

ROCK PI 4_CORE

CONTENT INDEXING

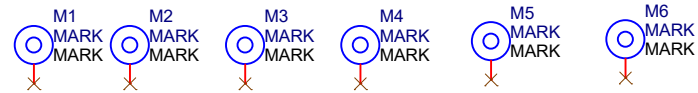
- 01.Index
- 02.Change List
- 03.Block Diagram
- 04.Power List
- 05.I2C Map
- 06.Power Domain Map
- 07.RK3399 Power
- 08.RK3399 PMU/eFUSE
- 09.RK3399 DDR
- 10.RK3399 EMMC/TF
- 11.RK3399 USB/TYPECO/ADC
- 12.RK3399 MIPI/GPIO2
- 13.RK3399 HDMI/EDP/MIPI
- 14.RK3399 GPIO
- 15.RK3399 PCIE
- 16.RAM-LPDDR4(200P)
- 17.Memory-eMMC/SPI
- 18.Power1-RK818-3
- 19.Power2-DC-DC
- 20.CONNECT
- 21.CONNECT1

Note:

器件参数说明

1:如果 Value 为 **DP**, 说明暂时不贴。

2:如果 Option 有 **DP**, 说明暂先不贴。



Size	Title	ROCK PI 4_CORE	REV
A4	Document Number	Index	2.0
Date:	Thursday, June 03, 2021	Sheet	01 of 21

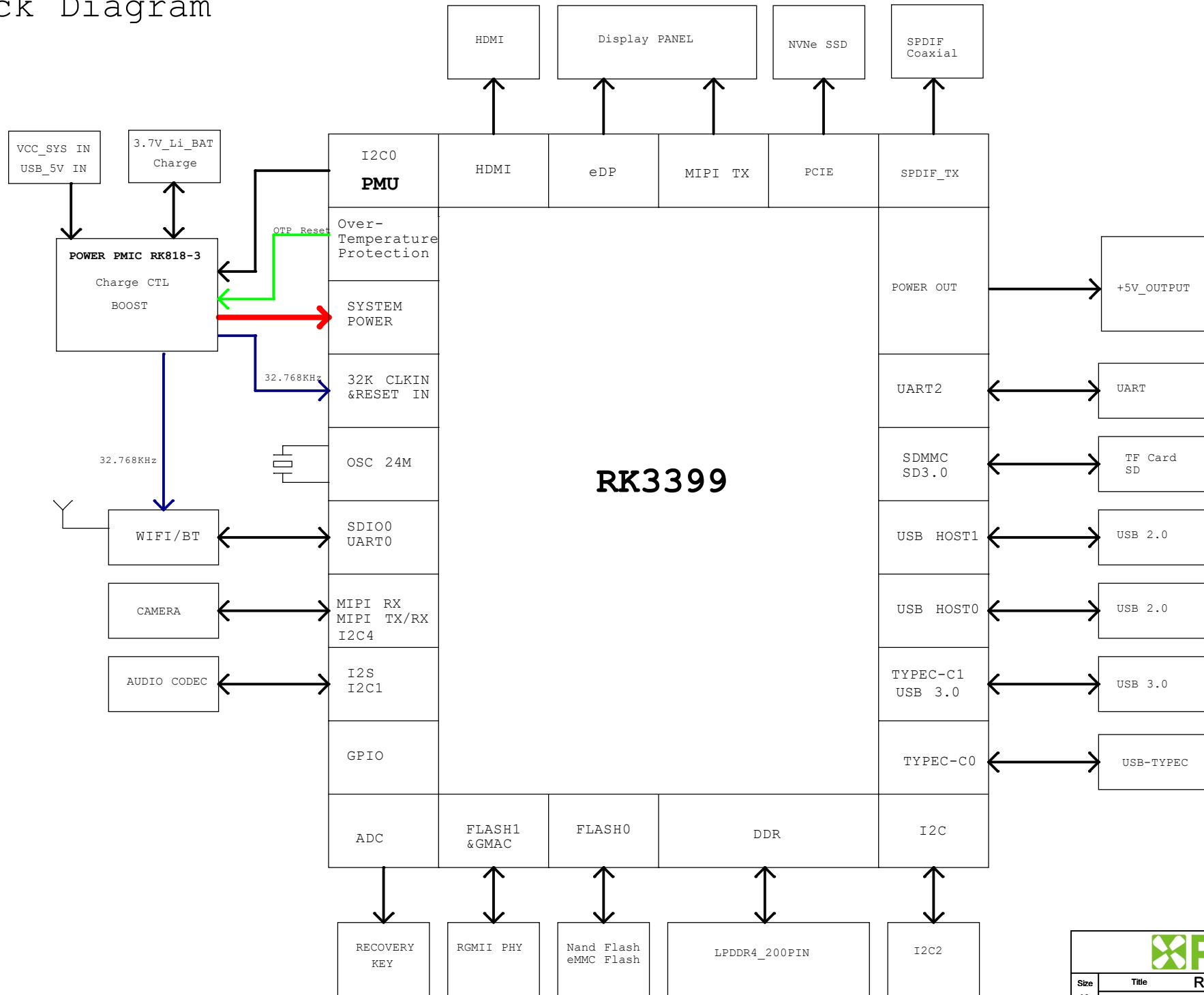
Change List

Version	Date	Author	Change Note	Approved
V1.0	20200126			
V1.1	20200826			
V2.0	20210324			



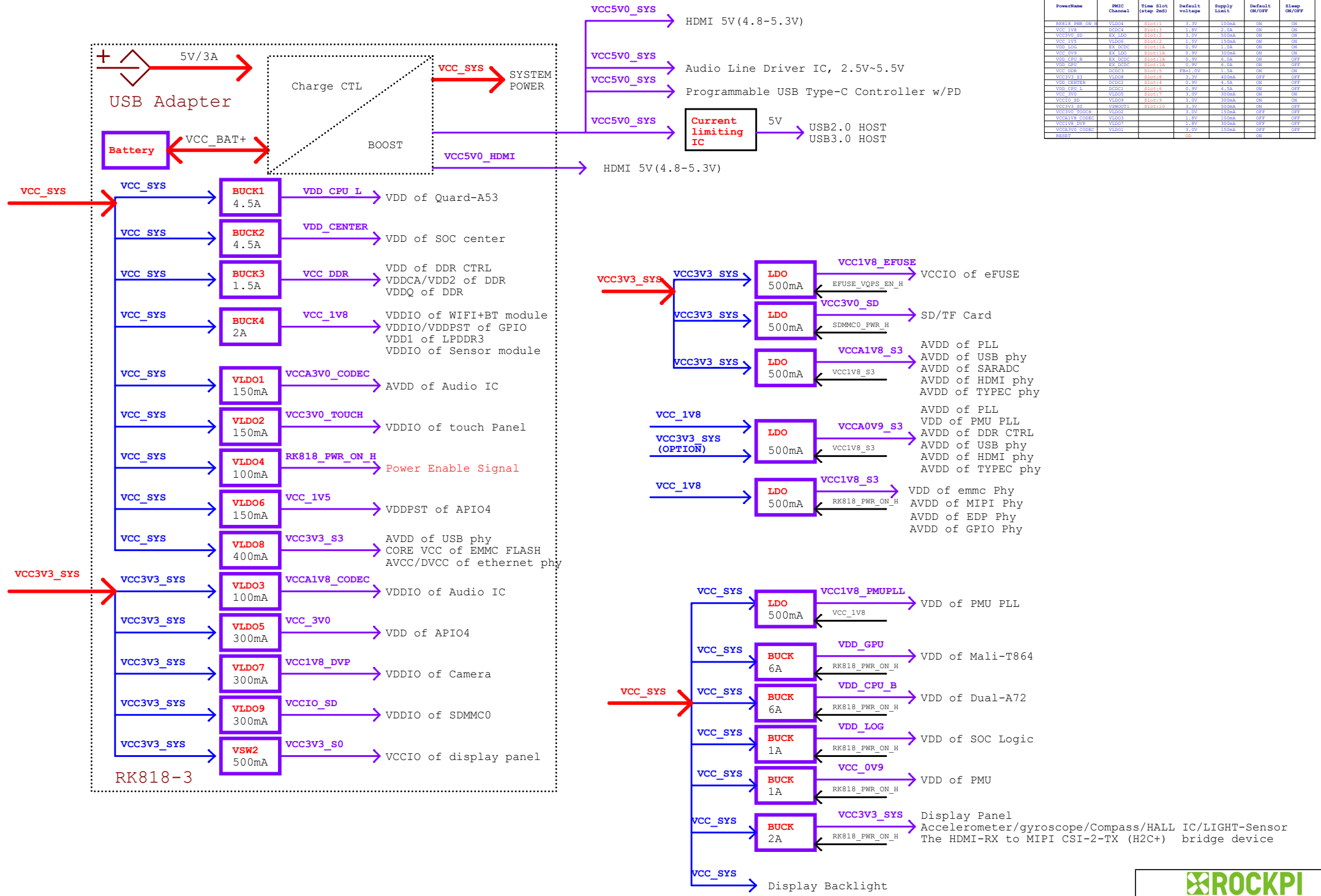
Size	Title	ROCK PI 4 CORE	REV
A4	Document Number	Change List	2.0
Date:	Thursday, June 03, 2021	Sheet	02 of 21

Block Diagram



RK818-3 Power Diagram and Sequence

PowerName	PMIC Channel	Time Slot (step 2ms)	Default voltage	Supply Limit	Default ON/OFF	Sleep ON/OFF
RK818_PWB_ON	VLD04	Slot11	3.3V	150mA	ON	ON
VCC_1V8	BUCK4	Slot11	1.8V	2.0A	ON	ON
VCC3V0_SD	EX_LDO	Slot12	3.0V	300mA	ON	ON
VCC_1V5	VLD08	Slot12	1.5V	150mA	ON	ON
VDD_1V05	EX_LDO	Slot11A	1.05V	300mA	ON	ON
VCC_0V9	EX_LDO	Slot11A	0.9V	300mA	ON	ON
VDD_GPU	EX_LDO	Slot11A	0.9V	300mA	ON	OFF
VDD_GPU	EX_LDO	Slot11A	0.9V	4.0A	ON	OFF
VCC_DDR	VLD03	Slot11	1.8V	1.5A	ON	ON
VCC3V3_E1	VLD09	Slot11	3.3V	400mA	OFF	OFF
VDD_CBTERR	BUCK2	Slot11	0.9V	4.0A	ON	OFF
VDD_GPU	VLD05	Slot11	1.0V	300mA	ON	ON
VCC10_SD	VLD09	Slot11	3.0V	300mA	ON	ON
VCC3V0_TOUCH	VLD02	Slot11	3.0V	150mA	OFF	OFF
VDD_1V05	VLD07	Slot11	1.05V	300mA	OFF	OFF
VCC1V8_DVP	VLD07	Slot11	1.8V	300mA	OFF	OFF
VCC3V0_CMD0	VLD01	Slot11	3.0V	150mA	OFF	OFF
RK818			0V	150mA	ON	OFF



I2C MAP

Port	Pin name	Domain	Bus name	Pull-up voltage	Slave Device	Slave Addr (MS 7Bits)	Note	Slave Bus Capability
I2C0	GPIO1_B7/SPI3_RXD/I2C0_SDA GPIO1_C0/SPI3_TXD/I2C0_SCL	PMUIO2	I2C_SDA_PMIC I2C_SCL_PMIC	VCC_1V8	Rockchip RK808	0x1b	PMIC	100kHz, 400KHz
					SYR837PKC	0x40	DC-DC BUCK	100kHz, 400KHz, 3.4MHz
					SYR838PKC	0x41	DC-DC BUCK	100kHz, 400KHz, 3.4MHz
I2C1	GPIO4_A1/I2C1_SDA GPIO4_A2/I2C1_SCL	APIO5		VCC_1V8			Low Speed CONNECTOR	
I2C2	GPIO2_A0/VOP_D0/CIF_D0/I2C2_SDA GPIO2_A1/VOP_D1/CIF_D1/I2C2_SCL	APIO2		VCC_1V8			High Speed CONNECTOR	
I2C3	GPIO4_C0/I2C3_SDA/UART2B_RX GPIO4_C1/I2C3_SCL/UART2B_TX	APIO4	I2C_SDA_HDMI I2C_SCL_HDMI	VCC_3V0				
I2C4	GPIO1_B3/I2C4_SDA GPIO1_B4/I2C4_SCL	PMUIO2	I2C_SDA_MEMS I2C_SCL_MEMS	VCC_1V8	Fairchild FUSB302B	0x44, 0x46	USB-TypeC Mux	100kHz, 400KHz, 1MHz
I2C5	GPIO3_B2/MAC_RXER/I2C5_SDA GPIO3_B3/MAC_CLK/I2C5_SCL	APIO1	Other pin function					
I2C6	GPIO2_B1/SPI2_RXD/CIF_HREF/I2C6_SDA GPIO2_B2/SPI2_TXD/CIF_CLKIN/I2C6_SCL	APIO2		VCC_1V8			Low Speed CONNECTOR	
I2C7	GPIO2_A7/VOP_D7/CIF_D7/I2C7_SDA GPIO2_B0/VOP_CLK/CIF_VSYNC/I2C7_SCL	APIO2		VCC_1V8			High Speed CONNECTOR	



