

Table and bench seats in daytime position. Seats are each secured to the cabin floor by two large shop-made bolts which pass through long slots in the base of the seat. The bolts thread into inserts in the cabin floor. Seats can move athwartships, bolts don't move.

To set up the double berth, loosen the two floor bolts and slide the seats towards the center of the boat until they stop at the end of their slots. Retighten the bolts. Fold the table down and put the backrest cushions on it. Move the forward backrest to vertical, remove the other backrest completely and fold its frame down to the floor.

# From dinette to walk around double berth in four easy steps:

Cross sections of main cabin looking forward. Helm, helmsman's seat, and forward steps not shown.

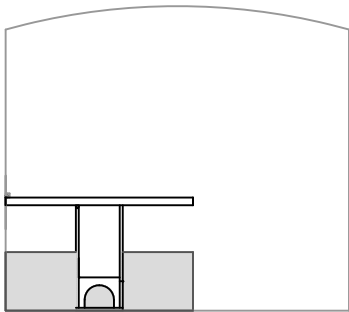
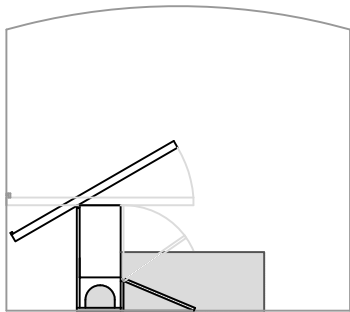
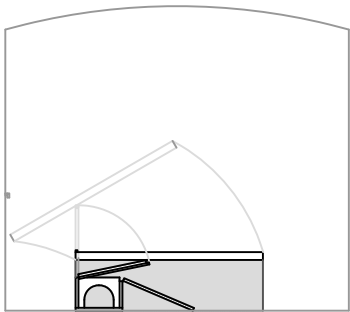


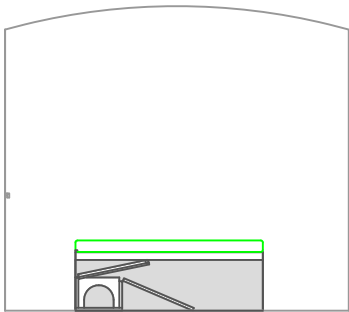
Table and seats in daytime position.



Loosen the two mounting bolts on each seat. Pull the seats towards the center of the cabin until they stop. Lift the inboard end of the table and swing the inboard leg down.  
Note: the center panel will prevent the outboard leg from folding at this point.

