SPACEMIT
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K3 Pico-ITX

User Guide
2026.11.06
V1.4

Revision History

The revision history below records the updates made to this document.

Revision	Date	Description
V1.4	2026.11.06	Removed the preinstalled operating system version number
V1.3	2026.09.17	Added CCC-certified power adapter requirements Updated Preface
V1.2	2026.07.03	Increase eDP Display Interface
V1.1	2026.06.10	Update notes for power supply
V1.0	2026.04.30	Initial release

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Preface

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1. Quick Start

Welcome to the SpacemiT K3 Pico-ITX single-board computer user guide.

The K3 Pico-ITX is available in two package options:

- **Single Board Kit**

- **Chassis Kit**

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Before getting started, connect the following required peripherals. Once power is connected, you can power on the board and begin using it:

- A Type-C power adapter or ATX 2-Pin DC power supply (a 20 V / 5 A power adapter is recommended) > Note:
    - The Type-C power adapter must provide a rated output of at least 20V @ 3.25A;
    - The ATX 2-pin DC power supply must provide a rated output of at least 12V @ 5A.
    - When using a power adapter for charging, use a compatible adapter that has obtained CCC certification and complies with applicable standards.
- A monitor
- A keyboard
- A mouse

You can power the K3 Pico-ITX and connect a display in either of the following ways:

Method 1: Use a monitor that supports 65 W or higher USB Type-C power delivery, and connect the monitor to the board with a full-featured Type-C cable.

- **Method 1 (Single Board Kit)**

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- **Method 1 (Chassis Kit)**

Method 2: Use a multifunction dock that supports HDMI output, USB, and PD charging. Connect the dock to the board's full-featured Type-C port to carry both power and display signals.

- **Method 2 (Single Board Kit)**

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- **Method 2 (Chassis Kit)**

Note: To ensure stable operation, make sure the board is placed in a well-ventilated environment before powering it on, and use the bundled heatsink.

1.1. U-Boot Version

The K3 Pico-ITX comes preinstalled with the Bianbu LXQt desktop edition. After powering on with the setup above, you can boot directly into Bianbu OS for initial configuration.

For first-boot and session setup, refer to Initial Setup and Sessions.

1.2. UEFI Preview Version

The K3 Pico-ITX supports UEFI boot and configuration, with NVMe SSD, USB, and UFS available as boot devices.

A UEFI preview image is currently available for the Pico-ITX.

For operating system installation steps, refer to Part 3 OS Installation.

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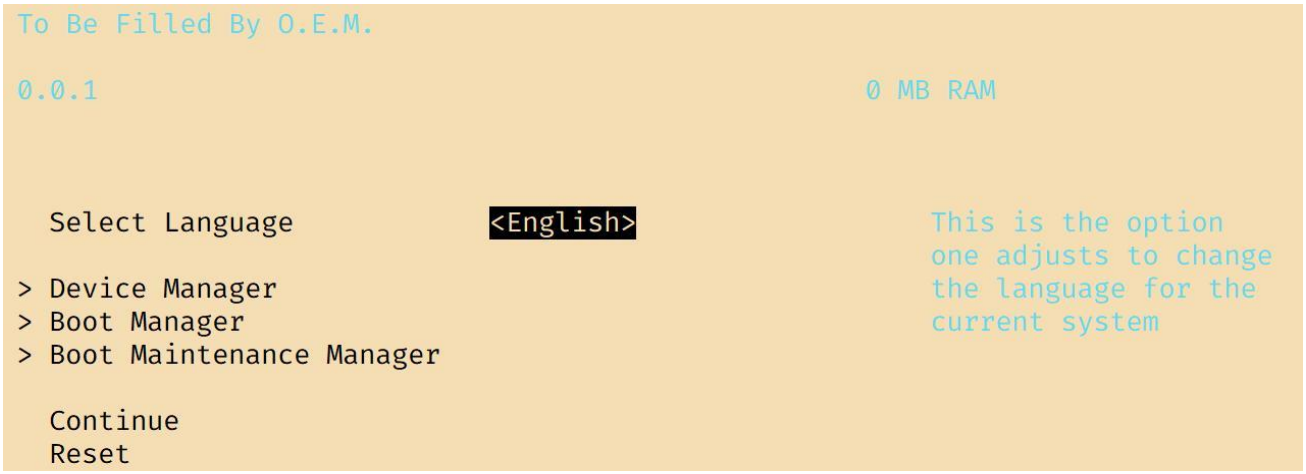
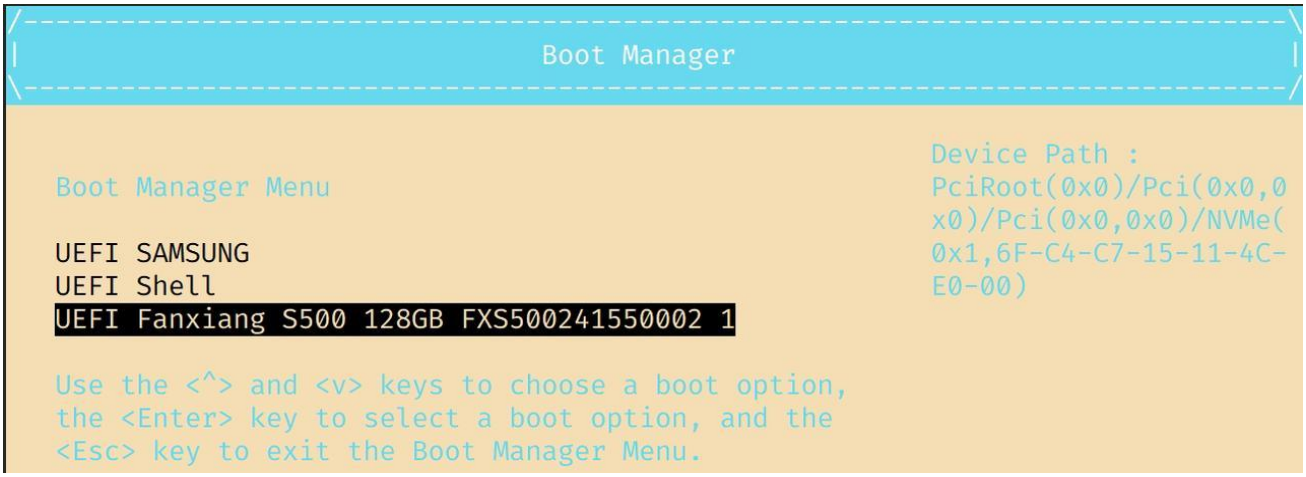
1.2.1. UEFI Setup

Within 3 seconds after powering on the K3 Pico-ITX, press F2 to enter the UEFI setup screen.



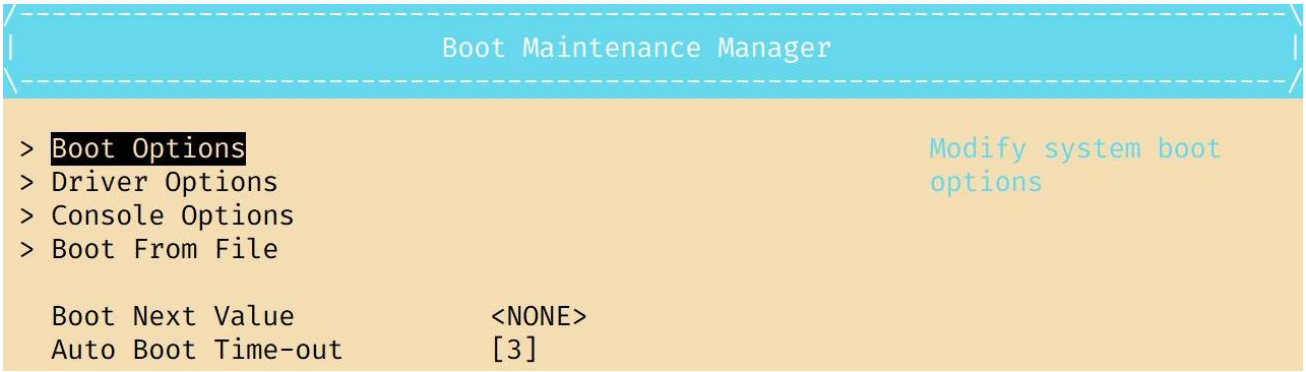
1.2.2. Boot Manager

In the Boot Manager menu, use the <↑> and <↓> keys to select a boot device such as an NVMe SSD, USB storage device, or UFS. You can also enter the UEFI Shell command-line interface.



