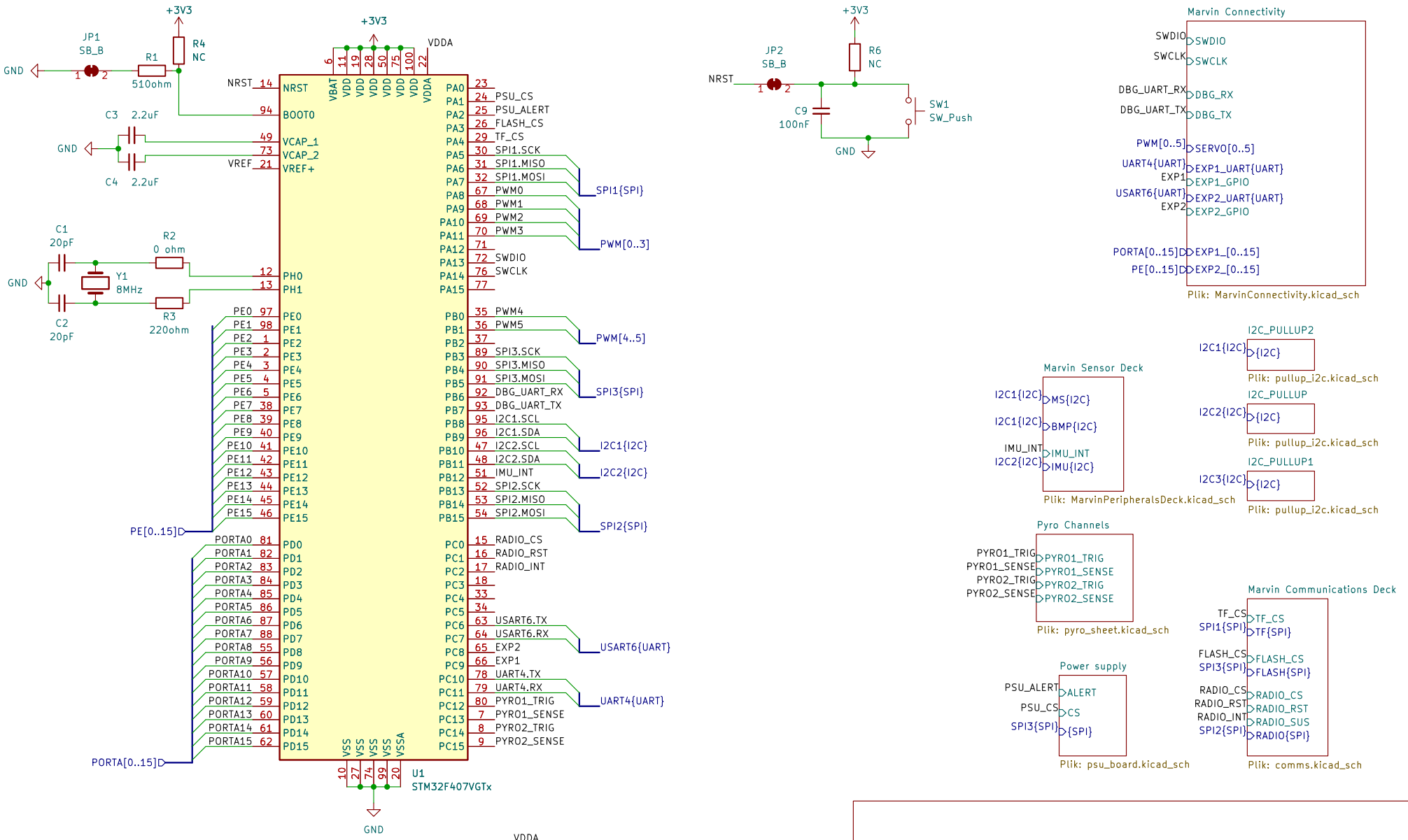
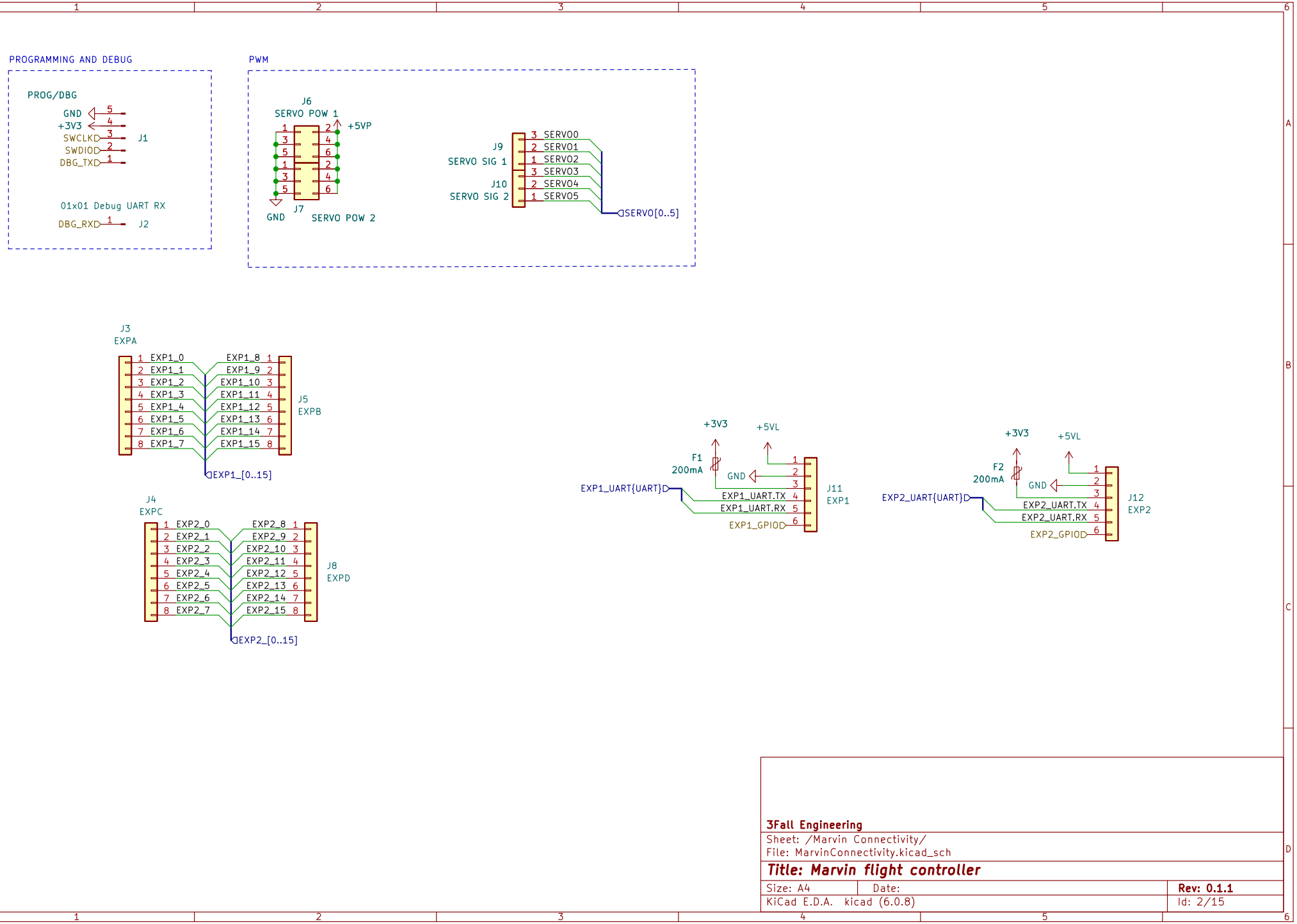

