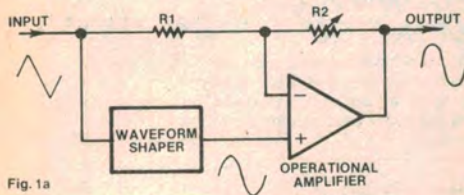


Circuit & Design Ideas

Interesting circuit ideas from readers and technical literature. While this material has been checked as far as possible for feasibility, the circuits have not been built and tested by us. As a consequence, we cannot accept responsibility, enter into correspondence or provide constructional details.

Improved triangle-to-sine-wave converter



Most triangle-to-sine-wave converters employed in function generators are incapable of reducing the cusps (spikes or steps) on the triangle peaks, so that discontinuities occur in the sine-wave derivative. Typical function generators (such as the EA Function Generator for April, 1982) use diode or transistor shaping networks to round the peak of the triangle into a sine-wave, the networks being embodied into an IC, such as the XR2206.

This design (Fig. 1a), taken from the US magazine "Electronics", follows the shaping network with an operational amplifier in which most of the remaining triangular component is cancelled. In addition, the design is not affected by small changes in the triangle wave amplitude.

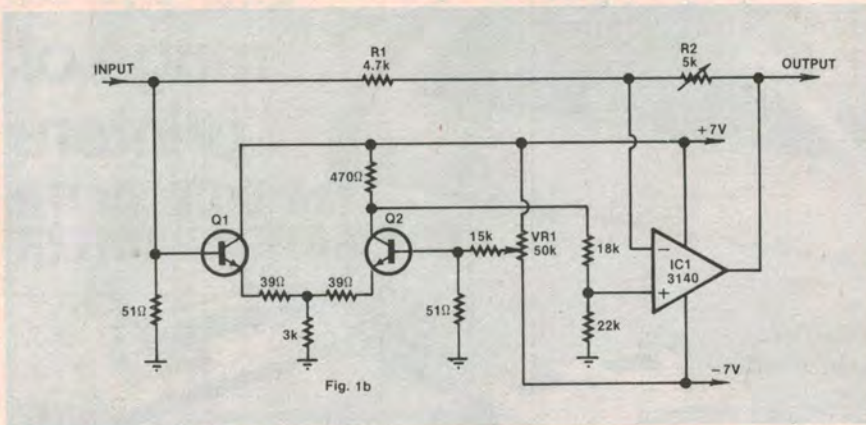


Fig. 1b shows the system in greater detail. The preliminary shaper is a differential amplifier consisting of Q1 and Q2. Any differences in transistor characteristics, which would generate even order harmonics in the output, can be taken care of by trimpot VR1. Finally, the shaped signal from Q2 is fed to the non-inverting input of the operational amplifier 3140.

At the same time a portion of the original triangular wave is fed to the in-

verting input, resistors R1 and R2 controlling the level. This level is adjusted until most of the remaining triangular component in the shaped wave has been cancelled.

The circuit is claimed to reduce odd harmonics by up to 52db to produce a resultant harmonic distortion of 0.4% for midband frequencies.

From "Electronics",
July 28, 1982.