EK-EPIC40P

User Guide

Safety guide

■ In order to help you use this motherboard, please read the [User Manual] carefully.

For product-related information, please read this safety guide carefully.

Product Version Identification

You can find the version [VER:XX] marked with this motherboard on the motherboard. Where XX is a number, for example marked [VER1.0], which means the version of this motherboard is 1.0. When you want to update the motherboard's BIOS, drivers or refer to other technical documents, please pay attention to the product version label.

Safe use of common sense

1、Before using this product, please be sure to read the product manual carefully;
2、For boards that are not ready to be installed, they should be stored in anti-static protective bags;
3、taking out the board from the anti-static protective bag , place your hands on a grounded metal object for a while (for example, 10 seconds) to release static electricity from your body and hands;
4、When handling the board, you need to wear electrostatic protection gloves, and you should develop the habit of only touching its edge;
5、In order to avoid electric shock to the human body or damage to the product, the AC power supply must be turned off before removing or reconfiguring the board;
6、Before moving the board or the whole machine, the AC power must be turned off;
7、For the whole product, when adding or reducing boards, be sure to turn off the AC power first;
8、Before you need to connect or unplug any equipment, you must first turn off the AC power;
9、In order to avoid unnecessary damage to the product caused by frequent power on and off, after power off, wait at least 30 seconds before power on.

Ordering Information:

serial number	model	CPU	number of cores	frequency	Memory	hdmi	VGA	LVDS	EDP	LAN	USB	PS2	LPT	COM/485	POWER
1	EK-EPIC40P-L26 VER1.1	J4125	4	2.0G	DDR4	1	1	1	/	2	6	/	/	6/2	12V

