



Electronics for Model Railroads

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SD-1

3 Aspect Lamp/LED Signal Driver

GENERAL DESCRIPTION: The CIRCUITRON **SD-1** is designed to drive any 3 color block signal that has separate lamps or LEDs for each color. The **SD-1** will also drive position light signals such as PRR and B & O style. LED type signals *MUST* be of the "common anode" design. If you are unsure, check with the signal manufacturer. *NOTE: The SD-1 will not control Bi-Color LED type signals where all three aspects are produced from the one LED. A CIRCUITRON SD-3 is recommended in this case.*

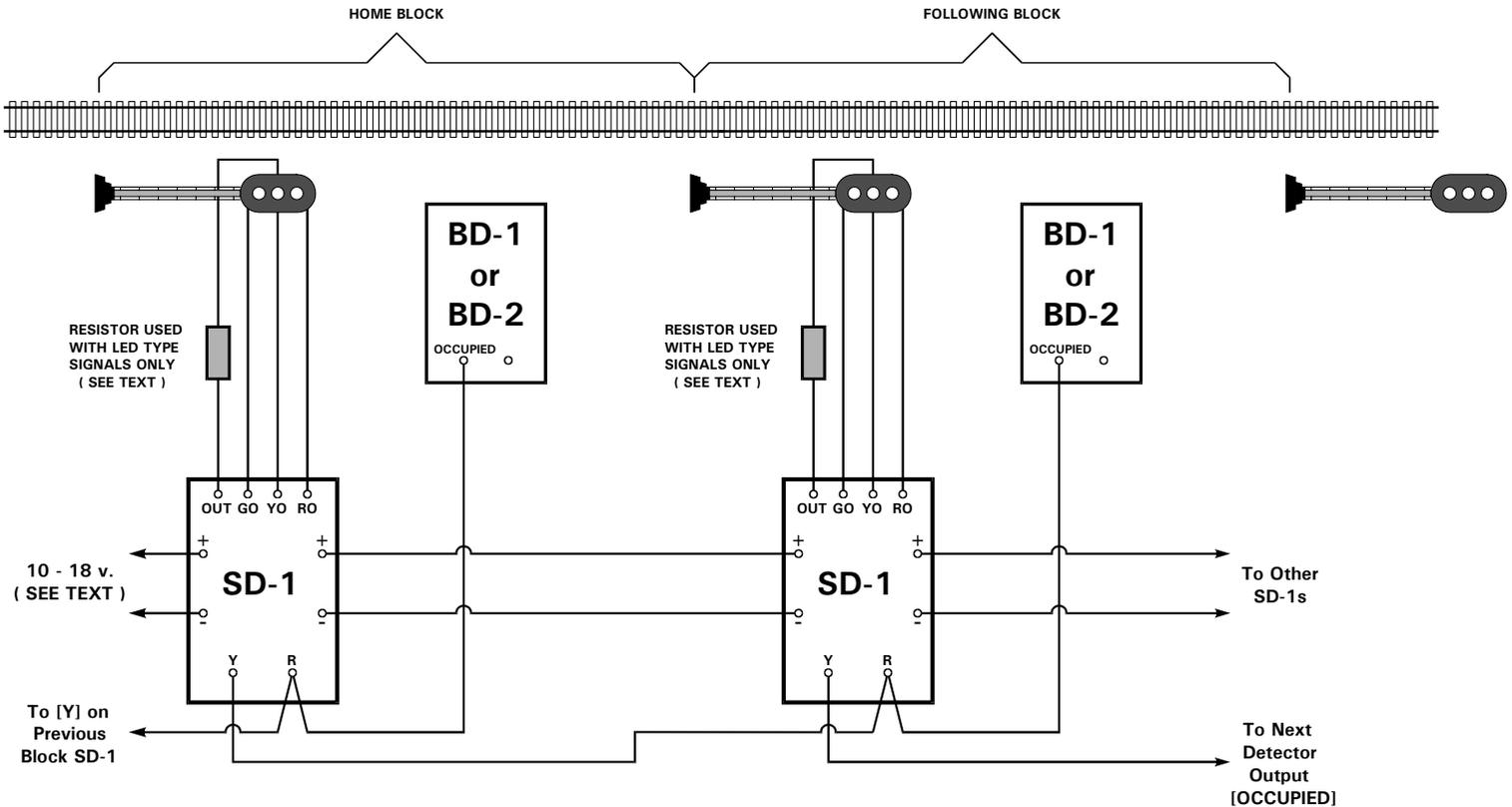
The **SD-1** accepts negative (-) control signals from CIRCUITRON detection circuits such as the **BD-1** or **BD-2** and includes all the necessary logic circuitry to automatically drive the signal to red, green and yellow aspects. *NOTE: A minimum of 2 blocks of detection (home and following) are required to provide all three aspects from the SD-1. A separate SD-1 will be required for EVERY signal on the layout that must display all three aspects.* The **SD-1** requires a 10 - 18 volt AC or DC input, however, DC will have to be used if the **SD-1** is connected to a DC output Detection circuit such as the CIRCUITRON **BD-1** or **BD-2**.

