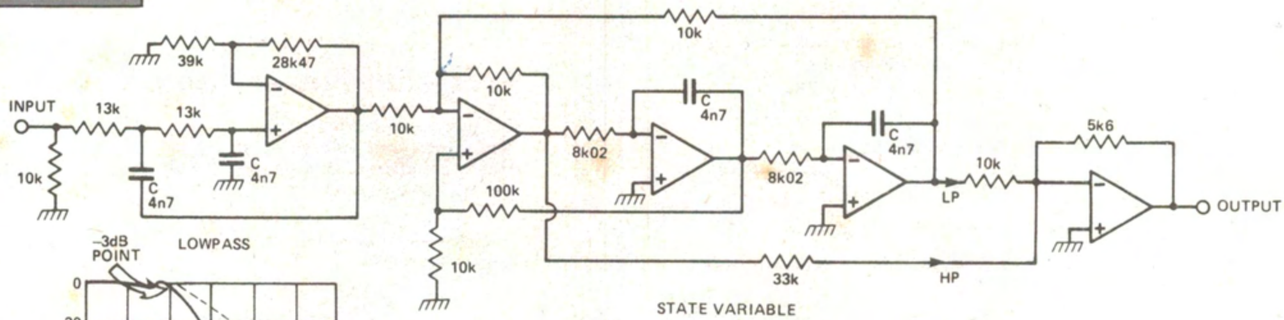
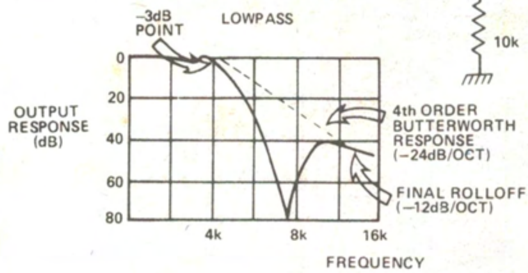




4th Order Elliptic lowpass

Cutoff frequency is 4 kHz. To change cutoff frequency, scale capacitor C (four off)

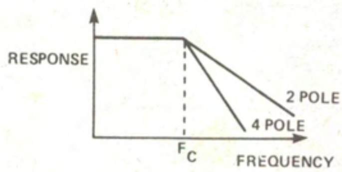
Lowpass Active Filters

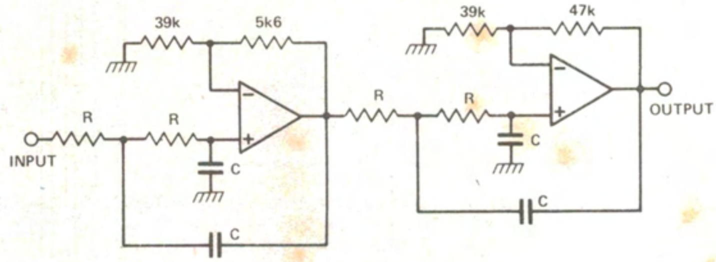
Inputs must have a DC path to ground

$$F_c = \frac{1}{2\pi RC}$$

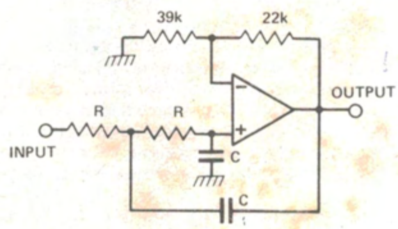
2 pole roll-off = −12 dB/octave
4 pole roll-off = −24 dB/octave

