

野火 RK3588 LubanCat 5 原理图

Page 1	Content
Page 2	Historic Version
Page 3	PWR TREE
Page 4	DC Power IN/SYS Power/FAN
Page 5	SYS_Power/SATA_Power
Page 6	Power_Ext Discrete
Page 7	PMIC DC-DC
Page 8	PMIC Managerment/LDO
Page 9	RK3588_Power/GND
Page 10	OSC/PLL/PMUIO
Page 11	DDR Controler
Page 12	LPDDR4/4x_01
Page 13	LPDDR4/4x_02
Page 14	EMMC/SD Controller
Page 15	USB20/TYPE C/DP PHY
Page 16	SARADC/1.8V GPIO
Page 17	MIPI D/C Interface
Page 18	MIPI CSI Interface
Page 19	HDMI/eDP Interface
Page 20	PCIE30/PCIE20
Page 21	VCCIO 4 Interface
Page 22	VCCIO 5 Interface
Page 23	VCCIO 6 Interface

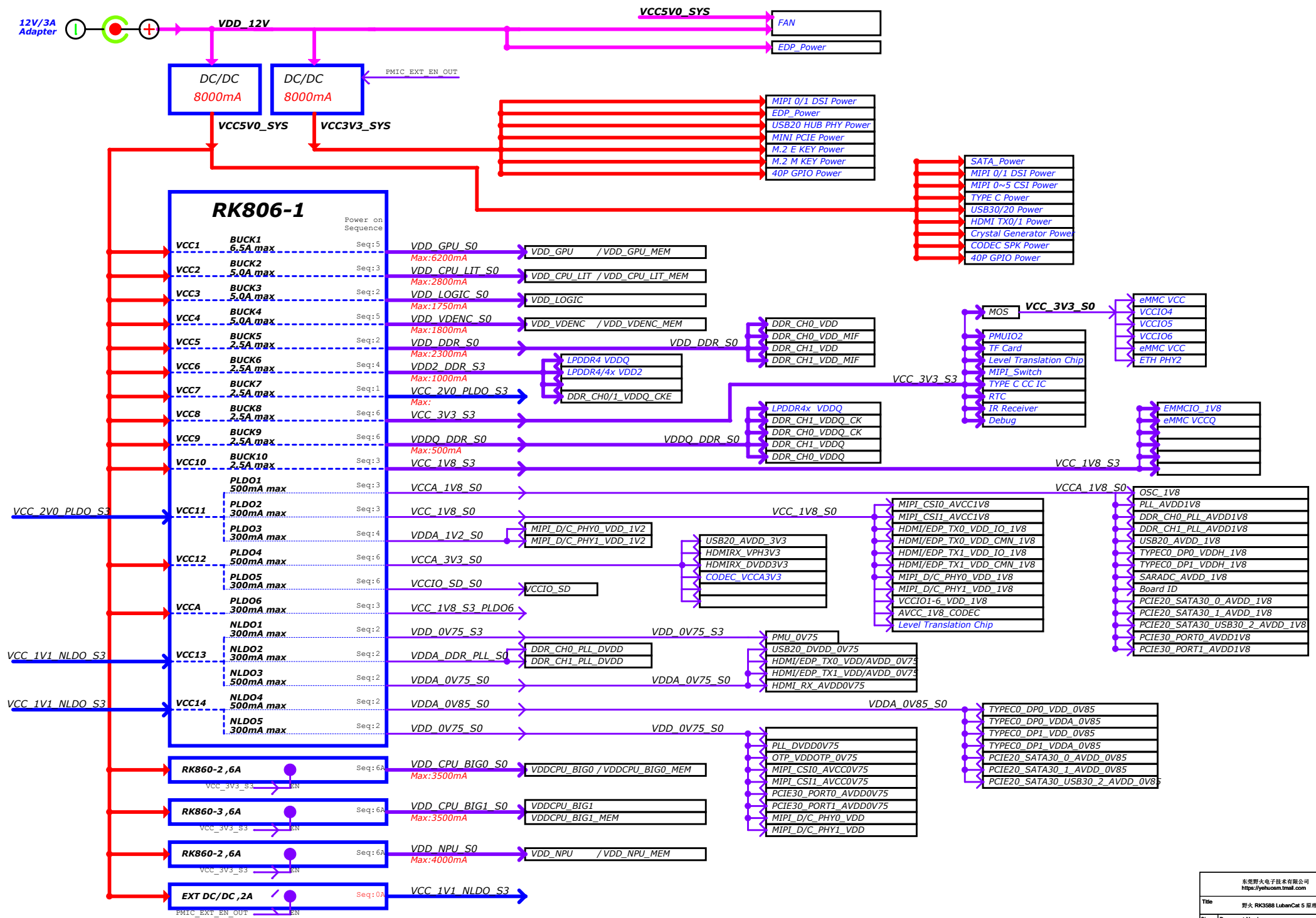
Page 24	EMMC_FLASH/Micro SD
Page 25	ETH_0
Page 26	ETH_1
Page 27	I2C/GPIO Level Translation
Page 28	MIPI DSI PORT
Page 29	MIPI CSI PORT1
Page 30	MIPI CSI PORT2
Page 31	eDP_1.3_PORT
Page 32	TYPE C OTG Socket
Page 33	USB30/USB20/SATA30_PORT
Page 34	HDMI TX 0 PORT
Page 35	HDMI TX 1 PORT
Page 36	HDMI RX PORT
Page 37	Crystal Generator
Page 38	MINI PCIE_PORT
Page 39	PCIE30 SSD/PCIE20 WLAN
Page 40	CODEC/EarPhone/MIC/SPK
Page 41	32K_OSC/DEBUG/40P_IO/KEY

东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A4	Document Number Content	Rev V2R1
Date: Wednesday, November 27, 2024Sheet 1 of 41		

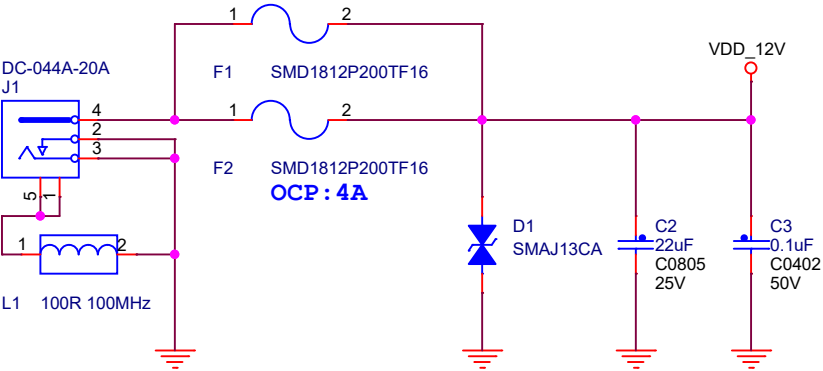
Historic Version

版本号	日期	设计	描述
V0.1	2023-02-09	ghs	初始版本, 开发阶段
V1.0	2023-11-10	ghs	正式版本
V1R0	2024-02-21	ghs	修正HDMI RX热拔插检测功能异常
V2R0	2024-04-10	ghs	调整U1, U2芯片的工作模式为PWM。 删除RTC_32K_IN信号, 将其引脚调整为FUSB302_INT信号 将LCD0_BL_PWM, LCD1_BL_PWM的引脚变更为GPIO0_C4, GPIO0_C6 将GPIO0_B7, GPIO0_C0的引脚变更为CAN0_TX_M0, CAN0_RX_M0 将GPIO4_B2, GPIO4_B3的引脚变更为CAN1_RX_M1, CAN1_TX_M1 将M2_E_KEY_nWDISABLE的引脚变更为I/O拓展芯片的GPIO6_A0 将EDP_BL_EN的引脚变更为I/O拓展芯片的GPIO6_A1 调整I/O拓展芯片的引脚及编号 调整40PIN排针接口, 使其兼容CAN接口。
V2R1	2024-11-27	ghs	将ETH_1增加二极管使其兼容瑞昱芯片, 更新时钟芯片为瑞星微

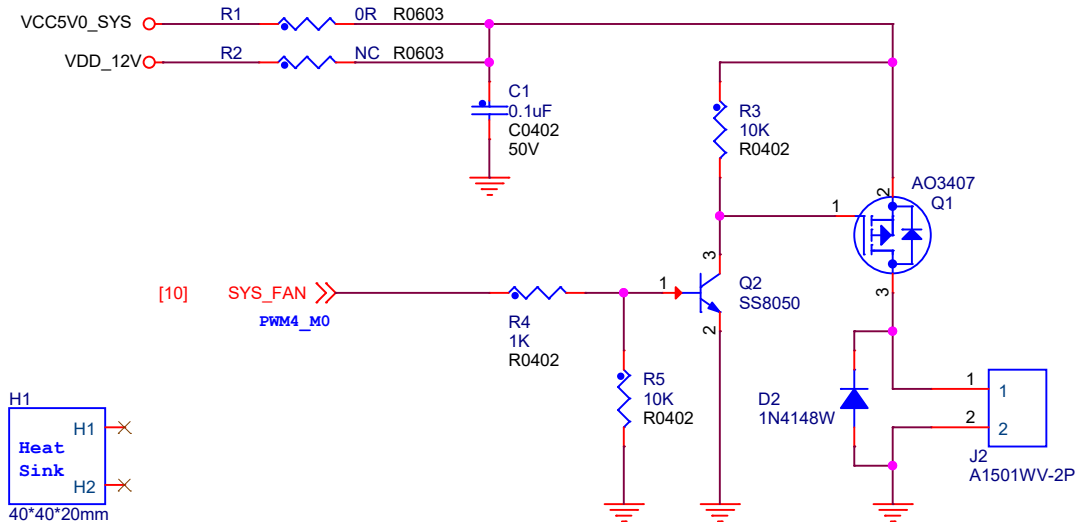
Power tree



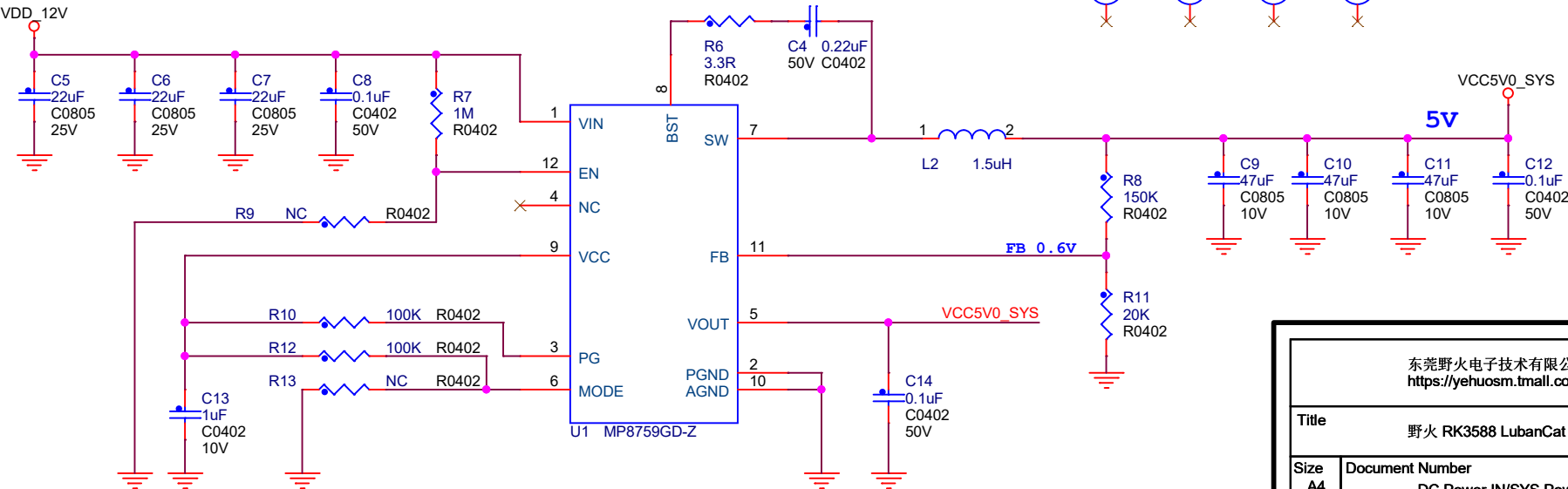
DC IN
12V 3A



Active Cooling

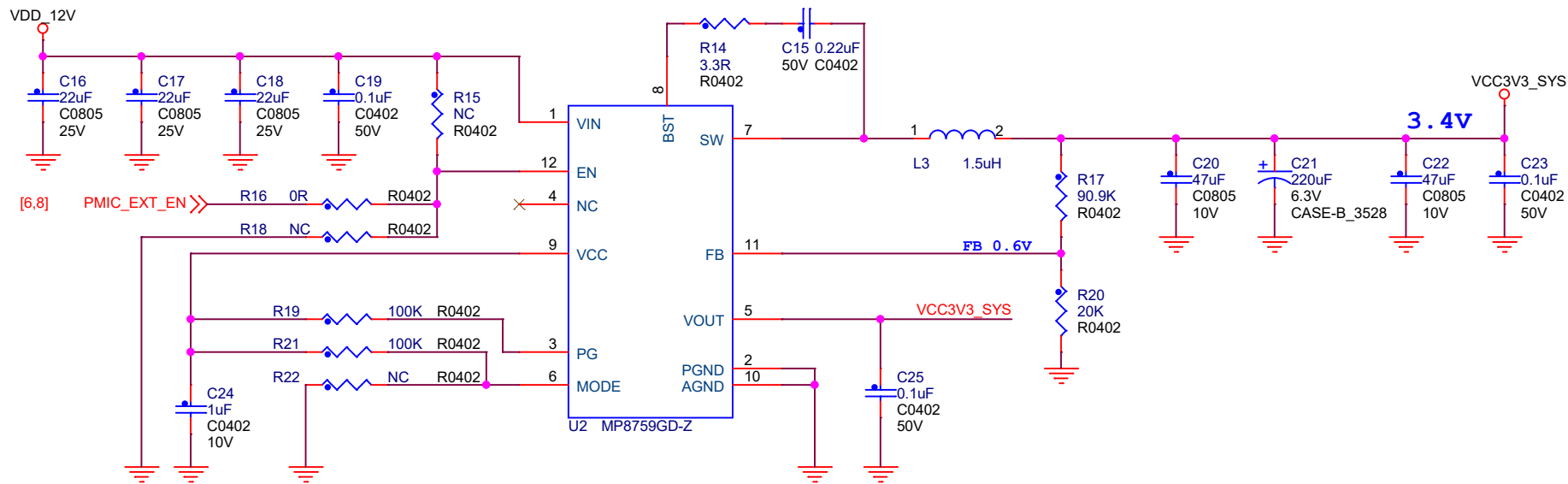


VCC5V_SYS



东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A4	Document Number DC Power IN/SYS Power/FAN	Rev V2R1
Date: Wednesday, November 27, 2024Sheet 4 of 41		

VCC3V3_SYS



Power_LED/SYS_LED



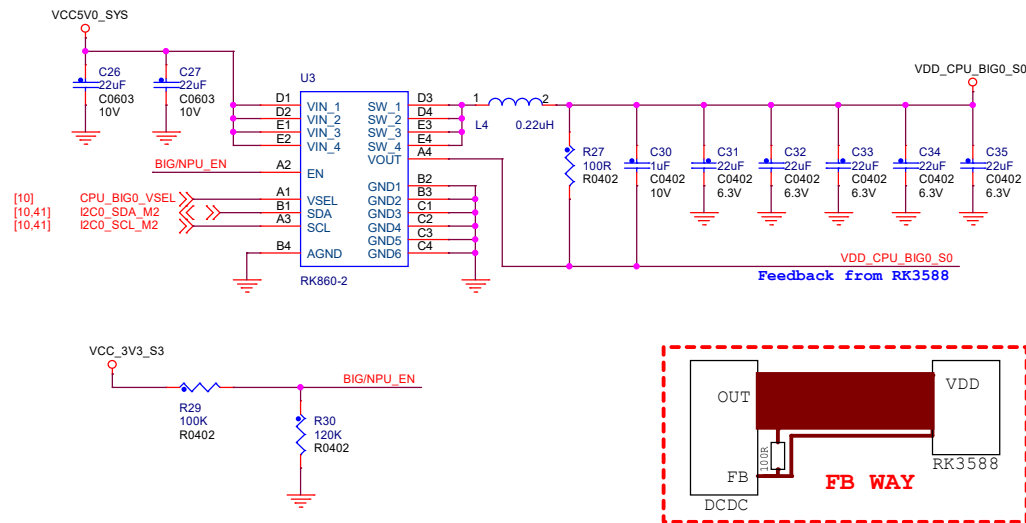
东莞野火电子有限公司
https://yehuosm.tmall.com

Title 野火 RK3588 LubanCat 5 原理图

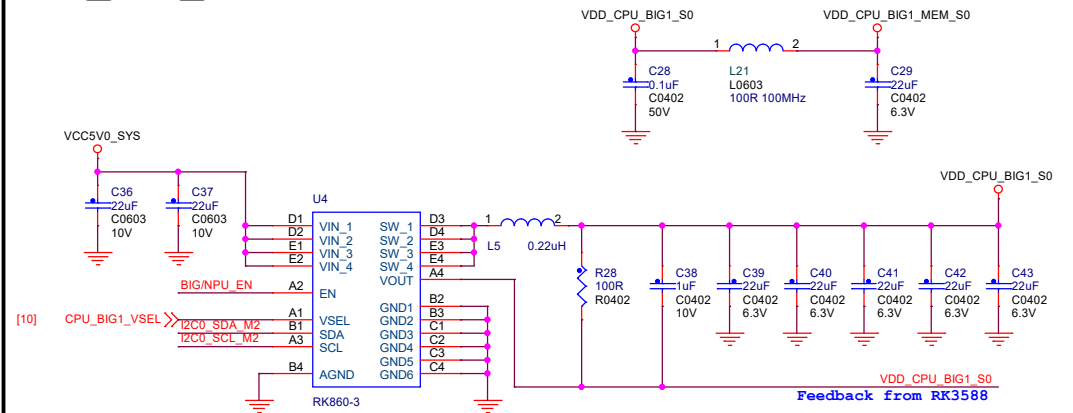
Size A4	Document Number SYS_Power/SYS_LED	Rev V2R1
---------	-----------------------------------	----------

Date: Wednesday, November 27, 2024 Sheet 5 of 41

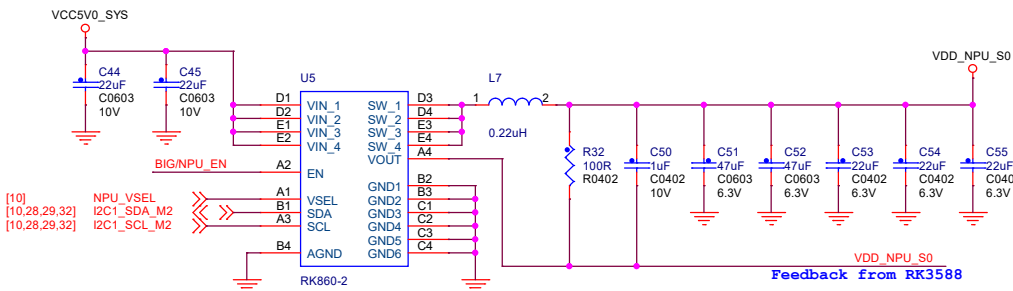
VDD_CPU_BIG0



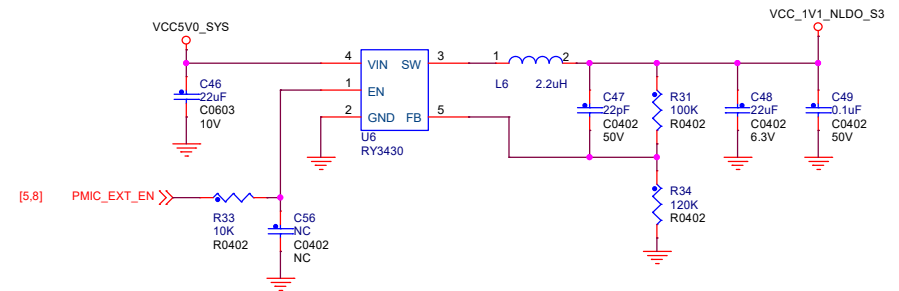
VDD_CPU_BIG1



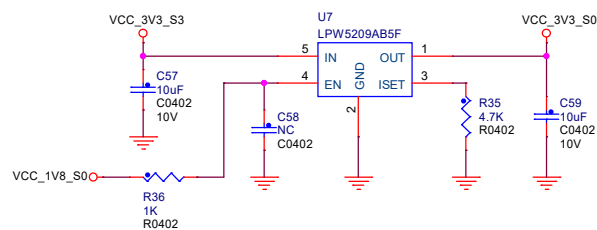
VDD_NPU



VCC_1V1_NLDO_S3



VCC_3V3_S0



东莞野火电子技术有限公司
https://yehuosm.tmall.com

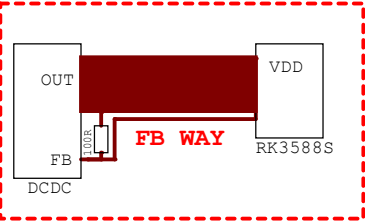
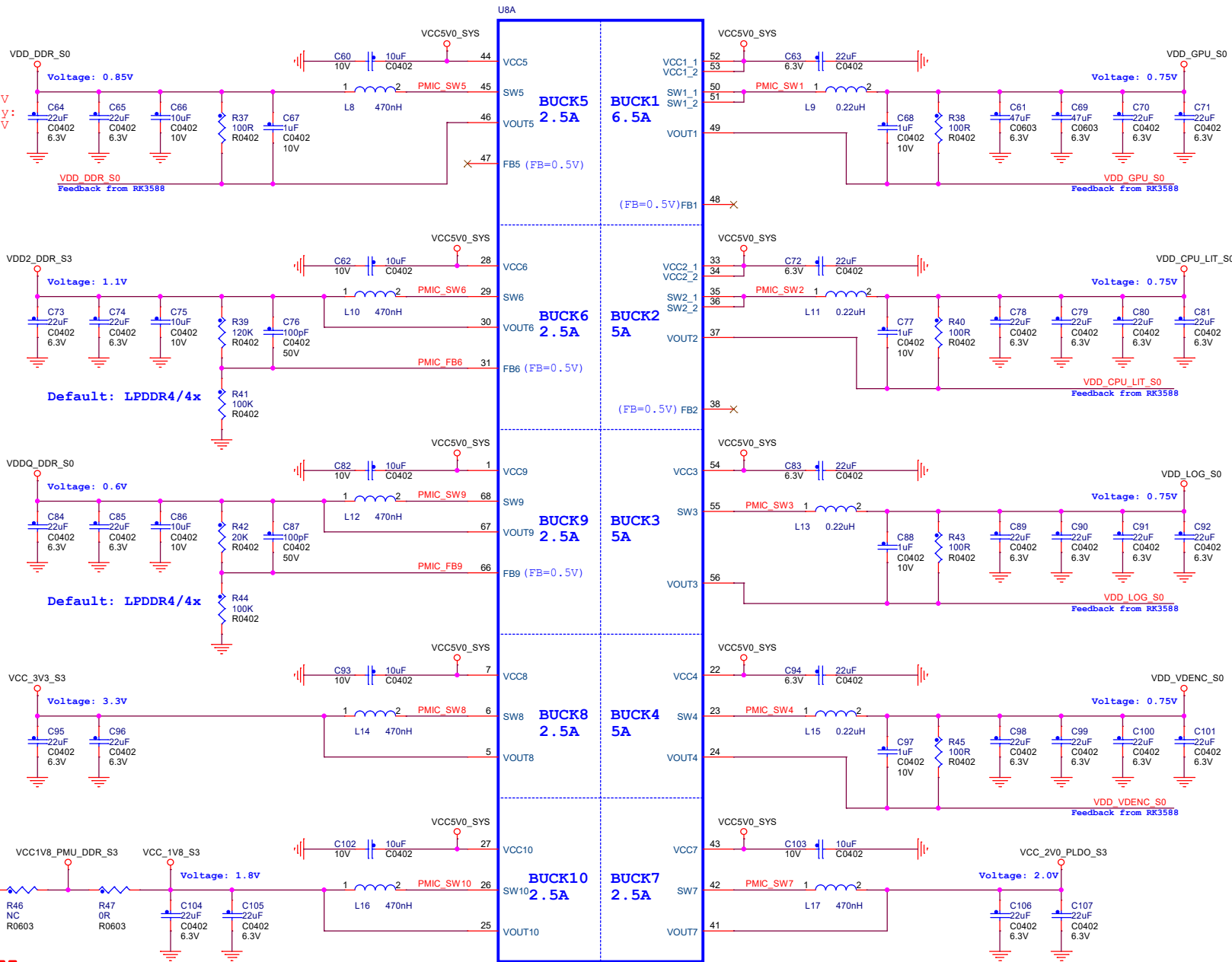
Title 野火 RK3588 LubanCat 5 原理图

