

Dassault Aviation
FALCON 7 X

for Jet CAT P160

Assembly Manual

AVIATION DESIGN

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INTRODUCTION

The Falcon 7X from **AVIATION DESIGN** is a very large model designed for a single high thrust and light turbine.

It is fully molded in fiberglass, carbon and epoxy.

All plywood reinforcements are already glued.

The flight characteristics are excellent with very good low speed capability.

The model has plug in wings and stabs.

The Falcon 7 X will operate from prepared grass fields (250 meters long) or tarmac surfaces (150 m).

KIT FEATURES: ref ADJ 500

- High quality, white gel-coated epoxy-glass fuselage. The fuselage is in two parts for ease of handling and transportation.
- Nose cone and door for radio access molded in carbon epoxy
- 1 Epoxy-glass inlet ducting
- Fully molded epoxy carbon wings with tube for aluminum spar and gear support already glued.
- Fully molded epoxy carbon stabs with tube already glued
- 2 Winglets
- 2 engine nacelles
- Carbon gear doors
- 2 carbon stab spars
- 2 aluminum wing and engine tubes
- All clear canopy CNC cut.
- Foam floor CNC cut.
- All hardware (screws, servo cover,)
- Instructions in English.



Parts required to complete the kit:

Turbine:

One **Jet Cat P160 SE** turbine or any light 16 kg thrust turbine.

Turbine must be as slight as possible to reduce CG problem

Kevlar Fuel tanks: ref ADJ 640 KU

Two Fuel cells molded in Kevlar with a 4.2L capacity

Includes tubing, nipples and clunks + 1 hopper tank

Can be used if you fit the interior in the fuselage. Two Fuel tanks fit under the floor

Kevlar Fuel tanks: ref ADJ 641 KU

One Fuel cell molded in Kevlar. Capacity: 4.2 liters

Includes tubing, nipples and clunks + 1 hopper tank

Can be used if you do not fit the interior in the fuselage. Fuel tank fits in the middle of the fuselage

Landing gear: ref: ADJ 635

AVIATION DESIGN scale retractable landing gear is specially designed for the Falcon 7X.

It is made in aluminum and steel.

It includes 3 retracts system, 3 scale oleo struts, 4 way valve, tubing, connectors, air tank and filling valve.



Wheels set + brakes: ref: ADJ 637

This set includes:

4 x 130 mm diameter wheels + scale cover + four brakes.

CNC machined on bearings

2 x 55 mm diameter scale front wheel. CNC machined on bearings

Includes valve, tubing, connectors, air tank, filling valve.

Gear door kit: ref: ADJ 638

Includes four air cylinders, electronic gear door cycler, 4-way valve, tubing, connectors, door hinges and ball links.

Not included in the different package:

Self-adhesive foam tape

0.2 kg epoxy and glass fiber

ZAP CA

DISCLAIMER

AVIATION DESIGN assumes no liability for the operation and use of these products.

The owner and operator of these products should have the necessary experience and exercise common sense. Said owner and operator must have a valid Model Airplane license and insurance, as required.

FIBREGLASS PREPARATION

The inside of the fuselage should be sanded with fresh #80-grit paper for best glue adhesion where bulkheads and other attachments are fixed.

GLUING TECHNIQUES

All the plywood formers should be fitted with cyano adhesive and then glued with epoxy and glass fiber tape. All other parts should be glued with epoxy.

CONSTRUCTION

Stab assembly:

Elevator control surface must be installed carefully. All hinges must be glued perfectly and there must be no play in hinges, linkage and servo

Cut the stabs according to the engraved panel lines with a Dremel saw (fine saw) or with a diamond disk

Sand the balsa inserted in the stab into $\frac{1}{2}$ V shape as shown below.



Drill four x 5 mm holes in the trailing edge stab for the hinge location.

Drill each stab for the four hinges on the top surface limit

Insert and glue with epoxy the four hinges in the balsa rib. (put some grease or oil on the pin axis to avoid gluing them)

Drill the corresponding hole in the stabs.

Insert and glue with epoxy the four hinges in the control surface. Check that the control surface can rotate freely. All hinges must be perfectly glued.



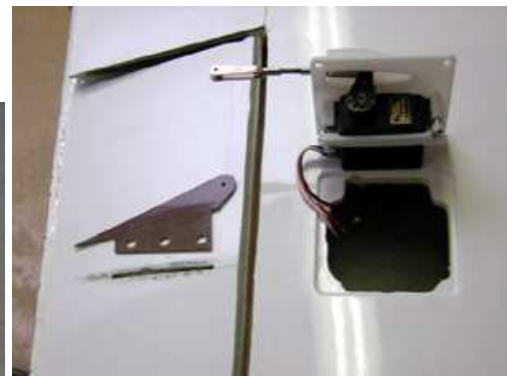
Cut the holes in the lower skin of the stabs according to the engraved panel lines for the servo covers



Make a 2 mm slot in the control surface for control horn.
Glue the control horn with epoxy.

