

Futaba T6L in a retro case

Introduction

I was playing with the idea of upgrading one of my early transmitters to 2.4 GHz but my knowledge of electronics is very limited and the task seemed to big of a challenge for me. An alternative was to use the electronics of a modern transmitter and build it into a vintage transmitter case. So I had a look on the internet and found this cheap Futaba T6L sport transmitter. The internals looked very simple, so I ordered a set complete with receiver for just under 80,00 euro from aerobertics.be.

When the set arrived, I disassembled the transmitter to see how I could proceed. I was pleased with the simplicity and the quality of that radio. If only we had that kind of quality for that price in the seventies... The gimbals were much better than anything on my vintage transmitters, so it would be a shame not to make use of them. But it had an internal antenna and that would complicate things. At first glance, I didn't see a possibility to move the antenna to the outside (probably the experts will tell me it can be done easily...), so the prospect of building it into a vintage aluminium case evaporated. But very often, a drawback inspires a creative mind. So I took the decision to preserve my collection of vintage transmitters and build a new case from plywood to be finished in a metallic industrial look of the sixties. This would add the benefit of getting rid of the 2.4 GHz antenna in the outside for added realism.

The modification is well within the reach of the average modeler. It involves some woodworking, finishing techniques and a bit of soldering. The modification does not alter anything to the radio. The effective range is unaffected as long as the case is not clad with aluminium or any other metal foil. All functions remain unchanged.

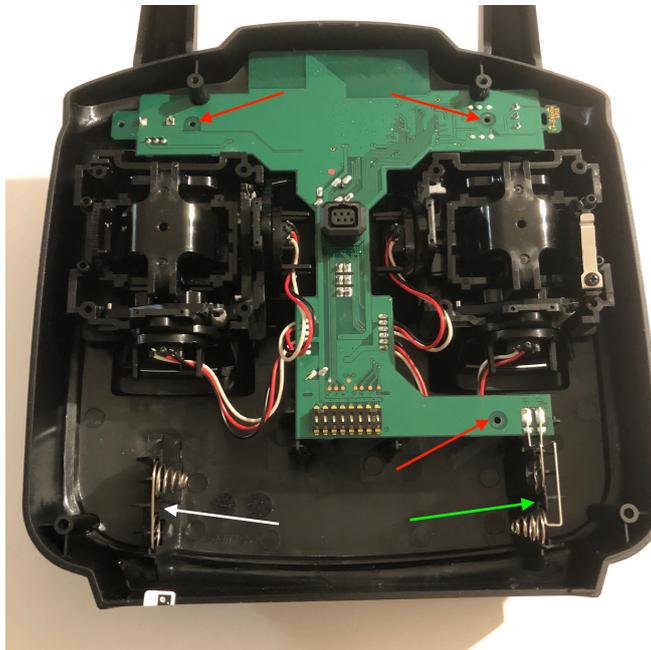
Taking the T6L transmitter apart

Start by removing the on/off switch extension and the rotary knob by simply pulling on them, and screw off the switch nut (blue arrows). Remove the 6 screws holding the gimbals in place (red arrows).

