OPERATION MANUAL

Starlight Express

Bayliner 4788

Home Port

Anacortes, Washington USA

Welcome Aboard!

We are happy you have chosen *Starlight Express* for your vacation. We are sure you will enjoy cruising to the San Juan Islands, the Gulf Islands, Puget Sound, Desolation Sound, the Broughtons, or wherever you decide to venture.

We hope this manual will help you become familiar with the boat. We ask that you keep it clean and operational. If you have questions about the boat or about places to visit, please do not hesitate to ask the AYC staff.

Pleasant cruising!


Starlight Express
ANACORTES WA

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BASIC INFORMATION - Helpful facts for docking, replenishment, and space:

Boat Dimensions	**Specification**
Length Overall (LOA) [pulpit + hull + transom]	54-ft 0-in
Hull Length	47-ft 4-in
Beam	14-ft 11-in
Draft	3-ft 6-in
Clearance Height (VHF Antennas)	23-ft
Clearance Height (Satcom Antenna)	
Displacement (approximate) (empty)	32,000 lbs
Boat Replenishment	
Diesel Fuel	444-gal (2 tanks, 222-gal, 3152-lbs)
Fresh Water Forward Tank	110-gal (916-lbs)
Fresh Water Aft Tank	40-gal (498-lbs)
Sanitation Holding Capacity	48-gal (333-lbs)
Dinghy Gas Fuel	10-gal (60-lbs)(non-ethanal gasoline)
Barbecue Propane Fuel	1-gal tank (2 refillable tanks onboard)
Lubricants/Fluids	
Diesel Engine Oil Type	Heavy Duty SAE 15W-40
Diesel Engine Coolant Mix	Antifreeze-Water 50:50 Mix
Transmission Fluid	ATF MD-3 (Chevron)
Trim Hydraulic Fluid	ATF (Chevron)
Steering Hydraulic Fluid	Mil-Spec 5606 (Sea Star)
Dinghy Motor Oil Type	SAE 10-30W synthetic
Wet Battery Fluid	Distilled Water
Diesel Furnace Hygronic Fluid	Antifreeze-Water 50:50 Mix
Anchoring/Docking	
Working Anchor, Bruce-Type	66-lbs (30 kg)
Working Anchor Rode	300-ft 5/16” HT chain+ 200-ft 5/8” nylon
Spare Anchor, Bruce-Type	44-lbs (20 kg) (in the lazarette)
Spare Anchor Rode	40-ft 5/16” HT chain, 200-ft ½” nylon
Docking Fenders & Whips	8 – 10” x 26” (black), 12-ft whip
Dock Lines	4 – 25+ft. 5/8” (black)
Spring Lines	4 – 35-ft x 5/8” (black)
General Purpose Lines	2 – 50-ft x ½” (white)
Berths	
Forward Stateroom Bed	6-ft L x 5-ft W
Aft Stateroom Bed	6-ft L x 4-ft W
Mid-Stateroom Bunks x2	5-ft 11-in L x 30-in W
Salon Stb Sofa	
Salon Aft Sofa	
Pilothouse Port Bench Seat	
Weights and Measures	
1-gallon (US) diesel fuel = 7.1-lbs	444-gal (total capacity) = 3152.4 lbs
1-gallon (US) water = 8.33-lbs	160-gal = 1166.2-lbs
Conversions	
1 knot = 1.15 miles per hour	16 knots = 18.41 miles per hour
1 mile per hour = 0.87 knot	25 miles per hour = 21.75 knots
1 nautical mile = 1.15 miles	
1 mile = 0.87 nautical mile	
1 mile = 1.6 kilometers	
1 kilometer = 0.625 mile	
1 gallon (US) = 3.785 liters	222 gallons (US) = 840.27 liters
1 liter = 0.264 gallon (US)	rule of thumb: 4 liters ~ 1 gallon (US)

1 BOAT OPERATION

Become familiar with the various systems outlined in this manual. *Starlight Express* has features outfitted for comfort, convenience, and safety. Proper use of these features will promote a safe and relaxing trip.

1.1 Important Points

- **Pre-Operation.** Remember **"WOBBS"**: **W**ater Coolant, **O**il, **B**ilge, **B**elts, and **S**ea Strainer. Any problem is easier to fix while moored and more difficult to fix while adrift.
- **Electrical.** Monitor both AC and DC electrical systems diligently. Be aware of power use, available power sources, and charging rates. 30A max available on Line 1 shore power. Turn off non-essential, appliances, devices and lights.
- **Cruising RPM**. Sustained engine speed for cruising is **2300 RPM** (about 80-percent power) for speed of about 14-16-knots (depending upon weight of fuel, water, passengers, and provisions). Cruising at **1200-1500 RPM** can achieve speed of 7-9 knots and will reduce fuel consumption per mile substantially. Avoid pro-longed engine speed above 2300 RPM.
- **Minor Repairs**. Lubricants, spare parts, and tools are in the engine compartment (forward and main) and beneath the salon starboard seat (see Appendix B).
- **Protection**. Protect interior from damage – vinyl furniture, headliners, mattresses, wallpaper, woodwork, countertops, carpet, and appliances. Wipe/wash spills off the gelcoat to avoid stains. Use spilled-wine cleaner in the Aft Head cabinet.

1.2 Engine Inspection

1.2.1 Forward Engine Compartment

Turn ON lights in the engine compartment at the ENGINE ROOM LIGHT switch on the Pilothouse DC Panel. Raise the passageway staircase hatch to enter the forward engine compartment.

- **Fuel Management Panel**. Forward of the hatch opening, note the levers position of the fuel distribution valves on the FUEL MANAGEMENT PANEL. Normally, all levers will be in the vertical position to ensure proper fuel flow from 'source' tank and return to same tank.
- **Engine Primary Fuel Filters**. Check the glass bowls of the PRIMARY FUEL FILTERS on the port and starboard bulkheads for water or debris. Rotate the thumb-wheel valve to drain water and debris. Use a paper cup to catch the mixture. Recheck after recent refueling.
- **Generator and Heater Filters.** On the starboard bulkhead, check the glass bowl of the GENERATOR FUEL FILTER for water or debris. Check the glass bowl of the HEATER FUEL FILTER for water or debris. Drain as necessary.
- **Hydraulic Shift Reservoir**. On the starboard bulkhead, check the gauge on the HYDRAULIC SHIFT RESERVOIR. Pressure should be about 80-85 PSI for best operation. A pump is in Tools box, if pressure needs to be restored.
- **Water Tank Selection**. On the port bulkhead, note the position of the WATER TANK SELECTOR valve – water is drawn from either the #1 tank (located near the bow) or #2 tank, (located beneath forward stateroom floor). If the FRESHWATER PUMP continues to run when water is not being used, the reason is an empty tank. Flip the selector valve to the other tank. The #1 tank holds 110-gallons, the #2 tank about 40-gallons.

1.2.2 Main Engine Compartment

From the Forward Engine Compartment, remove the bulkhead hatch to the main engine compartment and set it aside. From the Salon, the compartment may also be reached by lifting the center floorboard.

- **General Condition**. Look for abnormalities (loose connections, leaks, chaffing, etc). Note the general condition of HOSES, FUEL LINES, and AIR FILTERS.

- **Engine Coolant**. Check the ENGINE COOLANT reservoirs – normal level is about ½ full.

- **Oil Level.** With a paper towel or rag handy, remove the oil dipsticks. Etch marks on each dipstick indicates minimum and maximum oil level. If necessary, to add oil, raise the floorboards in the Salon to open the top of the engine compartment. Open the oil filler cap on piston #1 valve cover. Pour oil through a funnel. Recheck the dipstick. Cleanup spills.

  WARNING – DO NOT OVERFILL the engine oil. More is NOT better and may cause damage. Recheck oil level periodically. Report any unusual 'consumption' or 'creation'.

- **Transmission Fluid**. Check the TRANSMISSION FLUID level in each transfer case. Raise the dipstick on top of the transfer case housings. Tighten properly to prevent contamination.

- **Seacocks.** Ensure the RAW WATER SEACOCK valves are in the 'open' position (lever in-line with valve). Check the glass container for debris. If necessary, close seacock, loosen the thumbscrews on the cover, clean the strainer, and reassemble the cover snugly. Check later for leakage while running.

  WARNING – Open seacock fully after servicing or the engine will overheat.

- **Bilge Pumps**. Lift the engine room metal floor panel. There are 2 pumps. Check the 'automatic' bilge pump by lifting the tab on the float switch. If defective, take necessary steps to determine the cause, fix, or report – this is the first line of defense in case of flooding.

  NOTE – There are six total bilge pumps – 3 automatic, 3 manual at the pilothouse panel. Two pumps are located in engine room (describe above); two in forward engine room; two beneath the passageway step.

1.2.3 Lazarette

Open the center Lazarette hatch at the Cockpit.

- **Steering Fluid**. On the transom, note the STEERING FLUID level in the container.

- **Trim Tab Fluid**. On the transom, note the TRIM TAB FLUID level in the container.

- **Battery Fluid.** After a couple weeks of use, check the BATTERY FLUID levels in the batteries. Ensure the water covers the metal plates. Top off with DISTILLED water.

  WARNING – Use DISTILLED WATER only – bottled water is NOT distilled water and will destroy the batteries. DO NOT OVERFILL – a cell is full when fluid just touches the vent slots inside the fill opening – there must be an air gap for bubbling gas to escape.

1.3 Engine Startup

Procedure for engine startup:

- **Engine Switch.** At the top of the DC Electrical Panel, turn ON the PORT and STARBOARD "Engine" switches.

- **Trim Tab Switch**. At lower right of panel, check the TRIM TAB switch. It is normally ON.

- **Gear Shifts.** At the helm station, move the GEAR SHIFTS forward and backward to check freedom of movement. Then, position knobs at the 'neutral' (vertical) position – the START-SAFETY switch will NOT allow the engine to start if shift lever is out of neutral position.

  NOTE - It is a good idea to remember this fact if the engine fails to start, as expected.

- **Throttles.** Position throttles to the 'idle' position (aft or bottom position).

- **Ignition Keys.** Insert keys into the IGNITION SWITCHES. Start one engine at a time.

- **Pre-Heat**. Turn the key clockwise – the ENGINE ALARM will buzz, and the ENGINE PRE-HEAT LAMP will be 'green'. Wait for pre-heat lamp to turn OFF – the alarm pitch will rise.

- **Start**. Turn the key fully clockwise to engage the starter motor.

  NOTE – If the starter motor does not engage, check Engine switch on the DC panel is ON. Then, recheck/re-adjust the neutral position of the gearshift.

- **Difficult Starting**. It may be necessary to adjust the throttle, particularly in cold weather. If engine cranks slowly or fails to turn over, check the condition of the engine battery on the DC ELECTRICAL PANEL. If the battery appears low, press/hold down the BATTERY PARALLEL switch on the Helm Panel to combine engine batteries. Try restart.

- **Warm-up**. Raise the engine speed slowly to just above **1000 RPM** on the TACHOMETER. Warm the engine for about 2 minutes.

  NOTE – Raising the speed above 1000 RPM, will turn off the engine pre-heater and reduce the recharging load on the alternator while idling.

- **Gauges**. The oil pressure should indicate at about 40 PSI within 10 seconds. Note readings on VOLTMETER, OIL PRESSURE GAUGE, TEMPERATURE GAUGE, and FUEL GAUGE.

  WARNING – If oil pressure is low, shutdown the engine, inspect the engine compartment and find possible cause (for example, a loose and leaking oil filter.)

- **Exhaust Water**. Go to cockpit and ensure the cooling water is flowing through the ENGINE EXHAUSTS.

  WARNING – If no cooling water in the exhaust or engine overheats, stop the engine. Recheck seacock for open position or excess debris. Check for broken engine belt, which turns the water pump. Restart the engine, and re-check water flow at the exhaust. If water is not flowing properly, seek assistance.

Repeat the procedure for the other engine.

1.4 Engine Operation

Monitor engine operation while underway.

- **Oil Pressure**. Check oil gauges frequently. Oil pressure should remain above 40 PSI.
- **Coolant Temperature**. Coolant temperature should remain 150 to 200 degrees Fahrenheit.

  WARNING – If an engine overheats or the alarm sounds, stop the engine. Do an inspection to determine cause.

- **General Performance**. Look and listen for changes in engine performance (e.g. unusual noise or RPM loss) or visual appearance that may indicate need for service. An EAR PROTECTOR is in the engine forward compartment for visual inspections while underway.

1.5 Engine Shutdown

Procedure for engine shutdown:

- **Cooling**. Allow time for gradual and uniform cool-down of engines. The time engaged in docking is usually enough.
- **Throttles.** Move each THROTTLE to the idle position.
- **Ignition Key**. Turn each ignition key to OFF position.
- **Engine Switch.** At the DC Electrical Panel, turn OFF the PORT and STARBOARD "Engine" switches.
- **Electronics**. Check instrument switches on the Bridge and Pilothouse and turn off DC electrical devices or electronics. Also, turn off switches at the DC Electrical Panel.

1.6 Getting Underway

1.6.1 Shore Power

The SHORE POWER INLETS are located on the starboard side near the pilothouse. Power cords are stowed in beneath the starboard Lazarette hatch.

- **Shore Power**. Go to the shore station and turn the Shore Power switch OFF. Then, disconnect the cord from the shore receptacle.

  CAUTION – To avoid electrical shock from 'hot' cord is drop into the water, disconnect the shore-side plug first before handling the cord.

- **Boat Inlet**. Disconnect the cord from the boat inlet and replace/tighten the inlet cover.

  WARNING – If the boat inlet is found hot and has burnt prongs or connector damage, investigate. Ensure connectors are tight and not arching. Use other cords if available.

- **Cord Stowage**. Stow POWER CORDS beneath the starboard Lazarette hatch. Extra 30-amp extensions cords, as well as a 50-amp cord and adapters, are stowed there.
- **Adapters**. Two CORD ADAPTERS (20-amp and 15-amp) are stowed inside the PILOTHOUSE AC ELECTRICAL cabinet. Use these to adapt the 30-amp power cord to 20-amp or 15-amp shore power receptacles.

To reconnect shore power, reverse the procedure above, first plugging cord to the boat inlet, then to the shore station.

1.6.2 Interior Stowage

Prepare the boat interior for cruising and rough sea conditions.

- **Portholes**. Close and lock the PORTHOLES - 2 Aft Stateroom, 2 Mid Stateroom, Aft Head, Fwd Head, and 4 Forward Stateroom.

  NOTE - This is the common cause for 'wet' bunks. If water has soaked a bunk, remove the cover and mattress and take steps to dry, else mold and mildew will develop.

- **Fore Deck Hatches**. Close and lock the 2 deck HATCHES above the Forward Stateroom.

- **Windows**. Adjust or close Salon and Pilothouse windows.

- **Glassware**. Check Galley, Salon, Staterooms, Heads, and Bridge for items that may topple or spill while underway (drink glasses, coffee cups, wine bottles, bowls, dishes, etc.).

- **Galley**. Stow dishware, glasses, pots and pans in their respective cabinets and drawers. Push-in all LATCH buttons. Cabinet items may spill out in rough seas.

- **Loose Items**. Secure cell phones, iPods, laptops, and other electronics. Ensure heavy items will not fall. Put clothing inside cabinets and drawers and push-in the LATCH buttons.

- **Doors**. Close or latch Stateroom and Head doors to avoid swinging. Close the Bridge HATCH door or secure the open door with tie-strap beneath bridge seat to prevent slamming shut as the boat rolls.

1.6.3 Bimini Cover

The BIMINI may be deployed or stowed. To stow, release the canvas snaps from the mast. Fold the frame forward and secure the straps and frame in standing position. Wrap the BIMINI BOOT CANVAS around the Bimini – the boot is normally stowed beneath the bridge seat portside.

1.7 Cruising

Operate the vessel from a helm position that provides visibility for the course, speed, weather, and sea conditions. Close-quarter maneuvering is best from the bridge helm.

- **Line Handling.** Brief crewmembers on the departure plan. Assign duties for handling SPRING LINES, DOCK LINES, or to assist others.

- **Limited Visibility**. Turn ON the NAVIGATION LIGHTS at the DC Panel and helm switches.

- **Trim Tabs**. Ensure the TRIM TAB switch is ON at the DC Electrical Panel. For close quarter maneuvering or backing, press both TRIM TAB switches to 'Bow-Up' position to retract the trim vanes.

- **Bow Thruster Control**. Push the two ON buttons at the BOW THRUSTER control to activate the joystick. Move the bow as necessary.

- **Throttles and Gear Shifts.** Ensure the THROTTLES are 'idle' or very low speed before engaging the GEAR SHIFTS to avoid stress on transmission.

- **Fenders and Lines**. After clearing traffic, have crewmembers stow FENDERS and lines.

- **Cruising Trim**. Before high-speed cruising, press both TRIM TAB switches to 'Bow-Down' position. This sets the trim vanes downward, which will help raise stern as boat accelerates.

- **Acceleration.** Move THROTTLES smoothly, allowing the engines to power up. Equalize engine speeds on the ENGINE SYNCHRONIZER at the center of the pilothouse helm panel.

- **Cruise RPM**. Normally, ENGINE SPEED for cruising is **2300 RPM** (80% of rated engine power). This should achieve a satisfactory plane, depending upon trim configuration, weight, and sea condition. Choose a lower rpm for lower consumption rate of fuel. Cruising 1200-1500 RPM will reduce fuel consumption rate by about one-half. Avoid engine speeds above **2300 RPM**; but, vary the speed for short durations.

- **Trim Adjustment.** Perform trim adjustments carefully. In 'following-sea' conditions or swells, favor a 'bow-up' position to avoid plowing or surfing into waves.

1.8 Docking

For docking, the bridge usually offers the greatest visibility all around.

- Listed below is equipment onboard for docking and mooring.

Item	No.	Description	Stowage Location	Typical Use
Fender, Primary	8	10"x26" black with 12-ft black whip line	4x foredeck rails 2x midship/brdg, 2x cockpit	Hang from rail or cleat to waterline or to gunwale level for rafting or pier
Fender, Round	1	8" diameter, red with whip line	Cockpit aft hanger	May be used as mobile fender or buoy marker.
Fender, Angled	1	6"x12" black with 3-ft whip/plastic peg	Cockpit aft hanger	Supplemental. Wedge peg between swimstep & transom. Hang over stern
15-ft Dock Line	2	5/8" black braid line	2x stern cleats	Short-length to avoid propeller fouling.
25+-ft Dock Line	4	5/8" black braid line	2x bow locker 2x cockpit hanger	General purpose. Use as Dock or Spring Line.
35+-ft. Spring Line	4	5/8" black braid line	2x bow locker 2x cockpit hanger	General purpose. Use as Dock Line or Spring Line.
400-ft Poly Line	1	½" blue poly roll	Cockpit ladder reel	Stern tie line. Set up as self-retrieving line
50-ft General Purpose Line	2	½" white 3-strand line	Cockpit portside hanger	Supplemental. Required to transit *Ballard Locks*.
100-ft General Purpose line	1	7/16" yellow braided line	Cockpit hanger	Supplemental. May be used for towing dinghy
Boat Pole, Extendable	1	Silver aluminum with plastic hook	Cockpit rack	Reaching, line handling, retrieval
25-ft Line with Mooring Hook	1	5/8" white 3-strand line, 16" steel loop hook	Foredeck locker	With boat pole, insert into hook, apply tension to line. Poke hook tip into buoy ring. To retrieve, use pole hook.
200-ft Rode for Spare Anchor	1	½" white 3-strand line	Lazarette portside hatch	Anchor rode. General purpose.
2-ft Lines	3	¼" black, 3-strand with loops	Lazarette portside hatch	May use to secure weight to fenders for tying alongside log boom

- **Docking Plan**. Determine dock layout, plan the entry/maneuver, and inform the crew on how docking will take place (for example, port or starboard tie, bow in or stern in).

- **Fenders**. Deploy 3 or 4 fenders at dock level. Deploy other fenders on opposite side at gunwale height (to fend off adjacent boats just in case docking doesn't go as planned).

- **Line Handling.** Arrange/secure DOCK and SPRING lines in advance. Assign line-handling duties to crew. Under good conditions, an able crewmember may step off (not jump) from the swim step to secure the STERN LINE to dock.

- **Helm Centering.** Before entering the docking area, reduce throttle speed to about 800 rpm and synchronize engines. Center the WHEEL to straighten the rudder.

- **Trim Tab Retraction**. Re-position TRIM TABS to the 'Bow-Up' position (press 8 to 10- seconds) to allow stern to move freely.

- **Bow Thruster Control.** Push the two ON buttons on the BOW THRUSTER control to activate the joystick for positioning the bow if necessary.

- **Maneuver.** Rely on the GEARSHIFTS for close-quartering maneuvering. Avoid use of throttles, unless necessary.

1.9 Fuel

1.9.1 Refueling Boat

Each of 2 fuel tanks holds 222 gallons for total 444 gallons. Turn the ignition keys ON to read the Pilothouse fuel gauges.

- **Estimate Fill**. Estimate gallons needed for each tank based on fuel gauge readings. For example, if gauge shows ¾ full, anticipate 55-gallons; if ½ full, 110-gallons.

  NOTE – It is good practice to refuel before the tanks are 1/3 full. The best reason is to avoid the anxiety of searching for a fuel dock.

- **Fuel Fill Cap**. The FUEL FILL CAP for each tank is located on the deck, aft of the pilothouse doors. Fuel vents are located opening. Remove FILL CAP with the CAP REMOVAL TOOL.

- **Oil Sorbs**. Have oil sorbs handy to soak up spilled fuel. The fuel dock may provide; if not, oil sorbs are available in the forward engine room.

- **Diesel Hose**. At the pump, ensure the attendant provides the correct fuel hose – ask DIESEL; hear DIESEL, see DIESEL. Ensure the nozzle is placed into the 'DIESEL' deck fill opening on starboard side (not the sewage holding tank). Confirm everything to avoid a catastrophe.

  NOTE – On many fuel docks, the hose length is insufficient to reach the opposite side fill cap without passing the hose through the pilothouse or galley. Please take steps to protect the carpet and interior. Reposition rugs and mats, and place oil sorbs beneath the hose path. Wipe down hose with sorbs or towels before it enters. Wrap a sorb around the nozzle to catch drips.

- **Pump Flow**. If necessary, position a crewmember to call out the gallons/liters on pump. Place nozzle into the tank opening, and pump evenly. Note sound of the fuel flow. Pumping too fast will interfere with air escaping from the opening, resulting in a fuel geyser. As the tank nears full, the gurgling sound will rise in pitch; gently slow fuel flow. Pay attention to the TANK OVERFLOW VENT on the outside and be prepared to catch spurting fuel with oil sorb. Spurting indicates tank is nearly full. Recheck (or have someone check) the fuel gauge.

- **Fuel Filler Cap.** Replace each tank fill cap. DO NOT over-tighten. Clean spills with oil sorbs. Wash hands with soap and water thoroughly for health reasons.

1.9.2 Fuel Management

The FUEL MANAGEMENT PANEL is located beneath the opening to the front engine compartment. Fuel is directed/returned from/to either tank to the engines and generator via the supply valves. Recheck position of the levers whenever entering or exiting the engine compartment to ensure proper settings.

WARNING – Normally, all levers are in vertical position during operation, returning fuel to each source tank. If the returning fuel goes to an opposite tank and overfills, the fuel will discharge overboard through the vent – a nasty situation. These levers may be moved accidentally while working in engine room.

1.9.3 Refueling Dinghy

- **Estimate Fill**. The internal fuel tank holds 10-gallons. Use only non-ethanol gasoline, available at marina fuel docks. Estimate the amount needed by the fuel gauge reading.
- **Fuel Fill Cap**. The FUEL FILL CAP is located on port aft. Press latch and lift cover.
- **Pumping**. Place the nozzle into the tank opening. Pump slowly and evenly. Pumping too fast may result in spurting. There is no need to top off. Ensure fill cap is closed.

2 ELECTRICAL SYSTEMS

Power Distribution. The boat electrical is organized into TWO power distribution systems:

- DC (Direct Current) – 12V boat systems, lights, and electronics.
- AC (Alternating Current) – 120V appliances, like used in households

DC System Sources. The DC power distribution system has six sources:

- House Battery Bank #1 – supports main boat systems, lights, and electronics
- House Battery Bank #2 – supports AC/DC inverter; auto combines with Bank #1 during charging
- Starboard Engine Battery – Starboard Engine starting
- Port Engine Battery – Port Engine starting
- Generator Battery – Diesel Generator starting
- Thruster Battery Bank (24V) – Bow Thruster operation only.

AC System Sources. The AC power distribution system has three sources:

- Shore power – Typically Line 1 (30A) boat receptacle is used. Supports all AC equipment
- Diesel generator – Start switch below AC panel. Supports all AC equipment
- AC/DC Inverter – Switch at DC panel. 'Specific' AC equipment (see section 'Inverter Power')

The electrical distribution systems are controlled via the Pilothouse AC ELECTRIC Panel, the DC ELECTRIC PANEL, the BATTERY SWITCH PANEL in the Salon aft port cabinet, and the Thruster BATTERY switch in the Forward Stateroom.

NOTE – Refer to Appendix 19.6 Boat Electric Panels for illustrations.

When AC Shore Power or Generator is not used, the DC House Bank batteries provide 'inverted' 120-volt AC power to 'specific' AC equipment.

Batteries have limited capacity. Monitor the use of electrical equipment carefully. Turn OFF unnecessary devices and lights, and conserve battery power.

Connect to shore power or generator to restore battery capacity through the DC battery charging devices.

AC and DC Panel breakers are labeled for all devices and circuits.

2.1 DC System

2.1.1 Battery Banks and Switches

NOTE – Refer to Appendix 19.6 Boat Electrical Panels for illustrations.

The six BATTERY BANKS supply power for lights, refrigeration, electronics, engine starting, generator starting, and bow thruster:

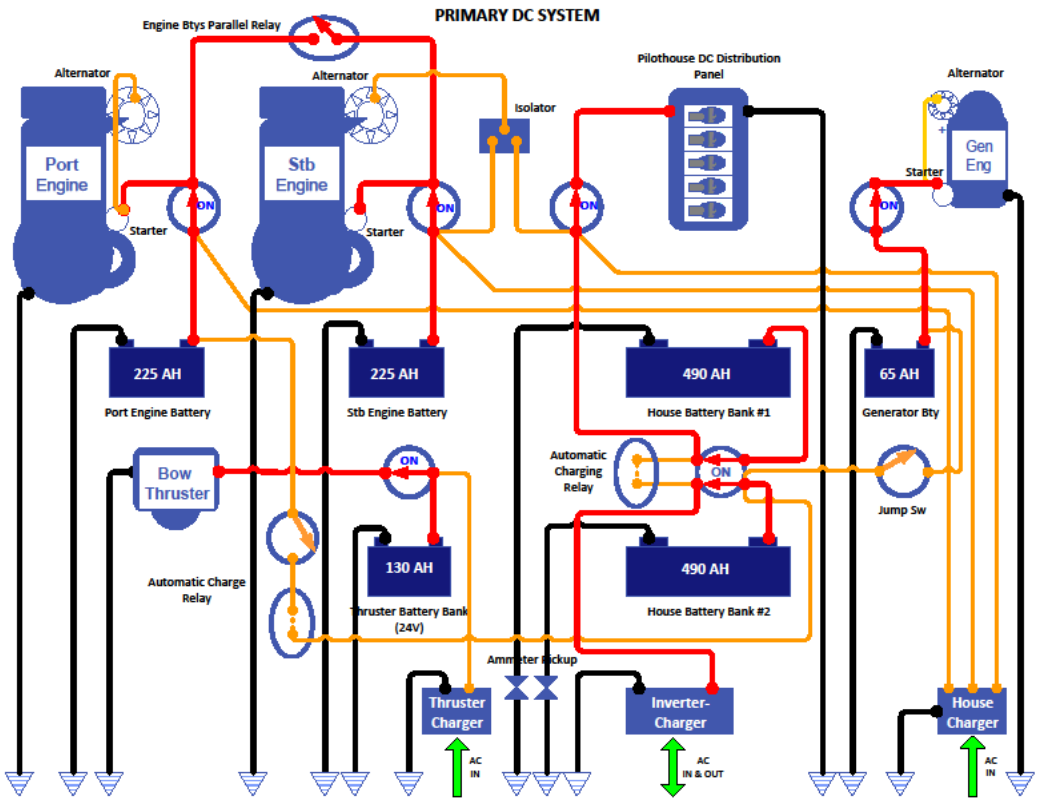
Battery or Battery Bank	Battery Type	Full Charge Storage
Port Engine Start Battery	Dyno Group 8Dc (12V wet cell) (1250-CCA)	255-AH
Starboard Engine Start Battery	Dyno Group 8Dc (12V wet cell) (1250-CCA)	255-AH
House Battery Bank #1 Boat Sys	*Dyno GC2B (4x6V wet cell, 2-Pair, Deep-Cycle) (235-AH)*	*470-AH*
House Battery Bank #2 Inverter	*Dyno GC2B (4x6V wet cell, 2-Pair, Deep-Cycle) (235-AH)*	*470-AH*
Generator Start Battery	West Marine M6 (Group 24 12V) (650-CCA)	65-AH
Thruster Battery Bank (24V)	Optima AGM (2x12V AGM, 1-Pair, Deep-Cycle) (65-AH)	130-AH

When the house batteries are combined, the total electrical storage is up to 940-AH. Battery capacity is measured in amperes per hour (AH or amp-hour).