1.2.3. Boot Maintenance Manager

In the Boot Maintenance Manager menu, go to Boot Options and select Change Boot Order to configure boot priority. Use <+> and <-> to adjust the boot order. Press <Enter>, then select Commit Change and Exit to apply the changes and exit. After returning to the main menu, press <F10> to save the settings.



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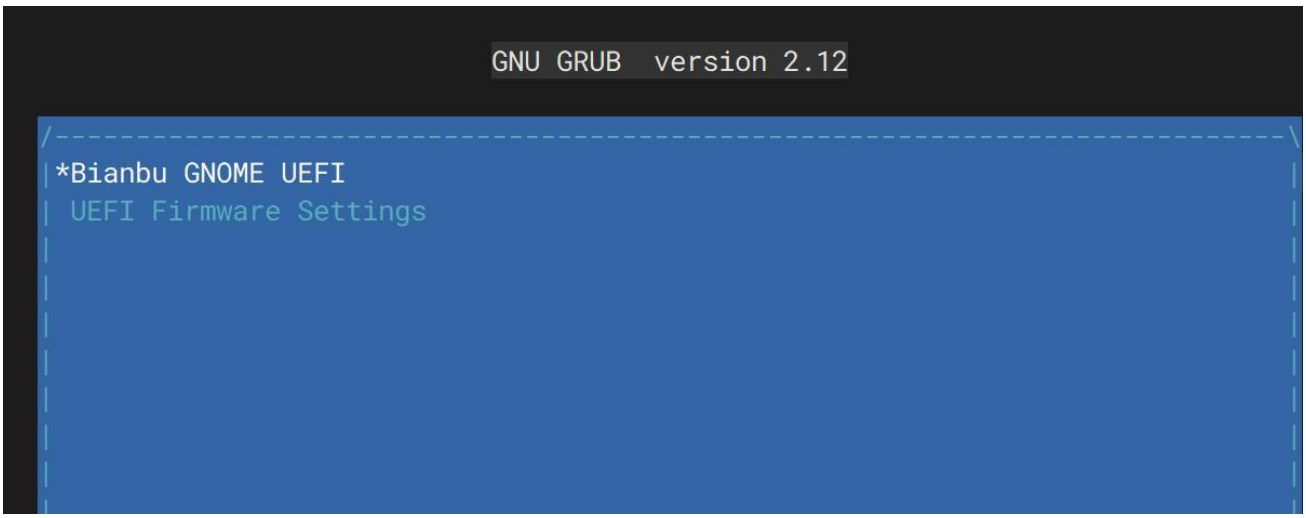
1.2.4. UEFI Interactive Shell

UEFI Interactive Shell V2.2 is supported. The first time you enter the UEFI Interactive Shell, the screen displays all currently detected storage devices. Press any key other than <Esc>, or wait 5 seconds, to enter the command-line interface. Enter help to view supported commands and related help information.

```
UEFI Interactive Shell v2.2
EDK II
UEFI v2.70 (SPACEMIT, 0x00FF00FF)
Mapping table
      FS3: Alias(s):HD1b:;BLK5:
          PciRoot(0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/NVMe(0x1,6F-C4-C7-15-11-4C-E0-0
0)/HD(1,GPT,ACDA5EAE-0965-47D4-AA74-0D20AE1E865F)
      FS4: Alias(s):HD1c:;BLK6:
          PciRoot(0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/NVMe(0x1,6F-C4-C7-15-11-4C-E0-0
0)/HD(2,GPT,49037F5D-82C5-491F-B650-5BCA54DAFDA8)
      FS5: Alias(s):HD1d:;BLK7:
          PciRoot(0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/NVMe(0x1,6F-C4-C7-15-11-4C-E0-0
0)/HD(3,GPT,6CA283B4-6B03-46D9-9E94-0634DCCC2136)
      FS0: Alias(s):HD0b:;BLK1:
          MemoryMapped(0xB,0xC0E00000,0xC0E3FFFF)/UFS(0x0,0x0)/HD(1,GPT,5D5C247F
-4A47-4F61-B131-7EBFB58F4D50)
      FS1: Alias(s):HD0c:;BLK2:
          MemoryMapped(0xB,0xC0E00000,0xC0E3FFFF)/UFS(0x0,0x0)/HD(2,GPT,78A626D1
-0C35-4DB8-B2FC-EBD14083D862)
      FS2: Alias(s):HD0d:;BLK3:
          MemoryMapped(0xB,0xC0E00000,0xC0E3FFFF)/UFS(0x0,0x0)/HD(3,GPT,5EF56C87
-1D0E-4021-AC73-943C98F9DCEF)
     BLK4: Alias(s):
          PciRoot(0x0)/Pci(0x0,0x0)/Pci(0x0,0x0)/NVMe(0x1,6F-C4-C7-15-11-4C-E0-0
0)
     BLK0: Alias(s):
          MemoryMapped(0xB,0xC0E00000,0xC0E3FFFF)/UFS(0x0,0x0)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell>
```

1.2.5. GRUB Boot

GRUB boot is supported, allowing multiple operating systems to be installed and selected at startup.



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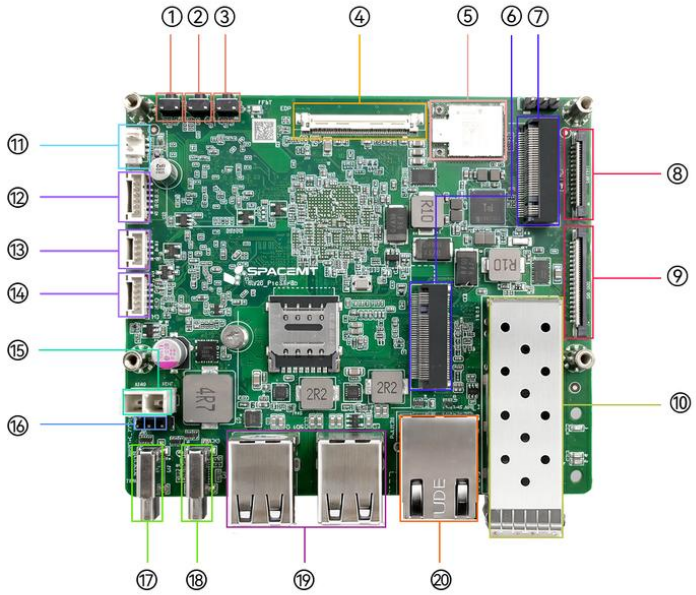
2. Hardware Description

2.1. Overview



Note: The board appearance may vary slightly depending on the hardware revision.

No.	Description
1	Power button PWR
2	FDL flashing button
3	Reset button RST
4	eDP interface
5	Wi-Fi and BT module
6	M.2 Key B slot
7	M.2 Key M slot
8	26 Pin FPC connector
9	36 Pin FPC connector
10	10G optical Ethernet port
11	Coin-cell battery header
12	Front-panel headphone connector
13	Front-panel switch header
14	EC expansion header
15	ATX power connector
16	UART pin header
17	Full-featured Type-C port
18	DRD Type-C port (no power input)

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No.	Description
19	Dual USB 2.0 Type-A ports
20	1G Ethernet RJ45 port

2.2. Indicators and Buttons

Indicator	Status Description
Status indicator STAT	Solid green: the board is powered on and running Blinking green: the board indicates that a forced power-off is imminent Off: the board is powered off

Button	Description
Power button PWR	- Short press in Shutdown state: power on - Short press in Standby state: wake the system - Press and hold for 3 s in Normal state: the LED changes from solid on to blinking, indicating imminent power-off; continue holding the button while blinking to force power off - Short press in Normal state: sends a button event, with behavior defined by the OS
Firmware flashing button FDL	- Hold while inserting power or resetting power to enter flashing mode
Reset button RST	- Short press: power reset, forces a reboot

2.3. Interface Description

2.3.1. Power Input

- USB Type-C supports USB PD 3.0 power delivery, up to 20 V / 5 A
- ATX power input supports up to 12 V / 7 A. When an ATX power supply is connected, the system will prioritize ATX power.

  Note: ATX and Type-C PD power do not support 1+1 hot redundancy.

