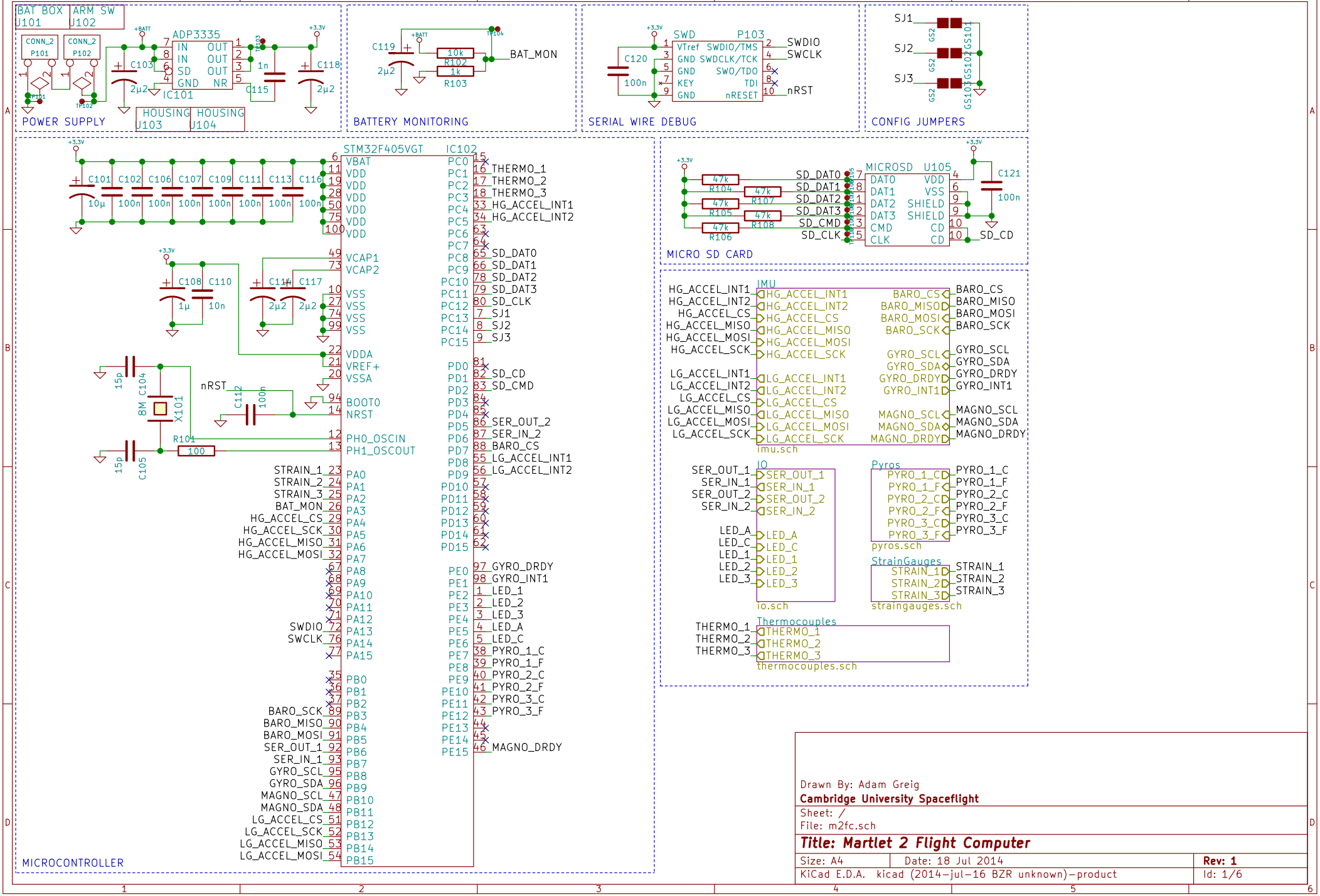
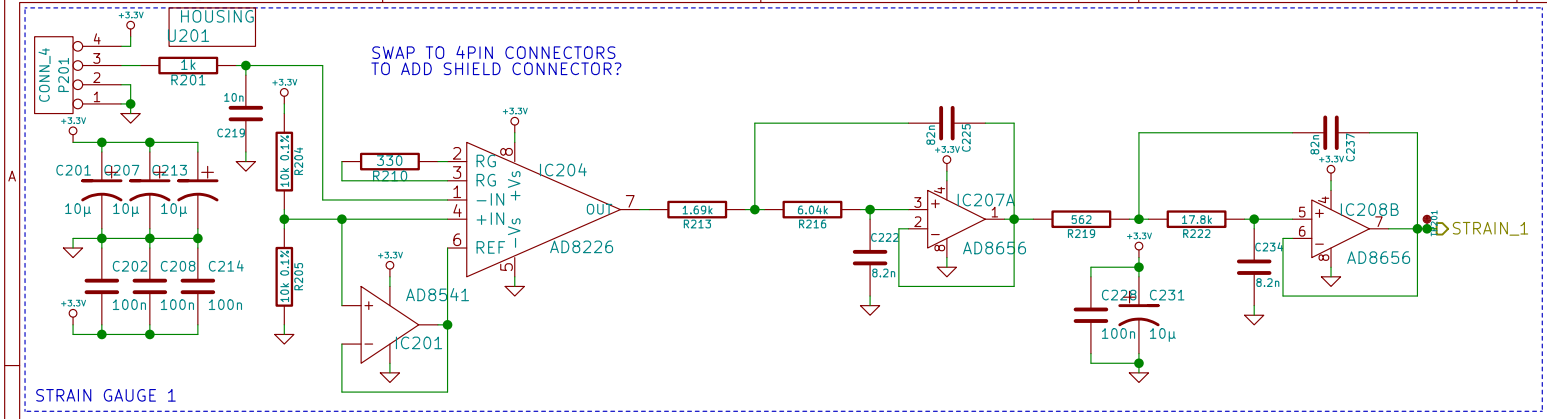
