glens models pre-built

Sports Scale Designs - Additional notes – 12/09/07

These are manufactured to our specification are as near as is practical to our kit designs and utilise the same materials and techniques wherever possible.

Laser cut from our CAD files, using the same European wood as our kits they are hand crafted and beautifully covered in Profilm, again to our specification, and are supplied complete with scale decals, applied where appropriate, pre-drilled aluminum undercarriage, epoxy glass parts, completed, painted ready to use, and high quality European hardware.

These notes and pictures offer a little further guidance in addition to the kit manual where required. They are not intended as a blow by blow description of assembly as these designs are aimed at reasonably experienced modelers who will have their own preferences in many areas.

These designs suit a wide variety of engines both in capacity and type. As such engine and radio installation will vary slightly depending on choice.

Assembly of these pre-built models is both straightforward and swift and should take no more than a few evenings.

glens models scale aerobatics

81 Hillhead Road, Kirkintilloch, Scotland.G66 2HY
Tel/Fax 0141-578-0022

email:glensmodels@ntlworld.com

Covering & Wing Joining.

The covering used is Profilm. Profilm is very tough, durable and both fuel and petrol proof.

The covering may have slackened however due to the climatic differences between the Far East and the UK so the first task is to work your way around the model with your tacking iron carefully tightening the covering and ensuring that it is well attached to the wood underneath. Tare care over decals not to melt them as they are vinyl and won't take the heat from the tacking iron.

The ailerons are top hinged with the covering material; this makes a very free and completely sealed hinge line. Due to this the ailerons require less movement than you might expect and response stays crisp right down to the very low stalling speed.

It is worth paying particular attention to the film which forms the hinge. Raising the aileron and tightening the underside of the hinge and then holding the aileron down while warming the top of the hinge serves to ensure that the film is securely attached and cosmetically attractive.

The aileron servo locations and bearers are already built in to the wing structure. Once you have ironed the film around the servo mounting cut the film with a very sharp modeling knife or scalpel and tidy the edges with the tacking iron.

It is also a good time to cut the film over the holes in the top of each wing panel at the root where the servo leads will pass through and the holes on the top and bottom of the wing for the wing bolts.

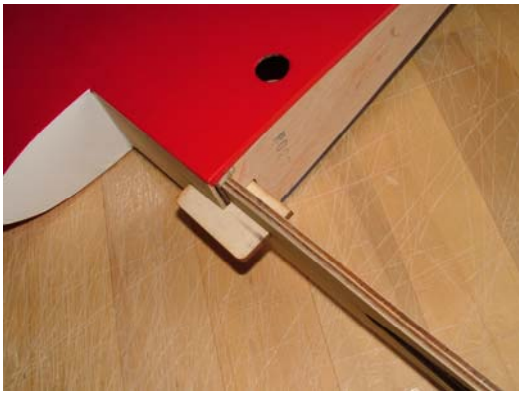
The wing joining is very straightforward using the ply joiner and tongue.

There are a fairly snug fit so dry assembly first is always a good idea to avoid a sticky mess with the glue!

These parts can be glued into the wing using either 1hr epoxy or good quality white PVA wood glue. The joint between the two root ribs will be best done with 1hr epoxy.

A small piece of masking tape on the trailing edge helps to hold the panels together while the epoxy cures.

These pictures depict the 68" Extra wing however the technique is the same on all of the Sports Scale designs.



Wing cont'd.

With the wings joined it is worth lifting the film either side of the joint and reinforcing the joint with some medium weight glass cloth and wing skinning epoxy or cyano. The glass itself need only be around 20-25mm wide and around 100gm cloth, just enough to ensure the wing sheeting becomes continuous across the joint.

Take care **NOT** to use a sharp knife to cut the film as this may score the wing sheeting outwith the reinforcement. It is best to warm the film with an iron and pull it back. Being Profilm this can easily be ironed back down once the epoxy or cyano has fully cured and the reinforcement has been lightly sanded.

The aileron servo, horn and linkage setup is very simple. The horns are fixed to the aileron with the screws and nuts supplied or can be fixed with small self tapping screws if preferred. The hard points for the horns are balsa in the other wise hollow ailerons so if using self tapers it is worth toughening the holes with a few drops of thin cyano.

The aileron linkages themselves are 2mm threaded rods fitted to the servo by creating a joggle in the unthreaded end and using the supplied M2 metal clevises in the 68" models and nylon quicklinks on the 58" models. Both work very well and should outlast the model.

Aileron servos will require extension leads to reach the Rx in the fuselage. Personally I like to then use a Y lead rather than mix them but that is your choice.

