

BEE-S-GEE 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 BEE-S-GEE Lighting Kit from Madman Lighting. This kit will let you quickly and easily light a Moebius Battlestar Galactica™ kit with minimal soldering and easy to use tools.

READ THE SECTION ON MOUNTING OPTICAL FIBERS FOR THE ENGINES CAREFULLY. There are many steps and you should take care when building those areas.

What You Get:

1 Delux-24 circuit card	4 feet of black fiber optic cable (64 strands)	8 feet of red and black hookup wire
3 five mm Blue LEDs for main engines	4 three mm Red LEDs for landing bay retraction areas	4 three mm White LEDs for landing bay entrances.
1 five mm White LEDs for windows	1 pair micro power connectors	Detailed instructions on CD ROM
8 feet of 0.5 mm optical fiber	2.5 feet of 2mm optical fiber	20" heat shrink tube

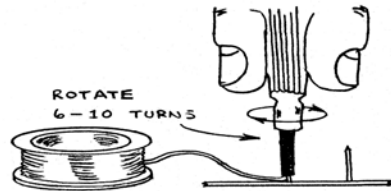
What you will need:

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

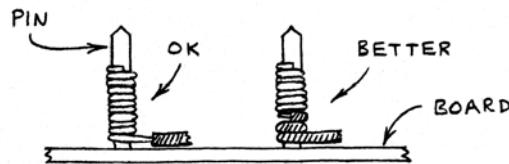
Supplies: Power supply, either a 12 volt battery pack (eight AA batteries) or a 12 volt DC wall transformer able to supply at least 100mA of current. Glue, putty, paint, etc.

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.

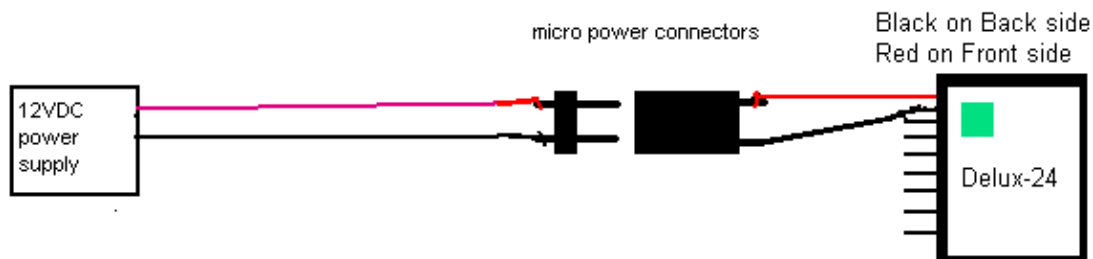


Power wires are provided as part of the kit. One length of twisted red and black wire is available for wiring your Delux Flasher to its LEDs and battery.

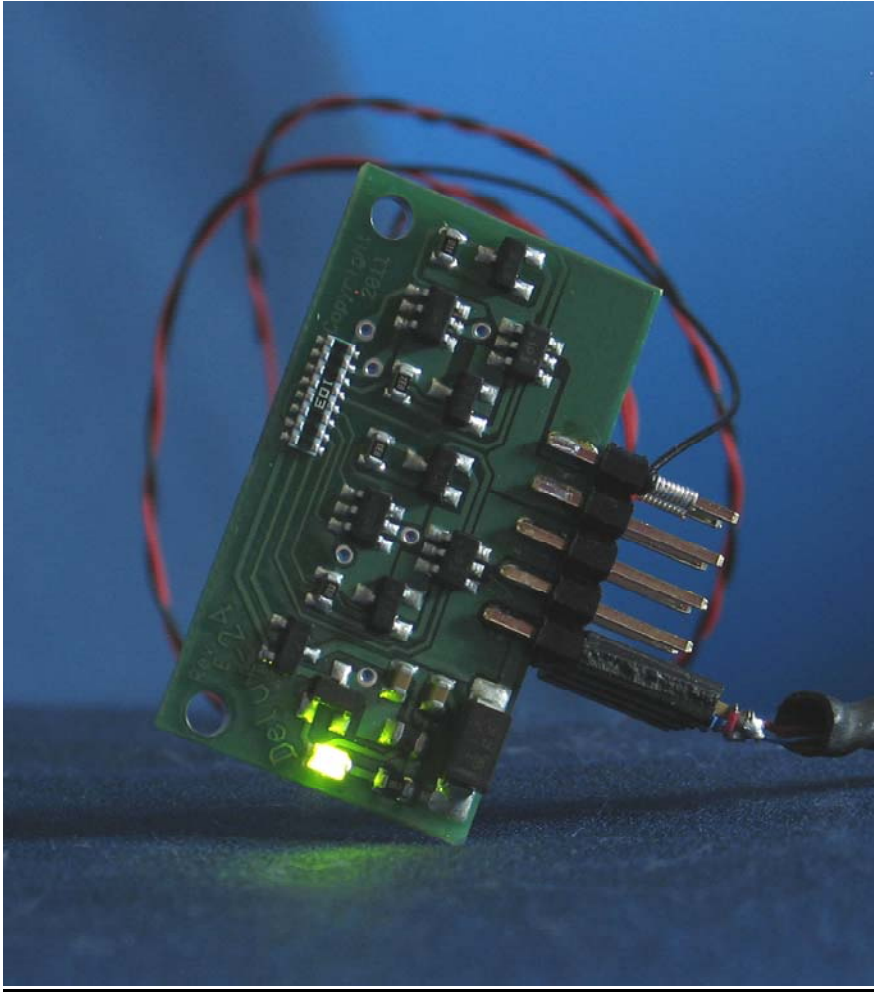
Black is for the Negative (-) connection, always the SHORT lead on the LEDs.

