

# DIY CHEAP INTERNAL WIFI ANTENNA

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Some time ago I put my hand on a couple of broken Axis network cameras which were about to be trashed. These cute small devices have an image sensor with a plastic lens, a wired and a WiFi interface to connect to an external network, and many other nasty features.

The cameras had a busted Marvell power supply, which probably broke ahead of time because of the high working temperature, and once replaced with an LD1117 (I know, not the best of choices...) they were as good as new. The one thing I did not like about these cameras was the cheap WiFi antenna, which is mounted far away from the casing and gives an old bulky feeling to the device.



This post is a tutorial on how to build an internal WiFi antenna to modify this kind of devices!

## The Device

My camera is an Axis-207W, but this internal antenna should work with any plastic-cased device.

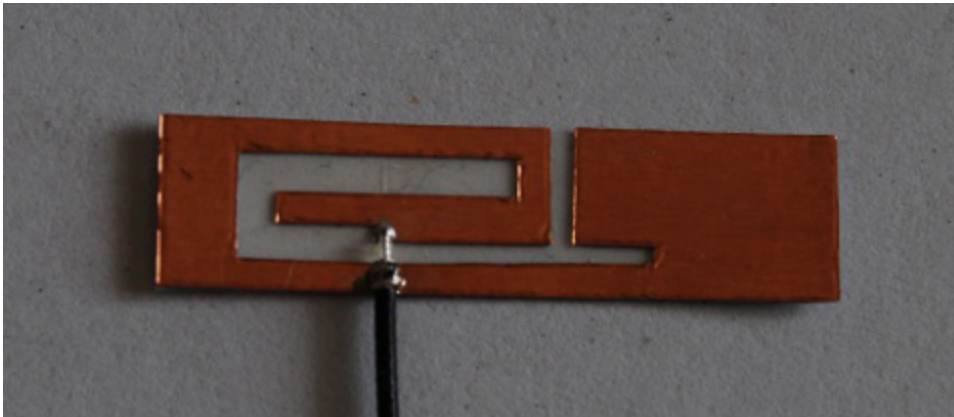
The important thing is to identify the connector, if any, used on the WiFi interface. The most common thing to find here is either a directly-soldered coax wire, or an [U.FL](#) connector.



To build the antenna, you may either find a pigtail with the correct connector to cut out, or just recycle the current cable.

### Antenna Design

The antenna design used is from a paper from [jpieer.org](http://jpieer.org), which is really nice because works both in the 2.4Ghz and 5Ghz range, and because is planar and easy to build.



### Construction

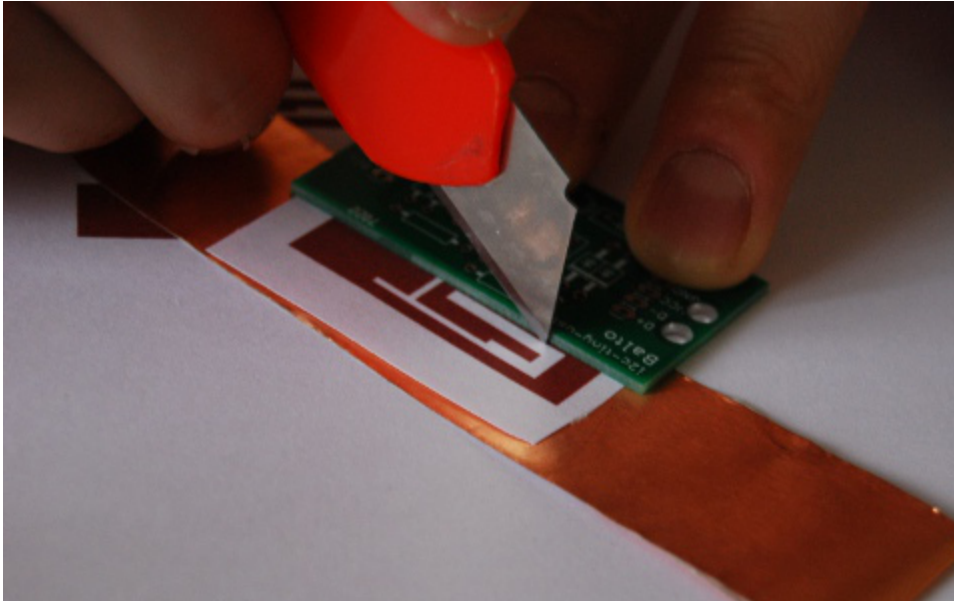
The easiest way to mass produce this kind of antenna is to make a laser cut out of it using a metal plate of copper-nickel-zinc alloy (see chapter 2 of the design paper), but if you want to just build out a couple of samples you can do that manually with just a printer, some copper tape, and a cutter.

This is the procedure:

Print the shape of the antenna (mirrored) on a paper, and stick the back of the shape with a strip of copper.



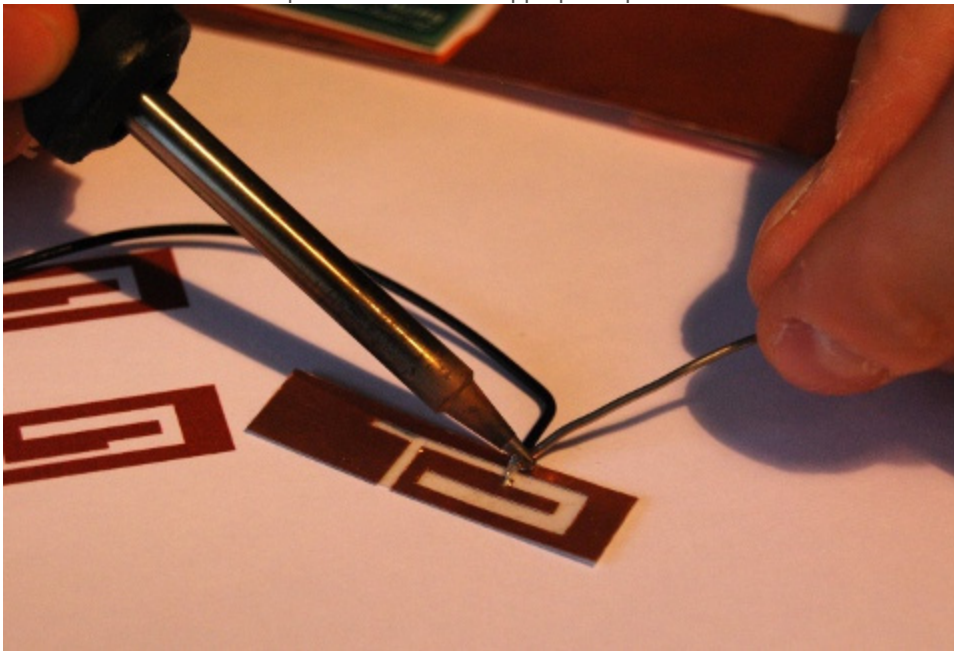
Cut out the shape as precise as you can using the cutter and remove the excess pieces.



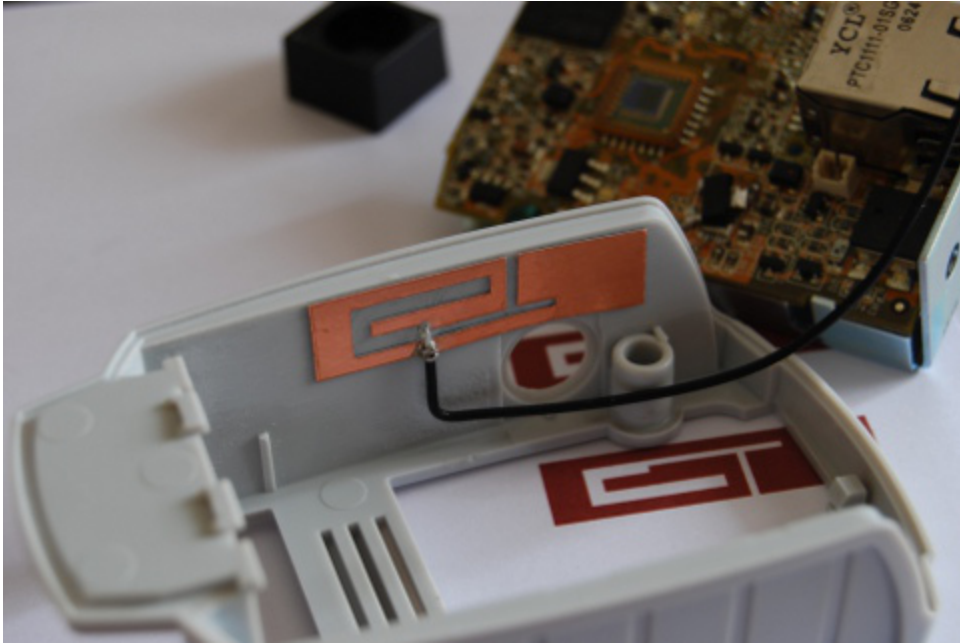
Optionally, stick some double sided tape on the back of the antenna (the printed side), to give some strength to the shape, and to fix it to the device case later on.



Solder the antenna cable tip and sleeve to the appropriate points of the antenna.



Stick the new antenna to the device and wire it up!



Also, tap the hole of the old antenna.



### Performances

If properly mounted, this design gives performance similar to the standard dipole.

When choosing where to mount the antenna on your modded devices, try to mount it vertically (to get the best radiation pattern), with a short cable but as far as possible from metallic part of the chassis and the PCB of the device.

You can use this antenna to modify any WiFi device, including router and access points, but although I found it to be very good performing, try to always do your own tests before permanently remove the old antenna.

Thanks to C.-T. Lee, S.-W. Su, and F.-S. Chang for the antenna design, my girlfriend [Maria](#) for the pictures and [Rudi](#) for the cameras!

Source : <http://fabiobaltieri.com/2012/06/02/diy-cheap-internal-wifi-antenna/>