



Electronics for Model Railroads

211 RocBaar Dr., Romeoville, IL 60446

(815) 886-9010 FAX: (815) 886-9076

AW-1 / AW-2

ARC WELDER CIRCUITS

GENERAL DESCRIPTION: The CIRCUITRON **AW-1** and **AW-2** Arc Welder Circuits use a blue and yellow lamp along with a sophisticated random flicker circuit to produce a very convincing simulation of an arc welder in operation. In both circuits, the yellow lamp provides a continuous flicker effect and the blue lamp pulses random bright blue flashes. The **AW-1** utilizes high output 1.4 mm micro-lamps and is designed for direct viewing in a situation where the modeling scene will depict an actual welder at work. The **AW-2** uses larger 3 mm lamps and the brighter output is ideal for backlighting a structure window to simulate welding inside a building. The yellow lamp may be used alone on either the **AW-1** or **AW-2** to provide a simple flickering flame effect. These circuits require a 10 - 18 volt AC or DC input for proper operation.

INSTRUCTIONS: The **AW-1 / AW-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.

LAMP LOCATION

AW-1: The Micro-Lamps are to be mounted into the model or scene in direct view of the observer. We recommend placing the yellow lamp in the foreground with the blue lamp mounted slightly to the side behind it. In this way, the random flickering of the yellow lamp predominates, and the bright flashes of blue will be seen right beside the yellow. A small wisp of cotton may be placed over the lamps to simulate smoke.

AW-2: The 3 mm lamps should be located inside the structure, side by side. The windows of the structure should be diffused by spraying with Dullcote™ or by sanding with 600 grit paper. Distance from the windows will vary depending on the effect desired. We recommend experimenting *before* fixing the lamps in position. Placing a shiny foil reflector behind the lamps will help to concentrate the lights on the windows.

NOTE: *Although the lamps provided with the AW-1 / AW-2 should last a long time, we recommend allowing for the eventual failure or burnout of the lamps. DO NOT seal the lamps into a closed model that might have to be destroyed in order to replace them.*

CIRCUIT BOARD WIRING

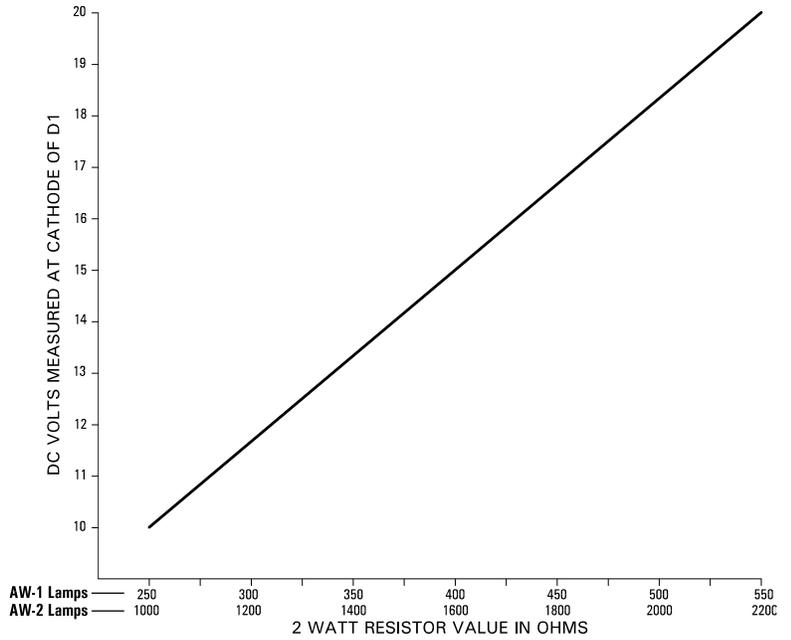
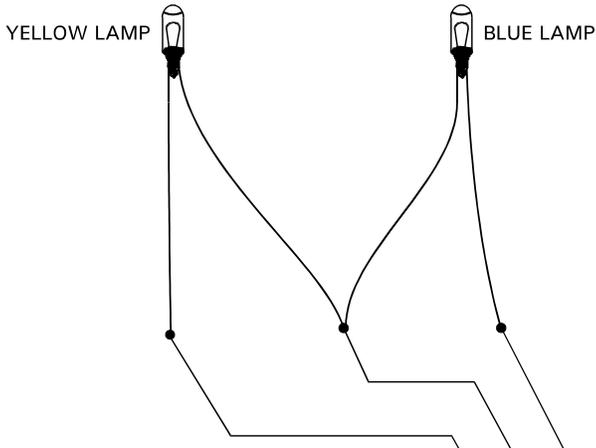
- 1) Mount the **AW-1 / AW-2** in a convenient location near the lamps. In the case of the **AW-2**, it may be possible to mount the circuit board inside the structure. You may drill holes in the 4 corner mounting pads or use a section of CIRCUITRON's **PCMT** for simple snap-in mounting.
- 2) Connect one lead from each lamp to the COMMON terminal [C] on the **AW-1 / AW-2** circuit board.
- 3) Connect the remaining lead from the YELLOW lamp to the terminal labeled [Y] on the circuit board.
- 4) Connect the remaining lead from the BLUE lamp to the terminal labeled [B] on the circuit board.
- 5) Adjust the trimmer labeled P1 fully clockwise, then counterclockwise 1/4 turn.
- 6) Connect a 10 - 18 volt AC or DC power source to the [+] and [-] input terminals. If DC is used, be sure to observe proper polarity. Both lamps should start flashing immediately.

