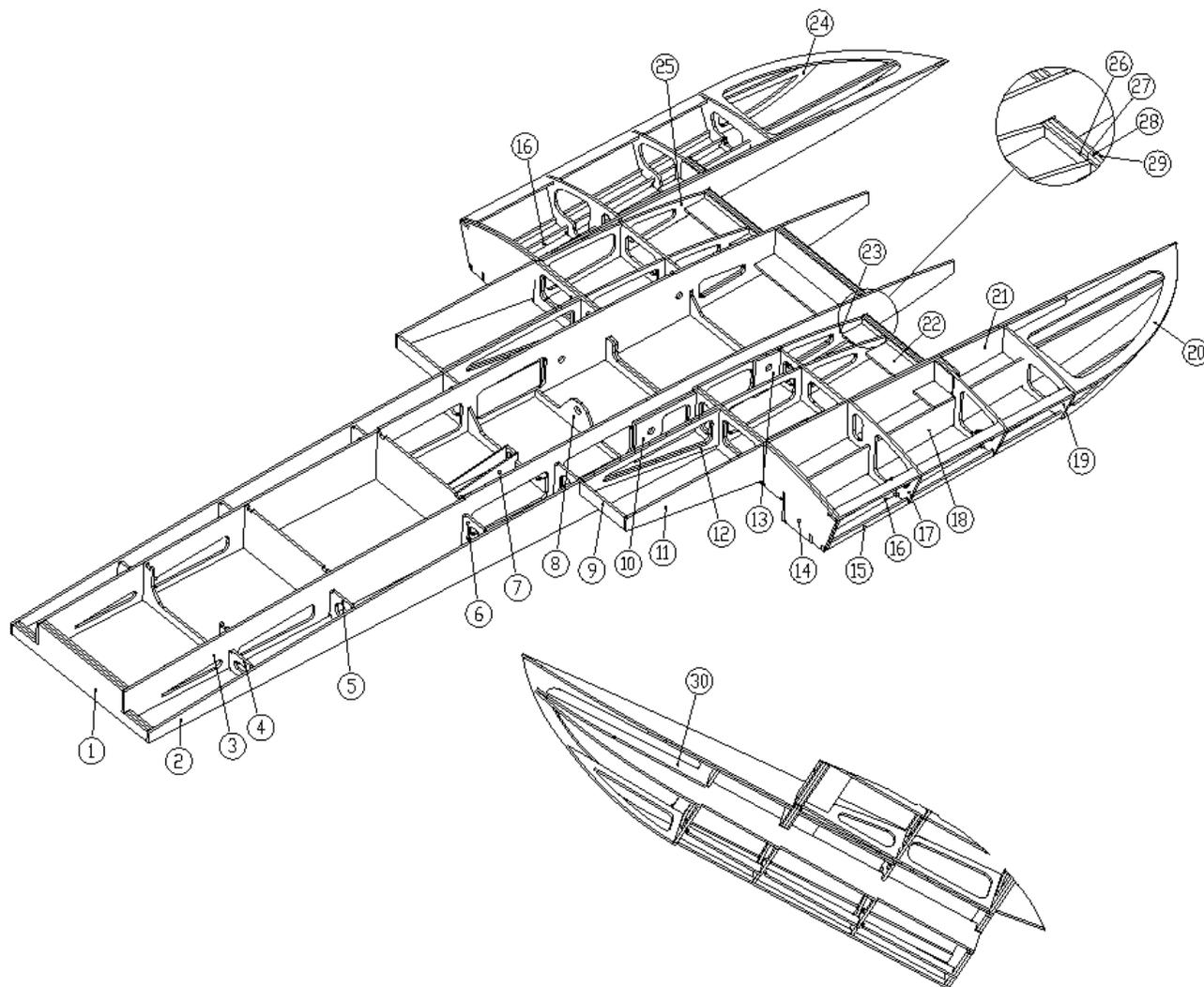


# *BACKLASH Gen3*

Designed by: Blazer Marine

[www.BlazerMarine.com](http://www.BlazerMarine.com)

513-598-1769



Thank you for choosing to build the Backlash Sport Hydro. The Backlash is the second Sport Hydro offering from Blazer Marine. The first offering was the Whiplash, which has held every speed record, won over 20 National Championships, and was the first very successful wood kit designed for gas engines. The Backlash, as with every kit from Blazer Marine is designed using state of the art 3d modeling software. Each piece in the laser cut kit will fit up perfectly with the mating part. We hope you enjoy the build as much as we enjoy bringing successful, fully tested, original designs to the market. Take your time and have fun with the build!

## **Tools and supplies required to build the Backlash:**

1. 1"x12"x36" MDF or flat plywood. Must be flat as this will form the contour of your boat.
2. 2 ounces of thick CA glue
3. 2 ounces of thin CA glue
4. 2 ounces of CA Accelerator
5. High quality epoxy (MAS Medium, or West System Medium). MAS has 24oz kits which is enough to construct and seal the boat.
6. Sanding blocks with 80 and 220 grit paper.
7. Small block planer is helpful, but not necessary
8. Weights (anything around the house will work)
9. Spring clamps and clothes line clips (You can never have enough)
10. Square
11. Ruler
12. Drill with bits
13. Razor knife
14. 2 pool noodles (Used for floatation and for clamping)
15. (2) 1"x24" (approximately) pieces of flat stock (used for clamping)
16. Masking tape
17. Rubber Bands
18. Wax Paper
19. Straight edge (36" ruler or flat piece of metal/wood)
20. Paper towels
21. Latex gloves
22. Bristle brush or foam brush for epoxy
23. PATIENCE AND PRIDE

## **Hardware needed to finish the Backlash:**

1. Gas engine of your choice
2. Hyper torque style 5" standard engine mount (CC-Racing, Gizmo etc)
3. 1/4" cullet for engine
4. 1/4" flex shaft cable, 36" long
5. Tuned pipe with 90 degree header (no offset)
6. 2-Channel radio with two standard size servos.
  - o 1- Standard Torque servo for throttle (Example: Futaba S3003)
  - o 1- High Torque servo for rudder (Example: Tower Hobbies TS-150)
7. Throttle pushrod (4-40 size, 12" long) with clevises.
8. Rudder pushrod
  - o (2) 4-40 size rods, 12" long
  - o (2) 1/4" nylon screws, 1" long

- (1) 1/4"x12" 1/4" carbon tube (arrow)
  - (2) Clevises
9. (2) Pushrod seals
  10. 250ml or 500ml IV Bag with fittings.
  11. 1/4" Round Bottom Strut (Speedmaster SPDS-008-250HR)
  12. Rudder (Speedmaster SPDR-011-60SB)
  13. 1/4" Drive Dog
  14. 1/4"-28 Prop Nut
  15. 1/4" Wheel Collar
  16. 5' large (5/32" i.d.) silicone water line
  17. 5/16" diameter brass tube – 36" long
  18. 11/32" diameter brass tube – 6" long
  19. Antenna

## Build Techniques:

### Building Jig:

- The only building jig you need is a flat surface. The flatter your work surface is, the flatter your boat will be. Trust the laser cut parts! A traditional jig where the top of the jig matches the bottom contour of the boat will never be as accurate as what the laser cut parts will automatically give you. Keep it simple and just use a flat board (MDF works well)

