

easydetect and easydetect deluxe model train detector kits

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INSTRUCTIONS AND DIAGRAMS REVISED APRIL 17TH 2012

Please note that the color of the calibration trimmer may be orange instead of the black pictured depending on what brand of trimmers are available

Features, Set Up, Calibration, User Manual, and Assembly Instructions

Thank you for purchasing our new detector circuit kit for model railroads. This kit can be used to provide a visual indication at your control panel of trains in hidden staging or it can also be used to turn on and off your crossing flashers at grade crossings

Features:

Least expensive train detector kit available

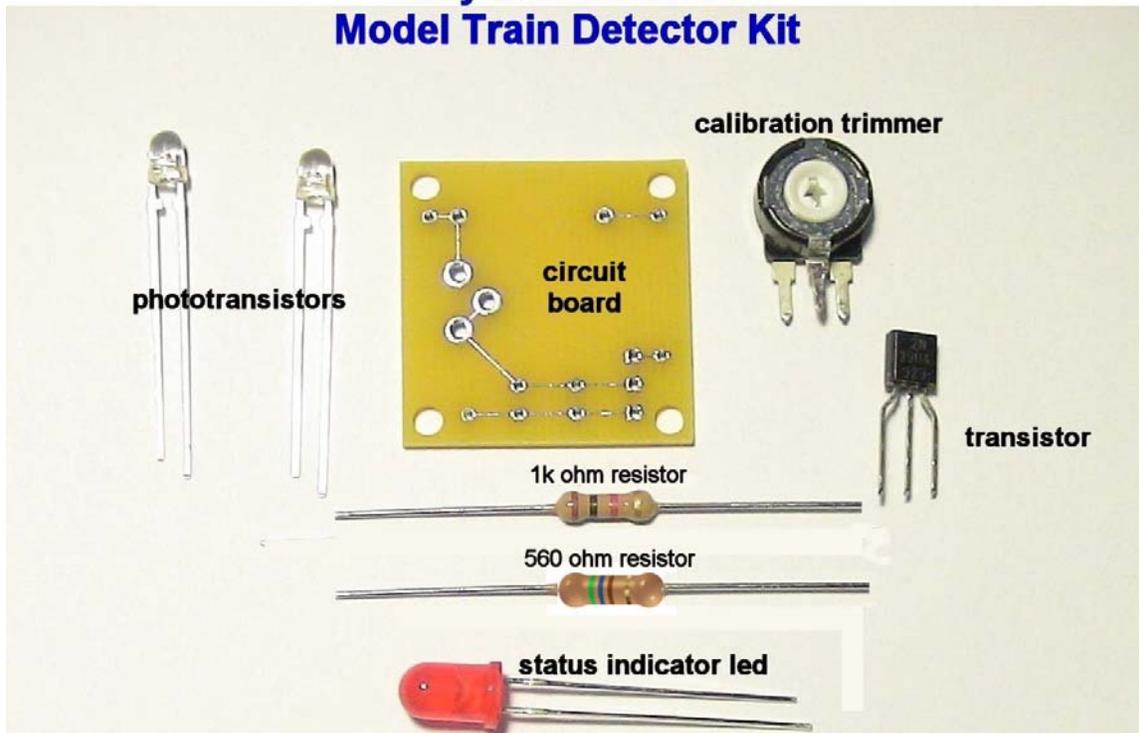
Easy To Assemble even for someone who has never built an electronic kit

Small Size so you can hide it virtually anywhere

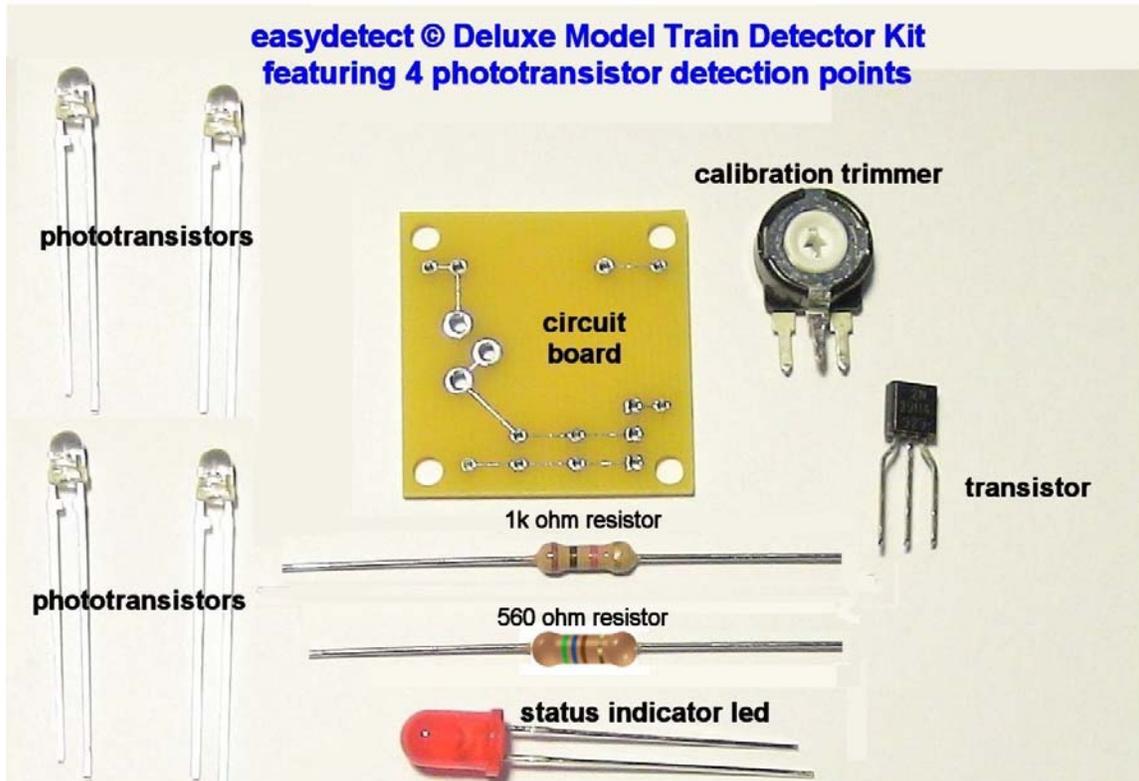
Easy to install on your layout...only 2 small holes needed between the rails, so it is almost invisible

Uses very little power – requires a 6 to 12 volt dc power supply, and uses only 10-20 milliamps

**easydetect © 2011
Model Train Detector Kit**



**easydetect © Deluxe Model Train Detector Kit
featuring 4 phototransistor detection points**



Before we go any further let's discuss the various means of detecting a model train and their advantages versus disadvantages.

1. Current Detection. In a current detection scenario, your layout is divided into electrical blocks. When a locomotive enters that block it draws current that can be detected. This is how real railroads detect trains. Unfortunately to do this on a model railroad, more than just the first locomotive needs to draw current. This means you have to equip all or most of your cars with resistors or resistive paint between the wheels. For this reason we did not use current detection, because you would have to spend a bunch of money and time to modify all of your cars.
2. Optical Detection. This is the method our detector uses, in a very simple, inexpensive way. Our circuit uses 2 phototransistors (or 4 phototransistors in our Deluxe Kit) to detect the ambient light on your layout. When something...a loco or car covers at least one of the phototransistors, the detector circuit is activated. This is like an electronic switch that is turned on or off depending on whether it senses light or darkness. You can use our easydetect circuit to turn on a led at your control panel so you know where on your layout a train is located....useful in hidden staging yards, or to turn on and off a crossing flasher kit...like the one we sell. The disadvantage to our circuit is that there must be enough light on your layout (there is a calibration adjustment you can make to adjust for most lighting levels, more on this later....) and if you are using it to turn on/off a crossing flasher, your train must be long enough that the 1st phototransistor will still be covered by a car as your locomotive goes over the 2nd phototransistor. Of course there are other optical detectors that either use ambient light, or infrared emitter/detectors, but they are a lot more expensive....in some cases 3 times as much !

ASSEMBLING YOUR DETECTOR KIT

You will need the following tools and supplies to assemble and install your detector kit:

.....Small pencil size soldering iron with fine tip

.....Rosin core solder

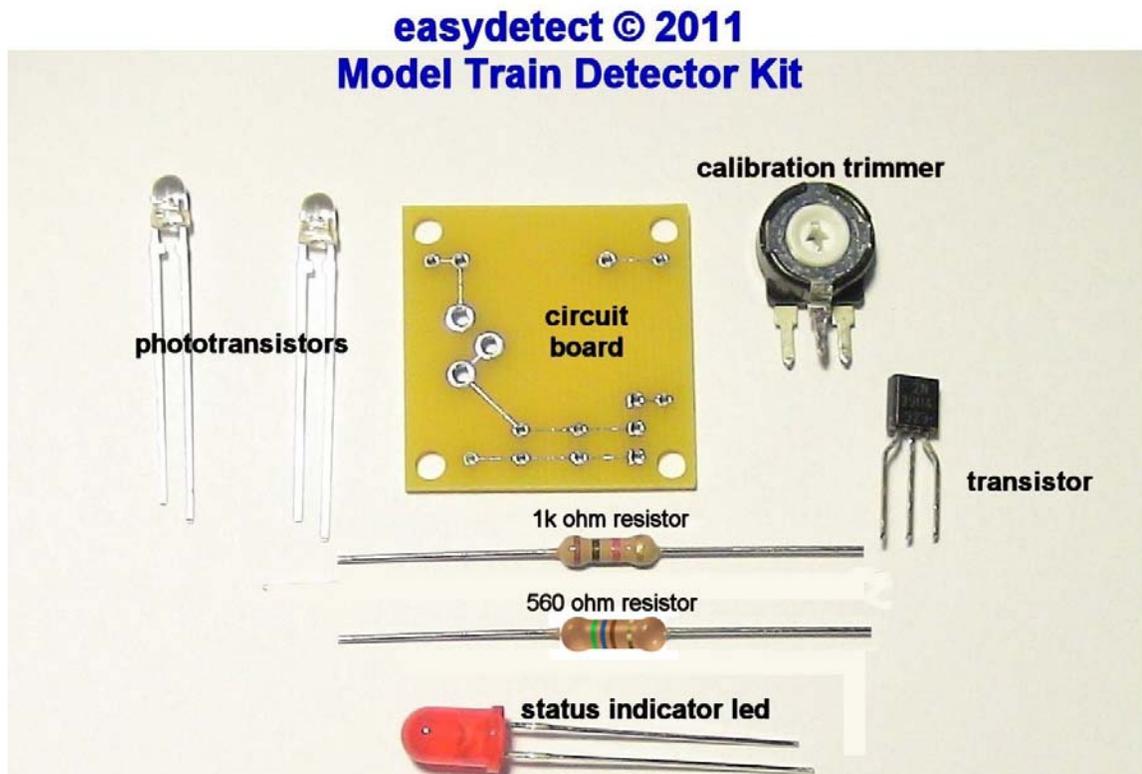
.....some small diameter (24-30 gauge) wire to connect the phototransistors to the circuit board, wire to connect to your 6 – 12 volt DC power supply, and wires