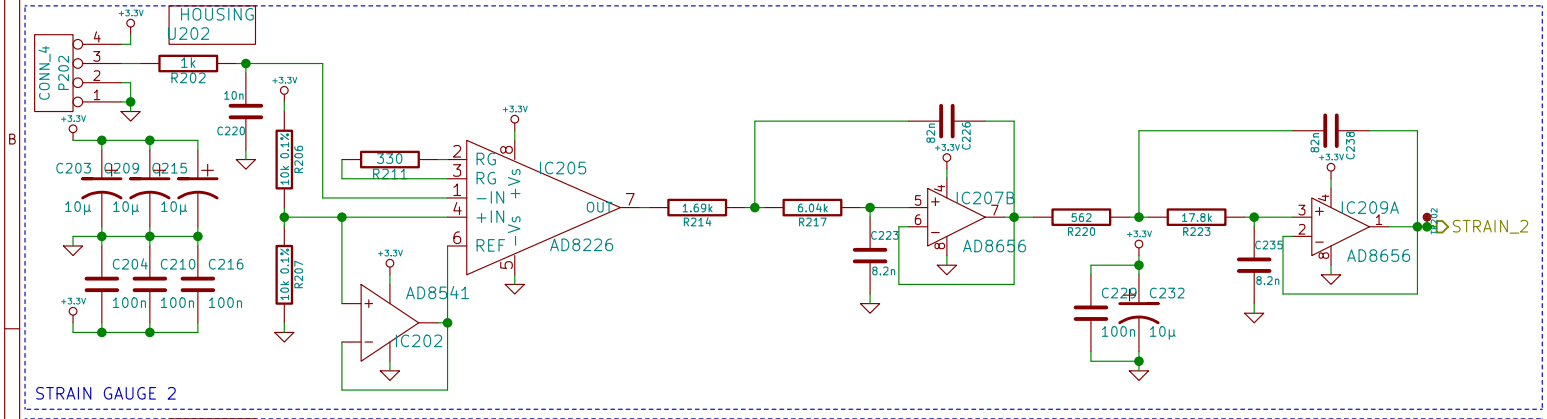
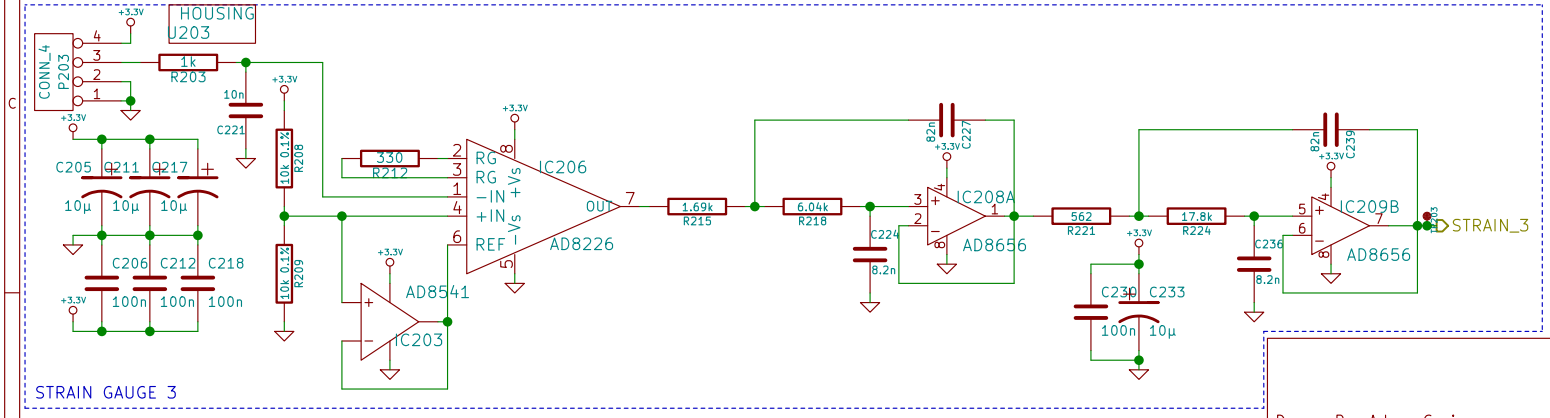