### Where to CA, and where to Epoxy:

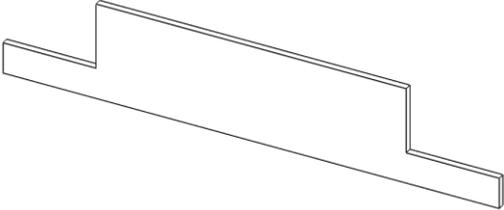
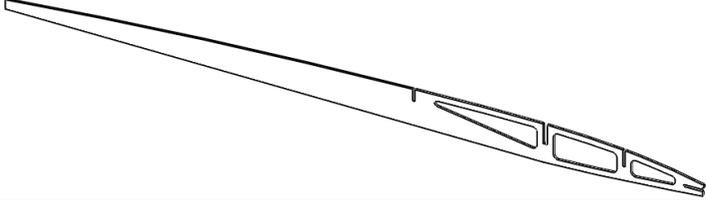
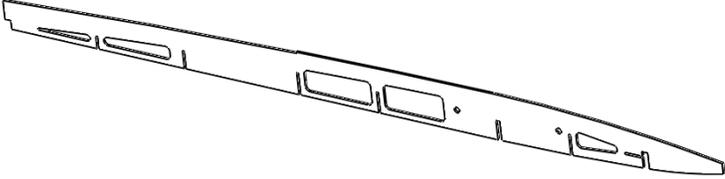
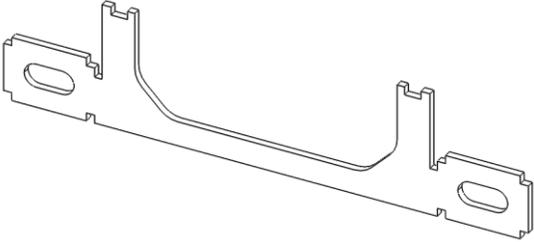
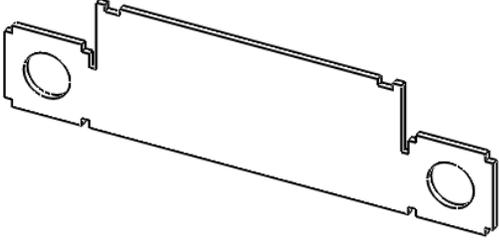
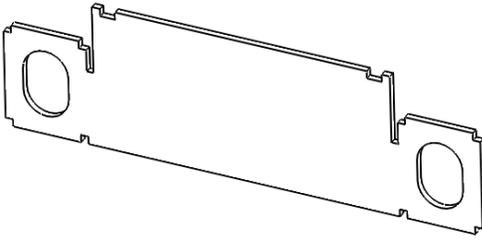
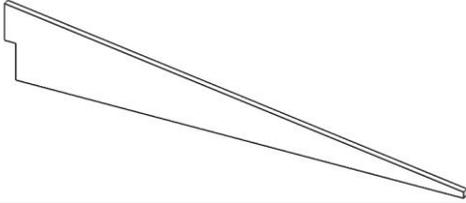
- Everyone has different opinions on this topic. Some people don't use any CA, some people use CA for the frames, some people use CA everywhere. It is a fact that CA is strong, but brittle and susceptible to cracking due to vibration or impact.
- I have never cracked an internal frame joint with the outer skin still bonded. I have always tacked my frames together with medium/thick CA. Since I have not had one failure, I suggest you use this method. Simply slide the frames together and apply a small bead of CA at the joint. Wipe away any excess with a paper towel. You do not want to use thin CA for this as thin CA requires compression of the mating parts to work well.
- I use CA when bonding similar frames together (transom pieces, turn fin doubler frames, and front frames). I have had good luck just clamping the frames together dry, and then apply thin CA around the perimeter. The thin CA will wick into the joint. Continue to apply the thin CA until it no longer wicks into the joint. If you use medium/thick CA or epoxy, coat the face of each piece and clamp together.

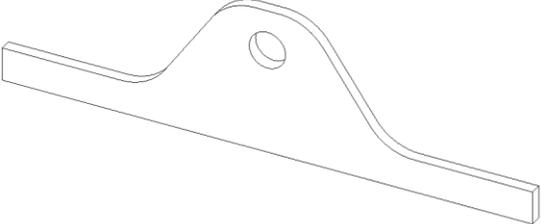
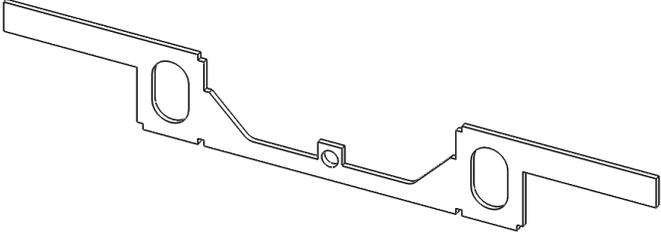
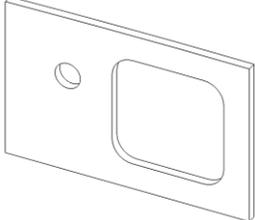
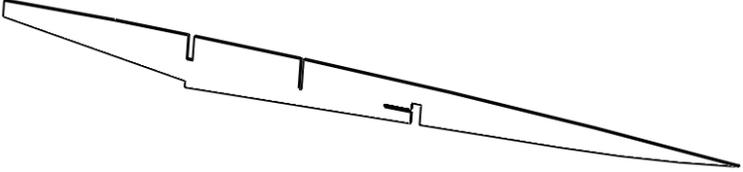
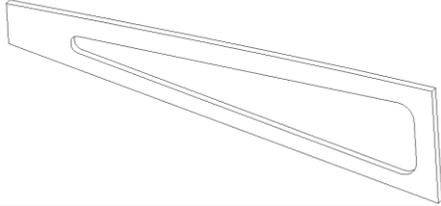
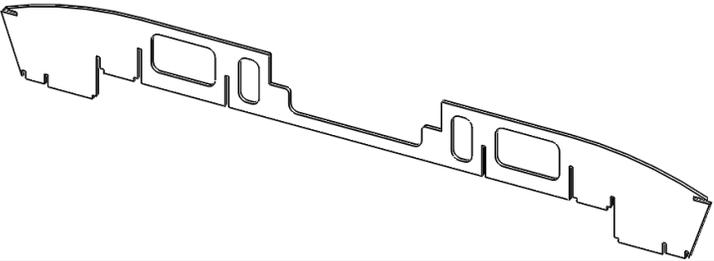
- I use CA when gluing the 1/8"x1/8" basswood to the birch frames. Again, wipe away any excess CA.
- I hear all the time that you should not use CA for bottom skins. I believe this to be true if you don't know how to apply the CA. When I put my bottom skins / sponson sheeting on, I use both thicknesses of CA. For the bottom sheeting, I use thin CA. I apply pressure to the joint and let the thin CA wick into the joint. I continue to apply the CA until it no longer wicks in. I then wipe away any excess CA. It is very important to wipe away all excess CA. You NEVER want to puddle up CA. I use thick CA for the sponson sheeting, again, wiping away excess CA. Once the bottom and sponsons are completely done, I then apply a good coat of either MAS Epoxy or West System Epoxy (usually put the decks on at the same time). Be sure that there is a build-up of epoxy at each joint, creating a fillet. This fillet creates your joint strength.
- The top decks should ALWAYS get glued in place with epoxy. I like to mix cabosil with the epoxy for perimeter bonding. Cabosil thickens the epoxy and helps it stay on the frames where you want the bond to take place.

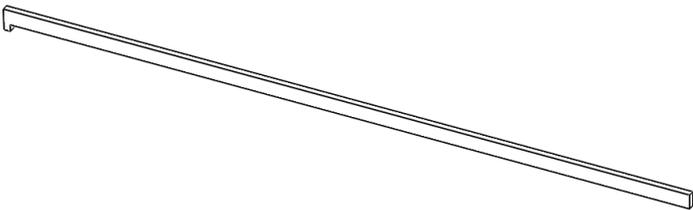
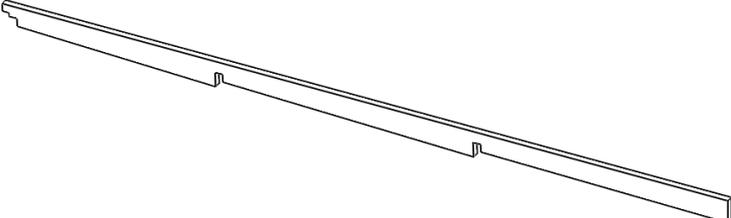
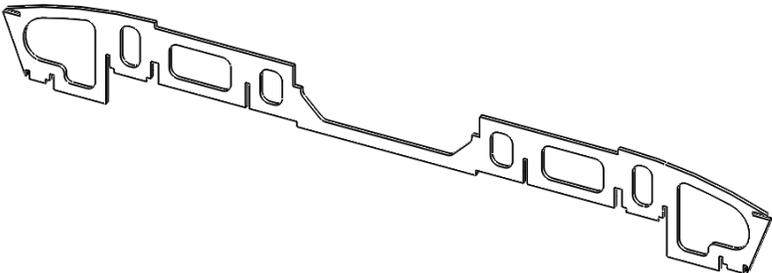
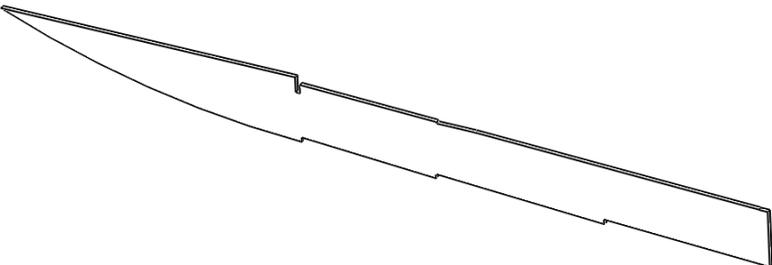
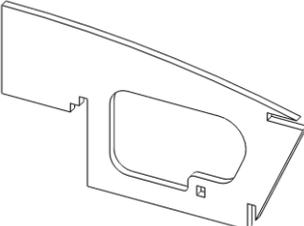
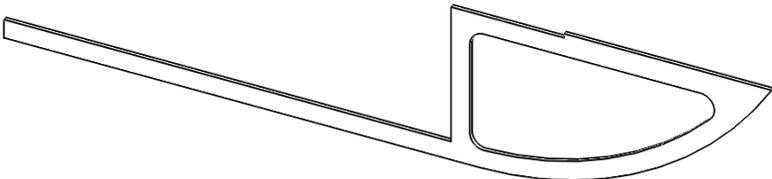
#### Part preparation:

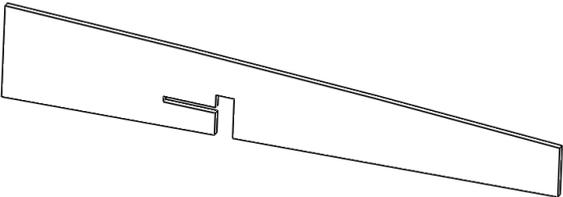
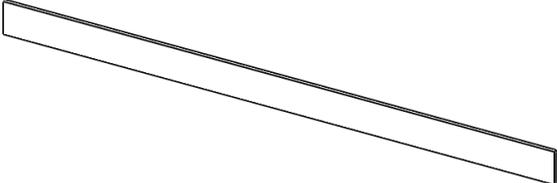
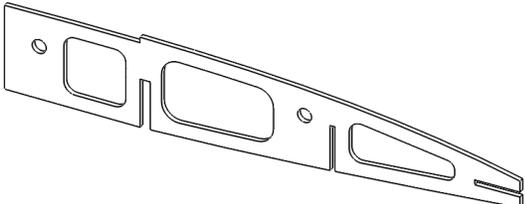
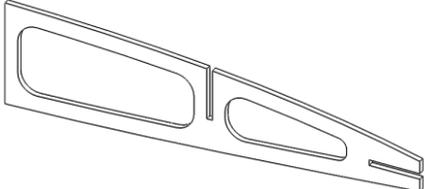
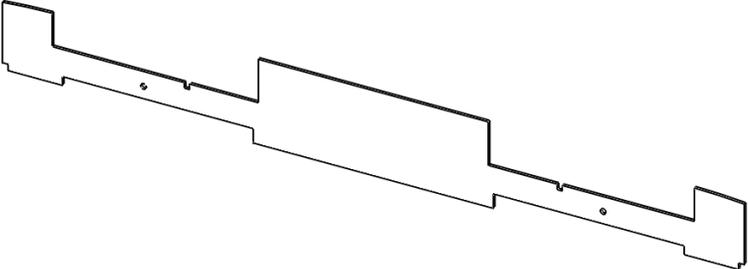
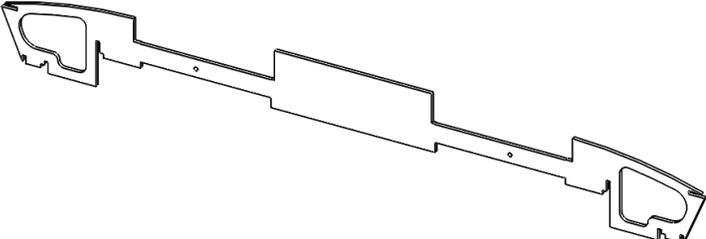
- Lightly sand the face of each part to get rid of the burn marks caused by the laser.
- Do not sand the burn mark off the edges until you are ready to apply skins. Epoxy/CA does not stick to the burnt edges very well, but it is beneficial to leave the burnt edge on each piece. When your framework is tacked together, you will have to block sand the framework prior to gluing any skin onto the boat. As you sand the framework, the burnt edges will sand away. If you are sanding and you still have a burnt edge visible, then you know you have a low spot in the framework.
- It is not necessary to sand the internal notches on the 1/8" parts to remove the burn marks. I have never sanded them, and have never had a joint failure.
- It is necessary to sand the 1/16" edges to remove the burn marks prior to gluing the skins to the boat.

Locate all of the parts, and lightly mark each frame with corresponding frame number. All parts are symmetrical, so there is not a left hand or a right hand.

FRAME #	THICKNESS	QUANTITY	PART IDENTIFICATION
1	1/8"	3	
2	1/8"	2	
3	1/8"	2	
4	1/8"	1	
5	1/8"	1	
6	1/8"	1	
7	1/16"	2	

FRAME #	THICKNESS	QUANTITY	PART IDENTIFICATION
8	1/8"	1	
9	1/8"	1	
10	1/8"	2	
11	1/8"	2	
12	1/8"	2	
13	1/8"	2	
14	1/8"	2	

FRAME #	THICKNESS	QUANTITY	PART IDENTIFICATION
15	1/8"	2	
16	1/8"	2	
17	1/8"	1	
18	1/8"	2	
19	1/8"	2	
20	1/8"	2	

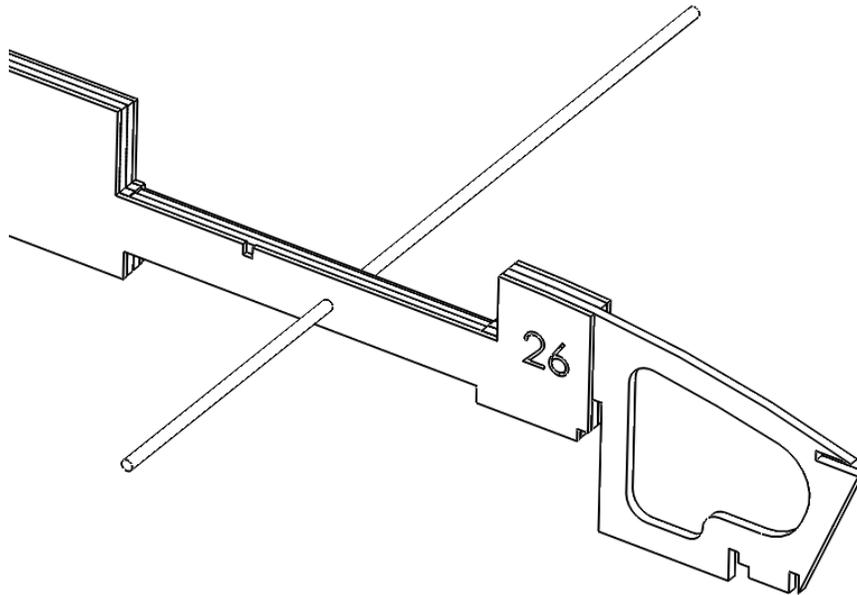
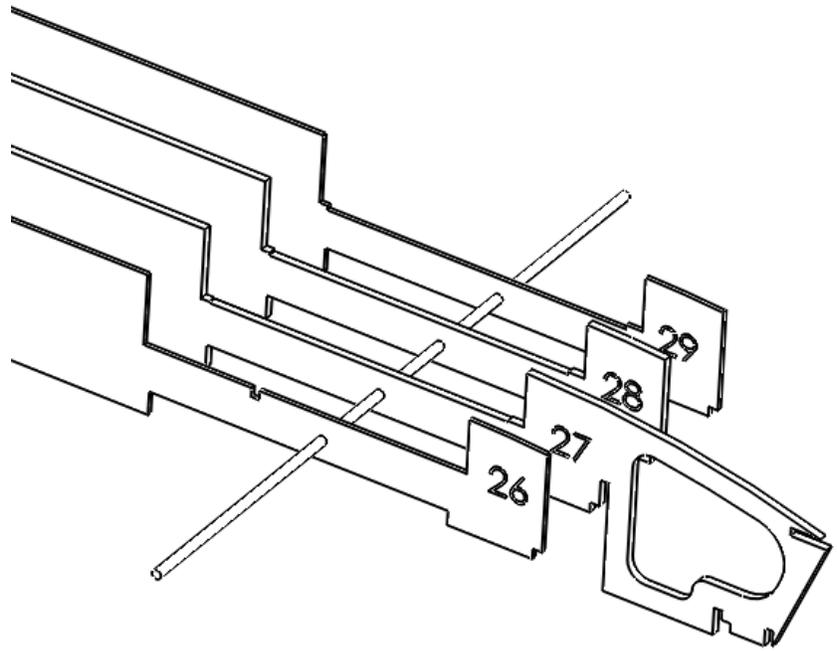
FRAME #	THICKNESS	QUANTITY	PART IDENTIFICATION
21	1/8"	2	
22	1/8"	1	
23	1/8"	2	
24	1/8"	2	
25	1/8"	2	
26	1/16"	1	
27	1/8"	1	



