

EC3-1641CLDNA

**3.5" Single Board Computer with
CPU/LCD/CRT/SSD/LAN/AUDIO**

Version: C00

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Safety Instructions

1. Before handling your motherboard, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety;
2. Any boards or cards not ready to be installed shall be kept in the anti-static packaging;
3. Before taking board or card from anti-static packaging, put your hand on grounded metal object for a while (about 10 seconds) to eliminate static on your body;
4. While fetching a board or card, you should wear static protective gloves; hold a board by its edges or by its metal mounting bracket;
5. Before inserting, removing or re-configuring motherboard or expansion card, first disconnect the computer and peripherals from their power sources;
6. Before removing boards or computer, first turn off all power resources and disconnect the power cord from power source;
7. For whole set, when inserting or removing boards, first disconnect the computer and peripherals from their power sources;
8. Before you connect or unplug any equipment, make sure all power cords are unplugged in advance;
9. To avoid unnecessary damage caused by turning on/off computer frequently, wait at least 30 seconds before re-turning on the computer.

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Chapter 1 Product Introduction

Overview

EC3-1641CLDNA single board computer is based on AMD® LX800 chipset. It is a sort of single board computer with compact structure and high reliability. The features are listed as follows:

- ◆ The standard board configures on-board AMD® LX800, compatible with AMD® LX700;
- ◆ One ATA100 IDE interface, support two sets of IDE devices;
- ◆ Integrates in LX800: VGA & TTL LCD & LVDS;
- ◆ One TYPE I/II Compact Flash Interface;
- ◆ One 10/100Mbps Ethernet Controller;
- ◆ Standard AC'97 on-board Audio;
- ◆ The latest AMI kernel BIOS.

What's more, EC3-1641CLDNA also provides three USB2.0 interfaces (one is on-board and the other two are connected externally), one parallel port, four serial ports (3 x RS232, 1 x RS232/422/485 and hardware switch the direction of RS485 automatically), one PS/2 keyboard/mouse interface and CPU temperature monitor, voltage monitor, fan speed monitor and watchdog timer, etc.

Environment and Dimension

- Dimensions: 146.05mm x 101.60mm
- Operating Temperature: -5°C~60°C
- Operating Humidity: 5%~90% (non-condensing)

Microprocessor

AMD® LX800-500MHz (compatible with AMD® LX700).

System Memory

On board 256MB DDR Memory standard

System Chipset

CS5536

Network Function

The motherboard integrates one 10/100Mbps Ethernet controller to provide users with high-speed and stable LAN platform.

Video Function

Integrate in LX800: VGA & TTL LCD & LVDS interfaces

Audio Function

Integrate on-board AC'97 Audio chip to provide high-quality audio effect.

IDE Function

One ATA100 IDE interface, support two sets of IDE devices.

Solid State Disk Function

One TYPE I/II Compact Flash interface.

USB Function

The motherboard provides three high-speed USB2.0 interfaces (one is on board while the other two are connected externally) for the embedded single board mobile mass memory.

Warning:

- 1) Please use qualified USB devices and make sure it is well grounded, or the system will be damaged. 2) Any time when touching the USB device, please touch the chassis first to discharge static on your body.
- 3) When the USB devices need to be removed when power-on, make sure the USB devices is in standby mode (not operating).

BIOS

The latest AMI kernel BIOS

Watchdog Function

- 1~255 levels, programmable time to interrupts
- 1~255 overtime event system reset
- 1 (second/minute) resolution down counter

I/O Function

- One high-speed parallel port; support SPP/EPP/ECP mode;
- There are four serial ports in total (COM2 can select RS-232/422/485 and hardware can switch the direction of RS485 automatically).
- Keyboard and mouse socket.