+3V3
JP1
SB_B
R4
NC
R1
510ohm
GND
C3 2.2uF
C4 2.2uF
C1 20pF
C2 20pF
Y1 8MHz
R2 0 ohm
R3 220ohm
VDDA
NRST
BOOT0
VCAP_1
VCAP_2
VREF+
PE[0..15]
PORTA[0..15]
U1
STM32F407VGTx
PA0 23
PA1 24 PSU_CS
PA2 25 PSU_ALERT
PA3 26 FLASH_CS
PA4 29 TF_CS
PA5 30 SPI1.SCK
PA6 31 SPI1.MISO
PA7 32 SPI1.MOSI
SPI1{SPI}
PA8 67 PWM0
PA9 68 PWM1
PA10 69 PWM2
PA11 70 PWM3
PWM[0..3]
PA12 71
PA13 72 SWDIO
PA14 76 SWCLK
PA15 77
PB0 35 PWM4
PB1 36 PWM5
PWM[4..5]
PB2 37
PB3 89 SPI3.SCK
PB4 90 SPI3.MISO
PB5 91 SPI3.MOSI
PB6 92 DBG_UART_RX
PB7 93 DBG_UART_TX
SPI3{SPI}
PB8 95 I2C1.SCL
PB9 96 I2C1.SDA
I2C1{I2C}
PB10 47 I2C2.SCL
PB11 48 I2C2.SDA
PB12 51 IMU_INT
I2C2{I2C}
PB13 52 SPI2.SCK
PB14 53 SPI2.MISO
PB15 54 SPI2.MOSI
SPI2{SPI}
PC0 15 RADIO_CS
PC1 16 RADIO_RST
PC2 17 RADIO_INT
PC3 18
PC4 33
PC5 34
PC6 63 USART6.TX
PC7 64 USART6.RX
USART6{UART}
PC8 65 EXP2
PC9 66 EXP1
PC10 78 UART4.TX
PC11 79 UART4.RX
UART4{UART}
PC12 80 PYRO1_TRIG
PC13 7 PYRO1_SENSE
PC14 8 PYRO2_TRIG
PC15 9 PYRO2_SENSE
JP2
SB_B
R6
NC
C9 100nF
SW1
SW_Push
Marvin Connectivity
SWDIO
SWCLK
DBG_UART_RX
DBG_UART_TX
PWM[0..5]
SERVO[0..5]
UART4{UART}
EXP1
USART6{UART}
EXP2
EXP1_UART{UART}
EXP1_GPIO
EXP2_UART{UART}
EXP2_GPIO
PORTA[0..15]
PE[0..15]
EXP1_[0..15]
EXP2_[0..15]
Plik: MarvinConnectivity.kicad_sch
Marvin Sensor Deck
I2C1{I2C}
MS{I2C}
BMP{I2C}
IMU_INT
IMU{I2C}
I2C2{I2C}
Plik: MarvinPeripheralsDeck.kicad_sch
I2C_PULLUP2
I2C_PULLUP
I2C_PULLUP1
Plik: pullup_i2c.kicad_sch
Pyro Channels
PYRO1_TRIG
PYRO1_SENSE
PYRO2_TRIG
PYRO2_SENSE
Plik: pyro_sheet.kicad_sch
Power supply
PSU_ALERT
PSU_CS
SPI3{SPI}
ALERT
CS
{SPI}
Plik: psu_board.kicad_sch
Marvin Communications Deck
TF_CS
SPI1{SPI}
TF{SPI}
FLASH_CS
SPI3{SPI}
FLASH{SPI}
RADIO_CS
RADIO_RST
RADIO_INT
SPI2{SPI}
RADIO_SUS
RADIO{SPI}
Plik: comms.kicad_sch
C5 100nF
C7 1uF
C6 1uF
C8 100nF
R5 46ohm
L1 L_Ferrite
VREF
3Fall Engineering
Sheet: /
File: marvin_fc_board.kicad_sch
Title: Marvin flight controller
Size: A4
Date: 2022-08-29
Rev: 0.1.1
KiCad E.D.A. kicad (6.0.8)
Id: 1/15



