FDNR FILTER DESIGN FORMULAS

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By: Frank McClatchie

The following formulas can be used to convert a *normalized* low pass filter design to a F
normalized capacitance through the FDNR conversion process to resistors that simulate
for each FDNR section. Additional sections may be added if a sharper cut off is required.
sections that require six FDNR operational amplifiers plus the zero source impedance op
at the output for a total of eight operational amplifiers.

Rc = 2 * PIE * Fc * Cfdnr * Rfdnr * Rfdnr = Resistance value that transforms to Capacity.

. Farads

Rl = Henrys = Resistance value that transforms to Inductance.

. 2 * PIE * Fc * Cfdnr

The FDNR internal components must be high quality, temperature stable value compone
value, and so are the internal resistors.

Rfdnr = R2, = R4 = 1000 Ohms 1%

Cfdnr = C1, C3, Ct = 0.01 Micro Farad temperature stable capacitors, 1%. , or trim with par
because the Reactance of 0.01 microfarads equals 1000 ohms at 15,000 Hz, thus making
off frequency.

Fc = Cut-off frequency of LPF (Low Pass Filter).

When the suggested FDNR internal components are used to implement the FDNR, then

Rc (2, 4 , 6) = $\frac{2 * PIE * Fc * 0.01}{}$ = Resistance value that transforms to Capacity.

. Farads (F2, F4, F6)

Rl(1, 3, 5, 7,) = $\frac{Henrys * 100,000,000}{}$ = Resistance value that transforms to Indu

. 2 * PIE * Fc (H1, H3, H5. H7)

THE FOLLOWING FORMULAS ASSUME (TWO) 0.01 MICROFARAD CAPACITORS AND (TWO

Rc = $\frac{0.0628319 * Fc}{}$

. Farads

. 6

Rl = $\frac{15.9155 * 10 * Henries}{}$

. Fc

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Don McClatchie

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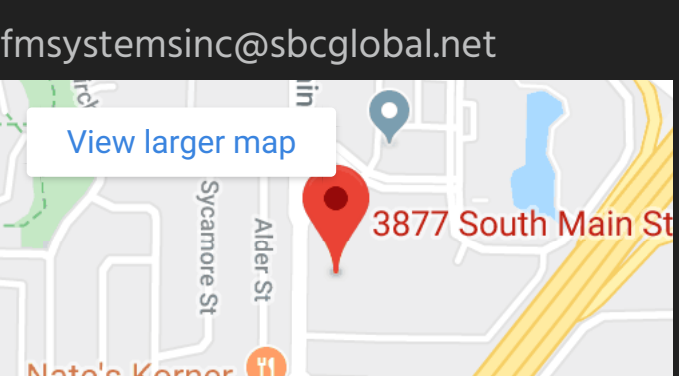

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