Astromech Front Logic Light Kit
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### http://www.hyperdynelabs.com

Your logic light kit comes with a mainboard and daughterboard to control all of the front logic and PSI lighting for your astromech dome.

You can also get 2 of our optional PSI light boards which conveniently house the colored LEDs for each PSI eye. If you have purchased the kit without LEDs installed, please go to the end of this document to read how to finish your kit.

LOGIC MAINBOARD

The mainboard has a 9V battery snap connector. Use at least a 9V battery that is fresh. If the battery is weak, the board will act unpredictably.   You can use a voltage of 6V-18V on the mainboard, as it has a voltage regulator. Hooking this up to your main battery is fine too. We recommend either using a 6AA battery pack or a larger capacity battery if you are going to run the lights for a long period.

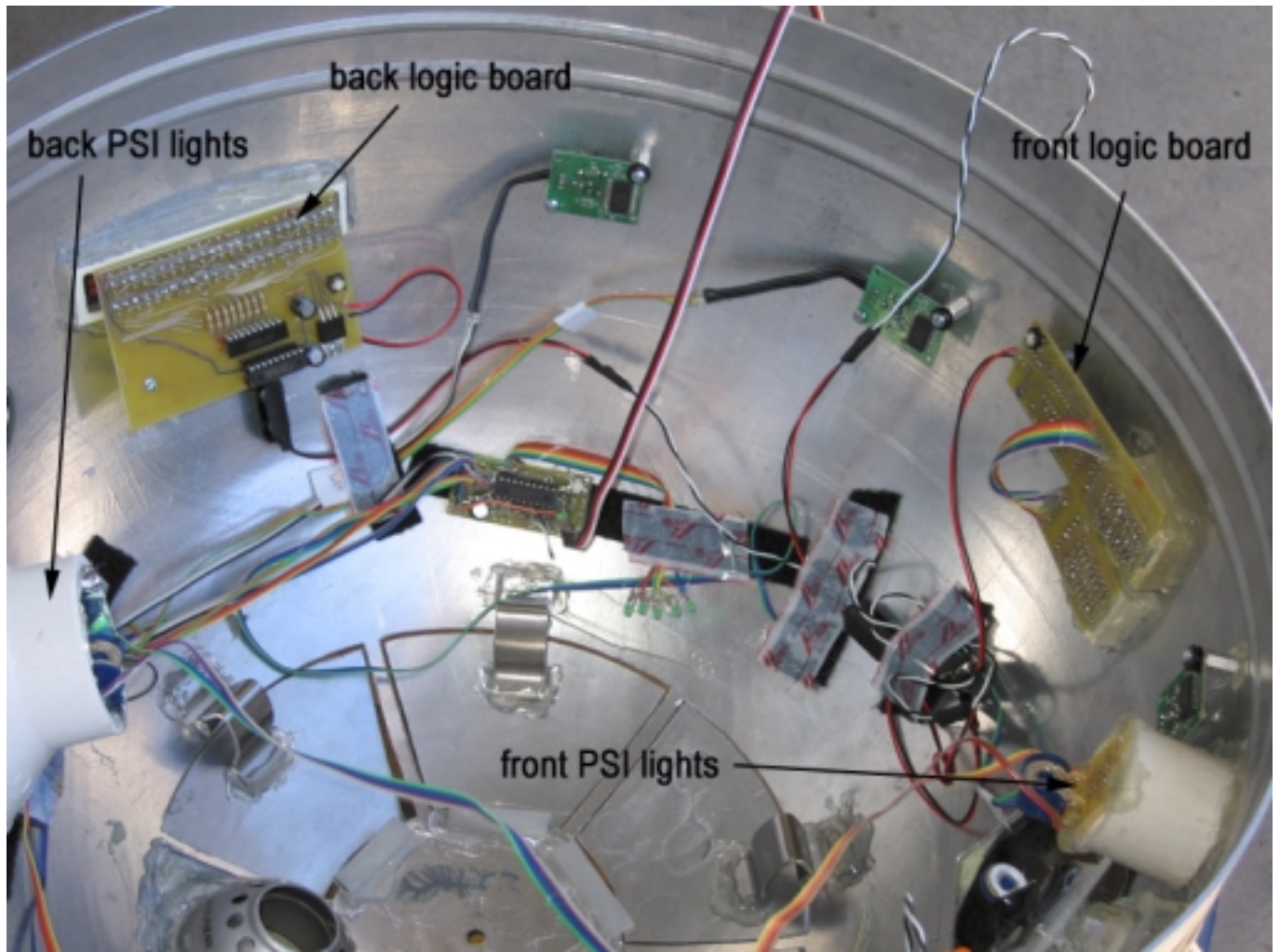Here is a pic of the front logic light kit with LEDs installed:
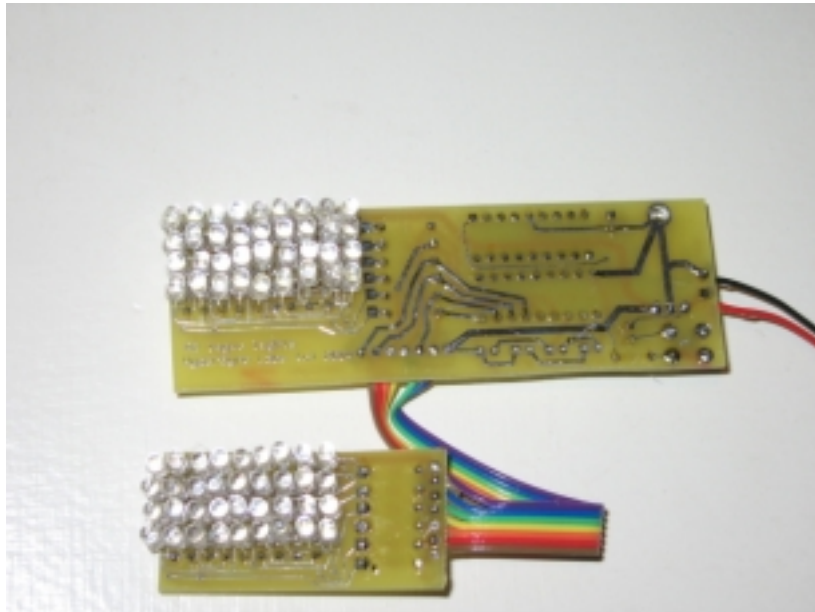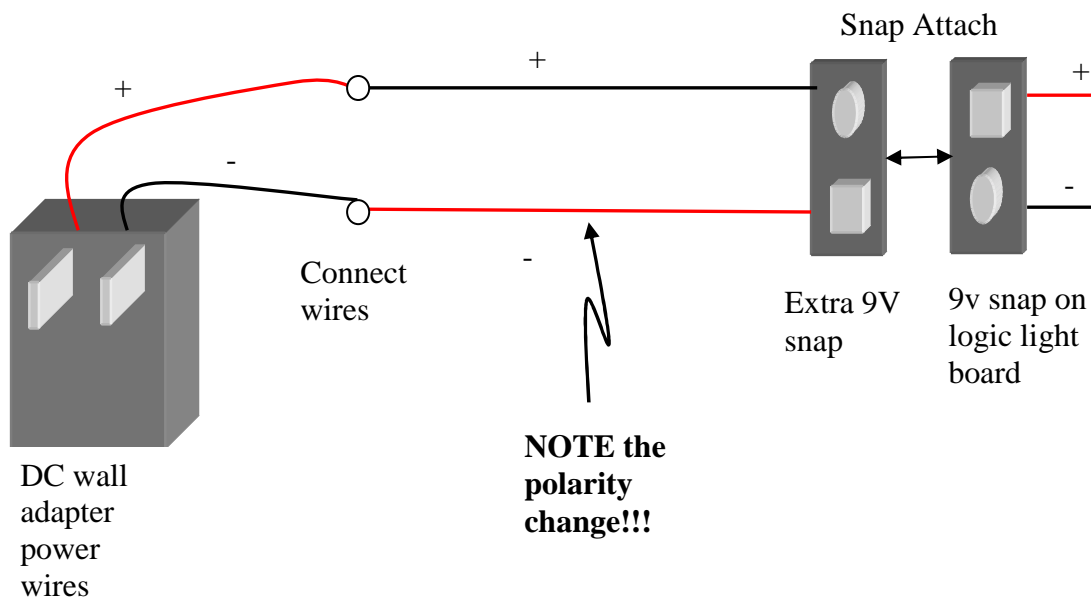
LOGIC BOARD INSTALLATION

The boards were made to fit a standard resin type logic box. You can simply slide the LED array inside your logic box and then hot glue or secure the boards in place.

