


BPI_F3_LP4XP200_32X1

Revision	Date	Change Description
V1.0	20231207	Initial version
V2.0	20240131	Update based on test results
V3.0	20240401	Update based on test results

 http://www.banana-pi.org	GUANGDONG BIPAI KEJI CPA.LTD		
	Design Name BPI-F3_LP4XP200_32X1		
	Size A3	Page Name 01 REVISION HISTORY	Rev <RevCode>
	Date: Wednesday, May 08, 2024 Sheet 1 of 28		

INDEX/NOTES

Page1	01	REVISION HISTORY
Page2	02	INDEX/NOTES
Page3	03	BLOCK DIAGRAM
Page4	04	POWER TREE
Page5	05	POWER SEQUENCE
Page6	06	CLOCK MAP/I2C MAP
Page7	07	UART MAP/OTHER MAP
Page8	08	GPIO ASSIGNMENT
Page9	09	CPU-eMMC-DDR-GPIO
Page10	10	CPU-Perphery
Page11	11	CPU-PWR
Page12	12	CPU-SYS-GPIO
Page13	13	POWER-EXT DCDC
Page14	14	POWER-P1
Page15	15	Memory-LPDDR4x
Page16	16	Storage-eMMC
Page17	17	Storage-FLASH-CARD-EEPROM
Page18	18	VI-Camera
Page19	19	VO-HDMI
Page20	20	VO-MIPI DSI
Page21	21	WiFi/BT-SDIO_2T2R/UART
Page22	22	Ethernet-GMAC0
Page23	23	Ethernet-GMAC1
Page24	24	USB3 HUB/USB2 TypeC/DC IN
Page25	25	PCIEB M.2 KEY M
Page26	26	PCIEC Mini PCIE
Page27	27	Audio ES8326B
Page28	28	26pin GPIO/KEY/LED

BLOCK

The diagram illustrates the system architecture centered around the **K1 Octa-Core RISC-V** processor. The processor is connected to various peripheral components:

- Power Management:** Includes a USB OTG port, CH224D, SY8386J, SY8810I, and VCC5V0_SYS. It provides power to PCIE_VCC3V3, CORE_OV9, and several voltage regulators (1V8, 3V3, 1V1, 1V2).
- Processing & Control:** Features a P1 controller, ES8326B audio codec, and a 32.768KHz crystal. It also includes a 24MHz clock source.
- Storage & Memory:** Utilizes 8GB K4UCE3Q4AB-MGCL, 16GB KLMA91JETD-B041, and 4MB W25Q32JVSSIQ memory modules. It also includes a 32bit LP4x/Lp3/LP4 and EMMC 5.1 storage.
- Connectivity:** Supports USB3/PCIE 1lane, PCIE 2lane, and PCIE 2lane. It also features USB2 HOST, USB2 OTG, GMAC0, GMAC1, MMC2, UART2, I2S1, MMC1, I2C, QSPI0, and a 2Kbit EEPROM ST24C02B.
- Input/Output:** Includes a 32K OUT, PMIC_RST, PMIC_INT, Sleep, PI2C, AP_I2C2, I2S0, HDMI, MIPI_DSI, MIPI_CSI*2, PRI_JTAG, SPI, UART, and I2C/GPIO interfaces.
- Other Components:** Includes a VL817 video interface, RTL8211F Ethernet controllers, RTL8852BS Wi-Fi module, and various sensors like BCT8013 and BCT8014.