Size	Document Number	Rev
A3	Power_Ext Discrete	V2R1

Date: Friday, November 29, 2024 Sheet 6 of 41

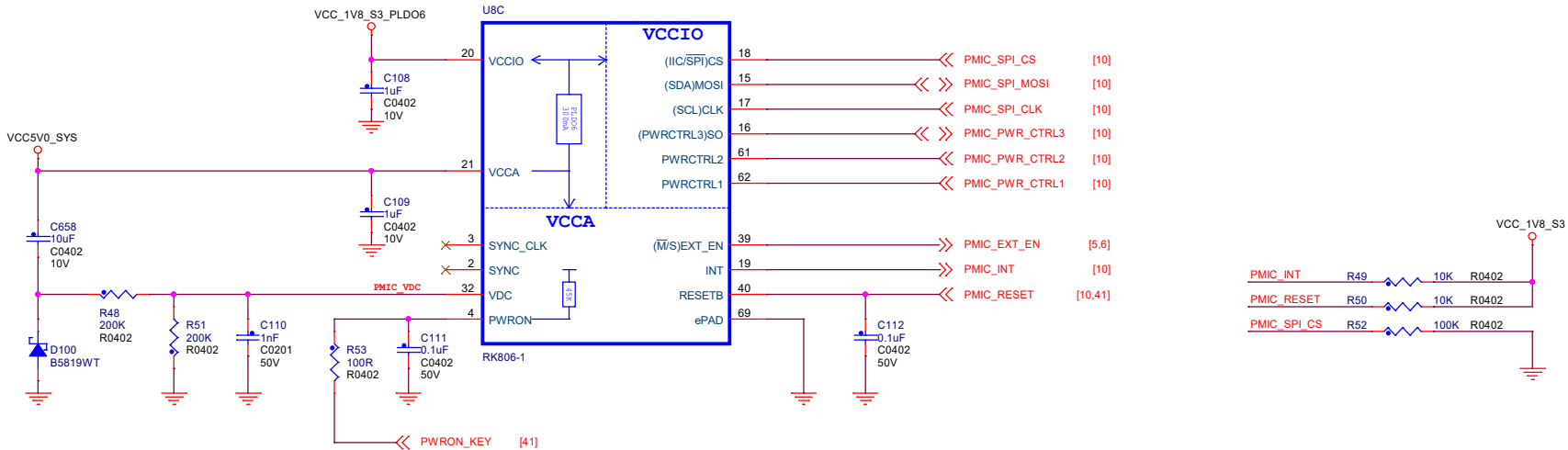
PMIC DC-DC

Default:0.85V
Low frequency:
0.85V-->0.75V

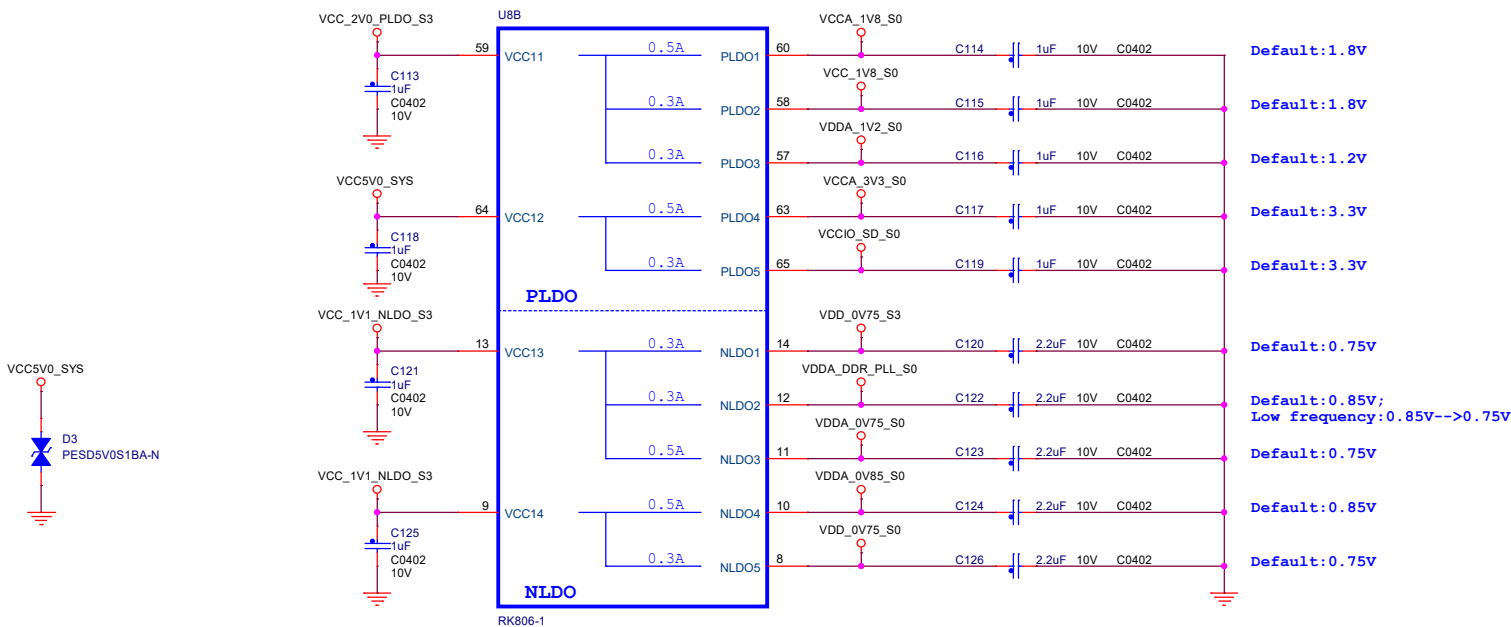


东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number PMIC DC-DC	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 7 of 41		

PMIC RK806-1 Managerment

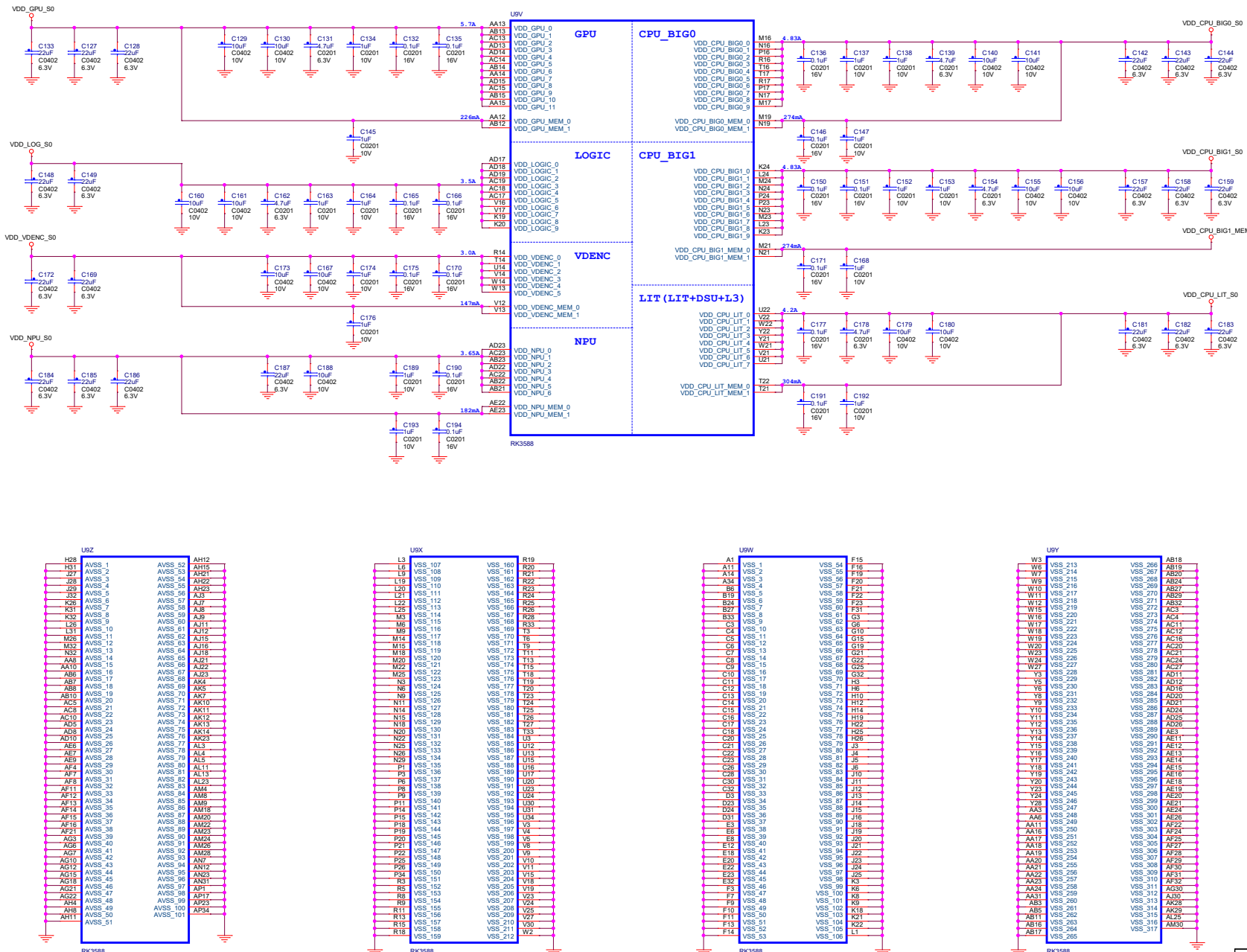


PMIC RK806-1 LDO

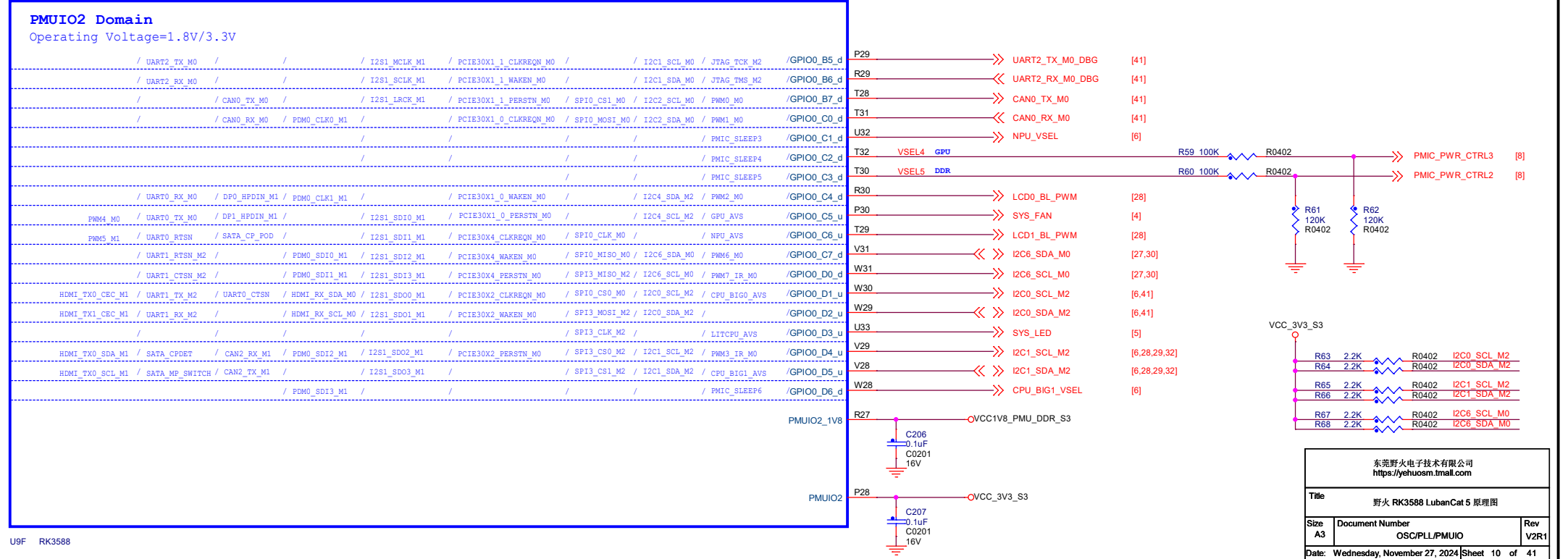
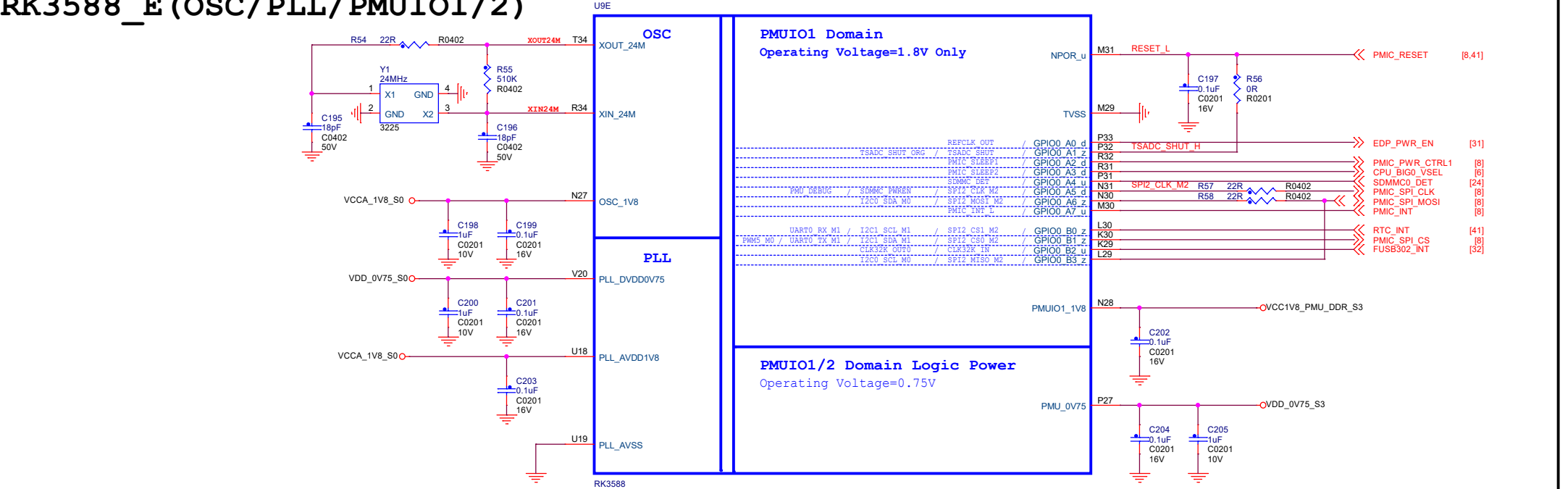


东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number PMIC Management/LDO	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 8 of 41		

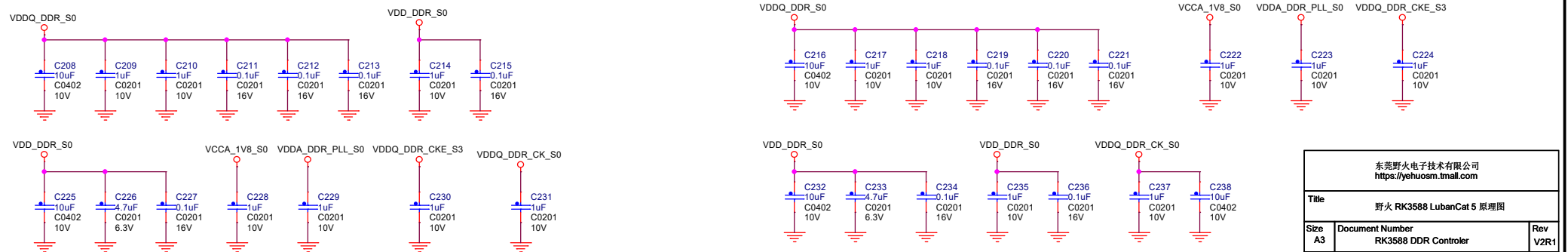
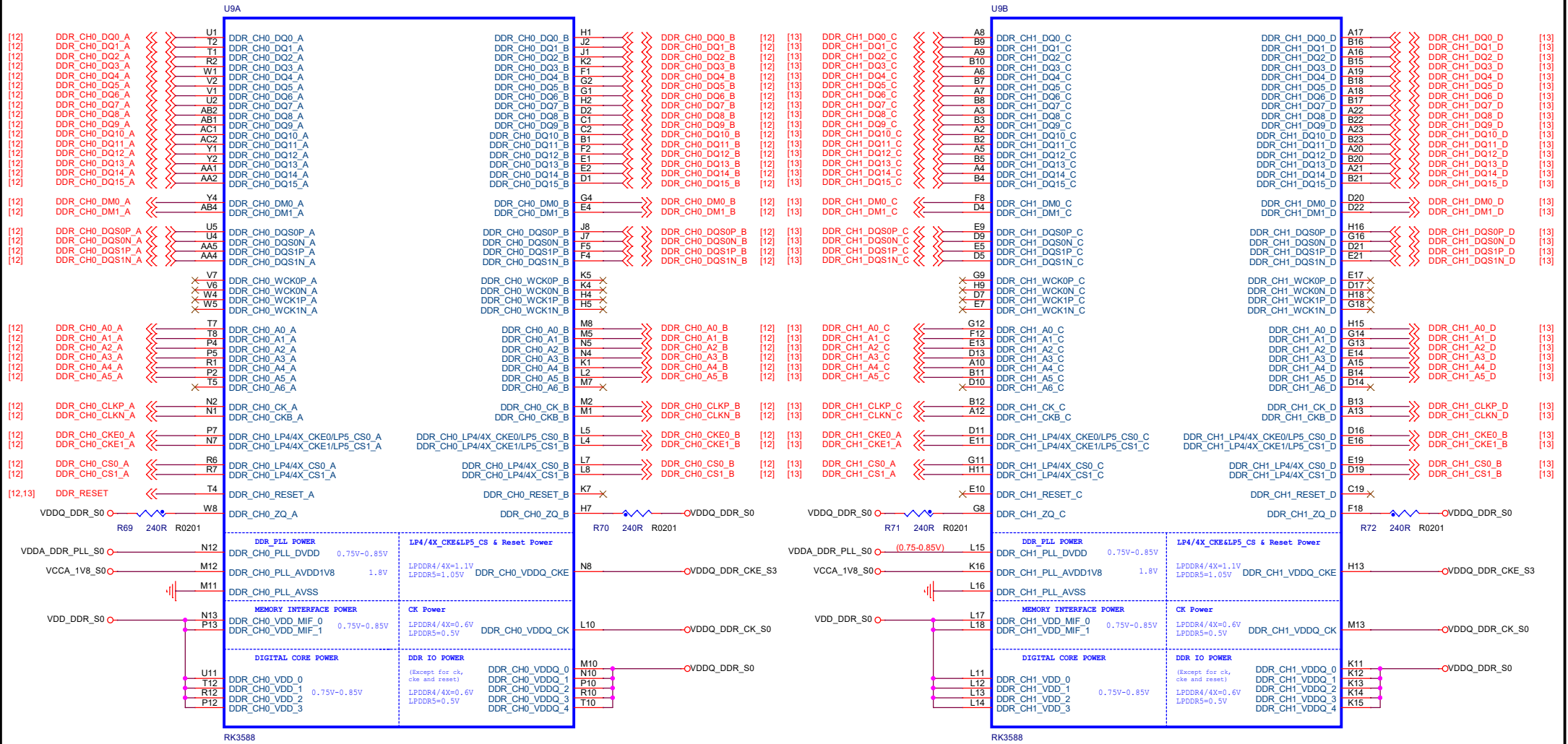
RK3588_V(POWER)



