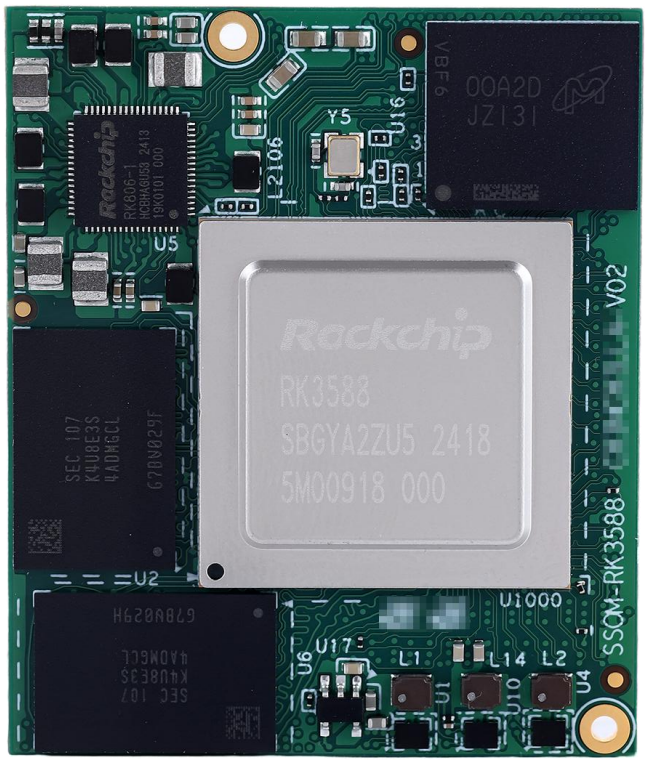
Bit-Brick SSOM-3588-X2 datasheet



Provisional version

V 1.0

Bit-Brick Technology Corporation

June 18, 2025

0 Release Note

Revision	Data	Contents
V1.0	June 18, 2025	First Draft

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2 Summary

• The SSOM-RK3588-X2 SoM (System on Module), developed by Bit-Brick, leverages the Rockchip RK3588 SoC, which is grounded in the ARM architecture. This board combines the advanced quad-core ARM Cortex-A76 and quad-core Cortex-A55 CPUs, ensuring a balance between performance and efficiency.
• Additionally, the RK3588 boasts a high-performance 4-channel external memory interface (LPDDR4/LPDDR4X/LPDDR5), designed to meet the high memory bandwidth requirements of applications ranging from graphic post-processing to demanding computational tasks.
• The SoM contains LPDDR4X, eMMC, PMIC and four board-to-board connectors
• Since most of the SoC signals can connected through the board-to-board connectors, most of the Soc's functions are available.

2.1 Devices

• Soc: RK3588 of Rockchip.
• 2xLPDDR4X up to 8GB
• eMMC up to 128GB
• PMIC: RK806-1 of Rockchip

2.2 Features

• Microprocessor
- Quad-core Cortex-A76 up to 2.4GHz
- Quad-core Cortex-A55 up to 1.8GHz
- 64KB I-cache 64KB D-cache and 512KB L2 for A76 each core, 32KB I-cache 32KB D-cache and 512KB L2 for A55 each core, 3MB L3 cache
- 6.0 TOPS Neural Process Unit, Embedded 384KB*3 internal buffer
- Mali-G610 MP4 up to 0.8GHz

• Memory Organization
- LPDDR4X RAM 16GB
- EMMC 64GB

• Boot ROM
- Supports system code download through USB OTG
• Secure system
- Embedded two cipher engine
- Support key ladder to guarantee key secure
- Support secure OS and data scrambling
- Support OTP

• Video Decoder/Encoder
- Supports video decoding up to 8K@60fps
- Supports H.264/265 encode up to 8K@30fps
- H.264 HP encoding up to 1080p@100fps
- Picture size up to 8192x8192

• NPU
- Include Triple NPU core
- Support deep learning frameworks

• Display Subsystem

Video Output
o Supports 2-CH HDMI 2.1 TX with ARC, up to 8K@60fps
o Or EDP TX interface up to 4K@60Hz
o HDMI 2.1 support FRL mode
o Supports 4 lanes MIPI DSI up to 4K@60Hz
o Supports 2-CH PD1.4a interface up to 8K@30Hz
o Supports BT-1120 16bit output

Video/Image Input
o Supports 3-CH MIPI 4lanes CSI interfaces
o Or 4-CH MIPI 2lanes + 1-CH 4lanes CSI interfaces
o Supports HDMI 2.0 RX interface up to 4K@30Hz
o Supports DVP 8/16-bit input

• **Audio**
- Three I2S/PCM interfaces
- Support 8-ch TX/RX on I2S0/1
- Support Mic array Up to 8ch PDM/TDM interface
- Two SPDIF output
- Support voice activity detection

• **USB/PCIE/SATA3**
- Two USB2.0 OTG/Host and two USB2.0 Host interfaces
- Two USB3.0 OTG/Host or DP interface
- One USB3.0 Host or SATA3 interface.
- One PCIE2.1x1 or SATA3 interface.
- One SATA3 interface.
- One PCIE3.0x2 interface
- Not support USB3.0/USB2.0 OTG SRP, HNP and RSP
- SATA3 support five device each port via PM switch

• **Ethernet**
- Support up to 2-CH 1GB Ethernet
- Support RMII/RGMII PHY interface

• **I2C**
- Up to 7-CH I2C
- Support standard mode and fast mode (up to 400kbit/s)

• **SDIO / SDMMC**
- Support SDIO 3.0 protocol
- Support SD3.0 card

• **SPI**
- Up to four SPI controllers,
- Full-duplex synchronous serial interface

• **UART**
- Support up to 10 UARTs
- UART2 with 2 wires for debug
- Embedded two 64byte FIFO

• **CAN**
- Support up to three CAN controller
- Support CAN 2.0B protocol

• **ADC**
- Up to Two ADC channels
- 12-bit resolution up to 1MS/s sampling rate
- Voltage input range between 0V to 1.8V

• **PWM**
- Up to15 PWMs with interrupt-based operation
- Support 32bit time/counter facility
- IR option on PWM3/7/11/15

• **Power unit**
- PMIC RK806-1 on board
- 3.3 ~ 4.4V Power input
- 1.8V and 3.3V max 500mA out

2.3 SoM Block Diagram

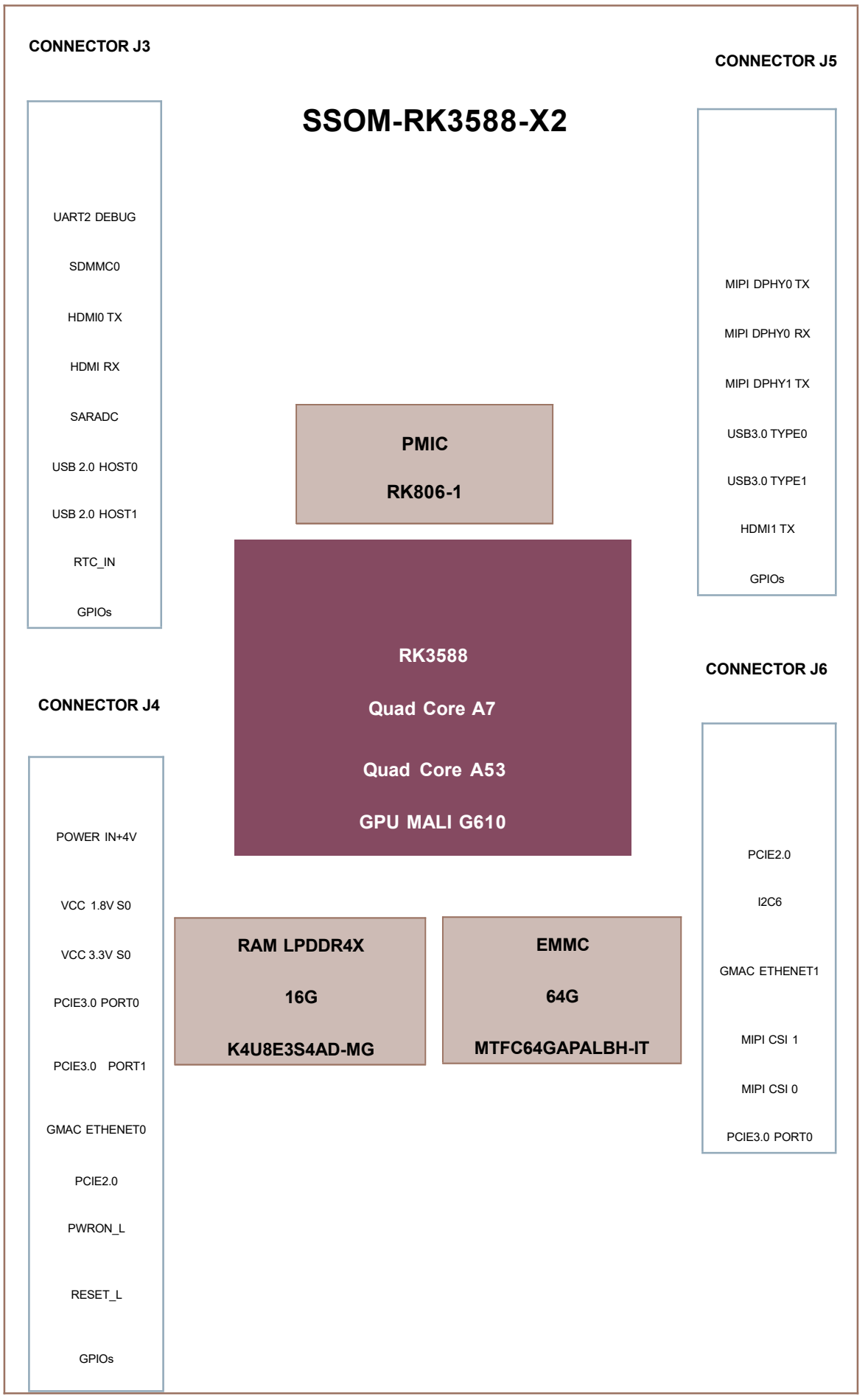


Figure 1: Shows SSOM-RK3588-X2 block diagram

2.4 Board Pictures

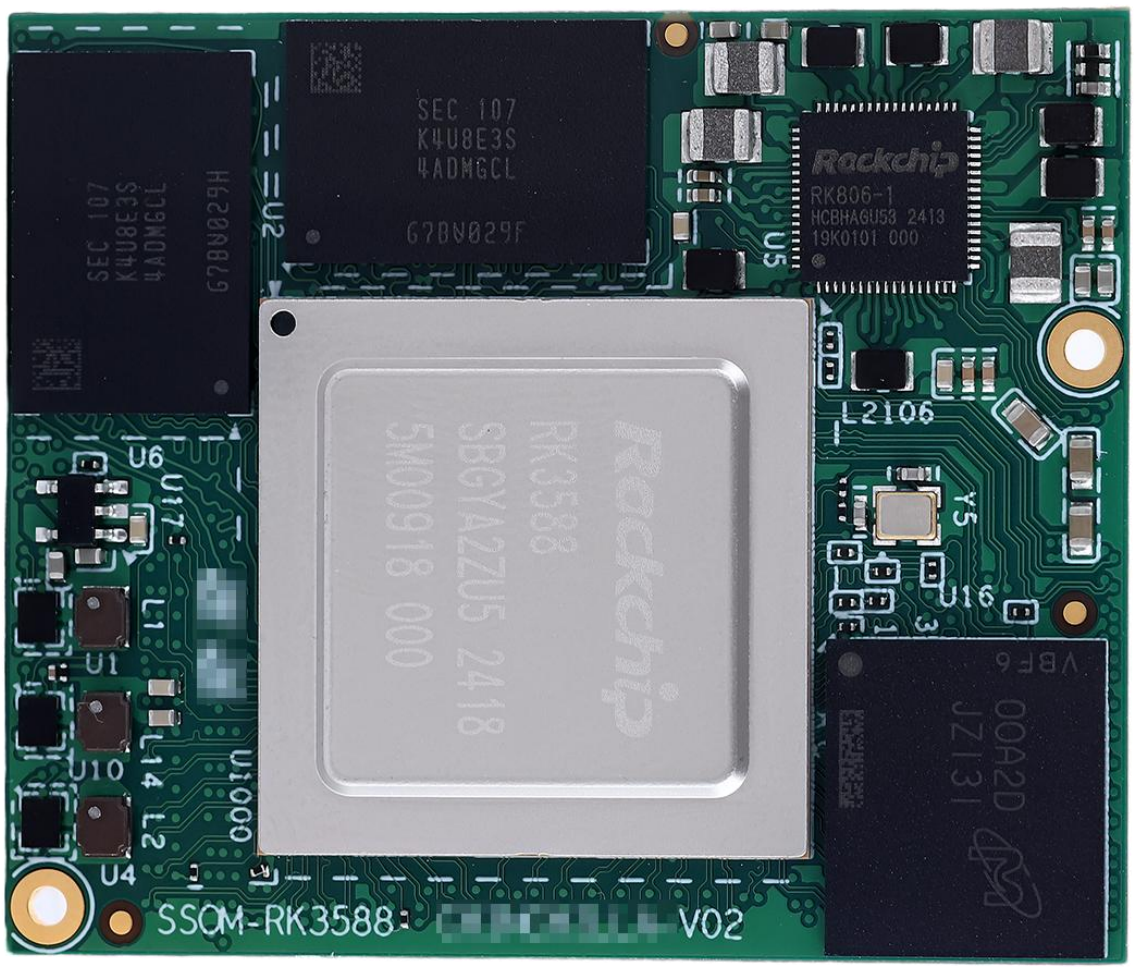


Figure 2: shows the top-side view of the SSOM-RK3588-X2 board

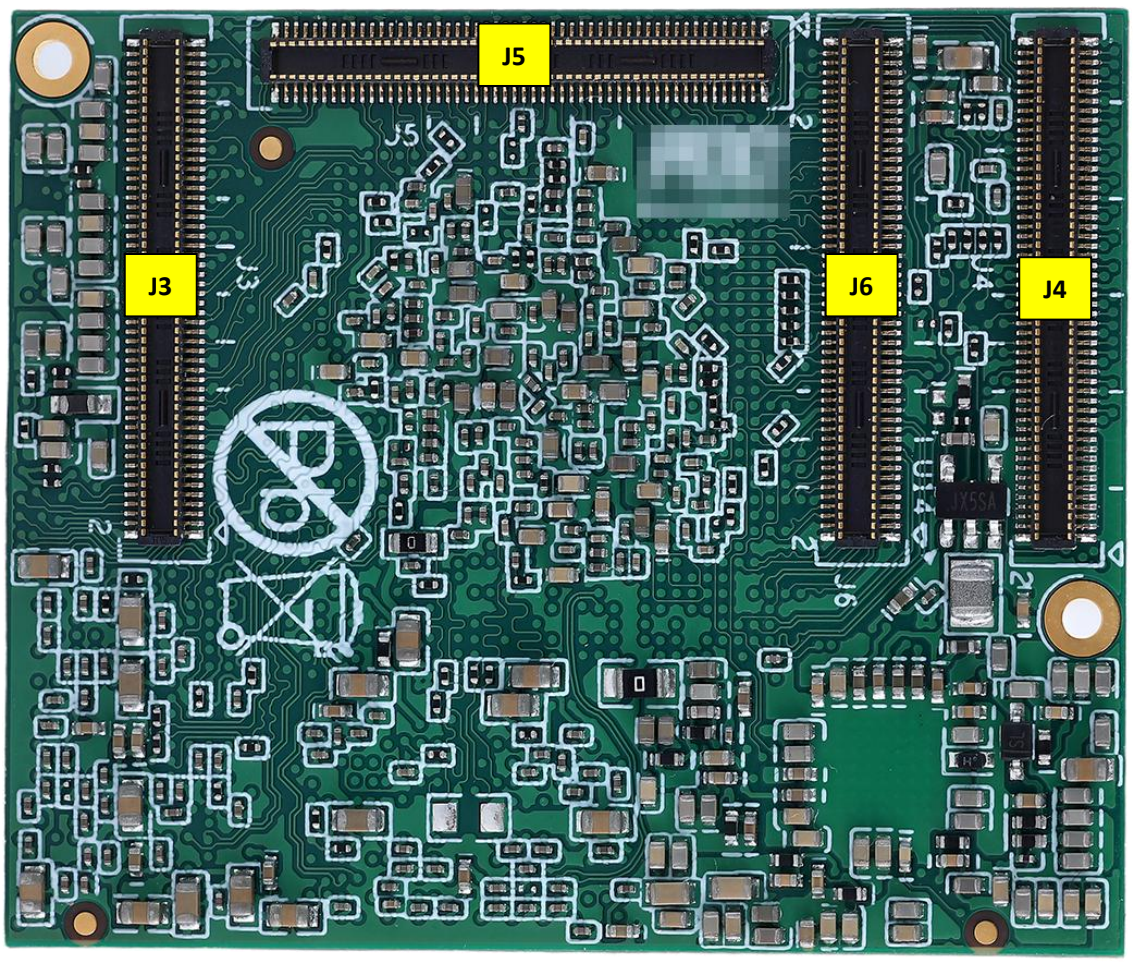


Figure 3: shows the bottom-side view of the SSOM-RK3588-X2 board

3 Mechanical Specification

3.1 Board

- Board dimensions: 47mm x 39.4mm x 4.7mm (dimensional tolerance ±0.10mm)
- Component mounting surface: Maximum height: 2mm (Soc part RK3588)
- Connectors surface P/N: DF40C-100DP-0.4V(51)
- Board thickness: 1.2mm
- 10 layers of immersion gold PCB.

