



# Radxa ROCK 2A

schematic

V1.20



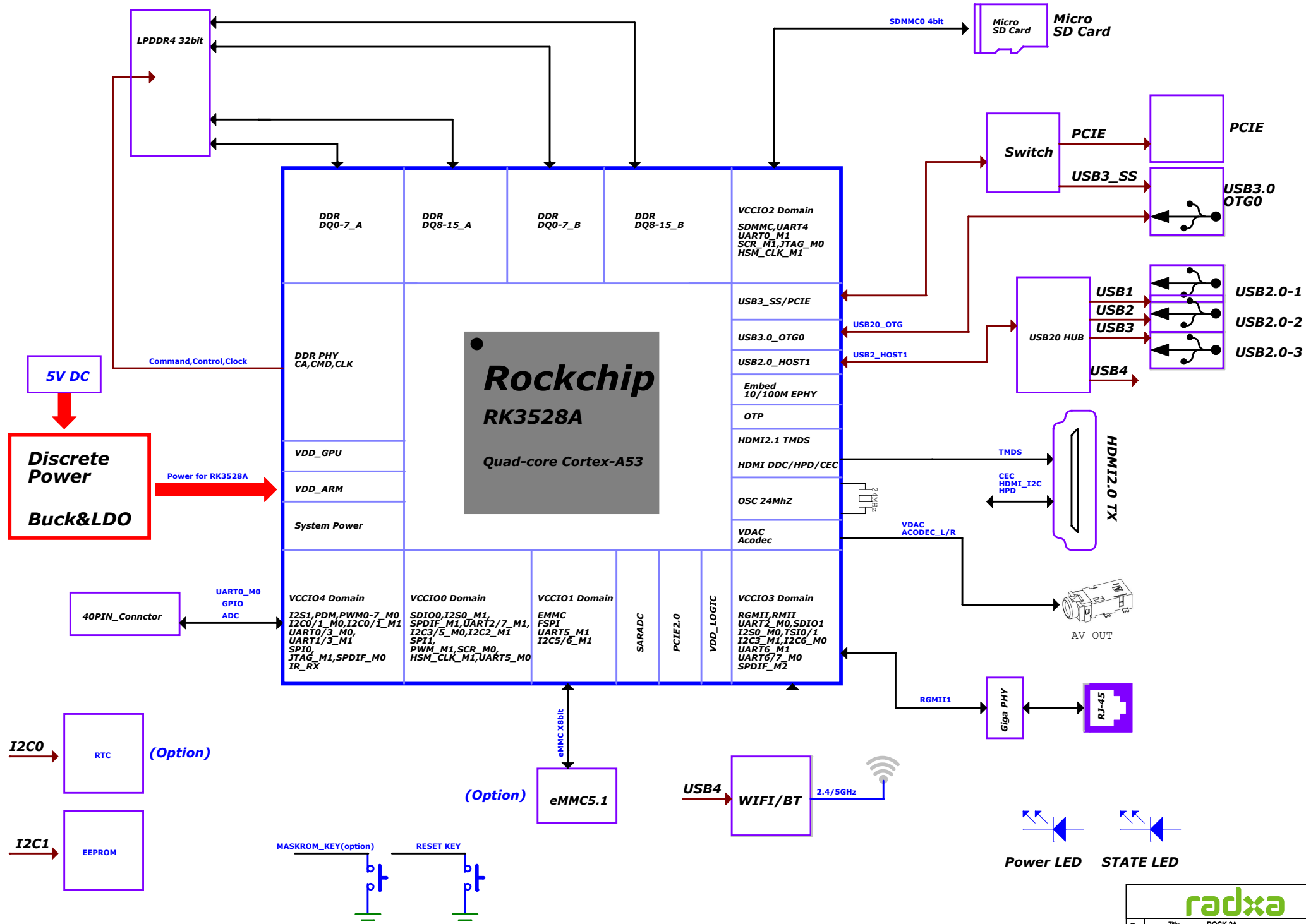
# Index

Page 1	01.Cover
Page 2	02.Index
Page 3	03.Block
Page 4	04.RK3528A Power/GND
Page 5	05.RK3528A OSC/PLL/PMUIO
Page 6	06.RK3528A DDR Controller
Page 7	07.RK3528A FLASH/SD Controller
Page 8	08.RK3528A USB/PCIE Controller
Page 9	09.RK3528A SARADC/OTP
Page 10	10.RK3528A HDMI Interface
Page 11	11.RK3528A AV OUT
Page 12	12.RK3528A Embed FEPHY
Page 13	13.RK3528A_1.8V/3.3V GPIO
Page 14	14.Power-DiscretePower
Page 15	15.DRAM-LPDDR4_1X32bit_200P
Page 16	16.Flash-eMMC
Page 17	17.HDMI TX
Page 18	18.USB_HUB
Page 19	19.Ethernet_RGMII
Page 20	20.WIFI/BT
Page 21	21.Micro_SD
Page 22	22.VO-AV Interface
Page 23	23.40PIN_Connctor_PCIE_CONN.
Page 24	24.5V_Power
Page 25	25.Key_LED_RTC_EEPROM

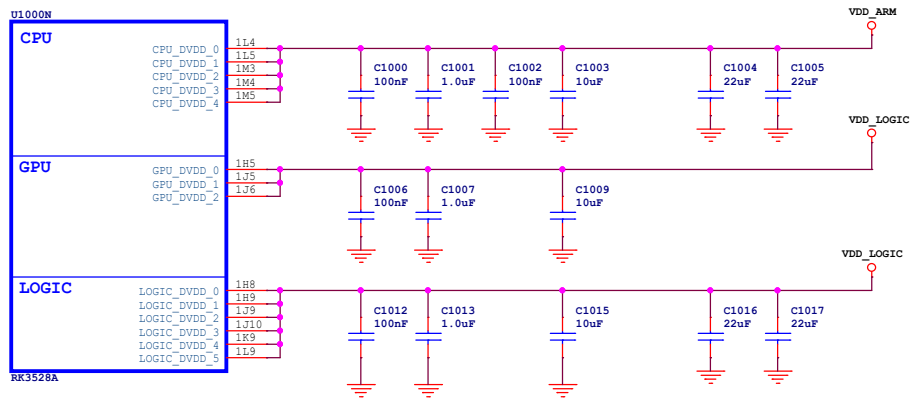


Size	Title: ROCK 2A	REV
A4	Page Name: 02.Index	V1.2
Date: Thursday, June 06, 2024	Sheet 02 of 25	

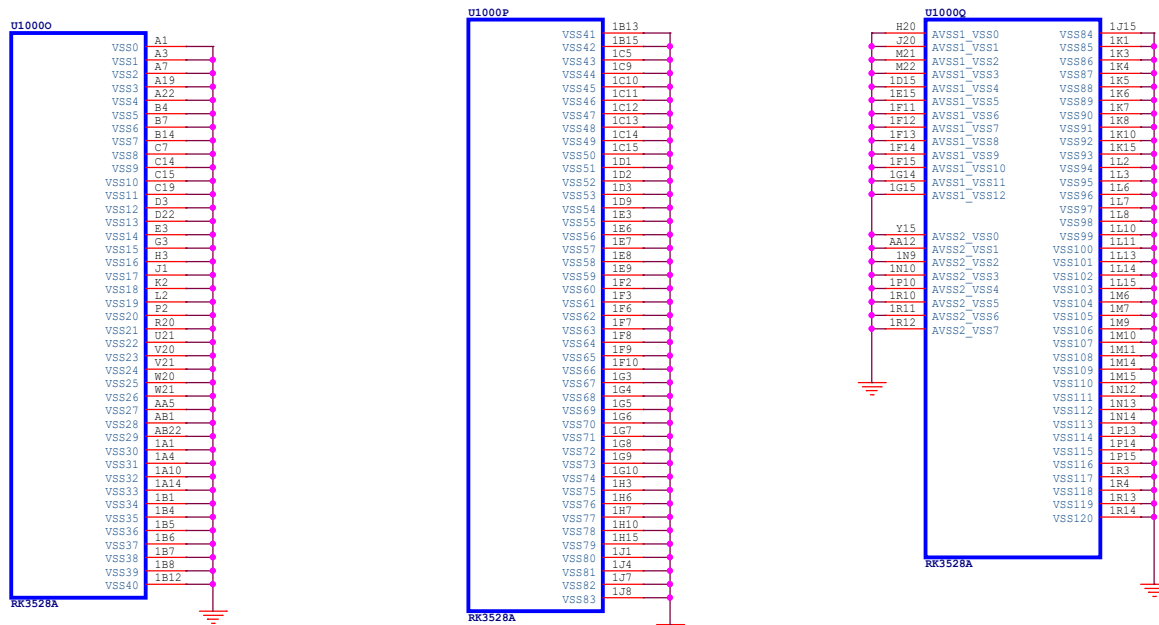
# RK3528A Block Diagram



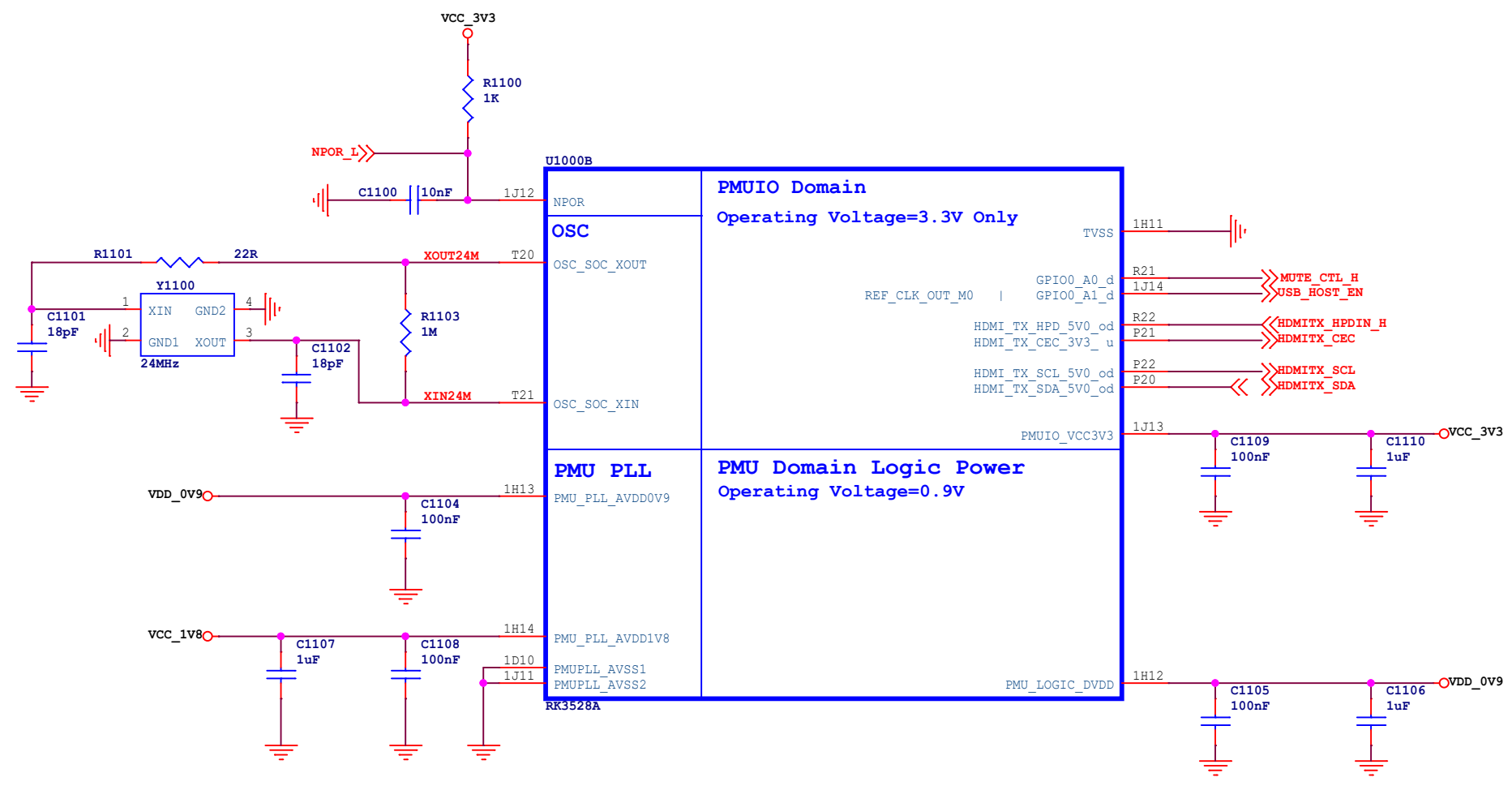
# RK3528A\_N (POWER)



