

The Hangar Deck Lighting Kit

By Madman Lighting Inc
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WARNING: This product contains small parts not suitable for children less than 12 years of age. DO NOT SWALLOW! MAY CAUSE CHOKING OR INJURY!

WARNING: Madman Lighting products are shipped in good working condition and are not to be modified or changed by the purchaser. Any change or attempt to repair, change, alter, modify or enhance Madman Lighting products in any way will void any warranty, written or implied.

ESD WARNING: Madman Lighting products contain sensitive electronic components and may be damaged by electrostatic discharge (ESD). Avoid shock, sparks, and static electricity by working on a grounded surface or by using a wrist-grounding strip.

Thank you for purchasing a Hangar Deck Lighting Kit from Madman Lighting. This kit is for lighting the hangar deck of 350th scale aircraft carrier models and will also light the “Christmas Tree” lights and outline the insignia numbers on the ship’s superstructure.

What You Get:

1 Delux-24 controller card	30” of 0.25mm jacketed fiber optic	Two 9V battery connectors
Seven White LEDs, 5mm, wide angle	One White LED, 3mm	One Green LED, 3mm
One Red LED, 3mm	One Yellow LED, 3mm	5” heat shrink tube
5 feet wire	Instructions on CD ROM	

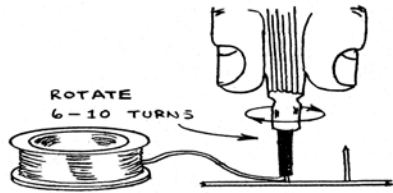
What you will need:

Tools: Xacto knife, Wire Wrap tool (Radio Shack), low wattage soldering iron and solder (Radio Shack), needle files, pin vise, set of drills including #80, small wire cutters, and a simple volt-ohm meter to measure voltage and continuity.

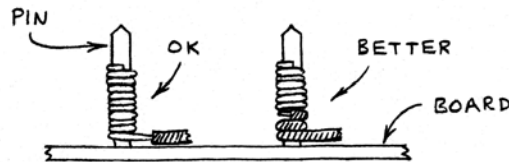
Supplies: Power supply, either an 18 volt battery pack (two 9V batteries) or an 18 volt DC wall transformer, able to supply 200mA or more. Glue, putty, paint, etc.

No soldering is required when using the Delux-Flasher 24. All connections are made with wire wrap wire, which is safer and easier than soldering. It is also easily changed.

Wire wrapping is easy! The wire wrap tool comes with a handy stripper you can use to remove the insulation from the wire. Remove about an inch of insulation, and then insert



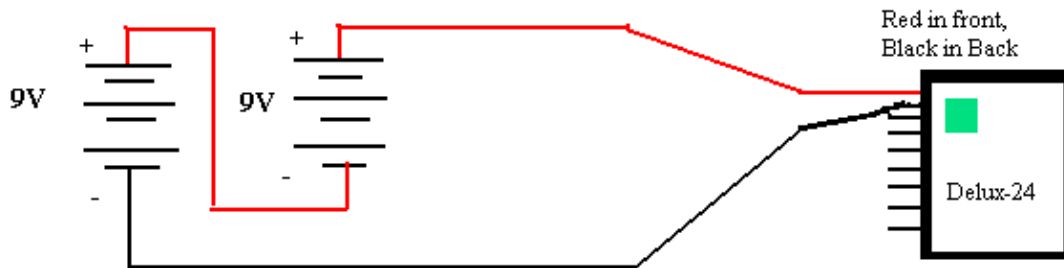
the bare end into the guide groove of the wrapping tool. Slip the tool down onto the post and rotate a few turns while letting it gently push itself upwards as the wire wraps around the post. The figure below shows some examples of finished wraps.