  - When the system is powered by ATX, it will continue to use ATX power even if a PD-capable Type-C cable is connected.
  - To switch to Type-C PD power, shut down the system, disconnect the ATX power supply, and then power on.
  - If the ATX power supply is removed while the system is running with Type-C PD power, the system will restart and automatically switch to Type-C PD power.
  - If an ATX power supply is connected while the system is running on Type-C PD power, the system will restart and switch to ATX power.
- In flashing mode, this port can provide both power input and USB Device functionality. After being connected to a host PC through USB Type-C, the board can be detected by the host PC and used for flashing and firmware updates

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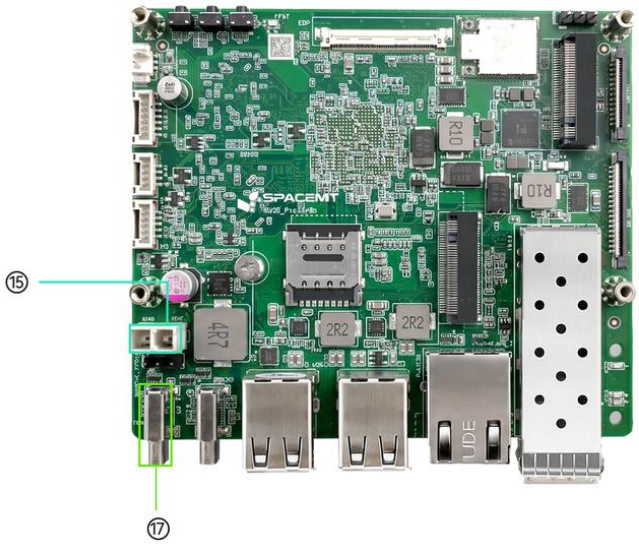
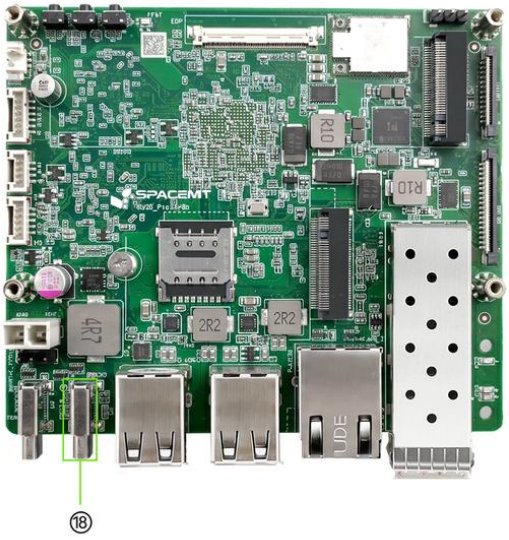


No.	Description
15	ATX power connector
17	Full-featured Type-C port

2.3.2. Flashing Interface

In flashing mode, this interface can only operate as a USB Device for data transfer and cannot supply power to the board. After connecting to a host PC through USB Type-C, the board can be detected by the host PC and used for flashing and firmware updates.

Note: The flashing Type-C port cannot supply power to the board. During flashing, power must be provided through another power input. The USB cable must support data transfer; charge-only USB cables cannot be used for flashing.



No.	Description
18	Flashing port (no power input)

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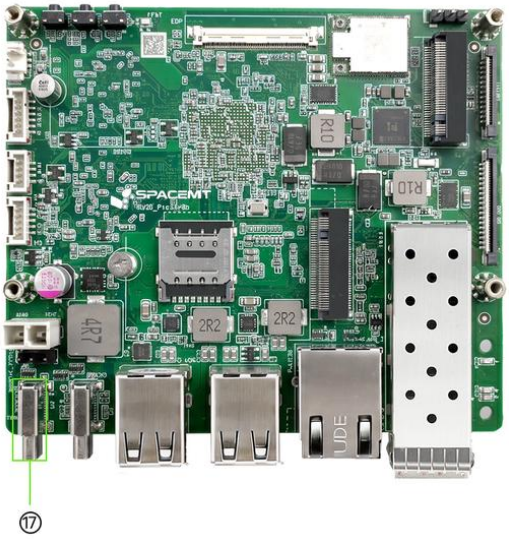
2.3.3. Full-Featured Type-C Interface

- Type: Type-C connector
- Supports PD 3.0 power negotiation and connections to DP displays and USB 3.0 peripherals
- Supports DP displays at up to 4K @ 60 Hz, with hot-plug support
- When only a DP display is connected, the DP display is used as the primary display



No.	Description
17	Full-featured Type-C port

2.3.4. High-Speed Expansion Interfaces: M.2 M-Key and M.2 B-Key

- Type: M.2 connector with 4.2 mm stack height
- **M.2 M-Key**
  - Supports 2280 NVMe SSDs
  - PCIe 3.0 x2/x4 bandwidth
- **M.2 B-Key**
  - Supports 2242 PCIe SSDs
  - PCIe 3.0 x2 bandwidth
  - Supports USB 2.0 4G modem modules

Note:

1. When a PCIe SSD is installed in the M.2 B-Key slot, the M.2 M-Key slot operates at PCIe 3.0 x2. When no SSD is installed in the M.2 B-Key slot, the M.2 M-Key slot operates at PCIe 3.0 x4.
2. When used for storage expansion, the M.2 B-Key slot supports PCIe SSD only. SATA SSD is not supported.
3. Hot-plugging is not supported. Power off the board before installation or removal.

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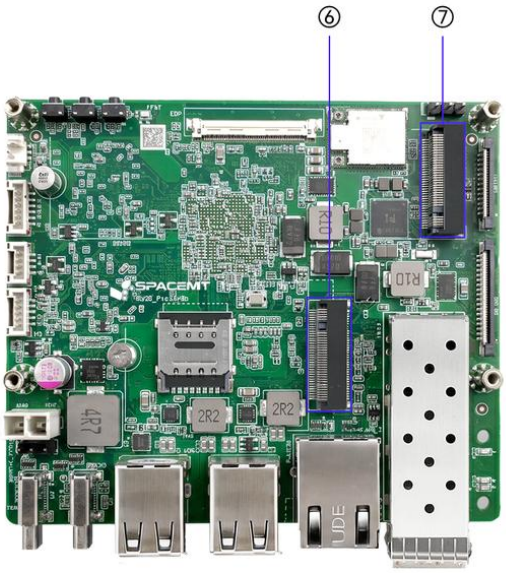
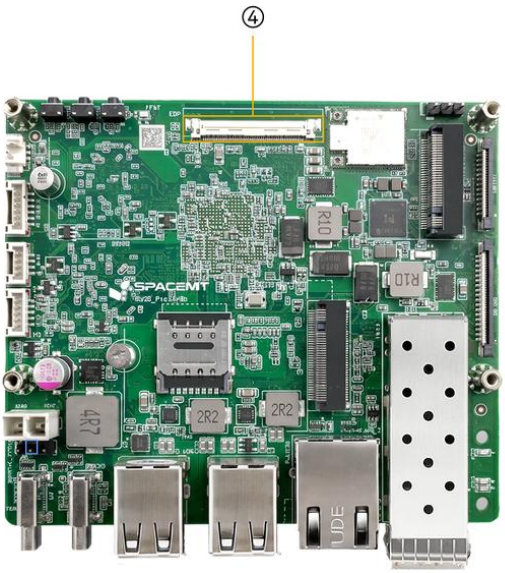


No.	Description
6	M.2 Key B slot
7	M.2 Key M slot

2.3.5. eDP Display Interface

- Type: eDP connector
- Supports external eDP displays at up to 2.5K @ 90 Hz. Hot-plugging is not supported
- When only an eDP display is connected, the eDP display is used as the primary display
- When both a DP display and an eDP display are connected, eDP is the default primary display and DP is used as an extended display. You can change the primary display to DP in the operating system



No.	Description
4	eDP interface

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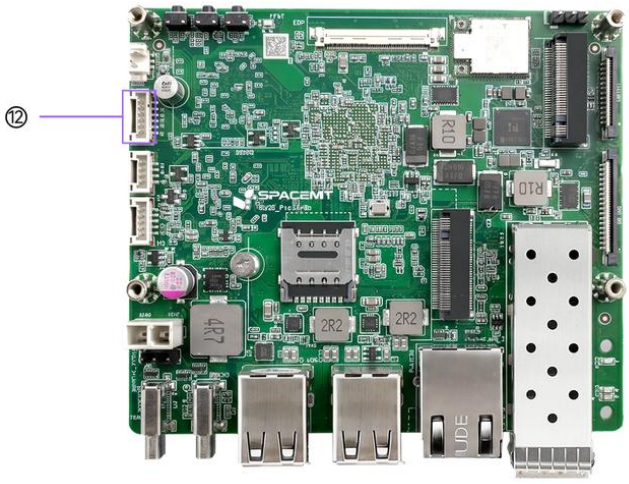
2.3.6. Audio Interface

- Type: 1.25 mm latch wire-to-board connector



No.	Description
12	Front-panel headphone connector

- An onboard audio output header is provided and can be connected to a front-panel 3.5 mm headphone jack using an adapter cable.

