

# 野火 EBF RK3588S LBC4

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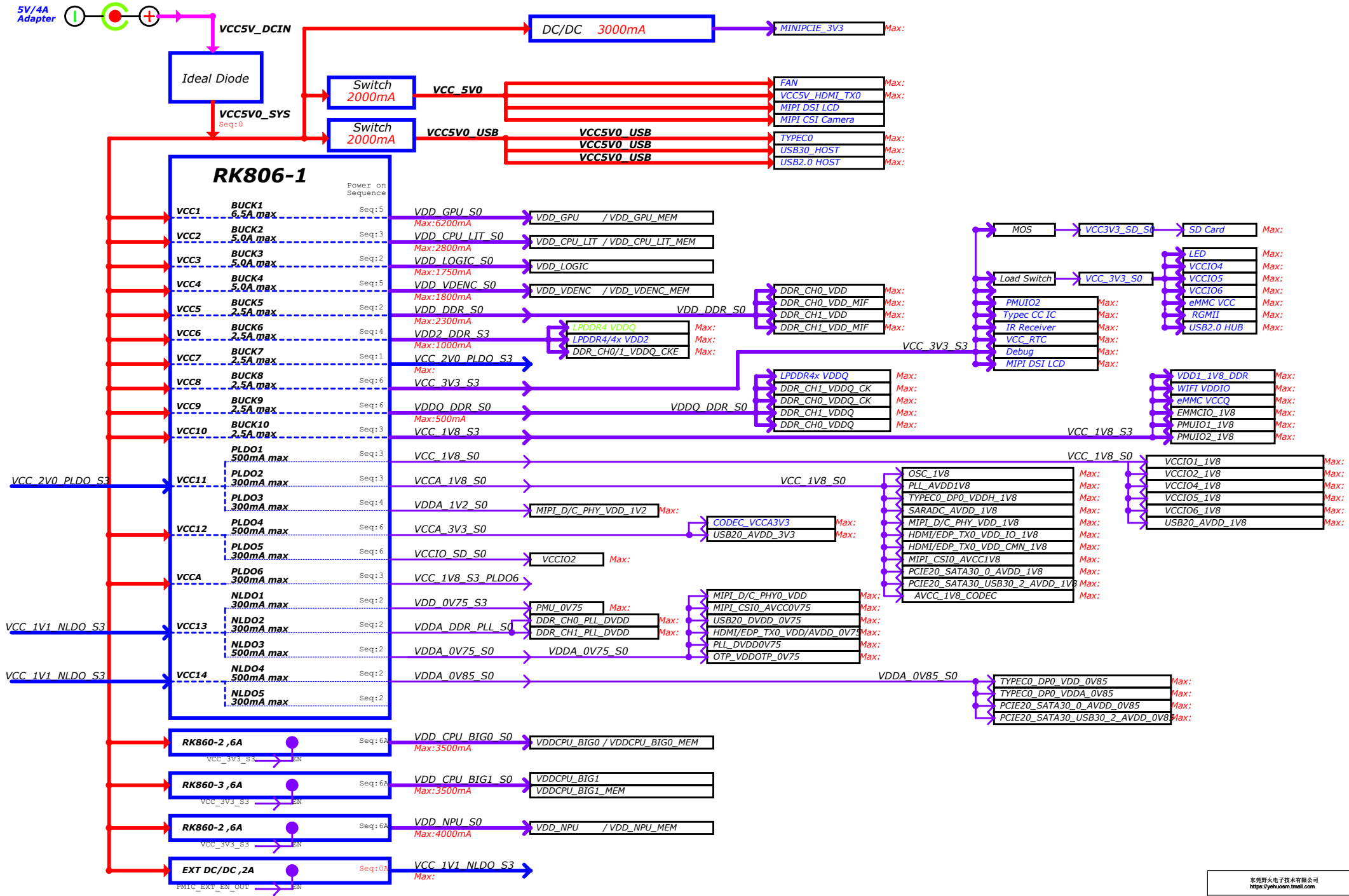
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# 历史版本

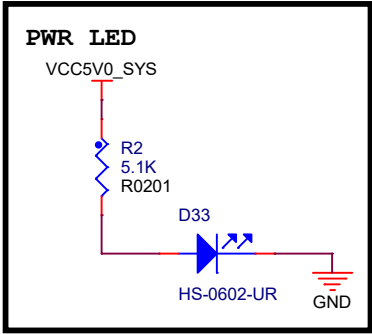
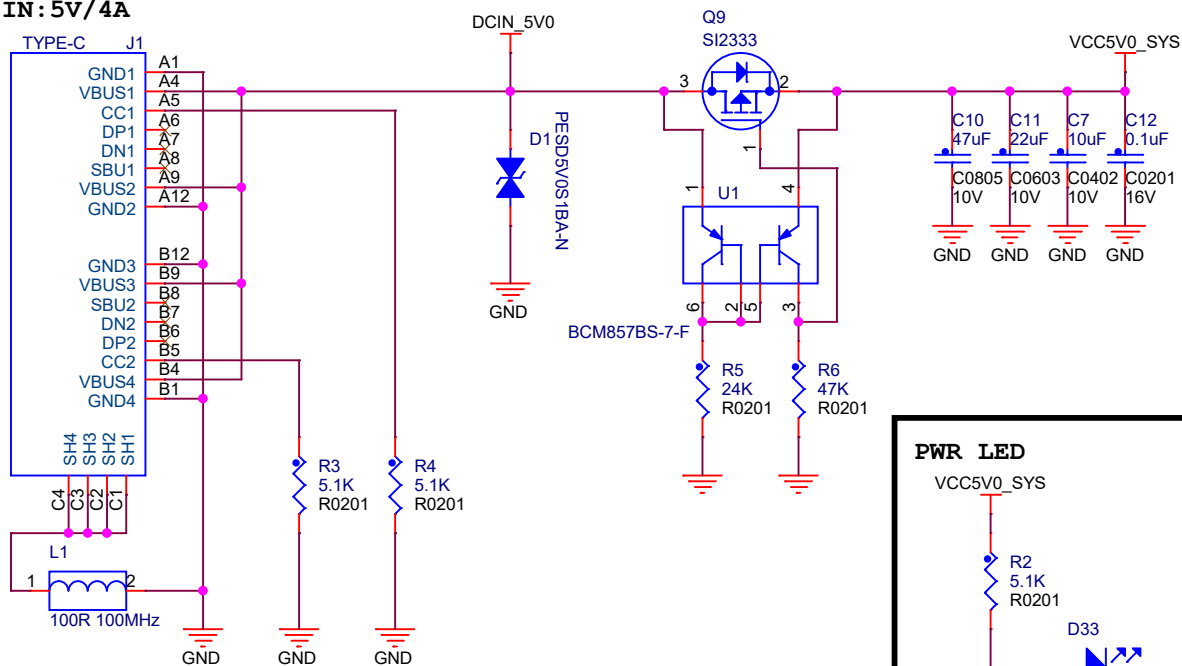
版本号	日期	设计	描述
V1.0	2022-01-25	llm	初始版本, 开发阶段
V1.1	2022-05-18	llm	修复初始版本的一些问题, 增加SATA接口, typec添加OTG自动识别host/device功能
V1.2	2022-07-27	llm	1. MIPI CSI 添加2 Lanes 2. 更新MINI PCIE、M.2 PCIE封装, 添加独立的定位孔 3. 把Z4、Z3、Z2、Z1位号改前缀为D的位号 4. 把sim卡座位号U18改为J18 5. 把mini pcie位号CON1改为J17
V1.3	2022-12-12	llm	1. 更新board id, EBF410116V1版本设置的baord id为: 0x0102 2. 把DCIN 5V0接到40pin排针的5V供电, 让40pin排针的5V支持输入/输出双向供电 3. mipi dis接口与40pin排针调换IO, 排针引出CAN: mipi dsi0: CTP0_RST (CAN0_RX_M0) <---> GPIO1_A0 LCD0_RST (CAN0_TX_M0) <---> GPIO1_A1 mipi dsi1: CTP1_INT (CAN2_RX_M0) <---> GPIO4_A1 CTP1_RST (CAN2_TX_M0) <---> GPIO4_A2 4. CAM3_PWDN改接GPIO3_A6, CAM3_RSTn改接GPIO4_A0 5. mini pcie电源增加220uF钽电容, 兼容5G模块供电

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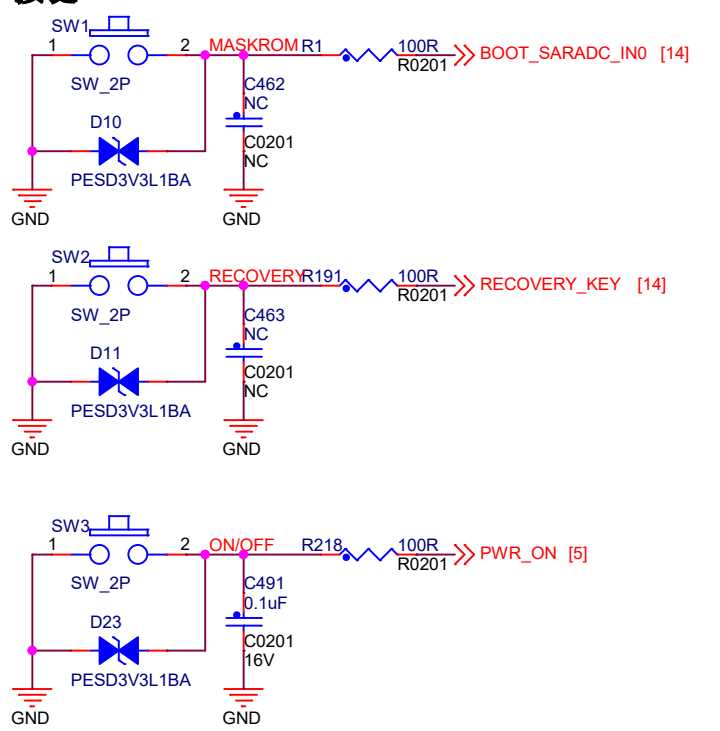
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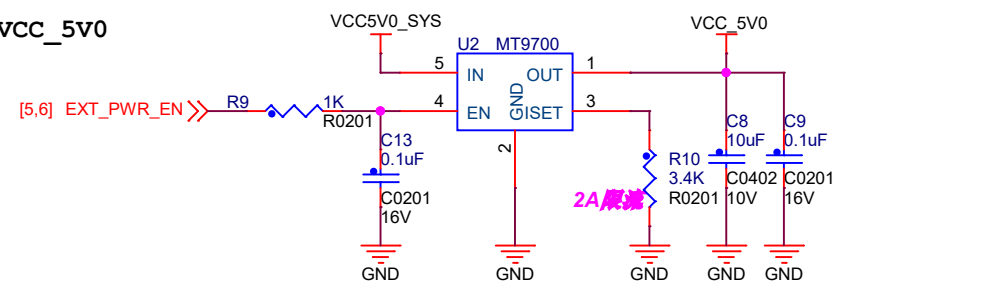
### DC IN: 5V/4A



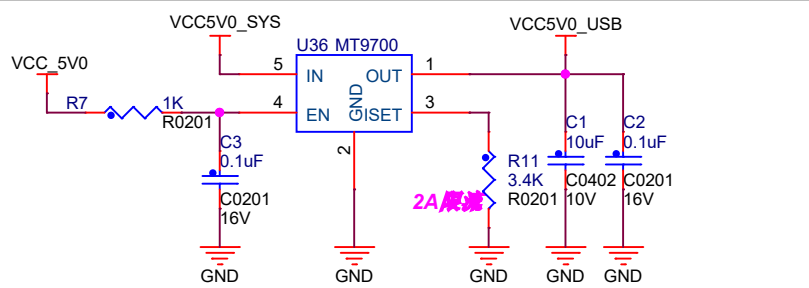
### 按键



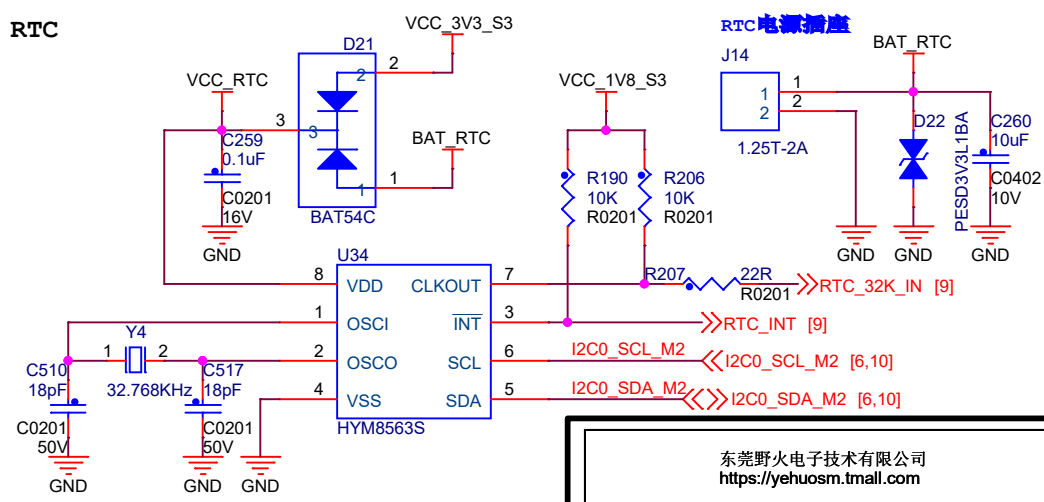
### VCC\_5V0



### VCC5V0\_USB

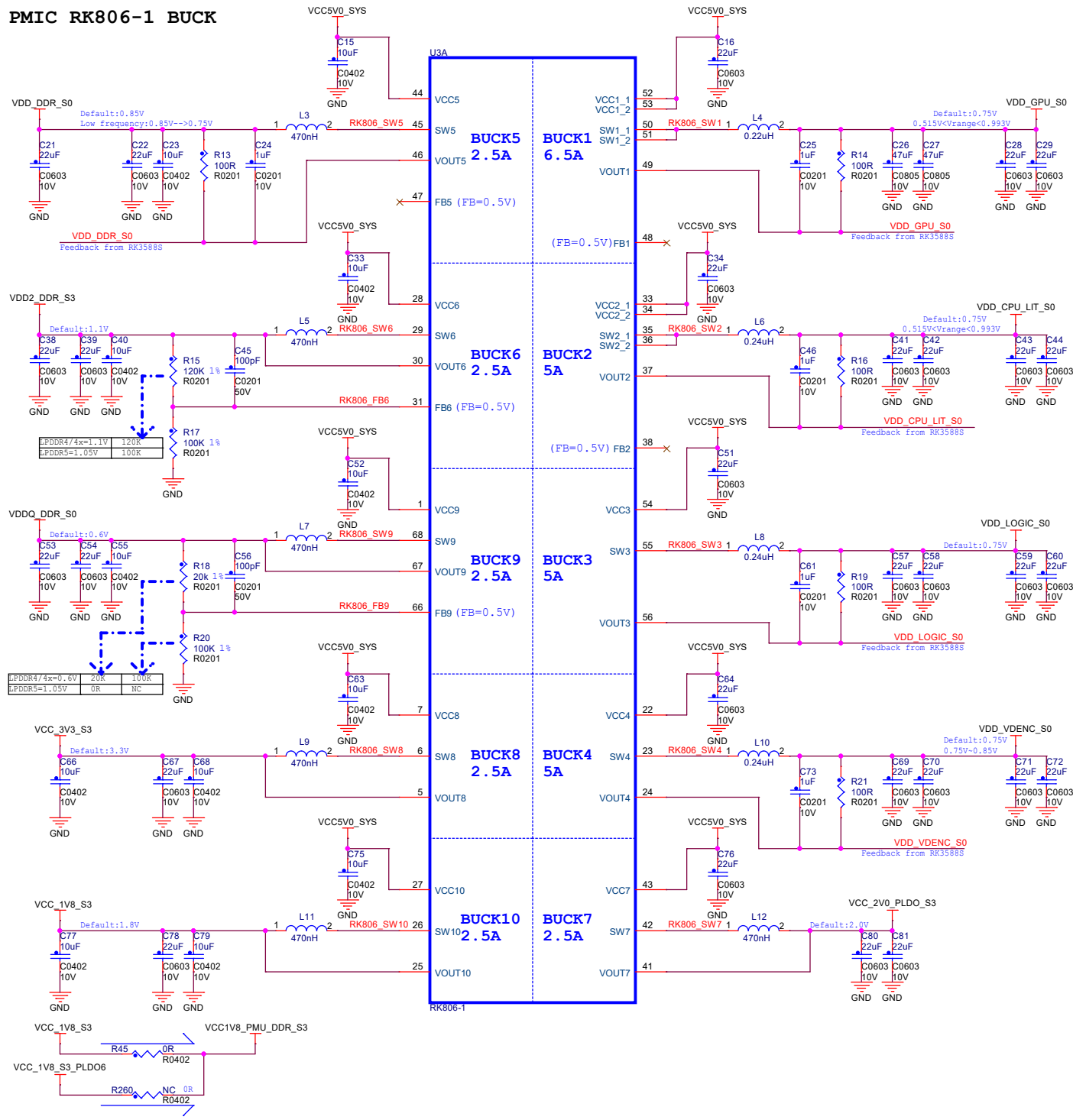


### RTC

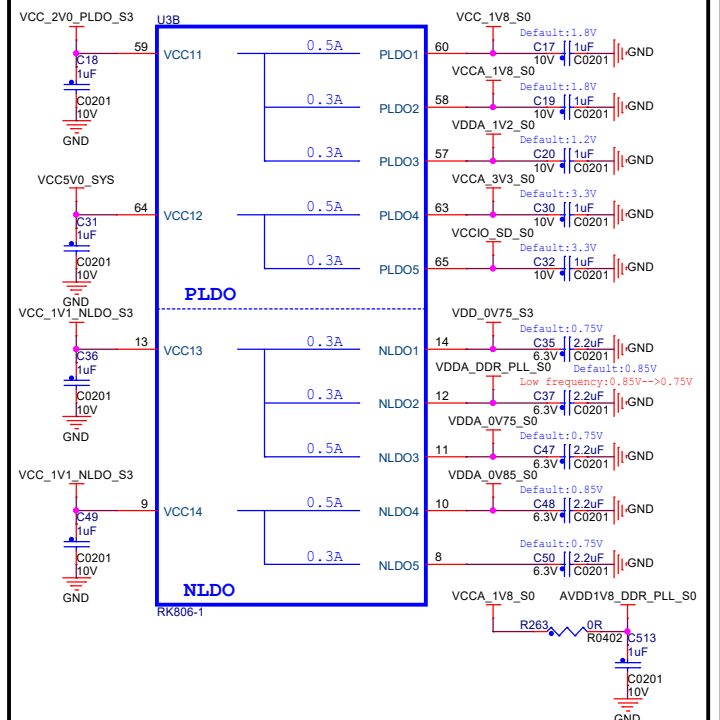


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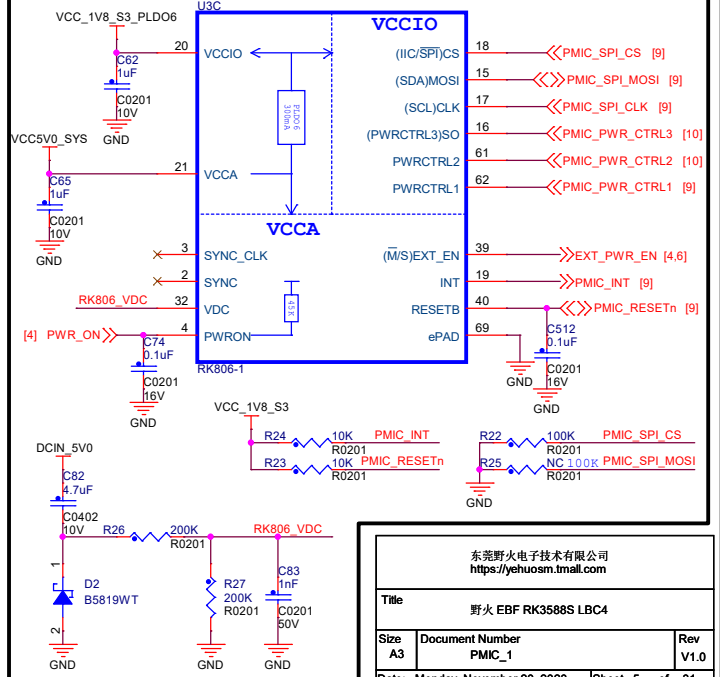
### PMIC RK806-1 BUCK



