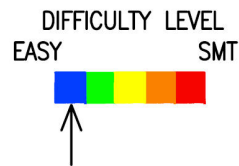
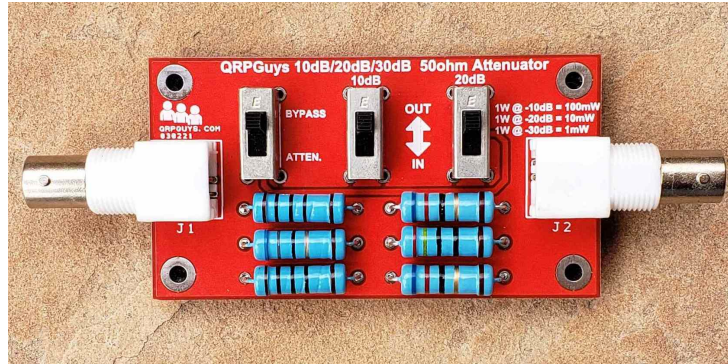


QRPGuys 10/20/30 dB 50Ω Attenuator



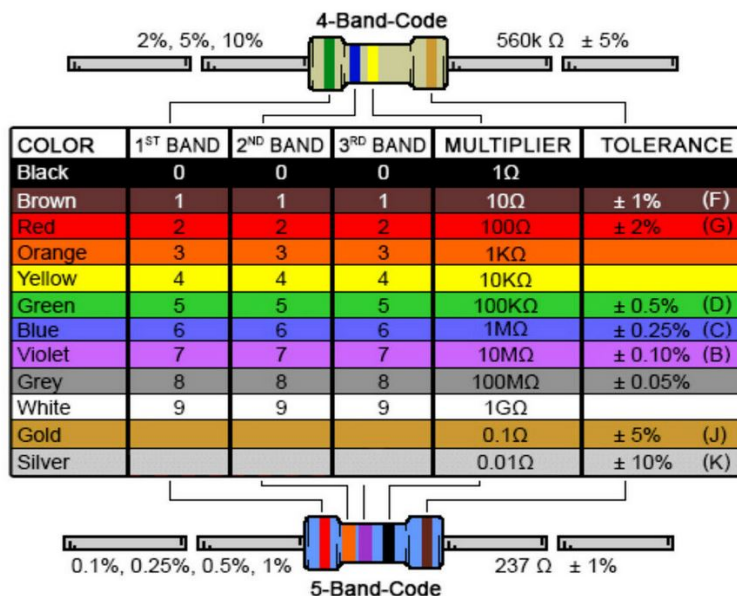
First, familiarize yourself with the parts and check for all the components. If a part is missing, please contact us at qrpguys.parts@gmail.com and we will send you one.

Please read all the instructions before assembly.

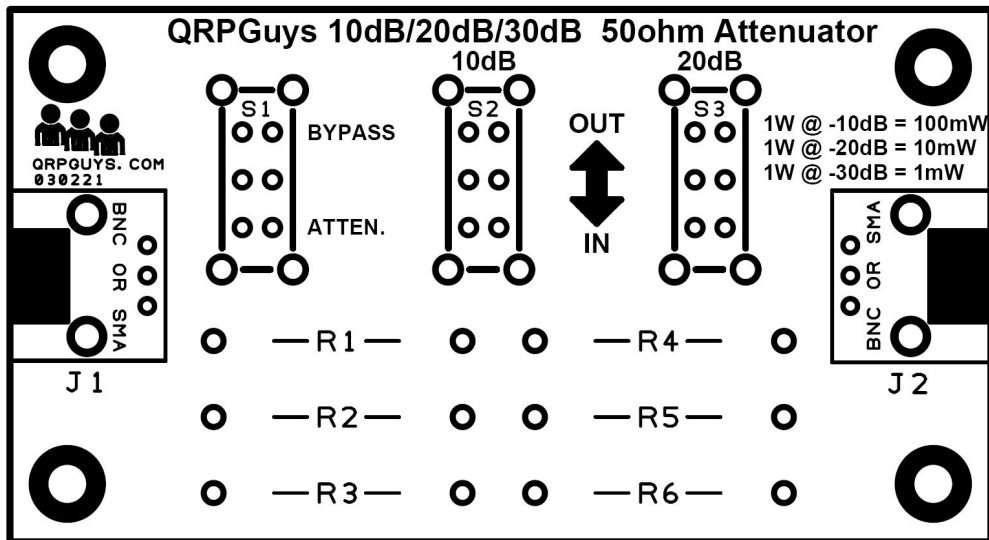
Parts List

- 1 – Attenuator pcb
- 2 – female pcb bnc 90° connector
- 3 – S1,2,3 DPDT slide switch
- 2 – R1,3, 100 ohm 3W resistor
- 1 – R2, 68 ohm 3W resistor
- 2 – R4,6, 62 ohm 3W resistor
- 1 – R5, 240 ohm 3W resistor
- 4 – self adhesive rubber foot

The resistors can be supplied from different manufacturers. The body color and marking scheme can change. **Check the values carefully with an ohmmeter before installing.** Also try <http://kiloohm.info/> for help reading component values of different part marking schemes.