# RK3528A\_O/P/Q (GND)



# RK3528A\_B (OSC/PLL/PMUIO Domain)



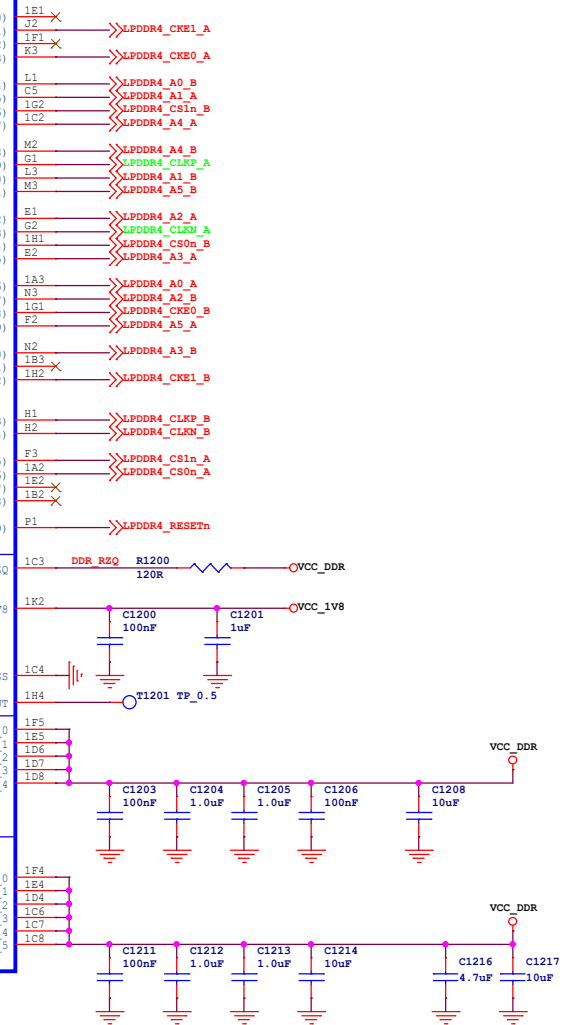
Size	Title: ROCK 2A	REV
A4	Page Name: 05.RK3528A OSC/PLL/PMUIO	V1.2
Date: Thursday, June 06, 2024	Sheet 05 of 25	

# RK3528A\_A (DDR PHY)

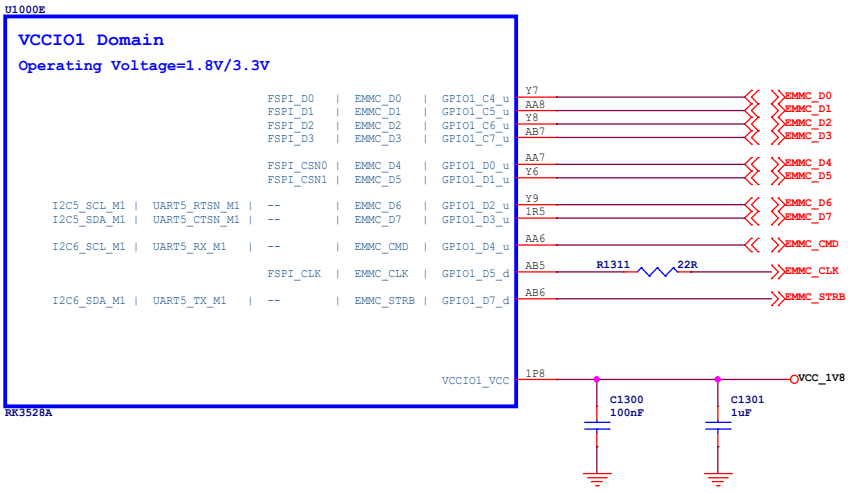
U1000A

	DDR4	LPDDR4	DDR3	LPDDR3	DDR4	LPDDR4	DDR3	LPDDR3		
LPDDR4_DQ0_A	DDRPHY_A_DQ0	DDR4_DQ0_A	LPDDR4_DQ0_A	DDR3_D0	LPDDR3_D0	DDR4_A0	LPDDR4_ODT1_B	DDR3_A9	LPDDR3_ODT2	DDRPHY_A0 (AC0)
LPDDR4_DQ1_A	DDRPHY_A_DQ1	DDR4_DQ1_A	LPDDR4_DQ1_A	DDR3_D1	LPDDR3_D1	DDR4_A1	LPDDR4_CKE1_A	DDR3_A14	--	DDRPHY_A1 (AC1)
LPDDR4_DQ2_A	DDRPHY_A_DQ2	DDR4_DQ2_A	LPDDR4_DQ2_A	DDR3_D2	LPDDR3_D2	DDR4_A2	LPDDR4_ODT0_B	DDR3_A13	LPDDR3_ODT3	DDRPHY_A2 (AC2)
LPDDR4_DQ3_A	DDRPHY_A_DQ3	DDR4_DQ3_A	LPDDR4_DQ3_A	DDR3_D3	LPDDR3_D3	DDR4_A3	LPDDR4_CKE0_A	DDR3_A1	--	DDRPHY_A3 (AC3)
LPDDR4_DQ4_A	DDRPHY_A_DQ4	DDR4_DQ4_A	LPDDR4_DQ4_A	DDR3_D6	LPDDR3_D4	DDR4_A4	LPDDR4_A0_B	DDR3_A2	LPDDR3_A5	DDRPHY_A4 (AC4)
LPDDR4_DQ5_A	DDRPHY_A_DQ5	DDR4_DQ5_A	LPDDR4_DQ5_A	DDR3_D5	LPDDR3_D5	DDR4_A5	DDR4_DQ7_A	DDR3_D7	--	DDRPHY_A5 (AC5)
LPDDR4_DQ6_A	DDRPHY_A_DQ6	DDR4_DQ6_A	LPDDR4_DQ6_A	DDR3_D5	LPDDR3_D6	DDR4_A6	LPDDR4_CS_N1_B	DDR3_A3	LPDDR3_CS_N2	DDRPHY_A6 (AC6)
LPDDR4_DQ7_A	DDRPHY_A_DQ7	DDR4_DQ7_A	LPDDR4_DQ7_A	DDR3_D3	LPDDR3_D7	DDR4_A7	LPDDR4_A4_A	DDR3_A6	--	DDRPHY_A7 (AC7)
LPDDR4_DM0_A	DDRPHY_A_DM0	DDR4_DML_A	LPDDR4_DM0_A	DDR3_DM0	LPDDR3_DM0	DDR4_A8	LPDDR4_A4_B	DDR3_A5	LPDDR3_A6	DDRPHY_A8 (AC8)
LPDDR4_DQS0P_A	DDRPHY_A_DQS0P	DDR4_DQS1_P_A	LPDDR4_DQS0P_A	DDR3_DQS0P	LPDDR3_DQS0P	DDR4_A9	LPDDR4_CLKP_A	DDR3_A11	LPDDR3_A2	DDRPHY_A9 (AC9)
LPDDR4_DQS0N_A	DDRPHY_A_DQS0N	DDR4_DQS1_N_A	LPDDR4_DQS0N_A	DDR3_DQS0N	LPDDR3_DQS0N	DDR4_A10	LPDDR4_A1_B	DDR3_A0	--	DDRPHY_A10 (AC10)
						DDR4_A11	LPDDR4_A5_B	DDR3_A7	LPDDR3_A7	DDRPHY_A11 (AC11)
						DDR4_A12	LPDDR4_A2_A	DDR3_A10	LPDDR3_A4	DDRPHY_A12 (AC12)
						DDR4_A13	LPDDR4_CLKN_A	DDR3_A8	LPDDR3_A3	DDRPHY_A13 (AC13)
						DDR4_WEN/A14	LPDDR4_CS_N0_B	DDR3_ODT0	LPDDR3_CS_N3	DDRPHY_A14 (AC14)
						DDR4_CASW/A15	LPDDR4_A3_A	DDR3_BA1	LPDDR3_A0	DDRPHY_A15 (AC15)
						DDR4_RASN/A16	LPDDR4_A0_A	DDR3_CKE0	--	DDRPHY_A16 (AC16)
						DDR4_ACTN	LPDDR4_A2_B	DDR3_CS_N0	LPDDR3_A9	DDRPHY_ACTN (AC17)
						DDR4_BA0	LPDDR4_CKE0_B	DDR3_BA2	LPDDR3_CKE0	DDRPHY_BA0 (AC18)
						DDR4_BA1	LPDDR4_A5_A	DDR3_A12	LPDDR3_A1	DDRPHY_BA1 (AC19)
						DDR4_BG0	LPDDR4_A3_B	DDR3_BA0	LPDDR3_A8	DDRPHY_BG0 (AC20)
						DDR4_BG1	--	DDR3_A15	--	DDRPHY_BG1 (AC21)
						DDR4_CKE	LPDDR4_CKE1_B	DDR3_RASN	--	DDRPHY_CKE (AC22)
						DDR4_CLKP	LPDDR4_CLKP_B	DDR3_CLKP	LPDDR3_CLKP	DDRPHY_CLKP (AC23)
						DDR4_CLKN	LPDDR4_CLKN_B	DDR3_CLKN	LPDDR3_CLKN	DDRPHY_CLKN (AC24)
						DDR4_CS_N0	LPDDR4_CS_N1_A	DDR3_CASN	LPDDR3_CS_N1	DDRPHY_CS_N0 (AC25)
						DDR4_CS_N1	LPDDR4_CS_N0_A	DDR3_CS_N1	LPDDR3_CS_N0	DDRPHY_CS_N1 (AC26)
						DDR4_ODT0	LPDDR4_ODT1_A	DDR3_WEN	LPDDR3_ODT0	DDRPHY_ODT0 (AC27)
						DDR4_ODT1	LPDDR4_ODT0_A	DDR3_ODT1	LPDDR3_ODT1	DDRPHY_ODT1 (AC28)
						DDR4_RESETN	LPDDR4_RESETN	DDR3_RESETN	--	DDRPHY_RESETN (AC29)
						Note: Sequences can not be swap				
						DDR3L = 1.35V DDR3 = 1.5V DDR4 = 1.2V LPDDR3 = 1.2V LPDDR4 = 1.1V LPDDR4x = 0.6V				
						DDR3L = 1.35V DDR3 = 1.5V DDR4 = 1.2V LPDDR3 = 1.2V LPDDR4 = 1.1V LPDDR4x = 1.1V				

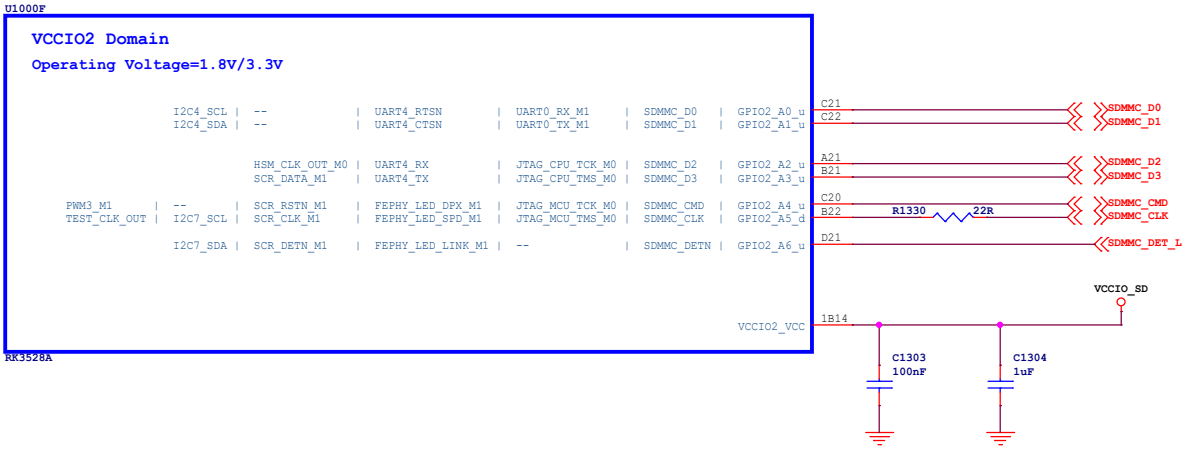
RK3528A



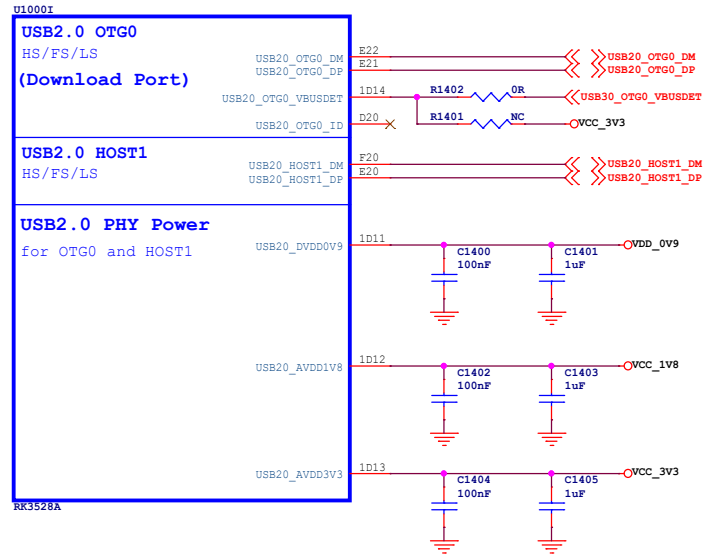
# RK3528A\_E (VCCIO1 Domain)



