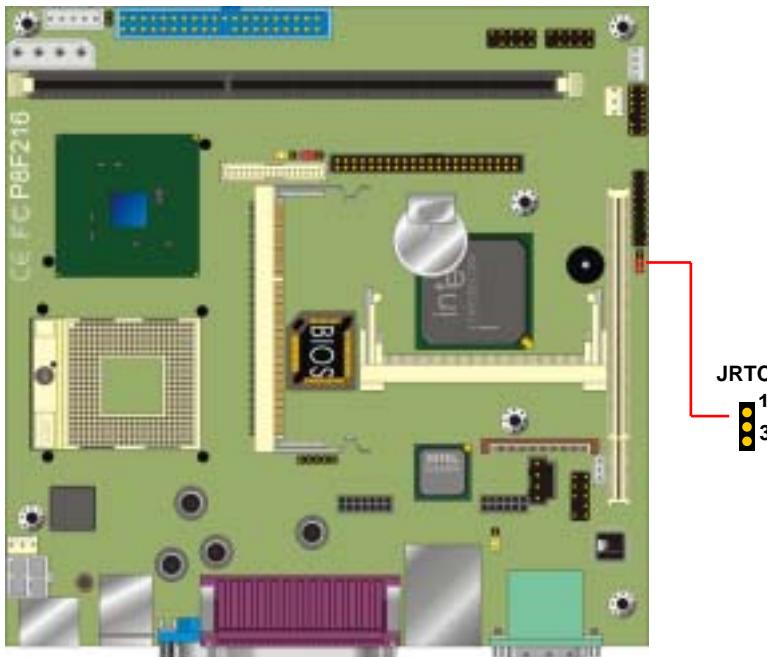
2.5 < CMOS Setup >

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: **JRTC**

Type: Onboard 3-pin Header

JRTC	Mode
1-2	Clear CMOS
2-3	Normal Operation

Default setting

JRTC
1
3

2.6 < Watchdog Timer Setting >

The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

Timeout Value Range
- 1 to 255
- Second or Minute

Program Sample
Watchdog timer setup as system reset with 5 second of timeout

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	Set as Second*
2F, 00	
2E, F6	Set as 5
2F, 05	

* Minute: bit 3 = 0; Second: bit 3 = 1

You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.

2.7 < Embedded Solid State Disk >

The **P8F216** supports the IDE-based, bootable and driver free DiskOnModule (DOM) embedded flash disk. The onboard 40-pin IDE1 and 44-pin IDE2 box header supports normal DOM (DiskOnModule) or M-systems DiskOnChip IDE Pro flash disk with or without the additional VCC power cable.

The **P8F216** also supports Compact Flash Card Type I/II interface. The jumper **JCFSEL** provides you to setup the CF card on master or slave mode.

Jumper: **JCFSEL**

Type: onboard 3-pin header

JCFSEL	Mode
1-2	Master
2-3	Slave
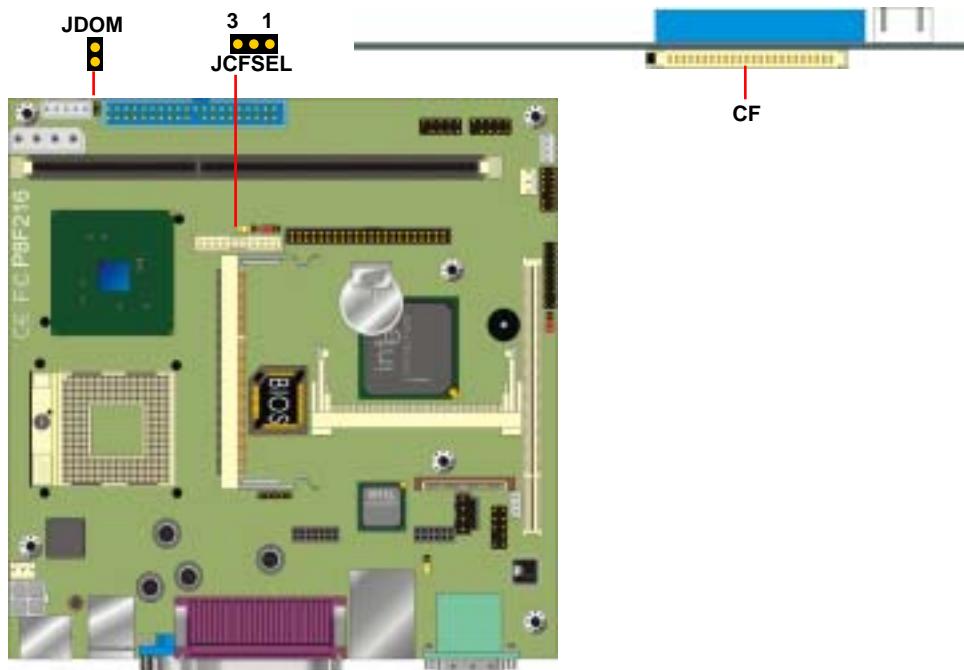
Default setting

Jumper: **JDOM**

Type: onboard 3-pin header

JDOM	Mode
ON	IDE1 pin-20 5V power supply enable
OFF	No 5V power supply on IDE1 pin-20

Default setting

JDOM   **3 1**

JCFSEL

CF

2.8 < Power & Fan Connectors >

   The board provides one Mini-Din 4-pin Adapter jack for DC 19V/12V input, or one 4-pin

P4 use +12V power connector, you can choose one of them to power on the board.

Connector: **CN_12V**
Type: 4-pin standard Pentium 4 +12V power connector

Pin	Description	Pin	Description
1	+12V	2	+12V
3	Ground	4	Ground
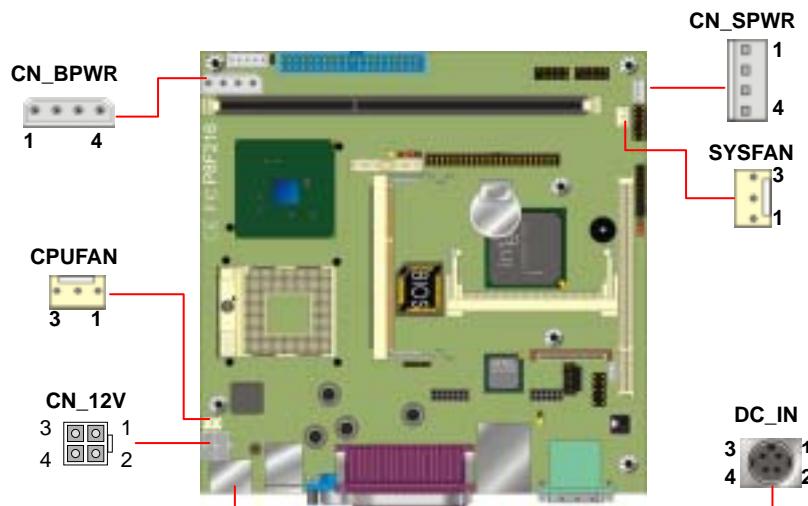
Connector: **DC_IN**
Type: 4-pin DC power connector

Pin	Description	Pin	Description
1	+12V	2	Ground
3	+12V	4	Ground

Connector: **CPUFAN**, **SYSFAN**
Type: 3-pin fan wafer connector

Pin	Description	Pin	Description	Pin	Description
1	Ground	2	+12V	3	Fan Control

This board also provides two +5V/+12V power output connectors for floppy, hard drive

or CD-ROM. Please use the 4-pin to 4-pin power cable to connect the device properly.

