

TOMMODELS

Electric radio controlled model aircraft designed by Tom van Haaren

Dewoitine D-520 construction manual



Construction manual for a 1/9 scale flying model of the Dewoitine D-520

Design by Tom van Haaren
Short kit by Manzano Laser Works

<http://users.telenet.be/tommodels>
<http://www.manzanolaser.com>

Wingspan:	1134 mm	44.6 "
Length:	895 mm	35.1"
Weight:	1358g	47.9 oz

This model plane is not a toy, nor a beginner model. The designer and short kit manufacturer are not responsible for whatever damage or injuries caused by improper use of the plane. The pilot of the plane is responsible for it and should always use it in a safe way.

It is recommended to read the construction manual through before you start building.

Materials needed:

Quantity	What
4	2.5mm balsa sheets (1000 x 100 mm)
6	1.5mm balsa sheets (1000 x 100 mm)
1	sheet of 2mm balsa (1000 x 100 mm)
1	sheet of 3mm balsa (1000 x 100 mm)
1	sheet of 5mm balsa (1000 x 100 mm)
3	2 x 5 mm spruce stringers (1000 mm)
2	control snakes

Glue: cyano (thick & thin), UHU Hart(= balsa cement), 30-minute epoxy
Before you start building:

Unroll the plan on a flat building surface and pin it down. First, the wing will be built so start with unrolling sheet 2. The cnc laser cut parts are still in there frames. Only cut out the parts you need for a particular step in the building proces. Otherwise you could loose some parts or mix them up. Use a sharp knife to cut the parts out. Don't push them out, you could damage the parts by doing so.

Wing:

1. Make the bottom wing sheeting for half a wing from 1.5mm balsa sheet. I prefer to use UHU Hart for gluing the sheets together because this glue is easier to sand than cyanoacrylate (cyano).
2. Mark all ribs and reinforcements on the wing sheeting with a pencil. This will make it easier to glue everything on. Pin down the wing sheeting on the plan.
3. Glue the wing spar reinforcements W10 to one of the W9 wing spars.
4. Carefully glue the wing spar to the sheeting. Make sure it stands vertical.
5. Glue wing ribs W2 to W8 on the sheeting. Always dry fit them first. Glue only the part that touches the sheeting. Afterwards, when all ribs are partially glued, bend up the sheeting to the forward part of the ribs and glue it with thin cyano. Make sure the ribs are vertical to the wing sheeting
6. Glue the rib W1 in place. Note that this is only the back part of the wing rib. Glue it using the correct dihedral. You can use the drawing of part W10 on the plan to make a template.
7. Cut the false leading edge from the 2mm balsa sheet and glue it in place.
8. Remove 1 cm of wing ribs W5 to W7 where the aileron reinforcements will sit.
9. Cut the aileron reinforcements from 5 mm balsa and glue them in place.

10. Sand the false leading edge and the aileron reinforcement flush with the wing ribs. Take care not to damage the wing ribs when sanding.
11. Make the bottom wing sheeting for the second half wing and, as with the first half, mark all ribs and reinforcements with a pencil.
12. Glue the second wing spar W9 on the sheeting. Make sure it is aligned with the one on the other half wing.
13. Repeat step 5 to 9 for the second half wing.
14. Glue the second wing half to the first. Support the first wing half under rib W8 to get the right dihedral. The wing sheeting at W8 must be 105mm above the building board. Use a slow glue to attach the wing panels together. Put clamps on the W10 wing spar reinforcements where they join and overlap the second wing spar.
15. Glue pieces W1a in place.
16. Install a servo wire in each wing side. Make it long enough. You can cut off excess wire afterwards.
17. Make the top sheeting of the wing from 1.5mm balsa sheet. Sand the underside of the trailing edge of the top sheeting to zero. This way it will fit better to the wing.
18. Cut a rectangular triangle from scratch 2 mm balsa or ply. The rectangular sides are 72mm and 6mm. This triangle will be used to get the right amount of washout in the wing.
19. Pin down the wing at the wing root. Support the wing under one wingtip with 105mm and put the triangle under the other wing tip. The point of the triangle should be at the rear side of the wing spar. Glue the top sheeting of the wing half which is on the building board. Use slow glue like UHU Hart. This way you have plenty of time to get it right.
20. Repeat step 18 for the second wing half.
21. Cut the leading edge from 5 mm balsa and glue it in place.
22. Glue the wing tips together and glue them to the wing.
23. Sand the wing tips and leading edge in form.
24. Mark and cut out the ailerons. Sand the aileron leading edge to a point, as shown on the plan.
25. Drill a hole in the centre of the wing in the leading edge, for the wing dowel. Round off one side of the wing dowel, and glue it in place. Make sure the rounded side sticks out.
26. Drill the wing bolt hole.
27. Make cutouts for the servos.
28. Install the servos, and cover the gap with wood.