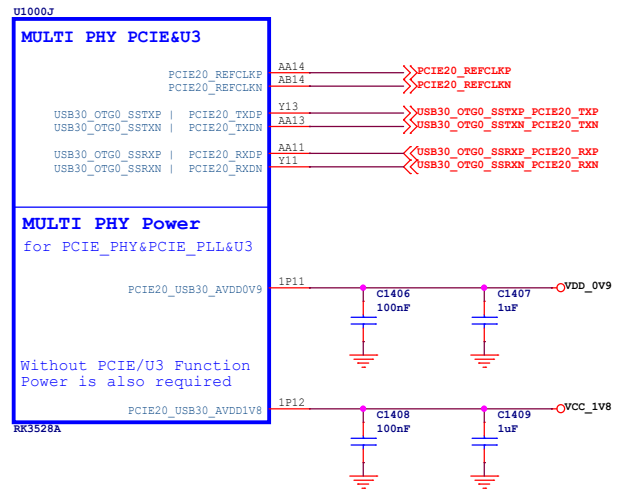
# RK3528A\_F (VCCIO2 Domain)



# RK3528A\_I (USB2.0 OTG/HOST)

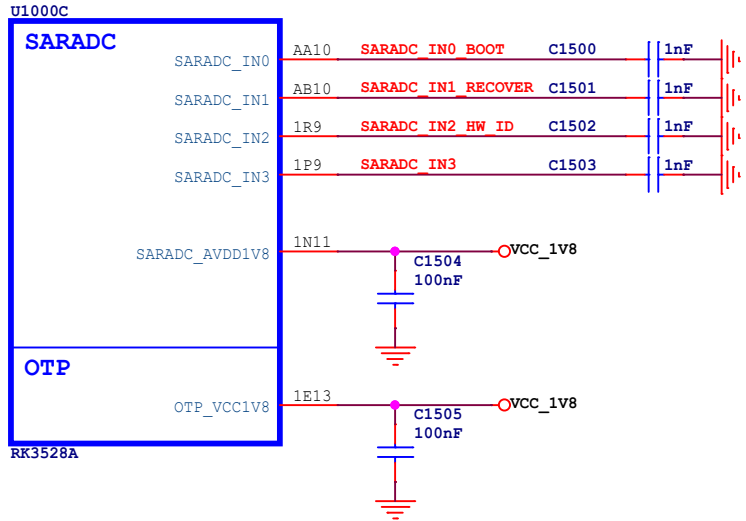


# RK3528A\_J (PCIE2.0/U3 PHY)



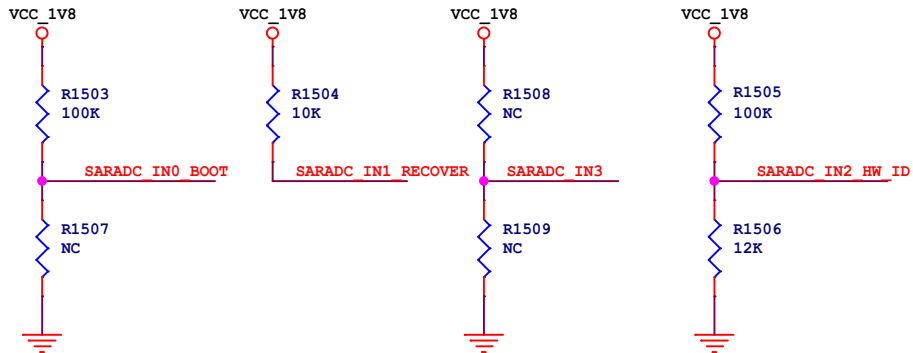


# RK3528A\_C (Saradc/OTP)



**TABLE**

Item	Rup	Rdown	ADC	BOOT MODE
LEVEL1	DNP	100K	0	USB (Maskrom mode)
LEVEL2	100K	12K	114	
LEVEL3	100K	27K	228	FSPI--USB
LEVEL4	100K	51K	342	
LEVEL5	100K	82K	456	
LEVEL6	100K	120K	570	EMMC--USB
LEVEL7	100K	200K	683	EMMC--SD Card--USB
LEVEL8	100K	330K	796	SD Card--USB
LEVEL9	100K	820K	910	
LEVEL10	100K	DNP	1023	FSPI--EMMC--SD Card--USB

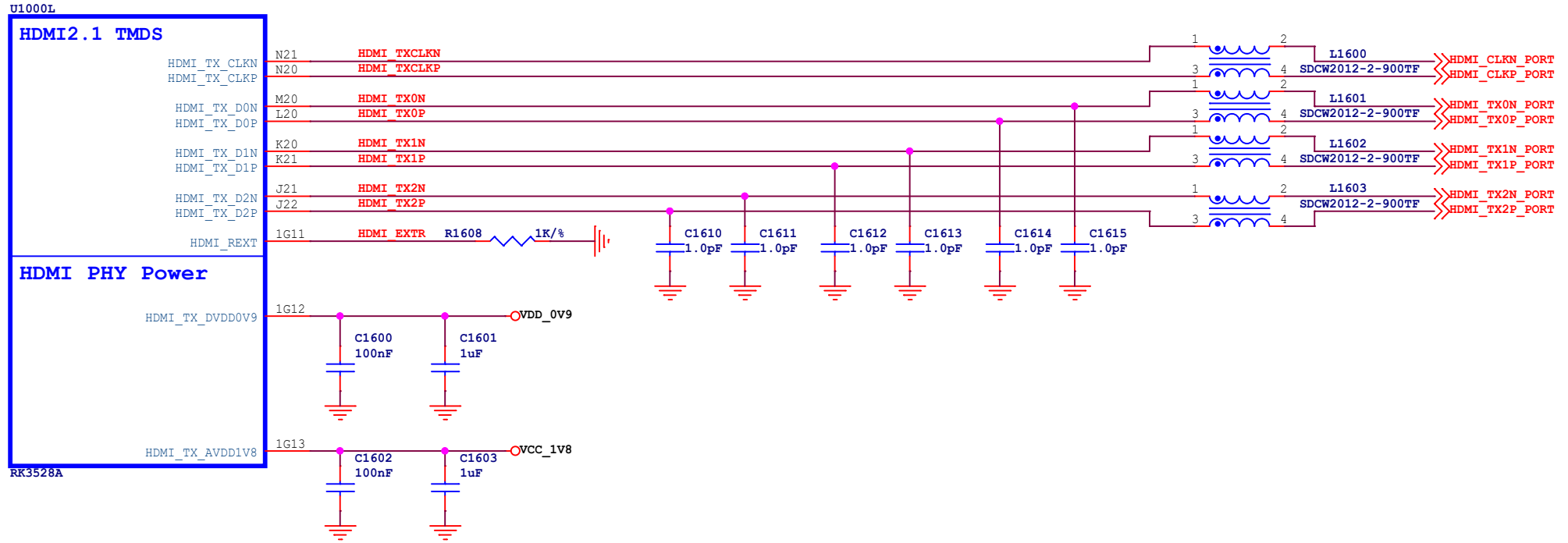


HW_ID	Rup	Rdown	Note
HW_ID1	100K	12K	onboard antenna
HW_ID2	100K	27K	external antenna



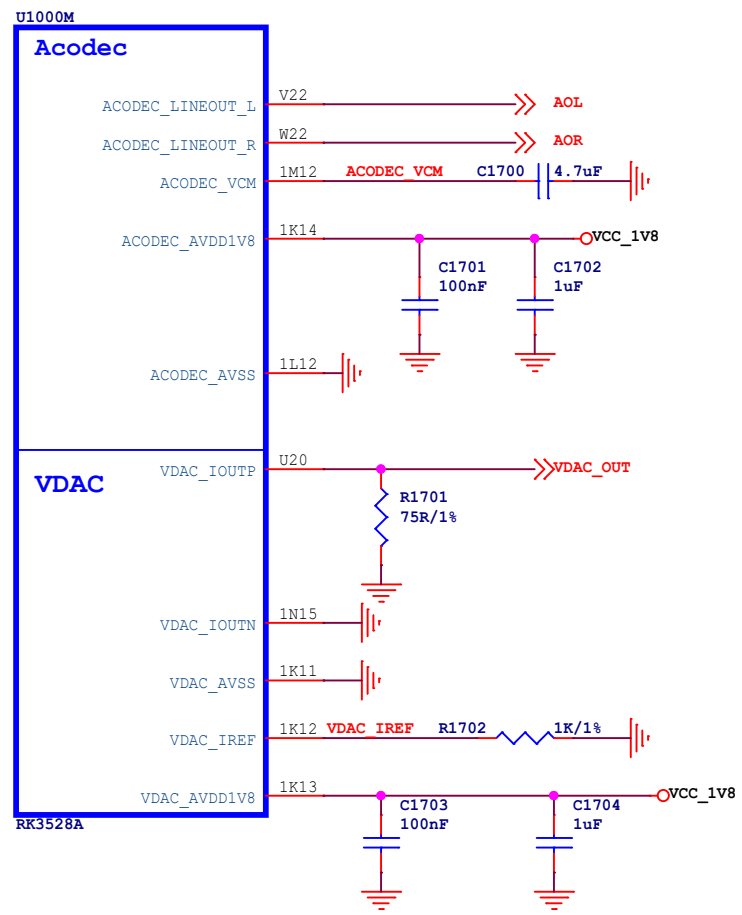
Size	Title: ROCK 2A	REV
A4	Page Name: 09.RK3528A SARADC/OTP	V1.2
Date: Thursday, June 06, 2024	Sheet 09 of 25	

# RK3528A\_L (HDMI PHY)



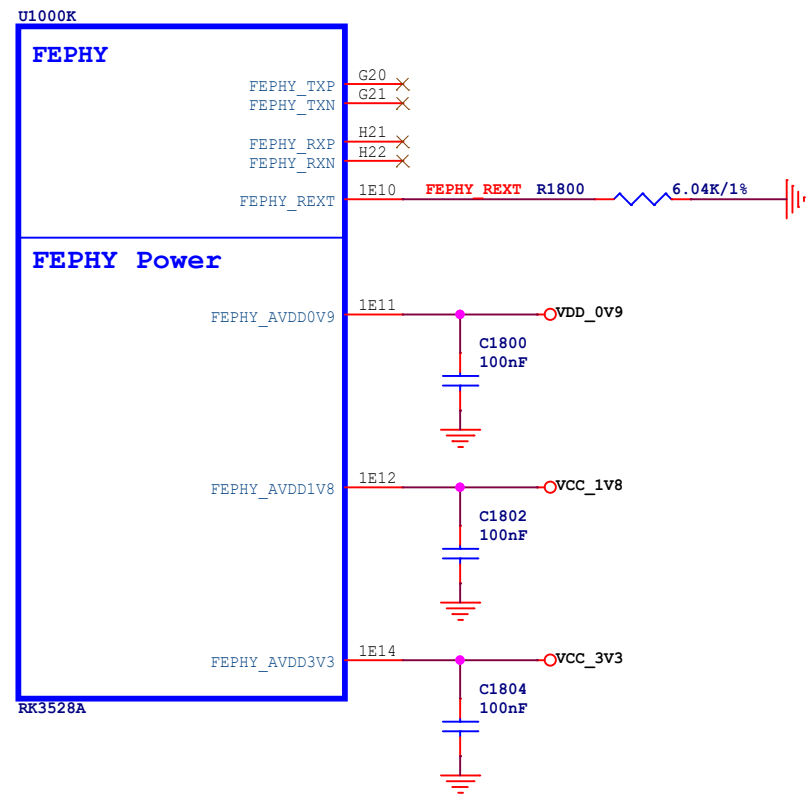
Size	Title: ROCK 2A	REV
A4	Page Name: 10.RK3528A HDMI Interface	V1.2
Date: Thursday, June 06, 2024	Sheet	10 of 25