Connector: **CN_BPWR**
Type: 4-pin P-type connector for +5V/+12V output

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+5V	2	Ground	3	Ground	4	+12V
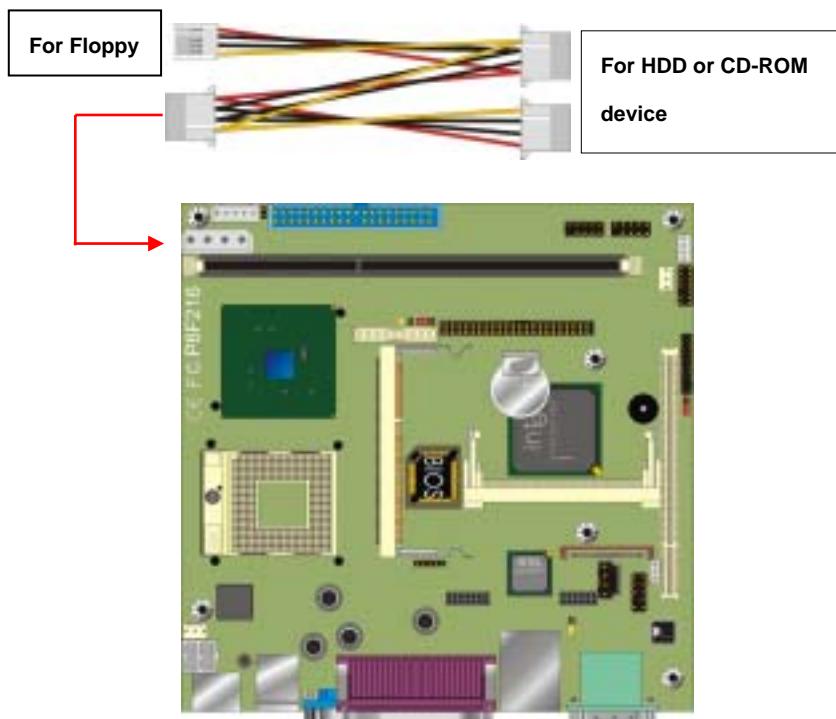
Connector: **CN_SPWR**
Type: 4-pin connector for +5V/+12V output

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+12V	2	Ground	3	Ground	4	+5V
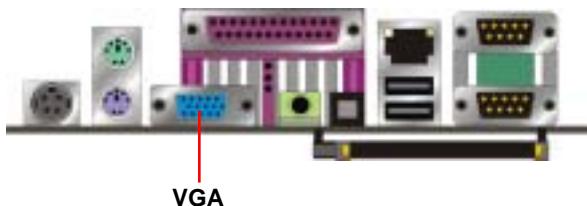
Caution!!!
Do not plug in the power connector from power supply into CN_BPWR and
CN_SPWR, this may hurt the board.

2.9 < Display Interface >
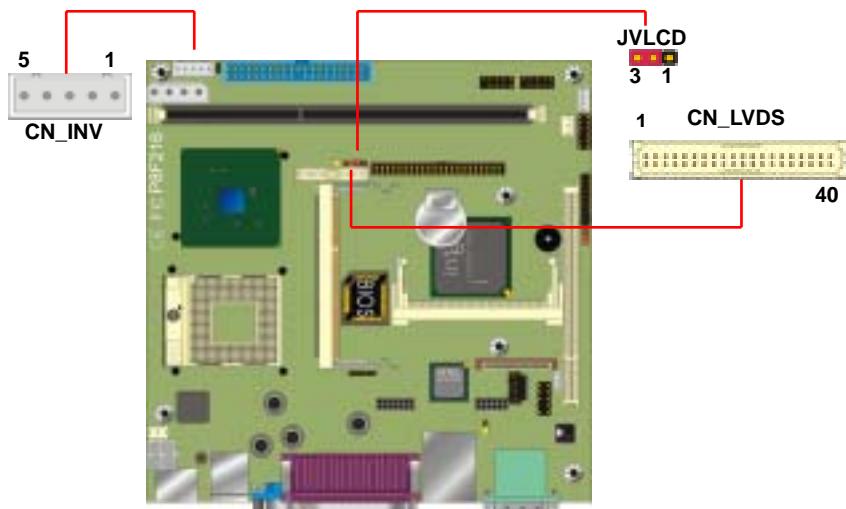
2.91 < Analog VGA Interface >

The board is integrated with Intel 855GM GMCH chipset built-in Intel Extreme Graphics 2 with 266 MHz VGA core, 256-bit 3D engine and Intel Dynamic Video Memory up to 64MBytes shared with system memory. The CRT / analog VGA interface includes one external DB15 female connector on bracket on board.

VGA

2.92 < Digital VGA Interface >

The board's digital video interface provides LVDS flat panel. The built-in 18/24-bit dual channel LVDS interface offers the economical solution for LVDS-based LCD display.

Connector: **CN_INV**

Type: 5-pin LVDS Power Header

Pin	Description
1	+12V
2	GND
3	GND
4	GND
5	ENABKL

Connector: **JVLCD**

Type: 3-pin Power select Header

Pin	Description
1	VCC
2	LCDVCC
3	VCC3

Connector: **CN_LVDS**

Type: onboard 40-pin connector for LVDS connector

Connector model: **HIROSE DF13-40S**

2	LCDVCC	1	LCDVCC
4	GND	3	GND
6	BTX0-	5	ATX0-
8	BTX0+	7	ATX0+
10	GND	9	GND
12	BTX1-	11	ATX1-
14	BTX1+	13	ATX1+
16	GND	15	GND
18	BTX2-	17	ATX2-
20	BTX2+	19	ATX2+
22	GND	21	GND
24	BTXCK-	23	ATX3-
26	BTXCK+	25	ATX3+
28	GND	27	GND
30	BTX3-	29	ATXCK-
32	BTX3+	31	ATXCK+
34	GND	33	GND
36	PANELCLK	35	N/C
38	PANELDATA	37	N/C
40	N/C	39	N/C
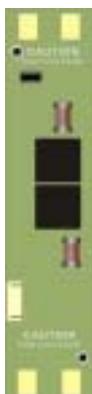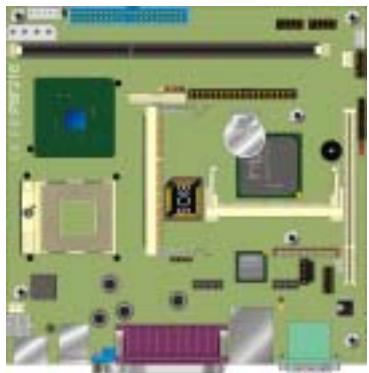
To setup the LCD, you need the components below:

1.   A panel (support up to 24-bit dual channel) with LVDS interfaces.
2.   An inverter for panel's backlight power.
3.   A LCD cable and an inverter cable.

