Build the Poor Man's Servant

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An inexpensive project which activates or deactivates appliances at the clap of your hands.

DID YOU know that with the expenditure of just a few dollars and about an hour's work, you can have a servant for your home that will turn electrical appliances on and off at just the clap of your hands? The "Poor Man's Servant" does just that—allowing you, among other things, to turn your television or radio on and off without moving from your chair or bed.

As shown in the schematic, the heart of the circuit is a small, preassembled, sound-activated switch module that can be purchased for as little as 88 cents from dealers who advertise in the Electronics Market Place section of this magazine. The module contains a small ceramic microphone element which provides gate drive for an SCR. It also has a sensitivity adjustment so that the user can set the sound level at which the SCR will begin to conduct.

To call the module a true VOX (voice-operated switch) is somewhat misleading. It will respond to a voice, but only if the speaker is close by and talking directly at the module in a loud voice. However, it is much more sensitive to certain sounds. For example, the SCR can be triggered by a clap of the hands from as far away as 20 feet (6.1 m), even though a television or radio is playing in the same room.

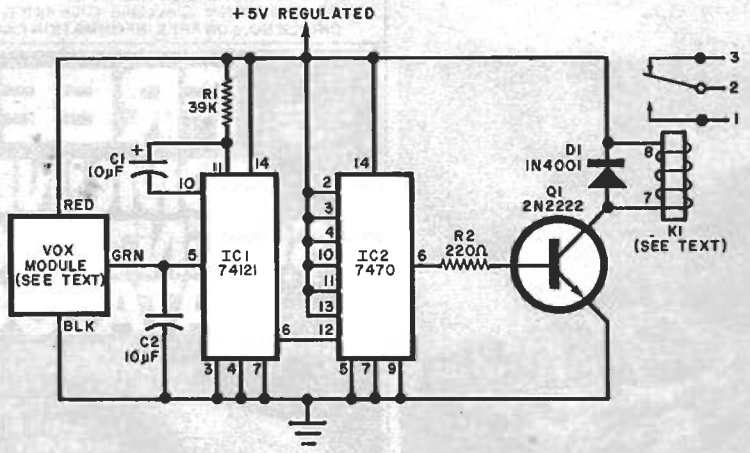
There are three leads on the module. The red lead is connected to the positive side of the power supply. The black lead is grounded, and the remaining (green) lead is used to trigger *IC1*, a 74121 monostable multivibrator. Clapping your hands causes the module to trigger the one-shot, which in turn toggles flip-flop *IC2*. The $\bar{Q}$ output of the flip-flop then goes high, providing gate current for relay driver *Q1*. This transistor turns on and energizes the coil of relay *K1*, whose contacts can be used to apply line power to an appliance. Another clap of the hands causes the flip-flop to toggle again, forcing its $\bar{Q}$ output low and depriving *Q1* of base drive. The relay then deenergizes and removes power from the appliance.

The relay specified in the parts list has a 6-volt coil and dpdt contacts rated at 5 amperes. However, a different relay with more sets of contacts can be substituted for it if more complex switching functions are required. No matter what relay is used, be sure to connect diode *D1* across its coil as shown in the schematic. This diode protects relay driver *Q1* from inductive spikes generated when the relay is keyed.

Construction. The Poor Man's Servant is a relatively simple circuit and can be duplicated using printed circuit, wrapped wire, or point-to-point wiring techniques. It requires +5 volts at approximately 100 mA. Any suitable power supply can be used, and both the project and the supply can be housed in a small enclosure.

Be sure to observe the polarities of electrolytic capacitors and diodes as well as the pin basing of IC's and transistors. Use the minimum amount of heat and solder consistent with the formation of good connections and, if desired, employ IC sockets or Molex Soldercons to simplify assembly.

Use. The Poor Man's Servant can be placed in a convenient spot and powered continuously. It will then be your faithful attendant, ready at all times to obey your command. Just clap your hands and it will perform the task assigned to it. Clap your hands again and it will instantaneously retire. ◇



Schematic diagram of the Poor Man's Servant. Module responds to sound and toggles flip-flop which keys relay **K1** *via driver transistor* **Q1**.

PARTS LIST

C1—10-μF, 16-volt electrolytic
D1—1N4001 rectifier
IC1—74121 monostable multivibrator
IC2—7470 J-K flip-flop
K1—6-volt relay with dpdt, 5-A contacts
Q1—2N2222 npn switching transistor
R1—39,000-ohm, ¼-W 10% resistor
R2—220-ohm, ¼-W 10% resistor
Misc.— Vox module, 5-volt regulated power supply, printed circuit or perforated board, IC sockets or Molex Soldercons, hookup wire, suitable enclosure, hardware, etc.

Note: The following are available from EDI, 4900 Elston Avenue, Chicago, IL 60630: Vox module, Part No. S-45, for $0.88; 6-volt relay with 5-ampere dpdt contacts, Part No. G-296, for $0.99. Illinois residents, add sales tax.