



COVERT WIRELESS LISTENING

INSTALL A SNEAKY
BUG IN A BOOK.

M016



BY DAVID SIMPSON



THE SPY WHO BUGGED ME: Don't judge a book by its cover.

Connect a shirt-pocket “amplified listener” hearing aid with an in-car FM transmitter, and you’ve got a wireless bug.

Tuck them inside a hollowed-out book with the mic concealed by the dust cover, and you’ve got a covert listening device that you can leave lying around or on a shelf near a surveillance target. Then an undercover agent in the next room can eavesdrop on any devious plotting through her FM radio.

This is a fun and easy project, and if it weren't for the “covert” part, you could have all the components working together before you leave the RadioShack where you got them. (Really, I did!)

I used a book to camouflage my listening system, but you can also use a stuffed animal, a plastic toy (the big robotic WALL-E has potential), a basket of

potpourri, or maybe even your dog's collar. The important considerations are:

- » Make sure the microphone isn't obstructed.
- » Provide an easy way to turn the power on and off.
- » Don't enclose the electronics in metal, which limits the transmitter's range.
- » Protect the delicate connections inside.

Photograph by Garry McLeod



IF THIS BOOK HAD EARS: Your sister might be listening to everything you're saying!

MATERIALS

Miniature “amplified listener” I used RadioShack #33-1096; the Listen Up (“As Seen On TV”) didn’t work.

Small wireless FM transmitter I used the Accurian T707, RadioShack #12-2054.

Personal music player with FM receiver I used an old Walkman-style cassette player.

Earbuds or headset

AA batteries (2)

2x AA battery holder

Hookup wire, red and black, around 22 gauge

Heavy shirt cardboard or illustration board

Heat-shrink tubing

Hardcover book

Velcro tape

White glue

TOOLS

Screwdrivers

Alligator jumper cables

Soldering/desoldering supplies

Hobby knife

Wire cutters/strippers

Ruler

Binder clips, large (1–2)

Drill and ½" drill bits

Paint brush, about ½" wide

Marker

Wood boards (2), with drywall screws (4) or handscrew clamps (2) for use as a book press

TESTING, ONE, TWO, THREE

Let’s launch this mission. First, we’ll test everything. Plug the headphones into the listener and turn it on. You should hear your surroundings like a bat.

Now plug the headphones into the FM receiver and tune it to a static-only spot at the low end of the dial, where these wireless FM transmitters generally broadcast.

Plug the transmitter into the listener, tune it to match the receiver, and you should be able to hear the sounds of the listener through the receiver. The signal should be strong, but it still might have some static.

Have a co-conspirator help with your test by talking near the listener while you walk away, listening through the receiver. See how far you can get before the signal is no longer intelligible. (For the best range, make sure to use fresh batteries.)

Test the components individually and together like this after each step of the assembly process. Delicate wires can snap and tiny switches can get switched at any stage, making troubleshooting difficult.

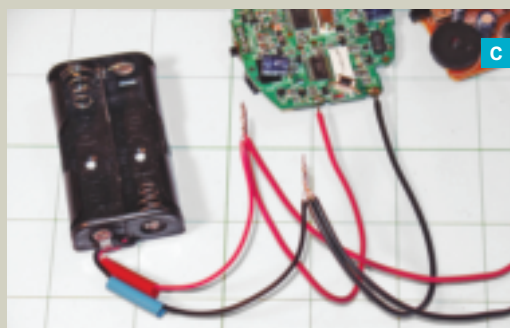
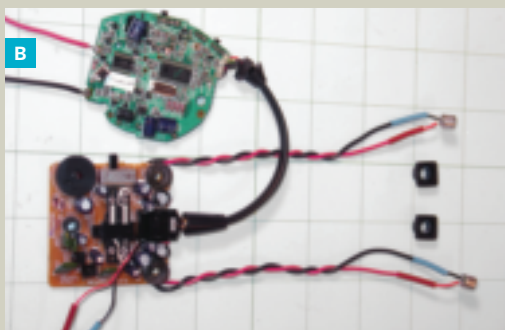
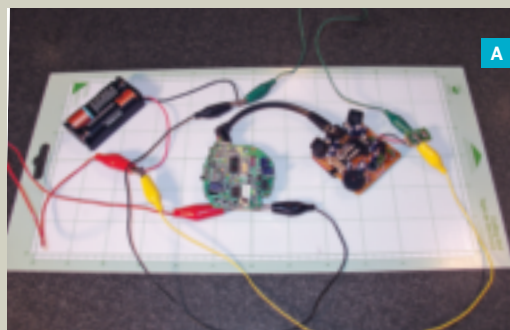


Fig. A: Components clipped together for initial testing.
Fig. B: Mics extended from listener PC board.

