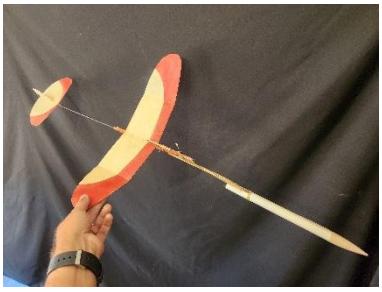


Polly Rocket ABC

18mm A-C class Boost Glider with Dethermalizer

By *J&H Aerospace*

www.jhaerospace.com

This is the build guide for the J&H Aerospace Polly Rocket ABC. This is a an NAR-legal boost glider.

Be sure you have the required systems for your rocket. For basic dethermalizer, you will need a BMK Band Burner and a 60mah lipo. For Radio Dethermalizer (RDT), you will need a BMK Band Burner RDT, BMK hand held unit (B2/B3 or Flexi receiver/controller), and a 60mah lipo. Tape is required to secure nose weight and the battery.

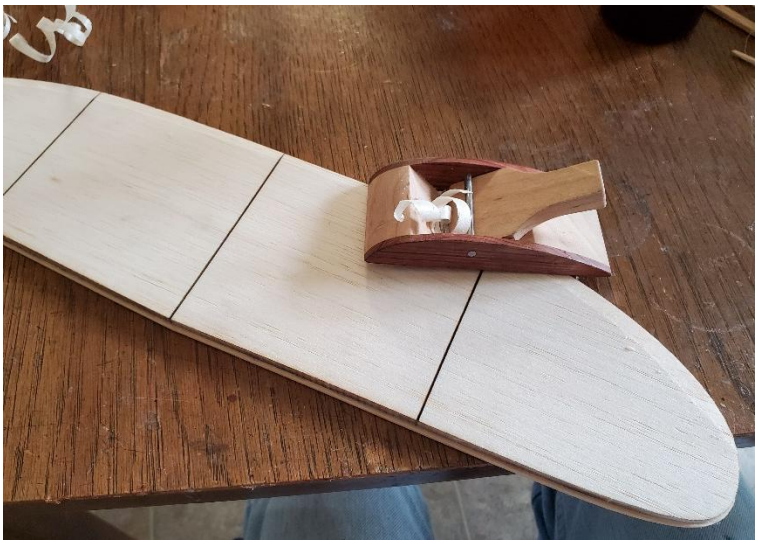
The dethermalizer mechanism is reliable, but requires careful attention, and you must take time to shape the wing carefully. You will need CA, Duco, and/or epoxy, a SHARP single edge or double edge razorblade, quality block plane, and sandpaper.

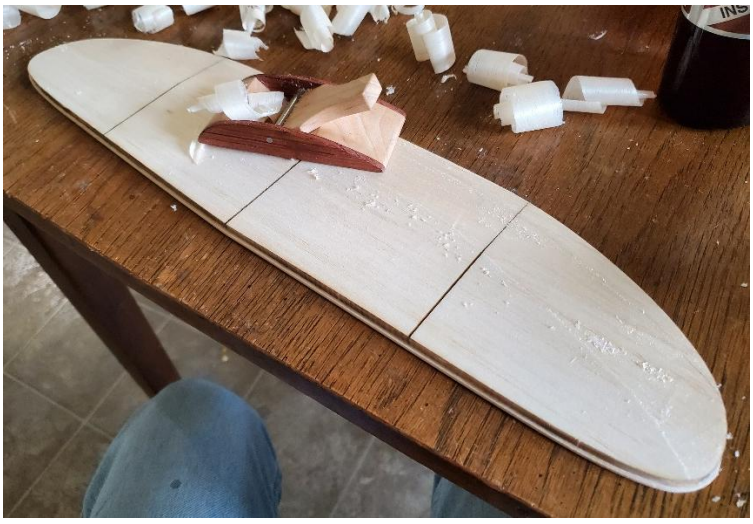
Use the kit insert to verify that everything you need is present.

Break the wing out of its carrier sheet (don't throw away the remaining laser cut part in this sheet) and sand the edges smooth of any tabs and burs. Wet out the 1/16" sq basswood strip and glue them to the

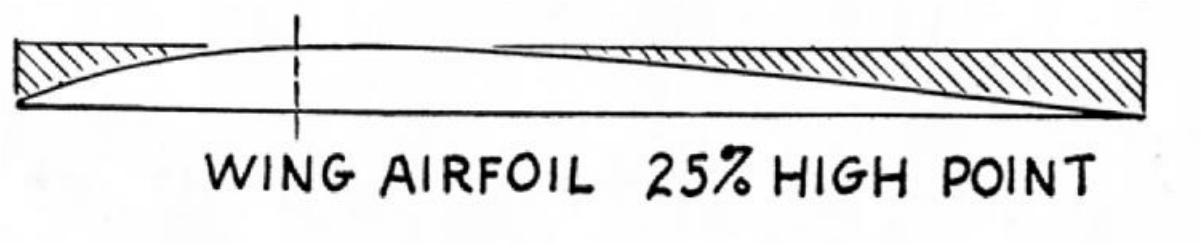
bottom of the leading edge. Carefully push the strip around the leading edge so that it curves around the wingtips as shown.

