

**104-1481CLDN**

**PC/104 SBC with CPU/LCD  
/CRT/SSD/LAN**

**Version: A2**

## **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

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1. Please read the *User Guide* carefully before using your 104-1481CLDN.
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 power on/off computer frequently, wait at least 30 seconds after turning off the computer before re-turning on the computer.

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## Chapter 1 Product Description

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### Overview

104-1481CLDN full-function embedded single board computer adopts low power consumption CPU, Integrates SDRAM memory, CRT/LCD dual display controller chip, 10/100Mbps network ports, CompactFlash SSD port, on-board flash, IDE port, two serial ports, two USB ports, watchdog timer, PS/2 mouse/keyboard port, PC/104 expansion bus.

104-1481CLDN adopts low power consumption CPU, can work normally in the range of -40°C~75°C without fan. Onboard TP6508 display chip, with 1MB display memory, supporting CRT+LCD dual display, LCD port supports LCD of TFT, DSTN, etc.

104-1481CLDN is widely applied in automation controller, instrument & meter, intelligent products, and other embedded field with its features of full-integrated, rich port function and high reliable characteristics.

### Ordering Information

Model	Description
104-1481CLDN	PC/104 SBC with CPU/LCD /CRT/SSD/LAN

## **Environment and Dimensions**

- **Operating Environment**

Temperature: -40°C~75°C

Relative Humidity: 5%~95% (non-condensing);

- **Storage Environment**

Temperature: -40°C~85°C

Relative Humidity: 5%~95% (non-condensing);

- **Dimensions: 90mm x 96mm**

## **Micro Processor (CPU)**

Onboard integrates 133MHz single chip low-power processor.

## **System Memory**

Onboard integrates 32MB SDRAM and 8MB FLASH Memory.

## **IDE Function**

One 44-pin IDE port, supports two IDE devices

## **CF Card**

Offers one CompactFlash socket.

## **USB Function**

Two USB ports accord with USB Ver2.0 standard.

## **Display Function**

TOPRO TP6508 graphics controlling chip, 1MB graphics memory, supports dual-display of VGA and LCD.

## **Network Function (LAN)**

Provides one 10M/100M network port.

## **I/O Function**

Two serial ports; COM1 supports RS-232, COM2 supports RS-232/485; one PS/2 KB/MS port.

## **Watchdog Function**

Offers two watchdogs, one is Super I/O watchdog, and another is CPU internal watchdog.

### **(1) Super I/O Watchdog**

- Timing time programmable from 1~255 level.
- Software programmable select time-out interrupt
- Programmable select time-out event reset system

### **(2) CPU Watchdog**

- Timing time 8-level programmable
- Can select time-out interrupt
- Can select time-out event reset system

## **Expansion Bus**

One PC/104 bus.

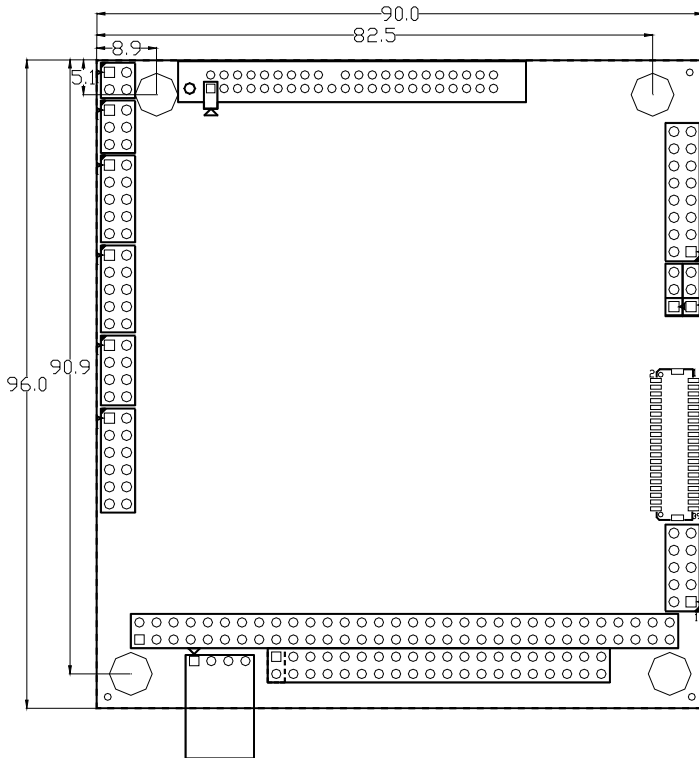
## **Other Features**

- Single 5V power supply (typical 5V@1A), floppy driver power supply port.



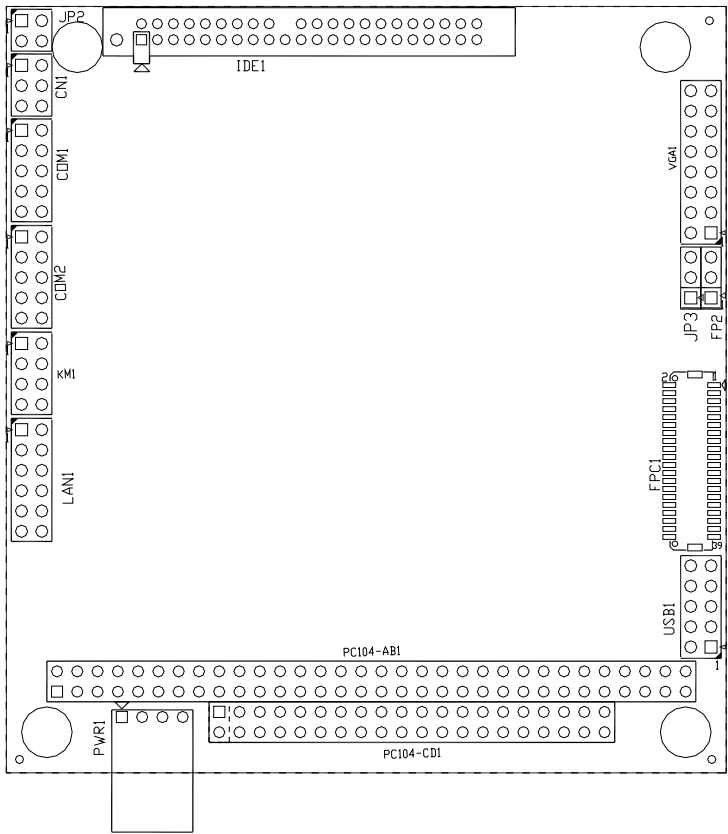
## Chapter 2 Installation

### Outline



Unit: mm

I/O Outline



## Jumper Settings

### Tips: How to identify the first pin of jump wire, interface

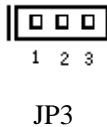
- Check the symbols beside plug and socket marked with “1” or bold line or triangle symbol; Check the pad on the back, square pad is the first pin; The red line or other mark on the cable should connect to the first pin of socket.