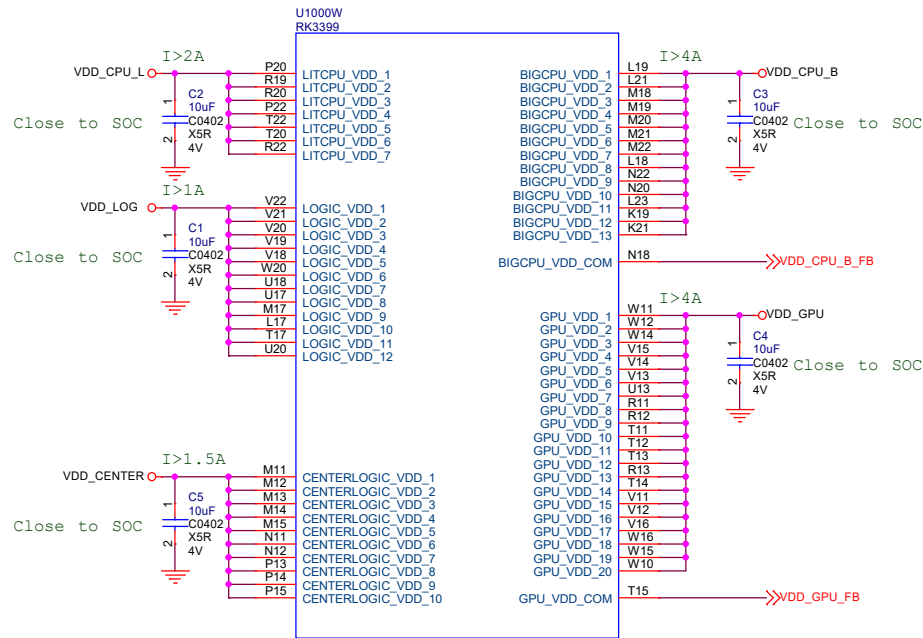
Size	Title	ROCK PI 4 CORE	REV
A4	Document Number	I2C Map	2.0
Date:	Thursday, June 03, 2021	Sheet	05 of 21

Power Domain Map

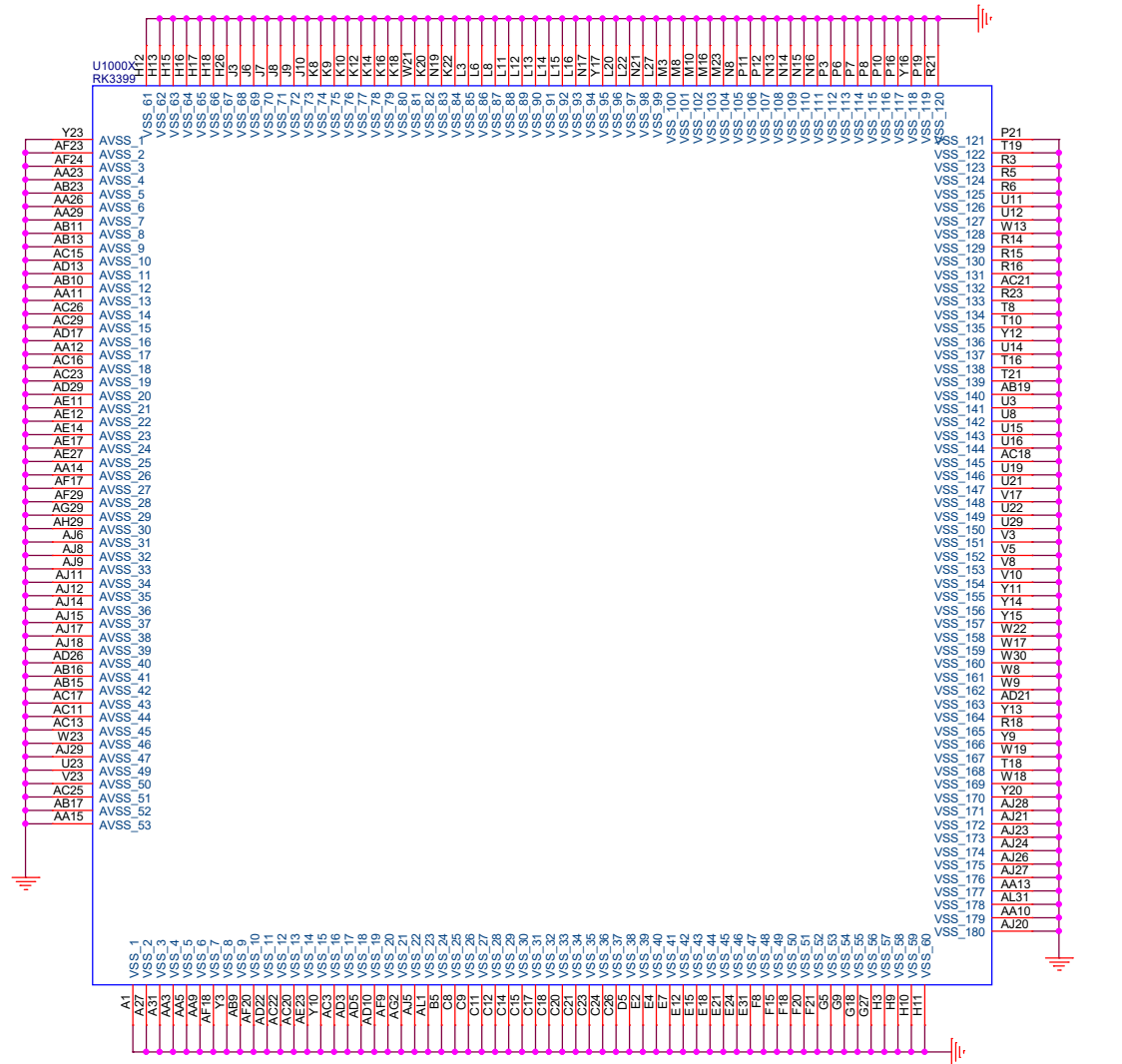
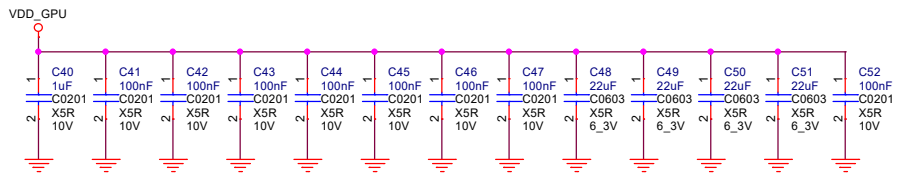
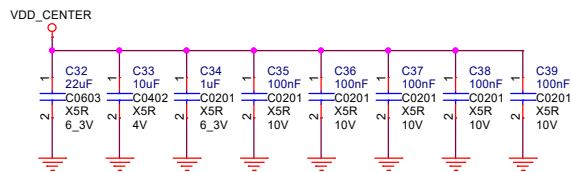
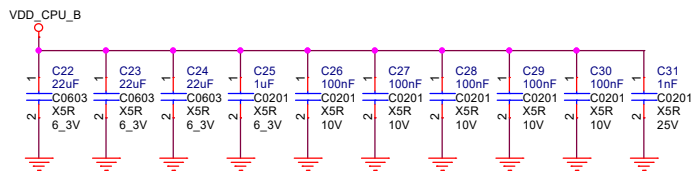
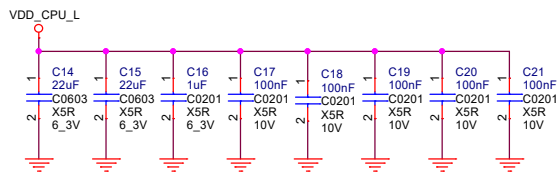
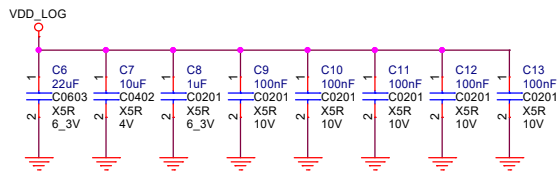
Part Port	Domain	Pin name in datasheet	I/O type	Power supply	Power source
Part C	PMUIO1	pmuiol_gpio0ab	1.8V only	VCCA_1V8	RK808-D VLDO3
Part E	PMUIO2	pmu1830_gpio1abcd	1.8V (Default) 3.0V	VCC_1V8	RK808-D Buck4
Part I	APIO1	gmac_gpio3abc	3.3V only	VCC_1V8 VCC3V3_SYS	RK808-D Buck4
Part L	APIO2	bt656_gpio2ab	1.8V (Default) 3.0V	VCC_1V8	RK808-D VLDO3
Part G	APIO3	wifi/bt_gpio2cd	1.8V only	VCC_1V8	RK808-D Buck4
Part K	APIO4	gpio1830_gpio4cd	1.8V 3.0V (Default)	VCC_1V5 VCC_3V0	RK808-D VLDO6 RK808-D VLDO8
Part J	APIO5	audio_gpio3d_gpio4a	1.8V (Default) 3.0V	VCC_1V8	RK808-D Buck4
Part F	SDMMC0	sdmmc_gpio4b	1.8V 3.0V (Default)	VCC_SDIO	RK808-D VLDO4



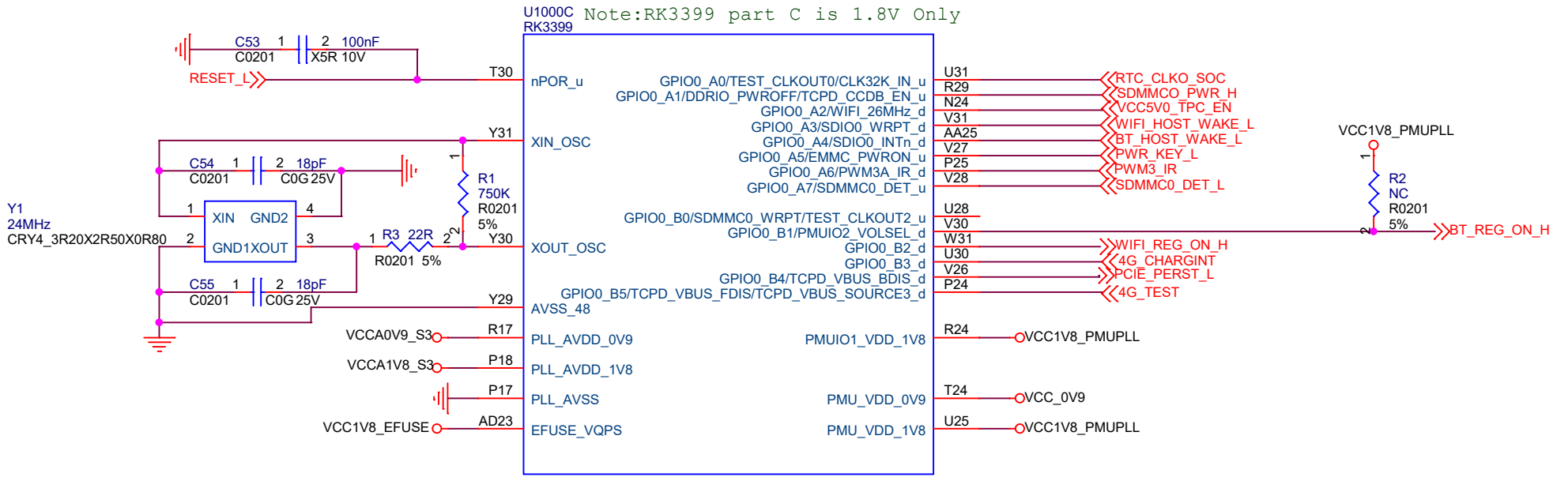
Size	Title	REV
A4	ROCK PI 4_CORE	2.0
Document Number		Power Domain Map
Date:	Thursday, June 03, 2021	Sheet 06 of 21



