# TWO (2) NIFTY PROJECTS

*Here are two nifty projects that are just perfect for this time of year!*

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FOR DECADES, MANKIND HAS BEEN BOTHered by the question: "What happens to the light in my refrigerator when I close the door? Does it go out, or does it stay on all the time?" Those claiming to be in the know will tell you that, "You know, it goes the same place your lap does when you stand up," or that it's controlled by the-little-man-who-wasn't-there.

Don't you believe them! After all, how did *they* find out? Well, now you can learn once and for all just what does happen to your refrigerator light when you close the door by building the Frid-O-Matic (pronounced "fridgeomatic"). This simple-to-use device, easily built from widgets, thingamabobs, and whatchamacallits found around the house, will give you the definitive answer and make you the talk of the neighborhood.

The Frid-O-Matic works on the principle that "what you see is what you get," which can also be stated as "never give a sucker an even break." As shown in Fig. 1, a DASCR (*D*ark *A*ctivated *S*ilicon *C*ontrolled *R*ectifer), aimed at the refrigerator's interior light, monitors that device's state at all times. As long as that light is on the Frid-O-Matic remains inactive, but when (and if) the interior light goes off the DASCR latches, conducting voltage to normally closed relay RY1, which is wired in series with the interior light's power source. If the light goes on, the relay is energized, causing it to go off.

The Frid-O-Matic can be built using point-to-point, perforated construction board, or PC board techniques. A five- or twelve-volt power supply can be used, depending on the coil voltage of RY1. The entire device can be housed in an empty milk or orange juice container so as to blend inconspicuously with the usual contents of your refrigerator (see Fig. 2).

Using your Frid-O-Matic is easy. With the side of the juice or milk container containing the DASCR facing the refrigerator's interior light, carefully close the refrigerator door. The next time you open it, if the interior light goes on, that is an indication it was never off. If, however, it does not light, that is an indication that it did go off when the door was closed (aha!), or when you weren't looking. Or maybe it just picked that time to burn out.

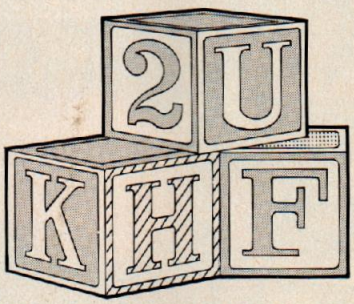


**FIG. 1—BLOCK DIAGRAM of the Frid-O-Matic. Schematic is behind blocks.**

**FIG. 2—WHICH ONE is the Frid-O-Matic? Only your wife knows for sure.**

The Frid-O-Matic can be disconnected by ripping out the wires to RY1.

### Build the CheapModem

Computer-to-computer communication can be an expensive proposition, and sometimes it isn't worth the investment in equipment. Here's a short-haul modem you can build. It's almost free!

**FIG. 3—AFTER MUCH TRIAL-AND-ERROR experimentation, it was found that the best resonator is usually determined by what happened to be on sale at the supermarket this week. Several good resonators can be found in this photograph.**

The operation of the CheapModem is quite straightforward. The output from the computer's serial port is fed to two amplifiers—a straight-through one and an inverting one, and coupled from each to a small buzzer. The buzzers have different pitches and correspond to the logic highs and logic lows that are output by the serial port.

Both buzzers are mounted inside a resonating chamber, which is connected by a flexible conductor to a similar resonator at the receiving computer. A phono cartridge or other suitable pickup is mounted in that resonator and connected through a pair of 567 tone decoders to that computer's serial port.

The electronic part of this project is elementary, and the circuits can be found in almost any project book. The real secret of the CheapModem is in the resonators and in the selection of the correct flexible conductor. Both rigid and semirigid resonators have been tried, and each type has its own advantages. Semirigid resonators, in the form of waxed or plasticised cardboard containers are more efficient than the rigid, or tin-can, sort, but are not as durable. They are, however, easier to open and empty, and for that reason may be preferred. The final choice is up to you, and may well be based on your eating habits or just on what's on sale at the supermarket. Several suitable resonators are shown in Fig. 3.

The flexible conductor is perhaps the most important part of this project. A number of materials were evaluated, among them wirewrap wire, UHF hard line, and a slinky. The last worked well, but was found to be prone to interference from ambient noise, which led to transmission errors. In the end, the most effective in terms of its price/performance ratio was found to be dental floss. Dental floss is also easy to knot, and a good knot is vital to the proper performance of the CheapModem.

A maximum reliable transmission rate of 1.25 baud was achieved in the author's prototype. While a higher speed would have been more useful, for the price you can't argue. And you get to eat what was in the cans or containers. **R-E**