For the cables, please follow the pin assignment of the connector to make a cable, because every panel has its own pin assignment, so we do not provide a standard cable; please find a local cable manufacture to make cables.

LCD installing guide:
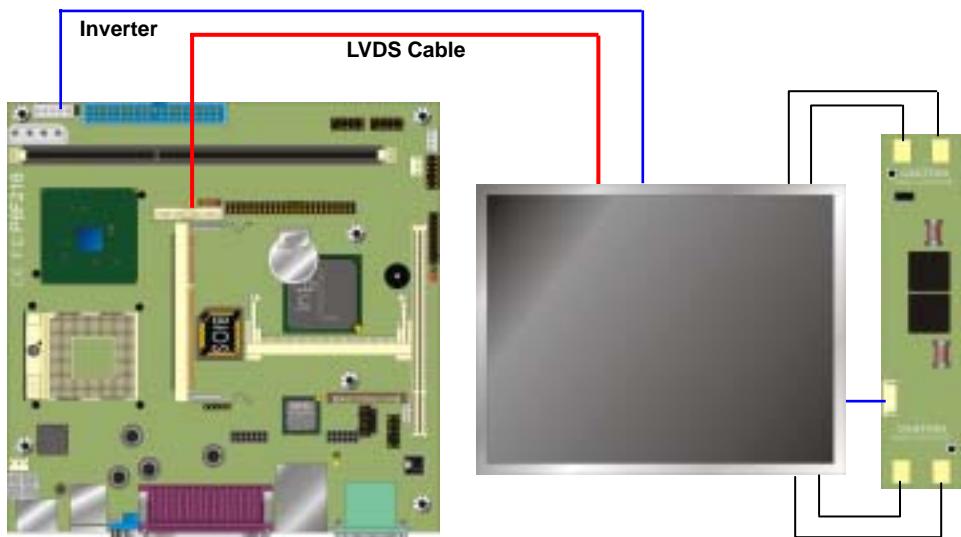
1. Prepare a panel, inverter and **P8F216**.
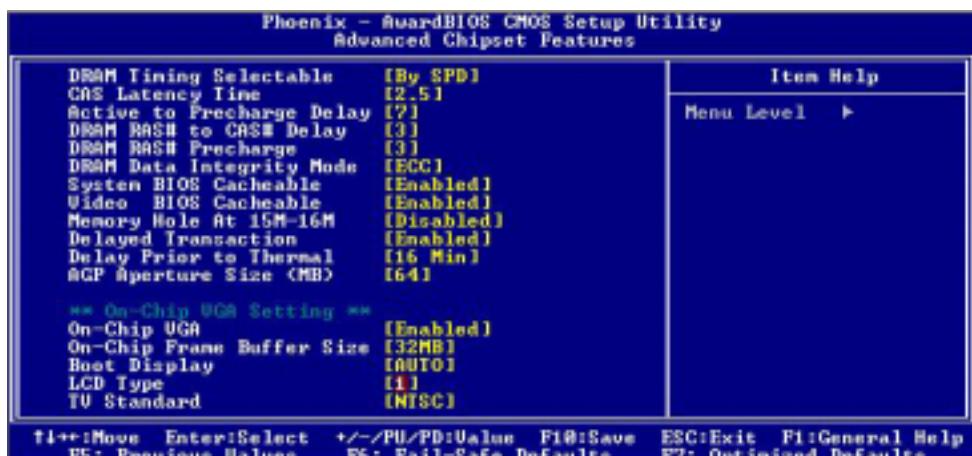
2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +5V or +3.3V.
3. Prepare a LVDS type LCD cable

Panel side

**For sample illustrator only**

Board side

4. Connect all the devices well.

Inverter

LVDS Cable

After setup the devices well, you need to select the LCD panel type in the BIOS.

```
               Phoenix - AwardBIOS CMOS Setup Utility
                      Advanced Chipset Features
┌──────────────────────────────────────────┬───────────────────────────┐
│  DRAM Timing Selectable      [By SPD]      │        Item Help          │
│  CAS Latency Time            [2.5]         │                           │
│  Active to Precharge Delay   [7]           │   Menu Level      ▶       │
│  DRAM RAS# to CAS# Delay     [3]           │                           │
│  DRAM RAS# Precharge         [3]           │                           │
│  DRAM Data Integrity Mode    [ECC]         │                           │
│  System BIOS Cacheable       [Enabled]     │                           │
│  Video  BIOS Cacheable       [Enabled]     │                           │
│  Memory Hole At 15M-16M      [Disabled]    │                           │
│  Delayed Transaction         [Enabled]     │                           │
│  Delay Prior to Thermal      [16 Min]      │                           │
│  AGP Aperture Size (MB)      [64]          │                           │
│                                            │                           │
│  ** On-Chip VGA Setting **                 │                           │
│  On-Chip VGA                 [Enabled]     │                           │
│  On-Chip Frame Buffer Size   [32MB]        │                           │
│  Boot Display                [AUTO]        │                           │
│  LCD Type                    [1]           │                           │
│  TV Standard                 [NTSC]        │                           │
├──────────────────────────────────────────┴───────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│   F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults    │
└────────────────────────────────────────────────────────────────────────────┘
```

he panel type mapping is list below:

BIOS panel type selection form			
For 18-bit color		For 24-bit color	
NO.	Output format	NO.	Output format
1	640 x 480	8	1024 x 768
2	800 x 600	9	1280 x 1024 Dual Channel
3	1024 x 768	10	1400 x 1050 Dual Channel
4	1280 x 1024	11	1600 x 1200 Dual Channel
5	1400 x 1050 Dual Channel @ 108Mhz	13	1024 x 768 Dual Channel
6	1400 x 1050 Dual Channel @ 122Mhz	14	1920 x 1080 Dual Channel
7	1600 x 1200 Dual Channel	15	1280 x 768
12	1024 x 768 Dual Channel		

2.10 < Ethernet Network Interface >

The **P8F216** is integrated with Intel PRO/1000+ Gigabit Ethernet interface at the type of 10Base-T/100Base-TX/100Base-T auto-switching Ethernet with full duplex and IEEE 802.3U compliant. The **P8F216** LAN interface is controlled by the Intel 82540EM, and connect with the external RJ45 connector on rear I/O panel.

