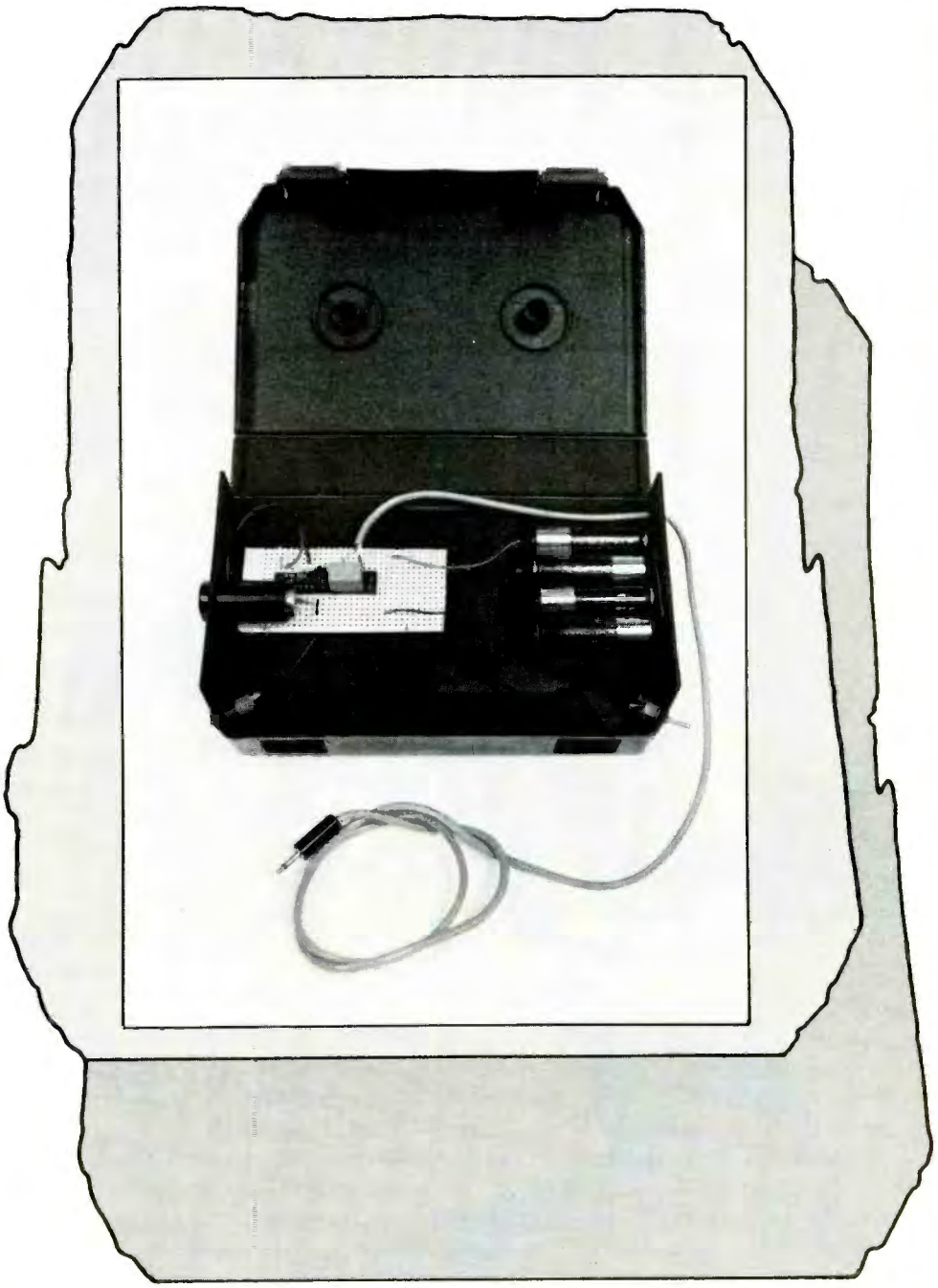
# VCR Wireless Remote Pause Control



*Photograph illustrates how project neatly nests inside a plastic videocassette case. Note particularly details of how the photocell mounts so that most room lighting is excluded.*

**By Rich Vettel**

Probably the most frequently used control on a video cassette's remote controller is the PAUSE function. It's used to stop video recording of a TV program when the commercial goes on or when you're interrupted for one reason or another. If you have a wired-type remote control, and you're tired of tripping over its wire, the project presented here will delight you.

It replaces the wired control with a light-activated control unit. Using a flashlight, you can then activate and shut off the PAUSE function while anywhere in a typical room. Moreover, this project does not require opening up a VCR's chassis.

## *How it Works*

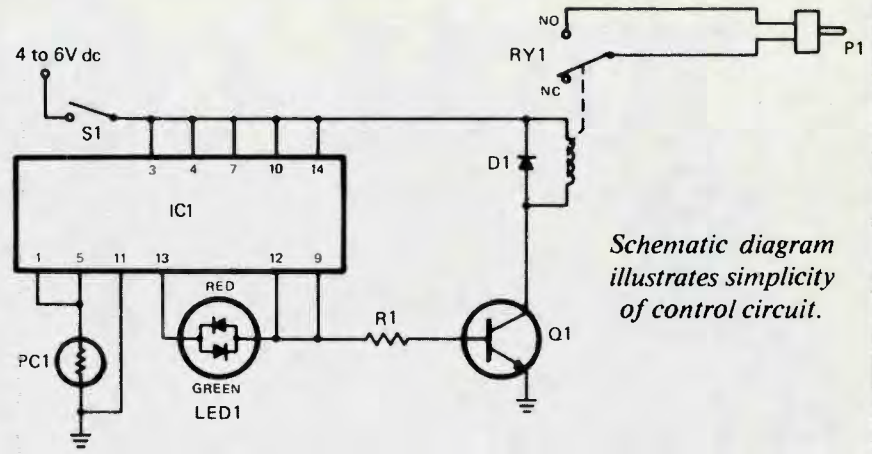
When a light beam hits the photocell on the control unit, the resistance decreases to approximately 100 ohms, applying a negative pulse to the flip-flop input. The relatively slow reaction time of the photocell acts as a debounce circuit, eliminating false trig-

gers. The flip-flop output then changes state and latches.

If the new state is HI, the transistor will be forward biased and therefore conducts, pulling in the relay. The relay contacts provide a closed circuit across the plug going to the VCR PAUSE jack, causing the VCR to go into the PAUSE mode. (This circuit will only work with VCRs having slide- or toggle-switch type remote pause controls. With the switch in one position, the connector plug is shorted and the VCR is paused. In the other position, there is an open circuit between plug tip and ground, and the VCR plays normally.) The next beam of light causes the flip flop to change state again, removing bias to the transistor. The relay drops out and, with continuity across the pause jack removed, the VCR exits the pause mode and resumes play.

The diode across the relay coil helps to protect the transistor from transient voltage spikes. These occur when the transistor is turned off and the relay's magnetic field suddenly decreases or collapses.

A tri-color LED is connected to the two outputs of the flop flop. When the Q output is HI, the Q output is LO and the LED glows red. When the flop flop changes state, the polarity of the LED is reversed and it glows green. This LED functions only as a status indicator and is not necessary for the rest of the circuit to operate.




*Schematic diagram illustrates simplicity of control circuit.*

PARTS LIST

R1—10,000 ohms (¼W, 5%)
IC1—7473 Dual Flip-Flop
Q1—2N2222 npn Transistor
RY1—5V relay, coil >50 ohms (Radio Shack #275-243 or equivalent)
LED1—Tri-color LED (Radio Shack #276-035 or equivalent)
PC1—Cadmium Sulfide Photocell, min. resistance <150 ohms (Radio Shack #276-116 or equivalent. Note: #276-116A will not work)
S1—SPST toggle switch
D1—IN914 Diode

Miscellaneous: Plastic VCR cassette case (Radio Shack #44-1192), 4 "AA" cells and holder, 2-conductor wire, plug to fit VCR pause jack, 20-pin IC socket, circuit board (Radio Shack #276-153), inline ¼" phone jack, velcro tape, double-sided foam tape, flashlight with batteries.

## *Assembly*

I used one half of a Radio Shack prototyping board for the circuit. This layout required a minimum number of wire connections. The IC chip and transistor can be directly soldered to the circuit board or inserted into a single 20-pin IC socket.

The entire unit fits nicely into a plastic video cassette case. Besides looking like a natural extension of the VCR, the case allows easy access for battery changes. A 5/8" hole should be drilled in the case for the photocell to show through. To help keep the cell in darkness even in a well-lighted room, it should be recessed about an inch back inside the case. The barrel of an inline phone jack, fitted through the case opening and over the photocell, assures proper alignment and provides a finished appearance. The circuit board can be attached to the case with velcro tape, allowing for easy repositioning, while the battery holder can be fastened with double-stick foam tape. Any two-conductor wire may be used to connect plug P1.

## *Testing*

Connect a continuity tester across plug *P1*'s tip and ground. Turn on the control unit power switch. The indicator LED should turn green, and there should be no continuity indicated across the plug.

As soon as a flashlight is momentarily shined on the photocell, the LED should turn red and there should be a closed circuit between the plug tip and ground. The distance from which the unit can be activated is determined by the brilliance of the flashlight. A light powered by 2 "D" cells can activate the unit from a distance of less than four feet, while a flashlight powered by 4 "C" cells is effective at up to 12 feet.

After passing the simple tests, just plug *P1* into the VCR's PAUSE jack, power up the control unit, and play the VCR as usual. Then momentarily activate the photocell with a beam of light to "pause" the VCR. To restart the PLAY function, just shine the flashlight at the photocell again. That's all there is to it. From wired to wireless for less than $10. **ME**