BAT BOX U101
ARM SW U102
CONN_2 P101
CONN_2 P102
ADP3335
IC101
HOUSING U103
HOUSING U104
POWER SUPPLY
BATTERY MONITORING
BAT_MON
SERIAL WIRE DEBUG
SWD P103
SWDIO
SWCLK
nRST
CONFIG JUMPERS
SJ1
SJ2
SJ3
STM32F405VGT IC102
MICROCONTROLLER
MICRO SD CARD
MICROSD U105
SD_DAT0
SD_DAT1
SD_DAT2
SD_DAT3
SD_CMD
SD_CLK
SD_CD
IMU
imu.sch
IO
io.sch
Pyros
pyros.sch
StrainGauges
straingauges.sch
Thermocouples
thermocouples.sch
Drawn By: Adam Greig
Cambridge University Spaceflight
Sheet: /
File: m2fc.sch
Title: Martlet 2 Flight Computer
Size: A4
Date: 18 Jul 2014
Rev: 1
KiCad E.D.A. kicad (2014-jul-16 BZR unknown)-product
Id: 1/6







FILTERING
==========
Signals of interest: 0 to 1200Hz
Nyquist: 10kHz
Sample: 20kHz

FRONTEND FILTER

Fc = 1/(2 pi RC) = 16kHz

ANTIALIAS FILTER

−3dB: 2kHz
Rejection at Nyquist: −55dB

INSTRUMENTATION AMPLIFIER
==========

Gain = 1 + 49400/R_G (AD8226 datasheet)

R_G is 330 so G=150.70

Gauge factor GF=2
Max strain 0.23% is 2.3E−3
Change in R therefore 4.6E−3 * R0
Gauges are R0=120
Strained R=(1+4.6E−3)R0=120.552
Giving voltage V=[Rs/(Rs+R0) * Vs] − Vs/2=3.78mV

Errors due to tolerance: as much as 2.47mV
Errors due to temperature: up to 1mV

Total required headroom then say 7.5mV
Max output is 3.3V (supply) − 0.1V (amp limit) = 3.2V
Headroom is 3.2 − (3.3/2) = 1.55V
Highest permissible gain 1.55/7.5E−3 = 206

So gain of 150 leads sufficient headroom:
Max differential signal amplitude: 1.55/150.7=10.2mV

