Kiwipi-5 Pro RK3588 Hardware User Manual

Revision 1.0

2026/08/19

Revision History

Date	Revision	Change Description
2026-8-19	1.0	1. Initial release

Table of Contents

Chapter 1 Kiwipi-5 Pro Overview

Kiwipi-5 Pro is a development board from Tianyue Zhichuang based on the Rockchip RK3588 processor. It is designed to integrate the RK3588 hardware capabilities on a compact PCB while supporting a broad range of operating systems and applications. The result is a compact embedded platform for education, DIY projects, and industrial deployment.

Chapter 2 Kiwipi-5 Pro Features

Kiwipi-5 Pro is built around the Rockchip RK3588 processor, high-performance LPDDR4X memory, and eMMC 5.1 storage. It provides strong CPU, GPU, and NPU performance together with advanced video encoding and decoding capabilities.

Kiwipi-5 Pro has a compact form factor and extensive onboard I/O. Standard interfaces include Type-C, USB 3.0, HDMI input and output, a 3.5 mm headset jack, dual 2.5 Gigabit Ethernet, a TF card slot, and M.2 SSD support. It also provides MIPI-CSI input, MIPI-DSI display output, Wi-Fi 6, Bluetooth 5.4, and two board-to-board expansion connectors: one 50-pin connector and one 60-pin connector with MIPI-CSI, MIPI-DSI, UART, I2C, SPI, CAN, PWM, GPIO, and other functions.

Kiwipi-5 Pro supports mainstream operating systems including Android 15, Ubuntu 24.04, and Debian 11, as well as HarmonyOS, UnionTech OS, and Kylin OS. Extensive RK3588 documentation, application examples, and mature development tools make it straightforward to build and deploy a suitable development environment.

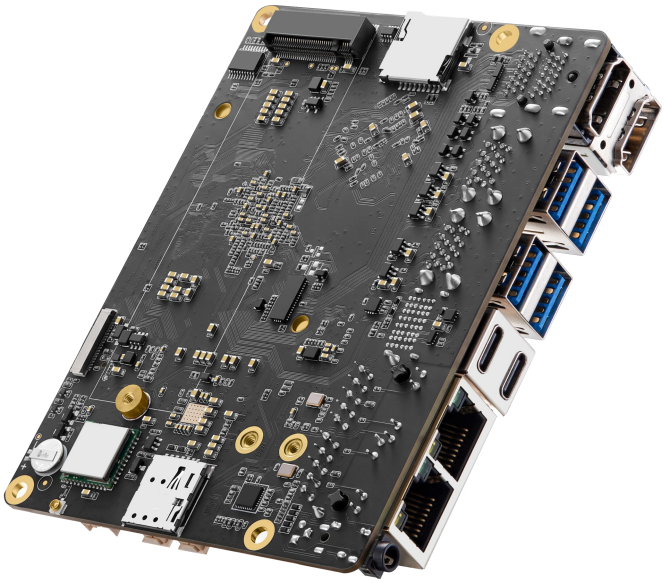
Chapter 3 Kiwipi-5 Pro Board Overview

3.1. Feature List

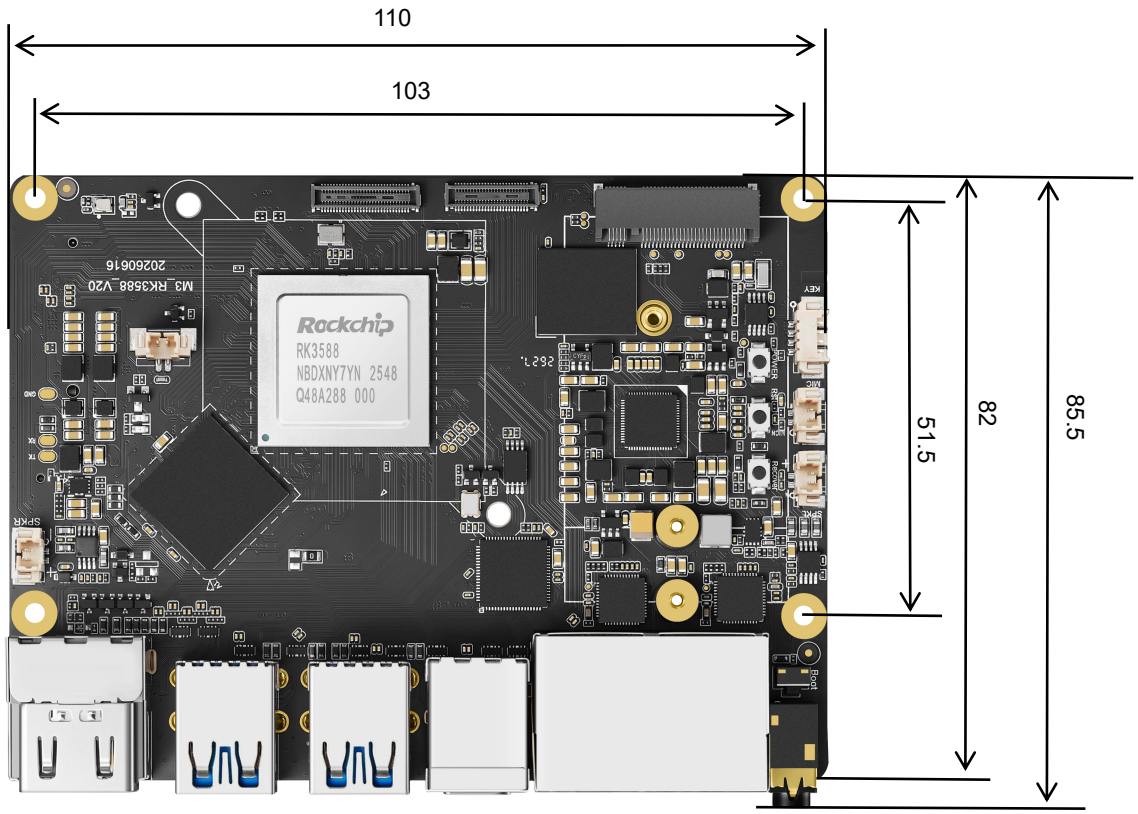
RK3588 SOC	CPU	8nm process Quad-core Cortex-A76 + Quad-core Cortex-A55
	GPU	ARM Mali-G610 MC4 OpenGL ES 1.1/2.0/3.1/3.2 Vulkan 1.1，1.2 OpenCL 1.1,1.2,2.0 Embedded high-performance 2D image acceleration module
	NPU	Triple core 6TOPS performance Support int4/int8/int16/FP16/BF16/TF32 acceleration
	Video Codec	H.265/H.264/AV1/AVS2 etc. multi video decoder, up to 8K@60fps 8K@30fps video encoders for H.264/H.265
	Display	Built-in DP/ HDMI2.1/MIPI display interface Support multiple display engine max to 8K@60fps Supports multi-screen display with 8K60FPS max
	Video in and ISP	Dual 16M Pixel ISP with HDR&3DNR Multiple MIPI CSI-2 and DVP interface， support HDMI 2.0 RX Support HDMI2.0 input with 4K60FPS max
	High speed interface	PCIe3.0/PCIe2.0/SATA3.0/TYPE-C/USB3.1
DDR	LPDDR4X	8GB
Onboard Storage	eMMC5.1	64GB
Expand Storage	SDMMC	TF Card Slot
	SSD(NVME)	M.2 2280 M-Key Slot, PCIe3.0
WLAN	WIFI	WIFI6,IEEE802.11 a/b/g/n/ac/ax,2T2R
	BT	Bluetooth 5.4 Compatible with V2.1+EDR

LAN	ETHERNET	10/100/1000M/2.5G Ethernet
Video output	MIPI-DSI	4 Lanes MIPI-DSI, maximum video output capability up to 2K@60Hz Supports I2C touch panel
	HDMI	HDMI 2.1, maximum video output capability up to 8K@60Hz
	Type-C	DP1.4 Alt, maximum video output capability up to 8K@30Hz
Video input	MIPI-CSI	2 * 4Lanes MIPI-DPHY-CSI 2 * 4Lanes MIPI-C/DPHY-CSI
	HDMI	HDMI2.0 input
USB	Type-C	1 * Type-C 3.0 OTG with DP Alt mode 1 * Type-C DC power input support PD/QC charging protocol
	USB3.0	2 * USB3.0 HOST
	USB2.0	1 * USB2.0 HOST(I/O Expand)
Audio	HP	3.5mm HP jack, support stereo output and mic input
	MIC	1.25mm MIC Interface
Real time clock	RTC	Support RTC with rechargeable battery
I/O Expand	I/O	0.4mm pitch 50Pin/60Pin socket with programmable I/O support USB2.0,UART,I2C,SPI,CAN,PWM,GPIO etc. support 5V and 4V output
KEY	KEY buttons	Onboard Boot,Reset,Recovery buttons
Power supply	Power supply	Type-C DC power input support PD/QC charging protocol Default 12V/2.5A DC power supply
Operating system	OS	Android16,Ubuntu 24.04,Debian 11,Linux6.0 and Chinese OS

