Q42 PMP

Q42 PMP is a standalone device featuring a Raspberry Pi and a Raspberry Pi Camera Module with a number of additonal features.

CONTENTS:

Version Revision:

v2.1 - 26.02.2021

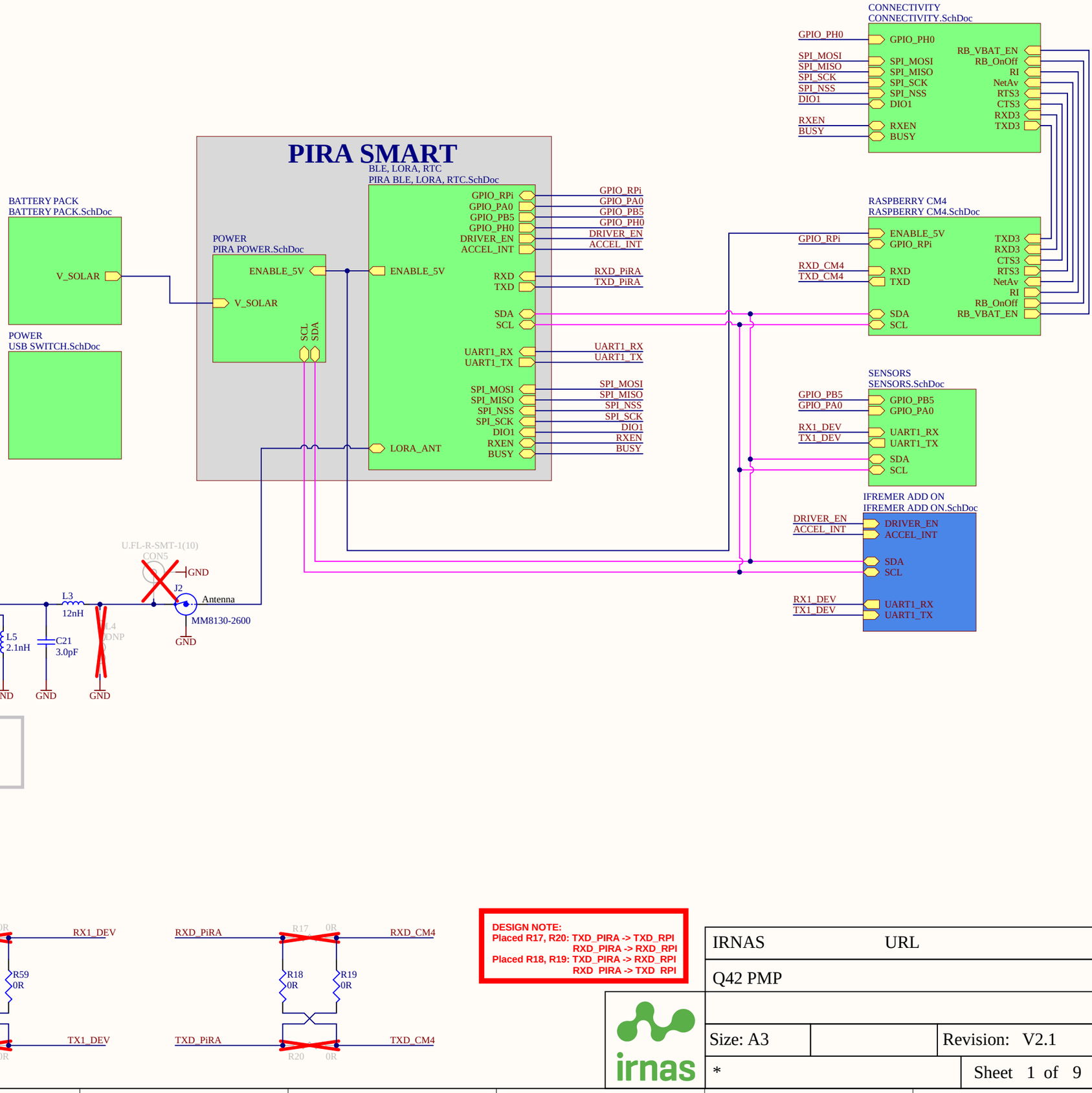
DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes.

DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

DIAGRAM

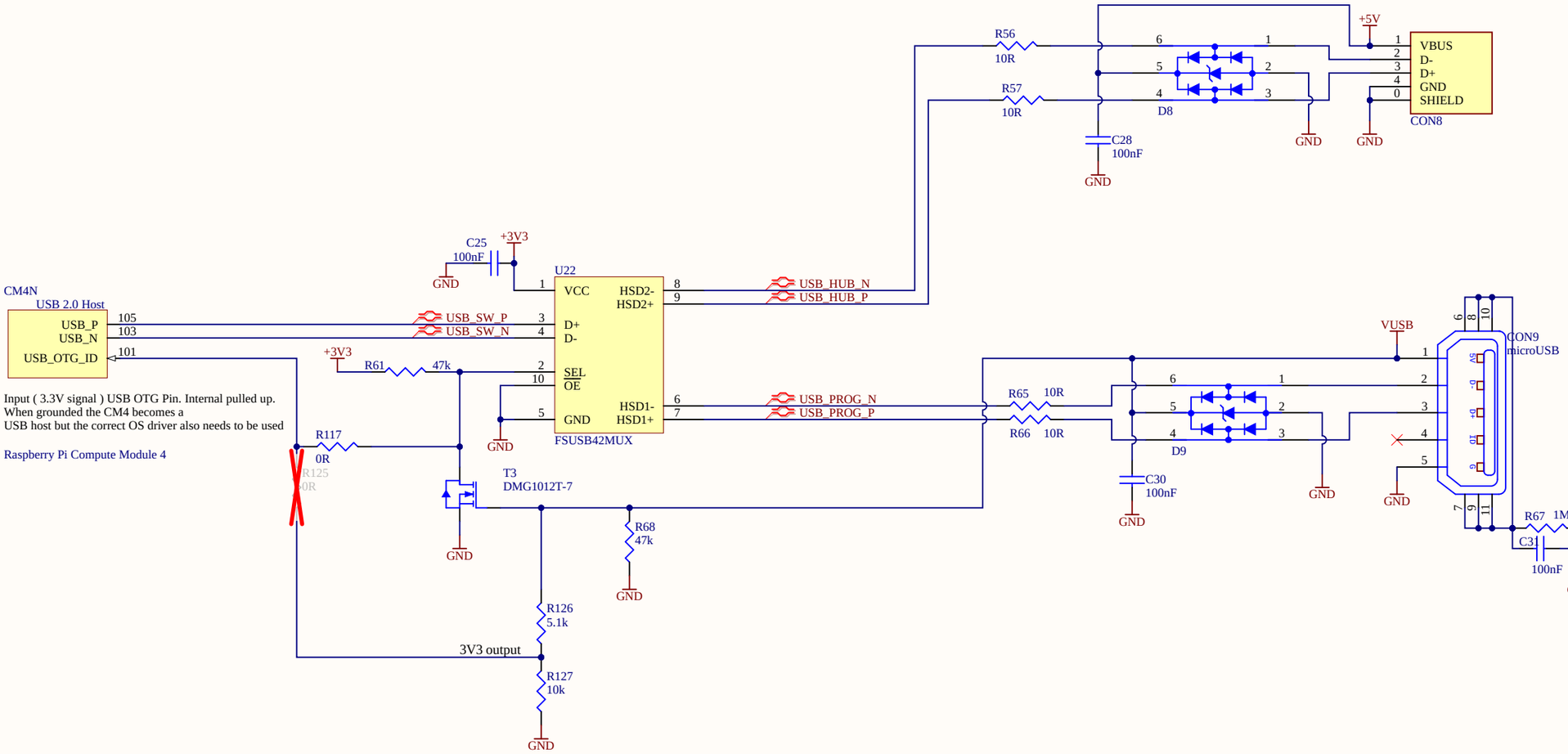


DESIGN NOTE:
Size of componnts in antenna circuit is 0402.

DESIGN NOTE:
Placed R17, R20: TXD_PIRA -> TXD_RPI
RXD_PIRA -> RXD_RPI
Placed R18, R19: TXD_PIRA -> RXD_RPI
RXD_PIRA -> TXD_RPI

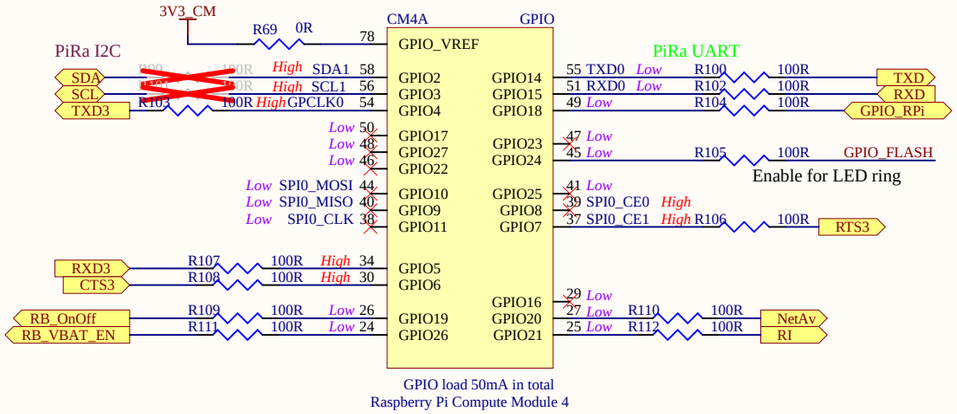
IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 1 of 9

USB switch

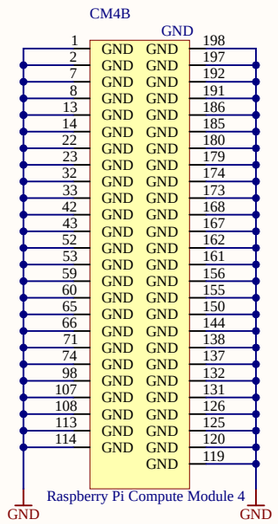


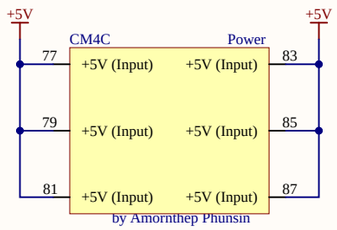
IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 2 of 9

