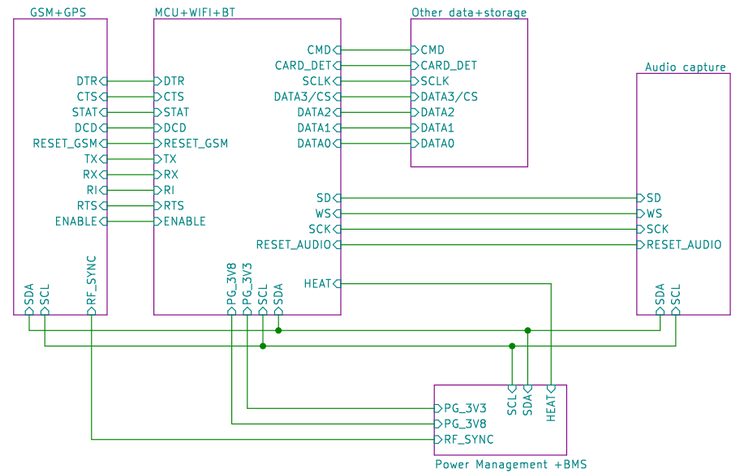
All SMD caps ceramic are 0603 16V X7R or better unless other notes are made
All SMD resistors are 0603
Stack up:
4 layer FR4 sig gnd gnd+sig sig
All non power traces should aim to be 50 ohm single ended impedance
unless other requirements are in place
Delata(T) aimed for is 20C or less



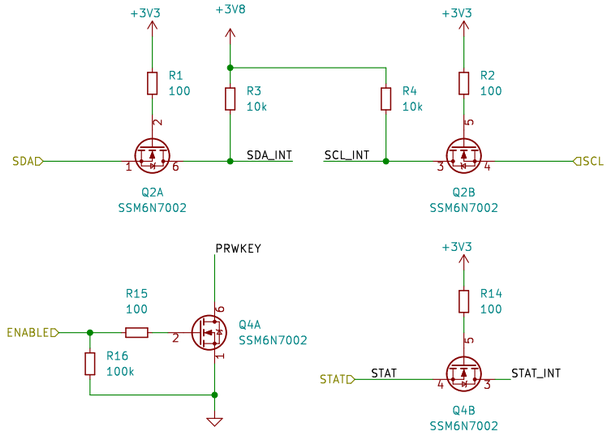
CASE+ GRAPHICS + MECHANICAL

Sheet: /
File: Bird_detector_V1.kicad_sch

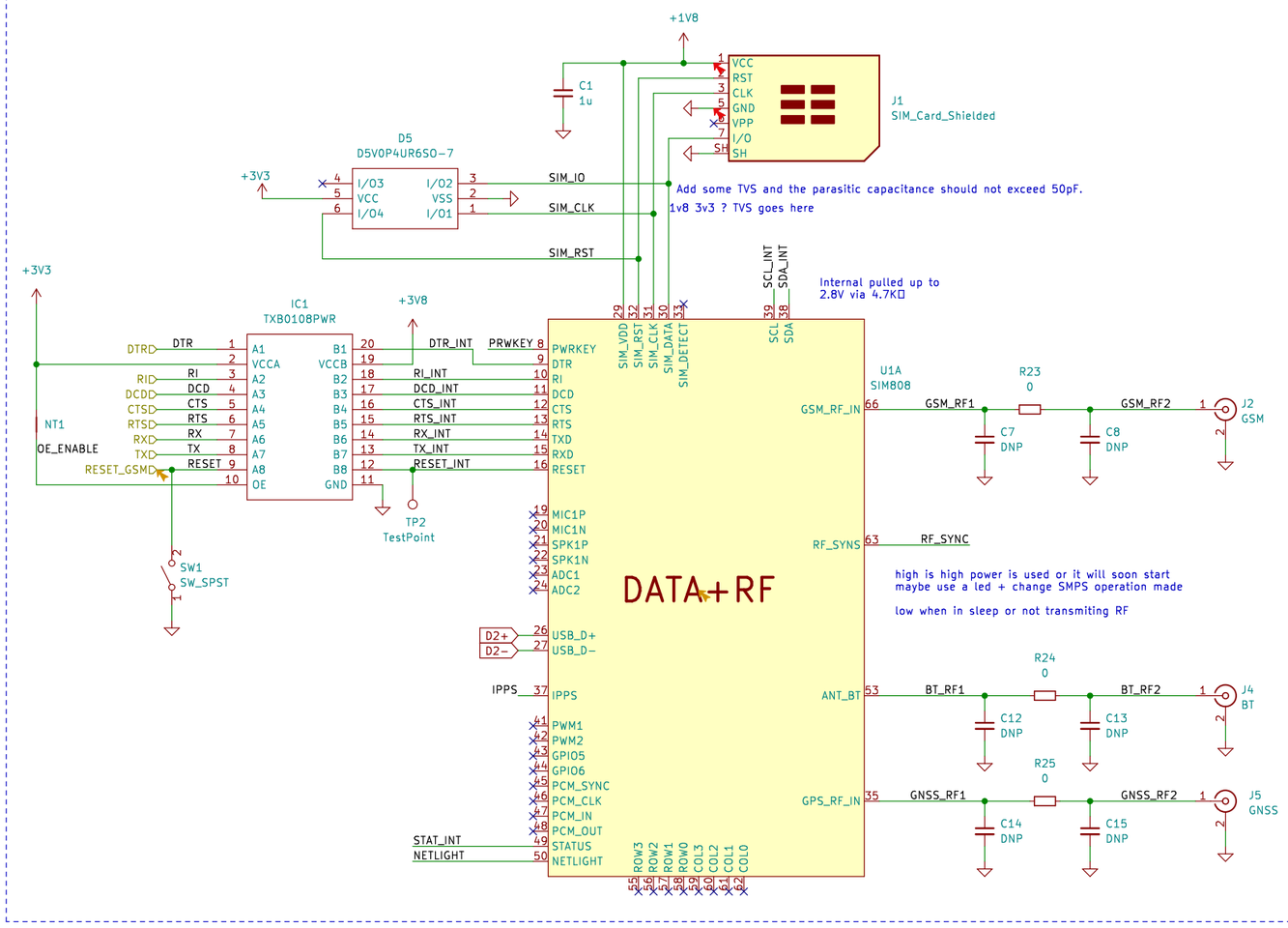
Title:

Size: A3 | Date: | **Rev:**
KiCad E.D.A. kicad (6.0.7) | Id: 1/7

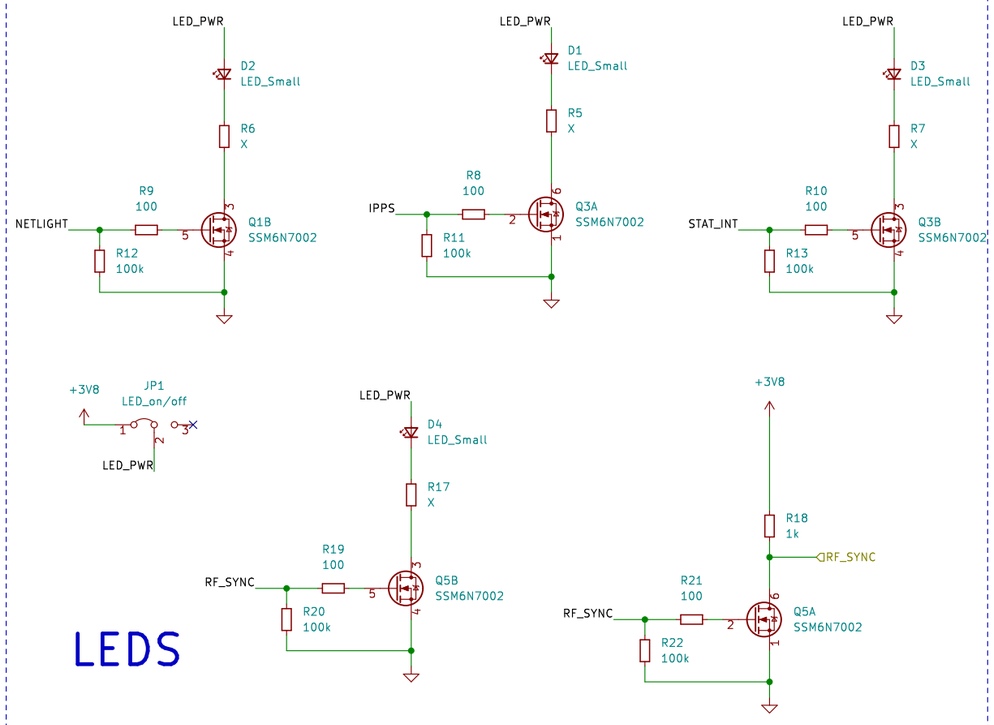
LEVEL SHIFTERS



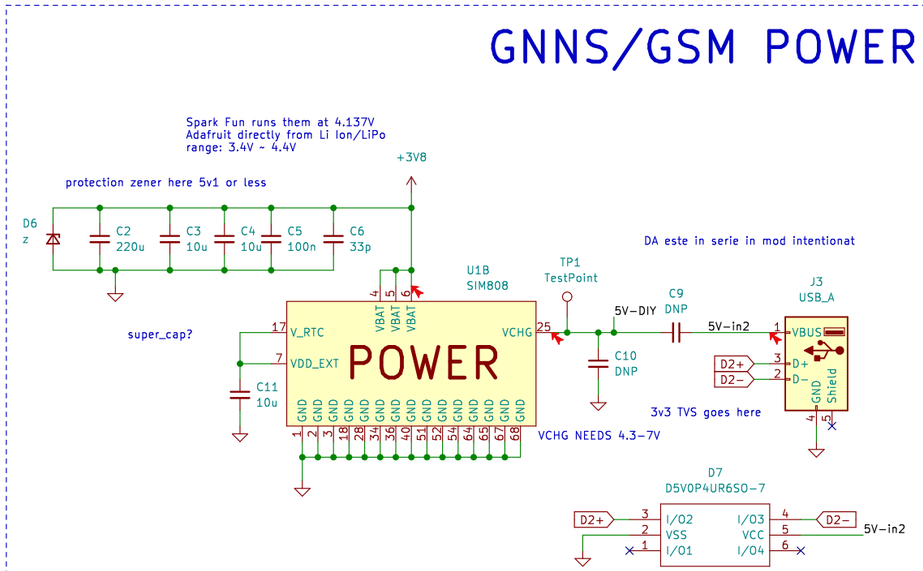
GSM/GNSS DATA+ RF +SIM



LEDS



GNNS/GSM POWER



Sheet: /GSM+GPS/		
File: RF.kicad_sch		
Title:		
Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.7)		Id: 2/7

Danger pins

GPIO_03
GPIO_45
GPIO_46
BOOT

Free pins

GPIO_39

ESP32-S3 has four strapping pins:
• GPIO0
• GPIO45
• GPIO46
• GPIO3
GPIO0, GPIO45 and GPIO46 are connected to the chip's internal weak pull-up/pull-down during the chip reset.
GPIO3 is floating by default

Internal Pull-up/down 45k
Max IC typical current:
source 40mA
sink 28mA

EN pin TTL:
0.75*Vcc+ HIGH
0.25*Vcc- LOW

J6
USB1046-GF-0190-L-B-A
VBUS
Shield3
C16 4p7-10p
R27 1Meg
MH1
MH2
USB_OTG_D-
USB_OTG_D+

U3
ESP32-S3-WROOM-1
BOOT
EN
GPIO0/BOOT
GPIO1/TOUCH1/ADC1_CH0
GPIO2/TOUCH2/ADC1_CH1
GPIO3/TOUCH3/ADC1_CH2
GPIO4/TOUCH4/ADC1_CH3