# RK3528A\_M (Acodec/VDAC)



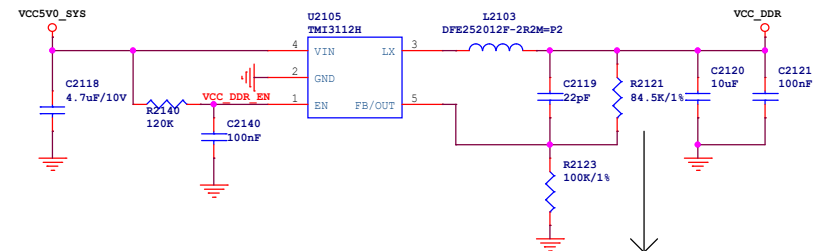
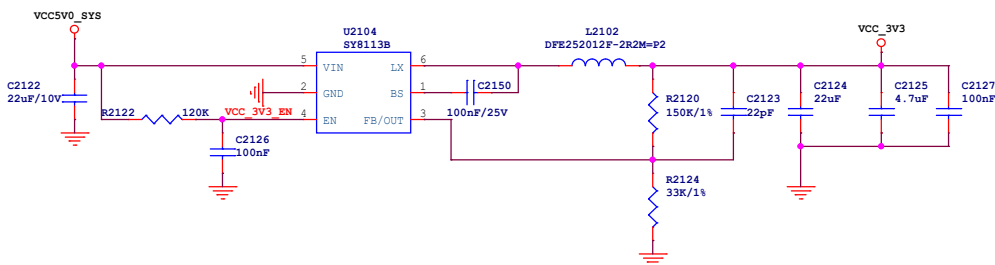
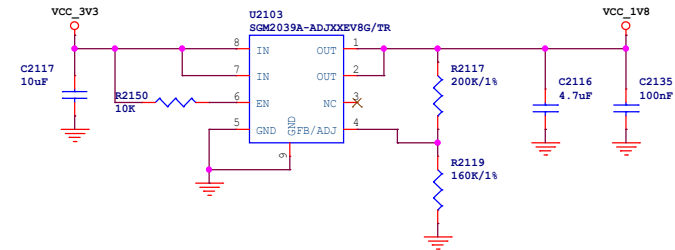
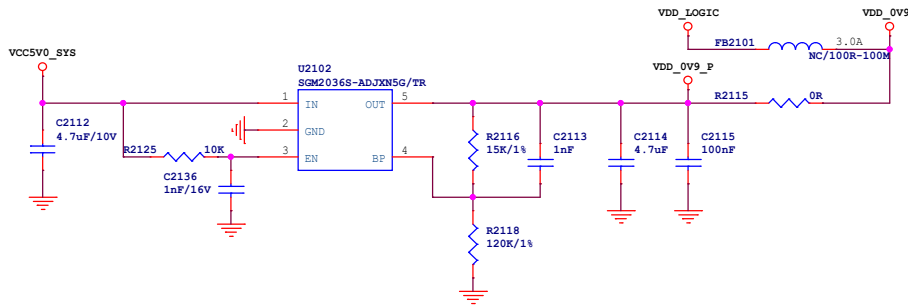
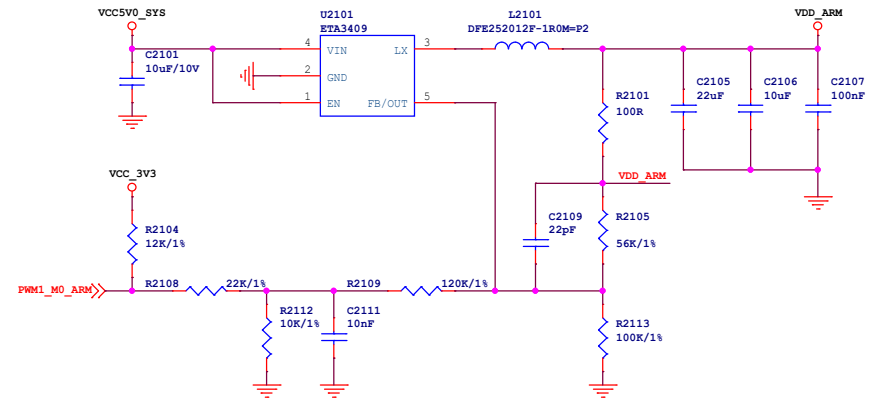
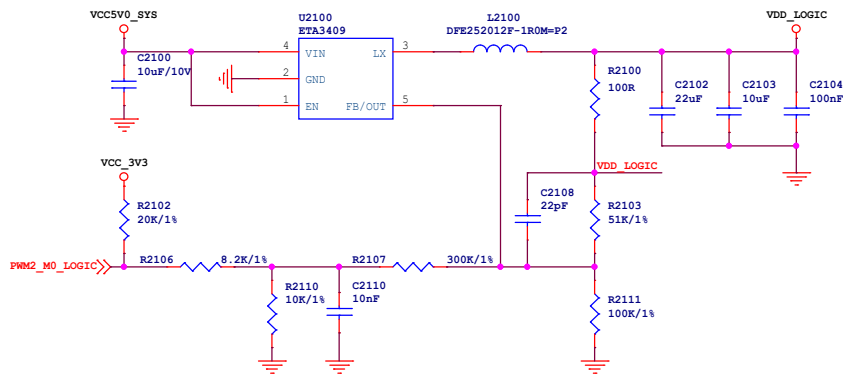
Size	Title: ROCK 2A	REV
A4	Page Name: 11.RK3528A AV OUT	V1.2
Date: Thursday, June 06, 2024	Sheet 11 of 25	

# RK3528A\_K (Embed FEPHY)



Size	Title: ROCK 2A	REV
A4	Page Name: 12.RK3528A Embed FEPHY	V1.2
Date:	Thursday, June 06, 2024	Sheet 12 of 25





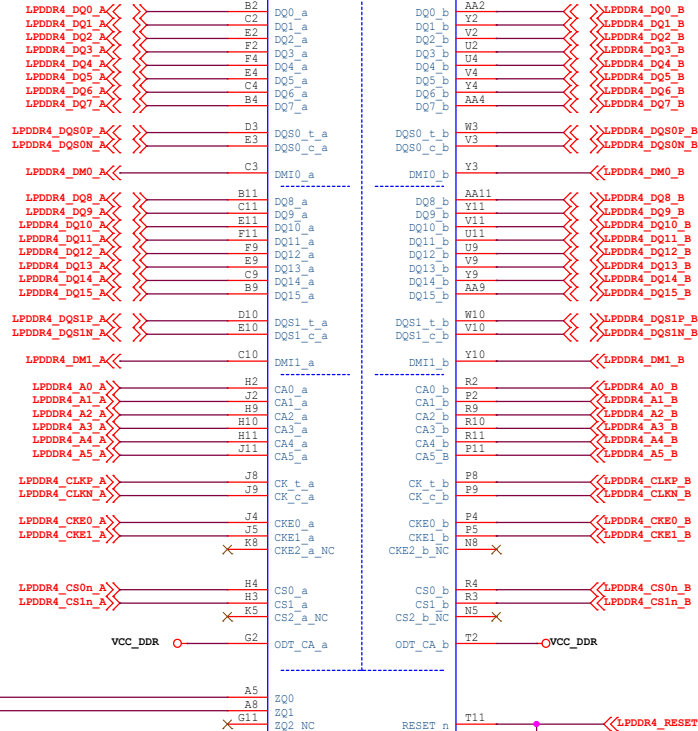
DDR4	1.20V	100K	1%
LPDDR4/4x	1.10V	84.5K	1%
DDR3	1.5V	150K	1%
DDR3L	1.35V	127K	1%
LPDDR3	1.25V	110K	1%



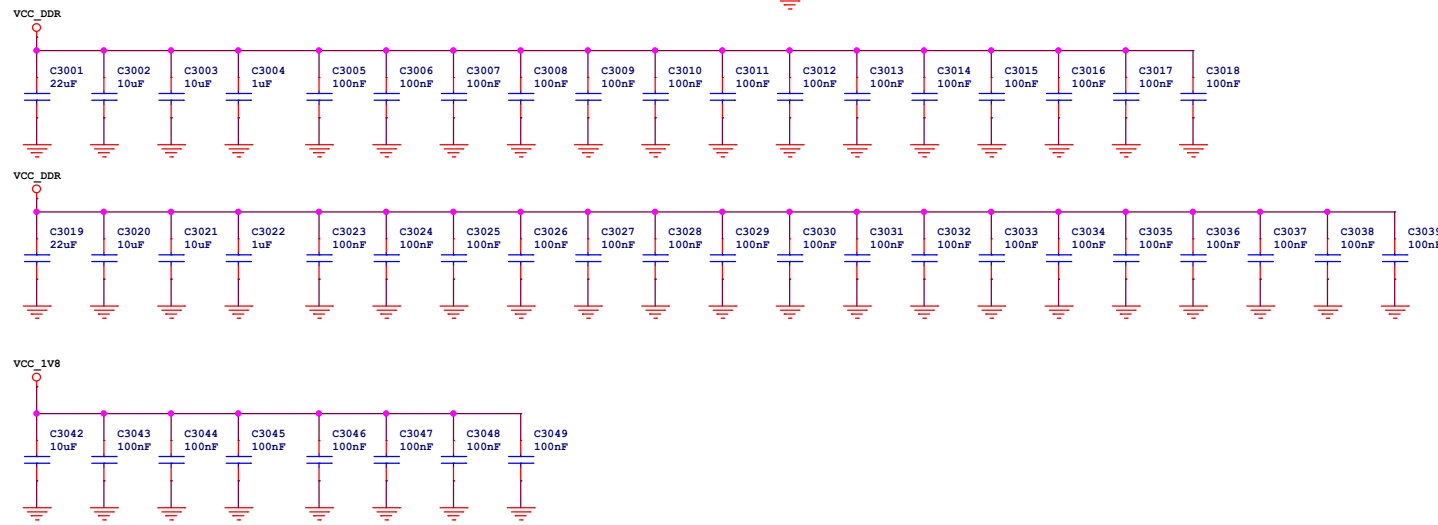
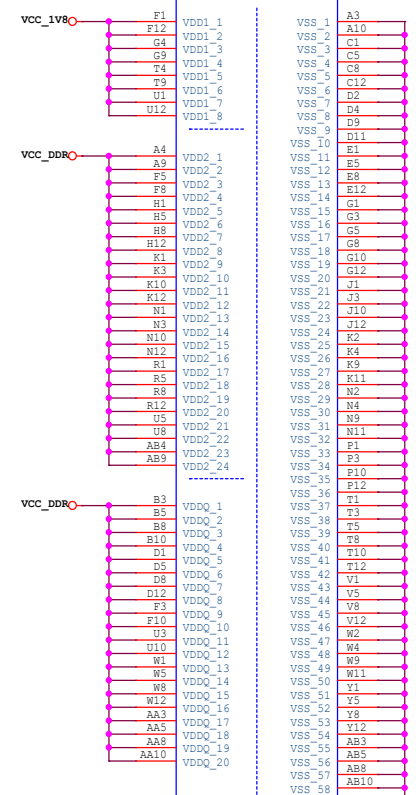
# LPDDR4 200Ball

