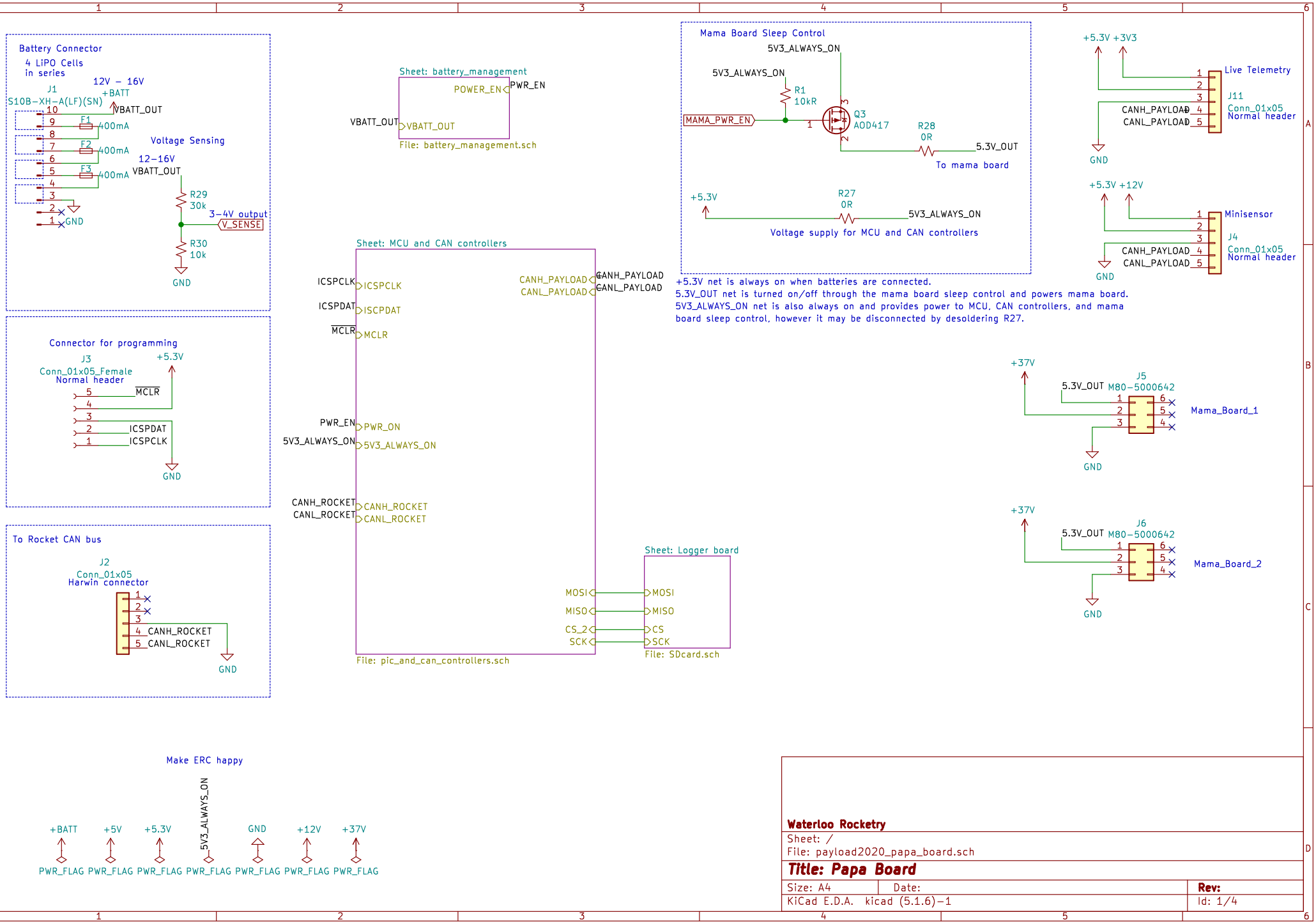
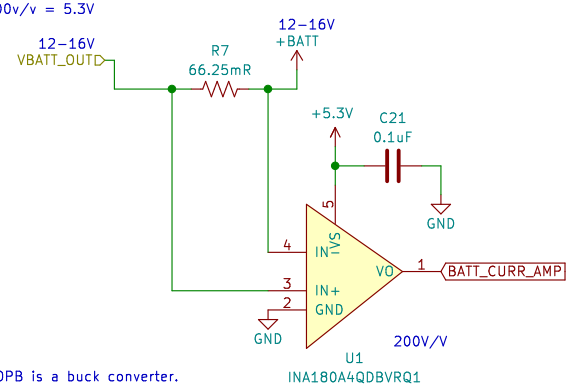
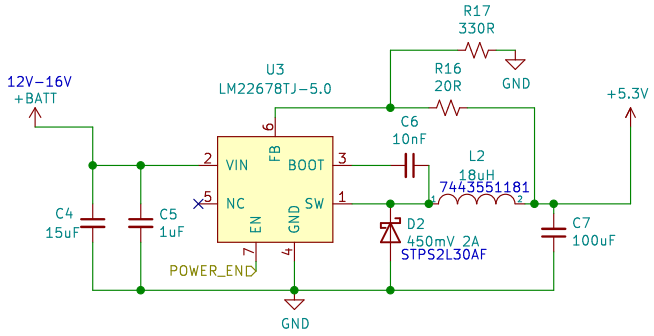

Battery Connector
4 LiPO Cells
in series
12V – 16V
+BATT
J1
S10B-XH-A(LF)(SN)
VBATT_OUT
F1 400mA
F2 400mA
F3 400mA
Voltage Sensing
12–16V
VBATT_OUT
R29
30k
3–4V output
V_SENSE
R30
10k
GND
Connector for programming
J3
Conn_01x05_Female
Normal header
+5.3V
MCLR
ICSPDAT
ICSPCLK
GND
To Rocket CAN bus
J2
Conn_01x05
Harwin connector
CANH_ROCKET
CANL_ROCKET
GND
Sheet: battery_management
POWER_EN
PWR_EN
VBATT_OUT
File: battery_management.sch
Sheet: MCU and CAN controllers
ICSPCLK
ICSPDAT
MCLR
CANH_PAYLOAD
CANL_PAYLOAD
PWR_EN
5V3_ALWAYS_ON
CANH_ROCKET
CANL_ROCKET
File: pic_and_can_controllers.sch
Sheet: Logger board
MOSI
MISO
CS_2
CS
SCK
File: SDcard.sch
Mama Board Sleep Control
5V3_ALWAYS_ON
R1
10kR
MAMA_PWR_EN
Q3
AOD417
R28
0R
5.3V_OUT
To mama board
+5.3V
R27
0R
5V3_ALWAYS_ON
Voltage supply for MCU and CAN controllers
+5.3V net is always on when batteries are connected.
5.3V_OUT net is turned on/off through the mama board sleep control and powers mama board.
5V3_ALWAYS_ON net is also always on and provides power to MCU, CAN controllers, and mama board sleep control, however it may be disconnected by desoldering R27.
+5.3V +3V3
Live Telemetry
J11
Conn_01x05
Normal header
CANH_PAYLOAD
CANL_PAYLOAD
GND
+5.3V +12V
Minisensor
J4
Conn_01x05
Normal header
CANH_PAYLOAD
CANL_PAYLOAD
GND
+37V
J5
5.3V_OUT
M80-5000642
Mama_Board_1
GND
+37V
J6
5.3V_OUT
M80-5000642
Mama_Board_2
GND
Make ERC happy
+BATT
+5V
+5.3V
5V3_ALWAYS_ON
GND
+12V
+37V
PWR_FLAG
Waterloo Rocketry
Sheet: /
File: payload2020_papa_board.sch
Title: Papa Board
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.6)-1
Id: 1/4

Main Power Supplies

66.25mR * I * 200v/v = 5.3V
Imax = 400mA

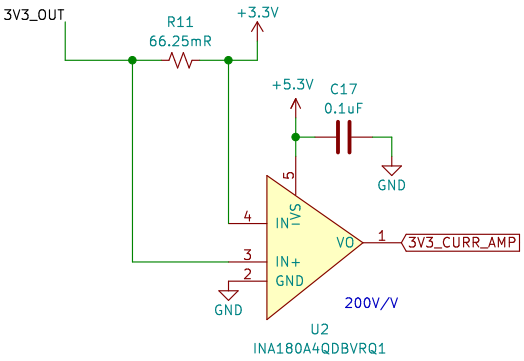


LM22678TJ-5.0/NOPB is a buck converter.
Iout: 1.5A
Values are taken from WEBENCH power designer
https://webench.ti.com/appinfo/webench/scripts/SDP.cgi?ID=2053C05C03E5ECAE
PDF version:
https://drive.google.com/file/d/13pYM-p7NzZnNQYZXknj9P6BV4uZ4R9wv/view?usp=sharing

