A Fake Guitar for Effects Testing

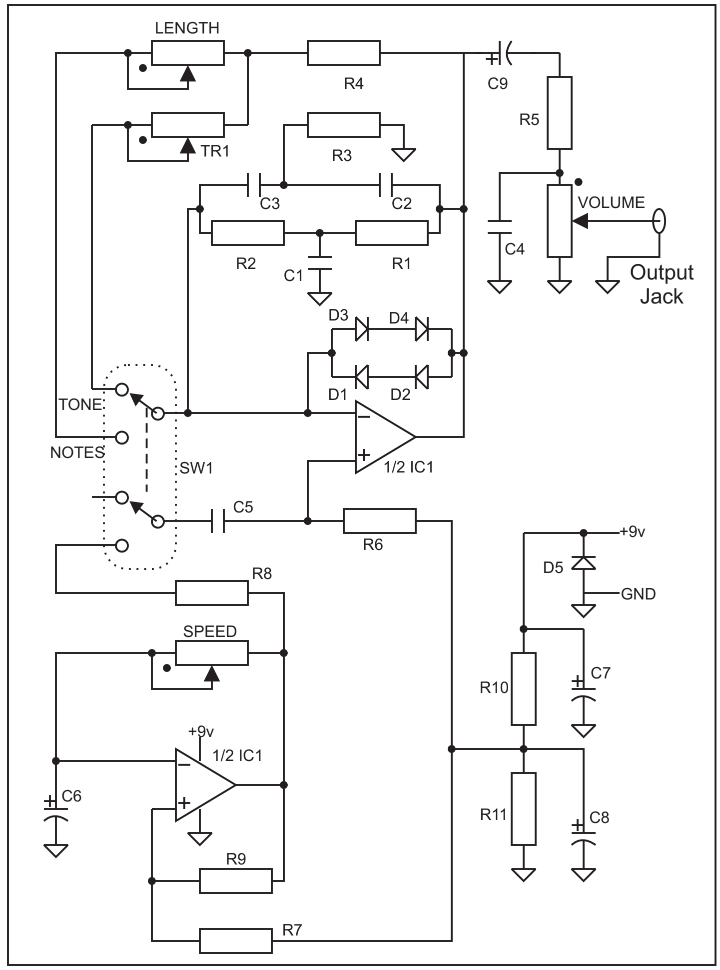
Sometimes you get tired of strumming a guitar to test that effect you're working on. Other times you just need a test tone. This little one-IC circuit does both.

I needed a test oscillator, but I wanted it to look like a guitar signal, but predictable. So I got out my "Quick and Dirty Oscillator" circuit and tinkered it.

Using a dual opamp instead of transistors made both design and construction easier. The top half of IC1 is our friend, the Twin T oscillator from the Q+D. The network of R1...R3 and C1...C3 determine the feedback null, and hence the oscillator frequency. The values chosen are something below 1kHz. If the exact frequency matters to you, either tinker the values or get a proper test instrument.

A Twin T can be adjusted so there is just barely not enough feedback gain to keep it ringing and so it will ring when it's disturbed, but die out, just like a guitar string. Resistor R4 and the Length control set this up. Large values of resistance between the opamp output and its inverting input make the circuit oscillate more easily, and values over about 300K more or less will make it oscillate continuously.

There is a somewhat delicate balance between oscillating forever but distorting and dying out. That is why the trimmer TR1 is there, to let you get a moderately pure sine wave. This may need tinkering from time to time, but not all that often.



Switch S1 chooses either TR1 or the "Length" control for a feedback trimmer. The length control can be set to make the thing oscillate forever, like TR1, but it can also be set to let the note die out. The value of the pot was chosen for a range of shortest notes that I liked. You may want to change the value a bit. Shortest notes were about 1/20 of a second for mine, which is pretty fast playing for a human.

The second section of the circuit, the other half of IC1 is an automated electronic string picker. With the switch set to select the Length control for feedback, the other half of SW1 connects the output of the second half of IC1 to the non-inverting input of the ringing section of IC1 through C5 and R8. When the switch is set in this position, transitions on the output of the lower section of IC1 will disturb the Twin T amplifier, triggering a "note".

Astute observers will recognize that the lower section of IC1 is set up like the LFO in the MXR Phase 90, but with the output of the opamp used, not the voltage on the capacitor. This signal is a square wave which can be set between about ten cycles per second down to about one cycle every two seconds. Both positive and negative edges trigger a ring in the tone generator, so the note frequency is about twice the frequency of the LFO.

Diodes D1-D4 limit the size of the note output to a realistic guitar level, and the output pot lets you turn down the guitar volume.

R1 = 100K
R2 = 100K
R3 = 10K
R4 = 270K
R5 = 10K
R6 = 100K
R7 = 100K
R8 = 1M
R9 = 100K
R10 = 10K
R11 = 10K

C1 = 10nF
C2 = 4.7nF
C3 = 4.7nF
C4 = 2.2nF
C5 = 47pF
C6 = 2.2uF
C7 = 100uF
C8 = 100uF
C9 = 1uF

D1...D4 = 1n4148 or
any of 1N4002...4007
D5 = 1N4002...1N4007

IC1 = TL072 or LF353
SW1 = DPDT
VOLUME = 10K
LENGTH = 50K
TR1 = 50K
SPEED = 1M

* Note that frequency is inversely proportional to C1, C2 and C3. Doubling them all makes frequency go down by half; halving them makes frequency go up by 2:1.

Be sure to change them all the same amount and direction.

Can you switch different sets? Sure! Keep the ratio the same.