CoreIPC

EPIC40P User Manual

Issue 1.2

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	Core	Freq.	Memory	HDMI	VGA	LVDS	EDP	LAN	USB	PS2	LPT	COM/485	POWER
1	EPIC40P-L26 VER1.1	J4125	4	2.0G	DDR4	1	1	1	/	2	6	/	/	6/2	12V
2	EPIC40P-IO VER 1.0	/	/	/	/	/	/	/	/	/	4	/	/	6 / 2	/

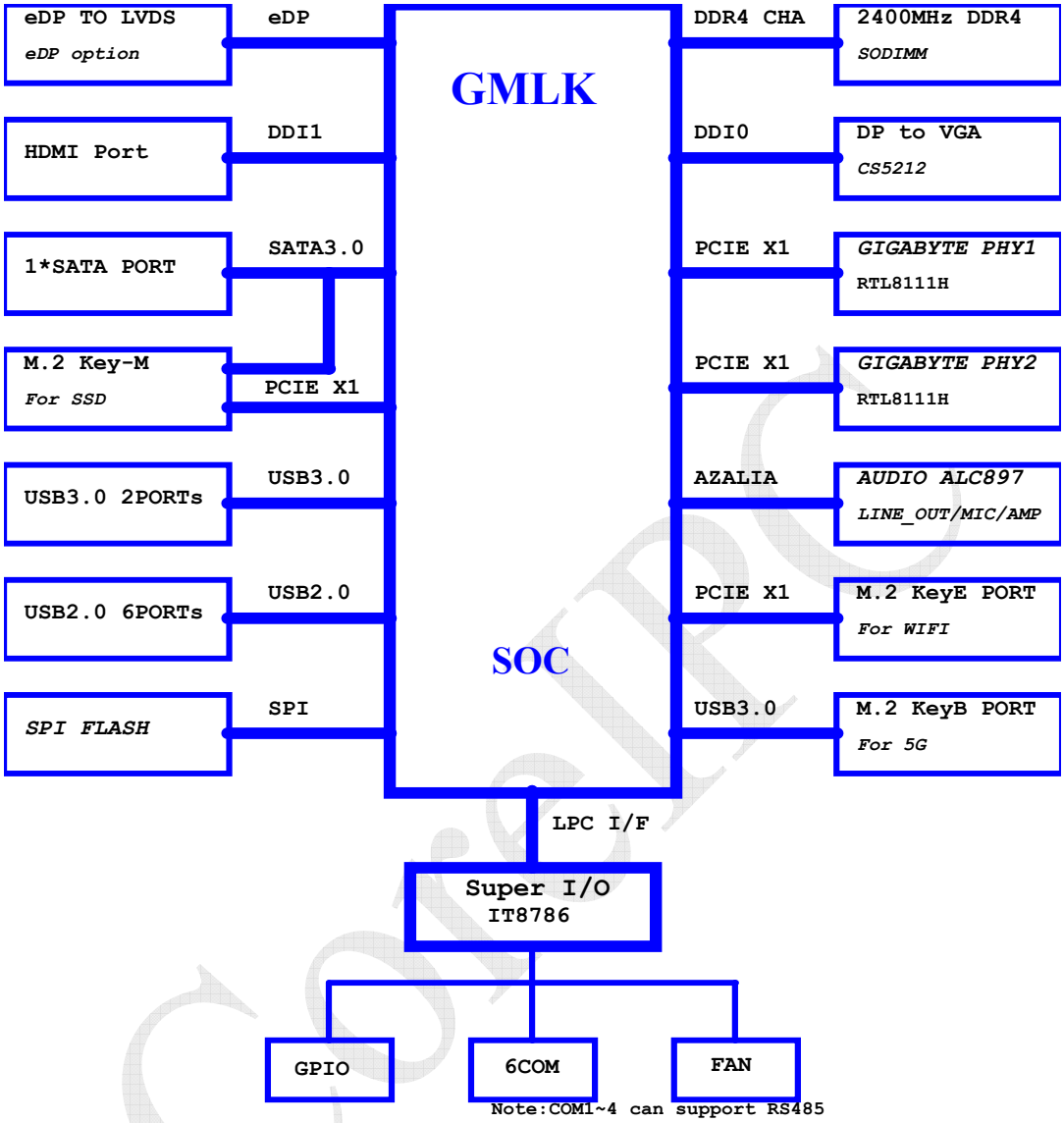
1. Product Description

EPIC40P is a CoreIPC 3.5-inch industrial motherboard supporting the full range of Intel® Gemini Lake Refresh processors. It is widely used in commercial displays, communication control systems, medical equipment, industrial automation, financial equipment, cloud terminals, and other industrial applications.

The main features of the EPIC40P motherboard are as follows:

- Integrates an Intel® Celeron® J4125 quad-core processor running at 2.0GHz and is compatible with the full range of Intel® Gemini Lake Refresh processors.
- Provides 1 × SO-DIMM slot, supporting single-channel DDR4 2400MHz memory, with a maximum capacity of 16GB.
- Supports synchronous/asynchronous display output via VGA, HDMI, and LVDS or eDP interfaces.
- Supports up to 2 × Realtek RTL8111H Gigabit Ethernet controllers.
- Supports 1 × M.2 Key E slot for Wi-Fi, 1 × M.2 Key B slot for 5G, and 1 × M.2 Key M slot for SSD storage.
- Supports 2 × USB 3.0 ports and 4 or 6 × USB 2.0 ports.
- Provides 6 × RS232 serial ports, with 2 × RS485 ports supported by default and optional support for up to 4 × RS485 ports.
- Features a fanless thermal design, allowing the system to be built as a fully enclosed computer 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.