GPIO5/TOUCH5/ADC1_CH4
GPIO6/TOUCH6/ADC1_CH5
GPIO7/TOUCH7/ADC1_CH6
GPIO8/TOUCH8/ADC1_CH7/SUBSPICS1
GPIO9/TOUCH9/ADC1_CH8/FSPIHD/SUBSPIHD
GPIO10/TOUCH10/ADC1_CH9/FSPICS0/FSPII04/SUBSPICS0
GPIO11/TOUCH11/ADC2_CH0/FSPID/FSPII05/SUBSPID
GPIO12/TOUCH12/ADC2_CH1/FSPICLK/FSPII06/SUBSPICLK
GPIO13/TOUCH13/ADC2_CH2/FSPIQ/FSPII07/SUBSPIQ
GPIO14/TOUCH14/ADC2_CH3/FSPIWP/FSPIDQS/SUBSPIWP
GPIO15/U0RTS/ADC2_CH4/XTAL_32K_P
GPIO16/U0CTS/ADC2_CH5/XTAL_32K_NH5
GPIO17/U1TXD/ADC2_CH6
GPIO18/U1RXD/ADC2_CH7/CLK_OUT3
3V3
GPIO20/U1CTS/ADC2_CH9/CLK_OUT1/USB_D+
GPIO19/U1RTS/ADC2_CH8/CLK_OUT2/USB_D-
U0TXD/GPIO43/CLK_OUT1
U0RXD/GPIO44/CLK_OUT2
GPIO21
GPIO45
GPIO46
GPIO48/SPICLK_N/SUBSPICLK_N_DIFF
GPIO47/SPICLK_P/SUBSPICLK_P_DIFF
SPII06/GPIO35/FSPID/SUBSPID
SPII07/GPIO36/FSPICLK/SUBSPICLK
SPIDQS/GPIO37/FSPIQ/SUBSPIQ
GPIO38/FSPIWP/SUBSPIWP
MTCK/GPIO39/CLK_OUT3/SUBSPICS1
MTDO/GPIO40/CLK_OUT2
MTDI/GPIO41/CLK_OUT1
MTMS/GPIO42
GND
ESP32-S3-WROOM-1
+3V3
C19 10u
C20 10u
C21 100n

