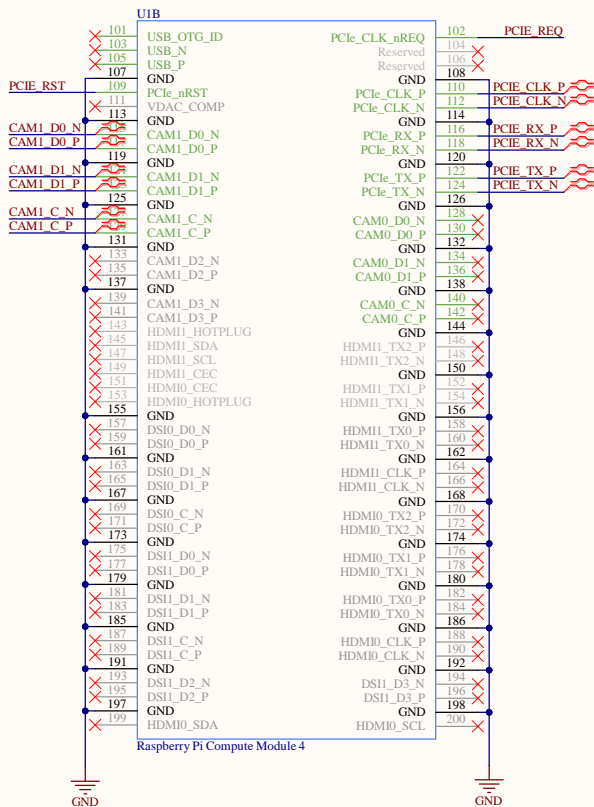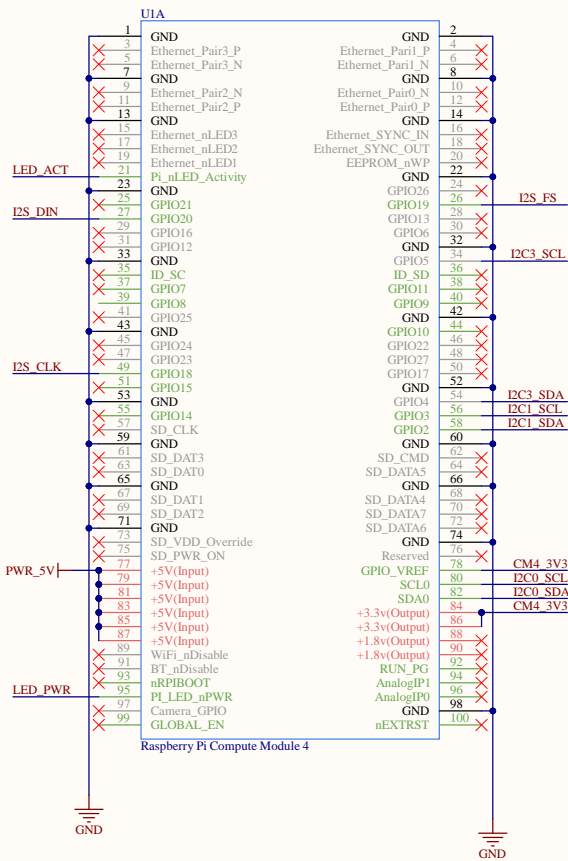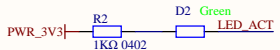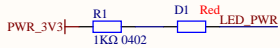Interface：

1. I2C1 & I2C3 - For Sensors
2. I2C0 & CAM1 - For MX219 Camera
3. I2S - For Microphone
4. LED_ACT & LED_PWR - CM4 Power Light

