Quick Installation Guide
V 1.0

Model: IP-06060
AMD Geode LX800 Low Power 3.5" Embedded SBC with VGA/LCD, Two 10/100LAN, Audio & SSD

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Chapter 1. General Information

1-1. Introduction

The IP-06060 is a full function of the 3.5" embedded format SBC board that uses the AMD CS5536 chipset to support the LX800 500 MHz processor. The IP-06060 supports CRT and 24-bit TFT panels, two Serial ATA, two Ultra ATA-133 IDE devices, Dual Intel® 82551ER (or Realtek RLT8139CL+); an Ethernet chipset with two RJ45 jacks for 10/100Mbps and an AC-97 Audio Interface.

Onboard features include three RS-232 and one RS-232/422/485 serial ports, one bidirectional parallel port, four USB 2.0 ports, also contains a watchdog timer and PC/104 connector for flexible expansion capabilities. In addition, the onboard SSD interface supports 50-pin CompactFlash socket for TypeI/II CompactFlash Cards and memory support 200-pin DDR SO-DIM.

1-2. Specifications

System	
CPU	AMD® Geode™ LX800 , 500MHz
BIOS	Award® 512KB Flash BIOS
System Chipset	AMD® Geode™ CS5536
System Memory	Onboard 1 x 200-pin DDR SO-DIMM socket supports DDR 333/400 max. up to 1GB
Power Management	APM 1.2; ACPI supported
SSD	50-pin CompactFlash™ type II socket (DMA mode CompactFlash™)
Watchdog Timer	255 levels timer interval, (1 ~ 255 seconds), setup by software. Jumper set up for system reset or IRQ
Expansion Interface	PC/104 connector for ISA (No ISA bus master & PnP)
Battery	Lithium 3V/220mAH
I/O	
I/O Chipset	Winbond® 83627HG
I/O Interface	1 x EIDE (Ultra ATA-66), 1 x PS/2 KB/Mouse, 3 x RS-232, 1 x RS-232-422/485, 1 x IrDA
USB	4 x USB ports, USB 2.0 compliant
Audio (optional Audio module R-031)	Supports AC 97 audio stereo sound (Mic. in & Speaker out)
GPIO	8-bit TTL input & 8-bit TTL output
Ethernet Interface	
Chipset	Intel® 82551ER or Realtek 8139CL+

Speed	10/100Mbps
Interface	2 x RJ-45
Standard	IEEE802.3u (100Base-T) protocol compatible

Display

Chipset	AMD® Geode™ LX800
Memory Size	2 ~ 254MB frame buffer sharing system memory
Resolution	CRT mode: ■1920 x 1440 x 32 bpp at 85Hz ■ 1600 x 1200 x 32 bpp at 100Hz
LCD/LVDS Interface	LCD/Simultaneous mode: 1024 x 768 x 16 bpp at 60Hz LVDS: 18/24-bit LVDS supports via optional R-053A/B
Dual Independent Display	CRT + LCD or CRT+ LVDS

Mechanical and Environmental

Dimension (L x W)	145mm (L) x 102mm(W) (5.7"L x 4"W)
Operating Temperature	0 ~ 60°C (32 ~ 140°F)
Operating Humidity	10% ~ 95% relative humidity, non-condensing

Power

Power Supply Voltage	Single +5V power in, AT/ATX power control
Power Consumption	LX-800 (500MHz)@256MB DDR266 Max (XP, Vpower):12W, +5V @2.4A

Ordering Information

IP-6060A	3.5" SBC with AMD® Geode™ LX800, VGA, LCD, 2 LANs (Intel® 82551ER), Audio & SSD
IP-6060B	3.5" SBC with AMD® Geode™ LX800, VGA, LCD, 2 LANs (Realtek® 8139CL+), Audio & SSD (by order)
IP-6060C	3.5" SBC with AMD® Geode™ LX800, PC/104, VGA, LCD, 2 LANs (Intel® 82551ER), Audio & SSD
IP-6060D	3.5" SBC with AMD® Geode™ LX800, PC/104, VGA, LCD, 2 LANs (Realtek® 8139CL+), Audio & SSD (by order)

Optional

DK-01023	Audio kit w/ Mic. in & Speaker out
R-053A	LVDS kit supports 18-bit
R-053B	LVDS kit supports 24-bit
CB-ICOM01-00	COM port cable (2mm) 13cm/RoHS
CB-IUSB03-00	USB cable 2 x 5 (2mm)/ RoHS
CB-ILPT01-00	Printer cable (2mm) 26cm/RoHS

Included Parts (Ships with Product)
1 x IP-60600 SBC
1 x IDE cable (p/n: CB-I00IDE-00)
1 x I/O cable (p/n:CB-ICOM-02-00)
1 x KB/MS cable (p/n:CB-IPS266-00)
1 x KB/MS cable (p/n:CB-IPS266-00)
1 x Vertical type to 4P power cable (p/n:CB-IPOW30-00)
User's Manual; s/w drivers from FTP download
*NOTE: The ITE8888G PCI to ISA bridge for PC/104 slot uses PC/PCI DMA (PPDMA) for ISA bus master. The Geode LX800 Chipset uses the CS5536 south bridge

1-3. IP-06060 Packaging

Please make sure that the following items have been included in the package before installation.

- IP-06060 3.5" Embedded SBC board

- Quick Installation Guide

- Cables (Please refer Appendix D)

- CD-ROM which contains the following folders:

    o   Manual (in PDF format)

    o   LAN Driver

    o   VGA Driver

    o   Audio Driver

    o   BIOS Utility

If any of these items are missing or damaged, please contact the dealer from whom you purchased the board at once. Save the shipping materials and carton in the event that

you want to ship or store the board in the future. After you unpack the board, inspect it to assure an intact shipment. Press down all the integrated circuits to make sure they are properly seated in their sockets. Do not apply power to the board if it appears to have been damaged. <u>Leave the board in its original packing until you are ready to install.</u>

Precautions

Make sure you properly ground yourself before handling the IP-06060 board or other system components. Electrostatic discharge can be easily damage the IP-06060 board.