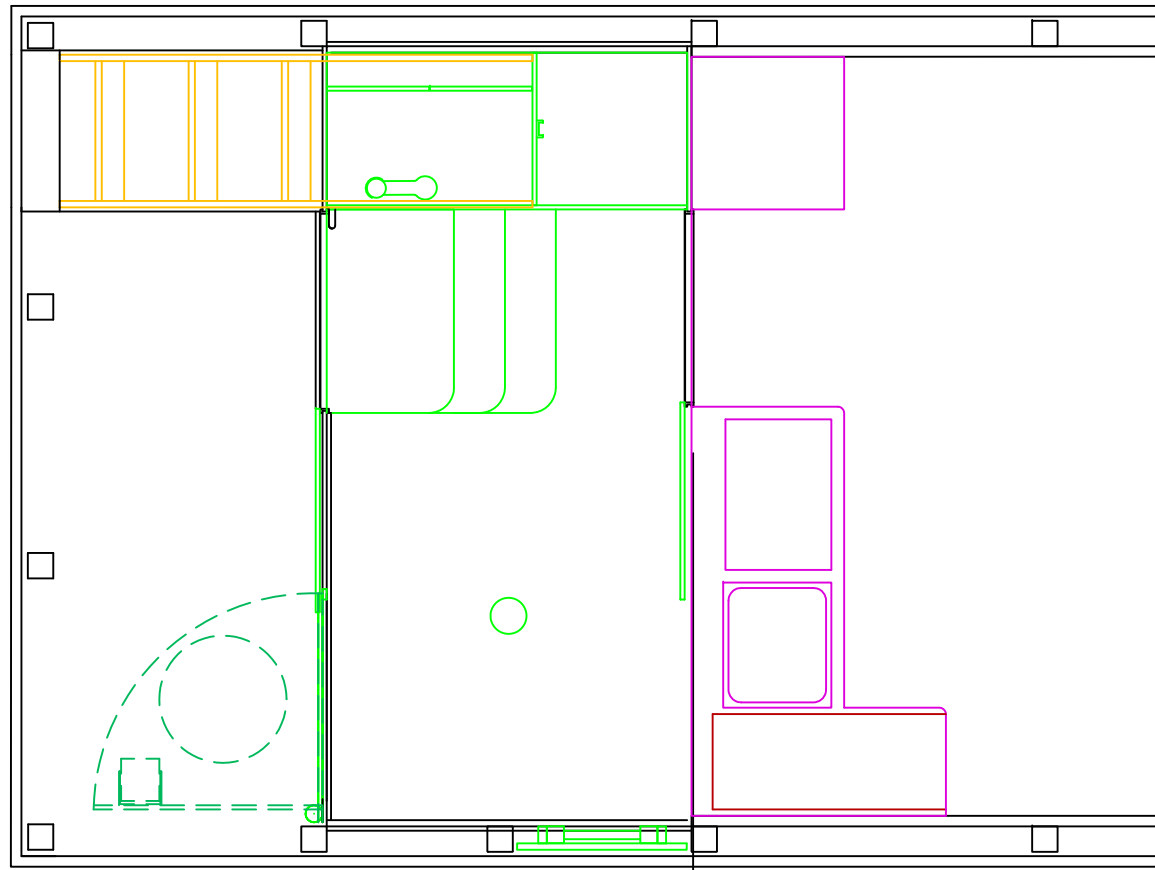


Swing the center panel back 90°  
The outboard leg will fold at the base and the table will drop down into position between the seats.



Place the backrest cushions on the table to complete the berth. There is now 18" of unobstructed walkway to port.

OCH Houseboat	L. Burroughs	Title: Dinette to Double Berth, side view		Sheet
	Feb. 8, 2016	Rev:	Date:	



