IPC110 series

Atom Fanless CPU boards

Hardware installation guide

V1.0.03

Hardware Version: V1.2

Declaration Of Conformity

We herewith certify that product

IPC110B IPC110C

Conforms with the

EC-directive 2004/108/EC(EMC)

To assess the product's compliance the following standards were applied:

EN61000-6-3(2007) for residential environments (generic device emissions)-Class A

EN61000-6-2(2005) for industrial environments (generic device immunity)

EN55022(2007) (ITE device emissions)-Class A

EN55024 (2003) (ITE device immunity)

This product also meet the requirements of

FCC Part 15 Subpart B –Class A

This explanation is responsible for the manufacturer

OpenVox

Given By:

President ,OpenVox

Aug 10,2011

Compliance information

EMI and EMS

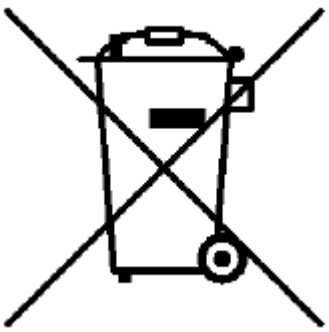
For FCC, IPC110 has been tested as a CPU board, installed in an enclosure, with the top cover removed. No further testing should be required if the board is used with other FCC tested modular components. Please see http://www.fcc.gov/oet/ for more details.

Testing for CE mark must be done at the level of the complete product. Please contact OpenVox for assistance and documentation. It can be used as an I.T.E, as well as a gerneric device. For an I.T.E, it must be tested according to EN55022 and EN55024; for a generic device, it is suit for EN 61000-6-2 (EMI test for commercial and light industrial eviroment) and EN61000-6-3 (Immuty test for Industril enviroment). The product has been tested both standards ,and get a class A evaluation for emmions All test result as a class A. OpenVox will provide Class B serie products in the future. Selecting a CE verification adapter is important, and we can also provide such adapter as customer's required.it is suggest that 12V@5A is typical value considering I/O peripheral.

ESD

For satisfactory resistance to electrostatic discharge events (ESD), the case of the IPC110 board should be grounded earth Ground termintal. (e.g. through the mounting holes, or the serial port connector). Under this condition, the system can be get class A evaluation according to EN 61000-4-2. if not, the system may be get class B evaluation.

Recycling / disposal



Do not discard electronic products in household trash!
All waste electronics equipment should be recycled according to local regulations.

Information for the recycler:

Please cut off Lithium battery, if present, for separate recycling.
OpenVox enclosures are made of aluminium.

Introduction / features

OpenVox IPC110 series CPU boards are small form factor system boards optimized for PBX and network security applications. With intel latest Z500P series processor, it is easy to develop a Fanless system which has more reliability .Integrated up to 3 ethenet ,IPC110 provide a flexible application for customer. A typical PBX application is , attaching OpenVox PCIe voice card by ACC1008 , to build total solution for little company communication. Or attaching MiniPCIe network card, to build up to 5 network port firewall device. With such feature, it is apparent to shorten time to market, and increase the value of customer.

- Powerful Intel Atom Z500P series Processor up to 1.6GHz
- 512 KB L2 cache ,24K data ,32K instruction
- PCIe x4 Golden Finger
- Up to 3 Ethernet channels
- Up to 2 MiniPCIe sockets for voice cards and other expansion
- Up to 2GB DDR2 SDRAM, 64 bit wide for high memory bandwidth
- 8Mbit flash for AMI BIOS
- Flexible combinations of data storage solution:
  CompactFlash + 44 pin IDE header + SATA connector(only available at DC12V power in) for user's operating system and application
- Wide voltage range :7 to 20V (absolute) DC supply through DC jack
- 1 serial port (DB9 male) for debug usage
- Header for LPC bus (use for flash recovery or I/O expansion)
- Low EMI Emission level and high Electro Magnetic Susceptibility

Specification

- CPU: Intel Atom Z510P 1.1GHz/ Z520P 1.3GHz /Z530P 1.6GHz
- DRAM: Slot Onboard, up to 2GB DDR2 400/533 SDRAM (double side 1GB)
- Chipset: Intel Poulsbo
- South Bridge: Poulsbo integrated
- Storage: CompactFlash socket, 44pin PATA connector
  1 SATA slot (only aviable at Power in DC12V)
- Power: DC jack ,7V to 20V, Suggest 12V supply,
  Center pin =positive, sleeve = ground, 2.1 mm diameter.
  Attention: Please confirm if the SATA HDD is attached before powering on. Hign voltage above 12V will damage the HDD.
- Three front panel LEDs, for 3 programmable GPO status indicator

• Push button: for mode setting switch, accessing a programmable GPI, active low means switch is pressed
• PCIe Interface : PCIe x4 Golden Finger
• Expansion: 2 MiniPCIe slot
• Connectivity: Up to 3 Ethernet channels (10/100/1000Mbps speed)
3 PCIe Ethernet controller
Support PXE (for remote booting)
• I/O: 1*DB9 serial port, for debug console usage ,RS232, 3*USB 2.0 port
• Board size: 6 x 6" (152.4 x 152.4 mm)
• Temperature: 0 ℃ to 60 ℃ (contact factory for more temp. options)
• Firmware: AMI BIOS
• PCB layer: 8
•Power dissipation: ~7.8W

condition:1GB memory, unattached HDD, unattached MiniPCIe card , Attached 4GB CF card, under Centos

Other condition:

8.1W@ condition:1GB memory, unattached HDD, unattached MiniPCIe card , attached 4GB CF card, under WindowsXP

9W@ condition:1GB memory, attached 2.5inch HDD, unattached MiniPCIe card , unttached CF card, under Centos

Ordering information

Standard available options:

Name	Function	Operating Temperature
IPC110B01	Z530P/3*Gigabit LAN/1 PCIe	0 ℃ to 60 ℃
IPC110C01	Z510P/3*Gigabit LAN/1 PCIe	0 ℃ to 60 ℃
IPC110B02	Z530P/3*Gigabit LAN/2 PCIe	0 ℃ to 60 ℃
IPC110C02	Z510P/3*Gigabit LAN/2 PCIe	0 ℃ to 60 ℃
IPC110B22	Z530P/3*Gigabit LAN/2G Memory	0 ℃ to 60 ℃
IPC110C12	Z510P/3*Gigabit LAN/1G Memory	0 ℃ to 60 ℃
IPC110B21	Z530P/3*Gigabit LAN/2G Memory/1 PCIe	0 ℃ to 60 ℃
IPC110C11	Z510P/3*Gigabit LAN/1G Memory/1 PCIe	0 ℃ to 60 ℃

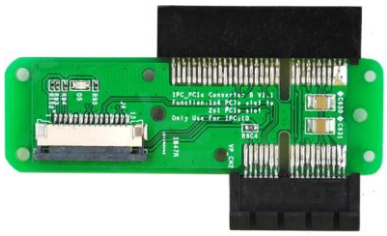
OEM options

The following option can be configured as OEM production for larger orders:

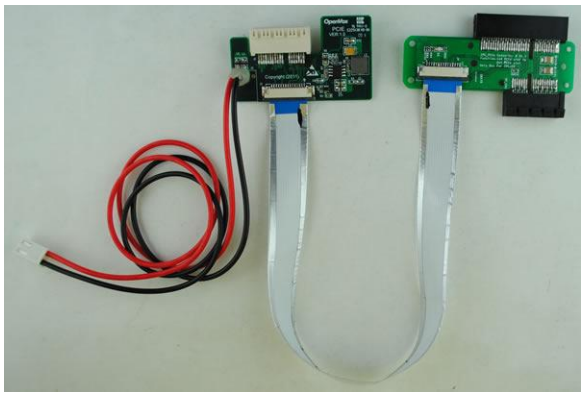
- DRAM size :1GB/2GB
- CPU speed :1.3Ghz
- Serveral configuration : 2* Gigabit /1* Gigabit
- Wide temperature: 0 ℃ –70 ℃ /–10 ℃ –70 ℃ /–40 ℃ to 85 ℃ (only @ Z510PT/Z520PT)

