



Electronics for Model Railroads

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# DF-1

## GRADE CROSSING DETECTOR AND FLASHER

**GENERAL DESCRIPTION:** The CIRCUITRON **DF-1** is an advanced, integrated circuit detection unit with an alternating flasher contained on the same circuit board. The detection part of the circuit utilizes CIRCUITRON's proven Opto-Electronic system and provides true-prototype grade crossing for all *single direction* applications. If your application requires Bi-directional detection, use a CIRCUITRON **DT-1** or **DT-2** instead. The **DF-1** is entirely independent of the track power and may be used for all scales and methods of power including AC track power and carrier control systems. The flasher section of the **DF-1** will power two 250 ma. loads and may be used with either LEDs or incandescent lamps. Additional CIRCUITRON detection units may be easily connected to the **DF-1** to control the flasher section in order to provide detection on parallel tracks. An output terminal on the **DF-1** may be connected to additional accessories such as the CIRCUITRON **ER-1** or **ER-2** External Relays or the **BR-1** and **BR-2** Bell Ringer Circuits. The **DF-1** may be powered by any 10-18 volt AC or DC source.

**INSTRUCTIONS:** The **DF-1** can be connected with .110" solderless connectors (available from CIRCUITRON) 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. A section of CIRCUITRON'S **PCMT** can be used for simple, snap-in mounting of the circuit board or you may drill holes in the mounting pads in the corners of the board and mount the **DF-1** with screws and standoffs.

- 1) Mount the **DF-1** in a convenient location. The **DF-1** should be mounted near the grade crossing on the underside of the layout.
- 2) Mount the two Opto-Sensors following the instructions included with them. One Sensor should be located where you want the approaching train to start the signals flashing, and the other should be located just a short distance beyond the crossing.
- 3) Connect one lead on each Opto-Sensor together with light gauge (22-24 ga.) wire, and then run that wire to the Sensor Drive Terminal [**SD**] on the circuit board.
- 4) Individual wires are then run from the remaining leads on both of the Opto-Sensors to the Sensor Terminals [**S1**] and [**S2**] on the board. Make sure that the Opto-Sensor just past the crossing is connected to [**S2**].
- 5) Connect one side of all the lamps to be flashed at the crossing together and run a wire to the [**LAMP**] Terminal on the circuit board. If the signals you are using have LEDs, you must observe proper polarity and include a current limiting resistor in this connection. Follow the instructions supplied with your signals. The [**LAMP**] terminal on the circuit board is positive (+).
- 6) Connect the remaining leads from the RIGHT side lamps together and run a wire to the Right Flasher Terminal [**R**] on the circuit board.
- 7) Connect the remaining leads from the LEFT side lamps together and run a wire to the Left Flasher Terminal [**L**] on the circuit board.

**CAUTION:** *The total lamp load connected to EITHER the [**L**] or [**R**] Terminal on the **DF-1** must never exceed 250 ma.*