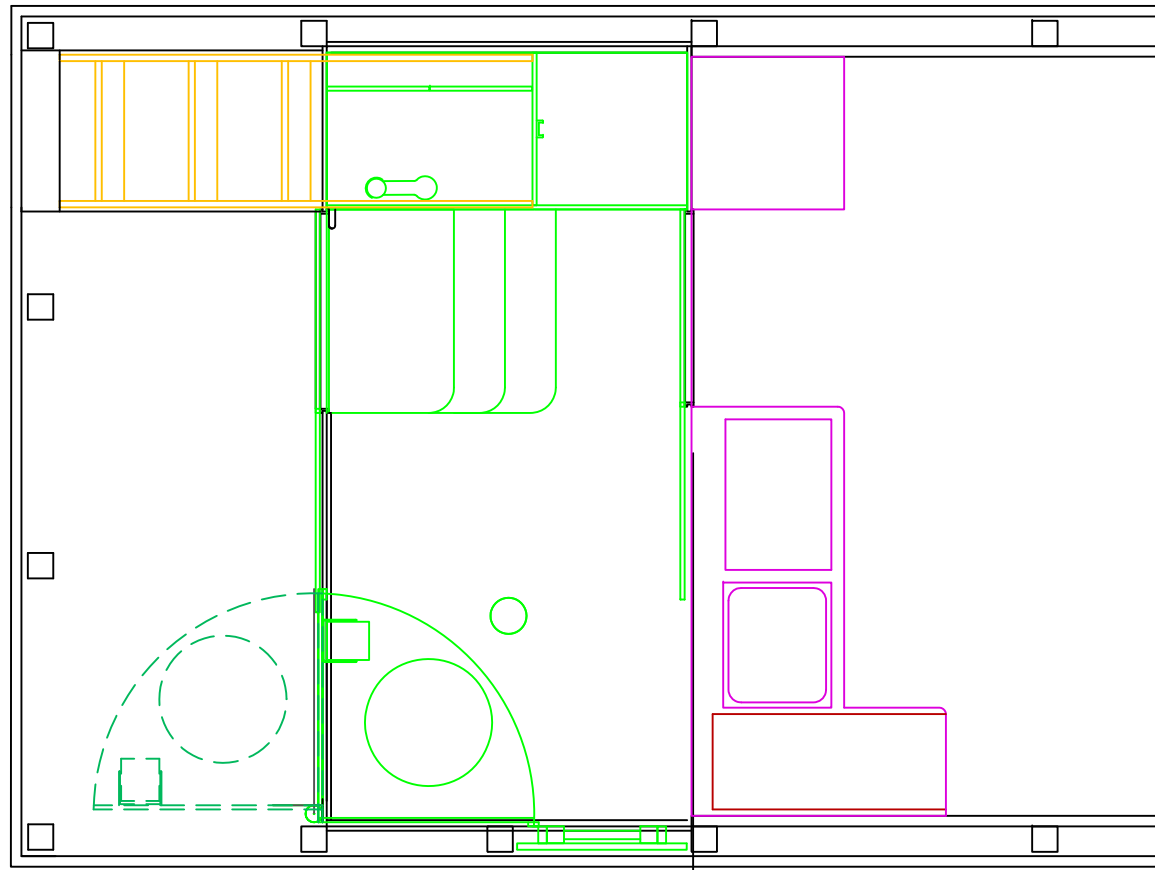
OCH Houseboat

L. Burroughs

Feb. 8, 2016

Title: Head Compartment -  
Daytime Configuration

Sheet

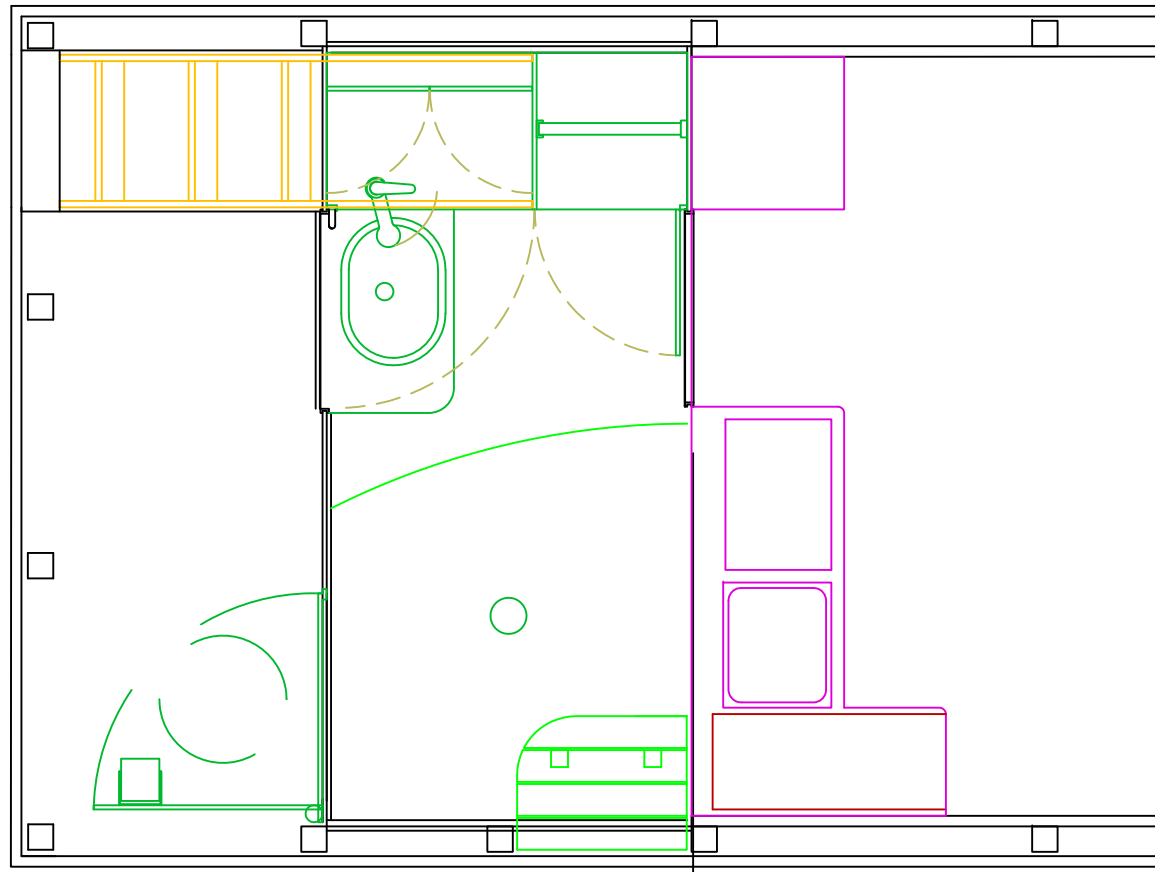


OCH Houseboat

L. Burroughs  
Feb. 8, 2016

Title: Head Compartment - daytime  