3Fall Engineering

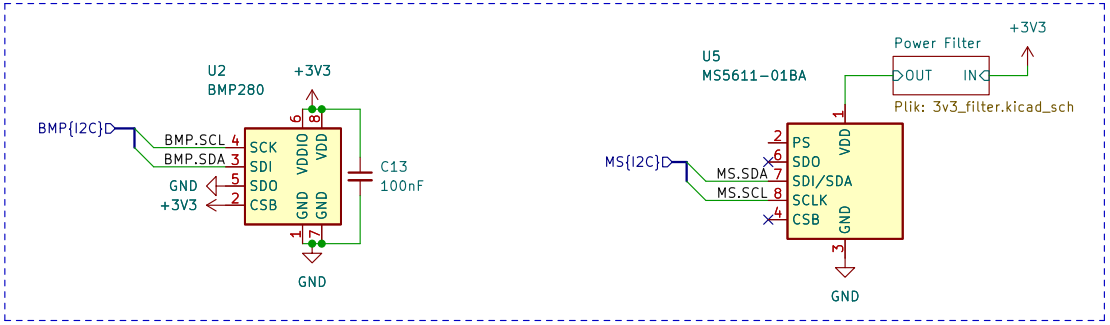
Sheet: /Marvin Connectivity/
File: MarvinConnectivity.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: 2/15

