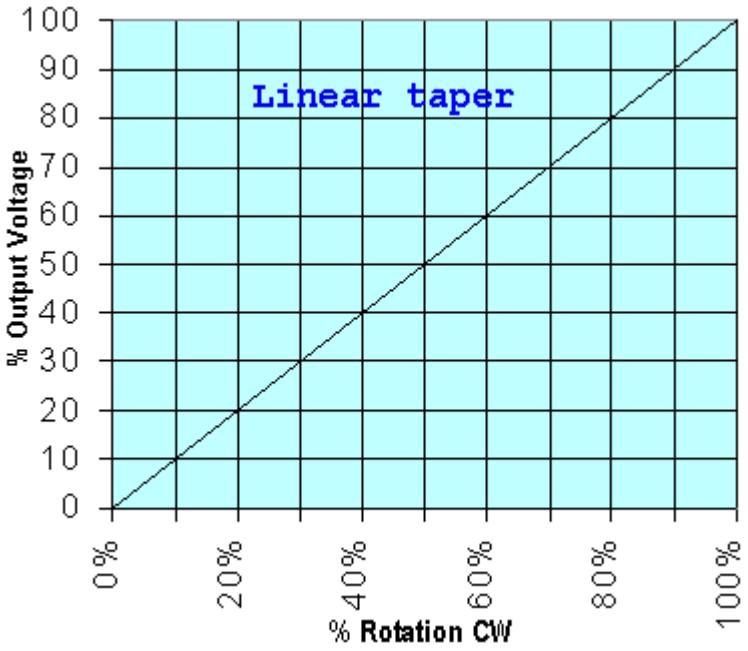
# Modifying Pot Response




Variable resistors (potentiometers) are available in a wider selection of linear taper values than the non-linear versions. A linear taper pot produces a response that varies in direct proportion to its percentage of rotation as shown in the graph of the output voltage vs. the amount of pot rotation (to the left). This taper works well for many types of controls but for others a log taper pot works better since its response is tailored more to the response of the human ear. Log taper pots are also called audio taper.

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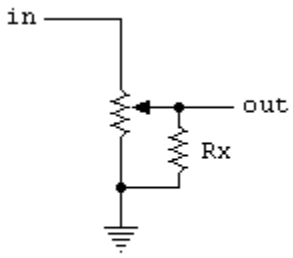
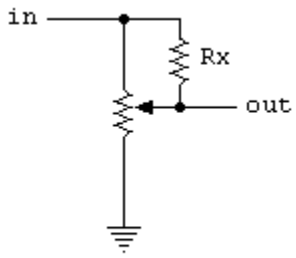
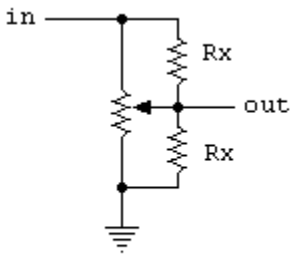



