

Miniature Steam Pty Ltd

Bringing the Highest Standards to Model Engineering

Assembly Instructions

“Miniature Steam Models”

“Wattle”

Steam Powered Launch



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1. Options provided:

- Choice of Vertical or Horizontal boiler steam plants. You probably have made this choice when ordering the kit. Assembly components are provided for both choices. Discard the one you don't want. See more below
- The kit includes wooden strips for deck finishing with the alternating light and dark wood as illustrated on the cover. It is your choice to use this presentation or source alternative covering material.
- Your own selection of RC control equipment. Fortunately the RC industry has standardized the dimensions of the RC components needed for this model so that we are able to make support fittings and cutouts and leave the choice of supplier to you.

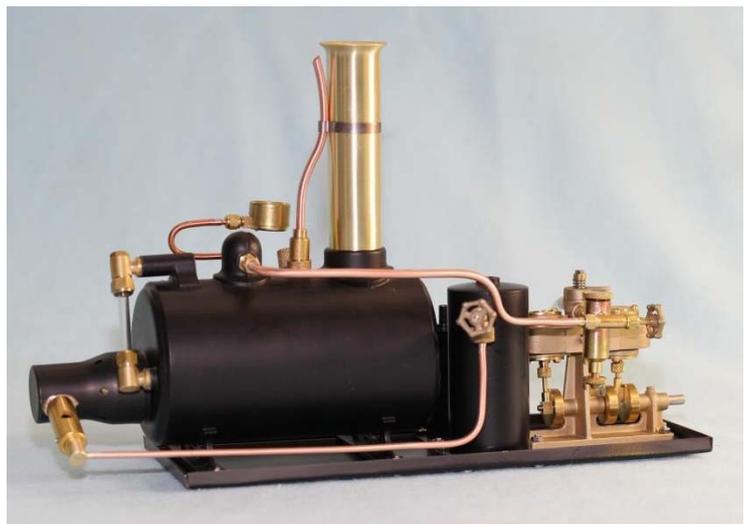
Vertical Boiler Steam Plant:

3" Boiler with Ceramic Burner
Clyde Twin Cylinder Oscillating Steam Engine
Vertical Refillable Gas Tank
Oil Trap
Mounting tray



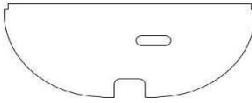
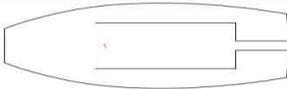
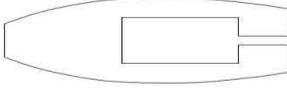
Horizontal Boiler Steam Plant

3" Boiler with Ceramic Burner
Clyde Twin Cylinder Oscillating Steam Engine
Vertical Refillable Gas Tank
Oil Trap
Mounting tray

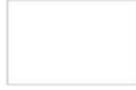
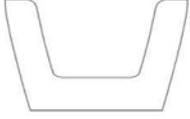
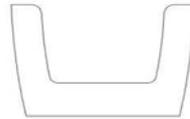
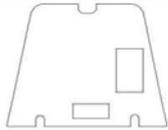
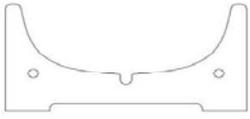
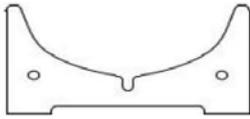


2. Check List of Items Supplied in Kit P1/3

Please check the contents of your order package against the following list (3 pages) and advise your supplier as soon as possible of any shortages.