Do not remove the anti-static packing until you are ready to install the IP-06060 board.

Ground yourself before removing any system component from its protective anti-static packaging. To ground yourself, grasp the expansion slot covers or other unpainted parts of the computer chassis.

Handle the IP-06060 board by its edges and avoid touching its components.

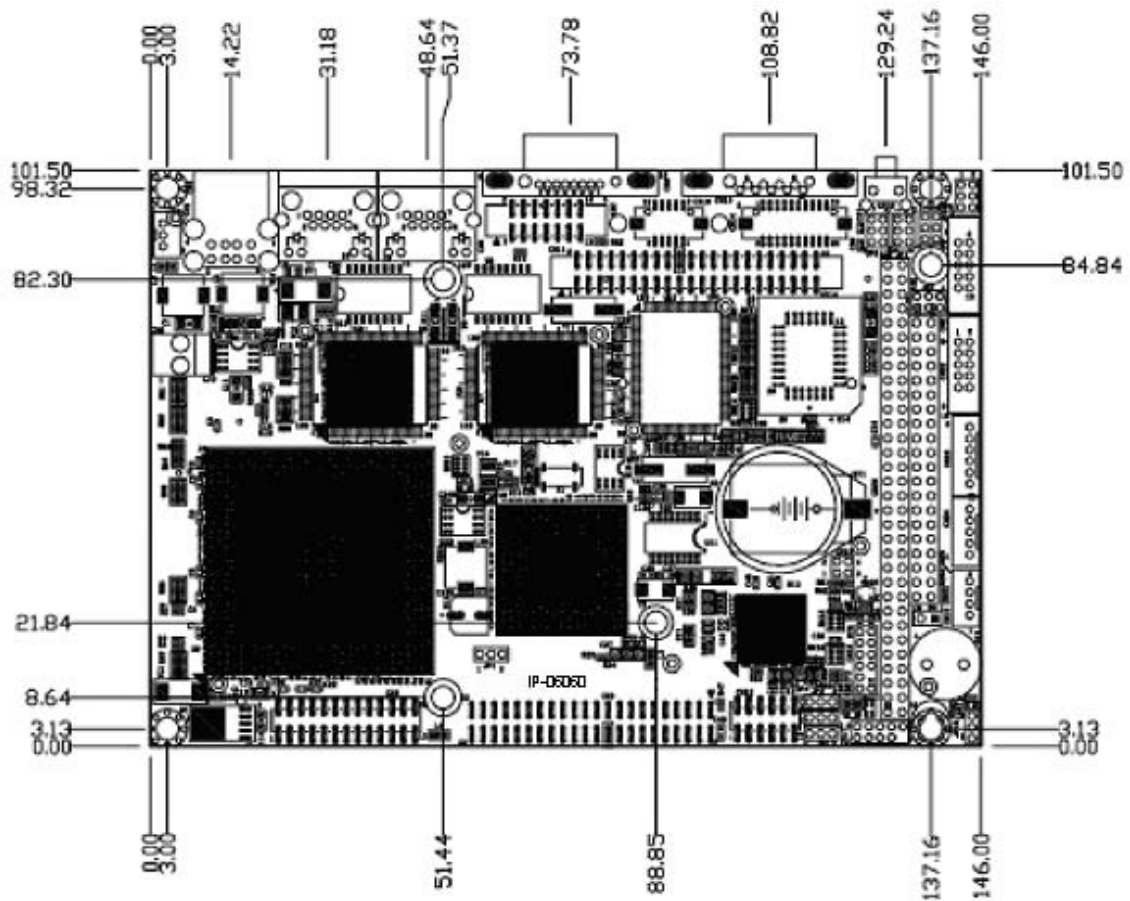**1-4. Board Layout 1-5. Board Dimension**
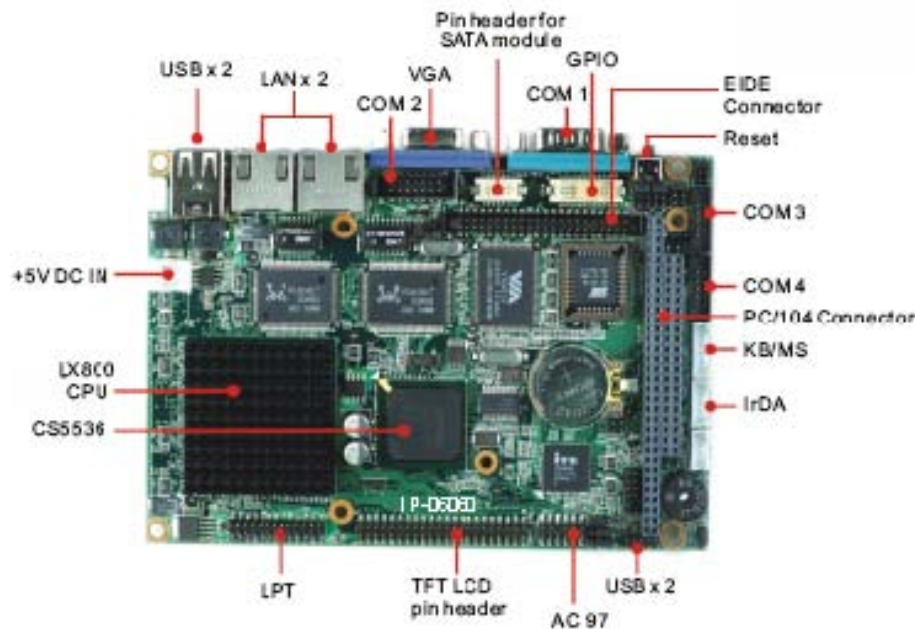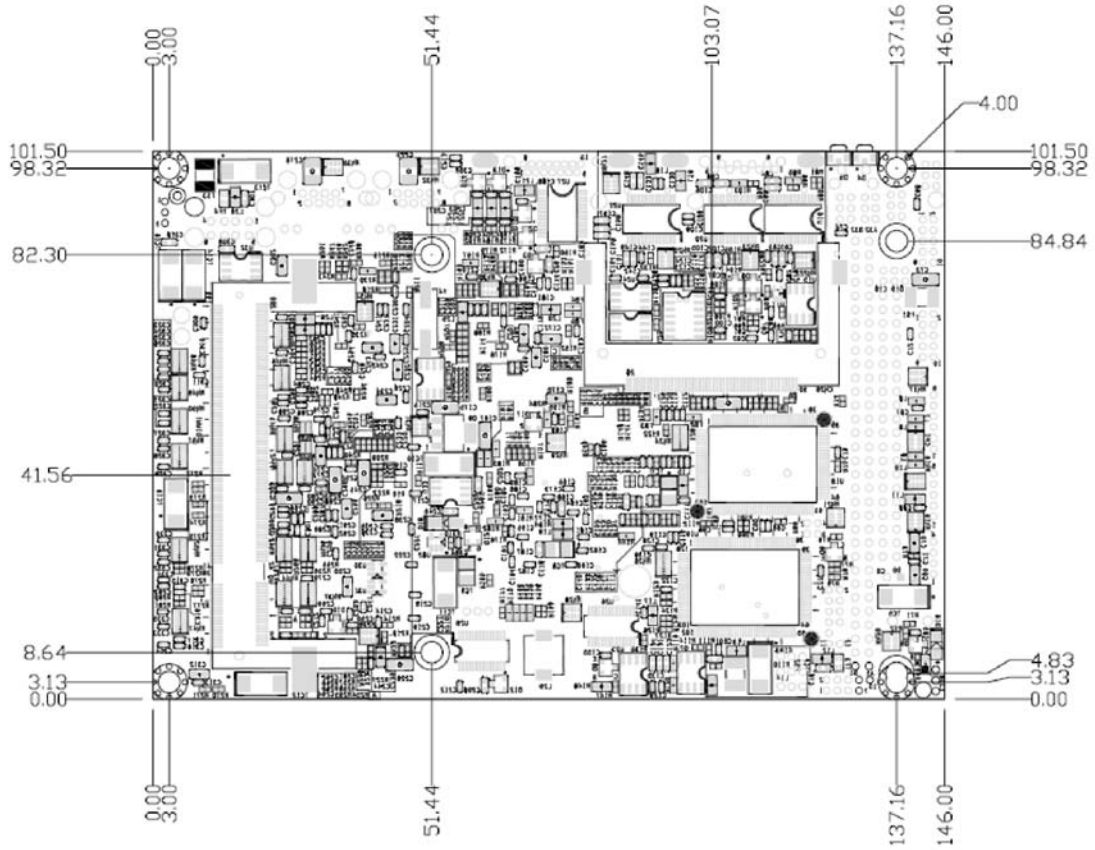
CompactFlash socket
DDR SO-DIMM

