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# R-17 Subway Set

## Operation Manual

(3V PS2)



### Compatibility

This engine will operate on any traditional O-31 Gauge track system, including M.T.H.'s RealTrax® or ScaleTrax™ or traditional tubular track. It is also compatible with most standard AC transformers. (See page 19 for a complete list of compatible transformers and wiring instructions.)



PLEASE READ BEFORE USE AND SAVE

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## **CAUTION: ELECTRICALLY OPERATED PRODUCT:**

Not recommended for children under 10 years of age. M.T.H. recommends adult supervision with children ages 10 - 16. As with all electric products, precautions should be observed during handling and use to reduce the risk of electric shock.

**WARNING:** When using electrical products, basic safety precautions should be observed, including the following:

Read this manual thoroughly before using this device.

- M.T.H. recommends that all users and persons supervising use examine the hobby transformer and other electronic equipment periodically for conditions that may result in the risk of fire, electric shock, or injury to persons, such as damage to the primary cord, plug blades, housing, output jacks or other parts. In the event such conditions exist, the train set should not be used until properly repaired.
- Do not operate your layout unattended. Obstructed accessories or stalled trains may overheat, resulting in damage to your layout.
- This train set is intended for indoor use. Do not use if water is present. Serious injury or fatality may result.
- Do not operate the hobby transformer with damaged cord, plug, switches, buttons or case.
- The transformer was designed to operate on regular US household current (120 volt, 50-60 Hertz). Do not connect to any other source of power.
- To avoid the risk of electrical shock, do not disassemble the transformer unit. There are no user-serviceable parts inside. If the unit is damaged contact M.T.H. Service for instructions.
- The transformer is equipped with an internal circuit protector. If the circuit protector trips, unplug the power cord from the electrical wall outlet, check your layout for any short circuits. The circuit breaker will reset automatically when the short is removed from the circuit.
- Unplug the transformer from the electrical wall outlet when not in use.
- Do not use this transformer for other than its intended purpose.

## **Transformer Ratings:**

Input: 120 VAC, 60 Hz Only, Output: 14 VAC 80W or 18VAC 100W

This product may be protected by one or more of the following patents: 6,019,289; 6,280,278; 6,281,606; 6,291,263; 6,457,681; 6,491,263; 6,604,641; 6,619,594; 6,624,537; 6,655,640.

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# Set Up Checklist

- Assemble RealTrax®
- Connect the transformer
- Lubricate the engine
- Place the engine and cars on the track and couple them together
- Check to see whether the battery needs to be charged for full sound effects
- Apply power to run as described in the Basic Operation section of these instructions.

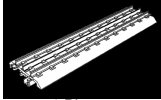
## Set Includes



Two Subway Cars



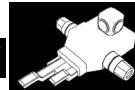
8-Pieces  
0-31 Curve RealTrax



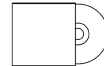
4-Pieces  
Straight RealTrax



Transformer and Controller  
with wire harness



Lighted Lock-On



DVD/CD-Rom

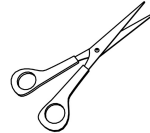
## Tools Needed



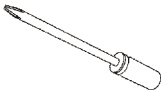
Battery Charger (Optional)



Pliers



Scissors



Philips Screwdriver



Cotton Swab or Rag



RailKing Maintenance Kit or  
Light Household Oil and Bearing Grease

You can obtain replacement parts and replacement instructions from the M.T.H. Parts Department

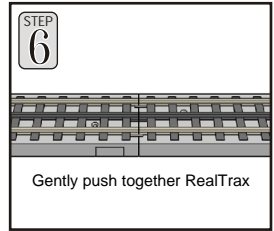
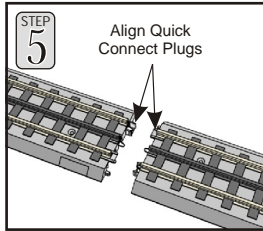
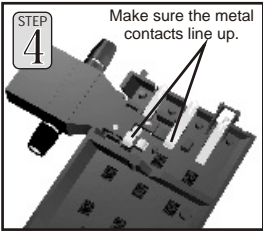
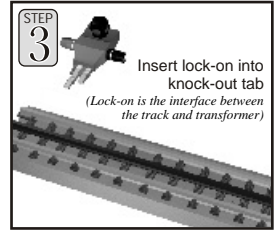
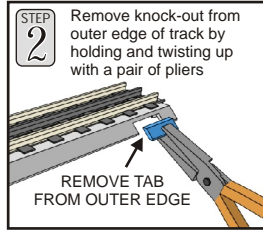
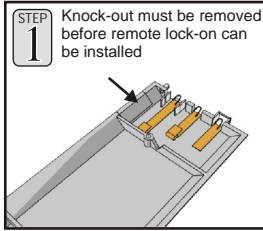
**e-mail:** parts@meth-railking.com, **phone:** 410-381-2580,