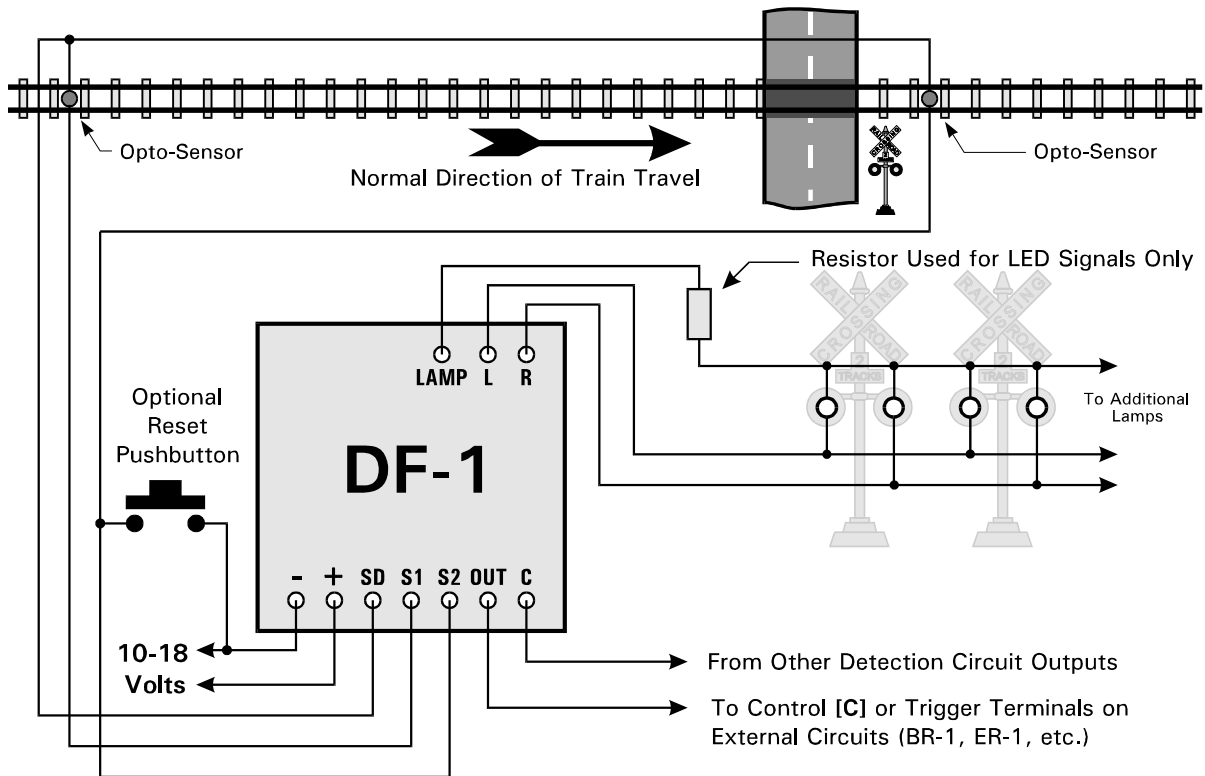
- 8) Connect a 10-18 volt AC or DC source to the Input Terminals [-] and [+]. Observe proper polarity if a DC source is used.

This completes the basic connections for the **DF-1**. If detection on parallel tracks is desired, use a CIRCUITRON **DT-1**, **DT-2**, or **DT-3** and connect the output to the Control Terminal [**C**] on the **DF-1**. If you wish to use the **DF-1** to control additional devices such as relays or bells, connect a wire from the Output Terminal [**OUT**] on the **DF-1** to the Control Terminal on the external device.

**ADJUSTMENTS:** All adjustments should be made with room lighting at the level it will be at during operating sessions of the layout. Changes of room lighting may necessitate readjustment of the sensitivity controls.

- 1) Making certain that no piece of rolling stock is shading either of the Opto-Sensors, adjust Sensitivity Control **P1** completely to its clockwise extreme so that Indicator Lamp **L1** is off.
- 2) Rotate Sensitivity Control **P2** fully counter-clockwise and then rotate it fully clockwise. The lamps on the crossing signals should now be off.
- 3) Slowly rotate **P2** counter-clockwise again until the lamps on the signals start to flash. Rotate **P2** back until the lamps JUST GO OFF. **P2** is now properly adjusted.
- 4) Rotate **P1** counter-clockwise until the Indicator Lamp **L1** on the circuit board comes on. Rotate **P1** back until **L1** JUST GOES OFF. **P1** is now properly adjusted. The lamps on the signals should still be flashing at this time.
- 5) Run a train past the crossing and the signals should go off after the last car clears the crossing. Check to make sure that the signals start flashing properly as the train approaches the crossing. If not, repeat steps 1 - 4.

*NOTE: When power is first applied to the layout, the signals may come on, requiring a "dummy" run past the crossing to turn them off. This is normal. In addition, a train passing through the crossing backwards, as when backing up will leave the signals flashing. A manual pushbutton may be connected between [S2] and [-] as shown in the diagram to reset the circuit.*



### 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.*

*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.*