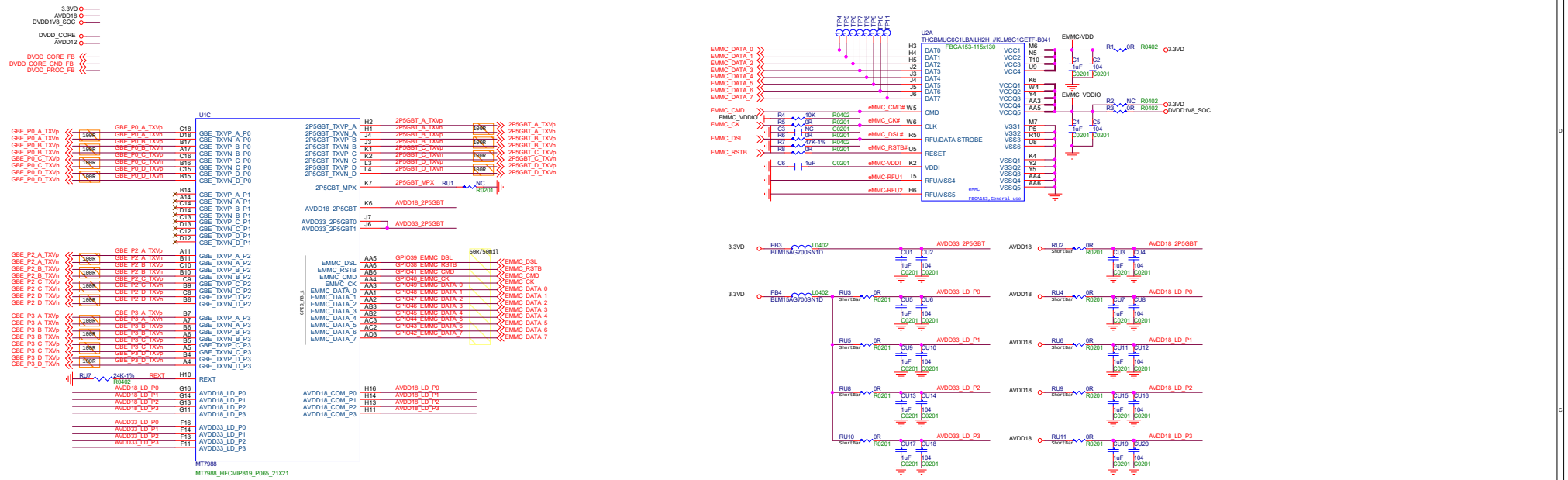
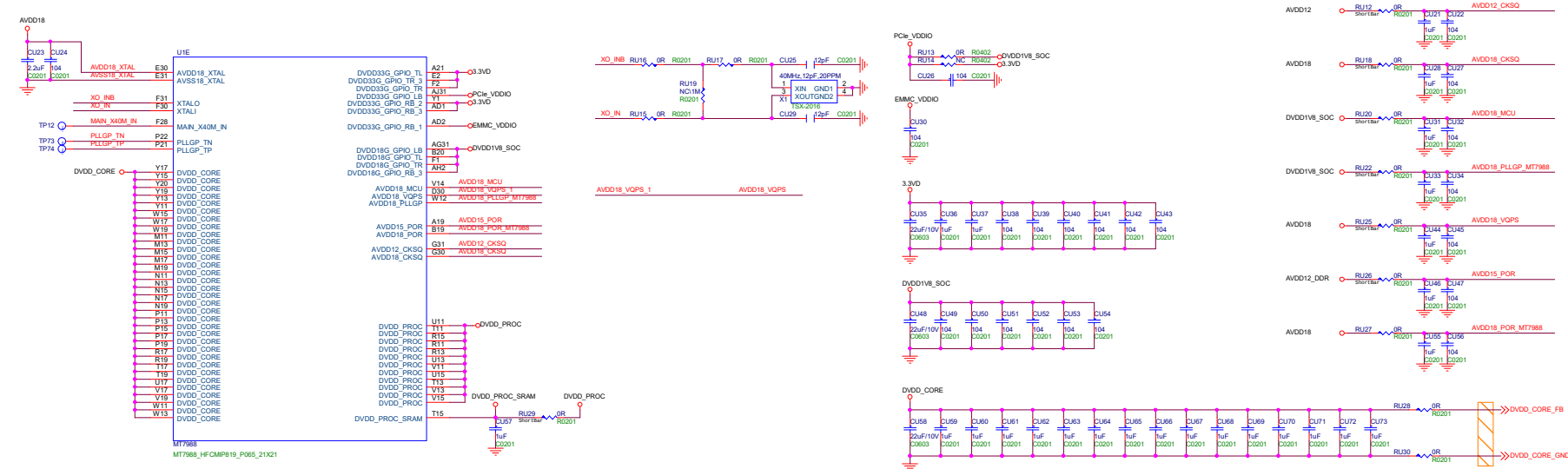
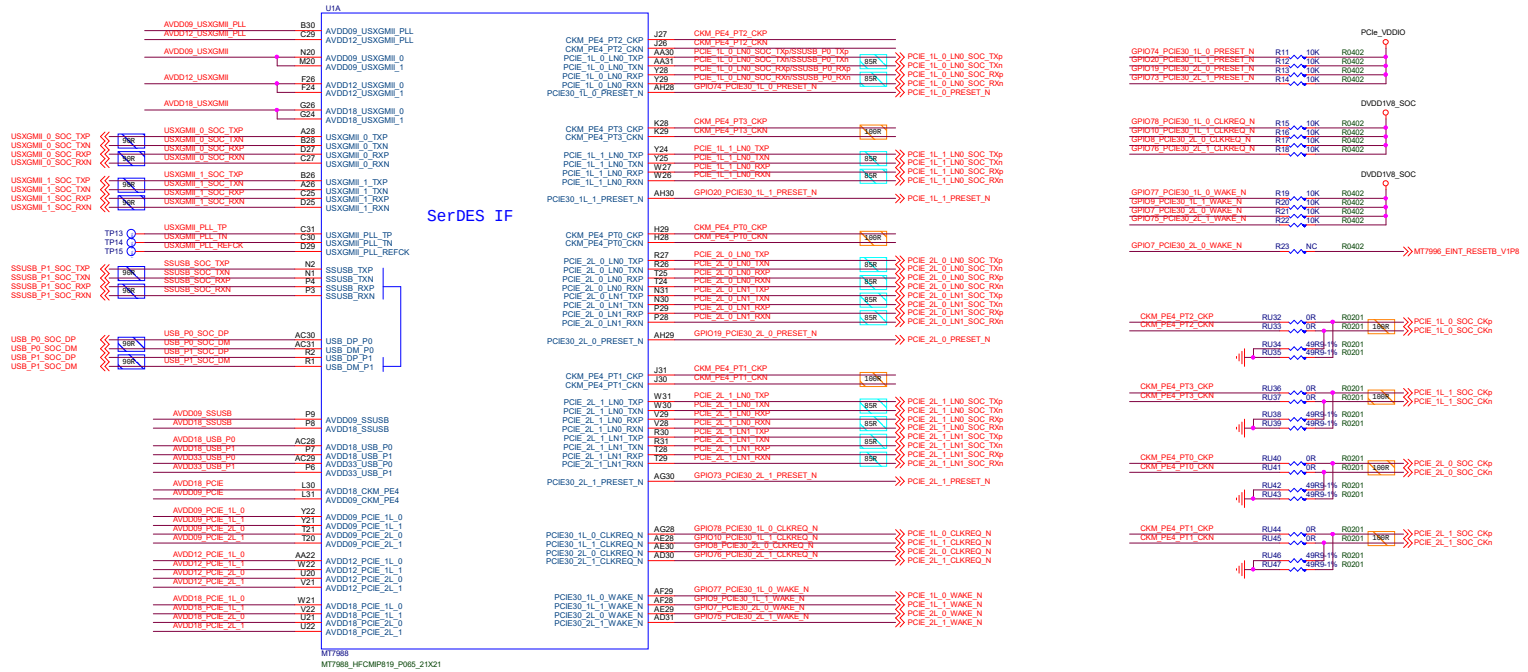


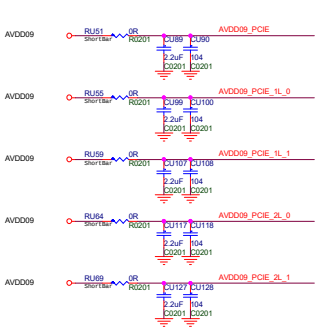


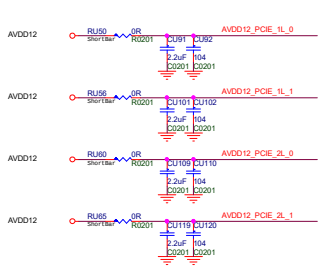
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Page Name	CM03.MT7988_PWR_GbE_Xmer_eMMC
Size	A2
Rev	V1.0
Date:	Tuesday, September 23, 2025
Sheet	3 of 22

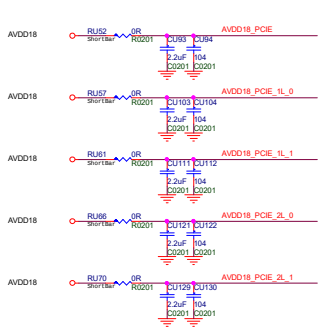
GUANGDONG BIPAI KEJI CPA.LTD

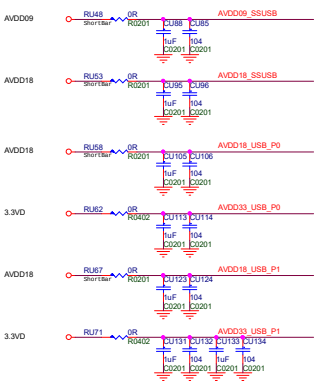
http://www.banana-pi.org

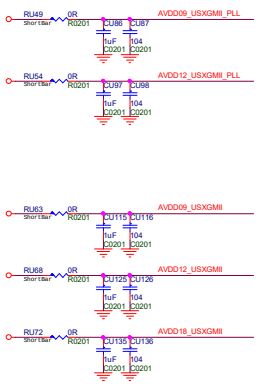




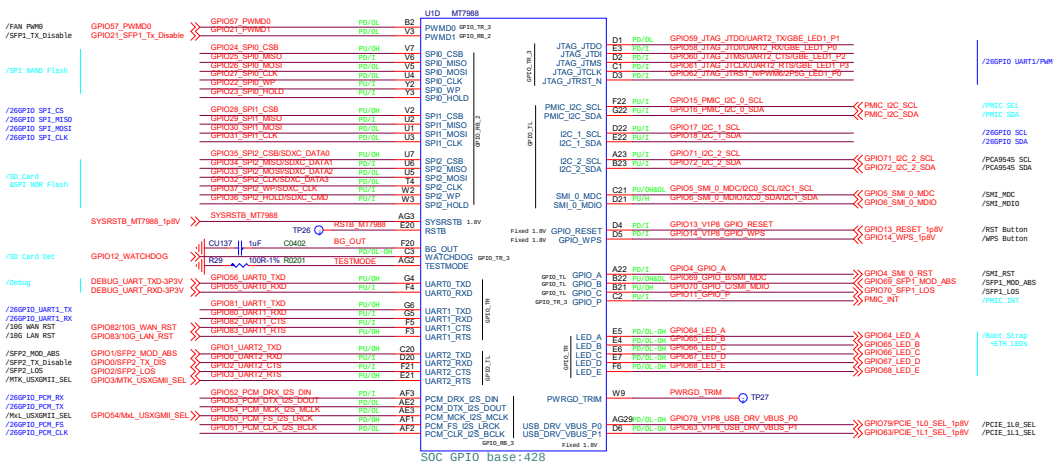




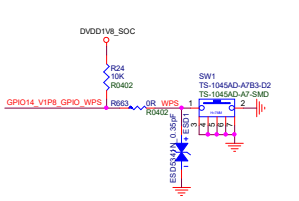




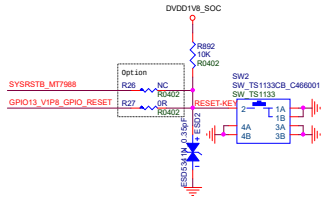
GUANGDONG BIPAI KEJI CPA.LTD		
Design Name: BPI-R4Pro_MT7988+DDR4x16bx2		
Size: A2	Page Name: CM04.MT7988_PCIe_USB_USXGMII	Rev: V1.0
Date: Wednesday, September 03, 2025	Sheet 4 of 22	
http://www.banana-pi.org		