### PMIC RK806-1 LDO

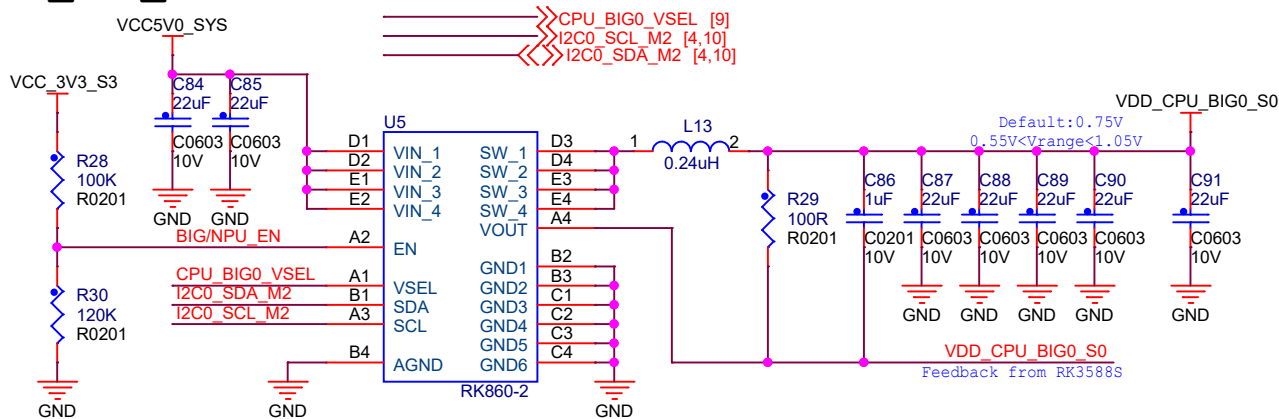


### PMIC RK806-1 LDO

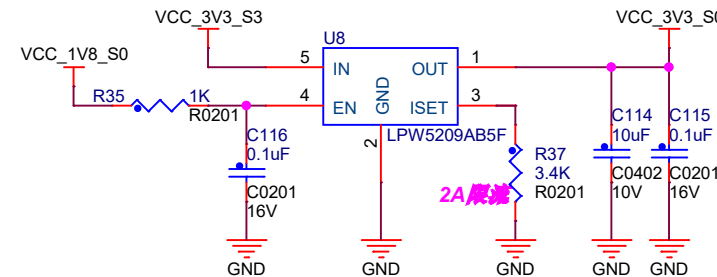


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A3	PMIC_1	V1.0
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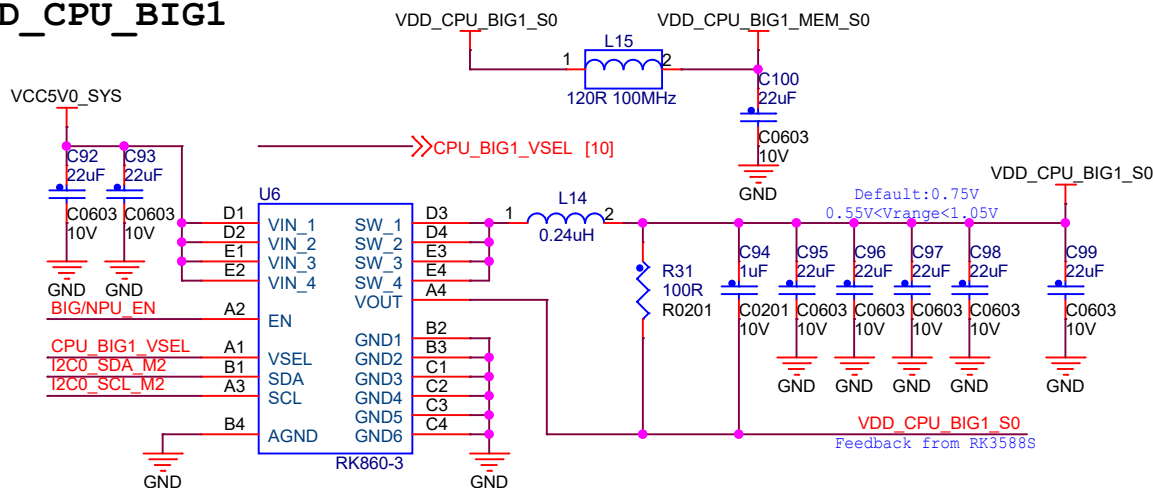
### VDD\_CPU\_BIG0



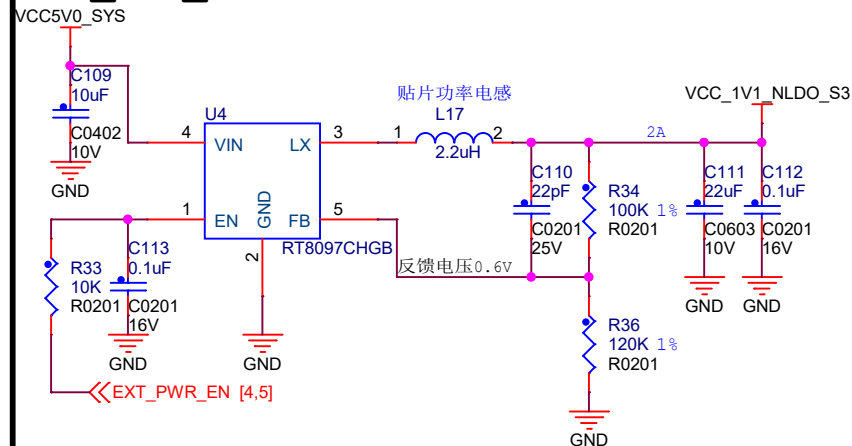
### VCC\_3V3\_S0



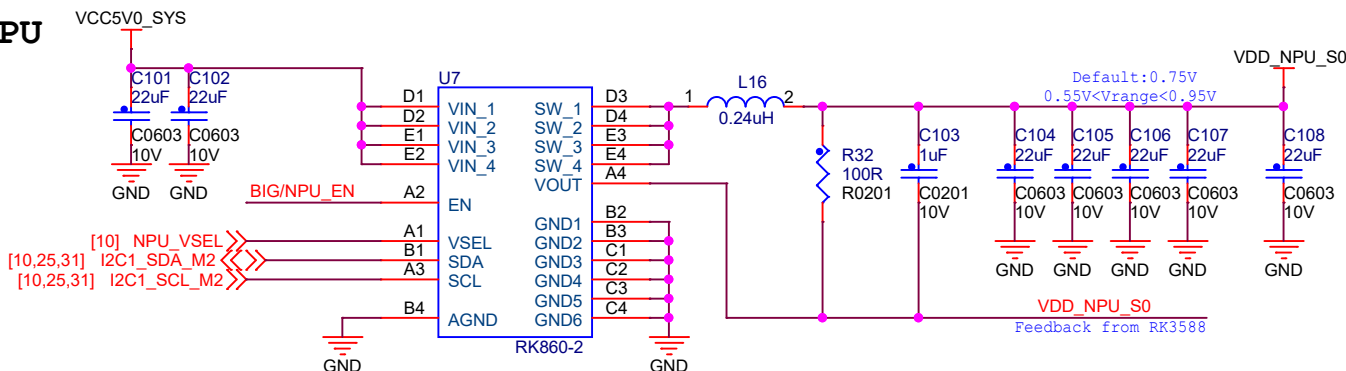
### VDD\_CPU\_BIG1



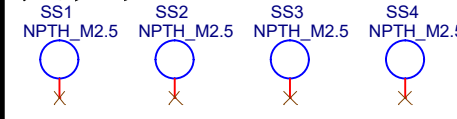
### VCC\_1V1\_NLDO



### VDD\_NPU



### 定位孔



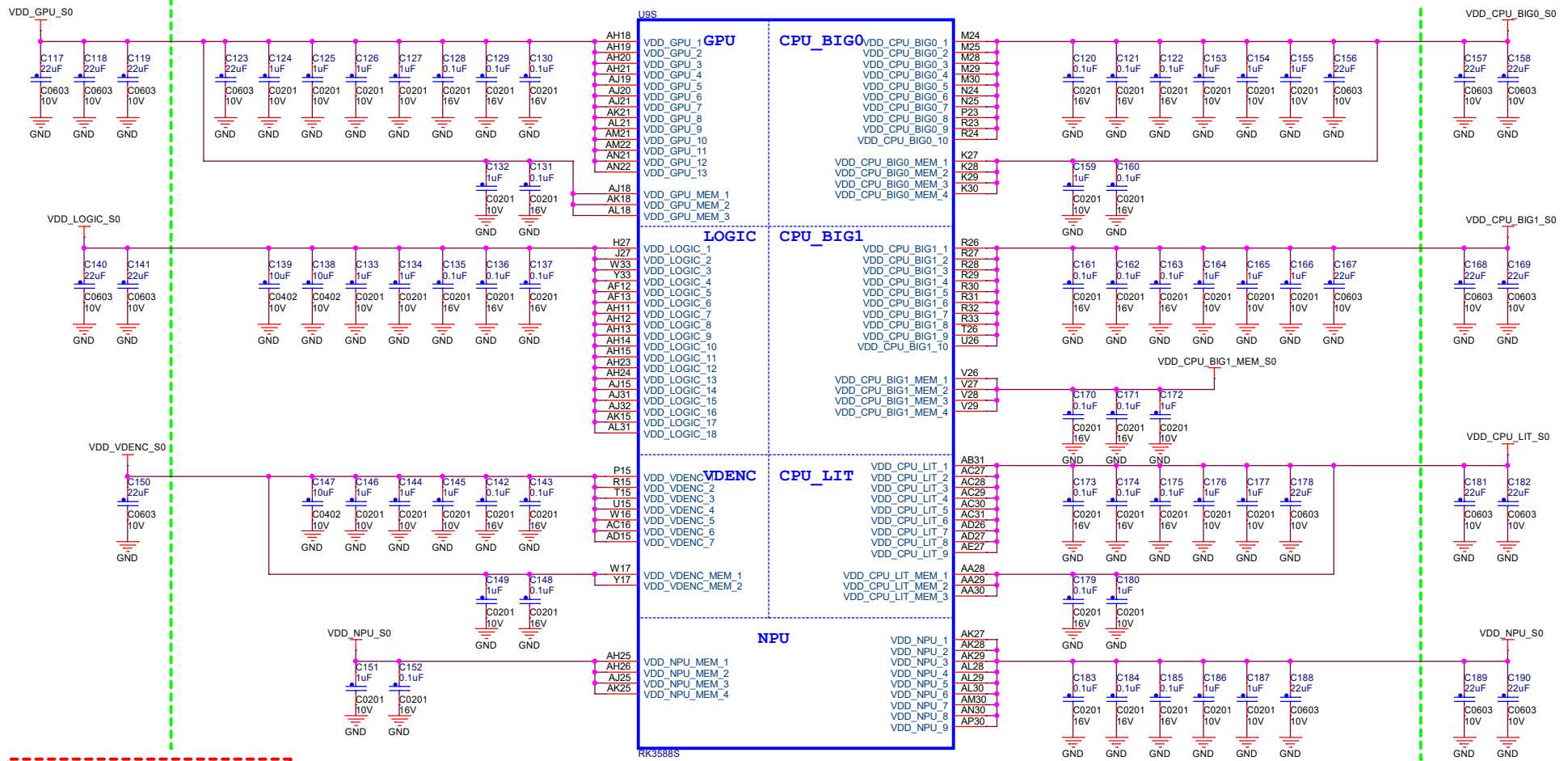
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Size: A4	Document Number: PMIC_2	Rev: V1.0
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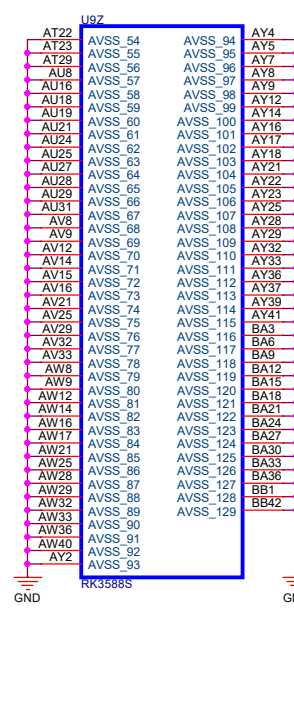
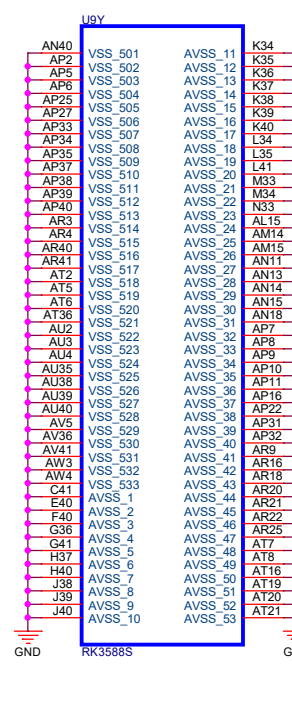
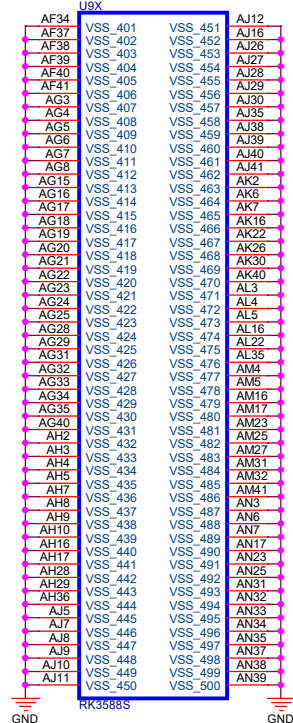
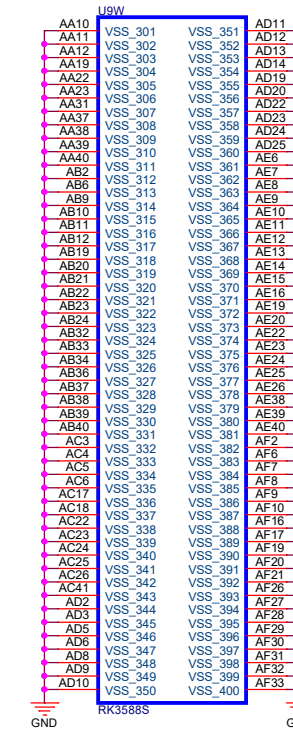
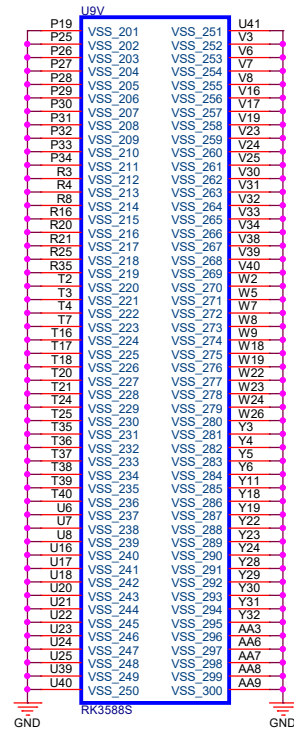
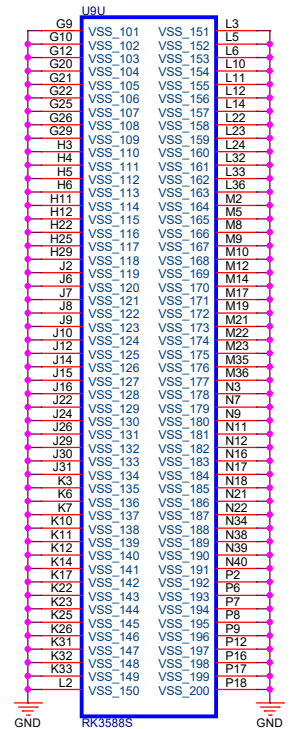
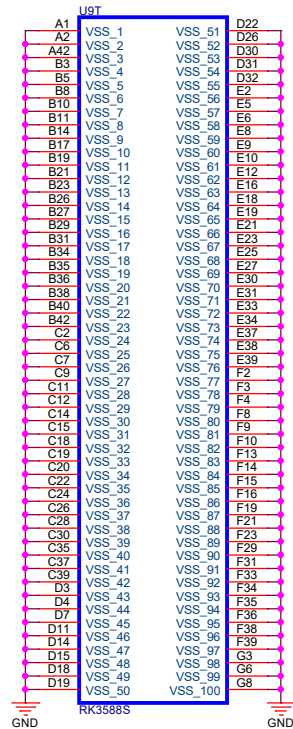
# RK3588S POWER



**NOTE:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package.

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RK3588S GND



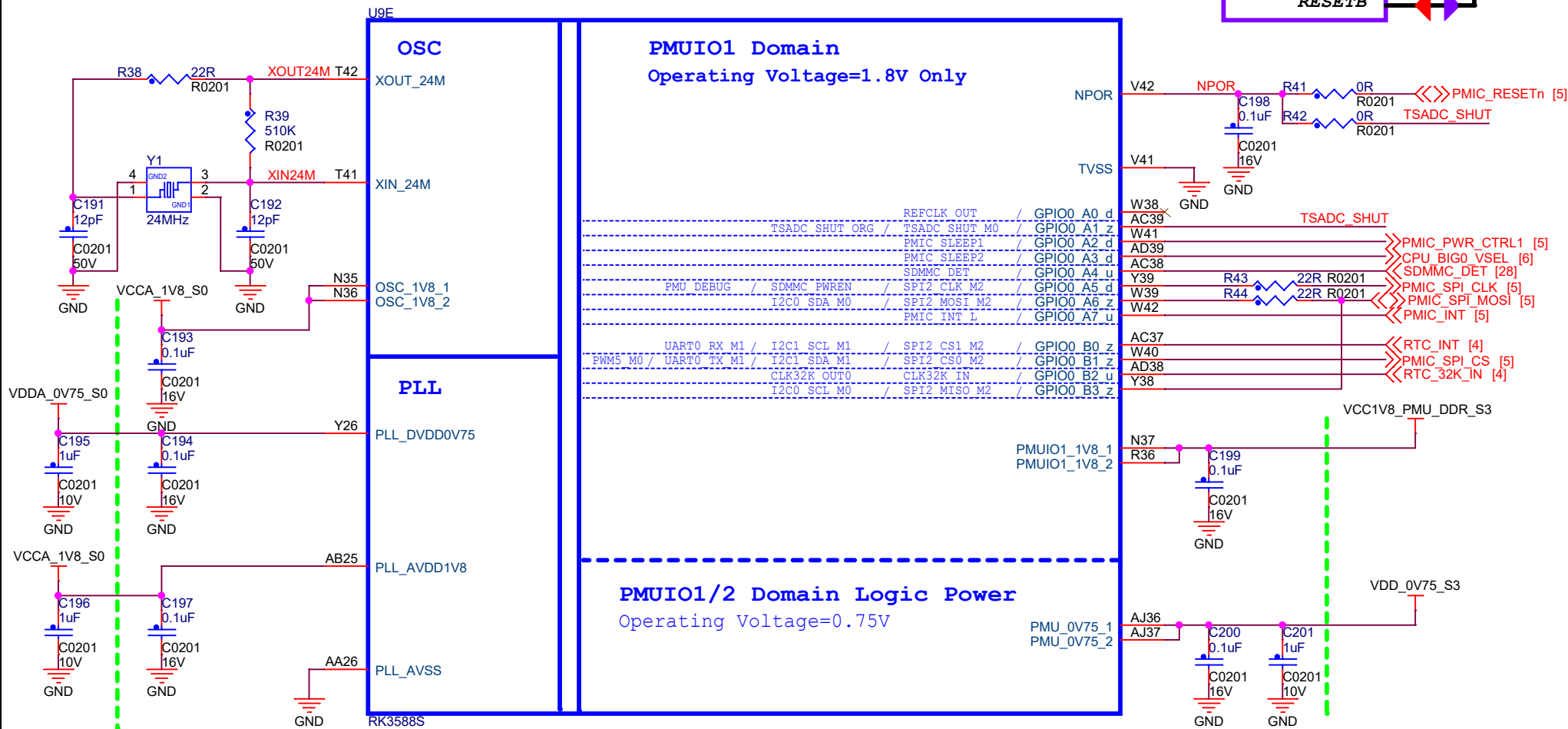
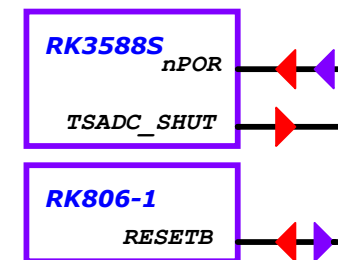
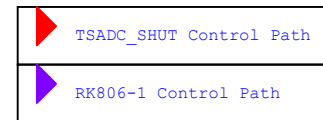
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# RK3588S OSC/PLL/PMUIO1

