

Pfalz DIIIa 41"

R/C Scale Model Instructions



CONTACT INFORMATION

The Pfalz DIIIa was designed by M.K. Bengtson

Prototype by Brian Allen

Manufactured and Distributed by:

Bengtson Company

e-mail: sales@aerodromerc.com

Web Site: www.aerodromerc.com

PFALZ DIIIa

Thank you for purchasing the Pfalz DIIIa model for electric flight.



Finished Model
THE MODEL

A semi scale adaptation of the Pfalz DIIIa, this model is designed to be relatively easy to build and exciting to fly.

SPECIFICATIONS

More than 260 laser cut parts

Scale:	1/9
Channels:	R/E/A
Wingspan:	41"
Wing Area:	431 sq in
Weight:	28 oz ready to fly
Power System:	AXI 2808 brushless
Prop:	11x7
Wheels:	Balsa & plywood Neoprene foam tires
Airfoil Type:	Flat bottomed
Spinner:	Built up foam and fiberglass
Covering:	Litespan, Polyspan or iron-on plastic
Decals:	Available on website

BUILDING THE MODEL

Before Starting

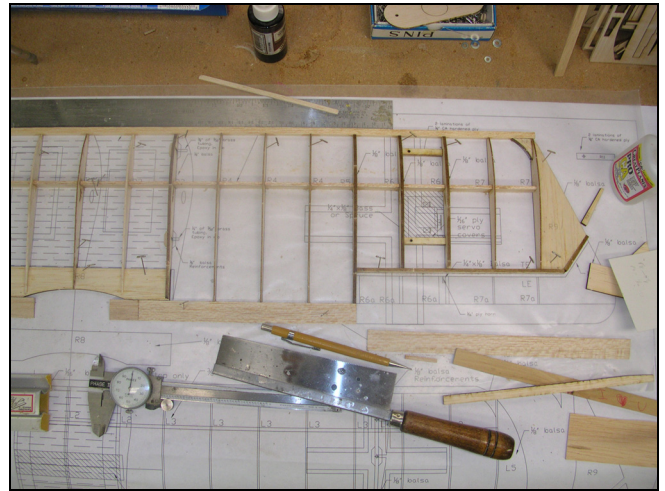
A note about the photos: The photos were taken of a prototype and the parts supplied may look slightly different from them. However, the concepts illustrated are the same.

WINGS

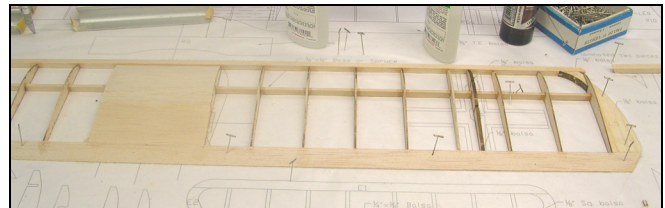
Wing Construction

Pin down, over the plan, the leading edge stock, trailing edge stock, spars and wing tips, gluing as

required. Sand the leading edge stock to be rounded and meet the ribs.