For extension leads I like to make up my own using a slightly heavier grade of wire and twist them tightly along their entire length. I have found this to be a simple and very effective form of interference rejection on even very long servo leads so it does no harm on medium length leads like these.

Now is a good time to press the M5 blind nuts into the wing bolt plate in the fuselage so that you can fit the wing using the M5 Nylon screws and washers provided.

On the Extra designs the covering on the underwing fairing can be cut away over the holes for wing bolt tightening. The fairing can be attached to the wing towards the rear of the opening with a gap at the front to allow removal of the wing. It can be simply glued to the covering as it is not structural.

Tailplane and fin:

The film over the tailplane slot should be cut and the edges sealed with your tacking iron before sliding the tailplane into position, ensuring that it is square to the fuselage and centered, and marking it at the fuselage side with a felt pen. Now remove the tailplane and trim the profilm from the center of the tailplane leaving the film 1 or 2mm over the line of the fuselage.

The tailplane can now be glued in place using 1hr epoxy ensuring once again that it is parallel to the wing and square to the fuselage in the normal way.

If the tailplane balsa appears to be less than fairly hard then it is worth adding some simple struts between the tailplane and fuselage on the underside. These can be made of carbon fiber tube of 5 or 6mm and epoxied into the tailplane and the fuselage sides.

The fin can also be glued in a similar fashion by firstly trial fitting it, marking the film, removing it and trimming the film leaving 1 or 2mm overlap and gluing in place with 1hr epoxy.

Undercarriage:

Undercarriage fitting is straightforward using the M4 x 20 screws, washers and blind nuts.

Wheels and spats are fitted using M4x40 screws as axles with two normal nuts and a nyloc nut.

The axle passes through the spat from the outside, with the nuts and washers as follows; washer, wheel, washer, 2 nuts, washer, spat, undercarriage, washer and finally nyloc nut. When finally fixing the axle and spat a small amount of silicon sealant between the spat and undercarriage leg helps to avoid the spat twisting in rough grass.

The undercarriage mounting on all of these models is a slightly critical area. It is designed such that in the event of mishap it the first area to break, minimizing damage elsewhere should you hit a hole at the side of the runway or the like. Repairing this area is far easier than rebuilding a fuselage!

It is worth however reinforcing the front edge of the mounting plate with some small pieces of glass cloth and medium cyano. This can be wrapped around the joint between the undercarriage plate and the front former on the Cap designs or in the case of the Extras simply glued across the slot which the undercarriage plate is located in. Please do not add any further reinforcement as this will inevitably cause problems elsewhere which are not so easy to repair should you have such a mishap!

On the Cap designs the undercarriage is in the scale location. This gives excellent ground handling on very smooth surfaces with practically no chance of bounce or ground loop however on rougher surfaces it can give a tendency to nose over. If you do fly from anything other than very smooth grass or tarmac it is worth loosening the undercarriage screws and packing the rear edge to angle the wheels forward to reduce this.

Tailwheel:

The tailwheel included is very simple and lightweight but in use is very robust and practical. You simply sand off the vertical blade on top of the nylon bearing and screw it to the bottom rear of the fuselage with the wire part bent horizontal along the bottom of the rudder. I bend this into a hook then loop a small rubber band between this and a small self tapping screw in the bottom of the rudder for steering.

Elevator and Rudder:

The elevators and rudder are simply hinged with cyano hinges. Horns are fitted as per the ailerons and the rudder is connected by closed loop. The closed loop should have the brass adjusters and plastic quicklinks on the 58” models and M2 metal clevises on the 68” ones at the rudder end while the servo end is just looped through the servo arms and fixed with the crimps supplied.

On the 58” models I like to make up a Y pushrod for the elevators using the 6mm square spruce and 2mm rods provided. This can be a fiddle to get into the fuselage but works very well once in place so can be worth the time and effort. Slots are pre-machined in the fuselage sides under the tailplane for the rods to exit.

On the 68” models when fitting a lightweight glow motor I use two elevator servos and a double Y pushrod i.e. two servos with one pushrod, again a fiddle but well worth the effort as it works beautifully. In these models you will have to cut a slot in either side of the fuselage under the tailplane for the rods to exit.

When fitting heavier glow motors or the Zenoah 26 to the 68 models the elevator servos are mounted in the fuselage sides at the rear of the model.

There are openings already machined in the fuselage sides which simply require lengths of the supplied 6mm spruce to be glued as servo bearers at either end of the opening.

