CM311Y3 Reference User Manual

V1.202608



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.

Content

1 CM311Y3 Introduction....3
1.1 Summary....3
1.2 Features....3
1.3 CM311Y3 Block Diagram....5
1.4 CM311Y3 specifications....6
1.5 CM311Y3 PCB Dimension....7
1.6 CM311Y3 Pin Definition....7
1.7 Development Kit (Idea311Y3)....16
2 Hardware Design Guide....17
2.1 Peripheral Circuit Reference....17
2.2 Mother Board length offset....19
2.3 PCB Footprint....20
3 Product Electrical Characteristics....20
3.1 Dissipation and Temperature....20

1 CM311Y3 Introduction

1.1 Summary

The CM311Y3 system-on-module is equipped with Amlogic's A311Y3. It has a dual-core Cortex-A78 and a hexa-core Cortex-A55 processor, embedded Mali-G625 MC1 GPU and 8.0 TOPs NPU.
It is designed specifically for the high-performance devices such as 4K video surveillance system, AI Edge calculation devices, intelligent interactive devices, personal computers and robots. The high-performance multimedia processing and acceleration engine solution can help customers to introduce new technologies more quickly and enhance the overall solution efficiency.

1.2 Features

- **Microprocessor**
  - Dual-core Cortex-A78 up to 2.4GHz
  - Hexa-core Cortex-A55 up to 2.0GHz
  - 64KB I-cache 64KB D-cache and 256KB L2 for A78 each core, 32KB I-cache 32KB D-cache and 128KB L2 for A55 each core, and shared 2MB L3 cache
  - 8.0 TOPS Neural Process Unit
  - Mali-G625 MC1 up to 1.0GHz
  - Built in RISC-V for system control and power management
- **Memory Organization**
  - LPDDR5 RAM up to 16GB
  - EMMC up to 256GB
  - Support FSPI Flash
- **Boot ROM**
  - Supports system code download through USB OTG
- **Secure system**
  -Trust Zone based Trusted Execution Environment
  -Support secure boot, encrypted OTP, encrypted DRAM.
  -Support Hardware Key ladder and internal control buses and storage.
  -Support Hardware based Trusted Video Path, video watermarking and secured contents.
- **Video Decoder/Encoder**
  - Supports video decoding up to 4Kx2K@120fps
  - Supports H.264/265 encode up to 4Kx2K@60fps
  - MJPEG encoding up to 4Kx2K@30fps
- **Display Subsystem**
  - **Video Output**

  Supports HDMI 2.1a TX with ARC, up to 3840x2160@60Hz
  Supports EDP1.3 TX interface up to 3840x2160@60Hz
  Supports 2x4 lanes MIPI DSI up to 2560x1600@60Hz or 1920x1080@120Hz
  Or dual-LVDS or sign channel TX up to 1080P@60Hz

Or V-by-One TX 3860x2160@60Hz

Supports PD1.4a interface up to 3860x2160@60Hz

- **Video/Image Input**

Supports up to 3-CH MIPI CSI interfaces

2-CH MIPI 2lanes or 1-CH 4lanes interfaces

1-CH 4lanes CSI interfaces

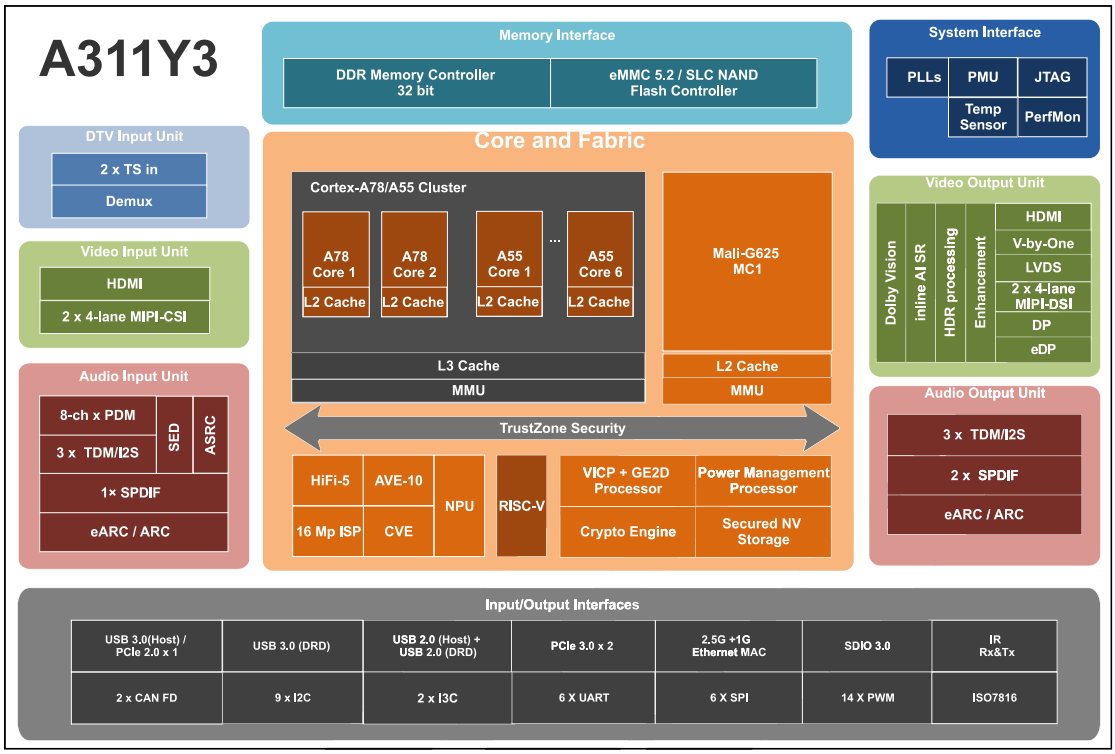
- **Audio**
  - Three I2S/PCM interfaces
  - Support Mic array Up to 8ch PDM/TDM interface
  - Support 2-ch SPDIF output
  - Support 1-ch SPDIF input
  - Support voice event detection
  - Option support HIFI5 DSP
- **USB / PCIE/SATA3**
  - One Type-C or DP interfaces
  - One USB3.0 Host or PCIE2.0 1x or HSGMII interface.
  - One PCIE3.0 2x or Two PCIE3.0 1x interfaces.
  - One USB2.0 Host interface
- **Ethernet**
  - Support up to three Ethernet interface
  - One 1GB RGMII and One 2.5GB HSGMII interfaces
  - On board RTL8211F
- **I2C**
  - Up to 8-CH I2C (I2C_A already used for RTC)
  - Support standard mode and fast mode (up to 400kbit/s)
- **I3C**
  - Up to 2-CH I3C
  - Support HDR mode
  - I2C compatible
- **SDIO / SDMMC**
  - Support SDIO 3.0 protocol
  - Support SD3.0 card
- **SPI**
  - Up to 4-ch SPI controllers,
  - Full-duplex synchronous serial interface
- **UART**
  - Support up to 5 UARTs
  - UART_B with 2 wires for debug
  - Support high baud rates up to 4M bps
- **CAN**
  - Up to 2-CH CAN controller
  - Support CAN FD protocol
- **ADC**
  - 1-CH ADC channels