2.3.7. 1G Ethernet Interface

- Type: RJ45 with green and yellow status LEDs
- Supports 100 M / 1000 M adaptive switching

The green LED on the Ethernet port is the LINK SPEED indicator and shows link state and link speed:

1. Solid green: link established at the highest supported speed
2. Off: link established but not at the highest supported speed
3. Off: no link established

The yellow LED on the Ethernet port is the ACTIVE indicator and shows link activity:

1. Off: no data transmission
2. Blinking yellow: data is being transmitted; faster blinking indicates higher activity
3. Off: no link established

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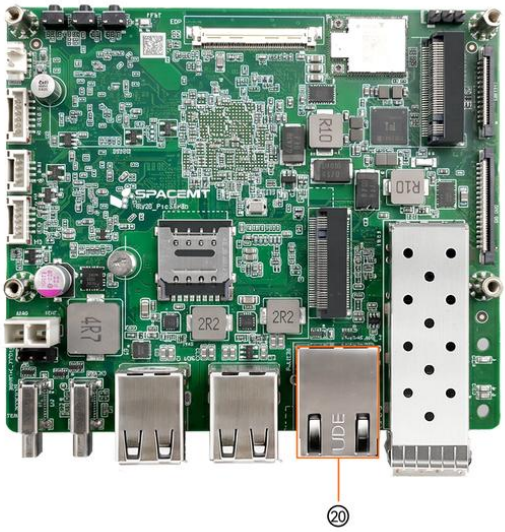
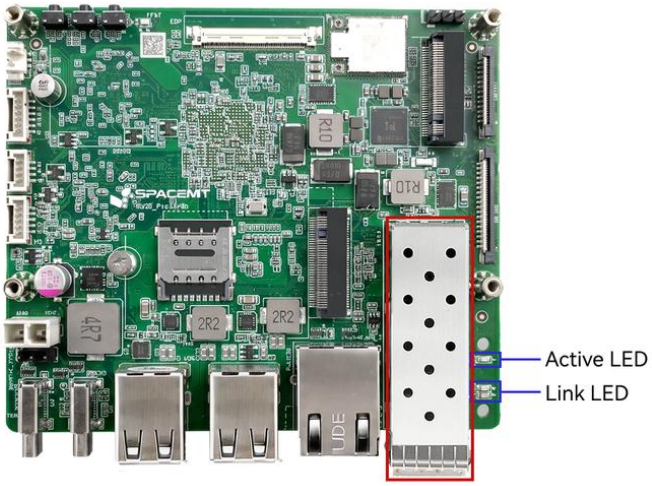


No.	Description
20	1G Ethernet RJ45 port

2.3.8. 10G Optical Ethernet Interface

- Type: SFP+ optical port
- Supports multimode optical modules, DAC cables, and optical-to-electrical transceiver modules, with 10G/1G auto-negotiation



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LINK SPEED indicates link state and link speed:

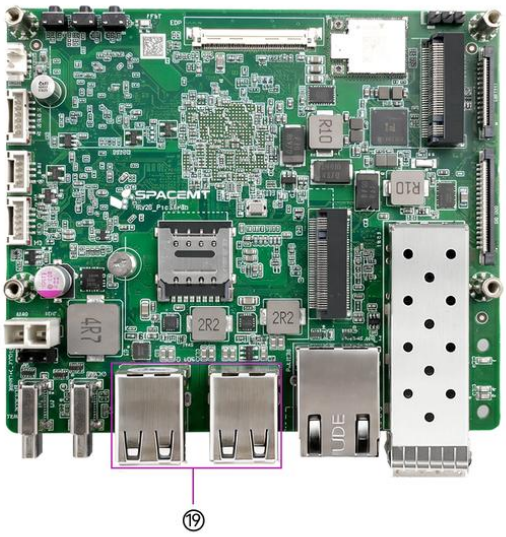
1. Green: link established at the highest supported speed
2. Yellow on the 10G port: link established but not at the highest supported speed
3. Off: no link established

ACTIVE indicates link activity:

1. Off: no data transmission
2. Blinking: data is being transmitted; faster blinking indicates higher activity
3. Off: no link established

2.3.9. USB 2.0 Interface

- Type: USB Type-A
- Plug and play; supports USB 2.0 host mode
- Supports multiple USB devices such as keyboards and mice at the same time



No.	Description
19	Dual USB 2.0 Type-A ports

2.3.10. FPC Expansion Interface

- Type: 0.5 mm pitch, 26 Pin + 36 Pin FPC wire-to-board connector
- Available signals:
  - CAN ×5
  - UART ×2
  - GMAC ×1
  - PWM ×2
  - I2C ×1
  - SPI ×1
- Can be connected directly to an expansion board

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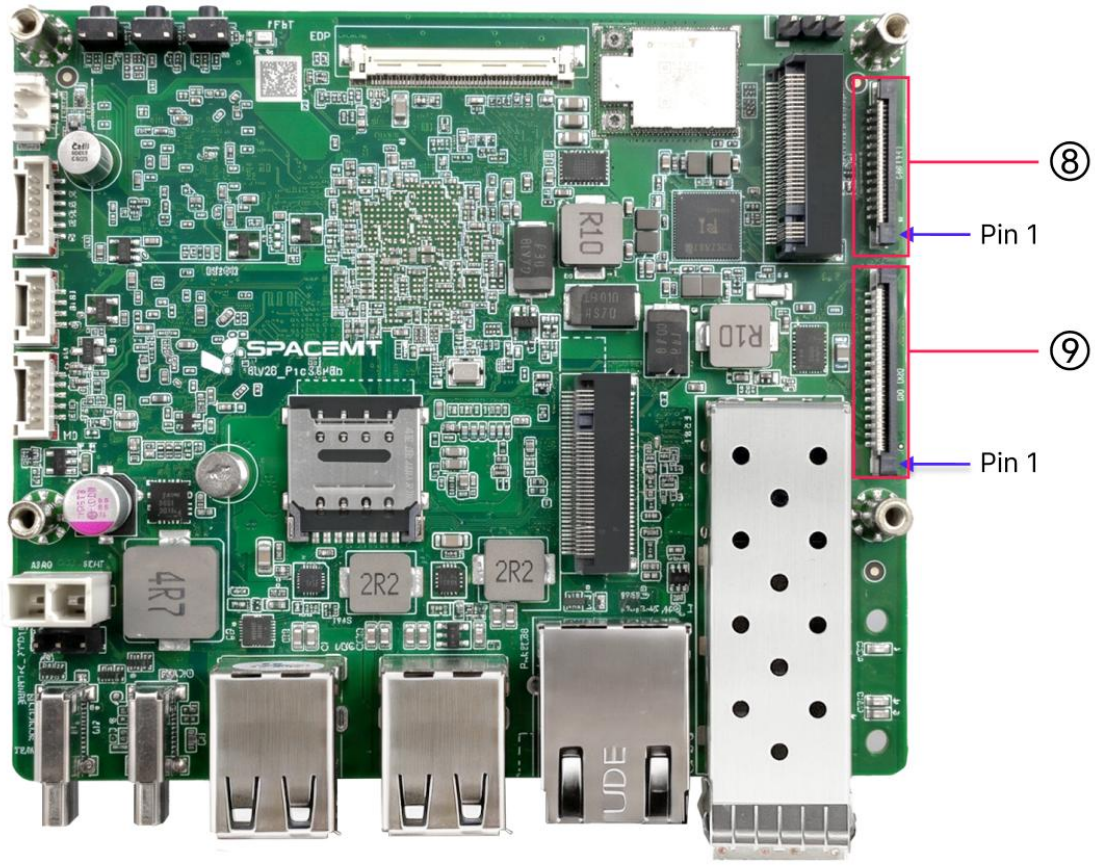

No.	Description
8	26 Pin FPC connector
9	36 Pin FPC connector

2.3.11. Wi-Fi Antenna Interface

- Type: onboard PCIe Wi-Fi 6 + BT 5.2 module, compliant with IEEE 802.11a/b/g/n/ac/ax, dual antennas, dual band (2.4 GHz / 5.8 GHz)
- A Wi-Fi antenna is included with the base package and can be installed at the recommended position shown below

