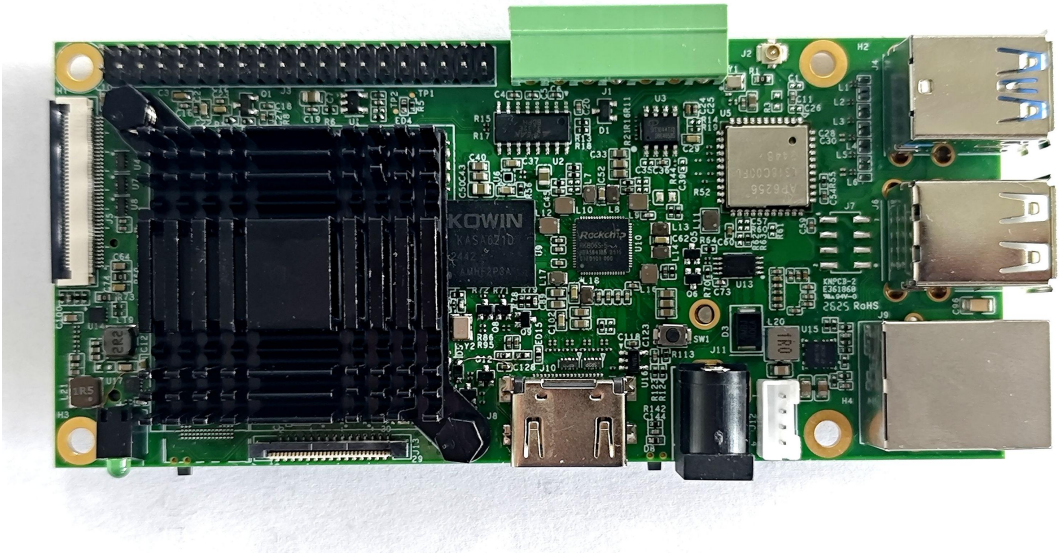
XPI-3576

Hardware User Guide V1.1



Technical Support:

Geniatech

Contents

I、Introduction

The XPI-3576 system is based on the RK3576J+Hailo H8 computing power module, can run Linux Debian12/Android 14 emulator systems, is compatible with Raspberry PI accessories, supports applications developed on the Raspberry PI system, enables seamless migration of Raspberry PI, and is better and more cost-effective than Raspberry PI. Compatible with the standard 40P GPIO expansion interface of Raspberry PI, supports 4K HDMI display output, supports MIPI-DSI display output interface and MIPI-CSI video input interface, has POE mode, supports communication interfaces such as CAN, 485, 232, and supports multiple network access such as WiFi and wired. Its typical application areas include programming education, software development, digital multimedia terminals, industrial control, smart display devices, etc.

- Quad-core ARM Cortex-A72 processor with ARM Cortex-A53 real-time core;
- Integration of NPU engine supports INT4 INT8 / INT16 / FP16 / BF16 / TF16 mixed operation, provide 6 tops INT8 force, support dual core team or to work independently, and compatible TensorFlow/PyTorch/Caffe mainstream deep learning framework, which can realize multitask parallel processing;
- Supports 4GB of RAM (for expansion to 8/16GB) and 32GB of eMMC flash (for expansion to 64/128GB);
- Supports MIPI-CSI video input interface and MIPI-DSI display output interface;
- Support for additional interfaces such as CAN/485/232/UART/PCIe 3.0/GPIO;
- Compatible with Android 14 and Debian 12 systems, stable and reliable performance;
- Industrial-grade standard design supports stable operation at -40 to 85℃.

