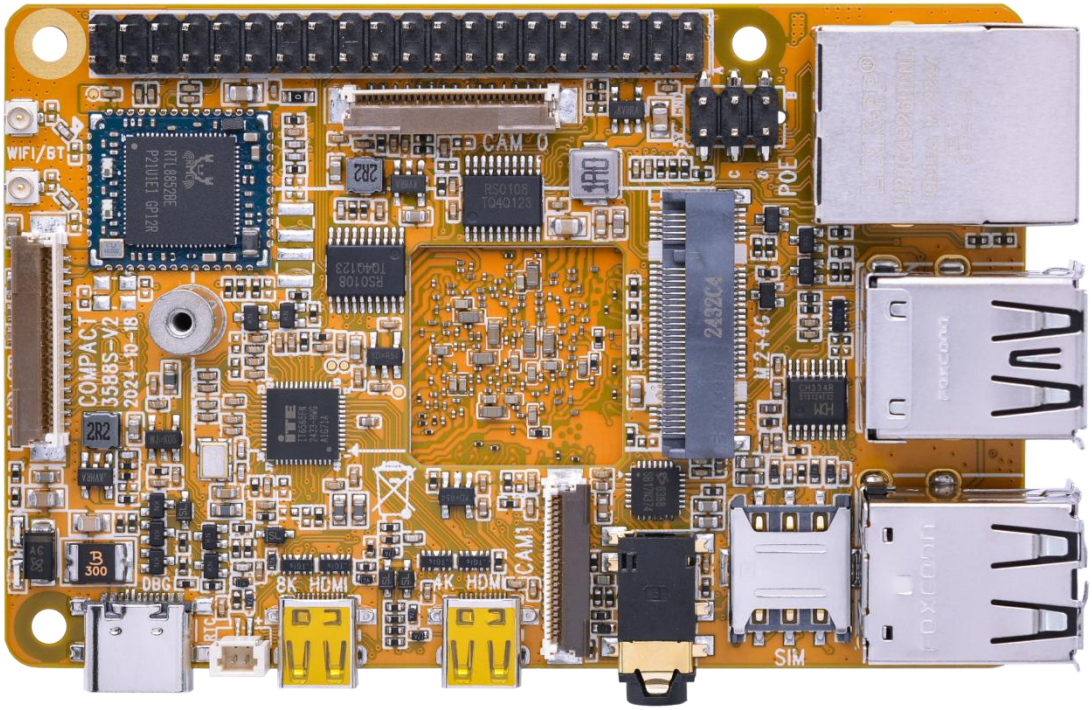
Compact3588S Hardware Manual

V2.202512



Boardcon Embedded Design

www.boardcon.com

1.Introduction

1.1.About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2.Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website(www.boardcon.com,www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence, If you have questions, comments, or concerns about your product or project, please no hesitate to contact us at support@armdesigner.com.

1.3.Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lighting or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit. In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this product.

Repairs make after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.

Content

1 Compact3588S Introduction 1

1.1 Summary 1

1.2 Rockchip RK3588S Features 1

1.3 Compact3588S Specifications 3

1.4 PCB Dimension 5

1.5 Block Diagram 6

1.6 CPU Introduction 6

2 Peripherals Introduction 11

2.1 Power in/ Debug(J1) 11

2.2 Headset(J17) 11

2.3 Camera(CON2, J4) 12

2.4 MIPILCD(J15) 14

2.5 HDMI(J3, J7) 15

2.6 USB2.0+USB3.0(P3) 16

2.7 2×USB 2.0(P4) 17

2.8 Ethernet(JP2) 17

2.9 User Buttons (K1) 18

2.10 WiFi&Bluetooth(U2) 19

2.11 4G/SSD(CON6) 20

2.12 SIM (P1) 22

2.13 Micro SD(J8) 22

2.14 RTC(J2) 23

2.15 2×UART/CAN/I2C/SPI/PWM/GPIO (CON3) 23

2.16 POE (CON5) 25

3 Product Configurations 26

3.1 Standard Contents 26

3.2 Optional Parts 26

1 Compact3588S Introduction

1.1 Summary

The Compact3588S adopts the Rockchip RK3588S SoC, which integrates a quad-core Cortex-A76 processor and a quad-core Cortex-A55 processor. The SoC also features a dedicated NPU with computing power up to 6 TOPS, enabling efficient AI processing for various AI scenarios. It supports 4K video decoding and 8K video encoding, providing ultra-high-definition rendering and superior image processing capabilities. The RK3588S also offers powerful network communication functions, including support for 4G, 2.4G/5G Wi-Fi, Bluetooth 5.2 and one Gigabit Ethernet. The Compact3588S is equipped with a variety of interfaces, such as HDMI OUT, DP, MIPI_LCD. It can used for the high-performance devices such as IoT devices, Industrial monitoring equipment, smart home devices, smart cameras, and smart customer service robots, etc.

Compact3588S is implemented with a CM3588S computer-on-module providing most of the functions and interfaces, and Compact3588S carrier board providing connectors and several additional functions. The rich feature set of Compact3588S is customizable according to the price / performance needs of the target application. Compact3588S contains expansion connectors which accommodate a wide range of standard peripheral devices. Compact3588S is provided with full ready-to-run Android 14, Debian 12, Buildroot SW packages and comprehensive user manual and designing guide.

1.2 Rockchip RK3588S Features

- **Microprocessor**

-Quad-core Cortex-A76 up to 2.4G. Each Cortex-A76 is equipped with 64KB L1 instruction cache, 64KB L1 data cache and 512KB L2 cache.

-Quad-core Cortex-A55 up to 1.8G. Each Cortex-A55 is equipped with 32KB L1 instruction cache, 32KB L1 data cache and 128KB L2 cache.

-Quad-core Cortex-A76 and Quad-core Cortex-A55 share 3MB L3 cache.

- **Memory Organization**

-8GB LPDDR4X (up to 16GB).

- **PWM**

-Supports 16 on-chip PWMs with interrupt-based operation.

-Support capture mode.

-Support continuous mode and one-shot mode.

- **Watchdog**

-Totally five Watchdog for CPU and MCU.

-32-bit watchdog counter.

- **Interrupt Controller**

-Support 12 PPI interrupt source and 480 SPI interrupt sources input from different components inside RK3588S.