(Rear view)

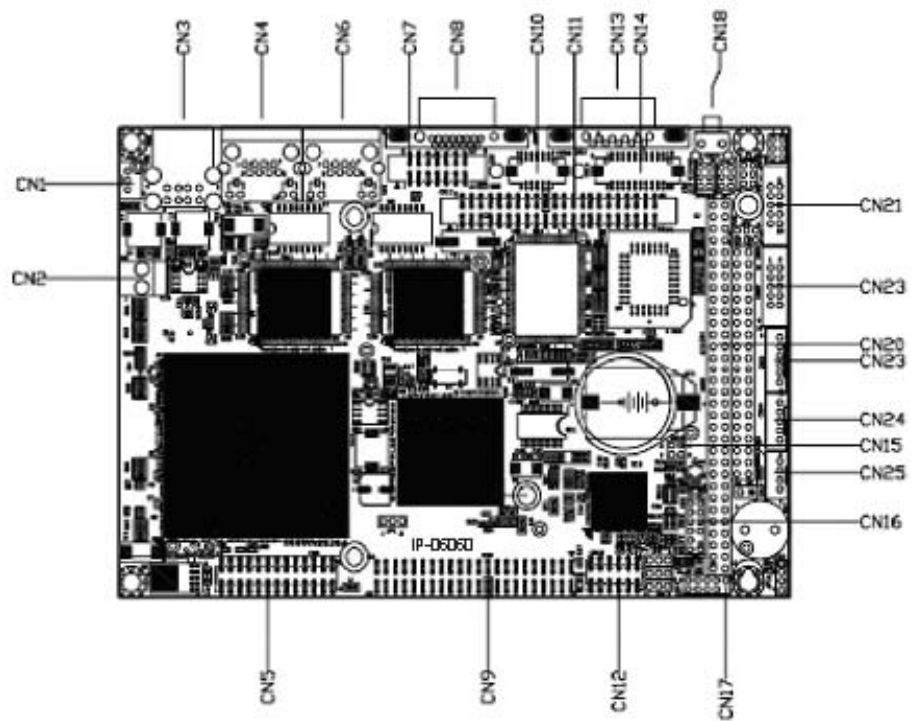**Board Dimension (mm)**

(Component Side)
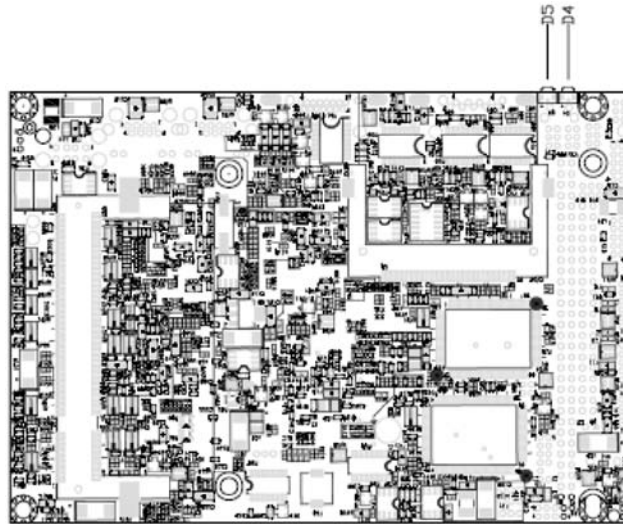
Board Dimension (mm) (Solder Side)

Chapter 2. Installation

## 2-1. Location of Connectors

(Component Side)

(Solder Side)

2-2. List of Connectors

Connectors	Description	Connectors	Description
CN1	ATX Power Connector	CN15	Power/LED Connector
CN2	Main Power Connector	CN16	
CN3	USB 1/2 Connector	CN17	USB 3/4 Connector
CN4	LAN1 Connector (RJ45)	CN18	Reset Switch
CN5	Parallel Connector	CN19	ATX Power Control Connector
CN6	LAN2 Connector (RJ45)	CN20	PC/104 Connector
CN7	COM2 Connector (Pin Header)	CN21	COM3 Connector (Pin Header)
CN8	VGA Connector (D-Sub)	CN22	COM4 Connector (Pin Header)
CN9	Flat Panel Connector	CN23	KB/Mouse Connector
CN10	S-ATA Connector	CN24	IR Connector
CN11	IDE Connector 44pin	CN25	Auxiliary Power Connector
CN12	AC 97 Audio Connector	D4	Power LED
CN13	COM1 Connector (D-Sub)	D5	HDD LED
CN14	GPIO Connector		

2-3. Location of Jumpers
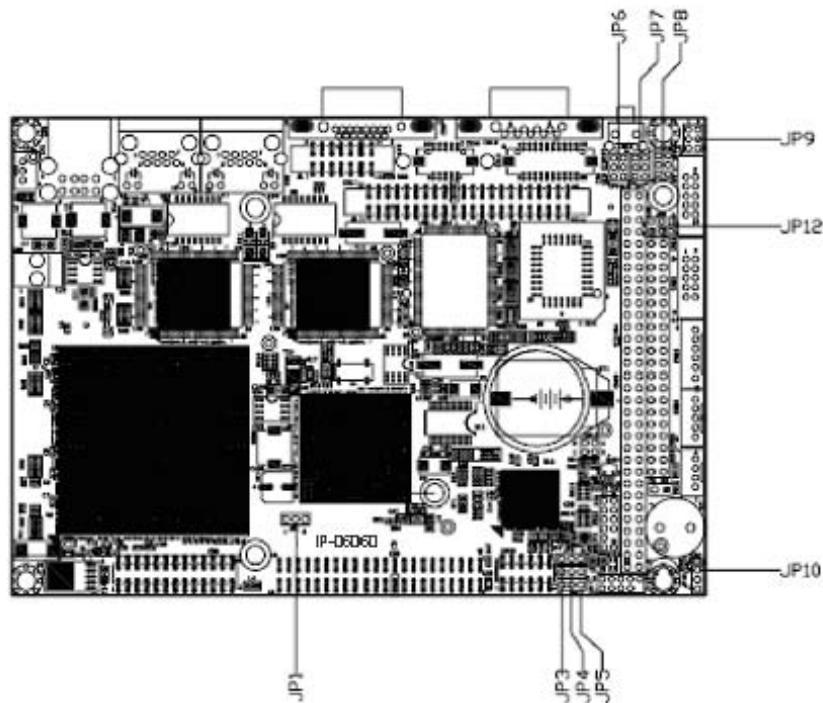
2-4. List of Jumpers

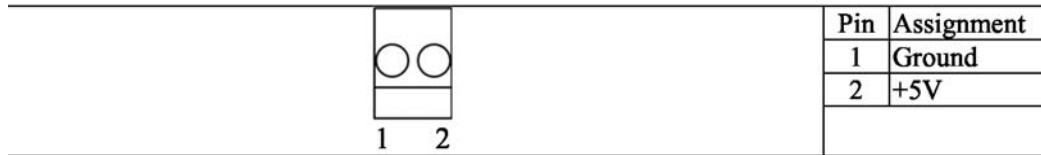| Pin	Define	Pin	Define
JP1	Memory Speed Selection	JP6	COM2 RI/Voltage Select
JP2	COM2 RS-232/422/485 Select	JP7	COM4 RI/Voltage Select
JP3	Clear CMOS	JP8	COM3 RI/Voltage Select
JP4	Reset Select	JP9	COM1 RI/Voltage Select
JP5	LCD Panel Voltage Selectt	JP10	AT/ATX Power Select

Connector Pin Assignment and Jumper Settings

CN1: ATX Power Connector

The IP-06060 supports a soft-power switch function if an ATX power supply is used. Note: Enable the soft power switch as follow: Connect the ATX-to-PS/2 power cable to CN1 and the ATX DC power connector

