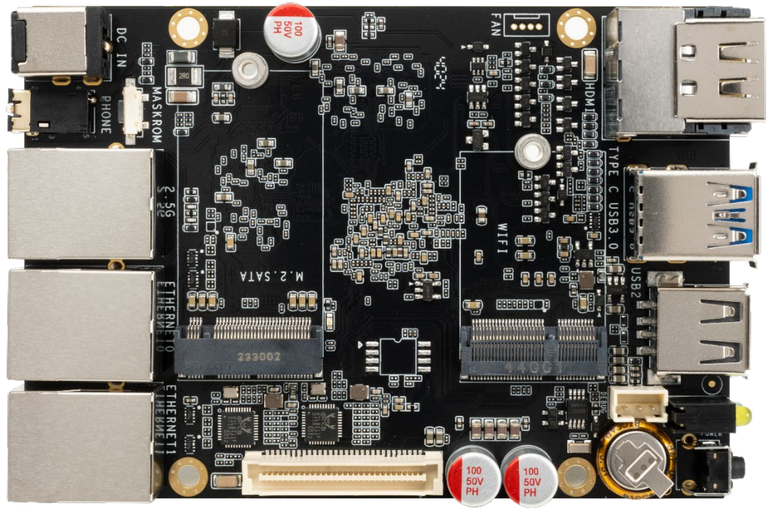
Octa-core 8K AI Multi-LAN port Mainboard

- ROC-RK3588-RT(Commercial)
- ROC-RK3588J-RT(Industrial)



V1.1 2025-6-4

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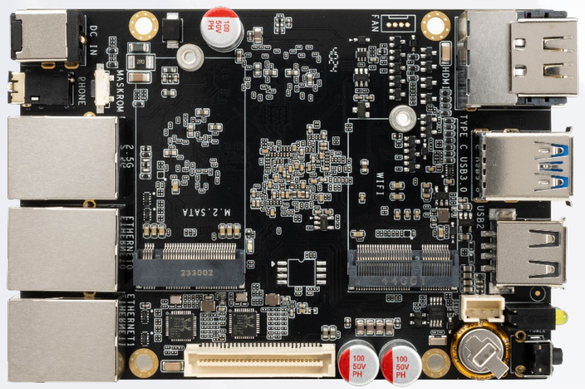
Product features



A new generation of high-end flagship processors

It adopts octa-core 64-bit processor RK3588, 4×Cortex-A76+4×Cortex-A55, 8nm process technology, and the main frequency is up to 2.4GHz.

8K video codec/6TOPS NPU

Supports 8K@60fps H.265/VP9 video decoding, 8K@30fps H.265/H.264 video encoding, and 6TOPS NPU to empower AI applications.

Equipped with 32GB large memory

It can be equipped with up to 32GB memory capacity and supports LPDDR4/LPDDR4x to meet the needs of large-capacity memory products.

2.5G/Dual Gigabit high-speed Ethernet ports

1×2.5G Ethernet + 2×Gigabit Ethernet. Faster data transfer, enhanced seamless multimedia streaming, and real-time communication with WAN/LAN customizable.

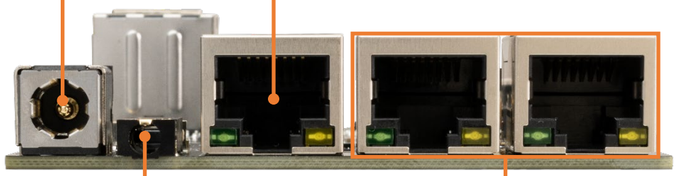
Wide range of application scenarios

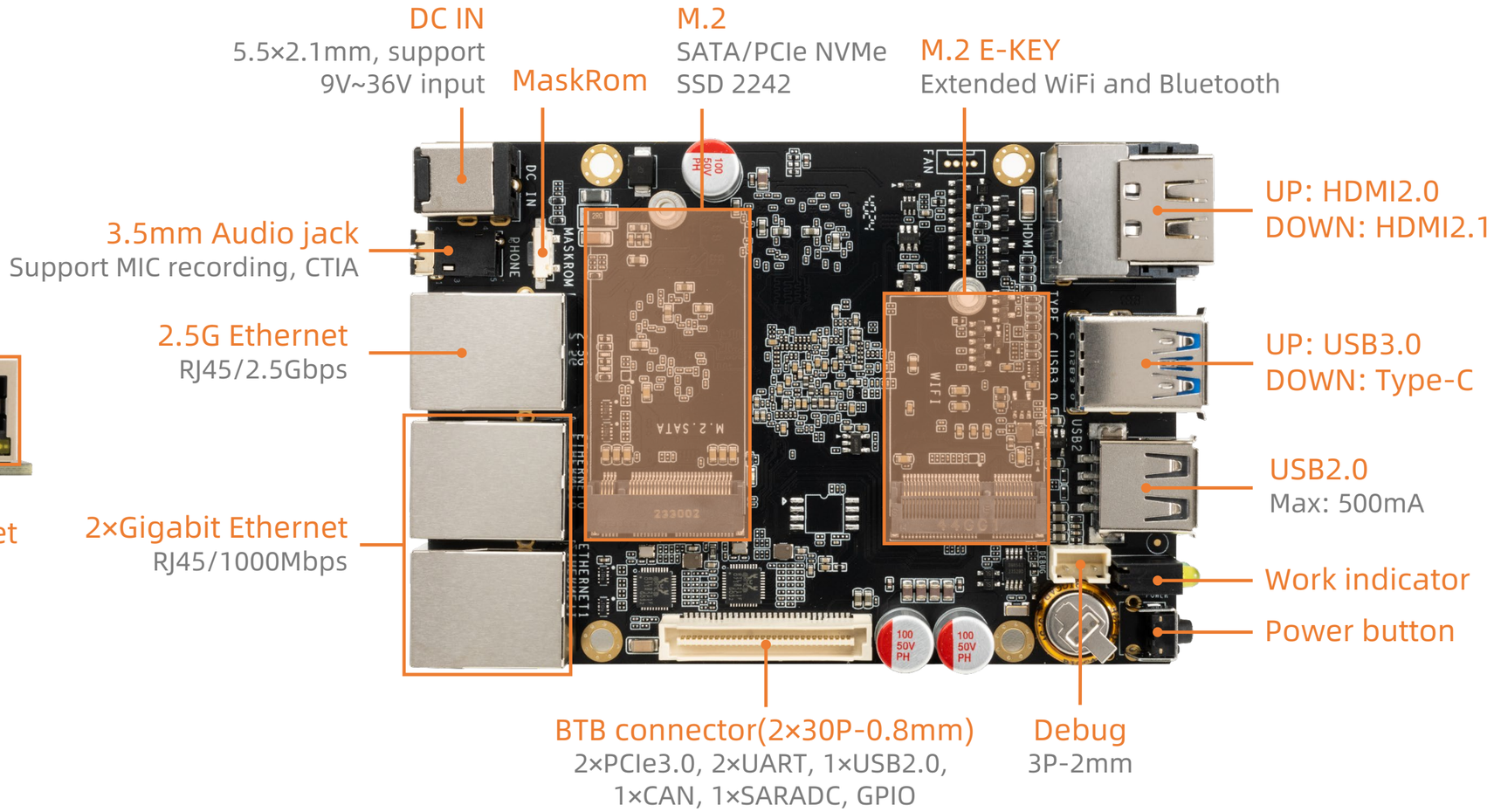
It is widely used in ARM PCs, mini hosts, industrial soft routing, intelligent gateways, NAS storage, edge computing, artificial intelligence, industrial control and other fields.