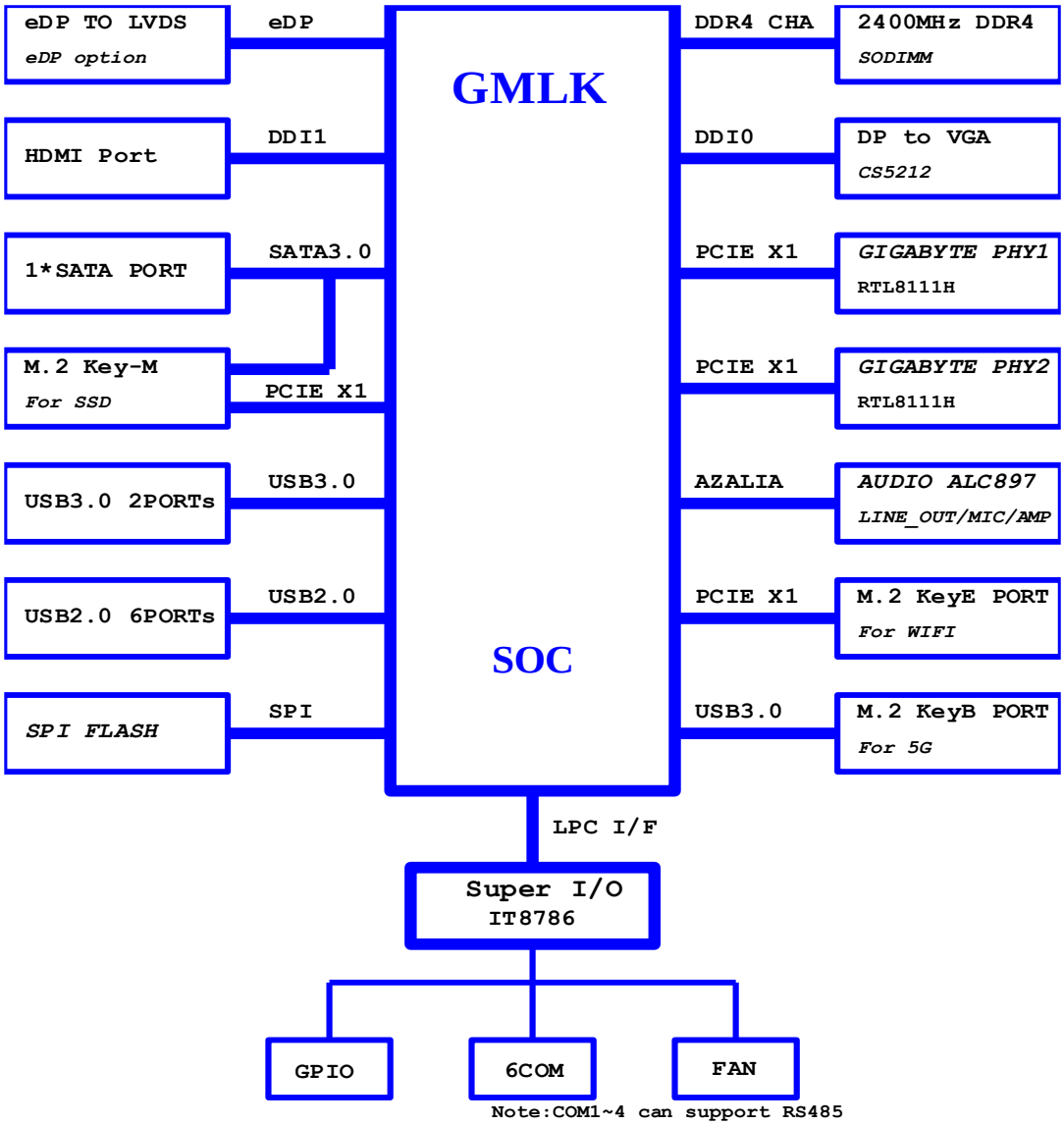
1. product introduction

EK-EPIC40P is a 3.5-inch series industrial motherboard for industrial control, supporting Intel® Gemini Lake-R full series CPU . It can be widely used in commercial display, communication control, medical equipment, industrial control, financial equipment, cloud terminal and other fields.

The main features of the EK-EPIC40P motherboard are as follows:

1. Integrated Intel® Celeron J4125 2.0GHz quad-core processor, compatible with Intel® Gemini Lake-R full series CPU ;
2. 1* SODIMM slot, support single channel 2400MHz DDR4 memory, maximum support 8GB ;
3. Support VGA, HDMI, LVDS or eDP synchronous/asynchronous display;
4. Can support 2 RTL8111H Gigabit networks;
5. Can support 1 M.2 KeyE (WIFI), 1 M.2 KeyB (5G) and 1 M.2 KeyM (SSD);
6. Can support 2 USB3.0 ports, 4 or 6 USB2.0 ports;
7. Built-in 6 RS232 serial ports, 2 RS485 are supported by default, 4 RS485 are optional;
8. There is no fan for heat dissipation, and it can be made into a closed machine to prevent dust and moisture;
9. Support -20 ~ 60 degrees wide temperature work
10. Support AT and ATX mode switching, 12V DC power supply;