Install glue and screw the servo in the servo cover.
Insert in the stab the servo extension lead
Make a hole in the stab root for the servo lead.
Connect the servo and the control horn with two x M3 links and M3 threaded rod.
Apply thread lock.

There must be no play.



Joining the two stabs:

Check the rear fuselage for the location for the two stab joining carbon spars. Drill 2 X 16 mm hole in the rudder at the correct location.

Fit the 2 carbon spars through the rudder. The Short spar is at the front, longer at the rear. Both must be anhedral. Fit the two stabs on each side. Check that the distance between the top of the rudder and the tip of the left and right stabs are equal.



Glue with slow epoxy and microballoon the two carbon spars in the rudder.

Put some wax in the stab tube and fit the 2 stabs on the fuselage

Check again that the distance between the top of the rudder and the tip of the left and right stabs are equal. Hold it in location with tape.

Let it dry overnight.

Make a hole in the fin for the elevator servo lead.



Fit the top fin pod.

The top fin pod is optional on the real airplane. The satellite phone antenna is inside.
If you want to put this pod, just sand carefully the fin and glue with epoxy the top pod.



Fit the rudder underfairing.

The fin fairing has been added after the first flight on the real airplane.
If you want to put this fairing, just sand carefully the fin and glue it with epoxy.



Fit the rudder on the fin.

Cut the rudder according to the engraved panel lines with a Dremel saw (fine saw) or with a diamond disk

Sand the balsa inserted in the fin with a half round Perma Grit tool to have half round in the fin

Sand the control surface half round

Drill 3 X 5 mm holes in the trailing edge fin for the hinge locations.

Insert and glue with epoxy the three hinges in the balsa rib.

Drill the corresponding hole in the rudder.

Insert and glue with epoxy the three hinges in the control surface. Check that the control surface can rotate freely. All hinges must be perfectly glued.

Cut the hole in the fin skin according to the engraved panel lines for the servo cover

Make a 2 mm slot in the control surface for control horn.

Glue the control horn with epoxy.

Install glue and screw the servo in the servo cover.

Insert in the rudder the servo extension lead

Connect the servo and the control horn with two x M3 links and M3 threaded rod.

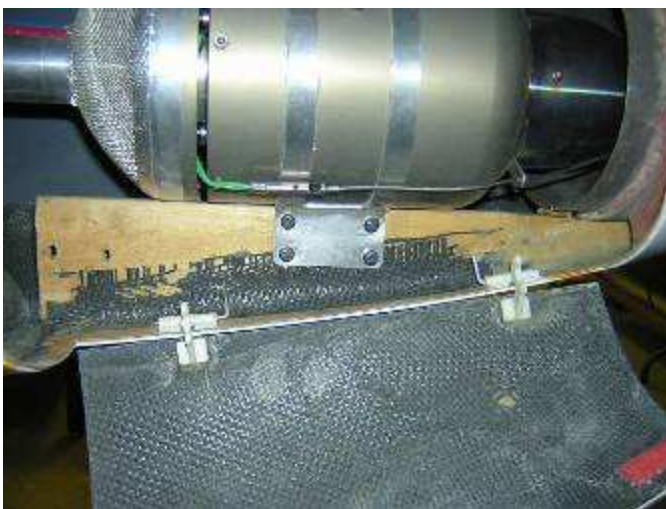


Engine hatch

Cut the engine hatch according to the engraved panel lines with a Dremel saw (fine saw) or with a diamond disk



Cut the engine hatch in 2 half
Glue two door hinges on each side of the door



Fit engine hatch latches or screws on each side of the doors to have an easy access to the engine

Inlet ducting:

Fit the inlet ducting in the fuselage.

Fit the plywood ring in the fuselage and fit the fiber ducting through the ring
Glue the fiber ducting, the plywood ring and the fuselage with epoxy.

Glue the fiber ring cover on both surfaces with microballoon



Engine nacelle:

Check the rear of the fuselage for the location of the two engine nacelles.

Drill a 6 mm hole in the fuselage for the nacelle pins at the correct location.

Drill a 25 mm hole in the fuselage for the nacelle axis at the correct location.