Communication and GPIO



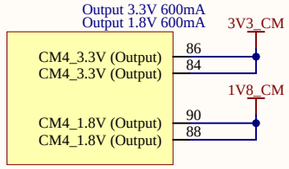
Power



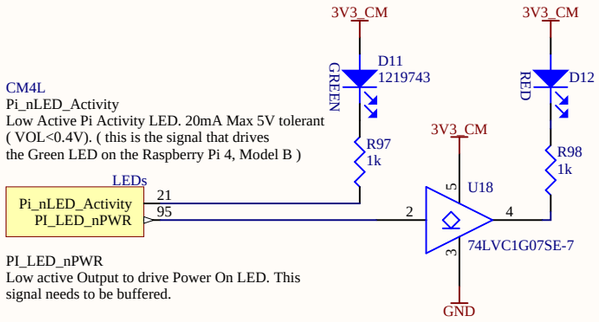


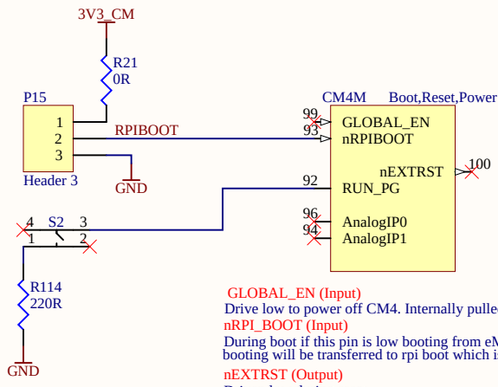
VIN 4.75V-5.25V (*Max 6V)
Power Required 5V 2A (10W) Avg
Raspberry Pi Compute Module 4

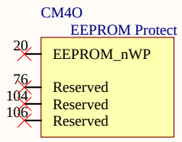
CM4Q
3.3V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered
down during power off or GLOBAL_EN being set low



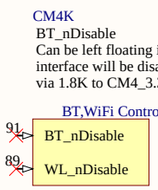
1.8V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered
down during power off or GLOBAL_EN being set low
Raspberry Pi Compute Module 4





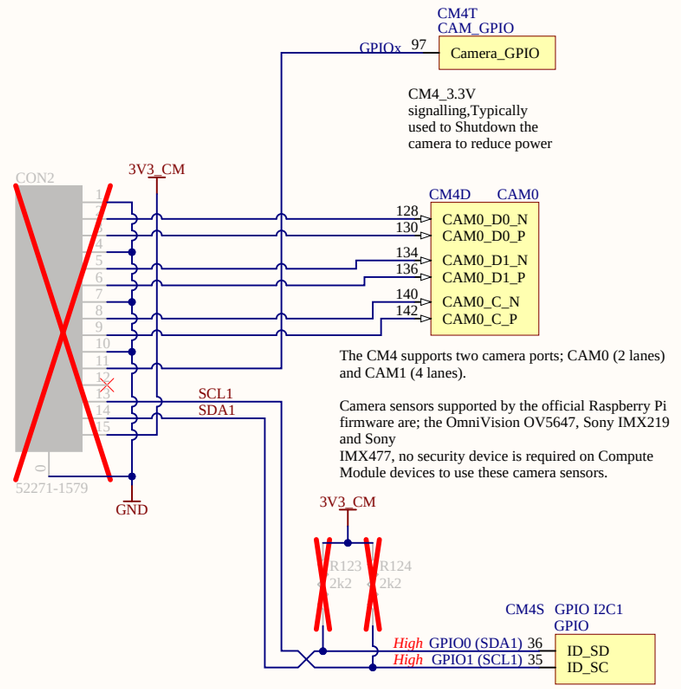


Leaving floating NB internally pulled up to
CM4_3.3V via 100K (VIL <0.8V) but can be
grounded to prevent writing to the on board
EEPROM which stores the bootcode
Raspberry Pi Compute Module 4

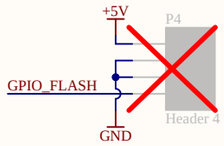


WL_nDisable
Can be left floating if driven low the wireless
interface will be disabled. Internal pulled up via
1.8K to CM4_3.3V
Raspberry Pi Compute Module 4