### (1) JP2: COM2 mode selection



Setting	Function
[1-2]short-circuit,[3-4]cut	RS232
[1-2]short-circuit,[3-4]cut	RS485

### (2) JP3: LCD working voltage selection

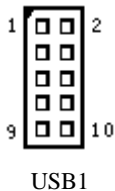


Setting	Voltage
[1-2]Short	3.3V (default setting)
[2-3]Short	5V

## USB

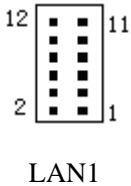
When connecting with USB devices, only fit in one direction. The following table gives the definition of all pins of CF card port:

Pin	Signal Name	Pin	Signal Name
1	+5V	2	+5V
3	USB Data0 -	4	USB Data1 -
5	USB Data0 +	6	USB Data1 +
7	GND	8	GND
9	NC	10	GND



## Network Port

Onboard one 10/100Mbps Ethernet port (LAN1), the following table lists the pin definitions:



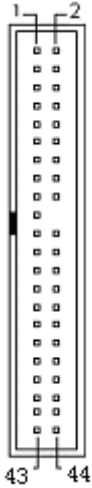
Signal Name	Pin	Pin	Signal Name
TXD-	1	2	RXD-
TXD+	3	4	LAN_CON2
LAN_CON1	5	6	RXD+
LAN_CON1	7	8	LAN_CON2
LAN_LED0	9	10	3.3V
LAN_LED1	11	12	3.3V

LAN\_LED0 is Link/Act LED; LAN\_LED1 is Speed LED. Please refer to the LED status descriptions as below:

Link/Act LED	Indicating status	Speed LED	Indicating status
On	Linked	On	100BT
Off	Unlinked	Off	10BT
Flash	Transmitting data		

## IDE Port

This is a 44-pin/2mm hard disk port. Connect one end to the board then connect the other end to the hard disk. Please setup master and slave jumper wire if you want to install two hard disks, please consult the setup of hard disk on master/slave jumper wire setup. Pin definitions as below:



IDE1

Pin	Signal Name	Pin	Signal Name
1	Reset	2	Ground
3	Host computer data 7	4	Host computer data 8
5	Host computer data 6	6	Host computer data 9
7	Host computer data 5	8	Host computer data 10
9	Host computer data 4	10	Host computer data 11
11	Host computer data 3	12	Host computer data 12
13	Host computer data 2	14	Host computer data 13
15	Host computer data 1	16	Host computer data 14
17	Host computer data 0	18	Host computer data 15
19	Ground	20	N.A.
21	DMARQ	22	Ground
23	Host IOW	24	Ground
25	Host IOR	26	Ground
27	IORDY	28	Ground
29	DMACK	30	Ground
31	IRQ	32	N.A.
33	Address 1	34	CBLID
35	Address 0	36	Address 2
37	Chip selection 0	38	Chip selection 1
39	Active	40	Ground
41	+5V	42	+5V
43	Ground	44	Ground

## CF Card

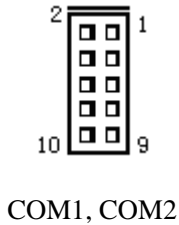
Compact Flash card is a kind of short-access storage with small size and easy to use, the storage can be changed upon the card, such as 256M and 1G. CF card can be inserted in only one direction. The following table gives the definition of all pins of CF card port:

Pin	Signal Name	Pin	Signal Name
1	GND	26	NC
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	NC
9	GND	34	IORD
10	GND	35	IOWR
11	GND	36	+3.3V
12	GND	37	INTRQ
13	+3.3V	38	+3.3V
14	GND	39	GND
15	GND	40	NC
16	GND	41	RESET
17	GND	42	IORDY
18	A2	43	DMARQ
19	A1	44	DMACK
20	A0	45	NC
21	D0	46	CBLID
22	D1	47	D8
23	D2	48	D9
24	NC	49	D10
25	NC	50	GND

## Serial Port

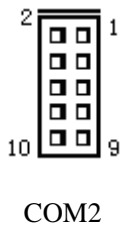
Provides two COM ports: COM1, COM2; both of them are standard 2 x 5-pin socket. COM1 supports RS-232. COM2 supports RS-232 and RS-485; the function can be selected through JP2.

The pin definition of COM1 and COM2 are as below:



Pin	Signal Name
1	DCD, data carrier detection
2	RXD, receive data
3	TXD, transmit data
4	DTR, data terminal ready
5	GND, ground
6	DSR, data set ready
7	RTS, request to send
8	CTS, clear to send
9	RI, ring indicator
10	NC not connected

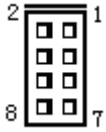
The functions of COM2 can be selected via JP2 (please refer to the jumper settings for the JP2 selection), the pin definitions of COM2 are as below:



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

## Keyboard and Mouse Interface

KM1 is a 8-pin port shared by keyboard and mouse, it needs transfer cable to connect with standard PS/2 keyboard and mouse.



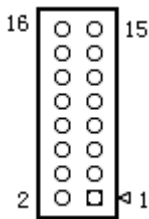
KM1

Signal Name	Pin	Pin	Signal Name
Keyboard data	1	2	Mouse data
Keyboard clock	3	4	Mouse clock
Ground	5	6	Ground
+5V	7	8	+5V

## Display Interface

### (1) VGA display output interface

This is a 2 x 8 pin VGA display socket, which can connect all kinds of monitors that have a standard VGA interface.



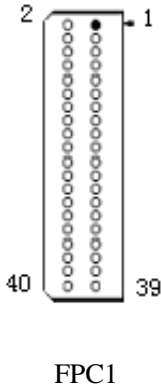
VGA1

Pin	Signal Name	Pin	Signal Name
1	Red	2	Ground
3	NC	4	Green
5	Ground	6	NC
7	Blue	8	Ground
9	HSYNC	10	NC
11	+5V	12	VSYNC
13	Ground	14	Ground
15	NC	16	NC



## (2) LCD interface

The socket is for the connection with LCD.



Pin	Signal Name	Pin	Signal Name
1	+5V/3.3V	2	+5V/3.3V
3	GND	4	ENVEE
5	GND	6	GND
7	PD1	8	PD0
9	PD3	10	PD2
11	PD5	12	PD4
13	PD7	14	PD6
15	PD9	16	PD8
17	PD11	18	PD10
19	PD13	20	PD12
21	PD15	22	PD14
23	PD17	24	PD16
25	PD19	26	PD18
27	PD21	28	PD20
29	PD23	30	PD22
31	GND	32	GND
33	FLM	34	SHFCLK
35	LP	36	DE
37	GND	38	ENVDD
39	GND	40	VCON

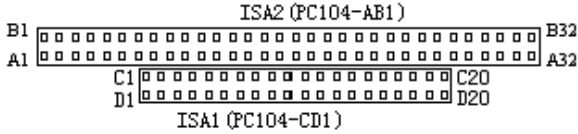
## Power Supply Interface

The interface is for the power supply of motherboard, it is standard floppy drive power supply interface. The port has foolproof design, which can prevent the wrong connection. Users should pay attention to the direction of the socket and gently insert the plug.



