



ITX610D User Manual

Issue 1.1

www.CoreIPC.com

Security Guidance

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- To help you use the CoreIPC motherboard, please read the [User Manual] carefully.
- For product-related information, please be sure to read these safety instructions carefully.
- Identifying the Product Version

You can find the version of this motherboard labeled [Issue:X.X] on the motherboard itself. X.X represents a number; for example, a label reading [Issue1.0] indicates that the version of this motherboard is 1.0. Please note the product version when updating the motherboard's BIOS or drivers, or when referring to other technical documentation.

Basic Safety Tips

1. Before using this product, please be sure to read the product manual carefully.
2. Any cards not yet ready for installation should be stored in anti-static bags.
3. Before removing the board from the antistatic bag, place your hand on a grounded metal object for a moment (such as 10 seconds) to discharge any static electricity from your body and hands.
4. When handling circuit boards, you must wear anti-static gloves and make it a habit to touch only the edges.
5. To prevent electric shock or damage to the product, be sure to turn off the AC power before inserting, removing, or reconfiguring the board.
6. Before moving a board or the entire unit, you must first turn off the AC power.
7. For complete systems, be sure to turn off the AC power before adding or removing any boards.
8. Before connecting or disconnecting any device, you must first turn off the AC power.

9. To avoid unnecessary damage to the product caused by frequent power cycles, wait at least 30 seconds after turning it off before turning it back on.

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Ordering Information

No.	Model	Chipset	DDR	HDMI	VGA	LVDS	LAN	USB	PS2	LPT	COM/ 485	POWER
1	ITXH610D-L26 VER1.1	H610/B660	DDR4	1	1	1	2	8	0	0	6/2	12-19V
2	ITXH610D-L16 VER1.1	H610/B660	DDR4	1	1	1	1	8	0	0	6/2	12-19V
3	ITXH610D-L12 VER1.1	H610/B660	DDR4	1	1	1	1	8	0	0	2/1	12-19V

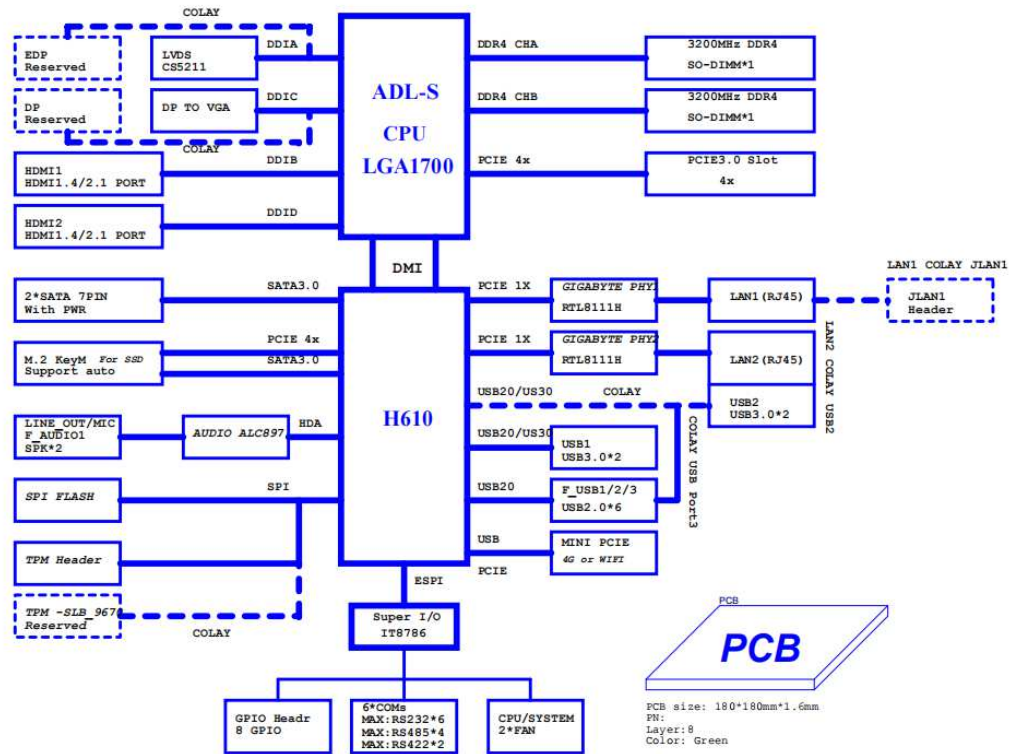
1. Product Description

ITXH 610D is a CoreIPC ITX industrial motherboard supporting Intel LGA1700 Pentium/Celeron/I3/I5/I7 Pin12/13/14th-generation processors. It is widely applicable to commercial displays, machine vision, medical instruments, industrial control, financial equipment, cloud terminals, and other fields.

ITXH610DThe main features of the motherboard are as follows:

- Supports Intel Pin12/13/14th-generation LGA1700 Pentium/Celeron/I3/I5/I7 series processors;
- Supports dual-channel 3200MHz DDR4 SO-DIMM memory, up to 64GB;
- Display support includes VGA or DP、LVD Sore DP、HDMI or dual-stack HDMI display interfaces, supporting three simultaneous or independent displays;
- Supports 2×Realtek Gigabit Ethernet ports;
- Supports 1×M.2 Key-MNVME or SATA auto-detectionSSD;
- Supports 1×Mini-PCle (WIFI/4G) ;
- Supports one Pcie 4.0 X4 SLOT;
- Supports 9×USB interface;
- Onboard 6×RS232 serial ports, supporting up to 4×RS485.

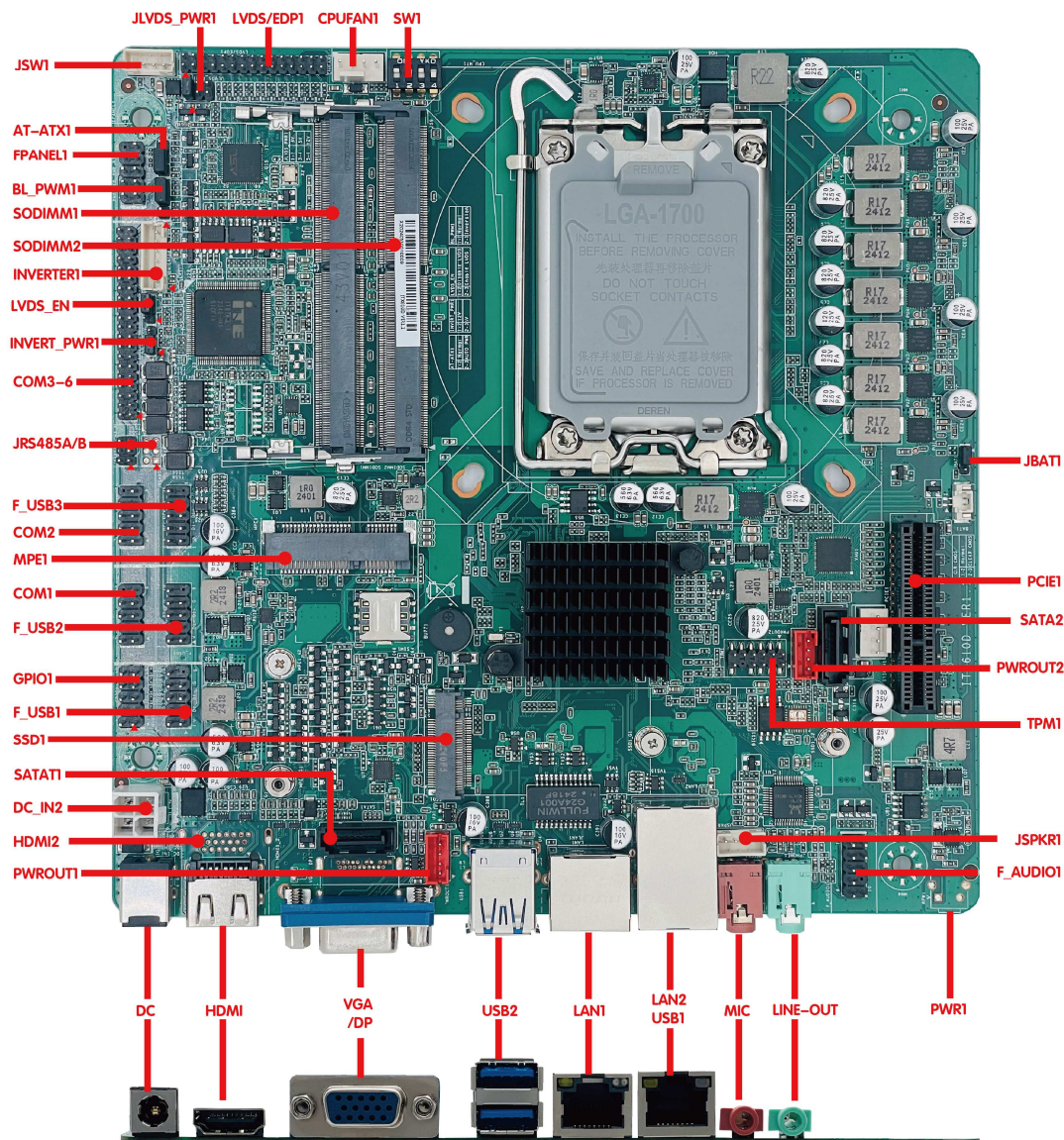
2. Motherboard Block Diagram



3. Motherboard Specifications

Item	Description
Processor	Supports 12/13/14th-generation LGA1700 Intel® Celeron/Pentium/Core™ i3/i5/i7 Processor
Chipset	Uses Intel® H610、B660 or Q670 high-speed chipset
Memory	2*SO-DIMM SO-DIMM slots supporting dual-channel 3200 DDR4 memory, up to 64GB
Display	Integrated Intel® UHD Graphics integrated graphics supports DirectX12, OpenGL4.5, Supports 4K display
	1* VGA interface, maximum resolution 1920*1080@60HZ, optional support for DP display interface, maximum resolution 4096x2160@60Hz
	1* HDMI2.0 interface; optional dual-stack HDMI display interface, maximum resolution 4096x2160@60Hz
	1* LVDS interface; optional support for EDP display interface
Network	2* Realtek Realtek Gigabit Ethernet controllers, supporting Wake-on-LAN and PXE boot/PXE
Storage	2* SATA3.0 Interface
	1* M.2 Key M 2280/2242 PCIe3.0 X4 slot supporting NVME and SATA storage-device auto-detection
Audio	Onboard ALC897 6-channel high-definition audio controller supporting MIC /Line-out/amplifier (supports 2ohm5W)
Expansion Slots	1* Mini-PCIe slot supporting WIFI/4G
	1* PCIe4.0 X4 Slots lot
Rear Panel/Interface	1* HDMI2.0 display interface (optional dual-stack HDMI display interface)
