



Most Often Asked Questions About Electronic Attenuators

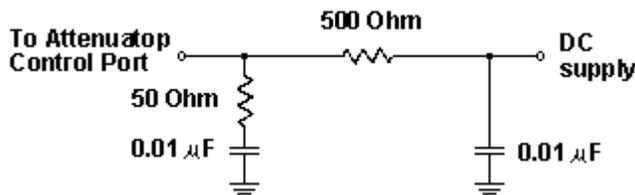
Q. As per the schematic of an electronic attenuator, it appears the device is just an application of a conventional mixer. Why should I have to use this device, when your conventional mixer is much cheaper?

A. The electronic attenuator is a special mixer design to produce low harmonics, high compression, and better intermodulation performance.

Mini-Circuits' electronic attenuator/switches use extremely well-matched PIN diodes, since matching of the diodes is the key to producing excellent performance.

Q. Does a switch/attenuator require a control port biasing configuration? If yes, what is a suggested configuration?

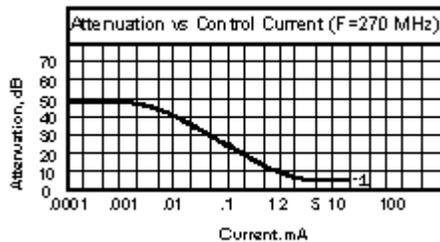
A. For improved rf performance, the control port should provide a proper 50-ohm match at the rf frequency. A simple circuit is shown below.



At RF frequencies greater than 1 MHz, the capacitors act like a short and the 50 and 500 ohm resistors appear in parallel, which is almost 50 ohm. For dc and low frequencies, the capacitor is nearly an open. Hence, dc current is applied through 500 ohms from the dc power supply.

Q. What is the attenuation linearity vs control current?

A. Attenuation is not linear as control current is varied, as shown in below.



Attenuation vs frequency is a function of the control current; the higher the control current level, the flatter the response.

Q. What is the significance of input-control isolation of the switch attenuator?

A. In-control isolation is a measure of the amount of rf signal leaking into the IF port. The amount that can be tolerated is dictated by system requirements for leakage.

Q. All of Mini-Circuits' switch attenuators are tested and specified at 50-ohms impedance, can I use them at 75 ohms?

A. Yes. The electronic attenuators are designed and tested for approximately a 50 ohm system. In many cases, the actual impedance is higher than 50 ohms, therefore enabling a match to 75 termination impedances. However, due to the higher impedance, the frequency response will be reduced by approximately 30%. For situations where critical specs in a 75 ohm system is required, please contact our applications department. Our engineering staff would be able to redesign the internal components of the unit to meet the specific requirements.

Q. Can Mini-Circuits provide surface-mount switch/attenuators?

A. Yes. We provide surface-mount TFAS-5 and SYAS-models. The specification sheet gives frequency range and features.

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