- 10-bit resolution
- Voltage input range between 0V to 1.8V

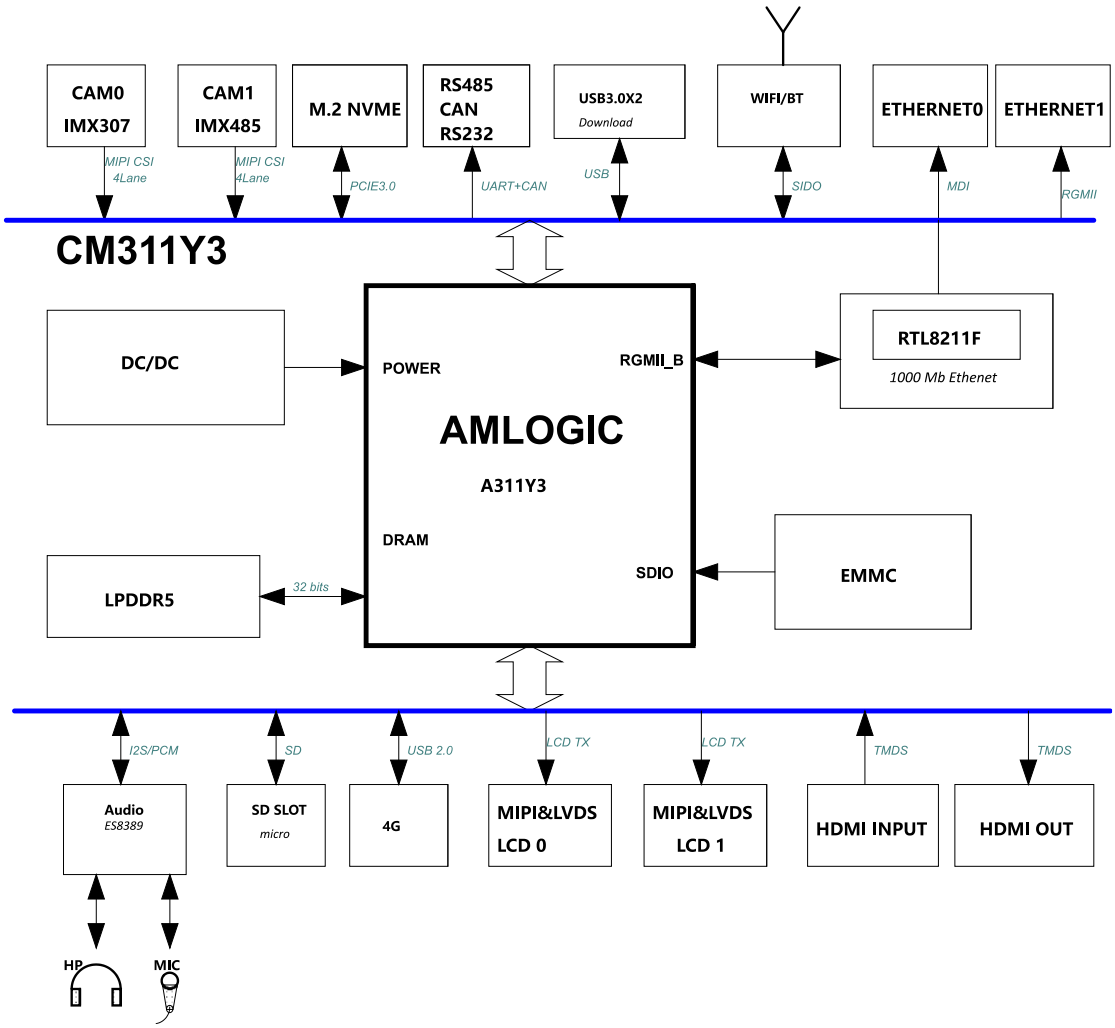
- **PWM**
  - Up to 14 PWMs
- **Power unit**
  - Discrete Power on board
  - 3.4 ~ 5.5V main power input
  - Power enable control input
  - Very low RTC consume current, less 5uA at 3V button Cell.

1.3 CM311Y3 Block Diagram

1.3.1 A311Y3 Block Diagram



1.3.2 Development board (idea311Y3) Block Diagram

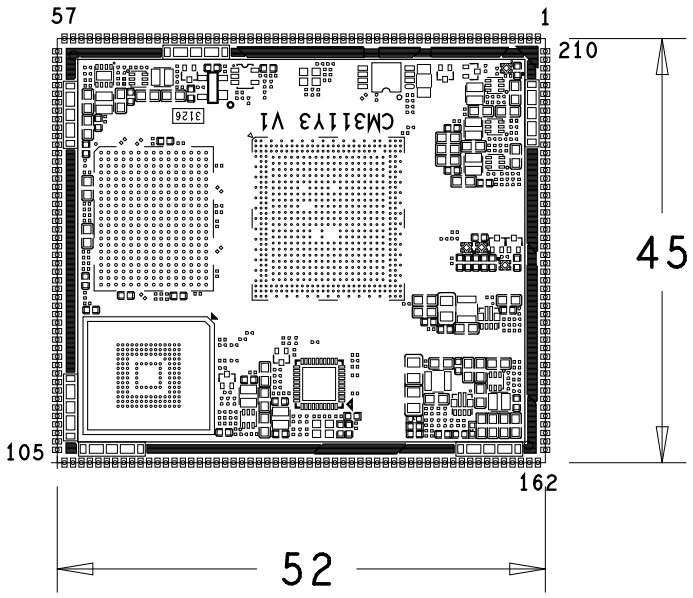


1.4 CM311Y3 specifications

Feature	Specifications
CPU	Quad-core Cortex-A78 and quad-core Cortex-A55
DDR	4GB LPDDR5 (up to 16GB)
eMMC FLASH	64GB (up to 256GB)
Power	DC 3.4 ~ 5.5V
VX1(V-by-One)	1-CH (Cannot use MIPI/LVDS/eDP, if VX1 setting.)
I2S	3-CH
MIPI CSI	2-CH 4-Lane or 2-CH 2-Lane + 1-CH 4-Lan CSI (up to 3 CSI Cameras)
HDMI output	1-CH
DP output	1-CH
eDP output	1-CH (Cannot use MIPI/LVDS dual channel, if eDP setting.)
MIPI DSI/LVDS	2-CH (option)

