Constitution Instructions

This kit will build a 1:48 scale hull for the USS Constitution frigate. The kit contains the following parts.

1/8” deck with laser etched deck lines
1/8” railing

Ribs

Center keel
Pump channel keels
Sub keel

Subdeck

Winch servo carriages
Mast caddy
Mast platforms
Mast joints

Rudder
Rudder servo tray
Fill for the bow and stern

Gun deck
3.5oz to 9 oz CO2 bottle mount
Gun ports
Pre-assembly tasks

Start by gluing together the 4 pieces of the 1/4” sub-deck. Make one saw cut from the bottom of the sub-deck between ribs 1 & 2, 2 & 3, 4 & 5, 5 & 6, 15 & 16, and 16 & 17, penetrating approximately 2/3 through the wood. These cuts will make it easier to bend the deck to fit the contour of the hull. Flex the sub-deck gently to make sure it bends.

Glue the two triangular support pieces to each of the winch servo supports. The wider tab goes into the winch servo supports, the narrower tab goes into the deck.
Glue the winch servo supports to the bottom of the sub-deck. Test fit 5/32 rods, 12” long between supports. Do not glue the rods until the sub-deck is assembled to the ribs and verified to be straight.

Glue the bow hard area pieces to rib #1, using the sanding template to keep them square. Make sure that you do not glue the pieces to the sanding template. Tack glue the sanding template to the #1 rib. Insert the rib into the sub-deck and draw a line where the sub-deck ends. This line is the shape of the hard area at the top. Sand the assembled parts to shape.

Repeat the process for the stern hard area. To help align the sanding template on the stern, first glue the two biggest pieces to rib 17, aligning the outside of the rib and the fill piece. Once satisfied with the shape of the parts, remove the sanding templates.

Glue together the two middle pieces of the main keel. Assemble (with 1/4” bolts) the two outside sub-keel pieces to the main keel, using the first set of holes. Insert the middle sub-keel piece in between, with the leading edges aligned. Glue the three pieces of the sub-keel together, making sure to not glue them to the main keel. Once the glue is dried, remove the sub-keel from the main keel.
Bevel the leading edge of the rudder.
Decide what kind of hinge you will use for the rudder. Dry fit the hinges to the keel and rudder and check for adequate movement. Do not permanently assemble the rudder to the keel at this time.

Tap the holes in ribs 4 through 10 with a 4-40 thread. The tapped hole will be used for the gun deck pivots. If you don’t have a tap you can drill the hole out with a 1/8” drill, allowing a 4-40 screw to pass through.

If planning to use magnets to hold down the decks, now is good time to drill the holes for the magnets. Use the provided holes as guides and drill the holes with a 1/4” Forsner bit. If not planning to use magnets, this is a good time to tap the holes in the sub-deck with threads for your planned studs or bolts.

Glue the ribs halves together. Glue the 4 pieces of the main keel together.

**Hull assembly**

Insert the ribs into the keel. A drill press vice can be helpful here to hold the keel upright.
Glue in the two pump channel keels. Add the piece to form the bottom of the pump channel, making sure the hole is towards the stern so that it is beneath the main mast.

Add the rudder tray and seat it into both the keel and ribs. Then add the sub-deck to the ribs. Work the sub-deck down until all parts are fully seated in the slots. The deck is wider than the tops of the ribs, so it works best to get one side fitted and then rotate the sub-deck down into the notches on the other side.

Add the stern windows to the sub-deck and rudder tray.

Add the bottom of the stern windows between the stern and the last rib.

Verify that the whole assembly is straight and then lock in place with thin CA glue. Reinforce the joints with thick CA or epoxy.

Glue in the 1/4” x 1/8” stringer on each side.
Add the two ribs on each side of the head in the bow.

Glue the deck to the sub-deck. If you plan to stain the deck, it is easier to do before the deck is glued in.

Glue 9/16” brass tubes into the holes for the fore and main masts. Glue in a 1/2” brass tube in the hole for the mizzen mast. The length of the tubes should be sized so that they end roughly at deck level. It is recommended that you drill a hole perpendicularly through the brass tubes to pin the masts in place. Allow about 1/2” of free space at the bottom of the mounting tube when the mast is in place and pinned to allow the mast to drop down slightly when the pin is removed.

