

Hardware interface description

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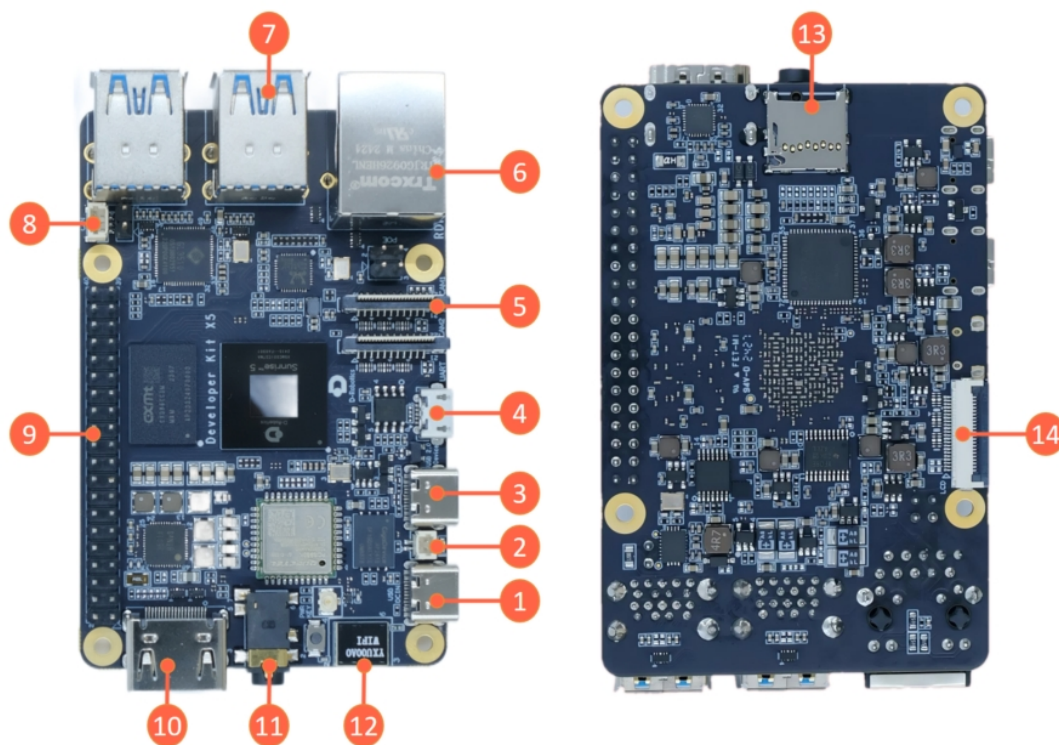
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1. Interface Overview



No.	Function	No.	Function	No.	Function
1	Power Interface (USB Type C)	2	RTC Battery Interface	3	Easy Connect Port (USB Type C)
4	Debug Serial Port (Micro USB)	5	Dual MIPI Camera Ports	6	Gigabit Ethernet Port with PoE
7	4 USB 3.0 Type A Ports	8	High-Speed CAN FD Interface	9	40-pin GPIO Interface
10	HDMI Display Interface	11	Multi-standard Headphone Jack	12	Onboard Wi-Fi Antenna
13	TF Card Interface (Bottom)	14	LCD Display Interface (MIPI DSI)		

Power Interface

The development board provides a USB Type C interface (No. 1) as the power interface. It requires a **5V/5A** power adapter for supplying power to the board. Once the adapter is connected, the **green power indicator** and the **orange indicator** will light up, indicating normal power supply.

caution

Do not use a computer USB port to power the board. Insufficient power may cause **abnormal shutdown or repeated reboots**.

Debug Serial Port

The development board includes a debug serial port (No. 4) for serial login and debugging functions. Configure the parameters in the serial tool on your computer as follows:

- **Baud rate:** 115200
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** 1
- **Flow control:** None

To connect, use a Micro USB cable to link the board's Interface 4 to your PC.

For first-time use, you may need to install the CH340 driver on your computer. Search for **CH340 serial port driver** to download and install it.

Ethernet Port

The development board features a Gigabit Ethernet port (No. 6) supporting 1000BASE-T and 100BASE-T standards. By default, it uses a static IP configuration with the address `192.168.127.10`.

To verify the board's IP address, log in via the serial port and use the `ifconfig` command to check the configuration of the `eth0` interface.

Additionally, this port supports PoE (Power over Ethernet), allowing simultaneous data and power transmission via a single Ethernet cable for easier installation.

HDMI Display Interface

The development board includes an HDMI display (Interface 10) that supports a maximum resolution of 1080p. Using the HDMI interface, the board can output the Ubuntu system desktop (on the Ubuntu Server version, it displays the logo).

The HDMI interface also supports real-time display of camera and network stream images.

USB Interfaces

The development board supports multiple USB interface extensions to accommodate various USB devices. Details are as follows:

Interface Type	Interface No.	Quantity	Description
USB 2.0 Type C	No. 3	1 port	USB Device mode for ADB, Fastboot, system flashing, etc.
USB 3.0 Type A	No. 7	4 ports	USB Host mode for connecting USB 3.0 peripherals, expanding 4 USB ports through a hub.

Connecting USB Flash Drives

The USB Type A ports (Interface 7) support USB flash drives, which will be automatically detected and mounted. The default mount directory is `/media/sda1`.

Connecting USB-to-Serial Adapters

The USB Type A ports (Interface 7) support USB-to-serial adapters, which will be automatically detected and create device nodes such as `/dev/ttyUSB*` or `/dev/ttyACM*` (where the asterisk represents a number starting from 0). Refer to the [40-pin UART Usage](#) section for details.

Connecting USB Cameras

The USB Type A ports support USB cameras, which will be automatically detected and create device nodes such as `/dev/video0`.

MIPI Camera Interface

The development board provides two MIPI CSI interfaces (No. 5) for connecting up to two MIPI cameras, including stereo cameras. Compatible camera modules and specifications are as follows:

No.	Sensor	Resolution	FOV	I2C Device Address
1	IMX219	8 MP		
2	OV5647	5 MP		

Connect the camera module to the board using an FFC (Flat Flex Cable) with the blue side facing upwards.

After installation, use the `i2cdetect` command to check if the I2C address of the module can be detected.

caution

Important: Do not connect or disconnect the camera while the board is powered on, as this may damage the camera module.

LCD Display Interface

The RDK X5 provides an LCD display interface (MIPI DSI, Interface 14) that supports LCD screens. This interface is 22-pin and can use DSI-Cable-12cm to directly connect to various LCD displays for Raspberry Pi.

Micro SD Interface

The development board includes a Micro SD card interface (Interface 13). It is recommended to use a card with at least 16GB of storage to meet the installation requirements of Ubuntu and related packages.

caution

Do not hot-swap the TF card during use, as it may cause system abnormalities or file system corruption.

Wi-Fi Antenna Interface

The board supports both onboard and external antennas for wireless networking. The onboard antenna is sufficient for most scenarios. If the board is enclosed in a metal casing, connect an external antenna to the port near Interface 12 to enhance signal strength.

CAN FD Interface

The RDK X5 provides a CAN FD interface for CAN and CAN FD communication. Refer to the [CAN Usage] section for details.

40-pin GPIO Interface

The development board provides a 40-pin standard interface for convenient peripheral expansion. The digital I/Os use a 3.3V voltage level. The pin definitions for the 40-pin interface are as follows:

RDX X5 Board 40Pin Table																
Reuse function3	Reuse function2	Reuse function1	Reuse function0	Function Description	X5 Pin Number	BCM Encoding	CVM Function	Physical Pin Board Encoding	CVM Function	BCM Encoding	X5 Pin Number	Function Description	Reuse function0	Reuse function1	Reuse function2	Reuse function3
	LSIO_GPIO0_11	SDA3	UART3_TXD	3.3V power signal	387	2	VDD_3V3	1	VDD_1V			5V power signal				
	LSIO_GPIO0_10	SCL3	UART3_RXD	I2C0 data signal	388	3	I2CS_SDA	3	VDD_1V			5V power signal				
				I2C0 clock signal	389	4	I2CS_SCL	5	GND			GND signal				
		DSP_GPIO_09	DSP_MCLK1	I2S0 MCLK clock signal	420	4	I2S1_MCLK	7	UART_TXD	14	383	UART1 send signal	UART1_TXD			LSIO_GPIO0_5
				GND signal			GND	9	UART_RXD	15	384	UART1 receive signal	UART1_RXD			LSIO_GPIO0_4
	LSIO_GPIO0_1		UART7_TXD	GPIO17 signal	380	17	GPIO17	11	I2S1_BCLK	18	421	I2S1 BCLK clock signal	I2S1_BCLK	DSP_GPIO_10		
	LSIO_GPIO0_0		UART7_RXD	GPIO27 signal	379	27	GPIO27	13	GND			GND signal				
	LSIO_GPIO0_9		UART2_TXD	GPIO22 signal	388	22	GPIO22	15	GPIO23	23	382	GPIO23 signal				
				3.3V power signal			VDD_3V3	17	GPIO24	24	402	GPIO24 signal	UART0_RTS	UART6_TXD	LSIO_GPIO0_3	
	/J16_TDO	LSIO_GPIO0_19	SPI1_MOSI	SPI1 MOSI signal	398	10	SPI1_MOSI	19	GND			GND signal				LSIO_PWM_OUT3
	/J16_TEN	LSIO_GPIO0_18	SPI1_MISO	SPI1 MISO signal	397	9	SPI1_MISO	21	GPIO25	25	387	GPIO25 signal	UART2_RXD			LSIO_GPIO0_8
	/J16_TCK	LSIO_GPIO0_16	SPI1_SCLK	SPI1 CLK signal	395	11	SPI1_SCLK	23	SPI_CSNO	8	394	SPI1 SSN1 signal	SPI1_CSNO	LSIO_GPIO0_15	/J16_TMS	
				GND signal			GND	25	SPI_CSNO	7	396	SPI1 SSNO signal	SPI1_CSNO	LSIO_GPIO0_17	/J16_TASTN	
LSIO_PWM_OUT5		LSIO_GPIO0_8	SDA0	I2C3 clock signal	355	0	I2CS_SDA	27	I2CS_SCL	1	354	I2C3 signal	SCL4	LSIO_GPIO0_7		LSIO_PWM_OUT4
LSIO_PWM_OUT0		LSIO_GPIO0_20	SPI2_SCLK	GPIO5 signal	399	5	GPIO5	29	GND			GND signal				
LSIO_PWM_OUT1	TIME_SYNC2	LSIO_GPIO0_21	SPI2_SSN	GPIO6 signal	400	6	GPIO6	31	PWM6	12	356	PWM6 signal	SCL1	LSIO_GPIO0_9	TIME_SYNC1	LSIO_PWM_OUT6
LSIO_PWM_OUT7		LSIO_GPIO0_10	SDA1	PWM0 signal	357	13	PWM7	33	GND			GND signal				
		DSP_GPIO_11	I2S1_LRCK	I2S0 LRCK signal	422	19	I2S1_LRCK	35	GPIO16	16	381	GPIO16 signal	UART0_CTS	UART6_RXD	LSIO_GPIO0_2	
LSIO_PWM_OUT2		LSIO_GPIO0_22	SPI2_MISO	GPIO26 signal	401	26	GPIO26	37	I2S1_SDOIN	20	423	I2S1 DI signal	I2S1_GIN	DSP_GPIO_12		
				GND signal			GND	39	I2S1_SDOOUT	21	424	I2S1 DO signal	I2S1_DOUT	DSP_GPIO_13		

The development board has silk screen markings on the 40-pin interface to facilitate operation. The locations of PIN1 and PIN40 are as follows:

