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Across-The-Track Infrared detection Application Note

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Introduction

These instructions illustrate how to mount and wire the "across the track" Infrared (IR) components with our *Grade Crossing Pro, Block Animator*, *Signal Animator* or *Optical Detector*. **For ALL circuits do NOT use the "INV" version of the main chip on the circuit board! You MUST use the version meant for the photocell version of these products; this is necessary in order to have the right detector polarity. If you don't have the correct chip please contact us for a replacement. Further, for optimal IR performance use a 12VDC (such as our 12VPSR) or a 9VAC power source for the circuit board. Do NOT exceed these ratings or else you may permanently damage the IR emitter. WARNING: The 180 ohm 1 watt resistor may become hot to the touch – take care so that you don't burn yourself! For safety reasons do NOT point the IR emitter directly into your eye or stare at the IR emitter!!!**

Mounting the IR components

The IR components should be located across the track as shown in Figure 1a and 1b. The detector (blue lens if you're using our components) should be mounted with a slight downward angle in order to minimize the possibility of false triggering from visible light sources; this is illustrated in Figure 1a. We would also recommend that you angle the emitter and detector across the track as shown in Figure 1b. This will minimize false "clear" situations due to the space between rolling stock.

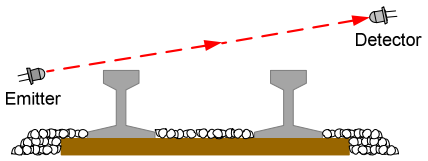

Figure 1a

In the event the leads don't reach the circuit board you can extend them with similar (or larger) wire. We recommend soldering these connections or using terminal blocks/strips especially when wiring to the *Block Animator* or *Grade Crossing Pro* since you'll have multiple DC and GND connections to make.

Aligning the IR components for reliable detection might be a bit challenging. We recommend the use of a straight edge or ruler for initial "rough" alignment. You can tweak the final alignment while using the sensor sensitivity adjustment process outlined below.

Since the IR components are located trackside, you'll probably want to consider "hiding" them. There are numerous ways to do this such as using shrubbery, small equipment buildings or fixtures. We leave this exercise up to your imagination and creativity! We would strongly suggest that you get the circuitry working properly first, and then address the physical appearance. .

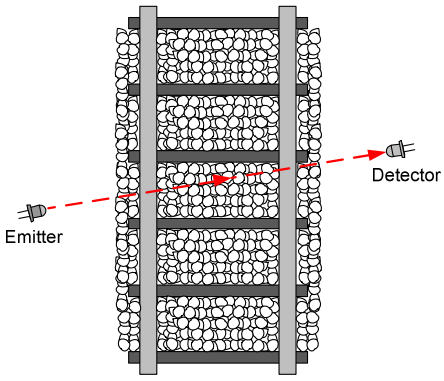

Figure 1b

Wiring and setup for the *Grade Crossing Pro*

Figure 2 below illustrates the wiring for <u>one set</u> of IR components. In this diagram the IR components are providing detection for the "WN" sensor location. Use the same wiring for the three remaining sensor locations (WF, EN, EF).

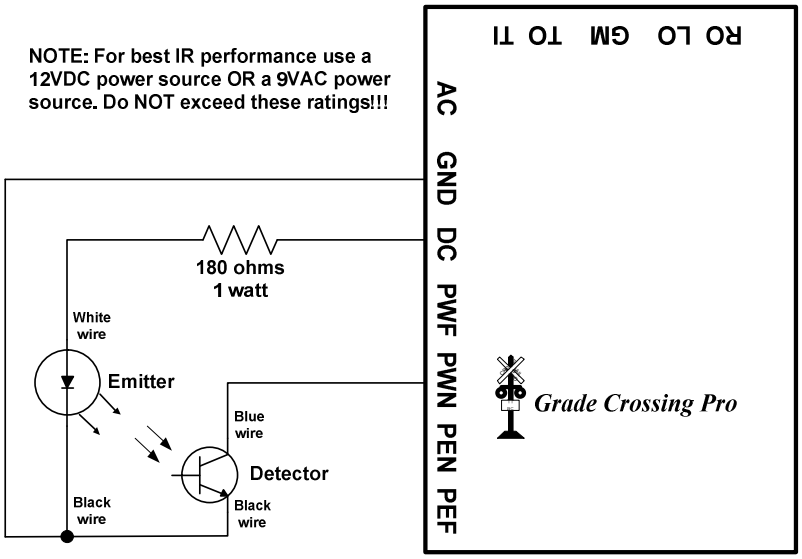

Figure 2

You can adjust the sensitivity of each sensor on the circuit board using a small slotted head screwdriver. Along one each of the board are four potentiometers (or “pots”) that are labeled "WF", “WN”, “EN” or “EF”. The GCP supports a SETUP mode to make this adjustment process easier. To enable this mode, you must have the switch labeled SETUP in the ON/CLOSED position. In this mode the signals and gates will not operate. The GCP circuit board contains a red LED near the configuration switches; this LED will assist you in setting the sensor sensitivity. Now follow these steps:

1. Remove all obstacles that may be blocking any of the IR beams across the track.
2. Turn all four adjustment pots fully counter-clockwise (left) and verify that the red LED is off.
3. Place a piece of rolling stock at the WF sensor location such that it is blocking the IR beam. Adjust the pot labeled WF clockwise (right) until the on-board LED lights up. Remove the piece of rolling stock and verify that the on-board LED turns off. If not, slightly turn the WF adjustment pot back counter-clockwise until the on-board LED turns off. Then verify that with the rolling stock present the on-board LED still turns on.
4. Repeat step 3 for the three remaining pots and associated sensor locations.
5. Exit SETUP mode by putting the SETUP switch in the OFF/OPEN position. The crossing signals should now operate properly.

Wiring and setup for the *Block Animator*

Figure 3 below illustrates the wiring for <u>one set</u> of IR components. In this diagram the IR components are providing detection for the “E1” sensor location. Use the same wiring for the three remaining sensor locations (E2, W1, W2).

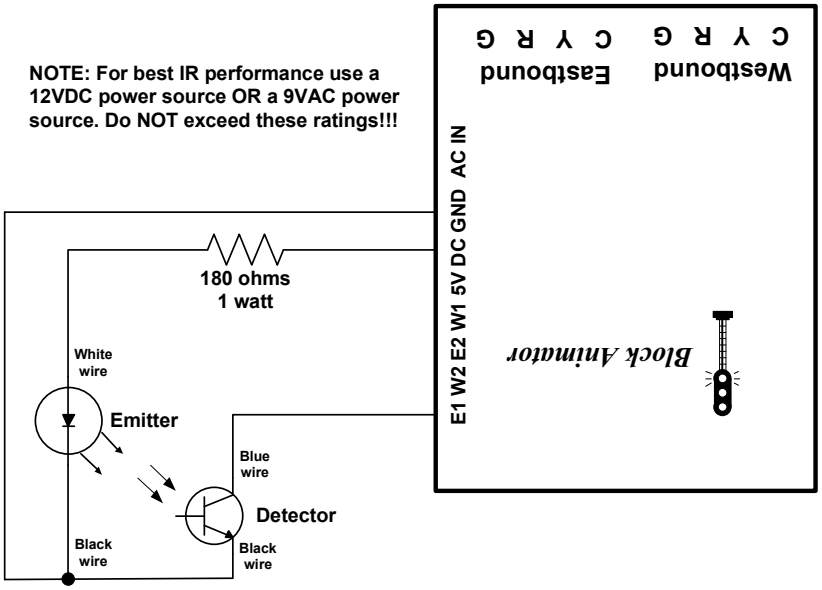

Figure 3

You can adjust the sensitivity of each sensor on the circuit board using a small slotted head screwdriver. Along one each of the board are four potentiometers (or “pots”) that are labeled "W1", “E2”, “W2” or “E1”. The BA supports a SETUP mode to make this adjustment process easier. To enable this mode, you must have the switch labeled SETUP in the ON/CLOSED position. In this mode the signals will not change colors. The BA circuit board contains a red LED near the configuration switches; this LED will assist you in setting the sensor sensitivity. Now follow these steps:

1. Remove all obstacles that may be blocking any of the IR beams across the track.
2. Turn all four adjustment pots fully counter-clockwise (left) and verify that the red LED is off.
3. Place a piece of rolling stock at the W1 sensor location such that it is blocking the IR beam. Adjust the pot labeled W1 clockwise (right) until the on-board LED lights up. Remove the piece of rolling stock and verify that the on-board LED turns off. If not, slightly turn the W1 adjustment pot back counter-clockwise until the on-board LED turns off. Then verify that with the rolling stock present the on-board LED still turns on.
4. Repeat step 3 for the three remaining pots and associated sensor locations.
5. Exit SETUP mode by putting the SETUP switch in the OFF/OPEN position. The signals should now operate properly.

Wiring and setup for the *Signal Animator* or *Optical Detector*

Figure 4 below illustrates the wiring for the set of IR components.

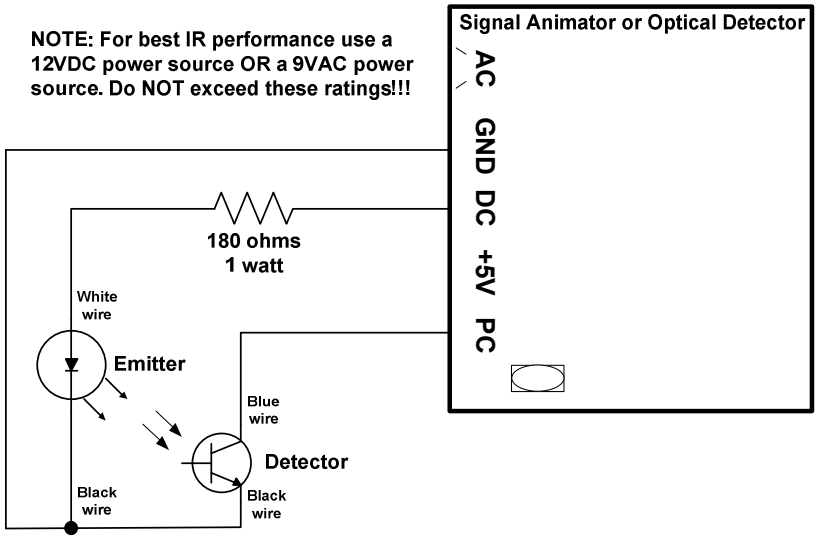

Figure 4

You can adjust the sensitivity of the sensor on the circuit board using a small slotted head screwdriver. Insert the screwdriver in the component labeled "VR1".

1. Remove all obstacles that may be blocking the IR beam across the track.
2. With the power to the SA/OD board OFF turn the screwdriver fully clockwise (right) and then turn ON the power to the board.
3. Verify that the signal remains Green.
4. Place a piece of rolling stock at the sensor location such that it is blocking the IR beam. Turn the screwdriver slowly counter-clockwise (left) until the signal turns Red.
5. Remove the piece of rolling stock and verify that the signal changes color after the appropriate time delay. If not, slightly turn the screwdriver back slightly clockwise. Verify that the signal changes color after the appropriate time delay. Then with the rolling stock present verify that the signal turns Red. Repeat as necessary.