U3000A

CH A CH B

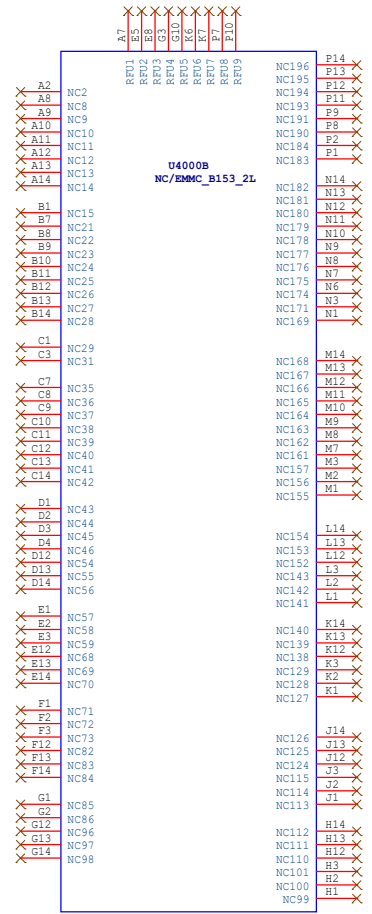
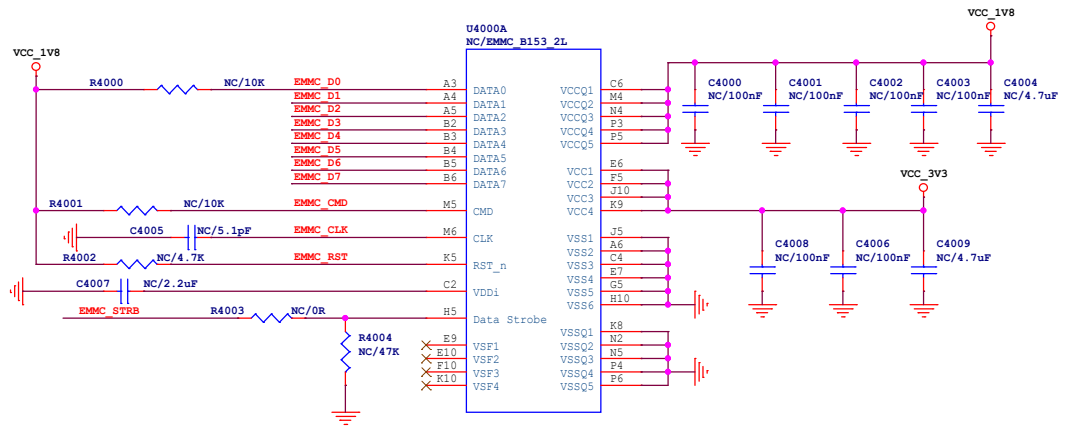


U3000B



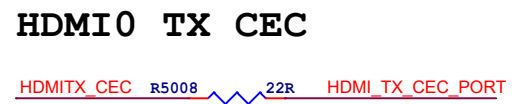
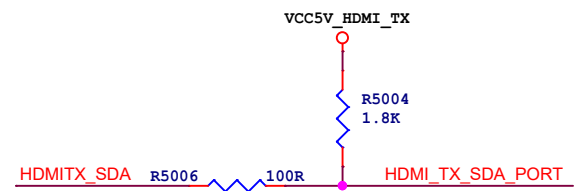
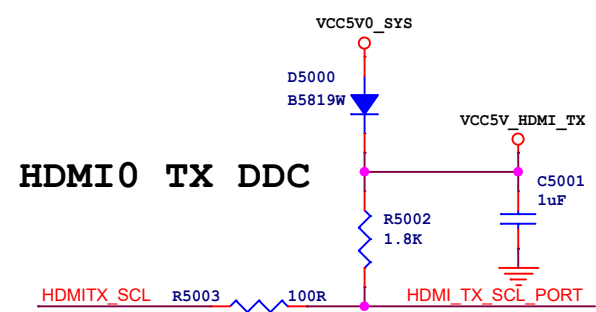
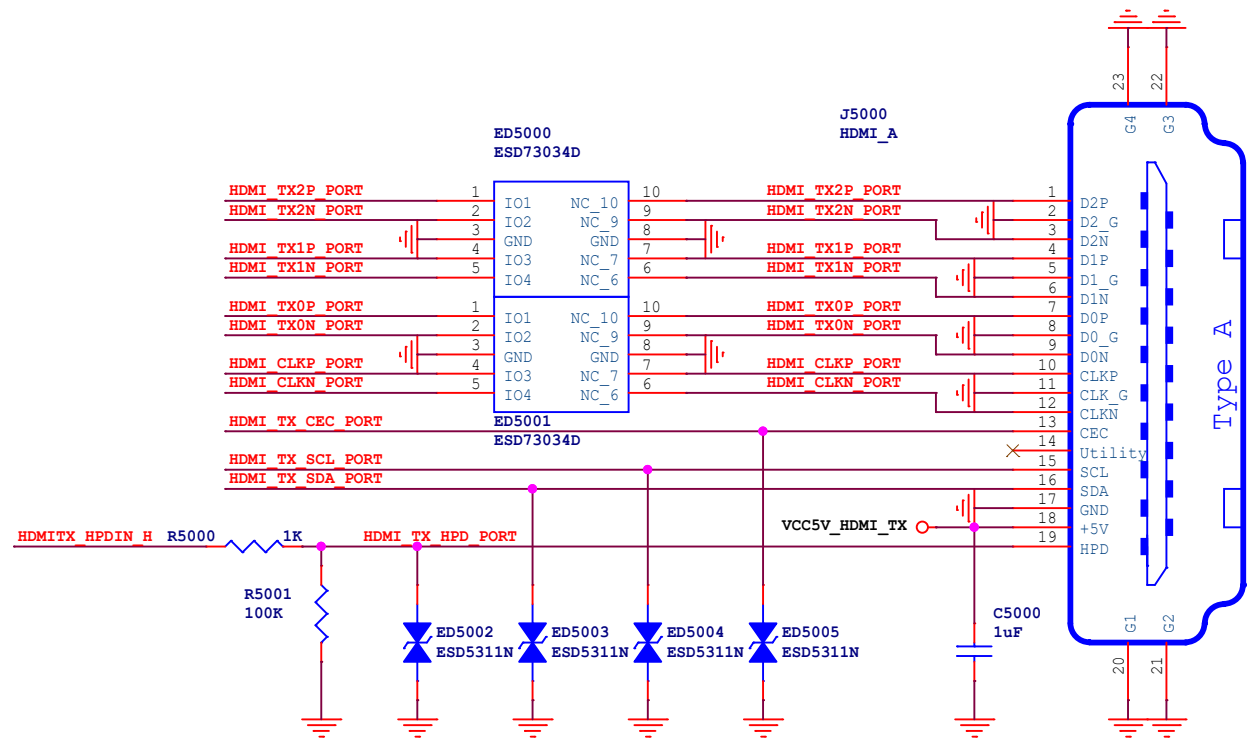
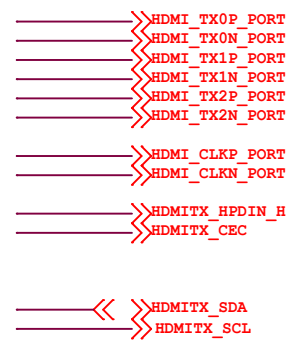
Size	Title: ROCK 2A	REV
A3	Page Name: 15.DRAM-LPDDR4_1X32bit_200P	V1.2
Date: Thursday, June 06, 2024	Sheet 15 of 25	

# EMMC (NC)



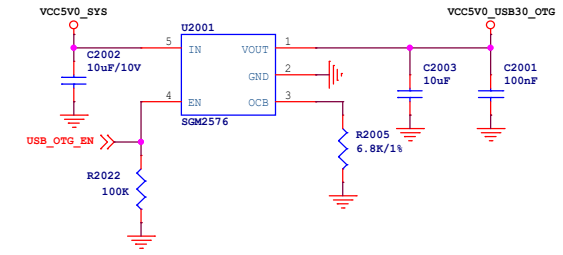
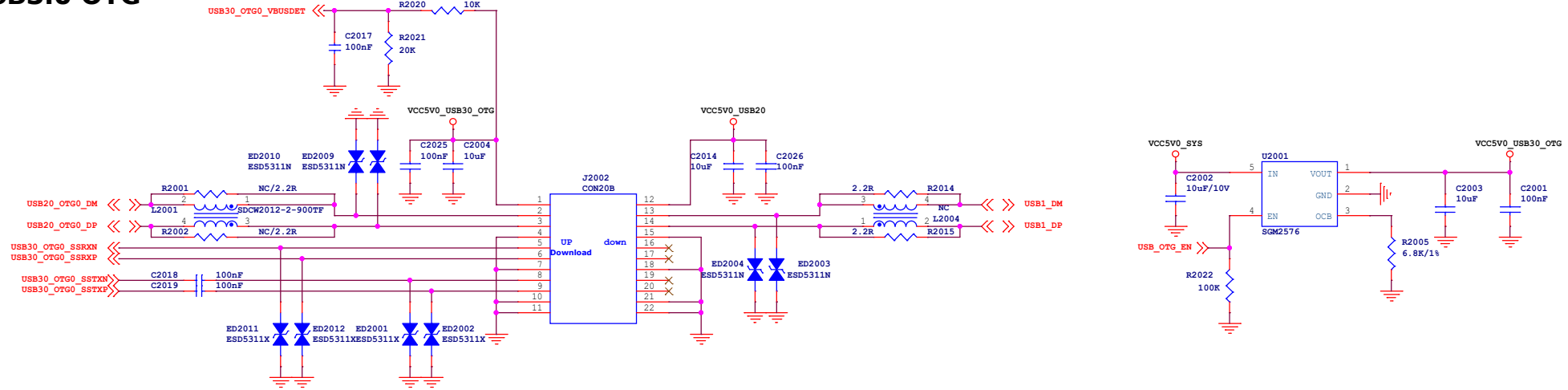


# HDMI2.0 TX

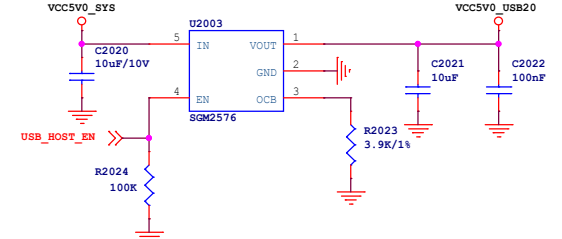
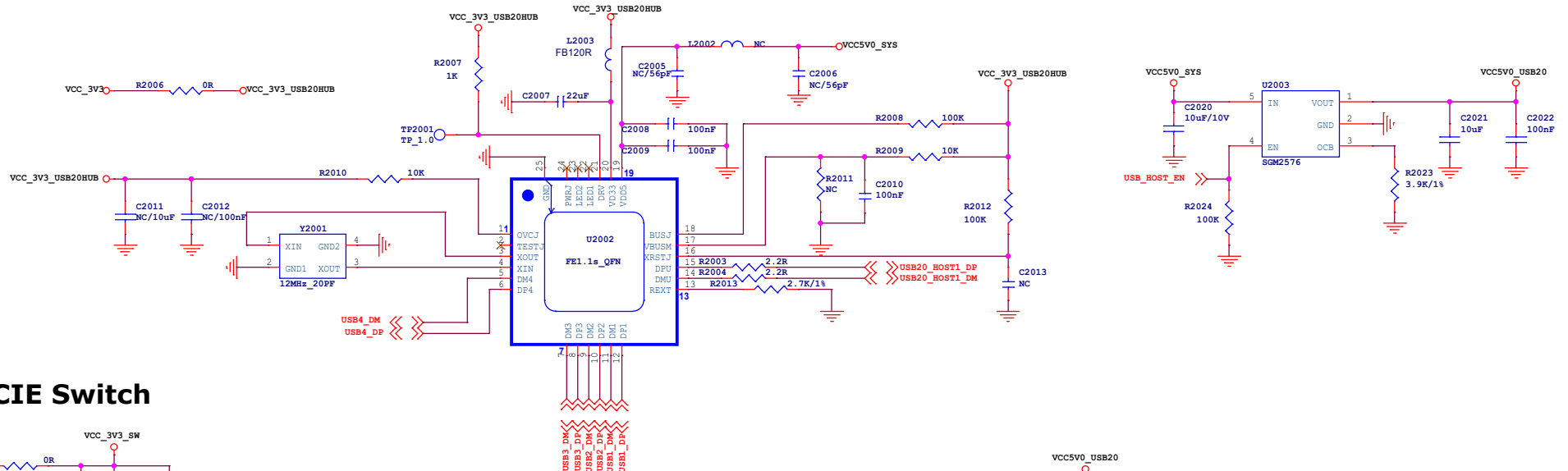


