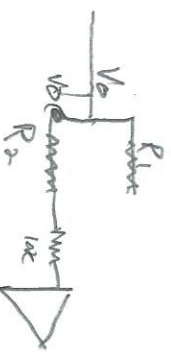
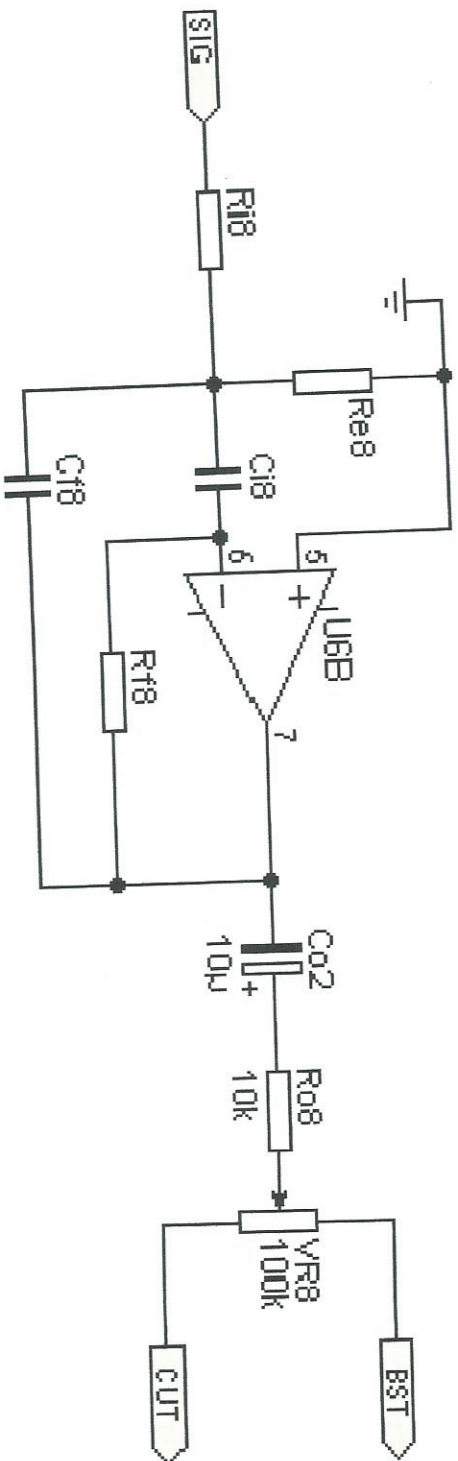
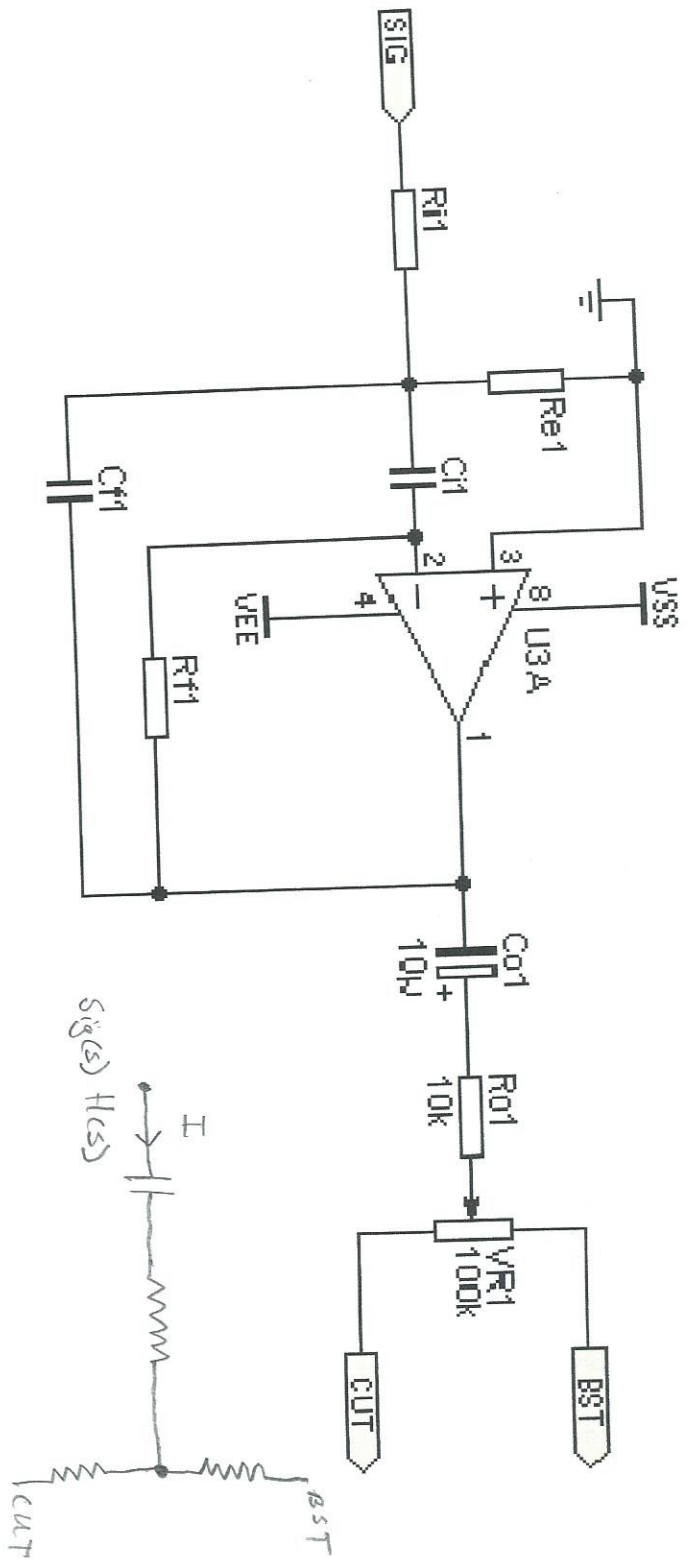