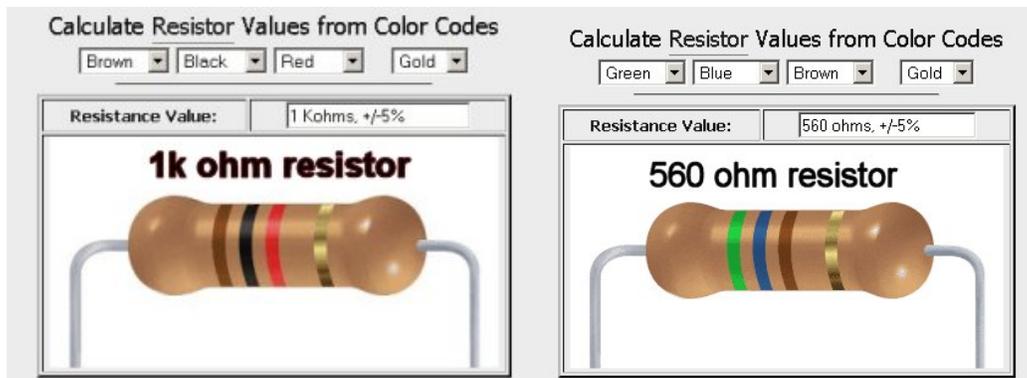
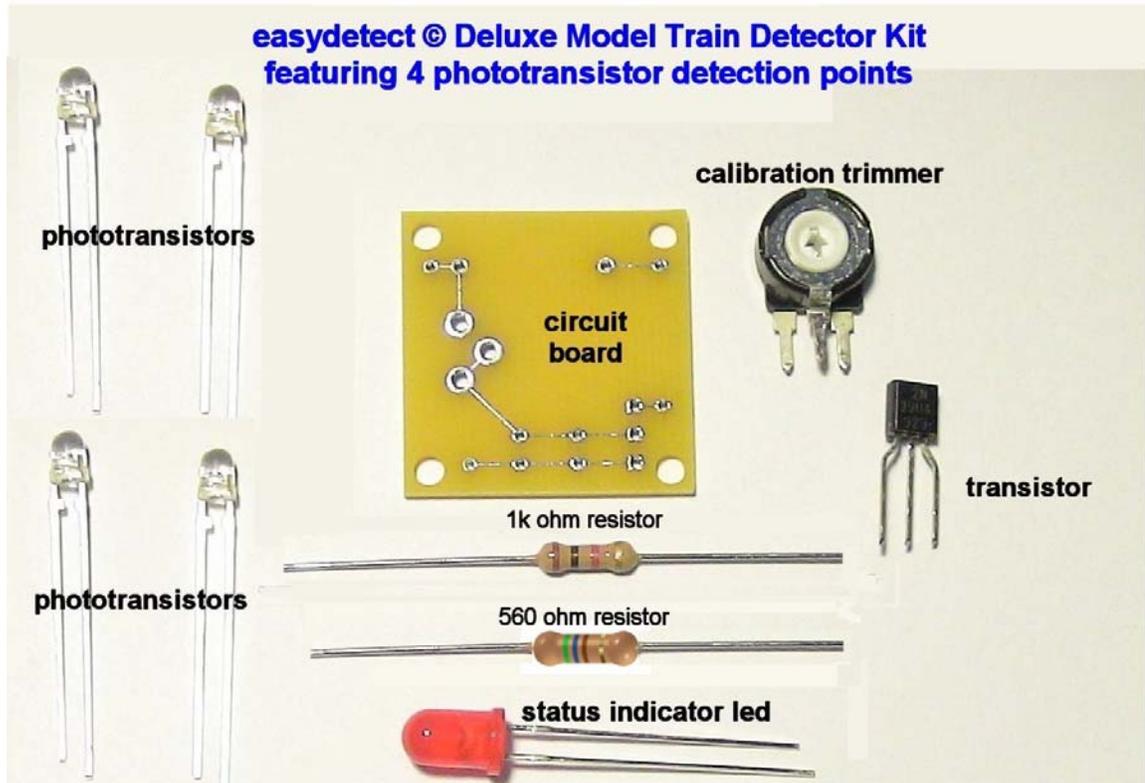
to connect to your load. Your load can be our crossing flasher kit, or an led mounted on your control panel

.....heat shrink tubing or electrical tape to insulate the leads of the phototransistors

.....drill to make holes between the rails of your model railroad track for the 2 phototransistors

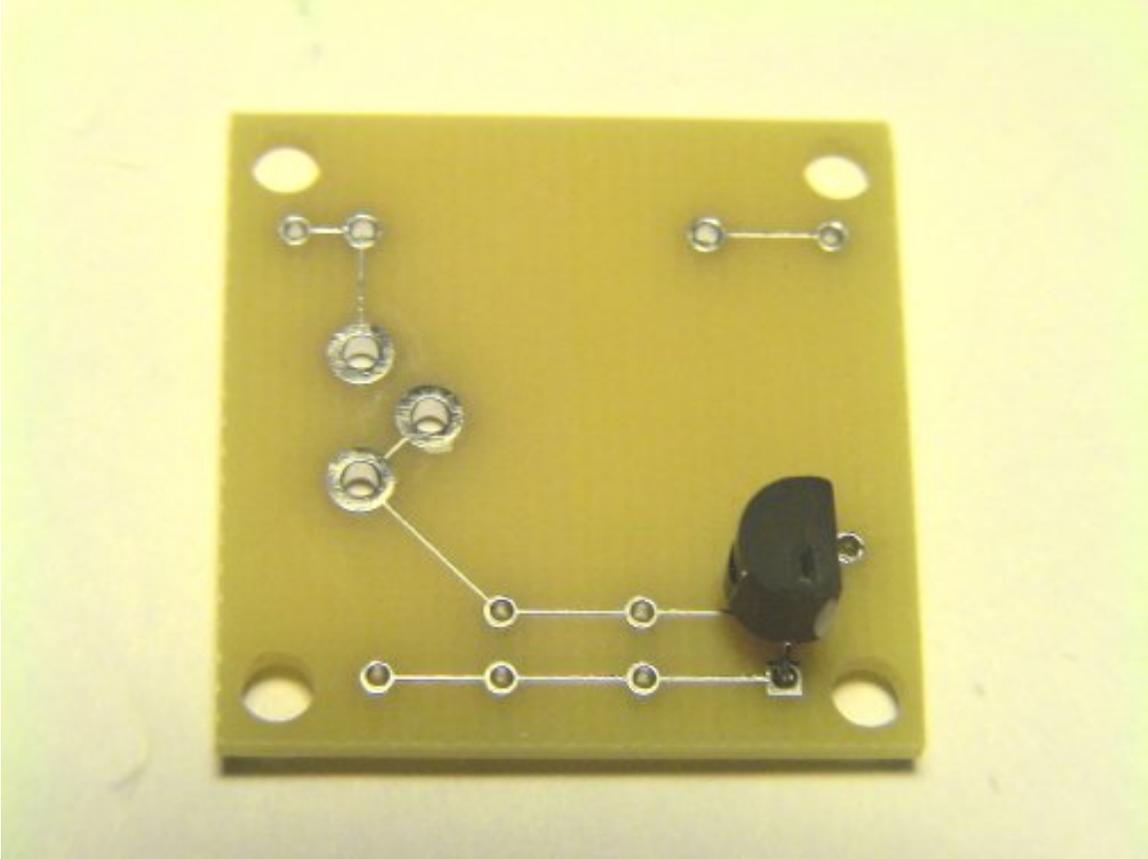
Please look at the picture below to identify the parts, and where the parts go on the circuit board – note that the phototransistors look just like 3mm leds



