

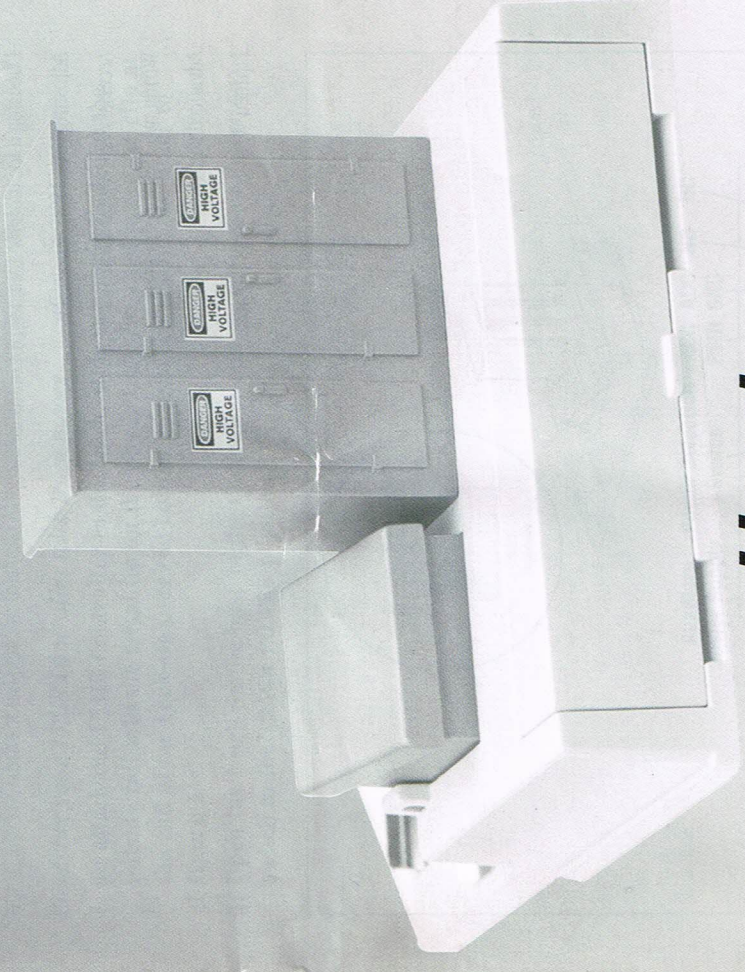
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# LIONEL



## ***#153IR Controller Owner's Manual***

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## ***Lionel 153IR Controller Owner's Manual***



## Congratulations!

Congratulations on your purchase of the new Lionel 153IR Controller. The 153IR controller is constructed of stamped metal and die-cast components and features a powerful optical sensor for years of reli-

able operation. The 153IR controller can be placed on any Lionel O or O-27 gauge three-rail layout and is designed to operate at 12-18 volts alternating current.

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## Installation of your #153IR Controller

You can install your 153IR controller to your layout in two ways, but it depends on how you would like to power the optics. If you would like to power your 153IR using track power, please follow the instruction listed below. If you would like to power your 153IR using a separate power supply, please skip down to the next paragraph.

It is easy to install your 153IR using track power to power your controller. You will notice a track clip extending out from the back of your 153IR. Simply attach your 153IR to your track the same way in which you would attach any other track clip. You will know that you have made a good connection when you hear the track snap in. Your 153IR is now ready to operate using track power.

You have two different options for installation when you are using a separate power

supply. The first installation is the same as mentioned above. The only thing to keep in mind is that the rocker switch located in the front of your 153IR is switched into the **AUX POWER** position. This will ensure that the controller is not too far away from the track and cause a missed signal. Your 153IR also has the flexibility to remove the track clip portion of your controller. To do this, remove the two screws located directly under the track clip area of your controller. You can now remove the track clip portion of your controller. You can now place your 153IR at any location on your layout.

**NOTES:** Removing the track clip portion of your 153IR will help to location your controller near curves or switches. You will need to keep the controller no further than 2-1/2 inches from the trigger point to assure proper functionality.

### Operation of your #153IR Controller

Your 153IR has a lot of flexibility built into it to accommodate the trickiest of layouts. When you lift the lid on the front of your controller (please see the diagram below), you will notice that there are 6 connection areas and a rocker switch. The four connection areas located to the right of your controller are used to attach your accessory to the controller. The rocker switch allows you to change the input voltage between track power and a separate accessory power supply. The last two connection areas located to the left are used to connect to your separate accessory power supply.

