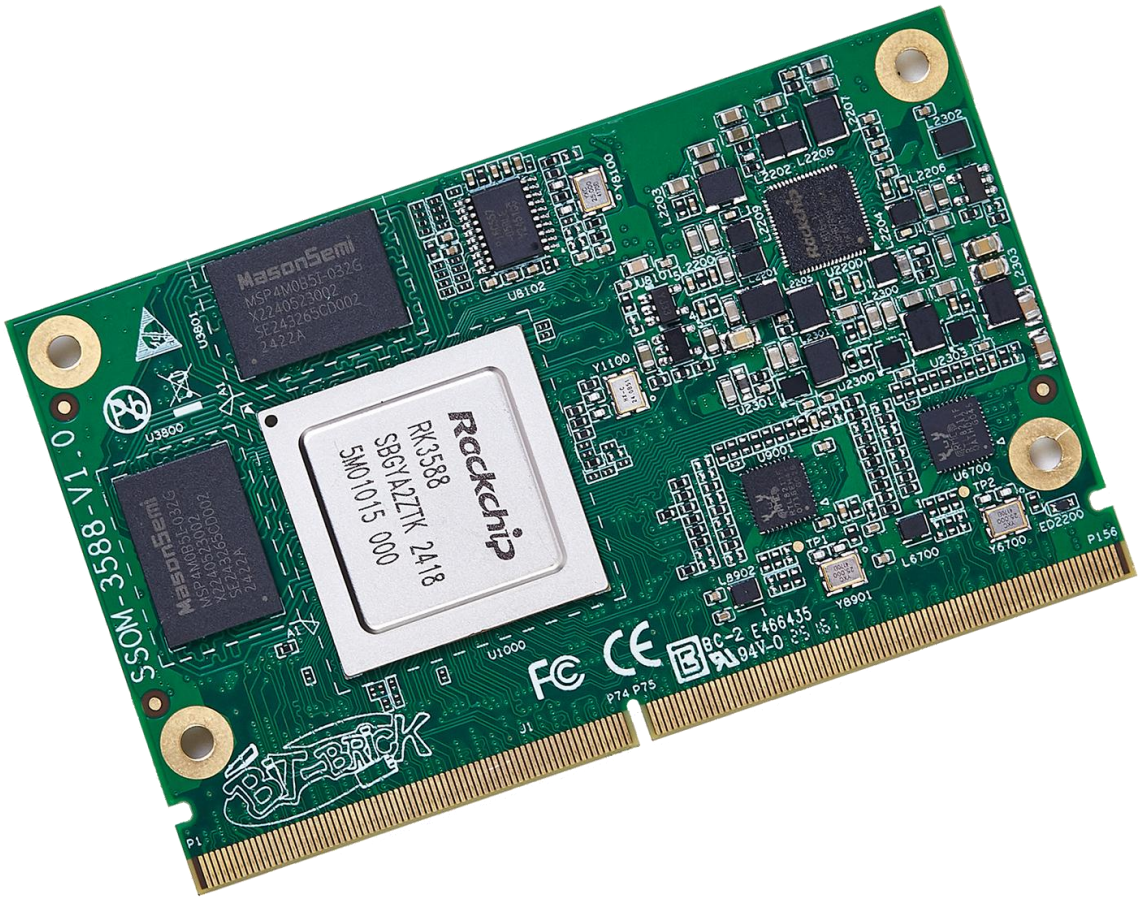
Bit-Brick SSOM-3588 datasheet



Provisional version

V 1.0

Bit Brick Technology Corporation

April 29, 2025

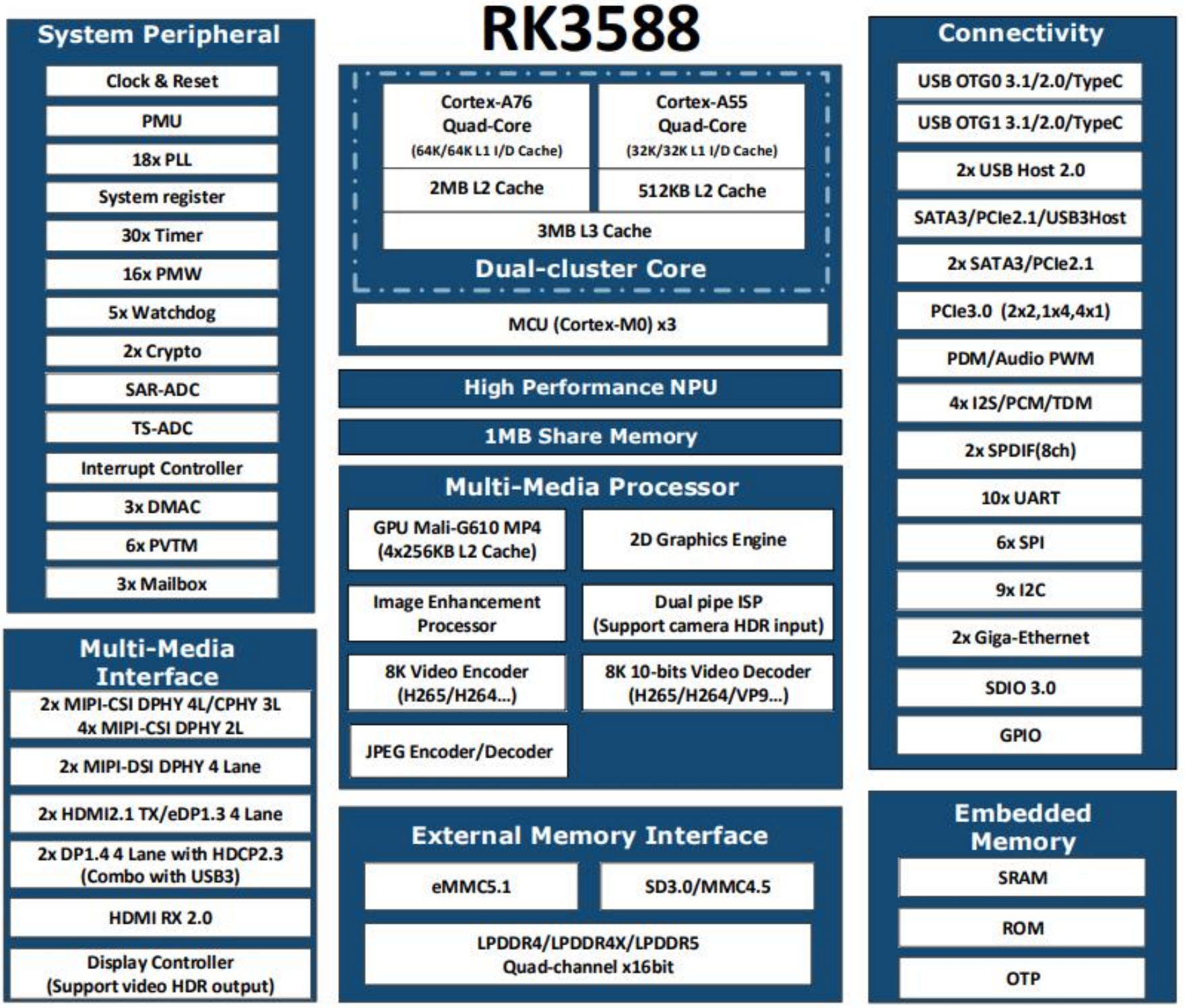
1. Product Introduction

Bit-Brick's SSOM-3588 SoM(System on Module) is a high-performance, highly integrated embedded computing platform built around the Rockchip