1.1 Motherboard Overview

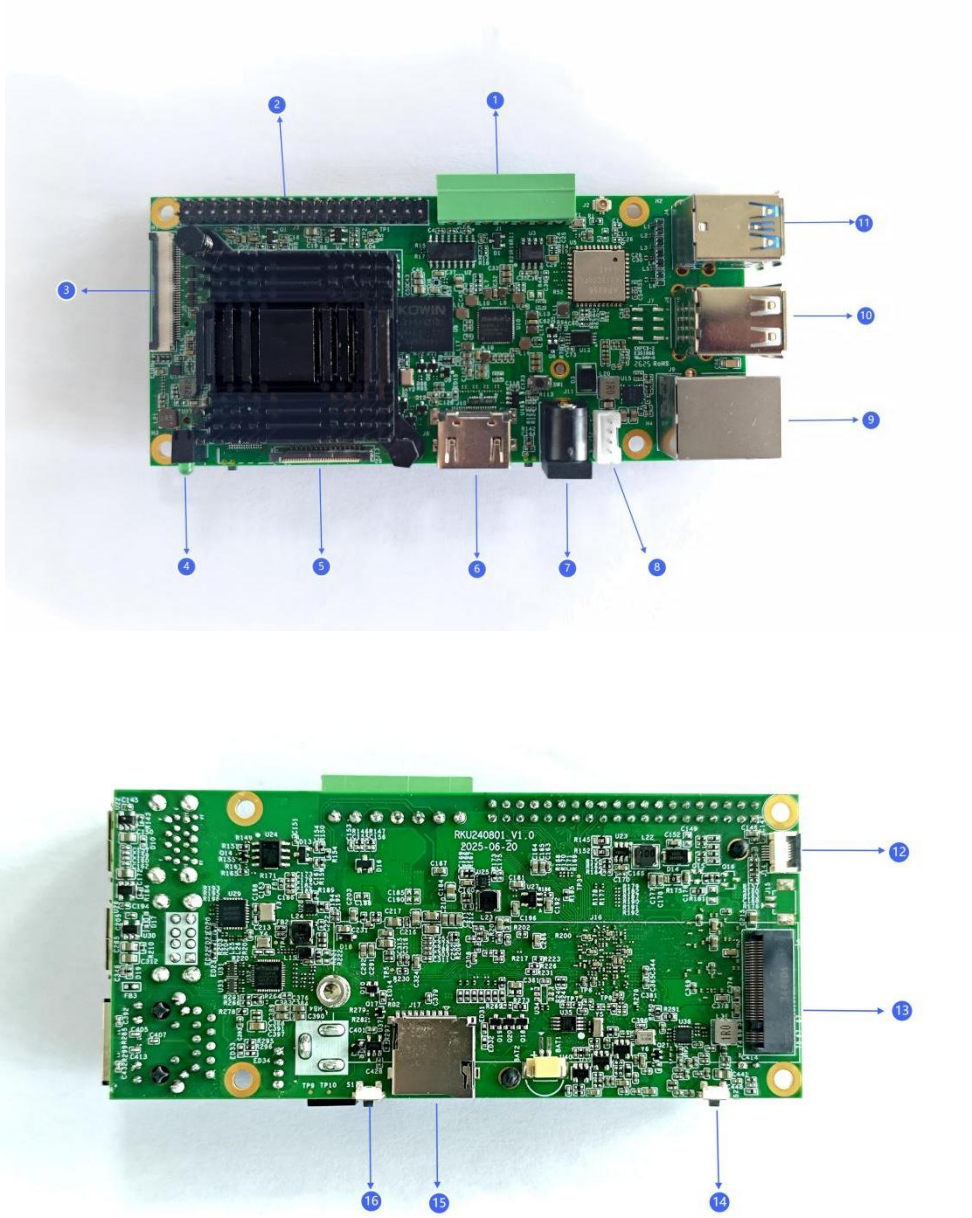


Figure 1 Schematic diagram of motherboard interfaces

Table 1 Names and functions of each interface on the motherboard

Serial number	Features	Notes
1	15 EDGRV-7p 3.81mm	1×CAN, 1× 485,1 ×232
2	GPIO	40PIN Expand I/O, 2.54mm interface
3	MIPI_DSI	4LANE DSI FPC (0.5mm FPC seat)
4	LED	5V power indicator light
5	MIPI_CSI	4LANE CSI FPC (0.5mm FPC seat)
6	HDMI OUT	HDMI V2.1
7	DC	12V/2A DC Power input

8	UART interface	DEBUG
9	RJ45	1×100M/1000M Ethernet (with POE mode)
10	USB 2.0	2×USB 2.0
11	USB 3.0	2×USB 3.0
12	FPC 6P	Touch Panel connector
13	M.2	A computing power module with Hailo H8
14	ADC	Recovery button
15	TF Card slot	TF Card Socket
16	Power key	Standby, wake switch

II、What's in the development board

The development board contains the XPI-3576.

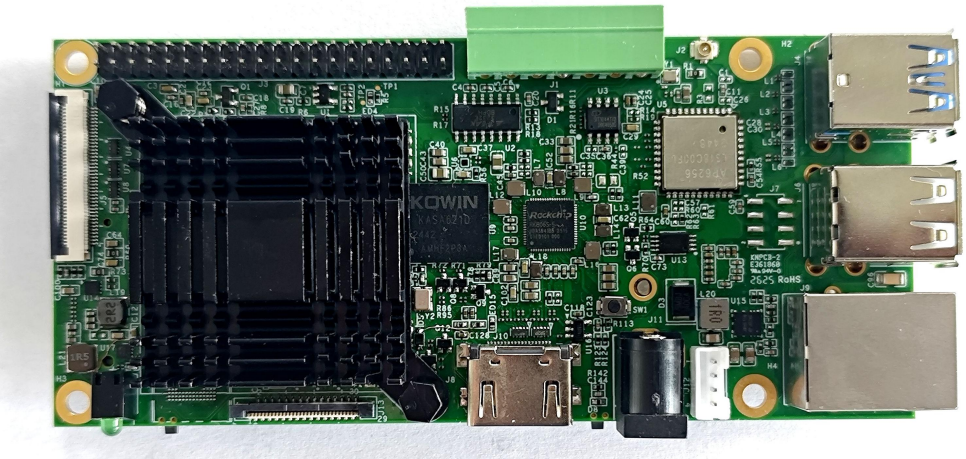


Figure 2 XPI-3576 on-board diagram

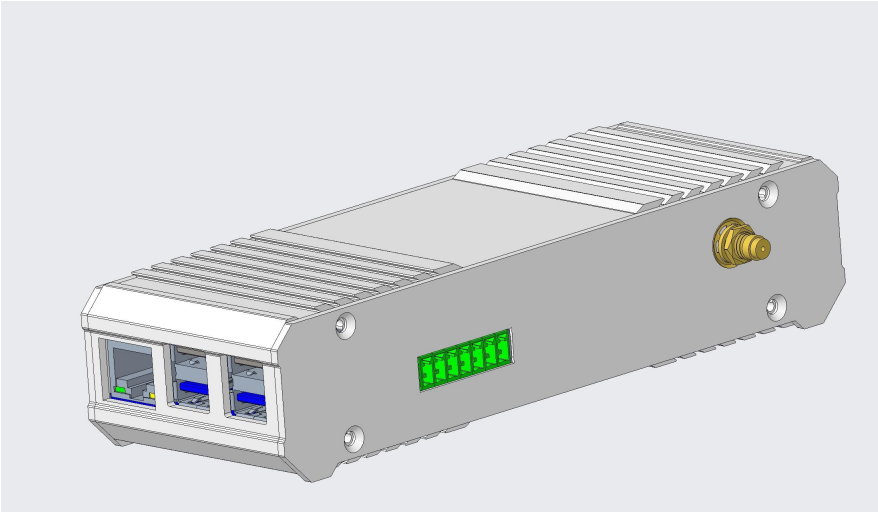


Figure 3 Product rendering of XPI-3576

III、A Beginner's Guide

3.1 Prerequisites

Before starting your XPI-3576 device for the first time, you need to prepare the following items:

- XPI-3576 motherboard;
- Power supply that conforms to XPI-3576 board specifications (purchased separately);
- An HDMI interface liquid crystal display with a resolution of up to 2560×1600@60Hz;
- Connect the circuit board to the LCD using an HDMI-HDMI cable;
- A computer keyboard/mouse with a USB interface.

3.2 First startup circuit board

To start the development board, please follow these simple steps:

Step 1.Connect the HDMI cable to the interface marked on the XPI-3576 development board and connect the LCD display;

Step 2.Connect the keyboard and mouse to the USB ports marked on the development board (the order of connection is not important and can also be connected via an external USB hub);

Step 3.Connect the power adapter to the marked power interface.

After the power-on operation (plugging in the power adapter), pull the power switch and the development board will start up and display a startup screen with the Android logo. Note that due to Android system initialization, the first boot takes several minutes and the subsequent boot process will be significantly faster.

