

104-1649CLD2NA Series

嵌入式 104 单板电脑

Embedded 104 Single Board Computer

Version: C01

Announcement

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Before purchasing, please have a detailed understanding of the product performance to see whether it meets your requirements.

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Safety Instructions

1. Please carefully read the users' manual before handling the product;
2. For the board which is not ready to be installed, please put it in the anti-static packaging;
3. Before taking the board out from anti-static packaging, please put your hand on grounded metal object for a while (about 10 seconds) to discharge static;
4. Please wear static protective gloves when holding the board; and always hold the board by edges;
5. Before inserting, removing or re-configuring the motherboard or the expansion card, please firstly disconnect the AC power or unplug the AC power cable from the power source to prevent damage to the product and ensure your personal safety;
6. Before removing the boards or Box PC, firstly turn off all power resources and unplug the power cable from power source;
7. For Box PC products, when inserting or removing boards, please disconnect the AC power in advance;
8. Before connecting or disconnecting any device, make sure all power cables 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.

Contents

Chapter 1 Product Introduction.....	1
Overview.....	1
Mechanical Dimension, Weight and Environment.....	1
Typical Power Consumption.....	2
Microprocessor.....	2
Chipset.....	2
System Memory.....	2
Video Function.....	2
Network Function.....	2
Audio Function.....	3
Power Feature.....	3
Expansion Bus.....	3
Watchdog Function.....	3
I/O Connectors.....	3
Chapter 2 Installation.....	4
Product Outline.....	4
Locations of Connectors.....	5
Motherboard Structure.....	6
Jumper Settings.....	7
LCD Backlight Control Connector.....	8
LED.....	8
Serial Port.....	9

USB Port.....	9
Video Connectors.....	10
LAN Port.....	12
Multi-functional Connector.....	12
Audio Connector.....	13
GPIO Connector.....	13
JTAG Connector	14
Power Connector.....	14
CF Card Slot	15
IDE Connector	16
PC/104 Connector.....	17
PC/104-Plus Connector.....	18
Chapter 3 BIOS Setup	19
Overview.....	19
BIOS Parameter Setup	19
Basic Function Settings for BIOS	20
System Resources Managed by BIOS under X86 Platform	34
Chapter 4 Install the Drivers.....	38
Appendix	39
Watchdog Programming Guide	39
Digital IO Programming Guide.....	41

Chapter 1 Product Introduction

Overview

104-1649CLD2NA series is an embedded PC/104-Plus motherboard with low power consumption. This motherboard has high integration, small volume, rich functions, low power consumption and it can be widely used in various embedded systems. The main features are listed as follows:

- Integrate AMD[®] LX Series CPU with extra low power consumption;
- On-board 512M DDR2 memory;
- Two 10/100Mbps Ethernet controllers;
- Integrate video chip in LX800; support VGA & 18-bit TFT LCD & 18-bit LVDS; support VGA+LVDS, VGA+TFT LCD dual-display function; the max. resolution reaches up to 1280x800;
- One standard IDE connector; one on-board CF card slot or one on-board 1G NAND FLASH, optional;
- Four serial ports, two of which support RS232 mode while the other two support RS422/RS485 mode. Four USB 2.0 ports; PC/104 and PC/104-Plus dual-bus expansion.

This motherboard is designed with high integration, and it is convenient to be used in various embedded applications via rich connectors, such as medical treatment, instruments, intelligent products, industrial control, national defense and transportation.

Mechanical Dimension, Weight and Environment

- Dimension: 115.6mm (L) x 96.9mm (W) x 23.2mm (H)
- Net Weight: 109.7g;
- Operating Environment:
Temperature: -40°C ~ 85°C;

Humidity: 5% ~ 90%, non-condensing;

➤ Storage Environment:

Temperature: -40°C ~ 85°C;

Humidity: +20% ~ 90%, non-condensing;

Typical Power Consumption

CPU: AMD[®] LX800/LX600 500/366MHz Memory: 512MB DDR2

➤ +5V @ 0.98A; +5%/-3%;

Microprocessor

AMD[®] LX800 (Standard Configuration)/LX600 500/366MHz BGA481 CPU;

Chipset

AMD[®] Geode[™] CS5536;

System Memory

On-board 512MB DDR2 memory;

Video Function

Video chip is integrated in LX800; support VGA, TFT LCD and 18-bit LVDS.

Support VGA+LVDS dual-display function; do not support VGA+LCD+LVDS synchronous display. The resolution reaches up to 1280x800.

Network Function

Two 10/100Mbps network ports; do not support Wake-On-LAN.

Audio Function

AC'97 sound effect chip; support MIC-IN, LINE-IN and SPK-OUT; provide excellent sound effect.

Power Feature

AT power, +5V single power supply;

Expansion Bus

One PC/104 slot, ISA bus compliant; one PC/104-Plus slot, PCI bus compliant;

Watchdog Function

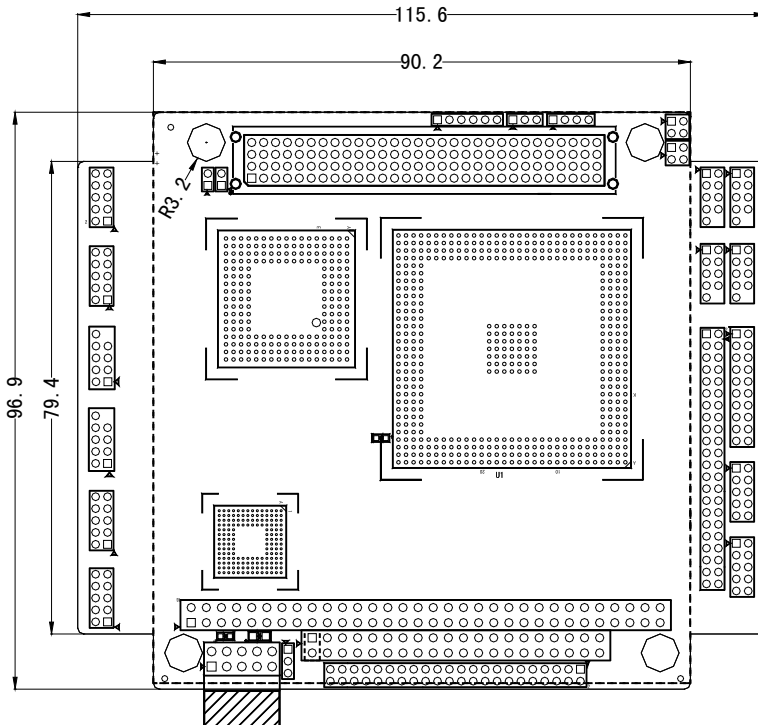
- 255 levels, programmable, time by minute or second;
- Support watchdog overtime or reset system.