Use DC lighting wisely. A DC device rated 10-amps and turned-on for 10-hours would consume 100-AH *(#amps* multiplied by *#hours* equals #amp-hrs). For example, each non-LED light bulb draws 0.8 amps – count the number of bulbs ON, then multiply by 0.8 to determine amp-hr consumption.

BATTERY SWITCHES are in the BATTERY PANEL in the aft portside cabinet in the Salon. For the bow thruster, the switch is located on starboard side of bunk in the forward stateroom.

Diagram of the DC storage and charging system is shown below:



If cruising for more than a week, inspect the level of the battery electrolyte fluid. Remove the battery caps. If the metal plates are exposed, add distilled water (see warning below). Distilled water is stowed beneath the port and starboard Lazarette hatch covers.

WARNING – USE only 'distilled' water. Do not use bottled water – it is NOT distilled; that will destroy a battery. Do not overfill. A cell is full when the fluid is at a level just beneath the bottom of the vent collar (i.e. not touching) – there MUST be an air gap beneath the collar for bubbling gas to escape properly.

2.1.2 Panel Digital Multi-Meter

The DIGITAL MULTI-METER is located on the DC panel. Rotate the battery switch between port, starboard, house 1, house 2, generator, and thruster. The left and right buttons on the meter will toggle the meter between voltage display and current display. Current (ampere) readings apply to HOUSE 1 and HOUSE 2 battery banks only.

A 'negative' current value indicates battery discharge – a 'positive' value indicates battery charge. This is useful for monitoring power consumption of DC devices and for conserving battery power.

2.1.3 Battery Charge Condition

Battery charge activity can be checked through the DIGITAL MUTI-METER. While a battery bank is charging, the voltage may read from 13.1 to 14.4 volts depending on the battery state-of-charge.

When a battery bank is 'at-rest' (not charging), the voltage reading provides a rough indication of the state-of-charge and amp-hour capacity remaining in the battery bank. (See AH capacity at paragraph 3.1.1).

Battery Meter Voltage At Rest	Approximate Battery State-of-Charge
12.65 volts	100%
12.47 volts	75%
12.25 volts	50%
11.95 volts	25%
11.70 volts	0%

2.1.4 Battery Charging Systems

2.1.4.1 Engine Alternators

The ENGINE ALTERNATORS provides charging while underway to operate the boat systems (navigation, lighting, sanitation, refrigeration). Excess energy is applied to battery charging. It will take time to fully recharge batteries using the alternators.

An engine speed at about 1000 RPM will activate charging (note voltmeter movement at helm panel). To increase charging output, raise engine speed above 1000 RPM.

Alternator DC Power Output (approximate)

Engine Speed	Stb Alternator (145-A)	Port Alternator (145-A)
<1000 rpm	0-amps	0-amps
1500 rpm	45-amps	45-amps
2000 rpm	100-amps	100-amps
2500 rpm	130-amps	130-amps
3000 rpm	140-amps	140-amps

2.1.4.2 House Battery Charger

The BATTERY CHARGER (*Promariner Model ProNautic 12-50)* provides energy to Port engine battery, Starboard engine battery, House Battery Bank #1 (boat systems); and through the Automatic Charger Relay, to House Battery Bank #2 (inverter).

Maximum continuous charge output is **50-Amps** DC. The charger will perform its charging cycles automatically. It is the white-colored unit behind the port engine.

NOTE -- Normally, the BATTERY CHARGER switch on the Pilothouse AC Panel may be kept OFF. If the Inverter is ON, its internal battery charger can handle daily needs. When the boat is laid up for long periods, this battery charger is used to maintain trickle charge on the battery banks. Turn ON if needed to supplement charging.

2.1.4.3 Inverter Battery Charger

The INVERTER includes an internal charger (*Outback Model VFX-2812M).* Its charging priority is to House Battery Bank #2 first, and then to House Battery Bank #1 (boat systems) through the Automatic Charging Relay, whenever connected to Shore Power or Generator.

Maximum continuous charge output is **120-Amps** DC.

Normally, the INVERTER AC SUPPLY switch and the INVERTER/CHARGER switch are turned ON at the Pilothouse AC Panel to connect Inverter. Turn OFF for maintenance.

The Inverter is located beneath the Salon starboard aft corner seat. It is equipped with an auxiliary thermostat and cooling fan to supplement air flow during warm weather.

2.1.5 House Batteries Automatic Charging Relay (ACR)

An AUTOMATIC CHARGING RELAY (ACR) connects House Battery Bank #1 (boat systems) and House Battery Bank #2 (inverter) during charging. The ACR is located forward of generator beneath the Lazarette center hatch.

When no charging source is present and one of the house banks is discharging heavily, the relay disconnects (opens) to isolate each banks. For example, if House Battery Bank #2 (inverter) is discharging heavily, the ACR will disconnect to isolate the House Battery Bank #1 to preserve energy for boat systems.

Three LEDs indicate the following ACR conditions:

- **GREEN** – Bank #1 and Bank #2 connected. When charge voltage is present in one of the banks, the LED will turn ON and the ACR will connect the other bank within a minute.
- **AMBER** – Either bank is being discharged. When the LED turns ON, the battery banks will disconnect within a minute.
- **RED** – Over-voltage (above 15-volts). The RED LED will turn ON, and the relay will disconnect battery banks.

2.1.6 House Batteries Switch & Combiner

The red-colored combiner switch is located forward of Generator next to the House batteries ACR.

When in **ON** position, the HOUSE BATTERIES SWITCH connects House Battery Bank #1 to boat systems and connects House Battery Bank #2 to inverter. When in the OFF position, both battery banks are disconnected from all boat systems.

In exceptional situations, turn the switch to the **COMBINE** position. The energy of both House Battery Banks is combined. This may be used to compensate for an ailing house battery bank or to supplement a failing alternator.

The House Batteries ACR is bypassed when the House Batteries Switch is in Battery ‘Combine’ position (see section House Batteries ACR)

CAUTION – If one bank is severely discharged, a large current surge may occur across the switch.

2.1.7 Port Alternator–House Battery #2 ACR

To supplement charging to the house batteries, or to compensate a failing starboard alternator, an AUTOMATIC CHARGING RELAY (ACR) can connect the Port Engine alternator to Inverter Battery Bank #2 first, and then to the House Battery Bank #1 through the House Batteries ACR.

The red-colored switch, located next to the ACR, is normally OFF. To use, turn ON before starting engines.

When the port engine is not operating, this ACR isolates HOUSE BATTERY BANK #2 and the PORT ENGINE BATTERY automatically, to preserve the engine battery for starting.

2.1.8 Engine Batteries Combiner (Parallel) Switch

A 'PARALLEL' switch is located at the pilothouse helm. Use when an engine does not have sufficient battery power to start. Press down the switch to combine the energy of the STARBOARD ENGINE BATTERY and PORT ENGINE BATTERY momentarily while starting the engine.

2.1.9 Generator Battery Combiner Switch

The GENERATOR BATTERY COMBINER switch is in the lazarette. The red-colored switch, located above the Generator Battery, can connect the House Battery #1 to the Generator Battery in case the Generator battery needs a jump start. Switch is normally OFF. To use, turn ON. After starting generator, turn switch OFF.

2.1.10 Thruster Battery Charger & Switch

The THRUSTER BATTERY CHARGER (*Xantrex Model XC 1524)* provides power to the Bow Thruster Battery Bank. The bank is a 24-volt system.

Maximum continuous charge output is **15-Amps** DC at 24-volts.

Turn ON the BT BATTERY CHARGER switch at the Pilothouse AC Panel. The battery charger is located beneath the forward stateroom bunk, starboard side.

The thruster 24-volt battery charger is ON automatically when the boat is connected Shore Power or Generator. The system is isolated from the boat's12-volt system - it is not recharged by the inverter-charger or engine alternators.

The THRUSTER BATTERY SWITCH is located on the starboard side of the forward stateroom bunk. Normally the switch is ON. Turn switch OFF during an emergency or to do maintenance.

2.1.11 Circuit Breakers and Fuses

The MASTER CIRCUIT BREAKER for **DC Systems** is located on the BATTERY PANEL in the Salon aft port cabinet. Branch circuit breakers for **anchor windlass** and **dinghy davit lift** are located there.

Individual DC **accessory** circuit breakers are located on the Pilothouse DC panel.

Supplemental fuse blocks for electronics, such as VHF radio, are located beneath the helm stations. A few electronic units also have secondary fuse protection near the unit.

2.1.12 12-Volt DC Outlets

12-VOLT OUTLETS are located as follows:

Outlets	Location	Panel Switch Name	Position
1	Pilothouse port side instrument panel	DC Electronics Switch	ON
2	Pilothouse stb side navigation station	DC Electronics Switch	ON
6	Above stereo system stbd side (4x USB)	DC Galley Switch	ON
2	Forward Stateroom port side cabinet	DC Stereo Switch	ON
2	Forward Stateroom stb cabinet (2x USB)	DC Stereo Switch	ON
1	Hygronic heater, stbd lazarette hatch	AUX DC Lazarette Switch	Always On

2.2 AC System

2.2.1 AC Sources

There are three sources for AC 120-volt power:

AC Source	Source Location	Service Inlets
Shore Power	3x Inlets on Pilothouse Stb Side. Select breaker position on AC electrical panel. Normally, connection to Line 1 is sufficient for power -- set Line 2 and Line 3 to 'Parallel'	LINE 1 = 30-A LINE 2 = 30-A LINE 3 = 50-A
Generator	Select breaker position on AC electrical panel	50-A
Inverter	Connects automatically when Shore Power or Generator are not in use	Connects LINE 1

NOTE -- Shore Power and Generator cannot be joined to increase power – the breaker lockouts prevent combination.

The Inverter will provide power to selected AC devices automatically, whenever Shore Power or Generator are not available. See Inverter Devices section for more information.

Monitor use of AC devices to remain within the capacity of shore power. The total power to be used for AC components should not exceed the capacity of the shore power service. For example, if shore power service is 30-amps and the total power used for appliances, motors, and lights is greater than 30-amps, the Line 1 AC circuit breaker will trip OFF.

2.2.2 Shore Power

2.2.2.1 Service Connection

Most marinas offer 30-amp (30A) service. Plug the 30A cord between the boat inlet and shore receptacle directly. Shore POWER CORDS and extensions are found in the Lazarette starboard.

If the marina has 15-amp (15A), 20-amp (20A), or 50-amp (50A) service, choose the appropriate adapter for the receptacle and cord. Line adapter combinations are shown in chart below.

Shore Source	Adapter Type	Location	Cord	Line1	Line2	Line3
15A/125V	15A/125V to 30A	Pilothouse	30A	Yes	Yes	na
20A/125V	20A/125V to 30A	Pilothouse	30A	Yes	Yes	na
30A/125V	***No Adapter Needed***	***N/A***	***30A***	***Yes***	***Yes***	***na***
50A/250V	***50A/250V to 30A***	***Pilothouse***	***30A***	***Yes***	***Yes***	***na***
50A/250V	50A/250V to 50A/125V cord	Lazarette	50A	na	na	Yes
50A/125V*	50A/125V to two 30A	Lazarette	50A	Yes	Yes	na

*NOTE – the 2 configurations highlighted above are most common. *Adapts to boat end of 50A cord.*

Shore power INLETS are located on Pilothouse starboard. Normally, use LINE 1 for service and set the AC Panel for Line 2, and Line 3 in "parallel" mode (see service options below).

CAUTION – Attach the shore power cord to the boat inlet first, and then to the dockside service to avoid 'shock' injury, should the cord (electrically hot) be dropped into the water accidently.

Allow slack in power cord to allow for boat/dock movement – this prevents strain on plugs (and arcing). Move cord off pathways; protect from foot traffic; keep out of the water. Coil excess.

Turn ON the DOCKSIDE MASTER switch on the panel. The VOLTMETER on the AC panel should read 110 to 120-volts.

WARNING – Check the electrical polarity indicator. A "red" light indicates reverse polarity and is dangerous – DO NOT engage the DOCKSIDE MASTER switch. Turn OFF the shore power source, disconnect cord, and seek help from marina management.

Turn ON individual AC component breakers only as needed. If the dockside power capacity is exceeded, the breaker will trip. Turn off excess AC devices before resetting the breaker.

2.2.2.2 Service Line Options

Normally, LINE 2 and LINE 3 on the Pilothouse AC Panel are operating in "parallel' mode with LINE 1. "Parallel mode" is setup when LINE 2 selector switch points to 'Line 1-2' and LINE 3 Selector switch points to 'Line 1-3". In this setup, the MASTER breakers for Lines 2 and 3 are disabled.

NOTE – The most common use and the easiest method is using "parallel" mode, delivering 30-A.

In "parallel" mode, total current being used is the sum of the three AMMETER readings. If the total current exceeds the capacity of shore power service, the LINE1 DOCKSIDE MASTER breaker will trip OFF. Turn off AC components to remain within the service capacity

Only if more shore power service is needed (and available), LINE 2 and/or LINE 3 can be switched to "normal" mode and their respective cord connected to shore power sources to deliver power in their separate AC circuits. In "normal" mode, the current is read on each line's AMMETER.

2.2.3 Generator Operation

The *Westerbeke* diesel GENERATOR is located beneath the Lazarette center hatch. During normal engine checks, ensure the generator SEACOCK is OPEN and the raw water strainer is free of debris. If used several days, check the oil level dipstick and coolant level inside the portside cockpit locker.

The GENERATOR CONTROL is located on the Pilothouse AC panel. To start the generator, rotate the GENERATOR CONTROL to RUN position. Press and hold the PRE-HEAT/OVERRIDE switch for at least 5-seconds. Then, while pressing the pre-heat switch, rotate the CONTROL knob to START position. Return control knob to RUN position after generator starts. Release the PRE-HEAT switch.

Do not operate starter for more than 15 seconds. Wait 30 seconds, then repeat startup steps.

NOTE – If the starter motor does not crank, check the emergency 'STOP' toggle switch (silver-color) located on the power control box at top, aft of generator. Remove the top panel. Set toggle position to 'RUN'. The switch can become toggled OFF accidently during maintenance.

NOTE – The throttle/cut-off solenoid has been known to stick and not seat properly – the starter will crank, but throttle does not provide fuel. To check solenoid operation, open the generator enclosure and locate the solenoid at the front starboard side of generator. Have a crewmember push the PRE-HEAT switch at pilothouse panel. The solenoid arm should move into the solenoid body. If not, nudge the arm until it seats. Start the generator.

To set up AC panel for generator, turn OFF the Line 1 MASTER switch. Slide the breaker lockout protector upward to uncover GENERATOR MASTER switch. Turn ON the Line 1 GENERATOR MASTER switch.

Turn ON the GENERATOR BREAKER switch. The green light will indicate power is available.

Observe reading of 110 to 120 volts on the AC voltage meter.

NOTE -- If power is not indicated, recheck the GENERATOR AC MASTER Switch. If okay, then check the GENERATOR BREAKER on the generator. Remove top panel; look for switch (double toggle white color) at aft end. Check switch position is ON (Up). Toggle the switch OFF, then ON (Up). The switch can trip OFF when output more than 50A or toggled during maintenance.

Turn ON AC device breakers as desired.

Monitor generator Oil Pressure, Water Temperature, and Voltage on the AC panel. The generator will shut down automatically whenever oil pressure and temperature conditions are unsatisfactory.

When generator is turned OFF, a 'squeal' will be heard from the cockpit portside. This is normal - the sound is from anti-siphon valve that allows the seawater intake hose to drain.

The Fuel Management Board is setup initially to supply fuel from the starboard fuel tank; however, the fuel source is selectable. The levers should be matched to 'return fuel' to the source tank. Otherwise, fuel would be transferred from one tank to the other, may overfill the tank, and will discharge fuel overboard through the tank vent.

The GENERATOR STARTING BATTERY switch is in the aft cabinet port side of the Salon.

2.2.4 Inverter Power

The INVERTER provides AC power when Shore Power or Generator is not connected.

Two switches on the AC and DC panels control inverter operation.

Panel	Panel Switch Name	Purpose	Switch
DC	Inverter DC Supply	Enabled Inverter Power from House Battery Bank	ON
AC Dual	Inverter AC Supply	Connects inverter to 120-V source	ON

The INVERTER MONITOR (*Outback Mate2)* beneath the salon corner seat provides monitoring and control of the inverter. Normally, this is used only for troubleshooting.

The inverter provides power to the following 120-v AC circuits and devices indicated. For detail graphic of inverter wiring, see Appendix.

AC Panel Switch Device	AC LINE	Inverter?	Key Devices/Notes
Water Heater	LINE 1	NO	
Trash Compacter	LINE 1	NO	
Battery Charger	LINE 1	NO	
Salon/Pilothouse Receptacles	LINE 1	**YES**	Internet, stereo system
Galley Receptacles	LINE 1	**YES**	Coffeemaker, small appliances, TV
Ice Maker	LINE 1	**YES**	Power reading on Line 2 Ammeter
Bridge Refrigerator	LINE 1	N/A	**Uses either DC or AC source**
Electric Range	LINE 2	NO	
Galley Refrigerator	LINE 2	N/A	**Uses either DC or AC source**
Mstr SR/Head Receptacles	LINE 2	**YES**	Power reading on Line 1 Ammeter
Aft SR/Head Receptacles	LINE 2	**YES**	Power reading on Line 1 Ammeter
Microwave	LINE 2	**YES**	Power reading on Line 1 Ammeter
Central Vacuum	LINE 2	NO	
Washer/Dryer	LINE 2	NO	

AC Panel Switch Device	AC LINE	Inverter?	Key Devices/Notes
Engine Heater Port	LINE 2	NO	
Engine Heater Starboard	LINE 2	NO	
Air Conditioner/Salon	LINE 3	NO	
Air Conditioner/Pilot House	LINE 3	NO	
Air Conditioner/Staterooms	LINE 3	NO	
Air Conditioner Relay	LINE 3	NO	
Heater #1 (forward stateroom)	LINE 3	NO	
Heater #2 (passageway)	LINE 3	NO	
Heater #3 (salon)	LINE 3	NO	
Heater #4 (pilothouse)	LINE 3	NO	
Bow Thruster Charger	LINE 3	NO	

When Shore or Generator power is available, the INVERTER will recharge HOUSE BATTERY BANK #2 first, then HOUSE BATTERY BANK #1 automatically through the BATTERY COMBINER.

NOTE - If the Inverter is not working, inspect the INVERTER unit located beneath the salon corner seat. If there is no indicator light, the main current fuse may need to be replaced.

- *Turn OFF the HOUSE BATTERY COMBINER switch beneath the center Lazarette hatch.*
- *At the fuse holder beneath the starboard hatch, remove the 2 bolts on the fuse*
- *Replace with 300 Amp fuse in the Electrical spares box (beneath Salon seat).*

WARNING -- Take precautions to avoid contacting DC high current.

2.2.5 120-volt Outlets

120-volt outlets are ground-fault protected (GFCI). In an outlet is not working, check the AC panel receptacle switch first, and then check the GFCI outlet on the circuit. See GFCI below:

Outlet Location	AC Panel Switch	GFCI Location	Suggested Usage
Port Side Helm	Salon/Pilothouse	Portside Helm	
Starboard Side Helm	Salon/Pilothouse	Portside Helm	
Above Stereo	Salon/Pilothouse	Portside Helm	Cell, Device Charging
In-Front Stereo	Salon/Pilothouse	Portside Helm	Cell, Device Charging
Salon Beneath Sofa	Salon/Pilothouse	Portside Helm	Laptop
Salon Port Aft	Salon/Pilothouse	Portside Helm	Lamp, Laptop
Stove Starboard	Galley	Stove Starboard	Coffee Maker
Sink Counter	Galley	Stove Starboard	Small Appliances
Salon Stb Aft Floor	Galley	Stove Starboard	Lamp, Laptop
Pilothouse Aft Seat	Refrigerator (AC)	None	Laptop, Nav Devices
Aft Head Cabinet	Aft Stateroom/Head	Aft Head Cabinet	
Aft Stateroom	Aft Stateroom/Head	Aft Head Cabinet	
Fwd Head Cabinet	Forward Stateroom/Head	Fwd Head Cabinet	
Fwd Stateroom Stb	Forward Stateroom/Head	Fwd Head Cabinet	
Fwd Stateroom Port	Forward Stateroom/Head	Fwd Head Cabinet	
Bridge Sink Cabinet	Bridge Refrigerator	Sink Cabinet	

3 SANITATION SYSTEM

Use MARINE TISSUE only in the marine heads (toilets) – this is very important. Marine tissue dissolves. "Household" tissue does not dissolve well, and it will clog pipes, valves, and pumps. An inoperable head is inconvenient for everyone, as well as a resulting in a nasty, costly repair.

Train crew and children to use the toilets. Monitor activity to ensure NO foreign objects (non-waste items, paper towels, facial tissue, and napkins) are thrown into the toilets.

Whenever the HOLDING TANK (TankWatch) Light on the Pilothouse DC Panel is RED, take immediate steps to remove sewage in the holding tank.

3.1 Marine Toilets

Turn ON the two TOILET switches and the WATER PRESSURE switch on the DC panel.

Press DOWN foot pedal to empty the MARINE TOILET (*VacuFlush*) bowl. Lift UP foot pedal to add water into the bowl.

WARNING – 'Never ever' put paper towels, facial tissue, tampons, sanitary napkins, household toilet paper, or food scraps into the toilet. Use ONLY marine dissolving tissue paper provided. If efforts fail to restore normal operation, the toilet system will need service - that means, opening the toilet pump and pipes -- a nasty and expensive job. The usual cause is disregard of the 'never ever' rule.

Common usage issues are described below:

If the toilet pump turns ON after the toilet has been recently used, check for water in the bowl. If no water, the usual cause is poor seal of the ball after the last flush, resulting in vacuum leak (listen for hissing air). Press the foot pedal to re-flush and clear any toilet paper, hair, or debris trapped between the ball and its rubber seal.

If the bowl fails to drain during flush, the pipe opening may be clogged. This opening is small to protect the system. Turn OFF the TOILET and the WATER PRESSURE switches at the DC panel. Press pedal to open the ball. Clear debris (poop and toilet paper) from opening. While clearing, suction may resume suddenly as the debris dislodges. Turn ON the switches and re-flush.

If the bowl fails to fill with water after flushing, check the WATER PRESSURE switch on DC Panel and the status of the water tank. If current water tank is empty, switch to alternate water tank.

If none of issues above and toilet pump runs intermittently on its own when not in use, a tiny vacuum leak at 'duck' valve or toilet seat may be occurring. Re-flush. If no correction and annoying, turn OFF panel switch when not in use.

NOTE – Spare seals, valves, motor, and bellows kit are stowed in Plumbing Spares box in engine room.

3.2 Sanitation Holding Tank

The SANITATION HOLDING TANK capacity is 48 gallons.

Note the sewage production rate of the crewmembers – this is about 1 gallon per toilet flush. Take steps to dispose of sewage frequently. An overfilled tank may break a hose, clog the tank vent, or burst a seal. The result will be indescribable catastrophe and costly repair.

3.2.1 Sanitation Tank Warning

The HOLDING TANK MONITOR is located on the Pilothouse DC panel. Turn ON the HOLDING TANK MONITOR switch on the DC Panel.

WARNING – When the red' light is ON, the tank is FULL. Take immediate steps to empty the tank (see below). Raw sewage may burst through the sensor at the top of tank (or elsewhere), flow into the bilge, release a nasty/unforgettable odor, and result in a hefty cleanup bill.

Do not rely on the 'red' warning light. If there has been much usage, or if in doubt, check the holding tank waste level in the engine compartment starboard side, with a flashlight. The holding tank indicator light will normally turn ON when within 4" from top of tank.

3.2.2 Marine Pump Out

Marine pump-out kiosks are located at fuel docks and sanitation barges. Each provides an opportunity to empty the holding tank. Follow the instructions at the kiosk. In many marinas, "pump-out" services with clever names, e.g. "Fecal Freak", "Sanitation Offloading Solutions (SOS)", can be called via phone and will come to the boat.

Remove the WASTE CAP located on starboard side.

CAUTION -- Check deck fitting cap to ensure it says "WASTE" -- not the "DIESEL" cap.

Most kiosk hoses have a rubber adapter to seal the tank opening. In necessary, attach an adaptor and connect to hose. Turn ON machine, then OPEN the lever on pump handle. CLOSE lever when finished. If water is available, re-fill the sanitation tank partially, and repeat pump out. This helps reduce odors.

Replace the WASTE CAP. Wash down the area. Wash hands.

3.2.3 Overboard Discharge

CAUTION – Be familiar with laws within cruising area, concerning discharging sewage overboard. Puget Sound, including San Juan Islands is a NO Discharge Zone.

To discharge, turn ON the HOLDING TANK DISCHARGE switch on the Pilothouse DC Panel. Depress both MACERATOR ROCKER SWITCHES together on the Pilothouse DC Panel. Listen to the discharge sound from starboard midship outlet. Gurgling indicates the tank is empty.

Do not run macerator longer than necessary.

NOTE – A spare macerator pump is stowed in storage box forward of the starboard engine.

3.2.4 Sewage Tank Treatment

Biological treatment (*NoFlex Digester*) is available in the cleanup cabinet. Flush granules down each toilet to help neutralize odor (hydrogen sulfide) and to liquefy holding tank sludge for easier pump out. Dosage is 1-tablespoon every 2 days for 2 persons. Flush sufficient water to reach the holding tank.

A spray bottle of biological toilet cleaner (*Biotal MDS 3000)* is located in the Aft Head cleanup cabinet to supplement cleaning of toilets and wash basins.

4 WATER SYSTEMS

4.1 Fresh Water

Two water tanks (Tank #1, 110-gal) (Tank #2, 40-gal) deliver fresh water to faucets, showers, and toilets. Use tank #1 as the main tank and keep it replenished. Consider tank #2 as a reserve.

4.1.1 Fresh Water Pressure

The FRESH WATER PUMP is in the forward engine room compartment and maintains water pressure automatically. Turn ON the WATER PRESSURE switch on the Pilothouse DC Panel.

If the FRESH WATER PUMP runs after faucets are closed, check the tank monitor on the DC panel to see whether the source tank (normally tanks #1) is empty (see switching tanks below)

NOTE – A spare fresh water pump is stowed forward of starboard engine. Turn OFF power at DC Panel. Disconnect wires, mounts, and connectors. Reconnect wires properly.

4.1.2 Fresh Water Tanks

Press the WATER TANK rocker switch on the DC Electrical Panel to inspect the level of each tank.

When a tank is empty, the FRESH WATER PUMP in the forward engine room runs continuously. The TANK SELECTOR VALVE is in the forward engine room portside. Rotate valve to a full tank.

To refill the tanks, open the WATER FILL CAPS on the Foredeck. Remove stale or rusty water from hose before placing nozzle into the tank opening. Avoid flushing deck debris into the tank opening.

NOTE – Tank #2 is more difficult to refill, due to slower venting -- fill slowly, allowing air to escape.

4.1.3 Fresh Water Dockside Inlet

A FRESH WATER INLET for shore-based water is found on the hull transom. Connect a water hose. Turn OFF the freshwater pressure pump when used. Turn OFF the shore faucet when not used.

4.1.4 Water Heater

The WATER HEATER *(Seaward S-1800)* capacity is 20-gallons. Hot water is produced by:

- AC Power – Turn ON the WATER HEATER switch on the Pilothouse AC Panel
- Diesel Furnace – Set control switch to SYSTEM HEAT while underway or dockside
- Engine Heat – Set control unit to ENGINE HEAT while underway

The heater consumes power -- 1500W AC (12.5A). Reduce other AC devices on 30A shore power.

CAUTION – Turn OFF water heater if water tanks are empty to avoid damage to heating elements.

4.1.5 Cockpit Fresh Water Shower

A FRESH WATER SHOWER is located in the Cockpit. The shower provides hot and cold water. Ensure the faucet valves are turned OFF or water will drain into the engine compartment.

4.1.6 Fresh Water Washdown Hose

A FRESH WATER WASHDOWN hose is located in the Cockpit starboard cabinet. Use this to wash food, equipment, shoes, and clothing. Ensure the hose nozzle and faucet are OFF when not used.

4.2 Wastewater (Gray Water)

4.2.1 Sinks

Wastewater from galley and salon sinks is gravity-drained overboard.

4.2.2 Showers

A SUMP PUMP, located in the Passageway starboard beneath forward shower, collects wastewater from Forward Head shower and Aft and Forward Head sinks, and pumps the water overboard. The pump cycles on/off automatically.

NOTE – If SUMP PUMP stays ON, debris may have built up on the sensor switch. Open the box lid, lift out the cylinder-shaped strainer. Wipe scum from switch and pump. Replace strainer and lid.

CAUTION – If SUMP PUMP fails, wastewater will soak the passageway. Immediately, check:

- *The TUB-SINK breaker button at Pilothouse DC Panel – push-in*
- *To right of pump box, the local 10A fuse holder – if fuse glows red, replace with spare*
- *The switch or pump -- may need replacement (see Section 19.2 Repair Parts).*

A separate pump drains wastewater from the Aft Head Shower. Turn ON the TUB-SINK push-in breaker on the Pilothouse DC Panel. Turn ON the SHOWER switch on the Aft Head cabinet to drain.

4.3 Raw Water

'Raw water' depends on the body of water the boat is floating – freshwater or saltwater. RAW WATER WASHDOWNS are available at 2 locations.

Location	Spigot Location
Bow	Inside Foredeck Locker
Cockpit	Inside Cockpit Cabinet Portside

Turn ON the WASHDOWN switch at the Pilothouse DC Panel. When not in use, turn OFF the switch to remove load on the water pump.