R	C	F_C
107k	15n	100 Hz
10k7	15n	1 kHz
10k7	1n5	10 kHz





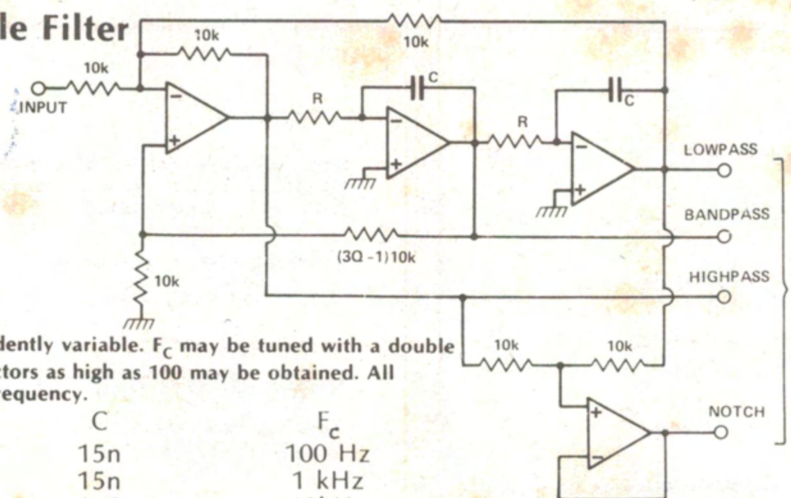
4 pole Butterworth

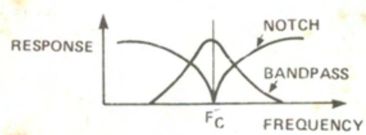


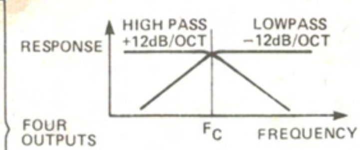
2 pole Butterworth

State Variable Filter

$$F_c = \frac{1}{2\pi RC}\ \text{Hz}$$





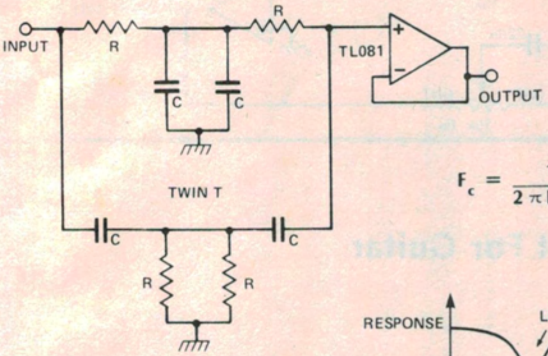


Gain = Q
Q and F_C are independently variable. F_C may be tuned with a double gang pot (for R). Q factors as high as 100 may be obtained. All responses track with frequency.

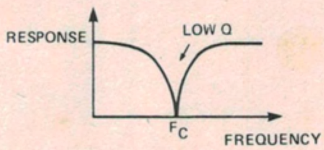
R	C	F_c
107k	15n	100 Hz
10k7	15n	1 kHz
10k7	1n5	10kHz

Active Notch Filter

The two R's in parallel represent R/2
The two C's in parallel represent 2C
For 50 Hz, R = 680k, C = 4n7 (a hum remover)

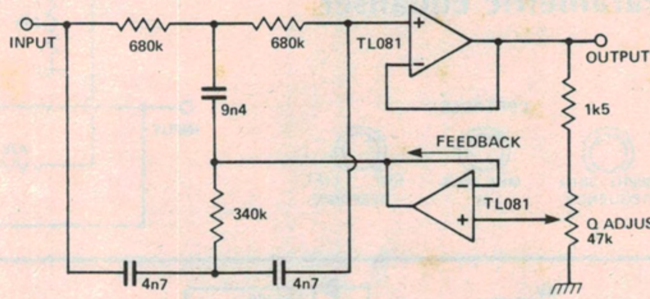


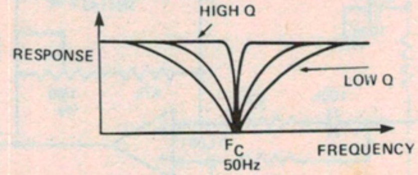
$$F_c = \frac{1}{2\pi RC}$$



A basic Twin-Tee notch. Rejection depends on component matching, so for best results use high-stability components.

50 Hz Notch, Variable Q

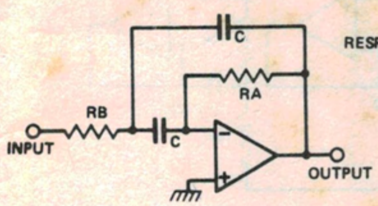


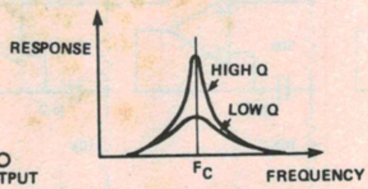


This is a modified version of the basic Twin-Tee notch filter. The Q can be adjusted by controlling the amount of feedback with the 47k potentiometer. The rejection offered by the circuit is determined by the matching of the passive components, but even with ordinary components a figure of 30 dB to 40 dB should be obtained.

Bandpass Active Filter

$F_C = 1/2\pi C\sqrt{RA+RB}$
$Q = 1/2\sqrt{RA/RB}$
Gain $= 2Q^2$





F_C = 1kHz, C = 15n

RA	RB	Q	GAIN
10k6	10k6	0.5	x 0.5
21k2	5k3	1.0	x 2.0
42k4	2k65	2.0	x 8.0
84k8	1k32	4.0	x 32.0

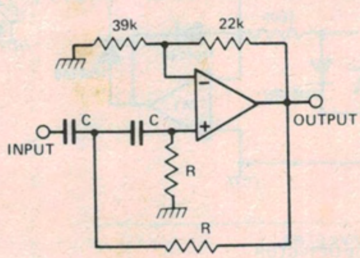
This is probably the most common bandpass filter. The circuit is really only useful for the relatively low Q shown. For a higher Q one of the more complex bandpass circuits should be used, such as the state variable filter.

Highpass Active Filters

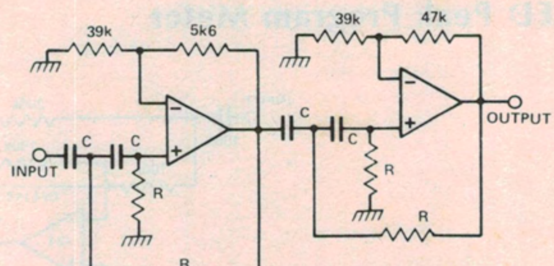
$$F_c = \frac{1}{2\pi RC} \text{ Hz}$$

2 pole roll-off = +12 dB/octave
4 pole roll-off = +24 dB/octave

R	C	F_C
107k	15n	100 Hz
10k7	15n	1 kHz
10k7	1n5	10 kHz



2 pole Butterworth



4 pole Butterworth