Feature	Specifications
CAN	2-CH
USB	1-CH Type-C + 1-CH USB Host3.0 + 1-CH USB Host 2.0
Ethernet	1-CH 1GB PHY + 1-CH RGMII + 1-CH HSGMII (option)
SDIO	2-CH
SPDIF TX	2-CH
SPDIF RX	1-CH
I2C	8-CH
I3C	2-CH
SPI	4-CH
UART	4-CH, 1-CH(DEBUG)
PWM	14-CH
ADC IN	1-CH
Board Dimension	52 x 45mm

1.5 CM311Y3 PCB Dimension



1.6 CM311Y3 Pin Definition

Pin	Signal	Description or functions	GPIO serial	IO Voltage
1	ETH_A_RGMII_TXD2_1V8	TSIN_B_D6/SPIB_SCLK/TDM_SCLK2	GPIOZ_12_d	1.8V
2	ETH_A_RGMII_TXD3_1V8	TSIN_B_D7/SPIB_SS0/TDM_FS2	GPIOZ_13_d	1.8V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
3	GND	Ground		0V
4	PCIE30_LANE1_TXP	Or PCIE30_LANE0_TXP1		0.5V
5	PCIE30_LANE1_TXN	Or PCIE30_LANE0_TXN1		0.5V
6	PCIE30_LANE1_RXP	Or PCIE30_LANE0_RXP1		0.5V
7	PCIE30_LANE1_RXN	Or PCIE30_LANE0_RXN1		0.5V
8	PCIE30_LANE1_PCIE 20_REFCLKP			0.5V
9	PCIE30_LANE1_PCIE 20_REFCLKN			0.5V
10	PCIE30_LANE0_RXP	PCIE30_LANE0_RXP0		0.5V
11	PCIE30_LANE0_RXN	PCIE30_LANE0_RXN0		0.5V
12	PCIE30_LANE0_TXP	PCIE30_LANE0_TXP0		0.5V
13	PCIE30_LANE0_TXN	PCIE30_LANE0_TXN0		0.5V
14	PCIE30_LANE0_REFC LK_P			0.5V
15	PCIE30_LANE0_REFC LK_N			0.5V
16	GND	Ground		0V
17	HSGMII_USB_B_SS_P CIe20_TXP	For HSGMII/ USB3/ PCIe20		0.5V
18	HSGMII_USB_B_SS_P CIe20_TXN	For HSGMII/ USB3/ PCIe20		0.5V
19	HSGMII_USB_B_SS_P CIe20_RXP	For HSGMII/ USB3/ PCIe20		0.5V
20	HSGMII_USB_B_SS_P CIe20_RXN	For HSGMII/ USB3/ PCIe20		0.5V
21	USB_A_TYPEC_RX1N /DP_TX_D3N	For TYPEC or DP		0.5V
22	USB_A_TYPEC_RX1P/ DP_TX_D3P	For TYPEC or DP		0.5V
23	USB_A_TYPEC_TX1N/ DP_TX_D2N	For TYPEC or DP		0.5V
24	USB_A_TYPEC_TX1P/ DP_TX_D2P	For TYPEC or DP		0.5V
25	USB_A_TYPEC_RX2N /DP_TX_D0N	For TYPEC or DP		0.5V
26	USB_A_TYPEC_RX2P/ DP_TX_D0P	For TYPEC or DP		0.5V
27	USB_A_TYPEC_TX2N/ DP_TX_D1N	For TYPEC or DP		0.5V
28	USB_A_TYPEC_TX2P/ DP_TX_D1P	For TYPEC or DP		0.5V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
29	DP_TX_AUXN_USB_SBU2	For TYPEC CC2 or DP	H/W Can change to I2C_F_SDA (Note1)	0.5V/3.3V
30	DP_TX_AUXP_USB_SBU1	For TYPEC CC1 or DP	H/W Can change to I2C_F_SCL (Note1)	0.5V/3.3V
31	GND	Ground		0V
32	SD_CLK	JTAG_B_CLK/SPID_SS1/I2C_A_SCL/PDMD_CLK	GPIOC_4_u /RT_GPIO_18	1.8V/3.3V
33	SD_D1	JTAG_B_TDI/SPID_MISO/I2C_C_SDA/PDMD_DIN1/UART_D_RTS/I3C_A_SDA	GPIOC_1_u	1.8V/3.3V
34	SD_CMD	JTAG_B_TMS/SPID_SS2/I2C_A_SDA/UART_D_RX	GPIOC_5_u	1.8V/3.3V
35	SD_D0	JTAG_B_TDO/SPID_MOSI/I2C_C_SCL/PDMD_DIN0/UART_D_CTS/I3C_A_SCL	GPIOC_0_u	1.8V/3.3V
36	SD_D3	SPID_SS0/I2C_B_SDA/PDMD_DIN3	GPIOC_3_u /RT_GPIO_17	1.8V/3.3V
37	SD_D2	SPID_SCLK/I2C_B_SCL/PDMD_DIN2	GPIOC_2_u /RT_GPIO_16	1.8V/3.3V
38	Vbutt	RTC Battery input		3.0V
39	USB_C_DP			0.5V
40	USB_C_DM			0.5V
41	USB_B_DP			0.5V
42	USB_B_DM			0.5V
43	USB_A_TYPEC_DP			0.5V
44	USB_A_TYPEC_DM			0.5V
45	GND	Ground		0V
46	RTC32KO_1V8	RTC32.768K output for WIFI	(PU10K)	1.8V
47	USB_A_OTG_VBUS			1.8V
48	USB_A_OTG_ID	(Connect to GND if not used)	(PU in core)	1.8V
49	CARD_DET	GEN_CLK_OUT/PCIE_CLKA_REQN/UART_D_TX	GPIOC_6_u	1.8V/3.3V