3.2 Holes For Fixing The Board

- Holes size: Hole diameter: 1.6mm
- Pad outer diameter: 3.175mm
- Holes position

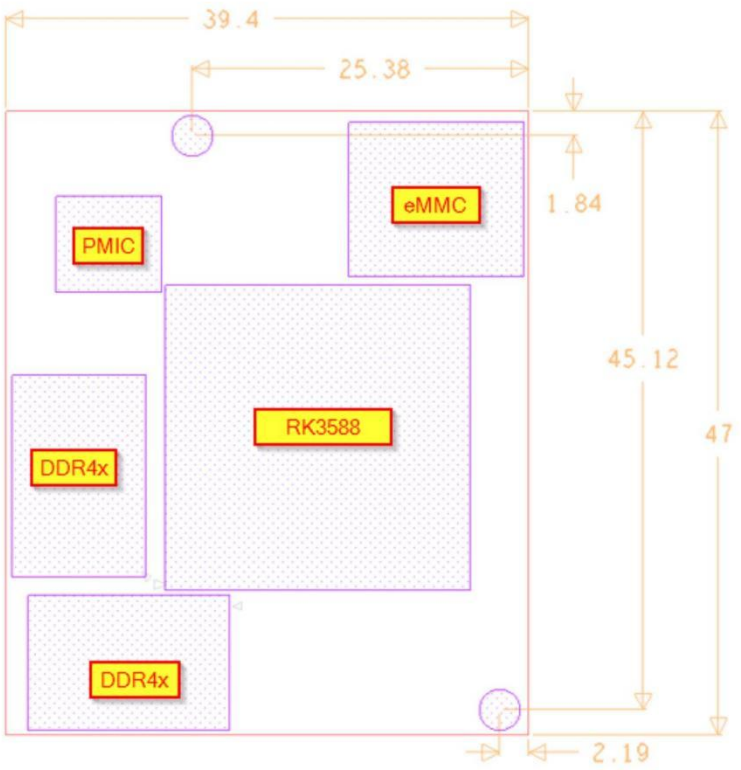


Figure 4: Holes position on top-side
All dimension is mm

3.3 Connectors Position

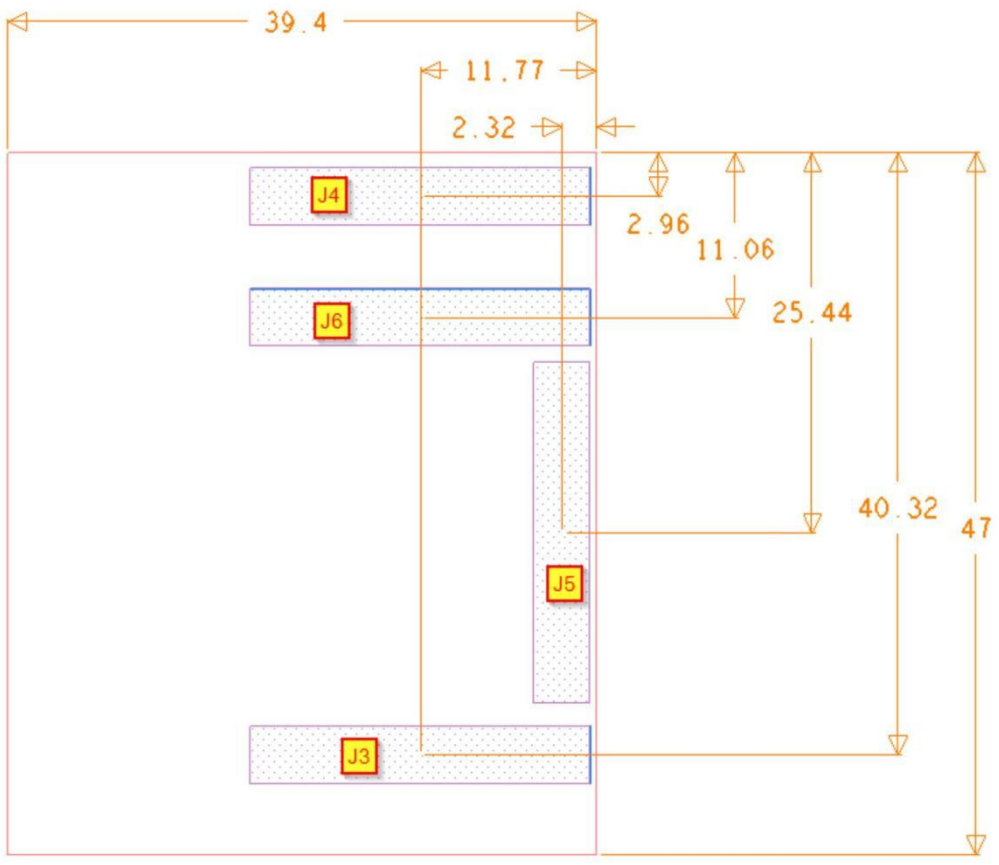


Figure 5: Connectors position on bottom-side
All dimension is mm

The SoM board connectors used DF40C-100DP-0.4V(51) and the corresponding carrier board connector is DF40HC(3.0)-100DS-0.4V(58)
These model numbers suggest that these connectors are part of Hirose Electric Co's DF40 series, which are known for their compact size and high reliability in board-to-board connection.

3.4 Main Components

- **Part location**

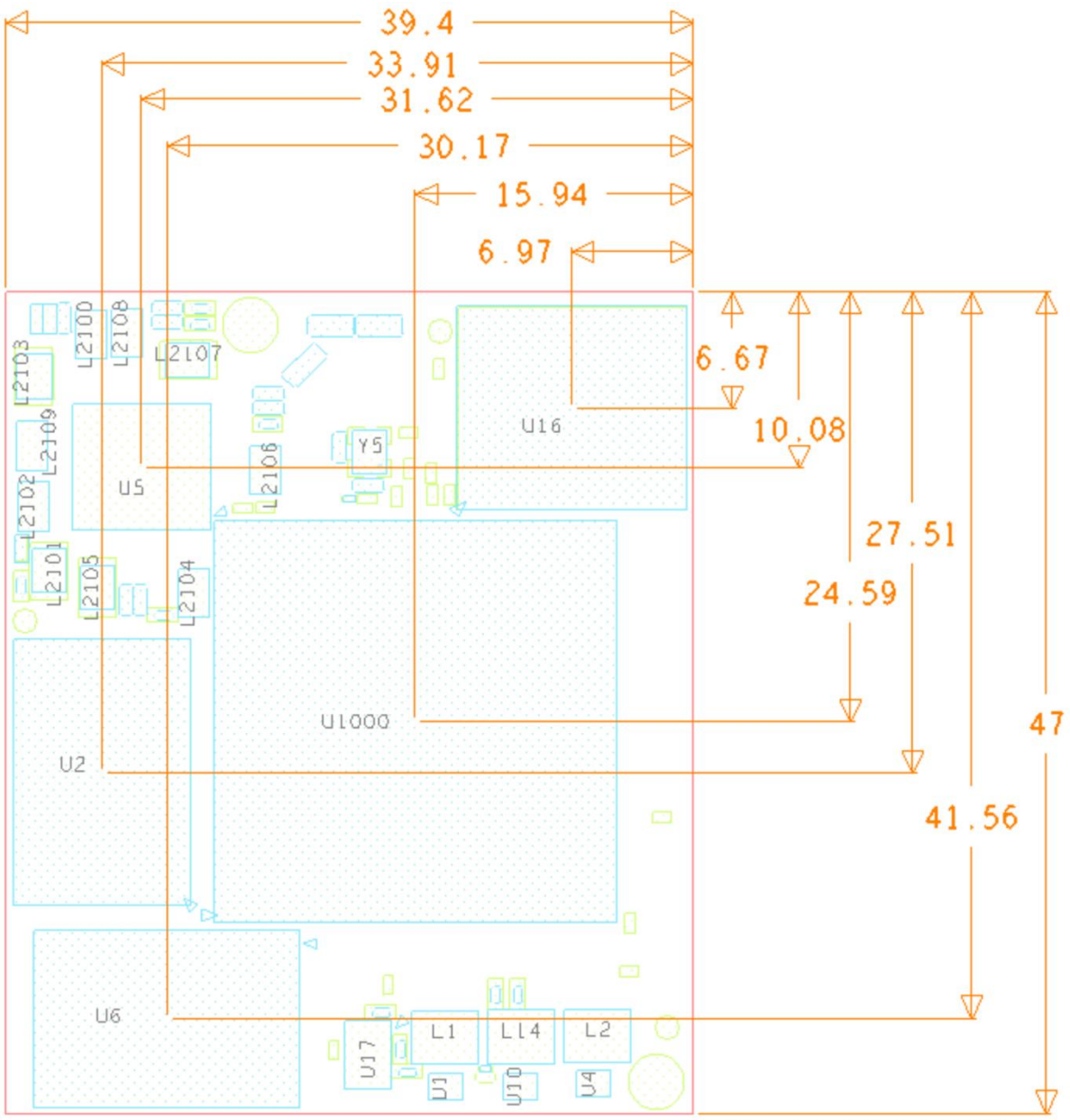


Figure 6: Parts position on top-side
All dimension is mm

- **Part Height**

U1000: 2mm (Soc part RK3588)
U2, U6: 0.8 to 1mm (RAM LPDDR4X)
U5: 0.9mm (PMIC)
U17: 1.25mm
L1, L2, L4: 1.2mm
L2100, L2102, L2104, L2106, L2108, L2109: 1mm
L2101, L2103, L2105, L2107: 1.2mm

4 Connector Pin Function Description

Note: Pin Type Symbol Definitions

Symbol	Description
I	Input
O	Output
I/O	Input/Output
AI	Analog Input
AO	Analog Output
AI/O	Analog Input/Output
PI	Power Supply
PO	Power Output
SOM	System on module

Table 1: J3 Connector Interface Pin Definition

Pin Number	Signal Name	Signal Type	IO Voltage	Main IC	IC Pin Number	IC Pin Name
1(J3)	GND	PI	0V			
2(J3)	GPIO1_A7	I/O	1.8V	RK3588	C25	PDM1_SDI0_M1/PCIE30X1_1_PERSTN_M2/PWM3 _IR_M3/SPI2_CS0_M0/GPIO1_A7_u
3(J3)	GPIO1_A6	I/O	1.8V	RK3588	C24	HDMI_TX1_HPD_M0/SPI2_CLK_M0/GPIO1_A6_d
4(J3)	GPIO3_D1	I/O	3.3V	RK3588	AG23	CIF_D13/PCIE20X1_2_PERSTN_M0/HDMI_RX_CE C_M1/UART4_TX_M1/PWM9_M2/SPI0_MISO_M3/ GPIO3_D1_d
5(J3)	GPIO3_D2	I/O	3.3V	RK3588	AG25	CIF_D14/PCIE30X2_CLKREQN_M2/HDMI_RX_SCL _M1/I2C7_SCL_M2/UART9_RTSN_M2/SPI0_MOSI _M3/GPIO3_D2_d
6(J3)	GPIO1_D4	I/O	1.8V	RK3588	D28	I2S0_SDI0/GPIO1_D4_d
7(J3)	GPIO4_B7	I/O	3.3V	RK3588	AJ28	BT1120_D13/PCIE20X1_2_CLKREQN_M1/HDMI_T X0_SCL_M0/I2C5_SDA_M1/SPI3_CLK_M1/GPIO4_ B7_u
8(J3)	UART2_TX_M0_DEBUG	I/O	1.8V	RK3588	P29	I2S1_MCLK_M1/JTAG_TCK_M2/I2C1_SCL_M0/UA RT2_TX_M0/PCIE30X1_1_CLKREQN_M0/GPIO0_B 5_d
9(J3)	GPIO3_D3	I/O	3.3V	RK3588	AG24	CIF_D15/PCIE30X2_WAKEN_M2/HDMI_RX_SDA_ M1/I2C7_SDA_M2/UART9_CTSN_M2/PWM10_M2/ SPI0_CLK_M3/GPIO3_D3_d
10(J3)	UART2_RX_M0_DEBUG	I/O	1.8V	RK3588	R29	I2S1_SCLK_M1/JTAG_TMS_M2/I2C1_SDA_M0/UA RT2_RX_M0/PCIE30X1_1_WAKEN_M0/GPIO0_B6_ d
11(J3)	GPIO3_C6	I/O	3.3V	RK3588	AG26	CIF_D10/PCIE30X4_PERSTN_M2/HDMI_TX1_SCL_ M1/SPI3_MISO_M3/GPIO3_C6_u
12(J3)	GPIO1_A0	I/O	1.8V	RK3588	A24	PCIE30X1_1_CLKREQN_M2/DP0_HPDIN_M2/I2C2 _SDA_M4/UART6_RX_M1/SPI4_MISO_M2/GPIO1_ A0_d
13(J3)	TYPEC1_OTG_ID	I		RK3588	AK8	TYPEC1_USB20_OTG_ID
14(J3)	SDMMC0_D0	I/O		RK3588	AD2	SDMMC_D0/PDM1_SDI3_M0/JTAG_TCK_M1/I2C3 _SCL_M4/UART2_TX_M1/PWM8_M1/GPIO4_D0_u
15(J3)	TYPEC1_USB20_VBUSDET	I		RK3588	AL8	TYPEC1_USB20_VBUSDET
16(J3)	SDMMC0_D1	I/O		RK3588	AD1	SDMMC_D1/PDM1_SDI2_M0/JTAG_TMS_M1/I2C 3_SDA_M4/UART2_RX_M1/PWM9_M1/GPIO4_D1 _u
17(J3)	GND	PI	0V			
18(J3)	SDMMC0_D3	I/O		RK3588	AF1	SDMMC_D3/PDM1_SDI0_M0/JTAG_TMS_M0/I2C 8_SDA_M0/UART5_RTSN_M0/PWM10_M1/GPIO4 _D3_u
19(J3)	HDMI_RX_CLKP	AI		RK3588	AF6	HDMI_RX_CLKP
20(J3)	SDMMC0_D2	I/O		RK3588	AF2	SDMMC_D2/PDM1_SDI1_M0/JTAG_TCK_M0/I2C8 _SCL_M0/UART5_CTSN_M0/GPIO4_D2_u
21(J3)	HDMI_RX_CLKN	AI		RK3588	AF5	HDMI_RX_CLKN
22(J3)	SD_CLK	I/O		RK3588	AE1	SDMMC_CLK/PDM1_CLK0_M0/TEST_CLKOUT_M 0/MCU_JTAG_TMS_M0/CAN0_RX_M1/UART5_TX _M0/GPIO4_D5_d

23(J3)	GND	PI	0V			
24(J3)	SDMMC0_CMD	I/O		RK3588	AE2	SDMMC_CMD/PDM1_CLK1_M0/MCU_JTAG_TCK_ M0/CAN0_TX_M1/UART5_RX_M0/PWM7_IR_M1/ GPIO4_D4_u
25(J3)	HDMI_RX_D0N	AI		RK3588	AG4	HDMI_RX_D0N
26(J3)	GND	PI	0V			
27(J3)	HDMI_RX_D0P	AI		RK3588	AG5	HDMI_RX_D0P
28(J3)	GPIO1_B2	I/O	1.8V	RK3588	D26	PDM1_SDI3_M1/PCIE30X4_PERSTN_M3/UART4_ RX_M2/SPI0_MOSI_M2/GPIO1_B2_d
29(J3)	GND	PI	0V			
30(J3)	GPIO0_C6	I/O	1.8V	RK3588	T29	I2S1_SDI1_M1/NPU_AVS/UART0_RTSN/PWM5_M 1/SPI0_CLK_M0/PCIE30X4_CLKREQN_M0/SATA_ CP_POD/GPIO0_C6_u
31(J3)	HDMI_RX_D1N	AI		RK3588	AH5	HDMI_RX_D1N
32(J3)	GPIO0_C5	I/O	1.8V	RK3588	P30	I2S1_SDI0_M1/GPU_AVS/UART0_TX_M0/I2C4_SC L_M2/DP1_HPDIN_M1/PWM4_M0/PCIE30X1_0_P ERSTN_M0/GPIO0_C5_u
33(J3)	HDMI_RX_D1P	AI		RK3588	AH6	HDMI_RX_D1P
34(J3)	GPIO0_B7	I/O	1.8V	RK3588	T28	I2S1_LRCK_M1/PWM0_M0/I2C2_SCL_M0/CAN0_ TX_M0/SPI0_CS1_M0/PCIE30X1_1_PERSTN_M0/ GPIO0_B7_d
35(J3)	GND	PI	0V			
36(J3)	SDMMC_DET/GPIO0_A4_ U	I/O		RK3588	P31	SDMMC_DET/GPIO0_A4_u
37(J3)	HDMI_RX_D2N	AI		RK3588	AJ4	HDMI_RX_D2N
38(J3)	GPIO3_C1	I/O	3.3V	RK3588	Y27	GMAC1_PPSCLK/PCIE30X2_BUTTON_RSTN/UART 7_RX_M1/SPI1_CLK_M1/GPIO3_C1_d
39(J3)	HDMI_RX_D2P	AI		RK3588	AJ5	HDMI_RX_D2P
40(J3)	GPIO0_C4	I/O	1.8V	RK3588	R30	PDM0_CLK1_M1/PWM2_M0/UART0_RX_M0/I2C4 _SDA_M2/DP0_HPDIN_M1/PCIE30X1_0_WAKEN_ M0/GPIO0_C4_d
41(J3)	GND	PI	0V			
42(J3)	GPIO3_D4	I/O	3.3V	RK3588	AA27	HDMI_TX0_HPD_M1/PCIE30X2_PERSTN_M2/HD MI_RX_HPDOUT_M1/MCU_JTAG_TCK_M1/UART9 _RX_M2/SPI0_CS0_M3/GPIO3_D4_d
43(J3)	USB20_HOST0_DP	AI/O		RK3588	AK6	USB20_HOST0_DP
44(J3)	GPIO3_D5	I/O	3.3V	RK3588	AB28	PCIE30X4_BUTTON_RSTN/DP1_HPDIN_M0/MCU_ JTAG_TMS_M1/UART9_TX_M2/PWM11_IR_M3/S PI0_CS1_M3/GPIO3_D5_d
45(J3)	USB20_HOST0_DM	AI/O		RK3588	AL6	USB20_HOST0_DM
46(J3)	GPIO1_B1	I/O	1.8V	RK3588	D25	PDM1_SDI2_M1/PCIE30X4_WAKEN_M3/SPI0_MIS O_M2/GPIO1_B1_d
47(J3)	GND	PI	0V			
48(J3)	GPIO1_B4	I/O	1.8V	RK3588	E24	PDM1_CLK0_M1/PCIE30X1_0_PERSTN_M2/UART 7_RX_M2/SPI0_CS0_M2/GPIO1_B4_u
49(J3)	USB20_HOST1_DP	AI/O		RK3588	AL7	USB20_HOST1_DP
50(J3)	GPIO1_B6	I/O	1.8V	RK3588	E26	MIPI_CAMERA1_CLK_M0/SPDIF0_TX_M0/PCIE30 X2_WAKEN_M3/HDMI_RX_HPDOUT_M2/I2C5_SC L_M3/UART1_TX_M1/GPIO1_B6_u
51(J3)	USB20_HOST1_DM	AI/O		RK3588	AM7	USB20_HOST1_DM
52(J3)	GPIO1_D7	I/O	1.8V	RK3588	F25	MIPI_CAMERA4_CLK_M0/PCIE30X2_CLKREQN_M 3/HDMI_RX_SDA_M2/I2C8_SDA_M2/UART1_CTS N_M1/PWM15_IR_M3/GPIO1_D7_u
53(J3)	GND	PI	0V			
54(J3)	GPIO1_D6	I/O	1.8V	RK3588	F24	MIPI_CAMERA3_CLK_M0/HDMI_RX_SCL_M2/I2C 8_SCL_M2/UART1_RTSN_M1/PWM14_M2/GPIO1 _D6_u
55(J3)	GPIO1_D0	I/O	1.8V	RK3588	F26	I2S0_SDO1/I2C7_SCL_M0/UART6_TX_M2/SPI1_M ISO_M2/GPIO1_D0_d

