# Introduction

Congratulations on purchasing the Proton Pack LED Bulbs Light Kit that adds some serious lighting effects to your nuclear accelerator!

The Light Kit plugs in directly to the GhostLab42 Matty Blaster and GBFans Sound Board or can be used stand-alone by plugging directly into a battery pack. Movie accurate mode can be activated by rotating a potentiometer (which also controls the speed), turning it further activates a special effects mode that will add multiple animation sequences to your power cell and cyclotron! This Light Kit also receives commands from the sound boards, which adds other effects like overheating, venting, and support for the video game modes (GBFans sound board only).

Power Cell and Cyclotron Light Kit features:
- 15 Wide angle Ultra Bright White LEDs on the main Power Cell circuit board
- 4 Wide angle Ultra Bright White LEDs for the cyclotron Lights
- 1 Wide angle Ultra Bright Wide LED for Venting affects
- Works with battery voltages from 9V to 14V
- High efficiency external switching power supply for longer battery life
- Easy wiring with separate power connection and a single ribbon cable connection for control from the Matty Blaster or GBFans Sound Board
- Easy wiring for stand-alone operation with a separate set of switch connections for Power up/down, Fire and Venting (not used when connected to a GBFans Sound Board)
- Cable connections are keyed to only go in one direction and have strain reliefs to make the cable more durable
- Separate connector to add an optional Vent Relay for controlling an external e-CIG style smoke kit
