



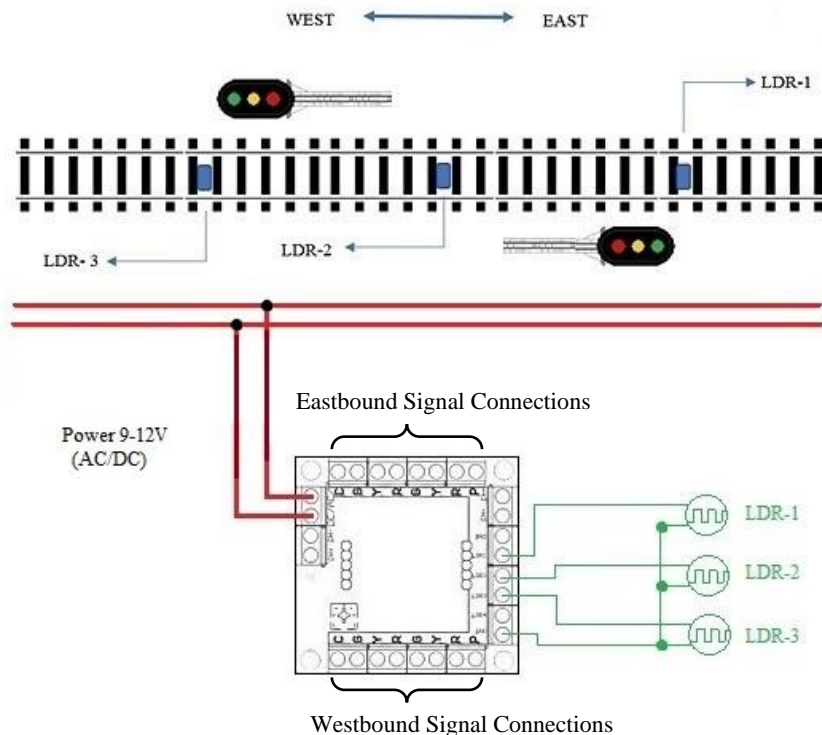
NJ International, Inc.

Stand Alone Simple Signal Circuit #8300 Instructions

Getting Started

Thank you for purchasing the NJ International Stand Alone Simple Signal Circuit. Please take a moment to read and familiarize yourself with the following instructions prior to installing and applying power to the circuit. This kit contains: One Stand Alone Simple Signal Circuit and three LDR's (sensors) with 24" leads. The Stand Alone Simple Signal Circuit simulates the behavior of a block occupancy detector. This circuit is suitable for small, modular, and large layouts and will operate with all NJ International Signals or common anode signals.

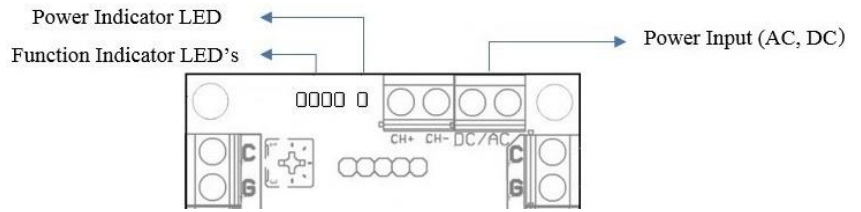
The Signal Circuit provides automatic operation of two single or dual head signals bi-directional on a single track by providing a cascading effect. For instance; in the absence of any trains the two signal heads will be green until the photocell is covered. If the train is moving Eastbound and covers **LDR-3** the Westbound signal will go to red and stay red until the train clears the entire block, this is to alert the opposite traffic the block is occupied. **(If you have multiple circuits connected all the signals facing the opposite side of train movement will turn red as well)**. Once the train reaches **LDR-2** the Eastbound Signal will go from Green "Clear" to Red "Stop" once the train reaches **LDR-1** the signal will change to Yellow or "Approach". After a selectable delay from 5-25 seconds the signal will turn from Yellow "Approach" back to Green "Clear" **(See Function Indicator LED's section)**. Circuit Operation for a Westbound train is similar with Eastbound signals turning red until the block is clear. **LDR-1 & LDR-3 are used to sense the direction of the train and LDR-2 is used for signal control**. Terminals Labeled **CH-** & **CH+** are used to connect multiple signal circuits to operate multiple blocks. Each circuit will need to share the same power source when being daisy chained **(See Daisy Chained section)**. The Signal circuit has a built in 30 second timer (non-adjustable). If the train takes longer than 30 seconds to reach the closest photocell the circuit will assume the train has reversed and exited the block or has diverted to different route/track in between sensors and the signal will return to Green. This only works with the Stand Alone (One Circuit), not while daisy chained.



