

Republic Cruiser 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!

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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 Republic Cruiser Lighting Kit from Madman Lighting. This kit will let you quickly and easily light a Revell Republic Star Destroyer™ kit with minimal soldering and easy to use tools.

What You Get:

1 Delux-24 circuit card	88" of black fiber optic cable (64 strands)	85" red and black hookup wire
4 five mm Blue LEDs for main engines	81 feet of 0.5 mm optical fiber	1 sheet clear plastic to make clear inserts for main engines
5 five mm white LEDs for windows	16" of 1.0 mm optical fiber	1 hole drilling template for main engines
2 five mm blue LED for small and medium engines	44" of 2.0 mm optical fiber	1 cotton ball to diffuse light
1 pair micro power connectors	20" heat shrink tube	Detailed instruction packet.

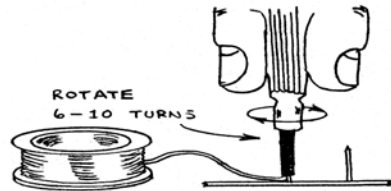
What you will need:

Tools: Xacto knife, Wire Wrap tool (Radio Shack), low wattage soldering iron and solder (Radio Shack), needle files, pin vise, set of precision drills including #9, #44, #58, #75 and #80, small wire cutters, and a simple volt-ohm meter to measure voltage and continuity.

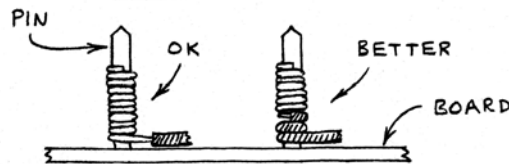
Supplies: Power supply, either a 12 volt battery pack (eight AA batteries) or a 12 volt DC wall transformer. Glue, putty, paint, etc.

No soldering is required when using the Delux-24 circuit card. 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



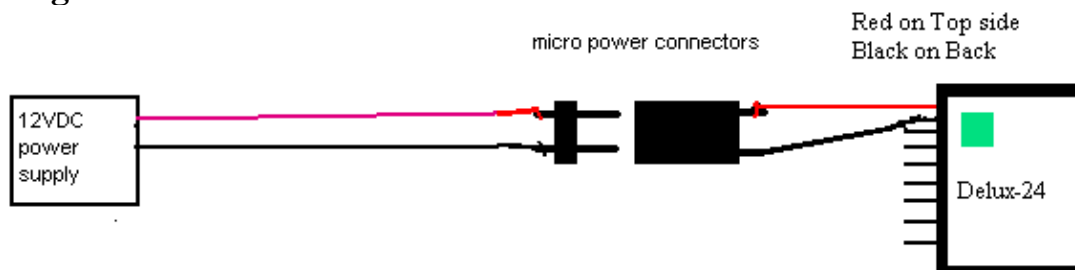
the bare end into the guide groove of the wrapping tool. Slip the tool down onto the post and rotate a few turns while letting it gently push itself upwards as the wire wraps around the post. The figure below shows some examples of finished wraps.



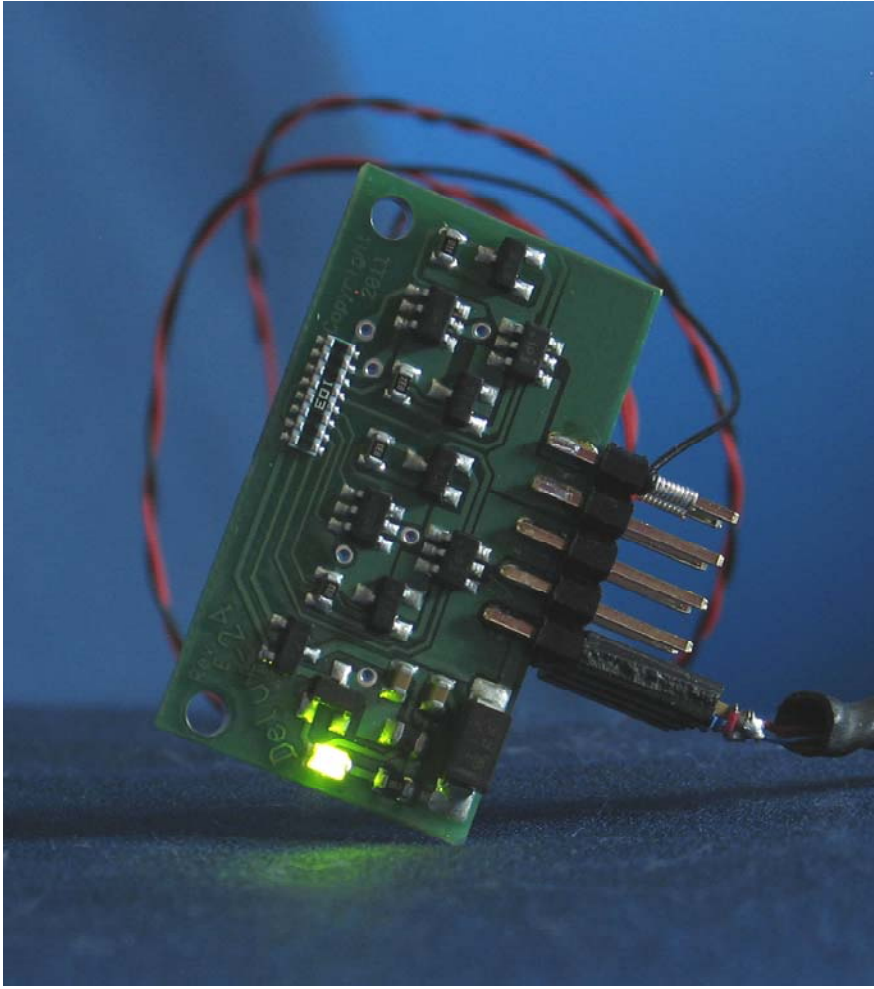
Power wires are provided as part of the kit. One length of twisted red and black wire is available for wiring your Delux Flasher to its LEDs and battery.