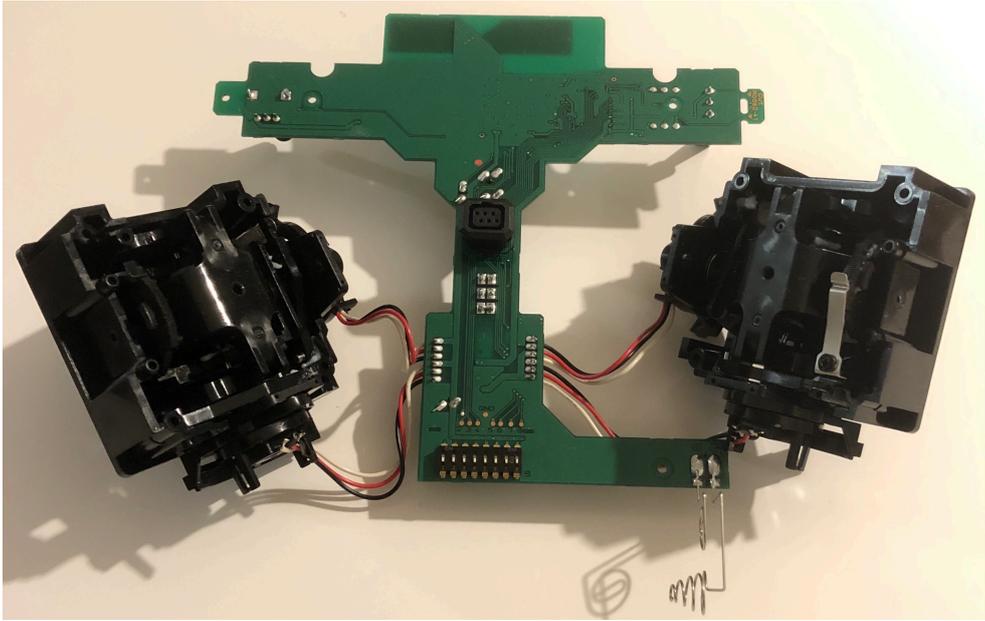




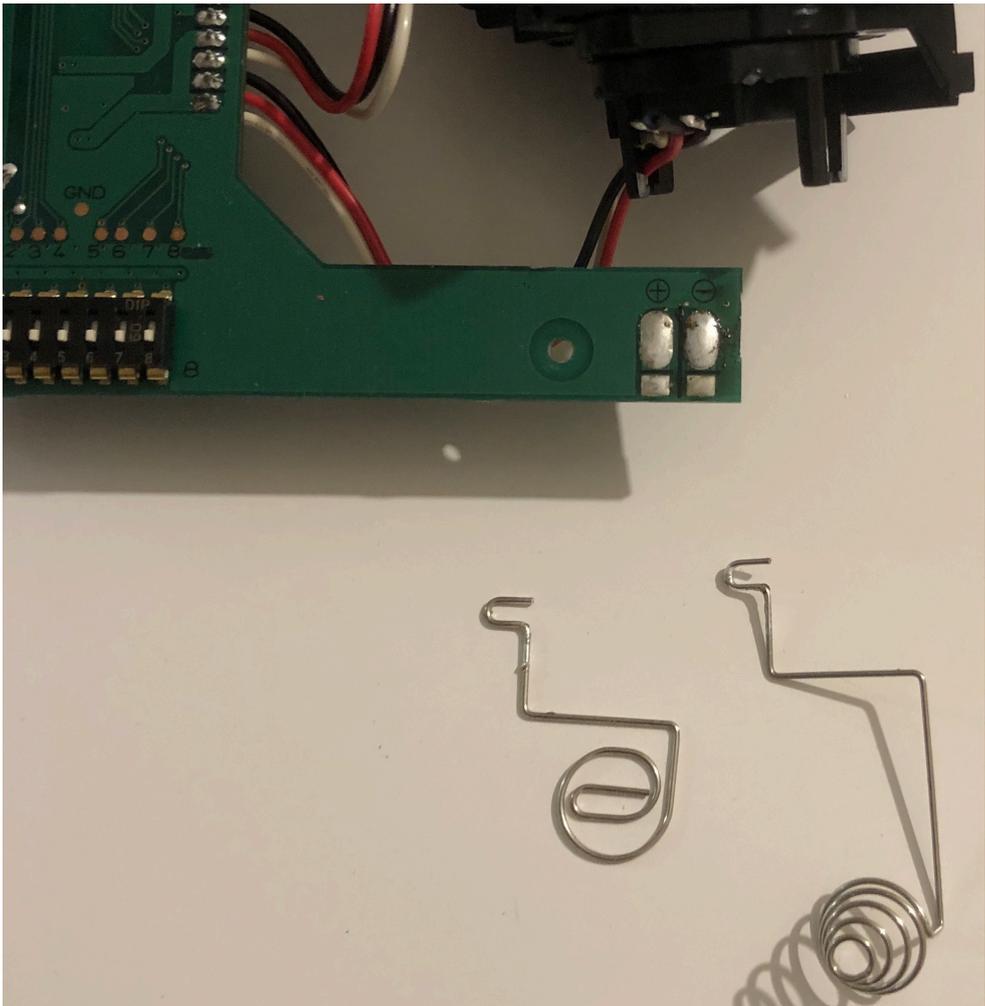
remove the 4 screws (white arrows), remove the battery cover and finally the complete back cover



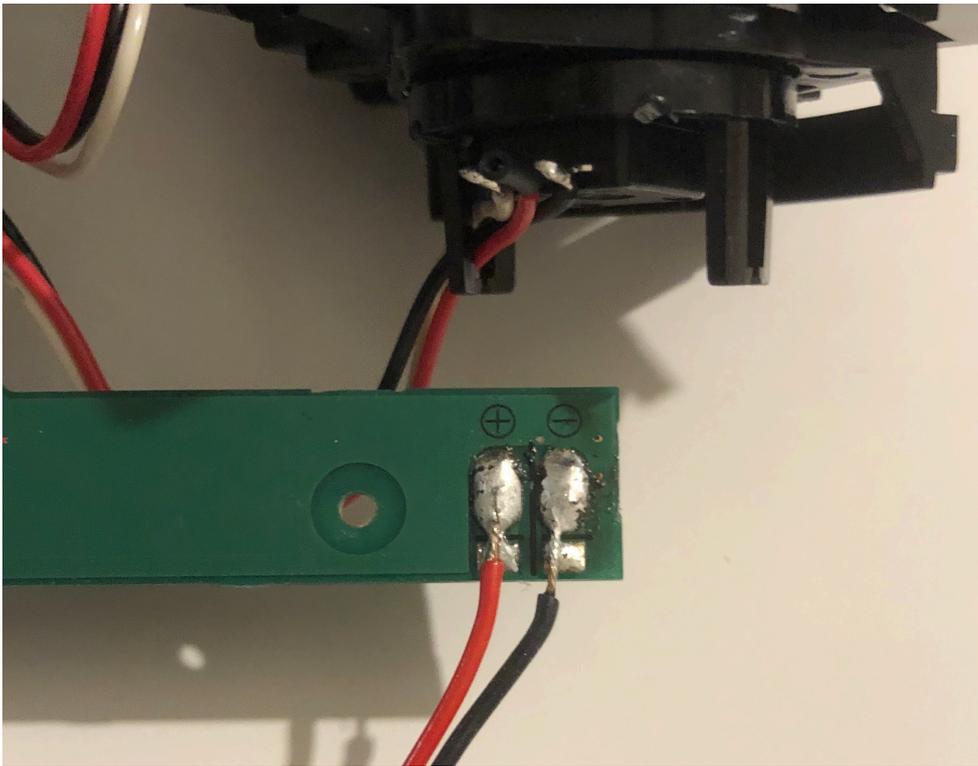
remove the 3 screws holding the PCB in place (red arrows), remove the left hand spring wire battery connector (white arrow) and lift the PCB out of the case making sure the right hand spring wire battery connector (green arrow) comes out nicely