Note: Power filter CAP please place back of SOC or close to SOC



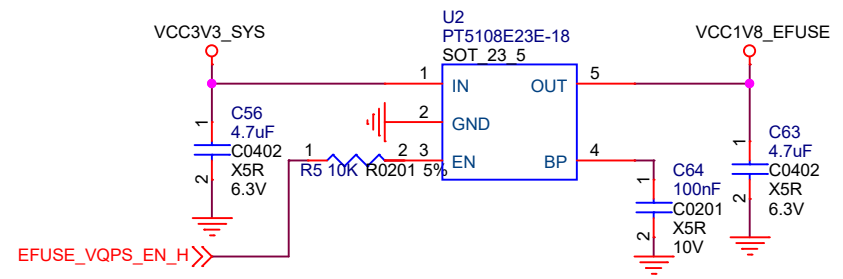
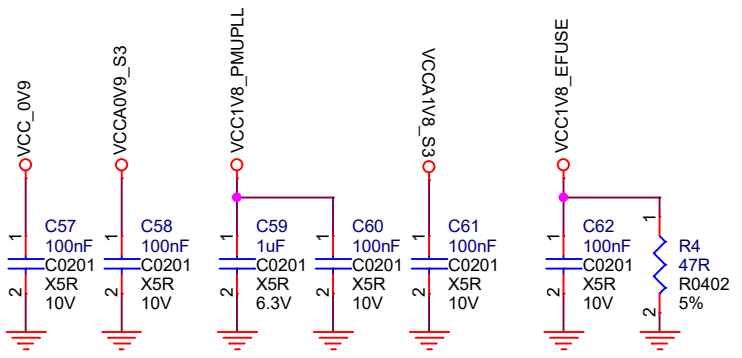
Size	Title	REV
A3	ROCK PI 4 CORE	2.0
Document Number		REV
RK3399 Power		2.0
Date:	Thursday, June 03, 2021	Sheet 07 of 21



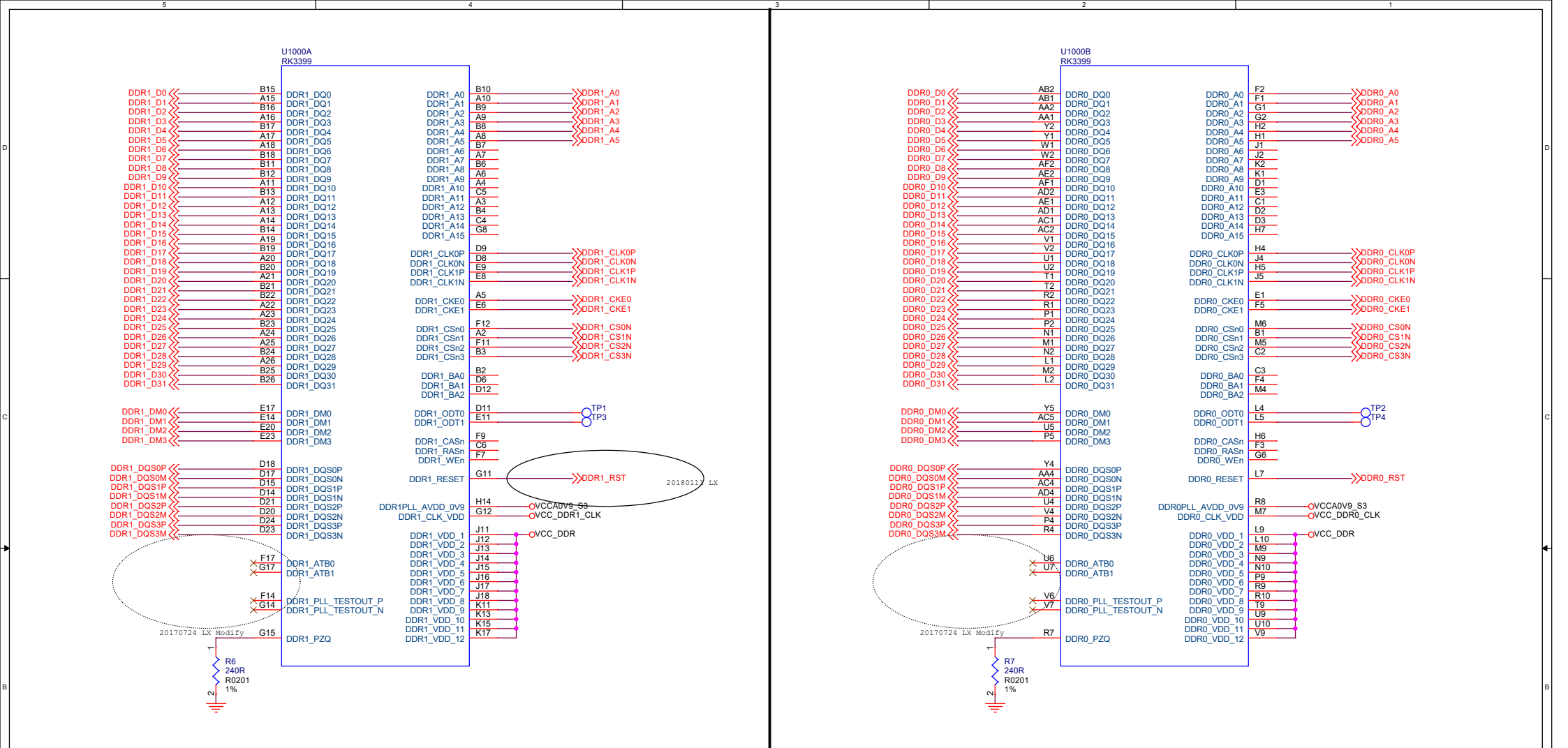
U1000C Note:RK3399 part C is 1.8V Only
RK3399

eFUSE (option)

Note:Power for eFUSE Program,it is recommended to reserve on the tooling.It can be deleted if no need.

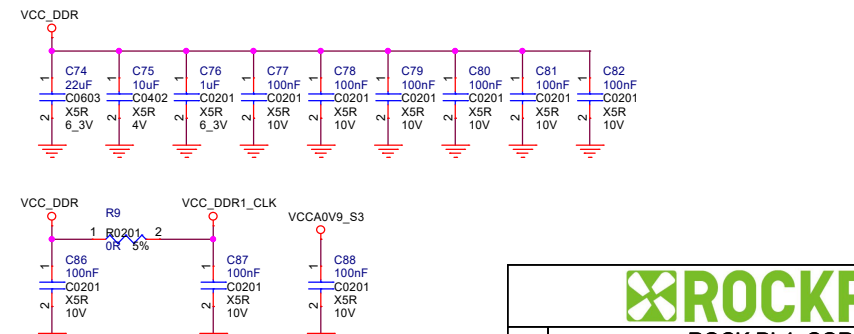
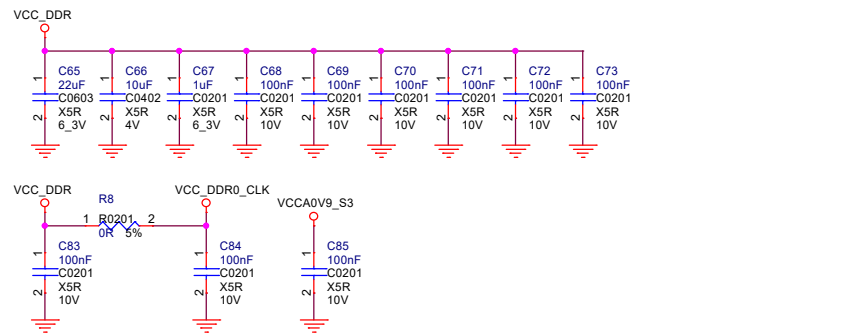


Size	Title	ROCK PI 4_CORE	REV
A4	Document Number	RK3399 PMU/eFUSE	2.0
Date:	Thursday, June 03, 2021	Sheet	08 of 21



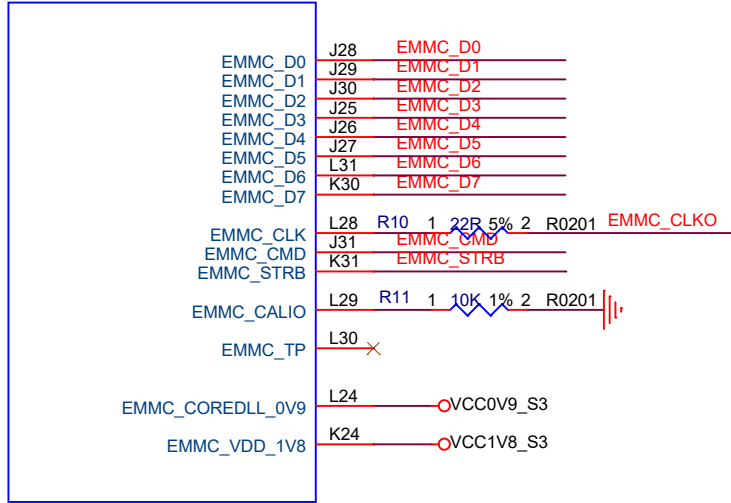
DDR FILTER Note:R1202 cannot be deleted

DDR FILTER Note:R1203 cannot be deleted



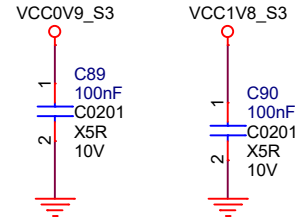
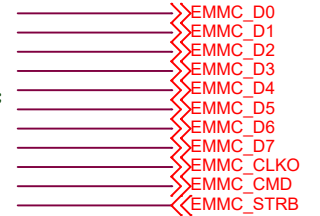
Size	Title	REV
A3	Document Number	2.0
Date: Thursday, June 03, 2021		Sheet 09 of 21

U1000H
RK3399

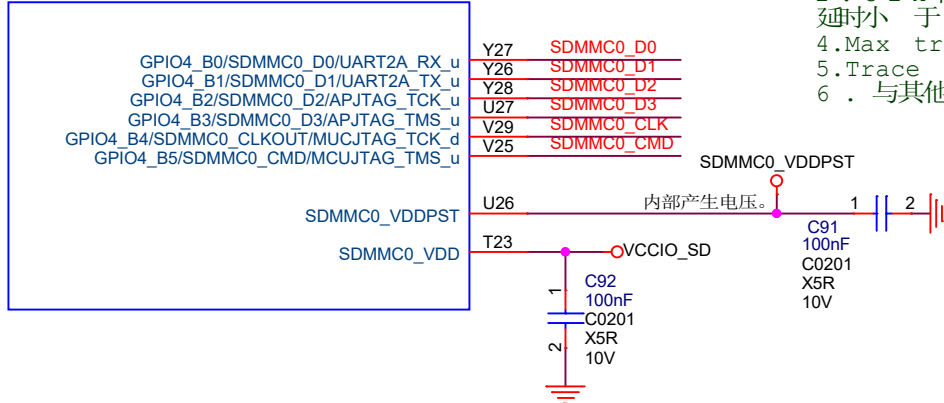


EMMC design rule:

1. Data[0:7]、cmd strobe 为一组并行走线并包地，组内等长要求为 $\pm 100\text{mil}$;
2. Clk 需要单独走线并包地处理，与 data 间的延时小于 20ps;
3. Max trace length < 3.93 inches;
4. Trace impedance 50ohm $\pm 10\%$;
5. 与其他信号间距遵循 3W 原则
6. R1300 靠近 S 放置



U1000F
RK3399

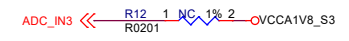
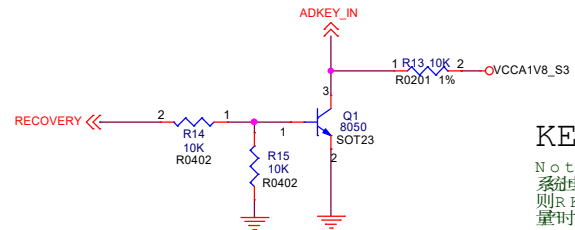
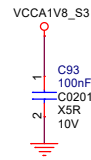
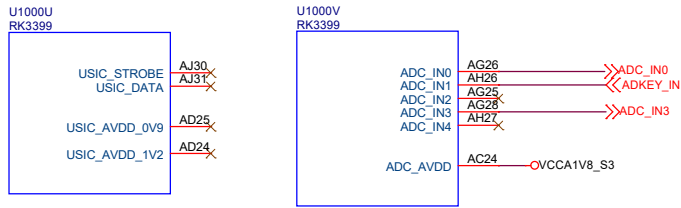


SDMMC design rule:

1. Data[0:3]、cmd 为一组并行走线并包地，组内等长要求为 $\pm 100\text{mil}$;
2. Clk 需要单独走线并包地处理，与 data 间的延时小于 20ps;
3. Max trace length < 3.93 inches;
4. Trace impedance 50ohm $\pm 10\%$;
5. 与其他信号间距遵循 3W 原则