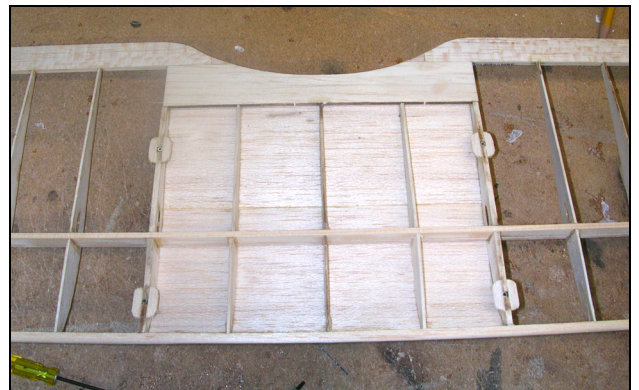


Upper Wing



Lower Wing

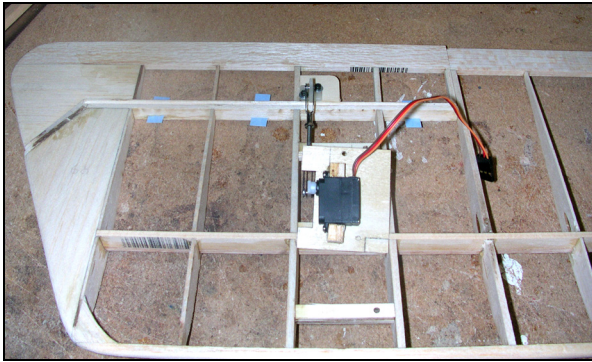
Sheeted center sections are featured in both wings.



Top Wing Center section

The leading edge of the aileron is rounded over with sandpaper to make the aileron movable with a minimum gap. The trailing edge of the wing in that section is left flat. There is no dihedral in either wing.

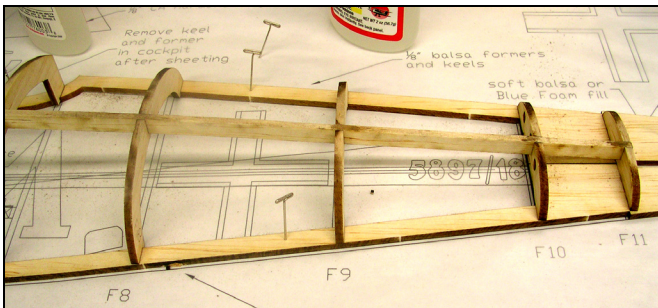
IP strut attachment points are made from short sections of 3/32" brass tubing epoxied in placed inside the wings.



Aileron Servo

FUSELAGE CONSTRUCTION

The fuselage is built using 1/16" balsa sheeted former and keel construction. The lower wing is built in one piece and glued to the fuselage. The fuselage and lower wing have undercarriage attachment points. Begin by assembling the top and bottom keels on the plan. Assemble the right and left side keels. The right side keel is shorter than the left side keel. The shorter keel provides for right thrust. The down thrust is also built in due to the length difference in the top and bottom keels.



Fuselage Construction Detail

Build the left fuselage side frame over the plan including the side keel. Add the front former F1 and the last former F11 then the longer side keel. Using the side keel as a stabilizer, the other formers are added.

Note: the main fuselage side formers are labeled on the bottom. They should be placed so that the label is readable i.e. not upside down.



Fuselage Construction Detail

The frame is removed from the building board. Glue the F1 and F11 former carefully and add the shorter side keel. The remaining formers are glued to the frame using the left side as a guide.

Formers F12 are placed on both sides of the keel to form a slot for the horizontal stabilizer so take care in gluing these in place or the horizontal stabilizer will be misaligned.

Attach F0 to serve as a base for the 1/16" ply motor mount. Be careful to ensure that right and down thrust is present at this time. It may be required to ream out F0 a bit to allow clearance for the motor housing so dry fit the motor at this point.

There are markings of the formers that show the locations of the cabane and landing gear attachment cross members. Made from 1/4" square bass or spruce, these should be attached at this time. It may be preferable to pre drill 1/16" holes in the ends before attaching the cross pieces to the frame. Alternate structures may be fabricated from 3/32"x1/16" and 3/32"x1/4" basswood strip stock. Using this method, a channel is formed that passes through the center of the 1/4" square cross piece. No drilling is required.

Also add the other formers F1a and F4a that serve as attachment points for the removable dummy motor. It is easiest to attach the 4-40 blind nut in the hole in F1a before gluing it in place.

Fashion a battery tray out of 1/8" balsa and scrap cross pieces at this time. Note: the AXI motor is attached to the front motor mount through the dummy motor access area. Be sure that there is room to attach it before adding the tray.

Pre fit the R/E servos on bass crosspieces in the cockpit

area. It is useful at this point to determine where the pushrods or pull-pull cables exit the fuselage at this point in construction. It will not be as easy after the sheeting is applied.