2. Motherboard frame diagram

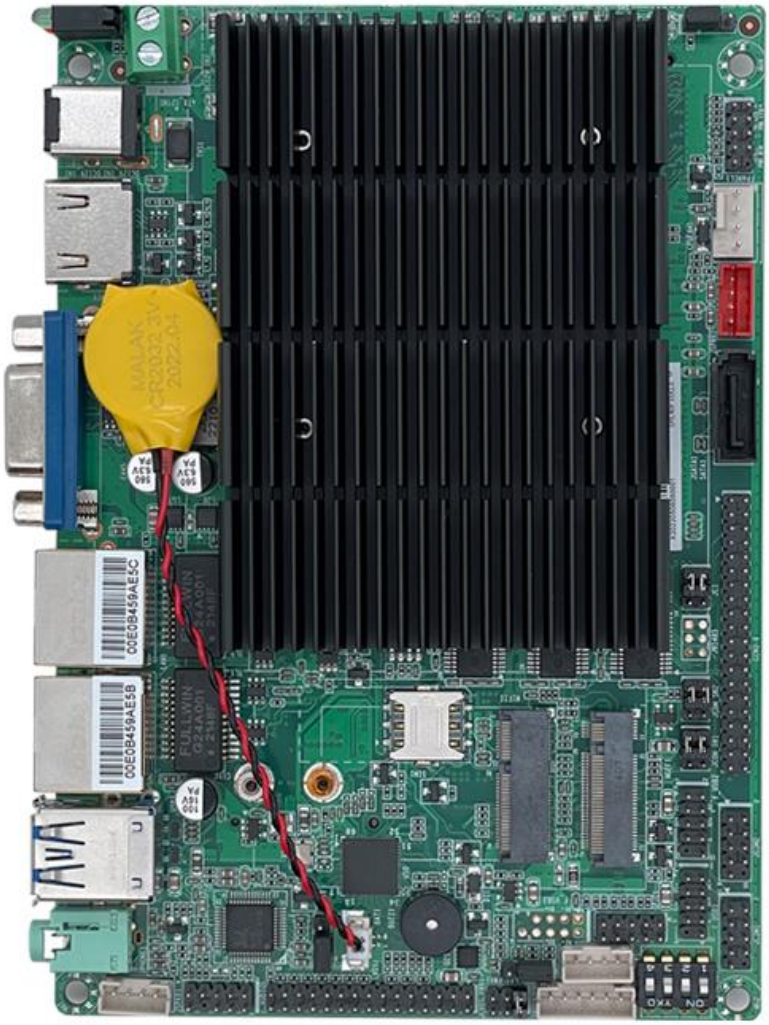


3. Motherboard Detailed Specifications

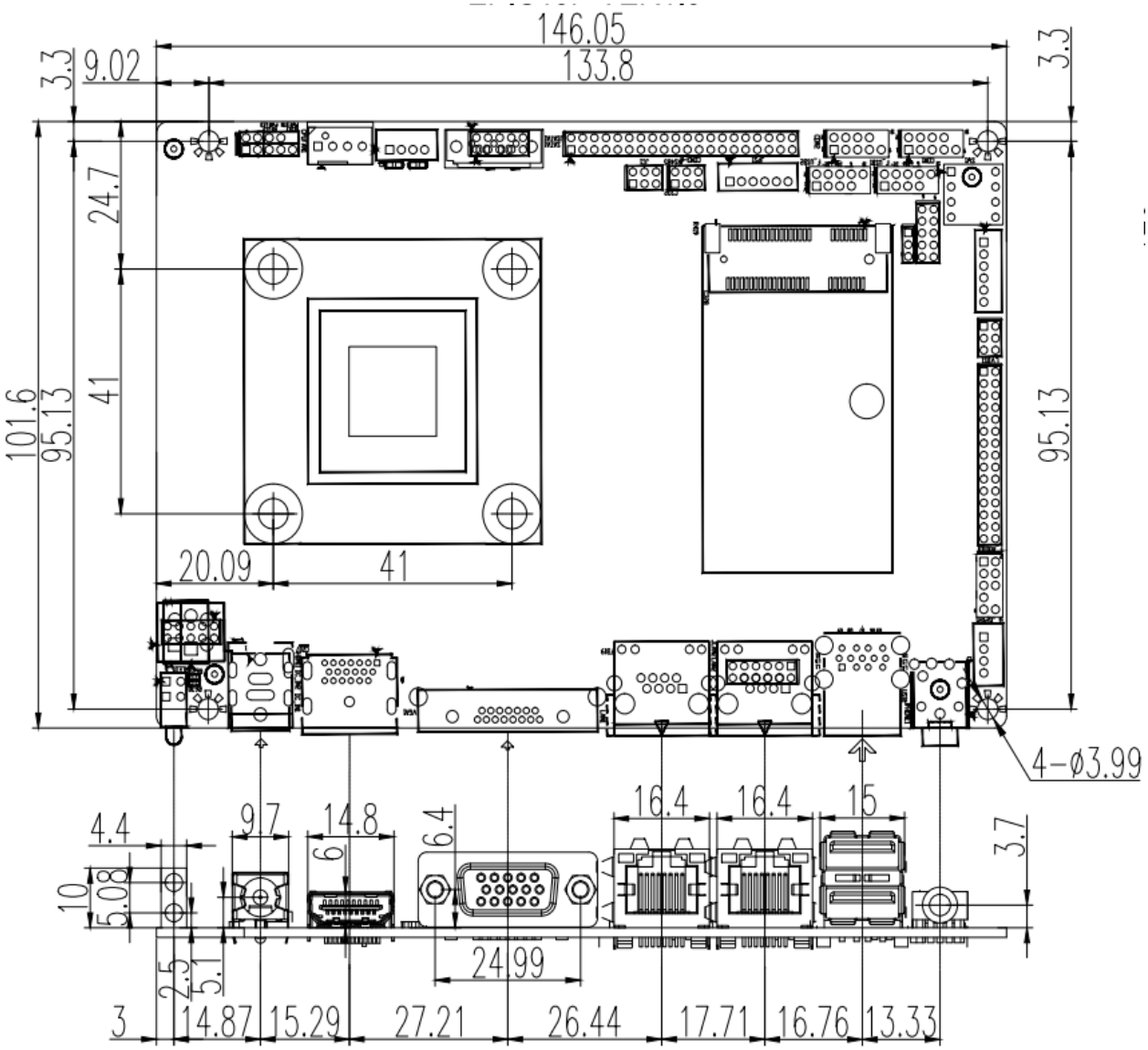
project	describe
processor	Integrated Intel® Celeron J4125 2.0GHz quad-core processor , TDP 10W compatible with Intel® Gemini Lake-R full series CPU
Memory	1* SODIMM slot, support single channel 2400MHz DDR4 memory, maximum support 8GB
show	Integrated Intel® UHD Graphics 600 core graphics card
	1* VGA port, 1*HDMI port, 1*LVDS or eDP port (default is LVDS)
	Support VGA, HDMI, LVDS or eDP synchronous/ asynchronous triple display
network	2* Realtek RTL8111H Gigabit LAN, support wake-on-lan/PXE
storage	1* 7pin SATA3.0 hard disk interface, transfer rate up to 6Gbps
	1* M.2 KeyM 2280 SSD slot
audio	Onboard ALC897 7.1-channel high-fidelity audio controller Support MIC/Line-out, power amplifier (support 2 ohm 5W dual channel)