PWR_3V3 — R1 1KΩ 0402 — D1 Red — LED_PWR

PWR_3V3 — R2 1KΩ 0402 — D2 Green — LED_ACT

U1A — Raspberry Pi Compute Module 4

Pin	Signal	Signal	Pin
1	GND	GND	2
3	Ethernet_Pair3_P	Ethernet_Pari1_P	4
5	Ethernet_Pair3_N	Ethernet_Pari1_N	6
7	GND	GND	8
9	Ethernet_Pair2_N	Ethernet_Pair1_N	10
11	Ethernet_Pair2_P	Ethernet_Pair0_P	12
13	GND	GND	14
15	Ethernet_nLED3	Ethernet_SYNC_IN	16
17	Ethernet_nLED2	Ethernet_SYNC_OUT	18
19	Ethernet_nLED1	EEPROM_nWP	20
21	Pi_nLED_Activity	GND	22
23	GND	GPIO26	24
25	GPIO21	GPIO19	26
27	GPIO20	GPIO13	28
29	GPIO16	GPIO6	30
31	GPIO12	GND	32
33	GND	GPIO5	34
35	ID_SC	ID_SD	36
37	GPIO7	GPIO11	38
39	GPIO8	GPIO9	40
41	GPIO25	GND	42
43	GND	GPIO10	44
45	GPIO24	GPIO22	46
47	GPIO23	GPIO27	48
49	GPIO18	GPIO17	50
51	GPIO15	GND	52
53	GND	GPIO4	54
55	GPIO14	GPIO3	56
57	SD_CLK	GPIO2	58
59	GND	GND	60
61	SD_DAT3	SD_CMD	62
63	SD_DAT0	SD_DATA5	64
65	GND	GND	66
67	SD_DAT1	SD_DATA4	68
69	SD_DAT2	SD_DATA7	70
71	GND	SD_DATA6	72
73	SD_VDD_Override	GND	74
75	SD_PWR_ON	Reserved	76
77	+5V(Input)	GPIO_VREF	78
79	+5V(Input)	SCL0	80
81	+5V(Input)	SDA0	82
83	+5V(Input)	+3.3v(Output)	84
85	+5V(Input)	+3.3v(Output)	86
87	+5V(Input)	+1.8v(Output)	88
89	+5V(Input)	+1.8v(Output)	90
91	WiFi_nDisable	RUN_PG	92
93	BT_nDisable	AnalogIP1	94
95	nRPIBOOT	AnalogIP0	96
97	PI_LED_nPWR	GND	98
99	GLOBAL_EN	nEXTRST	100

LED_ACT, I2S_DIN, I2S_CLK, PWR_5V, LED_PWR
I2S_FS, I2C3_SCL, I2C3_SDA, I2C1_SCL, I2C1_SDA, CM4_3V3, I2C0_SCL, I2C0_SDA, CM4_3V3

GND

U1B — Raspberry Pi Compute Module 4

Pin	Signal	Signal	Pin
101	USB_OTG_ID	PCIe_CLK_nREQ	102
103	USB_N	Reserved	104
105	USB_P	Reserved	106
107	GND	GND	108
109	PCIe_nRST	PCIe_CLK_P	110
111	VDAC_COMP	PCIe_CLK_N	112
113	GND	GND	114
115	CAM1_D0_N	PCIe_RX_P	116
117	CAM1_D0_P	PCIe_RX_N	118
119	GND	GND	120
121	CAM1_D1_N	PCIe_TX_P	122
123	CAM1_D1_P	PCIe_TX_N	124
125	GND	GND	126
127	CAM1_C_N	CAM0_D0_N	128
129	CAM1_C_P	CAM0_D0_P	130
131	GND	GND	132
133	CAM1_D2_N	CAM0_D1_N	134
135	CAM1_D2_P	CAM0_D1_P	136
137	GND	GND	138
139	CAM1_D3_N	CAM0_C_N	140
141	CAM1_D3_P	CAM0_C_P	142
143	HDMI1_HOTPLUG	GND	144
145	HDMI1_SDA	HDMI1_TX2_P	146
147	HDMI1_SCL	HDMI1_TX2_N	148
149	HDMI1_CEC	GND	150
151	HDMI0_CEC	HDMI1_TX1_P	152
153	HDMI0_HOTPLUG	HDMI1_TX1_N	154
155	GND	GND	156
157	DSI0_D0_N	HDMI1_TX0_P	158
159	DSI0_D0_P	HDMI1_TX0_N	160
161	GND	GND	162
163	DSI0_D1_N	HDMI1_CLK_P	164
165	DSI0_D1_P	HDMI1_CLK_N	166
167	GND	GND	168
169	DSI0_C_N	HDMI0_TX2_P	170
171	DSI0_C_P	HDMI0_TX2_N	172
173	GND	GND	174
175	DSI1_D0_N	HDMI0_TX1_P	176
177	DSI1_D0_P	HDMI0_TX1_N	178
179	GND	GND	180
181	DSI1_D1_N	HDMI0_TX0_P	182
183	DSI1_D1_P	HDMI0_TX0_N	184
185	GND	GND	186
187	DSI1_C_N	HDMI0_CLK_P	188
189	DSI1_C_P	HDMI0_CLK_N	190
191	GND	GND	192
193	DSI1_D2_N	DSI1_D3_N	194
195	DSI1_D2_P	DSI1_D3_P	196
197	GND	GND	198
199	HDMI0_SDA	HDMI0_SCL	200