	1* VGA display interface (optional DP interface)
	4* USB3.0 ports (of which USB1 and LAN2 are mutually exclusive; dual-LAN configuration supports only 2*USB3.0)
	1* Clear CMOS push-button switch
	2* RJ-45 Gigabit Ethernet ports (LAN2 and LAN2 and 2*USB3.0 are mutually exclusive)
	1* Line out Interface (green), 1* MIC Interface (red)
	1* 12~19V DCDC power input
Onboard/Interface	2* RS485 header 2*3 Pin By default, only 2*RS485. Up to 4*RS485 Interface, or 2*RS422
	1* LVDS interface 2*15 Pin, Supports dual-channel 24bit; component changes can enable EDP display
	1* display backlight power connector 1*6 Pin
	3* USB2.0 header 2*5 Pin, supporting expansion to 6*USB2.0 (the single-LAN version supports only 5*USB2.0, of which 1*USB2.0 signal is shared with LAN2 shared)
	1* front-panel audio header 2*5 Pin, supporting line-out and MIC in

	1* amplifier connector 1*4 Pin (small white connector located near the audio interface)
	6* COM header interfaces (COM1~6 default to RS232, of which COM1 optional support for RS485/422, COM2 optional support for RS485)
	1* ATX power connector 2*2 Pin
	2* SATA drive power connector (small red connector)
	1* front-panel switch, button, and LED header 2*5 Pin
Fan Connectors	1*4 Pin CPU fan connector; 1*4 Pin system fan connector
GPIO	Supports 4 channels of input/output GPIO
TPM	Supports TPM2.0 external header 2*6Pin, Supports onboard TPM2.0 Onboard
BIOS	64Mb Flash ROM
Watchdog Timer	Supports hardware reset (256levels,0~255seconds)
Operating System	Windows 10/11 Linux
Power Input	Supports 12~19V DCDC power input
Operating Temperature	60°C~-10°C
Storage Temperature	-20°C~70°C
Operating Humidity	5%-95% relative humidity, non-condensing
Dimensions	180mm x 180mm



The image can be enlarged. Pin1 Pinof each header is marked with a red triangle;
The image above shows the ITXH610D-L26 VER1.1 actual product; for reference only.