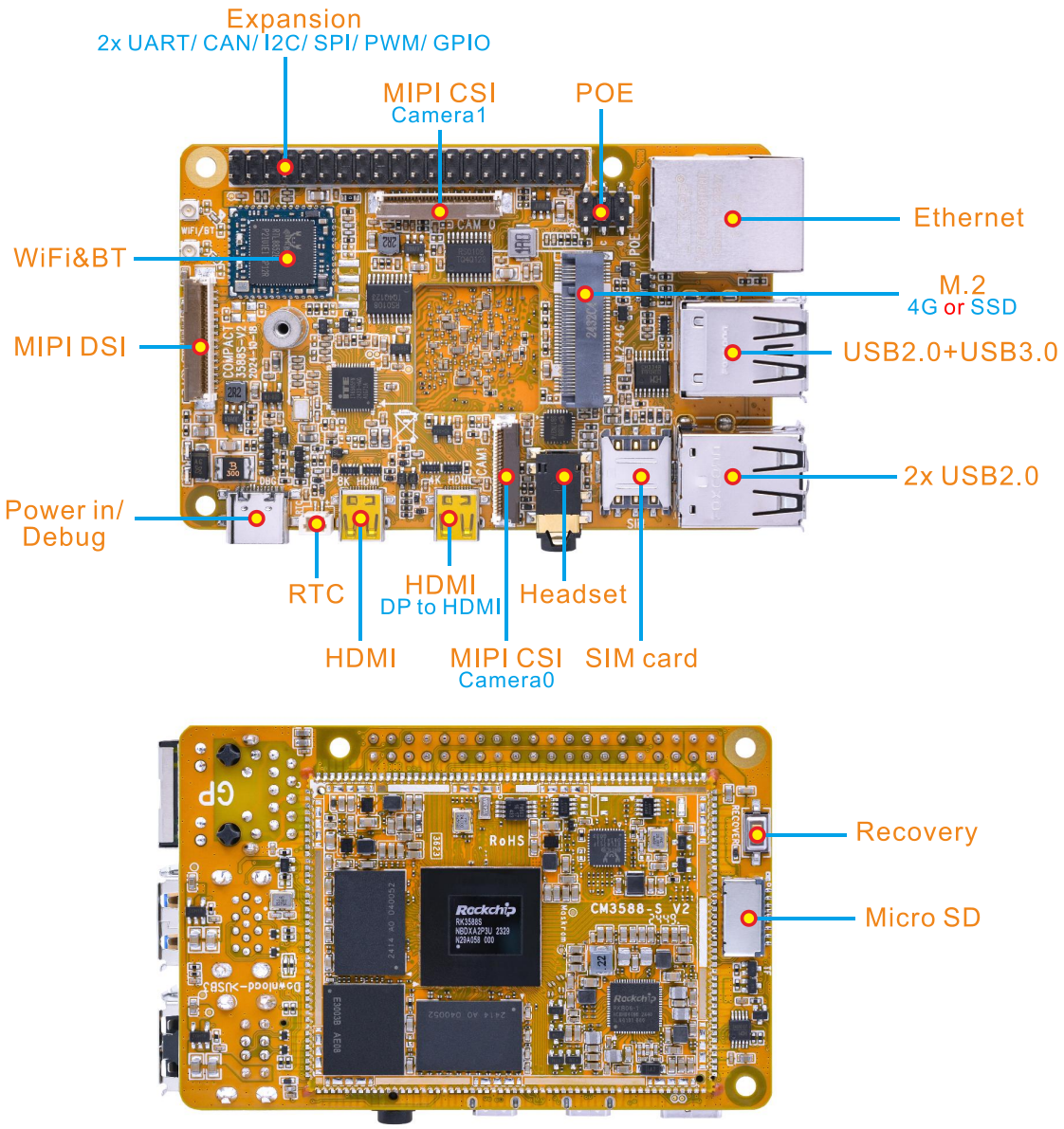
-Support 16 software-triggered interrupts.

- **Temperature**

-In Automatic Mode,the temperature of alarm (high/low temperature) interrupt can be configurable.

-40~125°C temperature range and 1°C temperature resolution.

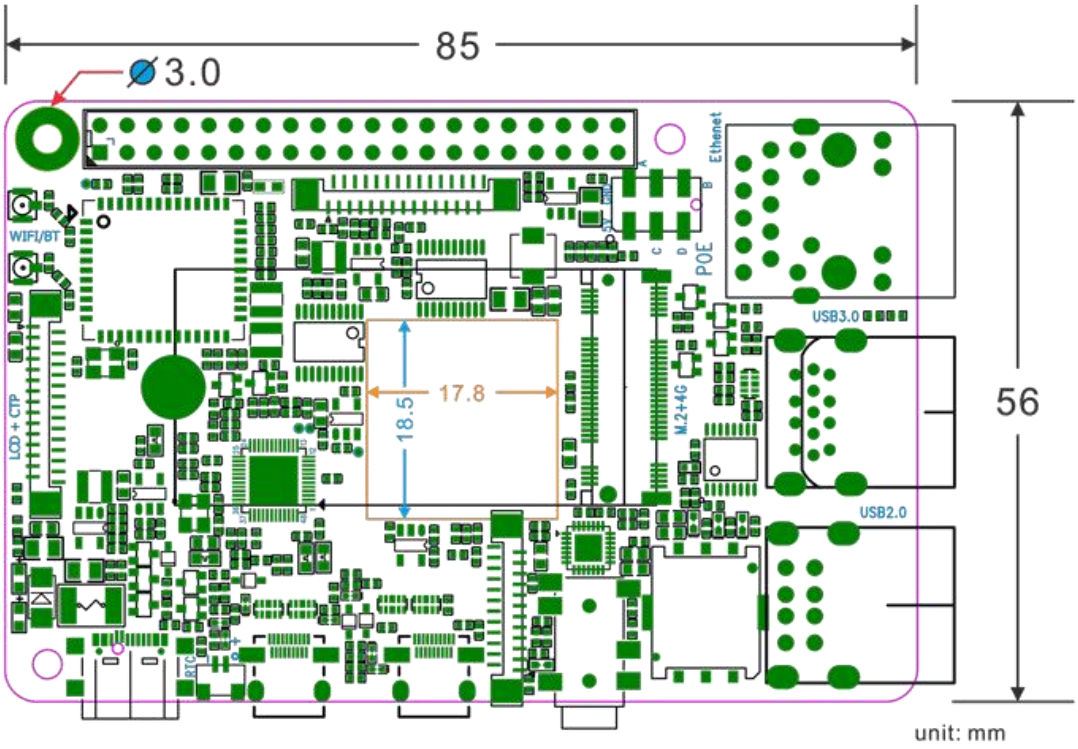
1.3 Compact3588S Specifications



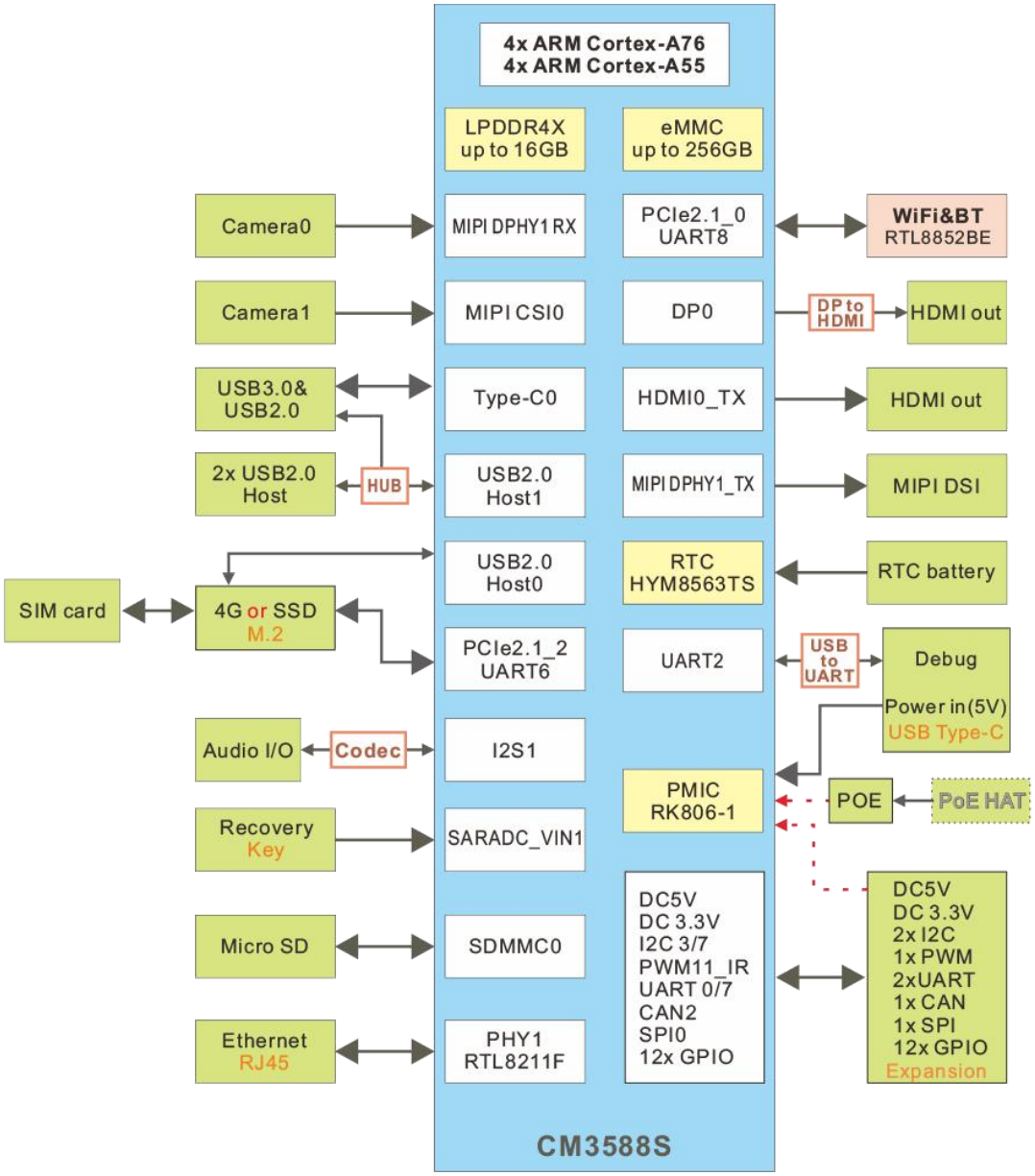
Feature	Specifications
CPU	Quad-core Cortex-A76 + Quad-core Cortex-A55
Memory	8GB LPDDR4X (up to 16GB)
Power	• 5V DC via USB-C connector (minimum 3A) • 5V DC via GPIO header (minimum 3A) • Power over Ethernet (PoE) enabled (requires separate PoE HAT)

