

100k Ω potentiometer

R_1 additional resistor

$$1\text{V/V} \rightarrow 20\text{V/V}$$

$x=0$ (max gain)

$$R_1 = 2\text{A}$$

$$R_2 = 100\text{k}\Omega$$

$$G = 20\text{V/V}$$

$x=1$ (min gain)

$$R_2 = 0$$

$$R_1 = 2\text{A} + 100\text{k}\Omega$$

$$G = 1\text{V/V}$$

$$G = 1 + \frac{R_2}{R_1} = 20$$

$$G = \frac{R_2}{R_1} = 19\text{V/V} = \frac{100}{R_1} = 19\text{V/V}$$

$$R_1 = 5.26\text{k}\Omega$$