## Note:



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Size A4	Document Number RK3588S OSC/PLL/PMUIO1	Rev V1.0
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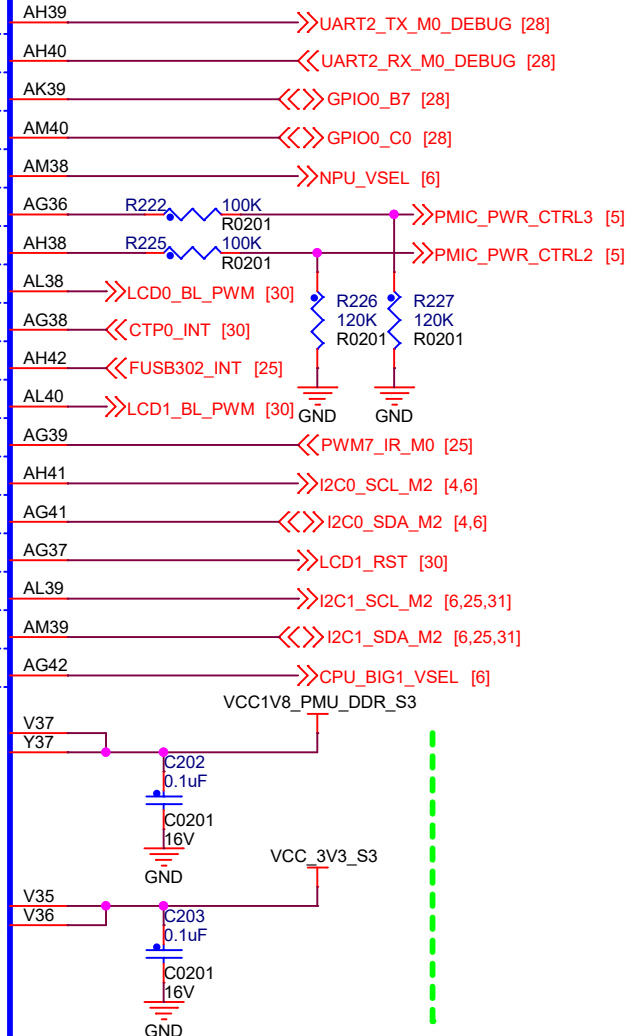
# RK3588S PMUIO2

U9F

## PMUIO2 Domain

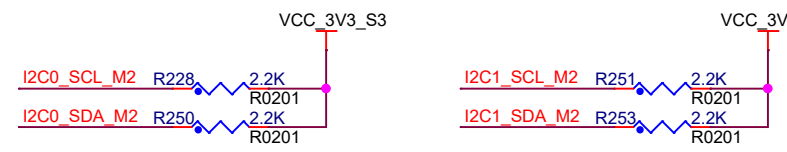
Operating Voltage=1.8V/3.3V

/ PCIE20X1_1_CLKREQN M0/	/ I2S1_MCLK M1 /	/ I2C1_SCL M0 /	/ UART2_TX M0 /	/ JTAG_TCK M2 /	/ GPIO0_B5 d			
/ PCIE20X1_1_WAKEN M0 /	/ I2S1_SCL M1 /	/ I2C1_SDA M0 /	/ UART2_RX M0 /	/ JTAG_TMS M2 /	/ GPIO0_B6 d			
/ PCIE20X1_1_PERSTN M0/	/ SPI0_CS1 M0/	/ I2S1_LRCK M1 /	/ I2C2_SCL M0 /	/ CAN0_TX M0 /	/ PWM0 M0 /	/ GPIO0_B7 d		
/	/ SPI0_MOSI M0/	/ I2C2_SDA M0 /	/ PDM0_CLK0 M1 /	/ CAN0_RX M0 /	/ PWM1 M0 /	/ GPIO0_C0 d		
/	/	/	/	/	/	/ GPIO0_C1 d		
/	/	/	/	/	/	/ GPIO0_C2 d		
/	/	/	/	/	/	/ GPIO0_C3 d		
DP0_HPDI_N_M1 /	/	/ I2C4_SDA M2 /	/ PDM0_CLK1 M1 /	/ UART0_RX M0 /	/ PWM2 M0 /	/ GPIO0_C4 d		
/	/	/ I2S1_SDI0 M1 /	/ I2C4_SCL M2 /	/ PWM4 M0 /	/ UART0_TX M0 /	/ GPU_AVS /	/ GPIO0_C5 u	
SATA_CP_POD /	/ SPI0_CLK M0 /	/ I2S1_SDI1 M1 /	/	/ PWM5 M1 /	/ UART0_RTSN /	/ NPU_AVS /	/ GPIO0_C6 u	
/	/ SPI0_MISO M0/	/ I2S1_SDI2 M1 /	/ I2C6_SDA M0 /	/ PDM0_SDI0 M1 /	/ UART1_RTSN M2 /	/ PWM6 M0 /	/ GPIO0_C7 d	
/	/ SPI3_MISO M2/	/ I2S1_SDI3 M1 /	/ I2C6_SCL M0 /	/ PDM0_SDI1 M1 /	/ UART1_CTSN M2 /	/ PWM7_IR M0 /	/ GPIO0_D0 d	
/	/	/	/	/	/	/	/ GPIO0_D1 u	
/	/	/	/	/	/	/	/ GPIO0_D2 u	
/	/	/	/	/	/	/	/ GPIO0_D3 u	
SATA_CPDET /	/ HDMI_TX0_SDA M1 /	/ SPI3_CS0 M2 /	/ I2S1_SDO2 M1 /	/ I2C1_SCL M2 /	/ PDM0_SDI2 M1 /	/ CAN2_RX M1 /	/ PWM3_IR M0 /	/ GPIO0_D4 u
SATA_MP_SWITCH/	/ HDMI_TX0_SCL M1 /	/ SPI3_CS1 M2 /	/ I2S1_SDO3 M1 /	/ I2C1_SDA M2 /	/	/ CAN2_TX M1 /	/ CPU_BIG1_AVS /	/ GPIO0_D5 u
/	/	/	/	/	/	/	/	/ GPIO0_D6 d
/	/	/	/	/	/	/	/	/ GPIO0_D7 d



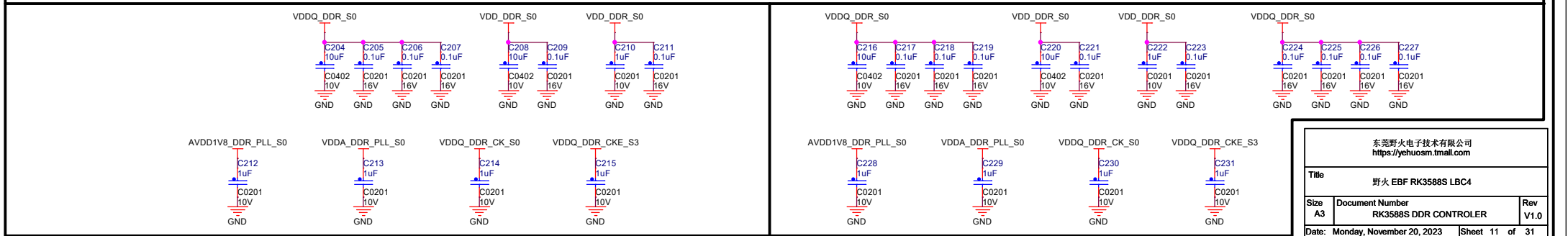
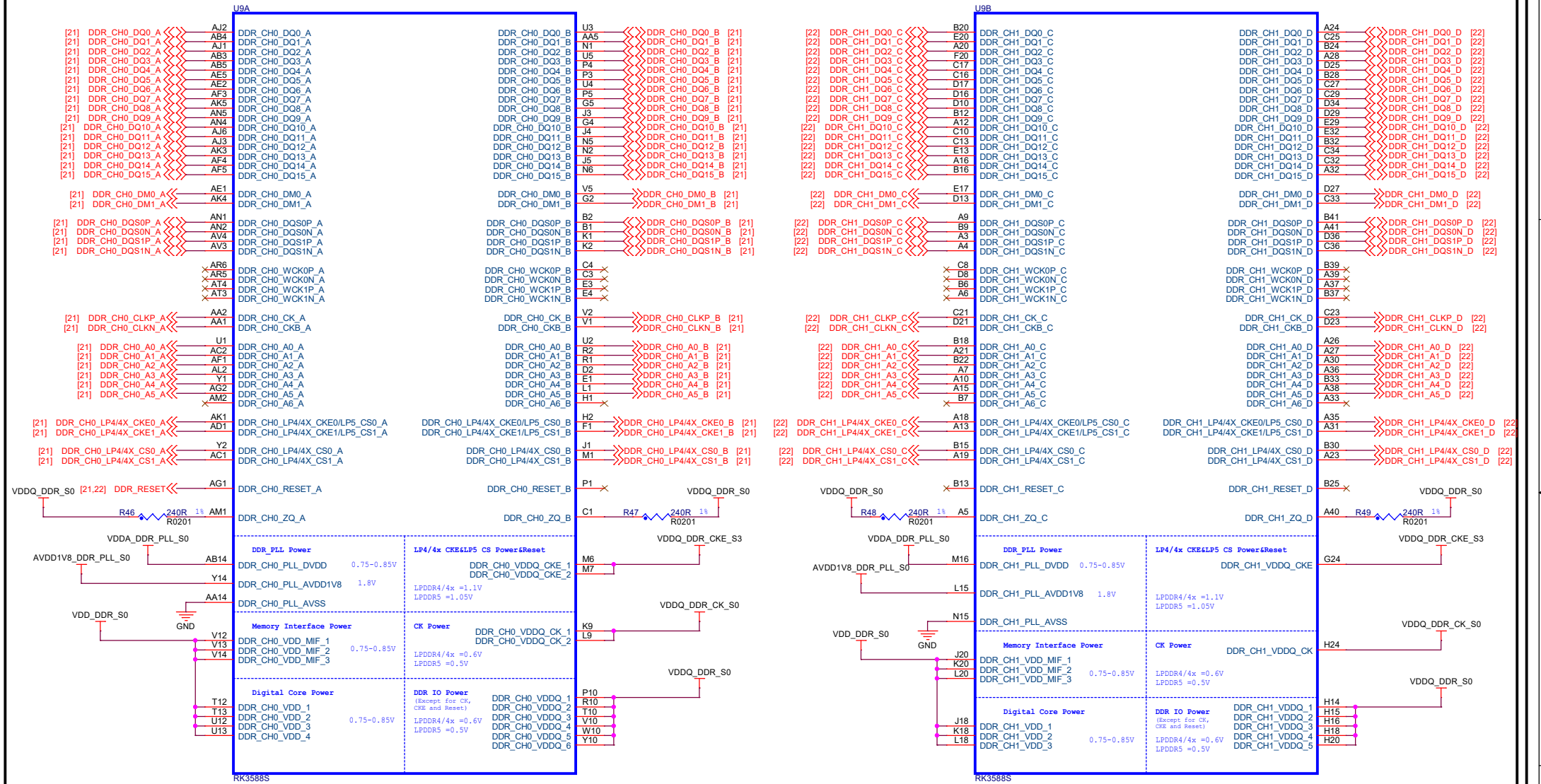
RK3588S

**Note:**  
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# RK3588S DDR CONTROLLER



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# RK3588S EMMCIO

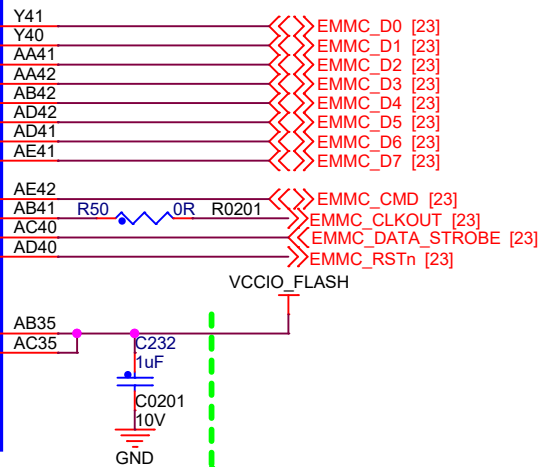
U9C

## EMMCIO Domain

Operating Voltage=1.8V Only

FSPI D0 M0 / EMMC D0	/ GPIO2 D0 u	Y41	>>> EMMC_D0 [23]
FSPI D1 M0 / EMMC D1	/ GPIO2 D1 u	Y40	>>> EMMC_D1 [23]
FSPI D2 M0 / EMMC D2	/ GPIO2 D2 u	AA41	>>> EMMC_D2 [23]
FSPI D3 M0 / EMMC D3	/ GPIO2 D3 u	AA42	>>> EMMC_D3 [23]
FSPI D4 M0 / EMMC D4	/ GPIO2 D4 u	AB42	>>> EMMC_D4 [23]
UART5 RX M2 / I2C1 SCL M3 / EMMC D4	/ GPIO2 D4 u	AD42	>>> EMMC_D5 [23]
UART5 TX M2 / I2C1 SDA M3 / EMMC D5	/ GPIO2 D5 u	AD41	>>> EMMC_D6 [23]
FSPI CS0N M0 / EMMC D6	/ GPIO2 D6 u	AE41	>>> EMMC_D7 [23]
FSPI CS1N M0 / EMMC D7	/ GPIO2 D7 u		
FSPI CLK M0 / EMMC CMD	/ GPIO2 A0 u	AE42	>>> EMMC_CMD [23]
	/ EMMC CLKOUT	AB41	>>> EMMC_CLKOUT [23]
UART5 CTSN M1 / I2C2 SDA M2 / EMMC DATA STROBE	/ GPIO2 A1 d	AC40	>>> EMMC_DATA_STROBE [23]
UART5 RTSN M1 / I2C2 SCL M2 / EMMC RSTN	/ GPIO2 A2 d	AD40	>>> EMMC_RSTn [23]
	/ GPIO2 A3 d		

EMMCIO\_1V8\_1  
EMMCIO\_1V8\_2



RK3588S

# RK3588S VCCIO2

U9D

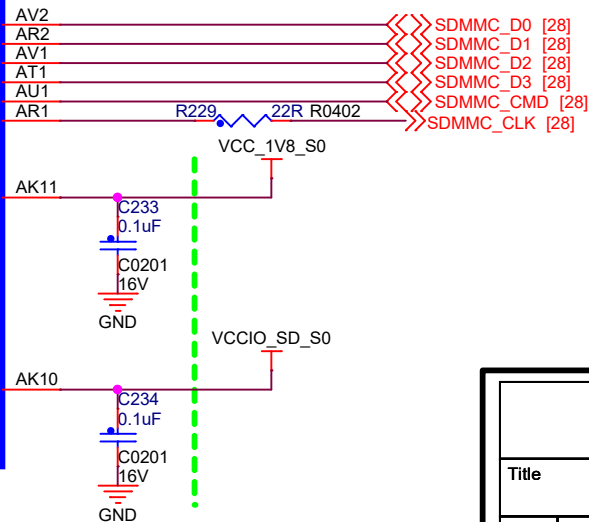
## VCCIO2 Domain

Operating Voltage=1.8V/3.3V

PWM8 M1 / I2C3 SCL M4 / PDM1 SDI3 M0 / JTAG TCK M1 / UART2 TX M1 / SDMMC D0	/ GPIO4 D0 u	AV2	>>> SDMMC_D0 [28]
PWM9 M1 / I2C3 SDA M4 / PDM1 SDI2 M0 / JTAG TMS M1 / UART2 RX M1 / SDMMC D1	/ GPIO4 D1 u	AR2	>>> SDMMC_D1 [28]
	/ GPIO4 D2 u	AV1	>>> SDMMC_D2 [28]
	/ GPIO4 D3 u	AT1	>>> SDMMC_D3 [28]
PWM10 M1 / I2C8 SDA M0 / PDM1 SDI0 M0 / JTAG TMS M0 / UART5 RTSN M0 / SDMMC D3	/ GPIO4 D3 u	AU1	>>> SDMMC_CMD [28]
PWM7 IR M1 / CAN0 TX M1 / PDM1 CLK1 M0 / MCU JTAG TCK M0 / UART5 RX M0 / SDMMC CMD	/ GPIO4 D4 u	AR1	>>> SDMMC_CLK [28]
TEST CLKOUT M0 / CAN0 RX M1 / PDM1 CLK0 M0 / MCU JTAG TMS M0 / UART5 TX M0 / SDMMC CLK	/ GPIO4 D5 d		

VCCIO2\_1V8

VCCIO2

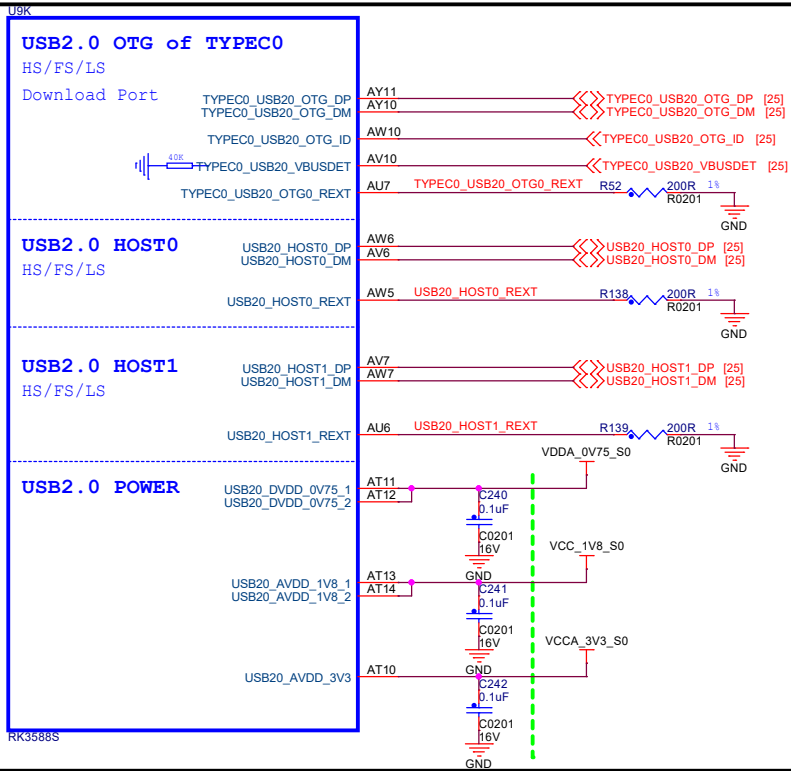
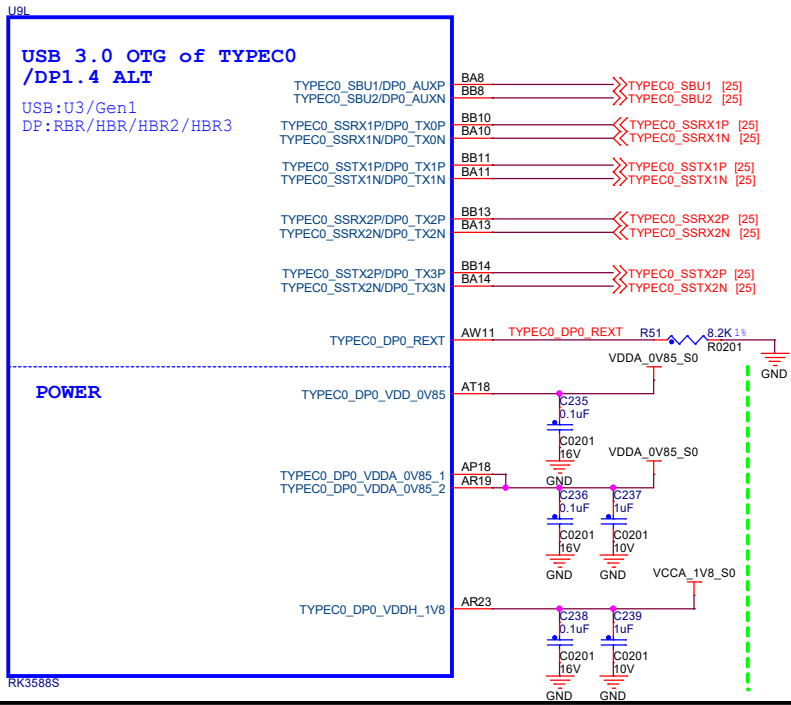


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**Note:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

