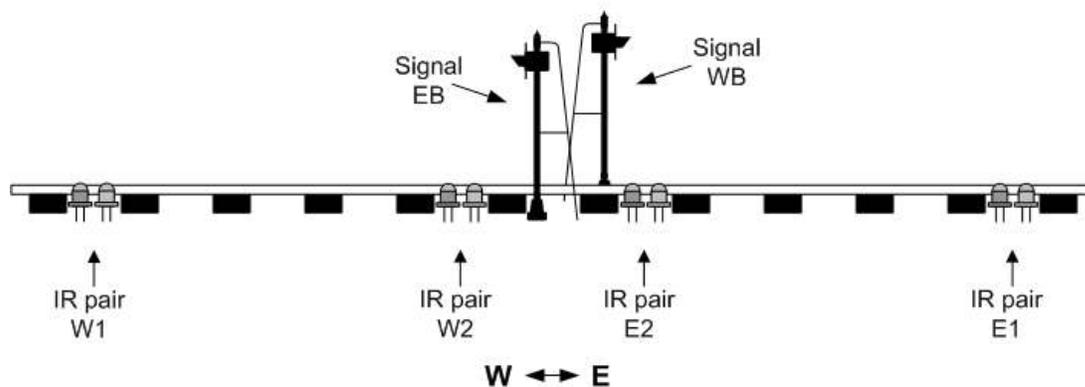


Getting started

Thank you for purchasing a *Logic Rail Technologies* product! Please familiarize yourself with all the instructions prior to installing this upgrade.

This Infrared (IR) upgrade kit for the *Block Animator* supplements the original instructions for ALL versions of the product (BA-1, BAD-SBCA, BAD-CC). The instructions herein describe the installation of the IR components. An Infrared (IR) emitter and detector are used for bidirectional train detection. Detection is achieved when the IR beam from the emitter reflects off the underside of the train back down to the detector. **Despite the use of infrared components you could still encounter false triggering from overhead lighting. This is usually eliminated with angled sensor mounting and/or proper sensor sensitivity adjustment (page 2).** This version of the *Block Animator* must be powered from either a 7-9V AC or 9-12V DC power source (such as our 12VPSR). Do NOT exceed these limits! The layout of the signals and IR components is illustrated below.



Installing the *Block Animator* replacement chip

The main chip (the one with the colored dot on it or with a white label on it) on the *Block Animator* must be replaced with the one that has "INV" on it. First, carefully pry the existing chip out of its socket using a flat blade screwdriver. Be VERY careful when doing this so that you do not damage the socket or circuit board. Next, carefully insert the replacement chip in the socket while making sure that the pins do not bend or fold underneath the chip. Make sure that the writing on the chip is in the same orientation as the *Block Animator* name on the upper portion of the board!

Mounting and wiring the IR components

The IR components should be mounted between the rails. Drill two 11/64" holes, through the ballast, roadbed, and sub-roadbed. These holes should be located one tie apart (Figure 1a) and drilled at approximately a 45 to 60 degree angle from horizontal as illustrated in the side view in Figure 1b. The benefit of mounting them at an angle is reduced false triggering from overhead light and increased detection reliability in smaller scales or irregular bottoms on rolling stock. For the smaller scales this drilling may end up hitting the ties. Take your time so you don't mangle them! Insert the leads of one IR emitter (white and black wires) into one of the holes (it doesn't matter which one!) from the top of your layout. Repeat for the IR detector (blue and black wires). The tops of the components should sit no higher than the top of your ballast for optimal IR performance; in some cases (e.g. false triggering) it may be necessary to locate the components a little below the ballast line. You can extend the leads with similar (or larger) wire. We recommend soldering and insulating these connections. We also recommend using terminal blocks/strips since you'll have multiple DC and GND connections to make. Once you have wired the IR components and verified their operation you may wish to put a dab of white glue or silicone caulk where the wires exit the holes underneath the layout. This will help to hold the components in place; make sure you don't get any substance (e.g. ballast or glue) on the top surface of the IR components as this may prevent them from operating properly. In extreme cases where you may be getting interference from overhead lighting you can mount the IR detector in some plastic or metal tubing. You can also recess the IR detector slightly below the ties and roadbed.

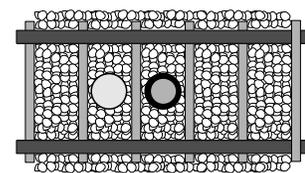


Figure 1a

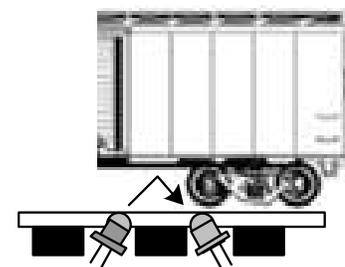


Figure 1b

Figure 2 illustrates the wiring for one set of IR components (shown for sensor location “E1”). Use the same wiring scheme for the three remaining sensor locations (E2, W1, W2). Four 180 ohm 1 Watt resistors are included with this kit.

WARNING: The 180 ohm 1 watt resistor may become hot to the touch – take care so that you don’t burn yourself! When properly wired the emitter will have a very faint red glow coming from it. You can also look at the emitter through a digital camera and see the infrared light! **For safety reasons do NOT point the IR emitter directly into your eye or stare at the IR emitter!!!**

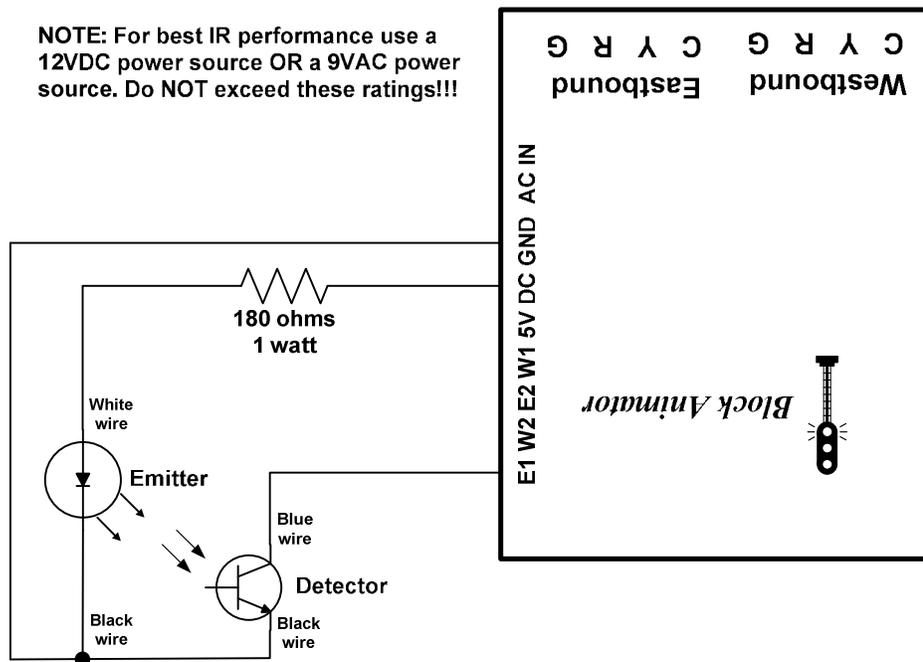


Figure 2 – IR component wiring

Sensor sensitivity setup

Along one edge of the board are four potentiometers that are labeled "W1", "E2", "W2" or "E1"; these are referred to as the sensitivity adjustment pots. **For most lighting environments it is USUALLY sufficient to just leave these set midway in their travel (i.e. halfway between fully clockwise and fully counterclockwise).** To determine if any adjustments need to be made do the following:

1. Remove all obstacles that may be covering the sensors. Verify that all four of the blue IR detector wires are connected into their associated terminal on the BA board.
2. Put the BA board into SETUP mode by putting the switch labeled SETUP in the ON/CLOSED position. In this mode the signals will not operate!
3. Using a small flat blade screwdriver turn all four adjustment pots to the midpoint in their travel as described above.
4. If the red LED on the BA board is ON then remove each of the four blue detector wires from the BA’s terminals one at a time. As you remove a wire check the red LED. If it turns OFF when you remove a particular wire then note which location (W1, E2, W2, or E1) caused the change. Then reconnect that same blue wire and turn the associated adjustment pot slightly clockwise (right) until the red LED turns OFF. It may be necessary to repeat this as you reconnect the disconnected blue wires!
5. One you confirm that the red LED stays OFF with all four blue detector wires properly reconnected then you’ll need to verify proper detection with a piece of rolling stock. Confirm that the red LED turns ON and OFF as you move a boxcar over each of the four detector locations. Exit SETUP mode by putting the SETUP switch in the OFF/OPEN position. The signals should now operate properly. You may wish to repeat this procedure with any other layout lighting conditions you operate under (e.g. “daytime” vs. “nighttime”).

Power

When using the *Block Animator* with IR you will need to provide 7-9V AC or 9-12V DC for power. Power consumption is approximately 300mA (PLUS whatever your signal consumes). If you are only using a single *Block Animator* then use the TWO AC terminals to provide power (polarity doesn’t matter). CAUTION: Most AC or DC accessory terminals on your throttle/power pack exceed 12V and cannot be used with the *Block Animator*! However, you can use those power sources in conjunction with our 12VPSR which will provide 12V DC. If you are using more than one *Block Animator* you can power them all from a single 9-12V DC source as shown in Figure 3 below.