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

Connecting Power to the Delux-24 circuit card



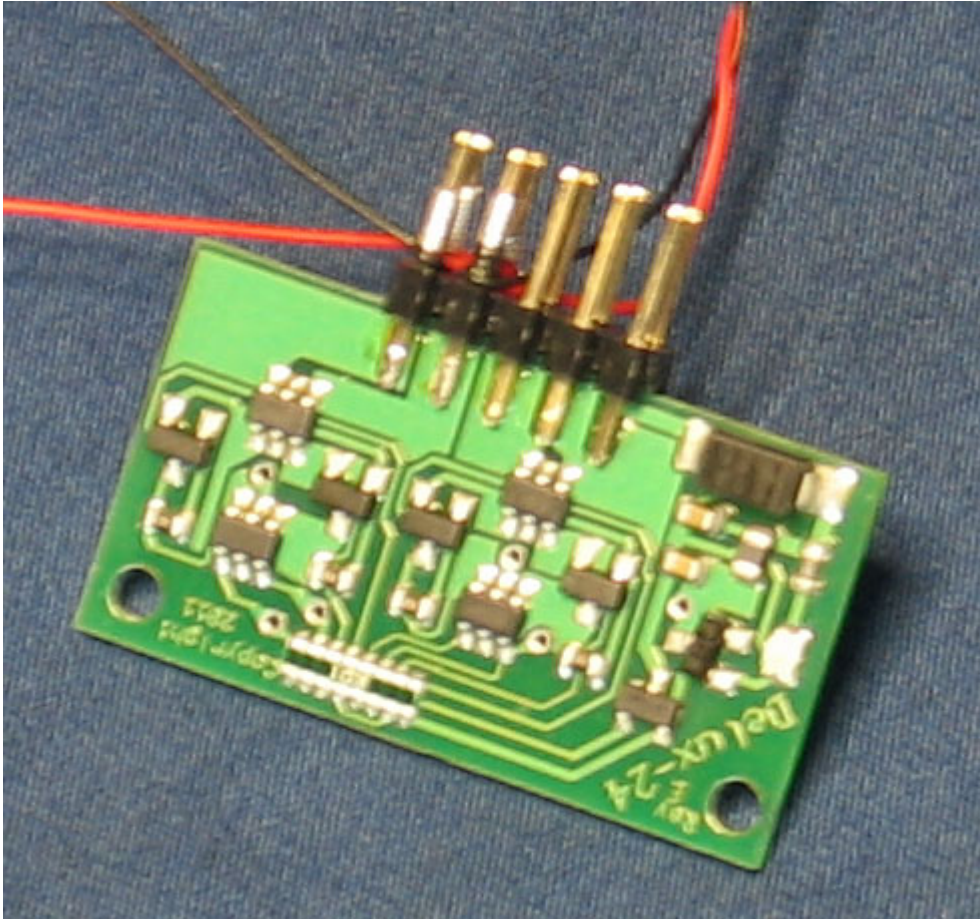
1. First, let's connect power to the Delux-24. The Delux-24 has a tiny power-on LED built-in to let you know you've hooked up power right. Once we've got power right we can take the power hookup apart and mount it in the model.
2. Temporarily wire-wrap power to the male micro-connector's short leads. (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.



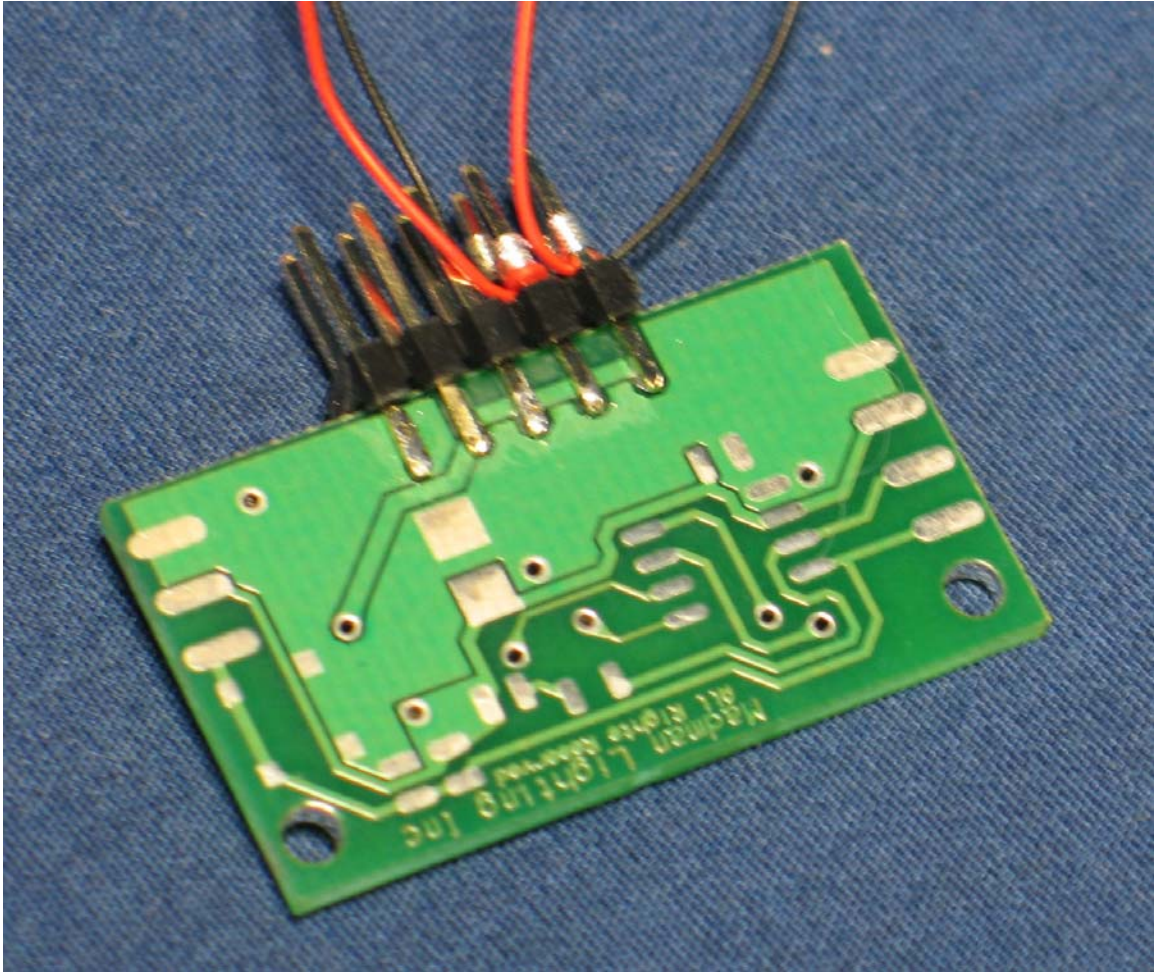
Power and Ground hookups, Red wire in connector is battery positive (+) , Black is battery negative (-), ie ground.

Connecting LEDs to the Delux-24.