P/N	Description	Image	New Pic Req'd ?
1231	885mm Clinker Design GRP Boat Hull		No
1240	Propeller Support Wedge		No
1241	WATTLE_ FORWARD BULKHEAD		?
1248	WATTLE_REAR BULKHEAD		No
1242	WATTLE_DECK		No
1243	WATTLE_FLOOR_HOR. BOILER		No
1256	WATTLE_STEAM PLANT Mounting Horizontal BOILER		No
1244	WATTLE_FLOOR_VERT. BOILER		No
1257	WATTLE_STEAM PLANT Mounting Vertical BOILER		No

Check List of Items Supplied in Kit P2/3

1245	WATTLE_FORWARD HATCH COVER		No
1246	WATTLE_FORWARD HATCH COVER INSERT (planned for local cutting)		No
1247	WATTLE_FRONT SEAT		No
1249	WATTLE_REAR SEAT (amended to enable access to propeller shaft grub screws)		Yes
1250	WATTLE_REAR FLOOR		No
1251	WATTLE_REAR HATCH COVER		No
1252	WATTLE_REAR Hatch Cover INSERT (planned for local cutting)		No
1253	WATTLE_STAND1		No
1254	WATTLE_STAND2		No
1255	Wattle stand dowels x 2		Yes
1258	Rudder assembly		Yes
1259	Rudder pintles x 2		Yes
1260	Rudder RC control lever		Yes
1261	Rudder lower pivot plate		Yes

Check List of Items Supplied in Kit P3/3

1262	Screws for the rudder lower pivot plate		?
1263	Servo Mounting Block 1		Yes
1264	Servo Mounting Block 2		Yes
1265	??? Propeller shaft		Yes
???	?? Dia. cast propeller		No
	Walnut 2mm x 7mm strip (Outside deck top)		
	White Wood 3mm x 6mm strip (Inside deck top)		
	Mahogany 8mm x 1mm strip (Decking)		
	Maple 8mm x 1mm strip (Decking)		
	? Ply 16mm x 1.5mm (Deck coaming)		
	? SS Self tapping screws for securing steam plant tray		

3. Tools, Adhesives & Paints Required

Tools: (NOT supplied except hex Allen key)

- Medium size flat screw driver – for securing the lower rudder control plate on the bottom of the skeg and the steam plant mounting plate to its mounting block.
- Small Philips head screw driver - for securing RC control fittings.
- Small shifting spanner – for securing rudder pintle nuts on the inside of the hull & propeller locknut.
- Long nose pliers – for setting RC servo control wires.
- 3mm hex Allen key setting key (supplied) – for securing propeller drive shaft universals and rudder control components.
- Clamps (see illustrations)
- 3mm twist drill - for drilling holes in transom for rudder pintles.
- 6mm twist drill – for drilling hole in stern skeg for the propeller shaft.
- Sharp modelers knife – for trimming some molding fins as instructed and trimming wooden parts during the assembly process.
- Small metric scale ruler – for marking out component positions.
- Fine emery paper – to clean the propeller tube before gluing it to the shaft support wedge.

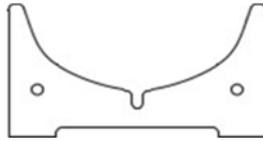
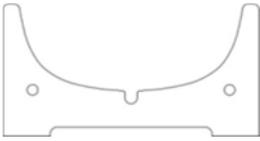
Adhesives: (Recommended for local selection – NOT supplied)

- For gluing any components to fiberglass (GRP) hull – two pack epoxy glue.
- For gluing two wooden components together – waterproof PVA glue.
- For filling & gluing components into spaces – two pack epoxy glue where practical. If there is a large space to be filled, two pack epoxy putty may be useful.

Paints: (Recommended for local selection – NOT supplied)

4. Assembly Instructions

Stand Assembly



The four components comprising the boat stand assembly are illustrated above. Just apply PVA wood glue to the ends of the dowels and fit the end plates. Leave time for the glue to set and you are ready to start assembling your boat on the convenient platform you just made.

Washing the hull

When making the fiberglass hull the manufacturer applies a wax to the mould to assist with removal of the hull when the resin sets. Usually some of this wax remains and if it is not removed it will interfere with glue adhesion later. Thoroughly wash the inside and outside surfaces of the hull in warm soapy water to remove this wax.

Setting up the propeller shaft - part 1



Trim the molding fin on the face of the skeg to provide a flat surface for drilling the hole for the propeller shaft (P/N 1265) as shown above. Mark a spot in the centre of the skeg face 25mm up from the bottom edge of the skeg.