Size	Title: ROCK 2A	REV
A4	Page Name: 17.HDMI TX	V1.2
Date: Thursday, June 06, 2024	Sheet 17 of 25	

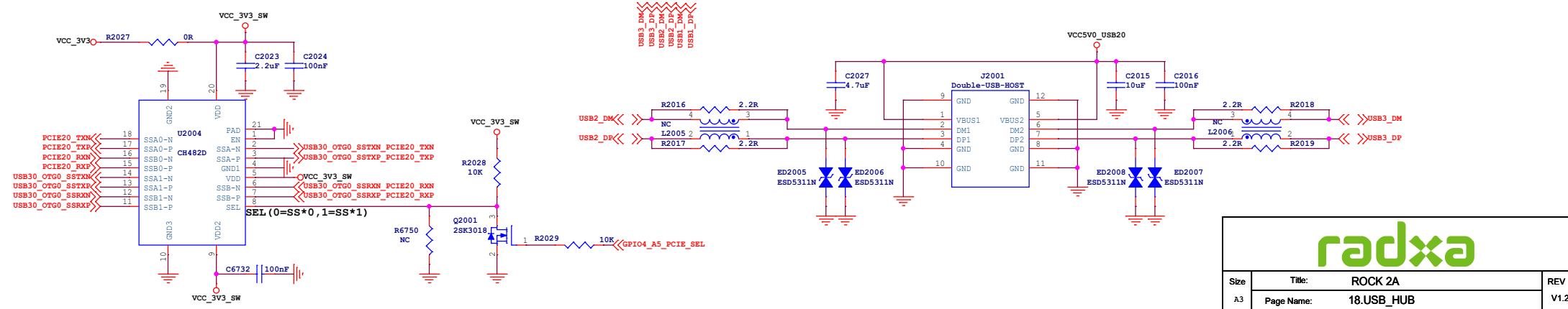
# USB3.0 OTG




# USB2.0 HUB+USB2.0



# USB\_SS/PCIE Switch

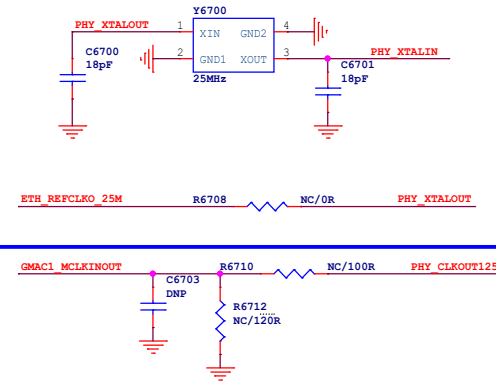




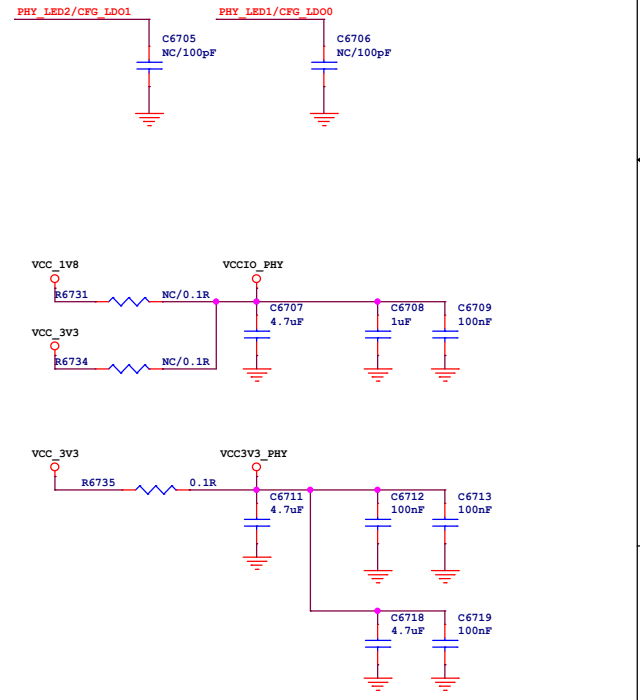
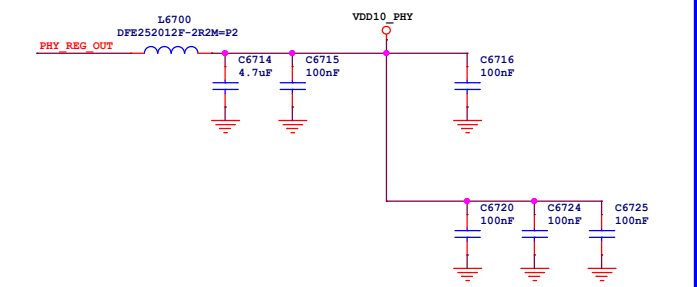
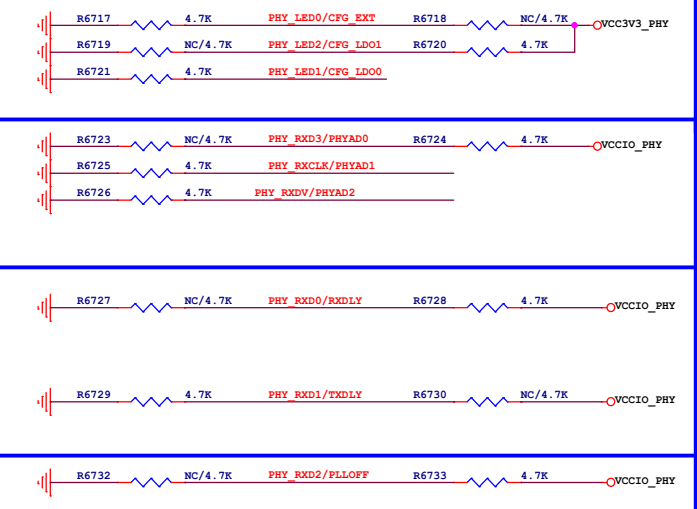
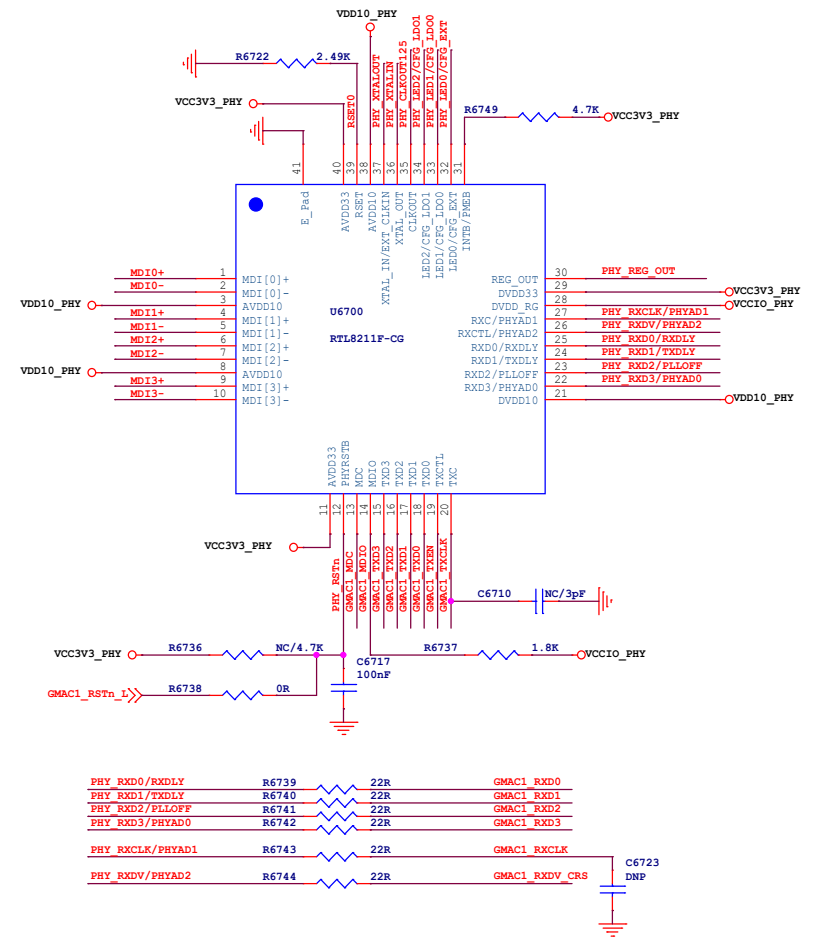
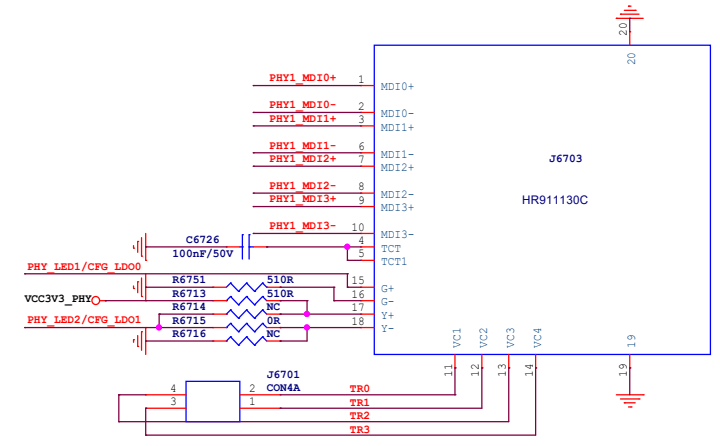
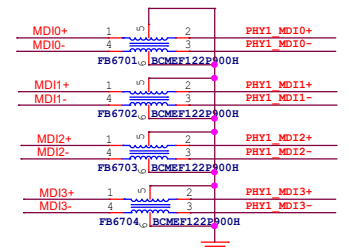
Size	Title: ROCK 2A	REV
A3	Page Name: 18.USB_HUB	V1.2
Date: Thursday, June 06, 2024	Sheet 18	of 25


# RGMI I

- >>> GMAC1\_TXD0
- >>> GMAC1\_TXD1
- >>> GMAC1\_TXD2
- >>> GMAC1\_TXD3
- >>> GMAC1\_TXEN
- >>> GMAC1\_RXCLK
- >>> GMAC1\_RXD0
- >>> GMAC1\_RXD1
- >>> GMAC1\_RXD2
- >>> GMAC1\_RXD3
- >>> GMAC1\_RXDV\_CRS
- >>> GMAC1\_RXCLK
- >>> ETH\_REFCLKO\_25M
- >>> GMAC1\_MCLKINOUT
- >>> GMAC1\_MDC
- >>> GMAC1\_MDIO
- >>> GMAC1\_RSTn\_L



