

### 6 10-Minute Power-On Switch

☐ There are projects and devices that operate off batteries that are used infrequently. When you switch them on, the battery is dead because the switch was on for the last few days. This happens all too often. So what do you do?

The 10-minute power-on switch delivers up to 10-12 milliamperes from a 9-volt source for ten minutes, then turns off automatically. This is a great feature for most devices, especially test gear, that is used for a few moments, at best—a few minutes, then remains unused for hours, days or longer.

The circuit consists of quad AND gates contained in a single 4011 chip. When S1 is depressed, and released, capacitor C1 charges up to the battery potential of 9 volts. A positive input is supplied to IC1-a for about 10 minutes as C1 slowly discharges through R1—a 10-megohm

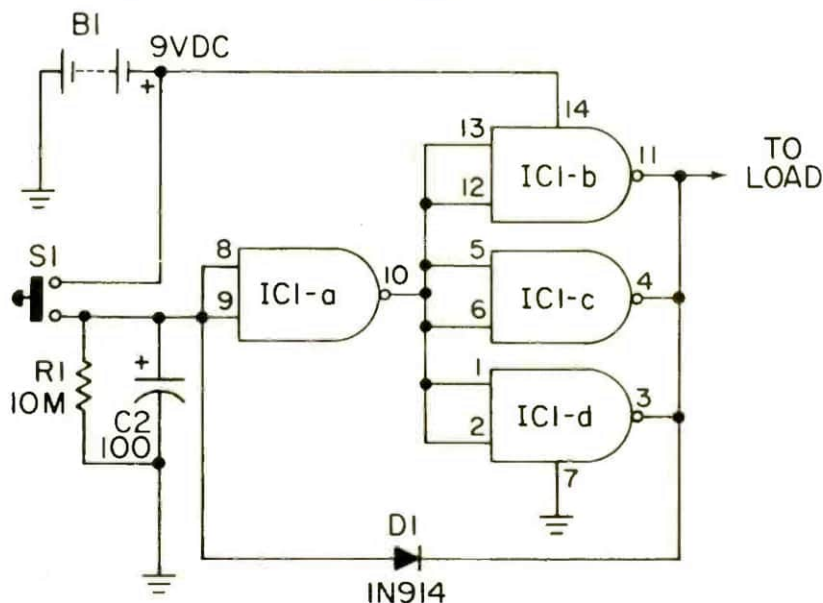
resistor. A 6.8-megohm resistor provides about 5 minutes of power. Experiment with different values for R1 to obtain different periods. The output of IC1-a goes low driving the combined outputs of IC1-b, -c, and -d to 9-volts DC. The output of these three paralld AND gates provide the power to drive the low-current stages that follow.

The battery, B1, is tied to the quad AND gate chip drawing almost no current when the circuit is at rest resulting in almost shelf life for the battery. Diode D1 completely discharges C1 when the power supply shuts off. Should the circuit you wish to automatically turn off require much more than 10 milliamperes of DC current, let the load be a sensitive relay that can control higher voltages and currents.

### PARTS LIST FOR 10-MINUTE POWER-ON SWITCH

**B1**—9-volt transistor battery  
**C1**—100- $\mu$ F, 16-VDC, electrolytic capacitor  
**D1**—1N914 diode

**IC1**—4011 quad AND gate chip  
**R1**—10,000,000-ohm resistor  
**S1**—Normally-open pushbutton switch



## 7 Telephone Voice Pickup

□ You can pick up and amplify the voice signals from your telephone by using this simple IC circuit and a small pickup coil. The circuit has sufficient output to drive a loudspeaker. One section of a quad op amp is used as a high-gain

voltage amplifier. This increases the relatively low output of the pickup coil (a few millivolts) to a sufficient level to drive the loudspeaker. The circuit draws about 60 milliamperes from a 12 volt power source. You can purchase a ready made