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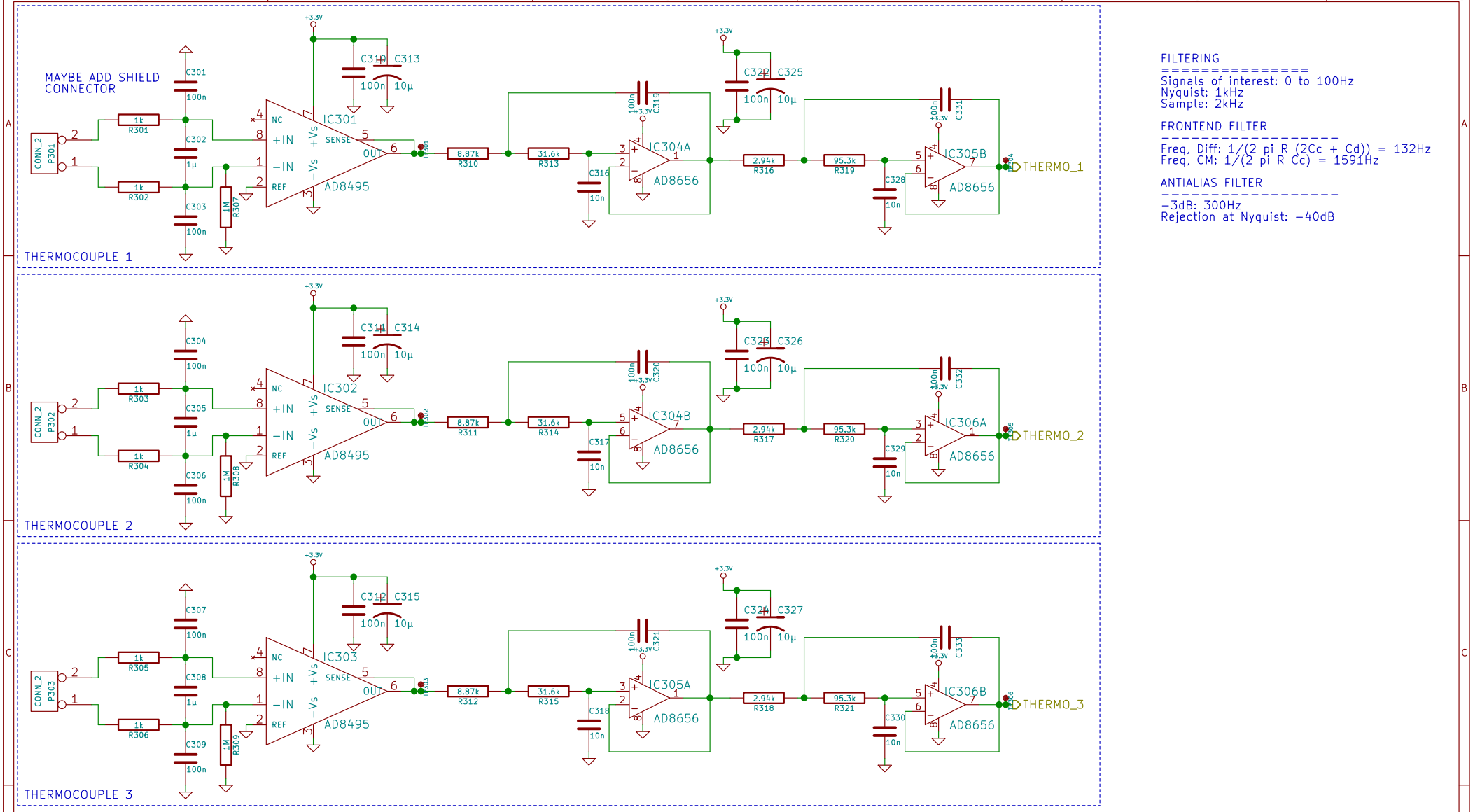
Sheet: /StrainGauges/
File: straingauges.sch

Title: Martlet 2 Flight Computer

Size: A4	Date: 18 Jul 2014	**Rev: 1**
KiCad E.D.A. kicad (2014−jul−16 BZR unknown)−product		Id: 2/6