50	GPIOD_8_d	JTAG_A_CLK/IR_OUT/UART_E_TX	GPIOD_8_d	3.3V
51	GPIOD_9_u	JTAG_A_TMS/IR_IN/UART_E_RX	GPIOD_9_u	3.3V
52	GPIOD_13_d	I2C_C_SCL/SPDIF_OUT/IN	GPIOD_13_d /RT_GPIO_6	3.3V
53	IR_IN	RT_GPIO_2	GPIOD_5_u	3.3V
54	DBG_UART_B_TX		GPIOD_0_u	3.3V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
55	DBG_UART_B_RX		GPIOD_1_u	3.3V
56	GPIOD_10_u	PMW_A/C_HIZ/JTAG_A_TDI /UART_E_CTS	GPIOD_10_u /RT_GPIO_4	3.3V
57	GPIOD_15_u	PMIC_SLEEP/STR_EN	GPIOD_15_u	3.3V
58	HDMI_CEC	I2C_C_SDA/WD_RSTO	GPIOD_14_od /RT_GPIO_7 (Note2)	3.3V
59	POWER_KEY		GPIOD_3_u	3.3V
60	GPIOD_11_u	SPDIF_IN/PMW_G_HIZ/JTAG_A_TDO/UART_E_RTS	GPIOD_11_u /RT_GPIO_5	3.3V
61	WD_RSTO	WD_RSTO/HDMI_CEC	GPIOD_17_od	3.3V
62	RESETn_IN	System Reset input	(PU10K)	3.3V
63	USB_BOOT_H	1: USB Boot Frist (Download) 0/N.C: EMMC Boot Frist	(PD4K7) (Note3)	1.8V/3.3V
64	GND	Ground		0V
65	ETH_A_MDIO_1V8	ISO7816_CLK/SPI_E_MOSI/ TDM_SCLK1/I2C_E_SDA/UART_D_CTS	GPIOZ_0_u	1.8V
66	ETH_A_MDC_1V8	ISO7816_DATA/SPI_E_MISO/TDM1_FS/I2C_E_SCL/UART_D_RTS	GPIOZ_1_u	1.8V
67	GPIOA_12_d_1V8	I2C_D_SDA/RT_GPIO_15	GPIOA_12_d	1.8V
68	GPIOA_11_d_1V8	I2C_D_SCL/PWM_A/RT_GPIO_14	GPIOA_11_d	1.8V
69	GPIOA_7_u_1V8	I2C_C_SDA/PDM_DIN1	GPIOA_7_u	1.8V
70	GPIOA_10_u_1V8	PDM_CLK	GPIOA_10_u	1.8V
71	GPIOA_6_d_1V8	I2C_C_SCL/PDM_DIN0/PWM_G	GPIOA_6_d	1.8V
72	GPIOA_8_u_1V8	PDM_DIN2	GPIOA_8_u	1.8V
73	CAN_A_TX_1V8	SPDIF_IN/I3C_A_SDA	GPIOA_18_d	1.8V
74	BT_UART_A_CTS_N_ 1V8		GPIOX_13_u	1.8V
75	BT_UART_A_RTS_N_ 1V8		GPIOX_14_u	1.8V
76	BT_UART_A_TX_1V8		GPIOX_11_u	1.8V
77	BT_UART_A_RX_1V8		GPIOX_12_u	1.8V
78	CAN_A_RX_1V8	I3C_A_SCL	GPIOA_19_d	1.8V
79	BTPCM_CLK_1V8	TDM_SCLK0	GPIOX_10_u	1.8V
80	BTPCM_DIN_1V8	TDM_D1	GPIOX_7_u	1.8V
81	BTPCM_DOUT_1V8	TDM_D0	GPIOX_8_u	1.8V
82	BTPCM_SYNC_1V8	TDM_FS0	GPIOX_9_u	1.8V
83	GND	Ground		0V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
84	PANEL_B_VDD_EN/VX1_LOCKN	TDM_D6/RT_GPIO_35	GPIOY_7_d	3.3V
85	DP_HPD	TDM_D7/I2C_I_SDA/RT_GPIO_36	GPIOY_8_u	3.3V
86	eDP_HPD/VX1_HPD	TDM_D8/I2C_I_SCL/RT_GPIO_37	GPIOY_9_u	3.3V
87	SPDIFOUT_GPIOY_4_d	PWM_M/TDM_MCLK1/PDM_D3	GPIOY_4_d	3.3V
88	PANEL_A_RST	PWM_K/TDM_FS1/PDM_D1/PCIE_A_PRST	GPIOY_2_d /RT_GPIO_32	3.3V
89	PANEL_A_VDD_EN	PWM_L/TDM_SCLK1/PDM_D2/SPDIF_IN/PCIE_B_PRST	GPIOY_3_d	3.3V
90	PANEL_A_BL_PWM_I	PWM_I/TDM_D3/PDM_DCLK/PCIE_B_REQN	GPIOY_1_d /RT_GPIO_31	3.3V
91	PANEL_A_BL_EN	PWM_N/TDM_D2/PDM_DIN0/PCIE_A_REQN	GPIOY_0_d /RT_GPIO_30	3.3V
92	HDMIRX_HPD		GPIOH_2_od	3.3V/5V
93	HDMIRX_SDA	UART_C_TX/CAN_B_TX	GPIOH_0_od	5V
94	HDMIRX_SCL	UART_C_RX/CAN_B_RX	GPIOH_1_od	5V
95	HDMITX_SDA	I2C_F_SDA/PWM_M/PCIECK_A_REQN	GPIOH_4_od	5V
96	HDMITX_SCL	I2C_F_SCL/PWM_VS/PCIECK_B_REQN/DP_HPD	GPIOH_5_od	5V
97	GND	Ground		0V
98	CMA_PWRDN_1V8	I2C_E_SCL/UART_D_RX/TDM_MCLK2/PDM_DIN2/SPI_C_SS0	GPIOM_3_d	1.8V
99	CMA_RST_L_1V8	I2C_E_SDA/UART_D_TX/TDM_D11/PDM_DIN1/SPI_C_SCLK	GPIOM_2_d	1.8V
100	CMC_RST_L_1V8	I2C_F_SDA/UART_F_TX/TDM_SCLK2/PDM_DIN3/PWM_J	GPIOM_4_d	1.8V