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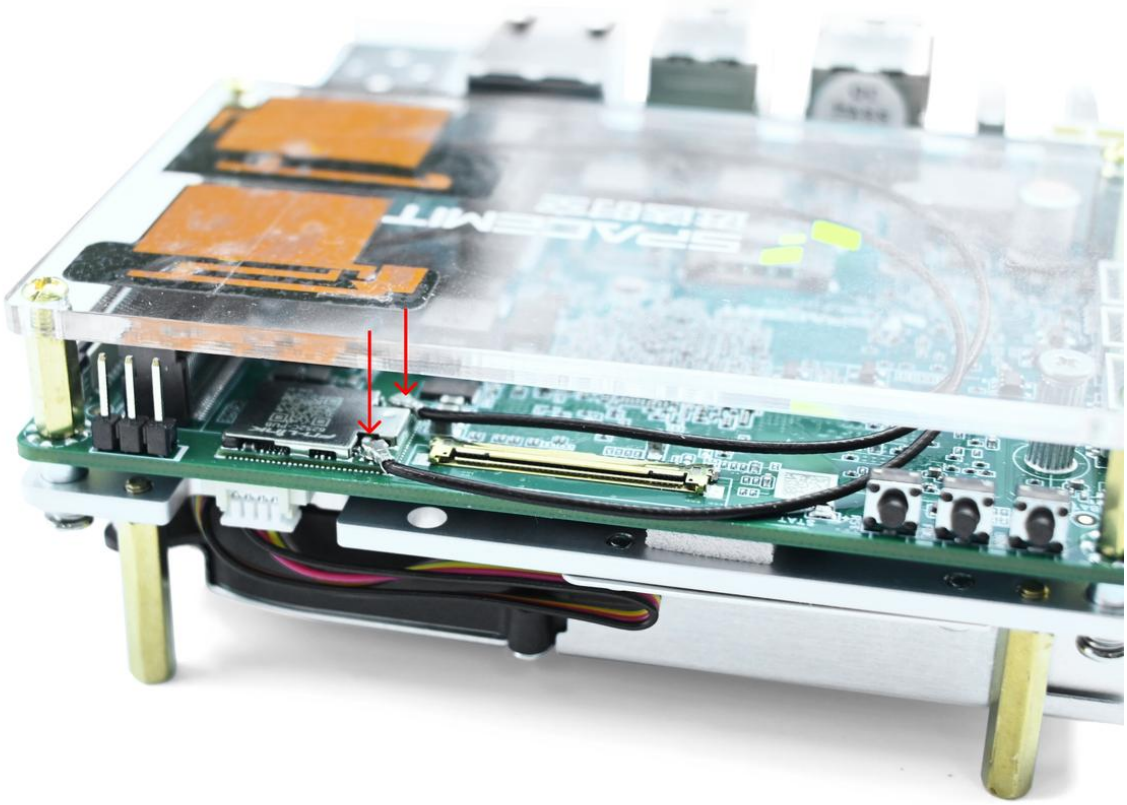

- The Chassis Kit configuration comes with the Wi-Fi antenna pre-connected and ready to use

2.4. Product Specifications

Item	Specification
Processor	SpacemiT K3, 8 cores, 2.4 GHz, 60 TOPS general AI compute, compliant with the RVA23 standard, supports IME extension and full virtualization
Display	- DP Type-C interface, up to 4K (3840 × 2160) at 60 Hz - 40 Pin eDP interface, up to 2.5K (2560 × 1600) at 90 Hz
Memory	Dual-channel 2 × 32 bit LPDDR5, 6400 MT/s, available in 16 GB / 32 GB
Onboard Storage	UFS 2.2, available in 128 GB / 256 GB
Storage Expansion	M.2 M-Key connector for 2280 NVMe SSDs, PCIe Gen3 x4 link
High-Speed Expansion	M.2 B-Key connector for 2242/3042 expansion cards, providing PCIe Gen3 x2 and USB signals
Real-Time Expansion	FPC connector supporting EtherCAT, 5 CAN-FD channels, SPI, I2C, UART, and other real-time signal expansion
Wireless Communication	Onboard PCIe Wi-Fi 6 + BT 5.2 module, compliant with 802.11a/b/g/n/ac/ax, dual antennas, dual band
Wired Networking	One Ethernet port with RJ45 connector, 100 M / 1000 M adaptive rates
Optical Networking	10G Ethernet with SFP+ interface, supporting 10G BASE-R and 10G BASE-X, as well as QinQ, MSI-X, WOL, and other networking features
Audio Interface	Onboard CODEC circuitry, supporting onboard audio input and output headers

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Item	Specification
USB Interfaces	- 2 USB 3.2 Gen1 Type-C ports (one full-featured, one OTG) - 4 USB 2.0 Type-A host ports
Debug Interfaces	Supports UART and JTAG, with 3 side buttons for power, reset, and firmware flashing
Management System	Onboard EC management system, supporting power management, intelligent thermal strategy, and system status management, with onboard I2C/UART/GPIO expansion interfaces
Form Factor	100 mm × 86 mm, Pico-ITX Plus single-board computer form factor, approximately the size of a 2.5-inch hard drive
Operating System	Preinstalled with Bianbu; supports Ubuntu 26.04, OpenHarmony 6.0, OpenKylin, Deepin, Fedora, and other operating systems
Power Input	Dual Type-C USB PD support, rated input power 65 W; onboard ATX 2 Pin power input supports 12 V @ 7 A
Reliability	- ESD protection for external board-level interfaces: contact ±4 kV, air ±8 kV - ESD protection at system level: contact ±6 kV, air ±12 kV - Compliant with CCC, CE, FCC, and other EMC certification standards
Clock	Onboard RTC power connector, supports battery installation for G3-state power retention
Mechanical Options	- Available as board-only or with a fan-cooled heatsink kit - Available as board-only or with a custom all-metal industrial enclosure - Optional real-time expansion boards, touch display, or industrial terminal configurations

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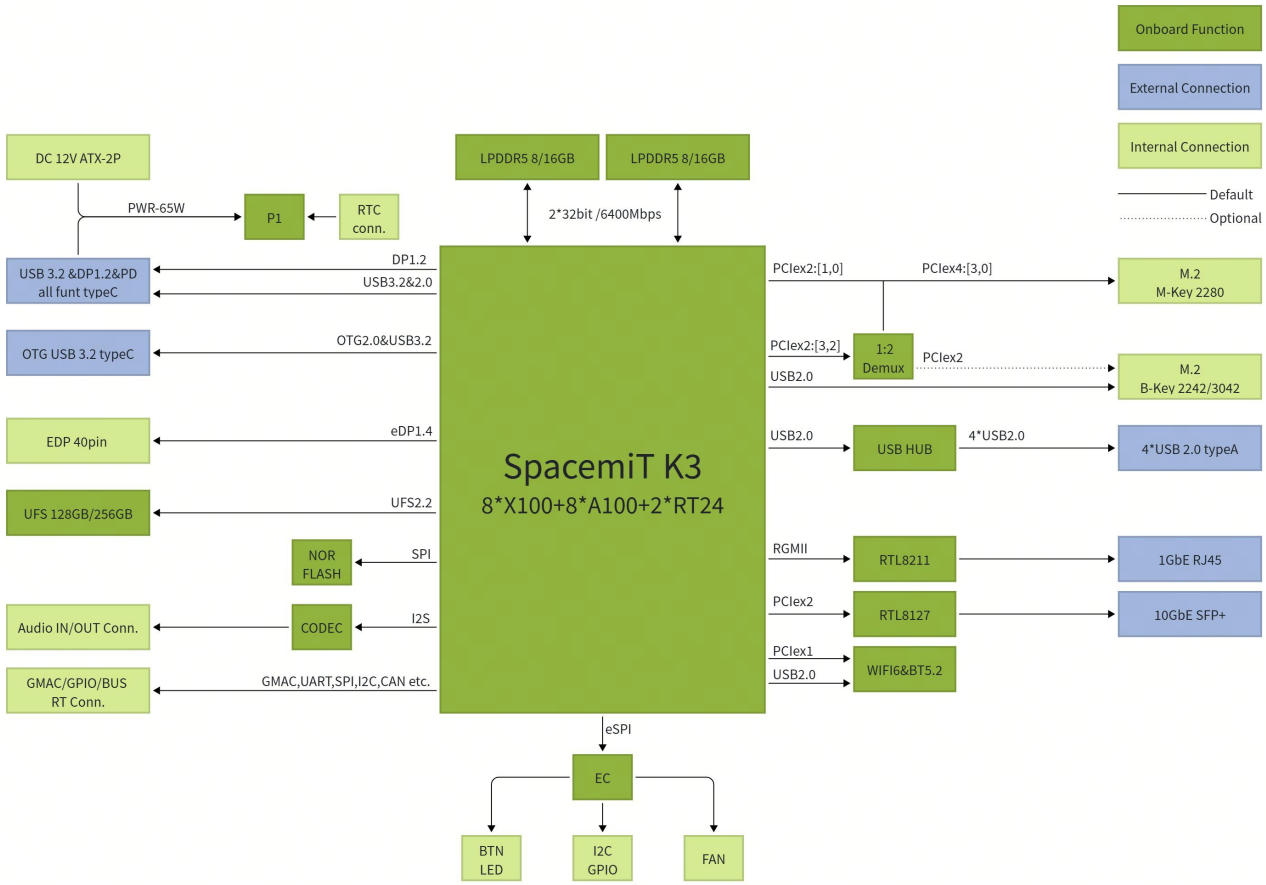
2.5. Block Diagram



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3. OS Installation

3.1. Method 1: Flashing via Type-C Data Cable

3.1.1. Device Powered Off

1. Press and hold the **FDL flashing button**.
2. Connect a full-featured Type-C cable or plug in the power supply cable to power on the device.
3. Release the **FDL flashing button**.
4. Use the flashing Type-C data cable to connect the DRD Type-C port to the host computer.
5. Use the official SpacemiT flashing tool **Titan** or the fastboot command to perform the flashing process.