IV、Overview of RK3576+XPI-3576

4.1 Product diagram of XPI-3576

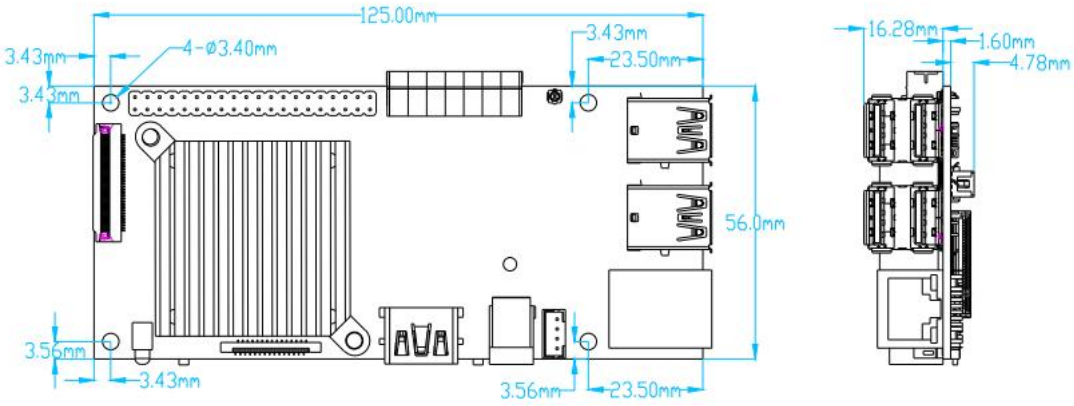


Figure 4 Product illustration dimensions

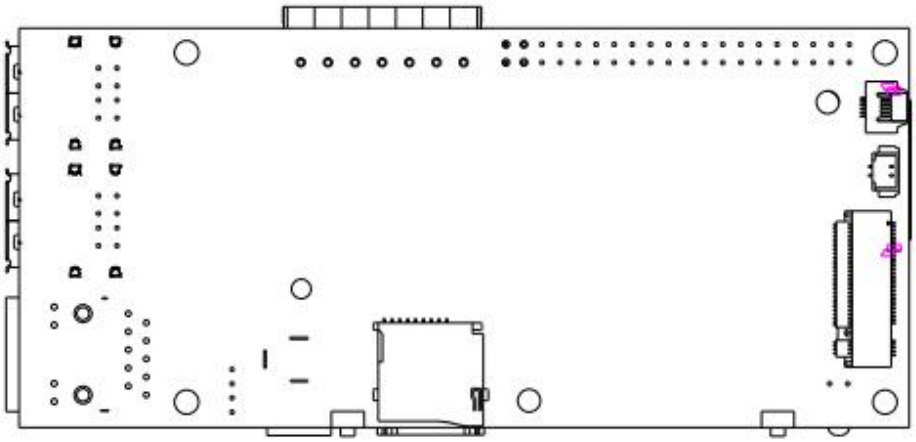


Figure 5 Back view

4.2 Product diagram of XPI-3576

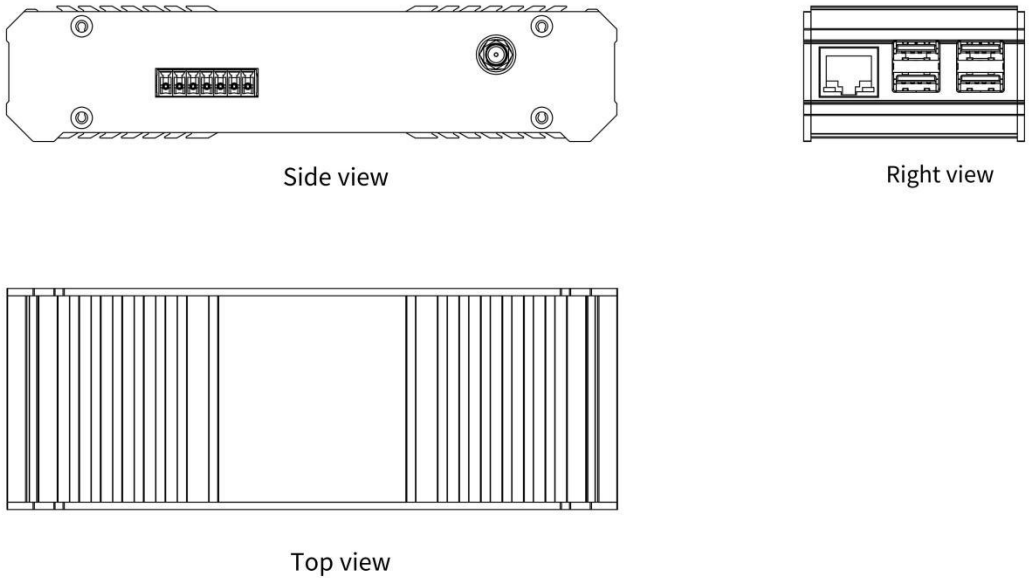


Figure 6 Three view drawing

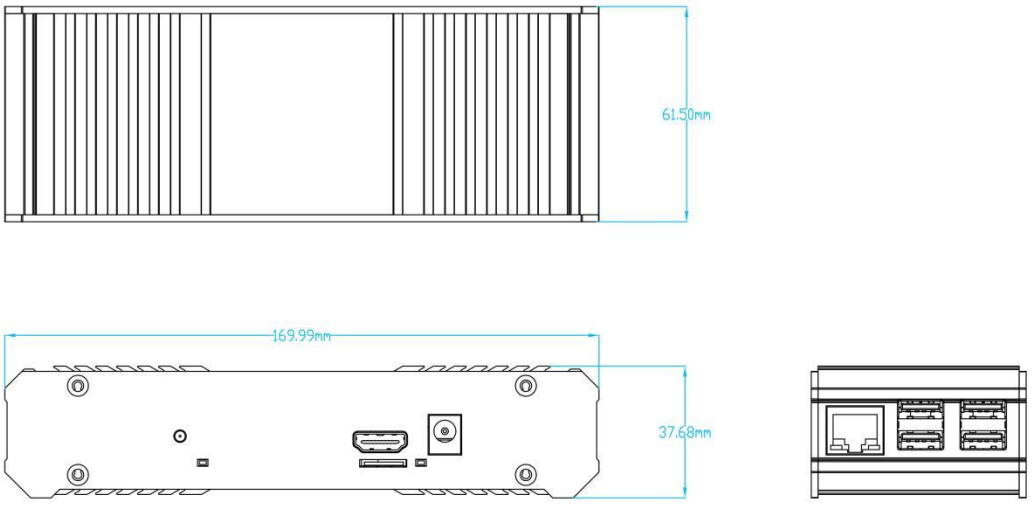


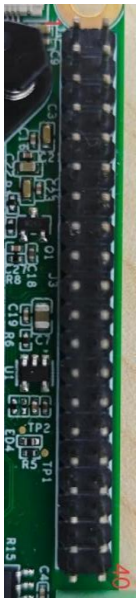
Figure 7 Dimension figure

4.3 Internal connectors, pin headers and jumpers

4.3.1 GPIO(J3)

Table 2 J3 interface definition

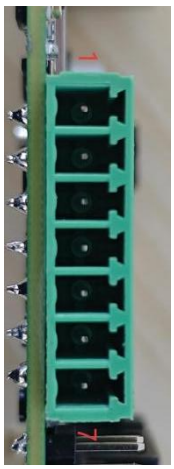
Serial number	Function	Features	Description	Illustration
1	VCC 3.3V IO	Input	3.3 V_1	
2	VCC 5V_SYS	Input	5V_1	
3	GP8A4_I2C1_SDA	Input/Output	I2C3_SDA_M3	
4	VCC 5V_SYS	Input	VCC5V_SYS	
5	GP8A5_I2C1_SCL	Input/Output	I2C3_SCL_M3	