Refer to the graphic below for parts placement.



All the components mount of the top side of the board, except the rubber feet, unless you are planning to mount the device in a chassis. In that case, mount the switches on the top side, and the connectors and resistors on the back side.

When mounting the resistors, *do not mount them flush to the surface*. Keep the resistor 1/16" off the surface of the pcb to allow for airflow. You can use a thin slat of wood like a popsicle stick, tongue depressor, or a couple of toothpicks to space them off the board, and remove after soldering. Don't press the resistors tight against the stick or it will be difficult to remove.

The board has the ability to use SMA female edge style connectors, however we supply only the BNC female connectors.

- [] Install S1,2,3 DPDT slide switch, solder all pads.
- [] Install R1,3, 100 ohm resistor
- [] Install R2, 68 ohm resistor
- [] Install R4,6, 62 ohm resistor
- [] Install R5, 240 ohm resistor
- [] Install J1,2, female pcb bnc 90° connector. The center hole on the board is signal, the outside hole for ground no matter which side you mount the BNC's on.
- [] Install the four self adhesive rubber feet where shown on the back side

This completes the assembly

Usage:

In the "BYPASS" position the signals can pass through virtually without loss.

In the "ATTENUATE" position:

- | | |
|---------------------------|----------------------------|
| 1W in @ -10dB = 100mW out | 10W in @ -10dB = 1W out |
| 1W in @ -20dB = 10mW out | 10W in @ -20dB = 100mW out |
| 1W in @ -30dB = 1mW out | 10W in @ -30dB = 10mW out |

We have used 3W resistors throughout. Figuring a duty cycle of 50%, you can expect no problems with 10W CW use. For other modes or higher power levels, monitor the resistor temperature to keep it $\leq 70^{\circ}\text{C}/158^{\circ}\text{F}$.

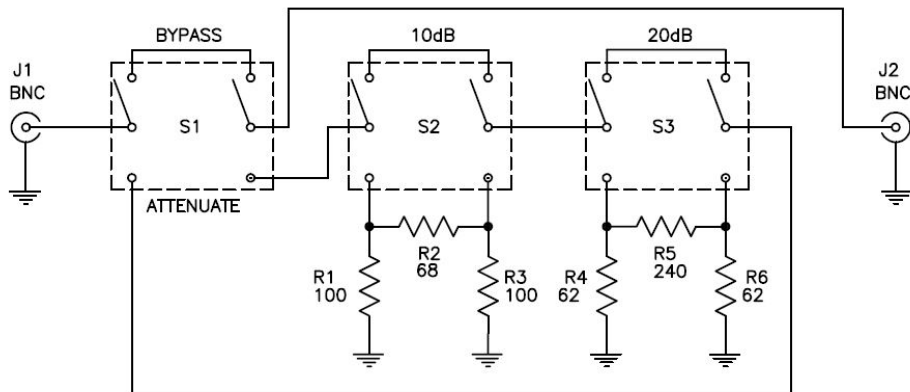
Remember that "voltage" and "power" attenuation are two different formulas. As an example, 1V in with -10dB applied is .3162V out, and 1W in with -10dB applied is 100mW out.

Ref:

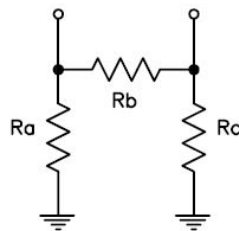
<http://www.sengpielaudio.com/calculator-amplification.htm>

<https://chemandy.com/calculators/matching-pi-attenuator-calculator.htm>

<https://www.minicircuits.com/pages/pdfs/dq03-110.pdf>



Use the table below for other attenuation values or calculate your own.



ATTEN.	Ra	Rb	Rc
1dB	910Ω	5.6Ω	910Ω
3dB	300Ω	18Ω	300Ω
6dB	150Ω	39Ω	150Ω
10dB	100Ω	68Ω	100Ω
20dB	62Ω	240Ω	62Ω

Notes:
