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# Lionel GW-180 Transformer Owner's Manual

## CAUTION-ELECTRICALLY OPERATED PRODUCT:

NOT RECOMMENDED FOR CHILDREN UNDER FOURTEEN YEARS OF AGE. AS WITH ALL ELECTRIC PRODUCTS PRECAUTIONS SHOULD BE OBSERVED DURING HANDLING AND USE TO PREVENT ELECTRIC SHOCK. **TRANSFORMER RATING** — INPUT : 120 VAC 60 HZ ONLY. AC OUTPUT : 18 V, 180 VA.

# ***Congratulations!***

**C**ongratulations on your purchase of the Lionel GW-180 Transformer! This device combines a high output control unit and an external power supply, providing your railroad with 180 watts and ten amps of alternating current. With a variable accessory voltage, the GW-180 Transformer features the precision control you demand!

Read this manual thoroughly before using your transformer. It has important information on the setup and operation of this product. If you have any questions after reviewing these instructions, contact Lionel Customer Service at 586-949-4100.

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## PowerHouse Power Supplies

Your Lionel PowerHouse Power Supply is listed by Underwriters Laboratories Inc. and has been carefully designed and tested to ensure peak performance. Refer to Figure 1 to identify the features of this device.

**Warning!** When using electrical products, basic safety precautions should be maintained including the following:

- Read this manual thoroughly before using this device.
- This device is not recommended for children under fourteen years of age.
- Parents should periodically inspect the PowerHouse unit for potential hazards and have the unit repaired or replaced if necessary by an authorized Lionel Service Center.
- The PowerHouse Power Supply is intended to be used indoors. Do not use if water is present. Serious or fatal injury may result.
- Use the PowerHouse Power Supply for only its intended purpose. The unit was designed to operate with the GW-180 Transformer and select Lionel controllers only.
- The PowerHouse is designed to operate on 120-volt, 60-Hertz power. Do not connect it to any other source of power.
- Do not operate the PowerHouse Power Supply with a damaged cord, plug, or case.
- To avoid the risk of electrical shock, do not disassemble the unit. There are no user-serviceable parts inside. If damaged, take the PowerHouse Power Supply to your authorized Lionel Service Center. See [www.lionel.com](http://www.lionel.com) for help locating a Service Center.

**Caution!** Do not operate your layout unattended. Obstructed accessories or stalled trains may overheat, resulting in damage to your layout.

- If the circuit breaker trips, correct the problem and then reset the circuit breaker by pressing the circuit breaker reset button or turning the power switch off, then on.
- *Always* unplug the PowerHouse Power Supply from the power source when not in use.

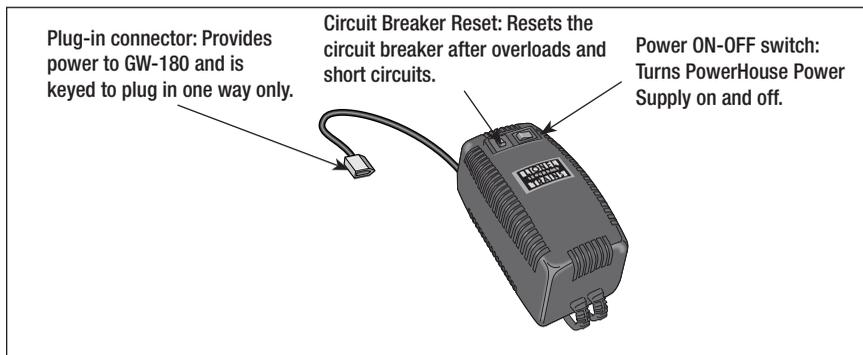


Figure 1. Features of the PowerHouse Power Supply

## **Safety Information: Protecting your layout from overloads**

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**Y**our GW-180 Transformer provides a total output of ten amps. The track outputs will deliver all of this power to the track when no accessories are connected to the transformer. Keep in mind that connected accessories borrow some of this power. For example, if the accessories require two amps of the total ten-amp capacity of the transformer, you have eight amps available for track power. This built-in flexibility will provide power for virtually any small- to medium-sized railroad. Also, available voltage depends on how much load is on the two outputs. Generally, track voltage and accessory voltage are 0-18 volts (AC) each.