Connector: **CN_WOL**

Type: onboard 3-pin (1 x 3) wafer connector
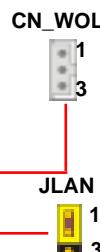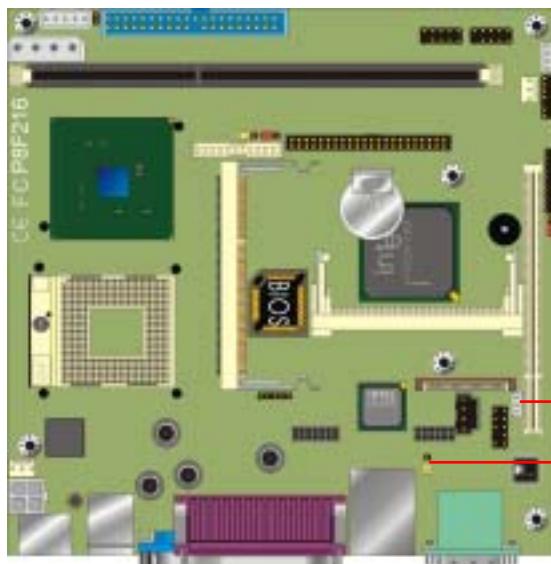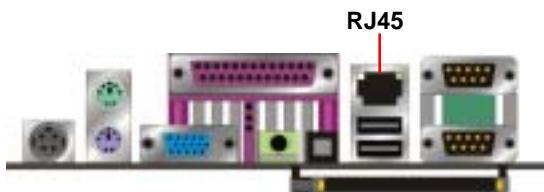
Pin	1	2	3
Description	WOL-Ctrl	Ground	+5V Standby

Jumper: **JLAN**

Type: onboard 3-pin header

JRTC	**Mode**
1-2	Enable Onboard LAN controller
2-3	Disable Onboard LAN controller

Default setting

RJ45

CN_WOL
1
3

JLAN
1
3

2.11 < Audio Interface >

The **P8F216** offers the AC97 3D audio with 5.1-channel and S/P DIF interface based

on Intel ICH4 and Realtek ALC655 codec.

Connector: CN_AUDIO
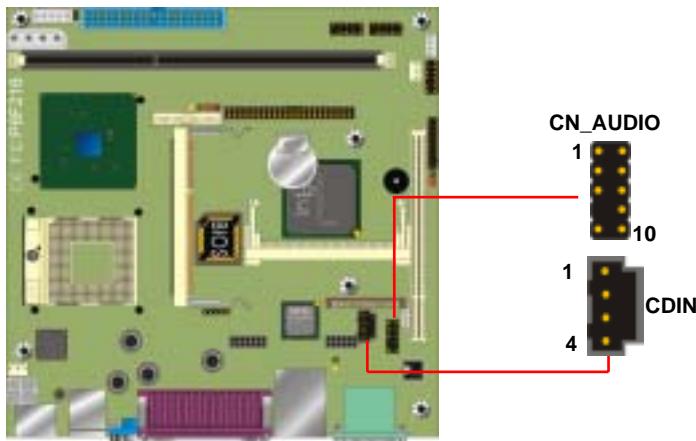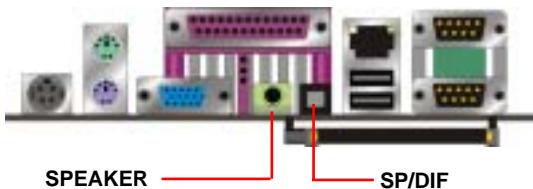
Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	Line – Right	2	Ground
3	Line – Left	4	MIC
5	MIC	6	Ground
7	N/C	8	Line Out – Left
9	Line Out – Right	10	Ground

Connector: CDIN
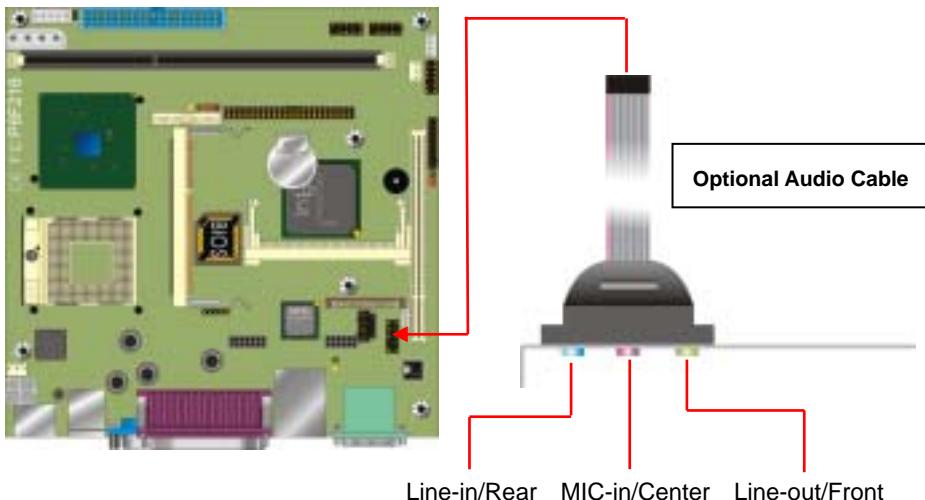
Type: 4-pin header

Pin	Description
1	CD – Left
2	Ground
3	Ground
4	CD – Right

SPEAKER   **SP/DIF**

CN_AUDIO

1

10

1

CDIN

4

The **CN_AUDIO** provides you the extended audio output solution. You can obtain an optional audio cable with PCI shield for Line-in/Rear, Line-out/Front and MIC-in/Center.

The **SPDIF** interface provides you the digital sound output solution. You can use an optical cable to connect the audio amplifier, digital audio receiver or MD walkman.

Optional Audio Cable

Line-in/Rear   MIC-in/Center   Line-out/Front
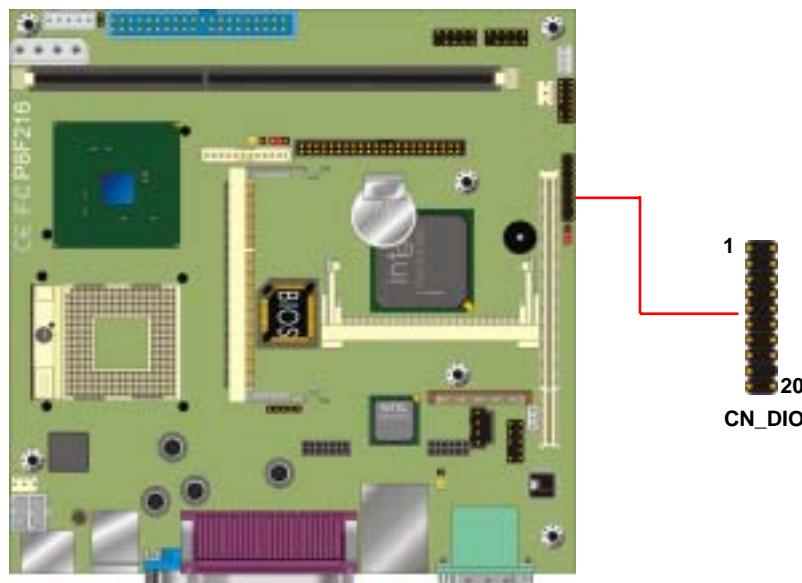
2.12 < GPIO Interface >

The board offers 16-bit digital I/O to customize its configuration to your control needs. For example, you may configure the digital I/O to control the opening and closing of the cash drawer or to sense the warning signal from a tripped UPS. The following is a detailed description of how the digital I/O is controlled via software programming.
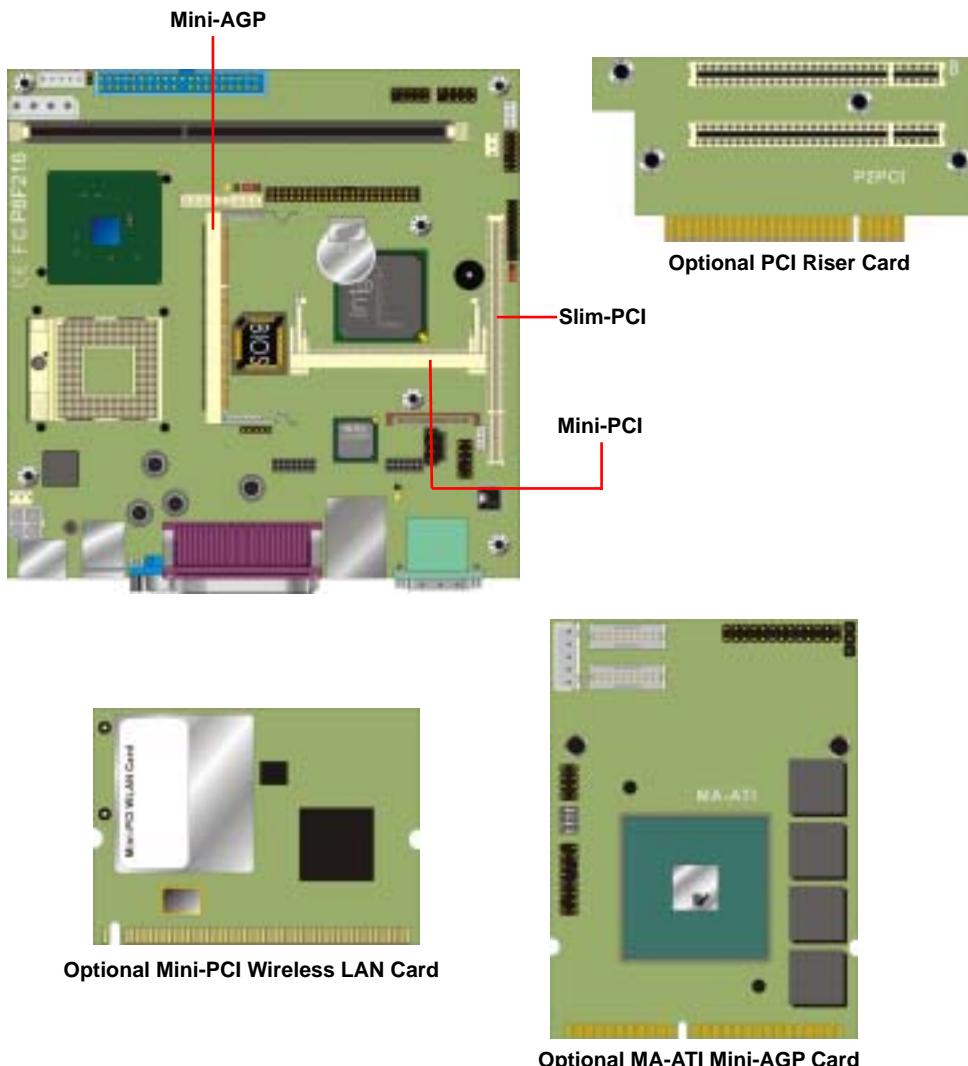
Connector: **CN_DIO**
Type: 20-pin (10 x 2) header

Pin	Description	Pin	Description
1	GP10	2	GP20
3	GP11	4	GP21
5	GP12	6	GP22
7	GP13	8	GP23
9	Ground	10	Ground
11	GP14	12	GP24
13	GP15	14	GP25
15	GP16	16	GP26
17	GP17	18	N/C
19	12VDU	20	5VDU

1

20
CN_DIO

2.13 < Expansive Slot >

The board supports one slim type PCI slot and one optional Mini-AGP or Mini-PCI interface. The slim PCI slot supports up to 2 PCI devices through an optional riser card. For Mini-PCI interface, you can obtain a wireless LAN card for potable system. For Mini-AGP interface, you can obtain an extended graphic card to improve the onboard graphics performance.

Mini-AGP

Optional PCI Riser Card

Slim-PCI

Mini-PCI

Optional Mini-PCI Wireless LAN Card

Optional MA-ATI Mini-AGP Card
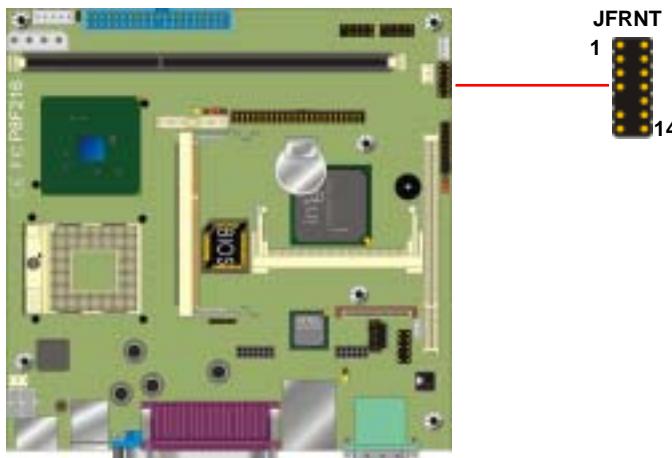
2.14 < Switch and Indicator >

Connector: **JFRNT**
Type: onboard 14-pin (2 x 7) 2.54-pitch header

Function	Signal	PIN		Signal	Function
IDE LED	Vcc（+）	1	2	（+）Vcc	Power LED
	Active	3	4	N/C	
Reset	Reset	5	6	GND	
	GND	7	8	Vcc	Speaker
	N/C	9	10	N/C	
Power Button	PWRBT	11	12	N/C	
	GND	13	14	SPKIN	

(This page is left for blank)

(This page is left for blank)

Chapter 3 < 5.1 channel Audio Setting >

This chapter shows how to setup the 5.1 channel audio under Windows OS.

Before you start to use, please install the driver properly and follow the steps below:
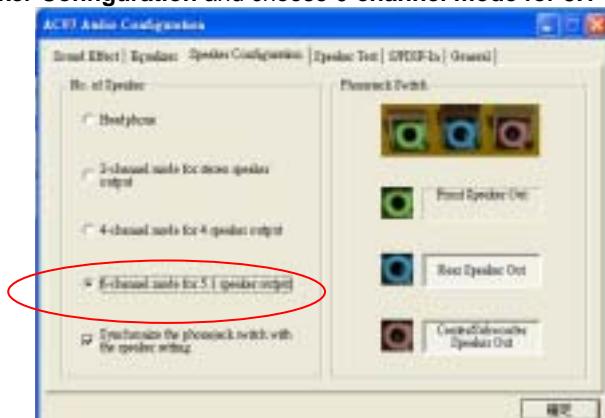
1. lunch the **Control Panel**

2. lunch the **Sound Effect Manager**

3. Select **Speaker Configuration** and choose **6-channel mode for 5.1 speaker output**

(This page is left for blank)

(This page is left for blank)

Chapter 4 < Display Mode Setup >

This chapter shows you how to setup the display device under Windows OS.

