

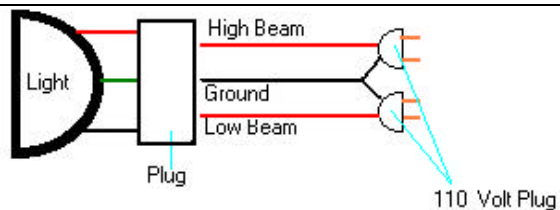
**Turn Light System for # 1 Pylon - Off Course**  
**Officials**  
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**NMPRA District 2**

The following describes our turn light system located at # 1 Pylon and how it operates at a 90 degree angle 350 feet from the center line of the course:

Four high intensity automotive headlights (One for each lane) are mounted at pylon one. These lights contain both high & low beam elements. Three prong plugs are attached to these lights and they are wired directly to two 110 volt plugs as shown below:

“Extension cords

plugs work”



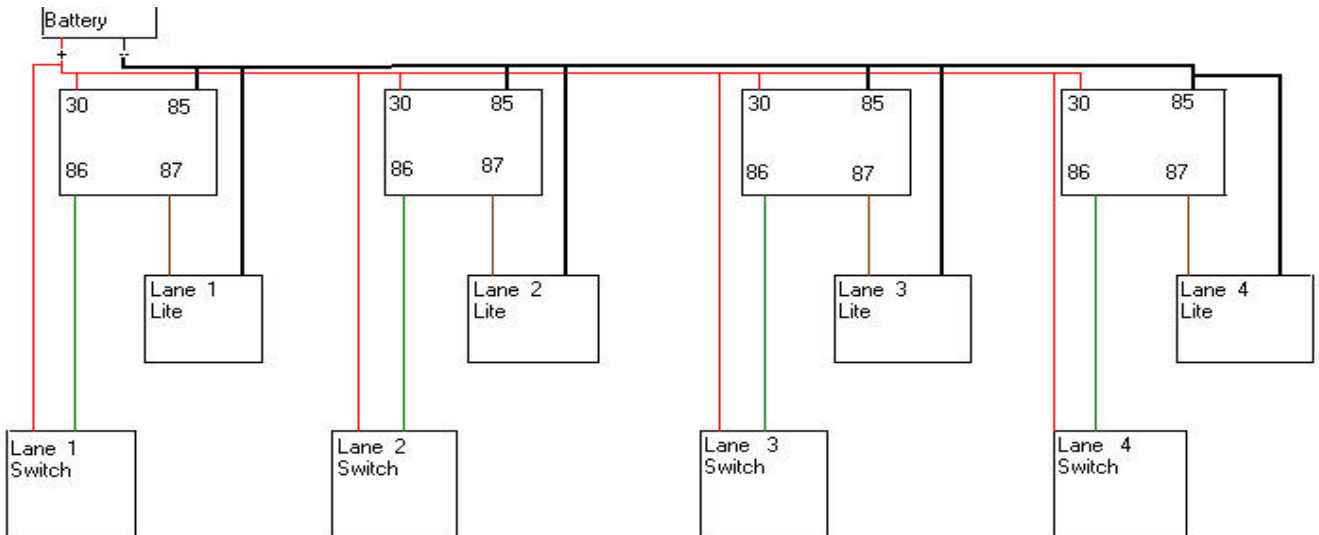
Use 14 gauge 110 volt wiring; The (3) prong plug which attaches to the headlamp can be procured from any auto parts store. Make good solder joints & use heat shrink tubing over the splices. Using the two male plugs will provide the maximum flexibility. You can plug in only the low beam if it happens to be dull day. If the day is bright you can use the high beam lamp or use both high and low beam if needed. If one beam is in use, there is still a back up incase there is a burnout.

Purchase (4) 12 volt accessory relays at an auto parts store – Part #AR274 or 1920, the approx cost is \$10.00 to \$12.00 each. These relays are cubed at

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1½ inches long on each side with a mounting lug & (5) terminals, we used (4) of the electrical terminals. The (4) relays are housed in a aluminum box that is about 10" x 6" x 3" that can be purchased at an electrical parts store for about \$20.00

Begin wiring the relays with the + &- terminals from the battery, use 14 gauge (2) conductor wire. Go to terminal 30 & 85 as shown on the diagram and then jumper inside the box to relay #2, #3, and #4. Clearly mark the Positive and negative leads to the battery. The battery is a 12 volt lead acid battery. Deep cycle batteries are a better choice because they take more abuse. The relay box, battery and the (4) lights should be located close together at # 1 pylon. Keep the wiring as short as possible.



Now do the wiring from the relays to male plugs on the turn lights. Use the female plug end from the 14 gauge extensions cords that were cut to wire the 3 prong light plugs. Solder to pin 85 & 87 of each relay so that you have (1) female plug for each of the turn lights. The diagram above shows the wiring procedure.



The switches that are used to flash the turn lights are “momentary on switches”; that is, you push and hold the switch to turn on the light. Purchase these switches at an electronic supply house. We used some  $\frac{3}{4}$  inch diameter aluminum tubing about 4 inches long with some machined end pieces to make a nice hand held housing.

All the wiring from the relays to the switches is 22 gauge wire. We used 22 gauge 2 conductor “Zip Cord” that is available at Radio shack, cut (4) pieces of wire about 2 feet long and solder them to terminals 30 & 86 of each of the relays.

The switches should be marked for lanes 1, 2, 3, and 4 as should the female plugs at the other end of the system. The male plugs at the lights should be marked for high & low beams. If you identify the wiring as you go, it will be easy. Trial & error will also work.

We purchased 350 feet of 22 gauge 6 conductor cable in a single sheath to run from outside the relay box to the switches. (1) conductor is used for each of the (4) switches plus a common ground. Wire each of the terminal 86 wires to (4) conductors in the sheathed cable. Solder all (4) conductors from terminal 30 together and attach to the 5<sup>th</sup> conductor in the sheathed cable. Heat shrink over all these soldered joints. Go to the other end of the sheathed cable & wire in the switches using 22 gauge “Zip cord” for each. The speaker wire should be long enough so that the (4) judges for #1 pylon have adequate physical separation.

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This system is light weight, simple & easy. The sheathed cable is less than  $\frac{1}{4}$  inch in diameter and the 350 feet of wire will roll onto a spool that is about 18 inches in diameter. Because the system is relay operated with the battery next to the relays, there are no line losses and the lights are bright. The 350-foot switch lines are just that, there is no time delay.

We plan to expand this system over the winter and put our cut lights at #1 pylon also. We will put (2) cut lights under each turn light - one amber & one red. Use (8) relays & a single switch box with (8) toggle switches located with the #1 pylon judges. Cuts at #2, #3 pylons will be radioed to #1 pylon and the judges will flip the cut lights. We will probably use a second battery to operate the cut lights. The wiring will be the same as described above.

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This is a map of our course with off course judging:

