Reference Schematic For RK1808

RK1808_Ref_Bref_V1.0

PMIC: RK809-2 (5BUCK + 9LDO + Codec)
RAM: DDR3 /LPDDR3/DDR4
ROM: eMMC + TF card
Interface: MIPI CSI/MIPI DSI/UART/I2S/RMII/LCDC/PCIE/USB3

Rockchip Confidential

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	00.Cover Page		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	0 of 99

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46.CAMER-MIPI CSI
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52.LCM-MIPI CSI
61.SDIO WIFI/BT AP6212
65.RJ45-1000M-RTL8211E
70.AUDIO1
75.AUDIO2-MIC Array Connector
77.TP COB-GSL1680
90.SENSOR
91.TF CARD
92.KEY BOARD
94.PCIEX4
97.DEBUG
98.POWER TEST_MCU
99.POWER TEST_INA226

Note

NOTE 1:
Component parameter description

1. DNP stands for component not mounted temporarily
2. If Value or option is DNP, which means the area is reserved without being mounted
3. If Flash is compatible, please notice when eMMC is used, the option is that @eMMC is mounted, @Nand is not mounted when Nand is used, the option is that @Nand is mounted, @eMMC is not mounted

NOTE 2:
Please use our recommended components to avoid too many changes.For more informations about the second source,please refer to our AVL.

Note

Option

Description

Remind

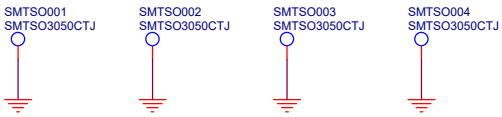
Bill of Materials

Header:

Item\tPart\tDescription\tPCB Footprint\tReference\tQuantity\tOption

Combined property string:

{Item}\t{Value}\t{Description}\t{PCB Footprint}\t{Reference}\t{Quantity}\t{Option}



Rockchip 瑞芯微电子 Fuzhou Rockchip Electronics			
Project:	RK_EVB_1808_lp3_sch_V12		
File:	01.Index		
Date:	Friday, February 15, 2019	Rev:	V1.0
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Version	Date	Author	Change List	Approved
V1.0	20180712		First edition for RK1808	RZF
V1.1	20181107			RZF
V1.2	20190215		1.PLL_AVDD_0V8(pin ac15)电源供电改成VDDA_0V8;PLL_AVDD_1V8(pin aa15)供电改成VCCA_1V8. 2.ADC_AVDD_1V8(pin N31)电源供电改成VCCA_1V8. 3.C6105电容22P改成18P. 4.C2001电容改成100nF,C2004电容改成100P.	RZF

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	02.Revision History		
Date:	Friday, February 15, 2019	Rev:	V1.0
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Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	03.Block Diagram		
Date:	Friday, February 15, 2019	Rev:	V1.0
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I2C MAP

Port	Pin name	Domain	Bus name	Pull-up voltage	Slave Device	Slave Addr (MS 7Bits)	Note	Slave Bus Capability
I2C0	I2C0_SCL/GPIO0_B0_u I2C0_SDA/GPIO0_B1_u	PMUIO2	I2C0_SCL_PMIC I2C0_SDA_PMIC	VCC_3V3	Rockchip RK809	0x20	PMIC	100kHz,400kHz
					SY837		BUCK	100kHz,400kHz
I2C1	I2C1_SCL/GPIO0_C0_u I2C1_SDA/GPIO0_C1_u	PMUIO2	I2C1_SCL I2C1_SDA	VCC_3V3	GSL1680		Touch IC	100kHz,400kHz
								100kHz,400kHz
I2C2	I2C1_SCL/GPIO1_B4_U I2C1_SDA/GPIO1_B5_U	VCCIO_3V3			NC			100kHz,400kHz
I2C3	GPIO2_D0/I2C3_SCL_U GPIO2_D1/I2C3_SDA_U	VCCA_1V8		VCCA_1V8	MIPI CAMERA			
					CIF CAMERA			
					BT1120			
I2C4	GPIO3_C2/I2C4_SCL_U GPIO3_C3/I2C4_SDA_U	VCCIO_3V3		VCCIO_3V3	DIGITAL MIC			
					RGB LCD			
					PCIEX4			
					SENSOR			

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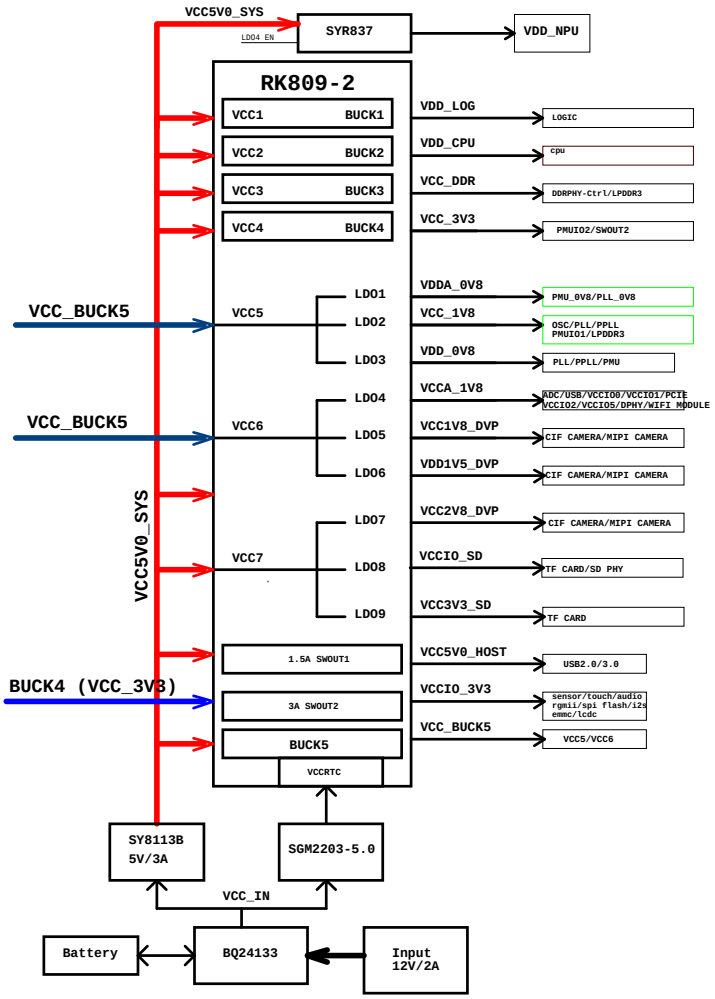
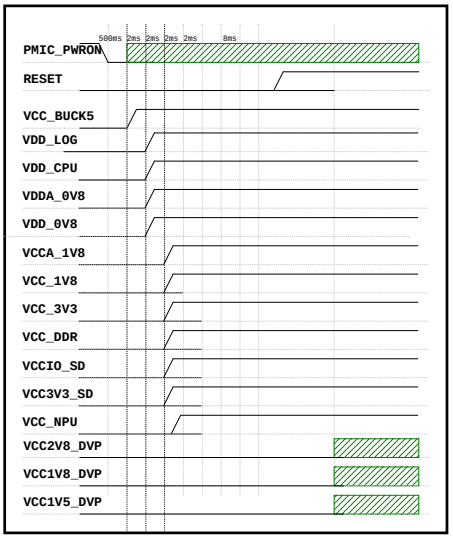
Project:	RK_EVB_1808_lp3_sch_V12
File:	04.I2C MAP
Date: Friday, February 15, 2019	Rev: V1.0
Designed by: Rzf	Sheet: 4 of 99

POWER DIAGRAM



RK809-2 Power-on Sequence

PowerName	PMIC Channel	Time Slot (step 2mS)	Default voltage	Supply Limit	Default ON/OFF	Sleep ON/OFF	Peak Current
VDD_NPU	EXTERNAL(SY837)	Slot:3A	1V	6A	ON	OFF	4A
VDD_LOG	BUCK1	Slot:2	0.85V	2.5A	ON	OFF	1.25A
VDD_CPU	BUCK2	Slot:2	0.85V	2.5A	ON	OFF	750mA
VCC_DDR	BUCK3	Slot:3	FB=0.6V	1.5A	ON	ON	
VCC_3V3	BUCK4	Slot:4	3.3V	1.5A	ON	ON	
VCC_BUCK5	BUCK5	Slot:1	2.5V	2.5A	ON	ON	
VDDA_0V8	LDO1	Slot:2	0.8V	400mA	ON	OFF	
VCC_1V8	LDO2	Slot:3	1.8V	400mA	ON	ON	
VDD_0V8	LDO3	Slot:2	0.8V	100mA	ON	ON	
VCCA_1V8	LDO4	Slot:3	1.8V	400mA	ON	OFF	
VCC1V8_DVP	LDO5		1.8V	400mA	OFF	OFF	
VDD1V5_DVP	LDO6		1.5V	400mA	OFF	OFF	
VCC2V8_DVP	LDO7		2.8V	400mA	OFF	OFF	
VCCIO_SD	LDO8	Slot:4	3.3V	400mA	ON	OFF	
VCC3V3_SD	LDO9	Slot:4	3.3V	400mA	ON	OFF	
VCCIO_3V3	SWOUT2	Slot:4	3.3V	3A	ON	OFF	
VCC5V0_HOST	SWOUT1		5V	1.5A	OFF	OFF	
RESET	RESETB	Slot:10	OD				



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics
Project:	RK_EVB_1808_lp3_sch_V12
File:	05.Power diagram and Sequence
Date: Friday, February 15, 2019	Rev: V1.0
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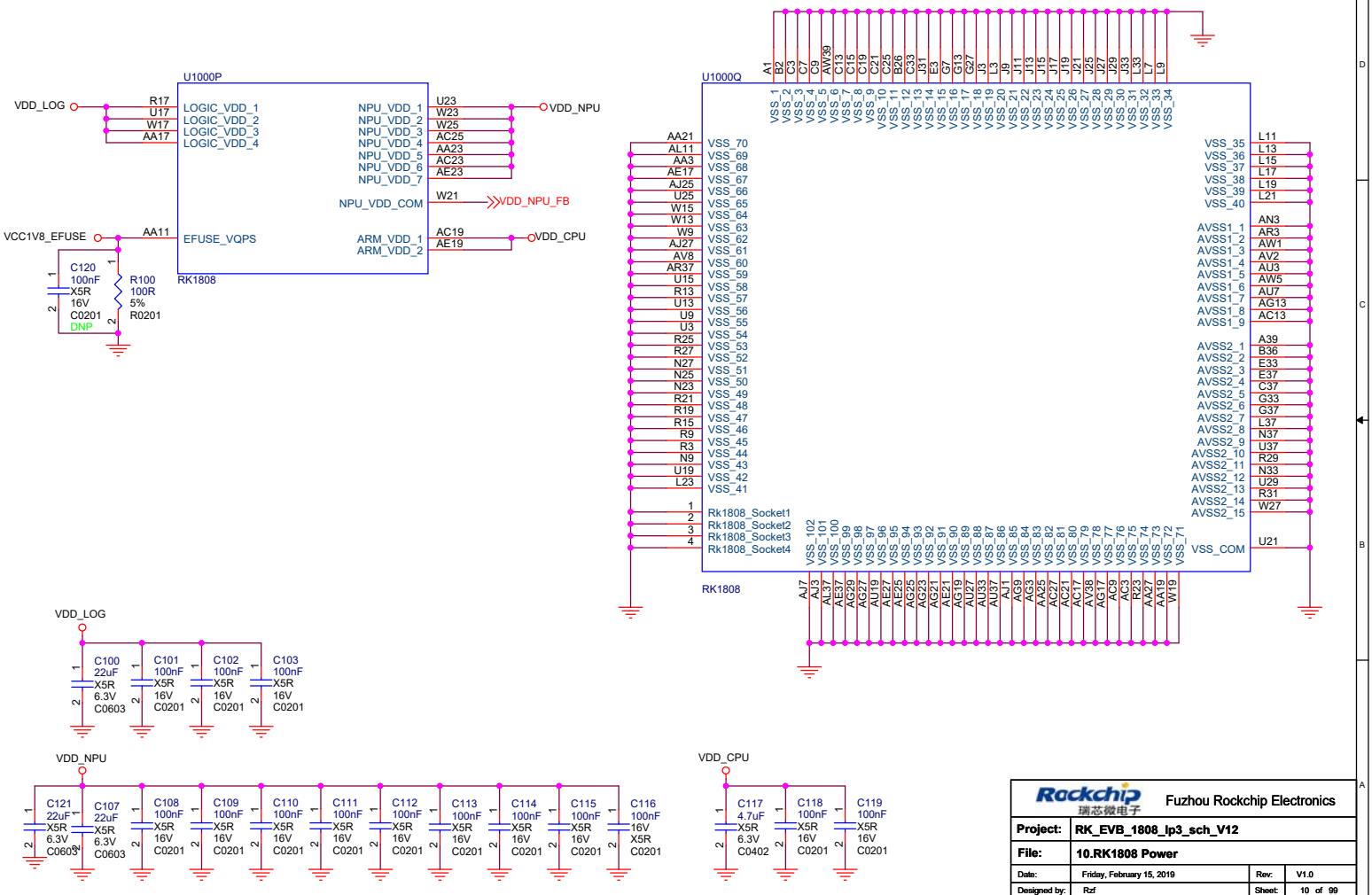
RK1808 Power