You will notice that each of the connection areas is labeled. The four connection areas to attach your accessory to your controller are labeled **NC**, **NO**, **COM 1**, and **COM 2**. The connection point labeled **NC**

is the connection to be used for Normally Closed operation. The connection point labeled **NO** is the connection to be used for Normally Open operation. The connection point labeled **COM 1** is the connection to be used for ground. Finally, the connection point labeled **COM 2** is the connection to be used for constant voltage. **COM 2** is a special connection area to light the inside of a building without triggering the accessory. This will be better illustrated in the wiring section of this instruction manual.

You will then notice the rocker switch located in the center. Each side rocker switch is labeled **AUX POWER** and **TRACK POWER**. If you would like to use track power to power the optics, the rocker switch must be depressed to the side labeled **TRACK POWER**. If you would like to use

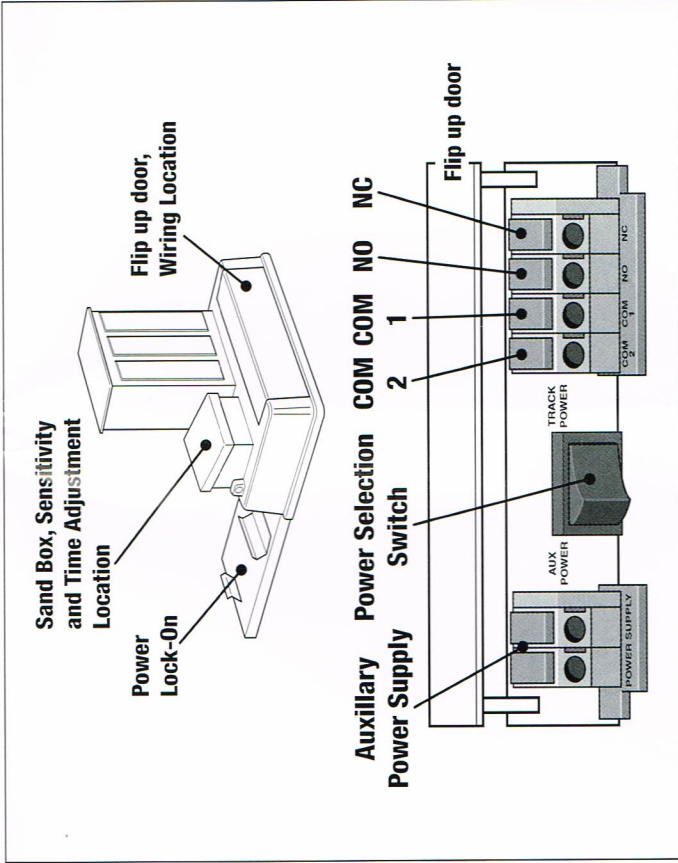
an auxiliary power supply to power the optics, the rocker switch must be depressed to the side labeled **AUX POWER**.

If you would like to use auxiliary power to power your controller, wire your auxiliary power supply to the two connections labeled **POWER SUPPLY**. These connections can be found directly to the left of the rocker switch. There is no need to be concerned with what post of your auxiliary power supply is connected to which connection point. Polarity is not a concern when connecting your auxiliary power supply.