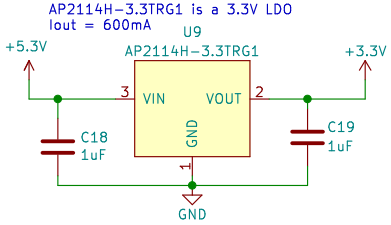


Logger Board Power Supplies

66.25mR * I * 200v/v = 5.3V
Imax = 400mA

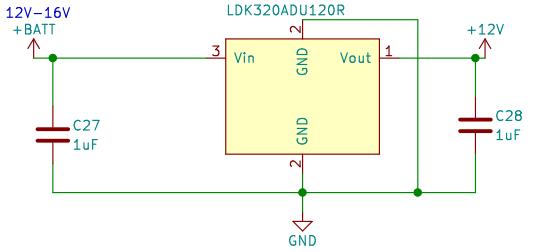


AP2114H-3.3TRG1 is a 3.3V LDO
Iout = 600mA

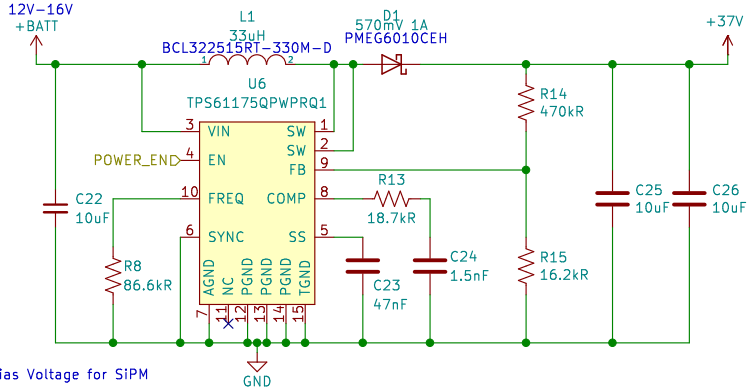


1uF capacitors as per datasheet directly (no calculations)
LDK320ADU120R is a 12V fixed-voltage regulator.
Max Iout rating: 0.2A

DNP - Do not place

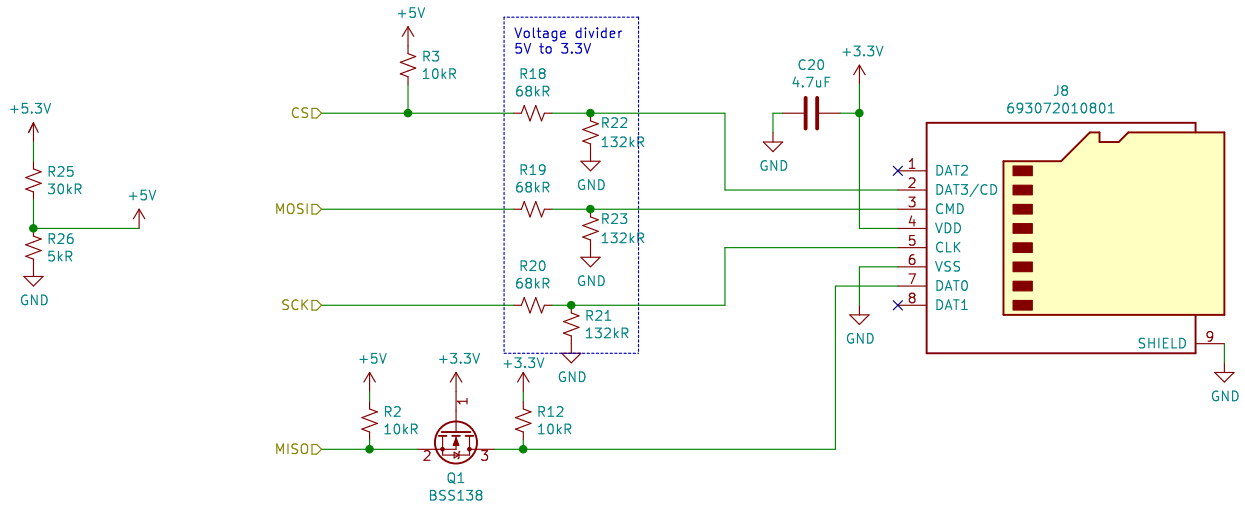


TPS61175 is a boost converter.
Max Iout rating: 3A
Values are taken from WEBENCH power designer
https://webench.ti.com/appinfo/webench/scripts/SDP.cgi?ID=944A159EFA65DE89
PDF version:
https://drive.google.com/file/d/1ktwurgh3BjmDxpc3J00zTu8llix18m34/view?usp=sharing

