



ITX50D 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.

Ordering Information

No.	Model	CPU	Cores	Freq.	Memory	HDMI	VGA	LVDS	EDP	LAN	USB	PS2	LPT	COM/ 485	POWER
1	ITX50D-L12 VER1.1	N5095	4	2.0G	DDR4	1	1	1	/	1	10	/	1	2 / 1	12V
2	ITX50D-L16 VER1.1	N5095	4	2.0G	DDR4	1	1	1	/	1	10	/	1	6 / 2	12V
3	ITX50D-L26 VER1.1	N5095	4	2.0G	DDR4	1	1	1	/	2	8	/	1	6 / 2	12V
4	ITX50D-L26 VER1.1	N5105	4	2.0G	DDR4	1	1	1	/	2	8	/	1	6 / 2	12V

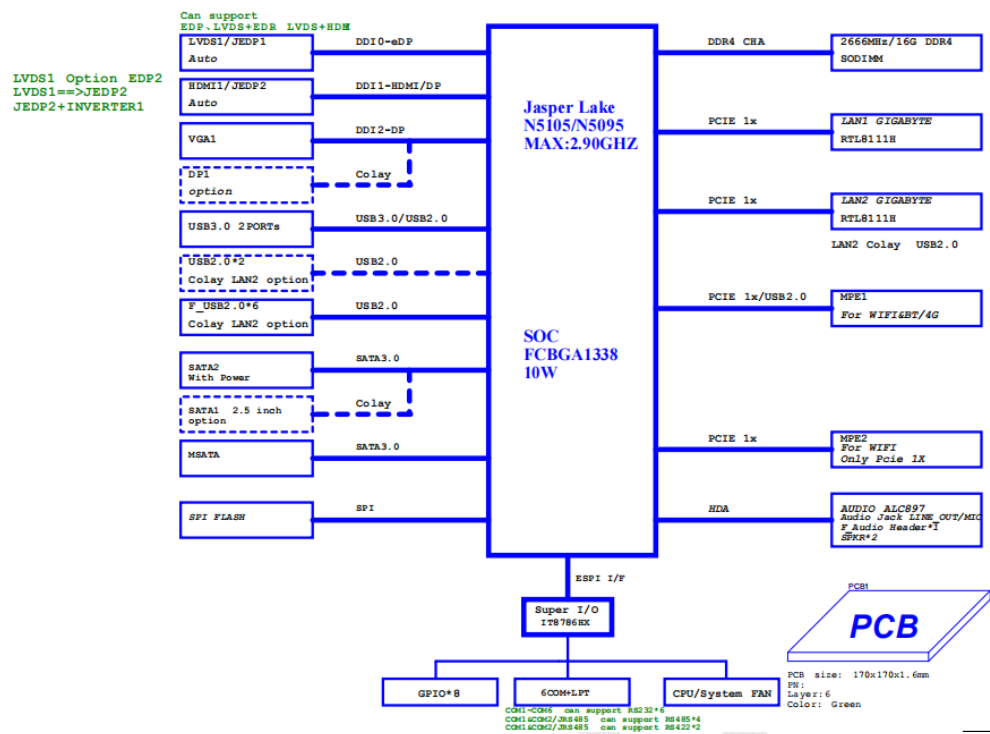
1. Product Description

The ITX50D is a CoreIPC Mini-ITX industrial motherboard supporting the full range of Intel® Jasper Lake processors. It is widely applicable to commercial displays, communication control, medical equipment, industrial control, financial equipment, cloud terminals, and other applications.

The main features of the ITX50D motherboard are as follows:

- Integrated Intel® Celeron® N5095 2.0 GHz quad-core processor, compatible with the full range of Intel® Jasper Lake processors;
- 1 × SO-DIMM slot supporting single-channel DDR4 memory up to 2933 MHz and up to 16 GB;
- Supports VGA, HDMI, and LVDS or eDP for synchronous or asynchronous triple-display output; dual eDP is also supported;
- Supports up to 2 × Realtek Gigabit Ethernet ports;
- Supports up to 2 × Mini PCIe slots for Wi-Fi/4G modules and 1 × mSATA slot;
- Supports up to 8 × USB ports, or up to 10 × USB ports in the single-LAN configuration;
- Provides 6 × onboard RS232 serial ports, with 2 × RS485 ports by default; optionally supports 4 × RS485 ports or 2 × RS422 ports;
- Fanless thermal design allows integration into a sealed system for improved dust and moisture resistance;
- Supports a wide operating temperature range of -20°C to 60°C;
- Supports AT/ATX power mode selection and 12V DC power input.

