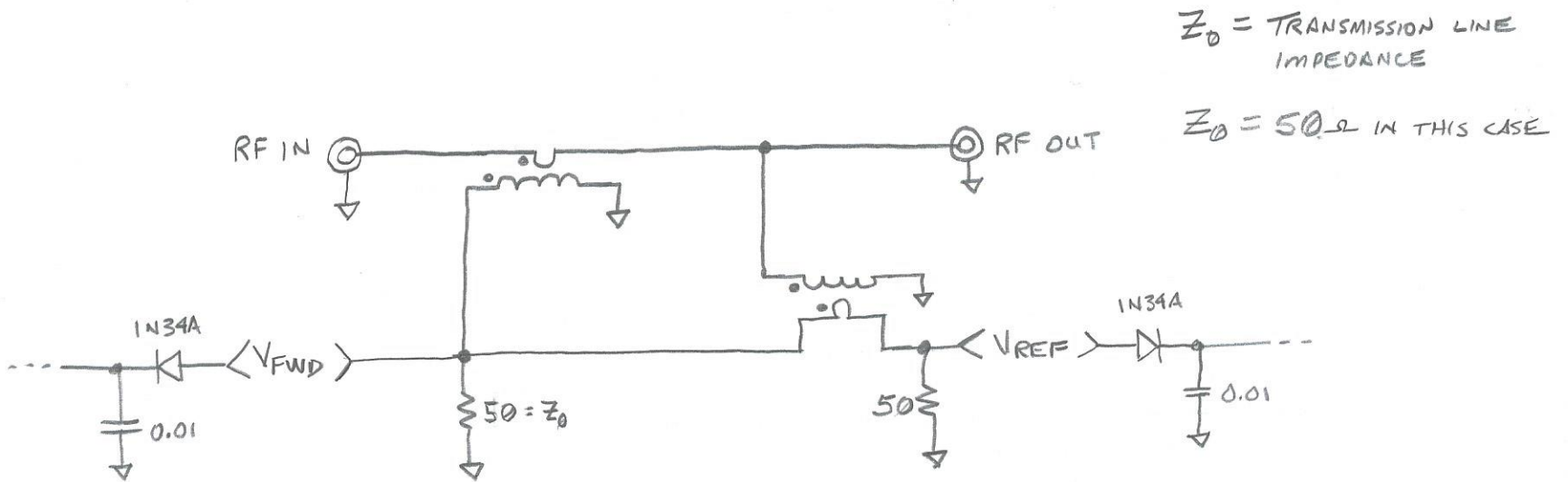


W2AEW

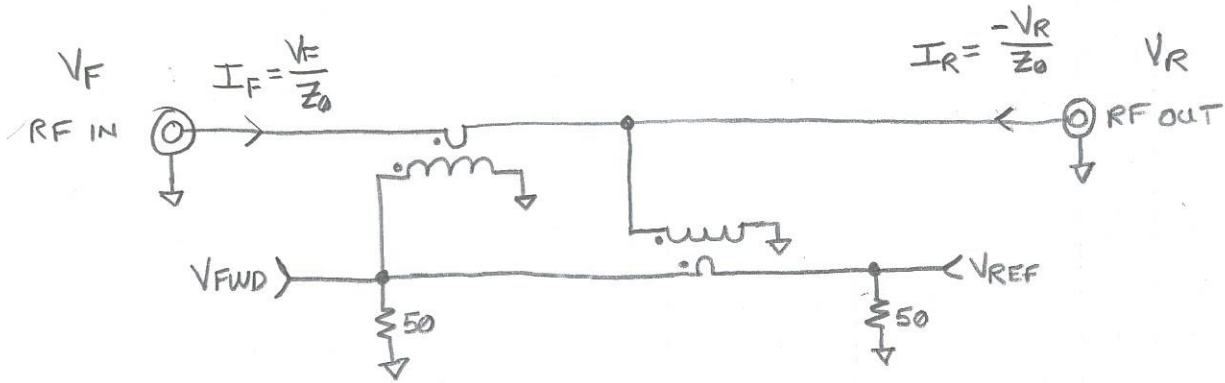
How A DIRECTIONAL COUPLER WORKS



- MANY DIFFERENT TYPES & DESIGNS
- THIS ONE IS COMMONLY USED IN HOMEBREWED SWR METERS, ETC.
 - SIMPLE
 - 50 OHM ON ALL PORTS
 - VERY GOOD DIRECTIVITY

How IT WORKS...

W2AEW

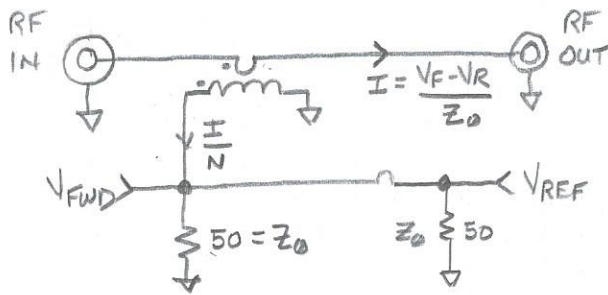


TRANSMISSION LINE VOLTAGE: $V = V_F + V_R$

TRANSMISSION LINE CURRENT: $I = I_F + I_R$

$$I = \frac{V_F - V_R}{Z_0}$$

SENSING LINE CURRENT

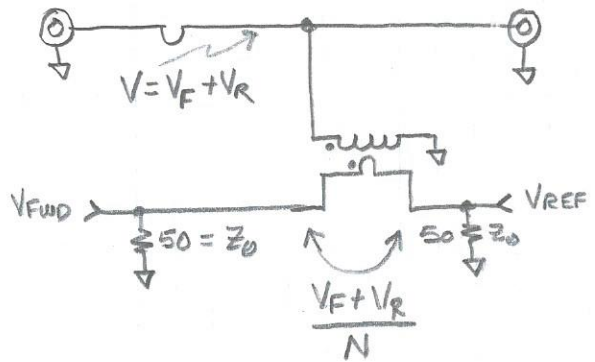


$$V_{FWD}' = V_{REF}' = \frac{I}{N} \cdot \frac{Z_0}{2}$$

$$= \frac{V_F - V_R}{Z_0} \cdot \frac{Z_0}{2N}$$

$$V_{FWD}' = \frac{V_F - V_R}{2N} = V_{REF}'$$

SENSING LINE VOLTAGE



$$V_{FWD}'' = \frac{1}{2} \cdot \frac{V_F + V_R}{N} \quad V_{REF}'' = -\frac{1}{2} \cdot \frac{V_F + V_R}{N}$$

$$V_{FWD}'' = \frac{V_F + V_R}{2N} \quad V_{REF}'' = -\frac{(V_F + V_R)}{2N}$$

$$V_{FWD} = V_{FWD}' + V_{FWD}'' = \frac{V_F - V_R}{2N} + \frac{V_F + V_R}{2N} = \frac{V_F}{N}$$

$$V_{REF} = V_{REF}' + V_{REF}'' = \frac{V_F - V_R}{2N} - \frac{(V_F + V_R)}{2N} = -\frac{V_R}{N}$$