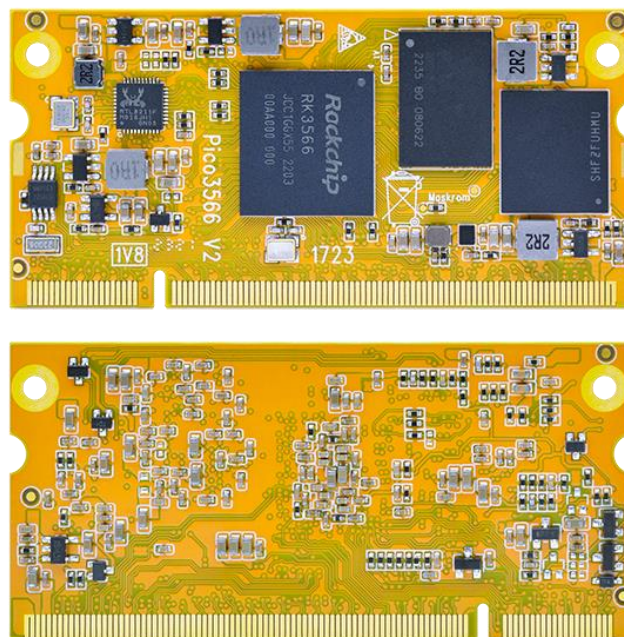

PICO3566 Reference User Manual

V2.202609



Boardcon Embedded Design

www.armdesigner.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 Pico3566 Introduction

1.1 Summary

The Pico3566 system-on-module is equipped with Rockchip's RK3566 it has quad-core Cortex-A55, Mali-G52 GPU, and 1 TOPs NPU.

It is designed specifically for the AI devices such as industrial controller, IoT devices, intelligent interactive devices, personal computers and robots. The high performance and low power solution can help customers to introduce new technologies more quickly and enhance the overall solution efficiency.

1.2 Features

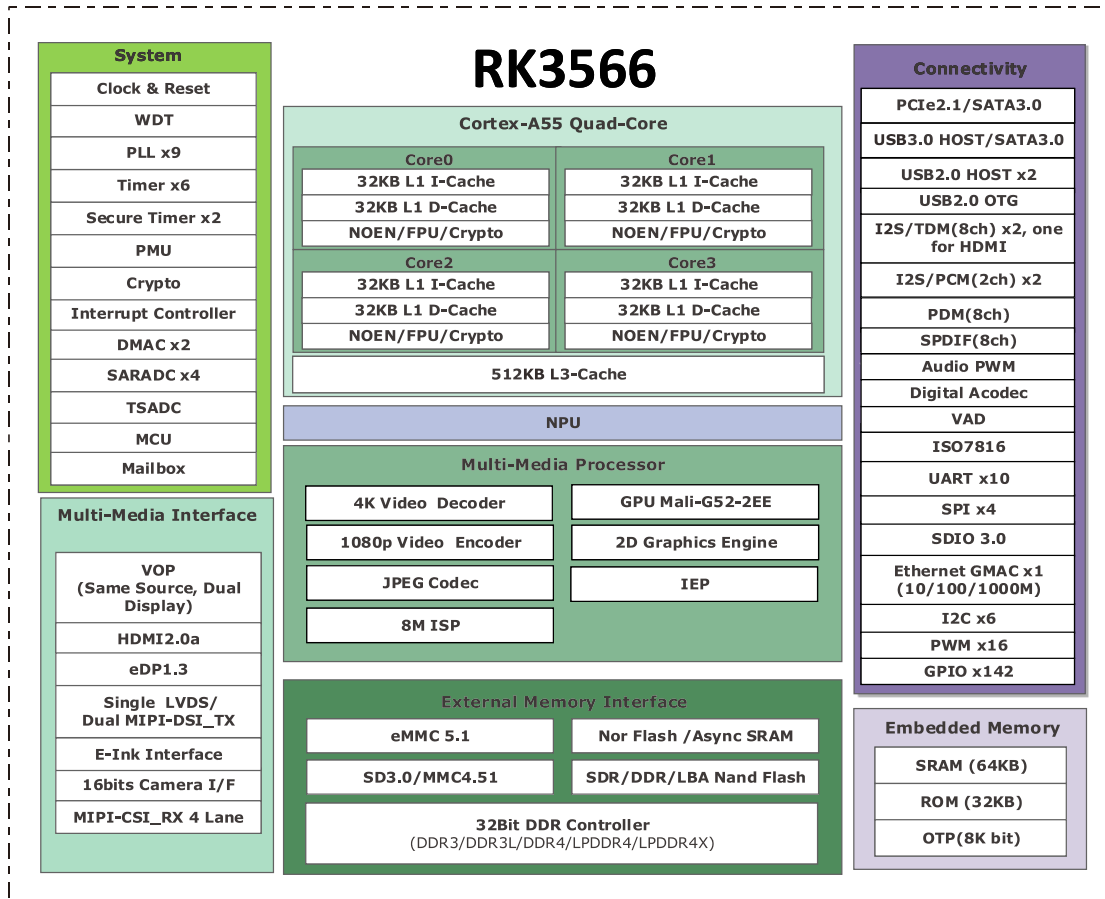
- **Microprocessor**
 - Quad-core Cortex-A55 up to 1.8G
 - 32KB I-cache and 32KB D-cache for each core, 512KB L3 cache
 - 1 TOPS Neural Process Unit
 - Mali-G52 up to 0.8G
- **Memory Organization**
 - LPDDR4 or LPDDR4X RAM up to 8GB
 - EMMC up to 128GB
- **Boot ROM**
 - Supports system code download through USB OTG or SD
- **Trust Execution Environment system**
 - Supports secure OTP and multiple cipher engine
- **Video Decoder/Encoder**
 - Supports video decoding up to 4K@50fps
 - Supports H.264 encode
 - H.264 HP encoding up to 1080p@100fps
 - Picture size up to 8192x8192
- **Display Subsystem**
 - **Video Output**
Supports HDMI 2.0 transmitter with HDCP 1.4/2.2, up to 4K@50fps
Supports 4 lanes MIPI DSI0 up to 2560x1440@60Hz
Or LVDS interface up to 1920x1080@60Hz
Supports 2 lanes MIPI DSI1 interface up to 2560x1600@60fps
 - **Image in**
Supports MIPI CSI 4lanes interface
Or 2ch MIPI CSI 2lanes interfaces
- **I2S/PCM/ AC97**