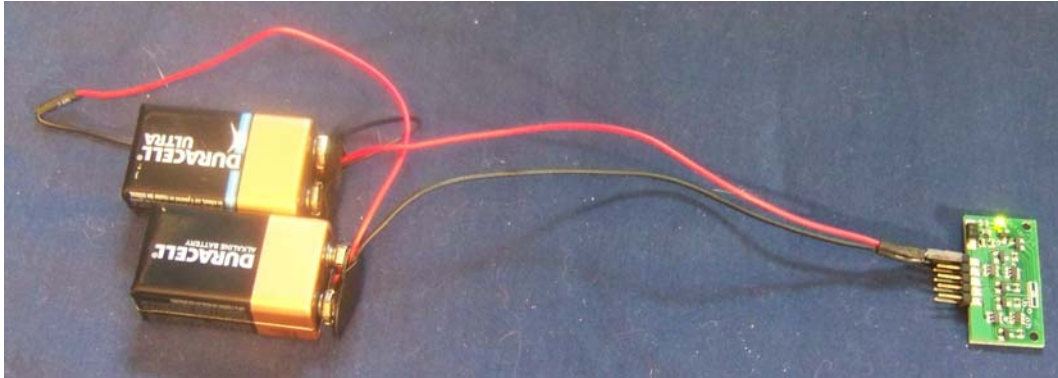
Power wires are provided as part of the kit. One length of twisted red and black wire is available for wiring your Delux-Flasher 24 to its LEDs and battery.

Black is for the Negative (-) connection, always the SHORT lead on the LEDs.
RED is for the Positive (+) connection, always the LONG lead on LEDs.

Connecting Power to the Delux 24



1. Attach two 9V batteries to the kit supplied dual 9V battery adapter.
2. Attach the plug from the dual 9V adapter to the Delux-24 controller card as shown above.
3. The green power-on LED should now be lit. If not, reverse the connection to the card to get correct polarity and check for good batteries.

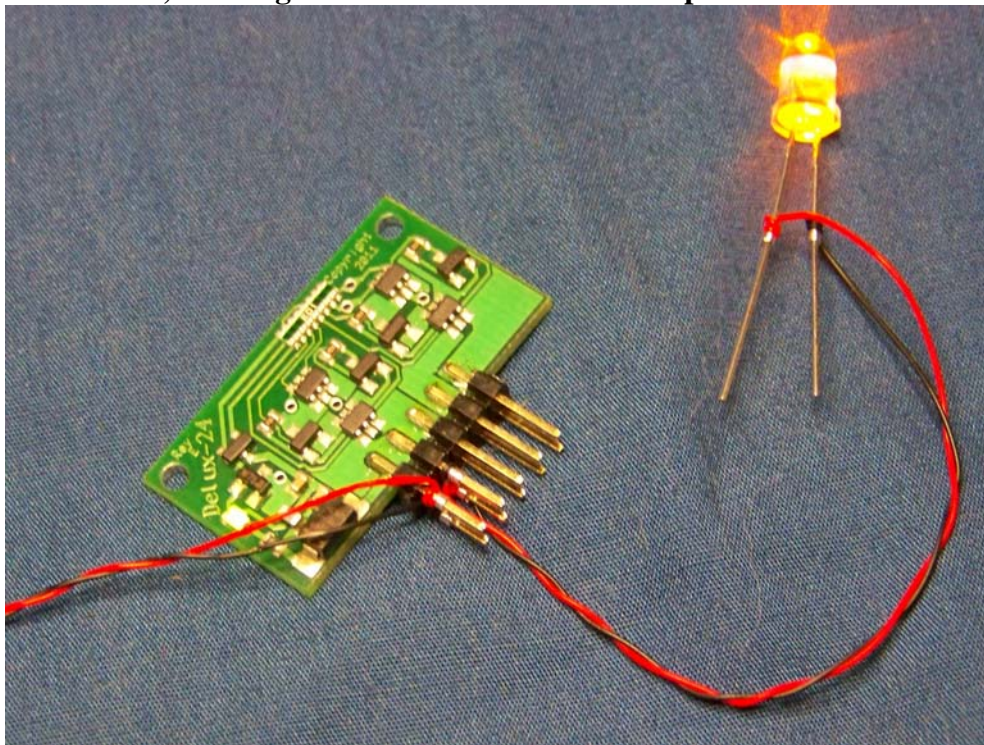


Power and Ground hookups, Red wire is battery positive (+) , Black is battery negative (-), ie ground. (This is the front side of the card)