RK3588 processor, delivering outstanding compute performance and energy efficiency. It is tailored for applications such as industrial control, edge computing, intelligent cockpits and security surveillance.

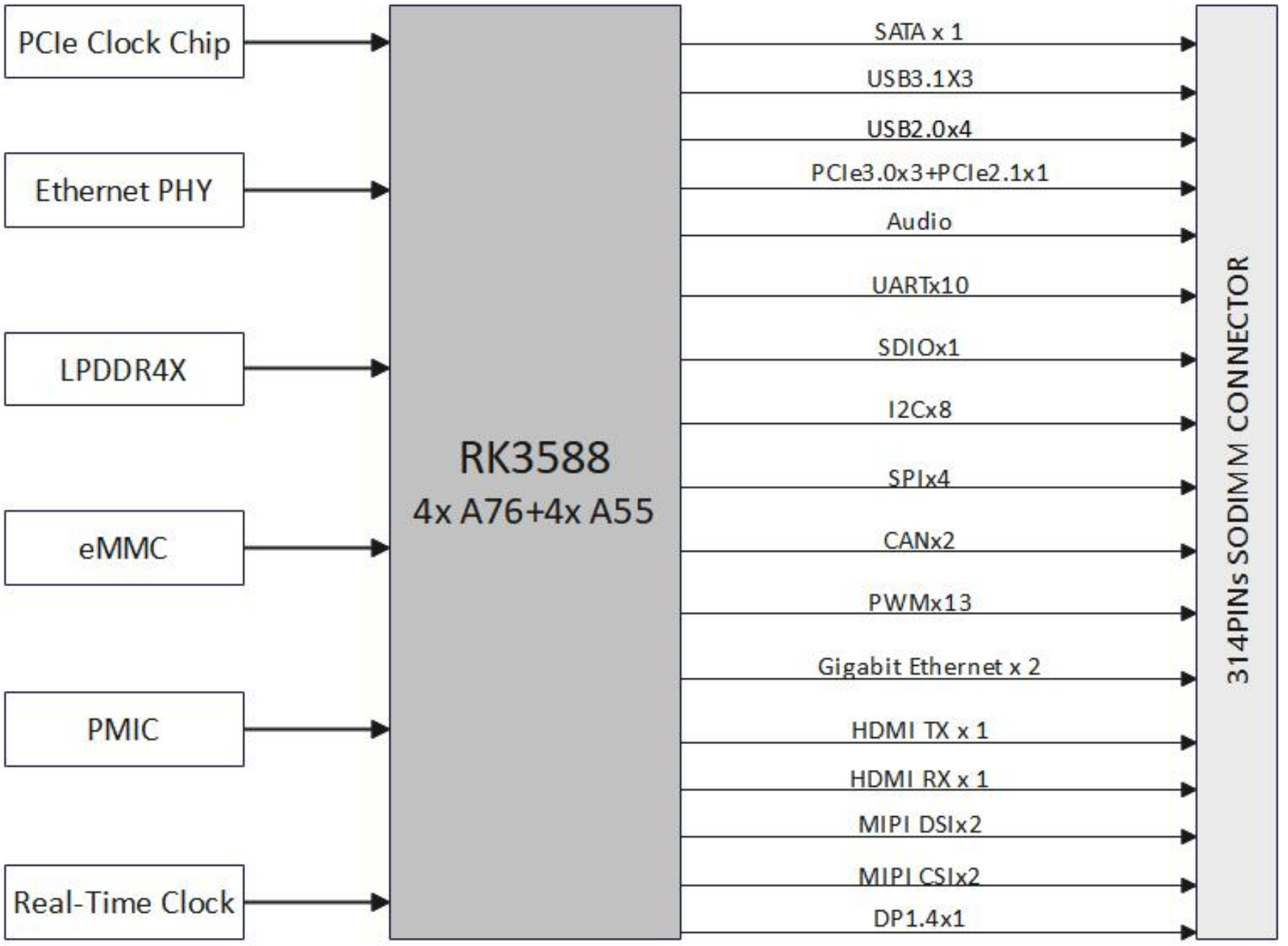
The module's SoC, the RK3588, is manufactured on an 8 nm process and features a heterogeneous CPU architecture with 4-core Cortex-A76(up to 2.4 GHz) and 4-core Cortex-A55(up to 1.8 GHz). It integrates a Mali-G610 MP4 GPU with an embedded 2D graphics engine, supporting OpenGL ES 1.1/2.0/3.2, OpenCL 2.2 and Vulkan 1.2, and offers 8K video encode/decode capabilities. A built-in NPU delivers 6 TOPS of AI performance, support INT4/INT8/INT16/FP16/BF16/TF32.