R26 1k
VIO
VDD_CP
RST_CP
+5V
C17 100n
C18 100n
R28 22k
R29 47k
VBUS_DETECT_CP
U2
CP2102N-Axx-xQFN24
TXD
RXD
RTS
CTS
DSR
DTR
DCD
RI/CLK
SUSPEND
TXT/GPIO.0
RXT/GPIO.1
RS485/GPIO.2
WAKEUP/GPIO.3
VBUS
D-
D+
R30 10K
D8 LED_Small
D9 LED_Small
R31 X
R32 X

I2C BUS
SDAD GPIO_36
SCLD GPIO_35

I2S BUS
SCKD GPIO_48
WSD GPIO_47
SDD GPIO_21
RESET_AUDIOD GPIO_38

SD CARD data
SPI/2/4bit
DATA2D GPIO_17
DATA3/CSD GPIO_16
CMDD GPIO_15
SCLKD GPIO_07
DATA0D GPIO_06
DATA1D GPIO_05
CARD_DETD GPIO_04

GSM UART + COMMANDS
DTRD GPIO_37
RID GPIO_18
DCDD GPIO_08
CTSD GPIO_14
RTSD GPIO_13
RXD GPIO_12
TXD GPIO_11
RESET_GSMD GPIO_10
STATD GPIO_09

U6
74LVC1G08
+3V3
ENABLED
GPIO_01
PG_3V8
NMOS and gate?

Heater controll
VDC
R93 10k
HEATD
R94 100
Q1A SSM6N7002
R95 100k
GPIO_40

U4
MCP2561-H-SN
+3V3
C22 100n
GPIO_42
GPIO_41
GPIO_02
TXD
RXD
STBY
VDD
VSS
CANH
SPLIT
CANL
CAN_H
CAN_L
SPLIT
R37 60
R38 300
R39 60
C24 4.7n
J7
Screw_Terminal_01x03

