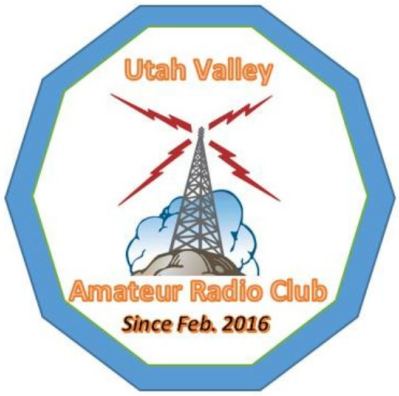


DIY

Worthwhile projects you can build on your own



Simple FM transmitter

Most of us are well-aware that during an incident in which phone towers are unavailable and we're possibly trapped, communication becomes a lifeline. This is why we stash handheld ham radios for emergency purposes, as a secondary communication tool. In the event that nobody is listening to your call for help, however, it would be really helpful to have a third way to communicate, maybe one that might attract the attention of your neighbors, for example.

During a disaster, we're told to monitor the FM broadcast frequencies for alerts, evacuation plans, and updates. If people are listening to FM broadcast like they should be, it seems wise to have a way to use that medium to call out for help, but you'll find it very difficult to locate a device that'll transmit on that band. So, if you can make one yourself, you'll have one more problem partly solved. "Partly" solved because it doesn't receive, but you can get around that problem by using an ordinary FM receiver.

This project is for a very simple FM transmitter, designed to transmit voice on broadcast FM (around 100 MHz ±5 MHz). It's legal because its power (actually, electric field) output is below the interference tolerance level maximum of 250 µV/m for an unlicensed transmitter. So, in reality, it'll only reach less than a half block away, but if your batteries are good, it's better than nothing. Let's see what it's going to take.

Parts list

One 3 x AAA battery pack

One 20 pF trimmer capacitor

One SN7413N dual 4-input Schmitt NAND gate

Three feet solid 12 AWG wire

One 1.2″ x 1.2″ prototype board

One 10 nF capacitor

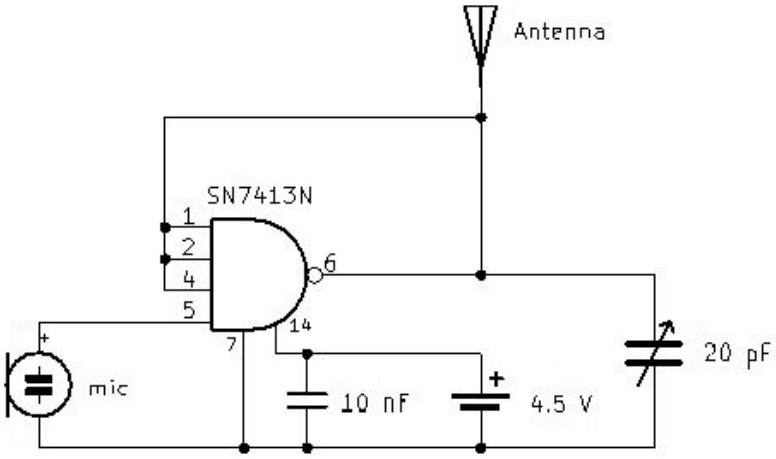
One electret microphone

One foot solid 22 AWG hookup wire

A pair of alligator clips (these in the link are better and cheaper than the ones I actually used)

The construction

Using the prototype board, insert the components in spots you feel are most convenient, and solder them according to this schematic:

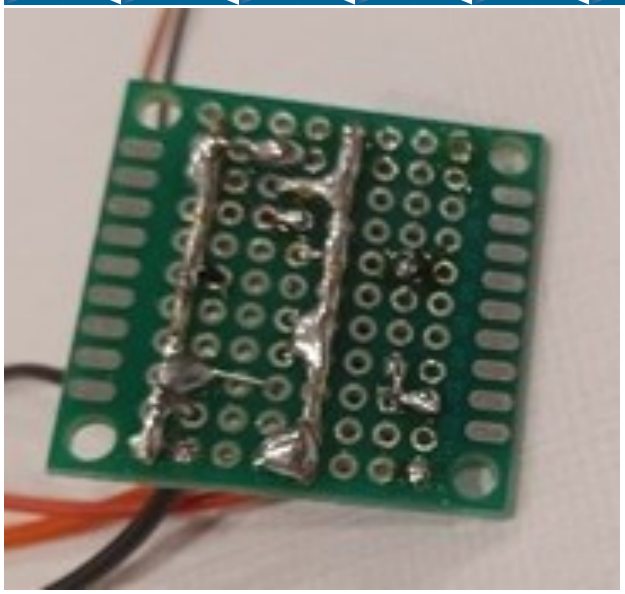


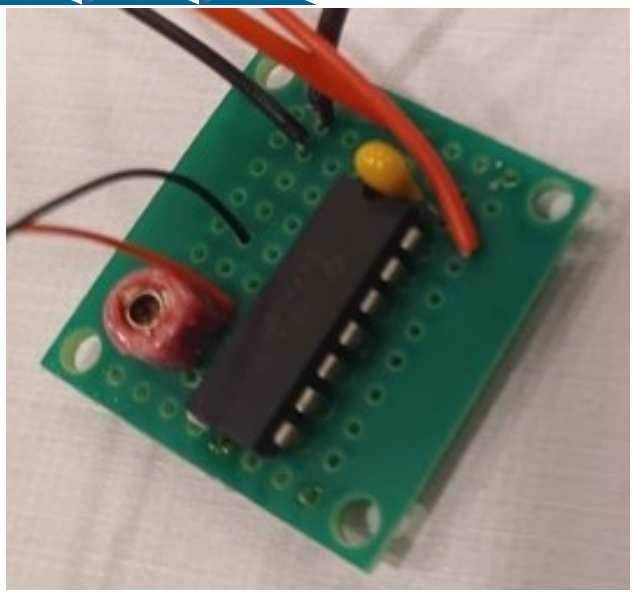
Being at the height of my laziness, instead of using wires, I pretty much connected everything mounted on the prototype board by solder bridges, not the brightest idea I've ever had. But I figured I could get away with it, since the real estate was pretty compact.

Several things are connected to-

DIY, continued

Simple FM transmitter





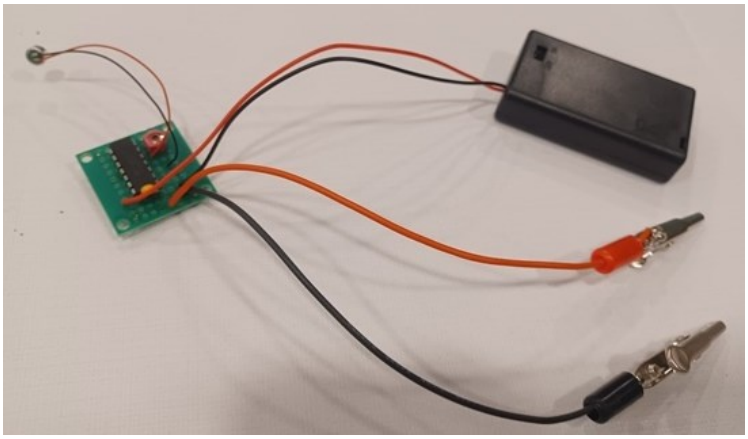
gether to pin 6 of the IC, so I called it the "6" bus. Note that the red wire of the microphone is the + side in the schematic. Connect a three-inch black wire from the common ground (negative end of the battery) to a black alligator clip for the Earth ground. Connect a three-inch red wire from the "6" bus to a red alligator clip for the antenna. Cut the 12 AWG wire about ¼(300 ÷ 100 MHz) x 0.95 (velocity factor) = 71 cm or (234 ÷ 100 MHz) x 0.95 = 2 ft 3 in for an antenna. Connect the red alligator clip to the antenna, and the project is completed.

Testing the transmitter

Insert the three AAA batteries and turn on the transmitter. By using an oscilloscope or an actual FM broadcast receiver close by, use the tiny screwdriver that comes with the trimmer capacitors and tune the 20 pF trimmer to an acceptable frequency, and start talking into the microphone. Because of the weakness of the electret microphone, you'll need to speak loudly.

The length of this antenna is a quarter-wavelength, so it might be a good idea to connect the black alligator clip to a good ground to complete your antenna's ground plane. You can read more about this design on Instructables by Abdel Razzac and on *Learning Electronics* by Tony van Roon VA3AVR.

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The finished project