Fuselage:

Before you start with the fuselage, change the plan. Put sheet 1 on the building table.

1. Mark the position of the fuselage formers on W15 and W16.
2. Start with building the internal box construction. Put F16 on the building board and glue the 2 sides, F15. Make sure they are vertical to F16.
3. Glue the 2 parts of F19 together. When they are glued together, glue the wing bolt nut to it.

4. Add the part F19 you've made in the previous step to the box construction.
5. Glue F4b to F4.
6. Glue F2 to F7 to the box construction. Make sure everything is square. Also take care of the sequence. If you mount F2 before you mount F4, you can't mount F4.
7. Add the 2 pieces of F14.
8. Glue F1 and F1b together. When this has dried, you can drill the holes to put the motor screws through.
9. Cut out the 2 pieces of F17. Dry fit F17 and F1 to the frame. Check if everything is square. When you are satisfied, use slow glue like UHU Hart to glue it. Again, make sure it is square.
10. Glue the 2 pieces of F18 together and add them.
11. Add some scratch ply where the servo screws will come on F16.
12. Glue the cockpit floor in place.
13. Cut out the wooden instrument panel front and paint it dark green. Copy the instrument panel on the plan (or in this manual) and cut it out. Put some transparent tape on it and glue it behind the wooden front when this has dried. Afterwards, glue it in place on the frame.
14. Sand the edges of the cockpit floor flush with the fuselage formers.
15. Cut one of the spruce stringers to length and glue it in the slots on top of the fuselage frame. Dry fit first. When you have to apply force to get it in the right shape, you can steam the stringer and bend it. This way, the stringer will permanently take this form.
16. Add F12.
17. Add F8 and F9. Take care that you position them right, so the holes for the control snakes are aligned.
18. Add F13.
19. Glue F10 vertical on F11. When this has dried, glue it on the frame. It is very important that the angle of F11 compared to the frame is correct.
20. Add a scratch 1.5mm balsa strip between F11 and F12 at the end of the fuselage. Sand the strip to zero before you glue it.
21. Now the side stringers must be added. They run from F1 to the Balsa strip at the end of the fuselage. At the front, the fuselage tapers a lot. Therefore you must steam the side stringers to the right shape. When you glue them in place, do it on top of the plan. It will determine the straightness of the fuselage.
22. Cut the control snake outer tubes to length and glue them in place. Make them long enough. They must run from F7 to the back end of the fuselage. Anything that comes out of the planking will be cut off later on. Glue a piece of scratch balsa in the region of F7 to support the outer snakes.
23. Plank the fuselage with 2.5mm balsa. Cut the balsa sheets in 1 cm wide strips. Try to fit the strips as best as possible. The better everything fits, the less filler will be needed and the plane will be lighter.
24. Cut the fuselage planking to accept the wing.
25. Cut out the wing fairing undersides from the 0.8mm ply sheet. Cover the centre part of the wing with plastic foil. Glue the fairing undersides to the fuselage. Put the wing in place to support the fairing undersides.

26. Build up the wing fairings using thick balsa. Afterwards sand it to the right form. Wrap sanding paper around a cylindrical object to make the sanding easier.
27. Make the side air intakes from 1.5mm balsa.
28. Mark the position of the air intakes, and cut a hole to allow for airflow in the fuselage.
29. Glue the side air intakes in place.
30. Cut out the air intake at the front.

Tail Surfaces:

1. Make the tail from T1, T2 and T3 and round the leading edge.
2. Make the rudder from R1 and R2 and round the leading edge. Leave the trailing edge square.
3. Cover the tail and rudder with 25g/m² glass cloth and resin or epoxy
4. Make the stabilizer from S1 and S2.
5. Cut out the elevator rudders and round off the leading edges.
6. Bend a 2mm steel piano wire (U-shape) and attach the 2 elevator rudders together.
7. Glue the 2 elevator rudders S3 together with the bent wire.
8. Cover the stabilizer and elevators with 25g/m² glass cloth and resin.
9. Cut slots in the stabilizer and the elevator rudders for S4.
10. Drill 1.5mm hole in the 2 S4 parts.
11. Cut 2 pieces from 1.5mm piano wire. They must be approximately 2 cm long.
12. Make 2 other slots for the 1.5mm axles in the elevators. Cut slips for the hinges.
13. Glue the 2 1.5mm piano wire axles in the elevator rudders while the axles are put through the pieces S4. You must take care not to glue S4. Use epoxy resin to glue this. You can put a little butter or grease on the pieces S4 to make sure they don't stick. Glue the 2 hinges in the elevator.
14. Glue the elevator with the pieces S4 and hinges to the stabilizer.
15. Glue the stabilizer to the fuselage. Align it carefully with the wing. Use epoxy.
16. Fill the gaps forward and aft of the stabilizer with 5 mm balsa.
17. Glue the tail in place.
18. Fill the gap between the tail and stabilizer with a hollow balsa block, or build up 2.5mm planking.

