

Specifications: Wingspan: 30 in. • Wing Area: 165 sq in.
Airframe Length: 24.5 in. • Weight: 7-8 oz. framed; 17-20 oz. (rtf)

Using the Manual

Be sure to read each step thoroughly before you start the step. Test-fit the parts together to make sure they fit properly. If necessary trim to fit.

Beside each step you will notice a check box (or two). These are so you can keep track of your progress while building your kit. For steps that have two boxes, as in the construction of the left and right wing halves, these steps must be performed at two different times.

- Your **Old School Model Works** aircraft should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, this model, if not assembled and operated correctly, could possibly cause injury to yourself or spectators, and damage to property.
- You must assemble this model according to the instructions. Do not alter or modify this model, as doing so may result in an unsafe or un-flyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
- You must take time to build straight, true and strong.
- You must use a R/C radio system that is in first-class condition, a correctly sized power system and components (electronics, batteries, wheels, etc.) throughout the building process.
- You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air. (Installation shown in the manual is a suggestion. You may have to adjust the mounting steps to accommodate the size of your radio equipment.)
- You must check the operation of the model before every flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.



- If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.
- While this kit has been flight tested to exceed normal use, if this model will be used for extremely high stress flying, such as racing, or if a power system larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.



WARNING

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT WARNINGS AND INSTRUCTIONS CONCERNING THE CONSTRUCTION AND USE OF THIS MODEL.

A Radio-Controlled aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio, powerplant, electronics and batteries.

- Inspect your model before every flight to ensure it is airworthy.
- Be aware of any other radio frequency user who may present an interference problem.
- Always be courteous and respectful of other users in your selected flight area.
- Choose an area clear of obstacles and large enough to safely accommodate your flying activity.
- Make sure this area is clear of friends and spectators prior to launching your aircraft.
- Be aware of other activities in the vicinity of your flight path that could cause potential conflict.
- Carefully plan your flight path prior to launch.
- Abide by any and all established AMA National Model Aircraft Safety Codes.

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

INCLUDED ITEMS

Wood parts included in this kit:

- 1 LP1 - laser cut 1/8" x 6" x 24" lite ply
- 1 LP2 - laser cut 1/8" x 3" x 12" lite ply
- 1 LP3 - laser cut 1/16" x 3.25" x 1.4" lite ply

- 1 BP1 - laser cut 1/8" x 4" x 24" balsa
- 1 BP2 - laser cut 3/32" x 4" x 24" balsa
- 1 BP3 - laser cut 3/32" x 4" x 24" balsa
- 1 BP4 - laser cut 1/16" x 4" x 24" balsa
- 1 BP5 - laser cut 1/16" x 4" x 24" balsa
- 1 BP6 - laser cut 1/16" x 4" x 12" balsa
- 1 1/16" x 4" x 36" balsa sheet

- 2 5/16" x 5/16" x 36" balsa strips
- 2 1/8" x 1/8" x 36" basswood strips
- 1 1/4" x 3/4" x 36" shaped balsa strip

Hardware parts included in this kit:

- 4 2-56 x 1/2" Self tapping screws
- 12 2-56 x 5/16" Self tapping screws
- 4 2-56 x 1/2" Machine screws
- 2 3/32" Wheel collars & set screws
- 4 Control horns
- 2 Landing gear straps
- 2 10-32 x 1" Wing bolts
- 2 10-32 T-nuts
- 2 Pre-bent main gear legs
- 2 Popsicle sticks
- 2 Large paper clips
- 1 2.5" Bamboo stick
- 4 magnets

Other items included in this kit:

- 1 - Rolled plan
- 1 - Construction Manual
- 1 - Sticker sheet

ITEMS NEEDED

Hardware needed (not included in the kit)

For some of these items there is more than one option which will require a bit of decision making ahead of time. There isn't a right or a wrong choice, so choose the items that work best for you.

We strongly recommended supporting your local hobby shop.

- Powerplant: 100+ watt motor, 2-3s lipo, 20+ amp ESC
- Propeller
- Motor mount and mounting hardware
- Receiver - 4 channel minimum (5 if using flaperons)
- Servos: 5 mini servos (Hitec HS5065MG or similar)
- 1 "Y" servo harness
- If using flaperons, 2 servo extensions for ailerons (6-8")
- Pushrods - two 5" for ailerons, two 14" for elevator and rudder
- Clevises for the pushrods.
- Wheels: two 1.5" - 2" for main gear
- Covering: If you're using simple color scheme, one roll of iron-on covering will be enough. You will need more if applying a more complicated livery.

Additional Required Building Tools and Adhesives

- Drill & assorted drill bits
- Hobby knife and new, sharp blades
- Sandpaper: coarse (80 or 100 grit) & medium (150-200 grit)
- Pencil or pen
- Ruler
- T-Pins
- Waxed paper
- Building board
- Wood adhesive of your choice. We use medium viscosity CA (cyanoacrylate), but aliphatic resin and/or carpenter's glues (used correctly) will work just as well and give longer working time.

We advise the following:

Closely inspect the supplied laser-cut parts for damage. If you find any damaged or missing parts, contact us within 60 days of purchase (not your dealer).

When removing the laser-cut parts from their sheets, you'll notice the parts are held in place by several small "tabs." These tabs are uncut pieces of wood and can sometimes make it difficult to remove a part. Rather than breaking and/or splintering the wood by forcing out the part, we recommend removing any laser-cut parts from their sheets by using a hobby knife with a sharp blade. A quick cut of the tab will allow the piece to be removed with no damage. Sand any tab remainders flush with the part, so there will be no problem aligning them later.

Don't remove parts from their sheets until you need them. Refer to Appendix A of this manual as a reference to what all the laser-cut parts look like and are called.

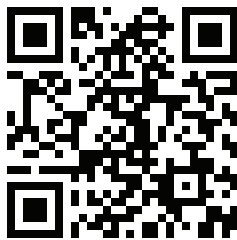
You'll notice a check box next to each step. Check these off as you go along so you don't miss a step. Some steps (building the wing) have two boxes; this means the step will be done twice: once now and once later (when told to repeat) for each wing half (or other part).

There could be a step or two, which leaves you a bit puzzled. If this happens, step back and study the photo(s) for that step, both in this manual and online.

All photos shown in this manual are of different Dart prototypes. Several pieces may have changed slightly with the improvements we've made, so parts may look a little different in some steps.

Online Supplementary Photos

We realize that the smaller black-and-white photos in this manual might not show some of the steps as clearly as you might want. So we've anticipated this and made these photos available on our website. You can either scan the QR code or type this address into your browser:



www.oldschoolmodels.com/mpics/dart/

If this is your first build, congratulations!

What you're about to do is build a flyable airplane - yup, that's a pretty cool thing. All of the techniques that you'll learn here can easily be used for anything else you'll build down the road.

Please read through each step before you start, so you can understand what's needed to be done for that step. We'll try to explain everything along the way, but there might be times you run into something you can't wrap your head around. Help can be found at your local r/c club or even on the interwebs - lots of forums and videos on building are available to you.

And remember, building is not a race. You are the craftsman, and if you take your time, take the time to understand, and make the effort to do good work, it will certainly show when the airframe is built.

IF YOU READ NOTHING ELSE IN THIS MANUAL, PLEASE READ THESE FIVE POINTS.

#1 - We've done everything we can to make the Dart a fun and easy to assemble kit. However, this is NOT a trainer. It is a lively little sport model that will get away from you in a hurry, if you're not an experienced pilot.

#2 - PLYWOOD HAS SLIGHT BOWS IN IT 93.48% OF THE TIME. We don't like it, but that's the way plywood is. Because of this, we engineered the Dart to eliminate these warps whenever possible - we'll make recommendations on how to overcome them as we go along.

#3 - Balsa HAS SLIGHT BOWS IN IT 81.53% OF THE TIME. We don't like it, but that's the way balsa is. We'll make recommendations on how to overcome them as we go along.

#4 - It is very important that you assemble the Dart in the order described. Skipping forward in the steps could leave you without the proper lengths of wood to finish the kit. We've included enough wood to easily complete this kit, but you must take care to properly measure and not waste wood when cutting.

5 - Save ALL of the scrap wood as you build - the ends of sticks, the left over sheets, etc. You will use some of this in assembly, and can use other parts if you need repairs.