1/16th balsa sheeting is employed. Planking may be preferable to sheeting. An excellent article showing how to plank is found here:

http://www.modelairplanenews.com/how_to/strip_plank1.asp. The reference is also found on the plan. If planking is used, use 3/32" balsa and sand the balsa, mercilessly, to 1/16" thickness.



Sheeting Detail

If sheeting is to be used, choose the lightest, softest 1/16" balsa. Cut to a rough shape and soak in hot water then bind to the fuselage with paper towel and rubber bands and let dry. This process will set the curve in the balsa. Use balanced sections so that no distortions occur in the fuselage.

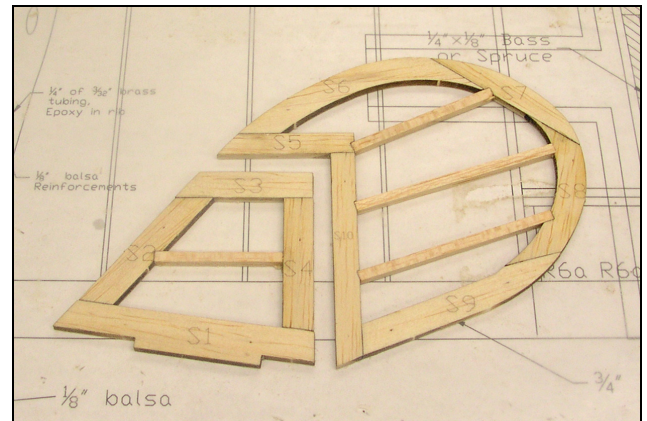
Use blue/pink Styrofoam for the tail end of the fuselage and sand to shape. The area can also be covered in balsa.

After the fuselage is sheeted, the cockpit and keel section for the cockpit opening is cut out. Cut away the top of the keel and formers in the area. This opening is used for access to the rudder and elevator servos.

Dummy Spandau machine gun parts are included in the kit. They are assembled as shown on the plan and a printed card stock "barrel" is wrapped around the round balsa disks forming the cooling jacket. The guns should be fashioned with the spent ammo shoots on opposite sides. Then set the guns into cutouts in the top of the fuselage BEFORE the top wing is attached.

TAIL SURFACES

Lay out and glue parts of the tail surfaces on the plans.



Rudder and Vertical Stabilizer

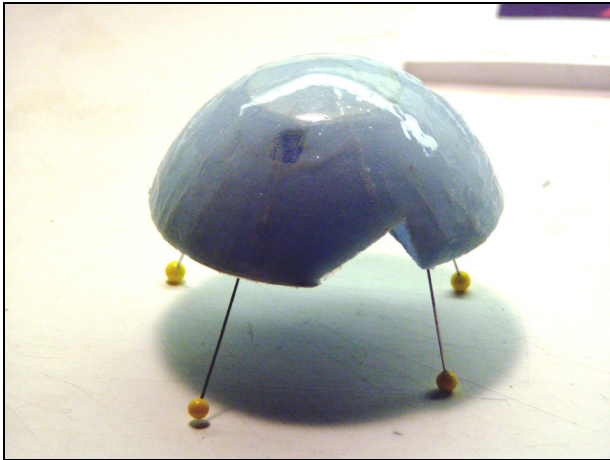


Elevator and Horizontal Stabilizer

Sand the tail parts, rounding off all edges. Don't add the horns or hinge the surfaces until after covering is complete.

SPINNER

The spinner is composed of fibreglassed blue foam. The spinner is made from blue foam which is tack glued to a piece of 1/32" ply. Epoxy a short 1/4" diameter dowel to the back in the center of the disk. Place the assembly in a drill chuck and sand the foam to shape while it spins. Glass the foam using standard glassing techniques. (Note, Minwax Polycrylic is an excellent substitute for epoxy). When the epoxy is ready, cut the excess fiberglass away. Then remove the plywood and carve out the necessary recess for the propeller. Drill out the dowel on the plywood disk. Glue the spinner to the plywood disk after the prop is mounted to the model. It should be perfectly aligned with the fuselage. It looks complicated but in practice the process goes easily and works very well.