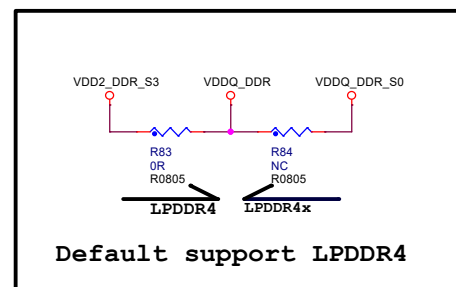
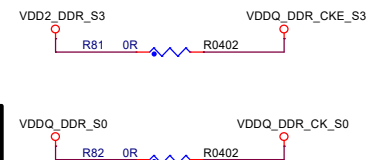
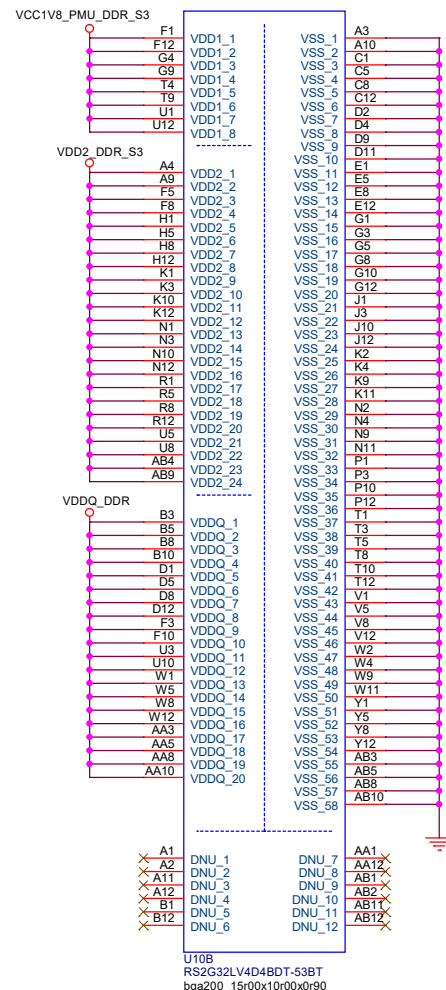
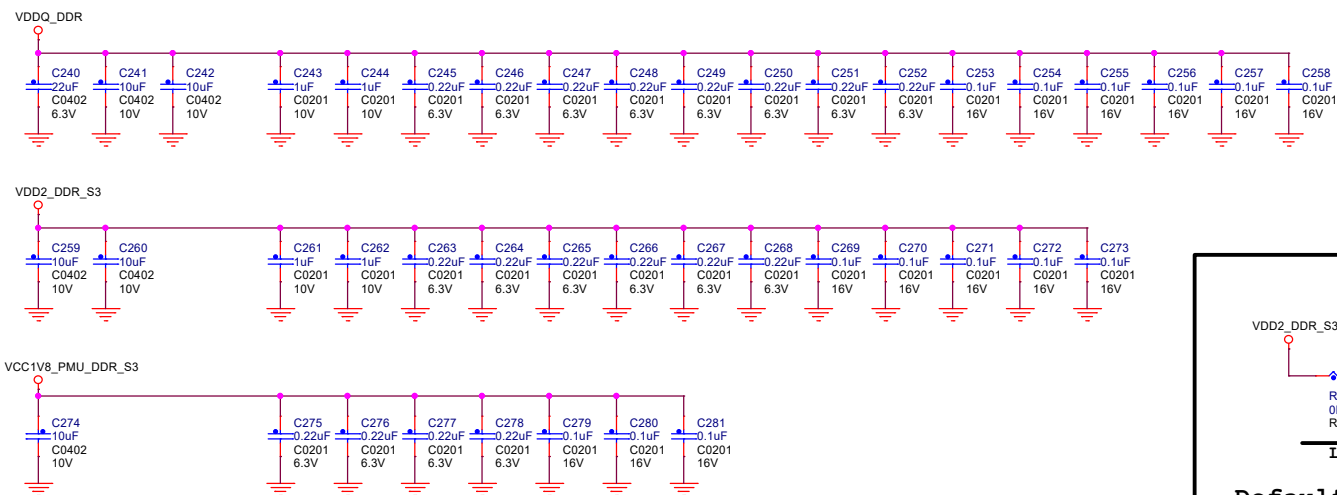
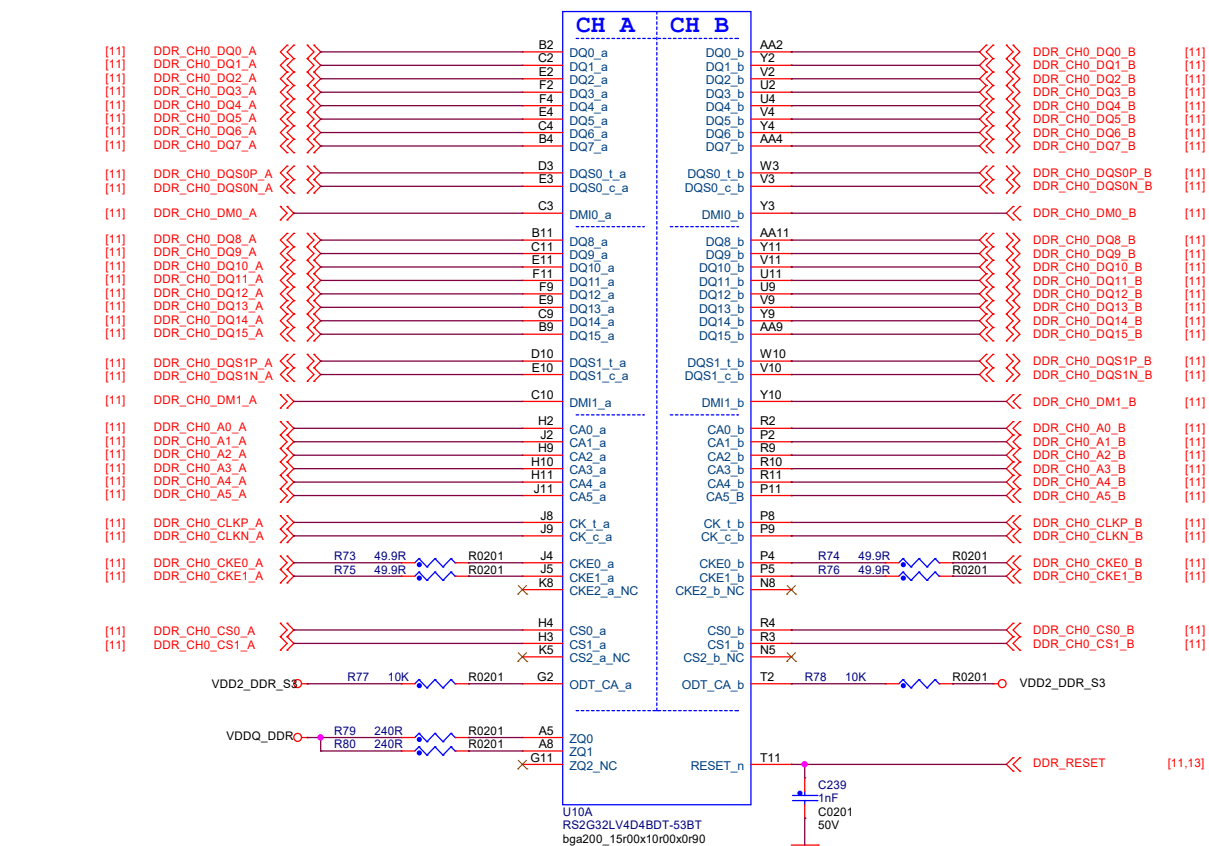
RK3588_E (OSC/PLL/PMUIO1/2)



RK3588 (DDR PHY)

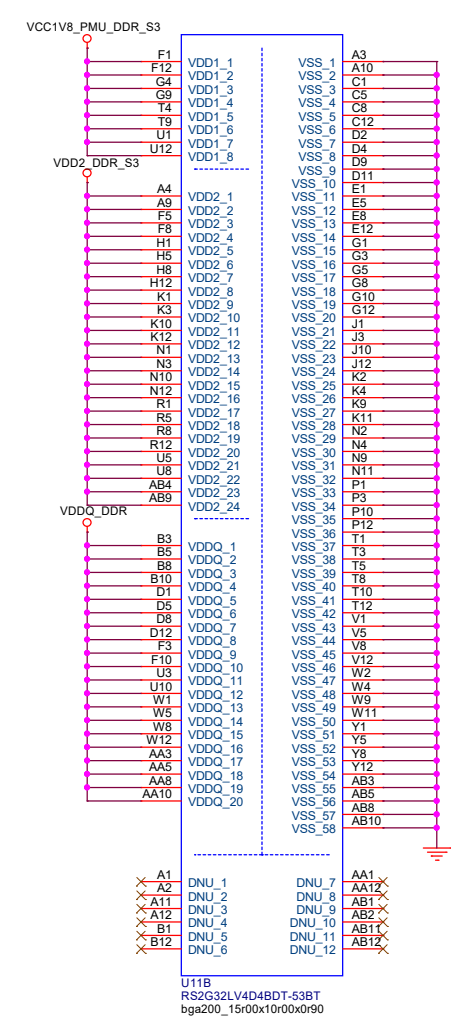
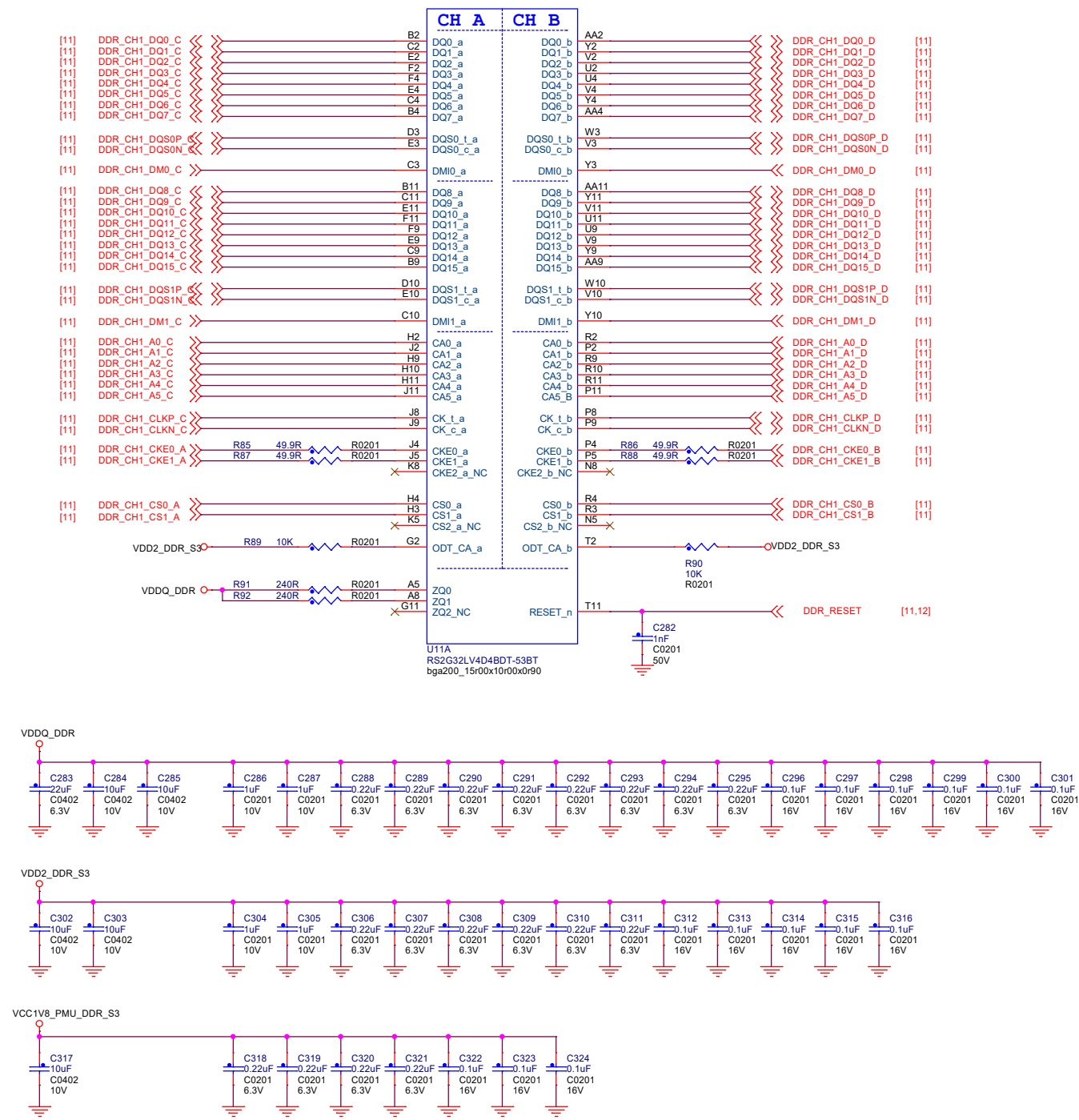


LPDDR4/4x 01

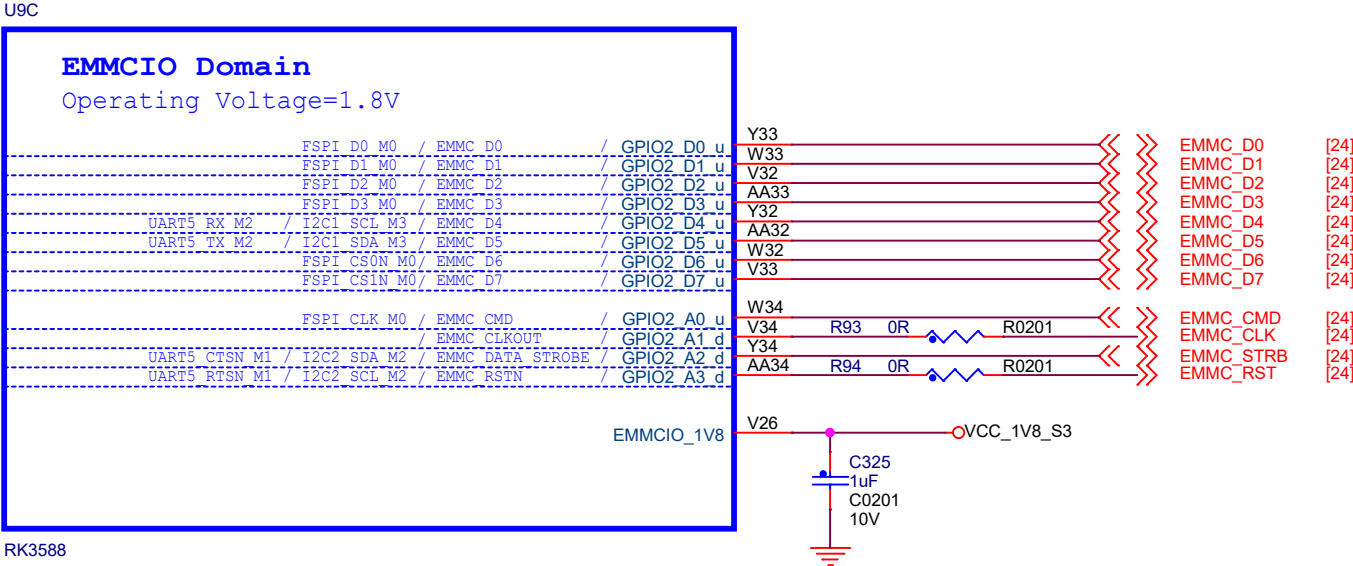


东莞野火电子技术有限公司 https://yehuosm.tmall.com			
Title 野火 RK3588 LubanCat 5 原理图			
Size A3	Document Number LPDDR4/4x_01		Rev V2R1
Date: Wednesday, November 27, 2024		Sheet 12 of 41	

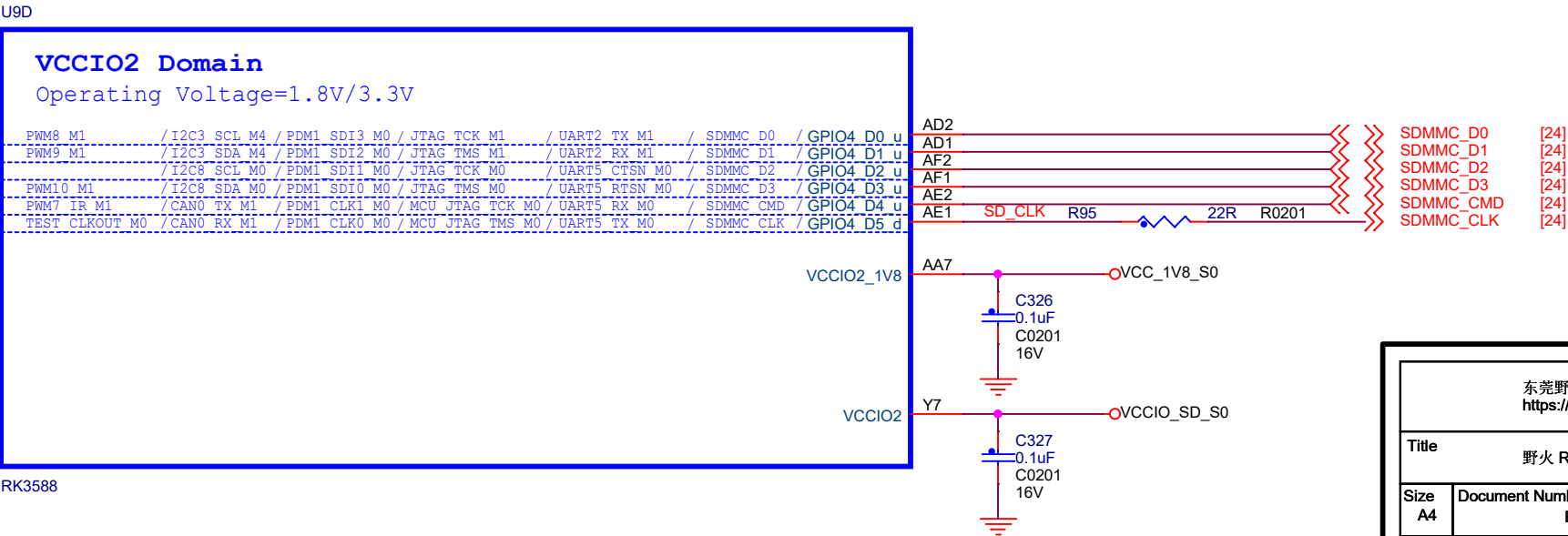
LPDDR4/4x_02



RK3588_C (EMMCIO Domain)



RK3588_D (VCCIO2 Domain)



东莞野火电子有限公司
https://yehuosm.tmall.com

Title
野火 RK3588 LubanCat 5 原理图

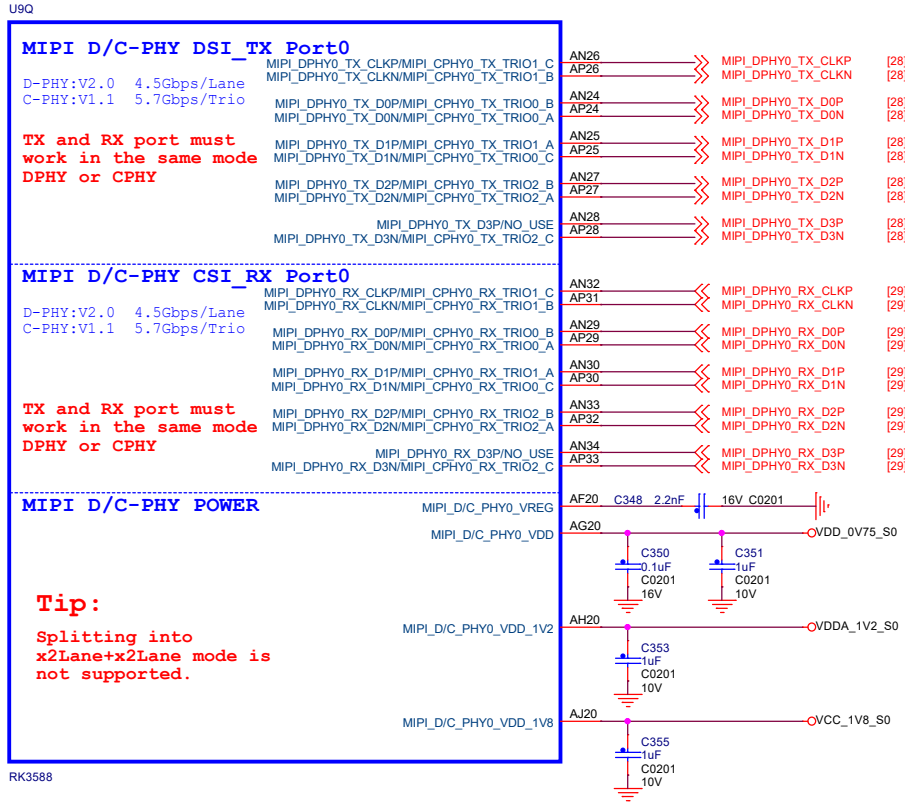
Size
A4

Document Number
EMMC/SD Controller

Rev
V2R1

Date: Wednesday, November 27, 2024Sheet 14 of 41

RK3588_Q/R(MIPI_D/C_PHY0)



RK3588_Q/R(MIPI_D/C_PHY1)



About MIPI_D/C_PHY0_VDD Pin:

D-PHY 4.5Gbps & C-PHY 2.5Gsps 0.85V

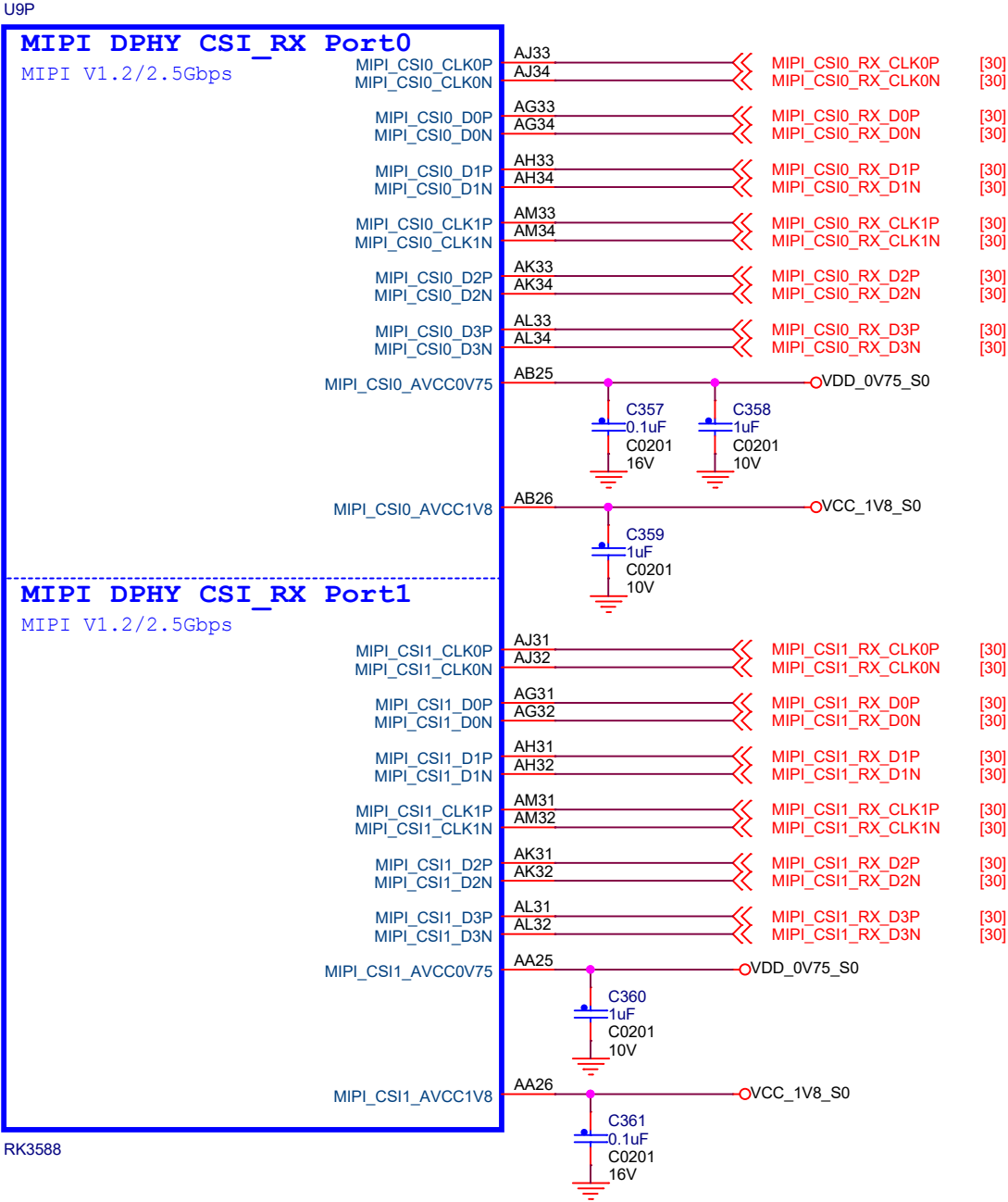
D-PHY 2.5Gbps & C-PHY 1.5Gsps 0.75V

Default: 0.75V

东莞野火电子技术有限公司
https://yehuosm.tmall.com

Title		
野火 RK3588 LubanCat 5 原理图		
Size	Document Number	Rev
A3	MIPI_D/C Interface	V2R1
Date: Wednesday, November 27, 2024 Sheet 17 of 41		

RK3588_P (MIPI_DPHY_CSI_RX_PHY)