Specifications

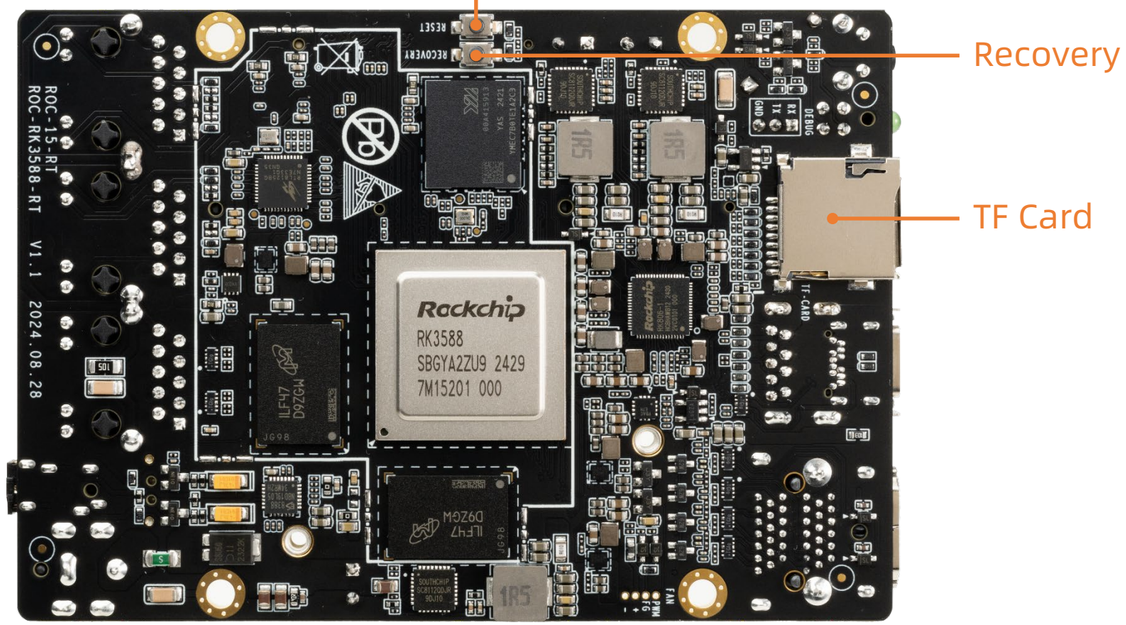
		ROC-RK3588-RT(Commercial)	ROC-RK3588J-RT(Industrial)
Basic Specifications	CPU	RK3588, Octa-core 64-bit(4×Cortex-A76+4×Cortex-A55) Up to 2.4GHz	RK3588J, Octa-core 64-bit(4×Cortex-A76+4×Cortex-A55) Up to 1.6GHz
	GPU	ARM Mali-G610 MP4 Quad-core GPU, support OpenGL ES3.2/OpenCL 2.2/Vulkan1.1, 450 GFLOPS	
	NPU	The computing power is up to 6TOPs (INT8), supports INT4/INT8/INT16 hybrid computing, and can be based on TensorFlow/MXNet/PyTorch/Caffe and other series of frameworks	
	VPU	Hardware Decoding: 8K@60fps H.265/VP9/AVS2, 8K@30fps H.264 AVC/MVC, 4K@60fps AV1, 1080P@60fps MPEG-2/-1/VC-1/VP8 Hardware Encoding: 8K@30fps H.265/H.264	
	RAM	4GB/8GB/16GB/32GB LPDDR4/LPDDR4x	
	Storage	32GB/64GB/128GB eMMC	
	Expand storage	1 × M.2 SATA/PCIe NVMe SSD (2242), 1 × TF Card	
	Power	DC 12V (5.5 × 2.1mm, support 9V~36V wide voltage input)	
	Power consumption	Max: 14.4W(12V/1200mA) Normal: 3W(12V/250mA) Min: 0.36W(12V/30mA)	Max: 13.2W(12V/1100mA) Normal: 3W(12V/250mA) Min: 0.36W(12V/30mA)
	OS	Android, Linux OS, OpenWRT	
	Weight	≈94g	
	Size	108.48mm × 74.98mm × 22.80mm	
	Environment	Operating Temperature: -20℃ ~ 60℃ Operating Humidity: 10% ~ 90%RH(non-condensing)	Operating Temperature: -40℃ ~ 85℃ Operating Humidity: 10% ~ 90%RH(non-condensing)
Interface Specifications	Ethernet	2 × 1000M bps Ethernet, 1 × 2.5G bps Ethernet, WAN/LAN can be customized	
	WiFi	The WiFi/Bluetooth module can be expanded through the M.2 E-KEY (2230), supporting WiFi6 and Bluetooth5.0	
	Video output	1 × HDMI2.1 (8K@60Hz), 1 × HDMI2.0 (4K@60Hz), 1 × DP1.4 (8K@30Hz, output via Type-C port)	
	Audio output	1 × 3.5mm Audio jack (Support MIC recording, American standard CTIA)	
	USB	1 × USB3.0 (Max: 1A), 1 × USB2.0 (Max: 500mA), 1 × Type-C (USB3.0 OTG/DP1.4)	
	Debug	1 × Debug (Debugging Serial Port, 3Pin-2mm)	
	Button	1 × Recovery, 1 × Reset	
	Other	1 × BTB connector (2×30Pin/0.8PH), interfaces can be extracted: 2×PCIe3.0(4Lanes) |2×UART | 1×USB2.0 | 1×CAN | 1×SARADC | GPIO Among them, the PCIe3.0 can be combined in a variety of ways: 1 × PCIe3.0 (4Lanes, RC or EP) or 1 × PCIe3.0 (2Lanes, RC or EP) + 1 × PCIe3.0 (2Lanes, RC) or 1 × PCIe3.0 (2Lanes, RC or EP) + 1 × PCIe3.0 (1Lane, RC) or 4 × PCIe3.0 (1Lane, RC)	