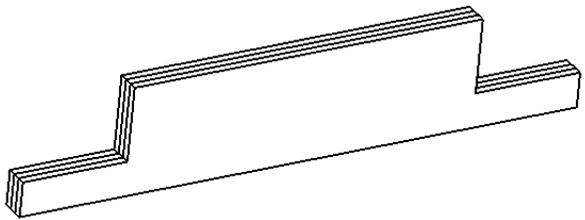
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DIRECTION AND DETAIL

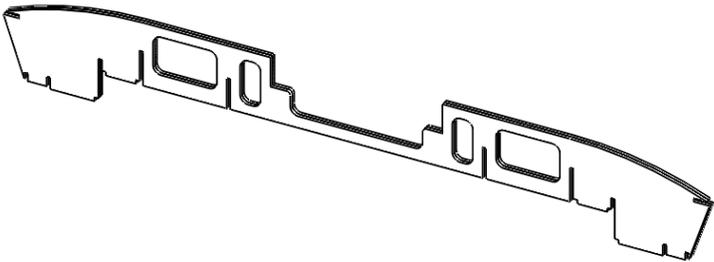
1. Frames 26, 27, 28, and 29 have 1/8" alignment holes burned into each part. Each piece is different, so it is very important that you ignore everything else except for the holes. Insert a 1/8" drill bit into each hole as shown. If you don't have an 1/8" drill bit (or only have one), drill out each hole to the next size up and use that same drill bit as your alignment pin. Make sure your part sequence is in order, 26-29 as shown. Either use epoxy, or CA to glue the parts together.



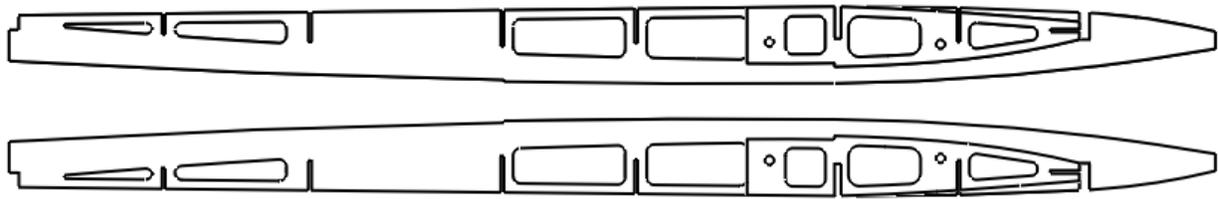
2 Glue the three #1 frames together with CA or Epoxy. These parts are identical.



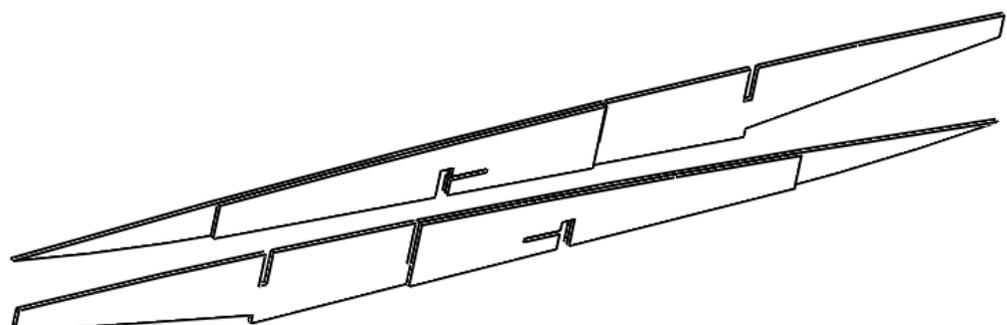
3 Glue the two #14 frames together with CA or Epoxy. These parts are identical.



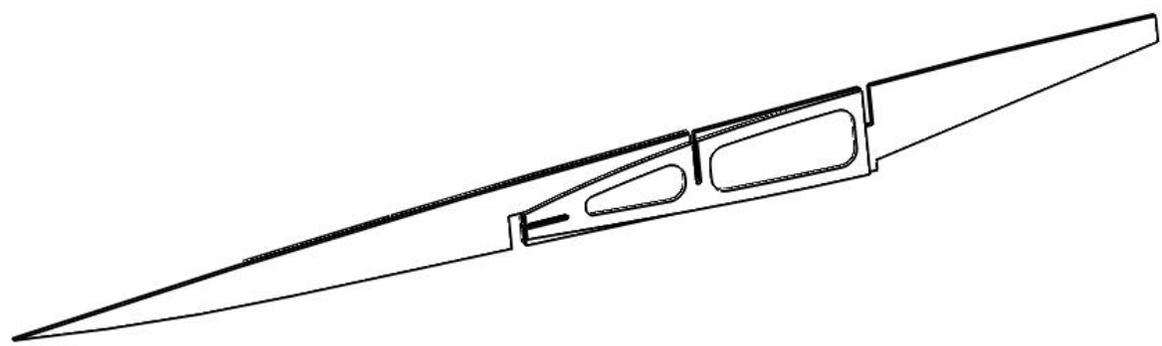
4 Glue frames 3 and 23 together as shown. Make sure you make a left hand version, and a right hand version. You can use CA or Epoxy for this step. Make sure the holes and slots match up perfectly.



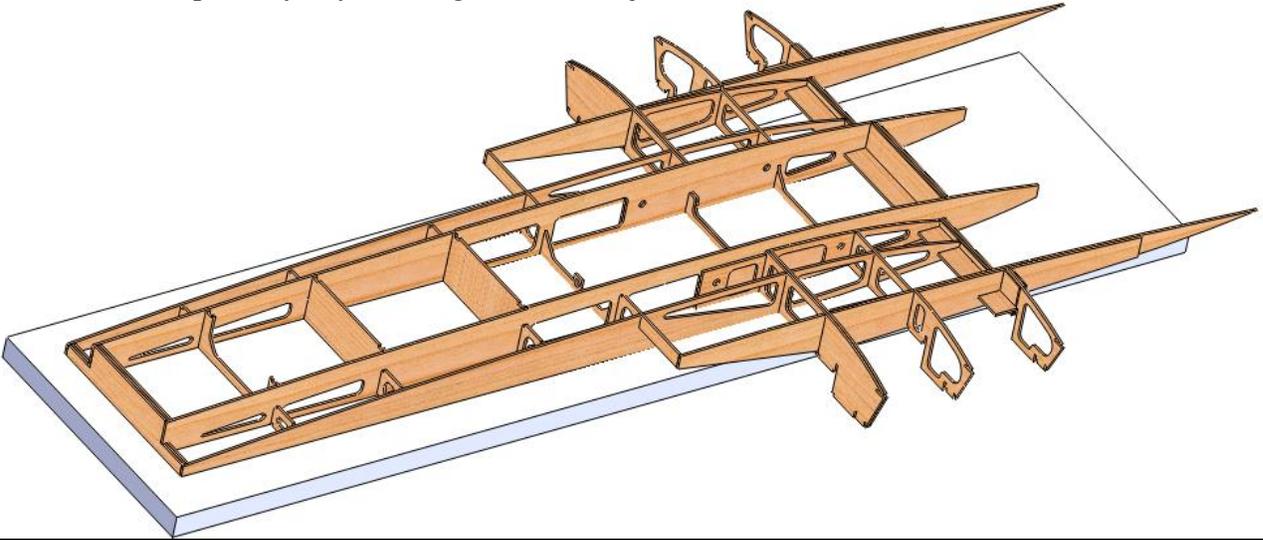
5 Glue frames 11 and 21 together as shown. Make sure you make a left hand version, and a right hand version. You can use CA or Epoxy for this step. Make sure the slots match up perfectly.



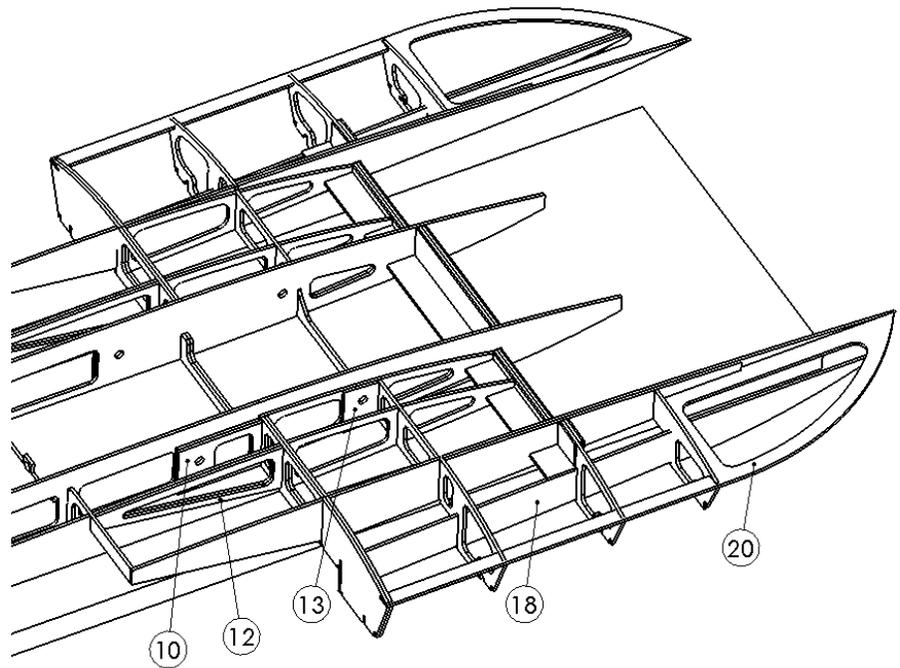
6. On the back side of frames (11 & 21) you just glued together in step 5, glue #25 as shown. You can use CA or Epoxy for this step. Make sure the slots match up perfectly.



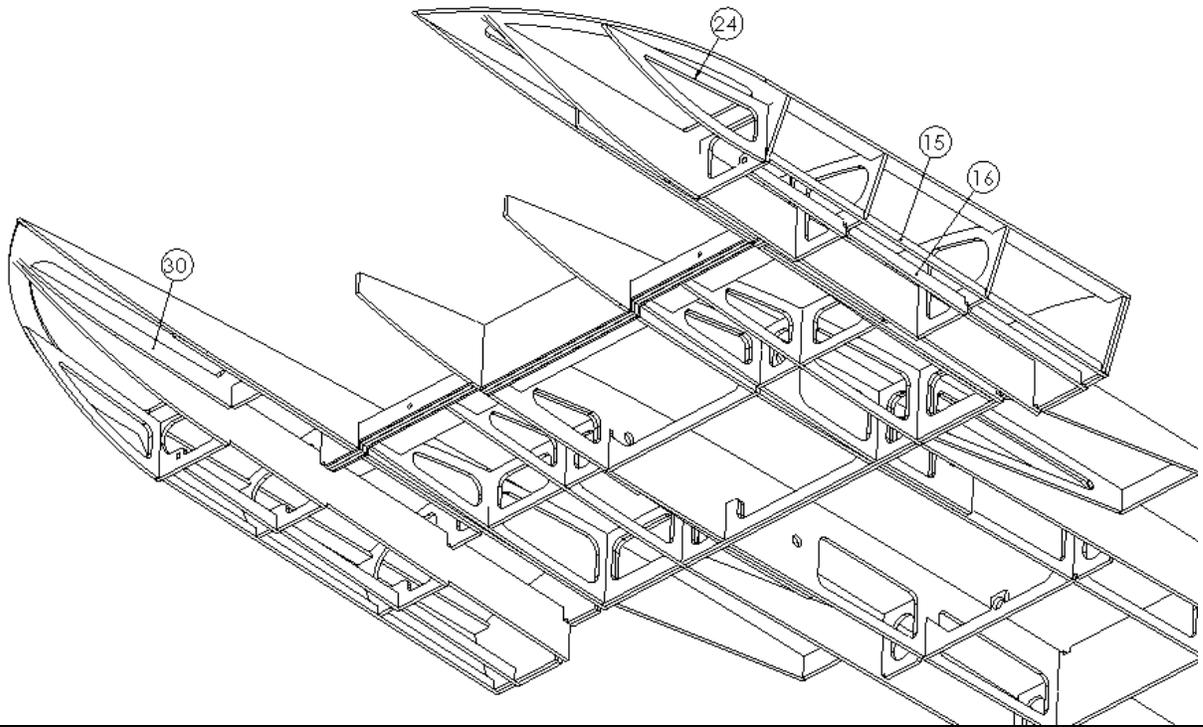
- 7 Place wax paper on your building board and dry fit the frames as shown. All of the frames are symmetrical except for the 26-29 assembly, which was glued together in step #1. Make sure frame #26 of the assembly is facing the rear of the boat, and frame #29 is towards the front. All of the frames should lay flat on the building board except for #17, and the #26-29 assembly. Once you are happy with the fit and each frame is square (90 degrees), you can start gluing. If using CA, remember to wipe away any excess glue from the joint.



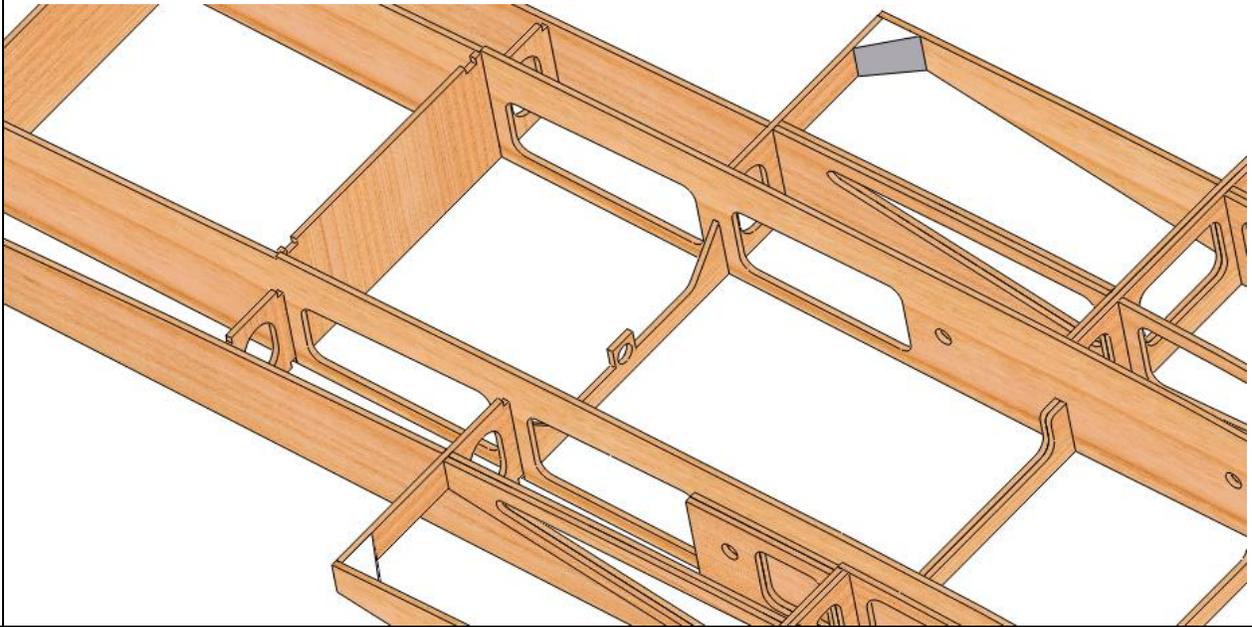
- 8 Glue frames 10, 12, 13, 18 and 20 in place as shown. Clamp a straight edge to frame #18 to make sure it is perfectly straight.



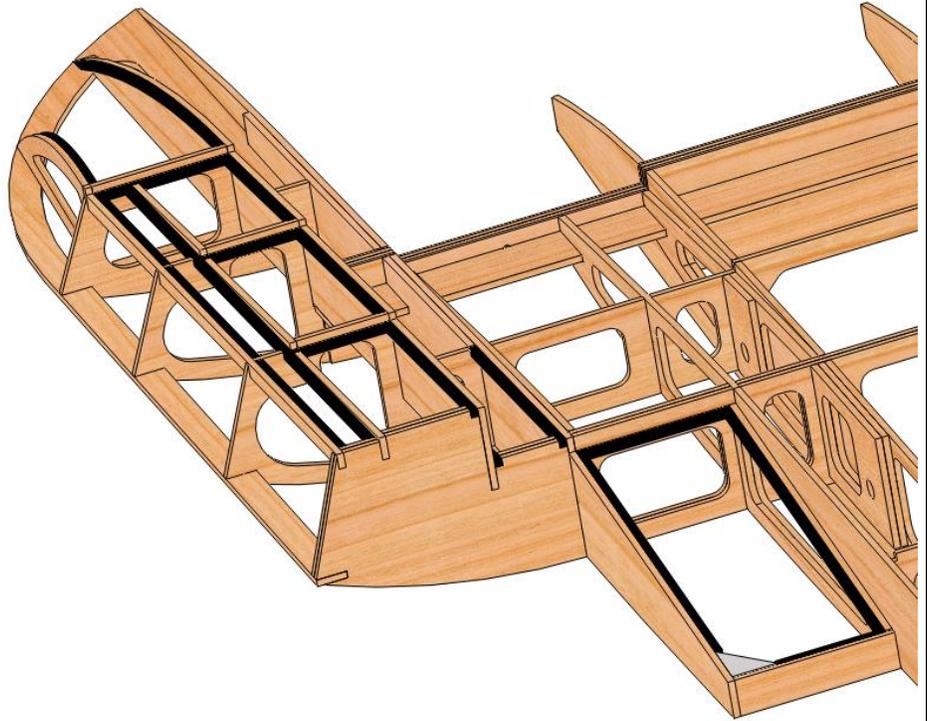
- 9 Glue frames 15, 16, 24 and 30 in place as shown. The tip of frame 24 should be tangential to outside of frame 20.



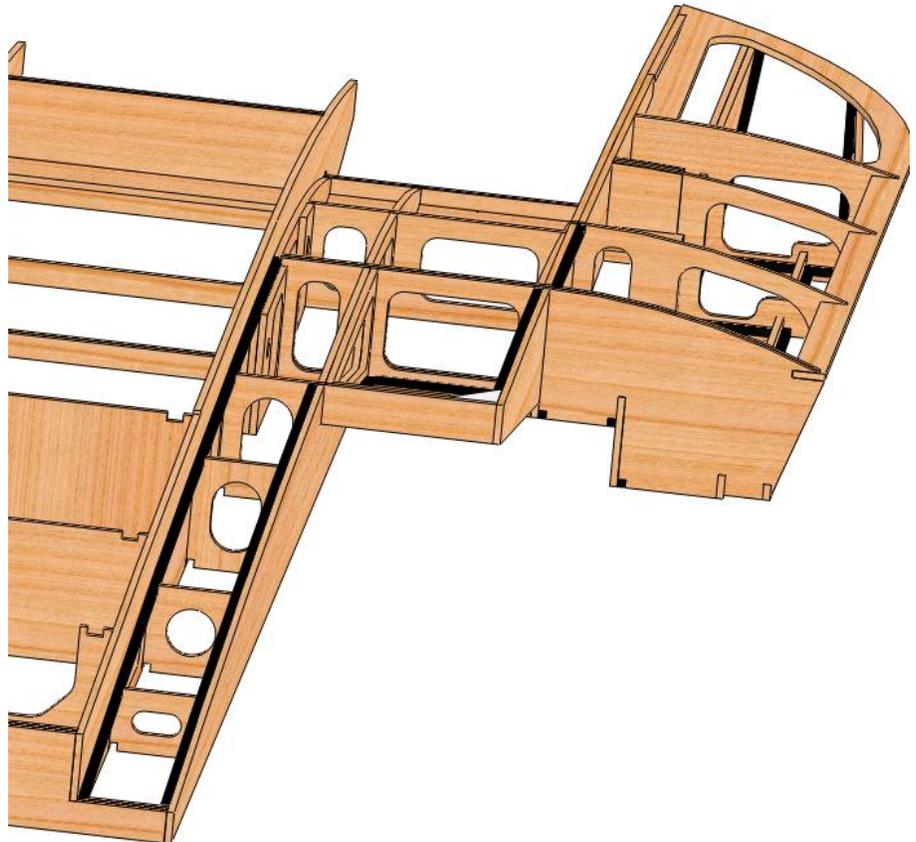
- 10 Cut two (2) 1" long pieces from the supplied basswood triangle stock. Glue them where frames #9 and #11 come together. Use a block sander and sand the top, and bottom of the triangle to the shape of frame #11.



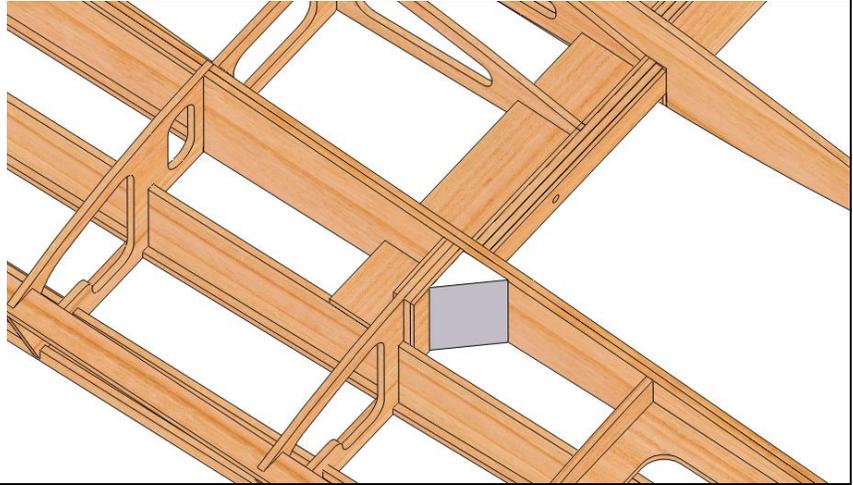
11 Cut and glue 1/8" basswood strips in place wherever the outside edges of the skin will touch. The Basswood doubles the gluing surface, thus making better glue joints. CA these in place.



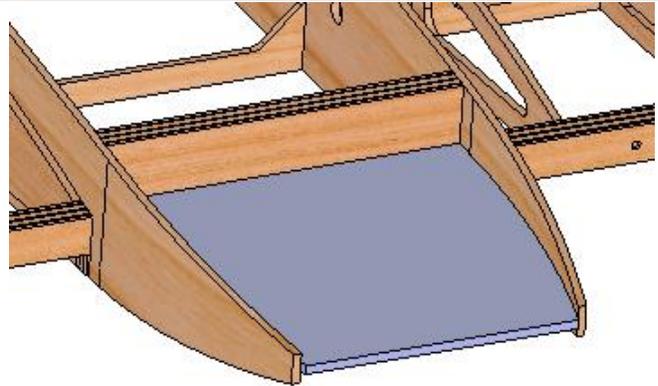
12 Continue to apply the 1/8" basswood to the top of the boat. Glue the basswood in place wherever the outside edges of the skin will touch.



13 Cut two (2) 1-5/8" long pieces from the supplied basswood triangle stock. Glue them to the inside sponson as shown. Sand the top and bottom flush with the mating framework.



14 Included in the kit is a nose template. This is tacked in place with CA and will be removed later on. The nose template creates a uniform shape for the cowl.



Now that we have all of the reinforcements in place, we can start gluing the skins on. Before anything is glued, the mating surface must be properly prepared. This is where a block sander is used, and will be used quite often. If you take a piece of sandpaper in your hand and try to sand a straight edge on a piece of wood, you will never get a flat edge. This is because your fingers will conform to any imperfections in the wood. If you put that same piece of sandpaper against a block of wood and perform the same task, you will get a perfectly straight edge. So always use a sanding block when you are preparing to glue your skins.

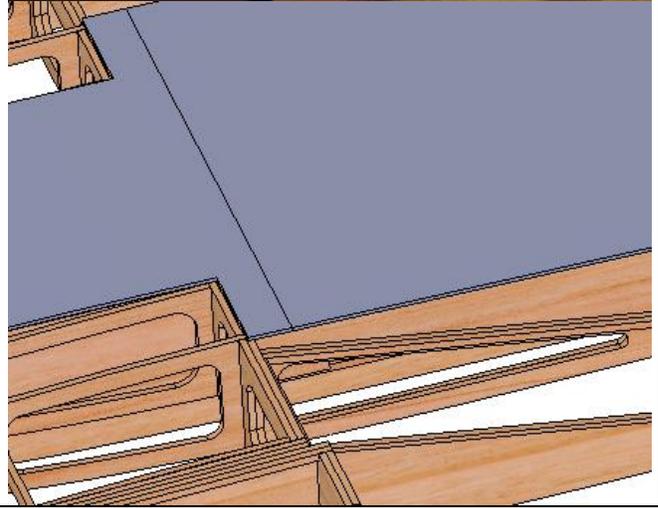
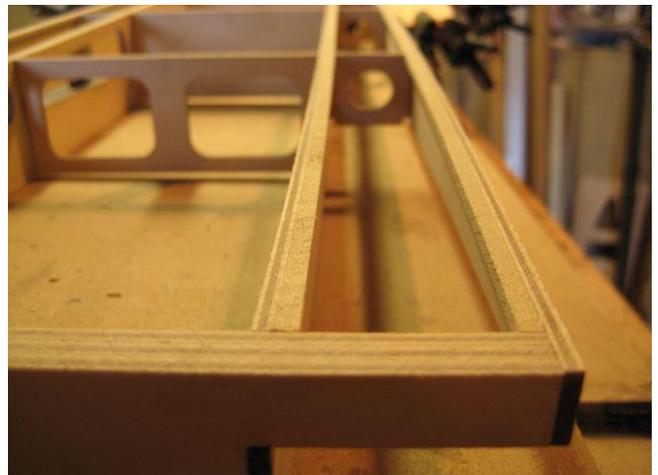
Here is a picture of the various sanding blocks I used when building a boat. Some are store bought, and some are just wood blocks with sandpaper stapled to them which works equally as well. I also use a block plane to quickly take material off skins after the glue has dried. The block plane gets the material close, then a block sander is used for the finishing. I usually use 40 grit, 80 grit and 180 grit sandpaper.



15 The first piece of skin we will glue on is the main bottom skin. This is the largest skin and will cover the transom to the nose. To start, use your largest block sander and sand the entire bottom of the boat. Sand until all burn marks from the laser are gone and the frames rest flush on your building board. The skin is cut oversized so it can be sanded perfectly flush with the sides after the glue has dried.

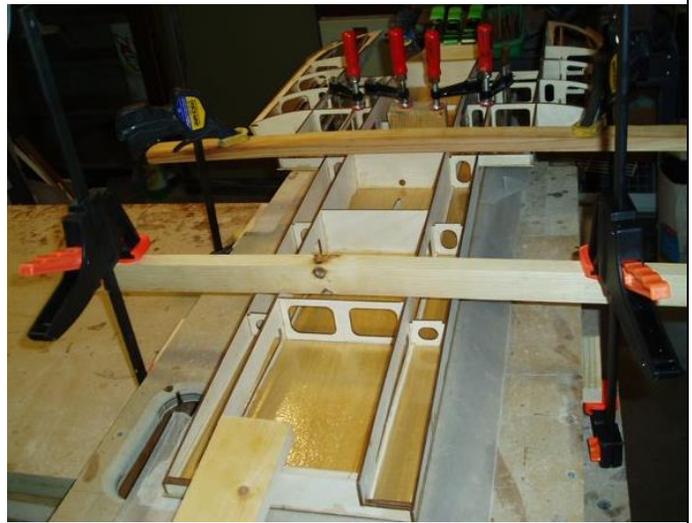
Please note: This picture is from Gen2

Coat one side of the bottom skin with epoxy, and place the skin onto the frames. The notch in the bottom sheeting should rest in-between the two #14 frames, which were glued together to make one frame. To make sure the bottom skin doesn't move while the epoxy cures, I suggest putting a small tack of CA at the joint.



16 Place wax paper onto your building surface, and flip the boat over so the bottom skin is resting perfectly flat. This is the first step to make sure your boat will be perfectly straight! Use weights and clamps to ensure the skin is resting on the framework properly. Once the epoxy cures, there is no going back. Make sure everything is mating up perfectly.

Please note: This picture is from Gen2



17 Block sand the framework for the tear drop, then epoxy the teardrop skin in place.



18 Block sand the framework in preparation for the two rectangular skins that complete the main body of the bottom. Make sure you block sand the front frame assembly (Frames #26-29) so that it is both straight across, and collinear with the frames that meet up with it. Once you are satisfied with the fitup, epoxy the front skin in place.



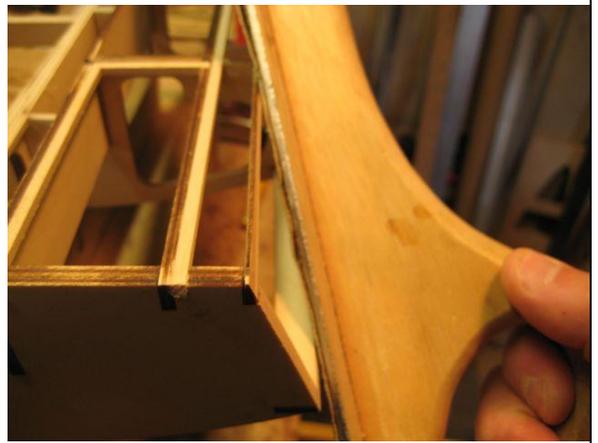
Please note: These pictures are from Gen2

19

The next sheet to glue in place is the sponson side. Take your time and make sure you prepare the framework properly. If you don't block sand properly, it will have a drastic aesthetic effect on the sponsons. Notice how much of the 1/8" framework you will sand into.

Pay special attention to make sure the bottom, outside edge is straight (use a straight edge as shown to verify). Your sponsons pads will conform to whatever shape your side sponson frames are, so take your time.

Clamp a straight edge to the inside sponson to make sure it is both straight, and parallel with the centerline of the boat. With the straight edge clamped, epoxy the skin in place.



You will have a lot of excess to trim off the side skin after the glue has cured. This can be done with your block sander, or block plane if you have one. The finished side sheet should look like this.

20 Probably the hardest piece to glue in place is the front recovery pad. After the side sheeting has fully cured and block sanded to the framework, epoxy the front recovery pad in place. You will have to use strong clamps to hold the corner down. I like to use colloidal silica, or microballoons to thicken the epoxy up to help keep the epoxy on the frames. You can also use sawdust mixed into the epoxy to serve the same purpose.



21 Glue the inside sponson sheeting, and the sponson ride pads on next only after you have first block sanded. The sponson pads are perfectly flat, so after you sand, be sure both sponsons are parallel to each other.

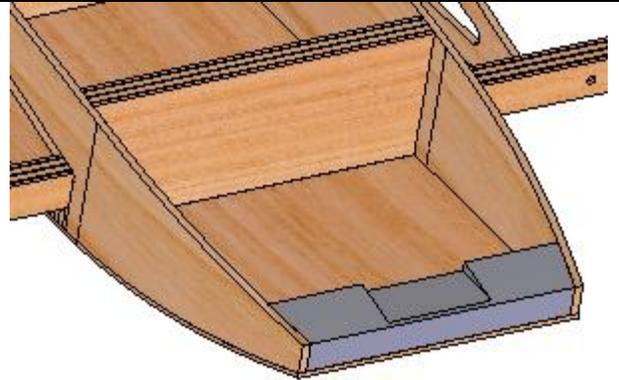
Sometimes you have to get creative when looking for ways to clamp your skins on. The white circular clamps are actually 3" diameter PVC drain pipe, cut into 1/4" sections. They work awesome for clamping in this area.

After the glue has cured, block sand the outside edges of the skins flush with the side sponson sheeting.



Congratulations! The bottom is done!!!

22 Carefully remove the nose template you tacked in place earlier in the build. Glue the angled pine block into the nose section. After the glue has cured, sand the top of the block to the shape of the engine wall sides. Notch the middle third of the block about 1/8" deep for the cowl.