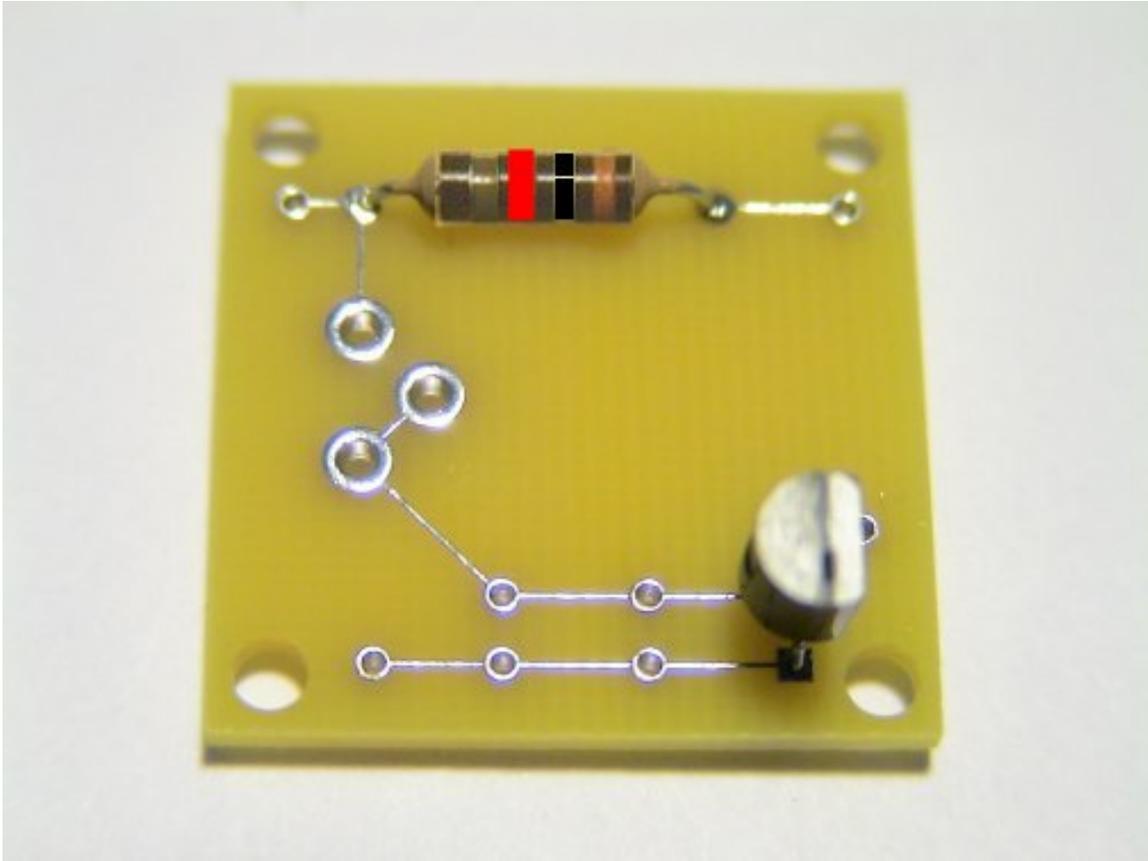


1. make sure the board is laying face up so that the silver lines between the holes are laying face up as shown

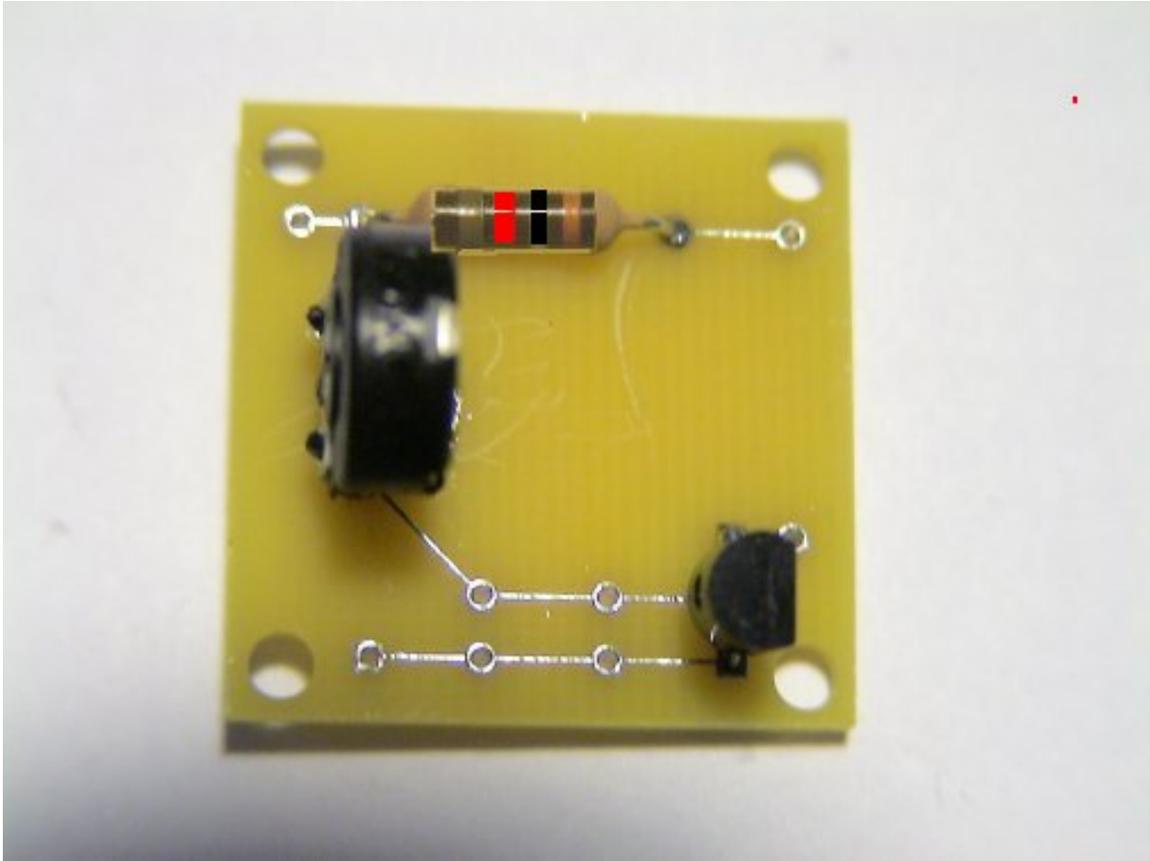
start by placing the 2n3904 transistor thru the 3 holes in the circuit board and solder in place....please note the transistor has a rounded side and a flat side, so **make sure you install the transistor the right direction as it appears in the pictures – flat side facing out** – clip off the excess length of the transistor leads on the bottom of the board after soldering



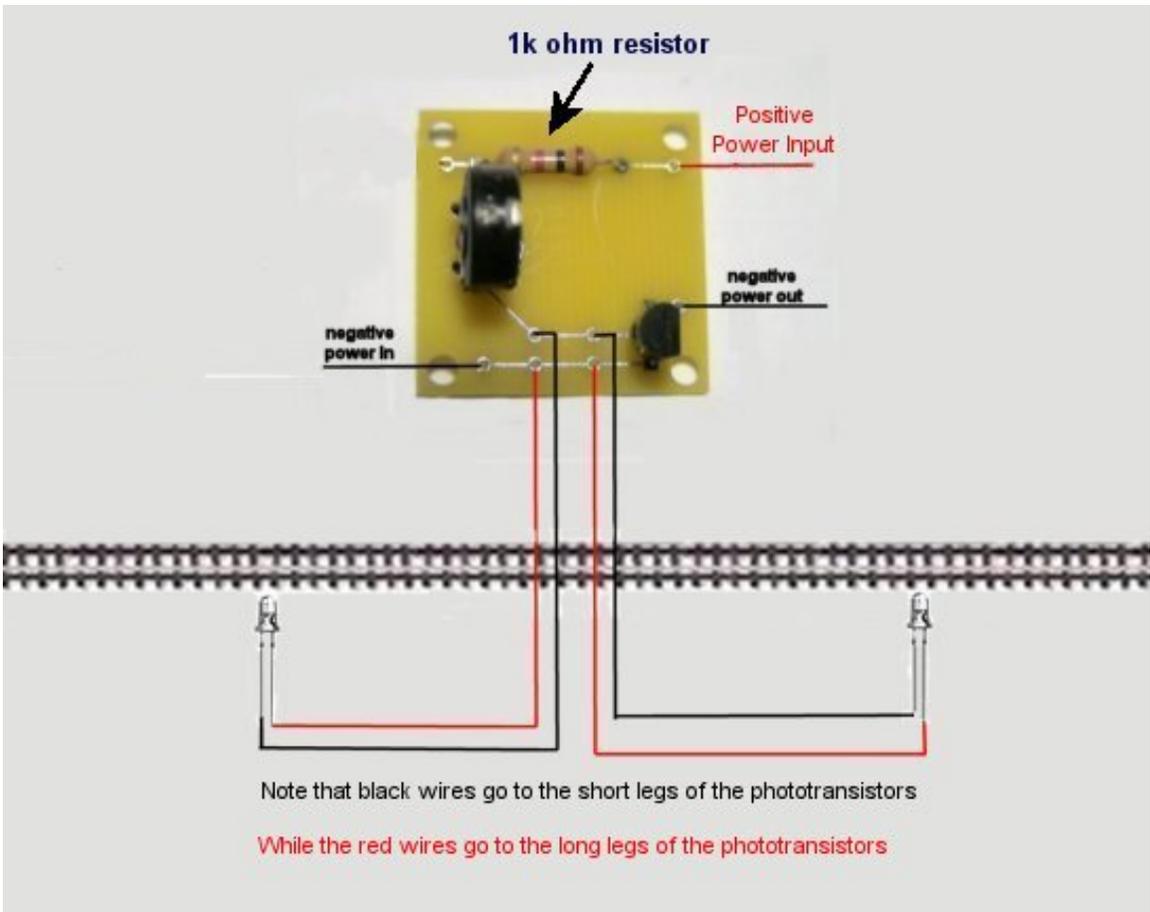
3. place the board resistor (1k Ohm – brown –black – red – gold)
as shown and solder in place
note it does not matter which end of the resistor goes where
clip off the excess length of the resistor leads on the bottom of the board after
soldering



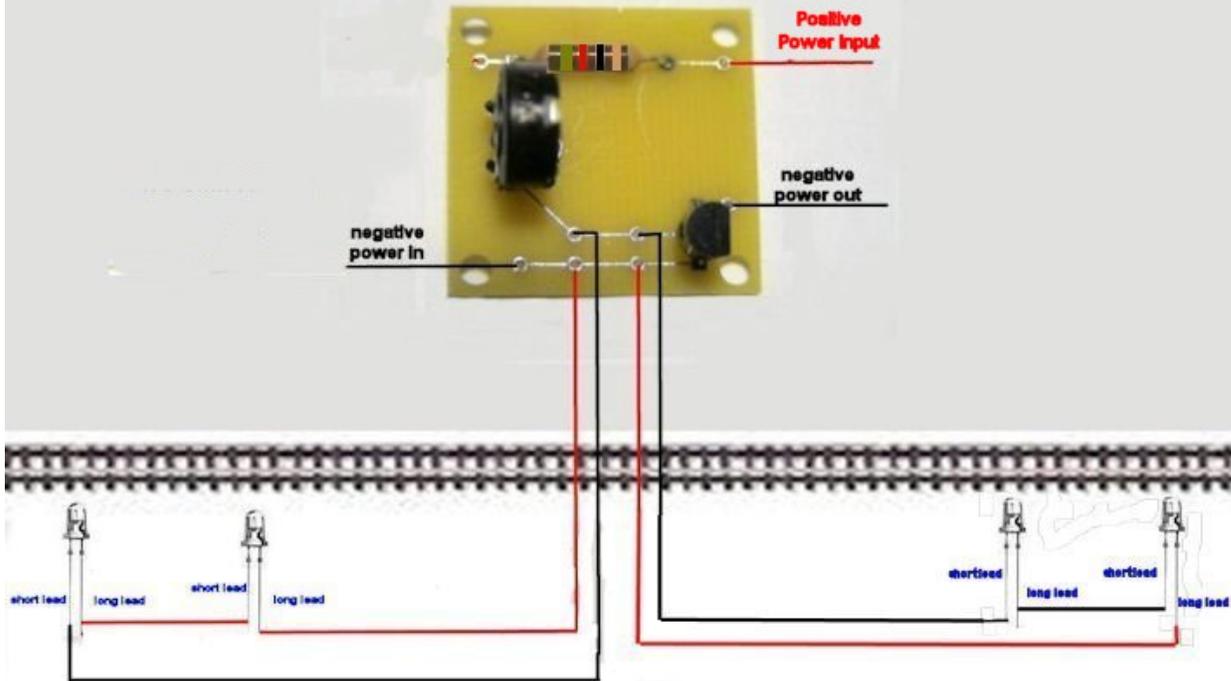
4. place the calibration trimmer in the holes as shown and solder in place