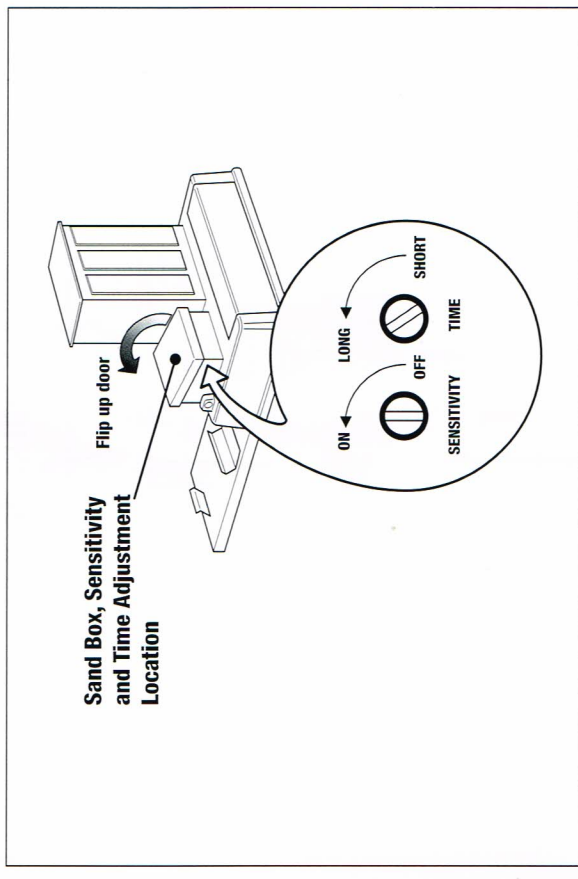
You will notice that under the sandbox there are two knobs. One is labeled **SENSITIVITY**, the other is labeled **TIME**. Your 153IR has the flexibility to allow you to turn on or off the sensitivity and/or change the amount of time delay. You will need to turn on the sensitivity for the controller to properly detect your engine or rolling stock. In this case, you would want to turn the sensitivity on. Rotating the knob in a counterclockwise rotation does this. You can rotate the knob by using either a straight head

screwdriver or simply using your fingers. You may find that if you are running an older steam locomotive that is decorated in black with a dull finish the optics may have a hard time detecting this locomotive because dark colors absorb light.

The other knob labeled **TIME** is used to increase the time delay of your controller. This is a huge benefit over the traditional 153C controller (pressure plate). This allows you to adjust the amount of time that the accessory continues to trigger even after your train has passed your controller. When the last car of your train passed over the traditional 153C controller, the accessory you had connected to it would stop operating. When using the 153C with the Lionel Automatic Crossing Gates, it did not give a realistic operation of the crossing gate. With your new 153IR controller, you can easily adjust the amount of time the crossing gates remain triggered even after your train has passed. Your range is 1 to 20 seconds of delay time. To increase the amount of time delay, simply rotate the knob in a



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counter-clockwise fashion. The more you rotate the knob, the higher the time delay becomes.

Now that you know what all the control knobs and connection points are, there are a few additional things to keep in mind when operating your 153IR. Your 153IR controller can be operated with almost any Lionel accessory. Your 153IR will not operate with accessories that are labeled as Command Control accessories. DO NOT connect a Command Control accessory to your 153IR.

When you first power your 153IR controller, you will notice that all of your accessories connected to it will turn on for approximately 3 seconds. The reason for this is that both the NO and NC positions are triggered at the same time. This allows you to make a quick check to insure that no bulbs are burnt out and your accessory operates properly. Remember this is only a 3 second check, so if you have an accessory

connected to your 153IR that has a long cycle time, you may not be able to see the entire functionality of your accessory.

This will also give you a chance to see what accessories you have that are connected to your 153IR, and the reassurance that your 153IR controller is working properly. If you do not get this 3 second check, you may want to check and see if all of your connections are secure.

Now that you have your 153IR controller powered up and wired to your accessory, you can easily test the operation of the controller. Simply pass your hand in front of the red screen on your 153IR, and your accessory should activate. If your accessory does not activate, you can do some checks found in the **Troubleshooting your 153IR Controller** section of this manual.

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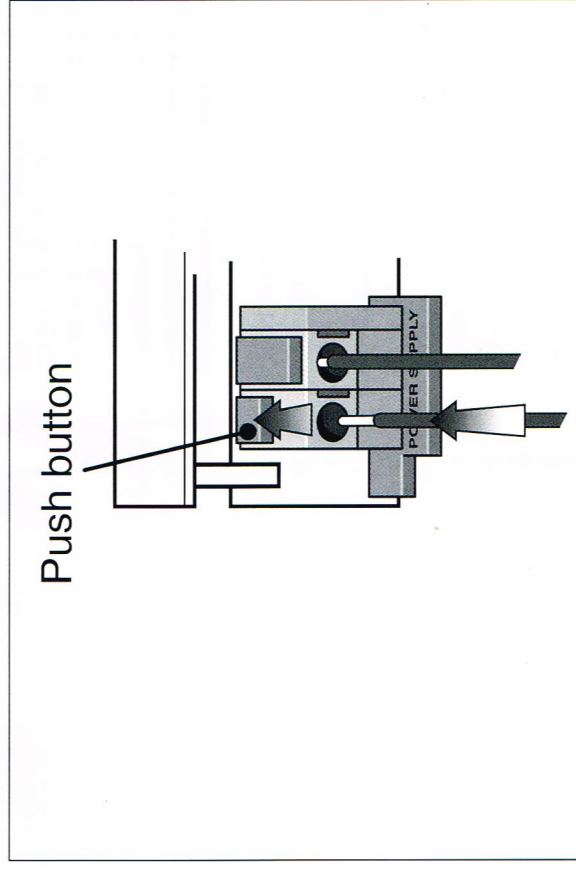
## Wiring your 153IR Controller