Wing radiator

1. Build the wing radiator frame on top of the plan with pieces R1-R4.
2. Sheet the radiator with 3mm balsa.
3. Cover the radiator with glass cloth and epoxy resin.
4. Drill a hole for the wing bolt.
5. Mark the radiator's position on the wing underside and glue it in place using epoxy.

6. Cut a plate of 0.8mm ply that fits the inside width of the radiator to the aft side of the wing.
7. Drill a hole in this plate for the wing bolt
8. Glue it in place, at the underside of the wing.

Finishing

I covered the prototype with 25g/m² glass cloth and G4 polyurethane resin. When the model was covered I cut out the back windows. Then I attached the ailerons with hinges. The model was painted with an airbrush. After painting the model, the cockpit interior must be painted. Add a pilot figure and afterwards glue the canopy on the model. Add a cardboard interior in the back windows. I made the back windows from thin plastic paper map.

Drill 2 holes (10mm) from the top of the wing, through the centre of wing, in the centre of the wing. They end up in the radiator. This is to allow the air, which comes in through the front air intakes, to get out of the fuselage. Install the fuselage servos and screw in a launch hook.

CG is 77 mm from the leading edge of the wing.

Enjoy !!!

If you have any questions regarding this plane, feel free to email me vanhaaren.tom@gmail.com

Tom van Haaren
September 2007

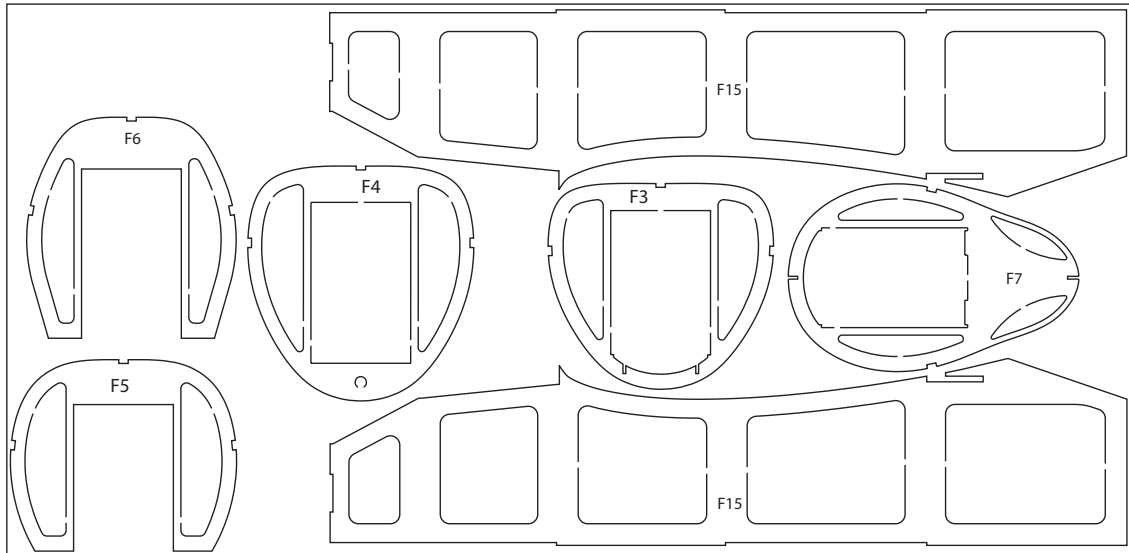
Instrument panel

Cut out en glue behind the wooden front.