Pin	Assignment
1	5V Standby
2	NC
3	PS_On

CN2: Main Power Connector

Pin	Assignment
1	Ground
2	+5V
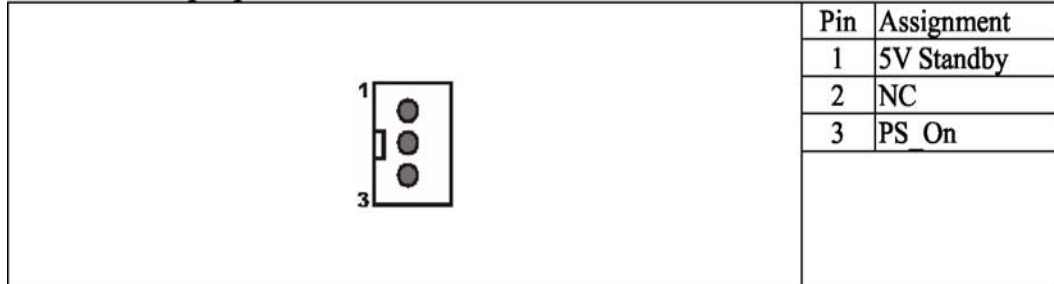
CN3: USB Connector The IP-06060 supports Four USB (Universal Serial Bus) ports, which give complete plug and play, hot attach/detach for up to 127 external devices. The USB interface complies with USB specification Rev. 1.0 and can be disabled in the system BIOS setup.

**CN4, CN6: LAN1/LAN2 10/100BaseT RJ-45 Connector**

The IP-06060 features onboard dual Ethernet RJ-45 connectors, the onboard Intel® 82559ER or Realtek RTL8139C+ fast Ethernet controller supports 10Mbps and 100Mbps N-Way auto-negotiation operations.

Pin	Define
1	TX0+
2	TX0-
3	RX0+
4	NC
5	NC
6	RX0-
7	NC
8	NC
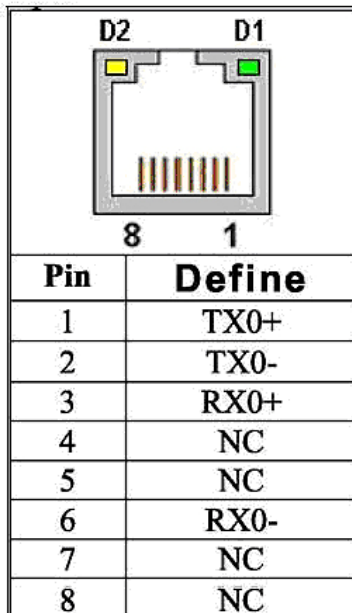
| D1: Speed indicated LED	
10 Mbps	DIM
100 Mbps	GREEN
2-1 D2 :Link/Activity LED	
Link	YELLOW
Activity	BLINKING

CN5: Parallel Port Connector

The IP-06060 supports one parallel port, accessed through CN5. You need an adapter cable if you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB25 connector on the other. The port is designed as LPT1 and can be disabled or changed to LPT2 or LPT3 in the BIOS Integrated Peripherals setup. You also can select the ECP/EPP mode in the BIOS Integrated Peripherals setup.
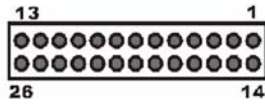
Pin	Assignment	Pin	Assignment
1	STRPBE	2	PD0
3	PD1	4	PD2
5	PD3	6	PD4
7	PD5	8	PD6
9	PD7	10	ACK#
11	BUSY	12	PE
13	SLCT	14	AUTOFD
15	ERR	16	INIT
17	SLCTIN	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground	26	Ground

CN7: COM2 RS-232/422/485 PIN-Header
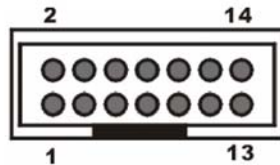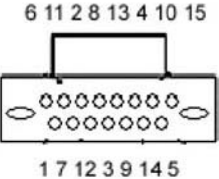
Pin	Assignment
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	Ground
10	NC
11	422/485TX+
12	422/485TX-
13	422RXD+
14	422RXD-

CN8: VGA Connector
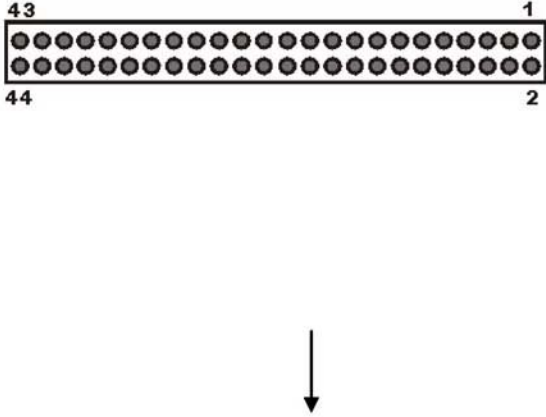
The IP-06060 supports a standard D-SUB VGA connector for CRT display.

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	NC
5	Ground
6	Ground
7	Ground
8	Ground
9	NC
10	Ground
11	NC
12	DDC Data
13	H-SYNC
14	V-SYNC
15	DDC Clock
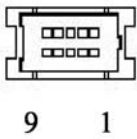
CN9: Flat Panel Connector

Pin	Signal	Pin	Signal
1	12V	2	12V
3	Ground	4	Ground
5	Vcc LCD	6	Vcc LCD
7	RS#	8	Ground
9	LCD-B0	10	LCD_B1
11	LCD_B2	12	LCD_B3
13	LCD_B4	14	LCD_B5
15	LCD_B6	16	LCD_B7
17	LCD_G0	18	LCD_G1
19	LCD_G2	20	LCD_G3
21	LCD_G4	22	LCD_G5
23	LCD_G6	24	LCD_G7
25	LCD_R0	26	LCD_R1
27	LCD_R2	28	LCD_R3
29	LCD_R4	30	LCD_R5
31	LCD_R6	32	LCD_R7
33	Ground	34	Ground
35	SHFCLK	36	FPVSYNC
37	DE	38	FPHSYNC
39	Ground	40	FPBKLEN
41	SMB_SCL	42	SMB-SDA
43	VDDEN	44	Vcc LCD
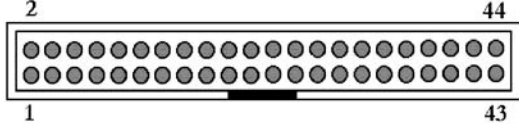
CN10 S-ATA Connector