Your 153IR controller will operate best from 12-20 VAC. It can be powered with track power or a separate accessory power supply. The output voltage from your 153IR ranges from 12 to 18 volts AC depending on the input voltage. Because of this if you are using track power to power your 153IR, as you increase the voltage to your track the brightness of lamps and the speed of accessories will increase. So if you are using an accessory with your 153IR that's operating voltage is less than 12 to 18 volts or where variable voltage control is recommended to adjust the speed and you are using Command Control, we recommend that you power your 153IR with an auxiliary power supply. This will help with the life of your accessory.

It is very simple to attach almost any wire to your 153IR controller. To begin, do not use a wire any larger than 24 gauge. A

wire any larger will not fit into the opening for connections. All Lionel accessories come with their own connection wires, and this size is the recommended. To attach a wire to any of the locations on your controller (POWER SUPPLY, COM1, COM2, NO or NC), start by pressing in on the orange rectangle located directly above the location in which you would like to connect wires to. Please see the diagram below. This rectangle will only go in approximately halfway, so there is no need to press it any further than this point.

While holding the orange rectangle depressed back, simply insert your wire(s) into the hole. Now you can release the orange rectangle, and the wires will be held securely into place. You can test the wires security by simply giving them a slight tug. That's all it takes to wire your accessories to your 153IR controller.



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## Getting Started Example for your 153IR Controller

We recognize that this may be a bit confusing if you don't have a degree in Nuclear Physics; so here is a simple example to help get you started. We will use the example of the Lionel Automatic Crossing Gate (Lionel part number 6-12714) to show how to wire an accessory to your 153IR. Knowing that crossing gates are usually setup in pairs and that using two will help to divide the output voltage, we will show you how to setup two crossing gates on a single controller.

Let start by assuming that your train is moving in a direction from left to right. You will want to begin by placing your 153IR controller somewhere to the left of your crossing gates. By doing this, the train will pass the controller before reaching the crossing gates. This setup can be found on Figure 1. Now, it is time to install your controller to track power. It is easy to install your 153IR controller using track power to power your controller and the accessory. You will notice a track clip extending out from the back of your 153IR. Simply attach your 153IR to your track the same way in which you would attach any other track clip. You will know that you have made a good connection when you hear the track snap in. Your 153IR is now ready to operate using track power.

Please note that this setup can be used for layouts with or without Command Control.

You will need to start by connecting one green insulated wire to each of the spring clips located on the bottom of the base of your crossing gates. If you are unsure how to do this, please refer to your instruction manual for your Automatic Crossing Gate (671-2714-250). Now that all of your wires are connected to your crossing gates, it is time to begin to wire the gates to your con-

troller. You will want to take the end of one wire from each crossing gate and connect it to the COM 1 location on your controller.

This is done by pressing in on the orange rectangle located directly above the COM1 location. While keeping this rectangle pressed in, insert both wires into the hole as far as possible. Now you can let go of the orange rectangle and the wires are secure. You can test to make sure that they are secured by giving them a slight tug.

Simply take the last two remaining wires and connect them to the NO location on your controller. This can be better illustrated by seeing Figure 2 below. Your crossing gates are now wired to your 153IR, but we still have a few last things to check. As noted above, we are using track power to power our controller and accessories. Knowing this, check to make sure that the rocker switch is in the TRACK POWER position. You will know that this is the correct position when the switch is depressed on this side.

We have placed small grooves under the panel door to allow your wires to come out of the controller while keeping the panel door closed. With this, close the panel door and allow the wires to run out of the groves in the base. Now turn on your track power.