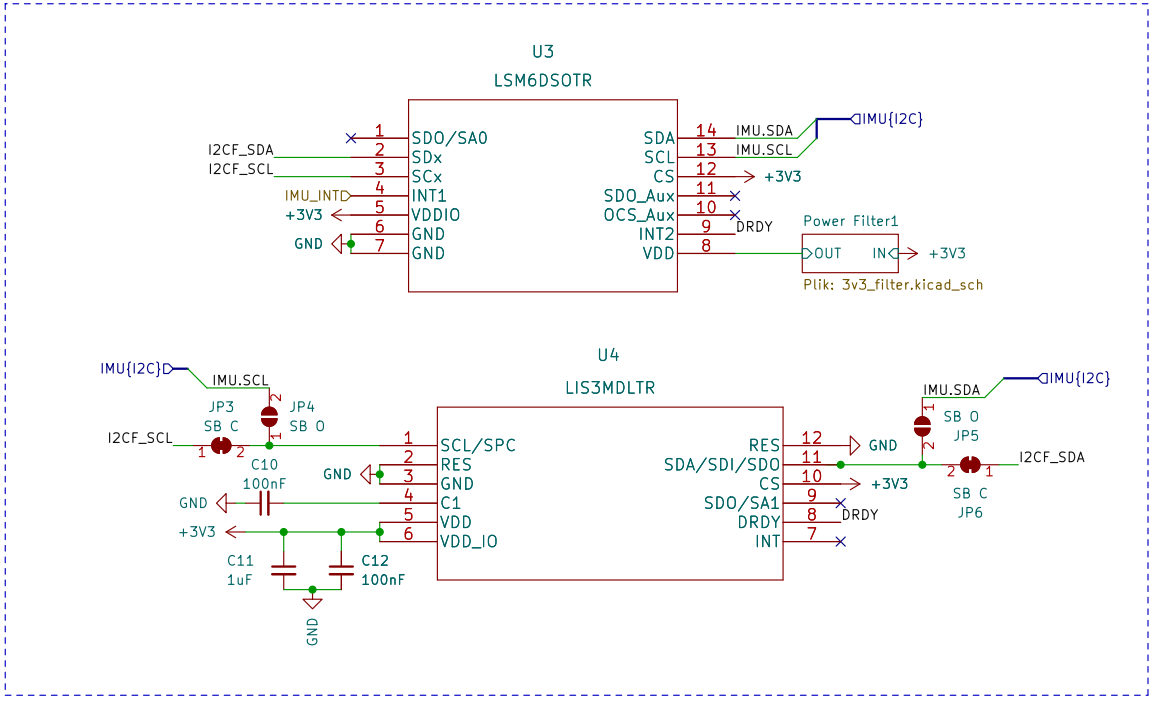
Pressure Sensors

High Performance MS5611 as a premium option, og BMP280 on a budget,
or as a redundancy for the MS.



IMU
LSM6DSOTR + LIS3MDLTR Sensor Fusion

LSM6DSO is a master of LIS3MDL over the I2CF(usion) bus,
no pullups needed, DRDY is a data ready interrupt for I2C sync between the sensors