Before you using your display device:

1. Check your software
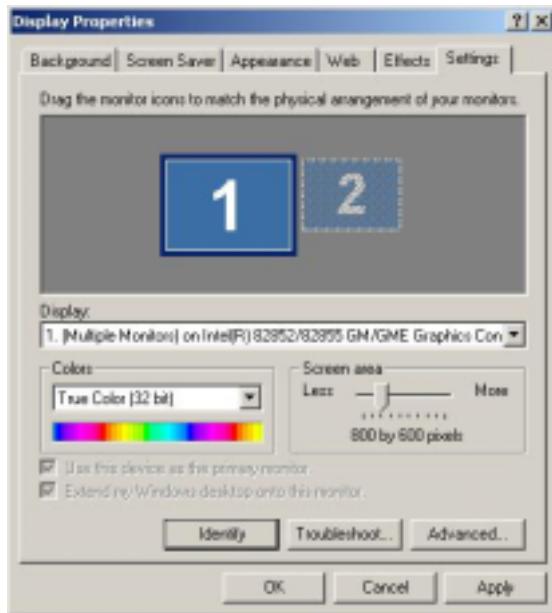
Before you can use the display device properly, please install the VGA driver.

2. Check your hardware

Please setup the display device properly before you boot up the system.

For configure your Display device, please follow the instructions below:

1. Please lunch Display Properties.

You would see two Graphics Controllers. If you connect two display devices, you would be

able to setup each device for color bit and resolution.
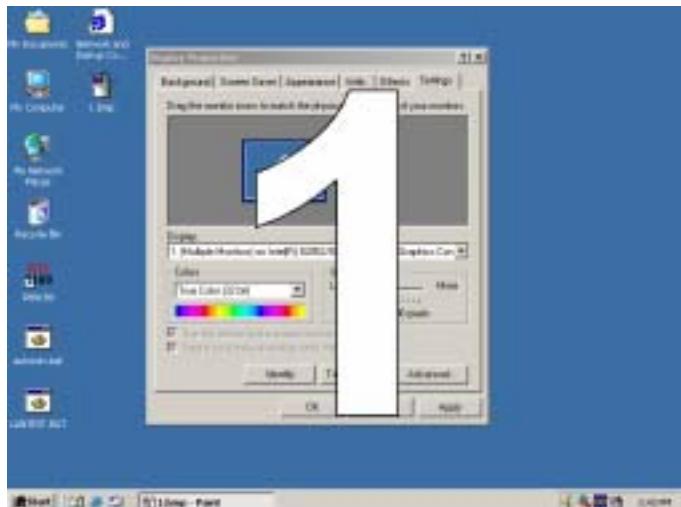
This item can let you configure which device would be the primary if you connect two

display devices.

This item can let you extend your Windows Desktop to second display device.

If you click the identify button, the screen will pop up the number sequence of your device.

For advanced display settings, please click Advanced… button and choose Intel(R)

Extreme Graphics.

Please click Graphics Properties button to enter the advanced setup.
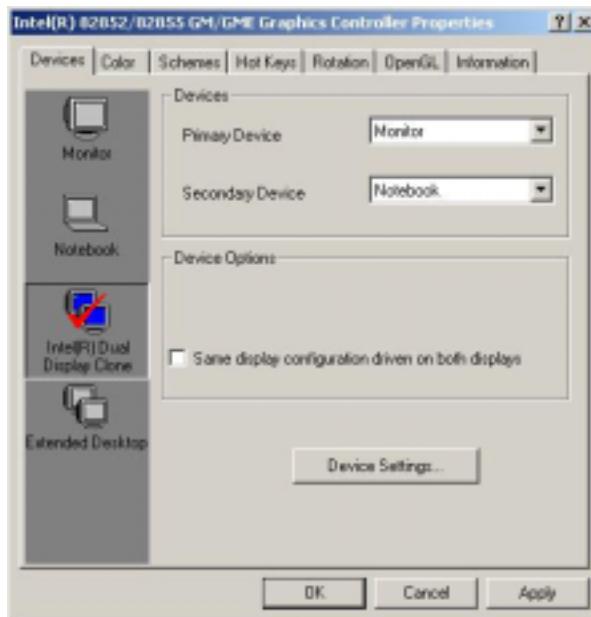
While you entering the Graphics Properties, you will see the options below:
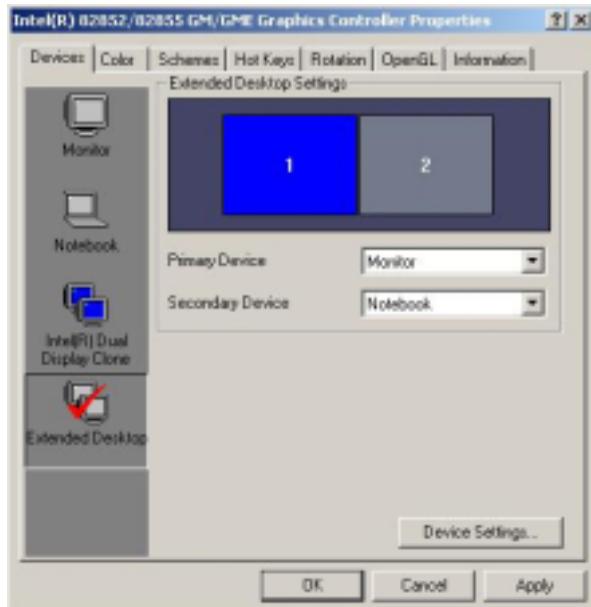
This option can let you configure the CRT monitors for Colors, Screen Area (Resolution) and Refresh Rate.

This option can let you configure the LCD panel for Colors, Screen Area (Resolution) and Full Screen option.

This option can let you configure the Dual Display for clone mode (same display on two devices)

This option can let you configure the Dual Display for Extended Desktop mode

Chapter 5 < BIOS Setup >
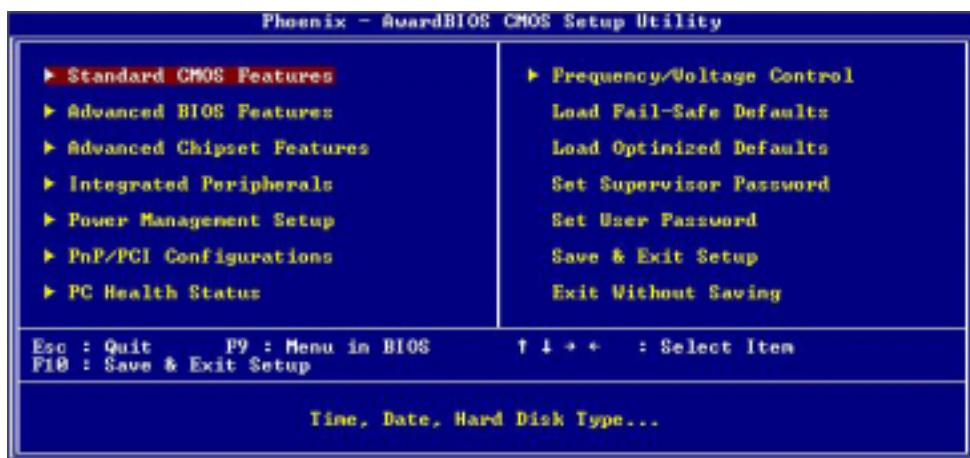
The single board computer uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press DEL key immediately after you turn on the system. The following message "Press DEL to enter SETUP" should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 5-1**. You can use arrow keys to select your function, press Enter key to accept the selection and enter the sub-menu.