with Air Head toilet

Sheet



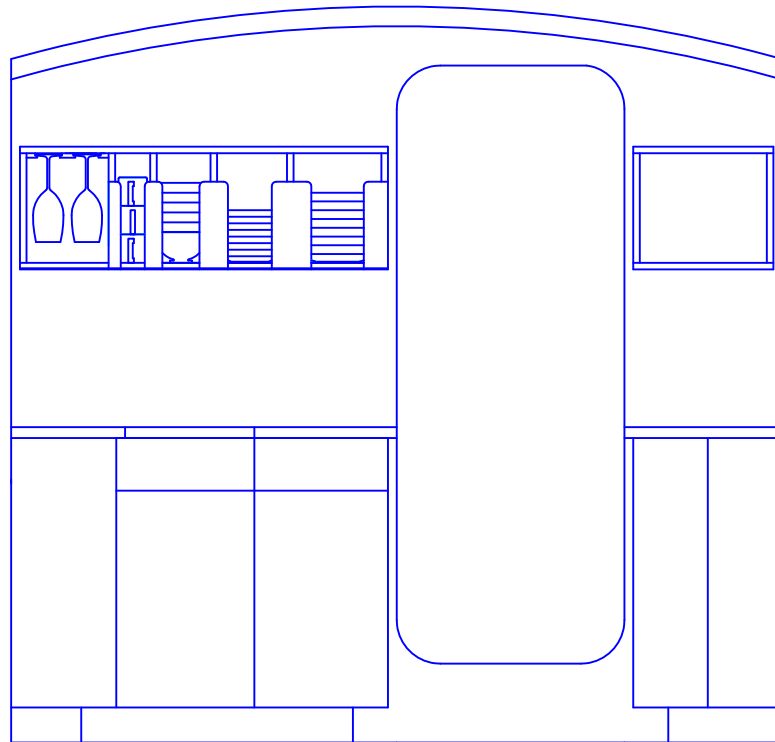
OCH Houseboat

L. Burroughs  
Feb. 8, 2016

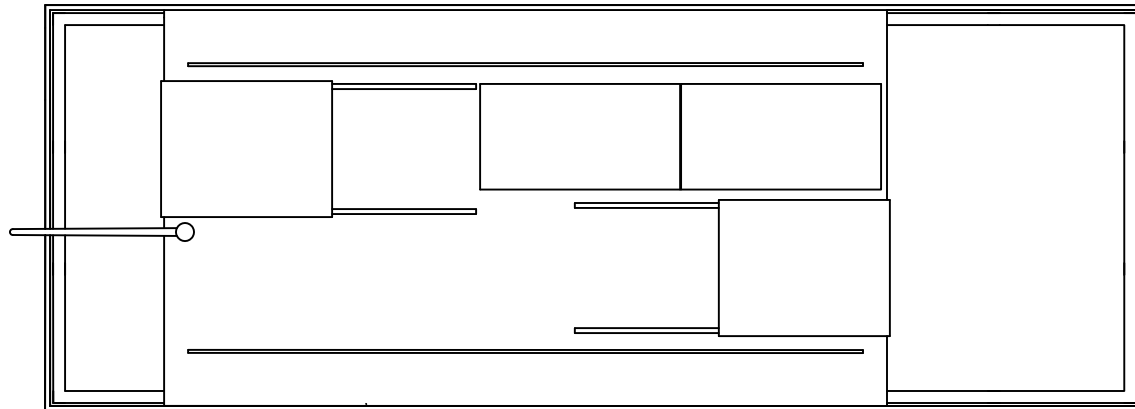
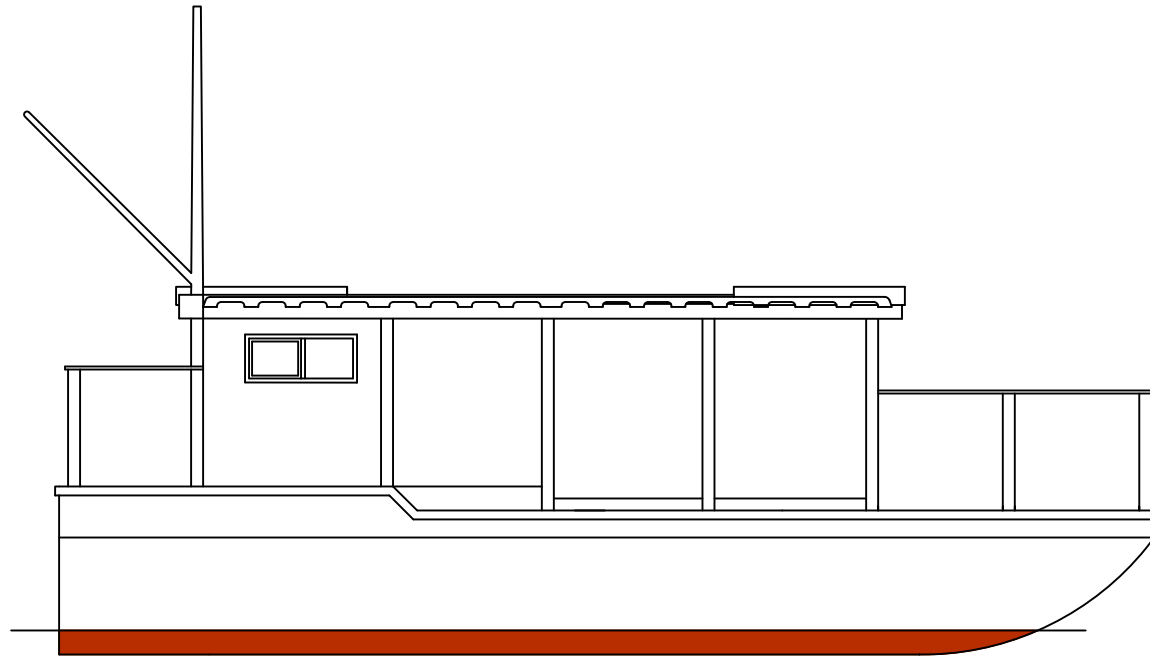
Title: Head Compartment with sink,  
shower curtain, & seat