5. place color coded wires in the holes to run to the phototransistors

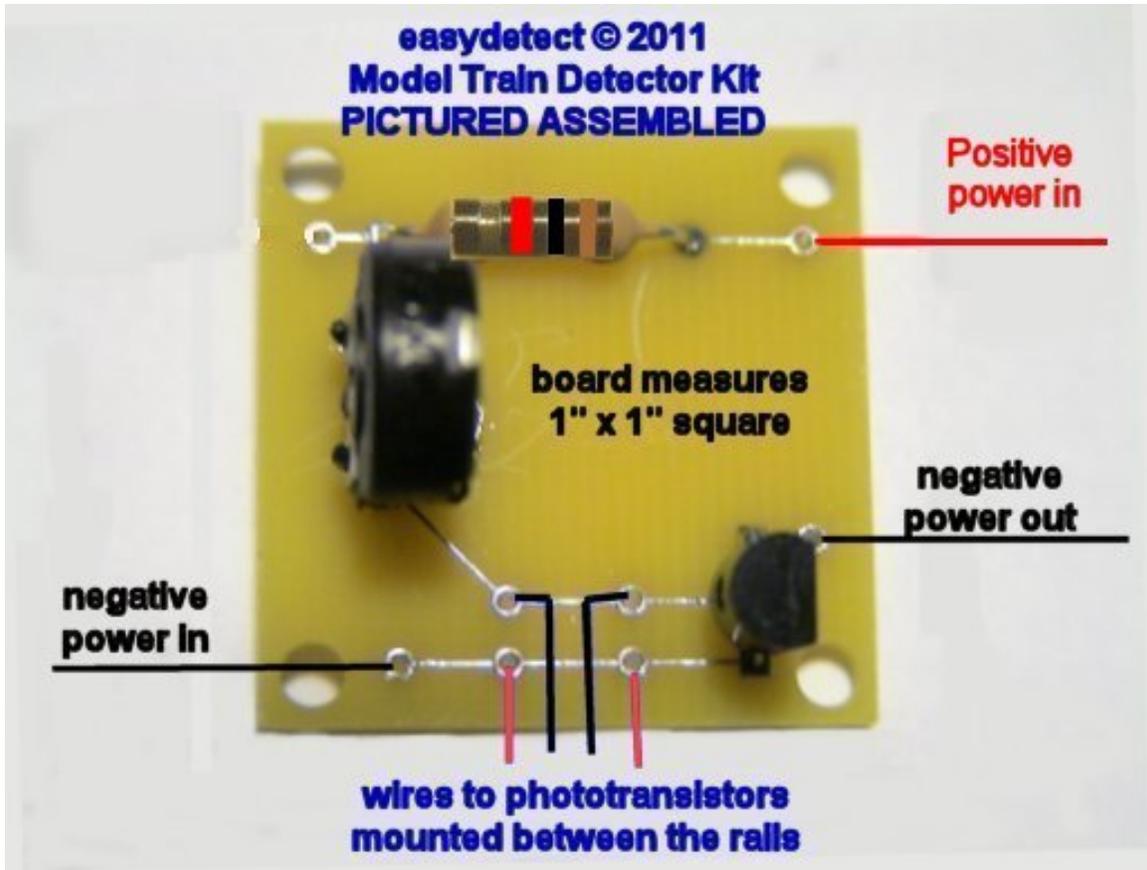


Phototransistor wiring diagram



easydetect © - deluxe detector with 4 phototransistor detection points

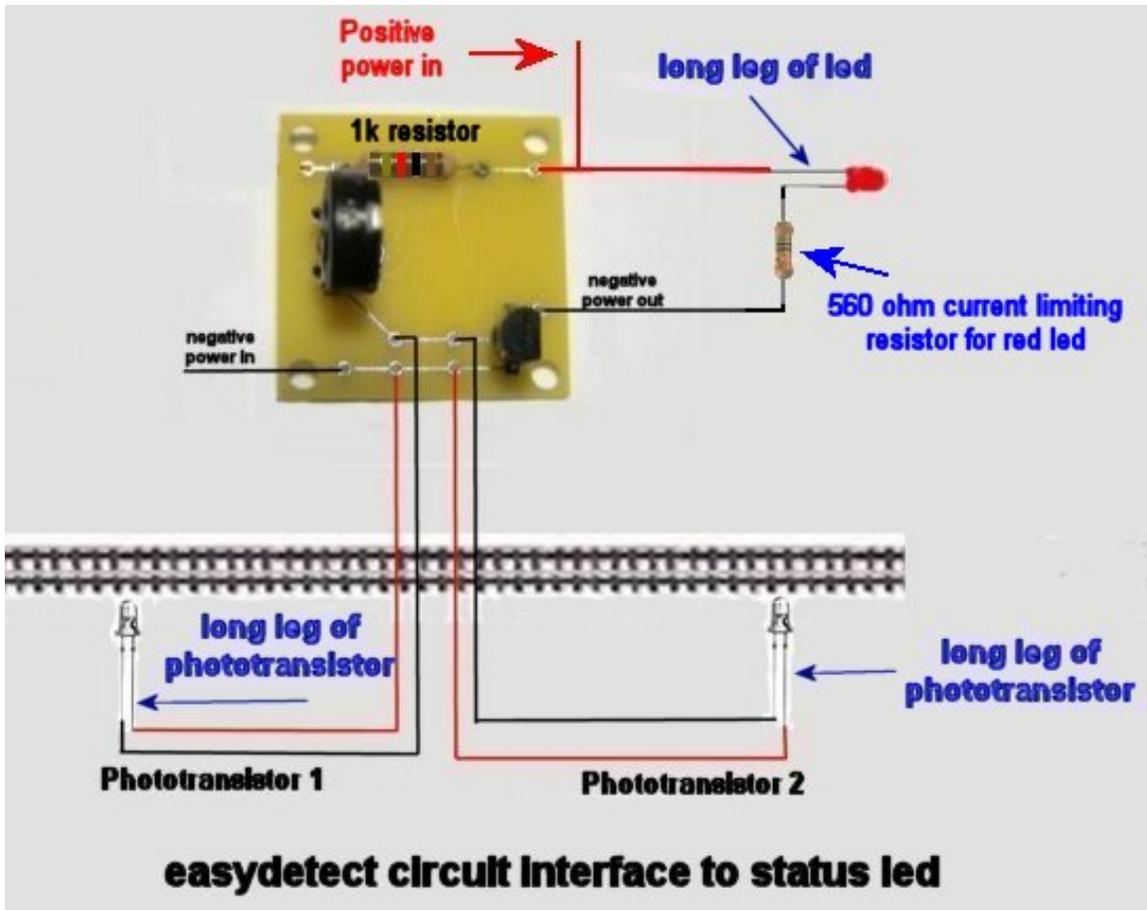
- determine how far apart you want to place the phototransistors, and trim the wires to length
- either slip some heat shrink tubing over the ends of the wire before soldering the wires to the phototransistors, or use electrical tape to insulate the legs of the phototransistors – make sure that the long leg of each phototransistor is soldered to the correct color coded wire that then goes to the correct hole on the circuit board
- Drill holes between the rails where you want your phototransistors to detect the train and insert the phototransistors in the holes so the rounded tops are facing upwards
- solder color coded wires in the holes as shown for power to the kit and power to control your load – follow the pictures and don't get them mixed up as connecting the kit backwards could destroy the kit



Calibration, Testing, and Connecting to other Circuits

We supply the kit with a red led for testing and calibration purposes...if all you need is to know where your train is at, you can mount this led at your control panel by using some long wires

Below is the Wiring Diagram for connecting your Red Status Indicator Led that is supplied with the kit



Apply 6-12 volts DC power to the power input wires on the kit as per the picture above

If the lights are fairly bright in your layout room the red led should light up when you cover either one of the two phototransistors with your finger.