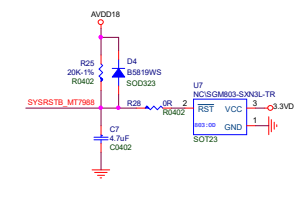
WPS BUTTON



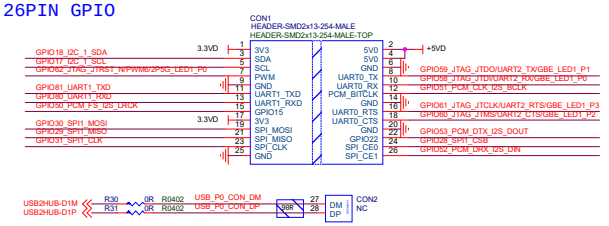
Reset BUTTON



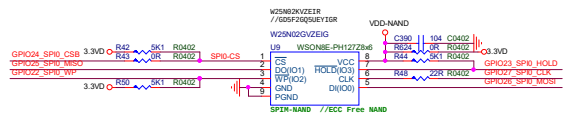
Reset Circuit



26PIN GPIO

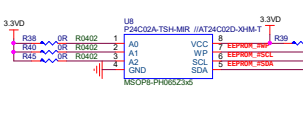


SPI0:SPIM-NAND/SNFI-NAND Flash

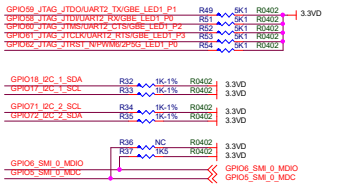


EEPROM

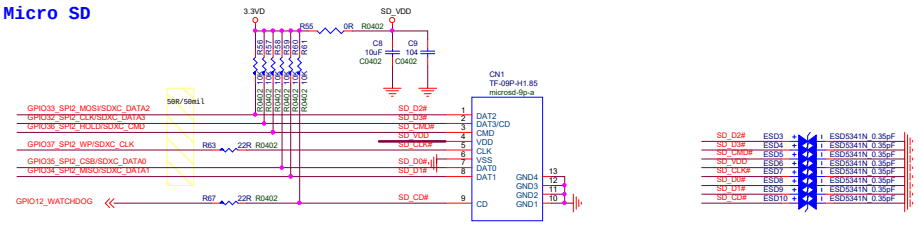
EEPROM: I2C Address: 0x57



PullUp

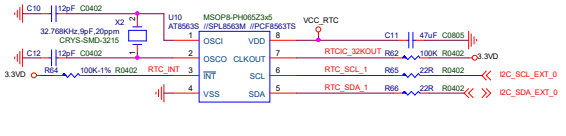


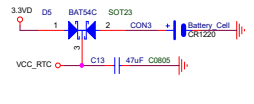
Micro SD



RTC

RTC: I2C Address: 0x50

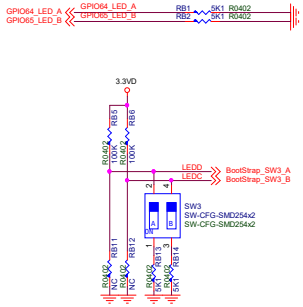




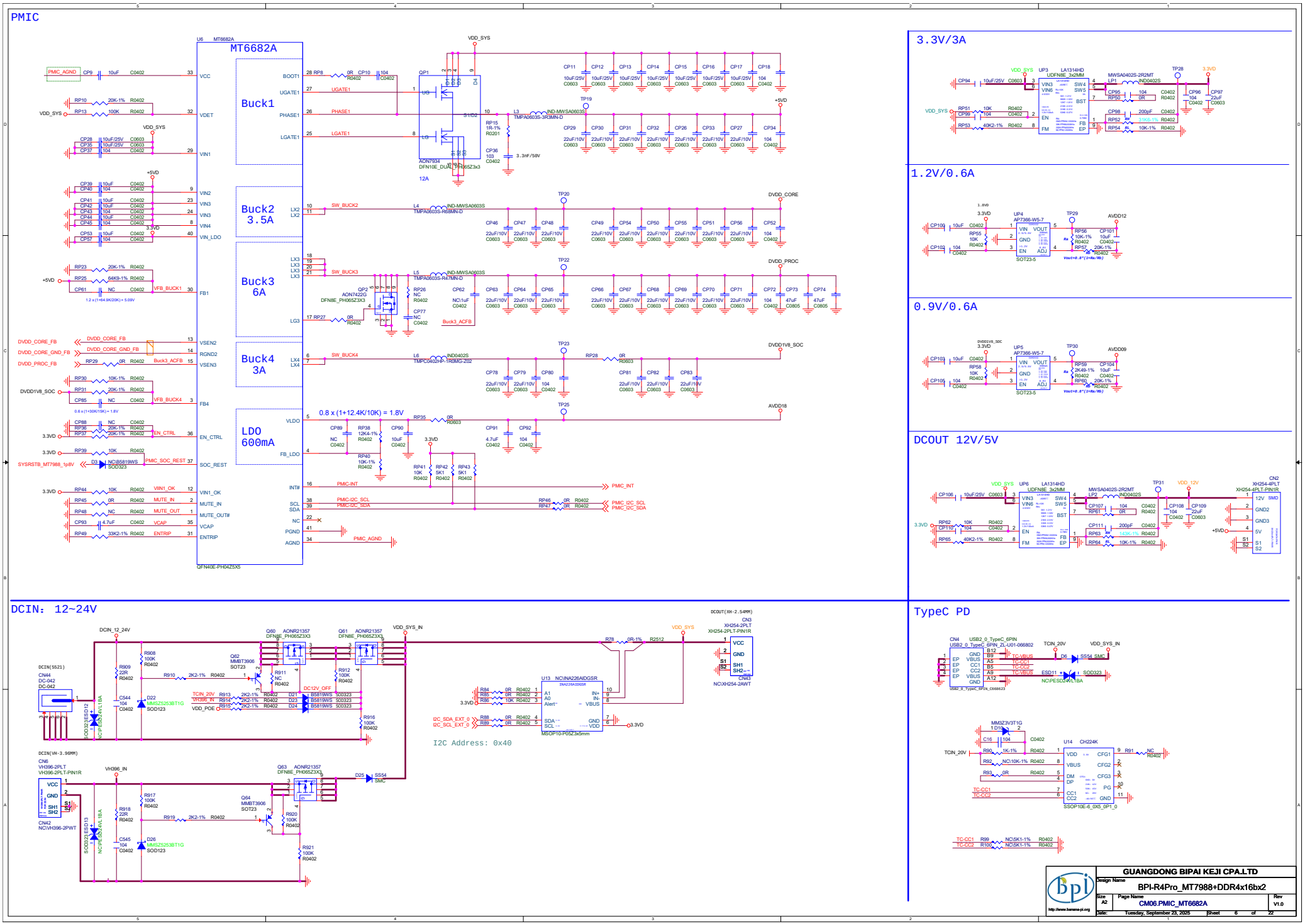
Boot Strapping

Boot Strapping Pin Name	Description	Boot Sequence
LED_A	Ref. CLK Source	0: By XTAL 1: By Oscillator
LED_B	DDR Type	0: DDRx16bx2 1: DDRx16bx1
(LED_D, LED_C)	Boot mode	00: SPI-NOR (SPI2) 01: SNAND(SPI_M)==>SD(SPI0) 10: eMMC 11: SNAND(SNFI)==>SD(SPI0)

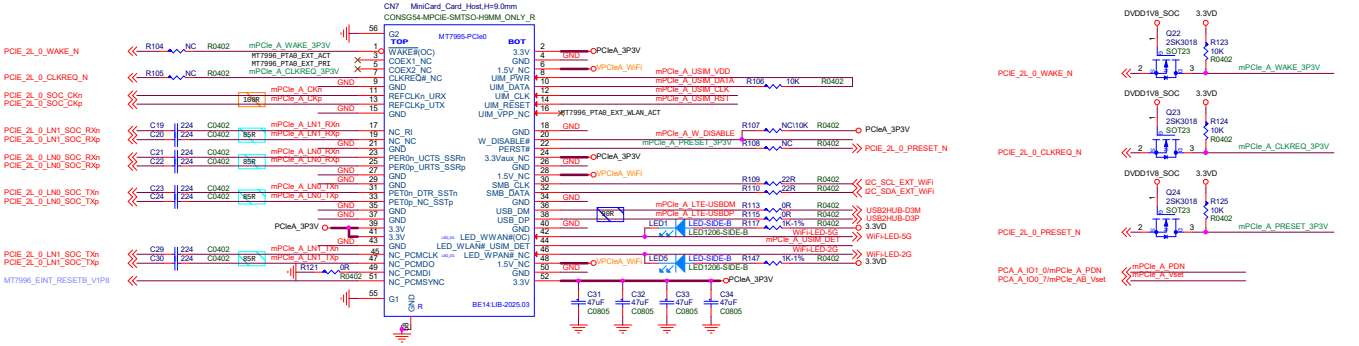
Jumper setting	SW3_A	SW3_B
NAND:01	Low	High
eMMC:10	High	Low
SD :11	High	High

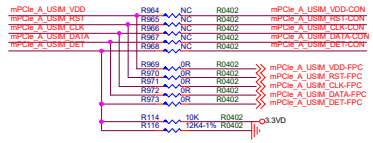


GUANGDONG BIPAI KEJI CPA.LTD	
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Size: A2	Page Name: CM05.MT7988_Peripheral
Rev: V1.0	
Date: Tuesday, September 23, 2025	Sheet 5 of 22
http://www.banana-pi.org	

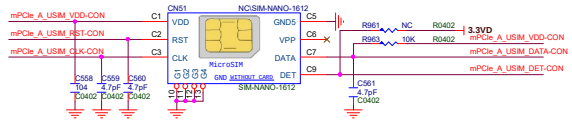

PMIC
MT6682A
Buck1
Buck2 3.5A
Buck3 6A
Buck4 3A
LDO 600mA
3.3V/3A
1.2V/0.6A
0.9V/0.6A
DCOUT 12V/5V
DCIN: 12~24V
TypeC PD
I2C Address: 0x40
GUANGDONG BIPAI KEJI CPA.LTD
BPI-R4Pro_MT7988+DDR4x16bx2
CM06.PMIC_MT6682A

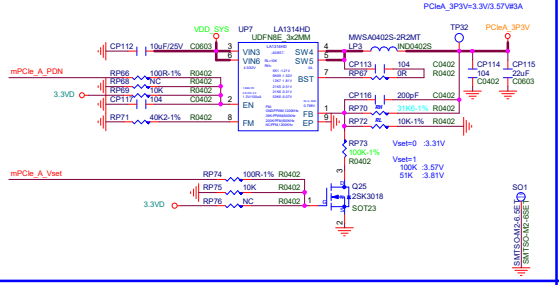
mPCIeA

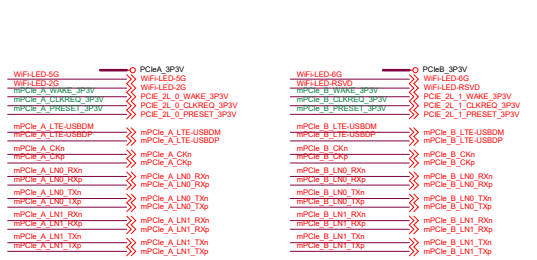




SIM4

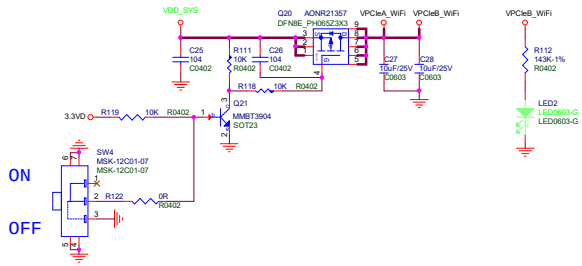




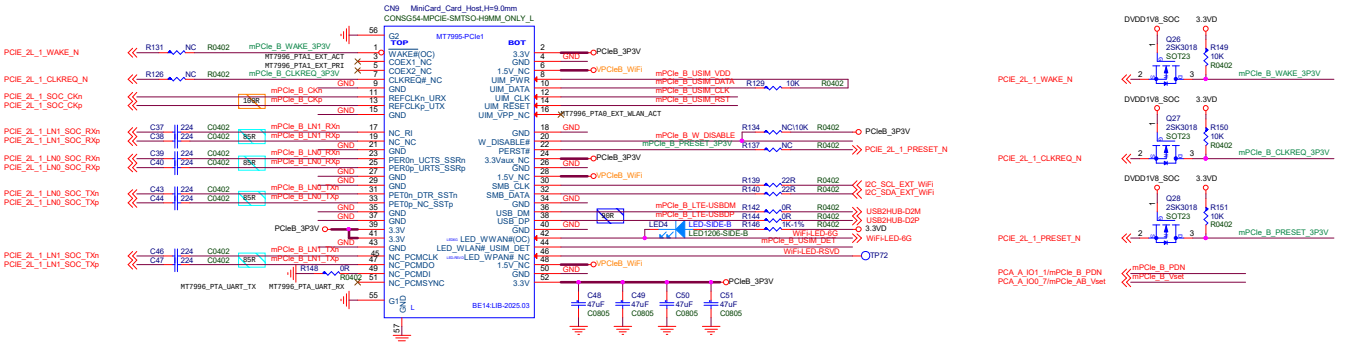


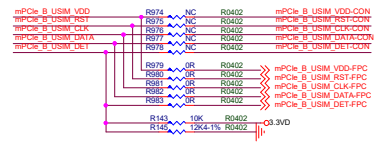
mPCIe Slot 12V(ONLY FOR BPI Wi-Fi NIC)

Confirm the PIN6, PIN28, PIN48 of the miniPCIe module,
If it is not NC, DO NOT install and powered on! ! !

