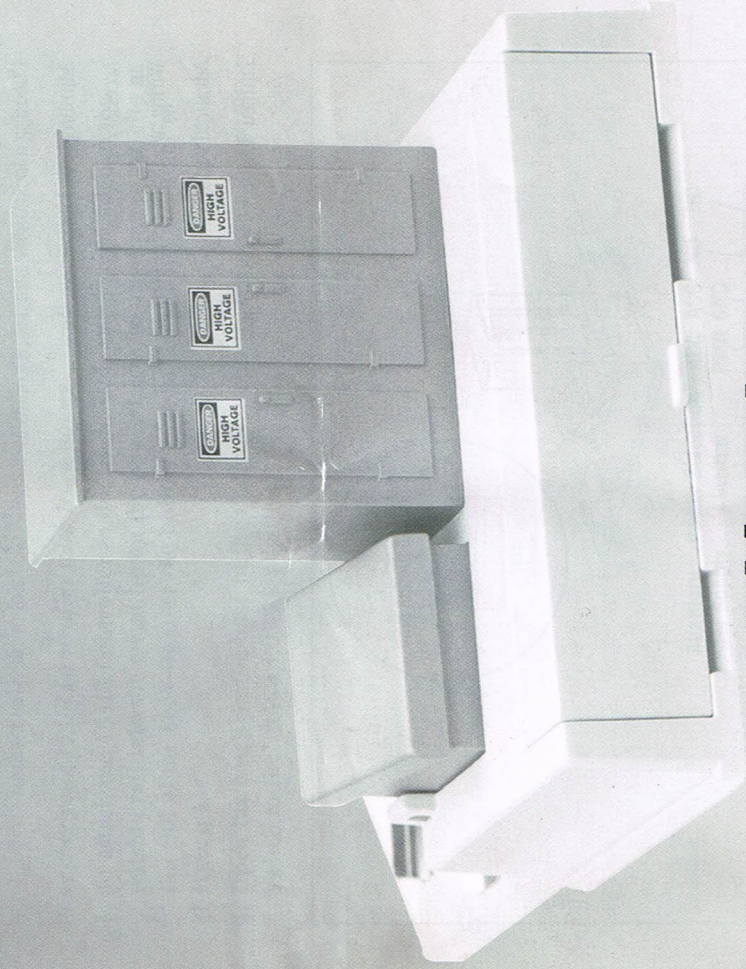


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Lionel **1531R Controller** **Owner's Manual**

Congratulations

Congratulations on your purchase of the Lionel 153IR Controller. Place this device on any Lionel O or O-27 gauge three-rail layout to activate any track side accessory. The 153IR Controller uses an infrared beam to detect passing trains, cueing the device to activate your signals and accessories. The 153IR Controller was built to provide years of reliable operation.

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Installing and powering your 153IR Controller

Your 153IR Controller will operate best at 12-20 volts (AC). There are two ways to power your Controller. First, you may choose to power the Controller through track power. The transformer supplies power to the track, and the Controller “borrows” some of this power through its power Lock-On. It may be necessary to increase the track voltage to compensate for this loss.

The other method of powering the 153IR Controller is to use a separate power supply. In this case, power is not supplied through the track Lock-On. This method of powering the Controller is recommended for Command Control layouts with accessories controlled by variable voltage or for layouts with accessories that operate at less than 12-18 volts.

Caution! To make the proper connections, you need the ends of the wires to be stripped back 1/4” to 3/8”. To strip the wires, use a pair of wire strippers or a sharp knife. Only an adult should perform this task! Always use care when stripping wires.

Powering your 153IR Controller with track power

1. To attach the 153IR Controller to the track, slide the bottom edge of the controller outside rail into the metal lip on the power Lock-On, then press the clip at the end of the Lock-On over the bottom edge of the inside rail. Refer to Figure 1.
2. Open the hatch on the base of the Controller and set the power selection switch to the TRACK POWER position.