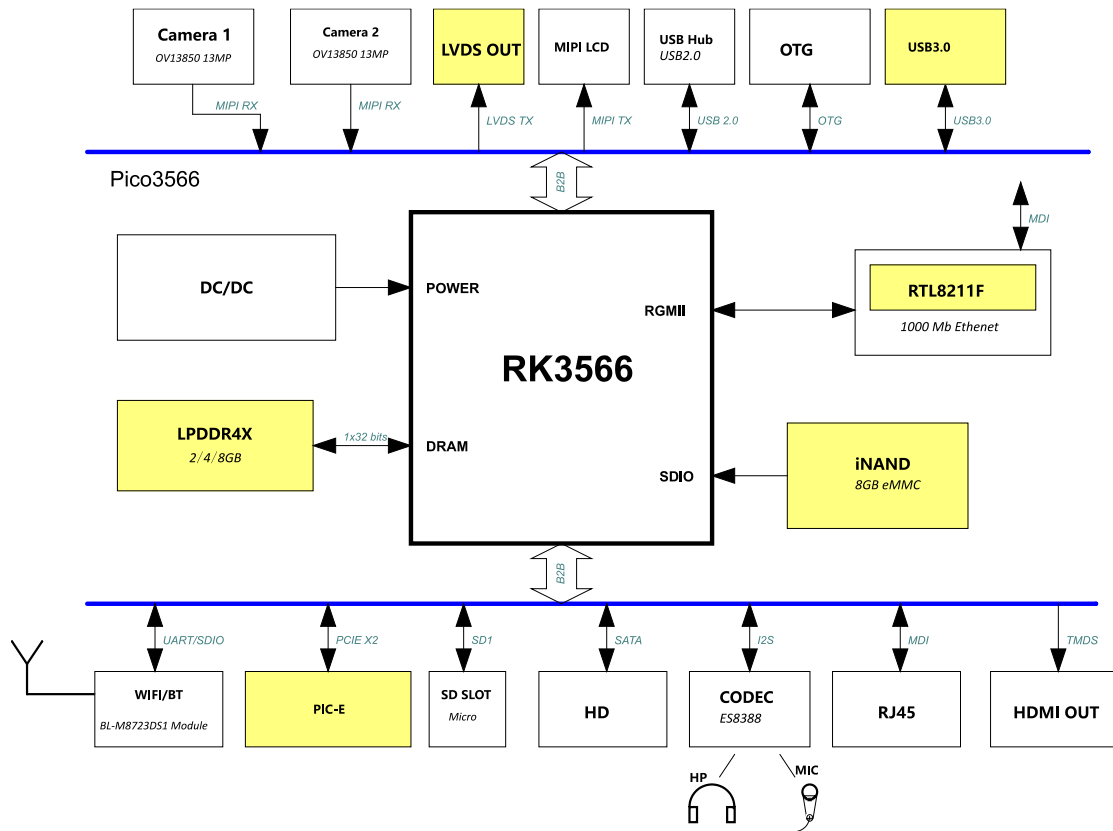
- Three I2S/PCM interface
- Support Mic array Up to 8ch PDM/TDM interface
- One SPDIF output
- **USB and PCIE**
 - Three 2.0 USB interfaces
 - One USB 2.0 OTG, and One USB2.0 hosts
 - One USB 3.0 host or SATA + USB2.0 interface.
 - One 1lane PCIE or SATA interface.
- **Ethernet**
 - RTL8211F on board
 - Support 10/100/1000Mbit/s data transfer rates
- **I2C**
 - Up to Four I2C
 - Support standard mode and fast mode(up to 400kbit/s)
- **SDIO**
 - Support SDIO 3.0 protocol
- **SPI**
 - Up to four SPI controllers,
 - Full-duplex synchronous serial interface
- **UART**
 - Support up to 9 UARTs
 - UART2 with 2 wires for debug tools
 - Embedded two 64byte FIFO
 - Support auto flow control mode for UART1-5
- **SATA**
 - Two SATA host controller
 - Support SATA 1.5Gb/s, 3.0Gb/s and SATA 6.0Gb/s
- **ADC**
 - One ADC channels
 - 10-bit resolution
 - Voltage input range between 0V to 1.8V
 - Support up to 1MS/s sampling rate
- **PWM**
 - 14 on-chip PWMs with interrupt-based operation
 - Support 32bit time/counter facility
 - IR option on PWM3/7/11/15
- **Power unit**
 - Discrete Power on board
 - 5V + 3.3V or Single 3.3V input
 - Very low RTC consume current, less 5uA at 3V button Cell

