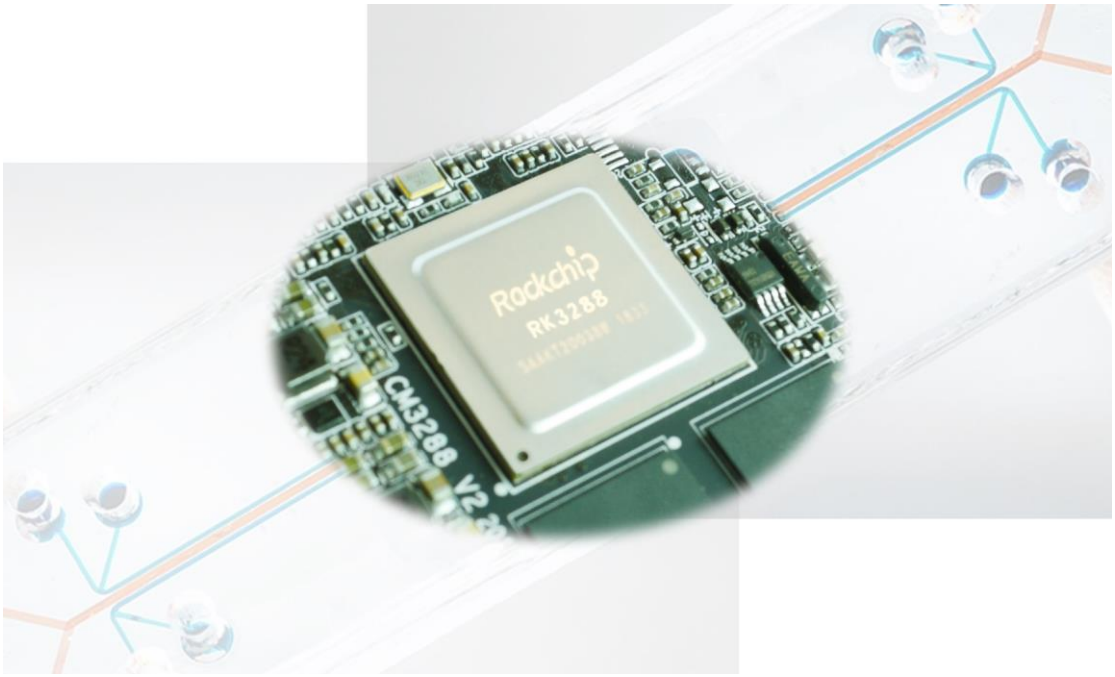
CM3288 Reference User Manual

V2.201908



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.

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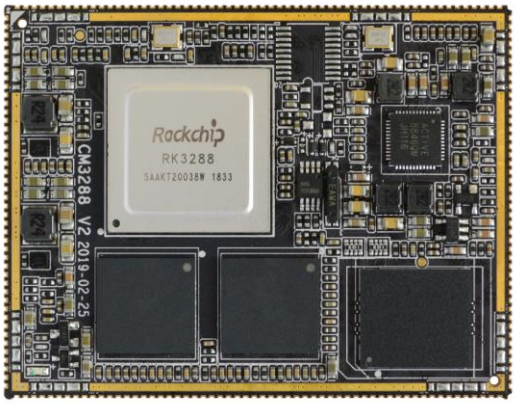
1 CM3288 Introduction

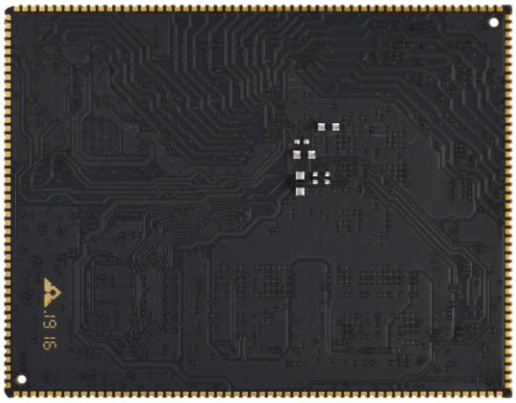
1.1 Summary

CM3288 is a Computer-on-Module powered by Rockchip RK3288 Quad-core ARM Cortex-A17 MPCore processor, and coupled with 1GB/2GB RAM and 8GB eMMC.

The module embedded powerful hardware engines provide optimized performance for high-end application, and embedded 3D GPU makes RK3288 completely compatible with OpenGL ES1.1/2.0/3.0, OpenCL 1.1 and DirectX 11.

The CM3288 is designed for Advertising machine, Vending machine, Commercial display device, Intelligent POS machine, Intelligent robot, Education video terminal, Intelligent control, etc.