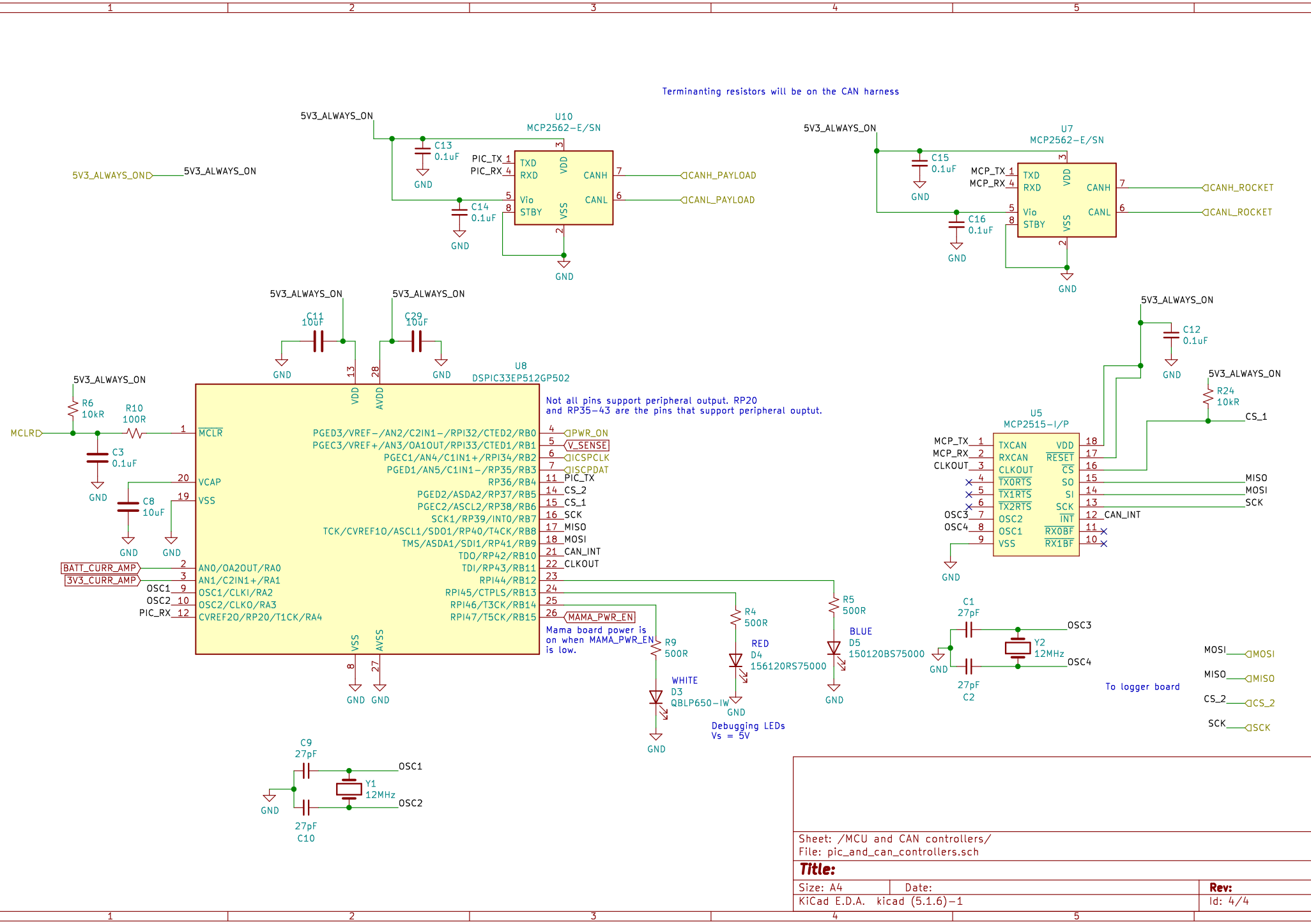


Bias Voltage for SiPM

Sheet: /battery_management/		
File: battery_management.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.6)-1		Id: 2/4



Sheet: /Logger board/		
File: SDcard.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.6)-1		Id: 3/4


Terminanting resistors will be on the CAN harness
U10
MCP2562-E/SN
U7
MCP2562-E/SN
U8
DSPIC33EP512GP502
U5
MCP2515-I/P
5V3_ALWAYS_ON
GND
C13 0.1uF
C14 0.1uF
C15 0.1uF
C16 0.1uF
C11 10uF
C29 10uF
C12 0.1uF
C3 0.1uF
C8 10uF
C9 27pF
C10 27pF
C1 27pF
C2 27pF
R6 10kR
R10 100R
R24 10kR
R4 500R
R5 500R
R9 500R
Y1 12MHz
Y2 12MHz
PIC_TX
PIC_RX
CANH_PAYLOAD
CANL_PAYLOAD
CANH_ROCKET
CANL_ROCKET
MCP_TX
MCP_RX
MCLR
VCAP
VSS
VDD
AVDD
AVSS
BATT_CURR_AMP
3V3_CURR_AMP
OSC1
OSC2
CS_1
CS_2
SCK
MISO
MOSI
CAN_INT
CLKOUT
PWR_ON
V_SENSE
ICSPCLK
ICSPDAT
MAMA_PWR_EN
Not all pins support peripheral output. RP20 and RP35-43 are the pins that support peripheral ouptut.
Mama board power is on when MAMA_PWR_EN is low.
WHITE D3 QBLP650-IW
RED D4 156120RS75000
BLUE D5 150120BS75000
Debugging LEDs Vs = 5V
To logger board
Sheet: /MCU and CAN controllers/
File: pic_and_can_controllers.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.1.6)-1
Id: 4/4