1.3 Pico3566 Block Diagram

1.3.1 RK3566 Block Diagram



1.3.2 Development board Block Diagram



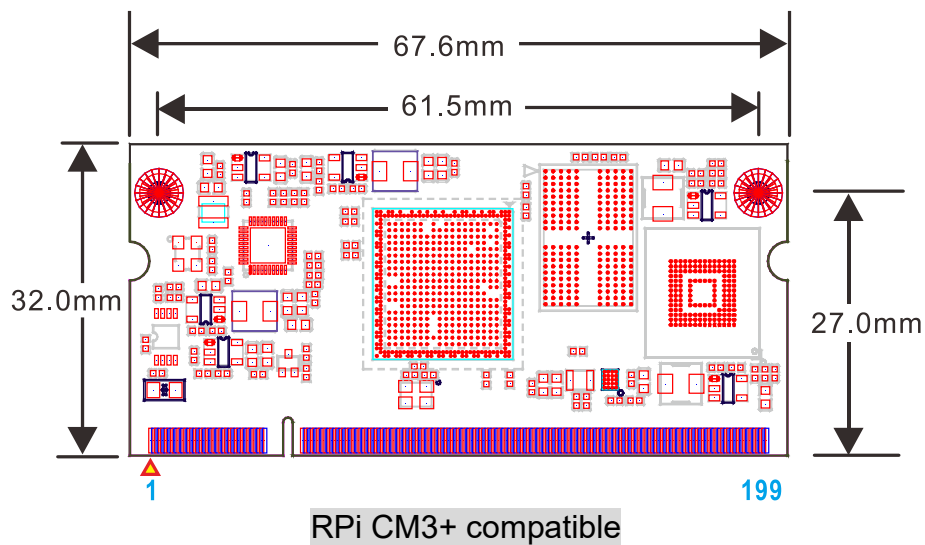
1.4 Pico3566 specifications

Feature	Specifications
CPU	Quad-core Cortex-A55
DDR	2GB LPDDR4X (up to 8GB)
eMMC FLASH	8GB (up to 128GB)
Power	DC 5V+ 3.3V
LVDS/MIPI DSI	4-Lane
I2S	3-CH
MIPI CSI	4-Lane
SATA	2-CH
HDMI out	1-CH
Camera	2-CH(CSI)
USB	1-CH (USB HOST2.0), 1-CH(OTG 2.0) and 1-CH(USB 3.0)
Ethernet	10/100/1000M MAC
SDMMC	2-CH
SPDIF TX	1-CH
I2C	4-CH



SPI	4-CH
UART	8-CH, 1-CH(DEBUG)
PWM	14-CH
ADC IN	1-CH
Board Dimension	32 x 67.6mm

1.5 Pico3566 PCB Dimension



1.6 Pico3566 Pin Definition

Pin	Signal	Description or functions	GPIO serial	IO Voltage
1	GND	Ground		0V
2	SDMMC0_DET_L		GPIO0_A4_u	3.3V
3	I2C1_SDA	Pull up 2.2K onboard	GPIO0_B4_u	3.3V
4	USB2_HOST2_DP	HOST2_DP		1.8V
5	I2C1_SCL	Pull up 2.2K onboard	GPIO0_B3_u	3.3V
6	USB2_HOST2_DM	HOST2_DM		1.8V
7	GND	Ground		0V
8	GND	Ground		0V
9	UART3_RX_M0	AudioPWM_LOUT_P/ I2C3_SDA_M0	GPIO1_A0_u	3.3V
10	SDMMC0_CLK	UART5_TX_M0	GPIO2_A2_d	3.3V
11	UART3_TX_M0	AudioPWM_LOUT_N/ I2C3_SCL_M0	GPIO1_A1_u	3.3V
12	SDMMC0_CMD	UART5_RX_M0	GPIO2_A1_u	3.3V
13	GND	Ground		0V



Pin	Signal	Description or functions	GPIO serial	IO Voltage
14	GND	Ground		0V
15	GPIO0_A3_u			3.3V
16	SDMMC0_D0	UART6_TX_M1	GPIO1_D5_u	3.3V
17	UART4_TX_M0	AudioPWM_ROUT_P/ PDM_CLK0_M0	GPIO1_A6_d	3.3V