You will notice that the crossing gates will turn on for approximately 3 seconds. This is your indicator that the accessories are functioning correctly and the software is calibrating to your environment. You can now test the functionality of your 153IR controller by passing your hand in front of the red screen. The crossing gates will turn on and remain on for the amount of time dialed in by the time delay knob. You can now adjust the time delay knob to the amount of time you desire. You have now

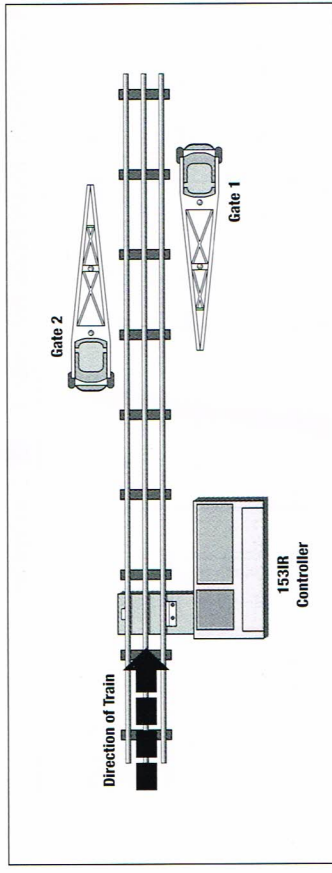


Figure 1

successfully setup a pairs of Automatic Crossing Gates using your 153IR controller. If your crossing gates do not activate correctly, you can do some checks found in the **Troubleshooting your 153IR Controller** section of this manual.