**mail:** 7020 Columbia Gateway Drive, Columbia MD 21046-1532

# Getting Started

## Assembling RealTrax®

The quick connectors and built-in roadbed allow you to set up RealTrax anywhere, including carpeted surfaces.



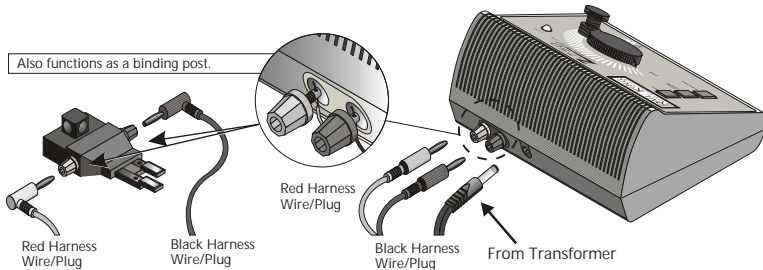
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## Connecting the Transformer

The transformer included with this set provides an easy-to-use, safe power source for AC-powered trains and accessories.

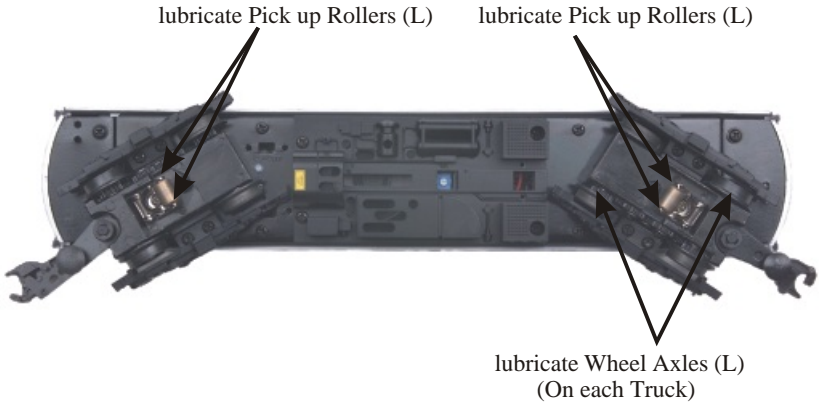
To complete the connection between the track and the transformer, simply plug in the color-coded wire harness that was included in your set and plug the transformer into your wall outlet.

- Plug the wire from the transformer into the Z-Controller's center port.
- Connect the Wires from the Z-Controller to the Lighted Lock-On, being sure that the wires are connected from red-to-red and black-to-black.
- Unplug when not in use.

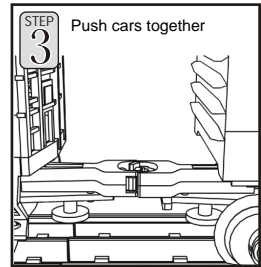
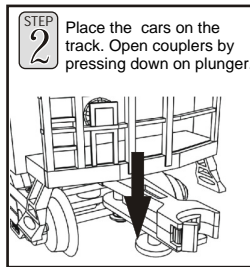
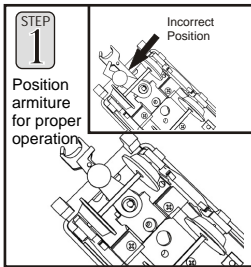


## Lubrication

Lubricate all exposed moving parts before operating, using a multi-purpose, oil (available with M.T.H.'s Maintenance Kit, sold separately) or a light household oil. Follow the lubrication points.



## Coupling the Powered and Non-Powered Subway Cars



## Checking The Battery

You may find, if your locomotive was built several months before you set it up, that the rechargeable battery has run down and needs to be charged before operating. If you notice that the sounds are garbled, test and charge the engine as described in the "Self-Charging Battery Back-up" on page 18.

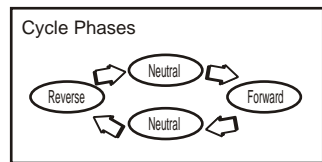
# Basic Operation

**Throttle** Throttle up the power to your track. Advance the throttle until 12 – 16 volts is applied, then put the subway set into forward motion by either firmly pressing the Direction button on your transformer or remote once or dropping and advancing the throttle.

**Bell** - To sound the bell, quickly press and release the Bell button. If you press the button for too long, you will trigger the Transit Announcement Sounds described later in this book. To turn the bell off, press and release the Bell button again. The bell will continue to ring from the time you turn it on until you press and release the button again to turn it off.

**Horn/Whistle** - To sound the horn, firmly press the Horn/Whistle button. The horn will sound for as long as you continue to depress the button. It will stop when you release the button. The horn has four different endings, depending on whether you hold the button for less than three seconds, three seconds, four seconds, or five seconds or longer.

**Direction** Your train is programmed to start in neutral. The first direction from neutral upon start-up is forward. Firmly press and release the Direction button to allow the engine to move forward. Just as you must stop your automobile between forward and reverse, this engine will not go directly from forward to reverse; it goes into neutral between directions. If the train has been moving forward, the first press of the Direction button will put the train from forward into neutral, the second press into reverse, the third press back into neutral, and the fourth back into forward. To prevent accidental high-speed start-ups, this engine is programmed to restart in neutral each time the track voltage is turned off for approximately 25 seconds or more.



## Manual Volume Control

To adjust the volume of all sounds made by this engine, turn the master volume control knob located under the powered unit (See Figure 2) clockwise to increase the volume and counter-clockwise to decrease the volume.

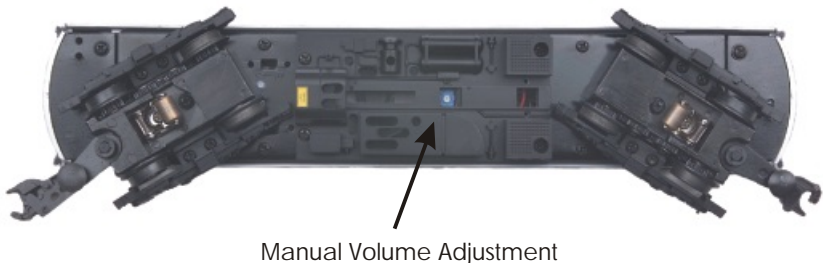


Figure 2: Manual Volume Adjustment

## Proto-Sound 2.0 Operating Instructions

This manual contains the operating instructions for Proto-Sound 2.0 in conventional mode only. Instructions for accessing DCS command mode features accompany the DCS Remote Control System equipment (sold separately.)

### Activating Proto-Sound 2.0 Conventional Mode Features

Proto-Sound 2.0 features are activated by sequences of Bell and Horn button pushes described below. Please read the full descriptions of each feature before using it. To use these buttons to activate features rather than to blow the horn or ring the bell, you should press the buttons firmly, but rapidly with a ½-second pause between button presses. You may need to practice your timing to make this work smoothly.

Timing Chart				
Press Horn Short & Firm	½ Sec. Pause	Press Bell Short & Firm	½ Sec. Pause	Press Bell Short & Firm
Total Time Lapse: 1 ½ Seconds				

## Operating Modes

### 1. Manual Mode

Upon initial power application, the engine will start up in manual mode. The chart below lists the features available to the operator when in Manual Mode. Different features are available when operating in Learn and Auto Modes, which are described later.

Feature to Be Activated	Button Code:
Freight Yard Sounds	1 Bell, 2 Horns
Fire the Rear Coupler	1 Bell, 3 Horns
Fire the Front Coupler	1 Bell, 4 Horns
Speed Control On/Off	1 Horn, 2 Bells (from Neutral only)
Lock into a Direction	1 Horn, 3 Bells
Reset to Factory Defaults	1 Horn, 5 Bells (from Neutral only)

