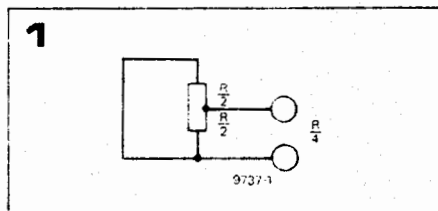


real load resistors

When measuring and comparing the output powers of audio amplifiers (especially at the high end of the audio spectrum) it is useful to have available a 'real' load resistor, i.e. one which is a pure resistance with no parasitic inductance or capacitance. Carbon film resistors have a low self-inductance, but unfortunately are, not commonly available in the high power ratings required for amplifier testing. The highest rating normally available in a carbon film resistor is 2 watts, so a load resistor for testing a 100 W amplifier would need to be made up of 50 such resistors in series/parallel combinations!

Wirewound resistors are available with high power ratings, but unfortunately such resistors are rarely wound so as to minimise self-inductance. A typical high-power wirewound resistor consists of a single layer of resistance wire wound helically on a cylindrical ceramic tube. This type of resistor has quite a high self-inductance, but since the usual applications of high-power wirewound resistors are DC or low-frequency AC this is not important.



For use as an amplifier load resistor some means must be found of reducing the inductance of a wirewound resistor. This can be achieved by providing the resistor with a centre tap and connecting it as shown in figure 1. Current flows in opposite directions in each half of the resistor, so the magnetic fields produced in each half (and hence the self-inductances) tend to cancel out. If the original resistor has a value R then the connection shown has a resistance $R/4$ since it consists of two $R/2$ sections in parallel.

Resistors already provided with taps, such as television H.T. dropper resistors, are suitable for this application. Presettable resistors may also be used. These consist of an exposed wire element wound on a ceramic former, and are provided with contact clips that may be fixed anywhere along the length of the element. 1 kW electric fire (heating) elements (which have a resistance of around 60Ω) may also be used. In order to obtain a load resistor of the desired resistance and wattage rating, several wirewound resistors may be connected in series/parallel combinations in the normal way, provided each one is first connected as shown to minimise its inductance.