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

## PC104 Interface



ISA2				ISA1			
Pin	Signal Name	Pin	Signal Name	Pin	Signal	Pin	Signal
A1	IOCHCK	B1	GND	C1	GND	D1	GND
A2	D7	B2	RESET	C2	SBHE	D2	MEMCS16
A3	D6	B3	+5V	C3	LA23	D3	IOCS16
A4	D5	B4	IRQ9	C4	LA22	D4	IRQ10
A5	D4	B5	NC	C5	LA21	D5	IRQ11
A6	D3	B6	DRQ2	C6	LA20	D6	IRQ12
A7	D2	B7	NC	C7	LA19	D7	IRQ15
A8	D1	B8	NOWS	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
A15	A16	B15	DACK3	C15	D11	D15	DACK7
A16	A15	B16	DRQ3	C16	D12	D16	DRQ7
A17	A14	B17	DACK1	C17	D13	D17	+5V
A18	A13	B18	DRQ1	C18	D14	D18	MASTER
A19	A12	B19	REFRESH	C19	D15	D19	GND
A20	A11	B20	CLK	C20	GND	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	+5V				
A30	A1	B30	OSC				
A31	A0	B31	GND				
A32	GND	B32	GND				

ISA2 and ISA1 are double row pin plugs; they support PC-104 modules. ISA2 is 64-pin, ISA1 is 40-pin. The above table defines the pin of ISA2 and ISA1.

Status Indicator Port

CN11, FP2 are routed to the function button or LED on the front panel of chassis.

1

2

5

6

CN1

Signal Name	Pin	Pin	Signal Name
NC	1	2	NC
GND	3	4	RESET
IDE LED -	5	6	IDE LED +

1

2

3

FP2

Pin	Signal Name
1	Power LED +
2	NC
3	GND

## Chapter 3 BIOS Introduction

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### Introduction

BIOS (Basic Input and Output System) resides in a flash memory chip. Its main functions include: initialize system hardware, set up the operating status of each part of the system, adjust the operating parameters of each part of the system, diagnose the functions of each part of the system and report error, provide hardware operating control port for upper software system, leading operating system and so on. BIOS provides you with a human-machine interface menu to set system parameters, control power management mode, adjust the resources distribution of system devices.

Correct BIOS settings make system more stable and reliable and also improve the comprehensive performance of the system. Inappropriate and wrong BIOS settings reduce the performance of system, make system unstable and even can't work normally.

The chapter is about BIOS setup. The 104-1481CLDN uses the latest AMI BIOS which had maximally optimized each performance of the system.

### BIOS Parameters Setup

Power on the system and boot up computer, then you can see the BIOS setup notification. At this time (invalid at other time), press the indicated key (usually <Del> key) to enter BIOS setup program.

If the BIOS settings in CMOS are damaged, system will demand to enter BIOS to set up or select all default settings.

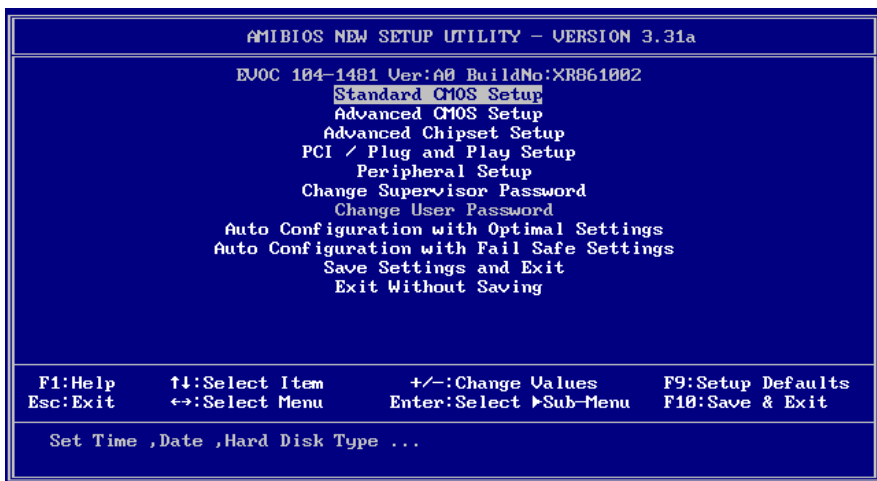
All the modified BIOS settings are saved in CMOS. The CMOS is powered by backup battery. So, the content in CMOS will not lost even when the power supply is cut off, unless performing clear CMOS operation.

**Note:** BIOS settings directly affect computer performance. Wrong settings may damage computer or even prevent boot up. Please restore default BIOS settings to recover system.

EVOC Company continues to develop and update BIOS program, so the following pictures are for your references only, they might be different from your current BIOS setting program.

## BIOS Basic Settings

When Setup program starts, you can see the main image of CMOS Setup Utility, shown as below:



The control keys of menu are displayed under the main menu item. The information of highlighted item is displayed at the bottom of the menu, under control keys.

**Note:** If the system can not work normally after you have saved the changing settings, you can clear CMOS and then restart the computer to enter BIOS setup and select the *Auto Configuration with Optimal Settings* or *Auto Configuration with Fail Safe Settings* to enable the default setting of BIOS.

*Do not change the default values of the chipset unless you are very familiar with it.*

### 3.1 Standard CMOS Setup

Standard CMOS Setup		[ Setup Help ]
System Time	21:00:25	Time is 24 hour format
System Date	Jul 18 2006 Tue	Hour: 00 - 23
▶ Floppy options		Minute: 00 - 59
▶ IDE Device Config		Second: 00 - 59
▶ System Information		(1:30AM = 01:30:00, 1:30PM = 13:30:00)
F1:Help    ↑↓:Select Item    +/-:Change Values    F9:Setup Defaults Esc:Previous Menu    Enter:Select ▶Sub-Menu    F10:Save & Exit		

The controlling keys are at the bottom of the menu. Press<F1> to get the corresponding help information if you need any help.