Fuzhou Rockchip Electronics			
Project:	RK_EVB_1808_lp3_sch_V12		
File:	10.RK1808 Power		
Date:	Friday, February 15, 2019	Rev:	V1.0
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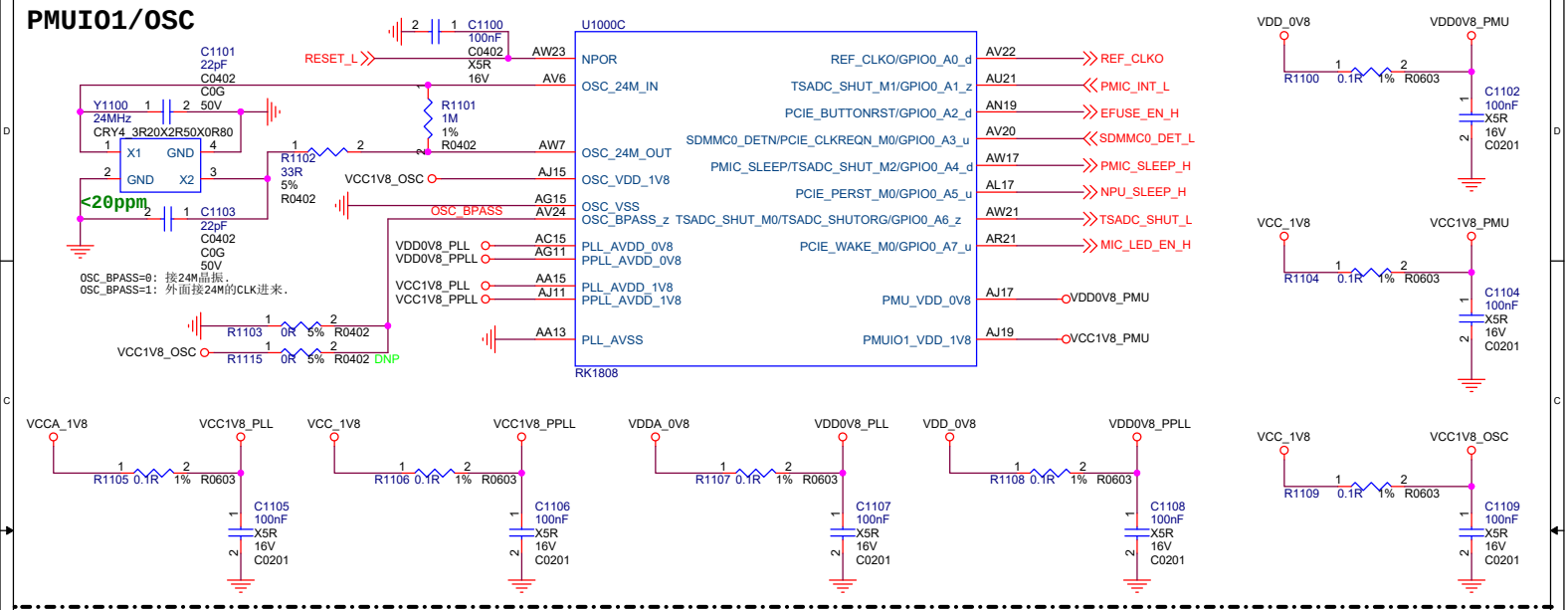
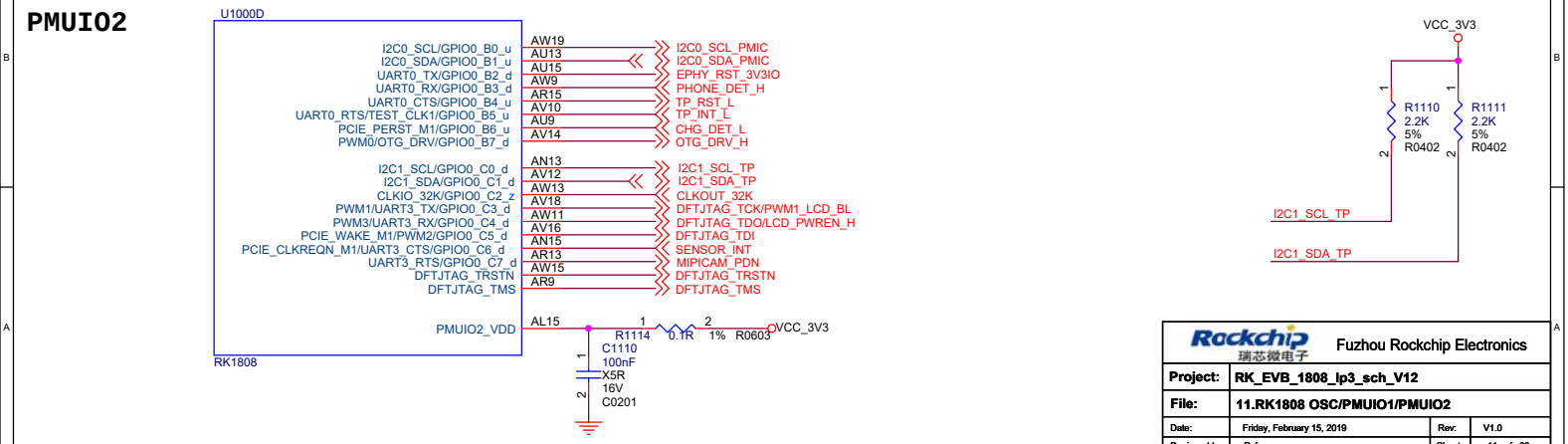
PMUIO1/OSC



PMUIO2



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	11.RK1808 OSC/PMUIO1/PMUIO2		
Date:	Friday, February 15, 2019	Rev:	V1.0
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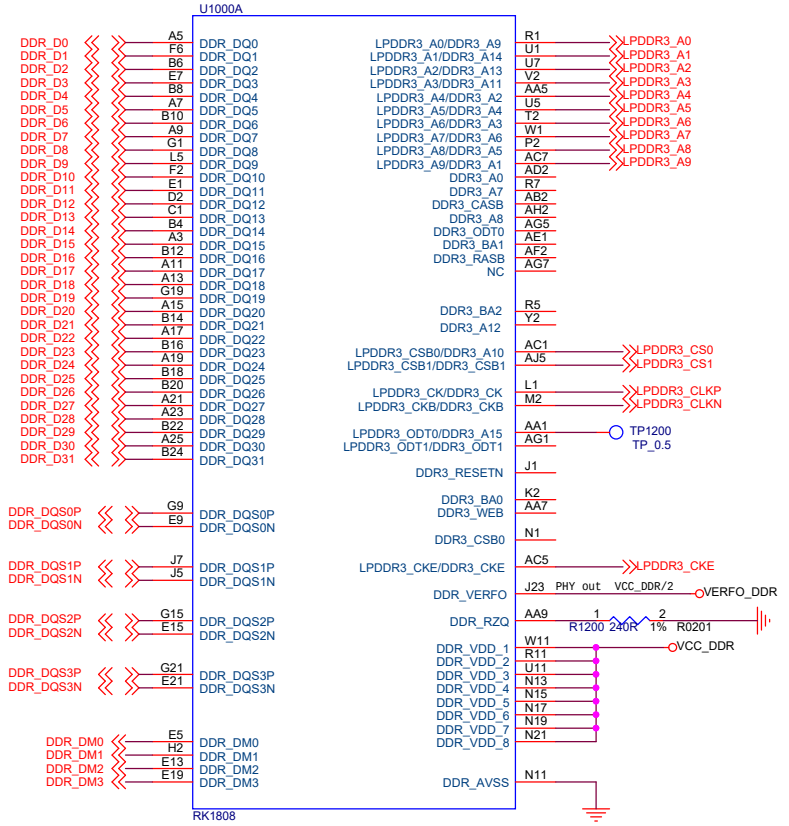
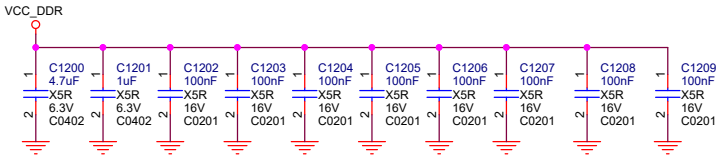
DDR Controller



LPDDR3/LPDDR2	DDR3
A0	A9
A1	A14
A2	A13
A3	A11
A4	A2
A5	A4
A6	A3
A7	A6
A8	A5
A9	A1
	A0
	A7
	CASB
	A8
	ODT0
	BA1
	RASB
	CSB0
	BA2
	A12
	BA0
	WEB
CK	CK
CKB	CKB
CKE	CKE
CSB0	A10
CSB1	CSB1
ODT0	A15
ODT1	ODT1
	RESETN



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	12.RK1808 DDR Controller		
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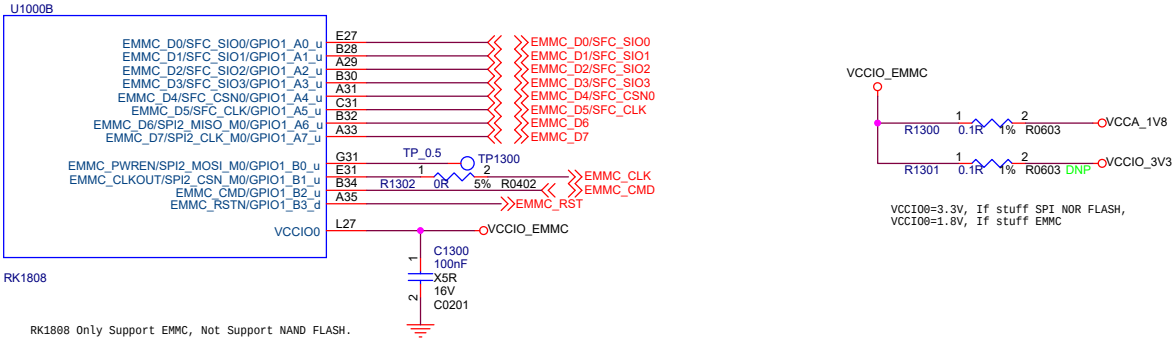
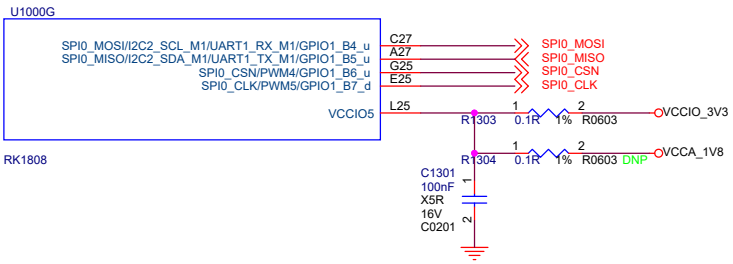
EMMC/SFC Controller



RK1808 Only Support EMMC, Not Support NAND FLASH.