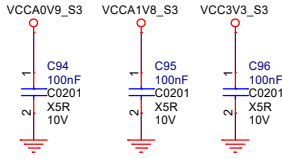
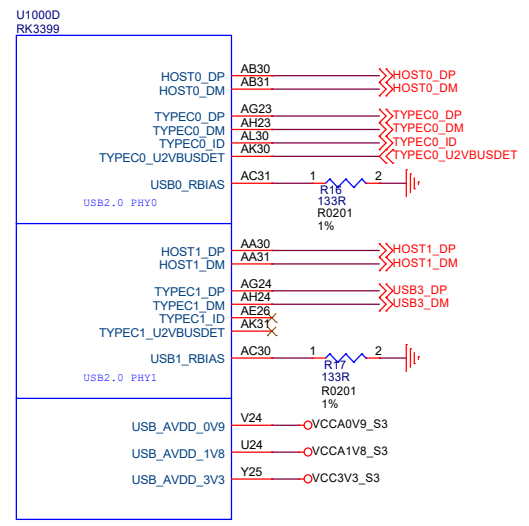
Size	Title	ROCK PI 4_CORE	REV
A4	Document Number	RK3399 EMMC/TF	2.0
Date:	Thursday, June 03, 2021	Sheet	10 of 21



KEY BAORD

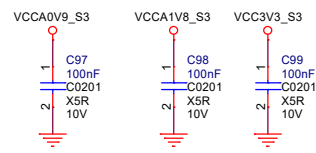
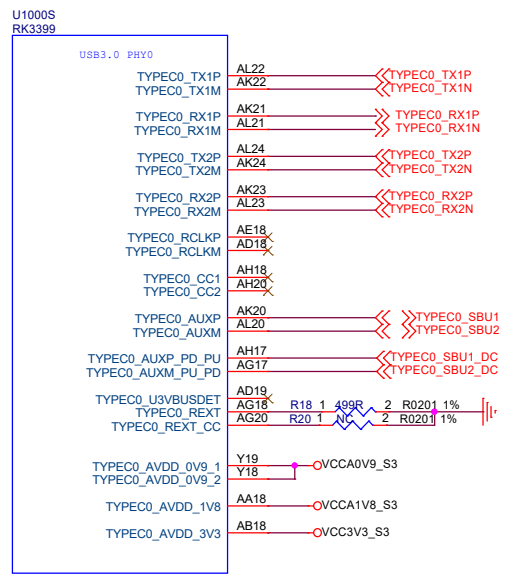
Note:
 系统上电时, 如果 ADKEY_IN 电平为 0V,
 则 RK3399 进入 Recovery 模式;
 量时 R1503, SW1500, ED1 面环 用 贴片

USB2.0

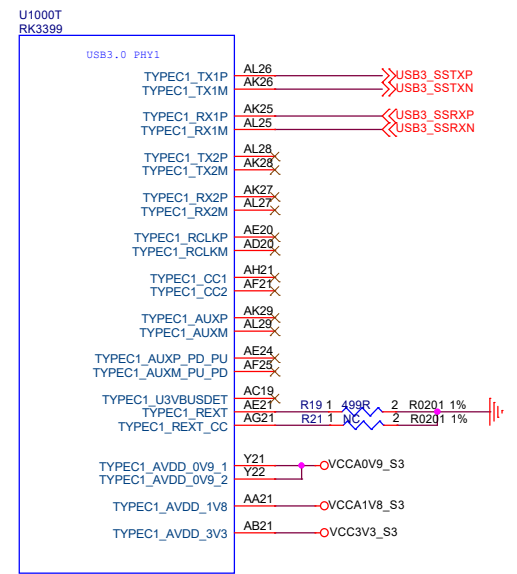


USB2.0 design rule:
 1.Max intra-pair skew < 4 ps;
 2.Max trace length < 6 inches;
 3.Max allowed via < 6;
 4.Trace impedance 90ohm+/-10%;
 5. 与其他信号间 距遵循3W 原则

USB3.0



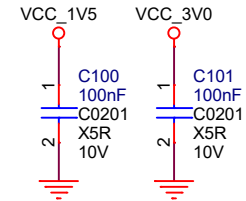
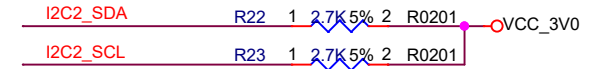
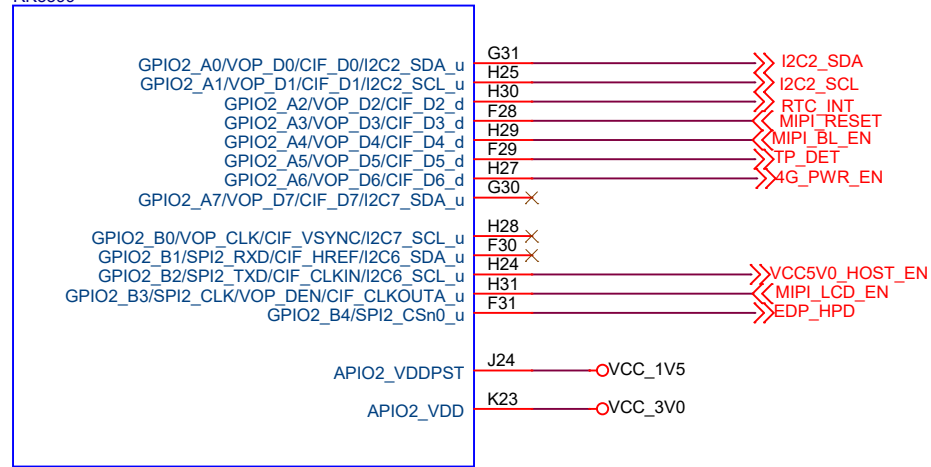
USB3.0 design rule:
 1.Max intra-pair skew < 4 ps;
 2.Max trace length between TX and RX < 1.6 n8;
 3.Max trace length < 6 inches;
 4.Max allowed via < 4;
 5.Trace impedance 90ohm+/-10%;
 6. 与其他信号间 距遵循3W 原则



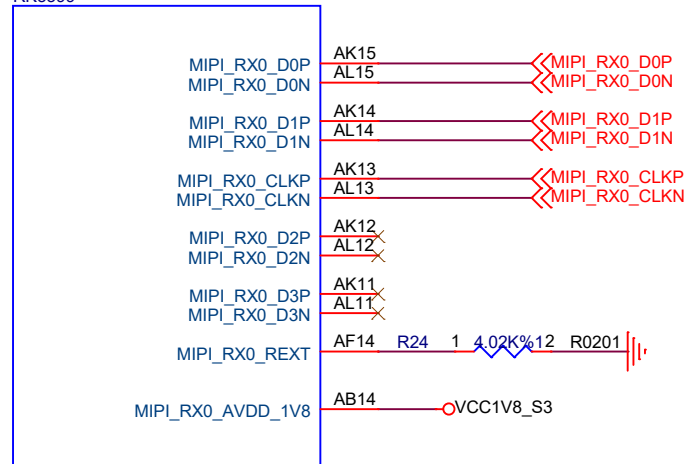
DP design rule:
 1.Max intra-pair skew < 4 ps;
 2.Max trace length < 6 inches;
 3.Max allowed via < 4;
 4.Trace impedance 90ohm+/-10%;
 5. 与其他信号间 距遵循3W 原则

Size	Title	ROCK PI 4 CORE	REV
A3	Document Number	RK3399 USB/TYCECO/ADC	2.0
Date:	Thursday, June 03, 2021	Sheet	11 of 21

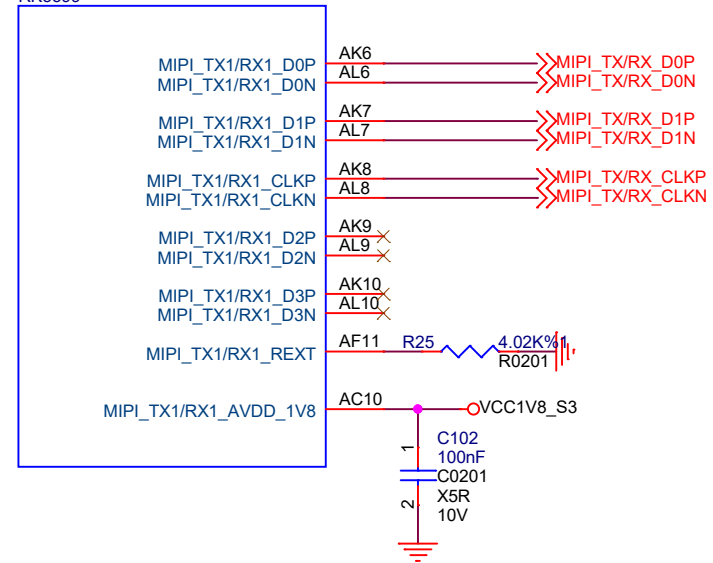
U1000L
RK3399



U1000R
RK3399



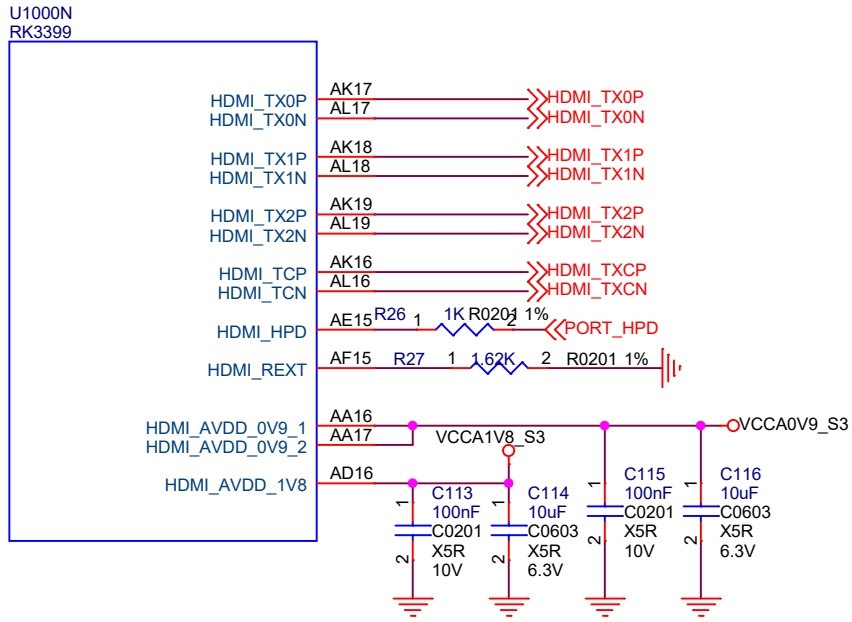
U1000P
RK3399



Dual
MIPI
Right

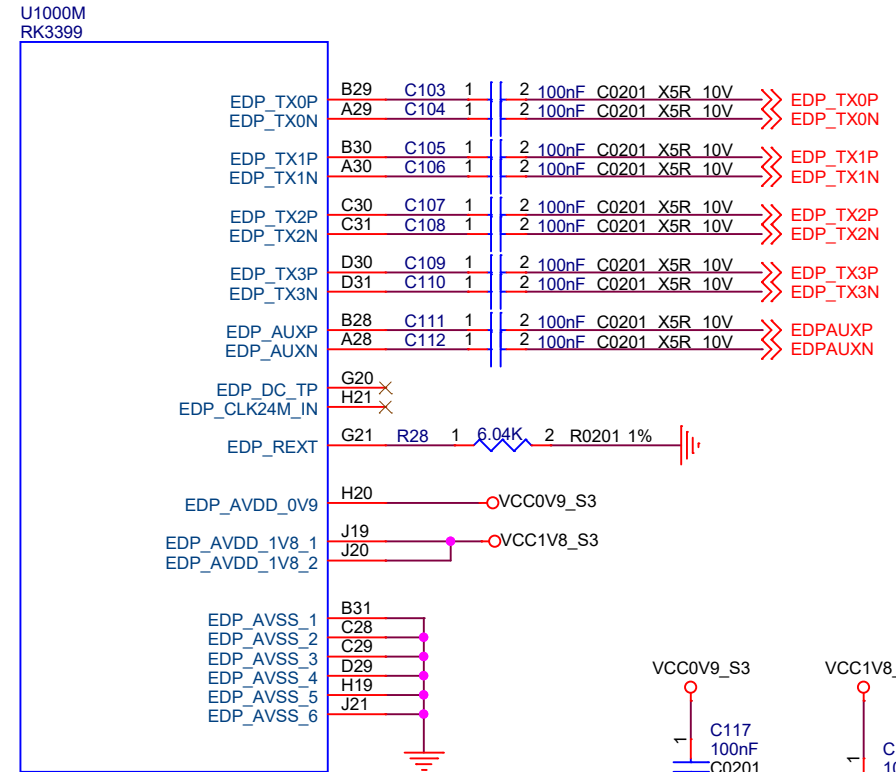


Size	Title	REV
A4	ROCK PI 4_CORE	2.0
Document Number		RK3399 MIPI/GPIO2
Date:	Thursday, June 03, 2021	Sheet 12 of 21



