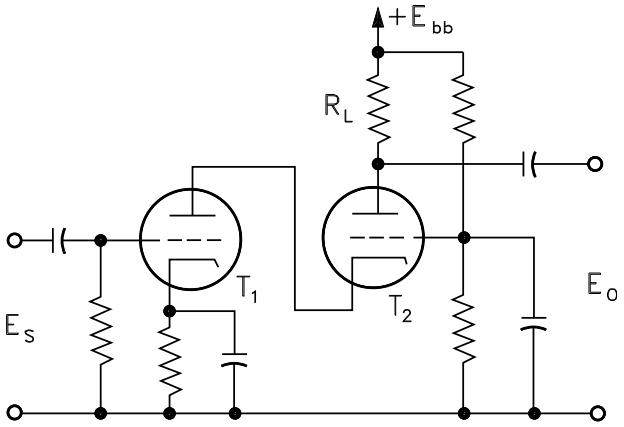
Cascode Circuit



A composite circuit consisting of a grounded-cathode triode followed by a grounded-grid triode is often adopted high-frequency amplification, because of several desirable characteristics. It is called a *cascode amplifier* ; often it uses a dual triode.

The load on the first triode is the input resistance of the grounded-grid triode as:

$$Ri2 = (rp2 + R_L) / (\mu 2 + 1)$$

and so the overall gain can be written as the product of the gains Av = Av1Av2,

$$\text{or } Av = (-\mu 1 Ri2/Rp1 + Ri2)\ [(\mu 2 + 1)R_L/rp2 + R_L] \quad (9\text{-}45)$$

For reasonably small values of R_L it can be expected that

$$rp1 >> Ri2$$

and so

$$Av \cong -gm1R_L \quad (9\text{-}46)$$

which is the gain of a pentode with transconductance gm1.

The gain of the grounded-cathode stage of the cascode amplifier is low because of the low load presented to it by the second valve, and so its input capacitance is not appreciably increased due to the Miller effect. the Miller effect. Thus its input capacitance approximates Cgp, and at high its loading on the source is small. Because of the low value of Ri2, the input capacitance of the grounded valve has small effect; therefore the circuit is a high-frequency amplifier.

While it would appear to be replaceable by a single pentode, the circuit is found to introduce much less circuit noise than does a pentode, and this is an important factor when working with very small input signals, such as RF amplifiers for radio receivers, or similar circuits.