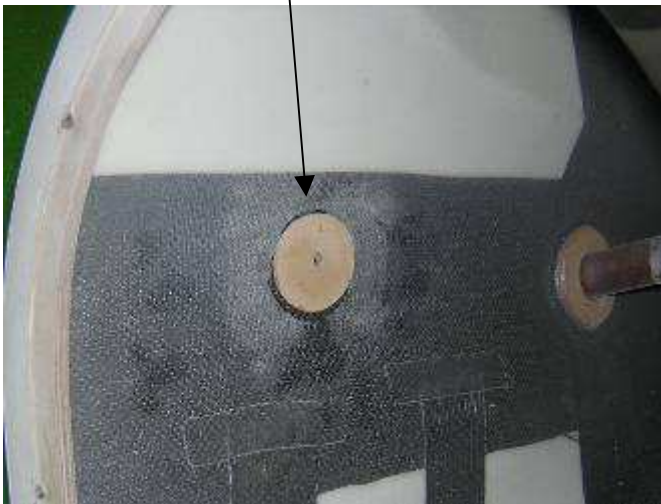
Insert the 25 mm diameter fiber tube in the fuselage

Put some wax on the aluminum tube.

Fit the aluminum tube through the fuselage, through the fiber tube, and through the plywood reinforcements and fit the two engine nacelles on each side.

Glue with slow epoxy and microballoon the fiber tube and the two round pin reinforcement plywood pieces.

Let it dry overnight.



Glue the fan cover at the limit of the engine nacelle



Secure the engine nacelle with one x M3x16 mm screw on each side through the aluminum tube

Wings:

Ailerons must be installed carefully. All hinges must be glued perfectly and there must be no play in hinges, linkages and servos.

Cut the ailerons according to the engraved panel lines with a Dremel saw (fine saw) or with a diamond disk

Sand the balsa inserted in the stab in $\frac{1}{2}$ V shape

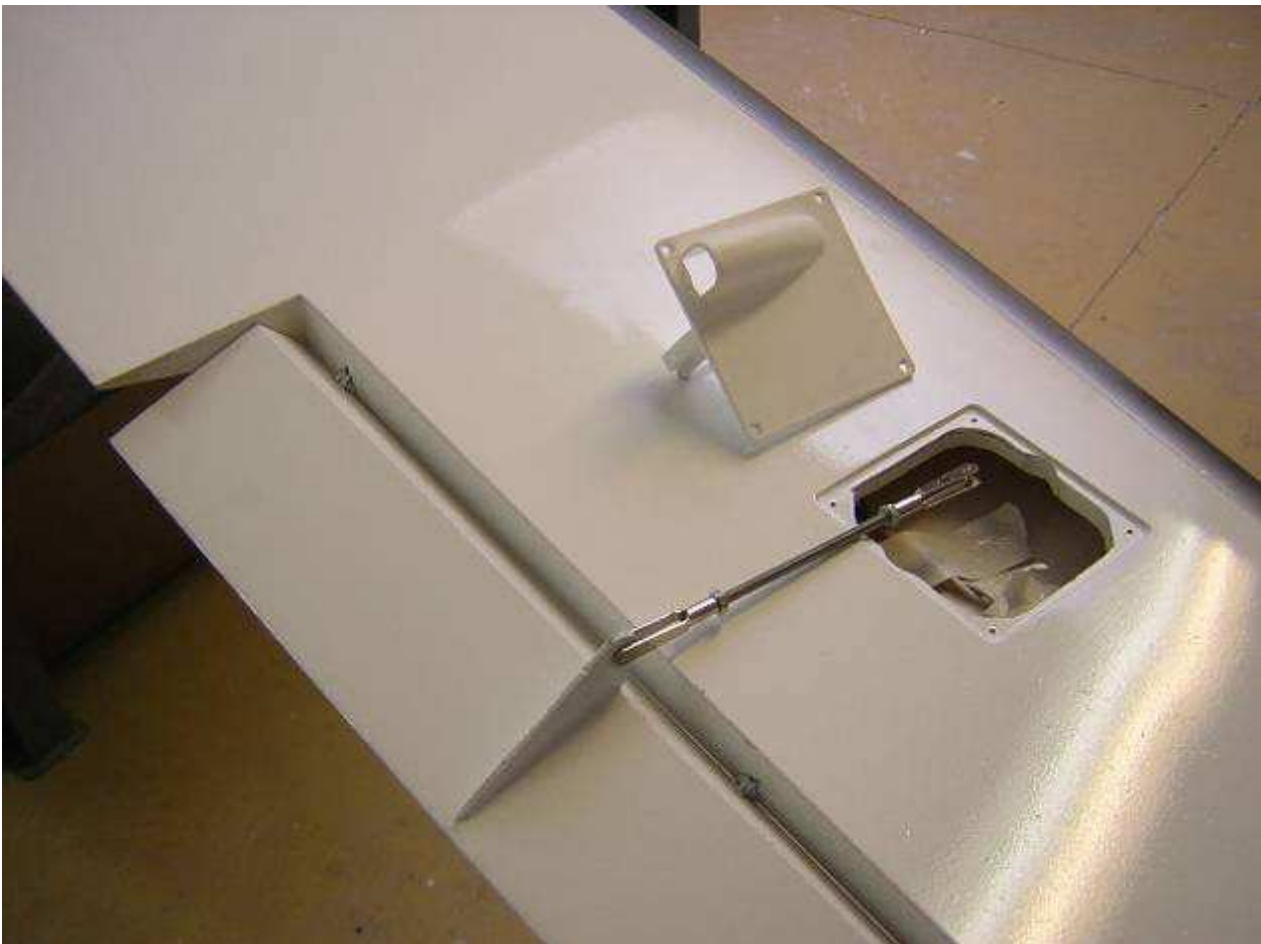
Drill three 5 mm holes for the hinges locations.