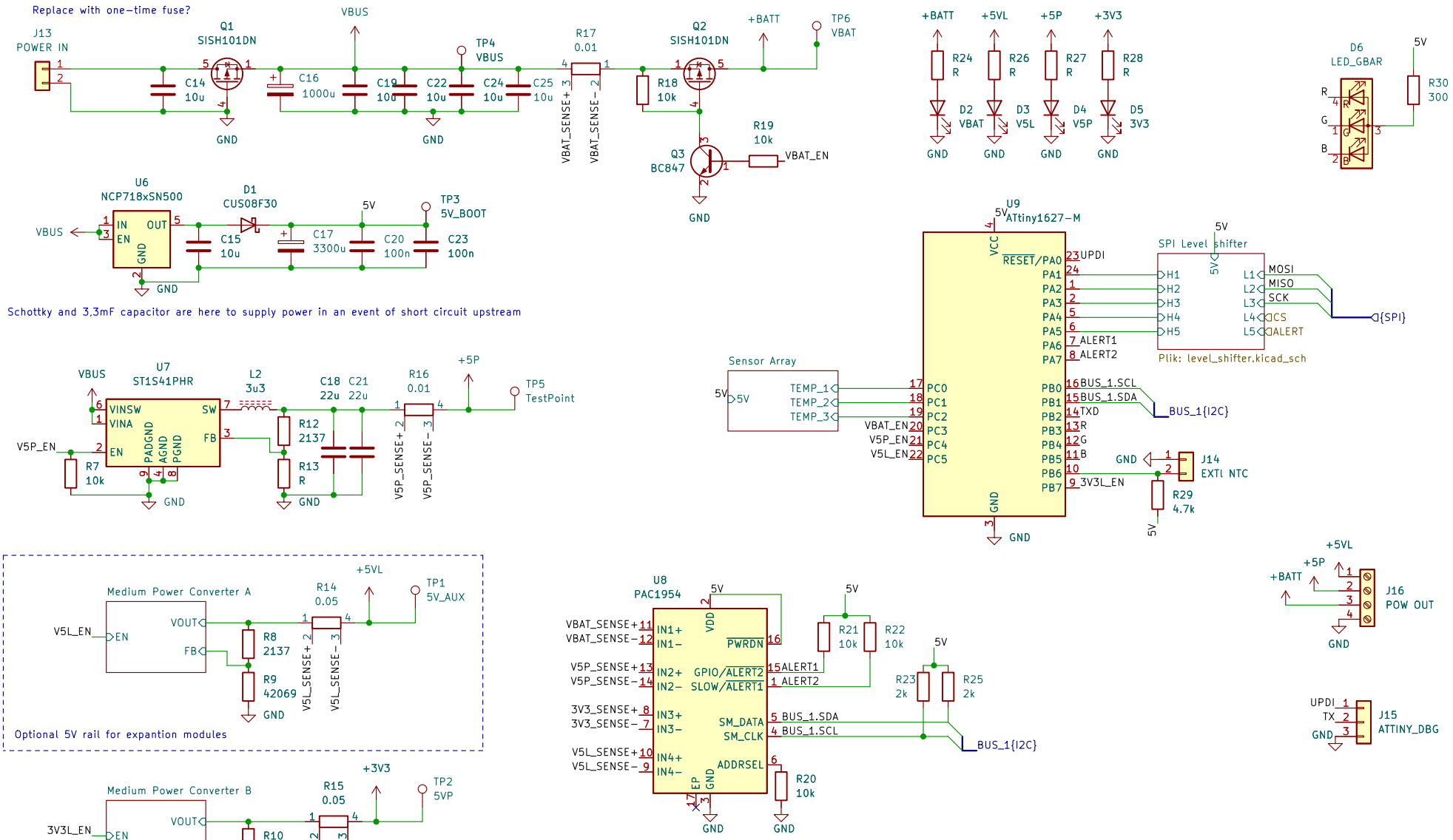


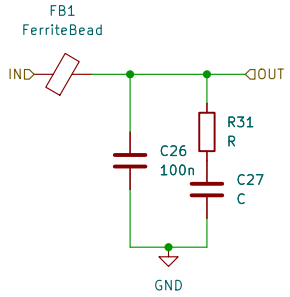
3Fall Engineering

Sheet: /Marvin Sensor Deck/
File: MarvinPeripheralsDeck.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: 3/15

