

EZTronic Installation Guide for Occupancy Detectors

Introduction

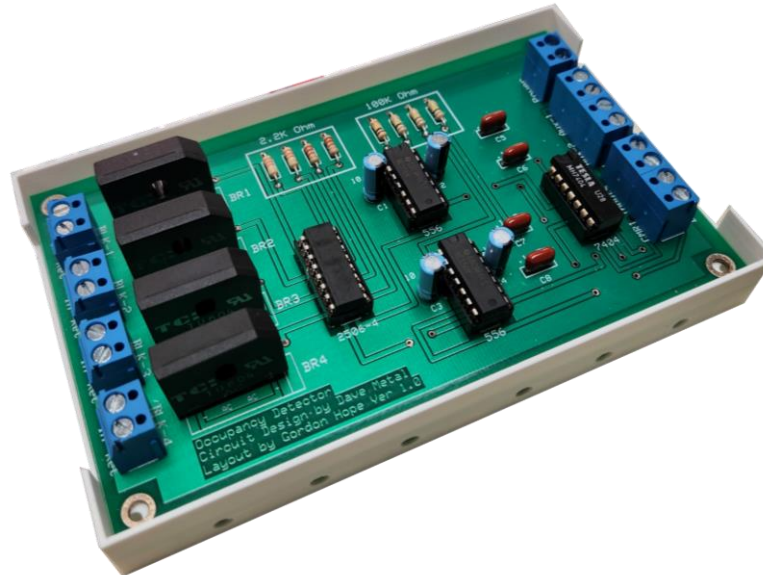
Identify your Product Shows which product(s) we have available and the contents of each. Take the time to familiarize yourself with the components of your particular kit. At the moment we provide only one Occupancy Detector which is shown on the following pages

Wiring Shows you how to get your components wired together and ready to use

Frequently Asked Questions At the end, we provide questions and answers for typical questions asked when installing and/or operating our system

