JSM
Jet Sport Models

Xcalibur+

Instruction Manual

Specification:

Wingspan:	2338mm (92″)
Length:	2412mm (95″)
Weight:	13.25Kg (Approx.)
Radio:	8 Channel (Minimum Required)
Turbine:	80-160N (8-16Kg) (Recommended)

Introduction

Congratulations on your purchase of the Xcalibur+ Jet. This high performance model is ideal for use as a first jet or as a sports jet model.

Before you build the model, please read the instructions the whole way through to understand the construction sequence.

Warning: The Xcalibur+ has been designed to enable turbines of 80 to 160 Newtons thrust to be installed, however it is VERY important to note that if turbines of over 120 Newtons thrust are fitted, full power should not be used for any extended diving manoeuvres, as this will lead to speed in excess of the design specifications. The use of full power in level flight or climbing manoeuvres is completely acceptable. As the Xcalibur+ is a light and low drag airframe, turbines of more than 80 Newtons can have their maximum thrust level reduced within the ECU, which will in turn reduce the fuel consumption and thus increase flight time, extending the period between services due to the lower stress on the turbine yet still give the model superb performance including prolonged vertical climbs.

Required to Complete

- Turbine of 80 – 160 Newton (8 to 16Kg) thrust
- Retractable Undercarriage set complete with Wheels/Brakes (F-JSMLG/LRGTRIKE recommended as this has been designed specifically for the Xcalibur+)
- Fuel tank (L-JSM002/FT recommended as this has been designed specifically for the Xcalibur+)
- Suitable radio system of at least 8 channels with receiver and battery pack/s of at least 2,400mAh total capacity) Twin battery packs with battery system/backer are highly recommended.
- 2 Standard size servos for ailerons of at least 10Kg/cm torque
- 2 Standard servos for rudders of at least 6.5Kg/cm torque
- 2 Standard size servos for elevator of at least 10Kg/cm torque
- 1 Standard size servo for flap of at least 10Kg/cm torque
- 1 Standard size metal gear servo for nosewheel steering
- 2 Servos for retract and brake valves or 2 electronic valves
- Various extension leads for rudder, elevator, aileron and flap servos
- Tygon fuel line

Step 1

Check the fit of the aileron to the wing panel. If there is any misalignment the holes in the trailing edge of the wing can be slotted as required for the hinges.

Step 2

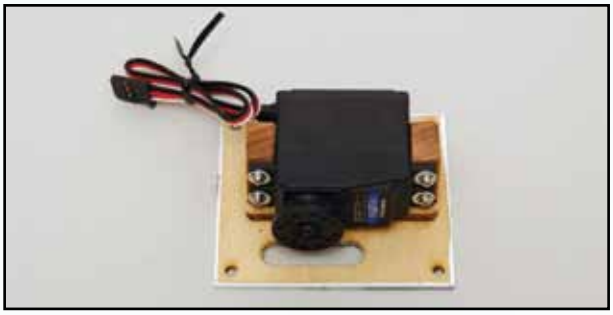
Run glue into the holes in the trailing edge of the wing panel and onto the exposed hinges, then fit the aileron to the wing panel. Wipe away any excess glue, some tissue or a rag can be used soaked in Cellulose Thinners or similar to remove the glue cleanly. (Take great care when using solvents such as these)

Step 3

Attach the aileron control horn being careful to position over the hardpoint under the film to give a secure mounting point.

Step 4

Install one of the aileron servos to the mounting plate as shown, then fit a suitable extension lead, long enough to reach the wing root. Secure the leads together using a short section of heatshrink, tape or a lead lock.

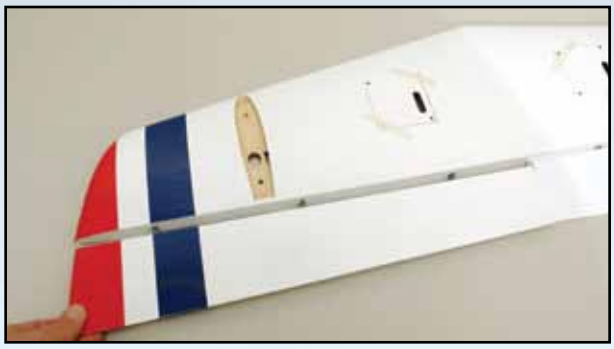


Step 5

Use the pre-installed cord in the wing panel to pull the servo extension lead though the wing panel, then screw the aileron mounting plate into place as shown. Make up the aileron pushrod and fit this, ensuring that keepers are fitted for security. The slot in the plate should be trimmed as required to allow free movement of the servo arm and pushrod. Repeat entire assembly procedure for the second wing.