Power

The **Stand Alone Simple Signal Circuit** accepts AC and DC (9V- 15V). The Signal Circuit will draw approximately 26mA under a full load. This circuit is designed to operate under any straight DC or AC current provided that the voltage doesn't exceed **15V**. If you are using a power pack transformer we strongly recommend using the fixed AC output terminals. Exceeding the Power requirements will cause the circuit components to overheat and eventually fail, and will void the warranty.

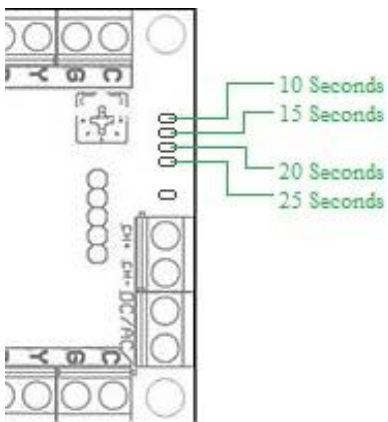
Once power is applied to the board the Blue power indicator LED will turn on indicating the circuit is receiving power. At the same time the Red function indicator LED's will come on and the circuit will start adjusting the LDR's to the room's lighting. This automatic process eliminates the need to adjust each individual sensor. The Signal Circuit is capable of handling Two Dual Head D- Type, G-Type and Search Light Signals as well as Pennsylvania and B&O signals. **You should make all connections to the circuit prior to applying power.** You can mount this circuit anywhere. We suggest mounting the circuit under the layout using #4 screws. The circuit is equipped with holes for easy mounting. Do not enlarge holes as doing so can cause damage to the circuit and will void your warranty.



False Triggering

This Circuit is equipped with False Trigger Prevention. To prevent any possible triggering from shadows while working on the layout or just passing shadows a two second delay is programmed into the circuit. Please keep in mind that you'll need to adjust your locomotive speed when running very short trains (3 cars or less), performing switching moves with small locomotives or running light engine (locomotives only) the train will need to cover each sensor for a period of 2 seconds for the circuit to detect the train. Failure to do so will cause all the signals to not activate. This delay will not affect long trains as they should have no problem covering the sensor for 2 seconds. This delay is also active on Daisy Chained Mode.

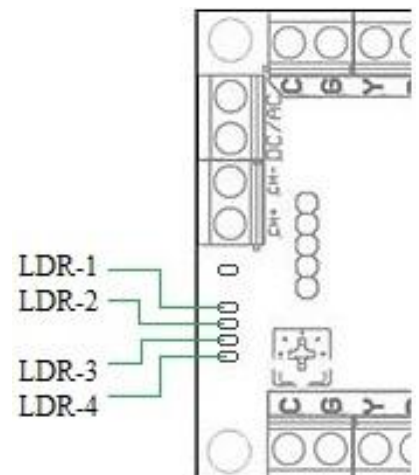
Function Indicator LED's



The signal circuit comes equipped with function indicator **LED's**. The **LED's** indicate three things; the Yellow "Approach" to Green "Clear" delay as well as **LDR** status and train detection. When adjusting the yellow to clear delay simply turn the potentiometer clockwise. The **LED's** on your board will turn on as you increase the timer delay. **Each LED that turns on indicates a 5 second Delay Increase.** (This delay is 5 Seconds by Default) Once you've adjusted to your preferred delay the **LED's** will return to their original **LDR** status sensing.