6	GND	Ground	Ground	
7	GPOC1_CLKOUT	Output	REF_CLK0_OUT	
8	GP5B1_UART1TX	Output	UART1_TX_M2	
9	GND	Ground	Ground	
10	GP5B0_UART1RX	Input	UART1_RX_M2	
11	GP5B4_SPIOCLK_UART4CTSN	Input/Output	SPIOCLK_UART4CTSN	
12	GP6A0_PCM12S_CLK	Input/Output	SAI3_SCLK_M2	
13	GP5B6 SPIO_TXD_UART4TX	Output	SPIO_TXD_UART4TX	
14	GND	Ground	Ground	
15	GP5B7_SPIO_RXD_UART4RX	Input	SPIO_RXD_UART4RX	
16	GP5B2_UART1CTSN	Input	UART1_CTSN_M2	
17	VCC 33 IO	Input	3V3_2	
18	GP5B3_UART1RTSN	Input	UART1_RTSN_M2	
19	GP8B1_SPI2TXD	Output	SPI1_MOSI_M2	
20	GND	Ground	Ground	
21	GP8B0_SPI2RXD	Input	SPI1_MISO_M2	
22	GP5C3	Input/Output	GPIO3_B5	
23	GP8A6_SPI2CLK	Output	SPI1_CLK_M2	
24	GP8A7_SPI2CSN0	Output	SPI1_CSN0_M2	
25	GND	Ground	Ground	
26	GP8A3_SPI2CSN1	Output	SPI1_CSN1_M2	