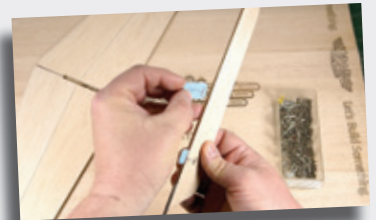
**Remember, building is not a race.
You are the craftsman here.
If you take your time, take the time to understand the steps, and make the effort to do good work, it will certainly show when the Dart's airframe is completed.**

Whether you're hinging, mounting, gluing, sanding, soldering, or installing, chances are we've got a video tip to make the task easier.

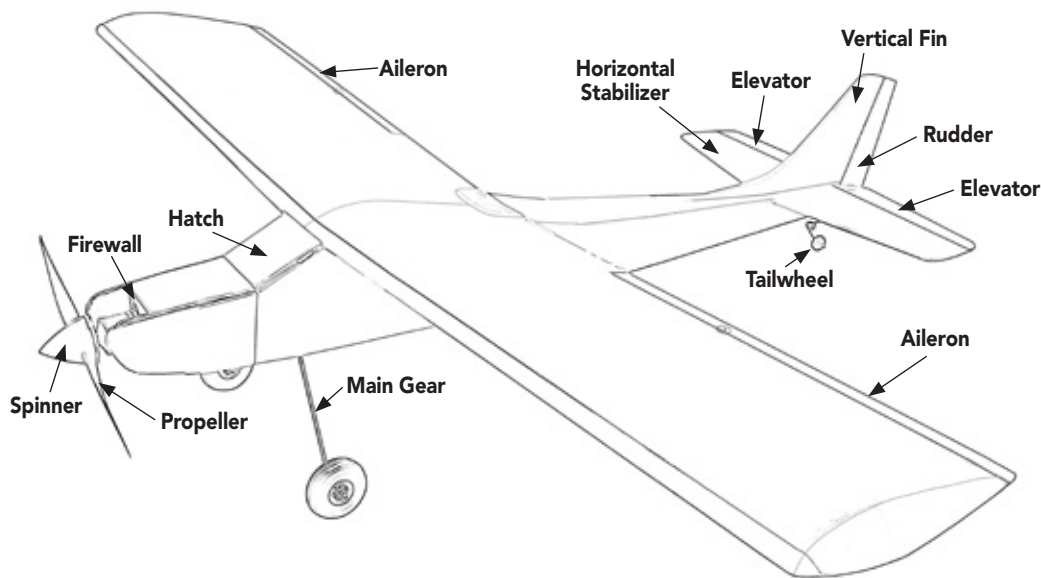
OSMW has created a series of videos to not only help you build your aircraft, but build it better. Our Bright Idea videos can come in handy for some of the following steps.

Check them out today - they're FREE, and we're adding to them all the time!

Visit oldschoolmodels.com/tips.htm or scan this QR code.



BASIC AIRCRAFT PARTS



OSMW BASIC AIRCRAFT TERMINOLOGY

3D FLYING (HOVERING) - Something that should definitely NOT be done (or attempted) with OSMW aircraft. Our designs are meant to fly like airplanes, not hovering like a helicopter.

AIRFOIL - the cross-section shape of a wing. Airfoils can be flat-bottomed (like the GHOST), or other shapes, depending on the style of airplane and what it needs to do.

AILERONS - the moving section of the trailing edge (TE) of the wing. Ailerons come in pairs, (left and right) and always work in opposite directions from each other (one up, one down). When used, they cause the airplane to roll to the left or right.

C/A - cyanoacrylate glue that bonds quickly compared to woodworking glues. If using C/A with the GHOST, we recommend medium viscosity for the majority of the build, then for the hinges.

CENTER OF GRAVITY (CG) - the airplane's point of fore-aft balance, or the point at which all gravitational forces act on the plane.

CLEVIS - a plastic or metal clip that is used on the end of pushrods, so the pushrod can be attached to control horns and servo horns.

CONTROL HORN - a plastic component that is securely attached to a control surface, onto which the servo linkage is connected.

CONTROL SURFACE - any moving part of the flying surface: rudder, elevator, ailerons, and/or flaps.

DIHEDRAL - the upward 'V' angle of the wings when viewed from the front. An airplane with a dihedral is more stable in the air than one without.

DOWN THRUST - designed into the Dart, it angles the firewall and powerplant downward to help counteract the natural lift of the flat-bottom airfoil when at higher speeds.

ELEVATOR - the moving section at the rear of the horizontal stabilizer that controls the pitch attitude of the airplane.

FIN (VERTICAL STABILIZER) - the vertical surface at the rear of the airplane used to stabilize the plane in flight.

FLAPS - moving sections of the trailing edge of the wing, usually found between the ailerons and fuselage. Flaps create more lift at slower flying speeds and also slows the plane on landing approaches.

FUSELAGE - the main body of an airplane, excluding the wings, tail, and everything else.

HORIZONTAL STABILIZER (TAILPLANE) - the horizontal surface at the back of the fuselage, to which the elevators are attached.

LANDING GEAR (MAIN GEAR) - the wires and wheels on the forward part of the fuselage.

LEADING EDGE - (L.E.) - the front edge of the wing, tailplane, or rudder.

PILOT ERROR - any mistake, particularly one that ends in a crash, made by the pilot for whatever reason. Pilot error is rarely ever admitted to by the pilot in question. Instead, the incident is usually blamed on radio failure, interference, unexplained gusts of wind, extra-fast-growing trees, or gravity having some fun and suddenly increasing its strength.

Don't be this type of pilot - admit it when there's pilot failure - it happens to all of us.

PORT - the left side of anything.

PUSHROD - a piece of metal/ plastic rod (or thread/cable) that connects a servo arm to its control surface or function. Clevises are commonly used at the ends of the linkages, to clip to the servo/control horns.

RECEIVER - a component of the radio control gear that lives inside the aircraft and picks up the radio signals being emitted by the transmitter, then sends signals out to attached servos.

RIGHT THRUST - designed into the GHOST, it angles the firewall and powerplant to the right to help counteract the natural pull to the left when at higher speeds.

RUDDER - the moving section on the back part of the fin. Used to control the airplane's yaw.

SERVO - the component of the radio control gear that converts the radio signal into movement.

SERVO ARM - a plastic or metal piece fixed to the servo's output shaft, onto which a pushrod (and/or clevis) connects.

STARBOARD - the right side of anything.

TAILDRAGGER - an airplane that has 2 main wheels and a small tail wheel - like the Dart. Taildraggers require you to use the rudder when on the ground, a bit more than tricycle gear designs.

TRAILING EDGE (T.E.) - the rear edge of the wing, tailplane, or rudder.

WHEEL COLLAR - a small, donut-shaped metal piece that slips over the landing gear wire and holds the wheel in place - using a small set screw.

WING - come on, seriously??

WINGSPAN - the overall length of the wing, from tip to tip.

□ InstaCaddy

Throughout this manual, you'll see photos with our InstaCaddy on the bench. This is a unique collection of Bob Smith C/A glues, accelerator, and pipettes. What makes this special is the box, as it has cutouts that make it the perfect tool to hold everything in one spot - **and the glue won't spill!** If you're needing C/A, consider our InstaCaddy!



Let's begin construction by building the tail surfaces of your Dart.

□ Prepare your work area

Tear off a piece of waxed paper roughly 14" long and tape it to your building surface (no need to do these first steps over the plans - just use them for reference).

□ Step 1 - Vertical Fin Assembly (VF1, VF4)

Locate VF1 and one of the VF4 strips from BP1. Measure and cut two lengths from the VF4 strip to snugly fit into the pre-cut slots in VF1.

Glue them in place, pressing them in to make sure they are perfectly flat inside VF4, along their entire lengths.



□ Step 2 - Vertical Fin Assembly (VF2)

Locate VF2 from BP1. Glue VF2 into the notch cut into the leading edge of VF1, as shown here. Pay attention to the orientation, making sure the curved edge of VF2 is in the correct position. Again, make sure this assembly is perfectly flat.

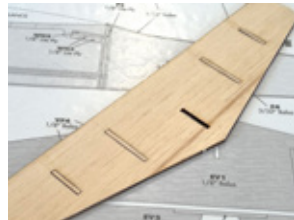


□ Step 3 - Horizontal Stab Assembly (EV1, VF4)

Locate EV1 from BP1, as well as the left over VF4 stick from step 1. Measure and cut four lengths from the VF4 strip to snugly fit into the outside two pre-cut slots in EV1 - **NOT THE CENTER SLOT.**

There's another VF4 strip in BP1 which can also be used if you need to re-cut a piece or two.

Glue these in place, pressing them in to make sure they are perfectly flat inside VF4, along their entire lengths.



□ Step 4 - 90° Triangle

Cut into LP1 is a 90° triangle. It can be used to vertically align any of the parts in the construction of your Dart. LP1 also includes a foot piece that can be used with the triangle to hold it vertically (hands-free).

You'll need this tool for the next step, and in other steps later on in the build.



□ Step 5 - Tail Surface Assembly

Now it's time to glue the vertical fin to the horizontal stab as shown here.

You might want to sand the leading edges of both pieces before you assemble them, rounding those edges.

Also, dry fit these together first (using the triangle from the previous step) to make sure the fin is perfectly perpendicular to the stab. Sand the slot as necessary to get a good, but slop-free fit.

When you're satisfied, remove the fin, apply glue where the two pieces touch, and attach them together to make one sub-assembly.

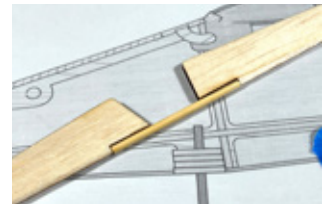


□ Step 6 - Elevator Assembly (EV2)

For this step, you'll need to have the elevator portion of the plans positioned over your building board with a piece of waxed paper over it.

Locate both EV2s from BP1 and the 2-1/2" bamboo stick from the hardware bag.

Pin both EV2s in position, making sure they are perfectly aligned with each other, then glue the bamboo joiner dowel in place.



Now set both of these sub-assemblies aside as we begin construction on the Dart's fuselage.

□ Step 7 - Fuselage Assembly (FS1, FS2)

Locate both FS1s from LP1. Also locate both FS2s from BP2 and BP3.

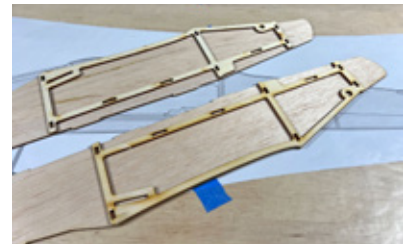
The FS1s are glued to the FS2s as shown, to make the start of the internal fuselage structure.

It is important that the FS1s are perfectly aligned with the FS2s, as any misalignment will cause the fuselage to be warped and possibly unfixable later on.

The alignment points are along the wing cradle and the front slope, where the hatch will fit. These need to be spot-on.

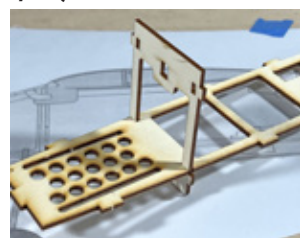
So glue one FS1 to an FS2 - perfectly aligned, and make sure it's held flat against the balsa sheeting until the glue cures.

When that piece is finished you'll now make a **MIRROR IMAGE** of the first piece - as shown in the photo. **Do NOT make matching pieces!**



□ Step 8 - Fuselage Assembly (TR1, F2)

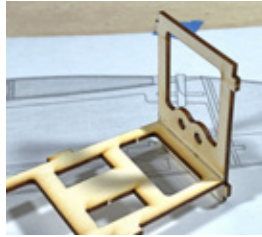
Dry-fit this first! The front of TR1 (LP2) (the side with all the circular holes) slides into the center of F2 (LP1) on a diagonal, so the two cutouts in TR1 match the uprights of R2. Then TR1 can be flattened so the pieces match the photo. When you know how these two pieces work, remove them,



place glue along the edge of the F2 cutout that touches TR1, and then re-assemble the pieces. Make sure that F2 is perfectly perpendicular to TR1 - *remember that 90° angle from earlier?*

Step 9 - Fuselage Assembly (F3)

Locate F3 from LP1. This is glued to the rear of TR1. TR1's rear tab should be fully inserted into the pre-cut slot in F3. Glue these two pieces together, making sure that F3 is perfectly perpendicular to TR1.



Step 10 - Fuselage Assembly (WH2)

Locate WH2 from LP1 and one of the two fuselage sides. WH2 is inserted into the long pre-cut slot towards the rear of the wing saddle. Make sure it's fully inserted and perpendicular to the fuselage side.



Step 11 - Fuselage Assembly

Now it's time for the big one! Locate both fuselage side assemblies and the TR1 assembly you've just made. It's time to dry-fit these pieces together, noting how all the tabs fit into the pre-cut slots in the FS1 side frames. There are several, and they all need to be fully inserted for the parts to assemble correctly. At the moment, we're only concerned with the fit from F2 to F3 - don't worry about the nose at this time (see the photo). WH2 will also need to fit into the long slot in the side frame.



Note that if you have the pieces dry-fitted together, it's possible to add a little twist if you're not careful. By placing the bottom side of the assembly down on your flat building surface and applying a little pressure, you can square everything up nicely. So remember this when the glue is applied, except you'll probably use weights rather than just your muscles.

When you're satisfied with how all is supposed to work, there's two ways to attack this.

- **If you're using medium CA**, you can probably do this with your hands. Leave one of the two sides dry-fitted, and glue on the other. Place it on the board and make sure everything is square and all the tabs and surfaces are mating as they should. Then, when cured, remove the dry-fitted side and attach it the same way.
- **If you're using slower-drying wood glue**, you can glue both sides at the same time. Use some clamps to hold the slight curvature of the sides to the TR1 assembly. And again, make sure everything is squared up.

Step 12 - Fuselage Assembly (F1)

Locate F1 from LP1. It should be placed so the etched "X" faces forward as shown.

Dry-fit this first, so the front tab of TR1 fits into the pre-cut slot in F1. Also, F1's



side tabs will fit into the pre-cut slots of the FS1 side frames. Note that you'll have to apply a bit of force to bend the fuselage sides to match the curvatures of TR1 and to hold F1 in position. Once satisfied with the fit, remove F1, apply glue, and then attach the firewall to the fuselage. Also, apply glue along the sides of TR1 where it touches the fuselage side frames. Clamp in place until the glue cures.

Step 13 - Fuselage Assembly (pin/tape the aft end)

This next step doesn't require any glue - you're simply holding things in place to help in the next few steps.

Grab some tape or a few pins. Squeeze the aft end of the fuselage sides together so they are aligned.

Now either tape these sides together or push in a few pins at various angles to hold the sides in place.

What we're looking for are two matching tapers on the fuselage sides, if you were to sight down the fuselage from the front and back. Also, the sides should be level with each other.

Step 14 - Fuselage Assembly (F4)

Locate F4 from BP3. This is glued in place between the fuselage sides, as noted on the plans. It should be positioned so that the two small, circular holes are at the bottom.

You'll now glue this in between the fuselage sides, making sure its tabs are fully inserted into the corresponding slots pre-cut into both sides of the fuselage.



Step 15 - Fuselage Assembly (F5)

Locate F5 from BP3. This is glued in place between the fuselage sides, as noted on the plans. It should be positioned so that the two small, circular holes are at the bottom.

You'll now glue this in between the fuselage sides, making sure its tabs are fully inserted into the corresponding slots pre-cut into both sides of the fuselage.

Now you can remove the tape and/or pins that have been holding the aft of the fuselage sides together.

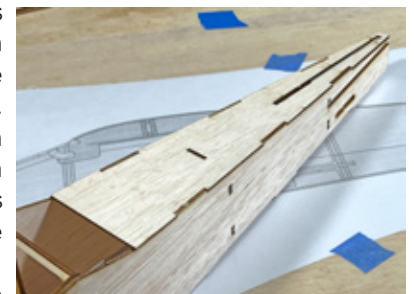


Step 16 - Fuselage Assembly (TS)

Locate TS from BP5. This forms the top sheeting from the angle break behind the wing saddle, rearwards. There are several notches in its edges, which will match up with the pre-cut tabs on the top of the fuselage sides.

Dry-fit this first, taking care as this piece is fragile until glued in place.

Once satisfied with how this fits, remove the piece, then, starting at one end, glue this in place a little at a time, making sure the tabs and notches are all happily mating and all is flat - and not twisting!



Step 17 - Fuselage Assembly (PS, pushrods)

Before the bottom sheeting is installed, we recommend installing the elevator and rudder pushrod guides inside the fuselage.

Pushrods are not included, and although there are probably ready-made systems out there from Du-Bro, Sullivan, etc., what you'll see here is made from scraps left over from other builds. These tubes are left-over lengths of the inner tube that Du-Bro uses in their Laser rods. We found them to be just perfect to guide the thinner wires we used for pushrods.



If you decide to do something similar, you'll push these tubes in through the pre-cut holes in F3, F4, and F5, and then out of the fuselage side's elongated cutouts, similar to what's shown here.

We've also included several PS pieces cut into BP2 and BP3. As we purposely made the holes in the formers a bit larger to accommodate most any option you wanted to use, these PS pieces are sized to perfectly fit over the tubes and can be glued to the formers to give the tubes support.

□ Step 18 - Fuselage Assembly (BS)

Locate BS from BP5. This forms the bottom sheeting from just behind the landing gear, rearwards. There are several notches in its edges, which will match up with the pre-cut tabs on the bottom of the fuselage sides.



Dry-fit this first, taking care as this piece is fragile until glued in place.

Once satisfied with how this fits, remove the piece, then, starting at one end, glue this in place a little at a time, making sure the tabs and notches are all happily mating and all is flat - and not twisting!

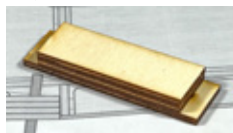
□ Step 19 - Fuselage Assembly (WH3)

Locate both WH3s from LP1. These are glued to the top of WH2 that was installed earlier. Glue one in first, then the other. Also, make sure to glue them to the fuselage sides and to the surface of F3.



□ Step 20 - Fuselage Assembly (LG1, LG2)

Locate LG1 and three LG2s from LP1. The three LG2s are glued to LG1 as shown here, making sure they are centered and aligned. Also, make sure to keep glue out of the grooves cut into LP1 and the holes pre-cut in both LG2s.



□ Step 21 - Fuselage Assembly (LG1, LG2)

Once the glue has cured from the previous step, you'll now glue this assembly into the bottom of the fuselage. There are pre-cut notches in the fuselage sides, just in front of F2. Dry-fit this first, sand as needed, then glue this sub-assembly into place as shown here.



□ Step 22 - Fuselage Assembly (F2A)

Locate F2A from LP1. This is glued to the front face of F2, strengthening the area around the wing mounting point.



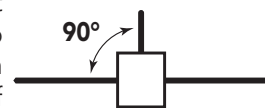
Glue this in place, making sure that the pre-cut hole is perfectly aligned with the matching hole in F2. Also, make sure it's straight.

□ Step 23 - Fuselage Assembly (Tail surfaces)

Now it's time to attach the tail surfaces to the fuselage. There's a small support piece that needs to be cut away from the stab and vertical fin slots to open them up.

Once that's done, carefully slide the tail surface assembly into the slots. The front of the vertical fin should be flush with the top sheeting. Also, the bottom of the vertical fin should be between the fuselage sides, flush with their aft edges.

Although we've done everything possible to engineer the Dart so it will build straight and true, take a few minutes to guarantee things are straight before gluing on the tail assembly. Place the fuselage flat on your building surface and sight down the fuselage. The horizontal stab should be level, with the vertical fin pointing perfectly straight in the air. If



you've built in a little twist in the fuselage, it will show here, and normally this can easily be solved by sanding the slot openings to allow the tail assembly to sit as it should. If you do need to do some sanding, please do it a little at a time - it's much easier to remove balsa than it is to put it back on!



□ Step 24 - Fuselage Assembly (H1, H2, H3)

Locate H1, both H2s and both H3s from LP1.

There's not really a top or bottom "side" of this hatch, so choose the best side and place that side on your building surface.



Now glue both H2s into the front slots, and both H3s into the rear

slots. These 4 pieces need to be perfectly perpendicular to the hatch surface, and their tabs need to be fully inserted in H1.

□ Step 25 - Fuselage Assembly (magnets)

Locate the four magnets in the hardware bag. Push two of them into the holes in the H2s you just installed. Place a bit of glue on them to hold them in place.

Inside the battery area, you'll see two pre-cut holes in the plywood side frames, one on each side. These two spots are where the other magnets will be used. Place a drop of glue inside these holes, then push in a magnet, making sure it is completely flush with the plywood side frame, but take care that you don't damage the outer balsa skin. Make sure you glue the magnets in so they attract the magnets in the hatch, not repel them.

Even though the fuselage isn't quite finished, it's time to set that aside for right now and start on the wing. Trust me, there's a reason that will become apparent much later on.

□ Step 26 - Wing Assembly (SS, spar)

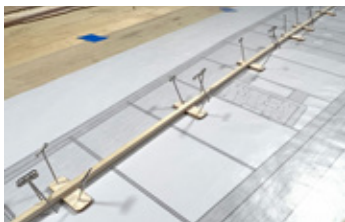
Tape the wing plan over your building surface and cover it with waxed paper. Now locate the SS pieces cut into BP4 and one of the 1/8" sq. x 36" basswood strips.



The basswood strip is the upper spar and needs to be spaced a 1/16th off the work surface; that's why the SS pieces. Pin those to the board, spaced a few ribs apart, similar to what's shown in this photo. However, contrary to what's shown, we found it easier to only put a single pin at the end of each piece, so the SS piece can then be rotated out of the way later on. It'll make more sense later, trust me.

Now, measure and cut the 1/8" basswood to length, but leave about a 1/4" extra on each end.

Then use pins on either side of the strip to hold it in position, keeping it arrow straight along its length. DO NOT ATTEMPT



TO PUT PINS THROUGH THE BASSWOOD. First off, it's very hard to do, and secondly, it will split the wood.

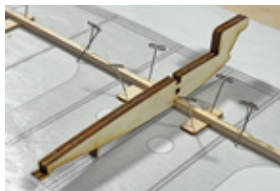
□ Step 27 - Wing Assembly (R1)

Locate both R1s from LP1. These are glued one on top of the other, making sure they are perfectly aligned and completely flat. Try to keep glue out of the pre-cut notches and the hole in the middle.



□ Step 28 - Wing Assembly (R1)

R1 is now glued to the spar, right in the center of the wing as shown on the plans. Make sure it's perfectly perpendicular to the work surface (using that little triangle again).

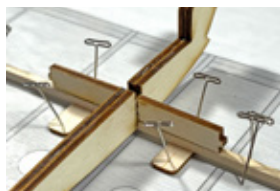


Also, here's a tip that can be used on this rib, as well as the others. Place a drop of glue on the back standoff to lock it in place on the waxed paper. It not only helps it stay straight but will also help hold the wing section down in future steps.

For most of the rest of the wing build, you will be building the left and right sides at the same time. So what is done on the starboard side of the R1 rib is also mirrored on the port side. The photos won't show this each time, but you need to do it each time to have a completed wing.

□ Step 29 - Wing Assembly (DH1)

Locate both DH1s from LP1. These are glued to the spar, attached to each side of the R1 rib. Make sure DH1's tab is completely inserted into the pre-cut holes in R1, and they are straight along their length on the spar.



□ Step 30 - Wing Assembly (R2)

Locate both R2s from LP1. These are glued in place, on each side of R1, as shown on the plans. Make sure they are perfectly perpendicular to the work surface, and straight along their length.



□ Step 31 - Wing Assembly (DH2)

Locate both DH2s from LP1. Note the etched circle in these pieces - That designates the edge that should be up-against the R2 ribs.

These are glued to the spar, attached to the outside of each R2 rib. Make sure DH2's tab is completely inserted into the pre-cut holes in R2, and they are straight along their length on the spar.



□ Step 32 - Wing Assembly (R3)

Locate both R3s from BP4 and BP5. These are glued in place, as shown on the plans. Make sure they are perfectly perpendicular to the work surface, and straight along their length. Also make sure the DH2's tabs are completely inserted into the hole in R3.



□ Step 33 - Wing Assembly (SH1, R4)

Locate both R4s from BP4 and BP5, and both SW1s from BP4.

Now, remember when I mentioned only putting one pin in the SS pieces so they could rotate out of the way? Well, here's where that starts to come into play. In order to properly position SW1, you'll need to rotate SS so it's still holding the spar, but out of the way of where SW1 will go. (You'll do this same thing for the other SW pieces in the following steps.)

Note the etched circle on SW1. This circle should be positioned towards R3 and down near the spar.

Glue SH1 to R3 and to the rear edge of the spar as shown. Then glue R4 to SH1, making sure SW1's tab is completely inserted into the pre-cut holes in R4, and they are straight along their length on the spar.



□ Step 34 - Wing Assembly (Popsicle sticks)

Locate both popsicle sticks from the hardware bag. Cut these in half, making four equal-length pieces.

Slide one into the front set of pre-cut slots in R3 and R4, and one into the rear set of pre-cut holes, as shown here.

Glue these in position.

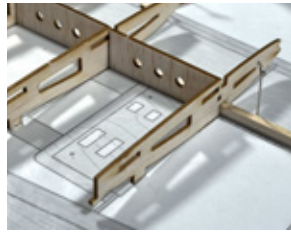


□ Step 35 - Wing Assembly (SH2, R5)

Locate both R5s from BP4, and both SW2s from BP4.

Note the etched circle on SW2. This circle should be positioned

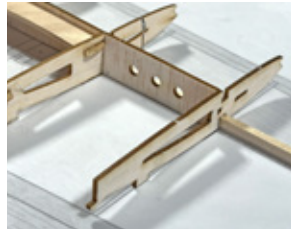
towards R4 and down near the spar. Glue SH2 to R4 and to the rear edge of the spar as shown. Then glue R5 to SH2, making sure SW2's tab is completely inserted into the pre-cut holes in R5, and they are straight along their length on the spar.



Step 36 - Wing Assembly (SH3, R6)

Locate both R6s from BP4 and BP5, and both SW3s from BP4. Note the etched circle on SW3. This circle should be positioned towards R5 and down near the spar.

Glue SH3 to R5 and to the rear edge of the spar as shown. Then glue R6 to SH3, making sure SW3's tab is completely inserted into the pre-cut holes in R6, and they are straight along their length on the spar.



Step 37 - Wing Assembly (SH4, R7)

Locate both R7s from BP4 and BP5, and both SW4s from BP4. Note the etched circle on SW4. This circle should be positioned towards R6 and down near the spar.

Glue SH4 to R6 and to the rear edge of the spar as shown. Then glue R7 to SH4, making sure SW4's tab is completely inserted into the pre-cut holes in R7, and they are straight along their length on the spar.



Step 38 - Wing Assembly (SH5, R8)

Locate both R8s from BP4, and both SW5s from BP4. Note the etched circle on SW5. This circle should be positioned towards R7 and down near the spar.

Glue SH5 to R7 and to the rear edge of the spar as shown. Then glue R8 to SH5, making sure SW5's tab is completely inserted into the pre-cut holes in R8, and they are straight along their length on the spar.



Step 39 - Wing Assembly (bottom spar)

Locate the other 1/8" sq. x 36" basswood strip, as this will be used to form the bottom wing spar.

Cut this to length, leaving about 1/4" extra on each end of R8.

Then glue this in position, making sure it is pressed completely into each of the pre-cut notches in each of the ribs and up against SW1-5 and both DH pieces.



Step 40 - Wing Assembly (trailing edge, outer sections)

Locate one of the 5/16" sq. x 36" balsa strips. This will be used as the outer sections of the trailing edge.

Cut this to length for the outer sections, as shown on the plans. Note that each rib has a "ledge" cut into the back of it. This ledge

will allow you to rest the 5/16" strip on each rib and position its height perfectly.

Now you will glue this strip to the back of each rib.



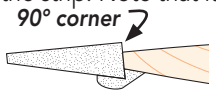
Step 41 - Wing Assembly (trailing edge, center section)

Locate the 1/4" x 3/4" x 36" tapered balsa strip. Part of this will be used as the center section of the trailing edge.

Cut this to length for the center section, as shown on the plans.

Before gluing this in place, look at the end of the strip. Note that it has one 90° angled corner.

This corner should be on top, as the wing is currently situated; see this diagram.



Now you will glue this strip to the back of each rib, resting on the ledges, and also to the point where the center section overlaps the 5/16" pieces you just installed.



Step 42 - Wing Assembly (leading edge, center section)

Locate another of the 5/16" sq. x 36" balsa strips. This will be cut in a couple places to form the wing's leading edge.

For now, measure and cut the center section, as shown on the plans.

When gluing this in place, note the angled cuts in the front of each of the ribs. These are guides to aid you in positioning the strip as needed. Make sure it is firmly seated in each of these cutouts when gluing in position.



Step 43 - Wing Assembly (leading edge, outer sections)

Now, from that same 5/16" sq. balsa strip you just used, measure and cut the outer leading edge sections, as shown on the plans.

Make sure each strip is firmly seated in each of these rib cutouts when gluing in position.



Step 44 - Wing Assembly (R1A)

Locate both R1As from BP2 and BP3. These are glued to either side of the R1

and up against the leading edge strip.

Note the curvature of the rib and the curvature of R1A. Be sure to make them match.



Step 45 - Wing Assembly (SH2)

Locate both SH2s from LP1. These are glued to the popsicle sticks you installed earlier to make two sides of the aileron servo box.

Pay attention to their orientation when gluing them in position.



□ Step 46 - Wing Assembly (Lower leading edge sheeting)

Locate the uncut 1/16" x 4" x 36" balsa sheet. Cut this sheet in half to make two 1/16" x 4" x 18" sheets. Now care must be taken here to properly measure and cut out the sheeting so there will be enough of this stock left over to finish off the fuselage. Refer to this diagram as to how the sheets should be used in the following steps.

One cut for the top sheeting.

One cut for the bottom sheeting.

Extra for fuselage sheeting.

Now, with this in mind, you'll need to carefully measure and cut the sheeting needed for both sides of the wing's lower leading edge sheets. It is highly advised that you follow the old adage: measure twice, cut once. But in this case, I would recommend **measuring several times before cutting**. Also, note that since the wing's surface curves, you need just a little extra as it wraps around.

So when you have it measured and ready to cut, leave yourself about 1/8" extra, just to be safe.

Then, after you cut the piece, you can trim it down to size a little at a time until you get a perfect fit.

Also note that you'll need to make a small notch on the inside face of each sheet for it to wrap around the wing hold of the R1 ribs.

When happy with the fit, slowly and carefully glue these sheets in place, making sure that the wing is kept flat so no warps are introduced.



□ Step 47 - Wing Assembly (WS2, WS3)

Locate both WS2s from BP4 and both WS3s from BP4 and BP5.

Glue one WS3 to one WS2 as shown, making sure the holes in each are perfectly aligned.

Then using the other WS2 and WS3, make a mirror image of the first one, as shown here. **Make sure NOT to make matching pieces.**



□ Step 48 - Wing Assembly (WS1, WS2)

Locate two WS1s from BP4 and BP6, as well as the two WS2s from the previous step.

These pieces form the wing's lower center sheeting. Glue the two WS2s in place first, making sure the WS3s are inside the wing (not visible).

Then you will need to measure and cut the WS1s to fit. They are purposely made a little long so you can get a perfect fit. When you're satisfied with how they fit, glue them in place.



□ Step 49 - Wing Assembly (Remove the tabs)

Remove the wing from the building surface and flip it over so you can work on the top.

Take a bit of time to carefully remove tabs from all of the ribs. Also take the time to cut-away the tiny ledges from the rear of each rib. Be sure that when cutting, you're removing just enough material to continue the curvature of each wing.

Blobs of glue normally form around the ledges, so take the time to remove them all.

□ Step 50 - Wing Assembly (trailing edge filler)

Locate the left over 1/4" x 3/4" x 36" tapered balsa strip.

Measure and cut two lengths that will fit between the R1 and R2 ribs - as filler pieces.

Glue these in place as shown, up against the trailing edge stock already installed.



□ Step 51 - Wing Assembly (Top Leading Edge Sheeting)

Locate the left over 1/16" x 4" sheets you used when making the bottom leading edge sheeting.

Now you'll do the same thing to create the two pieces for the top sheeting.

Again, take care, measure very carefully, and cut them just slightly oversized. Then work your way back down to a great fit. Note that these sheets should butt up against the SW pieces installed earlier, forming a smooth surface.

When satisfied, glue these pieces in place, making sure not to introduce any warps.



□ Step 52 - Wing Assembly (WS1)

Locate the four remaining WS1 pieces from BP4 and BP6. These are used for the upper center sheeting.

Just as before, glue on the two forward pieces first, then measure, trim, and glue in the rear two pieces.



□ Step 53 - Wing Assembly (T1, T4)

Locate both T1s from BP2 and both T4s from BP3.

T1 is glued to R8, making sure its tabs are fully inserted into the pre-cut slots in R8. Also, it should be 90° to R8, as shown here.

Then glue T4 to T1 and R8, making sure its tabs are fully inserted into T1.



□ Step 54 - Wing Assembly (T2, T3)

Locate both T2s and T3s from BP2 and BP3.

T2 is glued over the outer edge of T1, between T4 and the leading edge strip.

T3 is glued over back edge outer edge of T1.



Now, let's set the wing aside, and go back to the fuselage to finish a few things.

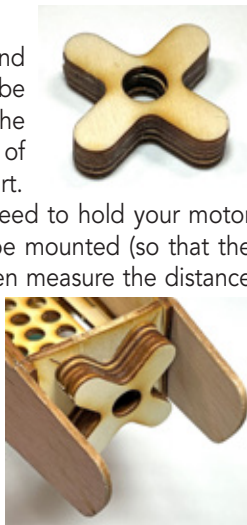
Step 55 - Fuse Assembly (MS)

There's a bunch of MS pieces on LP1 and LP2. These are motor spacers that can be used to get the proper spacing from the firewall to the rear of the prop, regardless of the motor you choose to use with your Dart.

It's pretty simple how this works. You'll need to hold your motor in the rough position in which it would be mounted (so that the prop clears the front of the fuselage). Then measure the distance between the firewall and the back of the motor's mount. That distance determines how many of the MS pieces you need to stack up.

Glue the correct number of MS pieces together, making sure they're all perfectly aligned - and the outside MS has the etched lines showing.

You can then use those etched lines when aligning the MS assembly with the firewall. Glue this in place when you're satisfied with the alignment.



Step 56 - Fuse Assembly (Motor mounting)

Now is the time to temporarily mount your motor. Drill the four mounting holes and use your hardware to mount your motor to the fuselage.

We prefer to use t-nuts on the back side, and you'll see that there are a couple of notches pre-cut into the front of the TR1. You may have to adjust these holes a little for your hardware, but it should be a good start.

When you're happy with the way the motor is mounted, remove the motor from the fuselage.

Step 57 - Fuse Assembly (Front, top sheeting)

Locate the left-over 1/16" x 4" sheeting you used when creating the wing's leading edge sheeting.

You'll now measure and cut a piece to cover up the area in front of the hatch, to where the nose starts to curve.

Make sure this piece is cross-grained, as shown here.



Step 58 - Fuse Assembly (Front, bottom sheeting)

Using more of the left-over 1/16" x 4" sheeting, you'll now cover up the area from the front of the landing gear block (LG) to the front of the fuselage, where the nose starts to curve.

Make sure this piece is cross-grained.

Step 59 - Fuse Assembly (Rear window sheeting)

Using more of the left-over 1/16" x 4" sheeting, you'll now cover up the area just in back of the wing saddle, on top of the fuselage.

Make sure this piece is cross-grained, as shown here.



Step 60 - Wing Assembly (Ailerons)

One last thing to "create" is the ailerons. They are cut from the left-over 1/4" x 3/4" tapered balsa strip. Measure and cut both the port and starboard ailerons.

Step 61 - Fuse Assembly (Sanding)

Now is the time to get quite familiar with the sanding tools of your choice. Take the time to perform a good sanding, rounding the wing's leading edge and blending it into the wingtips. Go over the entire wing, making sure the sheeting is smooth and the trailing edges are blended into the ribs, continuing the curvature of the wing. Pound out the extra time on those leading edges to make sure they are smooth and perfect works of art along their entire lengths.

Smooth out the edges of the fuselage. You can't do much rounding here; just make sure the edges are smooth along their entire length. You should have already rounded the leading edge of the stab and vertical fin, but if not, now is the time to do that.

Sand bevels into the leading edge of both elevator halves, the rudder (VF3 from BP1), and the ailerons.

The idea is to spend some time caressing this awesome airframe you've created, so what you end up with will be a thing of beauty.

Step 62 - Assembly (WH1)

Locate WH1 from LP3. This is glued to the top of the wing, right in the center of the trailing edge.

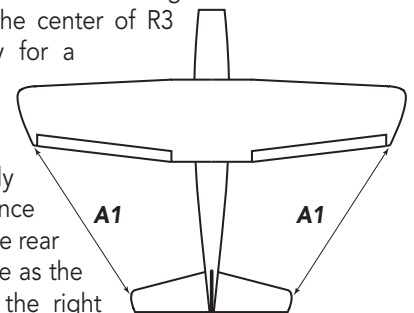


Step 63 - Wing Alignment

To align the wing properly on the fuselage, place the wing in position by pushing the forward wing retainer into the slot in the center of R3 (lightly sand if necessary for a smooth fit).

Then allow the wing to rest in the wing saddle.

The wing is perfectly aligned when the distance from the left wing tip to the rear of the fuselage is the same as the distance measured from the right wing tip (A1=A1).



Step 64 - Fuselage Assembly (drill wing bolt holes)

With the wing aligned, drill two 3/16" holes for the wing bolts, using the pre-cut holes in WH1 as a guide. Carefully drill down through the wing into the WH2/WH3 assembly in the fuselage.

Use caution to make sure the wing does not move until both holes are drilled.

When drilling, take your time and make sure the drill is held so the bit is perpendicular to the wing's sheeting. This will make it so the wing bolt goes in at an angle, but the screw's head will be flat on the wing surface. Remove the drill, remove the wing, and clean up around the new holes you drilled.

Now run a 1/4" drill through the WH2/WH3 assembly in the fuselage. Locate the two 10-32 t-nuts from the hardware bag and install them on the underside of the WH2/WH3 assembly.

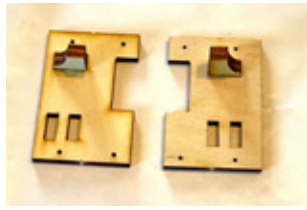
You can then test fit the wing again, running the 10-32x1 thumbscrews through the wing and into the t-nuts you just installed.

Step 65 - Servo Hatches (SH3)

Locate all of the SH3s in LP1. Pairs of SH3s are glued together to form a thicker SH3. You should end up with four thicker SH3s, with both pieces in each pair perfectly aligned.

Step 66 - Servo Hatches (SH1)

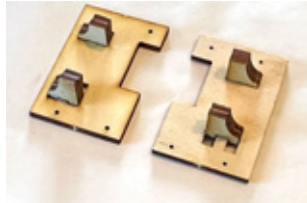
Now locate both SH1s from LP1 as well as your two aileron servos. Place the SH1s on your work surface, mirroring each other as shown here. Then glue one SH3 assembly into the top set of holes, making sure it's completely seated and 90° to the surface of SH1.



Step 67 - Servo Hatches (SH3)

As you can see, the lower holes are elongated, which makes this an adjustable mount to help fit your servo, regardless of brand.

Drop your servo in place, up against the SH3 you glued in, and then you can place the lower SH3 to meet your servo's width. Mark this location, remove the servo, then glue the lower SH3 in place. Make the other hatch match.



Step 68 - Servo Hatches (SH4)

There are four SH4s on LP1. These can be attached to the mounting surface of the SH3s to help space your servo to match the notch. If you need those, glue them in place, similar to what we've shown here.



Step 69 - Aileron Hatches (drill mounting holes)

Now fit the servo hatches into position on the bottom of the wing, into the openings for the aileron servos. Using SH1's pre-cut holes as a guide, drill four 1/16" mounting holes into the plywood beams you installed when building the wing. Harden the wood around the holes with a bit of thin CA. There is no need to mount them at this point.

Step 70 - Covering

Well, it's time to cover the Dart.

Double check that all surfaces are smooth and ready to cover. Sand as necessary, then cover the entire airframe with the covering/finish of your choice.

To cover the Dart as shown in our prototypes, it took a few rolls because there were four colors involved. But one roll of iron-on covering would easily cover the entire airframe, with some to spare.

Logos, numbers, etc.

If you want to use graphics similar to the ones we used, Old School Model Works has teamed up with Callie Graphics as a supplier for pre-cut vinyl. They are a very well known provider of custom graphics for R/C models.

We have supplied them with the artwork needed, and you can order straight from them, choosing the colors that work for you. Contact Callie Graphics at this link:

<https://callie-graphics.com>
or scan the QR code.



Note that Callie Graphics is not affiliated with Old School Model Works, nor does Old School Model Works generate any income from this partnership.

Step 71 - Covering

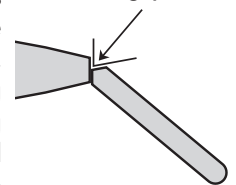
It's time to attach the control surfaces. Although you can use hinges (not included), we chose to hinge the surfaces using the iron-on covering as the hinge. As this is a small, light-weight design, this works well and saves you the chance of splintering through the thin 1/8" surfaces.

To do this, cut lengths of covering about 5/8" wide, then trim them as needed for the length of the aileron and elevator (you'll need two lengths for each - one for each side). **DO NOT ATTACH THE RUDDER AT THIS TIME.**

Fold a seam down the middle of the entire length of these pieces, so the adhesive side is facing outward.

Now, hold the control surface in position as we've shown in this diagram and tack the covering into the hinge gap, little by little, working your way down the piece, making sure the surface is centered on the trailing edge. When the covering has been applied into the gap, then you can iron down the edges.

Attach covering into this gap first.



When one side is finished, flip it over, bend the surface the other way, and iron a second strip to the reverse side.

Then do the same for all of the control surfaces.

Step 72 - Main gear

With the wing removed, place the fuselage upside down (be careful of the vertical fin). To attach the main gear, you'll need to locate the two gear straps and four of the 2-56 x 3/4" self-tapping screws from the hardware bag.



If you haven't already, cut away the covering from the channels in the LG piece. Wick a generous amount of thin CA into these holes to harden the ply around them, but make sure to keep the holes clear. Push both main gear legs into the holes in the LG assembly until they are fully seated in the slots. Then place the two plastic mounting straps over the gear, as we've shown in this picture. Using a 1/16" bit, drill through the holes in the plastic straps and into the LG block. Then use the screws to mount it all in place.

Step 73 - Attach wheels

Use the included 3/32" i.d. wheel collars to hold each wheel (not included) on the axles. Also use a touch of thread-locking compound to keep the screw from loosening over time.



Step 74 - Tailwheel

You'll see a couple of large paperclips in the hardware bag. These are used to form the tailwheel wire - and it's simpler than you think. You easily bend the paperclip using your hands and a set of small needle-nose pliers.

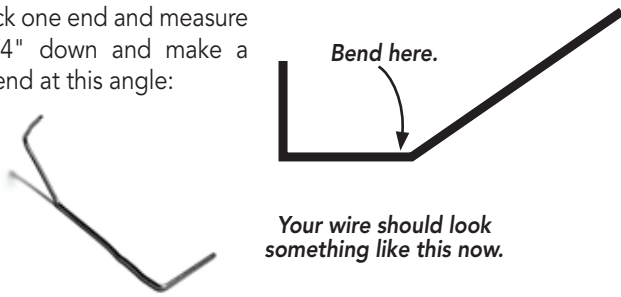
A. Straighten out the paperclip. It will be roughly 6" long. Cut it in half. That gives you two tries for each paperclip - four total.

B. 1/2" in from one end, make a 90° bend.

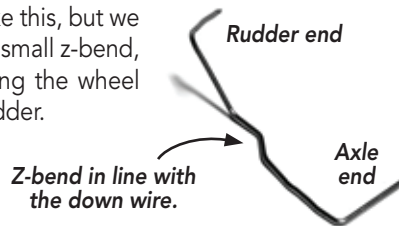
C. 1/2" in from the other end, make another 90° bend, but make it perpendicular to the first bend - so it should look like this:



D. Pick one end and measure 3/4" down and make a bend at this angle:



E. You can leave the wire like this, but we found it better to add a small z-bend, which will end up putting the wheel more in line with the rudder.



You should end up with a wire that looks a lot like what I'm holding in this picture. Note that I'm holding the axle.

In LP2, there are two TW pieces that can be used as tailwheels if you'd like. Slide one (or both) on the axle, then bend the axle up slightly to keep the wheels in place. Then trim the excess wire.



Step 75 - Tailwheel install

Now the top part of the wire can be inserted into the leading edge of the rudder. On the bottom of the rudder is cut an "inset," roughly .6" in length. At the top of this inset, carefully drill a hole into the rudder, roughly 1/2" deep, using a 3/64" drill bit. Make sure this goes straight into the rudder.

Then you can insert the upper portion of the tailwheel wire into the rudder, glue it in place, and wrap it with a bit of covering just to make sure it stays.

Now you can attach the rudder to the vertical fin using the same techniques you used to attach the other control surfaces.

Step 76 - Radio installation

Now it's time to install your receiver and hook up all the radio for the first time.

Attach the aileron servo hatches (with the servos mounted) into position on the bottom of the wing using the supplied 2-56 x 5/16" self-tapping screws to secure the hatches in place. Depending on the width of your servo, you may have to cut notches in the two mounting rails for clearance.

Run the wires through the cutouts in the ribs and then out through the pre-cut circles in the center sheeting.

(You will probably have to use a servo extension for the aileron servos, depending on the brand you use.)

Install the rudder and elevator servos into TR1. We've included four TR2s in LP1 and LP2, which you can use to give thickness to the mounting points.



Finish the layout of your radio gear by adding the receiver and ESC.

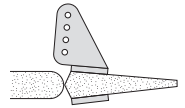
We mounted the receiver and ESC using a bit of self-adhesive hook-and-loop (not included).

Step 77 - Pushrod installation

Now it's time to mount all of the control horns, one for each control surface. A control horn consists of the horn's plastic backer plate and two 2-56 x 5/16" self-tapping screws; you'll find all of that in the hardware bag.

Note - for the ailerons, you'll use the two 2-56 x 1/2" machine screws instead.

Each control horn should be mounted so it's in-line with the pushrod opening, and the holes in the control horn should be in-line with the hinge, as shown in this diagram.



You'll need to carefully mark and drill the mounting holes, using the control horn as a guide. Then you insert the screws and thread them into the backer plate from the other side. Tighten the screws to firmly hold the control horn in place, but do not crush the wood of the control surface.

As for the pushrods, we're not going to go in-depth on how they work, as that's covered in their included instructions. Basically, you'll measure and cut the pushrods to length, taking into account the length of any clevises (or z-bends) on the end of the pushrods. We typically have one end of the pushrod (the exposed end for the elevator and rudder pushrods) that has an adjustable clevis. The other end is usually a simple z-bend that attaches to the servo horn. Doing it this way allows for fine adjustments at the field without having to get inside the plane taking things apart.

Also, when setting up the pushrods, the various holes in the servo arm and the control horns can drastically change the amount of throw that the surfaces will have. Here's a rudimentary diagram that shows how you can remove or add throw to a surface mechanically - simply by changing the holes used.



Sample control horn and pushrod installation for elevator and rudder

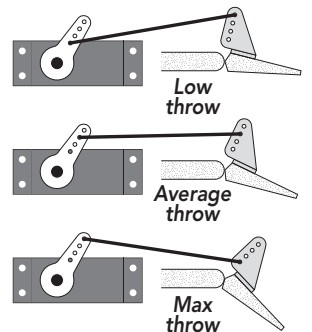


Sample control horn and pushrod installation for ailerons

Step 78 - Recommended Control Throws:

The amount of control throw should be adjusted as closely as possible using mechanical means, rather than making large changes electronically at the radio.

By moving the position of the clevis at the control horn toward the outermost hole, you will decrease the amount of control throw of the control surface. Moving it toward the control surface will increase the amount of throw. Moving the pushrod wire at the servo arm will have the opposite effect: moving it closer to the center will decrease throw, and moving it away from the



center will increase throw. Work with a combination of the two to achieve something relatively close to these throws that are good for everyday sport flying. If competing in pattern, you'll probably want to dial these down a bit to give a smoother appearance to your maneuvers.

Aileron 3/8" up/down (40% expo)

Elevator 3/8" up/down (33% expo)

Rudder 1/2" left/right (0% expo)

Step 79 - Flaperons

If your radio has flaperon mixing you might want to add that to your Dart. It can allow you fly even slower when cruising, shorter takeoffs, and slower landings.

To do this you need a 5+ channel receiver, as you'll need to move one of the aileron servos into another channel, plus you'd need the transmitter with this mixing capability, as I mentioned earlier.

I found it best to control the flaps with a 3 -position switch. These are the settings I used:

- Position 1 - no flaps
- Position 2 - half flaps (3/16")
- Position 3 - full flaps (3/8")

Of course you can play around with this and find settings that work for you, just use this as a starting point.

Please, please, please!

Check the direction that each control surface moves.

Then double check the directions.

Walk away for a while, then come back and check the directions again.

The number one cause of a crash of any brand new airplane on its maiden flight is having the wrong throw for one (or more) of the control surfaces.

This completes the assembly of the Dart. Now you'll need to adjust the control throws and check for balance.