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 circuit card



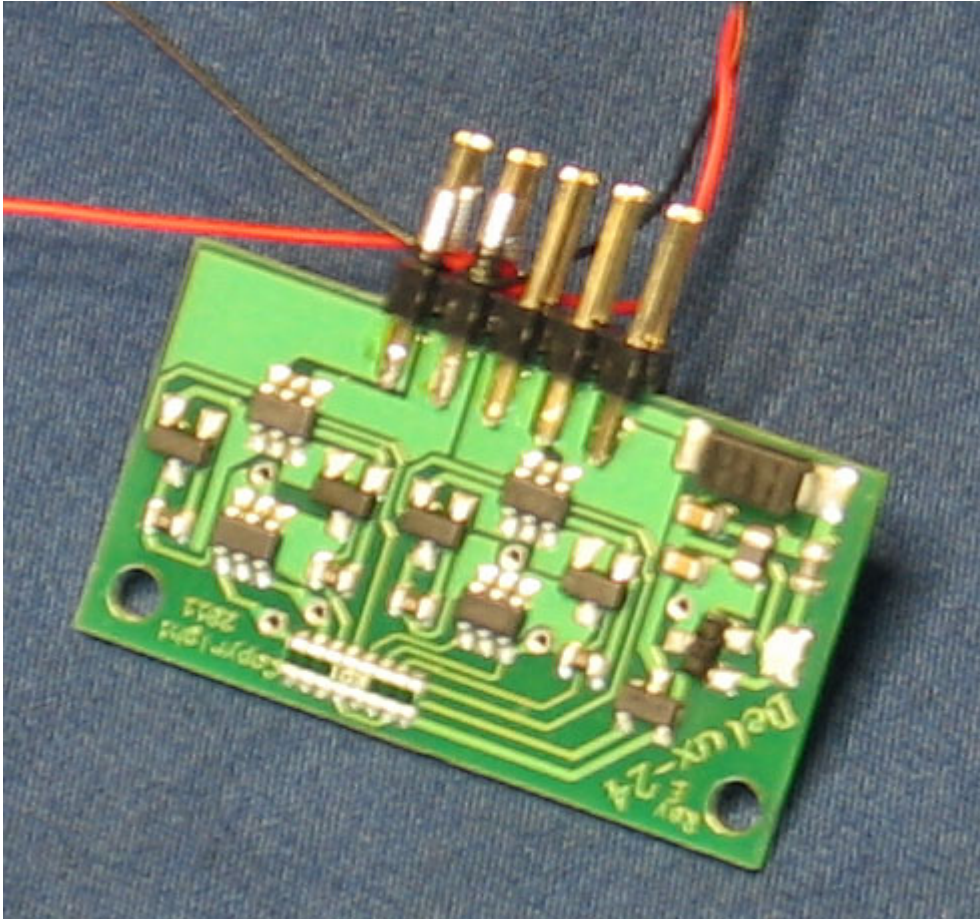
1. First, let's connect power to the Delux-24. The Delux-24 has a tiny power-on LED built-in to let you know you've hooked up power right. Once we've got power right we can take the power hookup apart and mount it in the model.
2. Temporarily wire-wrap power to the male micro-connector's short leads. (see above diagram)
3. Take about 3" of hookup wire and wrap to the terminals of the female connector. Wrap the other end to the power pins of the Delux-24. (see Delux-24 hookup diagram, last page of these instructions)
4. Turn it on! The tiny LED on-board the Delux-Flasher should now be lit. If not, reverse the wires and check that there are no breaks in the wires. The picture below shows power wires hooked to the Delux-24 board and the green LED on.