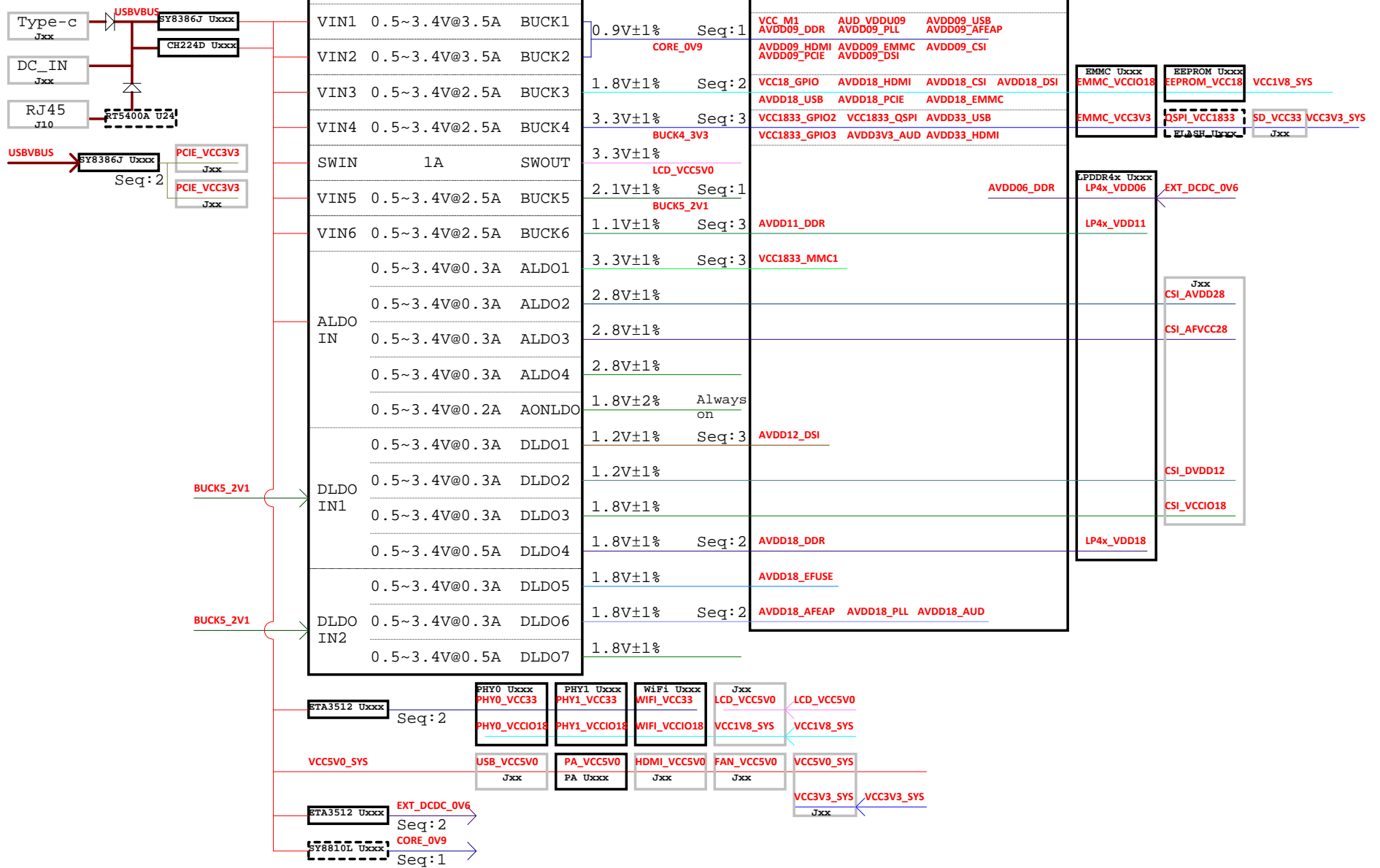
GUANGDONG BIPAI KEJI CPA.LTD

Design Name: BPI-F3_LP4XP200_32X1

Size A3 Page Name 03 BLOCK DIAGRAM Rev <RevCode>

Date: Wednesday, May 08, 2024 Sheet 3 of 28

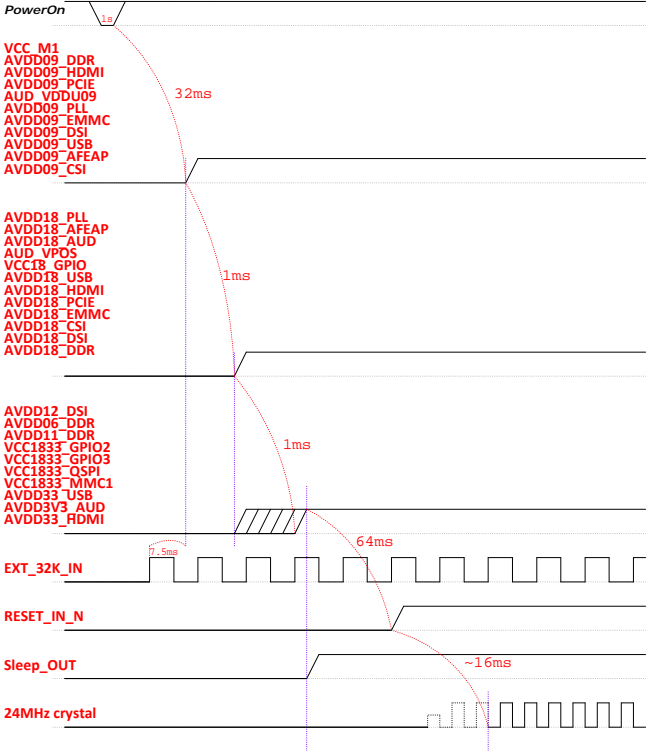
POWER TREE



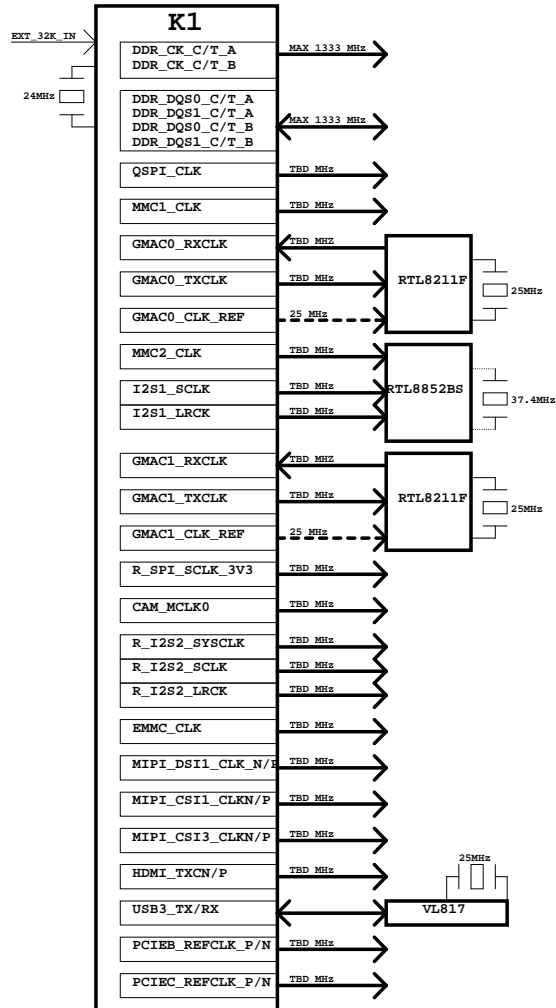
POWER SEQUENCE

Control by PMIC

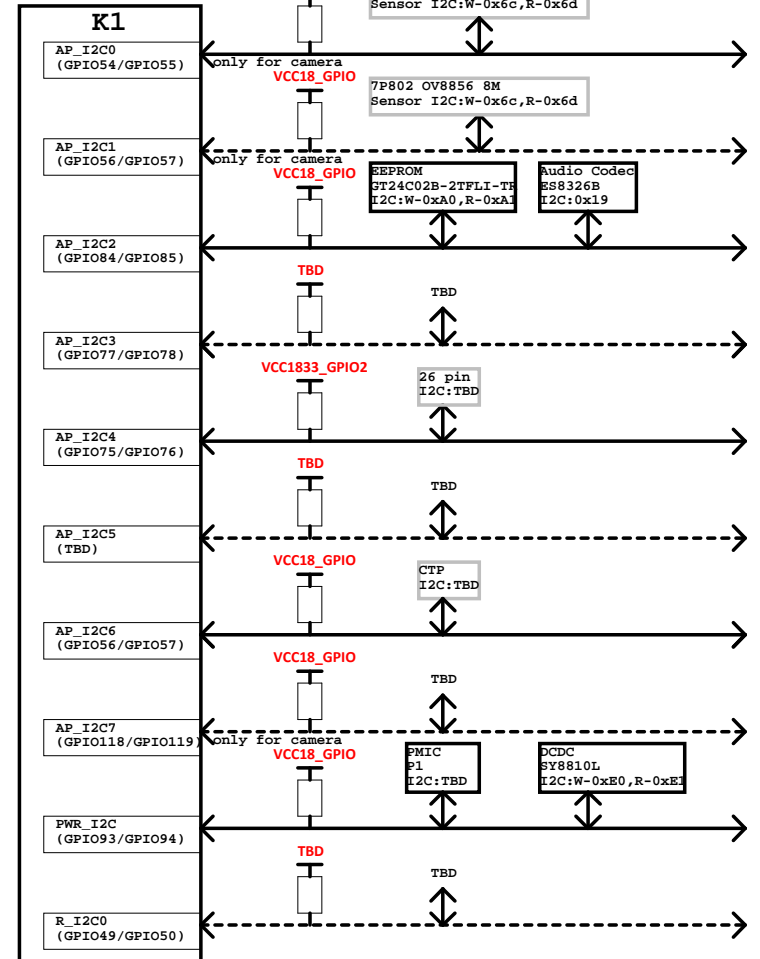
冷起自动上电，后续长按关机，短按开机



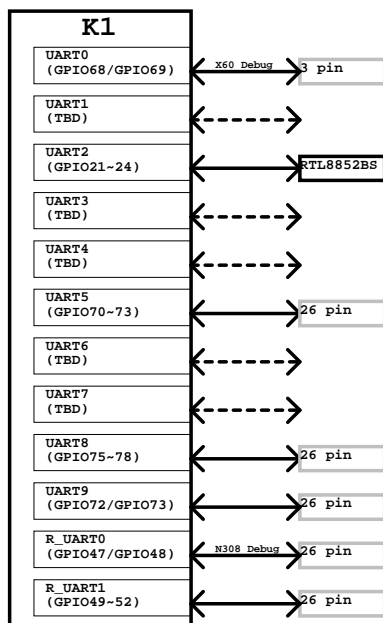
CLOCK MAP



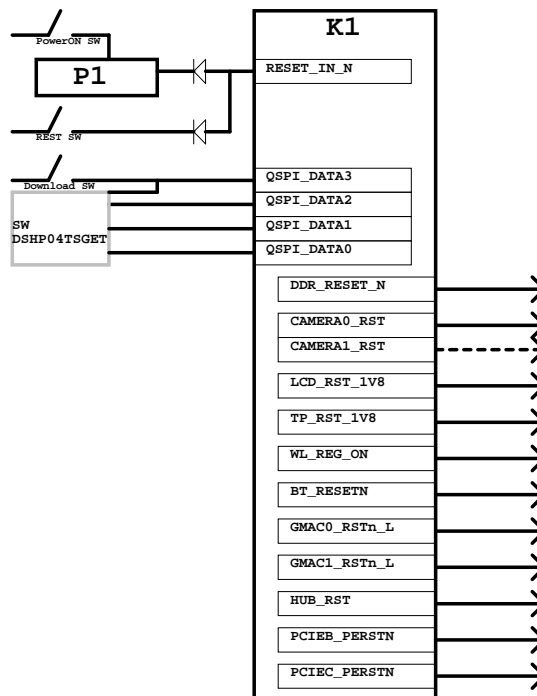
I2C MAP



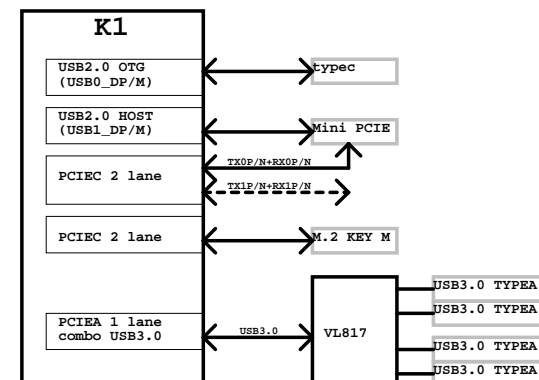
UART MAP



SW&RESET MAP



PCIE/USB MAP



GPIO ASSIGNMENT

PIN	Define	CFG	Function
GPIO0	GMAC0_RXDV	1	Ethernet -GMAC0
GPIO1	GMAC0_RXD0	1	
GPIO2	GMAC0_RXD1	1	
GPIO3	GMAC0_RXCLK	1	
GPIO4	GMAC0_RXD2	1	
GPIO5	GMAC0_RXD3	1	
GPIO6	GMAC0_TXD0	1	
GPIO7	GMAC0_TXD1	1	
GPIO8	GMAC0_TXCLK	1	
GPIO9	GMAC0_TXD2	1	
GPIO10	GMAC0_TXD3	1	
GPIO11	GMAC0_TXEN	1	
GPIO12	GMAC0_MDC	1	
GPIO13	GMAC0_MDIO	1	
GPIO14	GMAC0_INT_N	1	WiFi/BT
GPIO15	MMC2_DATA3	1	
GPIO16	MMC2_DATA2	1	
GPIO17	MMC2_DATA1	1	
GPIO18	MMC2_DATA0	1	
GPIO19	MMC2_CMD	1	
GPIO20	MMC2_CLK	1	
GPIO21	UART2_TXD	1	
GPIO22	UART2_RXD	1	
GPIO23	UART2_CTS_N	1	
GPIO24	UART2_RTS_N	1	
GPIO25	I2S1_SCLK	1	
GPIO26	I2S1_LRCK	1	
GPIO27	I2S1_TXD	1	Ethernet -GMAC1
GPIO28	I2S1_RXD	1	
GPIO29	GMAC1_RXDV	1	
GPIO30	GMAC1_RXD0	1	
GPIO31	GMAC1_RXD1	1	
GPIO32	GMAC1_RXCLK	1	
GPIO33	GMAC1_RXD2	1	
GPIO34	GMAC1_RXD3	1	
GPIO35	GMAC1_TXD0	1	
GPIO36	GMAC1_TXD1	1	
GPIO37	GMAC1_TXCLK	1	
GPIO38	GMAC1_TXD2	1	
GPIO39	GMAC1_TXD3	1	
GPIO40	GMAC1_TXEN	1	LCD/CTP
GPIO41	GMAC1_MDC	1	
GPIO42	GMAC1_MDIO	1	
GPIO43	GMAC1_INT_N	1	
GPIO44	LCD_BL_PWM_1V8	4	
GPIO45	GMAC0_CLK_REF	1	GMAC0
GPIO46	GMAC1_CLK_REF	1	GMAC1

PIN	Define	CFG	Function
GPIO110	GMAC0_RSTn_L	0	GMAC0
GPIO115	GMAC1_RSTn_L	0	GMAC1
GPIO116	WL_DIS_N	0	WiFi/BT
GPIO117	PCIEC_CLKREQN	4	PCIEC
GPIO118	I2S0_SCLK	3	Audio Codec
GPIO119	I2S0_LRCK	3	
GPIO120	I2S0_OUT	3	
GPIO121	I2S0_IN	3	
GPIO122	I2S0_SYSCLK	3	USB3_HUB
GPIO123	HUB_PWREN	0	
GPIO124	HUB_RST	0	USB2
GPIO125	VBUS_ON0	1	
GPIO126	CODEC_IRQ	0	
GPIO127	PA_SHUTDOWN	0	

PIN	Define	CFG	Function
GPIO53	CAM_MCLK0	1	CAMERA0
GPIO54	CAM_I2C0_SCL	1	
GPIO55	CAM_I2C0_SDA	1	
GPIO56	AP_I2C6_SCL	5	
GPIO57	AP_I2C6_SDA	5	LCD/CTP
GPIO58	TP_INT_1V8	0	CAMERA0
GPIO111	CAMERA0_RST	1	
GPIO112	PCIEC_WAKEN	3	
GPIO113	CAMERA0_PDN	1	
GPIO114	TP_RST_1V8	0	LCD/CTP
GPIO63	BT_RESETN	0	WiFi/BT
GPIO64	AP_WAKE_BT	0	
GPIO65	BT_WAKE_AP	0	
GPIO66	WL_WAKE_AP	0	
GPIO67	WL_REG_ON	0	X60 Debug
GPIO68	UART0_TXD	2	
GPIO69	UART0_RXD	2	

PIN	Define	CFG	Function
GPIO59	PCIEB_PERSTN	4	PCIEB
GPIO60	PCIEB_WAKEN	4	
GPIO61	PCIEB_CLKREQN	4	
GPIO62	PCIEC_PERSTN	4	PCIEC
GPIO70	GPIO70	1	26 pin
GPIO71	GPIO71	1	
GPIO72	GPIO72	1	
GPIO73	GPIO73	1	
GPIO74	GPIO74	0	

红色字体GPIO表示默认、持续上拉，等效上拉电阻约60K。需要软件修改才能解除默认上拉状态

PIN	Define	CFG	Function
GPIO93	PI2C_SCL	0	PMIC
GPIO94	PI2C_SDA	0	
GPIO95	SLEEP_OUT	0	LED
GPIO96	GPIO96	1	
GPIO97	USB3_PWREN	1	USB3_HUB
GPIO81	LCD_RST_1V8	0	LCD/CTP
GPIO82	LCD_BL_EN_1V8	0	
GPIO83	LCD_PWR_EN_1V8	0	
GPIO84	AP_I2C2_SCL	4	EEPROM Audio
GPIO85	AP_I2C2_SDA	4	
GPIO86	HDMI_SCL	1	HDMI_OUT
GPIO87	HDMI_SDA	1	
GPIO88	HDMI_CEC	1	
GPIO89	HDMI_HPD	1	26 pin
GPIO90	GPIO90	0	
GPIO91	GPIO91	0	
GPIO92	GPIO92	0	

PIN	Define	CFG	Function
GPIO98	QSPI_DATA3	0	SPI FLASH
GPIO99	QSPI_DATA2	0	
GPIO100	QSPI_DATA1	0	
GPIO101	QSPI_DATA0	0	
GPIO102	QSPI_CLK	0	
GPIO103	QSPI_CS1	0	

PIN	Define	CFG	Function
GPIO104	MMC1_DATA3	0	TF CARD
GPIO105	MMC1_DATA2	0	
GPIO106	MMC1_DATA1	0	
GPIO107	MMC1_DATA0	0	
GPIO108	MMC1_CMD	0	
GPIO109	MMC1_CLK	0	