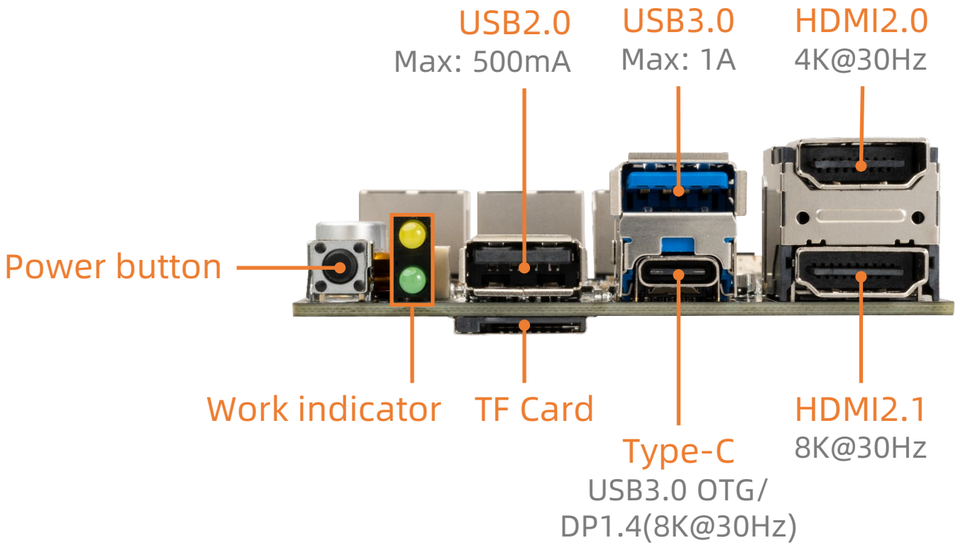
Interface description



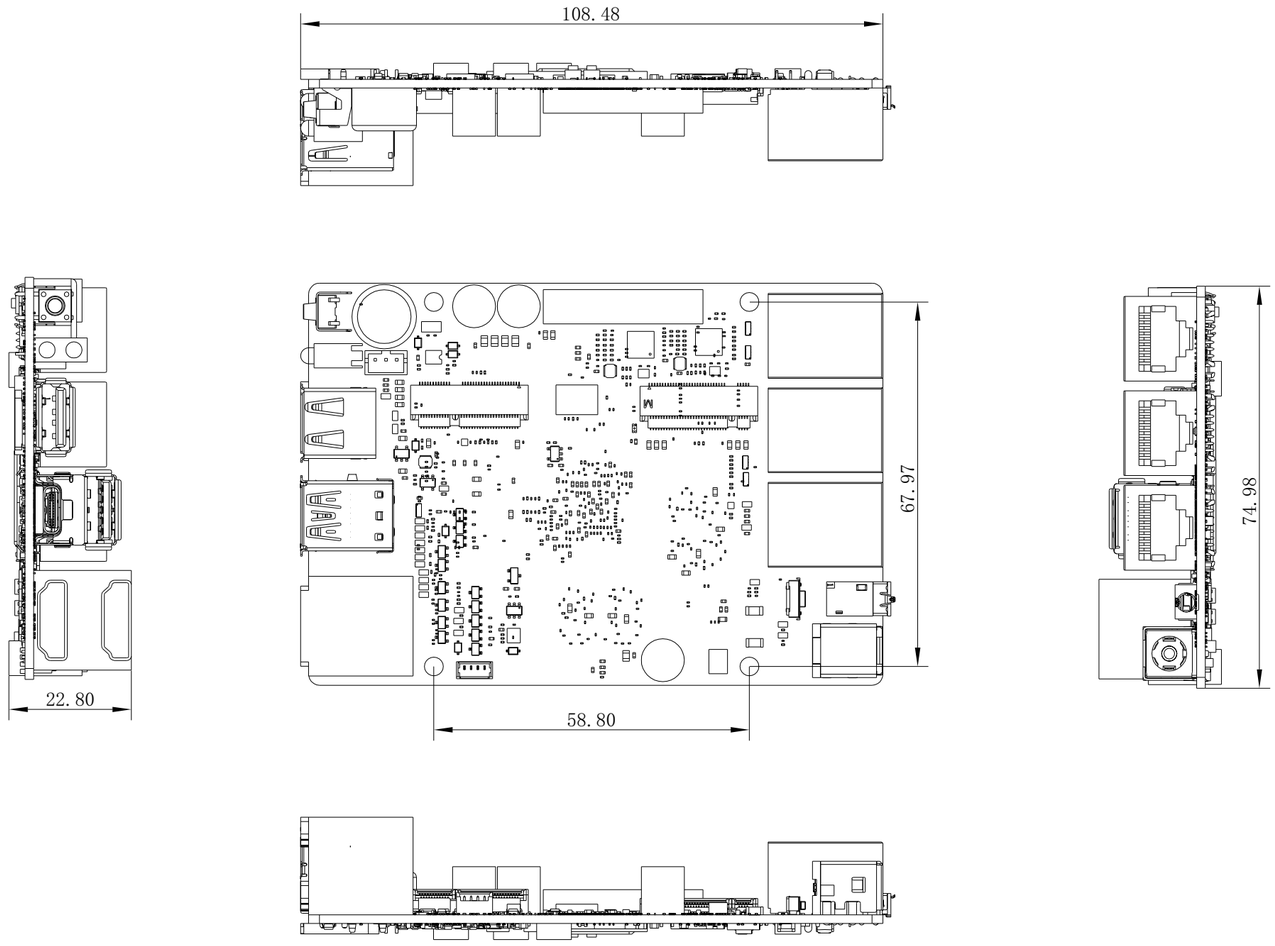


Interface description



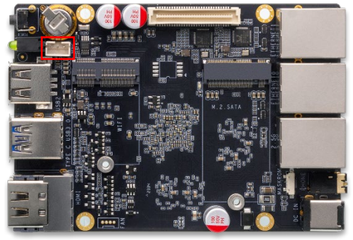


Dimension



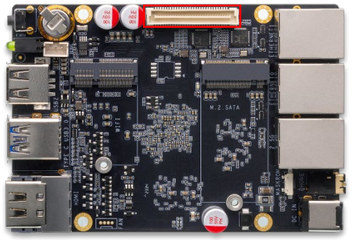
Interface definition

1. DEBUG: 3 PIN 2.0mm Pitch wafer (J13)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	DEBUG_RXD	3.3	3	GND	
2	DEBUG_TXD	3.3			

2. BTB Male 60 PIN (J12)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	VCC5V0_SYS(5V Output)	5.0	2	VCC5V0_SYS(5V Output)	5.0
3	VCC5V0_SYS(5V Output)	5.0	4	VCC5V0_SYS(5V Output)	5.0
5	VCC5V0_SYS(5V Output)	5.0	6	VCC5V0_SYS(5V Output)	5.0
7	VCC5V0_SYS(5V Output)	5.0	8	VCC5V0_SYS(5V Output)	5.0

