The Ultimate FM Transmitter (Long Range Spybug)
by ASCAS on July 13, 2014

Table of Contents
The Ultimate FM Transmitter (Long Range Spybug) .................................................................................. 1
Intro: The Ultimate FM Transmitter (Long Range Spybug) ...................................................................... 2
Step 1: Gather The Parts .......................................................................................................................... 3
Step 2: PCB & Schematics ....................................................................................................................... 4
  File Downloads .................................................................................................................................. 4
Step 3: Print The PCB Layout ................................................................................................................ 4
  File Downloads .................................................................................................................................. 5
Step 4: Develop The PCB ......................................................................................................................... 5
Step 5: Etch The PCB .............................................................................................................................. 6
Step 6: Clean The PCB ............................................................................................................................ 6
Step 7: Solder The Components ............................................................................................................... 7
Step 8: Construct The Coil ...................................................................................................................... 8
Step 9: Adding The Antenna .................................................................................................................. 8
Step 10: Recycle A Battery Clip ............................................................................................................ 8
Step 11: Glue Them Together .................................................................................................................. 9
Step 12: Tune The Transmitter .............................................................................................................. 9
Step 13: Don’t Forget To Leave A Comment [Stay Tuned] ................................................................. 9
Related Instructables ............................................................................................................................ 10
Advertisements ....................................................................................................................................... 10
Comments ............................................................................................................................................... 10
Hello There! I'm Angelo. I'm 15 and I love to build projects during my pastime! I plan to become an engineer someday and work for a company who innovates new products. My #1 inspiration is my grandpa! He's one of the reasons why I make so many projects. He was a great engineer and the best grandfather that a geek can ever have. When I was in elementary, he used to pick me up from school. We shop at hardware stores before we head home, then build projects together at their garage. When he passed away, I continued my hobby in honor of him. Most of my projects focus on Electronics, Woodworking and Robotics. I've been making projects since I was, now I that I have earned a lot of knowledge through my experience. I now compete in the annual "National Robotics Competition". I earned last year's championship title. I'll be one of our country's representative in this year's International Robotics Olympiad (which will be held at Beijing).

**Intro:** The Ultimate FM Transmitter (Long Range Spybug)

Have you ever wanted to broadcast your own radio station within the neighborhood? Ever get curious on where people get those "Surveillance Bugs" from spy and action movies? This small and simple FM transmitter is the toy that geeks have always wanted.

FM transmitters can be complicated to build, that's why I'm teaching you how to make a foolproof FM transmitter. There's no need to buy kits, this tutorial includes the PCB layout and the schematics. It has a range of up to 1/4 mile or more. It's great for room monitoring, baby listening and nature research.

It's been a while since I last posted a project. I apologize for the late replies, specially for the projects that I promised of posting. I've been bombarded with TV interviews lately. Well I'm back with a hoard of unpublished guides! :)

**Technical Specifications:**
- 1/4 Mile Radius Range
- Powered By A 9V Battery
- Lasts For Several Days
- Adjustable 87-108MHz

**Please Watch:** Celebrating the 1st episode of my new YouTube channel! It's my first time to document a project with videography. I hope you guys enjoy the vid! Please leave a comment below, I would appreciate some advise regarding the video.

**Disclaimer:** This project is for educational purposes only and is not intended to air/ interfere with present radio channels. Neither site nor I, am liable for careless actions. Please check for the legality before attempting the project within your area.

---

[Image of FM transmitter circuit board and battery]
Step 1: Gather The Parts
All of these are available on any branch of RadioShack! :)

MISC:
- Copper Clad PCB/ Perfboard
- Solid Gauge # 18 Wire
- Electret Microphone
- ¼" Bolt

Transistors:
- 2N3904 General NPN Transistor (2x)

Capacitors:
- 15pF or 40pF Trimmer Capacitor
- 100nF Ceramic Capacitor (2x)
- 10nF Ceramic Capacitor
- 4pF Ceramic Capacitor

Resistors:
- 1M Ohm ¼w Resistor
- 100K Ohm ¼w Resistor
- 10K Ohm ¼w Resistor (3x)
- 1K Ohm ¼w Resistor
- 100 Ohm ¼w Resistor

Tools:
- A Pair Of Pliers
- Soldering Iron
- Hot Glue Gun
Step 2: PCB & Schematics
I designed a compact PCB layout for Art Swan's miniature FM transmitter circuit using Fritzing. Use this step as your reference for the assembly.

About The Circuit: These is the exact description of Art Swan, the circuit's Author, "This miniature transmitter is easy to construct and can be picked up on any standard FM receiver. It has a range of up to 1/4 mile or more. It's great for room monitoring, baby listening and nature research"

Download Link: https://docs.google.com/file/d/0BwP5mrDBOvNYaHFnME...

Step 3: Print The PCB Layout
Download the PDF file then print it with your printer's standard setting.

Download Link: https://drive.google.com/file/d/0BwP5mrDBOvNYaHFnME/
Step 4: Develop The PCB

I'm using something what's called presensitized PCB fabrication, it's different from the toner transfer method. If you're not familiar with presensitized PCBs, better go with the toner transfer method.

Presensitized PCBs: I expose mine directly to a 10W fluorescent lamp for 5:20 minutes then use a dilute solution of Sodium Hydroxide to develop the exposed PCB.

Here's a separate tutorial for the PCB fabrication:
**Step 5: Etch The PCB**
Pour Ferric Chloride on a plastic tray then start to etch the PCB.

**Step 6: Clean The PCB**
Use a swab and Acetone to remove the photo-positive layer/ toner.

http://www.instructables.com/id/The-Ultimate-FM-Transmitter/
Step 7: Solder The Components

Use step #2 as your reference. Solder the smaller parts first. Start with the resistors, the capacitors, the transistors, the coil, the antenna then the 9V battery clip.
**Step 8: Construct The Coil**
Strip a solid gauge #18 wire. Use a 1/4" bolt then turn the wire 7-8 times.

**Step 9: Adding The Antenna**
Solder a hook-up wire to the antenna pin, it's located on the 2nd transistor's collector pin. Use a maximum of 8 inches and a minimum of 5 inches.

**Step 10: Recycle A Battery Clip**
The key to this compact transmitter is the ingenious battery clip. You can get one by dismantling an scrap 9v battery.
Step 11: Glue Them Together
Apply a generous blob of hot glue to hold the clip and the transmitter circuit together.

Step 12: Tune The Transmitter
Turn on your radio then tune it to your desired channel frequency. You'll get more range from the vacant channels. Don't touch the coil, just turn the trimmer capacitor until you hear a feedback from the radio.

Step 13: Don't Forget To Leave A Comment [Stay Tuned]
I've always dreampt of starting a continuous DIY video channel. I hope this goes out well. Please don't forget leave a comment below. Thank you!
Related Instructables

- Easy and low cost FM transmitter DIY kit (Photos) by buildcircuit
- Spy Audio by stive.cool
- FM Bug Detector Kit by mpilchfamily
- FM Transmitter running off wall power with extended range. by siamonsez
- MintyBeam: Bug a room and transmit voice over a laser beam (also a Super Spy Ear/Stethoscope) by drdan152
- FM Listening Bug by mpilchfamily

Comments