CIRCUIT DESIGN: The **SD-1** utilizes a CMOS NOR gate package driving three output transistors connected in an open-collector design capable of sinking 250 ma. to ground. Input to the board is half-wave rectified and the voltage to the CMOS IC is regulated by a zener diode.

INSTRUCTIONS: The **SD-1** can be connected with .110" solderless connectors or by soldering leads directly to the terminals on the printed circuit board. If soldering, use a small pencil-type iron and electronics-grade rosin core 60/40 solder (available at Radio Shack). Use only as much heat as necessary to obtain a good joint and do not wiggle the terminal until the solder has cooled completely.

- 1 Mount the circuit board in a convenient location. A section of CIRCUITRON's **PCMT** makes this a simple task, or the mounting pads in the corners of the board may be drilled out and the circuit mounted with screws and standoffs.
- 2 Your signal should have four wires, 1 common and 1 for each color. Run a light gauge (22-24 ga.) wire from the signal common to the **[OUT]** terminal at the top of the **SD-1**. *WARNING: If you are using a LED type signal, you MUST include a suitable current limiting resistor in this lead. Many signals come equipped with resistors. If yours did not, check with the signal manufacturer or use a value of 1,000 ohms for a 12 volt power supply. FAILURE TO ADD THIS RESISTOR WILL RESULT IN INSTANT DESTRUCTION OF YOUR SIGNAL AND MOST LIKELY THE SD-1 AS WELL!*
- 3 Run additional wires from the remaining three signal leads to the respective color outputs on the **SD-1**. **[GO]** is the GREEN output, **[YO]** is the YELLOW output and **[RO]** is the RED output.
- 4 Connect the **[+]** and **[-]** terminals on the **SD-1** to a 10 - 18 volt DC source. Leave your power source OFF during these connections. AC may be used to power the **SD-1**, but if the **SD-1** will be connected to Detection Circuits for automatic operation, then *DC MUST BE USED!* You will notice that the supply terminals, **[+]** and **[-]** are bussed across the board so that multiple **SD-1** installations are easily wired. Merely connect **[+]** to **[+]** and **[-]** to **[-]** for daisy-chained installations.
- 5 For automatic operation, connect a wire from the **[R]** terminal on the **SD-1** to the output from a CIRCUITRON detection circuit installed for the *SAME* block that the signal is supposed to protect. This terminal is labelled **[OCCUPIED]** in the case of the **BD-1** or **BD-2**. With this connection, the **SD-1** will now display 2 aspect signals (red and green). This block is designated the *HOME* block and will be referred to as such in the diagrams. *NOTE: The detection circuits and the SD-1 must have the same power source for proper operation.*
- 6 Connect a wire from the **[Y]** terminal on the **SD-1** to the output from a CIRCUITRON detection circuit installed for the block following the *HOME* block above. This block is designated the *FOLLOWING* block. Refer to *figure 1* for further clarification.
- 7 This completes the installation. Apply power to the board and run a train through the blocks and note that the signal properly displays all three aspects.

TYPICAL APPLICATION:



NOTES:

- 1) BD-1/BD-2 power supply and BD-1 Opto-Sensor connections are not shown.
- 2) Block Detectors and SD-1 board(s) must share a common power source.
- 3) Single direction mainline shown. Bi-directional travel requires additional signals & SD-1s for opposite direction.

WARRANTY

CIRCUITRON warrants this device against defects in materials and workmanship for a period of one year from the date of purchase. This warranty covers all defects incurred in normal use of the device and does not apply in the following cases:

- a) damage to the device resulting from abuse, mishandling, accident or failure to follow operating instructions.*
- b) if the device has been serviced or modified by other than the CIRCUITRON factory.*
- c) lamps are not warranted against burnout.*

EXCEPT AS MENTIONED ABOVE, NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED INCLUDING MERCHANTABILITY, ON THE PART OF THE UNDERSIGNED OR ANY OTHER PERSON, FIRM OR CORPORATION, APPLIES TO THIS DEVICE.

CIRCUITRON, INC.