MIPI_CSI_RX Configuration

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

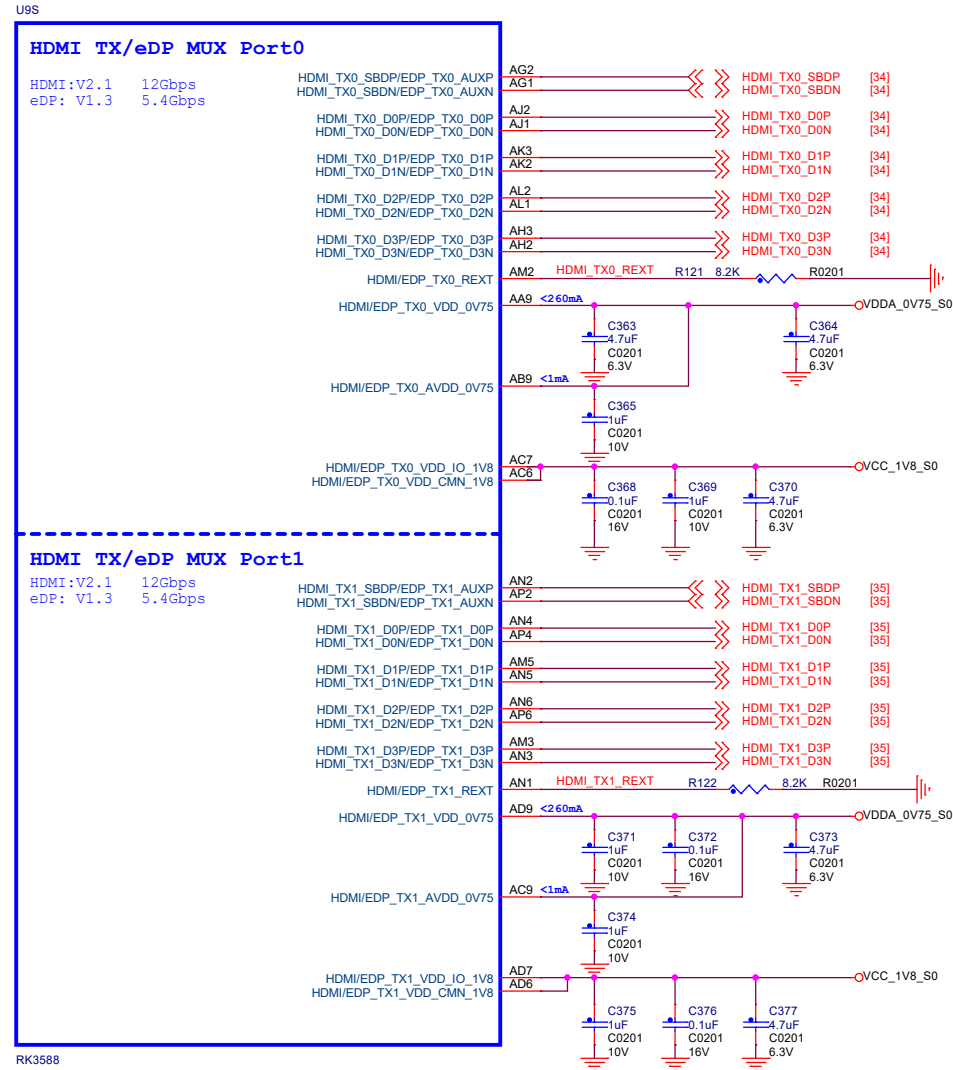
东莞野火电子技术有限公司
https://yehuosm.tmall.com

Title 野火 RK3588 LubanCat 5 原理图

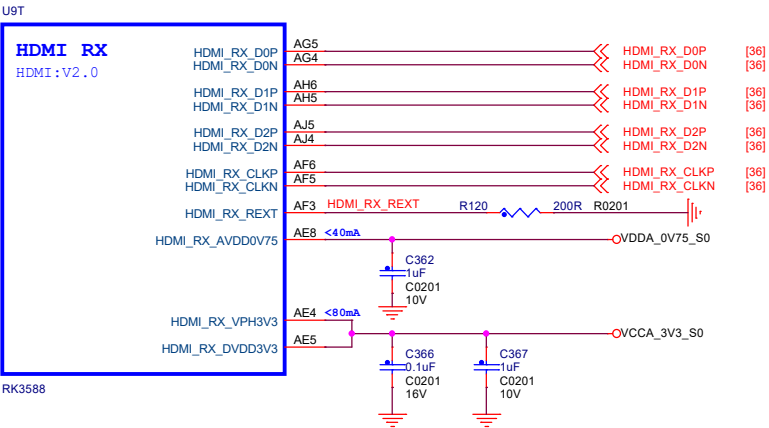
Size A4	Document Number MIPI CSI Interface	Rev V2R1
---------	------------------------------------	----------

Date: Wednesday, November 27, 2024Sheet 18 of 41

RK3588_S (HDMI2.1 TX)

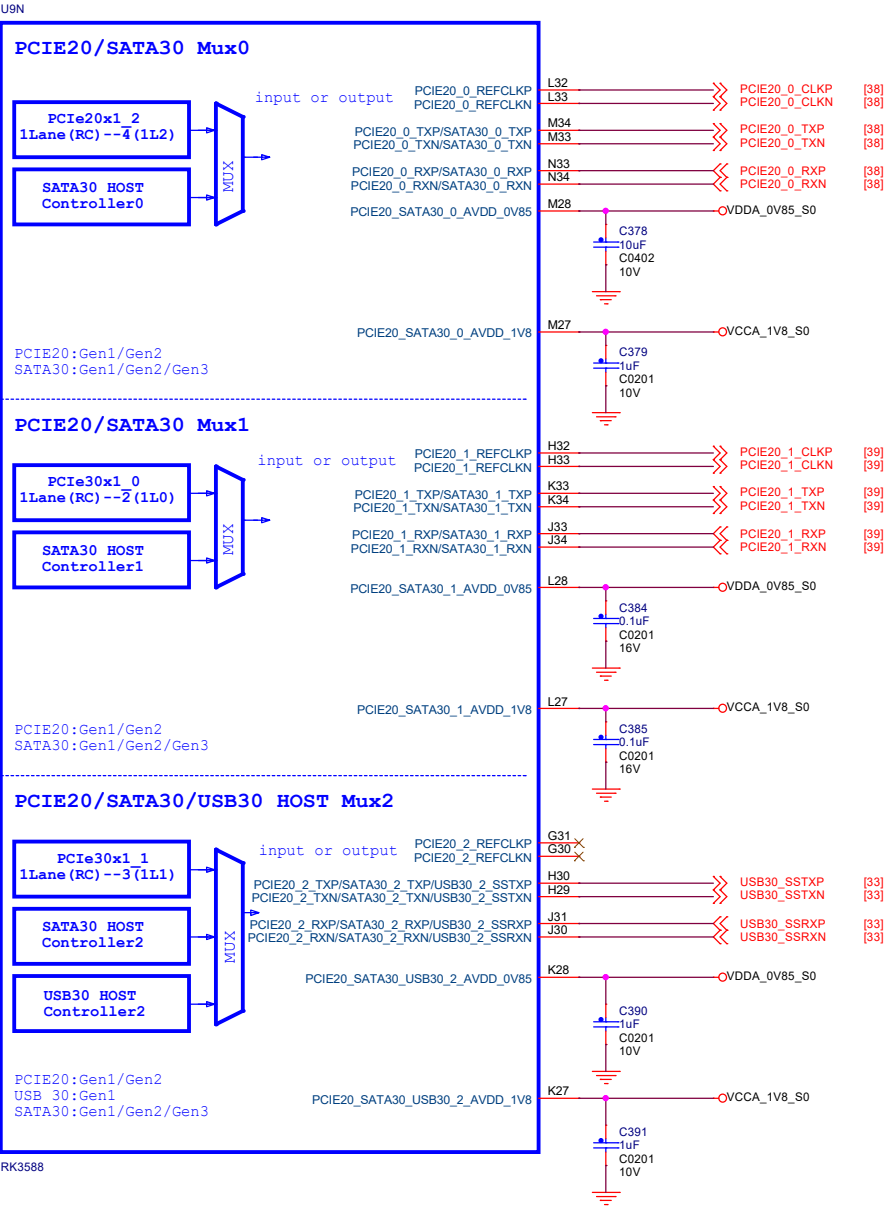


RK3588_T (HDMI20 RX)

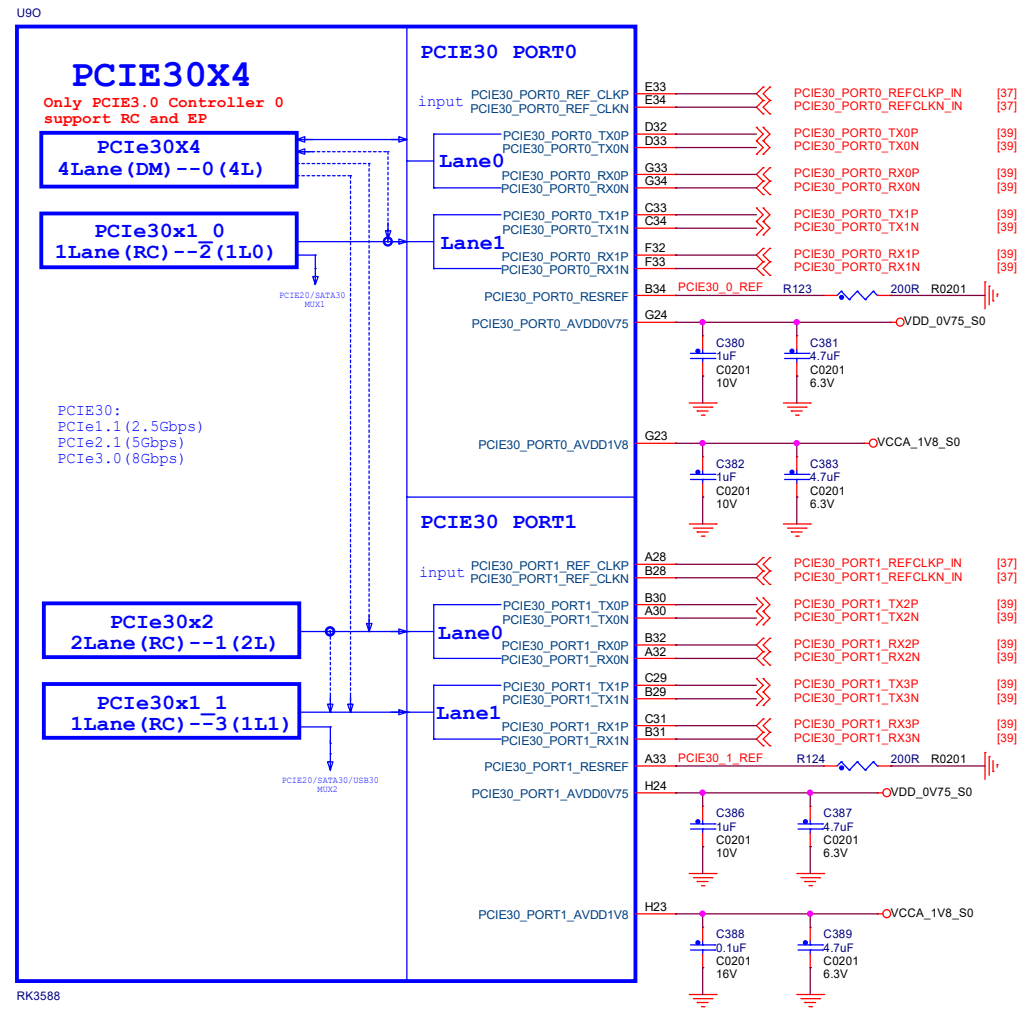


东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number HDMI/eDP Interface	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 19 of 41		

RK3588_N (PCIE20)



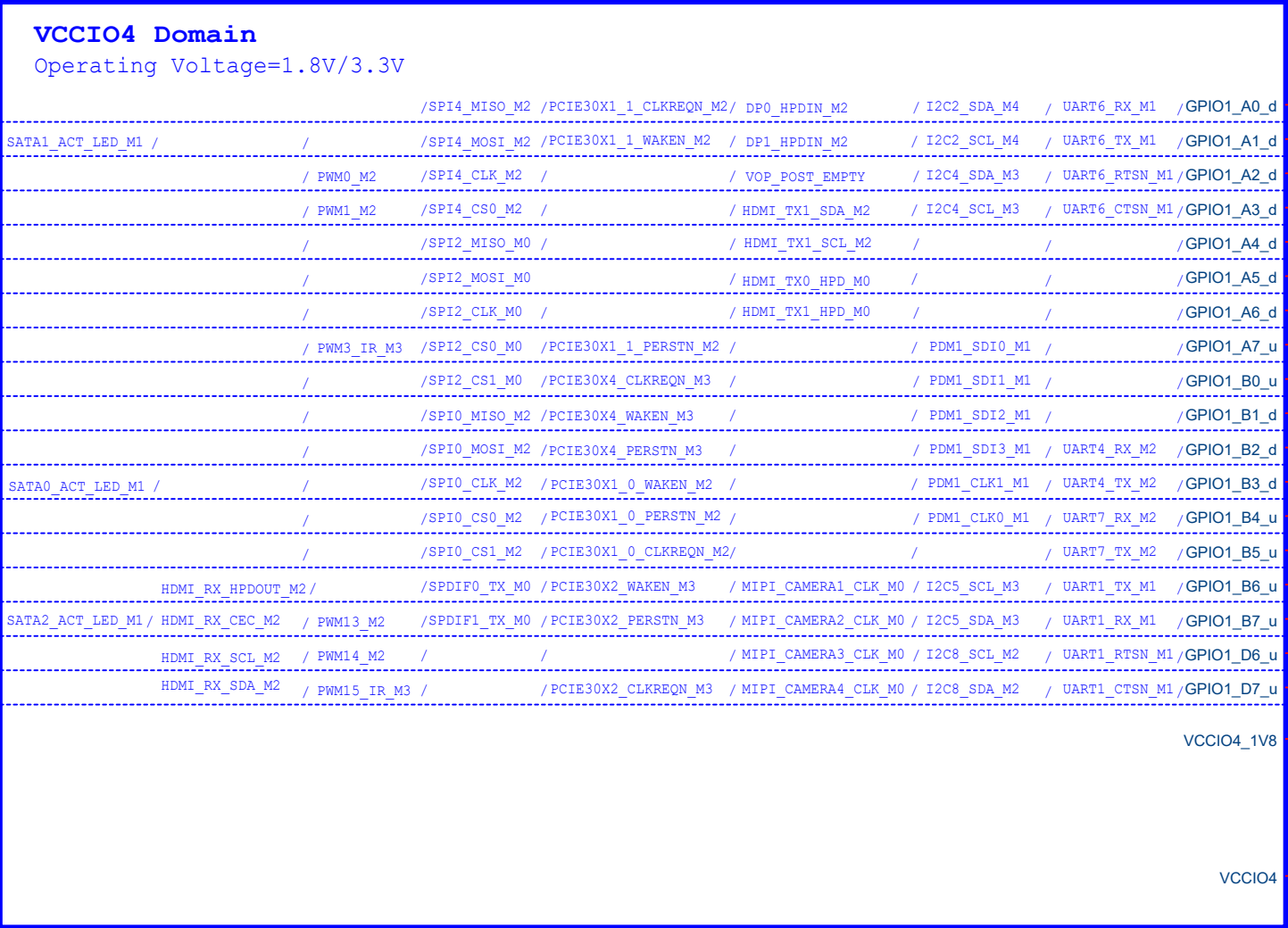
RK3588_O (PCIE30)



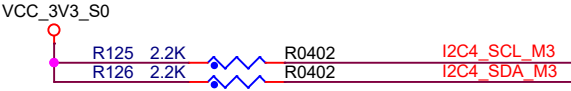
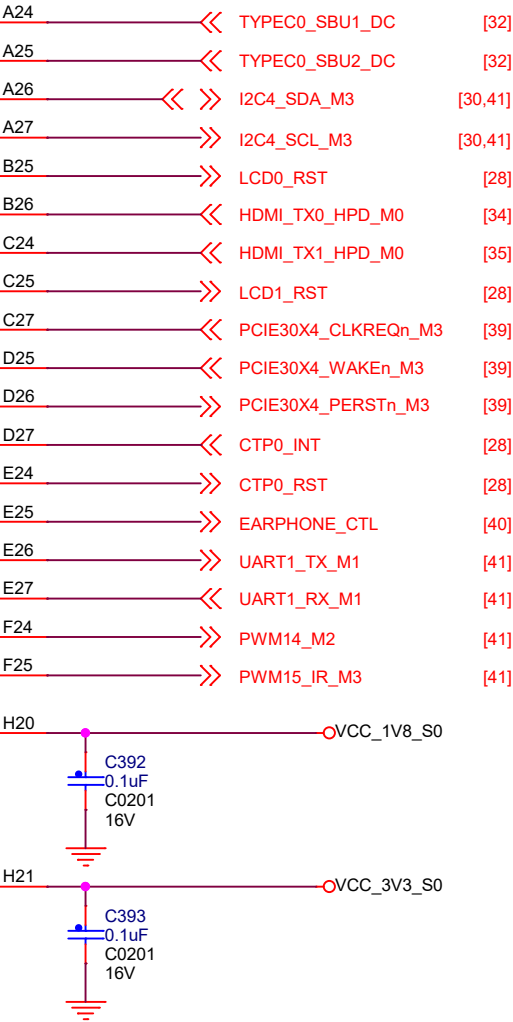
东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number PCIE30/PCIE20/SATA30	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 20 of 41		

RK3588_I (VCCIO4 Domain)

U9I

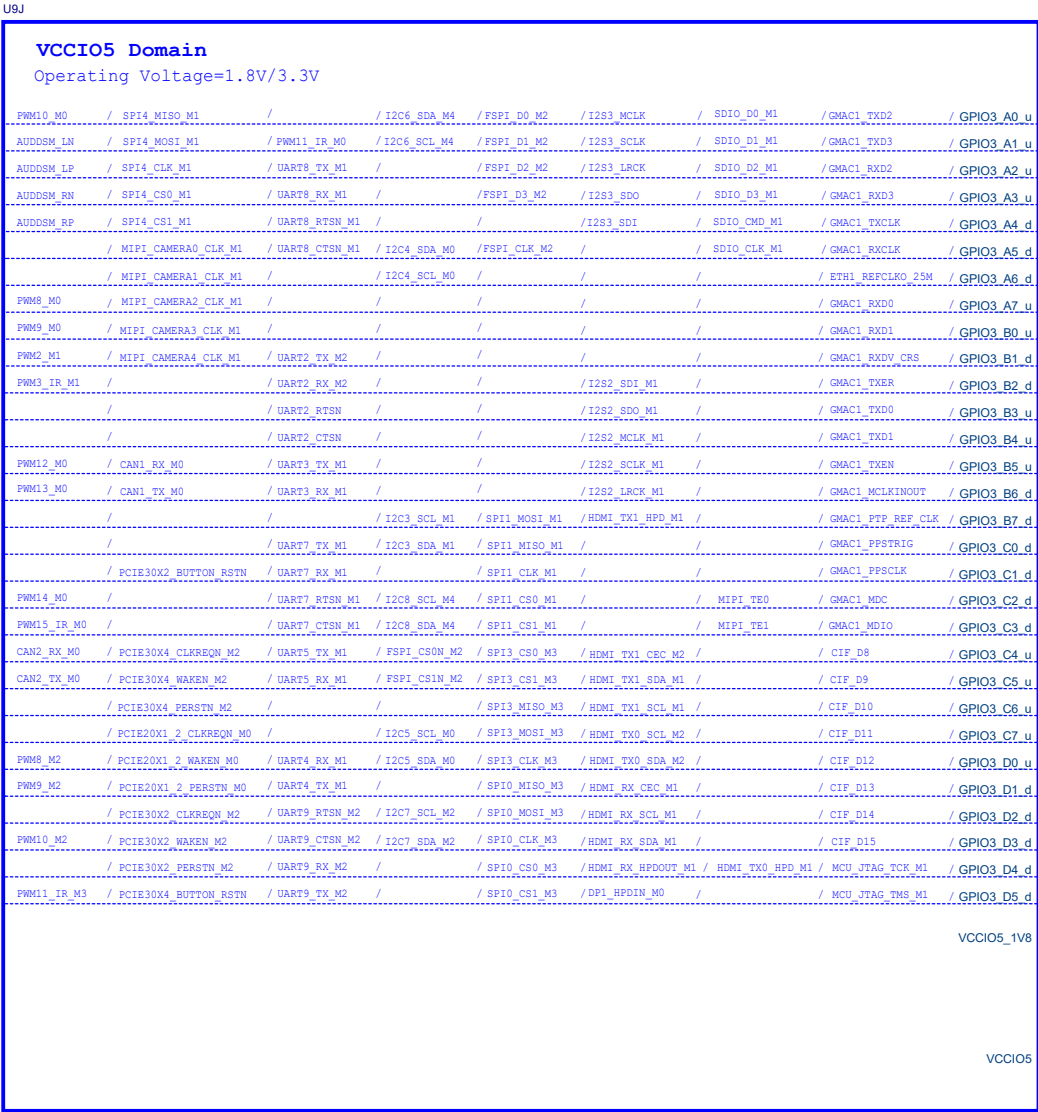


RK3588

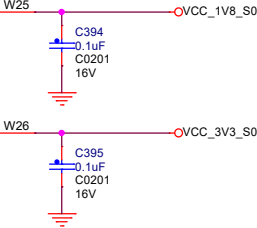


东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A4	Document Number VCCIO 4 Interface	Rev V2R1
Date: Wednesday, November 27, 2024Sheet 21 of 41		

RK3588_J(VCCIO5 Domain)