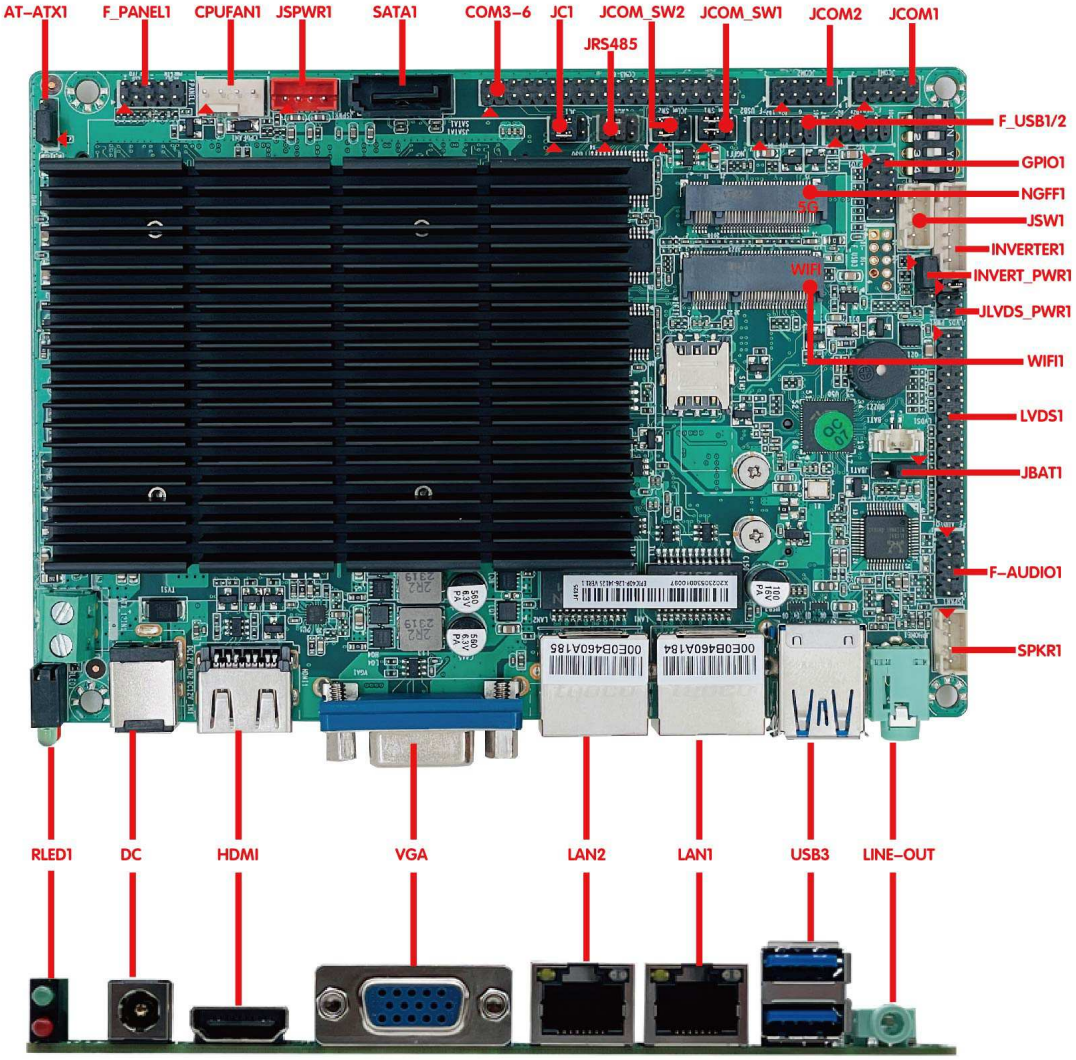
2. Motherboard Block Diagram



3. Motherboard Specifications

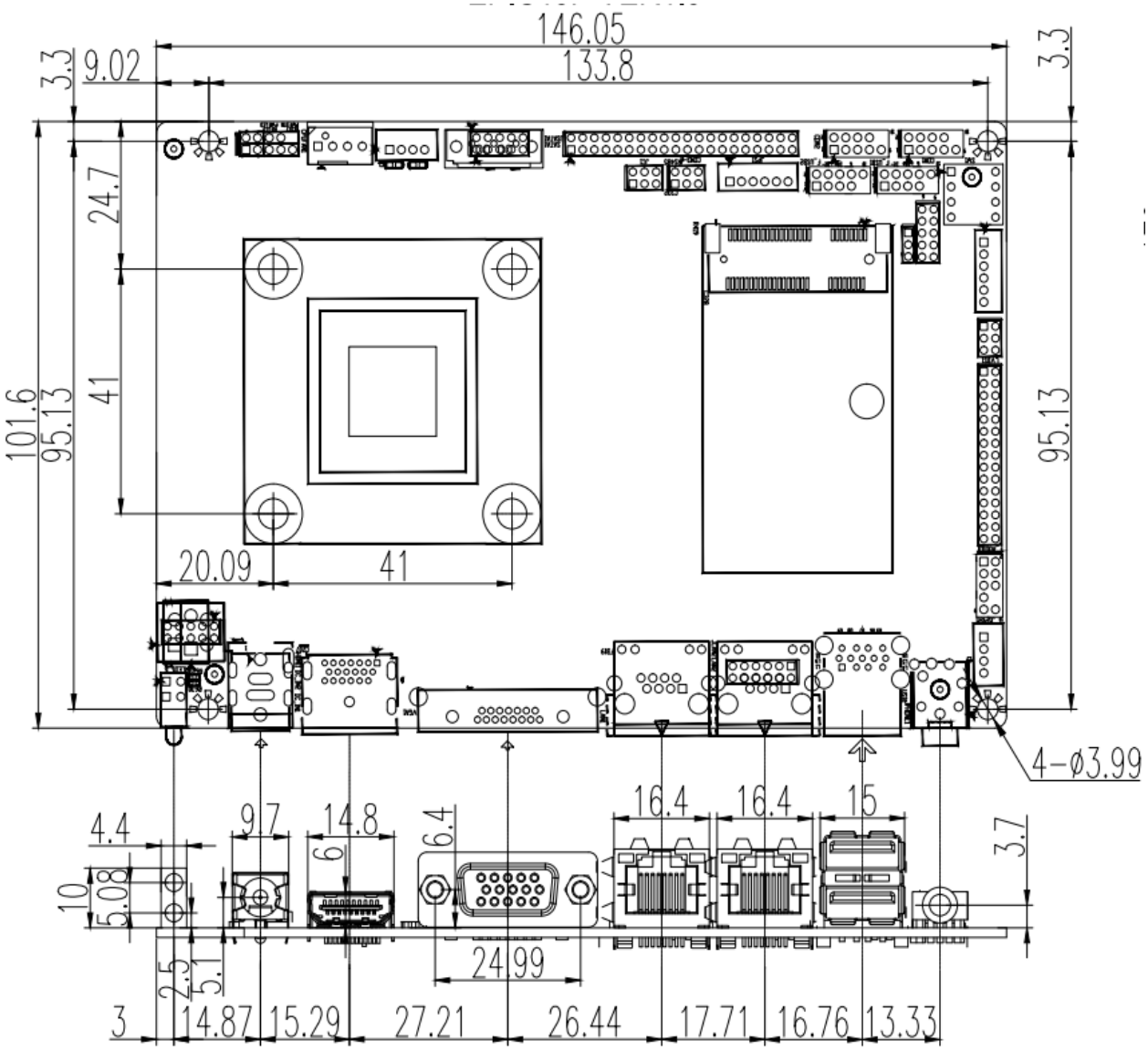
Item	Description
CPU	Integrated Intel® Celeron® J4125 quad-core processor, 2.0GHz, 10W TDP; compatible with the full range of Intel® Gemini Lake Refresh processors
Memory	1 × SO-DIMM slot, supporting single-channel DDR4 2400MHz memory, up to 8GB
Display	Integrated Intel® UHD Graphics 600
	1 × VGA port, 1 × HDMI port, and 1 × LVDS or eDP interface (LVDS by default)
	Supports synchronous/asynchronous triple display via VGA, HDMI, and LVDS or eDP interfaces
Network	2 × Realtek RTL8111H Gigabit Ethernet controllers, supporting Wake-on-LAN and PXE boot
Storage	1 × 7-pin SATA 3.0 storage connector, supporting data transfer rates of up to 6Gbps
	1 × M.2 Key M SSD slot (SATA signal by default; hardware-configurable for NVMe support)