Occupancy Sensor Board

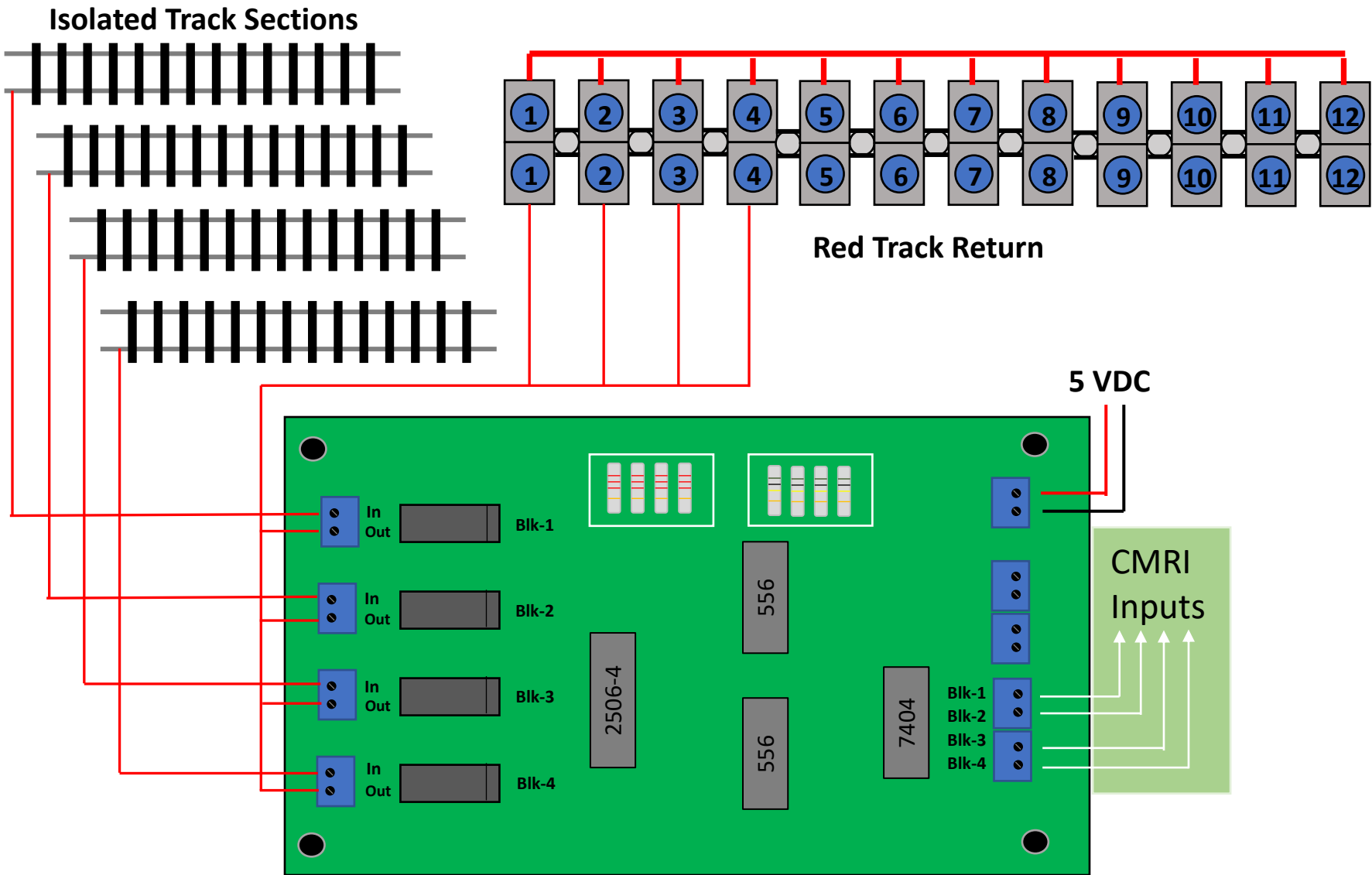
EZ-Occ-Quad



Description

- 4 individual circuits to support up to 4 blocks on your layout
- Each block can handle up to 4A of current
- You need to supply 5VDC power to run the board
- Optically isolated inputs means that there are no adverse high current or shorts that will be sent through our board or damage the other components on our board
- No adjustments are needed – just wire and install
- Typical resistor values used are 10K (10,000 Ohms) per wheelset
- 3D printed case allows for mounting the case to a location and then screw the board into the case.

