RR-CirKits

Specializing in Affordable Electronics for Model Railroads

BOD-4 / BOD-4-CP

4 Block DCC Occupancy Detector

BOD-4-CP

The BOD-4-CP is designed to augment the Signal LCC in order to do all of the primary functions required at a typical interlocking. (Control Point) The BOD-4-CP does not expect you to re-wire your layout to bring track feeders to remotely located detector cards.

The BOD-4-CP includes two dual-output turnout drivers with 4 shared input lines. To take advantage of this dual use, the Signal LCC output section needs to be configured as 'Sample' mode. The BOD-4-CP includes a 5 position screw terminal strip to connect the 4 logic level input lines. These lines include internal 10K ohm pull up resistors to +5V, and may be driven by logic level circuits, open collector outputs, or contacts. This shared option is not available for devices other than LCC nodes.

The BOD-4-CP outputs are designed to drive stall motor turnout machines such as those found in Tortoise® and Switchcraft® machines. It is also suitable for the higher current required by the MTB-MP1 and MTB-MP5 machines. The BOD-4-CP Output section is also able to drive relays, solenoid coils, or other high voltage medium power devices. The input supply voltage should not exceed 27VDC. The BOD4-CP board outputs are optically isolated from the driving circuitry to protect the Signal LCC or other control device from these high power outputs.

By using the proper options on the Signal LCC the BOD-4-CP may also be used to control motors or dual coil momentary switch machines. For 'Dual Coil' use the lines are paired and only the primary event of each pair will be used to trigger a pulse. Reverse the two EventIDs of the second line.

This action will normally require a 0.1 second pulse when driving solenoids. Dual coil operation should not be attempted if the switch machine power supply is not of the capacitive discharge type that will limit the long term current to a low value, or contains proper fusing, in case of hardware or configuration errors. Failure to observe this precaution may result in destruction of equipment and could be a fire hazard!

When driving stall motors, single coils or high power loads configure the lines as a steady output rather than pulse.

Warning! The BOD-4-CP is not designed to drive 20th century dual coil (Kemtron style) switch machines that require over 3A to operate properly. The BOD-4-CP output current is internally limited to approximately 3A and these older machines will not operate reliably, if at all. Use an SCSD-8, RB-4, or else install more modern machines.

BOD-4

The BOD-4 is the detector only version of the BOD4-CP. It is designed to augment the Signal LCC with 4 detection blocks when no high current turnout drivers are required. The BOD-4 does not expect you to re-wire your layout to bring track feeders to remotely located detector cards. The small CT (Current Transformer) detection coils are placed directly on the track feeders where they belong. A short length of Cat-5 cable is the usual way to carry the detected current back to the detector boards. The use of CT coils means that there are no track voltage losses associated with the detectors. Normal detection levels are 1mA. but may be adjusted to higher levels with on board pots. During a DCC bus power failure the Power-Lok input on the BOD4 instantly locks the present state of each block detector. I.e. the state of the layout does NOT change during a DCC power outage, neither to all occupied, nor to all vacant. It just suspends the sending of any occupancy changes until after power is restored and the layout has stabilized again. If you do not choose to use the Power-Lok feature, there is a jumper to disable it.

The BOD4 outputs are low during detection so the Signal LCC should be configured accordingly. The BOD4 also includes a screw terminal strip for easy connections to the 4 unused Signal LCC logic level I/O lines.

Remote Sensing

The BOD-4-CP and BOD-4 uses small CT (Current Transformer) detection coils placed directly on the track feeders between the rail and the power bus. Lengths of Cat-5 cable are the usual way to connect the coils to the detector boards. One cable pair connects to each screw terminal pair. CT coil sensors cause no track voltage losses like those associated with diode drop detectors. Normal detection levels are 1ma. for use with 10K wheel sets. Sensitivity may be decreased with the on board adjustment pots. To further reduce sensitivity you may place resistors across the coils.

