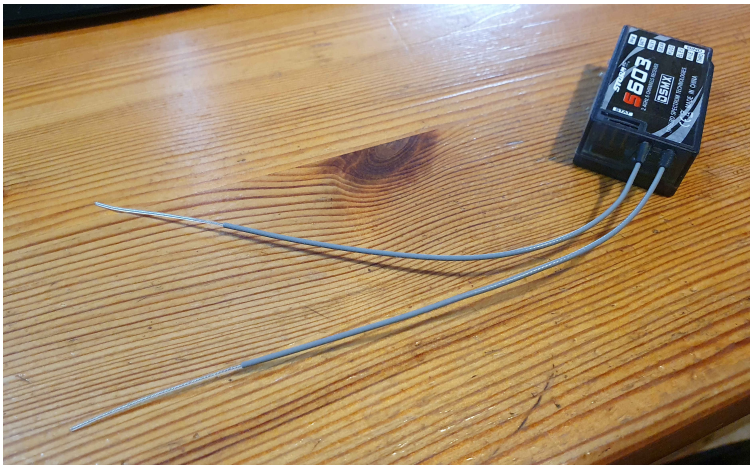
The information below is my best shot at a guide based on my personal experience. This article may be corrected or updated at any time. If you find a mistake or a better way of doing any of this please let me know.

Why worry about antennae?

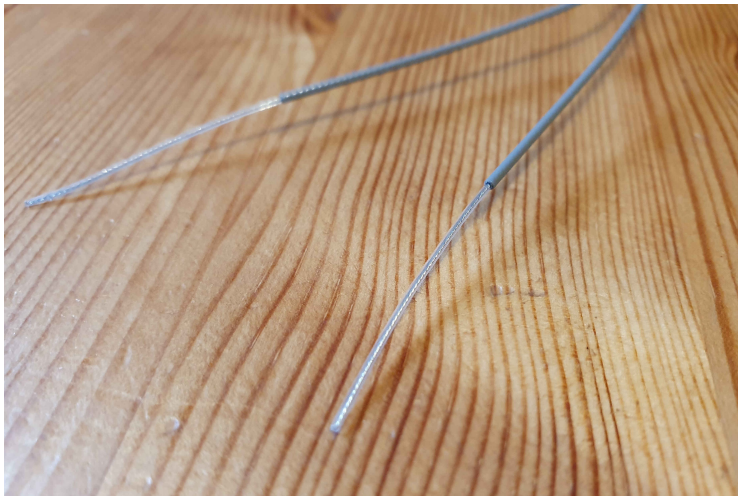
On the whole modern radio control systems are very reliable but they are dependent on the quality of their installations, particularly their antennae. I have seen some antenna installations which are dodgy to say the least and this article is intended to help pilots do a little better. Crashes are annoying, expensive and potentially dangerous so I want my radio systems to be as good as they reasonably can. This article examines 2.4 GHz receiver antenna placement and aims to be no more technical than necessary.

Antenna installation

Most conventional 2.4 GHz receivers have one or two antennae a bit like this:



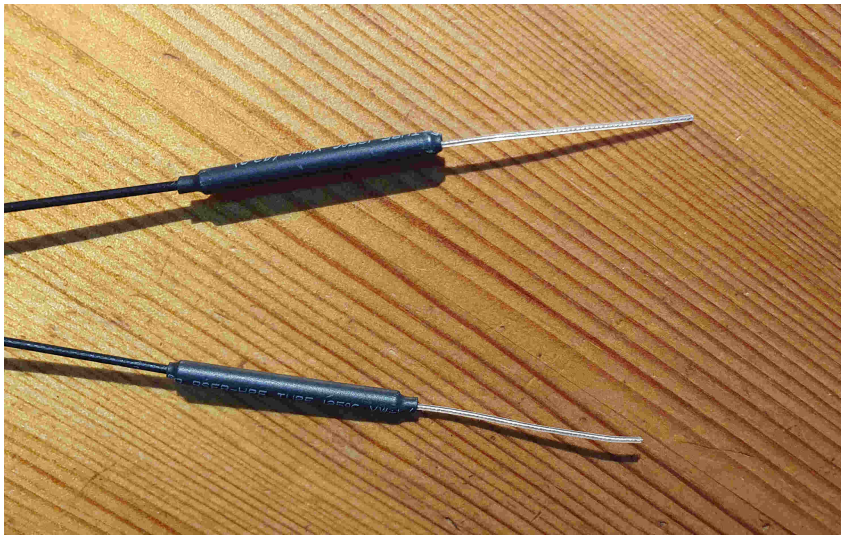
These are pieces of coaxial cable with about 30mm of the outer conductor stripped away at the end. The type and length of the cable and the amount stripped away may be matched to the type of receiver so if you damage an antenna get a proper replacement. The exposed “whisker” does the actual receiving.