4.4 Bilge

Three automatic and three manual bilge pumps, in pairs, are in the main engine room (AFT), forward engine room (MID), and passageway (FORWARD). Turn ON manual BILGE pumps at DC Electrical panel to operate manual pumps from pilothouse or the bridge. Automatic pumps are always ON (connected directly to house battery) as the first line of defense against flooding.

CAUTION – If RED light displays at either panel, turn ON the paired 'manual' switch immediately to start removal of bilge water. Investigate the cause! Best case, sloshing bilge water tripped a float sensor, causing false cycle. Worst case, the boat is taking on water!

5 GALLEY-SALON

5.1 Galleyware

Utensils and dishware are stowed in the Galley portside cabinets and drawers.

Drink glasses are stowed in the ceiling cabinet above the galley sink.

Wine glasses are stowed beneath the starboard salon sink.

Pots and skillets are stowed in the sliding drawer beneath the refrigerator.

Pans and oven accessories are stowed in the cabinet beneath the oven.

Small kitchen appliances and cleanup items are stowed beneath the galley sink.

For a detailed inventory of all galley equipment, see Section 19.4, Galley Inventory.

CAUTION – When underway, especially in rough seas, push-in (secure) all cabinet and drawer LATCHES to avoid spilling contents from cabinets.

5.2 Sink Countertop

Protect countertops and sinks from damage. Use cutting boards stowed in cabinet beneath the oven.

Avoid splashes. Keep countertops dry. Remove water puddled next to teak backsplash behind the faucet. Prevent water from flowing around the right of the backsplash onto the salon carpet.

5.3 Range and Oven

The boat is equipped with a 3-burner *Princess* Range and Oven. Turn ON the ELECTRIC RANGE switch at the Pilothouse AC panel.

NOTE – If using range and oven with generator power (ie. afloat), ensure the Line 1 circuit breaker on the pilothouse AC panel is switched from 'Shore Master' to 'Generator Master'.

Lift the entire cook top cover to a vertical position, then let it slide down naturally into the holder slot, then fold the top portion to form shelf.

WARNING – Do not force open or force closure of cook top cover. Ensure the cover is vertical and seated fully into the slot to disengage the 'safety' device; otherwise, the range will not operate. When closing, lift the metal cover vertically out of the slot, before attempting to fold flat.

During meal preparation, it may be necessary to turn OFF non-essential AC devices temporarily (e.g. water heater, battery charger) to have sufficient power for galley appliances (including microwave and plug-ins). This will avoid tripping the main AC Circuit Breaker (30A max). The range unit itself will use up to 20-amps. Read power on Ammeter 2. Total the three ammeters to determine if 30A is exceeded.

Top burners offer different maximum cooking temperatures. The LEFT and RIGHT burners are 'High" 1100-watt burners. The REAR burner is a 'Medium' 550-water burner.

NOTE – During cleaning, the burner elements may become mixed and not match controls. Watt values are stamped on the frame of each element.

The RANGE TOGGLE switch enables burners and oven.

- Flipping switch to 'Top Burners' enables ALL top burners.
- Flipping switch to 'Oven' enables the OVEN, the REAR top burner, and the RIGHT top burner. The LEFT burner will be disabled.

Whenever pre-heating OVEN, allow sufficient time to reach its full, stable temperature, else the upper element may remain on while cooking (like its broiling).

NOTE. To avoid scorching the bottom of baked goods, place baked goods on top of a thermal- insulating baking sheet to shield from bottom heating element. It also may be necessary to cover with foil loosely to shield from top broiling/heating element.

Lights beneath the Microwave can be used to illuminate the cook top surface. Turn ON the MICROWAVE switch at Pilothouse AC panel. Press 'Light' on the Microwave panel to 'Bright' or 'Night'.

Use the Microwave fan to vent odors, smoke, and steam overboard. Turn ON the MICROWAVE switch at Pilothouse AC panel. Press 'Fan' on the Microwave panel to 'High' or 'Low'.

5.4 Microwave

The microwave is a *GE Spacemaker* unit. Turn ON the MICROWAVE switch at the Pilothouse AC Panel.

The microwave uses a large amount of power (up to 15 amps). It may be necessary to turn off other AC devices to avoid tripping the AC Circuit Breaker. Read power consumption on Ammeter 2.

The microwave may be used any time – AC is provided by shore, generator, or inverter sources.

5.5 Refrigeration

5.5.1 Galley Refrigerator-Freezer

The Galley REFRIGERATOR-FREEZER is a *Norcold* 6.3-cu-ft model. It operates on DC power and switches to AC power automatically shore or generator power is available (dual-mode).

- Turn ON the REFRIGERATOR switch on the Pilothouse DC Panel – normally ON
- Turn ON the REFRIGERATOR switch on the Pilothouse AC Panel – normally ON
- Turn ON the power switch below the refrigerator door, and adjust the temperature

5.5.2 Bridge Refrigerator

The Bridge REFRIGERATOR is a *Norcold 2.7-cu-ft model*. It operates on DC power and switches to AC power automatically when shore or generator power is available (dual mode).

- Turn ON the ENTERTAINMENT CENTER switch on the Pilothouse DC Panel
- Turn ON the BRIDGE REFRIGERATOR switch on the Pilothouse AC Panel
- Turn ON the local power switch on unit and adjust the temperature

CAUTION – The bridge refrigerator consumes lots of AC/DC power. Use it selectively. Also, the refrigerator motor noise resonates in the Salon and may be annoying. Consider use of cockpit cooler.

5.6 Food Storage

Non-perishable food (canned or dry) may be stowed in Galley cabinets or in Salon cabinets portside.

Normally, food storage bags are located in cabinets beneath sink.

Wine bottles may be stowed horizontally beneath the Salon starboard sink.

The Cockpit Cooler may be used for drinks or large perishable food items (see Cooler). The Ice Maker can provide ice for cooling.

5.7 Coffee Maker

The coffee maker is a 'Mr. Coffee' digital Coffee Maker.

To set the time:
- Press the 'hr' button
- Press the 'min' button

To brew manually:
- Insert filter into basket. Add favorite ground coffee (about ¾-cup makes 12-cups)
- Add water
- Press 'On' button once to start brewing

To brew automatically:
- Set the clock time (see above)
- Add water and coffee
- Press and hold 'Delay' button to set 'hr' and 'min' buttons for brewing. Release.
- Press 'Delay' button again to set the delay
- When delayed brewing is complete, a tone will sound

5.8 Blender

The blender is a *Chefmate*, 5-speed unit. Plug into any 120-V outlet. Components are stowed in the cabinet beneath the sink.

5.9 Trash Compactor

To open the bin, press on foot switch at bottom.

The 'tall' size (13-gallon) plastic kitchen bag, available at supermarkets, will stretch firmly over the metal rim. There is no need for expensive compactor bags.

Turn ON the TRASH COMPACTOR on the Pilothouse AC Panel. Follow directions on compactor panel.

5.10 Ice Maker

The ICE MAKER is located in the Salon starboard. Turn ON the ICE MAKER switch on the Pilothouse AC Panel. The local power switch is reached through finger hole below the door -- it is normally ON.

Push the ice sensor bar-switch to downward position for continuous ice-making.

The Ice Maker is connected to the Inverter system, so will continue to make ice even when boat is not connected to shore power or generator.

NOTE - Ensure plastic bin remains in icemaker. Should the ice maker be turned OFF, thawing ice will soak the carpet.

5.11 Cooler

A 155-qt *Yeti* Cooler is located in the cockpit. It is molded, durable, and highly insulated. The lid may be locked for 'bear-proofing'. It doubles as an outdoor bench seat.

The cooler is useful for extra beverages and large perishable food. Replenish ice from the Ice Maker.

5.12 Salon Dining Table

To expand the dining table, slide the 4 lateral support bars outward and flip the table panels onto the supports. Rotate the table to fit the seating area around the sofa.

To change the height of the table, loosen the adjustment knob on the pedestal. Use two persons to lift/jiggle the tabletop upward – it is spring-assisted. Do not separate table from the pedestal. Retighten adjustment knob. To lower table, reverse procedure.

Use the 2 salon chairs for additional table seating.

5.13 Additional Bunk Options

One or two persons may sleep on the salon sofas -- one on starboard sofa, and one the aft sofa (expand legroom on the aft sofa by placing a saloon chair at the end).

The pilothouse bench may be used as a bunk, using 'seat' across opening of the port pilothouse door.

NOTE – Pads and air mattresses placed on the decks of salon, pilothouse, or bridge, offer other sleeping options. Some persons welcome the opportunity to spread out.

6 HEATING AND COOLING

There are three systems for heating, and one for cooling.

System	Heating	Cooling
Diesel Furnace	YES	
Cabin Electric	YES	
Marine Reverse Cycle	YES	YES

The *Webasto* DIESEL FURNACE system, rated at 45,000 Btu, uses DC power and diesel fuel. It can be used whenever heat is needed, especially when at anchor. The system has 7 fan heater units, and it will produce 'warm' tap water in the Hot Water tank when the system is active.

The *King* ELECTRIC CABIN HEATERS are AC-powered and are available when the boat is connected to Shore Power or to Generator. The 4 units provide heating in local zones.

The *Marine Air Reverse Cycle* system is available when connected to Shore Power or Generator. The 3 units provide 'heating' or 'cooling' automatically, depending on thermostat setting for each unit. The system can supplement heating on very cold days, or as a quick warmer while the Diesel Furnace ramps up.

It will be necessary to limit the use of cabin heaters or reverse cycle units to remain within the AC service capacity of Shore Power sources. When Generator is used, capacity is less of an issue.

6.1 Diesel-Furnace Heating System

WARNING – Do not to put a rafted boat, the dinghy, fenders, towels, or body parts over the exhaust port on the portside, when using. The exhaust is VERY HOT and will cause injury and damage.

Turn ON the SYSTEM HEAT switch with green indicator light, on the small panel above the Salon Stereo cabinet. Allow about 15 minutes for the system to reach operating-temperature --the fan-heaters will then turn ON automatically.

NOTE - The 'System Heat' switch controls the boiler unit and circulation pump, located beneath the Lazarette port hatch. If green indicator is not lit, reset the circuit breaker switch at the diesel heater unit beneath the port lazarette hatch.

Seven *Webasto* fan-heater units circulate warm air in four comfort zones

Comfort Zone	Thermostat/Control Location
Salon, Galley	Salon starboard
Aft Stateroom, Passageway, Aft Head	Aft Stateroom
Forward Stateroom, Mid Stateroom, Forward Head	Forward Stateroom Port
Pilothouse	Pilothouse helm (3-way rotary switch)

At each thermostat (white color), note the 'actual' room temperature. Press the UP or DOWN button to select the 'desired' temperature. Fan-heaters operate when the 'desired' temperature is greater than the 'actual' temperature.

Two temperature 'presets' provide easy selection of daytime and nighttime temperature. Press the 'SUN' button once for preset temperature of 68-degrees. Press the 'MOON' button once for preset temperature of 60-degrees.

When the System Heat switch is turned OFF, the boiler unit and pump may operate for a short period to cool-down the system before shutting down.

When underway, the system can be switched to ENGINE HEAT. The port engine, through a heat exchanger, will provide heat source for the system.

The FRESH WATER Hot Water Tank is connected to the Diesel Furnace system. Warm water will be available for washing or showering when the system is ON and producing heat.

6.2 Cabin Electric Heating System

Four *King* electric cabin heaters provide zone-controlled heating. A knobbed thermostat (beige-colored) controls each heater.

The cabin heaters will provide sufficient warmth in mild weather. Either AC-shore power or AC-generator power must be available. The most convenient use is when docked in a marina.

WARNING – Do not to block a heating unit screen or place heat-sensitive objects nearby, which may become damaged.

Heater Location	AC Panel Switch Name	Thermostat Location
Forward State Room	HEATER FWD SR	Forward Stateroom portside
Passageway	HEATER PASSAGEWAY	Passageway portside
Salon portside	HEATER SALON	Salon starboard side
Pilothouse portside	HEATER PILOTHOUSE	Bridge ladder amidships

Turn ON the desired HEATER on the Pilothouse AC Panel. At the thermostat, rotate knob to desired setting. It may be necessary to limit use of other AC devices to avoid overloading circuit.

6.3 Marine Reverse-Cycle Heating-Cooling System

Three *MarineAir Reverse Cycle Heating-Cooling* units provide heating or cooling depending upon temperature setting at the *Passport II* digital control thermostats. Each unit works independently.

Heat Zone	AC Panel Switch Name	Thermostat Location
Salon, Galley	AIR CONDITIONER 1	Galley Range starboard
Pilothouse	AIR CONDITIONER 2	Pilothouse Helm starboard
Forward SR, Mid SR, Aft SR	AIR CONDITIONER 3	Forward Stateroom portside

Normally, the AIR CONDITIONER RELAY switch is ON at the Pilothouse AC Panel. When any unit is operating, raw water is discharged from 3 portside ports (one forward, 2 amidships). Check discharge periodically – the intake may become blocked by seaweed.

Turn ON the AIR CONDITIONER switch on the Pilothouse AC Panel for the zone desired.

At the selected zone thermostat, press the 'ON/OFF' symbol on the *Passport* digital control panel to turn ON the control (panel will light up). Press the 'thermometer' symbols to select the 'desired' temperature. The system will heat or cool to the 'desired temperature'. After a few minutes, feel the airflow at the vent. If airflow temperature is not type expected, adjust the temperature setting.

7 ELECTRONICS

Electronic components are controlled from the Pilothouse DC Panel (***Electronics, Auto Pilot, Depth Sounder, & Radar*** circuit breakers). Local Power switches may be found on each component.

7.1 VHF Communication

The boat has 2 mounted VHF Radios, 1 hand-held VHF Radio, and 1 AIS TRANSCEIVER. VHF radio is the primary means for hailing boats or getting emergency assistance. Monitor Channel 16. Set radios to scan 'weather' or 'working' channels as desired. The AIS transceiver broadcasts the boat's name, position, course, and speed automatically, and it receives name, position, course, and speed information from nearby AIS-equipped vessels.

Common VHF Marine Channels for Pleasure Vessels in Washington, Canada, and Alaska:

Channel	Purpose and Use	Restrictions
16	International Distress and Calling. Hailing, distress, urgency	None
6	Intership Safety. Ship-to-ship safety communications. SAR Opns	
22A	US Coast Guard Liaison. Establish communication on Channel 16 first	
70	Digital Selective Calling Only for distress	No voice
9	Intership & Ship-Shore ALL Vessels. Pleasure Vessel Calling US	Calling US Only
67	Intership Only for ALL Vessels. Also Ship-Shore Canada	US Puget Sound
68	Intership & Ship-Shore for Pleasure Vessels only	
69	Intership & Ship-Shore for Pleasure Vessels only	
71	Intership & Ship-Shore for Pleasure Vessels only. US Only	Not in Canada
72	Intership. Ship-Shore US Puget Sound Only	No S-S Canada
73	Intership & Ship-Shore ALL Vessels. Canada Only	Not in US
8A	Intership & Ship-Shore for Pleasure Vessels only. US Only	Not in Canada
13	Vessel Bridge to Vessel Bridge. Also locks, bridges, except Seattle	Low Power
11	Vessel Traffic System (VTS) – Victoria, Haro Strait, Turn Pt, Boundary Strait	
5A	Vessel Traffic System (VTS) – Northern Puget Sound	
14	Vessel Traffic System (VTS) – Southern Puget Sound	

*NOTE -- The VHF radios are programmed with USA, International, and Canadian channels. The AIS transceiver is programmed with **MMSI Code 303505000** to identify 'Starlight Express'.*

7.1.1 Pilothouse VHF Radio

The pilothouse VHF radio (*iCOM IC-M504* model) is located at helm. It connects to the starboard VHF antenna via a VHF-AIS antenna splitter. Turn ON the ELECTRONICS switch at the Pilothouse DC Panel

In addition to radio functions, the *Icom IC-504* includes **DSC (digital selective calling)**. A key feature of the DSC system allows vessels in trouble to notify the Coast Guard and other vessels in the vicinity. The **MMSI Code 303505000** (boat identifier) is programmed to the *'Distress' Call* button. See section 12.5 Safety/VHF Radio Distress Call for procedure or refer to the *iCom IC-M504* manual, page 23 in the cabinet beneath Pilothouse Electrical Panel.

Another key feature of DSC is that it enables calls (like a direct dial telephone) to another vessel if you know its MMSI Code. Refer to the *IC-M504* manual, pages 26 and 41 for details.

The radio's automatic **Fog Horn** feature may be used during limited visibility. See section 12.7 Safety/Automatic Foghorn, or refer to the Icom IC-504 manual, pages 53-54.

To adjust backlight, press and hold [H/L], then rotate [DIAL] to adjust brightness.

7.1.2 Bridge VHF Radio

The bridge VHF radio (*iCOM IC-M502* model) is located in the portside cabinet and is connected to the port VHF antenna. Turn ON the ELECTRONICS switch at the Pilothouse DC Panel

The boat's **MMSI Code 303505000** is programmed to the *'Distress' Call* button. The calling procedure differs slightly from the Pilothouse VHF radio. Refer to the *Icom IC-M502* manual.

7.1.3 Handheld VHF Radio

The handheld VHF radio (*iCOM IC-M93D* model)) is located on the starboard navigation cabinet charger for use while using dinghy and as backup emergency communication.

The **MMSI Code 303505000** is programmed to the *'Distress' Call* button.

7.1.4 AIS Transceiver

The **AIS (Automatic Identification System)** (*Raymarine AIS 650)* is a Class B transceiver. The transceiver is active when the ELECTRONICS switch is ON. The transceiver shares the starboard VHF antenna through a *Raymarine AIS100 Splitter (*priority to VHF).

Vessels participating in AIS are displayed on each MFD chart plotter and radar screen. The primary use of AIS is to reduce the risk of collision.

The AIS transceiver sends and receives digital signals to exchange real-time data between vessels, shore-based stations, and navigation aids, on dedicated VHF frequencies. The transceiver sends the 'Starlight Express' name, position, course, and speed every 3-minutes when movement is under 2 knots, or 30-seconds when movement is above 2 knots. At the same time, it receives signals from nearby AIS-equipped ferries, fishing boats, tugs, tankers, cruise ships, pleasure boats, & navigation aids.

WARNING - Never assume AIS displays 'all' vessels; it will not display vessels not equipped with AIS.

AIS information is normally displayed on each MFD, but it is a selectable layer. On the MFD Chart window, select: Presentation/Chart Layers/AIS Layer/ON. AIS status is shown on top of MFD.

NOTE -- For details, refer to Raymarine Axiom Operators Manual.

7.2 Depth Sounding

The boat has 2 sonar sounding systems: primary and secondary.

7.2.1 Pilothouse Repeater Display

The *Raytheon Tri-Data* instrument on Pilothouse helm starboard repeats 'primary' sounder readings.

- Turn ON the ELECTRONICS switch at the Pilothouse DC Panel
- Turn ON the RADAR switch at the Pilothouse DC Panel (to receive readings).

Depth is displayed in feet, speed-through-water (STW) in knots, and temperature in Fahrenheit.

7.2.2 Primary Sonar

The primary SONAR is a Raymarine CP370 digital sonar module and provides depth, bottom characteristics, and fish location.

Turn ON the DEPTH SOUNDER switch on the Pilothouse DC Panel. The B744V transducer, located just forward of the starboard engine, is connected to the DMS unit.

Each MFD (pilothouse and bridge) can display depth or fish-finder information independently in the Data Bar. Refer to Axiom+ manual.

Depth reading is in "feet", measured from the bottom of the hull.

NOTE – If depth reading value is blank on MFD or Tri-Data, the water may be too deep to find bottom properly. If it persists in shallow water, turn OFF DepthSounder switch, then turn ON to reset.

7.2.3 Secondary Sounder (Bridge)

WARNING – Use the bridge sounder as a backup. Follow procedure below. The primary sounder transducer signal can interfere with depth reading of bridge sounder and provide false readings.

The secondary sounder is a *Hawkeye Depth Trax* sounder unit.

- Turn OFF the DEPTH SOUNDER switch [primary sounder] on the Pilothouse DC Panel.
- At the bridge helm, turn ON the Depth Sounder at the switch panel.
- If not already on, push button on sounder to turn on unit.

Set the scale, shallow alarm, and deep alarm as desired. Refer to the *Hawkeye* manual in the cabinet beneath the Pilothouse Electrical Panel.

7.3 Multi-Function Displays (MFD)

Two *Raymarine Axiom+* MULTIFUNCTION DISPLAYS (MFD) integrate control and information display of the boat's sensors and navigation systems.

- **Axiom+ 12 w/RV3 RV-100** – Pilothouse starboard helm.
- **Axiom+ 9** – Bridge portside. Stowed beneath pilothouse port helm seat - mount onto bracket and connect 2 cables.

NOTE – Do not wipe with dry cloth, paper towel, solution, polish, or spray. Wipe smears gently with a clean micro fiber cleaning cloth.

To start-up the MFDs, turn ON each unit in the **sequence** below:

1) **Axiom+ 12 MFD**. Turn ON ELECTRONICS, AUTOPILOT, & DEPTH SOUNDER switches on the Pilothouse panel. Then, turn ON the RADAR switch. Swipe the ON button on Axiom+ screen. The pilothouse MFD is the Master unit and the database for the networked system

2) **Axiom+ 9**. Ensure the ELECTRONICS switch is ON. Swipe the ON button.

Each MFD integrates equipment, sensors, and key navigation functions:

- ***Digital Radar Sensor*** – scanner overlay
- ***GPS Sensor*** – latitude, longitude, speed over ground (SOG), course over ground (COG)
- ***Electronic Chart Plotter*** – *Navionics+* geographic overlay: charts, waypoints, routes
- ***Digital Sonar Module*** – sounder, fishfinder, speed through water (STW), water temperature
- ***Course Computer*** – heading, auto pilot control
- ***Auto Pilot*** – course heading, waypoint navigation
- ***AIS Transceiver*** – AIS target identification and tracking, collision avoidance
- ***MOB*** – 'man overboard' GPS position mark
- ***Alarms*** – depth limit warnings, anchor movement, time lapse

Sensor data is shared through the Raymarine high-speed network and the SeaTalk NG backbone network. Refer to equipment details below.

7.3.1 Digital Radar Sensor

The RADAR sensor is a *Raymarine RD-424D 4kw* digital model, rated 48-nautical miles. However, useful range is limited by line-of-sight, fog, rain, target height, land formations, and sensitivity settings. Turn ON the RADAR switch on the Pilothouse DC Panel.

On the Axiom+ MFDs, activate the scanner and enable transmit mode (TX). Each MFD has 'local control' of the radar presentation.

Refer to Axiom+ manual or reference guide in cabinet beneath Pilothouse Electrical Panel or view on the pilothouse iPad.

7.3.2 GPS Sensor

The GPS (Global Position System) sensor is a *Raymarine Raystar 125* unit. It provides latitude and longitude position and aids speed calculation. Turn ON the ELECTRONICS switch on the Pilothouse DC Panel.

The GPS is connected to the SeaTalk HS network and shares data with the MFDs and both VHF radios.

7.3.3 Chart Plotter (Axiom+ MFDs)

The MFD CHART PLOTTER uses *Navionics+ (United States and Canada)* cartography. The microSD card inserted into the Axiom+12 multi-function display provides chart information.

Turn ON RADAR switch on the Pilothouse DC Panel, which turns ON the Axiom+12 MFD display.

Each MFD (pilothouse and bridge) allows local control of the chart. For information, see Charts in the Navigation Section.

7.4 Speed Logs

SPEED OVER GROUND (**SOG**). SOG may be read on the data bar of each *Axiom* MFD. The GPS provides the position changes, and each *Axiom* MFD calculates the SOG.

SPEED THROUGH WATER (**STW**). If displayed on the *Raytheon* Tri-Data display on the Pilothouse panel, the STW may be inaccurate or inoperative due to growth or debris on the sensor transducer beneath the boat. The best option is to rely on SOG information on each Axiom MFD.

7.5 Autopilot

The AUTOPILOT control unit, *Raymarine ST6200+*, is located on Pilothouse helm portside. In addition, an AUTOPILOT WIRELESS unit is in bridge radio cabinet.

Turn ON the ELECTRONICS and AUTOPILOT switches at the Pilothouse DC Panel. The *Raymarine EV-1 Heading Computer* (mounted in starboard compartment next to passageway steps) is part of the SeaTalkNG network and controls the auto pilot heading.

*WARNING – Unless you have confident, working knowledge on how to manage auto pilot control on the Axiom screen, recommend use of the AutoPilot Head control unit. ALWAYS know the status of the autopilot – is it on '**auto'(enabled)**? or is it on **'standby'(disabled)**? Turning the helm wheel to avoid debris or traffic **WILL NOT** disengage **'auto'** -- the boat will its maintain course. Press to '**standby**' button to disable '**auto**'. Refer to Raymarine Autopilot manual.*

A RUDDER POSITION INDICATOR is displayed at the bottom scale of the display. For night illumination, press the 'Lamp' button to change the light level of the Autopilot and the Tri-Data display.

7.6 Cellular Phone Service

Cell phone service (voice and data) is available almost anywhere in Puget Sound, the Strait of Juan de Fuca, and the Strait of Georgia. Roaming and long-distance charges may apply in US and Canada depending upon the terms of the cellular phone service provider.

7.7 Internet Service

Internet service may be accessed using an enabled device (e.g. cell phone, PC) in a marina or community. Get the WiFi SSID and password during check-in at marina or community webpage.

NOTE - Monitor data on cellular devices carefully to avoid unexpected roaming data charges. For example: three gigabytes' data provides about "1-hour" of streaming HD Video (1 TV show, less than one movie), or "30- hours" of streaming audio (Pandora, iTunes, Spotify), or "1,000" iPhone photos. Beware of automated video streaming (e.g. Facebook) and software updates -- disable these data thieves on connected devices.

7.8 USB Charging Ports

USB ports are located at several 120-v receptacles for charging electronic devices. Also, USB charger adapters can be plugged into 120-v or 12-v receptacles.

Outlets	Location	Panel Switch Name
2	Pilothouse beneath aft seat	AC Galley Switch
4	Above stereo system stbd side (4x USB)	DC Outlets Switch
2	Aft Stateroom beneath bed	AC Staterooms Switch
2	Forward Stateroom starboard side	AC Staterooms Switch
2	Forward Stateroom port side	AC Staterooms Switch

8 ENTERTAINMENT SYSTEMS

There are 4 audio/video entertainment systems aboard:

Location	Pilothouse Panel Switch	Systems
Salon Stb Cabinet	AC Salon Receptacles	Audio Receiver, CD Changer, Cassette, AM/FM Radio, iPod Music, Bluetooth Music
Salon Mid cabinet	AC Galley Receptacles	LED TV, DVD/CD Player, Satellite TV Receiver
Forward Stateroom	AC Master/Head Receptacles	LCD TV, DVD-CD Player, Satellite TV Receiver
Bridge	DC Stereo	AM/FM, USB Music, Bluetooth Music

All entertainment systems are available when ashore or afloat (powered by Inverter).

8.1 Salon Audio System

The STEREO AMPLIFIER in the starboard cabinet, provides control to audio components. Turn ON the PILOTHOUSE/SALON RECEPTACLES switch on the Pilothouse AC Electric Panel. Press power switch on stereo amplifier or turn ON 'power' button on the **JVC Audio Remote Control**. Ensure speaker #1 button (lower left) is pressed ON.

Adjust volume to primary speakers in the Salon. To re-direct sound of secondary speakers to either pilothouse or the Aft Stateroom, select 'rocker switch' on wall above the stereo cabinet.

- **FM/AM Radio** – Select either **FM** or **AM** switch on the audio receiver.
- **Five-CD Player** -- middle of the cabinet. Select **CD** switch on the audio receiver.
- **Cassette Tape Player** -- bottom of the cabinet. Select **TAPE** switch on the audio receiver.
- **DVD** – unit is located in TV cabinet. If enhanced sound is desired, select **DVD** switch, which redirects the DVD audio into the stereo system. Control volume through the stereo.
- **Audio Input Device** -- locate PHONO plug at bottom of cabinet. Plug into earphone jack of iPod or similar device. Select **PHONO** switch on the audio receiver. Reduce volume level on device to avoid distortion; use the stereo to control volume..
- **Bluetooth Music Receiver** – bottom of the cabinet. Select **BLUETOOTH** on audio receiver. Press 'pairing' button on top of Bluetooth receiver. Turn ON Bluetooth function on iPhone, Android phone, or other Bluetooth device to complete pairing to 'Logitech BT Adapter'.

8.2 Salon Video System

The Salon Video system includes an **LED TV**, **Direct TV Digital Satellite Receiver**, **DVD Player**, and **2 remote controllers**: 1) Direct TV, and 2) Sony DVD. Stow cabinet doors inward.

Turn ON the GALLEY RECEPTACLES switch on the Pilothouse AC Panel.

- **Digital Satellite HD TV**
  - At the DC Electric Panel, turn ON the SATELLITE DISH switch.
  - In the Salon TV cabinet, press the POWER button on the *Sea Tel* antenna control panel. Wait about 2 minutes while the antenna initializes and acquires the satellite signal. The 'tracking' lamp will illuminate a steady green when Direct TV satellite signal is acquired.
  - On the Salon Direct TV remote control, set SLIDE button to Direct TV icon (left position)
  - Press DTV & TV power ON button to turn ON both TV and Satellite receiver (blue light).
  - If other than TV screen is displayed, press TV Input button on Direct TV remote control, repeating until 'TV' is displayed. The satellite antenna is connected to 'TV' input.
  - Use the controller keypad to enter a 3-digit channel number, or use the channel button. *NOTE – Refer to list of Digital Satellite channels in Appendix J.*

- **DVD Player**
  - On Direct TV remote control, set SLIDE button to Direct TV icon (left position)
  - Press DTV & TV power ON button, to turn ON TV.
  - If other than DVD is displayed on TV screen, press TV Input button on remote control, repeating until 'Input1' is displayed. The DVD Player is connected to 'Input1'.
  - On remote control, SLIDE button to 'AV1' to enable DVD control
  - Load a DVD video disk or a CD music disk into the tray, press PLAY function

8.3 Forward Stateroom Audio-Video System

The Forward Stateroom Video-Audio System consists of **LCD TV, DVD/CD Player, and Direct TV Satellite Receive**r located on the port cabinet. A single Direct TV remote control supports functions.

