

Micro-Mark Instructions for

- #83232 IRDOT-1 (Standard)
 - #83233 IRDOT-1EW (Extended Wire-Lead)
- ## Infra-Red Detectors Of Trains

This product contains lead, a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Note: Although these devices were designed with model railroad applications in mind, they may be used to detect other items in the household, office or factory.

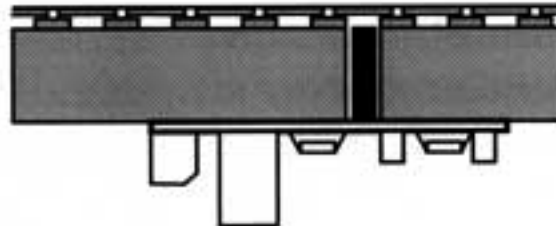
How it works: A tiny beam of infrared (invisible) light is projected from an emitter protruding from the solder side of the printed circuit board (PCB) nearest the edge of the board. An object, such as a model locomotive or rail car, moved near the beam reflects the light into the detector fitted alongside the emitter, thereby triggering the circuit. The circuit then activates lights or relays, based on the operation you desire.

The following instructions apply to the standard IRDOT version. Special instructions for the extended wire-lead version are shown near the end of these instructions.

The diagrams show terminal strip numbers as viewed from the component side of the PCB. To avoid confusion, the terminals are also numbered on the solder side of the PCB.

INSTALLATION: The unit is attached to the underside of the track baseboard with the infrared emitter/detector pair positioned in a hole drilled between the ties through the baseboard.

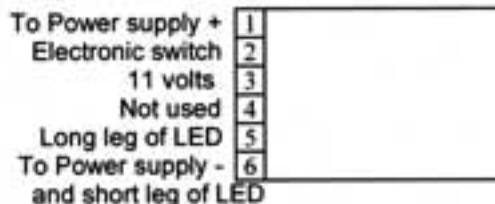
We recommend installing the IRDOT after the track is laid. Drill a 1/8" pilot hole on the centerline of the track between the ties. Mark a 3/8" drill bit with a piece of tape for slightly less than the baseboard thickness, then drill up from underneath the baseboard following the pilot hole. Use a knife or file to remove the remainder of the baseboard material left between the ties. Fit the emitter/detector into the hole, and secure the unit to the bottom of the baseboard with two #2 wood screws through the two mounting holes provided in opposite corners of the PCB (avoid over-tightening the screws; damage to the PCB will result). Use spacers as required to adjust the vertical position of the emitter/detector to near the bottom of the ties. Fill the remainder of the hole with putty or a piece of foam.



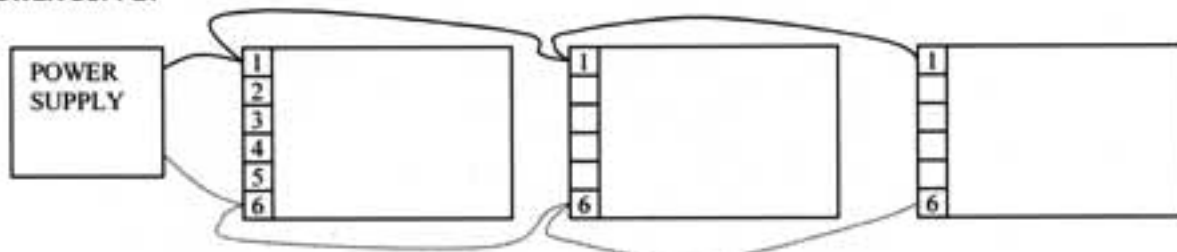
When fitted to Z or N gauge track, the gap between ties will be less than the diameter of the infrared detector and emitter. However, the modules will work well if they are adjusted to fit close to the ties. This positioning prevents false detection caused by reflections off the ties.

The IRDOTs will also operate when placed on their side alongside the track.

OPERATION: When the IRDOT-1 detects a train, it lights an LED and operates an electronic switch (open collector transistor). The IRDOT is supplied with a 5mm diameter red LED connected to the correct screw terminals. This provides an aid, while installing the IRDOT, to check for reflections off obstructions. After installation, the LED is wired to the control panel. Ensure that the long leg is wired to terminal 5. If several IRDOTs are used, all the short legs of the LED's may be connected together and a single connection taken to one of the terminal 6 connections. The LED will be damaged if it is connected directly to the power supply. It requires a current limiting resistor (this is built into the IRDOT terminal 5).