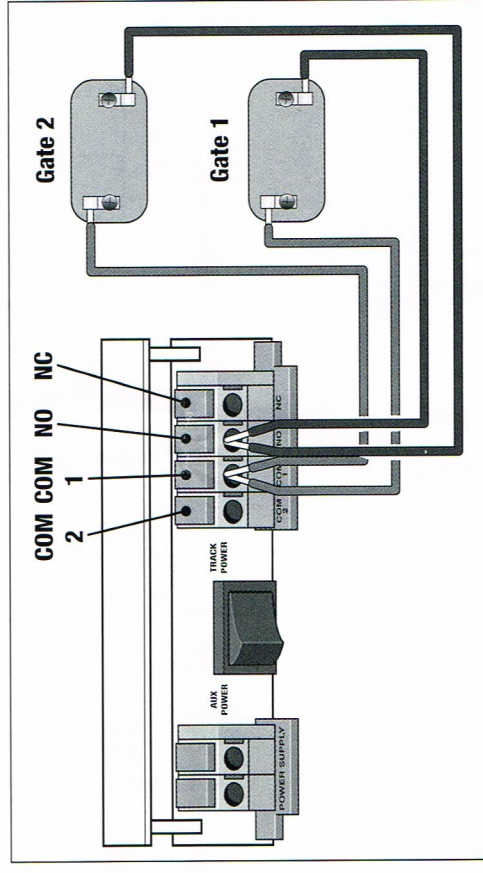


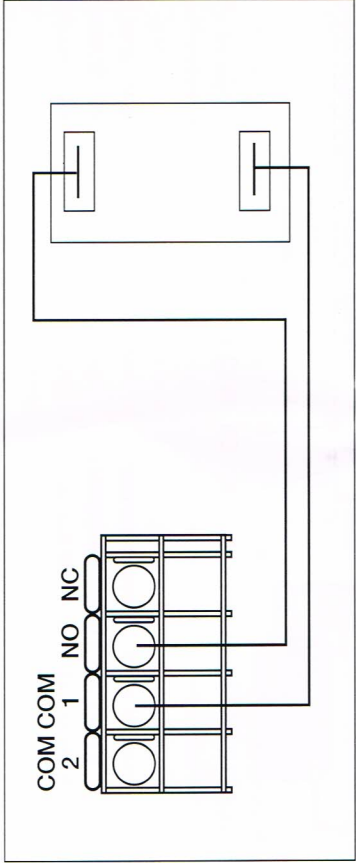
Figure 2



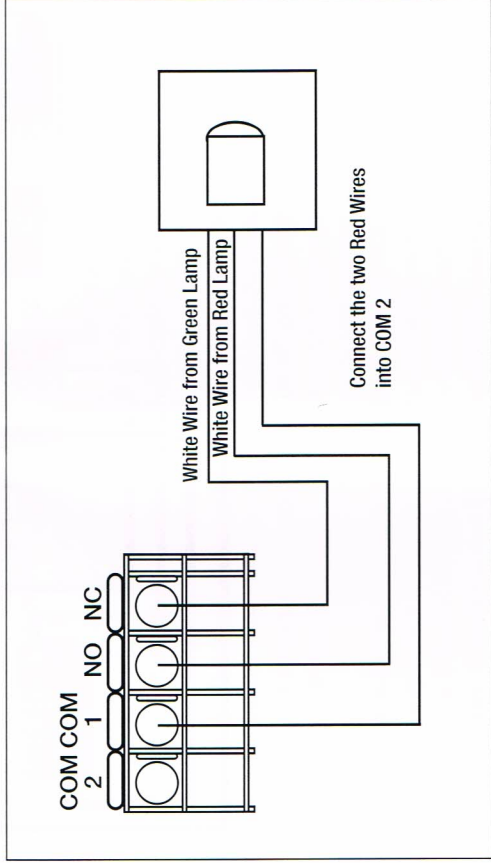
**Accessory Connections for your 153IR Controller**

The following are wire diagrams you can use to help with wiring your favorite Lionel accessories to your 153IR controller. There is in no way that we could cover every possible accessory, but each of these examples will help you learn how to wire almost any accessory to your 153IR.

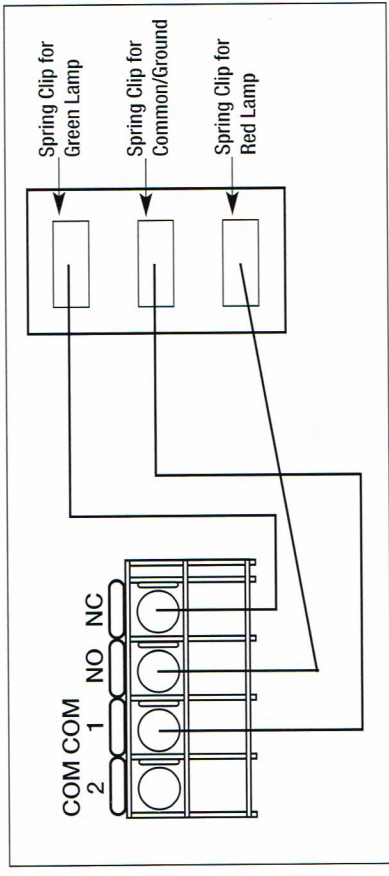
Automatic Crossing Gate (6-12714); Automatic Crossing Gate and Signal Mainline Automatic Crossing Gate (6-22947); Mainline Mast Signal (6-22849); Mainline Walkout Cantilever Signal (6-22934); Banjo Signal(6-12709)



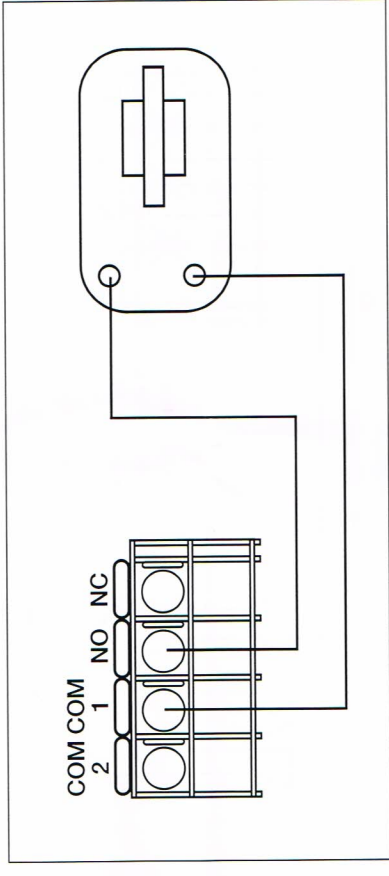
Dwarf Signal (6-12883); Mainline Dwarf Signal (6-22951)