### Transit Announcement Sounds (TAS)

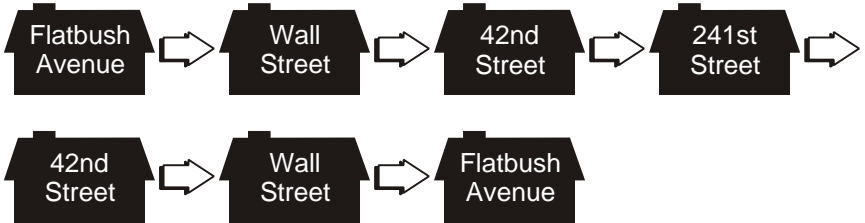
Your Proto-Sound 2.0 street car is equipped with operator controlled Transit Announcement Sounds, hereafter known as TAS. This easy-to-use feature plays digitally reproduced transit announcements and platform action sounds whenever you activate and stop your engine. No additional wires or modifications are needed on your layout to enjoy these amazing sound effects. These different sounds are heard each time you give a long bell button press. The entire TAS sequence is designed to simulate the arrival, disembarking, embarking, and departure of a transit stop. The sounds include the driver announcing the stop and the upcoming stop, passenger disembarking and embarking sounds, driver to passenger requests, door openings and closing and general transit stop sounds. After the station sounds have finished, the engine will shift back into gear and, if the throttle is set high enough, will pull away from the station. To activate the TAS, press and hold the bell button for approximately 2 seconds.



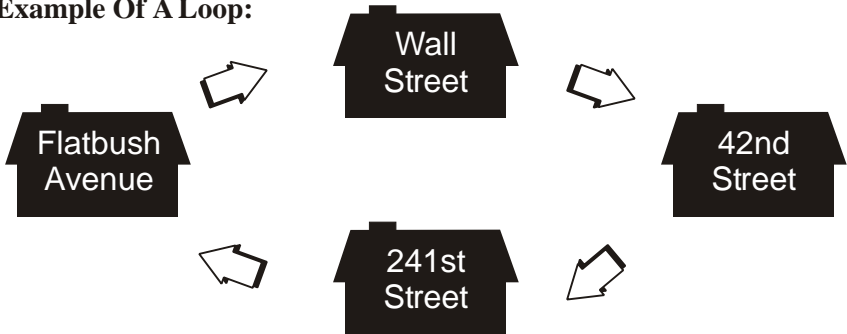
## 2. Learn Mode

In Learn Mode, the engine may be programmed with either an "Out & Back" route or a "Loop" route. An "Out & Back" route begins at the 1st station (as programmed by the operator), stops at intermediate stations, ends at the last station, then reverses its route until it reaches the 1st station. A "Loop" route begins at the 1st station (as programmed by the operator), stops at intermediate stations, ends at the last station, and then begins the route over again at the 1st station.

### Example Of An Out-and-Back:



### Example Of A Loop:



### To program stations:

1. Running in Forward, stop the unit at the desired location for the first stop by pressing the direction button. Note: if you stop the engine with the throttle control, you must re-apply power so that the engine goes into neutral and does not shut down.

2. Enter Learn Mode by pressing Horn-Bell-Bell-Bell-Bell. The train will then announce that you have entered Learn Mode.
3. Press and hold the Bell button to scroll through the available stations until you hear the one that you would like to be your first stop. Release the button quickly as soon as you have heard the desired stop name.
4. Press and hold the Horn button until a "saved" response confirms that station's location and name are saved in memory.
5. Proceed to the next stop by pressing the Direction button.
6. Press the Direction button to stop the train again when you have reached the next desired station location.
7. Using the Bell button, select the name of the station, then save using the Horn button.
8. Repeat steps 5-7 until you are ready to program the last stop in the route.
9. The manner of saving the last station in the route determines whether the route will be an "Out & Back" or "Loop" route.

#### "Out & Back"

Follow steps 5-7 to save the last station. After you press the Horn button and the sound system plays the "Saved" confirmation, press the Horn button again. Another "Saved" confirmation will play and the car will exit Learn Mode and enter Manual Mode.

#### "Loop"

Follow steps 5-7 to save the last station. Press the Direction button once to start the car in forward and stop the car at the location of the first stop by pressing the Direction button. Press the Bell button as many times as is necessary to hear the name of the first stop. Press the Horn button until the "Saved" confirmation is played. The car will then automatically exit Learn Mode and enter Manual Mode.

