Shenzhen Biqu Technology 3D Printer G0B1 Project

BIGTREETECH

BIGTREETECH_Manta_M4P_V2.1_220608

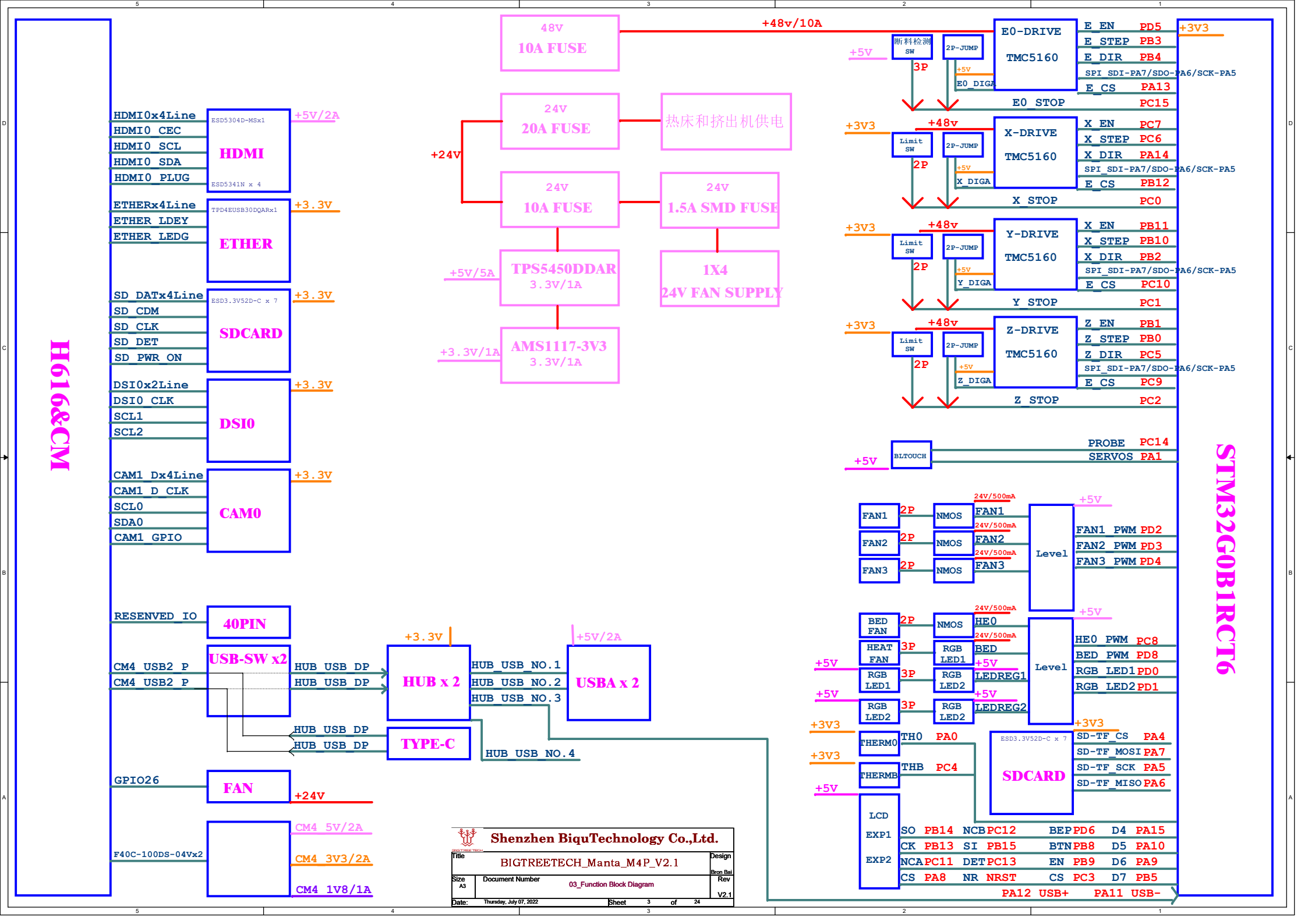
BIGTREETECH

MCU: STM32G0B1RCT6
MODULE: RPI-CM4Lite-R1-3 or H616
DCDC: TPS5450DDAR
LDO: AMS1117-3V3
DIRVE: TMC5160
USB_HUB: FE1-1S-QFN28BCN

Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A	Document Number: 01_Cover Page	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 1 of 24	

BIGTREETECH_Manta_M4P_V2.1 INDEX

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 02_Index		Rev: V02
Date: Thursday, July 07, 2022	Sheet 2 of 24		

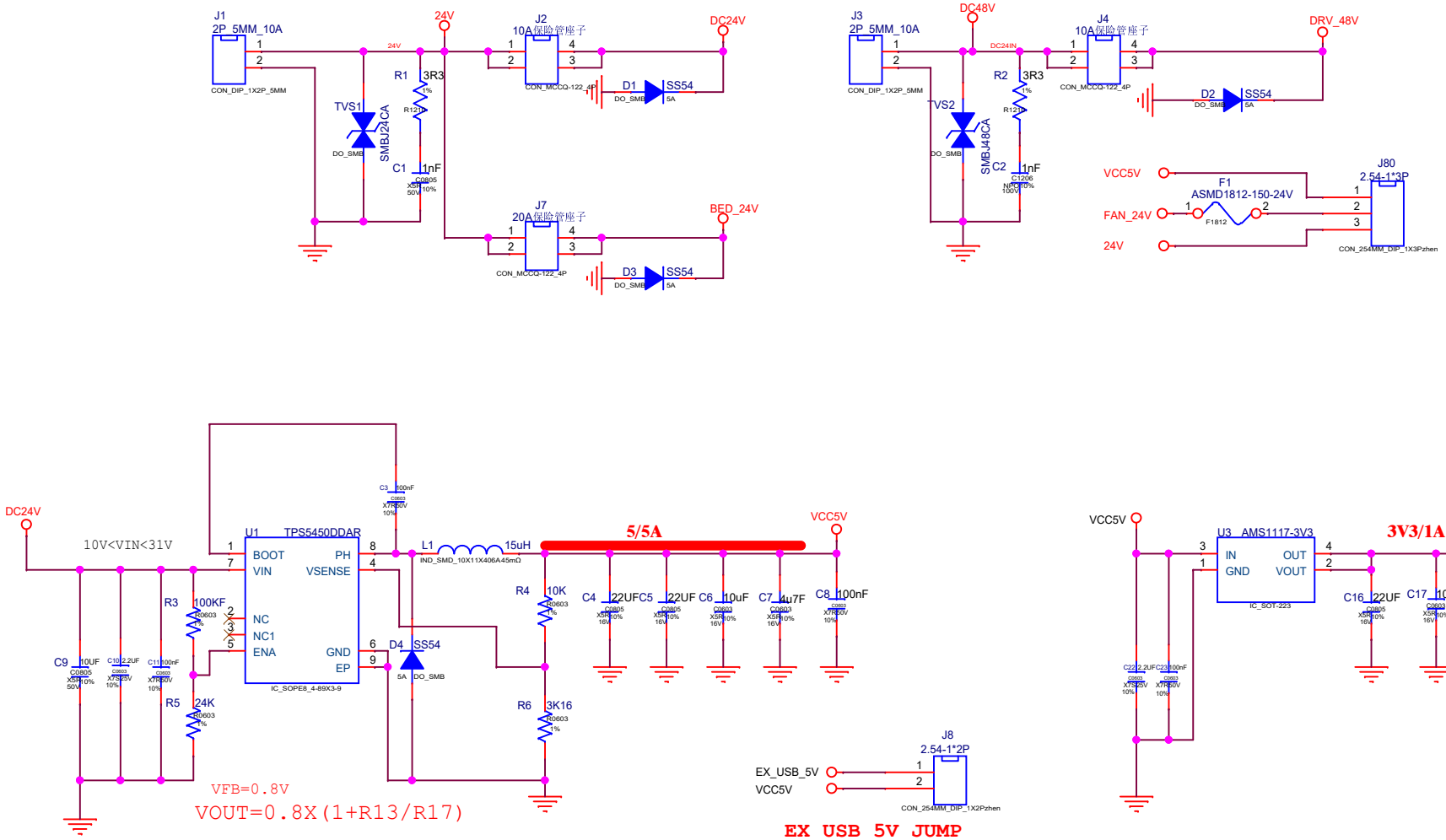

H616&CM
STM32G0B1RCT6
48V
10A FUSE
+48v/10A
24V
20A FUSE
热床和挤出机供电
+24V
24V
10A FUSE
24V
1.5A SMD FUSE
+5V/5A
TPS5450DDAR
3.3V/1A
1X4
24V FAN SUPPLY
+3.3V/1A
AMS1117-3V3
3.3V/1A
HDMI0x4Line
HDMI0_CEC
HDMI0_SCL
HDMI0_SDA
HDMI0_PLUG
ESD5304D-MSx1
HDMI
ESD5341N x 4
+5V/2A
ETHERx4Line
ETHER_LDEY
ETHER_LEDG
TPD4EUSB30DQARx1
ETHER
+3.3V
SD_DATx4Line
SD_CDM
SD_CLK
SD_DET
SD_PWR_ON
ESD3.3V52D-C x 7
SDCARD
+3.3V
DSI0x2Line
DSI0_CLK
SCL1
SCL2
DSI0
+3.3V
CAM1_Dx4Line
CAM1_D_CLK
SCL0
SDA0
CAM1_GPIO
CAM0
+3.3V
RESENVED_IO
40PIN
CM4_USB2_P
CM4_USB2_P
USB-SW x2
HUB_USB_DP
HUB_USB_DP
+3.3V
HUB x 2
HUB_USB_NO.1
HUB_USB_NO.2
HUB_USB_NO.3
+5V/2A
USBA x 2
HUB_USB_DP
HUB_USB_DP
TYPE-C
HUB_USB_NO.4
GPIO26
FAN
+24V
F40C-100DS-04Vx2
CM4_5V/2A
CM4_3V3/2A
CM4_1V8/1A
E0-DRIVE
TMC5160
+5V
断料检测
SW
3P
2P-JUMP
+5V
E0_DIGA
+3V3
+48v
E_EN PD5
E_STEP PB3
E_DIR PB4
SPI_SDI-PA7/SDO-PA6/SCK-PA5
E_CS PA13
E0_STOP PC15
+3V3
X-DRIVE
TMC5160
Limit
SW
2P
X_DIGA
X_EN PC7
X_STEP PC6
X_DIR PA14
SPI_SDI-PA7/SDO-PA6/SCK-PA5
E_CS PB12
X_STOP PC0
Y-DRIVE
TMC5160
Y_DIGA
X_EN PB11
X_STEP PB10
X_DIR PB2
SPI_SDI-PA7/SDO-PA6/SCK-PA5
E_CS PC10
Y_STOP PC1
Z-DRIVE
TMC5160
Z_DIGA
Z_EN PB1
Z_STEP PB0
Z_DIR PC5
SPI_SDI-PA7/SDO-PA6/SCK-PA5
E_CS PC9
Z_STOP PC2
BLTOUCH
PROBE PC14
SERVOS PA1
FAN1
FAN2
FAN3
2P
NMOS
24V/500mA
Level
FAN1_PWM PD2
FAN2_PWM PD3
FAN3_PWM PD4
BED FAN
HEAT FAN
RGB LED1
RGB LED2
3P
HE0
BED
LEDREG1
LEDREG2
HE0_PWM PC8
BED_PWM PD8
RGB_LED1 PD0
RGB_LED2 PD1
THERM0
THERMB
TH0 PA0
THB PC4
ESD3.3V52D-C x 7
SDCARD
SD-TF_CS PA4
SD-TF_MOSI PA7
SD-TF_SCK PA5
SD-TF_MISO PA6
LCD
EXP1
EXP2
SO PB14 NCB PC12 BEP PD6 D4 PA15
CK PB13 SI PB15 BTN PB8 D5 PA10
NCA PC11 DET PC13 EN PB9 D6 PA9
CS PA8 NR NRST CS PC3 D7 PB5
PA12 USB+ PA11 USB-
Shenzhen BiquTechnology Co.,Ltd.
Title
BIGTREETECH_Manta_M4P_V2.1
Design
Bron Bai
Size
A3
Document Number
03_Function Block Diagram
Rev
V2.1
Date:
Thursday, July 07, 2022
Sheet
3
of
24

Revision History

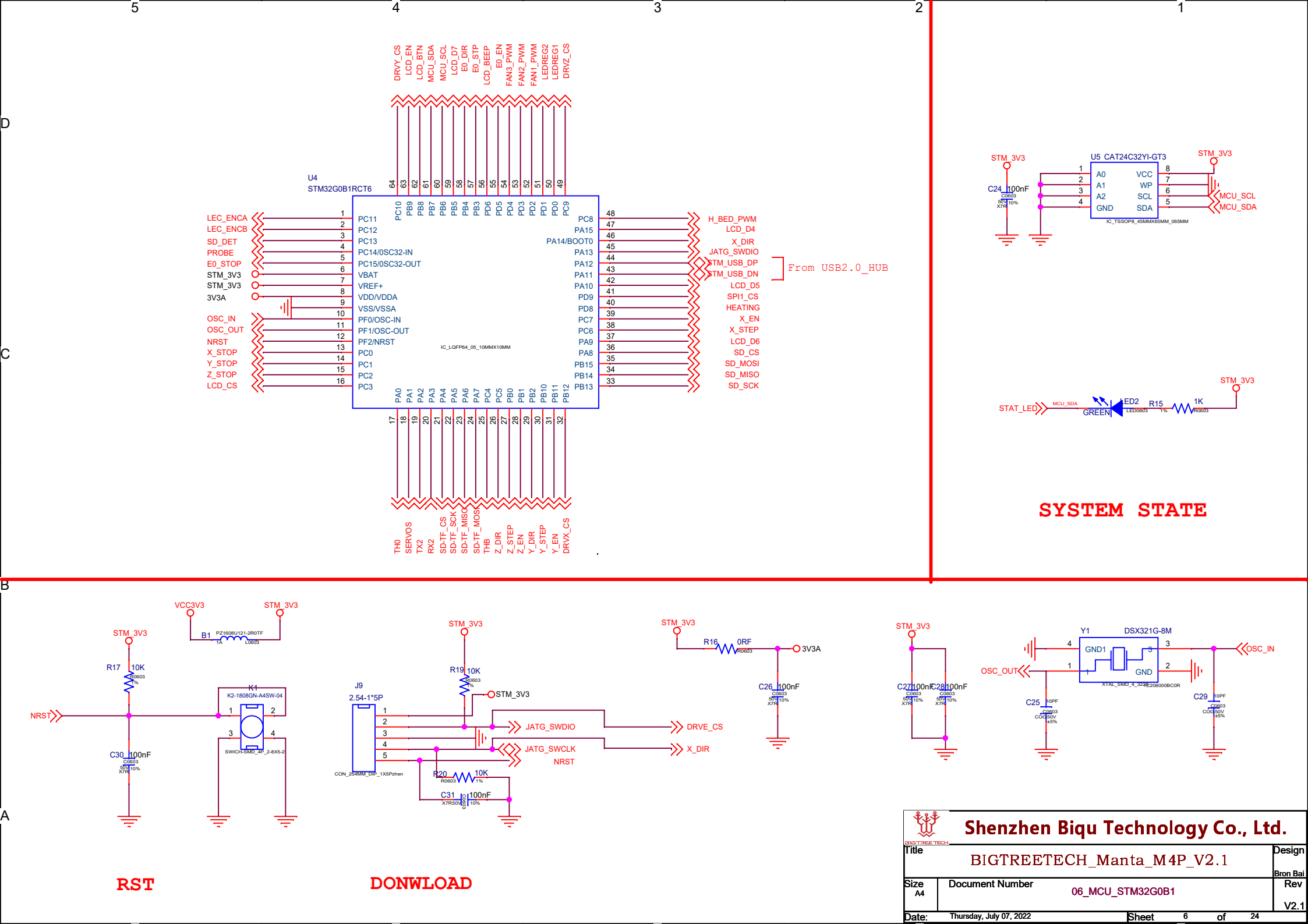
Version	Date	Author	Change Note	Approved
V01	2022.01.06	Byron Bai	1. BTT E3 SKR MINI V3.0的基础上修改 。 2. 树莓派模组RPI-CM4Lite-R1-3作为核心算法板。 3. 所有的IO口保护由压敏电阻改为ESD。 3. 所有的器件增加描述、厂商PN、厂商名称等。 注：V02只是修改PCB外形	
M4P_V1.0	2022.03.30	Byron Bai	MCU 1._X轴的 CS 和 DIR 所用的 MCU 的 IO 交换一下。（即X轴的DIR和下载口SWCLK复用，之前CS和下载口SWCLK不在一起复用，单IO口使用）。 2._ SPI1 的 MISO，MOSI，SCK 没有连接到MCU上（与板载的 MicroSD 卡公用，即TMC5160的SPI1_MISO，SPI1_MOSI，SPI1_SCK，分别用SD-TF_MOSI【PA7】SD-TF_MISO【PA6】SD-TF_CS 【PA5】连接；J58 的SPI1_MISO，SPI1_MOSI，SPI1_SCK也是如此连接）。 3._增加驱动高低压选择跳线帽没有 24V和48V转换。加2.54mm3P插针。 4._更改RGB 线序。正常的是 5V 信号线。（已经更改）。 5._驱动的 CS (UART) 脚没有隔离。用MOS+3个10电阻。 6._改变热床、挤出机的开关NMOS封装为DFN和TO252。 7._风扇的保险改为3A/F1812。 SoC 1. CSI、DSI 改为15pin 1.0mm间距，全部都用2Line 【 朝上接】 2. USB hub 换封装为QFN24。 3. CM4和H616统一改为 USB hub 挂载 USB 设备 。 4. HDMI旁边要放USB，使用HDMI屏幕时插USB触摸用的 。 5. 40pin GPIO尽量保留并且与树莓派线序一致。尽量。 6. 取消PCIE和PCIE 12V DCDC。图纸P6&P17，待决定。 7. 取消J73，只保留nRPIBOOT EEPROM_nWP增加拨码开关，GLOBAL_EN加个上拉电阻(NC) RUN_PG加个下拉电阻(NC)。 8.取消RTC。图纸P25。 9.取消HUB的灯。图纸P20。 10.HOST USB去掉一个电解电容。 11.取消HUB电源开关。 注：第三版由"BQ_CM4-H616_Carrier_Board_v2"更改为"BIGTREETECH_Manta_M4P_V1"	
M4P_V2.0	2022.05.06	Byron Bai	1. TF_CARD电源由CM4SD_3v3变更为"CM4_3V3"; 2. 变更J75的支持A型USB直插座子封装. 3. 变更了USB开关，电压启动方式. 4. 变更了J63右边的孔径，跟板厂沟通要走正公差. 5. J48/J51/J1/J3的1.1mm孔径不变，跟板厂沟通要走正公差. 7. J46由3PIN插针更改为3P 2.54mm插座. 8. J59 78PIN,连接CM4_3V3.供CM4内部3.3V参考电压,同时核心板H616_PC16NC. 9. 电机使能R150,R154,R153,R159由下拉变更为上拉 3.3V. 10. Q7,Q15,Q10,Q11,Q12,Q13,源极上拉由10K 变更为 0R. 源极下拉和漏极上拉由10K变更为 1.8 K. 11. HUB U16的晶振电容贴错，拆掉保留位置，预留12PF负载电容位置. 12. DSI插座和CSI插座，增加丝印标识。 13. Q14 R161接"HEATING"这端变更为接地下拉.	