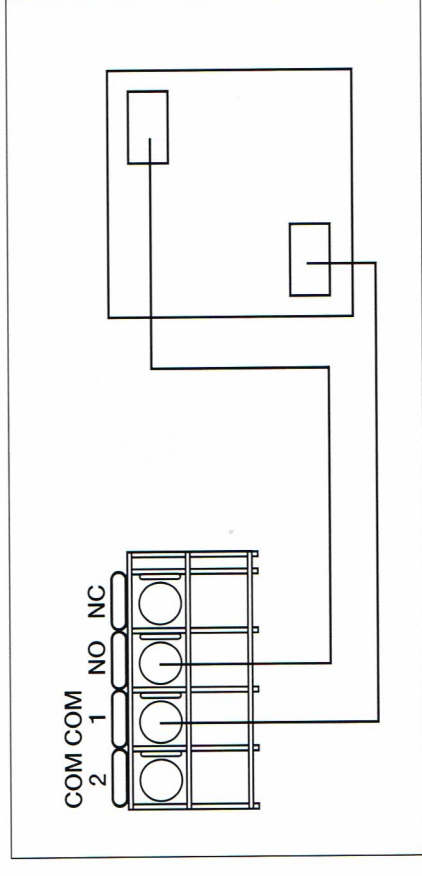
Single Signal Bridge (6-12894); Mainline Cantilever Signal (6-22931)

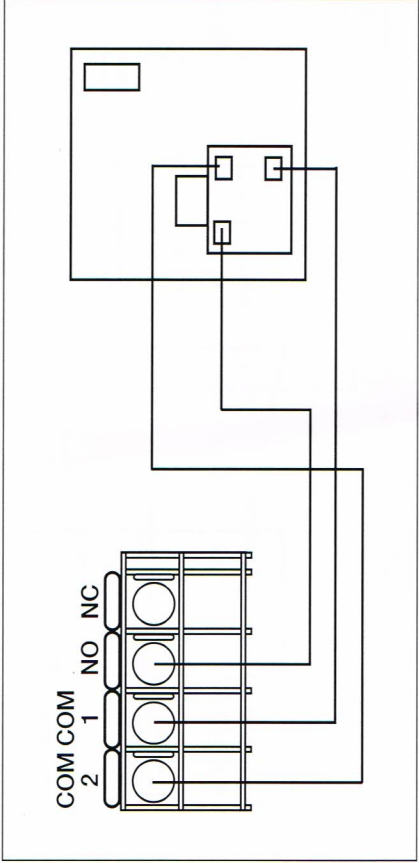


Railroad Crossing Flasher (6-12888)

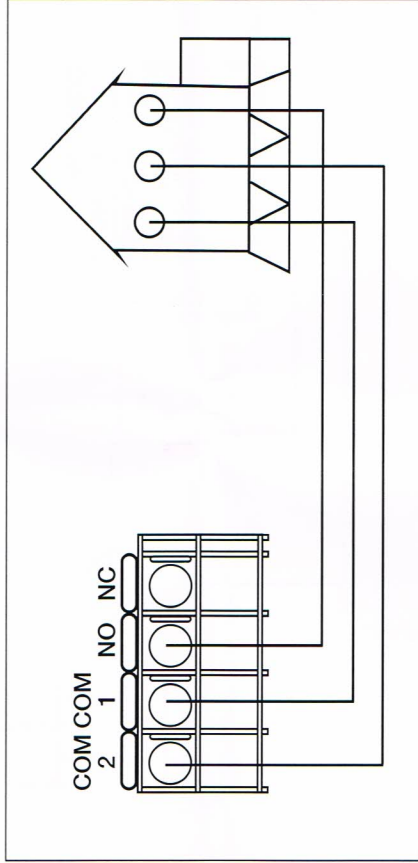


Whistle Shack (6-12737 & 6-12903 Diesel Horn Variant)