Audio	Onboard Realtek ALC897 7.1-channel high-definition audio codec, supporting MIC/Line-out and 2-channel amplifier output (5W per channel at 2Ω)
Expansion Slot	1 × M.2 Key E 2230 slot, supporting Wi-Fi modules
	1 × M.2 Key B 3052 slot, supporting 4G/5G modules
Rear I/O	1 × HDMI port
	1 × VGA port
	2 × USB 3.0 ports
	2 × RJ45 Gigabit Ethernet ports
	1 × Line-out jack (green)
	1 × Power/HDD LED indicator
	1 × 12V DC power input connector
Internal I/O	1 × LVDS header (2 × 15-pin), supporting dual-channel 24-bit LVDS; hardware-configurable for eDP support, with LVDS configured by default
	1 × LCD backlight power connector (1 × 6-pin)
	4 × USB 2.0 ports via 2 × 5-pin headers; up to 6 × USB 2.0 ports are supported when 4G/5G functionality is not required
	1 × Front audio header (2 × 5-pin), supporting Line-out and MIC
	1 × Amplifier header (1 × 4-pin)
	6 × COM ports. COM1–COM6 support RS232 by default; COM1/COM2 can be configured for RS232 or RS485; COM3 optionally supports RS485/RS422; COM4 optionally supports RS485; COM1–COM6 can also be optionally configured as six TTL serial ports
	1 × HDD power connector
	1 × 2-pin Phoenix terminal or 1 × 4-pin ATX connector for 12V DC power input

	1 × Front panel header (2 × 5-pin) for switches and LED indicators
Fan Connector	Fanless thermal design; 1 × 4-pin CPU fan header reserved
GPIO	Supports 4 GPIO input/output channels
BIOS	64Mb Flash ROM
Watchdog	Supports a hardware watchdog timer (256 levels, 0–255 seconds)
OS Support	Windows 10/Linux
Power Type	12V DC input
Operating Temperature	60℃～-10℃
Storage Temperature	-20℃～70℃
Operating Humidity	5%–95% RH, non-condensing
Dimensions	146mm x 102mm