No.	Description
2	FDL flashing button
17	Full-featured Type-C port
18	DRD Type-C port (no power input)

3.1.2. Device Powered by a Full-Featured Type-C Cable or ATX Power Supply (Powered On)

1. Press and hold the **FDL flashing button**.
2. Briefly press the **RST reset button**.
3. Release the **FDL flashing button**.
4. Use the flashing Type-C data cable to connect the DRD Type-C port to the host computer.

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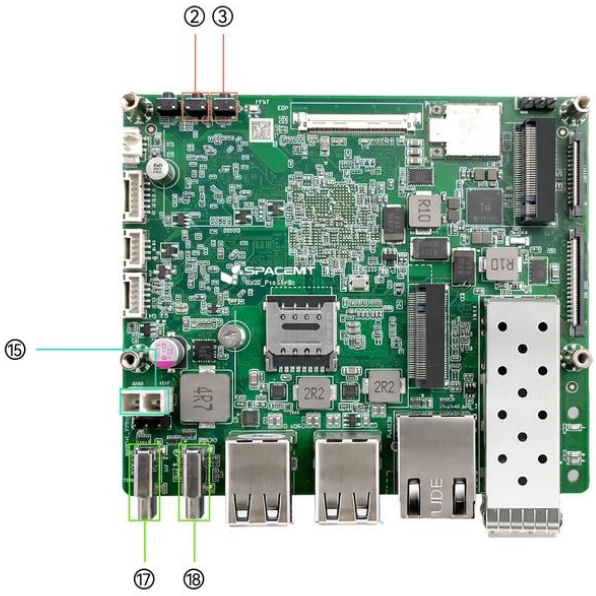
5. Use the official SpacemiT flashing tool **Titan** or the fastboot command to perform the flashing process.

Note: For the flashing tool manual, see the Flashing Tool User Guide.



No.	Description
2	FDL flashing button
3	Reset button RST
15	ATX power connector
17	Full-featured Type-C port
18	DRD Type-C port (no power input)

3.2. Serial Debugging

3.2.1. Interface Connection

Use a **USB-to-TTL** adapter to connect the host PC to the K3 Pico-ITX board header through **TX**, **RX**, and **GND**, as shown below.

Here, Tx and Rx represent the transmit and receive signals of the K3 board, respectively.

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3.2.2. Debugging on Windows (Using MobaXterm as an Example)

The following steps use MobaXterm as an example.

First, connect the serial hardware correctly, and confirm in Windows Device Manager under **Ports** that the corresponding COM port has been recognized, as shown below.

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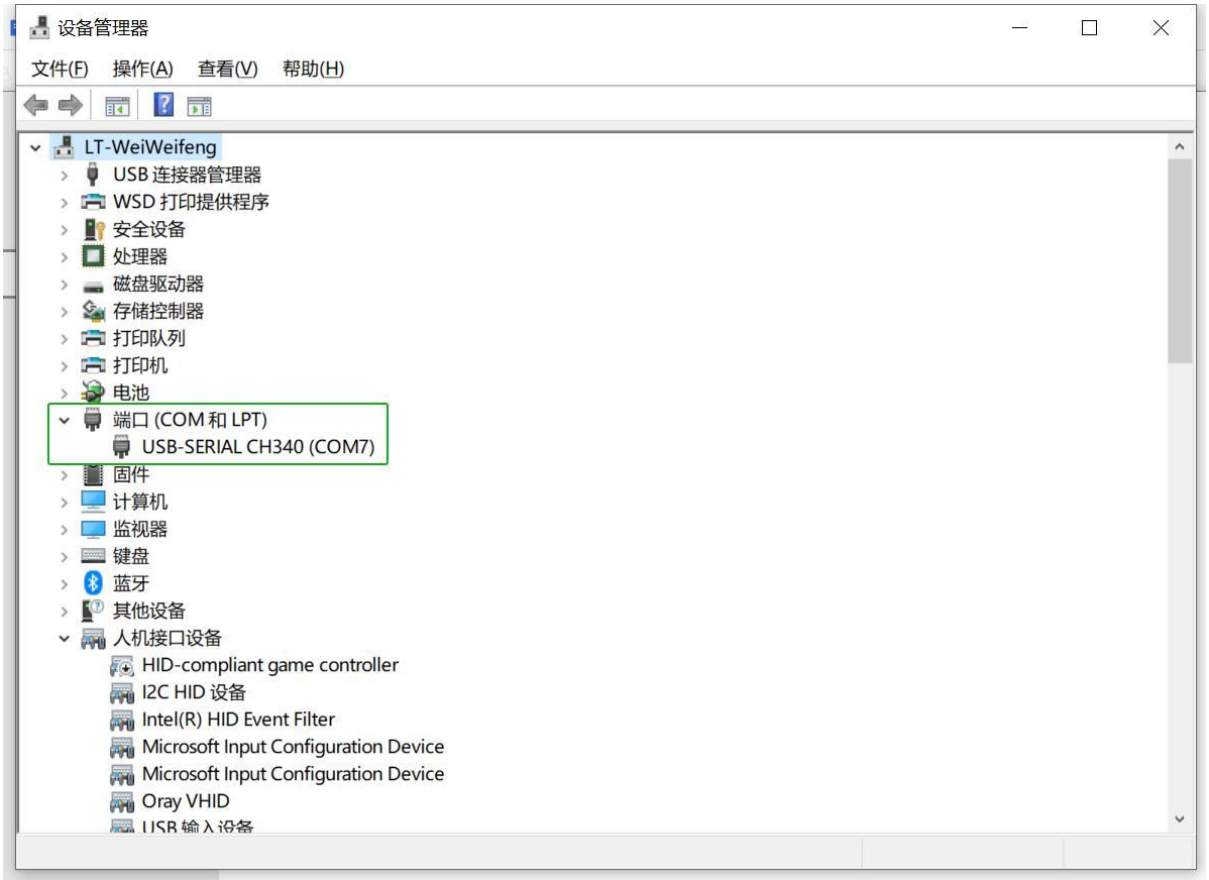
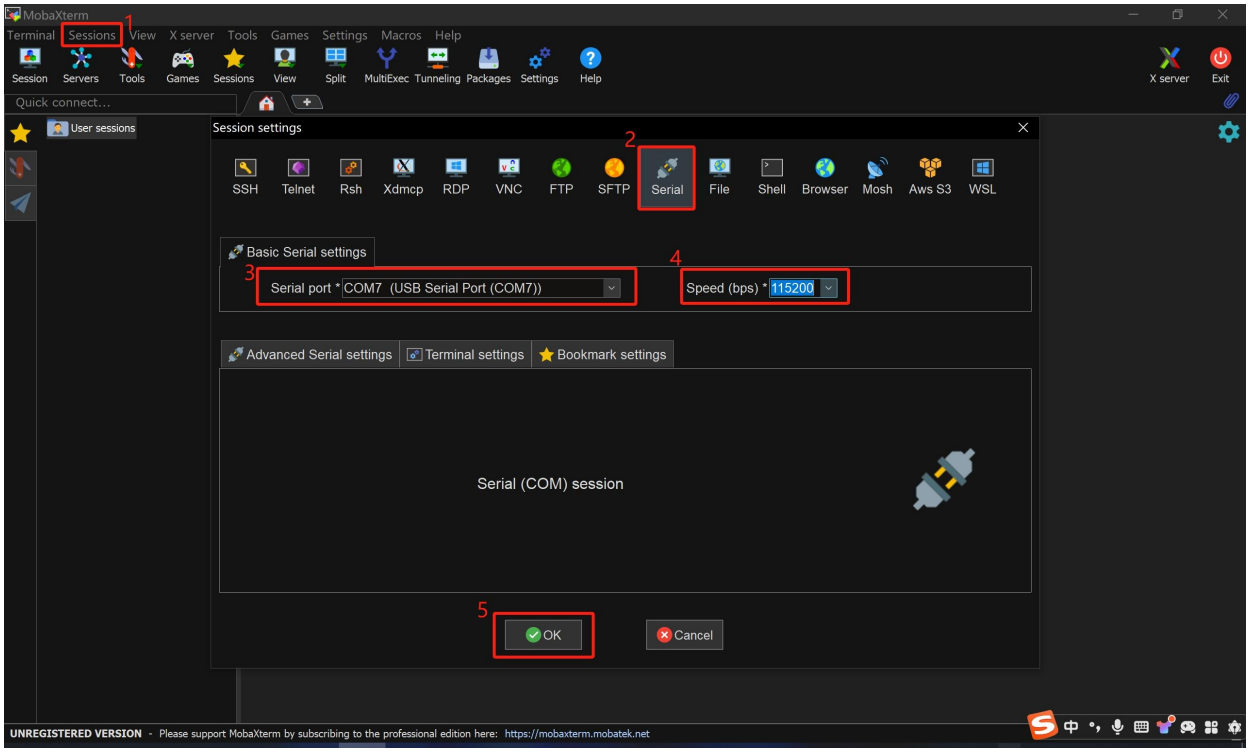


