

# Bandpass Filter for 1.6 MHz

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Hallo

To clean up the outputs of a DDS I am looking for a bandpass filter with the following properties:

- + Center frequency 200 kHz to 1600 kHz, fixed
- + 3-dB bandwidth 100 kHz
- + Voltage gain 1
- + Max. signal level 2 V pp
- + Slopes 20 dB/dec

There will be multiple DDS, each producing a different frequency in the range from 200 to 1600 kHz. Each DDS may sweep by  $\pm 50$  kHz around its nominal frequency. The filters should reduce noise, harmonics, and aliases from the DDS output signals.

Filters should be simple to construct and tune. The effects of component value tolerances on the center frequency must be compensated somehow, preferably by adjustment of one resistor.

I tried to use a multi-feedback (MFB) opamp bandpass filter topology. See here for a schematic and dimensioning:

<http://sound.westhost.com/project63.htm> . I tried with  $R1 = 12$  k,  $R2 = 62$ ,  $R3 = 24$  k,  $C1 = C2 = 82$  p. What I like about this circuit is that its center frequency can be adjusted by just changing  $R2$ , without affecting bandwidth or gain. What I don't like is that the voltage divider  $R1 - R2$  heavily attenuates the input signal, resulting in an extremely noisy output signal. It amplifies the opamp noise voltage by a factor of several hundred!

My questions: What circuit should I use here? Active opamp or LC, which topology? Which opamp?

Regards,  
Hans

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