Drill each wing for the three hinges at the limit of the top surface

Insert and glue with epoxy the three hinges in the balsa rib. (put some grease or oil on the pin axis to avoid gluing them)

Drill the corresponding hole in the ailerons.

Insert and glue with epoxy the three hinges in the control surface. Check that the control surface can rotate freely. All hinges must be perfectly glued.



Cut the holes in the lower skin of the wings according to the engraved panel lines for the servo covers

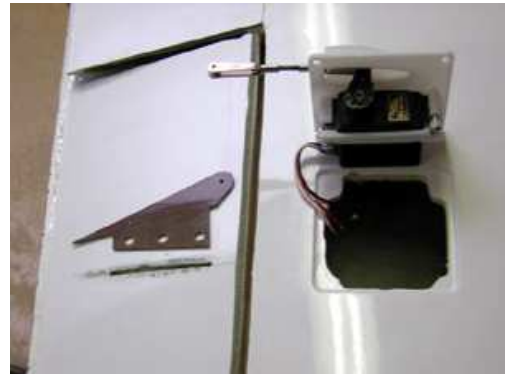
Make a 2 mm slot in the aileron for the control horn.

Glue the control horn with epoxy.

Install, glue and screw the servo in the servo cover.
Insert the servo extension lead in the wing.

Connect the servo and
the control horn with 2 x
M3 links and M3
threaded rod.
Apply thread lock.

There must be no play.



Flaps:

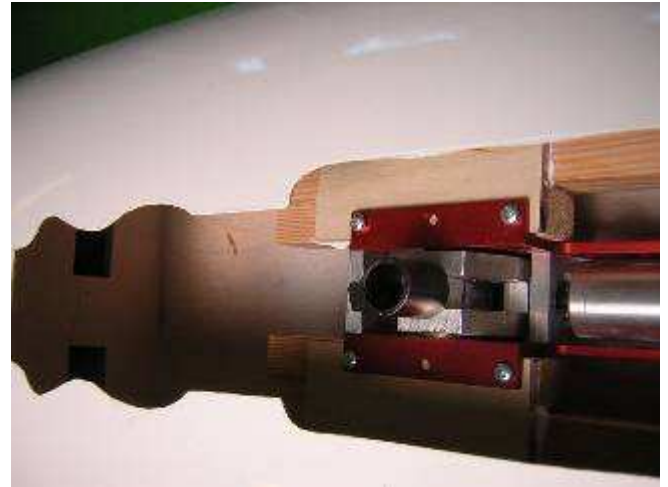
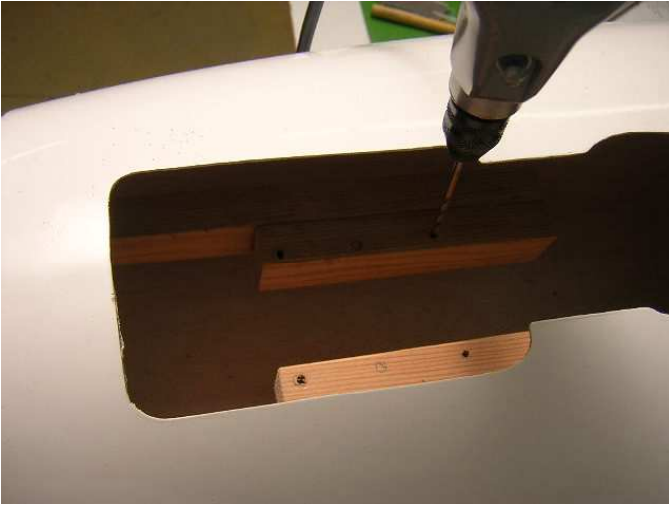
Flaps can be installed like the ailerons.

