

# Simple Mobile Transceiver Protection

*Automatic turn on and turn off for your mobile transceiver.*

Richard Hensel, N8WLC

I like to have my mobile transceiver on all the time while I'm in my car, but I don't want to have to remember to turn it on and off. In addition, I have always worried about transients and spikes when I start up my car.

## The Solution is Simple

I came across a simple application of the 555 timer integrated circuit that has made my life easier. The timer is wired as a *delayed turn on*. That is, after a fixed time the output will go high and stay high. This relieves me from having to remember to turn the radio off when I leave my car and turn it back on after I start it up. It also protects the radio from voltage spikes during starting.

As you can see in Figure 1, the circuit is simple and can be completed with point to point wiring; layout is not critical. I chose perforated prototype board from RadioShack. My board measured  $\frac{3}{4} \times 1\frac{1}{4}$  inches. The parts count is low and most of them can probably be supplied from a well stocked junk box. Figures 2 and 3 show my layout.

## Setting the Time

The timing is determined by  $R_A$  and  $C_A$  using the formula  $t(\text{seconds}) = 1.1 \times R_A \times C_A / 1000$ , where  $R_A$  is in  $k\Omega$  and  $C_A$  is in  $\mu\text{F}$ . Table 1 shows some common values for a 6 second delay.

The output of the timer is amplified by

an NPN transistor that supplies current to operate an automotive type relay. The relays come in several current ratings; be sure to get one that can switch the current needed to operate your radio. I found a number of 30 and 40 A models at a

national auto parts chain.

I used an MJ 3055 transistor in a TO-220 case because that is what I had in my junk box, but any NPN transistor that can comfortably source 200 mA should work here. I measured several relays from the auto parts

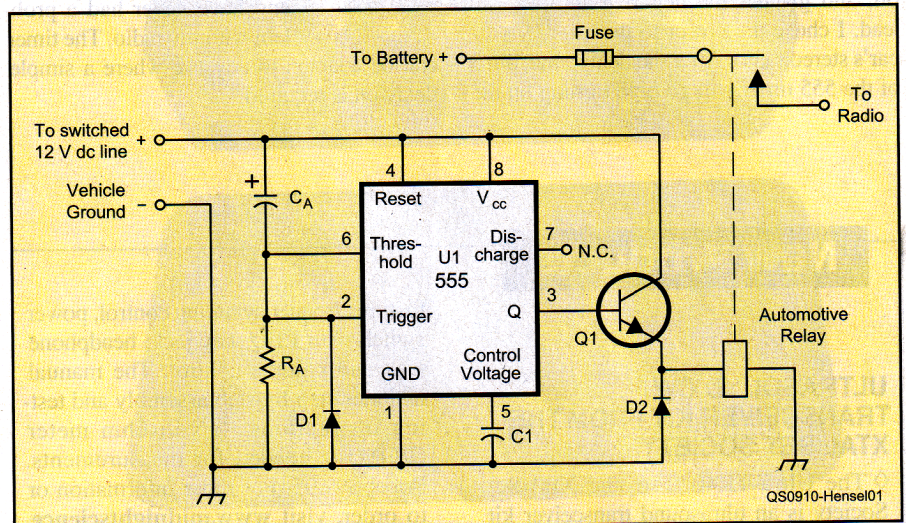


Figure 1 — Schematic diagram and parts list for transceiver protection circuit. Digikey parts are available at [www.digikey.com](http://www.digikey.com).

C1 — 0.01  $\mu\text{F}$  ceramic capacitor (Digikey 1460PH-ND).  
D1 — 1N4148 (Digikey 1N4148FS-ND).  
D2 — 1N4001 (Digikey 1N4001DITR-ND).

F1 — Fuse appropriate for radio load.  
Q1 — MJ 3055 (Digikey 497-2573-ND).  
Q2 — 555 timer integrated circuit (Digikey 497-1963-5-ND).  
Perf board —  $\frac{3}{4} \times 1\frac{1}{4}$  inches cut from RadioShack # 276-148.

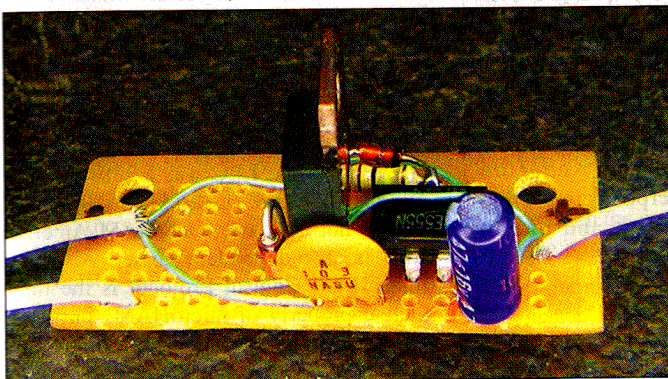


Figure 2 — Oblique view of the assembled unit.

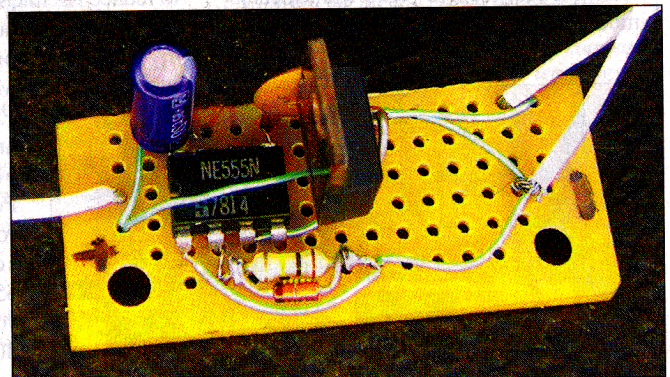


Figure 3 — Top view of the circuit assembly showing parts locations.