4. Board Installation

Safety Precautions

Before installing the motherboard, please read and follow the safety precautions below:

- Do not remove or damage the serial number label, distributor warranty label, or any other warranty-related labels on the motherboard before installation. Otherwise, it may affect the warranty validation.
- Before installing or removing the motherboard or any other hardware devices, make sure the power is turned off and the power cord is unplugged from the power outlet.
- When installing hardware devices into the motherboard connectors or slots, make sure the connectors are firmly and properly seated.
- When handling the motherboard, avoid touching the metal contacts or circuit areas to prevent short circuits.
- When handling the motherboard, CPU, or memory module, it is recommended to wear an anti-static wrist strap. If an anti-static wrist strap is not available, make sure your hands are dry and touch a grounded metal object first to discharge static electricity.
- Before installation, place the motherboard on an anti-static mat or inside an anti-static bag.
- Before unplugging the power connector from the motherboard, make sure the power supply is turned off.
- Before turning on the power, make sure the power supply voltage is set according to the local voltage standard.
- Before turning on the power, make sure all hardware cables and power cables are correctly connected.
- Do not allow screws to contact the circuits or components on the motherboard, as this may cause damage or malfunction.
- Make sure no screws or metal objects are left on the motherboard or inside the computer chassis.
- Do not place the computer system on an unstable surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the power during installation may cause damage to the motherboard, other devices, or personal injury.
- If you are not familiar with the installation process, or if you encounter any technical problems while using this product, please consult qualified technical personnel.

Memory Installation

This motherboard provides **2× 260-pin DDR4 SO-DIMM memory slot**.

Before installing the memory module, please note the following:

- 1) Make sure the memory module you purchased is compatible with the specifications supported by this motherboard.
- 2) Before installing or removing the memory module, make sure the computer power is

turned off to prevent damage.

- 3) The memory module is designed with a foolproof notch. If the insertion direction is incorrect, the module cannot be inserted. In this case, please change the insertion direction immediately.

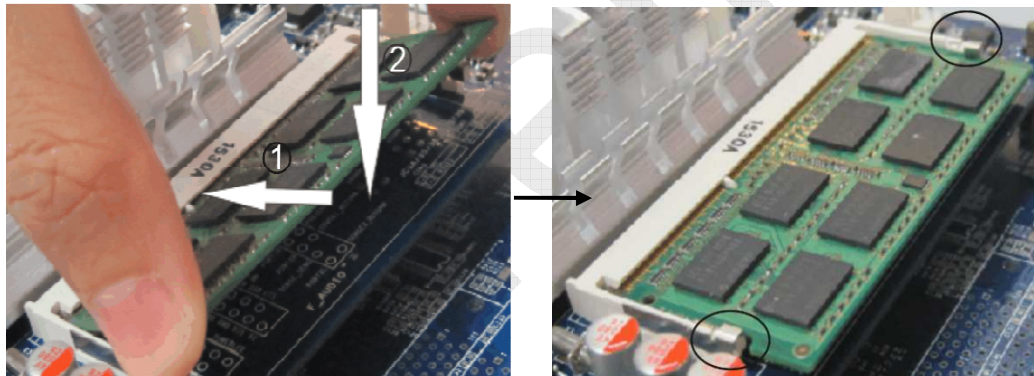
Memory Installation Steps:

- 1) Before installing or removing the memory module, turn off the power and unplug the AC power cord.
- 2) Carefully hold the memory module by both edges. Do not touch the metal contacts.
- 3) Align the gold fingers of the memory module with the memory slot. Make sure the notch on the memory module matches the key in the slot.
- 4) Insert the memory module into the slot at an angle of approximately 30 degrees, then gently press it down until you hear a “click” sound. This indicates that the memory module has been properly installed and is ready for use.

Note: Do not apply excessive force when pressing down the memory module to avoid damage.

- 5) To remove the memory module, push the retaining clips on both sides of the DIMM slot outward at the same time, then remove the memory module carefully.