The RK3588 SoC has a compact size. Most of the functional pins such as PCIe3.0, USB3.1, and HDMI2.1 are led out through the gold finger connector. It supports multi-screen heterogeneous display, multiple camera inputs and high-speed data transfer, enabling rapid deployment of complex AI and multimedia applications.

2. Processor Functional Block Diagram



3. Hardware Functional Block Diagram



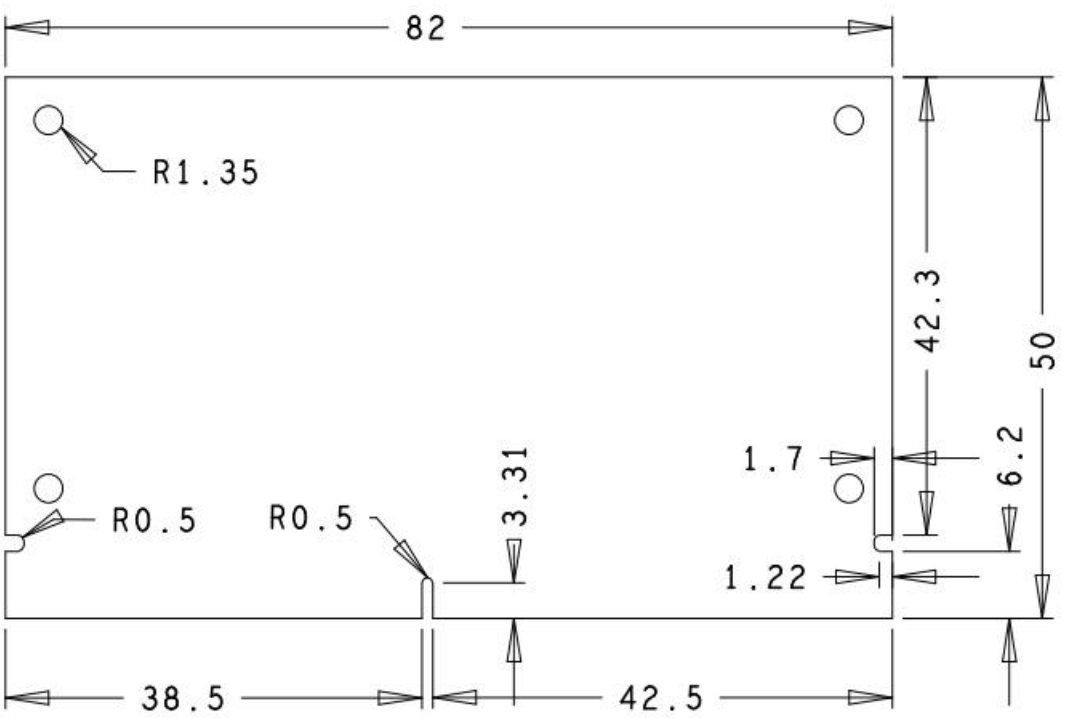
4. Specifications

Form factor	Specification	
Processor	CPU	RK3588, 8-core 64-bit (4xCortex-A76 + 4xCortex-A55) with 8nm advanced process, and the main frequency can reach up to 2.4GHz
	GPU	ARM Mali-G610 MP4 quad-core GPU, support 0penGL ES 1.1, 2.0 and 3.2/0penCL 2.2/Vulkan 1.2
	NPU	6 TOPS@INT8,support INT4/INT8/INT16/FP16/BF16/TF32 hybrid operation,support deep learning frameworks such as TensorFlow, PyTorch, Caffe,etc
	VPU	Decoder: 8K@60fps H.265/VP9/AVS2; 8K@30fps H.264/AVC/MVC; 4K@60fps AV1; 1080P@60fps MPEG-2/MPEG-1/VC-1/VP8 Encoder: 8K@30fps H.265/H.264
Memory	RAM	4GB/8GB/16GB/32GB LPDDR4X SDRAM
	ROM	32GB/64GB/128GB eMMC
Multimedia	Video	Output: 1x HDMI2.1(8K@60fps or 4K@120fps); 1x DP1.4(4K@60fps); 2x MIPI-DSI(4K@60fps) Input: 1x HDIMI-IN(4K@60fps),support HDCP2.3; 4x MIPI-CSI DPHY; 2x MIPI DC PHY
	Audio	2x 8-channel I2S; 2x 2-channel I2S; 2x SPDIF; 2x 8-channel PDM; 1x dual-channel DAC、1x VAD
	ISP	48MP ISP3.0, support HDR & 3DNR

IO	PCIe	3x PCIe3.0(3x 1Lane/1x 2Lane+2x 1Lane); 1x PCIe2.1(1Lane,multiplexed with SATA3.0)
	Ethernet	2 x Gigabit Ethernet
	USB	2x USB3.1 0TG; 1x USB3.1 HOST; 4x USB2.0 HOST
	UART	10x
	SDIO	1x
	I2C	8x
	SPI	4x
	CAN	2x
	PWM	13x
	MIPI DSI	2x
	MIPI CSI	2x
	SATA	1x
Power supply	Power Supply Voltage	DC 4V
Environment	Operating Temperature	-20 ~ 7 5 °C
	Operating Humidity	95% relative humidity, non-condensing
Mechanical	Dimensions (W x D)	82 X 50 mm
Operation System		Linux/Android
Certifications		CE/FCC Class B