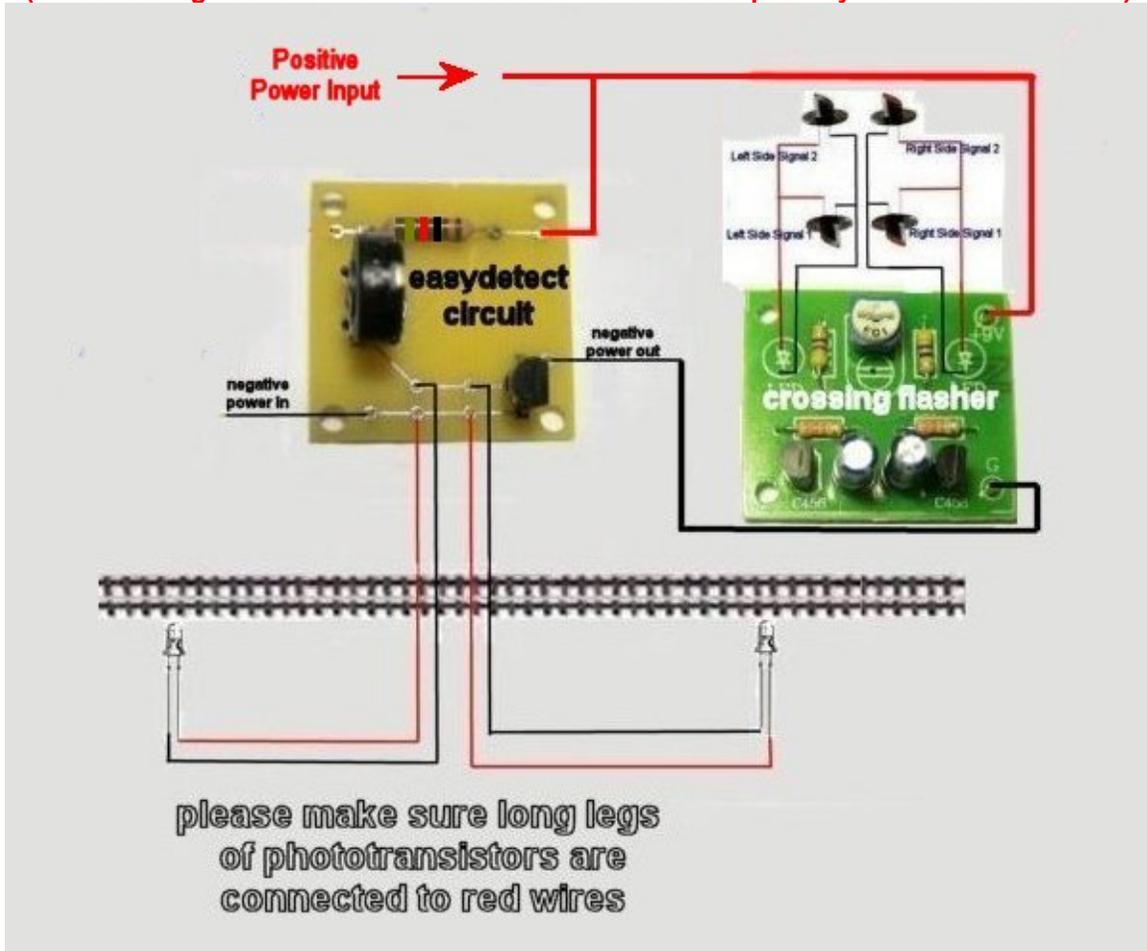
If the red led does not light when you cover either one or both of the phototransistors, then while keeping at least one of the phototransistors covered, take a small screwdriver, and turn the calibration trimmer until the red led turns on...

start by turning the calibration trimmer a small ways to the right then cover either one or both of the phototransistors, again.....by turning to either the left or right you should find a spot where the status led turns on when you cover one of the phototransistors....

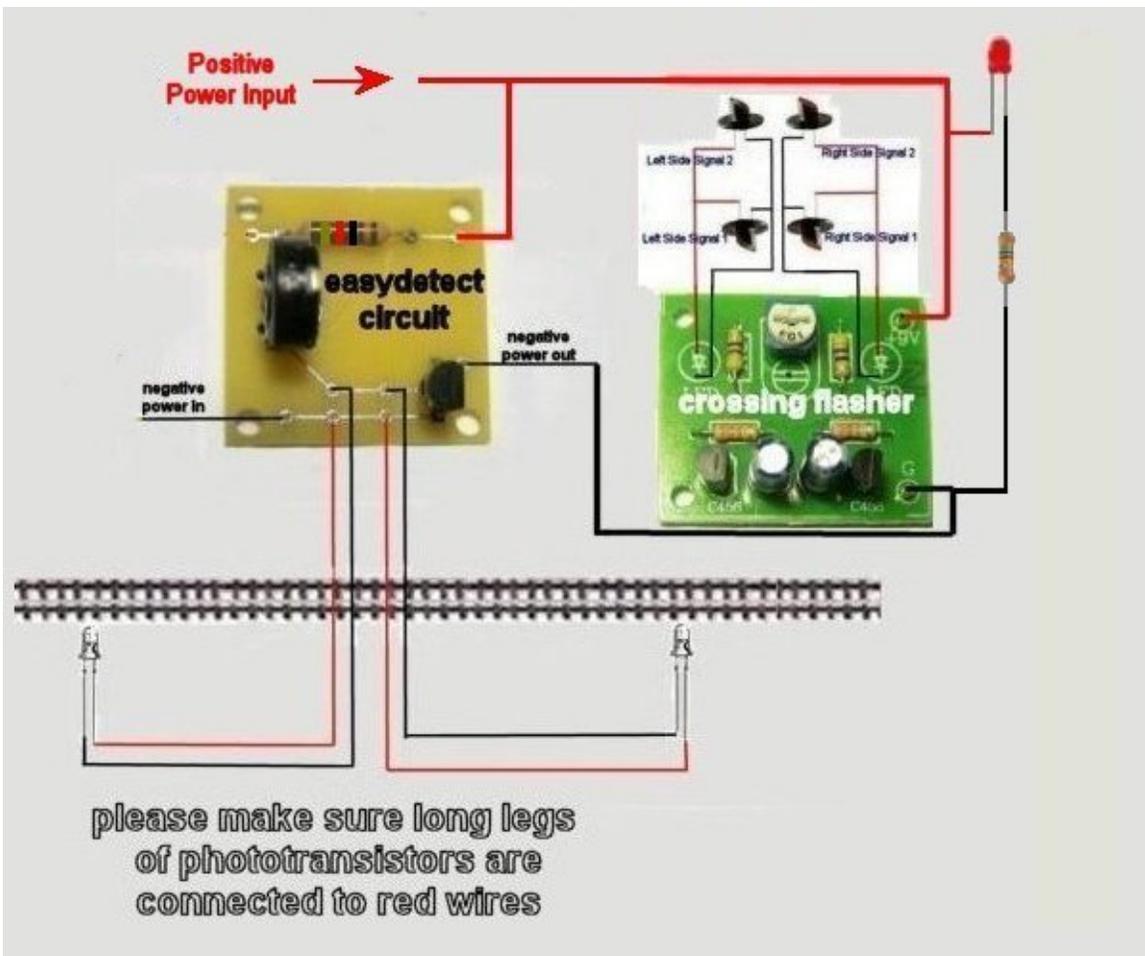
if you still cant get it to work, try increasing the light in you layout room...maybe try a small clamp on lamp over one of the phototransistors...and try adjusting the calibration trimmer again...it should work....

Below is the wiring diagram for interfacing to our Crossing Flasher Kit

(The crossing flasher kit is not included but is for sale separately from the detector kit)



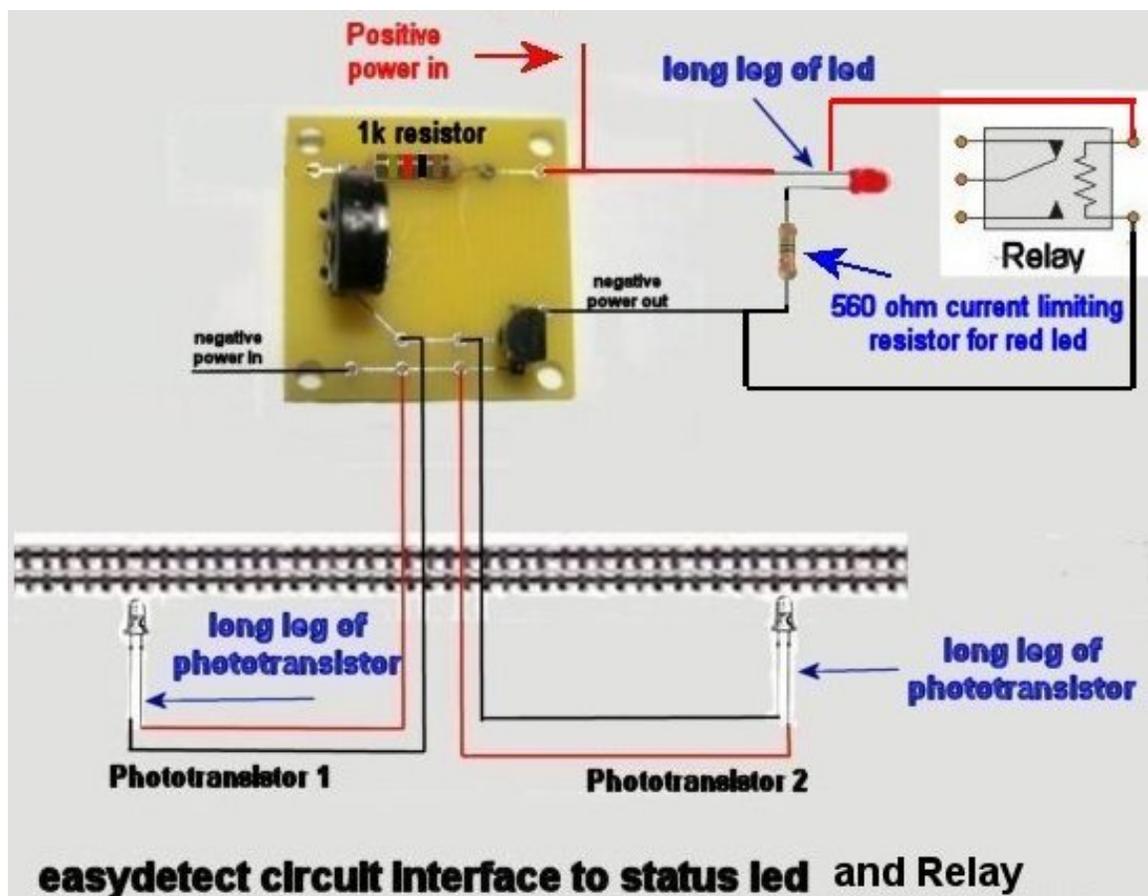
Below is the wiring diagram for interfacing to our Crossing Flasher Kit and the Red Status Indicator both at the same time