USB	• 3x USB2.0 Host • 1x USB3.0 Host/device
Storage	• 32GB eMMC flash (up to 256GB) • MicroSD card slot • M.2 socket for SSD (optional. multiplexed with 4G module)
Ethernet	PoE-capable Gigabit Ethernet RJ45 port via Realtek RTL8211F-CG controller
Display	• HDMI 2.1, up to 8Kp60, Micro HDMI (HDMI0) • DP1.4 to HDMI2.0, up to 4Kp60, Micro HDMI (HDMI1) • MIPI DSI, up to 4Kp60, 30-pin FPC connector
Camera	• 4-lane camera via 30-pin FPC connector • 2-lane camera via 24-pin FPC connector
Audio	3.5mm audio I/O jack
Keys&Switch	Recovery key
4G	M.2 socket with Nano SIM card port to support 4G LTE Module
WIFI&BT	2.4G/5G 2T2R WiFi (802.11a/b/g/n/ac/ax) with Bluetooth5.2
RTC	Real-time clock (RTC), powered from external battery, 2-pin connector
Other features	2x I2C, 1x PWM, 2x UART, 1x CAN, 1x SPI and 12x GPIO via 40-pin GPIO header
Dimension	85 x 56 mm

1.4 PCB Dimension



1.5 Block Diagram



1.6 CPU Introduction

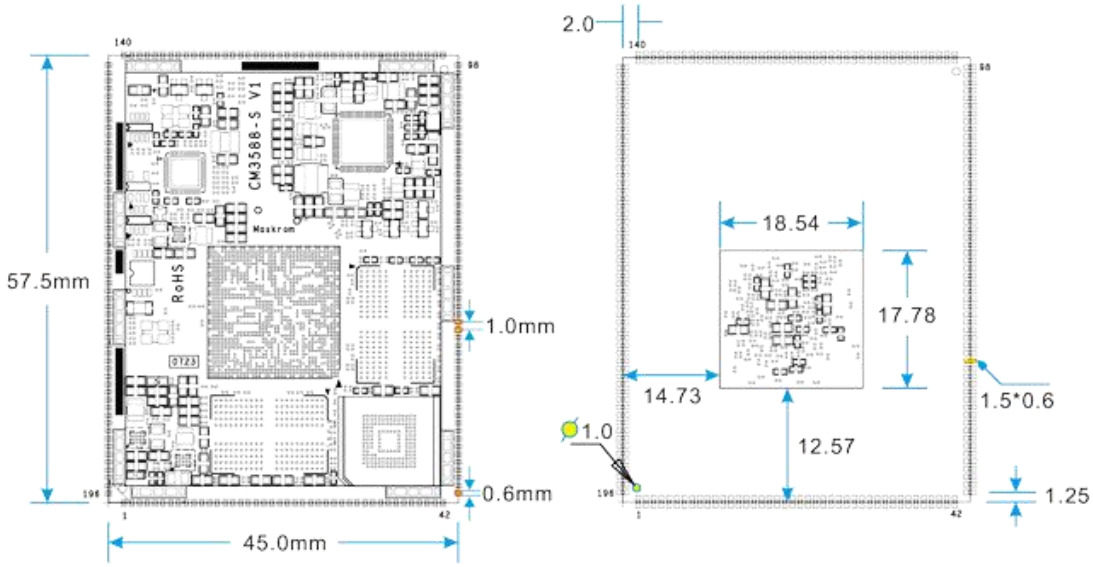
The CPU module RK3588S is equipped with 8GB (up to 16GB) of LPDDR4X RAM and offers 32GB (up to 256GB) of eMMC Flash storage.

CM3588S specifications

Pin number– 196-pin, 1.0mm pitch

Dimension–57.5 x 45.0 mm

Application–8K TV box or recorder, VI devices, intelligent interactive devices, personal computers and robots



Pin Definition

Pin	Signal	Pin	Signal
1	VCC_SYS	99	SDMMC_DET_1V8
2	VCC_SYS	100	PWRON_L
3	VCC_SYS	101	RESET_L
4	GND	102	VCC_1V8
5	PWM7_IR_M0_1V8	103	GND
6	BT_REG_ON_H_1V8	104	TYPEC0_SBU1/DP_AUXN
7	BT_WAKE_HOST_H_1V8	105	TYPEC0_SBU1/DP_AUXP
8	HOST_WAKE_BT_H_1V8	106	TYPEC0_SSRX1N
9	WIFI_WAKE_HOST_H_1V8	107	TYPEC0_SSRX1P
10	WIFI_REG_ON_H_1V8	108	TYPEC0_SSTX1P
11	GND	109	TYPEC0_SSTX1N
12	PDM0_CLK0_1V8	110	TYPEC0_SSRX2N
13	PDM0_CLK1_1V8	111	TYPEC0_SSRX2P
14	PDM0_SDI0_1V8	112	TYPEC0_SSTX2P
15	GND	113	TYPEC0_SSTX2N

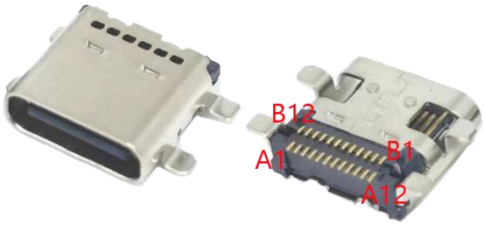
16	UART6_TX_M1_1V8	114	GND
17	UART6_RX_M1_1V8	115	MIPI_DPHY1_TX_D0N
18	UART6_RTSn_M1_1V8	116	MIPI_DPHY1_TX_D0P
19	UART6_CTSn_M1_1V8	117	MIPI_DPHY1_TX_D1N
20	GPIO1_A7_u_1V8	118	MIPI_DPHY1_TX_D1P
21	GPIO1_B0_u_1V8	119	MIPI_DPHY1_TX_CLKN
22	GPIO1_A4_d_1V8	120	MIPI_DPHY1_TX_CLKP
23	GPIO1_A5_d_1V8	121	MIPI_DPHY1_TX_D2N
24	GPIO1_A6_d_1V8	122	MIPI_DPHY1_TX_D2P
25	GND	123	MIPI_DPHY1_TX_D3N
26	MIPI_CAM4_CLK_M0_1V8	124	MIPI_DPHY1_TX_D3P
27	GND	125	GND
28	SPI0_CS1_M2_1V8	126	RECOVERY_SARADC_VIN1
29	SPI0_CS0_M2_1V8	127	SARADC_VIN2
30	SPI0_MISO_M2_1V8	128	SARADC_VIN5
31	SPI0_MOSI_M2_1V8	129	GND
32	SPI0_CLK_M2_1V8	130	MIPI_DPHY1_RX_D0N
33	GND	131	MIPI_DPHY1_RX_D0P
34	MIPI_CAM3_CLK_M0_1V8	132	MIPI_DPHY1_RX_D1N
35	GND	133	MIPI_DPHY1_RX_D1P
36	GPIO3_B7_d	134	MIPI_DPHY1_RX_CLKN
37	UART7_TX_M1	135	MIPI_DPHY1_RX_CLKP
38	UART7_RX_M1	136	MIPI_DPHY1_RX_D2N
39	CAN2_TX_M0	137	MIPI_DPHY1_RX_D2P
40	CAN2_RX_M0	138	MIPI_DPHY1_RX_D3N
41	PWM11_IR_M3	139	MIPI_DPHY1_RX_D3P
42	PWM13_M1	140	VCC_3V3_S0
43	GPIO3_C6_u	141	PHY1_LED2/CFG_LDO1
44	UART9_TX_M1	142	PHY1_LED1/CFG_LDO0

45	UART9_RX_M1	143	VCC_RTC
46	UART8_TX_M0	144	RTC_32KCLK_1V8
47	UART8_RX_M0	145	DP0_HPDIN_M1_1V8
48	UART8_CTSN_M0	146	GPIO0_D5_u_1V8
49	UART8_RTSN_M0	147	GND
50	UART3_TX_M2	148	PHY1_MDI0+
51	UART3_RX_M2	149	PHY1_MDI0-
52	GPIO4_A7_d	150	PHY1_MDI1+
53	PCIE20x1_1_PERSTn_M1	151	PHY1_MDI1-
54	PCIE20x1_1_CLKREQn_M1	152	PHY1_MDI2+
55	PCIE20x1_1_WAKEn_M1	153	PHY1_MDI2-
56	UART0_TX_M2	154	PHY1_MDI3+
57	UART0_RX_M2	155	PHY1_MDI3-
58	GND	156	GND
59	TYPEC0_OTG_ID_1V8	157	MIPI_CSI0_RX_CLK0N
60	TYPEC0_OTG_VBUSDET	158	MIPI_CSI0_RX_CLK0P
61	GND	159	MIPI_CSI0_RX_D0N
62	USB20_HOST0_DM	160	MIPI_CSI0_RX_D0P
63	USB20_HOST0_DP	161	MIPI_CSI0_RX_D1N
64	USB20_HOST1_DM	162	MIPI_CSI0_RX_D1P
65	USB20_HOST1_DP	163	MIPI_CSI0_RX_CLK1N
66	TYPEC0_OTG_DM	164	MIPI_CSI0_RX_CLK1P
67	TYPEC0_OTG_DP	165	MIPI_CSI0_RX_D2N
68	GND	166	MIPI_CSI0_RX_D2P
69	SDMMC0_CLK	167	MIPI_CSI0_RX_D3N
70	SDMMC0_CMD	168	MIPI_CSI0_RX_D3P
71	SDMMC0_D3	169	GND
72	SDMMC0_D2	170	I2S0_SDO2/SDI3_1V8
73	SDMMC0_D1	171	I2S0_SDO1_1V8

74	SDMMC0_D0	172	I2S0_SDO0_1V8
75	GND	173	I2S0_LRCK_TX_1V8
76	HDMI0_TX_SBDN/eDP0_TX_AUXN	174	GND
77	HDMI0_TX_SBDP/eDP0_TX_AUXP	175	PCIE20_0_REFCLKN
78	HDMI0_TX3N	176	PCIE20_0_REFCLKP
79	HDMI0_TX3P	177	PCIE20_0_RXN/SATA30_0_RXN
80	HDMI0_TX0N	178	PCIE20_0_RXP/SATA30_0_RXP
81	HDMI0_TX0P	179	PCIE20_0_TXN/SATA30_0_TXN
82	HDMI0_TX1N	180	PCIE20_0_TXP/SATA30_0_TXP
83	HDMI0_TX1P	181	PCIE20_2_REFCLKP
84	HDMI0_TX2N	182	PCIE20_2_REFCLKN
85	HDMI0_TX2P	183	PCIE20_2_TXP/SATA30_2/USB3_2_TXP
86	GND	184	PCIE20_2_TXN/SATA30_2/USB3_2_TXN
87	HDMI_TX0_SCL_M0	185	PCIE20_2_RXP/SATA30_2/USB3_2_RXP
88	HDMI_TX0_SDA_M0	186	PCIE20_2_RXN/SATA30_2/USB3_2_RXN
89	HDMI_TX0_CEC_M0	187	GND
90	HDMI_TX0_HPD_M1	188	I2S0_SDO3/SDI2_1V8
91	PCIE20x1_2_CLKREQn_M0	189	I2S0_SDI1_1V8
92	PCIE20x1_2_PERSTn_M0	190	I2S0_SDI0_1V8
93	PCIE20x1_2_WAKEn_M0	191	I2S0_SCLK_TX_1V8
94	UART2_RX_M0	192	I2S0_MCLK_1V8
95	UART2_TX_M0	193	I2C3_SDA_M0_1V8
96	I2C7_SDA_M2	194	I2C3_SCL_M0_1V8
97	I2C7_SCL_M2	195	I2C5_SDA_M3_1V8
98	GND	196	I2C5_SCL_M3_1V8

2 Peripherals Introduction

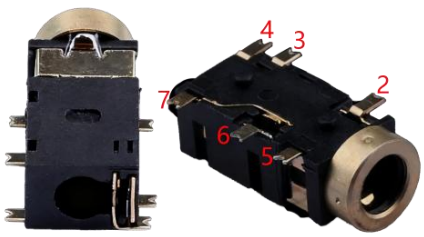
2.1 Power in/ Debug(J1)



This is a USB Type-C interface. It serves as both a power interface and a serial port interface, providing a 5V supply.

Pin	Signal	Description	Pin	Signal	Description
A1	GND	Ground	A2	NC	Not connect
A3	NC	Not connect	A4	VBUS-5V0	5V Power Supply
A5	CC1	Configuration Channel 1	A6	USB_DP	USB Data Positive
A7	USB_DM	USB Data Negative	A8	NC	Not connect
A9	VBUS-5V0	5V Power Supply	A10	NC	Not connect
A11	NC	Not connect	A12	GND	Ground
B1	GND	Ground	B2	NC	Not connect
B3	NC	Not connect	B4	VBUS-5V0	5V Power Supply
B5	CC2	Configuration Channel 2	B6	USB_DP	USB Data Positive
B7	USB_DM	USB Data Negative	B8	NC	Not connect
B9	VBUS-5V0	5V Power Supply	B10	NC	Not connect
B11	NC	Not connect	B12	GND	Ground

2.2 Headset(J17)



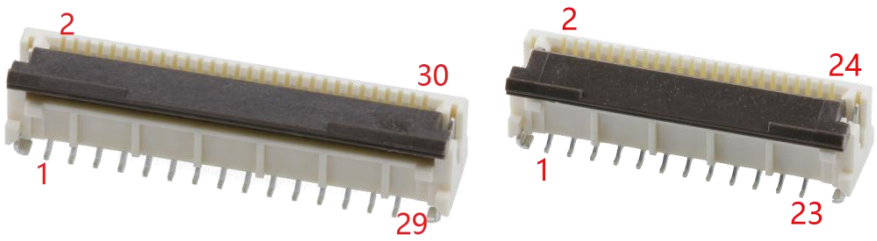
The Compact3588S audio provides stereo audio output / input.