Note: The installation diagram is for reference only.

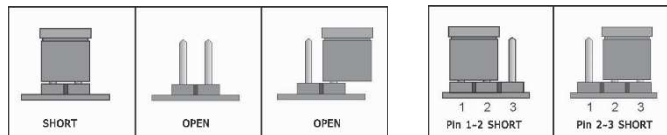


5. Jumper Settings

Jumper Description

For a **2-pin header**, installing a jumper cap on the two pins will close the circuit, creating a short connection.

For a **3-pin header**, the jumper cap can be installed on **Pin 1–2** or **Pin 2–3** to close the corresponding circuit and create a short connection.



How to Identify Pin 1 of a Jumper?

- 1) Carefully check the motherboard. The pin marked with “1” or indicated by a thick white line is usually Pin 1.
- 2) Check the solder pads on the back side of the motherboard. In most cases, the square solder pad indicates Pin 1.

Clear CMOS Jumper:

The motherboard provides 1 × 1×3-pin Clear CMOS header JBAT1 for clearing or retaining CMOS settings.

Pin pitch: 2.54 mm

The CMOS is powered by the onboard button battery. Clearing the CMOS will permanently erase the previous system configuration and restore the system settings to the default factory values.

To clear the CMOS, follow the steps below:

- 1) Turn off the computer and disconnect the power supply.
- 2) Short Pin 2–3 of JBAT1 for approximately 5 seconds.
- 3) Power on the computer.
- 4) During startup, follow the on-screen prompt to enter BIOS Setup, then load the optimized default settings.
- 5) Save the settings and exit BIOS Setup.

Pin definition is shown below:

JBAT1 Definition:

Function	JBAT1 Setting
Normal operation	Pin 1–2 shorted
Clear CMOS and restore all BIOS settings to factory defaults	Pin 2–3 shorted

AT/ATX Power Mode Jumper

The motherboard provides **1 × 1×3-pin AT-ATX1 jumper** for selecting the power-on mode.

Pin pitch: 2.54 mm

The power-on behavior can be configured by the jumper setting.

AT-ATX1 Definition:

Function	AT-ATX1 Setting
Disable Auto Power-on	1-2Pin
Enable Auto Power-on	2-3Pin

6. Pin Definitions

6.1. The motherboard provides a total of 6 serial ports, including COM1 and COM2 is 2*5 Pin standard single-COM header ports (pitch:2.54mm), and can be controlled through BIOS control to support RS485, COM3-6 is 2*20 Pin header terminal; COM1、COM2 standard Pin Definition:

Pin	Signal Name	Pin	Signal Name
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	NC

The motherboard provides 2*2*3 Pin RS485 wiring header (pitch2.00mm). COM1、COM2 To support RS485 operation, connect the cable directly to the JRS485A header, COM3、COM4 To support RS485 operation, connect the cable directly to the JRS485B header, and configure it through BIOS settings (located at BIOS>Advanced>IT8786 Super IO Configuration>Serial Port 1 Configuration>Serial Port mode Select =RS-232/RS485, COM2 RS485 in Serial Port 2 Configuration) .

JRS485A/B Pindefinition is as follows:

Pin	Signal Name	Pin	Signal Name
1	TXD+(A1)	2	TXD-(B1)
3	RXD+(A2)	4	RXD-(B2)
5	+5V	6	GND

Note: COM1 and COM2 RS232/RS485 mode switching is performed through BIOS for switching.

The motherboard provides 1*2*20 Pin standard 4 standard serial-port header (pitch:2.0mm), COM3-6 Definition:

Pin	Signal Name	Pin	Signal Name
1	COM3_DCD	2	COM3_RXD
3	COM3_TXD	4	COM3_DTR
5	GND	6	COM3_DSR
7	COM3_RTS	8	COM3_CTS
9	COM3-RI	10	NC
11	COM4_DCD	12	COM4_RXD
13	COM4_TXD	14	COM4_DTR
15	GND	16	COM4_DSR
17	COM4_RTS	18	COM4_CTS
19	COM4-RI	20	NC
21	COM5_DCD	22	COM5_RXD
23	COM5_TXD	24	COM5_DTR
25	GND	26	COM5_DSR
27	COM5_RTS	28	COM5_CTS
29	COM5-RI	30	NC
31	COM6_DCD	32	COM6_RXD
33	COM6_TXD	34	COM6_DTR
35	GND	36	COM6_DSR
37	COM6_RTS	38	COM6_CTS
39	COM6-RI	40	NC