Figure 5-1 CMOS Setup Utility Main Screen

(This page is left for blank)

(This page is left for blank)

Appendix A < I/O Port Pin Assignment >

A.1 < IDE Port >
Connector: **IDE1**
Type: 40-pin (20 x 2) box header

Pin	Description	Pin	Description
1	Reset	2	Ground
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	Ground	20	VCC
21	REQ	22	Ground
23	IOW-/STOP	24	Ground
25	IOR-/HDMARDY	26	Ground
27	IORDY/DDMARDY	28	IDESEL
29	DACK-	30	Ground
31	IRQ	32	N/C
33	A1	34	CBLID
35	A0	36	A2
37	CS0 (MASTER CS)	38	CS1 (SLAVE CS)
39	LED ACT-	40	Ground

Connector: **IDE2**

Type: 44-pin (22 x 2) box header

Pin	Description	Pin	Description
1	Reset	2	Ground
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	Ground	20	N/C
21	REQ	22	Ground
23	IOW-/STOP	24	Ground
25	IOR-/HDMARDY	26	Ground
27	IORDY/DDMARDY	28	Ground
29	DACK-	30	Ground
31	IRQ	32	N/C
33	A1	34	SD
35	A0	36	A2
37	CS1	38	CS3
39	ASP1	40	Ground
41	Vcc	42	Vcc
43	Ground	44	Ground

A.2 < Floppy Connector >

Connector: **FDD**

Type: 26-pin connector

Pin	Description	Pin	Description
1	VCC	2	INDEX
3	VCC	4	DRV0
5	VCC	6	DSKCHG
7	DRV1	8	N/C
9	MTR1	10	MTR0
11	RPM	12	DIR
13	N/C	14	STEP
15	Ground	16	WRITE DATA
17	Ground	18	WRITE GATE
19	N/C	20	TRACK 0
21	N/C	22	WRPTR
23	Ground	24	RDATA-
25	Ground	26	SEL

A.3 < USB Interface >
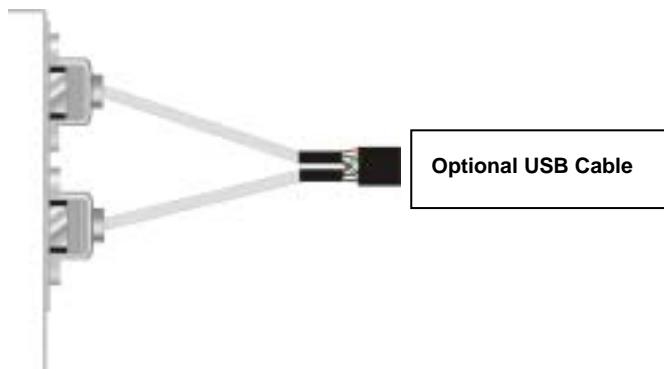
Connector: **CN_USB1**, **CN_USB2**

Type: 10-pin (5 x 2) header for dual USB Ports

Pin	Description	Pin	Description
1	VCC	2	VCC
3	Data0-	4	Data1-
5	Data0+	6	Data1+
7	Ground	8	Ground
9	N/C	10	N/C

PS. You can obtain an optional USB cable on bracket to support up to 4 USB ports.

Optional USB Cable

A.4 < IrDA Port >

Connector: **CN_IR**
Type: 5-pin header for SIR Ports

5   1
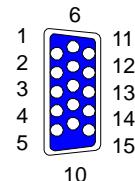
Pin	Description
1	Vcc
2	N/C
3	IRRX
4	Ground
5	IRTX

A.5 < VGA Port >

Connector: **VGA**
Type: 15-pin D-sub female connector on bracket
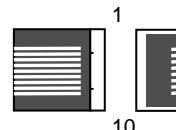
Pin	Description	Pin	Description	Pin	Description
1	RED	6	Ground	11	N/C
2	GREEN	7	Ground	12	5VCDA
3	BLUE	8	Ground	13	HSYNC
4	N/C	9	LVGA5V	14	VSYNC
5	Ground	10	Ground	15	5VCLK

A.6 < LAN Port >

Connector: **RJ45**
Type: RJ45 connector with LED on bracket
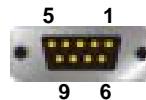
Pin	1	2	3	4	5
Description	TRD0+	TRD0-	TRD1+	TRD1-	NC

Pin	6	7	8	9	10
Description	NC	TRD2+	TRD2-	TRD3+	TRD3-

A.7 < Serial Port >

Connector: **COM1**
Type: 9-pin D-sub male connector on bracket

Pin	Description	Pin	Description
1	MDCD1-	6	MDSR1-
2	MSIN1-	7	MRTS1-
3	MSO1-	8	MCTS1-
4	MDTR1-	9	MRI1-
5	Ground		

Connector: **COM2**
Type: 9-pin D-sub male connector on bracket

Pin	Description	Pin	Description
1	MDCD2-	6	MDSR2-
2	MSIN2-	7	MRTS2-
3	MSO2-	8	MCTS2-
4	MDTR2-	9	MRI2-
5	Ground		

(This page is left for blank)

(This page is left for blank)

Appendix B < Flash the BIOS >

B.1 < BIOS Auto Flash Tool >

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

http://www.freetech.com

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

B.2 < Flash Guide >

1. Get the ".bin" file including the image of new BIOS you want to update.
2. Power on the system and flash the BIOS.
3. Re-star the system.

Any question about the BIOS re-flash please contact your distributors or visit our website at below:

http://www.freetech.com

(This page is left for blank)

(This page is left for blank)