Shenzhen Biqu Technology Co., Ltd.

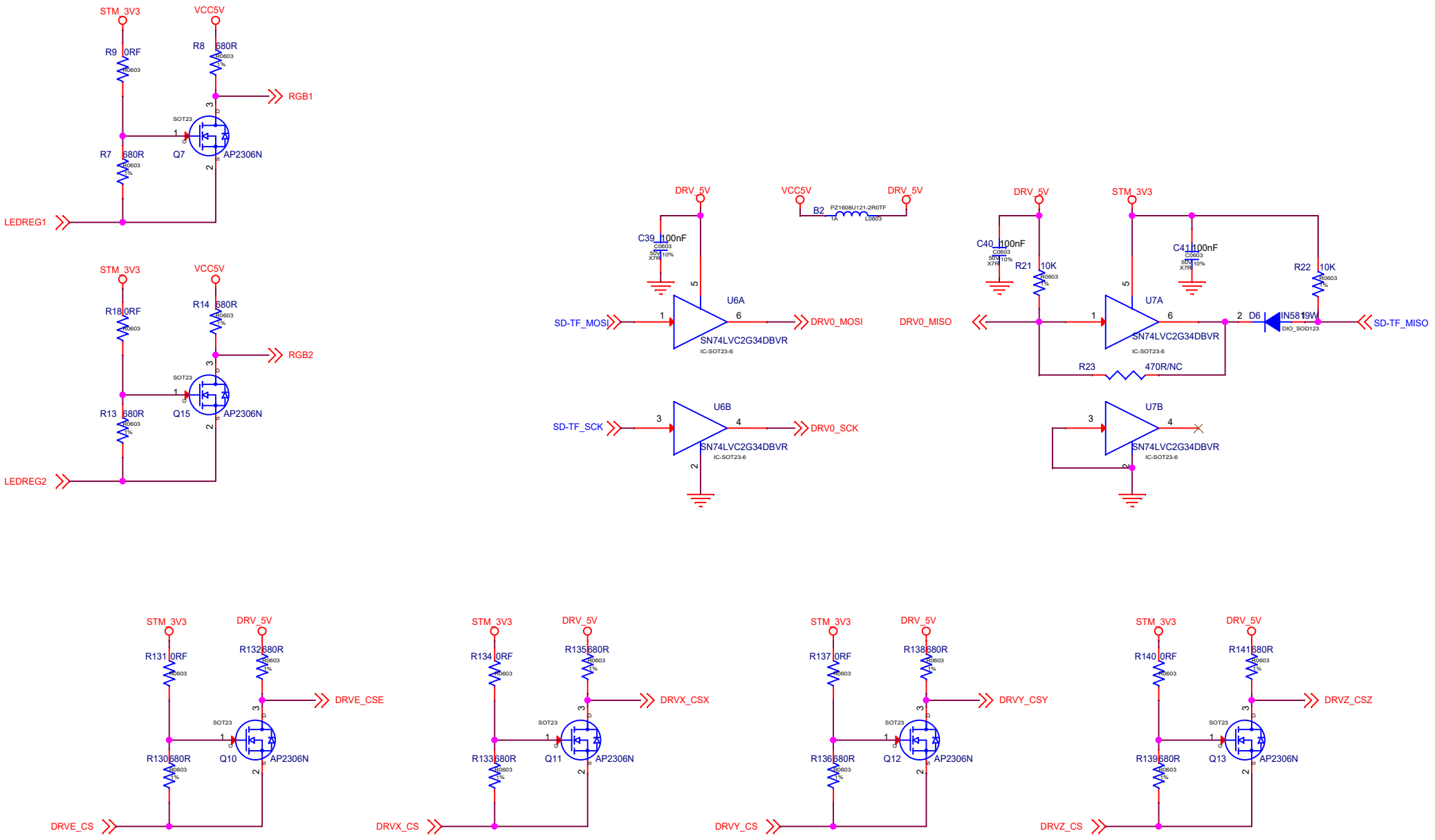
Title	BIGTREETECH_Manta_M4P_V2.1	Design: Bron Bai
Size: B	Document Number: 04_Revision History	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 4 of 24	



Shenzhen Biqu Technology Co., Ltd.			
Title	BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 05_DCDC_5V-10A		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 5 of 24	

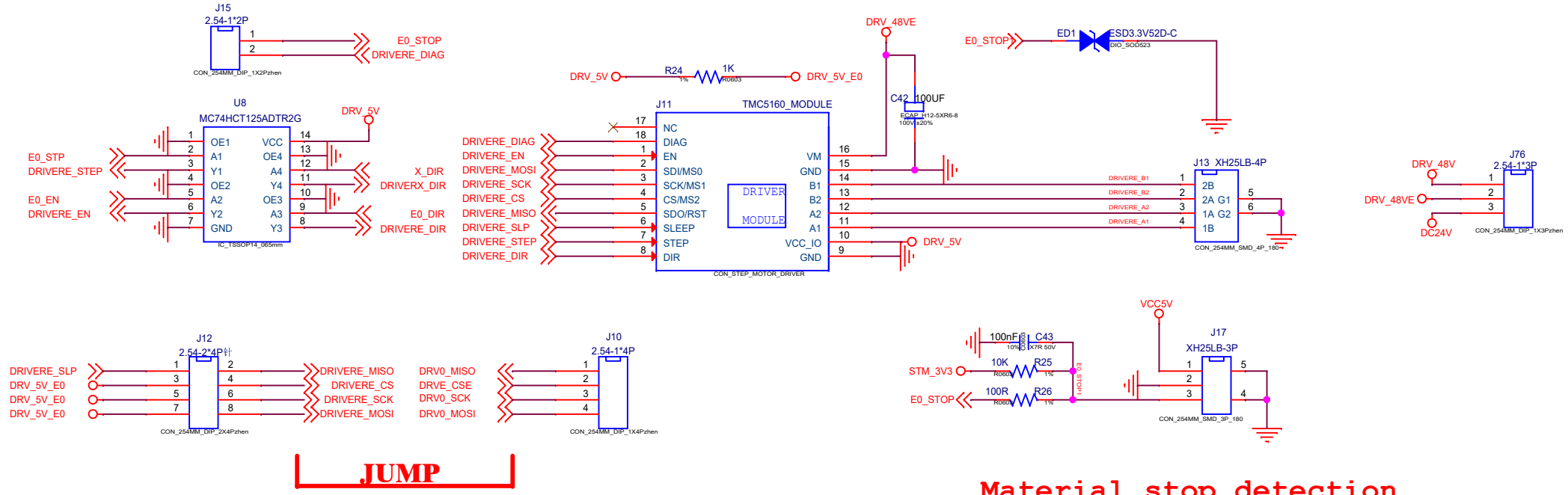


Shenzhen Biqu Technology Co., Ltd.	
Title	BIGTREETECH_Manta_M4P_V2.1
Design	Bron Bai
Size	A4
Document Number	06_MCU_STM32G0B1
Rev	V2.1
Date:	Thursday, July 07, 2022
Sheet	6 of 24

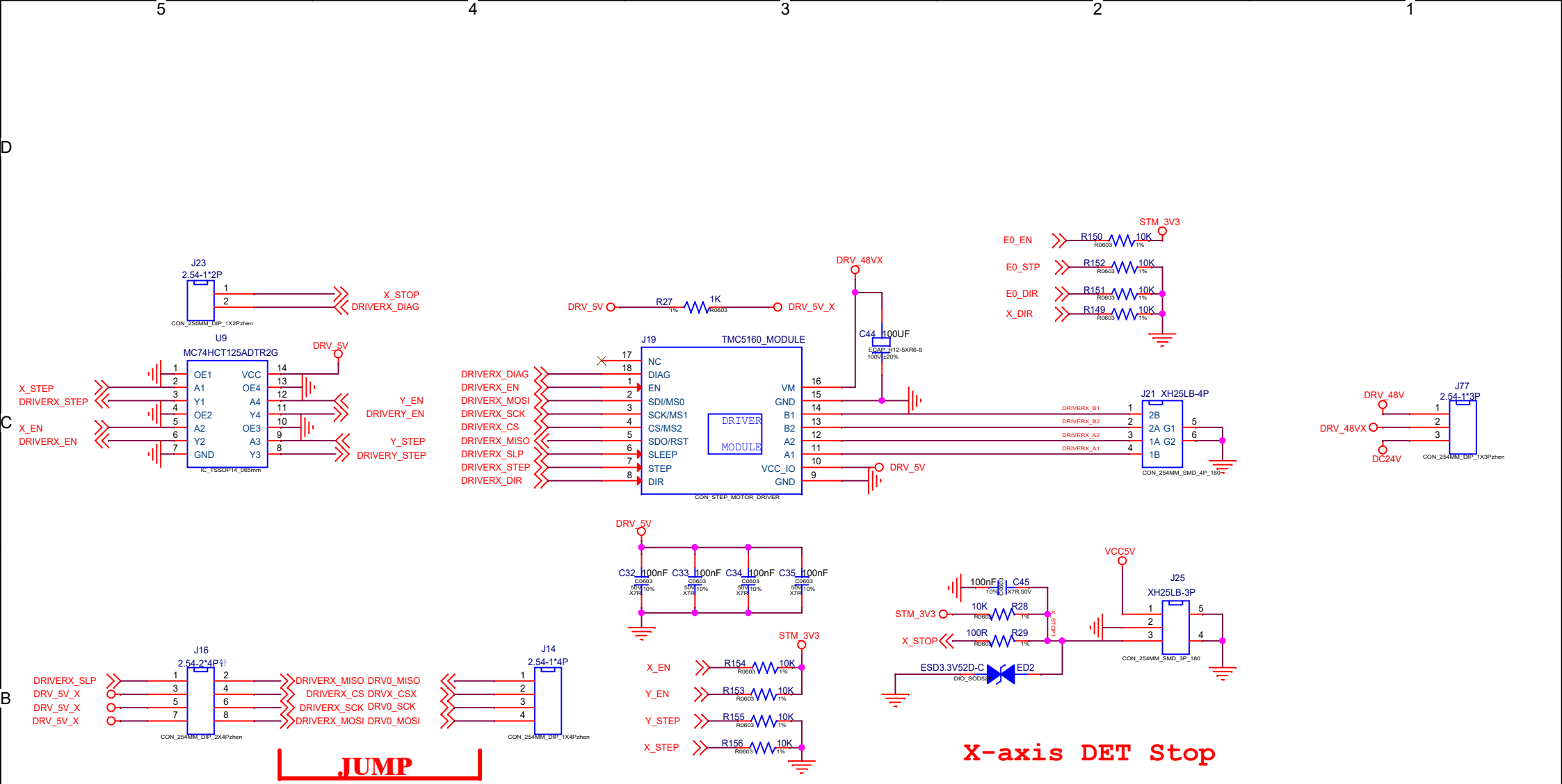


TMC5160 SPI IO level

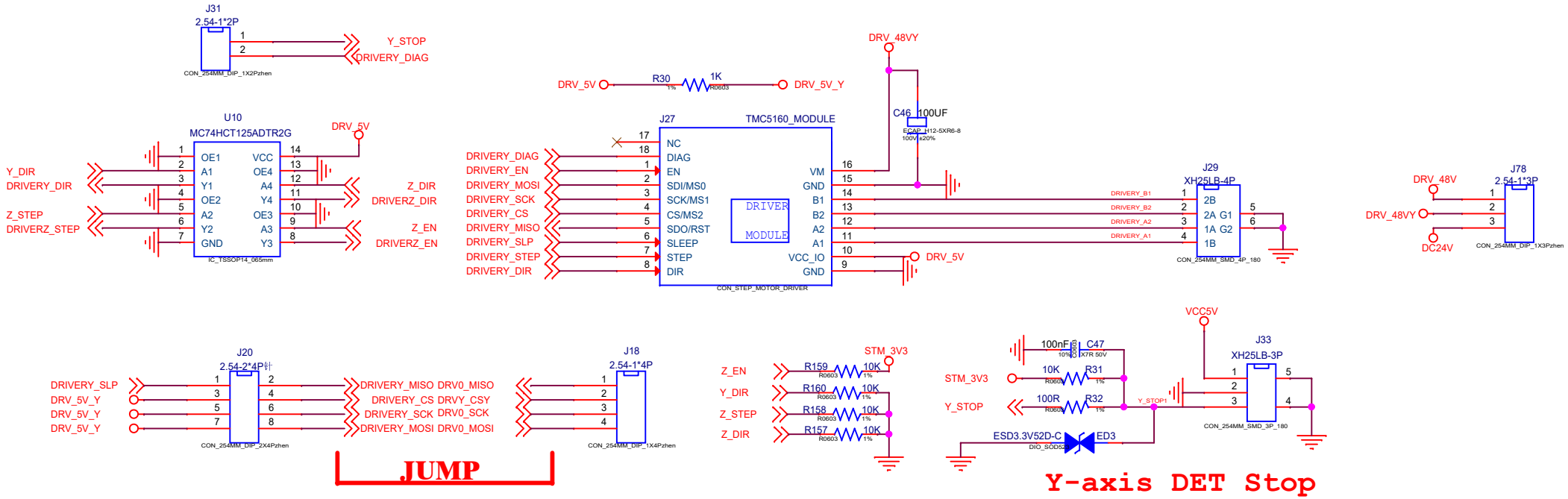
Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 07_DRIVER_SPI_LEVEL		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 7 of 24	



Shenzhen Biqu Technology Co., Ltd.			
Title	BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 08_STM32_MOTOR_DRIVER-E		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 8 of 24	

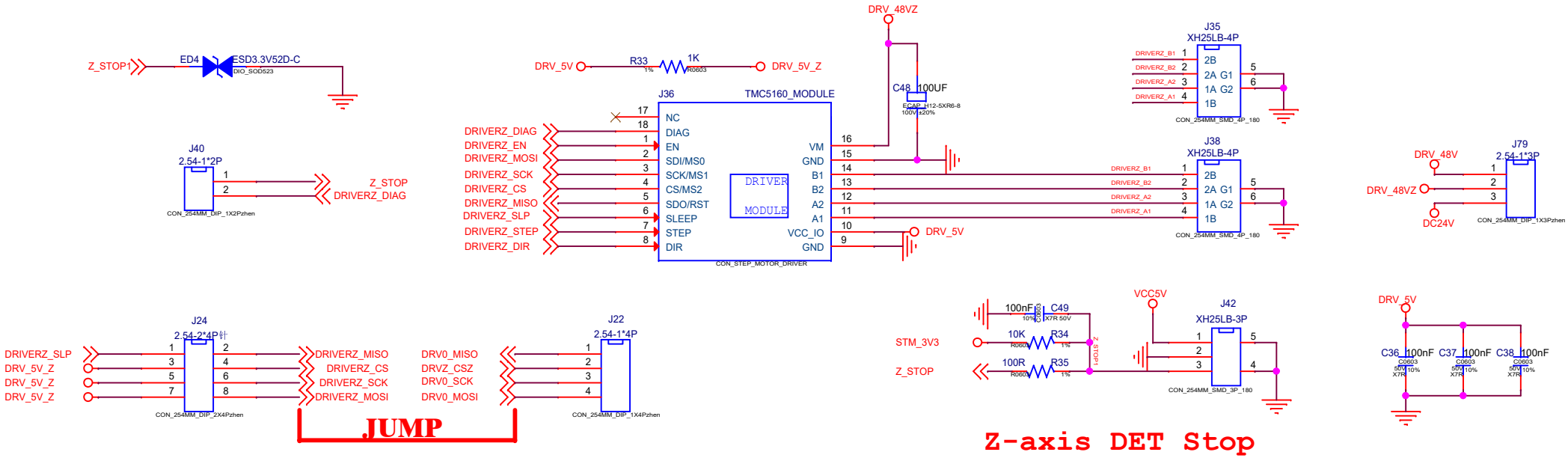


Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 09_STM32_MOTOR_DRIVER-X	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 9 of 24	