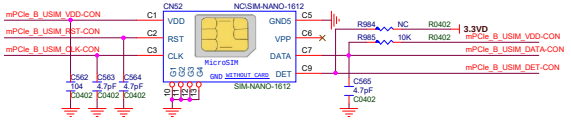


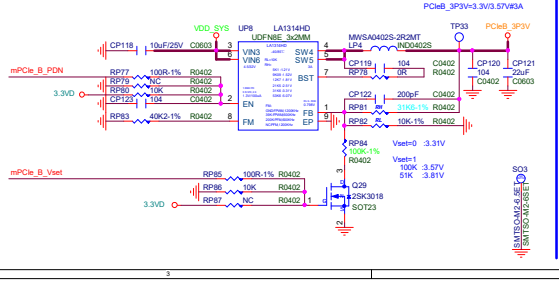
mPCIeB



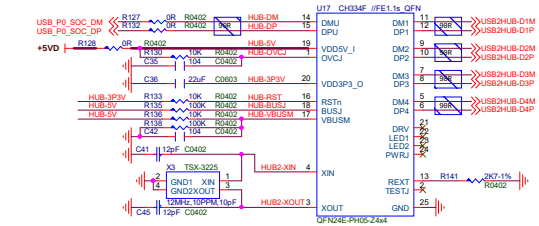


SIM5



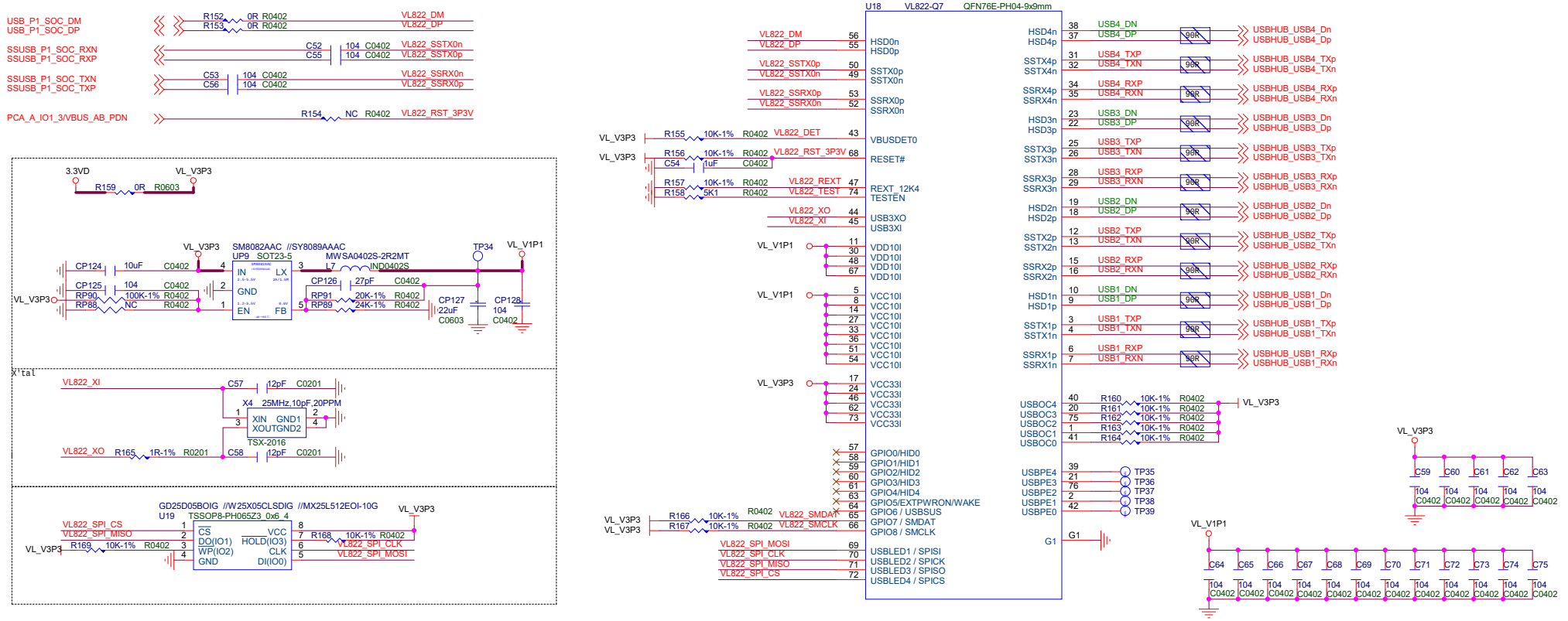


USB2.0 HUB

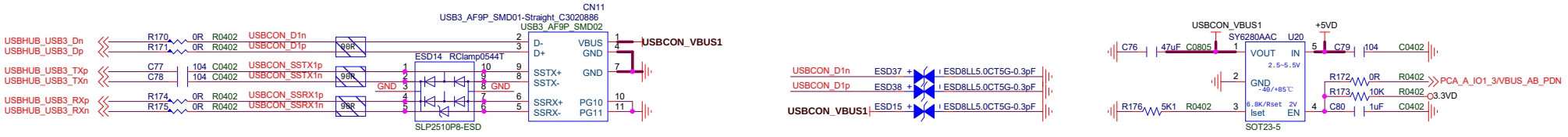


GUANGDONG BIPAI KEJI CPA.LTD			
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2		
Size A2	Page Name CM07.MiniPCIe_BE19000		Rev V1.0
Date: Wednesday, September 03, 2025	Sheet 7	of 22	

USB3.2 HUB

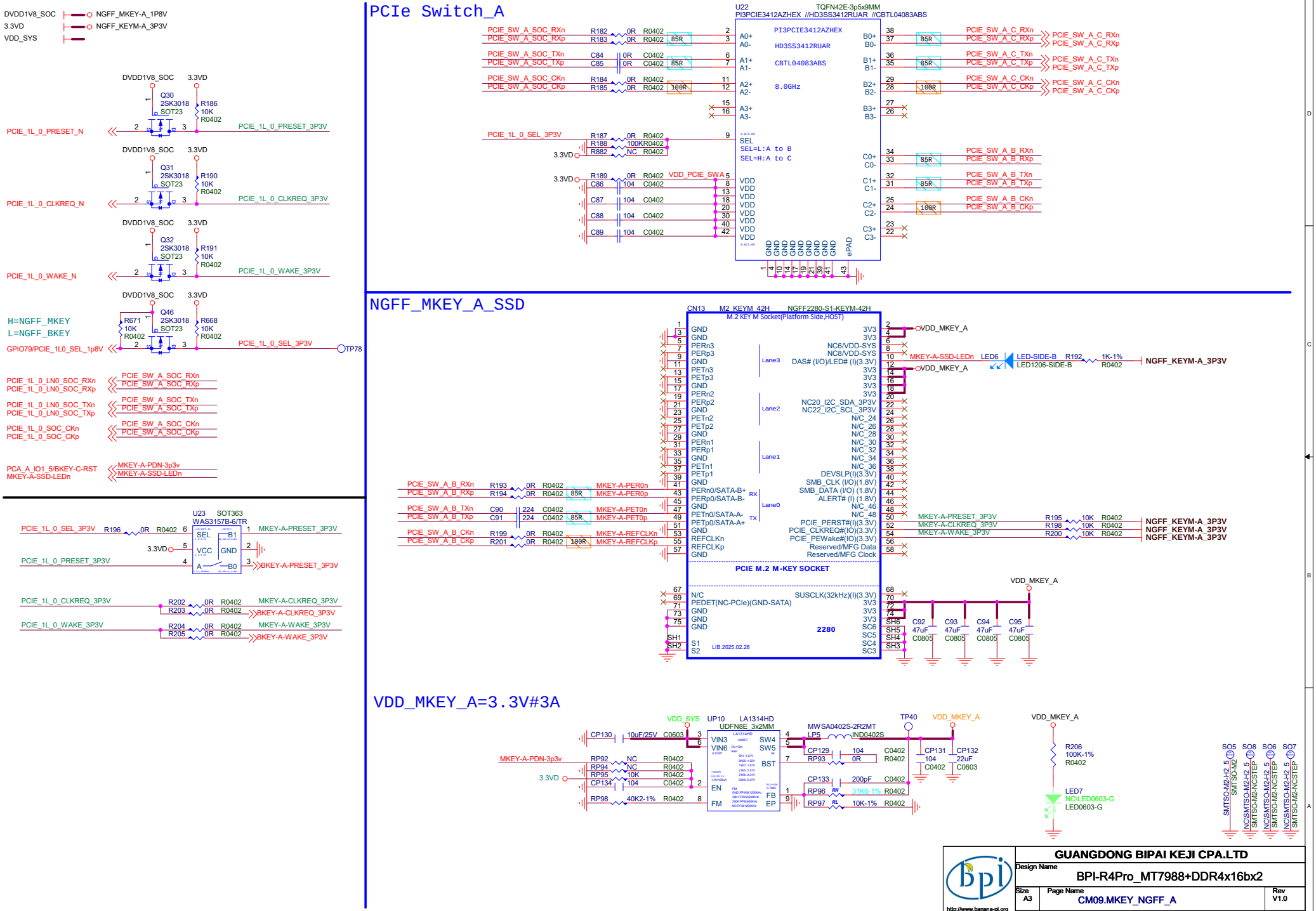


USB3



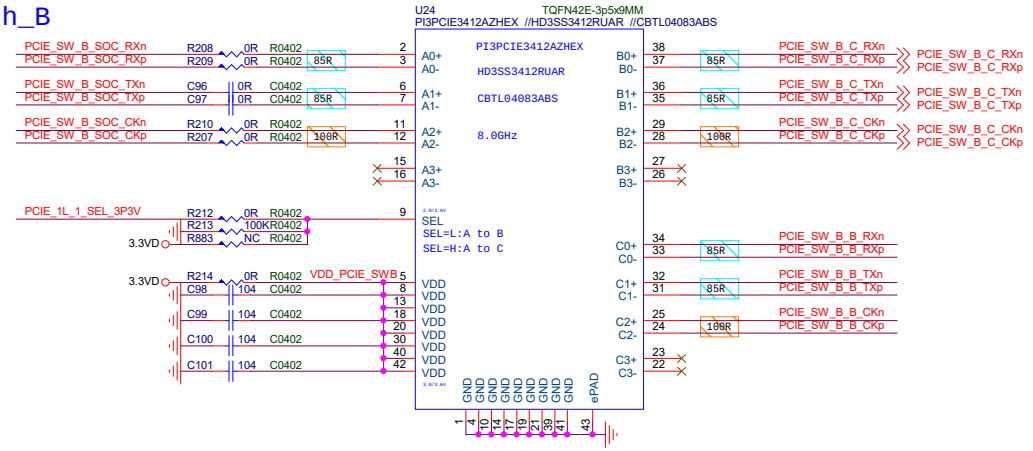
USB2

http://www.banana-pi.org	GUANGDONG BIPAI KEJI CPA.LTD	
	Design Name: BPI-R4Pro_MT7988+DDR4x16bx2	
	Size: A3	Page Name: CM08.USB3_HUB/I2C Switch
	Rev: V1.0	
	Date: Tuesday, September 23, 2025	Sheet 8 of 22

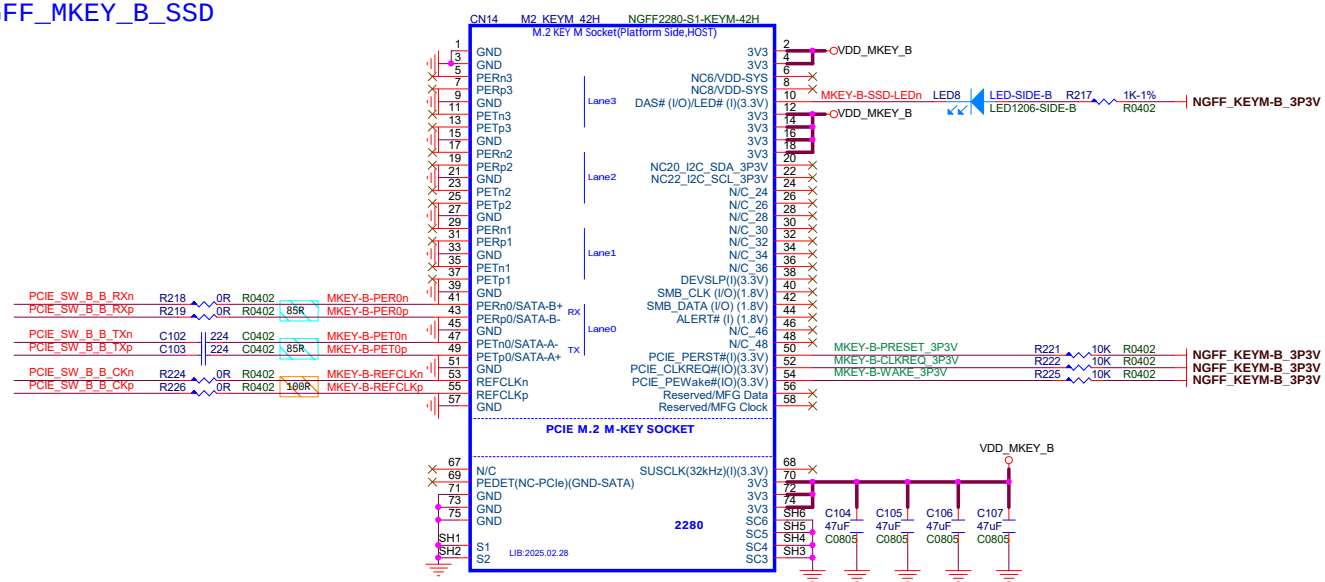

DVDD1V8_SOC
3.3VD
VDD_SYS
NGFF_MKEY-A_1P8V
NGFF_KEYM-A_3P3V
PCIe Switch_A
U22
TQFN42E-3p5x9MM
PI3PCIE3412AZHEX //HD3SS3412RUAR //CBTL04083ABS
PI3PCIE3412AZHEX
HD3SS3412RUAR
CBTL04083ABS
8.0GHz
SEL
SEL=L:A to B
SEL=H:A to C
ePAD
PCIE_SW_A_SOC_RXn
PCIE_SW_A_SOC_RXp
PCIE_SW_A_SOC_TXn
PCIE_SW_A_SOC_TXp
PCIE_SW_A_SOC_CKn
PCIE_SW_A_SOC_CKp
PCIE_SW_A_C_RXn
PCIE_SW_A_C_RXp
PCIE_SW_A_C_TXn
PCIE_SW_A_C_TXp
PCIE_SW_A_C_CKn
PCIE_SW_A_C_CKp
PCIE_SW_A_B_RXn
PCIE_SW_A_B_RXp
PCIE_SW_A_B_TXn
PCIE_SW_A_B_TXp
PCIE_SW_A_B_CKn
PCIE_SW_A_B_CKp
PCIE_1L_0_SEL_3P3V
VDD_PCIE_SWA
NGFF_MKEY_A_SSD
CN13
M2_KEYM_42H
NGFF2280-S1-KEYM-42H
M.2 KEY M Socket(Platform Side,HOST)
PCIE M.2 M-KEY SOCKET
2280
LIB:2025.02.28
VDD_MKEY_A
MKEY-A-SSD-LEDn
LED6
LED-SIDE-B
LED1206-SIDE-B
NGFF_KEYM-A_3P3V
MKEY-A-PRESET_3P3V
MKEY-A-CLKREQ_3P3V
MKEY-A-WAKE_3P3V
MKEY-A-PER0n
MKEY-A-PER0p
MKEY-A-PET0n
MKEY-A-PET0p
MKEY-A-REFCLKn
MKEY-A-REFCLKp
VDD_MKEY_A=3.3V#3A
VDD_SYS
UP10
LA1314HD
UDFN8E_3x2MM
MWSA0402S-2R2MT
TP40
VDD_MKEY_A
MKEY-A-PDN-3p3v
LED7
NC\LED0603-G
LED0603-G
SMTSO-M2-5
SMTSO-M2
NCSMTSO-M2-5
SMTSO-M2-NCSTEP
PCIE_1L_0_PRESET_N
PCIE_1L_0_CLKREQ_N
PCIE_1L_0_WAKE_N
H=NGFF_MKEY
L=NGFF_BKEY
GPIO79/PCIE_1L0_SEL_1p8V
TP78
PCIE_1L_0_LN0_SOC_RXn
PCIE_1L_0_LN0_SOC_RXp
PCIE_1L_0_LN0_SOC_TXn
PCIE_1L_0_LN0_SOC_TXp
PCIE_1L_0_SOC_CKn
PCIE_1L_0_SOC_CKp
PCA_A_IO1_5/BKEY-C-RST
MKEY-A-SSD-LEDn
U23
SOT363
WAS3157B-6/TR
BKEY-A-PRESET_3P3V
BKEY-A-CLKREQ_3P3V
BKEY-A-WAKE_3P3V
GUANGDONG BIPAI KEJI CPA.LTD
Design Name
BPI-R4Pro_MT7988+DDR4x16bx2
Size
A3
Page Name
CM09.MKEY_NGFF_A
Rev
V1.0
Date:
Tuesday, September 23, 2025
Sheet
9
of
22
http://www.banana-pi.org