3.2. Board Layout



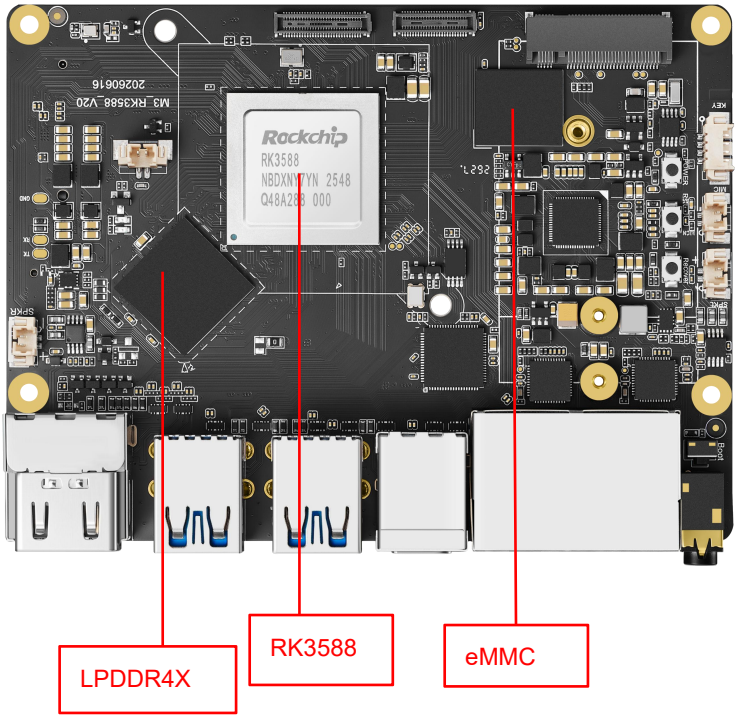
3.3. Mechanical Dimensions



Unit: mm

Chapter 4 Kiwipi-5 Pro Interface Guide

4.1. RK3588 Core

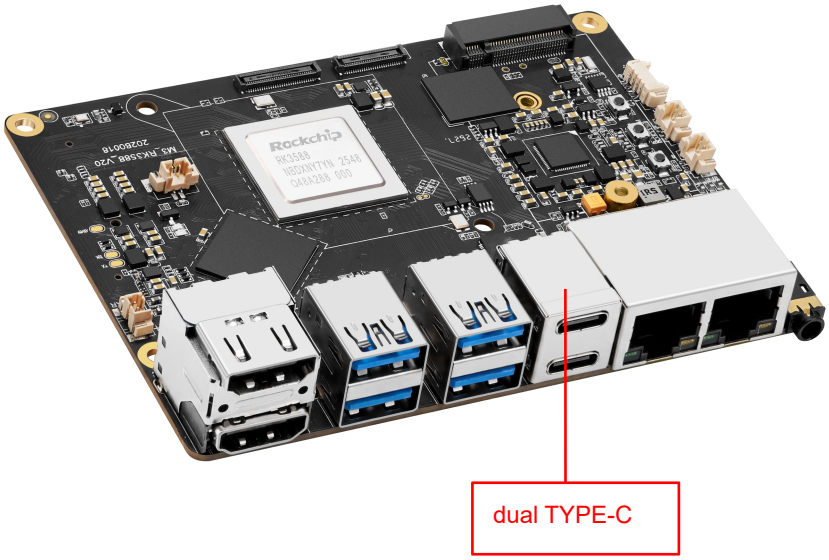


As shown above, the Kiwipi-5 Pro core consists of the RK3588 SoC, LPDDR4X memory, and eMMC storage. The table below lists the performance specifications of these core components.

Kiwipi-5 Pro Core Specifications		
Category	**Component**	**Specifications**
Processor	RK3588	Process: 8 nm CPU: Quad-core Cortex-A76 @2.2GHz + Quad-core Cortex-A55 @1.8GHz GPU: ARM Mali-G610 MC4 @1GHz NPU: Triple core, 6TOPS performance VPU: 8K@60fps video decoder; 8K@30fps video encoder. For additional specifications, refer to the RK3588 datasheet.
DDR	LPDDR 4X	8GB, 2*32Bit, 2133MHz
Storage	eMMC5.1	64GB，HS400

Usage Recommendations	For sustained high-performance workloads, install an appropriate cooling solution on the processor.

4.2. Stacked Type-C Ports



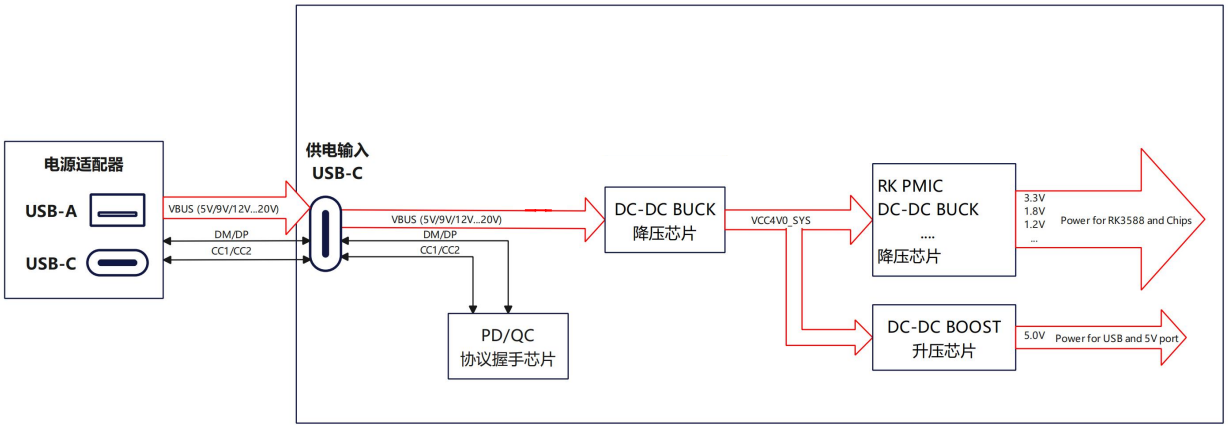
As shown above, Kiwipi-5 Pro includes a stacked dual Type-C connector. The lower port, closest to the board, is the power input. The upper port is used for data transfer.

Type-C Power Input

This is the board's only power input. It supports mainstream fast-charging protocols such as PD and QC, allowing the board to be powered by a wide range of compatible adapters. By default, the adapter negotiates a 12 V output to provide stable and reliable power. The table below lists the electrical characteristics and usage recommendations for the Type-C power input.

Type-C Power Input Specifications				
Parameter	**Minimum**	**Typical**	**Maximum**	**Unit**
Input Voltage	5.0	12.0	20.0	V
Input Current	3.0	2.5	1.5	A
Output Voltage	Not supported	Not supported	Not supported	/
Output Current	Not supported	Not supported	Not supported	/

Data Transfer	Not supported			
Charging Protocol	PD3.1/QC/BC1.2			
Adapter Recommendation	A 30 W PD adapter is recommended. Using a 5 V/3 A or lower-rated adapter may result in unstable operation.			



The diagram above shows the Kiwipi-5 Pro main power architecture and illustrates how the load capacity of different power adapters may affect normal operation. The possible effects of adapters with different power ratings are listed below:

Possible Effects of Different Power Adapters			
Output Power	Voltage / Current	Charging Protocol	Effect
10W or below	5V/2A or below	BC1.2 or lower / no protocol	Unable to boot normally
15W	5V/3A	BC1.2 or lower / no protocol	The board may boot under a light load, but operation may be unstable
18W-25W	9V/2A 9V/2.77A 10V/2.5A 12V/1.5A 12V/2.08A ...	PD/QC	Normal operation is possible, but high peripheral loads may cause instability

30W or above	9V/3.3A 10V/3A 12V/2.5A 15V/2A 20V/1.5A ...	PD/QC	Stable operation
Usage Recommendations	1. Do not power the board from a 5 V adapter output, as this may cause unstable operation. 2. When using a low- or medium-power fast charger, consider the power consumption of connected peripherals. 3. A 30 W USB-C PD fast charger is recommended.		

In the power diagram above, the DC-DC BOOST 5 V rail has a total load capacity of 5.0 V/6.0 A. It powers the USB 3.0 host, Type-C OTG, Pi I/O, camera, and HDMI ports. When connecting peripherals, account for the total load on VCC_5V0 and use an external supply when necessary. The electrical characteristics are listed below.