Log taper

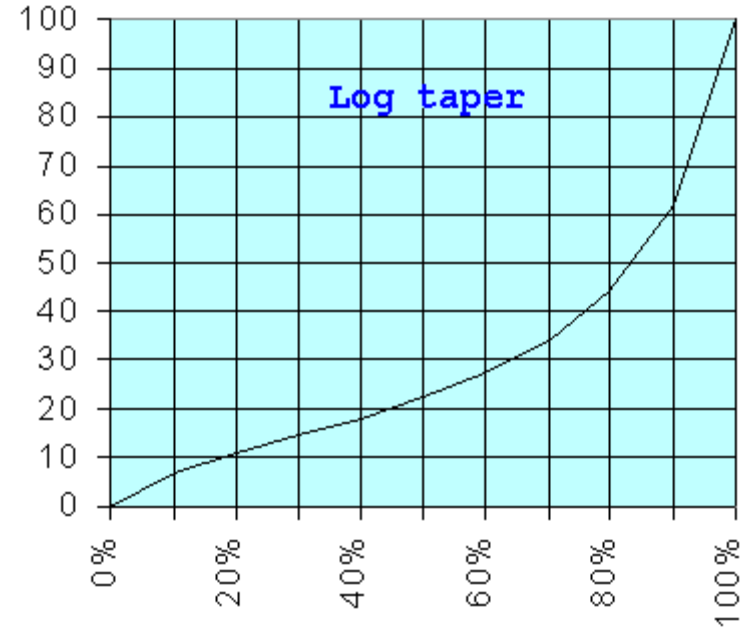


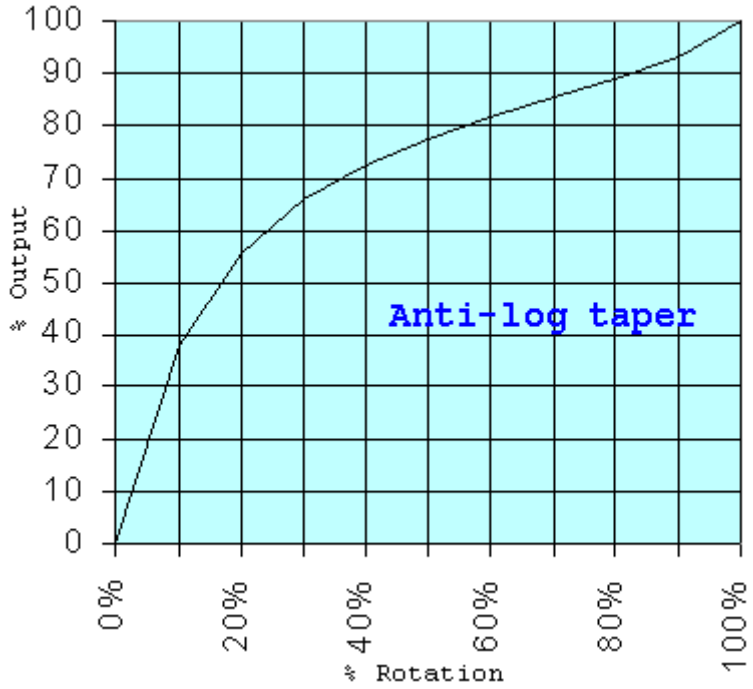

Anti-log taper

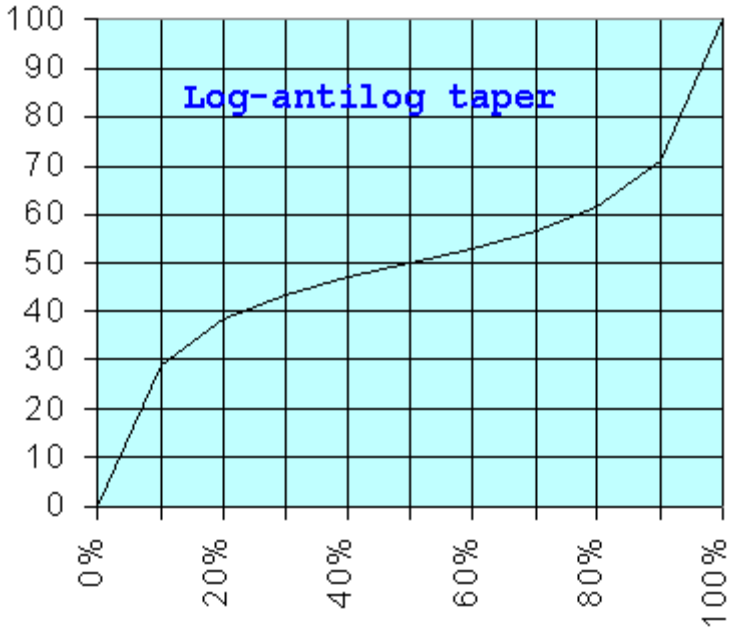



Log-antilog taper

If a log taper pot of the proper value is not available, it may be simulated by adding a resistor across the terminals of the pot to alter the response to simulate a non-linear pot. The schematic above shows how to add a resistor (or resistors) to a pot to produce a non-linear response. The value of Rx in each of the circuits should be 20% of the full value of the pot. Example: if using a 50k pot then Rx would be 10k ohms. Below are graphs of the output voltage produced by each of the circuits. This was produced by calculating the output vs. input voltage of the divider using Excel. Not only can the response of an audio taper pot be simulated but also an anti-log and the "S" taper (or log-antilog) that finds use in some graphic equalizer circuits.