Sheet





Cross section, cabin interior - Galley and dish storage compartment



# Off Center Harbor Houseboat Design Project

Larry Burroughs  
[larry772@roadrunner.com](mailto:larry772@roadrunner.com)  
February, 2016

## OCH Houseboat Project

### General criteria:

My wife and I are both retired, and our ideal houseboat would be one we could use for a weekend or as much as a couple of weeks at a time. We can imagine using it here at home as well as towing it to distant rivers and lakes.

### Our Criteria:

The houseboat must be trailerable.

Houseboat plus trailer width must not exceed 102", the maximum allowable.

Houseboat plus trailer must not weigh over 7,250 lbs, the rated towing capacity of our good old truck. We want to be able to launch & retrieve down a regular launching ramp (we do have four wheel drive) or by crane or Travel Lift.

We'd like to be able to use it as a camper when traveling to distant launch sites. That means that the length of trailer + houseboat should be no more than 27ft. for access to (most) state park campgrounds.

It must have safe and easy access from a dock, a dingy or kayak, from the water when swimming, and also from the ground when it is on the trailer.

It must have a double berth which is accessible from both sides – no crawling over each other in the middle of the night to get to the head. This is important. To both of us.

The head compartment must be large enough to shower and dress without banging the walls or the overhead. It should have a hanging locker and drawers for storage.

It must be as simple as possible with as few systems as practical. Use a composting toilet – no holding tank – and recycle the gray water – allows use of a smaller gray water tank and the recycled water can be used to wash down the boat, the ground tackle, and sandy feet coming back on board.

Solar panels could be used to charge the house and the starting batteries, and maybe even for heating water for the galley and shower.

We'd like to have enough room to be able to move around the boat without banging our knees or stubbing our toes, and we would like to be able to push the furniture around a bit when we get bored. It must be simple to build, and be built at home. And low maintenance. Really low maintenance. We just don't enjoy maintenance the way we used to.

Some of the things that have inspired us and helped us develop our ideas were the Lisa B. Good trailerable shantyboat from Geezer Boatworks and Duckworks Magazine, Harry Bryan's shantyboat featured in the February 2012 issue of *WoodenBoat* magazine, Doug Hylan's Bowler and Bagatelle, and the Tiny House Nation TV series.

Here's how it looks so far:

Length: 23 ft. 10 in.      Length of boat + trailer: 27 ft. 0 in.