$$V_{sig} = -A V_{s1}$$



$$V_o(s) = V_{sig}(s) H(s)$$

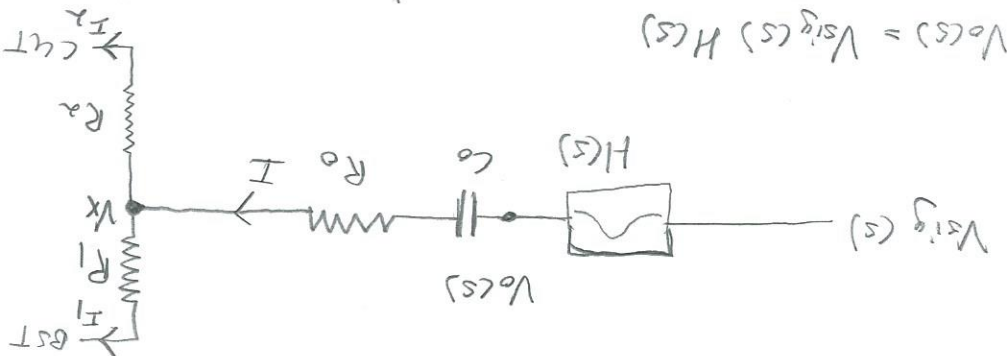
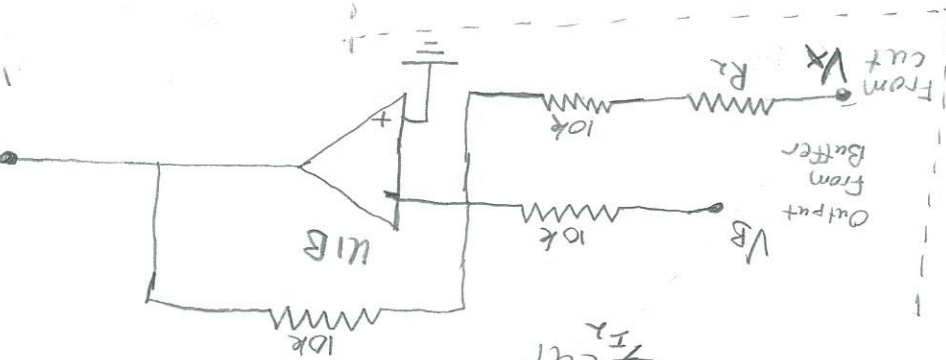
when pot centered:

$$R_1 = R_2, I_1 = I_2$$

Considering 0% Boost/Cut (Pot centered)