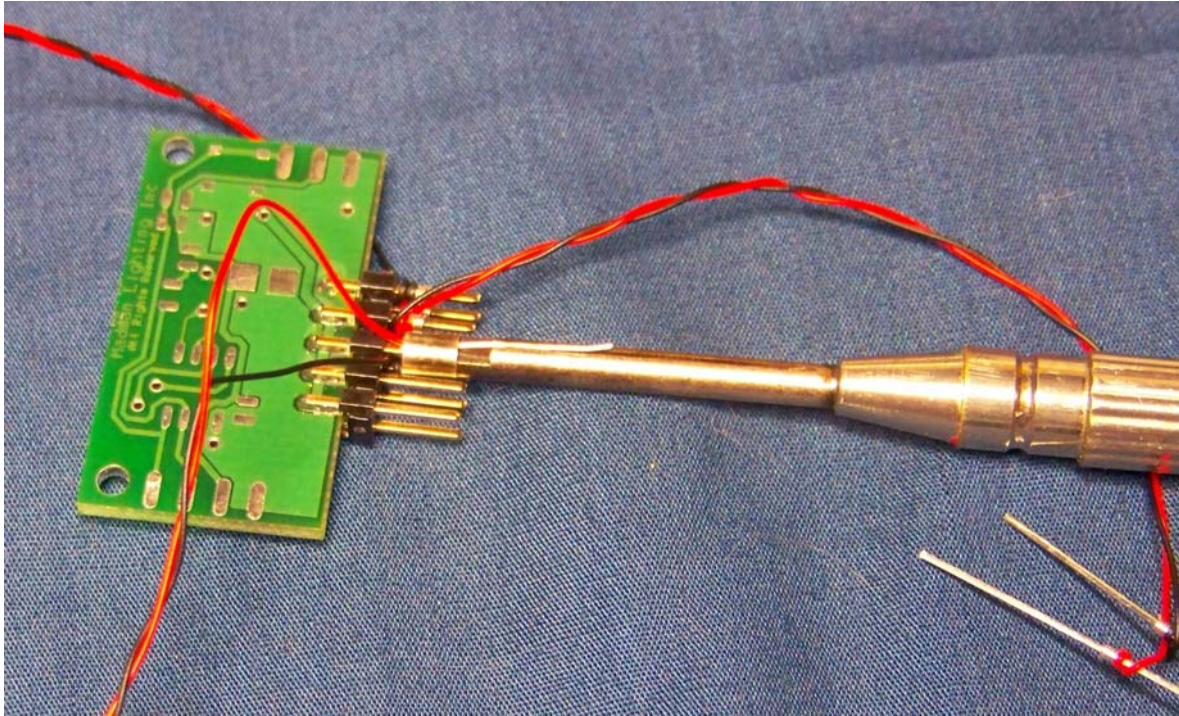
Connecting LEDs to the Delux-24.

Hooking up LEDs to the Delux-24 controller card is easy. Use the kit supplied wire-wrap wire and a Radio Shack wire-wrap tool to make connections by first cutting the wire to length, stripping the insulation from the ends of the wire, the wire-wrapping the wire onto the LEDs an the posts on the card. Always connect the RED wire to the LONG LED lead and the BLACK wire to the SHORT LED lead. Shown below are some simple examples:

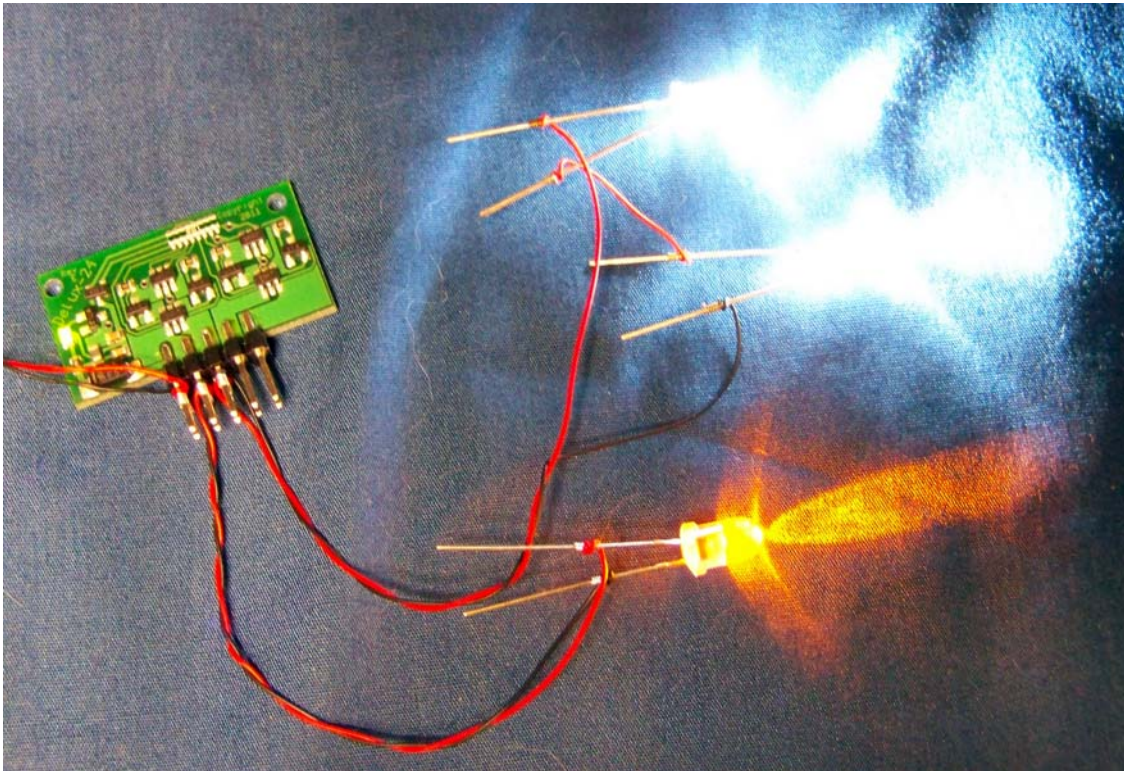
Hookup for one LED, showing the red and black wires for power and the LED.