PCIE_RST, CAM1_D0_N, CAM1_D0_P, CAM1_D1_N, CAM1_D1_P, CAM1_C_N, CAM1_C_P
PCIE_REQ, PCIE_CLK_P, PCIE_CLK_N, PCIE_RX_P, PCIE_RX_N, PCIE_TX_P, PCIE_TX_N
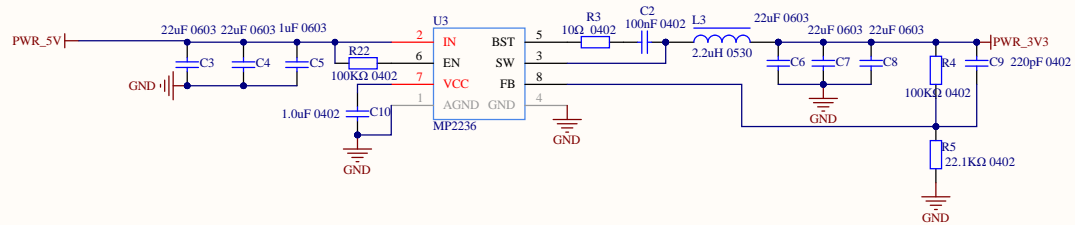
GND   GND

Function: USB 5V 3A Supply

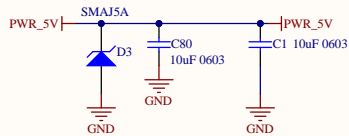**Description**: 5V Supply, need to connect the cc to 5.1K and to GND。

Function: 5V to 3V3, Maximum current output 6A.

Description: Output Voltage depents on R4 adn R5.
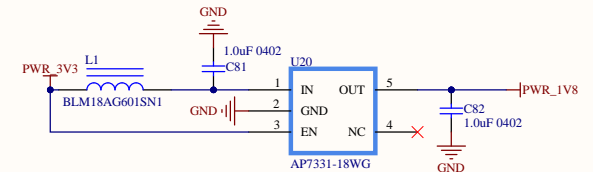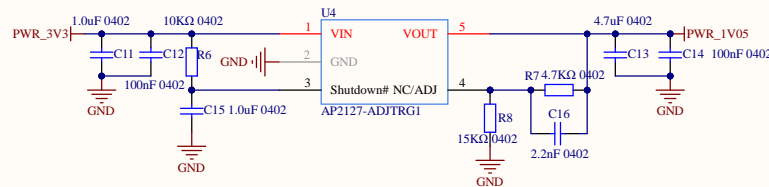$Vout = 0.6 * (R4/R5 + 1)$
$Vout = 3.3V, R4/R5 = 100/22.1$

Function: Voltage stabilization
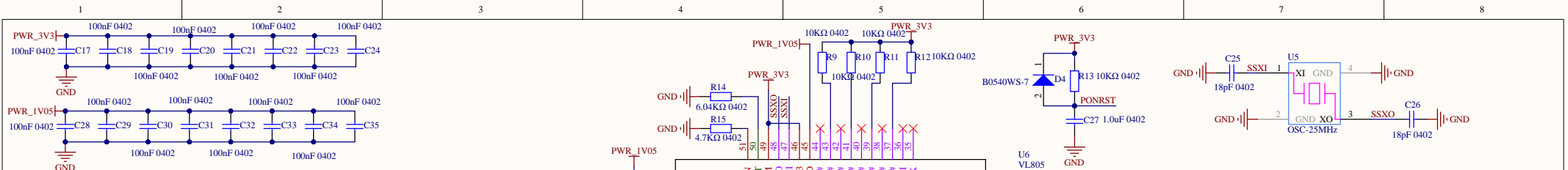**Description**:

Function: 3V3 to 1V05, for VL805.

Description: Output Voltage depents on R7 adn R8.
$Vout = 0.8 * (R7/R8 + 1)$
$Vout = 1.05V, R7/R8 = 4.7K/15K$

Function: 3V3 to1V8, for Coral。

Description:

U2
GND
GND 0
GND A1/B12 GND
VBUS A4/B9 PWR_5V
SBU2 B8
CC1 A5 R26 GND
DN2 B7 5.1KΩ
DP1 A6
DN1 A7
DP2 B6
SBU1 A8
CC2 B5 R28 GND
VBUS B4/A9 5.1KΩ PWR_5V
GND B1/A12
Type-C
GND

PWR_5V
22uF 0603 22uF 0603 1uF 0603
C3 C4 C5
GND
R22
100KΩ 0402
1.0uF 0402 C10
GND

U3
2 IN BST 5
6 EN SW 3
7 VCC FB 8
1 AGND GND 4
MP2236
GND

R3 C2 L3
10Ω 0402 100nF 0402 2.2uH 0530
22uF 0603
22uF 0603 22uF 0603
C6 C7 C8 R4 C9 220pF 0402 PWR_3V3
GND 100KΩ 0402
R5
22.1KΩ 0402
GND