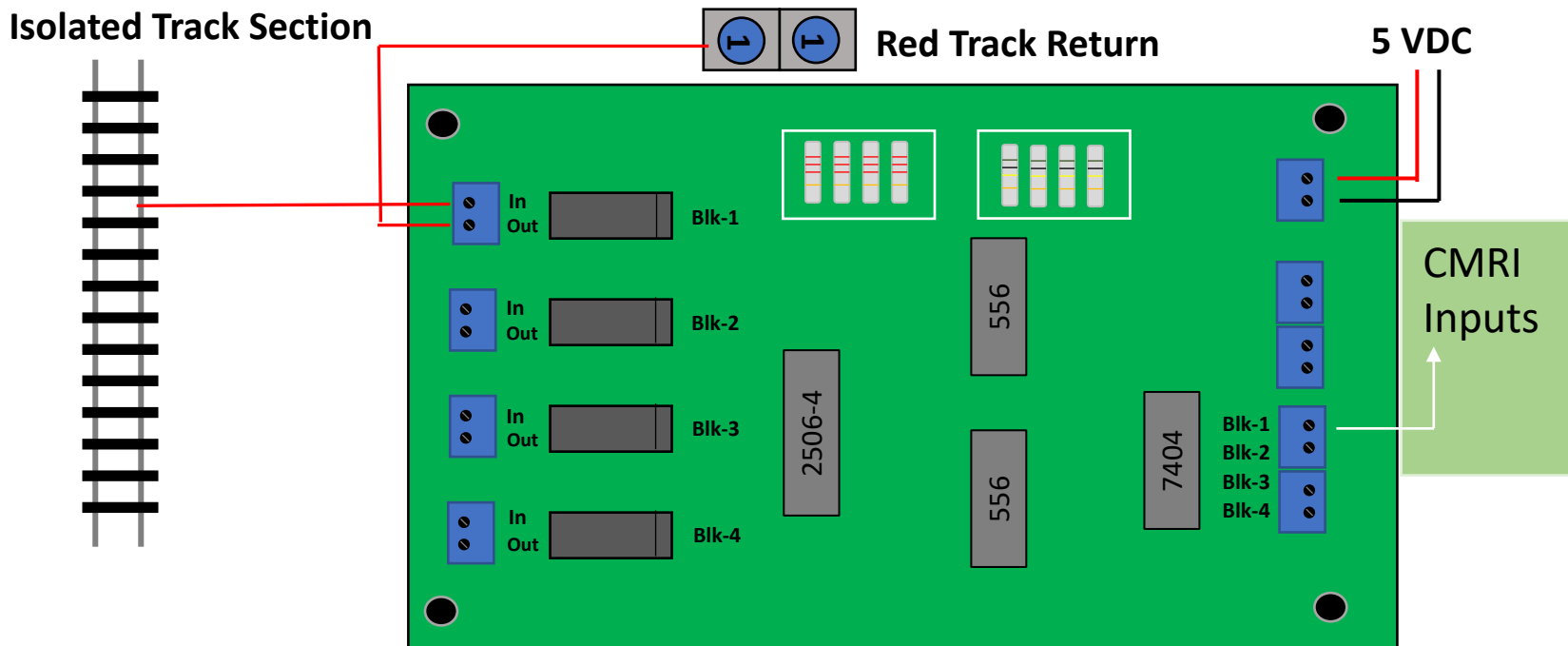
EZ-Occ-Quad Wiring Diagram



EZ-Occ-Quad Operation (Block-1 shown, all identical)

Description

- Isolate a track section for one rail and feed it into the “In” terminal and use the “Out” terminal to return
- This wiring allows current to flow into the Blk-1 circuit when a train is detected. This current is used to enable the input of the 2506-4 chip
- This chip provides both signal coupling as well as isolation from the track current to the rest of the board
- Signal from 2506-4 works with 556 timer to automatically keep the occupancy block from throttling up and down due to dirty track, wheelsets, or any other short duration power related disturbances of the block when the train is present.
- The Blk-1 output signal will go from High (unoccupied) to Low (occupied) and the logic low is used to indicate a train is present in the block
- Likewise, once the train has completely exited the block, the output signal will return high indicating the block is clear.