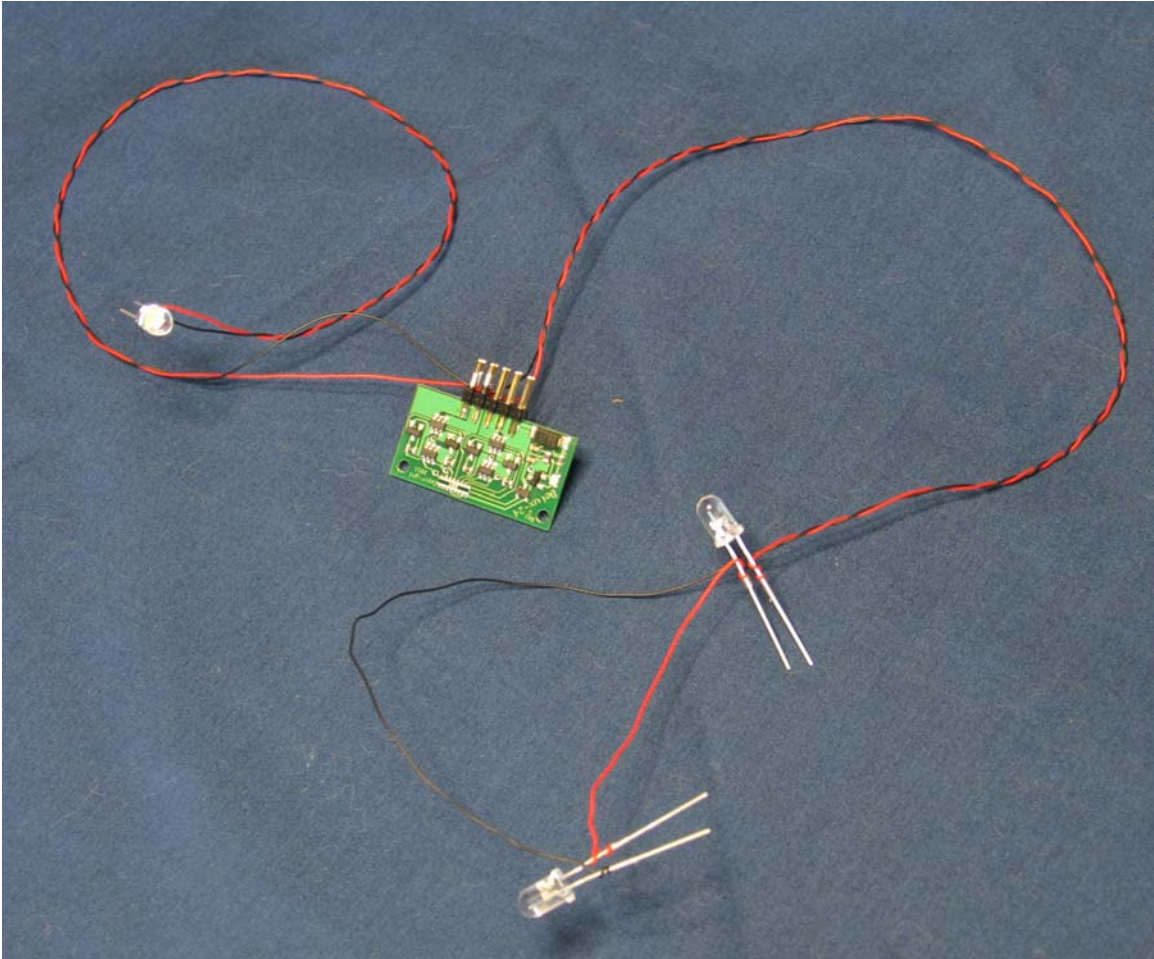
The following pictures show how to hook up wire-wrap wire to the Delux 8 board.



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 Battlestar Galactica™

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. For the smallest fibers, use a #80 drill.
- 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, using 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.

Picking spots to insert fibers

There is no special trick to this, I usually start somewhere and space the holes evenly. 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 spot, gently push the bit into the plastic, and start drilling.

Lighting Zones

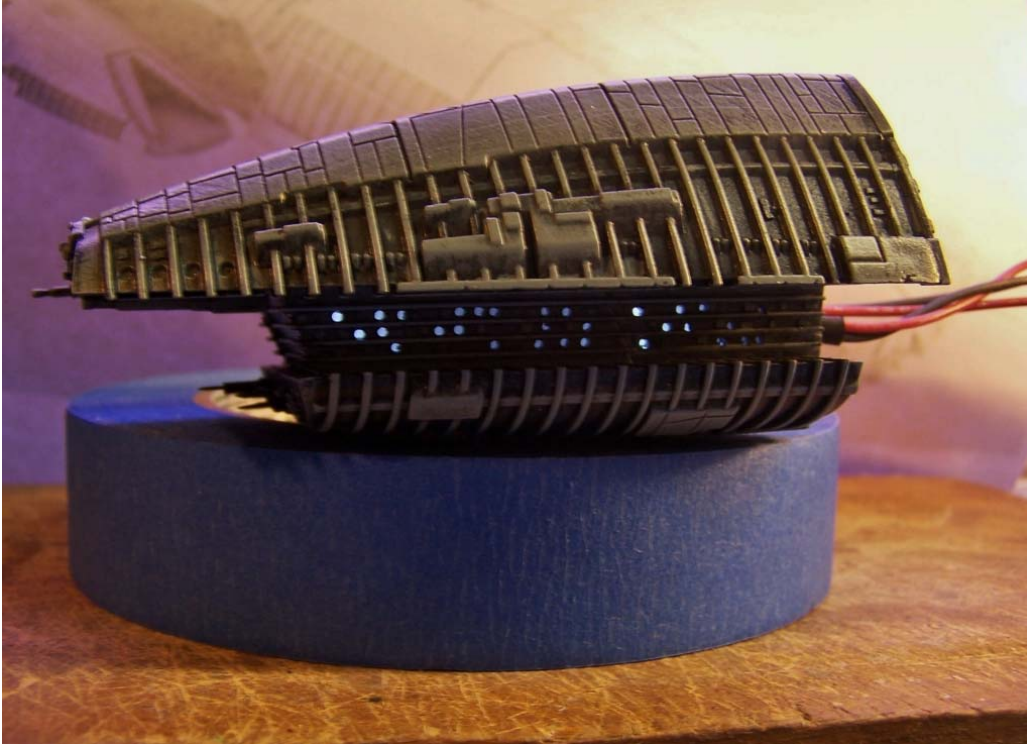
NOTE: These in-progress photos are all credited to Keith Sullivan who used much heavier wire than supplied with your kit. The wire supplied with your kit is more than enough to light the LEDs and is much thinner and easier to handle.

Also: The LEDs for the engines are flat-topped in your kit instead of round. This makes for a wider viewing angle and better effect.

Forward Section: This is a good place to start. It's the builder's choice to use fiber optics or not to create the windows in this section. Fibers will create a very "point source" lighting effect and the points will be very bright. The alternate is to install the lights as shown below and add a thin sheen of paper on the inside surface as a diffuser.



LEDs installed in forward section without fiber optics, a paper diffuser is used instead. This is from an alternate build, our kit uses one white LED instead.