1.2 Features

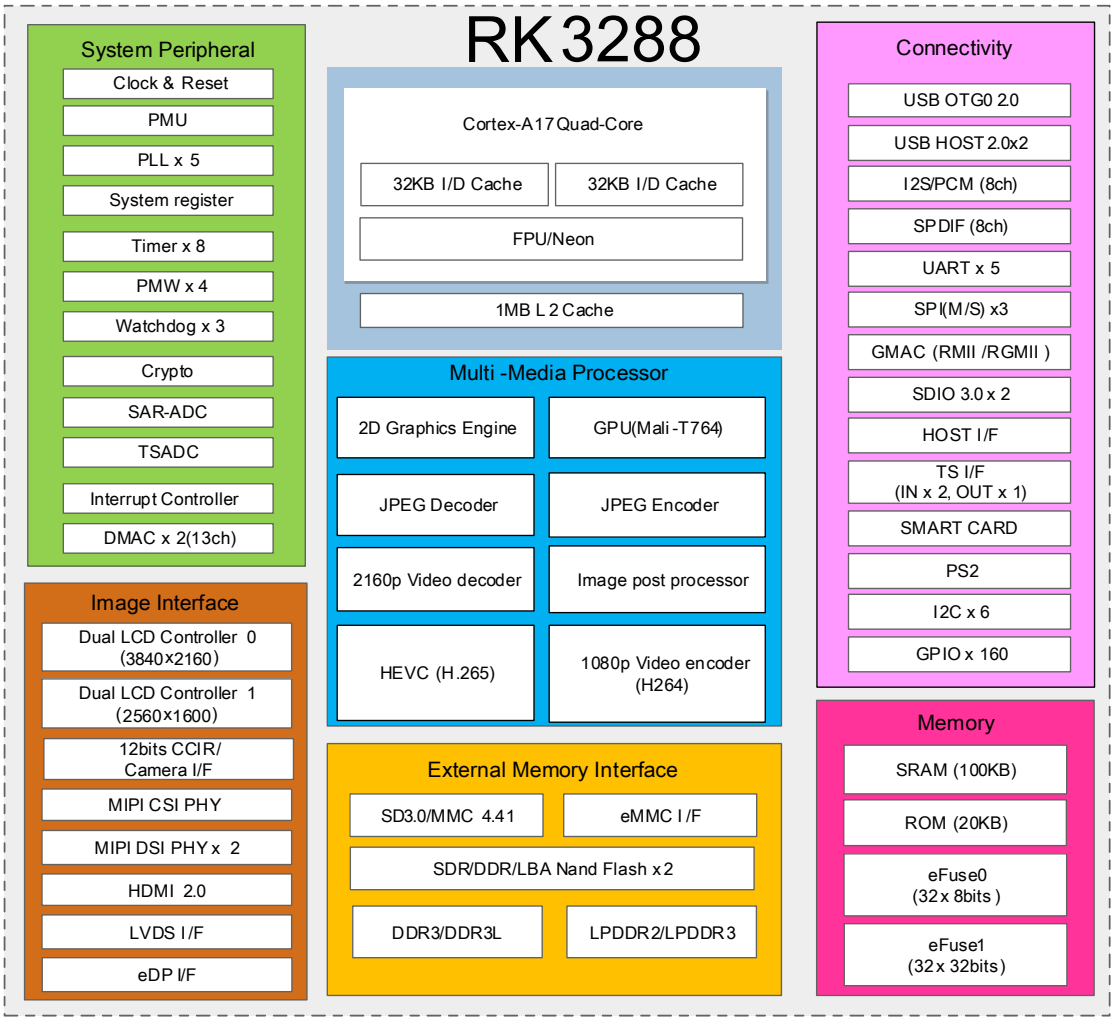
- **Microprocessor**
  - Quad-core Cortex-A17 up to 1.8G
  - 32KB I-cache, 32KB D-cache, 1MB L2 cache per core
- **Memory Organization**
  - LPDDR3 RAM up to 4GB
  - EMMC up to 32GB
- **GPU**
  - Quad-Core Mali-T7 series, latest powerful graphics processor Architected for GPU computing
  - Support OpenGL ES1.1/2.0/3.0, OpenVG1.1, OpenCL1.1 and Renderscript, Directx11
- **Security ID**
  - Size up to 2Kbit for security chip ID
- **Video Decoder/Encoder**
  - Support MPEG-2, MPEG-4, AVS, VC-1, VP8, MVC with up to 1080p@60fps
  - Support multi-format video decoder with up to 4Kx2K
  - Support multi-format video encoder with up to 1080p@30fps
- **Camera/Display Subsystem**
  - Video Input: camera, 1-ch 8bits DVP and 2-ch MIPI-CSI

- Video display support maximum 4Kx2K display:
  8/10bits LVDS or 32bits RGB,
  MIPI-DSI,
  HDMI2.0,
  EDP1.1

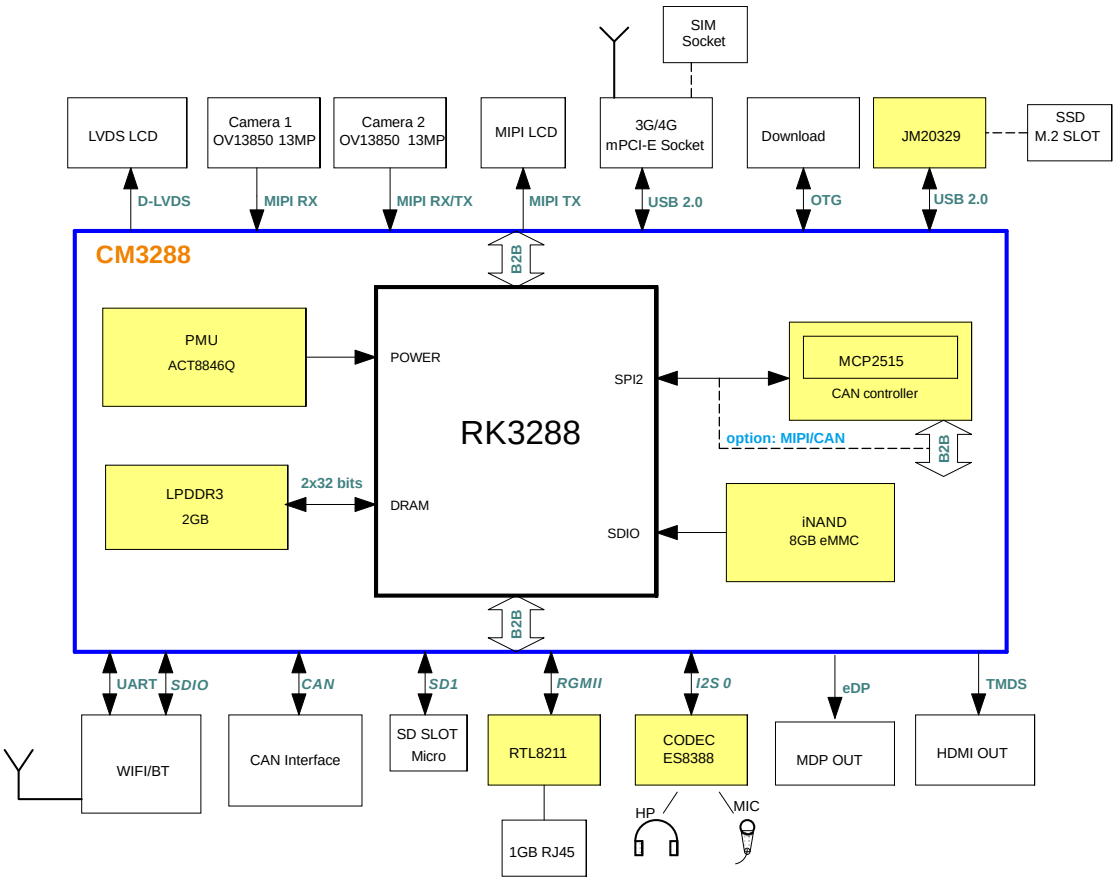
- **Audio inputs and outputs**
  - One 6-ch I2S/PCM interface
  - One SPDIF interface
- **USB**
  - Three USB interfaces
  - One USB 2.0 OTG, and 2 USB hosts
- **Ethernet**
  - GMAC/EMAC
  - Support 10/100/1000Mbit/s data transfer rates
  - Support MII/RGMII PHY interface
- **I2C**
  - 4-ch I2Cs
  - Support standard mode and fast mode(up to 400kbit/s)
- **SDIO**
  - 2 SD/MMC/SDIO interface
- **SPI and CAN**
  - Up to 2-ch SPI controllers, One CAN controller(MCP2515E) on board.
  - Full-duplex synchronous serial interface
- **UART**
  - Up to 5 UART controllers
  - UART2 for debug tools
- **PS2**
  - 1-ch PS2 controllers
- **PWM**
  - Two PWM out
- **KEYADC**
  - Up to two ADC channels for key application
  - 8-bit resolution
  - Voltage input range between 0V to 1.8V
- **WatchDog**
  - One watchdog to generate reset signal or interrupt
- **Interrupt Controller**
  - Support 97 interrupts
- **Power unit**
  - ACT8846Q on board
  - UVP/OTP/OCP protections
  - Very low RTC consume current, less 5uA at 3V button Cell
- **Temperature**
  - Industrial grade, Operating temperature: -20 - 85°C