Output of U_{1B} :

$$-\left(\frac{10k}{10k} V_B + \frac{10k}{R_2 + 10k} V_x\right) = -\left(V_B + \frac{10k}{R_2 + 10k} V_x\right) = V_{1B}$$

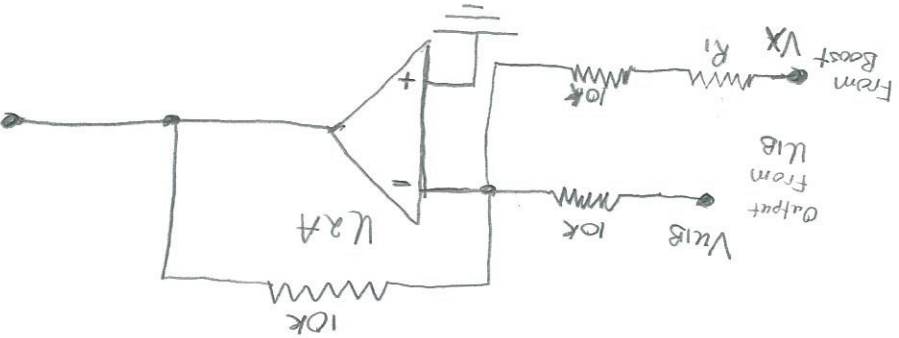


Output of U_{2A} :

$$-\left(\frac{10k}{10k} V_{1B} + \frac{10k}{R_1 + 10k} V_x\right) = V_{2A}$$

$$V_{2A} = -V_{1B} - \frac{10k}{R_1 + 10k} V_x$$

$$V_{2A} = V_B + \frac{10k}{R_1 + 10k} V_x - \frac{10k}{R_2 + 10k} V_x$$



$$V_{2A} = V_B + \left(\frac{10k}{R_1 + 10k}\right) V_x - \left(\frac{10k}{R_2 + 10k}\right) V_x$$

∴ for 0% Boost/Cut $R_1 = R_2$ ∴ $V_{2A} = V_B$ and hence $V_{out} = V_B$ which is basically a buffered, filtered version of the input

$$V_{X(s)} = V_{OC(s)} - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_{X(s)} = V_{sig(s)} H(s) - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_{sig(s)} = -A \cdot V_{inB}$$

$$V_{sig(s)} = -A V_{inB}$$

$$V_{sig} = A \left(V_B + \frac{10k}{R_A + 10k} V_X(s) \right)$$

$$V_X(s) = A H(s) \left(V_B + \frac{10k}{R_A + 10k} V_X(s) \right) - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_X(s) = A H(s) \left[V_B + \frac{10k}{R_A + 10k} V_X(s) \right] - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_X(s) = A H(s) V_B + \left(\frac{10k}{R_A + 10k} \right) (A H(s)) V_X(s) - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_X(s) - \left(\frac{10k}{R_A + 10k} \right) (A H(s)) V_X(s) = A H(s) V_B - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_X(s) \left[1 - A H(s) \left(\frac{10k}{R_A + 10k} \right) \right] = A H(s) V_B - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_X(s) = A H(s) V_B - I \left(\frac{1}{sC_0} + R_0 \right)$$

$$V_{inA} = V_B + V_X \left[\frac{10k}{R_A + 10k} - \frac{1}{1 - A H(s) \left(\frac{10k}{R_A + 10k} \right)} \right]$$

$$V_{inA} = V_B + \frac{A H(s) V_B - I \left(\frac{1}{sC_0} + R_0 \right)}{1 - A H(s) \left(\frac{10k}{R_A + 10k} \right)}$$

$$V_{inA} = V_B + \left(A H(s) V_B - I \left(\frac{1}{sC_0} + R_0 \right) \right) \left[\frac{10k}{R_A + 10k} - \frac{1}{1 - A H(s) \left(\frac{10k}{R_A + 10k} \right)} \right]$$

$$\left[\frac{1 - A H(s) \left(\frac{10k}{R_A + 10k} \right)}{1} \right] \cdot \left[\frac{10k}{R_A + 10k} - \frac{1}{1 - A H(s) \left(\frac{10k}{R_A + 10k} \right)} \right]$$