HDMI design rule:

1. Max intra-pair skew < 4 ps;
2. Max length skew between clk and data < 80 ps;
3. Max trace length < 9.8 inches;
4. Max allowed via < 4;
5. Trace impedance 100ohm+/-10%;
6. 与其他信号间距遵循3W原则

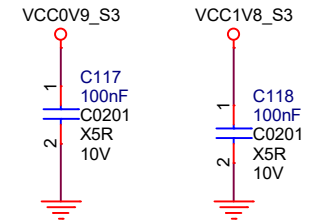
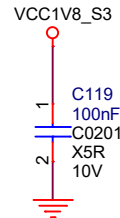
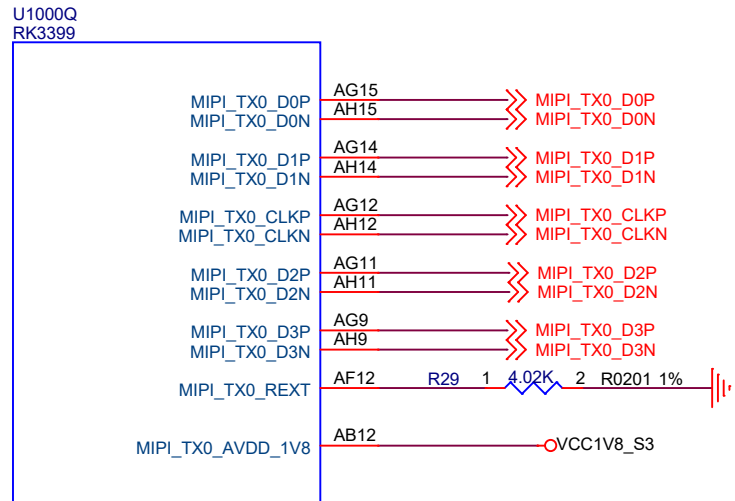


eDP design rule:

1. Max intra-pair skew < 4 ps;
2. Max trace length < 6 inches;
3. Max allowed via < 4;
4. Trace impedance 90ohm+/-10%;
5. 与其他信号间距遵循3W原则

MIPI design rule:

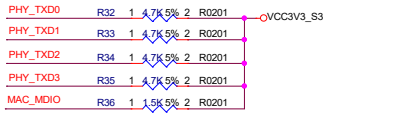
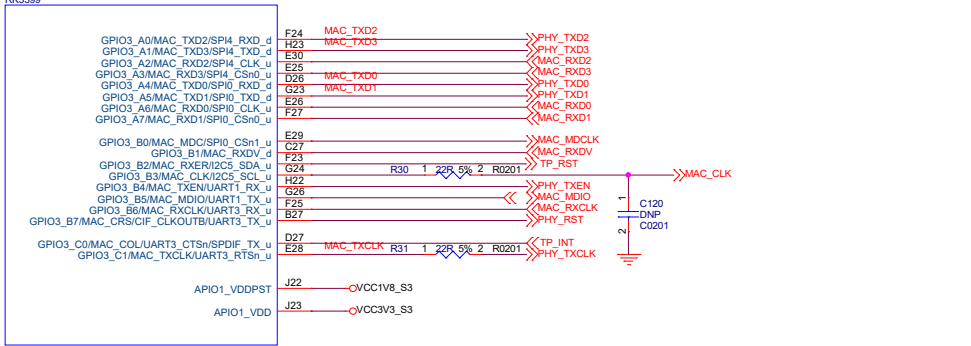
1. Max intra-pair skew < 4 ps;
2. Max length skew between clk and data < 7ps;
3. Max trace length < 7.2 inches;
4. Max allowed via < 4;
5. Trace impedance 100ohm+/-10%;
6. 与其他信号间距遵循3W原则



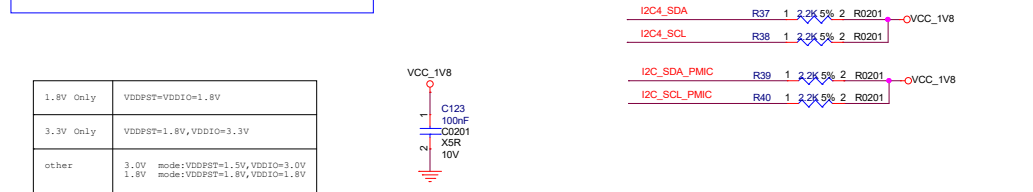
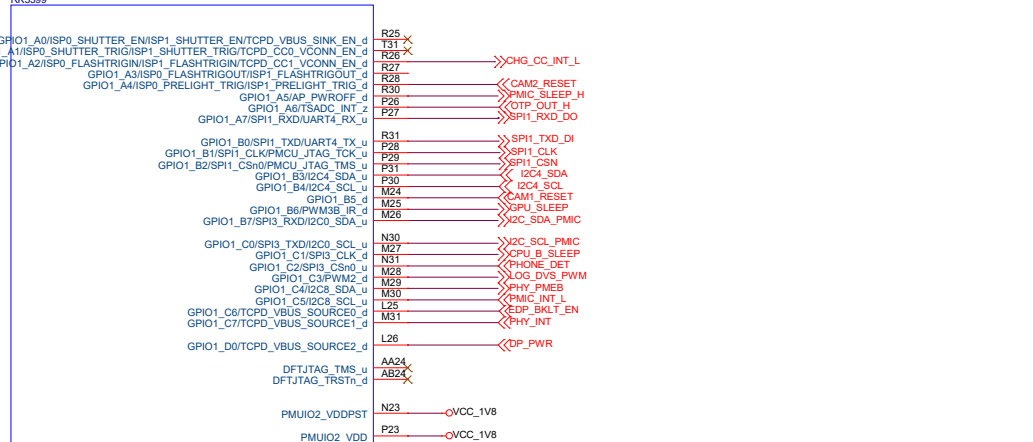


Size	Title	REV
A4	ROCK PI 4 CORE	2.0
Document Number		
RK3399 HDMI/EDP/MIPI		
Date: Thursday, June 03, 2021		Sheet 13 of 21

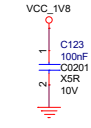
U1000I Note:RK3399 part I is 3.3V only



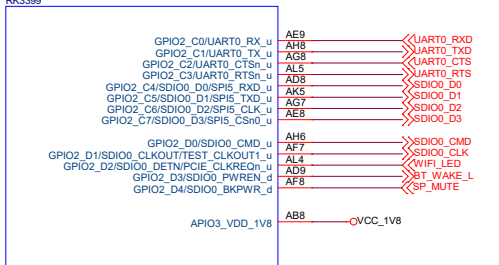
U1000E Note:RK3399 part E is 1.8V/3.0V mode



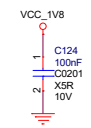
1.8V Only	VDDPST=VDDIO=1.8V
3.3V Only	VDDPST=1.8V, VDDIO=3.3V
other	3.0V mode: VDDPST=1.5V, VDDIO=3.0V 1.8V mode: VDDPST=1.8V, VDDIO=1.8V



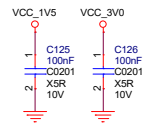
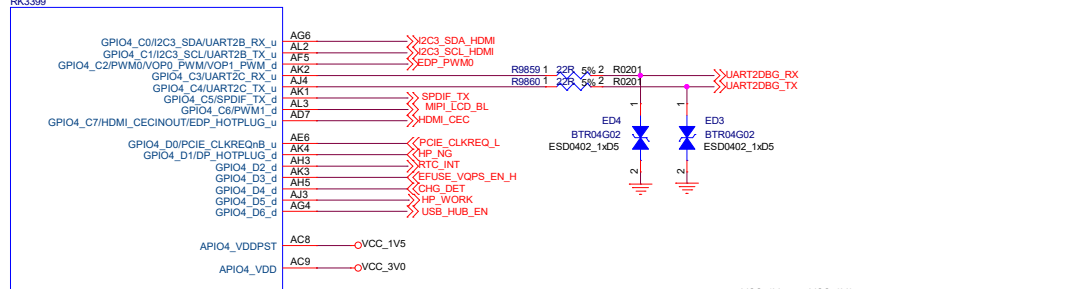
U1000G Note:RK3399 part G is 1.8V only



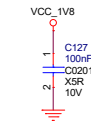
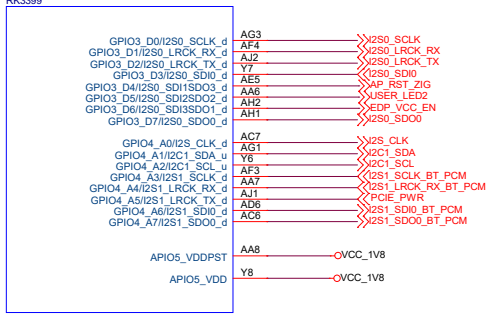
SDIO design rule:
 1. Data[0:3], cmd 数据组, 并行传输其他, 组内等长要求为 +/-10mil;
 2. clk 需要单独布线包地处理, 与 data 间隔
 延时小 于 20ps;
 4. Max trace length < 3.93 inches;
 5. Trace impedance 50ohm +/-10%;
 6. 与其他信号 间距遵循 3W 原则



U1000K Note:RK3399 part J is 1.8V/3.0V mode

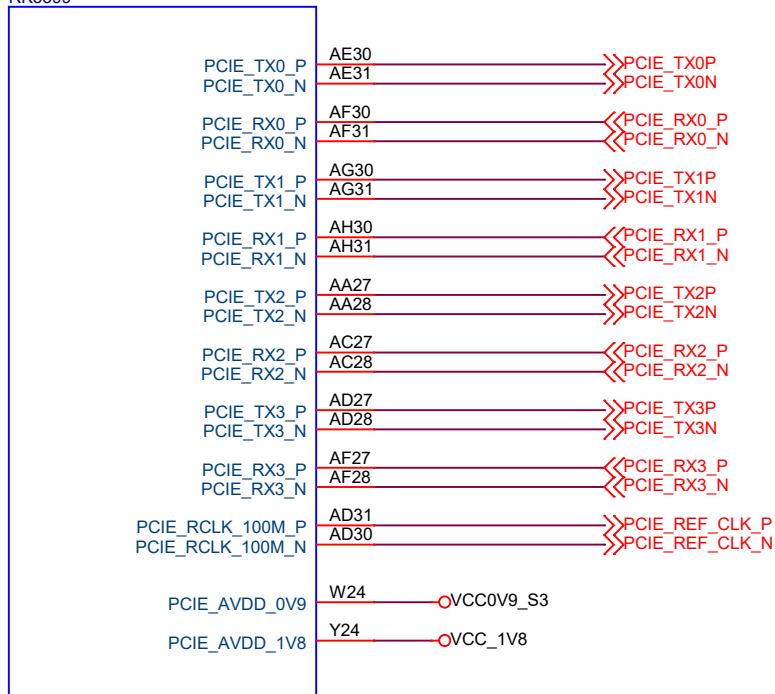


U1000J Note:RK3399 part J is 1.8V/3.0V mode



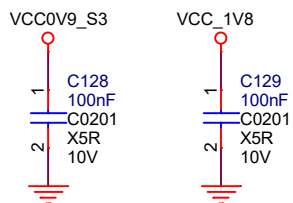
Size	Title	ROCK PI 4 CORE	REV
Customer	Document Number	RK3399 GPIO	2.0
Date:	Thursday, June 03, 2021	Sheet	14 of 21