56(J3)	GPIO1_D2	I/O	1.8V	RK3588	F28	I2S0_SDO3/I2S0_SDI2/PDM0_SDI2_M0/I2C1_SCL _M4/UART4_TX_M0/PWM0_M1/SPI1_CLK_M2/GP IO1_D2_d
57(J3)	GPIO1_D1	I/O	1.8V	RK3588	F27	I2S0_SDO2/I2S0_SDI3/PDM0_SDI1_M0/I2C7_SDA _M0/UART6_RX_M2/SPI1_MOSI_M2/GPIO1_D1_d
58(J3)	GPIO1_B5	I/O	1.8V	RK3588	E25	PCIE30X1_0_CLKREQN_M2/UART7_TX_M2/SPI0_ CS1_M2/GPIO1_B5_u
59(J3)	GPIO1_D5	I/O	1.8V	RK3588	G26	PDM0_SDI0_M0/SPI1_CS1_M2/GPIO1_D5_d
60(J3)	GPIO1_D3	I/O	1.8V	RK3588	E28	I2S0_SDI1/PDM0_SDI3_M0/I2C1_SDA_M4/UART4 _RX_M0/PWM1_M1/SPI1_CS0_M2/GPIO1_D3_d
61(J3)	GPIO1_C1	I/O	1.8V	RK3588	G27	I2C3_SCL_M0/UART3_TX_M0/SPI4_MOSI_M0/GPI O1_C1_z
62(J3)	GPIO1_C0	I/O	1.8V	RK3588	G29	I2C3_SDA_M0/UART3_RX_M0/SPI4_MISO_M0/GP IO1_C0_z
63(J3)	GPIO1_B3	I/O	1.8V	RK3588	D27	PDM1_CLK1_M1/PCIE30X1_0_WAKEN_M2/SATA0 _ACT_LED_M1/UART4_TX_M2/SPI0_CLK_M2/GPI O1_B3_d
64(J3)	GND	PI	0V			
65(J3)	GPIO1_C2	I/O	1.8V	RK3588	F30	I2S0_MCLK/I2C6_SDA_M1/UART3_RTSN/PWM3_I R_M2/SPI4_CLK_M0/GPIO1_C2_d
66(J3)	HDMI0_TX_SBDP/EDP0_T X_AUXP	AI/O		RK3588	AG2	HDMI_TX0_SBDP/EDP_TX0_AUXP
67(J3)	GPIO3_C4	I/O	3.3V	RK3588	AH26	CIF_D8/FSPI_CS0N_M2/PCIE30X4_CLKREQN_M2/ HDMI_TX1_CEC_M2/CAN2_RX_M0/UART5_TX_M 1/SPI3_CS0_M3/GPIO3_C4_u
68(J3)	HDMI0_TX_SBDN/EDP0_T X_AUXN	AI/O		RK3588	AG1	HDMI_TX0_SBDN/EDP_TX0_AUXN
69(J3)	GPIO3_D0	I/O	3.3V	RK3588	AH24	CIF_D12/PCIE20X1_2_WAKEN_M0/HDMI_TX0_SD A_M2/I2C5_SDA_M0/UART4_RX_M1/PWM8_M2/S PI3_CLK_M3/GPIO3_D0_u
70(J3)	GND	PI	0V			
71(J3)	GPIO3_C5	I/O	3.3V	RK3588	AH25	CIF_D9/FSPI_CS1N_M2/PCIE30X4_WAKEN_M2/H DMI_TX1_SDA_M1/CAN2_TX_M0/UART5_RX_M1/ SPI3_CS1_M3/GPIO3_C5_u
72(J3)	HDMI0_TX3P_PORT/EDP0 _TX_D3P	AO		RK3588	AH3	HDMI_TX0_D3P/EDP_TX0_D3P
73(J3)	SARADC_VIN5_HW_ID	AI	1.8V	RK3588	AK15	SARADC_IN5
74(J3)	HDMI0_TX3N_PORT/EDP0 _TX_D3N	AO		RK3588	AH2	HDMI_TX0_D3N/EDP_TX0_D3N
75(J3)	GPIO4_B6	I/O	3.3V	RK3588	AJ27	BT1120_D12/PCIE30X4_PERSTN_M1/HDMI_RX_H PDOUT_M0/SATA0_ACT_LED_M0/I2C5_SCL_M1/ PWM13_M1/SPI3_MOSI_M1/GPIO4_B6_d
76(J3)	GND	PI	0V			
77(J3)	TYPEC0_OTG_ID	I		RK3588	AL14	TYPEC0_USB20_OTG_ID
78(J3)	HDMI0_TX0P_PORT/EDP0 _TX_D0P	AO		RK3588	AJ2	HDMI_TX0_D0P/EDP_TX0_D0P
79(J3)	TYPEC0_USB20_VBUSDET	I		RK3588	AM14	TYPEC0_USB20_VBUSDET
80(J3)	HDMI0_TX0N_PORT/EDP0 _TX_D0N	AO		RK3588	AJ1	HDMI_TX0_D0N/EDP_TX0_D0N
81(J3)	RTC_INT_L	I/O	1.8V	RK3588	L30	SPI2_CS1_M2/I2C1_SCL_M1/UART0_RX_M1/GPI O0_B0_z
82(J3)	GND	PI	0V			
83(J3)	GPIO3_C7	I/O	3.3V	RK3588	AJ24	CIF_D11/PCIE20X1_2_CLKREQN_M0/HDMI_TX0_ SCL_M2/I2C5_SCL_M0/SPI3_MOSI_M3/GPIO3_C7 _u
84(J3)	HDMI0_TX1P_PORT/EDP0 _TX_D1P	AO		RK3588	AK3	HDMI_TX0_D1P/EDP_TX0_D1P
85(J3)	GPIO3_C0	I/O	3.3V	RK3588	Y29	GMAC1_PPSTRIG/I2C3_SDA_M1/UART7_TX_M1/S PI1_MISO_M1/GPIO3_C0_d
86(J3)	HDMI0_TX1N_PORT/EDP0 _TX_D1N	AO		RK3588	AK2	HDMI_TX0_D1N/EDP_TX0_D1N
87(J3)	BOOT_SARADC_IN0	AI	1.8V	RK3588	AM16	SARADC_IN0_BOOT
88(J3)	GND	PI	0V			
89(J3)	SARADC_VIN1_KEY/RECO VERY	AI	1.8V	RK3588	AL16	SARADC_IN1
90(J3)	HDMI0_TX2P_PORT/EDP0 _TX_D2P	AO		RK3588	AL2	HDMI_TX0_D2P/EDP_TX0_D2P

91(J3)	SARADC_IN3	AI	1.8V	RK3588	AN17	SARADC_IN3
92(J3)	HDMI0_TX2N_PORT/EDP0 _TX_D2N	AO		RK3588	AL1	HDMI_TX0_D2N/EDP_TX0_D2N
93(J3)	SARADC_IN2	AI	1.8V	RK3588	AK16	SARADC_IN2
94(J3)	GND	PI	0V			
95(J3)	SARADC_IN6	AI	1.8V	RK3588	AL17	SARADC_IN6
96(J3)	HDMI1_TX_SBDN/EDP1_T X_AUXN	AI/O		RK3588	AP2	HDMI_TX1_SBDN/EDP_TX1_AUXN
97(J3)	SARADC_IN7	AI	1.8V	RK3588	AK17	SARADC_IN7
98(J3)	HDMI1_TX_SBDP/EDP1_T X_AUXP	AI/O		RK3588	AN2	HDMI_TX1_SBDP/EDP_TX1_AUXP
99(J3)	SARADC_IN4	AI	1.8V	RK3588	AM17	SARADC_IN4
100(J3)	GND	PI	0V			

Table 2: J4 Connector Interface Pin Definition

Pin Number	Signal Name	Signal Type	IO Voltage	Main IC	IC Pin Number	IC Pin Name
1(J4)	VCC4V0_SYS	PI	4.0V			
2(J4)	VCC4V0_SYS	PI	4.0V			
3(J4)	VCC4V0_SYS	PI	4.0V			
4(J4)	VCC4V0_SYS	PI	4.0V			
5(J4)	VCC4V0_SYS	PI	4.0V			
6(J4)	VCC4V0_SYS	PI	4.0V			
7(J4)	VCC4V0_SYS	PI	4.0V			
8(J4)	VCC4V0_SYS	PI	4.0V			
9(J4)	VCC4V0_SYS	PI	4.0V			
10(J4)	VCC4V0_SYS	PI	4.0V			
11(J4)	VCC4V0_SYS	PI	4.0V			
12(J4)	VCC4V0_SYS	PI	4.0V			
13(J4)	VCC4V0_SYS	PI	4.0V			
14(J4)	VCC4V0_SYS	PI	4.0V			
15(J4)	VCC4V0_SYS	PI	4.0V			
16(J4)	VCC4V0_SYS	PI	4.0V			
17(J4)	VCC4V0_SYS	PI	4.0V			
18(J4)	VCC4V0_SYS	PI	4.0V			
19(J4)	VCC4V0_SYS	PI	4.0V			
20(J4)	VCC4V0_SYS	PI	4.0V			
21(J4)	GND	PI	0V			
22(J4)	VCC_1V8_S0	PO	1.8V			
23(J4)	PCIE30_PORT0_TX1P	AO		RK3588	C33	PCIE30_PORT0_TX1P
24(J4)	VCC_1V8_S0	PO	1.8V			
25(J4)	PCIE30_PORT0_TX1N	AO		RK3588	C34	PCIE30_PORT0_TX1N
26(J4)	VCC_3V3_S0	PO	3.3V			
27(J4)	GND	PI	0V			
28(J4)	VCC_3V3_S0	PO	3.3V			
29(J4)	PCIE30_PORT0_RX1N	AI		RK3588	F33	PCIE30_PORT0_RX1N
30(J4)	GND	PI	0V			
31(J4)	PCIE30_PORT0_RX1P	AI		RK3588	F32	PCIE30_PORT0_RX1P
32(J4)	PCIE30_PORT0_RX0N	AI		RK3588	G34	PCIE30_PORT0_RX0N
33(J4)	GND	PI	0V			
34(J4)	PCIE30_PORT0_RX0P	AI		RK3588	G33	PCIE30_PORT0_RX0P

35(J4)	PMIC_EXT_EN_OUT	O	MAX 4V			
36(J4)	GND	PI	0V			
37(J4)	GPIO1_A4	I/O	1.8V	RK3588	B25	HDMI_TX1_SCL_M2/SPI2_MISO_M0/GPIO1_A4_d
38(J4)	PCIE20_1_RXN/SATA30_1 _RXN	AI		RK3588	J34	PCIE20_1_RXN/SATA30_1_RXN
39(J4)	GPIO1_A1	I/O	1.8V	RK3588	A25	PCIE30X1_1_WAKEN_M2/DP1_HPDIN_M2/SATA1 _ACT_LED_M1/I2C2_SCL_M4/UART6_TX_M1/SPI 4_MOSI_M2/GPIO1_A1_d
40(J4)	PCIE20_1_RXP/SATA30_1 _RXP	AI		RK3588	J33	PCIE20_1_RXP/SATA30_1_RXP
41(J4)	GPIO1_B7	I/O	1.8V	RK3588	E27	MIPI_CAMERA2_CLK_M0/SPDIF1_TX_M0/PCIE30 X2_PERSTN_M3/HDMI_RX_CEC_M2/SATA2_ACT_ LED_M1/I2C5_SDA_M3/UART1_RX_M1/PWM13_ M2/GPIO1_B7_u
42(J4)	GND	PI	0V			
43(J4)	GPIO1_A2	I/O	1.8V	RK3588	A26	VOP_POST_EMPTY/I2C4_SDA_M3/UART6_RTSN_ M1/PWM0_M2/SPI4_CLK_M2/GPIO1_A2_d
44(J4)	ETH1_REFCLKO_25M	I/O		RK3588	AH27	ETH1_REFCLKO_25M/MIPI_CAMERA1_CLK_M1/I2 C4_SCL_M0/GPIO3_A6_d
45(J4)	GPIO1_A5	I/O	1.8V	RK3588	B26	HDMI_TX0_HPD_M0/SPI2_MOSI_M0/GPIO1_A5_d
46(J4)	GMAC1_RXD2	I/O		RK3588	AD27	GMAC1_RXD2/SDIO_D2_M1/I2S3_LRCK/AUDDSM _LP/FSPI_D2_M2/UART8_TX_M1/SPI4_CLK_M1/G PIO3_A2_u
47(J4)	GPIO1_A3	I/O	1.8V	RK3588	A27	HDMI_TX1_SDA_M2/I2C4_SCL_M3/UART6_CTSN _M1/PWM1_M2/SPI4_CS0_M2/GPIO1_A3_d
48(J4)	GMAC1_RXDV_CRS	I/O		RK3588	AH29	GMAC1_RXDV_CRS/MIPI_CAMERA4_CLK_M1/UA RT2_TX_M2/PWM2_M1/GPIO3_B1_d
49(J4)	GPIO1_B0	I/O	1.8V	RK3588	C27	PDM1_SDI1_M1/PCIE30X4_CLKREQN_M3/SPI2_C S1_M0/GPIO1_B0_u
50(J4)	GMAC1_RXCLK	I/O		RK3588	AH30	GMAC1_RXCLK/SDIO_CLK_M1/MIPI_CAMERA0_C LK_M1/FSPI_CLK_M2/I2C4_SDA_M0/UART8_CTS N_M1/GPIO3_A5_d
51(J4)	GND	PI	0V			
52(J4)	GMAC1_RXD3	I/O		RK3588	AE27	GMAC1_RXD3/SDIO_D3_M1/I2S3_SDO/AUDDSM_ RN/FSPI_D3_M2/UART8_RX_M1/SPI4_CS0_M1/G PIO3_A3_u
53(J4)	PCIE30_PORT1_REFCLKP_ IN	AI		RK3588	A28	PCIE30_PORT1_REF_CLKP
54(J4)	GMAC1_RXD0	I/O		RK3588	AG29	GMAC1_RXD0/MIPI_CAMERA2_CLK_M1/PWM8_ M0/GPIO3_A7_u
55(J4)	PCIE30_PORT1_REFCLKN _IN	AI		RK3588	B28	PCIE30_PORT1_REF_CLKN
56(J4)	GMAC1_RXD1	I/O		RK3588	AG28	GMAC1_RXD1/MIPI_CAMERA3_CLK_M1/PWM9_ M0/GPIO3_B0_u
57(J4)	GND	PI	0V			
58(J4)	GND	PI	0V			
59(J4)	PCIE30_PORT1_TX3N	AO		RK3588	B29	PCIE30_PORT1_TX1N
60(J4)	GPIO1_C6	I/O	1.8V	RK3588	D29	PDM0_CLK0_M0/I2C4_SDA_M4/PWM15_IR_M2/G PIO1_C6_d
61(J4)	PCIE30_PORT1_TX3P	AO		RK3588	C29	PCIE30_PORT1_TX1P
62(J4)	GPIO1_C5	I/O	1.8V	RK3588	D30	I2S0_LRCK/I2C2_SCL_M3/UART4_RTSN/GPIO1_C 5_d
63(J4)	GND	PI	0V			
64(J4)	GPIO1_C3	I/O	1.8V	RK3588	E31	I2S0_SCLK/I2C6_SCL_M1/UART3_CTSN/PWM7_I R_M2/SPI4_CS0_M0/GPIO1_C3_d
65(J4)	PCIE30_PORT1_TX2N	AO		RK3588	A30	PCIE30_PORT1_TX0N
66(J4)	GPIO1_C4	I/O	1.8V	RK3588	E30	PDM0_CLK1_M0/I2C2_SDA_M3/PWM11_IR_M2/S PI4_CS1_M0/GPIO1_C4_d
67(J4)	PCIE30_PORT1_TX2P	AO		RK3588	B30	PCIE30_PORT1_TX0P
68(J4)	GPIO1_C7	I/O	1.8V	RK3588	E29	I2S0_SDO0/I2C4_SCL_M4/UART4_CTSN/GPIO1_C 7_d
69(J4)	GND	PI	0V			
70(J4)	GND	PI	0V			