101	CMC_PWRDN_1V8	I2C_F_SCL/UART_F_RX/TDM_FS2/PCIECK_B_REQN/PWM_VS	GPIOM_5_d	1.8V
102	CMC_I2C_H_SCL_1V8	I2C_H_SCL/UART_F_RTS/TDM_D15/EDP_HPD/VX1_HTPDN	GPIOM_7_d	1.8V
103	CMC_I2C_H_SDA_1V8	I2C_H_SDA/UART_F_CTS/TDM_D14/DP_HPD/VX1_LOCKN	GPIOM_6_d	1.8V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
104	CMA_I2C_G_SDA_1V8	I2C_G_SDA/UART_D_CTS/ TDM_D9/PDM_DIN0/SPI_C_ MOSI	GPIOM_0_d	1.8V
105	CMA_I2C_G_SCL_1V8	I2C_G_SCL/UART_D_RTS/T DM_D10/PDM_DCLK/SPI_C _MISO	GPIOM_1_d	1.8V
106	MDI-BI_DDN	ETH_B_MDI		0.5V
107	MDI-BI_DDP	ETH_B_MDI		0.5V
108	MDI-BI_DCN	ETH_B_MDI		0.5V
109	MDI-BI_DCP	ETH_B_MDI		0.5V
110	MDI-BI_DBN	ETH_B_MDI		0.5V
111	MDI-BI_DBP	ETH_B_MDI		0.5V
112	MDI-BI_DAN	ETH_B_MDI		0.5V
113	MDI-BI_DAP	ETH_B_MDI		0.5V
114	LED1_CFG_LDO0	ETH_B_LED+	(PD4K7)	3.3V
115	LED2_CFG_LDO1	ETH_B_LED-	(PU4K7)	3.3V
116	GND	Ground		0V
117	WIFI_SDIO_D1_1V8	I3C_B_SDA_D0/I2C_I_SCL /TDM_D7/PDM_DIN1/TSIN_ B_SOP/ISO7816_DATA	GPIOX_1_u	1.8V
118	WIFI_SDIO_D0_1V8	I3C_B_SDA_D1/I2C_I_SDA /TDM_D6/PDM_DIN0/TSIN_ B_DIN0/ISO7816_CLK	GPIOX_0_u	1.8V
119	WIFI_SDIO_D2_1V8	I3C_B_SCL/I2C_H_SDA /TDM_FS1/D8/PDM_DIN2/T SIN_B_VALID	GPIOX_2_u	1.8V
120	WIFI_SDIO_D3_1V8	I3C_B_SDA_D2/I2C_H_SCL /TDM_SCLK1/D9/PDM_DIN3 /TSIN_B_CLK	GPIOX_3_u	1.8V
121	WIFI_SDIO_CMD_1V8	TDM_D4/PWM_C	GPIOX_5_u	1.8V
122	WIFI_SDIO_CLK_1V8	I3C_B_SDA_D3/TDM_MCLK 1/PDM_DCLK	GPIOX_4_u	1.8V
123	GND	Ground		0V
124	DSI_B_D3P/LVDS_B_3 P	MIPI_DSI or LVDS		0.5V
125	DSI_B_D3N/LVDS_B_3 N	MIPI_DSI or LVDS		0.5V
126	DSI_B_D2P/LVDS_B_ CLKP	MIPI_DSI or LVDS		0.5V
127	DSI_B_D2N/LVDS_B_ CLKN	MIPI_DSI or LVDS		0.5V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
128	DSI_B_CKP/LVDS_B_2P/VX1_A_7P	MIPI_DSI/ LVDS/ VX1		0.5V
129	DSI_B_CKN/LVDS_B_2N/VX1_A_7N	MIPI_DSI/ LVDS/ VX1		0.5V
130	DSI_B_D1P/LVDS_B_1P/VX1_A_6P	MIPI_DSI/ LVDS/ VX1		0.5V
131	DSI_B_D1N/LVDS_B_1N/VX1_A_6N	MIPI_DSI/ LVDS/ VX1		0.5V
132	DSI_B_D0P/LVDS_B_0P/VX1_A_5P	MIPI_DSI/ LVDS/ VX1		0.5V
133	DSI_B_D0N/LVDS_B_0N/VX1_A_5N	MIPI_DSI/ LVDS/ VX1		0.5V
134	GND	Ground		0V
135	EDP_A_3P/DSI_A_D3P/LVDS_A_3P/VX1_A_4P	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
136	EDP_A_3N/DSI_A_D3N/LVDS_A_3N/VX1_A_4N	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
137	EDP_A_2P/DSI_A_D2P/LVDS_A_CLKP/VX1_A_3P	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
138	EDP_A_2N/DSI_A_D2N/LVDS_A_CLKN/VX1_A_3N	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
139	EDP_A_1P/DSI_A_CKP/LVDS_A_2P/VX1_A_2P	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
140	EDP_A_1N/DSI_A_CKN/LVDS_A_2N/VX1_A_2N	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
141	EDP_A_0P/DSI_A_D1P/LVDS_A_1P/VX1_A_1P	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
142	EDP_A_0N/DSI_A_D1N/LVDS_A_1N/VX1_A_1N	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
143	EDP_A_AUXP/DSI_A_D0P/LVDS_A_0P/VX1_A_0P	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V
144	EDP_A_AUXN/DSI_A_D0N/LVDS_A_0N/VX1_A_0N	EDP/ MIPI_DSI/ LVDS/ VX1		0.5V