POWER SUPPLY



The diagram shows how to connect a number of IRDOTs to the same power supply. As the current consumption is low, many units can be powered by the same supply. The supply should be from 12 to 16 volts, AC or DC. If DC is

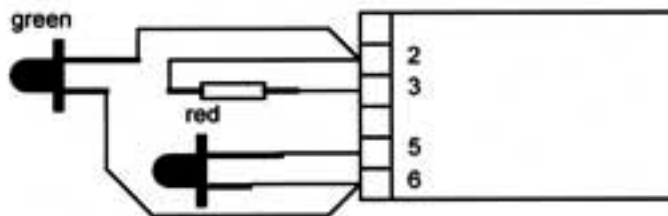
used, the positive connection of the power should connect to every terminal 1. If AC is used, it is important to be consistent and connect all the terminal 1s to the same power supply terminal.

HIDDEN SIDINGS AND LOOPS: The infrared may reflect off low tunnel ceilings, causing a permanent detection. The sensitivity of the unit can be reduced in the following ways: Paint the tunnel ceiling matt black to reduce the reflected infrared; bend apart the infrared emitter and detector; restrict the amount of infrared transmitted and received by blocking off part of the hole in the rubber covering of the emitter and detector.

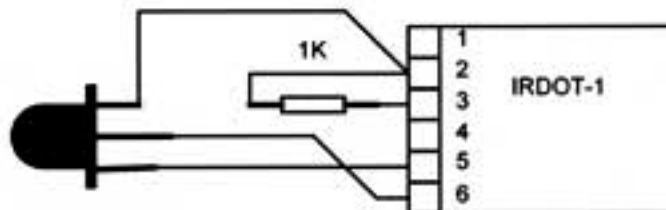
If rolling stock is not detected by the circuit, self-adhesive white labels can be stuck to the underside of the rolling stock to increase reflection.

INCREASING INFRARED RANGE: The rubber heat shrink covering the emitter (the one nearest the edge of the PCB) may be trimmed back to increase the range. Do not expose the infrared detector, as this will allow the infrared to travel straight from emitter to detector, giving false detection.

GREEN "NOT OCCUPIED" LED: The electronic switch of the IRDOT-1 can light an additional green "not occupied" LED. A 1K resistor is used to limit the current through the green LED.



BI-COLOUR LED



Resistor value should be 1K. Notice how the LED has three different leg lengths. Shortest leg connects to terminal 2; longest to terminal 6.

IRDOT-1EW...EXTENDED WIRE-LEAD VERSION

IRDOTS having the emitter/detector mounted at the end of wire leads (instead of directly on the PCB) are used in the same way as described above. Both the emitter (on the orange wire) and detector (on the yellow wire) are fitted into a single hole between the ties. A small piece of foam can be used to wedge them in place from the underside of the hole. Some people also find it helpful to fix the emitter and detector together with a piece of insulation tape or cellophane tape. The emitter and detector may also be used at the side of the track.

Alternatively, they can be used to form a beam pointing at each other. The train breaks the beam, thus reversing the LED indication. The operation then becomes: no train = beam across track = red LED lit. Train blocking beam = red LED unit. Of course, you may switch the LED's to the colors of your choice.

The orange emitter wire may be extended and a beam length of 5 to 6 feet will work.

TECHNICAL INFORMATION

When no object is detected: terminal 2 is open circuit; terminal 3 is constant 11 volts; terminal 5 is just above 0v.

When an object is detected: terminal 2 is connected to terminal 6; terminal 3 remains at 11 volts; terminal 5 is connected to 9 volts through an internal 1k ohm resistor.

Terminal 2 may be used to operate an external relay, or in conjunction with terminal 3 to operate a second "train not detected LED". Terminal 2 connects to the open collector of an NPN transistor (maximum current 100mA).

Terminal 3 supplies smoothed 11 volts DC for connection to a "train not detected LED" or to the coil of a 12v relay.

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