Turn ON the MASTER STATEROOM/HEAD RECEPTACLES switch on the Pilothouse AC Panel.

- **Digital Satellite TV**
  - At the DC Electric Panel, turn ON the SATELLITE DISH switch.
  - In the Salon TV cabinet, press the POWER button on the *Sea Tel* antenna control panel. Wait about 2 minutes seconds while the antenna initializes and acquires the satellite signal. The 'tracking' lamp will illuminate steady green when a good satellite signal.
  - At the Fwd Stateroom Direct TV remote control, set SLIDE button to Direct TV icon (left)
  - Press DTV & TV power ON button to turn ON both TV and Satellite receiver (blue light).
  - If other than 'Input1: SAT' is displayed on TV, press TV Input button on remote control, repeating until 'Input1: SAT' is displayed.
  - Use the controller keypad to enter a 3-digit channel number, or use the channel button. *NOTE – Refer to list of channels in Appendix J.*

- **DVD/CD Combo Player**
  - On Direct TV remote control, set SLIDE button to Direct TV icon (left position)
  - Press DTV & TV power ON button to turn ON both TV and Satellite receiver (blue light).
  - If other than 'Input2: DVD' is displayed on TV, press TV Input button on remote control, repeating until 'Input2: DVD' is displayed.
  - On remote control, SLIDE button to 'AV1' to enable DVD control
  - Load a DVD video disk or a CD music disk into the tray, press PLAY function

8.4 Bridge Audio System

The bridge audio receiver is an **AM/FM Tuner, Digital Media Player, and Bluetooth Device**. It is in the radio cabinet portside.

Turn ON the DC Outlets switch at the Pilothouse DC Panel. Operate **Power**, **Volume**, and **Selection** controls on the unit.

- **Mode** – Select between Radio, USB, Bluetooth, or AUX
- **AM/FM** – Press TUNE << >> to seek previous or next strong station
- **USB** – Insert a USB device with MP3 files. Press TUNE << >> to select track
- **Bluetooth** – Enable Bluetooth on iPhone or Android device for pairing. On audio receiver, select Mode to Bluetooth (initial display 'NotPair'). Complete pairing to device name 'Dual Media Player' - Bluetooth PIN is '1234' or '0000'. Receiver will display 'BT On' or 'BT Music'.

9 ANCHORING & DOCKING

The basic anchoring technique consists of selecting the anchorage location, bottom, and depth; dropping anchor; releasing sufficient 'scope' for the rode; setting the anchor; and assessing how the vessel will drift/rotate. Review anchoring techniques in the *Chapman's Piloting Book.*

9.1 Working Anchor

The WORKING ANCHOR is a Bruce-type anchor weighing 66-lbs (30-kg) mounted on the bow roller. It is attached to **300-ft of 5/16" 'Hi-Test' chain rode** (3900-lb SWL), and backed up by **200-ft of 5/8"nylon rode** (12,200-lb breaking strength), via a 360-degree swivel shackle (8,500-lb SWL).

The rode passes through the HAUSE PIPE to the ANCHOR RODE LOCKER, located behind the mirror in Forward Stateroom. FOOT SWITCHES to the *Muir Cougar* WINDLASS, control the deployment/retrieval of the rode. The remote ANCHOR SWITCH at the bridge helm may be used to support the anchoring process; however, best practice is have crewmember operate the WINDLASS.

9.1.1 Anchor Deployment

Before using the WINDLASS, free the LOCKING CAMS on the winch sprocket. First, lift and free the lever of the aft cam - rotate it backward to the deck. Then, lift the cam on the forward side and rotate it to the deck. The winch sprocket will now rotate freely for power use.

NOTE – Both cams are used if manual retrieval of the rode is necessary. Use the WINCH HANDLE on the lever to aid cranking.

Normally, the clutch on the drum has sufficient drag – if necessary to adjust, use the WINCH CRANK in the forward deck locker to adjust the drag.

Turn ON the WINDLASS POWER switch in the Pilothouse left side – green light will indicate power. If no power, check the WINDLASS MASTER BREAKER Switch in the Salon Aft Battery Switch Panel.
At foredeck, uncover the HAWSE PIPE. Uncover the FOOT SWITCHES; note UP/DOWN arrows.

Maneuver the boat to the selected anchor point. Note the water depth on sounder.

Tap gently on the DOWN foot switch and nudge the anchor off the bow roller. Maintain tension on rode – do not drop or swing anchor.

CAUTION – Ensure the chain runs freely through hawse pipe. Tangles can trip the 'windlass circuit breaker' and freeze the operation. To free a stoppage, go to forward Stateroom, and lift the mirrored panel cover. Clear tangle. At the Salon Aft Battery Panel, squeeze-in the slide on the windlass circuit breaker. Re-check green light for WINDLASS POWER at Pilothouse Electric panel for power.

Deploy ANCHOR using the 'snub' and 'feel' technique. At the anchor point, deploy anchor to the bottom. As boat backs away slowly, release rode at rate that maintains a light tension. Markers are placed at 30-feet intervals. When sufficient rode is deployed, stop the release. Back the boat at idle to set the anchor. Align shoreline reference points and observe for anchor drag. Redo procedure if a set is not achieved.

Monitor the boat's position to ensure the anchor remains set. With the variety of bottoms in Pacific Northwest waters, this is especially important, especially in strong wind, abrupt change in wind direction, or directional change of water current.

Consider setting a minimum of 4:1 scope. To achieve a 4:1 scope in 25-ft water depth, release 120-ft rode [(25-ft depth + 5-ft freeboard), multiplied by 4]. Compensate for depth changes during the tidal cycle and for holding strength of the bottom (mud, sand, gravel). Consider the swing of nearby boats. In general, the greater the scope, the greater the holding power (especially in unsettled weather). A common fault is too little scope for holding power.

Rode	Length (Feet)	Tag	Chain Mark
Chain	Anchor at surface	@ roller	6- Blue
Chain	30	Green 30	2 – Green
Chain	60	Green 60	3 – Green
Chain	90	Green 90	4 – Green
Chain	120	Red 120	2 – Red
Chain	150	Red 150	3 – Red
Chain	180	Red 180	4 – Red
Chain	210	Yellow 210	2 – Yellow
Chain	240	Yellow 240	3 – Yellow
Chain	270	Yellow 270	4 – Yellow
Nylon	300	Rode Splice	
Nylon	330	Green 30	
Nylon	360	Green 60	
Nylon	390	Green 90	
Nylon	420	Red 120	
Nylon	450	Red 150	
Nylon	480	Red 180	

For long or overnight stay, use the anchor rode snubber for a safe hookup – see deployment of an Anchor Rode Snubber. Do not rely on windlass cams to prevent the sprocket from free spooling.

NOTE – In an emergency, where anchor cannot be retrieved or must be jettisoned, a 'bolt cutter' and 'small hatchet' is available beneath the Salon starboard seat. The nylon rode may be cut at the 300-ft marker and may serve as a 200-ft backup rode.

9.1.2 Anchor Rode Snubber

The anchor bridle may be used to secure the rode and to reduce jarring and chain noise. The rig is in the Bow Foredeck locker. It includes a 5/16" chain hook, a *Shockles Line Snubber*, and 20-ft ½" nylon line.

First, to avoid loss of snubber, tie off each free end of each bridle line temporarily to the windlass cleat. With the bridle hook in hand, hook chain rode beneath the bow roller. Next, free the windlass and tap 'down' the foot control gently and slowly until the chain hook is about 6 to 8-ft away from bow roller.

Untie one bridle line and pass the free end beneath the pulpit and toward the port deck cleat - it should dangle from the chain hook to the deck cleat, outside of the boat. Remove slack and tie off to the deck cleat. Do the same on the starboard side for the remaining bridle line. There will be V-shape from chain hook to each deck cleat – adjust as necessary.

Finally, tap 'down' control again to place tension on the chain hook, snubber, and bridle lines. Continue to tap down until about 2 to 3-ft chain dangles freely beneath the hook.

The snubber will buffer shock of the rode and dampen chain noise. The dangling chain will apply sufficient weight/tension to the chain hook to prevent detaching should the rode slacken suddenly.

9.1.3 Anchor Retrieval

The windlass can use 100-amps DC power; therefore, operate the windlass with the engines running to supplement power.

Turn ON the WINDLASS POWER SWITCH at the Pilothouse AC Panel. Turn ON the WASHDOWN switch on the DC Panel.

Free the LOCKING CAMS on the winch sprocket. Uncover HAUSE PIPE and ensure rode will pass freely from the winch sprocket to the chain locker.

Remove the SNUBBER rig. Use foot controls to loosen if necessary

Retrieve the washdown hose from the FOREDECK LOCKER and prepare to wash the rode and anchor as they are retrieved.

Move the boat slowly toward the anchor point, placing slack in the rode. As the boat moves forward, press the UP-pedal switch to retrieve the slack rode, rather than pulling on the rode. Continue to retrieve rode until above the anchor point.

As anchor breaks free from bottom, hold the boat in position, and continue to retrieve rode until anchor is visible. Before the anchor breaks the surface, retrieve slowly to allow anchor to dangle vertically and to avoid striking the boat.

Tap the UP-pedal switch in tiny bursts as the anchor rises. Wash the anchor as necessary. Then rotate and nudge anchor into stowage position on the bow roller; being very careful not to stress rode as anchor lays on pulpit. Connect a flexible tie-cord between the anchor and the windlass cleat to snug anchor securely.

Close the covers on the FOOT PEDAL CONTROLS. Turn OFF the WINDLASS power switch at the AC Panel. Turn OFF and the WASHDOWN switch on the DC panel.

9.2 Spare Anchor

The SPARE ANCHOR is a Bruce-Type anchor weighing 44-lb (20 KG). It may be used in special anchoring situations, such as a “kedge” to limit swinging, to anchor bow and stern, to stabilize or pull off grounding, or as replacement spare for the working Anchor. It is located beneath the Lazarette port hatch.

CAUTION -- Remove unit from compartment carefully to avoid damage to hydraulic lines nearby.

A 12-ft 5/16” BBB chain (2650-lb SWL) should be attached first. Then, using the 3/8” shackle (2000-lb SWL), connect the 200-ft ½” SPARE ANCHOR RODE (5700-lb breaking strength). Both are stowed beneath the Lazarette starboard hatch.

9.3 Bow Thruster

The BOW THRUSTER (*Sidepower SE 120/215T*, 24-volt model) is located beneath the forward stateroom bunk. It may be used for positioning the bow during docking or maneuvering in tight spaces.

Normally, the main THRUSTER BATTERY SWITCH located in the forward stateroom on bunk starboard is turned ON. Know the switch location to disconnect thruster in case of malfunction.

Operate the thruster from either the pilothouse or bridge. To activate the control joystick, push both ON buttons on the switch simultaneously - the indicator light will turn orange. Move the joystick in the direction port or starboard. The momentum will carry the bow. Turn OFF when not in use.

CAUTION -- The best practice is to plan the docking maneuver using good docking technique, before committing the bow thruster. The thruster is not intended for prolonged use in current or wind. The manufacture estimates maximum time for continuous use is 3 minutes. The electromotor has a thermal switch to shutdown thruster if it overheats, and it will re-engage only when cooled sufficiently.

The thruster will draw objects into its tunnel. Be aware of dock lines or floating debris.

9.4 Mooring Buoy

Typically, mooring buoys are topped with a metal triangle and/or ring. A printed plate indicates the capacity or restriction. Before using, determine whether buoy is “public” and its safety limit.

Oftentimes, the metal ring on the buoy can be lifted to attach it to a mooring line. The connected chain is usually heavy, so a strong crewmember should assist. An alternative is to attach a mooring line from the port or starboard side (shorter reach), then guide the mooring line to bow.

The MOORING HOOK is another way to make the initial connection to the ring on a buoy. The hook rig (slender stainless steel frame with attached white line) is located in the bow foredeck locker. Lead the loop end of the hook line from below the pulpit opening and attach to cleat to prevent loss of rig overboard. Grab boat pole and extend. Place hook onto the end, applying slight pull-back pressure on the line to keep the hook on the pole tip. Extend the rig toward the buoy over the boat rail.

The helmsman should maneuver from downwind or down current. It is helpful to have a free crewmember point his/her arm to the buoy continuously. The body language will tell the helmsman the buoy’s location relative to the bow as it disappears from his view.

As the buoy, crewmember will insert the hook tip into the metal ring, and set the hook.
The mooring hook is adequate for short stay. For overnight, thread another mooring line through the ring and form a bridle between the bow cleats. It may be necessary to assist using dinghy.

To retrieve the hook, let mooring line and hook dangle slack. Poke the boat pole tip into the outer bend of hook and lift clear of ring.

9.5 Stern Tie

It may become necessary to secure the boat’s stern to shore when the anchorage is crowded or when swing space is limited.

A spool with 400-ft lightweight propylene line (light blue color) is mounted on the cockpit ladder.

In anchorages where stern-tie is common, metal rings (most with chain leaders) will be embedded on the shoreline. To setup the stern-tie for ‘easy retrieval’, run the free-end of stern line to shore with the dinghy, thread the free end through metal ring, and return the free end to the boat, doubling the line.

Tie off both line sections to the same transom cleat. If tied apart, the boat’s movement will pull line back and forth through the shore ring and may ‘saw’ the line. When leaving, untie the free-end and retrieve the line by pulling it through the ring.

10 DINGHY

The DINGHY is a *Walker Bay Generation LTE11* rigid-inflatable boat with 30-horsepower *Tohatsu* 4-stroke motor. It has a capacity to carry 5-persons, 850-lbs max. Dinghy, motor, fuel, and gear weigh about 650 pounds. Follow procedures below, especially ***WARNINGS***, for safe launch and retrieval.

10.1 Dinghy Launch

CAUTION – Before any launch, ensure the aft drain plug behind motor is screwed-in. Avoid panic and damage that would ensue if dinghy is sinking.

Normally, the DAVIT circuit BREAKER located in the Salon aft battery switch panel, is ON.

The DAVIT WINCH CONTROLLER is a hand-held unit attached to 8-foot cord and is normally stored on the Pilothouse helm port shelf. Plug the DAVIT CONTROL UNIT cord into the DAVIT WINCH CONTROL RECEPTACLE located on the port-side masthead just forward of the davit boom.

NOTE – A spare DAVIT CONTROL UNIT is in the Deck Spares Box in the Forward Engine Room.

Release the three deck tie downs. If the deck stanchions are in place, remove and stow them.

WARNING -- Before engaging, ensure the DAVIT CABLE is on top of the davit roller and will run freely. Because the cable is supple, its tendency is to ride off roller onto shaft. When on shaft, there will be severe strain on cable and risk of breakage! A plastic guide is installed help stay the cable.

Carefully, nudge the hand switch to UP position to lift dinghy clear of chocks.

WARNING -- DO NOT allow the pulley block to contact the boom – there will be tremendous strain.

CAUTION – Allow NO person to ride the dinghy or be BELOW the dinghy while lowering or lifting.

Move boat fenders out of way. Ensure good footing – the boat will list to port. Slowly push davit boom outward to right angle while rotating dinghy to point aft. Check clearance alongside, especially space from heater exhaust port. Nudge hand switch to DOWN position.

WARNING -- The dinghy will pass the Hydronic heater exhaust on port side. Best to turn OFF heater temporarily. DO NOT hover dinghy at the opening – continue downward past opening. Move dinghy AWAY soonest. Exposure to the hot discharge will damage the dinghy's Hypalon tube.

Tie off dinghy to the port transom cleat temporarily, being careful not to expose dinghy to exhaust port. Carefully board from swim step. Disconnect lifting harness hooks from the 3 attachment points.

Move the dinghy to the swim step or dock. Use the 2 fenders to avoid damage to the tubes. On the swim step, tie lines loosely to the pop-up cleat and to the handle of ladder cover.

CAUTION -- While raising cable with no load, use the full weight of the pulley block to maintain tension on the cable at all times and prevent 'reverse-winding' on the winch drum. If cable should become reverse-wound, the sudden release of the cable under tension may cause damage or injury.

Rotate the davit boom inward. Connect davit boom to the deck tie down cleat; remove slack.

WARNING -- When not used, disconnect the DAVIT CONTROL UNIT from the receptacle. If the handset becomes wet, it may short-circuit causing the uncontrolled operation. There will be severe strain on the davit, cable, and dinghy -- damage and injury may result.

10.2 Dinghy Operation

10.2.1 Pre-Checks

Check Power - Rotate main power switch ON beneath steering console. Turn key to ON position to check for power indication on battery gauge beneath console.

Check Fuel – Turn key to ON position to check fuel level on gauge beneath console. Use ***non-ethanol gasoline*****,** normally available at marina fuel docks. DO NOT add oil to the fuel.

Check for Water – Water inside boat may mean the drain plug was not inserted properly before launch. Switch ON bilge pump immediately. Reach over transom into water and rotate/insert the drain plug.

NOTE – Avoid water entering fuel tank during refueling. If suspect, inspect the fuel-water separator beneath seat - open valve, drain bowl, close valve. Refill bowl by squeezing the primer bulb.

NOTE - If dinghy has been used several weeks, check oil level. Spare oil is located beneath dinghy seat.

10.2.2 Operation

NOTE – WA-State and Canadian laws have minimum age minimums and personal certification requirements for operating power boats. For example, in WA-State, persons 14-years or older may operate a personal watercraft (PWC) if they have a Boater Education Card. Ensure crew is trained in safe operation. Be aware of speed, sea conditions, and traffic.
Lower or raise the motor by pressing the POWER TILT switch on the throttle handle. Ensure the FUEL LINE is secure to motor. Squeeze the PRIMER BULB until firm, if necessary.

Check STOP SWITCH LANYARD is inserted into the STOP SWITCH on control unit, otherwise motor will not operate. Attach the LANYARD to operator's body to shut down motor if operator goes overboard.

WARNING – For safety, ensure STOP SWITCH LANYARD is attached to operator. Avoid Coast Guard fine. Avoid pulling lanyard from stop switch during cruise, resulting in loss of control, falls, or passengers overboard.

Insert the SWITCH KEY. Set the CONTROL LEVER to the 'neutral' position – the motor starts in neutral only. Turn the switch to 'START'. Release key when motor starts.

NOTE – If motor does not crank, ensure the throttle is in neutral position – retry start. If motor cranks, but does not run, push-in the key switch to increase idle setting – retry start. In case of extreme system failure, refer to Tohatsu Manual (cabinet under pilothouse electrical cabinet).

Idle motor for a couple minutes to circulate oil and warm. CHECK for water \peeing' from motor to ensure circulation of cooling water. Idle speed is about 850 rpm; in case of cold engine, idle speed will increase 300 rpm automatically.

To move forward, slowly push the CONTROL LEVER to the 'Forward' position, while grasping firmly the bar at the bottom of the control lever grip. Continue forward to increase speed.

To move backward, slowly pull the CONTROL LEVER to the 'Reverse' position, while grasping firmly the bar at the bottom of the control lever grip. Further movement will increase speed.

Adjust the trim angle of the motor to suit load and sea conditions. Press the POWER TILT button for tilt-up or tilt-down. Choose trim angle that will allow the dinghy to run parallel to the water surface. Use trim within safe limits – excessive trim may lead to unstable operation.

To STOP motor, put the shift lever in the 'Neutral' position and run the motor for a few seconds at idle speed. Turn the main switch key OFF.

10.3 Dinghy Retrieval

To retrieve the dinghy, reverse the basic procedure for deployment.

NOTE – Use the dinghy's BILGE pump to remove water from bilge. Remove extra gear to reduce weight.

Tilt the motor UPWARD slightly to avoid damage to the boat deck as dinghy is stowed.

WARNING -- Before engaging the control, ensure the davit cable is on the davit roller and will run freely. The cable may ride off the roller if slack. If cable rides shaft, there will be severe strain on the cable!

Deploy the davit boom outward from boat. Let the full weight of the cable pulley block apply tension on the davit cable to prevent reverse-winding in the winch.

WARNING -- The dinghy will pass the Hydronic heater exhaust. Best to turn OFF heater. DO NOT hover dinghy at the exhaust opening – continue past opening. Exposure to the hot discharge will damage the dinghy's Hypalon tubes.

Move dinghy to port side with bow pointing aft, avoiding exposure to heater exhaust port. Loosely tie dinghy to port transom cleat. From swim step, have crew member carefully board dinghy, snap the lifting harness hooks to the dinghy's 3 lifting cleats, return to swim step, and free the dinghy from cleat. Retrieve slack on the cable. Ensure harness is not entangled with seats, motor, or fuel line.

Ensure good footing -the deck will list to port. Raise steadily. Avoid assistance from below.

Raise the pulley block to about 8-inches from the boom.

WARNING – Do not make contact between pulley and boom – there will be tremendous strain.

Rotate the dinghy bow inboard, pointing it across the deck. Grab dinghy firmly, and in one steady motion, pull and rotate the dinghy around the davit boom, leveling bow and aligning keel to the forward chocks. Continue to rotate boom and lower dinghy to center hull on the aft chocks. Check clearance and ensure chock pads face properly for solid contact. Lower dinghy until it rests on the pads.

Relieve tension on the cable and davit but retain sufficient snugness to prevent davit from swinging while underway. Secure the three-deck tie down straps.

NOTE – Ensure KEY SWITCH and main POWER SWITCH are OFF, else battery will discharge slowly.

Remove the DAVIT CONTROL unit from its plug-in and stow it in pilothouse.

WARNING -- Do not leave davit control unit plugged in. If handset becomes wet (i.e. rain or dew), it may 'short-circuit' and operate 'uncontrolled', resulting in severe damage to davit and dinghy.

During rain, open the drain plug on dinghy transom to reduce water accumulation.

10.4 Equipment

10.4.1 Air Inflation Pump.

Ensure the air tubes are rigid – no bend, sag, or limpness. Insufficient inflation will cause excess wear on tubes and a less comfortable ride.

The dinghy AIR INFLATION PUMP and HOSE is located beneath the dinghy seat.

Push the hose end into each inlet valve opening. Pump until nearly unable to apply movement to the pump – air pressure in the tubes will be sufficient. Ensure cap is replaced securely on each valve.

10.4.2 On-board Equipment

The following equipment is on-board the dinghy:

Item	Qty	Location	Remark
Depth/Fish Finder/GPS	1	Console helm	Garmin Echomap+ 44CV (stored in PH)
Bilge Pump	1	Bilge	Push console BILGE Switch
Fire Extinguisher	1	Console locker	Dry type B
Navigation Pole Light	1	Beneath aft seat	Plug nav light pole into stb aft receptacle
Battery Charger	1	Console locker	ProMariner ProSport 6, plug into 120v
Personal Floatation	5	Beneath aft seat	Type II PFD orange-color, 5 adult
Throwable Cushion	1	Aft seat	Type III blue/yellow-color,
Paddle, Telescopic	2	Bow locker	Yellow-color; floats; extends to 48”
Anchor, w/chain	1	Bow locker	10-lb mushroom w/ 5-ft chain, vinyl coated
Anchor Rode, Stretch	1	Bow locker	“Anchor Buddy” 14-50-ft; SS link to anchor
Anchor Rode, 3-strand	1	Bow locker	50-ft (w/5-ft chain), SS link, anchor/cleat
Shoreline, 3-strand	1	Bow locker	50-ft, SS Snap link, secure to bow/beach
Fenders	2	Tied port side	Protect side from swim step and dock
Dock Lines	3	Cleats	Stow lines inboard to avoid fouling
Inflation Pump/Hose	1	Beneath aft seat	Grey/yellow-color, Hawley-Hawkins valve
Downrigger/Pot Rig	1	Beneath aft seat	Mount into bracket on port side aft seat
Pot Puller Pulley	1	Beneath aft seat	Mount to downrigger/puller bracket
Emergency Kit	1	Beneath aft seat	Signal flares, spare key, lantern, tools
Gas Container	1	Bow locker	1-gal (empty)

- **Chartplotter/Sonar Sounder**. The combination unit (*Garmin Echomap+ 44CV)* has a 4.3” color screen. Press ON switch on the unit, if not ON automatically.
- **Bilge Pump.** Use to remove water in the bilge after rain.
- **Night Operation**. The NAV LIGHTS switch activates running lights on bow and all-around light pole on stern. Retrieve from console locker; unfold pole; insert into receptacle on transom.
- **Downrigger/Crab Puller Rig**. Mount the stainless-steel bar into the bracket on port side aft seat. Mount crab puller roller or downrigger on bracket.
- **12V Receptacles.** One 12-volt plug and two USB charging plugs are located beneath console. One 12-volt Scotty plug-in for downrigger or crab puller is mounted across from mounting bracket.

11 SAFETY

Ensure crew members and guests are familiar with safety procedures in case of an emergency.

- Know the location of all LIFE JACKETS, throw rings, and throw lines.
- Know use of FLOATATION devices for non-swimmers and children, as boating law requires.
- Know the location of DISTRESS SIGNALS and how to use them.
- Know the location of FIRE EXTINGUISHERS and how to use them.
- Know how to OPEN and UNLOCK doors and hatches for rapid evacuation.
- Know movement to fresh air if SMOKE or CARBON MONOXIDE alarms sound.
- Know how to use the VHF radio 'DISTRESS CALL PROCEDURE' (train crewmembers).

11.1 Personal Flotation Devices

Type II and PERSONAL FLOATATION DEVICES (PFDs) are in two locations: **Pilothouse Port Seat**, **Bridge Center Seat.** In addition, Type V Automatic FLOATATION VESTS are available. Encourage crewmembers to wear these vests or belts whenever outside the boat.

Type	Description	Number	Location
II	Adult PFD	7	Pilothouse Port Seat
II	Youth PFD	1	Pilothouse Port Seat
II	Adult PFD	6	Bridge Aft Seat
II	Youth PFD	2	Bridge Aft Seat
III	Youth Vest 30-50-lbs	2	Pilothouse Port Seat
IV	Infant Vest <30-lbs	2	Pilothouse Port Seat
V	Adult Auto-Inflation Vest	4	Pilothouse Port Seat
V	Adult Auto-Inflation Belt	2	Pilothouse Port Seat

NOTE – In Washington, children 12 years and younger must always wear U.S. Coast Guard approved life jackets when underway in a vessel less than 19-ft, unless riding in a fully enclosed area.

11.2 Throw Devices

11.2.1 Throw Ring

A THROW RING with a 50-ft floating line is located in the cockpit starboard side for immediate use. Have crew-members practice their method for throwing the device maximum distance.

11.2.2 Throw Line

Two 65-ft THROW LINES are stored in orange bags. One in the cockpit aft. The other at pilothouse helm. Open bag end and grab loop with non-throwing hand. While throwing bag, the line will pay out.

11.3 Rescue LifeSling

A RESCUE LIFESLING with a 125-ft line is mounted on the Bridge starboard rail. Have crewmember maintain visual contact of victim. Throw the LifeSling float and rope into the water. Maneuver boat, using 'skier pickup' method.

11.4 Fire Extinguishers

U.S Coast Guard approved FIRE EXTINGUISHERS are in the following locations:

Type	Location
1-A:10-B,C	Galley beneath sink counter
1-A:10-B,C	Pilothouse helm
5-B:C 1	Forward Engine Room
5-B:C 1	Aft Stateroom Closet
1-A:10-B,C	Forward Stateroom Closet

NOTE – Show crew members the exact location, so they can act quickly. Aim at the base of flame, using sweeping motion.

11.5 VHF Radio Distress Call

To request emergency assistance, contact the Coast Guard and other vessels through VHF radio.

11.5.1 Using Channel 16

Tune the VHF radio channel to '**16**'. Press and hold **[PTT]** switch and transit information below:

VOICE DISTRESS CALL PROCEDURE

- MAYDAY! MAYDAY! MAYDAY!
- THIS IS 'STARLIGHT EXPRESS'
- CALL SIGN is ***'WDC 7913'***. MMSI is ***'303505000'***
- LOCATED AT [refer to common map reference and/or ***Latitude/Longitude*** position]
- State ***nature of the distress*** and the type of assistance required
- Give ***other information*** that might facilitate a rescue

11.5.2 Using Digital Selective Calling (DSC)

DSC DISTRESS CALL PROCEDURE (Simple Call)

- Lift key cover, and push and hold **[DISTRESS]** for 5 seconds until 5 short beeps changes to one long beep. Radio will transmit vessel location every 3.5 to 4.5 minutes.
- Wait for an acknowledgement from a Coast Guard station.
- After acknowledgement is received, the radio will automatically tune to Channel 16.
- Push and hold **[PTT]** and provide the information in the voice distress procedure above.

NOTE – Train crew members. Making the emergency distress call may become any crew member's task. For details about calling methods, see Icom IC-M504 manual, pages 23-36.

11.6 Visual Distress Signals

Federal law requires day and night visual distress signals for this boat. Emergency signaling devices are found in orange containers in the cabinet beneath the Pilothouse Electric Panel.