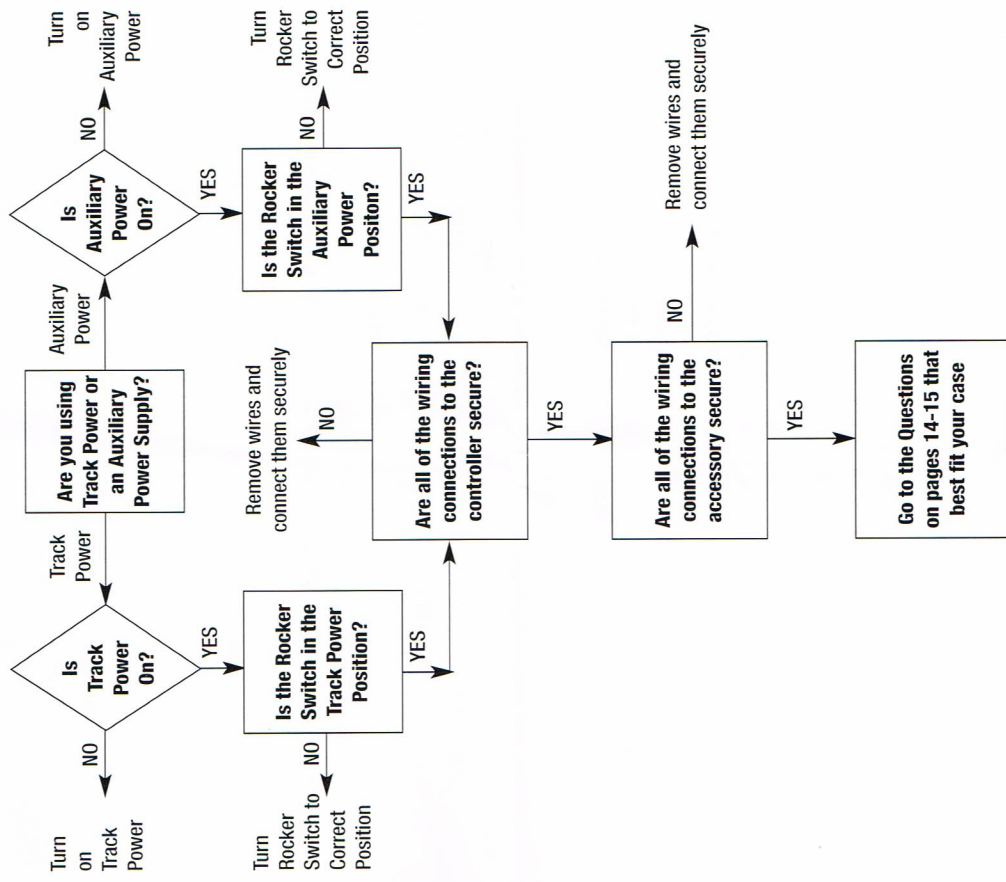


Animated Maiden Rescue(6-32919)



**Troubleshooting your 153IR Controller**

Shown below is a small chart to help work out any basic problems. If you are experiencing problems, specifically that your controller doesn't appear to be working, follow the questions below:



If you followed the above chart and got to the square labeled "Go to the Questions Below," you have a problem that may be a bit more specific. The following are a list of questions and answers that should solve your problem.

*Q: All of my accessories connected to my 153IR controller are doing to opposite of what I would like them to do. How do I fix this?*

A: There is a chance that you have made a mistake in wiring your accessory. You may want to check your connections at the NO and NC locations. The wire that should be connected to NC is probably connected to NO and visa versa. Remove the wires from these two locations and switch them. This should solve your problem.

*Q: How do I know whether or not to use track power or an auxiliary power supply?*

A: This is a great question, which requires some thought. Here are some basic guidelines to keep in mind.

**If you are connecting an accessory that has a voltage range of 10 to 14 volts,** you may want to use an auxiliary power supply to help increase the life span of your accessory unless your track power does not exceed 15 volts.

**If you are connecting two accessories that have a voltage range of 10 to 14 volts,** you may want to choose track power unless you are running Command Control. The output voltage will be divided, so there is no fear of damage to your accessory. However if you were running Command Control, you would have a voltage reduction in this area of your layout that may affect the performance of your Command Control products.

**If you are connecting an accessory where variable voltage control is recommended,** you may want to use an auxiliary power supply to adjust the speed of the accessory to your liking and to prevent a problem with the performance of your trains.

**If you are connecting two accessories where variable voltage control is recommended,** you may want to stick with an auxiliary power supply. You would have a very high voltage reduction in this area of your layout in any operating environment.

**If you are connecting an accessory that has a voltage range of 12 to 18 volts,** you can use either option you choose. All accessories with a voltage range of 12 to 18 volts are designed to run from track power regardless of operating environment.

*Q: Is there any limitations to what I can use as an auxiliary power supply?*

A: There are only a few basic limitations to the power supply that can be used as your auxiliary power supply. Your auxiliary power supply must be able to power up to 20 volts of AC power. You can use any Lionel transformer to power your 153IR controller.

*Q: After I start up power to my 153IR controller, my accessory turns on but will not shut off even without triggering it. Why is this?*

A: There is a chance that you have made a mistake in wiring your accessory. Check to make sure that the wires are connected to COM 1 and not COM 2. Remember COM 2 gives constant voltage; if you don't want constant voltage, do not connect to this location.

You may also want to check if you are connected to the NO or NC locations. You may be connected to the NC position rather than the NO position.