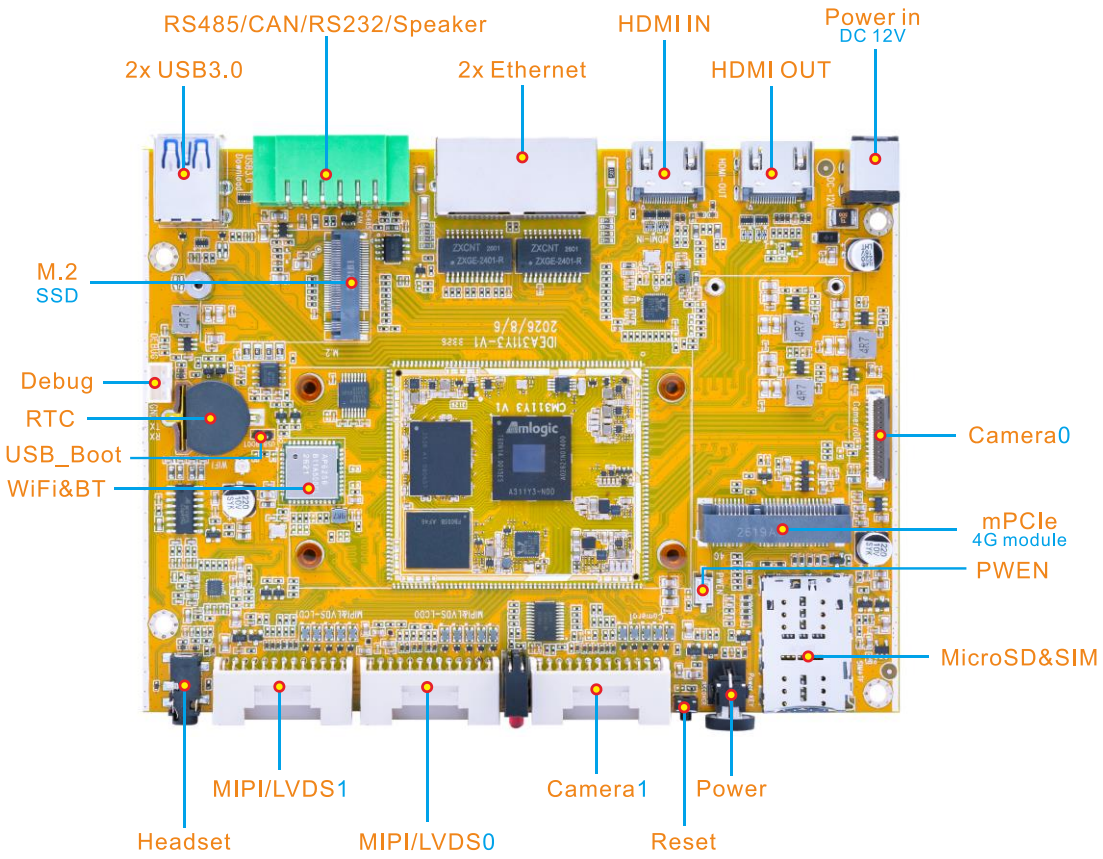
Pin	Signal	Description or functions	GPIO serial	IO Voltage
145	GND	Ground		0V
146	CSI_B_CLKN			0.5V
147	CSI_B_CLKP			0.5V
148	CSI_A_D3N	Or MIPI_CSI_B_D1		0.5V
149	CSI_A_D3P	Or MIPI_CSI_B_D1		0.5V
150	CSI_A_D2N	Or MIPI_CSI_B_D0		0.5V
151	CSI_A_D2P	Or MIPI_CSI_B_D0		0.5V
152	CSI_A_CLKN			0.5V
153	CSI_A_CLKP			0.5V
154	CSI_A_D1N			0.5V
155	CSI_A_D1P			0.5V
156	CSI_A_D0N			0.5V
157	CSI_A_D0P			0.5V
158	SARADC_CH1			1.8V
159	GND	Ground		0V
160	VCC_SYS	Main Power Input		3.4-5.5V
161	VCC_SYS	Main Power Input		3.4-5.5V
162	VCC_SYS	Main Power Input		3.4-5.5V
163	PWEN	System Power Control (Float it if not used)	(PU100K)	3.4-5.5V
164	HDMIRX_eARC_TXN		(Had coupling CAP)	5V
165	HDMIRX_5VDET_eARC_TXP	Comb Port Power Detection	(Had coupling CAP)	5V
166	HDMITX_HPD_eARC_RXN	Comb Port HPD	(Had coupling CAP)	5V
167	HDMITX_eARC_RXP		(Had coupling CAP)	5V
168	HDMIRX_A_CLKN			0.5V
169	HDMIRX_A_CLKP			0.5V
170	HDMIRX_A_D0N			0.5V
171	HDMIRX_A_D0P			0.5V
172	HDMIRX_A_D1N			0.5V
173	HDMIRX_A_D1P			0.5V
174	HDMIRX_A_D2N			0.5V
175	HDMIRX_A_D2P			0.5V
176	GND	Ground		0V
177	HDMI_TXCN			0.5V
178	HDMI_TXCP			0.5V
179	HDMI_TX0N			0.5V
180	HDMI_TX0P			0.5V
181	HDMI_TX1N			0.5V
182	HDMI_TX1P			0.5V
183	HDMI_TX2N			0.5V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
184	HDMI_TX2P			0.5V
185	GND	Ground		0V
186	CMC_MCLK	Camera C MCLK output		1.8V
187	CMB_MCLK	Camera B MCLK output		1.8V
188	CMA_MCLK	Camera A MCLK output		1.8V
189	GND	Ground		0V
190	CSI_C_D0P			0.5V
191	CSI_C_D0N			0.5V
192	CSI_C_D1P			0.5V
193	CSI_C_D1N			0.5V
194	CSI_C_CLKP			0.5V
195	CSI_C_CLKN			0.5V
196	CSI_C_D2P			0.5V
197	CSI_C_D2N			0.5V
198	CSI_C_D3P			0.5V
199	CSI_C_D3N			0.5V
200	GND	Ground		0V
201	ETH_A_RGMII_RX_CLK_1V8	TSIN_B_VALID/SPI_E_SCLK/TDM_D2/I2C_F_SDA/UART_D_TX	GPIOZ_2_u	1.8V
202	ETH_A_RGMII_RXDV_1V8	TSIN_B_SOP/SPI_E_SS0/TDM1_D3/I2C_F_SCL/UART_D_RX	GPIOZ_3_u	1.8V
203	ETH_A_RGMII_RXD0_1V8	TSIN_B_DIN0/SPI_E_MOSI/TDM_D4/I2C_G_SDA	GPIOZ_4_u	1.8V
204	ETH_A_RGMII_RXD1_1V8	TSIN_B_CLK/SPI_E_MISO/TDM_D5/I2C_G_SCL	GPIOZ_5_u	1.8V
205	ETH_A_RGMII_RXD2_1V8	TSIN_B_FAIL/TSIN_A_VALID/SPI_F_SCLK/TDM_D6/I2C_H_SDA/UART_E_TX	GPIOZ_6_u	1.8V
206	ETH_A_RGMII_RXD3_1V8	TSIN_B_DIN1/TSIN_A_SOP/SPI_F_SS0/TDM_D7/I2C_H_SCL/UART_E_RX	GPIOZ_7_u	1.8V
207	ETH_A_RGMII_TX_CLK_1V8	TSIN_B_DIN2/TSIN_A_CLK/SPI_B_SS2/TDM_D8/UART_E_CTS	GPIOZ_8_u	1.8V
208	ETH_A_RGMII_TXEN_1V8	TSIN_B_DIN3/TSIN_A_DIN0/SPI_B_SS1/TDM_D9/UART_E_RTS	GPIOZ_9_d	1.8V
209	ETH_A_RGMII_TXD0_1V8	TSIN_B_DIN4/ISO7816_CLK/SPI_B_MOSI/TDM_D10	GPIOZ_10_d	1.8V