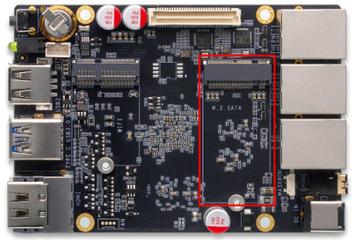
Interface definition

9	GND		10	GND	
11	GND		12	GND	
13	PCIE30X4_WAKEn_M1_L (GPIO4_B5_d)	3.3	14	PCIE30X2_PERSTn_M2 (GPIO3_D4_d)	3.3
15	PCIE30X4_CLKREQn_M1_L (GPIO4_B4_u)	3.3	16	PCIE30X2_WAKEN_M2 (GPIO3_D3_d)	3.3
17	PCIE30X4_PERSTn_M1_L (GPIO4_B6_d)	3.3	18	PCIE30X2_CLKREQN_M2 (GPIO3_D2_d)	3.3
19	PCIE30X1_1_WAKEn_M2_L (GPIO1_A1_d)	3.3	20	ADC4_INPUT [pull up resistor 10K]	1.8
21	PCIE30X1_1_CLKREQn_M2_L (GPIO1_A0_d)	3.3	22	UART7_RX_M2 (GPIO1_B4_u)	3.3
23	PCIE30X1_1_PERSTn_M2_L (GPIO1_A7_u)	3.3	24	UART7_TX_M2 (GPIO1_B5_u)	3.3
25	CAN1_RX_M1 (GPIO4_B2_u)	3.3	26	UART4_RX_M2 (GPIO1_B2_d)	3.3
27	CAN1_TX_M1 (GPIO4_B3_u)	3.3	28	UART4_TX_M2 (GPIO1_B3_d)	3.3
29	USB_20_HOST1_DM	-	30	USB_20_HOST1_DP	-
31	PCIE30_PORT0_RX1P	-	32	PCIE30_PORT0_RX0P	-
33	PCIE30_PORT0_RX1N	-	34	PCIE30_PORT0_RX0N	-
35	GND		36	GND	
37	PCIE30_PORT0_TX0P (Series capacitor 220nF)	-	38	PCIE30_PORT0_REFCLKP_IN	-
39	PCIE30_PORT0_TX0N (Series capacitor 220nF)	-	40	PCIE30_PORT0_REFCLKN_IN	-
41	GND		42	GND	

Interface definition

43	PCIE30_PORT1_RX2P	-	44	PCIE30_PORT0_TX1P(Series capacitor 220nF)	-
45	PCIE30_PORT1_RX2N	-	46	PCIE30_PORT0_TX1N(Series capacitor 220nF)	-
47	GND		48	GND	
49	PCIE30_PORT1_TX2P(Series capacitor 220nF)	-	50	PCIE30_PORT1_RX3P	-
51	PCIE30_PORT1_TX2N(Series capacitor 220nF)	-	52	PCIE30_PORT1_RX3N	-
53	GND		54	GND	
55	PCIE30_PORT1_REFCLKP_IN	-	56	PCIE30_PORT1_TX3P(Series capacitor 220nF)	-
57	PCIE30_PORT1_REFCLKN_IN	-	58	PCIE30_PORT1_TX3N(Series capacitor 220nF)	-
59	GND		60	GND	

3. M.2 SATA 66 PIN (U22)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	GND		2	VCC3V3_SATA (3.3V Output)	3.3
3	GND		4	VCC3V3_SATA (3.3V Output)	3.3
5	NC		6	NC	
7	NC		8	NC	