However, the flight performance does not change or improve with flaps. Flaps fully down do not do much drag and do not improve lift. So it is possible not fit the flaps and save 2 servos and some weight.

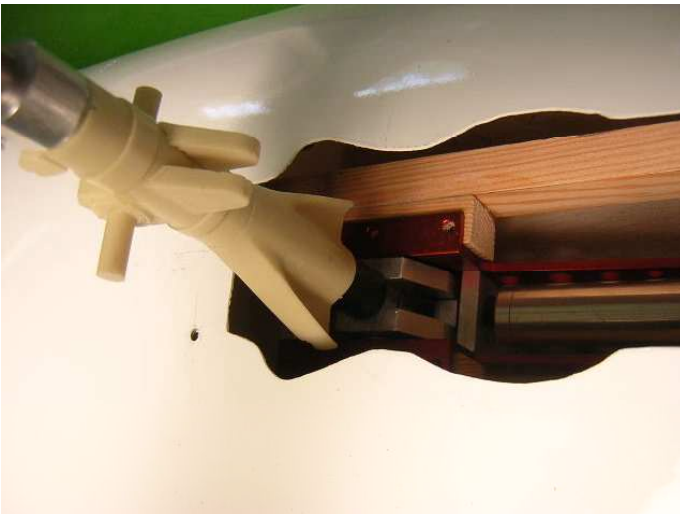
Front FUSELAGE

Assembling the nose gear

Cut the front gear door according to the engraved panel lines.



Put the 2 wood ribs forward for a better access from the gear door
Glue on them the 4 mm plywood reinforcement at the limit of the second rib reinforcement
Put the front gear on the wood ribs and plywood
Drill 4 x 2mm hole through the plywood and wood ribs
Screw with 4 x 3mm x 20mm parker screw the front gear on the support

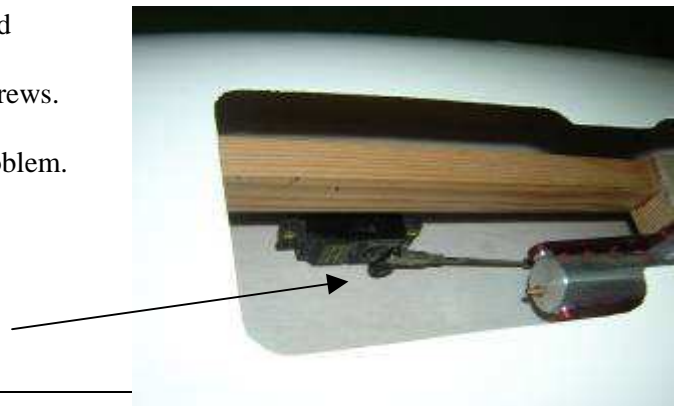


Put backward the wood ribs with gear so that the plywood reinforcement touches the plywood frame.
Put the front strut in the front gear and secure the gear screws.

Check that the front wheel retract and extend without problem.
Adjust position (forward or backward) if necessary.

Glue the two wood spars in the plywood frame.

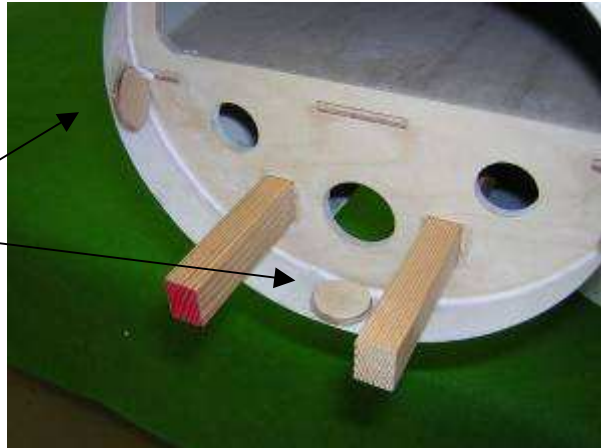
Put the steering servo on one side on the pilot floor.
Connect servo to the steering arm.



Battery support:

Glue the plywood battery support on the two wood gear ribs

Glue some small plywood reinforcements (4 pieces, 1 top, 1 bottom, 1 left and 1 right) to screw the nose on them.