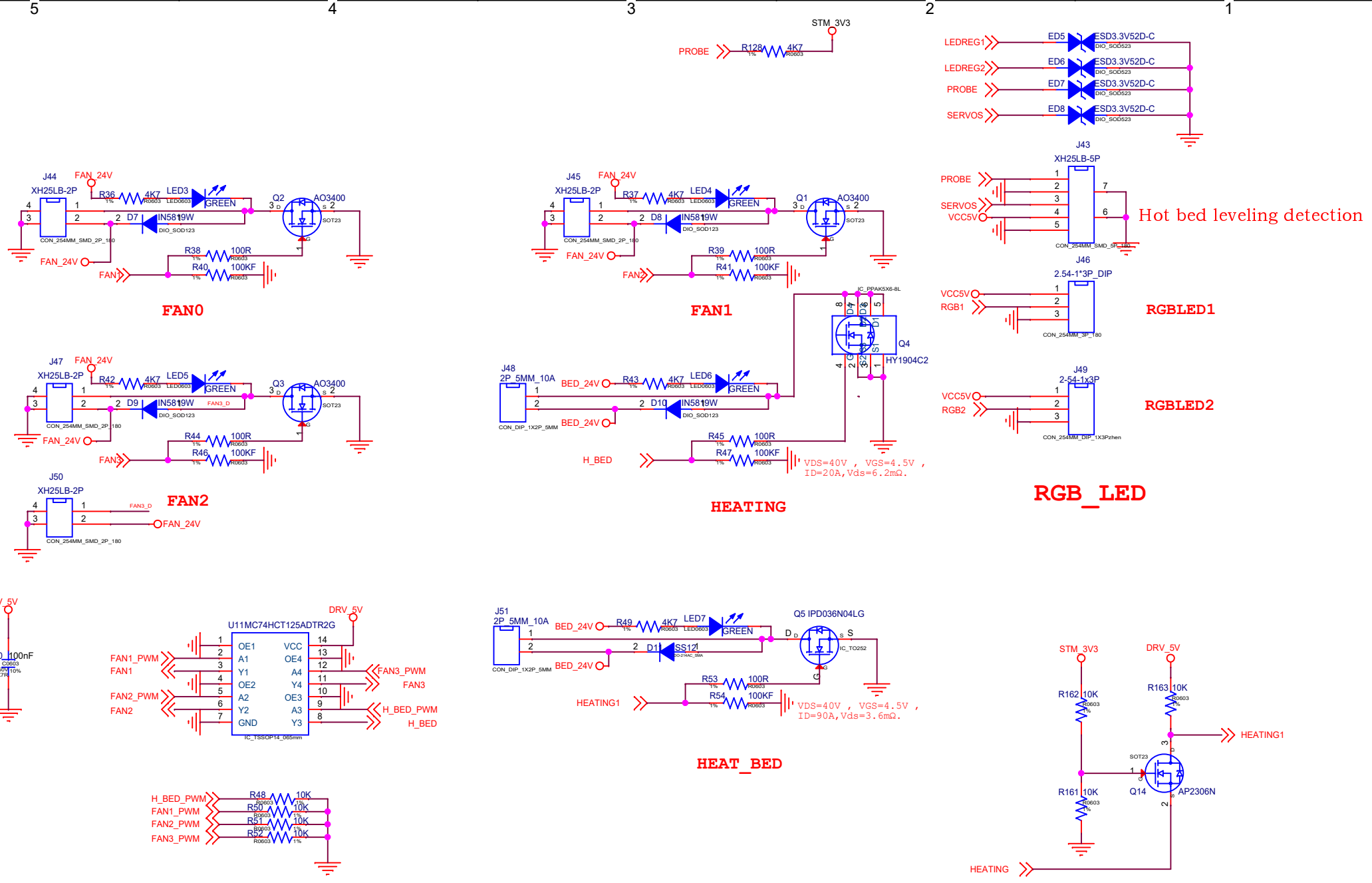
Y-DRIVE

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 10_STM32_MOTOR_DRIVER-Y		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 10 of 24	

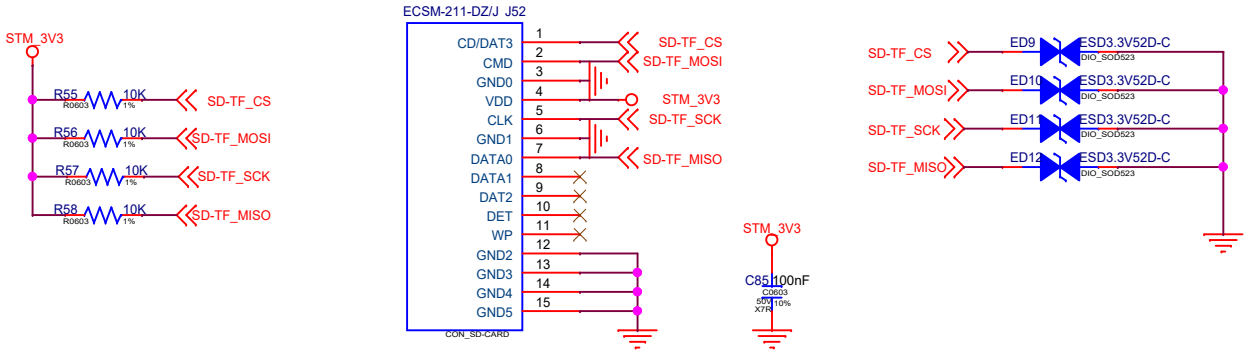


Z-DRIVE

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 11_STM32_MOTOR_DRIVER-Z		Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 11 of 24		



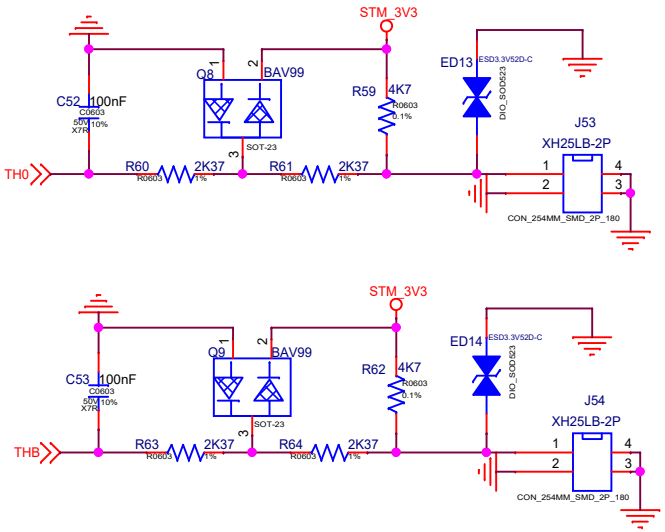
Shenzhen Biqu Technology Co., Ltd.	
Title: BIGTREETECH_Manta_M4P_V2.1	Design: Bron Bai
Size: A4	Document Number: 12_STM32_FAN&RGBLED_CNTR
Date: Thursday, July 07, 2022	Sheet 12 of 24
	Rev: V2.1



Description: Onboard SD card, drive SPI, expand SPI share G0B1 SPI1 (PA4, PA5, PA6, PA7)

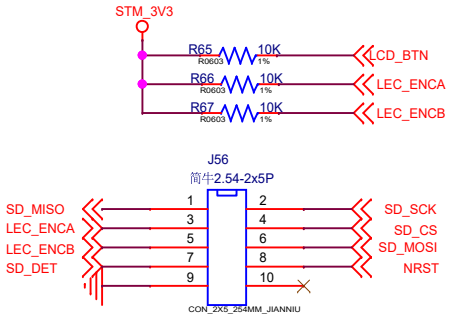
SD_Card

Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 13_STM32_SD_Card	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 13 of 24	



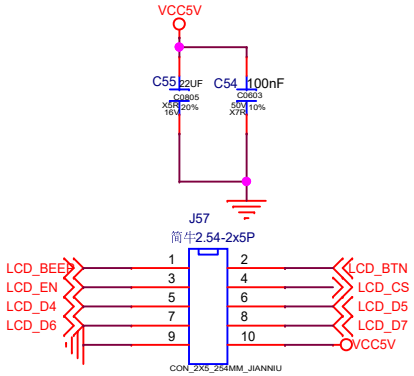
Thermistor

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 14_STM32_Thermistor		Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 14 of 24		