No installation is perfect, but our objective is to get the end bits straight, as far away from the rest of the receiver, wiring, servos or power installation as we reasonably can and, if possible, approximately at right angles to each other. The idea of having two antennae is that if the signal is poor in one it might be better on the other.

On receivers with only one antenna it is even more important to make sure it is well positioned.

Another less common type of antenna is the sleeved dipole.

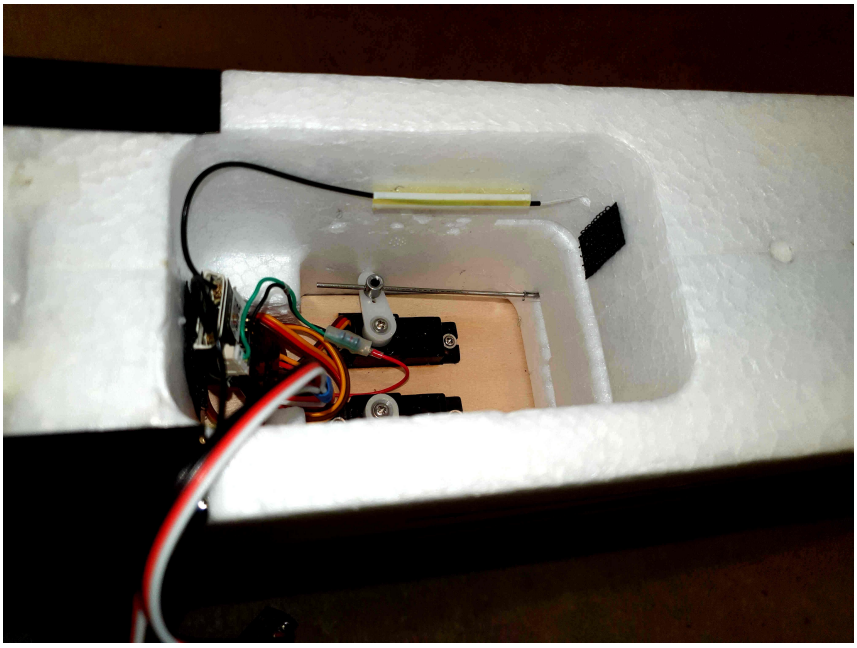


I have not used this type of antenna so will not comment except that the theoretical pattern of sensitivity is different to the “whisker” antenna and most of the points below should apply as they also will to satellite receivers like this.

I am unclear whether the two “whiskers” on these devices are separate antennae or two parts of a dipole but the unit should be considered as a single antennae and oriented with the wires sticking out as in the picture and at right angles to those on the primary receiver.

Fix your antennae properly

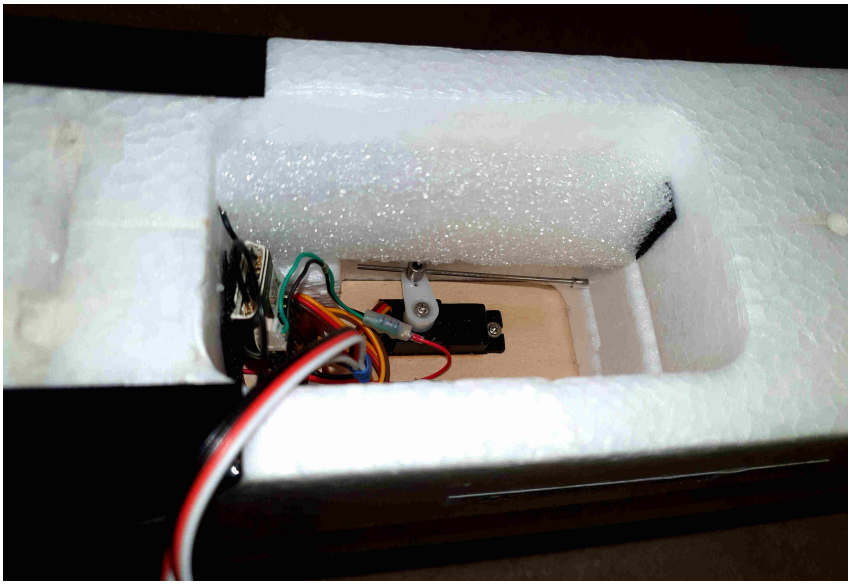
I have seen several models which (thankfully!) survived some loss of control in which the antennae were not fixed in any way and had fallen near, or into, some of the other wiring. Antennae don't need to be rigidly fixed but they do need to be kept out of harms way. I often glue a piece of plastic drinking straw or other plastic tube to the inside of the fuselage and push the antenna inside it.