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Size A4	Document Number RK3588S EMMCIO/VCCIO2	Rev V1.0
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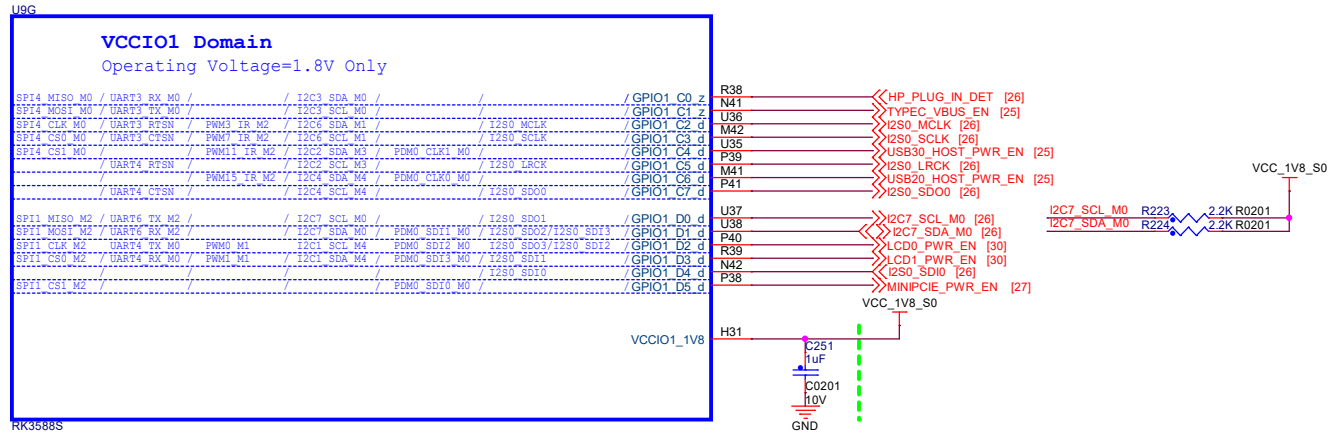
# RK3588S USB CONTROLLER



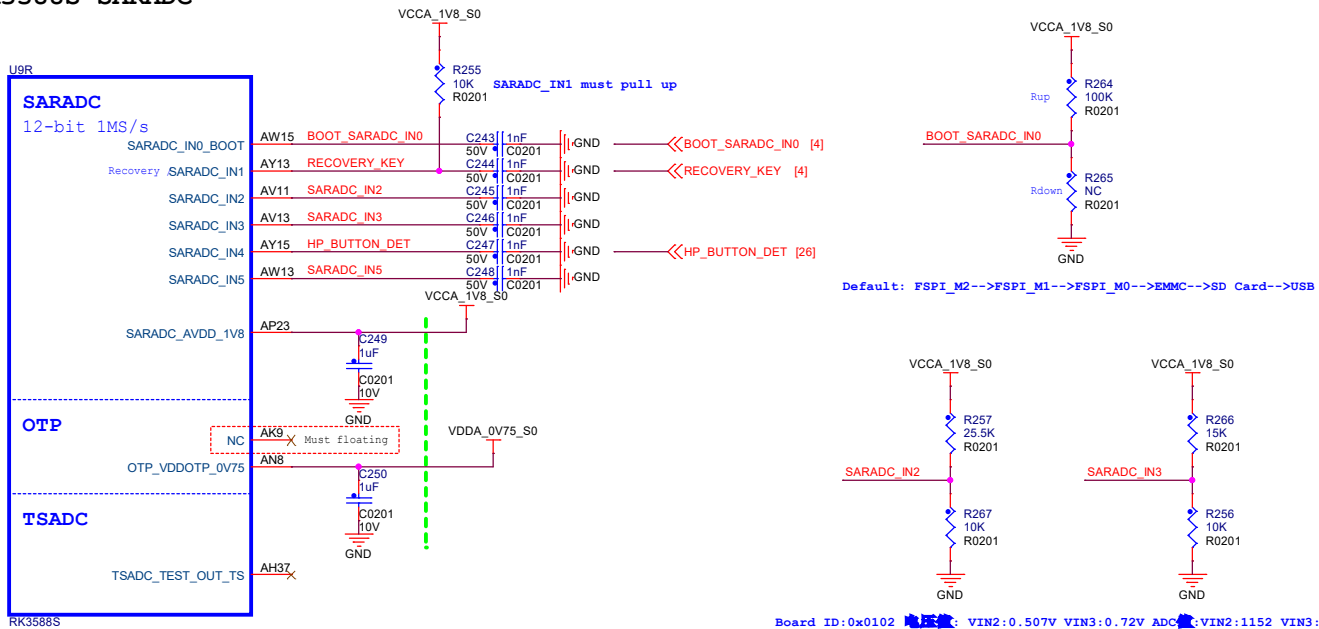
**Note:**  
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# RK3588S VCCIO1



# RK3588S SARADC



## BOOT MODE CONFIG

Item	Rup	Rdown	ADC	VOL	BOOT MODE
LEVEL1	DNP	100K	0	0V	USB (Maskrom mode)
LEVEL2	100K	20K	682	0.3V	SD Card-USB
LEVEL3	100K	51K	1365	0.6V	EMMC-USB
LEVEL4	100K	100K	2047	0.9V	FSPI M0-USB
LEVEL5	100K	200K	2730	1.2V	FSPI M1-USB
LEVEL6	100K	499K	3412	1.5V	FSPI M2-USB
LEVEL7	100K	DNP	4095	1.8V	FSPI_M2-FSPI_M1-FSPI_M0-EMMC-SD Card-USB

Board ID:0x0102 VIN2:0.507V VIN3:0.72V ADC VIN2:1152 VIN3:1638

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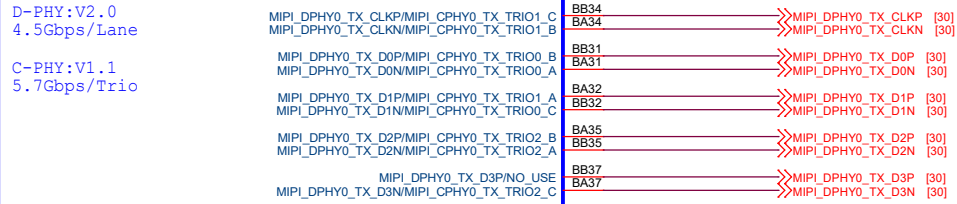
Size A3	Document Number RK3588S VCCIO1/SARAD	Rev V1.0
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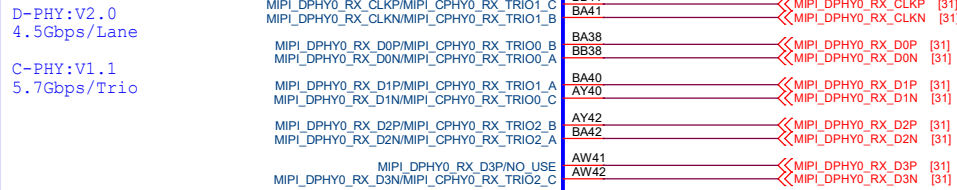
# RK3588S MIPI\_D/C PHY0

U90

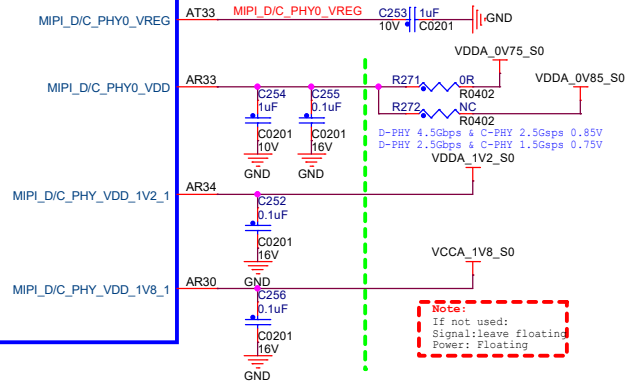
## MIPI D/C-PHY DSI\_TX Port0



## MIPI D/C-PHY CSI\_RX Port0



## Power



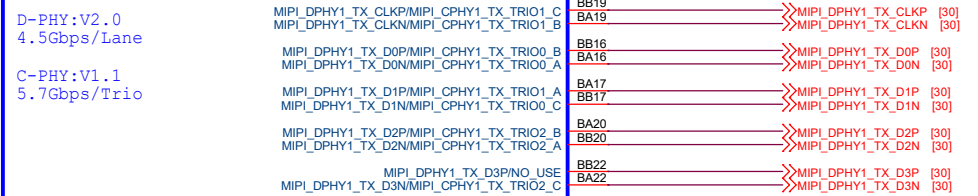
RK3588S

**Note:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

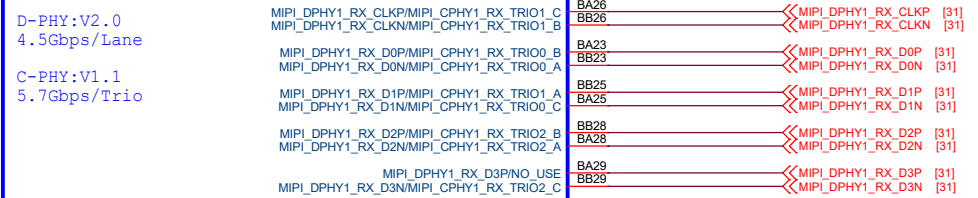
# RK3588S MIPI\_D/C PHY1

U9P

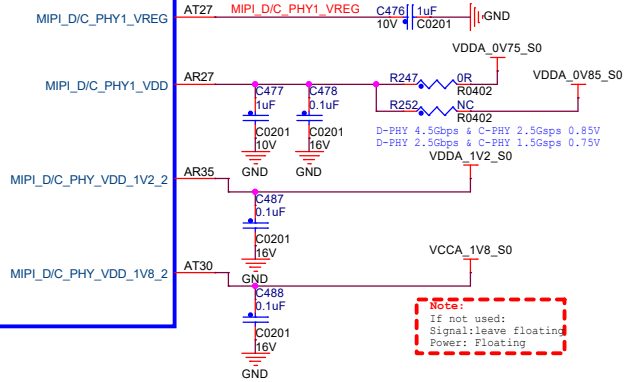
## MIPI D/C-PHY DSI\_TX Port1



## MIPI D/C-PHY CSI\_RX Port1



## Power



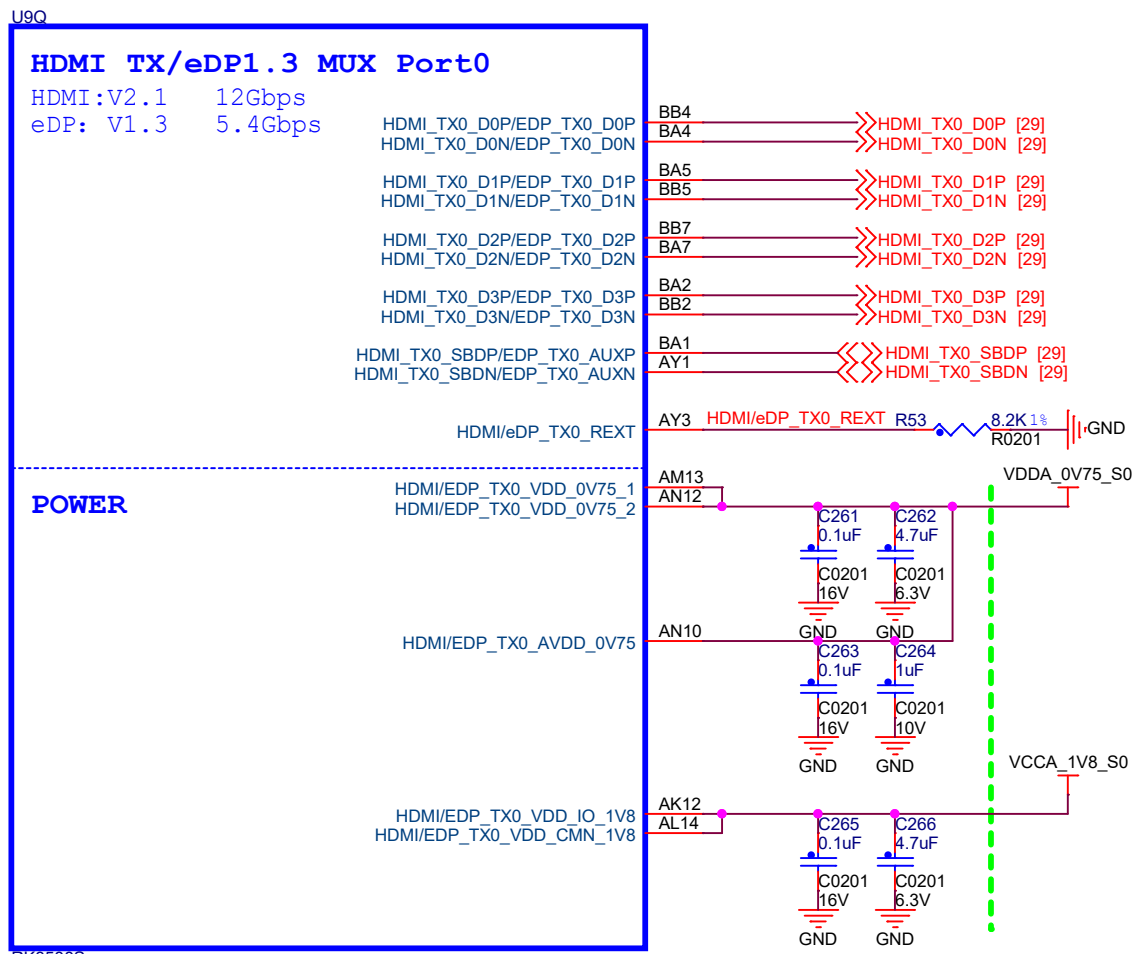
RK3588S

**Note:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

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Title		
野火 EBF RK3588S LBC4		
Size	Document Number	Rev
A3	RK3588S MIPI_D/C_PHY0/1	V1.0
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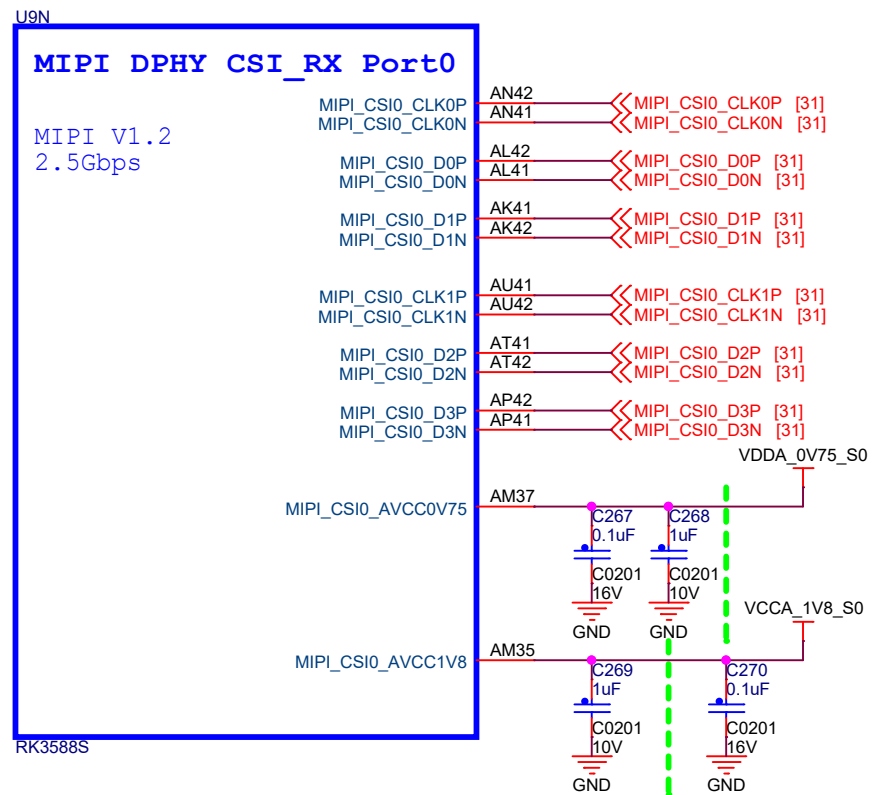
# RK3588S HDMI2.1 TX/eDP1.3 TX



RK3588S

**Note:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

# RK3588S MIPI\_DPHY CSI0 RX



RK3588S

## MIPI CSI RX Configuration

Option1	Sensor1 x4Lane	MIPI_CSI_RX_D0-3 MIPI_CSI_RX_CLK0
Option2	Sensor1 x2Lane	MIPI_CSI_RX_D0-1 MIPI_CSI_RX_CLK0
	Sensor2 x2Lane	MIPI_CSI_RX_D2-3 MIPI_CSI_RX_CLK1

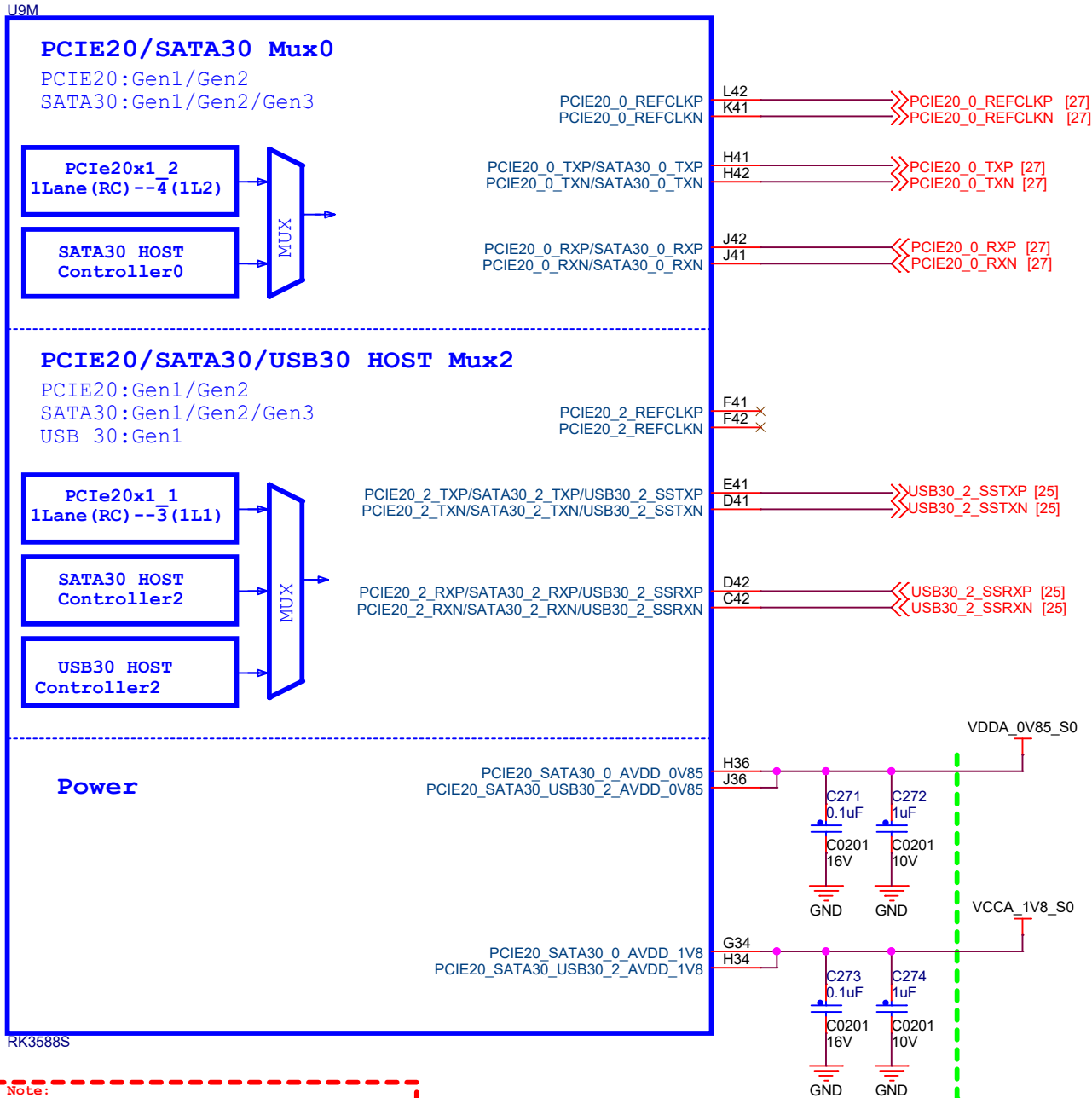
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# RK3588S PCIe20/SATA30/USB30



