43 Theremin Junior

☐ Let's return now to prehistoric times, at least as far as electronic music is concerned. Way back then, nearly forty years ago, an odd-looking and equally odd-sounding instrument known as the Theremin was born. Playing the Theremin entailed waving one's arms spastically between

two sets of antennas. The purpose of all this was to modulate the RF fields in the vicinity of these antennas, thereby producing accompanying changes in the frequency and volume of the sound emitted by the instrument.

Controlling the sound was both difficult and inexact. As a result, the Theremin never gained widespread popularity, but was instead relegated to the domain of avant-garde composers and science-fiction-movie soundtracks.

Despite the shortcomings, the Theremin is great fun to play, so we decided to create a simple solid-state circuit. Theremin Junior, for those of you too young to have experienced the real thing. In this instance, photocells replace the Theremin's antennas. To play, you move your hands to cast shadows on two photocells, one of which controlls pitch—the other, volume. PC1, the pitch-control photocell, varies in resistance as the intensity of the light shining on its surface varies. This causes a change in the frequency of square-wave oscillator IC1.

Similarly, modulating PC2's resistance with light changes the voltage at pin 5 of IC2, which controls the gain of the circuit. High light intensity results in high frequency and high volume. Frequencies between 150 and 4800 Hz, approximately, can be produced at a maximum amplitude of about 0.5 volt peak-to-peak.

PARTS LIST FOR THEREMIN JUNIOR

C1, C2—100-uF, 16-WVDC electrolytic capacitor
C3, C5, C6, C7—.1-uF ceramic disc capacitor
C4—.03-uF mylar capacitor
C8—.01-uF mylar capacitor
C9—.33-uF mylar capacitor
IC1—555 timer
IC2—RCA 3080 transconductance op-amp
PC1, PC2—cadmium sulfide photocell (Radio Shack 276-116 or equiv.)
R1—4,700-ohm, ½-watt 10% resistor
R2—150,000-ohm, ½-watt 10% resistor
R3—15,000-ohm, ½-watt 10% resistor
R4, R5—150-ohm, ½-watt 10% resistor
R6—10,000-ohm, ½-watt 10% resistor
R7-27,000-ohm, ½-watt 10% resistor
R8-1,000-ohm, ½-watt 10% resistor