VCCIO=3.3V, If stuff SPI NOR FLASH,
VCCIO=1.8V, If stuff EMMC

SPI0 Controller



Fuzhou Rockchip Electronics			
Project:	RK_EVB_1808_lp3_sch_V12		
File:	13.RK1808 EMMC /SPI Controller		
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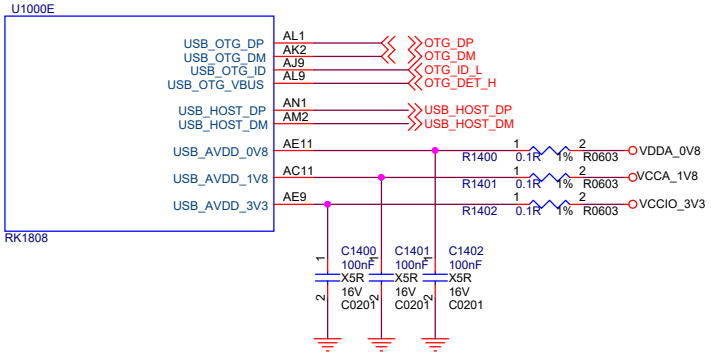
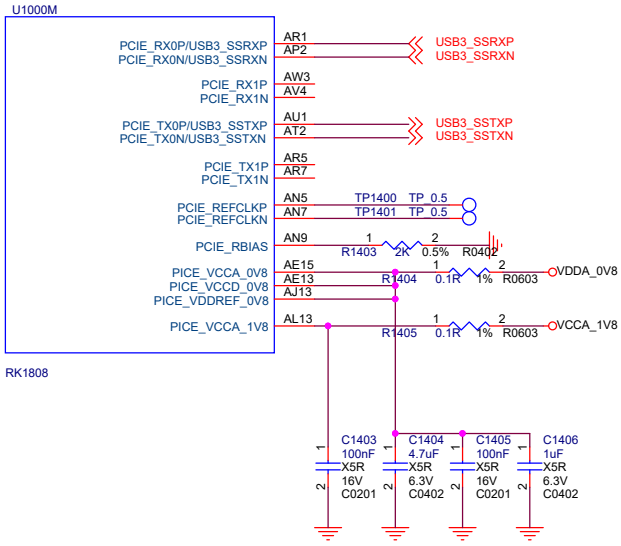
USB Controller



PCIE Controller



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	14.RK1808 USB/PCIE Controller		
Date:	Friday, February 15, 2019	Rev:	V1.0
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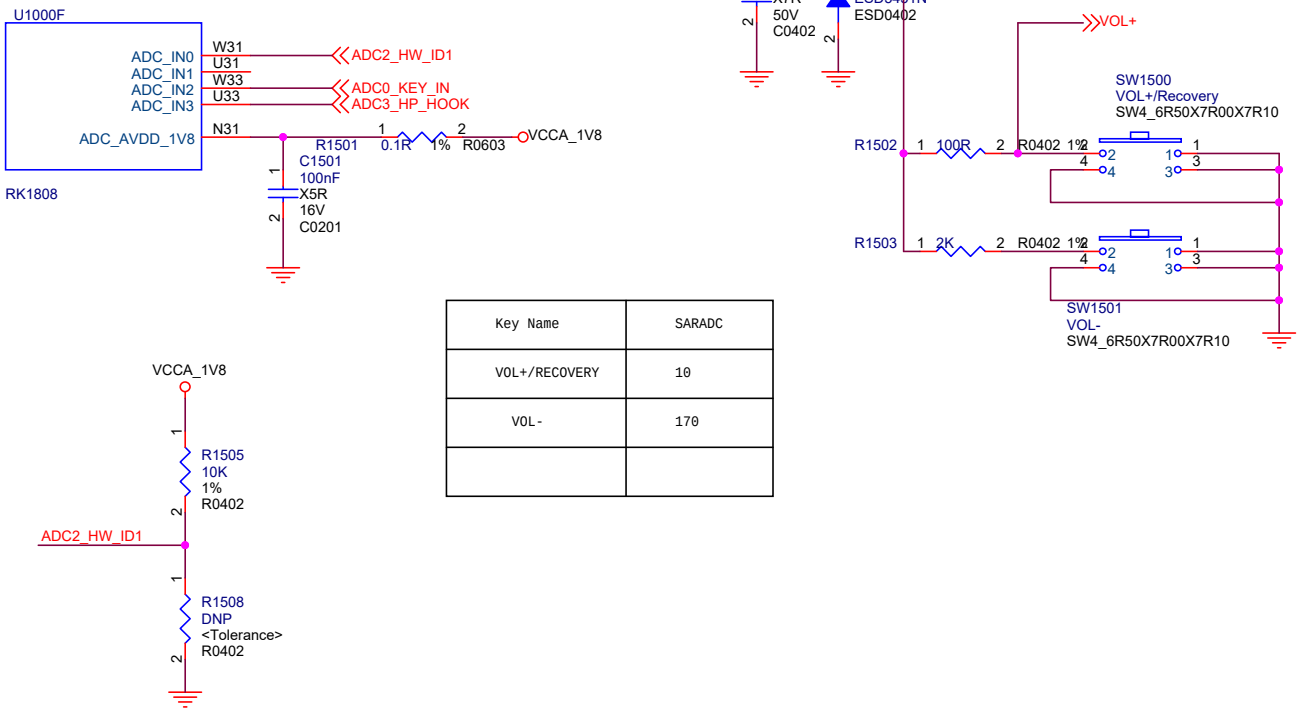
SARADC/KEY



Key Name	SARADC
VOL+/RECOVERY	10
VOL-	170

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	15.RK1808 SARADC/KEY		
Date:	Friday, February 15, 2019	Rev:	V1.0
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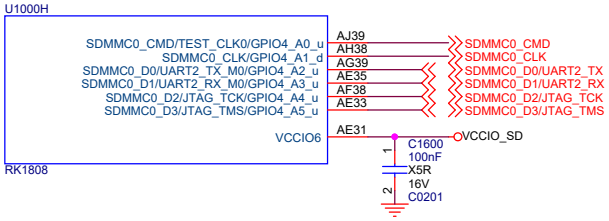
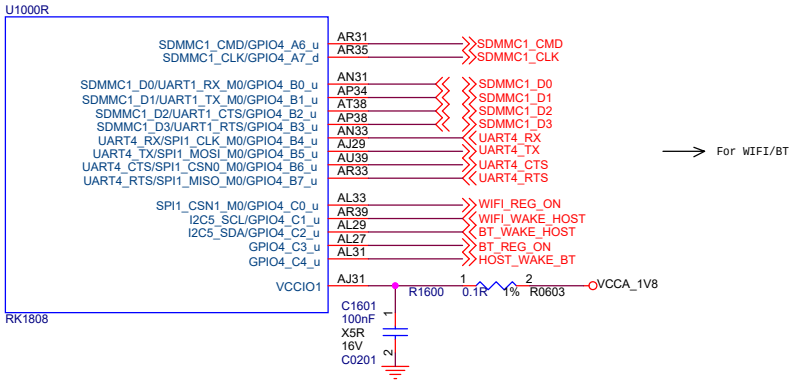
SDMMC0 Controller



SDMMC1 Controller



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	16.RK1808 SDMMC0/SDMMC1		
Date:	Friday, February 15, 2019	Rev:	V1.0
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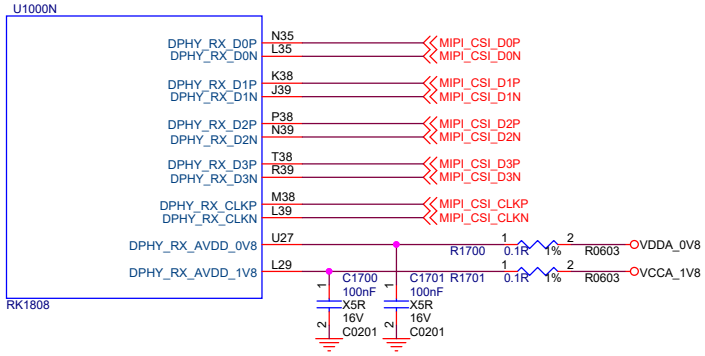
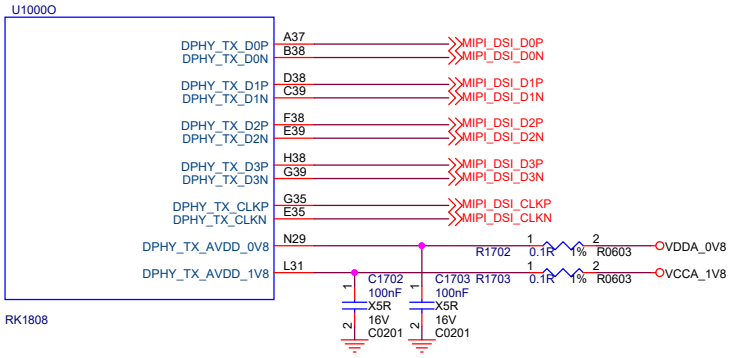
MIPI CSI Controller



MIPI DSI Controller



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	17.RK1808 MIPI DSI/CSI		
Date:	Friday, February 15, 2019	Rev:	V1.0
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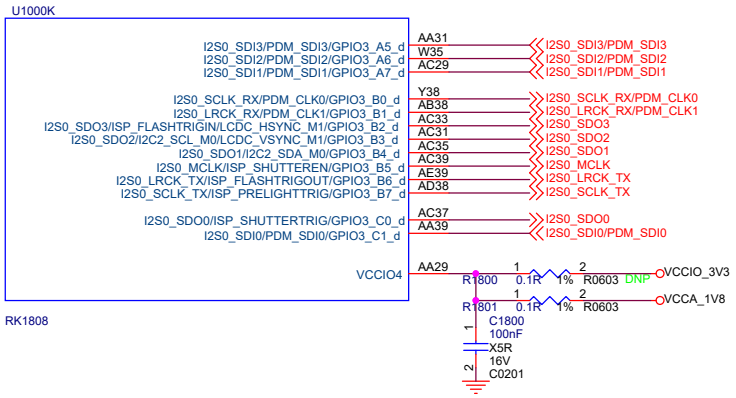
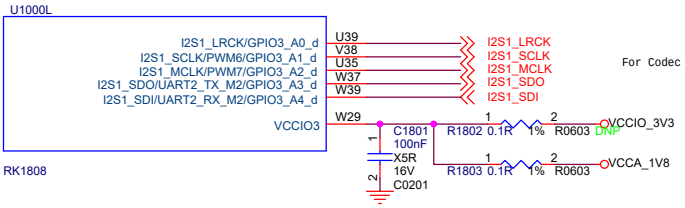
I2S0 Controller



