**What it is:** The DBD has two current sensing block occupancy detection circuits that operate independently. Each detector circuit senses whether electrical current is flowing into a section of track. If current is flowing, the circuit closes a relay contact. The relay contact is used to activate a signal or accessory circuit. The detector is sensitive to the rapidly changing currents of digital train control systems such as DCC. *This detector will not work with traditional analog DC train power.*

Power required: 9 to 16 v, ac or dc.
Output contacts: 350mA (0.35 amp) max, 28 v max.
Kit contents:
★ Circuit board
★ Two current sensing coils for remote sensing
★ Diode & resistors for LED signals, see pg. 2.
★ Mounting screws.
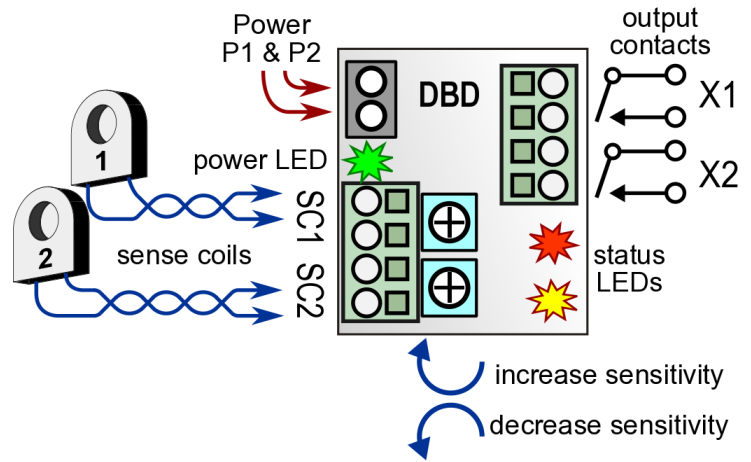
How it works: Track current is sensed by passing the track's power feed wire through a current sensing coil.
To detect a train in a defined section of track, one rail of that section must be electrically insulated from the rest of the layout. All power to that block must be passed through the detector circuit's sensing coil.

Installation

There are four installation steps: Sense coil installation, Power connection, Sensitivity adjustment and Output connection.

First, install the sense coils:
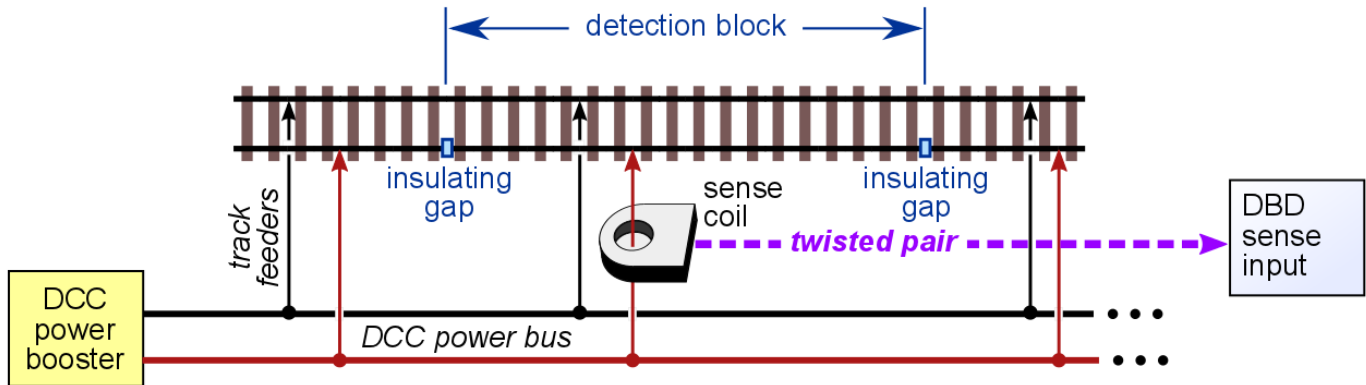
One rail of the detection section must be electrically isolated from the rest of the layout. Cut an insulating gap in the rail or use plastic rail joiners at each boundary of the detection section.

All track power for the detection section must pass through the sense coil. Pass the feed wire through the sense coil. To increase the sensitivity, loop the wire around and pass it through the sense coil again.

A single pass is sufficient to detect locomotives, lighted cars or a 10k-ohm resistor in most cases. To detect a higher value resistor, loop the feed wire and pass it through the sense coil a second time.
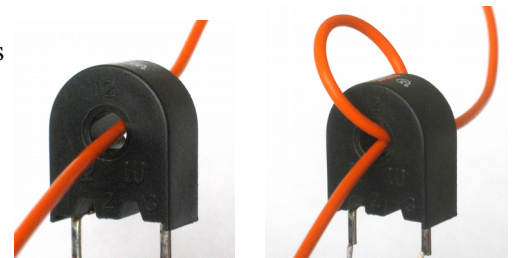
Connect each sense coil to the DBD module with twisted pair wire, such as from telephone or "Cat 5" ethernet cable. Keep the twisted pair away from track power wires to avoid inducing a false signal in the sense wires. If the twisted pair wires are kept away from track power and other digital signal sources, the sense coils can be placed as far as 12 ft (4 m) from the DBD module.