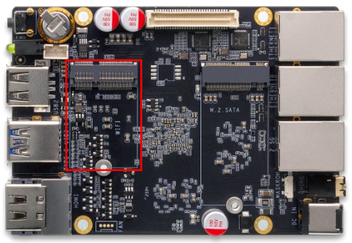
Interface definition

9	GND		10	DAS/DSS [pull up resistor10K]	3.3
11	NC		12	VCC3V3_SATA (3.3V Output)	3.3
13	NC		14	VCC3V3_SATA (3.3V Output)	3.3
15	NC		16	VCC3V3_SATA (3.3V Output)	3.3
17	NC		18	VCC3V3_SATA (3.3V Output)	3.3
19	NC		20	NC	
21	GND		22	NC	
23	NC		24	NC	
25	NC		26	NC	
27	GND		28	NC	
29	NC		30	NC	
31	NC		32	NC	
33	GND		34	NC	
35	NC		36	NC	
37	NC		38	SATA_DEVSLP (GPIO3_B2_d) [pull up resistor10K]	3.3
39	GND		40	NC	
41	PCIE20_2_RXP/SATA30_2_RXP/USB30_2_SSRXP	-	42	NC	
43	PCIE20_2_RXN/SATA30_2_RXN/USB30_2_SSRXN	-	44	NC	
45	GND		46	NC	
47	PCIE20_2_TXN/SATA30_2_TXN/USB30_2_SSTXN (Series capacitor 10nF)	-	48	NC	
49	PCIE20_2_TXP/SATA30_2_TXP/USB30_2_SSTXP (Series capacitor 10nF)	-	50	PCIE30X1_1_PERSTn_M1_L (GPIO4_A2_d)	3.3

Interface definition

51	GND		52	PCIE30X1_1_CLKREQn_M1_L (GPIO4_A0_d)	3.3
53	PCIE20_2_REFCLKN	-	54	PCIE30X1_1_WAKEn_M1_L (GPIO4_A1_d)	3.3
55	PCIE20_2_REFCLKP	-	56	NC	
57	GND		58	NC	
67	NC		68	NC	
69	GND		70	VCC3V3_SATA (3.3V Output)	3.3
71	GND		72	VCC3V3_SATA (3.3V Output)	3.3
73	GND		74	VCC3V3_SATA (3.3V Output)	3.3
75	GND				

4. WIFI 66 PIN (U14)



NO.	Definition	Power/V	NO.	Definition	Power/V
1	GND		2	WIFI_3V3 (3.3V Output)	3.3
3	USB20_HOST1_DP	-	4	WIFI_3V3 (3.3V Output)	3.3
5	USB20_HOST1_DM	-	6	NC	

Interface definition

7	GND		8	NC	
9	NC		10	NC	
11	NC		12	NC	
13	NC		14	NC	
15	NC		16	NC	
17	NC		18	GND	
19	NC		20	HOST_WAKE_BT_H (GPIO0_C5_u)	3.3
21	NC		22	NC	
23	NC		32	NC	
33	GND		34	NC	
35	PCIE20_1_TXP (Series capacitor 100nF)	-	36	NC	
37	PCIE20_1_TXN (Series capacitor 100nF)	-	38	BT_WAKE_HOST_H (GPIO0_A0_d)	1.8
39	GND		40	NC	
41	PCIE20_1_RXP (Series capacitor 100nF)	-	42	NC	
43	PCIE20_1_RXN (Series capacitor 100nF)	-	44	NC	
45	GND		46	NC	
47	PCIE20_1_REFCLKP	-	48	NC	
49	PCIE20_1_REFCLKN	-	50	32.768KHz OUTPUT	1.8
51	GND		52	PCIE30X1_0_PERSTN_M1 (GPIO4_A5_d)	3.3
53	PCIE30X1_0_CLKREQN_M1 (GPIO4_A3_d)	3.3	54	BT_DISABLE (GPIO0_C6_u)	3.3

Interface definition

55	PCIE30X1_0_WAKEN_M1 (GPIO4_A4_d)	3.3	56	WIFI_DISABLE (GPIO0_C4_d)	3.3
57	GND		58	NC	
59	NC		60	NC	
61	NC		62	NC	
63	GND		64	NC	
65	NC		66	NC	
67	NC		68	NC	
69	GND		70	NC	
71	NC		72	WIFI_3V3(3.3V Output)	3.3
73	NC		74	WIFI_3V3(3.3V Output)	3.3
75	GND				

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