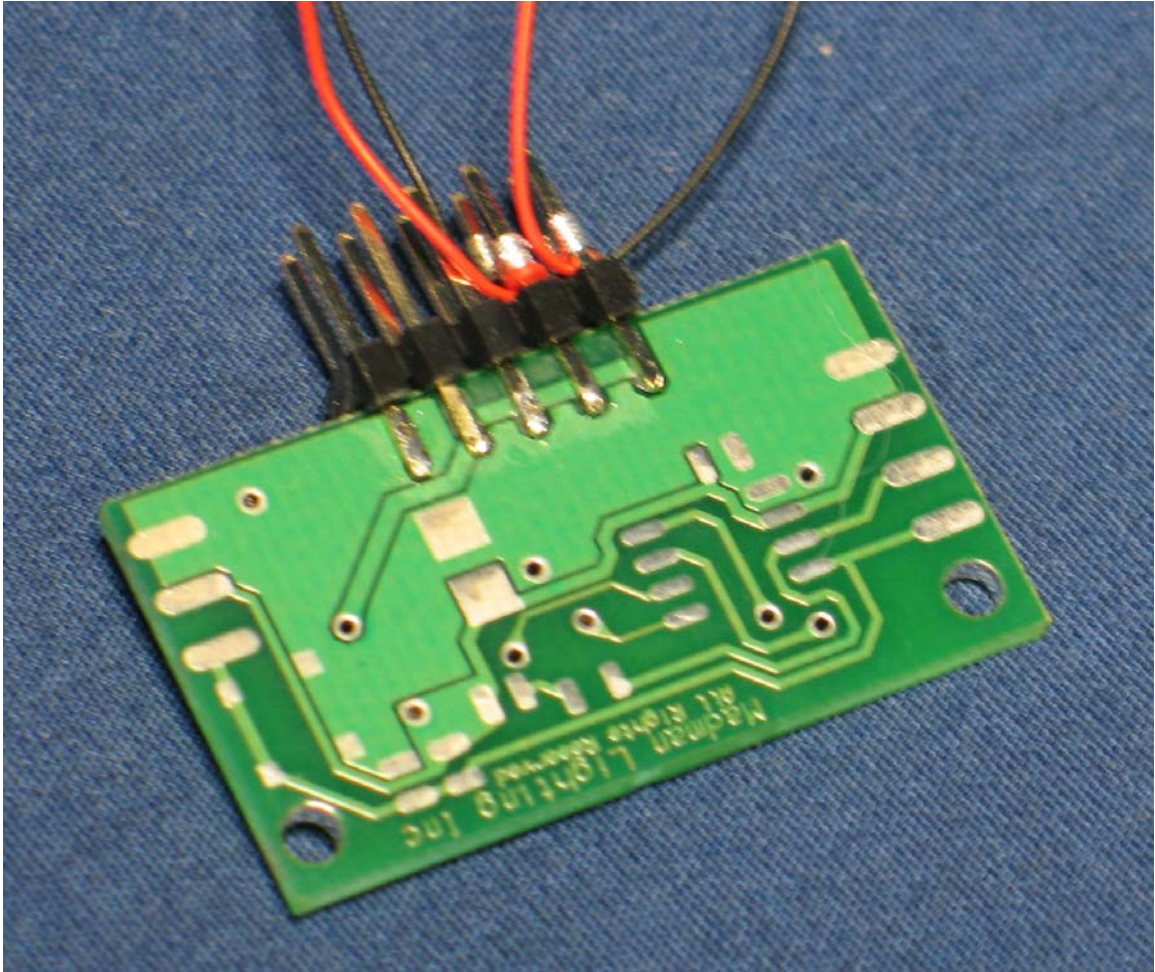
Power and Ground hookups, Red wire is battery positive (+) , Black is battery negative (-), ie ground

Connecting LEDs to the Delux-24

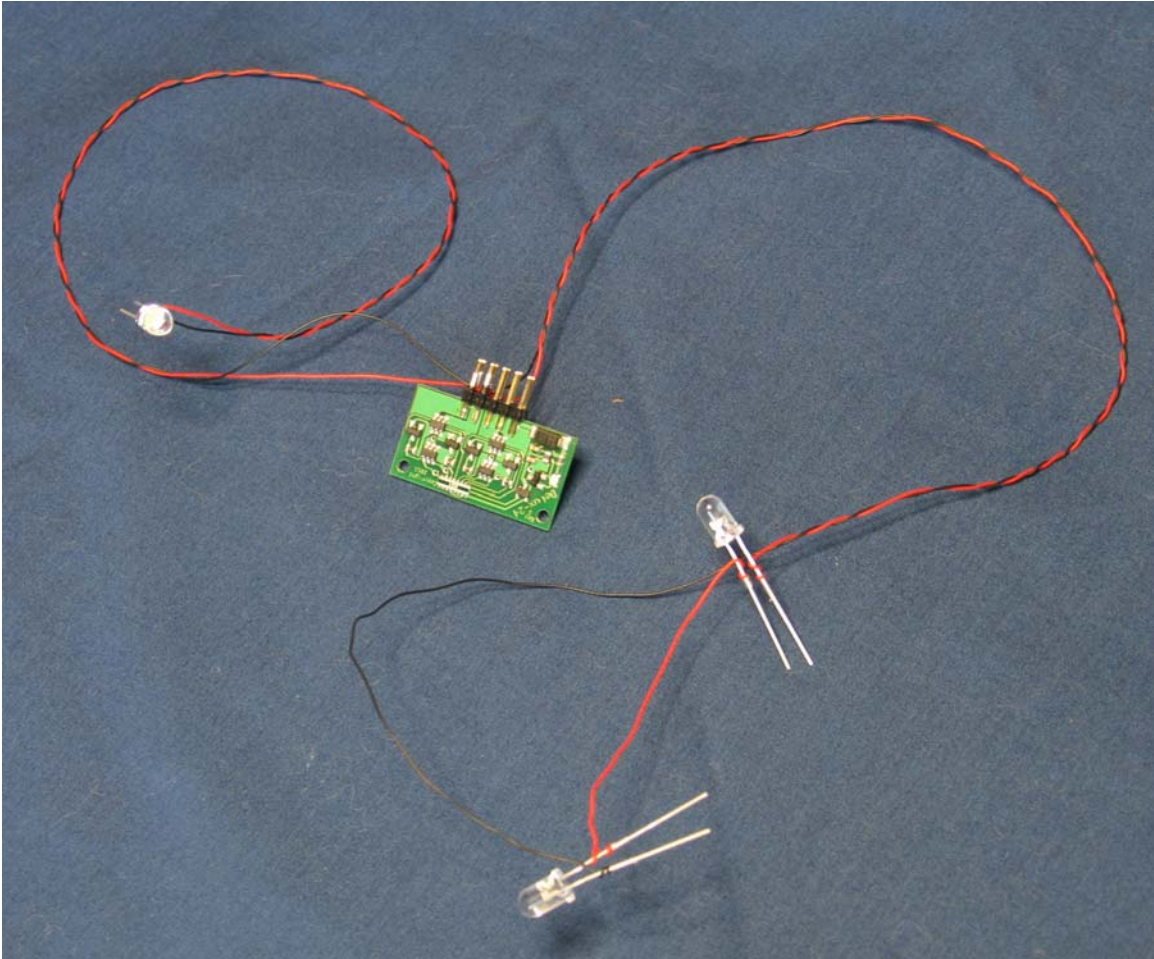
The following pictures show how to hook up wire-wrap wire to the Delux 8 board.