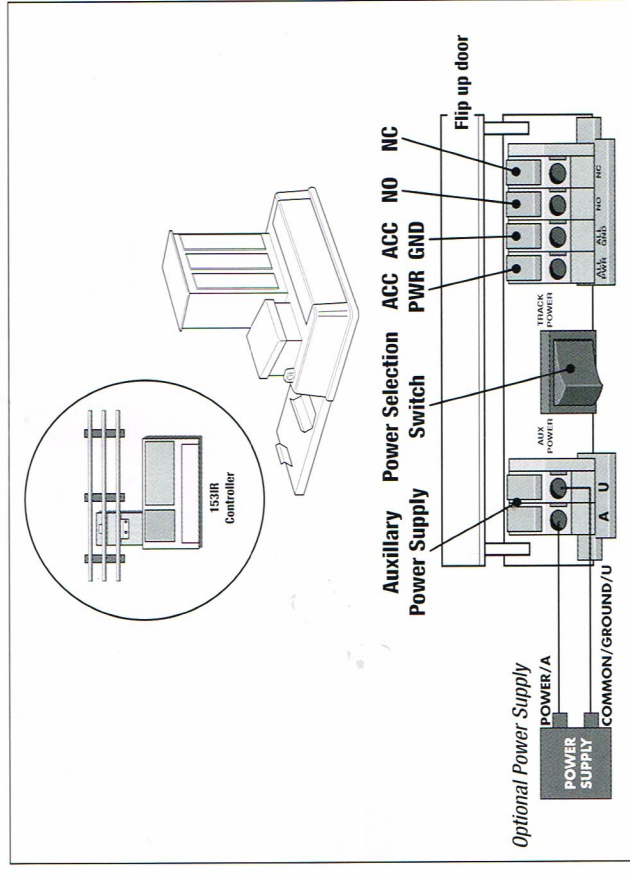


Figure 1. Lock-On attachment and switch location

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Installing and powering your 153IR Controller

Powering your 153IR Controller with a separate power supply

1. To attach the 153IR Controller to the track, slide bottom edge of the outside rail into the metal lip on the power Lock-On, then press the clip at the end of the Lock-On over the bottom edge of the inside rail. Refer to Figure 1.

-OR-

2. To set the 153IR Controller next to the track, remove the power Lock-On from the Controller. Simply remove the two screws that secure the Lock-On to the base at the bottom of the Controller, then lift away the Lock-On. Be sure to position the Controller no further than 2-1/2 inches from the trigger point.

Note! If you are placing the 153IR Controller near a switch or a curve, it is best to remove the power Lock-On.

3. Open the hatch on the base of the Controller and locate the POWER SUPPLY terminals to the left of the rocker switch.

4. Attach a wire to the POWER/A terminal on your power supply and connect it to the POWER SUPPLY/A terminal on the 153IR Controller.

Press the orange rectangle above the wire terminal and insert the wire. Release the button and gently tug on the wire to be sure that the wire is secure.

5. Attach a wire to the Common/Ground/U terminal on your power supply and connect it to the POWER SUPPLY/U terminal on the 153IR Controller.

6. Set the rocker switch to the AUX POWER position. Figure 1 illustrates the location of this switch

Wiring accessories with your 153IR Controller

Accessories are connected to the terminals labeled ACC PWR, ACC GND, NO, and NC. The NC (Normally Closed) terminal is used for lamps or accessories that are normally ON. The NO (Normally Open) terminal is used for lamps or accessories that are OFF until they are triggered by the train. The ACC GND terminal is the ground terminal. The ACC PWR (constant voltage) terminal is designed to keep parts of an accessory ON (for example, interior illumination) while other accessory functions are triggered by the train.

As illustrated in Figure 2, press in the small button located directly above the terminal and insert the wires.

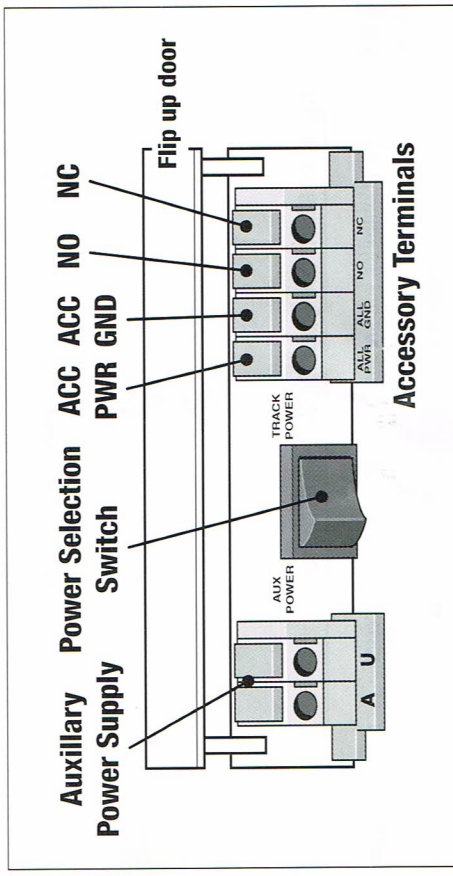


Figure 2. 153IR wire terminals and connections

Table 1 provides the basic wiring for various components (lamps, sounds, events, etc.) of your accessories. Some accessories feature only one component. For example, the only function of the Automatic Crossing Gate is to lower the arm. Other accessories feature multiple components. The Dwarf Signal features two lamps, each with a different function. Refer to the specific wiring examples that appear on pages 10-13 to help determine which accessory terminals control the individual components.