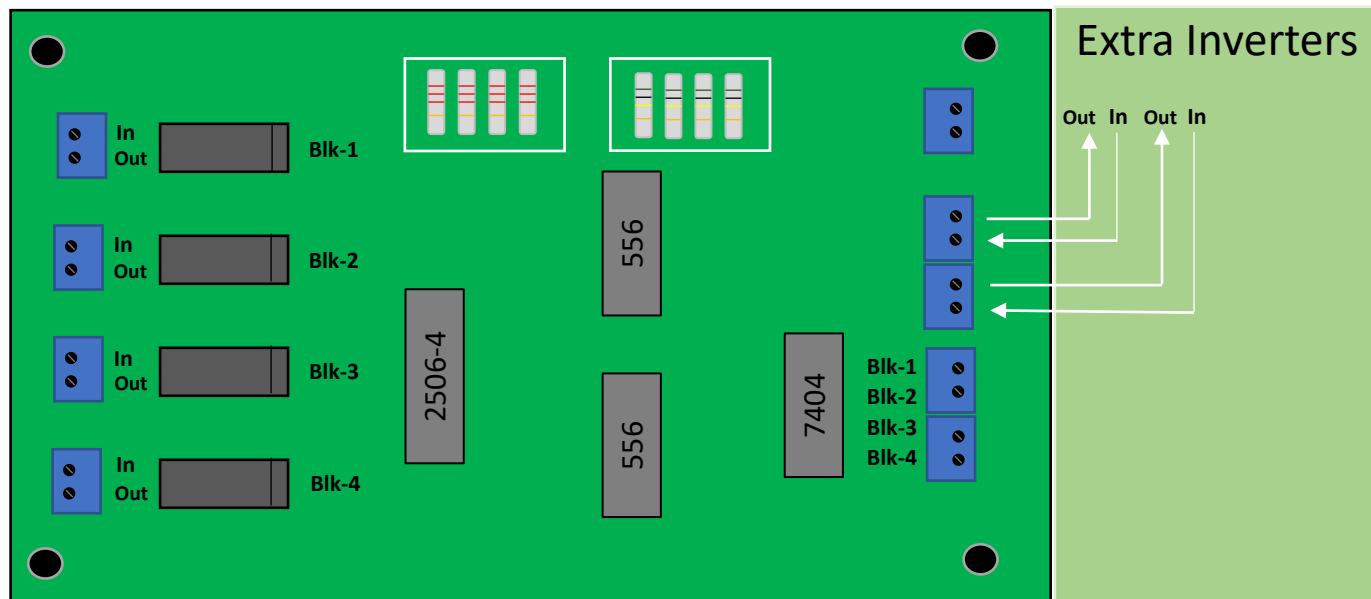
EZ-Occ-Quad Extra Inverters

Description

We had two left over pins from our on-board inverter chip and decided to pass along it capabilities to our hobbyists.

Therefore, if you have any signal that you wish to be inverted, you can wire it to an input and the other end will be the inverted signal. This is for 5V logic, so if you have a pin that is 0 volts and you wish it to be 5V, run the signal to the “In” terminal and the associated “Out” signal would be 5V. Likewise, if you had a 5V signal and wish it to be 0, you can feed the 5V signal to an “In” screw terminal and take the 0 Volt signal from its “Out” screw terminal.

This capability is sometimes desired for connectivity to 3rd party software that recognizes “off” as 0 or “off” as 5V (High) and you have a pin that is opposite of what the software might like. Some software allows you to handle this but some others may not – this is why we brought the unused pins out to screw terminals.



EZTronic Occupancy Detectors

Frequently Asked Questions-1

Q: I have read about other detectors that use infrared light to sense a train. Why does your product use current sensing instead of using light?

A: Whereas light sensing can be a bit easier to install, it does suffer from inconsistent operation based on light in the room. Also, if a train is located in such a way (between cars for example) that the detector sees light, it will erroneously indicate that the train is not there when it really is

Q: You indicate that 10K Ohms (10,000 Ohms) is a typical value used for resistive wheelsets. Why is this value used and what are the potential pitfalls of using smaller resistor values?

A: Let's examine the circuit using 10K Ohms in a resistive wheelset. Normally there are two axles on each car that get resistors installed (frontmost and rearmost axle of a train car). Therefore, the effective resistance of a single train car sitting in a block is 5K Ohm (Total resistance of a parallel circuit is the product of resistance divided by the sum). So, in our example, this is $10K * 10K = 100K$ divided by the sum of both resistors $10K + 10K = 20K$. $100/20=5$. The result is that the resistance of that car sitting on that block has lowered the single 10K resistance value down to 5K Ohms, thus allowing twice the amount of current to flow through the occupancy detector circuit than a single wheelset.

When we add a second car with two axles, we have reduced the total block resistance even further from 5K down to 2.5K. (This allows more current to flow than if we only had one car in the block). So, for each car that is added in a block, the amount of current flowing through the detector circuit rises.

Therefore, if we started with values below 10K, you see that the resistance would be even lower in the block thus driving more current through the occupancy circuit. Since we provide a healthy 4A of current capacity per circuit, it should not normally be of particular concern, however you need to be aware of reducing the resistor value if you are running lots of cars and your blocks lengths are long.