SMAJ5A
PWR_5V PWR_5V
D3 C80 C1 10uF 0603
10uF 0603
GND GND

PWR_3V3
1.0uF 0402 10KΩ 0402
C11 C12 R6 GND
100nF 0402
GND C15 1.0uF 0402

U4
1 VIN VOUT 5
2 GND
3 Shutdown# NC/ADJ 4
AP2127-ADJTRG1
R7 4.7KΩ 0402
R8
15KΩ 0402
C16
2.2nF 0402
GND

4.7uF 0402
C13 C14 100nF 0402 PWR_1V05
GND

PWR_3V3
L1 GND
BLM18AG601SN1 1.0uF 0402 C81
GND

U20
1 IN OUT 5
2 GND
3 EN NC 4
AP7331-18WG
C82
1.0uF 0402
GND
PWR_1V8

Title
Size A3
Number
Revision
Date: 10/09/2022
File: C:\Users\..\M2_Power.SchDoc
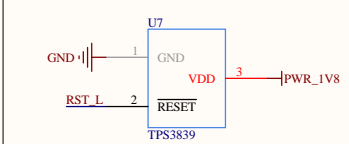Sheet of
Drawn By:

Function：PCIE转USB3.0
Description：
1.PCIE(VL805) <-> PCIE(CM4), Cross-connected. 90 Ohm impedance, no length matching between differential pairs, error within differential pairs at 0.1mm. CM4 has AC coupling capacitors inside TX and CLK, so external coupling capacitors need to be added at the RX side, near the source (PCIE TX side of VL805).

2.No need for additional EEPROM, because CM4 can initialize it.

3. Can be converted to 4 channels, but only the 2nd channel is used (CM4's firmware enables the 1st and 2nd USB3.0 channels by default).
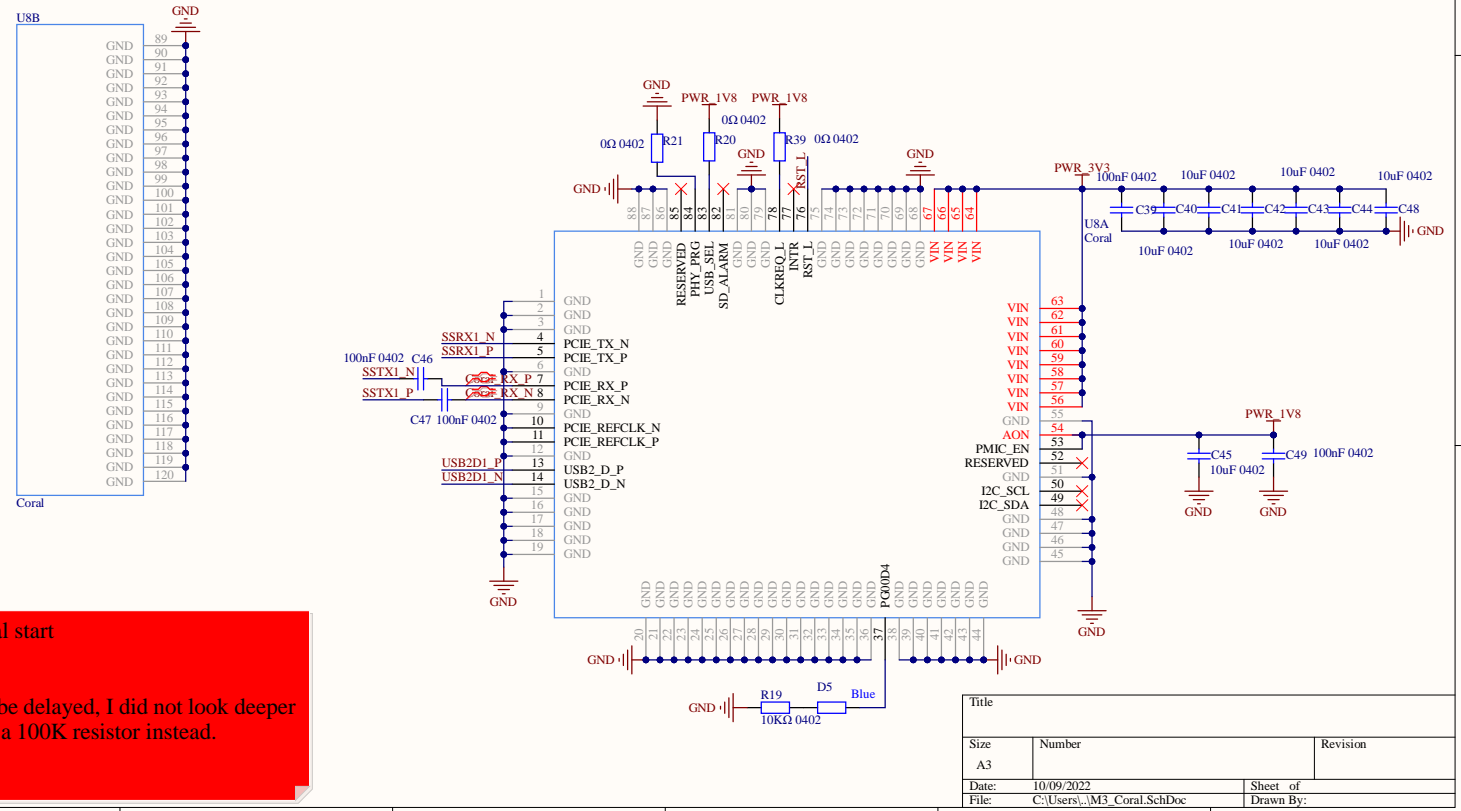
Function：Coral TPU
Description：
1.USB3.0 & USB2.0 <-> Coral。
2.Coral has a 0.1uF DC capacitor inside TX. So it is only necessary to add an external coupling capacitor to RX, near the source (which is the USB3.0 TX side of the VL805).
3.Coral's internal RX_N is 6 mil short, so it needs to be compensated externally.
4.UPositive and negative within the differential pair of USB 3.0 can be cross-connected.