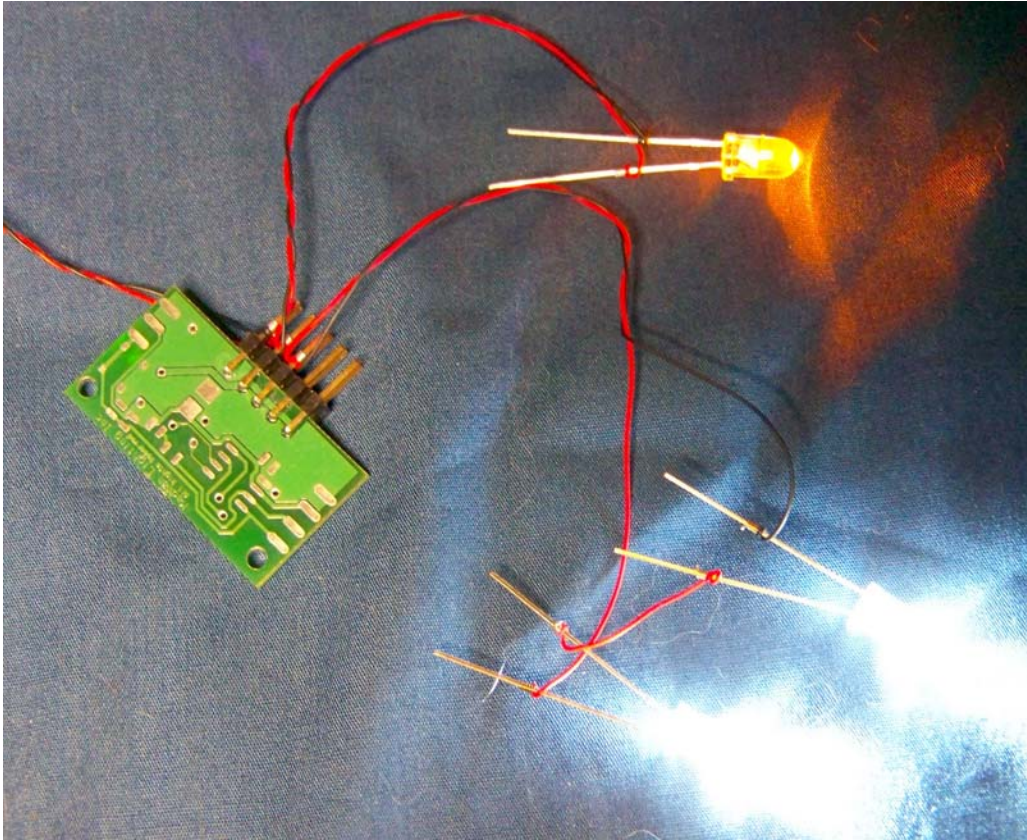
One LED hooked to the Delux-24. Notice the RED POWER wire connects to the FRONT side of the card and the RED LED wire connects to the BACK side of the card.