5. Dimension Specifications

Size：82.0mm X 50.0mm



6. Pin definations

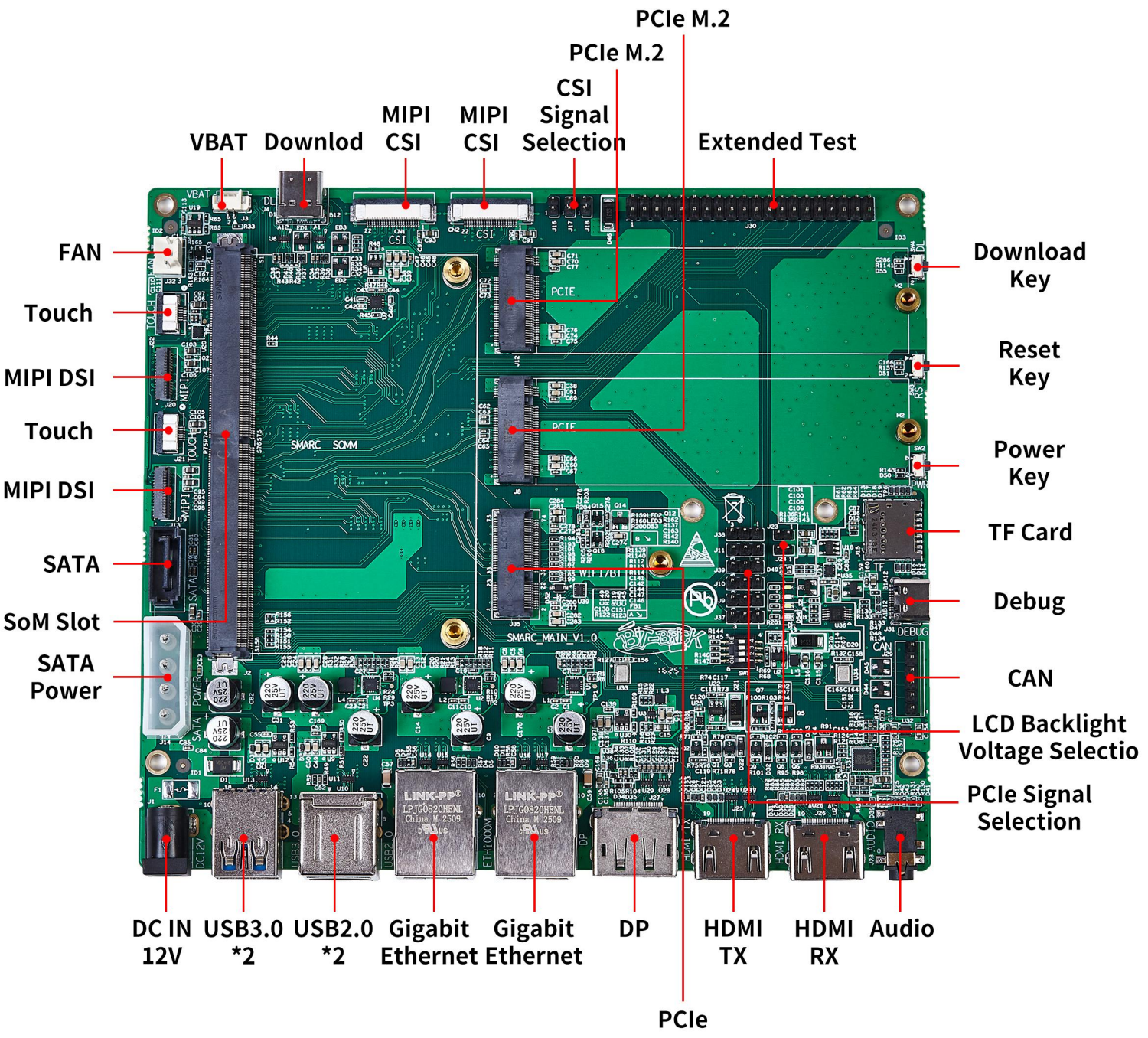
Top			Butttom		
Pin Number	**Default Defination**	**Corresponding GPIO**	**Pin Number**	**Default Defination**	**Corresponding GPIO**
P1	NC		S1	NC	
P2	GND		S2	NC	
P3	MIPI_CSI0_RX_CLK0P		S3	GND	
P4	MIPI_CSI0_RX_CLK0N		S4	MIPI_CAM1_CLKOUT	GPIO1_B6_u
P5	NC		S5	I2C3_SCL_M0_MIPI	GPIO1_C1_z
P6	NC		S6	MIPI_CAM2_CLKOUT	GPIO1_B7_u
P7	MIPI_CSI0_RX_D0P		S7	I2C3_SDA_M0_MIPI	GPIO1_C0_z
P8	MIPI_CSI0_RX_D0N		S8	MIPI_CSI1_RX_CLK0P	
P9	GND		S9	MIPI_CSI1_RX_CLK0N	
P10	MIPI_CSI0_RX_D1P		S10	GND	
P11	MIPI_CSI0_RX_D1N		S11	MIPI_CSI1_RX_D0P	
P12	GND		S12	MIPI_CSI1_RX_D0N	

P13	MIPI_CSI0_RX_D2P		S13	GND	
P14	MIPI_CSI0_RX_D2N		S14	MIPI_CSI1_RX_D1P	
P15	GND		S15	MIPI_CSI1_RX_D1N	
P16	MIPI_CSI0_RX_D3P		S16	GND	
P17	MIPI_CSI0_RX_D3N		S17	PHY2_MDI0+	
P18	GND		S18	PHY2_MDI0-	
P19	PHY0_MDI3-		S19	PHY2_LED2/CFG_LDO1	
P20	PHY0_MDI3+		S20	PHY2_MDI1+	
P21	PHY0_LED2/CFG_LDO1		S21	PHY2_MDI1+	
P22	PHY0_LED1/CFG_LDO0		S22	PHY2_LED1/CFG_LDO0	
P23	PHY0_MDI2-		S23	PHY2_MDI2+	
P24	PHY0_MDI2+		S24	PHY2_MDI2-	
P25	PHY0_LED0/CFG_EXT		S25	GND	
P26	PHY0_MDI1-		S26	PHY2_MDI3+	
P27	PHY0_MDI1+		S27	PHY2_MDI3-	
P28	GPIO4_C6_d	GPIO4_C6_d	S28	NC	
P29	PHY0_MDI0-		S29	PCIE30_PORT0_TX0P	
P30	PHY0_MDI0+		S30	PCIE30_PORT0_TX0N	
P31	SPI1_CS1_M2	GPIO1_D5_d	S31	PHY2_LED0/CFG_EXT	
P32	GND		S32	PCIE30_PORT0_RX0P	
P33	NC		S33	PCIE30_PORT0_RX0N	
P34	SDMMC0_CMD	GPIO4_D4_u	S34	GND	
P35	SDMMC_DET_L	GPIO0_A4_u	S35	TYPEC0_SSTX2P	
P36	SD_CLK	GPIO4_D5_u	S36	TYPEC0_SSTX2N	
P37	SDMMC_PWREN	GPIO4_B0_d	S37	TYPEC0_USB20_VBUSDET	
P38	GND		S38	I2S0_MCLK	GPIO1_C2_d
P39	SDMMC0_D0	GPIO4_D0_u	S39	I2S0_LRCK_TX	GPIO1_C5_d
P40	SDMMC0_D1	GPIO4_D1_u	S40	I2S0_SDO0	GPIO1_C7_d
P41	SDMMC0_D2	GPIO4_D2_u	S41	I2S0_SDI0	GPIO1_D4_d
P42	SDMMC0_D3	GPIO4_D3_u	S42	I2S0_SCLK_TX	GPIO1_C3_d
P43	SPI1_CS0_M2	GPIO1_D3_d	S43	HDMI_RX_SCL_M1	GPIO3_D2_d
P44	SPI1_CLK_M2	GPIO1_D2_d	S44	HDMI_RX_SDA_M1	GPIO3_D3_d
P45	SPI1_MISO_M2	GPIO1_D0_d	S45	HDMI_RX_D0P	
P46	SPI1_MOSI_M2	GPIO1_D1_d	S46	HDMI_RX_D0N	
P47	GND		S47	GND	
P48	SATA30_1_TXP		S48	HDMI_RX_D1P	
P49	SATA30_1_TXN		S49	HDMI_RX_D1N	
P50	GND		S50	HDMIIRX_HPDOUT_H	GPIO3_D4_d
P51	SATA30_1_RXP		S51	HDMI_RX_D2P	
P52	SATA30_1_RXN		S52	HDMI_RX_D2N	
P53	GND		S53	NC	
P54	SPI0_CS0_M2	GPIO1_B4_u	S54	HDMI_RX_CLKP	
P55	SPI0_CS1_M2	GPIO1_B5_u	S55	HDMI_RX_CLKN	
P56	SPI0_CLK_M2	GPIO1_B3_u	S56	HDMI_RX_CEC	GPIO3_D1_d
P57	SPI0_MISO_M2	GPIO1_B1_u	S57	HDMIIRX_DET_L	GPIO1_A4_d
P58	SPI0_MOSI_M2	GPIO1_B2_u	S58	NC	
P59	GND		S59	TYPEC0_SSRX2P	
P60	TYPEC1_OTG_DP		S60	TYPEC0_SSRX2N	
P61	TYPEC1_OTG_DM		S61	GND	
P62	USB0_EN_OC#	GPIO4_B1_u	S62	TYPEC0_SSTX1P	
P63	TYPEC1_USB20_VBUSDET		S63	TYPEC0_SSTX1N	
P64	TYPEC1_USB20_OTG_ID		S64	GND	
P65	USB20_HOST0_DP		S65	TYPEC0_SSRX1P	
P66	USB20_HOST0_DM		S66	TYPEC0_SSRX1N	
P67	USB1_EN_OC#	GPIO4_B2_u	S67	GND	
P68	GND		S68	TYPEC0_OTG_DP	
P69	USB20_HOST1_DP		S69	TYPEC0_OTG_DM	
P70	USB20_HOST1_DM		S70	GND	
P71	USB2_EN_OC#	GPIO4_B3_u	S71	USB30_2_SSTXP	
P72	TYPEC0_SBU1		S72	USB30_2_SSTXN	
P73	TYPEC0_SBU2		S73	GND	
P74	NC		S74	USB30_2_SSRXP	
P75	PCIE20x1_2_PERSTn_M0_L	GPIO4_C1_d	S75	USB30_2_SSRXN	
P76	PCIE30x1_1_CLKREQn_M1_L	GPIO4_A0_d	S76	PCIE30x1_0_PERSTn_M2_L	GPIO4_A5_d