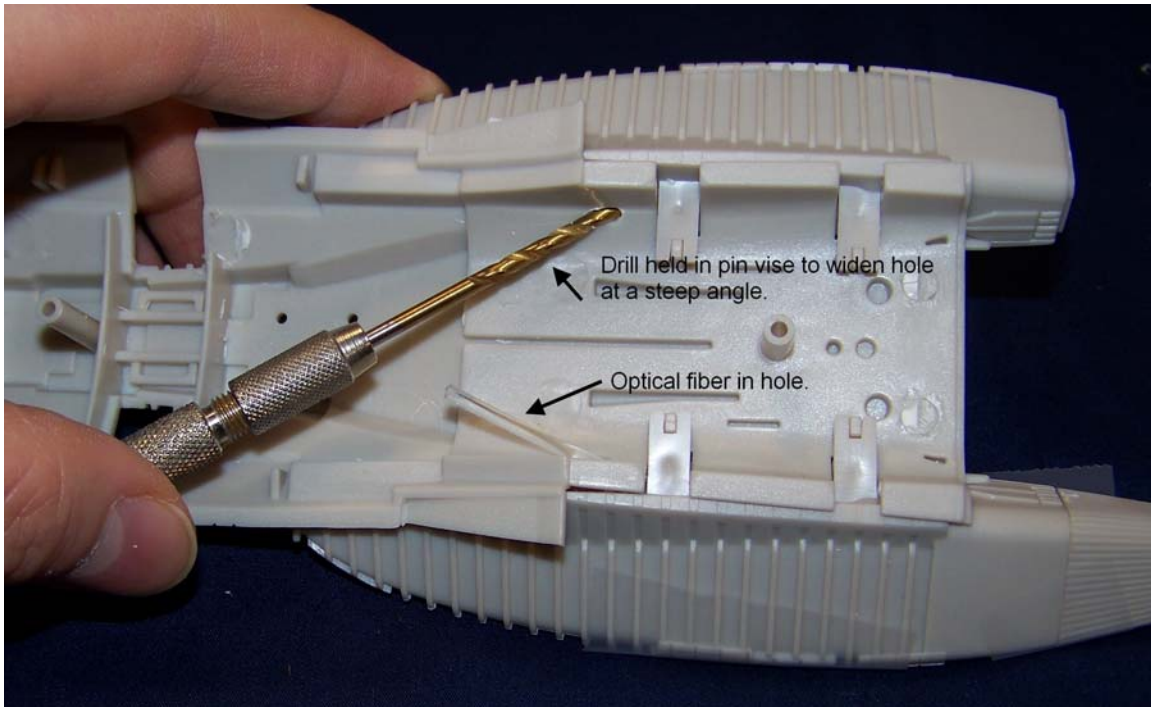
Completed forward hull with paper light diffuser and white LEDs.

Rear Engines: This kit uses three LEDs instead of six to light the rear engines. Light is piped out to the engines using large diameter (2 mm) fiber optics. The LEDs each drive two six-inch lengths of fiber and are grouped as follows:

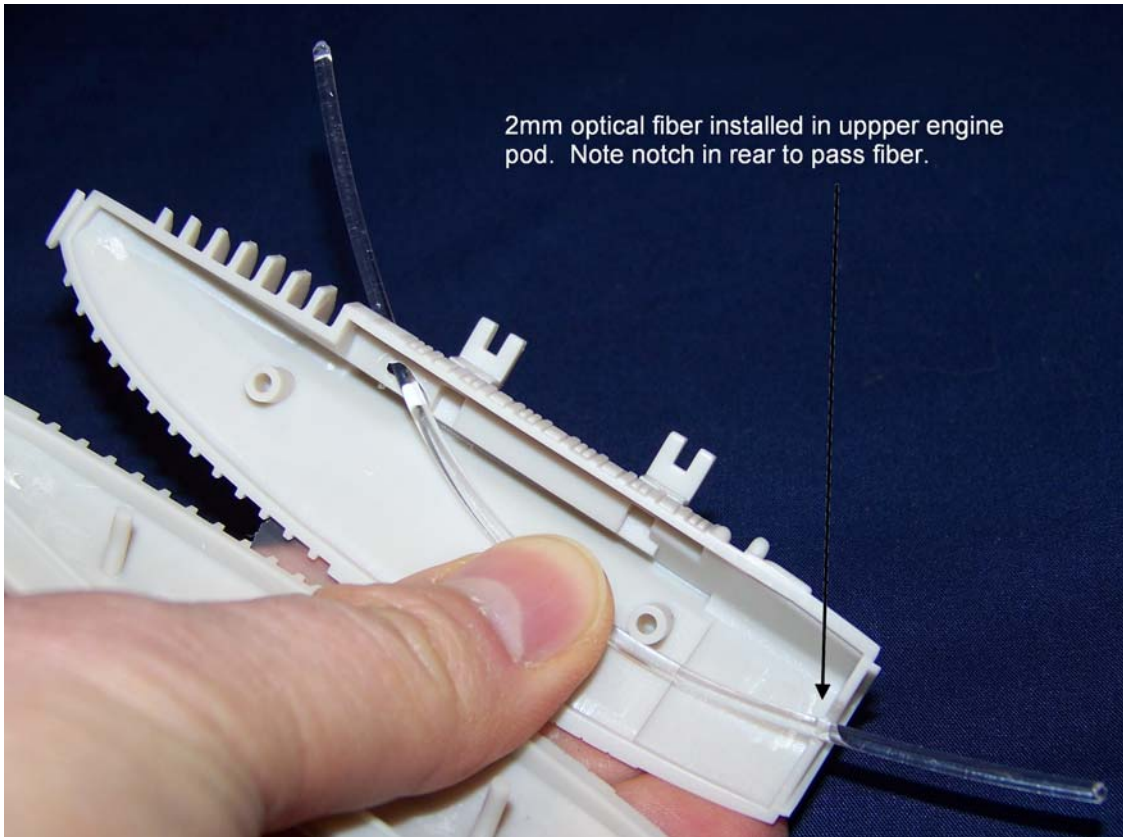
- One LED/fiber pair for the lower engine pods.
- One LED/fiber pair for the center engines.
- One LED/fiber pair for the upper engine pods.

First, install fibers for the upper engine pods. Temporarily tape the lower half of each engine pod to the main hull and drill from the pod into the main hull. Drill straight through from pod to hull. Next, twist the drill at a gradually steeper angle to cut the hole at a steep angle, as shown below:

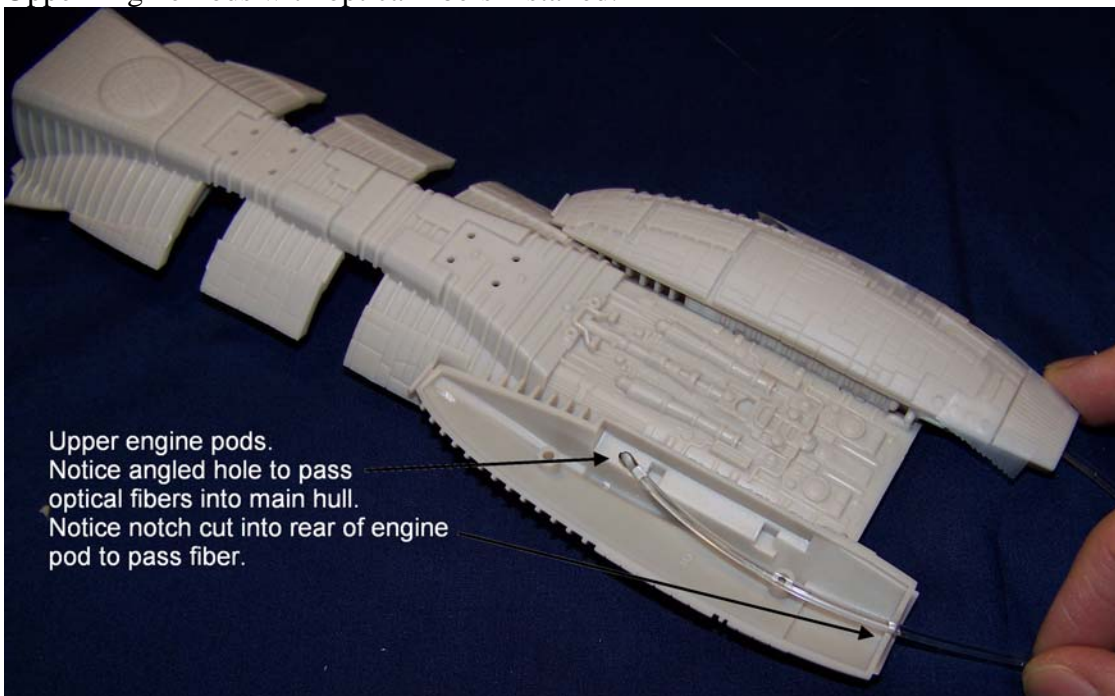
Cut a notch in the rear of each engine pod to allow the optical fiber to pass through. See below:



Notch the rear of the upper engine pods to pass the optical fiber, see below:



Upper Engine Pods with optical fibers installed:



Now install fibers in the lower engine pods. Drill straight in from the lower pod into the main hull. Insert a six-inch length of fiber for each pod, as shown below.



Completing Engine Pod Lighting:

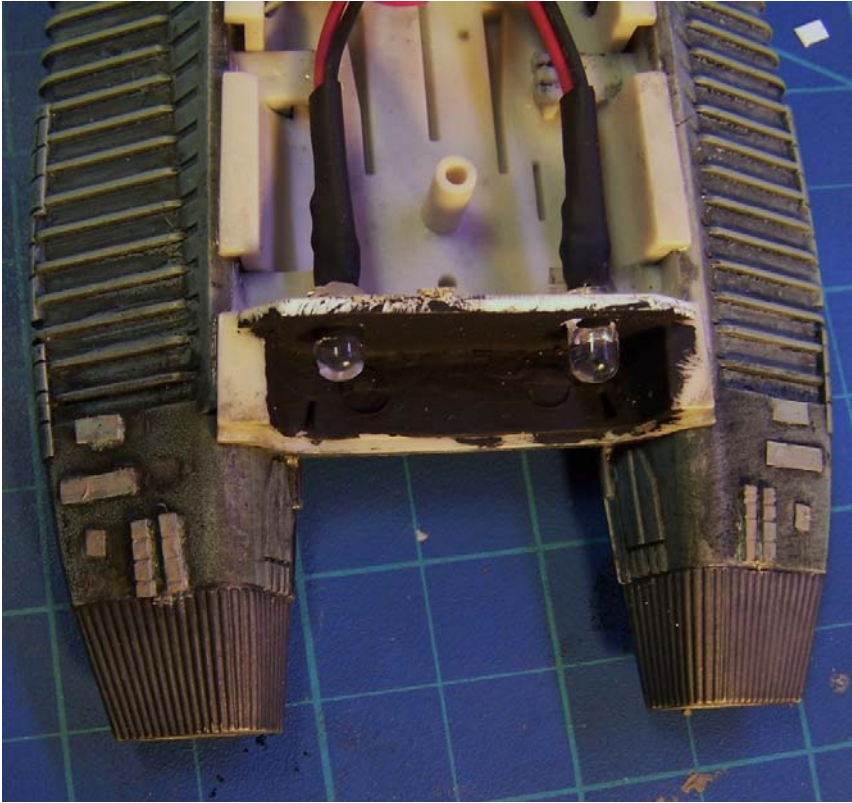
At this point there should be a large optical fiber installed into each engine pod, upper and lower. Each fiber should be loose in their holes and slide into the hole in the main hull easily.

Now use a hot soldering iron to *warm* but NOT TOUCH the ends of each fiber that will be visible out the rear of the engines. Do not warm the end that goes inside the main hull (yet). The end will soften and “mushroom” and form a rounded lens shape, greatly improving light transmission.

Use some white glue to mount the fiber inside each pod so it does not slide around. Assemble the engine pods around their fibers and glue them shut. They are now ready for painting.

Lighting Main Hull Engines:

Use some sheet plastic to make a bulkhead to hold two large optical fibers within the main hull. There should be two holes to align the fibers with the engine ports on the clear rear piece of the hull. As above, warm just one end of the fibers to soften and mushroom them. Insert the other end through the bulkhead and mount bulkhead and fibers in the main hull.



Plastic bulkhead holding two LEDs in an alternate build. For this kit, mount two large optical fibers in the bulkhead instead of LEDs.