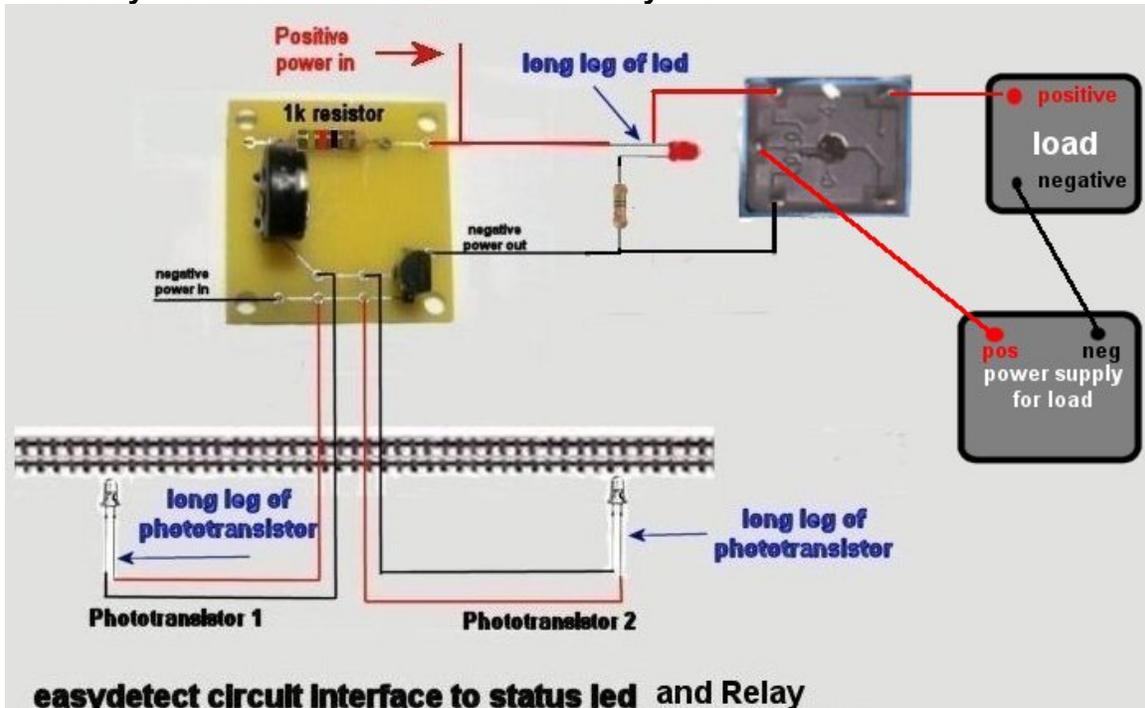
BELOW IS OUR WIRING DIAGRAM FOR INTERFACING OUR DETECTOR KITS TO A 12 VOLT DC RELAY

Pictured below is a wiring diagram for interfacing with a generic 12 volt DC relay Things to bear in mind when interfacing to a relay

1. Relay Selection: your relay must be a relay whose coil will operate reliably with 12 volts dc and 20 milliamps or less of power
2. Your power supply for you load should not exceed the relays contact rating



Pictured below is a wiring diagram showing how to interface with the 12 volt relay we sell in our Detector with Relay Kit



Things to bear in mind when interfacing to a relay

3. Relay Selection: your relay must be a relay whose coil will operate reliably with 12 volts dc and 20 milliamps or less of power
4. Your power supply for you load should not exceed the relays contact rating

see the pictures below for proper placing of your phototransistors and extra lighting options if your layout room has dim lighting

CONGRATULATIONS - That's ityou are done.....

Troubleshooting

If the red led does not come on regardless of which way or how far you turn the calibration trimmer then check the following

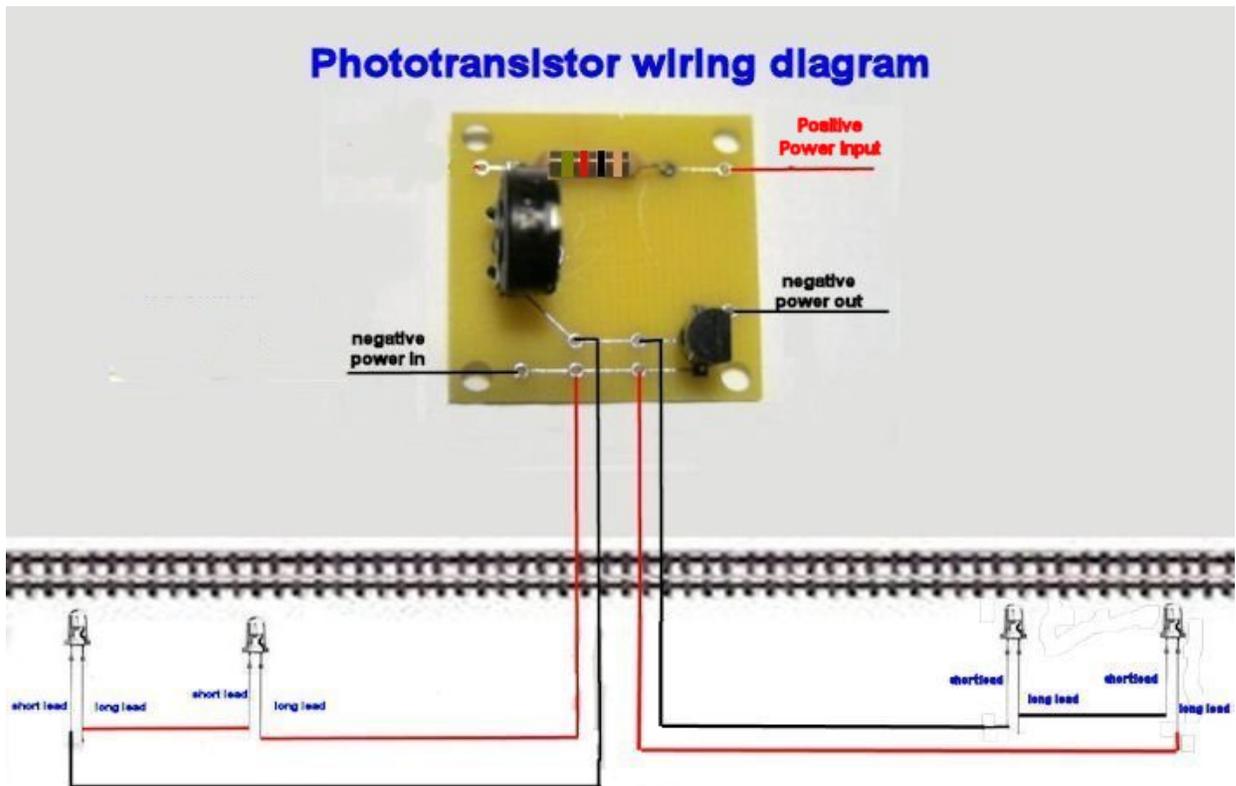
1. are the phototransistors wired correctly so that the long leg of each phototransistor is connected to the correct wire that goes to the correct hole?

2. check to see that all your soldering connections are nice and strong
3. check to see that the 2n3904 transistor is installed facing the right direction
4. check to see that you have the positive and negative wires that power the kit are connected correctly to you 6 - 12 volt dc power source
5. MAKE SURE YOUR POWER SUPPLY IS DC NOT AC
6. check to see that your 6 - 12 volt power supply is turned on...you can check that by connecting the red led/ 560 ohm resistor combination directly to your 6 - 12 volt dc power supply...make sure the 560 ohm resistor is soldered to one leg of the led or it could blow up the led
7. check to see that the red led is wired correctly, if it is backwards, it wont hurt the kit, but it wont light up either
8. the detector will not work if you turn the lights off in your layout room or if the lights are not bright enough. One way around this would be to install light posts on your layout above the phototransistors...see diagram below
9. Remember that at least one of the phototransistors need to be covered for the detector circuit to be activated. If your train is too short, you could have a situation where the detector comes on when the engine covers the first phototransistor, but shuts off before the train reaches the crossing because the 1st phototransistor gets uncovered before the 2nd phototransistor gets covered

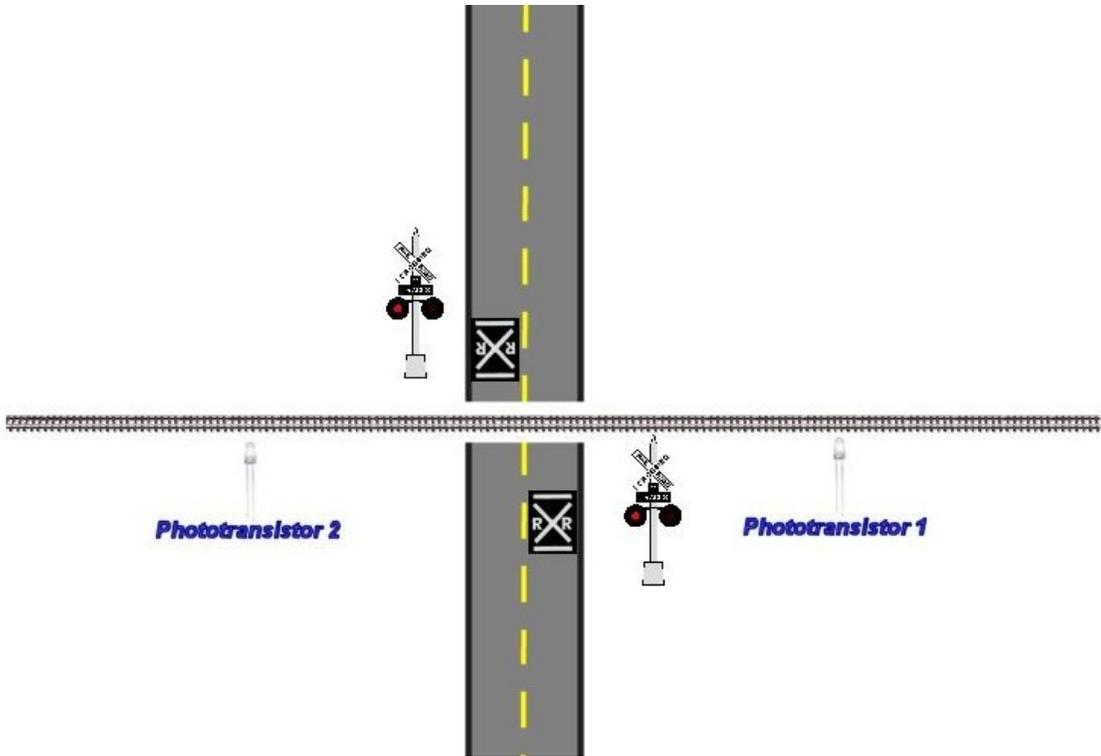
Thanks again for purchasing our new train detector kit
If you have any questions or problems please call us at 503-377-8247 or
email sales@quickar.com

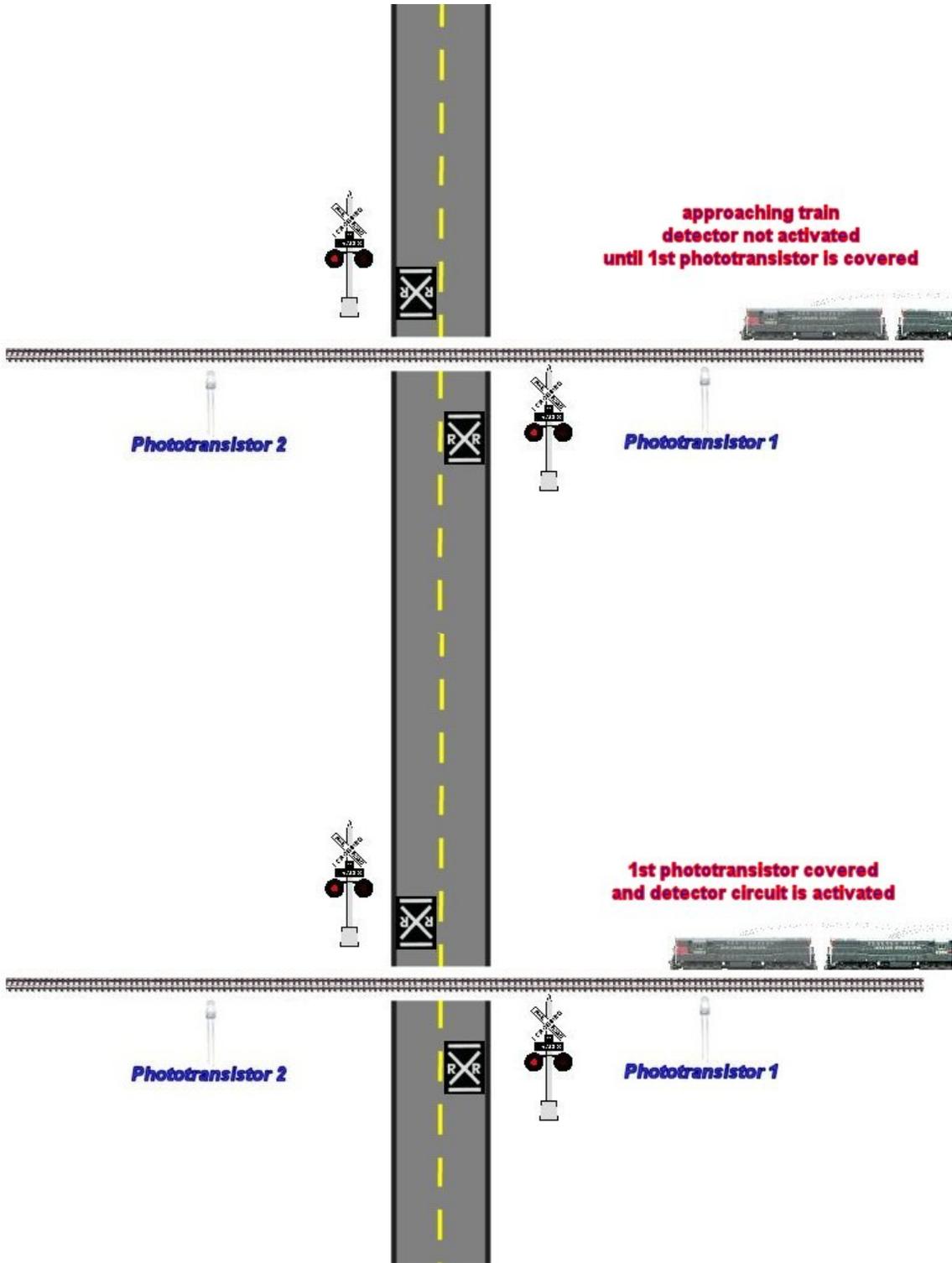
**see illustration below for proper spacing of
your phototransistors and for wiring the**

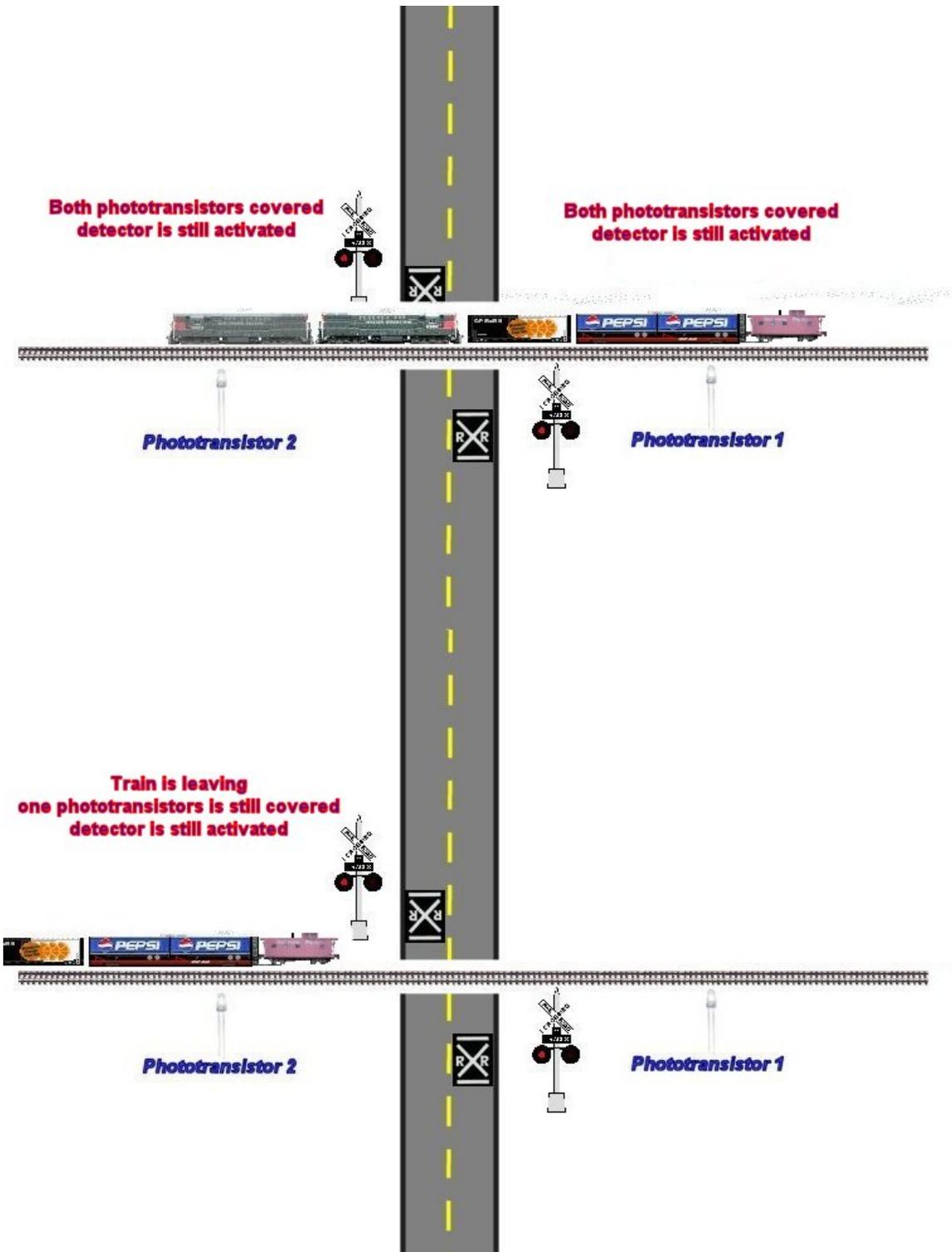
phototransistors in our Deluxe 4 Point Detector kit