The **LDR** status sensing is simple. Once you've connected your **LDR** to your circuit it will automatically turn the **LED ON** and stay **ON** to indicate the Photocell is working properly; in the case of the Photocell not working the **LED** won't turn **ON** indicating a problem.

Another feature not be confused with a non-working LDR is that the circuit will turn off the Indicator **LED's** when a train is covering the sensor to indicate the presence of



a train. **Note: LDR-4 is not currently used and is for Future Use.**

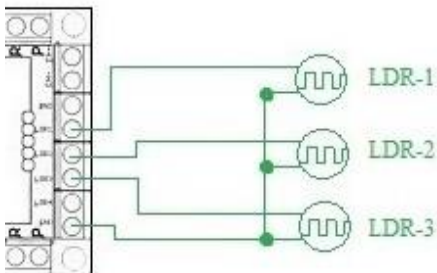
Mounting Photocells (LDR)

The Photocells should be mounted in between the rails. Drill a 1/8" hole in between the ties through the layout table and install the sensor (wires first) from the top of your layout, this hole size is suitable for HO and larger scales; please know when drilling on smaller scale track the drill bit may hit the ties, we recommend you start with a smaller drill diameter and gradually work your way up to the 1/8" drill hole to prevent damaging the ties; in some cases you may need to shave off a little plastic/wood from your ties in order to accommodate the sensors.

We recommend securing the LDR in place by using a small amount of white glue. Don't forget to wipe any excess glue from the sensor head as failure to do so may cause the sensor not to work or to provide a false indication. Each sensor is provided with 24" leads for ease of installation. In case this isn't enough any **30AWG** stranded wire can be used to extend the reach. The spacing between the photocells depends on how long you'll like the block to be defined. Please keep in mind that there is a 30 second delay timeout sequence. If the train takes longer than 30 seconds to reach the closest photocell the circuit will assume the train has reversed and exited the block or has diverted to different route/track in between sensors and the signal will return to Green.

Connecting the Photocells- (Stand Alone Mode)

The Signal circuit is designed to self-adjust the LDR's to the room's lighting. This automatic process eliminates the need to adjust each individual sensor from the bottom of the layout. Using the provided three sensors connect one leg of your first sensor to the LDR-1 and the other to GND terminal. Next, connect any leg of the second sensor to LDR-2 and the other to the same GND terminal and lastly connect any leg of the third sensor to LDR-3 and the other leg to the same GND terminal.



Once you're done your wiring will look like the diagram. **For Sensor placement see the image located at the bottom of page 1. The placement of the sensors is very important as failure to do so will cause signals to display a false indication.**

Prior to applying power make sure all obstacles have been cleared that may be blocking any overhead lighting or sensors.

Once power is applied to the Signal Circuit it will automatically start adjusting the LDR's to the current room lighting. Each sensor is adjusted independently. If one of your sensors is on a shaded area on your layout it will still operate if the sensor can detect the change in lighting once the train passes on top. **Keep in mind the sensors will NOT operate in the dark.**

Connecting the Photocells- (Daisy Chained Mode)

The daisy chained mode is only possible with the help of the LDR sensors. The LDR's tells the circuit if a train has entered, occupying or has exited the block by the change in lighting. It also tells the sensors what the next lighting aspect should be based on the sensor being activated. The amount of circuits being daisy chained will determine the number of sensors used, the more circuits, less sensors are needed. To connect two circuits, use terminals LDR 3 & LDR-2 on the first circuit and Terminals LDR-2 & LDR-1 on the second circuit. For 3 or more circuits the sequence is the same of the outer circuits. Each in between circuit will only use LDR-2. Figures 8, 9 & 10 illustrates the photocell wiring for multiple circuits quantities. Make sure to follow the same LDR order on your layout.