Assembling the wing joining tube:

Check on the front fuselage the location for the 2-wing aluminum joining tube.
Drill 2 X 30 mm hole in the fuselage at the correct location.

Insert the 2 x 30 mm diameter fiber tube in the fuselage

The short tube in the front one, the rear tube is the long one. Mark them (front and rear)

Put some wax on the aluminum tubes.

Fit the aluminum tubes through the fuselage, through the fiber tube, and through the plywood reinforcements and fit the two wings.

Glue with slow epoxy and microballoon the two fiber tubes and the two plywood reinforcements.
Let it dry overnight.

Assembling the fuselage gear support:

Cut the 2 main gear door

Insert the two plywood reinforcements
Insert the 20 mm x 30 mm gear support
wood spare through the fuselage

Fit the two wings on the fuselage and check
that the gear support fit correctly in the
wing plywood support.

Glue with slow epoxy and microballoon the
gear wood support tube and the two
plywood reinforcements.

Let it dry overnight.



Main Gear

Assemble the two wings to the fuselage

Put the model inverted

Put the 2 gear on their supports

Check that the gears retract and extend without problem. Adjust position if necessary

Trim fuselage and wings so that the gears do not touch them.

Drill the 4 x 2 mm hole for the gear screws

Screw the gear with four 4x20mm parker screw



To disassemble the model, remove only the rear screw so that the gears stay on the fuselage.
So when the model is in the normal position without wings (not inverted), it can stay on its three gears.

Main Gear door

Assemble the two wings onto the fuselage
Put the model inverted
Align the gear doors with the fuselage.



Fuselage door:

Put 3 gear door hinges in the fuselage on each side

Screw the steel ball link on the hinge

Screw the link to the 2" air cylinder

Adjust the position of the air cylinder and screw it on the plywood frame to have gear door closed when cylinder is closed.

Check that it opens and closes without problem



Wing door:

Attach the gear door to the aluminum gear supports with flat hinges



Connect the gear door to the strut with plastic ball link and adjust the length so that the door closes when the gear retracts
Check that it opens and closes without problem

Front gear door:

Cut the front gear door in 3 parts according to the photos



Put 2 gear door hinges on each front gear door

Drill a 2 mm hole in the front door hinge and screw the ball link on the hinge
Screw the ball link plastic end to the 1" air cylinder
Extend the air cylinder

Screw the air cylinder with the parker screw to have gear door closed when cylinder is closed
Check that it opens and closes without problem

Put 2 flat hinges on the rear front gear door
Attach the gear door to the front oleo strut so that the door is closed when gear is retracted

Landing Gear and door tubing:

Fit the wheels and brakes on the gears.

You have now to connect all the gear, door and brake tubing.

Kevlar Fuel Tanks:

The Kevlar fuel tanks are pre build.
Connect the tubing and clunk.
Check that the clunk can move freely.

You have now to check that your fuel tanks have no leaks.
Fill them fully with kerosene and let them during 1 hour full of fuel.
Check **carefully** that your fuel tanks have no leaks.

You will now have to install the fuel tanks in the front section of the fuselage before proceeding with the assembly.



There are now two possibilities:

- If you fit the cockpit interior with floor, you will have to use the two Kevlar tanks fitted under the two mains wing tubes.



- If you do not fit a cockpit interior, it is simpler to use one single large Kevlar fuel tank fitted on the top of the two mains wing tubes



Glue the first plywood fuel tank mounting on the front fiber tube

Glue the second plywood fuel tank mounting on the back of the rear fiber tube

Fit the Kevlar fuel tank on the mounting and hold it with rubber or plastic T rap



Assembling front and rear fuselage:

We strongly recommend not gluing the front and rear fuselage parts for easier handling and transportation

Insert M4 blind nuts in the rear fuselage.

Assemble the two fuselage parts together and screw the rear to the front with M4x20 Allen screws and large washers. You will have easy access to the screws from the main gear doors

Winglets:

Fit the winglets on the wing tip.
You can glue them with silicone glue, screw them or simply hold them with tape

Strobe lights can be installed in the winglets.
Clear formed covers are supplied with the kit.
Simply cut the winglet on the engraved location.
Insert strobe light and wiring and glue the clear cover with ZAP canopy glue.
Hold them with tape and let dry overnight



Canopy:

All fiberglass canopy windows can be cut with diamond disk.
Just keep a 1 or 2 mm border to glue the clear canopy easily



Put some Zap canopy glue on the border of the fuselage
Put each canopy and hold them with tape outside
Let it dry overnight. Same applies to all other windows.

