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**NAUTILUS DRYDOCKS, LLC**  
Exceptional Products For The World of R/C Submarines  
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## LED Lighting Kit for Disney Nautilus



Thank you for your purchase of the Nautilus Drydocks LED Lighting Kit. Included in your package is everything you need to create a practical lighting system for your model kit. In your package, you should have the following:

- Quantity: 3 each, cool white LED 4-light assembly
- Quantity: 2 each, 3mm cool white LED light - single
- Quantity: 1 each, warm white LED 4-light assembly
- Quantity: 2 each, 3mm green LED light - single
- Quantity: 1 each, 9V battery adapter with switch

Installation of your lighting system is exceptionally straightforward. Each LED assembly, whether a single or 4-light, wires together in parallel. More simply put, you connect all the red wires together and all the black wires together to form a lighting circuit.

A standard 9V battery clips to the battery holder and the integrated switch allows you to switch the circuit on and off easily. The LEDs will function from 6V to 12V DC. The lower the voltage, the dimmer the lights, but the longer they will last. Your 9V power source is a perfect balance of longevity and brightness.

Turn the page for detailed installation instructions:

### General preparation:

1. In all, you will have received 20 LED lights. To increase the ease of installation, it is recommended to file or grind off the lip from the base of the LED bulb. This will allow you to install the bulb into thicker areas of the hull from the rear.
2. To increase the field of view of the light, it is also recommended to file or grind the domed top section of the LED flat. This will allow the light to disperse in a wider angle, increasing the visibility when viewed from any angle other than straight on. Be careful not to grind or file any further than the base of the domed section as you can damage the diode encapsulated in the plastic and ruin the bulb.
3. R/C applications: this lighting kit is very applicable for us in R/C models, however additional preparation is necessary. Seal the ends of each section of heat-shrink at the base of the LEDs with RTV. After you manipulate the LEDs during installation, it is a good idea to re-apply a dab of RTV to the base of each LED to ensure no water can touch bare wire leads.

There are 5 main locations to install them, as follows:

1. **Salon floodlights:** Cool white (4-LED assemblies)
  - Drill a 3mm diameter hole (a 1/8in drill bit work just fine) in the exact center of each floodlight recess, ensuring that you penetrate all the way through the hull wall into the internal area of the boat.
  - Using a pair of pliers, gently pinch the wires at the base of the LED together so that the heat shrink does not extend beyond the perimeter of your LED bulb.
  - Insert the LED into the hole you drilled from the inside of the hull, pushing it until it protrudes from the outside of the hull
  - Push the LED back into the hull until the flat face of the LED is either flush or just slightly proud of the back of the floodlight recess
  - Secure the LED in place with a drop of thin CA glue
2. **Wheelhouse alligator eyes:** cool white (2 single-LED assemblies)
  - This installation is, by far, the trickiest! Take your time and you will do fine! You will need to use a larger diameter drill bit for this installation. I find 1/4in is just right.
  - Beginning in the exact center of the rear face of the alligator eye, drill back into the eye at an angle parallel to the eye upper face. This will ensure that you do not penetrate the hull skin and be forced to fill, sand and re-do rivets! Drill in approximately 3/8in. Do the same for the other side.
  - Now, from the ceiling of the wheelhouse, locate the point directly under the deepest part of your previous hole. Drill upwards until the bit penetrates the recess previously created. You may wish to use a small bit such as 1/16in to do your pilot and ensure that your hole accurately intercepts the ones previously drilled.
  - Bend the wire leads at the rear of your LED lights until they are at a 45 degree angle to the base of the LED. Ensure that the leads do not touch or cross over one another.
  - Insert the LED into the hole you drilled, starting from the inside of the wheelhouse. Maneuver the LED into place until the flat face sits either flush or just proud of the rear face of the floodlight recess.
  - Secure the LED in place using CA glue, ensuring that the face of the LED is in the center of the floodlight area
  - Run the wires down along the crease in the wheelhouse wall and secure with CA glue
  - Set the wheelhouse in place on the hull and mark the area in the wheelhouse floor where the wire leads from your alligator eye LEDs meet the floor (in theory this will be exactly at the location in the side of the wheelhouse floor where it angles from outward to inward, but check that you are bang-on!)
  - Use a 1/8in drill bit to drill through the wheelhouse floor into the interior of the hull at each of the two locations you marked
  - Insert the wire leads from the wheelhouse into their respective holes in the wheelhouse floor. If you located these holes correctly, you should be able to draw the wires into the hull until the wheelhouse is sitting in perfect position on the upper hull, ready for final installation after painting.