Table 7. Pins that must have matching pair lengths, and their internal trace lengths.

Pair	Pin name	Trace length (mils)	Time delay (ps)
PCIe clock	PCIE_REFCLK_P	149.6	26.4
	PCIE_REFCLK_N	158.5	28.0
PCIe TX	PCIE_TX_P	104.0	16.6
	PCIE_TX_N	104.0	16.6
PCIe RX	PCIE_RX_P	125.0	19.9
	PCIE_RX_N	119.0	19.0
USB2 data	USB2_D_P	87.0	13.9
	USB2_D_N	87.0	13.9

Function：RST Signal for Coral start
Description：

After my test TPS3839 can not be delayed, I did not look deeper into its cause. Here you can use a 100K resistor instead.

Attention!!!!

Title

Size	Number		Revision
A3			
Date:	10/09/2022	Sheet of	
File:	C:\Users\..\M3_Coral.SchDoc	Drawn By:	

MIC

PWR_3V3 10uF 0402 C54 C55 100nF 0402 GND

U11 INMP441
GND
4 L/R GND 5
3 WS GND 6
I2S_FS
2 SD VDD 7 PWR_3V3
I2S_DIN
1 SCK CHIPEN 8
I2S_CLK
GND GND 9
R27 100KΩ 0402

FROM VOLTAGE REGULATOR (1.8V TO 3.3V)
SYSTEM MASTER (DSP, MICROCONTROLLER, CODEC)
SCK WS SD
0.1µF 0.1µF
VDD VDD
CHIPEN CHIPEN
SCK SCK
WS WS
SD SD
LEFT INMP441 RIGHT INMP441
L/R L/R
100kΩ
GND GND GND GND GND GND

ADC

PWR_3V3 C50 C51 100nF 0402 10uF 0402 GND

U10 ADS1015IDGST
1 ADDR SCL 10 R23 1.5KΩ 0402 I2C3_SCL PWR_3V3
2 ALERT SDA 9 R25 1.5KΩ 0402 I2C3_SDA PWR_3V3
3 GND VDD 8 PWR_3V3
EMI 4 AIN0 AIN3 7
PIR 5 AIN1 AIN2 6
GND