Feature

- Low power.
- IIS transfer audio data.
- Stereo output, support recording.

Pin	Signal	Description	Pin	Signal	Description
2	MIC2P	Microphone Positive Signal	3	MIC2N	Microphone Negative Signal
4	HPO_R0	Right Channel Output	5	HPO_L0	Left Channel Output
6	GPIO0_D5_u_1V8	General Purpose I/O, 1.8V	7	GPIO0_D5_u_1V8	General Purpose I/O, 1.8V

2.3 Camera(CON2, J4)



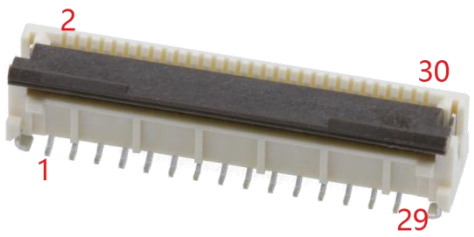
In the Compact3588S, CON2 is a 30-pin FPC connector designed for use with the IMX415 camera, while J15 is a 24-pin FPC connector intended for the OV13850 camera.

CON2					
Pin	Signal	Description	Pin	Signal	Description
1	NC	Not connect	2	AF_2V8	Analog 2.8V power supply
3	DVDD1V2	Digital 1.2V power supply	4	VCC1V8_DVP	1.8V power supply for DVP
5	NC	Not connect	6	GND	Ground
7	AVDD2V8_DVP	Analog 2.8V power supply for DVP	8	GND	Ground
9	I2C3_SDA_M0_1V8	I2C3 Serial Data Line at 1.8V	10	I2C3_SCL_M0_1V8	I2C3 Serial Clock Line at 1.8V
11	CAMERA_RST_1	Camera reset signal	12	PWDN	Power down signal
13	GND	Ground	14	MIPI_CLK1	MIPI Clock signal 1
15	GND	Ground	16	MIPI_CSI0_RX_D3P	MIPI CSI0 RX Data Line 3 Positive
17	MIPI_CSI0_RX_D3N	MIPI CSI0 RX Data Line 3 Negative	18	GND	Ground
19	MIPI_CSI0_RX_D2P	MIPI CSI0 RX Data Line 2 Positive	20	MIPI_CSI0_RX_D2N	MIPI CSI0 RX Data Line 2 Negative

21	GND	Ground	22	MIPI_CSI0_RX_D1P	MIPI CSI0 RX Data Line 1 Positive
23	MIPI_CSI0_RX_D1N	MIPI CSI0 RX Data Line 1 Negative	24	GND	Ground
25	MIPI_CSI0_RX_CLK0P	MIPI CSI0 RX Clock Line 0 Positive	26	MIPI_CSI0_RX_CLK0N	MIPI CSI0 RX Clock Line 0 Negative
27	GND	Ground	28	MIPI_CSI0_RX_D0P	MIPI CSI0 RX Data Line 0 Positive
29	MIPI_CSI0_RX_D0N	MIPI CSI0 RX Data Line 0 Negative	30	GND	Ground

J4					
Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	GND	Ground
3	NC	Not connect	4	AF_2V8_DVP	Analog 2.8V power supply for DVP
5	I2C3_SDA_M0_1V8	I2C3 Serial Data Line at 1.8V	6	I2C3_SCL_M0_1V8	I2C3 Serial Clock Line at 1.8V
7	NC	Not connect	8	AVDD2V8	Analog 2.8V power supply
9	CAMERA_RST_0	Camera reset signal 0	10	CAMERA_PWEN	Camera power enable signal
11	GND	Ground	12	MIPI_DPHY1_RX_D1P	MIPI DPHY1 RX Data Line 1 Positive
13	MIPI_DPHY1_RX_D1N	MIPI DPHY1 RX Data Line 1 Negative	14	GND	Ground
15	MIPI_DPHY1_RX_D0P	MIPI DPHY1 RX Data Line 0 Positive	16	MIPI_DPHY1_RX_D0N	MIPI DPHY1 RX Data Line 0 Negative
17	GND	Ground	18	MIPI_DPHY1_RX_CLKP	MIPI DPHY1 RX Clock Line Positive
19	MIPI_DPHY1_RX_CLKN	MIPI DPHY1 RX Clock Line Negative	20	GND	Ground
21	DVDD1V2	Digital 1.2V power supply	22	DOVDD_1V8	Digital output 1.8V power supply
23	GND	Ground	24	MIPI_CLK0	MIPI Clock signal 0

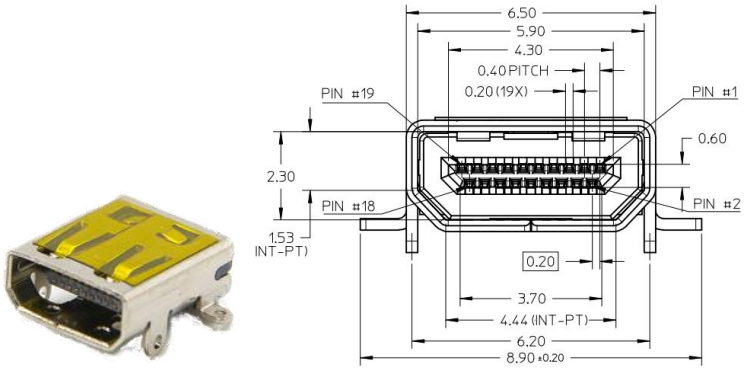
2.4 MIPILCD(J15)



Compact3588S MIPI supports up to 4K@60fps output. It is a 30-pin connector.

Pin	Signal	Description	Pin	Signal	Description
1	VDD5V	5V Power Supply	2	VDD5V	5V Power Supply
3	VDD5V	5V Power Supply	4	GND	Ground
5	VCC_3V3_S0	3.3V Power Supply	6	PWM13_M1	PWM signal for Motor 1
7	PDM0_CLK1_1V8	PDM Clock Line 1 at 1.8V	8	GND	Ground
9	I2C5_SCL_M3_1V8	I2C5 Serial Clock Line at 1.8V	10	I2C5_SDA_M3_1V8	I2C5 Serial Data Line at 1.8V
11	I2S0_SDO3/SDI2_1V8	I2S0 Serial Data Out/In at 1.8V	12	I2S0_SDI1_1V8	I2S0 Serial Data In at 1.8V
13	GND	Ground	14	MIPI_DPHY1_TX_D0P	MIPI D-PHY1 TX Data Line 0 Positive
15	MIPI_DPHY1_TX_D0N	MIPI D-PHY1 TX Data Line 0 Negative	16	GND	Ground
17	MIPI_DPHY1_TX_D1P	MIPI D-PHY1 TX Data Line 1 Positive	18	MIPI_DPHY1_TX_D1N	MIPI D-PHY1 TX Data Line 1 Negative
19	GND	Ground	20	GND	Ground
21	MIPI_DPHY1_TX_CLKP	MIPI D-PHY1 TX Clock Line Positive	22	MIPI_DPHY1_TX_CLKN	MIPI D-PHY1 TX Clock Line Negative
23	GND	Ground	24	GND	Ground
25	MIPI_DPHY1_TX_D2P	MIPI D-PHY1 TX Data Line 2 Positive	26	MIPI_DPHY1_TX_D2N	MIPI D-PHY1 TX Data Line 2 Negative
27	GND	Ground	28	MIPI_DPHY1_TX_D3P	MIPI D-PHY1 TX Data Line 3 Positive
29	MIPI_DPHY1_TX_D3N	MIPI D-PHY1 TX Data Line 3 Negative	30	GND	Ground

2.5 HDMI(J3, J7)



Compact3588S HDMI is 19pins Micro HDMI, with width6.50mm and thickness 2.90mm. J3 is

DP to HDMI port, up to 4Kp60, J7 is HDMI port, support up to 8Kp60.

Features

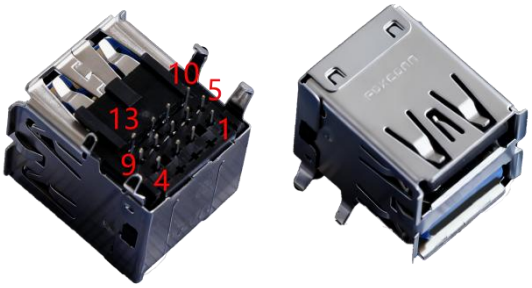
- Transmits high-quality audio signals,including support for various audio formats and audio synchronization.
- The housing, made of LCP with 30% glass fiber reinforcement, offers strength and durability along with flame retardant properties.
- The stainless steel shield effectively guards against electromagnetic interference, ensuring signal integrity.

J3					
Pin	Signal	Description	Pin	Signal	Description
1	HDMI_HPD	HDMI Hot Plug Detect	2	NC	Not connect
3	TX2P	Differential Signal +	4	GND	Ground
5	TX2M	Differential Signal -	6	TX1P	Differential Signal +
7	GND	Ground	8	TX1M	Differential Signal -
9	TX0P	Differential Signal +	10	GND	Ground
11	TX0M	Differential Signal -	12	TXCP	Differential Signal +
13	GND	Ground	14	TXCM	Differential Signal -
15	NC	Not connect	16	GND	Ground
17	HDMI2_TX_SCL_PORT	HDMI2 Transmitter SCL Port	18	HDMI2_TX_SDA_PORT	HDMI2 Transmitter SDA Port
19	HDMI_5V	5V Power Supply for HDMI			

J7					
Pin	Signal	Description	Pin	Signal	Description
1	HDMI0_TX_HP	HDMI Hot Plug Detect	2	NC	Not connect

	D_PORT				
3	HDMI0_TX2P	HDMI Differential Signal +	4	GND	Ground
5	HDMI0_TX2N	HDMI Differential Signal -	6	HDMI0_TX1P	HDMI Differential Signal +
7	GND	Ground	8	HDMI0_TX1N	HDMI Differential Signal -
9	HDMI0_TX0P	HDMI Differential Signal +	10	GND	Ground
11	HDMI0_TX0N	HDMI Differential Signal -	12	HDMI0_TX3P	HDMI Differential Signal +
13	GND	Ground	14	HDMI0_TX3N	HDMI Differential Signal -
15	HDMI0_TX_CEC_PORT	HDMI Consumer Electronics Control	16	GND	Ground
17	HDMI0_TX_SCL_PORT	HDMI I2C Clock	18	HDMI0_TX_SDA_PORT	HDMI I2C Data
19	VCC5V_HDMI_TX0	5V Power Supply for HDMI			

2.6 USB2.0+USB3.0(P3)

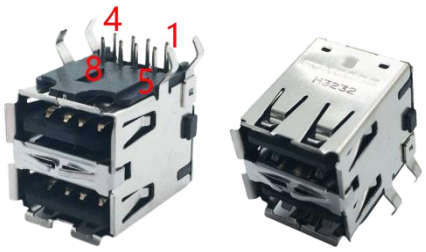


This connector has 13 pins. The upper part is for USB 2.0, which can be used to connect USB drives or mice. The lower part is a USB 3.0 interface, serving as a type-A cable. It can also be switched to device or Host mode through commands.

Pin	Signal	Description	Pin	Signal	Description
1	VCC5V_OTG	5V Power Supply for USB OTG	2	TYPEC0_DM	USB Type-C Data Minus
3	TYPEC0_DP	USB Type-C Data Plus	4	GND	Ground
5	TYPEC0_RX1N	USB Type-C Receive Data Minus	6	TYPEC0_RX1P	USB Type-C Receive Data Plus
7	GND	Ground	8	TYPEC0_TX1N	USB Type-C Transmit Data Minus
9	TYPEC0_TX1P	USB Type-C Transmit	10	VCC5V_OTG	5V Power Supply for

		Data Plus			USB OTG
11	HOST3_DM	USB Host 3 Data Minus	12	HOST3_DP	USB Host 3 Data Plus
13	GND	Ground			

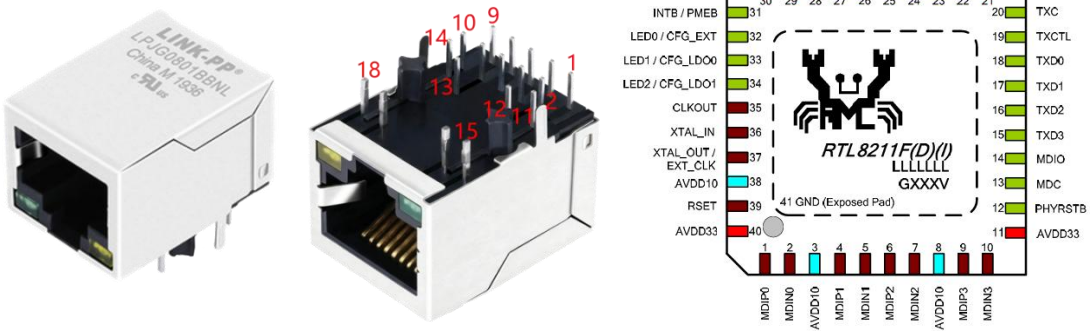
2.7 2×USB 2.0(P4)



Compact3588S USB2.0 port, it is 8-pin, used to docking station to connect USB device. It is used to connect a wide range of USB devices, such as external hard drives, USB flash drives, USB hubs, and other peripherals and supports hot-plug functionality.

Pin	Signal	Description	Pin	Signal	Description
1	VCC5V_USB1	5V Power Supply for USB1	2	HOST2_DM	USB Host 2 Data-
3	HOST2_DP	USB Host 2 Data+	4	GND	Ground
5	VCC5V_USB1	5V Power Supply for USB1	6	HOST1_DM	USB Host 1 Data-
7	HOST1_DP	USB Host 1 Data+	8	GND	Ground

2.8 Ethernet(JP2)



Compact3588S adopts RTL8211F as the Ethernet chip. RJ45 connector.

Feature

- Compliant with 1000Base-T IEEE 802.3ab, 100Base-TX IEEE 802.3u, and 10Base-T IEEE 802.3 standards.
- Supports both full-duplex and half-duplex operation.
- Supports RGMII interface.

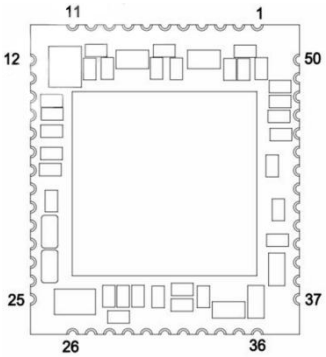
Pin	Signal	Description	Pin	Signal	Description
1	PHY1_MDI0+	Positive differential signal for MDI0	2	PHY1_MDI0-	Negative differential signal for MDI0
3	PHY1_MDI1+	Positive differential signal for MDI1	4	GND	Ground
5	GND	Ground	6	PHY1_MDI1-	Negative differential signal for MDI1
7	PHY1_MDI2+	Positive differential signal for MDI2	8	PHY1_MDI2-	Negative differential signal for MDI2
9	PHY1_MDI3+	Positive differential signal for MDI3	10	PHY1_MDI3-	Negative differential signal for MDI3
11	CT_A	Control signal A	12	CT_B	Control signal B
13	CT_C	Control signal C	14	CT_D	Control signal D
15	PHY1_LED1/ CFG_LDO0	LED indicator signal for PHY1 or configuration signal for LDO0	16	GND	Ground
17	PHY1_LED2/ CFG_LDO1	LED indicator signal for PHY1 or configuration signal for LDO1	18	GND	Ground

2.9 User Buttons (K1)

RECOVER key functions as the burning key. When the Android system is running, it can be used as the volume increase button.

