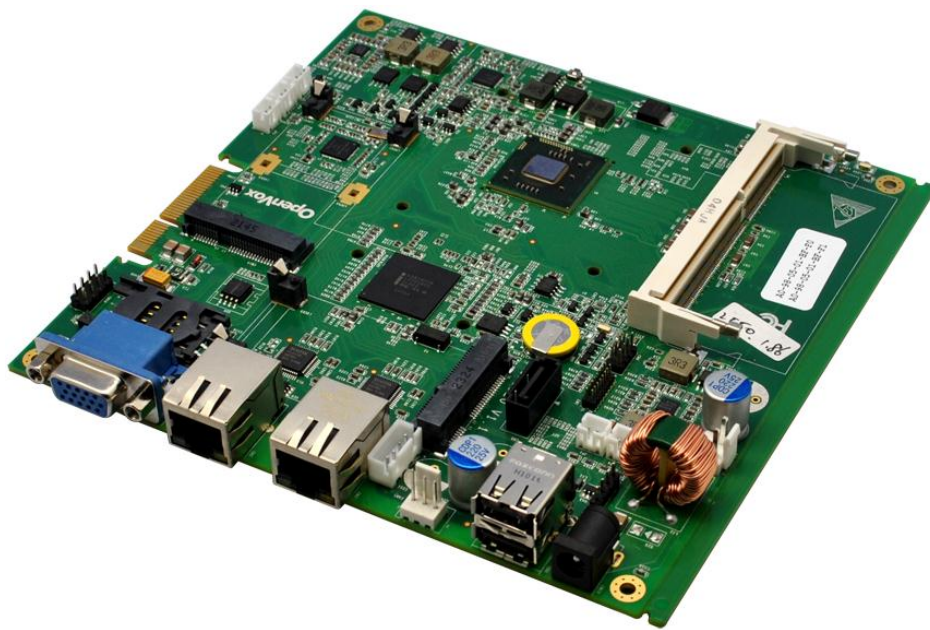




IPC120 User Manual

Atom Fanless CPU boards



Hardware Version: V1.0

Guide Version: V1.0

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Compliance information

EMI and EMS

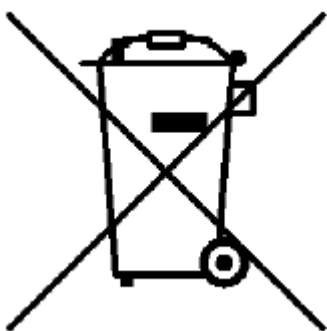
For FCC, IPC120 has been tested as a CPU board, installed in an enclosure, with the top cover removed. No further testing should be required if the board is used with other FCC tested modular components. Please see <http://www.fcc.gov/oet/> for more details.

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 generic 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 environment) and EN61000-6-3 (Immunity test for Industrial environment). The product has been tested both standards, and get a class B evaluation. Selecting a CE verification adapter is important, and we can also provide such adapter as customer's required. It is suggested that 12V@5A is typical value considering I/O peripheral.

ESD

For satisfactory resistance to electrostatic discharge events (ESD), the case of the IPC120 board should be grounded earth Ground terminal. (eg. through the mounting holes, or the serial port connector). Under this condition, the system can be get class B evaluation according to EN 61000-4-2.

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 aluminum.

Chapter 1 Overview

OpenVox IPC120 series CPU boards are small form factor system boards optimized for PBX and network security applications. With Intel latest D2000 and N2000 series processor, it is easy to develop a fanless system which has more reliability. Integrated up to 2 Ethernet, IPC120 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. Another typical is attaching MiniPCIe network card to build up to 3 network port firewall device. With such features, it is apparent to shorten time to market, and increase the value of customer.

Features

- Powerful Intel Atom D2000/N2000 series Processor up to 1.86 GHz
- 1MB L2 cache, 64-bit instruction
- PCIe x4 Golden Finger
- Up to 2 Ethernet channels
- Up to 1 MSATA Socket
- Up to SATA slot
- Up to 1 Mini PCIe sockets for wife cards
- Up to 4 GB DDR3 SDRAM
- 16Mbit flash for AMI BIOS
- 1VGA port (DB15) for display interfac
- Header for LPC bus (use for flash recovery or I/O expansion)
- Low EMI Emission level and high Electro Magnetic susceptibility
- Voltage range :12V DC supply through DC jack