Daughter board ordering information:

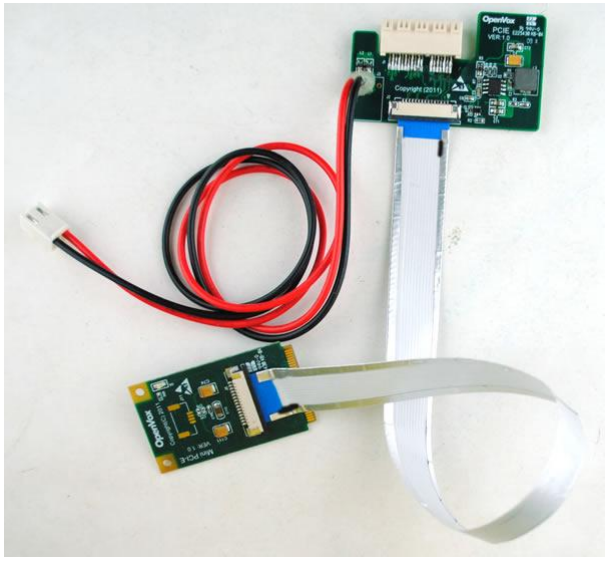
Name	Function	Operating Temperature
ACC1005	SDVO to VGA daughter board	0℃ to 60℃
ACC1007	1 x4 PCIe slot to 1 x1 PCIe slot	0℃ to 60℃
ACC1008	1 x4 PCIe slot to 2 x1 PCIe slot	0℃ to 60℃
ACC1009	1 x1 miniPCIe Goldenfinger to 1 x1 PCIe slot	0℃ to 60℃



ACC1007



ACC1008



ACC1009

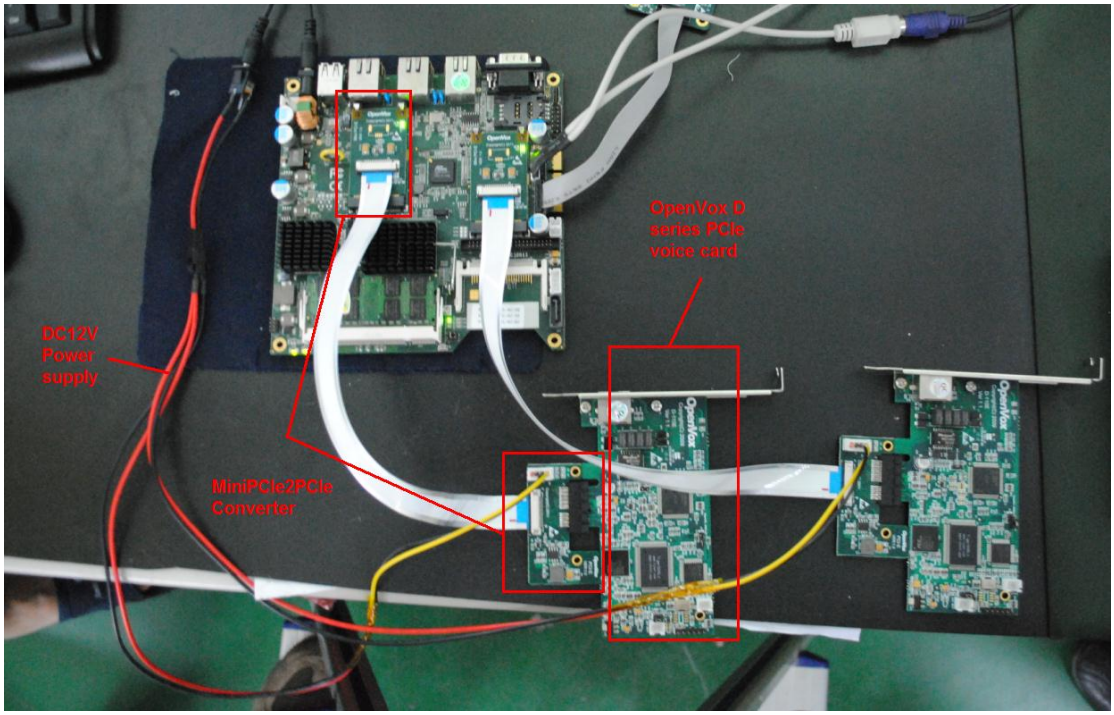
Hardware compatibility

MiniPCIe slot:

IPC110 MiniPCIe slot has been tested by following device

HuaWei EM770W 3G Module (HSPA)

Ralink RT3090 wifi card



*IPC110B + ACC1009 OpenVox MiniPCIe2PCIe Converter +2 * OpenVox A400E*

PCIe GoldenFinger: (By OpenVox PCIe2PCIe Converter)

OpenVox A400E voice card

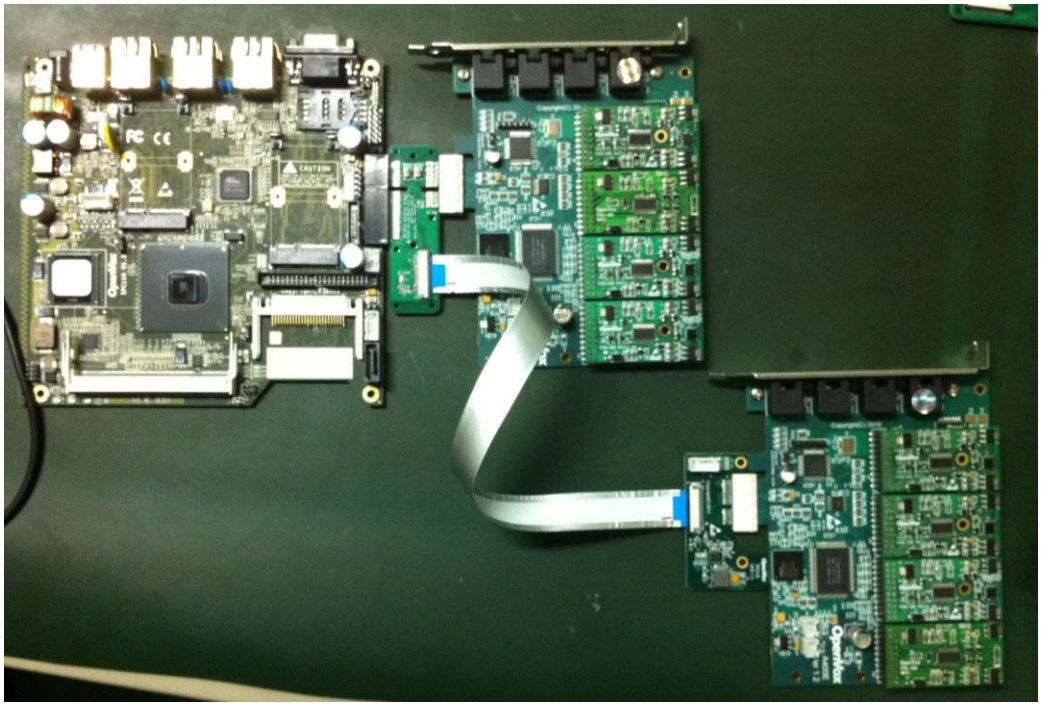
OpenVox B400E voice card

OpenVox BE400E voice card

OpenVox D410E voice card

OpenVox D430E voice card

Moschip PCIe2USB card:



*IPC110B + ACC1008 1 x4 PCIe slot to 2 x1 PCIe slot + 2 * OpenVox A400E*

Memory slot:

Kingstone KVR667D2S5/1G

Kingstone KVR800D2S6/1G

Kingstone KVR800D2N6/2G-SP

Kingstone KTH-ZD8000B/2G

Operating system compatibility

Windows XP,

Tested ok, boot from one of CF card, SATA HDD, and IDE HDD

Windows 2000

Tested ok

DOS7.0

Tested ok

Centos5.3

Tested ok

Centos5.4,

Tested ok

Pfsense 2.0

Tested ok

Freeiris2-3.0

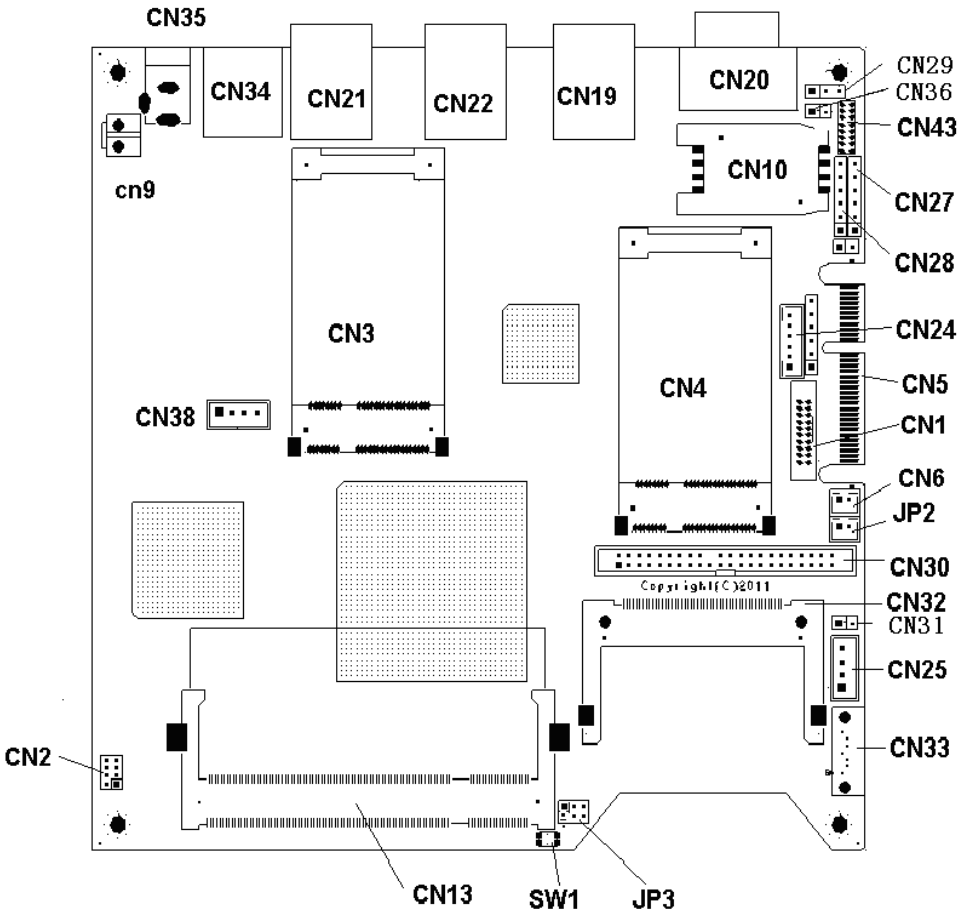
Tested ok

Monowall 1.33

Tested ok

IPC110 Connector and Jumper

1. Layout



2. Connector and Jumper List

Name	Function
CN1	SDVO display output
CN2	External LEDs and GPIO
CN3	Mini PCIe Slot 1
CN4	Mini PCIe Slot 2
CN5	PCIe x4 Golden Finger
CN6	Clear CMOS
CN9	Power Supply Jacket
CN10	SIM Socket
CN13	DDR2 Memory Slot
CN19	Ethernet 3
CN20	Serial Port
CN21	Ethernet 1

CN22	Ethernet 2
CN24	PS/2 Keyboard and Mouse Port
CN25	SATA power supply
CN27	POWER_LED Interface
CN28	HDD_LED Interface
CN29	Serial Port
CN30	44 Pin IDE Interface
CN31	12V Output Interface
CN32	Compact Flash Interface
CN33	SATA Interface
CN34	USB Port
CN35	Main Power in Jacket
CN36	12V Output Interface
CN38	USB connector
CN43	LPC interface
JP2	Manual Reset In
JP3	IDE/SATA Configuration
SW1	GPI switch

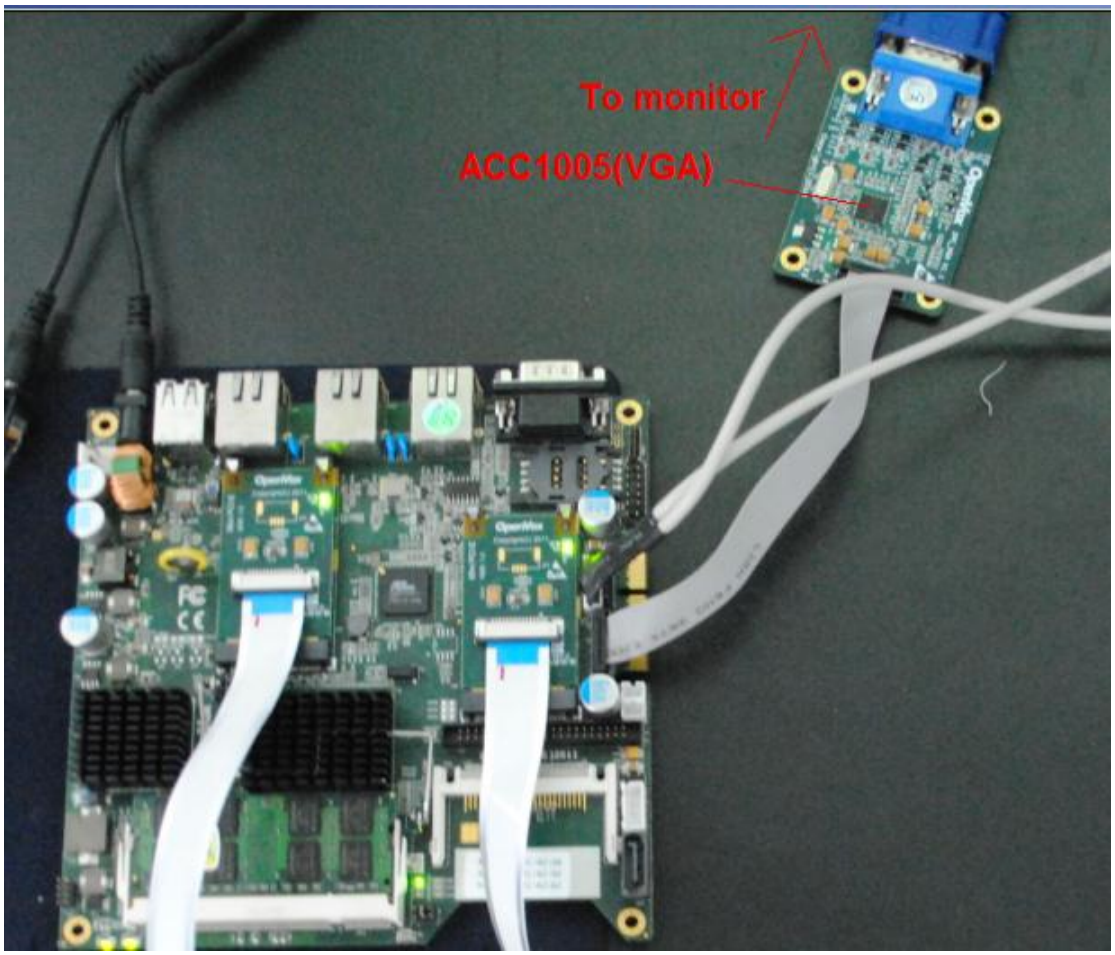
System Status Indicator

Name	Function
LED6	GPO use
LED16	GPO use
LED17	GPO use
SW1	GPI use

3. Connector and Jumper Description

CN1 SDVO Display Output

Attached with IPC_VGA card for VGA display.



