Microphone Circuit Test Oscillator

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Introduction

So, a reader sends me an e-mail, and says ....

> Say, I am looking for a tone generator schematic. Specifically, one that is mounted on an "XLR" style plug, to test mic lines. These are great when installing multiple mic lines, to sort out which one is which; you can test the lines with only one person, too! Do you have one? It has got to be cheaper than buying one, and they can't be that difficult to build, can they? Thanks!

Well, it turns out I don't have one, but I could see the circuit in my head as I wrote the reply. Using my trusty opamp test board (see Project 41), I whipped it up in about 10 minutes. And here it is ....

Description

This unit would be mounted in a small plastic or preferably metal box, with a 9V battery, level control, a male XLR connector (same as on a mic) and a switch. Current drain is low, since the circuit only uses one dual opamp. There is no need for a high quality device, and a 1458 is all that is needed.

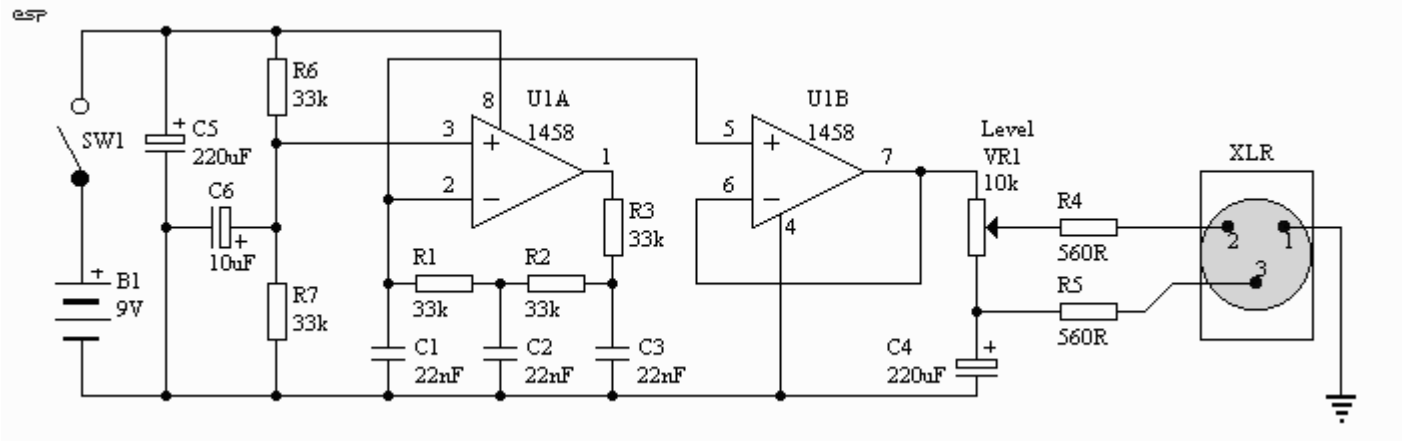

Figure 1 - Mic Circuit Test Oscillator

The first stage is the oscillator itself. This is a simple three stage phase shift oscillator - a circuit that is remarkably uncommon - which is to say I have never seen it used elsewhere. I designed it for another project a few years ago, and I don't understand why it is not in any opamp application notes. Maybe I invented a new circuit :-D

If you want to tune it, you can use a 50k pot instead of R1. I suggest that if tuned, set it to A-440 Hz. Frequency stability is not wonderful, and it changes by a few Hertz as the battery discharges, but this is unlikely to cause problems - it is a test oscillator, not a tuning standard. As shown, frequency will be about 430Hz, depending on the accuracy of the capacitors.

The phase shift network (R1-C1, R2-C2 and R3-C3) serves two purposes. First (and for an oscillator, most importantly), it shifts the phase of the output signal so the feedback is positive, causing oscillation. Secondly, since it is a three stage filter, it attenuates the signal and filters the output square wave so the signal at pin 2 is a reasonable sine wave. Distortion (if you really care) is about 3% or so - I didn't measure it this time, but I recall having done so before.

The second stage is the output buffer, and the signal is simply split to supply the two mic leads. The metal case should be connected to pin 1 (earth) on the XLR connector. The output level control must be a linear type, as the circuit loading will create a good approximation to a log pot. Maximum output into a typical microphone input will be about 100mV (unloaded oscillator output on mine was 140mV).

Not much to it - the whole circuit can be built on a small piece of veroboard, and the battery, pot and XLR connector will take up far more room than the oscillator. There is no LED indicator for power, as this would draw more current than the circuit. To prevent accidentally turning it on, a slide switch is suggested. They are a pig to mount compared to a toggle switch, but are much less easily bumped. If you can get a pot with a switch, this would be even better, but these are now hard to get - especially as linear.

Make sure that you do not connect any of the internal circuit to the case. As shown, the unit will be quite happy on phantom powered (48V) mic lines - this will not be true if you connect to the case.