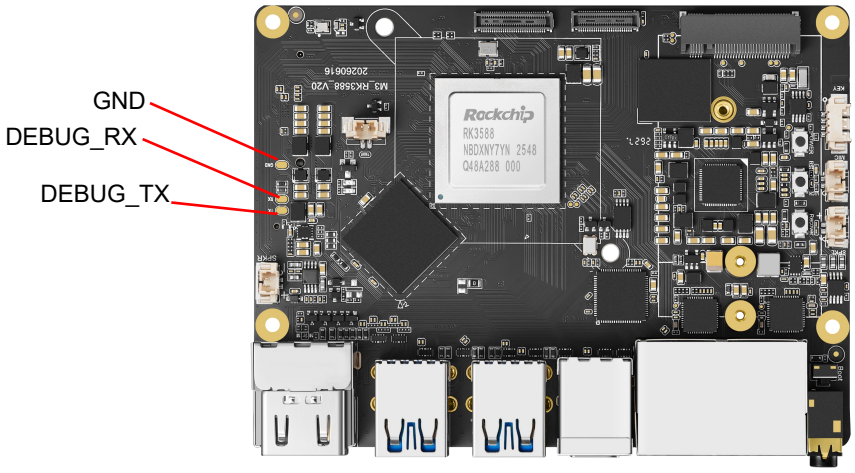
VCC_5V0 Electrical Specifications		
Output Port	Maximum Current Limit	Possible High-Power Peripherals
TYPE-C OTG	2.0A	USB flash drive, USB camera, portable hard drive, etc.
USB3.0 HOST	2.0A	USB flash drive, USB camera, portable hard drive, etc.
USB3.0 HOST	2.0A	USB flash drive, USB camera, portable hard drive, etc.
Pi I/O	2.0A	User debugging peripherals
MIPI_CSI0	2.0A	Video-input peripherals
HDMI	0.05A	TV
BOOST Converter IC	SG Micro SGM6611CYTQV11G; maximum output: 5.0 V/6 A	
Usage Recommendations	1. When connecting peripherals, account for the load on VCC_5V0. The combined peripheral load must not exceed 5.0 V/6.0 A. 2. Do not operate high-power peripherals from the board for extended periods.	

Type-C Data Interface

This port connects to the RK3588 Type-C0 interface and supports USB 3.0 OTG and DisplayPort Alt Mode. It is used for USB data transfer, firmware flashing, ADB debugging, upstream/downstream USB device connections and expansion, as well as Type-C display output. The table below lists its electrical characteristics and usage recommendations.

Type-C Data Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
Input Voltage	/	5.0	5.5	V
Input Current	/	/	/	A
Output Voltage	/	5.0	5.0	V
Output Current	/	2.0	2.0	/
Controller Connection	RK3588 Type-C0 + FUSB302BMPX controller			
Data Function	USB3.0 OTG / DP1.4 ALT MODE			
Usage Precautions	This port includes a PD controller and overvoltage protection. External input above 5.5 V is not supported.			

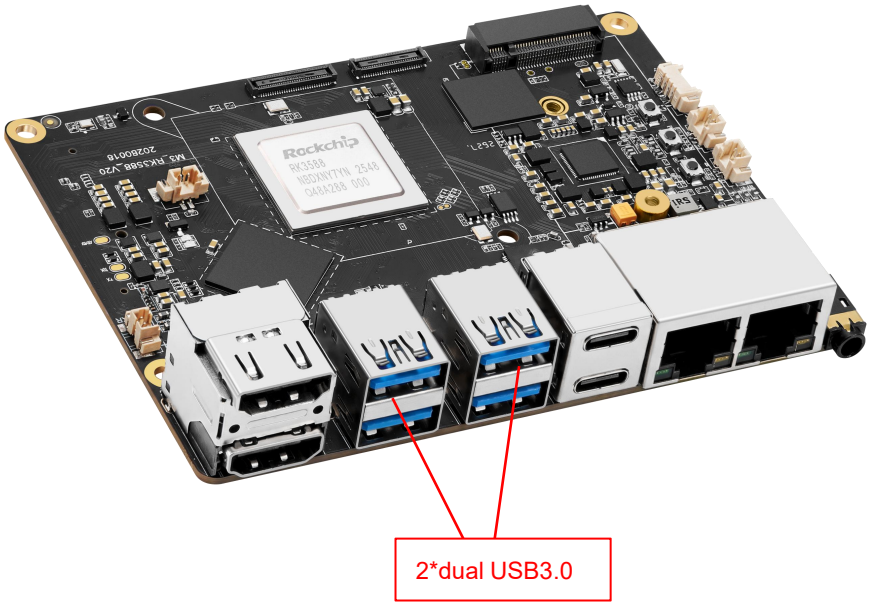
4.3. Debug Interface



As shown above, Kiwipi-5 Pro exposes the debug interface through solder pads. A cable must be soldered to the pads before use. The table below lists the electrical characteristics and usage recommendations.

Debug Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
UART Voltage Level	/	3.3	/	V
Baud Rate	/	1500000	/	bps
Controller	RK3588 UART2_M0			
Connector Type	Solder-Pad Wiring			
Usage Recommendations	Verify that the serial-interface voltage levels match and that the communication baud rate is configured correctly.			

4.4. Stacked USB 3.0 Ports

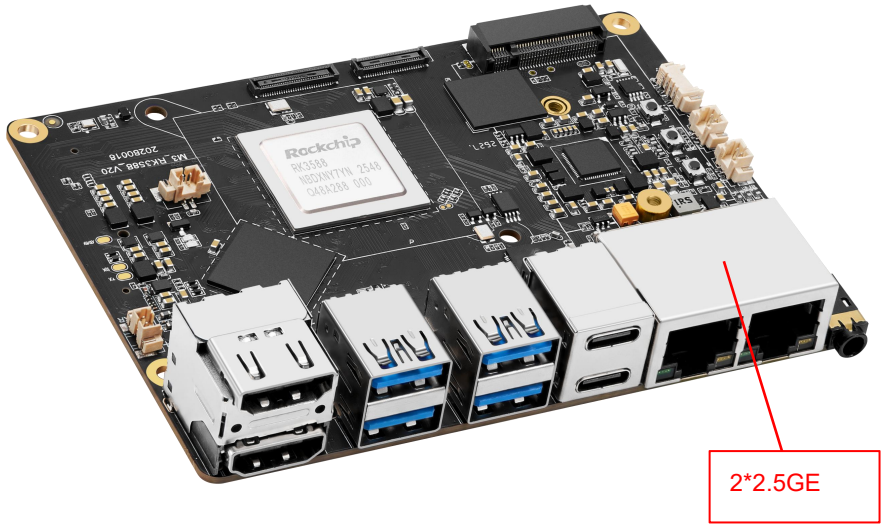


As shown above, Kiwipi-5 Pro includes two stacked dual USB 3.0 Type-A connectors. The RK3588 USB 3.0 controller connects to a GL3523 USB 3.0 hub, which provides four USB 3.0 ports. The table below lists the electrical characteristics and usage recommendations.

USB 3.0 Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
Input Voltage	/	5.0	5.5	V

Input Current	/	/	/	A
Output Voltage	/	5.0	5.0	V
Output Current	/	2.0	2.0	/
Controller	SOC side: RK3588 TYPE-C1 USB3.0			
	Hub：GL3523			
Data Transfer	USB3.0 HOST			

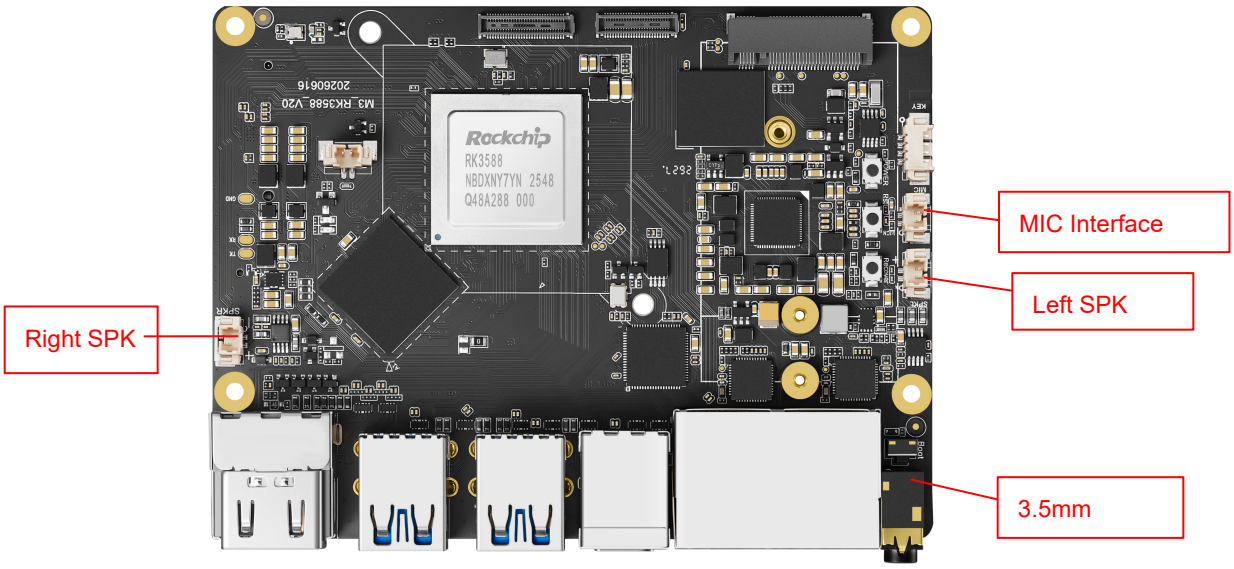
4.5. Ethernet Interface



As shown above, Kiwipi-5 Pro includes two RJ45 Ethernet ports supporting data rates up to 2.5 Gbps. The table below lists the interface characteristics and usage recommendations.