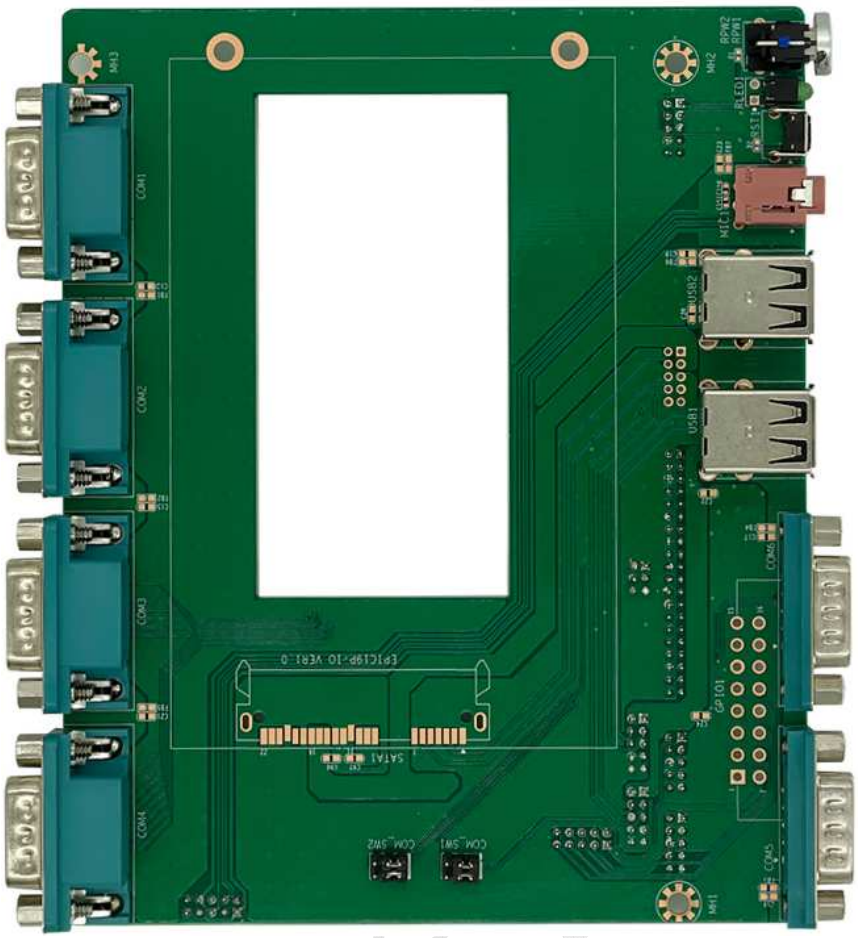


The motherboard image can be enlarged for viewing. Pin 1 of each header is marked with a red triangle.

Note: The above image shows the front view of the EPIC40P. The appearance and layout of other models may differ.



The above diagram illustrates the I/O interface layout of the EPIC40P series motherboards.



I/O Board for EPIC40P

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 **1 × 260-pin DDR4 SO-DIMM memory slot**.

Before installing the memory module, please note the following:

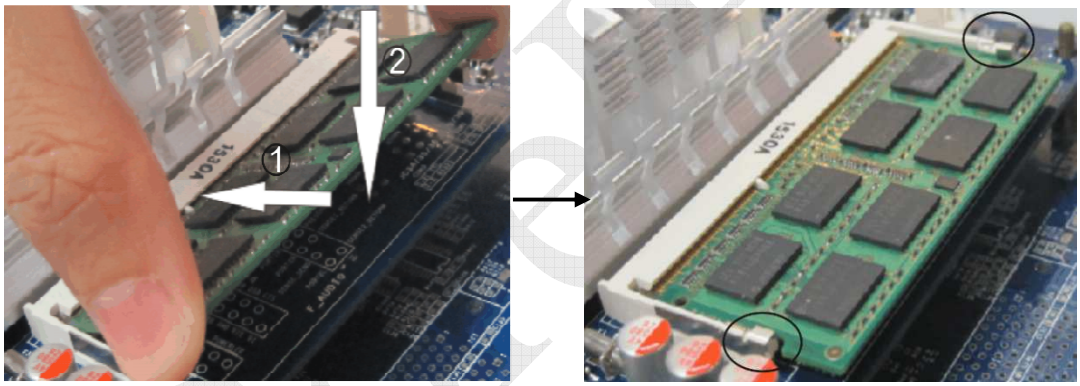
1) Make sure the memory module you purchased is compatible with the specifications supported by this motherboard.
2) Before installing or removing the memory module, make sure the computer power is turned off to prevent damage.