This Transformer is capable of operating trains up to and including dual-motored AC engines. To operate at this level of track power, it may be necessary to disconnect any accessories. You may also want to attempt to lower the accessory voltage settings. Refer to the “Setting the accessory output” section.

The fold-back current limit protects your transformer and layout from damage caused by severe overloads and short circuits in the case of derailments or objects falling on the track. At the same time, it prevents the inconvenience of nuisance tripping caused by momentary overloads. It continuously monitors the output current both outputs. When there is an overload on either output, it will reduce the voltage on both outputs in a fraction of a second to hold the current at 10A. If the short circuit is not corrected in three seconds the transformer will interrupt power to both outputs. During the three seconds, the red light on the Controller will flash. Once the output is shut down, the red light will come on solid. Move the throttle to the Off position to reset the transformer and resume normal operation.

The circuit breaker on the PowerHouse Power Supply is designed as a fail-safe for the electronic over-current protection. Because most problems will be protected by and corrected during fold-back mode operation, the circuit breaker should trip infrequently. If the circuit breaker does trip, correct the short circuit (e.g., make sure that the train's wheels are properly on the track and remove any foreign objects from the rails), return the handle to the Off position, and then press the Circuit Breaker Reset button.

## Connecting your GW-180 Transformer

**F**or best performance on large layouts, it is recommended that you use 16-gauge wire to connect your GW-180 Transformer to the track. Use the stripped ends of the wires, or spade-shaped connectors on all GW-180 Transformer connections, with no more than two wires on each terminal. Use terminal strips (available at your local electronics supply store) to allow you to connect multiple wires to evenly distribute power to your layout.

Make sure that all connections are secure. Loose connections can produce extremely high temperatures. For this reason, do not touch the terminals or track connections during use. Also, do not locate scenery materials such as lichen or ground foam near the terminals.

**Caution!** To prevent the excessive build up of heat, be sure to select the proper wire gauge for your layout. Follow these guidelines:

- Track connections (or Lockon connections) must be made with 18-gauge wire or heavier. Larger layouts require a minimum of 16-gauge wire.
- Use 24-gauge wire only when connecting single accessories that require lower current.
- When wiring multiple accessories (two or more) or accessories that require higher current, be sure to use 18 to 16 gauge wire.

**1. Connect the PowerHouse power supply** to the GW-180 controller by inserting the connector into the input jack in the back of the controller. See Figure 2.



Figure 2. Connecting the PowerHouse

## Connecting your GW-180 Transformer (continued)

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### 2. Attach a Lionel Lockon to your track.

As illustrated in Figure 3, slide the bottom edge of the outside rail into the metal lip on the Lockon. Press the clip at the end of the Lockon over the bottom edge of the inside rail.

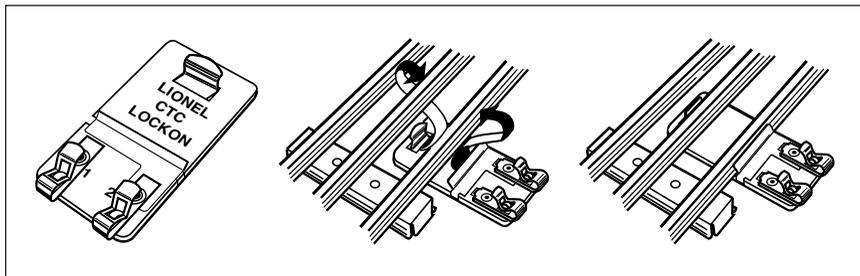


Figure 3. Lockon attachment

### 3. Attach one wire to the Lockon spring clip terminal labeled “1” and connect it to the power terminal labeled “A”. All Controller connections are illustrated in Figure 4 on page 7.

To attach the wire to the Lockon, press down on the top of the terminal clip so that the metal loop is exposed. Slide the bare end of the wire into the exposed loop. Release pressure on the terminal clip, allowing the metal clip to pinch the end of the wire in the metal loop. Give a little tug on the wire to check if the hold is secure.