I2S1 Controller



Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	18.RK1808 I2S0/I2S1		
Date:	Friday, February 15, 2019	Rev:	V1.0
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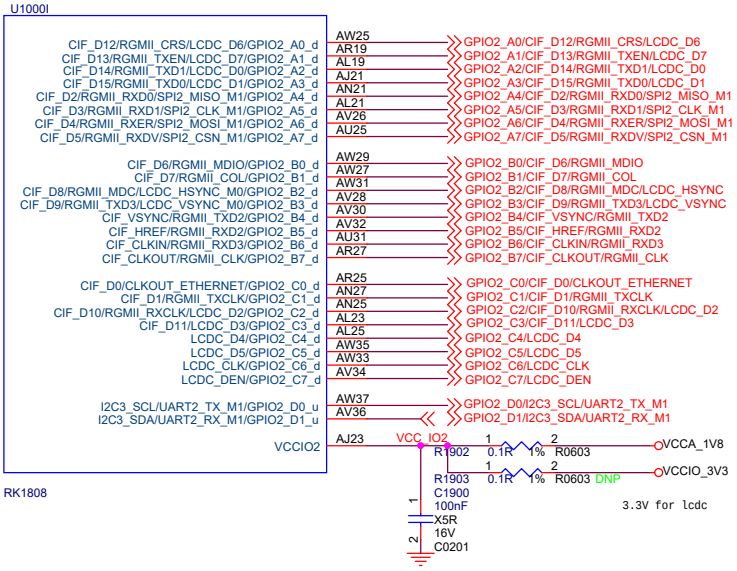
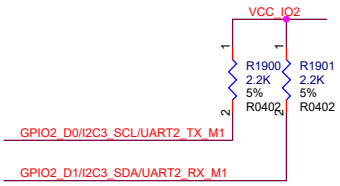
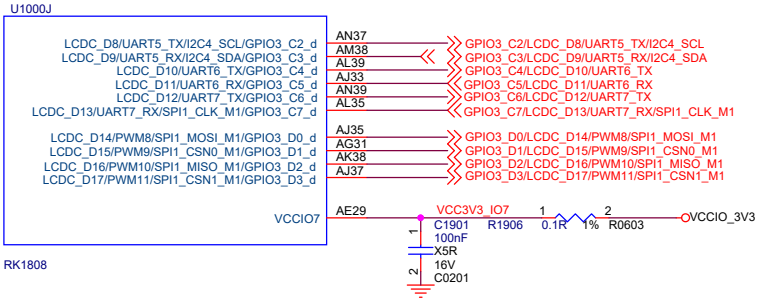
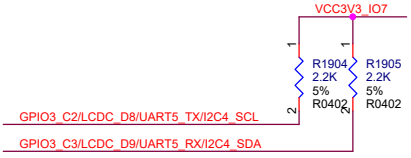
CIF/RGMII/LCDC Controller





LCDC Controller





Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	**RK_EVB_1808_lp3_sch_V12**		
File:	**19.RK1808 RGMII/LCDC/CIF**		
Date:	Friday, February 15, 2019	Rev:	V1.0
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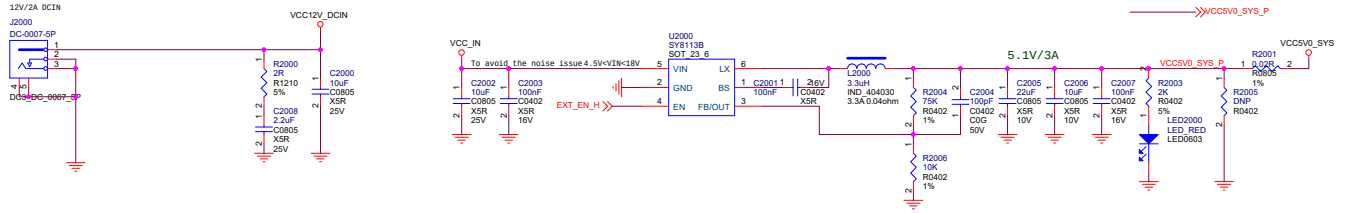
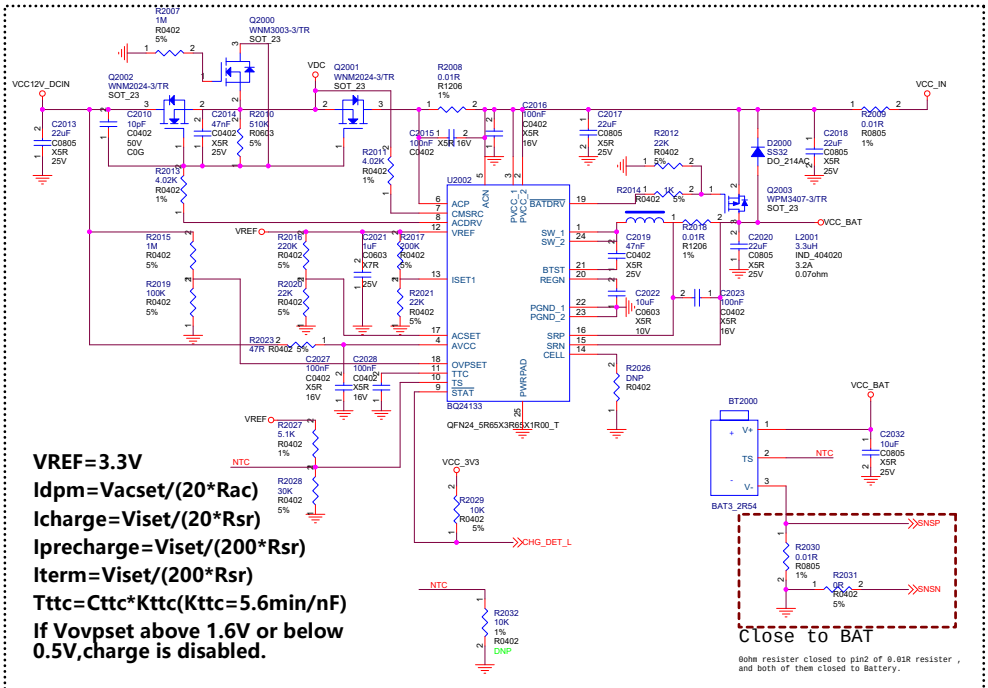
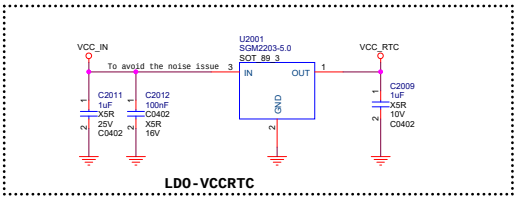
DC IN&SYSTEM Power



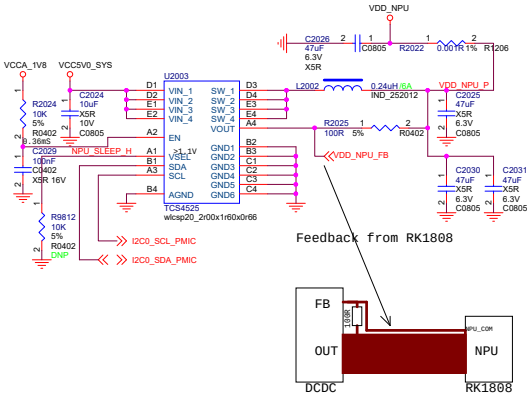


VREF=3.3V
Idpm=Vacset/(20*Rac)
Icharge=Viset/(20*Rsr)
Iprecharge=Viset/(200*Rsr)
Iterm=Viset/(200*Rsr)
Tttc=Cttc*Kttc(Kttc=5.6min/nF)
If Vovpset above 1.6V or below 0.5V,charge is disabled.

1.6-MHz Synchronous Switched-Mode Li-Ion and Li-Polymer Stand-Alone Battery Charger



LDO-VCCRTC



Feedback from RK1808

NPU_SLEEP_H
VDD_NPU_P

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_ech_V12		
File:	20.Power-DC IN		
Date:	Friday, February 15, 2019	Rev:	V1.0
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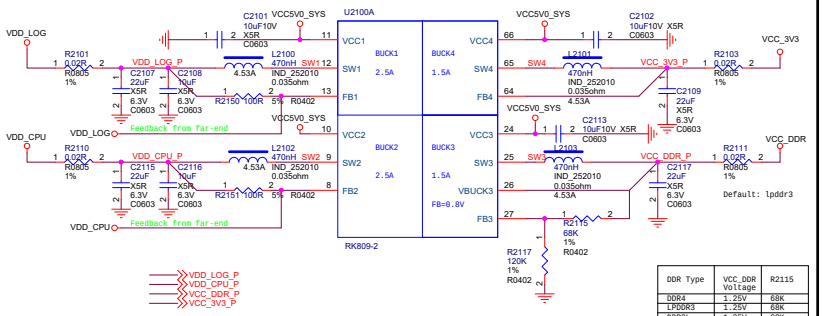
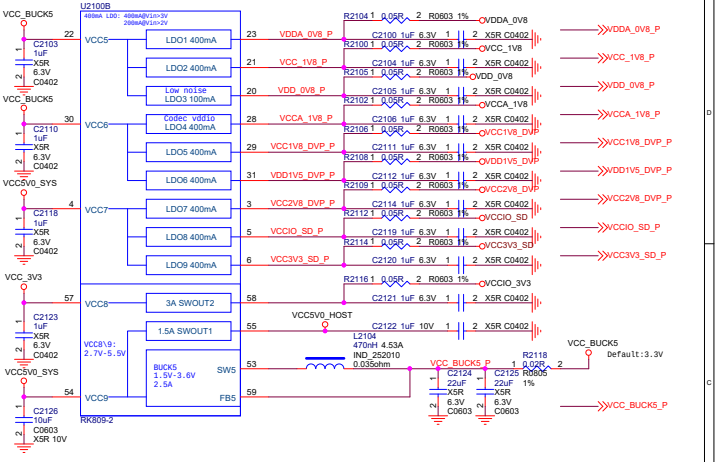
PMIC RK809-1 DCDC

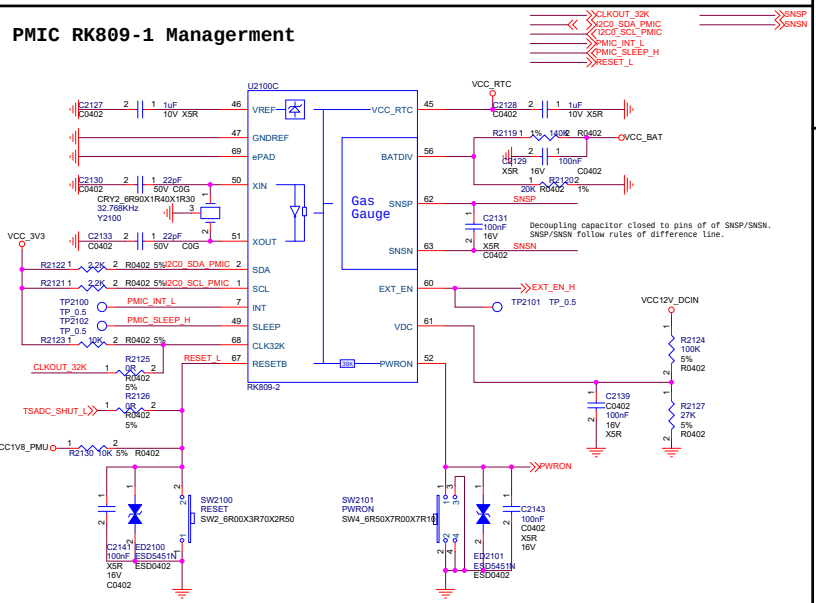


DDR Type	VCC_DDR Voltage	R2115
DDR4	1.25V	68K
LPDDR3	1.25V	68K
DDR3L	1.35V	82K
DDR3	1.53V	110K