**System Time**

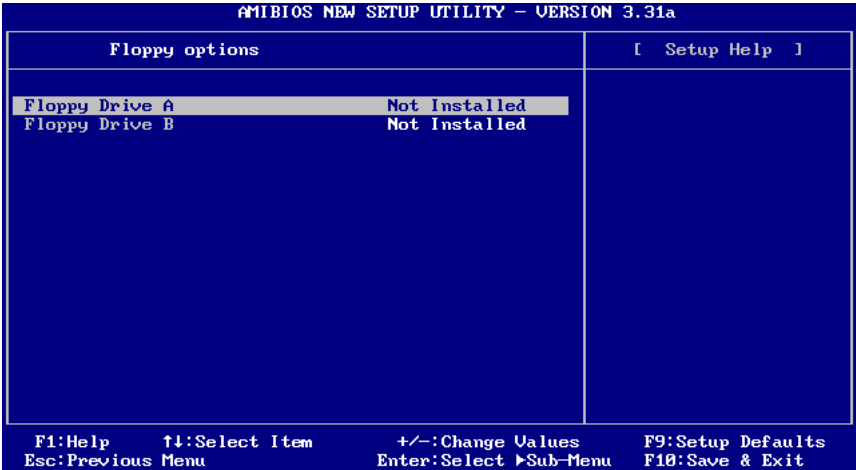
Select this option, use <Page Up>/<Page Down> or <+>/<->to set the current time. Time display form: hour/minute/second. The acceptable range of each item: hours of the day (00-23), minutes of the hour (00-59), seconds of the minute (00-59).

**System Date**

Select this option, use <Page Up>/<Page Down> or <+>/<->to set the current date. Time display form: month/day/year. The acceptable range of each item: day of month (1~31), month of year (1~12), year (expanded to 2099).

**Floppy options**

Floppy driver connector option can connect up to two devices.



**IDE Device config.**

IDE device (hard disk) configuration:

AMIBIOS NEW SETUP UTILITY – VERSION 3.31a		
IDE Device Config		[ Setup Help ]
▶ Primary IDE Master	Not Installed	Primary IDE Master Configuration
▶ Primary IDE Slave	Not Installed	
▶ Secondary IDE Master	Not Installed	
▶ Secondary IDE Slave	Not Installed	
F1:Help    ↑↓:Select Item    +/-:Change Values    F9:Setup Defaults		F10:Save & Exit
Esc:Previous Menu    Enter:Select ▶Sub-Menu		

AMIBIOS NEW SETUP UTILITY - VERSION 3.31a		
Primary IDE Master		[ Setup Help ]
Type	Not Installed	1-50: Predefined types USER: Set Parameters by User AUTO: Set parameters automatically CD-ROM: Use for ATAPI CD-ROM drives  Or Double click [AUTO] to set all HDD parameters automatically
Cylinders		
Heads		
Write Precompensation		
Sectors		
Maximum Capacity		
LBA Mode	Off	
Block Mode	Off	
Fast Programmed I/O Modes	Auto	
32 Bit Transfer Mode	Off	
F1:Help    ↑↓:Select Item    +/-:Change Values    F9:Setup Defaults		F10:Save & Exit
Esc:Previous Menu    Enter:Select    ▶Sub-Menu		

## 1. Type

1~50: each IDE parameter of system predefined;

USER: users customize the parameters of IDE hard disk;

AUTO: system bootstrap IDE parameter auto-detection;

CD/DVD: used for ATAPI CDROM;



ARMD: used for all kinds of simulating IDE devices;

## 2. **Cylinders**

Hard disk cylinder parameter, setable range:0~65535.

## 3. **Heads**

Hard disk head parameter, setable range:0~255.

## 4. **Write Precompensation**

Used for the settings of write precompensation cylinder parameter.

## 5. **Sectors**

Hard disk sectors parameter, setable range: 0~255.

## 6. **Maximum Capacity**

The parameter indicates the max capacity of hard disk.

## 7. **LBA MODE**

When the option is set “ON” it supports hard disk larger than 512MB, when it is set “OFF” it fits for the operating system of NetWare, UINIX, and so on.

## 8. **BLOCK MODE**

It can improve the speed of reading/writing data from hard disk when set to “ON”

## 9. **Fast Programmed I/O MODE**

Settings of this parameter under PIO mode can optimize the sequential logic of hard disk.

## 10. 32-bit Transfer MODE

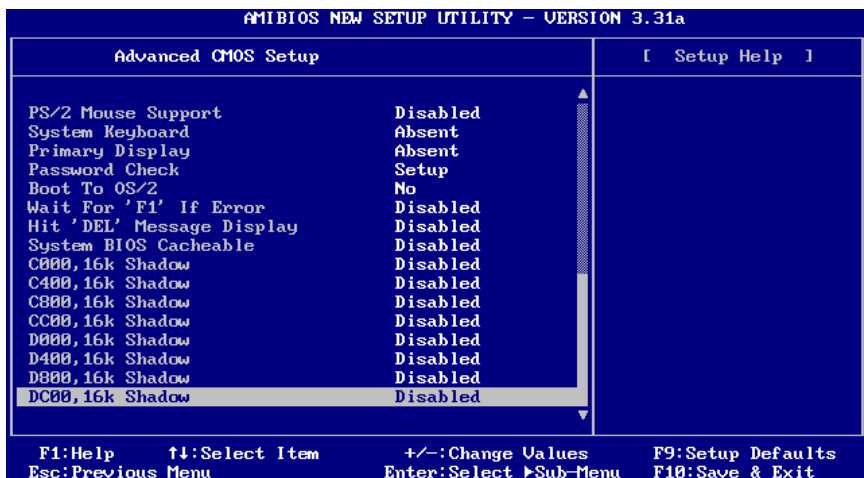
The option can enable the visiting mode of 32-bit hard disk, to optimize the transmit speed of hard disk to the best performance.

### System Information

This option indicates the information of BIOS creating time, processor type and speed, the system memory, and so on.

AMIBIOS NEW SETUP UTILITY – VERSION 3.31a		[ Setup Help ]
System Information		
BIOS Version	01/15/07	
Processor Type	Generic-X86	
Processor Speed	65535MHz	
Base Memory	0KB	
Extended Memory	0MB	
Total Memory	32MB	
Memory Bank 0	Standard	
Memory Bank 1	Standard	
Memory Bank 2	Standard	
F1:Help    ↑↓:Select Item    +/=:Change Values    F9:Setup Defaults Esc:Previous Menu    Enter:Select    ▶Sub-Menu    F10:Save & Exit		

## 3.2 Advanced CMOS Setup



### Quick Boot

This function can accelerate the POST time by jumping over the second and third test of memory. POST is a full test every time.

### Boot Device Priority

The option is to set the priority of the launch equipments.

### **Try Other Boot Devices**

When the boot devices set in the *Boot Device Priority* fail to start, you can set this option to let the system try to start from other boot devices.

### **Initial Display Mode**

The option decides the showing of BIOS information or BIOS OEM LOGO when setting the boot.

### **Display Mode at Add-on ROM Init**

The option is for setting of the display mode of the option ROM.

### **Floppy Access Control**

The option is for the settings of hard disk visiting purview, there are two options: Read-Write & Read-Only.

### **Hard Disk Access Control**

The option is for the settings of hard disk visiting purview, there are two options: Read-Write & Read-Only.

### **BootUp Num-lock**

The option is for the setting of the number pad status when the computer boots up. When set to ON, the number pad is in number-input status when the system boots up, when set to OFF, the number pad is in arrowhead status when system boots up.

### **Floppy Drive Seek**

When set to Enable, BIOS will seek the floppy disk and check the floppy disk as 40 tpi or 80 tpi.

### **PS/2 Mouse Support**

The option can enable or disable the PS/2 mouse port.

### **System Keyboard**

This option is used to decide weather BIOS detect the keyboard or not, even if it is set to Absent, the keyboard still can be used in OS, but BIOS will not detect it.

### **Primary Display**

The option is used to set the display mode when setting the system, the optional values are: Absent, VGA/EGA, CGA 40x 25 and CGA80x 25, Mono. If you are using VGA display or more advanced display, please select VGA/EGA.

When set to Absent, BIOS will not detect VGA devices, if there is no VGA or VGA devices is damaged, BIOS will run normally without reporting error.

Absent                      display non existence or not connect;

VGA/EGA                      EGA, VGA, SEGA, SVGA or PGA display  
adapters

CGA 40 x 25              Power-up in 40-line mode

CGA 80 x 25              Power-up in 80 line mode

### **Password Check**

It is used to decide inputting user's password or administrator's password when system boots up.

### **Boot to OS/2**

Boot the system to OS/2.

### **Wait For 'F1' If Error**

The option is to decide weather it has to press "F1" to continue starting the computer when there are errors, it is default as "Enabled"

### **Hit "DEL" Message Display**

The option is to decide whether it will show the hints that press Del to enter BIOS setup.

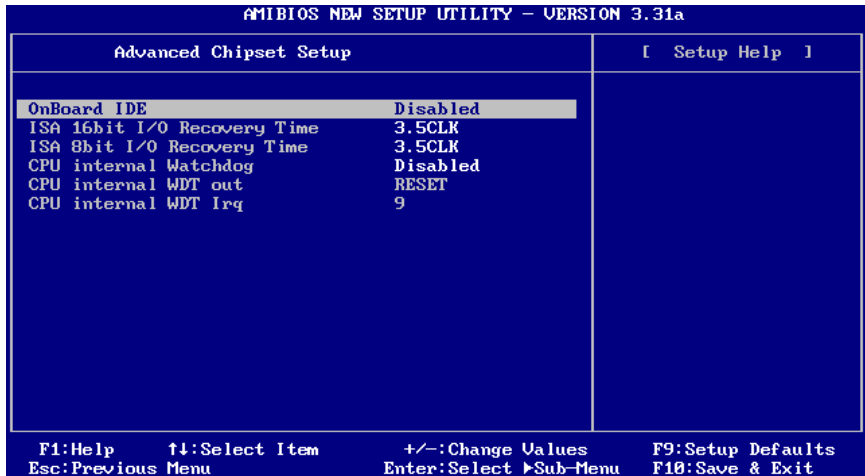
### System BIOS Cacheable

Its default setting is “enable”, when it is turned on, it will improve BIOS operating speed and the performance of the system

### C000-DC00 Shadow

These memory areas are setting to Disable when they are used to be the ROM mapping area of other expansion cards. If set to Enabled, BIOS will search for device on the address in the system bus, if found, content of the device will be copied to corresponding memory, then CPU will visit the memory at the address instead of the device on bus.

## 3.3 Advanced Chipset Setup



## Onboard IDE

This option is used to control if the onboard IDE interface is useable or not, the four options are: Both, Disable, Primary, Secondary.

## ISA 16bit I/O Recovery Time

The option is used to set the recovery time of ISA bus 16 bit I/O.

## ISA 8bit I/O Recovery Time

The option is used to set the recovery time of ISA bus 8 bit I/O.

## CPU internal Watchdog

The option is used to enable or disable the CPU internal watchdog.

## CPU internal WDT out

Action of CPU internal WDT out. There are two options: Reset and IRQ, they are used to reset CPU or bring interrupt when WDT overflow.

## CPU internal WDT IRQ

Set the interrupt number of CPU internal WDT.

## 3.4 PCI/Plug and Play Setup

AMIBIOS NEW SETUP UTILITY - VERSION 3.31a	
PCI / Plug and Play Setup	[ Setup Help ]
Plug and Play Aware O/S	No
IRQ3	PCI/PnP
IRQ4	PCI/PnP
IRQ5	PCI/PnP
IRQ7	PCI/PnP
IRQ9	PCI/PnP
IRQ10	PCI/PnP
IRQ11	PCI/PnP
IRQ15	PCI/PnP

F1:Help	↑↓:Select Item	+/-:Change Values	F9:Setup Defaults
Esc:Previous Menu		Enter:Select ▶Sub-Menu	F10:Save & Exit

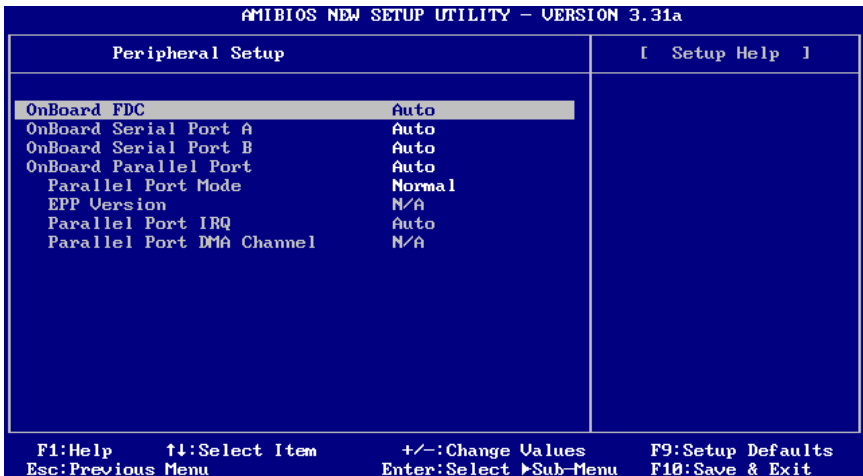
## Plug and Play Aware O/S

The option allows you to select whether your system is PNP operating system. When set to NO, BIOS will take all the PNP tasks. This value is recommended.

## IRQ 3~15

The option is used to decide the IRQ interrupt is PNP mode or reserved for ISA.

## 3.5 Peripheral Setup



### Onboard FDC

If there are FDC onboard, and you want to enable it, please select Enable or Auto.

### Onboard Serial Port A

The option is used to configure the first serial port type onboard, and distribute the corresponding interrupt and I/O address. There are: Auto



(BIOS auto configuration), Disabled; 3F8/COM1, 2F8/COM2, 3E8/COM3, 2E8/COM4.

### **Onboard Serial Port B**

The option is used to configure the second serial port type onboard, and distribute the corresponding interrupt and I/O address. There are: Auto (BIOS auto configuration), Disabled; 3F8/COM1, 2F8/COM2, 3E8/COM3, 2E8/COM4.