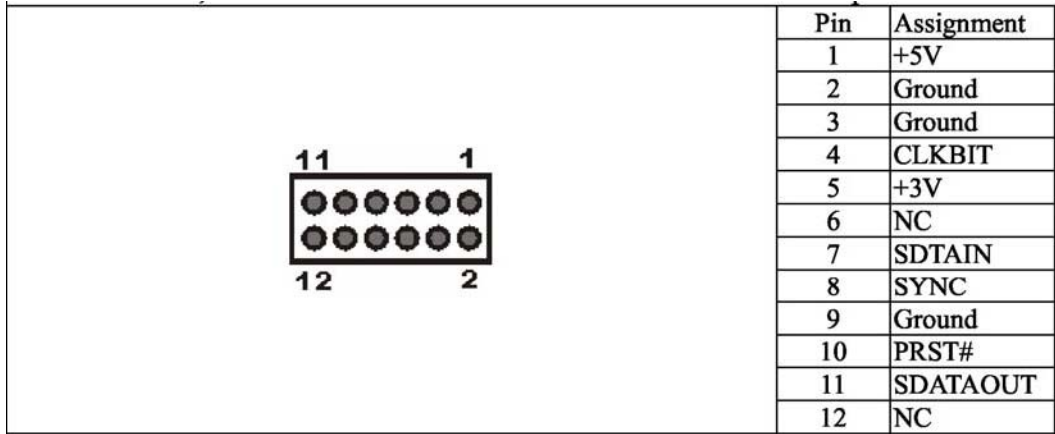| Pin	Assignment
1	TX2+
2	TX1+
3	TX2-
4	TX1-
5	Ground
6	Ground
7	RX2-
8	RX1-
9	RX2+
10	RX1+

CN11: IDE Connector

You are able to configure two hard disks to Master mode by using one ribbon cable on the primary IDE connector and another on the secondary IDE connector.

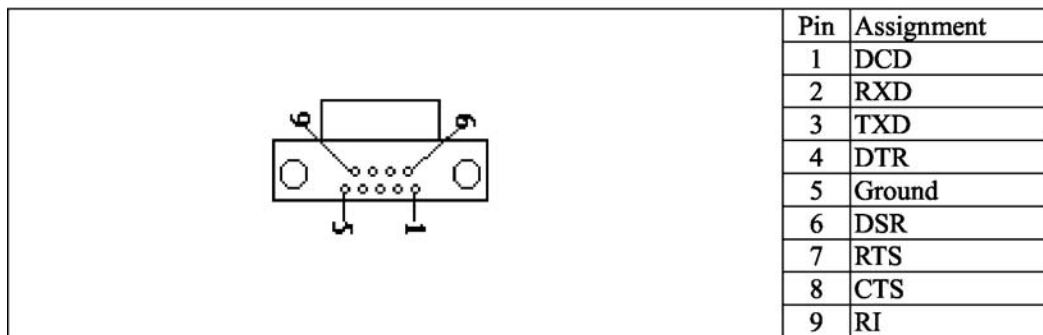| Pin	Signal	Pin	Signal
1	Reset	23	IOW#
2	Ground	24	Ground
3	Data7	25	IOR#
4	Data8	26	Ground
5	Data6	27	IRDY
6	Data9	28	Ground
7	Data5	29	DACK#
8	Data10	30	Ground
9	Data4	31	IRQ14
10	Data11	32	NC
11	Data3	33	Address 1
12	Data12	34	Detect
13	Data2	35	Address 0
14	Data13	36	Address 2
15	Data1	37	Select 0
16	Data14	38	Select 1
17	Data0	39	Active
18	Data15	40	Ground
19	Ground	41	+5V
20	NC	42	+5V
21	DREQ	43	Ground
22	Ground	44	NC

CN12: Audio Connector

This connector is used to connect a CD Audio cable, depending on the type of installed CD-ROM drive; connect the CD-ROM drive cable to one of these 12-pin connectors.

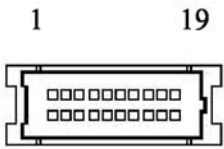| Pin	Assignment
1	+5V
2	Ground
3	Ground
4	CLKBIT
5	+3V
6	NC
7	SDTAIN
8	SYNC
9	Ground
10	PRST#
11	SDATAOUT
12	NC

CN13, CN7, CN21, CN22: Serial Ports

The IP-06060 supports four serial ports: three RS-232 (COM1/COM3/COM4) and one RS-232/422/485 (COM2). The COM1(CN13) is D-Sub connector and COM2/COM3/COM4 are pin header type. These ports allow you to connect serial devices such as mouse, printer and more. You need an adapter cable if you use a traditional DB-9 connector for COM2/COM3/COM4. The COM2 cable has 14-pin and COM3/COM4 has 10-pin.

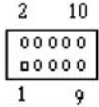The COM2 designed as RS232 and can be changed to RS-422/485 in the JP5.

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

CN14 GPIO Connector

Pin	Assignment	Pin	Assignment
1	GPI0	2	GPI1
3	GPI2	4	GPI3
5	GPI4	6	GPI5
7	GPI6	8	GPI7
9	Ground	10	+5V
11	GPO0	12	GPO1
13	GPO2	14	GPO3
15	GPO4	16	GPO5
17	GPO6	18	GPO7
19	Ground	20	+5V

CN15: Power LED/ HDD LED Connector CN17: USB Connector

Pin	Assignment
1	Power LED+
2	HDD LED+
3	Power LED-
4	HDD LED-

The IP-06060 supports four USB ports, CN17 with 2.0mm pitch pin header for USB3/4, which give complete plug and play, hot attach/detach for up to 127 external devices. The USB interface complies with USB specification Rev. 1.0 and can be disabled in the system BIOS setup.

