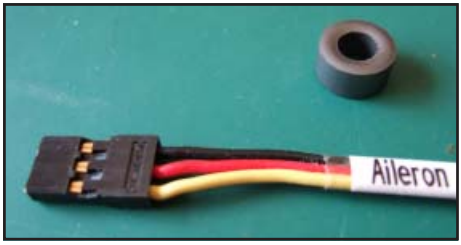
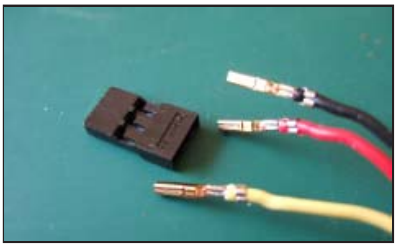
Long Servo Leads

It's now becoming common practise to install servos in each wing section and tail of the fuselage to operate Ailerons, Flaps, Rudder and Elevator. This eliminates the use of push rods, bell cranks and push-pull cables and is more direct to the control surfaces from the servo.



No one will argue that this gives a more flexible installation for adjusting control surfaces and mixing, never the less we are introducing a new problem with the length of the servo leads running inside the model.

The servo leads are now looking more like an antenna, and in some cases around 1metre in length, about the same as the antenna wire length. This tends to de-tune the receiver and range can suffer as a result. That may not be a problem if you fly close circuits.



The bigger problem is that the long leads tend to pick up interference both externally and internally to the model, and with the antenna being de-tuned with the long leads makes things a little prone to glitches.
This problem effects both PPM and all modes of PCM receivers, both Analogue and Digital Servos. In fact, the digital servos can be a bigger problem because of the high frequency impulse currents that are generated with this type of servo.

The leading manufactures of Radio Control equipment do sell long extension leads with filters fitted to solve this problem, so they are aware of the problem but it's not generally known unless you may be into IMAC models.

I have personally carried out tests on my own equipment after finding a problem with the Spitfire locking up the servos. The tests were carried out using different receivers and servos. The problem starts with the interference travelling back down the long leads to the receiver from both induced current from the servos and interference from the motors in the servos.

This is called COMMON MODE interference as it travels down all wires in phase from the source of interference. This can be corrected by the use of a common mode filter which is in the form of a FERRITE BEAD; these beads are around 9mm in diameter and are made from a material that is called “ferrite” which as the ability to attenuate (reduce) the interference on the lead.

The ferrite material must be a grade or mix that will attenuate the interference around our operating frequency of 36 MHz, the mix required is #43 which gives maximum attenuation starting at 30 MHz.

The manufacturer “Amidon” makes a bead suitable type FB 2401 #43 - these are placed on the long servo leads as close to the receiver as possible.

With the hole in the bead being only around 5mm diameter, the plug that goes into the receiver will not pass through it, so the following procedure must be followed:

You will observe on the plug small plastic fingers that hold the termination sockets in place.

Lifting the fingers slightly while pulling on each lead in turn as you lift each finger will remove the plastic cover.

Pass the lead through the bead and make one full turn of the lead through the bead.

Make sure you put the sockets back in the correct orientation and position in the plastic body of the plug. When reassembling check with another lead to make sure.

NB. If you put the sockets in wrong orientation, the plastic fingers will not lock the sockets in place.

Move the bead down as close as possible to the plug and pull the lead to make a nice loop around the bead.

I have a limited number of these beads. If anyone wants to make their own leads up, one bead is required for each long lead at a cost price of $1.00 each.

It will not make me a million dollars at a $1.00 each but it may save your model.

Happy Landings
Mal Nicklin VH 56289