PCB and gimbals removed



desolder the spring wire battery connectors from the PCB

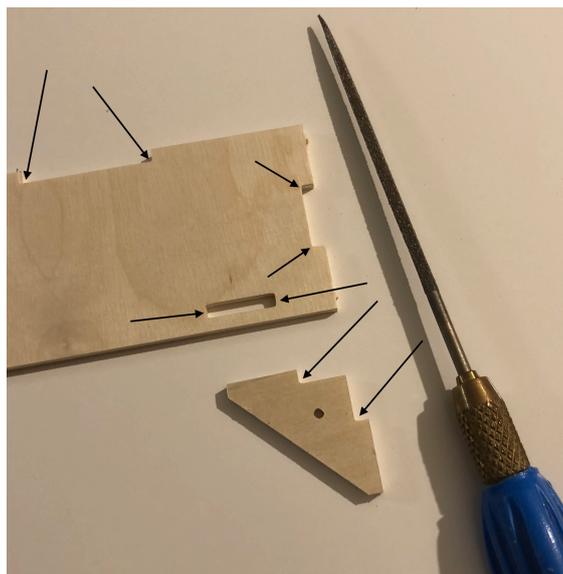


solder the power supply wires to the PCB

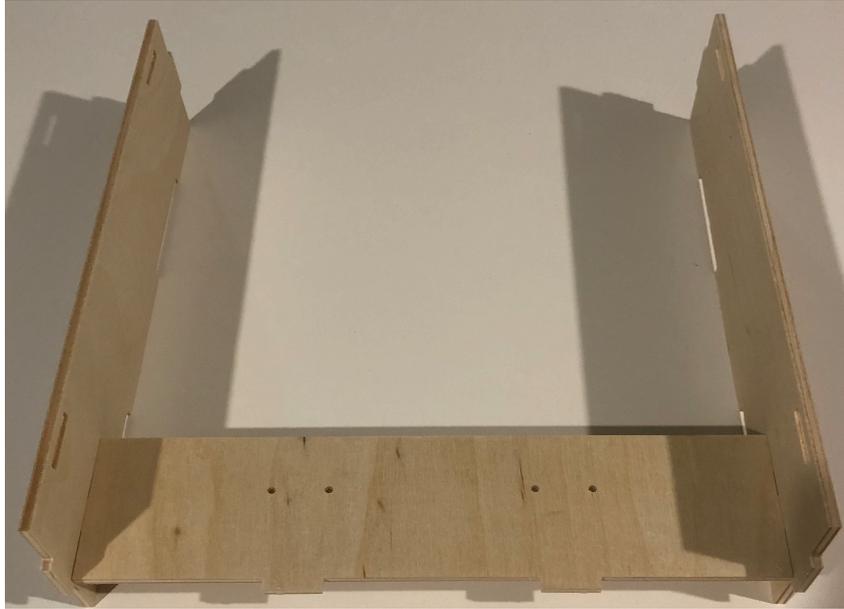
This completes the work on the original T6L transmitter.

Assembly of the plywood box

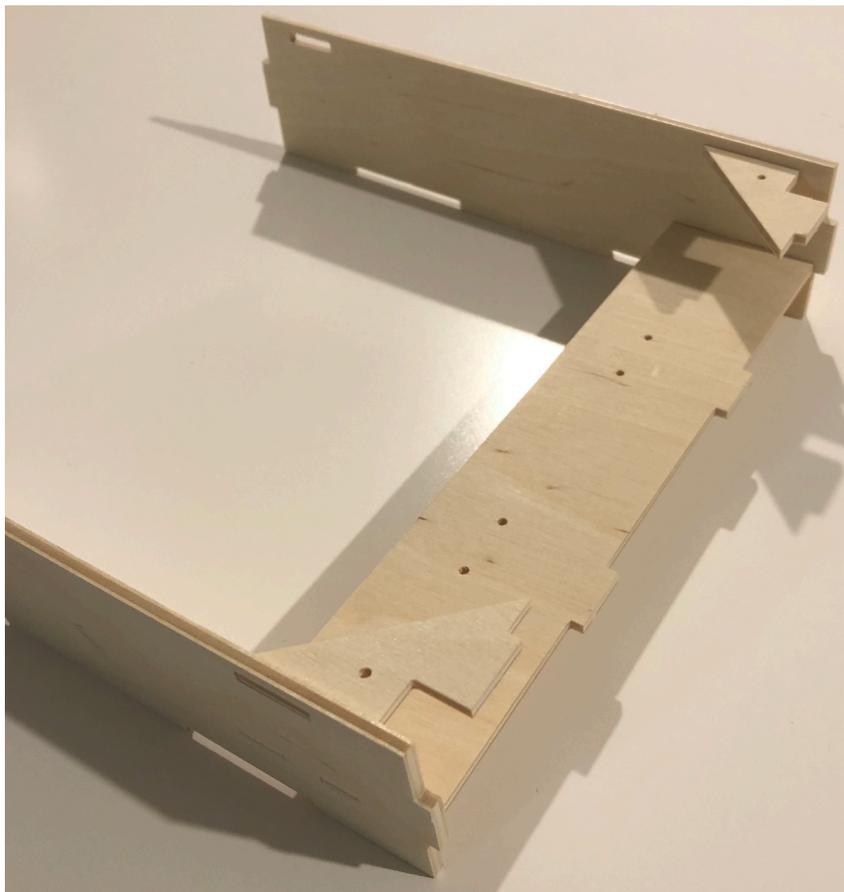
Assembly is straightforward. Just follow the illustrated steps below and start with cleaning up the plywood parts. Trial fit all interlocking parts before doing any gluing.