71(J4)	PCIE20_2_TXN	AO		RK3588	H29	PCIE20_2_TXN/SATA30_2_TXN/USB30_2_SSTXN
72(J4)	PCIE20_2_RXP	AI		RK3588	J31	PCIE20_2_RXP/SATA30_2_RXP/USB30_2_SSRXP
73(J4)	PCIE20_2_TXP	AO		RK3588	H30	PCIE20_2_TXP/SATA30_2_TXP/USB30_2_SSTXP
74(J4)	PCIE20_2_RXN	AI		RK3588	J30	PCIE20_2_RXN/SATA30_2_RXN/USB30_2_SSRXN
75(J4)	GND	PI	0V			
76(J4)	GND	PI	0V			
77(J4)	PCIE20_0_REFCLKP	AI/O		RK3588	L32	PCIE20_0_REFCLKP
78(J4)	GPIO4_A0	I/O	3.3V	RK3588	AK30	CIF_D0/BT1120_D0/I2S1_MCLK_M0/PCIE30X1_1_ CLKREQN_M1/UART9_RTSN_M1/SPI0_MISO_M1/ GPIO4_A0_d
79(J4)	PCIE20_0_REFCLKN	AI/O		RK3588	L33	PCIE20_0_REFCLKN
80(J4)	GPIO4_A1	I/O	3.3V	RK3588	AL30	CIF_D1/BT1120_D1/I2S1_SCLK_M0/PCIE30X1_1_ WAKEN_M1/UART9_CTSN_M1/SPI0_MOSI_M1/GP IO4_A1_d
81(J4)	GND	PI	0V			
82(J4)	GPIO4_A5	I/O	3.3V	RK3588	AK27	CIF_D5/BT1120_D5/I2S1_SDI0_M0/PCIE30X1_0_P ERSTN_M1/I2C3_SDA_M2/UART3_TX_M2/SPI2_M OSI_M1/GPIO4_A5_d
83(J4)	GPIO2_B4	I/O	1.8V	RK3588	AB31	GMAC0_PTP_REFCLK/FSPI_CS0N_M1/HDMI_TX1 _SDA_M0/I2C4_SDA_M1/UART7_RX_M0/GPIO2_B 4_u
84(J4)	PWRON_L	I				
85(J4)	GPIO2_A6	I/O	1.8V	RK3588	AC32	GMAC0_RXD2/SDIO_D0_M0/FSPI_D0_M1/UART6 _RX_M0/GPIO2_A6_u
86(J4)	RESET_L	I		RK3588	M31	NPOR
87(J4)	GPIO2_A7	I/O	1.8V	RK3588	AC31	GMAC0_RXD3/SDIO_D1_M0/FSPI_D1_M1/UART6 _TX_M0/GPIO2_A7_u
88(J4)	GPIO4_A3	I/O	3.3V	RK3588	AL29	CIF_D3/BT1120_D3/PCIE30X1_0_CLKREQN_M1/U ART0_TX_M2/GPIO4_A3_d
89(J4)	GPIO2_C1	I/O	1.8V	RK3588	AD32	GMAC0_RXD0/I2C2_SCL_M1/UART1_CTSN_M0/S PI1_MISO_M0/GPIO2_C1_d
90(J4)	GPIO4_A2	I/O	3.3V	RK3588	AM29	CIF_D2/BT1120_D2/I2S1_LRCK_M0/PCIE30X1_1_ PERSTN_M1/SPI0_CLK_M1/GPIO4_A2_d
91(J4)	GPIO2_C5	I/O	1.8V	RK3588	AE30	CLK32K_OUT1/GPIO2_C5_d
92(J4)	GPIO4_A4	I/O	3.3V	RK3588	AL28	CIF_D4/BT1120_D4/PCIE30X1_0_WAKEN_M1/I2C 3_SCL_M2/UART0_RX_M2/SPI2_MISO_M1/GPIO4 _A4_d
93(J4)	GPIO2_C3	I/O	1.8V	RK3588	AD30	ETH0_REFCLKO_25M/I2S2_SDI_M0/I2C6_SCL_M 2/SPI1_CS0_M0/GPIO2_C3_d
94(J4)	GPIO4_A6	I/O	3.3V	RK3588	AL27	CIF_D6/BT1120_D6/I2S1_SDI1_M0/PCIE30X2_CL KREQN_M1/I2C5_SCL_M2/UART3_RX_M2/SPI2_C LK_M1/GPIO4_A6_d
95(J4)	GPIO2_B5	I/O	1.8V	RK3588	AB30	GMAC0_PPSTRIG/FSPI_CS1N_M1/HDMI_TX1_SC L_M0/I2C4_SCL_M1/UART7_TX_M0/GPIO2_B5_u
96(J4)	GPIO4_A7	I/O	3.3V	RK3588	AM27	CIF_D7/BT1120_D7/I2S1_SDI2_M0/PCIE30X2_WA KEN_M1/I2C5_SDA_M2/SPI2_CS0_M1/GPIO4_A7 _d
97(J4)	GPIO3_B2	I/O	3.3V	RK3588	AE28	GMAC1_TXER/I2S2_SDI_M1/UART2_RX_M2/PWM 3_IR_M1/GPIO3_B2_d
98(J4)	GPIO4_B0	I/O	3.3V	RK3588	AK26	CIF_CLKIN/BT1120_CLKOUT/I2S1_SDI3_M0/PCIE3 0X2_PERSTN_M1/I2C6_SDA_M3/UART8_TX_M0/ SPI2_CS1_M1/GPIO4_B0_d
99(J4)	GPIO4_C5	I/O	3.3V	RK3588	AB33	GMAC0_MDIO/I2C0_SCL_M1/UART9_CTSN_M0/P WM6_M2/SPI3_MOSI_M0/GPIO4_C5_d
100(J4)	GND	PI	0V			

Table 3: J5 Connector Interface Pin Definition

Pin Number	Signal Name	Signal Type	IO Voltage	Main IC	IC Pin Number	IC Pin Name
1(J5)	GND	PI	0V			
2(J5)	GND	PI	0V			
3(J5)	MIPI_DPHY0_RX_D1P	AI		RK3588	AN30	MIPI_DPHY0_RX_D1P/MIPI_CPHY0_RX_TRIO1_A

4(J5)	MIPI_DPHY0_RX_D2P	AI		RK3588	AN33	MIPI_DPHY0_RX_D2P/MIPI_CPHY0_RX_TRIO2_B
5(J5)	MIPI_DPHY0_RX_D1N	AI		RK3588	AP30	MIPI_DPHY0_RX_D1N/MIPI_CPHY0_RX_TRIO0_C
6(J5)	MIPI_DPHY0_RX_D2N	AI		RK3588	AP32	MIPI_DPHY0_RX_D2N/MIPI_CPHY0_RX_Trio2_A
7(J5)	GND	PI	0V			
8(J5)	GND	PI	0V			
9(J5)	MIPI_DPHY0_RX_D0P	AI		RK3588	AN29	MIPI_DPHY0_RX_D0P/MIPI_CPHY0_RX_TRIO0_B
10(J5)	MIPI_DPHY0_RX_CLKP	AI		RK3588	AN32	MIPI_DPHY0_RX_CLKP/MIPI_CPHY0_RX_TRIO1_ C
11(J5)	MIPI_DPHY0_RX_D0N	AI		RK3588	AP29	MIPI_DPHY0_RX_D0N/MIPI_CPHY0_RX_TRIO0_A
12(J5)	MIPI_DPHY0_RX_CLKN	AI		RK3588	AP31	MIPI_DPHY0_RX_CLKN/MIPI_CPHY0_RX_TRIO1_ B
13(J5)	GND	PI	0V			
14(J5)	GND	PI	0V			
15(J5)	MIPI_DPHY0_TX_D2N	AO		RK3588	AP27	MIPI_DPHY0_TX_D2N/MIPI_CPHY0_TX_TRIO2_A
16(J5)	MIPI_DPHY0_TX_D3P	AO		RK3588	AN28	MIPI_DPHY0_TX_D3P/NO_USE
17(J5)	MIPI_DPHY0_TX_D2P	AO		RK3588	AN27	MIPI_DPHY0_TX_D2P/MIPI_CPHY0_TX_TRIO2_B
18(J5)	MIPI_DPHY0_TX_D3N	AO		RK3588	AP28	MIPI_DPHY0_TX_D3N/MIPI_CPHY0_TX_TRIO2_C
19(J5)	GND	PI	0V			
20(J5)	GND	PI	0V			
21(J5)	MIPI_DPHY0_TX_CLKP	AO		RK3588	AN26	MIPI_DPHY0_TX_CLKP/MIPI_CPHY0_TX_TRIO1_C
22(J5)	GPIO4_B4	GPIO	3.3V	RK3588	AL26	CIF_CLKOUT/BT1120_D10/I2S1_SDO3_M0/PCIE30 X4_CLKREQN_M1/DP0_HPDIN_M0/SPDIF0_TX_M 1/UART9_TX_M1/PWM11_IR_M1/GPIO4_B4_u
23(J5)	MIPI_DPHY0_TX_CLKN	AO		RK3588	AP26	MIPI_DPHY0_TX_CLKN/MIPI_CPHY0_TX_TRIO1_ B
24(J5)	GPIO4_B2	GPIO	3.3V	RK3588	AK25	CIF_HREF/BT1120_D8/I2S1_SDO1_M0/PCIE30X1_ 1_BUTTON_RSTN/I2C7_SCL_M3/UART8_RTSN_M 0/PWM14_M1/SPI0_CS0_M1/CAN1_RX_M1/GPIO4 _B2_u
25(J5)	GND	PI	0V			
26(J5)	GPIO4_B3	GPIO	3.3V	RK3588	AM25	CIF_VSYNC/BT1120_D9/I2S1_SDO2_M0/PCIE20X1 _2_BUTTON_RSTN/I2C7_SDA_M3/UART8_CTSN_ M0/PWM15_IR_M1/CAN1_TX_M1/GPIO4_B3_u
27(J5)	MIPI_DPHY0_TX_D1P	AO		RK3588	AN25	MIPI_DPHY0_TX_D1P/MIPI_CPHY0_TX_TRIO1_A
28(J5)	GPIO4_B1	GPIO	3.3V	RK3588	AL24	MIPI_CAMERA0_CLK_M0/SPDIF1_TX_M1/I2S1_S DO0_M0/PCIE30X1_0_BUTTON_RSTN/SATA2_AC T_LED_M0/I2C6_SCL_M3/UART8_RX_M0/SPI0_C S1_M1/GPIO4_B1_u
29(J5)	MIPI_DPHY0_TX_D1N	AO		RK3588	AP25	MIPI_DPHY0_TX_D1N/MIPI_CPHY0_TX_TRIO0_C
30(J5)	GPIO4_C1	GPIO	3.3V	RK3588	AK24	BT1120_D15/SPDIF1_TX_M2/PCIE20X1_2_PERST N_M1/HDMI_TX0_CEC_M0/I2C8_SDA_M3/PWM6_ M1/SPI3_CS1_M1/GPIO4_C1_d
31(J5)	GND	PI	0V			
32(J5)	GND	PI	0V			
33(J5)	MIPI_DPHY0_TX_D0P	AO		RK3588	AN24	MIPI_DPHY0_TX_D0P/MIPI_CPHY0_TX_TRIO0_B
34(J5)	MIPI_DPHY1_TX_D3N	AO		RK3588	AP22	MIPI_DPHY1_TX_D3N/MIPI_CPHY1_TX_TRIO2_C
35(J5)	MIPI_DPHY0_TX_D0N	AO		RK3588	AP24	MIPI_DPHY0_TX_D0N/MIPI_CPHY0_TX_TRIO0_A
36(J5)	MIPI_DPHY1_TX_D3P	AO		RK3588	AN22	MIPI_DPHY1_TX_D3P/NO_USE
37(J5)	GND	PI	0V			
38(J5)	GND	PI	0V			
39(J5)	MIPI_DPHY1_TX_D2P	AO		RK3588	AN21	MIPI_DPHY1_TX_D2P/MIPI_CPHY1_TX_TRIO2_B
40(J5)	MIPI_DPHY1_TX_CLKN	AO		RK3588	AP20	MIPI_DPHY1_TX_CLKN/MIPI_CPHY1_TX_TRIO1_ B
41(J5)	MIPI_DPHY1_TX_D2N	AO		RK3588	AP21	MIPI_DPHY1_TX_D2N/MIPI_CPHY1_TX_TRIO2_A
42(J5)	MIPI_DPHY1_TX_CLKP	AO		RK3588	AN20	MIPI_DPHY1_TX_CLKP/MIPI_CPHY1_TX_TRIO1_C
43(J5)	GND	PI	0V			

44(J5)	GND	PI	0V			
45(J5)	MIPI_DPHY1_TX_D1N	AO		RK3588	AP19	MIPI_DPHY1_TX_D1N/MIPI_CPHY1_TX_TRIO0_C
46(J5)	MIPI_DPHY1_TX_D0N	AO		RK3588	AP18	MIPI_DPHY1_TX_D0N/MIPI_CPHY1_TX_TRIO0_A
47(J5)	MIPI_DPHY1_TX_D1P	AO		RK3588	AN19	MIPI_DPHY1_TX_D1P/MIPI_CPHY1_TX_TRIO1_A
48(J5)	MIPI_DPHY1_TX_D0P	AO		RK3588	AN18	MIPI_DPHY1_TX_D0P/MIPI_CPHY1_TX_TRIO0_B
49(J5)	GND	PI	0V			
50(J5)	GND	PI	0V			
51(J5)	TYPEC0_SSTX2P/DP0_TX 3P	AO		RK3588	AP16	TYPEC0_SSTX2P/DP0_TX3P
52(J5)	TYPEC0_SSRX2P/DP0_TX 2P	AI/O		RK3588	AN15	TYPEC0_SSRX2P/DP0_TX2P
53(J5)	TYPEC0_SSTX2N/DP0_TX 3N	AO		RK3588	AN16	TYPEC0_SSTX2N/DP0_TX3N
54(J5)	TYPEC0_SSRX2N/DP0_TX 2N	AI/O		RK3588	AP15	TYPEC0_SSRX2N/DP0_TX2N
55(J5)	GND	PI	0V			
56(J5)	GND	PI	0V			
57(J5)	TYPEC1_SSRX2P/DP1_TX 2P	AI/O		RK3588	AN10	TYPEC1_SSRX2P/DP1_TX2P
58(J5)	TYPEC0_SSTX1N/DP0_TX 1N	AO		RK3588	AN14	TYPEC0_SSTX1N/DP0_TX1N
59(J5)	TYPEC1_SSRX2N/DP1_TX 2N	AI/O		RK3588	AP10	TYPEC1_SSRX2N/DP1_TX2N
60(J5)	TYPEC0_SSTX1P/DP0_TX 1P	AO		RK3588	AP14	TYPEC0_SSTX1P/DP0_TX1P
61(J5)	GND	PI	0V			
62(J5)	GND	PI	0V			
63(J5)	TYPEC1_SSTX1P/DP1_TX 1P	AO		RK3588	AP9	TYPEC1_SSTX1P/DP1_TX1P
64(J5)	TYPEC0_SSRX1P/DP0_TX 0P	AI/O		RK3588	AN13	TYPEC0_SSRX1P/DP0_TX0P
65(J5)	TYPEC1_SSTX1N/DP1_TX 1N	AO		RK3588	AN9	TYPEC1_SSTX1N/DP1_TX1N
66(J5)	TYPEC0_SSRX1N/DP0_TX 0N	AI/O		RK3588	AP13	TYPEC0_SSRX1N/DP0_TX0N
67(J5)	GND	PI	0V			
68(J5)	GND	PI	0V			
69(J5)	TYPEC1_SSRX1N/DP1_TX 0N	AI/O		RK3588	AP8	TYPEC1_SSRX1N/DP1_TX0N
70(J5)	TYPEC1_SSTX2P/DP1_TX 3P	AO		RK3588	AP11	TYPEC1_SSTX2P/DP1_TX3P
71(J5)	TYPEC1_SSRX1P/DP1_TX 0P	AI/O		RK3588	AN8	TYPEC1_SSRX1P/DP1_TX0P
72(J5)	TYPEC1_SSTX2N/DP1_TX 3N	AO		RK3588	AN11	TYPEC1_SSTX2N/DP1_TX3N
73(J5)	GND	PI	0V			
74(J5)	GND	PI	0V			
75(J5)	HDMI1_TX2P_PORT/EDP1 _TX_D2P	AO		RK3588	AN6	HDMI_TX1_D2P/EDP_TX1_D2P
76(J5)	TYPEC1_SBU2/DP1_AUXN	AI/O		RK3588	AM10	TYPEC1_SBU2/DP1_AUXN
77(J5)	HDMI1_TX2N_PORT/EDP1 _TX_D2N	AO		RK3588	AP6	HDMI_TX1_D2N/EDP_TX1_D2N
78(J5)	TYPEC1_SBU1/DP1_AUXP	AI/O		RK3588	AL10	TYPEC1_SBU1/DP1_AUXP
79(J5)	GND	PI	0V			
80(J5)	GND	PI	0V			
81(J5)	HDMI1_TX1P_PORT/EDP1 _TX_D1P	AO		RK3588	AM5	HDMI_TX1_D1P/EDP_TX1_D1P
82(J5)	TYPEC1_OTG_DM	AI/O		RK3588	AL9	TYPEC1_USB20_OTG_DM
83(J5)	HDMI1_TX1N_PORT/EDP1 _TX_D1N	AO		RK3588	AN5	HDMI_TX1_D1N/EDP_TX1_D1N
84(J5)	TYPEC1_OTG_DP	AI/O		RK3588	AK9	TYPEC1_USB20_OTG_DP
85(J5)	GND	PI	0V			
86(J5)	GND	PI	0V			

87(J5)	HDMI1_TX0P_PORT/EDP1 _TX_D0P	AO		RK3588	AN4	HDMI_TX1_D0P/EDP_TX1_D0P
88(J5)	TYPEC0_SBU2/DP0_AUXN	AI/O		RK3588	AM15	TYPEC0_SBU2/DP0_AUXN
89(J5)	HDMI1_TX0N_PORT/EDP1 _TX_D0N	AO		RK3588	AP4	HDMI_TX1_D0N/EDP_TX1_D0N
90(J5)	TYPEC0_SBU1/DP0_AUXP	AI/O		RK3588	AL15	TYPEC0_SBU1/DP0_AUXP
91(J5)	GND	PI	0V			
92(J5)	GND	PI	0V			
93(J5)	HDMI1_TX3P_PORT/EDP1 _TX_D3P	AO		RK3588	AM3	HDMI_TX1_D3P/EDP_TX1_D3P
94(J5)	TYPEC0_OTG_DP	AI/O		RK3588	AL12	TYPEC0_USB20_OTG_DP
95(J5)	HDMI1_TX3N_PORT/EDP1 _TX_D3N	AO		RK3588	AN3	HDMI_TX1_D3N/EDP_TX1_D3N
96(J5)	TYPEC0_OTG_DM	AI/O		RK3588	AM12	TYPEC0_USB20_OTG_DM
97(J5)	GND	PI	0V			
98(J5)	GND	PI	0V			
99(J5)	GPIO4_B5	GPIO	3.3V	RK3588	AJ26	BT1120_D11/PCIE30X4_WAKEN_M1/HDMI_RX_C EC_M0/SATA1_ACT_LED_M0/UART9_RX_M1/PW M12_M1/SPI3_MISO_M1/GPIO4_B5_d
100(J5)	GPIO4_C0	GPIO	3.3V	RK3588	AJ25	BT1120_D14/PCIE20X1_2_WAKEN_M1/HDMI_TX0 _SDA_M0/I2C8_SCL_M3/SPI3_CS0_M1/GPIO4_C0 _u