1. Open MobaXterm, then select **Sessions** → **New Session**.



2. In the dialog box, select **Serial**.
3. In the **Serial port** drop-down list, select the detected COM port.
4. Set **Speed** to **115200**.
5. Click **OK** to enter the serial log output page.

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4. Precautions

The K3 Pico-ITX is suitable for home, office, and industrial environments. Before operating the board, read the following precautions carefully:

1. Do not hot-plug display interfaces, CSI interfaces, or expansion boards under any circumstances.
2. Before unpacking or installing the single-board computer, take proper anti-static precautions to avoid ESD damage to the hardware.
3. When handling the board, hold it by the edges. Do not touch exposed metal parts on the board, to avoid electrostatic damage to components.
4. Place the board on a dry, flat surface, away from heat sources, electromagnetic interference sources, radiation sources, and devices sensitive to electromagnetic radiation, such as medical equipment.
5. Keep the board in a well-ventilated environment. If the system must run continuously at full load for 72 hours or longer, install the original heatsink or implement sufficient cooling measures.

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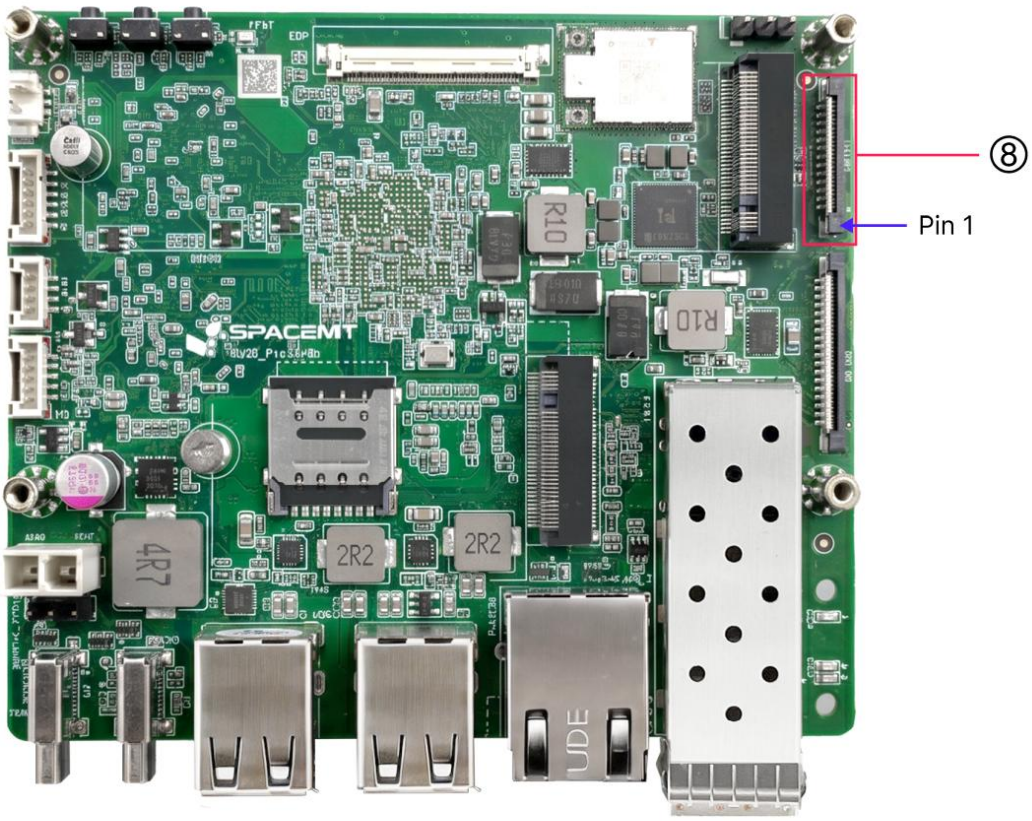
5. Appendix — Connector Pinout

5.1. FPC Expansion Interface

The K3 Pico-ITX provides **26 Pin + 36 Pin FPC expansion interfaces**.



26 Pin Connector Pinout: CAN (from RT24) + I2C (from RT24) + UART + PWM + 3.3 V (main power)

Pin	Signal	Description
1	3.3V	IO power supply
2	3.3V	IO power supply
3	R_I2C1_SCL	I2C clock
4	R_I2C1_SDA	I2C data
5	GND	Ground
6	R_UART0_TX	UART TX
7	R_UART0_RX	UART RX
8	GND	Ground
9	UART5_TX	UART TX
10	UART5_RX	UART RX
11	RX_PWM1	PWM

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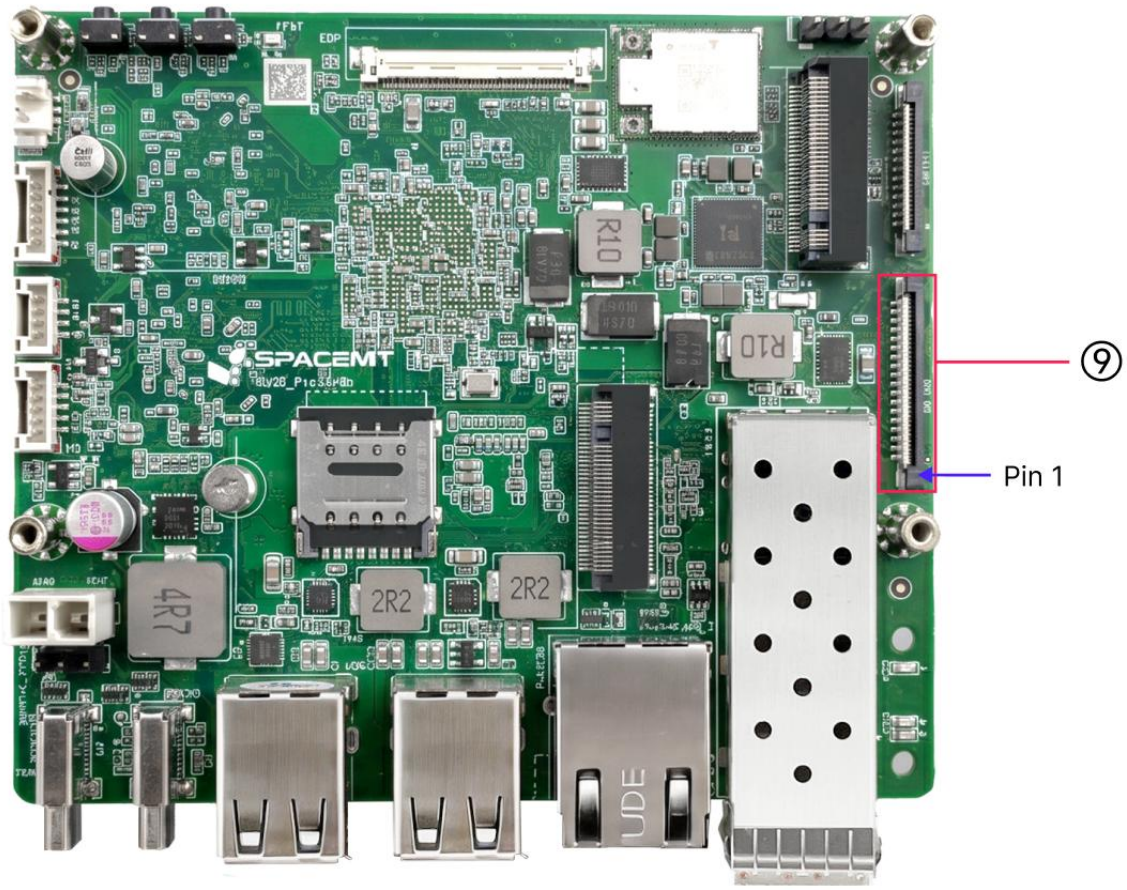
Pin	Signal	Description
12	RX_PWM2	PWM
13	UART10_TX	UART TX
14	UART10_RX	UART RX
15	UART10_CTS	UART CTS
16	UART10_RTS	UART RTS
17	GND	Ground
18	R_CAN4_TX	CAN TX
19	R_CAN4_RX	CAN RX
20	GND	Ground
21	R_CAN3_TX	CAN TX
22	R_CAN3_RX	CAN RX
23	GND	Ground
24	R_CAN2_TX	CAN TX
25	R_CAN2_RX	CAN RX
26	GND	Ground