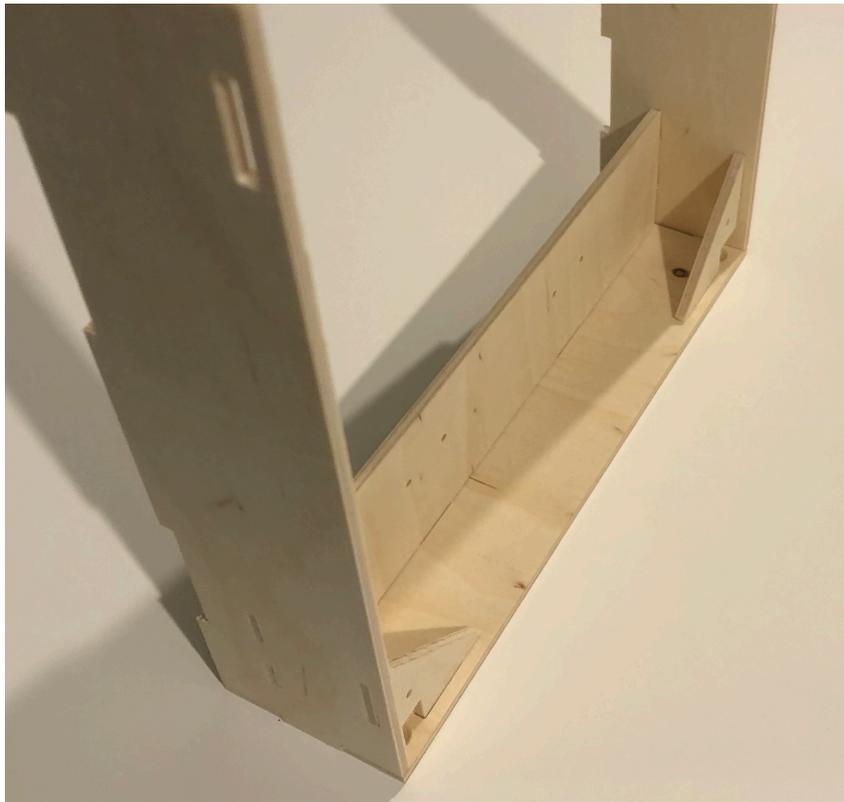
using a square file, remove the router radius from all the corners for a perfect fit