Key	Signal	Description	Key	Signal	Description
K1	RECOVER	Recover key			

2.10 WiFi&Bluetooth(U2)



BL-M8852BP2 is a highly integrated Dual-band WLAN+ Bluetooth Combo module. it combines a 2T2R Dual-band WLAN subsystem with PCI Express interface controllers and a Bluetooth v5.2 subsystem with UART interface controller. The module compatible IEEE 802.11a/b/g/n/ac/axstandard and provides the maximum PHY rate up to 1201Mbps, it supports Bluetooth dual mode with v5.2/v4.2/v2.1 compliant.

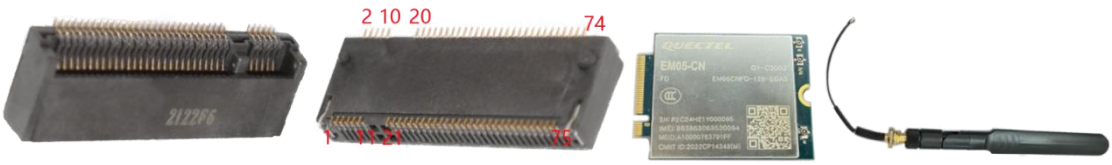
Features

- Operating Frequencies: 2.4~2.4835GHz or 5.15~5.85GHZ.
- Support 802.11ax with OFDMA and MU-MIMO.
- Dual Mode Bluetooth support: Simultaneous LE and BR / EDR.

Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	WL_ANT0	Wireless LAN antenna 0 signal
3	GND	Ground	4	GND	Ground
5	GND	Ground	6	GND	Ground
7	GND	Ground	8	GND	Ground
9	WL_ANT1	Wireless LAN antenna 1 signal	10	GND	Ground
11	GND	Ground	12	PCIE20_PERSTn_1V8	PCIe 2.0 peripheral reset signal
13	XIN_WIFI	External clock input for WiFi module	14	XOUT_WIFI	External clock output for WiFi module
15	WIFI_REG_ON_H_1V8	WiFi regulator enable signal (high active)	16	WIFI_WAKE_HOST_H_1V8	WiFi wake host signal (high active)
17	NC	Not connect	18	NC	No connect
19	I2S0_SDI0_1V8	I2S 0 serial data input 0 (1.8V)	20	I2S0_SDO0_1V8	I2S 0 serial data output 0 (1.8V)
21	I2S0_LRCK_TX_1V8	I2S 0 left-right clock transmit (1.8V)	22	I2S0_SCLK_TX_1V8	I2S 0 serial clock transmit (1.8V)

23	GND	Ground	24	PCIE20_WAKEn_1V8	PCIe 2.0 wake signal (active low)
25	CBUCK_0P9	Buck converter output (0.9V)	26	CSR_VLX	Chipset supply voltage level X
27	GND	Ground	28	ASR_VLX	Active supply regulator voltage level X
29	ABUCK_1P12	Buck converter output (1.12V)	30	GND	Ground
31	LPO	Low power oscillator output	32	GND	Ground
33	PCIE_REFCLK_N	PCIe reference clock negative	34	VDDIO	I/O supply voltage
35	PCIE_REFCLK_P	PCIe reference clock positive	36	VBAT	Battery voltage
37	PCIE20_CLKREQn_1V8	PCIe 2.0 clock request signal (active low)	38	BT_REG_ON_H_1V8	Bluetooth regulator enable signal (high active)
39	GND	Ground	40	UART8_RX_M0_1V8	UART 8 receive signal (1.8V)
41	UART8_TX_M0_1V8	UART 8 transmit signal (1.8V)	42	UART8_CTSN_M0_1V8	UART 8 clear to send signal (active low, 1.8V)
43	UART8_RTSN_M0_1V8	UART 8 request to send signal (active low, 1.8V)	44	PCIE_RDN	PCIe receive data negative
45	PCIE_RDP	PCIe receive data positive	46	PCIE_TDN	PCIe transmit data negative
47	PCIE_TDP	PCIe transmit data positive	48	NC	No connect
49	HOST_WAKE_BT_H_1V8	Host wake Bluetooth signal (high active)	50	BT_WAKE_HOST_H_1V8	Bluetooth wake host signal (high active)

2.11 4G/SSD(CON6)

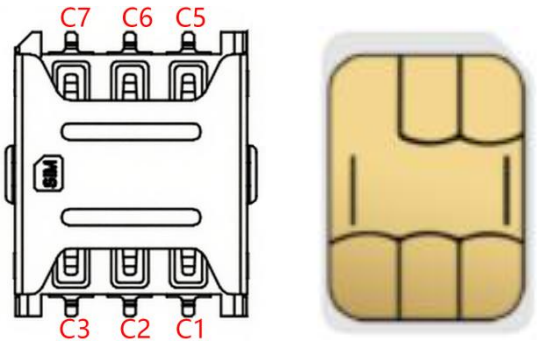


The M2_B-KEY_H3.2MM interface default supports 4G network connections, the 4G module is EM05-CN, also optionnal PCIe Express.

Pin	Signal	Description	Pin	Signal	Description
1	NC	Not connect	2	PCIE_3V3	3.3V Power Supply for PCI Express
3	GND	Ground	4	PCIE_3V3	3.3V Power Supply for PCI Express
5	GND	Ground	6	PCIE_3V3	3.3V Power Supply for PCI Express
7	USB20_HOST 0_DP	USB 2.0 Host 0 Data Positive	8	NC	Not connect
9	USB20_HOST 0_DM	USB 2.0 Host 0 Data Negative	10	NC	Not connect
11	GND	Ground	20	NC	Not connect
21	GND	Ground	22	NC	Not connect
23	WAKE_HOST	Wake-up signal to host	24	NC	Not connect
25	NC	Not connect	26	NC	Not connect
27	GND	Ground	28	NC	Not connect
29	NC	Not connect	30	SIM_RST	SIM card reset signal
31	NC	Not connect	32	SIM_CLK	SIM card clock signal
33	GND	Ground	34	SIM_DATA	SIM card data signal
35	NC	Not connect	36	SIM_VCC	SIM card power supply
37	NC	Not connect	38	PCIE_DEVSLP	PCIe device sleep signal
39	GND	Ground	40	NC	Not connect
41	PCIE20_RXN	PCIe 2.0 receive data negative	42	NC	Not connect
43	PCIE20_RXP	PCIe 2.0 receive data positive	44	NC	Not connect
45	GND	Ground	46	NC	Not connect
47	SATA2_TXN	SATA 2 transmit data negative	48	NC	Not connect
49	SATA2_TXP	SATA 2 transmit data positive	50	PERST	PCIe reset signal
51	GND	Ground	52	UART6_RX_M1_ 3V3	UART 6 receive signal (3.3V)
53	PCIE20_2_RE FCLKN	PCIe 2.0 reference clock negative	54	UART6_TX_M1_ 3V3	UART 6 transmit signal (3.3V)
55	PCIE20_2_RE FCLKP	PCIe 2.0 reference clock positive	56	NC	Not connect
57	GND	Ground	58	NC	Not connect
59	NC	Not connect	60	NC	Not connect
61	NC	Not connect	62	NC	Not connect

63	NC	Not connect	64	NC	Not connect
65	NC	Not connect	66	NC	Not connect
67	4G_RESET	4G module reset signal	68	NC	Not connect
69	NC	Not connect	70	PCIE_3V3	3.3V Power Supply for PCI Express
71	GND	Ground	72	PCIE_3V3	3.3V Power Supply for PCI Express
73	GND	Ground	74	PCIE_3V3	3.3V Power Supply for PCI Express
75	GND	Ground			

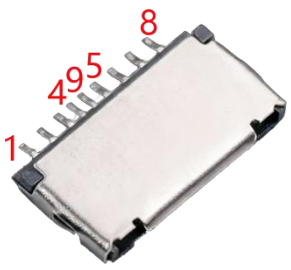
2.12 SIM (P1)



Nano SIM is a 6-pin pull-out card slot which is compatible to the standard SIM Card and can be used for wireless transmission with a 3G/4G module.