SDVO (Serial Digital Video Out) is a proprietary Intel technology introduced with their motherboard chipsets

Pin	Name	Pin	Name
1	RED positive	2	Red negative
3	Ctrl Clk	4	Green positive
5	Green negative	6	Blue positive
7	Blue negative	8	CLK positive
9	CLK negative	10	Ctrl Data
11	Reset#	12	Gnd
13	Gnd	14	Gnd
15	3.3v	16	3.3v
17	3.3v	18	5v
19	5v	20	5v

CN3 CN4 Mini PCIe Slot 1&2

Attach 3G SIM card to CN10, and attach MiniPCIe 3G module to CN3，implement 3G function for IPC110.

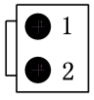
MiniCard Pinout

Pin #	Signal Name	Pin #	Signal Name
51	Reserved	52	+3.3V
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	LED_WPAN#
43	Reserved	44	LED_WLAN#
41	Reserved	42	LED_WWAN#
39	Reserved	40	GND
37	Reserved	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
21	GND	22	PERST#
19	Reserved (UIM_C4)	20	Reserved
17	Reserved (UIM_C8)	18	GND
Mechanical Key			
15	GND	16	UIM_VPP
13	REFCLK+	14	UIM_RESET
11	REFCLK-	12	UIM_CLK
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	Reserved	6	1.5V
3	Reserved	4	GND
1	WAKE#	2	3.3V

CN6 clear CMOS

Setting	Function
Close 1-2	Clear CMOS
Open 1-2 (default)	Normal

CN9 Power Supply Jacket DC out @12V

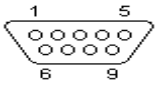


Pin	Name
1	Vin
2	Gnd

CN13 DDR2 Memory Slot

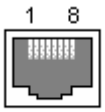
- **1.8V**
- **DDR2**
- **Support for a maximum of 2GB of DRAM**

CN20 Serial R232 Port COM0 (DB9 male)



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

CN21/CN22/CN19 Giga Ethernet Port



Pin	Name
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

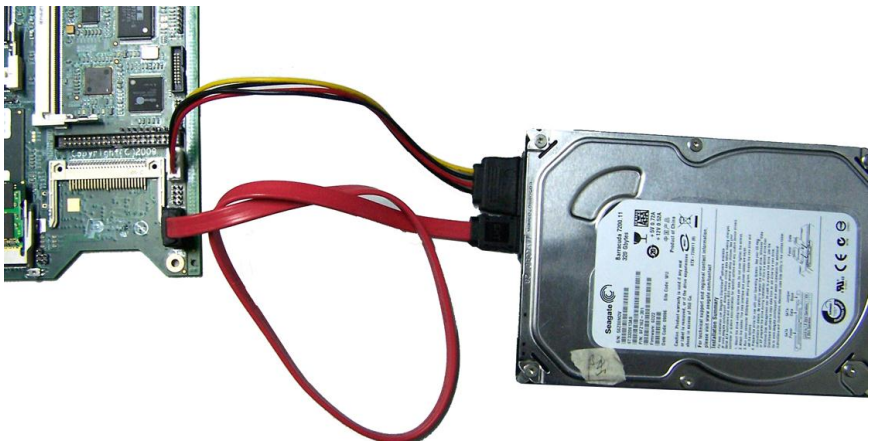
CN24 PS2 Keyboard and Mouse Port

Pin	Name
1	+5V
2	MSCLK
3	MSDATA

4	KBCLK
5	KBDATA
6	GND

CN25 SATA Power Supply

Pin	Name
1	5v
2	Ground
3	Ground
4	12v



! Caution: Before use the jacket to supply SATA HDD, check carefully the voltage of DC-in jacket (CN35) must be 12V +5% below.

CN27 POWER_LED Interface

Pin	Name
1	PWR_LED_S3
2	GND
3	PWR_BTN
4	GND
5	PWR_LED
6	GND

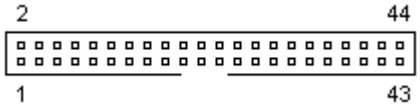
CN28 HDD_LED Interface

Pin	Name
1	IDE_LED_P
2	IDE_LED_N
3	CF_LED_P
4	CF_LED_N
5	SATA_LED_P
6	SATA_LED_N

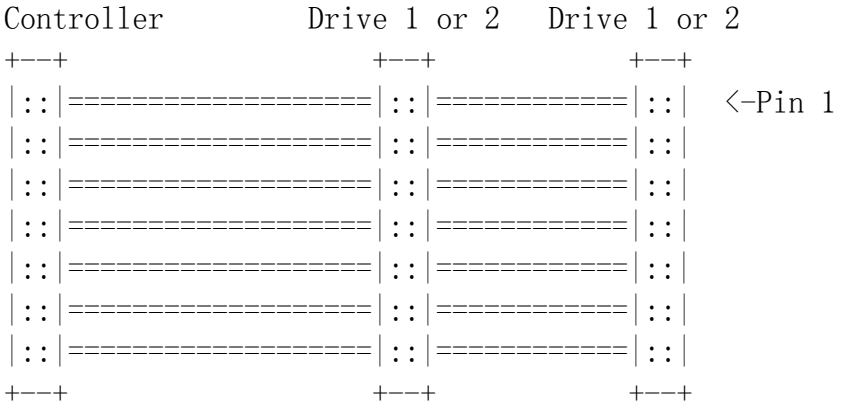
CN29 Serial R232 Port COM0

Pin	Name
1	RXD
2	TXD
3	GND

CN30 44 Pin IDE Interface



- 44 pin (2.0mm pitch) for 2.5" harddisks.



Pin	Name	Pin	Name
1	/RESET	23	/DIOW
2	GND	24	GND
3	DD7	25	/DIOR
4	DD8	26	GND
5	DD6	27	IORDY
6	DD9	28	SPSYNC:CSEL
7	DD5	29	/DMACK
8	DD10	30	GND
9	DD4	31	INTRQ
10	DD11	32	/IOCS16
11	DD3	33	DA1
12	DD12	34	PDIAG
13	DD2	35	DA0
14	DD13	36	DA2
15	DD1	37	/IDE_CS0
16	DD14	38	/IDE_CS1
17	DD0	39	/ACTIVE
18	DD15	40	GND
19	GND	41	+5V
20	KEY	42	+5V
21	DMARQ	43	GND
22	GND	44	GND

CN32 Compact Flash Interface

Pin	Name	Pin	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	/CE1	32	/CE2
8	A10	33	/VS1
9	/OE	34	/IORD
10	A9	35	/IOWR
11	A8	36	/WE
12	A7	37	/READY:/RDY:/IREQ
13	VCC	38	VCC
14	A6	39	CSEL

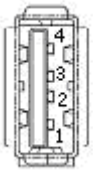
15	A5	40	/VS2
16	A4	41	RESET
17	A3	42	/WAIT
18	A2	43	/INPACK
19	A1	44	/REG
20	A0	45	/BVD2:SPKR
21	D0	46	/BVD1:STSCHG
22	D1	47	D8
23	D2	48	D9
24	/WP:/IOIS16	49	D10
25	/CD2	50	GND

CN33 SATA Interface

Pin	Name
1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

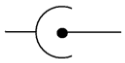
CN34 USB Port

2 USB2.0 ports . 500 mA Continuous Current per Channel. Short-Circuit and Thermal Protection With Overcurrent Logic.



Pin	Name
1	5v
2	Data-
3	Data+
4	Ground

CN35 Main Power Jacket DC in @12V



1 **2**

Pin	Name
1	Gnd
2	Vin

CN31/CN36 12V Output Interface

Pin	Name
1	12V
2	Ground

CN38 USB connector

Pin	Name
1	5v
2	Data-
3	Data+
4	Ground

CN43 LPC Interface

Pin	Name	Pin	Name
1	LPC_CLK	9	AD3
2	SERIRQ	10	+3.3V
3	AD0	11	FRAME#
4	NC	12	GND
5	AD1	13	GND
6	GND	14	NC
7	AD2	15	48MHz_CLK
8	+5V	16	NC

JP2 Manual Reset In

Setting	Function
Close 1-2	Reset System
Open 1-2 (default)	Normal

JP3 IDE/SATA Configuration

2*4*2.0mm header

Default Setting	Function

Open 1-2	CF Slave (close it means CF master)
Close 3-4	IDE Master (open it means IDE slave)
Close 5-6	Disable SATA (default)

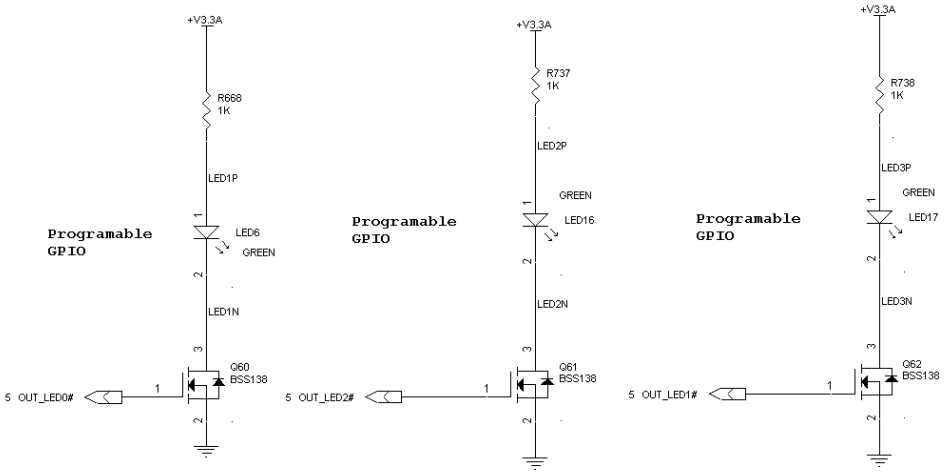
Note:1. There's a important principle that only one device can be allowed to exsit in one master (slave) simultaneously. IDE device Should be a SATA hard disk drive ,a type II CF card, or a IDE hard disk drive.

2. You should disable SATA (close 5-6) first before attach CF card or IDE hard disk ,.. If not system will spend more time to detect IDE devices. That means Pin 5-6 are only open at the case when user using SATA hard disk.

CN2 External LEDs and GPIO

2*4*2.0mm header

3.3V 200mA max CMOS output. See page 18 for more detail.



Pin	Name	Pin	Name
1	LED1P (3.3V)	2	LED1N
3	LED2P(3.3V)	4	LED2N
5	LED3P(3.3V)	6	LED3N
7	GPIO	8	GND

System Status LEDs Indicator & SW1

How does the LEDs light when system is booting?

There are 3 stage When system is booting ,

a. All three LEDs will light after system power-up ,

b. The right LED will be dark. It means that system is run POST. You can see BIOS startup messages is start to display on serial console .

c. 2 LEDs on the right side will be dark. It means POST is complete. At this time ,You can press F4 to enter BIOS menu to change setting as your required.

How to use the status indicator LEDs and Micro switch SW1 ?

After system completed boot , enter I/O space based address 480H and change some register value as follow:

LED6

1. Set 480H+28H, bit1 (bit7-----bit0)
2. the LED will light
3. clear the 480H+28H, bit1
4. the LED will dark

LED16

1. Set 480H+09H, bit1
2. the LED will light
3. clear the 480H+09H, bit1
4. the LED will dark

LED17

1. Set 480H+08H, bit1
2. the LED will light
3. clear the 480H+08H, bit1
4. the LED will dark

SW1

1. Set 480H+04H, bit6 ,means direction is input
2. press SW1 ,then 480H+08H ,bit6 will be changed to 0
3. when SW1 release, 480H+08H ,bit6 will be changed to 1 (default)

CN2.7-8pin GPIO

As output

1. clear 480H+04H, bit6 ,means direction is output
2. Set 480H+08H, bit6 ,CN2.7 will be changed to 1 (High level)
3. Clear 480H+08H, bit6 ,CN2.7 will be changed to 0 (low level)

As input

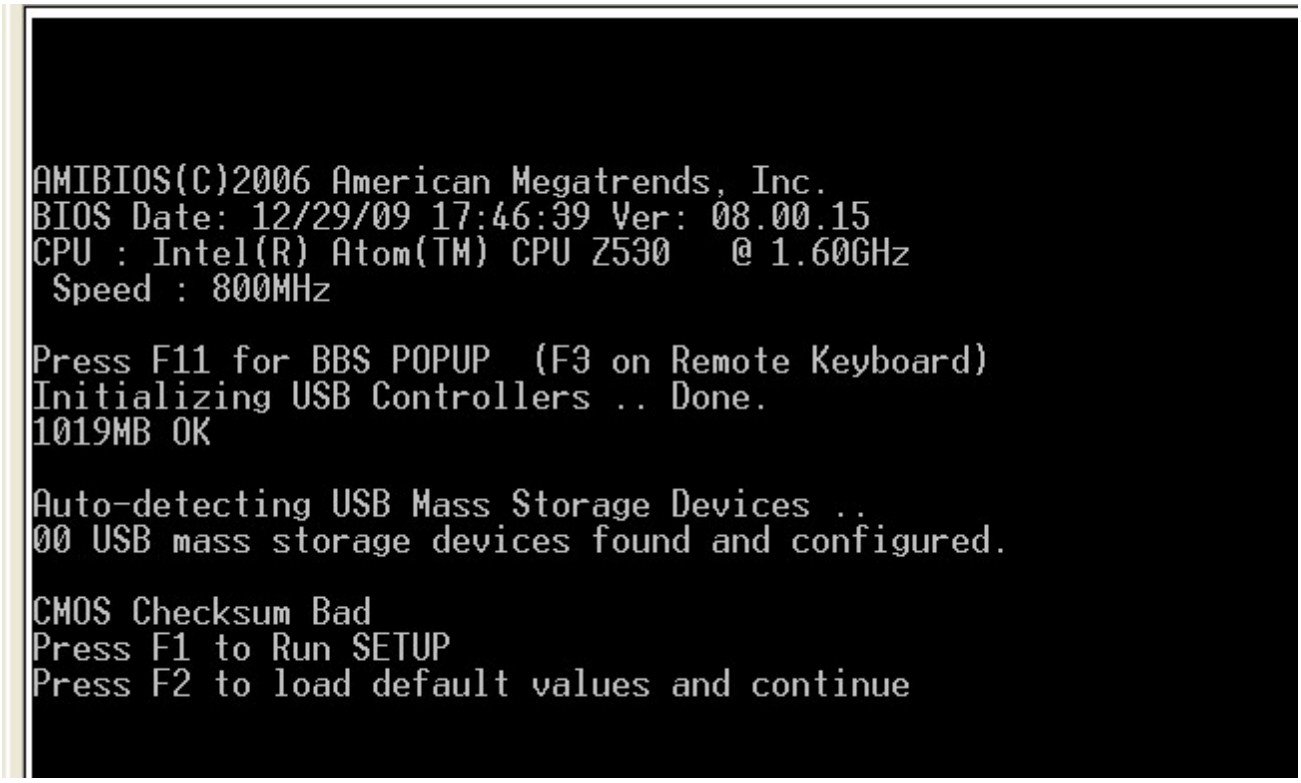
1. set 480H+04H, bit6 ,means direction is input
2. CN2.7 input 1 (High level), then 480H+08H, bit6 will be changed to 1
3. CN2.7 input 0 (Low level), then 480H+08H, bit6 will be changed to 0