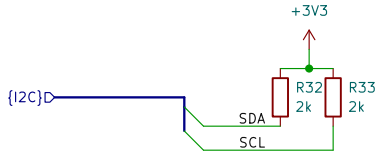

Replace with one-time fuse?
J13
POWER IN
Q1
SISH101DN
VBUS
TP4
VBUS
R17
0.01
Q2
SISH101DN
+BATT
TP6
VBAT
C14
10u
C16
1000u
C19
10u
C22
10u
C24
10u
C25
10u
R18
10k
R19
10k
Q3
BC847
VBAT_EN
VBAT_SENSE+
VBAT_SENSE−
GND
+BATT
+5VL
+5P
+3V3
R24
R
R26
R
R27
R
R28
R
D2
VBAT
D3
V5L
D4
V5P
D5
3V3
D6
LED_GBAR
R30
300
5V
U6
NCP718xSN500
IN
OUT
EN
GND
D1
CUS08F30
C15
10u
C17
3300u
C20
100n
C23
100n
TP3
5V_BOOT
Schottky and 3,3mF capacitor are here to supply power in an event of short circuit upstream
U7
ST1S41PHR
VINSW
VINA
EN
SW
FB
PADGND
AGND
PGND
L2
3u3
C18
22u
C21
22u
R12
2137
R13
R
R16
0.01
TP5
TestPoint
V5P_EN
R7
10k
V5P_SENSE+
V5P_SENSE−
U9
ATtiny1627-M
VCC
RESET/PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
UPDI
ALERT1
ALERT2
BUS_1.SCL
BUS_1.SDA
TXD
R
G
B
3V3L_EN
SPI Level shifter
MOSI
MISO
SCK
CS
ALERT
{SPI}
Plik: level_shifter.kicad_sch
Sensor Array
TEMP_1
TEMP_2
TEMP_3
VBAT_EN
V5P_EN
V5L_EN
BUS_1{I2C}
J14
EXTI NTC
R29
4.7k
Medium Power Converter A
V5L_EN
VOUT
FB
R14
0.05
TP1
5V_AUX
R8
2137
R9
42069
V5L_SENSE+
V5L_SENSE−
Optional 5V rail for expantion modules
U8
PAC1954
VDD
IN1+
IN1−
IN2+
IN2−
IN3+
IN3−
IN4+
IN4−
PWRDN
GPIO/ALERT2
SLOW/ALERT1
SM_DATA
SM_CLK
ADDRSEL
EP
R21
10k
R22
10k
R23
2k
R25
2k
R20
10k
Compatible with PAC1934 or PAC1953, PAC1933 if +5C is not used
J16
POW OUT
J15
ATTINY_DBG
UPDI
TX
Medium Power Converter B
3V3L_EN
R15
0.05
TP2
5VP
R10
?
R11
?
3V3_SENSE+
3V3_SENSE−
todo: add reverse protection? (programmin header)
Power Supply Section
Generates 3.3V, 5V for logic, 5V for Expansion and Unregulated
Four rail are independently monitored
Also provides 3 temperature sensors
Attiny communictes with the main system processor over SPI
TODO:
– Add alert Master connection
3Fall Engineering
Sheet: /Power supply/
File: psu_board.kicad_sch
Title: Marvin flight controller
Size: A4
Date:
Rev: 0.1.1
KiCad E.D.A. kicad (6.0.8)
Id: 4/15



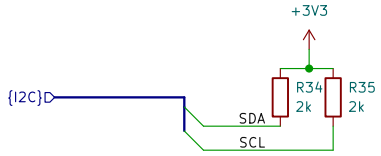
Sheet: /Marvin Sensor Deck/Power Filter1/
File: 3v3_filter.kicad_sch

Title:

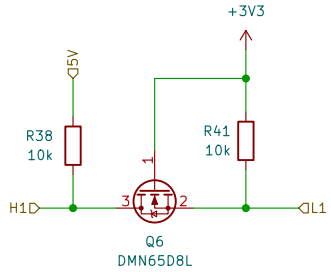
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 5/15

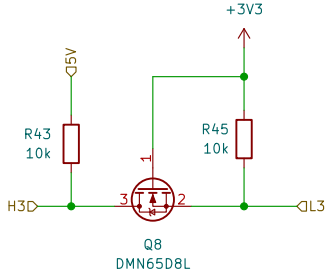


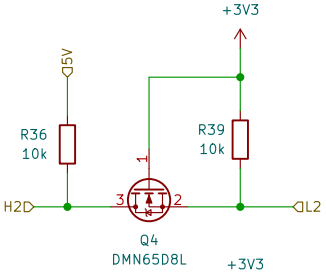
Sheet: /I2C_PULLUP1/		
File: pullup_i2c.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 6/15

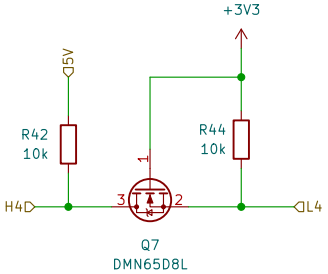


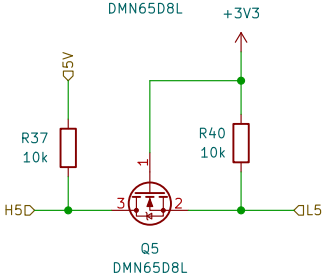
Sheet: /I2C_PULLUP2/		
File: pullup_i2c.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 7/15