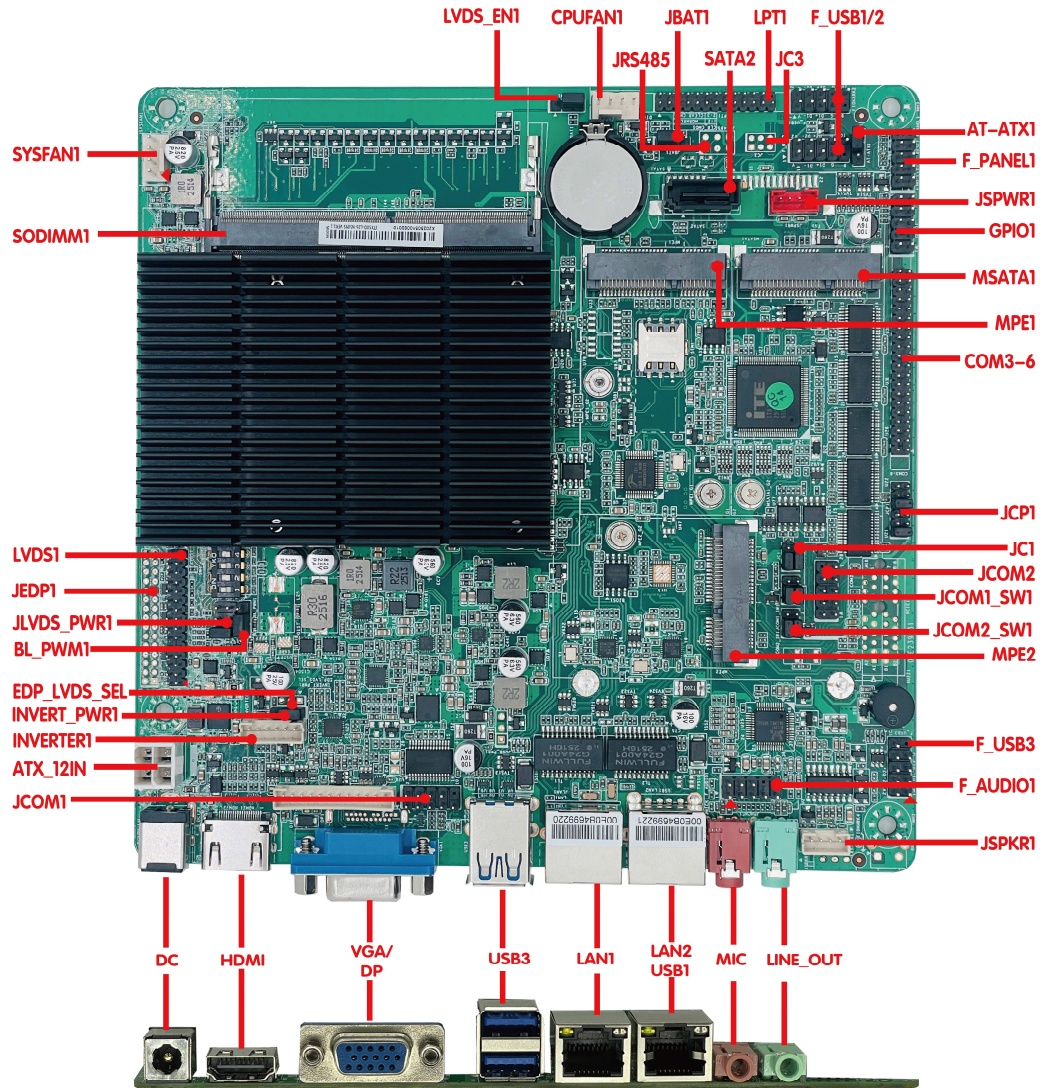
2. Motherboard Block Diagram



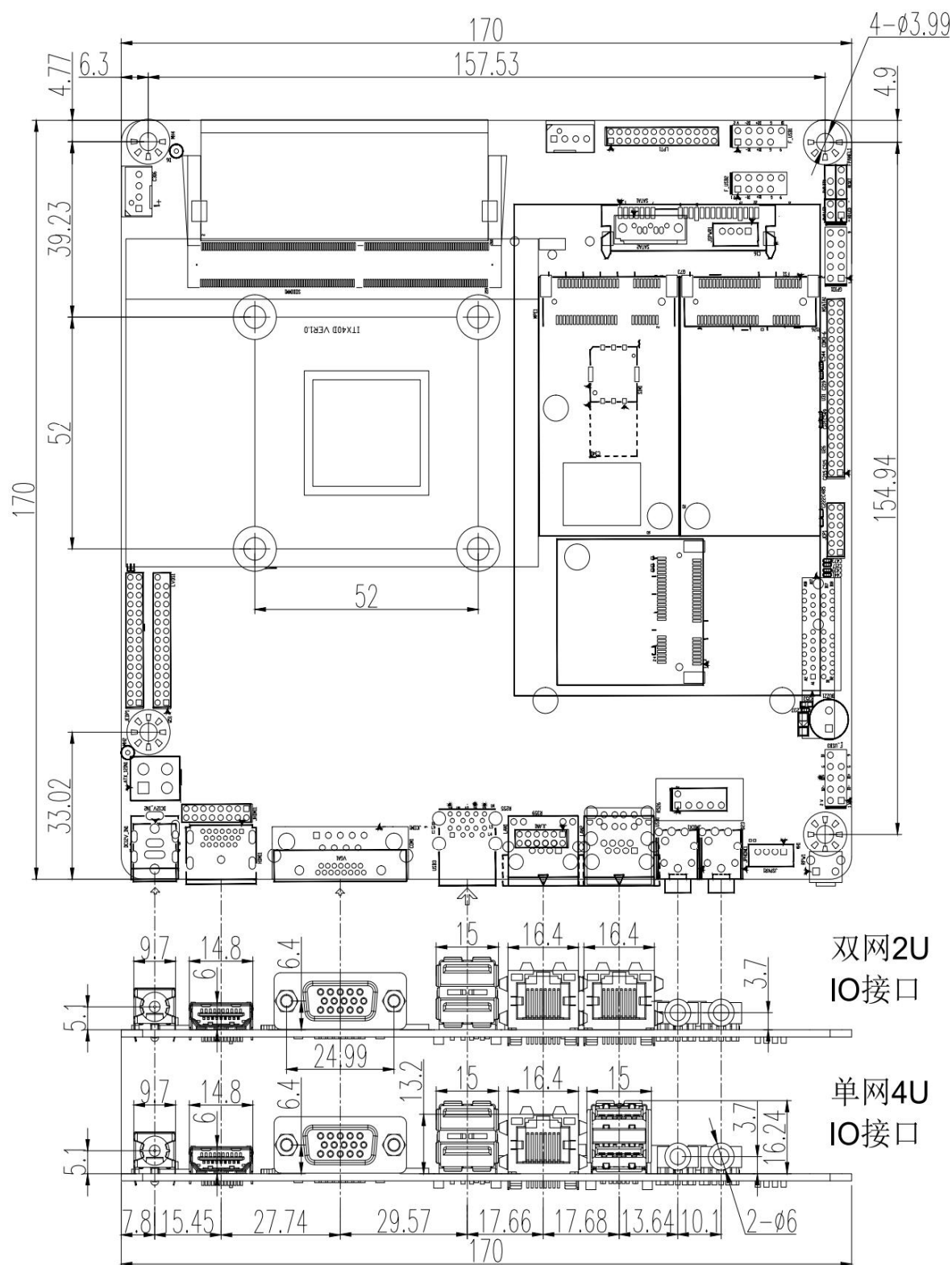
3. Motherboard Specifications

Item	Description
Processor	Integrated Intel® Celeron® N5095 2.0 GHz quad-core processor, TDP 15W Compatible with the full range of Intel® Jasper Lake processors
Memory	1 × SO-DIMM slot supporting single-channel DDR4 memory up to 2933 MHz and up to 32 GB
Display	Integrated Intel® UHD Graphics 600
	1 × VGA or DP port; 1 × HDMI 1.4 port supporting 4096 × 2160 at 30 Hz; 1 × LVDS or eDP1 interface (LVDS by default)
	Supports synchronous or asynchronous triple-display output via VGA, HDMI, and LVDS or eDP
Ethernet	2 × Realtek RTL8111H Gigabit Ethernet controllers (single LAN optional), supporting Wake-on-LAN and PXE boot
Storage	1 × 7-pin SATA 3.0 drive connector, supporting transfer rates up to 6 Gbps
	1 × 2.5-inch SATA drive connector (optional; mutually exclusive with the 7-pin SATA 3.0 connector)
	1 × full-size mSATA 3.0 slot
Audio	Onboard ALC897 7.1-channel HD audio codec supporting microphone input, line output, and dual-channel 5W amplifier output into 2-ohm speakers
Expansion Slots	1 × Mini PCIe slot supporting half-size and full-size Wi-Fi/4G modules
	1 × half-size Mini PCIe slot (optional), supporting a Wi-Fi module
	1 × PCIe x1 slot (optional, not populated by default, with an independent PCIe signal)
Rear I/O	1 × HDMI display port
	1 × VGA display port
	2 × USB 2.0 ports
	2 × USB 3.0 ports