System Monitor Function:

Monitor CPU temperature, system chassis temperature monitor, and system operating voltage;

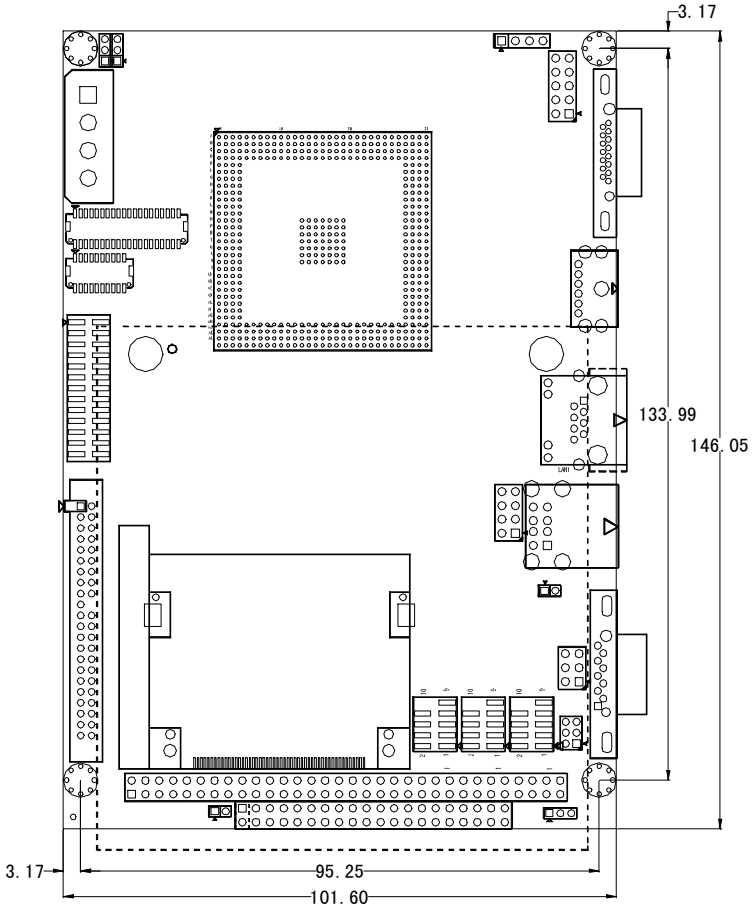
Operating System

WinXP and Linux supported; Win98 unsupported; provides with WinXPE as well.

When installing Linux9.0, please disable the USB function in BIOS first. (Note: when installing redhat9.0 system via USB CD-ROM, please disable USB2.0 in USB function only; it might unable to get the CD-ROM if other USB functions are disabled.)

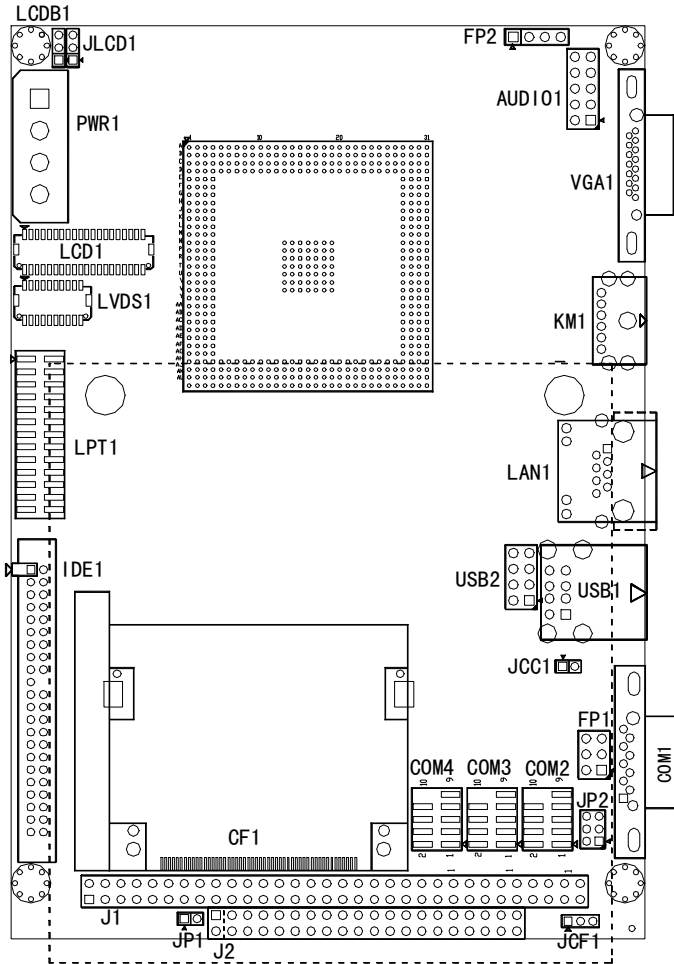
Chapter 2 Installation

Product Outline



Unit: mm

The Locations of Interfaces



Tip: How to identify the first pin of the jumpers and interfaces?