Note! Do not use wire that is larger than 24 gauge.

Wiring accessories with your 153IR Controller (continued)

Power is constantly ON	POWER terminal on the accessory connected to the ACC PWR terminal GROUND terminal on the accessory connected to the ACC GND terminal
Power is ON until triggered by the train	POWER terminal on the accessory connected to the NC terminal GROUND terminal on the accessory connected to the ACC GND terminal
Power is OFF until triggered by the train	POWER terminal on the accessory connected to the NO terminal GROUND terminal on the accessory connected to the ACC GND terminal

Table 1. Accessory operation and wiring configurations

Choosing a location for your 153IR Controller

With the 153IR Controller, you are able to trigger signals and accessories for more prototypical operation of your layout. Position your 153IR Controller so that the train will trigger the 153IR Controller to activate the accessory before the train arrives. For example, if your train is moving from left to right, position the Controller to the left of the accessory so that the train triggers the action before it arrives. This is illustrated in Figure 3. Position the Controller to the right of the accessory to trigger the action when at least part of the train has passed the accessory.

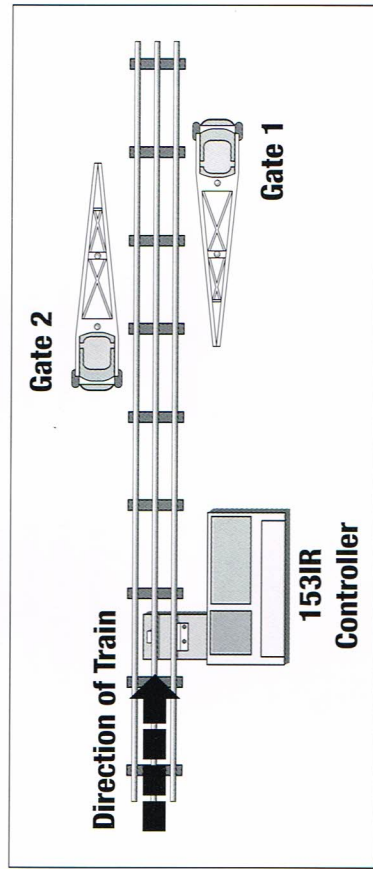


Figure 3. Single 153IR Controller location

Adjusting your 153IR Controller

Fine-tune the performance of your 153IR Controller! Adjust the duration of accessory operation and the sensitivity of the infrared sensor with the two knobs located under the “battery box.” Refer to Figure 4 for the location of these controls.

Setting the duration of accessory operation

Use the TIME knob, located under the “battery box” hatch on top of the base, to set the length of time that the accessory remains on. To determine this duration, quickly pass your hand in front of the sensor and note how long the accessory operates. If you would like the accessory to remain on for a longer period of time, turn the TIME knob counter-clockwise. If you would like the accessory to remain on for a shorter period of time, turn the TIME knob clockwise.

Note! The accessory will turn on while the infrared beam is reflected back by the train. Once the train has cleared the sensor, the timer begins. When the time runs out, the accessory will turn off. If the train passes in front of the sensor while the timer is operating, the accessory will remain on.

Adjusting your 153IR Controller (continued)

Adjusting the sensitivity

Use the SENSITIVITY knob if the 153IR Controller does not properly detect your locomotive or rolling stock. Dark-colored finishes may not be detected by the 153IR without adjusting the sensitivity; to remedy this problem, use a straight head screwdriver or your fingers to turn the SENSITIVITY knob counter-clockwise.