Step 6

Hinge the elevator to the tailplane in the same way as the ailerons were fitted to the wing panels.

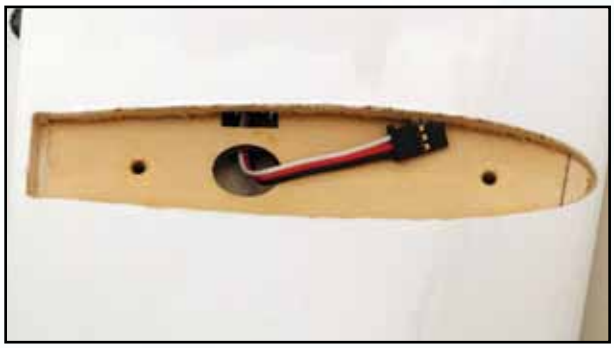


Step 7

Install the first elevator servo onto the mounting plate in the same way as was done with the aileron servo, then feed the servo lead through the servo lead tube built-in to the tailplane.

Step 8

Make sure that the servo lead is fed out through the circular hole in the ply plate as shown, then tape the lead in place until the tailplane is to be fitted to the tailbooms.

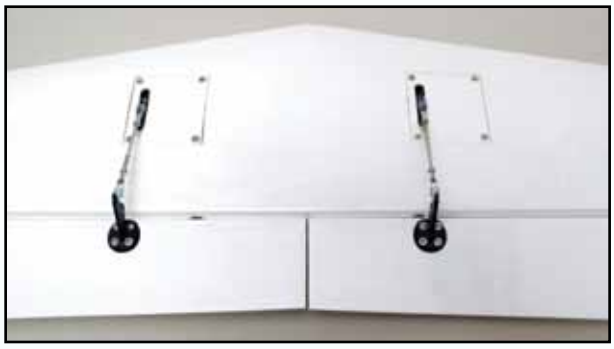


Step 9

Screw the servo mounting plate into place, fit the elevator control horn and make up and fit the pushrod as shown, fitting keepers to the clevises for security. The slot in the hatch should be trimmed as required to allow free movement of the servo arm and pushrod.

Step 10

Repeat the assembly procedure for the second elevator servo - note that as the servos are fitting in the same orientation as each other there is no requirement for one of the servos to be reversed, allowing a single receiver channel to be used.

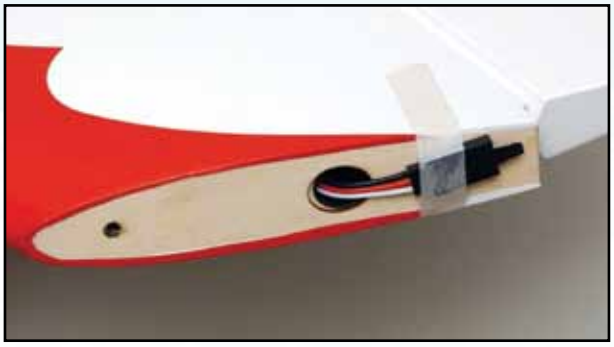


Step 11

Fit the rudders to the tail booms, installing the hinges in a similar manner to that illustrated for the elevator, note that the rudders are handed and have hard points for the control horns on the inboard sides, and the rudder servos are consequently fitted on the inboard sides of the booms

Step 12

Run extension leads through both of the tail booms for the elevator and rudder servos.



Step 13

Install the rudder servos as shown, with the output arm towards the rear of the boom.

Step 14

Attach the control horn to the rudder and make up the rudder pushrod in the same way as the elevator previously, making sure that keepers are fitted to the clevises for security. Note the angle of the servo arm at neutral, this is to match the angle of the leading edge of the rudder, so as to obtain equal movement in both directions. Repeat for the second tail boom.