To attach the wire to the transformer terminal, loosen the thumbscrew to expose the hole in the terminal shaft, then insert the bare end of the wire into the hole. Tighten the thumbscrew, making sure that the bare wire is in contact with the terminal shaft.

### 4. Attach a second wire to the Lockon spring clip terminal labeled “2” and connect it to the transformer terminal labeled “U”.

### 5. Attach a third wire to the transformer terminal labeled “B” and connect it to your accessories.

### 6. Attach a final wire from your accessories to the transformer terminal labeled “U”.

### 7. Plug the PowerHouse power supply into your wall outlet (120 volts).

## Connecting your GW-180 Transformer (continued)

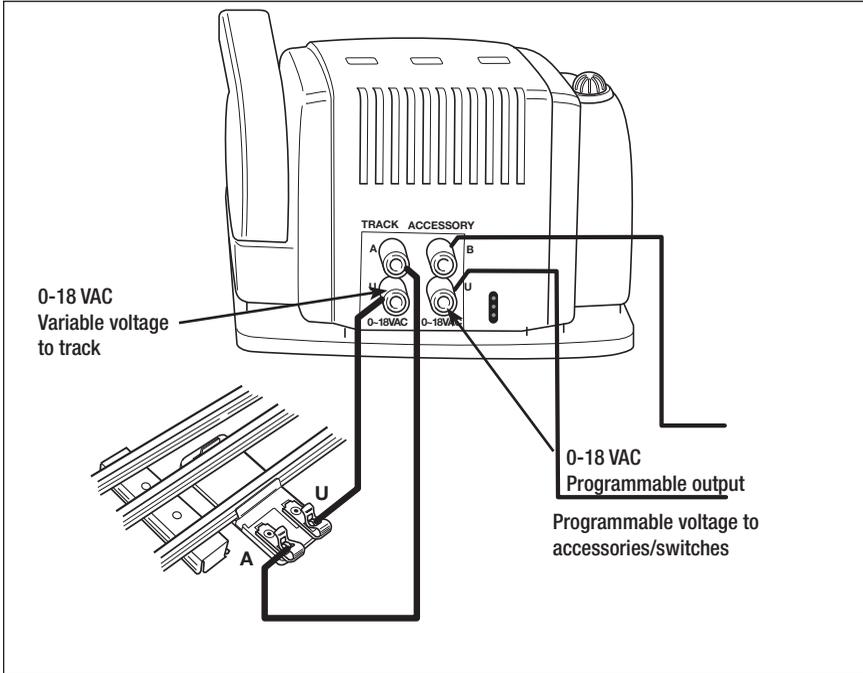


Figure 4. Controller connections

## Connecting the FasTrack terminal section

If you are using the Lionel FasTrack track system, you will find that the terminal section easily connects to the transformer's TRACK posts. Two wires are attached to the underside of the FasTrack terminal section (available separately, 6-12016). Attach the spade-shaped connectors at the ends of these wires to the GW-180 Transformer. Be sure that the connections are secure. Follow these steps and refer to Figure 5.

**Caution!** If you are connecting the transformer to your layout with any other type of wire, refer to the guidelines on page 4.

1. **Connect the PowerHouse power supply** to the GW-180 controller by inserting the connector into the input jack in the back of the controller. See Figure 2 on page 5.
2. **Feed the wires through the notch in the FasTrack terminal section.** Refer to Figure 5.
3. **Loosen the RED TRACK thumbscrew terminal, then slide the spade-shaped connector with the RED insulation at the end of the black wire with white tracer into position.** The thumbscrew post should be positioned between the “blades” of the spade connector. Tighten the thumbscrew to secure the connection.
4. **Loosen the BLACK TRACK thumbscrew terminal, then slide the spade-shaped connector with the BLACK insulation at the end of the black wire into position.** Tighten the thumbscrew to secure the connection.
5. **If you need to power an accessory, connect the accessory to the ACCESSORY thumbscrew terminals as described on page 6.**
6. **Plug the PowerHouse power supply into your wall outlet (120 volts).**

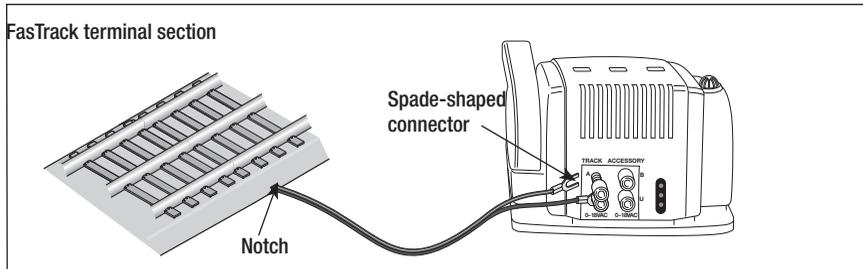


Figure 5. Transformer connections

## **Operating your trains with the GW-180 Transformer**

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**Y**ou're clear for departure! Move the throttle control handle forward to increase power to the track. The farther forward you push the handle, the faster your train will go.

**Note!** Quickly shutting off or throwing the throttle all the way forward will not result in an instant change in track voltage.

When operating in the conventional (non-Command) environment, remember that the greater the load on the engine (adding more cars for the engine to pull, for example), the farther forward the handle must be pushed before it will operate the locomotive.

## **Experiencing the features of the GW-180 Transformer**

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**R**efer to Figure 6 on page 11 for the location of the transformer features listed in this section.

### ***THROTTLE***

Push the throttle forward to increase track power. The markings on the throttle approximate the percentage of full power. For more realism, push the throttle slowly to gradually increase or decrease the speed of the locomotive. Slowing or stopping the locomotive with the throttle instead of the DIRECTION button will allow you to continue in the same direction when you increase the throttle again. To achieve this effect, reduce the throttle to the point that the locomotive stops moving, don't completely turn off the throttle. That way, your train won't sequence into neutral.

### ***INDICATOR LIGHT***

The Indicator Light will be green during normal operation. The light will change to red and flash if you exceed the power limit of the GW-180. The light will stay red and stop flashing if the power limited is exceeded for more than three seconds.

### ***DIRECTION***

The DIRECTION control button interrupts track power to activate the reverse unit in locomotives with forward-neutral-reverse operation. This button has no effect on locomotives not equipped with reverse units or on locomotives with the reverse unit in the OFF position.

**Note!** When the DIRECTION button is pressed, track power is interrupted instantaneously. Track power is restored gradually when the DIRECTION button is released.

### ***WHISTLE/HORN***

The WHISTLE/HORN button will activate Lionel sound-equipped locomotives, including those equipped with the RailSounds sound system. The sound will continue until the button is released. No external sound activation buttons are needed.

## Experiencing the features of the GW-180 Transformer (continued)

### **BELL**

The BELL button will activate all RailSounds bells. Press and hold the BELL button for two to three seconds to begin the sounds; press and hold the button again to turn off the ringing.

### **Note!**

Do not activate horns, whistles, or bells on RailSounds-equipped locomotives until track power has been turned on for a few moments, or a continuous horn/whistle or bell sound may occur. To correct this problem, simply turn off the GW-180 Transformer, then turn it back on.

### **Note!**

The GW-180 Transformer may cause random whistles in the Lionel Mighty Sounds of Steam™ tenders with a three-pin connector. We recommend that you purchase a RailSounds-equipped tender to solve this problem.