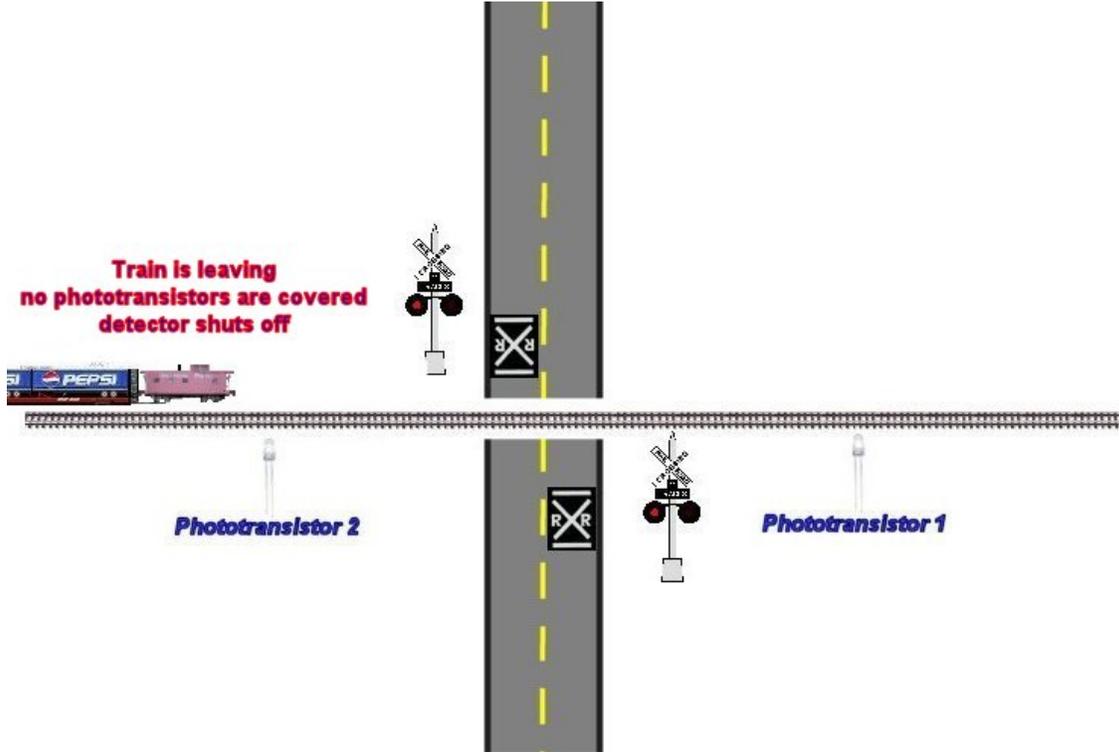


**easydetect © - deluxe detector
with 4 phototransistor detection points**





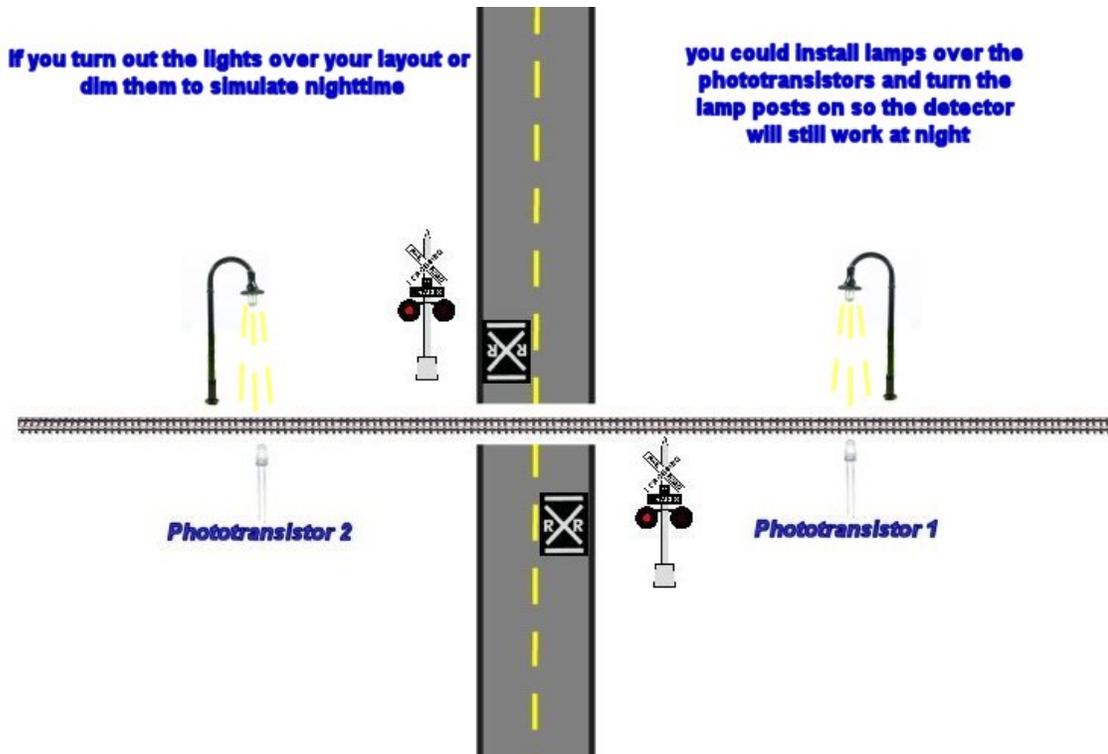




As shown in the above pictures, Please note that as long as at least one of the phototransistors is covered the detector is still activated, so if the train stops and backs up, as long as at least one phototransistor is covered, the detector will work.

Things to remember before buying or installing your detector kit so your detector kit works properly

10. the detector will not work if you turn the lights off in your layout room or if the lights are not bright enough. One way around this would be to install light posts on your layout above the phototransistors...see diagram below

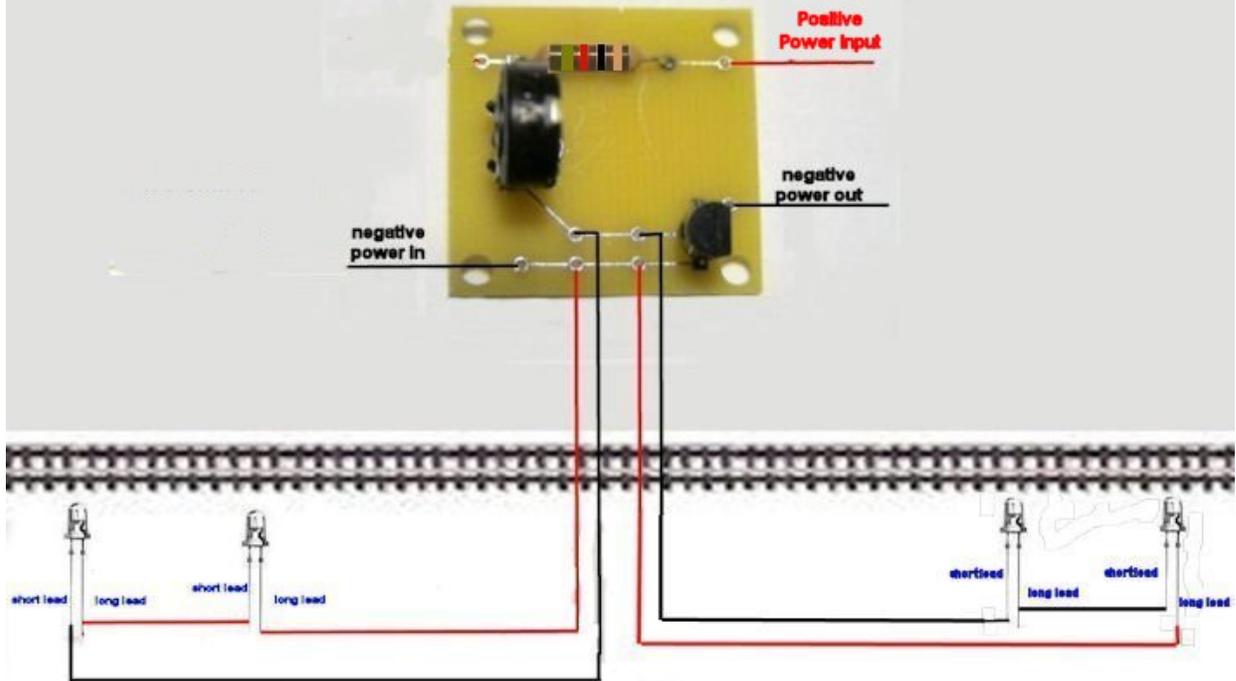


Things to remember before buying or installing your detector kit so your detector kit works properly

11. Remember that at least one of the phototransistors need to be covered for the detector circuit to be activated. If your train is too short, you could have a situation where the detector comes on when the engine covers the first phototransistor, but shuts off before the train reaches the crossing because the 1st phototransistor gets uncovered before the 2nd phototransistor gets covered. **See picture below...The remedy is to either move the two phototransistors closer together, or use a longer train or you can purchase our Deluxe Detector Kit that features 2 extra phototransistors for a total of 4 detection points**

See Wiring Diagram Below for wiring the 4 phototransistors in our Deluxe Detector Kit

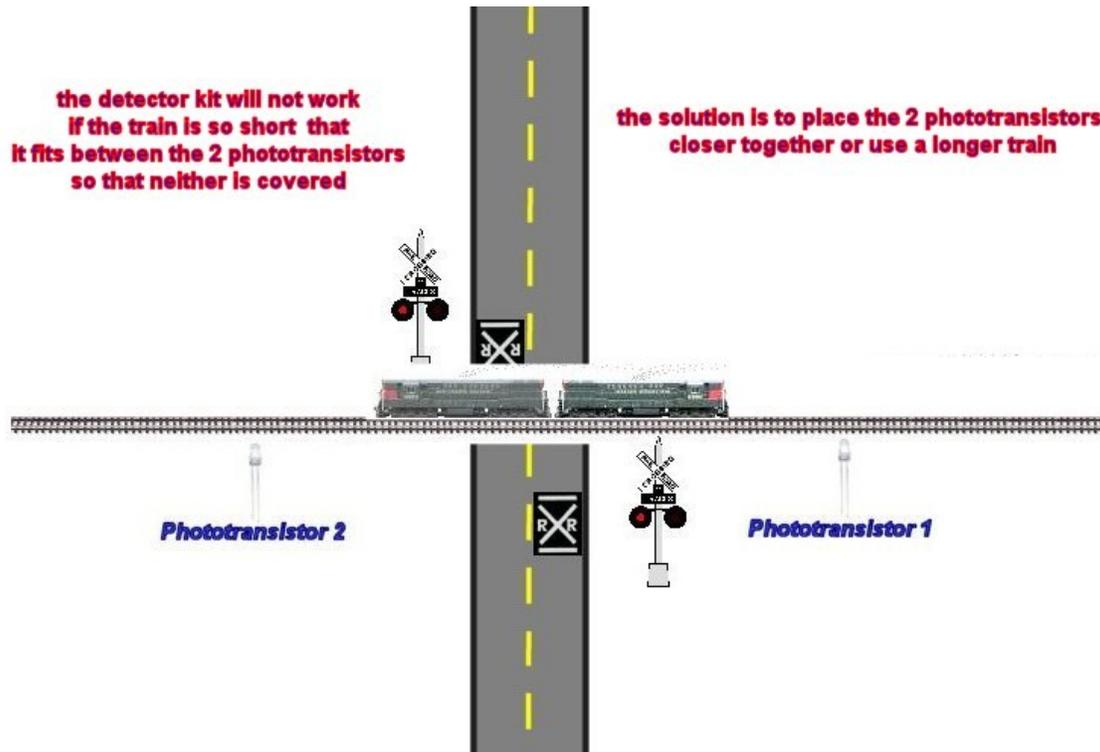
Phototransistor wiring diagram



easydetect © - deluxe detector with 4 phototransistor detection points

**the detector kit will not work
if the train is so short that
it fits between the 2 phototransistors
so that neither is covered**

**the solution is to place the 2 phototransistors
closer together or use a longer train**



**Thanks again for purchasing our new train detector kit
If you have any questions or problems please call us at 503-377-8247 or
email sales@quickar.com**