U10000
RK3399

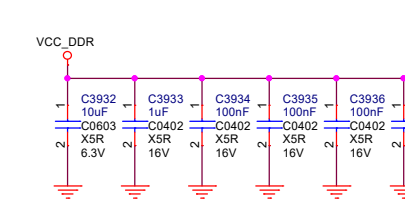
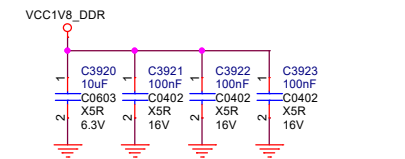
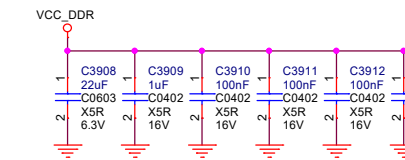
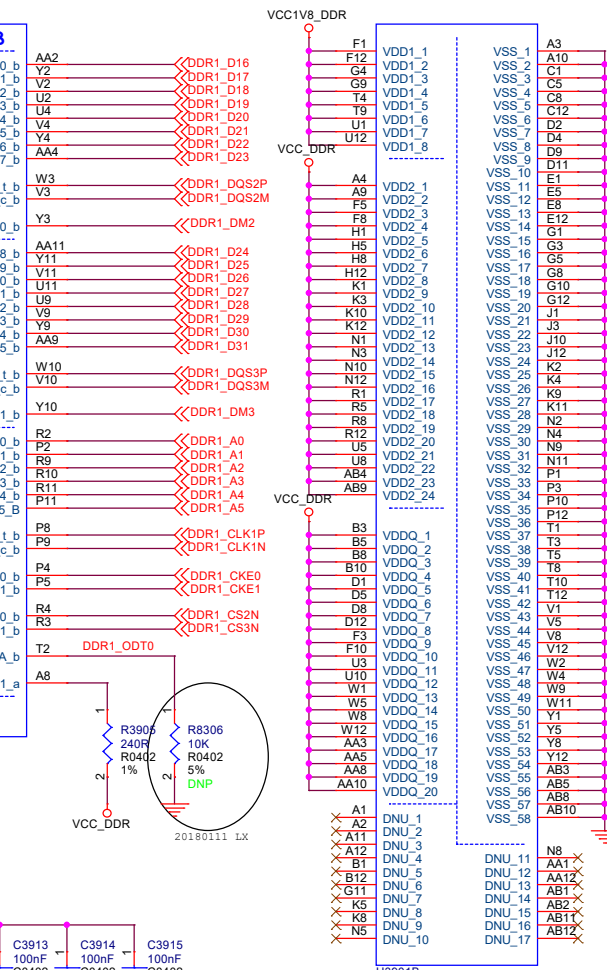
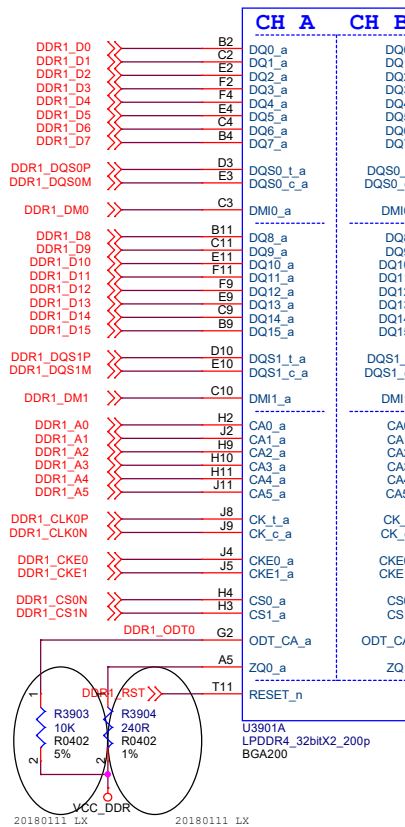
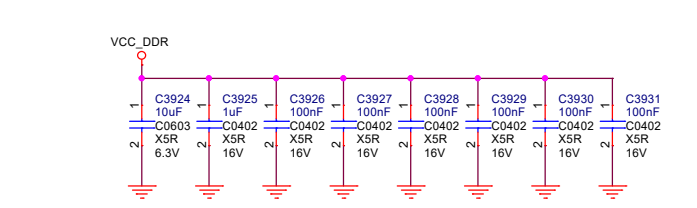
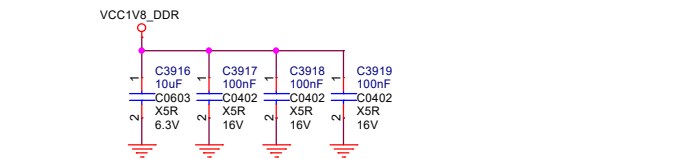
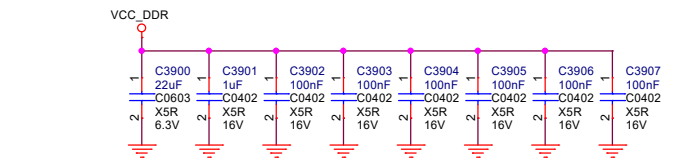
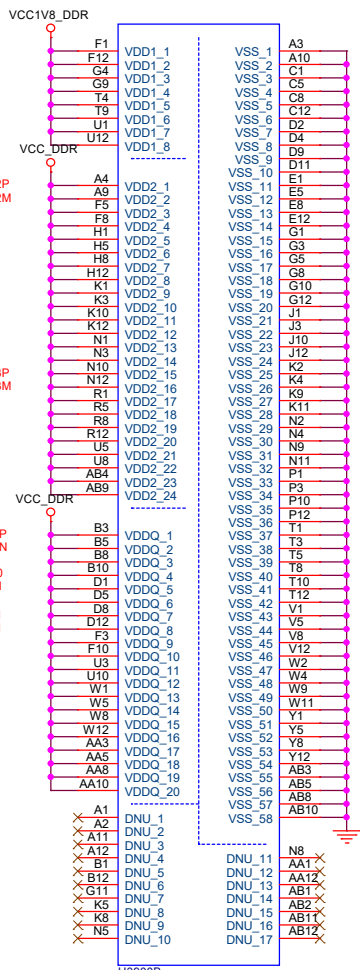
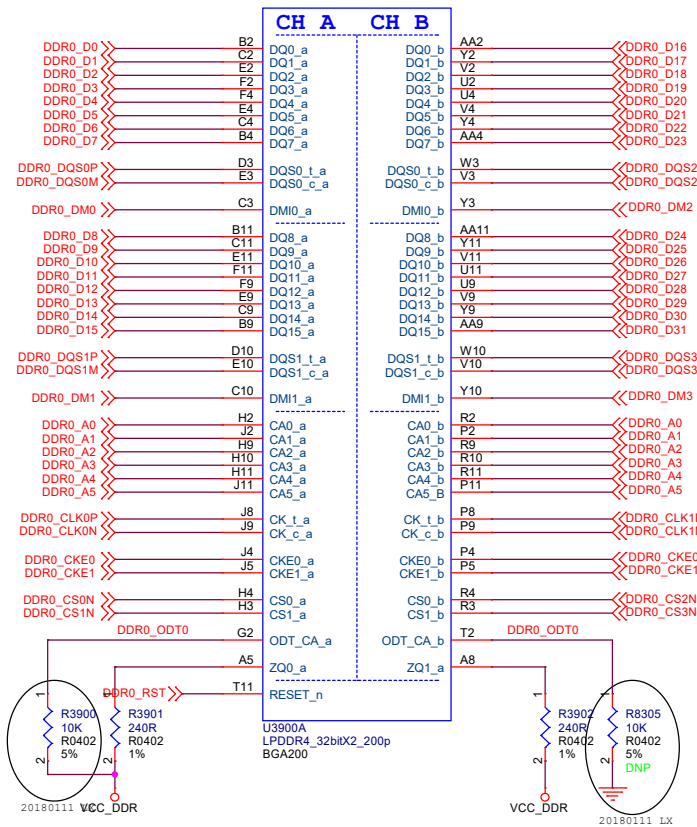


PCIE design rule:

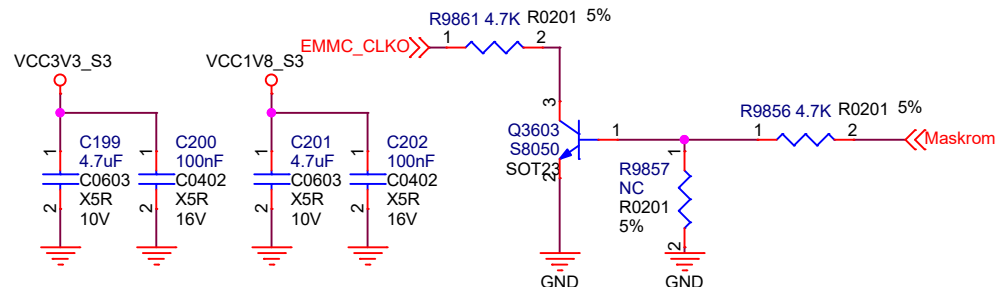
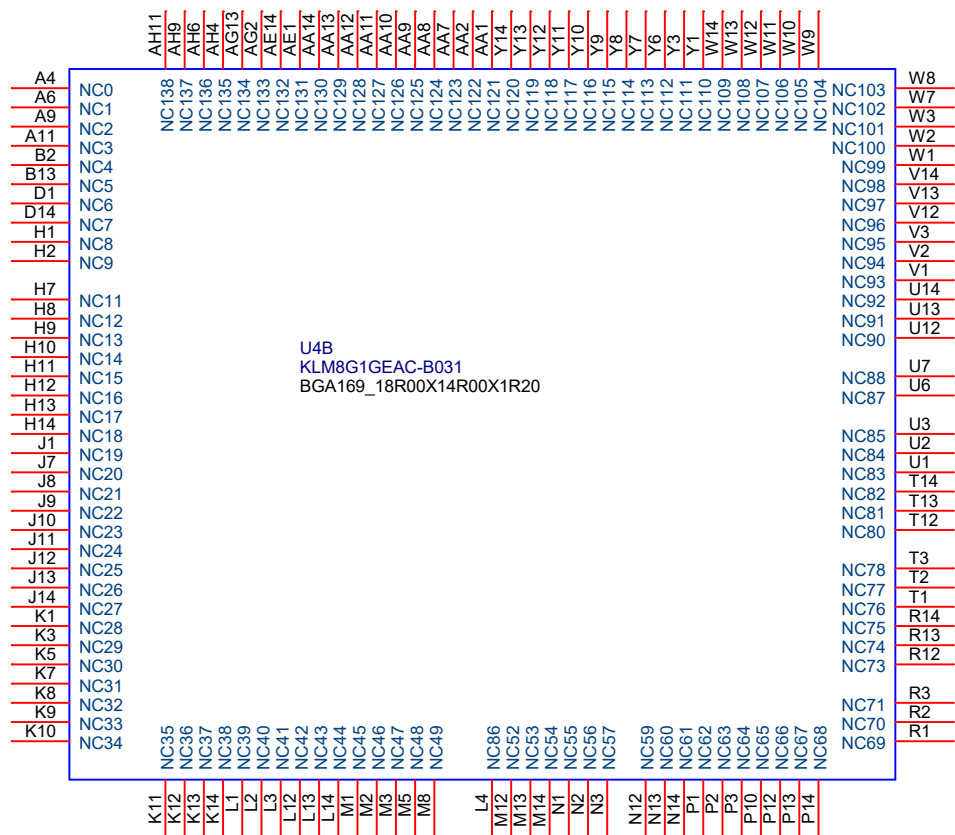
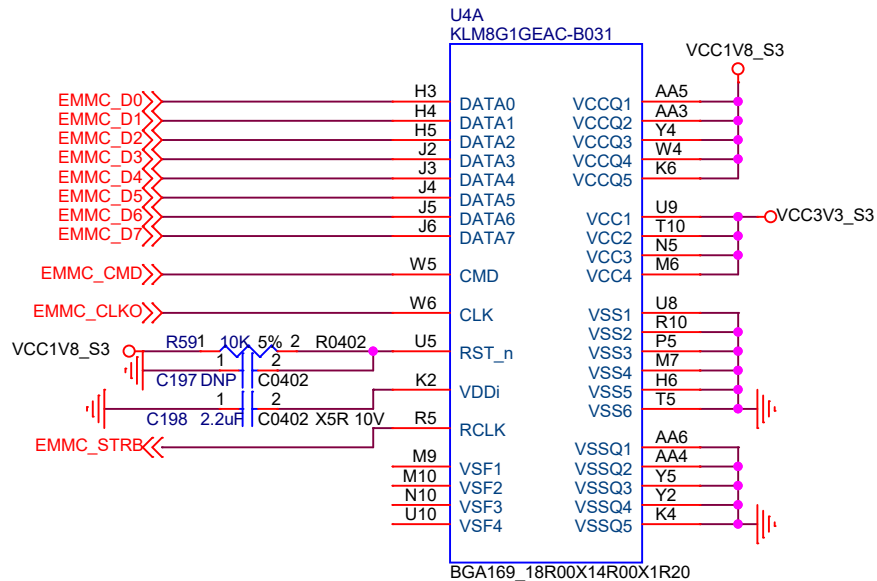
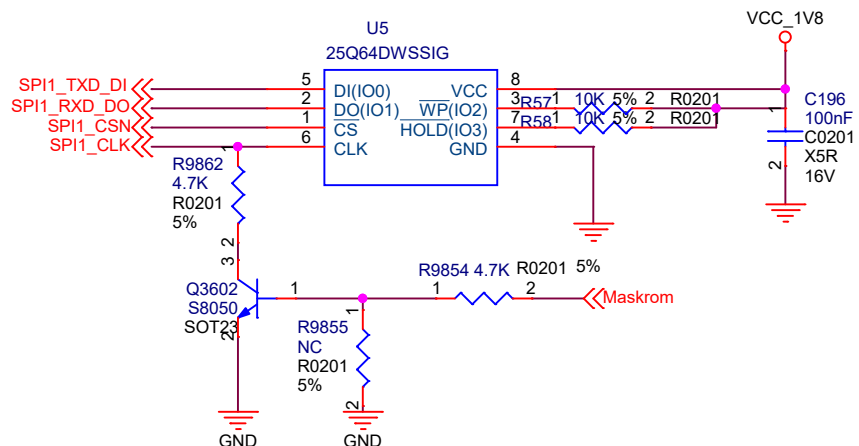
1. Max intra-pair skew < 4ps;
2. Max inter-pair skew < 1.6 ns;
3. Max trace length < 14 inches;
4. Max allowed via < 4;
5. Trace impedance 100ohm+/-10%;
6. 与其他信号间距遵循3W原则



