

Sensitivity and other technical stuff:

Detector sensitivity may be increased by two means:

1. Connect a resistor across the track that is just large enough to be **under** the trip threshold of the detector. Try resistors in the 10K to 47K range (¼ or ½ watt rating).
2. Putting more "turns" through the hole in the current transformer. There is a limit to the number of turns based on the output current of the system booster (sometimes called 'power station'). If you put too many turns through the hole for the capacity of the booster you may damage the detector module. Table 1 lists various popular booster sizes. Areas where the detector limits will be OK have an "X" in the table. For example: putting 3 turns through the transformer is not allowed with a 10 Amp booster.

Booster Current Output				
Number of turns	3 Amp	4 Amp	5 Amp	10 Amp
1	OK	OK	OK	OK
2	OK	OK	OK	OK
3	OK	OK	OK	
4	OK	OK	OK	
5	OK	OK		

Table 1: allowable number of turns through current transformer based on capacity of booster

Table 2 lists the number of milliamps through the track feeder wire required to bring the logic output of the detector down to 0.7 volts (a 5 volt supply with a 10K pullup resistor is assumed). This is low enough to give a reliable indication on the TTL logic chips used in most signal systems.

Number of turns	Sensitivity
1	8mA
2	4mA
3	2.5mA
4	1.9mA
5	1.5mA

Table 2: Typical sensitivity in mA (.7 volt output) based on number of turns

Product Warranty

This product is fully factory tested and warranted against manufacturing defects for a period of 1 year. As the circumstances under which this product is installed can not be controlled, failure of the decoder due to installation problems can not be warranted. This includes misuse, miswiring, operation under loads beyond the design range of the product. If the product fails for non-warranted reasons NCE will replace the decoder, no questions asked, for \$10 U.S. plus \$2 shipping. For warranty or non-warranty replacement send the decoder (and any payment, if required) to:

NCE Warranty Center
82 Main Street
Webster, New York 14580

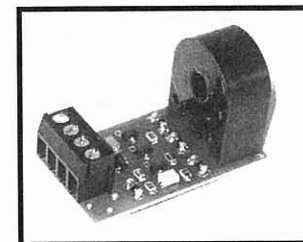


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BD20



\$14.95

Dimensions: 1.40 x 0.80 x .875 inches - 36 x 20 x 22 mm

Features of block detector:

- ✓ Isolated so that there is no electrical connection to the track
- ✓ Needs no external power for most operations
- ✓ Suitable for DCC power up to 20 Amps
- ✓ Can light up LED or operate relay with external DC power (5-12Volts)

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Age
14+

Warning: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Description:

The BD-20 block detector module is normally used to indicate the presence of a locomotive, caboose or other rolling stock in a track section by sensing electrical current drawn by that rolling stock. Locomotives will naturally trigger the detector because they draw current through their DCC decoder. Unpowered rolling stock will not trigger the detector unless equipped with some means of drawing current from the rails such as lights or resistor wheel sets.

Unlike other detection units the BD-20 requires no direct electrical connection to the track. This block detector can be used with any sized DCC power booster of up to 12 Amps capacity. The track feeder wire for one rail of the block is just passed through the hole in the current transformer on the module (see figure 1) before connecting the feeder to the track. The more times the wire goes through the hole in the current transformer the more sensitive the detector becomes. See the section on Detector Sensitivity for some limits on this matter.

An LED is provided if you wish for simple indication of staging track occupancy, progress though a helix, etc. You can also add an external relay to control heavy or high voltage loads.