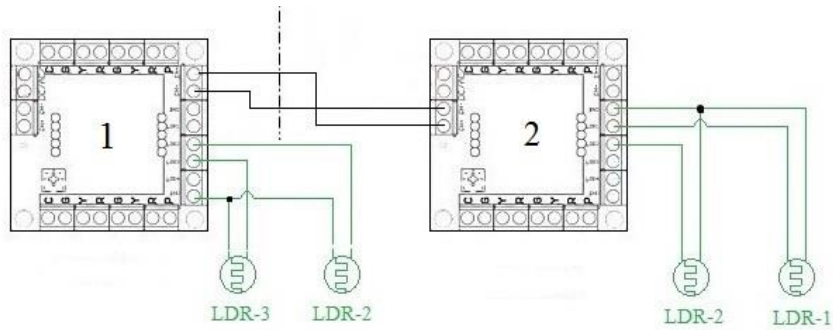


Image 8- {2 Circuits Daisy Chained}

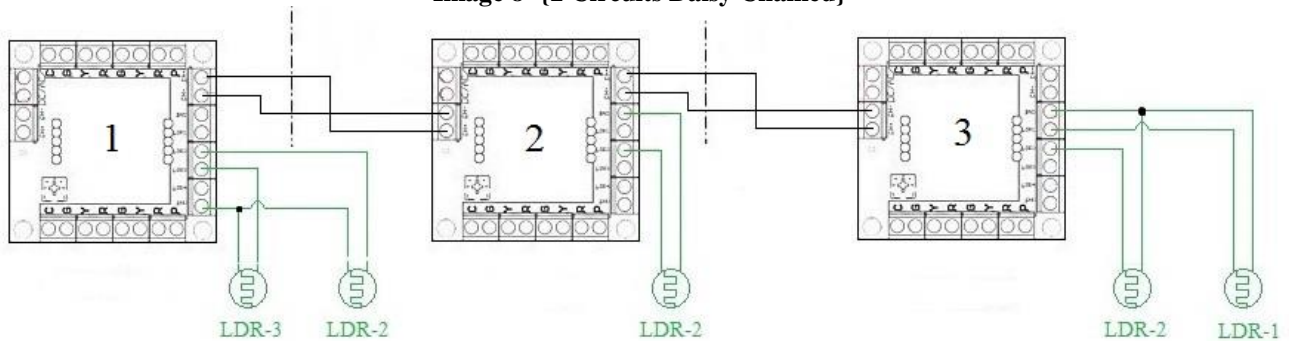


Image 9- {3 Circuits Daisy Chained}

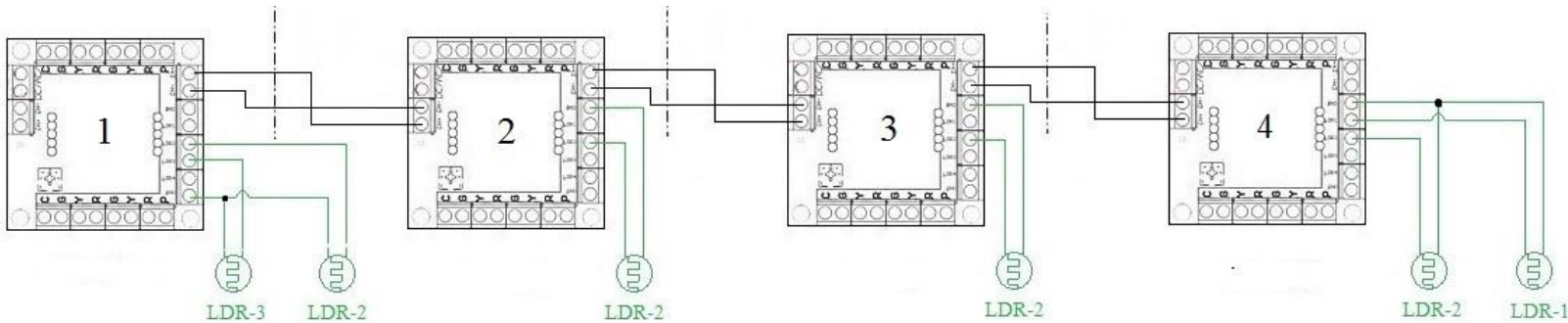


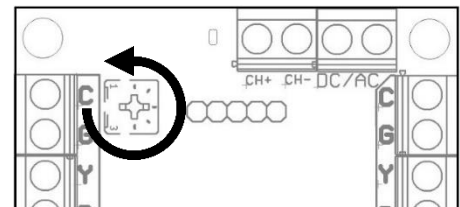
Image 10- {4 or More Circuits Daisy Chained}

Daisy Chained Mode/ Multiple Circuits

The Signal circuit may be linked to other Stand Alone Signal Circuits by using the **CH+** & **CH-** Terminals on the circuit. **Please make sure that you link Terminals CH- Output with terminal CH- Input on the second circuit as well as CH+ Output with CH+ Input.**

When multiple circuits are operating in sequence and a train enters the block it's required for the train to clear or exit the block before another train can enter. In the unfortunate case of a train decoupling or going into emergency inside the block the signals will maintain their corresponding aspects until the train regains movement and exits the block.

Prior to applying power or making any Daisy Chained connections to the circuit please make sure all the potentiometers are in the same time sequence/delay. Using a screwdriver rotate the potentiometer completely counter-clockwise to bring them back to default timer settings.



Once all the circuits are in the same timer you can now proceed to connecting the **CH+** & **CH-**. If you wish to increase the timer/delay, please make sure to adjust to the same timer on all other circuits, you can do this while the circuit is powered.

When connecting the circuits in daisy chained mode make sure each circuit is connected on the same power bus line. We recommend dedicating a power bus line to each individual block, doing so will make it easier in case you ever have to power reset any circuit that maybe have been triggered accidentally. Images 11, 12 & 13 illustrate the wiring connections depending on the amount of circuits your block may have. **If you wish to increase your block to more than 4 circuits, simulate the wiring of circuits 2 & 3 on image 13.**