RK3588S

**Note:**  
 The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

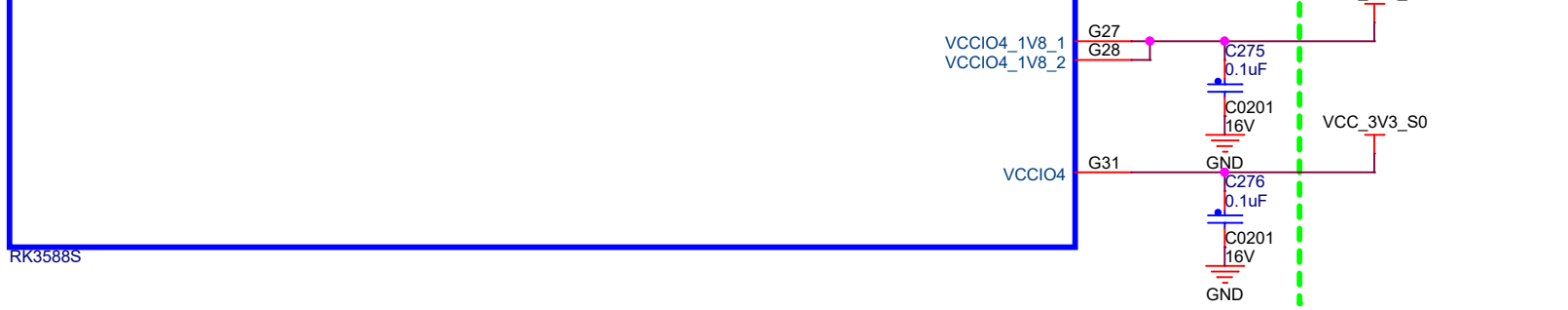
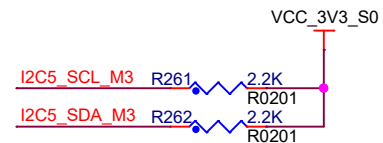
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Title 野火 EBF RK3588S LBC4		
Size A4	Document Number RK3588SPCIE20/SATA30/USB30	Rev V1.0
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# RK3588S VCCIO4

U9H

**VCCIO4 Domain**  
Operating Voltage=1.8V/3.3V

/ PCIE20X1 1 CLKREQN M2 / DP0 HPDIN M2 / UART6 RX M1 / SPI4 MISO M2 / I2C2 SDA M4 / GPIO1 A0 d	G40	>>CTP0_RST [30]
/ PCIE20X1 1 WAKEN M2 / / / UART6 TX M1 / SPI4 MOSI M2 / I2C2 SCL M4 / GPIO1 A1 d	L40	>>LCD0_RST [30]
PWM0 M2 / / / VOP POST EMPTY / UART6 RTSN M1 / SPI4 CLK M2 / I2C4 SDA M3 / GPIO1 A2 d	D38	>>FAN_CTRL [26]
PWM1 M2 / / / / / UART6 CTSN M1 / SPI4 CS0 M2 / I2C4 SCL M3 / GPIO1 A3 d	L39	>>CAM0_PWDN [31]
/ / / / / / / SPI2 MISO M0 / / / GPIO1 A4 d	G37	>>CAM0_RSTn [31]
/ / / / / HDMI TX0 HPD M0 / / / / SPI2 MOSI M0 / / / GPIO1 A5 d	M40	<<HDMI_TX0_HPDM0 [29]
/ / / / / / / SPI2 CLK M0 / / / GPIO1 A6 d	D39	>>EARPHONE_CTL [26]
PWM3 IR M3 / PCIE20X1 1 PERSTN M2 / / / / / SPI2 CS0 M0 / PDM1 SDI0 M1 / GPIO1 A7 u	H38	<<<> GPIO1_A7 [28]
/ / / / / / / SPI2 CS1 M0 / PDM1 SDI1 M1 / GPIO1 B0 u	H39	<<<> GPIO1_B0 [28]
/ / / / / / / SPI0 MISO M2 / PDM1 SDI2 M1 / GPIO1 B1 d	G39	<<SPI0_MISO_M2 [28]
/ / / / / / / UART4 RX M2 / SPI0 MOSI M2 / PDM1 SDI3 M1 / GPIO1 B2 d	M38	>>SPI0_MOSI_M2 [28]
/ / / / / SATA0 ACT LED M1 / UART4 TX M2 / SPI0 CLK M2 / PDM1 CLK1 M1 / GPIO1 B3 d	M37	>>SPI0_CLK_M2 [28]
/ / / / / / / UART7 RX M2 / SPI0 CS0 M2 / PDM1 CLK0 M1 / GPIO1 B4 u	M39	>>SPI0_CS0_M2 [28]
/ / / / / / / UART7 TX M2 / SPI0 CS1 M2 / / / GPIO1 B5 u	D40	>>SPI0_CS1_M2 [28]
/ / / / / MIPI CAMERA1 CLK M0 / UART1 TX M1 / SPDIF0 TX M0 / I2C5 SCL M3 / GPIO1 B6 u	L38	>>I2C5_SCL_M3 [28,30,31]
PWM13 M2 / SATA2 ACT LED M1 / MIPI CAMERA2 CLK M0 / UART1 RX M1 / SPDIF1 TX M0 / I2C5 SDA M3 / GPIO1 B7 u	F37	<<<> I2C5_SDA_M3 [28,30,31]
PWM14 M2 / / / MIPI CAMERA3 CLK M0 / UART1 RTSN M1 / / / I2C8 SCL M2 / GPIO1 D6 u	L37	>>PWM14_M2 [28]
PWM15 IR M3 / / / MIPI CAMERA4 CLK M0 / UART1 CTSN M1 / / / I2C8 SDA M2 / GPIO1 D7 u	G38	>>PWM15_IR_M3 [28]



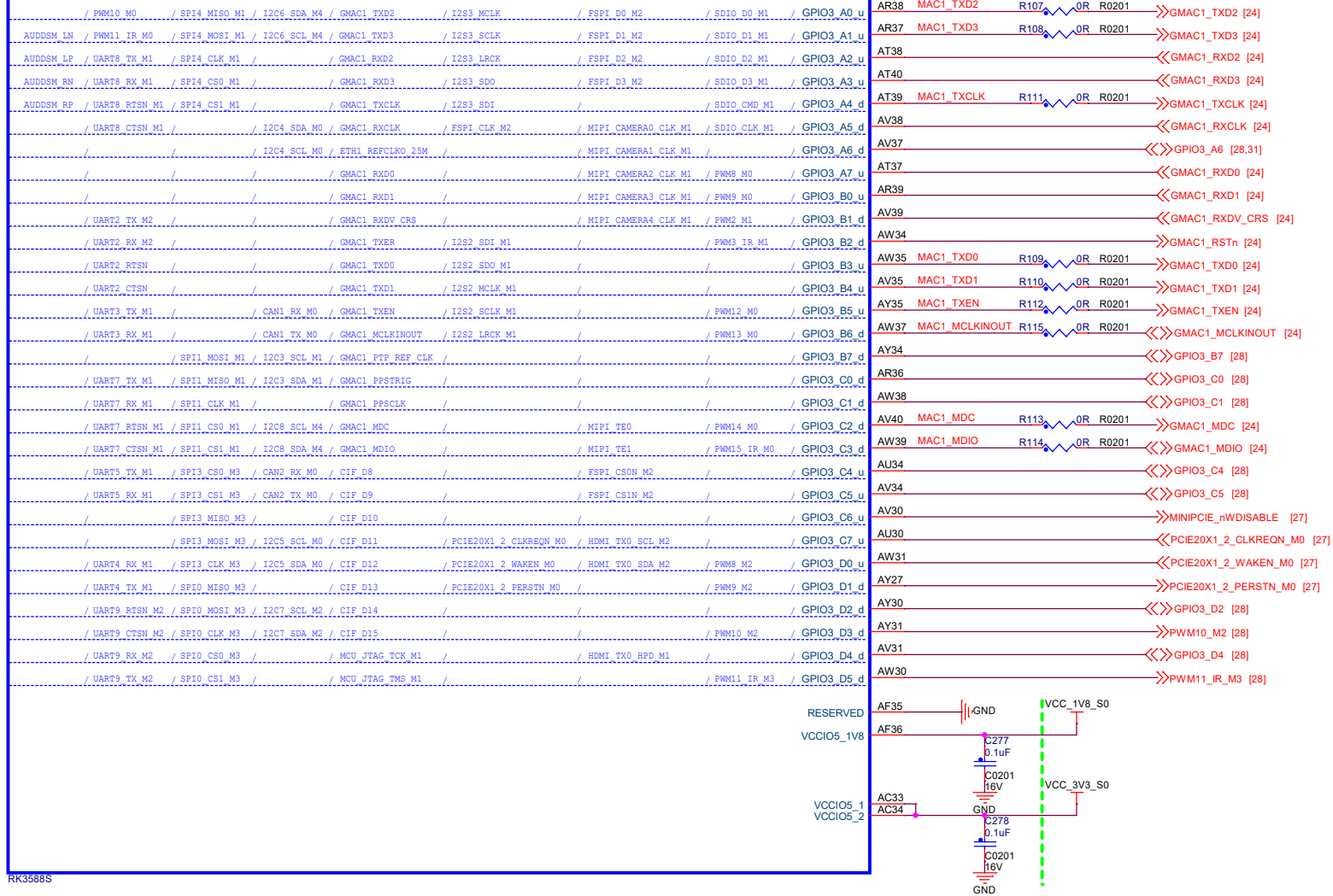
RK3588S

**Note:**  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

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U9I

VCCIO5 Domain  
Operating Voltage=1.8V/3.3V



Note:  
The Caps between green line and U9 should be placed under the U9 package. Other caps should be placed close to the U9 package

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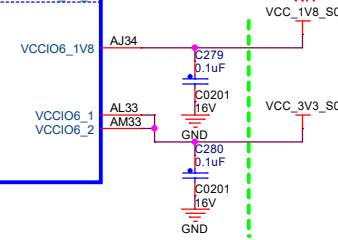
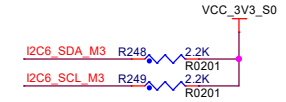
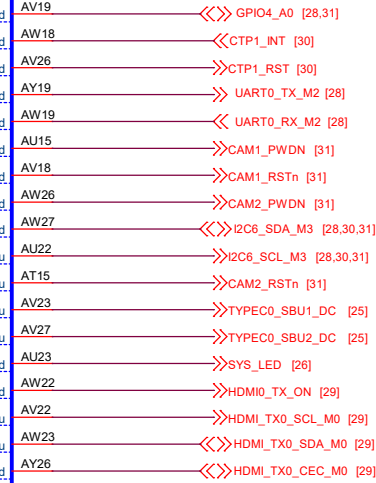
# RK3588S VCCIO6

U9J

VCCIO6 Domain		Operating Voltage=1.8V/3.3V	
BT1120_D0 / CIF_D0 /	/ I2S1_MCLK_M0 /	UART9_RTSN_M1 /	SPI0_MISO_M1 /
BT1120_D1 / CIF_D1 /	/ I2S1_SCLK_M0 /	UART9_CTSN_M1 /	SPI0_MOSI_M1 /
BT1120_D2 / CIF_D2 /	/ I2S1_LRCK_M0 /	/ SPI0_CLK_M1 /	/ PCIE20X1_1_PERSTN_M1 /
BT1120_D3 / CIF_D3 /	/	/	/ GPIO4_A3_d
BT1120_D4 / CIF_D4 /	/	/	/ GPIO4_A4_d
BT1120_D5 / CIF_D5 /	/ I2S1_SDI0_M0 /	UART3_TX_M2 /	SPI2_MISO_M1 /
BT1120_D6 / CIF_D6 /	/ I2S1_SDI1_M0 /	UART3_RX_M2 /	SPI2_CLK_M1 /
BT1120_D7 / CIF_D7 /	/ I2S1_SDI2_M0 /	/	/ SPI2_CS0_M1 /
BT1120_CLKOUT / CIF_CLKIN /	/ I2S1_SDI3_M0 /	UART8_TX_M0 /	SPI2_CS1_M1 /
SPDIF1_TX_M1 /	/ MIPI_CAMERA0_CLK_M0 /	SATA2_ACT_LED_M0 /	I2S1_SDO0_M0 /
CAN1_RX_M1 /	BT1120_D8 /	CIF_HREF /	PWM14_M1 /
CAN1_TX_M1 /	BT1120_D9 /	CIF_VSYNC /	PWM15_IR_M1 /
BT1120_D10 /	CIF_CLKOUT /	PWM11_IR_M1 /	I2S1_SDO3_M0 /
BT1120_D11 /	/	PWM12_M1 /	/
BT1120_D12 /	/	PWM13_M1 /	/
BT1120_D13 /	/	/	/
BT1120_D14 /	/	/	/
BT1120_D15 /	SPDIF1_TX_M2 /	PWM6_M1 /	HDMI_TX0_CEC_M0 /

**Note:**  
BT1120 Only Support Output

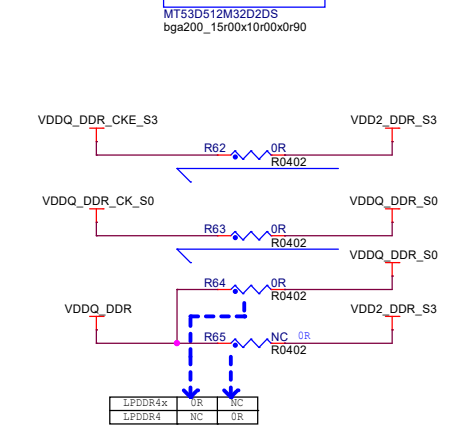
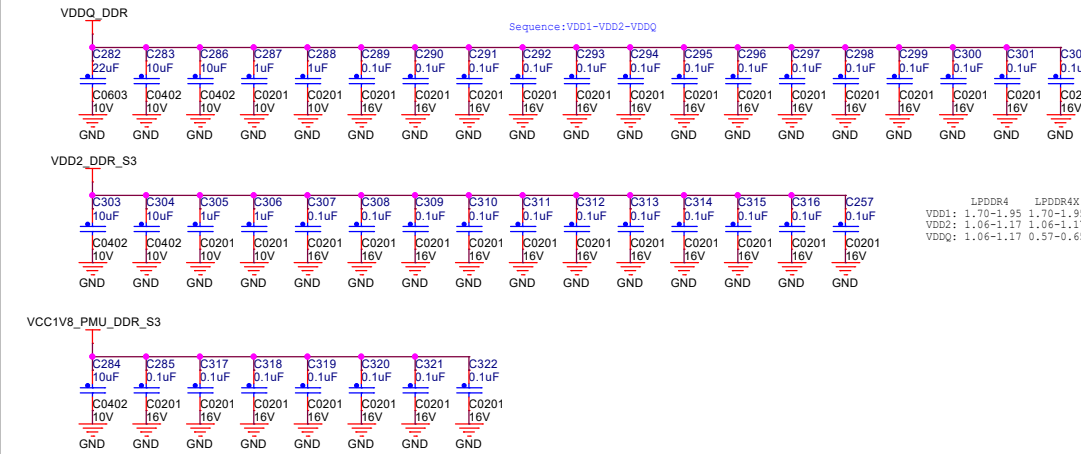
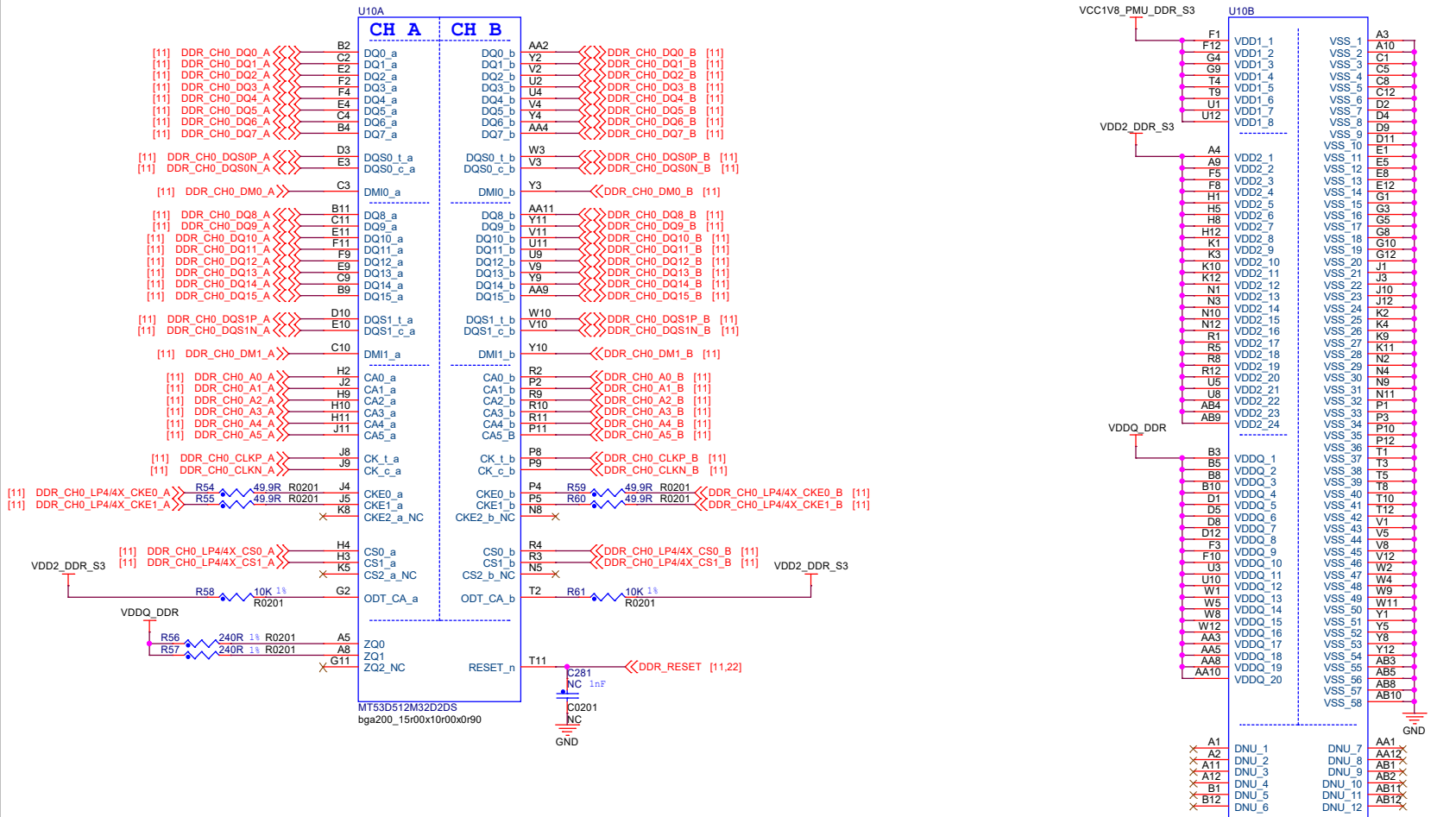
RK3588S



**Note:**  
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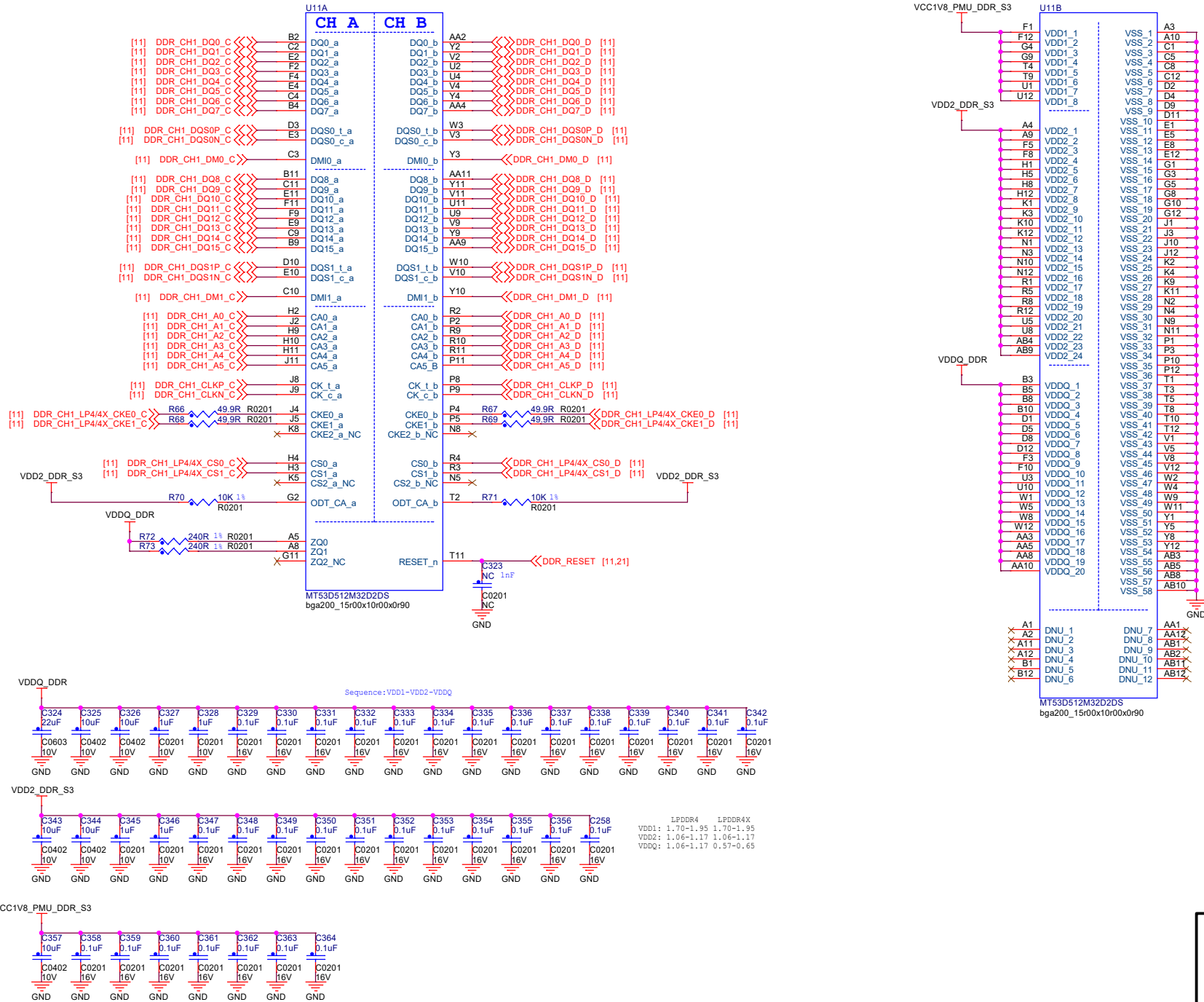
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Size A3	Document Number RK3588S VCCIO6	Rev V1.0
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# LPDDR4/LPDDR4x\_1