Size	Title	ROCK PI 4 CORE	REV
A4	Document Number	RK3399 PCIE	2.0
Date:	Thursday, June 03, 2021	Sheet	15 of 21




eMMC FLASH



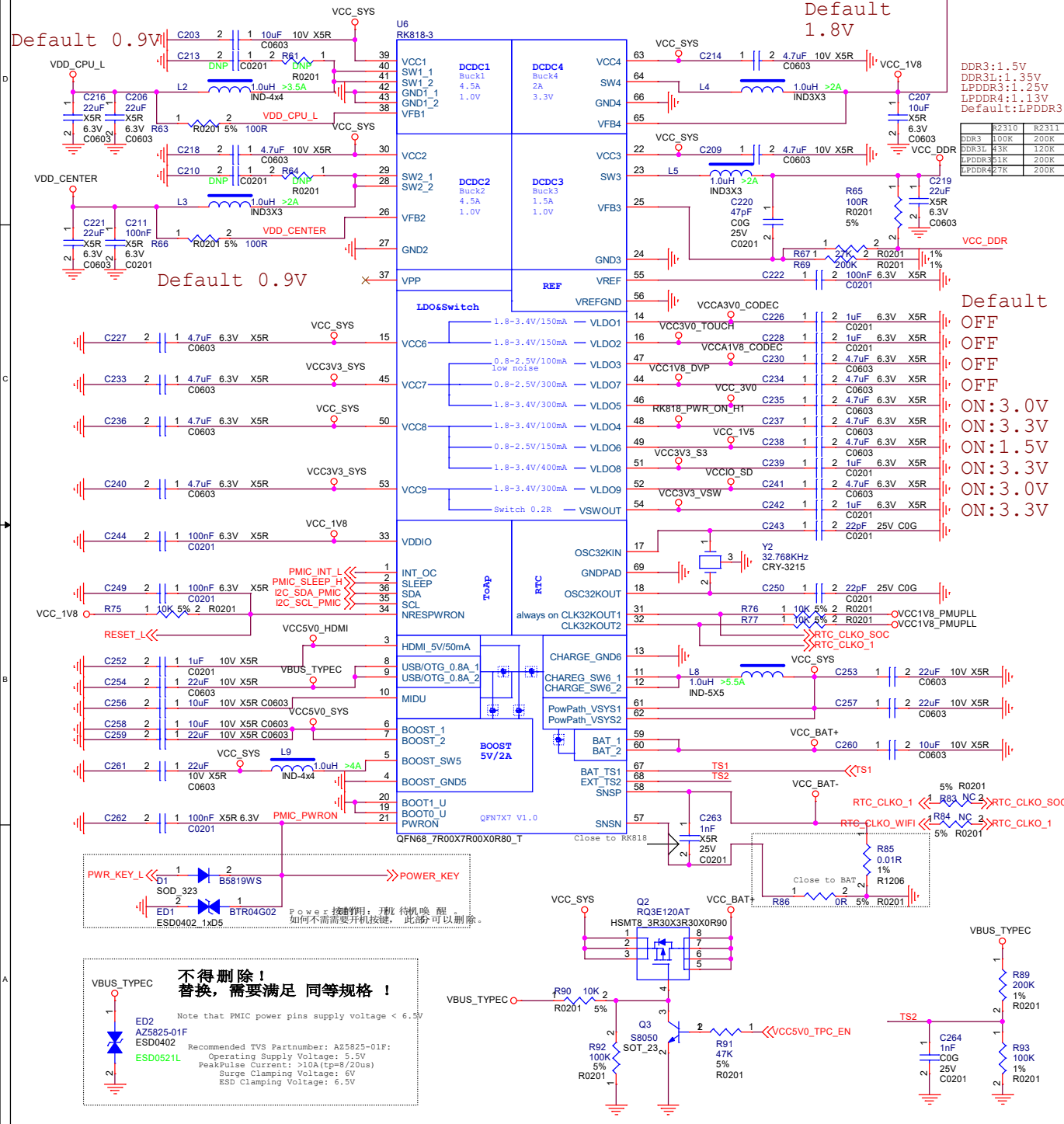
Note: All the Power filter capacitors should be placed close to the power pins of eMMC

Note:
Reserve TestPoint for firmware update.
If EMMC_CLKO=0V at power-on reset,
then system will enter into Maskrom mode.

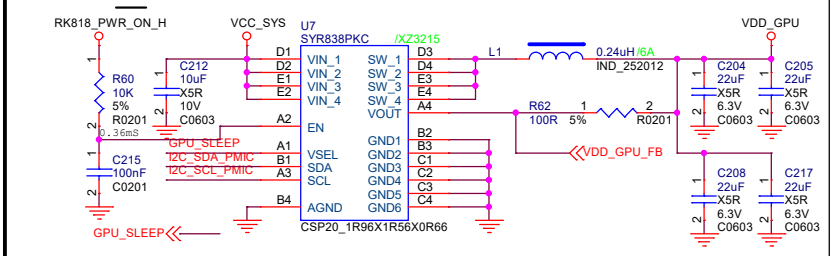


Size	Title	REV
A4	ROCK PI 4_CORE Memory-eMMC/SPI	2.0
Date:	Thursday, June 03, 2021	Sheet 17 of 21

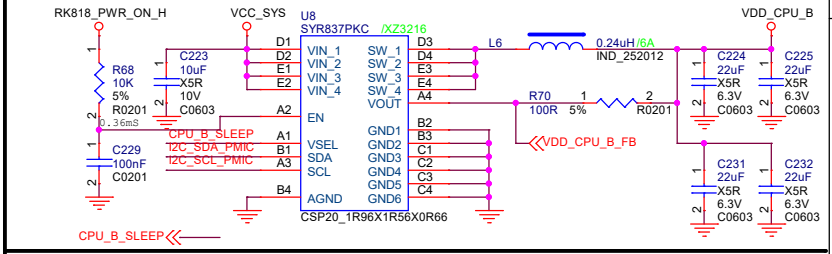
PMIC RK818-3



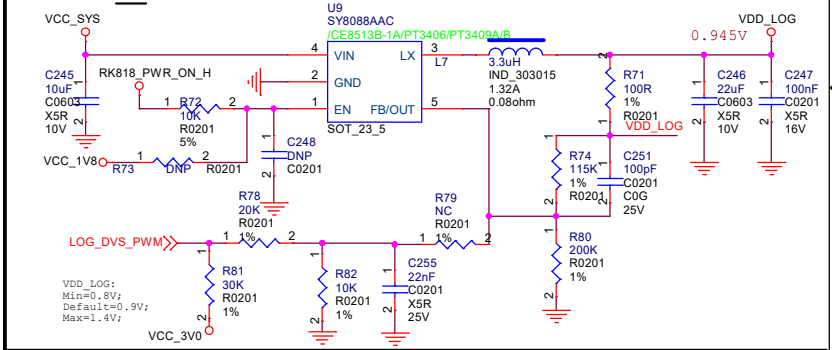
VDD_GPU



VDD_CPU_B



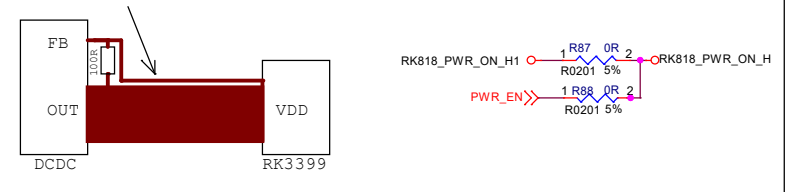
VDD_LOG



如下电源反馈信号的走线，需满足如下方式：

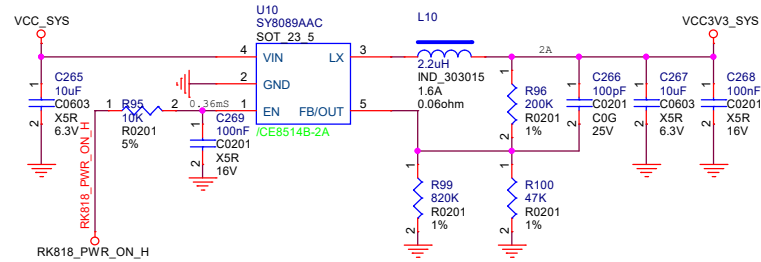
1. VDD_CPU_L
2. VDD_CENTER
3. VCC_DDR
4. VDD_CPU_B
5. VDD_GPU
6. VDD_LOG

Feedback from RK3399

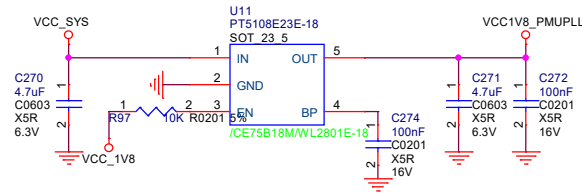


ROCK PI 4 CORE		
Size	Title	REV
A3	Document Number	2.0
Power1-RK818-3		
Date:	Thursday, June 03, 2021	Sheet 18 of 21

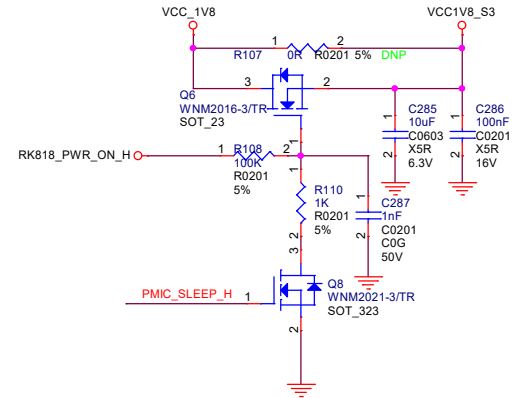
VCC3V3_SYS



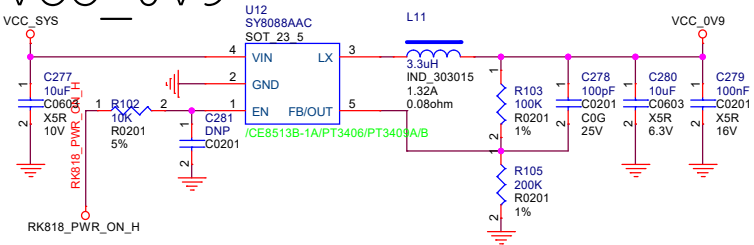
VCC1V8_PMUPLL



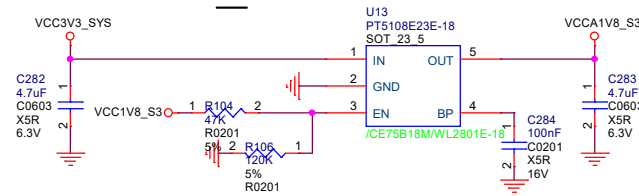
VCC1V8_S3



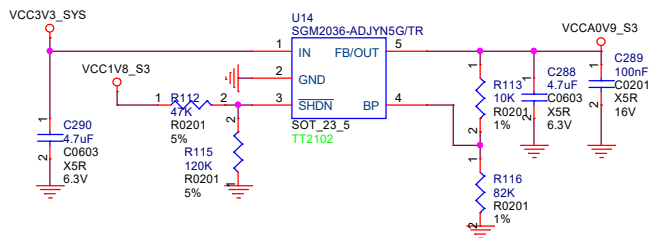
VCC_0V9



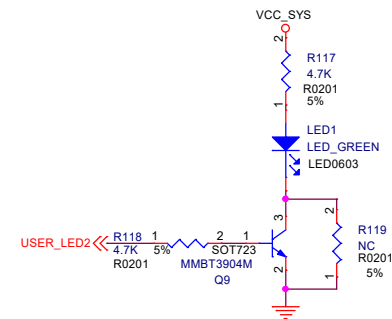
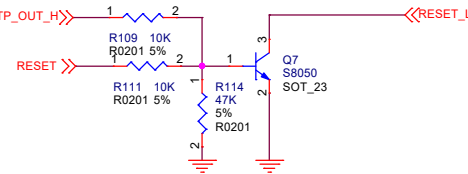
VCCA1V8_S3