1. Observe the letter beside the socket, it would be marked with "1" or thickened lines or triangular symbols;
2. The square pad on the rear is the first pin;
3. The red line on the cable or other marks shows that they should be connected with the first pin of the socket.

Jumper Settings

1. COMS Setup

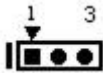
If the system fails to boot due to improper BIOS settings, try to clear CMOS to recover the default settings of all the system parameters manually, and then reboot system.



JCC1

Setting	Function
[1-2] open	Normal (default)
[1-2] short	clear CMOS, all BIOS settings are restored to factory

2. JCF1: Select Operating Voltage of CF Card



JCF1

Setting	Function
[1-2] short	+3V
[2-3] short	+5V (Default)

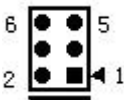
3. JP1: Select Master/Slave CF Card



JP1

Setting	Function
[1-2] short	Master
[1-2] open	Slave (default)

4. JP2: RS-232/RS-422/RS-485 Mode Selection of COM2



JP2

JP2 Selection	Pin		
	1-2	3-4	5-6
RS-232(Default)	ON	OFF	OFF
RS-422	OFF	ON	OFF
RS-485	OFF	OFF	ON

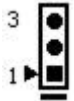
Part of the pin definitions of COM2:

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	RTX-
2	RXD	TX+	RTX+
8	CTS	RX+	X
9	RI	RX-	X

Note: data transmission direction is controlled by TXDx at RS-485 mode.

5. JLCD1: Voltage Selection

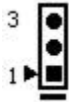
Different LCD screens have different voltages; the board provides two voltage options, 3.3V and 5V. Only when the selected LCD voltage is in accord with the LCD voltage in use, the LCD screen could display normally.



JLCD1

Setting	Function
[1-2]short	+3.3V(Default)
[2-3]short	+5V

6. LCDB1: LVDS Backlight Power Control



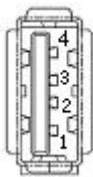
LCDB1

Pin	Signal Name
1	LVDS_BKLTEN
2	+12V
3	GND

USB Interface

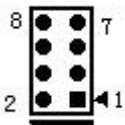
The motherboard provides one standard USB interface and a set of 2×4-Pin USB interface. Transfer cable is needed to connect USB signals with standard USB socket.

The pin definitions are listed as follows:



USB1

Pin	Signal Name
1	+5V
2	USB Data-
3	USB Data+
4	GND



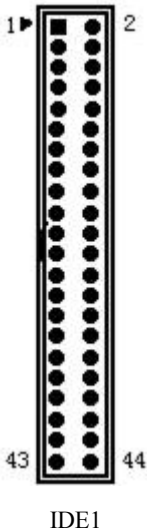
USB2

Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB1/3 Data-	4	USB2/4 Data-
5	USB1/3 Data+	6	USB2/4 Data+
7	GND	8	GND

IDE Interface

The motherboard provides a set of 44-pin IDE interface, please pay attention as follows when installing IDE device:

IDE interface can connect with two sets of IDE devices, a Master and a Slave. The method of connecting the devices: connect the Master to the end of the cable while connecting the Slave to the middle (the one with the red mark is the first pin of IDE cable).