Ethernet Interface Specifications	
Connector Type	RJ45
Data Rate	10/100/1000M/2.5G
Controller Connection	RK3588 PCIE_20X0/1
POE	Not supported
Usage Recommendations	Use a Category 5e or higher Ethernet cable.

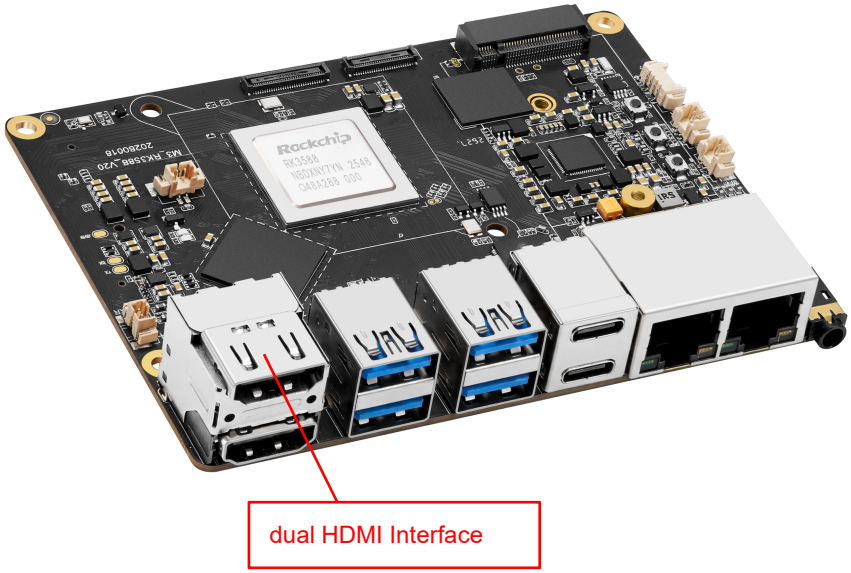
4.6. Audio Interface



As shown above, Kiwipi-5 Pro includes two 1.25 mm speaker connectors, one 3.5 mm headset jack, and one microphone connector. It supports stereo audio output and microphone input. The table below lists the audio specifications and usage recommendations.

Audio Interface Specifications		
ADC	SF	24-bit, 8 to 192 kHz
	SNR	103 dB
	THD+N	-90 dB
DAC	SF	24-bit, 8 to 192 kHz
	SNR	110 dB
	THD+N	-85 dB
Headset Jack	3.5 mm headset jack with stereo output, microphone input, and inline remote-button support	
Recording Input	Onboard analog MEMS microphone	
Speaker Connector	Maximum output power: 3 W; RL=4 ohm, P=3 W / RL=8 ohm, P=1.7 W	
Usage Recommendations	The 3.5 mm jack follows the OMTP standard. Use a compatible headset for high-quality audio output. Avoid high-power speakers, which may cause no output or audio distortion.	

4.7. HDMI Ports

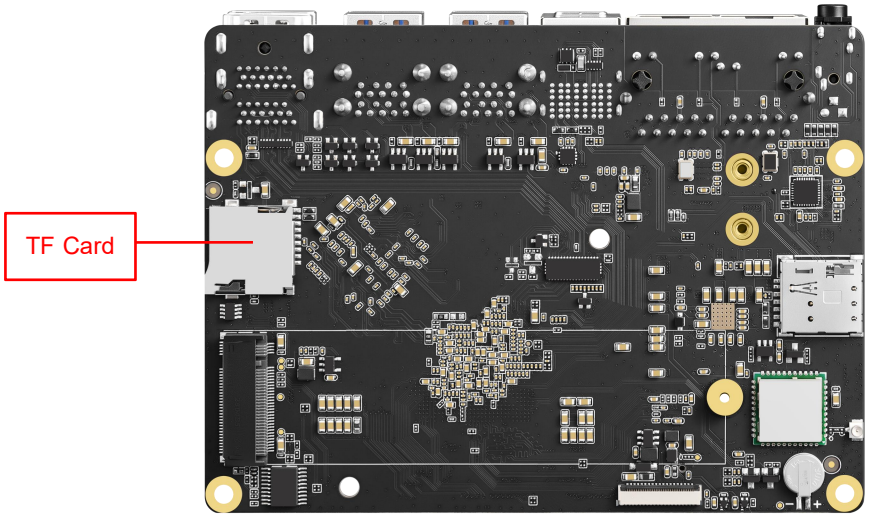


As shown above, Kiwipi-5 Pro includes one HDMI output and one HDMI input/output port. It supports HDMI 2.1 output and HDMI 2.0 input. The table below lists the interface characteristics and usage recommendations.

HDMI Input/Output Interface Specifications		
HDMI0Output	Controller Connection	RK3588 HDMI TX Port0
	Revision	HDMI2.1
	Maximum Resolution	8192*4096@60Hz
	Data Format	RGB/YUV444/YUV420(10bit)
	ARC	Supported
	CEC	Supported
	Usage Recommendations	For 8K output, use a cable rated for 8K transmission.
HDMI1 Input/Output	Controller Connection	ASW3742
	SOCController	HDMI RX2.0/HDMI TX PORT1
	Revision	RX:HDMI2.0 TX:HDMI2.1
	Maximum Resolution	4096*2160@60Hz

	Data Format	RGB888/YUV420/YUV422/YUV444(8bit)
	CEC	Not Supported
	Usage Recommendations	Ensure that the HDMI video-source clock meets the applicable standard; otherwise the signal cannot be received. Use Rockchip-recommended HDMI input software to display the image.

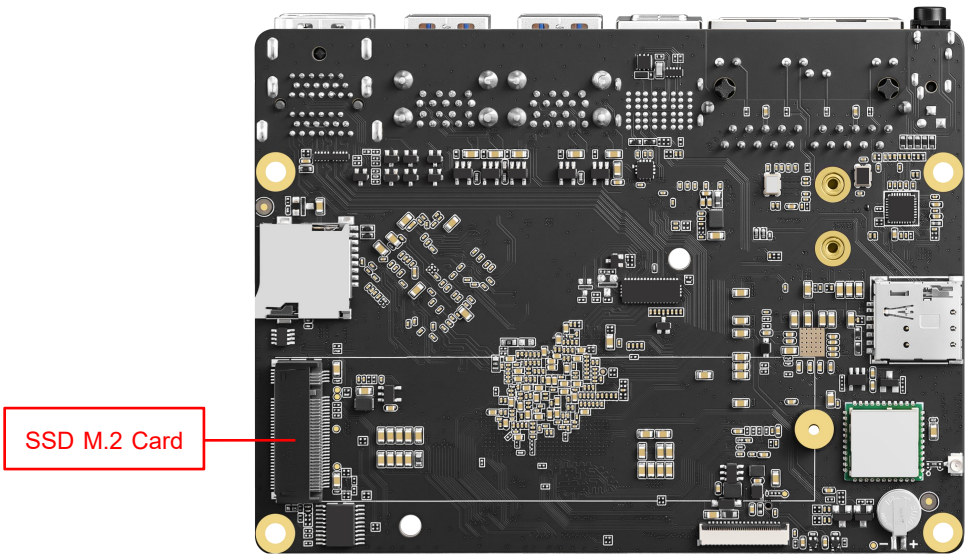
4.8. TF Card Interface



As shown above, the Kiwipi-5 Pro includes a MicroSD card slot for TF-card storage expansion. The table below lists the interface characteristics.

TF Card Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
Output Voltage	0	3.3	3.3	V
Output Current	0	2.0	2.0	A
Controller	RK3588 SDMMC			
Revision	SDIO 3.0			
Connector	MicroSD Card Slot (Push-Push)			

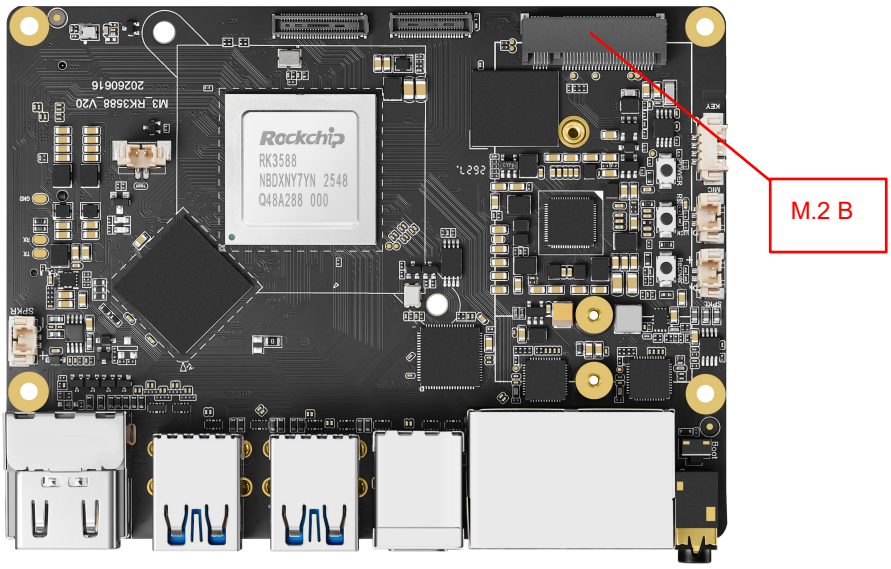
4.9. M.2 SSD Interface



As shown above, Kiwipi-5 Pro includes an M.2 2280 slot for NVMe SSD expansion. The table below lists the interface characteristics and usage recommendations.

