

MEASURE IMPEDANCE OF "UNKNOWN"
TRANSMISSION LINE WITH A VNA

USE THE QUARTER-WAVE TRANSFORMER

$$\frac{Z_{IN}}{Z_0} = \frac{Z_0}{Z_{LOAD}}$$

Z_{IN} = IMPEDANCE LOOKING INTO LINE

Z_0 = IMPEDANCE OF THE LINE

Z_{LOAD} = LOAD IMPEDANCE AT END OF LINE

REARRANGE:

$$Z_0 = \sqrt{Z_{IN} \cdot Z_{LOAD}}$$

(2)

PROCESS

- PUT 50Ω LOAD AT END OF COAX
- ESTIMATE THE LENGTH OF THE COAX
- * COMPUTE FREQUENCY THAT IS (ABOVE) THE QUARTER WAVELENGTH FREQUENCY
- SWEEP FROM LOW FREQ TO \uparrow
- RECORD THE RESISTANCE @ $\lambda/4$ (R_x)
(1ST CROSSING OF PRIME AXIS)
- COMPUTE $Z_0 = \sqrt{50 * R_x}$

* HOW TO ESTIMATE "STOP" FREQUENCY

$$F_{\text{STOP}} \approx \frac{75}{\text{LENGTH (m)}}$$

$$F_{\text{STOP}} \approx \frac{246}{\text{LENGTH (ft)}}$$

THIS COMPUTES THE "FREE SPACE" $\lambda/4$ FREQ, WHICH WILL BE HIGHER THAN THE $\lambda/4$ FOR THE COAX