DVDD1V8_SOC
3.3VD
VDD_SYS
NGFF_MKEY-B_1P8V
NGFF_KEYM-B_3P3V

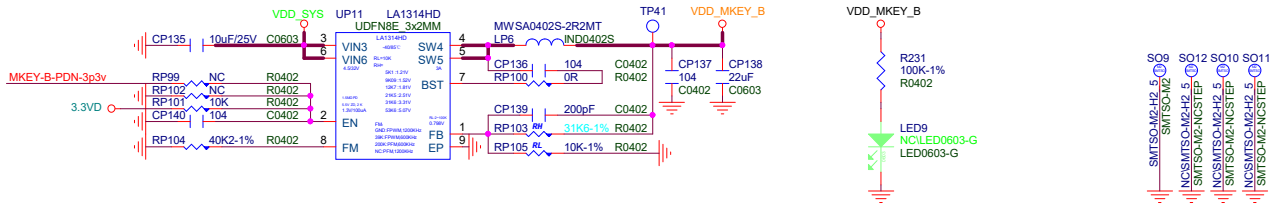
PCIe Switch_B



NGFF_MKEY_B_SSD



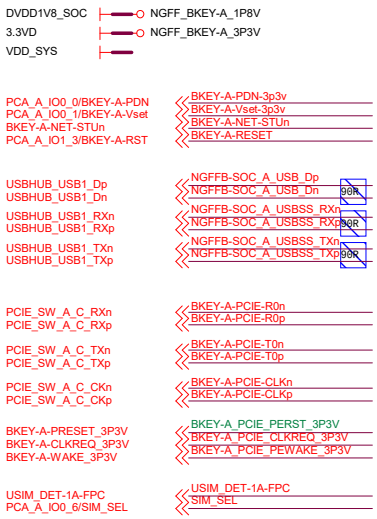
VDD_MKEY_B=3.3V#3A

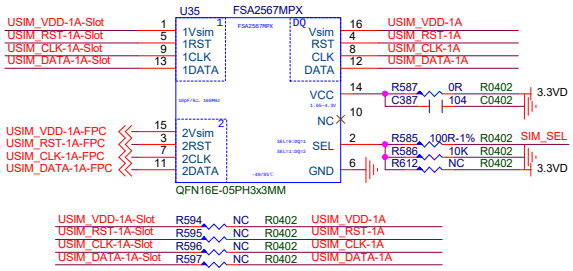


GUANGDONG BIPAI KEJI CPA.LTD		
Design Name: BPI-R4Pro_MT7988+DDR4x16bx2		
Size: A3	Page Name: CM10.MKEY_NGFF_B	Rev: V1.0
Date: Tuesday, September 23, 2025	Sheet 10 of 22	

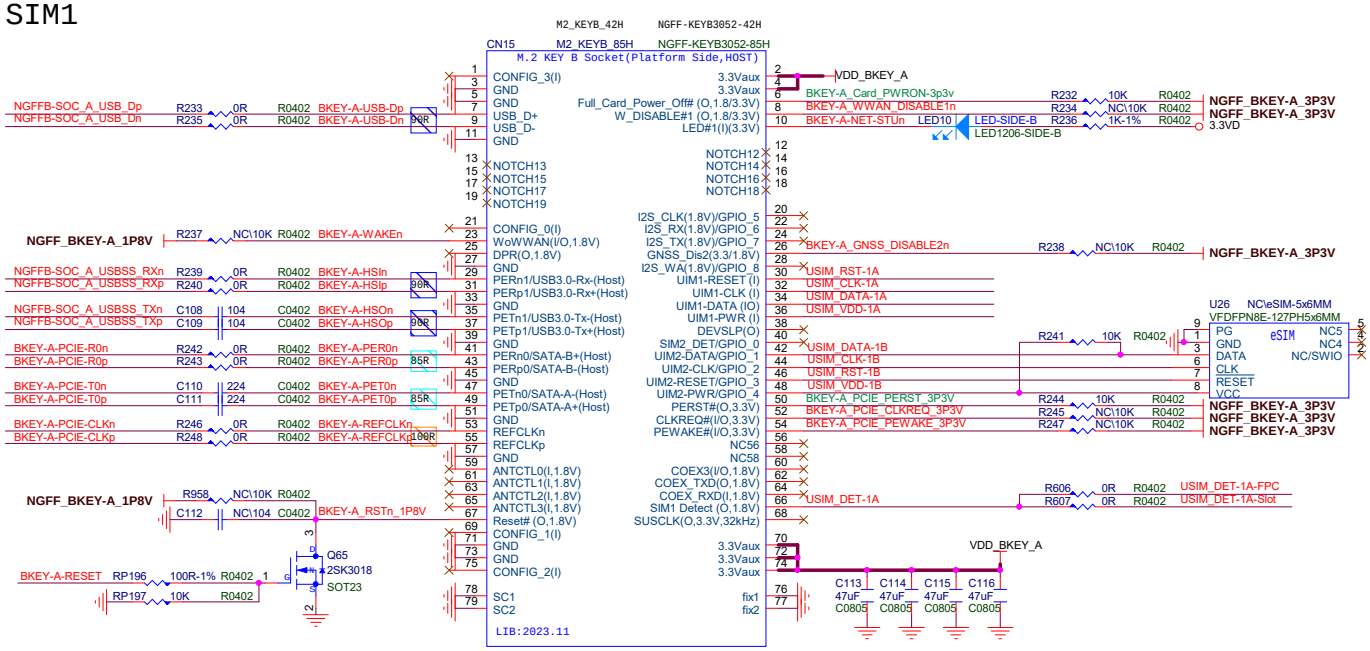
http://www.banana-pi.org

NGFF_BKEY_A

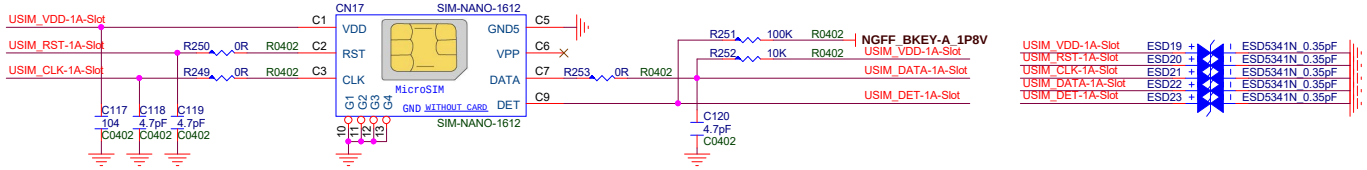




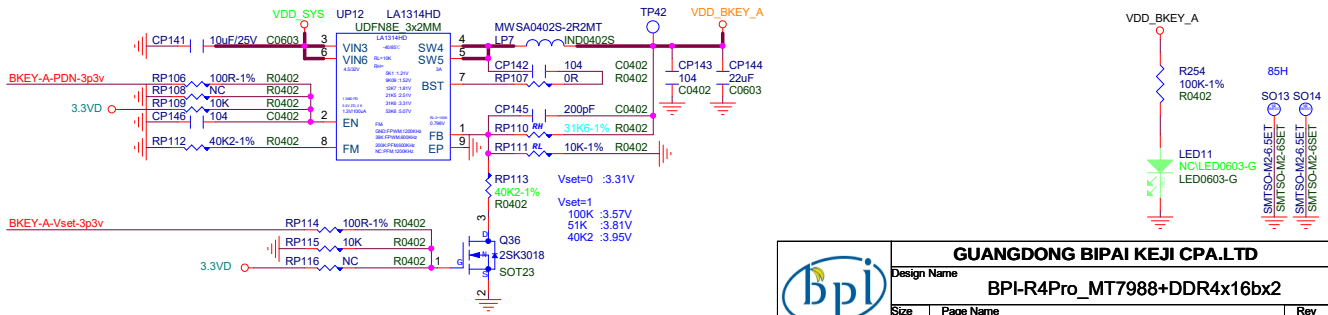
SIM1



SIM1

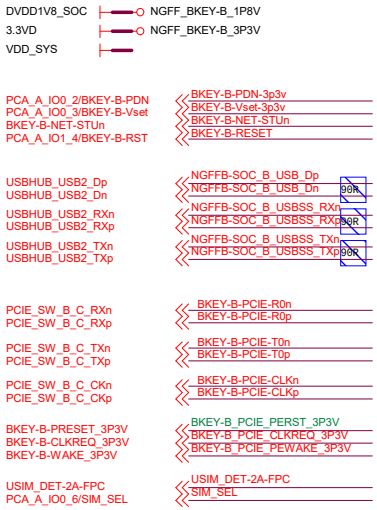


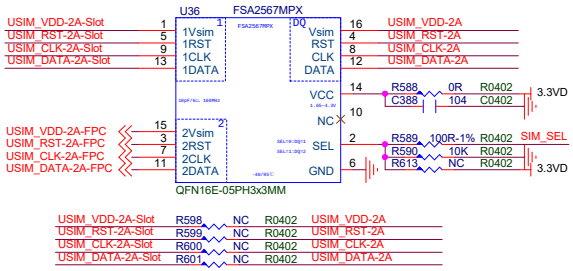
VDD_BKEY_A=3.3V/3.95V#3A



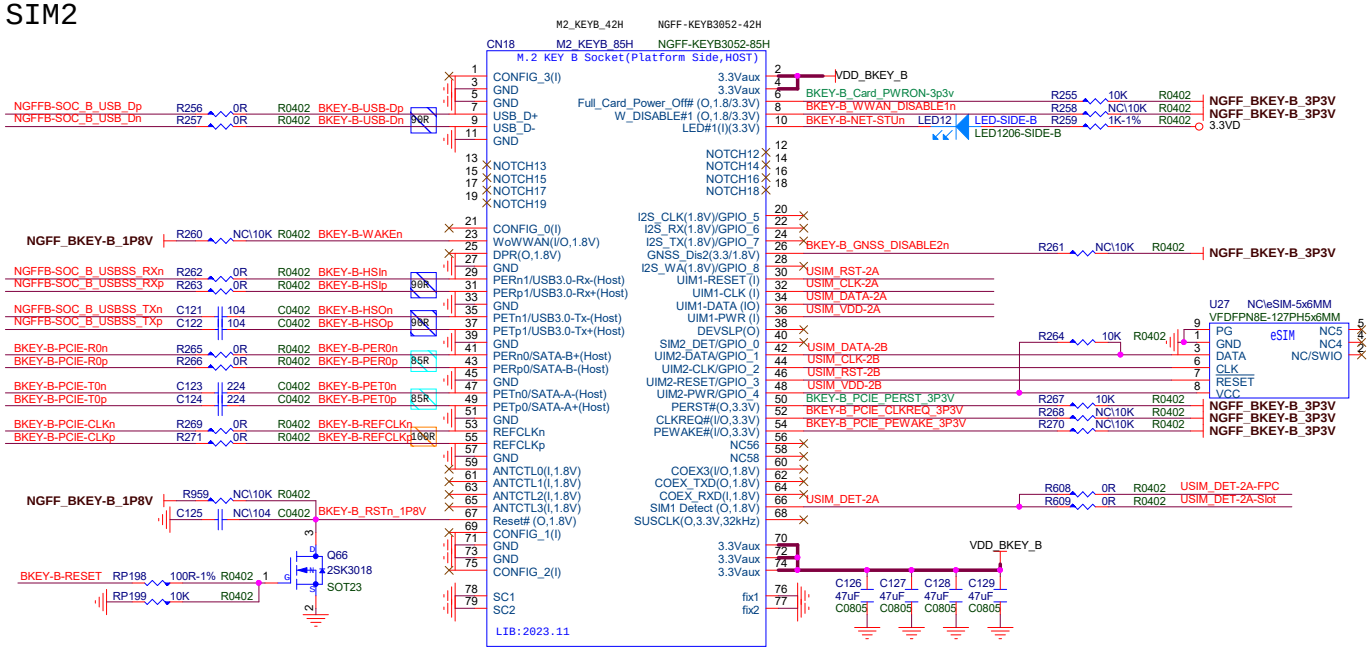
	GUANGDONG BIPAI KEJI CPA.LTD	
http://www.banana-pi.org	Design Name: BPI-R4Pro_MT7988+DDR4x16bx2	
	Size: A3 / Page Name: CM11.BKEY_NGFF_A	Rev: V1.0
	Date: Tuesday, September 23, 2025	Sheet 11 of 22