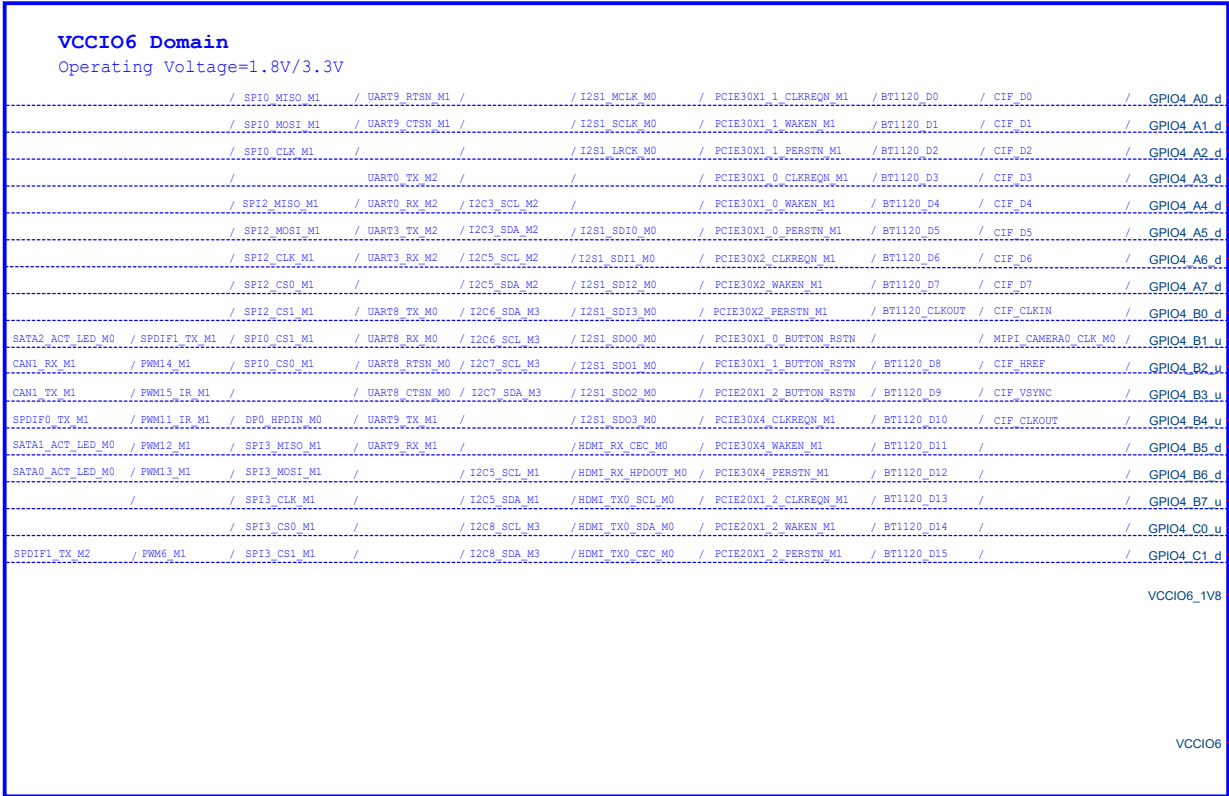
RK3588



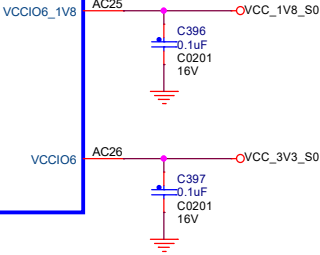
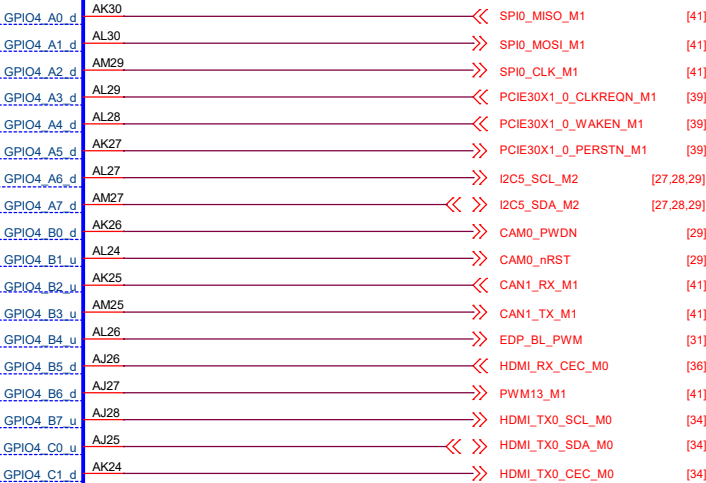
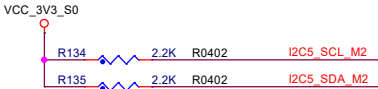
东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number VCCIO 5 Interface	Rev V2R1
Date: Wednesday, November 27, 2024	Sheet 22	of 41

RK3588_K(VCCIO6 Domain)

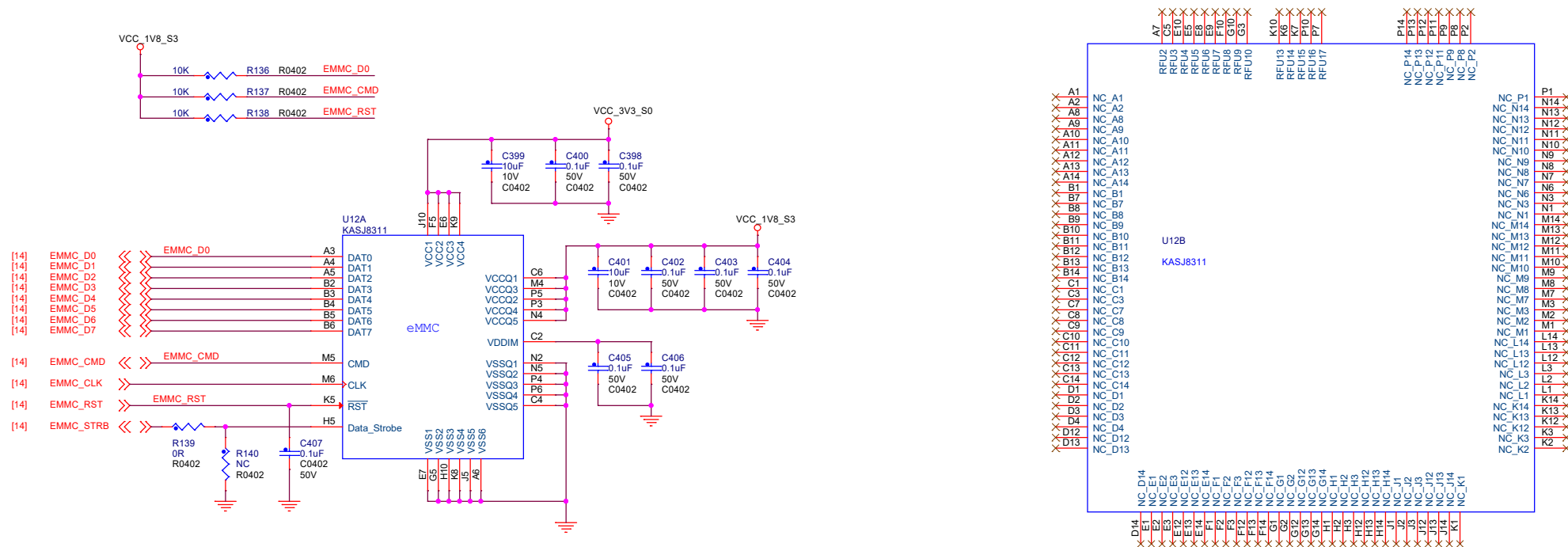
U9K



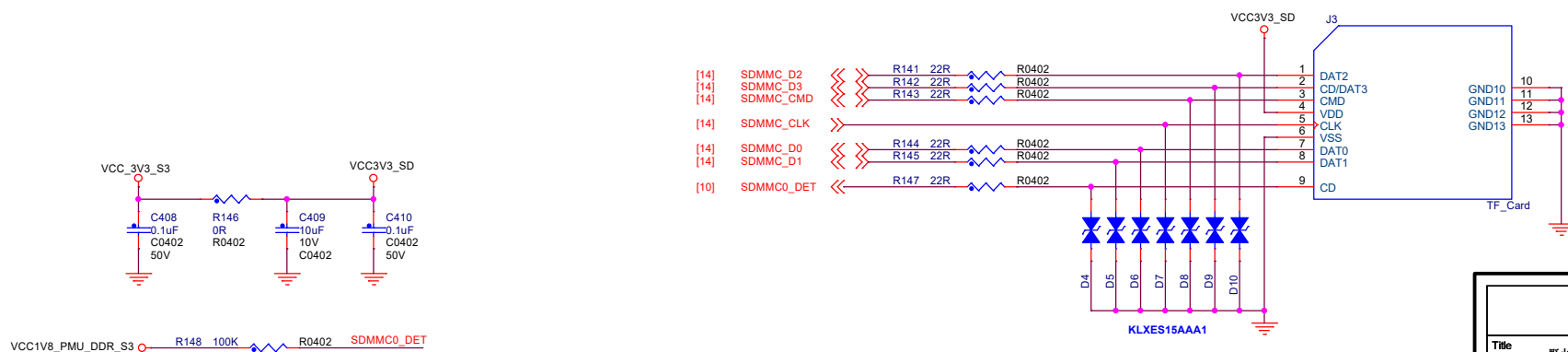
RK3588



EMMC FLASH



Micro SD Card



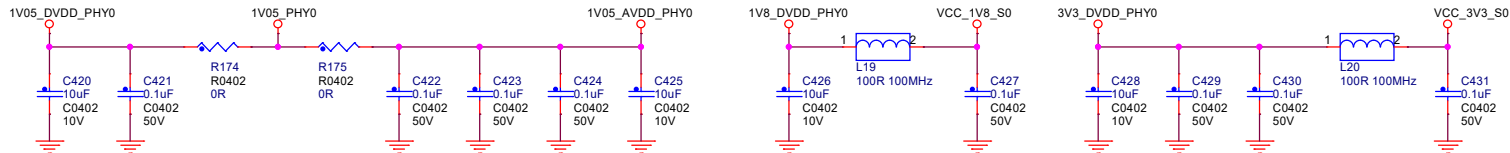
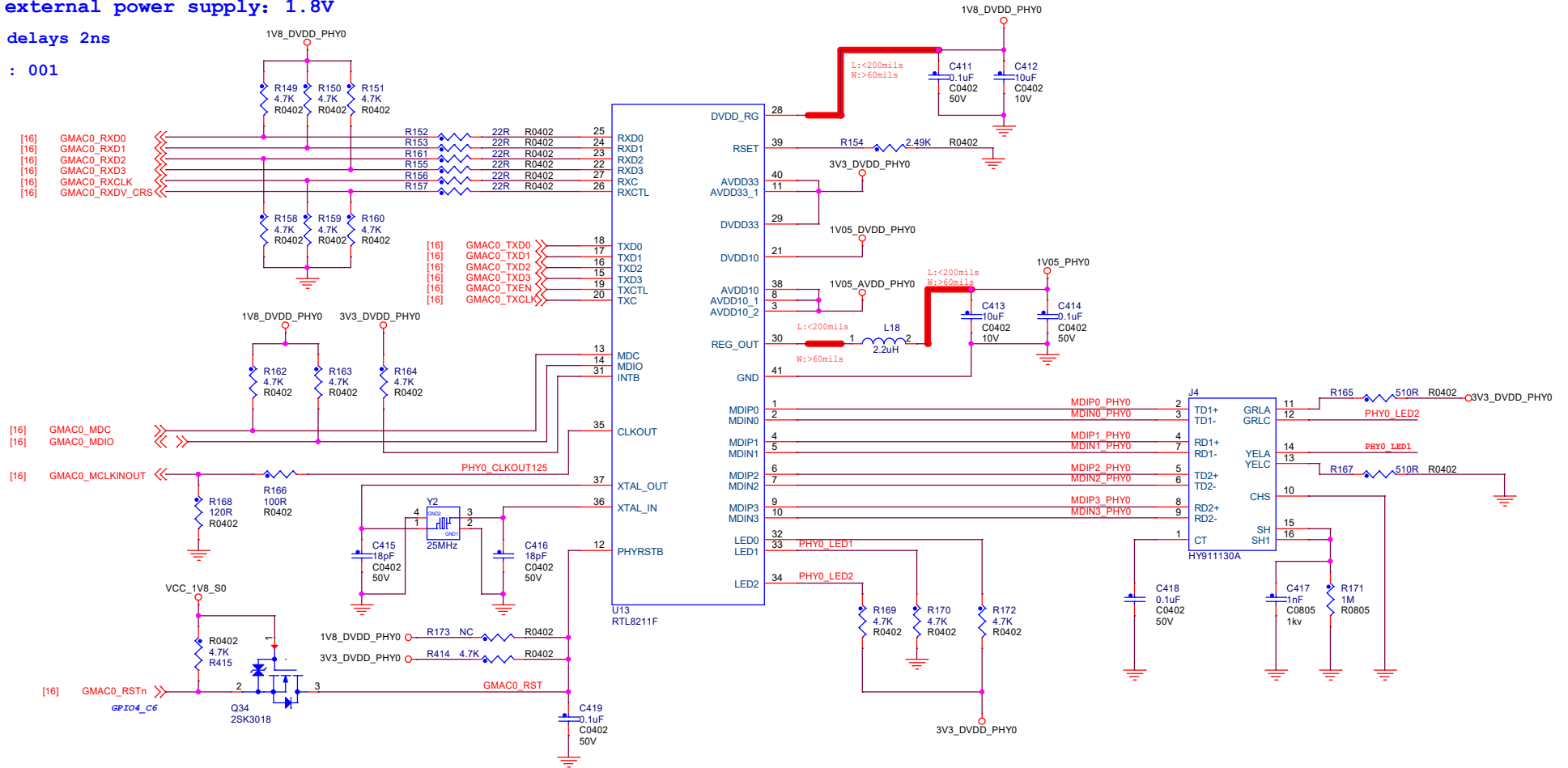
东莞野火电子技术有限公司 https://yehuosm.tmall.com			
Title 野火 RK3588 LubanCat 5 原理图			
Size A3	Document Number	EMMC_FLASH/Micro SD	
Date:	Wednesday, November 27, 2024	Sheet 24	of 41

ETH_1

IO Use an external power supply: 1.8V

TXC / RXC : delays 2ns

PHY Address : 001



东莞野火电子技术有限公司
https://yehuosm.tmall.com

Title 野火 RK3588 LubanCat 5 原理图

Size	Document Number	Rev
A3	ETH_1	V2R1

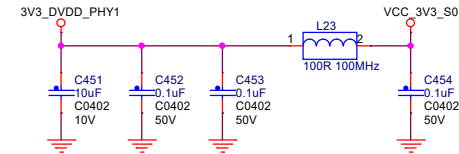
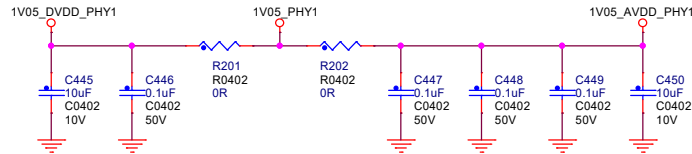
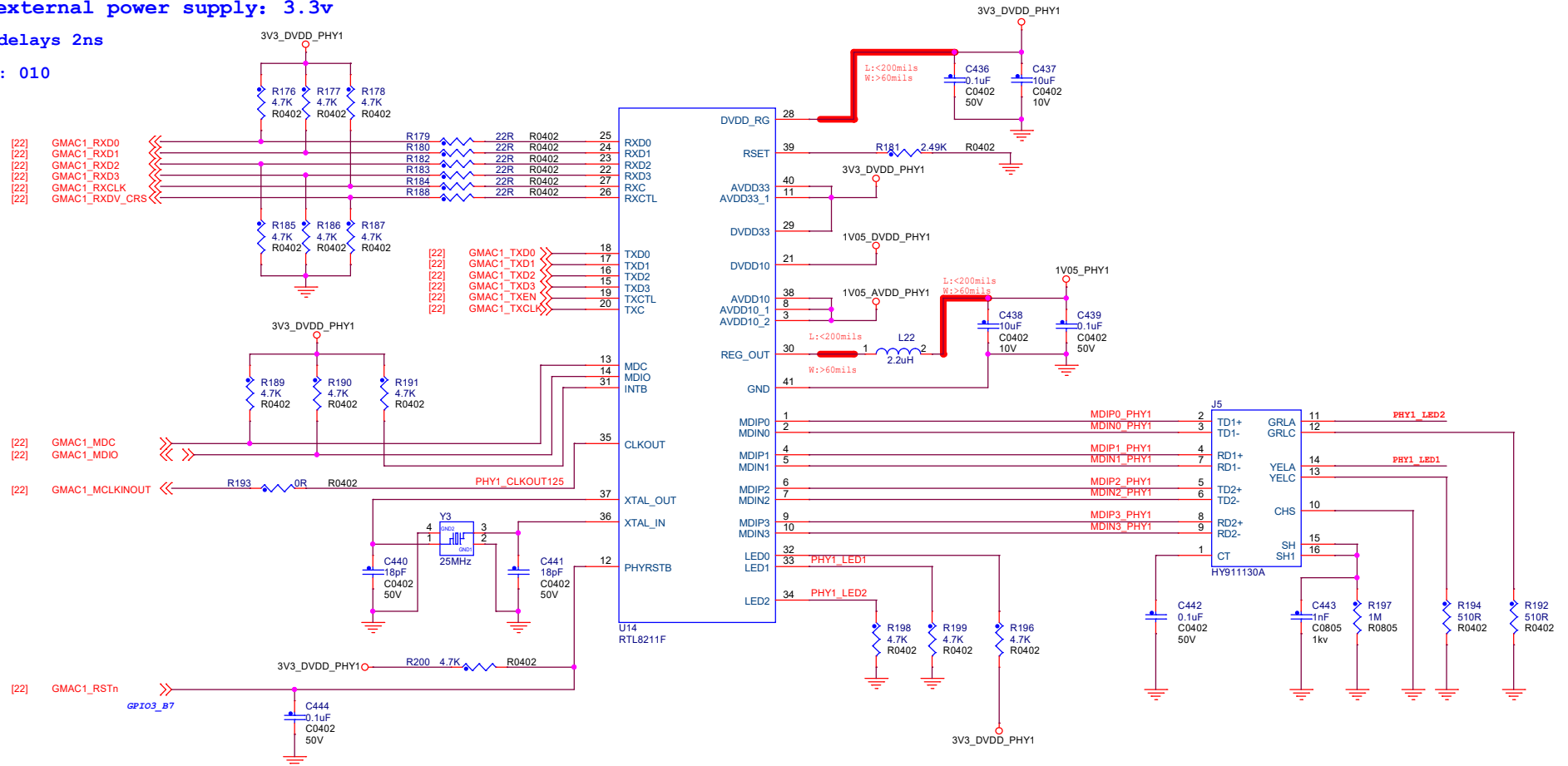
Date: Friday, November 29, 2024 Sheet 25 of 41

ETH_0

IO Use an external power supply: 3.3v

TXC / RXC : delays 2ns

PHY Address : 010



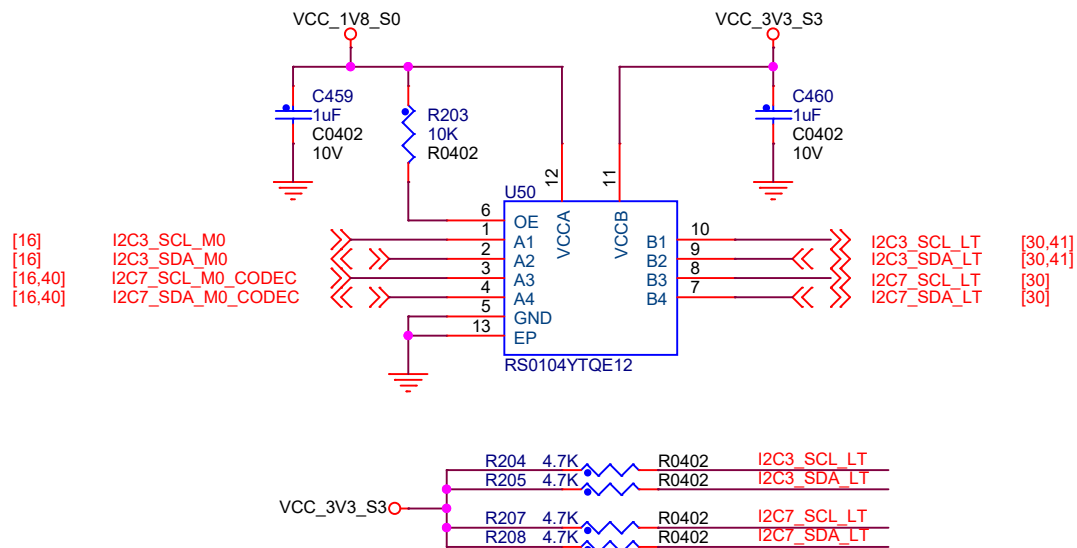
东莞野火电子有限公司
https://yehuosm.tmall.com

Title 野火 RK3588 LubanCat 5 原理图

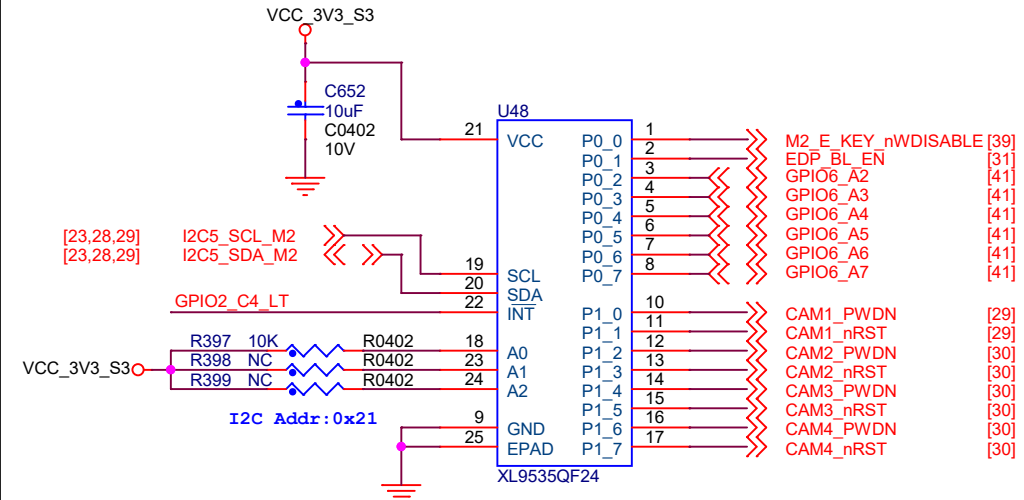
Size	Document Number	Rev
A3	ETH_0	V2R1

Date: Friday, November 29, 2024 Sheet 26 of 41

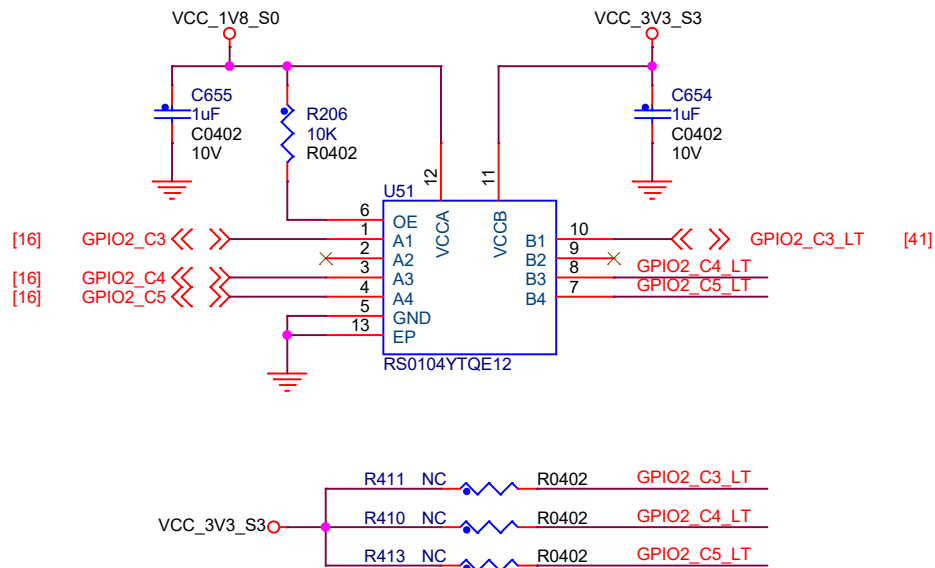
I2C Level Translation



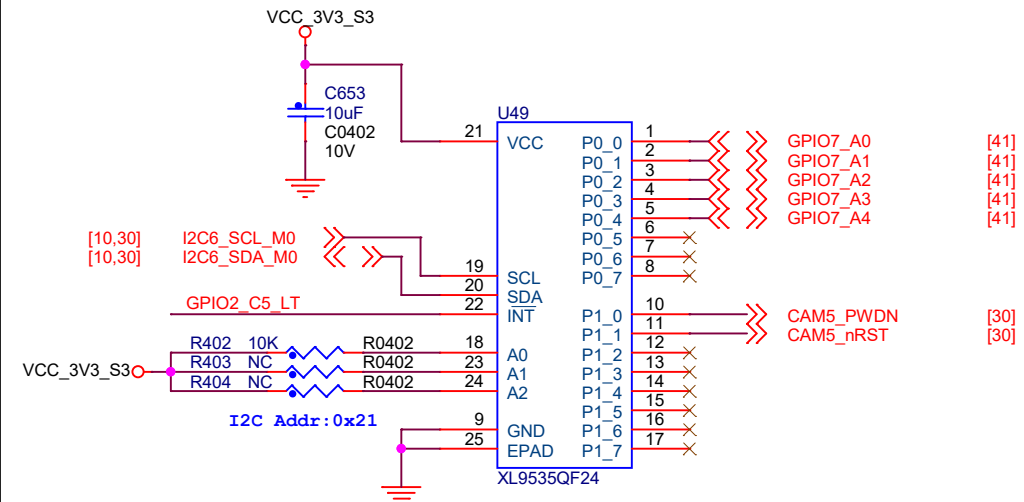
I/O Expand GPIO6



GPIO Level Translation



I/O Expand GPIO7



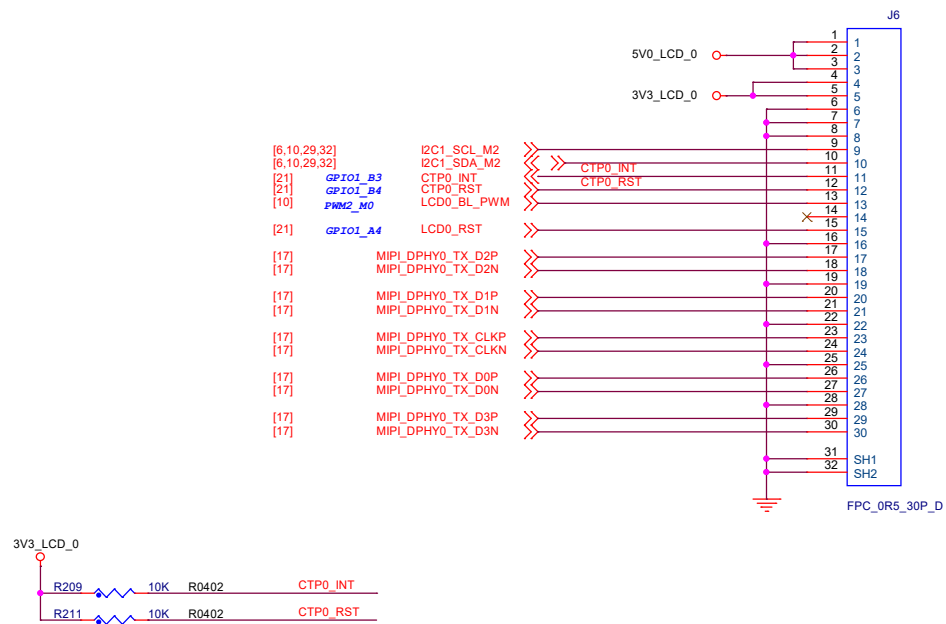
东莞野火电子技术有限公司
<https://yehuosm.tmall.com>

