

of about 2- μ F or else a quality tantalum of about 4.7- μ F. Although the reversed flow of current through the transformer's primary winding causes a different sound in the speaker from the positive-

going inrush, diode D3 and potentiometer R5 can be added to make the "tock" more definitive in its sound quality.

28 Organ Tone Generator

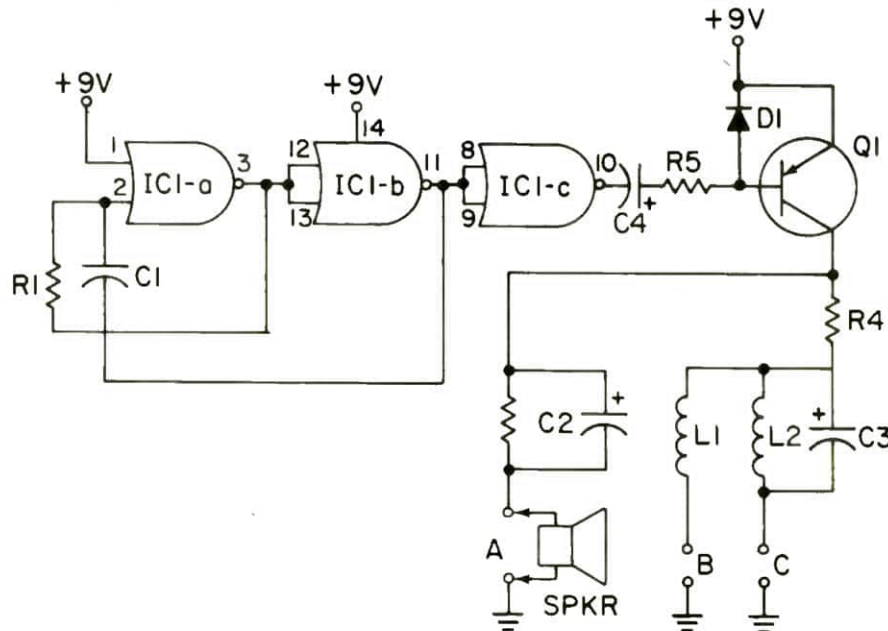
□ Musical organ-like sounds can be generated with this CMOS circuit. The IC generates a nearly square-wave output from pin 11 and the spacings on that output stream of pulses can be varied by changing R1 and R2. If you change them smoothly, you can get a slide-trombone effect.

Outputs A, B, and C are different from the pin 4 output in that the square wave now becomes a sawtooth, a spike and a complex combination of both. Rich overtones result that you can hear with the 8-ohm speaker.

PARTS LIST FOR ORGAN TONE GENERATOR

C1—0.2- μ F disc capacitor, 15 VDC
C2—4.7- μ F electrolytic capacitor, 15 VDC
C3—6.8- μ F electrolytic capacitor, 15 VDC
C4—2- μ F electrolytic capacitor, 15 VDC
D1—1N4001 diode
IC1—4011 quad NAND gate

L1—2.5-millihenry RF choke
L2—2.5-millihenry RF choke
Q1—2N4403 transistor
R1—20,000-ohm, 1/2-watt resistor
R2—100,000-ohm, 1/2-watt resistor
R3—220-ohm, 1/2-watt resistor
R4—220-ohm, 1/2-watt resistor
R5—1,000-ohm, 1/2-watt resistor
SPKR—8-ohm PM-type



29 Slide Trombone

□ This is a novel little instrument that can be played through your stereo system. IC1 and IC2 comprise a ramp generator, the frequency of which is adjusted by R3. The range of adjustment spans two octaves from 150 to 600 Hz. The ramp signal is fed to modulator IC3, which imparts a

natural-sounding attack and decay to the note the sounds when S1 is pressed. R12 allows adjustment of the note's decay interval, and R10 controls the volume. Maximum signal amplitude at the output is 500 mV peak to peak (sufficient to drive an amp's high level input). To play, just R3