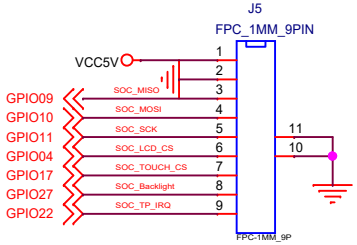
MCU_DISP_EXP2

SPI in EXP-2 uses G0B1 SPI2 (PB13, PB14, PB15, PA8)

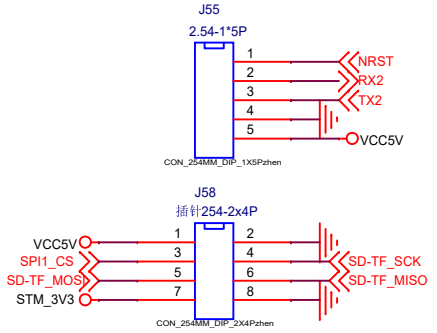


MCU_DISP_EXP1

Description: Onboard SD card, drive SPI, expand SPI share G0B1 SPI1 (PA5, PA6, PA7)



Soc_DIS

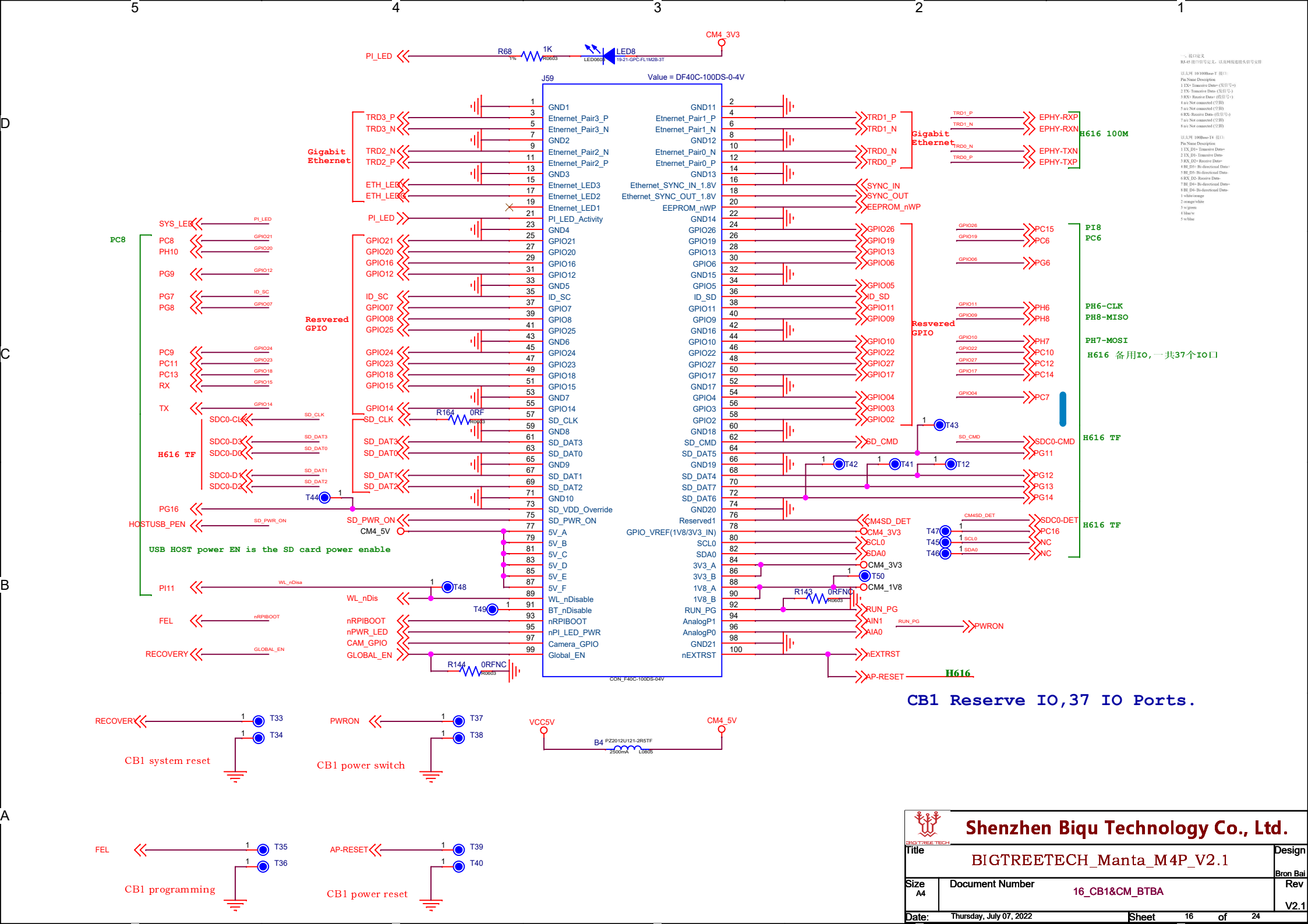


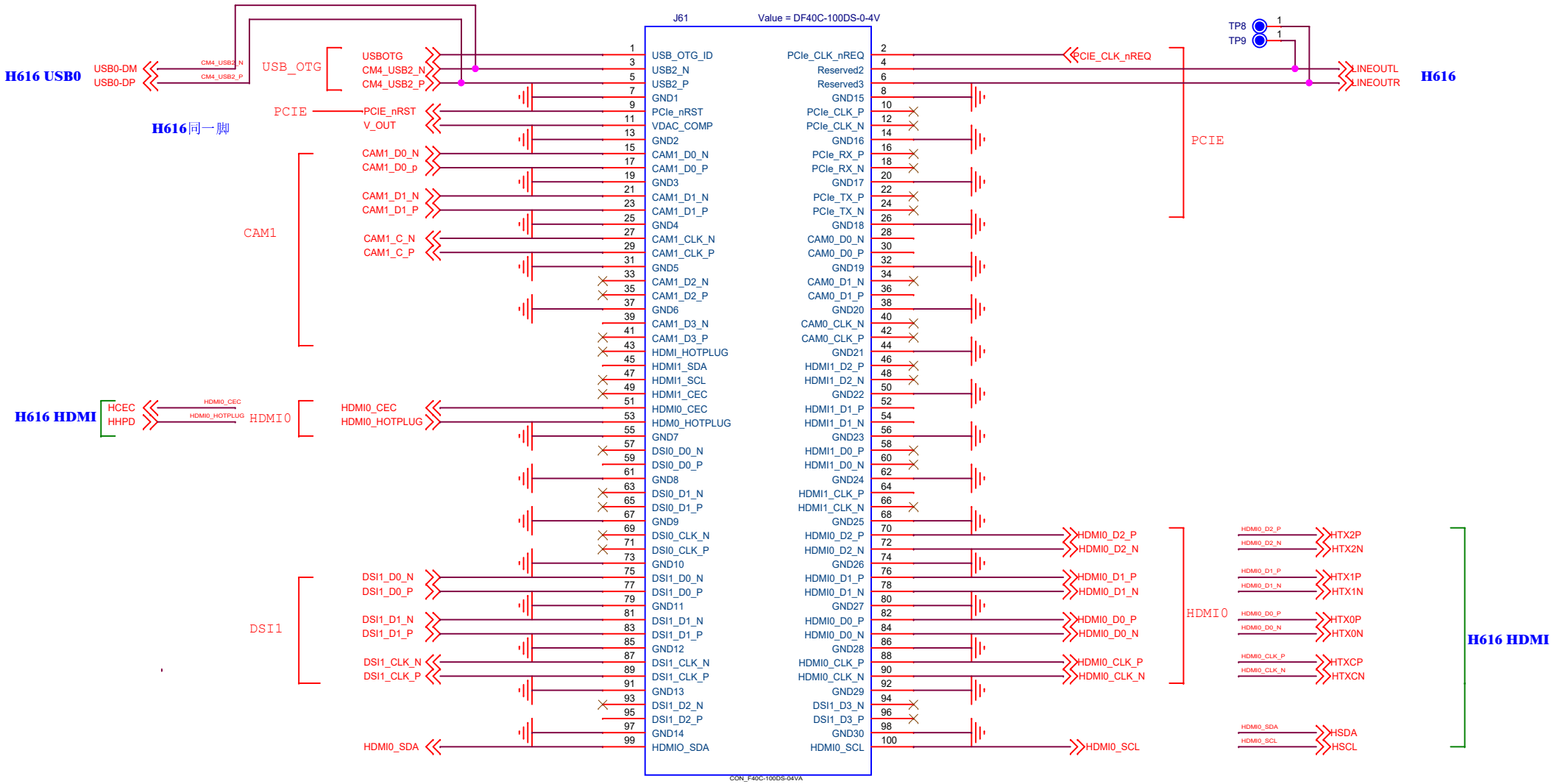
MCU_DISP_SPI1_EXP3

Description: onboard SD card, driver SPI, Expand SPI to share G0B1 SPI1 (PA5\PA6\PA7/PD9)