Cockpit interior:

If you chose to fit the cockpit interior, you will need to fit the floor.
First insert and glue the 2 long balsa spares in the pre cut holes in the two plywood frames.



Glue 2 or 3 balsa rib perpendicular to the long spare to hold the floor.

Slide and glue the light hard foam floor on the balsa ribs. Floor should be cut in two half parts for an easier access.

All seats and tables can be made from balsa and light foam. Always think weight to avoid excess weight.



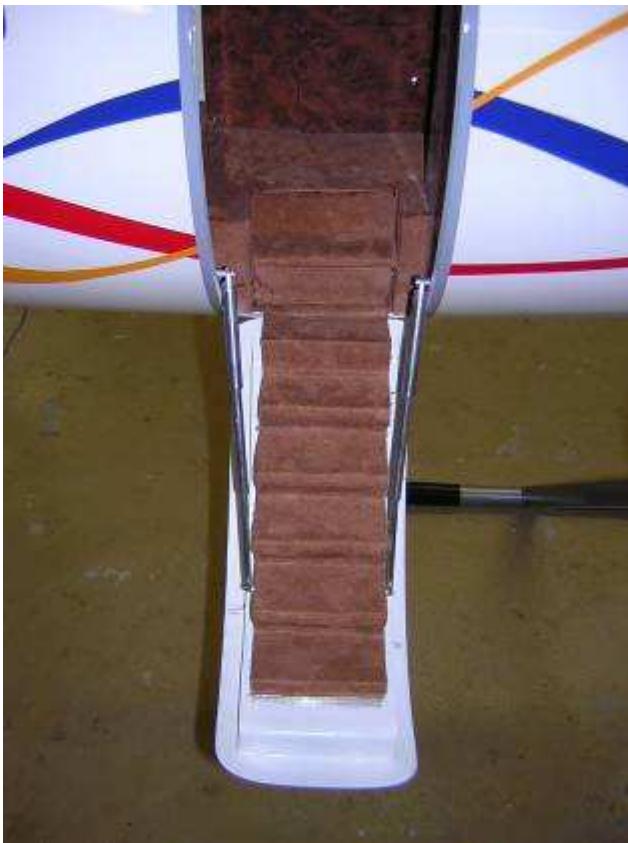
Access door:

If you fit the cockpit interior, you will have to fit the access door and the **stairs**.

Cut the ABS vacuum parts for the steps and glue it to the access door.

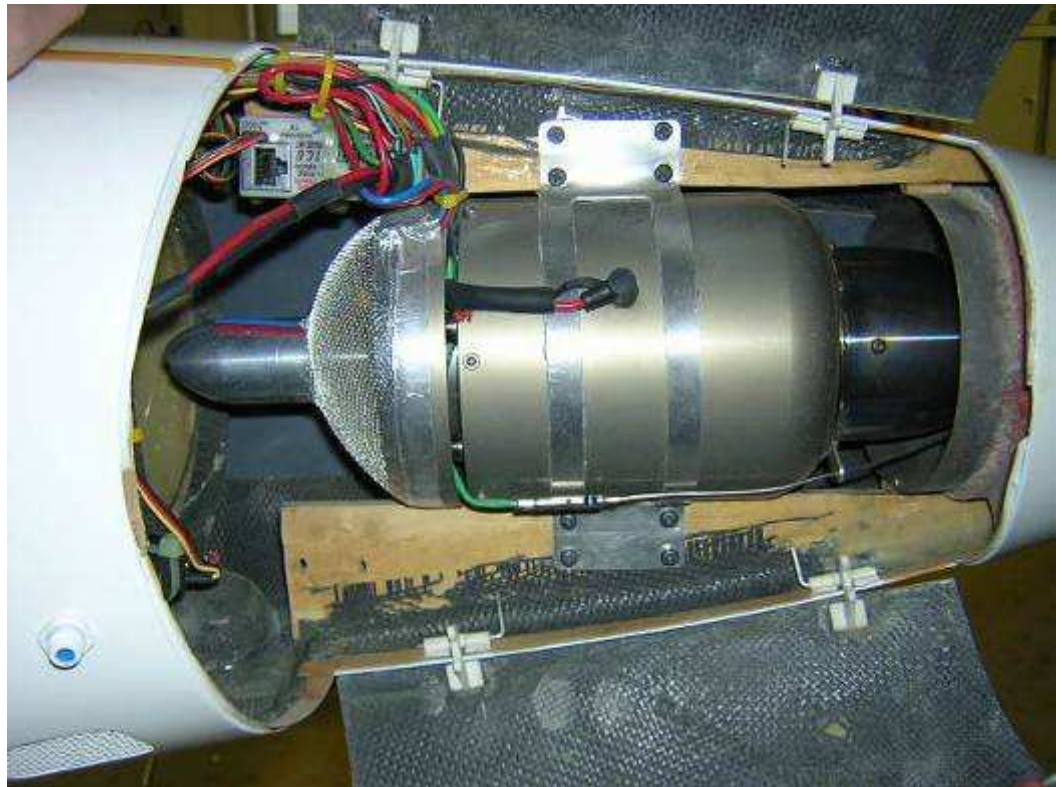
Glue two flat hinges on the bottom of the access door for the rotation.