Using the 3mm drill bit drill a pilot hole running the line parallel to the slope of the underside of the skeg then enlarge the hole with the 6mm bit.

Take the propeller shaft and holding the threaded end slide the shaft into the hole. It should be a loose fit to allow for correct alignment when connecting the drive train to the engine. If it is a little tight re-run the 6mm drill and “wobble” it to enlarge the hole a little.

Setting up the propeller shaft - part 1 (Cont'd)



Take the propeller shaft wedge (P/N 1240) and insert it in the inside of the hull under the propeller shaft to check that it will properly support the shaft when it is linked to the engine. It will be glued in position in a later step. Make any adjustments to the propeller shaft hole to achieve the correct alignment of the drive train.

When satisfied that the loose propeller shaft can eventually be aligned with the engine, remove it from the hull and fit the propeller.

Screw the propeller locknut onto the threaded end of the propeller shaft assembly as far as it will go, then screw the propeller on to the shaft as far as it will go and tighten the locknut on to the hub of the propeller. This locknut connection must be sound to ensure you do not lose a propeller while doing forward/reverse maneuvers.

Re-insert the propeller shaft assembly and lightly screw the drive train universal joint assembly (P/N 1266) with the smaller diameter bore in the end (4mm) to the end of the propeller shaft. The other end of the universal assembly has a 5mm bore fitting and will be connected to the engine crankshaft in later steps.

DO NOT GLUE ANYTHING AT THIS TIME!

Final installation of the propeller shaft is done after a number of other steps.

Fitting the rudder 1/2



we need dimensions for positioning and sizing the servo access hole shown above)

As delivered to you, the transom at the back end of the boat has a molding fin that clearly defines the centerline of the boat. Using a scale ruler and a knife, nick this fin at 20mm below the top of the transom and then make a further nick at 55mm from the top of the transom. With the knife, clear enough of the fin away to allow for drilling a 3mm hole in the spots as measured, and centered on the fin centreline. (with GRP materials, maintaining the "gel coat" skin on the molding is important for the life of the product and damage should be kept to a minimum). Remove the nuts from the two rudder pintles (P/N 1259) supplied and thread the pintles onto the rudder assembly (P/N 1258).

Fit the threaded end of the pintles into the holes in the transom and add the washers supplied and gently tighten the nuts inside the hull while rotating the rudder shaft to ensure the pintles settle into a correct position to allow free movement of the rudder shaft.

