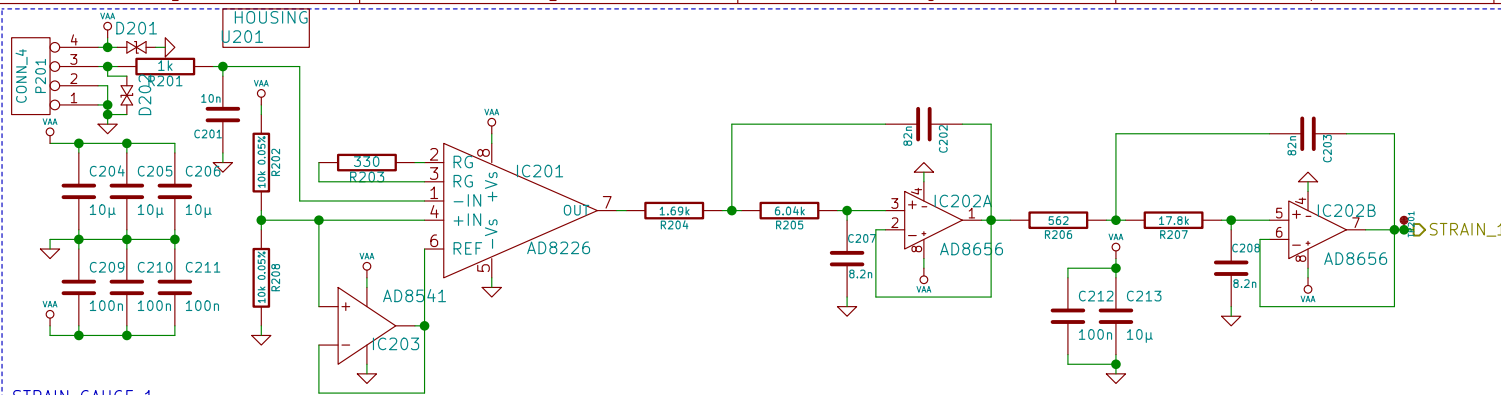


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Sheet: /
File: m2fc.sch

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STRAIN GAUGE 1

FILTERING

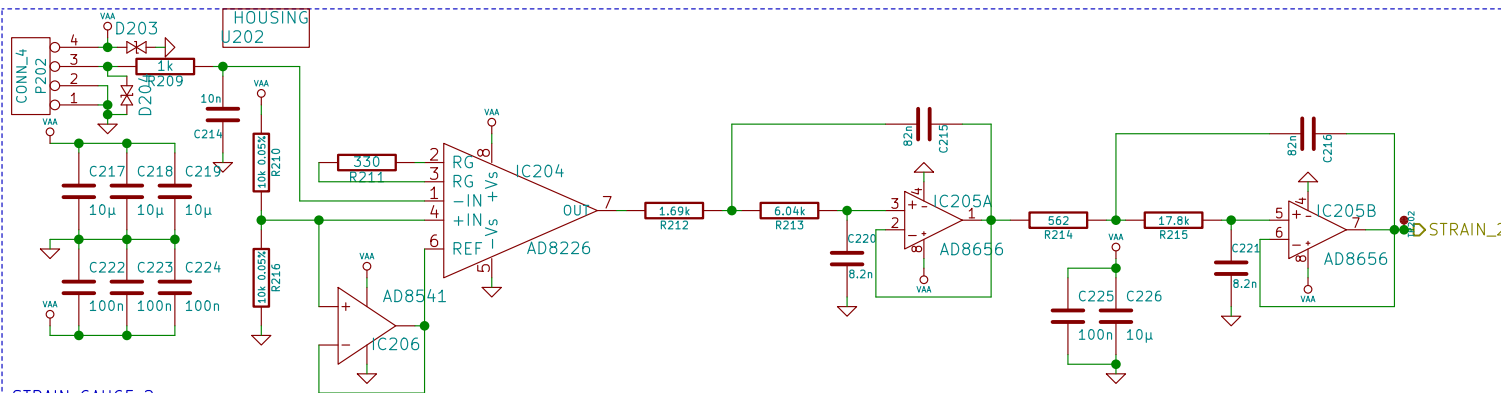
=====
 Signals of interest: 0 to 1200Hz
 Nyquist: 10kHz
 Sample: 20kHz

FRONTEND FILTER

 $F_c = 1/(2 \pi RC) = 16\text{kHz}$

ANTI_ALIAS FILTER

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



STRAIN GAUGE 2

INSTRUMENTATION AMPLIFIER

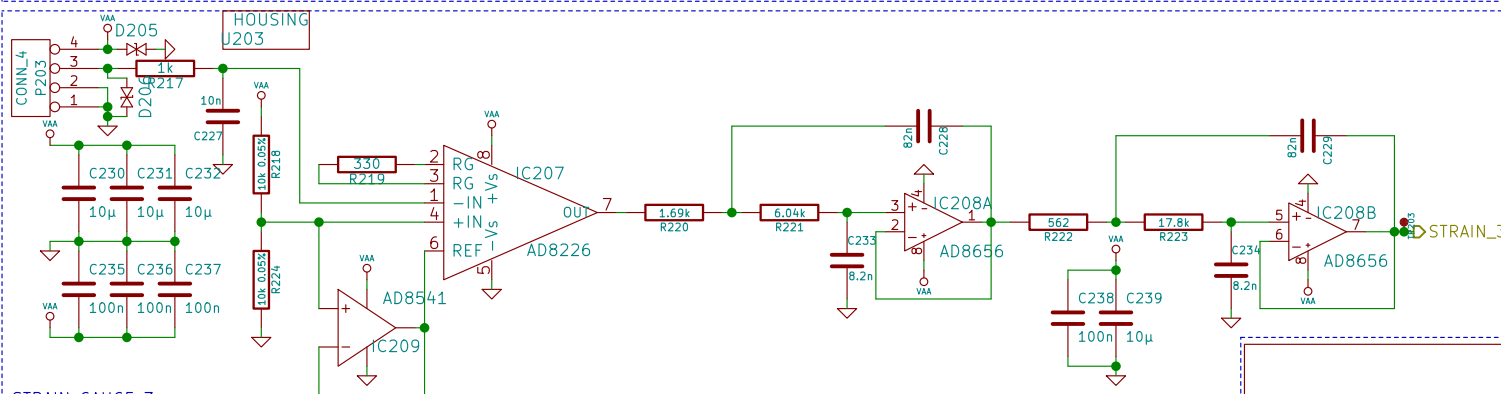
=====
 Gain = $1 + 49400/R_G$ (AD8226 datasheet)
 R_G is 330 so G=150.70

Gauge factor GF=2
 Max strain 0.23% is $2.3E-3$
 Change in R therefore $4.6E-3 * R_0$
 Gauges are $R_0=120$
 Strained $R=(1+4.6E-3)R_0=120.552$
 Giving voltage $V=[R_s/(R_s+R_0) * V_s] - V_s/2=3.78\text{mV}$

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 $3.3V (\text{supply}) - 0.1V (\text{amp limit}) = 3.2V$
 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: $1.55/150.7=10.2\text{mV}$



STRAIN GAUGE 3

STRAIN GAUGES

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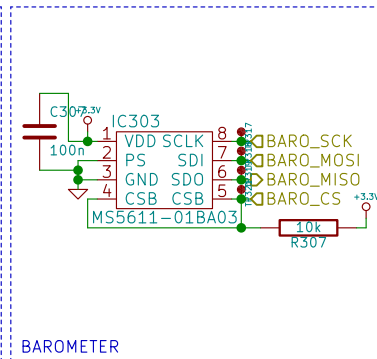
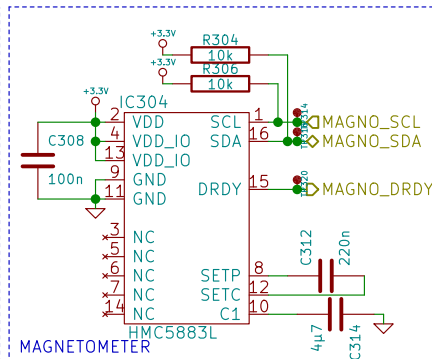
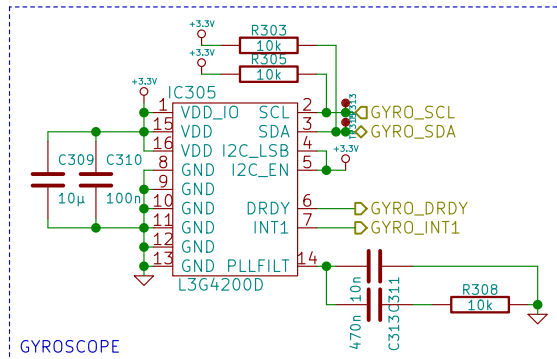
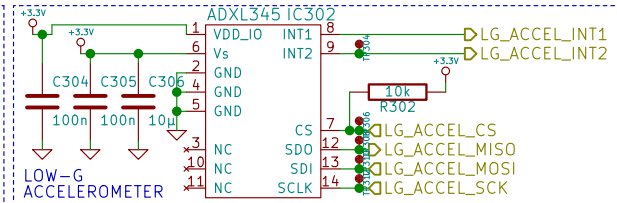
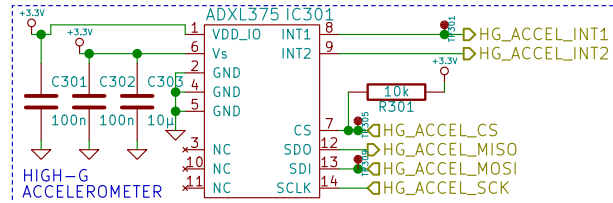
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 File: straingauges.sch