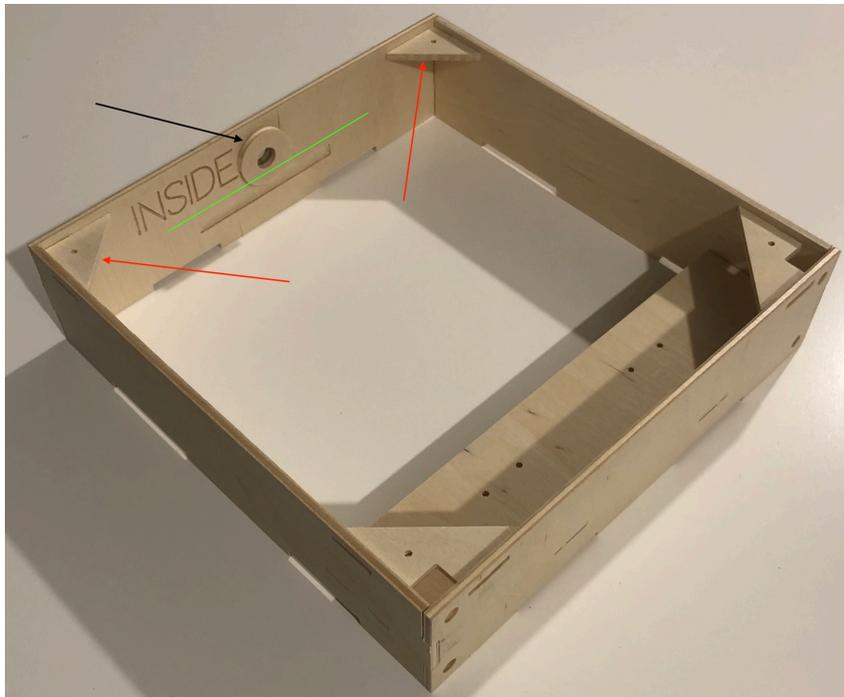
side parts glued to the battery tray



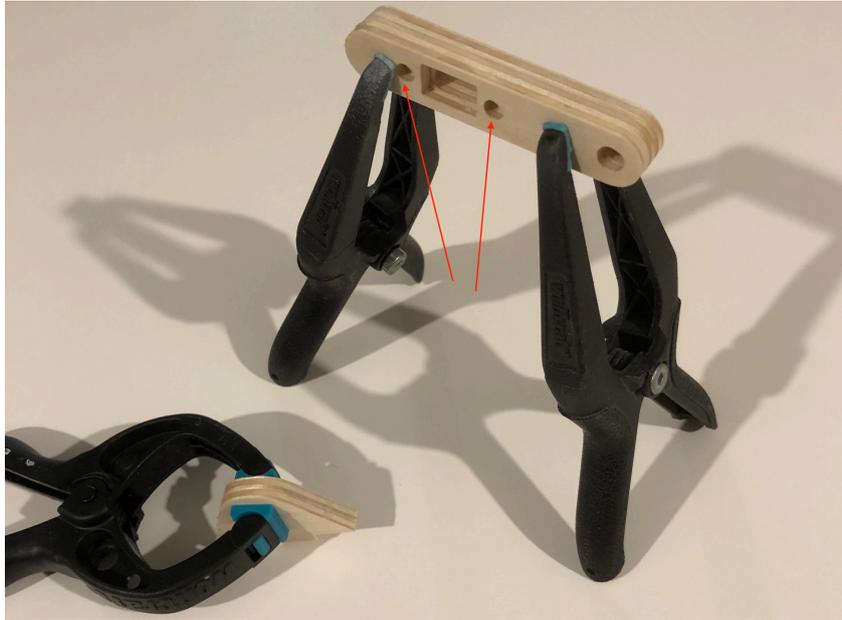
corner parts glued to the sides



bottom part glued in place



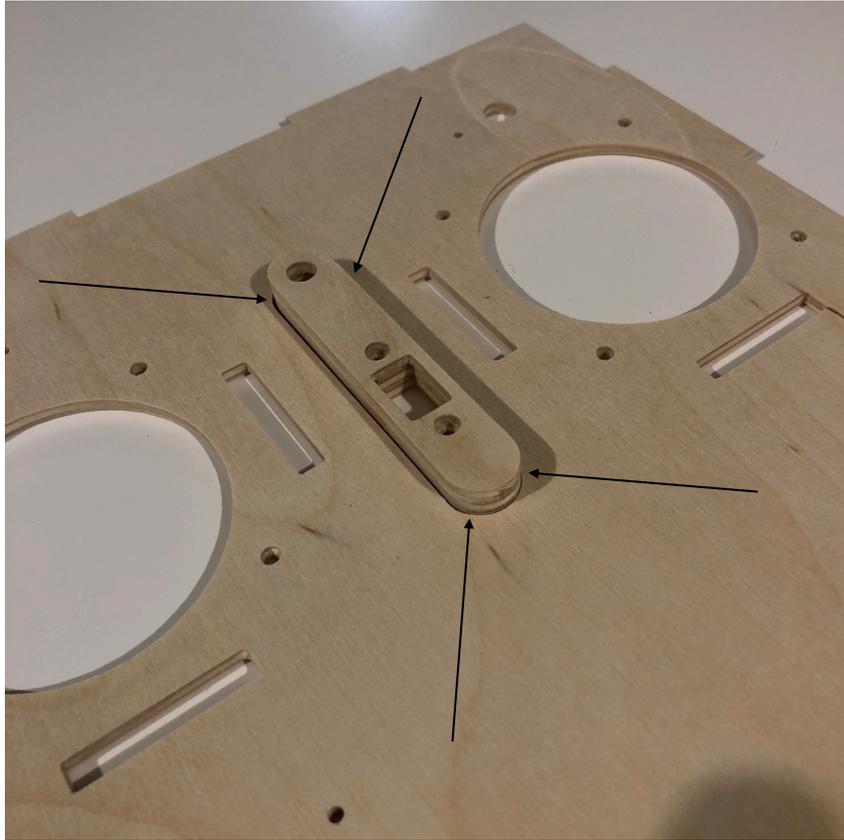
glue top corner parts to the sides first (red arrows) followed by the top part and finally the antenna base reinforcement (black arrow, aligned with green line)



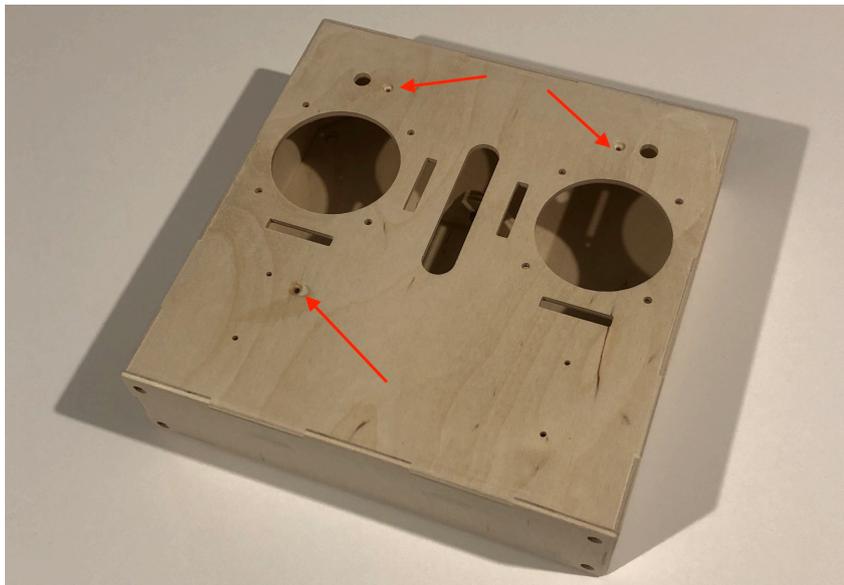
glue the 3 parts for the power switch and LED support together, making sure the part with the larger screw openings is on the outside (red arrows)



press in the brass threaded insert into the antennae support and add a drop of CA glue