NGFF_BKEY_B

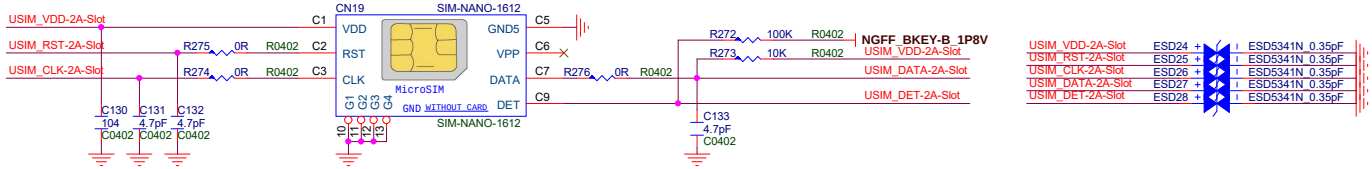




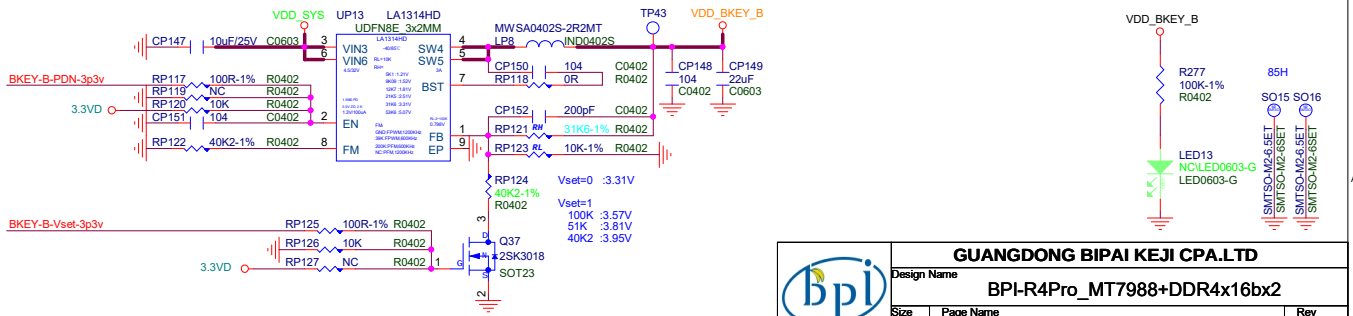
SIM2



SIM2



VDD_BKEY_B=3.3V/3.95V#3A



GUANGDONG BIPAI KEJI CPA.LTD
http://www.banana-pi.org

Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Size A3 / Page Name	CM12.BKEY_NGFF_B
Rev	V1.0
Date:	Tuesday, September 23, 2025
Sheet	12 of 22

NGFF_BKEY_C

DVDD1V8_SOC — NGFF_BKEY_C_1P8V
3.3VD — NGFF_BKEY_C_3P3V
VDD_SYS

PCA_A_IO0_4/BKEY-C-PDN → BKEY-C-PDN-3p3v
PCA_A_IO0_5/BKEY-C-Vset → BKEY-C-Vset-3p3v
BKEY-C-NET-STUn → BKEY-C-NET-STUn
PCA_A_IO1_5/BKEY-C-RST → BKEY-C-RESET

USBHUB_USB4_Dp → NGFFB-SOC_C_USB_Dp
USBHUB_USB4_Dn → NGFFB-SOC_C_USB_Dn
USBHUB_USB4_RXn → NGFFB-SOC_C_USBSS_RXn
USBHUB_USB4_RXp → NGFFB-SOC_C_USBSS_RXp
USBHUB_USB4_TXn → NGFFB-SOC_C_USBSS_TXn
USBHUB_USB4_TXp → NGFFB-SOC_C_USBSS_TXp

USIM_DET-3A-FPC → USIM_DET-3A-FPC
PCA_A_IO0_6/SIM_SEL → SIM_SEL

U37 FSA2567MPX
USIM_VDD-3A-Slot 1 — 1Vsim — DO — Vsim — 16 — USIM_VDD-3A
USIM_RST-3A-Slot 5 — 1RST — RST — 4 — USIM_RST-3A
USIM_CLK-3A-Slot 9 — 1CLK — CLK — 8 — USIM_CLK-3A
USIM_DATA-3A-Slot 13 — 1DATA — DATA — 12 — USIM_DATA-3A
VCC — 14 — R591 0R R0402 — C389 104 C0402 — 3.3VD
NC — 10
USIM_VDD-3A-FPC 15 — 2Vsim — SEL — 2 — R592 100R-1% R0402 — SIM_SEL
USIM_RST-3A-FPC 3 — 2RST — R593 10K R0402
USIM_CLK-3A-FPC 7 — 2CLK — GND — 6 — R614 NC R0402 — 3.3VD
USIM_DATA-3A-FPC 11 — 2DATA
QFN16E-05PH3x3MM

USIM_VDD-3A-Slot — R602 NC R0402 — USIM_VDD-3A
USIM_RST-3A-Slot — R603 NC R0402 — USIM_RST-3A
USIM_CLK-3A-Slot — R604 NC R0402 — USIM_CLK-3A
USIM_DATA-3A-Slot — R605 NC R0402 — USIM_DATA-3A

SIM3

M2_KEYB_42H NGFF-KEYB3052-42H
CN21 M2_KEYB_85H NGFF-KEYB3052-85H
M.2 KEY B Socket(Platform Side,HOST)

NGFFB-SOC_C_USB_Dp — R279 0R R0402 — BKEY-C-USB-Dp
NGFFB-SOC_C_USB_Dn — R281 0R R0402 — BKEY-C-USB-Dn — 90R
CONFIG_3(I) — 3.3Vaux — VDD_BKEY_C
GND — 3.3Vaux
GND — Full_Card_Power_Off# (O,1.8/3.3V) — BKEY-C_Card_PWRON-3p3v — R278 10K R0402 — NGFF_BKEY_C_3P3V
USB_D+ — W_DISABLE#1 (O,1.8/3.3V) — BKEY-C_WWAN_DISABLE1n — R280 NC\10K R0402 — NGFF_BKEY_C_3P3V
USB_D- — LED#1(I)(3.3V) — BKEY-C-NET-STUn — LED14 LED-SIDE-B LED1206-SIDE-B — R282 1K-1% R0402 — 3.3VD
GND
NOTCH12 NOTCH13 NOTCH14 NOTCH15 NOTCH16 NOTCH17 NOTCH18 NOTCH19

NGFF_BKEY_C_1P8V — R283 NC\10K R0402 — BKEY-C-WAKEn
CONFIG_0(I) — I2S_CLK(1.8V)/GPIO_5
WoWWAN(I/O,1.8V) — I2S_RX(1.8V)/GPIO_6
DPR(O,1.8V) — I2S_TX(1.8V)/GPIO_7 — BKEY-C_GNSS_DISABLE2n — R284 NC\10K R0402 — NGFF_BKEY_C_3P3V
GND — GNSS_Dis2(3.3/1.8V) — I2S_WA(1.8V)/GPIO_8 — USIM_RST-3A
NGFFB-SOC_C_USBSS_RXn — R285 0R R0402 — BKEY-C-HSIn — PERn1/USB3.0-Rx-(Host) — UIM1-RESET(I) — USIM_CLK-3A
NGFFB-SOC_C_USBSS_RXp — R286 0R R0402 — BKEY-C-HSIp — 90R — PERp1/USB3.0-Rx+(Host) — UIM1-CLK (I) — USIM_DATA-3A
GND — UIM1-DATA (IO) — USIM_VDD-3A
NGFFB-SOC_C_USBSS_TXn — C134 104 C0402 — BKEY-C-HSOn — PETn1/USB3.0-Tx-(Host) — UIM1-PWR (I)
NGFFB-SOC_C_USBSS_TXp — C135 104 C0402 — BKEY-C-HSOp — 90R — PETp1/USB3.0-Tx+(Host) — DEVSLP(O)
GND — SIM2_DET/GPIO_0 — USIM_DATA-3B
PERn0/SATA-B+(Host) — UIM2-DATA/GPIO_1 — USIM_CLK-3B
PERp0/SATA-B-(Host) — UIM2-CLK/GPIO_2 — USIM_RST-3B
GND — UIM2-RESET/GPIO_3 — USIM_VDD-3B
PETn0/SATA-A-(Host) — UIM2-PWR/GPIO_4 — BKEY-C_PCIE_PERST_3P3V — R287 10K R0402 — NGFF_BKEY_C_3P3V
PETp0/SATA-A+(Host) — PERST#(O,3.3V) — BKEY-C_PCIE_CLKREQ_3P3V — R288 10K R0402 — NGFF_BKEY_C_3P3V
GND — CLKREQ#(I/O,3.3V) — BKEY-C_PCIE_PEWAKE_3P3V — R289 10K R0402 — NGFF_BKEY_C_3P3V
REFCLKn — PEWAKE#(I/O,3.3V) — R290 10K R0402 — NGFF_BKEY_C_3P3V
REFCLKp — NC56
GND — NC58
ANTCTL0(I,1.8V) — COEX3(I/O,1.8V)
ANTCTL1(I,1.8V) — COEX_TXD(O,1.8V)
ANTCTL2(I,1.8V) — COEX_RXD(I,1.8V)
ANTCTL3(I,1.8V) — SIM1 Detect (O,1.8V) — USIM_DET-3A — R610 0R R0402 — USIM_DET-3A-FPC
Reset# (O,1.8V) — SUSCLK(O,3.3V,32kHz) — R611 0R R0402 — USIM_DET-3A-Slot
CONFIG_1(I)
GND — 3.3Vaux — VDD_BKEY_C
GND — 3.3Vaux — C137 47uF C0805 — C138 47uF C0805 — C139 47uF C0805 — C140 47uF C0805
CONFIG_2(I) — 3.3Vaux
SC1 — fix1
SC2 — fix2
LIB:2023.11

U28 NC\eSIM-5x6MM
VFDFPN8E-127PH5x6MM
PG — eSIM — NC5
GND — NC4
DATA — NC/SWIO
CLK
RESET
VCC

NGFF_BKEY_C_1P8V — R960 NC\10K R0402 — C136 NC\104 C0402 — BKEY-C_RSTn_1P8V
BKEY-C-RESET — RP200 100R-1% R0402 — RP201 10K R0402 — Q67 2SK3018 SOT23

SIM3

CN22 SIM-NANO-1612
USIM_VDD-3A-Slot — C1 VDD — GND5 — C5
USIM_RST-3A-Slot — R291 0R R0402 — C2 RST — VPP — C6
USIM_CLK-3A-Slot — R294 0R R0402 — C3 CLK — DATA — C7 R295 0R R0402 — R292 100K R0402 — NGFF_BKEY_C_1P8V
MicroSIM — R293 10K R0402 — USIM_VDD-3A-Slot
GND WITHOUT CARD — DET — C9 — USIM_DATA-3A-Slot
C141 104 C0402 — C142 4.7pF C0402 — C143 4.7pF C0402 — C144 4.7pF C0402 — USIM_DET-3A-Slot
SIM-NANO-1612

USIM_VDD-3A-Slot — ESD29 ESD5341N_0.35pF
USIM_RST-3A-Slot — ESD30 ESD5341N_0.35pF
USIM_CLK-3A-Slot — ESD31 ESD5341N_0.35pF
USIM_DATA-3A-Slot — ESD32 ESD5341N_0.35pF
USIM_DET-3A-Slot — ESD33 ESD5341N_0.35pF

VDD_BKEY_C=3.3V/3.95V#3A

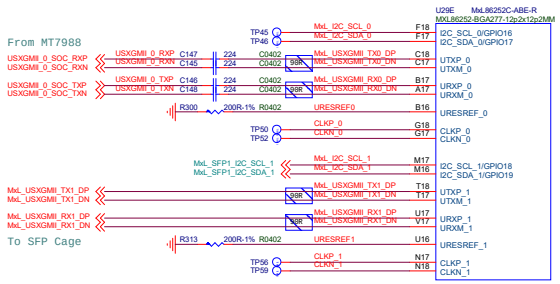
VDD_SYS — UP14 LA1314HD UDFN8E_3x2MM — TP44 — VDD_BKEY_C
CP153 10uF/25V C0603 — VIN3 SW4 — MWSA0402S-2R2MT LP9 — IND0402S
VIN6 SW5 — CP154 104 C0402 — RP129 0R R0402 — CP155 104 C0402 — CP156 22uF C0603
BST
BKEY-C-PDN-3p3v — RP128 100R-1% R0402
3.3VD — RP130 NC R0402 — RP131 10K R0402 — CP158 104 C0402 — EN — FB — CP157 200pF C0402
RP132 RM 31K6-1% R0402 — FM — EP
RP133 RL 10K-1% R0402 — RP134 40K2-1% R0402
RP135 40K2-1% R0402 — Vset=0 :3.31V — Vset=1 100K :3.57V 51K :3.81V 40K2 :3.95V
BKEY-C-Vset-3p3v — RP136 100R-1% R0402
RP137 10K R0402
3.3VD — RP138 NC R0402 — Q38 2SK3018 SOT23

VDD_BKEY_C — R296 100K-1% R0402 — LED15 NC\LED0603-G LED0603-G
85H — SO17 SO18 — SMTSO-M2-6.5ET SMTSO-M2-6SET SMTSO-M2-6.5ET SMTSO-M2-6SET