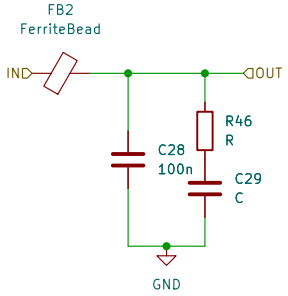


3Fall Engineering

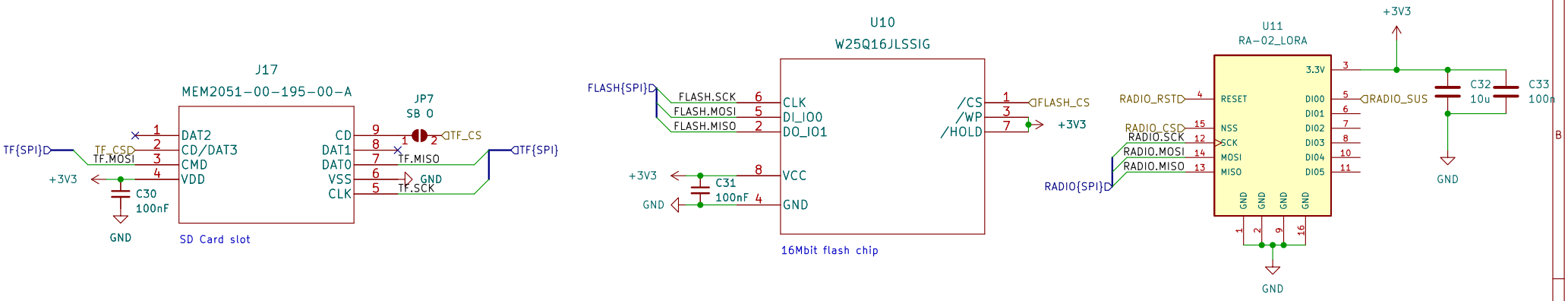
Sheet: /Power supply/SPI Level shifter/
File: level_shifter.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: 8/15



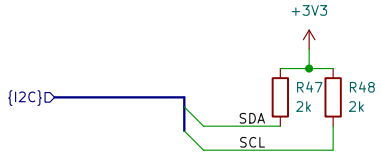
Sheet: /Marvin Sensor Deck/Power Filter/ File: 3v3_filter.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 9/15