STRAIN GAUGES



FILTERING
==========
Signals of interest: 0 to 100Hz
Nyquist: 1kHz
Sample: 2kHz

FRONTEND FILTER

Freq, Diff: 1/(2 pi R (2Cc + Cd)) = 132Hz
Freq, CM: 1/(2 pi R Cc) = 1591Hz

ANTIALIAS FILTER

-3dB: 300Hz
Rejection at Nyquist: -40dB

THERMOCOUPLES

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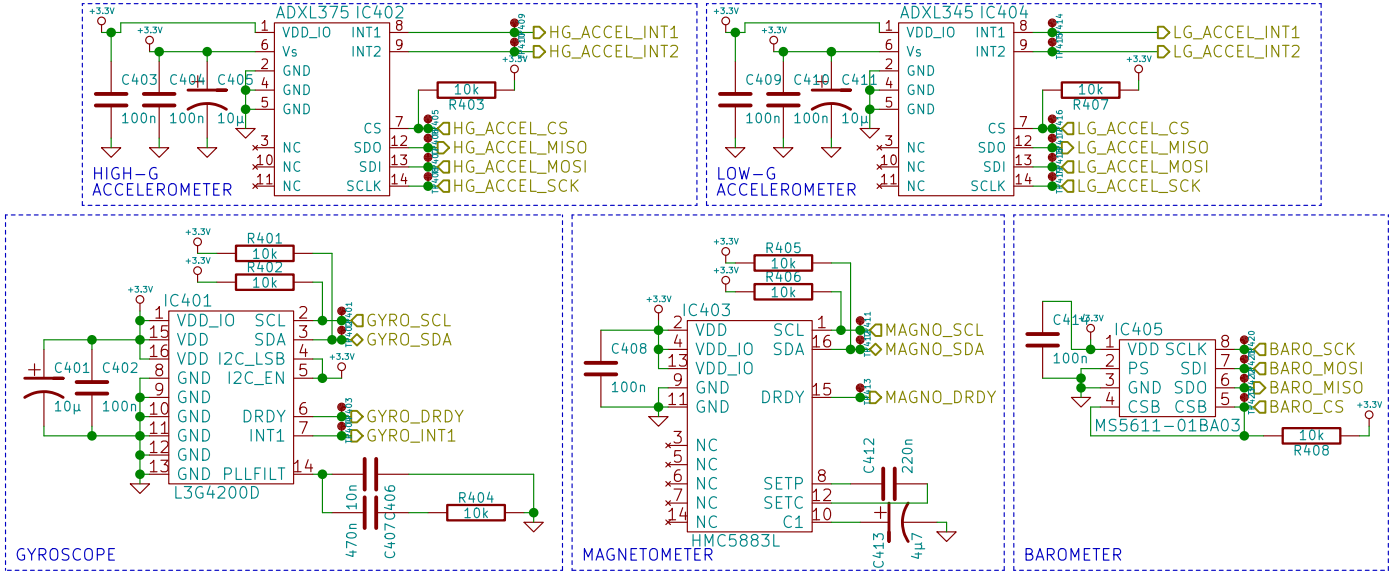
Sheet: /Thermocouples/
File: thermocouples.sch

Title: Martlet 2 Flight Computer

Size: A4	Date: 18 Jul 2014	**Rev: 1**
KiCad E.D.A. kicad (2014-jul-16 BZR unknown)-product		Id: 3/6

INERTIAL MEASUREMENT UNIT



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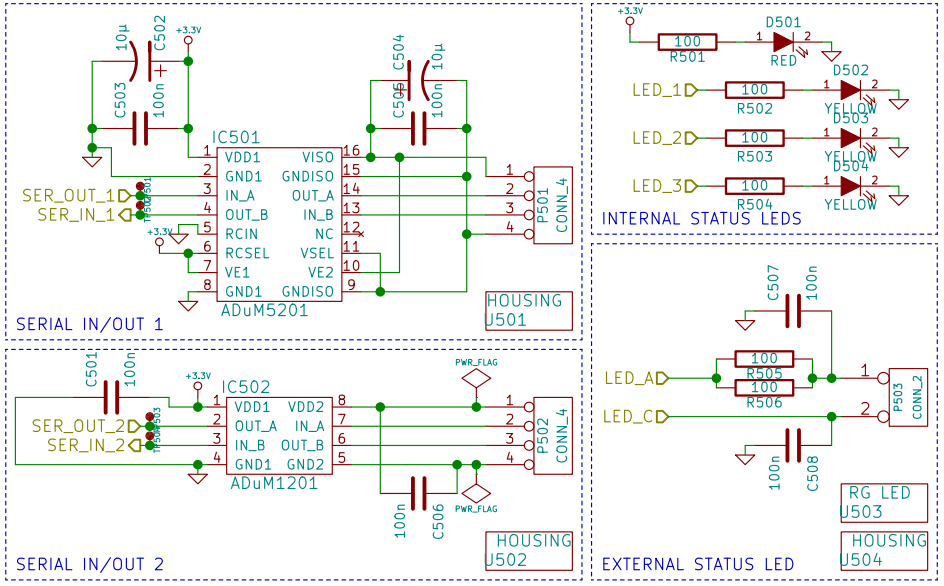
Sheet: /IMU/