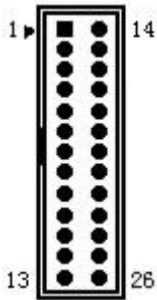


Pin	Signal Name	Pin	Signal Name
1	Reset IDE	2	GND
3	PDD7	4	PDD8
5	PDD6	6	PDD9
7	PDD5	8	PDD10
9	PDD4	10	PDD11
11	PDD3	12	PDD12
13	PDD2	14	PDD13
15	PDD1	16	PDD14
17	PDD0	18	PDD15
19	GND	20	NC
21	PDREQ	22	GND
23	PDIOV	24	GND
25	PDIOR	26	GND
27	PIORDY	28	Host ALE
29	PDDACK	30	GND
31	IRQ14	32	NC
33	PDA1	34	P66DET
35	PDA0	36	PDA2
37	PDCS	38	PDCS
39	IDEACTP	40	GND
41	VCC	42	VCC
43	GND	44	NC

Parallel Port and Serial Port

1) Parallel Port

Standard 26pin parallel port, it can connect to the peripheral devices according to requirements.

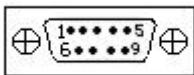


LPT1

Pin	Signal Name	Pin	Signal Name
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

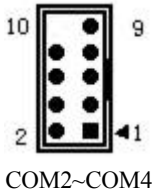
2) Serial Port

The motherboard provides four standard serial ports. COM2 can select RS232, RS422 or RS485 operating modes via jumper. COM1, COM2, COM3 and COM4 can be connected with the devices such as mouse, modem, numeral camera which has RS-232 standard interface.



COM1

Pin	Signal Name	Pin	Signal Name
1	DCD#	6	DSR#
2	RXD	7	RTS#
3	TXD	8	CTS#
4	DTR#	9	RI#
5	GND		



Pin	Signal Name	Pin	Signal Name
1	DCD#	2	RXD
3	TXD	4	DTR#
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#	10	NA

Note: please refer to the introduction about JP2 for the jumper setup of COM2.

Video Interface

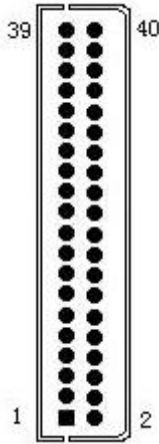
1) VGA Output Interface



VGA1

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	GND
7	GND	8	GND
9	N.C	10	GND
11	N.C.	12	DCCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

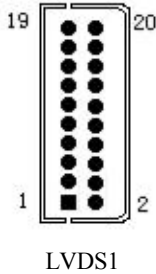
2) LCD Output Interface



LCD1

Pin	Signal Name	Pin	Signal Name
1	VDD	2	VDD
3	GND	4	VCC
5	GND	6	GND
7	TFT_B1	8	TFT_B0
9	TFT_B3	10	TFT_B2
11	TFT_B5	12	TFT_B4
13	TFT_B7	14	TFT_B6
15	TFT_G1	16	TFT_G0
17	TFT_G3	18	TFT_G2
19	TFT_G5	20	TFT_G4
21	TFT_G7	22	TFT_G6
23	TFT_R1	24	TFT_R0
25	TFT_R3	26	TFT_R2
27	TFT_R5	28	TFT_R4
29	TFT_R7	30	TFT_R6
31	GND	32	GND
33	VSYNC_C	34	TFTCLK
35	HSYNC_C	36	LEDMOD_HSIP_VSYNC
37	DISPEN	38	HSIP_HSYNC
39	GND	40	VCON

3) LVDS Output Interface



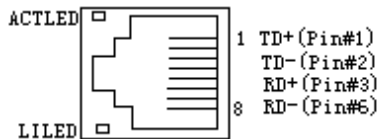
Pin	Signal Name	Pin	Signal Name
1	LVDS0+	2	LVDS0-
3	GND	4	GND
5	LVDS1+	6	LVDS1-
7	GND	8	GND
9	LVDS2+	10	LVDS2-
11	GND	12	GND
13	LVDSCLK+	14	LVDSCLK-
15	GND	16	GND
17	LVDS3+	18	LVDS3-
19	VDD	20	VDD

LAN Interface

This is a 10/100 Mbps Ethernet port on the motherboard. LILED and ACTLED are LEDs beside the Ethernet port, they respectively show the LAN activity and transmission state of LAN. The state description for each LED is shown as follows:

TD+,TD-: positive/negative TXD signal RD+,RD-: positive/negative RXD signal

ACTLED: indicator of network activity LILED: indicator of network links

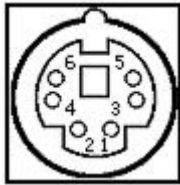


LILED	Indicator Status	ACTLED	Indicator Status
On	100M LAN link is available	Blink	Data receiving/sending
Off	10M LAN link is available or LAN link is unavailable	OFF	No data to receive/send

Keyboard and Mouse Interface

KM1 is a 6-pin mini DIN socket used by both of keyboard and mouse; it can be connected with PS/2 keyboard directly. But 1-to-2 PS/2 keyboard and mouse cable equipped with the single board computer is needed when users want to connect keyboard and mouse at the same time.

If you use PS/2 mouse, system self-test will begin and assign IRQ12 to PS/2 mouse, or IRQ12 will be assigned to expansion card.

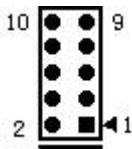


KM1

Pin	Signal Name
1	Keyboard data
2	Mouse data
3	GND
4	+5V
5	Keyboard clock
6	Mouse clock

Audio Interface

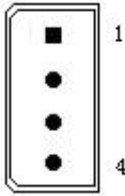
Audio_out can be connected to a headset or more suitable power loudspeakers via the cable attached to the motherboard. Line in is for the record for computer tape or other audio source, or play via Audio Out. Mic is for connecting the sound input of microphone.



AUDIO1

Pin	Signal Name	Pin	Signal Name
1	Audio Out Right	2	Audio Out Left
3	GND	4	GND
5	Line in Right	6	Line in Left
7	GND	8	GND
9	Mic Phone in	10	Mic Phone P

Power Supply Interface



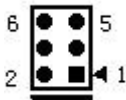
PWR1

Pin	Signal Name
1	+12V
2	GND
3	GND
4	+5V

Status Indicator Interface

FP1 and FP2 are used to connect with the functional buttons and indicators on the front panel of chassis.

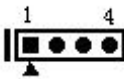
Pin Definitions of FP1:



FP1

Pin	Signal Name
1	PWR LED
2	VCC
3	EXT-RST
4	GND
5	IDE LED
6	VCC

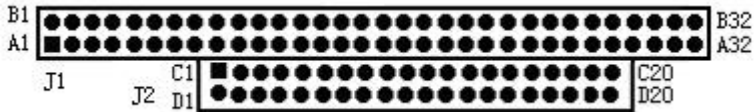
Pin Definitions of FP2:



FP2

Pin	Signal Name
1	Speaker out
2	NC
3	GND
4	+5V

PC104 Interface



Pin Definitions are listed as follows:

J1				J2			
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	IOCHK	B1	GND	C1	GND	D1	GND
A2	D7	B2	REST	C2	SBHE	D2	MEMCS16
A3	D6	B3	VCC	C3	LA23	D3	IOCS16
A4	D5	B4	IRQ9	C4	LA22	D4	IRQ10
A5	D4	B5	-5V	C5	LA21	D5	IRQ11
A6	D3	B6	DRQ2	C6	LA20	D6	IRQ12
A7	D2	B7	-12V	C7	LA19	D7	IRQ15
A8	D1	B8	OWS	C8	LA18	D8	IRQ14
A9	D0	B9	+12V	C9	LA17	D9	DACK0
A10	IOCHRDY	B10	GND	C10	MEMR	D10	DRQ0
A11	AEN	B11	SMEMW	C11	MEMW	D11	DACK5
A12	A19	B12	SMEMR	C12	D8	D12	DRQ5
A13	A18	B13	IOW	C13	D9	D13	DACK6
A14	A17	B14	IOR	C14	D10	D14	DRQ6
ZA15	A16	B15	DACK3	C15	D11	D15	DACK7
A16	A15	B16	DRQ3	C16	D12	D16	DRQ7
A17	A14	B17	DACK1	C17	D13	D17	VCC
A18	A13	B18	DRQ1	C18	D14	D18	MASTER
A19	A12	B19	REFRESH	C19	D15	D19	GND
A20	A11	B20	CLK	C20	KEY	D20	GND
A21	A10	B21	IRQ7				
A22	A9	B22	IRQ6				
A23	A8	B23	IRQ5				
A24	A7	B24	IRQ4				
A25	A6	B25	IRQ3				
A26	A5	B26	DACK2				
A27	A4	B27	TC				
A28	A3	B28	BALE				
A29	A2	B29	VCC				
A30	A1	B30	OSC				
A31	A0	B31	GND				
A32	GND	B32	GND				