3. **Wheelhouse attack lights:** green (single LED assemblies)
  - Locate the front face of the wheelhouse floor area in the upper hull.
  - Drill two 1/8in holes, side by side, approximately 1/8in rearward of that face
  - Using a pair of pliers, gently pinch the wires at the base of the LEDs together so that the heat shrink does not extend beyond the perimeter of your LED bulb.
  - Insert one of the LEDs into the hole you drilled from the inside of the hull, pushing it until it protrudes from the outside of the hull
  - Bend the wire leads on the bottom of the LED at an approximate 45 degree angle
  - Push the LED back into the hull until the lower edge of the LED bulb meets the wheelhouse floor. Your LED bulb should now be on the floor of the wheelhouse, pointed up and to the rear of the boat at approximately 45 degrees
  - Secure the LED in place with CA glue
  - Repeat for the second bulb in the second hole
4. **Salon Interior areas:** Warm white (4 LED assembly) — use 3 here
  - Using a pair of pliers, bend the wires at the base of the LED 90 degrees from their original position. Ensure that the bare leads do not come in contact or proximity to one another
  - Secure the LED to the interior of your hull or the ballast tubes of your salon kit assembly using a drop of thick CA glue. I recommend one in the center over the specimen table and one over each of the sunken setee couch areas
5. **Wheelhouse Interior:** Warm white (4 LED assembly) use 1 here
  - This LED is most easily mounted in the spiral staircase hole, shining upward into the wheelhouse area. This provides ambient light that fills the entire wheelhouse
  - Using a pair of pliers, bend the wires at the base of the LED 90 degrees from their original position. Ensure that the bare leads do not come in contact or proximity to one another
  - With the LED centered on the spiral staircase hole, secure the wire to the upper hull using CA glue
  - Manipulate the wire so that the LED sits below the opening in the floor of the wheelhouse, shining upward. A slight angle in any direction is acceptable.

### Final Wiring:

Neatly bundle all wiring together so as not to get pinched or interfere with other internal model components such as a salon kit assembly. Make use of small zap straps (electrical tape works, but is not ideal). You can also glue wire to the interior sections of the hull to ensure that it does not move on you during manipulation of the hull pieces during assembly.

While you can get away with not soldering the wires together, it is highly recommended to do so to prevent the connections from coming apart over time and handling of the model. A basic tutorial can be found online at:

<https://www.youtube.com/watch?v=BLfXXRfRIzY>.

1. Drill a 3/8in diameter hole in the lower hull just in front of the bottom hatch. Insert the wire leads from the 9V battery adapter through the hole, keeping the switch and battery clip outside the model. This step is not required for R/C applications.
2. Inside the hull, locate all the red wires, including the one from your 9V battery lead, and twist them together tightly.
3. Locate all the black wires, including the one from your 9V battery lead, and twist them together tightly
4. R/C Applications: If your model will be used in RC applications, instead of the 9V battery lead, you will need to solder a wire lead from these central connections to your power outputs on your watertight cylinder.
5. Solder both connections using the appropriate soldering technique.

6. Use a section of heat-shrink or electrical tape to insulate your two connections. For RC applications, also use a dab of RTV at each end of the heat shrink to stop water from entering the covered connection. Special case is required to get the RTV around the base of each wire entering this connection hub.

Installed correctly and used with the correct voltage, your lighting system should theoretically last for thousands of hours of continued use. That said, imperfections in manufacturing process or damage during installation can affect the life of your lighting. It is highly recommended to retain access to the interior of your model by using clear RTV to secure the upper and lower halves together during final assembly. This will allow “emergency” access to the interior of the model in case of failure or damage.

Questions? Feel free to email me at any time at [bob@rc-sub.com](mailto:bob@rc-sub.com).

Thanks for your business! Have a wonderful day!

A handwritten signature in blue ink, appearing to read 'Bob Martin', with a long horizontal flourish extending to the right.

Bob Martin  
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Naples, FL