Trim off the excess basswood leading edge liner as shown



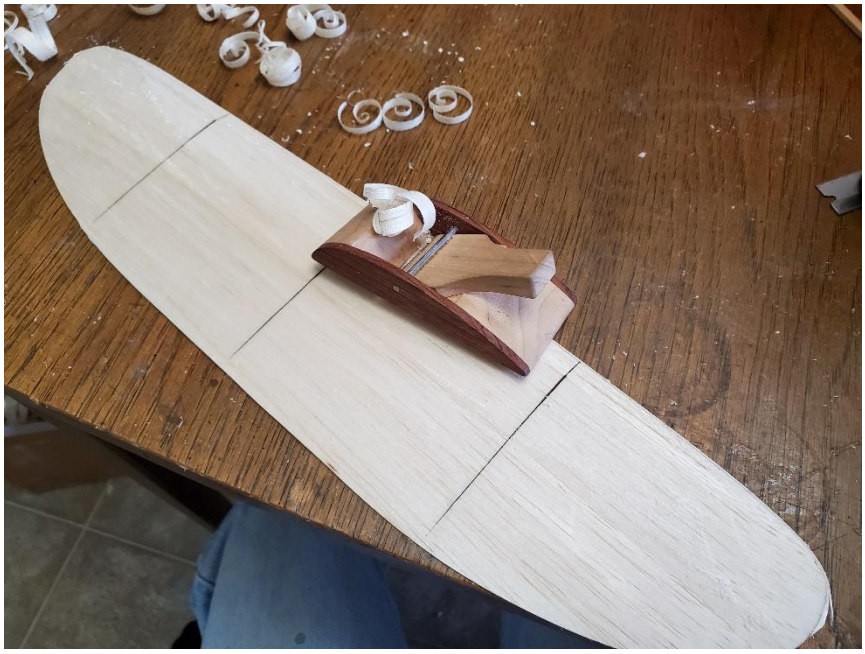


Use your razor plane to carve the trailing edge to a shallow bevel. Take your time to gradually progress the bevel across the trailing edge. Your goal is to create the trailing edge profile shown below:



Be sure to continue the taper all the way around the wingtips.

The trailing edge should be about 1/32” thick from the wingtips all the way around to the wing root. Don’t sand it thinner than this or it will warp and be easily broken. There is almost zero aerodynamic or weight advantage to going thinner!



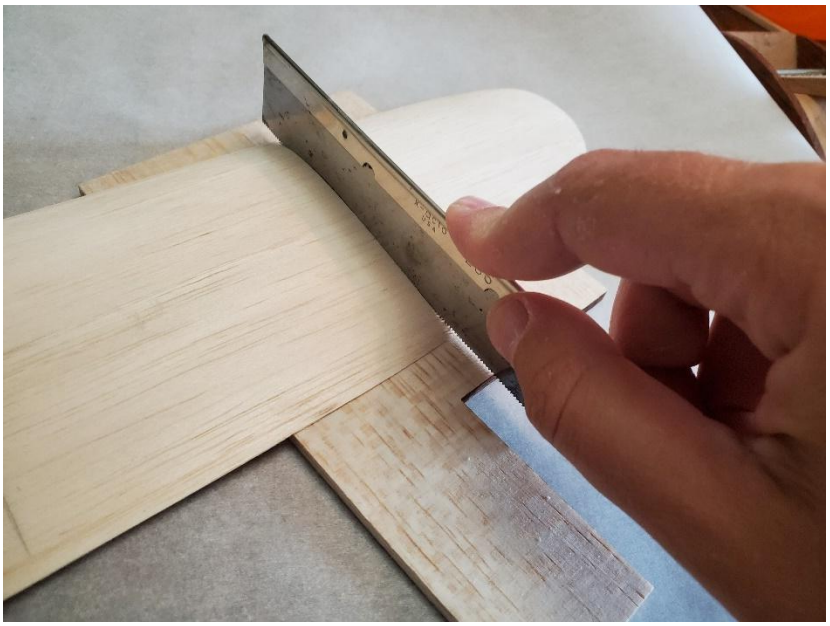
Begin tapering the leading edge with your razor plane. You want a thin rounded section that is almost sharp at the front.

Only plane down until the balsa is flush with the basswood liner. You will taper the bottom of the leading edge up to provide the rest of the airfoil.

Use your razor plane to taper the lower surface of the leading edge upward to finish the airfoil. The curvature should extend about ½” back from the wing leading edge on the lower surface for maximum performance.

Sand the entire upper surface of the wing as smooth as possible using 300-600 grit sandpaper. Leave the trailing edge thickness alone with no rounding, but sand the leading edge smooth and streamlined. Sand until all gouges are removed.

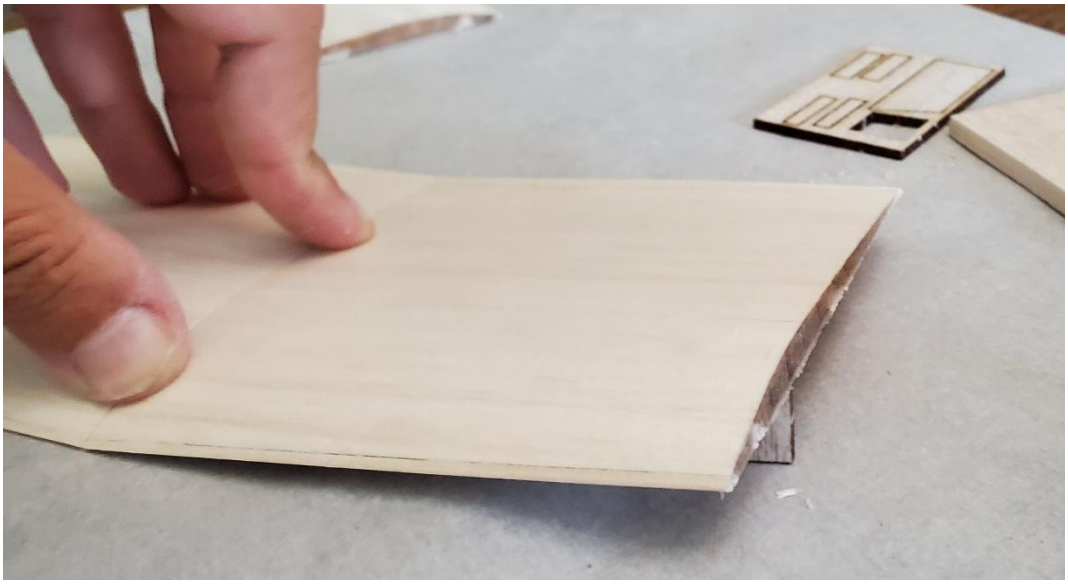
Sand the bottom of the leading edge round as well, fairing in the upsweep you created with the razor plane so that the bottom of the wing is smooth and streamlined and the leading edge is round and devoid of sharp edges.