1.3 Block Diagram

RK3288 Block Diagram



Development kit (Idea3288) Block Diagram

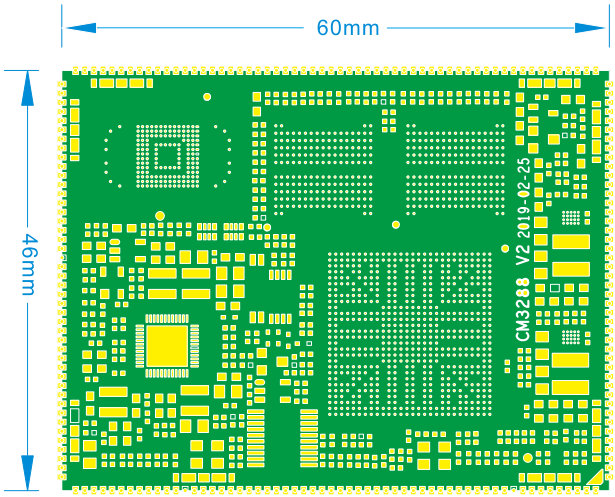


1.4 CM3288 specifications

Feature	Specifications
CPU	RK3288 Quad-core ARM Cortex-A17 MPCore processor
DDR	2GB LPDDR3 (up to 4GB)
eMMC FLASH	4GB (up to 32GB)
Power	DC 3.6V-5V power supply
PMU	ACT8846
LVDS/RGB	1-CH 10bit Dual-LVDS
MIPI_TX	1-CH
HDMI out	1-CH
Camera	1-CH(DVP) and 2-CH MIPI(4Lane)
USB	2-CH (USB HOST2.0), 1-CH(OTG 2.0)
Ethernet or Nand	RGMII or Nand Flash
SDMMC	2-CH
SPDIF TX	1-CH
I2C	4-CH

SPI	2-CH
UART	4-CH, 1-CH(DEBUG)
PWM	2-CH
ADC IN	2-CH
Board Dimension	46 x 60mm

1.5 CM3288 PCB Dimension



1.6 CM3288 Pin definition

Pin	Signal	Function	Description / Alternate functions	IO Level
1	OTG_DM	USB OTG 2.0 Data signal DM		3.3V
2	OTG_DP	USB OTG 2.0 Data signal DP		3.3V
3	OTG_ID	OTG ID detection		3.3V
4	PWM0	Pulse Width Modulation output	GPIO7_A0_d	3.3V
5	PWM1	LCD Backlight PWM used	GPIO7_A1_d	3.3V
6	GPIO7_A2_D	GPIO		3.3V
7	GPIO7_A3_D	GPIO		3.3V
8	LCD_HSYNC	LCD RGB interface horizontal sync signal	GPIO1_D0_d	3.3V
9	LCD_VSYNC	LCD RGB interface vertical sync signal	GPIO1_D1_d	3.3V
10	LCD_DEN	LCD RGB interface data enable	GPIO1_D2_d	3.3V
11	LCD_CLK	LCD RGB interface display clock	GPIO1_D3_d	3.3V
12	LCD_D8_LD4P	LCD Data8 or LVDS ED4+		3.3V
13	LCD_D9_LD4N	LCD Data9 or LVDS ED4-		3.3V
14	LCD_D20_LD9P	LCD Data20 or LVDS OD4+		3.3V
15	LCD_D21_LD9N	LCD Data21 or LVDS OD4-		3.3V