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36 Pin Connector Pinout: GMAC-MII (from RT24) + CAN + SPI + 1.8 V (main power)

Pin	Signal	Description
1	1.8V	IO power supply
2	1.8V	IO power supply
3	CAN1_RX	CAN RX
4	CAN1_TX	CAN TX
5	GND	Ground
6	R_TX_CLK	MAC transmit clock
7	GND	Ground
8	R_TX_D0	MAC transmit data 0
9	R_TX_D1	MAC transmit data 1
10	R_TX_D2	MAC transmit data 2
11	R_TX_D3	MAC transmit data 3
12	GND	Ground
13	R_RX_CLK	MAC receive clock
14	GND	Ground
15	R_RX_D0	MAC receive data 0
16	R_RX_D1	MAC receive data 1
17	R_RX_D2	MAC receive data 2
18	R_RX_D3	MAC receive data 3
19	GND	Ground
20	R_TX_EN	Transmit enable
21	R_CLK_25M	25 MHz reference clock
22	R_RX_DV	Receive data valid
23	R_PWDN/INTn	Ethernet PHY interrupt
24	R_RESETn	Ethernet PHY reset input
25	R_MDIO_MDC	MDIO clock
26	R_MDIO_MDIO	MDIO data
27	R_CRS	Carrier sense
28	R_COL	Collision detect
29	GND	Ground
30	SPI0_MOSI	SPI TX
31	SPI0_MISO	SPI RX
32	SPI0_SCLK	SPI clock
33	SPI0_CS	SPI chip select
34	GND	Ground
35	R_CAN0_TX	CAN TX
36	R_CAN0_RX	CAN RX

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5.2. UART Debug Interface

Use a **USB-to-TTL** adapter to connect the host PC to the K3 Pico-ITX board header through **TX**, **RX**, and **GND**, as shown below.

Here, Tx and Rx represent the transmit and receive signals of the K3 board, respectively.

Note: The motherboard appearance may vary slightly depending on the hardware revision.

5.3. EC Expansion Interface

Pin	Signal	Description
1	EC_I2C0_CLK_3V3	EC I2C bus clock
2	EC_I2C0_DAT_3V3	EC I2C bus data
3	GND	Ground
4	EC_GPB2/TXD1/CTX0	Serial TX or GPIO B2
5	EC_GPC0/RXD1/CRX0	Serial RX or GPIO C0

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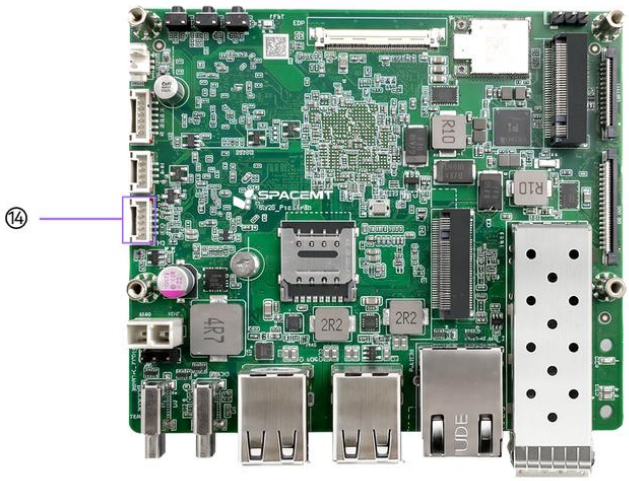
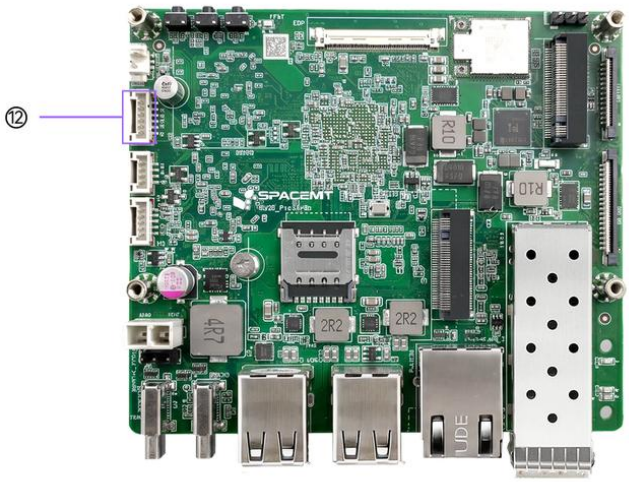


5.4. Audio Expansion Interface

Pin	Signal	Description
1	MICN_GMS1	Microphone negative
2	MICP_GMS0	Microphone positive
3	ROUT	Right-channel output
4	JACK_DET	Headphone jack detection
5	LOUT	Left-channel output
6	AUDIO_AGND	Audio analog ground



5.5. eDP Display Interface

Pin	Signal	Description
1	NC	No signal
2	GND	Ground

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Pin	Signal	Description
3	EDP0_TX3_N	EDP0 transmit data 3 negative
4	EDP0_TX3_P	EDP0 transmit data 3 positive
5	GND	Ground
6	EDP0_TX2_N	EDP0 transmit data 2 negative
7	EDP0_TX2_P	EDP0 transmit data 2 positive
8	GND	Ground
9	EDP0_TX1_N	EDP0 transmit data 1 negative
10	EDP0_TX1_P	EDP0 transmit data 1 positive
11	GND	Ground
12	EDP0_TX0_N	EDP0 transmit data 0 negative
13	EDP0_TX0_P	EDP0 transmit data 0 positive
14	GND	Ground
15	EDP0_AUX_N	EDP0 auxiliary channel negative
16	EDP0_AUX_P	EDP0 auxiliary channel positive
17	GND	Ground
18	eDP_VCC3V3	eDP 3.3 V power supply
19	eDP_VCC3V3	eDP 3.3 V power supply
20	eDP_VCC3V3	eDP 3.3 V power supply
21	eDP_VCC3V3	eDP 3.3 V power supply
22	NC	No signal
23	GND	Ground
24	GND	Ground
25	GND	Ground
26	GND	Ground
27	HPD_3V3	eDP hot-plug detect signal
28	GND	Ground
29	GND	Ground
30	GND	Ground

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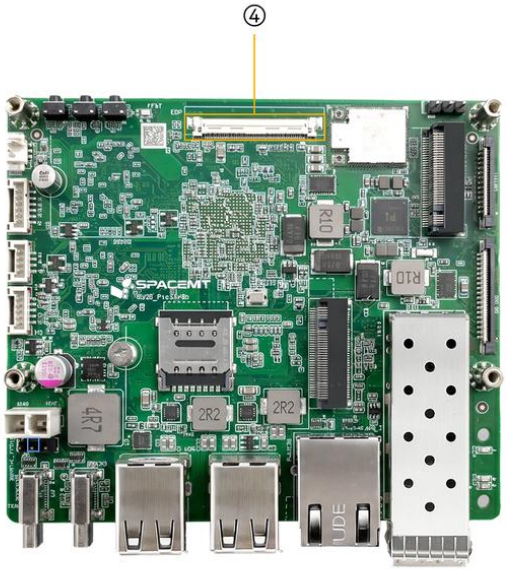
Pin	Signal	Description
31	GND	Ground
32	SOC_eDP0_BL-EN_3V3	eDP backlight enable signal
33	SOC_eDP0_BL-PWM_3V3	eDP backlight brightness PWM control signal
34	NC	No signal
35	NC	No signal
36	P12V0_eDP-BL	eDP backlight 12 V power supply
37	P12V0_eDP-BL	eDP backlight 12 V power supply
38	P12V0_eDP-BL	eDP backlight 12 V power supply
39	P12V0_eDP-BL	eDP backlight 12 V power supply
40	NC	No signal



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