Table 4: J6 Connector Interface Pin Definition

Pin Number	Signal Name	Signal Type	IO Voltage	Main IC	IC Pin Number	IC Pin Name
1(J6)	GND	PI	0V			
2(J6)	GND	PI	0V			
3(J6)	PCIE30_PORT0_REFCLKN _IN	AI		RK3588	E34	PCIE30_PORT0_REF_CLKN
4(J6)	PCIE20_1_REFCLKP	AI/O		RK3588	H32	PCIE20_1_REFCLKP
5(J6)	PCIE30_PORT0_REFCLKP_ IN	AI		RK3588	E33	PCIE30_PORT0_REF_CLKP
6(J6)	PCIE20_1_REFCLKN	AI/O		RK3588	H33	PCIE20_1_REFCLKN
7(J6)	GND	PI	0V			
8(J6)	GND	PI	0V			
9(J6)	PCIE30_PORT0_TX0P	AO		RK3588	D32	PCIE30_PORT0_TX0P
10(J6)	PCIE20_1_TXN/SATA30_1 _TXN	AO		RK3588	K34	PCIE20_1_TXN/SATA30_1_TXN
11(J6)	PCIE30_PORT0_TX0N	AO		RK3588	D33	PCIE30_PORT0_TX0N
12(J6)	PCIE20_1_TXP/SATA30_1 _TXP	AO		RK3588	K33	PCIE20_1_TXP/SATA30_1_TXP
13(J6)	GND	PI	0V			
14(J6)	GND	PI	0V			
15(J6)	PCIE30_PORT1_RX3N	AI		RK3588	B31	PCIE30_PORT1_RX1N
16(J6)	PCIE20_0_TXP/SATA30_0 _TXP	AO		RK3588	M34	PCIE20_0_TXP/SATA30_0_TXP
17(J6)	PCIE30_PORT1_RX3P	AI		RK3588	C31	PCIE30_PORT1_RX1P
18(J6)	PCIE20_0_TXN/SATA30_0 _TXN	AO		RK3588	M33	PCIE20_0_TXN/SATA30_0_TXN
19(J6)	GND	PI	0V			
20(J6)	GND	PI	0V			
21(J6)	PCIE30_PORT1_RX2P	AI		RK3588	B32	PCIE30_PORT1_RX0P
22(J6)	PCIE20_0_RXN/SATA30_0 _RXN	AI		RK3588	N34	PCIE20_0_RXN/SATA30_0_RXN
23(J6)	PCIE30_PORT1_RX2N	AI		RK3588	A32	PCIE30_PORT1_RX0N
24(J6)	PCIE20_0_RXP/SATA30_0 _RXP	AI		RK3588	N33	PCIE20_0_RXP/SATA30_0_RXP
25(J6)	GND	PI	0V			

26(J6)	GND	PI	0V			
27(J6)	PCIE20_2_REFCLKN	AI/O		RK3588	G30	PCIE20_2_REFCLKN
28(J6)	GPIO0_C2	I/O	1.8V	RK3588	T32	PMIC_SLEEP4/GPIO0_C2_d
29(J6)	PCIE20_2_REFCLKP	AI/O		RK3588	G31	PCIE20_2_REFCLKP
30(J6)	GPIO0_D3	I/O	1.8V	RK3588	U33	LITCPU_AVS/SPI3_CLK_M2/GPIO0_D3_u
31(J6)	GND	PI	0V			
32(J6)	GPIO0_C0	I/O	1.8V	RK3588	T31	PDM0_CLK0_M1/PWM1_M0/I2C2_SDA_M0/CAN0 _RX_M0/SPI0_MOSI_M0/PCIE30X1_0_CLKREQN_ M0/GPIO0_C0_d
33(J6)	GMAC1_MDC	I/O		RK3588	Y31	GMAC1_MDC/MIPI_TE0/I2C8_SCL_M4/UART7_RT SN_M1/PWM14_M0/SPI1_CS0_M1/GPIO3_C2_d
34(J6)	I2C6_SDA_M0	I/O	1.8V	RK3588	V31	I2S1_SDI2_M1/PDM0_SDI0_M1/I2C6_SDA_M0/U ART1_RTSN_M2/PWM6_M0/SPI0_MISO_M0/PCIE 30X4_WAKEN_M0/GPIO0_C7_d
35(J6)	GMAC1_RSTN_L	I/O		RK3588	AA28	GMAC1_PTP_REF_CLK/HDMI_TX1_HPD_M1/I2C3 _SCL_M1/SPI1_MOSI_M1/GPIO3_B7_d
36(J6)	I2C6_SCL_M0	I/O	1.8V	RK3588	W31	I2S1_SDI3_M1/PDM0_SDI1_M1/I2C6_SCL_M0/UA RT1_CTSN_M2/PWM7_IR_M0/SPI3_MISO_M2/PCI E30X4_PERSTN_M0/GPIO0_D0_d
37(J6)	GND	PI	0V			
38(J6)	GND	PI	0V			
39(J6)	GPIO4_C4	I/O	1.8V	RK3588	AB34	GMAC0_MDC/I2C7_SDA_M1/UART9_RTSN_M0/P WM5_M2/SPI3_MISO_M0/GPIO4_C4_d
40(J6)	GMAC1_MDIO	I/O		RK3588	Y30	GMAC1_MDIO/MIPI_TE1/I2C8_SDA_M4/UART7_C TSN_M1/PWM15_IR_M0/SPI1_CS1_M1/GPIO3_C3 _d
41(J6)	GPIO2_B2	I/O	1.8V	RK3588	AC34	GMAC0_TXD3/SDIO_CMD_M0/I2C3_SCL_M3/GPI O2_B2_u
42(J6)	GMAC1_TXD2	I/O		RK3588	AA29	GMAC1_TXD2/SDIO_D0_M1/I2S3_MCLK/FSPI_D0 _M2/I2C6_SDA_M4/PWM10_M0/SPI4_MISO_M1/ GPIO3_A0_u
43(J6)	GPIO2_B1	I/O	1.8V	RK3588	AC33	GMAC0_TXD2/SDIO_D3_M0/FSPI_D3_M1/I2C8_S DA_M1/UART6_CTSN_M0/GPIO2_B1_u
44(J6)	GMAC1_TXD3	I/O		RK3588	AA30	GMAC1_TXD3/SDIO_D1_M1/I2S3_SCLK/AUDDSM _LN/FSPI_D1_M2/I2C6_SCL_M4/PWM11_IR_M0/S PI4_MOSI_M1/GPIO3_A1_u
45(J6)	GPIO2_C0	I/O	1.8V	RK3588	AE34	GMAC0_TXEN/I2S2_LRCK_M0/I2C2_SDA_M1/UAR T1_RTSN_M0/SPI1_CLK_M0/GPIO2_C0_d
46(J6)	GMAC1_TXD0	I/O		RK3588	AC28	GMAC1_TXD0/I2S2_SDO_M1/UART2_RTSN/GPIO3 _B3_u
47(J6)	GPIO2_B6	I/O	1.8V	RK3588	AD33	GMAC0_TXD0/I2S2_MCLK_M0/I2C5_SCL_M4/UA RT1_RX_M0/GPIO2_B6_d
48(J6)	GMAC1_TXD1	I/O		RK3588	AC29	GMAC1_TXD1/I2S2_MCLK_M1/UART2_CTSN/GPI O3_B4_u
49(J6)	GPIO2_B7	I/O	1.8V	RK3588	AD34	GMAC0_TXD1/I2S2_SCLK_M0/I2C5_SDA_M4/UAR T1_TX_M0/GPIO2_B7_d
50(J6)	GMAC1_TXEN	I/O		RK3588	AD29	GMAC1_TXEN/I2S2_SCLK_M1/CAN1_RX_M0/UAR T3_TX_M1/PWM12_M0/GPIO3_B5_u
51(J6)	GPIO2_B3	I/O	1.8V	RK3588	AE33	GMAC0_TXCLK/SDIO_CLK_M0/FSPI_CLK_M1/I2C 3_SDA_M3/GPIO2_B3_d
52(J6)	GMAC1_MCLKINOUT	I/O		RK3588	AE29	GMAC1_MCLKINOUT/I2S2_LRCK_M1/CAN1_TX_ M0/UART3_RX_M1/PWM13_M0/GPIO3_B6_d
53(J6)	GPIO4_C6	I/O	1.8V	RK3588	AF33	GMAC0_TXER/I2C0_SDA_M1/UART7_CTSN_M0/P WM7_IR_M3/SPI3_CLK_M0/GPIO4_C6_d
54(J6)	GMAC1_TXCLK	I/O		RK3588	AD28	GMAC1_TXCLK/SDIO_CMD_M1/I2S3_SDI/AUDDS M_RP/UART8_RTSN_M1/SPI4_CS1_M1/GPIO3_A4 _d
55(J6)	GPIO4_C3	I/O	1.8V	RK3588	AF34	GMAC0_MCLKINOUT/I2S2_SDO_M0/I2C7_SCL_M 1/PWM4_M1/SPI3_CS1_M0/GPIO4_C3_d
56(J6)	GND	PI	0V			
57(J6)	GND	PI	0V			
58(J6)	MIPI_CSI1_RX_D0N	AI		RK3588	AG32	MIPI_CSI1_D0N

59(J6)	MIPI_CSI0_RX_D0P	AI		RK3588	AG33	MIPI_CSI0_D0P
60(J6)	MIPI_CSI1_RX_D0P	AI		RK3588	AG31	MIPI_CSI1_D0P
61(J6)	MIPI_CSI0_RX_D0N	AI		RK3588	AG34	MIPI_CSI0_D0N
62(J6)	GND	PI	0V			
63(J6)	GND	PI	0V			
64(J6)	MIPI_CSI1_RX_D1N	AI		RK3588	AH32	MIPI_CSI1_D1N
65(J6)	MIPI_CSI0_RX_D1N	AI		RK3588	AH34	MIPI_CSI0_D1N
66(J6)	MIPI_CSI1_RX_D1P	AI		RK3588	AH31	MIPI_CSI1_D1P
67(J6)	MIPI_CSI0_RX_D1P	AI		RK3588	AH33	MIPI_CSI0_D1P
68(J6)	GND	PI	0V			
69(J6)	GND	PI	0V			
70(J6)	MIPI_CSI1_RX_CLK0N	AI		RK3588	AJ32	MIPI_CSI1_CLK0N
71(J6)	MIPI_CSI0_RX_CLK0P	AI		RK3588	AJ33	MIPI_CSI0_CLK0P
72(J6)	MIPI_CSI1_RX_CLK0P	AI		RK3588	AJ31	MIPI_CSI1_CLK0P
73(J6)	MIPI_CSI0_RX_CLK0N	AI		RK3588	AJ34	MIPI_CSI0_CLK0N
74(J6)	GND	PI	0V			
75(J6)	GND	PI	0V			
76(J6)	MIPI_CSI1_RX_D2N	AI		RK3588	AK32	MIPI_CSI1_D2N
77(J6)	MIPI_CSI0_RX_D2P	AI		RK3588	AK33	MIPI_CSI0_D2P
78(J6)	MIPI_CSI1_RX_D2P	AI		RK3588	AK31	MIPI_CSI1_D2P
79(J6)	MIPI_CSI0_RX_D2N	AI		RK3588	AK34	MIPI_CSI0_D2N
80(J6)	GND	PI	0V			
81(J6)	GND	PI	0V			
82(J6)	MIPI_CSI1_RX_D3N	AI		RK3588	AL32	MIPI_CSI1_D3N
83(J6)	MIPI_CSI0_RX_D3N	AI		RK3588	AL34	MIPI_CSI0_D3N
84(J6)	MIPI_CSI1_RX_D3P	AI		RK3588	AL31	MIPI_CSI1_D3P
85(J6)	MIPI_CSI0_RX_D3P	AI		RK3588	AL33	MIPI_CSI0_D3P
86(J6)	GND	PI	0V			
87(J6)	GND	PI	0V			
88(J6)	MIPI_CSI1_RX_CLK1N	AI		RK3588	AM32	MIPI_CSI1_CLK1N
89(J6)	MIPI_CSI0_RX_CLK1P	AI		RK3588	AM33	MIPI_CSI0_CLK1P
90(J6)	MIPI_CSI1_RX_CLK1P	AI		RK3588	AM31	MIPI_CSI1_CLK1P
91(J6)	MIPI_CSI0_RX_CLK1N	AI		RK3588	AM34	MIPI_CSI0_CLK1N
92(J6)	GND	PI	0V			
93(J6)	GND	PI	0V			
94(J6)	GPIO2_B0	I/O	1.8V	RK3588	AE32	GMAC0_RXCLK/SDIO_D2_M0/FSPI_D2_M1/I2C8_ SCL_M1/UART6_RTSN_M0/GPIO2_B0_u
95(J6)	MIPI_DPHY0_RX_D3N	AI		RK3588	AP33	MIPI_DPHY0_RX_D3N/MIPI_CPHY0_RX_TRIO2_C
96(J6)	GPIO4_C2	I/O	1.8V	RK3588	AE31	GMAC0_RXDV_CRS/UART7_RTSN_M0/PWM2_M2 /SPI3_CS0_M0/GPIO4_C2_d
97(J6)	MIPI_DPHY0_RX_D3P	AI		RK3588	AN34	MIPI_DPHY0_RX_D3P/NO_USE
98(J6)	GPIO2_C2	I/O	1.8V	RK3588	AD31	GMAC0_RXD1/I2C6_SDA_M2/UART9_TX_M0/SPI1 _MOSI_M0/GPIO2_C2_d
99(J6)	GND	PI	0V			
100(J6)	GPIO2_C4	I/O	1.8V	RK3588	AC30	GMAC0_PPSCLK/TEST_CLKOUT_M1/HDMI_TX1_ CEC_M0/UART9_RX_M0/SPI1_CS1_M0/GPIO2_C4 _d

5 Connecting Main IC RK3588 To Each Device

The main ic RK3588 is connected to 2 IC LPDDR4x, eMMC, PMICs, and board-to-board connector. The connection between main ic RK3588 and each devices on the SoM is shown below.

5.1 Connection Main Ic RK3588 With 2 IC LPDDR4x

The connection between main ic RK3588 and DDR4X IC1 and IC2 is shown in table 5 and table 6.

Table 5: Relationship between main ic RK3588 with DDR4X ic1

Net Name	RK3588 Pin Number	RK3588 Pin Name	DDR4X Pin Number IC1	DDR4X Pin Name IC1
DDR_CH0_A0_A	T7	DDR_CH0_A0_A	H2	CA0_A
DDR_CH0_A0_B	M8	DDR_CH0_A0_B	R2	CA0_B
DDR_CH0_A1_A	T8	DDR_CH0_A1_A	J2	CA1_A
DDR_CH0_A1_B	M5	DDR_CH0_A1_B	P2	CA1_B
DDR_CH0_A2_A	P4	DDR_CH0_A2_A	H9	CA2_A
DDR_CH0_A2_B	N5	DDR_CH0_A2_B	R9	CA2_B
DDR_CH0_A3_A	P5	DDR_CH0_A3_A	H10	CA3_A
DDR_CH0_A3_B	N4	DDR_CH0_A3_B	R10	CA3_B
DDR_CH0_A4_A	R1	DDR_CH0_A4_A	H11	CA4_A
DDR_CH0_A4_B	K1	DDR_CH0_A4_B	R11	CA4_B
DDR_CH0_A5_A	P2	DDR_CH0_A5_A	J11	CA5_A
DDR_CH0_A5_B	L2	DDR_CH0_A5_B	P11	CA5_B
DDR_CH0_CLKN_A	N1	DDR_CH0_CKB_A	J9	CK_C_A
DDR_CH0_CLKN_B	M1	DDR_CH0_CKB_B	P9	CK_C_B
DDR_CH0_CLKP_A	N2	DDR_CH0_CK_A	J8	CK_T_A
DDR_CH0_CLKP_B	M2	DDR_CH0_CK_B	P8	CK_T_B
DDR_CH0_DM0_A	Y4	DDR_CH0_DM0_A	C3	DMI0_A
DDR_CH0_DM0_B	G4	DDR_CH0_DM0_B	Y3	DMI0_B
DDR_CH0_DM1_A	AB4	DDR_CH0_DM1_A	C10	DMI1_A
DDR_CH0_DM1_B	E4	DDR_CH0_DM1_B	Y10	DMI1_B
DDR_CH0_DQ0_A	U1	DDR_CH0_DQ0_A	B2	DQ0_A
DDR_CH0_DQ0_B	H1	DDR_CH0_DQ0_B	AA2	DQ0_B
DDR_CH0_DQ1_A	T2	DDR_CH0_DQ1_A	C2	DQ1_A
DDR_CH0_DQ1_B	J2	DDR_CH0_DQ1_B	Y2	DQ1_B
DDR_CH0_DQ10_A	AC1	DDR_CH0_DQ10_A	E11	DQ10_A
DDR_CH0_DQ10_B	C2	DDR_CH0_DQ10_B	V11	DQ10_B
DDR_CH0_DQ11_A	AC2	DDR_CH0_DQ11_A	F11	DQ11_A
DDR_CH0_DQ11_B	B1	DDR_CH0_DQ11_B	U11	DQ11_B
DDR_CH0_DQ12_A	Y1	DDR_CH0_DQ12_A	F9	DQ12_A
DDR_CH0_DQ12_B	F2	DDR_CH0_DQ12_B	U9	DQ12_B
DDR_CH0_DQ13_A	Y2	DDR_CH0_DQ13_A	E9	DQ13_A
DDR_CH0_DQ13_B	E1	DDR_CH0_DQ13_B	V9	DQ13_B
DDR_CH0_DQ14_A	AA1	DDR_CH0_DQ14_A	C9	DQ14_A
DDR_CH0_DQ14_B	E2	DDR_CH0_DQ14_B	Y9	DQ14_B
DDR_CH0_DQ15_A	AA2	DDR_CH0_DQ15_A	B9	DQ15_A
DDR_CH0_DQ15_B	D1	DDR_CH0_DQ15_B	AA9	DQ15_B
DDR_CH0_DQ2_A	T1	DDR_CH0_DQ2_A	E2	DQ2_A
DDR_CH0_DQ2_B	J1	DDR_CH0_DQ2_B	V2	DQ2_B
DDR_CH0_DQ3_A	R2	DDR_CH0_DQ3_A	F2	DQ3_A