M.2 SSD Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
Output Voltage	0	3.3	3.3	V
Output Current	0	3.0	3.0	A
Controller	RK3588 PCIE30X4			
Revision	PCIe3.0			
Number of Lanes	4Lanes			
Connector	M.2 M-KEY 2280 (LOTES APCI0107-P001A)			
Usage Recommendations	1. Verify that the installed SSD uses the NVMe protocol. 2. Ensure that the SSD does not interfere with components on the board.			

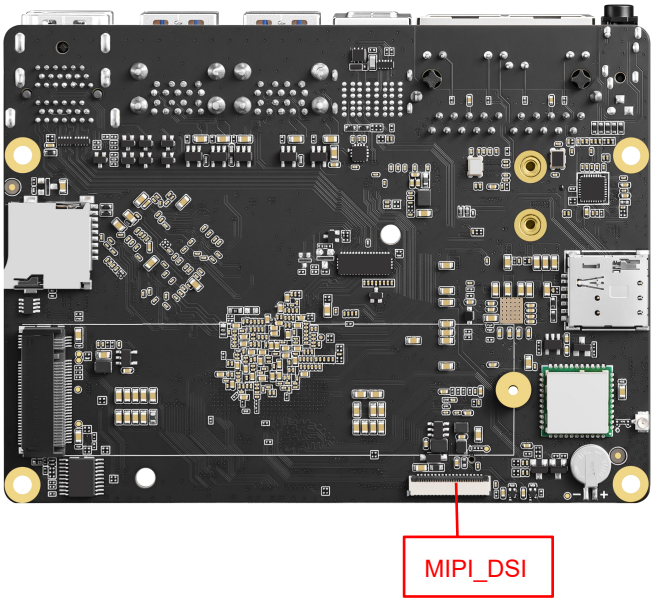
4.10. M.2 B-Key Interface



As shown above, Kiwipi-5 Pro includes an M.2 B-key slot supporting PCIe 2.0 and optional USB 3.0. It can be used for a 4G/5G module. The table below lists the output-interface characteristics and usage recommendations.

M.2 B-Key Interface Specifications				
Parameter	Minimum	Typical	Maximum	Unit
Output Voltage	0	3.8	3.8	V
Output Current	0	2.0	2.0	A
Controller	RK3588 PCIE2.0			
Revision	PCIe2.0			
Number of Lanes	1Lanes			

4.11. MIPI-DSI Display Interface



As shown above, the Kiwipi-5 Pro includes a 39-pin, 0.3 mm-pitch MIPI-DSI output connector and supports MIPI displays with a touch panel. The table below lists the interface characteristics and usage recommendations.

MIPI-DSI Display Interface Specifications	
Controller	RK3588 MIPI-D/CPHY DSI_TX Port1
Revision	DPHY V2.0
Number of Lanes	4Lanes
Output Resolution	2K@60Hz
Touch Interface	RK3588 I2C4_M1 (1.8V)
Connector	39Pin 0.3mm Pitch (MOLEX 5025983993)
Validated Display	Tianzhengda 5TS8055FH041-T: 5.5-inch, 1080 x 1920, capacitive touchscreen

MIPI-DSI Display Interface Pinout			
Pin NO.	PIN Name	I/O	Description
1	VCC_LEDA	PO	Backlight Power Supply Anode
2	VCC_LEDK	PO	Backlight Power Supply Cathode

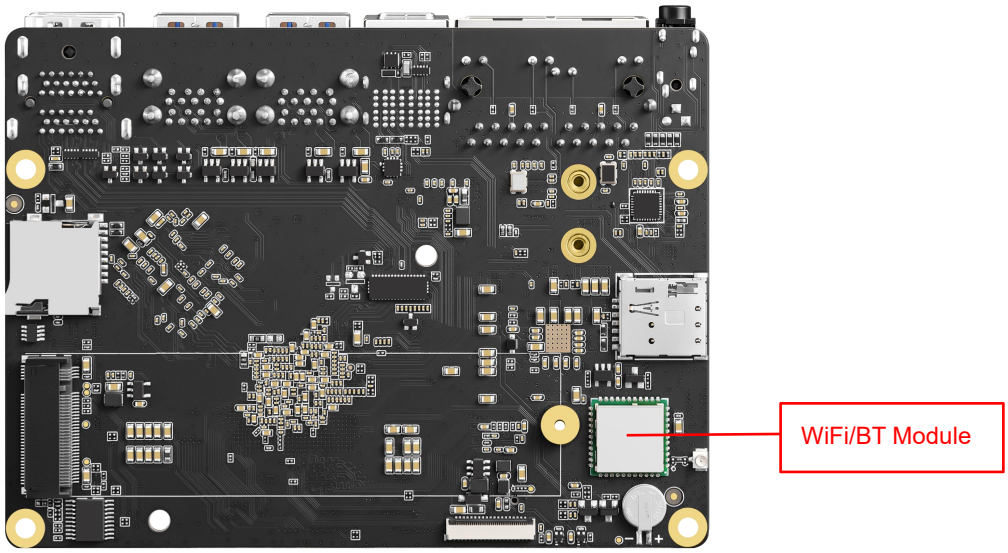
3	VCC_LEDK	PO	Backlight Power Supply Cathode
4	GND	/	Ground
5	VCC_1V8_LCD	PO	Power Supply 1.8V
6	GND	/	Ground
7	AVDD	PO	Power Supply AVDD
8	AVEE	PO	Power Supply AVEE
9	GND	/	Ground
10	NC	/	NC
11	GND	/	Ground
12	LCD_RESET	DO	Reset pin for the whole chip(1.8V)
13	NC	/	NC
14	NC	/	NC
15	NC	/	NC
16	GND	/	Ground
17	MIPI_TX_D2P	DO	MIPI Differential Data
18	MIPI_TX_D2N	DO	MIPI Differential Data
19	GND	/	Ground
20	MIPI_TX_D1P	DO	MIPI Differential Data
21	MIPI_TX_D1N	DO	MIPI Differential Data
22	GND	/	Ground
23	MIPI_TX_CLKP	DO	MIPI Differential Clock
24	MIPI_TX_CLKN	DO	MIPI Differential Clock
25	GND	/	Ground
26	MIPI_TX_D0P	DO	MIPI Differential Data
27	MIPI_TX_D0N	DO	MIPI Differential Data
28	GND	/	Ground
29	MIPI_TX_D3P	DO	MIPI Differential Data
30	MIPI_TX_D3N	DO	MIPI Differential Data

31	GND	/	Ground
32	GND	/	Ground
33	I2C_SCL_TP	CLK	Touch I2C SCL
34	I2C_SDA_TP	IO	Touch I2C SDA
35	GND	/	Ground
36	VCC2V8_LCD	PO	Power Supply 2.8V For TP
37	GPIO1_B5_U_1V8_CAM2_INT	DI	Touch interrupt
38	GPIO1_B4_U_1V8_CAM1_RST	DO	Touch reset
39	VCC1V8_TP	PO	Power Supply 1.8V For TP

MIPI-DSI Display Interface Specifications					
Rail	Parameter	Minimum	Typical	Maximum	Unit
VCC_LEDA	Output Voltage	0	TDB	27	V
	Output Current	0	2.0	2.0	A
VCC_LCD	Output Voltage	0	1.8	1.8	V
	Output Current	0	0.3	0.5	A
AVDD_LCD	Output Voltage	2.4	5.0	6.4	V
	Output Current	/	0.4	0.55	A
AVEE_LCD	Output Voltage	-6.4	-5.0	-2.4	V
	Output Current	/	0.4	0.55	A
VCC_TP	Output Voltage	0	2.8	2.8	V
	Output Current	0	0.3	0.5	A
VDDIO_TP	Output Voltage	0	1.8	1.8	V
	Output Current	0	0.3	0.5	A

LCD_RST	Reference Voltage	0	1.8	1.8	V
TP_I2C	Reference Voltage	0	1.8	1.8	V
Precautions	1. The selected display must meet the board's power and signal specifications. 2. Observe the Pin 1 position during installation to avoid damaging the board or LCD. 3. Different displays may require driver configuration or debugging.				