Carefully cut the wing apart at all three dihedral breaks using a Zona saw or similar tool, being careful to avoid tearing the trailing edges. Make clean, straight cuts perpendicular to the wingspan. Note that the tip breaks are skewed. Just follow the cut marks and you will matched skew on each wing, making your glider stall resistant in the glide.

The dihedral breaks are around about 16 degrees at the tips and 10 degrees in the center, so use the edge of a table and a good straight sanding block to sand the dihedral breaks to about 8 degrees on each surface and 5 degrees each surface at the center.

Sand the dihedral breaks as flat as possible to get a clean joint. Use the dihedral gages to guide you in getting the surfaces matched.



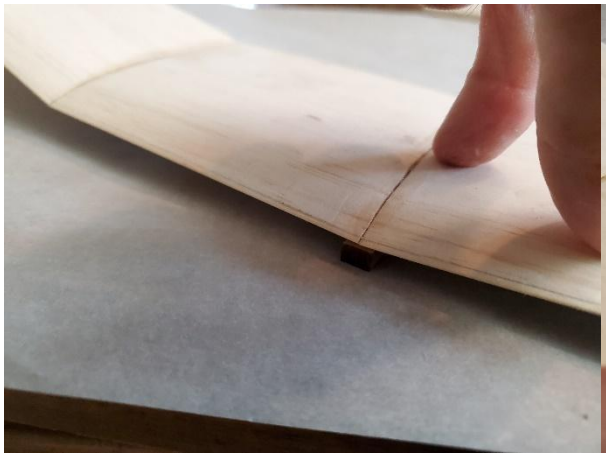
The short dihedral gage is used for the wing center section join.

Use a thorough coat of medium CA glue or epoxy to join the center section.

The tall dihedral gage is used for the wingtips.

As before, use medium CA or epoxy to join the tips at the correct angle using the dihedral gage. Sand all of the dihedral breaks smooth, and sand a small flat area on the bottom of the wing center dihedral break.

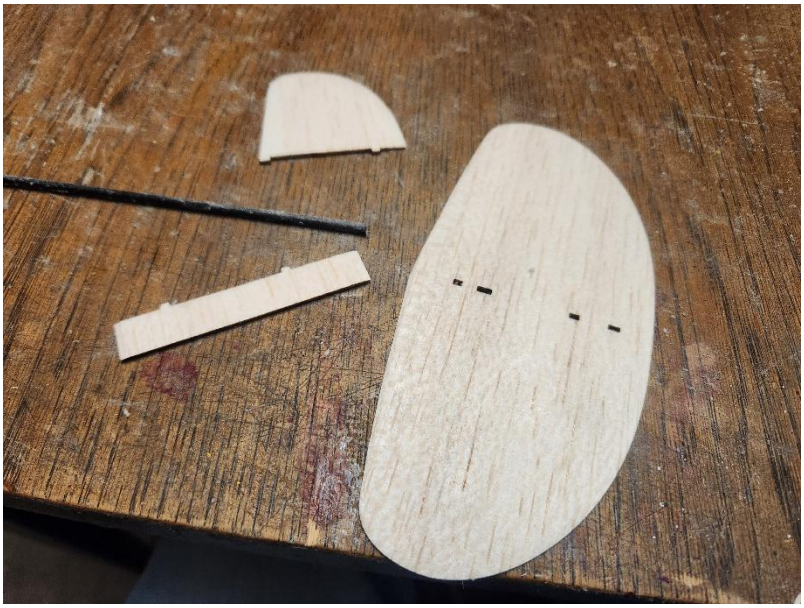
Break the 3/16” balsa wing saddle free from its carrier sheet and sand the laser tabs and burrs off the edges.



Block up the wing so that it sits level on the wing saddle while you attach the wing to the saddle. The leading edge of the wing is flush with the front of the saddle. The screw hole goes at the back, extending behind the wing trailing edge as shown.

Glue to the wing pivot arms to either side of the wing saddle, with the screw holes facing ahead of the wing leading edge. Be sure to add glue fillets where these arms meet the wing. This bond sees significant loads during launch, DT, and landing.

Plane and sand the elevator to an airfoil shape. No upsweep is required in the bottom of the stab leading edge. Don’t sand the trailing edge too thin or it will be fragile and prone to warps. The leading edge should be rounded, not sharp, so that it is not easily damaged.



Sand the stabilizer pylon and fin to streamlined cross sections. Be very careful to avoid breaking the pylon during sanding as it is very fragile prior to installation.