16	LCD_D0_LD0P	LCD Data0 or LVDS ED0+		3.3V
17	LCD_D1_LD0N	LCD Data1 or LVDS ED0-		3.3V
18	LCD_D2_LD1P	LCD Data2 or LVDS ED1+		3.3V
19	LCD_D3_LD1N	LCD Data3 or LVDS ED1-		3.3V
20	LCD_D4_LD2P	LCD Data4 or LVDS ED2+		3.3V
21	LCD_D5_LD2N	LCD Data5 or LVDS ED2-		3.3V
22	LCD_D10_LCK0P	LCD Data10 or LVDS ECLK+		3.3V
23	LCD_D11_LCK0N	LCD Data11 or LVDS ECLK-		3.3V
24	LCD_D6_LD3P	LCD Data6 or LVDS ED3+		3.3V
25	LCD_D7_LD3N	LCD Data7 or LVDS ED3-		3.3V
26	GND	Ground		0V
27	LCD_D12_LD5P	LCD Data12 or LVDS OD0+		3.3V
28	LCD_D13_LD5N	LCD Data13 or LVDS OD0-		3.3V
29	LCD_D14_LD6P	LCD Data14 or LVDS OD1+		3.3V
30	LCD_D15_LD6N	LCD Data15 or LVDS OD1-		3.3V
31	LCD_D16_LD7P	LCD Data16 or LVDS OD2+		3.3V
32	LCD_D17_LD7N	LCD Data17 or LVDS OD2-		3.3V
33	LCD_D22_LCK1P	LCD Data22 or LVDS OCLK+		3.3V
34	LCD_D23_LCK1N	LCD Data23 or LVDS OCLK-		3.3V
35	LCD_D18_LD8P	LCD Data18 or LVDS OD3+		3.3V
36	LCD_D19_LD8N	LCD Data19 or LVDS OD3-		3.3V
37	SPI1_CLK	SPI serial clock	GPIO7_B4_D	3.3V
38	SPI1_CSn0	SPI chip select signal	GPIO7_B5_U	3.3V
39	SPI1_TXD	SPI serial data output	GPIO7_B7_D	3.3V
40	SPI1_RXD	SPI serial data input	GPIO7_B6_D	3.3V
41	UART3_TX	UART serial data output	GPIO7_B0_D	3.3V
42	UART3_RX	UART serial data input	GPIO7_A7_U	3.3V
43	SPI0_UART4_TXD	SPI/UART data output	GPIO5_B6_D	3.3V
44	SPI0_UART4_RXD	SPI/UART data input	GPIO5_B7_U	3.3V
45	MAC_CLK	RMII REC_CLK output or GMAC external clock input	GPIO4_A3_U	3.3V
46	PHY_PMEB	PHY Power management Event	GPIO0_B0_U	3.3V
47	MAC_MDIO	GMAC management interface data	GPIO4_A5_U	3.3V
48	MAC_MDC	GMAC management interface clock	GPIO4_A0_U	3.3V
49	PHY_RST	PHY Collision signal	GPIO4_B0_U	3.3V
50	PHY_TXEN	GMAC TX data	GPIO4_A4_U	3.3V
51	PHY_TXD3	GMAC TX data	GPIO3_D1_U	3.3V
52	PHY_TXD2	GMAC TX data	GPIO3_D0_U	3.3V
53	PHY_TXD1	GMAC TX data	GPIO3_D5_U	3.3V
54	PHY_TXD0	GMAC TX data	GPIO3_D4_U	3.3V
55	PHY_TXCLK	RGMII TX clock output	GPIO4_B1_U	3.3V

56	PHY_INT	PHY interrupt	GPIO0_B1_U	3.3V
57	MAC_RXCLK	RGMII RX clock input	GPIO4_A6_U	3.3V
58	MAC_RXD3	GMAC RX data	GPIO3_D3_U	3.3V
59	MAC_RXD2	GMAC RX data	GPIO3_D2_U	3.3V
60	MAC_RXD1	GMAC RX data	GPIO3_D7_U	3.3V
61	MAC_RXD0	GMAC RX data	GPIO3_D6_U	3.3V
62	MAC_RXDV	GMAC RX data valid signal	GPIO4_A1_U	3.3V
63	GND	Ground		0V
64	SDMMC_DET	SDMMC card detect signal	GPIO6_C6_u	3.3V
65	SDMMC_D1	SDMMC card data	GPIO6_C1_u	3.3V
66	SDMMC_D0	SDMMC card data	GPIO6_C0_u	3.3V
67	SDMMC_CLK	SDMMC card clock	GPIO6_C4_d	3.3V
68	SDMMC_PWR	SDMMC power	eDP_HOTPLUG/GPIO7_B3_d	3.3V
69	SDMMC_CMD	SDMMC card command output and response input	GPIO6_C5_u	3.3V
70	SDMMC_D3	SDMMC card data	GPIO6_C3_u	3.3V
71	SDMMC_D2	SDMMC card data	GPIO6_C2_u	3.3V
72	UART0_RTS	UART request to send	GPIO4_C3_u	1.8V
73	UART0_TX	UART serial data output	GPIO4_C1_d	1.8V
74	UART0_RX	UART serial data input	GPIO4_C0_u	1.8V
75	UART0_CTS	UART clear to send	GPIO4_C2_u	1.8V
76	BT_RST	Bluetooth reset	SDIO0_BKPWR/GPIO4_D5_d	1.8V
77	VCC_SD0IO	WiFi/BT module power supply	Out Max300mA	1.8V
78	RTC_CLKOUT	RTC clock	CLKIN_32K	3.3V
79	SDIO0_D1	SDIO card data	GPIO4_C5_u	1.8V
80	SDIO0_D0	SDIO card data	GPIO4_C4_u	1.8V
81	SDIO0_CLK	SDIO card clock	GPIO4_D1_d	1.8V
82	SDIO0_CMD	SDIO card command output and response input	GPIO4_D0_u	1.8V
83	SDIO0_D3	SDIO card data	GPIO4_C7_u	1.8V
84	SDIO0_D2	SDIO card data	GPIO4_C6_u	1.8V
85	WIFI_HOST_WAKE	WIFI to wake-up HOST	SDIO0_INTn/GPIO4_D6_u	1.8V
86	WIFI_REG_ON	WIFI Regulators power EN	SDIO0_PWR/GPIO4_D4_d	1.8V
87	UART3_CTSn	UART clear to send	GPS_RFCLK/GPS_CLK_T1/ GPIO7_B1_u	3.3V
88	BT_HOST_WAKE	Bluetooth device to wake-up HOST	GPIO4_D7_u	1.8V
89	BT_WAKE	BT wake CPU in	SDIO0_DET/GPIO4_D2_u	1.8V