Input Connector Pin Identification

The Input terminal strip X2 [1-C 2-C 3-C 4-C] is shown at the upper right on the board image. Use Cat-3 or Cat-5 twisted pair wire to connect the CT coils. (use one pair per coil) Pass the detected rail's track feeder through the center hole in each CT coil. You may locate the coil at any convenient point between the DCC power bus and each isolated block

detection section. If you choose to provide your own coils, the board is designed to use 100 turn coils, but will accept a wide variation. Extra turns are not normally required.

Note: Every detected rail feeder in a block must pass through the CT coil, either in parallel or via a common wire.

Indicators Each block has an associated indicator LED located next to its adjustment potentiometer to assist in sensitivity adjustments.

PowerLok Connections

During a DCC bus power failure the PowerLok input on the BOD-4-CP and BOD-4 instantly locks the detection status of each block detector. I.e. the state of the layout does NOT change during a DCC power outage, neither to all occupied, nor to all vacant. It simply suspends the sending of any occupancy changes until after power has been restored and the layout has stabilized again.

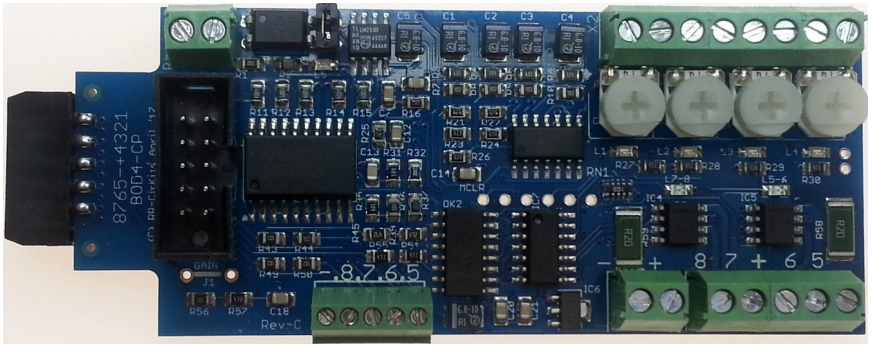
To enable the PowerLok feature connect a wire pair from the PowerLok input terminal (upper left screw terminal) to the power district bus that supplies the blocks being detected, then remove the PowerLok disable jumper. A power off condition locks the outputs.

Connecting I/O Modules

All RR-CirKits I/O modules may be plugged directly into an I/O port, or else mounted in Tyco 3-1/4" Snap-Track® mounted to the bench work and connected with ribbon cables. Each I/O module is equipped with two connectors to facilitate these connection options.

Connections

There are two input/output connections and five terminal strips on the BOD-4-CP board.

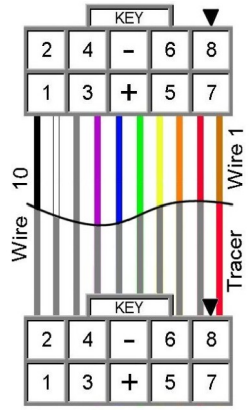


Input/Output Connector Pin Identification

The input/output connections (left end) use the standard [2 x 5] 10 pin cable connection that is shared by all RR-CirKits daughter cards. Both a male and female connector are provided, and either may be used depending on your requirements.

The port connector wiring is as follows.

Pin (wire) number	*Connection*	*Color*
1	line 8	
2	line 7	
3	line 6	
4	line 5	
5	Common	
6	+5VDC	
7	line 4	
8	line 3	
9	line 2	
10	line 1	



10 position IDC connector

Output Screw Terminal Identification

Connect the appropriate power for the output devices to the terminal labelled [- +]. The supply voltage should be 7VDC minimum, and not exceed 27VDC. Connect your switch machines to the terminal strip labelled [8 7 + 6 5]. For use with dual coil switch machines a capacitive discharge type of power supply is recommended, but not required. The + connection is common to both output pairs. Bi-polar and stall motor drive machines may not require this connection.

These output lines may also be used to drive relays, LED lighting, or other steady state loads up to ½ A.

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