Step 15

Before you install the retracts we advise you remove the screws and re-install them using locktite. You can do this one at a time so you don't need to disassemble the retract. Continue this process with the oleo legs and the wheel hubs.

Step 16

Test fit the main undercarrage and pre-drill the mounting holes. Use a felt tip pen to mark the sides of the recess where the air line holes are needed.

Step 17

Test fit the nose undercarriage and pre-drill the mounting holes. Using a pen mark two holes for the air lines.

Step 18

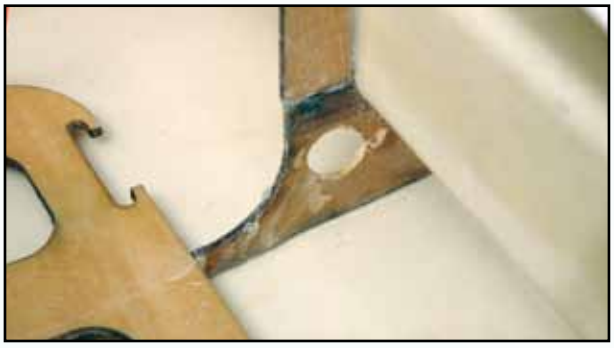
Remove the main undercarriage and drill the holes for the airlines as shown.

Step 19

Remove the nose undercarriage and drill the holes for the airlines as shown.

Step 20

Drill or cut a hole as shown in the former alongside the fuel tank mounting plate, making this large enough for the air lines and servo extension leads. Repeat for the other side.



Step 21

Fit the nose retract, having previously connected the air lines, and run these back into the main equipment bay.

Step 22

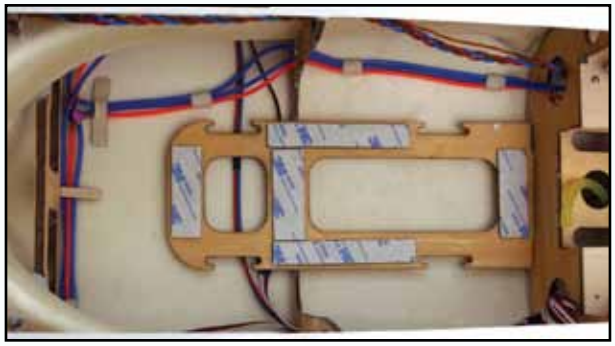
Install the main retracts, legs and wheels as shown, running the retract and brake airlines into the fuselage. Check that the legs/wheels retract fully, a small amount of trimming of the underside fuselage skin may be required to achieve this.

Step 23

Neaten the main brake airlines using electrical tape and run them as shown. Take care to ensure that the line will not be pinched when retracted.

Step 24

Run the airlines under the air intake ducting, then towards the front of the fuselage through the holes in the side former made earlier. Secure using tape to stop rattling and rubbing.



Step 25

The nosewheel steering servo should be installed as shown with the output shaft towards the rear of the fuselage.

Step 30

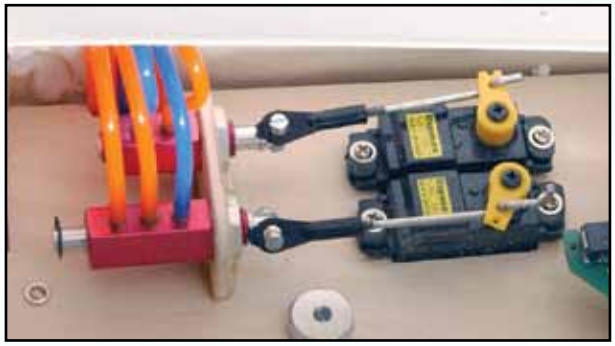
Holes need to be drilled in the retract bay for the steering cables to run into the fuselage. Attach the closed loop cables to the nose leg and crimp firmly to secure.

Step 31

Fit the clevises and closed loop adapters to the centred servo arm and attach the closed loop cables to the adapters, crimping securely. It can be helpful to have someone hold the noseleg straight while you remove slack from the cables.

Step 32

Install the retract and brakes valves/servos as shown on the left hand equipment plate, and connect up the air lines. The fill valve can also be fitted to this plate. The air tanks are fitted beneath the equipment plates and are secured in place with some small dabs of silicon sealant.