6.2. The motherboard provides 1*2*15 Pin LVDS header (pitch:2.0mm) , LVDS 1 Pin definition is as follows:

Pin	Signal Name	Pin	Signal Name
1	LCDVDD	2	LCDVDD

3	LCDVDD	4	NC
5	GND	6	GND
7	LVDS_A0-	8	LVDS_A0+
9	LVDS_A1-	10	LVDS_A1+
11	LVDS_A2-	12	LVDS_A2+
13	GND	14	GND
15	LVDSA_CLK-	16	LVDSA_CLK+
17	LVDS_A3-	18	LVDS_A3+
19	LVDS_B0-	20	LVDS_B0+
21	LVDS_B1-	22	LVDS_B1+
23	LVDS_B2-	24	LVDS_B2+
25	GND	26	GND
27	LVDSB_CLK-	28	LVDSB_CLK+
29	LVDS_B3-	30	LVDS_B3+

For conversion to EDP refer to the following definition:

PIN	Signal Name	PIN	Signal Name
1	PVDD	2	PVDD
3	NC	4	NC
5	EDP_TX0+	6	EDP_TX0-
7	GND	8	GND
9	EDP_TX1+	10	EDP_TX1-
11	GND	12	GND
13	EDP_TX2+	14	EDP_TX2-
15	GND	16	GND
17	EDP_TX3+	18	EDP_TX3-
19	GND	20	GND
21	EDP_AUX+	22	EDP_AUX-
23	GND	24	HPD_DET
25	BKLT_PWMBacklight Brightness Control	26	BKLT_EN(Backlight Enable)
27	GND	28	GND
29	INVERT_PWR(Backlight Power)	30	INVERT_PWR(Backlight Power)

The board provides 3.3V、5V、12V three panel operating voltage options, and 5V and 12V panel backlight power supply voltage options;

Before using LVDS, first determine the required rated operating voltage. When the selected LCD voltage matches the LCD panel voltage, LCD the panel will display correctly. Configure it as follows:

INVERTER1(backlight power connector)Definition:

Pin	Signal Name
1	12V/5V(INVERT_PWR1Setting)
2	12V/5V(INVERT_PWR1Setting)
3	Backlight Enable
4	Backlight Brightness Control
5	GND
6	GND

INVERT_PWR1(panel backlight power)Setting:

Interface	Function	INVERT_PWR1 Setting
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LVDS/EDP	12V (Default)	1-2 Pin
	5V	2-3 Pin

JLVDS_PWR1(panel operating voltage)setting:

Interface	Function	JLVDS_PWR1Setting
LVDS/EDP	3.3V (Default)	1-2 Pin
	5V	3-4 Pin
	12V	5-6 Pin

BL_PWM1(panel backlight PWM inversion control)Setting:

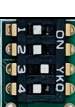
BL_PWM1 Setting	PWM Function
1-2Pin	Inverted (Low)
2-3Pin	Normal (High)

LVDS function enable jumper: The motherboard provides 1×1*3PIN LVDS_EN1 jumper (pitch:2.54 mm), The jumper controls LVDS enable / disable status.

LVDS_EN1definition:

Interface	Function	LVDS_EN1 Setting
LVDS1	DisableLVDS	1-2Pin
	EnableLVDS	2-3Pin

The motherboard provides 1×SW1 DIP switch is used to set LVDS resolution. Detailed settings are as follows:

N o.	DIP Switch Setting	Resolution/ Bit Width	N o.	DIP Switch Setting	Resolution/ Bit Width	No .	DIP Switch Setting	Resolution/ Bit Width
1		800x600 Single-channel6	2		1024x768 8 Single-channel 6	3		1280x768 Single-channel6
4		1280x800 Single-channel6	5		1280x960 Single-channel 6	6		1280x1024 Dual-channel8
7		1366*768 Single-channel6	8		1366x768 Single-channel 8	9		1440x900 Dual-channel8
10		1024*600 Single-	11		1920x1080 Dual-	12		1920x1080 Dual-channel8

		channel6			channel 6 15.6inc h			21.5inch
13		1920x1080 Dual- channel8 42inch	14		1280x1 024 Dual- channel 8	15		1280x800 Single- channel8
16		1024x768 Single- channel8	17			18		