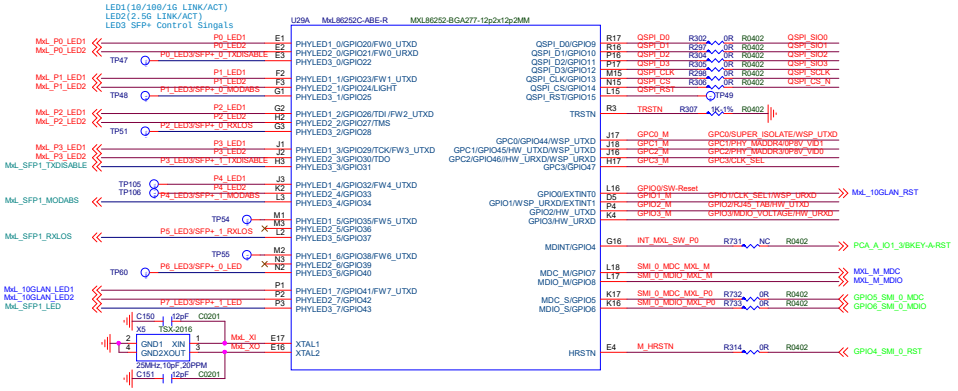
http://www.banana-pi.org

Company	GUANGDONG BIPAI KEJI CPA.LTD
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Size	A3
Page Name	CM13.BKEY_NGFF_C
Rev	V1.0
Date:	Tuesday, September 23, 2025
Sheet	13 of 22

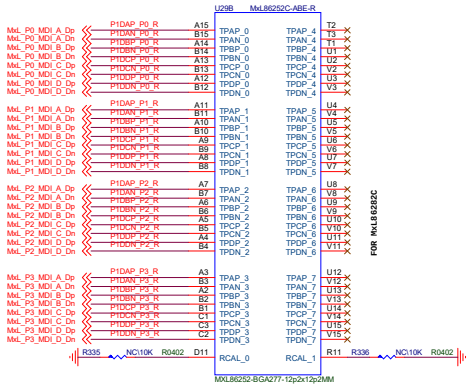
MxL86252C USXGMII



MxL86252C Config

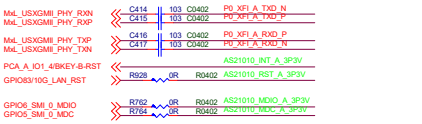


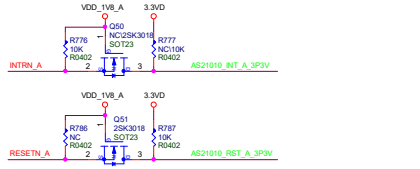
MxL86252C Twisted-Pair Interface (TPI)

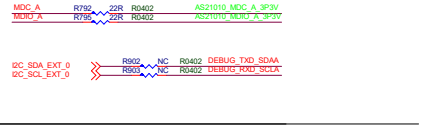


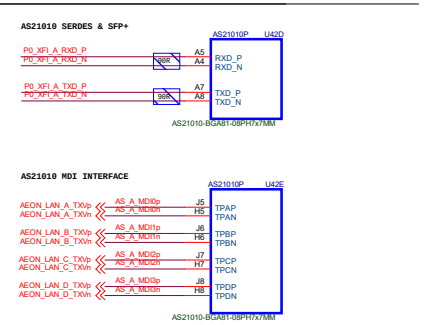
10G LAN,From Mxl

SEI Address(MxL P1,USXGMII_0)
0x18(24) = 11000



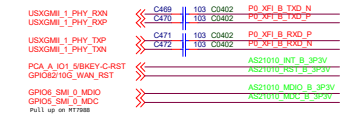


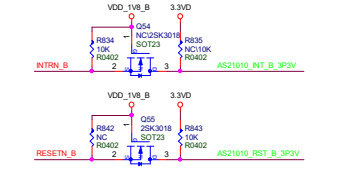


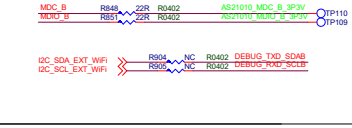


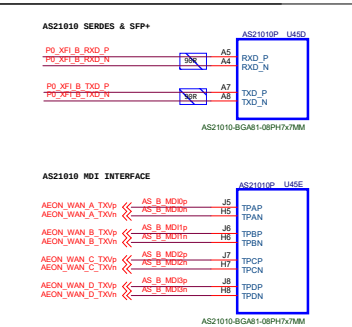
10G WAN,From MT7988

SEI Address(MT7988,USXGMII_1)
0x1C(28) = 11100



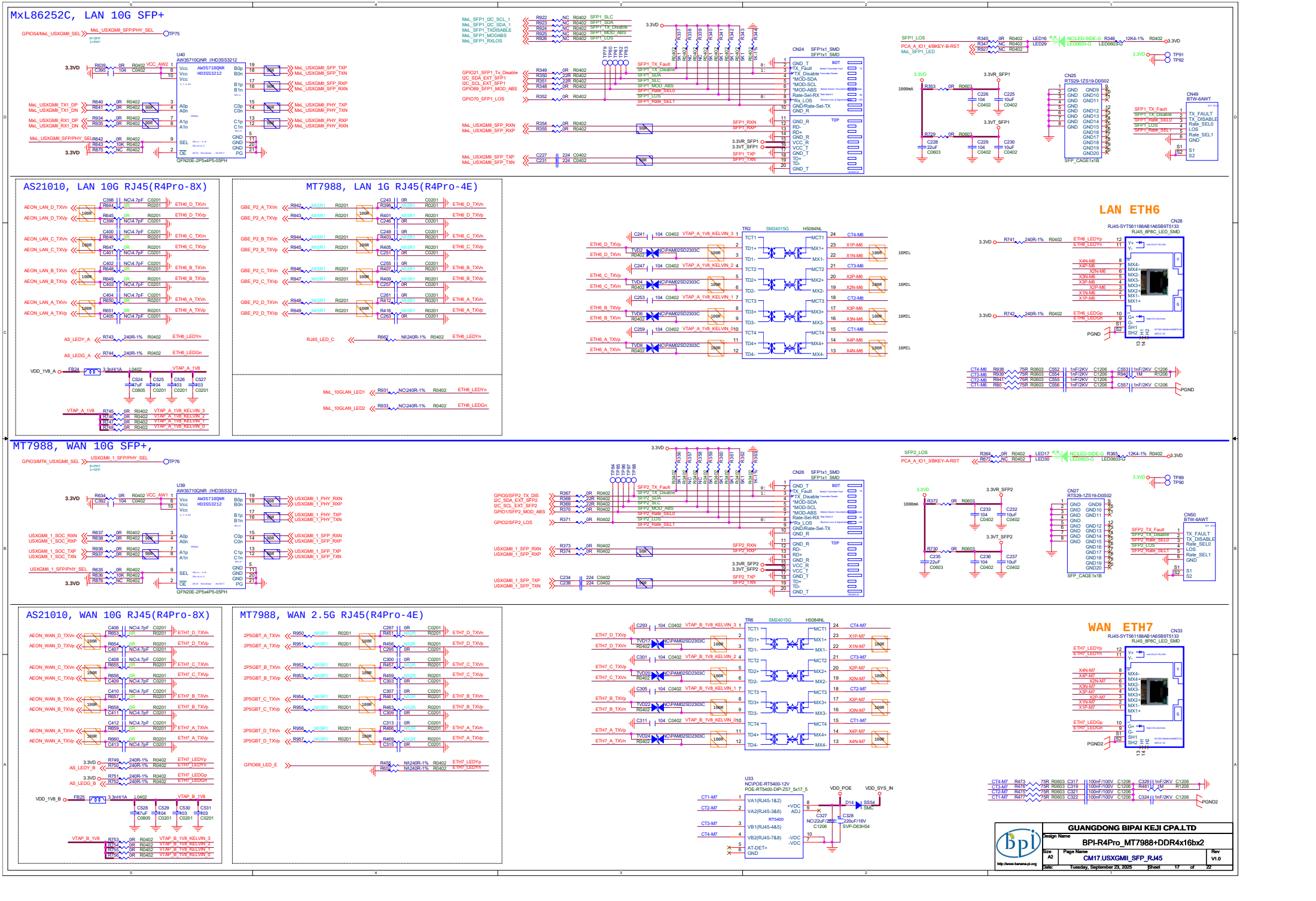




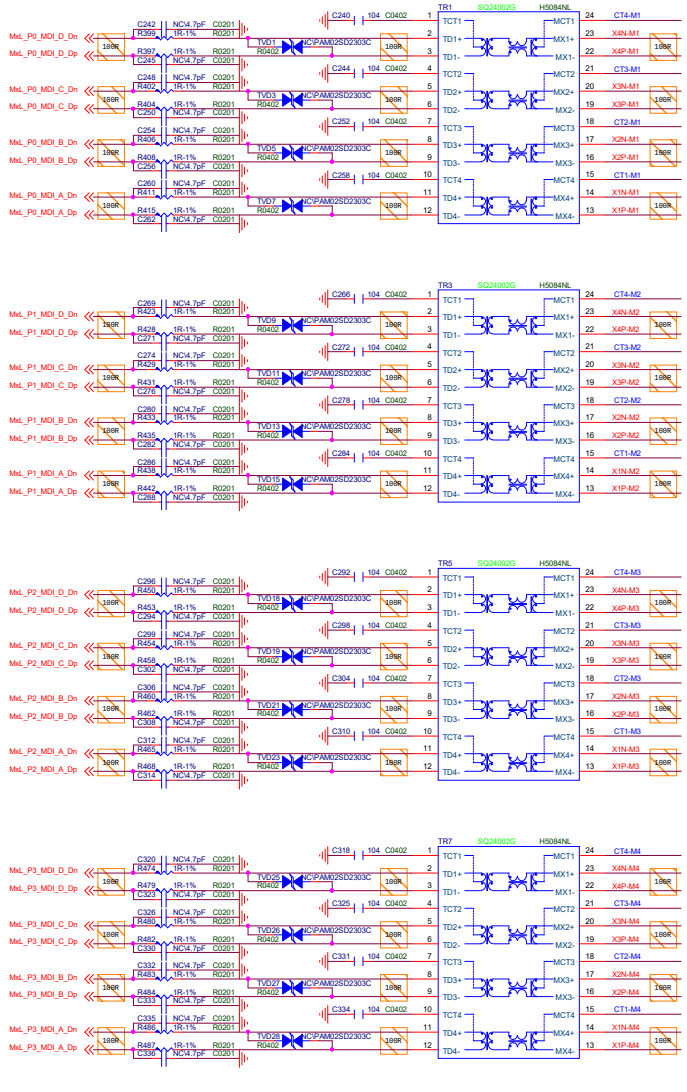


Company	GUANGDONG BIPAI KEJI CPA.LTD
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Size	A2
Page Name	CM14.MxL86252C
Rev	V1.0
Date:	Tuesday, September 23, 2025
Sheet	14 of 22

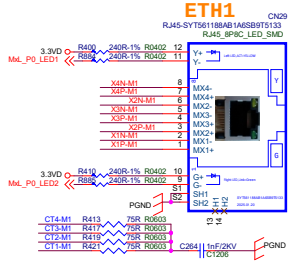
http://www.banana-pi.org


MxL86252C, LAN 10G SFP+
AS21010, LAN 10G RJ45(R4Pro-8X)
MT7988, LAN 1G RJ45(R4Pro-4E)
LAN ETH6
MT7988, WAN 10G SFP+,
AS21010, WAN 10G RJ45(R4Pro-8X)
MT7988, WAN 2.5G RJ45(R4Pro-4E)
WAN ETH7
GUANGDONG BIPAI KEJI CPA.LTD
BPI-R4Pro_MT7988+DDR4x16bx2
CM17.USXGMII_SFP_RJ45
Tuesday, September 23, 2025

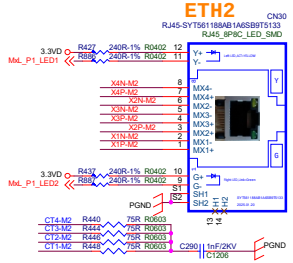
2.5G RJ45 x4(MxL86252)



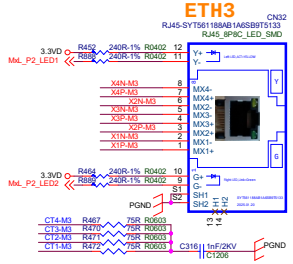
ETH1



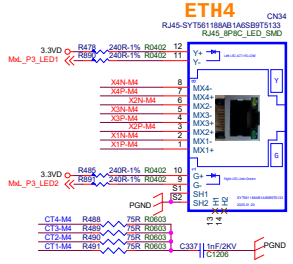
ETH2



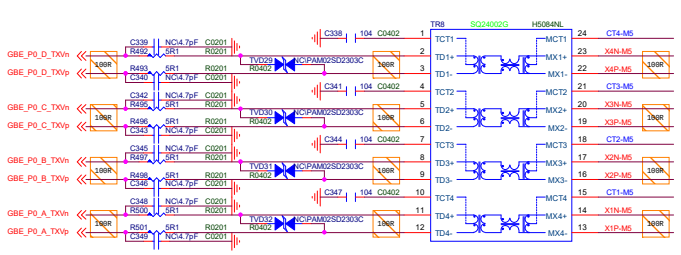
ETH3



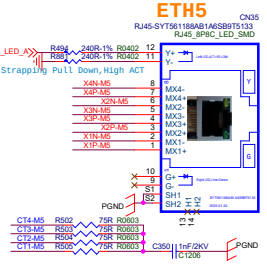
ETH4



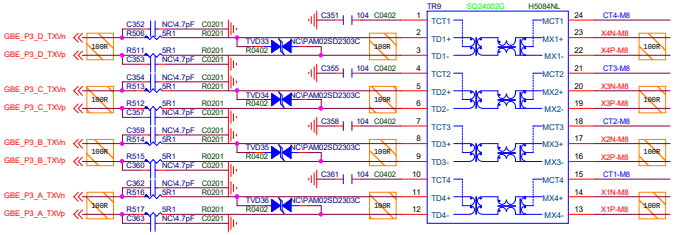
GbEx1 (MT7988)