Hookup for two LEDs, showing the red and black wires for the LEDs. Notice that the wires for the LEDs have the BLACK wire on TOP side and RED wire on BOTTOM side.



Hookup for two LEDs on the BACK side of the card. LED RED wires connect on the BACK side of the card.



Installing Fiber Optics in the Republic Star Destroyer™

Basic guide to installing fiber optics:

- Use a small drill held in a pin vise to drill a hole slightly larger than the optical fiber.
- Glue each fiber in place on the inside of the model with a small amount of glue. Super glue works but makes fibers brittle. Try other glues like rubber cement and Elmers white glue.

- Bundle fibers together on the inside of the model with heat shrink tubing. Use gentle heat to shrink the tubing. Cut the fibers all the same length by cutting off the end of the tubing/fiber bundle.
- “Flare” the fibers by warming the ends close, but not touching, a candle or hot soldering iron. This will round and “lens” the ends, improving light flow.
- Use more tubing to heat shrink an LED to the fiber.

Parts that should be together now

Only certain parts should be together when you install your fiber optics lighting kit. Putting the wrong parts together too soon will keep you from installing fibers.

Assemble the following sections:

- Lower half of model and all the side panels and parts that attach to the bottom side.
- Medium sized engines and center “spike” that they attach to, but do not glue engines to spike.
- Most of the bridge towers, but NOT the bridges themselves.

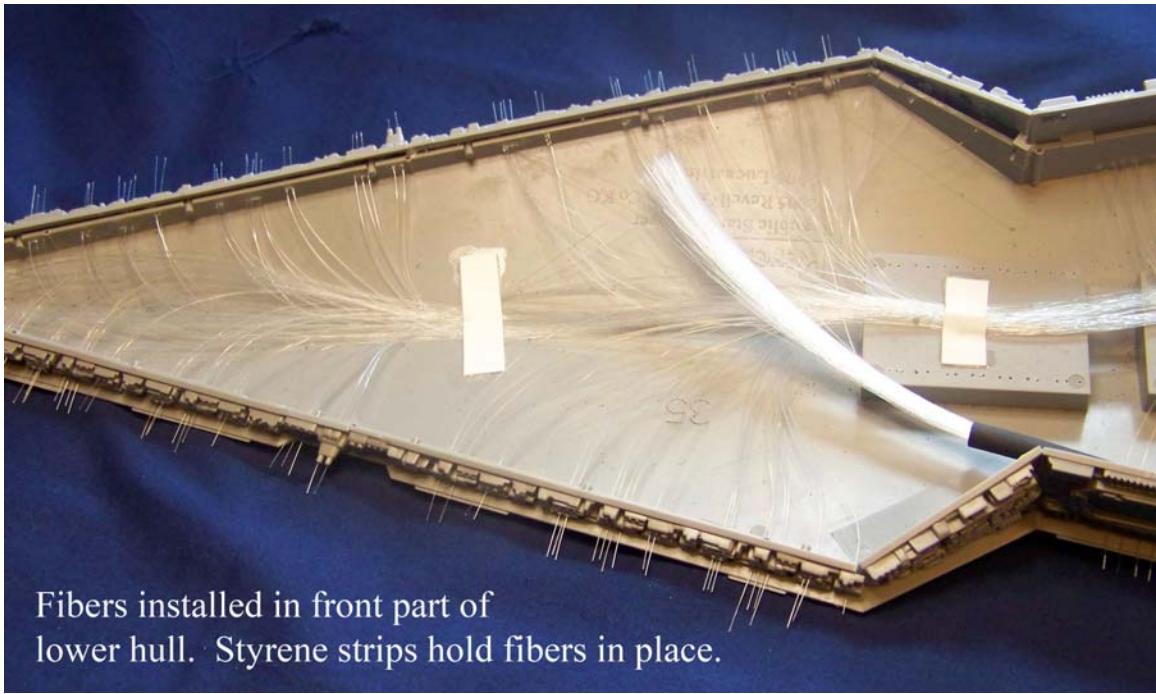
Picking spots to insert fibers

There is no special trick to this, I usually start somewhere and use the tiny raised bumps on the model itself as my guide. I start with a #80 bit, with only as much of the drill sticking out of a pin vise as needed to drill through. Pick a bump, gently push the bit into the plastic, and start drilling.