expansion slot	1* M.2 KeyE 2230 slot, support WIFI module
	1* M.2 KeyB 3052 slot, support 4G/5G module
Backplane I/O interface	1* HDMI display interface
	1* VGA display port
	2* USB3.0 ports
	2* RJ-45 Gigabit network interface
	1* Line out/MIC combo interface (black)
	1* Power HDD LED
	1* 12V DC power input interface
Built-in I/O interface	1* LVDS interface 2*15pin, support dual channel 24bit (choose one with eDP , default)
	1* Screen backlight power supply interface 1*6pin
	4* USB 2.0 interface 2*5Pin (6 USB2.0 interfaces can be supported when 4G/5G is not required)
	1* Front audio interface 2*5pin
	1* Power amplifier interface 1*4pin
	6* COM interface (COM1-6 supports RS232 by default, among which COM1/2 can support RS232 or RS485, COM3 can optionally support RS485/422, COM4 can optionally support RS485, COM1~COM6 can also optionally support 6 TTL serial ports)
	1* HDD power supply interface
	1* 4pin ATX power connector
	1* Front panel switch button and indicator light interface 2*5Pin
fan interface	Fanless heat dissipation design, reserve 1*4pin CPU fan interface
GPIOs	Support 4 input and output GPIO
BIOS	64Mb Flash ROM
watchdog	Support hardware reset function (256 levels, 0~255 seconds)
operating system	Windows 10/Linux
power type	Powered by DC 12V power supply
Operating temperature	60℃～-10℃
Storage temperature	-20℃～70℃
Working humidity	5%-95% relative humidity, non-condensing

size	146mm x 102mm



Please note: the above is the front view of EK-EPIC40P VER1.1, the pictures of other models will be different



The above is the IO interface structure diagram of the EK-EPIC40P VER1.1 series motherboard

4. Motherboard installation

Safety Note:

- Before installation, please do not arbitrarily tear up the serial number on the main board and the agent warranty sticker, etc., otherwise it will affect the identification standard of the product warranty period.
- Before installing or removing the motherboard and other hardware devices, please be sure to turn off the power first, and unplug the power cord from the socket.
- When installing other hardware devices to the sockets on the motherboard, please make sure the connectors and sockets are tightly connected.
- When handling the motherboard, please try not to touch the metal wiring part to avoid short circuit.
- It is best to wear an anti-static wrist strap when handling the motherboard, central processing unit (CPU) or memory module. If you do not have an anti-static wrist strap, make sure your hands are dry, and touch a metal object first to eliminate static electricity.
- Before the motherboard is installed, please place it in an antistatic mat or antistatic bag.
- Make sure the power supply is turned off when you unplug the power socket on the motherboard.
- Before turning on the power, please make sure that the voltage value of the power supply is the voltage standard value set in the window.
- Before turning on the power, please make sure that the cables and power cables of all hardware devices are properly connected.
- Do not let the screws touch the circuit or parts on the main board to avoid damage or failure of the main board.
- Make sure there are no leftover screws or metal objects on the motherboard or inside the computer case.
- Do not place the main computer on an unstable place.
- Do not place the host computer in an environment with excessive temperature.
- Turning on the power during installation may cause damage to the motherboard, other devices or yourself.
- If you are not familiar with performing installation, or if you have any technical problems with this product, please consult a professional technician.

memory installation

The motherboard provides a 260Pin DDR4 SO-DIMM memory slot.