18	SDMMC0_D1	UART6_RX_M1	GPIO1_D6_u	3.3V
19	GND	Ground		0V
20	GND	Ground		0V
21	UART4_RX_M0	PDM_CLK1_M0/ SPDIF_TX_M0	GPIO1_A4_d	3.3V
22	SDMMC0_D2	UART5_CTSn_M0	GPIO1_D7_u	3.3V
23	SPI0_CS1_M0	PWM5	GPIO0_C4_d	3.3V
24	SDMMC0_D3	UART5_RTSn_M0	GPIO2_A0_u	3.3V
25	GND	Ground		0V
26	GND	Ground		0V
27	SPI0_CS0_M0	PWM7	GPIO0_C6_d	3.3V
28	I2S2_SCLK_TX_M0	SPI2_MISO_M0	GPIO2_C2_d	3.3V /1.8V
29	SPI0_MISO_M0	PWM6	GPIO0_C5_d	3.3V
30	I2S2_LRCK_TX_M0	SPI2_MOSI_M0	GPIO2_C3_d	3.3V /1.8V
31	GND	Ground		0V
32	GND	Ground		0V
33	SPI0_MOSI_M0	I2C2_SDA_M0	GPIO0_B6_u	3.3V
34	I2S2_SDI_M0	UART8_TX_M0	GPIO2_C5_d	3.3V /1.8V
35	SPI0_CLK_M0	I2C2_SCL_M0	GPIO0_B5_u	3.3V
36	I2S2_SDO_M0	SPI2_CS0_M0	GPIO2_C4_d	3.3V /1.8V
37	GND	Ground		0V
38	GND	Ground		0V
39	UART2DBG_TX	UART2 for Debug	GPIO0_D1_u	3.3V
40	UART2DBG_RX	UART2 for Debug	GPIO0_D0_u	3.3V
41	VCCIO4	VCCIO4 Power in		3.3V /1.8V
42	VCCIO4	VCCIO4 Power in		3.3V /1.8V
43	GND	Ground		0V
44	GND	Ground		0V
45	PWM0_M1	HDMITX_CEC_M1	GPIO0_C7_d	3.3V
46	HOST_WAKE_BT_H	I2S2_MCLK_M0	GPIO2_C1_d	3.3V /1.8V
47	I2S3_MCLK_M1	SPI3_CLK_M1	GPIO4_C2_d	3.3V
48	WIFI_REG_ON_H	UART8_RX_M0	GPIO2_C6_d	3.3V /1.8V
49	GND	Ground		0V
50	BT_WAKE_HOST_H	I2S2_LRCLK_RX_M0	GPIO2_C0_d	3.3V /1.8V
51	UART5_TX_M1		GPIO3_C2_d	3.3V
52	WIFI_WAKE_HOST_H	I2C4_SCL_M1	GPIO2_B2_d	3.3V /1.8V
53	UART5_RX_M1		GPIO3_C3_d	3.3V