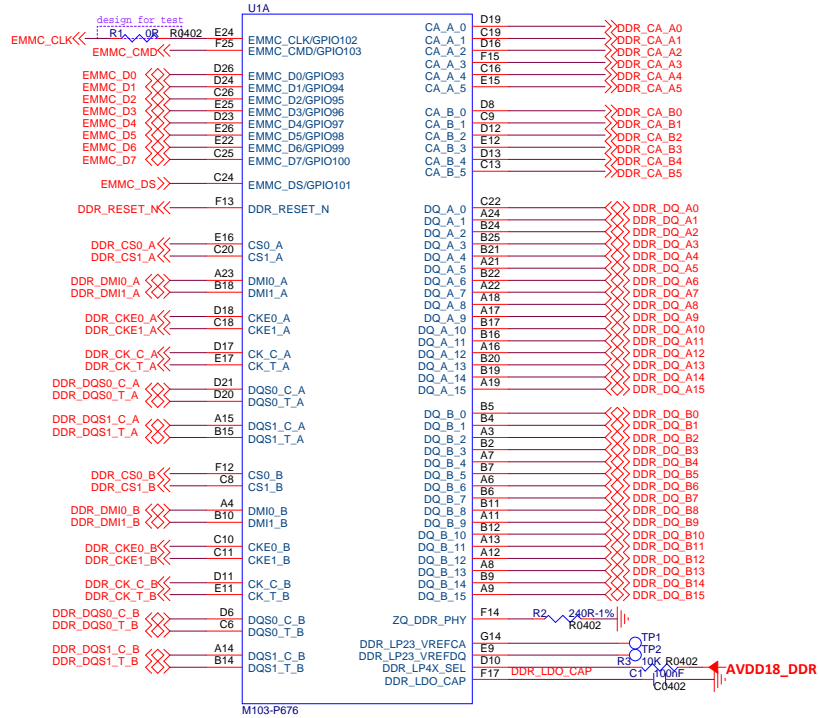
PIN	Define	CFG	Function
GPIO75	SPI3_SCLK_3V3	2	26 pin
GPIO76	SPI3_CS_3V3	2	
GPIO77	SPI3_MOSI_3V3	2	
GPIO78	SPI3_MISO_3V3	2	
GPIO79	FAN_PWM	2	FAN
GPIO80	SD_CD_3V3	1	TF CARD

PIN	Define	CFG	Function
GPIO47	R_UART0_TXD_3V3	1	26 pin
GPIO48	R_UART0_RXD_3V3	1	
GPIO49	GPIO_49_3V3	0	
GPIO50	GPIO_50_3V3	0	
GPIO51	AP_I2C4_SCL_3V3	4	
GPIO52	AP_I2C4_SDA_3V3	4	

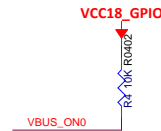
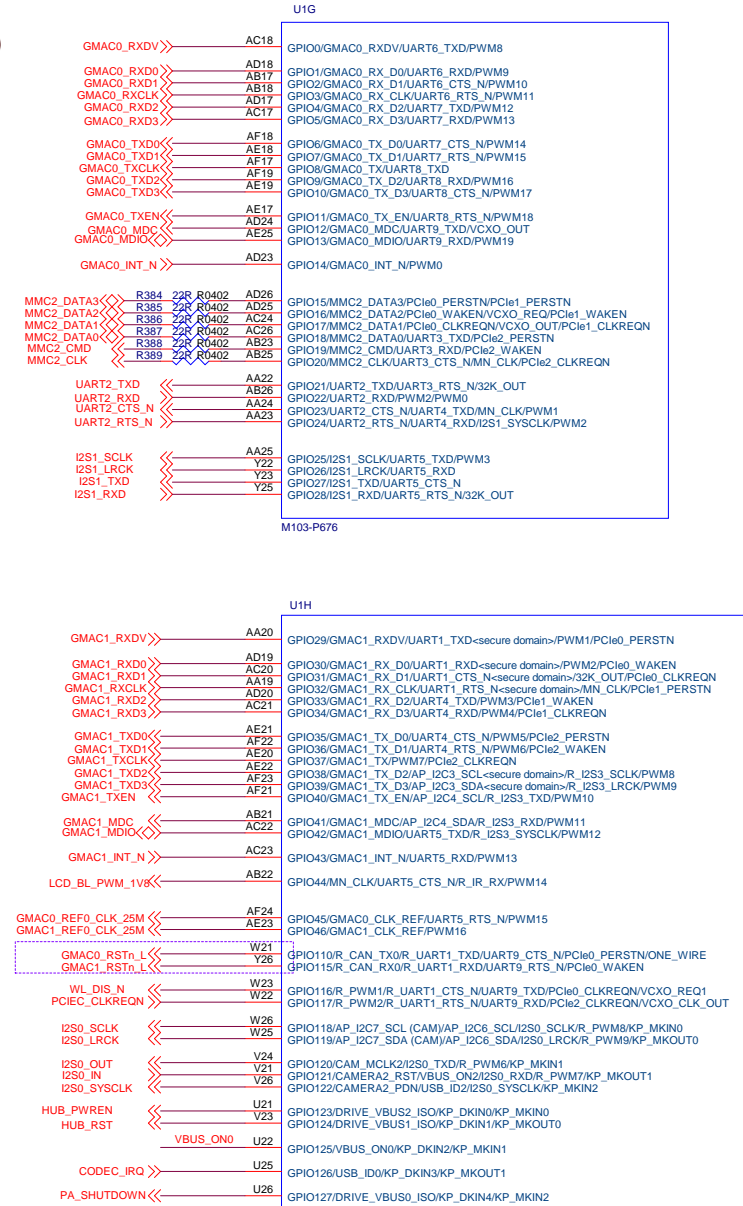


GUANGDONG BIPAI KEJI CPA.LTD			
Design Name			
BPI-F3_LP4XP200_32X1			
Size	Page Name	Rev	
A3	08 GPIO ASSIGNMENT	<RevCode>	
Date:	Wednesday, May 08, 2024	Sheet	8 of 28

