



Electronics for Model Railroads

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PB-1

Power Booster Circuit

GENERAL DESCRIPTION: The CIRCUITRON **PB-1** is designed to connect directly to the output of any CIRCUITRON Detection Circuit and raise the load capacity to 1 amp DC. The **PB-1** can be powered by any DC power supply that can provide between 4 and 24 volts. The output can only be used to control DC circuits and provides a connection to common (ground). The **PB-1** presents a negligible load on the detection circuit to which it is connected as the control current is only around 2 milliamps.

CIRCUIT DESIGN: In operation, the **PB-1** is a simple transistor current amplifier. Whenever the voltage on the control terminal is 0.7 volts or more below the voltage on the supply pins, transistor Q1 will turn on and supply current to the base of the power transistor through R3. The power transistor is connected common emitter and connects the Output terminal to ground when it is biased on. Since the power transistor operates in the saturated state, a small heat sink is all that is necessary to handle currents up to 1 amp.

INSTRUCTIONS: The CIRCUITRON **PB-1** can be connected with .110" solderless connectors or by soldering leads directly to the terminals on the printed circuit board. Mount the **PB-1** in a convenient location. The mounting pads on the corners of the circuit board may be drilled out, or use a section of our Printed Circuit Mounting Track (**PCMT**) for the simplest installation.

- 1) Connect a source of DC current, preferably filtered, to the supply terminals on the **PB-1**. For proper operation, the supply that is powering the **PB-1** and the supply that is powering the Detection Circuit to which it is to be connected must share a common ground connection. If you are using the same supply for both units, this condition is met automatically. If, however, you are using separate power supplies for each circuit, then you must connect a jumper between the (-) supply terminals on each of the boards. It is a good idea to run a common ground connection throughout your layout anyway as it simplifies wiring of accessories. If you do not have a source of DC current already established on your layout, then a CIRCUITRON **PS-1** or **PS-2** can be used to rectify and filter the output from the AC accessory terminals on your power pack.
- 2) Connect the Control Terminal on the **PB-1** to the Output Terminal [**OUT**] of the Detection Circuit using light gauge wire.
- 3) Connect the devices you want to control (lamps, LEDs, relays, etc.) between the Output Terminal on the **PB-1** and a source of *POSITIVE* DC. You must connect LEDs and motors with the correct polarity or improper operation or damage may result. With lamps and relays, the polarity is unimportant. Please remember that the Output Terminal of the **PB-1** provides a connection to common (ground) and does *NOT* provide a positive output. No damage will result if an accessory is connected between the **PB-1** Output and the [-] terminal, however, it will not operate with this hookup.

DO NOT EXCEED THE PB-1's RATED OUTPUT OF 1 (ONE) AMP UNDER ANY CONDITIONS. FAILURE FROM THIS TYPE OF ABUSE IS NOT WARRANTED.