Glue a 7/16” brass tube into the bowsprit hole if you plan to make the bowsprit removable.
Glue the pieces of the railing together. These pieces do not key together, so it is recommended that you use a clamp to keep them together until they dry.

Glue the railing to the tops of the ribs. Glue in the bow railing insert. Using scrap wood, extend the bow from the sub-deck to the bow railing insert. Glue scrap wood between the sub-deck and railing to assist in sheeting the head area.

If desired, glue the davits for the 28’ gig to the rail at the stern.

Fill in the gap between the stern hard area and rudder tray with some suitable scrap wood and sand to shape.

Seal the entire hull with laminating epoxy or spar varnish.

**Winch servo trays**

Glue together the 5 parts of each winch servo tray. Make sure to pick the top that has the right hole size (standard or 1/4 scale) for the servo you plan to use.

Cut four pieces of 3/16” brass tubing to the length of the winch servo tray. Glue these tubes into the two trays.
Assemble the trays onto the shafts and glue in the shafts. If you want these shafts to be removable, you can use a 5/32” wheel collar at each end to hold them in place.

28’ Gig

Assemble the hull pieces of the gig to the keel. The pieces are numbered from 1 to 8, with the numbers always on the bow side and ascending from bottom to top. Leave piece #8 to the side for now.

Sand the top of the gig to remove the steps between the top pieces.

Glue the keel to the hull. Glue the railing (piece #8) to the top of the hull.

Optional step for a smooth hull: Glue the hull parts together, but do not glue in the keel. Once the glue is dry, remove the keel and carefully sand the hull to a round shape.

Masts
Glue the mast together using the lengths in the table below. Two joint pieces are used for each joint, at the top and bottom of the overlapping part.

Glue the bottom supports to each mast platform and then glue the platforms to their respective masts. The biggest platform goes on the main mast, middle sized platform on the fore mast, and smallest platform on the mizzen mast.

Glue the cleats to the end of the spanker spars. The longer set of cleats goes on the smaller spar (1/4” diameter) while the small goes on the bottom spar (5/16” diameter).

Thread the shrouds through the holding plates that go under the outriggers. When the tension on the rigging is removed, these can be easily slid out and will help prevent the rigging from getting tangled.

Assemble the mast caddy from the five 1/4” pieces.

**Gun ports and gun trays**

Assemble the gun ports from the one 1/4” piece and the 3 1/8” pieces. Start by sanding the edges smooth on the larger round pieces. The square 1/8” piece is assembled to the 1/4” gun port, making sure that the bottoms are even. Assemble the round pieces, smaller first, to the previous assembly, keeping the slots aligned. Make a boot using a #114 0-ring to capture the finger of a rubber glove around the port and barrel. The gun ports are glued to the back of the ribs, approximately 3/4” below the sub-deck.

Cut small pieces of 5/32” brass tubing and glue into the pivots for the gun tray.

Glue the servo horn to the bottom of each tray. Make sure that you make a left and right side.
Glue two pivots to the gun tray. A third pivot is provided in case the weight of the guns causes the gun tray to sag. Use 4-40 stainless steel screws to attach the gun tray to the hull.

Mount the elevation servo in place and fabricate a linkage between the servo and gun tray.

**Finishing**

Make spars for the masts using the table below as a guide.

Sheet the bottom of the ship from the keel to the top of the stringer.

Sheet the sides between the sub-deck and railing with 1/32” to 1/16” planks or plywood.

Sheet the penetrable area with 6” wide sheets of 1/32” balsa.

Use a piece of 2” PVC pipe, approximately 18” long, for the keel bulb. Cut a slot in the top and insert the sub-keel into the slot. Glue the sub-keel to the keel bulb. Fill the bulb with heavy material and fabricate a front and rear cap.

Hinge the rudder to the keel. Glue the tiller onto rudder. The single arm tiller is meant to be used with one linkage and the servo in one of the side positions. The double tiller is meant to be used with a double servo arm and either a pull-pull set up or dual pushrods. Use the center servo hole for this setup.

Determine where you want to mount your CO2 bottle and glue the mounts to the pump channel sides.

Mount your pump at the rear of the pump channel; the pump channel is sloped to send the water to the back.

Add internal ballast to bring the ship to a total weight of about 40 lbs.
### Masts

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### Yards

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