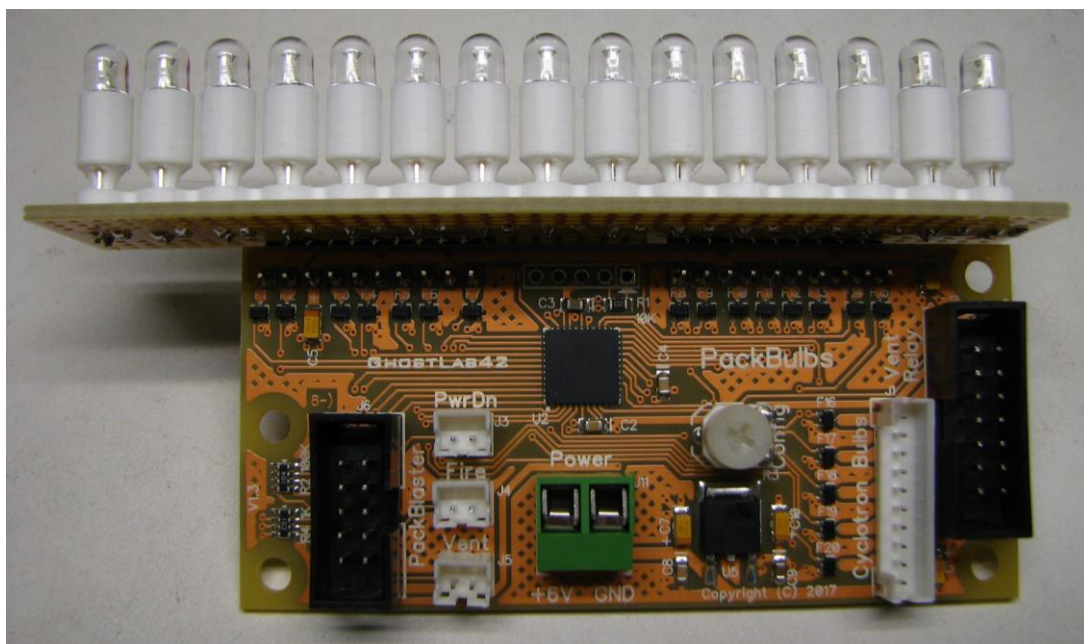
The looks are inspired by the original prop hand wired kits that used incandescent bulbs. I did offer a version of this board that used the same type of incandescent bulbs as the original prop, but many expressed interest in having a version with much lower power and higher reliability by using LEDs. The LEDs are custom made for Ghostlabs and then mounted in 3D printed bases to look like the original electronics:
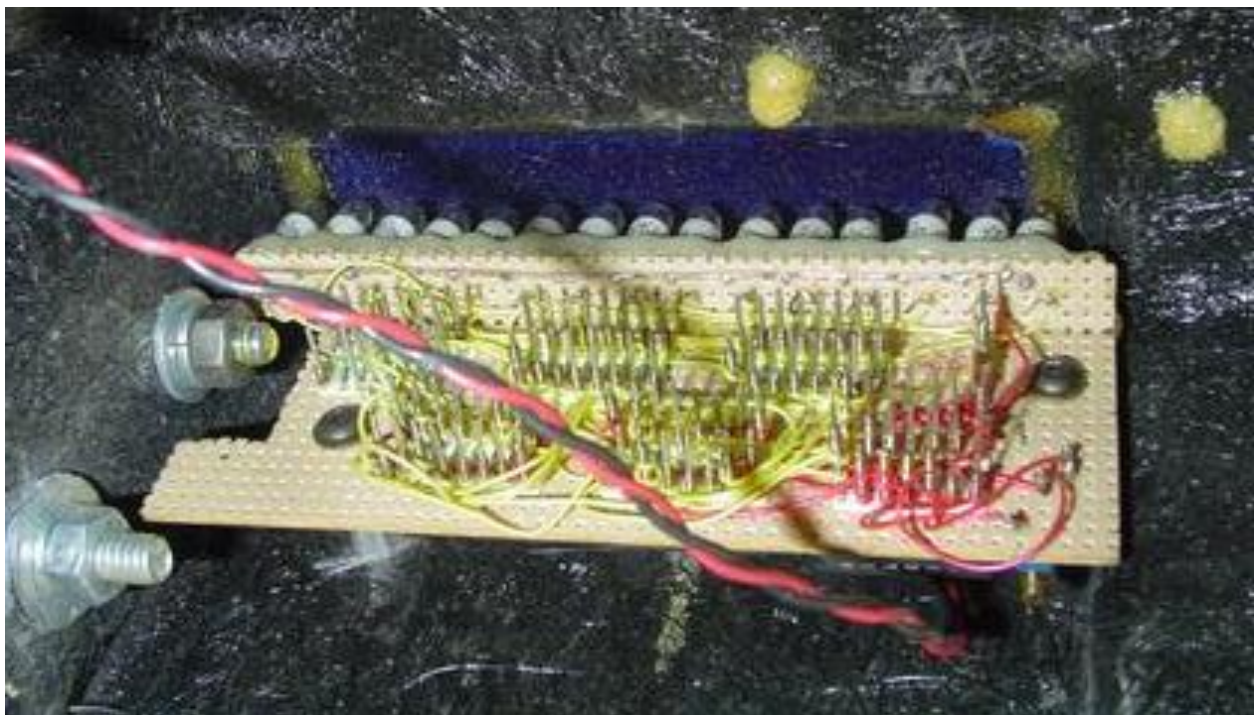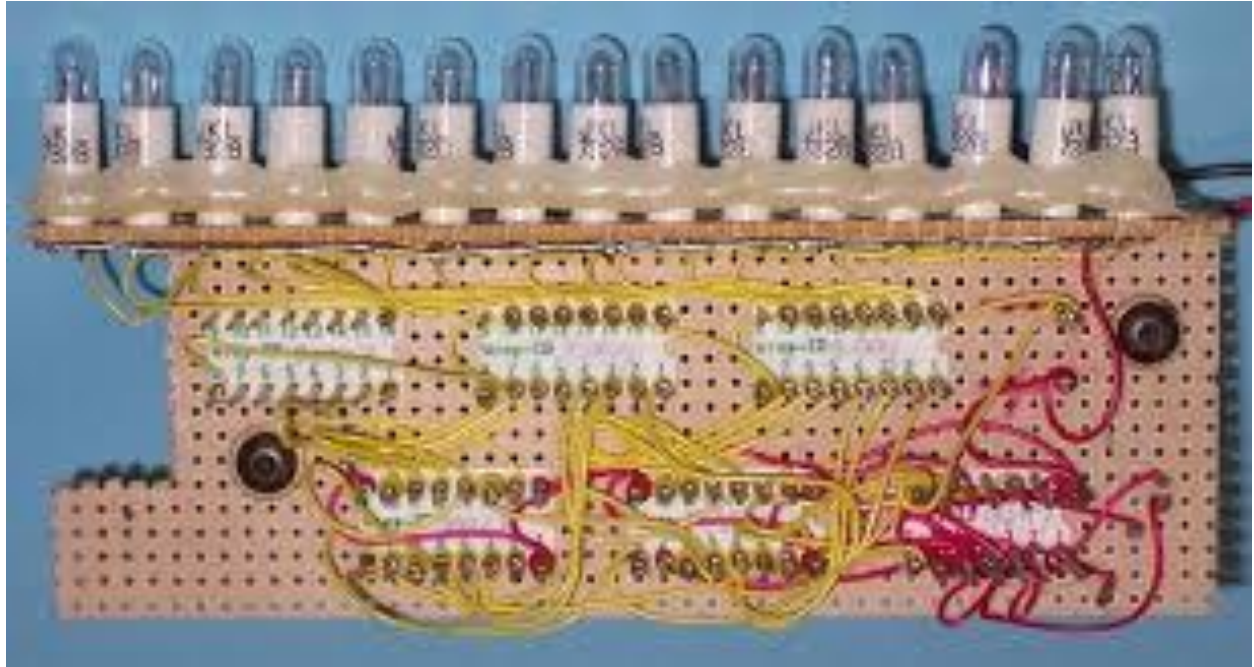
Operation and connector locations:
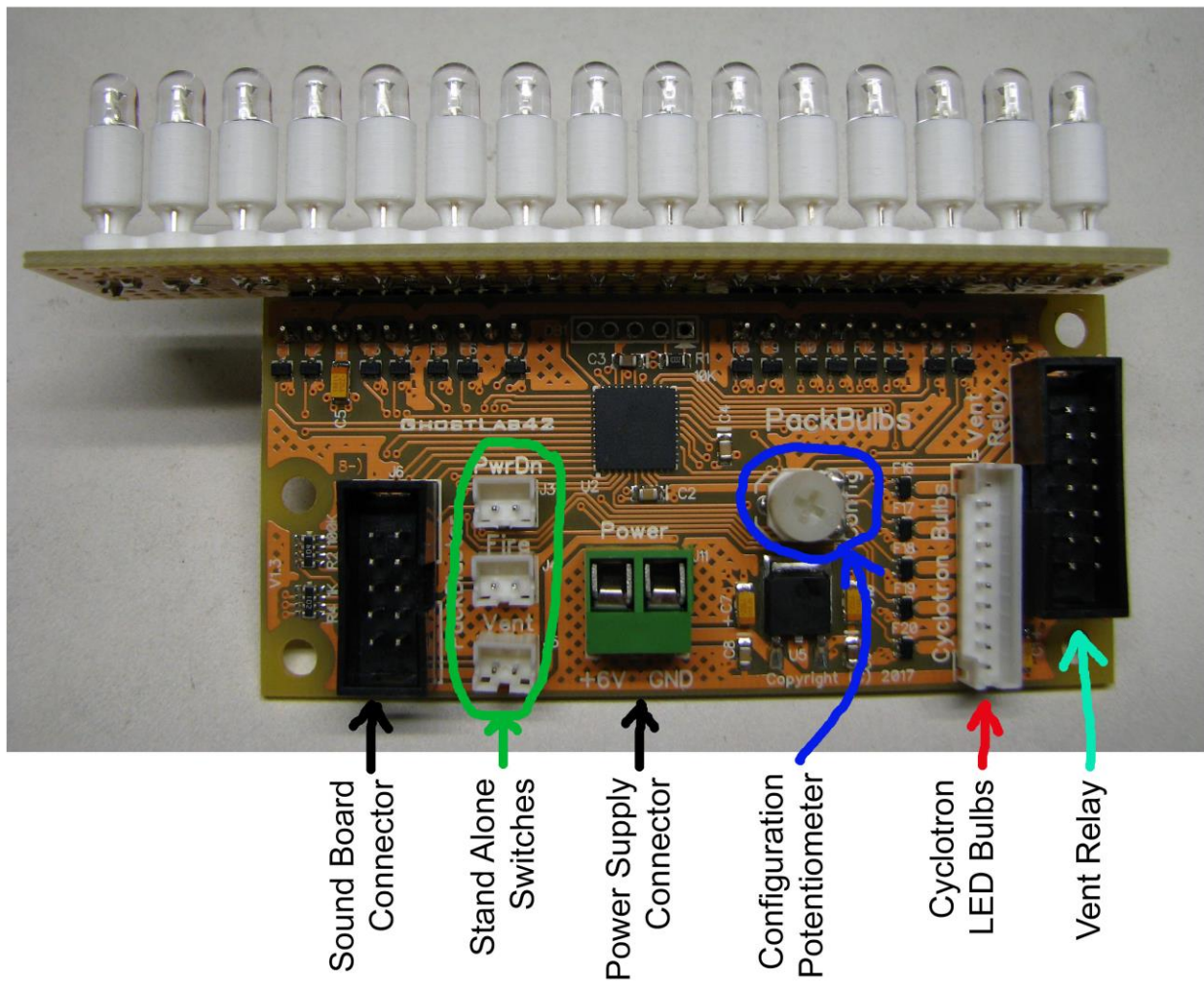
The Light Kit has a configuration potentiometer on the fron of the board to select between four main modes of operation:

1) Firmware Version Display and Cyclotron Test
   (Configuration potentiometer fully counterclockwise)
   a. The Power Cell LEDs will show the firmware version number
   b. The Cyclotron LEDs will show what is on the 4 digital inputs (all on in stand alone mode)
   c. The White Vent LED will be turned on

2) Movie Accurate Mode
   (Configuration potentiometer counterclockwise half of the range)
   a. No separate power-up sequence
   b. Each Cyclotron Light will snap on and off
   c. Rotate Counterclockwise for slower or Clockwise for faster sequencing

3) Special Affects Mode
   (Configuration potentiometer clockwise half of the range)
   a. Separate power-up sequence
   b. Cyclotron lights will snap on and fade off like in the Video Game
   c. Rotate Counterclockwise for slower or Clockwise for faster sequencing

4) Power Cell Test Mode
   (Configuration potentiometer fully clockwise)
   a. All Power Cell LEDs will be steadily on
   b. All Cyclotron and Vent LEDs are off

Back of board:
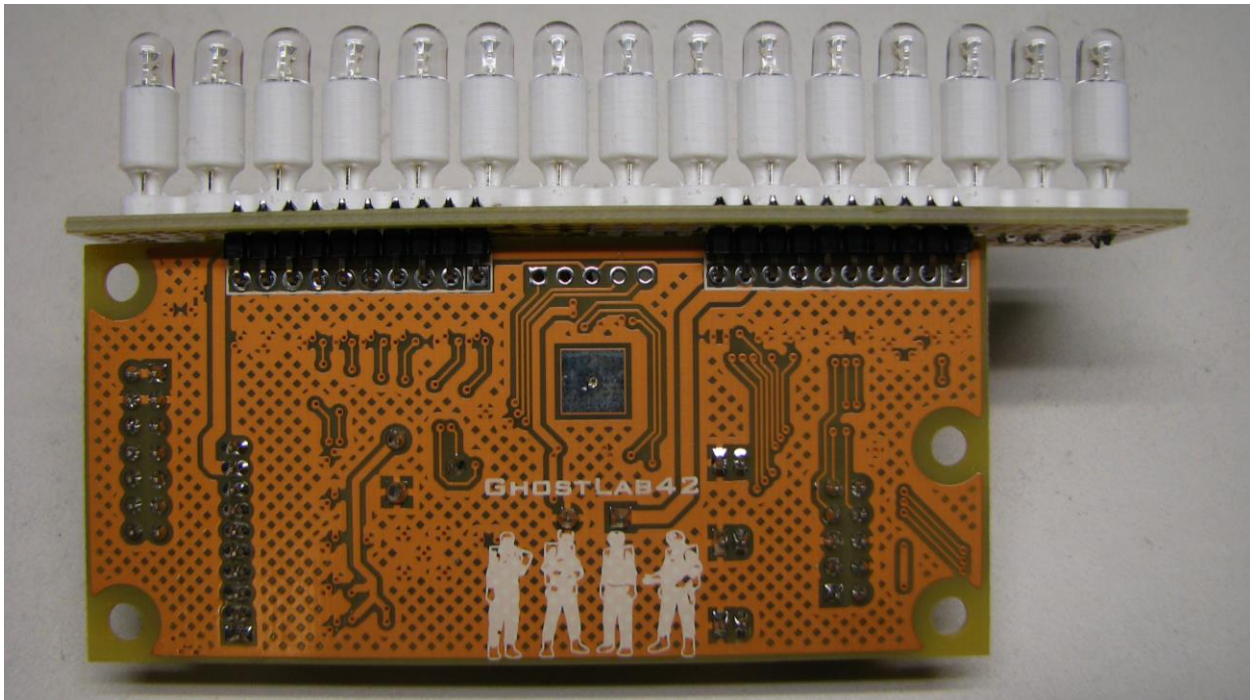
Connecting to the GBFans Sound Board

The Cyclotron LED Bulbs are on a single multi-colored cable that plugs into the 1x10 pin connector on the right side on the back of the board. Connection to the Matty Blaster or GBFans Sound Board is with the 10 pin 2x5 connector on the left right side of the board that uses the same grey colored ribbon cable that GBFans sells to connect their sound board to their powercell board. Only connect the cable to between the Sound Board and the Light Kit when the power supply and the Sound Board does not have power.