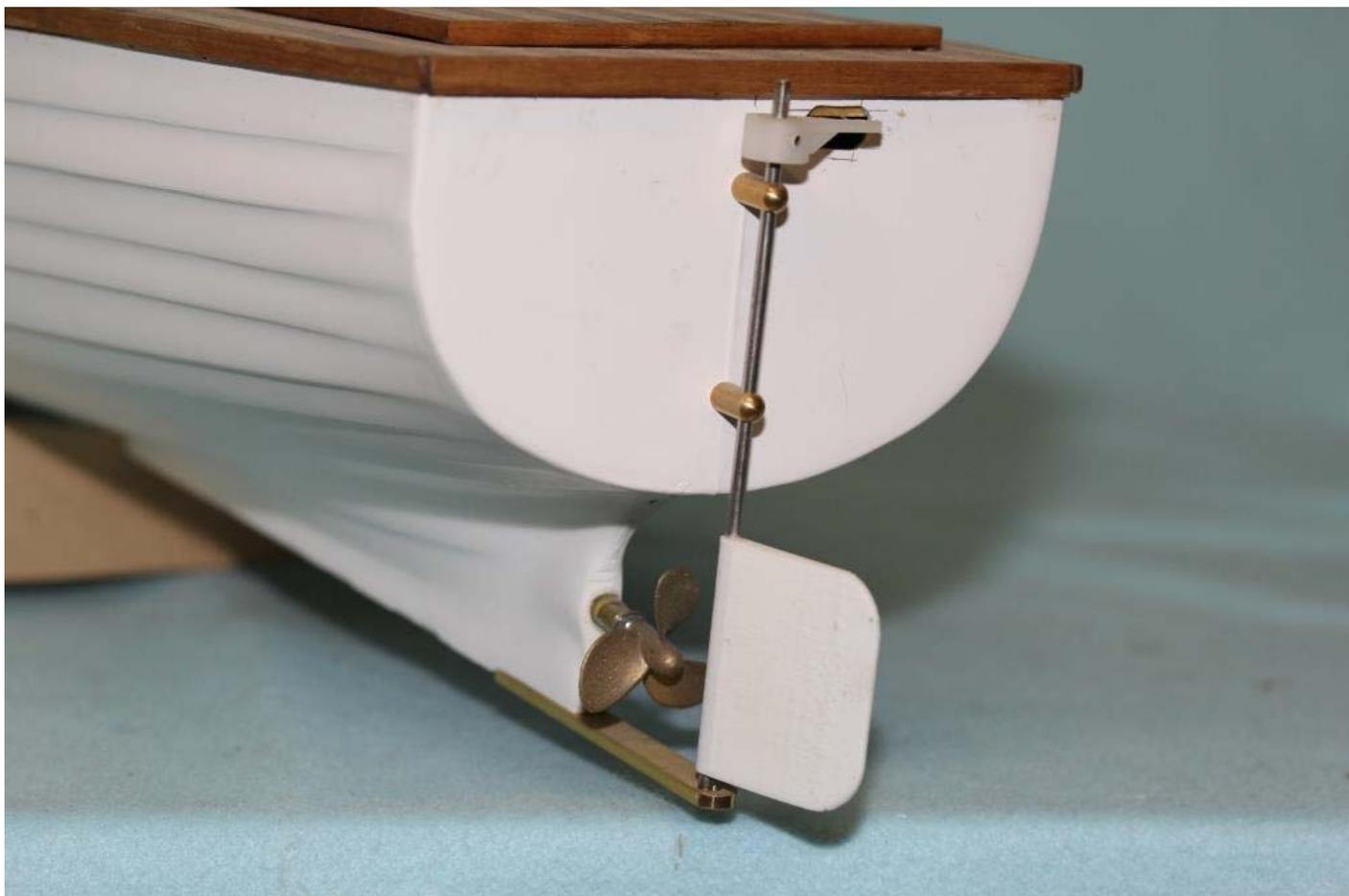
Strip the molding fin from the underside of the skeg and fit the rudder lower pivot plate (P/N 1261) with the countersunk screw holes facing out. Position the plate so that the rudder shaft moves freely and mark the centre of each countersink hole on the skeg,

Remove the lower pivot plate and drill xxmm dia holes in the marked positions.

Re-position the pivot plate and secure it to the skeg with the countersunk screws. Ensure the rudder moves freely before removing the screws and the plate ready for the next step.

Fitting the Rudder P2/2

This is how the stern of the boat should look after final installation of propeller shaft (final instructions next) and rudder fully installed.



Selecting the right steam plant mounting plates

At this point in the assembly process, a choice has to be made on what to do next for the boiler type chosen—i.e. Vertical or Horizontal boiler.

Different floor plates and steam plant mounting plates are supplied for each.

The horizontal boiler steam plant requires the use of Floor Plate P/N 1243 and Mounting Plate P/N 1256 and the vertical boiler uses Floor Plate P/N 1244 and Mounting Plate P/N 1257. The holes in the mounting plates match the position of the screw heads used to hold the steam plant components to the assembly mounting trays. In each case the narrow gap in the floor plate will face the stern of the hull as will the end of the mounting plates with two holes close together. A label is attached to each mounting plate to show both the correct “side up” and the positioning of the plate when installing it in the hull. Make your selection of the appropriate plates and put aside the unused plates for discard when you have completed installation of the steam plant assembly.

The next step is to assemble and glue together the components for the complete steam plant mounting block.

Assembling the steam plant mounting block

The steam plant mounting block is the assembly of the steam plant mounting plate onto rails that, when glued to the hull, provide a firm foundation for powering the boat.

