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LOW-COST ESD DETECTOR

ESD detectors are useful in correlating unusual circuit upsets with specific ESD events. The following is based on a simple lightning detector based upon a circuit by Charles Wenzel and written up later by Bob Radmore in the April 2002 issue of QST Magazine. It was since improved by Wenzel and described on his Web site: <http://www.techlib.com/electronics/lightning.html>. It turns out this circuit also makes a great ESD detector! I have taken the original circuit, added LED and beeper indicators, modified the pulse stretcher circuit a little to give a good indication on these indicators and added an LCD counter to record the number of ESD events.

The LCD counter is an Omron H7EC, which is available from a number of surplus outlets. I bought mine for about \$30. The circuitry is housed in a small plastic box and powered by a 6V battery pack. Switches control on-off, beeper on-off, and a small button resets the LCD counter.



The circuit is comprised of a low-frequency tuned circuit. Lightning has much of its energy around 300 kHz and the front end is tuned here. The 270 K-Ohm resistor serves to decrease the

Q a bit. The tuned circuit feeds into an amplifier transistor and then on to a quasi-Darlington pair with pulse-stretching circuitry. The 82 k-Ohm resistor and 10 uF capacitor sets the pulse width. I modified these to provide a little longer pulse, so the LED and beeper indicators stayed on longer.

I then added a switch transistor (not shown) to drive the LED and beeper. The LCD counter was also connected in appropriately. I use a Diamond RH789 telescoping antenna with BNC connector, but any similar telescoping antenna will work. For best sensitivity, a length of 2-3 feet is best. For casual ESD detection, the "rubber duck" antenna (shown above) works OK. The detector will sense ESD events within several feet and lightning within 2-3 miles.

As an aside, I added a small magnetic reed relay to trip the shutter of my camera. Connecting the relay output to a modified shutter release cable allows me to photograph lightning more easily during the daytime!

