Public-address amplifier serves as variable ac-power source

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Alternating voltages at moderate power, low distortion, and variable amplitude and frequency are obtainable over an extended range by a technique similar to one previously proposed [*Electronics*, Dec. 20, 1973, p. 121], but with simpler and more readily obtainable equipment—namely, an ordinary monophonic or public-address amplifier—but with less power output.

In the earlier proposal, a stereo amplifier was differentially coupled to the output of an audio oscillator to provide low audio frequencies at voltages of 0 to 130 volts. However, the frequency range can easily be extended to low ultrasonic frequencies with even higher voltages. Naturally, the higher the quality of the amplifier and transformer, the greater the frequency range available for any given distortion level. The voltage obtainable is limited by the amplifier's available output power and by the breakdown voltage of the external output transformer.

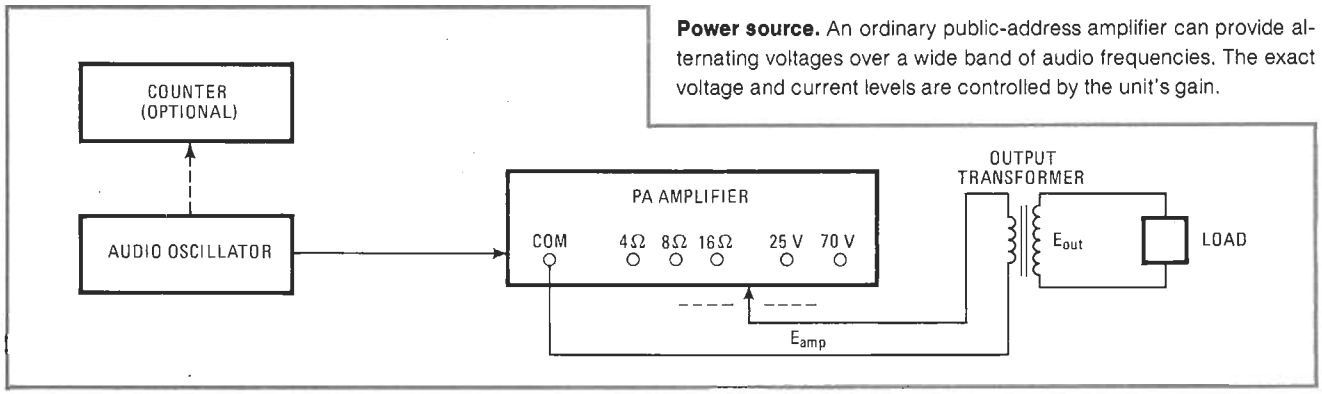
Using a PA amplifier in place of the more expensive stereo amplifier eliminates the requirement for any input transformer. It has a further advantage in that most models have 4-, 8- and 16-ohm and 25- and 70-volt outputs, so that the proper impedance or voltage tap is easily selected for the desired output conditions. On the debit side, the output power is only half that of a comparatively rated stereo amplifier, and its distortion may be somewhat greater, especially at frequency extremes.

The output voltage is:

$$E_{amp} = (P_{amp}R_{tap})^{1/2}$$

E_{amp} is the amplifier's output voltage developed across the chosen output tap, which matches load (R_{tap}) at the power level (P_{amp}) required for the final output voltage, E_{out}—which is N times the amplifier output voltage (N is the transformer's turns ratio).

Ordinary filament transformers (used backward) are available with a large selection of input and output voltages to match input impedance and output voltage for almost any amplifier power level. For example, a recent application required a 100-V, 0.1-A supply over the range of 100 to 1,000 hertz. At a typical amplifier's maximum output, 20 watts, the formula given previously shows that an 8-ohm load calls for an output of 12.65 V, at which the load draws 1.58 A. A 12.6/115-V filament transformer steps this up by a factor of about 10, slightly higher than the application requires, but slightly turning down the amplifier's volume control provides the proper level. Thus, the inexpensive amplifier and transformer provide an almost perfect impedance match and an acceptable distortion level over the entire frequency range. □



Power source. An ordinary public-address amplifier can provide alternating voltages over a wide band of audio frequencies. The exact voltage and current levels are controlled by the unit's gain.