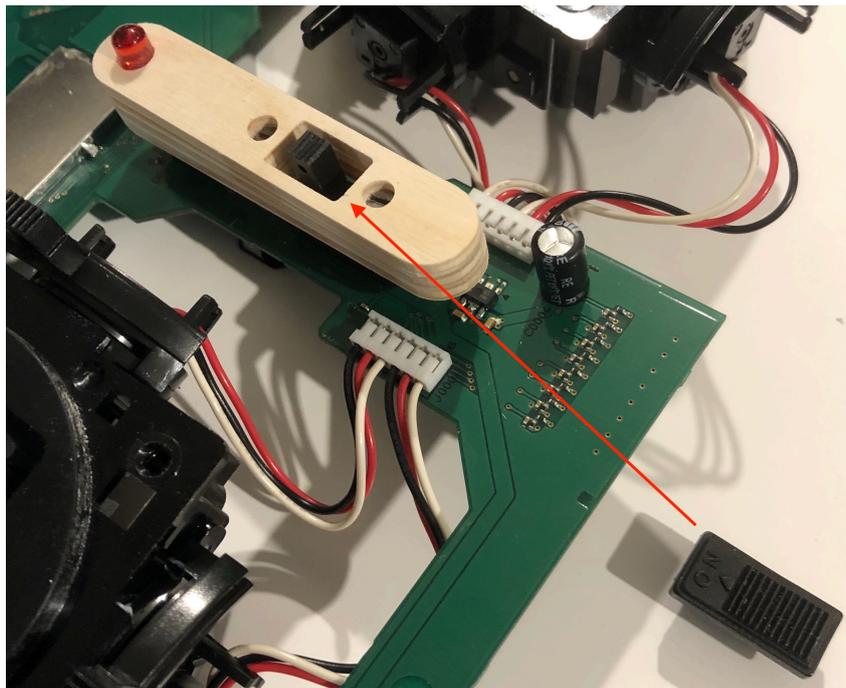
check the fit of the power switch support in the face plate: it should be a very loose fit (sand if necessary)



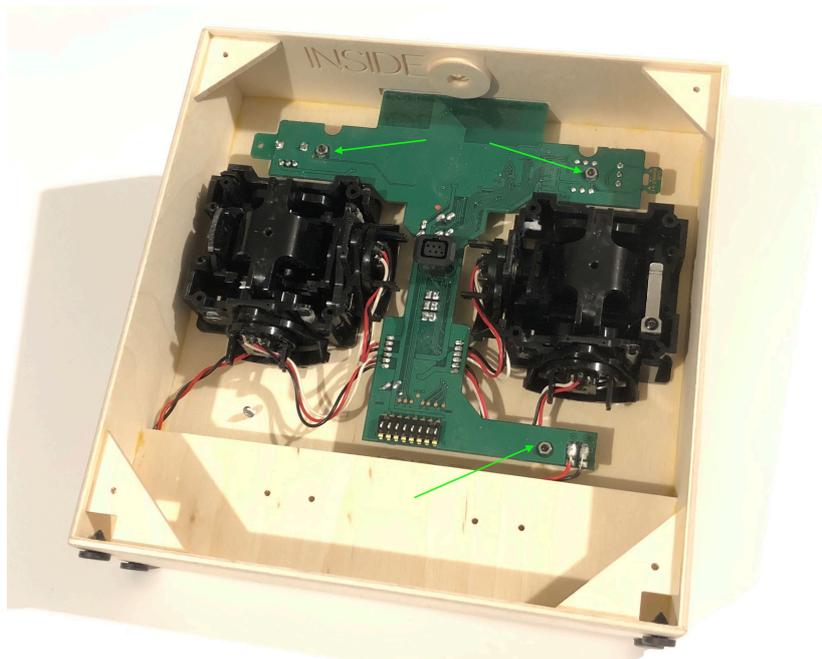
countersink the holes to match the PCB screws (red arrows) and glue the faceplate to the box assembly



glue the antenna support in the slot of the back plate as shown



do a trial fit of the power switch support (2 flat head screws) and the on/off switch extension



do a trial fit of the components in the case, just to make sure everything is fitting nicely; the PCB is held in place with three 10 mm long stand offs with the countersunk screws on the face plate side and the nuts on the PCB side (green arrows)
make sure to place the thick washer on the 5th channel switch first

Antenna

You have the choice of two styles of antenna feet: cylindrical or conical. The cylindrical style is straightforward, but the conical style requires turning into shape. This can be done on a power drill but ideally, this is done on a lathe. If you don't feel comfortable with making the conical style, just choose the simple cylindrical style. Note that only the conical style is detailed in this manual.



3 same size discs glued together for cylindrical style (use a steel shaft or similar for alignment)



5 discs of decreasing diameter glued together (use a steel shaft or similar for alignment)



conical shape turned on a lathe (can be done on a power drill)