	2 × RJ45 Gigabit Ethernet ports (LAN2 is mutually exclusive with the USB 2.0 ports)
	1 × Line-out jack (green) and 1 × microphone input jack (red)
	1 × 12V DC power input connector
Onboard I/O	1 × JVGA header (1 × 12-pin), sharing the same signals as the DB15 connector
	1 × LVDS1 header (2 × 15-pin), supporting dual-channel 24-bit output (mutually exclusive with eDP; LVDS by default)
	1 × panel backlight power connector (1 × 6-pin)
	1 × eDP header (2 × 15-pin, optional; mutually exclusive with HDMI1)
	6 × USB 2.0 ports via 2 × 5-pin headers; the single-LAN version supports 6 onboard USB 2.0 ports, while the dual-LAN version supports 4

	1 × front audio header (2 × 5-pin)
	1 × amplifier output header (1 × 4-pin)
	6 × COM ports (COM1 and COM2 support RS485 by default; Pin 9 of COM1/COM2 supports selectable power; optionally supports 4 × RS485)
	1 × LPT header
	1 × 4-pin ATX power connector
	1 × drive power connector
	1 × front panel header (2 × 5-pin) for switches and LED indicators
Fan Headers	Fanless thermal design with 1 × reserved 4-pin CPU fan header and 1 × reserved 4-pin system fan header
GPIO	Supports 4 GPIO input/output channels
BIOS	64Mb Flash ROM
Watchdog Timer	Supports a hardware watchdog timer (256 levels, 0-255 seconds)
Security	Supports an onboard TPM 2.0 chip
Operating System	Windows 10/Linux
Power Input	12V DC power input
Operating Temperature	-20°C to 60°C
Storage Temperature	-20°C to 70°C
Operating Humidity	5%-95% RH, non-condensing
Dimensions	170mm x 170mm