Step 33

Install the flap servo with the output arm towards the front of the fuselage.

Step 34

Fit the flap to the fuselage using hinges in a similar manner to that illustrated for the elevator, hold the flap in correct position with tape whilst the glue cures, to ensure free movement without jamming. Connect the linkage as shown.

Step 35

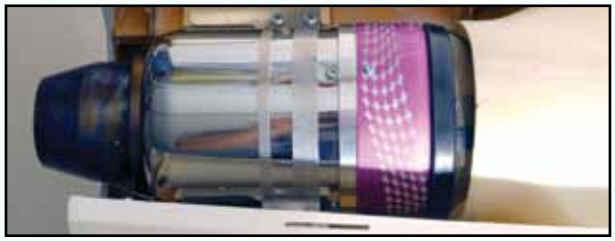
Prepare the fuel system for the tank as shown – it is strongly recommended that all fuel lines are safety wired to all tubes/fittings to eliminate any leakage or possibility of the fuel lines becoming detached. Note the use of a felt clunk to eliminate any air bubbles being passed through to the turbine. Complete tank assembly and then check for leaks by sealing the pipes and plunging the tank into hot water to pressurise. If any leaks are found they can be sealed with a drop of cyano or 5-minute epoxy.

Step 36

Fit the fuel tank and retain with a small amount of servo tape onto the mounting plate and two heavy duty cable ties – tighten these snugly, but do not overtighten, as the fuel tank may be damaged. Glue a short length of brass or aluminium tubing through the bottom of the fuselage and connect the overflow pipe from the tank to this.

Step 37

Mount the turbine being used with self tapping screws, note the use of a FOD guard. The fuel and kerostart lines should be run down one side of the fuselage with the electrical cables run down the other side.



Step 38

Install the header tank (if used) towards the front of the fuselage as shown, in this case the tank was secured to a ply mounting plate using servo tape and cable ties, with the plate itself being attached to mounting rails using small self tapping screws. As nose weight will be required unless a very light turbine is being used, ensure that as much of the heavy equipment as possible is mounted as far forward in the fuselage as is possible whilst ensuring easy access.

Step 39

Install the ECU on the left hand side of the fuselage on the equipment plate. Secure using double sided tape to dampen vibrations and a cable tie. Fit I/O board.

Step 40

Install the receiver on the right hand equipment plate using double sided tape and neaten the wiring using cable ties.

Step 41

Install the switch and regulator/power system (if used) in front of the receiver, ensuring easy access to the switch when the canopy is removed.

Step 42

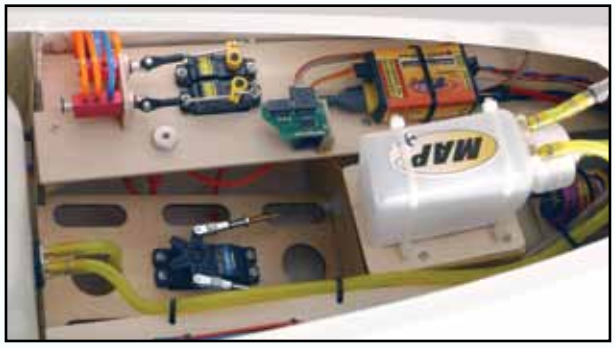
ECU and receiver battery packs should be mounted as far forward as possible to reduce the amount of nose weight required. Do make sure that the nose moulding will still fit correctly when the battery packs are installed.

Step 43

The right side equipment plate carries the receiver, switch and power system, note also that the fuel tubing from main to header tank is secured along the plate, and the run of the overflow tube from the main tank to the brass tube glued through the fuselage underside.

Step 44

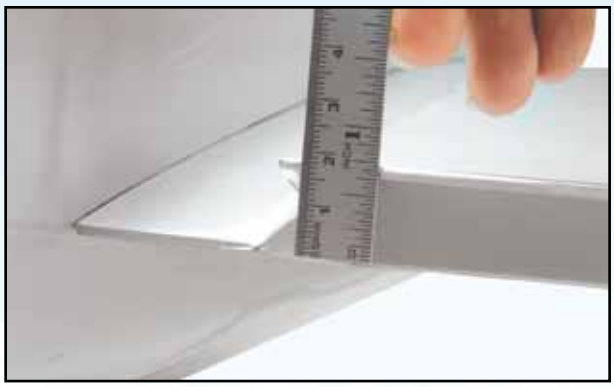
Typical layout of equipment shown from the right hand side, note the forward position of the relatively heavy fuel pump, just ahead of the header tank.