Before you begin installing memory, please note the following information:

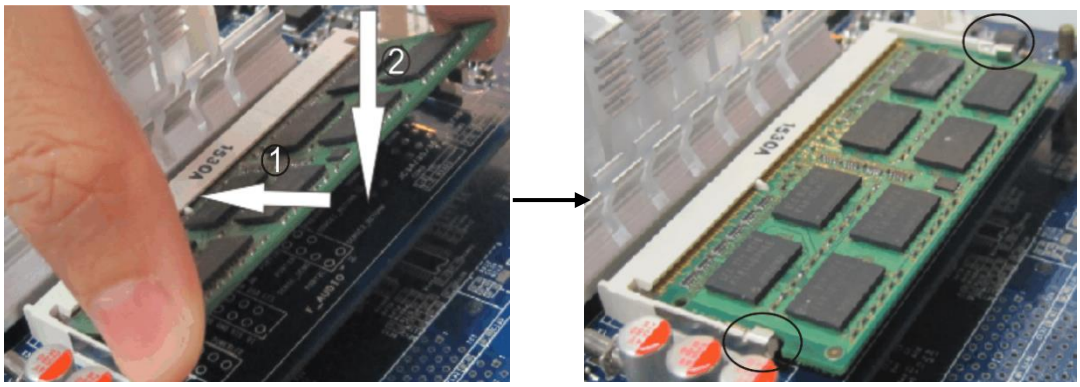
1. Please confirm that the memory you purchased is compatible with the specifications supported by this motherboard.
2. Before installing or removing the memory, please make sure that the power of the computer is turned off to avoid damage.
3. The memory design has a fool-proof mark . If you insert the memory in the wrong direction, the memory cannot be inserted. At this time, please change the insertion direction immediately.

Install memory:

1. Before installing or removing memory, please turn off the power and unplug the AC power cord.

2. Carefully hold the two ends of the memory stick and do not touch the metal contacts on it.
3. Align the gold finger of the memory stick with the memory stick slot, and pay attention to the direction where the concave hole of the gold finger aligns with the convex point of the upper slot;
4. Insert the memory stick into the memory slot at an angle of 30 degrees, and then press down the memory stick until a "click" sound is heard, indicating that the memory has been successfully installed and can be used. (Note: Do not press the memory stick too hard to avoid damage to the memory)
5. To remove the memory module, please push the latches on both ends of the DIMM slot outward at the same time, and then take out the memory module.

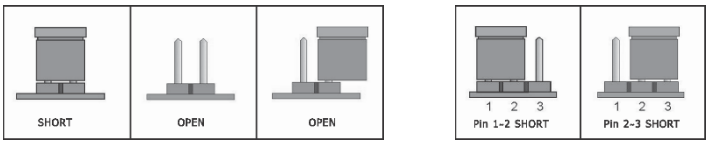
The installation diagram is for reference only :



5. Jumper settings

Jumper description

2-pin header: Inserting a jumper cap into both pins will turn it off (short circuit).
3-pin connector: A jumper cap can be inserted into pins 1-2 or 2-3 to close (short circuit).



How to identify the position of the first pin of the jumper?

1. Please check the main board carefully. Any pin marked with "1" or marked with a white thick line is the position of pin 1.
2. Look at the pad on the backplane, usually the square pad is the first pin .

Clear CMOS jumper pin: The motherboard provides a 1*3PIN JBAT1 connector : CMOS content clear/hold setting (pin pitch: 2.54 mm) CMOS is powered by the button battery on the board. Clearing the CMOS will permanently erase the previous system configuration and set it to the original (factory default) system settings. The steps: (1) turn off the computer and disconnect the power supply; (2) short JBAT1 2-3pin for about 5 seconds; (3) turn on the computer; (4) press the screen prompt button to enter the BIOS setting when starting up, and reload the optimal default Save value; (5) Save and exit the settings. The pins are defined as follows:

JBAT1 definition:

set up	JBAT 1
1-2 short circuit	normal working condition
2-3 short	clear CMOS contents

circuit	All BIOS settings are restored to factory defaults

Power-on and boot function jumper: The motherboard provides a 1*3PIN AT-ATX1 jumper (pin pitch: 2.54 mm) , which can be used to control whether the power is on or not.