P77	PCIE30x1_0_CLKREQn_M2_L	GPIO4_A3_d	S77	PCIE30x1_1_PERSTn_M1_L	GPIO4_A2_d
P78	PCIE20x1_2_CLKREQn_M0_L	GPIO4_B7_u	S78	PCIE30_PORT1_RX1P	
P79	GND		S79	PCIE30_PORT1_RX1N	
P80	PCIE30_REFCLKP_SLOT1		S80	GND	
P81	PCIE30_REFCLKN_SLOT1		S81	PCIE30_PORT1_TX1P	
P82	GND		S82	PCIE30_PORT1_TX1N	
P83	PCIE20_0_REFCLKP		S83	GND	
P84	PCIE20_0_REFCLKN		S84	PCIE30_REFCLKP_SLOT0	
P85	GND		S85	PCIE30_REFCLKN_SLOT0	
P86	PCIE20_0_RXP/SATA30_0_RXP		S86	GND	
P87	PCIE20_0_RXN/SATA30_0_RXN		S87	PCIE30_PORT0_RX1P	
P88	GND		S88	PCIE30_PORT0_RX1N	
P89	PCIE20_0_TXP/SATA30_0_TXP		S89	GND	
P90	PCIE20_0_TXN/SATA30_0_TXN		S90	PCIE30_PORT0_TX1P	
P91	GND		S91	PCIE30_PORT0_TX1N	
P92	HDMI0_TX2P_PORT		S92	GND	
P93	HDMI0_TX2N_PORT		S93	DP1_TX0P	
P94	GND		S94	DP1_TX0N	
P95	HDMI0_TX1P_PORT		S95	NC	
P96	HDMI0_TX1N_PORT		S96	DP1_TX1P	
P97	GND		S97	DP1_TX1N	
P98	HDMI0_TX0P_PORT		S98	DP1_HPDIN_M0	GPIO5_D5_d
P99	HDMI0_TX0N_PORT		S99	DP1_TX2P	
P100	GND		S100	DP1_TX2N	
P101	HDMI0_TX3P_PORT		S101	GND	
P102	HDMI0_TX3N_PORT		S102	DP1_TX3P	
P103	GND		S103	DP1_TX3P	
P104	HDMITX0_HPDIN_M0	GPIO1_A5_d	S104	TYPEC0_USB20_OTG_ID	
P105	HDMITX0_SCL_M2	GPIO3_C7_u	S105	DP1_AUXP	
P106	HDMITX0_SDA_M2	GPIO3_D0_u	S106	DP1_AUXN	
P107	HDMITX0_CEC_M1	GPIO0_D1_u	S107	LCD1_BKLT_EN	GPIO3_C6_u
P108	MIPI_CAM1_PWREN_H	GPIO1_D6_u	S108	MIPI_DPHY1_TX_CLKP	
P109	MIPI_CAM2_PWREN_H	GPIO1_D7_u	S109	MIPI_DPHY1_TX_CLKN	
P110	MIPI_CAM1_PDN_L	GPIO1_A7_u	S110	GND	
P111	MIPI_CAM2_PDN_L	GPIO3_B2_d	S111	MIPI_DPHY1_TX_D0P	
P112	HP_DET_L	GPIO1_C4_d	S112	MIPI_DPHY1_TX_D0N	
P113	PWM5_M1_FAN	GPIO0_C6_u	S113	NC	
P114	GPIO1_B0_u	GPIO1_B0_u	S114	MIPI_DPHY1_TX_D1P	
P115	GPIO1_A6_d	GPIO1_A6_d	S115	MIPI_DPHY1_TX_D1N	
P116	GPIO1_C6_d	GPIO1_C6_d	S116	LCD1_VDD_EN	
P117	PCIE20x1_2_WAKEN_M0_L	GPIO4_C0_u	S117	MIPI_DPHY1_TX_D2P	
P118	PCIE30x1_1_WAKEN_M1_L	GPIO4_A1_d	S118	MIPI_DPHY1_TX_D2N	
P119	PCIE30x1_0_WAKEN_M2_L	GPIO4_A4_d	S119	GND	
P120	GND		S120	MIPI_DPHY1_TX_D3P	
P121	PCIE30X4_PERSTn_M0_L	GPIO4_B6_d	S121	MIPI_DPHY1_TX_D3N	
P122	PCIE30X4_CLKREQn_M0_L	GPIO4_B4_u	S122	MIPI_DPHY1_TX_D3N	
P123	BOOT_SARADC_IN0		S123	PCIE30X4_WAKEN_M0_L	GPIO4_B5_d
P124	HDMI0_TX_SBDP		S124	GND	
P125	HDMI0_TX_SBDN		S125	MIPI_DPHY0_TX_D0P	
P126	NC		S126	MIPI_DPHY0_TX_D0N	
P127	RESET_L		S127	LCD0_BKLT_EN	GPIO3_A6_d
P128	PWRON_L		S128	MIPI_DPHY0_TX_D1P	
P129	UART5_TX_M1	GPIO3_C4_u	S129	MIPI_DPHY0_TX_D1N	
P130	UART5_RX_M1	GPIO3_C5_u	S130	GND	
P131	BT_REG_ON_H	GPIO0_D2_u	S131	MIPI_DPHY0_TX_D2P	
P132	BT_WAKE_HOST_H	GPIO0_A0_d	S132	MIPI_DPHY0_TX_D2N	
P133	GND		S133	LCD0_VDD_EN	GPIO2_B4_u
P134	UART7_TX_M1	GPIO3_C0_d	S134	MIPI_DPHY0_TX_D3P	
P135	UART7_RX_M1	GPIO3_C1_d	S135	MIPI_DPHY0_TX_D3N	
P136	UART6_TX_M1	GPIO1_A1_d	S136	GND	
P137	UART6_RX_M1	GPIO1_A0_d	S137	MIPI_DPHY0_TX_D3N	
P138	UART6_RTS_M1	GPIO1_A2_d	S138	MIPI_DPHY0_TX_CLKN	
P139	UART6_CTS_M0	GPIO1_A3_d	S139	TP_INT_L	GPIO2_C5_d
P140	UART2_TX_M0_DEBUG	GPIO0_B5_d	S140	HOST_WAKE_BT_H	GPIO2_C3_d