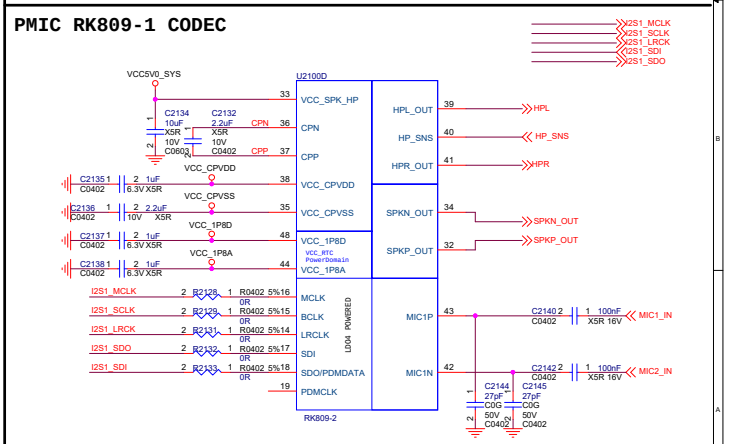
PMIC RK809-1 LDO



PMIC RK809-1 Managerment



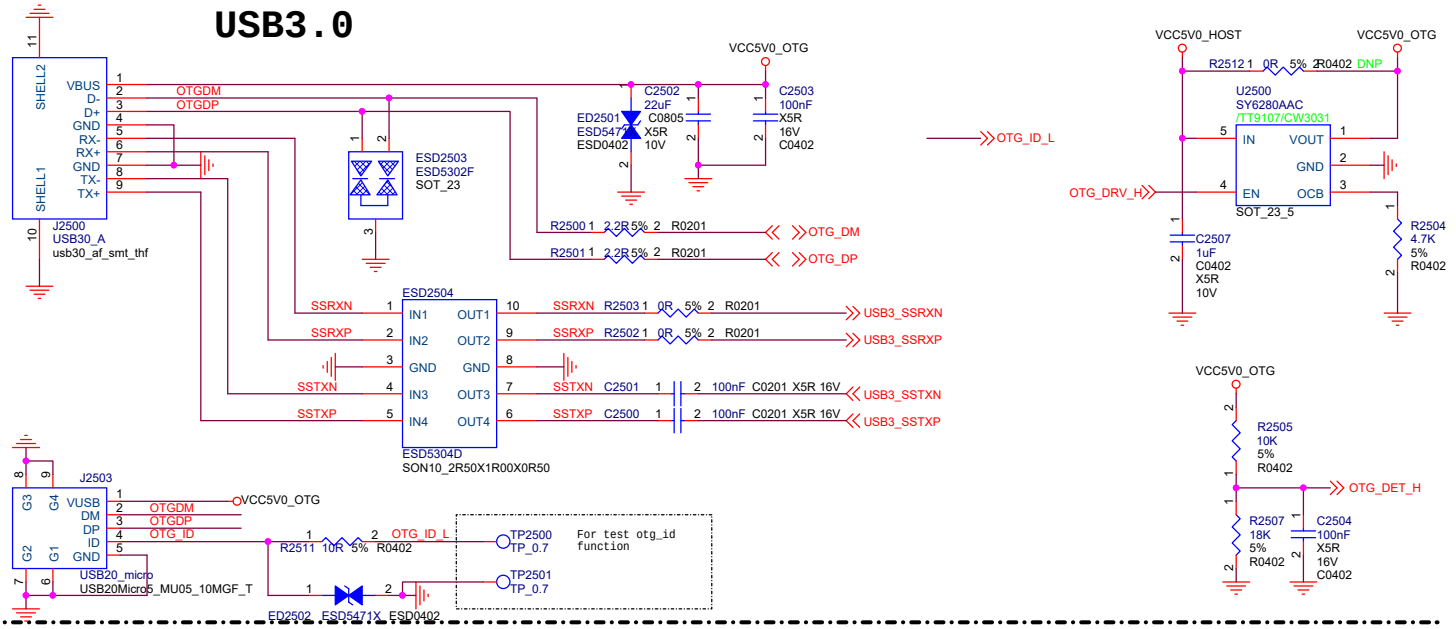
PMIC RK809-1 CODEC



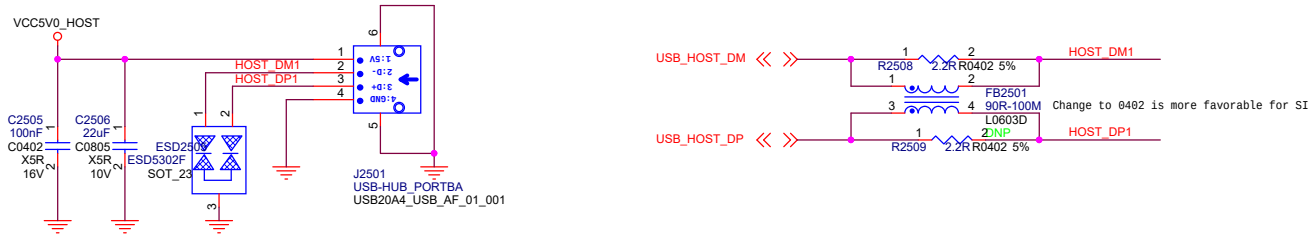
Fuzhou Rockchip Electronics

Project:	RK_EVB_1808_lp3_sch_V12		
File:	21:Power-PMIC RK809-2		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rdf	Sheet:	21 of 99

USB3.0

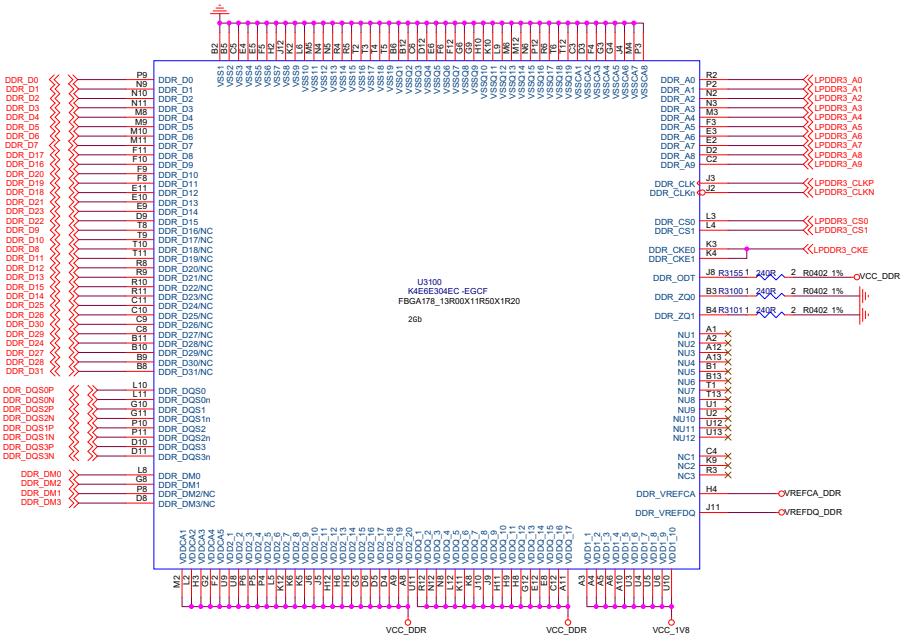


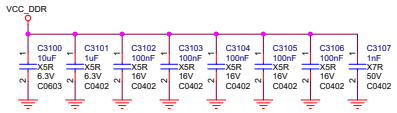
USB HOST

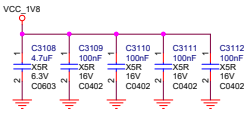


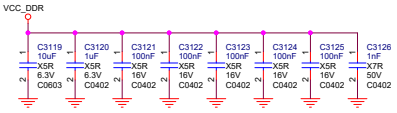
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	25.USB 3.0/USB2.0 HOST		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	25 of 99

LPDDR3 1x32bit

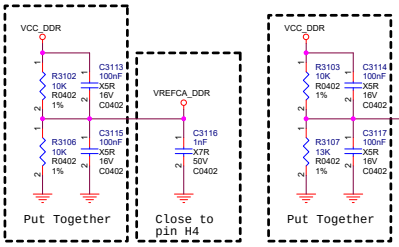


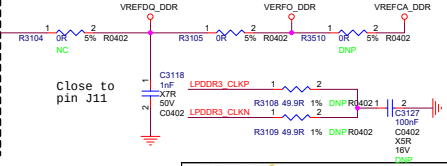






Note:All the power filter capacitors should be placed close to the power pins of LPDDR3



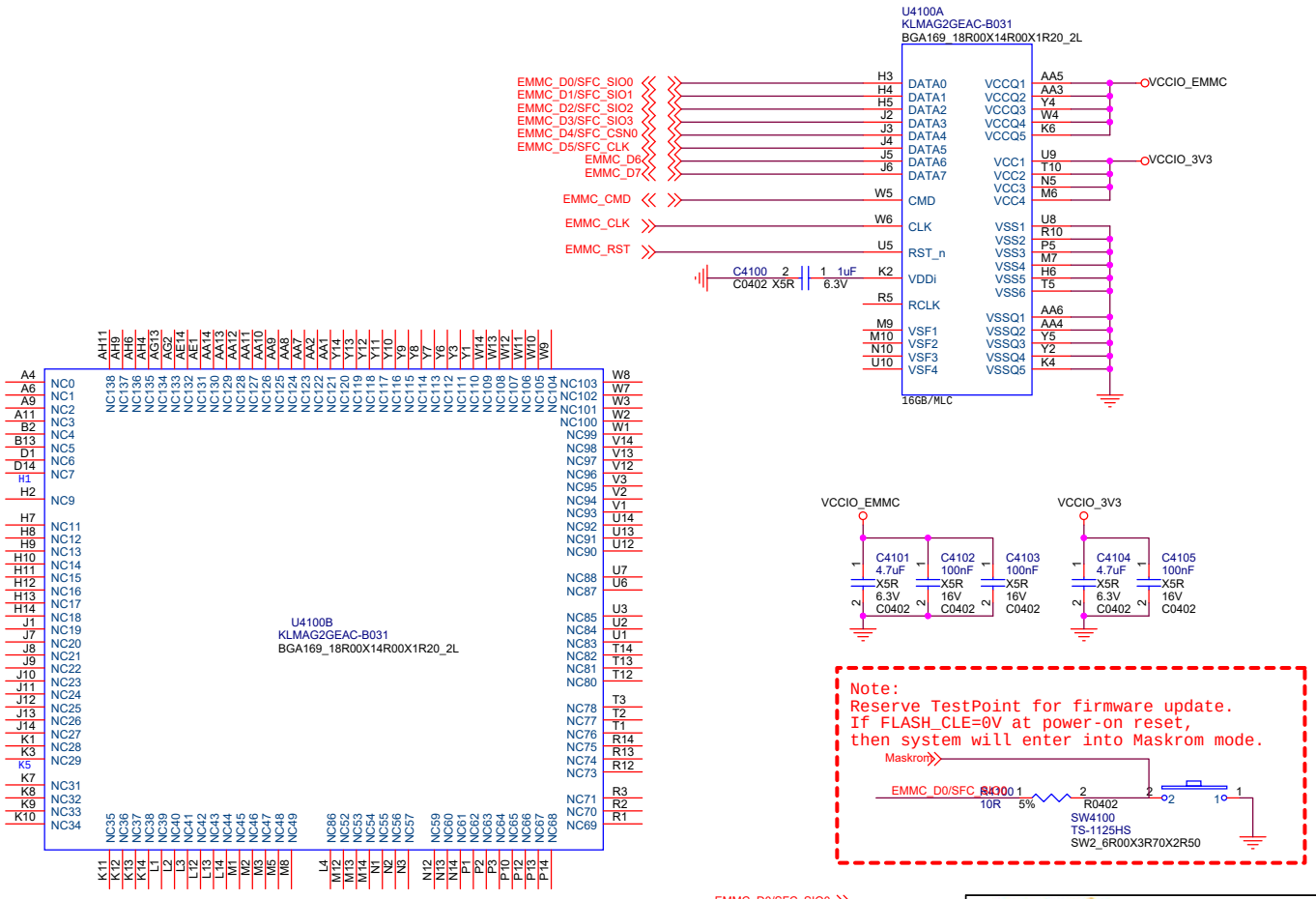


Note:
Vih=VCC
Vil=VCC*Ron/(Ron+Rodt)
VREFDQ_DDR=(Vih+Vil)/2

eg:VCC=1.2V,Ron=34ohm,Rodt=240ohm
so,Vih=1.2V,Vil=0.149V,VREFDQ_DDR=0.674V

Fuzhou Rockchip Electronics	
Project:	RK_EVB_1808_lp3_sch_V12
File:	31.RAM-LPDDR3 1x32bit
Date:	Friday, February 15, 2019
Rev:	V1.0
Designed by:	Rzf
Sheet:	31 of 99

