EVERT FRUITMAN

# A Simple Utility Oscilator

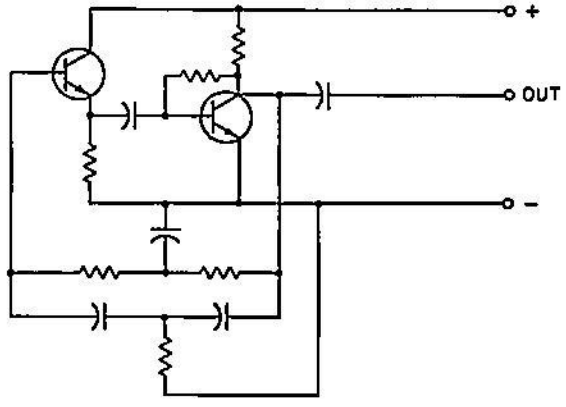
*For under $10, you can create a single frequency low distortion oscillator for quick checks, ringing out lines, and other studio duties.*

MOST SIMPLE OSCILLATORS that are small enough to be practical suffer from an overabundance of distortion which precludes their use in many studio applications The unit described here is small enough to plug directly into a patch panel, (don't forget where you left it); it will deliver a minus 6 vu all day, and do it at less than 0.8 per cent distortion. Typical distortion measurements are in the area of 0 4 per cent. It is possible to get the distortion down to less than 0 1 per cent but it isn't practical to keep it there. The intended purpose was to make a single frequency low distortion oscillator for quick distortion checks, ringing out lines, and other general studio uses.

In designing the device, the parallel tee phase shift oscillator depicted in FIGURE 1 looked like a good place



*Figure 1. Basic phase shift (parallel tee) oscillator approx. 15 per cent distortion, must see high Z load. (See Figure 4 for values.)*

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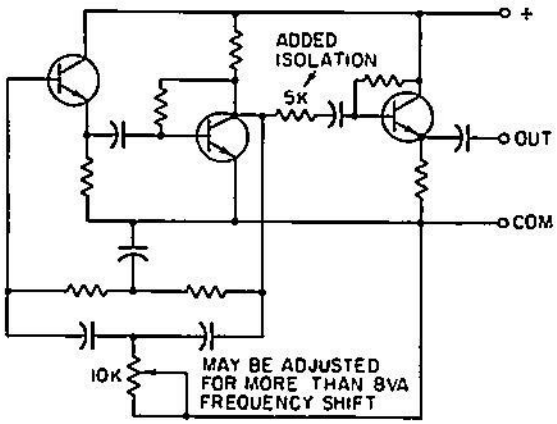


*Figure 2. Basic phase shift oscillator with emitter follower. Will drive medium Z load. May be adjusted for more than 8 VA frequency shift.*

to begin since it was supposed to be fairly stable and have a reasonable level of distortion. Before the stability or distortion could be measured, it was necessary to reduce the output impedence to a usable level because any change in load resistance at the collector of $Q_2$ shifted the frequency. This was neatly resolved by using an emitter follower for isolation. (A J fet would have been better, but wasn't handy when this was put together.)

The next thing that became evident was the fact that there was about 18 per cent distortion in the 3-stage system The usual quick cure-all consisting or bias and voltage juggling didn't do enough, and a mathematical analysis



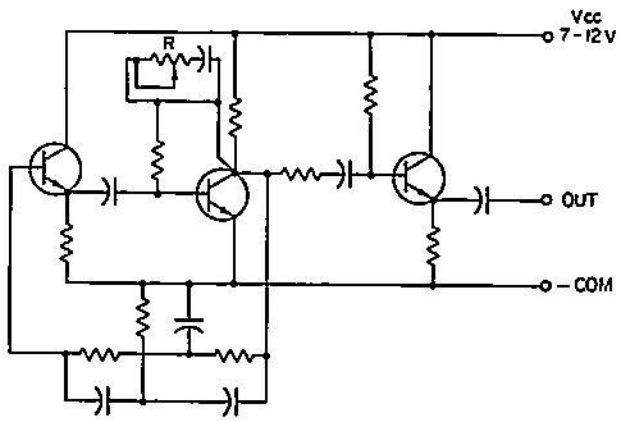


*Figure 3. Low distortion oscillator with negative feedback, suitable for use with fixed voltage supply R is adjusted for low distortion.*

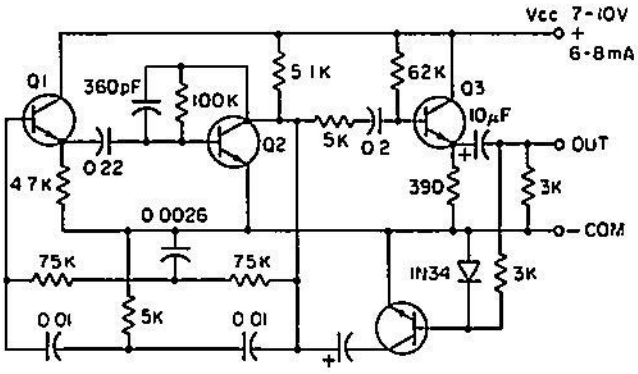


*Figure 4. Low distortion oscillator with negative feedback and agc approx. 1 kHz. For balanced output use MT 26FB. 2N2926 may be used for Q1-4. 2N1171, 2N2102, 2N3053.*

wasn't all that practical or helpful either

If a balanced output is required, it is a simple matter to add a small 1:1 transformer However, there have been no difficulties encountered in using the units without a transformer at studio or transmitter.

The values shown in the diagrams are those that were actually used; standard values will work equally well. It will probably cost less than $10.00 to build one of these if all of the parts (except the transformer) are purchased new.

The net result of this effort has been a small, inexpensive utility oscillator with long battery life, reasonable frequency stability, and low distortion. ■

REFERENCE

1 Terman, F. E. *Radio Engineers' Handbook*, McGraw-Hill, New York, 1943.