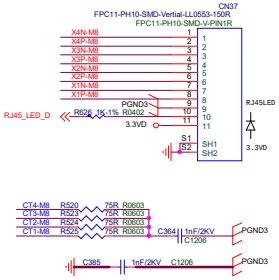
ETH5



GbE FPC Connector(MT7988)

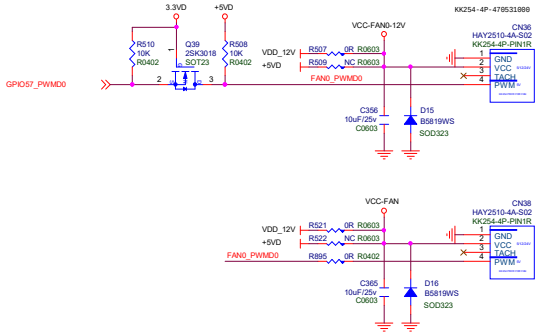


ETH8



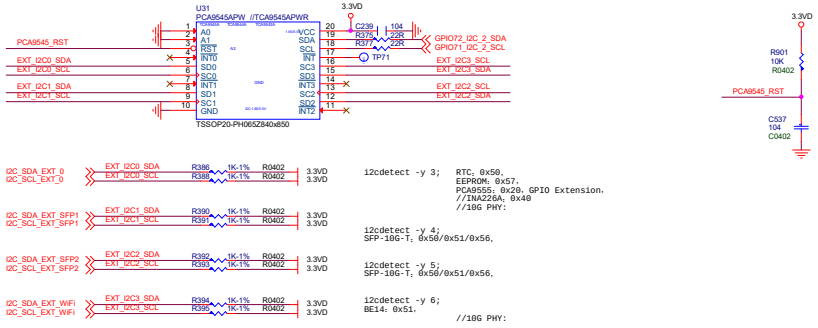
	GUANGDONG BIPAI KEJI CPA.LTD		
http://www.banana-pi.org	Design Name	BPI-R4Pro_MT7988+DDR4x16bx2	
	Size A2	Page Name CM18.RJ45	Rev V1.0
	Date: Tuesday, September 23, 2025	Sheet 18 of 22	

FAN



I2C BUS Switch

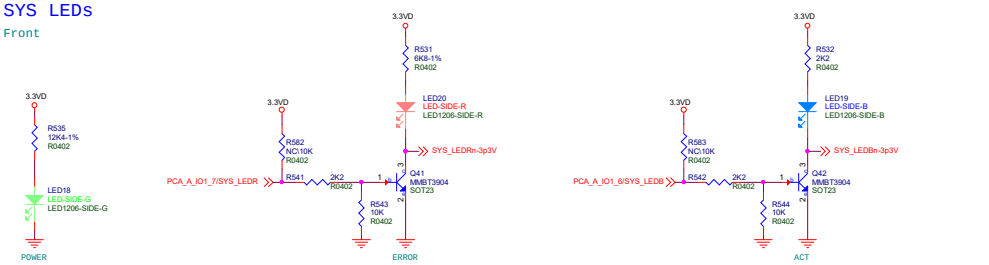
PCA9545: I2C Address: 0x70



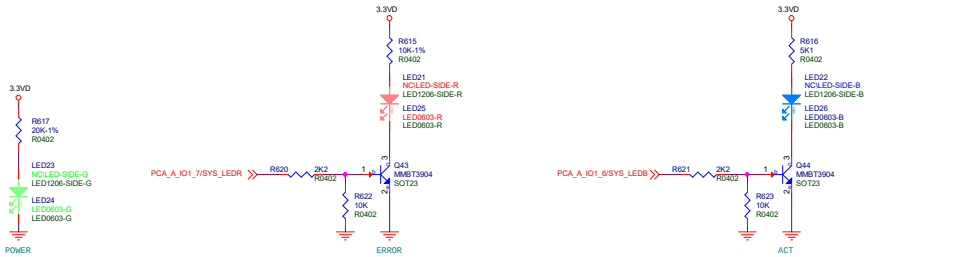

```
i2cdetect -y 3;   RTC, 0x50,
                  EEPROM: 0x57.
                  PCA9555, 0x20, GPIO Extension.
                  //INA226A, 0x40
                  //10G PHY:

i2cdetect -y 4;
SFP-10G-T; 0x50/0x51/0x56,

i2cdetect -y 5;
SFP-10G-T; 0x50/0x51/0x56,

i2cdetect -y 6;
BE14: 0x51.
                  //10G PHY:
```

SYS LEDs

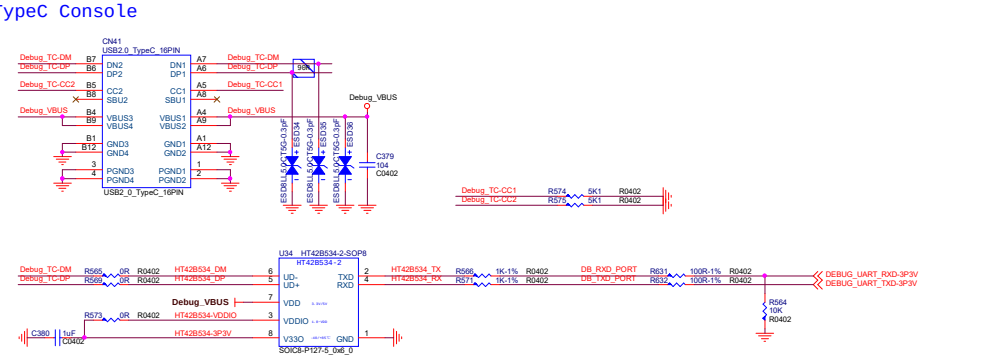
Front



Rear

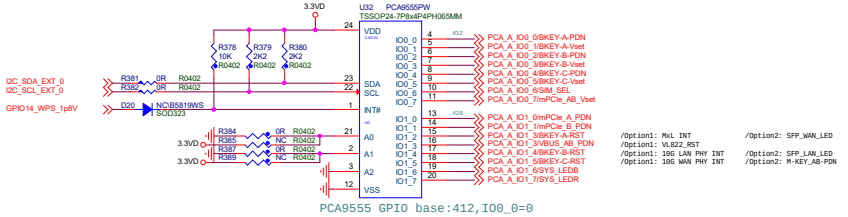


TypeC Console



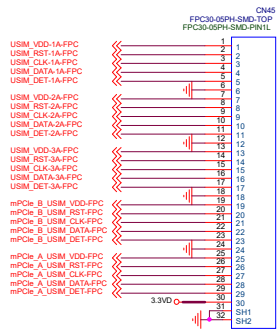
I2C To GPIO

PCA9555: I2C Address: 0x20

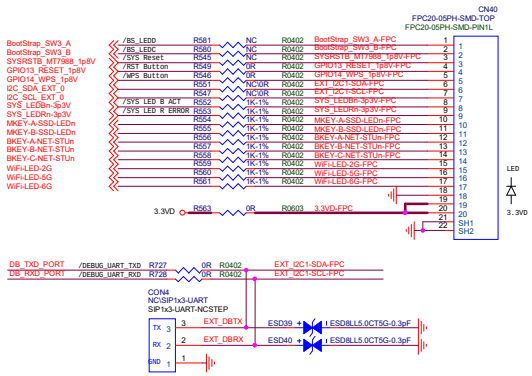


PCA9555 GPIO base:412,IO0_0=0

SIM Connector

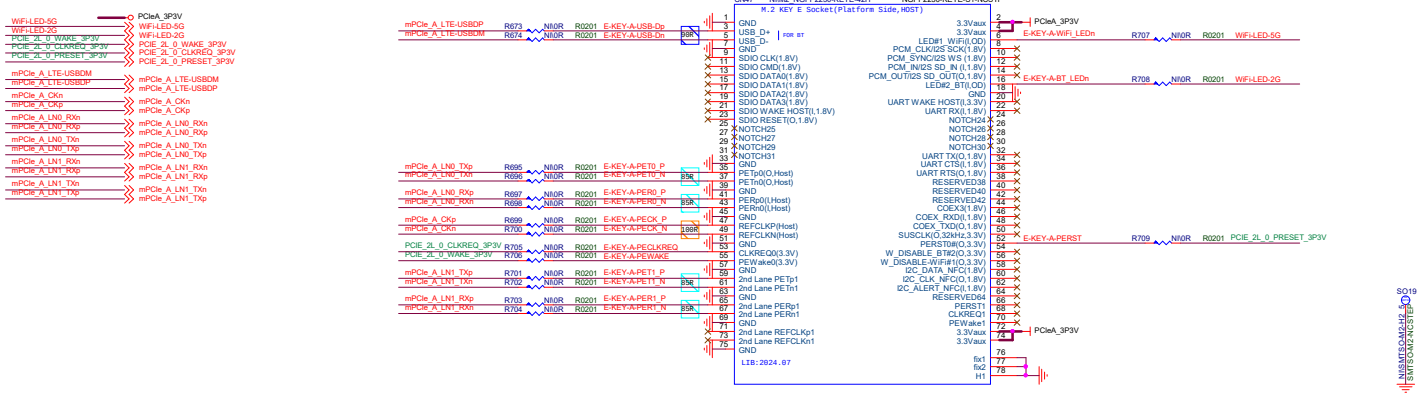


SYS/Wi-Fi/SSD/5G LEDs Connector

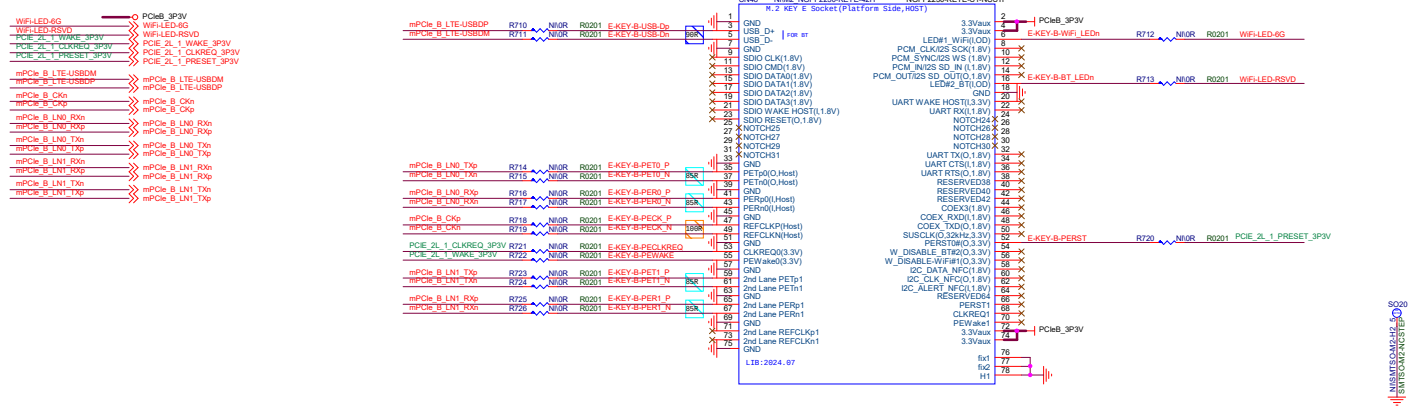


	GUANGDONG BIPAI KEJI CPA.LTD		
http://www.banana-pi.org	Design Name: BPI-R4Pro_MT7988+DDR4x16bx2		
	Size: A2	Page Name: CM19.Peripheral	Rev: V1.0
	Date: Tuesday, September 23, 2025	Sheet: 19 of 22	

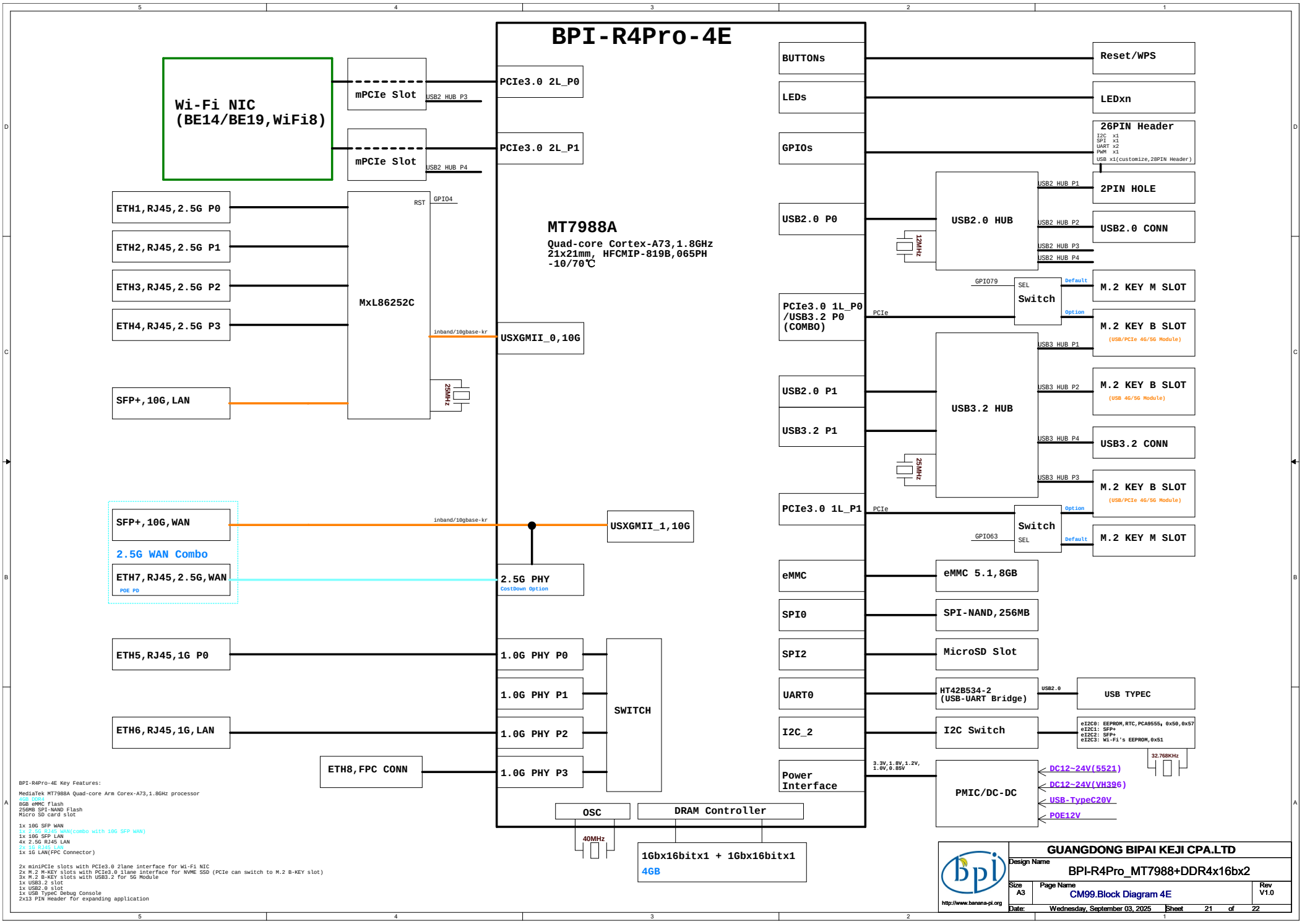
NGFF_EKEY_A(RSVD)

