Bandpass 2. Another multiple-feedback circuit uses an additional active element to overcome some of the disadvantages of the single-amplifier circuit, especially the bandpass realization for Q's roughly between 10 and 50. High Q's realized with bandpass 1 have large spreads of element values and high Q sensitivities to element value changes. The multiple-feedback circuit with positive feedback is shown in Fig. 8.6. The voltage transfer function is

$$\frac{E_o}{E_1}(s) = \frac{s(K/R_1C_4)}{s^2 + (s/R_5C_4)(1 + C_4/C_3 - KR_5/R_6) + (1/C_3C_4R_5)(1/R_1 + 1/R_2 + 1/R_6)}$$

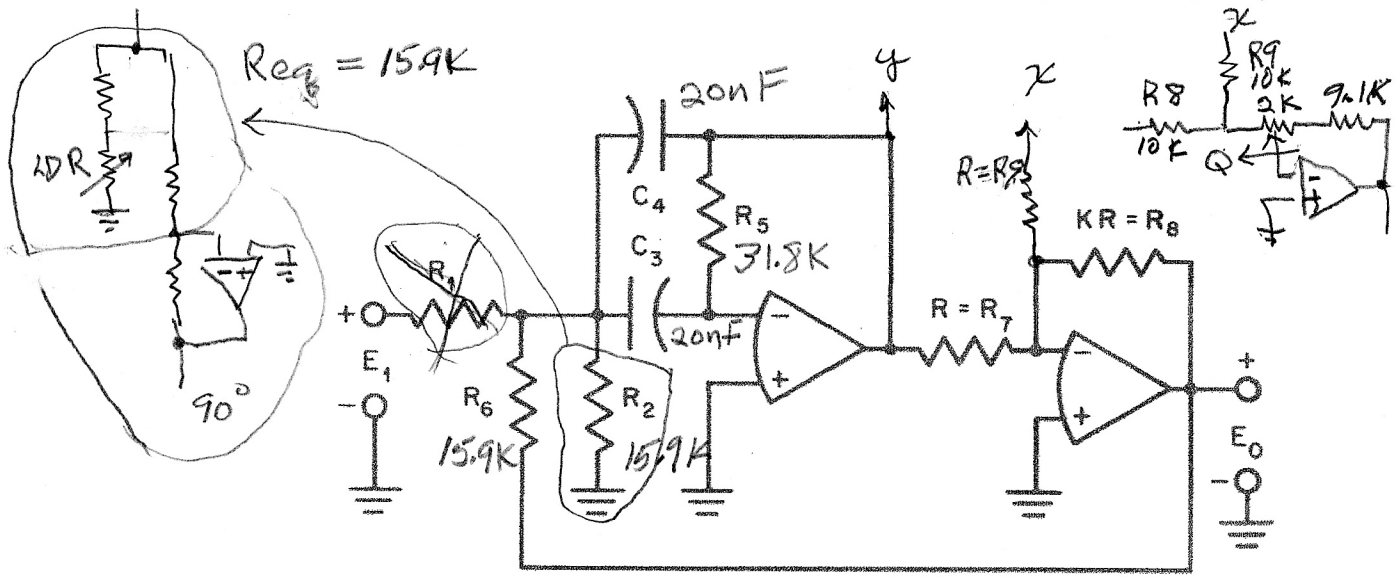

Fig. 8.6 Multiple-feedback bandpass circuit with positive feedback.

$$\frac{y}{x} = \frac{KH_o}{1 - KH_o} \cdot \frac{s\alpha\omega_o(1 - KH_o)}{s^2 + s\alpha\omega_o(1 - KH_o) + \omega_o^2}$$

$$H_o' = \frac{KH_o}{1 - KH_o} \qquad Q' = \frac{1}{\alpha'} = \frac{1}{\alpha(1 - KH_o)}$$