Connect power to the DBD module: Connect a power supply of 9 to 16 volts AC or DC to terminals P1 and P2. A green LED on the DBD module will light when power is applied.

Adjust the sensitivity: With no trains in the detection zones, the red and yellow LEDs on the DBD module should be off. If the red or yellow LED is on, decrease that detector's sensitivity by turning the sensitivity adjuster anti-clockwise.

Test for train detection. Place a train in detection section #1. Make sure the rails and the wheels are clean. The train must have an electrical connection from one rail to the other, either a motor, lamp, sound module or a resistor. Turn on the track power. The red LED should light. If not, increase the detector's sensitivity by turning the adjuster clockwise. If the red LED still does not light, loop the track feed wire around the sense coil for an additional pass through the coil (see pg. 1).

Repeat for detection section #2. The yellow LED shows the state of detection section #2.

Output connection: Connect the X1 and X2 terminals to the circuits that will be controlled by the DBD. Note that X1 and X2 outputs are switch contacts only -- the DBD does not provide power to your signal or accessory. Power must come from an accessory power supply.

Example applications are shown here.
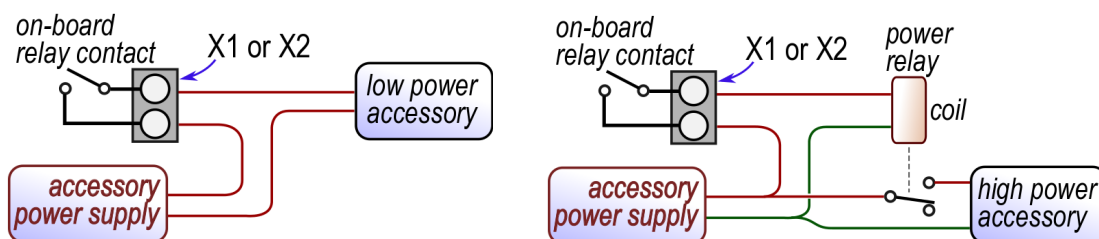
For higher load current: The DBD's output contacts are rated for a maximum current of 350 milliamps (0.35 amp) each. To control a high power accessory, use the DBD output contact to control a power relay, such as the Azatrax MRAPR, then use the contacts of the power relay to switch the load.

LED signals: Below are examples for using simple green/red LED signals with the DBD. The signal shows green when its block is clear, and red when occupied. Note that only one resistor is used with each signal, it is in series with the 'common' signal wire (usually the white or black wire). The resistor can be 680 to 2,000 ohms, depending on the DC supply voltage. An approximate resistor value (ohms) can be determined by multiplying the DC voltage times 80.

The diode is a common silicon rectifier, part number 1N4001, 1N4002, 1N4003, 1N4933, 1N4934 or similar.

Switching red / green common anode (+) LEDs.

Switching red / green common cathode (−) LEDs.
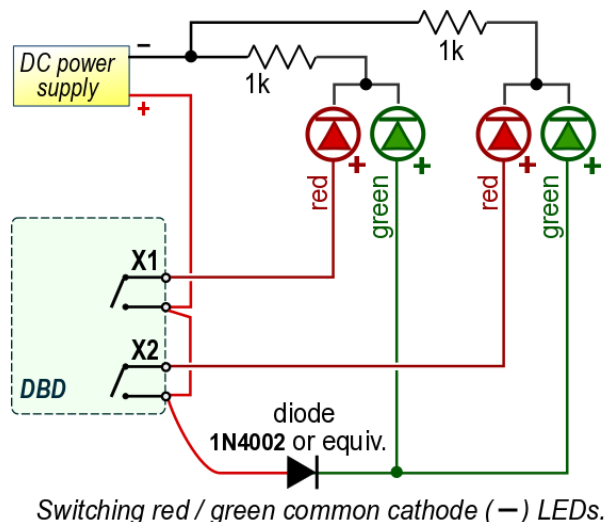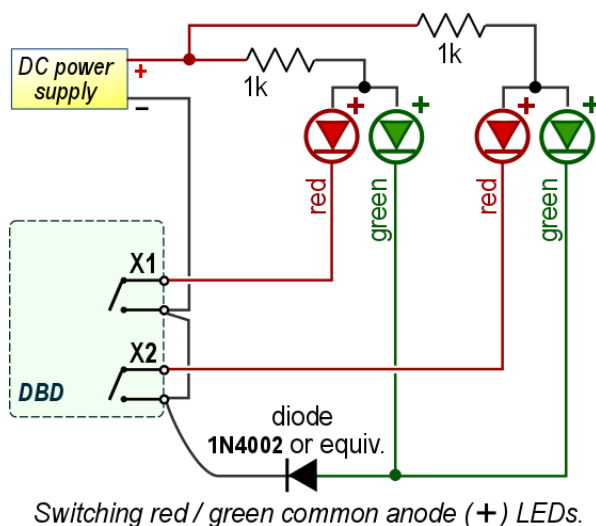
More information and assistance is available at the Azatrax website: www.azatrax.com