### **Onboard Parallel Port**

This option is used to configure the interrupt request and I/O address range of the parallel port. If set to AUTO, it will be controlled automatically by BIOS.

### **Parallel Port Mode**

This option is used to appoint the working mode of parallel port: Normal, Bi-Dir, EPP, ECP. Normal means the normal speed of unidirectional data transmission; Bi-Dir means Bidirectional data transmission; EPP means the highest speed in Bi-Dir mode; and ECP means even higher speed than EPP in Bi-Dir mode.

### **EPP Version**

This option can use the EPP (enhanced parallel port) version.

### **Parallel Port IRQ**

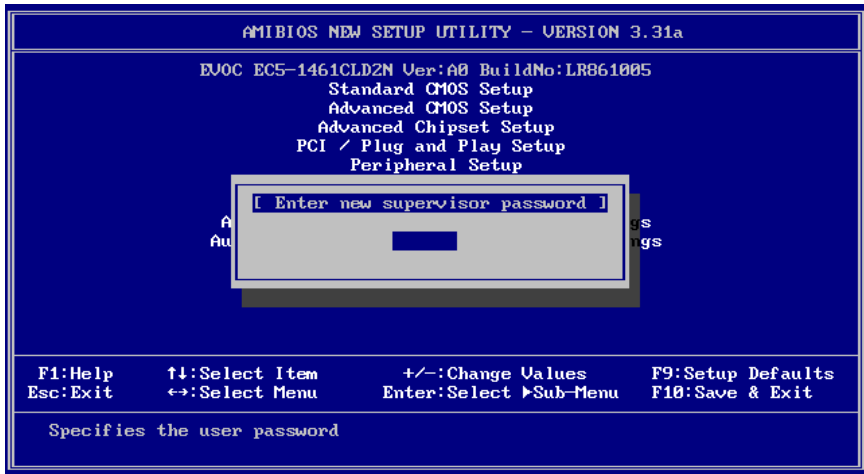
The option is for selecting the interrupt of parallel port.

### **Parallel Port DMA Channel**

The option is for selecting the DMA channel of parallel port.

### 3.6 Change User&Supervisor Password

Press Change User/Supervisor Password then input a new password into dialog box; it will show that user's password has been set.



### 3.7 Auto Configuration with Optimal Settings

The menu helps you to input default value to the system configuration. These default settings are optimized and can help all the hardware with their high performances.

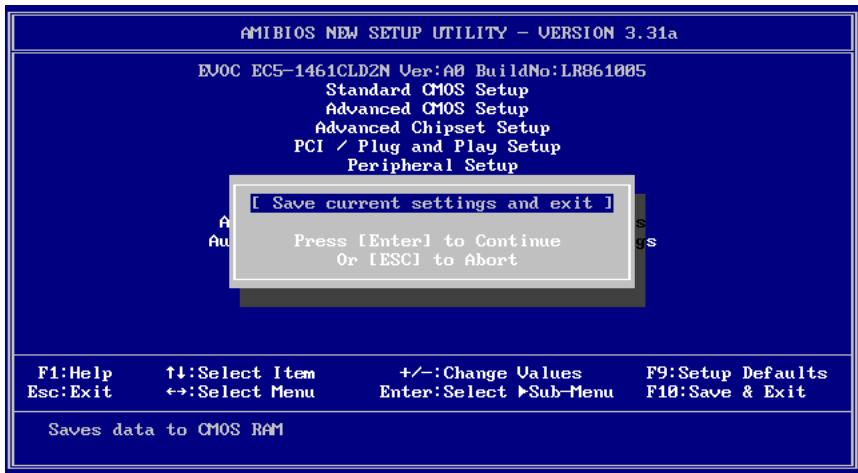


### 3.8 Auto Configuration with Fail Safe Settings



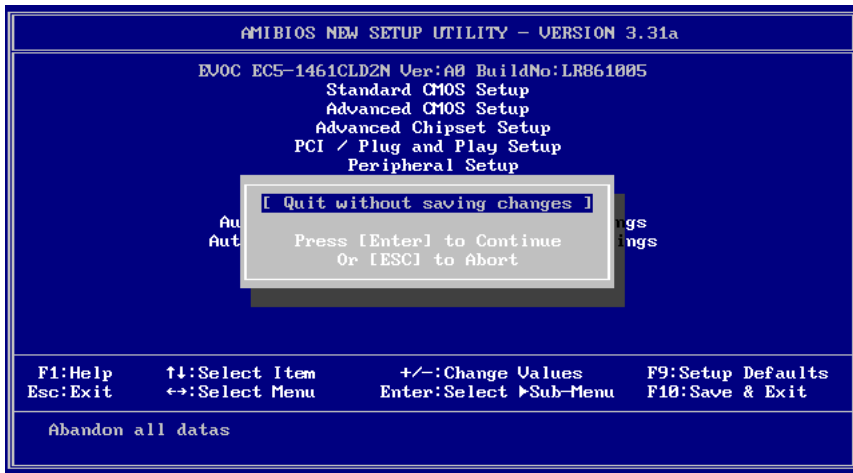
The option allows you to initialize all the settings to enable the basic and safest value of system function. To enable this function, select this option and press<Enter>, then the system will ask you to insure your information, press <Enter> to insure and enable the function.

### 3.9 Save Settings and Exit



This function allows you to recover the former setting parameters after you have finish all the changes, new setting parameters will be saved in the memory of CMOS. To enable this operation, press<Enter> to select this option then press <Enter> again.

### 3.10 Exit Without Saving



This option allows you to exit without saving all the changing settings into memory of CMOS, press <Enter> to select this option and then press <Enter> again.

## Appendix

---

### Driver Installation

#### Driver Installation of USB

The installation steps under DOS are as below:

- (1) Start the computer, enter DOS environment → find the three files in the drive disk: USBASPI.SYS, USBCD.SYS, NJ32DISK.SYS; and then copy this three files to the submenu of C disk (C:\);
- (2) Modify CONFIG.SYS file, and add the following contents in the file:  
DEVICE=HIMEM.SYS  
DOS=HIGH,UMB  
LASTDRIVE=Z  
DEVICEHIGH=USBASPI.SYS /v /o  
DEVICEHIGH =NJ32DISK.SYS  
DEVICEHIGH =USBBCD.SYS /d:USBBCD001
- (3) Modify the AUTOEXEC.BAT file, and add the following contents in the file:  
LH MSCDEX /d:USBBCD001 /l:d
- (4) After modifying, you need to restart your computer to enable the new driver.

NOTE: (1) Users should insert the USB device into the USB port before starting the computer, or the system can not find USB device.

(2) The disk volume of USB devices should be after hard disk volumes.

(3) Thereinto: DEVICEHIGH =USBCD.SYS /d:USBCD001  
LH MSCDEX /d:USBCD001 /l:d

These two lines is the support for USB optical drive. If there is no USB optical drive, these to lines of codes can be omitted. If the MSCDEX is not in the submenu of Disk C, please appoint the right path for it.

