

C-3 Merchant Hull Kit

This kit will build a C-3 merchant hull from WW II, suitable for running as a R/C navel combat ship or convoy ship. These hulls were used for many different types of ships, including seaplane carriers, troop transports, and escort carriers.

The kit consists of two sheets of 1/4" birch ply laser cut parts. The hull consists of 14 ribs, a single center keel, two water channel keels, a sub-deck, and rudder.



Construction. Construction is designed to be compatible with most R/C navel combat rule sets. There is two inches of solid area in the bow and one inch in the stern. The vulnerable windows are set one inch below the waterline (10 lb minimum weight) and follow the 45 degree turn of the hull in the back. Ribs are 1/4" and are spaced a minimum of 2.5 inches apart center-to-center. Check your rule set to make sure it is compliant before starting to build.

Hull Assembly

1. Start by removing the parts from the plywood sheets. To remove the 1/4" parts, cut through the retaining tabs on both sides using a stout knife, like a utility knife, and then push the parts out. Sand off any remaining tabs on the parts.
2. Locate the 5 pieces of the subdeck. Between ribs 1 through 9, make two cuts 1/2 way through the subdeck. These slots will help the deck assume its curved shape without stressing the keel. Assemble the pieces of the subdeck and glue them together.
3. Assemble the three center keel pieces and glue them together.
4. Place the ribs on the center keel, making sure that they are pushed completely together. The fit with the ribs is tight, so use a piece of scrap 1/4" wood to push the ribs down and make sure they are fully set in the keel. Do not glue them at this time. Now add the subdeck, starting at rib 2 and then engaging the remaining ribs. Add the forecastle deck between ribs 1 and 2. Again, do not glue anything yet.
5. Place the hull on a flat surface and weigh it down on the inside to make sure keel is flat. Check each rib to make sure it is fully seated in both the keel and subdeck. If everything looks right and straight, use thin CA to glue the pieces together.



6. Determine the width of your water channel - generally just big enough to fit the pump - and place the water channel keels between ribs 4 and 9 at this width.

7. Glue the water channel keels to the ribs using CA or epoxy. Remove the center of ribs 5-8 and the portion of the center keel with them to form the water channel.



8. Place the 1/8" x 1/4" bass wood rail in the slots in the sides of the ribs. ** IMPORTANT – keep the ship on a table and use some weights to keep the keel straight for this step** The easiest way is to start at rib 14 and while carefully bending and twisting the rail to fit in each subsequent slot. If not using a continuous rail, join the pieces in the flat portion of the sides on any of ribs 6-8. Once the rail is in place, glue it with thin CA and then repeat for the second side.
9. Sand the sides and subdeck to blend them together. There will be a significant amount of material that will have to be removed from ribs 13 and 14 and from the subdeck near the bow to get the proper shape.
10. Add balsa or other soft wood in front of the first rib and after the last rib. Also fill in up to the stringer location between the last two ribs. Sand the balsa to get a nicely shaped hull.



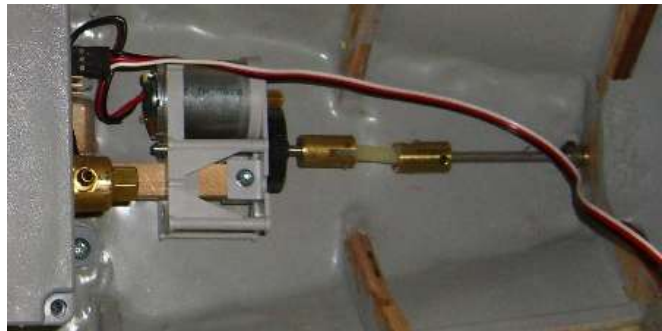
11. Sheet the center section of the hull with 1/32 plywood. When using plywood, use one piece for each rib bay. The plywood will bend around the ribs with the exception on the last bay, which will need some balsa blocks at the keel to form the tight curve.



12. Drill a 5/32" hole for the rudder post tube using the notch on the keel as a guide. Insert the tube in, making sure that it extends about 1/16" below the hull.
13. Install a 9/32" brass stuffing tube, lining it up with the front of rib 12 and the back of the center keel. Glue in place with epoxy.
14. Fill in any gaps between the pieces with spackling and sand the whole hull smooth.
15. Now is the best time to seal the hull. Paint all parts with thin epoxy or spar varnish and let cure.
16. Bend a 90 degree bend into a length of 1/8" rod to form the rudder post. Glue the rudder onto the 1/8" rudder post with epoxy. Sand the rudder post before gluing to promote adhesion. To keep the post centered while the epoxy sets, support it with some scrape 1/16" wood.
17. Mark the centerline on the back of the rudder and then sand it to an airfoil shape, using the line you have drawn and the rudder post to keep it straight.

Finishing notes:

1. Complete the stuffing shaft by adding two 1/8" x 1/4" flanged bronze bushings. Cut a drive shaft out of 1/8" stainless steel rod. Size the rod so that it extends approximately 1/4" beyond where the stuffing shaft exits the ship and leave enough room between the inside end and the motor shaft to put a dog bone.
2. A good motor for this ship is the GWS DX 370 B. With a 6 volt lead-acid gel cell, it only draws about 4 amps using a 1.5" x 25 prop. The shaft is 3mm, which is close enough to 1/8" that you can use a 1/8" dog bone end without modification. See below for a motor mount pattern if you use this setup.
3. The ship must weigh at least 10 pounds to get the waterline right. This allows a large 12 Amp Hour battery to be used, or you could go with a smaller battery and add ballast. In the picture below, you can see that an unopened container of 6000 BBs was about the right amount of additional ballast needed. In the prototype, 1 pound of ballast was added between ribs 12 and 13. This helps keep the prop in the water when running at less than max displacement. As typical with the merchant hull that this ship was based on, running empty means the bow is out of the water quite a bit and the prop is barely covered. The prototype balanced very well with a 3.5 oz CO2 bottle in the front, 12AH battery immediately behind, followed by the bilge pump, water tight box, and motor. The mount for the CO2 bottle is piece of scrap 1/4" plywood notched for the bottle neck to rest on. The battery sits on the water channel keels, but a couple of pieces of 1/4 plywood added between the keels allows the use of a piece of double sided Velcro to hold the battery in case of a sink.



Motor Mount Pattern

For use with a stick mount motor such as the GWS DX 370 B. Screw the stick to the top of the motor mount after it has been glued on the port side of rib 10.