Title 野火 RK3588 LubanCat 5 原理图

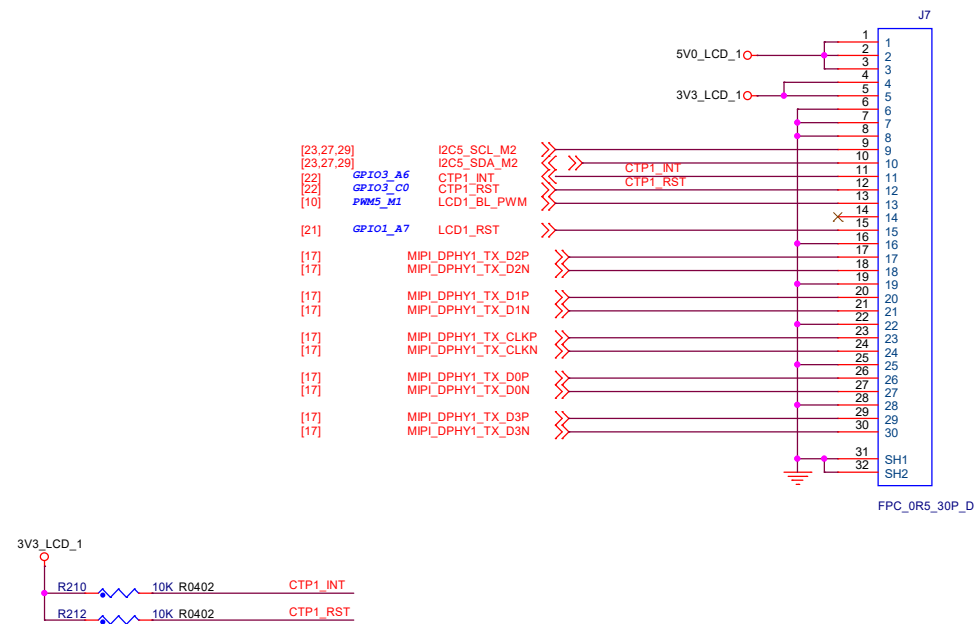
Size A4	Document Number I2C/GPIO Level Translation	Rev V2R1
---------	--	----------

Date: Wednesday, November 27, 2024 Sheet 27 of 41

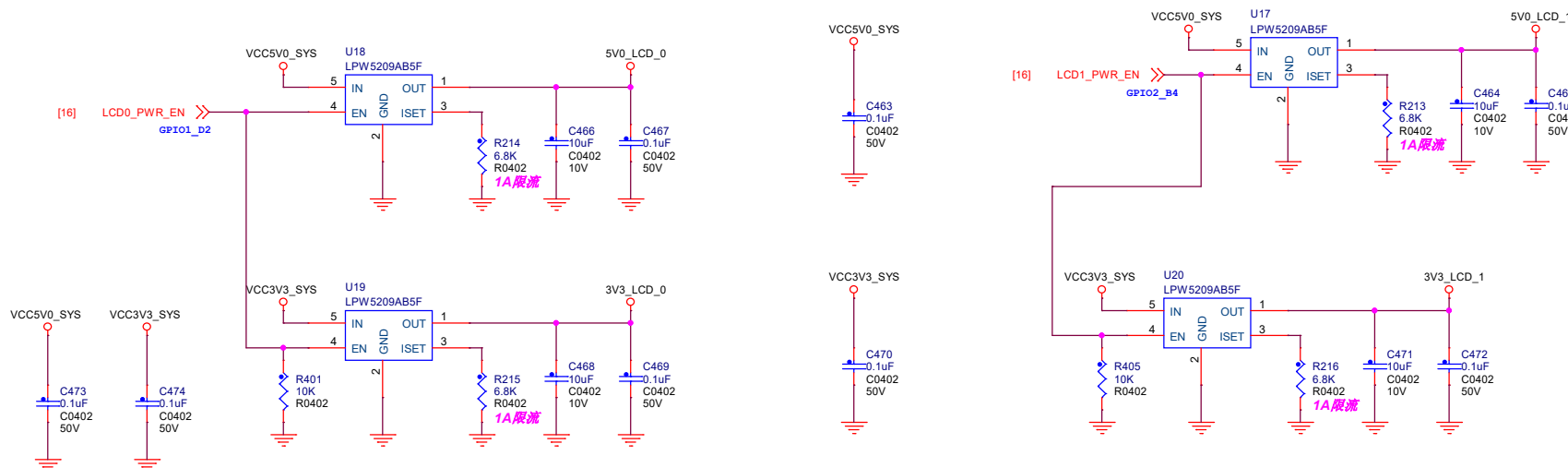
MIPI_DSI_TX0 PORT



MIPI_DSI_TX1 PORT

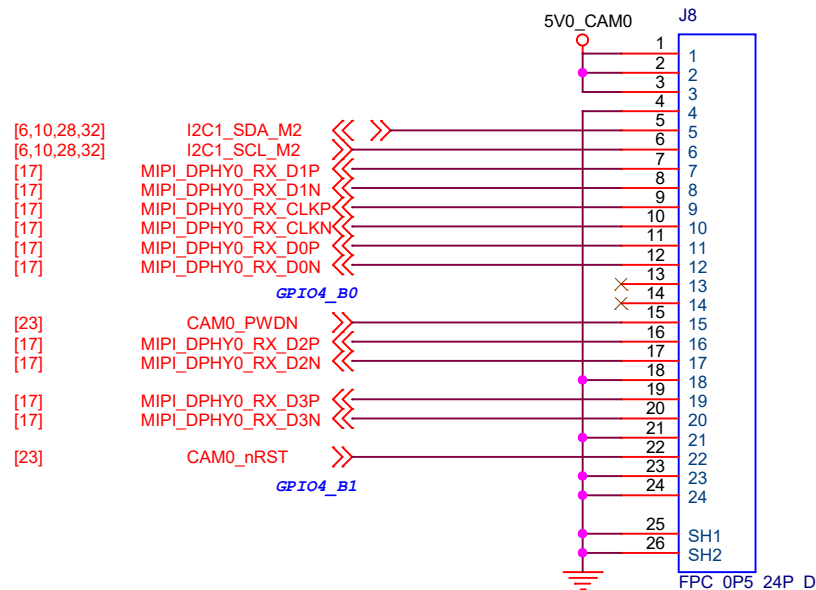


MIPI DSI Power

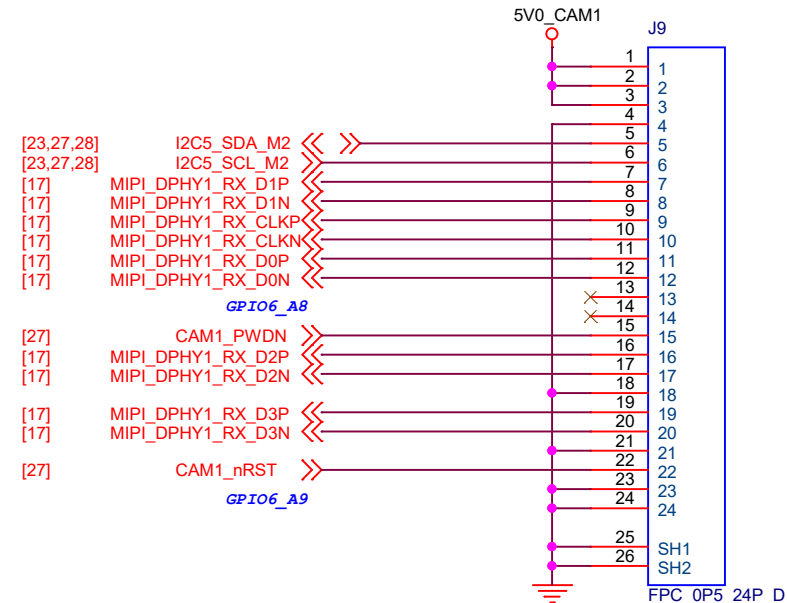


东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number MIPI DSI PORT	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 28 of 41		

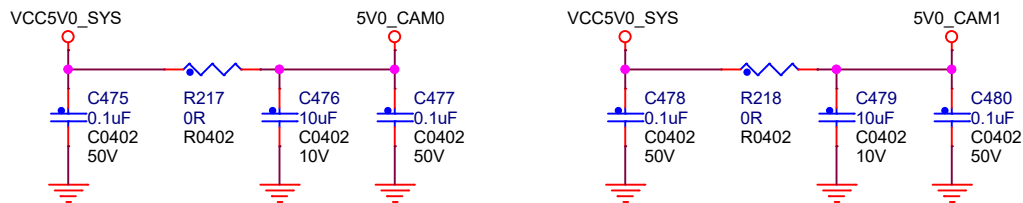
MIPI CSI 0 PORT



MIPI CSI 1 PORT



MIPI CSI Power



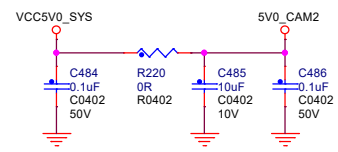
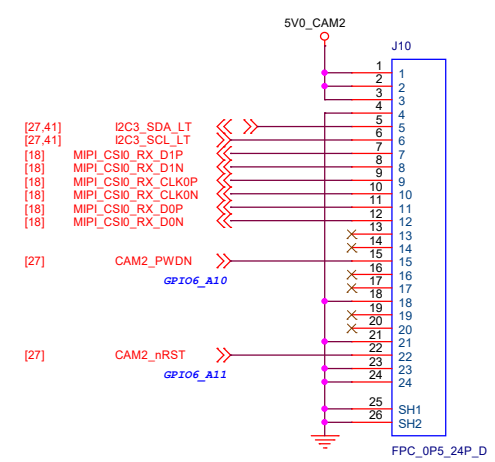
东莞野火电子技术有限公司
<https://yehuosm.tmall.com>

Title 野火 RK3588 LubanCat 5 原理图

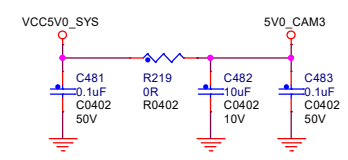
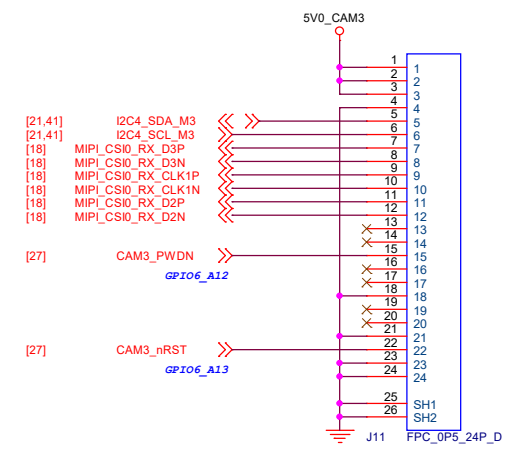
Size A4	Document Number MIPI DSI PORT1	Rev V2R1
---------	--------------------------------	----------

Date: Wednesday, November 27, 2024 Sheet 29 of 41

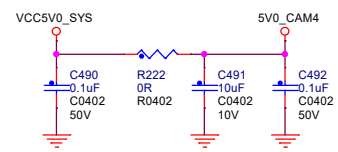
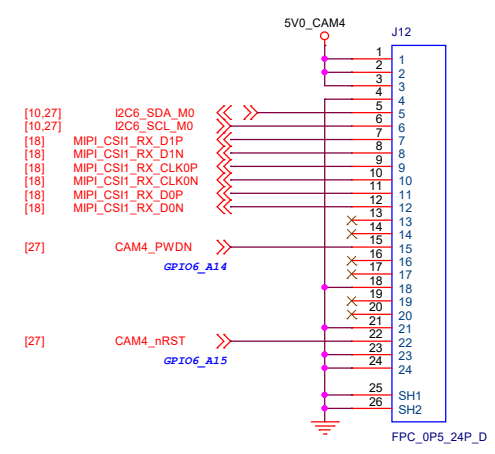
MIPI_CSI2_PORT



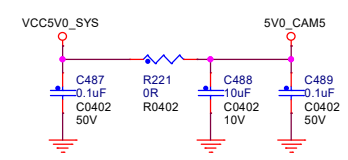
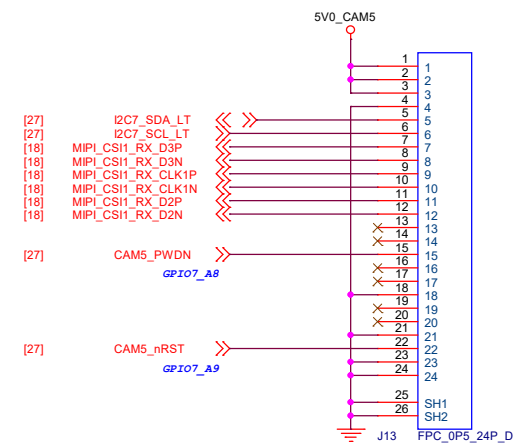
MIPI_CSI3_PORT



MIPI_CSI4_PORT

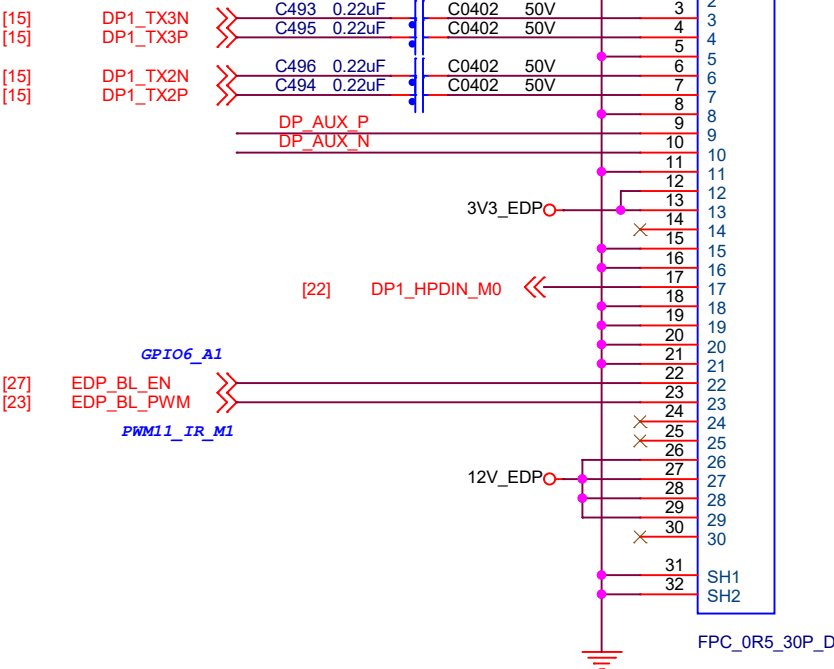
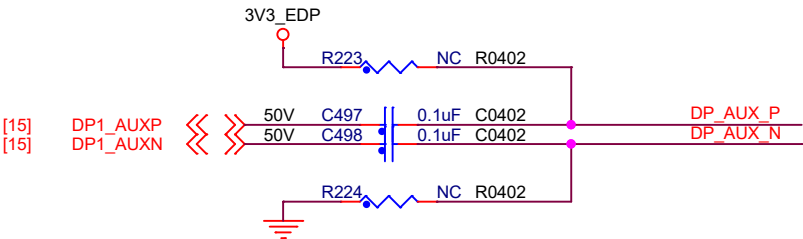


MIPI_CSI5_PORT

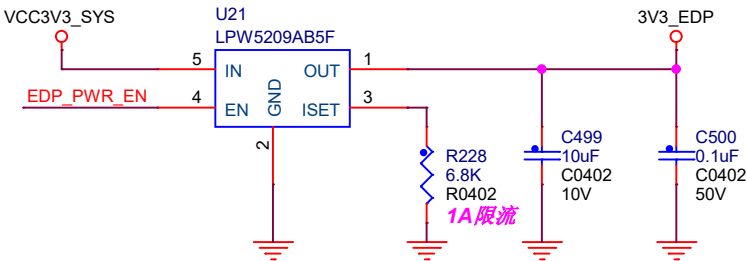
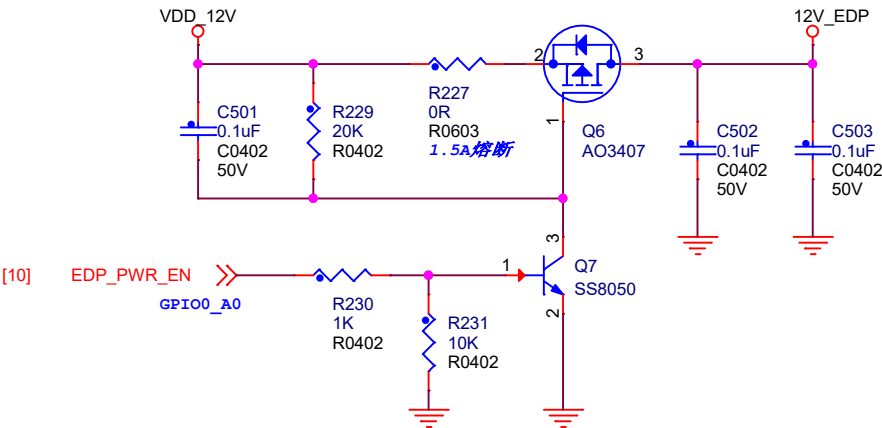


东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number MIPI DSI PORT	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 30 of 41		

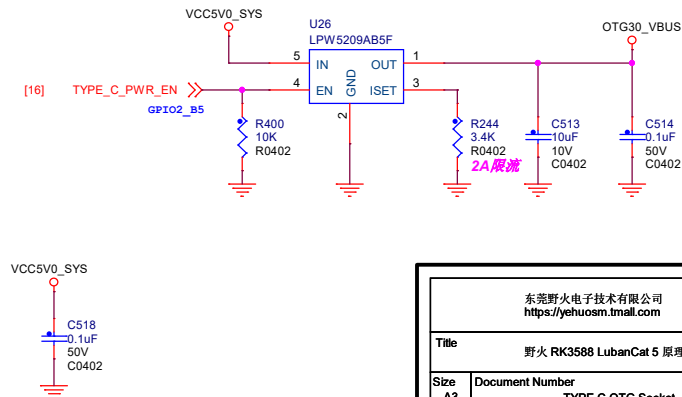
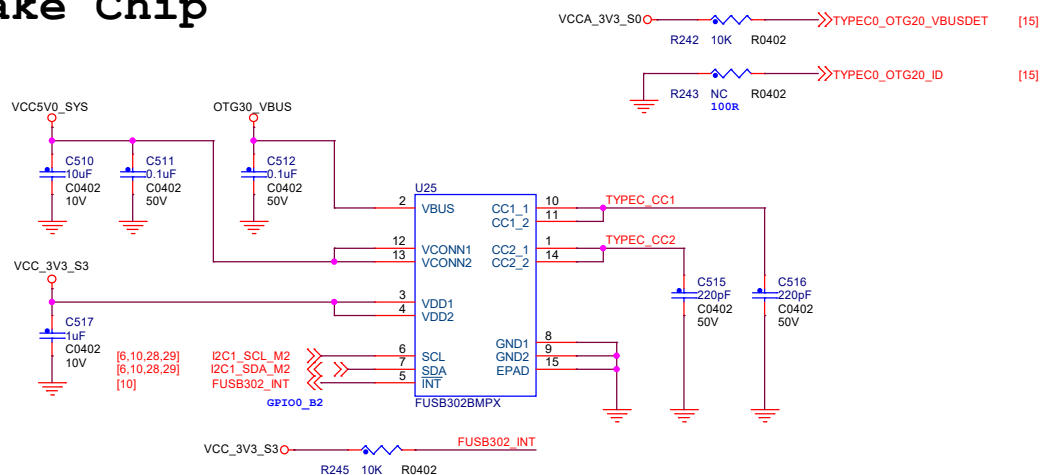
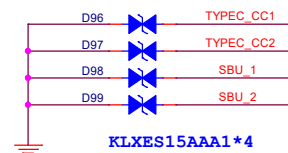
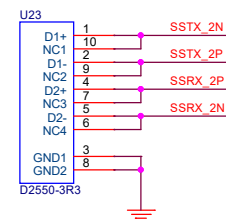
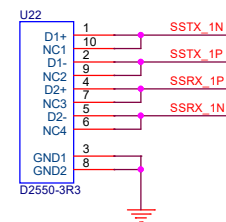
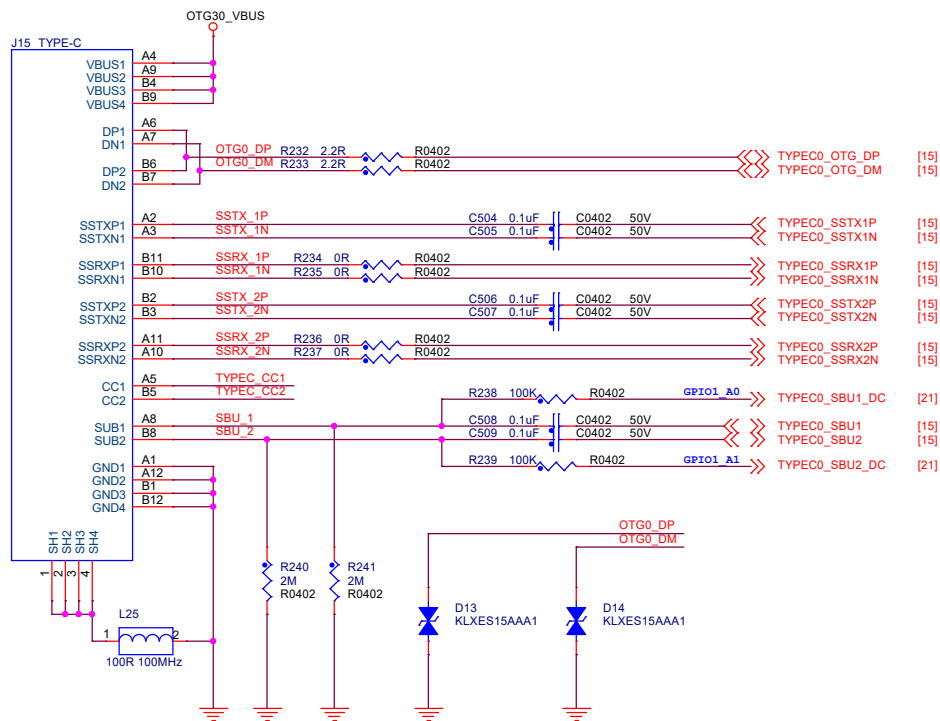
eDP1.3 PORT