Compact Flash Interface

Pin definitions of Compact Flash Slot (CF1) are listed as follows:

Signal Name	Pin	Pin	Signal Name
Ground	1	26	Ground
Data 3	2	27	Data 11
Data 4	3	28	Data 12
Data 5	4	29	Data 13
Data 6	5	30	Data 14
Data 7	6	31	Data 15
HDC_CS0#	7	32	HDC_CS1#
Ground	8	33	N/C
Ground	9	34	IORD#
Ground	10	35	IOWR#
Ground	11	36	+3.3V pull-up
Ground	12	37	IRQ15
+3.3V	13	38	+3.3V
Ground	14	39	CSEL
Ground	15	40	N/C
Ground	16	41	RESET#
Ground	17	42	IORDY
SA2	18	43	N/C
SA1	19	44	+3.3V pull-up
SA0	20	45	HDD_ACTIVE
Data 0	21	46	PDIAG
Data 1	22	47	Data 8
Data 2	23	48	Data 9
GND pull-down	24	49	Data 10
N/C	25	50	Ground

Chapter 3 BIOS Setup

Please refer to the *AMI BIOS Setup Guide* edited by EVOC Company for more information about BIOS setup.

Wherein, there are differences in 3.2.7, please refer to the following content:

3.2.7 USB Configuration

BIOS SETUP UTILITY	
USB Configuration	
USB Devices Enabled :	
1 Drive	
USB 1.1 Controller	[Enabled]
USB 2.0 Controller	[Enabled]
Legacy USB Support	[Auto]
Port 4 Assignment	[Host Controller]
▶ USB Mass Storage Device Configuration	
	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
V02.57 (c)Copyright 1985-2004,American Megatrends, Inc.	

1. USB 1.1 Controller

The switch option of USB 1.1 controller;

2. USB 2.0 Controller

The switch option of USB 2.0 controller;

3. Legacy USB Support

This option is used to support traditional USB device (keyboard, mouse and storage device, etc.). When this option is set to Enabled, USB device can be used even in the OS that does not support USB, such as DOS.

4. Port 4 Assignment

This option is used to configure the USB controller type of Port 4.

5. USB Mass Storage Device Configuration

This menu will appear when detecting out USB Mass storage device.

1) USB Mass Storage Reset Delay

This option is used to set the reset delay of USB mass storage device.

2) Emulation Type

This option is used to set the emulation type of USB mass storage device.

Appendix

Watchdog Programming Guide

The board provides a programmable watchdog timer (WDT) up to 255 levels and time by minute or second. Watchdog timeout event can be programmed to reset system or generate maskable interrupts.

The available IRQ numbers for this board are: 3, 4, 5, 7, 9, 10 and 11. Please modify the corresponding IRQ number in PCIPnP of BIOS Setup interface into “Reserved” before using.

The following describes WDT program in C language. The steps to program WDT are listed as follows:

- Enter WDT programming mode;
- Set WDT operating mode/enable WDT/disable WDT.

(1) Enter WDT Programming Mode

```
#define INDEX_PORT 0x4E
#define DATA_PORT 0x4F
unsigned int tmp_reg;
unsigned int pm_base;

outportb(INDEX_PORT, 0x55);
outportb(INDEX_PORT, 0x07);
outportb(DATA_PORT, 0x0A);
outportb(INDEX_PORT, 0x30);
outportb(DATA_PORT, 0x01);
outportb(INDEX_PORT, 0x60);
tmp_reg = inportb(DATA_PORT);
pm_base = tmp_reg;
outportb(INDEX_PORT, 0x61);
tmp_reg = inportb(DATA_PORT);
```

```
pm_base = pmbase<<8+tmp_reg; /*Get the variable pm_base for later  
use*/
```