Glue the pylon into the notches on the bottom of the horizontal stabilizer, being careful to keep it straight.

Glue the tailboom to the stabilizer pylon. If a tapered boom is supplied, the tail will attach to the smaller end of the boom. Take your time to get the pylon attached as straight as possible or you will be stuck with whatever turn orientation it ends up with. It's always easier to set the glider for you own desired turn direction later.

Break the fuselage core out of its carrier sheet with extreme caution as the front is quite fragile. Also break out the 1/32" plywood sides.

The fuselage side with the large rectangular hole (battery port) is the right side (this allows for correct orientation of the dethermalizer antenna). Glue the fuselage core to this fuselage side.

Attach the left side of the fuselage.

The two narrow fuselage lug pieces (1/16” plywood) must be laminated together. Make sure they are aligned EXACTLY with each other.

Insert and cement the fuselage lug pieces into the bottom of the fuselage. Be careful to ensure proper orientation.

Give the fuselage a light sanding to eliminate burrs, but do not round it off at this time.

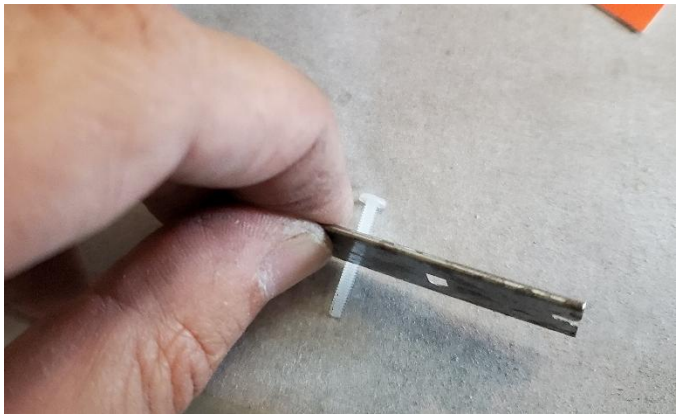
Install the tailboom/tail assembly carefully into the fuselage. Get the stabilizer as close as possible to perpendicular to the fuselage side profile.

Install the 1/32” plywood wing incidence plate in the back of the fuselage pod over the tailboom.

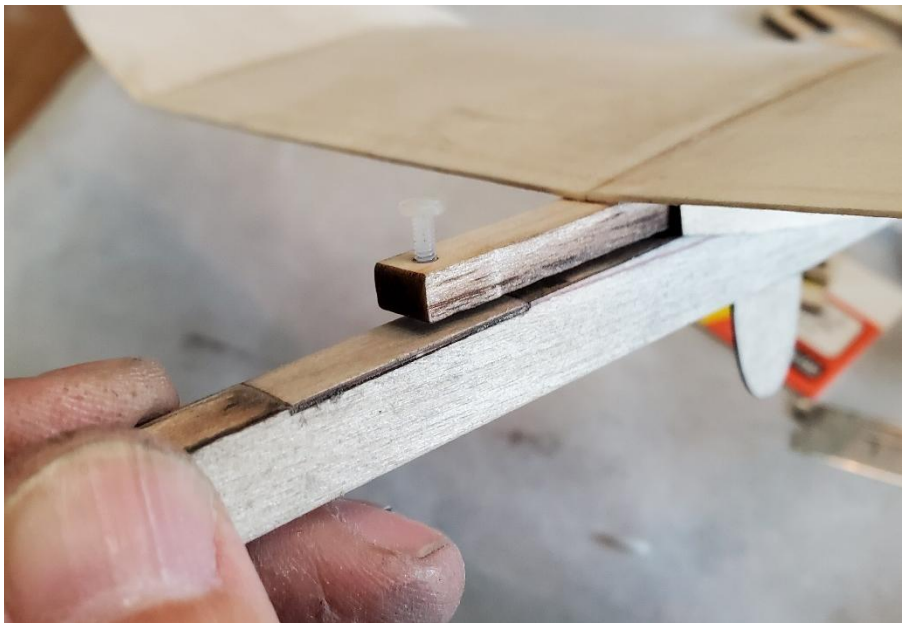
Sand the area where the wing will rest smooth and round the top edges of the fuselage thoroughly in this area.

Install the wing on top of the fuselage using the 2-56 steel screw. Sand the fuselage in front of the wing as needed to get at least 60 degrees of forward travel in the wing, and sand the fuselage area that is covered by the pivot arms until there is minimal resistance to the wing pivoting from its flight position.

The steel screw is held in place with a nylon nut.



Cut the nylon 2-56 screw to 2/3 of its supplied length using a razor blade.

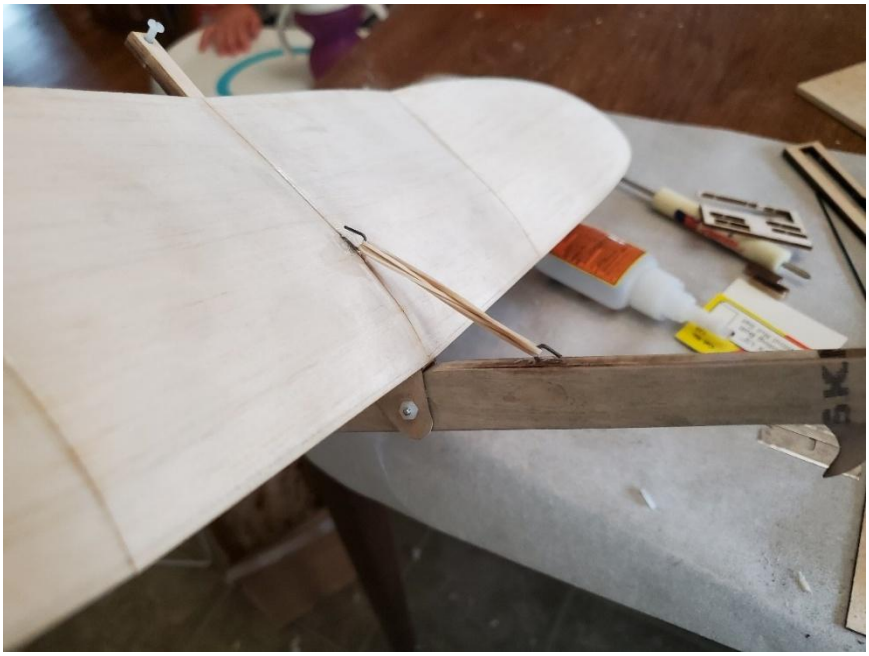


Install the shortened nylon screw in the wing saddle as shown.

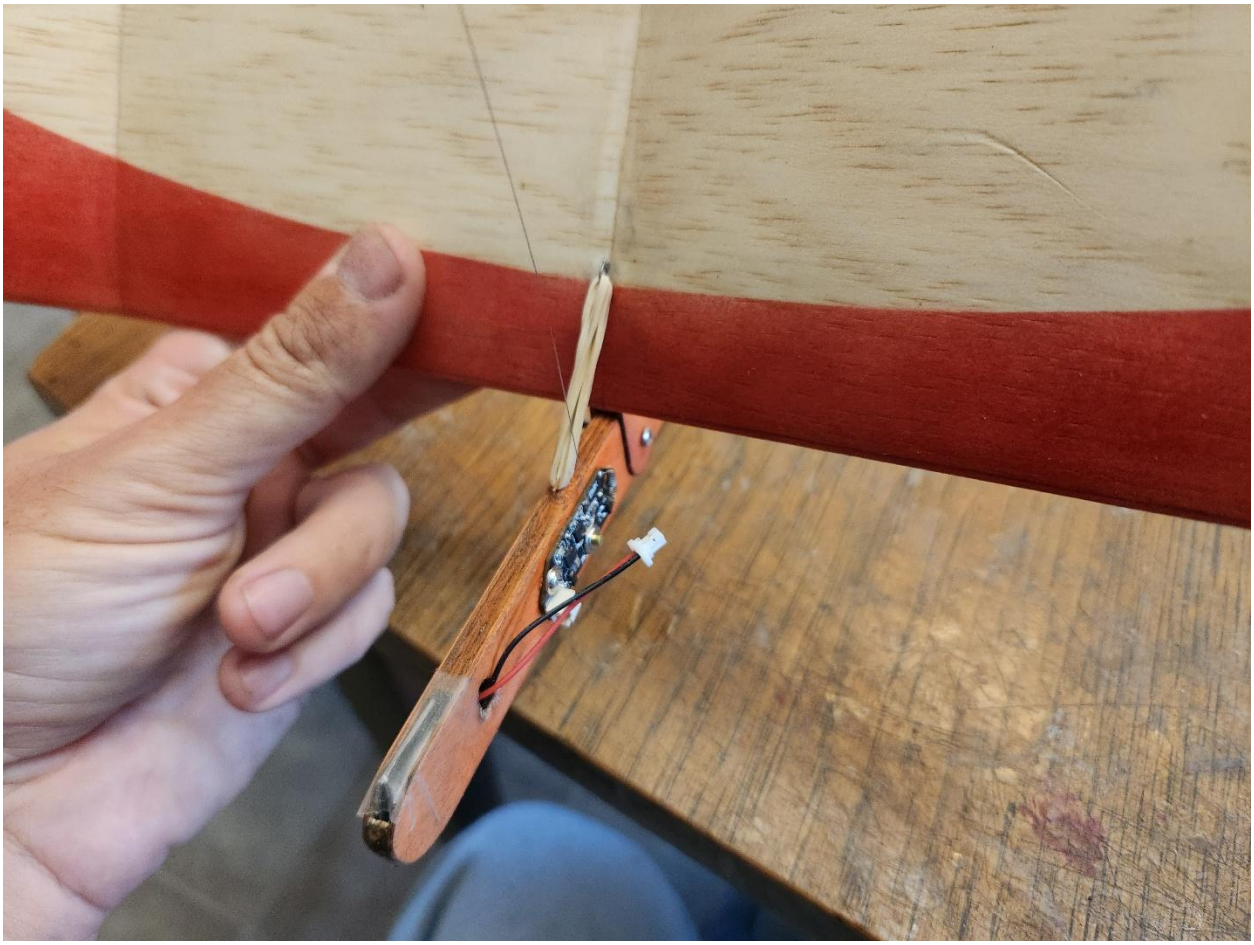
Install the vertical tail in the slots in the horizontal stabilizer.

Add the DT hooks in the wing center break and fuselage as shown. Secure these hooks firmly in place with CA glue or epoxy.

Basic assembly of your glider is now complete. Coat all wood surfaces with one very thin coat of oil based polyurethane/varnish using a paper towel to insure the thinnest full coat possible. Once dry, sand the entire glider with 300 grit or finer sandpaper. You can add color to your glider by misting spray paint onto it. Only add enough paint to get some color. The wood grain should remain clearly visible through the paint. If you use a quality paint light Design Master, sanding should be unnecessary, however if there is any surface roughness (particularly prevalent with fluorescent colors), you will need to sand lightly to smooth the surfaces for maximum performance.

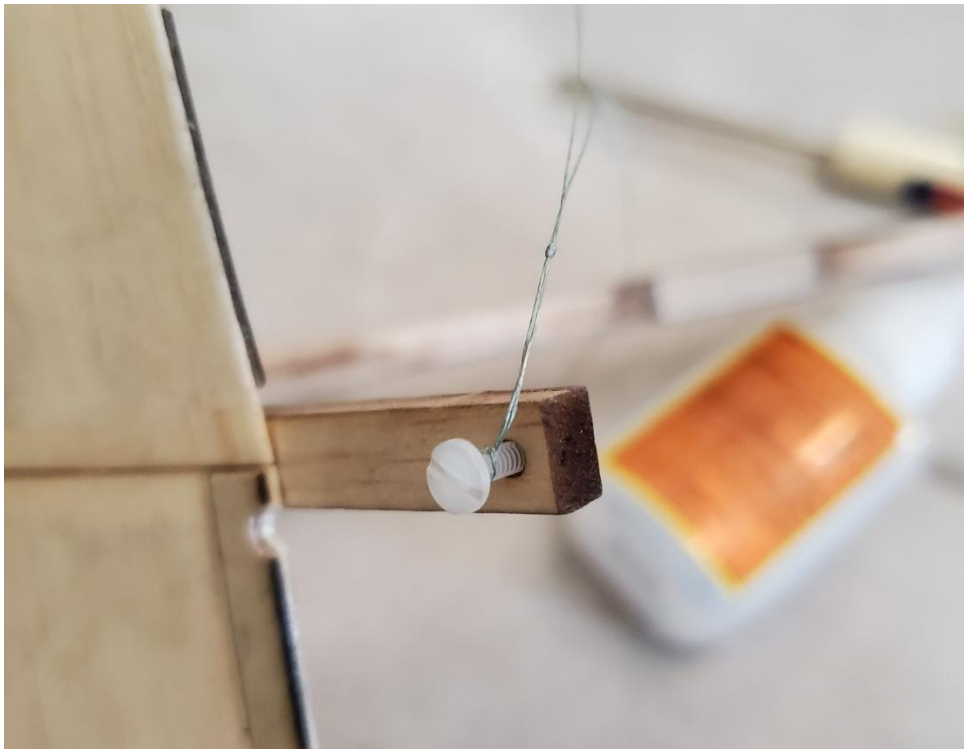


Add a rubber band between the hooks to verify proper DT pivot operation. We have found that the rubber band usually has to be looped around 3 time to get reliable operation.

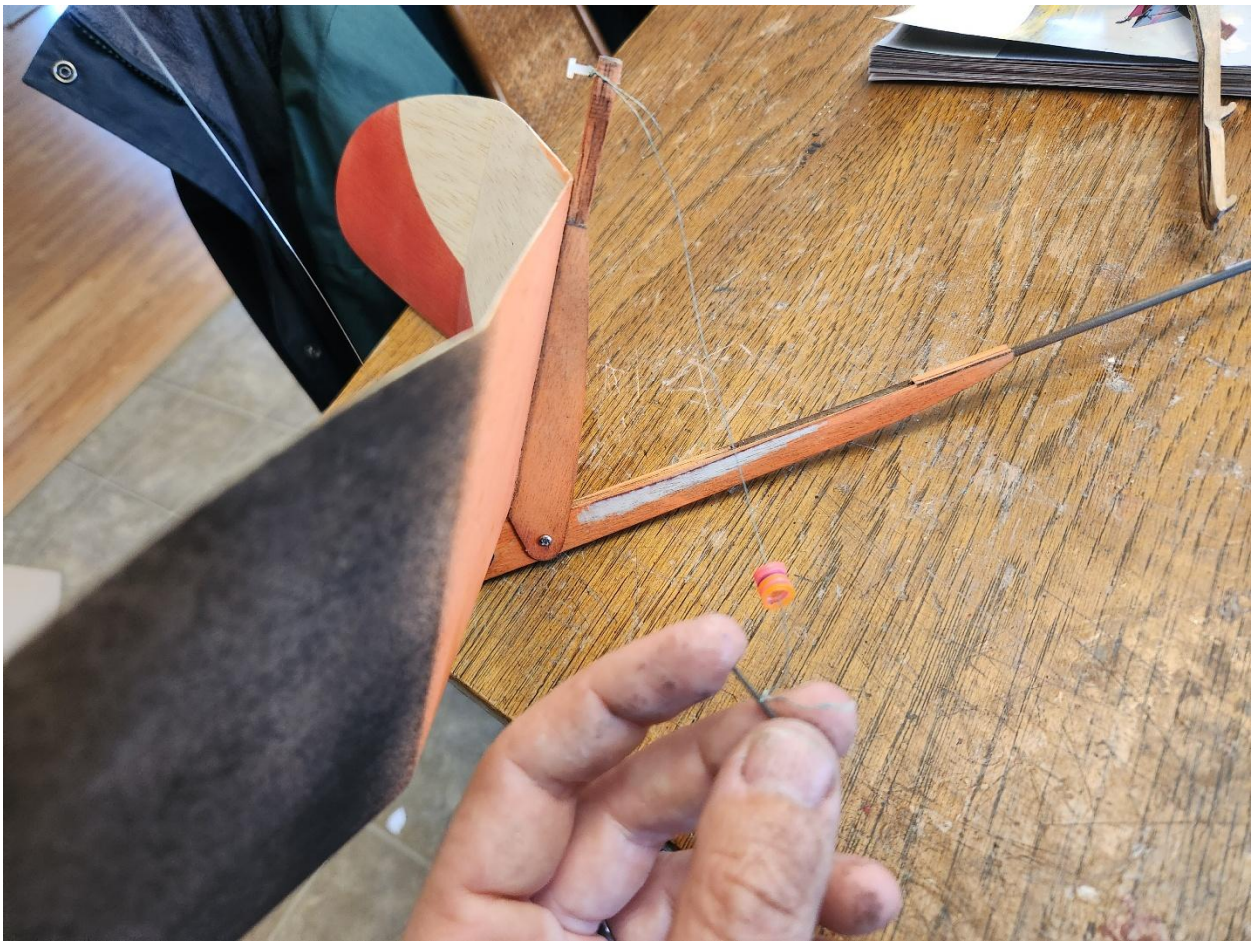


Install the dethermalizer timer using a small servo screw, being careful to avoid damaging the battery connector, which can be quite vulnerable. If necessary, widen the hole for the battery so that its leads can be threaded through. It will be necessary to tape the battery in place. You can now balance your Polly Rocket glider. Starting CG is 50% of root chord (half of the way back from the leading edge). Turn the incidence screw in 1 turn from flush with the bottom of the saddle to start.

Tie a small loop in the end of the supplied Spiderwire fishing line.



Slip knot this loop around the incidence screw as shown.



Remove the wing DT rubber band so that the wing can be laid in the glide position without force. Loop the DT line around the fuselage, around the incidence screw, and forward under the wing to the timer. Tie off a piece of carbon rod about 3/8” short of the timer so that a DT band can be stretched over the timer from this carbon crossbar retainer you have created.

You can now assemble the motor pod.

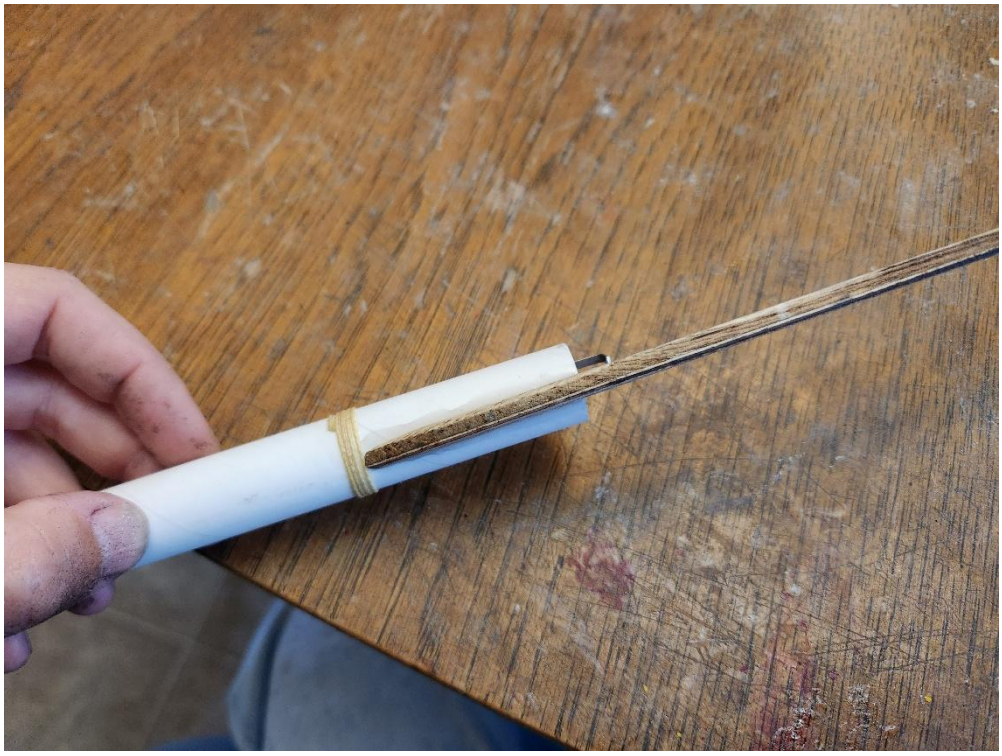
The pod connector saddle is formed by laminating the 1/16” plywood piece with the lug inserts to the 1/8” balsa segment which matches it. Be very careful to get these two components accurately lined up

with each other so as to ensure the proper thrustline angle so that your glider does not tend to loop on launch.

The glider is free to rock around somewhat on the connector, however this does not significantly affect performance. If it does bother you, you may attach a scrap piece of 1/8” balsa to the other side of the plywood to reduce the rocking tendency.

An engine clip suitable for Estes, Quest and Aerotech 18mm motors is included in your kit. If you choose to use it, slot the body tube so that the clip extends about ¼” from the end of the body tube.

Bind the end of the engine clip with Kevlar and seal with CA glue to retain it. Don’t use too much Kevlar, as you will use the remaining Kevlar as a shock cord.



Sand the attachment area of the glider connector and glue it to the body tube.

Run the Kevlar shock cord material around the back of the connector and glue it in place in a fillet.

Install the launch lug against the fillet.

Install the screw eye in the nose cone. Remove the screw eye, squirt glue in the hole, and reinstall.

Tie loose the end of the shock cord around the screw eye. Glue the knot so that it cannot come untied.

Tie the end of the streamer around the shock cord.

The streamer should be protected with either an 18mm foam piston or 2 squares of flame resistant recovery wadding.

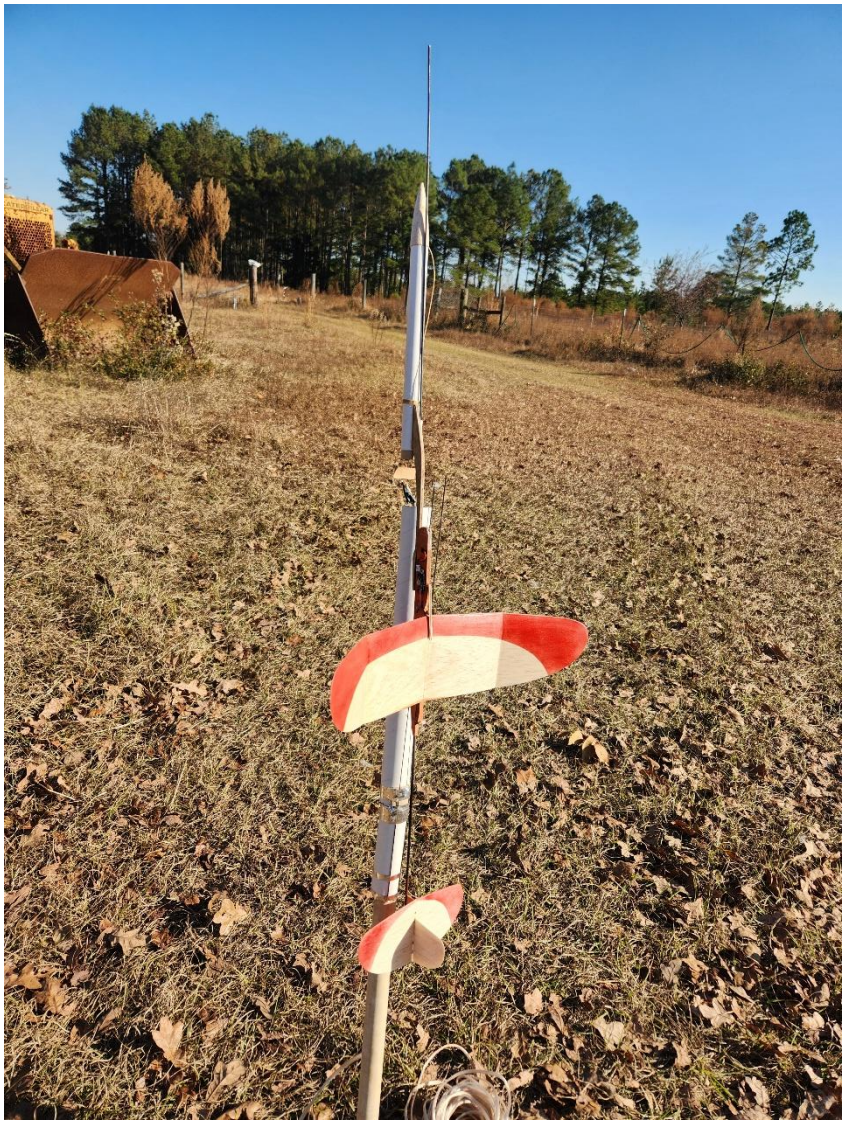
Dethermalizer programming:

1. BMK Band Burner

Plug in battery while holding down the program button. Release button. Press and hold, counting LED flashes (1 flash = 10 seconds) and release when appropriate time is logged. Timer is now programmed; cycle power to use timer. Fly only with a fully charged battery, and store the model with the battery unplugged. To start timing, hold down the program button until the LED turns solid red. Release to begin timing sequence.

2. BMK RDT Band Burner

   Plug in battery while holding down the program button. Release button. Press DT button on handheld unit until the LED on the timer/RX turns solid red. Timer is now bound to the transmitter; cycle power to use timer. Fly only with a fully charged battery, and store the model with the battery unplugged. The timer/rx may be actuated at any point by pressing and holding the button on the handheld unit until the timer burns the rubber band. Timer may also be optionally programmed using the steps in (1) so that a guaranteed actuation can occur at a set time if desired. This does not preclude or affect use of the handheld unit.



A launcher suitable for gliders is highly recommended. We use a 30” segment of 1” PVC pipe with a 1/8” launch rod and ignitor leads run inside it. The launch lug mounting position places the engine nozzle over the opening of the PVC pipe so that the leads can be kept out of the way of the tail as the rocket moves up the launch rod. A block of wood at the bottom of the pipe can hold a set of carbon rods or 1/16” piano wire stabilizers to keep the glider from being whipped around in the wind and disconnecting or shorting out the ignitor. A tent stake is hose clamped to the bottom of the pipe so that it can be driven into the ground. This system has been tested all the way up to the NAR limits of 20 mph winds without problems (getting the glider back is your problem, but that RDT will help a lot).

Burn a few DT bands before flying to make sure your dethermalizer functions correctly.

Trim the glider for a smooth, steady glide (not too floaty, as this will develop into oscillations in anything other than dead calm conditions), making sure the wing is fully held down against the incidence screw. Adjust the screw as needed to get a smooth glide (turn it in for stalling, out for diving). Add gurney flaps (small strips of 1/32” sq wood) to the opposite side of the tail from a turn if any turning tendency is excessive. You do want a consistent turn. 200 ft diameter circles are about optimum.

Begin flying on Estes A8-3 engines to become familiar with the flight profile of your Polly Rocket, and work your way up in power as desired. If you have configured it correctly and are methodical in your flying, it will last you for many years of enjoyable flying.

If you have questions or comments about your Polly Rocket, please contact us through jhaerospace.com for full service.