File: imu.sch

Title: Martlet 2 Flight Computer

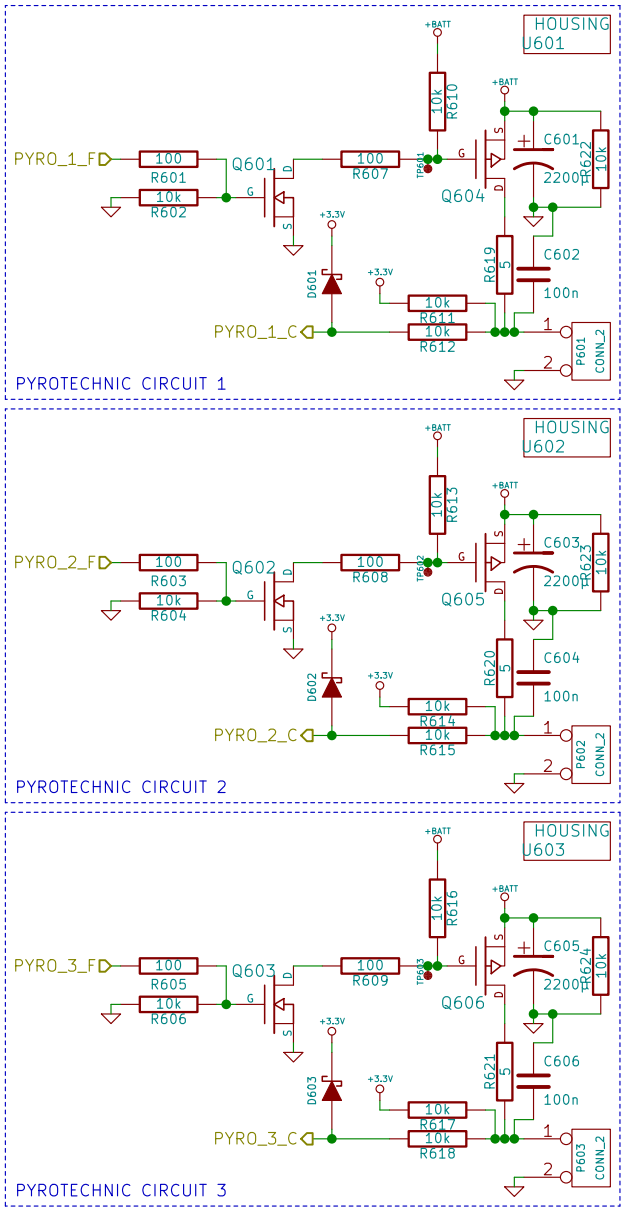
Size: A4	Date: 18 Jul 2014	**Rev: 1**
KiCad E.D.A. kicad (2014-jul-16 BZR unknown)-product		Id: 4/6

INPUT/OUTPUT



Drawn By: Adam Greig		
Cambridge University Spaceflight		
Sheet: /IO/		
File: io.sch		
Title: Martlet 2 Flight Computer		
Size: A4	Date: 18 Jul 2014	**Rev: 1**
KiCad E.D.A. kicad (2014-jul-16 BZR unknown)-product		Id: 5/6

PYROTECHNIC CHANNELS



Drawn By: Adam Greig
Cambridge University Spaceflight

Sheet: /Pyros/
File: pyros.sch

Title: Martlet 2 Flight Computer

Size: A4	Date: 18 Jul 2014	**Rev: 1**
KiCad E.D.A. kicad (2014-jul-16 BZR unknown)-product		Id: 6/6