Here is a pic of the logic boards installed inside a dome:

BATTERY HOOKUP/WALL OUTLET HOOKUP

If you are going to use an AC wall adapter or a non-standard 9V battery connector, you can wire in the battery/adaptor to the included snap connector. Below is a diagram for wiring for an AC "wall wart" adapter to your front logic board. Note that when you use an extra 9V snap the polarity of the wires changes.

Snap Attach

+

+

-

-

+

Connect
wires

NOTE the
polarity
change!!!

Extra 9V
snap

9v snap on
logic light
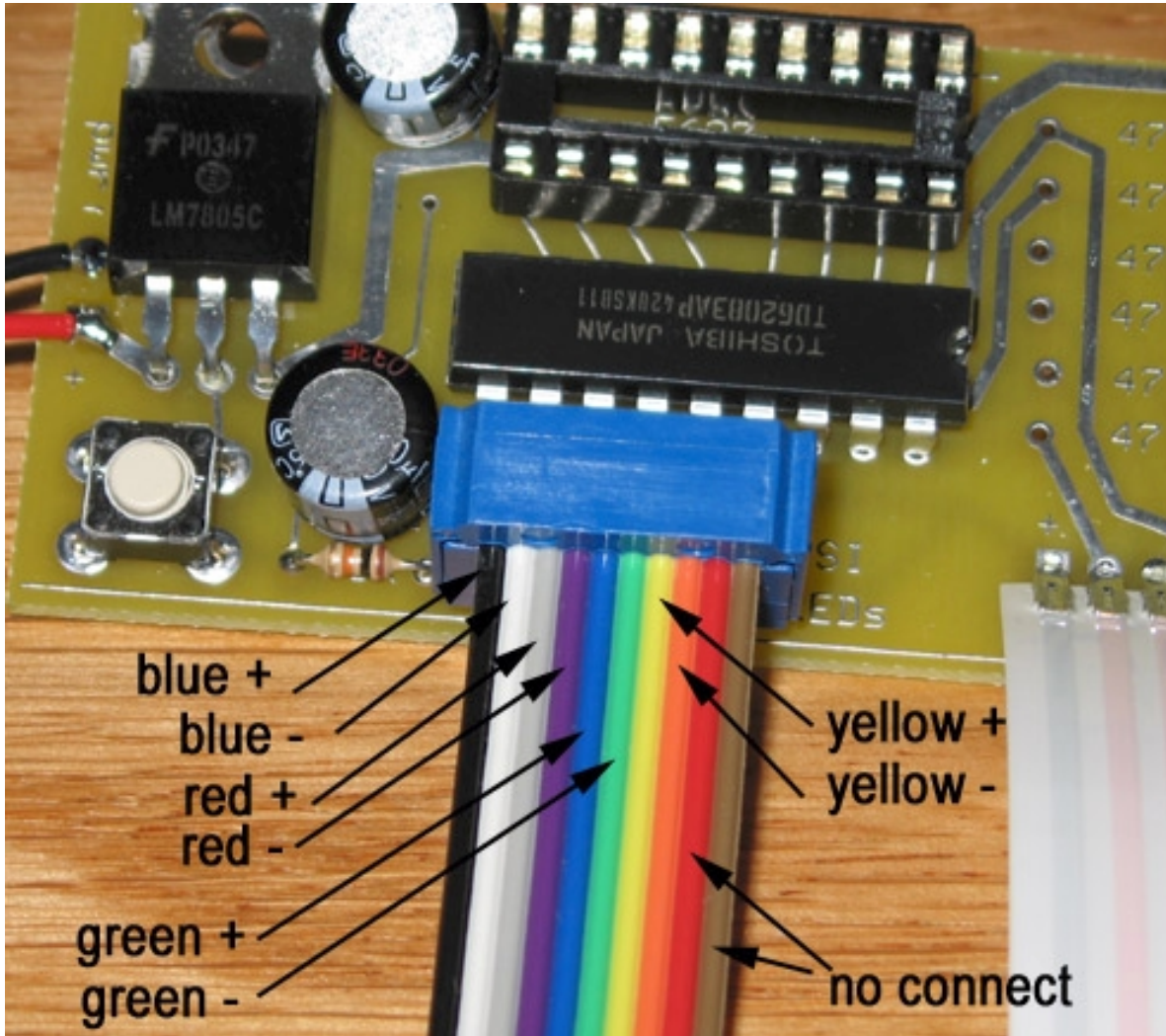board

DC wall
adapter
power
wires

PSI LED HOOKUP

Here is a pic of the other side of the mainboard showing the PSI output header. The PSI output