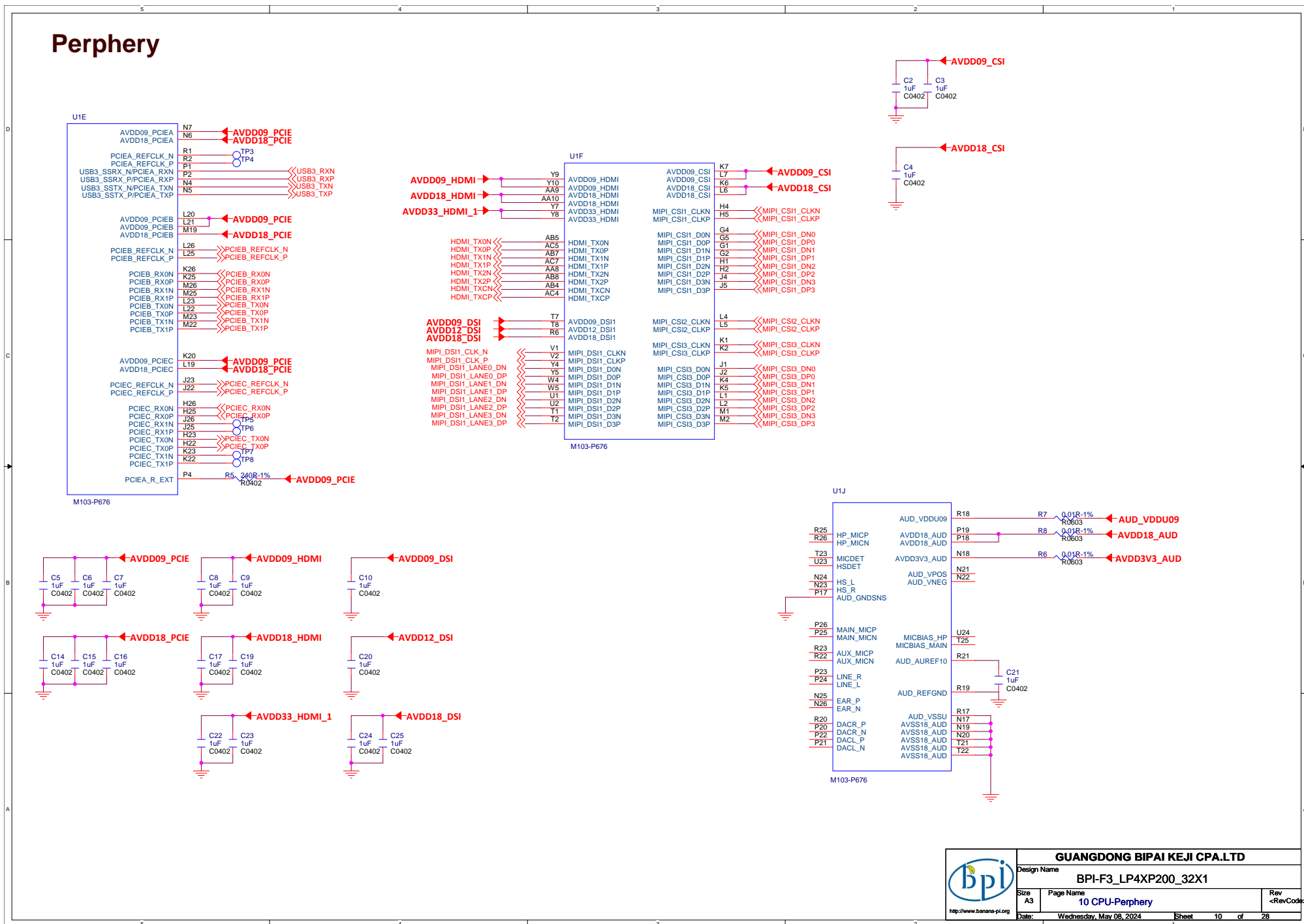
eMMC+DDR



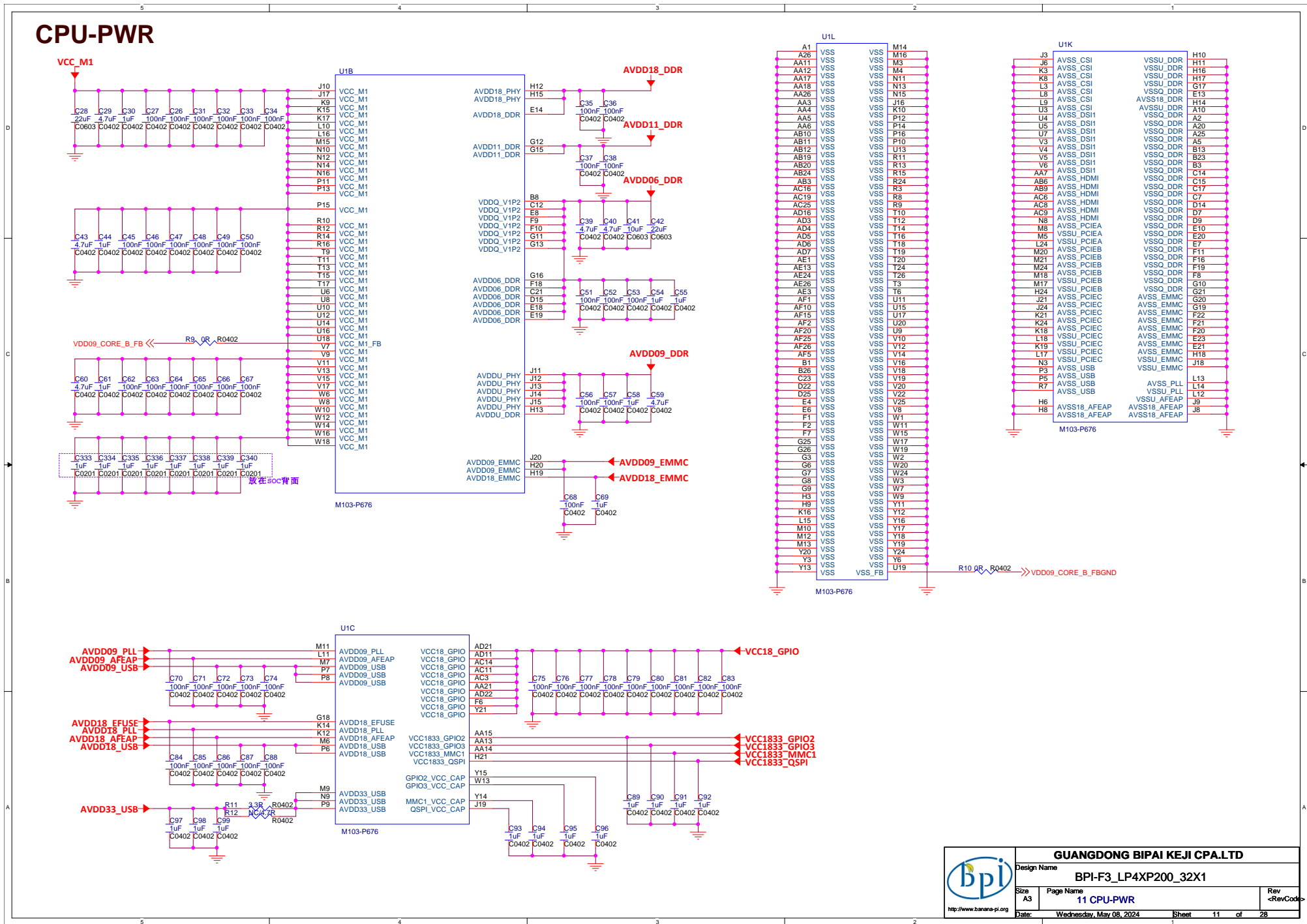
GPIO

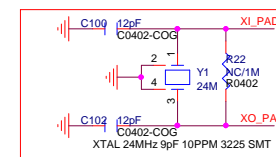


Periphery

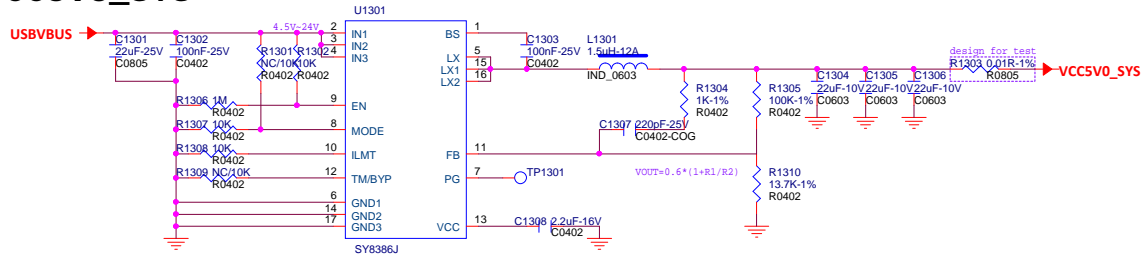


CPU-PWR

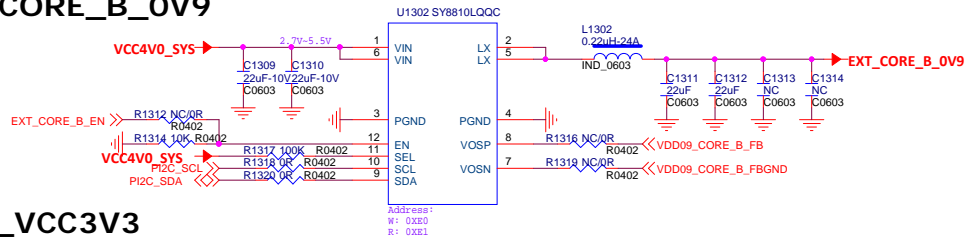


[illegible]

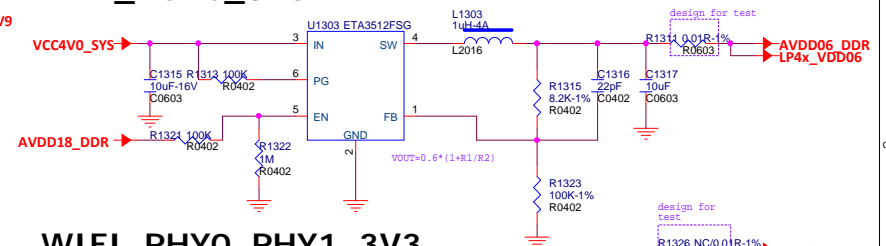
VCC5V0_SYS



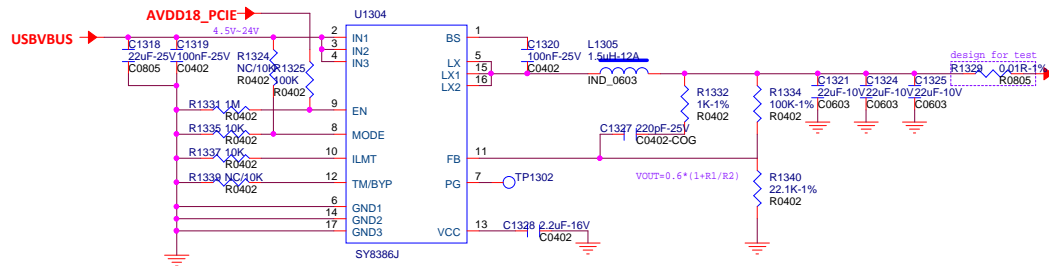
EXT_CORE_B_0V9



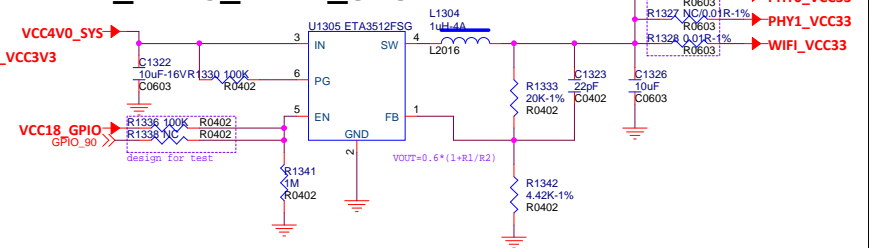
EXT_DCDC_0V6



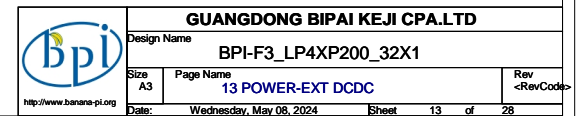
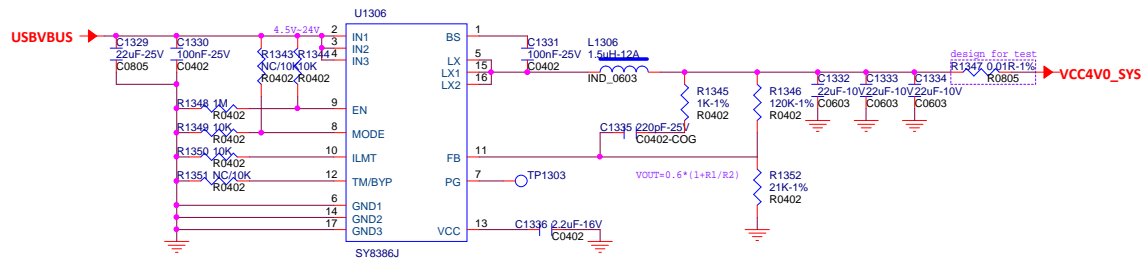
PCI E_VCC3V3



