

Driveway Sentry project revisited

The letter in the Mailbag pages of the March 2010 issue, about the failure of Driveway Sentry coil, triggered my memory of what I went through to get a solar-powered remote version to work, some five years back.

My application was for a 1km-long driveway at a vineyard in the Hunter Valley, to warn house residents that a vehicle was coming up the drive. I had been experimenting with a solar-powered PIR and 433.92MHz coded Tx/Rx modules for some time. I finally achieved the range by

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using a Yagi antenna on the transmitter but I could not make any of the 12V PIR sensors stable in all weathers and temperatures.

After purchasing and building the Driveway Sentry kit and using the relay output to drive the transmitter module, supported via a 1.2Ah SLA battery with an AA-0348 charging regulator fed from a Suntech 2W solar panel, I had a working system.

I had to refit it into a weatherproof box but everything worked fine. Unfortunately, the Driveway Sentry pulled too much power in standard configuration and flattened the battery in about three days, even in sunny weather. That was puzzling, as the sensor itself is virtually passive.

I then rationalised the Sentry circuit to reduce power use by removing the 12V relay and feeding the transmitter module directly from pin 3 of the 7555 timer IC. I also removed IC3, IC4, REG1 and the power LED. Finally, I installed a phone charger power supply card between the battery and the control board, replacing the regulating resis-

tors with a multi-turn pot to adjust it to exactly 6V. These can be bought for about \$15 and have an efficient chopper regulator; much less power hungry.

Current consumption dropped to 4.7mA on standby and 7mA when triggering. This will do about 10 days in complete darkness, so is well within the battery and solar panel capabilities. The control card is now quite bare, with only the op amp and timer chips loaded.

The receiver end in the house is a plugpack-powered box with the receiver module and a small piezo ding-dong siren. I put a small transistorised relay on the data signal output so the siren could get full voltage. A straight 14.3cm cheap telescopic antenna is used. This will easily convert to an outdoor Yagi if more range is needed. I am transmitting 450 metres at the moment, halfway down the drive, as it was felt that mounting at the driveway entrance at 1km was likely to attract vandals to the solar equipment.

The transmitter end is a Yagi design I downloaded off the net. It is built

from 10mm aluminium tube and a piece of PVC pipe, all glued together and trimmed to exact 433.32MHz dimensions.

The unit has performed well for five years but I did have to replace the SLA battery after four years. After three years, the sensing coil went open-circuit. I dug it up and opened it to find the iron bar within the coil had rusted and burst the copper coil. I found a new piece of iron rod and passivated it and painted it with bitumastic before winding a new coil on it. I then filled the whole housing with bitumastic putty. It has worked ever since. It certainly isn't rocket science.

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