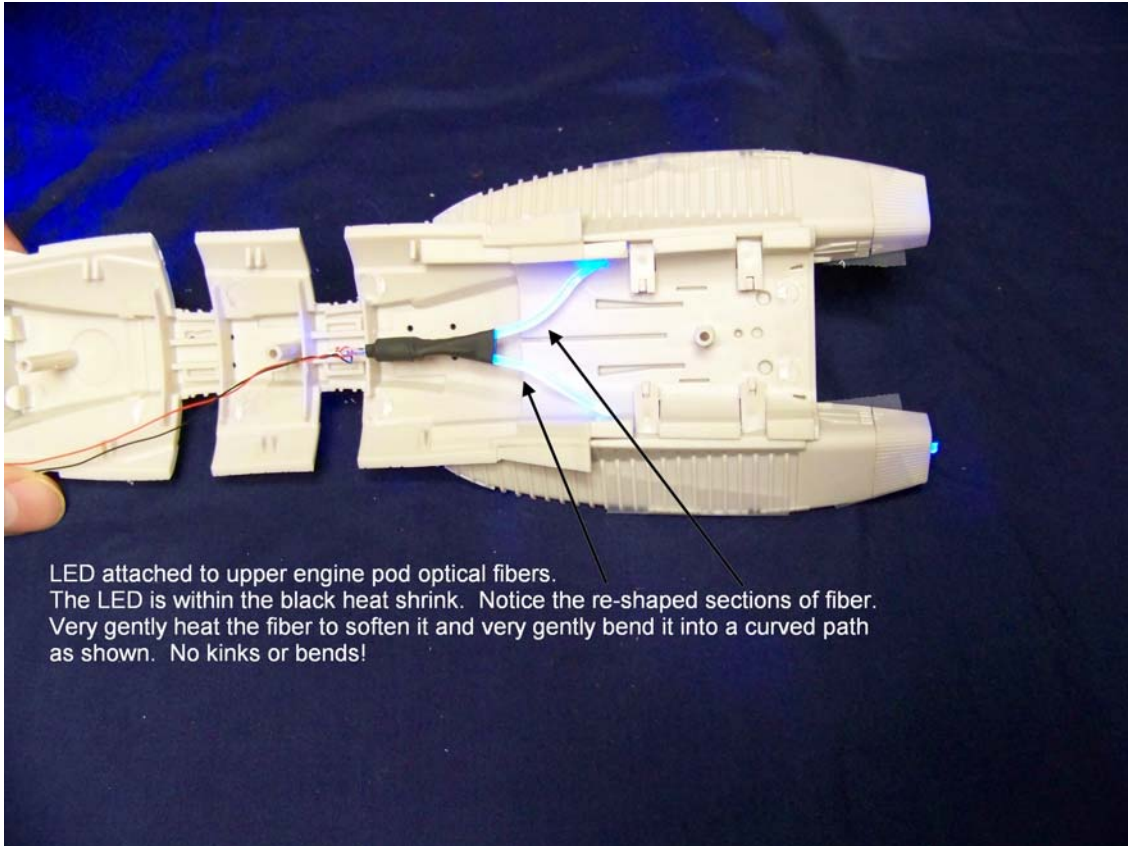
Attaching LEDs to large optical fibers:

This part is a bit tricky and requires care and patience. Go slowly when heating plastic optical fiber! At this point all the “engine” ends of the fibers should be mounted in their pods or bulkheads. If the builder (that’s you) has chosen to paint engine pods and hull separately, the pods and hull should now be painted. The main hull should still be open.

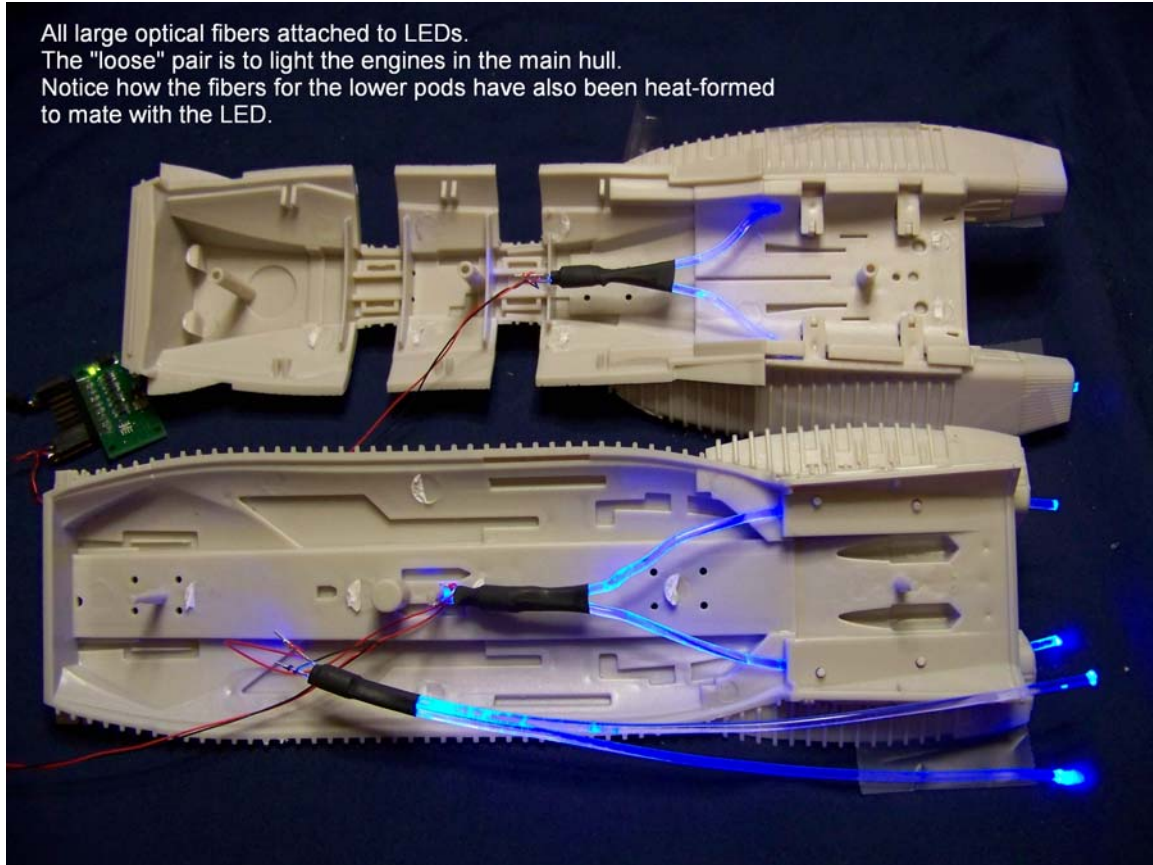
First, use a hot soldering iron to *warm* the LED ends of the fibers. Bring the iron CLOSE but do NOT TOUCH the fibers. They will soften and “mushroom” out, forming a smooth, rounded lens shape. This will greatly improve light transmission.

Next, warm the fiber to soften it and gently bend it into the shapes shown below. Keep all the bends gentle and smooth, no sharp kinks or breaks. This will allow the fibers to fit better inside the model.

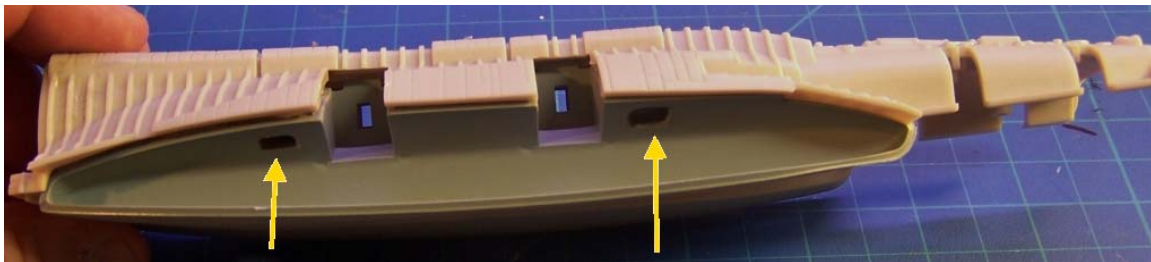
Finally, attach the LEDs to the mushroomed fiber ends with heatshrink tubing as shown below:



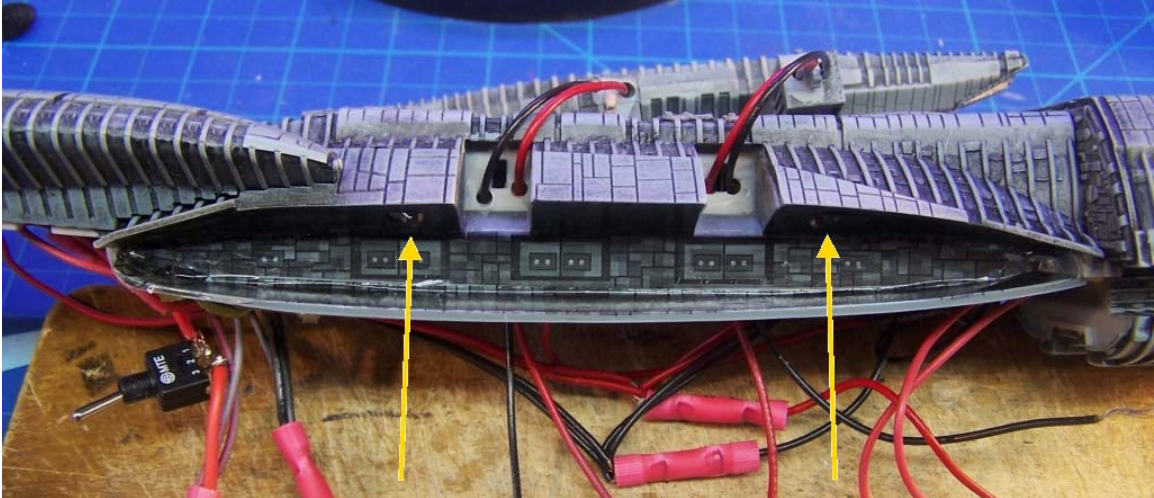
Repeat the process above with the large fibers for the lower engine pods, as shown below:



Red Retraction Zone lights: These are the red lights that illuminate the “retraction zones” where the landing bays are pulled in just before an FTL jump. There are two red LEDs here, shown by the yellow arrows below.



In-progress picture, showing holes to be cut for mounting red retraction zone LEDs.

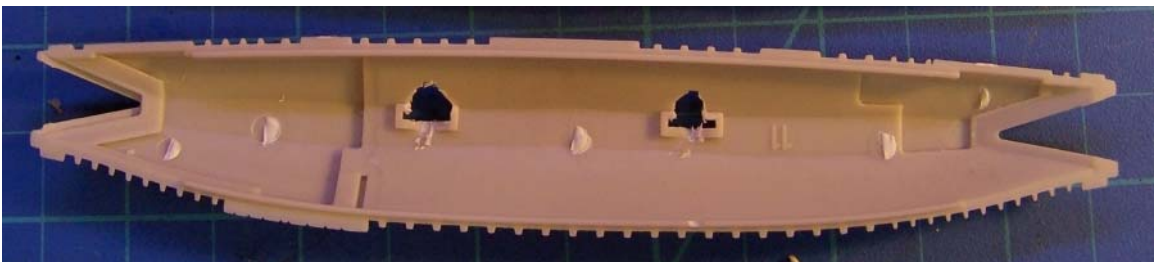


Near-completed picture, showing red LED location.

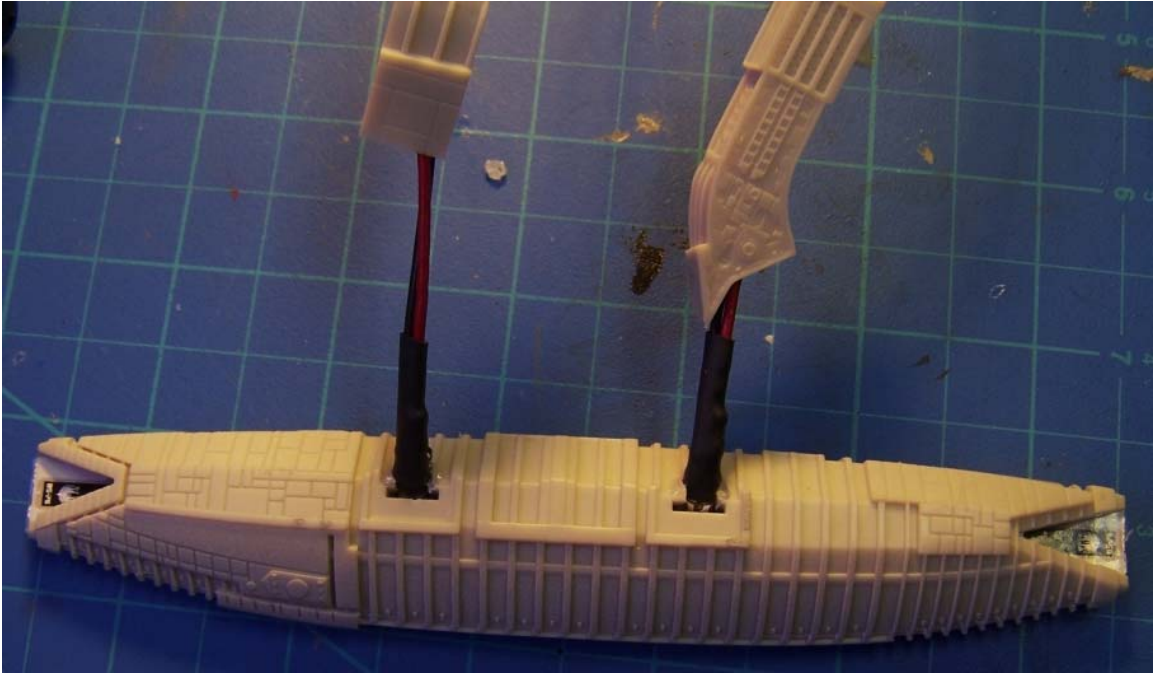
White Landing Bay lights: These are a bit tougher. You need to run these lights through the landing bay arms and into the top of the bay. Drill all the holes you will need in the arms and top of the landing bay first. Test fit everything carefully.