Display

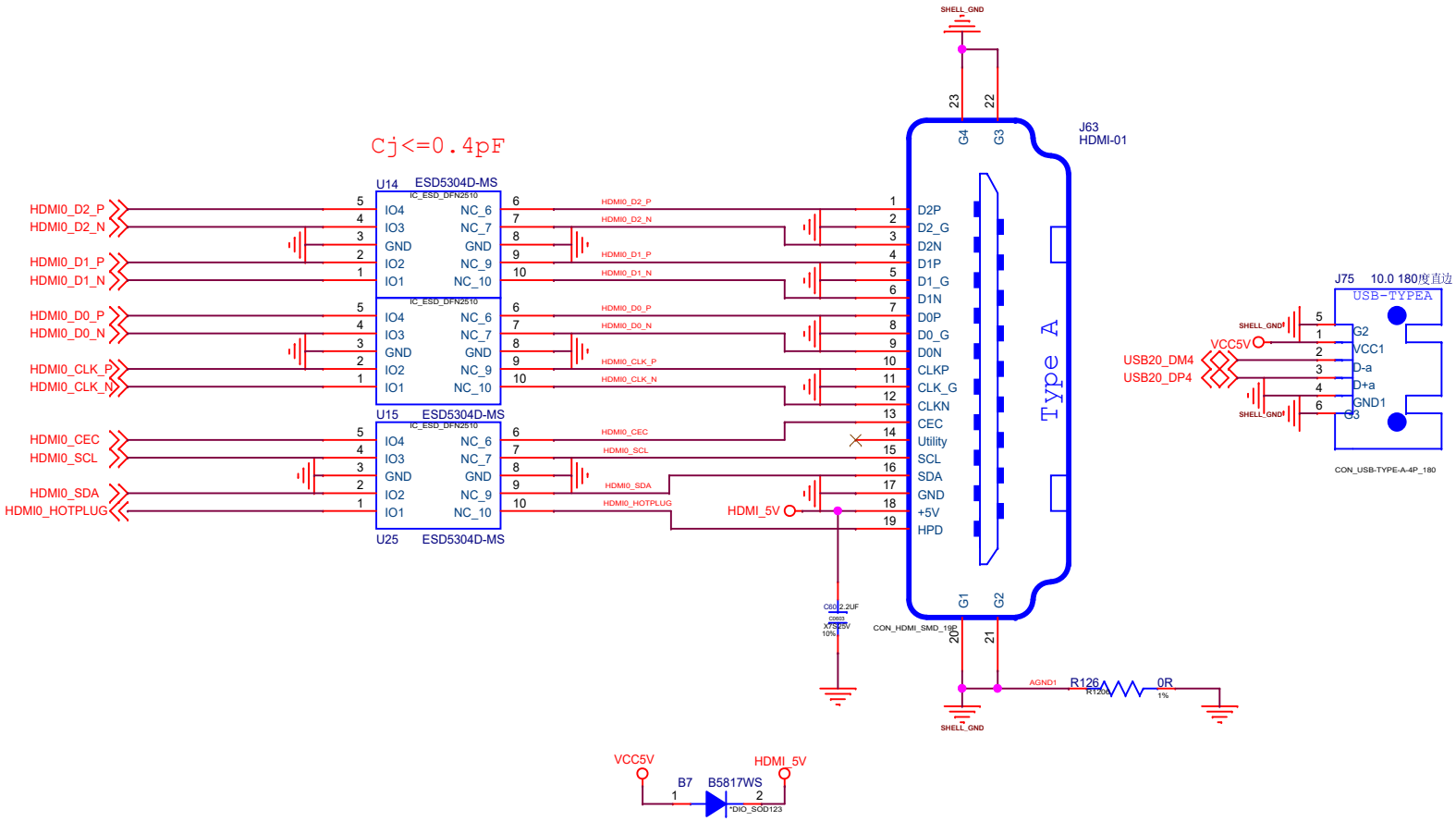
Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 15_STM32_SPI-DSP	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 15 of 24	


J59
Value = DF40C-100DS-0-4V
CON_F40C-100DS-04V
Gigabit Ethernet
Resvered GPIO
H616 TF
H616 100M
PC8
USB HOST power EN is the SD card power enable
CB1 Reserve IO,37 IO Ports.
H616 备用IO,一共37个IO口
PI8
PC6
PH6-CLK
PH8-MISO
PH7-MOSI
CB1 system reset
CB1 power switch
CB1 programming
CB1 power reset
Shenzhen Biqu Technology Co., Ltd.
BIGTREETECH_Manta_M4P_V2.1
Bron Bai
16_CB1&CM_BTBA
V2.1
Thursday, July 07, 2022
Sheet 16 of 24



CB1 core board and CM4 core board are common.

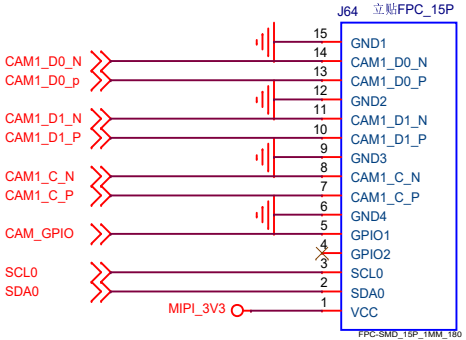
Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 17_CB1&CM_BTBB	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 17 of 24	

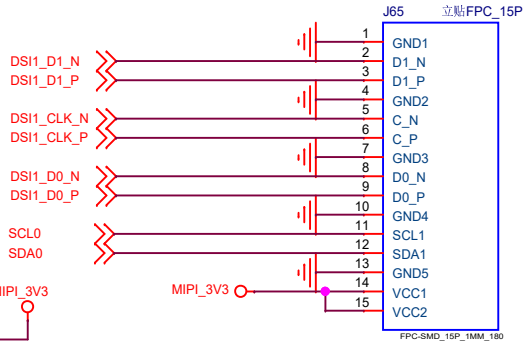


CB1 core board and CM4 core board are common.

HDMI

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 18_CB1&CM_HDMI		Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 18 of 24		