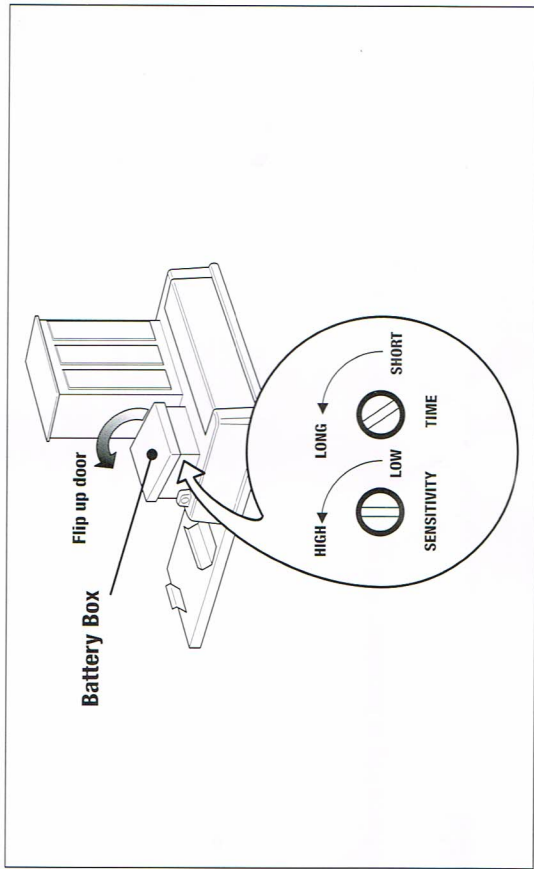


Figure 4. TIME and SENSITIVITY adjustment knobs

Accessory and signal wiring examples

Refer to the following diagrams as you wire your accessories. The section entitled **Wiring Accessories with your 153IR Controller** explains these connections.

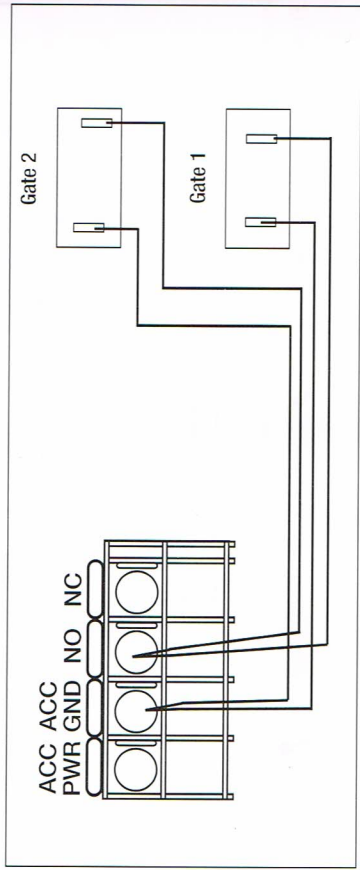


Figure 5. Crossing Gates (6-12714)

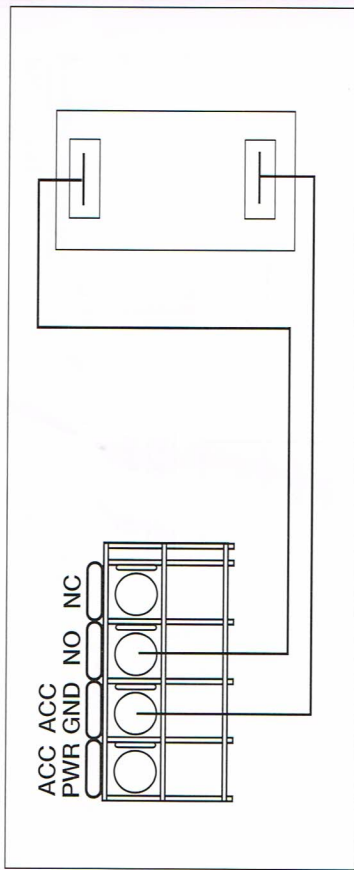


Figure 6. Automatic Crossing Gate (6-12714); Mainline Automatic Crossing Gate (6-22947); Automatic Operating Semaphore (6-12727); Railroad Crossing Flasher (6-12888); Mainline Automatic Operating Semaphore (6-22944); Automatic Crossing Gate and Signal (6-62162); Banjo Signal (6-12709)

Accessory and signal wiring examples (continued)