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INERTIAL MEASUREMENT UNIT



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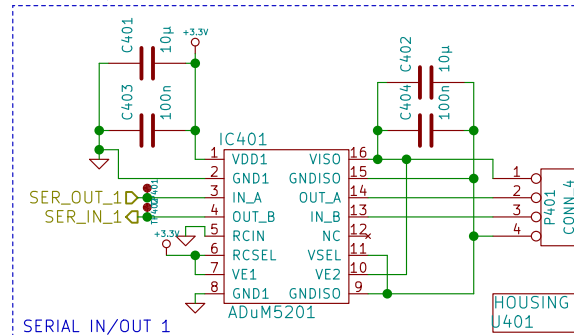
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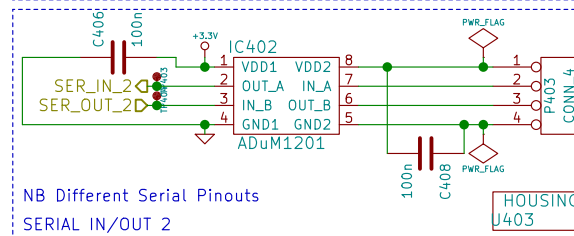
Size: A4 Date: 18 Jul 2014
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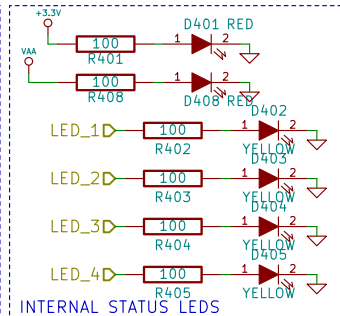
INPUT/OUTPUT



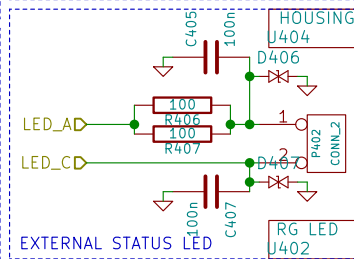
SERIAL IN/OUT 1



NB Different Serial Pinouts
SERIAL IN/OUT 2



INTERNAL STATUS LEDS



EXTERNAL STATUS LED

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File: io.sch

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Pyrotechnic Circuit 4

The diagram shows the output stage of the 100nF capacitor tester. It features two MOSFETs, Q503 and Q504, which are driven by the PYRO_2_FD signal. The output of the stage is PYRO_2_C, which is connected to a 100nF capacitor. The circuit is powered by +BATT and +3.3V. A 100nF capacitor is connected to the output. The diagram is labeled 'HOUSING U502'.

The diagram illustrates the internal circuitry of the PyroSense module. It features two input channels, PYRO_3_FD and PYRO_3_C, each with a 100k resistor (R516, R517) and a 10k resistor (R518, R521) connected to a +3.3V supply. The PYRO_3_FD channel uses a Q506 MOSFET and a Q505 MOSFET. The PYRO_3_C channel uses a D505 diode and a D509 diode. A 100nF capacitor (C503) is connected to the PYRO_3_C input. The output of the PYRO_3_C channel is connected to a P503 connector. A HOUSING U503 is shown at the top right.

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