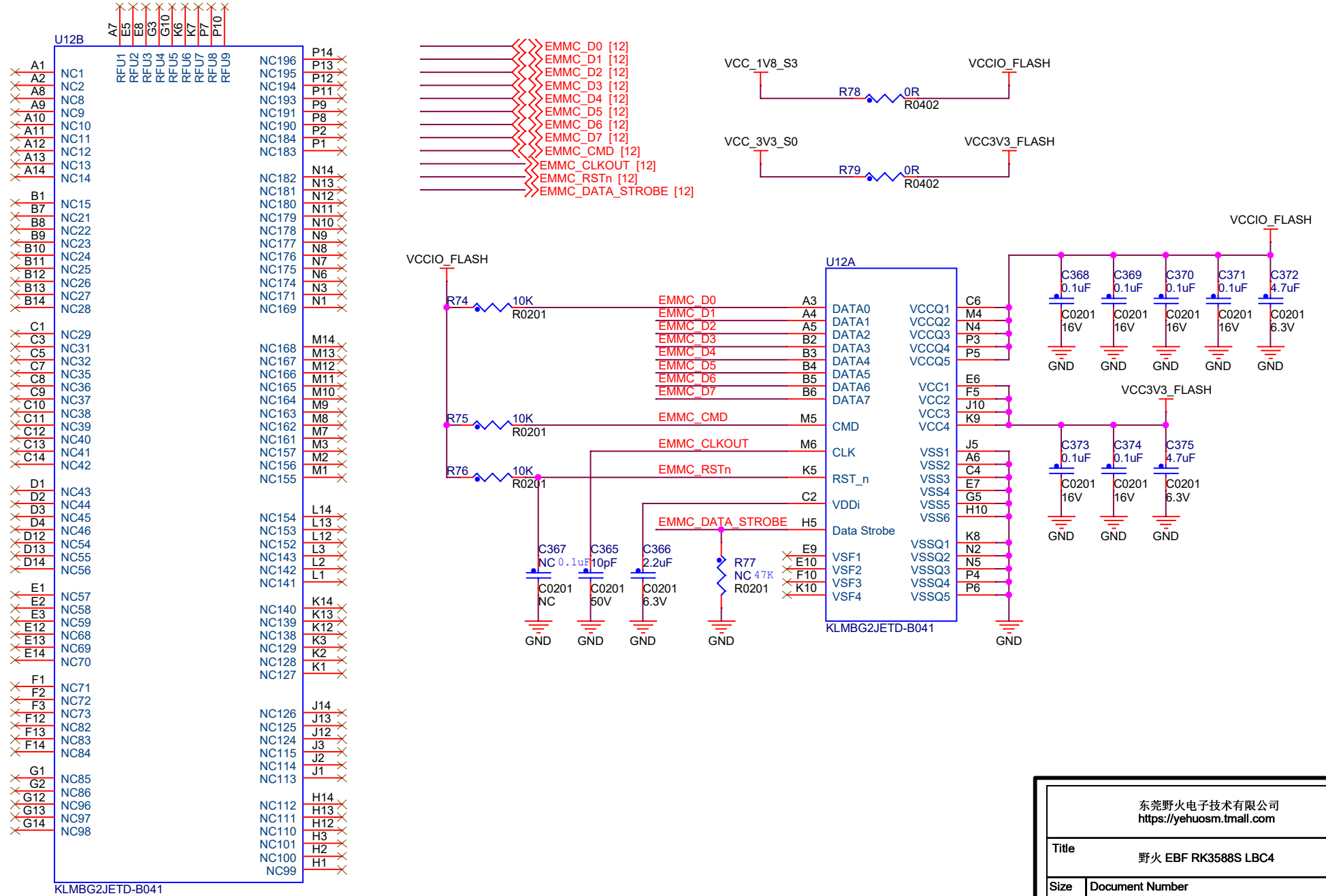
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Title 野火 EBF RK3588S LBC4		
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# LPDDR4/LPDDR4x\_2



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# EMMC FLASH



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A4	EMMC FLASH	V1.0
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# 以太网

TXC / RXC : delays 2ns  
PHY Address : 001

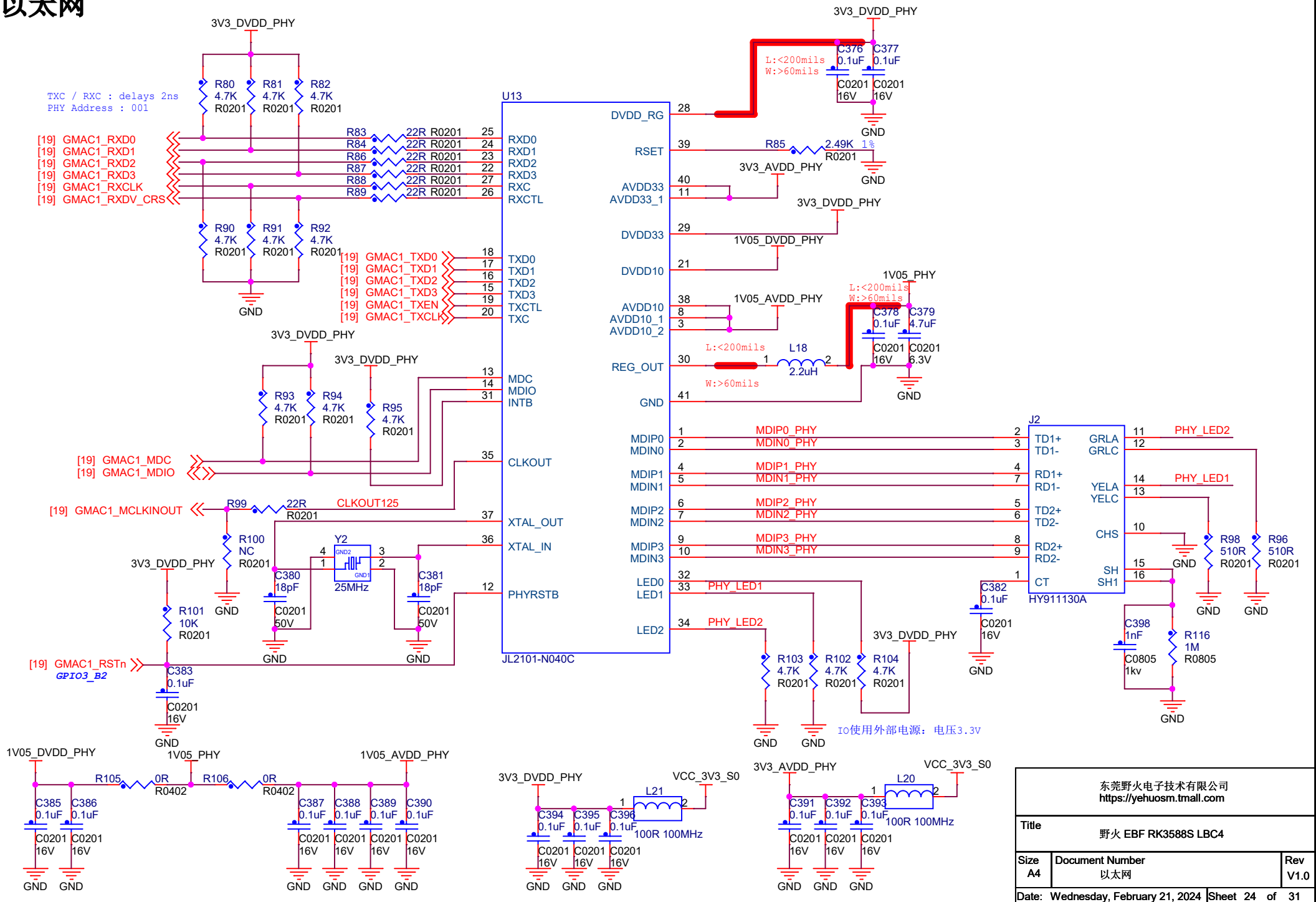
- [19] GMAC1\_RXD0
- [19] GMAC1\_RXD1
- [19] GMAC1\_RXD2
- [19] GMAC1\_RXD3
- [19] GMAC1\_RXCLK
- [19] GMAC1\_RXDV\_CRS

- [19] GMAC1\_TXD0
- [19] GMAC1\_TXD1
- [19] GMAC1\_TXD2
- [19] GMAC1\_TXD3
- [19] GMAC1\_TXEN
- [19] GMAC1\_TXCLK

- [19] GMAC1\_MDC
- [19] GMAC1\_MDIO

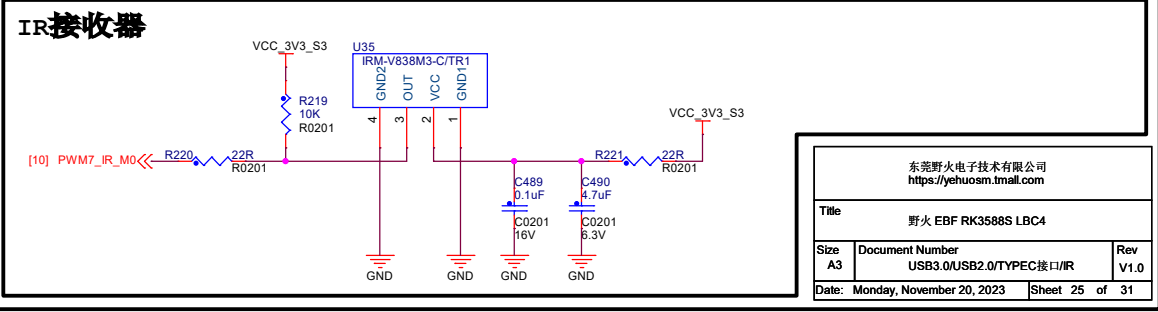
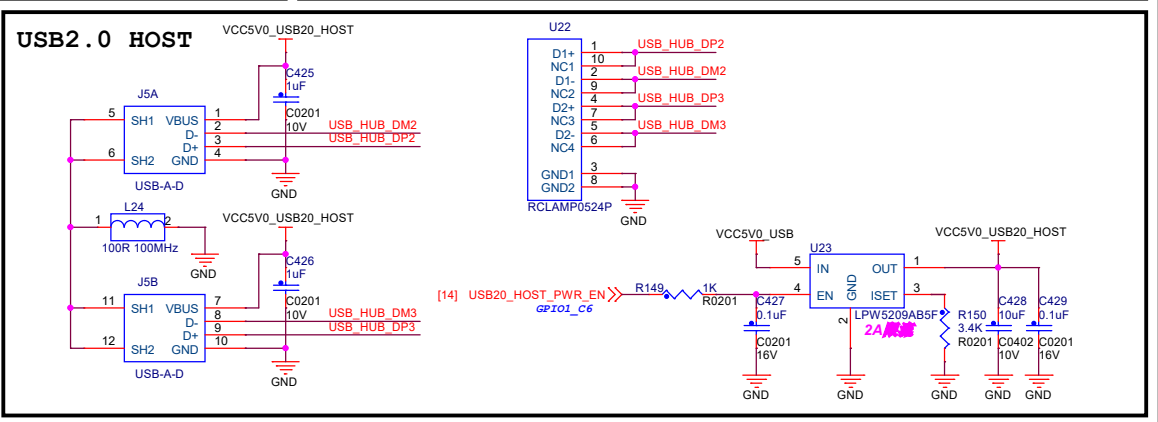
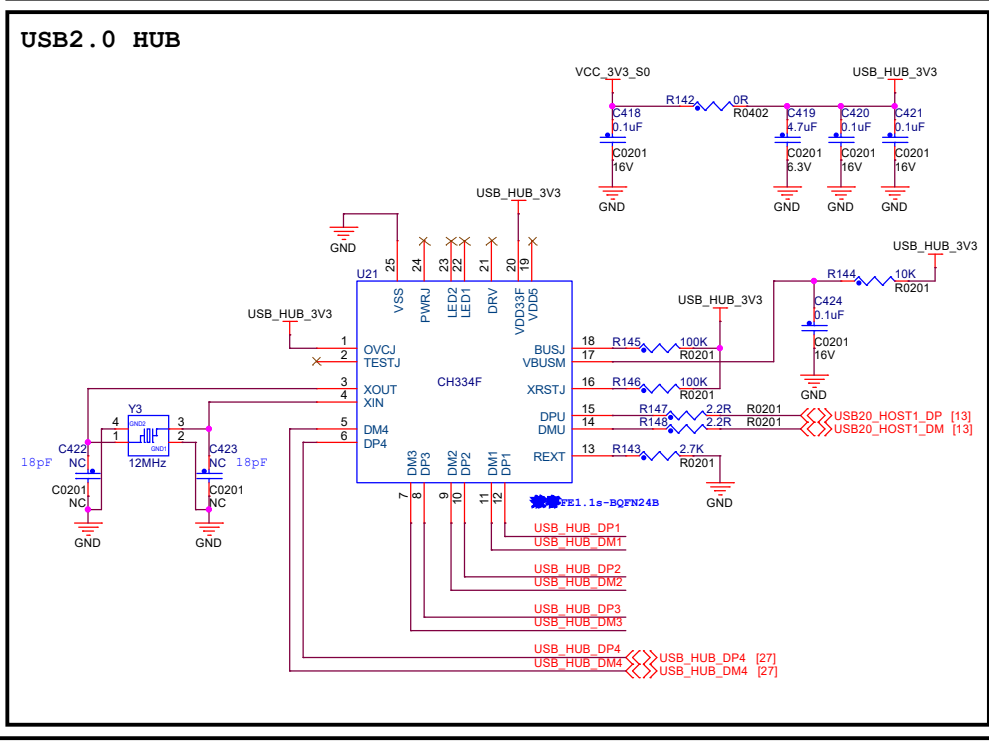
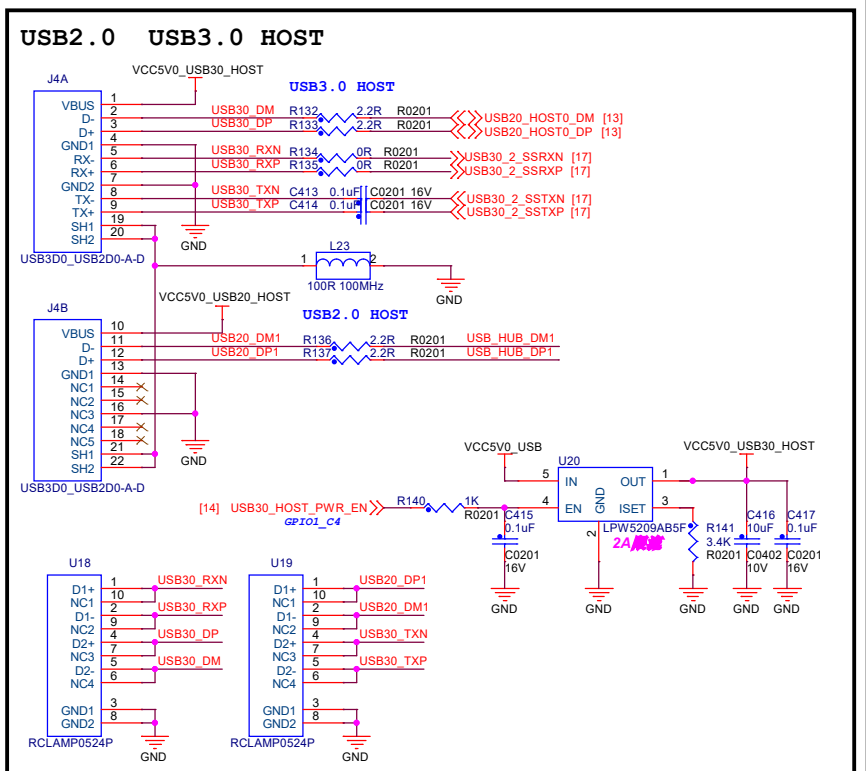
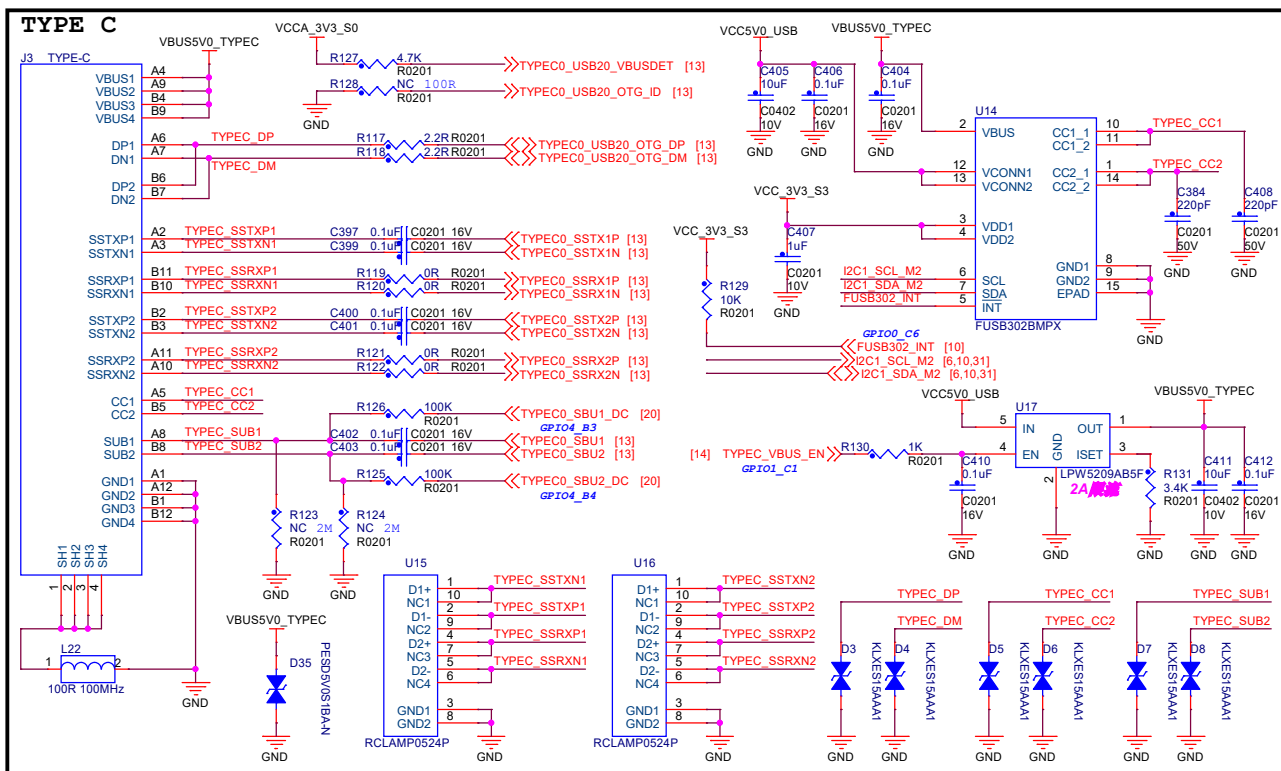
- [19] GMAC1\_MCLKINOUT