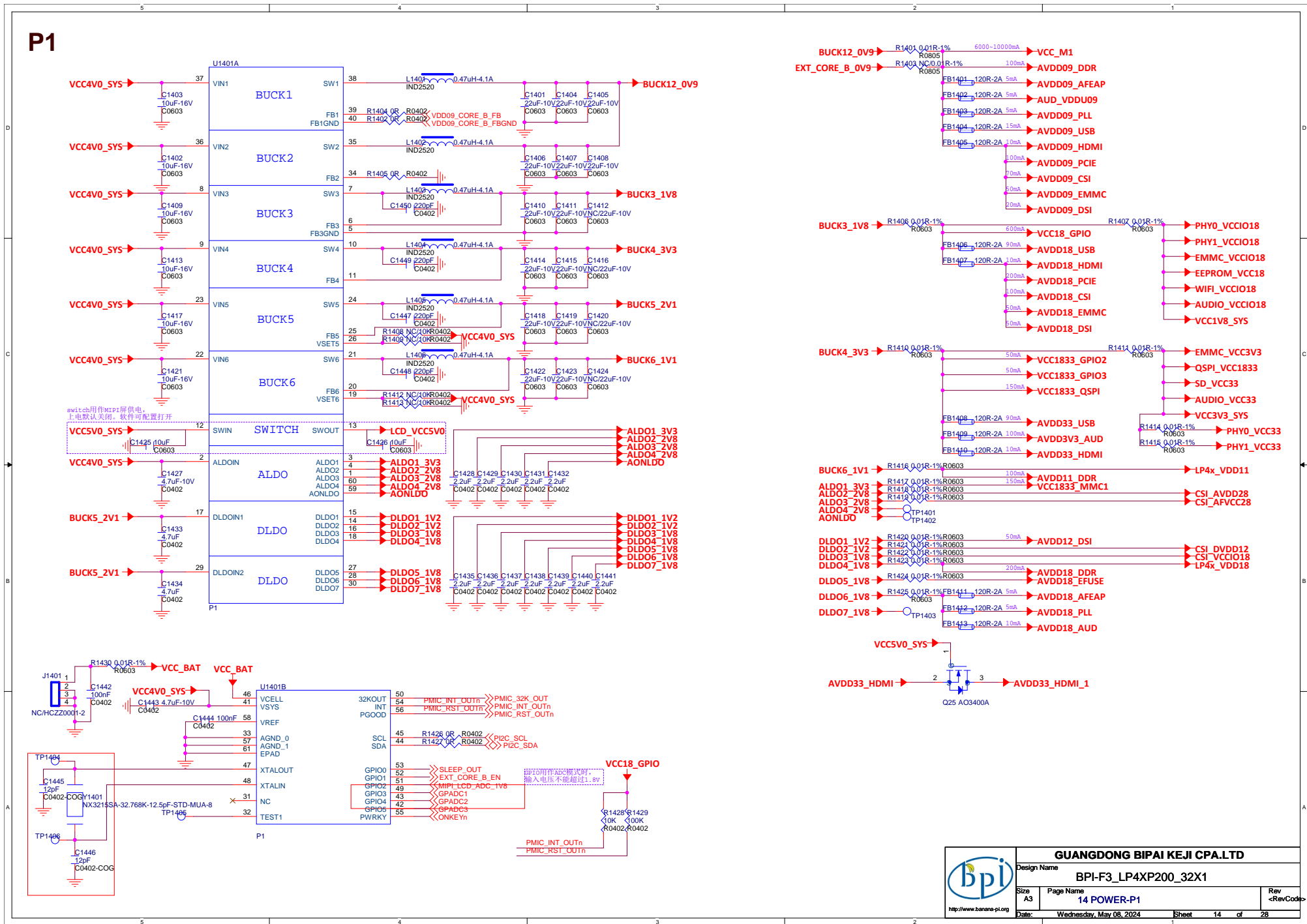
WIFI_PHY0_PHY1_3V3



VCC4V0_SYS

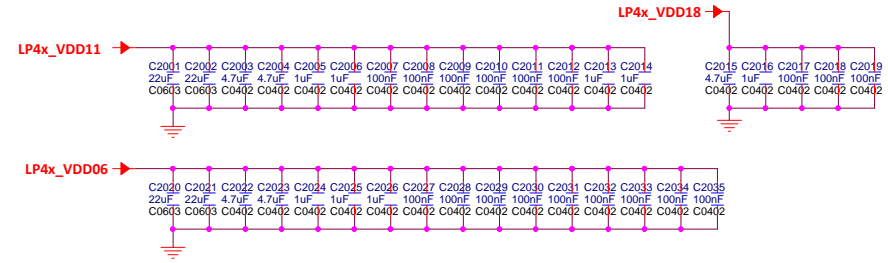
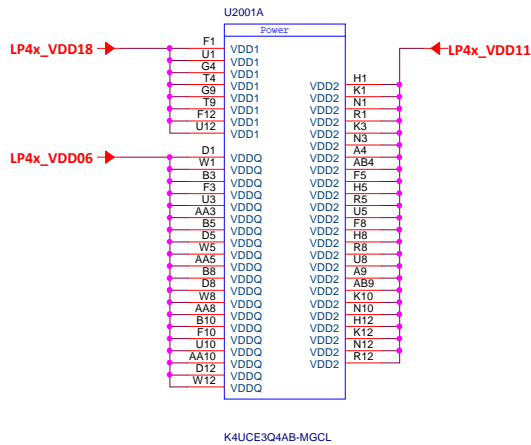
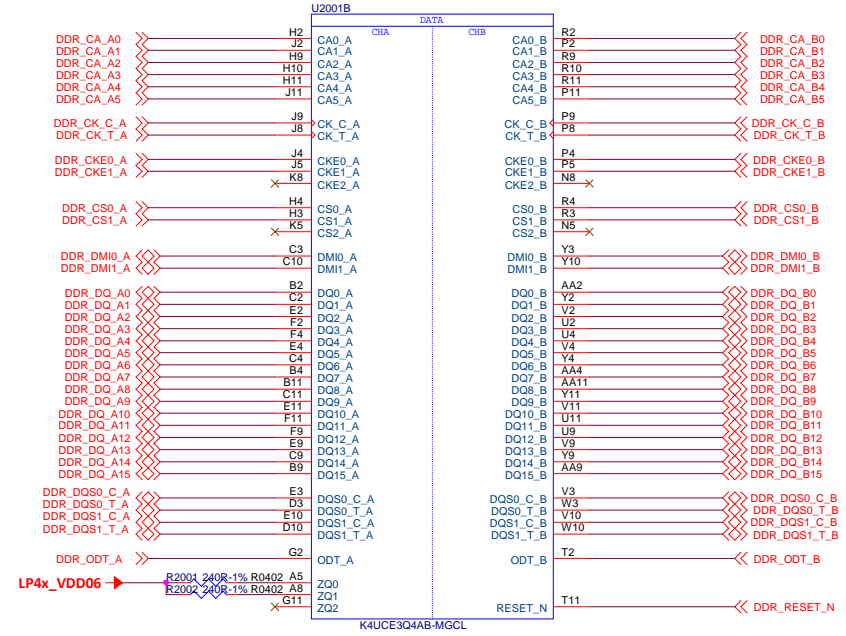
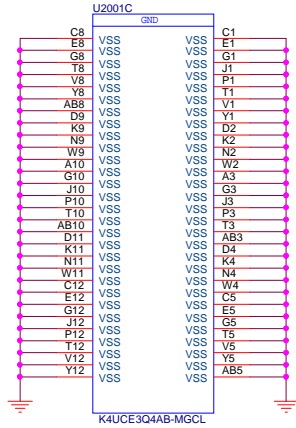
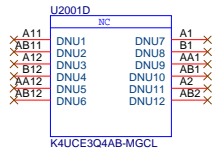


P1

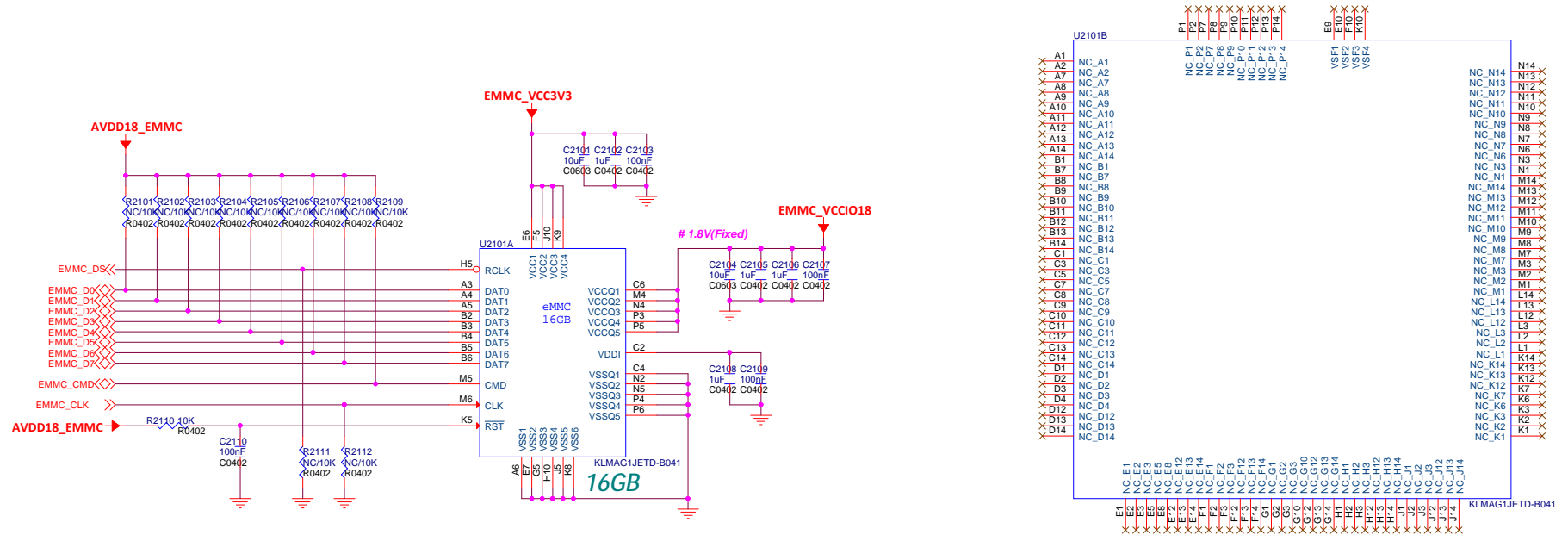


LPDDR4X

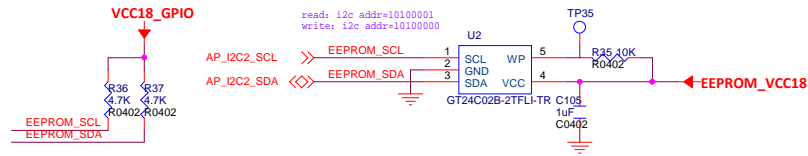
NOTE:CKE2/CS2/ZQ2 NC IN SAMSUNG



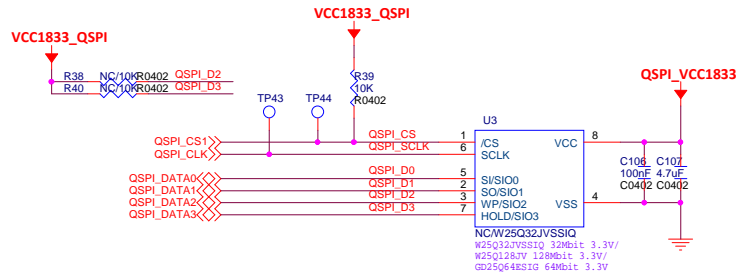
EMMC



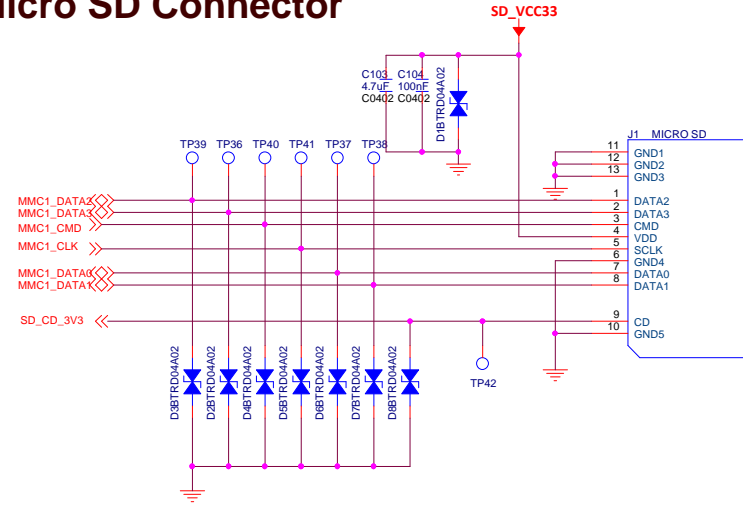
EEPROM



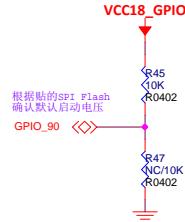
SPI FLASH



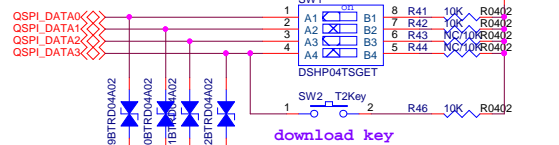
Micro SD Connector



Flash Boot voltage sel



GPIO 90	Function
0	1V8
1	3V3



boot download sel

QSPI_DATA3	Function
0	启动
1	下载

download sel

QSPI_DATA2	Function
0	USB
1	UART

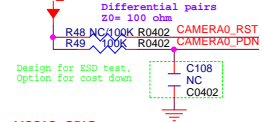
Boot SEL

QSPI_DATA1	QSPI_DATA0	Function
0	0	TF Card -> EMMC
0	1	TF Card -> SPI NOR
1	0	TF Card -> SPI NAND
1	1	TF Card -> SD

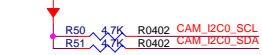


CAMERA

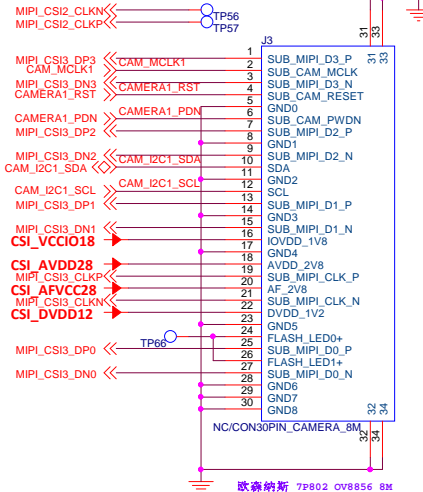
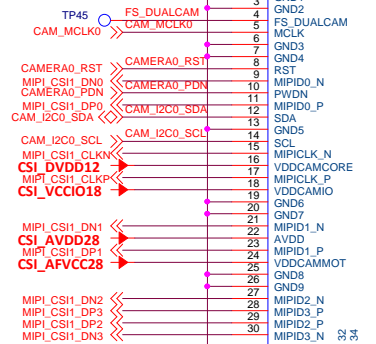
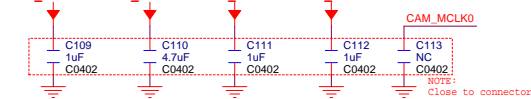
VCC18_GPIO



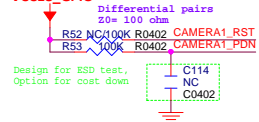
VCC18_GPIO



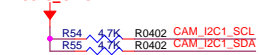
CSI_AFVCC28 CSI_AVDD28 CSI_VCCIO18 CSI_DVDD12