The picture above shows a piece of plastic straw holding an antenna in a Century Models Riot. The end of the “whisker” extends further into a hole I made in the expanded polystyrene. In this way the antenna is kept away from the wiring and the steel wire pushrods.

Keep the antenna away from other wiring

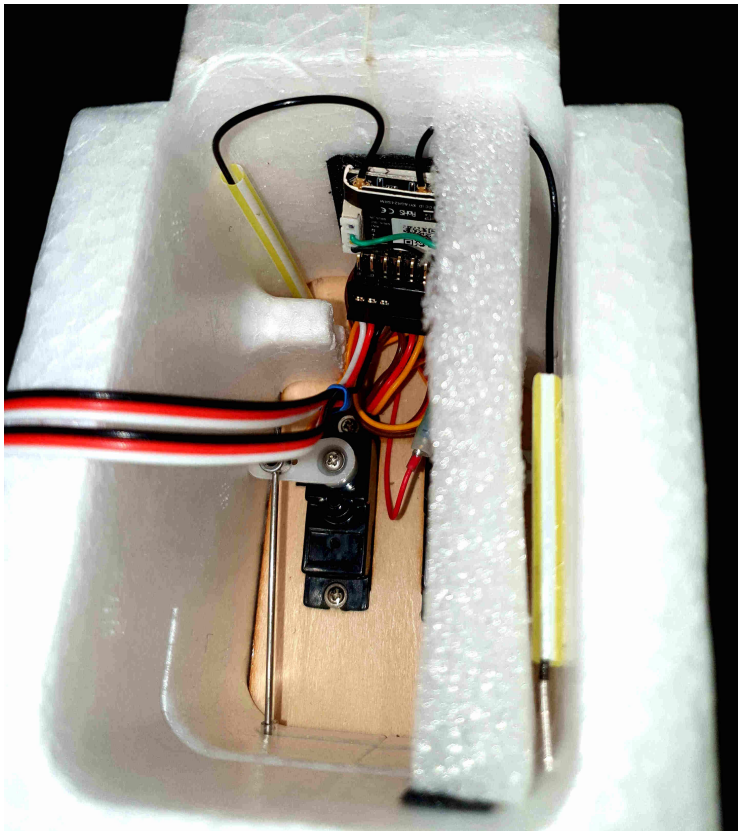
The Riot above has a servo splitter cable (hanging over the side in the picture) to connect to the ailerons. When the wing was fitted the aileron servo wires tended to be pushed up against the antenna, so I wedged a piece of foam in to keep them away.



A small piece of self adhesive velcro “hook” material on the right hand side of the picture helps to keep the foam in place.