EMI

PWR_3V3 10uF 0402 U9 2 EMI R24 100KΩ 0402 GND
C52 C53 100nF 0402 GND 100mH-8x10 1

PIR

PWR_3V3 10uF 0402 C56 C57 100nF 0402 GND

U12 AMN21111
VCC 1 PWR_3V3
AOUT 2 PIR
GND 3 GND

MPU

PWR_3V3 C58 C59 100nF 0402 10uF 0402 GND

GND PWR_3V3
U13 MPU9250
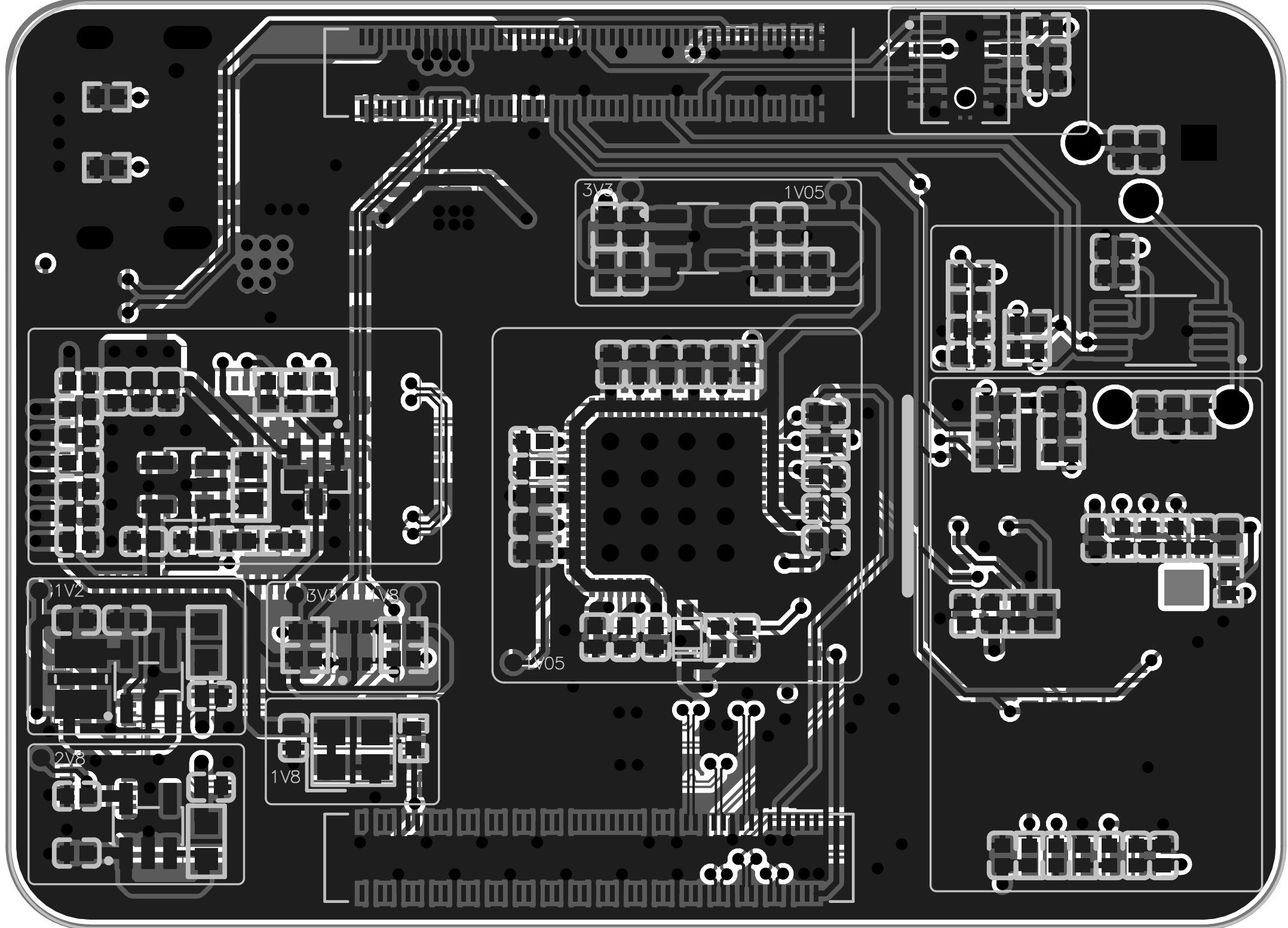18 GND 17 16 15 14 13 VDD
19 RESV INT 12 R30 10KΩ 0402 GND
20 RESV FSYNC 11 C62 100nF 0402 GND
21 AUX_DA REGOUT 10
PWR_3V3 22 nCS AD0/SDO 9 R31 10KΩ 0402 GND
I2C1_SCL 23 SCL/SCLK VDDIO 8 PWR_3V3
I2C1_SDA 24 SDA/SDI AUX_CL 7 C74 10nF 0402 GND
RESV NC NC NC NC NC 1 2 3 4 5 6
PWR_3V3
R29 10KΩ 0402 GND

VDD
U? MPU-9250
VDD AUX_CL
VDDIO AUX_DA
INT CS
FSYNC SCL/SCLK
REGOUT SDA/SDI
GND AD0/SDO
C2 0.1uF C1 0.1uF GND
AD0 sets LSB of address
SJ2
AD0/SDO default I2C address to leaves the ADR Connect to ADR

MPU-9250
SCL SDA (SDI)
VDDIO
NC
2.4 – 3.3VDC
C2, 0.1 µF
1.8 – 3.3VDC
C3, 10 nF C1, 0.1 µF
AD0

IR

PWR_3V3 C60 C61 100nF 0402 10uF 0402 GND

U14 AMG8833
1 NC NC 14
I2C1_SDA 2 SDA VPP 13 PWR_3V3
I2C1_SCL 3 SCL DVDD 12 C63 2.2uF 0402 GND
4 INT NC 11 C64 1.0uF 0402 GND
AD_S 5 AD_S AVDD 10 R34 20Ω 0402 GND
6 GND VDD 9 PWR_3V3
7 NC NC 8 C78 100nF 0402
R33 10KΩ 0402 PWR_3V3 GND GND