DDR_CH0_DQ3_B	K2	DDR_CH0_DQ3_B	U2	DQ3_B
DDR_CH0_DQ4_A	W1	DDR_CH0_DQ4_A	F4	DQ4_A
DDR_CH0_DQ4_B	F1	DDR_CH0_DQ4_B	U4	DQ4_B
DDR_CH0_DQ5_A	V2	DDR_CH0_DQ5_A	E4	DQ5_A
DDR_CH0_DQ5_B	G2	DDR_CH0_DQ5_B	V4	DQ5_B
DDR_CH0_DQ6_A	V1	DDR_CH0_DQ6_A	C4	DQ6_A
DDR_CH0_DQ6_B	G1	DDR_CH0_DQ6_B	Y4	DQ6_B
DDR_CH0_DQ7_A	U2	DDR_CH0_DQ7_A	B4	DQ7_A
DDR_CH0_DQ7_B	H2	DDR_CH0_DQ7_B	AA4	DQ7_B
DDR_CH0_DQ8_A	AB2	DDR_CH0_DQ8_A	B11	DQ8_A
DDR_CH0_DQ8_B	D2	DDR_CH0_DQ8_B	AA11	DQ8_B
DDR_CH0_DQ9_A	AB1	DDR_CH0_DQ9_A	C11	DQ9_A
DDR_CH0_DQ9_B	C1	DDR_CH0_DQ9_B	Y11	DQ9_B
DDR_CH0_DQS0N_A	U4	DDR_CH0_DQS0N_A	E3	DQS0_C_A
DDR_CH0_DQS0N_B	J7	DDR_CH0_DQS0N_B	V3	DQS0_C_B
DDR_CH0_DQS0P_A	U5	DDR_CH0_DQS0P_A	D3	DQS0_T_A
DDR_CH0_DQS0P_B	J8	DDR_CH0_DQS0P_B	W3	DQS0_T_B
DDR_CH0_DQS1N_A	AA4	DDR_CH0_DQS1N_A	E10	DQS1_C_A
DDR_CH0_DQS1N_B	F4	DDR_CH0_DQS1N_B	V10	DQS1_C_B
DDR_CH0_DQS1P_A	AA5	DDR_CH0_DQS1P_A	D10	DQS1_T_A
DDR_CH0_DQS1P_B	F5	DDR_CH0_DQS1P_B	W10	DQS1_T_B
DDR_CH0_LP4/4X_CKE0/LP5_CS0_A	P7	DDR_CH0_LP4/4X_CKE0/LP5_CS0_A	J4	CKE0_A
DDR_CH0_LP4/4X_CKE0/LP5_CS0_B	L5	DDR_CH0_LP4/4X_CKE0/LP5_CS0_B	P4	CKE0_B
DDR_CH0_LP4/4X_CKE1/LP5_CS1_A	N7	DDR_CH0_LP4/4X_CKE1/LP5_CS1_A	J5	CKE1_A
DDR_CH0_LP4/4X_CKE1/LP5_CS1_B	L4	DDR_CH0_LP4/4X_CKE1/LP5_CS1_B	P5	CKE1_B
DDR_CH0_LP4/4X_CS0_A	R6	DDR_CH0_LP4/4X_CS0_A	H4	CS0_A
DDR_CH0_LP4/4X_CS0_B	L7	DDR_CH0_LP4/4X_CS0_B	R4	CS0_B
DDR_CH0_LP4/4X_CS1_A	R7	DDR_CH0_LP4/4X_CS1_A	H3	CS1_A
DDR_CH0_LP4/4X_CS1_B	L8	DDR_CH0_LP4/4X_CS1_B	R3	CS1_B
DDR_RESET	T4	DDR_CH0_RESET_A	T11	RESET_N

Table 6: Relationship between main ic RK3588 with DDR4X ic2

Net Name	RK3588 Pin Number	RK3588 Pin Name	DDR4X Pin Number IC2	DDR4X Pin Name IC2
DDR_CH1_A0_C	G12	DDR_CH1_A0_C	H2	CA0_A
DDR_CH1_A0_D	H15	DDR_CH1_A0_D	R2	CA0_B
DDR_CH1_A1_C	F12	DDR_CH1_A1_C	J2	CA1_A
DDR_CH1_A1_D	G14	DDR_CH1_A1_D	P2	CA1_B
DDR_CH1_A2_C	E13	DDR_CH1_A2_C	H9	CA2_A
DDR_CH1_A2_D	G13	DDR_CH1_A2_D	R9	CA2_B
DDR_CH1_A3_C	D13	DDR_CH1_A3_C	H10	CA3_A
DDR_CH1_A3_D	E14	DDR_CH1_A3_D	R10	CA3_B
DDR_CH1_A4_C	A10	DDR_CH1_A4_C	H11	CA4_A
DDR_CH1_A4_D	A15	DDR_CH1_A4_D	R11	CA4_B
DDR_CH1_A5_C	B11	DDR_CH1_A5_C	J11	CA5_A
DDR_CH1_A5_D	B14	DDR_CH1_A5_D	P11	CA5_B
DDR_CH1_CLKN_C	A12	DDR_CH1_CKB_C	J9	CK_C_A
DDR_CH1_CLKN_D	A13	DDR_CH1_CKB_D	P9	CK_C_B
DDR_CH1_CLKP_C	B12	DDR_CH1_CK_C	J8	CK_T_A

DDR_CH1_CLKP_D	B13	DDR_CH1_CK_D	P8	CK_T_B
DDR_CH1_DM0_C	F8	DDR_CH1_DM0_C	C3	DMI0_A
DDR_CH1_DM0_D	D20	DDR_CH1_DM0_D	Y3	DMI0_B
DDR_CH1_DM1_C	D4	DDR_CH1_DM1_C	C10	DMI1_A
DDR_CH1_DM1_D	D22	DDR_CH1_DM1_D	Y10	DMI1_B
DDR_CH1_DQ0_C	A8	DDR_CH1_DQ0_C	B2	DQ0_A
DDR_CH1_DQ0_D	A17	DDR_CH1_DQ0_D	AA2	DQ0_B
DDR_CH1_DQ1_C	B9	DDR_CH1_DQ1_C	C2	DQ1_A
DDR_CH1_DQ1_D	B16	DDR_CH1_DQ1_D	Y2	DQ1_B
DDR_CH1_DQ10_C	A2	DDR_CH1_DQ10_C	E11	DQ10_A
DDR_CH1_DQ10_D	A23	DDR_CH1_DQ10_D	V11	DQ10_B
DDR_CH1_DQ11_C	B2	DDR_CH1_DQ11_C	F11	DQ11_A
DDR_CH1_DQ11_D	B23	DDR_CH1_DQ11_D	U11	DQ11_B
DDR_CH1_DQ12_C	A5	DDR_CH1_DQ12_C	F9	DQ12_A
DDR_CH1_DQ12_D	A20	DDR_CH1_DQ12_D	U9	DQ12_B
DDR_CH1_DQ13_C	B5	DDR_CH1_DQ13_C	E9	DQ13_A
DDR_CH1_DQ13_D	B20	DDR_CH1_DQ13_D	V9	DQ13_B
DDR_CH1_DQ14_C	A4	DDR_CH1_DQ14_C	C9	DQ14_A
DDR_CH1_DQ14_D	A21	DDR_CH1_DQ14_D	Y9	DQ14_B
DDR_CH1_DQ15_C	B4	DDR_CH1_DQ15_C	B9	DQ15_A
DDR_CH1_DQ15_D	B21	DDR_CH1_DQ15_D	AA9	DQ15_B
DDR_CH1_DQ2_C	A9	DDR_CH1_DQ2_C	E2	DQ2_A
DDR_CH1_DQ2_D	A16	DDR_CH1_DQ2_D	V2	DQ2_B
DDR_CH1_DQ3_C	B10	DDR_CH1_DQ3_C	F2	DQ3_A
DDR_CH1_DQ3_D	B15	DDR_CH1_DQ3_D	U2	DQ3_B
DDR_CH1_DQ4_C	A6	DDR_CH1_DQ4_C	F4	DQ4_A
DDR_CH1_DQ4_D	A19	DDR_CH1_DQ4_D	U4	DQ4_B
DDR_CH1_DQ5_C	B7	DDR_CH1_DQ5_C	E4	DQ5_A
DDR_CH1_DQ5_D	B18	DDR_CH1_DQ5_D	V4	DQ5_B
DDR_CH1_DQ6_C	A7	DDR_CH1_DQ6_C	C4	DQ6_A
DDR_CH1_DQ6_D	A18	DDR_CH1_DQ6_D	Y4	DQ6_B
DDR_CH1_DQ7_C	B8	DDR_CH1_DQ7_C	B4	DQ7_A
DDR_CH1_DQ7_D	B17	DDR_CH1_DQ7_D	AA4	DQ7_B
DDR_CH1_DQ8_C	A3	DDR_CH1_DQ8_C	B11	DQ8_A
DDR_CH1_DQ8_D	A22	DDR_CH1_DQ8_D	AA11	DQ8_B
DDR_CH1_DQ9_C	B3	DDR_CH1_DQ9_C	C11	DQ9_A
DDR_CH1_DQ9_D	B22	DDR_CH1_DQ9_D	Y11	DQ9_B
DDR_CH1_DQS0N_C	D9	DDR_CH1_DQS0N_C	E3	DQS0_C_A
DDR_CH1_DQS0N_D	G16	DDR_CH1_DQS0N_D	V3	DQS0_C_B
DDR_CH1_DQS0P_C	E9	DDR_CH1_DQS0P_C	D3	DQS0_T_A
DDR_CH1_DQS0P_D	H16	DDR_CH1_DQS0P_D	W3	DQS0_T_B
DDR_CH1_DQS1N_C	D5	DDR_CH1_DQS1N_C	E10	DQS1_C_A
DDR_CH1_DQS1N_D	E21	DDR_CH1_DQS1N_D	V10	DQS1_C_B
DDR_CH1_DQS1P_C	E5	DDR_CH1_DQS1P_C	D10	DQS1_T_A
DDR_CH1_DQS1P_D	D21	DDR_CH1_DQS1P_D	W10	DQS1_T_B
DDR_CH1_LP4/4X_CKE0/LP5_CS0_C	D11	DDR_CH1_LP4/4X_CKE0/LP5_CS0_C	J4	CKE0_A
DDR_CH1_LP4/4X_CKE0/LP5_CS0_D	D16	DDR_CH1_LP4/4X_CKE0/LP5_CS0_D	P4	CKE0_B
DDR_CH1_LP4/4X_CKE1/LP5_CS1_C	E11	DDR_CH1_LP4/4X_CKE1/LP5_CS1_C	J5	CKE1_A

DDR_CH1_LP4/4X_CKE1/LP5_CS1_D	E16	DDR_CH1_LP4/4X_CKE1/LP5_CS1_D	P5	CKE1_B
DDR_CH1_LP4/4X_CS0_C	G11	DDR_CH1_LP4/4X_CS0_C	H4	CS0_A
DDR_CH1_LP4/4X_CS0_D	E19	DDR_CH1_LP4/4X_CS0_D	R4	CS0_B
DDR_CH1_LP4/4X_CS1_C	H11	DDR_CH1_LP4/4X_CS1_C	H3	CS1_A
DDR_CH1_LP4/4X_CS1_D	D19	DDR_CH1_LP4/4X_CS1_D	R3	CS1_B
DDR_RESET	T4	DDR_CH0_RESET_A	T11	RESET_N

5.2 Connection Main Ic RK3588 With EMMC

The connection between main ic RK3588 with eMMC IC is shown in table 7

Table 7: Relationship between main ic RK3588 with eMMC

Net Name	RK3588 Pin Number	RK3588 Pin Name	EMMC Pin Number	EMMC Pin Name
EMMC_CLKOUT	V34	EMMC_CLKOUT/GPIO2_A1_d	U16.M6	CLK
EMMC_CMD	W34	EMMC_CMD/FSPI_CLK_M0/GPIO2_A0_u	U16.M5	CMD
EMMC_D0	Y33	EMMC_D0/FSPI_D0_M0/GPIO2_D0_u	U16.A3	DATA0
EMMC_D1	W33	EMMC_D1/FSPI_D1_M0/GPIO2_D1_u	U16.A4	DATA1
EMMC_D2	V32	EMMC_D2/FSPI_D2_M0/GPIO2_D2_u	U16.A5	DATA2
EMMC_D3	AA33	EMMC_D3/FSPI_D3_M0/GPIO2_D3_u	U16.B2	DATA3
EMMC_D4	Y32	EMMC_D4/I2C1_SCL_M3/UART5_RX_M2/GPIO2_D4_u	U16.B3	DATA4
EMMC_D5	AA32	EMMC_D5/I2C1_SDA_M3/UART5_TX_M2/GPIO2_D5_u	U16.B4	DATA5
EMMC_D6	W32	EMMC_D6/FSPI_CS0N_M0/GPIO2_D6_u	U16.B5	DATA6
EMMC_D7	V33	EMMC_D7/FSPI_CS1N_M0/GPIO2_D7_u	U16.B6	DATA7
EMMC_DATA_STROBE	Y34	EMMC_DATA_STROBE/I2C2_SDA_M2/UART5_CTSN_M1/GPI O2_A2_d	U16.H5	DATASTROBE
EMMC_RSTN	AA34	EMMC_RSTN/I2C2_SCL_M2/UART5_RTSN_M1/GPIO2_A3_d	U16.K5	RST_N

5.3 Connection Main Ic RK3588 With PMIC

The connection between main ic RK3588 with PMIC is shown in table 8

Table 8: Relationship between main ic RK3588 with PMIC

Net Name	RK3588 Pin Number	RK3588 Pin Name	PMIC Pin Number	PMIC Pin Name
PMIC_INT_L	M30	PMIC_INT_L/GPIO0_A7_u	19	INT
PMIC_SPI_CS	K30	SPI2_CS0_M2/I2C1_SDA_M1/PWM5_M0/UART0_TX_M1/GPIO0_ B1_z	18	(IIC/SPI)CS
PMIC_SPI_CLK	N31	SPI2_CLK_M2/SDMMC_PWREN/PMU_DEBUG/GPIO0_A5_d	17	(SCL)CLK
PMIC_SPI_MOSI	L29	SPI2_MISO_M2/I2C0_SCL_M0/GPIO0_B3_z	15	(SDA)MOSI
PMIC_PWR_CTRL2	T30	PMIC_SLEEP5/GPIO0_C3_d	61	PWRCTRL2
PMIC_PWR_CTRL1	R32	PMIC_SLEEP1/GPIO0_A2_d	62	PWRCTRL1
RESET_L	M31	NPOR	40	RESETB

5.4 Connection Main Ic RK3588 With Other Devices

The connection between main ic RK3588 with other devices is shown in table 9

Table 9: Relationship between main ic RK3588 with other devices

Net Name	RK3588 Pin Number	RK3588 Pin Name	Other devices
CPU_BIG0_VSEL	R31	PMIC_SLEEP2/GPIO0_A3_d	Control power output power net VDD_CPU_BIG0
CPU_BIG1_VSEL	W28	PMIC_SLEEP6/PDM0_SDI3_M1/GPIO0_D6_d	Control power output power net VDD_CPU_BIG1

I2C0_SCL_M2	W30	I2S1_SDO0_M1/CPU_BIG0_AVS/I2C0_SCL_M2/UART0_CTSN/UART1_TX_M2/HDMI_RX_SDA_M0/SPI0_CS0_M0/PCIE30X2_CLKREQN_M0/HDMI_TX0_CEC_M1/GPIO0_D1_u	Ic PMIC for power net VDD_CPU_BIG0 and BIG1
I2C0_SDA_M2	W29	I2S1_SDO1_M1/I2C0_SDA_M2/UART1_RX_M2/HDMI_RX_SCL_M0/SPI3_MOSI_M2/PCIE30X2_WAKEN_M0/HDMI_TX1_CEC_M1/GPIO0_D2_ u	
I2C1_SCL_M2	V29	I2S1_SDO2_M1/PDM0_SDI2_M1/PWM3_IR_M0/I2C1_SCL_M2/CAN2_RX_M1/HDMI_TX0_SDA_M1/SPI3_CS0_M2/PCIE30X2_PERSTN_M0/SATA_CPDET/GPIO0_D4_u	Ic PMIC for power net VDD_NPU
I2C1_SDA_M2	V28	I2S1_SDO3_M1/CPU_BIG1_AVS/I2C1_SDA_M2/CAN2_TX_M1/HDMI_TX0_SCL_M1/SPI3_CS1_M2/SATA_MP_SWITCH/GPIO0_D5_u	
NPU_VSEL	U32	PMIC_SLEEP3/GPIO0_C1_d	Control power output power net VDD_NPU
XIN24M	R34	XIN_24M	crystal oscillator 24MHz
XOUT24M	T34	XOUT_24M	

6 Electrical Specifications

6.1 Power Supply Block Diagram

This Power supply block diagram description points to a scenario involving a power management integrated circuit (PMIC) in a system that includes the RK3588 SoC (System on Chip) and the RK806-1 PMIC.
Here's a more detailed breakdown of how this setup typically functions:

- **Power source from VCC4V_SYS (4V) power supply through the SOM connector.**
- **RK806-1 PMIC is main systems power management unit.**
- **Some other parts PMIC as: RK860-2, RK860-3, SY8089, SGM2576**