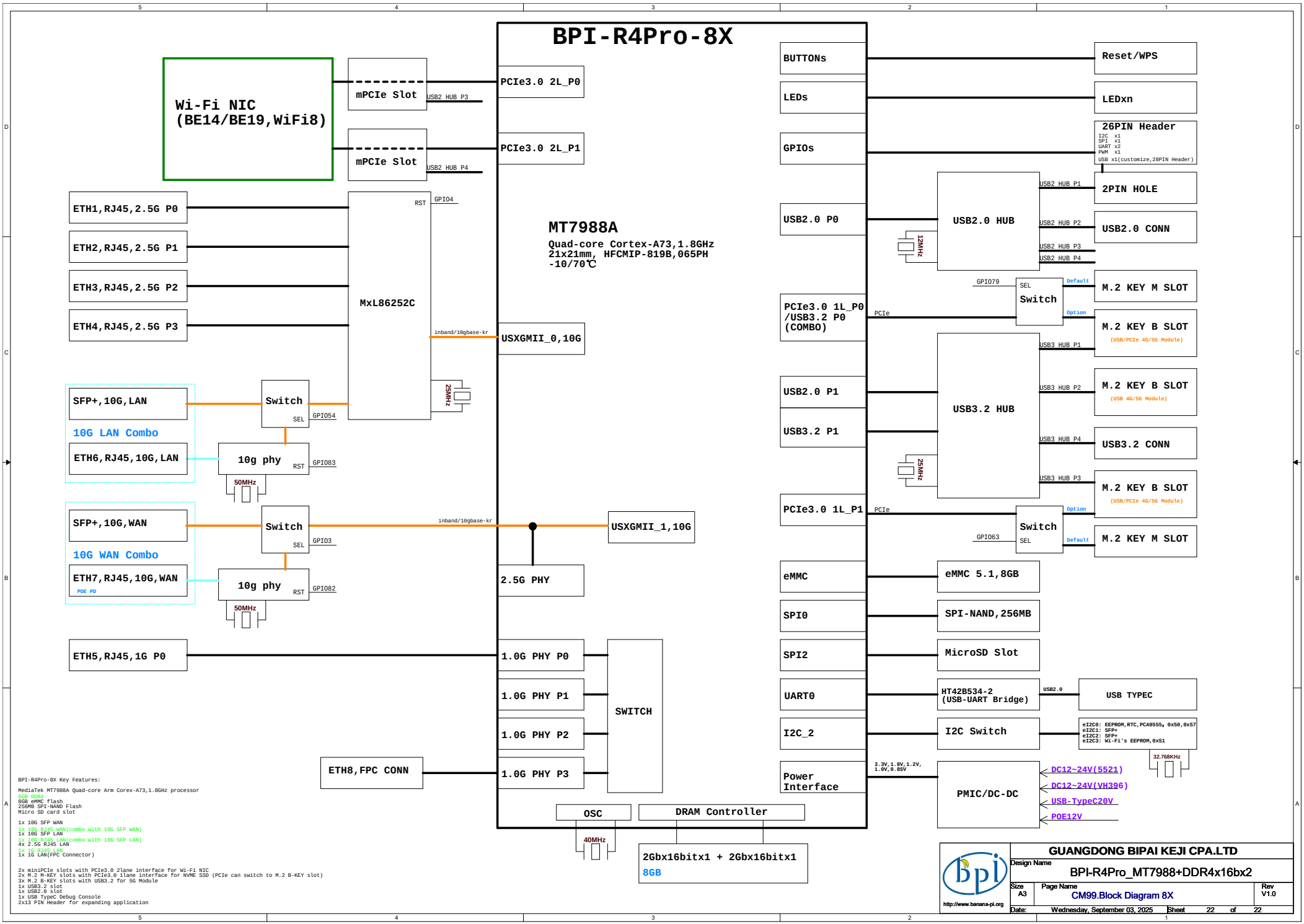


NGFF_EKEY_B(RSVD)



GUANGDONG BIPAI KEJI CPA.LTD	
Design Name	BPI-R4Pro_MT7988+DDR4x16bx2
Size A2 / Page Name	CM20.EKEY_NGFF
Rev	V1.0
Date: Tuesday, September 23, 2025	Sheet 20 of 22
http://www.banana-pi.org	


BPI-R4Pro-4E
Wi-Fi NIC
(BE14/BE19,WiFi8)
mPCIe Slot
mPCIe Slot
USB2 HUB P3
USB2 HUB P4
PCIe3.0 2L_P0
PCIe3.0 2L_P1
ETH1,RJ45,2.5G P0
ETH2,RJ45,2.5G P1
ETH3,RJ45,2.5G P2
ETH4,RJ45,2.5G P3
MxL86252C
RST
GPIO4
25MHz
inband/10gbase-kr
USXGMII_0,10G
SFP+,10G,LAN
SFP+,10G,WAN
2.5G WAN Combo
ETH7,RJ45,2.5G,WAN
POE PD
inband/10gbase-kr
USXGMII_1,10G
2.5G PHY
CostDown Option
ETH5,RJ45,1G P0
ETH6,RJ45,1G,LAN
ETH8,FPC CONN
1.0G PHY P0
1.0G PHY P1
1.0G PHY P2
1.0G PHY P3
SWITCH
MT7988A
Quad-core Cortex-A73,1.8GHz
21x21mm, HFCMIP-819B,065PH
-10/70℃
OSC
40MHz
DRAM Controller
1Gbx16bitx1 + 1Gbx16bitx1
4GB
BUTTONs
LEDs
GPIOs
USB2.0 P0
PCIe3.0 1L_P0
/USB3.2 P0
(COMBO)
USB2.0 P1
USB3.2 P1
PCIe3.0 1L_P1
eMMC
SPI0
SPI2
UART0
I2C_2
Power
Interface
3.3V,1.8V,1.2V,
1.0V,0.85V
Reset/WPS
LEDxn
26PIN Header
I2C x1
SPI x1
UART x2
PWM x1
USB x1(customize,28PIN Header)
2PIN HOLE
USB2.0 HUB
12MHz
USB2 HUB P1
USB2 HUB P2
USB2 HUB P3
USB2 HUB P4
USB2.0 CONN
GPIO79
SEL
Switch
Default
Option
M.2 KEY M SLOT
PCIe
M.2 KEY B SLOT
(USB/PCIe 4G/5G Module)
USB3.2 HUB
25MHz
USB3 HUB P1
USB3 HUB P2
USB3 HUB P4
USB3 HUB P3
M.2 KEY B SLOT
(USB 4G/5G Module)
USB3.2 CONN
M.2 KEY B SLOT
(USB/PCIe 4G/5G Module)
PCIe
Option
Switch
SEL
GPIO63
Default
M.2 KEY M SLOT
eMMC 5.1,8GB
SPI-NAND,256MB
MicroSD Slot
HT42B534-2
(USB-UART Bridge)
USB2.0
USB TYPEC
I2C Switch
eI2C0: EEPROM,RTC,PCA9555, 0x50,0x57
eI2C1: SFP+
eI2C2: SFP+
eI2C3: Wi-Fi's EEPROM,0x51
32.768KHz
PMIC/DC-DC
DC12~24V(5521)
DC12~24V(VH396)
USB-TypeC20V
POE12V
BPI-R4Pro-4E Key Features:
MediaTek MT7988A Quad-core Arm Corex-A73,1.8GHz processor
4GB DDR4
8GB eMMC flash
256MB SPI-NAND Flash
Micro SD card slot
1x 10G SFP WAN
1x 2.5G RJ45 WAN(combo with 10G SFP WAN)
1x 10G SFP LAN
4x 2.5G RJ45 LAN
2x 1G RJ45 LAN
1x 1G LAN(FPC Connector)
2x miniPCIe slots with PCIe3.0 2lane interface for Wi-Fi NIC
2x M.2 M-KEY slots with PCIe3.0 1lane interface for NVME SSD (PCIe can switch to M.2 B-KEY slot)
3x M.2 B-KEY slots with USB3.2 for 5G Module
1x USB3.2 slot
1x USB2.0 slot
1x USB TypeC Debug Console
2x13 PIN Header for expanding application
http://www.banana-pi.org
GUANGDONG BIPAI KEJI CPA.LTD
Design Name
BPI-R4Pro_MT7988+DDR4x16bx2
Size
A3
Page Name
CM99.Block Diagram 4E
Rev
V1.0
Date:
Wednesday, September 03, 2025
Sheet
21
of
22


BPI-R4Pro-8X
Wi-Fi NIC
(BE14/BE19,WiFi8)
mPCIe Slot
mPCIe Slot
USB2 HUB P3
USB2 HUB P4
PCIe3.0 2L_P0
PCIe3.0 2L_P1
MT7988A
Quad-core Cortex-A73,1.8GHz
21x21mm, HFCMIP-819B,065PH
-10/70℃
BUTTONs
LEDs
GPIOs
USB2.0 P0
PCIe3.0 1L_P0
/USB3.2 P0
(COMBO)
USB2.0 P1
USB3.2 P1
PCIe3.0 1L_P1
eMMC
SPI0
SPI2
UART0
I2C_2
Power
Interface
Reset/WPS
LEDxn
26PIN Header
I2C x1
SPI x1
UART x2
PWM x1
USB x1(customize,28PIN Header)
2PIN HOLE
USB2.0 HUB
USB2.0 CONN
12MHz
GPIO79
SEL
Switch
Default
Option
M.2 KEY M SLOT
M.2 KEY B SLOT
(USB/PCIe 4G/5G Module)
USB3.2 HUB
25MHz
M.2 KEY B SLOT
(USB 4G/5G Module)
USB3.2 CONN
M.2 KEY B SLOT
(USB/PCIe 4G/5G Module)
GPIO63
M.2 KEY M SLOT
eMMC 5.1,8GB
SPI-NAND,256MB
MicroSD Slot
HT42B534-2
(USB-UART Bridge)
USB TYPEC
I2C Switch
eI2C0: EEPROM,RTC,PCA9555, 0x50,0x57
eI2C1: SFP+
eI2C2: SFP+
eI2C3: Wi-Fi's EEPROM,0x51
32.768KHz
3.3V,1.8V,1.2V,
1.0V,0.85V
PMIC/DC-DC
DC12~24V(5521)
DC12~24V(VH396)
USB-TypeC20V
POE12V
ETH1,RJ45,2.5G P0
ETH2,RJ45,2.5G P1
ETH3,RJ45,2.5G P2
ETH4,RJ45,2.5G P3
MxL86252C
RST
GPIO4
inband/10gbase-kr
USXGMII_0,10G
25MHz
SFP+,10G,LAN
Switch
SEL
GPIO54
10G LAN Combo
ETH6,RJ45,10G,LAN
10g phy
RST
GPIO83
50MHz
SFP+,10G,WAN
Switch
SEL
GPIO3
10G WAN Combo
ETH7,RJ45,10G,WAN
POE PD
10g phy
RST
GPIO82
50MHz
inband/10gbase-kr
USXGMII_1,10G
2.5G PHY
ETH5,RJ45,1G P0
1.0G PHY P0
1.0G PHY P1
1.0G PHY P2
1.0G PHY P3
SWITCH
ETH8,FPC CONN
OSC
40MHz
DRAM Controller
2Gbx16bitx1 + 2Gbx16bitx1
8GB
BPI-R4Pro-8X Key Features:
MediaTek MT7988A Quad-core Arm Corex-A73,1.8GHz processor
8GB DDR4
8GB eMMC flash
256MB SPI-NAND Flash
Micro SD card slot
1x 10G SFP WAN
1x 10G RJ45 WAN(combo with 10G SFP WAN)
1x 10G SFP LAN
1x 10G RJ45 LAN(combo with 10G SFP LAN)
4x 2.5G RJ45 LAN
1x 1G RJ45 LAN
1x 1G LAN(FPC Connector)
2x miniPCIe slots with PCIe3.0 2lane interface for Wi-Fi NIC
2x M.2 M-KEY slots with PCIe3.0 1lane interface for NVME SSD (PCIe can switch to M.2 B-KEY slot)
3x M.2 B-KEY slots with USB3.2 for 5G Module
1x USB3.2 slot
1x USB2.0 slot
1x USB TypeC Debug Console
2x13 PIN Header for expanding application
http://www.banana-pi.org
GUANGDONG BIPAI KEJI CPA.LTD
Design Name
BPI-R4Pro_MT7988+DDR4x16bx2
Size
A3
Page Name
CM99.Block Diagram 8X
Rev
V1.0
Date:
Wednesday, September 03, 2025
Sheet
22
of
22