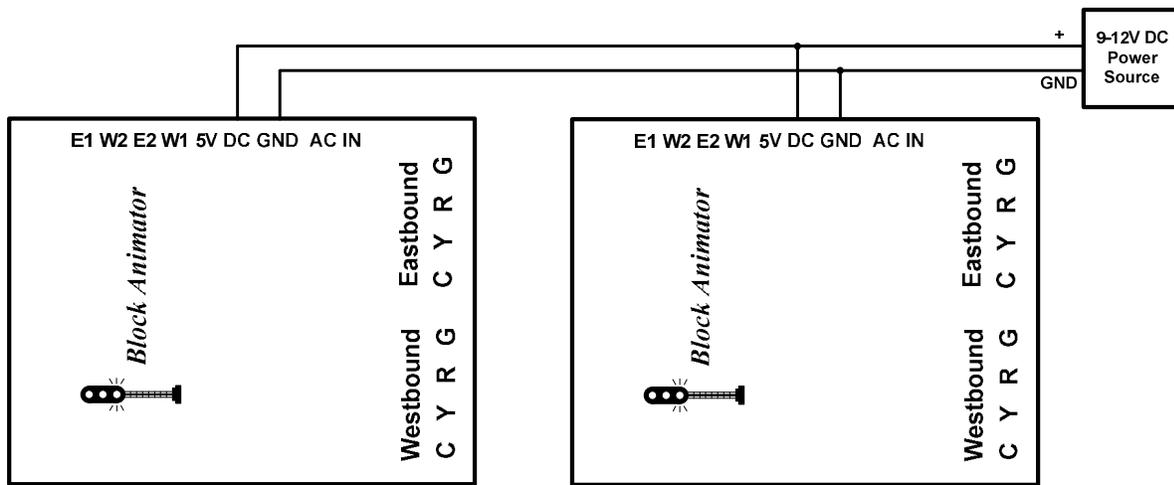


Figure 3 – DC power

Troubleshooting

If your signals do not change colors when a particular sensor is activated then you can perform the following tests. First, perform the sensor setup routine previously described. If one or more of the sensors does not function properly then you know it is faulty. If the sensors are OK then you might have a problem with the *Block Animator*, the signals, or the wiring between them.

If the red LED on the *Block Animator* board stays lit when the *Block Animator* is in SETUP mode then there is a problem with sensor sensitivity, sensor wiring, or one of the chips on the *Block Animator*. First, double-check your sensor wiring. A missing sensor connection (missing wire or open circuit) will be interpreted by the *Block Animator* as a cleared sensor. A shorted sensor (i.e. blue and black wires touching) will be interpreted by the *Block Animator* as an activated sensor. Next, put the *Block Animator* in SETUP mode (see page 1) and turn all four sensor sensitivity pots completely counter-clockwise (left). If the red LED goes out then simply complete the sensor setup process continuing with Step 3 on page 4. If the red LED is still lit then the problem is either a bad sensor or a faulty chip on the *Block Animator*.

You can determine if the *Block Animator* sensing chip is working correctly by TEMPORARILY disconnecting all blue sensor wires from the *Block Animator*. If the red LED on the *Block Animator* is lit then its sensing chip is faulty (read on below for details on replacing it). If, on the other hand, the red LED on the *Block Animator* is now dark then connect each sensor input (W1, E2, W2, E1) to GND, ONE sensor input at a time. An activated sensor appears to the *Block Animator* like a connection to GND so you are, in effect, mimicking an activated sensor with this test. If the red LED does NOT come on each time you make that temporary connection (make sure you try all four sensor inputs!) then you have a faulty chip.

The chip that “processes” the sensor inputs is located closest to the photocell sensitivity pots. This chip is labeled “LM339”. Replacements are available from us or you can purchase one from stores such as Radio Shack (part number 276-1712). To replace the chip you will need to gently pry it out of its socket using a flat blade screwdriver. Take great care when inserting the replacement chip so that you don’t bend any of its pins underneath it. Make sure the text on the chip has the OPPOSITE orientation as the name “*Block Animator*” on the circuit board.

Still having problems?! Please contact us for further assistance!

Troubleshooting

If your signal is not changing colors when the sensor is activated or stays red all the time you can perform the following tests. First, verify the sensor wiring and sensitivity adjustment previously described. If the signal stays red all the time then disconnect the sensor’s blue wire. After two time delays the signal should return to green. If it does then there is a problem with the sensor. If your signal never changes from green then temporarily connect a wire between the PC terminal and the GND terminal. The signal should immediately change to red. If not, then the *Block Animator* board should be returned to us for test/repair. If the signal did change to red then disconnect the temporary wire. The signal should proceed through its delay and color changes. If so then the problem lies with the sensor.

Warranty

This product is warranted to be free from defects in materials or workmanship for a period of one year from the date of purchase. **Logic Rail Technologies** reserves the right to repair or replace a defective product. The product must be returned to **Logic Rail Technologies** in satisfactory condition. This warranty covers all defects incurred during normal use of this product. This warranty is void under the following conditions:

- 1) If damage to the product results from mishandling or abuse.
- 2) If the product has been altered in any way (e.g. soldering).
- 3) If the current or voltage limitations of the product have been exceeded.

Requests for warranty service must include a dated proof of purchase, a written description of the problem, and return shipping and handling (\$6.50 inside U.S./\$15.00 outside U.S. - U.S. funds only). Except as written above, no other warranty or guarantee, either expressed or implied by any other person, firm or corporation, applies to this product.

Technical Support

We hope the preceding instructions are sufficient for answering any questions you might have about the installation of this product. However, technical support is available should you need it. We would ask that you first contact your place of purchase for assistance. If you still need further assistance then please do not hesitate to contact us. You can reach us via phone, mail and email; our contact information can be found on the top of page 1.