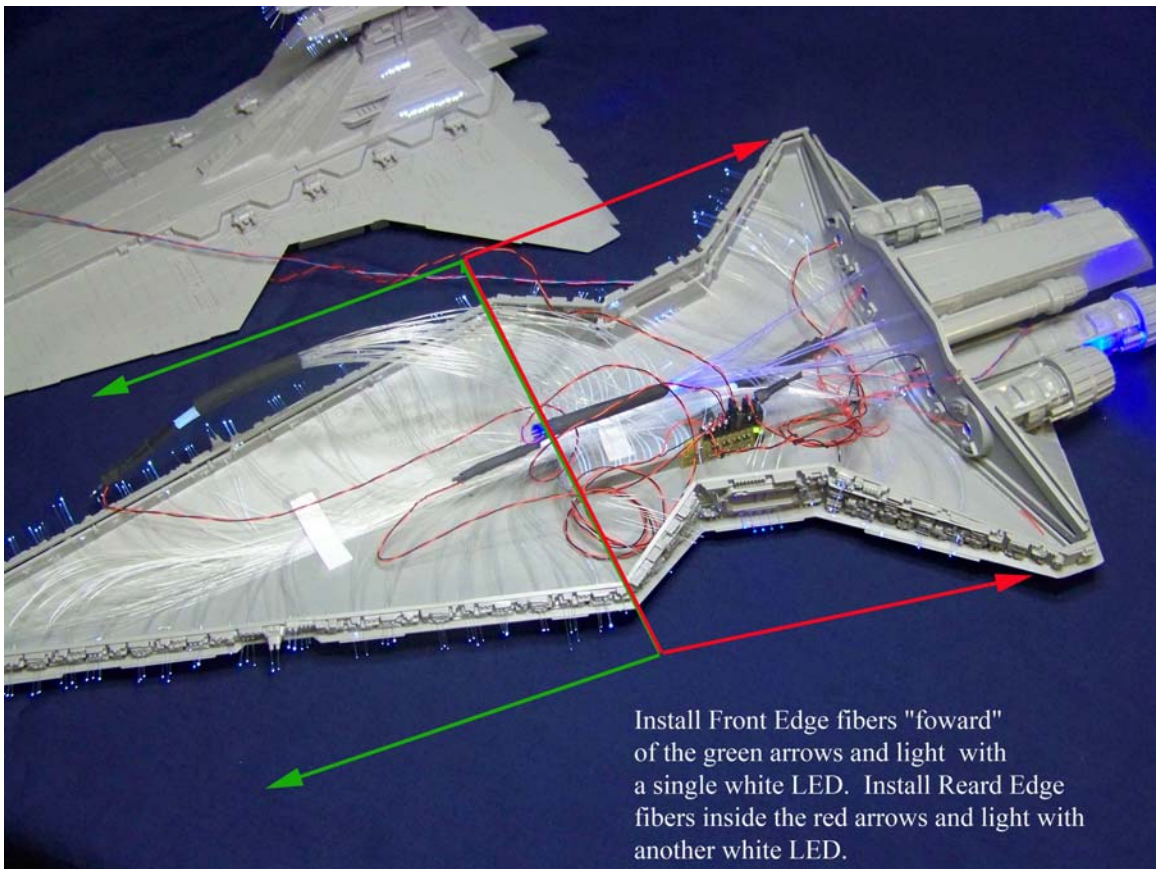
Lighting Zones

Front Edge: The bumpy, greebly, detailed edge of the ship from the front tip rearward to the first bend in the edge. Drill #80 and #75 holes and insert 0.25mm fibers and 0.5mm fibers here. Group all these fibers into a single bundle and light with one 5mm white LED.

Cut two 17” lengths of black fiber optic cable and up to ten 17” lengths of 0.5mm cable for use in this zone.



Fibers installed in front part of lower hull. Styrene strips hold fibers in place.



Install Front Edge fibers "foward" of the green arrows and light with a single white LED. Install Reard Edge fibers inside the red arrows and light with another white LED.

Rear Edge: The bumpy, greebly, detailed, wider edge of the ship rearwards of the Front Edge area. Drill and install the same as Front Edge here, EXCEPT for five fibers under the hatch on each side. Drill with a #75 bit and insert 6" long 0.5mm fibers here.

Cut one 12" length of black fiber optical cable and up to six 12" lengths of 0.5mm cable for this area.