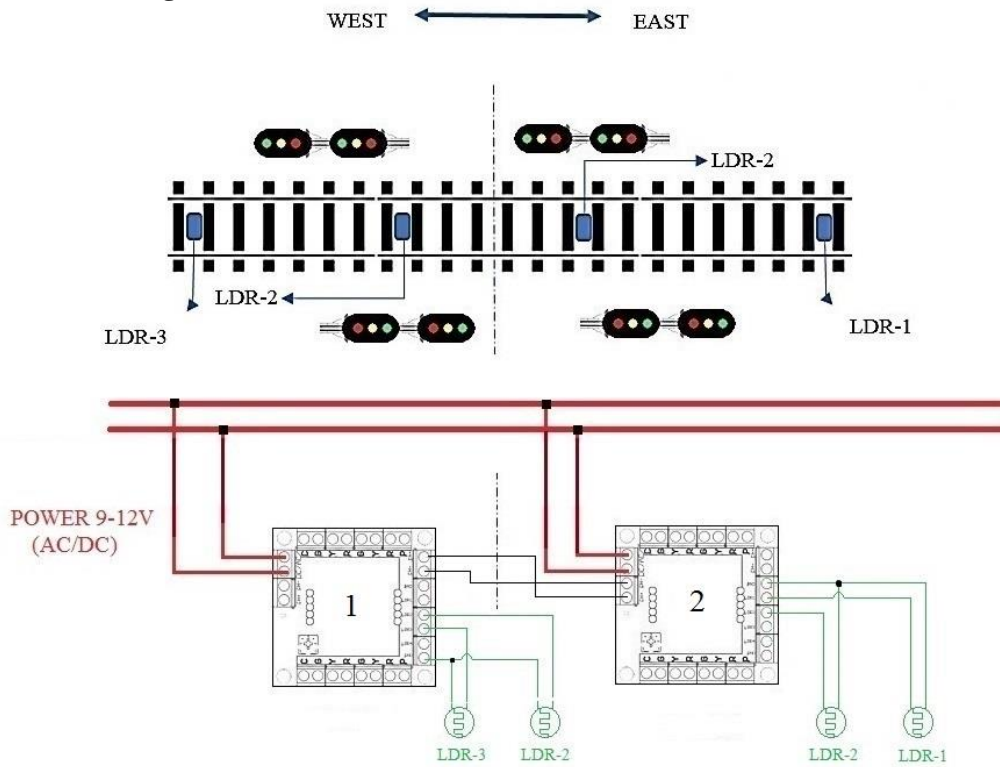


Image 11- {2 Circuits Daisy Chained}

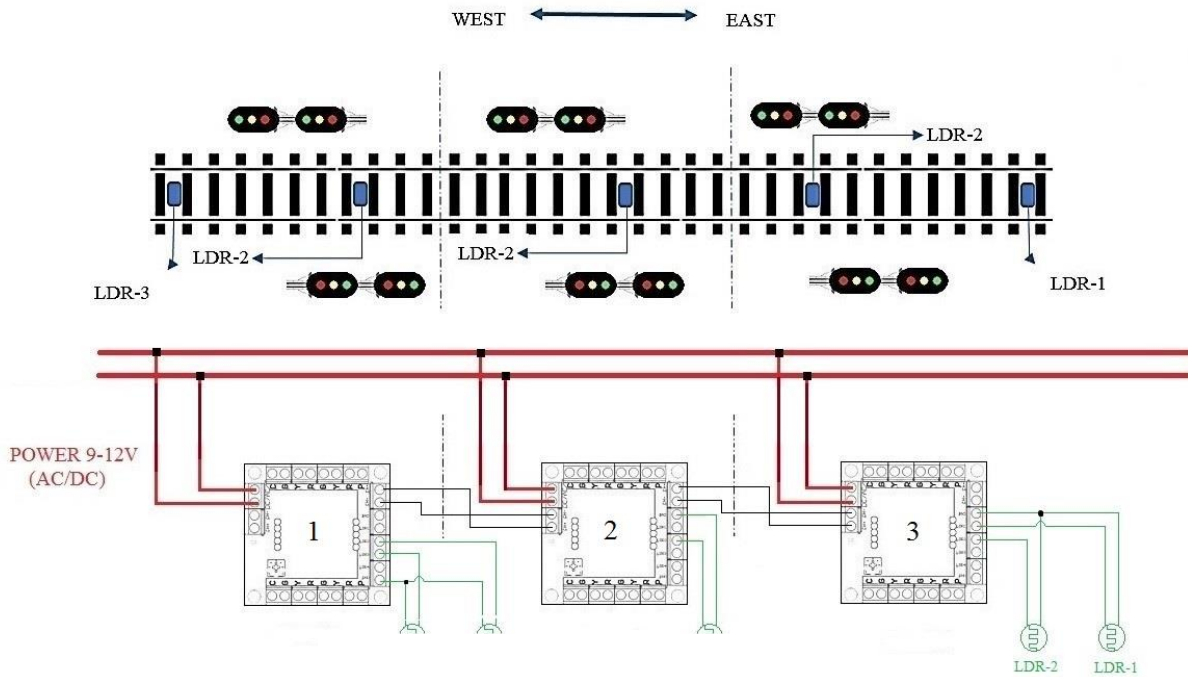


Image 12- {3 Circuits Daisy Chained}

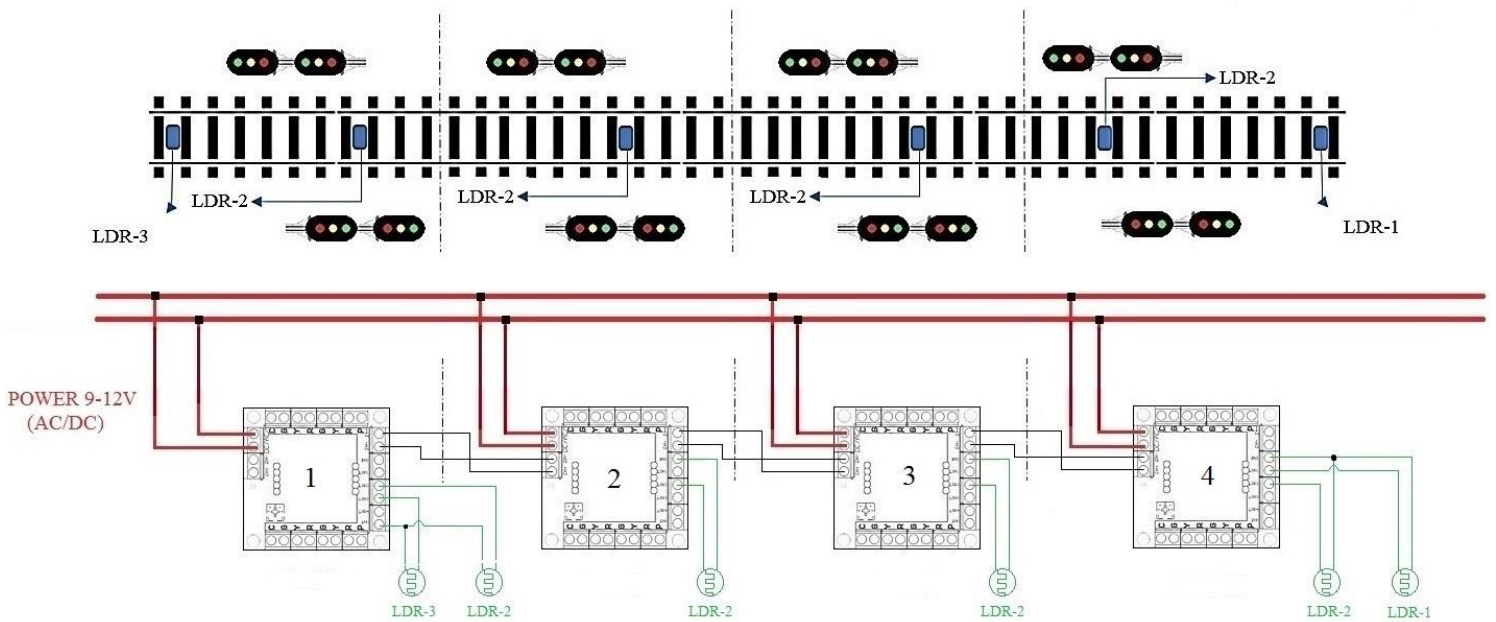


Image 13- {4 or More Circuits Daisy Chained}

Warranty

This Circuit is warranted to be free from defects in workmanship and materials for a period of ninety (90) days from the date of purchase. This warranty covers all defects experienced during normal operation except for the following conditions:

If current or voltage limitations has been exceeded

**If product has been modified in any way (e.g. Missing/Additional Components, Soldering)
If product has been mishandled or abused.**

Requests for warranty service must contact us first to receive a RMA (Return Merchandise Authorization) at info@njinternational.com Please include a written description of the issue and purchase receipt when returning the product.

Technical Support

We hope the foregoing instructions are adequate for answering any questions you might have about the installation and operation of this circuit. However, if you still have any questions or problems with your circuit, technical support is available through email at info@njsignals.com.

Warning:

This product is not a toy. Keep away from children. It is not suitable for children under the age of 14, as small parts and/or broken parts may present a choking hazard. If swallowed, seek immediate medical help.

This product contains know Chemicals which are known to the state of CA to cause cancer, birth defects, or other reproductive harm.

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