header controls the blue/red and green/yellow eye lighting. Your kit also comes with a ribbon
cable to make the connections easier.


LED pads

button for
LED speed

PSI LED outputs
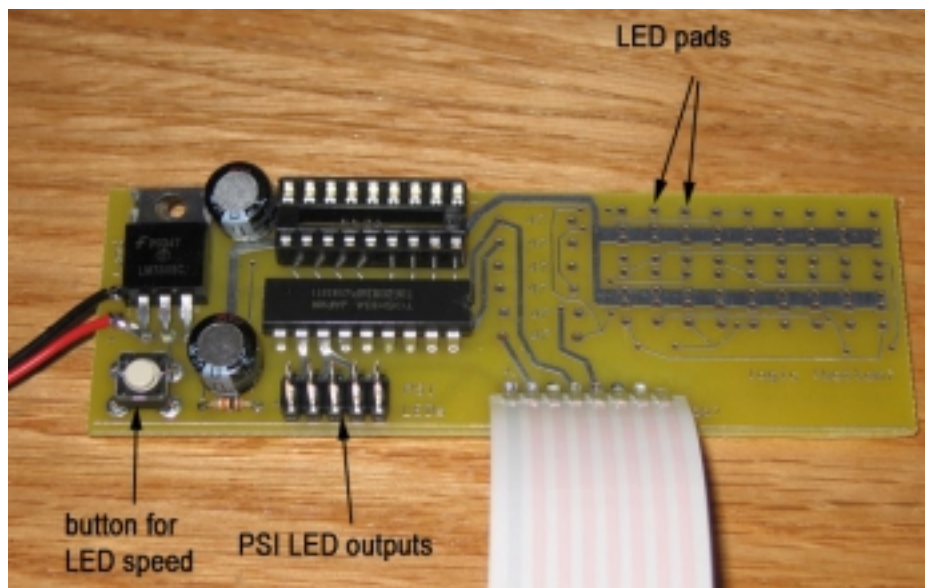
The PSI lighting sequence cycles through 3 different blink modes to emulate astromech PSI
behavior. The PSI LEDs sequence in this order:

1) ESB astromech blink mode: 50 sec
2) ROTJ astromech blink mode: 50 sec
3) Random blink mode: 30 sec
Repeats above.…

Here is a wiring diagram for connecting the PSI LEDs to the included ribbon cable.
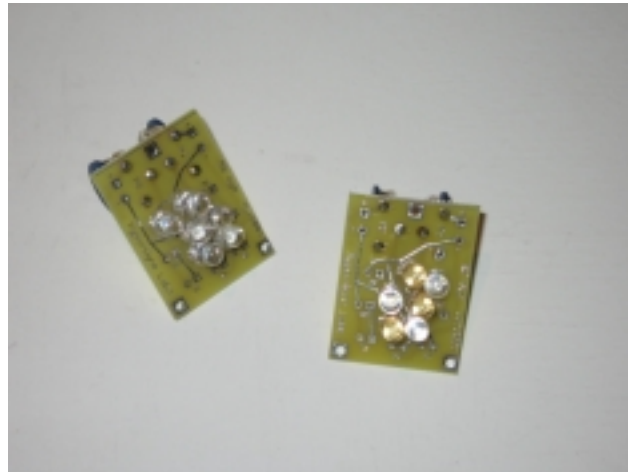

If you are using your own LEDs note that leds have polarity - one positive leg and one negative leg. The longer leg on the LED is typically the positive (+) leg.