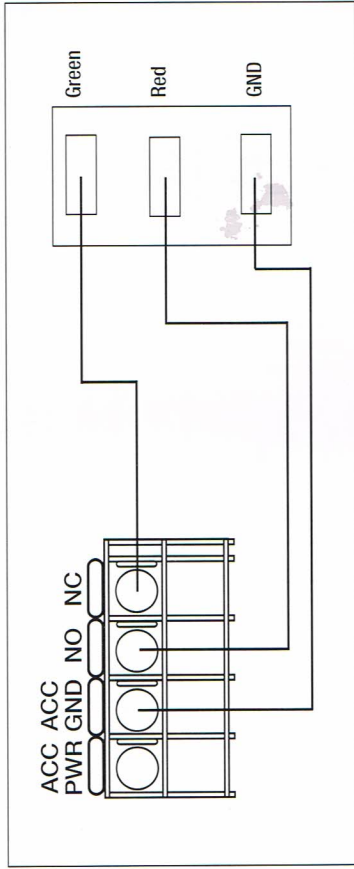


Figure 7. Mainline Walkout Cantilever Signal (6-22934); Mainline Block Target Signal (6-14099)

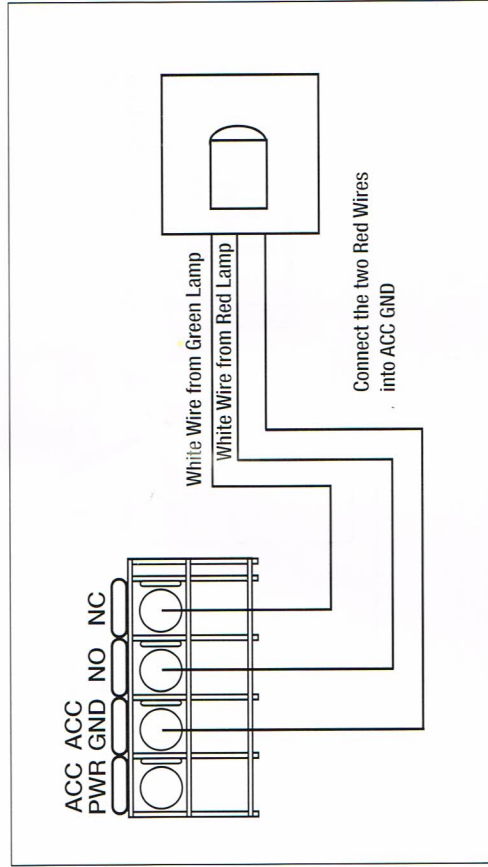


Figure 8. Dwarf Signal (6-12883); Mainline Dwarf Signal (6-22951)

Accessory and signal wiring examples (continued)

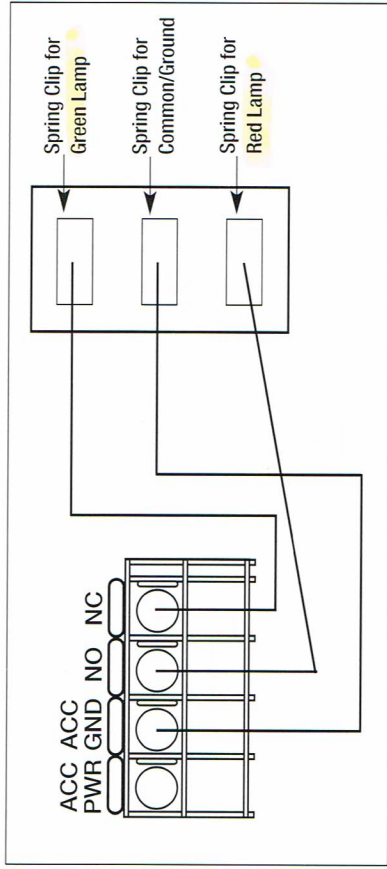


Figure 9. Single Signal Bridge (6-12894); Mainline Cantilever Signal (6-22931)

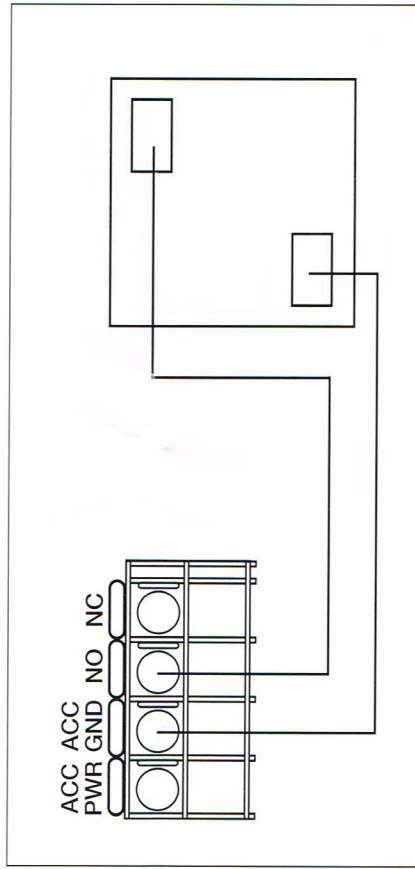


Figure 10. Whistle Shack (6-12737 & 6-12903 Diesel Horn Variant)