Log taper
100
90
80
70
60
50
40
30
20
10
0
0%
20%
40%
60%
80%
100%


Anti-log taper
% Output
100
90
80
70
60
50
40
30
20
10
0
0%
20%
40%
60%
80%
100%
% Rotation

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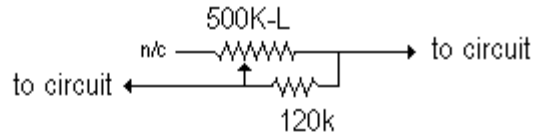
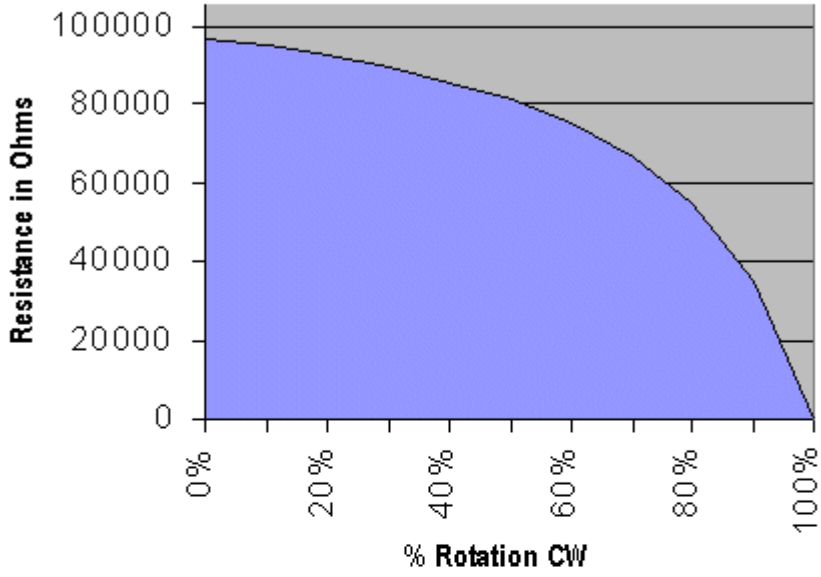
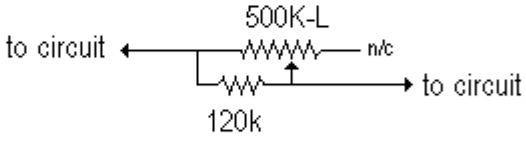
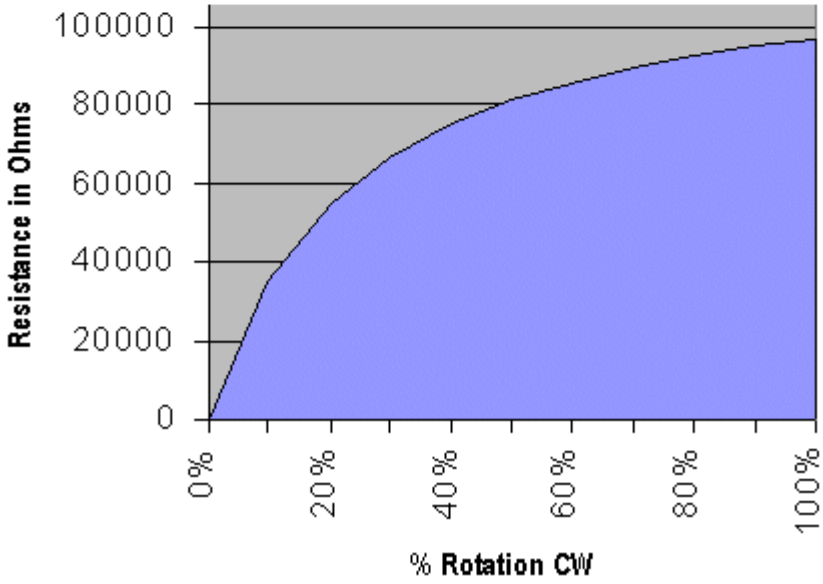
Additionally, a linear pot used as a variable resistor can have its response modified into anti-log response by adding a resistor as shown below. The resistor chosen for this example is slightly larger than 20% of the pot value so that the parallel resistance of the pot with added resistor will be close to 100k. The anti-log response is useful in many variable resistance circuits, such as the frequency control of oscillators. Note that it is not possible to simulate log response with this technique. The unused end terminal of the pot is not connected in the diagram for clarity, but it may be connected to the outside pot terminal (that does not have the resistor soldered to it) without effecting the response.



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