I/O Connectors

- Four serial ports, two of which support RS-232 mode while the other two support RS-422/RS-485 mode selection;
- One IDE connector, it supports two IDE devices; one CF card slot or on-board 1G NAND FLASH (Slave as default), optional;
- Two sets of USB2.0 connectors, which can transfer four USB ports;
- One multi-functional connector, it supports a set of PS2 keyboard and mouse, one buzzer and one reset button;
- One VGA connector; one LVDS connector; one TFT LCD connector;
- One audio connector;
- One 8-bit digital I/O connector;

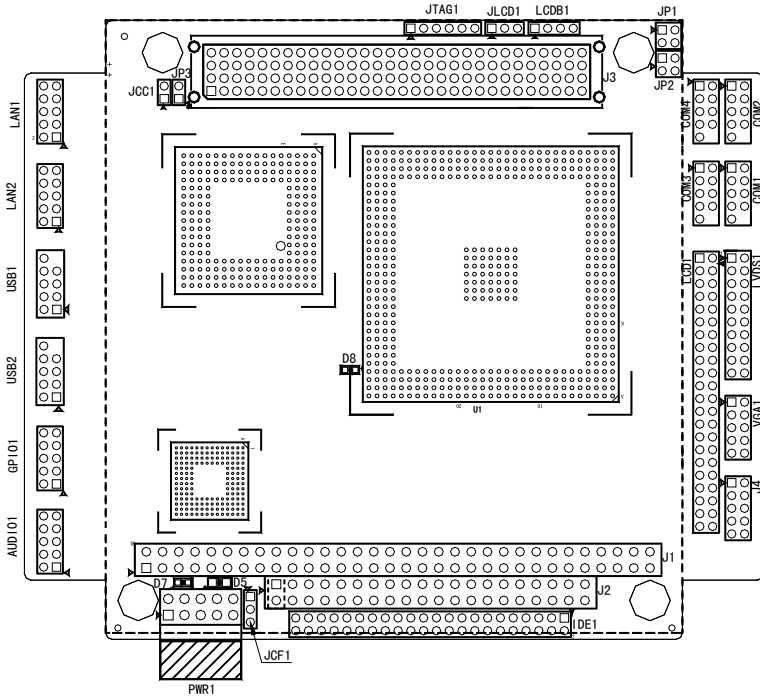
Chapter 2 Installation

Product Outline

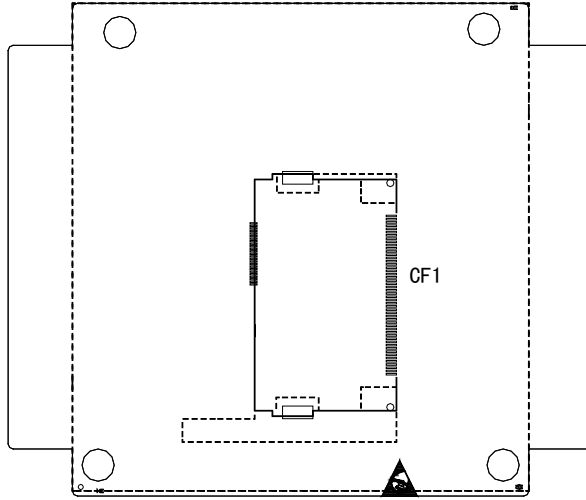


unit: mm

Locations of Connectors

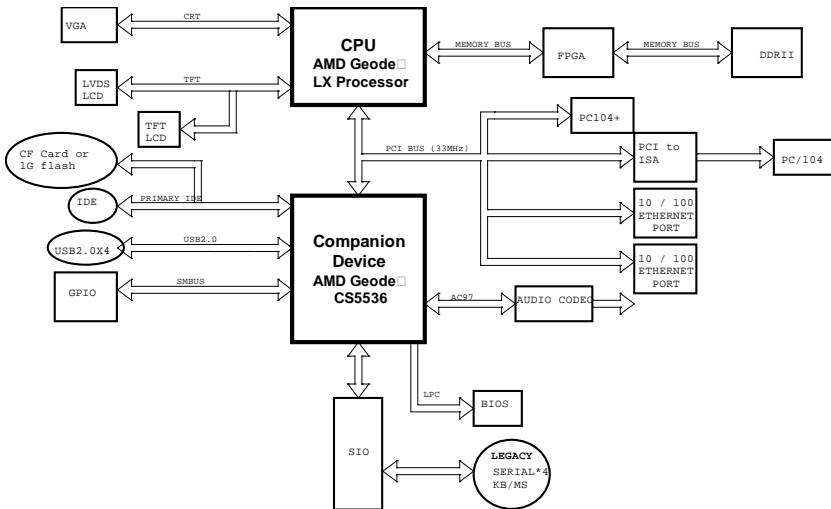


Front View



Rear View

Motherboard Structure



Tip: How to identify the first pin of the jumpers and connectors

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

Jumper Settings

1. JCC1: Clear/Keep CMOS Setting (Pin Distance: 2.0mm)

CMOS is powered by the button battery on board. Clearing CMOS will restore original settings (factory default). The steps are listed as follows : (1) Turn off the computer and unplug the power cable; (2) Instantly short circuit JCC1; (3) Turn on the computer; (4) Follow the prompt on screen to enter BIOS setup when starting the computer, load optimized defaults; (5) Save and exit. Please set it as follows:

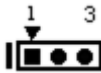


JCC1

Setup	Function
1-2 Open	Normal (Default)
1-2 Short	Clear the contents of CMOS, all BIOS setting will restore to factory default values.

2. JLCD1: Select Operating Voltage for LCD (Pin Distance: 2.0mm)

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, can the LCD screen display normally. Please set it as follows:



JLCD1

Setup	Function
1-2 Short	+3.3V (Default)
2-3 Short	+5V

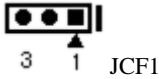
3. JP3: Select Master/Slave Mode for CF Card (Pin Distance: 2.0 mm)



JP3

Setup	Function
1-2 Short	Master
1-2 Open	Slave (Default)

4. JCF1: Select Operating Voltage for CF Card (Pin Distance: 2.0mm)



Setup	Function
1-2 Short	+3.3V
2-3 Short	+5V (Default)

5. JP1, JP2: Select Serial Port Mode (Pin Distance: 2.0 mm)

COM3 and COM4 support optional RS-422/RS-485, JP1 and JP2 can be used to carry out the selection. Please set it as follows:



JP1/JP2

Pin Setup	Mode Selection	
	RS-485 (Default)	RS-422
JP1	1-2	3-4
JP2	1-2	3-4

Note: “1-2” indicates the status of the jumper cap.

LCD Backlight Control Connector



LCDB1

(Pin Distance: 2.0 mm)

Pin	Signal Name
1	VCC_LCDBKLT
2	NC
3	LCD_BKLTEN
4	GND

Note: VCC_LCDBKLT----backlight power, the current is limited below 1A.)

LCD_BKLTEN ---- backlight enabling, active high

LED

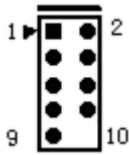


D5/D7/D8

LED	Function
D5 (Green)	IDE Indicator
D7 (Red)	Power Indicator
D8 (Red)	FPGA Operating Indicator

Serial Port

This board provides four 2×5Pin headers for serial ports (Pin Distance: 2.0mm). COM1 and COM2 support RS-232 mode, COM3 and COM4 can select RS-422 or RS-485 mode via setting JP1 and JP2, the default is RS-485. COM3 and COM4 support automatic data transmission at RS-485 mode. The pin definitions are listed as follows:

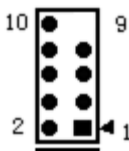


COM1 ~ COM4

Pin	Signal Name		
	COM1/COM2	COM3/COM4	
	RS-232	RS-422	RS-485 (Default)
1	DCD#	TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	NC
4	DTR#	RXD-	NC
5	GND	GND	GND
6	DSR#	NC	NC
7	RTS#	NC	NC
8	CTS#	NC	NC
9	RI#	NC	NC
10	NA	NA	NA

USB Port

This motherboard provides two 2x5 Pin (Pin 9 is NC) USB connectors. Four USB ports can be educed via transfer cable. The pin definitions are listed as follows:



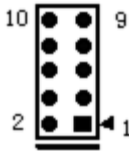
USB1/USB2

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB1_Data-	4	USB2_Data-
5	USB1_Data+	6	USB2_Data+
7	GND	8	GND
9	NA	10	GND_CHASSIS

Video Connectors

1. VGA Connector



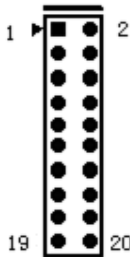
VGA1

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	VSYNC	2	HSYNC
3	DDCDATA	4	Red
5	DDCCLK	6	Green
7	+5V	8	Blue
9	GND	10	GND

Note: when using VGA in WinXP system, if the resolution is 1024×768, please set the same value in BIOS Setup. Please set it as follows: Press DEL to enter SETUP menu—Enter Chipset option—Enter North Bridge Configure Menu—Video Configuration Menu—Flat Panel Resolution Menu, change the resolution from 640×480 (Default) to 1024×768.

2. 18bit LVDS Connector

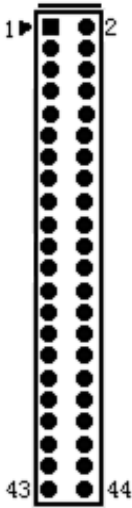


LVDS1

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	LVDS_D0+	2	LVDS_D0-
3	GND	4	GND
5	LVDS_D1+	6	LVDS_D1-
7	GND	8	GND
9	LVDS_D2+	10	LVDS_D2-
11	GND	12	GND
13	CLK+	14	CLK-
15	GND	16	GND
17	NC	18	NC
19	VDD	20	VDD

3. TFT LCD Connector



LCD1

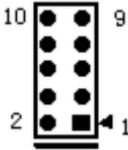
Pin	Signal Name	Pin	Signal Name
1	+12V	2	+12V
3	GND	4	GND
5	VCC_LCD	6	VCC_LCD
7	ENAVEE	8	GND
9	B0	10	B1
11	B2	12	B3
13	B4	14	B5
15	NC	16	NC
17	G0	18	G1
19	G2	20	G3
21	G4	22	G5
23	NC	24	NC
25	R0	26	R1
27	R2	28	R3
29	R4	30	R5
31	NC	32	NC
33	GND	34	GND
35	CLK	36	VSYNC
37	DE	38	HSYNC
39	GND	40	ENABKL
41	GND	42	NC
43	ENAVDD	44	VCON

Note: ENAVEE: LCD Bias Voltage Enabling; ENABKL: LCD Backlight Enabling;

ENAVDD: LCD Power Enabling; VCON: Luminance Adjustment;

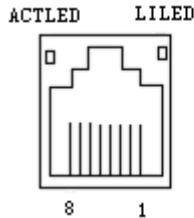
LAN Port

LAN1 and LAN2 are 2×5Pin headers for Ethernet port on the motherboard, transfer cable is required to connect the signals to the standard sockets. The pin definitions are listed as follows:



LAN1/LAN2(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	LED+	2	LINK_LED-
3	RX+	4	RX-
5	ACT_LED-	6	TERMINAL1
7	TERMINAL2	8	GND
9	TX+	10	TX-

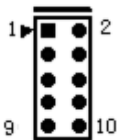


TX+ (Pin#1)
TX- (Pin#2)
RX+ (Pin#3)
RX- (Pin#5)

ACTLED (Green)	LAN Activity Status Indicator	LILED (Yellow)	LAN Speed Indicator
Blink	Data transmitting	ON	100Mbps
OFF	No Data to Transmit	OFF	10Mbps

Multi-functional Connector

J4 is a 2×5 Pin header, this is a multi-functional connector and it is used to connect keyboard, mouse, buzzer and Reset button. The multi-functional cable attached to the single board computer is required. The pin definitions are listed as follows:



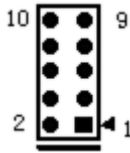
J4

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	SPEAK-	2	+5V
3	Reset	4	GND
5	Keyboard Data	6	Keyboard Clock
7	GND	8	Mouse Clock
9	+5V	10	Mouse Data

Audio Connector

LOUT can connect to earphone or more compatible power loudspeaker via the cable attached to the motherboard. MIC_IN is used to connect the microphone and input the sound. The pin definitions are listed as follows:



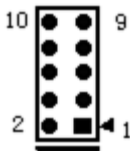
AUDIO1

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	LOUT_R	2	LOUT_L
3	GND_AUDIO	4	GND_AUDIO
5	LIN_R	6	LIN_L
7	GND_AUDIO	8	GND_AUDIO
9	MIC_IN	10	MIC_P

GPIO Connector

This motherboard provides one 8-channel programmable GPIO port; the input and output can be controlled discretionarily by programming. The default status is that pin 1, 3, 5 and 7 are for output and pin 2, 4, 6 and 8 are for output. The pin definitions are listed as follows:



GPIO1

(Pin Distance: 2.0 mm)

Pin	Signal Name	Pin	Signal Name
1	GPIO1	2	GPIO5
3	GPIO2	4	GPIO6
5	GPIO3	6	GPIO7
7	GPIO4	8	GPIO8
9	GND	10	NC

JTAG Connector

JTAG1 is used to record on-board XILINX FPGA code (Reserved).