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.

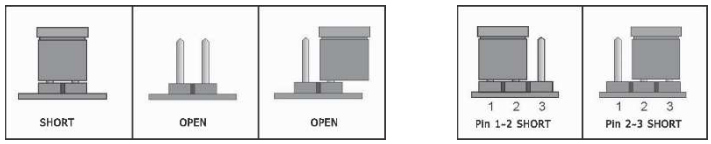


5. Jumper Settings

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	Pin 1–2 (default)
Enable Auto Power-on	2-3Pin

6. Pin Definitions

1、The motherboard provides two standard 2 × 5-pin COM headers (2.0 mm pitch).
The standard pin definitions of JCOM1 and JCOM2 are as follows:

PIN	Signal Name	PIN	Signal Name
1	DCD（A）	2	RXD（B）
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	NC

2、In addition to RS232, JCOM1 and JCOM2 also support RS485. The JCOM1 RS232/RS485 selection jumper settings are as follows:

Port	Function	JC1 Setting	JCOM_SW1 Setting	Note
COM1	RS232	1-3Pin default	1-3Pin，2-4Pin（default）	
	RS485	3-5pin	3-5pin，4-6Pin	COM1 RS485 signals are available through the JCOM1 header. Pin 1: COM A; Pin 2: COM B.

JCOM2 RS232/RS485 Selection Jumper Settings:

Port	Function	JC1 Setting	JCOM_SW2 Setting	Note
COM2	RS232	2-4Pin default	1-3Pin，2-4Pin（default）	
	RS485	4-6Pin	3-5Pin，4-6Pin	COM2 RS485 signals are available through the JCOM2 header. Pin 1: COM A; Pin 2: COM B.

3、The motherboard provides one standard 2 × 20-pin header for four COM ports (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

COM3 supports RS232 and RS485/RS422, while COM4 supports RS232 and RS485.
COM3 and COM4 support RS232 by default. If RS485 or RS422 support is required, please contact us in advance.

4、The RS485/RS422 connection header for COM3 and COM4 is JRS485 (2.0 mm pitch). The JRS485 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	TXD+(A3)	2	TXD-(B3)
3	RXD+(A4)	4	RXD-(B4)
5	GND	6	GND

Port	Function	Setting	Definition
COM3	RS232	(default)	
	RS485	Requires Hardware Modification	COM3 RS485 signals are available through the JRS485 header. Pin 1: COM A; Pin 2: COM B.
COM3	RS422	Requires Hardware Modification	RS422 signals are available through the JRS485 header. Hardware modification is required. Please contact us in advance if this function is needed.
Port	**Function**	**Setting**	**Definition**
COM4	RS232	(default)	
	RS485	Requires Hardware Modification	COM4 RS485 signals are available through the JRS485 header. Pin 3: COM A; Pin 4: COM B.

5、The motherboard provides one 2 × 15-pin LVDS header (2.0 mm pitch). The LVDS1 pin definition is as follows:
LVDS1 can be hardware-configured as an eDP interface. LVDS is the default configuration. If an eDP interface is required, please contact us before placing an order.