Fig. C: The listener and transmitter share connections to the battery pack. **Fig. D:** Cut through the pages to hollow out the book.

GUT AND EXTEND

Shed the extra bulk by unscrewing the listener and transmitter's plastic housings and taking out their guts. Note the locations of all the controls: on/off, volume, balance, tuning, and so on. Hook everything back up with jumper cables, drawing power from 2 AA batteries in a holder (Figure A). Test again.

I decided to move the listener's 2 microphones from their original position to the book's outside spine, because the spine is generally exposed whether the book is in a bookcase or just laying around.

To do this, desolder the mics from the PC board, being careful not to damage them or any nearby electronics with too much heat. Use hookup wire to extend the leads of both mics by about 6", and resolder the extended leads back to the board (Figure B).

While you're at it, extend the power leads from the transmitter and listener by about 6" as well. Protect all the new connections with heat-shrink tubing (always slip it on before soldering). Attach the power leads from the 2 components and the battery box, joining all the reds (positive) and all the blacks (negative), as in Figure C. Twist the conductors together, solder, and cover with heat-shrink.

PREPARE THE BOOK

Choose a hardcover book that's big enough in all 3 dimensions to enclose the system's components. The dust jacket should be in good condition. Pick a title that won't draw undue attention from your intended target. You don't want them to notice the book and start looking through it!

Skip a few pages and set your components centered side-by-side on a front-facing page. Draw a rectangular outline of the components with a ruler, adding $\frac{1}{2}$ "–1" all around, making sure there's still $\frac{1}{2}$ "–1" of book left around the edges. This outline will become your compartment. Cut a piece of cardboard about $\frac{1}{4}$ " smaller all around, to serve as the compartment's floor.

I used an X-Acto knife and a ruler to cut the rectangle through the pages, cutting down about $\frac{1}{16}$ " each time and stopping within $\frac{1}{4}$ " of the back cover. I used a binder clip to keep the cut pages out of the way while I worked downward (Figure D).

Two previous MAKE articles also describe book-hollowing techniques: "Palm Pilot Notebook" (*Volume 07, page 138*) and "Uncle Bill's Magic Tricks" (*Volume 13, page 60*).



Fig. E: Drill holes through the spine for the microphones.
Fig. F: Mics and rubber dampers in place.

Fig. G: Electronics all tucked neatly inside the book.
Fig. H: Some books are not to be trusted!

Glue the cardboard floor to the bottom of the compartment and give the walls 3 coats of a 50/50 solution of white glue and water. I dried each coat for about 12 hours, with waxed paper on the top cut sheet to prevent it from gluing shut, and the whole thing under weights to keep the pages flat.

Clamp the book between 2 boards using drywall screws or handscrew clamps. For each microphone and its surrounding rubber sound damper, drill a $\frac{1}{2}$ " hole through the spine, clear into the compartment (Figure E). Clean away the shredded paper and paint the tunnels with the 50/50 glue solution.

HOOK UP, STRAP IN, TURN ON

I used velcro tape to mount the components to the compartment floor, and before sticking them in, I slid the microphones with their dampers into their holes in the spine. Inset the mics about $\frac{1}{8}$ " so they won't touch the dust jacket (Figure F).

Tidy the wires so that they're all well within the chamber and the book can be closed (Figure G). Test the rig again, put the dust cover on, and you're ready to save the free world!

Another cool use for this setup is as a covert 2-way communication system. Assemble 2 of these systems, then you and your fellow agent can conduct a whispered conversation in a noisy environment — listening on one another's frequency — without sitting together.

LIMITATIONS

The problem with these in-car FM transmitters is that their range is only about 15'–20'. The listener can be in an adjacent room or the room above or below if there's no metal blocking the signal.

Sorry about that, Max — you probably can't tune in from a car parked at the curb of the subject's building. For that, you might consider modifying a wireless lapel mic system, like the ones used by presenters.

David Simpson also wrote "G-Meter and Altimeter" in this volume of MAKE, as well as "Hydraulic Flight Simulator" in Volume 12 and "Explosion Engine" in Volume 13.