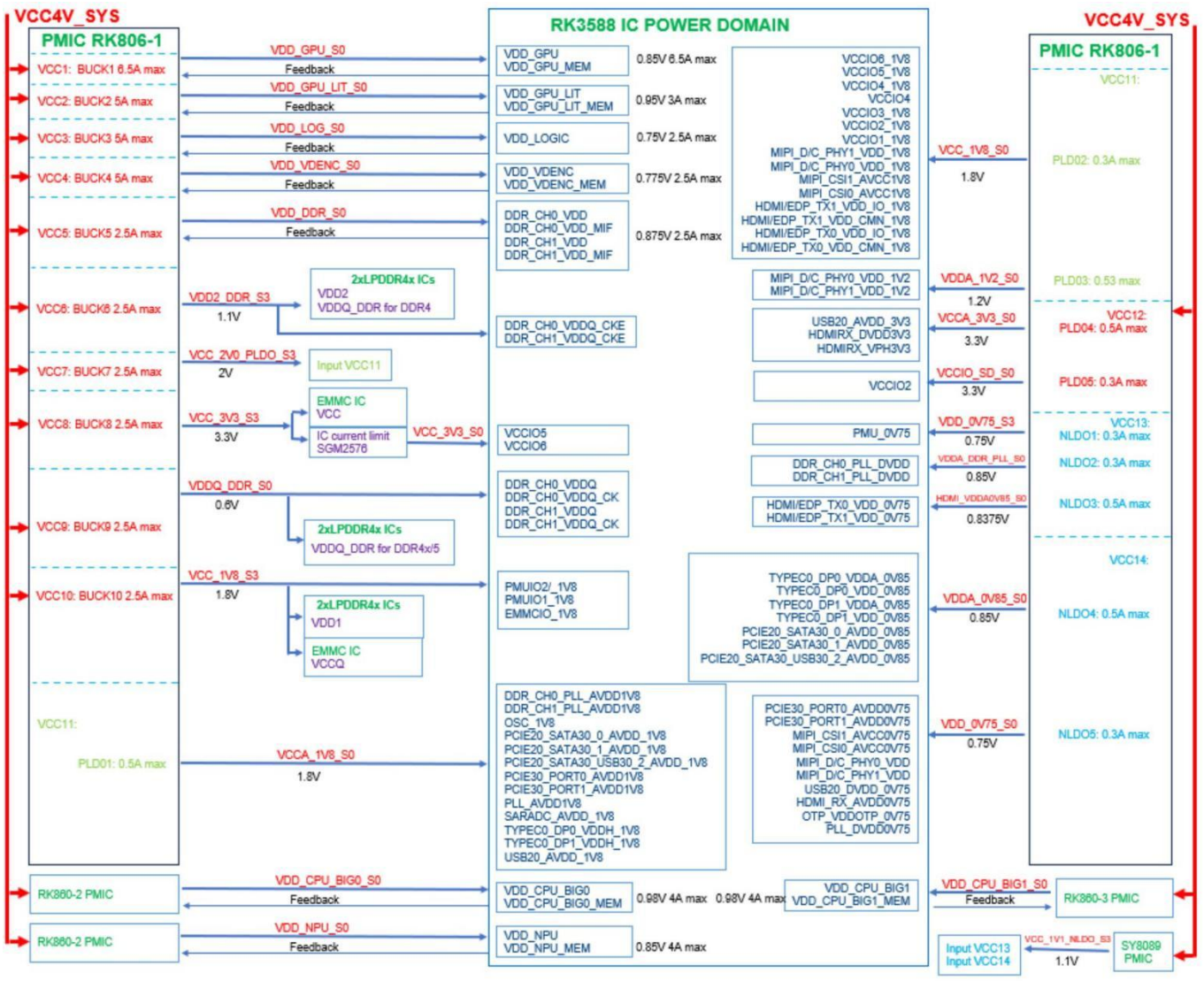


Figure 6: Power supply block diagram

6.2 Total Power Consumption on SoM

Maximum total power consumption on SOM is about 25.6W in high performance conditions

	Power Network	Voltage (V)	Peak Current (A)	Peak Power (W)	NOTE
The Extreme Current of Core Module	VDD_CPU_BIG0_S0	0.980	4.00	3.92	2400MHz
	VDD_CPU_BIG1_S0	0.980	4.00	3.92	2400MHz
	VDD_CPU_LIT_S0	0.950	3.00	2.85	1800MHz
	VDD_LOG_S0	0.750	2.50	1.88	
	VDD_GPU_S0	0.850	6.50	5.53	1000MHz
	VDD_NPU_S0	0.850	4.00	3.40	1000MHz
	VDD_VDENC_S0	0.775	2.50	1.94	750MHz
	VDD_DDR_S0	0.870	2.50	2.18	2112MHz
			Total Peak Power (W)	**25.60**	

6.3 System Frequency

Name	Specification				Remark
	Smallest	Typical	Maximum	Unit	
frequency Arm® Cortex®-A76	-	-	2400	MHz	-
frequency Arm® Cortex®-A55	-	-	1800	MHz	
frequency Arm® Cortex® - M0	-	-	-	-	-

6.4 Working Environment

Parameter		Specification				Remark	
		Smallest	Typical	Maximum	Unit		
Operating temperature	working environment	0	25	80	℃	commercial grade	commercial grade
	Storage environment	-40	25	125	℃		
Humidity	working environment	10	-	90	%RH	No condensation	No condensation

6.5 Interface Speed

Parameter	Specification				Remark
	Smallest	Typical	Maximum	Unit	
Serial communication speed	-	115200	4M	bps	-
SPI Clock frequency	-	-	50	MHz	-
I2C Communication speed	-	100	400	Kbps	-
USB3.0 interface speed	-	-	5	Gbps	-
USB2.0 interface speed	-	-	480	Mbps	-
CAN Communication speed	-	-	1	Mbps	-
PCIe2.1	-	-	5	Gbps	-
PCI e3.0	-	-	8	Gbps	-

6.6 ESD Characteristic

Parameter	Specification		Unit	Scope of application
	Smallest	Maximum		
ESD HBM (ESDA/JEDEC JS-001-2017)	-2000	2000	V	All pinout signals of the core board
ESD CDM (ESDA/JEDEC JS-002-2018)	-250	250	V	All pinout signals of the core board

7 Notes For Carrier Board Design

7.1 GPIO Power Domain

Voltage level on GPIO input and output depends on power supply for GPIO Power Domain. When design carrier board have to check power supply for GPIO Power Domain on SOM

Table 2-7 RK3588 GPIO Power Pins Description

Power domain	GPIO Type	Pin name	Description
PMUIO1	1.8V	PMUIO1	1.8V Only IO supply for this GPIO domain (group).
PMUIO2	1.8V/3.3V	PMUIO2	1.8V or 3.3V IO supply for this GPIO domain (group).
EMMCIO	1.8V	EMMCIO	1.8V Only IO supply for this GPIO domain (group).
VCCIO1	1.8V	VCCIO1	1.8V Only IO supply for this GPIO domain (group).
VCCIO2	1.8V/3.3V	VCCIO2	1.8V or 3.3V IO supply for this GPIO domain (group).
VCCIO3	1.8V	VCCIO3	1.8V Only IO supply for this GPIO domain (group).
VCCIO4	1.8V/3.3V	VCCIO4	1.8V or 3.3V IO supply for this GPIO domain (group).
VCCIO5	1.8V/3.3V	VCCIO5	1.8V or 3.3V IO supply for this GPIO domain (group).
VCCIO6	1.8V/3.3V	VCCIO6	1.8V or 3.3V IO supply for this GPIO domain (group).

PMUIO1, EMMCIO, VCCIO1, VCCIO3 are fixed-level power domains which cannot be configured;

• **PMUIO1**
- Voltage supply for PMUIO1_ 1V8 pin N28 is 1.8V.
- GPIO0_A0-A7 and GPIO0_B0-B3 voltage level is 1.8V

• **PMUIO2**
- Voltage supply for PMUIO2 pin P28 is 1.8V
- GPIO0_B5-B7, GPIO0_C0-C7, GPIO0_D0-D6 voltage level is 1.8V

• **VCCIO1**
- Voltage supply for VCCIO1_ 1V8 pin G20 is 1.8V
- GPIO1_C0-C7, GPIO1_D0-D5 voltage level is 1.8V

• **VCCIO2**
- Voltage supply for VCCIO2 pin Y7 is VCCIO_SD_S0= 3.3V
- GPIO4_D0-D5 voltage level is 3.3V

• **VCCIO3**
- Voltage supply for VCCIO3 pin Y26 is 1.8V
- GPIO2_A6-A7, GPIO2_B0-B7, GPIO2_C0-C7, GPIO4-C2-C6 voltage level is 1.8V

• **VCCIO4**
- Voltage supply for VCCIO4 pin H21 is 1.8V
- GPIO1_A0-A7, GPIO1_B0-B7, GPIO1_D6-D7 voltage level is 1.8V

• **VCCIO5**
- Voltage supply for VCCIO4 pin W26 is 3.3V
- GPIO3_A0-A7, GPIO3_B0-B7, GPIO3_C0-C7, GPIO3_D0-D5 voltage level is 3.3V

• **VCCIO6**
- Voltage supply for VCCIO6 pin AC26 is 3.3V
- GPIO4_A0-A7, GPIO4_B0-B7, GPIO4_C0-C1 voltage level is 3.3V

• **SARADC**
- Voltage supply for SARADC_AVDD_ 1V8 pin AH18 is 1.8V
- SARADC_IN0-IN7 voltage range is 0V-1.8V

7.2 Boot Mode Config

- On SOM in use boot mode level 7:
- FSPI_M2 → FSPI_M1 → FSPI_M0 → EMMC →SD Card → USB

7.3 Power Control Signals

• **PWRON_L**

Signals PWRON_L on connector J4 pin 84 allow user on/off or reset main power of system (more detail see data sheet PMIC RK806-1).
- Keep PWRON_L low level 500/20ms would turn on the PMIC
- When the PMIC work in “on” state or “sleep” state, writing register bit 0x76<6>=0 then keep low level PWRON_L for 6/8/10/12S would turn off the PMIC.
- When the PMIC work in “on” state or “sleep” state, writing register bit 0x76<6>=1 then keep low level PWRON_L for 6/8/10/12S would turn off the PMIC.

• **RESET_L**
Signals RESET_L on connector J4 pin 86 allow user on/off or reset main power of system (more detail see data sheet PMIC RK806-1).
- When the PMIC work in “on” state or “sleep” state if RESET_L pull down, the PMIC would restart immediately.

7.4 Recovery System

Signal SARADC_VIN1_KEY/RECOVERY on connector J3 pin89 allow user recovery system.

SARADC_VIN1 is pulled up to VCCA_ 1V8_S0 through a 10Kohm pull-up resistor, and the default is high level (1.8V).

Under the premise that there is no key action and the system has already burned the firmware, power on and enter the system directly.

If the Recovery mode button is in the pressed state (low level) when the system starts, (that is, SARADC_VIN1 remains at low level (0V)), RK3588 enters Loader programming mode.

When the PC recognizes the USB device, release the button to restore SARADC_VIN1 to a high level (1.8V), and then the firmware can be programmed.

7.5 Trace Impedance Recommendation

The following table lists the recommended impedance for high-speed signals on the carrier board.

Table 5. Trace impedance recommendation

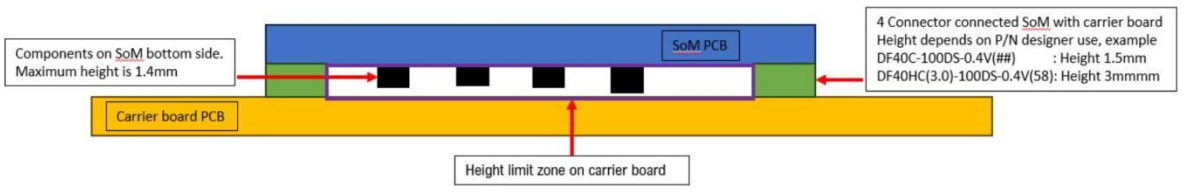
Signal group	Impedance	PCB manufacture tolerance (±)
All single-ended signal, unless specified	50 Ohm single-ended	10%
PCIe TX/RX data pair	85 Ohm differential	10%
USB differential signals	90 Ohm differential	10%
Differential signals: including Ethernet, PCIe clocks, HDMI, MIPI (CSI and DSI)	100 Ohm differential	10%

7.6 Height limit Zone on Carrier Board at Area SoM Connected.

We recommend to use connector on carrier board is DF40HC(3.0)-100DS-0.4V(58).

The connectors have height is 3mm and maximum height components on bottom side of SoM is 1.4mm so that area top side on carrier board where the SOM is connected should keep components limit height is1.5mm.

Note: In case designer use connectors on carrier board with lower height. Example designer use P/NDF40HC-100DS-0.4V(58) have height is 1.5mm. Area top side on carrier board where the SOM connected is not allow placement any components because it will conflict with components on SoM (SoM hasmaximum height components on bottom side of SoM is 1.4mm).



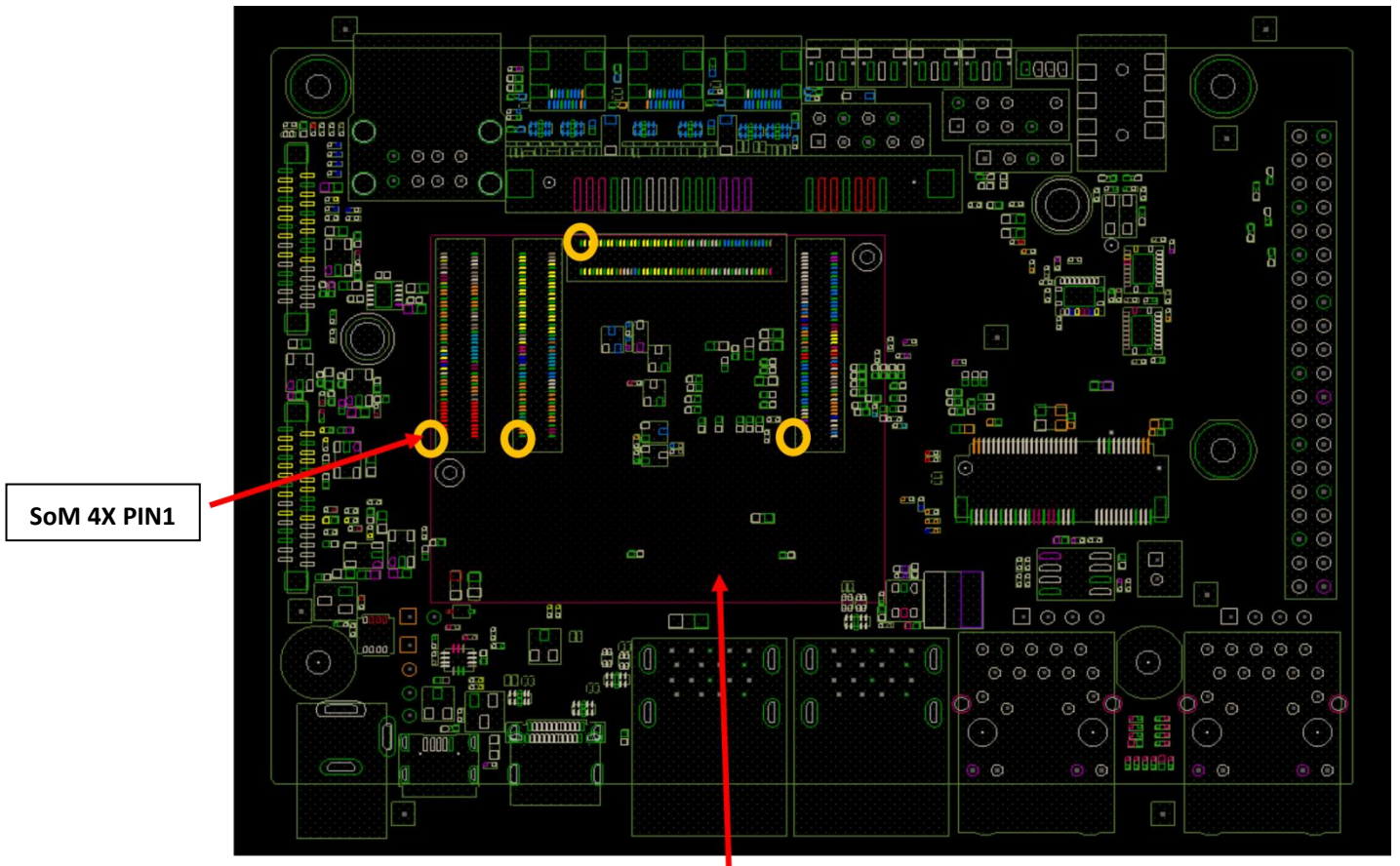


Figure 7: Height limit zone on carrier board top side

8 Trace Length on IC Package and SoM

8.1 MIPI Signals

Net Name	IC PACKAGE Pin Number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
MIPI_CSI0_RX_CLK0N	U1000.AJ34	J6.73	521.32	222.00	743.322
MIPI_CSI0_RX_CLK0P	U1000.AJ33	J6.71	516.70	225.95	742.654
MIPI_CSI0_RX_CLK1N	U1000.AM34	J6.91	474.51	285.70	760.213
MIPI_CSI0_RX_CLK1P	U1000.AM33	J6.89	470.38	295.39	765.769
MIPI_CSI0_RX_D0N	U1000.AG34	J6.61	414.13	237.03	651.159
MIPI_CSI0_RX_D0P	U1000.AG33	J6.59	425.51	228.04	653.551
MIPI_CSI0_RX_D1N	U1000.AH34	J6.65	430.32	234.18	664.494
MIPI_CSI0_RX_D1P	U1000.AH33	J6.67	437.65	231.87	669.518
MIPI_CSI0_RX_D2N	U1000.AK34	J6.79	496.56	231.03	727.593
MIPI_CSI0_RX_D2P	U1000.AK33	J6.77	491.33	240.99	732.32
MIPI_CSI0_RX_D3N	U1000.AL34	J6.83	467.61	257.83	725.437
MIPI_CSI0_RX_D3P	U1000.AL33	J6.85	464.76	265.35	730.107
MIPI_CSI1_RX_CLK0N	U1000.AJ32	J6.70	409.64	157.31	566.951
MIPI_CSI1_RX_CLK0P	U1000.AJ31	J6.72	405.04	166.77	571.815
MIPI_CSI1_RX_CLK1N	U1000.AM32	J6.88	456.98	215.73	672.712
MIPI_CSI1_RX_CLK1P	U1000.AM31	J6.90	457.63	218.80	676.429
MIPI_CSI1_RX_D0N	U1000.AG32	J6.58	379.47	173.78	553.253
MIPI_CSI1_RX_D0P	U1000.AG31	J6.60	378.21	180.45	558.652
MIPI_CSI1_RX_D1N	U1000.AH32	J6.64	449.18	181.48	630.66
MIPI_CSI1_RX_D1P	U1000.AH31	J6.66	470.91	162.50	633.403
MIPI_CSI1_RX_D2N	U1000.AK32	J6.76	412.01	168.55	580.558
MIPI_CSI1_RX_D2P	U1000.AK31	J6.78	410.11	175.38	585.489
MIPI_CSI1_RX_D3N	U1000.AL32	J6.82	398.68	182.72	581.401
MIPI_CSI1_RX_D3P	U1000.AL31	J6.84	397.02	188.20	585.226
MIPI_DPHY0_RX_CLKN	U1000.AP31	J5.12	401.82	179.10	580.922
MIPI_DPHY0_RX_CLKP	U1000.AN32	J5.10	417.26	164.32	581.577
MIPI_DPHY0_RX_D0N	U1000.AP29	J5.11	363.24	228.52	591.761
MIPI_DPHY0_RX_D0P	U1000.AN29	J5.9	355.16	234.80	589.96
MIPI_DPHY0_RX_D1N	U1000.AP30	J5.5	408.95	201.62	610.565
MIPI_DPHY0_RX_D1P	U1000.AN30	J5.3	372.67	234.24	606.903
MIPI_DPHY0_RX_D2N	U1000.AP32	J5.6	419.62	213.27	632.886
MIPI_DPHY0_RX_D2P	U1000.AN33	J5.4	429.97	208.01	637.973
MIPI_DPHY0_RX_D3N	U1000.AP33	J6.95	474.24	301.06	775.303
MIPI_DPHY0_RX_D3P	U1000.AN34	J6.97	443.30	327.92	771.217
MIPI_DPHY0_TX_CLKN	U1000.AP26	J5.23	339.44	251.54	590.98
MIPI_DPHY0_TX_CLKP	U1000.AN26	J5.21	349.51	242.25	591.752
MIPI_DPHY0_TX_D0N	U1000.AP24	J5.35	301.30	250.46	551.765
MIPI_DPHY0_TX_D0P	U1000.AN24	J5.33	273.25	279.42	552.663
MIPI_DPHY0_TX_D1N	U1000.AP25	J5.29	335.21	222.02	557.231
MIPI_DPHY0_TX_D1P	U1000.AN25	J5.27	284.86	272.63	557.49
MIPI_DPHY0_TX_D2N	U1000.AP27	J5.15	335.29	229.46	564.753
MIPI_DPHY0_TX_D2P	U1000.AN27	J5.17	329.02	239.85	568.863
MIPI_DPHY0_TX_D3N	U1000.AP28	J5.18	370.56	140.43	510.991