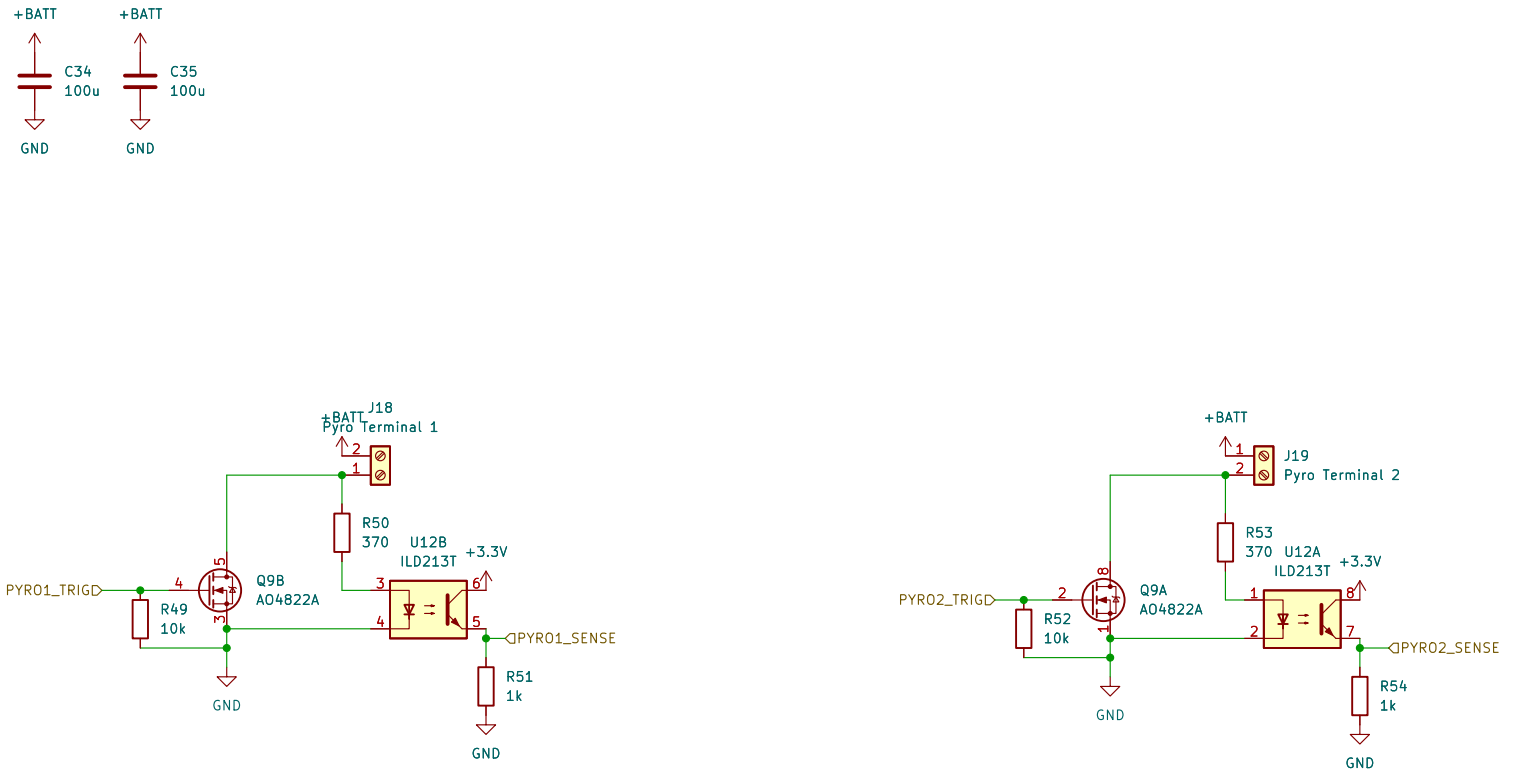
Sheet: /Marvin Communications Deck/
File: comms.kicad_sch

Title:

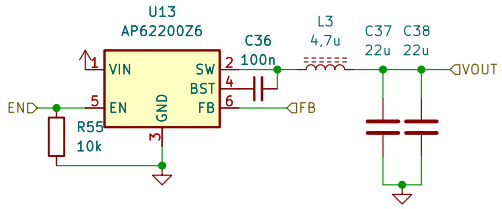
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 11/15



Sheet: /I2C_PULLUP/		
File: pullup_i2c.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 12/15



Sheet: /Pyro Channels/		
File: pyro_sheet.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.8)		Id: 15/15

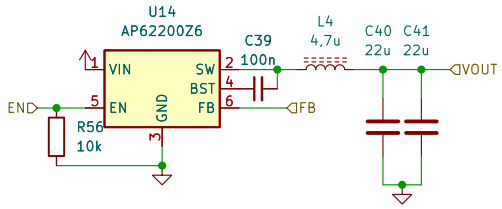


3Fall Engineering

Sheet: /Power supply/Medium Power Converter A/
File: medium_power_converter.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: #/15

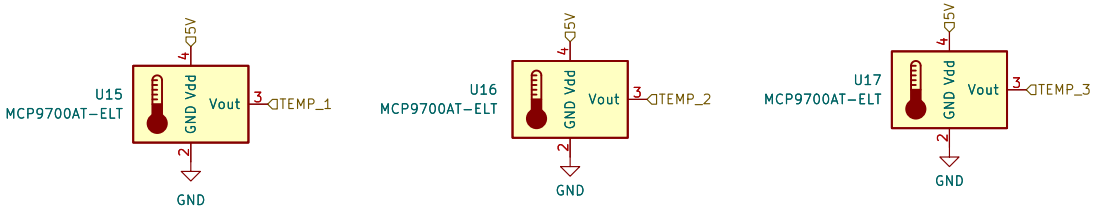


3Fall Engineering

Sheet: /Power supply/Medium Power Converter B/
File: medium_power_converter.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: #/15



System manager temperture sensor array

3Fall Engineering

Sheet: /Power supply/Sensor Array/
File: psu_sensor_array.kicad_sch

Title: Marvin flight controller

Size: A4	Date:	**Rev: 0.1.1**
KiCad E.D.A. kicad (6.0.8)		Id: #/15