31 Guitar Tuner

☐ By taking advantage of the frequency stability of the 555 timer IC operating in an astable mode, an oscillator can be constructed which can be used as a tuning aid for the guitar. The first string of the guitar, E, produces a note with a frequency of 82.4 Hertz. That frequency of the oscillator is set to twice this value. 164.8 Hertz, and then followed by a divide-by-two stage to produce the desired frequency. The purpose of the divide-by-two stage is to guarantee that the waveform produced has a duty cycle of exactly 50%. This produces a note with no second harmonic distortion. The frequency of oscillation of the circuit is set by adjustment of R1, R2, and C2 also determine the frequency of oscillation but these components are fixed values and need no adjustment. The output of IC2 is fed to an emitter follower to provide current gain to drive a loudspeaker. C3 acts as a low-pass natural sounding note. The circuit is powered by a 5-volt supply, and this voltage **must** fall within the range of 4.75 to 5.25 volts for IC2 to operate properly.

PARTS LIST FOR GUITAR TUNER

C1, C4—0.1-uF ceramic capacitor, 15-WVDC
C2—15-uF electrolytic capacitor, 15-WVDC
C3—100-uF electrolytic capacitor, 15-WVDC
IC1—555 timer
IC2—7490 decade counter
Q1—2N4401
R1—50,000-ohm linear-taper potentiometer
R2, R4—4,700-ohm, ½-watt 10% resistor
R3—33,000-ohm, ½-watt 10% resistor
R5—33-ohm, ½-watt 10% resistor
SPKR—8-ohm PM type speaker