Camera



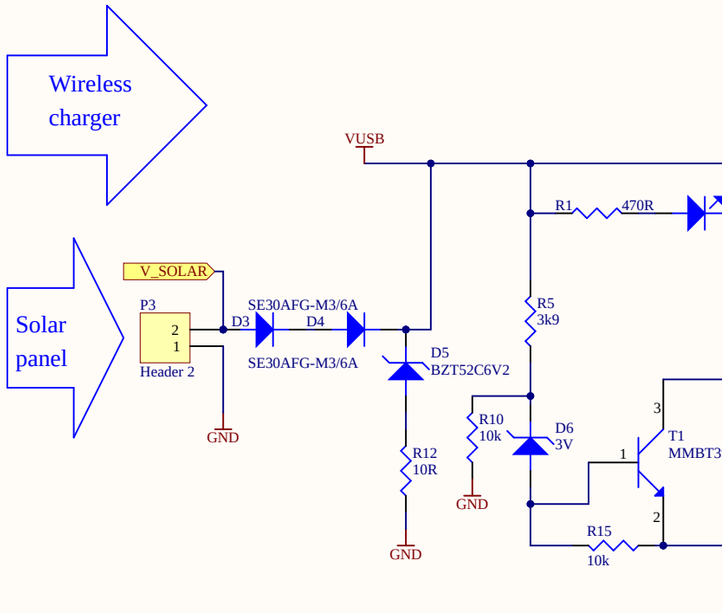
RPi camera LED ring



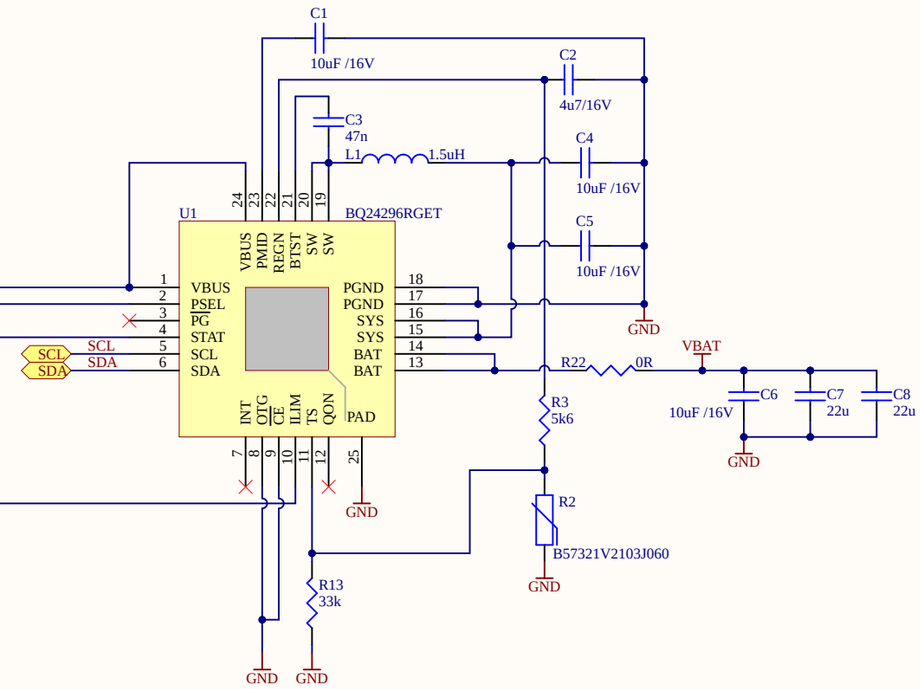
IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 2 of 9

POWER SHEET

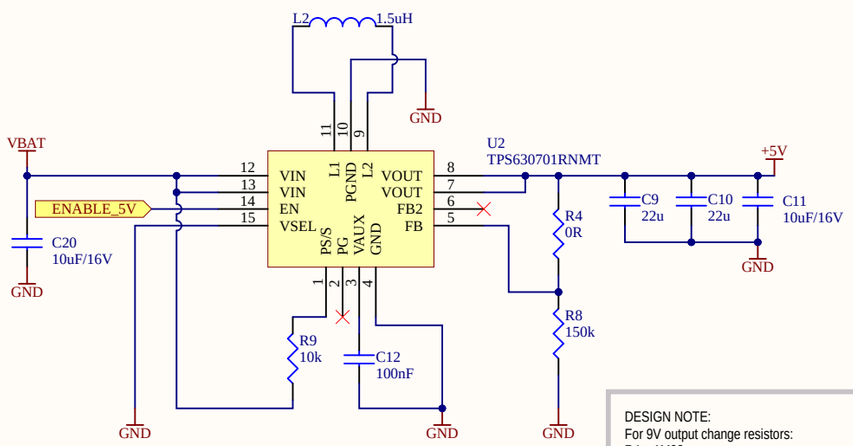
CHARGER INPUTS



CHARGER

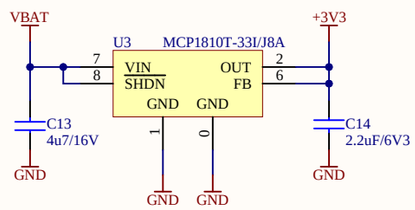


BOOST CONVERTER



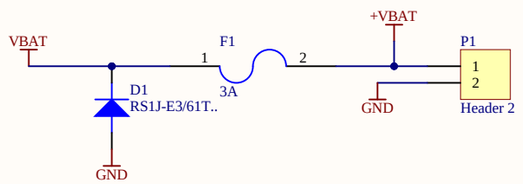
DESIGN NOTE:
For 9V output change resistors:
R4 = 1M02
R8 = 100k