Control Throws

Use the following control throws as a starting point, when you have experience and are comfortable with the model then you can increase or decrease them to suit your flying style.

Aileron: 20mm each way at the tip of aileron, with 40% exponential



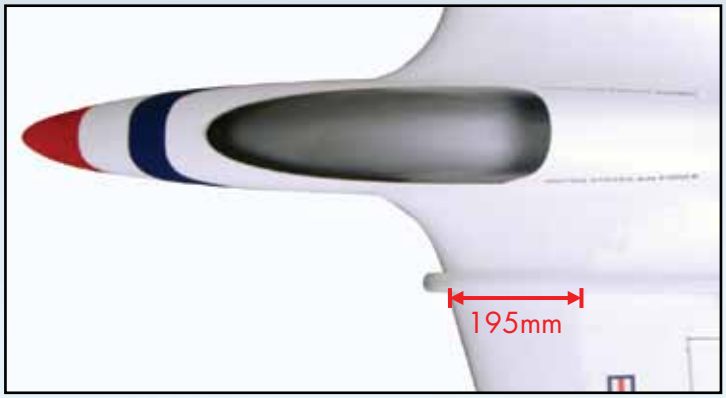
Elevator: 27mm each way at tip of elevator, with 20% exponential

Rudder: 60mm each way at base of rudder, with no exponential

Flap: 50mm deflection for take off
130mm deflection for landing

Balancing the Xcalibur+

The balance point of the Xcalibur+ is 195mm back from the leading edge at the root of the wing panels, this should be measured with the undercarriage extended and with any header tank (if used) full.