**Hooking up a Second LED by wrapping the wire around the posts.
Notice the RED LED wire connects to the BACK side of the card.**



Three LEDs hooked up, Lights ON! (top side)



Three LEDs hooked up, Lights ON! (back side)

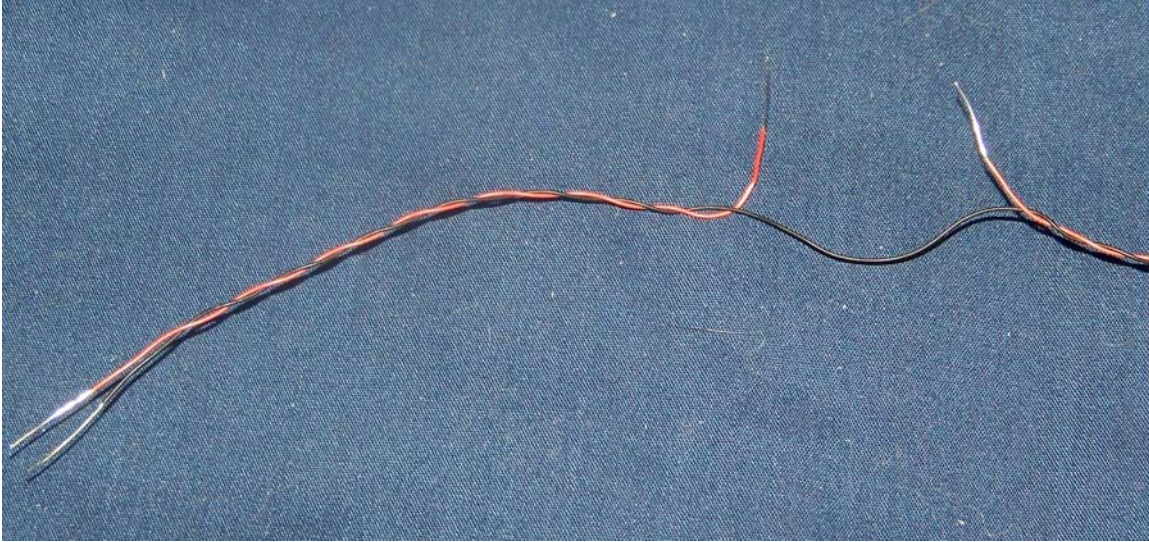
Connecting a long string of LEDs to the Delux-24 Card:

For this kit, the white LEDs are connected in long “strings” to the controller card. This means that the LEDs are “in series”, connected Plus to Minus, Plus to Minus, Plus to Minus, like a group of batteries connected in series to get a higher voltage.

For this technique follow these simple steps:

1. Measure the length of wire from the controller card to the farthest LED in the string.
 - a. For example: Assume we are doing a 1/350th scale Nimitz class carrier and the controller card is hidden under the superstructure. Run a string of LEDs from the controller card forward to slightly ahead of the most forward elevator doorway, about 12 inches.

2. Estimate where each LED will go on the string and un-twist the wire at those points. For the Nimitz carrier, see the diagram at the end on where to mount the LEDs. Cut the Red wire in the middle of the un-twist and strip the wire. See picture:



Length of wire cut to length and stripped, ready to receive LEDs.

3. Cut the SHORT lead of the LEDs short, about ¼” long. Cut off about ½” from the long LED lead. Wire-wrap the LONG LED lead to the RED wire where it runs toward the controller card and the SHORT LED lead to the other exposed red wire. See below:



Length of wire with LEDs installed. Keep leads spread apart to avoid a short circuit!

4. Connect an LED to the end of the string by connecting the RED wire to the LONG lead and the BLACK wire to the short lead.
5. Now the string of LEDs should be ready to connect to the controller. Check carefully that none of the LED wires are touching each other, creating a short circuit!
6. Strip the end of the wire and wrap the wire to the controller posts, RED wire to the BACK SIDE post, BLACK wire to the FRONT SIDE post.