- [19] GMAC1\_RSTn
- GPIO3\_B2



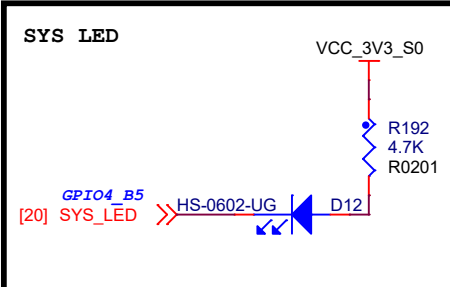
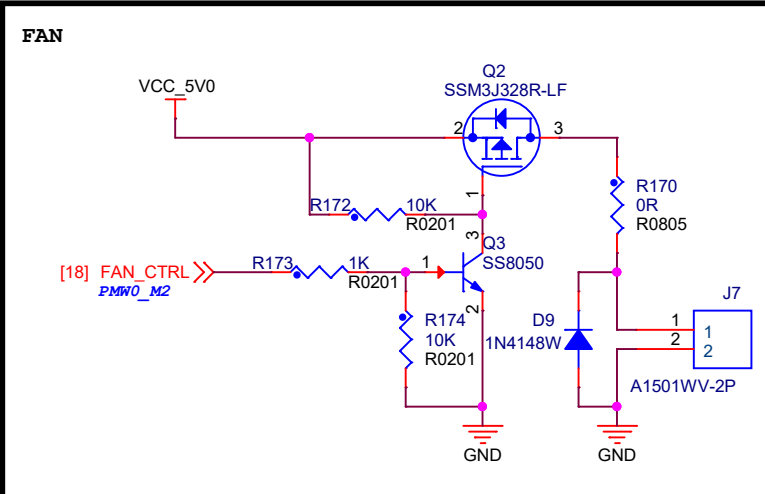
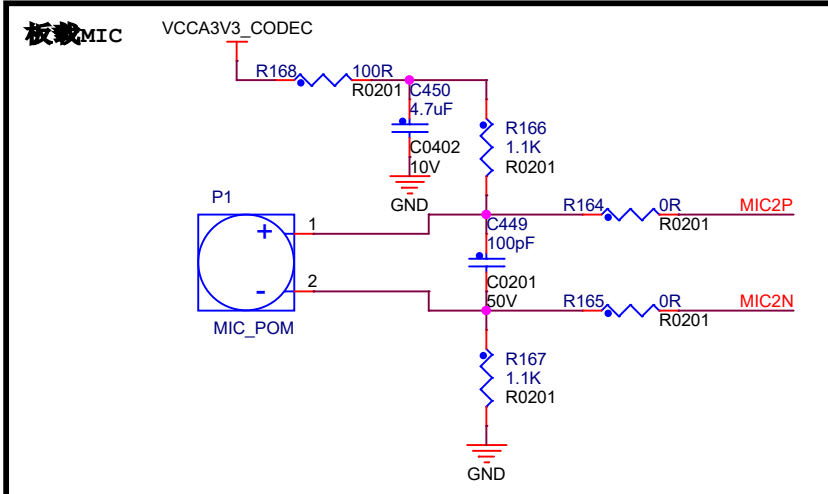
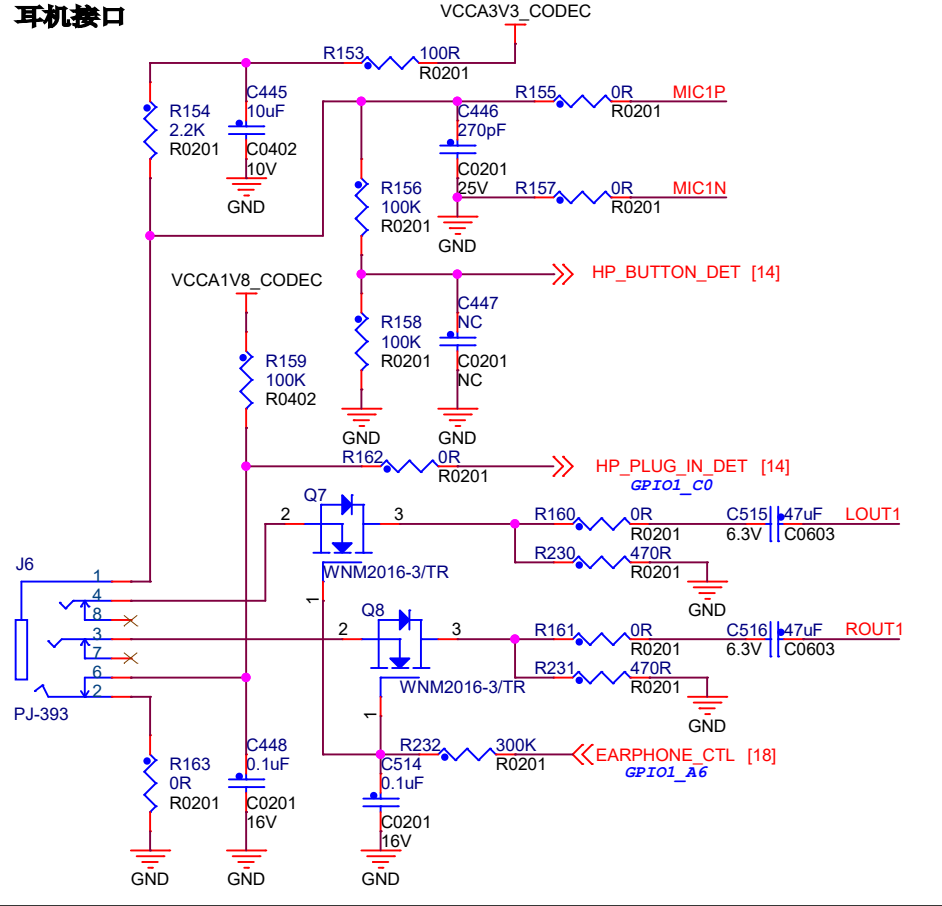
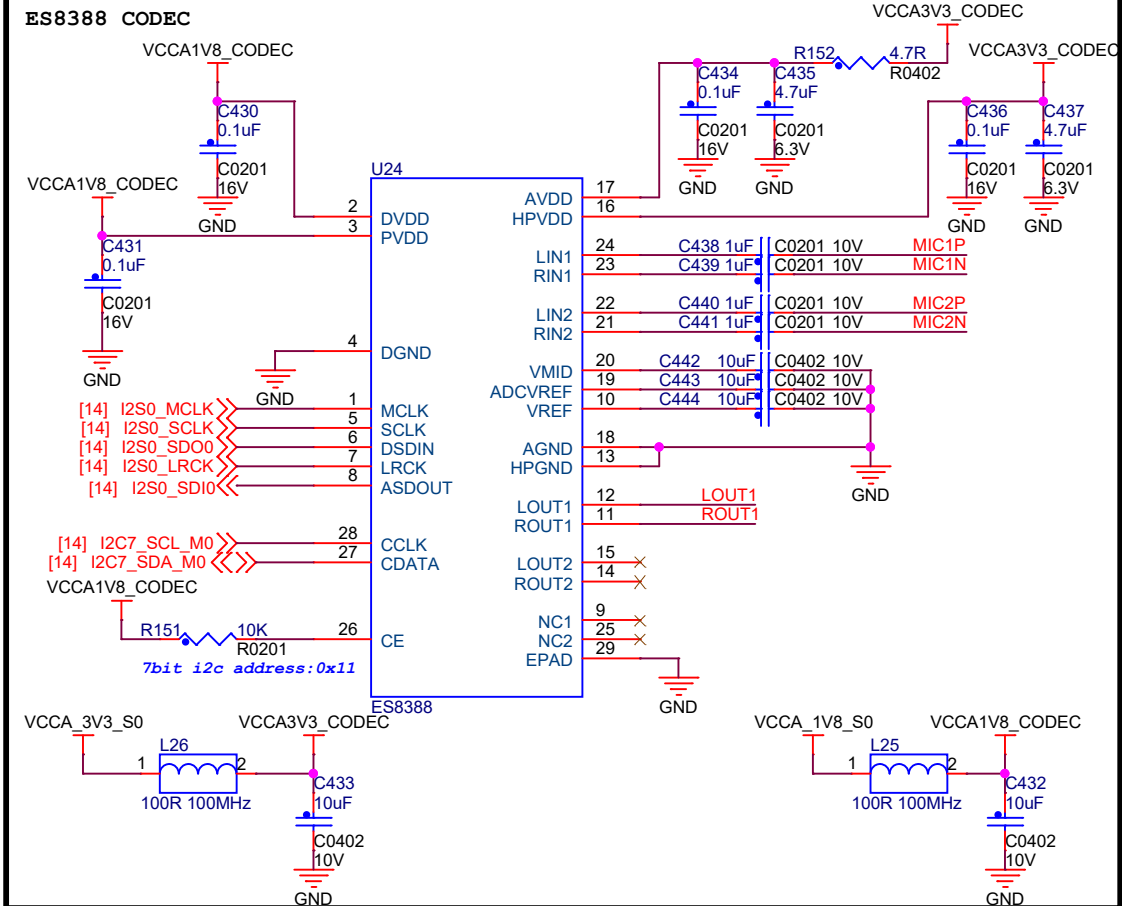
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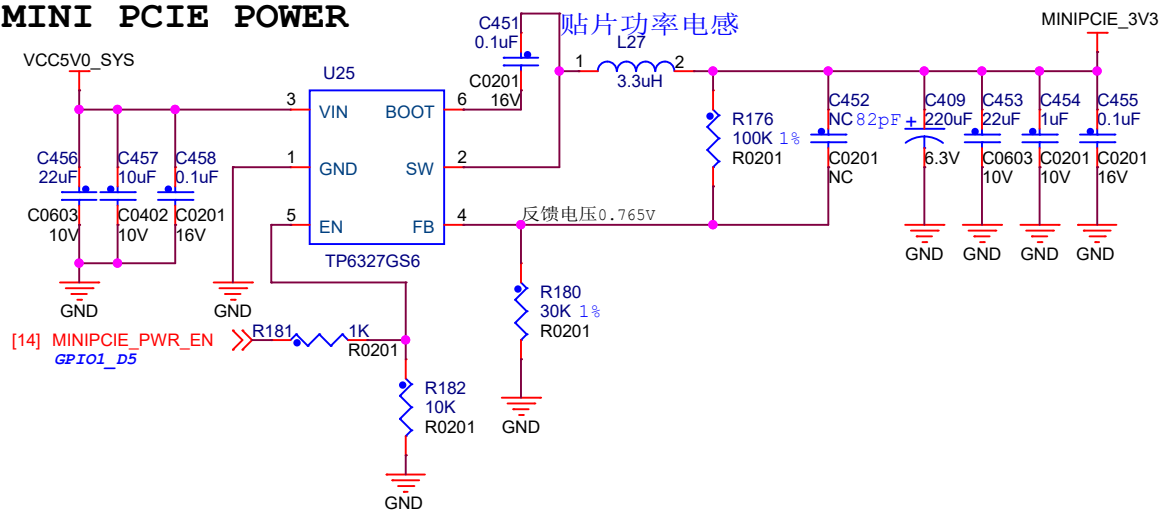
Title	野火 EBF RK3588S LBC4	
Size	Document Number	Rev
A3	USB3.0/USB2.0/TYPERC接口/IR	V1.0
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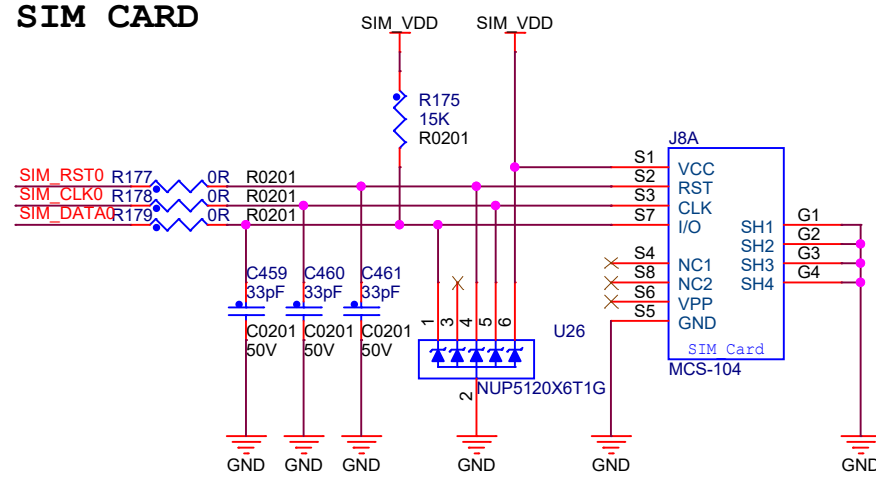
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Size A4	Document Number 音频/FAN/LED	Rev V1.0
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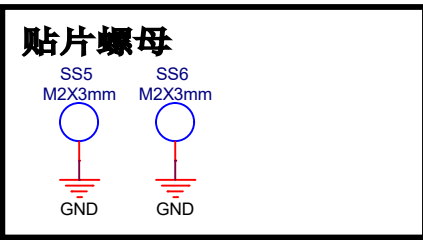
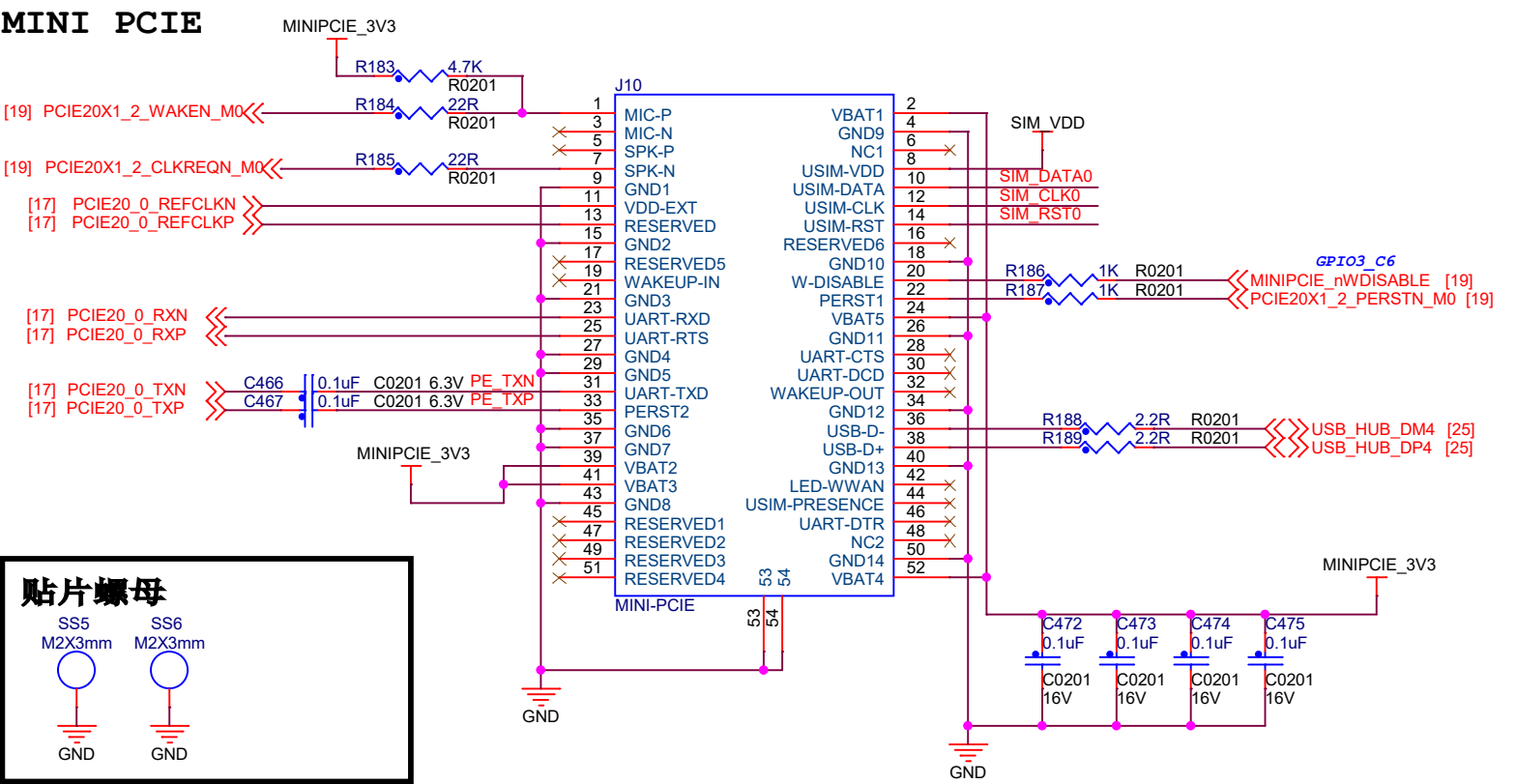
### MINI PCIE POWER



### SIM CARD

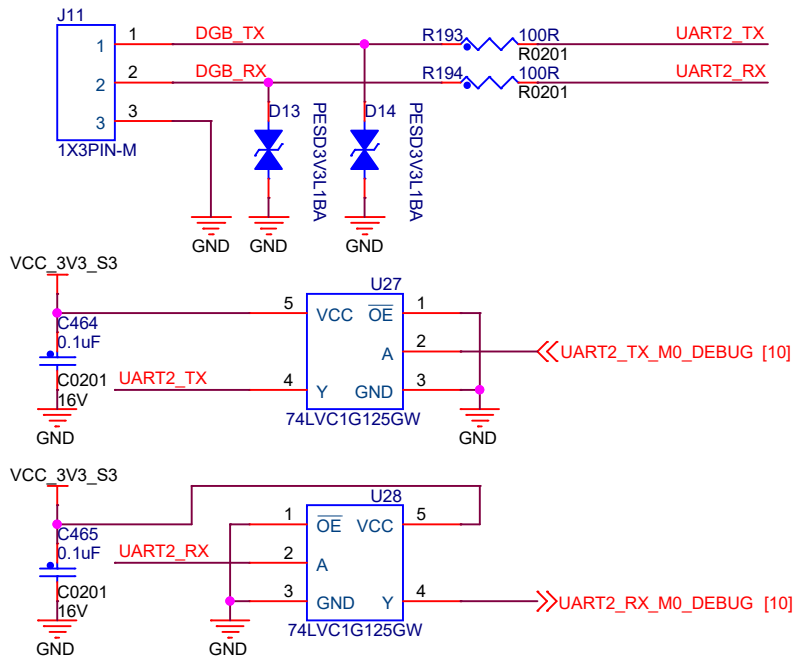


### MINI PCIE

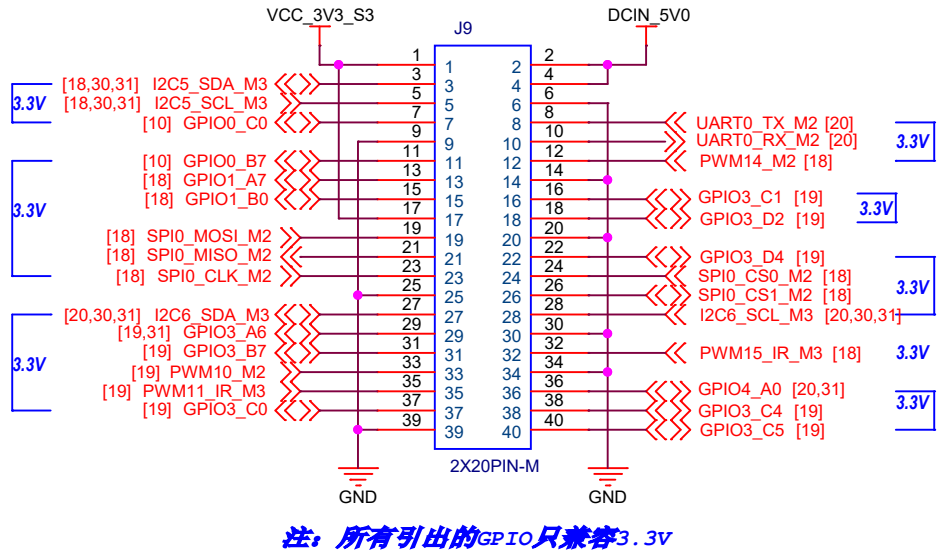


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Title 野火 EBF RK3588S LBC4		
Size A4	Document Number MINI PCIE接口	Rev V1.0
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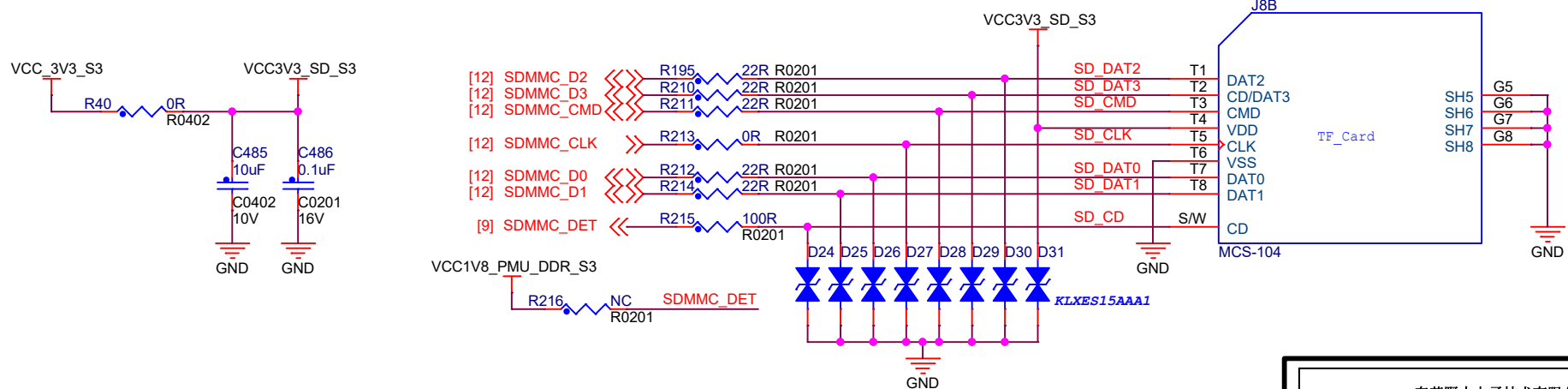
### Debug接口