Identify the two mounting rails P/N 1267L & P/N 1267R and identify the following features:

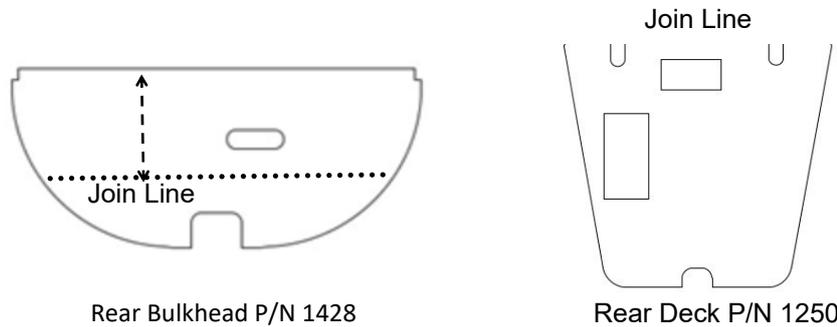
- They are of equal length and the same length as the length of the mounting plate for the horizontal boiler(P/N 1256). They are longer than the vertical boiler mounting plate (P/N 1257). If you have a vertical boiler, this is not a problem in that you can either leave the extra length project towards the bow in later steps or shorten the bow end of the rails to match the length of the vertical boiler mounting plate. We recommend the former option.
- They are shaped with a taper along the length of the rail and also across its width. This is to enable the rails to follow the shape of the hull when they are glued in position.
- The taper along the length shapes the rail to the curve of the hull going forward towards the bow of the hull. It REDUCES when the rails are properly positioned pointing forward.
- The taper across the width of the rail indicates which side of the boat they are shaped for. When in correct position the taper of the rail on the LEFT, viewed from the stern, will INCREASE as the rail seats toward the centre line of the hull. Likewise, when viewed from the stern, the taper of the rail on the RIGHT will increase as it seats toward the centre line of the hull.

When you have these orientations clear, apply PVA glue to each surface and clamp the flat side of the rails to the appropriate plate as shown in the following picture. By all means glue one rail at a time if you are short of clamps. This is a factory sourced picture where numerous clamps were available.



When the glue has dried paint all surfaces EXCEPT the tapered rail surfaces, (they should be kept as bare wood to obtain best adhesion with the epoxy glue when fitting to the hull) with the clear polyurethane varnish to be used when finishing the decking.

Assembling the rear bulkhead & rear deck



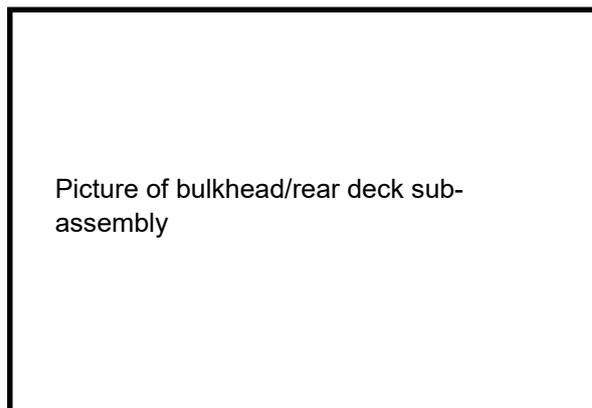
This sub-assembly is made by joining the Rear Deck P/N 1250 to the Rear Bulkhead P/N 1428 at a right angle. Both components are made to match the shape of the hull in their respective connection points. This sub-assembly must be assembled before you commence setting up the steam plant/drive train positions.

First orient the bulkhead as shown above and draw a pencil line **xxmm** down from, and parallel to, the straight top of the bulkhead as shown.

As a trial, position the rear deck, oriented as shown above, with the pencil line just visible from above.

Place the bulkhead on a flat surface ready to attach the deck positioned as just noted.