The EMERGENCY SIGNALS '**ALERT**' Kit contains the following:

Quantity	Device
1	12-gauge Flare Gun
6	Hi-Altitude Red Aerial Flares for Flare Gun
1	Signal Mirror
1	Dye Marker Package
2	Whistles

The EMERGENCY SIGNALS '**LOCATE**' Kit contains the following:

Quantity	Device
3	Red Handheld Flares (day or night use)
1	Orange Handheld Smoke Flare (day use)

The EMERGENCY STROBE LIGHT has the following features:

Quantity	Device
1	Flashing Strobe Light (day or night use)
1	Flashlight

NOTE – Train each crew member. Signaling may become any crew-member's task in an emergency.

11.7 Emergency Towing

Contact AYC first if situation permits. If cannot, contact BoatUS: **800-391-4869,** or hail **TowBoatUS on VHF 16**. Services include towing from the breakdown location to nearby port; jumpstarts; delivery of fuel, fluids, or basic parts; soft ungrounding assistance; or towing from port to repair facility.

11.8 Automatic Foghorn

When underway or stopped in fog, the Pilothouse VHF automatic foghorn function may be activated:

- While pushing and holding **[H/L]**, push **[HAIL•RX]** to enter auto foghorn mode.
- Rotate **[DIAL]** to select the desired foghorn pattern, push **[DIAL•ENTER]**. Typically select:
  'UNDERWAY' – emits 5-second blast every 120 seconds from the mast HAILER speaker
  'STOP' – sounds two 5-second blasts every 120 seconds from the mast HAILER speaker
- Rotate **[DIAL]** to adjust the foghorn sound level, push **[DIAL•ENTER]**.

To return to normal operation, repeat step 1. N*ote – Refer to iCom IC-504 manual, pages 53-54.*

11.9 Medical Aid Kits

MEDICAL AID KITS are located Aft Head cabinet. The 'orange' medical bag contains advanced first aid equipment, including stethoscope, blood pressure cuff, and oral airway passages.

11.10 Fire and CO2 Alarms

FIRE and CARBON MONOXIDE alarms are in the passageway near sleeping areas, in the pilothouse, and engine room. These include audible and voice alerts. Evacuate everyone to fresh air, and then determine the cause of the alarm.

11.11 Lanterns and Flashlights

FLOATING LANTERNS (yellow-color) are distributed in staterooms, salon, and pilothouse. Spare lanterns are in the portside aft cabinet near the Salon doorway.

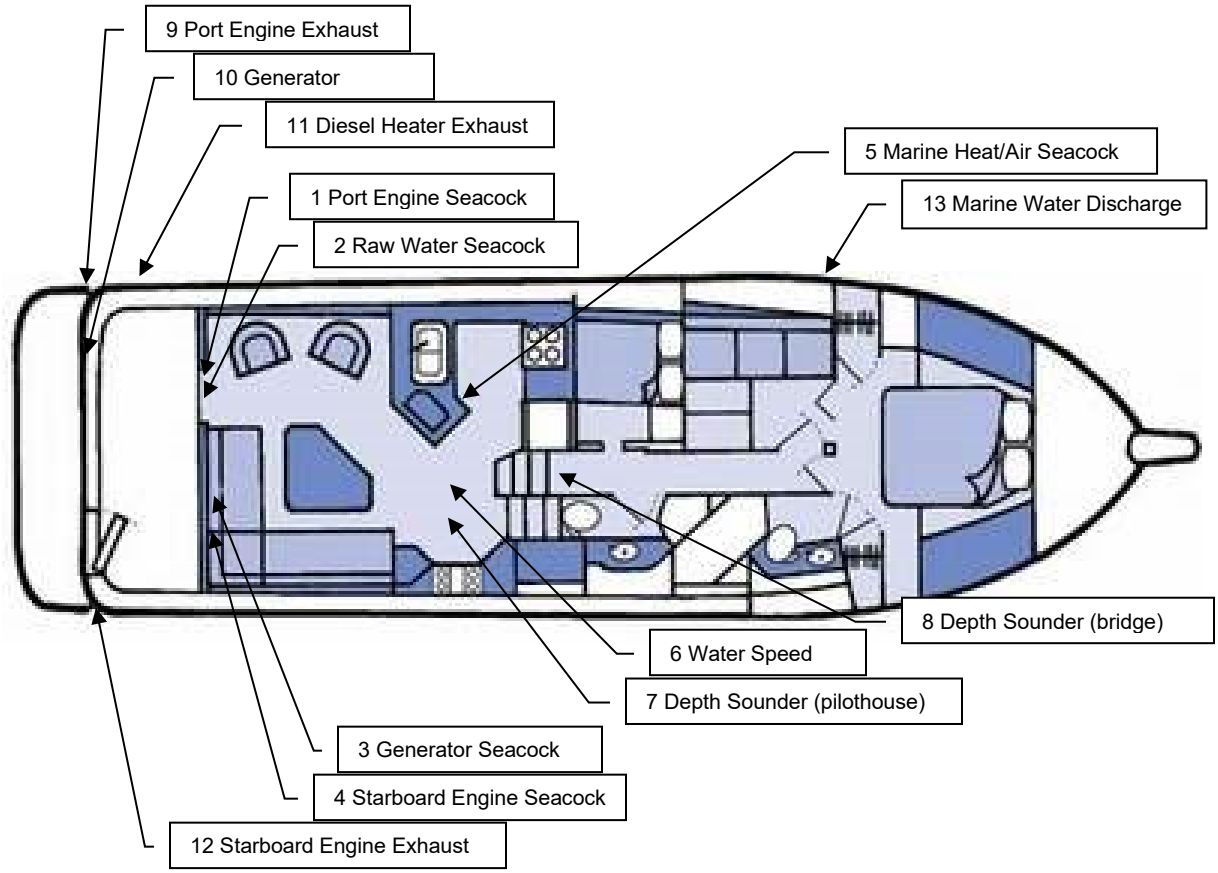
11.12 Spotlights

A 100,000-cp HANDHELD SPOTLIGHT is at Pilothouse portside. Plug into 12-volt receptacle.

11.13 Seawater Intakes

Thru-hull fitting locations are shown below. Rotate valves to close/open. In an emergency, where a thru-hull has failed and is leaking, stem flow with rags, cloth, or wooden plugs. Turn on bilge pumps.

Ref	Thru-Hull Opening	Location
1	Port Engine Seacock	Aft Engine Room, Port
2	Raw Water Wash-down Seacock	Aft Engine Room, Port
3	Generator Seacock	Aft Engine Room, Starboard
4	Starboard Engine Seacock	Aft Engine Room, Starboard
5	Marine Heat/Air Seacock	Forward Engine Room, Port
6	Water Speed Paddlewheel	Forward Engine Room, Starboard
7	Depth Sounder Transducer (pilothouse)	Forward Engine Room, Starboard
8	Depth Sounder Transducer (bridge)	Passageway, Bottom Step



Locations of discharges are shown above.

Ref	Exhaust/Outlet	Location
9	Port Engine Exhaust	Stern, Portside
10	Generator Exhaust	Stern, Portside
11	Diesel Heater Exhaust	Portside, Aft. *Do not cover or park other boats close alongside*
12	Starboard Engine Exhaust	Stern, Starboard side
13	Marine Water Discharge	Portside, Forward

12 NAVIGATION

12.1 Charts

12.1.1 Electronic Charts

Electronic charts (*Navionics Platinum 913P*) are available on each Raymarine MFD. The charts cover Puget Sound, San Juan Islands, Juan de Fuca Strait, Strait of Georgia, Johnstone Strait, Queen Charlotte Strait, and northward into Alaska.

CAUTION – Electronic charts add to safety and enjoyment, but do not rely solely on them. Practice traditional navigation. Use multiple sources (NOAA, Canadian Map Service) in unfamiliar waters.

12.1.2 Official Charts

OFFICIAL CHARTS for Puget Sound, San Juan Islands, and Gulf Islands northward to Desolation Sound, Broughton Islands, and northward to Alaska are in drawer beneath the Pilothouse starboard chart table. See Appendix B for list.

12.1.3 Cruising Atlas

Use the CRUISING ATLAS for 'planning'. When in doubt, refer to Official Charts.

12.1.4 Chart Books

A CHART BOOK for 'Jervis Inlet & Desolation Sound', as well as separate, folded charts for the 'Sunshine Coast' of British Columbia, 'Strait of Georgia', 'Discovery Islands', 'Broughton Islands', 'Johnstone Strait, and 'Queen Charlotte Strait' are in the chart drawer. See Section 19.2 for list.

12.2 Tide and Current Tables

The TIDES and CURRENTS reference book (*Ports and Passes*) is located at the Pilothouse navigation table. It contains tide and current information from Olympia in southern Puget Sound to Johnstone Strait in northern Vancouver Island.

The book is also packed with useful information about marine weather, area restrictions, fuel locations, vessel services, and supplies.

The '*Ports and Passes'* CURRENT ATLAS TABLE booklet is the annual supplement for use with the CANADIAN CURRENT ATLAS. It is found at the Pilothouse navigation table or drawer.

12.3 Cruising Guides

Guidebooks for marinas, anchorages, and boating points of interest are found in the Pilothouse aft cabinet above the seat. These include the *Waggoner* Cruising Guide (covering all the Pacific Northwest), *Gunkholing in the San Juans, Gulf Islands* Guide, *Desolation Sound* Guide, *South Puget Sound* Guide.

When planning a passage, it is a good idea to make alternate plans in case of delay, inclement weather, comfort, or safety. Use these references for guidance.

12.4 Navigation Tools

BINOCULARS are located in the Pilothouse helm. Replace lens covers to prevent damage.

PLOTTING RULER, DIVIDER, and glass MAGNIFIER SHEET are located at the Pilothouse navigation station.

13 DOCUMENTS

13.1 Vessel Documents

The VESSEL DOCUMENTS include papers for boat identification, registration, licensing, and recent inspections. These are normally found in the 'AYC Charter Manual'; otherwise, they are found in the 'Boat Documents' white binder in the cabinet beneath the Pilothouse Electric panel.

Documents include:

- Coast Guard 'Documented Ship' Official Certificate (Official Number)
- US Customs Annual Registration (decal on Salon aft window)
- FCC Ships Radio Station License
- Washington DoR Registration (boat)
- Washington State Boat Registration (dinghy)
- Recent Coast Guard safety inspections

13.2 Border Crossing

When cruising into Canada, the vessel and the passengers are required to clear through a Canadian Customs 'Reporting Site'. Information on reporting sites, phone numbers, and procedure for clearing Canadian Customs can be found in the *Ports and Passes* Tide and Current book.

NOTE – The nearest Canadian reporting sites are Bedwell Harbor (May-Sep 8AM to 10PM), Port Sidney, and Port Victoria Customs Wharf. Use check-in phone station when staff not present.

When returning to the United States, the vessel and passengers must clear through a United States Customs & Border Protection (CBP) 'Designated Port of Entry'. Locations, telephone numbers, and hours of operation, and procedure for clearing USCBP are found in the *Ports and Passes* book.

NOTE – The nearest US ports of entry into the San Juan Islands are Roche Harbor (seasonal), Friday Harbor (8AM to 5PM), Anacortes (8AM to 5PM), Bellingham (7AM to 6PM), or call After Hours 800-562-5943. Use check-in phone station when staff is not present.

The annual US CUSTOMS Decal is located on the aft Salon window, easily seen from the rear entry. The document is found in the vessel documents.

To avoid delay, have the vessel documents, all passports, and paper/pencil ready, before meeting or calling customs officials.

- **Vessel Official Number**: 1137711
- **Vessel Name**: Starlight Express
- **Vessel Length**: 54 feet
- **Vessel Make/Type**: Bayliner 4788 Powerboat
- **US Customs Decal Number** (US reentry): located on salon aft, copy in vessel doc book
- **CA Customs Entry Number & Date** (US reentry): provided by Canadian Customs on entry
- **Master (Skipper)**: name, passport number, citizenship, birth date
- **ALL persons aboard**: name, passport number, citizenship, birth date
- **Items Inventory**: liquor bottle count, tobacco, fruits and vegetables, firearms

NOTE – Contact US customs before traveling to Canada if you are unfamiliar with customs laws, especially traveling with children where both parents are NOT present. Minors traveling without both parents require a Letter of Consent signed by other custodial parent. Passport is required.

13.3 Boat Equipment Manuals

BOAT EQUIPMENT MANUALS contain information and instructions for accessories (e.g. outboard motor, microwave, radar, TV). Most manuals are in the cabinet beneath the Electric Panel. Key manuals are listed below:

Equipment	Manual Title	Cabinet Location
Multifunction Display System	Axiom Basic Ops Manual (digital view screen)	Axiom MFD files
Pilothouse VHF Radio	Icom IC-M504 Instruction Manual	Beneath Electric Panel
Bridge VHF Radio	Icom IC-M502 Instruction Manual	Beneath Electric Panel
Pilothouse Auto Pilot	ST600R Autopilot Control Owner Handbook	Beneath Electric Panel
Bridge Auto Pilot	S100 Controller User Guide	Beneath Electric Panel
Pilothouse Sndr-Speed Unit	ST60 Tridata Instrument Owner's Handbook	Beneath Electric Panel
Sea Tel Satellite Antenna	Sea Tel Coaster 18 Owner's Handbook	Beneath Electric Panel
Bridge Sounder Unit	QT206 Owner's Manual	Beneath Electric Panel
Audio/Video Controller	JVC Audio/Video Control Receiver	OM/Interior, Electric Panel
Compact Disk Auto Changer	JVC Compact Disk Automatic Changer	Beneath Electric Panel
Double Cassette Deck	JVC Double Cassette Deck	Beneath Electric Panel
Sony DVD Player	Sony DVD Player	Beneath Electric Panel
Sharp LCD TV	Sharp 19" LCD TV	Fwd Stateroom Port Locker
Toshiba LED TV	Toshiba 23" LED TV	Salon TV Cabinet
Air Conditioning System	Vector Compact Install, Operation, Maint	OM/Enviro, Electric Panel
LPG Tank	Seaward LPG Owner's Manual	OM/Deck, Electric Panel
Remote Control Searchlight	Jabsco Model 60020 Installation	OM/Deck, Electric Panel
Davit Winch	Rule Owner's Manual	OM/Deck, Electric Panel
Tohatsu 30-hp outboard	Tohatsu Owner's Manual	Beneath Electric Panel

14 CLEANING

14.1 Waste Management Plan

All crew members and passengers must be briefed on the vessel's Solid Waste Management Plan to comply with US Coast Guard regulation.

WASTE MANAGEMENT PLAN for Starlight Express

Person in Charge: Master of Vessel

Solid Waste Management Procedures as Referenced Below:

All the garbage generated on the vessel is put in a garbage bag and disposed of in the trash containers at the harbor at the end of each trip or is given to the tender vessel to shore for disposal. All crew members have been oriented to the requirements of MARPOL ANNEX V by captain, and all new crew are specifically shown the MARPOL V placard and told to keep all refuse stowed on board. Passenger orientation to the vessel includes being shown the location of trash receptacles and mention of refuse discharge regulations.

14.2 Cleaning Supplies

Cleaning supplies are located under the Galley sink or in the Head cabinets.

CAUTION - DO NOT use 'steel wool' or metal scrubbers on the counters, sinks, and galley range – those materials will scratch the polished surfaces.

Clean vinyl with 'vinyl cleaner'.

14.3 Vacuum Cleaner

The CENTRAL VACUUM CLEANER and hose accessories are located in the starboard compartment in the passageway behind the Plexiglas panels.

Turn ON the Vacuum Cleaner switch on the Pilothouse AC panel. The vacuum will turn ON automatically when the hose is plugged into the intake opening of the vacuum cleaner.

Spare bags are located behind the vacuum cleaner unit.

14.4 Washer/Dryer

The WASHER/DRYER is in the port cabinet in the passageway. Laundry soap is located in the Aft Head cabinet

- Turn ON the Washer/Dryer switch on the Pilothouse AC panel.
- Pull open the detergent tray on the left side and add 1-2 tablespoons of detergent into Dispenser B (Dispenser A for cold-cold cycle). Close the tray.

- Select Wash Cycle on the right dial. Select wash water temperature on the left dial. If drying is desired, select drying time on the center dial. Select temperature and spin on buttons.

- Press the ON button to start. The unit will do the wash cycle first, and if drying time was selected, it will do drying cycle automatically. Washing and drying can be independent.

  NOTE – Expect drying time for clothing to be much more than with household dryer.

14.5 Deck Cleaning Gear

A DECK BRUSH is located on the cockpit transom.
.
One or two 50-ft expandable WATER HOSE(s) is located beneath the Lazarette portside hatch. Connect these to shoreside water sources. Plastic nozzles are mounted on hoses. Extras are stowed in the Cockpit starboard cabinet. Additionally, these hoses may be used to replenish fresh water tanks.

A BUCKET, WASH MITT, and SPONGE are usually located on the bridge deck.

14.6 Fresh Water Wash Down

Turn ON the WATER PRESSURE switch on the Pilothouse DC Panel.

In the Cockpit cabinet portside is a 50-foot coiled HOSE connected to the FRESH WATER WASHDOWN FAUCET.

On the cockpit transom is an OUTDOOR SHOWER HOSE, which can be used as a hot water source. Ensure the faucets are OFF when not in use, else water will spill into the lazarette bilge.

14.7 Raw Water Wash Down

Turn ON the WASHDOWN switch on the Pilothouse DC panel.

Two RAW WATER wash down outlets are available, one at the Foredeck and one in the Cockpit.

In the Cockpit starboard cabinet, a 20-ft coiled HOSE is connected to the AFT RAW WATER WASHDOWN FAUCET

In the foredeck locker, a 15-ft coiled HOSE is connected to the FORWARD RAW WATER WASHDOWN PUMP

When not in use, turn OFF panel switch.

15 RECREATIONAL EQUIPMENT

15.1 Barbeque

The BARBECUE (*Magma 'Newport' Model*) is mounted on the starboard rail on the boat deck. For safety, do not leave the barbecue unattended during cooking. The barbecue creates a lot of heat. - ensure flammable materials and plastics are away from barbecue. Cooking grease may flame.

OPEN the blue cover on tank box beneath BBQ and turn ON tank valve - gauge will indicate propane pressure. If no pressure, tank may be empty.

NOTE – An extra propane tank is located in sink cabinet. When changing tank, ensure the regulator connector is fully seated and tightened onto tank valve, otherwise the safety feature will not allow gas to flow. The gauge will indicate pressure. Close tank valve after use to avoid loss of propane.

Push-IN on the BBQ CONTROL KNOB, then turn counter-clockwise about ¼-turn to the HIGH flame position. Then, press the barbeque IGNITOR BUTTON (red) rapidly to ignite – listen for flame and feel for heat. Redo process until lit.

If the ignitor button fails to produce spark to ignite burner, use matches or butane lighter. Insert flame into the hole on left side of box, while adjusting control knob.

Turn clockwise to lower flame. Turn counterclockwise for raise flame. To turn OFF, turn the knob fully clockwise. Control knob will pop outward.

15.2 Deck Chairs

Two folding CANVAS DECK CHAIRS are stowed at the cockpit portside near doorway. Use the bungee cord to secure to bulkhead.

Four folding frame BLUE CANVAS CHAIRS, two folding CANVAS STOOLS, and one folding CANVAS TABLE are stowed beneath the salon aft seat for additional seating shore side.

15.3 Crabbing Gear

Two CRAB TRAPS are stowed on the bridge deck in a black canvas bag, during crab season. LINES and FLOATS are stowed in a covered bucket. BAIT CONTAINERS are stowed with traps or beneath the bridge starboard seat.

Assemble the FLOAT as desired – flag, pole section, buoy, pole section, and weight. Clip the weighted LINE securely to the FLOAT and to the CRAB TRAP harness. Fill bait containers and suspend containers inside trap. Crab bait (chicken, turkey legs, salmon heads, cat food, etc) is available from marina stores or local markets; or try your own.

Two 60-ft (or longer) lines are available. Deploy within safe depth, allowing up to a 10-ft tidal change. Measure crabs using the CRAB MEASURING GAUGE normally found in the bucket. Keep 'hard' shell *Dungeness* male crabs greater than 6-1/4" in US waters, or greater than 6-1/2" in Canada or Alaska.

After use, rinse gear with fresh water to lessen corrosion. To learn more about crabbing, refer to the book *How to Catch Crab* found on the Pilothouse aft cabinet.

15.4 Clamming Gear

A CLAM SHOVEL and HAND RAKE are stowed beneath the salon aft seat. Rinse with fresh water and dry thoroughly before re-stowing to avoid forming rust.

15.5 Fishing Gear

FISHING POLES may be stowed in the pole holders on the bridge deck. Poles and gear may be available from AYC.

A complimentary supply of flashers, sinkers, and lures for trolling or mooching is stowed beneath the starboard forward bridge seat. Wash and secure these items after use. Pole holders are stowed there for use in the flush mounts at the cockpit stern.

One *Scotty electric* DOWNRIGGER (*Depthpower 1106 Longarm)* is stowed beneath the starboard forward bridge seat, along with mounts to install in the flush-mounts pole at the cockpit stern.

CAUTION – If inexperienced with downriggers, learn how to use and practice before using. Needless to say, fouling the cable in the propellers would not be a good thing.

Set up the downrigger in the cockpit.

- **Pedestal Mount** – Place the PEDESTAL MOUNT into either flush mount pole holder on the stern. Push down and rotate until seated and locked into place.

- **Rotating Base Unit** – Place the rotating BASE UNIT onto the pedestal, and secure unit to the pedestal with the four knob screws. This allows the downrigger to rotate.

- **Downrigger Unit** – On left side of the DOWNRIGGER base, remove the red-colored base bolt. Place unit on the Rotating Base Unit, align the base holes to the TILT UP BRACKET, and insert the red-colored base bolt from left (pushing completely through base), and tighten.

- **Power Receptacle**. Plug the power cord into the RECEPTACLE beneath the rail. Rotate the cord plug until prongs align, then push in and rotate clockwise slightly to lock. Test power to the unit by short taps on the GREEN power button.

Follow good practice when using downrigger.

- Keep wire tight. Slack forms kinks. Wire may come off spool, causing damage.
- Keep fingers away from the underside of the downrigger base, the spool, and the wire.
- Lower the ball weight while boat is in forward motion to avoid tangling in props or rudder.
- Bring gear toward you when retrieving weights or resetting release clips.
- Avoid leaning out – unexpected boat motion may send you overboard.
- Remove the ball weight when downrigger is unattended. Secure ball in the ball carrier.
- Use the red lock-lever to secure the downrigger upright or rotate the boom parallel to the rail.
- Keep a pair of wire cutters handy to cut away snagged lines if necessary.
- Keep a good bend in fishing rod. When fish hits, the bent rod will take up line as clip releases.

16 MAINTENANCE

TOOL kits and REPAIR PARTS are stowed in various locations described below. Return tools to their original boxes and stowage location.

NOTE – Report on usage of spares (filters, pumps, parts), so steps can be taken to have these replaced.

16.1 Tools

Tool kits are located beneath the Salon starboard seat.

- **TOOL BOX ONE** -- Orange plastic toolbox. Contains common tools, wrenches, screwdrivers, drill bits, hammers, and other large common tools.
- **TOOL BOX TWO** – Orange plastic toolbox. Repair tools, sealants, and parts.
- **TOOL BOX THREE** -- Orange plastic toolbox. Electric cord kit. Contains a 120v SHOP LIGHT and 50-ft 120-volt EXTENSION CORD as well as spare shore power parts.
- **ELECTRICAL KIT** – Black plastic toolbox. Multi-meter, DC power source, temperature measuring tool.
- **SOCKET WRENCH KIT** -- *Ace Hardware* black plastic box. Contains sockets, small wrenches, and screwdriver bits.
- **CORDLESS DRILL KIT** – *DeWalt* black plastic box. Contains portable drill, drill bits, and recharging accessories.

16.2 Filters

FILTER spares are found in the forward engine room compartment in the ENGINE SPARE PARTS box, mounted on the bulkheads, or forward of starboard engine.

Filter	Manufacturer and Type	Count
Engine Lube (Oil) Filter	Cummins LF 3959 or LF 3349	2
Engine Secondary Fuel Filter	Cummins FF 5285	2
Engine Primary Fuel Filter	Racor 120P	2
Generator Primary Fuel Filter	Racor 12P	1
Generator Lube (Oil) Filter	Westerbeke 35828	1
Diesel-Furnace Fuel Filter	Sure Marine (Gar-Ber Fuel R)	1
Diesel-Furnace Coolant Filter	Sure Marine (WIX 24073)	1
Engine Air Intake Filters	Stowed on side of port engine	2
Holding Tank Vent Filter	Dometic 309311001/2	1

Dinghy FILTERS are found in the DINGHY SPARE PARTS Box beneath bridge starboard aft seat.

Filter	Manufacturer and Type	Count
Lube (Oil) Filter		1
Fuel-Water Filter	Racor S3240	1

16.3 Repair Parts

REPAIR PARTS are stowed in kits in several locations.

- COMMON SMALL PARTS - 4 boxes. Salon beneath starboard seat.
  - 2x Electrical - light bulbs, batteries, fuses, wire, connectors
  - 1x Hardware - latches, bolts, and screws
  - 1x Miscellaneous – wire, special items.

- ENGINE SPARE PARTS - engine room starboard; forward of sanitation holding tank.
  - Large Blue Box - Filters, filter wrenches, engine belts, raw water impellers, and common engine and generator maintenance spares.
  - Medium Black Box – Alternator
  - Medium Black Box – Water Pump

- PLUMBING SPARE PARTS – engine room starboard, forward of sanitation holding tank.
  - Medium Black Box - Freshwater pump
  - Medium Black Box - Macerator pump
  - Medium Black Box - Sanitation Pump Repair Kit, Bilge pumps, float switches, and toilet repair parts.

- DINGHY SPARE PARTS – Medium Orange Box. Bridge beneath starboard aft seat.
  - Propeller
  - Drain Plugs

16.4 Fluid Cleanup

Wiping RAGS and large cloth towels are stowed beneath the mid-stateroom bunk, forward locker.

OIL SORB sheets are located in the forward engine room wedged between the water heater.

Oil sorbs are placed beneath each engine to trap fluid leakage. Check periodically to reveal unusual conditions. An oil sorb is placed forward of the generator to trap oil or fuel draining from the lazarette.

16.5 Oil Change Pump

An OIL CHANGE PUMP is located beneath the port cockpit hatch to simplify engine oil changes. To use, turn ON the WASHDOWN PUMP switch on the DC Electrical panel. It is also helpful to remove floor panels in the salon for easy access to the oil dipsticks on each engine.

The system is set up to use 5-gal oil buckets for oil removal and replacement. Have 2 empty buckets available, as well as 2 buckets of new oil.

To remove oil, remove cap (yellow) from pump outlet hose. Remove bucket dip-tube from its white PVC storage case and connect to hose. Place dip-tube into empty bucket.

Use the valve lever to select engine. On top of the pump, select switch position to pump oil ‘out’ of engine. Run the pump until the engine is empty. Using another empty bucket, repeat the process with other engine.

To fill oil, reverse the process. Place dip-tube into bucket of new oil. Select switch position to pump oil ‘into’ engine. Monitor the dipstick as the engine fills. Toggle switch until proper oil level is reached. Run engine, and then re-check oil level. Toggle switch for top off oil or add oil through engine manifold cap.

Replace hose cap, and stow dip-tube into storage case. Clean up oil spillage.