Here is what the Light Kit looks like with both the Cyclotron and Sound Board cables installed in addition to the power supply:
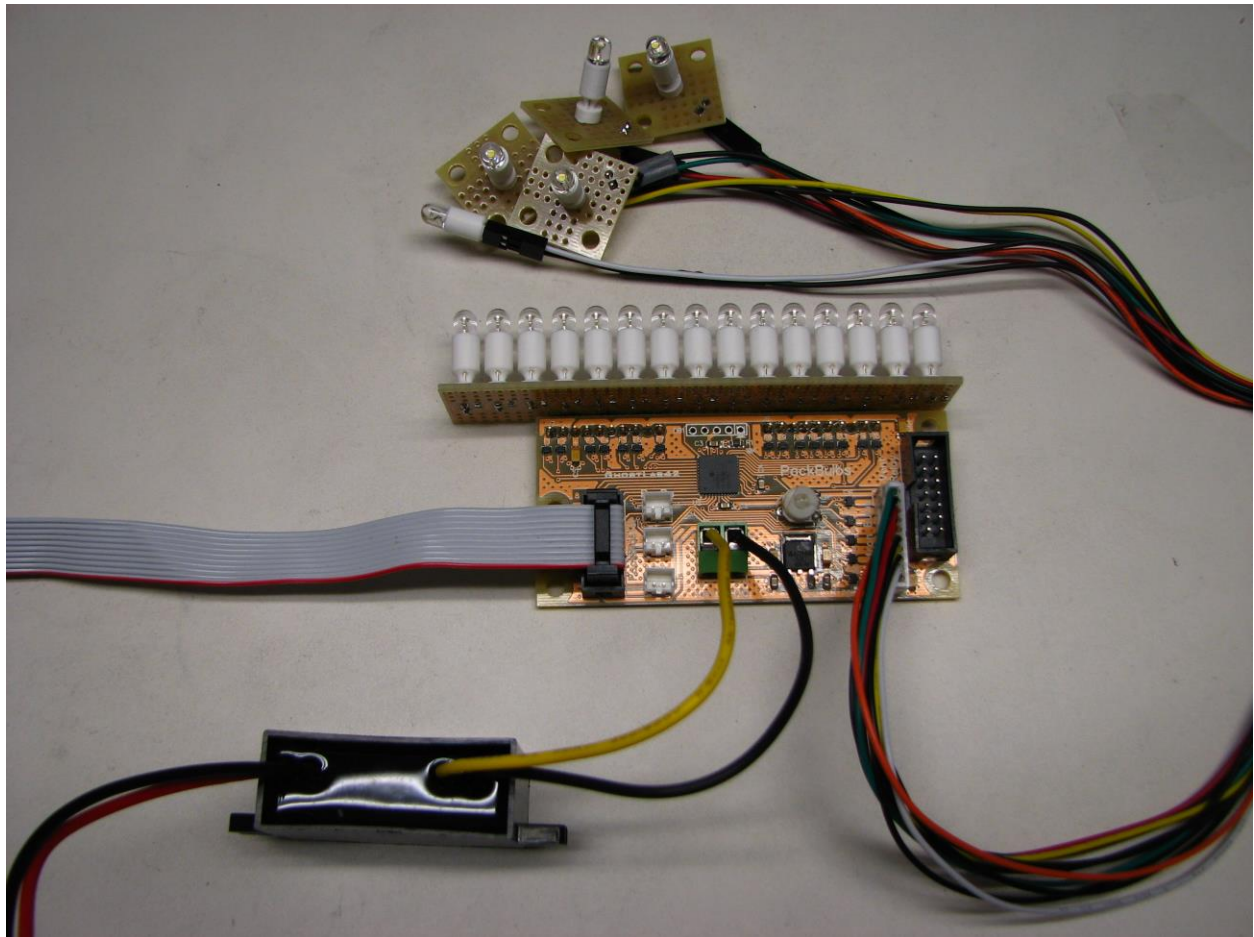
Standalone Operation

For Standalone operation, the Sound Board cable is not used. Just connect the power supply to the battery and the board will go through the powerup sequence (if selected) and then continue to operate until the battery is disconnected.

Advanced Standalone Operation

For those that are a bit more adventurous, just connect your own wires and switches to the three dedicated switch connectors. The connectors are 2mm spacing 1x2 connectors that are of the PH style.

The Standalone mode uses the three switch connections for the following:
1) PowerUp/Down toggle switch
   a. Enables a power up sequence (if the configuration allows) when the switch is open
   b. Enables a power down sequence when the switch is closed
   c. If power is applied and the switch is closed, the board waits for the switch to be opened
2) Fire momentary switch
   a. Will cause the sequence to speed up when the switch is closed
   b. Will slow back down to the normal sequence speed when the switch is open
3) Vent momentary switch (or toggle)
   a. Vent sequence when the switch is closed

The inputs each have a single ended signal and a common ground signal. Shorting the selected input to Gnd will activate a function.

These same signals are also available on the sound board connection (2x5 header) but may be more difficult to access.

Sound Board Connector Pinout:
   1: N.C.
   2: N.C.
   3: N.C.
   4: GND, connected to "Gnd" Standalone use Battery Connector
   5: GND, connected to "Gnd" Standalone use Battery Connector
   6: GND, connected to "Gnd" Standalone use Battery Connector
   7: Pack Change (Gnd = Change), has a weak 10K to 100KΩ pullup to +5VDC
   8: Vent (Gnd = Vent), has a weak 10K to 100KΩ pullup to +5VDC
   9: Fire (Gnd = Fire), has a weak 10K to 100KΩ pullup to +5VDC
   10: PowerUp/Down (Gnd = PowerDown), has a weak 10K to 100KΩ pullup to +5VDC