Lighting a Nimitz Class Carrier's Hangar Deck

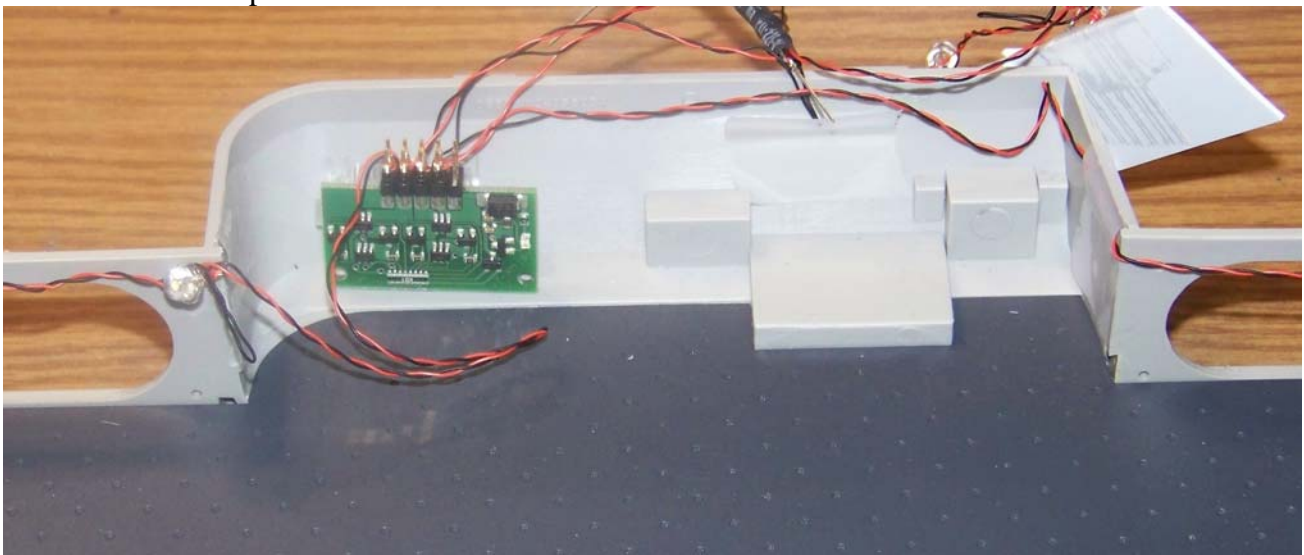
Now an example of lighting an actual model: a Trumpeter 1/350th scale Nimitz class carrier.

Placing the Battery Pack:

Place the battery pack under the model, beneath the superstructure. Alternately, a wall power supply can be used that provides 18VDC at at least 100mA and mounted as the builder sees fit.

Placing the Delux-24 controller card:

Place the Delux-24 controller beneath the superstructure, in the "bump" off the hangar deck underneath it. See picture below:



Placing the LEDs:

There are four strings of LEDs to place: Three of wide angle white LEDs to floodlight the hangar deck with an additional small white LED to light a bundle of fiber optics for outlining the ship's ID numbers on the side of the superstructure. The fourth string is of three small red, yellow and green LEDs to drive fiber optics for lighting the "Christmas Tree" of marker lights, indicators, warning markers, etc on all the ship's antenna and radars.

Place the first three strings of white LEDs per the diagram below: Red lines are where power wires belong, yellow arrows show where and what direction to point the LEDs.