Accessory and signal wiring examples (continued)

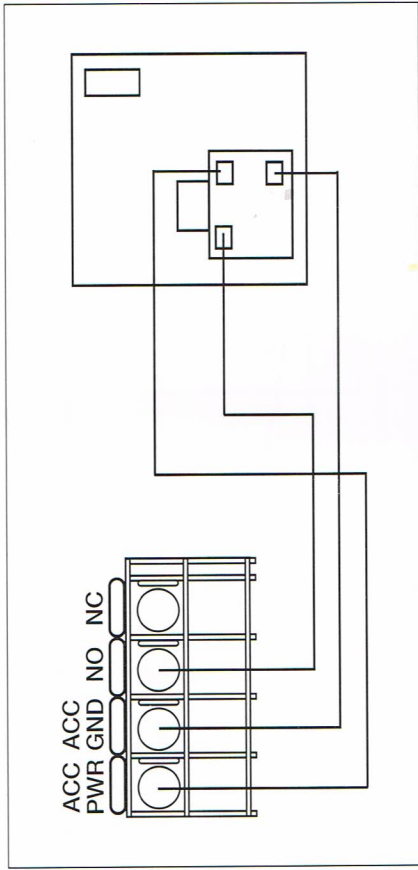


Figure 11. Automatic Gateman (6-12713)

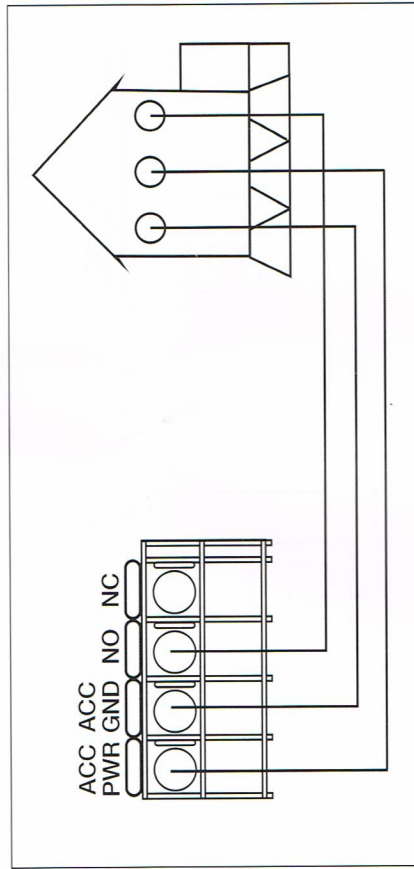


Figure 12. Animated Maiden Rescue (6-32919)

Wiring two 153IR Controllers

With an additional 153IR Controller, it is possible for your trains to trigger a signal or an accessory, regardless of the direction that they are traveling in. Simply place a 153IR Controller on both sides of the accessory as illustrated in Figure 13.

Note! To wire accessories with more than two wire connections (power and ground) with two 153IR Controllers refer to the Advanced wiring section.

If you have connected two 153IR Controllers, take extra care to adjust the TIMER. Your train will activate the accessory as soon as it reaches the first 153IR Controller, and the accessory will stay on for as long as the TIMER is set or a train is in front of the controller. For the accessory to remain on while the train passes it, the TIMER must be set long enough for the end of the train to pass the accessory. Keep in mind that the second 153IR Controller will reactivate the accessory. To prevent the accessory from turning off before the second 153IR Controller turns it on, the TIMER must be set long enough for the front of the train to reach the second 153IR Controller. If your trains travel in two directions, be sure that you have set each TIMER in this manner.