eMMC

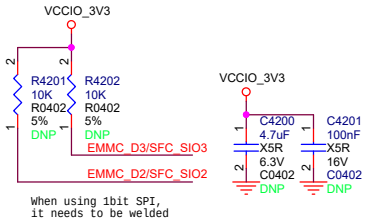


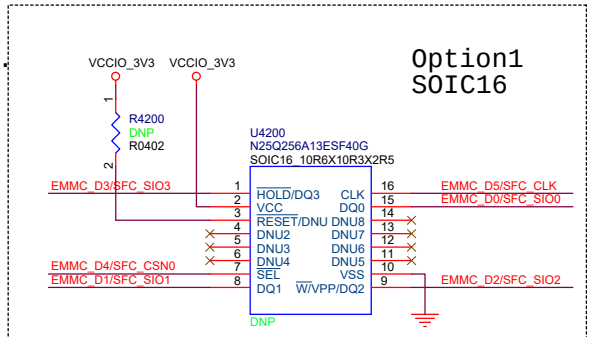
Remind: Refer to the latest AVL for parts selection.

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	41.EMMC		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	41 of 99

SPI NOR Flash

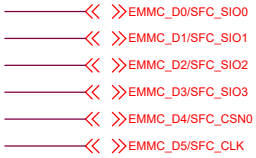
Reserved for minimal system.





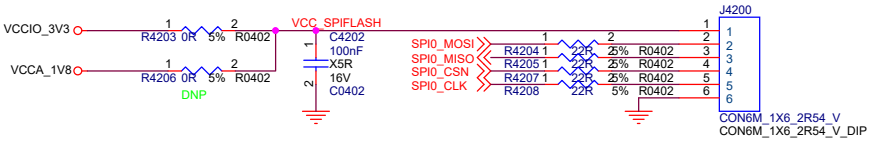
Option1
SOIC16

256Mb



Remind: Refer to the latest AVL for parts selection.

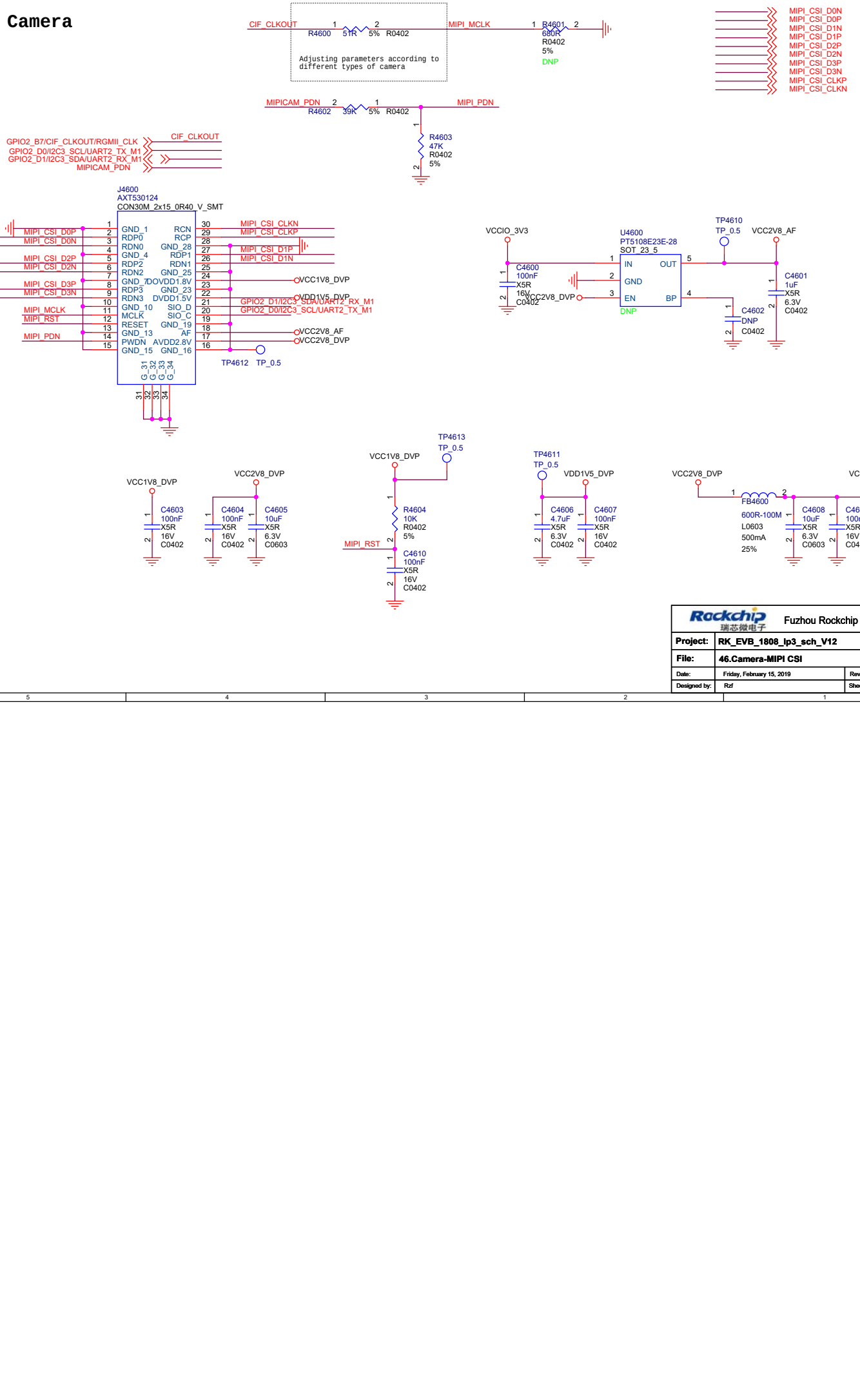
SPI0 Interface



SPI0预留测试点,做为级联用。

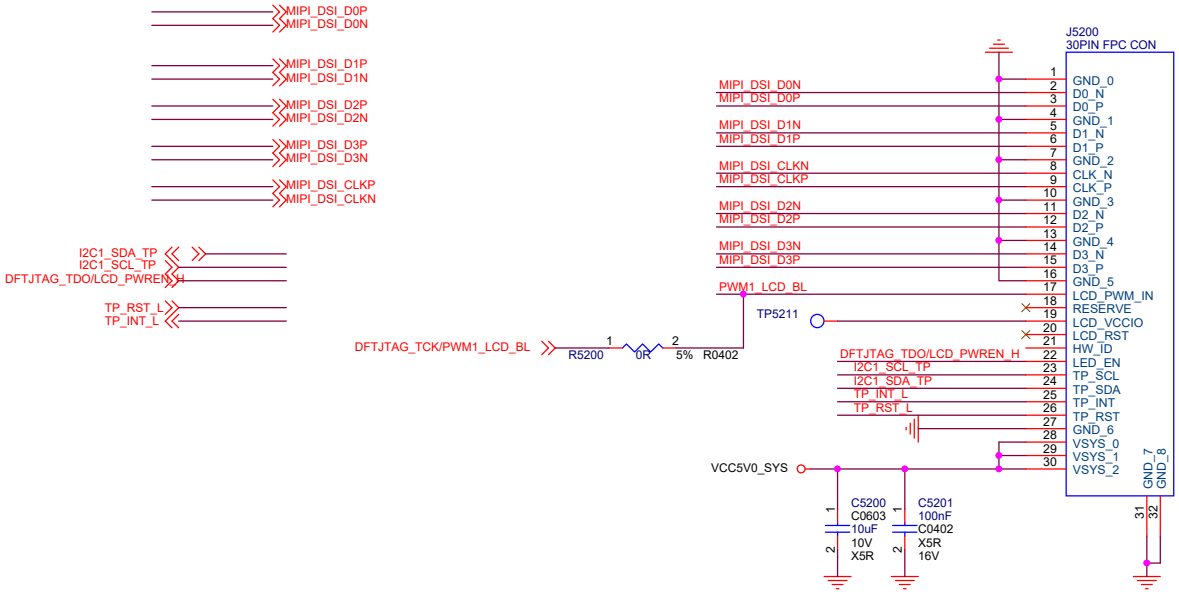
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	42.SPI Flash		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	42 of 99

MIPI Camera



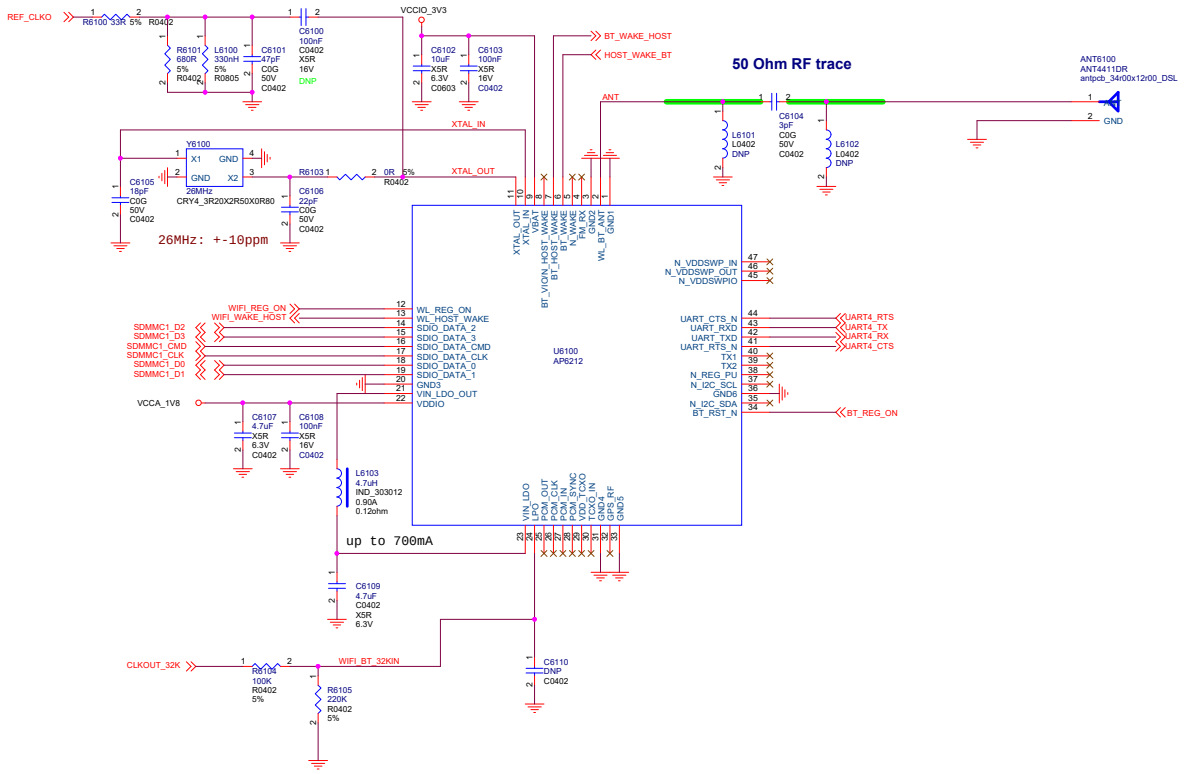
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	46.Camera-MIPI CSI		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	46 of 99