Note: The image above shows the front view of the ITX50D-L26 VER1.1. Images of other models may vary.



The image above shows the I/O interface layout of the ITX50D VER1.1.

4. Board Installation

Safety Precautions:

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

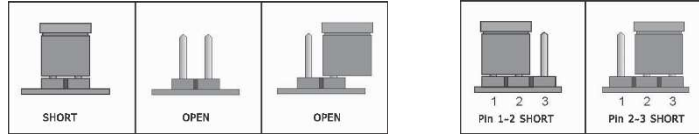
- Do not remove or damage the serial number label, distributor warranty label, or any other warranty-related labels on the motherboard before installation. Otherwise, it may affect the warranty validation.
- Before installing or removing the motherboard or any other hardware devices, make sure the power 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.

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

LVDS Enable Jumper: The motherboard provides 1 × LVDS_EN1 jumper (1 × 3-pin, 2.54 mm pitch) for enabling or disabling the LVDS function.

LVDS_EN1 Settings:

Interface	Function	LVDS_EN1 Setting
LVDS1	Disable LVDS	1-2Pin
	Enable LVDS	2-3Pin

USB 3.0 Wake-Up Jumper: The motherboard provides 1 × JUSB_PWR1 jumper (1 × 3-pin, 2.54 mm pitch) for enabling or disabling USB 3.0 wake-up functionality.

JUSB_PWR1 Settings:

Interface	Function	JUSB_PWR1 Setting
USB3	USB power off	1-2Pin
	USB powered in shutdown Supports keyboard/mouse wake-up	2-3Pin

6. Pin Definitions

6.1. The motherboard supports 6 serial ports. COM1 supports RS232/RS485; COM2 and COM3 support RS232/RS485/RS422; COM4 supports RS232/RS485; and COM5 and COM6 support RS232.