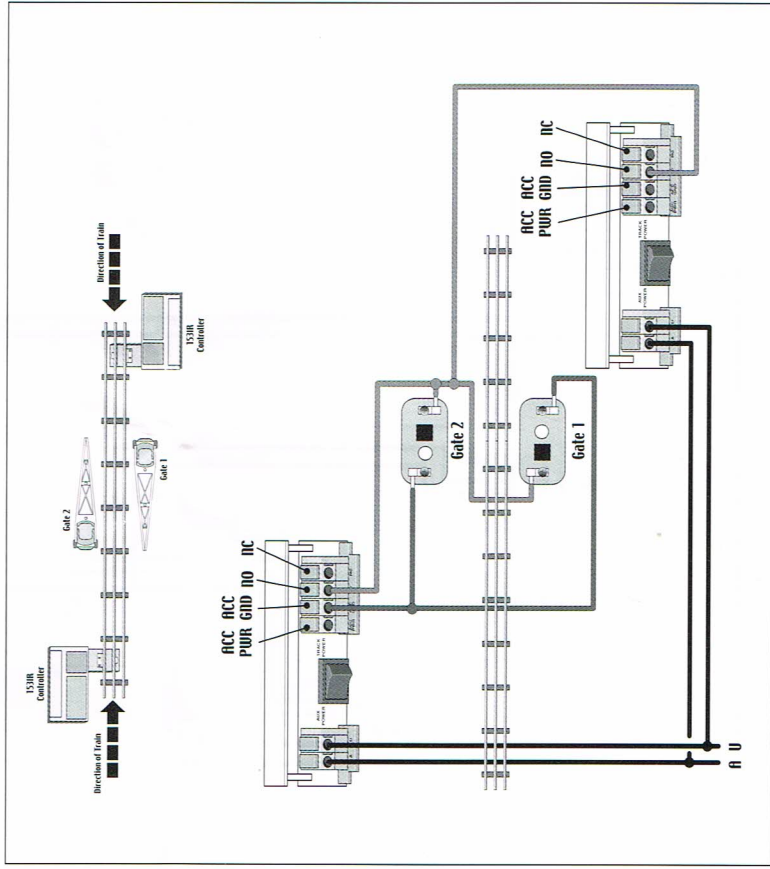


Figure 13. Dual 153IR Controller locations

Advanced wiring

To wire accessories with more than two connections (e.g., signals with multiple lights), you must purchase a 12 volt DC **Relay** (DPDT, 1A contact rating), and a **Diode** (1N4001, 1N4002, 1N4003, or 1N4004), available from your local electronics supply store. You will also need to refer to the information printed on or packaged with your relay to identify the proper connections. Refer to Figure 14 as you wire the Lionel Automatic Crossing Gates (6-14098). Refer to Figure 15 as you wire these other multi-wire accessories.