Since it is very important that the rear deck be glued to the rear bulkhead at right angles we have included two wood “chocks” (P/N 1274) to help you achieve this easily. These are for one time use only. They are glued in place to keep the plates at right angles and play no part in the operation of the boat once the glue has set on the join. Experiment with where to place them before commencing to glue them and apply glue to them as well as the “joint line” illustrated above.



Final steps for installing the propeller shaft (Part 2)

The objective of the following steps is to properly position the propeller tube/shaft and glue it into position.

Place the steam plant mounting block assembly selected for your boiler in the center of the hull and ensure that the rails sit neatly in the hull ridges.

1. Place the rear bulkhead/rear deck sub assembly in position so that the rear deck butts up to the inside of the transom.
2. Place the Floor Plate selected for your boiler type (Page 13) into the hull, first adjusting the position of the Mounting Block assembly to allow the floor plate to fit over it, then juggle the two items together to butt the end of the floor plate against the rear bulkhead. When carrying out the following steps make sure these positions are maintained.
3. Place the steam plant on the mounting block with the engine pointing to the stern and try to slide the drive train universal assembly onto the engine output drive shaft. There are four points in the drive train that allow adjustment—the longitudinal position of the propeller shaft assembly (it should project 10mm from the skeg), the position of the stern end of the universal on the propeller shaft, the centre fittings of the universal assembly and the forward end of the universal assembly as placed on the engine drive shaft. Juggle these factors to obtain a smooth action of the drive train while maintaining the 10mm projection of the propeller shaft. Rotate the shaft by the propeller. When this is achieved, nip up the grub screws on each end of the universal assembly.
4. Remove the rear bulkhead sub assembly without disturbing the position of the other components. Take the Propeller Support Wedge (P/N 1240) and slide it into the cavity formed when molding the skeg and under the propeller shaft so that the taper of the wedge aligns with and gently supports the propeller shaft. Release the grub screw in the engine end of the universal assembly and again check for smooth running of the drive train as before. Make corrections as necessary.
5. When the drive train is running freely, use the abrasive paper to lightly sand the surface of the propeller tube that is immediately above the wedge to ensure it has a clean surface for glue adhesive in the following step.
6. Mix a batch of epoxy resin appropriate to gluing the propeller tube to the top of the wedge, to glue the wedge in place in the skeg cavity and to complete the sealing of the propeller tube in the skeg.—remember with 10mm of the propeller tube projecting beyond the skeg.
7. Place a little resin on the sanded spot on the propeller tube and rotate the tube to spread the resin onto the top of the wedge. Pour some resin down each side of the propeller support wedge and pour the remainder into the back of the wedge cavity to secure the propeller/tube in the skeg. Be ready to trim any leakage on the outside of the skeg as the resin sets.

Once the resin has set you are in a position to complete the assembly of the internal components of the boat.

Completing the assembly of the boat internal parts

Please note that in the following steps we have generally assumed that the various plates match the profile of the moulded GRP hull as supplied. Unfortunately the GRP moulding process does not always result in an exact copy of the shape that it was given in the mould. The next steps require an intelligent use of the term “adjust where necessary”. Please start with the assumption that the hull shape needs to be adjusted to fit the plate by the use of clamps, duct tape, sanding or other means. It should be a last resort to modify the shape of the plates supplied. When downward pressure is required, clean sand or wheat bags can be very effective.

Once the resin on the propeller shaft assembly has set it is time to glue the steam plant mounting block in it's final position. Remove the steam plant from the mounting block and holding the mounting block carefully in its current position, remove the floor plate.

Make pencil marks on the hull that will enable you to re-position the mounting block exactly where it is now. Remove the mounting block, apply epoxy resin to the underside of the rails and re-insert the mounting block in the original position. Place some weights (say a clean brick or a sand bag) on the top to keep the block in place while the glue sets.