90	TS0_CLK	TSI reference clock	GPIO5_C2_d	3.3V
91	TS0_ERR	TSI fail signal	GPIO5_C3_d	3.3V
92	I2S_SDI	I2S/PCM1 serial data input	GPIO6_A3_d	3.3V
93	I2S_LRCK_RX	II2S/PCM1 left & right channel signal for receiving serial data	GPIO6_A1_d	3.3V
94	I2S_LRCK_TX	I2S/PCM1 left & right channel signal for transmitting serial data,	GPIO6_A2_d	3.3V
95	I2S_SDO0	I2S/PCM1 serial data output	GPIO6_A4_d	3.3V
96	I2S_SCLK	I2S/PCM1 serial clock	GPIO6_A0_d	3.3V
97	I2S_MCLK	I2S Master clock	GPIO6_B0_d	3.3V
98	I2C2_SCL	I2C_PMU clock	GPIO6_B2_u	3.3V
99	I2C2_SDA	I2C_PMU data	GPIO6_B1_u	3.3V
100	VCCA_CODEC	Audio Codec power supply	Out Max 350mA	3.3V
101	PS2_CLK	P2S clock signal	GPIO8_A0_u	3.3V
102	GPIO7_C5_D	GPIO	GPIO7_C5_d	3.3V
103	GPIO4_D3_D	GPIO	SDIO0_WP	3.3V
104	UART2_RX	UART serial data input	IR_RX/PWM2/GPIO7_C6_u	3.3V
105	UART2_TX	UART serial data output	IR_TX/PWM3/EDPHDMI_CEC/GPIO7_C7_u	3.3V
106	UART1_RX	UART serial data input	TS0_D0/GPIO5_B0_u	3.3V
107	UART1_TX	UART serial data output	TS0_D1/GPIO5_B1_d	3.3V
108	ADC_IN1_RECOVER	Recover		1.8V
109	PWR_KEY	Power key		3.3V
110	RST_KEY	Reset key		3.3V
111	SPDIF_TX	SPDIF biphase data output	GPIO6_B3_d	3.3V
112	CIF_D2	Camera interface input pixel data	HOST_D0/TS_D0/ GPIO2_A0_d	1.8V
113	CIF_D1	Camera interface input pixel data	GPIO2_B5_d	1.8V
114	CIF_D3	Camera interface input pixel data	HOST_D1/TS_D1/ GPIO2_A1_d	1.8V
115	CIF_D0	Camera interface input pixel data	GPIO2_B4_d	1.8V
116	CIF_D4	Camera interface input pixel data	HOST_D2/TS_D2/ GPIO2_A2_d	1.8V
117	CIF_CLKIN	Camera interface input pixel clock	HOST_WKACK/GPS_CLK/TS_CLKOUT/ GPIO2_B2_d	1.8V
118	CIF_D5	Camera interface input pixel data	HOST_D3/TS_D3/ GPIO2_A3_d	1.8V

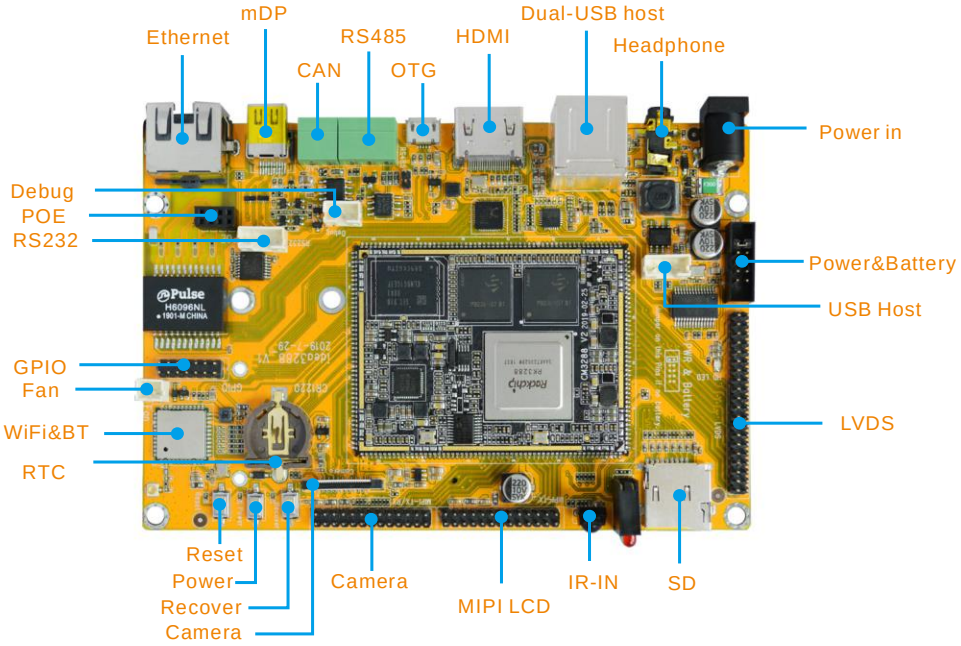
119	CIF_D6	Camera interface input pixel data	HOST_CKINP/TS_D4/ GPIO2_A4_d	1.8V
120	CIF_CLKOUT	Camera interface output work clock	HOST_WKREQ/TS_FAIL/ GPIO2_B3_d	1.8V
121	CIF_D7	Camera interface input pixel data	HOST_CKINN/TS_D5/ GPIO2_A5_d	1.8V
122	VCC18_DVP	Camera Power Supply	Out Max 100mA	1.8V
123	CIF_HREF	Camera interface horizontal sync signa	HOST_D7/TS_VALID/ GPIO2_B1_d	1.8V
124	CIF_D11	Camera interface input pixel data	GPIO2_B7_d	1.8V
125	CIF_VSYNC	Camera interface vertical sync signal	HOST_D6/TS_SYNC/ GPIO2_B0_d	1.8V
126	I2C3_SCL	I2C3 clock for Camera	GPIO2_C0_u	1.8V
127	I2C3_SDA	I2C3 data for Camera	GPIO2_C1_u	1.8V
128	GND	Ground		0V
129	CIF_D10	Camera interface input pixel data	GPIO2_B6_d	1.8V
130	DVP_PWR	Camera interface power	TEST_CLKO/CLK_27M_ T1/PMUGPIO0_C1_d	3.3V
131	MIPI_RX_D0N	MIPI RX negative differential data line transceiver output		1.8V
132	MIPI_RX_D0P	MIPI RX positive differential data line transceiver output		1.8V
133	MIPI_RX_D1N	MIPI RX negative differential data line transceiver output		1.8V
134	MIPI_RX_D1P	MIPI RX positive differential data line transceiver output		1.8V
135	MIPI_RX_CLKN	MIPI RX negative differential clock line transceiver output		1.8V
136	MIPI_RX_CLKP	MIPI RX positive differential clock line transceiver output		1.8V
137	MIPI_RX2N_SPI0CL K/ MIPI_RX_D2N	MIPI RX negative differential data line transceiver output	UART4_CTSn/TS0_D4/G PIO5_B4_u	1.8/3.3
138	MIPI_RX2P_PS2DAT / MIPI_RX_D2P	MIPI RX positive differential data line transceiver output	GPIO8_A1_u	1.8/3.3
139	MIPI_RX3N_CANRX/ MIPI_RX_D3N	MIPI RX negative differential data line transceiver output	Or CAN bus RX data	1.8/3.3
140	MIPI_RX3P_CANTX/ MIPI_RX_D3P	MIPI RX positive differential data line transceiver output	Or CAN bus TX data	1.8/3.3
141	VCC_RTC	Button cell Power input		**3V**
142	VCC_IO	IO Power output (Max500mA)		3.3V
143	I2S_SDO2	I2S/PCM1 serial data output	GPIO6_A6_d	3.3V