MIPI Panel

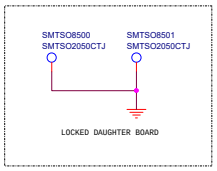


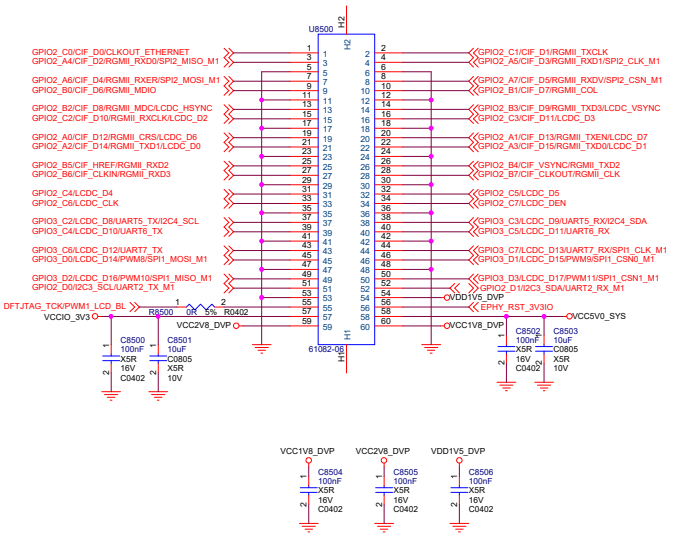
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	52.LCM-MIPI Panel		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	52 of 99

WIFI/BT MODULE

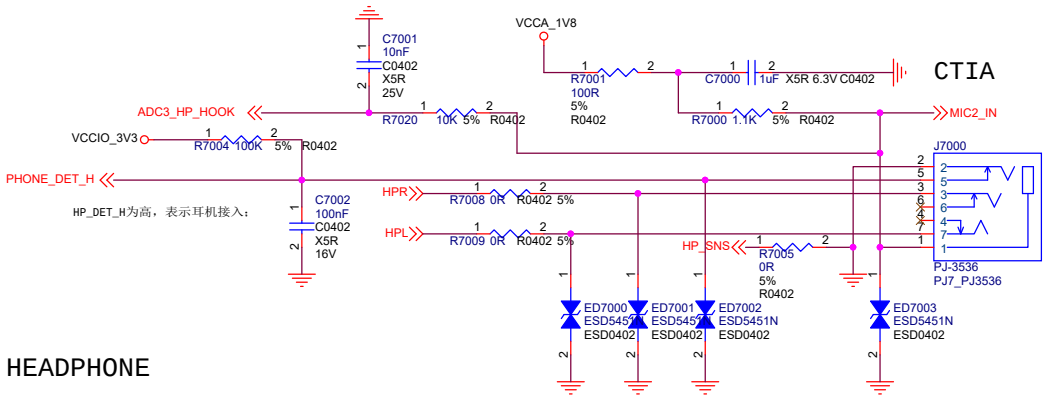


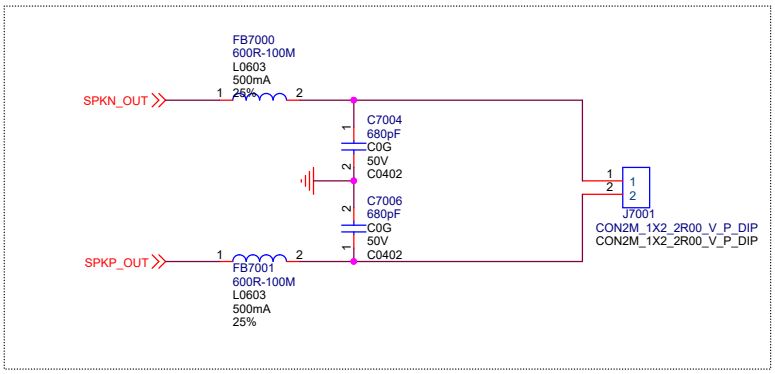
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	61.SDIO WIFI/BT AP6212		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	61 of 99

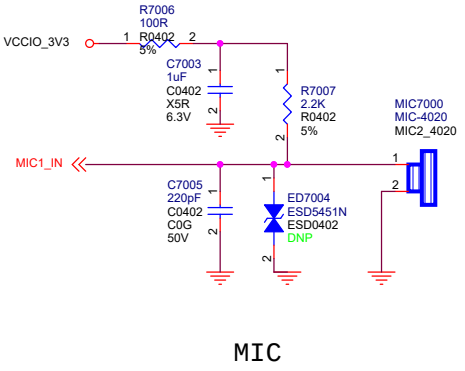




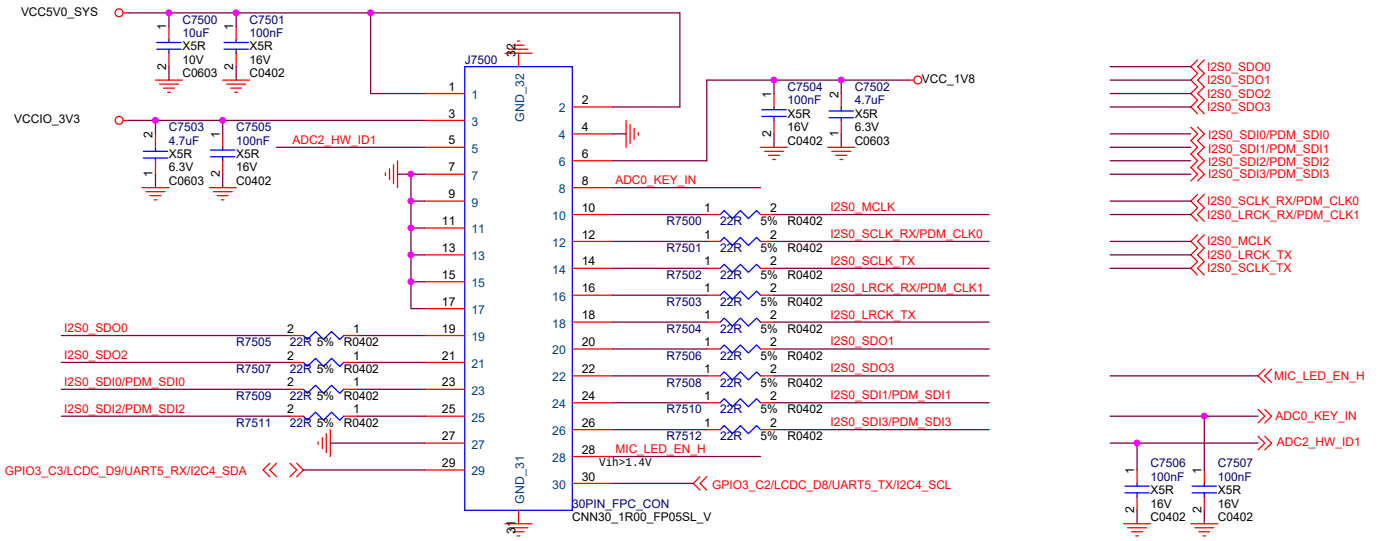
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	85.INTERFACE		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	85 of 99







Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	70.AUDIO1		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	70 of 99

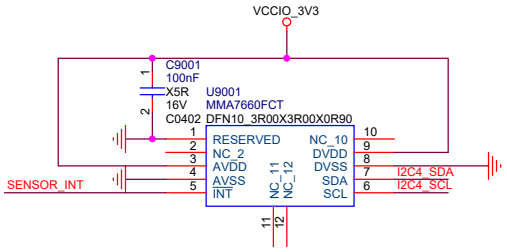


MIC Array-Digital Interface

Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	75.AUDIO2-MIC Array Connector		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	75 of 99

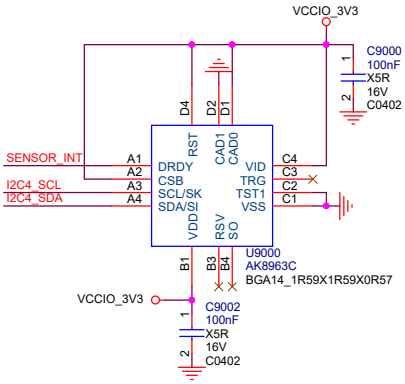
I2C4_SDA
I2C4_SCL
GPIO3_C3/LCDC_D9/UART5_RX/I2C4_SDA
GPIO3_C2/LCDC_D8/UART5_TX/I2C4_SCL
SENSOR_INT

G-sensor



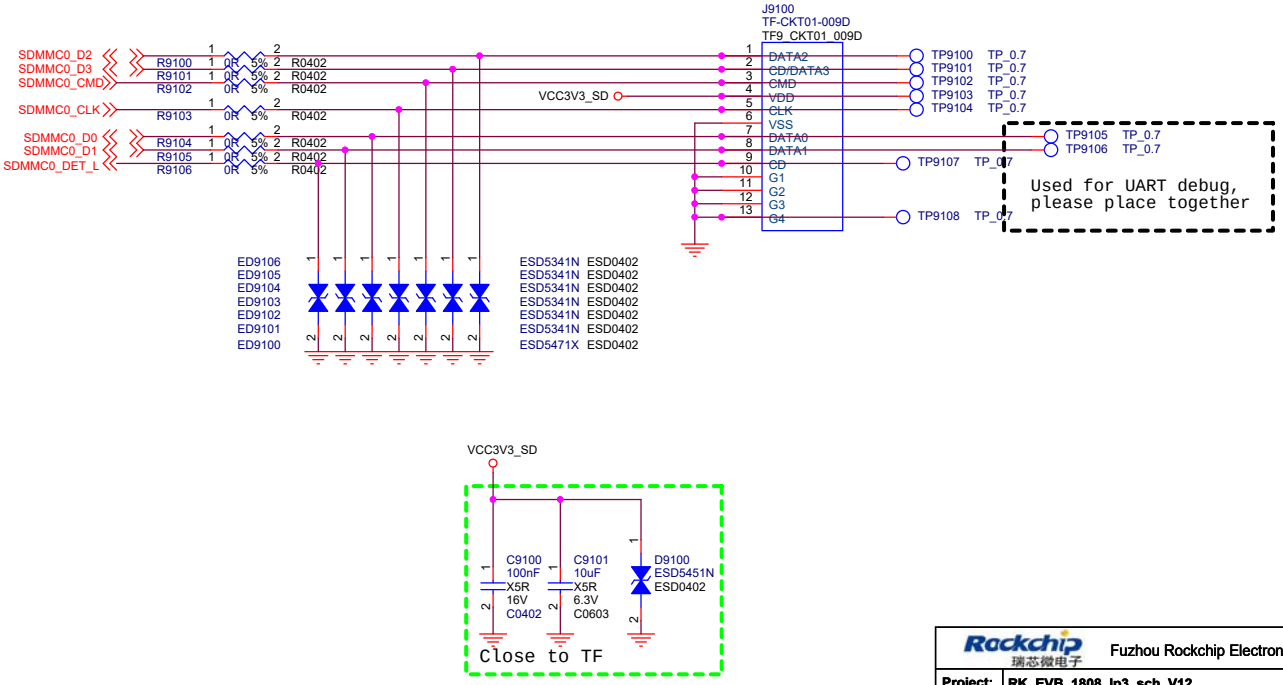
Compass

Note:
The first pin of AK8963C must be place on the lower left corner of PCB.