(2) Configure WDT operating mode, reset mode or interrupt mode:

a. Configure WDT to reset mode

```
outportb(pm_base+0x47, 0x0C);
```

b. Configure WDT to interrupt mode

```
unsigned int irq;
```

```
irq = IRQ_NO; /*Please replace the constant IRQ_NO with the interrupt  
number need to be used, evaluate the variable irq. The available range of the interrupt  
number has been listed in the beginning of this chapter*/
```

```
irq = irq<<4;
```

```
outportb(pm_base+0x47, 0x80);
```

```
outportb(pm_base+0x67, irq);
```

(3) Configure WDT to time by minute or second:

a. Time by minute:

```
outportb(pm_base+0x65, 0x00);
```

b. Time by second:

```
outportb(pm_base+0x65, 0x80);
```

(4) Enable/Disable WDT

a. Enable WDT:

```
outportb(pm_base+0x66, TIME_OUT_VALUE); /*Please replace the  
constant TIME_OUT_VALUE with the unit number of timeout value (0x01 ~  
0xFF)*/
```

b. Disable WDT:

```
outportb(pm_base+0x66, 0x00);
```

I/O Address Map

There is 64K for the system I/O address space. Each external device will occupy portion of the space. The table below shows parts of the distribution of the I/O address. As the address of PCI device (e.g. PCI network card) is configured by software, it is not listed in this table.

Address	Device Description
020h - 021h	Programmable Interrupts Controller #1
040h - 043h	System Timer
060h - 060h	Standard 101/102 Key or Microsoft Keyboard
064h - 064h	Standard 101/102 Key or Microsoft Keyboard
070h - 071h	System CMOS/Real Time Clock
081h - 083h	DMA Controller #1
087h - 087h	DMA Controller #2
089h - 08Bh	DMA Controller #3
08Fh - 08Fh	DMA Controller #4
0A0h - 0A1h	Programmable Interrupts Controller #2
0C0h - 0DFh	DMA Controller #5
0F0h - 0FFh	Numerical Data Processor
170h - 177h	Primary IDE Channel
1F0h - 1F7h	Master IDE Channel
2E8h - 2EFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
376h - 376h	Primary IDE Channel
378h - 37Fh	Parallel Port #1(LPT1)
3B0h - 3BAh	Advanced Micro Devices Win 2K/XP Graphics Controller
3C0h - 3DFh	Advanced Micro Devices Win 2K/XP Graphics Controller
3E8h - 3EFh	Serial Port #3(COM3)
3F6h - 3F6h	Master IDE Channel
3F8h - 3FFh	Serial Port#1(COM1)
480h - 48Fh	DMA Controller #6
EE00h - EEEFh	Realtek RTL8139(A) PCI Fast Ethernet Adapter
EF00h - EF7Fh	GeodeLX Audio Driver(WDM)
FFE0h - FFEFh	Standard dual-channel PCI IDE Controller

IRQ Interrupts Assignment

There are interrupt sources as follows in WinXP system. Some has been exclusively occupied by system device. Only those interrupt sources which is not exclusively occupied can be assigned to other devices. ISA device requests exclusive use of its interrupt; only interrupts of PnP ISA device can be assigned by BIOS or operating system. While multiple PCI devices can share the same interrupt, and assigned by BIOS or operating system.

Level	Function
IRQ0	System Timer
IRQ1	Standard 101/102 key or Microsoft Keyboard
IRQ3	Communication Port (COM2)
IRQ4	Communication Port (COM1)
IRQ5	Realtek RTL8139 Family PCI Fast Ethernet NIC
IRQ5	GeodeLX Audio Driver(WDM)
IRQ6	Standard floppy disk controller
IRQ8	System CMOS/Real Time Clock
IRQ9	ACPI-Compliant System
IRQ10	Communication Port (COM3)
IRQ11	Communication Port (COM4)
IRQ12	Compatible PS/2 Mouse Port
IRQ13	Numerical Data Processing
IRQ14	Primary IDE channel

For more information, please visit our website: <http://www.evoc.com>.