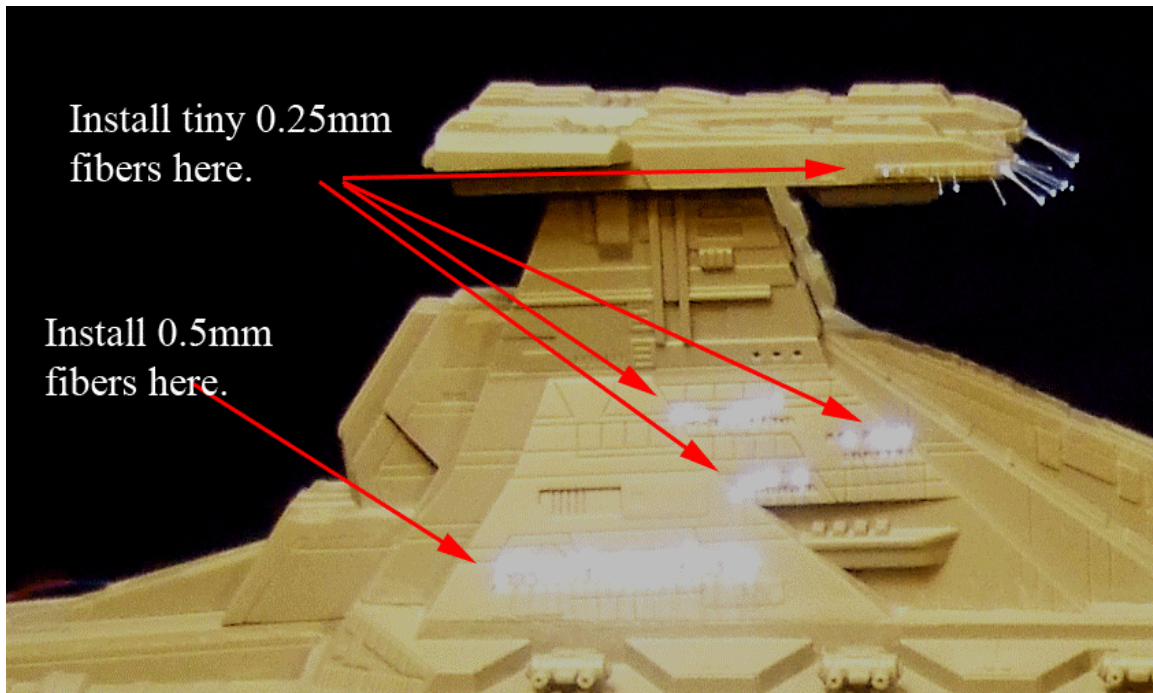
Also cut ten 6" lengths of 0.5mm cable for under the side hatches. The fibers for under the side hatches will later be joined to the 5mm blue LED that lights the large fibers which light the medium sized engines.

Bridge Lighting: BEFORE assembling them, drill out the bridge windows with a #80 drill and insert 0.25mm fibers. Cut a hole in the bottom plates of the bridges so the fibers can run down the towers. Cut a hole inside the tower so the fibers can run out the bottom of the towers also. An adventurous modeler can cut out all the bridge windows and insert a solid clear piece of plastic, then re-construct the window dividers over it.

Cut a 14" long length of black fiber optic cable for the bridges.

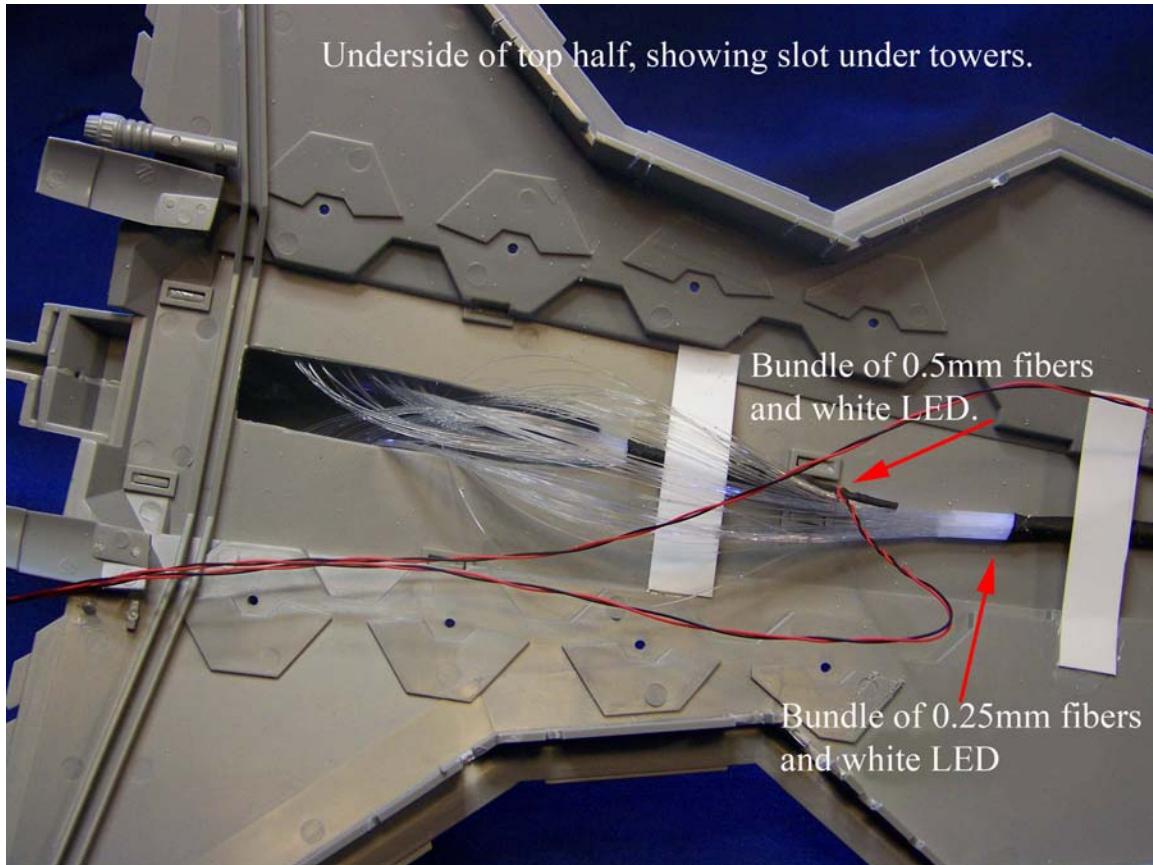
Tower Lighting: There are two sizes of windows to light for the towers. (see picture below) Use 0.25mm fiber for the small windows and 0.5 mm fiber for the larger ones.