NOTE: *When powering the AW-x circuits off AC, component tolerances may cause the lamps to light dimly or not at all. This is not usually a problem with higher voltages (16-18 VAC). The solution is to use a DC power source, or to connect a 100 microfarad, 25 volt capacitor (supplied) with the + end connected to the banded end of diode D1 and the [-] side of the capacitor to the [C] terminal. See FIGURE 3.*

ADJUSTMENTS AND OPTIONS

- 1) By adjusting trimmer P1 counterclockwise, the frequency of BLUE flashes is decreased. At some point, depending on lamp type, the blue lamp will stop flashing altogether. Adjust P1 to your liking.
- 2) The YELLOW and BLUE lamp connections may be interchanged if you prefer a BLUE flicker with YELLOW flashes. Other size or color lamps may be substituted. Lamp ratings should be:
AW-1 -- 1.5 volts at 60 ma. maximum.
AW-2 -- 5.0 - 6.0 volts at 250 ma. maximum.
- 3) By design, the YELLOW lamp goes completely OFF during a certain percentage of the flicker cycle. If you prefer to have a slight glow at all times, wire a **2 watt** resistor from the banded end (cathode) of diode D1 to the [Y] terminal. The value of the resistor will vary depending on your supply voltage and how bright you want the lamp lit. Start with a value 20% higher than shown in the graph on the next page. You **must** measure your input voltage carefully with a voltmeter at the cathode (banded) end of D1. **DO NOT trust your power pack rating.** Then work down. Lower values give a brighter light. **WARNING:** *Too low a value will burn out your lamp instantly. Be Careful!*

FIGURE 1: Graph of suggested resistor values for biasing YELLOW lamp partially on.



Optional 2 Watt Resistor to bias Yellow Lamp Partially On. (See Text & Graph)

10 - 18 v. AC or DC

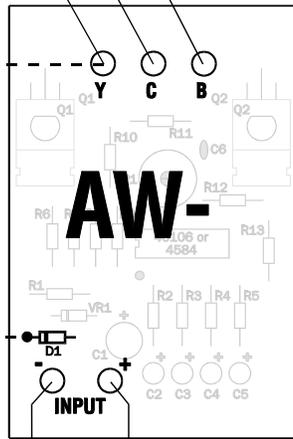
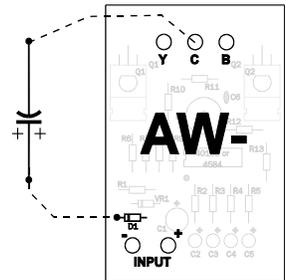


FIGURE 2: TYPICAL HOOKUP

FIGURE 3: Adding a Filter Capacitor



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.