Specification

- CPU: Intel Atom N2600_1.6Ghz/D2500_1.86Ghz/D2550_1.86Ghz
- DRAM: Slot Onboard, up to 4GB DDR3 1333 SDRAM (Atom N2600 only support 2GB)
- Chipset: Intel NM10 Express Chipset
- Southbridge: Intel NM10
- Storage: 1 SATA slot, 1 mSATA Socket
- 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: 1 Mini PCIe slot
- Connectivity: Up to 2 Ethernet channels (10/100/1000Mbps speed)
2 PCIe Ethernet controllers
Support PXE (for remote booting)
- I/O: 1*DB15 VGA port, 5*USB 2.0 port
- Board size: 6 x 6" (152.4 x 152.4 mm)
- Temperature: 0 °C to 60 °C (contact factory for more temp. options)
- Firmware: AMI_UEFI BIOS
- PCB layer: 4
- Power dissipation: ~7.8W (Minimum Power Dissipation)

Ordering information

Standard available options:

Name	Function	Operating Temperature
IPC120B	N2600/2*Gigabit LAN/1 PCIe	0 °C to 60 °C
IPC120C	D2500/2*Gigabit LAN/1 PCIe	0 °C to 60 °C
IPC120D	D2550/2*Gigabit LAN/1 PCIe	0 °C to 60 °C

Chapter 2 Hardware Compatibility

Mini PCIe slot:

IPC120 MiniPCIe slot has been tested by following device:

HuaWei EM770W 3G Module (HSPA)

Ralink RT3090 wifi card

PCIe Golden Finger: (By OpenVox PCIe2PCIe Converter)

OpenVox A400E voice card

OpenVox B400E voice card

OpenVox BE400E voice card

OpenVox D410E voice card

OpenVox D430E voice card

And so on.

Memory slot:

Kingstone KVR1333 1G

Kingstone KVR1333 2G

Kingstone KVR1333 4G

SAMSUNG 13333 1G

Operating system compatibility

Windows XP Tested ok

Windows 7 Tested ok

Centos5.4 Tested ok

Centos6.2 Tested ok

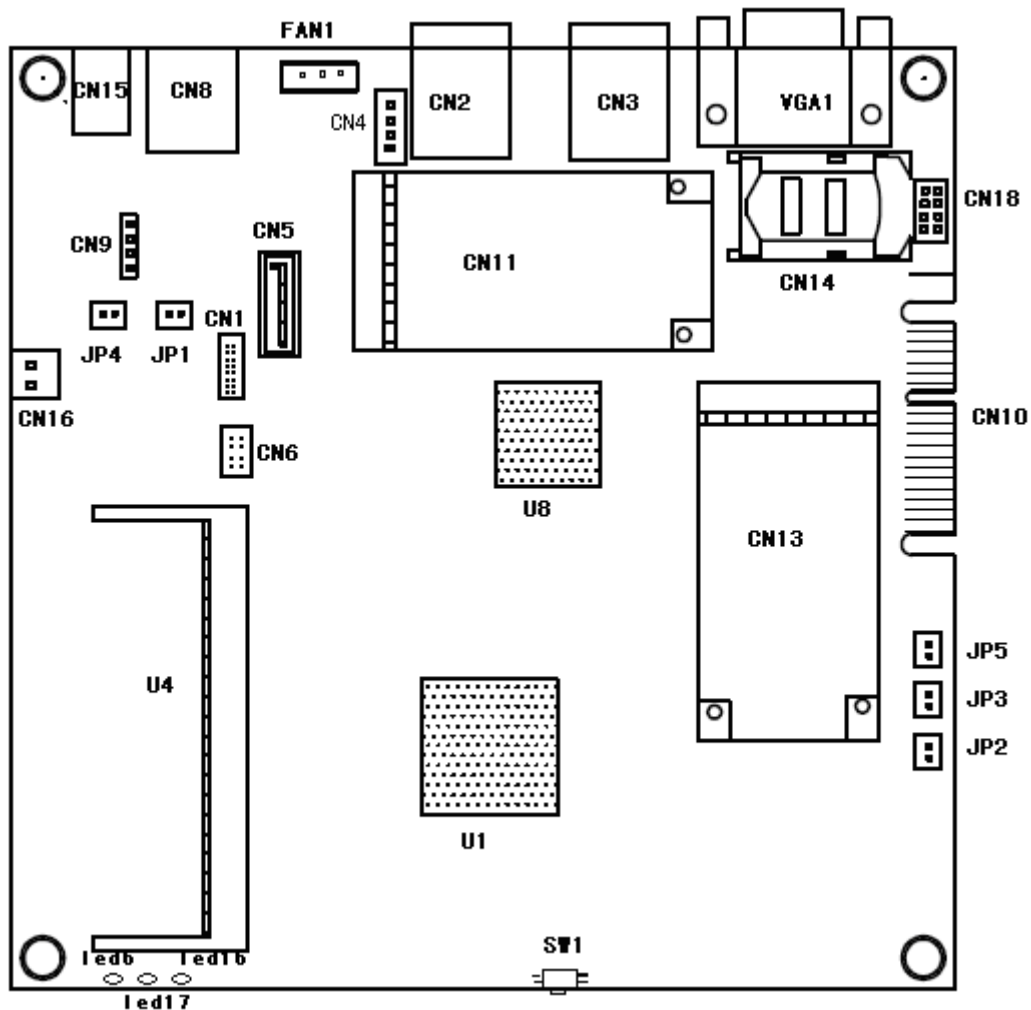
Pfsense 2.0 Tested ok

Freeiris2-3.0 Tested ok

Monowall 1.33 Tested ok

Chapter 3 IPC120 Connector and Jumper

1. Layout



2. Connector and Jumper List

Name	Function
VGA1	VGA display output
CN10	PCIe x4 Golden Finger
JP1	Clear CMOS
CN15	Main Power in Jacket
CN16	Power Supply Jacket
U4	DDR3 Memory Slot
CN11	mSATA Slot
CN13	Mini PCIe Slot
CN2	Ethernet 1
CN3	Ethernet 2

CN5	SATA Interface
CN4	SATA power supply
CN8	USB Port
CN1	LPC interface
JP5	Manual Reset In
CN6	External LEDs and GPIO
CN18/CN9	USB connector
CN14	SIM Socket
FAN1	FAN power supply
SW1	GPI switch

3. System Status Indicator

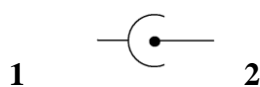
Name	Function
LED6	GPO use
LED17	GPO use
LED16	GPO use
SW1	GPI use

4. Connector and Jumper Description

JP1 clear CMOS

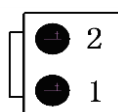
Setting	Function
Close 1-2	Clear CMOS
Open 1-2 (default)	Normal

CN15 Main Power Jacket DC in @12V



Pin	Name
1	Gnd
2	Vin

CN16 Power Supply Jacket DC out @12V



Pin	Name
1	Vin
2	Gnd

U4 DDR3 Memory Slot

- 1.5V
- DDR3
- ATOM N2600 CPU Support Max Memory Size 2GB of DRAM
- ATOM D2550 CPU Support Max Memory Size 4GB of DRAM

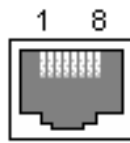
CN13 Mini PCIe Slot

Attach 3G SIM card to CN14, and attach Mini PCIe 3G module to CN13, implement 3G function for IPC120.

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

CN2/CN3 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-

CN5 SATA Interface



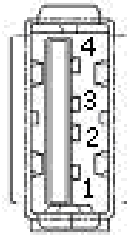
Pin	Name
1	Ground
2	Transmit +
3	Transmit -
4	Ground
5	Receive -
6	Receive +
7	Ground