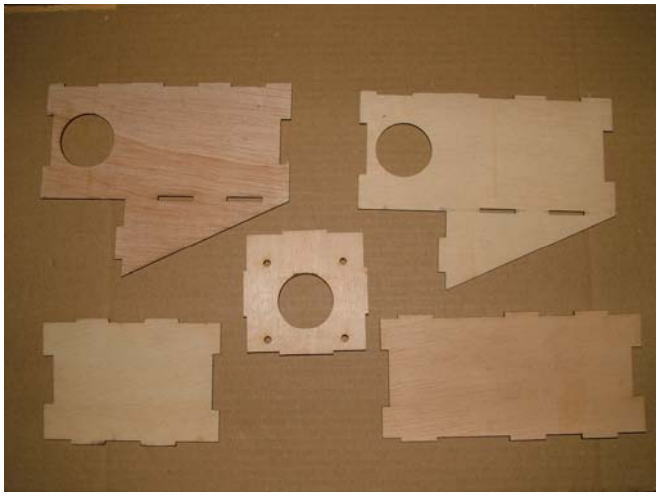
Straight pushrods are then made up from 2mm rods and M2 metal clevises as per the aileron linkages. The servos are staggered so that one is above the other.

On the upper servo take the pushrod from the lower side of the servo arm and do the opposite on the lower servo. This allows you to use a simple Y lead to connect the servos as the elevators will operate in the same sense.

Again, as per the aileron servos for extension leads I like to make up my own using a slightly heavier grade of wire and twist them tightly along their entire length.

Engine mounting:

The engine mounts on a simple five sided box. This is constructed in the same way as in the kit manual however the laser cutting provides a slightly greater tolerance in the joints allowing the use of good quality PVA adhesive or 1hr epoxy for the basic box but still using medium cyano for the bulkhead itself together with some small pieces of glass cloth and medium cyano reinforcement from the bulkhead to the box. This allows the bulkhead to break loose in the event of an 'arrival'. This helps dissipate a lot of the energy involved and can greatly reduce more significant damage to both the airframe and the engine. It is also a very simple and accurate repair job rather than a pile of matchwood!

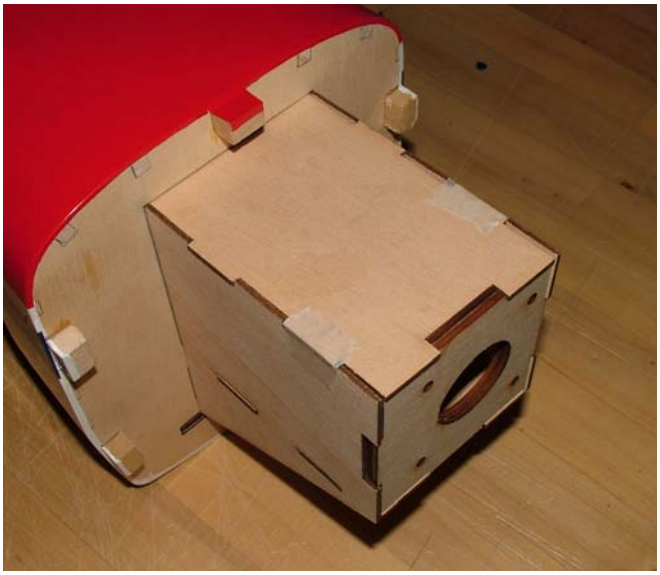


IMPORTANT: - Remember to put the engine box together with right thrust!

The box can be glued into the fuselage using the same good quality PVA or 1hr epoxy. I would suggest gluing the box together and gluing it to the fuselage at the same time. You can hold the joints together with a few pieces of masking tape while the glue dries.

The blind M4 nuts can be pressed into the inside of the 58" models bulkhead before gluing in place with cyano and reinforcing. You may have to file one of the nuts to clear the box side.

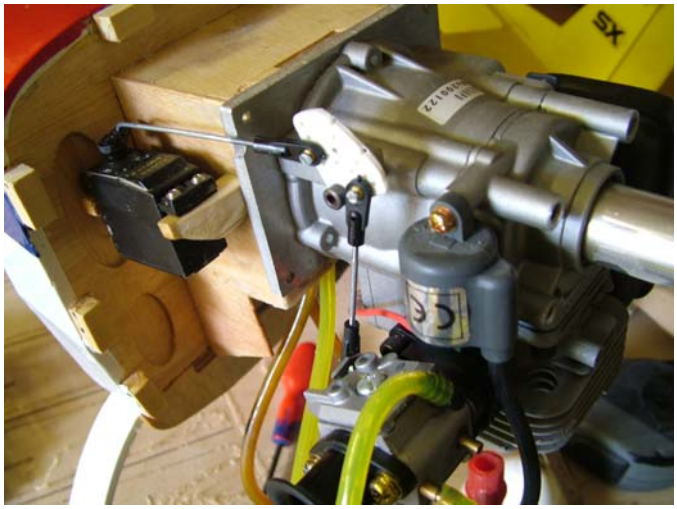
In order to fit the cowl the engine must first be mounted on the model. The engine mount supplied with the 58" model needs the mounting holes drilled to clear the M4 x 20 bolts provided before being fitted to the bulkhead.