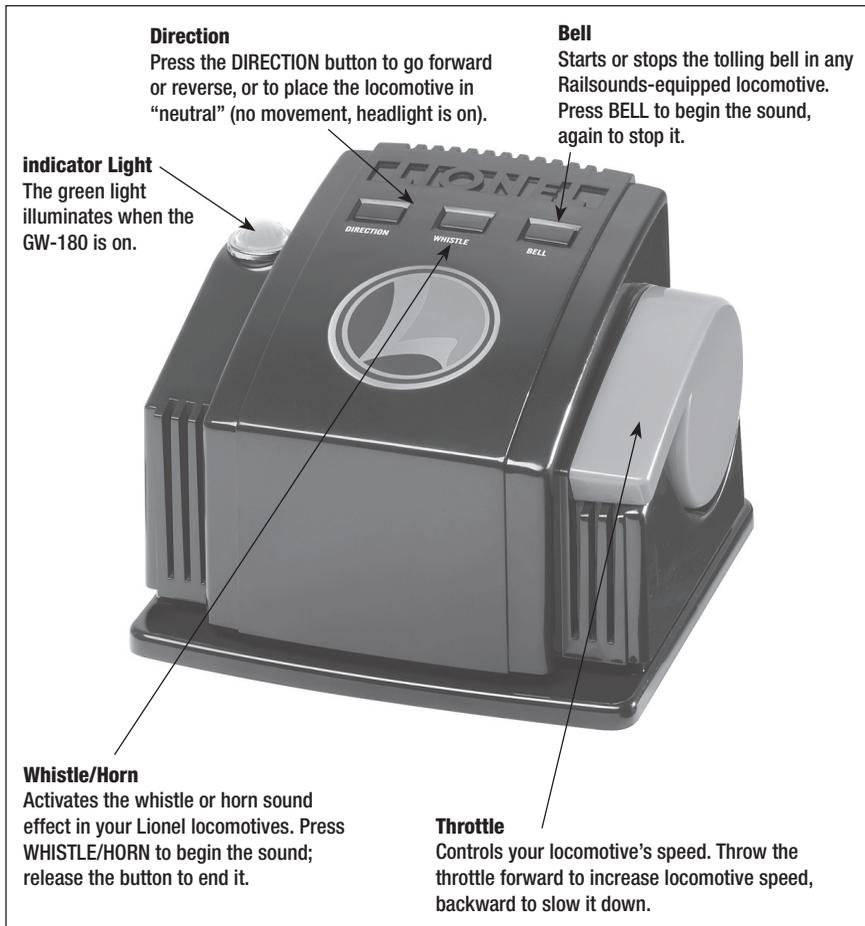


Figure 6. Transformer features

## Setting the accessory output

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**T**ake control of your Lionel empire with your GW-180 Transformer! You choose how much power your accessories need. Your GW-180 Transformer features a programmable accessory output. The ability to control the voltage allows you to set the speed of your accessory motors and the intensity of your lights. Follow these steps to set the voltage.

**Note!** The accessory voltage was set to 12 volts at the factory.

- 1. Bring the throttle all the way back down to turn off the power.**
- 2. Press and hold down the DIRECTION, WHISTLE/HORN, and BELL buttons on the Controller. Refer to Figure 6 for the location of these buttons.**  
The indicator light on the transformer will flash and track power will turn off.
- 3. With all three buttons held down, raise the throttle slowly until you reach your desired accessory voltage.**
- 4. Release the buttons once you have reached your desired voltage.**
- 5. Bring the throttle all the way back to turn off the power.**  
The solid green light indicates that you have set the accessory voltage.

At this point, increasing the throttle again will control track power.

## **Troubleshooting**

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### ***No lights or operation***

Be sure that the PowerHouse is plugged into the GW-180, the PowerHouse cord is plugged into a 120 vac outlet, and the power switch is turned on.

### ***Train runs, but WHISTLE/HORN, BELL, and DIRECTION buttons do not work***

Check track connections. The track must be connected to the “A” and “U” terminals on the transformer.

### ***No change when DIRECTION button is pressed***

Be sure that your locomotive reverse unit switch is ON. Check track connections. The track must be connected to the “A” and “U” terminals on the transformer.

### ***Accessory operation is intermittent or absent***

Check for loose, shorted, or improper connections. The accessory output voltage may have been set too low for the accessory. Refer to page 12 and reset the voltage to a higher level.

### ***Locomotive runs slowly or lights dim at the far end of the track***

On larger layouts, additional track resistance may cause a voltage drop. Attach additional Lockons to the remote portion of your track.

### ***Indicator light is red and flashing***

The power limit of the transformer has been exceeded. The unit will gradually reduce power until the problem is corrected.

### ***Bell button blows whistle***

Switch the wire connections at the Lockon or Controller Terminals. Be sure that the U post is connected to the outside rail and the A post is connected to the inside rail.