Secure the door with small parker screws.



Engine installation:

Screw the engine on the two rear plywood ribs
Fit fuel pump and electro valves close to the engine.
All tubing must be held in the rear fuselage.



Exhaust tube:

A very short exhaust tube must be fitted at the back of the airplane to protect the rear of the fuselage.

Exhaust tube can be made in 0.2 mm aluminum sheet or stainless steel.
Drawing is given at the end of the manual.
Glue the exhaust tube with high temperature silicon glue to the rear frame and to the end of the fuselage



Radio installation:

All batteries must be installed in the nose to have the correct CG

There are few possibilities to fit the radio system (receiver and valves):

You can install them:

- In the nose cone section. Access is easy, just remove the nose cone.
- In the main left access door (real access door) if you do not fit the floor and cockpit). You will access the radio by opening the door
- At the limit of the rear and front fuselage. You will have an access only when you disassemble the model or from the main gear doors.



Connect all the engine tubing to the fuel pump.
Connect the fuel pump to the fuel tank.
Connect all the engine connector to the ECU.
Connect radio and ECU
Connect all the retract tubing to the air valve.
Connect all radio wires
Fit the ECU battery and radio batteries as forward as possible

Secure all the screws with thread lock.

Finishing tips:

Now you have to remove the wax from all the parts to paint.
The best way to do this is to sand all the surfaces with a "scotch brit" scouring pad used to wash up the crockery
All the parts can also be sanded with #600 grit paper to remove wax.

Do not apply primer on the fuselage, wings and stabs.

They must be directly painted.

Think light: excessive paint build-up will add unnecessary weight to the model. Apply light, thin coats of paint and sand between coats to avoid excess weight.

Servos:

The Falcon 7X needs good servos:

For the two ailerons, we recommend two servos with metal gears: 9 kg torque

For the two stabs, we recommend two servos with metal gears: 9 kg torque

Rudder: one servo 6 kg torque

NG steering: one servo 5 kg torque

Flaps: two servos 9 kg torque

Retracts + gear doors: two micro servos 1 kg torque or two electro valves

Control surface setting:

Aileron: 20 mm up and 20 mm down

Elevator: 30 mm up and 30 mm down

Rudder: 22 mm left and 22 mm right

You also need to mix the steering nose wheel with the rudder.

Wheel brakes can be mixed with the elevator down.

Center of Gravity

You normally need 4 x 2500 mAh batteries for Rx power and the 1 x ECU battery in the nose + about 2 kg lead in the nose to achieve the correct Center of Gravity.

All batteries and lead must be fitted on the front plywood mounting plate.

The correct CG is located on the front aluminum gear corner where the retract screws are located.

The best way to check this is to assemble your model ready with gear down, make a small support that you will slide under the wing and under the main gear. Put the aluminum gear corner on your support so that the plane does not touch the ground.

If the tail drops move the batteries forward or add weight in the nose.

Note : balance the model with the gear down and **the fuel tanks empty.**



With a Jet Cat P160 engine, the total weight of the Falcon is 27 to 30 kg tanks empty

The Falcon 7 X can take off from grass with a 16 kg thrust engine, but take off roll is about 200 meters. Acceleration is slow. Take off from tarmac is about 150m long with better acceleration.

Minimum engine thrust is 16 kg thrust.

Take off is very smooth.

Normal flight only requires half power.

All aerobatic maneuvers (roll, loops, and inverted flight) are not recommended.

Flight must be smooth like the real airplane, do not perform high rate of turn.

Stall : the Falcon 7 X will stall badly at very low speed. We do not recommend to do it, or only do so at high altitude.

Landing is very easy, it is like a very big glider, and you can adjust throttle to control your landing.

Important note : Pay very careful attention to structural integrity. This jet can reach speeds of over 300 KPH. It is your responsibility to operate it safely.

Specifications may change without notice.