The motherboard provides 2 × standard JCOM headers (2 × 5-pin, 2.54 mm pitch). The standard JCOM1 and JCOM2 pin definitions are as follows:

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

JCOM1 and JCOM2 Pin 9 voltage selection jumper (2.0 mm pitch), JCP1 settings:

Interface	Function	JCP1 Setting	Interface	Function	JCP1 Setting
COM1	RI	1-2Pin (default)	COM2	RI	7-8Pin(default)
	5V	3-4Pin		5V	9-10Pin
	12V	5-6Pin		12V	11-12Pin

6.2. The motherboard provides 1 × standard four-port serial header (2 × 20-pin, 2.0 mm pitch).

The COM3-COM6 pin definitions are as follows:

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

6.3. The JRS485 pin definition 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
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RS232, RS485, and RS422 selection jumpers for JCOM1 and JCOM2:

The JCOM1_SW1 and JC1 settings are as follows:

Interface	Function	JCOM1_SW1 Setting	JC1 Setting	Definition
COM1	RS232	1-3Pin ,2-4Pin (default)	1-3Pin (default)	COM1 Pin 2: RXD COM1 Pin 3: TXD
	RS485	3-5Pin ,4-6Pin	3-5Pin	COM1 Pin 1: A COM1 Pin 2: B

The JCOM2_SW1 and JC1 settings are as follows:

Interface	Function	JCOM2_SW1 Setting	JC1 Setting	Definition
COM2	RS232	1-3Pin ,2-4Pin (default)	2-4Pin (default)	COM2 Pin 2: RXD COM2 Pin 3: TXD
	RS485	3-5Pin ,4-6Pin	4-6Pin	COM2 Pin 1: A COM2 Pin 2: B
	RS422	3-5Pin ,4-6Pin	4-6Pin	Hardware modification is required. COM2 Pin 1 is TX+, Pin 2 is TX-, Pin 3 is RX+, and Pin 4 is RX-.

RS232/RS485 selection jumpers for COM3 and COM4; the RS485 signals are routed to the JRS485 header:

Hardware modification is required for COM3 and COM4 to support RS485, with the RS485 signals available on the JRS1 header. Hardware modification is also required for COM3 to support RS422. Please consult CoreIPC before ordering.

The JC3 settings are as follows:

Interface	Function	JC3 Setting	Remarks
COM3	RS232	3-5 Pin (default)	
	RS485	1-3 Pin	The RS485 signals are available on the JRS485 header: Pin 1 is COM A and Pin 2 is COM B.
Interface	Function	JC3 Setting	Remarks
COM4	RS232	4-6 Pin (default)	
	RS485	2-4 Pin	The RS485 signals are available on the JRS485 header: Pin 3 is COM A and Pin 4 is COM B.

6.4. The motherboard provides 1 × LPT1 parallel port header (2 × 13-pin, 2.0 mm pitch). The LPT1 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	STB-	2	AFD-
3	PD0	4	ERR-
5	PD1	6	INIT-
7	PD2	8	SLIN-
9	PD3	10	GND
11	PD4	12	GND

13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK-	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

6.5. The motherboard provides 1 × JVGA1 connector (1 × 12-pin, 2.0 mm pitch), sharing the same signals as VGA1. The JVGA1 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	NC	2	VSYSNC
3	HSYNC	4	GND
5	R	6	GND
7	G	8	GND
9	B	10	GND
11	DDC_SDA	12	DDC_SCL

6.6. The motherboard provides 1 × JHDMI1 header (2 × 8-pin, 2.0 mm pitch). The JHDMI1 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	TMDS Data2+	2	SCL
3	TMDS Data2-	4	SDA
5	TMDS Data1+	6	NC
7	TMDS Data1-	8	Hot Plug Detect
9	TMDS Data0+	10	+5V Power
11	TMDS Data0-	12	GND
13	TMDS Clock+	14	GND
15	TMDS Clock-	16	GND

6.7. The motherboard provides 1 × eDP header (2 × 15-pin, 2.0 mm pitch). The JEDP1 pin definition is as follows:

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_PWM (Backlight Brightness Control)	26	BKLT_EN (Backlight Enable)
27	GND	28	GND
29	INVERT_PWR (Backlight Power)	30	INVERT_PWR (Backlight Power)

Note: JEDP1 and LVDS1 are mutually exclusive and are selected using the EDP_LVDS_SEL jumper. This switching option is reserved and is not supported by default. For eDP support, please consult CoreIPC before ordering, as component changes are required.