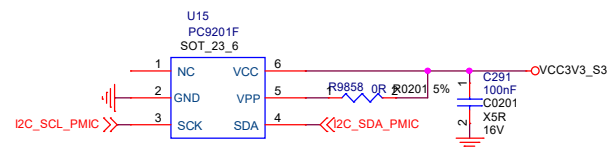
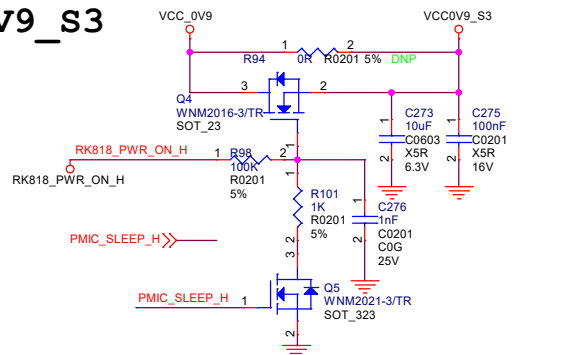
VCCA0V9_S3



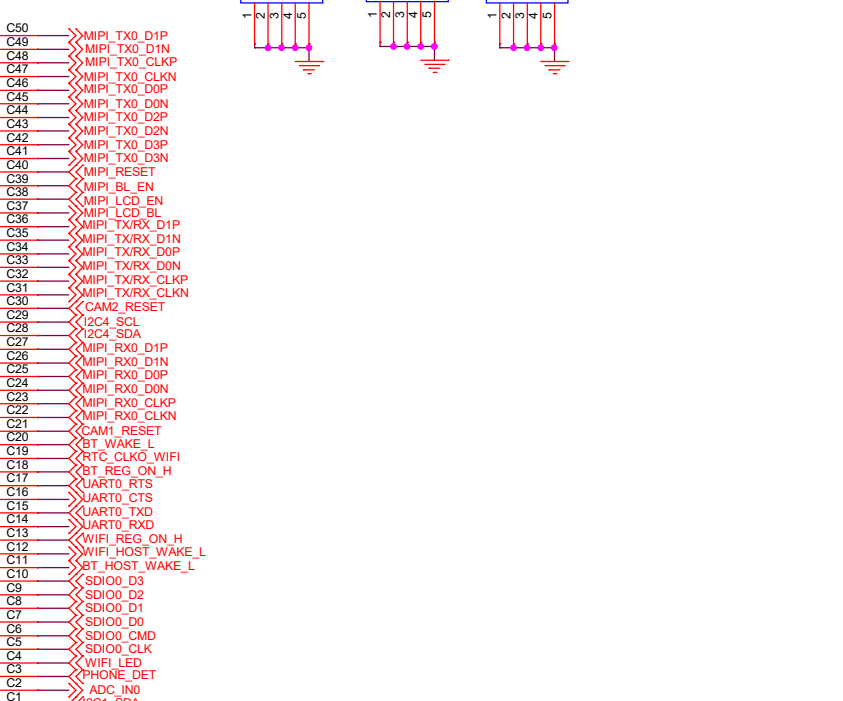
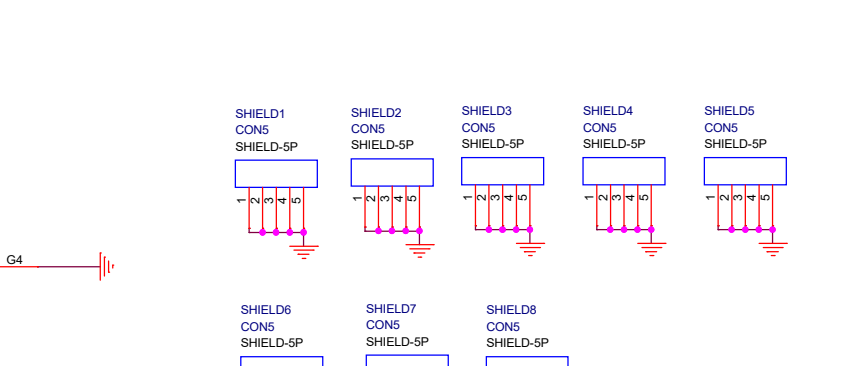
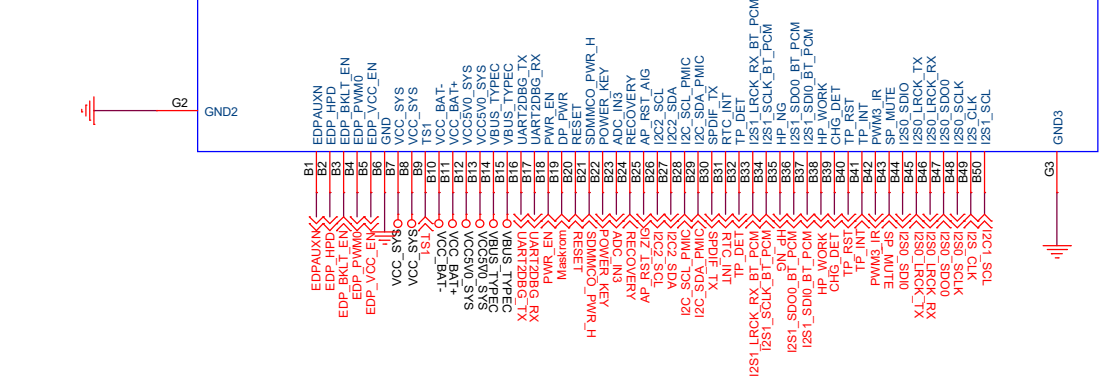
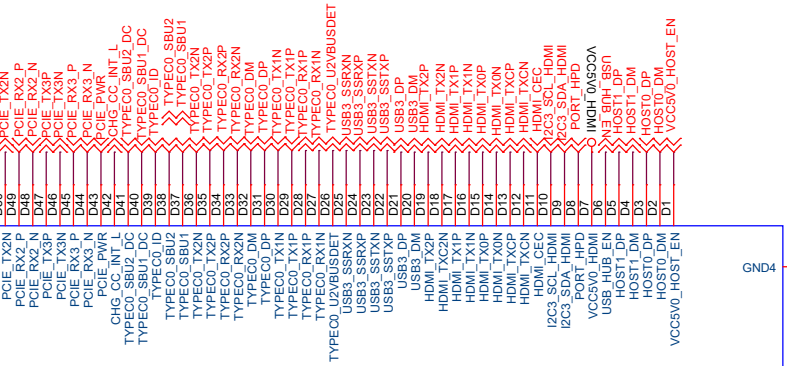
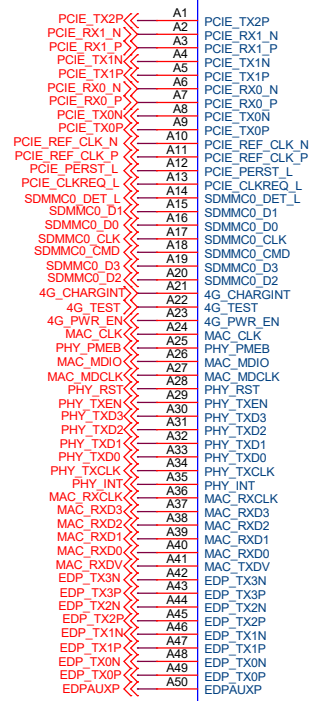
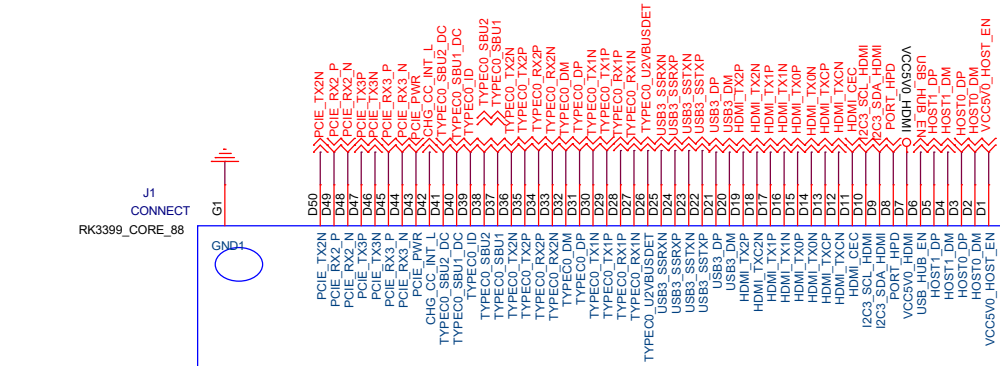
Over-temperature Protection



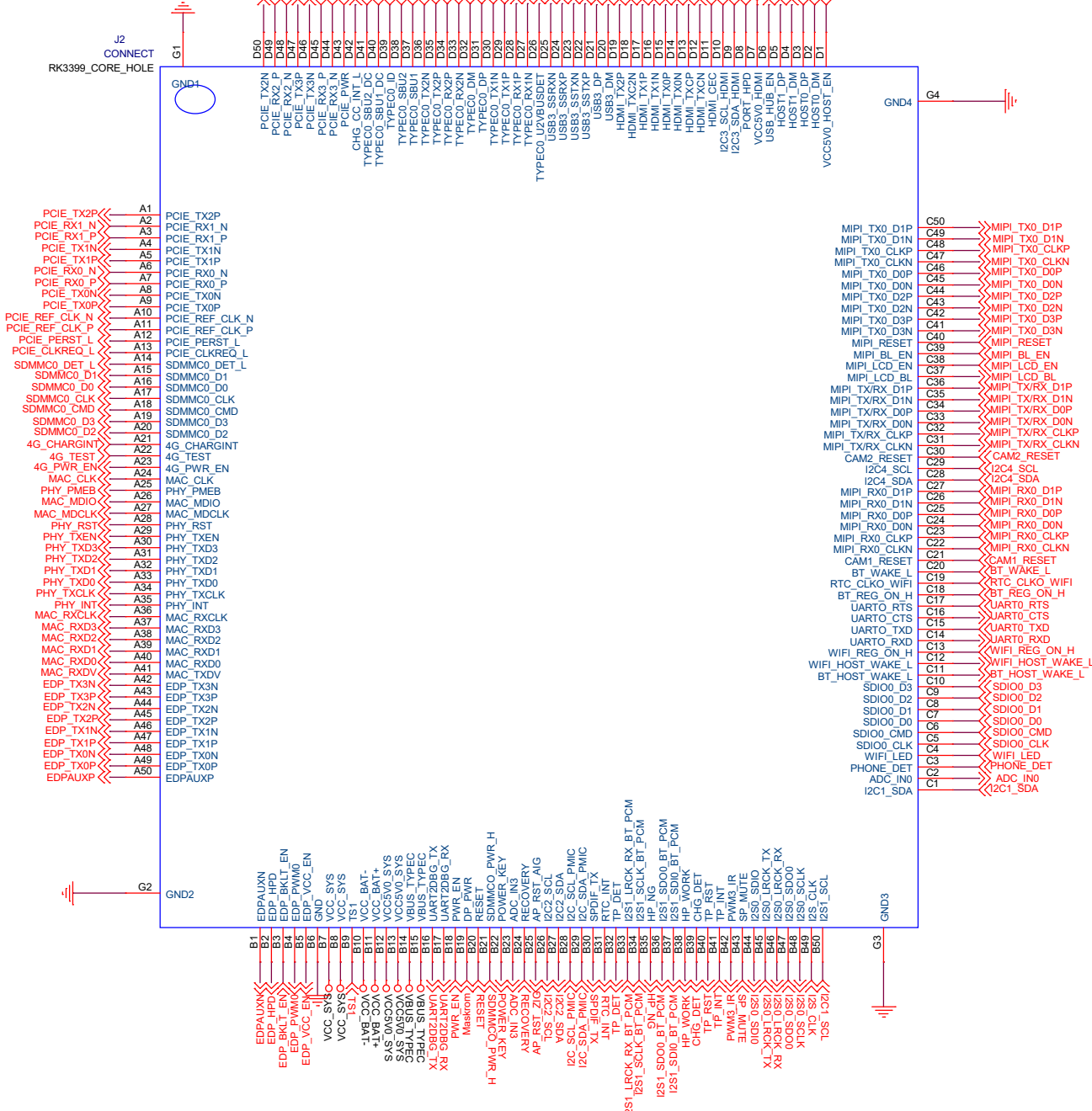
VCC0V9_S3



Size	Title	ROCK PI 4 CORE	REV
A3	Document Number	Power2-DC-DC	2.0
Date:	Thursday, June 03, 2021	Sheet	19 of 21



Size	Title	ROCK PI 4 CORE	REV
Custom	Document Number	CONNECT	2.0
Date:	Thursday, June 03, 2021	Sheet	20 of 21



Size	Title	REV
Custom	ROCK PI 4 CORE Document Number CONNECT_1	2.0
Date:	Thursday, June 03, 2021	Sheet 21 of 21