Spinner

COVERING

Any lightweight covering material can be used. Polyspan with dope or Minwax Polycrylic makes a good choice. Litespan is also popular. Brian used an iron on plastic covering similar to Solite.

Decal outlines for this model are available on www.aerodromerc.com/decals in Adobe Acrobat pdf format for printing on decal paper. Contact paper used for kitchen shelf lining makes excellent decals. Print out the decal on paper, glue with a glue stick to the paper backing on the shelf paper, cut the decal out with an Exacto knife or micro scissors. Peel off the paper and adhere to your model.

Use black material for the crosses and white for the backgrounds.

If a lozenge pattern is desired, decals outlines for these are also available. Refer to our June issue of our Webzine for an excellent article on how to make lozenge patterns.

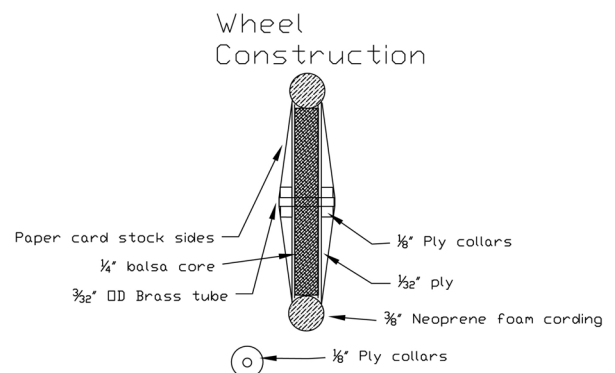
WHEELS

Gluing the ply sides on the 3/8" balsa core makes the basis for the wheels. Use the brass hub for alignment. Epoxy the hubs in place and add a sufficient amount of epoxy around the base of the hub to reinforce the connection of the hub to the ply. Plywood reinforcing hubs are provided that are to slip over the brass tubing as shown. Next, CA glue the neoprene cording together to form a "tire". Use thin CA sparingly as the CA bonds very aggressively to the rubber. Press the CA wetted ends together for an instant bond. The best way to align the ends is to glue them while they are in place on the wheel. Then attach the tires to the wheels and CA in place. A thin bead of

CA around the rim makes for a secure tire.

Paper cones are cut out. Use a ball point pen to score each line on the back to make an impression of "spokes". It is helpful to do this operation on a paper tablet so that the pen makes a good crease. Fold the paper along the crease lines to exaggerate the raised lines. One of the sections forming a wedge is cut out. Make cuts to the center of the circle along a pair of the spokes. Close the paper cutout to form a cone and tape the joint inside the cone.

The inside cones may now be attached to the wheels. The outside cones may be attached at this point if wheel collars are to be used. Alternatively, after installing the wheels on the landing gear, a washer may be soldered to hold the wheel in place and then the cone is attached. This method makes a very nice scale appearance.



INSTALLING THE RADIO CONTROL GEAR

Servo Bay

Get the bulk of your R/C gear fitted at this stage, and also the motor.

Aileron Servos

Aileron servos are mounted in wing and attached with short threaded rods to the ailerons. Note: Use a "Y" wiring harness connector to wire the servos to a single radio connection.

Battery Tray

After all the above has been placed, mount the battery tray made from 1/8" balsa and use the battery position to balance the model as shown on the plan.

ASSEMBLY

Wings

Glue the bottom wing onto the fuselage first making sure the fuselage is aligned straight and not leaning to one side.

Fashion a lower wing fairing from soft balsa or blue/pink foam. A paper template is shown on the plan for a cardstock version.

IP and cabane struts are made from a lamination of two 1/16" balsa pieces and an inner 1/32" plywood core. Two outer 1/16" balsa sides are attached to a 1/32" ply core that straddles a 1/32" music wire. The wires are cut to the lengths shown and embedded into the wood parts and sanded to a rounded shape. The ends of the wire are clad with short "boots" of 1/16" brass tubing. The completed struts are attached by inserting the "boots" into the 3/32" brass tubing built into the top and bottom wings and fuselage. When all incidence and alignment checks are complete use a drop of thin CA to lock the wings together at the Cabane and IP joints. Alternately, 5-minute epoxy can be used.