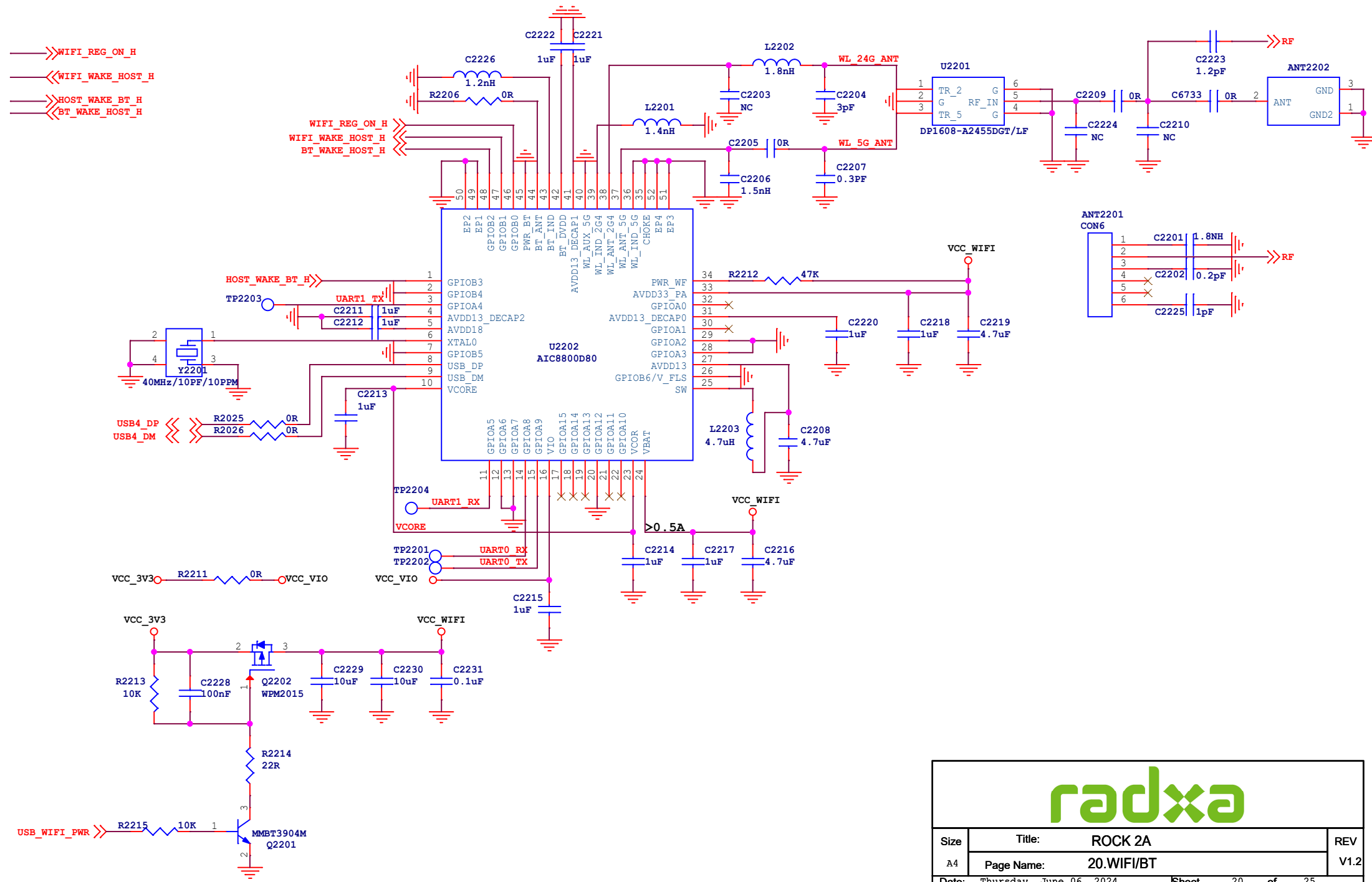
# RJ45





Size	Title: ROCK 2A	REV
A3	Page Name: 19.Ethernet_RGMII	V1.2
Date: Thursday, June 06, 2024	Sheet 19 of 25	

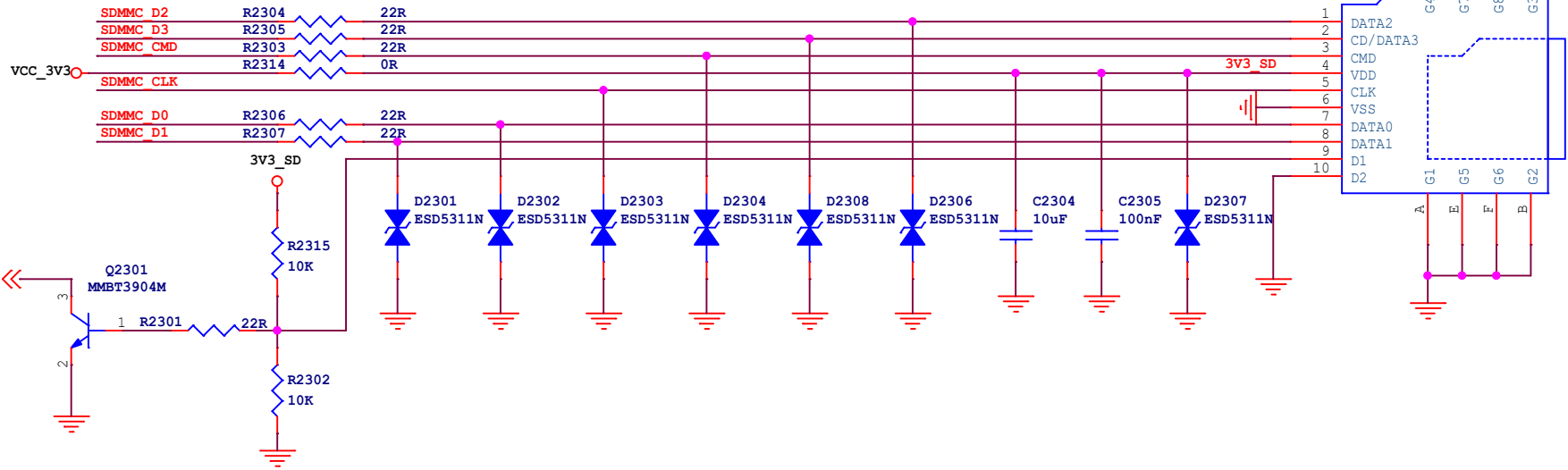
# WIFI/BT (USB interface)



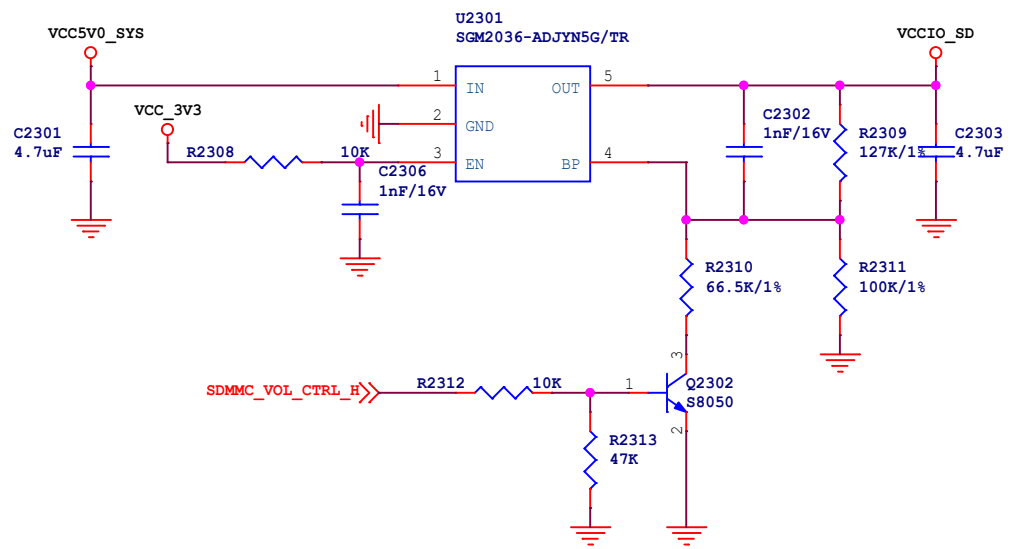
Size	Title: ROCK 2A	REV
A4	Page Name: 20.WIFI/BT	V1.2
Date: Thursday, June 06, 2024	Sheet 20 of 25	

# Micro\_SD Card

- SDMMC\_D0
- SDMMC\_D1
- SDMMC\_D2
- SDMMC\_D3
- SDMMC\_CMD
- SDMMC\_CLK

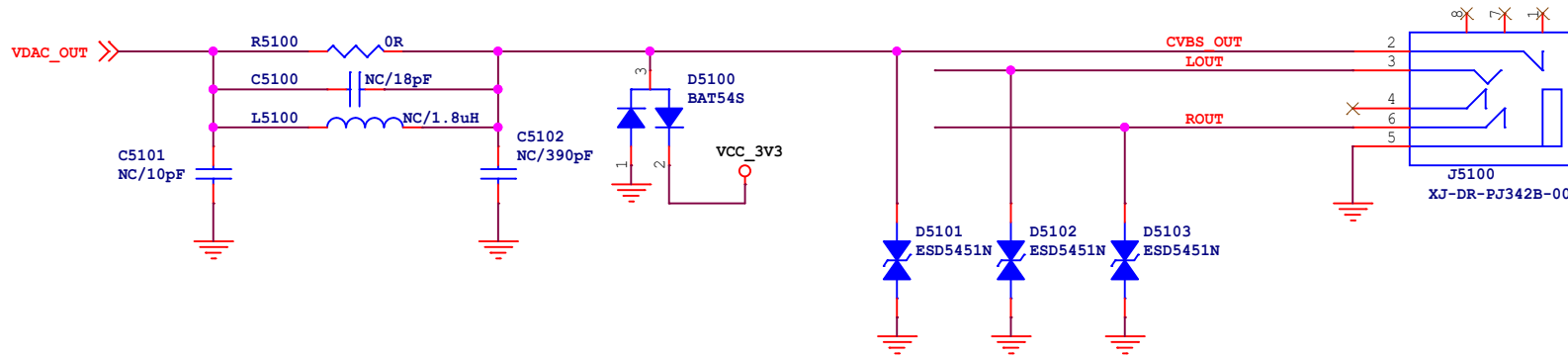


# VCCIO\_SD

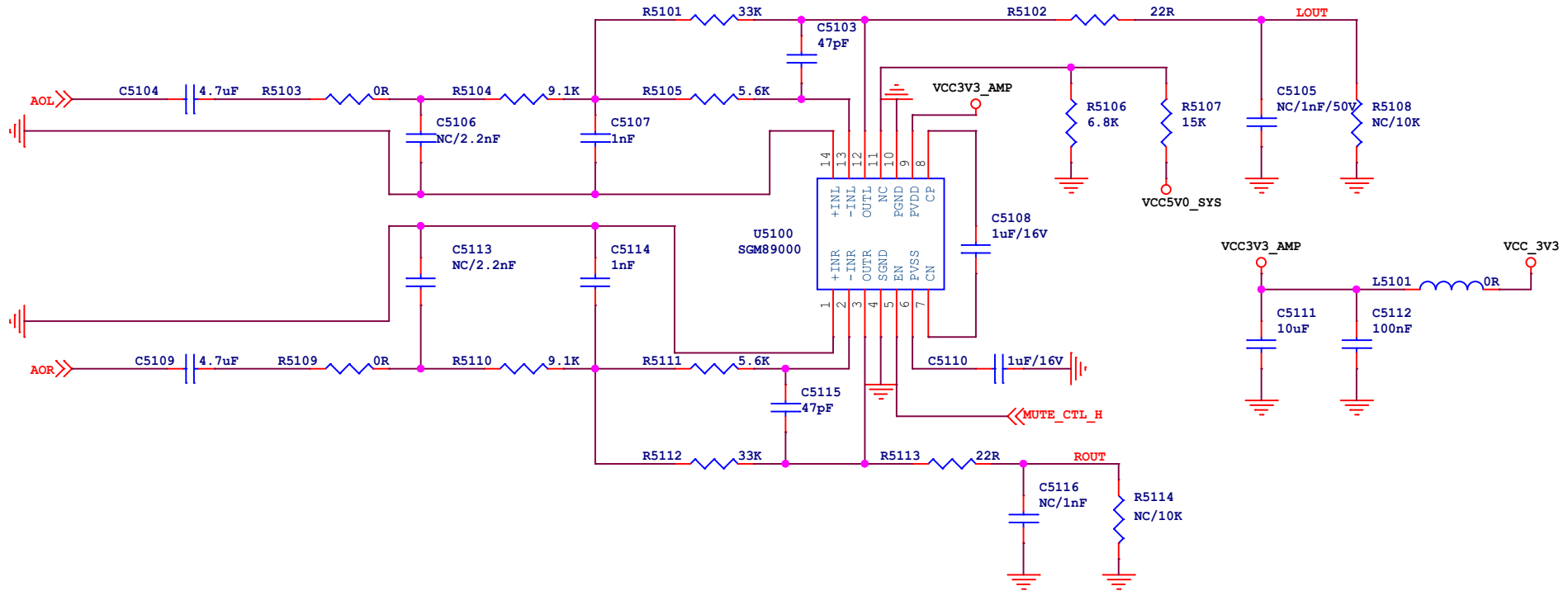


Size	Title: ROCK 2A	REV
A4	Page Name: 21.Micro_SD	V1.2
Date: Thursday, June 06, 2024	Sheet 21 of 25	