Pin	Signal	Description or functions	GPIO serial	IO Voltage
210	ETH_A_RGMII_TXD1_1V8	TSIN_B_DIN5/ISO7816_DATA/SPI_B_MISO/TDM_CLK2	GPIOZ_11_d	1.8V

Note:
1. This Pin Can change to I2C，if DP_AUX no needed.
2. "–od" is MOSFET OD output in chip.
3. Input H level can setting USB Boot Frist.

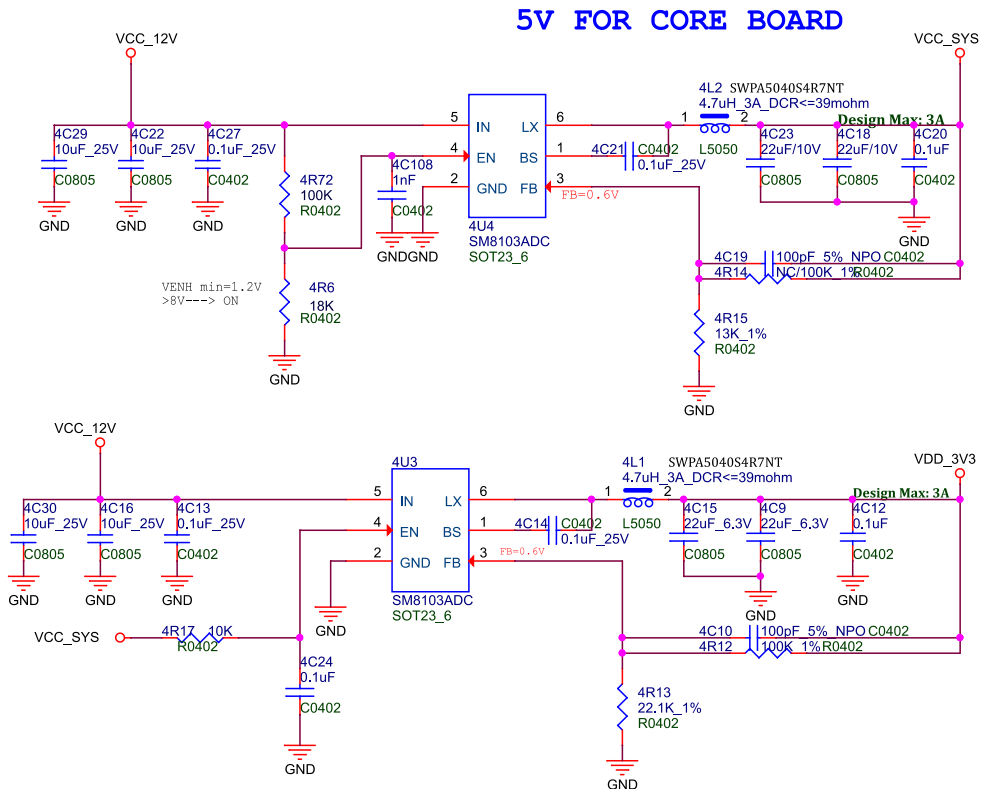
1.7 Development Kit (Idea311Y3)