4.12. Wi-Fi & Bluetooth

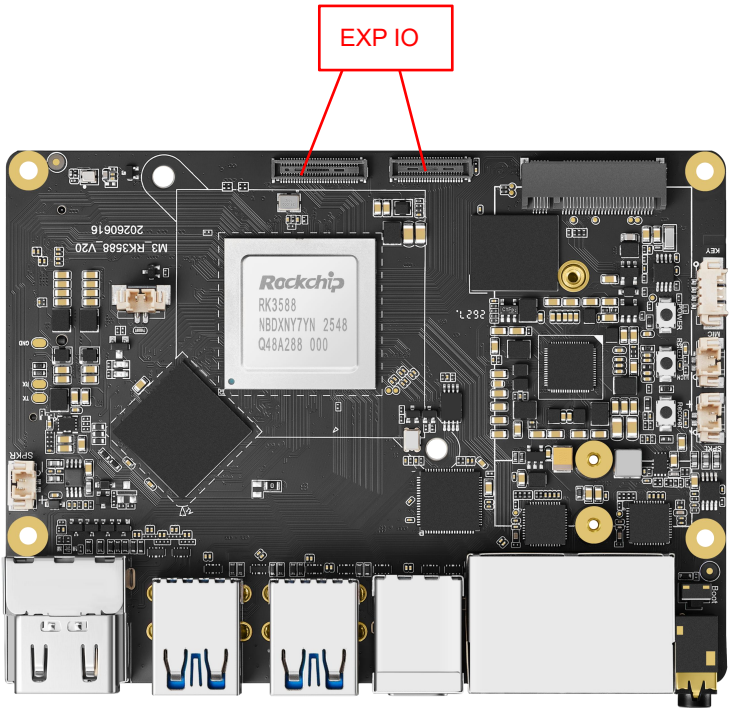


As shown in the two figures above, the Kiwipi-5 Pro includes a combined Wi-Fi/Bluetooth wireless module supporting Wi-Fi 6 and Bluetooth 5.4. The table below lists the WLAN characteristics and usage recommendations.

WIFI & BT Specifications	
Module Information	Module: Fn-Link FGN280ASRL-00
WIFI	Wi-Fi 6, 2.4/5 GHz dual-band, MIMO single-antenna configuration, IEEE 802.11a/b/g/n/ac/ax; maximum data rate: 600.4 Mbps
BT	Bluetooth 5.4, compatible with Bluetooth 2.1 + EDR
antenna	MIMO single-antenna configuration by default; first-generation I-PEX U.FL connector (20279-001E)

Controller	RK3588 SDIO
Usage Recommendations	1. Make sure the antenna is connected before use. Connect it to the default MIMO antenna position. 2. Use an antenna with the correct matching parameters to obtain better wireless performance.

4.13. I/O Expansion Header



As shown above, Kiwipi-5 Pro includes 50-pin and 60-pin board-to-board connectors with 0.4 mm pitch. Their pins can be configured for GPIO, I2C, UART, SPI, and other functions, providing convenient peripheral connections during development and debugging. The tables below list the interface characteristics and usage recommendations.

50-Pin, 0.4 mm-Pitch Board-to-Board Connector Pin Functions												
PINNO.	SOCNO.	PinName	VERF	func1	func2	func3	func4	func5	func6	func7	func8	func9
1	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
2	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
3	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
4	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
5	-	GND	-	Ground	-	-	-	-	-	-	-	-
6	-	GND	-	Ground	-	-	-	-	-	-	-	-
7	-	GND	-	Ground	-	-	-	-	-	-	-	-

8	-	GND	-	Ground	-	-	-	-	-	-	-	-
9	AN10	TYPEC1_SSRX2P/DP1_TX2P	-	-	-	-	-	-	-	-	-	-
10	AN24	MIPI_DPHY0_TX_D0P/MIPI_CPHY0_TX_TRIO0_B	-	-	-	-	-	-	-	-	-	-
11	AP10	TYPEC1_SSRX2P/DP1_TX2N	-	-	-	-	-	-	-	-	-	-
12	AP24	MIPI_DPHY0_TX_D0N/MIPI_CPHY0_TX_TRIO0_A	-	-	-	-	-	-	-	-	-	-
13	AN11	TYPEC1_SSTX2N/DP1_TX3N	-	-	-	-	-	-	-	-	-	-
14	AN25	MIPI_DPHY0_TX_D1P/MIPI_CPHY0_TX_TRIO1_A	-	-	-	-	-	-	-	-	-	-
15	AP11	TYPEC1_SSTX2P/DP1_TX3P	-	-	-	-	-	-	-	-	-	-
16	AP25	MIPI_DPHY0_TX_D1N/MIPI_CPHY0_TX_TRIO0_C	-	-	-	-	-	-	-	-	-	-
17	-	GND	-	Ground	-	-	-	-	-	-	-	-
18	AN26	MIPI_DPHY0_TX_CLKP/MIPI_CPHY0_TX_TRIO1_C	-	-	-	-	-	-	-	-	-	-
19	AM7	USB20_HOST1_DM	-	-	-	-	-	-	-	-	-	-
20	AP26	MIPI_DPHY0_TX_CLKN/MIPI_CPHY0_TX_TRIO1_B	-	-	-	-	-	-	-	-	-	-
21	AL7	USB20_HOST1_DP	-	-	-	-	-	-	-	-	-	-
22	AN27	MIPI_DPHY0_TX_D2P/MIPI_CPHY0_TX_TRIO2_B	-	-	-	-	-	-	-	-	-	-
23	-	GND	-	Ground	-	-	-	-	-	-	-	-
24	AP27	MIPI_DPHY0_TX_D2N/MIPI_CPHY0_TX_TRIO2_A	-	-	-	-	-	-	-	-	-	-
25	AM10	TYPEC1_SUB2/DP1_AUXN	-	-	-	-	-	-	-	-	-	-
26	AN28	MIPI_DPHY0_TX_D3P/NO_USE	-	-	-	-	-	-	-	-	-	-
27	AL10	TYPEC1_SUB1/DP1_AUXP	-	-	-	-	-	-	-	-	-	-
28	AP28	MIPI_DPHY0_TX_D3N/MIPI_CPHY0_TX_TRIO2_C	-	-	-	-	-	-	-	-	-	-
29	-	GND	-	Ground	-	-	-	-	-	-	-	-
30	-	GND	-	Ground	-	-	-	-	-	-	-	-
31	-	GND	-	Ground	-	-	-	-	-	-	-	-
32	AK16	SARADC_IN2		-	-	-	-	-	-	-	-	-
33	-	VCC_5V0	-	-	-	-	-	-	-	-	-	-
34	AK17	SARSDC_IN7		-	-	-	-	-	-	-	-	-
35	-	VCC_5V0	-	-	-	-	-	-	-	-	-	-
36	AM17	SARSDC_IN4		-	-	-	-	-	-	-	-	-
37	-	VCC_5V0	-	-	-	-	-	-	-	-	-	-
38	AL17	SARADC_IN6	-	-	-	-	-	-	-	-	-	-
39	AC29	GPIO3_B4_U	3.3	GMAC1_TXD1	-	I2S2_MCLK_M1	-	-	UART2_CTSN	-	-	-
40	-	GND	-	Ground	-	-	-	-	-	-	-	-
41	AC28	GPIO3_B3_U	3.3	GMAC1_TXD0	-	I2S_SDO_M1	-	-	UART2_RTSN	-	-	-
42	AK25	GPIO4_B2_U	3.3	CIF_HREF	BT1120_D8	PCIE30X1_1_BUTTON_RTSN	I2S_SDO1_M0	I2C7_SCL_M3	UART8_RTSN_M0	SPI0_CS0_M1	PWM14_M1	CAN1_RX_M1
43	AD29	GPIO3_B5_U	3.3	GMAC1_TXEN	-	I2S2_SCLK_M1	-	-	UART3_TX_M1	CAN1_RX_M0	PWM12_M0	-
44	AM25	GPIO4_B3_U	3.3	CIF_VSYNC	BT1120_D9	PCIE30X1_2_BUTTON_RTSN	I2S_SDO2_M0	I2C7_SDA_M3	UART8_CTSN_M0	-	PWM15_IR_M1	CAN1_TX_M1
45	AF28	GPIO3_B2_U	3.3	GMAC1_TXER	-	I2S2_SDI_M1	-	-	UART2_RX_M2	-	PWM3_IR_M1	-
46	AH26	GPIO3_C4_U	3.3	CIF_D8	-	HDMI_TX1_CEC_M2	SPI3_CS0_M3	FSPI_CS0N_M2	UART5_TX_M1	PCIE30X4_CLKREQN_M2	CAN_RX_M0	-
47	AF29	GPIO3_B6_D	3.3	GMAC1_MCLKINOUT	-	I2C2_LRCK_M1	-	-	UART3_RX_M1	CAN1_TX_M0	PWM13_M0	-
48	AE27	GPIO3_A3_U	3.3	GMAC1_RXD3	SDIO_D3_M1	I2S3_SDO	FSPI_D3_M2	-	UART8_RX_M1	SPI4_CS0_M1	AUDDSM_RN	-
49	AD28	GPIO3_A4_D	3.3	GMAC1_TXCLK	SDIO_CMD_M1	I2S3_SDI	-	-	UART8_RTSN_M1	SPI4_CS1_M1	AUDDSM_RP	-