BIOS Setup Guide

1. Enter BIOS setup menu

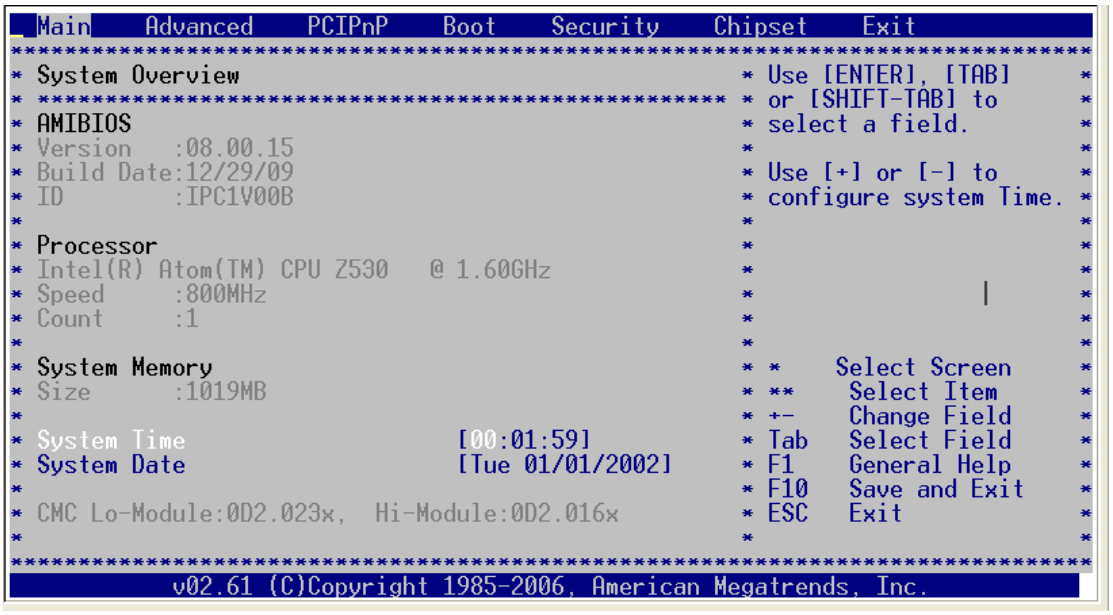
When system is powered up, press F4 on keyboard of remote PC connected IPC110's serial port.

Notice: Press F1 when following picture appeared



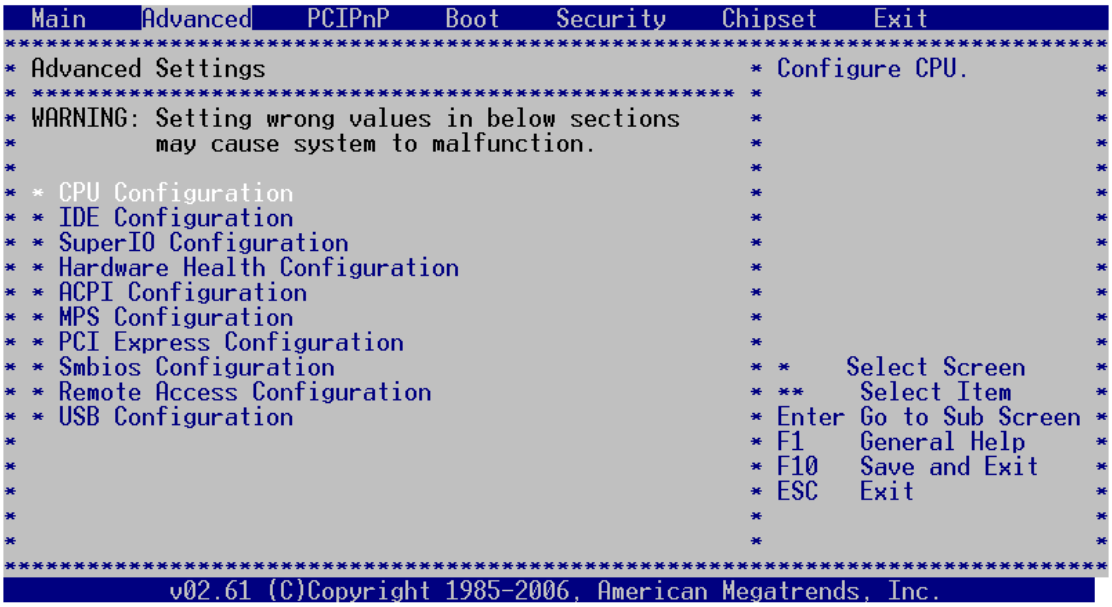
System will display content as following:

1.1 Main

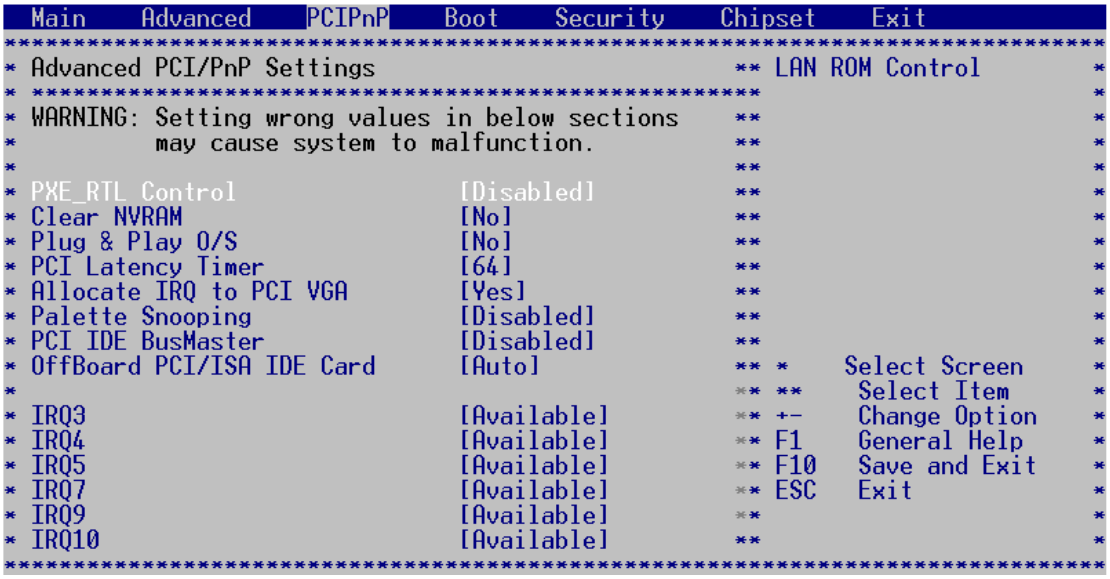


1.2 press right arrow key ,you will see other menu item as following

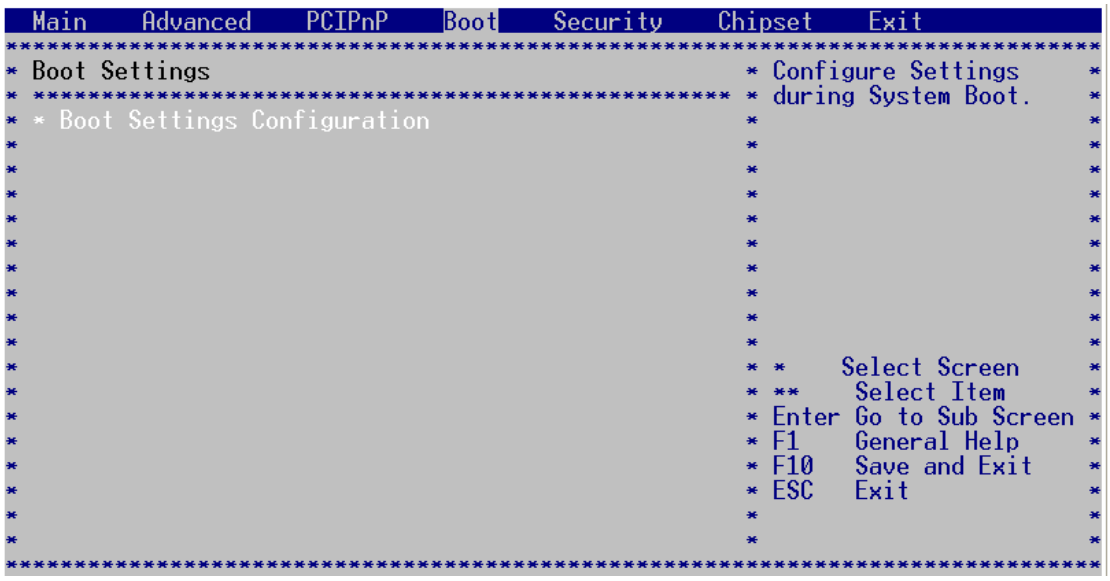
advanced



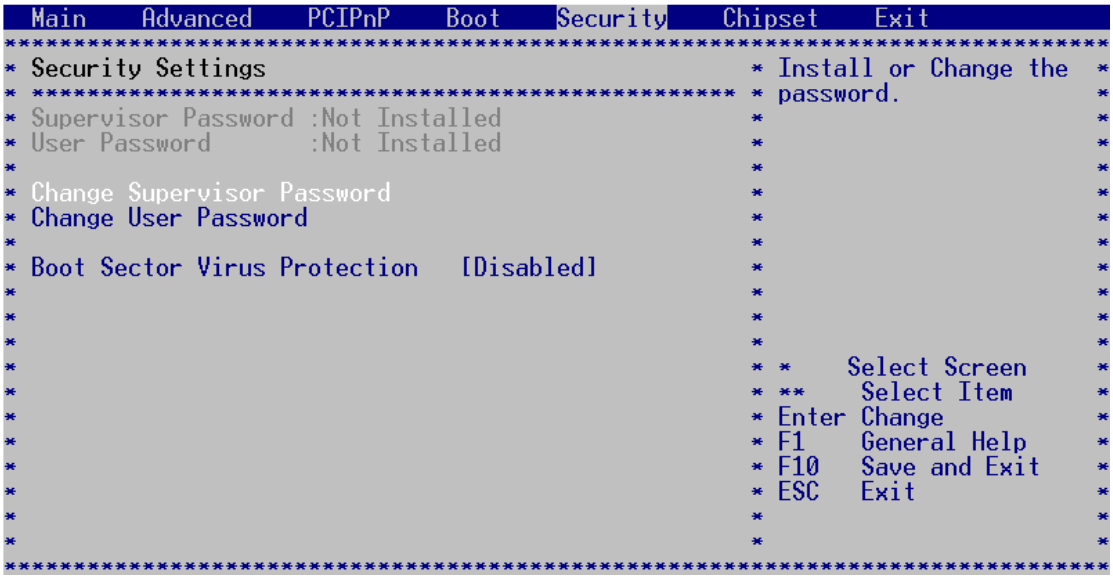
1.3 PCIPnP



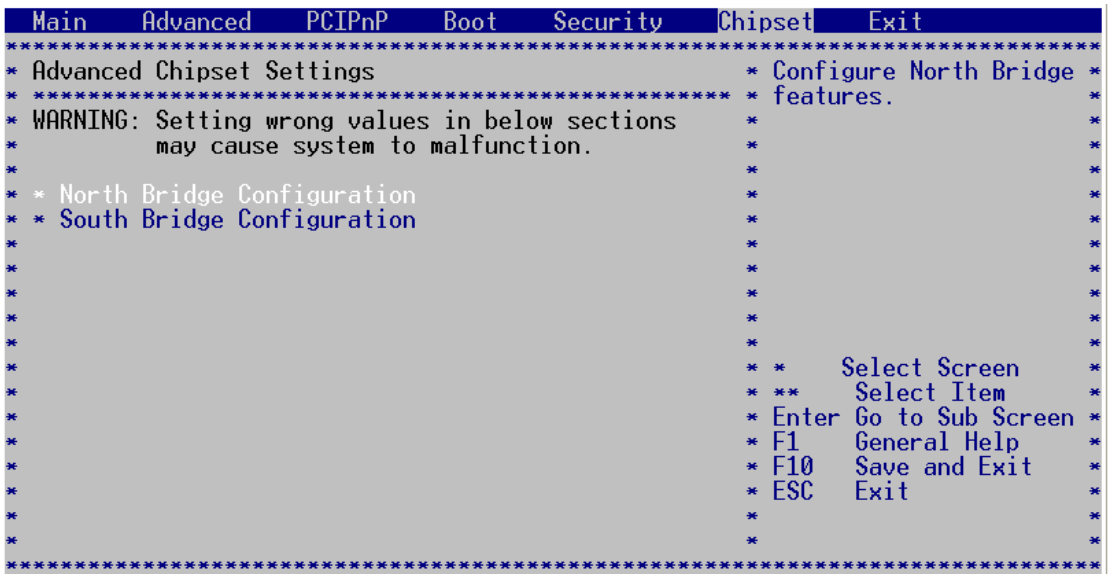
1.4 Boot



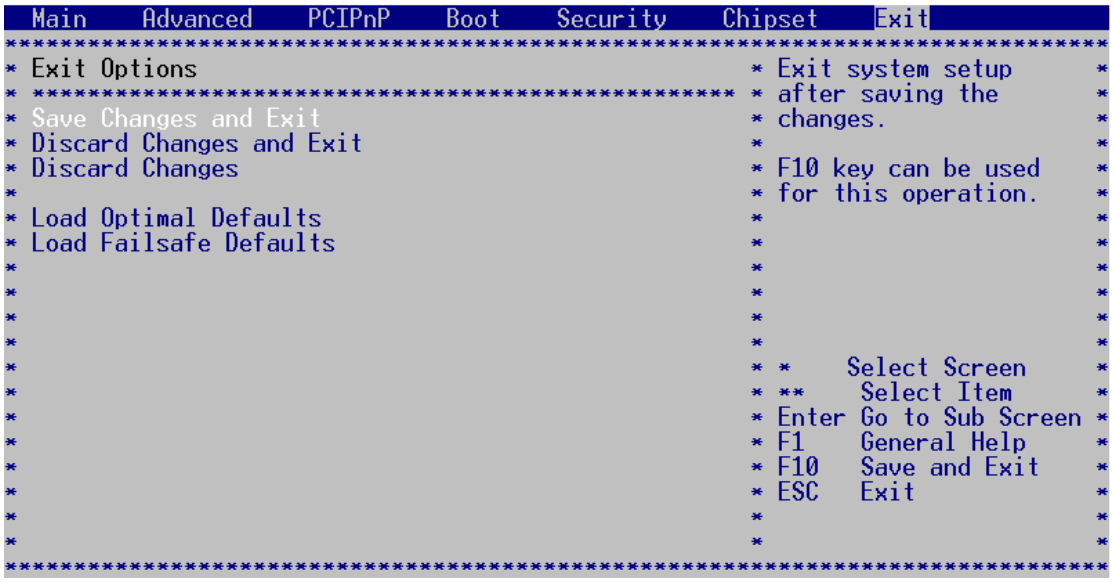
1.5 Security



1.6 Chipset



1.7 Exit

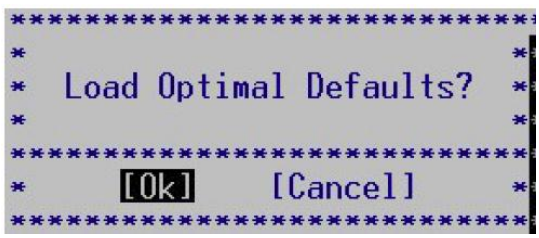


2. General BIOS Setup

2.1 Load BIOS default value

a. Enter Exit menu ,press down arrow key to highlight the “LOAD optimal Defaults”.then press enter key

b. system will prompt as following,answer OK



c. press up arrow key to highlight “save changes and exit”

d. answer ok to confirm the latest change.