Pin	Signal	Description or functions	GPIO serial	IO Voltage
54	BT_REG_ON_H	I2S2_SCLK_RX_M0	GPIO2_B7_d	3.3V /1.8V
55	GND	Ground		0V
56	GND	Ground		0V
57	GPIO3_C1_d			3.3V
58	UART1_TX_M0		GPIO2_B4_u	3.3V /1.8V
59	GPIO1_B1_d	PDM_SDI2_M0/PCIE20_WA KEn_M2/I2S1_SDO2_M0		3.3V
60	UART1_RX_M0		GPIO2_B3_u	3.3V /1.8V
61	GND	Ground		0V
62	GND	Ground		0V
63	I2S3_SCLK_M1	SPI3_MOSI_M1	GPIO4_C3_d	3.3V
64	UART1_RTSn_M0		GPIO2_B5_u	3.3V /1.8V
65	I2S3_LRCK_M1	SPDIF_TX_M2	GPIO4_C4_d	3.3V
66	UART1_CTSn_M0		GPIO2_B6_u	3.3V /1.8V
67	GND	Ground		0V
68	GND	Ground		0V
69	I2S3_SDI_M1	SPI3_CS0_M1	GPIO4_C6_d	3.3V
70	SDMMC1_D0	UART6_RX_M0	GPIO2_A3_u	3.3V /1.8V
71	I2S3_SDO_M1	SPI3_MISO_M1	GPIO4_C5_d	3.3V
72	SDMMC1_D1	UART6_TX_M0	GPIO2_A4_u	3.3V /1.8V
73	GND	Ground		0V
74	GND	Ground		0V
75	GPIO0_A6_d			3.3V
76	SDMMC1_D2	UART7_RX_M0	GPIO2_A5_u	3.3V /1.8V
77	PWM0_M0		GPIO0_B7_d	3.3V
78	SDMMC1_D3	UART7_TX_M0	GPIO2_A6_u	3.3V /1.8V
79	GND	Ground		0V
80	GND	Ground		0V
81	PWM3_IR		GPIO0_C2_d	3.3V
82	SDMMC1_CMD	UART9_RX_M0	GPIO2_A7_u	3.3V /1.8V
83	GPIO0_A0_d			3.3V
84	SDMMC1_CLK	UART9_TX_M0	GPIO2_B0_d	3.3V /1.8V
85	GND	Ground		0V
86	GND	Ground		0V
87	GPIO1_B2_d	PDM_SDI1_M0/ PCIE20_PERSTn_M2		3.3V
88	HDMI_HPD_N			3.3V
89	GPIO0_A5_d	PCIE20_CLKREQn_M0		3.3V
90	SARADC_VIN0	RECOVERY_KEY (pull up 10K)		1.8V
91	GND	Ground		0V
92	GND	Ground		0V