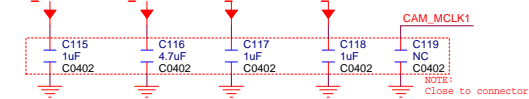
VCC18_GPIO



VCC18_GPIO

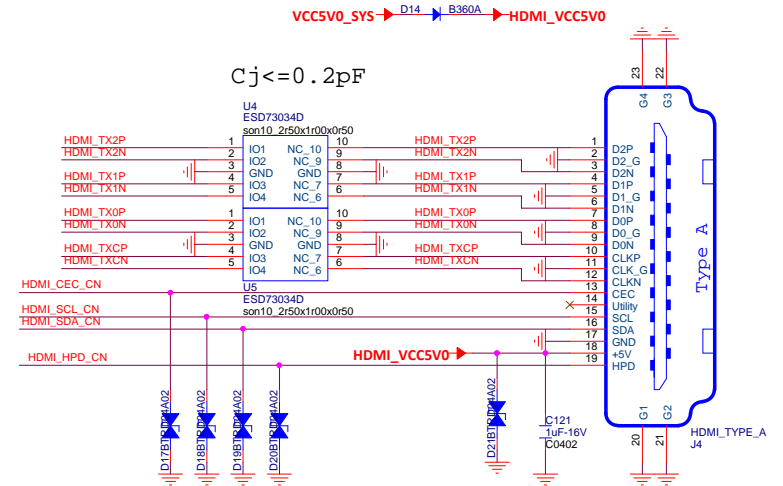
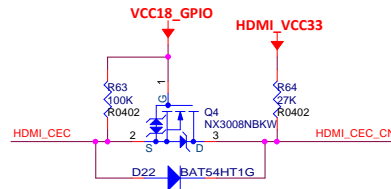
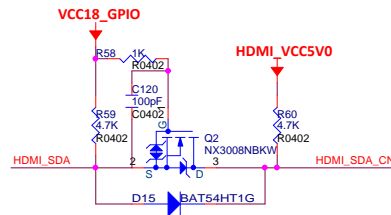
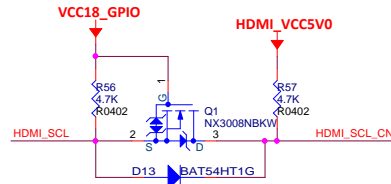
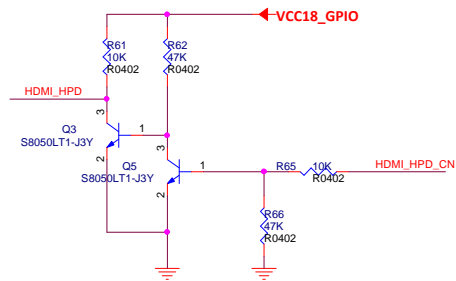


CSI_AFVCC28 CSI_AVDD28 CSI_VCCIO18 CSI_DVDD12

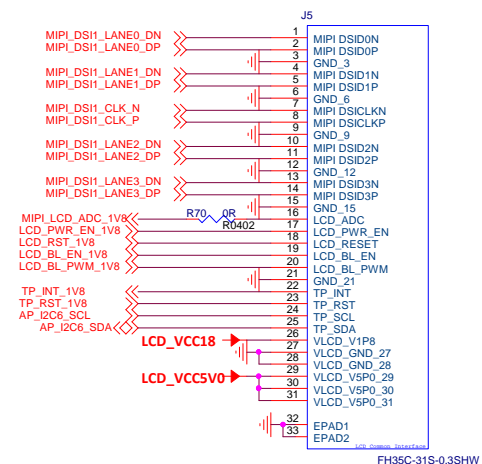
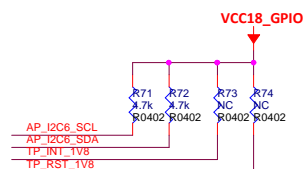
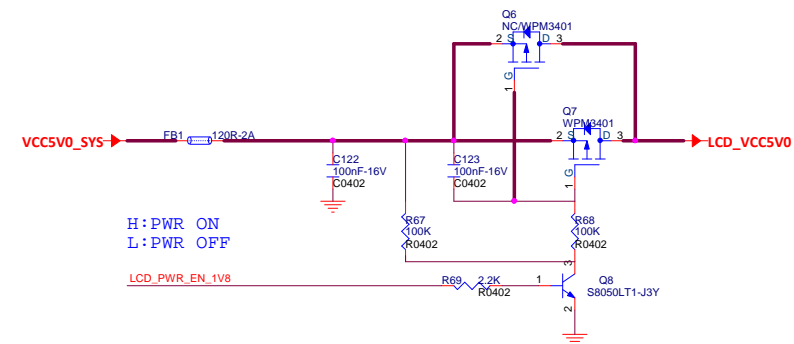


HDMI

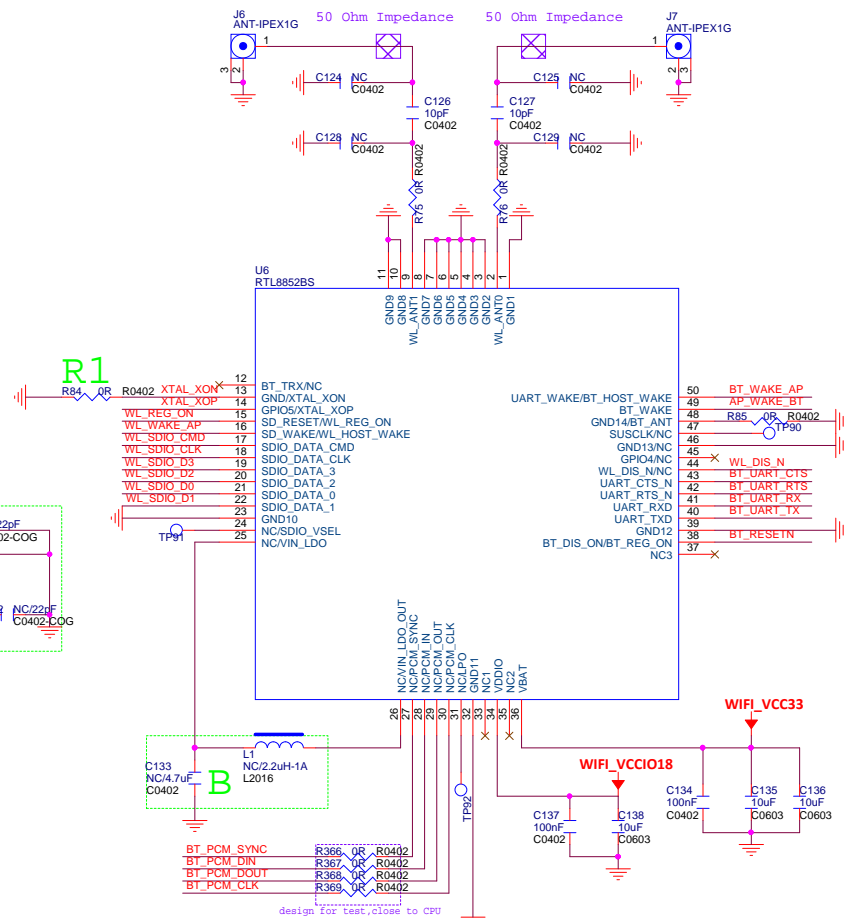
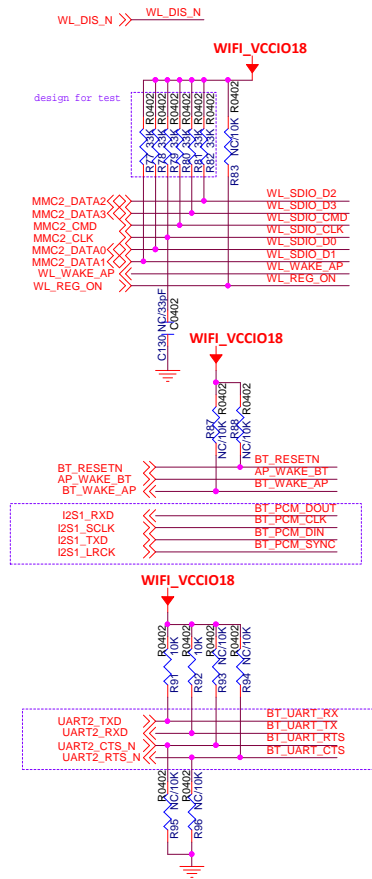
>>HDMI_TX0P
 >>HDMI_TX0N
 >>HDMI_TX1P
 >>HDMI_TX1N
 >>HDMI_TX2P
 >>HDMI_TX2N
 >>HDMI_TXCP
 >>HDMI_TXCN
 >>HDMI_SCL
 >>HDMI_SDA
 >>HDMI_CEC
 >>HDMI_HPD



MIPI-DSI



RTL8852BS



GMAC Ethernet0

PHY Address

PHY Address	PHYAD[2:0]
1	001

RGMII Power Source

RGMII Power Source	CFG_EXT	CFG_LD0[1:0]
External 3.3V	1	00
External 2.5V	1	01
External 1.8V	1	10
External 1.5V	1	11
Internal 2.5V	0	01
Internal 1.8V(default)	0	10
Internal 1.5V	0	11

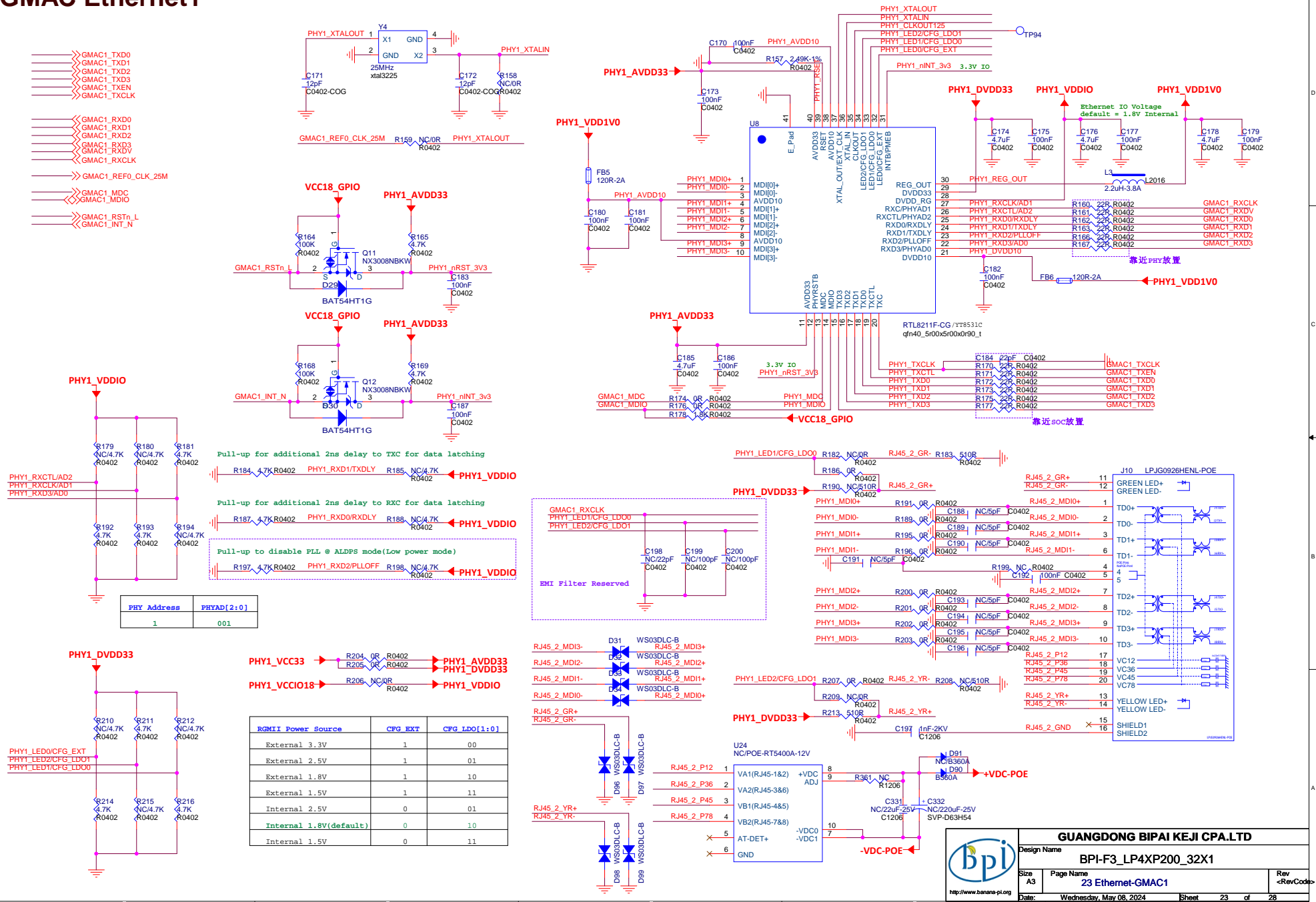
Guangdong Bipi Keji CPA.LTD

Design Name: BPI-F3_LP4XP200_32X1

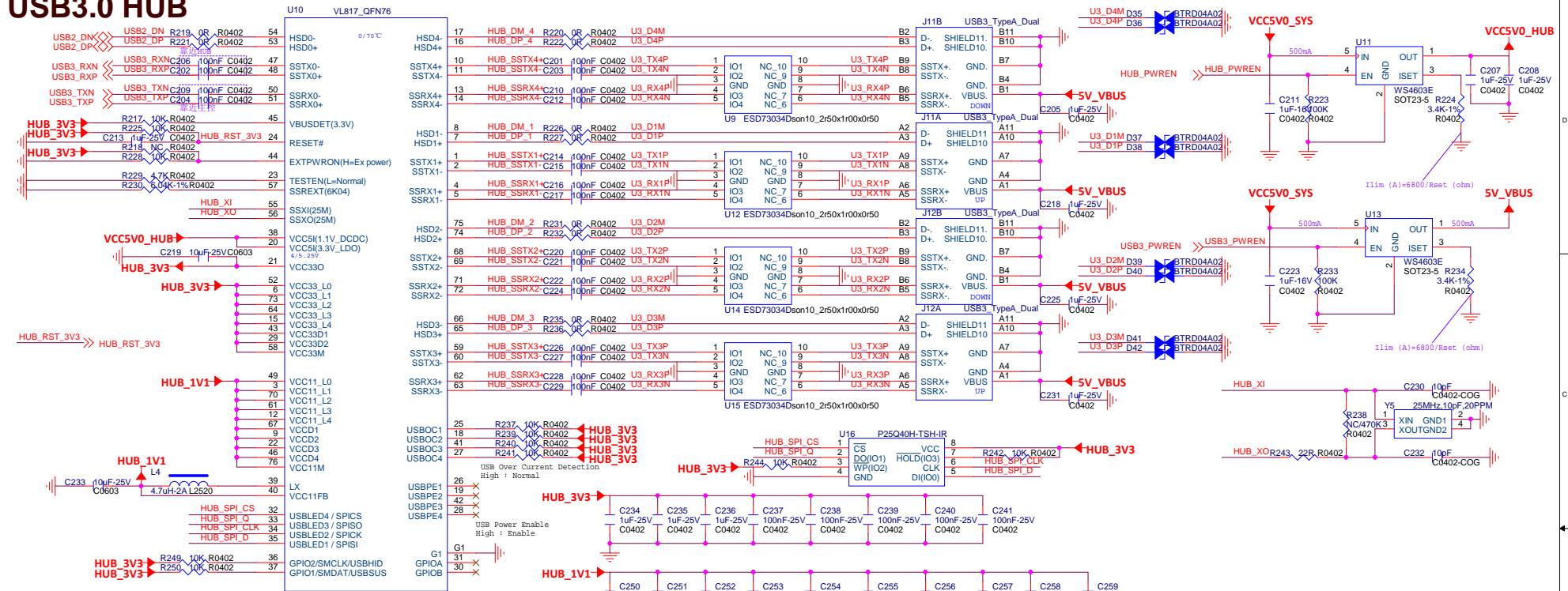
Size: A3 Page: 22 Ethernet-GMAC0

Date: Wednesday, May 08, 2024 Sheet: 22 of 28

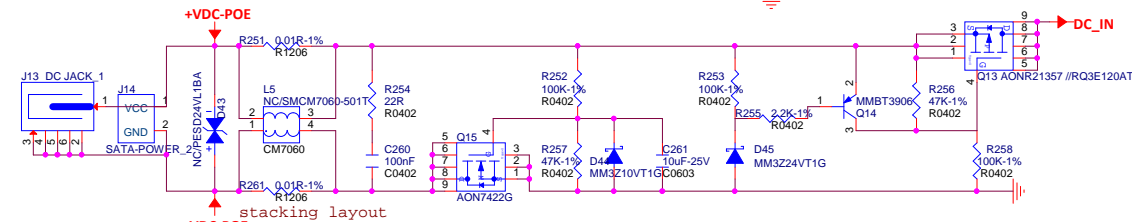
GMAC Ethernet1



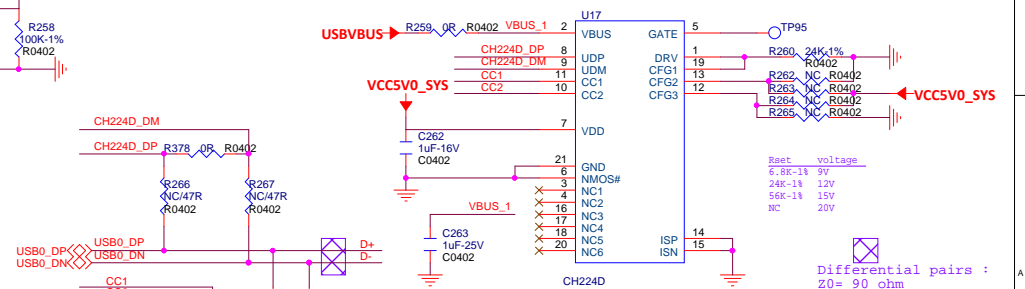
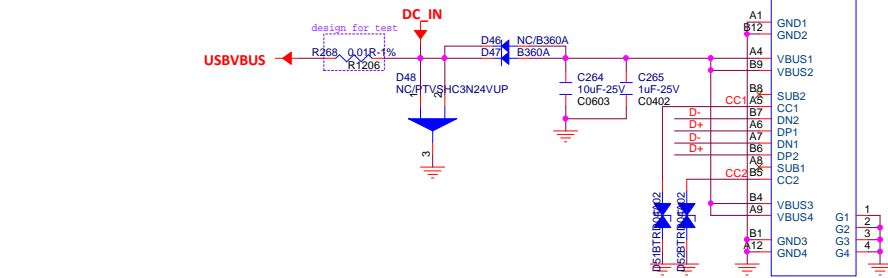
USB3.0 HUB



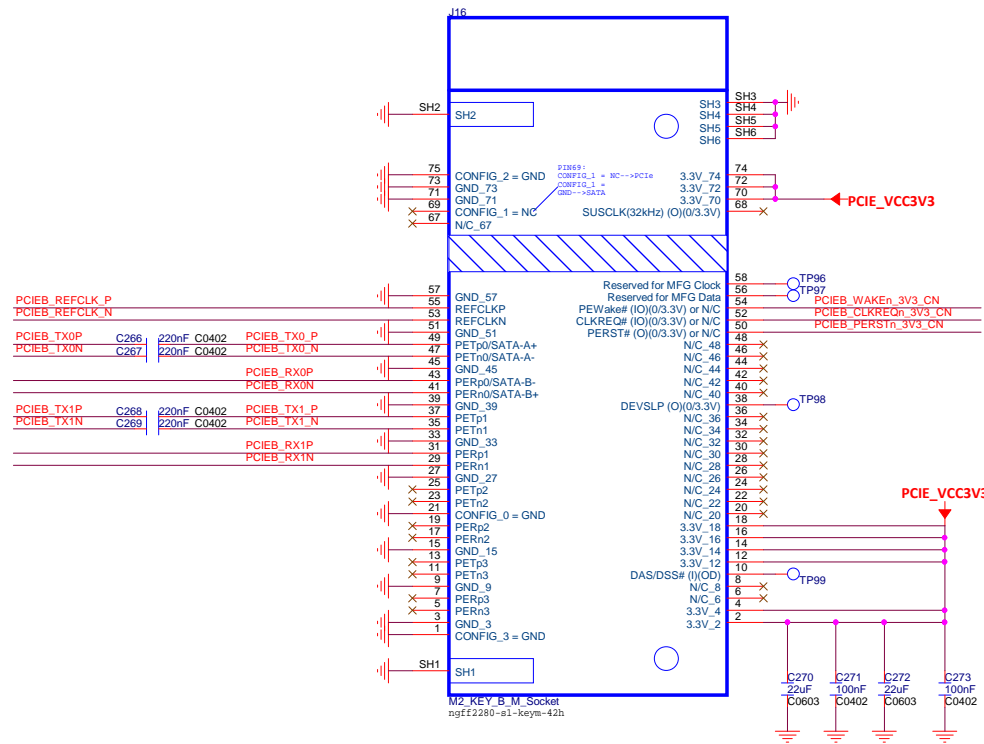
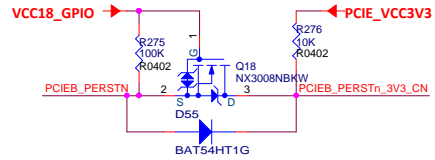
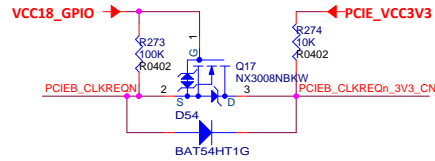
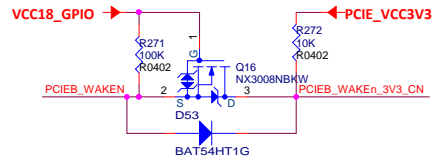
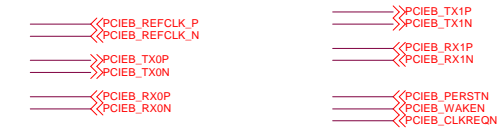
12V DC IN