On the 68" models the pre-machined holes line up exactly with four M4 tapped holes on the mounting plate of the Zenoah 26. If fitting a different engine these holes can be used as a reference as they are equidistant around the centerline of the crankshaft.

When fitting the Zenoah 26 to the 68" Extra it is necessary to shorten the engine box by 50mm. To do this simply measure back 50mm from each corner and mark with a pen. Draw lines between the marks to copy the cutouts at the front of the box. Now using a straight edge and scalpel score along these lines a few times to cut the box accurately.

The fuselage is simply secured to the Zenoah 26 using four short M4 screws from inside the engine box and is mounted inverted.



When fitting the Zenoah 26 the throttle servo can be mounted and setup as shown.

It is always worth applying a coat of fuel proofer to the engine box and bulkhead area.

If fitting the ZG20 in the 68” models then it is best to keep the cowl full length and make up ply spacers to go between the engine box and the engine. As with the ZG26 the engine is secured using M4 screws from inside the fuselage. Also with this engine fitted you may find it best to mount the elevator servos in the cockpit area instead of at the rear to balance the model, the ZG20 is very light and compact! The throttle servo can also be mounted in the cockpit area with a snake to the carb.

The cowl is mounted on the pre-fitted blocks with small self tapping screws.

On the Cap models the cowl is cut away to clear the leading edge of the wings,

When fitting the Zenoah 26 to the 68” Extra the cowl should be shortened by 60mm while when fitting the Zenoah 26 to the 68” CAP the cowl should have approx 20mm removed from the rear edge to where it widens. This allows it to overlap the fuselage and it can be cutaway at the bottom to clear the fuselage.

A large cooling hole should be cut in the lower rear of the cowl together with suitable air inlet holes for air to pass over the silencer with a glow motor fitted.

With the Zenoah 26 or ZG20 aim to have the exit area 4x the inlet area, remember petrol engines are primarily air cooled where glow motors are primarily fuel cooled. Original prototype cowl shown in picture.

Once fitted the cowl can be finished with the self adhesive trim provided.

Fuel tank and radio installation:-

The square fuel tank provided with the 58” models fits neatly into the engine box with a little packing around it.

The nicad and receiver can be situated above the undercarriage; however they may be moved elsewhere for balancing. The switch can be mounted in the fuselage side at a convenient point.

In the 58” models the servos are simply screwed onto the mounts already fitted with the throttle servo mounted in the middle to facilitate a straight run to the engine with a snake or Bowden cable.

In the 68” models no tanks is supplied due to the wide range of suitable engine sizes and types.

When fitting the Zenoah 26 a 16oz petrol tank with screw cap and felt filtered clunk should be used. This should be positioned above the c of g in the wing bay. On the 68” Extra the tank is held in place by the wing which slightly squeezes the mid section of the tank when in place.

Both 58” and 68” models fly well with basic Futaba 3001 servos on all surfaces. The 68” models have one on each elevator which is plenty of power for such light models. Indeed with careful throttle management and a bit of finesse on the sticks even the 68”models with the Zenoah 26 fitted will knife edge loop with one 3001 on the rudder!

Basic setup:

As a stating point the c of g should be set as 26mm behind the front face of the main spar on the 58” models and 36mm on the 68” models.

Ailerons - 10mm up and down on the 58” models and 12mm on the 68”.

Elevators - 25mm up and down on the 58” models and 35mm on the 68”.

Rudder - 50mm up and down on the 58” models and 70mm on the 68”.

Please note: - When setting up controls try to avoid giving the surfaces a large mechanical advantage over your servos by using a small amount of servo travel to give full surface movement. This can allow surface flutter to set in at higher speeds.

I like to set them up with 16% negative expo on elevators and ailerons and around 25-30% on rudder.

They benefit from 15-25% up elevator mixed with rudder to prevent the nose from pitching down with rudder.

These models are very light and rigid which gives a nice crisp performance with very low stall speeds and easy handling while still capable of very advanced manoeuvres.

Remember take off, throttle back, relax and enjoy your scale aerobatic flying. Use the power to maintain constant speed in the vertical rather than to charge around like a pylon racer – a little airframe sympathy goes a long, long way, and looks so much better too!

Please email if you require any further assistance with the assembly of your model.

Happy landings!