Pin	Signal	Description	Pin	Signal	Description
C1	SIM_VCC	SIM Card Power Supply	C2	SIM_RST	SIM Card Reset
C3	SIM_CLK	SIM Card Clock	C5	GND	Ground
C6	SIM_VCC	SIM Card Power Supply	C7	SIM_DATA	SIM Card Data

2.13 Micro SD(J8)



The Compact3588S is equipped with a plug-and-play MicroSD card socket featuring a short-body 9-Pin design, with the detection pin positioned in the middle.

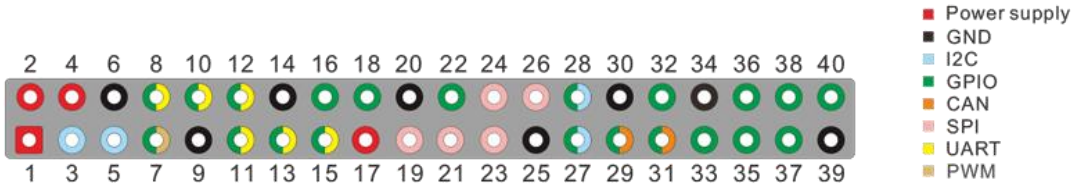
Pin	Signal	Description	Pin	Signal	Description
1	SDMMC0_D2	SD/MMC 0 Data Line 2	2	SDMMC0_D3	SD/MMC 0 Data Line 3
3	SDMMC0_CMD	SD/MMC 0 Command Line	4	VCC_3V3_S0	3.3V Power Supply for SD/MMC 0
5	SDMMC0_CLK	SD/MMC 0 Clock Line	6	GND	Ground
7	SDMMC0_D0	SD/MMC 0 Data Line 0	8	SDMMC0_D1	SD/MMC 0 Data Line 1
9	SDMMC_DET_1V8	SD/MMC 0 Detection Signal (1.8V logic level)			

2.14 RTC(J2)

The RTC utilizes a 2-pin connector that is powered by an external battery. The backup battery (3V) is used to ensure the RTC (frequency 32.768KHz) is still able to work after power off. Lithium cell model: CR1220.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_RTC	3V battery	2	GND	Ground

2.15 2×UART/CAN/I2C/SPI/PWM/GPIO (CON3)

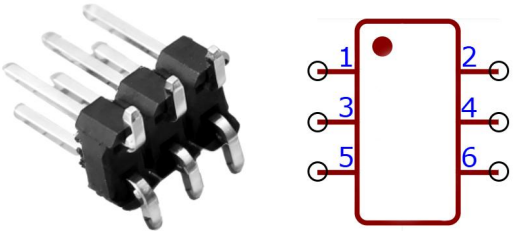


This is a 2×20-pin dual straight-through connector, featuring UART, CAN, I2C, SPI, PWM, and GPIO capabilities.

Pin	Signal	Description	Pin	Signal	Description
1	VCC_3V3_S0	3.3V Power Supply	2	VDD5V	5V Power Supply
3	I2C3_SDA_M0_3V3	I2C3 Data Line (3.3V Level)	4	VDD5V	5V Power Supply
5	I2C3_SCL_M0_3	I2C3 Clock Line	6	GND	Ground

	V3	(3.3V Level)			
7	GPIO3_D5_d	GPIO3 Pin D5 (Digital Signal)	8	GPIO3_C0_d	GPIO3 Pin C0 (Digital Signal)
9	GND	Ground	10	GPIO3_C1_d	GPIO3 Pin C1 (Digital Signal)
11	GPIO4_A6_d	GPIO4 Pin A6 (Digital Signal)	12	GPIO4_B5_d	GPIO4 Pin B5 (Digital Signal)
13	GPIO4_A4_d	GPIO4 Pin A4 (Digital Signal)	14	GND	Ground
15	GPIO4_A3_d	GPIO4 Pin A3 (Digital Signal)	16	GPIO1_A2_d	GPIO1 Pin A2 (Digital Signal)
17	VCC_3V3_S0	3.3V Power Supply	18	GPIO1_A3_d	GPIO1 Pin A3 (Digital Signal)
19	SPI0_MOSI_M2_3V3	SPI0 Master Out Slave In (3.3V Level)	20	GND	Ground
21	SPI0_MISO_M2_3V3	SPI0 Master In Slave Out (3.3V Level)	22	GPIO1_D0_d	GPIO1 Pin D0 (Digital Signal)
23	SPI0_CLK_M2_3V3	SPI0 Clock Line (3.3V Level)	24	SPI0_CS0_M2_3V3	SPI0 Chip Select 0 (3.3V Level)
25	GND	Ground	26	SPI0_CS1_M2_3V3	SPI0 Chip Select 1 (3.3V Level)
27	GPIO3_D3_d	GPIO3 Pin D3 (Digital Signal)	28	GPIO3_D2_d	GPIO3 Pin D2 (Digital Signal)
29	GPIO3_C4_u	GPIO3 Pin C4 (Pull-Up Input)	30	GND	Ground
31	GPIO3_C5_u	GPIO3 Pin C5 (Pull-Up Input)	32	GPIO3_C6_u	GPIO3 Pin C6 (Pull-Up Input)
33	GPIO1_C6_d	GPIO1 Pin C6 (Digital Signal)	34	GND	Ground
35	GPIO1_D5_d	GPIO1 Pin D5 (Digital Signal)	36	GPIO3_B7_d	GPIO3 Pin B7 (Digital Signal)
37	GPIO1_B0_u	GPIO1 Pin B0 (Pull-Up Input)	38	GPIO1_C2_d	GPIO1 Pin C2 (Digital Signal)
39	GND	Ground	40	GPIO4_A7_d	GPIO4 Pin A7 (Digital Signal)

2.16 POE (CON5)



Power over Ethernet (PoE) requires a separate PoE HAT to enable Ethernet power supply.

Pin	Signal	Description	Pin	Signal	Description
1	VDD5V	5V Power Supply	2	GND	Ground
3	CT_C	Control Signal C	4	CT_A	Control Signal A
5	CT_D	Control Signal D	6	CT_B	Control Signal B

3 Product Configurations

3.1 Standard Contents

NO.	Item	Qty.(PCS)	Description
1	Compact3588S board	1	Standard Content(8GB RAM, 32GB eMMC)
2	U-disk/CD-ROM	1	Android SDK, Debian SDK, Buildroot SDK, Documents, tools, Schematic Drawing, datasheets, etc.
3	Ethernet cable	1	1.5m Crossover cable
4	USB Cable	1	USB-A, Type-C
5	Antenna	1	2x WIFI antenna

3.2 Optional Parts

- LCD Module (10.1-inch MIPI panel)
- MIPI camera Module (IMX415)
- 4G Module (EM05)