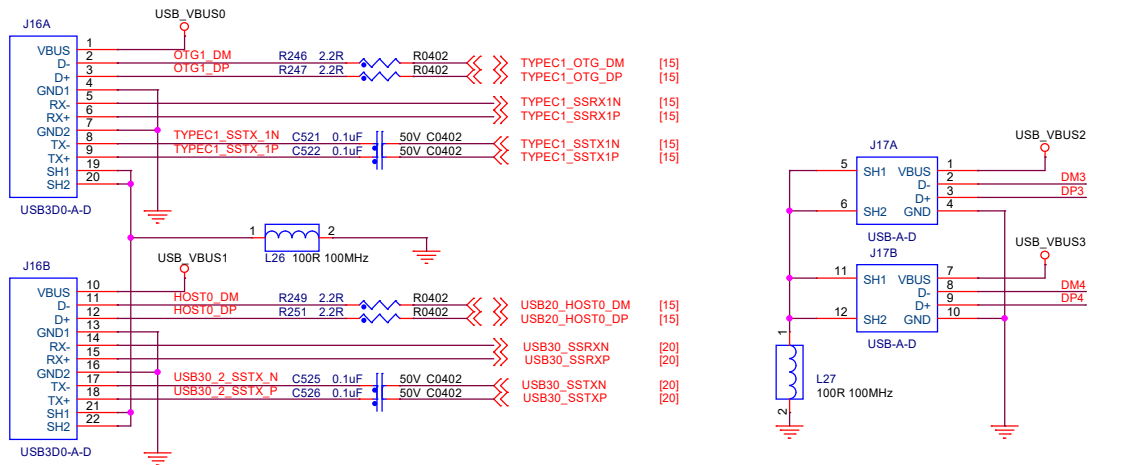
EDP Power



东莞野火电子有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A4	Document Number eDP_1.3_PORT	Rev V2R1
Date: Wednesday, November 27, 2024Sheet 31 of 41		

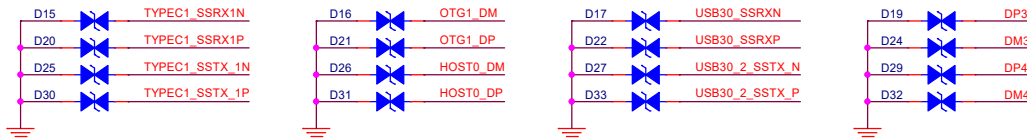


USB 2.0 HOST x2

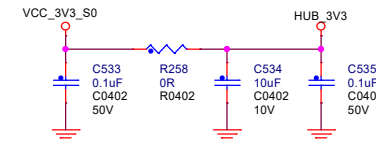
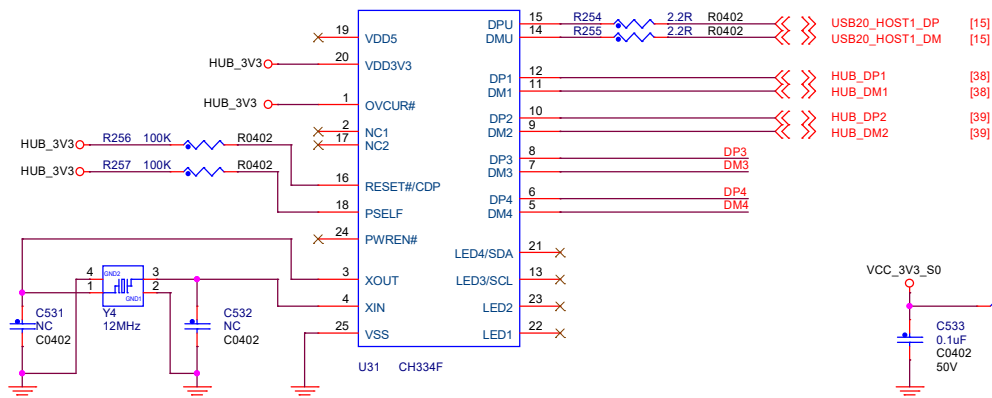


ESD

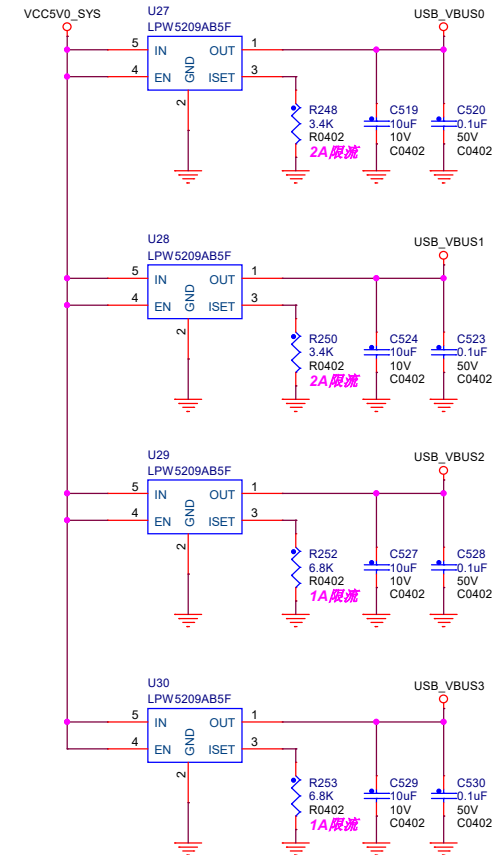
KLXS15AAA1*16



USB20 HUB PHY



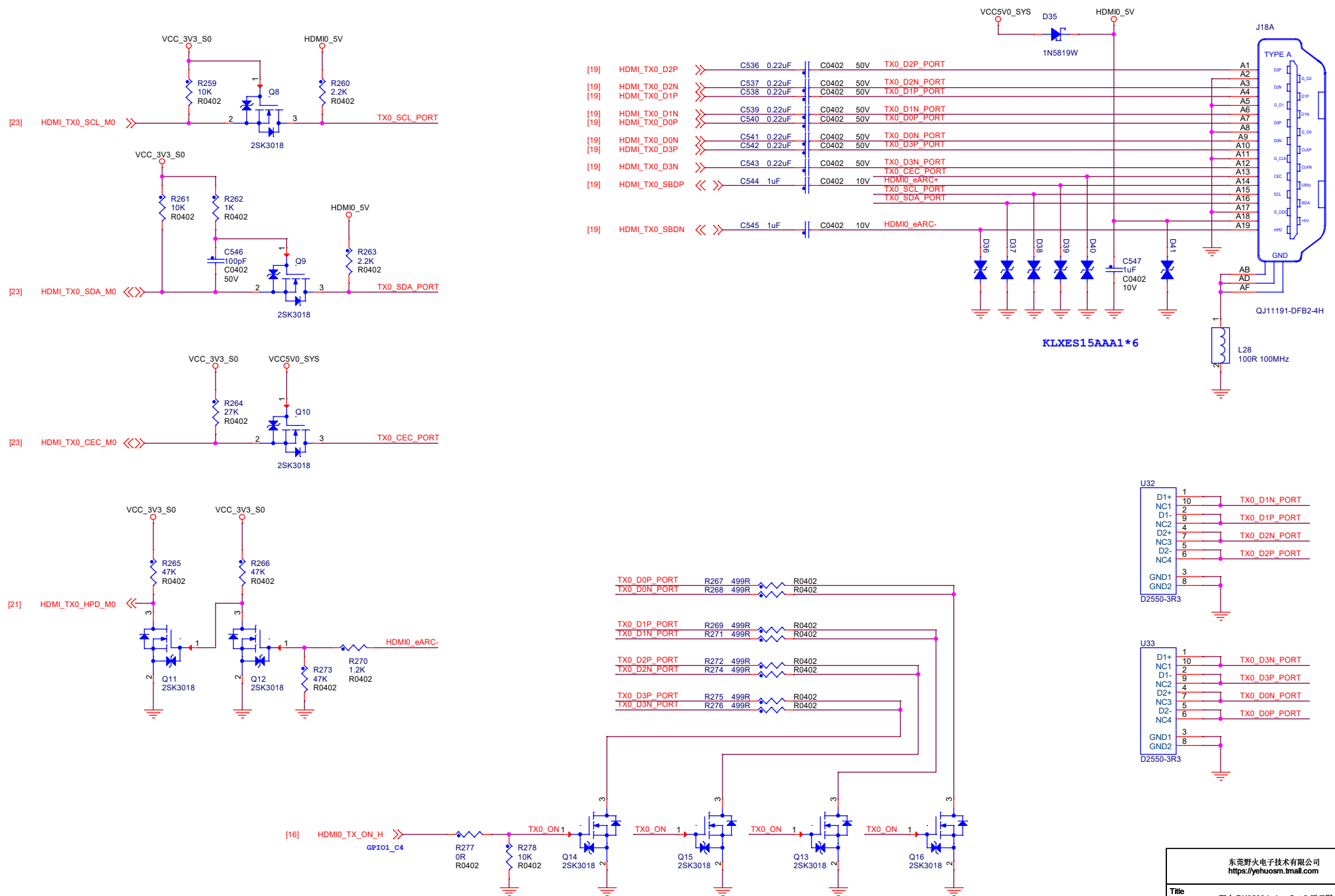
USB POWER



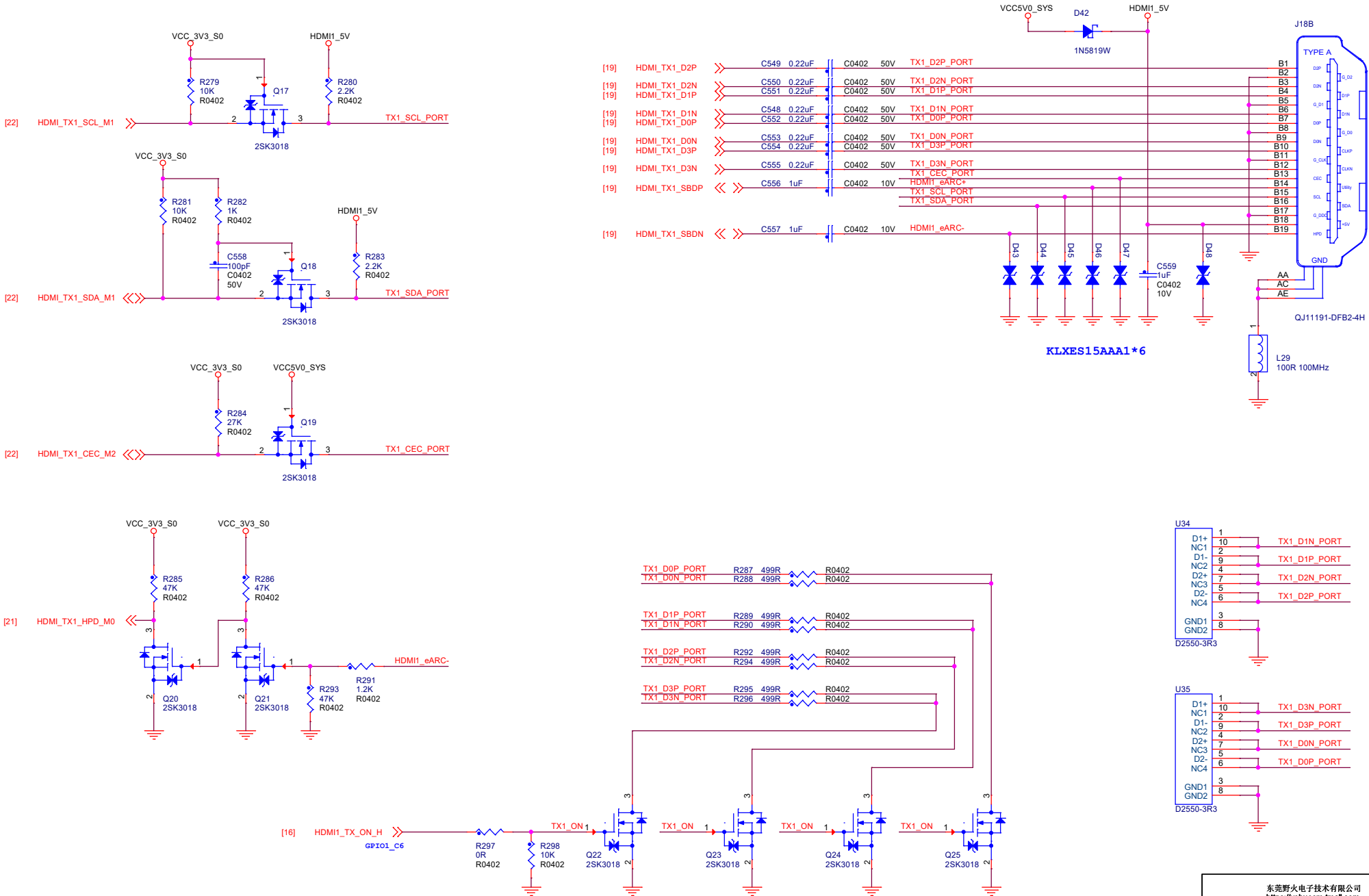
东莞野火电子技术有限公司
https://yehuosm.tmall.com

Title		
野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number USB30/USB20/SATA30_PORT	Rev V2R1
Date:	Wednesday, November 27, 2024	Sheet 33 of 41

HDMI2.1 PORT

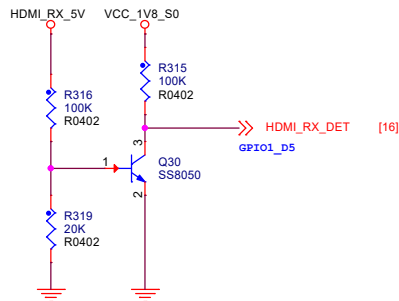
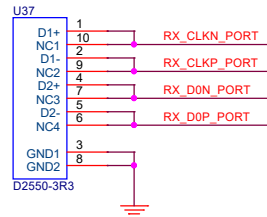
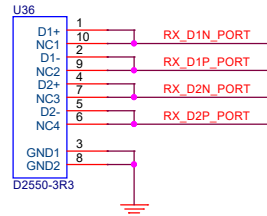
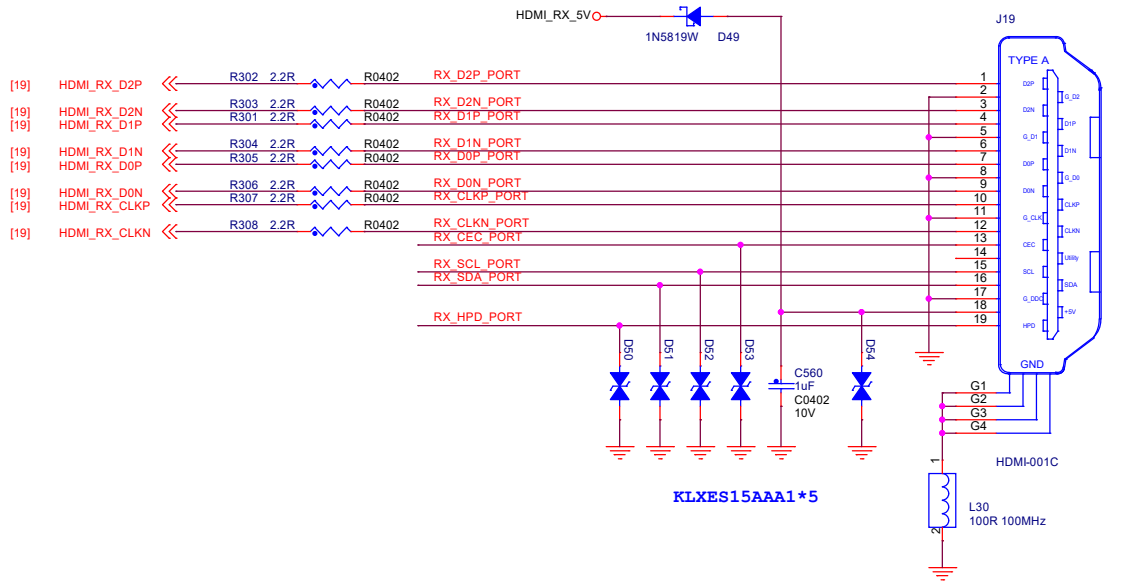
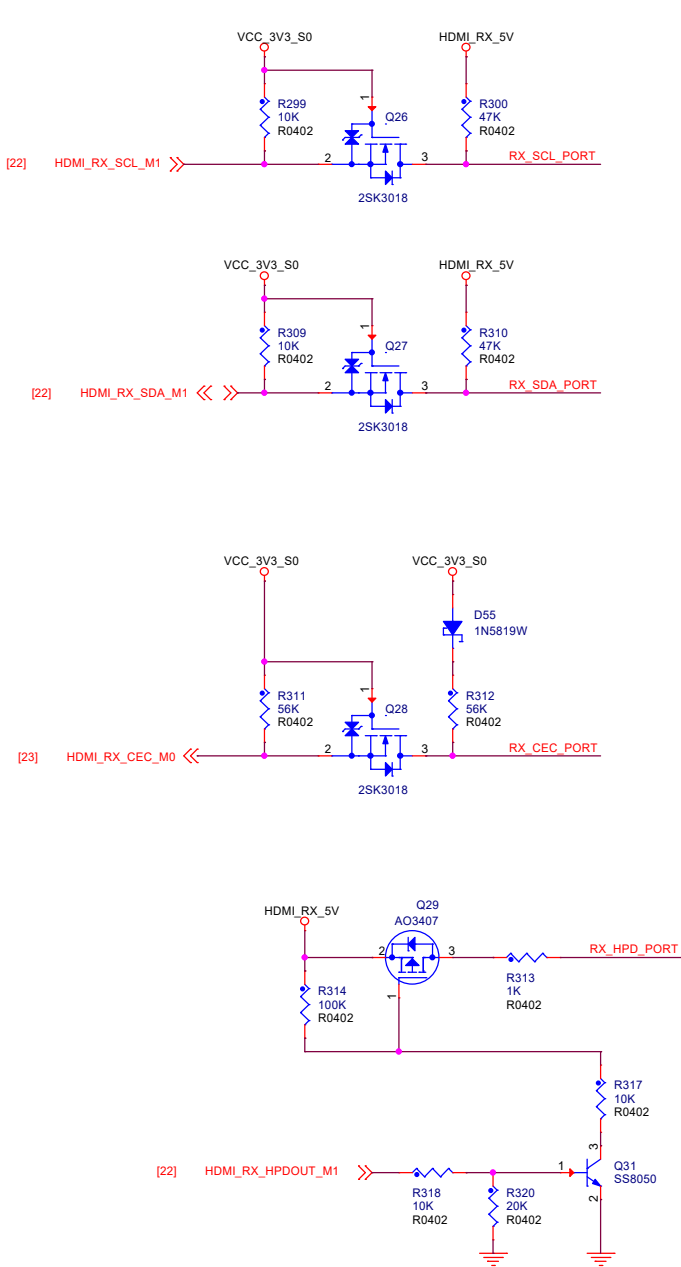


HDMI2.1 PORT



东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number HDMI TX 1 PORT	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 35 of 41		

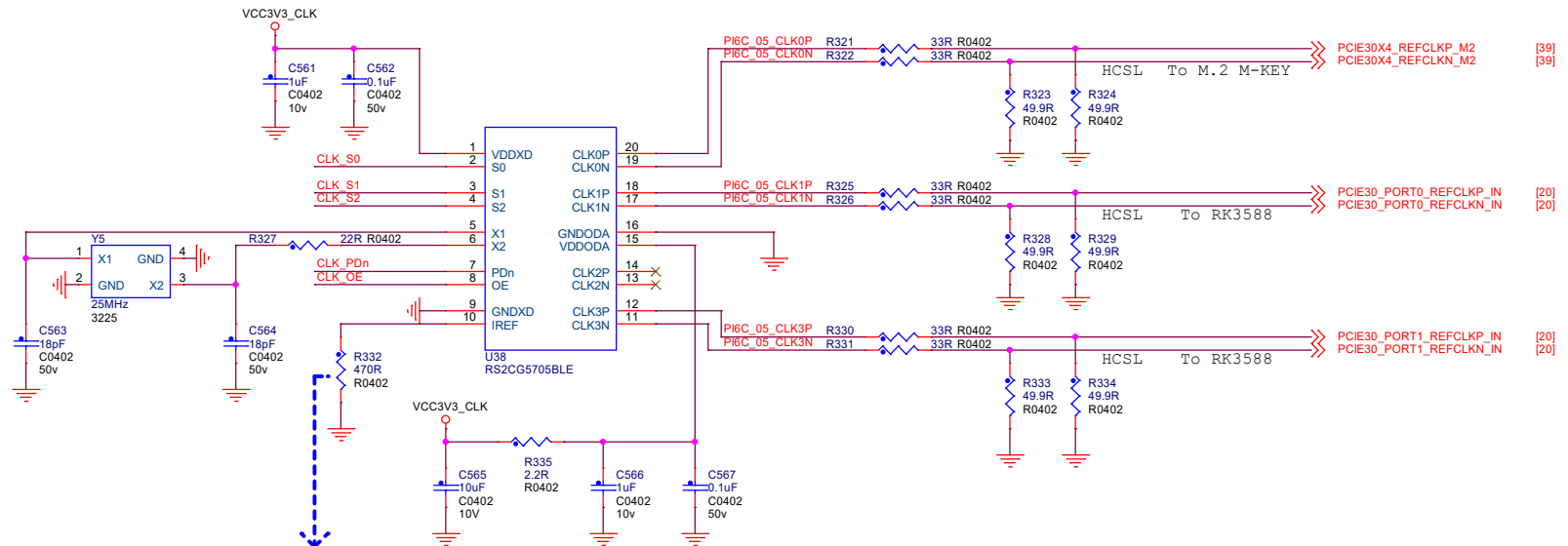
HDMI2.0 RX PORT



东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number HDM RX PORT	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 36 of 41		