27	GP7C1_12C4_SDA	Input/Output	I2C8_SDA_M3
28	GP7C2_12C4_SCL	Input/Output	I2C8_SCL_M3
29	GP5B5_SPIOCSN0_UART4RTSN	Input/Output	SPIOCSN0_UART4RTSN
30	GND	Ground	Ground
31	GP5C0_SPIOCSN1	Output	SPI0_CS1_M0
32	GP7C7_UART2TX_PWM3	Output	UART10_TX_M0
33	GP7C6_UART2RX_PWM2	Input	UART10_RX_M0
34	GND	Ground	Ground
35	GP6A1_PCM/I2S_FS	Input/Output	SAI3_LRCK_M2
36	GP7A7_UART3RX	Input	UART2_RX_M2
37	GP7B0_UART3TX	Output	UART2_TX_M2
38	GP6A3_PCM/I2S_SDI	Input	SAI3_SDI_M2
39	GND	Ground	Ground
40	GP6A4_PCM/I2S_SDO	Output	SAI3_SDO_M2

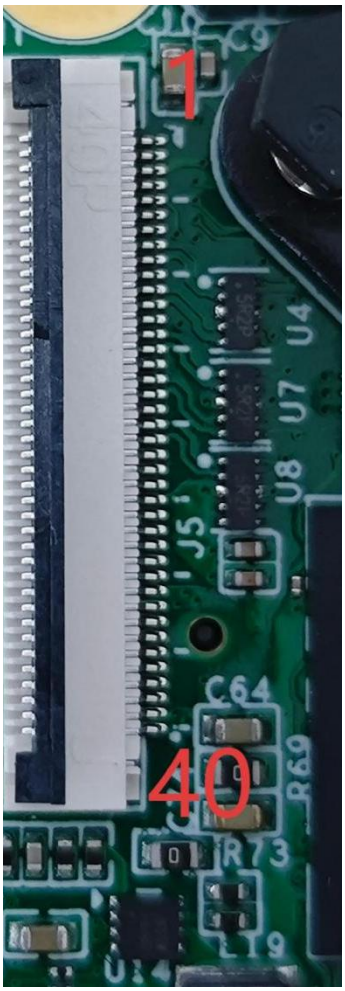
4.3.2 15 EDGRV-7p 3.81mm(J1)

Table 3 J1 interface definition

Serial number	Features	Characteristics	Description	Illustration
1	RS232_TX	Send data	RS232 sending data terminal	
2	RS232_RX	Receive data	RS232 receiving data terminal	
3	CANH	Sending and receiving data	CAN high-speed line	
4	CANL	Sending and receiving data	CAN low speed line	
5	RS485_A	Send and receive data	RS485_A port	
6	RS485_B	Sending and receiving data	RS485_B port	
7	GND	Ground wire	/	