LDO REGULATOR



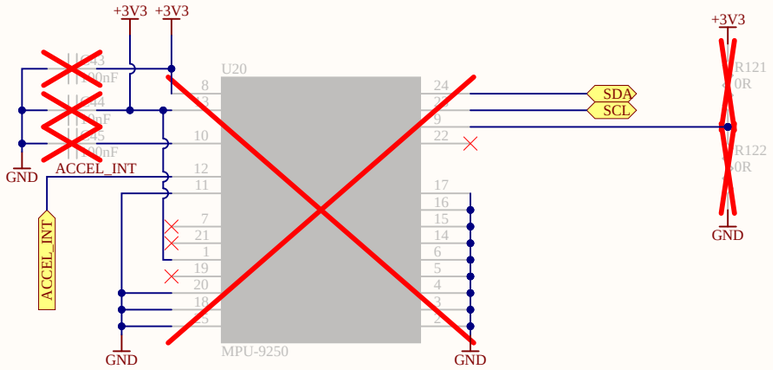
DESIGN NOTE:
VCC = +3 V
Iq = 20nA

BATTERY CONNECTOR



IRNAS	URL	
Title: Q42-PMP.PrjPCB		
Page Contents: PIRA POWER.SchDoc		
Size:	DWG NO	Revision: V2.1
Date: *	Sheet 2 of 9	

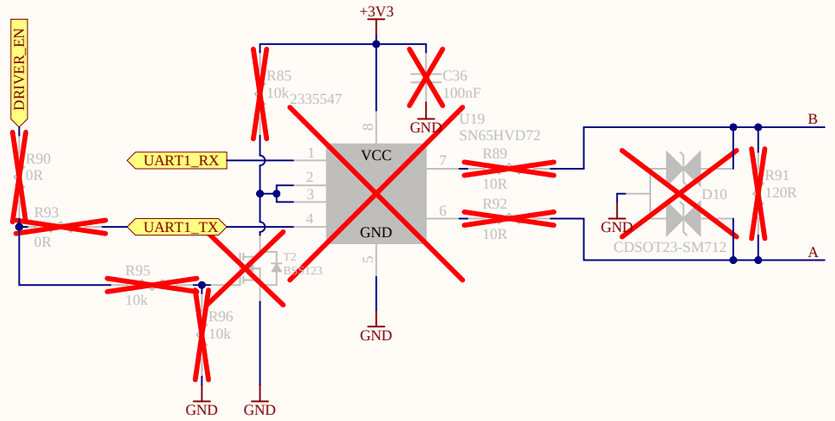
Accelometer



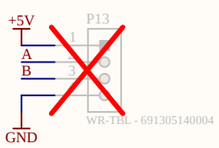
I2C address:
Pin HIGH 0x69
Pin LOW 0x68

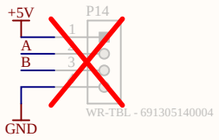
DESIGN NOTE:
Zamenjaj obstoječ čip z ICM-20948 in prilagod napajanje!

RS-485



Output connector

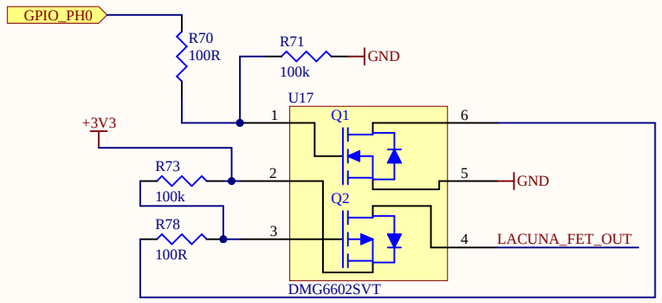




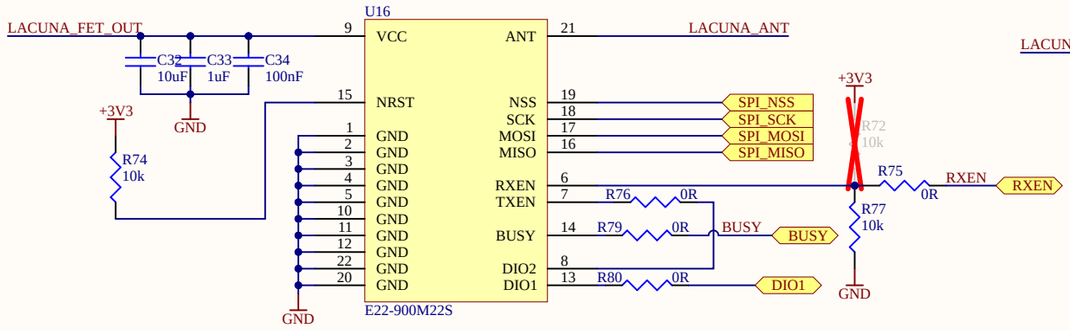
DESIGN NOTE:
Currently is voltage supply port 5V, to get 9V putput change resistors in Boost converter.

IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 2 of 9

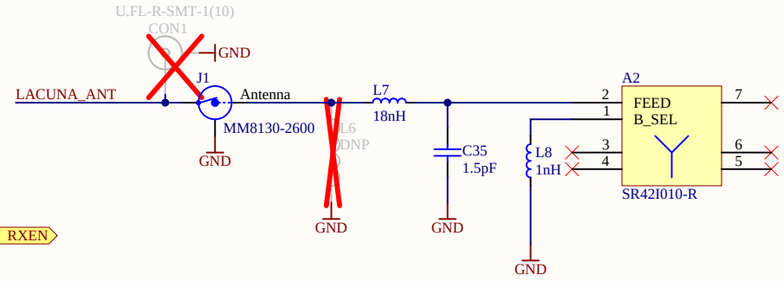
Lacuna space power



Lacuna space

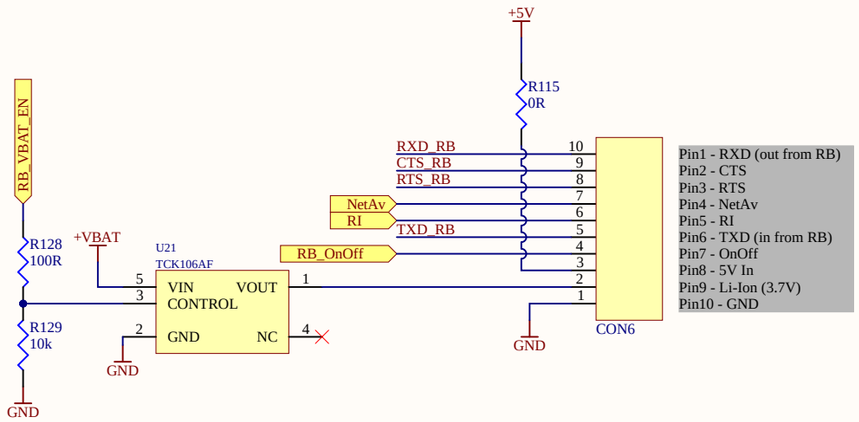


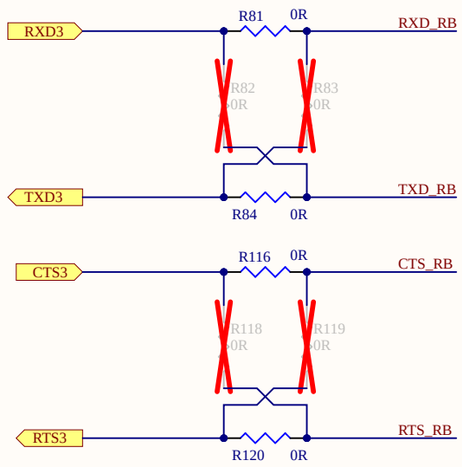
Antenna circuit



DESIGN NOTE:
Controled by PiRA

RockBLOCK 9603





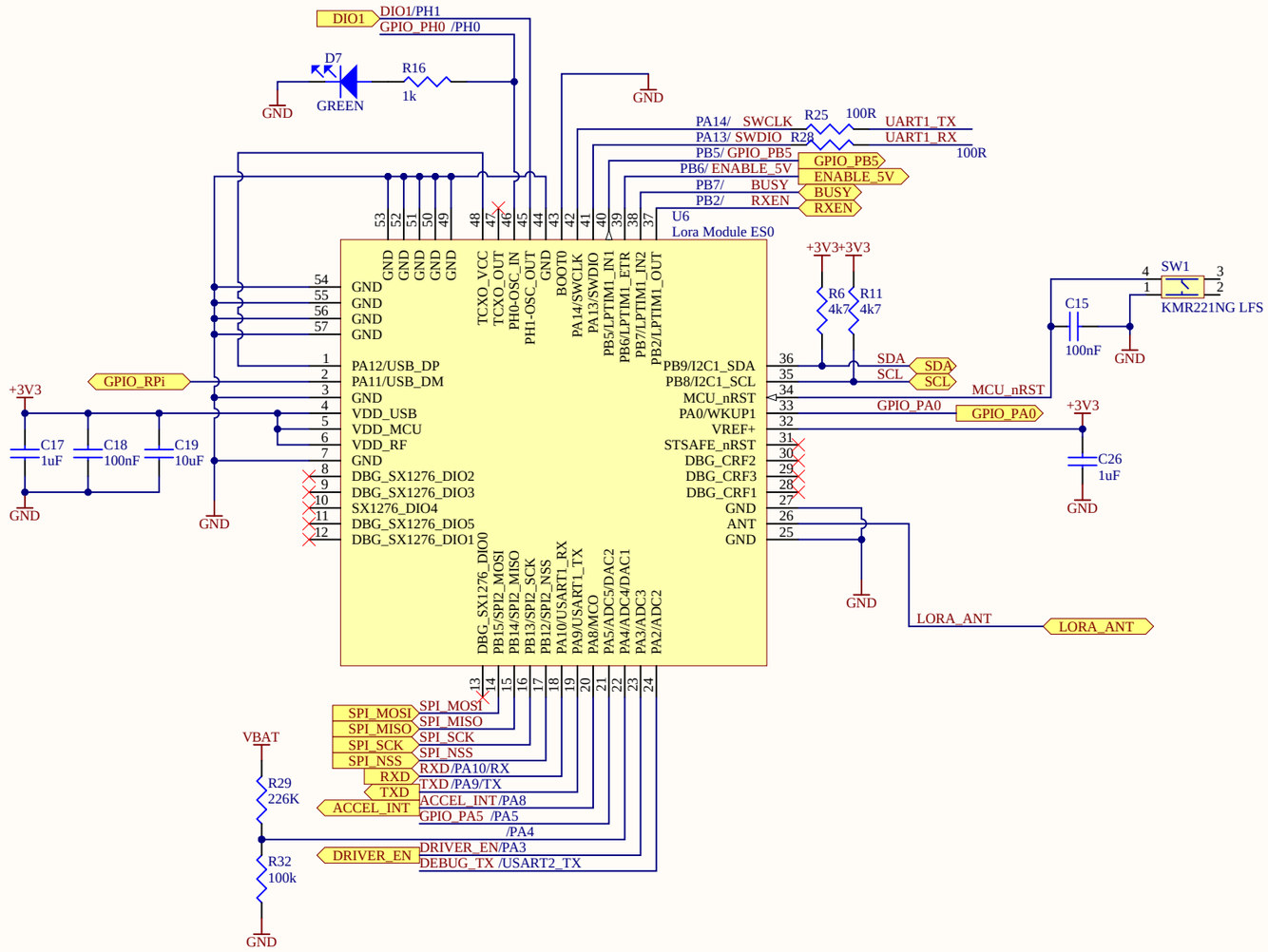
DESIGN NOTE:
5V to VIN
GND to GND
TX to TXD
RX to RXD