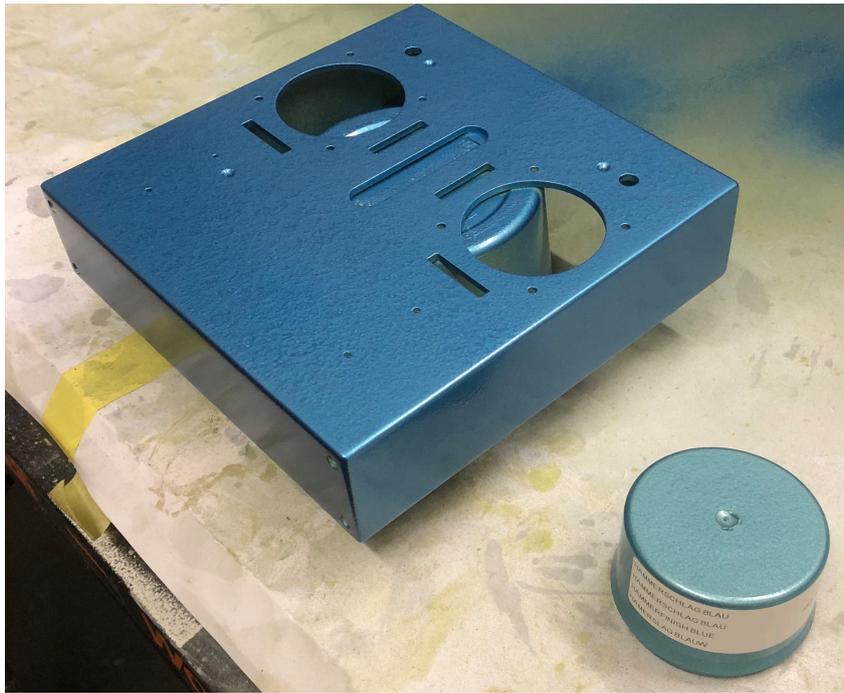


screw in the long M4 set screw into the drilled end of the dummy antenna (8 mm wooden dowel) and slip the antenna base on the dowel but do not glue (this may be done after finishing)

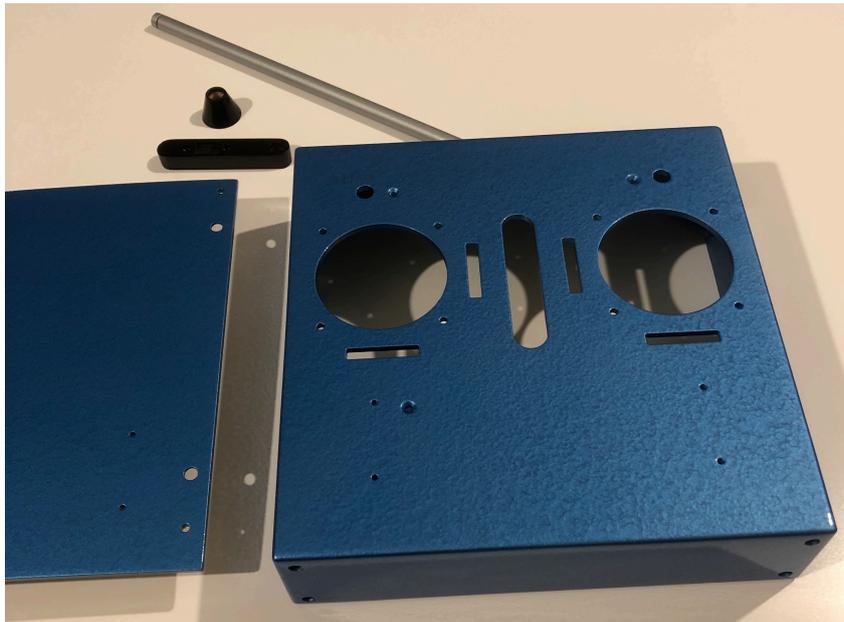
All components are made now, time to finish the wooden parts.

Finishing the wooden parts

Choose your favourite method to finish wooden parts. On the prototype model, the parts were given a coat of solvent based wood primer (I used Graupner Universal-Haftgrund which sadly is no longer available). Do not use water based primers, they tend to warp the wooden parts. After drying, the primer was sanded smooth. The parts were then given two coats of Motip filling primer from the spray can, sanded smooth again. The case and the back plate were then given two coats of Motip hammer finish. The power switch support and the antenna base were sprayed black, the dummy antenna silver. Finally, a coat of gloss 2K clear coat was sprayed on all the parts to protect the finish.

