

# Clinic Handout

## Occupancy Detector Project by *Glenn Edmison*

### Introduction

If you have a hidden staging yard, tunnel, or area of your layout that is out of visual range, this may be a project that solves the problem. Since it is separately powered, it would serve either DC or DCC layouts. It works by blocking a light source from reaching a photo detector mounted between the tracks. This turns on a red LED mounted on a control panel, or wherever you may need it to be. It is a simple circuit, quick and easy to build.

### Tools

Needle-nosed pliers    Wire cutter/stripper    Soldering iron    Breadboard  
LED tester    Multimeter.    Test mounting board.

### Supplies

Tinned solid wire, 22 or 24 awg    Stranded Hookup wire, 24 awg, red and black  
Scrap solid wire, 22 or 24 awg.    Rosin core solder    Rosin flux    Plastic tubing, 1/8 ID  
Shrink tubing, 3-64

### Parts

PC Board (with center busses)	Radio Shack # 276-150
PC Terminal connectors, (3 per circuit)	Jameco 161067 or All Electronic Ter-202
LEDs T-1 3mm Red, water clear	Jameco 114673
Resistors    1 K <sup>^</sup> - 1/4 watt carbon film	Mouser 291-K-RC
4.7 K <sup>^</sup> - 1/8 watt	Jameco 109089
Photo dectectors    200K <sup>^</sup> -3K <sup>^</sup>	Jameco 202403
Diode 5.1v, 1/2 watt Zener	Jameco 179047PS
Transistor NPN PN 2222A NPN #SKU-	Jameco 178511PS
Shrink tubing 3/64 X 4'-0" black	All Electronics HUG-364B
Shrink tubing 3/64 X 4'-0" red	All Electronics HUG-364R
wire 24 awg, stranded black	All Electronics 24-100 bk
wire 24 awg, stranded red	All Electronics 24-100 rd
Misc wire 24/22 awg solid red and black	scrap box

### The Circuit

## **Procedure**

- Step 1 Cut PC busses to separate card into two halves
- Step 2 Jumper from + to outside 1<sup>st</sup> row 3
- Step 3 1K-1/4 w resistor
- Step 4 Jumper - to left pair 3 inside
- Step 5 Jumper -5 left inside to 11 outside 3
- Step 6 Jumper - 12 to 8 outside 3
- Step 7 Jumper + 5 left inside to + outside 3
- Step 8 4.7 K<sup>^</sup> resistor +6 right to 11/3 center
- Step 9 Zener diode +7 closest 3
- Step 10 Transistor TD 92 flat side out to + 6,7,8 three center
- Step 11 6 terminal posts. Power, Photocell, LED
- Step 12

**Power.** I am using a surplus Bachman power supply set at about 3.6 volts output to operate 14 detectors