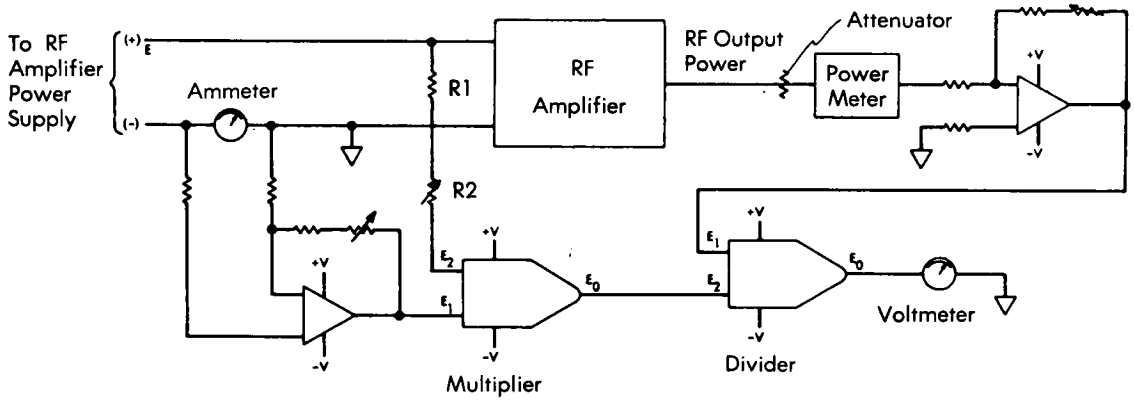
NASA TECH BRIEF

NASA Pasadena Office

Meter Circuit for Tuning RF Amplifiers



The problem:

To eliminate the many tedious calculations required when signal, bias, and power inputs are varied during tune-up of an RF amplifier for optimum efficiency.

The solution:

A metering circuit which computes and indicates the efficiency of the RF amplifier as the inputs and other parameters are varied.

How it's done:

The metering circuit indicated in the diagram includes a precision ammeter which indicates the DC current flowing from the power supply to the RF amplifier. The voltage drop across the internal resistance of the ammeter is amplified by an operational amplifier and applied to one of the inputs of a multiplier. The other input to the multiplier is obtained through two resistors from the positive terminal of the power supply. The multiplier output is thus proportional to the denominator of the efficiency equation, $\eta_c(\%)=P_{rf}/(I \times E)$.

The power ouput of the RF amplifier is fed to a power meter to provide a visible indication of the amplifier's output. The power meter simultaneously generates a voltage that is proportional to the scale indication (within a range of 0 to −1 volt); the output voltage is amplified by an operational amplifier and applied to one of the inputs of a divider; the output of the multiplier is applied to the other input of the divider. The divider output voltage is thus the amplifier power output divided by the I x E power input to the amplifier and is representative of the efficiency of the RF amplifier for a given DC power and signal output. The conditions for optimum operation of an RF amplifier can be obtained more quickly with the aid of the meter circuit than when separate current, voltage, and power values must be obtained from meter readings and then used to compute overall efficiency by manual computations.

(continued overleaf)

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: TSP 73-10389

Patent status:

NASA has decided not to apply for a patent.

Source: James E. Longthorne of
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