Beam: 8 ft. 5½ in.

Displacement: Just under 4,000 lbs.

Draft: 5" ( Outboard has power tilt – won't start digging channels until the water is about 14" deep)

Power: Honda 9.9 hp four stroke short shaft outboard

Cruising Speed: 6 knots

The hull and roof are plywood, as are the exterior walls of the head compartment and the main bulkhead. The main cabin is soft-sided. There are decks forward and aft with handrails all around.

General Arrangement:

The main cabin is roughly 7 ft. 4 in. wide by 10 ft. long. At the forward end, bench seats and a table form a dinette to port. There are steps up to a sliding door, and to starboard are the helm and a collapsible helmsman's seat. At night, the dinette seats slide out into the center of the cabin and the table folds down between them to create a walk-around double berth.

In the back of the cabin, the galley has a sink, a stove, a pull-out refrigerator, and plenty of storage. On the other side of the bulkhead is the head compartment. It is 3½ ft. X 6 ft. and has a sink, vanity, hanging locker, and an Air Head composting toilet which swings out from its stowed position under the aft deck. There is also a swing-up shower seat. Three steps up provide access to the rear deck through a sliding door. Both forward and aft companionways have sliding hatches.

General Construction:

Mostly plywood and epoxy. Can be built at home. It could even be built in sections – in the garage -

build the forward and aft hull sections first and put them outside. Then build the hull/cabin center section. It's about fourteen feet long, eight feet wide. Build the hull section upside down, flip it over and install the frames and roof. Push it out in the driveway and bolt on the forward and aft sections of the hull. Presto - it's a houseboat.

The hull and decks are all drawn as  $\frac{3}{4}$ " plywood. Full length laminated plywood stringers and floors form grids. Epoxy filets, taped and epoxy coated inside, maybe two layers of 10 oz. fiberglass cloth set in epoxy on the outside of the hull. The 3" X 3" vertical frames that also support the roof are hollow, glued up out of  $\frac{3}{4}$ " Douglas fir, and provide runs for wiring (and plumbing?) from the cabin to the roof and vice versa.

The roof is two layers of  $\frac{1}{4}$ " plywood with the joints staggered. One layer of 10 oz. cloth over the whole thing.

The sides and back of the head compartment are plywood, as is the main bulkhead between the head compartment and the main cabin. The doors on the boat are all rolling "barn" doors.

#### Furniture and Arrangements:

##### Daytime:

There are two 48" long bench seats with a 30" X 48" table between them. During the daytime they are configured as a dinette up against the port coaming leaving plenty of room for the helm and the steps leading up to the foredeck. The helm and helmsman's chair are to starboard.

The bench seats are each secured to the floor with two big shop-made "bolts" (probably wood, maybe plastic)<sup>1</sup> that fit through slots in the floor of each seat and thread into inserts in the cabin floor. They can be screwed down tight for trailering, but could be left loose in flat water.

##### Night time:

To change to the night time configuration, first stow the forward steps – the two bottom steps push straight back under the foredeck and the top step flips straight up. (Note – when the top step is flipped up it blocks the doorway from the foredeck. It would be impossible not to see from the outside. No chance of someone not realizing that it's folded and falling into the cabin.) Fold the helmsman's seat if it is up, and stow the footrest under the helm. Now you have about 42" of floor space between the dinette and the starboard side of the cabin. Lift the seat cushion and lid, loosen the two bolts, and pull each seat straight out into the center of the cabin until it stops at the end of the slot. You can't get it wrong. Next is the table. No heavy lifting here, it simply swings down into place. First, lift the inboard edge of the table straight up. It will pivot on the top of the outboard leg and be somewhat balanced. Fold the inboard leg down: just let it lie on the floor. Still holding the edge of the table up, swing the table's center panel back 90°. Now the outboard leg of the table will

fold at the bottom and the table will swing down and into position between the seats. Backrest cushions fill in the gap. You now have a 48"X 78" walk-around double berth with 18" of unobstructed walkway to port and almost 24" to starboard, aft of the helm.

#### Alternative Arrangements:

The seats and table can be mounted in other configurations: If the table is unbolted, the seat closest to the galley can be swung around 90° so it backs up against the coaming to port to form an "L" shaped settee with the forward seat. The table can then be mounted inboard of the seat. Threaded inserts are installed in the floor for all alternative locations. The seat (or the seat and the folded table) can also be stowed under the fore deck leaving only one bench seat in the main cabin.