Cut one 10" length of black fiber optic cable and use 8" lengths of 0.5mm fiber for the larger window.



Cut a large slot in the top plate under the tower mount to run all the bridge and tower fibers into the main body of the ship.

Bundle all the small fibers from the bridges and tower together and light them with single 3 mm white LED. Do the same with the 0.5mm fibers and light them with a 5 mm white LED.



Small Engine Lighting: Mount the two smallest engines in place and drill them out with a #58 drill. Drill all the way through, making a tube to insert the 1.0mm fiber.

Cut two 8" lengths of fiber and join to a single 5mm blue LED.

Medium Engine Lighting: Assemble the medium engines and test fit them to the large square spike that sticks out of the rear of the ship. **DO NOT** glue to the rear plate yet!! Dry fit, without gluing, this assembly to the rear mounting plate. Use a #58 drill to drill out these engines and also to drill through the rear plate.

Cut four 11" lengths of 1.0mm fiber, flare ONE end of each, and insert the non-flared end into the engines, through the plate and into the model's center. **DO NOT GLUE YET!!** This is a test fit only! Remove the fibers and set aside. These will later be joined to a 5mm blue LED that lights the medium sized engines and the fibers that go under the side docking bay doors.

This section must be painted separately before gluing fibers and attaching LEDs. When all engines are fully painted and ready for final assembly, after everything else is painted, then glue in this section and attach a single 5mm blue LED to drive these fibers.

Large Engine Lighting: **This section must be painted separately.** Using the kit supplied hole drilling templates, glued to the back of each engine nozzle, use a #44 drill bit and drill a hole for the large engine LEDs. Use the same bit and drill a hole in the rear mounting plate to run wires for these LEDs. These are special wide angle high brightness LEDs, do not mix them with the others. Assemble the engine “tubes” and paint separately. After everything is painted, insert and glue the LEDs, tease some cotton to act as a light diffuser, and cut out 1” disks of clear plastic and insert them into the nozzles to keep the cotton in place.

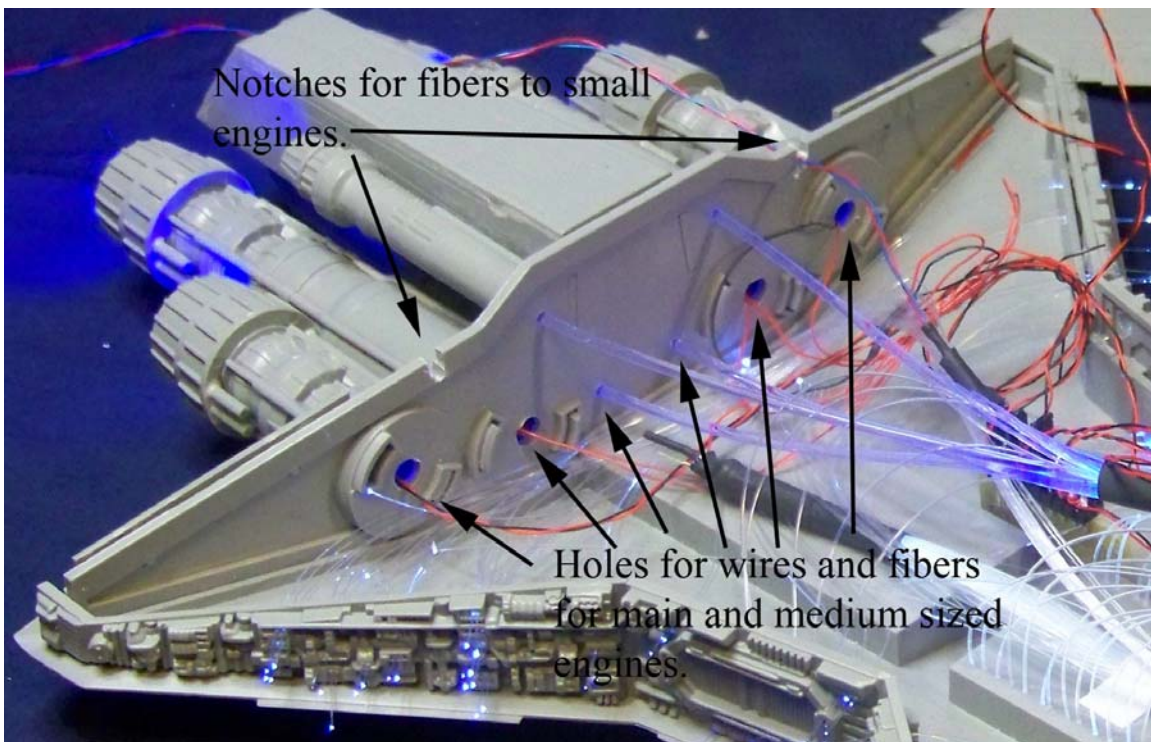
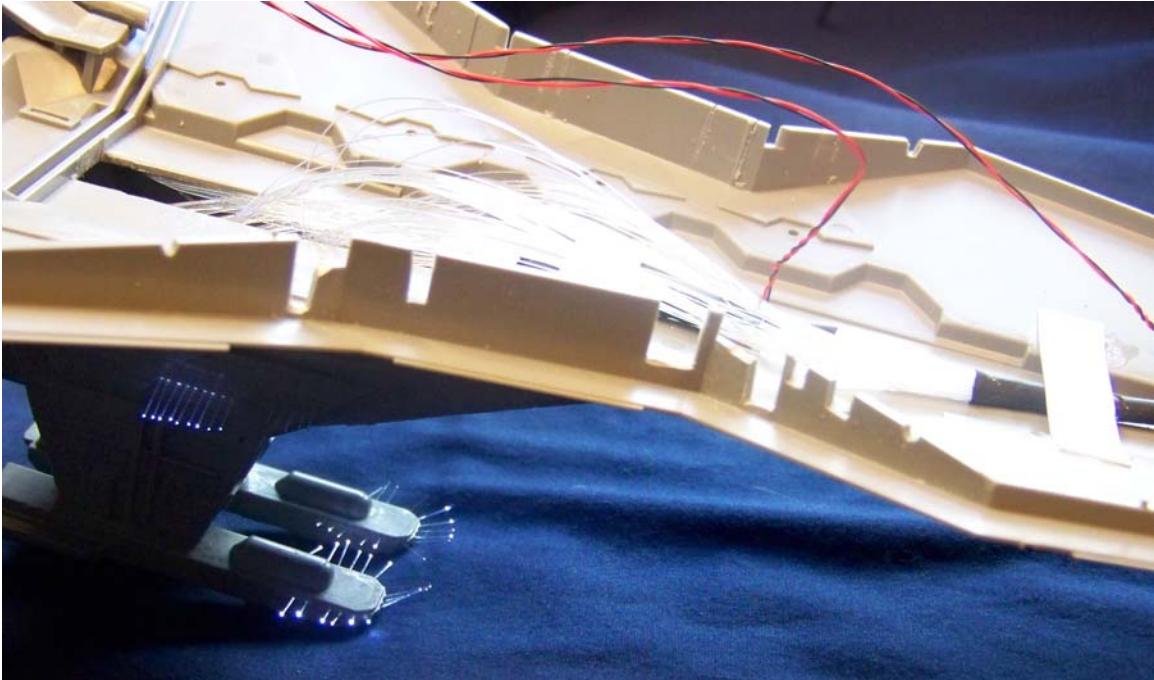
Lower Docking Bay Lighting: To light the lower docking bay on the underside of the model use a #75 drill and drill 16 holes along each side of the bay. TEMPORARILY insert 11” long 0.5mm fibers into these holes and bundle them to a 5mm white LED. Remove these fibers before painting and re-insert them after all painting is complete.