GRIDEYE VCC Range: 3.0V–3.6V
Clear solder jumper JP7 to disconnect I2C pullups
7-Bit I2C Address Jumper
Open (default) = 0x69
Closed = 0x68
GRIDEYE

Laser

PWR_3V3 C67 C68 100nF 0402 10uF 0402 GND

U15 VL53L1X
7 GPIO1 GND3 6 GND
R37 10KΩ 0402
8 DNC XSHUT 5 R38 10KΩ 0402 PWR_3V3
I2C1_SDA 9 SDA GND2 4
R40 1.5KΩ 0402
I2C1_SCL 10 SCL GND 3 GND
R41 1.5KΩ 0402
PWR_3V3 11 AVDD AVS 2
PWR_3V3 AVD 1 PWR_3V3
GND 12 GND4

3.3V
JP9 INT
3.3V
Clear J I2C Pul
I2C
3.3V 3.3V 3.3V U2 VL53L1X
R2 10k R1 10k R5 2.2k R... 2.2k
C1 4.7uF C4 0.1uF
VCC SHUT SHUT
SDA SDA
SCL SCL
GND INT INT
GND

T/H/B

PWR_3V3 C65 C66 100nF 0402 10uF 0402 GND

U16 BME280
8 VDD GND 1 GND
7 GND CSB 2 R32 10KΩ 0402 PWR_3V3
6 VDDIO SDI I2C1_SDA
SDO SCK I2C1_SCL
PWR_3V3 R36 10KΩ 0402 GND
BME280

3.3V 3.3V 3.3V 3.3V 3.3V
S?3 EN ADR PULLUP R4 4.7K
S?1 EN I2C PULL S?2 EN I2C MODE
R... 4.7K R3 4.7K
U1 BME280
VDD GND1
GND2 CS
VDDIO SDI/SDA
SDD/ADR SCK/SCL
C1 0.1uF 0.1uF GND

Color

PWR_3V3 R35 100Ω 0402 U17 ISL29125
10uF 0402 1 VDD SCL 6 I2C3_SCL
C69 C70 2 NC INT 5 R44 10KΩ 0402 PWR_3V3
100nF 0402 3 GND SDA 4 I2C3_SDA
GND GND INT

3.3V 3.3V 3.3V
R? 10k U1 ISL29125
C1 0.1uF C2 1.0uF
VDD SDA SCL
GND INT SDA
GND
I2C Address
7bits 0x44
Read: 0x89
Write: 0x88

PWR section

PWR_3V3
C71 1.0uF 0402
C72 1.0uF 0402
GND

PWR_3V3
L4 BLM18AG601SN1
GND
C75 1.0uF 0402
GND
U22
IN OUT 5
GND 2
EN NC 4
AP7331-28WG
GND
C76 1.0uF 0402
CSI_2V8

U24
1 EN VIN 4
2 GND
3 SW VOUT/FB 5
PAM2301CAAB120
GND
C77 4.7uF 0402
L5 BLM18AG601SN1
PWR_3V3
GND
C79 10uF 0402
CSI_1V2
L6 2.2uH 2520

OSC section

OSC
MCLK
R50 22Ω 0402
X1
3 OUT VDD 4
2 GND OE# 1
OSC-24MHz-2520
PWR_1V8
C83 1.0uF 0402
GND
GND

I2C section

U18
R46 2.2KΩ 0402
PWR_1V8
SDA_1V8
1 S2 D2 6
I2C0_SDA
R47 4.7KΩ 0402
PWR_3V3
PWR_1V8
2 G2 G1 5
PWR_1V8
PWR_3V3
R48 4.7KΩ 0402
I2C0_SCL
3 D1 S1 4
SCL_1V8
R49 2.2KΩ 0402
PWR_1V8
DMG1024UV

CAM1_D0_P 1 U19 2 CSI_D0_P
CAM1_D0_N 4 3 CSI_D0_N
DLP11SN900HL2L

CAM1_D1_P 1 U21 2 CSI_D1_P
CAM1_D1_N 4 3 CSI_D1_N
DLP11SN900HL2L

CAM1_C_P 1 U23 2 CSI_CLK_P
CAM1_C_N 4 3 CSI_CLK_N
DLP11SN900HL2L

J1
15 DGND1 DGND5 16
14 NC1 NC6 17
13 NC2 NC7 18
12 DGND2 DGND6 19
11 NC3 MD1N 20 CSI_D1_N
10 VA2V8 MD1P 21 CSI_D1_P
9 AGND DGND7 22
8 DGND3 MD0N 23 CSI_D0_N
7 MCLK MD0P 24 CSI_D0_P
6 DGND4 DGND8 25
5 /PWDN MCKN 26 CSI_CLK_N
4 VD1V2 MCKP 27 CSI_CLK_P
3 VO1V8 DGND9 28
2 NC4 SCL 29 SCL_1V8
1 NC5 SDA 30 SDA_1V8
DF37NC-30DS