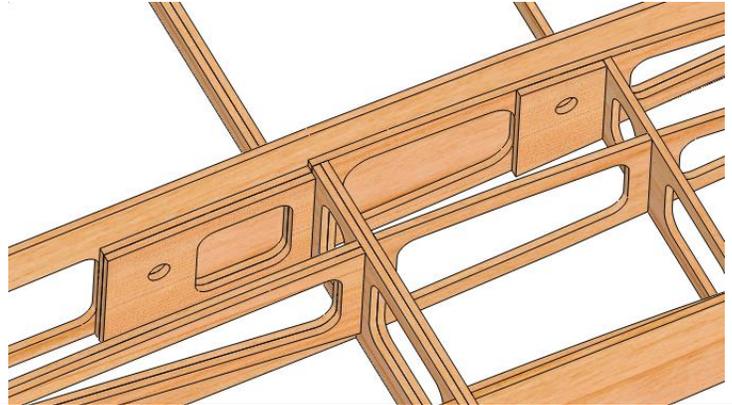


The completed bottom of the Backlash Generation 3!!!



23 Glue the engine reinforcements (10 and 13) in place. After the reinforcements are in place, install 1/4-20" blind nuts for the engine isolators.

The holes are spaced for a hyperrrtorque style mount. Gizmomotors.com and [cc-racingengines.com](http://cc-racingengines.com) both have mounts that work well.



24 The turn fin mount should be perpendicular and located 5/16" up from the bottom of the sponson. The outside edge of the mount should be even with the outside edge of the sponson pad. Drill your holes and insert #10 blind nuts.



25 Glue the 1/16" nose skin in place, leaving a ledge for the cowl to rest on. Finish off the nose with some pine or oak.



26 Cut some pool noodle and place them in the sponsons. The waterline from the rudder (RH) has to go around the radio box, so do not put any floatation in that area. When the floatation is in the boat, number each piece to keep track where they go when you put the deck on.

27 Block sand the entire top of the boat to prepare for the skins. By now you are an expert at block sanding, so do your thing. Fit the skins and figure out how you are going to clamp your skins down. It is better to be prepared for this before you start mixing epoxy. Once you are happy with the fit up, and know how you are going to clamp, seal the entire inside with epoxy. While the epoxy is still wet, put your floatation back in the boat and seal the inside top decking with epoxy. It is extremely important that the boat is on the flat building board when the decks are curing. The decks create the strength of the hull and will permanently form the boat to whatever position the boat is in while the epoxy is curing. Be sure the boat resting on your flat building board!!! I will say it again...be sure the boat is resting on your flat building board!!!

One more tip: while clamping, try to be as symmetrical as you can, especially on the tips. If you put 2 lbs of clamps on one sponson, put 2 lbs of clamps on the other sponson.



28 Turn the boat upside down and glue on the 1/16" deck doublers. You may want to glass these to the hull since people will use these to pick the boat up.



29 Sand the front of the deck and glue in either the supplied pine block, or another type of wood that suits your fancy. Sand the block to roughly the final shape before gluing it in place.

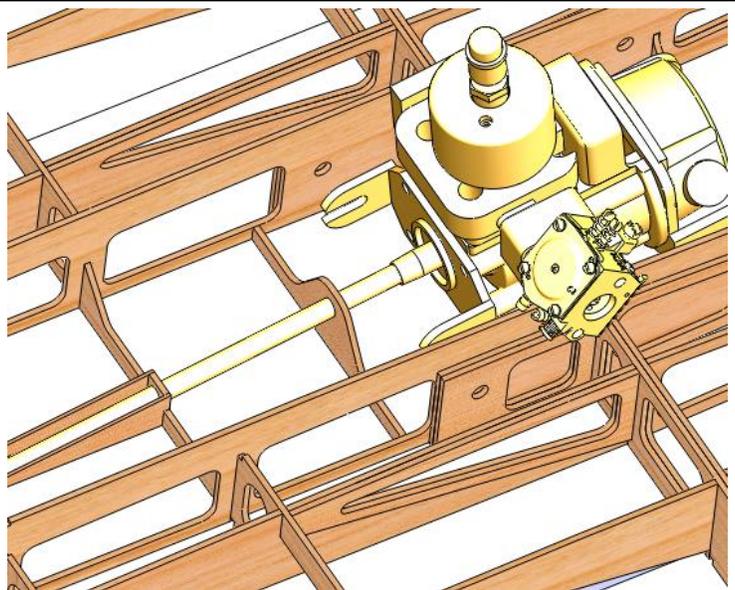


30 Glue the  $\frac{1}{4}$ " basswood strips in place from the transom to frame #6. Place your boat flat on your building surface, and epoxy the radiobox top in place. After the radiobox top has cured, cut strips of  $\frac{1}{4}$ " basswood and glue to the underside of the radiobox to finish the lip for the lids.

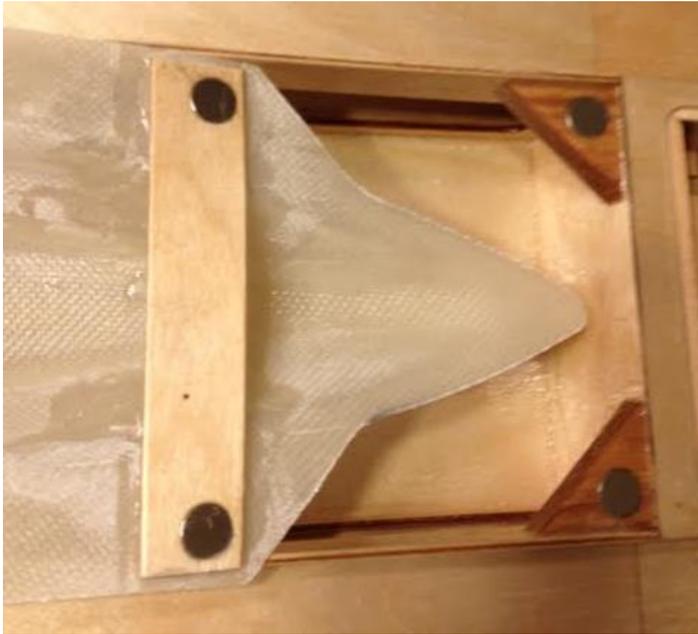


31 Install your engine and align your stuffing tube so it aligns perfectly with your crankshaft. Glue items 7 and 8 in place and tack your stuffing tube in place with CA. Turn the boat upside down and apply hot glue around the stuffing tube sleeve going thru the boat. The hot glue will seal the stuffing tube sleeve so you can fill the cavity with epoxy. If you wish to cover the cavity with wood, a piece of  $\frac{1}{16}$ " is supplied in the kit.

The hole in the bottom of the boat is for an  $\frac{11}{32}$ " tube. This short tube is glued into the boat, and the  $\frac{5}{16}$ " tube goes thru this for the flex shaft.



32 Fit the cowling to the boat. The cowl is made big so you can sand the sides to fit. Make a tab to secure the front of the cowl to the nose block, and install rare earth magnets as shown (or whatever your preference is) to hold the rear down. Profile the rear of the cowl to your liking.



33 Trace the profile of the cowl carb shield onto the deck. Glue the 1/16" carb shield (supplied with kit) to the deck, recessing it in from the line on the deck about 1/8". I like to fiberglass this in place after it is glued.



34 **You are Finished!!!! Congratulations!!!!**



35 Hardware and Setup:

Rudder: Right Hand Speedmaster Item#: SPDR-011-60SB, 60/90 with 1 1/8" Bracket (Be sure to mount the rudder on the RIGHT Side of the boat – NO EXCEPTIONS!!!)

Strut: Speedmaster Item # SPDS-008-250HR, 1/4" HYDRO, Round Bottom – Short Bracket

Turn Fin: Blazer Marine (of course!)

Props: CoCr TH1, Racers Edge 6719 #654, Racers Edge 2716 #400.

Strut should be positioned in the middle of the transom. Strut should be about 1" from the bottom of the boat to the bottom of the strut, parallel with the bottom of the boat.

Fin should be parallel with the bottom of the boat. Start to angle the fin in towards the center of the boat to increase cornering speed.

250ml fuel bag in front of motor.

90 degree zero offset header.

Every boat is different, so every setup will be different.

Good luck, and congratulations!!!