Cut 32 11” long 0.5mm fibers for this section. **DO NOT GLUE YET!** After painting, these fibers should be polished at an angle to cause light to flood the docking bay from the sides.

Notching the Edge

Now take a pencil and mark the edge of the top half of the model along the edge where it joins the bottom edge. Mark all the places where fibers have been inserted through the outer edge and would otherwise prevent assembly. Use a knife or razor saw to cut notches to allow the top half of the model to drop straight down into the bottom half.

Repeat this technique with the rear engine mounting plate to allow the fiber lighting the smallest engines to pass through.

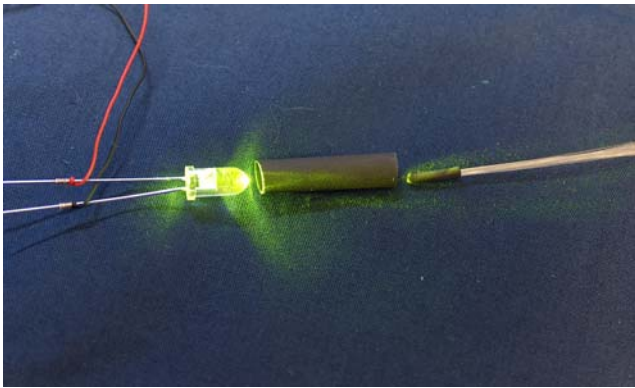


Connecting Fiber Optics to LEDs

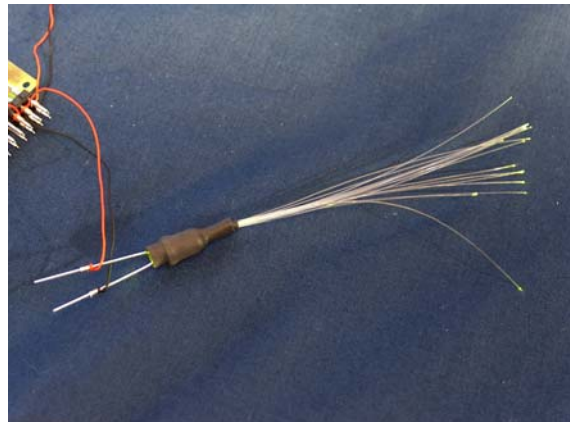
1. To light windows, portholes, or other small round lights use fiber optics. Cut the fiber a little longer than what you need and remove the black plastic covering by slitting it lengthwise and remove the fibers. **Gently** warm up the ends of the fiber with a low wattage soldering iron or other modest 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.

2. Cut a length of heat shrink about 3/4" 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 1/4", 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.