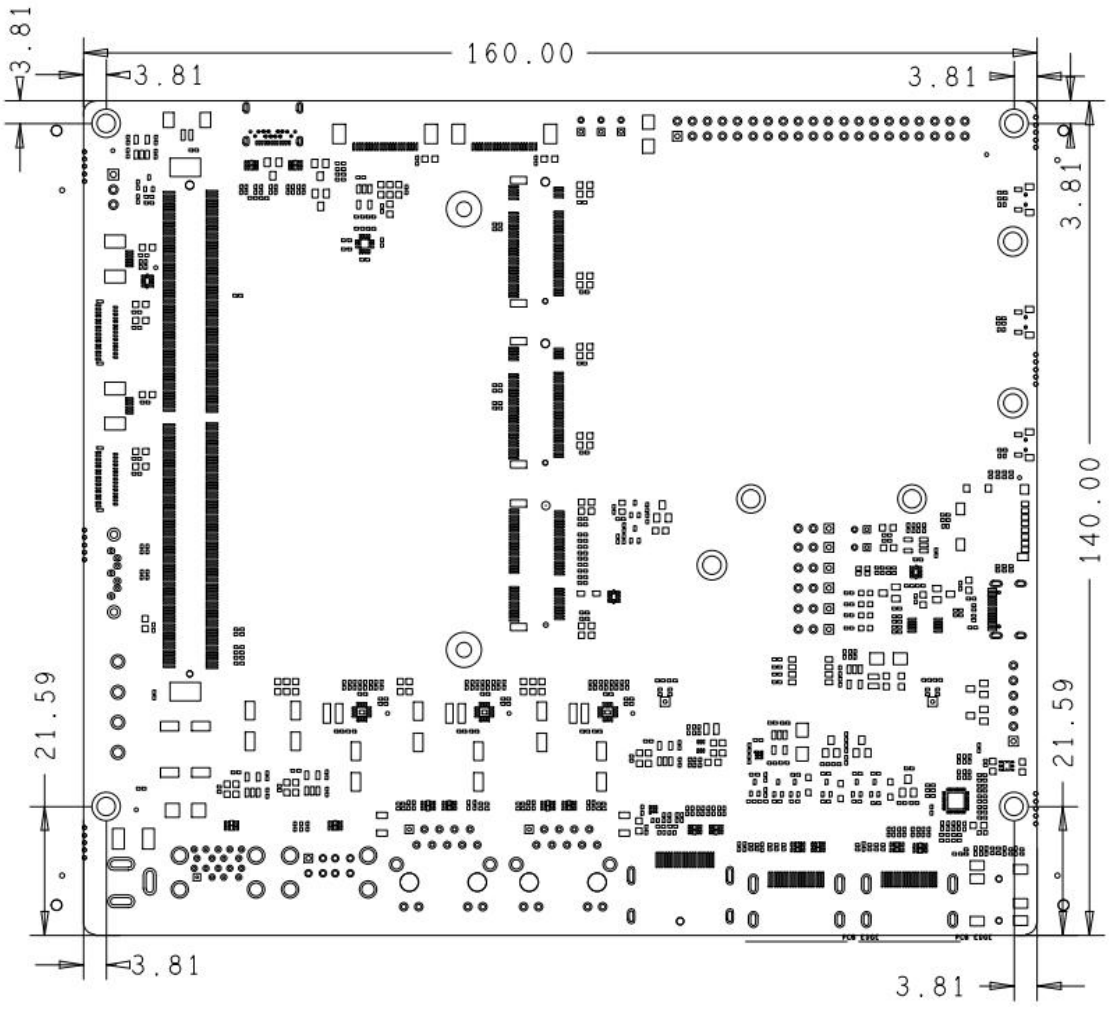
P141	UART2_RX_M0_DEBUG	GPIO0_B6_d	S141	LCD0_BKLT_PWM	GPIO3_B6_d
P142	GND		S142	GPIO0_D3_d	GPIO0_D3_d
P143	CAN0_TX_M0	GPIO0_B7_d	S143	GND	
P144	CAN0_RX_M0	GPIO0_B8_d	S144	GPIO0_B2_u	GPIO0_B2_u
P145	CAN2_TX_M1	GPIO0_D5_u	S145	NC	
P146	CAN2_RX_M1	GPIO0_D4_u	S146	NC	
P147	VCC4V0_SYS		S147	VDD_RTC	
P148	VCC4V0_SYS		S148	SARADC_VIN5_HW_ID	
P149	VCC4V0_SYS		S149	NC	
P150	VCC4V0_SYS		S150	SARADC_IN6	
P151	VCC4V0_SYS		S151	SARADC_IN1	
P152	VCC4V0_SYS		S152	SARADC_IN2	
P153	VCC4V0_SYS		S153	SARADC_IN3	
P154	VCC4V0_SYS		S154	NC	
P155	VCC4V0_SYS		S155	NC	
P156	VCC4V0_SYS		S156	SARADC_IN4	
			S157	NC	
			S158	GND	

7. Hardware Resources of SSOM-3588 Dev Board



8. Dimension Specifications of SSOM-3588 Dev Board

Size:160mm X 140mm



9. Ordering Information

Part No.	CPU	Memory	Flash	Operating Temperature
SSOM-3588-0432	RK3588	4GB	32GB	-20~75°C
SSOM-3588-0864	RK3588	8GB	64GB	-20~75°C
SSOM-3588-1628	RK3588	16GB	128GB	-20~75°C
SSOM-3588-3228	RK3588	32GB	128GB	-20~75°C

10. Update History

Version Revision	Update Date	Content
Provisional V 1.0	2025-4-29	Initial the first version