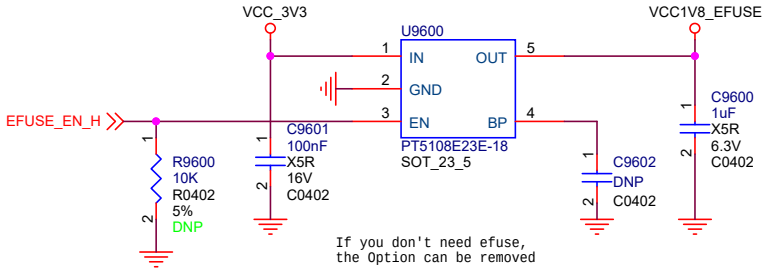
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	90.Sensor		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	90 of 99

TF Card



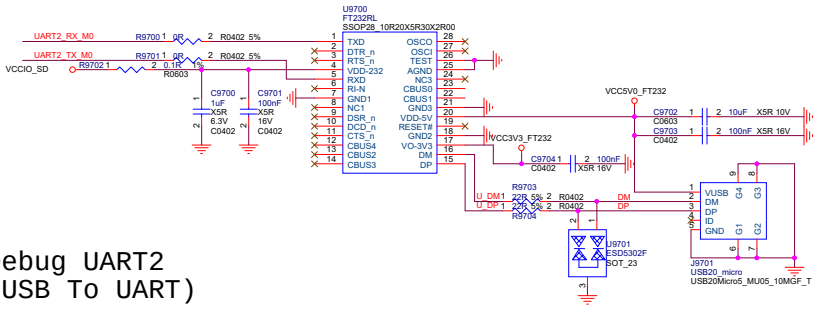
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	91.TF Card		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	91 of 99

OPTION

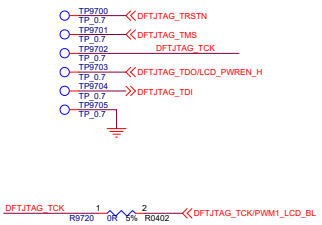


If you don't need efuse,
the Option can be removed

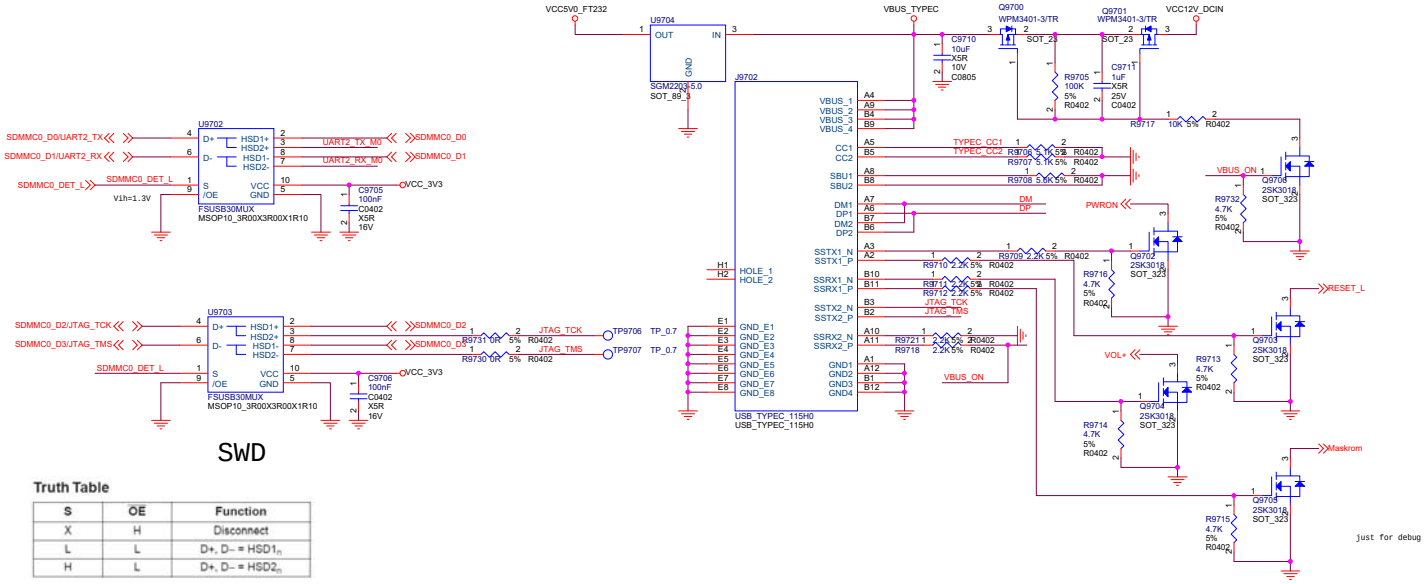
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	96.EFUSE		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	96 of 99



Debug UART2
(USB To UART)



JTAG



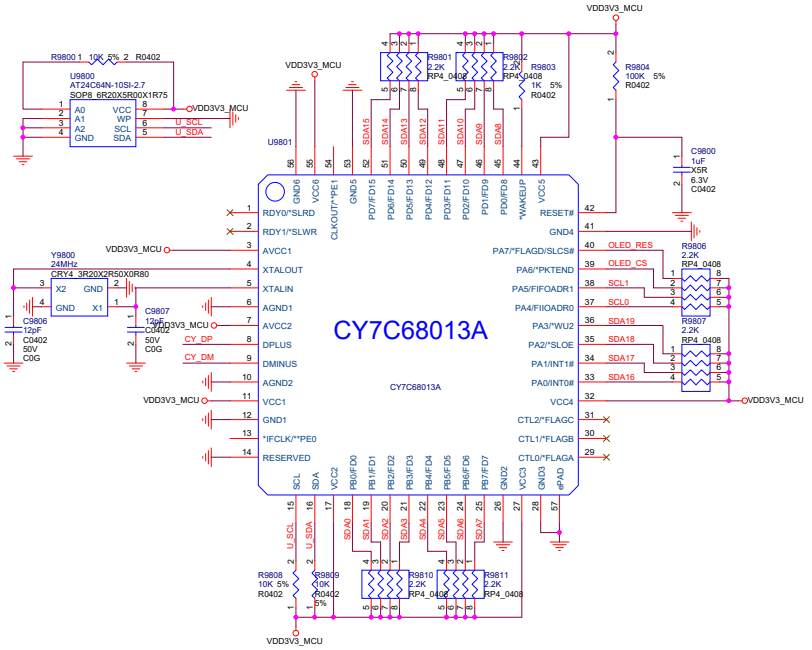
SWD

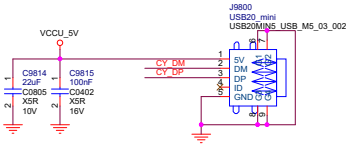
Truth Table

S	$\overline{OE}$	Function
X	H	Disconnect
L	L	D+, D− = $HSD1_n$
H	L	D+, D− = $HSD2_n$

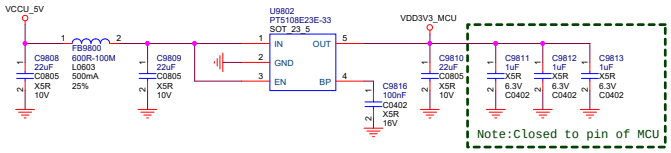
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics
Project:	RK_EVB_1808_lp3_sch_V12
File:	97.DEBUG
Date:	Friday, February 15, 2019
Rev:	V1.0
Designed by:	Rzf
Sheet:	97 of 99

Current Detection MCU



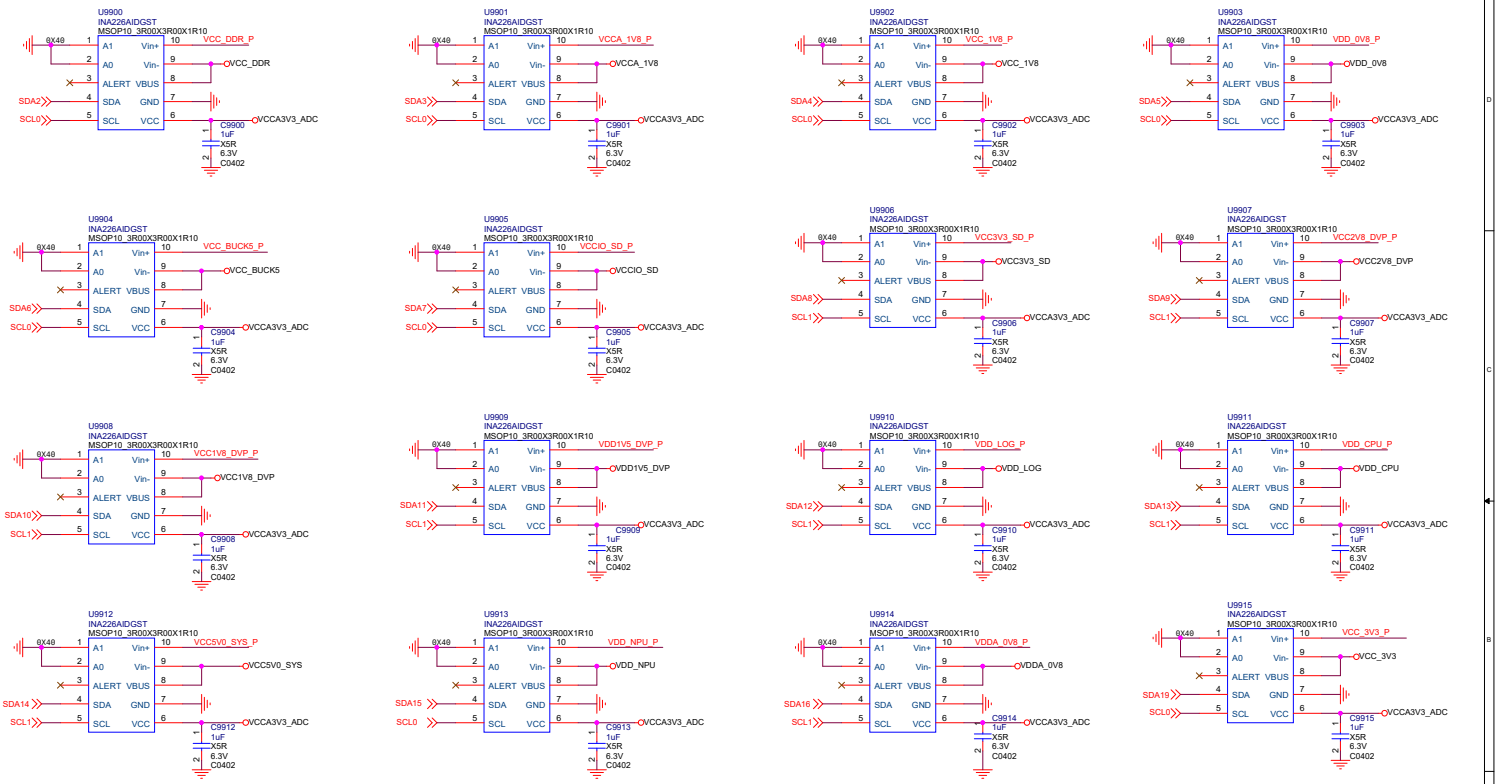


Power

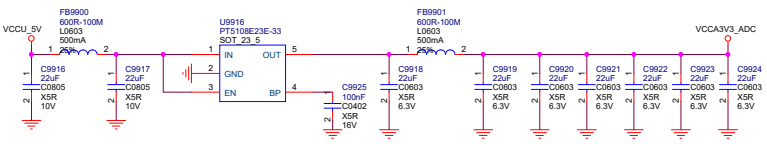


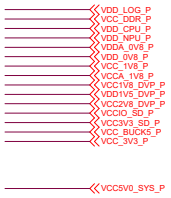
Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	98.Power Test_MCU		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	98 of 99

ADC Array



ADC Power





Rockchip 瑞芯微电子	Fuzhou Rockchip Electronics		
Project:	RK_EVB_1808_lp3_sch_V12		
File:	99.Power Test_INA226		
Date:	Friday, February 15, 2019	Rev:	V1.0
Designed by:	Rzf	Sheet:	99 of 99