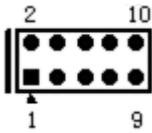


JTAG1

(Pin Distance: 2.0 mm)

Pin	Signal Name
1	VCC
2	GND
3	TCK
4	TDO
5	TDI
6	TMS

Power Connector



PWR1

(Pin Distance: 2.54 mm)

Pin	Signal Name	Pin	Signal Name
1	GND	2	+5V
3	NC	4	+12V
5	NC	6	-12V
7	GND	8	+5V
9	GND	10	+5V

CF Card Slot

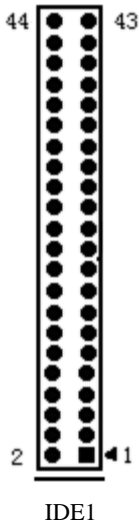
Compact Flash card is a sort of high speed memory, small in size and easy to use. Its storage capacity will vary with different cards in use, such as 128M, 256M etc. This board provides one CF card (on the rear of the board, marked as CF1) and it could only be inserted in one direction.

Pin	Signal Name	Pin	Signal Name
1	GND	26	CD1#
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS0#	32	CS1#
8	GND	33	VS1#
9	ATASEL#	34	IOR#
10	GND	35	IOW#
11	GND	36	WE#
12	GND	37	IRQ
13	VCC	38	VCC
14	GND	39	CSEL#
15	GND	40	VS2#
16	GND	41	RESET#
17	GND	42	IORDY
18	A2	43	DREQ
19	A1	44	DACK#
20	A0	45	DASP#
21	D0	46	ATA66_DET
22	D1	47	D8
23	D2	48	D9
24	WP/IOCS16#	49	D10
25	CD2#	50	GND

IDE Connector

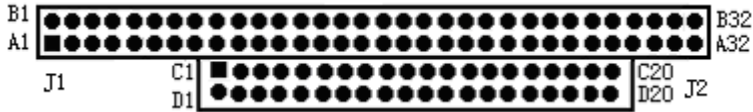
This board provides a set of 2×5Pin header (Pin Distance: 2.0 mm). Please pay attention as follows when installing IDE device:

- One set of IDE connector could be connected with two IDE devices: one is Master and the other is Slave.
- The connecting method is: connect the master device to the end of the cable while connect the slave device to the middle of the cable. (The first pin of the IDE cable is red.)



Pin	Signal Name	Pin	Signal Name
1	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	Key
21	DREQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IRDY	28	GND
29	DACK#	30	GND
31	IRQ	32	NC
33	DA1	34	ATA66_DET
35	DA0	36	DA2
37	CS1#	38	CS3#
39	LED#	40	GND
41	+5V	42	+5V
43	GND	44	GND

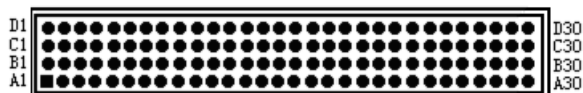
PC/104 Connector



Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	IOCHCK#	B1	GND	C1	GND	D1	GND
A2	SD7	B2	RESET	C2	SBHE#	D2	MEMCS16#
A3	SD6	B3	+5V	C3	LA23	D3	IOCS16#
A4	SD5	B4	IRQ9	C4	LA22	D4	IRQ10
A5	SD4	B5	-5V	C5	LA21	D5	IRQ11
A6	SD3	B6	DRQ2	C6	LA20	D6	IRQ12
A7	SD2	B7	-12V	C7	LA19	D7	IRQ15
A8	SD1	B8	SRDY#	C8	LA18	D8	IRQ14
A9	SD0	B9	+12V	C9	LA17	D9	DACK0#
A10	IOCHRDY	B10	KEY	C10	MEMR#	D10	DRQ0
A11	AEN	B11	SMEMW#	C11	MEMW#	D11	DACK5#
A12	SA19	B12	SMEMR#	C12	SD8	D12	DRQ5
A13	SA18	B13	IOW#	C13	SD9	D13	DACK6#
A14	SA17	B14	IOR#	C14	SD10	D14	DRQ6
A15	SA16	B15	DACK3#	C15	SD11	D15	DACK7#
A16	SA15	B16	DRQ3	C16	SD12	D16	DRQ7
A17	SA14	B17	DACK1#	C17	SD13	D17	+5V
A18	SA13	B18	DRQ1	C18	SD14	D18	MASTER#
A19	SA12	B19	REFRESH#	C19	SD15	D19	GND
A20	SA11	B20	BCLK	C20	KEY	D20	GND
A21	SA10	B21	IRQ7				
A22	SA9	B22	IRQ6				
A23	SA8	B23	IRQ5				
A24	SA7	B24	IRQ4				
A25	SA6	B25	IRQ3				
A26	SA5	B26	DACK2#				
A27	SA4	B27	TC				
A28	SA3	B28	BALE				
A29	SA2	B29	+5V				
A30	SA1	B30	OSC				
A31	SA0	B31	GND				
A32	GND	B32	GND				

PC/104-Plus Connector

Support PCI-104 2.0. The pin definitions are listed as follows:



J3

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	KEY	B1	NC	C1	+5V	D1	AD0
A2	NC	B2	AD2	C2	AD1	D2	+5V
A3	AD5	B3	GND	C3	AD4	D3	AD3
A4	C/BE0#	B4	AD7	C4	GND	D4	AD6
A5	GND	B5	AD9	C5	AD8	D5	GND
A6	AD11	B6	NC	C6	AD10	D6	NC
A7	AD14	B7	AD13	C7	GND	D7	AD12
A8	+3.3V	B8	C/BE1#	C8	AD15	D8	+3.3V
A9	SERR#	B9	GND	C9	NC	D9	PAR
A10	GND	B10	PERR#	C10	+3.3V	D10	NC
A11	STOP#	B11	+3.3V	C11	PLOCK#	D11	GND
A12	+3.3V	B12	TRDY#	C12	GND	D12	DEVSEL#
A13	FRAME#	B13	GND	C13	IRDY#	D13	+3.3V
A14	GND	B14	AD16	C14	+3.3V	D14	C/BE2#
A15	AD18	B15	+3.3V	C15	AD17	D15	GND
A16	AD21	B16	AD20	C16	GND	D16	AD19
A17	+3.3V	B17	AD23	C17	AD22	D17	+3.3V
A18	IDSEL0	B18	GND	C18	IDSEL1	D18	IDSEL2
A19	AD24	B19	C/BE3#	C19	NC	D19	IDSEL3
A20	GND	B20	AD26	C20	AD25	D20	GND
A21	AD29	B21	+5V	C21	AD28	D21	AD27
A22	+5V	B22	AD30	C22	GND	D22	AD31
A23	REQ0#	B23	GND	C23	REQ1#	D23	NC
A24	GND	B24	REQ2#	C24	+5V	D24	GNT0#
A25	GNT1#	B25	NC	C25	GNT2#	D25	GND
A26	+5V	B26	CLK0	C26	GND	D26	CLK1
A27	CLK2	B27	+5V	C27	CLK3	D27	GND
A28	GND	B28	PIRQD#	C28	+5V	D28	RESET#
A29	+12V	B29	PIRQA#	C29	PIRQB#	D29	PIRQC#
A30	-12V	B30	REQ3#	C30	GNT3#	D30	GND

Chapter 3 BIOS Setup

Overview

BIOS (Basic Input and Output System) is solidified in the flash memory on the CPU board. Its main functions include: initialize system hardware, set the operating status of the system components, adjust the operating parameters of the system components, diagnose the functions of the system components and report failures, provide hardware operating and controlling interface for the upper level software system, guide operating system and so on. BIOS provides users with a human-computer interface in menu style to facilitate the configuration of system parameters for users, control power management mode and adjust the resource distribution of system device, etc.

Setting the parameters of the BIOS correctly could enable the system operating stably and reliably; it could also improve the overall performance of the system at the same time. Inadequate even incorrect BIOS parameter setting will decrease the system operating capability and make the system operating unstably even unable to operate normally.

BIOS Parameter Setup

Prompt message for BIOS setting may appear once powering on the system. At that time (inefficient at other time), press the key specified in the prompt message (usually) to enter BIOS setting.

When the BIOS setting in CMOS is destroyed, system may also require entering BIOS setting or selecting certain default value.

All the setup values modified by BIOS are saved in the CMOS storage in system. The CMOS storage is powered by battery; unless clearing CMOS contents, or else its contents will not be lost even if powered off.

Note! BIOS setting will influent the computer performance directly. Setting parameter improperly will cause damage to the computer; it may even unable to power on. Please use the internal default value of BIOS to restore the system.

Our company is constantly researching and updating BIOS, its setup interface may be a bit different. The figure below is for reference only; it may be different from your BIOS setting in use.

Basic Function Settings for BIOS

After starting SETUP program, the main interface of CMOS Setup Utility will appear:

BIOS SETUP UTILITY	
System Overview	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
Processor Type :AMD Geode LX Speed : 500MHz	
System Memory Size :231MB	
System Time [00:47:55] System Date [Wed 01/02/2009]	
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◆ Main

➤ System Time

Select this option and set the current time by < + > / < - >, which is displayed in format of hour/minute/second. Reasonable range for each option is: Hour (00-23), Minute (00-59), Second (00-59).

➤ System Date

Select this option and set current data by < + > / < - >, which is displayed in format of month/date/year. Reasonable range for each option is: Month (Jan.-Dec.), Date (01-31), Year (Maximum to 2099), Week (Mon. ~ Sun.).

◆ **Advanced**

BIOS SETUP UTILITY	
Advanced Settings	Configure CPU
WARNING: Setting wrong values in below sections may cause system to malfunction ▶ CPU Configuration ▶ IDE Configuration ▶ Super IO Configuration ▶ ISA I/O Decode Configuration ▶ ISA Memory Decode Configuration ▶ ISA DDMA Channels Configuration ▶ Hardware Health Configuration ▶ USB Configuration ▶ Power Management Configuration	←→ Select Screen ↑↓ Select Item Enter Go to Sub Screen Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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➤ **CPU Configuration**

BIOS SETUP UTILITY	
CPU Configuration	
Manufacturer: AMD Brand String: AMD Geode LX Frequency :500MHz Cache L1 :64 KB Cache L2 :128 KB	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
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➤ **IDE Configuration**

BIOS SETUP UTILITY	
IDE Configuration	←→ Select Screen
Onboard PCI IDE Controller [Primary]	↑↓ Select Item
	+ - Change Field
	Tab Select Field
▶ Primary IDE Master :[Not Detected]	F1 General Help
▶ Primary IDE Slave :[Not Detected]	F10 Save and Exit
	ESC Exit
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● **Primary IDE Master/Slave**

*** Type**

Not Installed: IDE device cannot be detected by system;

AUTO: automatic detection of IDE parameters when power on;

CD/DVD: used for ATAPI CDROM;

ARMD: used for various analog IDE devices.

*** LBA/Large Mode**

Used to set whether to support LBA mode or not.

*** Block(Multi-sector Transfer)**

Used to set whether to support multi-sector simultaneous transfer or not.

*** PIO Mode**

Used for PIO mode setting.

*** DMA Mode**

Used for DMA mode setting.

*** S.M.A.R.T**

Used to set whether to enable S.M.A.R.T function and it is only effective for the hard disk supporting this function.

*** 32Bit Data Transfer**

This option is used to enable 32-bit hard disk accessing mode, which could optimize hard disk read and write speed.

➤ **Super IO Configuration**

BIOS SETUP UTILITY	
Configure SCH311X Super IO Chipset	
Floppy A [Disabled]	Allows BIOS to Enable or Disable Floppy Controller ←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
OnBoard Floppy Controller [Enabled]	
Serial Port1 Address [3F8]	
Serial Port1 IRQ [IRQ4]	
Serial Port2 Address [2F8]	
Serial Port2 IRQ [IRQ4]	
Serial Port3 Address [3E8]	
Serial Port3 IRQ [IRQ3]	
Serial Port4 Address [2E8]	
Serial Port4 IRQ [IRQ3]	
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● **Floppy A**

Configuration of the floppy disk driver type.

● **On-Board Floppy Controller**

Enable floppy disk controller.

● **Serial Port 1~4 Address**

Set the addresses of COM1~COM4 on motherboard.

● **Serial Port 1~4 IRQ**

Set the IRQs of COM1~COM4 on motherboard.

● **Parallel Port Address**

Set the address of the parallel port on motherboard and its default value is 378.