Pin	Define	Pin	Define
1	+5V	2	+5V
3	Data2-	4	Data3-
5	Data2+	6	Data+
7	Ground	8	Ground
9	NC	10	Ground

CN19: ATX Power Control Connector CN20: PC/104 Connector

Pin	Assignment
1	PANSW-
2	PANSW+

CN20 is a standard PC/ 104 bus connector and it is fully occupied with the signals of the "ISA" (PC/AT) bus. It offers full architecture, hardware and software compatibility with the ISA bus
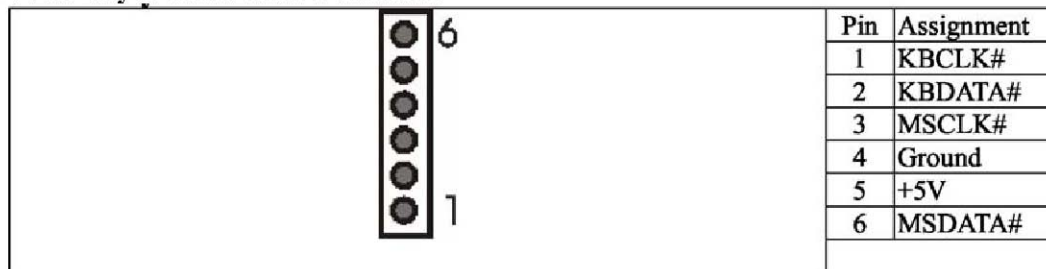
Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin
Ground	C0	Ground	D0	IOCHCHK	A1	Ground	B1
SBHE*	C1	MEMCS16*	D1	SD7	A2	RESET	B2
LA23	C2	IOSC16*	D2	SD6	A3	+5V	B3
LA22	C3	IRQ10	D3	SD5	A4	IRQ9	B4
LA21	C4	IRQ11	D4	SD4	A5	-5V	B5
LA20	C5	IRQ12	D5	SD3	A6	NC	B6
LA19	C6	IRQ15	D6	SD2	A7	-12V	B7
LA18	C7	IRQ14	D7	SD1	A8	0 wait state	B8
LA17	C8	NC	D8	SD0	A9	+12V	B9
MEMR*	C9	NC	D9	IOCHRDY	A10	Ground	B10
MEMW*	C10	NC	D10	AEN	A11	SMEMW#	B11
SD8	C11	NC	D11	SA19	A12	SMEMR*	B12
SD9	C12	NC	D12	SA18	A13	IOW*	B13
SD10	C13	NC	D13	SA17	A14	IOR*	B14
SD11	C14	NC	D14	SA16	A15	NC	B15
SD12	C15	NC	D15	SA15	A16	NC	B16
SD13	C16	+5V	D16	SA14	A17	NC	B17
SD14	C17	MASTER*	D17	SA13	A18	NC	B18
SD15	C18	Ground	D18	SA12	A19	REFRESH*	B19
NC	C19	Ground	D19	SA11	A20	SYSCLK	B20
				SA10	A21	IRQ7	B21
				SA9	A22	IRQ6	B22
				SA8	A23	IRQ5	B23
				SA7	A24	IRQ4	B24
				SA6	A25	IRQ3	B25
				SA5	A26	NC	B26
				SA4	A27	TC	B27
				SA3	A28	BALE	B28
				SA2	A29	+5V	B29
				SA1	A30	OSC	B30
				SA0	A31	Ground	B31
				Ground	A32	Ground	B32

See how to install the PC/104 module in Appendix C.
CN21, CN22: COM3, COM4 Pin-Header Connector

Pin	Assignment
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	Ground
10	NC
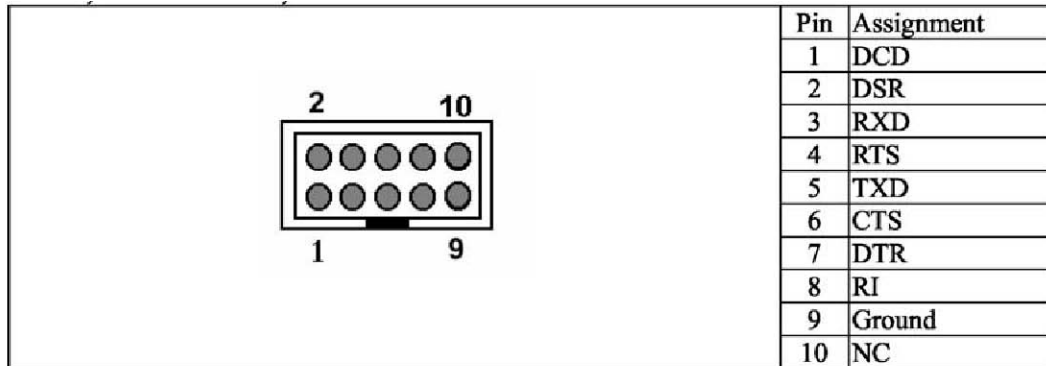
CN23: Keyboard/Mouse Connector