Landing Gear

The landing gear is attached after the lower wing is attached. The gear is made from 1/16" music wire. The front mounts are inserted into the holes in the cross pieces inside the fuselage. The rear mounts attach to a plywood plate on the bottom of the lower wing. Use small strips of tin plate bend into saddle clamps and small screws to attach the gear. The LG are fashioned around the precut 1/8" ply structures. These ply templates serve as a fairing and are used as a template for bending the music wire.

The ply and wire are to be attached to each other using Kevlar or Nylon thread with CA glue. For additional strength, attach a reinforcing section of music wire on the leading and trailing edge of the slotted ply undercarriage. Bend the ends of the wire and lash to the music wire LG. A shock-absorbing axle is constructed by attaching the axle to the ply undercarriage at the points shown on the plan. 3/32" brass tubing serves as wheel hub and axle spacers. Use rubber bands at the ends where the wheels attach to provide the shock resistance for the freely moving axle and wheel. Sand the plywood to a rounded shape. Note: soaking with thin CA hardens the lite ply and

this adds considerable strength to the gear. Epoxy the ply wood parts together for additional strength. When complete, the landing gear is very strong, aligned properly and very close to scale.

Tailskid

The tailskid is formed from a laser cut ply piece and should be reinforced with 1/32" music wire, lashed in place with thread. The tailskid takes a lot of abuse so CA harden it and wrap it tightly with thread.

DUMMY MOTOR

Assemble the dummy motor from the balsa parts supplied and sand to shape. Not all the parts of the engine are supplied as some are best fabricated from other materials. Solid 16 gauge copper electrical wire (black insulation) makes an excellent "radiator hose". The dummy motor is also the battery hatch. It features a 1/4" dowel that slides into a hole in a former F4a inside the fuselage. The front cylinder has a vertical hole that permits a 4-40 nylon bolt to hold the motor in place.

Fitting Tail Surfaces

The horizontal stabilizer fits into a slot in the side of the fuselage. Insert and dry fit the elevator using CA hinges. The vertical stabilizer also fits into a slot in the top of the fuselage keel.

Control Horns on the Pushrod Ends

Slip the control horns onto the wire pushrod ends and, with both the servos and the control surfaces centered, glue the horns into their slots.

Fitting Rigging Wire

Use strong thread or Kevlar fishing line or elastic beading cord to simulate rigging wires. Use small screws, fishing hook eyes, straight pinheads or small eyelets to attach the lines. These "wires" add a degree of strength to your model. Windsock Datafiles "Pfalz DIIIa" publication has details on rigging placement, color schemes and markings. Available at <http://www.byrdaviationbooks.com/>

Balancing the Model

Balance the model at the point shown on the plan. It may be required to use a bit of lead to balance the model.



Finished Model Ready to Fly

FLYING

Let the model gain altitude slowly off the runway. Applying too much up elevator at slow speeds risks a stall. Make your turns gently as tight turns risk tip stalling in any model. Don't expect the elevator to make the model climb. Think of the elevator as a device to change the attitude of the model. The wing and airspeed ultimately make the model climb. Often down elevator applied at stalling can avoid a major crash. The most important details for proper flight operations are:

- 1) CG location. Tail-heavy models never fly well or at all.
- 2) Down and right thrust
- 3) Straight and non-warped wings.

Here are some excerpts of Brian's maiden flight report.

"We got to the field and while the Pfalz was charging we flew other planes and had a great time. I set her on the runway and powered her up. She was off the ground in less than 25 ft with minimal rudder and climbed out nicely.

I flew her for about 7 minutes with several landings and takeoffs for trim adjustments etc. had three takeoffs and landings. She looks absolutely stunning in the air. I had to turn the elevator rates up as I ran out of elevator on a couple of the landings, when turned up the landings were fine. "

CONTACT INFORMATION

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Bengtson Company
E-mail: sales@aerodromerc.com
Web Site: www.aerodromerc.com