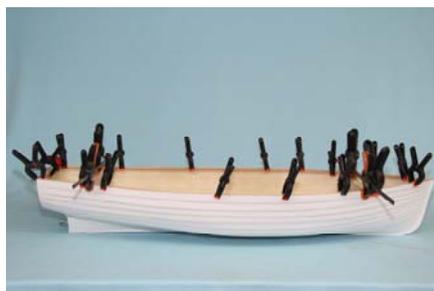
When the resin on the mounting block rails has set, check that the rear bulkhead sub-assembly fits neatly in the stern and that the floor plate butts up gently against it. Make adjustments as necessary to ensure that glue is not required to fill joint spaces that should otherwise mate neatly.

When ready, generously coat the edges of the rear bulkhead sub-assembly, that will be joined to the hull, with epoxy glue. Insert the rear bulkhead sub-assembly into the hull and push the floor plate up to the rear bulkhead to help keep its position correct.

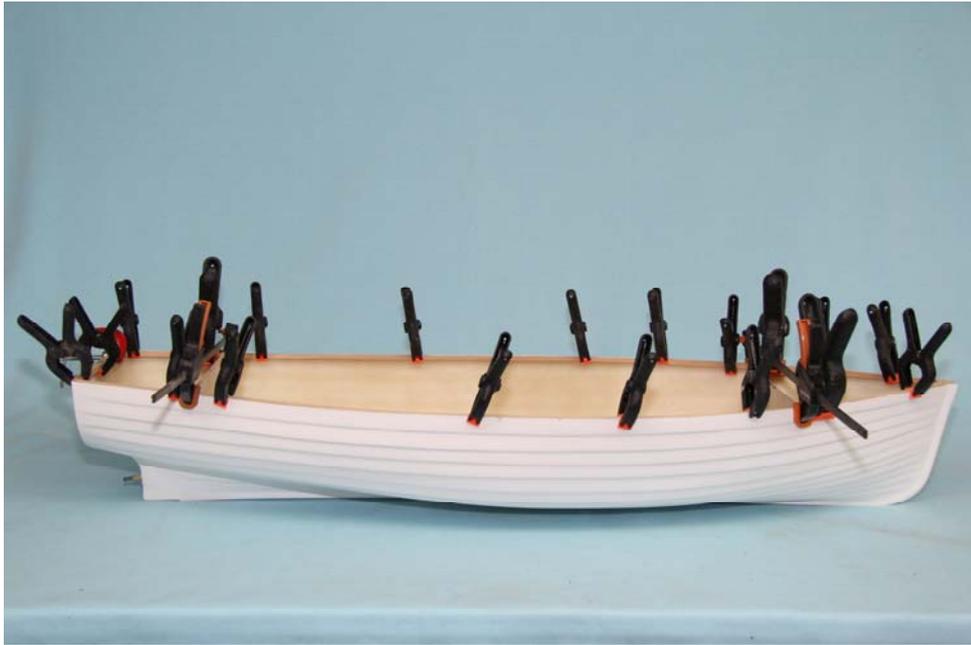
Allow the glue to set on the rear (stern) components and then start fitting the forward (bow) components.

Insert the forward bulkhead in position so that it is vertical, makes contact with the forward end of the floor plate and is a reasonable match to the curve of the hull. Make adjustments as necessary. When ready, remove the bulkhead, coat all the edges of the floor plate and the bulkhead with epoxy glue and fit them into their final position, with the floor plate properly glued to each bulkhead and the hull where appropriate.

The next step of this sequence is to attach a trim bead to the top inner edge of the hull to provide a base for fitting the deck. The bead is “White Wood 3mm x 6mm strip” (P/N 1268), mounted with the 6mm side epoxy glued to the hull, and provides a gluing base for joining the deck to the hull. The following picture shows a factory based hull with clamps holding the full round of trim in one gluing session. If you are short of clamps, by all means do the job in several steps.



