Circuitron
Electronics for Model Railroads
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ER-1, ER-2

EXTERNAL RELAYS

GENERAL DESCRIPTION: The CIRCUITRON **ER-1** and **ER-2** are circuits consisting of a 2 amp relay, either single pole double throw in the case of the **ER-1,** or double pole double throw in the case of the ER-2, and all the necessary driver circuitry to enable them to be directly connected to the output of any CIRCUITRON Detection Units. The relay contacts can be used to control AC or DC circuits and are ideal for use with CIRCUITRON Block Occupancy Detectors to provide automatic train control. Both the **ER-1** and the **ER-2** have 12 volt relays and require a supply voltage of 11 to 14 volts DC. The **ER-1** and **ER-2** present a negligible load on the Detection Unit to which they are connected as the control current is only around 2 milliamps.

INSTRUCTIONS: The **ER-1** and **ER-2** 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. The mounting pads on the corners of the boards may be drilled out, or a section of CIRCUITRON's Printed Circuit Mounting Track (PCMT) may be used for the simplest mounting.

2) Connect the supply terminals [+] and [-] to a source of 11 to 14 volts DC. This should be the same power supply you are using for your Detection Units. *WARNING: Never connect AC power to the [+] and [-] terminals. Damage to the control transistor is likely and is not covered under our warranty.*

3) Connect the Control Terminal [**CONTROL**] to the output of one of CIRCUITRON's Detection Units. (The Detection Unit used will depend on the application.)

4) Connect the devices to be controlled to the contact terminals on the circuit boards. These terminals are numbered and connect through the relay contacts as follows:

ER-1: Terminal [**2**] is connected to Terminal [**3**] when the output of the Detection Unit is off. When the output is on, the relay will pull in, and Terminal [**2**] will be connected to Terminal [**1**].

ER-2: When the output of the Detection Unit is off, Terminal [**3**] will be connected to Terminal [**2**] and Terminal [**4**] will be connected to Terminal [**6**]. When the output of the Detection Unit turns on, the relay will pull in, and then Terminal [**3**] will be connected to Terminal [**1**] and Terminal [**4**] will be connected to Terminal [**5**].

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.

CIRCUITRON, INC.