● **Parallel Port Mode**

Set the mode of the parallel port on motherboard.

● **Parallel Port IRQ**

Set the interrupt of the parallel port on motherboard.

➤ **ISA I/O Decode Configuration**

BIOS SETUP UTILITY	
Configuration ITE8888 IO Address	Enables Hardware Health Monitoring Device
Decode I/O Space 0 [Enabled]	
Decode I/O BASE 0 [0100h]	
Decode I/O Size 0 [128 Bytes]	
Decode I/O Space 1 [Enabled]	←→ Select Screen
Decode I/O BASE 1 [0180h]	↑↓ Select Item
Decode I/O Size 1 [64 Bytes]	+ - Change Field
Decode I/O Space 2 [Enabled]	Tab Select Field
Decode I/O BASE 2 [01C0h]	F1 General Help
Decode I/O Size 2 [32 Bytes]	F10 Save and Exit
Decode I/O Space 3 [Enabled]	ESC Exit
Decode I/O BASE 3 [0200h]	
Decode I/O Size 3 [128 Bytes]	
Decode I/O Space 4 [Enabled]	
Decode I/O BASE 4 [0279h]	
Decode I/O Size 4 [16 Bytes]	
Decode I/O Space 5 [Enabled]	
Decode I/O BASE 5 [0A79h]	
Decode I/O Size 5 [16 Bytes]	
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 ● **DECODE I/O Space n**

DECODE I/O Space n (n=0, 1, 2, 3, 4, 5); the options are Disable and Enable (Default), which mean disabling/enabling the decoding of the ISA device at this address space.

 ● **DECODE I/O Speed n**

DECODE I/O Speed n (n=0, 1, 2, 3, 4, 5); the options are Subtractive speed, Slow Speed, Medium Speed (Default) and Fast Speed, which correspond with the decoding speed of ISA device in this address space.

- **DECODE I/O BASE ADDR n**

DECODE I/O BASE ADDR n (n=0, 1, 2, 3, 4, 5) indicates the base address of this I/O Space; the options are 0100h, 0200h and 0300h; when adding the corresponding value of DECODE I/O Address Offset n, we can get the starting value of this decoding address.

- **DECODE I/O Address Offset n**

DECODE I/O Address Offset n (n=0, 1, 2, 3, 4, 5) indicates the offset of this I/O Space, the default value is 00; the range is 00~FF; use “+” and “-” to adjust the value.

- **DECODE I/O Size n**

DECODE I/O Size n (n=0, 1, 2, 3, 4, 5) indicates the size of this decoding I/O Space; the options are 1, 2, 4, 8, 16, 32, 64 and 128Bytes.

➤ **ISA Memory Decode Configuration**

BIOS SETUP UTILITY	
Configuration ITE8888 Memory Address	
Memory Space 0	[Disabled]
Decode Mem Base 0	[D00]
Decode Mem Size 0	[64 KB]
Memory Space 1	[Disabled]
Decode Mem Base 0	[0]
Decode Mem Size 0	[32 KB]
Memory Space 2	[Disabled]
Decode Mem Base 0	[0]
Decode Mem Size 0	[32 KB]
Memory Space 3	[Disabled]
Decode Mem Base 0	[0]
Decode Mem Size 0	[32 KB]
←→ Select Screen ↑↓ Select Item + - Change Field F1 General Help F10 Save and Exit ESC Exit	
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● **DECODE Space n**

Memory Space n (n=0, 1, 2, 3), the options are Disable (Default) and Enable, which mean disabling/enabling the decoding of the ISA device at this address space.

● **Decode Mem Base n**

Memory Address Base n [24: 8] (n=0, 1, 2, 3) indicates the base address of this memory space; the default value is 0000; the range is 0000~FFFF; use “+” and “-” to adjust the value.

● **Decode Mem Size n**

Decode Mem Size 0 (n=0, 1, 2, 3) indicates the size of this memory space.

➤ **ISA DDMA Channels Configuration**

BIOS SETUP UTILITY	
Configuration ITE8888 Memory Address	
DDMA Slave Channel 0	[Disabled]
DDMA Slave Channel 1	[Disabled]
DDMA Slave Channel 2	[Disabled]
DDMA Slave Channel 3	[Disabled]
DDMA Slave Channel 4	[Disabled]
DDMA Slave Channel 5	[Disabled]
DDMA Slave Channel 6	[Disabled]
DDMA Slave Channel 7	[Disabled]
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● **DDMA Slave Channel 0**

DDMA Slave Channel 0 (n=0, 1, 2, 3 ... 7), the options are Disable (Default) and Enable, which mean disabling/enabling the DMA port of this ISA device.

➤ **Hardware Health Configuration**

BIOS SETUP UTILITY	
Hardware Health Configuration	Enables Hardware Health Monitoring Device
System Temperature : 34°C/93°F	←→ Select Screen ↑↓ Select Item + - Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit
CPU Temperature : 34°C/93°F	
Vcore : 1.320 V	
V3.3 : 3.312 V	
V5.0 : 5.107 V	
V12.0 : 11.481V	
VBAT : 3.200 V	
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- **System Temperature**

Current system temperature is generally monitored by thermal resistor on motherboard.

- **CPU Temperature**

Current CPU temperature is monitored by temperature sensors on motherboard.

- **Vcore**

Core voltage of CPU.

- **V3.3/ V5.0/V12.0**

Turn on/off power output.

➤ **USB Configuration**

BIOS SETUP UTILITY	
USB Configuration	Enables USB host controllers.
Module Version -2.24.0-12.4	
USB Devices Enabled :	
None	←→ Select Screen
USB 1.1 Controller [Enabled]	↑↓ Select Item
USB 2.0 Controller [Enabled]	+ - Change Field
Legacy USB Support [Auto]	F1 General Help
Port 4 Assignment [Host Controller]	F10 Save and Exit
	ESC Exit
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● **USB 1.1 Controller**

This option is used to set the switch of USB controller, to confirm whether to support USB controller.

● **USB 2.0 Controller**

This option is used to select whether to support USB 2.0 controller.

● **Legacy USB Support**

This option is used to support legacy USB devices (keyboard, mouse and storage device, etc.), when this option is set to “Enabled”, the USB device could be used even if under OS that doesn’t support USB, such as DOS.

● **Port 4 Assignment**

This option is used to specify the type of USB controller.

➤ **Power Management Configuration**

BIOS SETUP UTILITY	
Power Management Configuration	←→ Select Screen
ACPI Aware O/S [Yes]	↑↓ Select Item
	+ - Change Field
	F1 General Help
	F10 Save and Exit
	ESC Exit
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● **ACPI Aware O/S**

This option is used to provide support for ACPI mode.