Pin	Signal	Description or functions	GPIO serial	IO Voltage
93	MIPI_DSI_TX1_D1N			1.8V
94	MIPI_DSI_TX0_D0P/ LVDS_TX0_D0P			1.8V
95	MIPI_DSI_TX1_D1P			1.8V
96	MIPI_DSI_TX0_D0N/ LVDS_TX0_D0N			1.8V
97	GND	Ground		0V
98	GND	Ground		0V
99	MIPI_DSI_TX1_D0N			1.8V
100	MIPI_DSI_TX0_CLKP/ LVDS_TX0_CLKP			1.8V
101	MIPI_DSI_TX1_D0P			1.8V
102	MIPI_DSI_TX0_CLKN/ LVDS_TX0_CLKN			1.8V
103	GND	Ground		0V
104	GND	Ground		0V
105	MIPI_DSI_TX1_CLKN			1.8V
106	MIPI_DSI_TX0_D3P/ LVDS_TX0_D3P			1.8V
107	MIPI_DSI_TX1_CLKP			1.8V
108	MIPI_DSI_TX0_D3N/ LVDS_TX0_D3N			1.8V
109	GND	Ground		0V
110	GND	Ground		0V
111	HDMI_TXCLKN			1.8V
112	MIPI_DSI_TX0_D2P/ LVDS_TX0_D2P			1.8V
113	HDMI_TXCLKP			1.8V
114	MIPI_DSI_TX0_D2N/ LVDS_TX0_D2N			1.8V
115	GND	Ground		0V
116	GND	Ground		0V
117	HDMI_TX0N			1.8V
118	MIPI_DSI_TX0_D1P/ LVDS_TX0_D1P			1.8V
119	HDMI_TX0P			1.8V
120	MIPI_DSI_TX0_D1N/ LVDS_TX0_D1N			1.8V
121	GND	Ground		0V
122	GND	Ground		0V
123	HDMI_TX1N			1.8V
124	PCIE20_SATA2_TXP			1.8V



Pin	Signal	Description or functions	GPIO serial	IO Voltage
125	HDMI_TX1P			1.8V
126	PCIE20_SATA2_TXN			1.8V
127	GND	Ground		0V
128	GND	Ground		0V
129	HDMI_TX2N			1.8V
130	PCIE20_SATA2_RXP			1.8V
131	HDMI_TX2P			1.8V
132	PCIE20_SATA2_RXN			1.8V
133	GND	Ground		0V
134	GND	Ground		0V
135	PCIE20_REFCLKP			1.8V
136	MIPI_CSI_RX_D0P			1.8V
137	PCIE20_REFCLKN			1.8V
138	MIPI_CSI_RX_D0N			1.8V
139	GND	Ground		0V
140	GND	Ground		0V
141	USB3_HOST1_DP			1.8V
142	MIPI_CSI_RX_CLK0P			1.8V
143	USB3_HOST1_DM			1.8V
144	MIPI_CSI_RX_CLK0N			1.8V
145	GND	Ground		0V
146	GND	Ground		0V
147	MIPI_CSI_RX_CLK1P			1.8V
148	MIPI_CSI_RX_D1P			1.8V
149	MIPI_CSI_RX_CLK1N			1.8V
150	MIPI_CSI_RX_D1N			1.8V
151	GND	Ground		0V
152	GND	Ground		0V
153	MIPI_CSI_RX_D3P			1.8V
154	USB3_HOST1_SSTXP			1.8V
155	MIPI_CSI_RX_D3N			1.8V
156	USB3_HOST1_SSTXN			1.8V
157	GND	Ground		0V
158	GND	Ground		0V
159	MIPI_CSI_RX_D2P			1.8V
160	USB3_HOST1_SSRXP			1.8V
161	MIPI_CSI_RX_D2N			1.8V
162	USB3_HOST1_SSRXN			1.8V
163	GND	Ground		0V
164	GND	Ground		0V
165	USB_OTG0_DP			1.8V
166	PCIE20_CLKREQn_M2	PDM_SDI3_M0	GPIO1_B0_d	3.3V