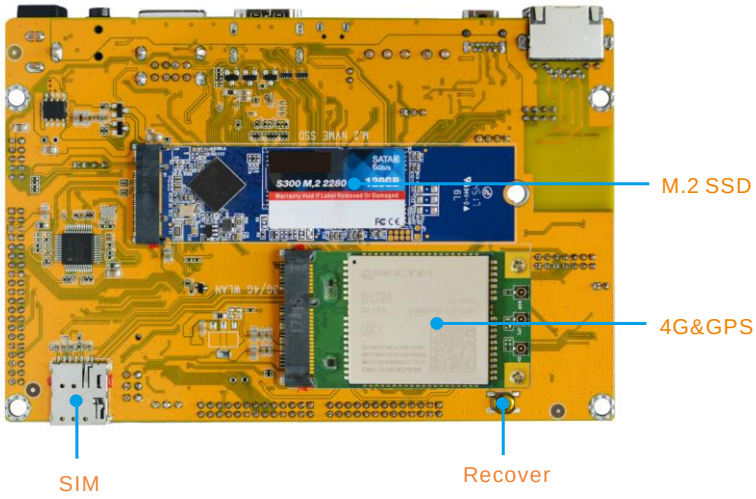
144	I2S_SDO1	I2S/PCM1 serial data ouput	GPIO6_A5_d	3.3V
145	GND	Ground		0V
146	GND	Ground		0V
147	VCC_SYS	Main power input		3.5-5V
148	VCC_SYS	Main power input		3.5-5V
149	PWRHOLD	Power hold input. NC	Used for key Power ON	3.5-5V
150	EDP_TX3N	eDP data lane negative output		1.8V
151	EDP_TX3P	eDP data lane positive output		1.8V
152	EDP_TX2N	eDP data lane negative output		1.8V
153	EDP_TX2P	eDP data lane positive output		1.8V
154	EDP_TX1N	eDP data lane negative output		1.8V
155	EDP_TX1P	eDP data lane positive output		1.8V
156	EDP_TX0N	eDP data lane negative output		1.8V
157	EDP_TX0P	eDP data lane positive output		1.8V
158	EDPAUXN	eDP CH-AUX negative differential output		1.8V
159	EDPAUXP	eDP CH-AUX positive differential output		1.8V
160	GND	Ground		0V
161	HDMI_HPD	HDMI hot plug detect signal		3.3V
162	I2C5_SCL	I2C5 clock	GPIO7_C4_u	3.3V
163	I2C5_SDA	I2C5 data	GPIO7_C3_u	3.3V
164	HDMI_CEC	HDMI ground reference for the hot plug detect signal	ISP_FLASHTRIGIN /GPIO7_C0_u	3.3V
165	TX_C-	HDMI TXC-		1.8V
166	TX_C+	HDMI TXC+		1.8V
167	TX_0-	HDMI TXD0-		1.8V
168	TX_0+	HDMI TXD0+		1.8V
169	TX_1-	HDMI TXD1-		1.8V
170	TX_1+	HDMI TXD1+		1.8V
171	TX_2-	HDMI TXD2-		1.8V
172	TX_2+	HDMI TXD2+		1.8V
173	MIPI_TX/RX_CLKP	MIPI TXRX positive differential clock line transceiver output		1.8V
174	MIPI_TX/RX_CLKN	MIPI TXRX negative differential clock line transceiver output		1.8V
175	MIPI_TX/RX_D0P	MIPI TXRX positive differential data line transceiver output		1.8V
176	MIPI_TX/RX_D0N	MIPI TXRX negative differential data line transceiver output		1.8V
177	MIPI_TX/RX_D1P	MIPI TXRX positive differential data line transceiver output		1.8V
178	MIPI_TX/RX_D1N	MIPI TXRX negative differential		1.8V