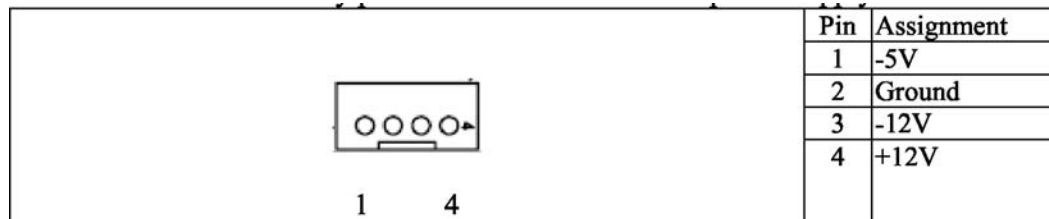| Pin	Assignment
1	KBCLK#
2	KBDATA#
3	MSCLK#
4	Ground
5	+5V
6	MSDATA#

CN24: IR Connector The IrDA connector (CN24) can be configured to support a wireless infrared module. With this module and application software such as Laplink or a WIN95/98 direct cable connection, you can transfer files to or from Laptops, Notebooks, PDAs, and printers. This connector supports HPSIR (115.2kbps, 2 meters) and ASK-IR (56Kbps). Connect an infrared module to the IrDA connector and enable the infrared function in the BIOS setup.

Pin	Assignment
1	Vcc
2	NC
3	IR Receiver
4	Ground
5	IR Transmitter
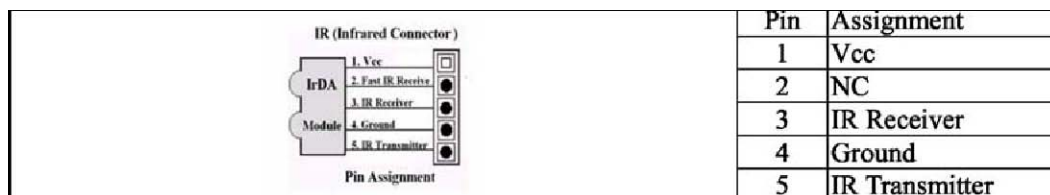
CN25: Auxiliary Power Connector The IP-06060 supports an auxiliary power connector that includes +12V, –5V and –12V voltages. It supports some PCI add-on cards or PC/104 modules that require these voltages. Connect the auxiliary power cable to CN25and the power supply DC connector.

Pin	Assignment
1	-5V
2	Ground
3	-12V
4	+12V

1   4

JP1: Memory Speed Selection

Setting		Define
1 2 3	1-2	400
1 2 3	2-3 (Default)	333

JP2: COM2 RS-232/422/485 Selector (Default: RS-232)

Setting		COM Ports
2 4 6 / 1 3 5	1-2 (Default)	RS-232
2 4 6 / 1 3 5	3-4	RS-422
2 4 6 / 1 3 5	5-6	RS-485

JP3: CMOS Clear
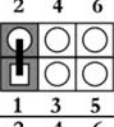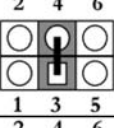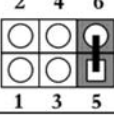
Setting		Define
1 2 3	1-2	Normal Status (Default)
1 2 3	2-3	Clear CMOS

JP4: Watchdog Time Mode Select

| Setting		Define
1 2 3	1-2	IRQ11
1 2 3	2-3	Reset Switch (Default)

JP5: LCD Panel Volta^ge Select **JP9, JP6, JP8, JP7: COM1 – COM4 RI/Voltage Select**

Setting		Define
1 2 3	1-2	+5V
1 2 3	2-3	+3.3V (Default)

Setting		COM Port	RI/Voltage
2 4 6 / 1 3 5	1-2 (Default)	COM1/COM2/COM3/COM4	Ring
2 4 6 / 1 3 5	3-4	COM1/COM2/COM3/COM4	5V
2 4 6 / 1 3 5	5-6	COM1/COM2/COM3/COM4	12V

JP10: AT/ATX Power Select

Setting		Define
1 2 3	1-2	ATX
1 2 3	2-3	AT (Default)

Appendix A. Programming the Watchdog Timer

The IP-06060 provides a watchdog timer that resets the CPU or generates an interrupt if processing is interrupted. This function ensures greater system reliability in industrial stand-alone and unmanned environments.

In order to enable the watchdog timer, you have to output the value of the watchdog timer interval to the controller. The value range is from 01H to FFH; and the related time watchdog timer interval is 1 sec to 255 sec.

Data	Timer interval
00	Disabled
01	1 sec
02	2 sec
*	*
*	*
FF	255 sec

If you want to disable the watchdog timer just set the timer interval value to 00H.

After setting the timer interval value the watchdog timer begins to count down. You have to refresh the watchdog timer so that the watchdog timer will return to its initial value, otherwise, your system will reset after a time-out. The following program shows how to set the watchdog timer:

ASSEMBLY LANGUAGE	DOS DEBUG

Program 1: Initializing the watchdog controller

ASSEMBLY LANGUAGE	DOS DEBUG
MOV DX,2EH	O 2E 87
MOV AL,87H	O 2E 87
OUT DX,AL	
OUT DX,AL	
MOV DX,2EH	O 2E 07
MOV AL,07H	O 2F 08
OUT DX,AL	
MOV DX,2FH	
MOV AL,08H	
OUT DX,AL	
MOV DX,2EH	O 2E 30
MOV AL,30H	O 2F 01
OUT DX,AL	
MOV DX,2FH	
MOV AL,01H	
OUT DX,AL	

Program 2: Writing a watchdog timer interval value

ASSEMBLY LANGUAGE	DOS DEBUG
MOV DX,2E ; Set timer interval value to 16 seconds	O 2E F6
MOV AL,F6H	O 2F XX
OUT DX,AL	O 2E AA
MOV DX,2FH	
MOV AL,XXH ; Timer interval *** see note ***	
OUT DX,AL	
MOV DX,2EH	
MOV AL,AAH	
OUT DX,AL	

Note: This XX value range is from 01 H to FFH, and the related watchdog timer interval is 1 sec. to 255 sec. (as in the previous description).