DESIGN NOTE:
Placed R17, R20: TXD_PIRA -> TXD_RPI
RXD_PIRA -> RXD_RPI
Placed R18, R19: TXD_PIRA -> RXD_RPI
RXD_PIRA -> TXD_RPI

DESIGN NOTE:
Controled by Raspberry Pi Compute Module 4

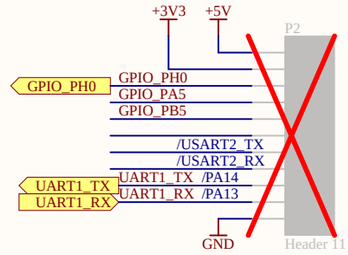
IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 2 of 9

MCU+LORA



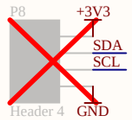
CONNECTORS

GPIO header

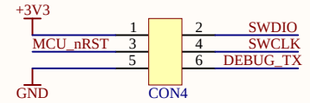


DESIGN NOTE:
PB5 - GPS FET OUT
PB7 - ULTRASONIC FET OUT
PH0 - LED status +Rock block
PA5 - GPIO buttons (voltage devider)

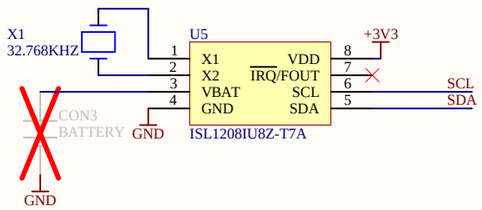
I2C



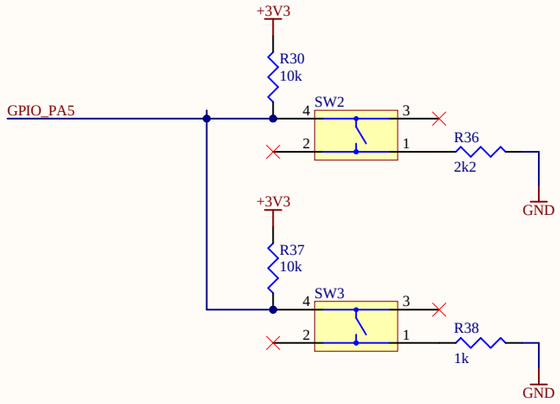
PROGRAMMER



RTC

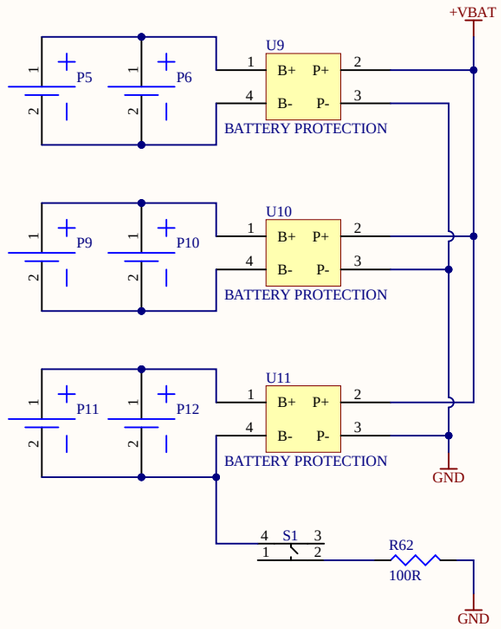


GPIO buttons



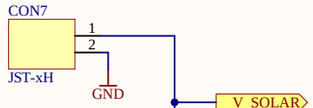
IRNAS	URL
Title:	Q42-PMP.PrjPCB
Page Contents:	PIRA BLE, LORA, RTC.SchDoc
Size:	DWG NO
Revision:	V2.1
Date: *	Sheet 3 of 9