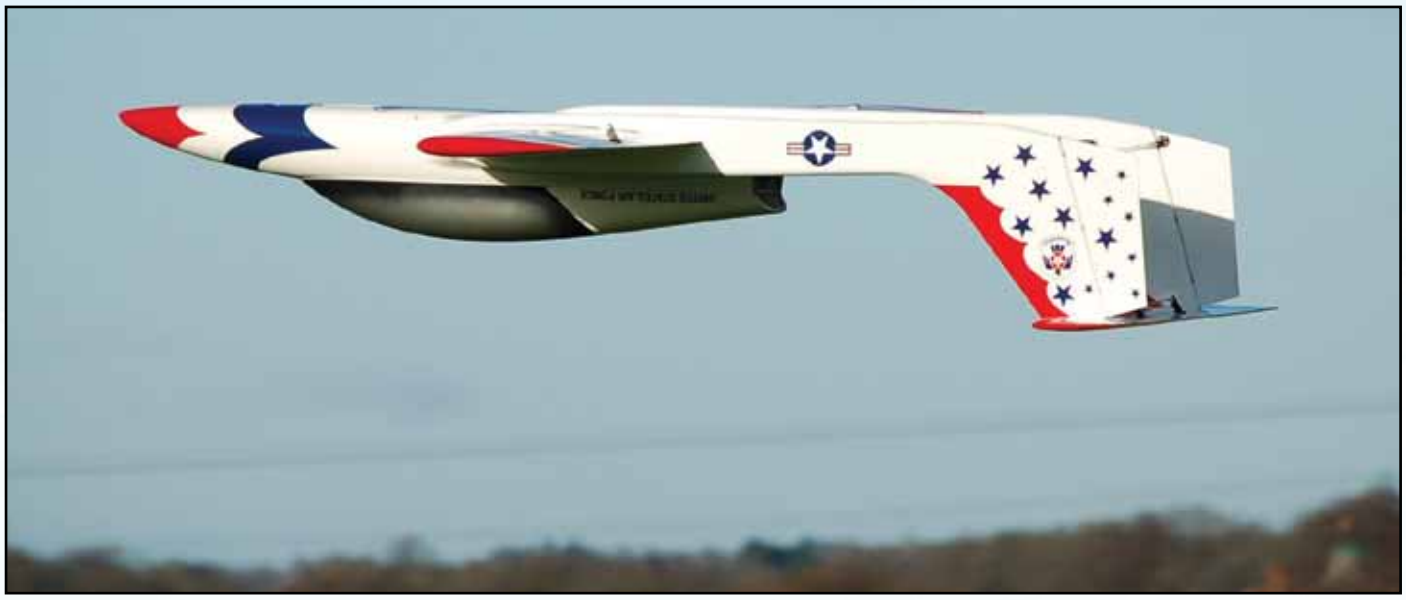
Flying Notes

We recommend the use of a long runway for first flights, particularly if this is the first jet model you have flown. The Xcalibur+ a good sized model with a matching performance, so it can cover a great deal of sky in flight – having a long runway and plenty of available air space makes the early flights much safer and more enjoyable.

Do carry out thorough range checks before flying, both with the turbine shut down and running, and check for any radio interference caused by the turbine, throughout the rpm range. Also check all the controls, ensuring that they operate in the correct direction and with the correct movements, and that there is no slop or lost motion in any of the linkages. Check that all clevises and ball joints are secure. Any clevises being used must have keepers fitted for added security. Finally check the retracts to make sure they are operating correctly and that no air leaks have developed.

Once happy, refill the fuel and air tanks, and once the turbine is running check that it will hold full power without any air appearing in the fuel lines which could then result in a flameout on take-off. Taxi the model out to the runway being used – although flap can be used for take off we suggest that this is not done for first flights. If the nosewheel is correctly trimmed then no rudder application

should be required during the early stages of the take off run unless taking off cross wind, and once at flying speed a small amount of up elevator is all that is required to allow the model to lift off, whereupon we suggest that the landing gear can be retracted and the model allowed to climb to circuit height. Once at a comfortable height power should be reduced, as the model will quickly build speed being a clean low drag airframe, generally around half power is ample to maintain a comfortable cruise speed.



Fine trimming can now be carried out, and once the model is correctly trimmed we suggest that a few handling manoeuvres are performed at a safe height, for example turns in both directions, slow flight, a clean stall, etc, etc. When happy with the handling of the model it is recommended that the model be slowed down, the undercarriage lowered and flap applied into landing configuration and a simulated landing approach is flown at a safe height, so that descent rates and flight attitudes at various throttle setting can be observed. With this completed the model can be flown through basic and advanced aerobatics until it is time to land.

The Xcalibur+ is a fairly simple model to land, a normal approach should be flown to stabilise the model and slow it enough to lower the undercarriage, once aligned with the runway the flap can be lowered in stages until full flap is applied – note that more power will be required due to the increased drag of the flap. You will find that the Xcalibur+ is very stable in the landing configuration and it should be relatively simple to position the model for an accurate touchdown, the stability once on the ground being excellent due to the wide track of the main wheels. If new to turbines then it is wise to fly a few landing approaches at a safe height to become used to the relatively slow acceleration of turbines and the descent

rate of the model, this will reduce the likelihood of the model ending up too low and too slow on final approach, with power coming on too late to arrest the descent and resulting in an off runway landing.

Due to the relatively light wing loading of the Xcalibur+ and the clean design it is a pleasure to fly through most aerobatics, and rolls, loops, spins etc are all easily performed, as can be slow flight, particularly as the tank empties and the model weight reduces. The model is also very stable and smooth to fly and we hope that you enjoy flying your Xcalibur+ as much as we enjoyed test flying the prototypes and pre-production models!

Pre-Flight Checks

- Completely charge your transmitter and receiver batteries before flying.
- Carefully check your model over to ensure that all screws are tight and everything is well bonded.
- Double-check the Centre of Gravity.
- Check the control surfaces for both the correct throw and direction. Ensure that each surface moves freely, without any binding.
- Ensure the components are secure.

Always carry a fully charged Co2 fire extinguisher and ensure that it is to hand whilst starting or operating any turbine powered model.

Always fly the Xcalibur+ in a safe location at a recognised club. For further information on flying in the UK, please contact:

British Model Flying Association (BMFA)
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