The EDP_LVDS_SEL settings are as follows:

Interface	Function	EDP_LVDS_SEL Setting
EDP/LVDS	LVDS	1-2Pin
	JEDP1	2-3Pin

6.8. The motherboard provides 1 × LVDS header (2 × 15-pin, 2.0 mm pitch). The LVDS1 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+

The motherboard provides selectable 3.3V, 5V, or 12V panel operating voltage, as well as selectable 5V or 12V panel backlight power.

Before using LVDS, confirm the rated operating voltage required by the LCD panel. The selected LCD voltage must match the panel voltage for proper operation. Configure the settings as follows:

INVERTER1 (Backlight Power Connector) Pin Definition:

PIN	Signal Name
1	12V/5V (set by INVERT_PWR1)
2	12V/5V (set by INVERT_PWR1)
3	Backlight Enable
4	Backlight Brightness Control
5	GND
6	GND

INVERT_PWR1 (Panel Backlight Power) Settings:

Interface	Function	INVERT_PWR1 Setting
LVDS1	12V (default)	1-2Pin
	5V	2-3Pin

JLVDS_PWR1 (Panel Operating Voltage) Settings:

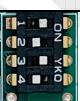
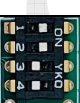
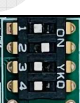
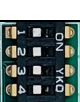
Interface	Function	JLVDS_PWR1 Setting
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LVDS1	3.3V (default)	1-2Pin
	5V	3-4Pin
	12V	5-6pin

BL_PWM1 (Backlight PWM Polarity) Settings:

Interface	Function	JLVDS_PWR1 Setting
LVDS1	Active High	1-2Pin
	Active Low	2-3Pin

The motherboard provides 1 × SW1 DIP switch for setting the LVDS resolution. The detailed settings are as follows:

N o.	DIP Switch Setting	Resolution / Bit Depth	N o.	DIP Switch Setting	Resolution / Bit Depth	No .	DIP Switch Setting	Resolution / Bit Depth
1		800x600 Single-channel 6-bit	2		1024x768 Single-channel 6-bit	3		1280x768 Single-channel 6-bit
4		1280x800 Single-channel 6-bit	5		1280x960 Single-channel 6-bit	6		1280x1024 Dual-channel 8-bit
7		1366*768 Single-channel 6-bit	8		1366x768 Single-channel 8-bit	9		1440x900 Dual-channel 8-bit
10		1024*600 Single-channel 6-bit	11		1920x1080 Dual-channel 6-bit 15.6-inch	12		1920x1080 Dual-channel 8-bit 21.5-inch
13		1920x1080 Dual-channel 8-bit 42-inch	14		1280x1024 Dual-channel 8-bit	15		1280x800 Single-channel 8-bit
16		1024x768 Single-channel 8-bit	17			18		

6.9. The motherboard provides 3 × USB 2.0 headers (2 × 5-pin, 2.54 mm pitch).

The F_USB1, F_USB2, and F_USB3 pin definitions are 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
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6.10. The motherboard provides 2 × fan headers (1 × 4-pin). The CPUFAN1 and SYSEAN1 pin definitions are as follows:

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

Note: DET is the fan speed pulse output; PWM is the fan speed PWM control signal.

6.11. The motherboard provides 1 × front audio header (2 × 5-pin, 2.54 mm pitch). The 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

6.12. The motherboard provides 1 × amplifier output header (1 × 4-pin, 2.0 mm pitch), supporting dual-channel 5W output into 2-ohm speakers. The JSPKR1 pin definition is as follows:

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

6.13. The motherboard provides 1 × red SATA drive power connector (1 × 4-pin, 2.0 mm pitch). The JSPWR1 pin definition is as follows:

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

Be sure to identify Pin 1 of JSPWR1 correctly; otherwise, the hard drive may be damaged. Use only the power cable supplied by CoreIPC.

6.14. The motherboard provides 1 × FPANEL1 header (2 × 5-pin, 2.54 mm pitch).

The chassis power switch, reset switch, HDD LED, and power LED can be connected to this header. The 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	

6.15. The motherboard provides 1 × GPIO header (2 × 5-pin, 2.54 mm pitch). The 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