Battery protection

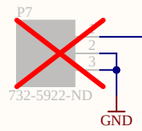


Solar connectors

JST 2 pin TH

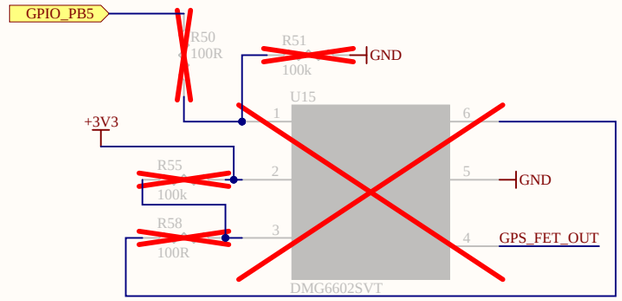


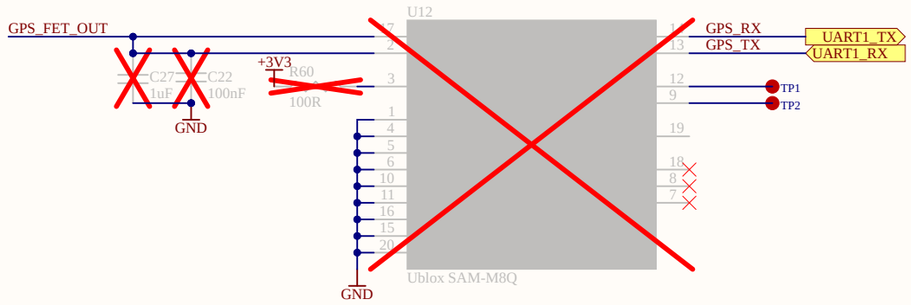
Wurth jack plug



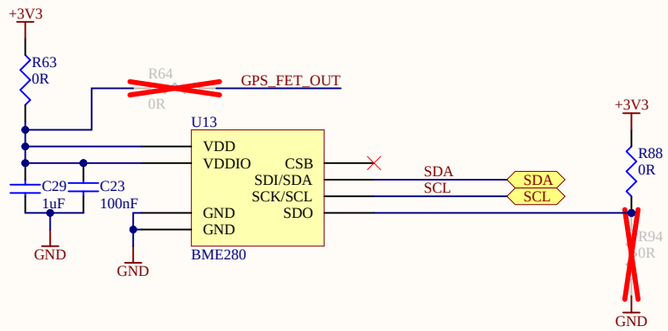
IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 3 of 9

GPS sensor



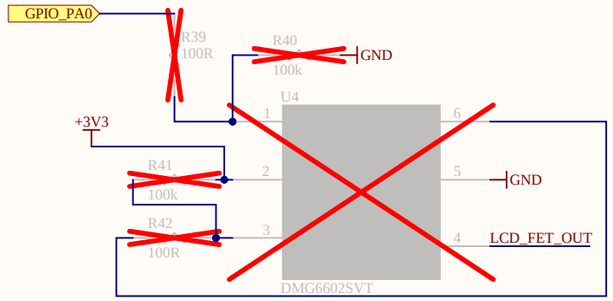


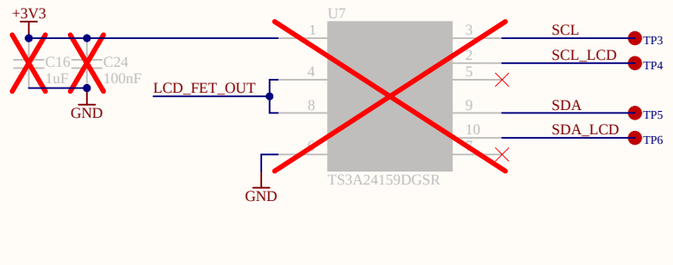
Microclimate sensor

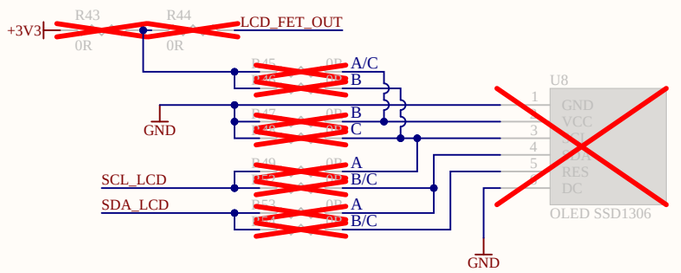


I2C address:
Pin HIGH 0x77
Pin LOW 0x76

OLED display







Design note:
Check pinout on oled display, determine if it is A, B or C. Solder 0 ohm resistors on marked positions, leave other ones disconected.

PIN	A	B	C
1	GND	NC	NC
2	VCC	GND	VCC
3	SCL	VCC	GND
4	SDA	SCL	SCL
5	RES	SDA	SDA
6	DC	NC	NC

IRNAS	URL	
Q42 PMP		
Size: A3		Revision: V2.1
*		Sheet 4 of 9