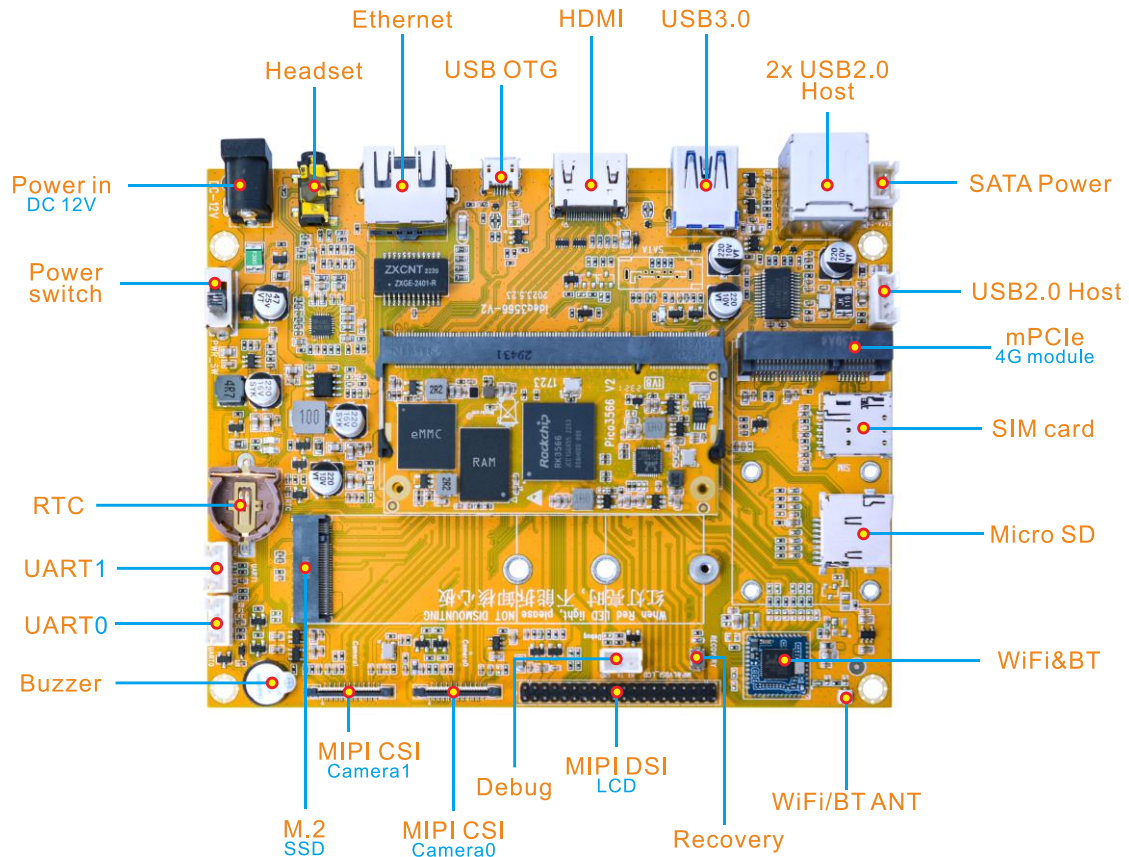
Pin	Signal	Description or functions	GPIO serial	IO Voltage
167	USB_OTG0_DM			1.8V
168	USB_OTG0_ID			1.8V
169	GND	Ground		0V
170	LCD_BL_PWM	PWM4	GPIO0_C3_d	3.3V
171	HDMITX_CEC		GPIO4_D1_u	3.3V
172	I2S1_SCLK_TX_M0	UART3_CTSn_M0	GPIO1_A3_d	3.3V
173	HDMITX_SDA	Pull up 2.2K onboard	GPIO4_D0_u	3.3V
174	I2S1_LRCK_TX_M0		GPIO1_A5_d	3.3V
175	HDMITX_SCL	Pull up 2.2K onboard	GPIO4_C7_u	3.3V
176	I2S1_SDI0_M0	PDM_SDI0_M0	GPIO1_B3_d	3.3V
177	LED1/CFG_LDO0			3.3V
178	I2S1_SDO0_M0	AudioPWM_ROUT_N/ UART4_CTSn_M0	GPIO1_A7_d	3.3V
179	LED2/CFG_LDO1			3.3V
180	I2S1_MCLK_M0	UART3_RTSn_M0	GPIO1_A2_d	3.3V
181	MDI0+			0V
182	MDI2+			1.8V
183	MDI0-			1.8V
184	MDI2-			1.8V
185	MDI1+			1.8V
186	MDI3+			1.8V
187	MDI1-			1.8V
188	MDI3-			1.8V
189	VCC_RTC			3.3V
190	RTC_32KOUT	32.768kHz output (PU 10K)		3.3V
191	USB_OTG0_VBUSDET	USB OTG VBUS input		3.3V
192	VCC3V3_SYS			3.3V
193	VCC3V3_SYS			3.3V
194	VCC3V3_SYS			3.3V
195	GND	Ground		0V
196	GND	Ground		0V
197	VCC5V_SYS			5V/3.3V
198	VCC5V_SYS			5V/3.3V
199	VCC5V_SYS			5V/3.3V
200	VCC5V_SYS			5V/3.3V