➤ **Chipset**

BIOS SETUP UTILITY	
Advanced Chipset Settings	
WARNING:Setting wrong values in below sections may	
NorthBridge Configuration	
Configure DRAM Timing by SPD [Enabled]	
Internal Graphics Mode [Disabled]	
Internal Graphics Memory [24]	←→ Select Screen
Boot Display Type [Panel+CRT]	↑↓ Select Item
Flat Panel Resolution [800x600]	Enter Go to Sub Screen
Flat Panel Data Bus Type [9-24 bits, 1]	F1 General Help
Horizontal Sync Polarity [Active low]	F10 Save and Exit
Vertical Sync Polarity [Active low]	ESC Exit
SouthBridge Configuration	
Onboard Audio Controller [Enabled]	
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● **Configure DRAM Timing by SPD**

Configure of the memory controller according to the time sequence of the SPD chip on DRAM. It is recommended to use Enabled here. Manual

modification of the DRAM timing may cause the computer unable to boot because it is not supported by DRAM.

● **Internal Graphics Mode**

This option is used to adjust mode of the on-board graphic card when internal video device is connected

● **Internal Graphics Memory**

This option is used to adjust the shared physical memory size of the on-board graphic card, the unit is MB.

● **Boot Display Type**

This option is used to select the default video output device when booting.

● **Flat Panel Resolution**

Option for Flat Panel resolution.

● **Flat Panel Data Bus Type**

Flat Panel data bus type, which shall be in accord with the Spec of Flat Panel.

● **Onboard Audio Controller**

Select whether to start the audio controller.

◆ **PCIPnP**

BIOS SETUP UTILITY	
Advanced PCI/PnP Settings	
WARNING: Setting wrong values in below sections may cause system to malfunction.	
IRQ3 [Available]	←→ Select Screen ↑↓ Select Item +- Change Field F1 General Help F10 Save and Exit ESC Exit
IRQ4 [Available]	
IRQ5 [Available]	
IRQ7 [Available]	
IRQ9 [Available]	
IRQ10 [Available]	
IRQ11 [Available]	
IRQ15 [Available]	
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➤ **IRQ3 ~ 15**

This option is used to specify whether to assign the IRQ number to PNP mode or reserved for ISA.

◆ **Boot**

BIOS SETUP UTILITY	
Boot Settings	←→ Select Screen
Quick Boot [Enabled]	↑↓ Select Item
Quiet Boot [Disabled]	Enter Go to Sub Screen
Waite For 'F1' If Error [Enabled]	F1 General Help
Boot from Embedded WinCE [No]	F10 Save and Exit
Boot Device Priority	ESC Exit
1 st Boot Device [1 st FLOPPY DRIVE]	
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➤ **Quick Boot**

Configure whether to permit skipping certain test during BIOS boot to reduce BIOS boot time.

➤ **Quiet Boot**

Configure whether to display the OEM LOGO.

➤ **Wait for 'F1' If Error**

Configure whether to prompt to press "F1" during system error.

➤ **Boot from Embedded WinCE**

Configure to boot from embedded WinCE. Note: please make sure there is WinCE system core file in the primary boot device when this option is set to "Yes".

➤ **1st ~ 4th Boot Device**

Configure the priority when the system starts.

◆ Security

BIOS SETUP UTILITY	
Security Settings	Install or Change the password
Supervisor Password :Not Installed	
User Password :Not Installed	←→ Select Screen ↑↓ Select Item Enter Change
Change Supervisor Password	F1 General Help F10 Save and Exit
Change User Password	ESC Exit
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➤ Change User/ Supervisor Password

After pressing Change User/ Supervisor Password and input new password in the dialog box, this column will show that user's password has been installed.

◆ Exit

South Bridge Configuration	
Exit Options	Exit system setup after saving the changes.
Save Changes and Exit	
Discard Changes and Exit	
Discard Changes	←→ Select Screen ↑↓ Select Item Enter Go to Sub Screen
Load Optimal Defaults	F1 General Help F10 Save and Exit
Load Failsafe Defaults	ESC Exit
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➤ Save Changes and Exit

Please implement this operation when you have finished all the changes and want to cover the original parameters, the new parameters will be saved into

CMOS storage. To implement this operation, please select this option and press < Enter >; press < Enter > again to exit.

➤ **Discard Changes and Exit**

If you do not want to save the change into CMOS storage, please select this option and press < Enter >; press < Enter > again to exit.

➤ **Discard Changes**

If error occurs in your changes and the changes need to be discarded, please select this option and press < Enter > to come into corresponding options again and re-set it.

➤ **Load Optimal Defaults**

This menu is used to input the default value in system configuration. These default values are optimized and could give play to the high capability of all hardware.

➤ **Load Failsafe Defaults**

This option is used to initialize the value of each option which can realize the most fundamental and secure system function. To implement this function, select this option and press < Enter >; messages to be confirmed will display on the screen, press < Enter > to implement this function.

System Resources Managed by BIOS under X86 Platform

We define three kinds of system resources here: I/O port address, IRQ interrupt number and DMA number.

◆ DMA

Level	Function
DMA0	DRAM Refresh
DMA1	Unassigned
DMA2	Unassigned
DMA3	Unassigned (sometimes used for hard disk)
DMA4	Used for DMAC cascade
DMA5	Unassigned
DMA6	Unassigned
DMA7	Unassigned

◆ APIC

Advanced programmable interrupt controller. Most of motherboards above P4 level support APIC and provide more than 16 interrupt sources such as IRQ16 - IRQ23 while some others support up to 28 interrupt sources such as which supports PCI-X. However, the related OS is required in order to enable that function and only the OS above Windows 2000 could support that function currently.