6.3. The motherboard provides 1×2*5 Pin (pitch:2.54mm) front-panel audio interface;
F_AUDIO1 Pin definition is as follows:

Pin	Signal Name	Pin	Signal Name
1	MIC-L	2	GND
3	MIC-R	4	NC
5	Line out-R	6	Sense Return1
7	GND	8	NC
9	Line OUT-L	10	Sense Return2

6.4. The motherboard provides 1×1*4 Pin (pitch:2.0mm) amplifier connector (supports
2ohm 5W stereo), JSPKR1 Pin definition is as follows:

Pin	Signal Name	Pin	Signal Name
1	SPKL-	2	SPKL+
3	SPKR-	4	SPKR+

6.5. The motherboard supports 8×USB Interface (the single-LAN version optionally
supports 4×USB3.0); refer to the specific motherboard model;
The motherboard provides 3× 2*5 Pin header-type USB2.0 interface (pitch:2.54mm); the
dual-LAN version supports 6×USB2.0 interfaces, while the single-LAN motherboard
supports 4×USB2.0 interface.

F_USB1、F_USB2、F_USB3 Pin definition is as follows:

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

6.6. The motherboard provides 1 × 2*5 Pin GPIO header (pitch:2.54mm), GPIO1 Pin
definition is as follows:

Pin	Signal Name	Pin	Signal Name
1	GND	2	+5V
3	GPO1	4	GPI1
5	GPO2	6	GPI2
7	GPO3	8	GPI3
9	GPO4	10	GPI4

6.7. This board provides 2 smart fan connectors; CPU/SYS FAN1 Pin definition is as follows:

CPU/SYS FAN1 Pin definition is as follows:

Pin	Signal Name
1	GND
2	+12V
3	DET
4	PWM

Note: DET: fan-speed pulse output; PWM: fan-speed PWM control

6.8. This board provides 2×1×4 Pin red SATA SATA drive power connector (pitch:2.0mm),

PWR OUT1 Pin definition is as follows:

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

Please be sure to confirm SATA_PWR1 Pin1 Pin position; otherwise, the drive may be damaged. Use only the power cable supplied by CoreIPC.

6.9. This board provides 1×2×5 Pin FPANEL1 interface (pitch:2.54mm)

The chassis power switch, reset switch, HDD LED, and power LED can be connected to this header. FPANEL1 Pin definition is as follows:

Pin	Signal Name	Pin	Signal Name
1	HDDLED+	2	PWRLED+
3	HDDLED-	4	PWRLED-
5	GND	6	PWRBTN#
7	RESETBTN#	8	GND
9	NC	10	

6.10. Onboard provision includes 1×2×6 Pin TPM2.0 interface; TPM 1pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	SPI POWER	2	SPI CS#
3	SPI MISO	4	SPI MOSI
5	NC	6	SPI CLK
7	GND	8	SPI RESET
9	NC		
11	NC	12	SPI IRQ

7. Power Adapter Selection

The motherboard is designed for a maximum power consumption of 250W.

Recommended: 12V15A/19V10A or higher power adapter is recommended. The following power-consumption data was measured using a 19V Huntkey power adapter during a bare-board stress test; ACAC-input data and is for reference only.

Process or Family	Model / Specification	Clock Frequency	TDP	Maximum Power Consumption (Power Meter)	Long-Term Stable Power(Power Meter)
Core	I3-12100	4 cores 8 threads 3.4 up to 4.3GHZ	60W	88W	72W
Core	I5-12400	6 cores 12 threads 2.5 up to 4.4GHZ	65W	147W	95W
Core	I7-12700	12 cores 20 threads 2.1 up to 4.9GHZ	65W	221W	100W
Core	I3-13100	4 cores 8 threads 3.4 up to 4.5GHZ	60W	135W	85W
Core	I5-13400	10 cores 16 threads 2.5 up to 4.6GHZ	65W	170W	95W
Core	I3-14100	4 cores 8 threads 3.5 up to 4.7GHZ	60W		
Celeron	G6900	2 cores 2 threads 3.4GHZ	46W	48W	48W