4.3.3 MIPI_DSI(J5)

Table 4 J5 interface definition

Serial number	Features	Features	Description	Illustration
1	NC1	/	empty	
2	VCI (+ 3.3 V)	Output	VCC_1V8_S3	
3	IOVCC_1. 8 V / 3.3 V	Input/Output	VCC_3V3_S3	
4	GND1	Ground	Ground wire	
5	RST	Input	MIPI_DSI_nRST	
6	NC2	/	empty	
7	GND2	Ground	Ground wire	
8	MIPI_ON	Input/Output	MIPI_DPHY_DSI_TX_DON	
9	MIPI_OP		MIPI_DPHY_DSI_TX_DOP	
10	GND3	Ground	Ground wire	
11	MIPI_1N	Input/Output	MIPI_DPHY_DSI_TX_D1N	
12	MIPI_1P		MIPI_DPHY_DSI_TX_D1P	
13	GND4	Ground	Ground wire	
14	MIPI_CKN	Input/Output	MIPI_DPHY_DSI_TX_CLKN	
15	MIPI_CKP		MIPI_DPHY_DSI_TX_CLKP	
16	GND5	Ground	Ground wire	
17	MIPI_2N	Input/Output	MIPI_DPHY_DSI_TX_D2N	
18	MIPI_2P		MIPI_DPHY_DSI_TX_D2P	
19	GND6	Ground	Ground wire	
20	MIPI_3N	Input/Output	MIPI_DPHY_DSI_TX_D3N	
21	MIPI_3P		MIPI_DPHY_DSI_TX_D3P	
22	GND7	Ground	Ground wire	
23	NC3	/	empty	
24	NC4	/	empty	
25	GND8	Ground	Ground wire	
26	NC4(ID)	/	empty	
27	PWMO	Output	PWM_OUT	
28	NC5	/	empty	
29	NC6	/	empty	
30	GND9	Ground	Ground wire	
31	LED1-	Input	VCC1_LED-	
32	LED2-			
33	NC7	/	empty	
34	NC8	/	empty	
35	NC9	/	empty	
36	NC10	/	empty	
37	NC11	/	empty	
38	NC12	/	empty	
39	VLED1+	Output	VCC1_LED+	
40	VLED2+			

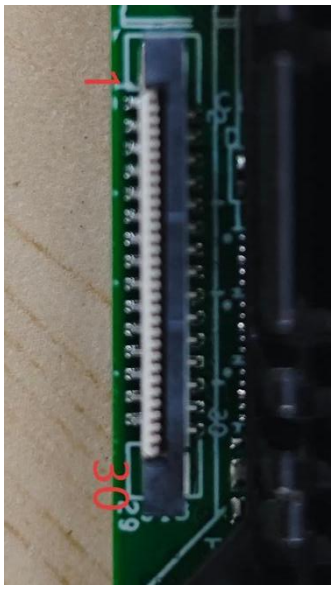
4.3.4 DEBUG(J12)

Table 5 J12 interface definition

Serial number	Features	Features	Description	Illustration
1	RX	Input	UART0_RX_M0_DEBUG	
2	GND	Ground	Ground	
3	TX	Output	UART0_TX_M0_DEBUG	
4	VCC	/	empty	

4.3.5 MIPI-CSI(J13)

Table 6 J13 interface definition

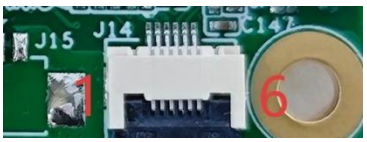
Serial Number	Function	Features	Description	Illustration
1	NC1	/	empty	
2	AFVDD2.8 V	Output	VCC2V8_DVP	
3	DVDD1.2 V	Output	VDD1V2_DVDD_DVP	
4	DOVDD1.8 V_1	Output	VCC1V8_DOVDD_DVP	
5	NC2	/	empty	
6	AGND	Ground	Ground	

7	AVDD2.8 V	Output	VCC2V8_AVDD_DVP
8	GND1	Ground	Ground
9	SDA	Input/Output	I2C4_SDA_M1_MIPI_CAM
10	SCL		I2C4_SCL_M1_MIPI_CAM
11	RESET	Output	MIPI_CSI_CAM_RST_H
12	DOVDD1.8 V_2	Input	VCC1V8_DOVDD_DVP
13	GND2	Ground	Ground
14	MCLK	Output	MIPI_DCPHY_CSI_CAM_CLKOUT
15	GND3	Ground	Ground
16	DP3	Input	MIPI_DPHY_CSI0_RX_D3P
17	DN3	Input	MIPI_DPHY_CSI0_RX_D3N
18	GND4	Ground	Ground
19	DP2	Input	MIPI_DPHY_CSI0_RX_D2P
20	DN2	Input	MIPI_DPHY_CSI0_RX_D2N
21	GND5	Ground	Ground
22	DP1	Input	MIPI_DPHY_CSI0_RX_D1P

23	DN1	Input	MIPI_DPHY_CSI0_RX_D1N
24	GND6	Ground	Ground
25	CP	Input	MIPI_DPHY_CSI0_RX_CLKP
26	CN	Input	MIPI_DPHY_CSI0_RX_CLKN
27	GND7	Ground	Ground
28	DP0	Input	MIPI_DPHY_CSI0_RX_D0P
29	DN0	Input	MIPI_DPHY_CSI0_RX_D0N
30	GND8	Ground	Ground