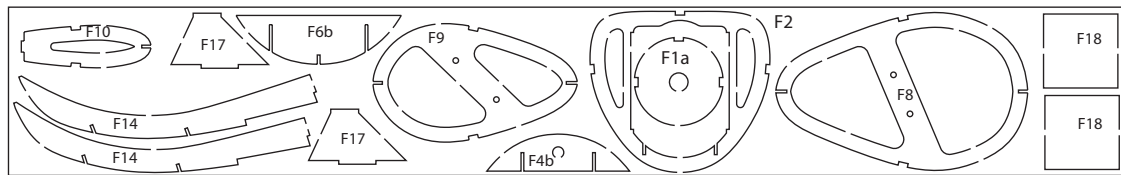


Part list

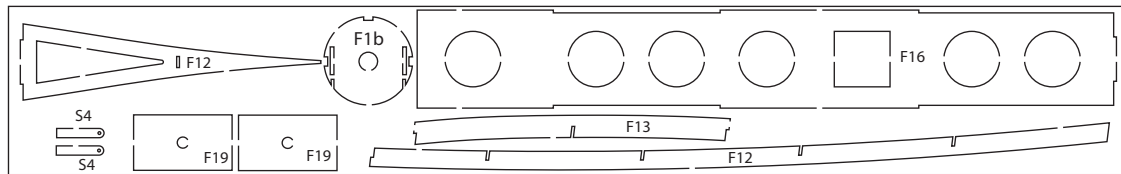
Ply parts



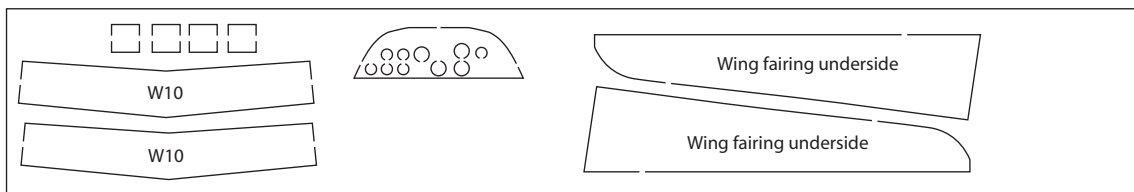
1.5 mm Ply



1.5 mm Ply



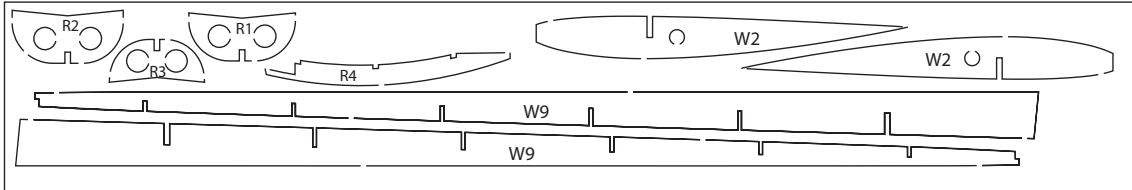
1.5 mm Ply



0.8 mm Ply

Part list

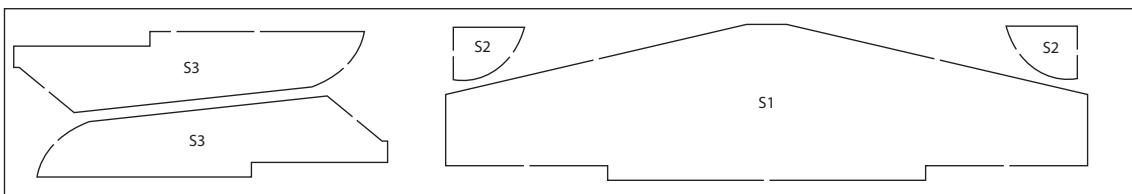
Balsa parts



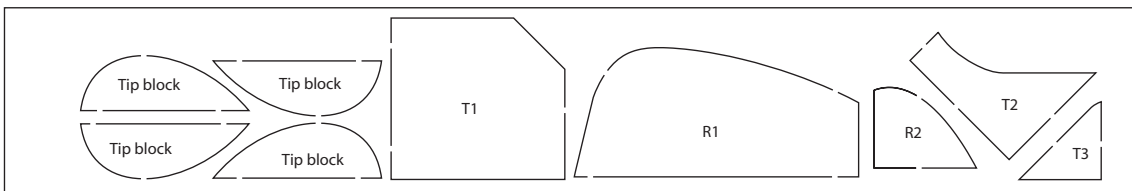
3 mm Balsa



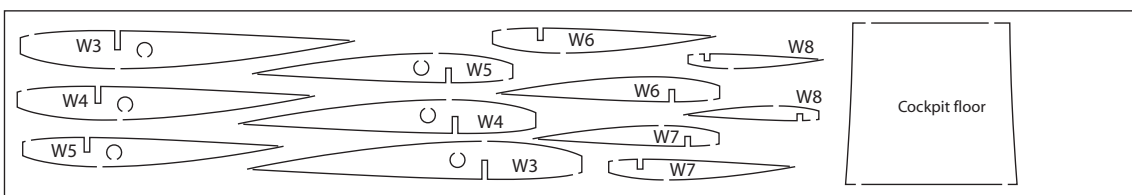
3 mm Balsa



5 mm Balsa



5 mm Balsa



2 mm Balsa