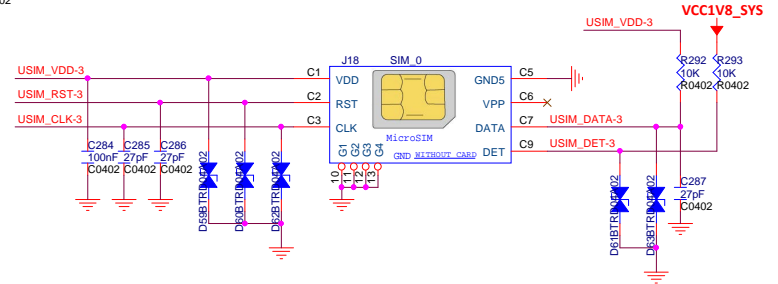
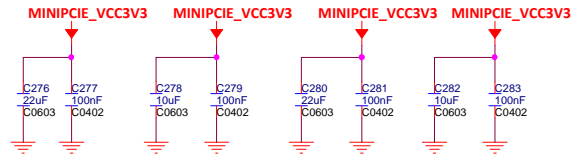
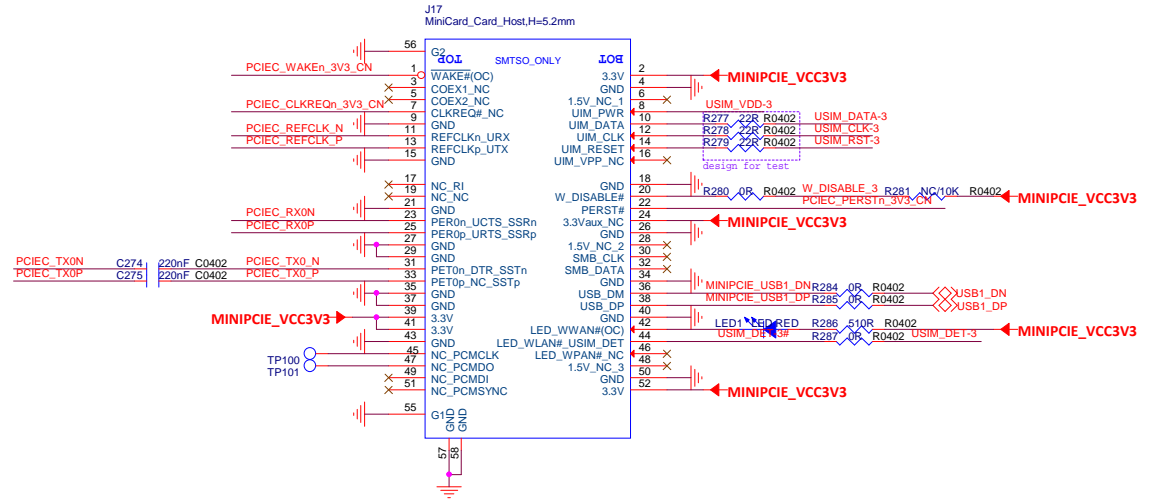
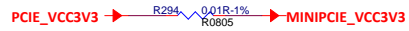
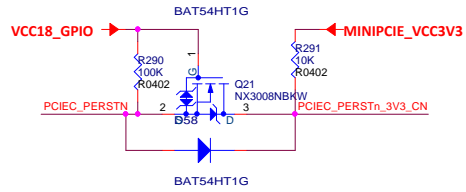
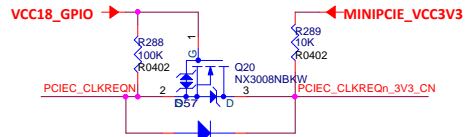
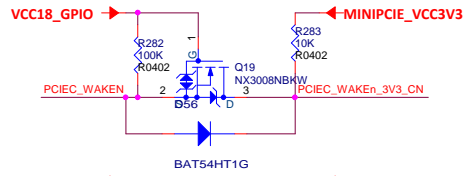
USB2.0 TYPEC



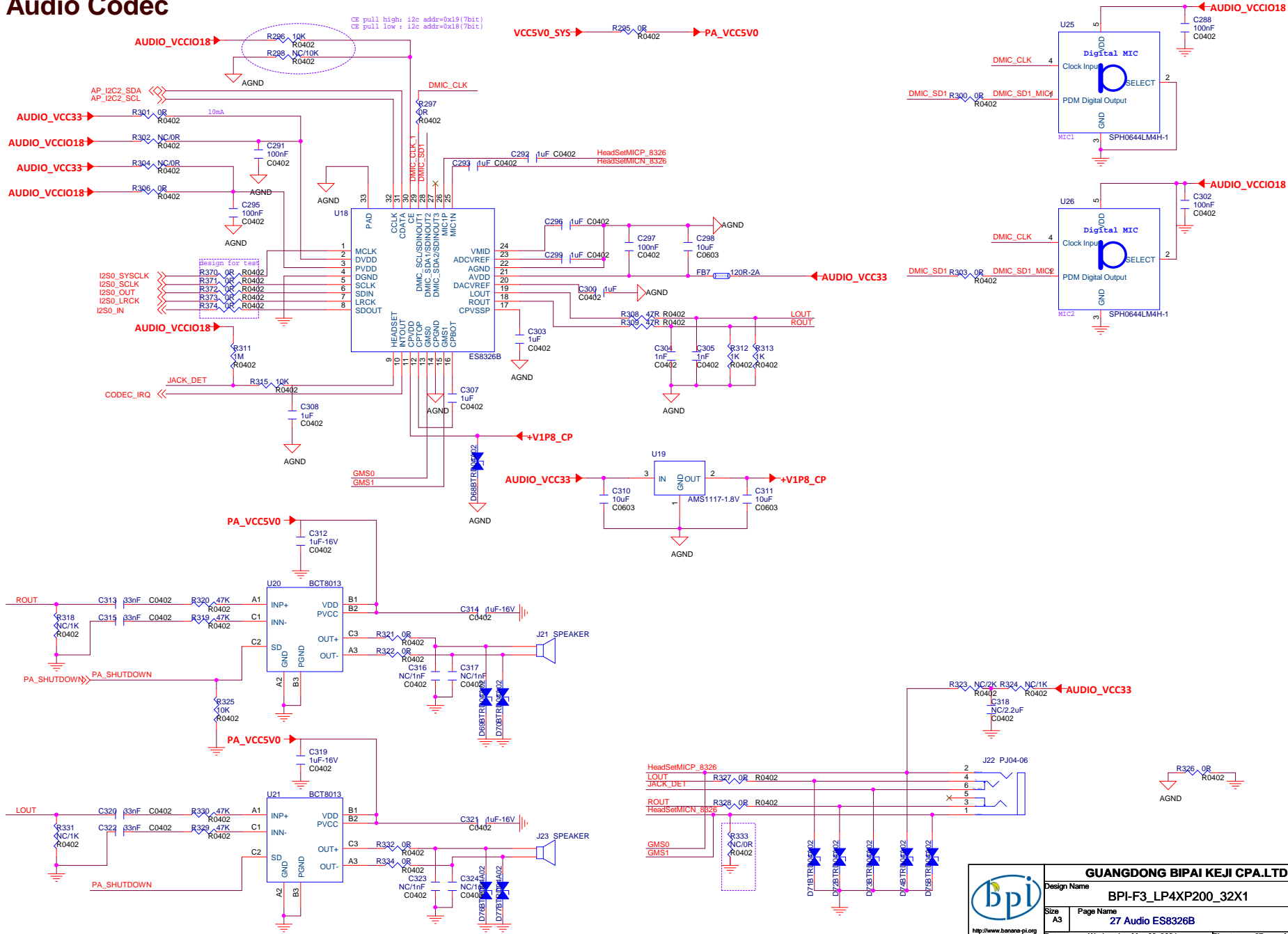
GUANGDONG BIPAI KEJI CPA.LTD			
Design Name			
BPI-F3_LP4XP200_32X1			
Size	Page Name	Rev	
A3	24 USB3 HUB/USB2 TypeC/DC IN	<RevCode>	
Date:	Wednesday, May 08, 2024	Sheet	24 of 28

PCIEB

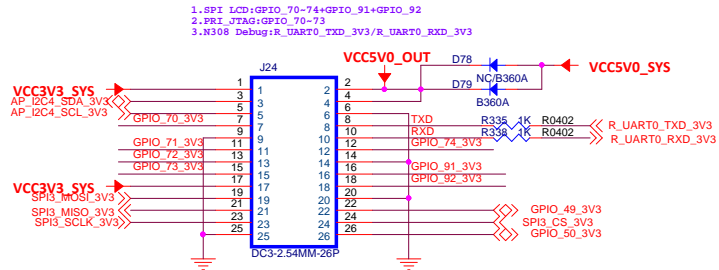
PCIEC



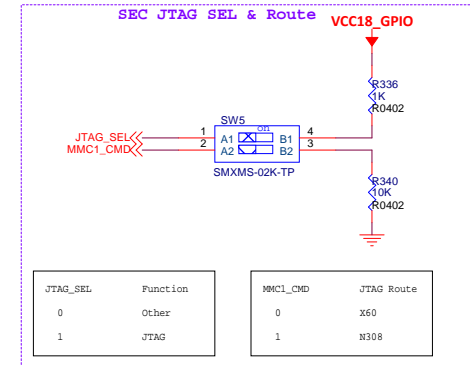
Audio Codec



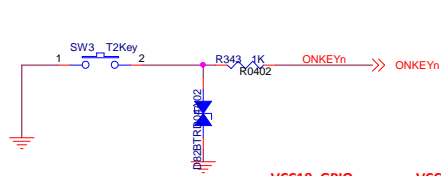
26 pin GPIO



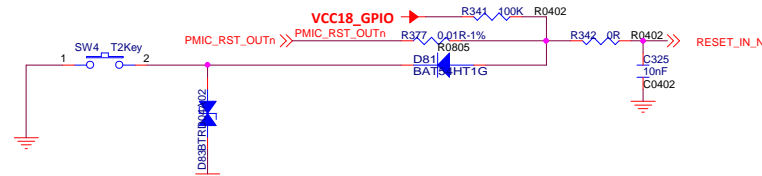
JTAG SEL



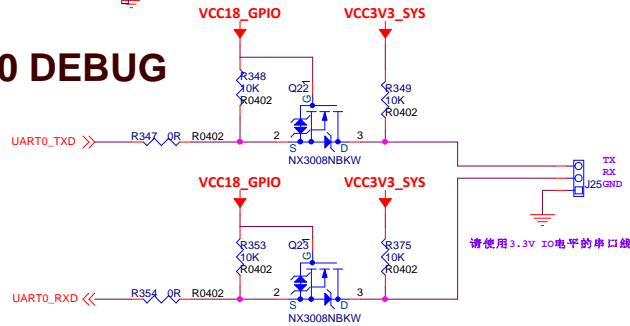
PowerON



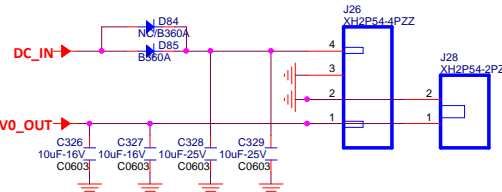
REST



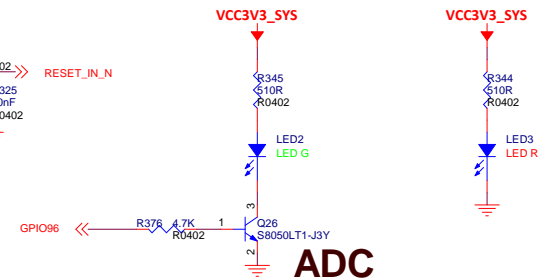
X60 DEBUG



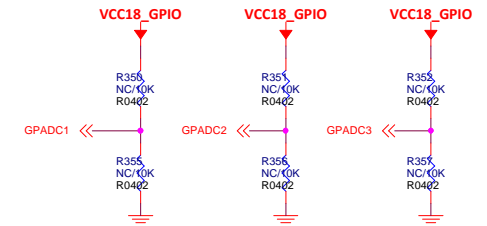
SATA HDD



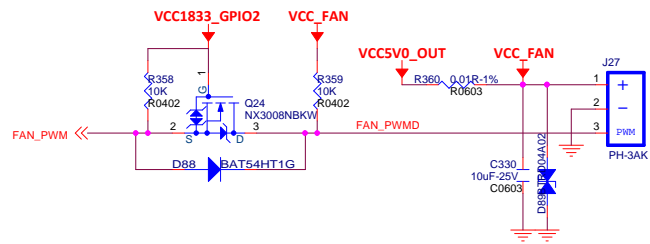
LED



ADC



FAN



Mark Port