## **FCC Statement**

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Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

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Notes: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **NOTES**

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## Lionel Limited Warranty Policy & Service

This Lionel product, including all mechanical and electrical components, moving parts, motors and structural components, with the exception of **LIGHT BULBS, LED's & TRACTION TIRES** are warranted to the original owner-purchaser for a period of **one year from the original date of purchase** against original defects in materials or workmanship when purchased through a **Lionel Authorized Retailer\***.

This warranty does **NOT** cover the following:

- Normal wear and tear
- Light bulbs or LED's
- Defects appearing in the course of commercial use
- Damage resulting from abuse/misuse of the product

Transfer of this product by the original owner-purchaser to another person voids this warranty in its entirety. Modification of this product in any way; visually mechanically or electronically, voids the warranty in its entirety.

Any warranted product which is defective in original materials or workmanship and is delivered by the **original owner-purchaser** (this warranty is non-transferrable) to Lionel LLC or any Lionel Authorized Service Station **MUST** be accompanied by the original receipt for purchase (or copy) from an **Authorized Lionel Retailer\***, will at the discretion of Lionel LLC, be repaired or replaced, without charge for parts or labor. In the event the defective product cannot be repaired, and a suitable replacement is not available, Lionel will offer to replace the product with a comparable model (**determined by Lionel LLC**), if available. In the event a comparable model is not available the customer will be refunded the original purchase price (requires proof of purchase from the **Authorized Lionel Retailer\*** it was originally purchased). Any products on which warranty service is sought must be sent freight and postage prepaid (Lionel will refuse any package when postage is due). **Transportation and shipping charges are not covered as part of this warranty.**

**NOTE: Products that require service that do not have a receipt from an LIONEL AUTHORIZED RETAILER\* will be required to pay for all parts required to repair the product (labor will not incur a charge) providing the product is not older than 3 years from date of manufacture and is within 1 year from date of purchase. A copy of the original sales receipt is required.**

**In no event shall Lionel LLC be held liable for incidental or consequential damages.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.

### Instructions for Obtaining Service

If service for this Lionel LLC product is required, bring the item, along with your DATED sales receipt and completed warranty information (at the bottom of this page) to the nearest Lionel Authorized Service Station. Your nearest Lionel Service Station can be found by calling 1-800-4-LIONEL or by accessing the website at [www.lionel.com](http://www.lionel.com).

If you prefer to send your Lionel product directly to Lionel, for repair you must FIRST call 586-949-4100 extension 9105 or FAX Lionel at 586-949-5429 or write to Customer Service, 26750 Twenty Three Mile Road, Chesterfield, MI 48051-2493. Please have the 6-digit Lionel product number, the date of original purchase, the dealer where the item was purchased and what seems to be the problem. You will receive a return authorization (RA) number to ensure your merchandise will be properly tracked and handled upon receipt at Lionel LLC.

Once you have your Return Authorization (RA) number, make sure the item is packed in its original Styrofoam inner container which is placed inside the original outer display box (this will help prevent damage during shipping and handling). This shipment **MUST** be prepaid and we recommend that it be insured with the carrier of your choice.

Please make sure you have followed all of the above instructions carefully before returning any merchandise for service. You may choose to have your product repaired by one of Lionel LLC's Authorized Service Stations after its warranty has expired. A reasonable service fee should be expected once the product warranty has expired.

### Warranty Information

Please complete the information below and keep it, along with your **DATED ORIGINAL SALES RECEIPT**. You **MUST** present this form **AND** your **DATED SALES RECEIPT** when requesting warranty service.

\*A complete listing of Lionel Authorized retailers can be found by calling 1-800-4-LIONEL or by visiting our website at [www.lionel.com](http://www.lionel.com).

Products that are more than 3 years old, from date of manufacture, are not applicable for warranty coverage, even if they have never been sold prior to this date. (Under no circumstance shall any components or labor be provided free of charge.)

Name \_\_\_\_\_

Address \_\_\_\_\_

Place of Purchase \_\_\_\_\_

Date of Purchase \_\_\_\_\_

Product Number \_\_\_\_\_

Product Description \_\_\_\_\_



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