17 Appendix A – Boat Information

17.1 Registration Information

Item	Description	Serial/ID Number	Remark
USCG Document	Official Number Annual Certificate Hull ID Number	**1137711** Exp: **09/31/2022** BLBA65EVA000	Transom Inner Hull, Center Lazarette DHS, USCG. Boat documents Transom Starboard Aft
US Customs Annual	DTOPS User ID	D00036339A Year 2022	Pwd: Starlight1! Acct ID: A00531796 Salon aft window, Boat documents
FCC Radio License	Call Sign ID FRN File Number MMSI Station ID	**WDC7913** Exp: 11/29/2025 0014324750 0006951830 303505000	Boat documents Federal Registration Number Station Identity
WA DoR Vessel	 Annual Decal No. OID No UBI No. FEIN	 **Year 2022** 11741 602-555-358 87-0756309	
WA DoL Dinghy #1 Walker Bay Gen11 LTE	Registration No. Decal No. Hull ID Number	**WN 0283 SW** D546016 (Y2021) US-EWVGL175C919	Boat hull, boat documents Boat hull Boat aft transom plate
WA DoL Dinghy #2 Rendova RIB 12 (backup)	Registration No. Decal No. Hull ID Number	**WN 8942 NH** **104403** (Y2021) RH025050L899	Boat hull, Boat documents Boat hull Boat plate
WA DoL Boat Trailer 1	Registration No Decal No Vehicle ID Number	WA 7493QT 31476 Exp: 4/2021 4XBBA1613JA014324	Trailer plate Make: King Boat Trailer Model: KB1150
WA DoL Boat Trailer 2	Registration No Decal No. Vehicle ID Number	**WA 2905-UK** **572412** Exp: 2/2021 4XBBA16108A007101	Trailer plate Make: King Boat Trailer Model:
WA Parks Annual	Decal No.	Not Used	
Direct TV Service	RID Card No. RID Card No. Account No.	0004 3961 2946 0014-5999-7050 0004 5282 2299 0012-0627-3532 37894673	Salon Satellite Receiver ID Salon Satellite Receiver slot Fwd SR Satellite Receiver ID Fwd SR Satellite Receiver slot dalmero@msn.com/catabara

17.2 Boating Contacts

AYC Charter Base		
Main Office	800-233-3004	http://www.ayc.com
	360-293-4555	
Coast Guard		
US Coast Guard	VHF CH 16	Hailing channel for Coast Guard
	800-368-5647	Boating information (non-emergency calls)
Emergency Services		
BoatUS Towing Service	800-391-4869	Or hail VHF 16 (membership 20214653)
Emergency Services	911	Police, fire, medical (except cell phones SJI)
Emergency (San Juan Islands)	360-378-4141	For cell phones
WA State Patrol	425-649-4370	Information (non-emergency calls)
US Customs & Border Patrol		

United States Customs	800-562-5943	
Canadian Customs		
Canadian Customs	888-226-7277	Reporting arrival to CA designated port of entry
Weather Reports		
NOAA NWS Marine Forecast (Northern Inland Waters, San Juan Islands)	Website VHF 1 or 4	https://marine.weather.gov/MapClick.php?zoneid=PZZ133
NOAA NWS Marine Forecast ((Puget Sound and Hood Canal)	Website VHF 1 or 4	https://marine.weather.gov/MapClick.php?zoneid=PZZ135#.XqZc42hKhPY
NOAA NWS Marine Forecast (Strait of Juan de Fuca)	Website	https://marine.weather.gov/MapClick.php?zoneid=PZZ131#.XqZdumhKhPZ
NOAA National Buoy Data Center (buoy reports, WA, Canada, Alaska)	Website	https://www.ndbc.noaa.gov/maps/Alaska.shtml
Environment Canada Marine Pacific – South Coast	Website 640-666-3655	https://weather.gc.ca/marine/region_e.html?mapID=02
Environment Canada Forecast (Johnstone Strait)	Web site	http://www.weatheroffice.gc.ca/marine/forecast_e.html?mapID=03&siteID=06800
Environment Canada Forecast (Haro Strait)	Web site	http://www.weatheroffice.gc.ca/marine/forecast_e.html?mapID=03&siteID=06100
Environment Canada Forecast (Strait of Georgia – North)	Web site	http://www.weatheroffice.gc.ca/marine/forecast_e.html?mapID=03&siteID=14301
Environment Canada Forecast (Strait of Georgia – South	Website	http://www.weatheroffice.gc.ca/marine/forecast_e.html?mapID=03&siteID=14305
Environment Canada Forecast (Strait of Juan de Fuca – East)	Website	http://www.weatheroffice.gc.ca/marine/forecast_e.html?mapID=03&siteID=07003
Fishing		
WA Fishing Hotline (openings/closures)	360-902-2500	http://wdfw.wa.gov/fishing/
WA Shellfish Hotline (openings/closures)	866-880-5431	http://wdfw.wa.gov/fishing/shellfish/
WA State Online Services	Website	http://www.access.wa.gov. Boating information
Boat Services		
Cap Sante Marine	800-422-5794	*Cummins* parts, Anacortes WA
North Harbor Diesel	360-292-5551	Travel lift, *Cummins* engine repair, Anacortes WA
Skyline Marine Center	360-293-5134	Travel lift, fuel, Skyline Marina, Anacortes WA
Anacortes Marine Electronics	360-293-6100	Electronics, Satellite TV, Anacortes WA
Wave Point Marine Electronics	360-708-4880	Navigation Electronics (Brent), Anacortes WA
Fuel – Points Northbound		
Skyline Marina, Anacortes	800-828-7337	Chevron (call for appointment)
Cap Sante Marina, Anacortes	360-293-8502	Fido's Fuel Dock, Cap Sante Marina Fuel Dock
Bellingham	360-734-1710	Shell, Harbor Marine Fuel
Friday Harbor	360-378-3114	Port of Friday Harbor Fuel Pier, Shell
Roche Harbor	800-586-3590	Resort Fuel Dock, Texaco
Victoria	250-381-5221	Victoria Marine Fuels, Ltd
Sydney	250-656-1138	Van Isle Marina, VHF 66A
Ganges	250-537-5242	Shell, Ganges Marina
Nanaimo	250-754-7828	Gabe's Petro-Canada Marine
Powell River	604-485-2867	Westview Fuels Fuel Dock
Lund	604-414-0474	Lund Hotel
Egmont	604-883-2298	Egmont Marine Resort
Refuge Cove	250-935-6659	Refuge Cove General Store
Blind Channel	888-329-0475	Blind Channel Resort
Campbell River	250-287-2614	Discovery Harbour Marina, Esso
Lagoon Cove	VHF66A	Lagoon Cove Marina
Echo Bay	250-974-7139	Echo Bay Resort
Sullivan Bay	250-483-6881	Sullivan Bay Marine Resort
Port McNeill	250-956-3336	Port McNeill Marine and Aviation Fuels
Port Hardy	250-949-6551	Quarterdeck Inn and Marina Resort

18 Appendix B – Inventory

18.1 Boat Equipment

PH = Pilothouse stb = starboard elect = Electric cab = cabinet SR=stateroom

Group	Boat Equipment Description	Make	Model	Serial No./Desc	Location	tgt	oh
Appliance	Barbeque	Magma	Newport		Bridge deck stb	1	1
Appliance	Barbeque, Storage, LPG	Seaward	S/W 93268	With 1-gal tank	Bridge deck stb	1	1
Appliance	Barbeque, Tank, Spare	Worthington	1-gallon		Bridge sink cab	1	1
Appliance	Compactor	GE	Compactall		Galley	1	1
Appliance	Electric Range (120-VAC)	Princess 3-b	3342-1112	730056	Galley	1	1
Appliance	Icemaker	U-Line	Automatic		Salon stb	1	1
Appliance	Microwave	GE	jvm1540dp1ww	FT928282B	Galley	1	1
Appliance	Refrigerator, 12vdc/120vac	Norcold	DE-461	TBR	Galley	1	1
Appliance	Refrigerator ,12vdc/120vac	Norcold	DE-051	TBR DE-0751	Bridge	1	1
Appliance	Vacuum Cleaner	Wal-Vac	540		Passageway stb	1	1
Appliance	Washer-Dryer	Spendide	SWD1054M	Combomatic 2K	Passageway prt	1	1
Appliance	Water Heater, Domestic	Seaward	S-1800	F809295	Engine Rm Fwd	1	1
Deck	Adapter 15A – 30A	Marinco	83A plug	Yellow	PH Elect Panel	1	1
Deck	Adapter 20A – 30A	Marinco	84A plug	Yellow	PH Elect Panel	1	1
Deck	Adapter 50A-250V – 30A	Marinco	121A pigtail	Yellow	PH Elect Panel	1	1
Deck	Adaptr 50a/250v – 50a/125v	Marinco	123A pigtail	Cord Adapter Box	Lazarette stb	1	1
Deck	Adapter 50A/125V to 2x 30A	Marinco	152AY 503-2-30’	Cord Adapter Box	Lazarette stb	1	1
Deck	Anchor Winch Handle	Muir			Bow deck locker	1	1
Deck	Anchor Windlass	Muir	Cougar H-1200	1.2kmax, 275-lb wk	Bow pulpit	1	1
Deck	Anchor, Rode, Spare	West Marine	5/16 BB; ½-nyl	100-chain, 200-nyl	Lazarette stb	1	1
Deck	Anchor, Rode, Working	West Marine	5/16 HT; 5/8-nyl	300-chain, 200-nyl	Chain Locker	1	1
Deck	Anchor, Snubber Rig w/Line	Shockles	w/ chain hook	Black	Bow deck locker	1	1
Deck	Anchor, Spare	Bruce	44-lb (20-kg)	10-chn	Lazarette	1	1
Deck	Anchor, Working	SeaDog	66-lb (30-kg)		Bow roller	1	1
Deck	Cord, 25-ft Shore Power	Marinco	30-Amp	Yellow	Lazarette stb	1	1
Deck	Cord, 50-ft Shore Power	Marinco	30-Amp	Yellow	Lazarette stb	2	2
Deck	Cord, 50-ft Shore Power	Marinco	50-Amp	Yellow	Lazarette stb	1	1
Deck	Cover, Barbeque		canvas		Bridge cabinet	1	1
Deck	Cover, Bridge Aft Seat		canvas		Bridge seat port	1	1
Deck	Cover, Bridge Bimini Cover		canvas		Bridge seat port	1	1
Deck	Cover, Bridge E-80 Unit		canvas		PH panel seat	1	1
Deck	Cover, Bridge Entertainment		canvas		Bridge seat port	1	1
Deck	Cover, Bridge Hatch		canvas		Bridge seat port	1	1
Deck	Cover, Bridge Helm Panel		canvas		Bridge seat port	1	1
Deck	Cover, Bridge Helm Seat		canvas		Bridge seat port	1	1
Deck	Cover, Bridge Stb Seat		canvas		Bridge seat port	1	1
Deck	Cover, PH Port Door		canvas		PH seat port	1	1
Deck	Cover, PH Port FwdWindow		canvas		PH seat port	1	1
Deck	Cover, PH Port WingScreen		canvas		PH seat port	1	1
Deck	Cover, PH Port WingWindo		canvas		PH seat port	1	1
Deck	Cover, PH Stb Door		canvas		PH seat port	1	1
Deck	Cover, PH Stb FwdWindow		canvas		PH seat port	1	1
Deck	Cover, PH Stb WingScreen		canvas		PH seat port	1	1
Deck	Cover, PH Stb WingWindow		canvas		PH seat port	1	1
Deck	Cover, PH Windshield		canvas		Foredeck Stb Lkr	1	1
Deck	Cover, PH WS Screen		canvas		PH seat port	1	1
Deck	Cover, Foredeck Seat		Canvas		Foredeck Stb Lkr	1	1
Deck	Cover, Salon Door		canvas		PH seat port	1	1
Deck	Cover, Searchlight		canvas		PH seat port	1	1
Deck	Cover, Windlass		canvas		PH seat port	1	1
Deck	Flag, American	Flagstaff	24x48		Cockpit	1	1
Deck	Flag, Canadian	Flagstaff	12x18		Pulpit	1	1
Deck	Fender, Cylinder	Taylor, HTM	10x24, HTM-3		Deck	8	8
Deck	Fender, Round	Taylor	12 orange w/whp		Bridge	1	1
Deck	Fender, Step	DanFender	Fender Step, sgl		Cockpit	1	1

Group	Boat Equipment Description	Make	Model	Serial No./Desc	Location	tgt	oh
Deck	Hook, Boat, Adjustable	West Marine	15-ft extendable		Cockpit	1	1
Deck	Hook, Buoy, Mooring		w/25-ft line	SS	Bow deck locker	1	1
Deck	Hose, Water, 15-ft Coiled		15-ft Coiled	Blue	Bow deck locker	1	1
Deck	Hose, Water, 25-ft Coiled		25-ft Coiled	Green	Cockpit Stb	1	1
Deck	Hose, Water, 50-ft		50-ft	White	Lazarette port	1	2
Deck	Line, Dock	New England	15-ft, 5/8	Black, braid	Deck, cockpit	2	2
Deck	Line, Dock	New England	25-ft, 5/8	Black, braid	Deck, cockpit	3	3
Deck	Line, Dock	New England	35-ft, 5/8	Black, braid	Deck	3	3
Deck	Line, Dock	New England	40-ft, 5/8	Black, braid	Deck, cockpit	1	1
Deck	Line, General Purpose		50-ft, ½, lock-line	White, 3-strand	2–Cockpit	2	2
Deck	Line, General Purpose		100-ft ½		Cockpit	0	0
Deck	Line, General Purpose		100-ft 3/8	White, 3-strand	Cockpit	1	1
Deck	Line, Spare Anchor Rode	New England	200-ft ⅛braid	W/loop	Lazarette	1	1
Deck	Line, Snubber		20-ft, ½ w/eye	White, 3-strand	Bow-deck locker	1	1
Deck	Searchlight, Remote Control	Jabsco	135SL	100,000-cp	Bow pulpit	1	1
Deck	Winch, Davit, SS (6/2/20)	Rock Machin	REW3000	3000-lb 2.3hp 140a	Bridge boat davit	1	1
Dinghy	Anchor, Folding	5-lb	W/100-ft rode		Dinghy bow lockr	1	1
Dinghy	Can, Gas, Spare		1-gal (empty)	Red	Dinghy console	1	1
Dinghy	Crab Pot Line Retriever	Scotty	Trap-Ease		Dinghy stb mt	1	1
Dinghy	Dinghy, RIB, Int Fuel Tank	Walker Bay	Gen11LTE	11'2"x5'10" 362lbs	Bridge Deck	1	1
Dinghy	Fenders	Taylor	White 12"		Dinghy cleat	2	2
Dinghy	Foot Pump and Hose	Bravo	10-ft hose		Dinghy Box	1	1
Dinghy	Life Vest, Near Shore	Stearns	Type II Adult	Orange	Dinghy aft seat	5	5
Dinghy	Line, Anchor, w/10-chain		10-lb mushroom	SS snap link	Dinghy bow	1	1
Dinghy	Line, Anchor, Stretch	Anchr Buddy	14-50-ft, 4K-lb	Black w/ SS 4" link	Dinghy bow	1	1
Dinghy	Line, Anchor Rode		50-ft	Blue	Dinghy bow	1	1
Dinghy	Line, Shore Tie		50-ft	White	Dinghy bow	1	1
Dinghy	Motor, Outboard 4-stroke	Tohatsu	30hp EFI 157lbs	Black	Dinghy stern	1	1
Dinghy	Seat, Floatation, Throwable	West Marine	Type IV,ModF	Blue Cushion	Dinghy seat	1	1
Dinghy	Sounder-Fishfinder/Map	Garmin	Echomap+ 44cv	SN 5AW003455	Dinghy console	1	1
Dinghy	Wrench, Drain Plug	Braid		Yellow	Start Key	1	1
Electronics	AIS 650 Transceiver w/GPS	Raymarine	E32158	AE321580920515	PH panel seat	1	1
Electronics	AIS 100 Splitter	Raymarine	A80190	A801900820035	PH panel seat	1	1
Electronics	AM/FM/MP3, Bluetooth Rvr	West Marine	MXD337BT	SN 002493	Bridge Port	1	1
Electronics	Antenna, TV Omnidirect	Shakespeare	SeaWatch	2030	PH panel under	1	1
Electronics	Autopilot Sensor Core	Raymarine	E70096 EV-1	SN 0470896	Passaway Stair	1	1
Electronics	Autopilot Computer Unit	Raymarine	E70099 ACU200	SN 0670427	Salon Aft Corner	1	1
Electronics	Autopilot Controller	Raymarine	E70329	P70Rs	PH helm Port	01	1
Electronics	Autopilot Controller	Raymarine	E12098P	ST6002+, 0210234	PH Helm Port	1	1
Electronics	Autopilot Remote, Wireless	Raymarine	E15024	S-100	Bridge helm	1	1
Electronics	Adapter, RayNet-STHS	Raymarine	A80160	Axiom+9 to STHS	Bridge helm	1	1
Electronics	Adapter, STNG-SeaTalk	Raymarine	E22158	SN 0273576	PH helm STNG	1	1
Electronics	Adapter, T-Piece	Raymarine			STNG backbone	2	2
Electronics	Converter,nmea0183-STNG	Raymarine	E70196	SN 0870354	PH helm STNG	1	1
Electronics	Cable, SeaTalkHS, 10M	Raymarine	E55051	Sw - Fwd E-120	PH helm port	1	1
Electronics	Cable, SeaTalkHS,15M	Raymarine	A62135	Sw - Bridge Axiom	PH helm port	1	1
Electronics	Cable, SeaTalkHS, 1.5M	Raymarine	E55059	Sw - PH Axiom+12	PH helm port	1	1
Electronics	Cable, SeaTalkHS, 1.5M	Raymarine	E55059	Sw - DMS-300	PH helm port	1	1
Electronics	Cable, SeaTalkHS, 3M	Raymarine	A80151	Sw – PH Axiom	PH helm port	1	1
Electronics	Cable, Radar Digital, 15M	Raymarine	E55078D	Dome to STHS Sw	PH helm port	1	1
Electronics	Cable, SeaTalkNG, 9M	Raymarine	A06068	ACU to EV-1	STNG backbone	1	1
Electronics	Cable, SeaTalkNG, 9M	Raymarine	A06068	EV-1 to Helm	STNG backbone	1	1
Electronics	Cable, SeaTalkNG	Raymarine	E070196	5-waySTNG-NMEA	STNG backbone	1	1
Electronics	Cable, SeaTalkNG, Conn	Raymarine		5-waySTNG-ST1	STNG backbone	1	1
Electronics	Cable, SeaTalkNG, T-Conn	Raymarine	A06028	T-Piece	STNG backbone	1	1
Electronics	Cable, SeaTalkNG, 3M	Raymarine	A06040	AIS to STNG	STNG spur	1	1
Electronics	Cable, SeaTalkNG	Raymarine	A06047	STNG-ST1 Ada	STNG spur	1	1
Electronics	Cassette Deck (dual)	JVC	TDW254		Salon audio cab	1	1
Electronics	CD Changer (5-disk)	Sony			Salon audio cab	1	1
Electronics	CD Changer (5-disk)	Sony	CDP-C37	Backup spare	Home	1	0
Electronics	CD/DVD Player	Sony	DVP-S330		Salon TV cabinet	1	1
Electronics	CD/DVD Player	Sony	DVPSR500H		Fwd SR Stb	1	1
Electronics	CD/DVD Player	Sony	DVPSR500H	Backup spare	Home	1	0
Electronics	Depth Sounder	Hawkeye	DepthTrax 2B		Bridge helm	1	1

Group	Boat Equipment Description	Make	Model	Serial No./Desc	Location	tgt	oh
Electronics	Depth/Temp/Log Instrument	Raytheon	ST-60 TriData		PH helm	1	1
Electronics	Chart card Vancouver Island	Navionics	CF 913P+	000600337985	PH e-120 MFD	1	1
Electronics	Chart card Canada&Alaska	Navionics+	CF/NAV+CA	21245 97713 7	PH-e-120 MFD	1	1
Electronics	GPS Antenna, RayStar 125	Raymarine	E32042		Mast portside	1	1
Electronics	Headset, Intercom, BT ST	Sena	SPH10 (unitA)	151100379	PH helm	0	0
Electronics	Headset, Intercom, BT ST	Sena	SPH10 (unitB)	151100382	PH helm	0	0
Electronics	iPad Air w/cellular data	Apple	MYH82LL/A	356762119763287	PH helm	1	1
Electronics	Intercom, Handset	NewMar	PI-10 10-sta		ph,fb,fsr,ga,er	4	4
Electronics	Multifunction Disp Axiom+12	Raymarine	E70639-03	SN 0810231	PH helm Port	1	1
Electronics	Multifunction Disp Axiom+9	Raymarine	E70636	SN 0410065	Bridge helm port	1	1
Electronics	Paddlewheel (STW)	Raytheon	P19	Nylon	Keel stb midship	0	0
Electronics	Radar, Radome Scanner	Raymarine	E92132		Mast center	1	1
Electronics	Receiver, Bluetooth Audio	Logitech	980-000910	1068GG116648	Salon audio cab	1	1
Electronics	Receiver, DTV Satellite, HD	Direct TV	H24-200	c06bC0qw300239	Salon TV cab	1	1
Electronics	Receiver, DTV Access Card	Direct TV	Id035420397826	cd 0019-0063-4914	Salon Rcv Card	1	1
Electronics	Receiver, B-Band Converter	Direct TV	SUP-2400	YGBBD1328A1509	Salon HD Rcvr	1	1
Electronics	Receiver, DTV Satellite, Std	Direct TV	D11-500		Fwd SR Port cab	1	1
Electronics	Receiver, DTV Access Card	Direct TV	id035429427202	cd 0014-5999-7050	Fwd SR Rcv Crd	1	1
Electronics	Receiver, SiriusXM	Sirius	Starmate 8	ID 066591687420	Pilothouse	0	1
Electronics	Receiver, Stereo Amplifier	JVC	RX-558VBK	154X5422 06/27/16	Salon audio cab	1	1
Electronics	Receiver, Digital Media	Dual	MXCP47BT	27204-11231-1	Bridge helm	1	1
Electronics	Sonar Module, CP370	Raymarine	E70297	1070056, 2017	PH panel seat	1	1
Electronics	Sonar Module, DSM300	Raymarine	E63069 (backup)	1200160, V4.20	PH port seat	1	1
Electronics	Satellite TV, Antenna/Trackr	Sea Tel	Coastal 18	98007194	Mast	1	1
Electronics	Satellite Comm/GPS	Garmin	InReach Explore	50302525	Pilothouse	1	0
Electronics	Switch, Network,SeaTalkHS	Raymarine	E55058		PH panel seat	1	1
Electronics	Transducer 50/200 Hz,	Raytheon	ST600	S/T Nylon	Keel stb midship	1	1
Electronics	Transducer 50/200 Hz,744V	Raymarine	A66091, B744V	Bronze	Keel stb midship	1	1
Electronics	Transducer (In-hull)	Lowrance			Keel midship	1	1
Electronics	TV, LCD, Color, 19”	Sharp	LC-19SB27UT		Fwd SR port	1	1
Electronics	TV, LED, Color, 23”	Toshiba	23L1350U	D25245C67886L1	Salon TV cabinet	1	1
Electronics	Radio, VHF (DSC)	Icom	IC-M502	0303239 Black	Bridge helm	1	1
Electronics	Radio, VHF (DSC, Hailer)	Icom	IC-M504 03	0103290 Gray	PH helm Stb	1	1
Electronics	Radio, VHF, Handheld	Icom	IC-M24	01014816 Black	PH panel seat	1	0
Electronics	Radio, VHF, Handheld	Icom	IC-M93D	01003747 Black	PH panel seat	1	1
Environmnt	Air Conditioner/Heater	Marine Air	VCP16K	L9-M75565	PH seat aft	1	1
Environmnt	Air Conditioner/Heater	Marine Air	VCP16K	L9-M755444	Fwd SR bed	1	1
Environmnt	Air Conditioner/Heater	Marine Air	VCP16K	L9-M	PH helm under	1	1
Environmnt	Engine Marine Heater	BoatSafe	BSAT 750W	S: TB 6323	Engine Rm stb	1	1
Environmnt	Engine Marine Heater	BoatSafe	BSAT 750W	P:	Engine Rm port	1	1
Environmnt	Furnace, Diesel, Hygronic	Webasto	DBW-2015	801089	Lazarette port	1	1
Environmnt	Heater, Built-in, Space Elect	King	750 W		Fwd Stateroom	1	1
Environmnt	Heater, Built-in, Space Elect	King	750 W		Passageway	1	1
Environmnt	Heater, Built-in, Space Elect	King	750 W		Salon port	1	1
Environmnt	Heater, Built-in, Space Elect	King	750W	replaced 04-06-19	Pilothouse port	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Dual 4” Outlet	14,000 BTU	Salon, aft seat	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Triple 3” Outlet	25,000 BTU	Pilothouse	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Dual 3” Outlet	7,000 BTU	Passage, Aft SR	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Single 3” Outlet	3,500 BTU	Aft Head	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Single 3” Outlet	3,500 BTU	Mid-SR	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Single 4” Outlet	7,000 BTU	Fwd Stateroom	1	1
Environmnt	Heater, Fan, Hygronic	REAL	Single 3” Outlet	3,500 BTU	Fwd Head	1	1
Environmnt	Heater, Portable, Electric	West Marine	9200		Aft SR, Mid SR	2	2
Environmnt	Tank, Expansion, Hygronic	SMS	2.5 gal		Pilothouse Port	1	1
Furnishing	Chair, Canvas, Folding	Glacier	folding legs	Blue Canvas	Salon aft seat	4	4
Furnishing	Chair, Deck, Crew, Folding	West Marine	Comfort Plus	Blue Canvas	Cockpit port	2	2
Furnishing	Chair, Sofa-Type, Barrel		Recovered 4/16	Blue Fabric	Salon	2	2
Furnishing	Cooler, Poly, 155-qt	Yeti	155-qt	White poly	Cockpit	1	1
Furnishing	Table, Canvas, Folding	Glacier		Blue Canvas	Salon aft seat	1	1
Furnishing	Table, Dining, Folding			Teak	Salon	1	1
Furnishing	Table, Utility w/Corian Top			Teak, Corian	Salon	1	1
Key	Key, Door, Access	Access	Hidden	Red float	Cockpit port	1	1
Key	Key, Door, Spare	Spare		Orange float	PH panel seat	2	2
Key	Key, Engine Ignition	Spare	Set	Orange float	PH panel seat	2	2

Group	Boat Equipment Description	Make	Model	Serial No./Desc	Location	tgt	oh
Key	Key, Dinghy Ignition	Spare		Orange float	PH panel seat	1	1
Recreation	Clam Rake			3-prong	Salon aft seat	1	0
Recreation	Clam Shovel			Black	Salon aft seat	1	1
Recreation	Crab Float, Set x2		Line, Flag	White/Red Bucket	Bridge boat deck	2	2
Recreation	Crab Pot, Folding	Danielson		Canvas Bag	Bridge boat deck	2	2
Recreation	Downrigger, 300-ft cable	Scotty	Depthmaster 60”	Model 1106,	Bridge seat stb	1	1
Recreation	Downrigger, Mount, Base	Custom	Vertical Pole Mnt	Pole/Rigger Holder	Bridge seat stb	2	2
Recreation	Downrigger, Pedestal Swiv	Scotty	With Tilt Up Brkt	Models 1026, 1023	Bridge seat stb	1	2
Recreation	Downrigger, Pole Holder	Scotty	10” tube	Model 247	Bridge seat stb	2	2
Recreation	Downrigger, Holder Adapter	Scotty	Gear-Head Mnt	Model 453	Bridge seat stb	2	2
Recreation	Fishing Tackle	Misc		Plastic boxes	Bridge seat stb	3	3
Recreation	Stove, Propane, Fold, 65btu	Power Stove	ps65-0000 65btu	PS652200	Bridge seat stb	1	1
Recreation	Tank, Propane 4.25-lb	Worthington	281149		Bridge boat deck	2	2
Safety	Alarm, Smoke and CO2	First Alert	PC900V		Passageway	1	1
Safety	Alarm, Smoke	First Alert	ATOM		Pilothouse	1	1
Safety	Alarm, Smoke	First Alert			Engine Rm Fwd	1	1
Safety	Binoculars	West Marine	Coastal 200	Blue	PH helm	2	2
Safety	Life Seat, Cushion, Floating	Stearns	Type IV Float	White	PH seat port	1	0
Safety	Emergency Signal Kit –Alert	Orion	‘Alert’ exp 6/15	3-flare, 1 smoke	PH Elect cab	1	1
Safety	Emergency Signal Kit –Loca	Orion	‘Locate’ exp 6/15	12mm Flare	PH Elect cab	1	1
Safety	Emergency Strobe Light	Orion		Orange	PH Elect cab	1	1
Safety	Extinguisher, Fire, BC	Kidde	B:C Rated	White/Red	PH,G,S,FSR,FE	5	5
Safety	Horn, Portable	West Marine		Can w/horn	PH Elect cab	1	1
Safety	Headset, Intercom, BT, Ster	Sena	SPH10	Black	PH helm	2	0
Safety	Life Buoy with Line	LifeSling	LifeSling2	125-ft line	Bridge deck	1	1
Safety	Lifeline, Bag, Throwable	Stearns	Rescue Mate	Orange bag	1–PH, 2–cockpit	3	3
Safety	Life Ring, Buoy, Throwable	West Marine	24” white	Type IV PFD	Cockpit	1	1
Safety	Life Vest, Inflatable, Belt Pk	Stearns	Type V Inflatable	Blue	2-PH seat port	2	2
Safety	Life Vest, Inflatable, Vest	West Marine	Type V Inflatable	Blue, HR 85000 Inf	2-PH seat port	2	2
Safety	Life Vest, Inflatable, Vest	West Marine	Auto/M14897425	Blue/Gray	2-PH seat port	2	2
Safety	Life Vest, Near Shore	Stearns/Kent	Type II Adult	Orange	10-bridge 7-PH	17	17
Safety	Life Vest, Near Shore	Stearns/Kent	Type II Child	Orange	2-bridge, 2-PH	4	4
Safety	Life Vest, Near Shore	Sterns/Kent	Type II Infant	Orange	1-PH seat port	1	1
Safety	Life Vest, Near Shore	West Marine	Type II Infant	Blue	1-PH seat port	1	1
Safety	Life Vest, Near Shore, collar	Mustang	Type II Infant	Yellow	1-PH seat port	1	1
Safety	Scuba, Wetsuit, 7mm, M	NeoSports	Waterman	Black	Mid-SR bed port	1	1
Safety	Scuba, Hood, 7/4mm, XL	Aqua Lung	SeaHood HS200	Black	Mid-SR bed port	1	1
Safety	Scuba, Sock 3mm S	Aqua Lung	HighTide	Black	Mid-SR bed port	1	1
Safety	Scuba, Diving Gloves	Deep See	Waterfall	Black/White	Mid-SR bed port	1	1
Safety	Scuba, Fins			Blue	Mid-SR bed port	1	1
Safety	Scuba, Mask/Snorkel			Blue	Mid-SR bed port	1	1
Safety	Scuba, Mesh Belt w/weights	Aqua	Mesh, 6-pocket	Black	Mid-SR bed port	1	1
Safety	Spotlight, Hand-held	Stanley	SL12VDC	Blacke, 800K cp	PH helm	1	1
Sanitation	Toilet, Flush	VacuFlush	SeaLand 806	White	Fwd/Mid Head	2	2
Tools	Drill Kit, Portable w/ Drills	DeWalt	DCD790D2	711840	Salon stb seat	1	1
Tools	Socket-Wrench Set	Ace		Black case	Salon stb seat	1	1
Tools	Tool Box One - Common	Plano	Orange-color bx	Common tools	Salon stb seat	1	1
Tools	Tool Box Two – Lg Repair		Orange-color bx	Large Repair tools	Salon stb seat	1	1
Tools	Tool Box Three – Electrical		Orange-color bx	100-ft cord, light	Salon stb seat	1	1
Tools	Tool Box Four – Meters		Dark Green Bx	Multimeters	Salon stb seat	1	1
Tools	Cutter, Bolt		Red-handle		Salon stb seat	1	1
Tools	Hatchet, Hand		Black-handle		Salon stb seat	1	1