## Network Driver Installation

There is network diver R6040PD.COM in DOS mode in the diver disk, which is network card in DOS mode Packet Diver. Please consult its online help for its guide.

### (1) The user guide of R6040PD.COM

>R6040PD [options] <packet\_int\_no>

Examples:

R6040PD -slot=1 -m=00:90:00:2a:00:01 0x66

-slot=1 : Select the network port LAN1

-m: set MAC address as 00:90:00:2a:00:01;

0x66: use interrupt 0x66;

<packet\_int\_no> is the interrupt number for Packet Driver, the interrupt number will be used as the entrance of Packet Driver. The available interrupt range is: 0x60→0x66, 0x68→0x6f and 0x78→0x7e.

NOTICE: -slot=1: installing the drivers of LAN1;

### ② The uninstall of R6040PD.COM

Please use -u and appoint the slot number and interrupt number when uninstalling this packet driver, examples as below:

Installing LAN1 network driver



```
>r6040pd -slot=1 -m=00:90:00:2a:00:01 0x60
```

★ Uninstalling LAN1 network driver

```
>r6040pd -slot=1 -u 0x60
```

(2) The installing steps of Packet Driver under IPX protocol (Novell):

① Install LSL.COM after the DOS prompt

```
>LSL
```

② Install Packet Driver after DOS prompt

```
>R6040PD <packet_int_no>
```

③ Run PDIPX.COM after DOS prompt

```
>PDIPX
```

④ Call VLM

PDIPX.COM is the IPX drive developed by Intel; it can communicate with the Packet Driver of network card and use IPX protocol on Packet Driver.

(3) The installing steps of Packet Driver under TCP/IP protocol:

A. The installing steps under DOS:

① Install Packet Driver after DOS prompt

```
>R6040PD <packet_int_no>
```

② Then you can run DOS program of TCP/IP protocol.

B. the installing steps under Window 3.x enhanced mode:

① Install Packet Driver after DOS prompt

```
>R6040PD <packet_int_no>
```

② Run WINPKT.COM after DOS prompt

```
>WINPKT <packet_int_no>
```

the interrupt number <packet\_int\_no> in step② must be the same with the interrupt number <packet\_int\_no> in the step①.

③ Enter Windows and run Winsock program, the interrupt number of Winsock <packet\_int\_no> should be same with the interrupt number <packet\_int\_no> in the step①.

④ Then you can run Windows programs of TCP/IP protocol.

The WINPKT.COM provides the connector between application programs Packet Driver of network card in Windows 3.x enhanced mode. Then you can run related Windows programs on Packet Drive.

## Watchdog Programming Guide

### (1) Super I/O Watchdog

The super I/O chip offers one programmable watchdog timer software which can be set by minutes or seconds and up to 255-level (short in SIOWDT). Through programming, SIOWDT timeout event can reset system or bring maskable interrupt.

Below it describes WDT program in C language. You must notice that before operating SIOWDT, you should first enter SIOWDT programming mode; after finishing SIOWDT operation, exit SIOWDT.

Please follow the below instructions when you program SIOWDT:

- » Enter SIOWDT Programming Mode
- » Set the SIOWDT working mode/startup SIOWDT/shutdown SIOWDT
- » Exit SIOWDT Programming Mode

Please consult the following example code for the SIOWDT programming

```
#define INDEXP    0x2e
#define DATAP      0x2f

//Super I/O Watchdog
#define STARTPROG { outportb(INDEXP,0x87);
                  outportb(INDEXP,0x87);}
#define ENDPROG outportb(INDEXP,0xaa);
#define SELEDEV(x) { outportb(INDEXP,7);
outportb(DATAP,x);}
```

```
#define WRITEREG(reg,val) {outportb(INDEXP,reg);
```

---

```
outportb(DATAP,val);}
```

```
//1.Initial Watchdog device
```

```
short SLOWTD_Setup(short irq)
```

```
/*irq=3,4,5,6,7,9,10,11,12,13,15,0:disable interrupt, 0xff:reset*/
```

```
{
```

```
unsigned char oldval;
```

```
//start programming Watchdog
```

```
STARTPROG
```

```
//Active Watchdog Device
```

```
SELEDEV(8) //logical device 8
```

```
WRITEREG(0x30,0x01)
```

```
outportb(INDEXP,0x2b);
```

```
unsigned char oldval=inportb(DATAP);
```

```
if(irq==0xff) //WatchDog cause System Reset
```

```
{
```

```
oldval &= 0xef; //BIT4=0
```

```
WRITEREG(0x2b, oldval);
```

```
}
```

```
else //Watchdog cause System Interrupt
```

```
{
```

```
oldval |= 0x10; //BIT4=1
```

```
WRITEREG(0x2b,oldval)
```

---

```

WRITEREG(0xf7,irq)
}
//end programming watchdog

ENDPROG

return 0;
}

//2.start Watchdog to count

short SLOWTD_Enable(short time,short unit)
/*unit=0:second, =1:minutes */
{
if(time<1 || time>255) return -1;
if(unit<0 || unit>1) return -1;
//start programming watchdog

STARTPROG

SELEDEV(8) //logical device 8
//select Watchdog Timer clock

switch(unit)
{
case 0:
WRITEREG(0xf5,0x00) //BIT3=0,secondes
break;
case 1:
WRITEREG(0xf5,0x08) //BIT3=1,minutes
break;
}

```

```
WRITEREG(0xF6,time) //set timeout value
```

```
//end programming watchdog
```

```
ENDPROG
```

```
return 0;
```

```
}
```

## (2) CPU Watchdog

CPU chip internal offers an 8-level programmable watchdog timer (short in CPUWDT).Through programming, CPUWDT timeout event can reset system or bring maskable interrupt. The 8-level are 81.92us, 83.9ms, 167.8ms, 335.5ms, 671.1ms, 1.34s, 2.68s and 5.37s.

CPUWDT functions are set in BIOS please consult the *Chapter3 3.3 Advanced Chipset Setup* for the detail.

Below it describes CPUWDT program in x86 assembly language. Please consult the following example code for the CPUWDT programming

```
//select CPUWDT controller register
```

```
mov eax, 80003844h
```

```
mov dx, 0cf8h
```

```
out dx, eax
```

```
//setup WDT time-out time and startup WDT to time
```

```
mov dx,0cfch
```

```
in eax,dx
```

---

```

or    eax,00800000h    ; bit23=1: startup Watchdog
                                ; if bit23=0, enable watchdog

and   eax,ffffff00h

or    eax,00000001h    ; bit[7:0]=01h,timing time: 81.92us
                                ; if bit[7:0]=02h, timing time: 83.9ms
                                ; if bit[7:0]=04h, timing time: 167.8ms
                                ; if bit[7:0]=08h, timing time: 335.5ms
                                ; if bit[7:0]=10h, timing time: 671.1ms
                                ; if bit[7:0]=20h, timing time: 1.34s
                                ; if bit[7:0]=40h, timing time: 2.68s
                                ; if bit[7:0]=80h, timing time: 5.37s

out   dx,eax            ; input the setting values into register, the Watchdog
will start to work

```

## Available I/O and Memory Space of PC104-bus Devices

Some of the I/O addressed have been occupied by system board, ranges of PC104 expansion bus available I/O port address are: 0x200-0x27F, 0x300-0x340, 0x280-0x2C0.

