

What it is

When (context)

## RMG Signal Filter

27<sup>th</sup> Sept 16

Specifications:

Cutoff frequency: 180 Hz  
 > 40 dB rejection at 60 Hz  
 < 1 dB passband ripple

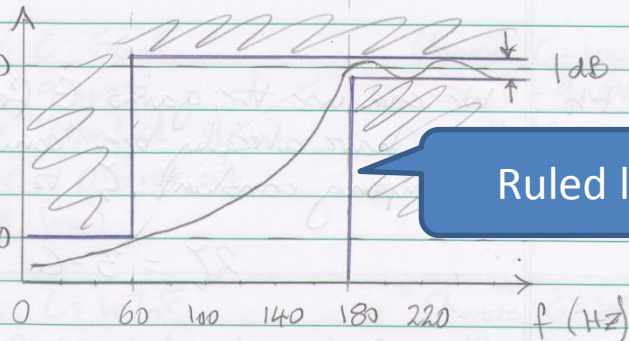
} → HPF

Requirements

Design:

1-1

Relative amplitude (dB)



Ruled lines

Labelled axes

1-2 Using tables provided:

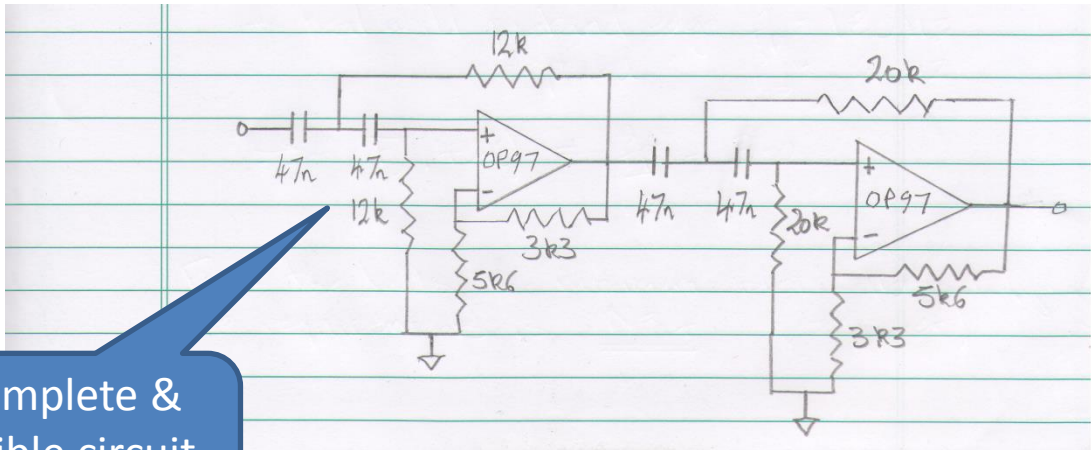
\* Chebyshev 2.0 dB does not satisfy ripple spec  
 ∴ must use Chebyshev 0.5 dB

Explain what we are doing

\* Real-world passband edge  $f_p = 180$  Hz  
 " stopband "  $f_s = 60$  Hz

$$\Rightarrow F_s (40\text{dB}) = \frac{f_p}{f_s} = 3.0$$

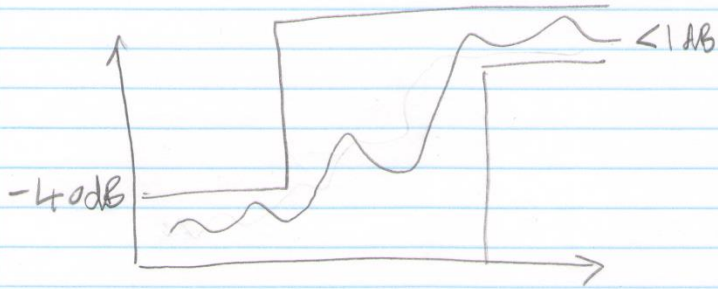
From the tables, the minimum order filter satisfying the requirements is  $N=4$  (see over)



Complete &  
legible circuit  
diagram

**ACID TEST:** would another Biomedical Engineer (or *future you*) be able to understand, modify, build and test the circuit based on your notes?

What is this?



$$\frac{180}{60} = 3$$

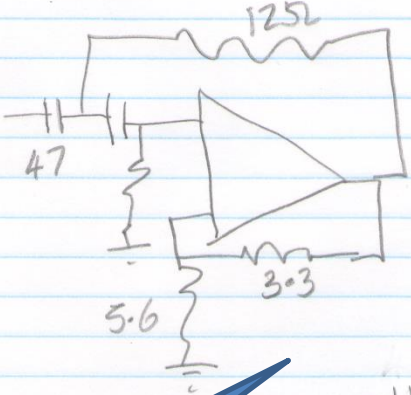
$$\frac{180}{60} = 3$$

Where does this come from?

4<sup>th</sup> order = ~ 2 stages

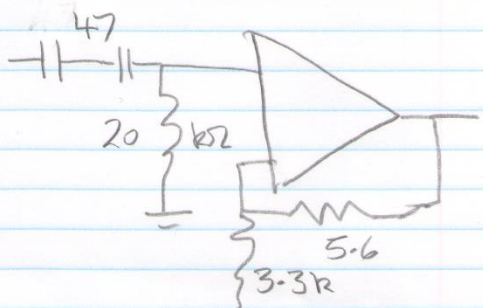
$$\frac{180}{0.597} = 301.01$$

$$\frac{180}{1.031} = 174.6$$



Units?

Freehand, missing labels



Has ALL the "answers" but is far from engineering quality