18.2 Charts, Cruising Guides, and References

PH = Pilothouse stb = starboard elect = Electric nav = navigation cab = cabinet SR=stateroom

Format	Charts, Guides, References Title	Description	Year	Author	Pilothouse Location	T G	O H
Tide/current	Ports & Passes	Olympia to Broughtons. Tide, Current	2020	Fine Edge	stb helm	1	1
Tide/current	Canadian Current Atlas	Canadian waters		CHS	aft cabinet	1	1
Tide/current	Washburne's Tables	Annual for Canadian Current Atlas	2020		aft cabinet	1	1
Tide/current	Puget Sound Current	Puget Sound waters		IslandCano	nav drawer	1	1
Cruise Guid	Waggoner	Points of Interest - Olympia to Ketchikan	2020	Fine Edge	nav drawer	1	1
Nav Tool	Parallel Ruler	Plastic		N/A	nav drawer	1	1
Nav Tool	Dividers	Metal, in case		N/A	nav drawer	1	1
Nav Tool	Mag-vue Sheet	Magnifier sheet, Bausch & Lomb		N/A	nav drawer	1	1
Chart Book	San Juan Islands	Spiral bound, waterproof, Edition 1	2002	MapTech	nav drawer	1	1
Atlas	San Juan Isl & Gulf Isl	Spiral bound	2009	Evergreen	nav drawer	1	1
Atlas	Atlas Northwest Waters	Olympia to Queen Charlotte Sound	2009	Evergreen	nav drawer	1	1
Atlas	Marine Atlas	Olympia to Malcolm Island		Bayless Ent	nav drawer	1	1
Chart Flat	NOAA 18421 1:80,000	Strait of Juan de Fuca & Strait of Georgia	2008	NOAA	nav drawer	1	1
Chart Flat	CHS 3461 1:80,000	Juan de Fuca Strait – Eastern Portion		CHS	nav drawer	1	1
Chart Flat	CHS 3462 1:80,000	Juan de Fuca Strait to Strait of Georgia		CHS	nav drawer	1	1
Chart Flat	CHS 3463 1:80,000	Strait of Georgia – Southern Portion		CHS	nav drawer	1	1
Chart Flat	CHS 3512 1:80,000	Strait of Georgia – Central Portion		CHS	nav drawer	1	1
Chart Flat	CHS 3513 1:80,000	Strait of Georgia – Northern Portion	1993	CHS	nav drawer	1	1
Chart Fold	CHS 3311 1:40,000	Sunshine Coast – Vancouver to DS	1993	CHS	nav drawer	1	1
Chart Flat	CHS 3312 1:250,000	Jervis Inlet and Desolation Sound	1991	CHS	nav drawer	1	1
Chart Flat	CHS 3538 1:40,000	Desolation Sound & Sutil Channel		CHS	nav drawer	1	1
Chart Flat	CHS 3539 1:40,000	Discovery Passage		CHS	nav drawer	1	1
Chart Flat	CHS 3541 1:40,000	Approaches to Toba		CHS	nav drawer	1	1
Chart Flat	CHS 3543 1:80,000	Cordero Channel		CHS	nav drawer	1	1
Chart Flat	CHS 3544 1:40,000	Johnstone Str – Race Psg-Current Pasg		CHS	nav drawer	1	1
Chart Flat	CHS 3545 1:40,000	Johnstone Str – Prt Neville-Robson Bight		CHS	nav drawer	1	1
Chart Flat	CHS 3515 1:80,000	Knight Inlet	1998	CHS	nav drawer	1	1
Chart Flat	CHS 3546 1:40,000	Broughton Strait	1999	CHS	nav drawer	1	1
Chart Flat	CHS 3547 1:40,000	Queen Charlotte Strait – Eastern	1999	CHS	nav drawer	1	1
Chart Book	Charlie's Charts	North to Alaska		C. Woods	aft cabinet	1	1
Local Chart	Port of Victoria Traffic	Victoria Harbour			nav drawer	1	1
Cruise Gde	Burgee Marina Guide	Olympia to Nanaimo		D. Kutz	aft cabinet	1	1
Cruise Gde	Crows Nest, Puget Snd				aft cabinet	1	1
Cruise Gde	San Juan Islands	A Boater's Guidebook	2013	Breeding	aft cabinet	1	1
Cruise Gde	Gulf Islands	Gulf Islands & E Coast Vancouver Is.	2006	Vassilopoul	aft cabinet	1	1
Cruise Gde	Puget Sound Guide	North & South Puget Sound, Hood Canal			aft cabinet	1	0
Cruise Gde	Cruising Guide BC #1	Gulf Islands, Vancouver Isl to Courtenay		Wolferstein	aft cabinet	1	1
Cruise Gde	Cruising Guide BC #2	Desolation Sound & Discovery Islands		Wolferstein	aft cabinet	1	1
Cruise Gde	North Coast of BC	Blunden Harbor to Dixon Entrance		Douglas	NA	1	0
Cruise Gde	Exploring SE Alaska	Dixon Entrance to Skagway, 2nd edition	2007	Douglas	NA	1	1
Navigation	Weatherby Waypt Vol 1	Puget Snd, San Juan Isl, Gulf Islands		R. Hale	aft cabinet	1	1
Navigation	Weatherby Waypt Vol 2	Gulf of Georgia		R. Hale	aft cabinet	1	1
Learning	Chapman's Piloting	Chapman		Chapman	aft cabinet	1	1
Learning	Boatowner's Manual	N Calder		N. Calder	aft cabinet	1	1

18.3 Repair Parts, Spares, Tools, and Supplies

This table shows spare parts, model numbers, and location onboard Starlight Express. Where zero on-hand (OH), model numbers/description information is for parts reference.

See LEGEND at bottom of the list for the storage locations.

Type	Repair Part, Spare, Tools, Supplies Description	Location-Legend	OH	Model No/Component
Cleaning	Bag, Filter, Vacuum	Mid-SR Bunk Fwd	3	Wal Vac 540 Serie
Corrosion	Zinc, Hull Plate	Passageway Fwd Step	0	Plate, Diver Dream ½" holes
Corrosion	Zinc, Shaft	Passageway Fwd Step	0	2" dia, egg-shape, 2x3-per shaft
Corrosion	Zinc, Thruster	Passageway Fwd Step	2	Sidepower, cone
Corrosion	Zinc, Trim Tab	Passageway Fwd Step	0	5" round, ½" hole, 4x1-per tab
Deck	Controller, Davit Winch	PH Helm Seat Port	1	Handset w/8-ft cord, plug
Deck	Strut, Hatch, Cockpit	NA	0	SPD-GSNI-5300-60
Deck	Latch, Flush-Cup, T-Handle	NA	2	All-West SOU24-20-101-36
Deck	Wiper Blade	NA	0	RainX Weatherbeater 28"
Diesel Htr	Controller, Temperature	Pilothouse Port Seat	1	Aube Tech TH135-01B
Diesel Htr	Filter, Fuel	Engine Room Stb	1	CarBar (Sure Marine)
Diesel Htr	Filter, Treatment, Coolant	Engine Room Stb	1	Sure Marine BWFC-12
Diesel Htr	Pump, Coolant, Hygronic	Engine Room Stb	0	MP Pumps, MP801-001 #29924 7/18/19
Diesel Htr	Nozzle, Injector, Diesel	Engine Spares Box	1	Hago 0.35 60'B DFN
Dinghy	Adapter, Valve, Hose	NA	0	Halkey-Roberts, WM#10138105
Dinghy	Bowl, Fuel Filter	NA	0	Racor RK 10222
Dinghy	Box, Storage, Marine	Dinghy Seat	0	Plano 1812-50, Large Orange
Dinghy	Cable, Control, Motor 10-ft	NA	0	Teleflex Tfxtreme CCX63310
Dinghy	Cable, Steering, Motor 10-ft	NA	0	Teleflex QCII SSC6210
Dinghy	Cable, Control, Davit	NA	1	Warn Switch w/Sierra 3-pr male plg
Dinghy	Filter, Fuel-Water Sep	NA	1	Parker Racor S3240TUL
Dinghy	Filter, Lube	NA	1	Honda 15400-PFB-007
Dinghy	Filter, Fuel	NA	1	Honda, Sierra 18-7786D
Dinghy	Key, Starter (spare)	Dinghy Emergency Kit	2	Orange float "spare"
Dinghy	Carburetor (#1 top, #2 mid)	NA	0	Honda 16101-ZW3-D23
Dinghy	Carburetor (#3 bot)	NA	0	Honda 16102-ZW3-D23
Dinghy	Carburetor Assembly	NA	0	Honda 16100-ZW3-D23ZA
Dinghy	Cover, Inflatable (10'2"-5'-2")	NA (Dinghy 2)	0	West Marine 11161031
Dinghy	Gasket, Carburetor	NA	6	Honda 16221-ZW4-000
Dinghy	Gasket, Intake Manifold	NA	2	Honda 17151-ZV5-000
Dinghy	Gauge, Fuel	NA	0	Faria Dress White 13101
Dinghy	Grease, Marine	NA	1	Quicksilver 2-4-C w/ PTFE
Dinghy	Hose, Inflation	NA	1	12-ft length w/ HK valve adapter
Dinghy	Light, Side-Light, Stb	NA	1	MarPac
Dinghy	Oil, Gear, Lower Unit, 90W	NA	0	West Marine Hypoid 90 Premium
Dinghy	Oil, Lube, SAE 10W-30 Syn	NA	1	West Marine 10W-30 Synth Blend
Dinghy	Plug, Drain	NA	1	Lid top compartment
Dinghy	Propeller, Spare	NA	1	9.9x12 RH 3-blade
Dinghy	Propeller, Wrench	NA	0	Quicksilver 15/16"
Dinghy	Pump, Bilge, Auto	NA	0	Rule 25S 500 gph
Dinghy	Pump, Lower Unit, Fill-Up	Dinghy Emergency Kit	1	West Marine 11097714, 2..9-qt
Dinghy	Pump, Inflation, Manual	Dinghy Emergency Kit	1	
Dinghy	Steering, Rotary Drive Sys	N/A	0	Teleflex SS13710 (SH5094)
Dinghy	Sender, Fuel Tank	N/A	0	Rochester Gauges 9341-R7000
Dinghy	Spark Plug	NA	3	NGK DR7EA
Dinghy	Zinc, Lower Unit	NA	0	
Dinghy	Zinc, Motor Body	NA	0	
Electronic	Sonar Module (spare)	PH Port Seat	1	Raymarine CP300 #06043892
Electrical	Adapter, 15A-125V/30A-125V	Electr Cord Box	1	Marinco 83A
Electrical	Battery, A6-size	Electr Spares Box	4	Fire Alarms
Electrical	Battery, AAA-size	Electr Spares Box	10	Remote controllers
Electrical	Battery, AA-size	Electr Spares Box	10	Thermostats, remote controllers
Electrical	Battery, D-size	Electr Spares Box	2	
Electrical	Battery, Lantern	Salon Port Aft Cab	3	Spare Floating Lanterns
Electrical	Battery, MN21	Electr Spares Box	3	GoLight Control

Type	Repair Part, Spare, Tools, Supplies Description	Location-Legend	OH	Model No/Component
Electrical	Bulb, LED, bPinG4 5xTriC50	Electr Spares Box	2	HeroLedStore.com BG4EX-5T-5PK-WW
Electrical	Bulb, Mast Light	Electr Spares Box	1	West Marine 10800
Electrical	Bulb, Nav Light	Electr Spares Box	2	West Marine 10800
Electrical	Bulb, Searchlight, Bow	PH Port Helm Seat	1	Jabsco 18753-0178,hal,100kcp
Electrical	Bulb, Tube, Fluorescent,	Aft Head Cabinet	1	Anchor 529407,Type: FL-13CW
Electrical	Bulb, Cockpit Light, Halogen	Electr Spares Box	1	Philips 6434/fr gbe 20w 18' 15d
Electrical	Circuit Breaker, 120v	Electr Spares Box	2	Various 10-50A
Electrical	Circuit Breaker, 12v	Electr Spares Box	1	Blue Sea Systems
Electrical	Circuit Breaker, 12v-50A T	Electr Spares Box	1	Hi-Amp 50A/BlueSea PN7039
Electrical	Compressor, Air Horn	NA	0	WOLO 400-C
Electrical	Connector, Cord, 30A Fem	Electr Spares Box	1	Marinco 305CRCN
Electrical	Connector, Cord, 30A Male	NA	0	Marinco 305CRPN
Electrical	Connector, Cover, 30A Male	NA	0	Marinco 103RN
Electrical	Connector, Cover, 30A Male	NA	0	Marinco 102N
Electrical	Connector, Inlet, 30A Male	NA	1	Marinco 305CRMB
Electrical	Connector, Cord, Ring	Electr Spares Box	2	Marinco
Electrical	Connectors, Wire,Electrical	Electr Spares Box	X	Variety 10-18 ga
Electrical	Controller, Temp,Electr Htg	NA	0	King
Electrical	Controller, Temp, Hygronic	NA	0	Aube (Sure Marine)
Electrical	Controller, Temp, MarineAir	NA	0	Passport II
Electrical	Fuses, AGC	Electr Spares Box	X	Various AGC
Electrical	Floodlight, Cockpit	NA	0	Marinco-Guest GST 412
Electrical	High Current Fuse 300A	Electr Spares Box	1	BlueSea Systems
Electrical	Inlet, Cord, Inter, 30A-125V	Electr Cord Box	1	Marinco 305CRMB (boat inlet)
Electrical	Meter, Ammeter AC 50A	NA	0	Hua DH-670, AC50A
Electrical	Lamp, Indicator, Flush Dome		1	FP Marine
Electrical	Relay, Auto Charging	NA	0	Blue Sea Sys CL-Series
Electrical	Relay, Auto Charging	NA	0	Blue Sea Sys ML-Series 7700
Electrical	Relay, Inverter Power	NA	0	Dayton 5X847N 30A
Electrical	Switch, 2-Bty On/Off/Comb	NA	0	Blue Sea Sys e-Series 5511e
Electrical	Switch, Battery On/Off	NA	0	Blue Sea Sys m-Series 6006
Electrical	Switch, Generator Strt/Run	NA	0	Krauss Naimer chr10-L90152/002
Electrical	Switch, Selector 6-position	NA	0	Krauss Naimer A262-L83791/004
Electrical	Switch, 2/3-way (common)	Electr Spares Box	2	Vimar 8000-08005
Electrical	Tube, Fluorescent (head)	Aft Head Cabinet	1	GE F13T5CW
Engine	Additive, BioGuard Fuel	Cockpit Port Hatch	1	ValvTec Microbiocide
Engine	Additive, Water Absorber	Bridge Stb Ent Cab	1	
Engine	Alternator 15SI 12V 105A	NA	0	Delco REMY10479924 or 93038
Engine	Alternator 15SI 12V 105A	Engine Room Stb	1	ROM 7583N 15SI 12V
Engine	Alternator 19SI 12V 130A	N/A	0	Cummins 10459304 19009958
Engine	Alternator 19Si 12V 145A	Engine Rm Stb Box	1	SpiderMarine #1528 Cummins 10459304
Engine	Alternator 19Si 12V 160A	Engine Rm Stb Box	1	ROM 8099-160A-USA
Engine	Alternator, Pulley	Engine Rm Stb Box	0	Cummins 3918275
Engine	Alternator, Hub (ROM 8099)	Engine Rm Stb Box	0	HD Power Systems P/N 8-413
Engine	Antifreeze, Engine Coolant	Cockpit Stb Hatch	2	Cummins Fleetguard 50-50 mix
Engine	Drive Belt, Engine	Engine Spares Box	2	Cummins P/N 3911587
Engine	Filter, Air Separator	Engine Portside	2	Walker 7.5"x8" Straight CD176
Engine	Filter, Oil (Lube)	Engine Spares Box	4	Cummins Fleetguard LF3959 or LF3349
Engine	Filter, Fuel, Primary	Engine Spares Box	2	Racor R120P
Engine	Filter, Fuel, Secondary	Engine Spares Box	2	Cummins Fleetguard FF5285
Engine	Filter, Transmission	Engine Spares Box	2	ZF Hurth 3312199031
Engine	Fluid, Steering (bottle)	Mil Spec 5606	1	Lazarette aft
Engine	Fluid, Transmission	Cockpit Stb Hatch	1	Chevron ATF 3108
Engine	Fluid, Trim Tab (bottle)	ATF MD-3(Chevron)	1	Lazarette aft
Engine	Fuel Injector	NA	0	Cummins CUMM 0432131715
Engine	Impeller, Raw Water w/gsk	Engine Spares Box	2	Sherwood P/N 17000PK
Engine	Key, Starting, pair (spare)	PH Port Seat	2	
Engine	Light-Buzzer, Dual Warning	NA	0	Cole Hersee 4112-RC-BP
Engine	Lube, Oil (gal jug)	Cockpit Stb Hatch	4	Heavy Duty SAE 15W-40
Engine	Motor, Starting	NA	0	Cummins 3964428
Engine	Pump, Sea Water	Seawater Pump Box	1	Cummins 5265994 (stb repl 7/15/16)
Engine	Switch, Magnetic Relay	Engine Spares Box	2	Cummins 3916301 (pre-heat sw)
Engine	Switch, Pressure, Oil	NA	0	Cummins 3408612
Engine	Switch, Starter	NA	0	Cummins 3916854

Type	Repair Part, Spare, Tools, Supplies Description	Location-Legend	OH	Model No/Component
Engine	Transducer, Oil Sender	Engine Spares Box	0	Cummins 3866218
Engine	Sender, Oil, Dual		0	Cummins 3408612
Engine	Water, Distilled, Battery	Cockpit Port Side	2	Distilled Water
Engine	Zinc, Raw Water System	Engine Spares Box	6	5/8"x2"
Genset	Exchanger, Cap	Engine Spares Box	2	Westerbeke 022850
Genset	Exchanger, Gasket	Engine Spares Box	2	Westerbeke 022851
Genset	Exchanger, O-Ring	Engine Spares Box	2	Westerbeke 019321
Genset	Drive Belt, Engine	Engine Spares Box	1	Westerbeke 30475
Genset	Filter, Lube	Engine Spares Box	1	Westerbeke 35828
Genset	Filter, Primary Fuel	Engine Room Fwd	1	Racor R12P (bulkhead mount)
Genset	Filter, Secondary Fuel	Engine Spares Box	1	Westerbeke Element
Genset	Impeller, Raw Waterw/gask	Engine Spares Box	1	Westerbeke 33100 Kit
Genset	Pump, Water	N/A	X	Westerbeke PN 48080
Genset	Solenoid, Start	Engine Spares Box	1	Woodward 1502-12D6U1B251A
Genset	Zinc, Raw Water System	Engine Spares Box	2	3/8"x2"
Hardware	Bolts, Nuts, Washers	Hardw Spares Box	X	Various sizes
Hardware	Hinge, Full Overlap, Self-Cl	NA	X	Grass Tiomos Series
Hardware	Knob, Hafele, Plastic Brass	Hardw Spares Box	1	Push button cabinet, FP Marine
Hardware	Hinge, Door Connect, Cap	Hardw SparesBox	2	2625401 Plexiglass Hinge Mount, PH
Interior	Carpet Replacement	Home Dp Katama II	X	Muslin Wrap/0549D-31-12, 03/16
Interior	Carpet Pad Replacement	Home Dp PrimeCom	X	½-in dbl-side moisture barrier w/teflon
Interior	Valance Recover	Discnt Designer Fab	X	A426 'Beige Way Check' Uph Fab
Interior	Pilothouse Vinyl Recover		X	'Forest Green'
Interior	Salon Barrel Seat Recover		X	'Prestige Pine'
Paint	Bottom, Hull	NA	X	Pettite Trinidad SR (70%Cu. Blk)
Paint	Bottom, Metal Surfaces	NA	X	Barrier Coat
Paint	Trim, Black	Aft Head Cabinet	1	Interlux "Brightside" 1Poly #4258
Paint	Trim, White	Aft Head Cabinet	1	Interlux "Brightside" 1Poly #4359
Plumbing	Pump, Bilge, Cartridge	Plumbing Spares Box	3	Johnson 1250 gph, Model 4252
Plumbing	Pump, Water, Fresh 4.5g/m	Freshwater Pump Box	1	Jabsco Sensor Max 17 variable
Plumbing	Pump, Water, Fresh 3.3g/m	NA (home)	0	Shurflo 2088-433-344 on-demand
Plumbing	Pump, Macerator 13gpm	Macerator Pump Box	1	Jabsco Model 18520-2092
Plumbing	Pump, Washdown 3.4gpm	NA	0	West Marine #7865678
Plumbing	Switch, Bilge Pump	Plumbing Spares Box	1	West Marine #15003841
Plumbing	Sensor, Water, Forward Tank	NA	0	WEMA 316
Sanitation	Filter, Holding Tank Vent	Engine Room Stb	1	Dometic 'Eco' Cartridge 309311002
Sanitation	Sensor, Sanitation Tank Full	Plumbing Spares Box	1	Dometic 385230278 Kit, Vert Float Sw
Sanitation	Toilet, Ball-Shaft Kit	NA	0	SeaLand VacuFlush 318162
Sanitation	Toilet, Bowl Seal Kit	Plumbing Spares Box	2	SeaLand VacuFlush 316140, 311462
Sanitation	Toilet, Duck Bill Valve	Plumbing Spares Box	4	SeaLand VacuFlush 347802
Sanitation	Toilet, Bellows Motor	Plumbing Spares Box	1	SeaLand VacuFlush 600344812
Sanitation	Toilet, Kit, Bellows	Plumbing Spares Box	1	Dometic 385230980
Sanitation	Toilet, Kit, PumpBellowsClamp	Plumbing Spares Box	1	Dometic 385311226
Sanitation	Toilet, Kit, O-Ring Kit S/T8-bolt	Plumbing Spares Box	1	Dometic 385310151
Sanitation	Toilet, Vacuum Breaker Kit	NA	0	SeaLand VacuFlush 316906
Sanitation	Toilet, Water Valve Kit	Plumbing Spares Box	1	Dometic 385314349
Propulsion	Propeller, Starboard, 4-blade	NA	0	24x24x4 RH
Propulsion	Propeller, Port, 4-blade	NA	0	24x24x4 LH
Propulsion	Shaft	NA	0	
Safety	Bobbin, Water Sensing	Pilothouse Flares Kit	2	Leland, Halke-Roberts Systems
Safety	Cartridge, CO2 25-gr, 3/8"	Pilothouse Flares Kit	1	Leland 84121Z 2W134
Safety	Cartridge, CO2 38-gr, 3/8"	Pilothouse Flares Kit	1	Leland 86121Z 2W134
Safety	Pin, Green Indicator	Pilothouse Flares Kit	6	Halkey-Roberts 85000 Inflator

LEGEND:

- **Toolbox 1** – Orange-colored, Common Tools. ***Salon Starboard Seat***
- **Toolbox 2** – Orange-colored, Repair Tools/Materials. ***Salon Starboard Seat***.
- **Drill Kit** – Yellow, DeWalt, cordless drill accessories. ***Salon Starboard Seat***
- **Electric Cord Box** – Orange-colored, 110v light, Cords, Power Accessories. ***Salon Stb Seat***
- **Electrical Spares Box** –Canvas Spare Parts Bag, Clear Plastic Box. ***Salon Starboard Seat***
- **Hardware Spare Box** – Canvas Spare Parts Bag, Clear Plastic Box. ***Salon Starboard Seat***
- **Engine Spares Box** – Large, BLUE-colored. Filters, repair parts. ***Forward Engine Room***
- **Plumbing Spares Box** – Medium, BLUE-colored. ***Forward of Stb Engine***
- **Alternator Spare Box** – Medium, BLUE-colored. ***Feorward of Stb Engine***
- **Dinghy Spares Box –** Orange-colored, Propeller, repair parts. ***Bridge Starboard Aft Seat***

Bayliner Customer Care – Inventory of components/parts for Bayliner 4788
http://www.baylinercustomercare.com/catalogs_index.html

18.4 Tools

This table shows tools inventory and location on *Starlight Express*

Tool Description	Location (see Legend)	Target	On Hand	Remark
Brush, Stainless Steel Bristles	Toolbox 2	1	1	
Brush, Toothbrush-type	Toolbox 2	1	1	
Cable, Jumper, Battery, 15-ft	Salon Seat Stb Aft Qtr	1	1	
Cord, Elec, Extension, 14-ga, 15 ft, w/ground	Electric Cord Box	1	1	Yellow
Cord, Elec, Extension, 14-ga, 50-ft, w/ground	Electric Cord Box	1	1	Orange
Crimper, Lug, Hammer-Type	Toolbox 2	1	1	
Crimper, Wire Terminal, Pliers	Toolbox 1	1	1	
Cutter, Retractable-Blade	Toolbox 1	1	1	
Cutter, Wire, End-Cut	Toolbox 1	1	0	
Cutter, Wire, Side-Cut	Toolbox 1	1	1	
Cutter, Bolt	Salon Seat Stb	1	1	
Drill Set, 1/32" to ½"	DeWalt Drill Kit Toolbox	1	1	Titanium
Drill, Cordless, Li Battery-Powered	DeWalt Drill Kit Toolbox	1	1	DCD790 s/n 71140
File, Flat, Fine Grade	Toolbox 1	1	1	
Hacksaw w/ Spare Blades	Toolbox 2	1	1	
Hammer, Ball peen, Small	Toolbox 1	1	1	
Hammer, Large, 2lb	Toolbox 1	1	1	2-lb head
Hatchet, Small	Salon Seat Stb	1	1	
Heat Gun	Electric Tools Box	1	1	
Knife, Putty	Toolbox 2	1	1	2"
Label Maker, D1	Dymo LabelManager 160	1	1	D1 tape
Light, Work light, 110v	Electric Cord Box	1	1	Florescent
Mallet, Nylon-head	Toolbox 1	1	1	Plastic head
Measure, Tape	Toolbox 2	1	1	25-ft
Multi-meter, Digital	Electric Tools Box	1	1	
Multi-meter, Clamp	Vevor Tool Bag	1	1	
Pliers, Electricians	Toolbox 1	1	1	
Pliers, Needle Nose	Toolbox 1	2	1	8", 6"
Pliers, Ordinary	Toolbox 1	1	1	
Pliers, Slip-Joint	Toolbox 1	1	1	
Power Supply, 12v	Electric Tools Box	1	1	
Ratchet, Socket, ½-drive, 10" handle	Toolbox 1	1	NA	½"x10"
Ratchet, Socket, 3/8-drive, small	Sockets Tool Kit	1	NA	3/8" x 6"
Scraper, Paint, Razor Blade	Toolbox 2	1	1	W/spare blades
Scraper, Paint, Metal	Toolbox 2	1	1	
Scraper, Paint, Plastic	Toolbox 2	1	1	2-in
Screwdriver, Battery-Powered	Toolbox 1	1	NA	B&D
Screwdriver, Miniature	Toolbox 1	1	1	
Screwdriver, Offset	Toolbox 1	1	1	
Screwdriver, Slotted	Toolbox 1	6	6	

Tool Description	Location (see Legend)	Target	On Hand	Remark
Screwdrivers, Phillips	Toolbox 1	4	4	
Screwdriver, Philips, Large 10”	Toolbox 1	1	1	
Screwdriver, Slotted, Large, 10”	Toolbox 1	1	1	
Socket, ½”, ½-drive	Toolbox 1	1	1	Top compartment
Socket 5/8”, ½-drive,	Toolbox 1	1	1	Top compartment
Socket, ¾”, ½-drive,	Toolbox 1	1	1	Top compartment
Socket, 15/16”, ½-drive, long	Toolbox 1	1	1	Bottom compartment
Sockets, set, metric, various, ¼, 3/8 drive	Sockets Tool Kit	1	1	Misc
Sockets, set, SAE, various ¼, 3/8 drive	Sockets Tool Kit	1	1	Misc
Tape, Duct	Toolbox 2	1	1	Roll
Tape, Electrical	Toolbox 1	1	1	Roll
Tool, Opening, Deck Fitting	Pilothouse Shelf	1	1	Tank filler
Tweezers, Giant	Toolbox 1	1	0	
Vice-Grips	Toolbox 1	1	1	
Wrench, Adjustable, 10”-length	Toolbox 1	1	1	
Wrench, Adjustable, 6”-length	Toolbox 1	1	1	
Wrench, Adjustable, 8”-length	Toolbox 1	1	1	
Wrench, Set, Ignition-type	Toolbox 1	1	1	
Wrench, Pipe, 10”-length	Toolbox 1	1	1	
Wrench, Open/Box, 15/16”	Toolbox 1	1	0	
Wrench, Oil Filter, Large	Engine Spares Box	2	1	

LEGEND:

- **Toolbox 1** – Orange-colored, Common Tools. ***Salon Starboard Seat***
- **Toolbox 2** – Orange-colored, Repair Tools/Materials. ***Salon Starboard Seat***
- **Electric Tools Box –** Dark Green, Multimeters, Heat Gun, DC Source. ***Salon Starboard Seat***.
- **DeWalt Drill Kit** – Yellow, DeWalt, cordless drill accessories. ***Salon Starboard Seat***
- **Electric Cord Box** – Orange-colored, 110v light, Cords, Power Accessories. ***Salon Starboad Seat***
- **Electric Tools Box** – Black-colored, small. ***Salon Starboard Seat***
- **Electrical Spares Box** – Clear Plastic Box. ***Salon Starboard Seat***
- **Hardware Spare Box** – Clear Plastic Box. ***Salon Starboard Seat***
- **Engine Spares Box** – Large, BLUE-colored. Filters, repair parts. ***Forward Engine Room***
- **Plumbing Spares Box** – Medium, BLUE-colored. ***Forward Engine Room***
- **Alternator Spare Box** – Medium, BLUE-colored. ***Forward Engine Room***
- **Dinghy Spares Box –** Orange-colored, Propeller, repair parts. ***Bridge Starboard Aft Seat***

18.5 Galley

This table shows galley inventory and location on *Starlight Express*

Galley Inventory Description	Location	OH	Min	Remark
Bin, cleanup, plastic 10x12	Cabinet beneath sink	1	1	
Blender, 5-speed, pulse, 120-V	Cabinet beneath sink	1	1	Chefmate BL-10
Board, cutting, plastic, 10x14 w/lip	Cabinet beneath oven	1	1	
Board, cutting, plastic, 6”’x8”	Galley port	1	1	
Board, cutting, plastic, 9” round	Galley port	1	1	
Board, cutting, wood, 18”X10”,	Cabinet beneath oven	1	1	
Board, cutting, wood, 18”X8.5”	Cabinet beneath oven	1	1	
Bottle, beverage, plastic, 2-qt	Cabinet port	1	1	
Bowl, cereal, 5”x2.5”D, ceramic	Bottom drawer port	8	8	
Bowl, colander, plastic, large	Cabinet beneath sink	1	1	
Bowl, salad/soup, 8.5”, ceramic	Cabinet port	8	8	
Bowl, serving, 8.5”x2.5”D, ceramic	Cabinet port	2	2	Serving
Bowl, mixing/serving, metal, large	Cabinet beneath sink	4	4	Ikea Stainless 1523
Bowl, mixing/serving, metal, medm	Cabinet beneath sink	1	1	
Bowl, mixing/serving, metal, small	Cabinet beneath sink	2	2	Ikea Stainless 1527
Coffee, grinder, bean, 120-V	Cabinet beneath sink	1	1	Braun KSM-2
Coffee, maker, 12-cup,120-V, timer	Range counter	1	1	Mr Coffee
Cover, bowl, storage, plastic	Cabinet port	8	8	

Galley Inventory Description	Location	OH	Min	Remark
Cracker, crab shell, metal	3rd drawer port	3	3	
Cup, measuring, plastic, 2-cup	Cabinet port	1	1	
De-veiner, shrimp, metal	3rd drawer port	1	1	
Fork, cooking, large, metal	2nd drawer port	1	1	
Fork, dinner, large, metal	Top drawer port	8	8	Spares @ salon port
Fork, dinner, small, metal	Top drawer port	8	8	Spares @ salon port
Fork, serving, large, metal	Top drawer port	2	2	
Fork, serving, salad, metal	Top drawer port	1	1	
Glass, drink, large, 14-oz	Cabinet above sink	9	8	Ikea Godis, spare obd
Glass, drink, small, 10-oz	Cabinet above sink	9	8	Ikea Godis, spare obd
Glass, wine, short	Salon cabinet stb	9	8	Spares @ galley port
Holder, cozy, can/bottle	Salon cabinet stb	4	4	Blue
Kettle, tea, 1-qt	Cabinet beneath sink	1	1	Silver
Knife, kitchen, bread, serrated	2nd drawer port	1	1	
Knife, kitchen, large	2nd drawer port	1	1	
Knife, kitchen, medium, serrate	2nd drawer port	1	1	
Knife, oyster	2nd drawer port	1	1	
Knife, paring	2nd drawer port	1	1	
Knife, serving, butter, metal	Top drawer port	1	1	
Knife, steak	2nd drawer port	10	8	
Knife, table	2nd drawer port	8	8	Spares salon port
Mug, coffee, ceramic, white, 12oz	Bottom drawer port/port cabinet	8	8	Ikea 365+ 12oz
Opener, can	Top drawer port	1	1	
Opener, wine	Top drawer port	1	1	
Pan, baking, 9x12x2.5, 3-qt, Pyrex	Cabinet beneath oven	2	2	Pyrex
Pan, broiling, 8x10”, metal, w/lid	Cabinet beneath oven	1	1	
Pan, broiling, sheet, 9x13”	Cabinet beneath oven	2	2	
Pitcher, 2-qt, storage, plastic	Cabinet port	1	1	
Plate, dinner, 9.5”, ceramic	Cabinet port	8	8	
Plate, serving, 12” oval, ceramic	Cabinet port	1	1	
Plate, serving, 12” round, ceramic	Cabinet port	1	1	
Plate, small, 7.5”, ceramic	Cabinet port	8	8	
Poacher, 2-egg, microwave	Cabinet port	1	1	Living Good #5891
Pot, 12-qt, stainless steel	Drawer beneath refrigerator	1	1	Revereware, silver
Pot, Dutch oven, covered, 5-qt, NS	Drawer beneath refrigerator	1	1	WearEver, red
Pot, saucepan, covered, 1.2-qt, NS	Drawer beneath refrigerator	1	1	WearEver, red
Pot, saucepan, covered, 2.4-qt, NS	Drawer beneath refrigerator	1	1	WearEver, red
Potholder, glove	Drawer beneath refrigerator	2	2	
Potholder, pad	Drawer beneath refrigerator	4	4	
Press, garlic	3rd drawer port	1	1	
Rack, dish drying, plastic	Sink port	1	1	
Rack, pan, roasting	Cabinet beneath oven	2	2	
Rack, spice	Range shelf	1	1	
Rack, paper towel, upright, wood	Counter	1	1	
Rack, utensil, can, metal	Cabinet beneath sink	1	1	Ikea
Rack, wine	Salon cabinet stb	1	1	
Scissors	2nd drawer port	1	1	
Scraper, bowl	3rd drawer port	1	1	Danesco
Shaker, sugar, covered	Range shelf	1	1	
Sharpener, knife	2nd drawer port	1	1	
Skillet, 4”, egg, non-stick	Drawer beneath refrigerator	1	1	Padera
Skillet, 6”, non-stick	Drawer beneath refrigerator	1	1	
Skillet, 8”, non-stick	Drawer beneath refrigerator	1	1	WearEver, red
Skillet, 10”, non-stick	Drawer beneath refrigerator	1	1	WearEver, red
Skillet, 12”, w/ cover	Drawer beneath refrigerator	1	1	TFAL
Spatula, cooking, metal	3nd drawer port	1	1	
Spatula, cooking, plastic	3rd drawer port	2	2	
Spoon, cooking, spaghetti, plastic	3rd drawer port	1	1	
Spoon, dinner, large, metal	Top drawer port	8	8	Spares salon port
Spoon, dinner, small, metal	Top drawer port	8	8	Spares salon port
Spoon, measuring, set, metal	3rd drawer port	1	1	
Spoon, serving, slotted, metal	Top drawer port	1	1	
Spoon, serving, solid, metal	Top drawer port	1	1	
Steamer, pot, cooking, 8-qt	Drawer beneath refrigerator	1	1	

Galley Inventory Description	Location	OH	Min	Remark
Strainer, plastic, large	Cabinet beneath sink	1	1	
Strainer, pot, cooking, 8-qt, large	Drawer beneath refrigerator	1	1	
Strainer, tea, small	3rd drawer port	1	1	
Timer, cooking, nylon	Cabinet port	1	1	
Toaster, 2-slice, large, 120V	Cabinet beneath sink	1	1	Procter Silex 22609K
Tong, long, metal	3nd drawer port	3	3	
Tong, salad, plastic	3nd drawer port	1	1	
Tray, ice, plastic	Freezer	1	1	
Whip, beverage, small, battery	3rd drawer port	1	1	
Whip, cooking, metal	3rd drawer port	1	1	

Note - Silverware Cutlery: Hampton Silversmiths, Stainless China 6

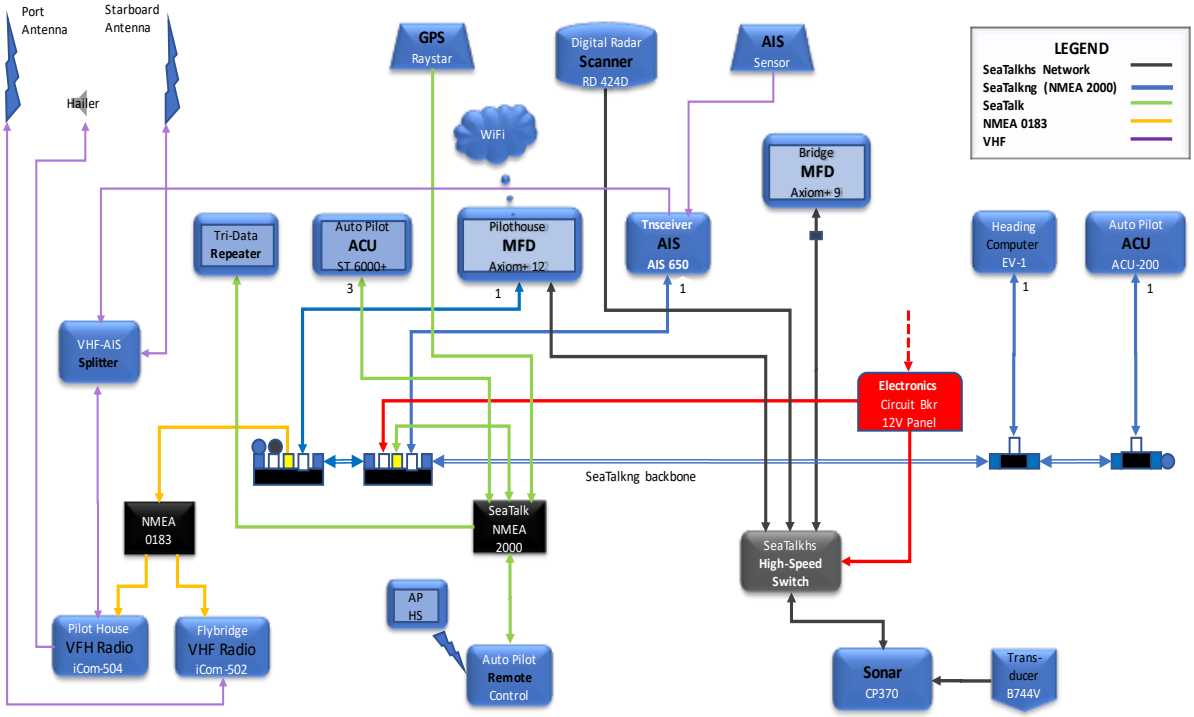
19 Appendix C – Boat Systems

19.1 Mechanical and Electrical Information

Mechanical & Electrical Item	Description/Model	Serial/ID Number	Location/Notes
Alternator, Engine, Port	19si 145A Spider Marine	Replaced 08/06/2016	Stb side Port Engine
Alternator, Engine, Stb	19si 130A Spider Marine	Replaced 08/06/2015	Stb side Stb Engine
Battery, Engine, Port Starting	Dyno Group 8Dc 12-volt	Replaced 02/01/2020	Lazarette Stb
Battery, Engine, Stb Starting	Dyno Group 8Dc 12-volt	Replaced 02/01/2020	Lazarette Stb
Battery, House Bank #1 (boatsys)	4x Dyno GC2B (6-volt 2-pair)	Replaced 02/01/2020	Lazarette Port
Battery, House Bank #2 (invtr)	4x Dyno GC2B (6-volt 2-pair)	Replaced 02/01/2020	Lazarette Stb
Battery, Thruster Bank	2x Optima 12-volt (Glasmat)	Replaced 08/30/2016	Fwd Stateroom bunk
Battery, Dinghy x2	BCI Group U1 12v	New 06/05/2020	Dinghy
Battery, Generator Starting	West Marine M6 Grp 24 12v	Replaced 03/2016	Lazarette Stb
Boat, 4788 Hull, Year 2000	Bayliner 4788ES	BLBA65EVA000	Transom starboard
Charger, Battery, House, 50A	Promariner ProNautic 12-50	13030022783C, 10/2013	Engine Room Port
Charger, Battery, Thruster	Xantrex XC1524 (24-volt)	Installed 02/2009	Fwd Stateroom
Dinghy, Rigid Inflatable	Walker Bay Gen 11LTE	US-EWVGL175C919	Bridge Deck
Engine, Diesel, Port	Cummins 6BTA 370-3000	60274885,CPL2208	45923734@2185.6-hrs
Engine, Diesel, Starboard	Cummins 6BTA 370-3000	60253860,CPL2208	45925219@1044.4-hrs
Engine, Oil Type	Heavy Duty SAE 15W-40		Engine Rm, Lazarette
Furnace, Diesel	Wabasco 45,000 BTU		Lazarette Stb
Generator, Diesel	Westerbeke 12.5BTDA	S/N 35828	12 Kilowatt
Heater, Water	SeaWard S-1800 (20-gal)	S/N 848966	Replaced 02/2012
Ice Maker	U-Line B195BTP	S/N 9960911488	Serviced 04/2016
Isolator, Galvanic 30A	Professional Mariner 15785		Behind Electrical Panel
Inverter/Charger, 120VAC/12DC	Outback VXF2812M (60Hz)	VF1906F0100407 06/19	2800W, Salon Aft
Motor, Outboard	Tohatsu 30HP EFI 4-stroke		Dinghy Transom
Motor, Starting, Port	Cummins ST09312		Engine stb side
Motor, Starting, Stb	Cummins ST09312		Ending stb side
Propeller, Starboard	4-blade, 24”diax24”pitch	Clockwise spin	Starboard Shaft
Propeller, Port	4-blade, 24”diax24”pitch	Counterclockwise	Port Shaft
Pump, Bilge, Diaphram	Jabsco 30200-0000	S/N 14L18453	Fwd Bilge
Pump, Raw Water, Washdown	WM Washdown 3.4 #7865678		Engine Room Aft Port
Pump, Sea Water, Starboard	Cum 5265994 or SHE P1730C	Replaced 05/2016	Engine port side
Pump, Sea Water, Port	Cum 5265994 or SHE P1730C	Replaced 05/2010	Engine port side
Pump, Water, Accumulator	Shurflo 18590-2092	Replaced 07/2018	Engine Room Fwd
Pump, Water, Freshwater	Jabsco SensorMax17 4.5gpm	Replaced 08/2019	Engine Room Fwd
Steering, Fluid	Mil-Spec 5606		Engine Room Aft
Steering, System	Hynamic		Lazarette
Thruster, Bow, Gear Leg	SidePower SE 120/215 T-24V	706107/4607	Fwd SR, Thrust 242lbs
Toilet, VacuFlush	SeaLand 806	0806008633, Beige	Forward Head
Toilet, VacuFlush	SeaLand 806	0806007964, Beige	Aft Head
Transducer, Sounder, DTS	Raymarine B744V	WM 9438326	HullStb, Replaced 1/12
Transducer, Sounder	Uniden		Hull Midship
Transmission, Fluid	ATF		Lazarette
Transmission, Port	ZF Hurth HSW800A2-2.0		Ratio 1.96
Transmission, Starboard	ZF Hurth HSW800A2-2.0	Rebuilt 8/2022	Ratio 1.96
Trim Tab, Fluid	ATF MD-3 (Chevron)		Engine Room
Trim Tab, System			Lazarette Aft
Windlass, Anchor	Muir Cougar H-1200	Replaced 03/2018	Bow Pulpit

19.2 Integrated Data Network

Integrated Data Network



The ***Pilothouse MFD*** enables data sharing between ***SeaTalkhs (High-Speed)*** devices and ***SeaTalkng (NMEA 2000)*** devices. Network power to the SeaTalkng backbone and SeaTalkhs switch is provided by the ELECTRONICS switch at DC Electrical Panel.

The ***SeaTalk-SeaTalkng (NMEA 2000)*** adapter enables data sharing between **SeaTalk** devices and the ***SeaTalkng*** backbone devices (green colored lines). Power to SeaTalk is provided shared by the SeaTalkng network.

The ***NMEA 0183*** converter enables data sharing between ***NMEA 0183*** devices and ***SeaTalkng*** devices (yellow lines). Power is provided by the SeaTalkng network.

19.2.1 SeaTalkhs (High-Speed) Network

The following components are connected directly to the **SeaTalkhs switch** located beneath the pilothouse port corner bench seat:

Device	Make/Model	Location
Pilothouse Multifunction Display	Raymarine Axiom+ 12 RV	Pilothouse starboard helm
Bridge Multifunction Display	Raymarine Axiom+ 9	Bridge port helm
Radar	Raymarine RD 4240	Mast center
Depth Sounder/Sonar	Raymarine CP370	Pilothouse port corner seat
Sonar Transducer (via DMS300)	Raymarine A66091 B744V	Keel mid-ship

19.2.2 SeaTalkng (NMEA 2000) Network

The following NMEA 2000 components are connected to the **SeaTalkng backbone** network at connectors located beneath pilothouse helm starboard, except ACU and Heading Sensor which are connected individually at aft and mid network backbone. Access is via removal of ceiling panel at forward end of passageway.

Device	Make/Model	Location
Pilothouse Multifunction Display	Raymarine Axiom+ 12 RV	Pilothouse port helm
Autopilot Control Unit (ACU)	Raymarine ACU-200	Salon starboard corner seat
Heading Computer	Raymarine EV-1	Passageway steps stb cab
Autopilot Controller	Raymarine P70Rs	Pilothouse port helm
Automated Identifier System (AIS)	Raymarine 650	Pilothouse port corner seat
SeaTalk (legacy) Units	via Raymarine Adapter	*See SeaTalk list*
NMEA 0183 Units	Via Raymarine Converter	*See NMEA 0183 list*

19.2.3 SeaTalk (Raymarine) Sub-Network

The following SeaTalk components are connected to the SeaTalkng backbone via **SeaTalk-SeaTalkng** adapter at terminal block located beneath pilothouse helm starboard:

Device	Make/Model	Location
Autopilot Remote Controller	Raymarine S-100 (base)	Pilothouse stb helm below
External GPS	Raymarine Raystar RS125	Mast port
Tri-Data Repeater	Raytheon ST-60	Pilothouse starboard helm
Auto Pilot Controller	Raymarine ST6000+	Pilothouse port helm

19.2.4 NMEA 0183 Sub-Network

The following NMEA 0183 components are connected to the SeaTalkNG network via the **NMEA 0183-SeaTalkng** converter at terminal block located beneath pilothouse helm starboard. Used to pass GPS data to VHF radios.

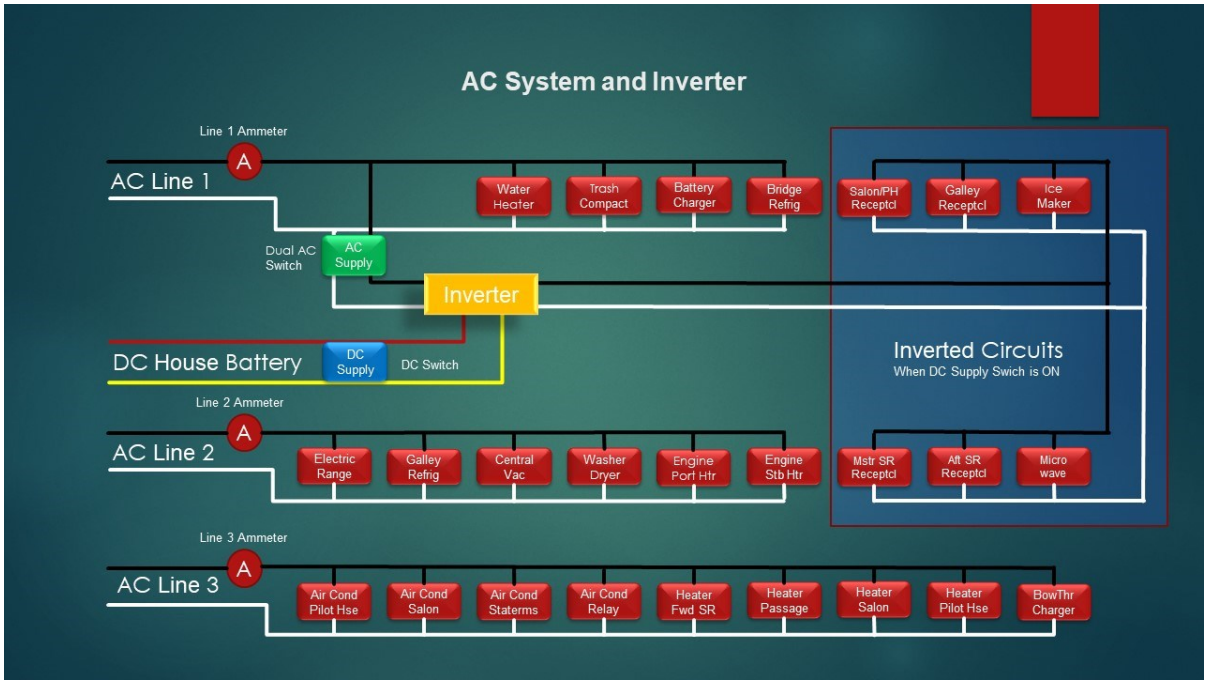
Device	Make/Model	Location
Pilothouse VHF Radio	iCom IC-504	Pilothouse starboard helm
Bridge VHF Radio	iCom IC-502	Bridge portside helm

19.3 Inverter Components

The diagram below shows the details of the AC and Inverter circuits.

Switch the DC Supply switch ON at the DC Panel to provide inverted power (battery-source AC power) to the 'Inverted circuits automatically, whenever AC power is not available/enabled.

Switch the Dual Inverter Switch ON at the AC Panel to provide AC 120-v power to the Inverter and its 'Inverted circuits' directly whenever AC power is available/enabled. Providing AC power to the Inverter also makes the Inverter a charger for the DC House Battery bank.



19.4 Global Position System (GPS) Location Tools

19.4.1 AIS (Automatic Identification System)

The *Raymarine AIS650* Class B transceiver:

- Broadcasts boat data and receives digital signals for exchange of real-time information about position, speed, and status between boats
- Receives status information from navigation aids
- Sends boat position, speed, and status to shore-based AIS-Receiving Network stations.

The location of Starlight Express and nearby boats and navigation aids using AIS is displayed on the MFD Chartplotter. Refer to section Electronics, AIS Transceiver for details.

19.4.2 MarineTraffic.com

MarineTraffic.com is a web-based subscription application that tracks and reports the position, speed, and status of 'Starlight Express' onto a world-wide map on the internet.

Enter URL: http://marinetraffic.com, then follow instructions to search for ***Starlight Express, MMSI: 303505000***

AIS information is received by shore-based AIS-receiving network stations within range, but location information also be relayed by satellite (see SPOT device below).

19.4.3 OnCourse Mobile Application

OnCourse is a mobile application which enables a GPS-enabled mobile device onboard to report position, details, and status to MarineTraffic.com. This is useful whenever the AIS transponder is not within the range of the receiving shore stations.

Visit the application store to download and install the OnCourse Mobile App.

19.5 Digital Satellite TV Channels

Channel	Station ID	Channel	Station ID	Channel	Station ID
1	DTV Help	258	FMC	326	GAC
4	KOMO	264	BBCA	327	CMT
5	KING	265	A&E	329	BET
7	KIRO	268	IRTV	331	MTV
9	KCTS	269	HIST	333	MTV2
11	KSTW	270	DTV	335	VH1
13	KCPQ	273	BRAVO	338	GMC
18	KONG	276	NGC	339	FUSE
22	KZJO	278	DSC	353	BTV
45	KFFV	279	DHN	356	MSNBC
51	KUNS	280	TLC	360	FNC
70	JTV	282	APL	364	INSP
74	SHOP	283	NASA	365	GTV
77	SALE	290	DISw	367	WHT
78	LOOK	291	DISe	369	DSTR
80	HOME	292	DXD	370	EWTN
81	BUY	296	CNe	372	TBN
82	**EDEN**	297	CNw	373	WORD
83	WOW	299	NIKe	374	BYU
84	IDEA	300	NIKw	375	LINK
85	SAVE	302	NKTN	376	CTN
88	BEST	304	TVLD	377	TCT
95	CSHP	309	GSN	378	NRB
100	DTV CINE	311	ABCF	404	GALS
101	AUD	313	JTV	593	ERTX
110	GAME	314	CRTV	608	HUNT
111	IAC	318	BUY	687	RTNW
113	DTV Sports	319	DTV	795	DTV Spt
200	DTV CINE	324	AAN	800	CD USA

Note. Seattle ‘Mariner’ Fans – Games on Channel 687 FSNW.

Direct TV Service Information

Direct TV Service	RID	0004 3961 2946	Salon Satellite Receiver ID
	Card No.	0014-5999-7050	Salon Satellite Receiver back slot
	RID	0004 5282 2299	Fwd SR Satellite Receiver ID
	Card No.	0012-0627-3532	Fwd SR Satellite Receiver back slot
	Account No.	037894673	
	UID	dalmero@msn.com	catabara

19.6 Boat Electric Panels

Pilothouse main electrical panel.

Engine/House Batteries Switch (Aft Salon)

Bow Thruster Battery Switch (Forward Stateroom)

House Batteries Connect Switch (Lazarette)

Port Alternator X-over, Generator X-over (Lazarette)

Appendix D – Moorage Checklist

BRIDGE:
- ❑ **Dinghy Drain Plug OPEN**
- ❑ **Dinghy Main Power Switch (red) OFF**
- ❑ *(winter) Dinghy Fuel DISCONNECTED. Dinghy Motor ALIGNED and vertical.*
- ❑ *(winter) Depth Sounder REMOVED and stowed in PIlothouse*
- ❑ **Davit Remote Control cable REMOVED and stowed on Pilothouse port shelf**
- ❑ **Raymarine Axiom+ 9 Multi-Function Display REMOVED and stowed beneath Pilothouse port seat**
- ❑ *(winter) Bridge Seats REMOVED and stowed in Forward Stateroom. Canvas covers SECURED.*
- ❑ *(winter) Bimini frame FOLDED and canvas COVERED; frame LOWERED to windshield*
- ❑ *(winter) Davit disconnected from dinghy; lowered to STOWAGE position; hook SECURED to deck*

DECK/SHORE:
- ❑ **Power Cord CONNECTED to shore. Inlet plug ring TIGHT; lid DOWN. Cable SECURED w/SLACK**
- ❑ **Fenders DOCKSIDE level; opposite side at RAIL level. Shore lines SECURED**
- ❑ *(winter) Portside Bow Line shock absorber SECURED; line is double tied.*
- ❑ *(winter) Foredeck seat REMOVED and stowed in Forward Stateroom; canvas cover SECURED*

FORWARD STATEROOM/HEAD:
- ❑ **Two Deck Ceiling Hatches CLOSED and LATCHED**
- ❑ **Four Stateroom Portholes (port and starboard) CLOSED and LATCHED**
- ❑ **Two Head/Shower Starboard Portholes CLOSED and LATCHED**
- ❑ *(winter) Stateroom Dry-Eze on portside shelf DRAINED; Head Dry-Eze on counter DRAINED*
- ❑ *(winter) Dehumidifier PLUGGED into portside receptacle and on floor*
- ❑ *(winter) Closet doors OPEN for ventilation*

MID STATEROOM:
- ❑ **Two Portside Portholes CLOSED and LATCHED**
- ❑ *(winter) Two Mattresses ELEVATED to circulate air*
- ❑ *(winter) Dry-Eze portside corner aside bed DRAINED*

AFT STATEROOM/HEAD:
- ❑ **Two Portside Porthole CLOSED and LATCHED**
- ❑ *(winter) Mattress ELEVATED to circulate air*
- ❑ *(winter) Dry-Eze on portside shelf DRAINED*
- ❑ *(winter) Dehumidifier PLUGGED into forward receptacle and passageway floor*
- ❑ *(winter) Closet door OPEN for ventilation*
- ❑ *(winter) Aft Head sink faucet OPEN after water pump system turned off to drain freshwater lines*

PILOTHOUSE:
- ❑ **Bridge Hatch/Door CLOSED and LATCHED**
- ❑ (winter) hatch/door canvas cover SECURED
- ❑ **Port Pilothouse door CLOSED and LOCKED**
- ❑ **Starboard Pilothouse CLOSED and LOCKED**

ELECTRICAL PANEL:
- ❑ **Shore Power Line 1 Voltage ON; voltmeter indicates 110 volts**
- ❑ **AC & DC Panel switches SET as color-coded [Always ON (green), Normal OFF (red)]**
- ❑ *(winter) Port and Starboard ENGINE HEATER switches ON*

SALON/GALLEY:
- ❑ **Diesel Furnace Heat System main switch OFF**
- ❑ **Stereo cabinet equipment switches OFF (audio receiver, DVD player, tape player)**
- ❑ **Ice Maker Ice DRAINED; door OPEN to dry; bin REMOVED and placed in sink**
- ❑ *(winter) Portable Heater PLUGGED into receptacle, on counter, temp set to 'snowflake', & speed is '1'*

COCKPIT:
- ❑ **Main door CLOSED and LOCKED**
- ❑ **Bridge-Cockpit Hatch Cover CLOSED.**
- ❑ **Transom door CLOSED and LATCHED**

Update Notes:

This section provides free-text description of equipment condition, special instructions, manual corrections, or notes that may be included into next revision of the Operation Manual

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INDEX

BACK COVER