◆ IO Port Address

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
000h - 00Fh	DMA Controller#1
000h - CF7h	PCI Bus
010h - 01Fh	Carrier Resource
020h - 021h	Programmable Interrupt Controller#1
022h - 03Fh	Carrier Resource
040h - 043h	System Timer
044h - 05Fh	Carrier Resource
060h	Standard 101/102 keys or Microsoft natural PS/2 Keyboard
061h	System speaker
062h - 063h	Carrier Resource
064h	Standard 101/102 keys or Microsoft natural PS/2 Keyboard
065h - 06Fh	Carrier Resource
070h - 071h	Real Time Clock, NMI
072h - 07Fh	Carrier Resource
080h	Carrier Resource
081h - 083h	DMA Controller#2
084h - 086h	Carrier Resource
087h	DMA Controller#3
088h	Carrier Resource
089h - 08Bh	DMA Controller#4
08Ch - 08Eh	Carrier Resource
08Fh	DMA Controller#5
090h - 09Fh	Carrier Resource
0A0h - 0A1h	Programmable Interrupt Controller#2
0A2h - 0BFh	Carrier Resource

Address	Device Description
0C0h - 0DFh	DMA Controller#6
0E0h - 0EFh	Carrier Resource
0F0h - 0FFh	Numeric Data Processor
170h - 177h	Secondary IDE
1F0h - 1F7h	Primary IDE
274h - 277h	ISAPNP Read Data Port
279h	ISAPNP Read Data Port
2F8h - 2FFh	Serial Port #2 (COM2)
376h	Secondary IDE(dual FIFO)
378h - 37Fh	Parallel Port#1(LPT1)
3B0h - 3BBh	Intel(R) Q965/Q963 Express Chipset Family
3C0h - 3DFh	Intel(R) Q965/Q963 Express Chipset Family
3F0h - 3F5h	Standard Floppy Disk Controller
3F6h	Primary IDE(dual FIFO)
3F8h - 3FFh	Serial Port #1 (COM1)
400h - 41Fh	Intel(R) 82801G (ICH8 Family) SMBus Controller - 27DA
480h - 4BFh	Carrier Resource
4D0h - 4D1h	Carrier Resource
800h - 87Fh	Carrier Resource
B00h-B0Fh	Carrier Resource
B10h-B1Fh	Carrier Resource
A79h	ISAPNP Read Data Port
D000h-DFFFh	Intel(R) ICH8 Family PCI Express Root Port-2849
0D00h-FFFFh	PCI bus

◆ IRQ Assignment Table

There are 15 interrupt sources in the system. Some are exclusively occupied by the system device. Only the ones which are not exclusively occupied can be assigned. The ISA devices claim to engross the interrupt. Only the plug and play ISA devices can be assigned by the BIOS or the OS. And several PCI devices can share one interrupt through the assignment of BIOS or OS. The diagram below shows parts of the interrupt assignment, but it does not show the interrupts of the PCI devices.

Level	Function
IRQ0	System Timer
IRQ1	Standard 101/102 Keys or Microsoft Keyboard
IRQ2	Programmable Interrupt Controller
IRQ3	Serial Port#2
IRQ4	Serial Port#1
IRQ5	Parallel Port#2
IRQ6	Standard Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	System CMOS/Real Time Clock
IRQ9	De-direct Software to Int 0Ah
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Mouse Port
IRQ13	Numeric Co-processor
IRQ14	Primary IDE
IRQ15	Secondary IDE

Chapter 4 Install the Drivers

Please install the drivers of this product according to the equipped CD; the steps will not be introduced here.

Appendix

Watchdog Programming Guide

This motherboard provides a programmable watchdog timer (WDT) up to 255 levels and time by minute or second. Watchdog timer overtime 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, 11** and **15**.

Before using, please modify the corresponding IRQ number in PCIPnP of BIOS Setup interface into “Reserved”.

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 variable pm_base here for future 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 needed IRQ  
number, set value to variable irq, the available range of IRQ  
numbers are listed at the beginning of this document.*/  
irq = irq<<4;  
outportb(pm_base+0x47, 0x80);  
outportb(pm_base+0x67, irq);
```

(3) Configure WDT 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);

```

Digital IO Programming Guide

This board provides 8-channel programmable digital I/O pins, 4 for input while the other 4 for output. The following shows the example of digital I/O programming in C language; please follow the steps listed below to program the digital I/O:

- Initialize digital I/O;
- Input/output program

(1) Initialize digital I/O:

```

#define    BAR 0x400

    unsigned char tmp_val;

    outportb(BAR,0xbf);

    outportb(BAR+0x04,0x40);

    outportb(BAR+0x03,0x03);

    outportb(BAR+0x05,0x0f);

    tmp_val =(inportb(BAR+0x02)|0x08)&0xeb;

    tmp_val |= 0x40;

    outportb(BAR+0x02, tmp_val);

    delay(30);

    tmp_val =inportb(BAR);

    while((tmp_val &0x02)!=0x02)

```

```
{  
  
    tmp_val =inportb(BAR);  
    if((tmp_val &0x04)!=0)  
    {  
        printf("ERROR\n");  
        return 0;  
    }  
}
```

(2) Input/Output Program:

a. Output Program

Function Input: int pin – values 1~4 are corresponding with the output pins 1~4
respectively

int lev_val – 1: the output pin is high, 0: the output pin is low

Function Output: None

```
void Out_Lev(int pin ,int lev_val)  
{  
    unsigned int reg_val ;  
    outportb(BAR,0xbf);  
    outportb(BAR+0x04,0x40);  
    outportb(BAR+0x03,0x01);  
    reg_val = inportb(BAR+0x05);  
    reg_val = lev_val ?  
    reg_val|(0x01<<(pin+3)) :reg_val&(~(0x01<<(pin+3)));  
    outportb(BAR+0x05, reg_val);  
}
```

```

reg_val =(inportb(BAR+0x02)|0x08)&0xeb;

reg_val |= 0x40;

outportb(BAR+0x02, reg_val);

delay(30);

reg_val =inportb(BAR);

while((reg_val &0x02)!=0x02)
    {
        reg_val =inportb(BAR);
        if((reg_val &0x04)!=0)
            {
                printf("ERROR\n");
                return 0;
            }
    }
}

```

b. Input Program

Function Input: int pin – values 1~4 are corresponding with the output pins 1~4 respectively

Function Output: int lev_val – 1: the input pin is high, 0: the input pin is low

```

int In_Lev(int pin)
{
    unsigned int reg_val ;
    int lev_val ;
    outportb(BAR,0xbf);

```



```
outputb(BAR+0x04,0x41);
outputb(BAR+0x03,0x00);
reg_val =(inportb(BAR+0x02)|0x08)&0xeb;
reg_val |= 0x40;
outputb(BAR+0x02, reg_val);
delay(30);
reg_val =inportb(BAR);
while((reg_val &0x02)!=0x02)
{
    reg_val =inportb(BAR);
    if((reg_val &0x04)!=0)
    {
        printf("ERROR\n");
        return 0;
    }
}
lev_val = inportb(BAR+0x05) & (0x01<<(pin-1));
lev_val = lev_val ? 1:0; /*Get the value of the variable lev_val here, 1
means that the input pin is high while 0 means the input pin is low*/
return lev_val ;
}
```

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