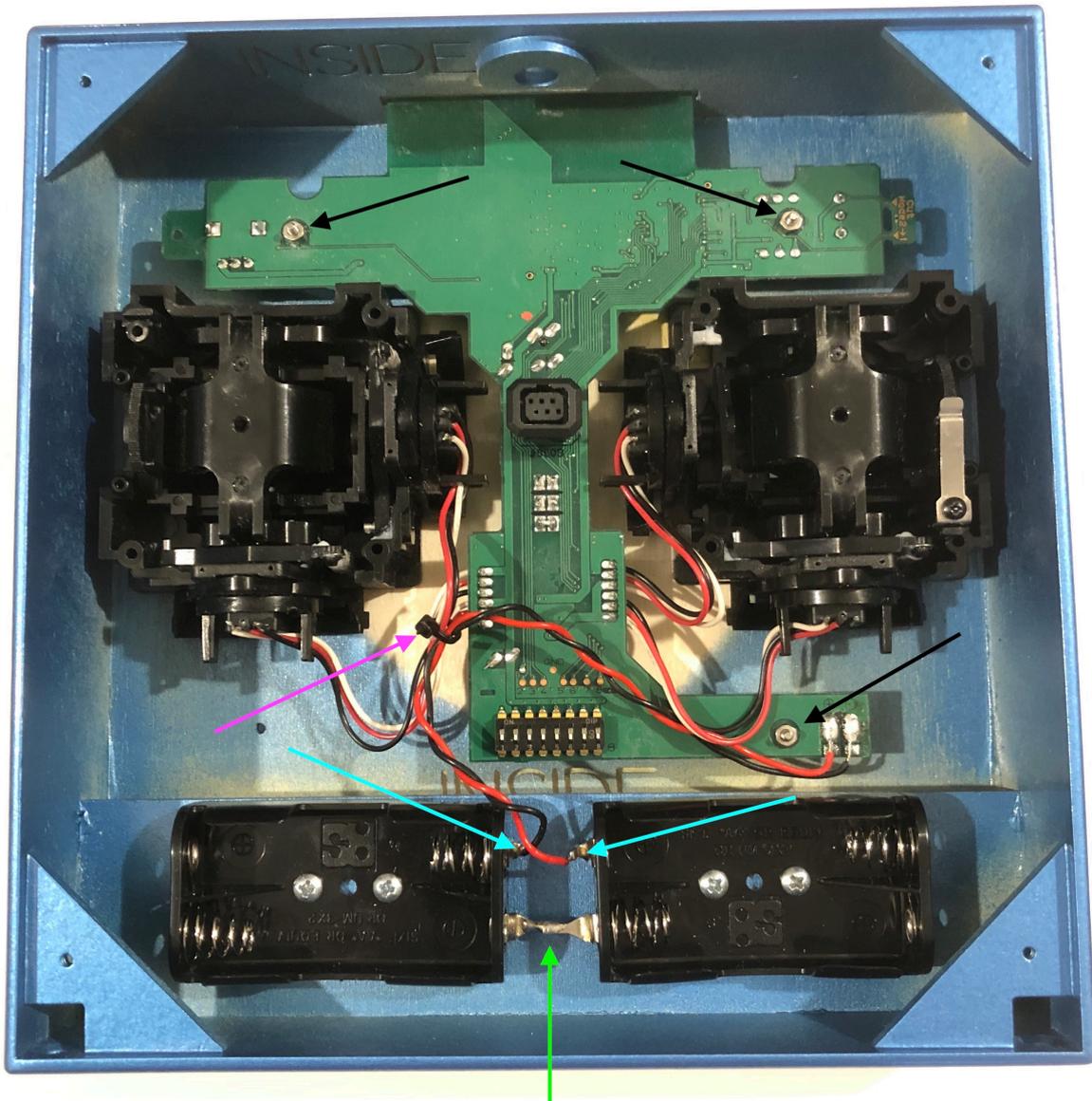


hammer finish from Motip spray can



all components finished: case in hammer colour, power switch support and antenna base in black, and dummy antenna in silver

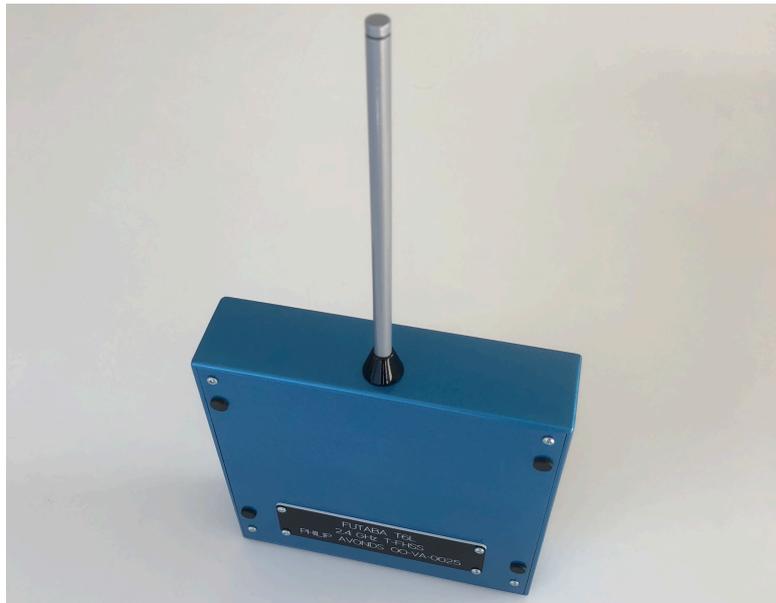
Final assembly



the PCB is held in place with three 10 mm long stand offs with the countersunk screws on the face plate side and the nuts on the PCB side (black arrows)
make sure to place the thick washer on the 5th channel switch first
install the two battery trays with 4 self tapping screws
solder the lugs together as shown (green arrow)
solder the power supply wires as shown (blue arrows, double check polarity)
finish off by tying the wires together with a cable tie (purple arrow)



attach the 8 self tapping screws holding the stick assemblies
install the power switch support and insert the switch extension
install the nut on the 5th channel switch (top left)
install the knob on the 6th channel rotary switch (I substituted a silver knob)
install the engraved Tenco label with 4 self tapping screws
install the dummy antenna
install the rubber feet
note: the antenna cannot be placed before the back cover plate is installed



install back cover plate with 4 self tapping screws
install the engraved Futaba T6L label with 4 self tapping screws
install the rubber feet



always remove the dummy antenna before opening the back cover plate
install batteries (check correct polarity)
install back cover plate again
install dummy antenna (if desired)

Your retro modified Futaba T6L transmitter is now ready. Very important: do a proper range check after the modifications to make sure everything works normally! We assume no liability whatsoever with regard to the use of the modified transmitter! Please be aware that warranty from Futaba may be void due to this modification.

Bill of materials

- 1 ea. set of CNC cut 3 mm plywood (24 individual parts)
- 1 ea. 8 mm diameter round hardwood (for dummy antenna)

- 1 ea. engraved Tenco label
- 1 ea. engraved Futaba T6L label

- 2 ea. battery holder
- 1 ea. length of red/black electrical wire
- 1 ea. cable tie

- 8 ea. rubber feet

- 24 ea. #4 mm self tapping screw
- 3 ea. M2 x 10 mm stand off (to hold PCB)
- 3 ea. M2 x 8 mm counter sunk head screw (to hold PCB)
- 3 ea. M2 washer (to hold PCB)
- 3 ea. M2 nut (to hold PCB)
- 1 ea. large washer (for 5th channel switch)
- 1 ea. M4 brass insert (to hold dummy antenna)
- 1 ea. M4 x 10 mm set screw (to hold dummy antenna)
- 2 ea. M2 x 8 mm flat head screw (to hold on/off switch support)

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