### IO 引出



### SD Card



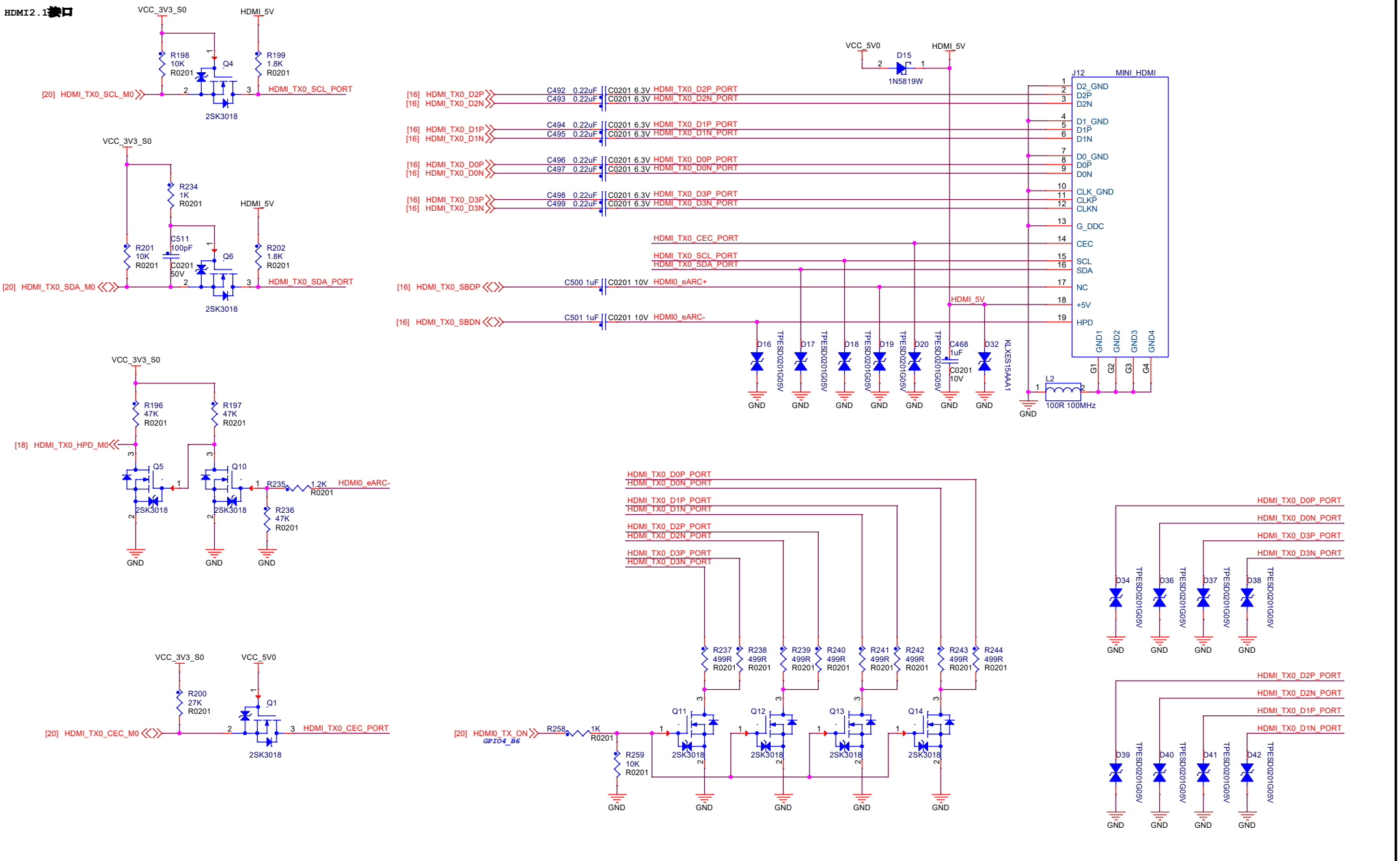
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Title: 野火 EBF RK3588S LBC4

Size: A4	Document Number: SD Card/DEBUG/IO引出	Rev: V1.0
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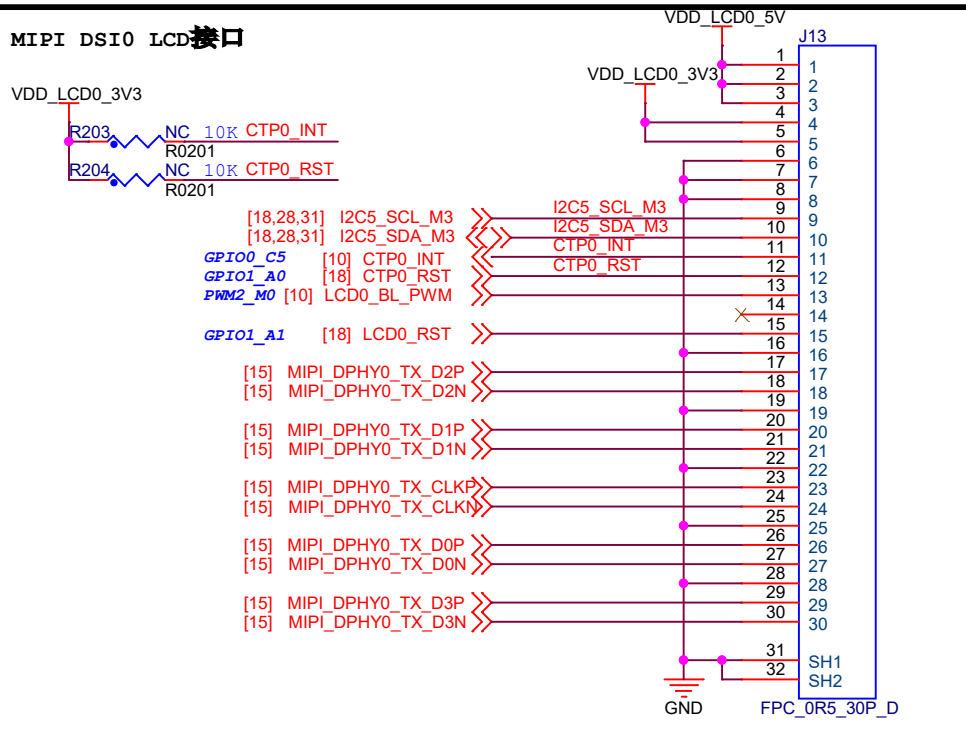
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HDMI2.1接口

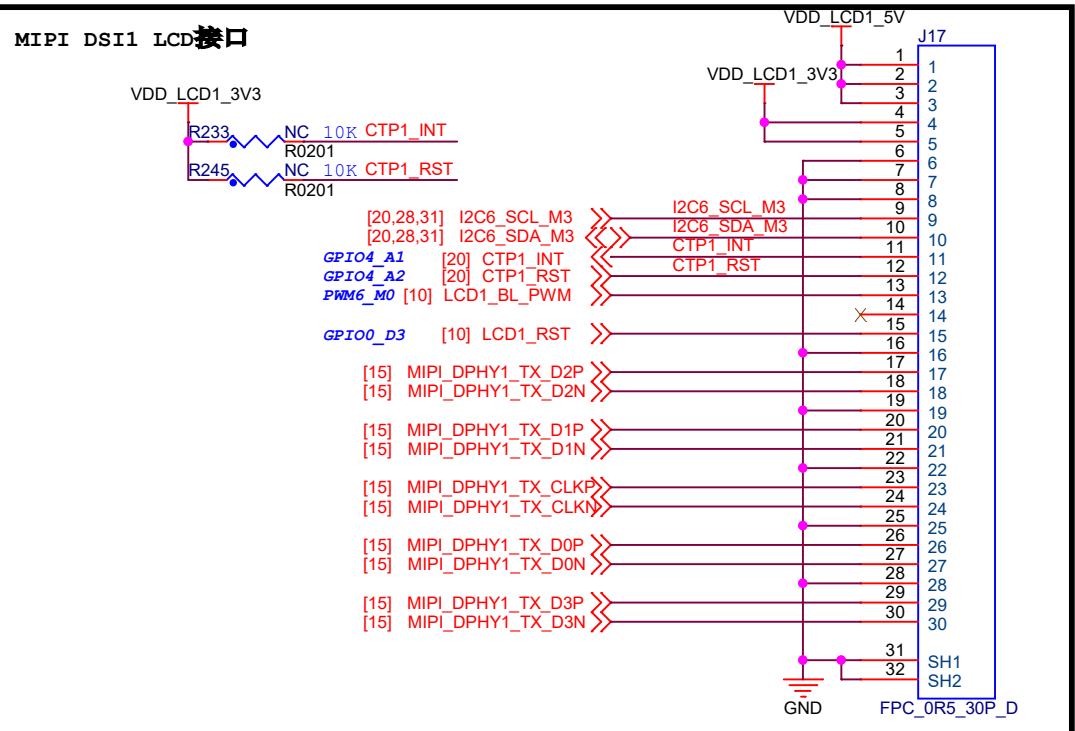


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Size A3	Document Number HDMI2.1接口	Rev V1.0
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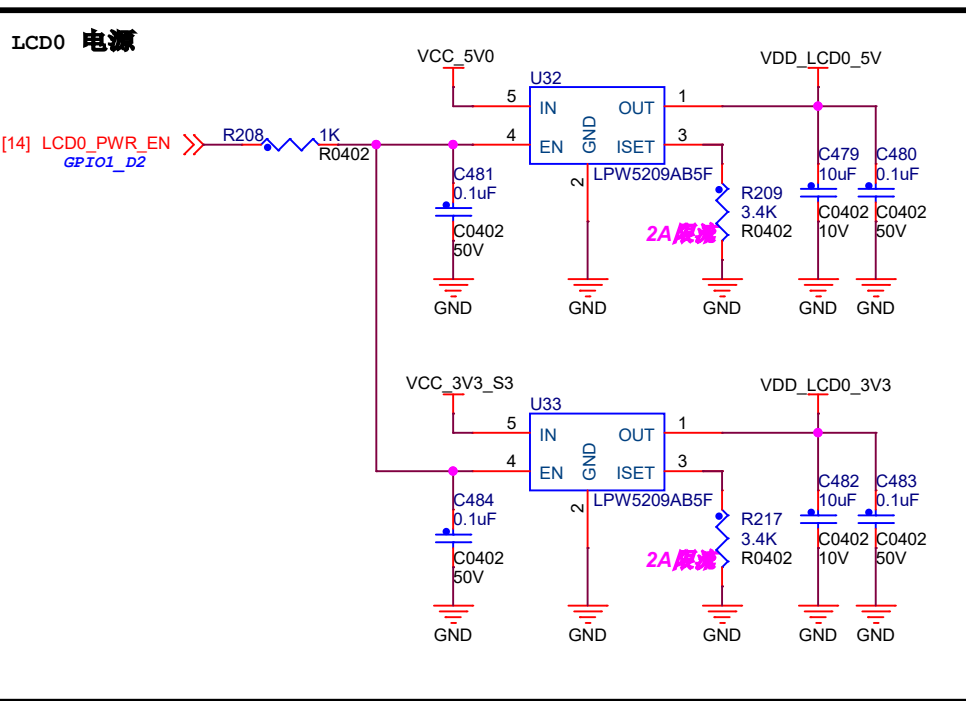
### MIPI DSI0 LCD接口



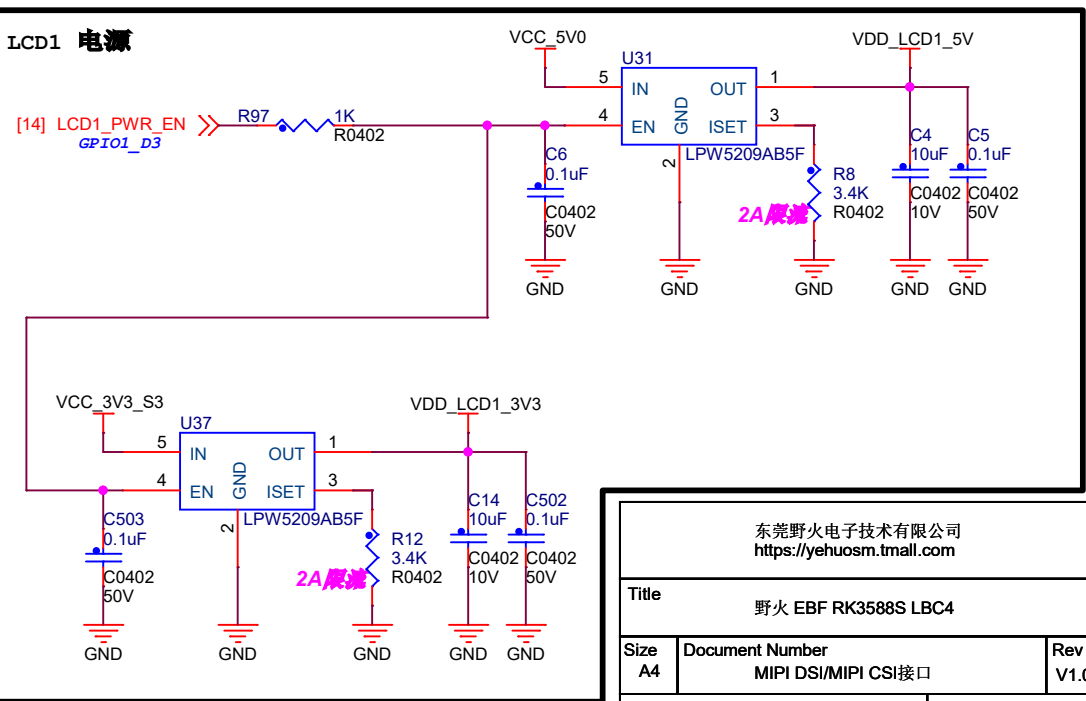
### MIPI DSI1 LCD接口



### LCD0 电源

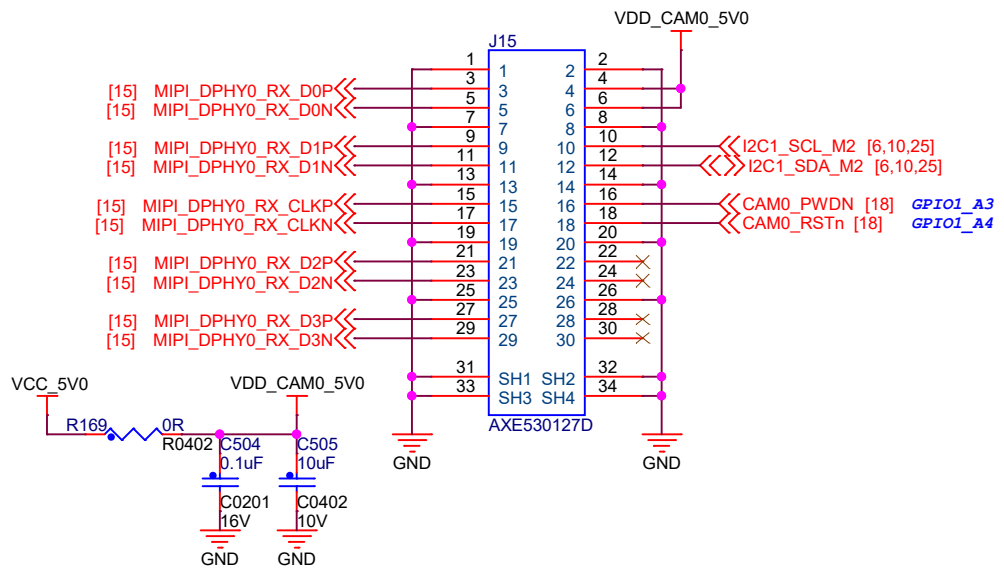


### LCD1 电源

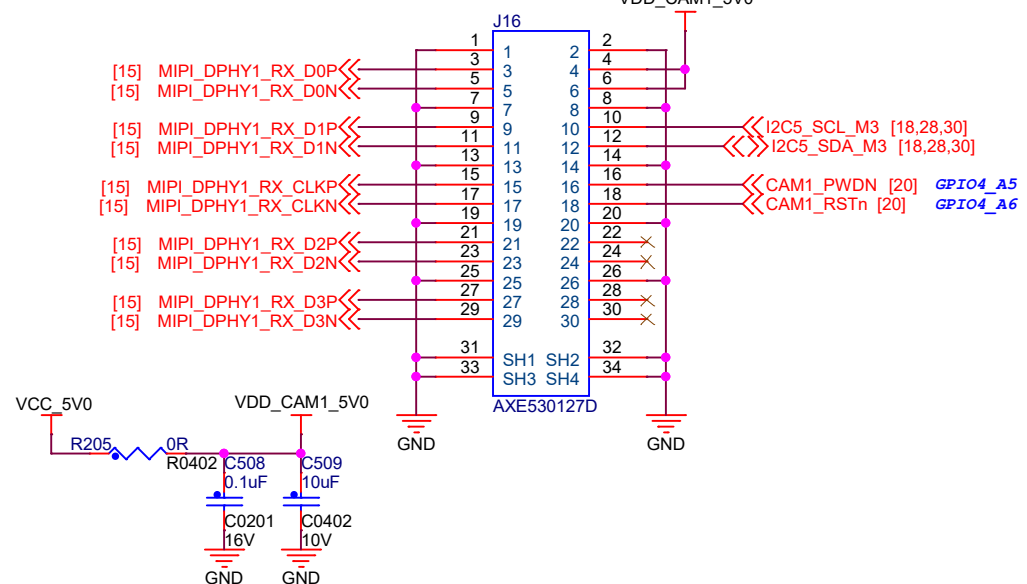


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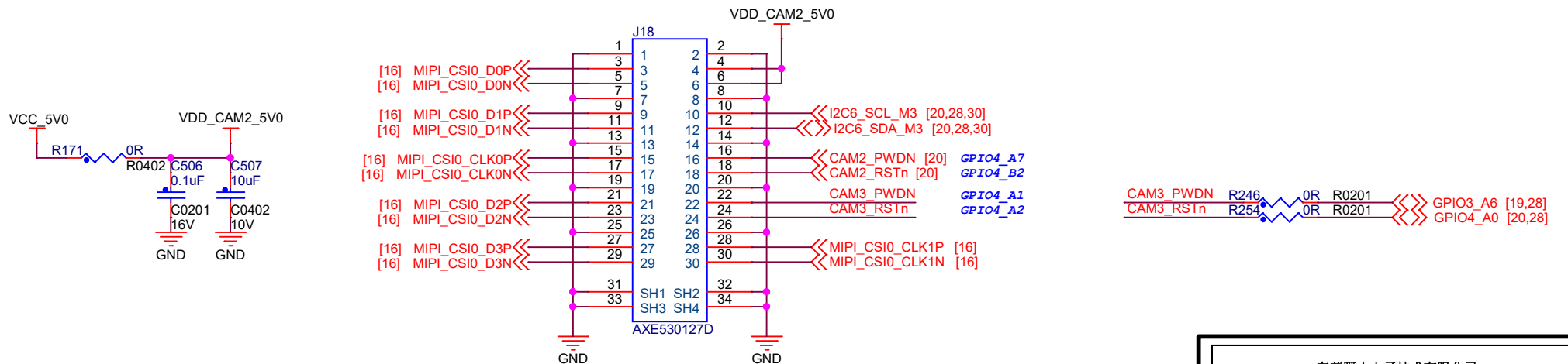
### CAM0 摄像头接口



### CAM1 摄像头接口



### CAM2 摄像头接口



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