PCIE3.0_ REFCLK

CLK*3 @100MHz



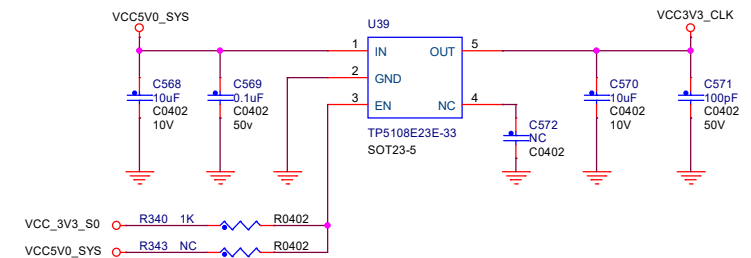
If board target trace impedance is 50ohm
then $R = 475\text{ohm}$ providing an IREF of 2.32 mA . The output current (IOH) is $6 * \text{IREF}$.
 $6 \times 2.32 \times 50 = 696\text{mV}$

SPEED_MODE_SET

Default: No Spread

CLK_S0	CLK_S1	CLK_S2	Spread %	Out Freq
0	0	0	-0.5	100MHz
1	0	0	-1.0	100MHz
0	1	0	-1.5	100MHz
1	1	0	No Spread	100MHz

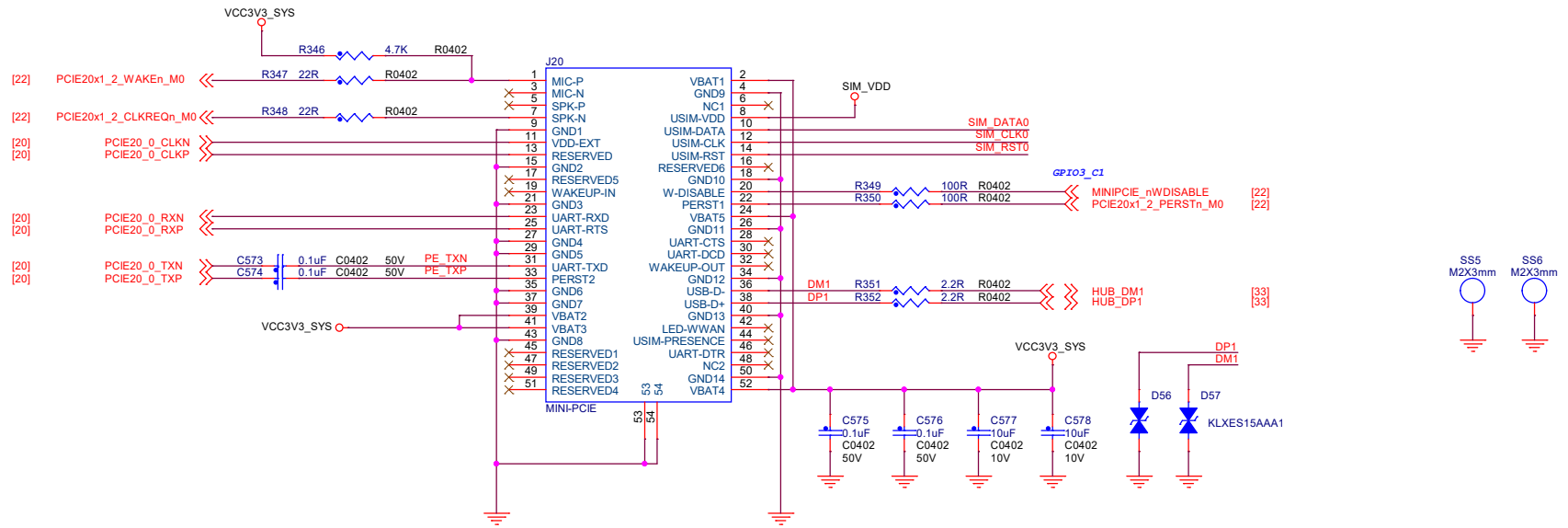
SPLIT_CLK_POWER



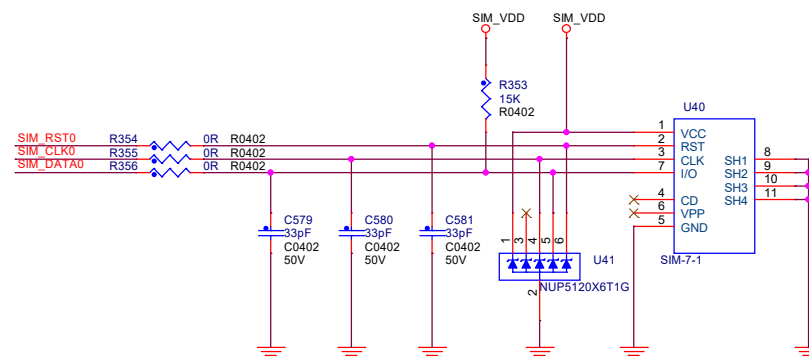
东莞野火电子技术有限公司
<https://yehuosm.tmall.com>

Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number Crystal Generator	Rev V2R1
Date: Friday, November 29, 2024	Sheet 37 of 41	

MINI PCIE



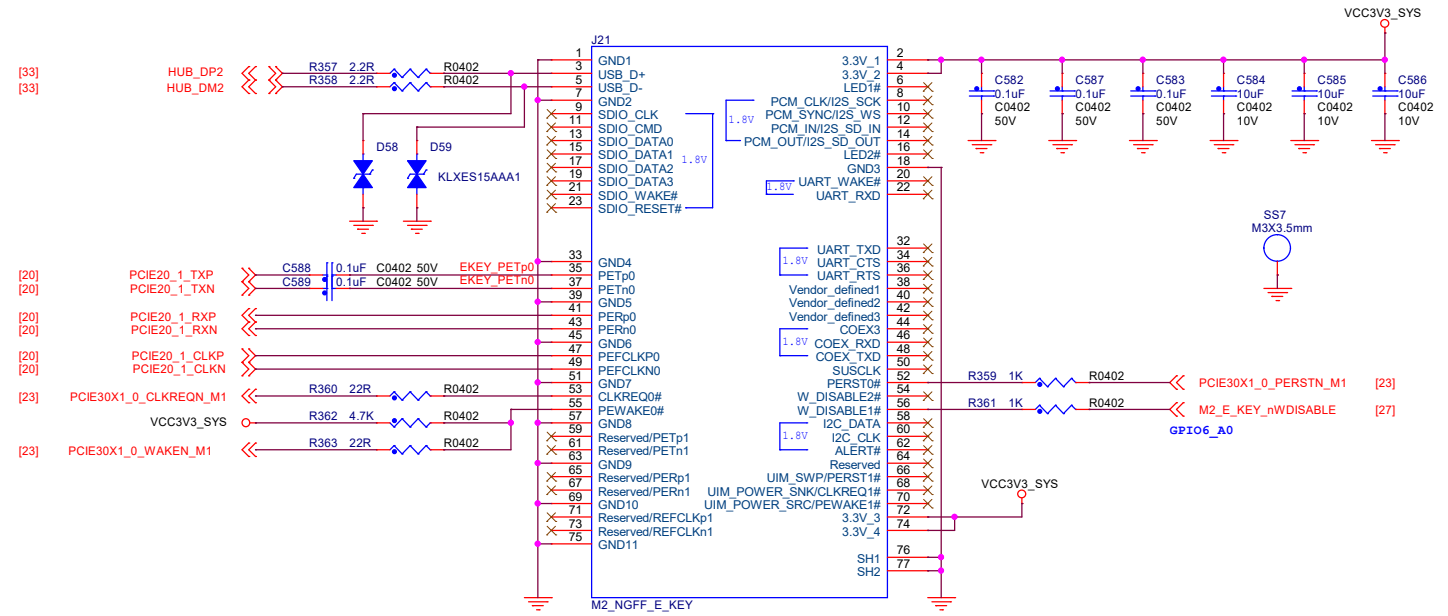
SIM CARD



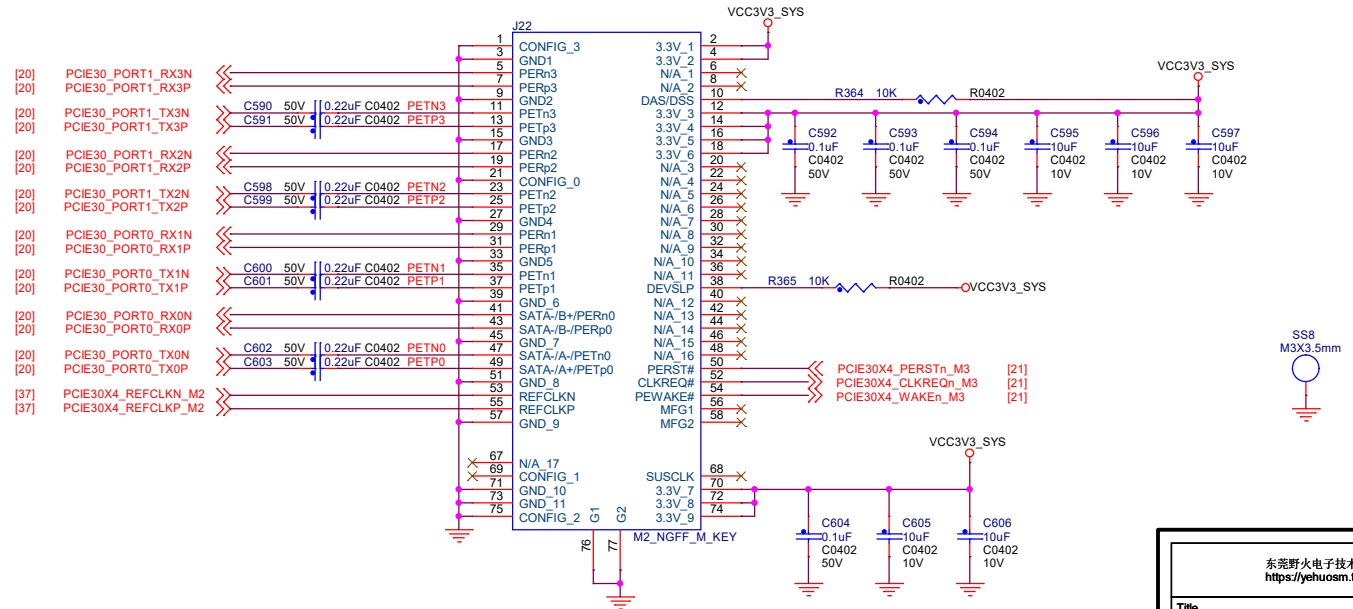
东莞野火电子有限公司
https://yehuosm.tmall.com

Title		
野火 RK3588 LubanCat 5 原理图		
Size	Document Number	Rev
A3	MINI PCIE_PORT	V2R1
Date: Wednesday, November 27, 2024 Sheet 38 of 41		

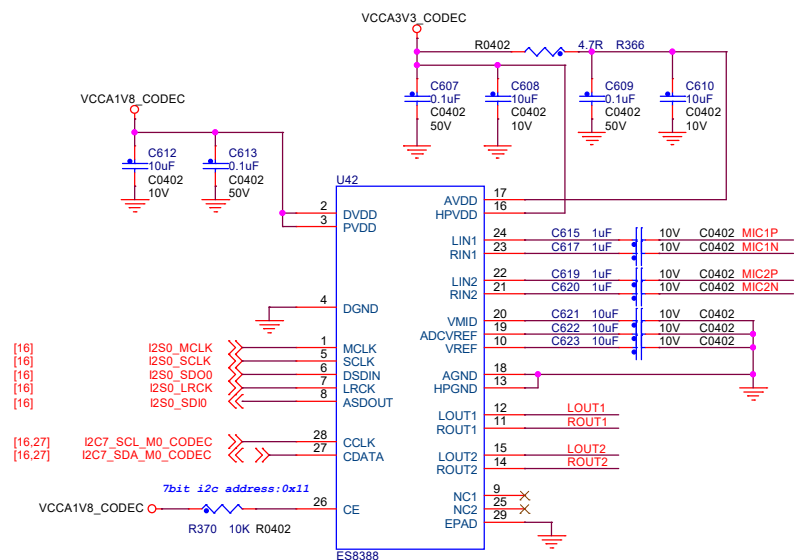
PCIE2.0 x 1Lanes E-KEY WLAN



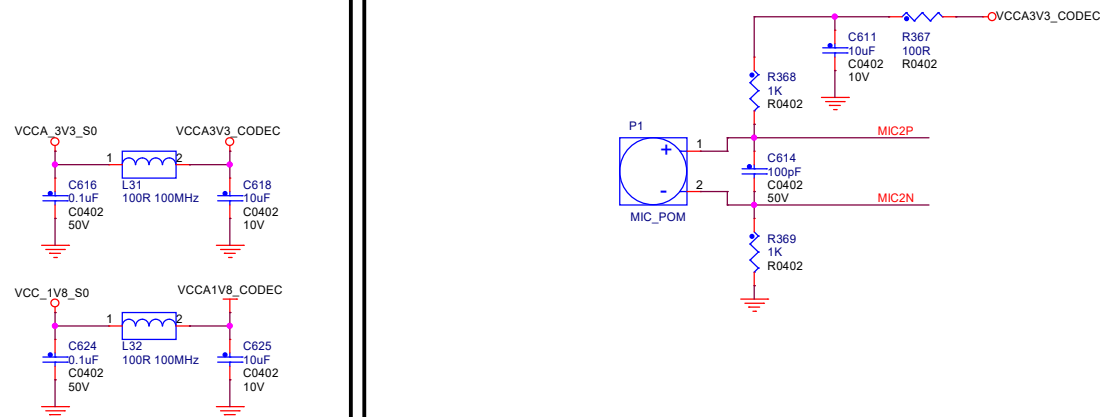
PCIE3.0 x 4Lanes m.2 SSD



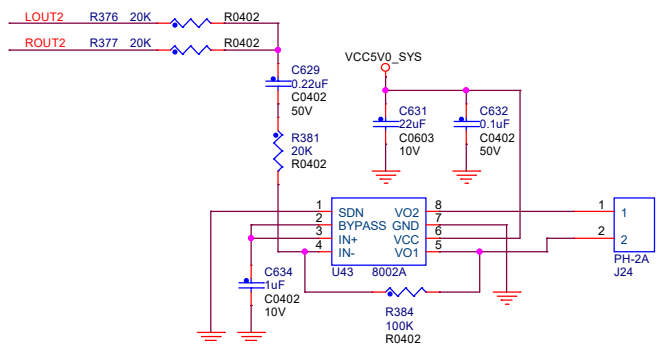
ES8388 CODEC



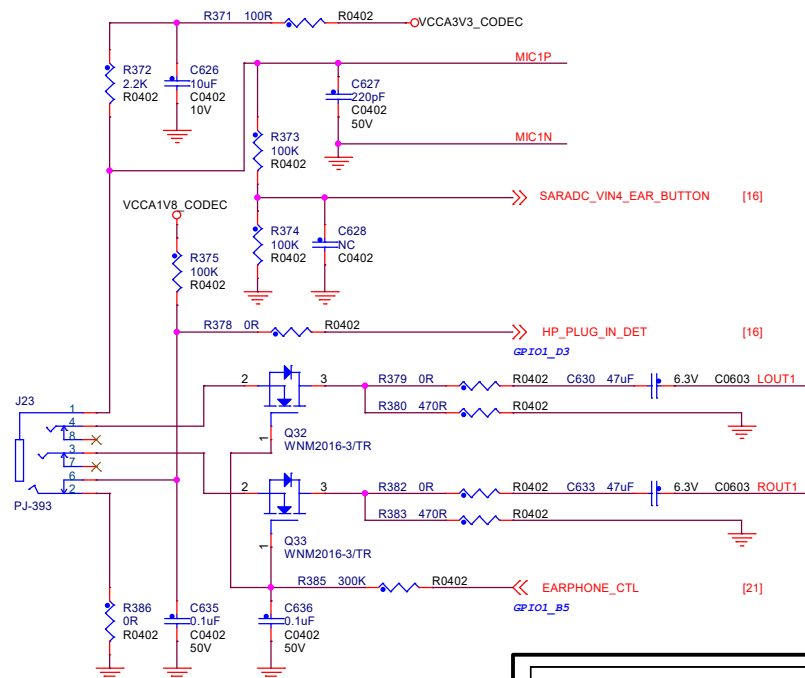
MIC



SPK



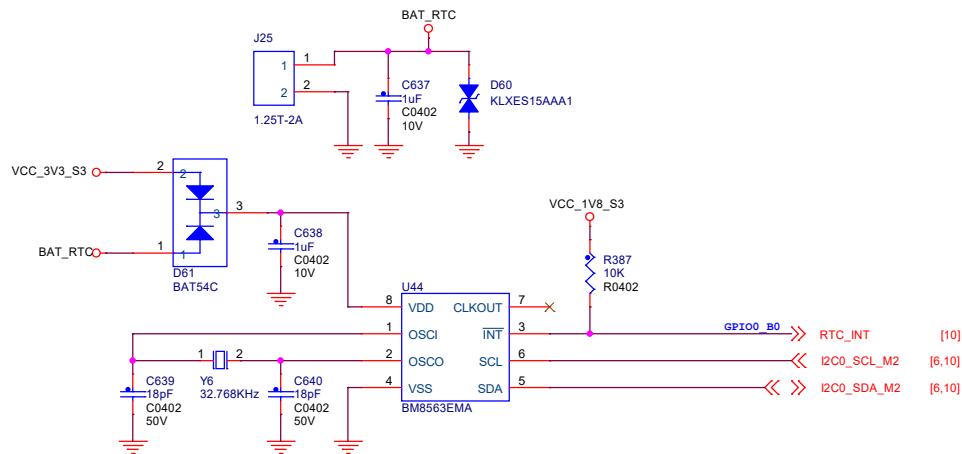
EarPhone



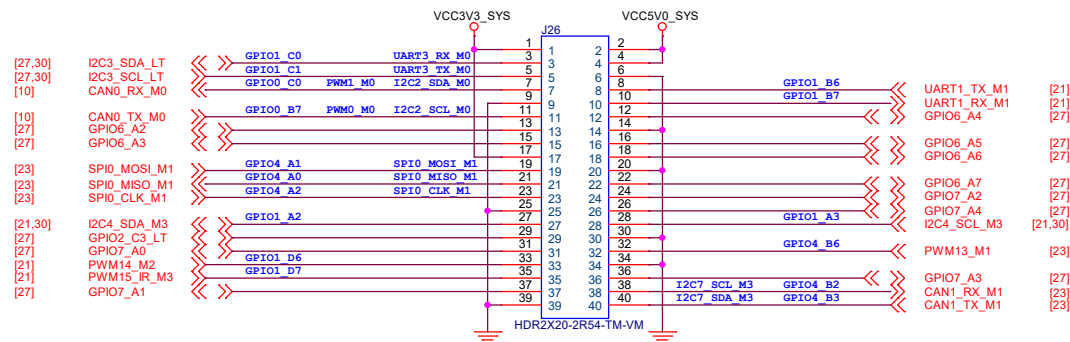
东莞野火电子技术有限公司
https://yehuosm.tmall.com

Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number CODEC/EarPhone/MIC/SPK	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 40 of 41		

RTC

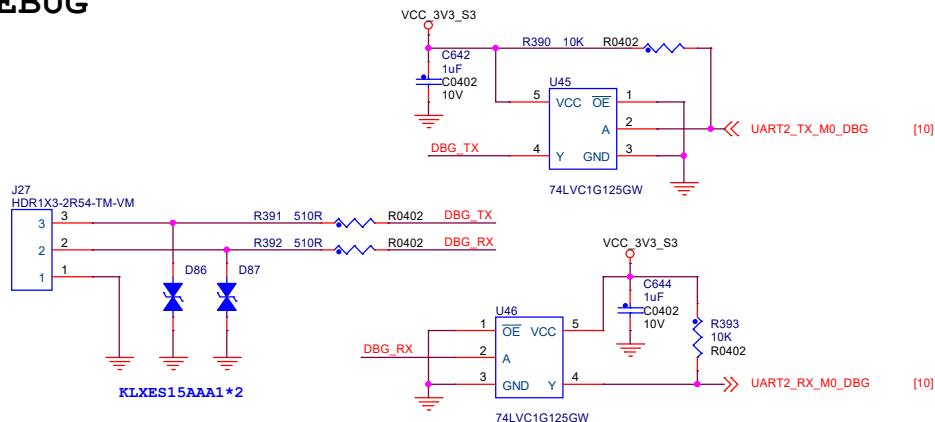


40Pin GPIO

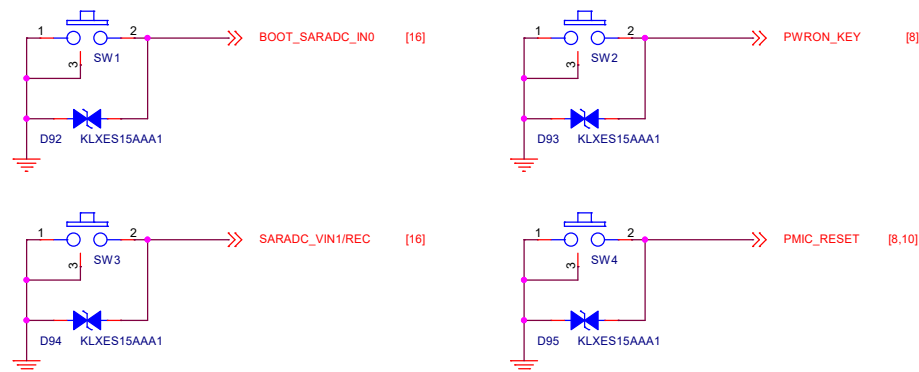


Only Support 3V3 I/O

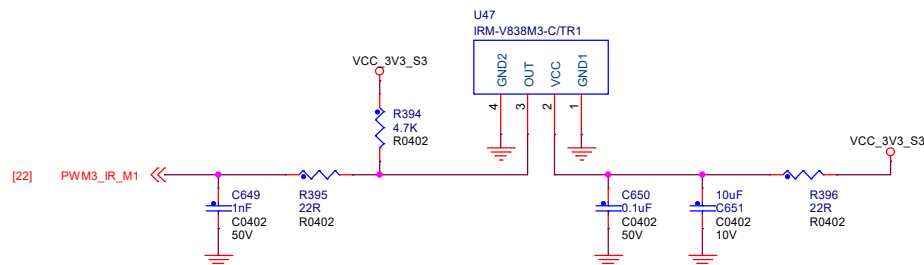
DEBUG



KEY



IR INPUT



东莞野火电子技术有限公司 https://yehuosm.tmall.com		
Title 野火 RK3588 LubanCat 5 原理图		
Size A3	Document Number 32K_OSC/DEBUG/40P_IO/KEY	Rev V2R1
Date: Wednesday, November 27, 2024 Sheet 41 of 41		