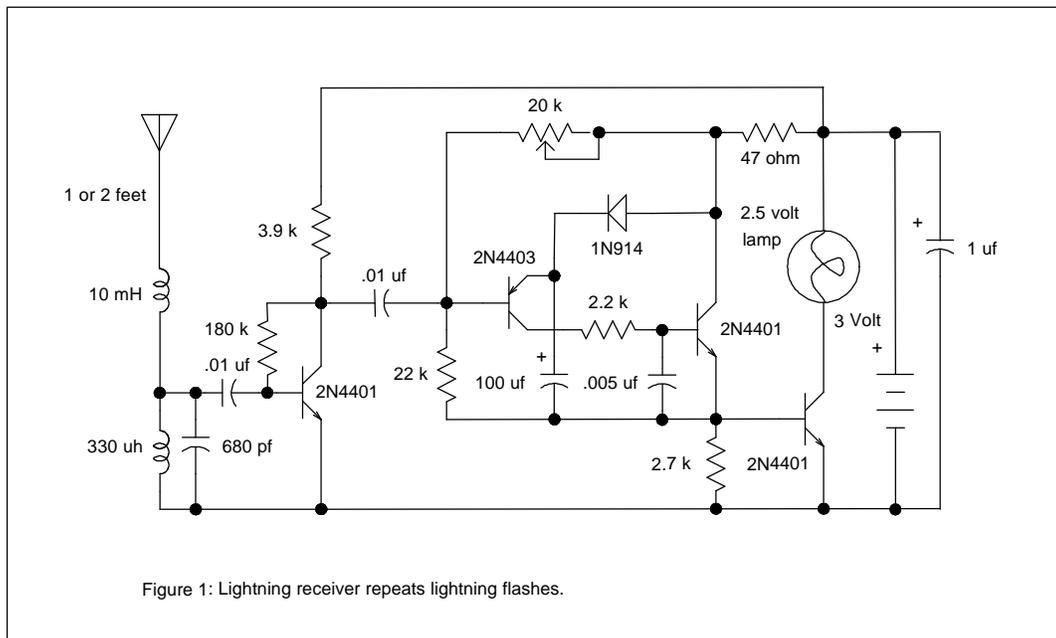


Lightning Detector

Egor! Come quick! A storm approaches!

Here is a VLF receiver tuned to 300 kHz designed to detect the crackle of approaching lightning. A bright lamp flashes in synchrony with the lightning bolts indicating the proximity and intensity of the storm. Figure 1 shows the simple receiver which consists of a tuned amplifier driving a modified flasher circuit. The flasher is biased to not flash until a burst of RF energy, amplified by the 2N3904, is applied to the base of the 2N4403. The receiver standby current is about 350 microamps which is nothing at all to a couple of D cells, hardly denting the shelf life. Of course, the stormier it gets, the shorter the battery life.



For best effect, mount the lamp in an old-fashioned holder with an extra-large colored glass lense. Or construct your own fixture with a plate of textured colored glass behind a panel painted with black-crackle paint. Watch a few old science fiction movies for other ideas.

A totally different approach is to mount the circuit in an empty glass jar with the antenna and bulb protruding through the top. (A malted-milk jar has a nice, red plastic lid which is easy to work and looks good.) Use a pin jack for the antenna. The gadget looks quite home-made but fascinating.

Boat owners may wish to replace the lamp with a 3-volt beeper to provide an early warning of approaching bad weather. Choose one of those unbreakable clear plastic jars like the large jars of coffee creamer. A little silicone rubber will seal the antenna hole in the lid of the jar. Use a longer antenna for increased sensitivity since there are few electrical noise sources on the lake.

Tune-up is simple: adjust the potentiometer until the regular flashing just stops. (Use a multi-turn trimmer.) When properly adjusted, the lamp will occasionally flash when large motors or appliances switch on and off and an approaching storm will give quite a show. Obviously, tune-up is a bit more difficult during stormy weather. Adjust the pot with no antenna if lightning is nearby. Tune an AM radio to the bottom of the dial to monitor the pulses that the lightning detector is receiving.

This lightning detector is not so sensitive that it will flash with every crackle heard on the radio but will only flash when storms are nearby. Increased sensitivity may be achieved by increasing the antenna length. The experienced experimenter may wish to add another gain stage after the first by duplicating the 2N3904 circuitry including capacitor coupling with the addition of a 47 ohm emitter resistor to reduce the gain somewhat. This additional gain can cause stability problems if the layout is poor so novices are advised to use a longer antenna or adjust the sensitivity potentiometer more delicately instead! (When operating properly, the additional gain makes the pot adjustment much less critical.)