#### Helm:

Helm is forward to starboard. It has a traditional six spoke brass steering wheel<sup>2</sup> and a single lever binnacle mount engine control<sup>3</sup>. There is a grab rail incorporated into the top edge of the helm next to the steps. I really prefer to stand at the helm, but there is a helmsman's seat that can be set up at a height of either 18" or 28". It is adjustable fore and aft, and when pushed back all the way leaves room to stand at the helm. When set at 28" it gives the skipper the same eye level as when standing. For that, a 10" footrest pulls out from under the helm. When set at 18", the seat is a good height for general seating when not driving the boat. When folded it fits completely beneath the coaming without protruding into the open space.

#### Galley:

The galley runs athwartships separating the main cabin from the head compartment. It has a sink<sup>4</sup>, a Wallas stove<sup>5</sup>, and a refrigerator from Indel Wabasto Marine<sup>6</sup>. The stove is diesel fired and can function as a cabin heater. All fumes are vented outside. The refrigerator is top loading and is mounted in a rolling cart that pulls out from under the counter on the starboard side. Push it back in at night to make it easier to get around the foot of the berth in the dark. Dishes and mugs are stored in an open compartment mounted on the bulkhead over the counter. There is a cabinet to port with drawers. There is a 20 gal. grey water tank and two (or perhaps three) 20 gal. rotomolded fresh water tanks<sup>7</sup> on the centerline of the boat, under the floor. It might be possible to pump water from the river or lake through a filtering system<sup>8</sup> to replenish the fresh water. Either way, bottled water would definitely be carried for drinking.

#### Head Compartment:

The head compartment is 3½ ft. X 6 ft., has a sink<sup>9</sup>, vanity, hanging locker, a swing-out Air Head<sup>10</sup> composting toilet. The floor is a 6" step up from the main cabin and it has a ¼" per foot slope to the

center drain. I think the best shower is a 1 gal. garden sprayer with water heated on the stove. It would be possible to set up solar heating for hot water – there is room on the roof – but I think that might encourage using way too much water. The Air Head composting toilet is mounted on a quadrant and stows under the aft deck. It just swings out for use. The toilet paper comes out with it. There is a swing-up shower seat, and a shower curtain. The Air Head and the shower seat can be out at the same time (for anyone who wants a desk while using the toilet). In the default (daytime) configuration the steps to the aft deck are deployed. To access the sink, swing the top step up to expose the sink. The step will block the doorway. Push the lower steps under the sink. Open the locker door to port to access the faucet<sup>11</sup> – it will swing out over the sink. In the back of this locker is a two door medicine cabinet. Just forward of this locker is the hanging locker. Plenty of drawers below for storage. On the starboard cabin wall is a 12"X 30" window<sup>12</sup> – a vinyl horizontal slider.

#### Decks, ladders, and ramps.

There is a traditional wooden boarding ladder stowed under the aft deck to port. When stowed, it extends forward under the locker in the head compartment. No lifting required to deploy the ladder: just swing the hatch cover up and slide the ladder out until it reaches the tipping point. It will tip down against the transom and stop. The bottom step will be right at the waterline. The lower section can be swung down for better access to and from the water. When swung down, the bottom step will be about 32" below the surface of the water. The top of the ladder will be roughly 27" above the deck, providing a good handhold as you step from the ladder onto the deck.

There is also a landing ramp/ladder under the fore deck to starboard. No lifting required to deploy the ramp either: just swing the hatch cover up and slide the ladder out until it reaches the tipping point. Tip the ladder down. Climb down the ladder, face the boat, and pull the ramp out over the ladder rungs. Step down onto the beach and pull the bottom of the ladder with its ramp out as far as it will go to give the most gentle slope back up to the boat. The ramp will lock onto the rungs of the ladder and has "chicken steps" (small cross strips) across its surface to provide sure footing going up and down the ramp. Close the lid again so the deck is flush. The fore deck has two other lockers – one is an anchor locker and the other is for the washdown pump & hose.

#### Electrical:

The boat is wired for 12V DC and 120V shore power. There are two 100W solar panels<sup>13</sup> that charge both the house batteries and the starting battery for the outboard. The house battery bank will probably be 4ea. 6V batteries<sup>14</sup> wired to provide 12V.