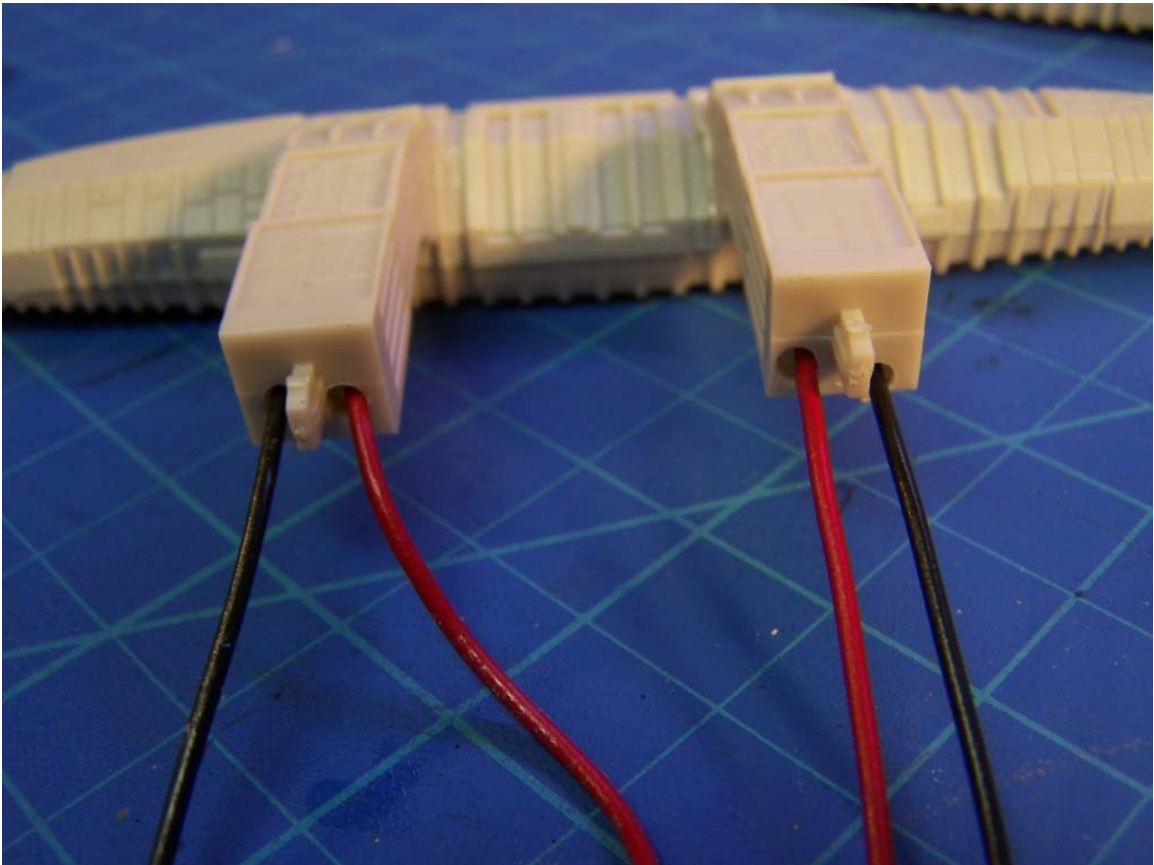
LED mounted in landing bay arm.



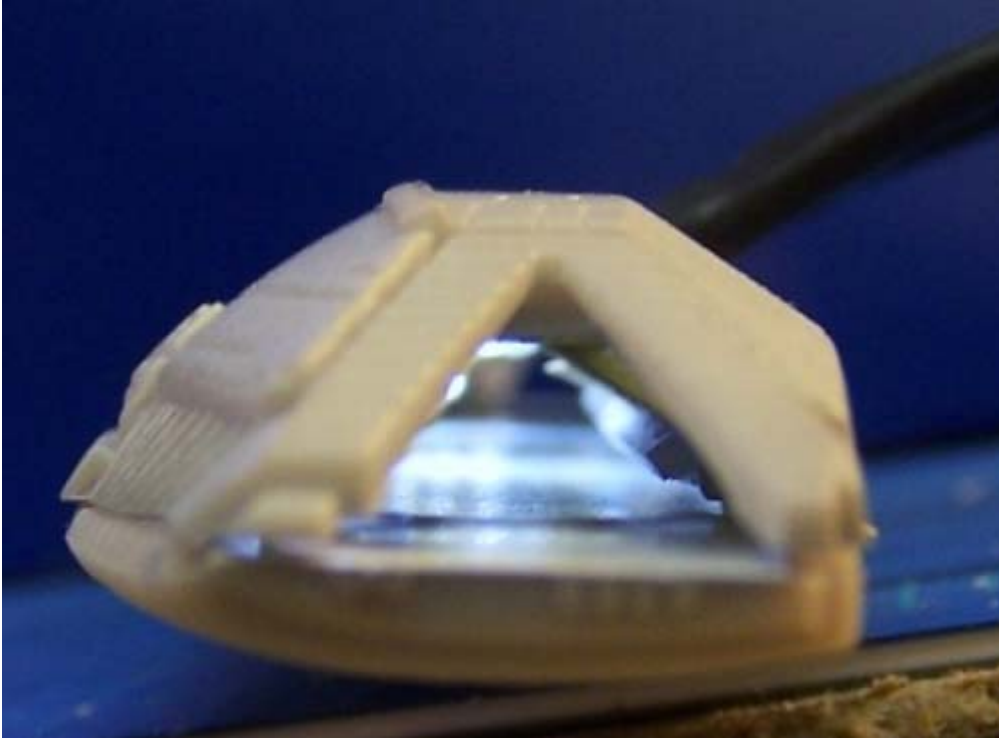
Holes in top of landing bay for LEDs.



LEDs test fitting into landing bay.



Completed landing bay assembly.

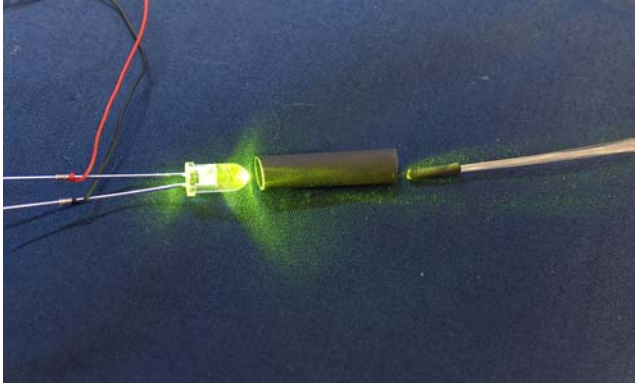


Lights ON!

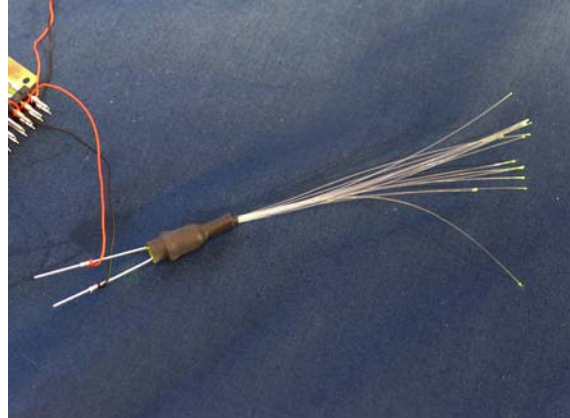
Connecting Fiber Optics to LEDs

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. 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 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 open flame are not recommended for heating.



LED, 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.