2.2 modify system DATE and TIME

a.Enter main menu, ,press down arrow key to highlight "system time" or "system date"item. Type in new value which you want.

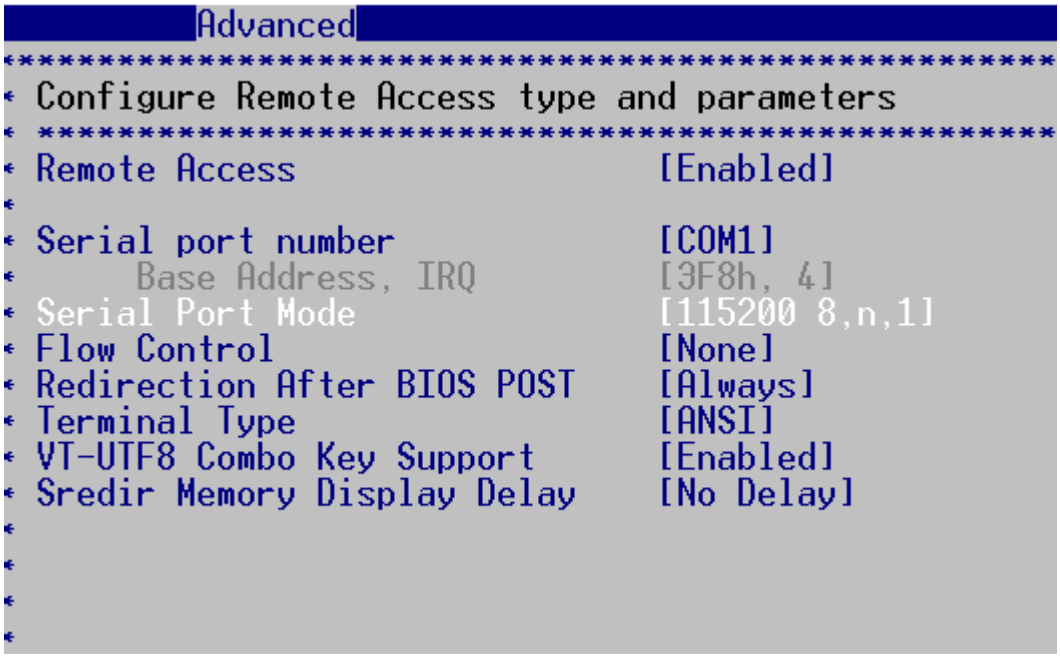
b.Press Enter key to confirm the new value

c.Enter "exit "menu,and highlight "save changes and exit",

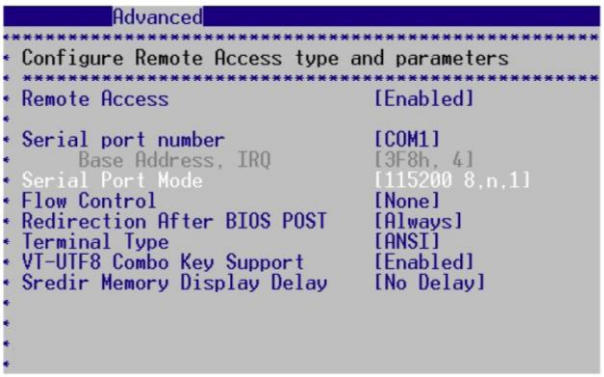
d.answer ok to confirm the latest change.

2.3 modify serial port baut rate

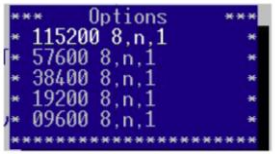
a.enter advanced menu . highlight "remote access configuration"



b. System will display following contens



c.Highlight “serial port mode”



d.Press enter key ,then select new selection what you want.

e. Enter “exit ”menu,and highlight “save changes and exit”,

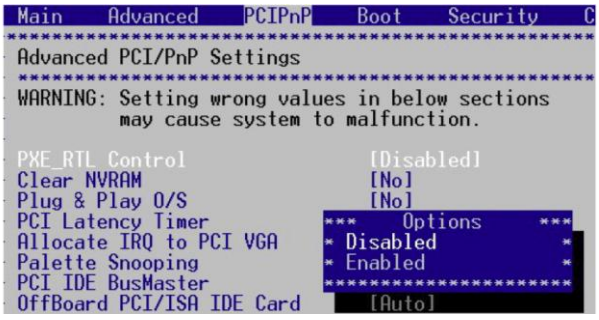
f. Answer ok to confirm the latest change.

2.4 PXE remote boot function setup

a.Enter PCIPnP menu

b.Highlight PXE_RTL control

c.Press enter key ,system will prompt as following



d. answer enabled to open PXE function

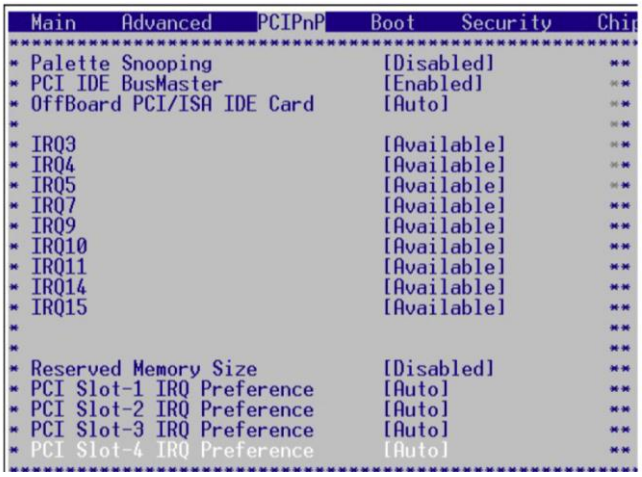
e. Enter “exit ”menu, then highlight “save changes and exit” item, answer ok to confirm the latest change.

2.5 PCI slot IRQ setup

IPC110 series board provides 2 MiniPCIe 3.3v slots. You can attache with standard MiniPCIe card. If The features is useful for linux OS like Centos5.3 embed applicaton. You can change the IRQ as

following .

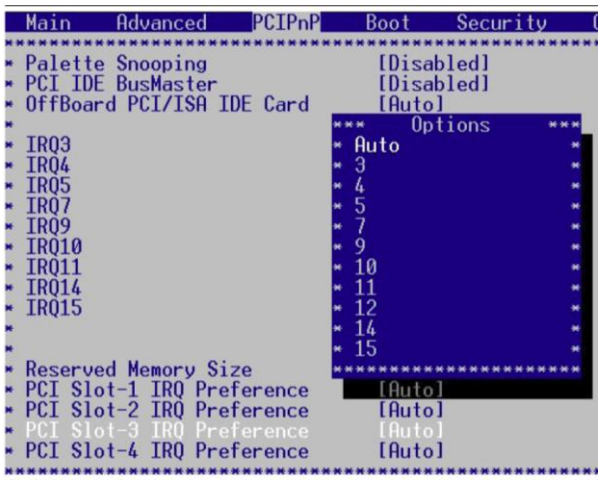
a. Enter PCIPnP menu



b.press down arrow key to highlight “PCI Slot-x IRQ preference”

slot-3 is CN16,slot-4 is CN15.

c.press enter key system will prompt a list for IRQ



d. select new value what you want.

Notice :if you select system remain IRQ,the IRQ will be fail for PCI device

Following is a simple IRQ list of IPC110

IRQ3: Serial port

IRQ14: Primary IDE chanel

IRQ12: PS/2 mouse

e. Press enter key

f .Enter “exit ” menu, and highlight “save changes and exit”