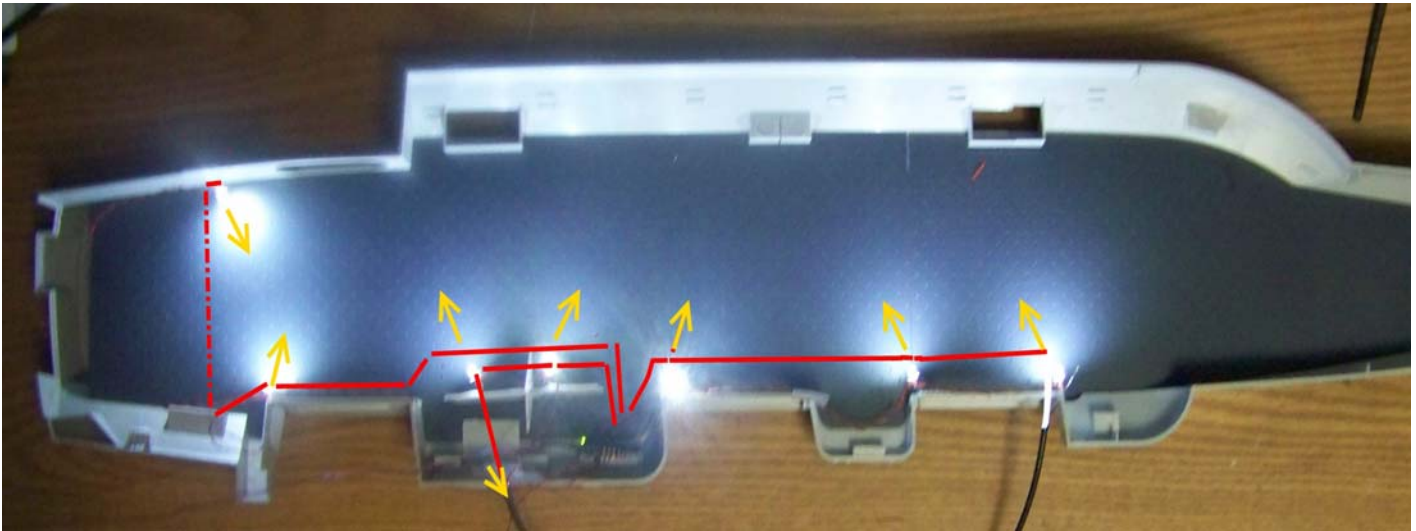


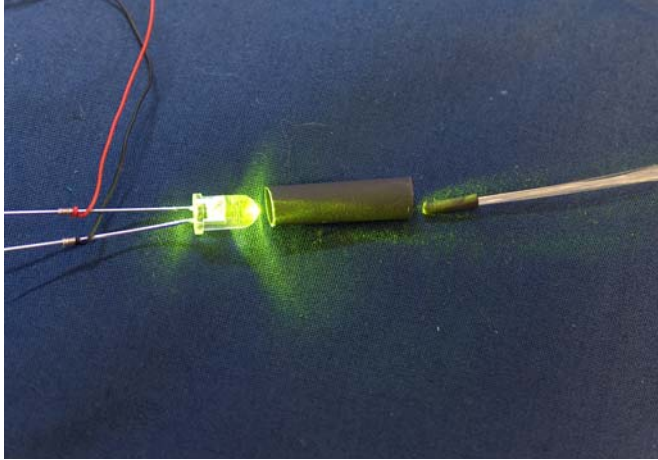
Figure showing location of wires (RED) and location and direction of white LEDs (yellow arrows).

Place the fourth string within the same “bump” hiding place as the controller card. Mount them facing upwards so that its easy to attach fiber optics to them later. Use a short length of wire to connect the LEDs together and glue them firmly in place within the “bump” so accidental short circuits don’t happen.

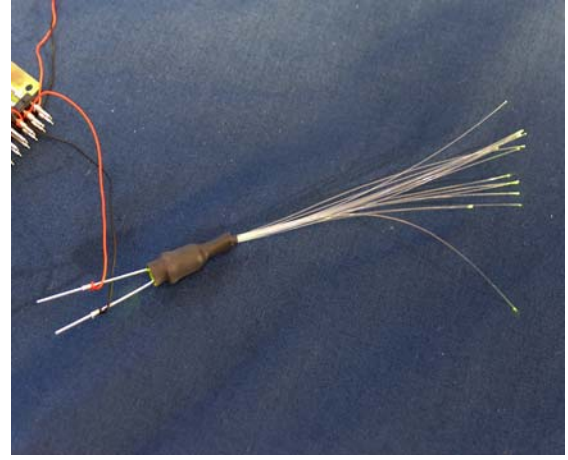
Connecting Fiber Optics to LEDs

To light windows, portholes, or other small round lights use fiber optics. Cut the fiber a little longer than what you need and remove the black plastic covering by slitting it lengthwise and remove the fibers. *Gently* warm up the ends of the fiber with a low wattage soldering iron or other modest heat source by bringing the heat CLOSE, but NOT TOUCHING the fiber ends. This will smooth them and form a lens at the end of each fiber, greatly improving light transmission.

Cut a length of heat shrink about ¾” long for each LED you use. Stretch one end open so it fits over the LED easily. Join the LED to the fiber by butting them end to end and slipping the heat shrink over them both. (see pictures below) Heat the heat shrink with a low wattage soldering iron or hair dryer to shrink it and hold the fiber to the LED. Matches or flame are not recommended for heating.



LED, and heatshrink tube, and fibers, ready to join.



Fibers joined to LED with heatshrink tubing.

Painting with Fiber Optics and Lighting

It's easy! Any place you have a fiber, leave a little extra, maybe ¼", sticking out, and paint the entire area, including the fiber. Once you're all done painting, cut the fiber flush with the surface. Light will shine from the flush cut fiber. Now you've got a great fiber optic lighting effect.

