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PROPER USE OF LINE CONTROLS

Selecting the correct line control can be as important as the choice of transformers in a sound system. The term “attenuator” includes potentiometers (“pots”), pads, and auto-transformers. Since each performs a different function it is useful to distinguish between the three. In the past, pots were widely used because of their lower cost. Now that prices have become competitive, the advantages of pads have made them the preferred choice in most installations.

Pots typically have been used to control the volume level of a single speaker. As a general rule, pots controlling 8 ohm speakers should have a value of approximately 50 ohms (or at least 5 times the speaker impedance) and be rated at a minimum of 2 watts. If the resistance value of a pot is too high, the result will be a loss of control linearity (i.e., “range”). That is, no sound will be heard until the pot is turned almost completely up, at which time full volume, will be produced. If the value of the pot is too low, excessive power will be drawn from the amplifier and the control will be destroyed by heat.

Pads avoid many of the problems associated with pots as these controls contain dual offsetting elements (shown in the diagram below) and therefore provide a constant impedance to the source. Smooth linearity is afforded throughout the volume range, reliability is far superior, and operation at higher power is possible due to better heat dissipation. Care must be taken however to match the impedance of pads to loudspeaker impedance. An 8 ohm L-pad as an example must be used between the 8 ohm secondary taps of the line transformer and an 8 ohm loudspeaker.

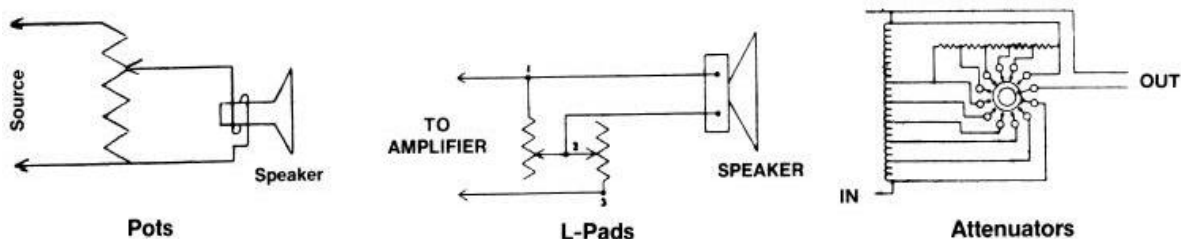


Figure 1

Line attenuators are auto-transformers used to control the volume of a speaker, or a group of speakers, on 25 or 70 volt lines. These controls operate in a manner similar to an ordinary line transformer with each step or change in volume being accomplished by switching to a lower or higher ratio primary tap.

The maximum line load is determined by adding the wattage taps of the speakers being controlled. For example, an auto-transformer rated at 10 watts controlling three speakers, each connected on the 2.5 watt tap, would produce a line load of 7.5 watts when at its highest volume setting. This highest volume setting should always be assumed when planning system requirements.



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Auto-transformers, like L-Pads, have maximum power ratings which should never be exceeded. If the three speakers in the previous example each had been tapped at 5 watts, the total 15 watts would exceed the 10 watt power rating of the attenuator. This condition may result in overheating and damage to the control.

Special precautions should be taken in conventional sound installations to avoid allowing line controls to be used as the primary volume regulator. The overall volume level always must be set by the power amplifier with line controls being utilized for “fine tuning.”