50	AD27	GPIO3_A2_U	3.3	GMAC1_RXD2	SDIO_D2_M1	I2S3_LRCK	FSPI_D2_M2	-	UART8_TX_M1	SPI4_CLK_M1	AUDDSM_LP	-

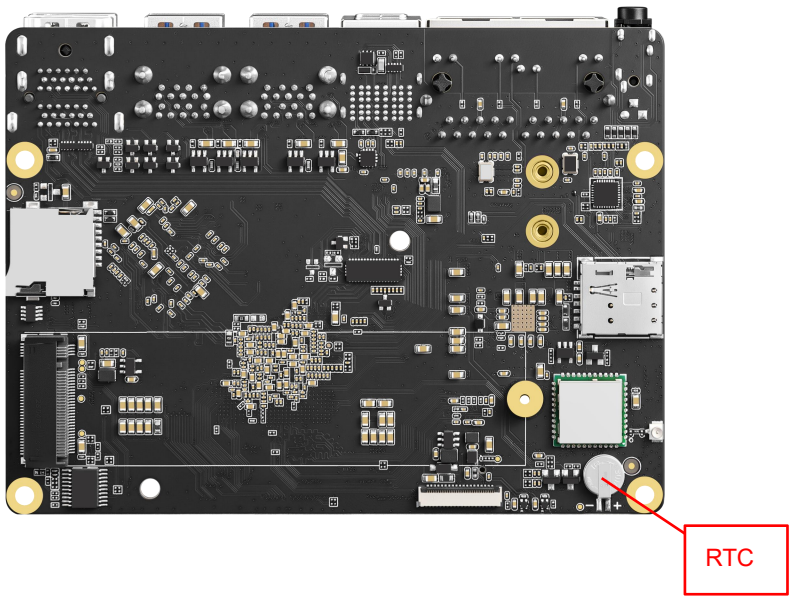
60-Pin, 0.4 mm-Pitch Board-to-Board Connector Pin Functions

PIN NO.	SOC NO.	Pin Name	VERF	func1	func2	func3	func4	func5	func6	func7	func8	func9
1	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
2	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
3	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
4	-	VCC4V0_SYS	4.0	POWER	-	-	-	-	-	-	-	-
5	-	GND	-	Ground	-	-	-	-	-	-	-	-
6	-	GND	-	Ground	-	-	-	-	-	-	-	-
7	T28	GPIO0_B7_D	1.8	PWM0_M0	I2C2_SCL_M0	SPI0_CS1_M0	PCIE30X1_1_PERSTN_M0	I2S1_LRCK_M1	-	CAN0_TX_M0	-	-
8	AL31	MIPI_CSI1_D3P	-	-	-	-	-	-	-	-	-	-
9	T31	GPIO0_C0_D	1.8	PWM1_M0	I2C2_SDA_M0	SPI0_MOSI_M0	PCIE30X1_0_CLKREQN_M0	-	PDM0_CLK_M0	CAN0_RX_M0	-	-
10	AL32	MIPI_CSI1_D3N	-	-	-	-	-	-	-	-	-	-
11	-	GND	-	Ground	-	-	-	-	-	-	-	-
12	AK31	MIPI_CSI1_D2P	-	-	-	-	-	-	-	-	-	-
13	R30	GPIO0_C4_D	1.8	PWM2_M0	I2C4_SDA_M2	-	PCIE30X1_0_WAKEN_M0	-	PDM0_CLK1_M1	DP0_HPDIN_M1	UART0_RX_M0	-
14	AK32	MIPI_CSI1_D2N										
15	P30	GPIO0_C5_U	1.8	GPU_AVS	I2C4_SCL_M2	-	PCIE30X1_0_PERSTN_M0	I2S1_SDI0_M1	-	DP1_HPDIN_M1	UART0_TX_M0	PWM4_M0
16	AJ31	MIPI_CSI1_CLK0P	-	-	-	-	-	-	-	-	-	-
17	C27	GPIO1_B0_U	1.8	-	PDM1_SDI1_M1	-	PCIE30X4_CLKREQN_M3	SPI2_CS1_M0	-	-	-	-
18	AJ32	MIPI_CSI1_CLK0N	-	-	-	-	-	-	-	-	-	-
19	C25	GPIO1_A7_U	1.8	-	PDM1_SDI0_M1	-	PCIE30X1_1_PERSTN_M2	SPI2_CS0_M0	PWM3_IR_M3	-	-	-
20	AH31	MIPI_CSI1_D1P	-	-	-	-	-	-	-	-	-	-
21	C24	GPIO1_A6_D	1.8	-	-	HDMI_TX1_HPD_M0	-	SPI2_CLK_M0	-	-	-	-
22	AH32	MIPI_CSI1_D1N	-	-	-	-	-	-	-	-	-	-
23	B25	GPIO1_A4_D	1.8	-	-	HDMI_TX1_SCL_M2	-	SPI2_MISO_M0	-	-	-	-
24	AG31	MIPI_CSI1_D0P	-	-	-	-	-	-	-	-	-	-
25	A27	GPIO1_A3_D	1.8	UART6_CTSN_M1	I2C4_SCL_M3	HDMI_TX1_SDA_M2	-	SPI4_CS0_M2	PWM1_M2	-	-	-
26	AG32	MIPI_CSI1_D0N	-	-	-	-	-	-	-	-	-	-
27	A26	GPIO1_A2_D	1.8	UART6_RTSN_M1	I2C4_SDA_M3	VOP_POST_EMPTY	-	SPI4_CLK_M2	PWM0_M2	-	-	-
28	-	GND	-	Ground	-	-	-	-	-	-	-	-
29	A25	GPIO1_A1_D	1.8	UART6_TX_M1	I2C2_SCL_M4	DP1_HPDIN_M2	PCIE30X1_1_WAKEN_M2	SPI4_MOSI_M2	-	SATA_ACT_LED_M1	-	-
30	AL33	MIPI_CSI0_D3P	-	-	-	-	-	-	-	-	-	-
31	A24	GPIO1_A0_D	1.8	UART6_RX_M1	I2C2_SDA_M4	DP0_HPDIN_M2	PCIE30X1_1_CLKREQN_M2	SPI4_MISO_M2	-	-	-	-
32	AL34	MIPI_CSI0_D3N	-	-	-	-	-	-	-	-	-	-
33	-	GND	-	Ground	-	-	-	-	-	-	-	-
34	AK33	MIPI_CSI0_D2P	-	-	-	-	-	-	-	-	-	-
35	-	GND	-	Ground	-	-	-	-	-	-	-	-
36	AK34	MIPI_CSI0_D2N	-	-	-	-	-	-	-	-	-	-
37	E27	GPIO1_B7_U	1.8	UART1_RX_M1	I2C5_SDA_M3	MIPI_CAMERA2_CLK_M0	PCIE30X2_PERSTN_M3	SPDIF1_TX_M0	PWM13_M2	HDMI_RX_CEC-M2	SATA2_ACT_LED_M1	-

38	AJ33	MIPI_CSI0_CLK0P	-	-	-	-	-	-	-	-	-	-
39	E26	GPIO1_B6_U	1.8	UART1_TX_M1	I2C5_SCL_M3	MIPI_CAMERA1_CLK_M0	PCIE30X2_WAKEN_M3	SPDIF0_TX_M0	-	HDMI_RX_HPDOUT-M2	-	-
40	AJ34	MIPI_CSI0_CLK0N	-	-	-	-	-	-	-	-	-	-
41	-	GND	-	Ground	-	-	-	-	-	-	-	-
42	AH33	MIPI_CSI0_D1P	-	-	-	-	-	-	-	-	-	-
43	D25	GPIO1_B1_D	1.8	-	PDM1_SDI2_M1	-	PCIE30X4_WAKEN_M3	SPI0_MISO_M2	-	-	-	-
44	AH34	MIPI_CSI0_D1N	-	-	-	-	-	-	-	-	-	-
45	D26	GPIO1_B2_D	1.8	UART4_RX_M2	PDM1_SDI3_M1	-	PCIE30X4_PERSTN_M3	SPI0_MOSI_M2	-	-	-	-
46	AG33	MIPI_CSI0_D0P	-	-	-	-	-	-	-	-	-	-
47	F25	GPIO1_D7_U	1.8	UART1_CTSN_M1	I2C8_SDA_M2	MIPI_CAMERA4_CLK_M0	PCIE30X2_CLKREQN_M3	-	PWM15_IR_M3	HDMI_RX_SDA_M2	-	-
48	AG34	MIPI_CSI0_D0N	-	-	-	-	-	-	-	-	-	-
49	F24	GPIO1_D6_U	1.8	UART1_RTSN_M1	I2C8_SCL_M2	MIPI_CAMERA3_CLK_M0	-	-	PWM14_M2	HDMI_RX_SCL_M2	-	-
50	-	GND	-	Ground	-	-	-	-	-	-	-	-
51	D27	GPIO1_B3_D	1.8	UART4_TX_M2	PDM1_CLK1_M1	-	PCIE30X1_0_WAKEN_M3	SPI0_CLK_M2	-	SATA0_ACT_LED_M1	-	-
52	F26	GPIO1_D0_D	1.8	I2S0_SDO1	-	I2C7_SCL_M0	-	UART6_TX_M2	SPI_MISO_M2	-	-	-
53	-	GND	-	Ground	-	-	-	-	-	-	-	-
54	F27	GPIO1_D1_D	1.8	I2S0_SDO2/I2S0_SDI3	PDM0_SDI1_M0	I2C7_SDA_M0	-	UART6_RX_M2	SPI_MOSI_M2	-	-	-
55	AA30	GPIO3_A1_U	3.3	GMAC1_TXD3	SDIO_D1_M1	I2S3_SCLK	FSPI_D1_M2	I2C6_SCL_M4	PWM11_IR_M0	SPI4_MOSI_M1	AUDDSM_LN	-
56	E28	GPIO1_D3_D	1.8	I2S0_SDI1	PDM0_SDI3_M0	I2C1_SDA_M4	PWM1_M1	UART4_RX_M0	SPI_CS0_M2	-	-	-
57	-	GND	-	Ground	-	-	-	-	-	-	-	-
58	F28	GPIO1_D2_D	1.8	I2S0_SDO3/I2S0_SDI2	PDM0_SDI2_M0	I2C1_SCL_M4	PWM0_M1	UART4_TX_M0	SPI_CLK_M2	-	-	-
59	-	GND	-	Ground	-	-	-	-	-	-	-	-
60	-	GND	-	Ground	-	-	-	-	-	-	-	-

Interface Usage Recommendations	
Software Design	1. Before selecting a multiplexed port, verify that its controller is not already used by another board function. A controller that is already occupied cannot be reassigned. 2. Configure the interface drivers according to the Rockchip development documentation.
Hardware Design	1. Before use, verify the voltage level and other electrical characteristics of the selected port. Ensure that the peripheral matches the port to prevent damage. 2. Observe the connector pin order to prevent installation errors and damage to the board or peripheral. 3. Do not short the PWRON pin to ground, or the board will not boot.

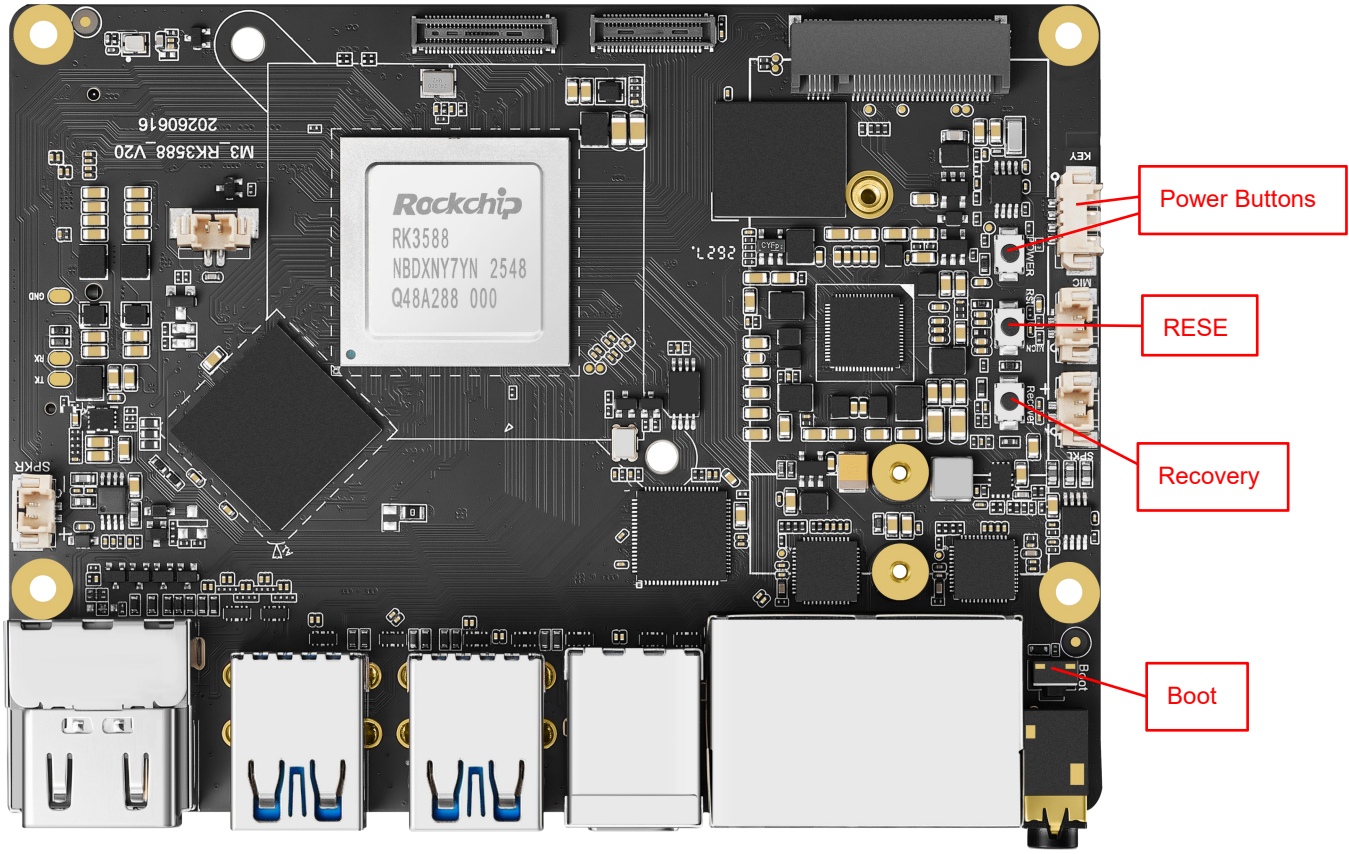
4.14. Real-Time Clock (RTC)



As shown in the two figures above, the Kiwipi-5 Pro supports a real-time clock (RTC) backed by a rechargeable coin-cell battery. The table below lists the RTC characteristics and usage recommendations.

RTC Electrical Specifications and Usage Recommendations	
Coin-Cell Battery	Seiko Instruments MS614SE-FL28E, 3.0 V / 3.4 mAh
Backup Time	Theoretical backup time on a full charge: approximately 180 days
Usage Recommendations	1. At first use, verify that the RTC time is correct. If necessary, synchronize it manually or over the network. 2. The RTC time may be lost if the board remains unpowered for an extended period.

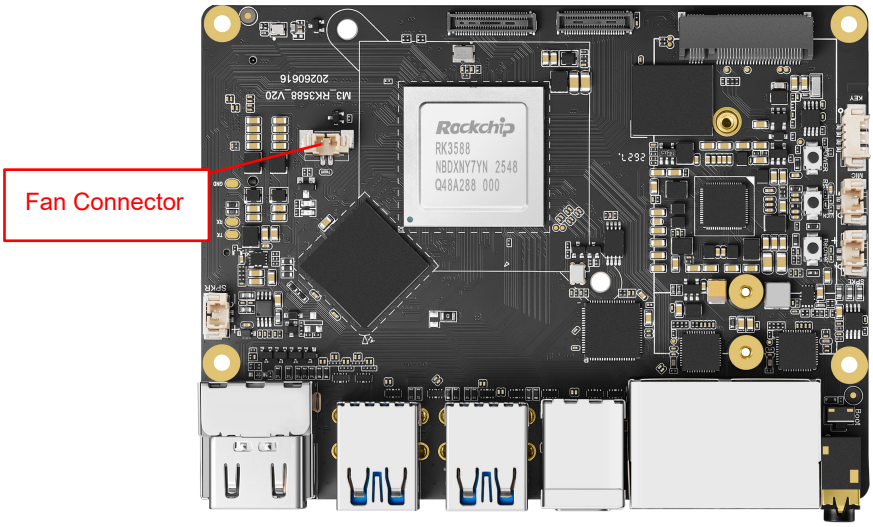
4.15. Buttons



As shown above, Kiwipi-5 Pro has four onboard buttons used to reset the board and select firmware download modes. The table below describes their functions.

Onboard Button Functions	
Recovery	Hold the button while powering on to enter BootLoader firmware download mode, typically used for standard firmware flashing
Reset	Hardware reset
Boot	Hold the button while powering on to enter MaskROM mode, typically used to recover a board with corrupted firmware
Power	Board power button

4.16. Fan



Kiwipi-5 Pro includes a fan connector for cooling the CPU, allowing the RK3588 to sustain higher performance.

Fan Connector Specifications					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
FanVoltage	Vadp	-	5	-	V
Connector Pitch	MM	-	1.25	-	mm
The fan is controlled through GPIO. Do not connect a high-power fan.					

4.17. Verified Specifications

Board Operating Voltage and Current					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Voltage	Vadp	4.5	12	20	V
Operating Current	Iadp	/	190	/	mA

Board Temperature Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Ambient Temperature	Toperation	0	25	60	℃
Storage Temperature	Tstorage	-20	25	85	℃

Board Dimensions and Weight		
Parameter	Value	Unit
Length x Width x Height	110 * 82 * 21.2	mm
PCB Thickness	1.6	mm
Mounting Hole Diameter	3.2	mm

Chapter 5 Precautions

During assembly and operation, observe the following precautions, including but not limited to:

1. Prevent short circuits between the bare board and peripherals.
2. Do not bend or deform the bare board during installation or fastening.
3. Observe the Pin 1 orientation of all connectors.
4. When installing peripherals (USB, I/O, etc.), verify their I/O voltage levels and current requirements.
5. Connect power only to the designated input. Ensure the supply voltage and current meet the combined load of the board and peripherals.
6. For long-term storage, seal the board in an antistatic bag and keep it in a dry, temperature-controlled environment.