Recommended C.G. setting:

An important part of preparing the aircraft for flight is properly balancing the model. This is especially important because of the various motor/battery combinations that can be used.

CAUTION! DO NOT SKIP THIS STEP!

The recommended Center of Gravity (CG) for the Dart is 2" from the leading edge of the wing, and you'll see this marked on the fuselage plan with this symbol.

C.G. BALANCE POINT



If necessary, move the battery, receiver, and/or add weight to either the nose or the tail

until the correct balance is achieved. Stick-on weights are available at your local hobby store and work well for this purpose.

We recommend balancing it at the forward point for the first flights, then moving it backward if you'd like it to be a little more maneuverable.

Preflight:

Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases, the radio should be charged the night before going out flying. Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the engine and make sure it transitions smoothly from idle to full throttle and back. Also ensure the engine is tuned according to the manufacturer's instructions, and it will run consistently and constantly at full throttle when adjusted.

Check all the control horns, servo horns and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

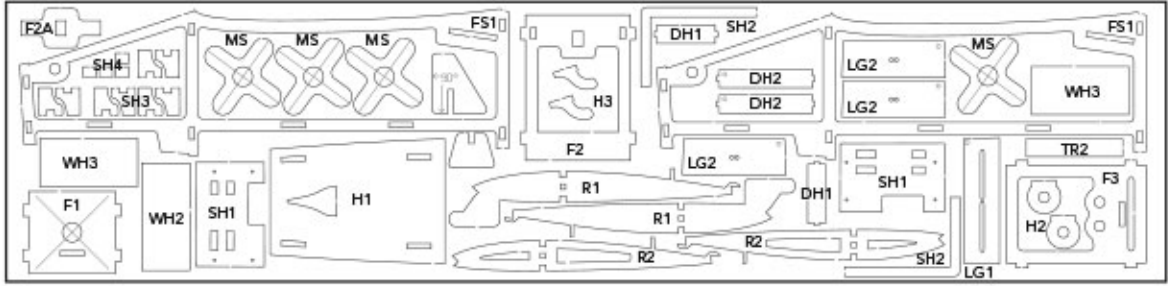
Range check your radio before flying

Before each flying session, range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane, but do not attach the arming switch.

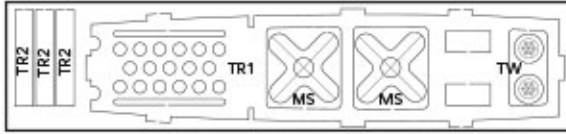
With your airplane on the ground, you should be able to walk 30 paces away from your airplane and still have complete control of all functions.

If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

LP1
1/8" Lite Ply



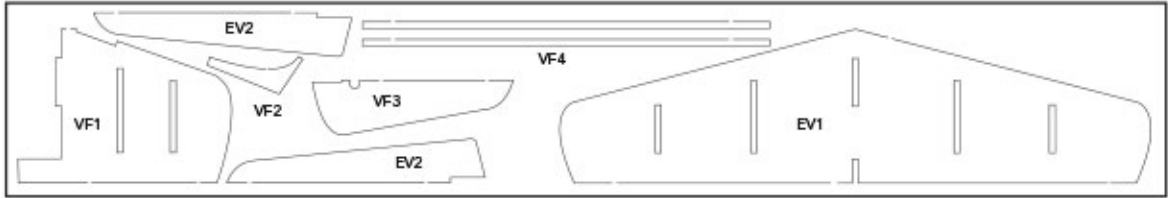
LP2
1/8" Lite Ply



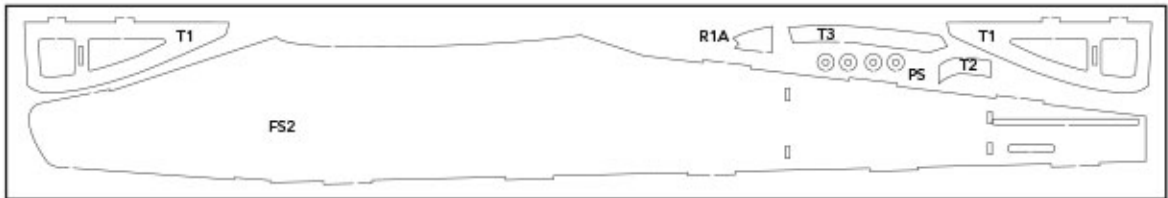
LP3
1/16" Ply



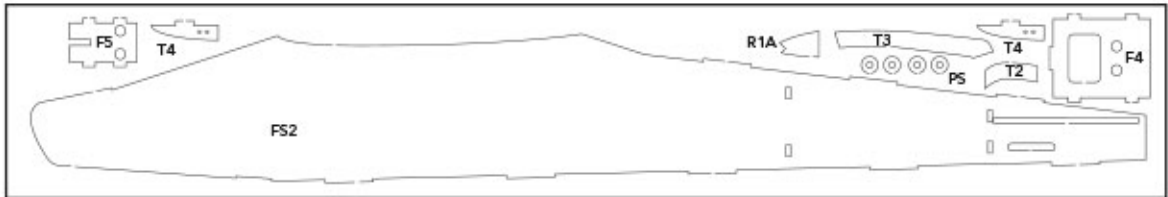
BP1
1/8" Balsa



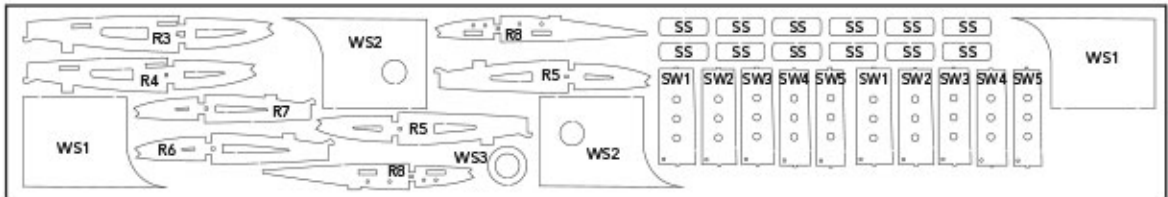
BP2
3/32" Balsa



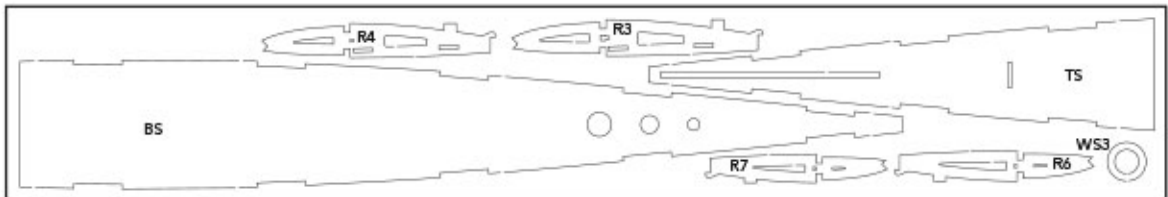
BP3
3/32" Balsa



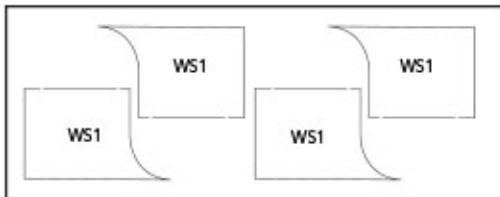
BP4
1/16" Balsa



BP5
1/16" Balsa



BP6
1/16" Balsa



Warranty Information

Old School Model Works guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any parts damage by use or modification. In no case shall **Old School Model Works'** liability exceed the original cost of the purchased kit. If you find any damaged or missing parts, contact us within 60 days from purchase to receive replacement(s).

Further, **Old School Model Works** reserves the right to change or modify this warranty without notice.

In that **Old School Model Works** has no control over the final assembly or material used for the final assembly, no liability shall be assumed nor accepted for any damage of the final user-assembled product. By the act of using the product, the user accepts all resulting liability.

Limit of Liability

In the use of this product, our only obligation shall be to replace such quantity of the product proven to be defective. The user shall determine the suitability of the product for his or her intended use and shall assume all risk and liability in connection therewith.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unopened condition.

As of this printing, you are required to register with the FAA if you own this product.

For up-to-date information on how to register with the FAA, visit:

<https://registermyuas.faa.gov> .

For additional assistance on regulations and guidance of UAS usage, visit: <http://www.knowbeforeyoufly.org> .

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