PC104 expansion bus usable memory spaces are as below:

C8000 – CFFFF : 32KB;

D0000 – DFFFF : 64KB;

E0000 – E7FFF : 32KB;

NOTE: Some of the software might occupy the above memory spaces, such as: EMM386.exe, etc.

---

PC104 expansion bus do not support DMA visiting mode.



## Read-write Methods of Onboard FLASH (8M)

Onboard integrates 8M Flash Memory.

- (1) There are two steps for the reading and writing of FLASH:  
 firstly mapping the base address of 8M Flash, input the base address into the base-address mapping register of CS1;  
 secondly operating the selected addresses. NOTE: the read-write of Flash is 16-bit data operation.

Steps as below: 1

Assume: the required read-write address is 0xd300;

Flash Men Base at 0xd0000;

- ① Mapping the base address of FLASH

```
mov eax,80003890h
```

```
mov dx,0cf8h
```

```
out dx,eax
```

```
mov eax,d000000h ;; A[31:8] = d0000
```

```
or eax,00000007h
```

```
mov dx,0cfch
```

```
out dx,eax
```

- ② Then you can read the address, 0xd300h has been mapping to 0xdd300 (=0xd0000h +0xd300h).

```
mov ax, 0d000h    ;;point to cs1 base address
```

```
mov ds, ax        ;;DS point to D000 segment
```

```
mov bx, 0d300h  
mov ax, ds:[bx]    ;;read word from 0xdd3000
```

- (2) It can be customized upon user's requirements, divide the 8M FLASH into 128 64K pages; when operating, firstly write the page number (means the high 7-bit value) into the corresponding GPIO port of GPIO13-GPIO7, and then set the high 7-bit address of Flash; finally you can operate the 64K page in the mapping spaces of FLASH. NOTE: The read-write in 64K page is 16-bit.

There are two steps for the read-write of FLASH: firstly input the high 8-bit [22:16] of read-write address into GPIO [13:7]; secondly operate the appointed location of the low 16-bit of read-write address in 64K.

Steps as below:

Assume: the required read-write address is 0x09d300;

Flash Mem Base Address at 0xd0000;

- ① Enable GPIO [13:7]  

```
mov eax,80003848h  
mov dx,0cf8h  
out dx,eax  
  
mov dx,0cfch  
in  eax,dx  
or  eax,00003f80 ;;GPIO[13:7]—bit[13:7]  
out dx,eax
```

- ② Set the page number of 64K via writing GPIO [13:7]

```
mov eax,8000384ch
mov dx,0cf8h
out dx,eax

mov dx,0cfch
in  eax,dx
and eax,ffffc07f    ;;GPIO[13:7] reset
or  eax,00000480    ;;GPIO[13:7]=09
out dx,eax
```

- ③ Mapping the base address of FLASH

```
mov eax,80003890h
mov dx,0cf8h
out dx,eax
```

```
mov eax,d0000h
or  eax,0000007h
mov dx,0cfch
out dx,eax
```

- ④ Then you can read the address, 0x09d300h has been mapping to 0xdd300 (=0xd0000h +0xd300h). The high 7-bit address (page number 0x09h) was already setup in step②, so you just need to set low 16-bit address.

```
mov ax, 0d000h    ;;point to cs1 base address
mov dx, ax         ;;DS point to D000 segment
mov bx, 0d300h
mov ax, ds:[bx]    ;;read word from 0xdd3000
```

## **Operating Guide of BIOS Online Refresh Tool Software**

There is software of BIOS on-line refresh in DOS environment in the Driver disk: flash.exe.

The operating method of Flash.exe as below:

- (1) Save the original BIOS.

Input the following word after the DOS prompt:

```
>flash.exe /Sxxxx.xx
```

Then you can backup the onboard BIOS into the file of xxxx.xx, xxxx.xx is the name of the file.

Note: no space between /S and xxxx.xx.

(2) Refresh BIOS.

Input the following word after the DOS prompt:

```
>flash.exe xxxx.rom
```

Then you can input the new BIOS file xxxx.rom into BIOS onboard, xxxx.xx is the new name of the file.

## I/O Port Address Mapping

System distributes every peripheral a set of I/O address as the ID of every peripheral. There is 1K address space in total. The bellowing table list out the industrial CPU card I/O address. There is 1K address space in total. The bellowing table list out the industrial CPU card I/O address.

Address	Device Description
000h - 00Fh	DMA Controller# 2
020h - 021h	Programmable Interrupt Controller#1
040h - 043h	System Timer
061h	NMI
060h,062h-064h	Standard 101/102 Keyboard Controller
070h - 071h	Real-time clock, CMOS Memory
080h - 09Fh	DMA Page Register
092h	System Control Register
0A0h - 0A1h	Programmable Interrupt Controller#2
0C0h - 0DFh	DMA Controller# 1
170h - 177h	Slave IDE
1F0h - 1F7h	Master IDE
2F8h - 2FFh	Serial Port #2(COM2)
378h - 37Fh	Parallel Port #1 (LPT1)
3B0h - 3DFh	Display Interface
3F0h - 3F5h	Standard Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)
0CF8h	PCI Configuration Address Register Port
0CFCh	PCI Configuration Data Read/Write Port

## Interrupt Request Line (IRQ)

There are 15 available IRQ lines onboard. Peripherals can apply for required services to CPU via interrupt request line. The following table lists out all the IRQ used by the devices on industrial motherboard.

Level	Function
IRQ 0	System timer
IRQ 1	Standard 101/102-key or Microsoft Keyboard
IRQ 2	Programmable Interrupt Controller
IRQ 3	Serial Port#2
IRQ 4	Serial Port#1
IRQ 5	Reservation
IRQ 6	Floppy Controller
IRQ 7	Parallel Port#1
IRQ 8	System CMOS/Real-time clock
IRQ 9	Reservation
IRQ 10	Reservation
IRQ 11	Reservation
IRQ 12	Reservation
IRQ 13	Reservation
IRQ 14	Reservation
IRQ 15	Reservation

Besides, the motherboard integrates PCI devices such as: two USB and two LAN. The interrupt of PCI devices are dynamic distribute by system according to situation, system will list out the practice distributed interrupt number of the above devices every time when it is power-up.

Part of the interruption can be force to reserve by BIOS for ISA/PC104 bus devices, instead of being distributed for the PCI devices, please consult the *PCI/PnP part* of the *BIOS Setup* for the detail.