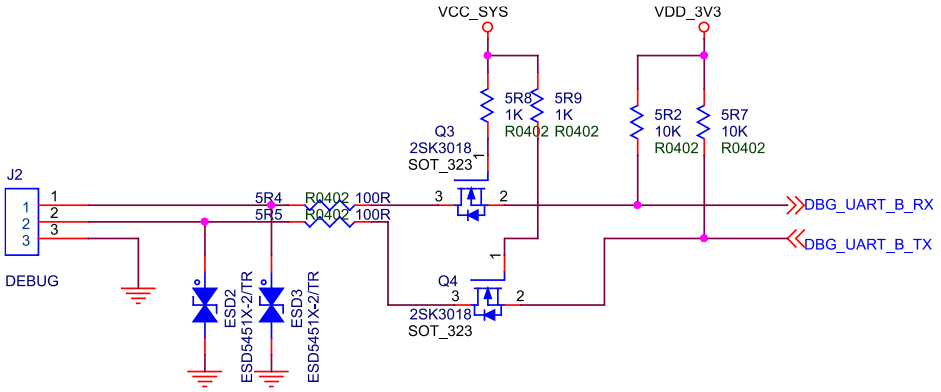
2 Hardware Design Guide

2.1 Peripheral Circuit Reference

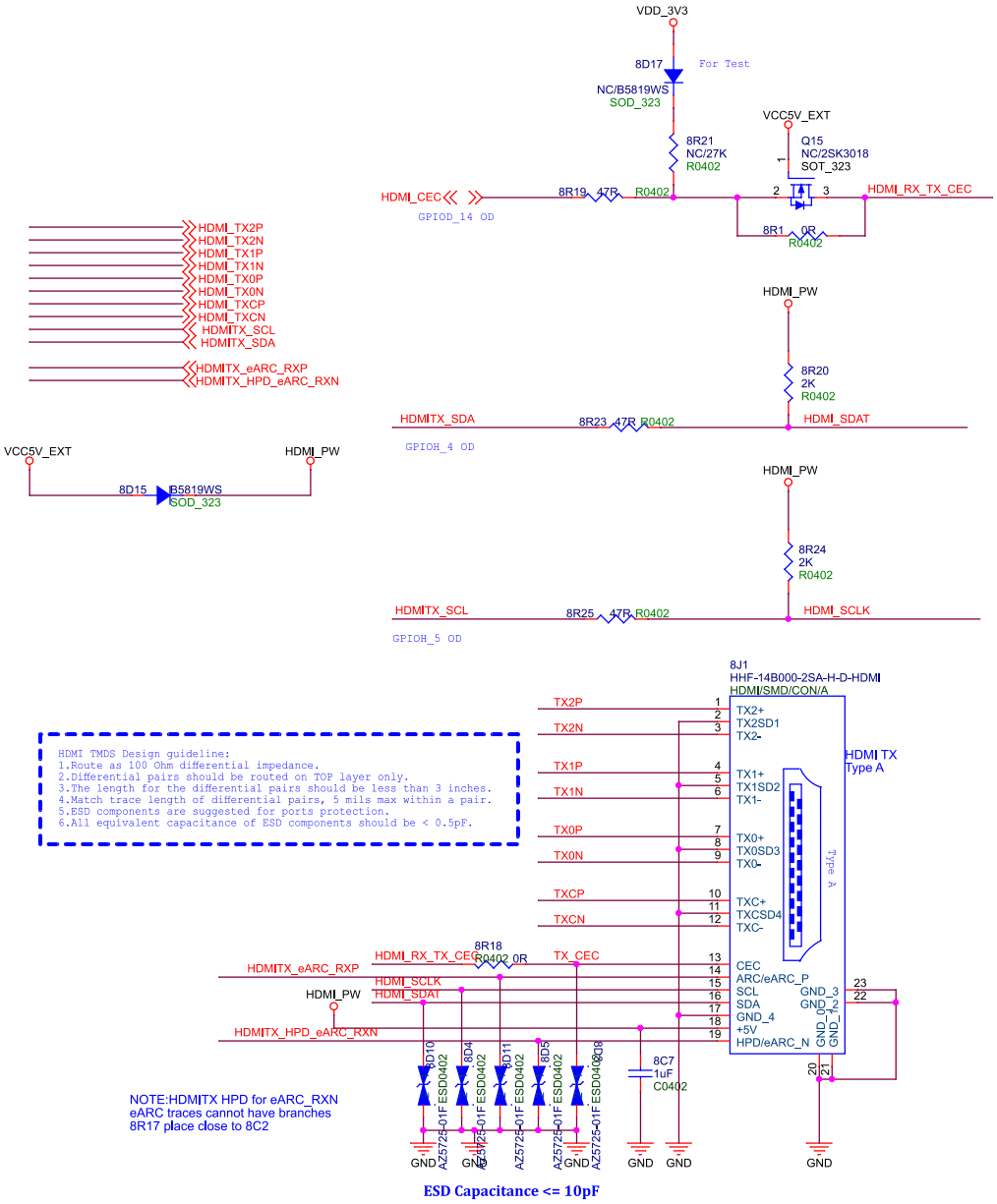
2.1.1 External Power



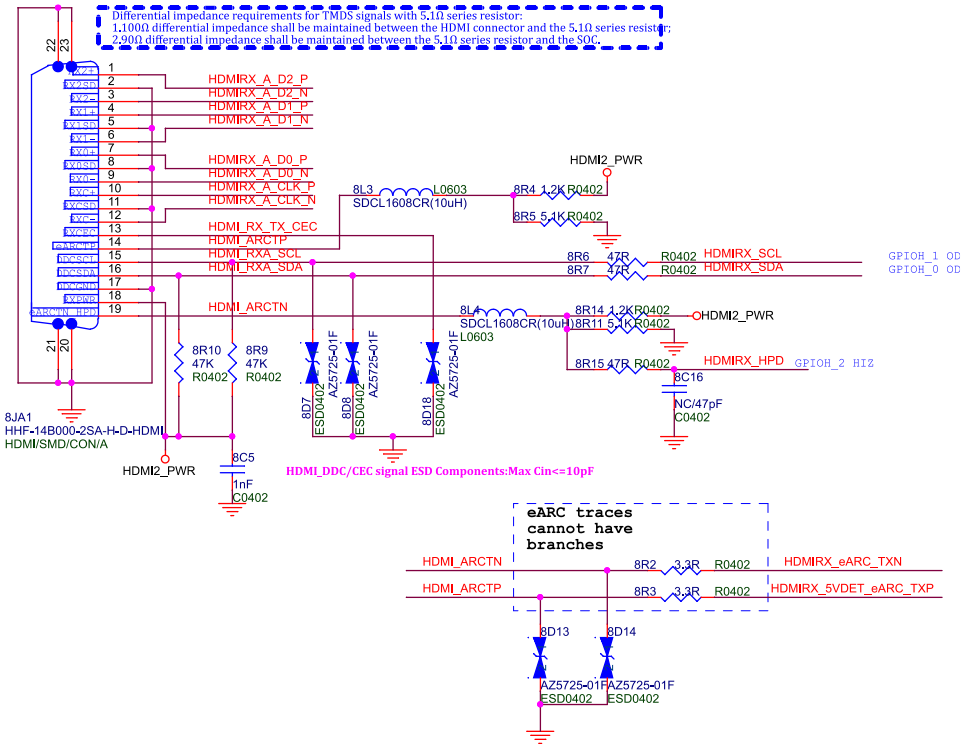
2.1.2 Debug Circuit



2.1.3 HDMI TX Circuit



2.1.4 HDMI RX Circuit

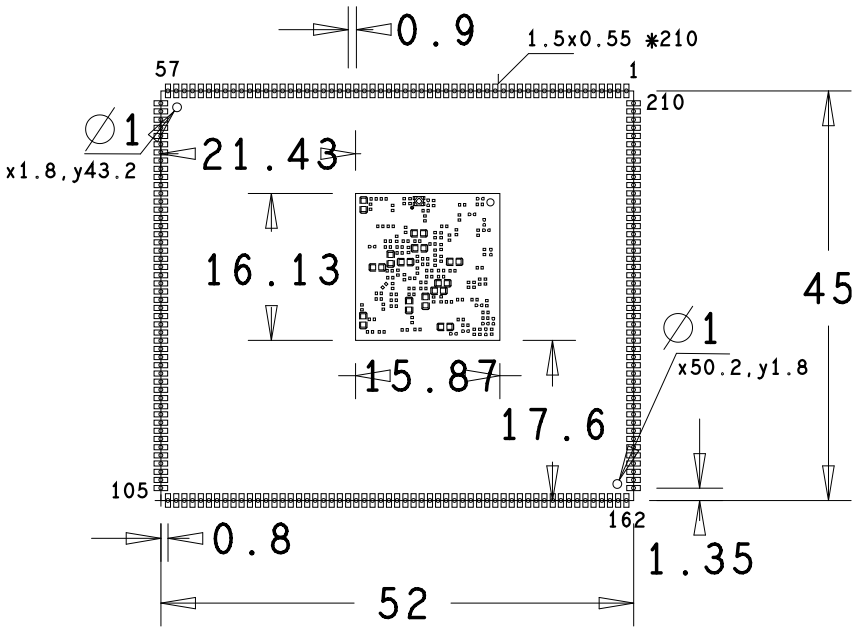


2.2 Mother Board length offset

MIPI CSI C 4-Lane Interface length offset			
MIPI_CSI_C_CLKP	MIPI_CSI0_RX0_D0P	(26.2)	(+30)
	MIPI_CSI0_RX0_D1P	(5.05)	
	MIPI_CSI0_RX0_D2P	(9.7)	
	MIPI_CSI0_RX0_D3P	(-37.18)	(-30)

Yellow block is CM311Y3 CSI C group length difference. Unit: mil

2.3 PCB Footprint



--Top View--

3 Product Electrical Characteristics

3.1 Dissipation and Temperature

Symbol	Parameter	Min	Typ	Max	Unit
VCC_SYS	System Voltage	3.4V	5	5.5	V
Isys_in	VCC_SYS input Current		2050		mA
VCC_RTC	RTC Voltage	1.8	3	3.4	V
Iirtc	RTC input Current		5	8	uA
Ta	Operating Temperature	0		70	°C
Tstg	Storage Temperature	-40		85	°C