PIN	Signal Name	PIN	Signal Name
1	LCDVDD（LVDS/eDP Panel Voltage: Configured via JLVDS_PWR1 ）	2	LCDVDD（LVDS/eDP Panel Voltage: Configured via JLVDS_PWR1 ）
3	LCDVDD（LVDS/eDP Panel Voltage: Set via JLVDS_PWR1 ）	4	NC（eDP_HDP）
5	GND	6	GND
7	LVDS_A0-（eDP_TX0-）	8	LVDS_A0+（eDP_TX0+）
9	LVDS_A1-（eDP_TX1-）	10	LVDS_A1+（eDP_TX1+）
11	LVDS_A2-（eDP_AUX-）	12	LVDS_A2+（eDP_AUX+）
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+

Text shown in blue indicates the eDP pin definitions.

Note: This motherboard provides three LCD panel operating voltage options: 3.3V, 5V, and 12V, as well as 5V and 12V LCD backlight power supply options.

Before using the LVDS interface, please confirm the rated operating voltage required by the LCD panel. The LCD panel can operate properly only when the selected LCD voltage matches the rated voltage of the connected panel. The jumper settings are as follows:

INVERT1 (LVDS/eDP Backlight Power Connector) Pin Definition:

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

INVERT_PWR1 (LVDS/eDP Backlight Power Supply) Settings:

Port	Function	INVERT_PWR1 Setting
LVDS1	12V（Default）	1-2Pin
	5V	2-3Pin

JLVDS_PWR1 (LVDS/eDP LCD Panel Operating Voltage — LCDVDD) Settings:

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

The motherboard provides one onboard SW1 DIP switch for configuring the LVDS resolution. The detailed settings are as follows:

No.	DIP switch method	Resolution/ bits	No.	DIP switch method	Resolution/ bits	No.	DIP switch method	Resolution/ bits
1		800x600 Single 6	2		1024x768 Single 6	3		1280x768 Single 6
4		1280x800 Single 6	5		1280x960 Single 6	6		1280x1024 Double 8
7		1366*768 Single 6	8		1366x768 Single 8	9		1440x900 Double 8
10		1024*600 Single 6	11		1920x1080 Dual 6 15.6-inch	12		1920x1080 Dual 8" 21.5"
13		1920x1080 Dual 8" 42-inch	14		1280x1024 Double 8	15		1280x800 Single 8
16		1024x768 Single 8	17			18		

6、The motherboard provides one 2 × 5-pin front audio header (2.0 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

7、The motherboard provides one onboard 1 × 4-pin amplifier header (2.0 mm pitch). The JSPKR1 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name

1	SPKL-	2	SPKL+
3	SPKR-	4	SPKR+

8、The motherboard provides three onboard 2 × 5-pin USB 2.0 headers (2.0 mm pitch), supporting four USB 2.0 ports by default. The pin definitions of F_USB1, F_USB2, and F_USB3 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

Note: F_USB3 is not populated by default.

9、The motherboard provides one onboard 1 × 4-pin smart fan header. The CPUFAN1 pin definition is as follows:

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

Note: DET: Fan speed pulse signal output; PWM: Fan speed PWM control signal.

10、The motherboard provides one onboard 1 × 4-pin red SATA power connector (2.0 mm pitch). The JSPWR1 pin definition is as follows:

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

Warning: Make sure that Pin 1 of JSPWR1 is correctly identified before connecting the power cable. An incorrect connection may damage the storage device. Use only the power cable supplied by CoreIPC.

11、The motherboard provides one optional 2 × 5-pin SATA 3.0 header (2.0 mm pitch). The JSATA1 pin definition is as follows:

PIN	Signal Name	PIN	Signal Name
1	SATA_TXP1	2	+5V
3	SATA_TXN1	4	+5V
5	GND	6	GND
7	SATA_RXN1	8	GND
9	SATA_RXP1	10	+12V

12、The motherboard provides one 2 × 5-pin F_PANEL1 header (2.0 mm pitch). The chassis power switch, reset switch, HDD LED, and power LED can be connected to this header. The

F_PANEL1 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	

13、The motherboard provides one 2 × 5-pin GPIO header (2.0 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

14、The motherboard provides one optional 1 × 2-pin Phoenix power connector (5.5 mm pitch). The DC12V_IN3 pin definition is as follows:

PIN	Signal Name
1	GND
2	+12V

