



$$\frac{V_{out}}{V_{cc}} = \frac{\frac{R_2 \times R_{ZVC}}{R_2 + R_{ZVC}}}{R_1 + \frac{R_2 \times R_{ZVC}}{R_2 + R_{ZVC}}}$$

given V_{out} , R_2 , $R_1 \rightarrow V_{cc} = 5$
unknown R_{ZVC} .

$$\frac{V_{out}}{5} =$$

$$\frac{R_2 \times R_{ZVC}}{R_2 + R_{ZVC}} = \frac{\left(\frac{R_{ZVC}}{R_2}\right) R_2}{1 + \frac{R_{ZVC}}{R_2}} = R_2 \left(\frac{\frac{R_{ZVC}}{R_2}}{1 + \frac{R_{ZVC}}{R_2}}\right)$$

$$\rightarrow \frac{V_{out}}{V_{cc}} = \frac{R_2 \left(\frac{\frac{R_{ZVC}}{R_2}}{1 + \frac{R_{ZVC}}{R_2}}\right)}{R_1 + R_2 \left(\frac{\frac{R_{ZVC}}{R_2}}{1 + \frac{R_{ZVC}}{R_2}}\right)} = \frac{R_2 \left(\frac{R_{ZVC}}{R_2}\right)}{R_1 \left(1 + \frac{R_{ZVC}}{R_2}\right) + R_2 \left(\frac{R_{ZVC}}{R_2}\right)}$$

let $\frac{R_{ZVC}}{R_2} = a$

$$\frac{V_{out}}{5} = \frac{a R_2}{R_1(a+1) + a R_2} \rightarrow 5 a R_2 = V_{out} [R_1(a+1) + a R_2]$$

$$5 a R_2 = V_{out} [R_1 + R_2] a + V_{out} R_1$$

Choose $R_1 = R_2 = 10k \Omega$

$$a [5R_2 - V_{out} [R_1 + R_2]] = \frac{V_{out} R_1}{V_{out} R_1}$$

$$a = \frac{V_{out} R_1}{5R_2 - V_{out} (R_1 + R_2)}$$

$R_1 = 9.8k \Omega$
 $R_2 = 9.9k \Omega$

$$\rightarrow R_{ZVC} = \frac{V_{out} R_1 R_2}{5R_2 - V_{out} (R_1 + R_2)}$$

black 5V
 red green $V_{out} = 5$
 10k at voltmeter