		data line transceiver output		
179	MIPI_TX/RX_D2P	MIPI TXRX positive differential data line transceiver output		1.8V
180	MIPI_TX/RX_D2N	MIPI TXRX negative differential data line transceiver output		1.8V
181	MIPI_TX/RX_D3P	MIPI TXRX positive differential data line transceiver output		1.8V
182	MIPI_TX/RX_D3N	MIPI TXRX negative differential data line transceiver output		1.8V
183	MIPI_TX_CLKP	MIPI TX positive differential clock line transceiver output		1.8V
184	MIPI_TX_CLKN	MIPI TX negative differential clock line transceiver output		1.8V
185	MIPI_TX_D0P	MIPI TX positive differential data line transceiver output		1.8V
186	MIPI_TX_D0N	MIPI TX negative differential data line transceiver output		1.8V
187	MIPI_TX_D1P	MIPI TX positive differential data line transceiver output		1.8V
188	MIPI_TX_D1N	MIPI TX negative differential data line transceiver output		1.8V
189	MIPI_TX_D2P	MIPI TX positive differential data line transceiver output		1.8V
190	MIPI_TX_D2N	MIPI TX negative differential data line transceiver output		1.8V
191	MIPI_TX_D3P	MIPI TX positive differential data line transceiver output		1.8V
192	MIPI_TX_D3N	MIPI TX negative differential data line transceiver output		1.8V
193	I2C4_SDA	I2C4 data	GPIO7_C1_	3.3V
194	I2C4_SCL	I2C4 clock	GPIO7_C2_u	3.3V
195	GPIO7_A6_U	GPIO		3.3V
196	GPIO7_A5_D	GPIO		3.3V
197	SPI0_CSn0	SPI chip select signal, low active	UART4_RTSn/TS0_D5/GPIO5_B5_u	3.3V
198	HOST1_DP	USB HOST 2.0 Data signal DP		3.3V
199	HOST1_DM	USB HOST 2.0 Data signal DM		3.3V
200	HOST2_DP	USB HOST 2.0 Data signal DP		3.3V
201	HOST2_DM	USB HOST 2.0 Data signal DM		3.3V
202	GND	Ground		0V
203	OTG_VBUS_DRV	USB OTG 2.0 drive VBUS	PMUGPIO0_B4_d	3.3V
204	OTG_DET	USB OTG 2.0 detect	OTG_VBUS	3.3V

Note: All 1.8V GPIO Can change to 3.3V.