LED
polarity
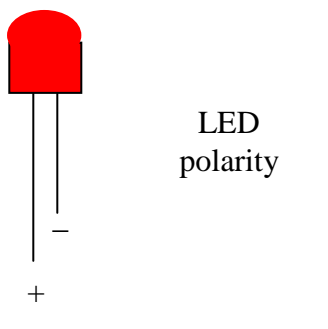
PSI LIGHTBOARDS (OPTIONAL)

Here is a pic of the PSI lightboards that you may also purchase with the kit.

These boards hold several LEDs for each color (blue and red on one board, green and yellow on the other board) in a honeycomb-type array. This maximizes brightness and maintains a uniform brightness over a given area.

The included ribbon cable can be spliced and connected directly up to our PSI lightboards to complete the PSI circuit. Below is a pic showing the connections from to each PSI board. You will see on each PSI board is text that says "red/yellow" or "blue/green" next to the pads. Follow the diagram to hook up the wires from the ribbon cable shown above. Match up the wires and solder them into place.
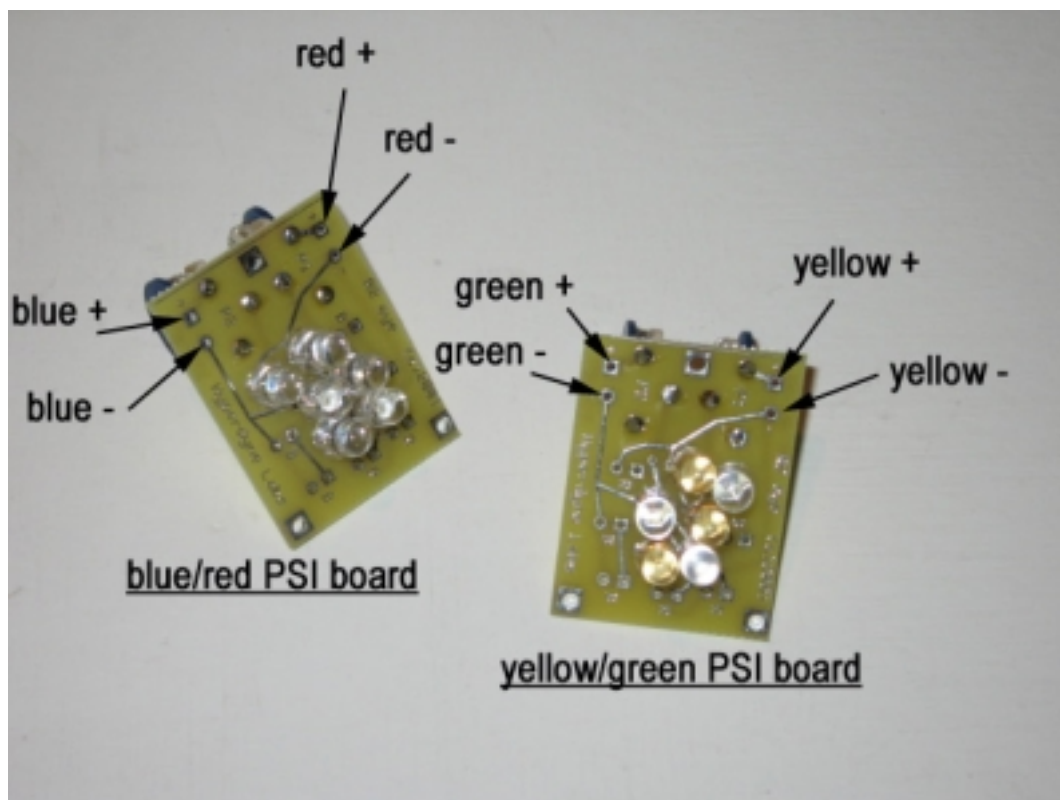
Once you have completed the wiring, the PSI lights will now sequence.