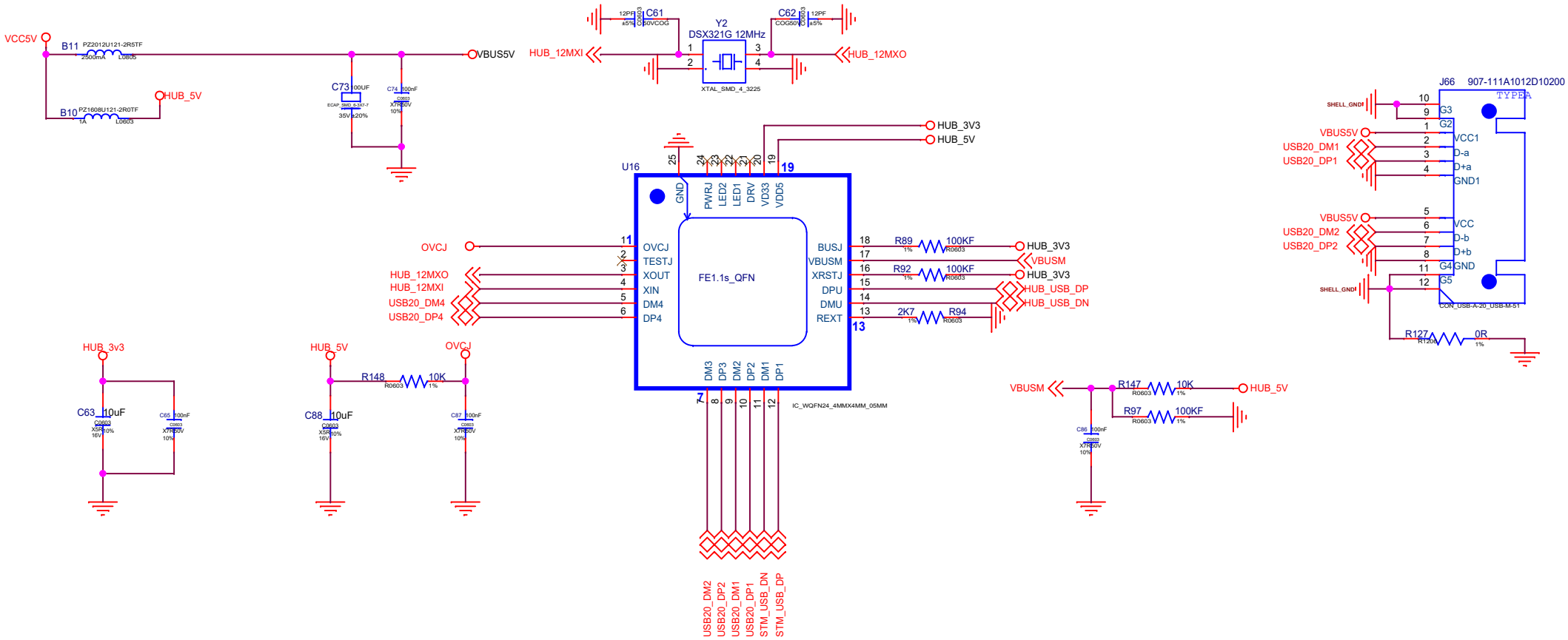




CAM1

DSI0

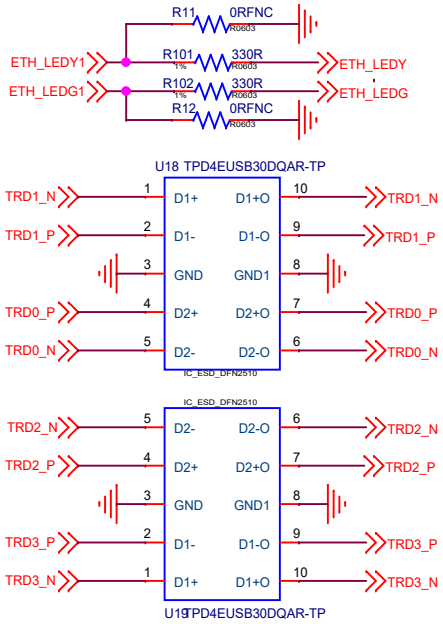
Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 19_CM4_DSI1_CAM1	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 19 of 24	



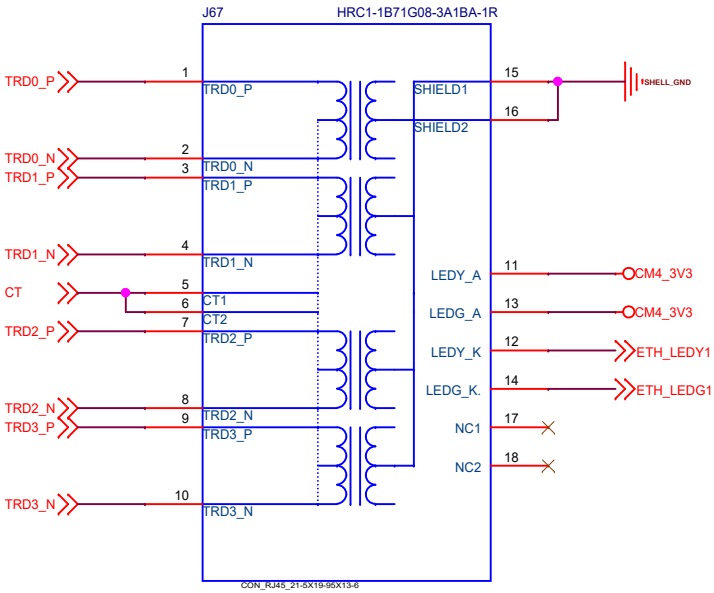
USB2.0 HUB

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 20_CB1&CM_2.0HUB		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 20 of 24	

CB1 core board and CM4 core board are common.

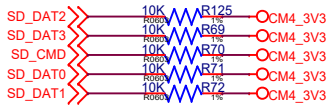


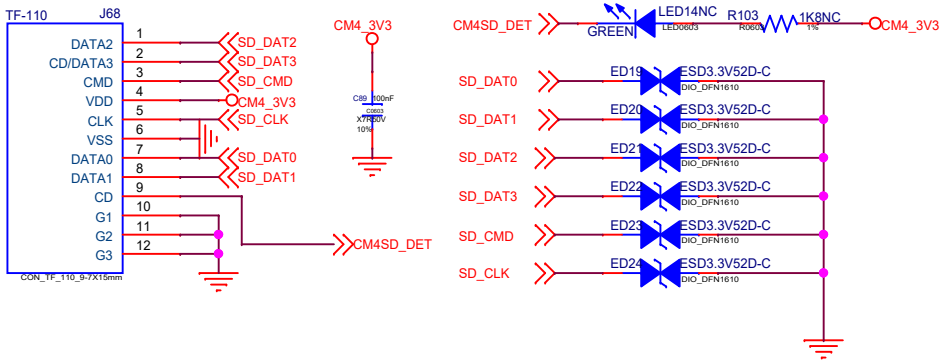
ETHERNET ESD



RJ45-100M&1000M

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 21_CB1&CM_ETHERNET		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 21 of 24	

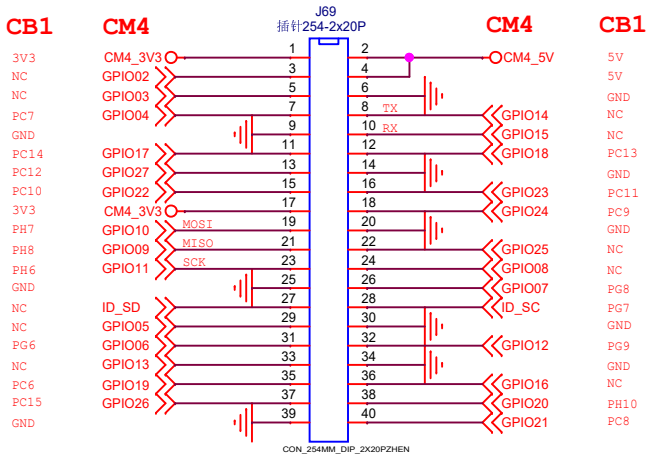




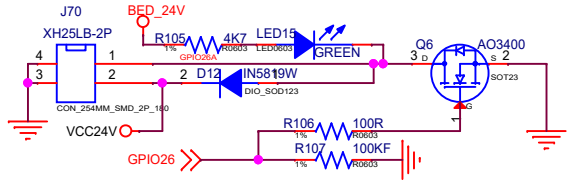
CB1 core board and CM4 core board are common.

CB1&CM4 SD_TF_CARD

Shenzhen Biqu Technology Co., Ltd.		
Title: BIGTREETECH_Manta_M4P_V2.1		Design: Bron Bai
Size: A4	Document Number: 22_CB1&CM_TF_CARD	Rev: V2.1
Date: Thursday, July 07, 2022	Sheet 22 of 24	

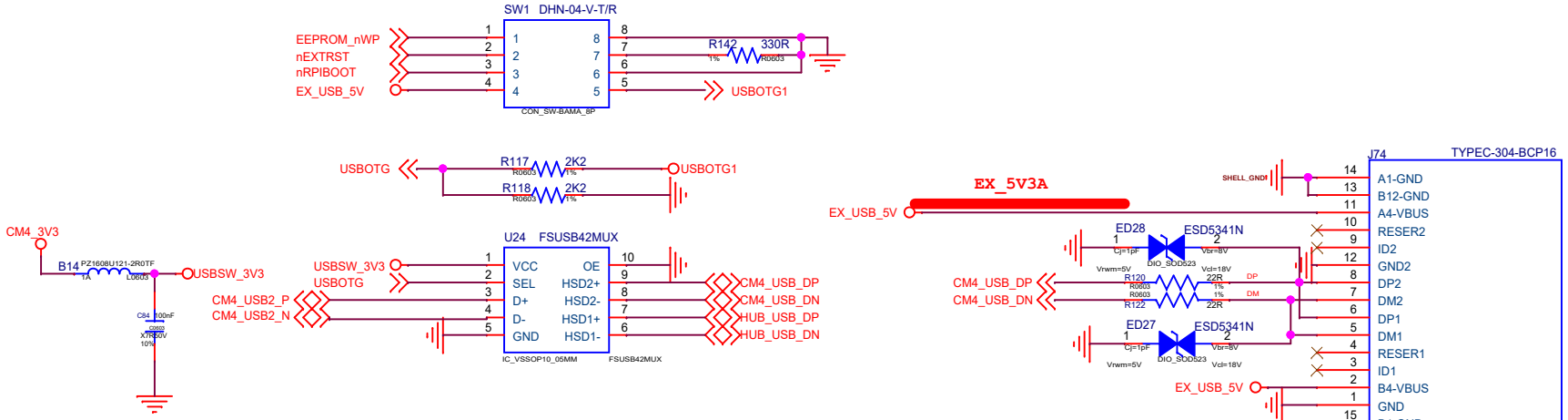


CB1&M4P reserved IO



CM4&CB1 FAN

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 23_CB1&CM_RESE_IO&CM4-FAN		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 23 of 24	



Sel	OE	Function
X	HIGH	Disconnect
LOW	LOW	D+, D- communicate with HSD1+, HSD1-, the core board communicates with the HUB;
HIGH	LOW	D+, D- communicate with HSD2+, HSD2-, the core board communicates with PC.

USB2.0 OTG

Shenzhen Biqu Technology Co., Ltd.			
Title: BIGTREETECH_Manta_M4P_V2.1			Design: Bron Bai
Size: A4	Document Number: 24_CB1&CM_USB-OTG		Rev: V2.1
Date: Thursday, July 07, 2022		Sheet 24 of 24	