1.7 Development Kit (Idea3288)

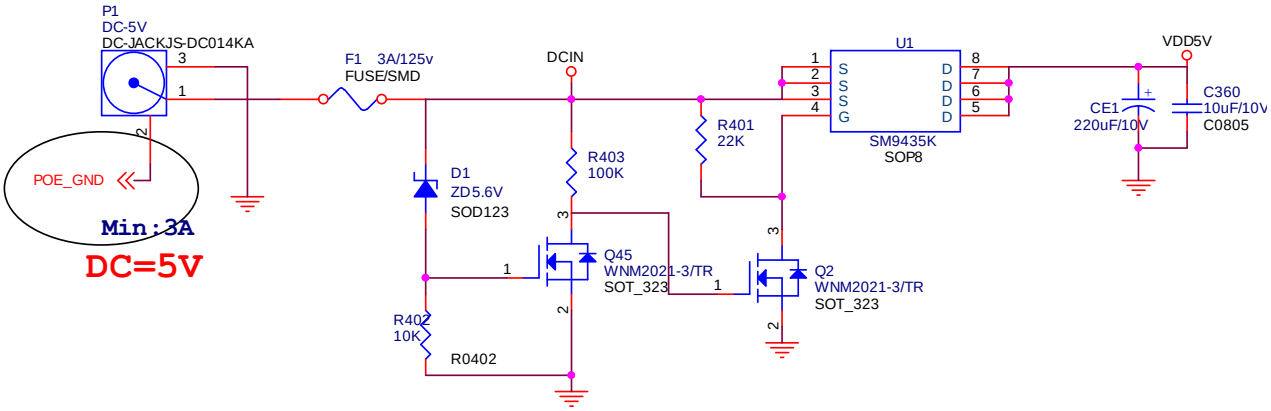


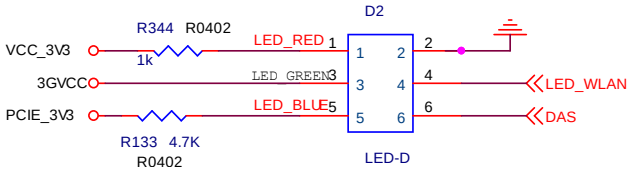


2 Hardware Design Guide

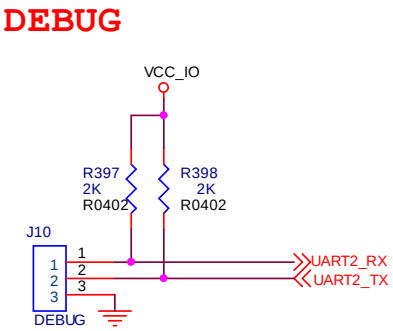
2.1 Peripheral Circuit Reference

2.1.1 External Power

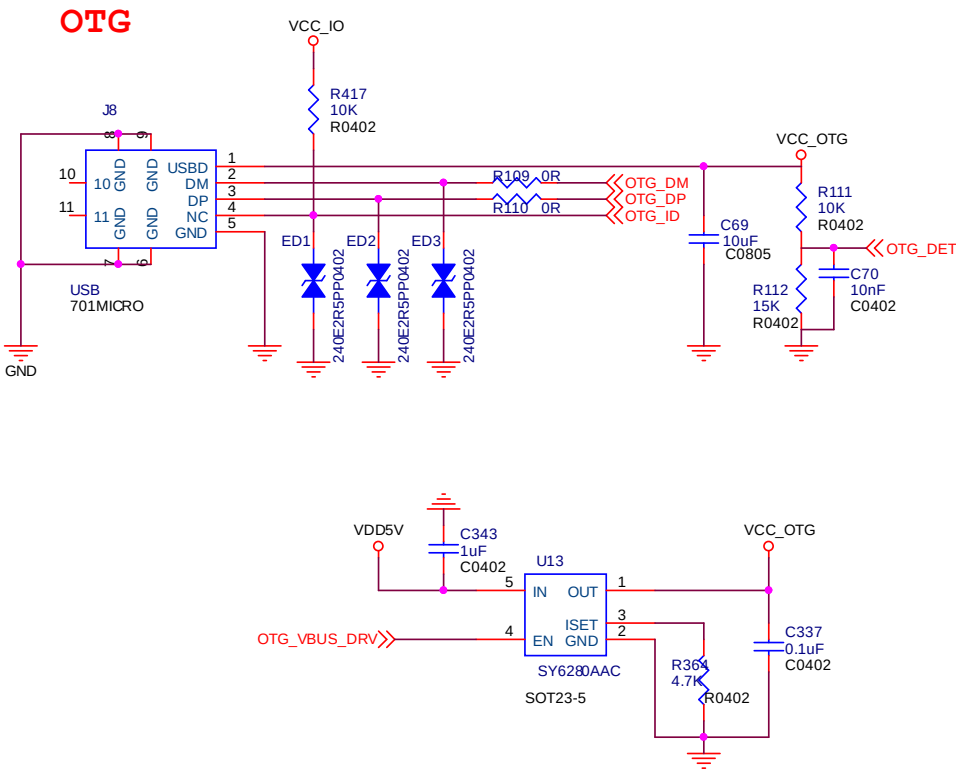




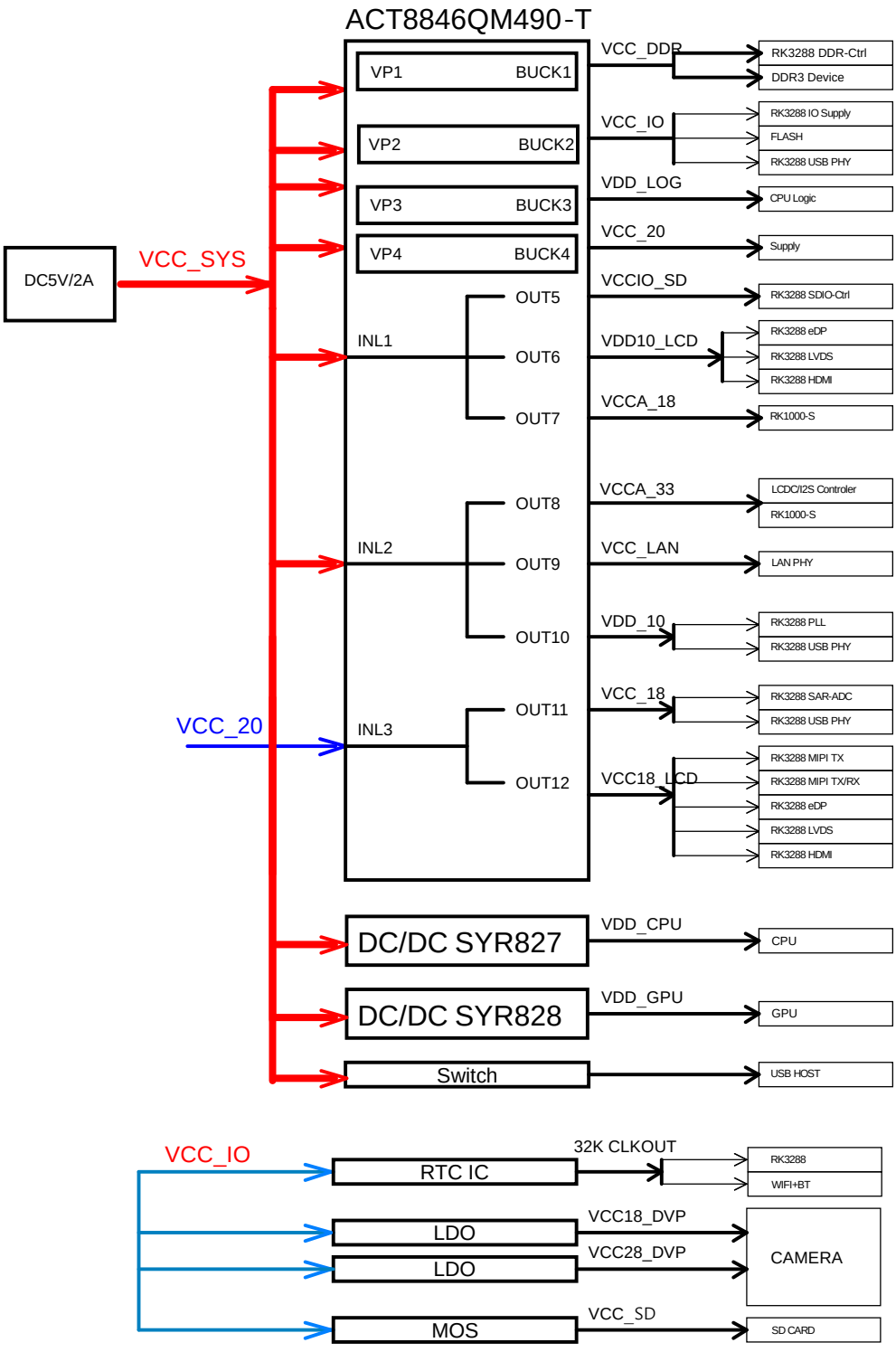
2.1.2 Debug Circuit



2.1.3 USB OTG Interface Circuit



2.2 Power Tree



3 Product Electrical Characteristics

3.1 Dissipation and Temperature

Symbol	Parameter	Min	Typ	Max	Unit
VSYS	System Voltage	3.5	5	5.5	V
VCC_IO	System IO Voltage	3.3-5%	3.3	3.3+5%	V
Isys_in	VSYS input Current		800	1600	mA
Ivio_out	VCC_IO output Current		400	500	mA
VCC_RTC	RTC Voltage	1.8	3	3.4	V
Iirtc	RTC input Current		5	8	uA
Ta	Operating Temperature	-20		70	°C
Tstg	Storage Temperature	-40		85	°C

3.2 Reliability of Test

Operating Environment	Ambient Temperature	Duration	Result
High Temperature	55 °C ± 2 °C	8 hours	Pass
Room Temperature	27 °C	120 hours	Pass