# CVBS/AV\_OUT

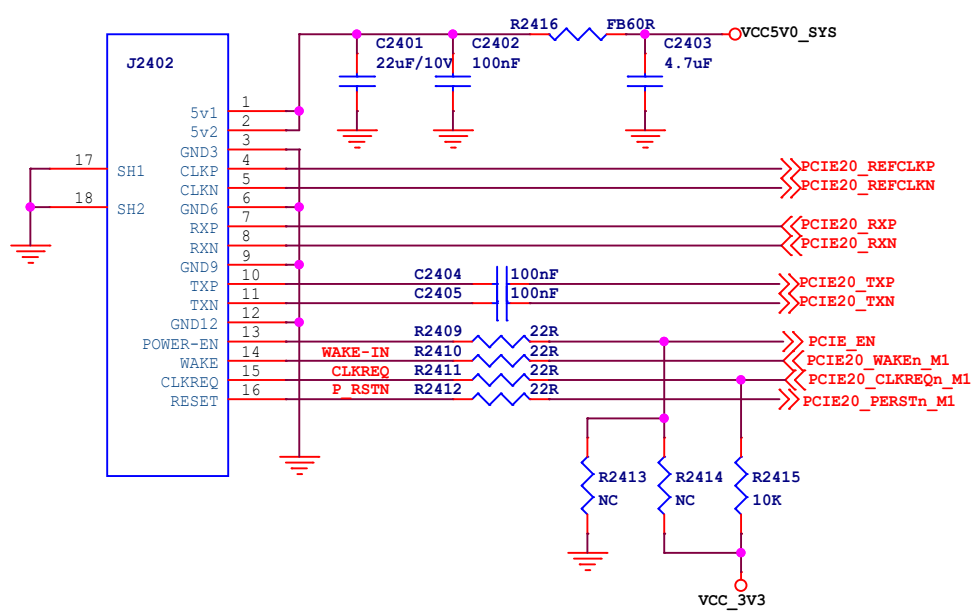
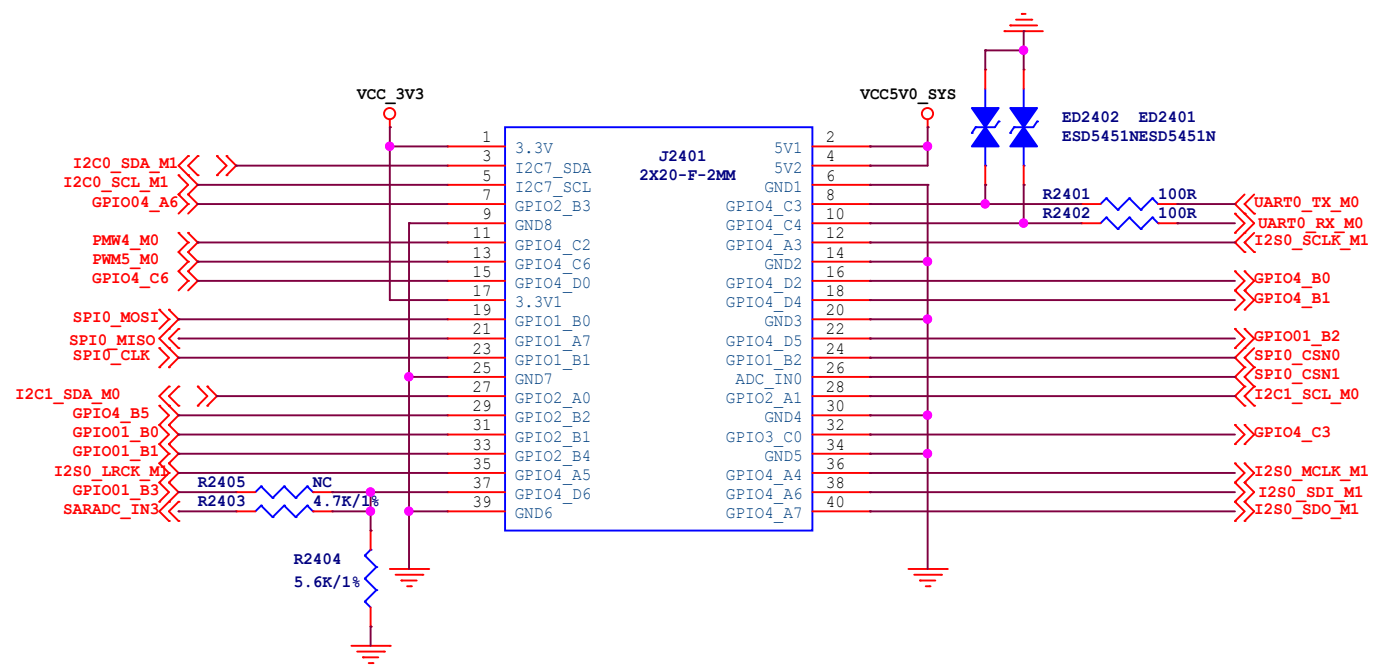



# 2-Vrms Audio Line Driver



Size	Title: ROCK 2A	REV
A4	Page Name: 22.VO-AV Interface	V1.2
Date: Thursday, June 06, 2024	Sheet 22 of 25	

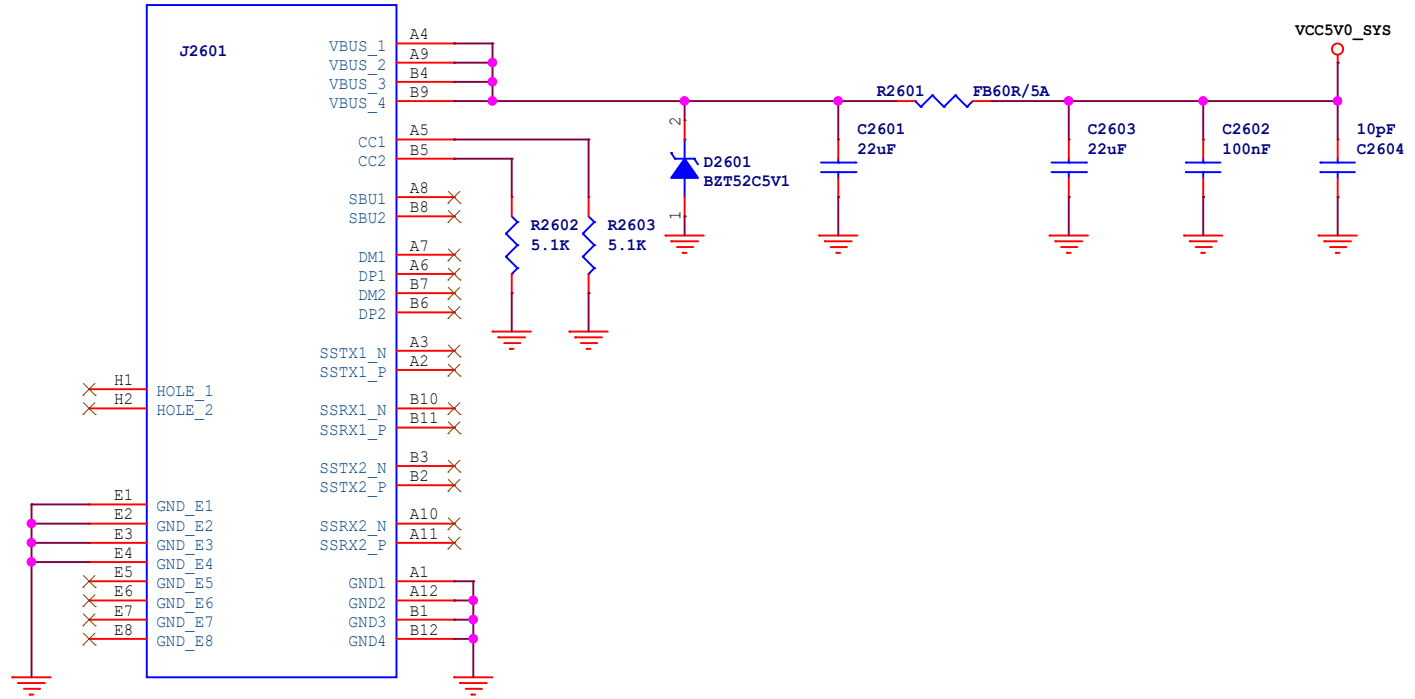
# 40PIN\_Connector/PCIE interface





Size	Title: ROCK 2A	REV
A4	Page Name: 23.40PIN_Connctor/PCIE interface	V1.2
Date:	Thursday, June 06, 2024	Sheet 23 of 25

# DC 5V

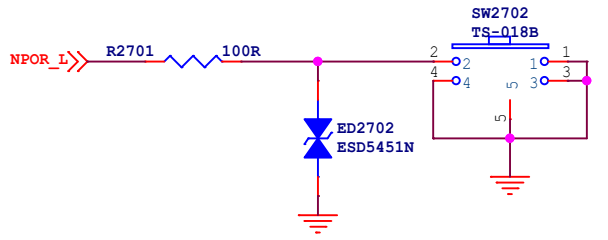


Size	Title: ROCK 2A	REV
A4	Page Name: 24.5V_Power	V1.2
Date: Thursday, June 06, 2024	Sheet 24 of 25	

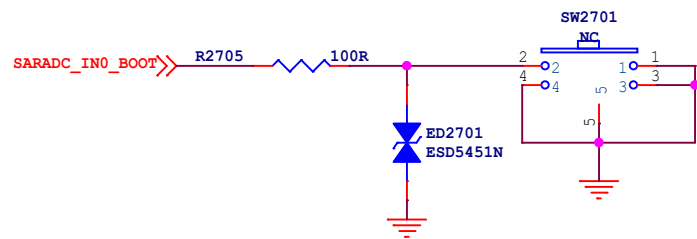


# KEY

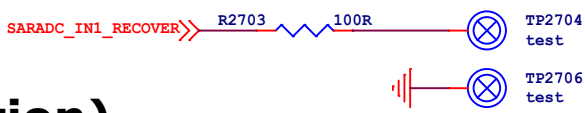
## RESET



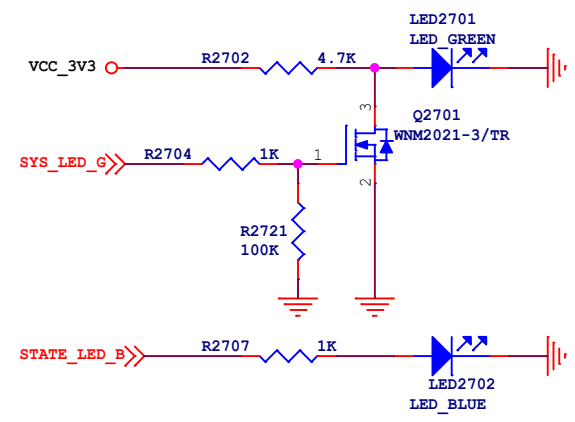
## MASKROM



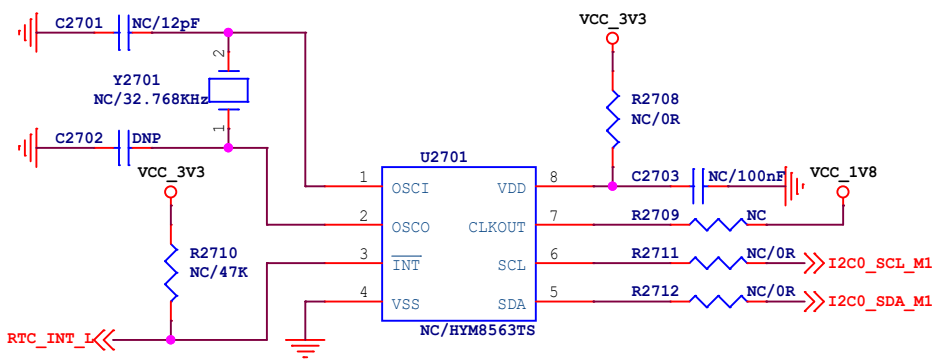
## RECOVERY



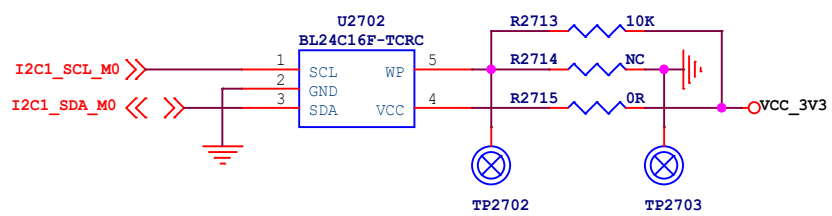
# LED



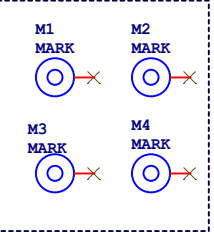
# RTC(option)




# EEPROM



# MARK





Size	Title: ROCK 2A	REV
A4	Page Name: 25.Key_LED_RTC_EEPROM	V1.2
Date: Thursday, June 06, 2024	Sheet	25 of 25