4.3.6 TP(J14)

Table 7 J14 interface definition

Serial number	Features	Features	Description	Illustration
1	SCK	Input/Output	I2C0_SCL_M1_TP	
2	SDA		I2C0_SDA_M1_TP	
3	VCC	Input	VCC_3V3_S3	
4	RST	Output	TP_RST_L	
5	INT	Input	TP_INT_L	
6	GND	Ground	Grounding	

4.4 System block diagram

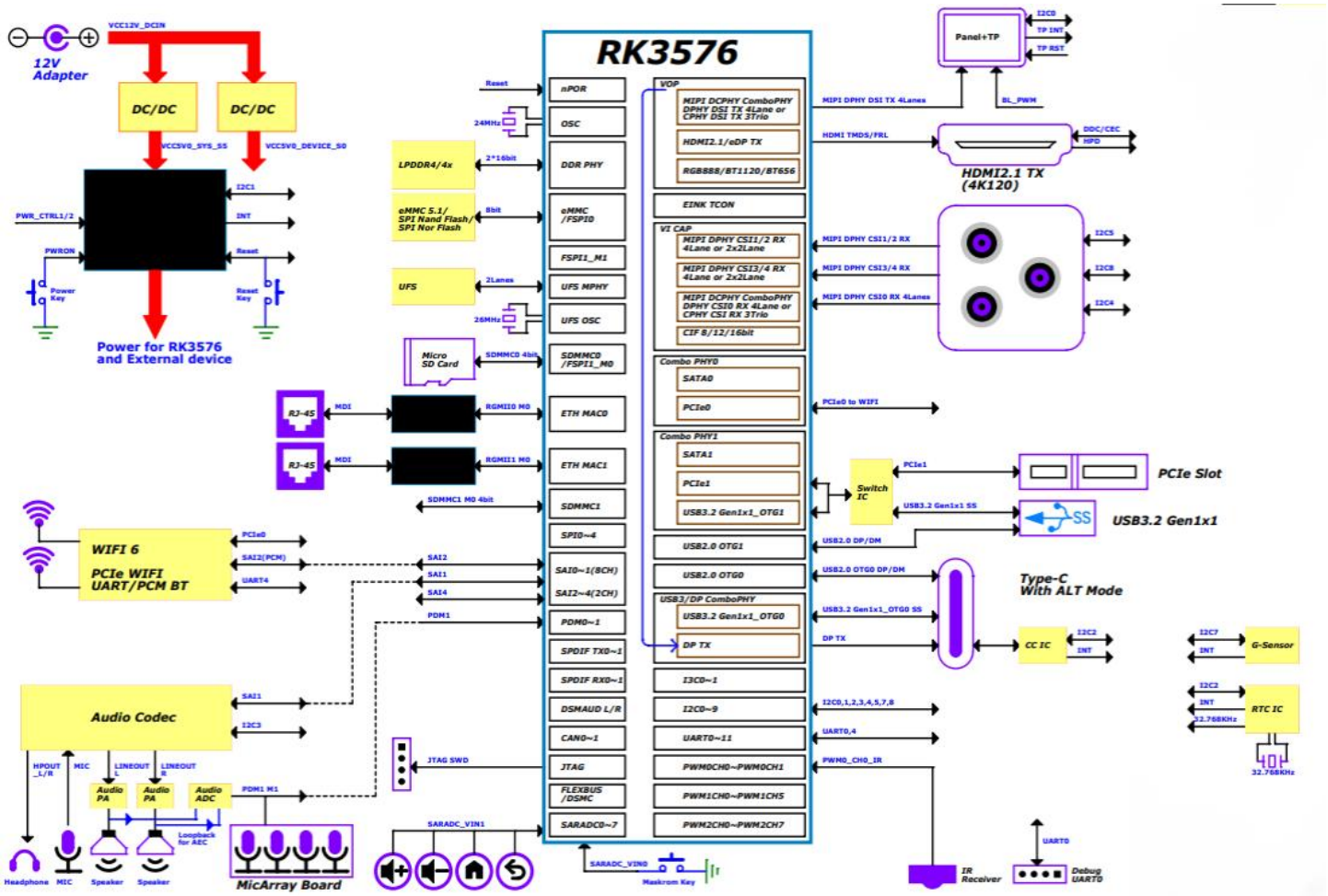


Figure 8 Product framework diagram