Note:

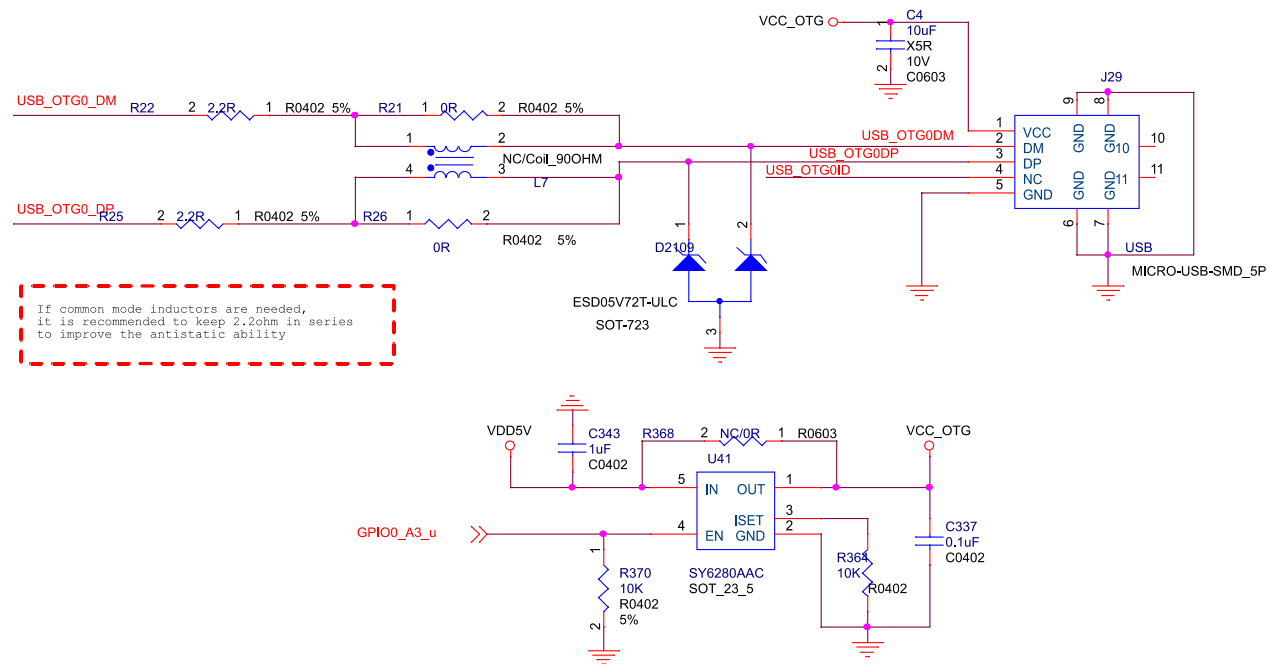
The Pins filled red is different as RPi CM3+.

The Green word GPIOs is powered by VCCIO4(Pin41-42).

1.7 Development Kit (KIT3566)



2.1.3 USB OTG Circuit



2.3 Motherboard Connector

Adopt standard DDR2 SODIMM connector.



DIMM200 1.8V connector



3 Product Electrical Characteristics

3.1 Dissipation and Temperature

Symbol	Parameter	Min	Typ	Max	Unit
VCC5V_SYS	System IO Voltage	3.2	5	5.5	V
I _{sys5_in}	VCC5V_SYS input Current		TDB		mA
VCC3V3_SYS	System IO Voltage	3.3-5%	3.3	3.3+5%	V
I _{sys33_in}	VCC3V3_SYS input Current		TDB		mA
VCC_RTC	RTC Voltage	1.8	3	3.4	V
I _{rtc}	RTC input Current		5	8	uA
T _a	Operating Temperature	0		70	°C
T _{stg}	Storage Temperature	-40		85	°C