CN4 SATA Power Supply

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

CN8 USB Port

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



Pin	Name	Pin	Name
1	5v	5	5v
2	Data-	6	Data-
3	Data+	7	Data+
4	Ground	8	Ground

CN9 USB connector

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

CN18 USB connector

Pin	Name	Pin	Name
1	5v	2	Ground
3	Data-	4	Data+
5	Data+	6	Data-
7	Ground	8	5v

CN1 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

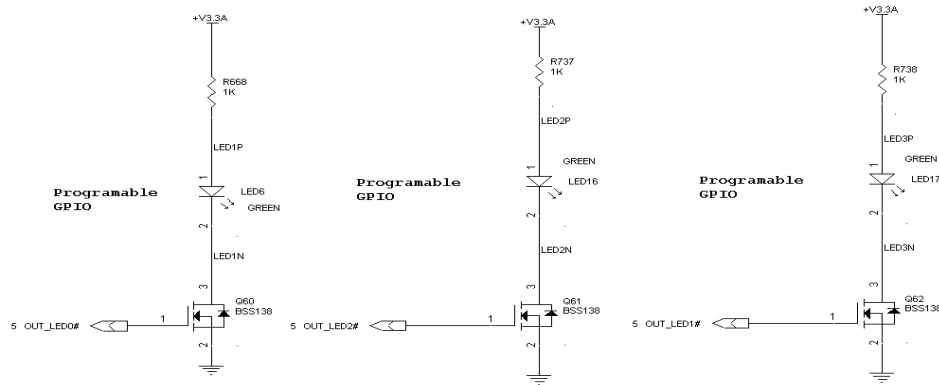
JP5 Manual Reset In

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

CN6 External LEDs and GPIO

2*4*2.0mm header

3.3V 200mA max CMOS output



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

Chapter 4 System Status LEDs Indicator & SW1

How do the LEDs light when system is booting?

There are 3 statuses 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;
- c. 2 LEDs on the right side will be dark. It means POST is complete. At this time, you can press “DEL” key 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 500H and change some register value as follow:

LED16

1. Set 500H+0CH, bit7
2. the LED will light
3. clear the 500H+0CH, bit7
4. the LED will dark

LED17

1. Set 500H+0CH, bit6
2. the LED will light
3. clear the 500H+0CH, bit6
4. the LED will dark

LED6

1. Set 500H+0FH, bit28
2. the LED will light
3. clear the 500H+0FH, bit28
4. the LED will dark

SW1

1. Set 500H+0DH, bit13 ,means direction is input
2. press SW1 ,then 500H+0DH ,bit13 will be changed to 0
3. when SW1 release, 500H+0DH ,bit13 will be changed to 1 (default)

CN6 7-8pin GPIO

As output

1. Clear 500H+0DH, bit13, means direction is output
2. Set 500H+0DH, bit13 ,CN6 7pin will be changed to 1 (High level)
3. Clear 500H+0DH, bit13 ,CN6 7pinwill be changed to 0 (low level)

As input

1. Set 500H+0DH, bit13, means direction is input
2. CN6 7Pin input 1 (High level), then 500H+0DH, bit13 will be changed to 1
3. CN6 7pin input 0 (Low level), then 500H+0DH, bit13 will be changed to 0

Chapter 5 BIOS Setup Guide

PXE remote boot function setup

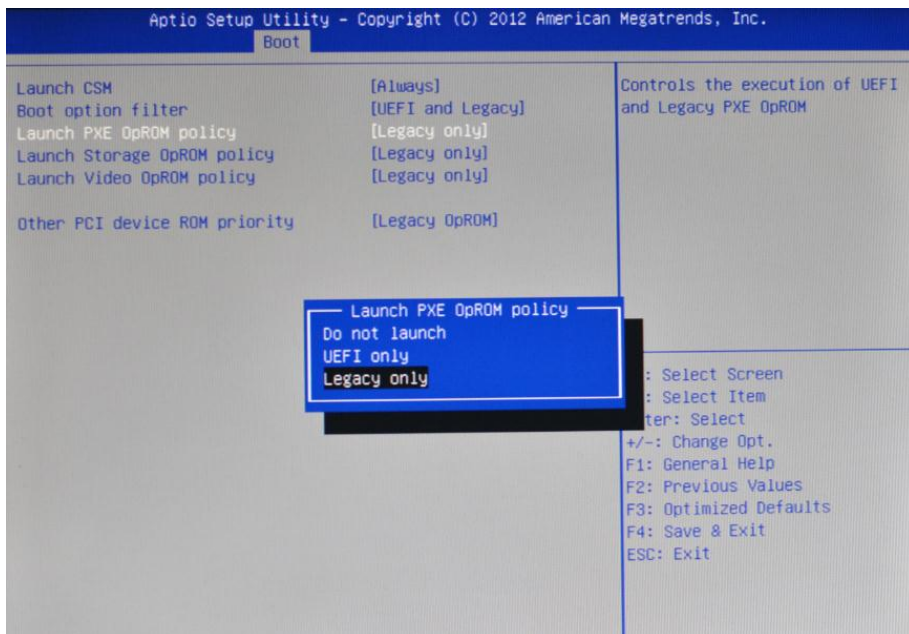
Press the “del” key Enter the BIOS, system will display content as following:

2.3 PXE remote boot function setup

- a. Enter Boot menu – >CSM Parameters Options



- b. Highlight PXE OpROM control, press enter key, system will prompt as following:



Legacy only Options enable PXE, Other options disable.

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



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