Try and place the second antenna at right angles to the first

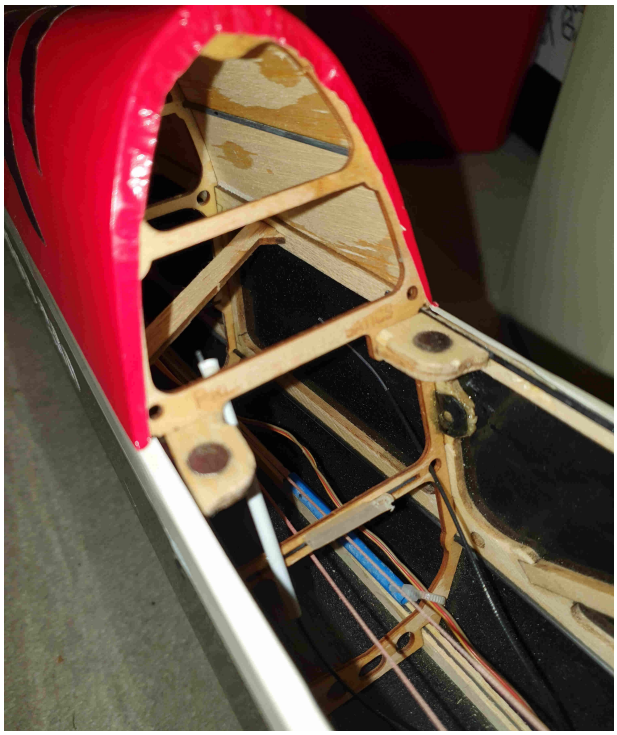
In this picture the second antenna in the Riot is pushed into another piece of plastic straw inserted into a convenient hole in wooden plate at the bottom of the receiver bay.



This keeps it a short distance from the receiver and wiring. I could have made more effort to place it further away from the receiver but in this aircraft it works fine. I would not want it any closer though.

An exact right angle is not important

In the model below one antenna is inside the white vertical plastic tube on the left of the picture. The other goes through a hole in the bulkhead on the right at an angle of about 70 degrees to the first. No fixing, other than poking it through the hole in the bulkhead, was necessary to keep it in place.



Note this model is constructed with wood re-enforced with carbon fibre rods and strips.

Carbon fibre is electrically conductive and we should try and keep the antennae away from it as we should metals.

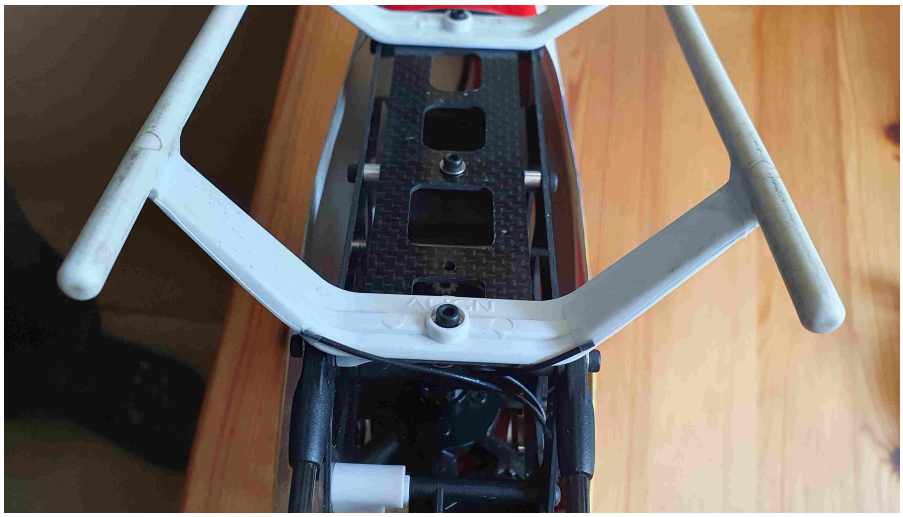
Look for the simple answer

The inside of the foam motor glider in the picture below was a bit constricted and it was difficult to get the antennae away from the servo and power wiring. I simply taped one antenna vertically to the bulkhead at the back of the canopy opening with Scotch Magic Tape. The Magic Tape is almost transparent and difficult to see in the picture.

When fitted, the canopy presses the antenna against the bulkhead. The other antenna (not visible) is in a plastic tube glued to the inside of the fuselage running back at an angle directing it away from the servo wiring.

Helicopters

Helicopters tend to have a lot of carbon fibre and metal but the canopies are usually made of glass fibre which is effectively transparent to radio waves. However this still leaves the issue that an antenna is likely to end up close to large carbon fibre chassis plates or metal components. A solution which works well on my 470 helicopter is to tape the antennae to the undercarriage legs with Magic Tape.



The legs are well away from the chassis and approximately at right angles to each other. Of course this would not be a good idea with metal or carbon fibre legs.

ALWAYS DO A RANGE CHECK!

Always do a range check with a new or modified installation or if there is any cause for concern. Ideally range checks should be repeated with the model in several different orientations.

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