CSI_2V8
MCLK
PWR_1V8
CSI_1V2
C73 1.0uF 0402
GND
GND
GND

Title

Size	Number		Revision
A			

Date:	10/09/2022	Sheet of
File:	C:\Users\..\M5_Camera.SchDoc	Drawn By:

Line #	Name	Description	Designator	Quantity	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	100nF 0402	贴片电容	C2, C12, C14, C17, C18, C19, C20, C21, C22, C23, C24, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C39, C46, C47, C49, C51, C53, C55, C57, C59, C61, C62, C66, C68, C70, C78	36							
	10KΩ 0402	贴片电阻	R6, R9, R10, R11, R12, R13, R16, R17, R18, R19, R29, R30, R31, R32, R33, R36, R37, R38, R44	19							
	10uF 0402	贴片电容	C38, C40, C41, C42, C43, C44, C45, C48, C50, C52, C54, C56, C58, C60, C65, C67, C69, C79	18							
	1.0uF 0402	贴片电容	C10, C11, C15, C27, C64, C71, C72, C73, C75, C76, C81, C82, C83	13							
	22uF 0603	贴片电容	C3, C4, C6, C7, C8	5							
	1.5KΩ 0402	贴片电阻	R23, R25, R40, R41	4							
	4.7KΩ 0402	贴片电阻	R7, R15, R47, R48	4							
	100KΩ 0402	贴片电阻	R4, R22, R24, R27	4							
	0Ω 0402	贴片电阻	R20, R21, R39	3							
	BLM18AG601SN1	贴片电感	L1, L4, L5	3							
	DLP11SN900HL2L	Camera	U19, U21, U23	3							
	1KΩ 0402	贴片电阻	R1, R2	2							
	2.2KΩ 0402	贴片电阻	R46, R49	2							
	4.7uF 0402	贴片电容	C13, C77	2							
	5.1KΩ	贴片电阻	R26, R28	2							
	10uF 0603	贴片电容	C1, C80	2							
	18pF 0402	贴片电容	C25, C26	2							
	1uF 0603	贴片电容	C5	1							
	2.2nF 0402	贴片电容	C16	1							
	2.2uF 0402	贴片电容	C63	1							
	2.2uH 0530	2.2uH 0630	L3	1							
	2.2uH 2520	2520	L6	1							
	6.04KΩ 0402	贴片电阻	R14	1							
	10nF 0402	贴片电容	C74	1							
	10Ω 0402	贴片电阻	R3	1							
	15KΩ 0402	贴片电阻	R8	1							
	20Ω 0402	贴片电阻	R34	1							
	22Ω 0402	贴片电阻	R50	1							
	22.1KΩ 0402	贴片电阻	R5	1							
	100mH-8x10	Sensor 100mH	U9	1							
	100Ω 0402	贴片电阻	R35	1							
	220pF 0402	贴片电容	C9	1							
	ADS1015IDGST	ADC 12Bit 4Channel	U10	1							
	AMG8833	Sensor IR	U14	1							
	AMN21111	Sensor PIR	U12	1							
	AP2127-ADJTRG1	3.3V-1.05V	U4	1							
	AP7331-18WG	Camera 1.8V	U20	1							
	AP7331-28WG	Camera 2.8V	U22	1							
	B0540WS-7		D4	1							
	Blue	贴片电阻	D5	1							
	BME280	Sensor T/H/B TOP View	U16	1							
	Coral	G313-06329-00	U8	1							
	DF37NC-30DS	Camera Connector	J1	1							
	DMG1024UV	Camera	U18	1							
	Green	贴片电阻	D2	1							
	INMP441	Sensor Microphone	U11	1							
	ISL29125	Sensor Color	U17	1							
	MP2236	Vin=18, Iout=6A	U3	1							
	MPU9250	Sensor MPU	U13	1							
	OSC-24MHz-2520	24MHz Camera	X1	1							
	OSC-25MHz	Passive crystal oscillator	U5	1							
	PAM2301CAAB120	Camera 1.2V	U24	1							
	Raspberry Pi Compute Module 4	Raspberry Pi Compute Module 4	U1	1							
	Red	贴片电阻	D1	1							
	SMAJ5A	TVS	D3	1							
	TPS3839	Delay 200 MS	U7	1							
	Type-C	Type-C-16P	U2	1							
	VL53L1X	Sensor Laser	U15	1							
	VL805	PCIe to USB3.0	U6	1							