MIPI_DPHY0_TX_D3P	U1000.AN28	J5.16	351.96	154.00	505.955
MIPI_DPHY1_TX_CLKN	U1000.AP20	J5.40	282.48	108.26	390.733
MIPI_DPHY1_TX_CLKP	U1000.AN20	J5.42	272.36	124.05	396.406
MIPI_DPHY1_TX_D0N	U1000.AP18	J5.46	277.52	97.59	375.108
MIPI_DPHY1_TX_D0P	U1000.AN18	J5.48	225.90	145.37	371.275
MIPI_DPHY1_TX_D1N	U1000.AP19	J5.45	290.67	222.23	512.896
MIPI_DPHY1_TX_D1P	U1000.AN19	J5.47	255.06	258.63	513.693
MIPI_DPHY1_TX_D2N	U1000.AP21	J5.41	285.74	241.88	527.62
MIPI_DPHY1_TX_D2P	U1000.AN21	J5.39	275.44	254.34	529.777
MIPI_DPHY1_TX_D3N	U1000.AP22	J5.34	290.16	124.77	414.936
MIPI_DPHY1_TX_D3P	U1000.AN22	J5.36	291.77	125.73	417.501

8.2 SDMMC Signals

Net Name	IC PACKAGE Pin number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
SDMMC0_CMD	U1000.AE2	J3.24	330.64	498.31	828.957
SDMMC0_D0	U1000.AD2	J3.14	346.61	535.68	882.291
SDMMC0_D1	U1000.AD1	J3.16	328.87	503.49	832.358
SDMMC0_D2	U1000.AF2	J3.20	364.33	616.71	981.04
SDMMC0_D3	U1000.AF1	J3.18	381.91	544.47	926.379
SDMMC_DET/GPIO0_A4_U	U1000.P31	J3.36	274.69	1377.88	1652.562
SD_CLK	U1000.AE1	J3.22	366.00	490.41	856.407

8.3 USB Signals

Net Name	IC PACKAGE Pin number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
TYPEC0_OTG_DM	U1000.AM12	J5.96	225.04	655.55	880.595
TYPEC0_OTG_DP	U1000.AL12	J5.94	230.41	657.78	888.189
TYPEC0_OTG_ID	U1000.AL14	J3.77	230.15	600.03	830.174
TYPEC0_SBU1/DP0_AUXP	U1000.AL15	J5.90	221.73	786.69	1008.421
TYPEC0_SBU2/DP0_AUXN	U1000.AM15	J5.88	220.75	782.09	1002.833
TYPEC0_SSRX1N/DP0_TX0N	U1000.AP13	J5.66	292.31	111.93	404.239
TYPEC0_SSRX1P/DP0_TX0P	U1000.AN13	J5.64	276.34	133.40	409.741
TYPEC0_SSRX2N/DP0_TX2N	U1000.AP15	J5.54	290.82	120.44	411.261
TYPEC0_SSRX2P/DP0_TX2P	U1000.AN15	J5.52	277.47	136.46	413.927
TYPEC0_SSTX1N/DP0_TX1N	U1000.AN14	J5.58	285.21	124.79	410.002
TYPEC0_SSTX1P/DP0_TX1P	U1000.AP14	J5.60	275.08	131.49	406.577
TYPEC0_SSTX2N/DP0_TX3N	U1000.AN16	J5.53	271.10	247.84	518.935
TYPEC0_SSTX2P/DP0_TX3P	U1000.AP16	J5.51	269.26	248.87	518.133
TYPEC0_USB20_VBUSDET	U1000.AM14	J3.79	237.42	794.48	1031.909
TYPEC1_OTG_DM	U1000.AL9	J5.82	206.21	233.03	439.241
TYPEC1_OTG_DP	U1000.AK9	J5.84	210.43	231.46	441.888
TYPEC1_OTG_ID	U1000.AK8	J3.13	266.20	707.35	973.555
TYPEC1_SBU1/DP1_AUXP	U1000.AL10	J5.78	286.57	189.48	476.056
TYPEC1_SBU2/DP1_AUXN	U1000.AM10	J5.76	264.66	206.53	471.189
TYPEC1_SSRX1N/DP1_TX0N	U1000.AP8	J5.69	369.18	235.82	605.003
TYPEC1_SSRX1P/DP1_TX0P	U1000.AN8	J5.71	355.21	254.08	609.295
TYPEC1_SSRX2N/DP1_TX2N	U1000.AP10	J5.59	331.61	269.46	601.074

TYPEC1_SSRX2P/DP1_TX2P	U1000.AN10	J5.57	313.06	293.71	606.77
TYPEC1_SSTX1N/DP1_TX1N	U1000.AN9	J5.65	360.15	264.33	624.48
TYPEC1_SSTX1P/DP1_TX1P	U1000.AP9	J5.63	356.70	273.16	629.858
TYPEC1_SSTX2N/DP1_TX3N	U1000.AN11	J5.72	330.60	147.97	478.567
TYPEC1_SSTX2P/DP1_TX3P	U1000.AP11	J5.70	304.26	169.77	474.028
TYPEC1_USB20_VBUSDET	U1000.AL8	J3.15	227.94	246.09	474.028
USB20_HOST0_DM	U1000.AL6	J3.45	292.05	456.31	748.356
USB20_HOST0_DP	U1000.AK6	J3.43	295.56	448.52	744.085
USB20_HOST1_DM	U1000.AM7	J3.51	237.59	464.70	702.292
USB20_HOST1_DP	U1000.AL7	J3.49	219.93	477.48	697.418

8.4 GMAC Signals

Net Name	IC PACKAGE Pin number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
GMAC1_MDC	U1000.Y31	J6.33	323.27	492.34	815.61
GMAC1_RSTN_L	U1000.AA28	J6.35	212.03	606.12	818.153
GMAC1_RXCLK	U1000.AH30	J4.50	433.36	690.40	1123.76
GMAC1_RXD0	U1000.AG29	J4.54	397.51	638.60	1036.107
GMAC1_RXD1	U1000.AG28	J4.56	379.69	672.12	1051.809
GMAC1_RXD2	U1000.AD27	J4.46	328.88	715.99	1044.869
GMAC1_RXD3	U1000.AE27	J4.52	361.14	656.99	1018.129
GMAC1_RXDV_CRS	U1000.AH29	J4.48	439.53	745.86	1185.39
GMAC1_MCLKINOUT	U1000.AE29	J6.52	361.13	261.89	623.025
GMAC1_TXCLK	U1000.AD28	J6.54	333.39	349.01	682.4
GMAC1_TXD0	U1000.AC28	J6.46	296.19	232.66	528.844
GMAC1_TXD1	U1000.AC29	J6.48	311.08	209.96	521.045
GMAC1_TXD2	U1000.AA29	J6.42	289.05	219.70	508.749
GMAC1_TXD3	U1000.AA30	J6.44	264.69	183.90	448.593
GMAC1_TXEN	U1000.AD29	J6.50	285.49	216.02	501.507
GMAC1_MDIO	U1000.Y30	J6.40	297.36	212.66	510.026

8.5 HDMI Signals

Net Name	IC PACKAGE Pin number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
HDMI0_TX0N_PORT/EDP0_TX_D0N	U1000.AJ1	J3.80	456.08	316.35	772.422
HDMI0_TX0P_PORT/EDP0_TX_D0P	U1000.AJ2	J3.78	436.29	339.87	776.164
HDMI0_TX1N_PORT/EDP0_TX_D1N	U1000.AK2	J3.86	413.66	392.50	806.157
HDMI0_TX1P_PORT/EDP0_TX_D1P	U1000.AK3	J3.84	422.31	389.81	812.112
HDMI0_TX2N_PORT/EDP0_TX_D2N	U1000.AL1	J3.92	496.73	349.19	845.926
HDMI0_TX2P_PORT/EDP0_TX_D2P	U1000.AL2	J3.90	477.79	363.91	841.698
HDMI0_TX3N_PORT/EDP0_TX_D3N	U1000.AH2	J3.74	348.22	371.35	719.572
HDMI0_TX3P_PORT/EDP0_TX_D3P	U1000.AH3	J3.72	364.13	360.91	725.043
HDMI0_TX_SBDN/EDP0_TX_AUXN	U1000.AG1	J3.68	344.43	337.09	681.529
HDMI0_TX_SBDP/EDP0_TX_AUXP	U1000.AG2	J3.66	331.99	355.48	687.472
HDMI1_TX0N_PORT/EDP1_TX_D0N	U1000.AP4	J5.89	454.00	227.92	681.926
HDMI1_TX0P_PORT/EDP1_TX_D0P	U1000.AN4	J5.87	452.41	227.35	679.758
HDMI1_TX1N_PORT/EDP1_TX_D1N	U1000.AN5	J5.83	401.80	292.26	694.055
HDMI1_TX1P_PORT/EDP1_TX_D1P	U1000.AM5	J5.81	425.96	272.80	698.764

HDMI1_TX2N_PORT/EDP1_TX_D2N	U1000.AP6	J5.77	366.57	224.66	591.234
HDMI1_TX2P_PORT/EDP1_TX_D2P	U1000.AN6	J5.75	347.81	249.26	597.071
HDMI1_TX3N_PORT/EDP1_TX_D3N	U1000.AN3	J5.95	371.75	259.98	631.722
HDMI1_TX3P_PORT/EDP1_TX_D3P	U1000.AM3	J5.93	372.16	265.00	637.168
HDMI1_TX_SBDN/EDP1_TX_AUXN	U1000.AP2	J3.96	429.18	420.04	849.22
HDMI1_TX_SBDP/EDP1_TX_AUXP	U1000.AN2	J3.98	419.24	424.64	843.878
HDMI_RX_CLKN	U1000.AF5	J3.21	243.51	482.46	725.97
HDMI_RX_CLKP	U1000.AF6	J3.19	227.26	498.89	726.149
HDMI_RX_D0N	U1000.AG4	J3.25	260.15	472.10	732.243
HDMI_RX_D0P	U1000.AG5	J3.27	247.86	488.92	736.782
HDMI_RX_D1N	U1000.AH5	J3.31	241.06	492.03	733.095
HDMI_RX_D1P	U1000.AH6	J3.33	233.49	505.48	738.966
HDMI_RX_D2N	U1000.AJ4	J3.37	279.97	468.36	748.331
HDMI_RX_D2P	U1000.AJ5	J3.39	288.88	464.05	752.925

8.6 PCIE Signals

Net Name	IC PACKAGE Pin number	Connector	Length IC Package (MIL)	Length SOM (MIL)	Total Length = IC Package + SOM (MIL)
PCIE20_0_REFCLKN	U1000.L33	J4.79	321.04	1210.15	1531.189
PCIE20_0_REFCLKP	U1000.L32	J4.77	310.38	1214.04	1524.418
PCIE20_0_RXN/SATA30_0_RXN	U1000.N34	J6.22	345.92	118.22	464.138
PCIE20_0_RXP/SATA30_0_RXP	U1000.N33	J6.24	335.95	133.94	469.89
PCIE20_0_TXN/SATA30_0_TXN	U1000.M33	J6.18	370.67	122.29	492.961
PCIE20_0_TXP/SATA30_0_TXP	U1000.M34	J6.16	367.24	131.62	498.864
PCIE20_1_REFCLKN	U1000.H33	J6.6	354.94	143.98	498.915
PCIE20_1_REFCLKP	U1000.H32	J6.4	343.32	161.60	504.918
PCIE20_1_RXN/SATA30_1_RXN	U1000.J34	J4.38	360.44	631.99	992.424
PCIE20_1_RXP/SATA30_1_RXP	U1000.J33	J4.40	350.83	647.75	998.583
PCIE20_1_TXN/SATA30_1_TXN	U1000.K34	J6.10	472.15	112.19	584.332
PCIE20_1_TXP/SATA30_1_TXP	U1000.K33	J6.12	473.74	116.06	589.798
PCIE20_2_REFCLKN	U1000.G30	J6.27	356.42	524.70	881.121
PCIE20_2_REFCLKP	U1000.G31	J6.29	350.91	524.28	875.195
PCIE20_2_RXN	U1000.J30	J4.74	324.92	975.95	1300.875
PCIE20_2_RXP	U1000.J31	J4.72	337.04	960.26	1297.298
PCIE20_2_TXN	U1000.H29	J4.71	296.55	1114.69	1411.234
PCIE20_2_TXP	U1000.H30	J4.73	306.36	1111.36	1417.726
PCIE30_PORT0_REFCLKN_IN	U1000.E34	J6.3	448.12	283.12	731.245
PCIE30_PORT0_REFCLKP_IN	U1000.E33	J6.5	428.96	306.54	735.505
PCIE30_PORT0_RX0N	U1000.G34	J4.32	413.48	660.06	1073.541
PCIE30_PORT0_RX0P	U1000.G33	J4.34	419.37	657.55	1076.918
PCIE30_PORT0_RX1N	U1000.F33	J4.29	380.75	877.94	1258.689
PCIE30_PORT0_RX1P	U1000.F32	J4.31	365.87	898.38	1264.258
PCIE30_PORT0_TX0N	U1000.D33	J6.11	381.59	411.81	793.393
PCIE30_PORT0_TX0P	U1000.D32	J6.9	380.19	418.49	798.676
PCIE30_PORT0_TX1N	U1000.C34	J4.25	498.97	849.95	1348.915
PCIE30_PORT0_TX1P	U1000.C33	J4.23	512.64	840.56	1353.201
PCIE30_PORT1_REFCLKN_IN	U1000.B28	J4.55	484.95	1312.65	1797.601
PCIE30_PORT1_REFCLKP_IN	U1000.A28	J4.53	478.71	1314.70	1793.404
PCIE30_PORT1_RX2N	U1000.A32	J6.23	500.07	641.71	1141.777

PCIE30_PORT1_RX2P	U1000.B32	J6.21	505.74	631.28	1137.019
PCIE30_PORT1_RX3N	U1000.B31	J6.15	421.04	542.17	963.208
PCIE30_PORT1_RX3P	U1000.C31	J6.17	424.70	544.09	968.797
PCIE30_PORT1_TX2N	U1000.A30	J4.65	424.53	1152.74	1577.269
PCIE30_PORT1_TX2P	U1000.B30	J4.67	429.53	1153.25	1582.78
PCIE30_PORT1_TX3N	U1000.B29	J4.59	367.40	1200.99	1568.39
PCIE30_PORT1_TX3P	U1000.C29	J4.61	374.78	1199.04	1573.817

9 Acronyms and Abbreviations

The table below lists and explains the acronyms and abbreviations used in this document.

Table 6. Acronyms and abbreviation

Term	Description
BGA	Ball grid array
CAN	Controller area network
Codec	Coder/decoder
CSI-2	Camera serial interface 2
HDMI	High-Definition Multimedia Interface
SDMMC	Digital/ Multi Media Card interface
DSI	Display serial interface
SARADC	Successive Approximation Register Analog-to-Digital Converter
GPIO	General-purpose input/output
HS	High-speed
I2C	Inter-integrated circuit
I2S	Inter-IC sound
I3C	Improved inter-integrated circuit
MIPI D-PHY	Mobile Industry Processor Interface Physical Layer
MIPI C-PHY	Mobile Industry Processor Interface C-PHY
LDO	Low dropout regulator
LED	Light-emitting diode
MCU	Microcontroller unit
MIPI	Mobile industry processor interface
PDM	Pulse-density modulation
PMIC	Power management integrated circuit
POR	Power-on reset
RTC	Real-time clock
PWM	Pulse width modulation
PCIE	Peripheral Component Interconnect Express
SDK	Software development kit
SMT	Surface-mount technology
UART	Universal asynchronous receiver/transmitter
USB	Universal serial bus
uSDHC	Ultra secured digital host controller