Appendix C < System Resources >

C.1 < I/O Port Address Map >

Address Range	Device
x0000 - x000F	Direct Memory Access Controller
x0010 - x001F	Motherboard Resource
x0020 - x0021	Programmable Interrupt Controller
x0022 - x003F	Motherboard Resource
x0040 - x0043	System Clock
x0044 - x005F	Motherboard Resource
x0060 - x0060	Standard 101/102-Key or Microsoft Natural Keyboard
x0061 - x0061	System Speaker
x0062 - x0063	Motherboard Resource
x0064 - x0064	Standard 101/102-Key or Microsoft Natural Keyboard
x0065 - x006F	Motherboard Resource
x0070 - x0073	System CMOS/ Real Time Clock
x0074 - x007F	Motherboard Resource
x0080 - x0090	Direct Memory Access Controller
x0091 - x0093	Motherboard Resource
x0094 - x009F	Direct Memory Access Controller
x00A0 - x00A1	Programmable Interrupt Controller
x00A2 - x00BF	Motherboard Resource
x00C0 - x00DF	Direct Memory Access Controller
x00E0 - x00EF	Motherboard Resource
x00F0 - x00FF	Numeric Data Processor
x0170 - x0177	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
x0170 - x0177	Secondary IDE controller (dual fifo)
x01F0 - x01F7	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
x01F0 - x01F7	Primary IDE controller (dual fifo)
x0294 - x0297	Motherboard Resource
x02F8 - x02FF	Communication Port (COM2)
x0376 - x0376	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
x0376 - x0376	Secondary IDE controller (dual fifo)
x0378 - x037F	Printer Port (LPT1)
x03B0 - x03BB	Intel(R) 82852/82855 GM/GME Graphics Controller
x03C0 - x03DF	Intel(R) 82852/82855 GM/GME Graphics Controller
x03F0 - x03F5	Standard Floppy Controller
x03F6 - x03F6	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
x03F6 - x03F6	Primary IDE controller (dual fifo)
x03F7 - x03F7	Standard Floppy Controller

x03F8 - x03FF	Communication Port (COM1)
x0400 - x04BF	Motherboard Resource
x04D0 - x04D1	Motherboard Resource
x0500 - x051F	Intel(R) 82801DB/DBM SMBus Controller - 24C3
x0778 - x077B	Printer Port (LPT1)
x0A78 - x0A7B	Motherboard Resource
x0B78 - x0B7B	Motherboard Resource
x0BBC - x0BBF	Motherboard Resource
x0CF8 - x0CFF	PCI Bus
x0E78 - x0E7B	Motherboard Resource
x0F78 - x0F7B	Motherboard Resource
x0FBC - x0FBF	Motherboard Resource
xA000 - xBFFF	Intel(R) 82801DB PCI Bridge - 244E
xB000 - xB03F	Intel(R) PRO/1000 MT Network Connection
xC000 - xC01F	Intel(R) 82801DB/DBM USB Universal Host Controller
xC400 - xC41F	Intel(R) 82801DB/DBM USB Universal Host Controller
xC800 - xC81F	Intel(R) 82801DB/DBM USB Universal Host Controller
xCC00 - xCC07	Intel(R) 82852/82855 GM/GME Graphics Controller
xD400 - xD4FF	Realtek AC'97 Audio
xD800 - xD83F	Realtek AC'97 Audio
xF000 - xF007	Primary IDE controller (dual fifo)
xF000 - xF00F	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
xF008 - xF00F	Secondary IDE controller (dual fifo)

C.2 < Memory Address Map >

Range	Device
x00000000 - x0009FFFF	System board extension for ACPI BIOS
x000A0000 - x000AFFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
x000B0000 - x000BFFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
x000C0000 - x000CC7FF	Intel(R) 82852/82855 GM/GME Graphics Controller
x000CC800 - x000CFFFF	System board extension for ACPI BIOS
x000E0000 - x000EFFFF	System board extension for ACPI BIOS
x000F0000 - x000F7FFF	System board extension for ACPI BIOS
x000F8000 - x000FBFFF	System board extension for ACPI BIOS
x000FC000 - x000FFFFF	System board extension for ACPI BIOS
x00100000 - x1DFEFFFF	System board extension for ACPI BIOS
x1DFF0000 - x1DFFFFFF	System board extension for ACPI BIOS
xD0000000 - xD7FFFFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
xD8000000 - xDFFFFFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
xE0000000 - xE0000FFF	Ricoh RL5C475 CardBus Controller
xE0000000 - xE1FFFFFF	Intel(R) 82801DB PCI Bridge - 244E
xE1000000 - xE101FFFF	Intel(R) PRO/1000 MT Network Connection
xE1020000 - xE102FFFF	Intel(R) PRO/1000 MT Network Connection
xE2000000 - xE207FFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
xE2080000 - xE20FFFFF	Intel(R) 82852/82855 GM/GME Graphics Controller
xE2100000 - xE21003FF	Intel USB 2.0 Enhanced Host Controller
xE2101000 - xE21011FF	Realtek AC'97 Audio
xE2102000 - xE21020FF	Realtek AC'97 Audio
xFEC00000 - xFECFFFFF	System board extension for ACPI BIOS
xFEE00000 - xFEEFFFFF	System board extension for ACPI BIOS
xFFB00000 - xFFB7FFFF	System board extension for ACPI BIOS
xFFB80000 - xFFBFFFFF	Intel(r) 82802 Firmware Hub Device
xFFF00000 - xFFFFFFFF	System board extension for ACPI BIOS

C.3 < System IRQ and DMA Resource >

C3.1 IRQ

IRQ Number	Device
0	System Clock
1	Standard 101/102-Key or Microsoft Natural Keyboard
2	Programmable Interrupt Controller
3	Communication Port (COM2)
4	Communication Port (COM1)
5	Realtek AC'97 Audio
5	Intel(R) 82801DB/DBM SMBus Controller - 24C3
5	ACPI IRQ Holder for PCI IRQ Steering
6	Standard Floppy Controller
7	Printer Port (LPT1)
8	System CMOS/ Real Time Clock
9	Ricoh RL5C475 CardBus Controller
9	ACPI IRQ Holder for PCI IRQ Steering
9	SCI IRQ used by ACPI bus
10	Intel(R) 82801DB/DBM USB Universal Host Controller - 24C7
10	Intel(R) 82801DB/DBM USB Universal Host Controller - 24C2
10	Intel(R) 82852/82855 GM/GME Graphics Controller
10	ACPI IRQ Holder for PCI IRQ Steering
10	ACPI IRQ Holder for PCI IRQ Steering
11	Intel(R) PRO/1000 MT Network Connection
11	Intel USB 2.0 Enhanced Host Controller
11	Intel(R) 82801DB/DBM USB Universal Host Controller - 24C4
11	ACPI IRQ Holder for PCI IRQ Steering
11	ACPI IRQ Holder for PCI IRQ Steering
12	PS/2 Compatible Mouse Port
13	Numeric Data Processor
14	Primary IDE controller (dual fifo)
14	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB
15	Secondary IDE controller (dual fifo)
15	Intel(R) 82801DB Ultra ATA Storage Controller - 24CB

C3.2 DMA

Channel	Device
0	(free)
1	(free)
2	Standard Floppy Disk Controller
3	(free)
4	Direct Memory Access Controller
5	(free)
6	(free)
7	(free)

(This page is left for blank)

(This page is left for blank)

Online Services

Flexus Computer Technology, under the Freetech brand name, has consistently won recognition for excellence in the design and manufacturing of high quality mainboards!

Our products are globally recognized among the leading cost-performance mainboards in the industry today and we are a certified ISO-9001 manufacturer!

Our customers are our partners! Flexus practices partnership service "not customer service"! Our attention to partnership service is aggressive and proactive, by using our global partnership service system. We create value for our partners in the high-end market and we are always ready to see to our partners' requirements, because at Flexus, we believe our partners' success is our success!

If you need technical support, information on products, or updated versions of the BIOS, drivers and utilities access the Internet and point your browser to:

www.freetech.com