AT-ATX1 definition:

set up	AT-ATX1
1-2 short circuit	Turn off the auto-start function
2-3 short circuit	Turn on the automatic call function

6. Definition of each pin

1. The motherboard provides two 2*5Pin standard COM pin ports (pin pitch: 2.0mm), JCOM1, JCOM2 ordinary pin definitions:

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 supporting RS232, JCOM1 and JCOM2 can also support RS485, RS232 and RS485 selection jumpers of JCOM1 and JCOM2:

JC1 settings	JCOM_SW1	JCOM1	Function
1- 3 short circuit	1-3, 2-4 short circuit	RS232	J COM1 1st PIN (DCD) J COM1 2nd PIN is (RXD)
3- 5 short circuit	3-5, 4-6 short circuit	RS485	J COM1 1st PIN (A) J COM1 2nd PIN is (B)

JC1 settings	JCOM_SW2	JCOM2	Function
2 - 4 short circuit	1-3, 2-4 short circuit	RS232	J COM2 1st PIN (DCD) J COM2 2nd PIN is (RXD)
4 - 6 short circuit	3-5, 4-6 short circuit	RS485	J COM2 1st PIN (A) J COM2 2nd PIN is (B)

3. The main board provides a 2*20Pin standard 4 serial pin port (pin 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
twenty one	COM5_DCD	twenty two	COM5_RXD
twenty three	COM5_TXD	twenty four	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

4、COM3 can support RS232 and RS485/RS422, COM4 can support RS232 and RS485.

COM3 and COM4 support RS232 by default, please contact our business if you need to support RS485 and RS422.

The RS485/RS422 connection pins of COM3 and COM4 (pin pitch 2.0mm), and the JRS485 pins are defined as follows:

pin	signal name	pin	signal name
1	TXD+ (A3)	2	TXD- (B3)
3	RXD+ (A4)	4	RXD- (B4)
5	GND	6	GND

5. The motherboard provides a 2*15Pin LVDS pin interface (pin pitch: 2.0mm), and the definition of LVDS1 pins is as follows:

LVDS1 can be set to eDP interface by changing the hardware. The default is LVDS interface. If you need an eDP interface, please contact the salesperson before placing an order.

pin	signal name	pin	signal name
1	LCDDVDD (LVDS and EDP screen voltage, set by JLVDS_PWR1)	2	LCDDVDD (LVDS and EDP screen voltage, set by JLVDS_PWR1)
3	LCDDVDD (LVDS and EDP screen voltage, set by 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+
twenty one	LVDS_B1-	twenty two	LVDS_B1+
twenty three	LVDS_B2-	twenty four	LVDS_B 2+ _
25	GND	26	GND
27	LVDSB_CLK-	28	LVDSB_CLK+
29	LVDS_B3-	30	LVDS_B3+

The blue font is the eDP definition

Note: The board provides 3.3V, 5V, and 12V screen working voltage options , as well as 5V and 12V screen backlight supply voltage options ;

Before using LVDS , please understand the required working voltage . When the selected LCD voltage is consistent with the voltage of the LCD screen used , the LCD screen can display normally. The setting method is as follows:

INVERT1 (LVDS and EDP backlight power supply interface) definition:

pin	signal name
1	12V/5V (INVERT_PWR1 setting)
2	12V/5V (INVERT_PWR1 setting)
3	Backlight enable
4	Backlight Brightness Control
5	GND
6	GND

INVERT_PWR1 (LVDS and EDP screen backlight power supply) settings:

set up	INVERT_PWR1
1-2 short circuit	12V
2-3 short circuit	5V

JLVDS_PWR1 (LVDS and EDP screen working voltage LCDDVDD) set up:

set up	JLVDS_PWR1
1-2 short circuit	3V

3-4 short circuit	5V
5-6 short circuit	12V

SW1 is used to set the resolution of LVDS, the detailed settings are as follows:

拨码开关 数字代表1，字母代表0 ，从1数到4

	Switch [1:4]	HA (Pixel)	VA (line)	RR (Hz)	PC (MHz)	CD (bit)	Port	HB (Pixel)	HSO (Pixel)	HSPW (Pixel)	VB (line)	VSO (line)	VSPW (line)
0	0000	800	600	60	60.00	6	Single	160	48	32	22	3	4
1	1000	1024	768	60	56.00	6	Single	160	48	32	22	3	4
2	0100	1280	768	60	68.25	6	Single	160	48	32	22	3	7
3	1100	1280	800	60	71.00	6	Single	160	48	32	23	3	6
4	0010	1280	960	60	85.25	6	Single	160	48	32	28	3	4
5	1010	1280	1024	60	91.00	8	Dual	160	48	32	30	3	7
6	0110	1366	768	60	72.75	6	Single	160	48	32	23	3	10
7	1110	1366	768	60	72.25	8	Single	160	48	32	23	3	10
8	0001	1440	900	60	106.50	8	Dual	464	80	152	34	3	6
9	1001	1024	600	60	56.00	6	Single	160	48	32	22	3	4
10	0101	1920	1080	60	138.50	6	Dual 15.6 inch	280	48	32	31	3	5
11	1101	1920	1080	60	138.50	8	Dual 21.5 inch	280	48	32	31	3	5
12	0011	1920	1080	60	138.50	8	Dual 42 inch	280	48	32	31	3	5
13	1011	1920	1200	60	154.00	6	Dual	280	48	32	35	3	6
14	0111	1280	800	60	154.00	8	Single	280	48	32	35	3	6
15	1111	1024	768	60	56.00	8	Single	160	48	32	22	3	4

6. The motherboard provides a 2*5PIN (pin pitch: 2.0mm) front audio interface, and the F_AUDIO1 pin is defined 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. There is a built-in power amplifier interface of 1*4PIN (pin pitch: 2.0mm) on the motherboard, and the JSPKR1 pin definition is as follows:

pin	signal name	pin	signal name
1	SPK L -	2	SPK L +
3	SPK R -	4	SPK R +

8. The motherboard has built-in 3 USB2.0 interfaces in the form of 2*5pin pins (pin pitch: 2.0mm), and the default built-in supports 4 USB2.0 interfaces

F_USB1, F_USB2, F_USB3 pins are defined as follows:

pin	signal name	pin	signal name
1	+5V	2	+5V
3	Data 0- _	4	Data 1- _
5	Data 0+ _	6	Data 1+ _
7	GND	8	GND
9		10	GND

Note: F_USB3 defaults to not uploading files

9. This board provides a 1*4Pin smart fan interface, and the pin definition of CPUFAN1 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

10. This board provides a 1*4Pin red SATA hard disk power interface (pin pitch: 2.0mm), and the JSPWR1 pin definition is as follows:

pin	signal name	pin	signal name
1	+12V	2	GND
3	GND	4	+5V

Please be sure to confirm the position of the first pin of JSPWR1, otherwise the hard disk will be burned. When using, the standard power cord provided by our company must be used ;

11. The motherboard provides a 2*5 Pin SATA3.0 pin (pin pitch: 2.0mm, optional), and the JSATA1 pin definition is as follows:

pin	signal name	pin	signal name
1	SATA_TXP1	2	+5V
3	SATA_TX N 1	4	+5V
5	GND	6	GND
7	SATA_R X N 1 _	8	GND
9	SATA_R X P 1 _	10	+12V

12. This board provides a 2*5Pin F_PANEL1 interface (pin pitch: 2.0mm)

The power switch of the chassis, the reset switch hard disk indicator light and the power indicator light can be connected to this pin. The definition of the F_PANEL1 pin is as follows:

pin	signal name	pin	signal name
1	HDD LED+	2	PWRLED+
3	HDD LED-	4	PWRLED-
5	GND	6	PWRBTN#
7	RESETBTN#	8	GND
9	NC	10	

13. The motherboard provides a 2*5 Pin GPIO pin (pin pitch: 2.0mm), and the GPIO1 pin is defined as follows:

pin	signal name	pin	signal name
1	GND	2	+5V
3	GPO1 /0xA02/bit6	4	GPI1/0xA00/bit0
5	GPO2 /0xA02/bit7	6	GPI2 /0xA01/bit3
7	GPO3 /0xA04/bit6	8	GPI3 /0xA05/bit0
9	GPO4/0xA04/bit7	10	GPI4 /0xA05/bit1

15. The motherboard provides a 1*2 Pin Phoenix power interface (pitch: 5.5mm, optional). The definition of DC12V_IN3 pin is as follows:

pin	signal name
1	GND
2	+12V