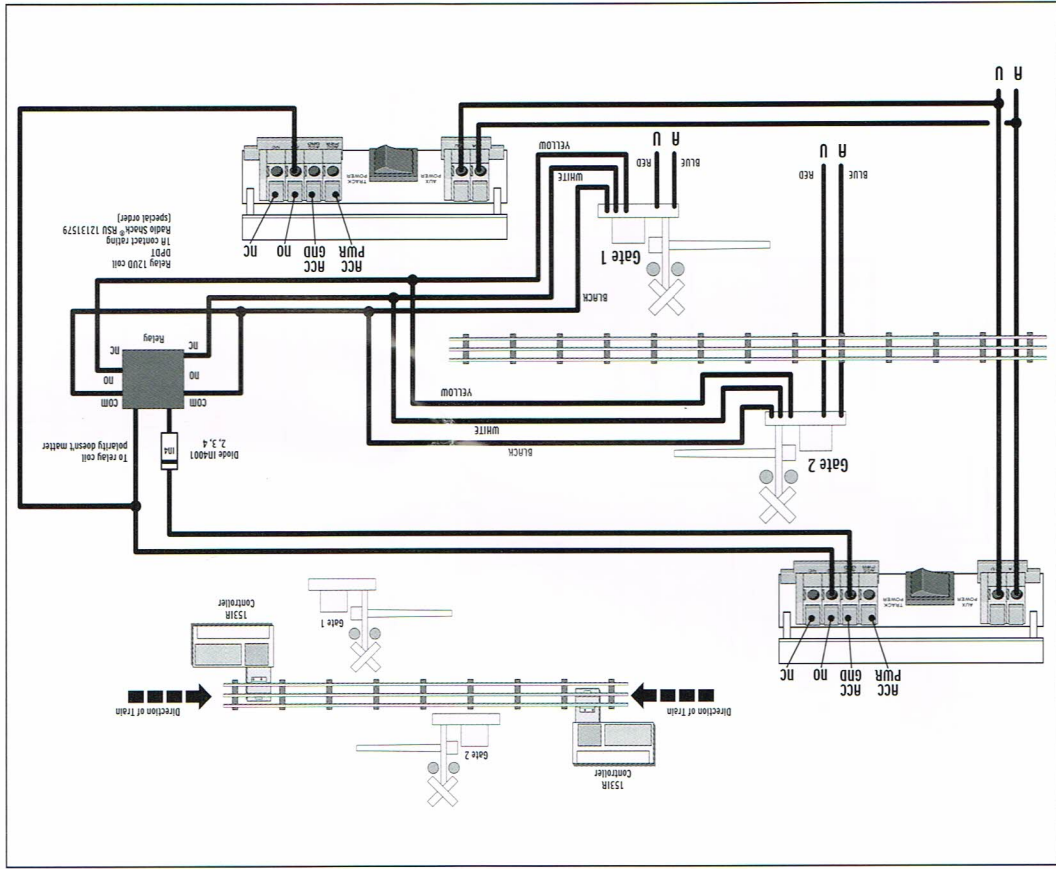


Figure 14. Wiring your Lionel Automatic Crossing Gates (6-14098)

Advanced wiring (continued)

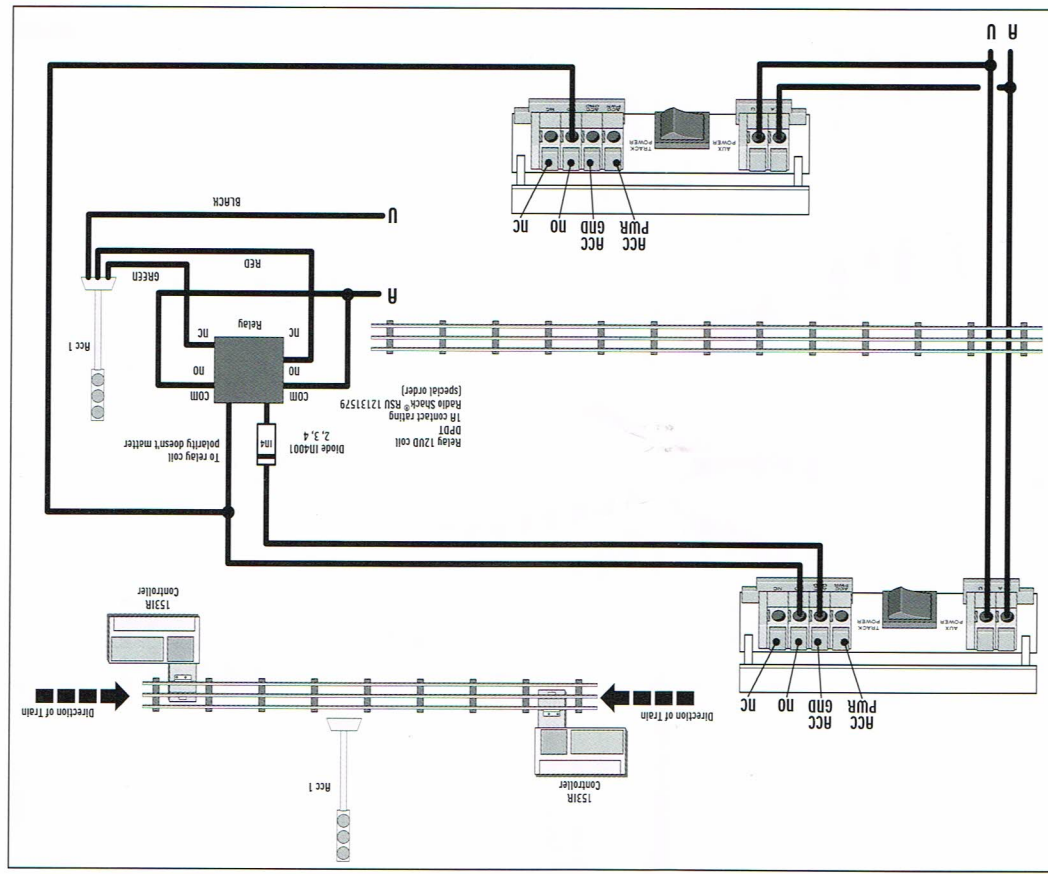


Figure 15. Wiring your multi-wire accessories