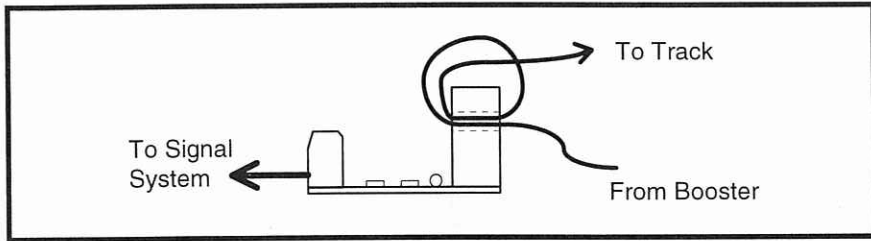


Figure 1

False Triggering:

You may get false triggering of the detector if the block is too long. The capacitance between the rails actually conducts a small amount of the DCC signal and can cause the detector to trigger. If you think you have problems with this see the section on desensitizing the detector.

Detector Output Note: this is Technical Stuff:

The Logic Output of the detector is "open collector" (figure 2). This type of output is compatible with most signal system logic boards on the market today. If you design your own signal logic circuitry, sensitivity rating of the detector is specified with a load of 500uA (10K pullup to 5 volts) on the output transistor. Heavier loads will yield slightly less sensitivity. The maximum rating of the transistor is 10mA at 12 volts. When the detector activates the Logic Output Transistor turns on connecting the LOGIC (terminal 2) output to GND (terminal 1).

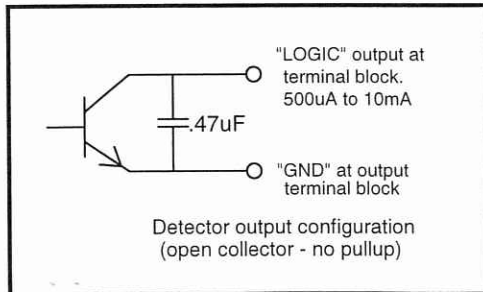


Figure 2

Desensitizing the detector:

If you have problems with false triggering due to humidity, ballast glue, track oil, etc. providing a conduction path for the DCC track current, a resistor or potentiometer may be installed on the PC board to desensitize the detection circuit. Figure 3 shows the location of the desensitizing resistor mounting holes. The resistor or pot should be 1/4 watt or more. The value is determined adjusting the pot. You can use a pot to determine the correct resistance for the block then substitute a fixed resistor of the same value for the pot. The value is typically in the range of 500-1000 Ohms. We suggest a 6mm 500 Ohm pot. Digikey (1-800-DIGIKEY - www.digikey.com) offers suitable pots. Part number X262R501B-ND is about 50 cents.

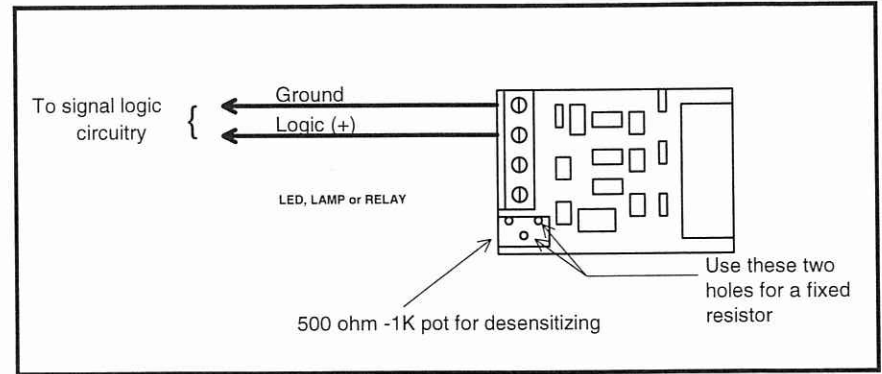


Figure 3 Component layout.

Optional onboard LED indicator:

If you decide to use the optional LED indicator connect a DC power supply of between 5 and 12 Volts to terminal 1 (ground) and terminal 4 (+ voltage). When the detector activates the onboard LED will light.

Optional external LED, lamp or relay driver output:

If you decide to use connect an external LED, lamp, or relay, hook up a DC power supply of between 5 and 12 Volts, as appropriate for the device, to terminal 1 (ground) and terminal 4 (+ voltage). The LED or relay coil connects to terminals 3 and 4. The maximum current that can be controlled by the terminal 3 is 150mA.