#### Windows:

We have a Duffy electric boat<sup>15</sup> which has a simple, lightweight, and easy to clean weather tight enclosure. The windows are stiff (.060" thick) clear polycarbonate panels<sup>16</sup> sewn into a border of white vinyl fabric<sup>17</sup> with zippers<sup>18</sup> on two vertical sides. Each window is secured across the top and zippers to its neighbors on either side. There is Velcro along the bottom edge. Each window can be individually unzipped, swung up, and secured to the overhead where it is out of the way.

The front panel and three windows on each side of the main cabin in the houseboat are made the same way. In addition, each window has a zippered screen on the inboard side and a roll-up solid fabric panel on the outside for privacy. The solid sliding front door can be lifted off its track and stowed on the roof under the solar panels to make the main cabin completely open.

Power is a Honda BF9.9<sup>19</sup>, a four stroke 9.9 hp short shaft outboard with a 12A alternator and power tilt. It weighs 92 lbs. and is mounted in a well under the aft deck. Really quiet. The standard 3 gal. plastic fuel tank is used.

#### Bits and Pieces:

1. Shop Made bolts to secure bench seats to floor: I drew these at 1¼" dia.. To make these you'll need a Tap & Die Wood Threading Set: [www.garrettwade.com](http://www.garrettwade.com) Stock No. 98N11.04
2. Wheel is a 17" dia. brass ship wheel from Lunenburg Foundry: [www.lunenburgfoundry.com](http://www.lunenburgfoundry.com)
3. Morse MT-3 single lever binnacle mount: [www.teleflexmorse.com](http://www.teleflexmorse.com) and available from [www.jamestowndistributors.com](http://www.jamestowndistributors.com) or [www.pyacht.com](http://www.pyacht.com)
4. Sink is a Scandvik Stainless Steel single sink, 12¾"X 14¾"X 8" deep Model No. 10214 from Defender: [www.defender.com](http://www.defender.com)
5. Stove: Wallas Nordic Dt Ceramic Flush Mount Diesel Stove/Heater: [www.scanmarineusa.com](http://www.scanmarineusa.com)
6. Refrigerator: Indel Webasto Marine BI 29 (or maybe a BI41 – more space, doesn't use much more power): [www.indelwebastomarine.com](http://www.indelwebastomarine.com)
7. Rotomolded fresh and greywater tanks: [www.ronco-plastics.com](http://www.ronco-plastics.com)
8. Grey Water Recycling Kit: Parts Kit TSK190: [www.usi-rv.com](http://www.usi-rv.com)
9. Head Compartment Sink is a Scandvik Stainless Steel Oval Sink, 15¾"X 10½"X 6" deep. Model No. 10206 from Defender Marine: [www.defender.com](http://www.defender.com)
10. Composting Toilet is from Air Head Dry Composting Toilets: [www.airheadtoilet.com](http://www.airheadtoilet.com)

11. Faucet: Ambassador Marine Stasis Small Pull-Out Galley Faucet from Defender, Model No. 133-0112-CP, [www.defender.com](http://www.defender.com)
12. Head Compartment window: 12"X 30" Milgard Style Line® Series vinyl horizontal slider: from Milgard, [www.milgard.com](http://www.milgard.com)
13. Solar Panels: 200 Watt 12 V Solar Kit has 2ea. 100 Watt polycrystalline solar panels, charge controller, and all the cables to hook it up. SKU 700-10610-20: [www.store.sundancesolar.com](http://www.store.sundancesolar.com)
14. Trojan Batteries – 6V ModelT-105: [www.trojanbattery.com](http://www.trojanbattery.com)
15. Duffy Electric Boat Co.: [www.duffyboats.com](http://www.duffyboats.com)
16. Polycarbonate window material is .060" Makrolan® from Sheffield Plastics and is available through [www.sdplastics.com](http://www.sdplastics.com), [www.eplastics.com](http://www.eplastics.com), or [www.aetnaplastics.com](http://www.aetnaplastics.com)
17. White vinyl fabric is Stamoid 8.3oz. white vinyl coated woven polyester and is available through Sailrite: [www.sailrite.com](http://www.sailrite.com)
18. Zippers: same source as above, [www.sailrite.com](http://www.sailrite.com)
19. Honda BF9.9 is a short shaft with optional power tilt: [www.marinehonda.com](http://www.marinehonda.com)