Each PSI lightboard has a primary and secondary color. The front lightboard has red/blue LEDs, and the back lightboard has yellow/green LEDs. Each lightboard can hold up to 12 LEDs, 6 or the primary color and 6 of the secondary color. You can add more as you see fit.

There are 2 blue potentiometers on the back of each PSI lightboard. These are used to tune the brightness of each color on the lightboard. When the blue peg (on each potentiometer's side) is in the middle, the LEDs are at a normal brightness. The potentiometers range from 0 ohms to 250 ohms. Middle position is 125 ohms. Turning each pot all the way to the center of the lightboard gives 250 ohms. Turning each pot away from the center of the lightboard gives 0 ohms (read warning)!

WARNING: **Be careful when tuning the brightness of the LEDs. If you turn the potentiometers to one extreme (away from the center of each lightboard), then you are decreasing the resistance and therefore increasing brightness in the LEDs! If you go too far (to 0 ohms), you can burn out the LEDs and/or the driving transistor!! So, try not to leave the potentiometers in that extreme position. If you do, you may notice that the lightboards become very warm. This generally will decrease the life of the LEDs in favor of more brightness. If the LEDs still do not provide enough brightness, you can replace or add some high intensity LEDs to the honeycomb array.**

When tuning the LEDs, try and start from the center position, and slowly dial each pot forward/back til you get the brightness you want. Again, check to see that you don't end up in the extreme 0 ohm position, which can cause damage to the board if you are using a high current battery! This position is not recommended for long time use. Try and back off some, or add more LEDs (even higher intensity ones) to get the brightness you need.

PSI REFLECTOR LENS

It is a good idea to use an LED lens to get help maintain uniform brightness over the area you are illuminating. The red/blue lightboard uses special "wide angle" LEDs, which may or may not need the use of a reflector. The yellow/green lightboard has high intensity green and yellow LEDs, both have a narrower light "beam". You may need a LED lens to diffuse the light over the necessary area due to the tighter beam that is inherent in most green and yellow LEDs on the market.

You can use a standard T1 ¾ LED lens or contact us for more info on obtaining lenses:

Here are 2 pictures showing the different colors of the PSI eye circuit working:

Blue/green:

Red/yellow:

PSI LIGHTBOARD INSTALLATION (OPTIONAL)

You can easily install the PSI LED lightboards inside your dome using a couple pieces of PVC. By setting the lightboard back into a PVC tube, the light will shine evenly onto the PSI lens. You can even place some foil inside the PVC tube so the light bounces off the tube wall and shines upon the PSI lens evenly.

Here is a quick diagram of the setup:

lightboard

PVC pipe

PSI "milky" lens
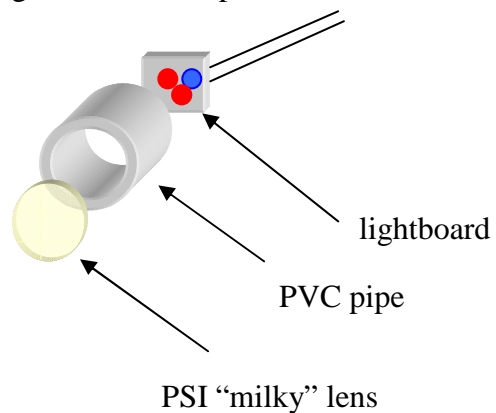
Please reference the previous picture in this document showing this PVC type setup installed into a dome.

INSTALLING YOUR OWN LOGIC LEDS

If you purchased our kit without the logic LEDs installed, you will have to solder your own 3mm LEDs to the board. You will need 72 total LEDs for both boards. Make sure you are using LEDs with the same forward voltage, as different types/colors of LEDs may not light up correctly if you mix them.

Here is a pic of the array layout:
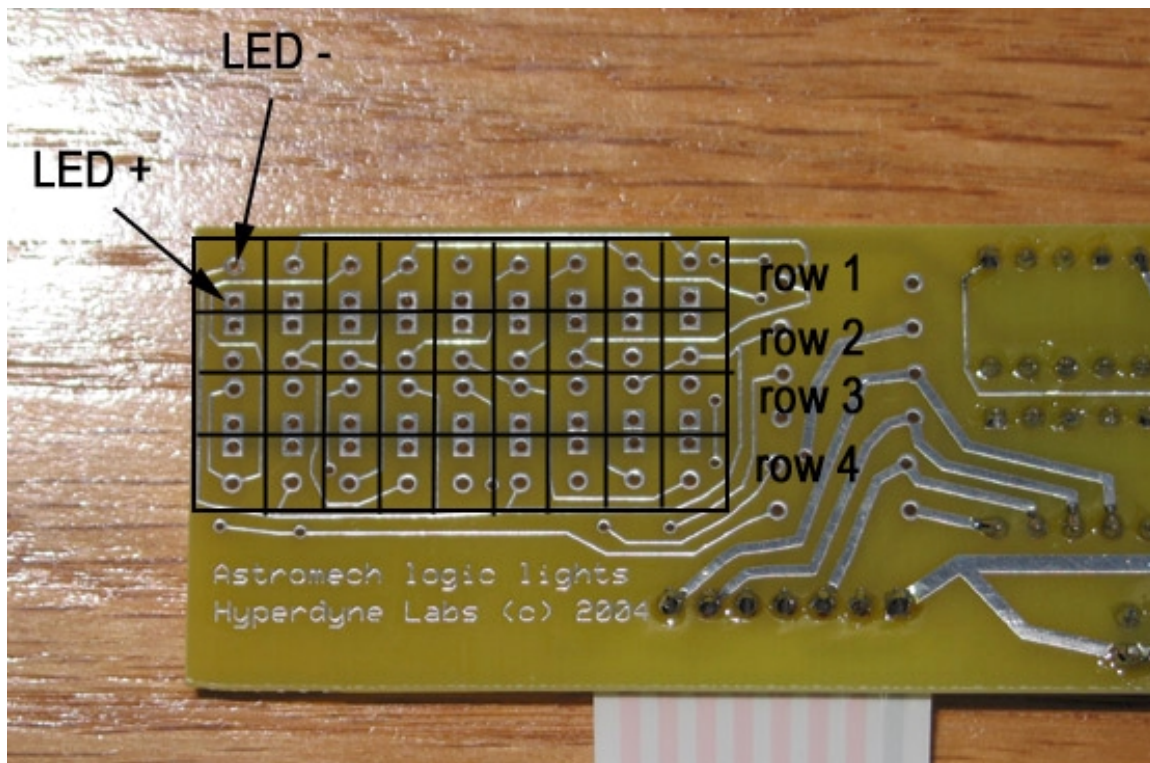
Step 1:

Turn the mainboard over to the shown side above and populate "row1" with white/blue LEDs. Also note LED polarity. The + side of each LED goes into the square holes, and the – side of each LED goes into the round hole.

Now solder the legs of each LED and clip the excess leads.

Step 2:

Populate the next "row2" with 3mm white/blue LEDs. Solder the – lead legs first on the same side of the board, then turn the board over and clip the excess leads. Next solder the + legs from the bottom side of the board (this will give you enough room to reach each pad).

<u>Step 3:</u>

Populate the next "row3" with 3mm white/blue LEDs. Solder the + lead legs first, then turn the board over and clip the excess leads. Next solder the – legs from the bottom side of the board.

<u>Step 4:</u>

Populate the next "row4" with 3mm white/blue LEDs. Solder the - lead legs first, then turn the board over and clip the excess leads. Next solder the + legs from the bottom side of the board.

<u>Top Logic board/daughtercard install:</u>

Follow the exact above steps 1-4 for the front logic daughtercard. It is assembled in the same fashion and using the same side of the board as shown above.

DIFFUSING THE LOGIC LEDS

You can also use a front diffusing gel in front of the LEDs to get a more accurate effect. Below is a pic of a mylar-backed colored gel cut out to fit in some resin logic boxes. Installing the LEDs behind the gel gives a very nice fading effect that mimics the fiber-optic look. These gels can be found on the R2 builders group.

CHANGING THE SPEED OF THE LOGIC LED FADING

The onboard pushbutton will cycle through 4 different fading speeds for the LED array. Pressing the button once will change the speed. Pressing 4 times will cycle through all the speeds. The board should remember the last speed you entered when powering the board down and back up.