Completing the assembly of the boat internal parts (cont'd)



In the above picture you can see two long clamps, amongst the forest of small clamps, one towards the bow and one near the stern. With this particular hull, these are used to draw in the sides of the hull where the hull moulding did not accurately reproduce the mold form. (See heading on pervious page) This adjustment is done by placing the deck over the hull before attaching the trim and using any means you can think of, set the hull sides correctly under the deck—long clamps, duct tape, adjustable rubber bands, etc. ,etc. It can be done at any time after gluing but is better done at this time when the trim can be glued to the correct hull line. Again the main deck is the primary refer-

The final step in installing the internal components is gluing in the forward and rear seats as illustrated below. Check that they sit neatly on the hull ribs , are horizontal and butted up to the respective bulkhead before applying epoxy glue to the contact edges and complete their installation.



Attaching the main deck

The next step is to glue the main deck (P/N 1242) to the hull using PVA glue.

Before applying the glue, lay the deck on the hull and work out what hull shape adjustments will be required and how you are going to make them.

When using clamps, as in the following factory picture, small hull shape adjustments can be secured after applying the glue, by clamping at the spot where the adjustment is made.



Since PVA glue is slow setting, it is possible to make adjustments to the connection after applying the glue but if not using clamps it is important to plan what you will do, and how, to maintain the desired position while the glue sets. If “holding it with your fingers while the glue sets” is the only option then epoxy glue should be used. By now you should have enough experience with epoxy to have an idea of how long you will have to hold on!

Fitting the deck hatch cover locating blocks

Each hatch cover has a smaller, but same shaped, “locating block” panel to be glued under the larger panel. The smaller panel has been cut to just fit the relevant deck holes to locate the hatch cover accurately

P/N 1245 is matched to P/N 1246 and P/N 1251 is matched to P/N 1252.

The smaller panels should be PVC glued to the larger with an equal space left around the edges. .

Applying the main deck cladding

The standard deck cladding materials supplied with the kit are comprised of 8mm x 1mm wooden strips, P/N 1269 (Mahogany) and P/N 1270 (Maple). Caulking material for separating the strips is to be cut out of a sheet P/N 1271. Using a sharp modelling knife and metal straight edge shave 1mm wide strips off the sheet.

The following factory picture illustrates the mounting operation described in the following. (Note that this picture has the deck coaming installed but it is recommended that the cladding strips be applied BEFORE installing the coaming.



Start by pencil marking the centreline from the bow to the stern where you can on the deck and then draw a parallel line 4mm on one side of the centreline. Take a strip of wood (suggest the light colour but it does not matter which colour), cut pieces that will exceed the length they are required to cover their section and PVA glue them, aligned with the second line drawn as noted above. (The excess length material will be trimmed in a later step.) This is going to be your primary reference line for positioning all future strips. Repeat this for each of the four sections (bow to forward hatch, rear of forward hatch to cockpit, stern cockpit edge to rear hatch forward edge and rear hatch to stern. Wait for the glue to set before proceeding.

Lay a strip of caulking along each side the centreline strip, ensuring that the caulking strip at least matches the thickness of the wood strip. Cut a piece of the other colour wood strip to again exceed the length required to cover the space as before. Apply PVA glue to the wood strip and ensure there is enough excess glue to soak the caulking strip when the wood strip is pressed into position. Repeat this procedure with alternating wood colours.

We recommend that you proceed in the following stages after setting the initial line of strips as described above—and have allowed time for the glue to set:

Cover the bow section down to the forward edge of the forward hatch

Continue to cover both sides as illustrated (for one side only above) down to the stern

Cover the section between the rear edge of the forward hatch and the cockpit edge where the coaming will be installed later.

Complete the covering of the section between the stern and the rear hatch while building in from each side to ensure there is a complete match for the alternating wood colours.

Complete the same steps to cover the deck space behind the cockpit and the forward edge of the rear hatch.

Applying the main deck cladding (cont'd)

In turn, place the forward and rear hatch covers over their hatch openings and repeat the previous process while matching up the wood strip colours with those on the deck.

When ALL the glue used on applying the deck plating is thoroughly dry, lightly sand back the projecting elements to make a clean and smooth surface to the deck and hatch covers.

With a sharp modelling knife, trim the projecting ends of the decking strips back to their logical end at the line of the deck and its hatches and hatch covers.

Fitting the cockpit coaming strip

Fitting external bead with epoxy—need pic