R35 10k
R36 10k
SDA
SCL

U5
BME280
+3V3
C26 100n
VDDIO
VDD
GND
SDO
SCK
SDI
CSB
SCL
SDA
CSB
NT2
JP2
ADR0

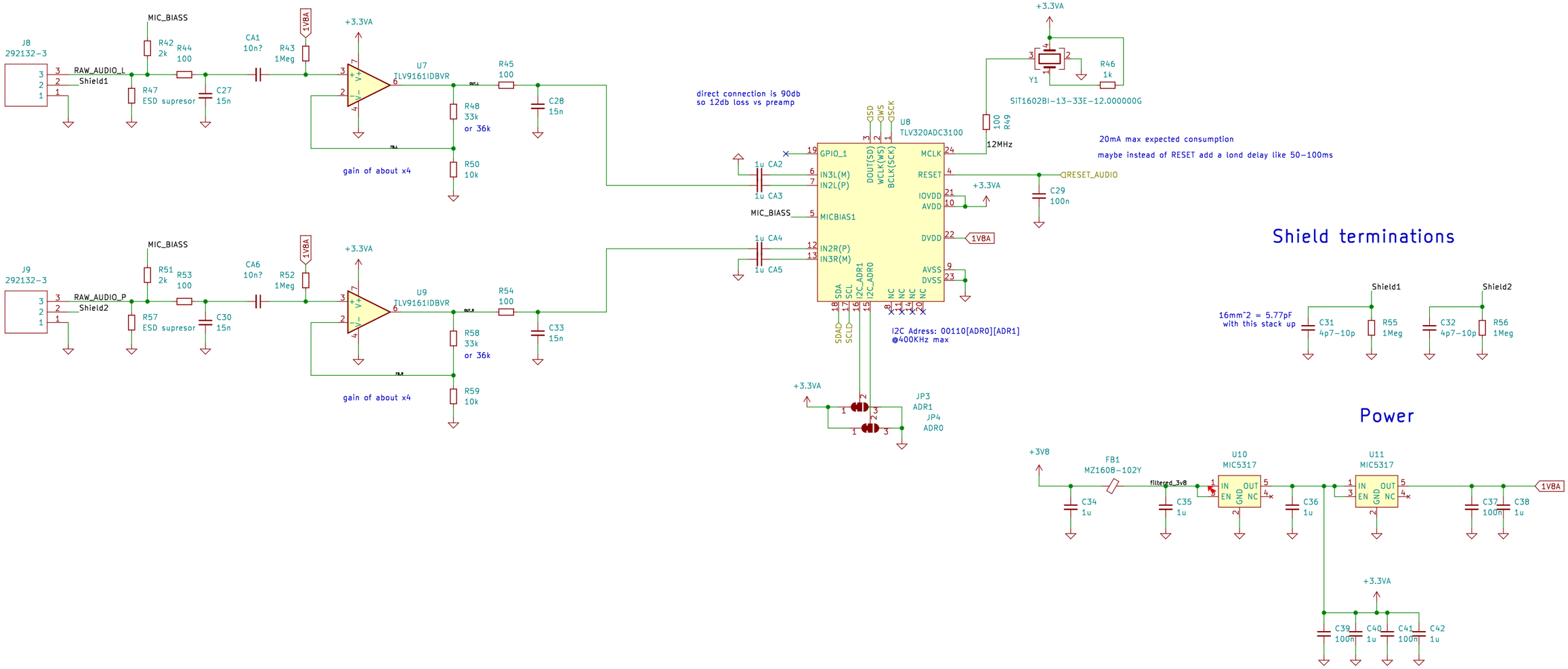
RC delay
recomanded min 10ms
wanted 15-20ms

NOTE: PG 1Meg R so for
delay in ms is cap rating in nF
ex: 15ms => 15nF

R33 y
PG_3V3
EN
C23 z
SW2 MCU_RESET
+3V3
R41 10k
BOOT
C25 100n

R34 10k
DTR
Q6A BC847BS
RTS
Q6B BC847BS
R40 10k
EN
BOOT

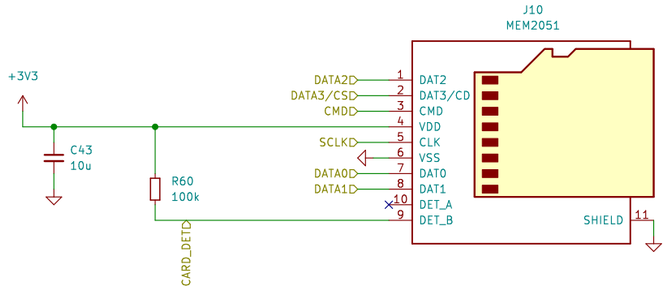
Sheet: /MCU+WIFI+BT/
File: MCU.kicad_sch
Title:
Size: A3
Date:
Rev:
KiCad E.D.A. kicad (6.0.7)
Id: 3/7



Sheet: /Audio capture/
File: Audio.kicad_sch

Title:

Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.7)		Id: 4/7



Sheet: /Other data+storage/
File: SDcard.kicad_sch

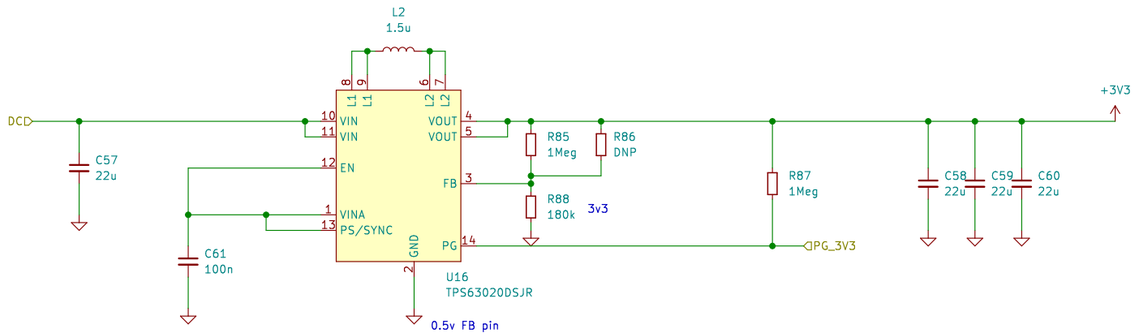
Title:

Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.7)		Id: 5/7

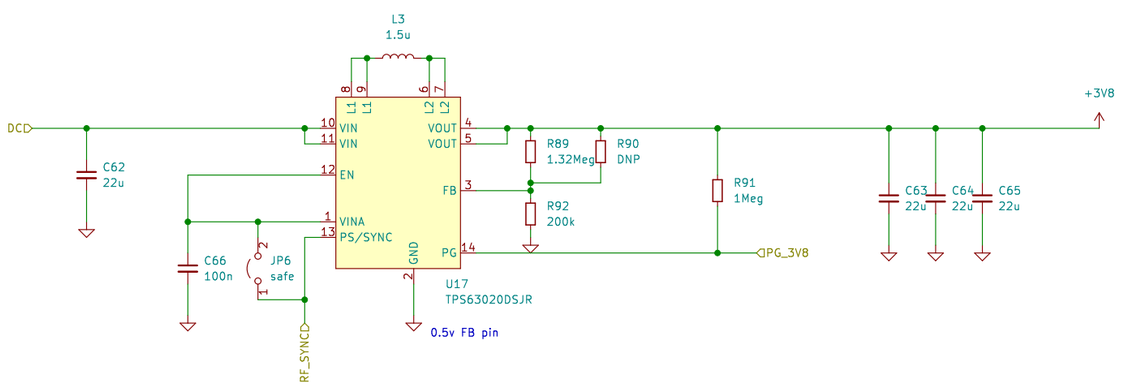
Solar input
J11
Solar input
J12
140-502-415-000
F1
PPTC 2A 16V
IN_SOLAR+
IN_SOLAR-
C44
100n
50m
R61
R64
1k
LED_Small
D14
Reverse Voltage Protection
+Indicator(0.17W R at 15V)
&Over Voltage Protection
&Overcurrent Protection
(Short Circuit too)
D12
MMSZ5245B
15V 1W total
D13
MMSZ5245B
Q8B
DMP3028LSD
Q8A
DMP3028LSD
R66
1k
D10
SX33L_R1_00001
R67
100k
Q9A
DMP3028LSD
R65
1k
+5V
for the heater?
Q7A
DMP3028LSD
Heater_Input
HEAT
VDC
4.5-28V
input
C46
10u
C47
10u
Q7B
DMP3028LSD
C45
100n
D11
SX33L_R1_00001
L1
15u
R62
50m
+BATT
R63
45
C51
3.5n
snubber
C48
22u
C49
22u
C50
1u
R68
X
D15
LED_Small
D16
LED_Small
R69
1Meg
R72
280.5587k
1.205V at MPPT
5.5V MPPT
for seed studio solar
U12
CN3791
R70
120
C52
220n
R71
10k
Q10A
SSM6N7002
Q10B
SSM6N7002
R73
64k
R74
100k
R75
100k
+3V3
U13
MAX11601
C53
100n
Temp1
Temp2
AIN0
AIN1
AIN2
AIN3/REF
Vdd
GND
SCL
SDA
SCL
SDA
R76
50k+
R77
50k+
TH1
100k
TH2
100k
Temp1
Temp2
R79
50k+
R80
50k+
C54
100n
U14
INA3221
MAX 150mV on shunt
IN_USB_+
IN_USB_-
IN_SOLAR+
IN_SOLAR-
IN_SYSTEM+
IN_SYSTEM-
PV
CRITICAL
WARNING
TC
SDA
SCL
A0
JP5
ADR1
Adress:
100000[A0]
J13
USB_A
VBUS
FB2
MH2029-401Y
F2
PPTC 2A 16V
R78
50m
C55
100n
3v3 TVS goes here
D17
D5V0P4UR6SO-7
J14
batt input
Heater_Input
F3
PPTC 2A 16V
Q11B
DMP3028LSD
Q11A
DMP3028LSD
U15
APX810S05
Vcc
GND
RESET
R83
100k
R84
100k
D18
SX33L_R1_00001
Q9B
DMP3028LSD
R82
1k
C56
100n
50m
R81
+VDC
SMPSs
DC
RF_SYNC
PG_3V8
PG_3V3
RF_SYNC

Sheet: /Power Management +BMS/
File: Power.kicad_sch
Title:
Size: A3 | Date: | Rev:
KiCad E.D.A. kicad (6.0.7) | Id: 6/7

3V–3V3



3V8–4V



Sheet: /Power Management +BMS/SMPSs/		
File: SMPSs.kicad_sch		
Title:		
Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.7)		Id: 7/7