Kantronics D4-10 Analog Input Attenuator

Narrative

The Kantronics D4-10 transceiver analog input has a specification value of 50-mV P-P. Not all TNC's can be accurately adjusted down to this level and still produce a quality signal.

The unbalanced T-pad attenuator used here is designed for a 600-ohm impedance at the input and output with a target level of -30.0 dB. Thus a input level of 1.6 volts P-P (+17 dBm) results in a output level of 50-mV (-13 dBm). Using the values shown in the parts list, the attenuation is -29.722 dB with an impedance value of 597.731 ohms. The attenuator can be placed inside the DB9M shell that connects to the D4-10.

Calculations

Shown here are the formula's necessary to calculate the T-pad attenuator values with an impedance Z value of 600 ohms.

1. Determine the K value:
   K=10^(desired dB value/20)
   K=10^(30/20)
   K=10^(1.5)
   K=31.6227

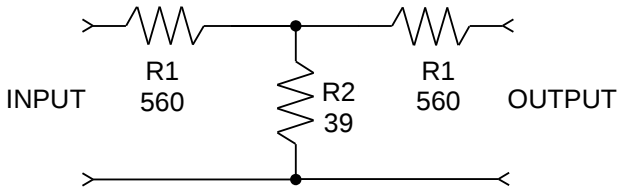
2. Determine the value of shunt resistor R2:
   $R2=[K/(K^2-1)]*2Z$
   R2=[31.6227/998.995]*1200
   R2=0.0316545*1200
   R2=37.985 ohms

3. Determine the value of series resistor R1:
   R1=[(K-1)/(K+1)]*Z
   R1=[30.6227/32.6227]*600
   R1=0.938692996*600
   R1=563.215 ohms.

Parts List

2-each, 560-ohm 5% 1/4-watt resistor
1-each, 39-ohm 5% 1/4-watt resistor

Schematic



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