#### Notes:

Always approach a desired station stop location while running in Forward. Learn mode counts distance traveled, not actual physical locations. However, unlike an automobile's odometer, Proto-Sound 2.0 Learn Mode does erase distance when traveling in reverse. If you operate your car past the desired stop location, you may back it up to the desired

## Auto Mode

When you have finished programming your stations in Learn the car will be in Manual Mode. Running in Forward, stop the car at the location of the first programmed station by pressing the Direction button. Press Bell-Horn-Horn to put the train into Auto Mode. Press the Direction button again to begin operation in Auto Mode. Because Auto Mode operation begins at the first stop, the next stop announced will be the second stop.

Function Learn Mode		Button Code:	
To Enter Learn Mode		1 Horn, 4 Bells	
To Stop at Each Station		Direction	
To Scroll through the Station Names		Bell (hold to scroll and release as soon as you hear the desired station name)	
To Save Station		Horn (hold for "Saved" response)	
Function Auto Mode		Button Code:	
To Enter Auto Mode from Manual Mode		1 Bell, 2 Horn at the location of the first programmed station stop	
To Begin Programmed Run		Direction	
Function Manual Mode		Button Code:	
To Enter Manual Mode from Auto Mode		1 Bell, 2 Whistles	

## Proto-Coupler® Operation

This locomotive is equipped with one coil-wound Proto-Coupler for remote uncoupling action. Because Proto-Couplers are controlled through the Proto-Sound 2.0 microprocessor, they do not require an uncoupling track section or modification to your layout to function. You can fire a coupler from neutral or while in motion. Use the code shown below (and in the chart on p. 7) to fire the coupler(s).

### Front Coupler:

To fire the front coupler, quickly tap the Bell button once followed by four quick taps of the Horn button, allowing approximately 1/2 second to lapse between each quick button press. The sound of the liftbar and air line depletion will play, and the knuckle will be released.



## Speed Control

M.T.H. engines equipped with Proto-Sound 2.0 have speed control capabilities that allow the engine to maintain a constant speed up and down grades and around curves, much like an automobile cruise control. You can add or drop cars on the run, and the engine will maintain the speed you set.

While the engine is programmed to start with the speed control feature activated, you can opt to turn it off. This means the engine's speed will fall as it labors up a hill and increase as it travels downward. It is also affected by the addition or releasing of cars while on the run. Because the engine will run more slowly at a given throttle voltage when speed control is on than when it is off, you should adjust the throttle to a lower power level for operation with speed control off to avoid high-speed derailments. When speed control is off, the volume will drop to allow for better low voltage operation.

**To turn speed control on and off**, put the engine in neutral, then quickly tap the transformer's Horn button one time then quickly tap the Bell button two times, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change. Repeat the 1 horn, 2 bells code to return it to the other condition. You will want to do this during the initial neutral upon start-up if you ever couple this engine to another engine that is not equipped with speed control to avoid



Place  
Engine into  
Neutral



=

Speed Control  
Two Horn Blasts  
(indicates change is made)  
Repeat to Return  
to Normal Condition

## Locking Locomotive Into A Direction

You can lock your engine into a direction (forward, neutral, or reverse) so that it will not change directions. To do this, put the engine into the direction you want (or into neutral to lock it into neutral), run it at a very slow crawl (as slowly as it will move without halting), and quickly but firmly tap the Horn button once followed by three quick taps of the Bell button, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change. The engine will not change direction (including going into neutral) until you repeat the 1 horn, 3 bells code to return the engine to its normal condition, even if the engine is kept without power for extended periods of time.



## Reset To Factory Default

To override the settings you currently have assigned to the engine and reset it to its factory defaults, while in Neutral tap the Horn button quickly once, followed by five quick taps of the Bell button, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change.



## Automatic Sound Effects

Certain Proto-Sound 2.0 sound effects automatically play in programmed conventional mode conditions:

- Squealing Brakes play any time the engine's speed decreases rapidly.
- Platform Action sounds play at random intervals when the engine idles in neutral.
- Engine Start-up and Shut-down sounds play when the engine is initially powered on or is powered off for five seconds or more.

## Maintenance

### Lubricating and Greasing Instructions

The engine should be well oiled and greased in order to run properly.

Regularly lubricate all axles and linkage components and pickup rollers to prevent squeaking. Use light household oil, such as that found in M.T.H.'s maintenance kit. Do not over oil. Use only a drop or two on each pivot point.



Front of Car

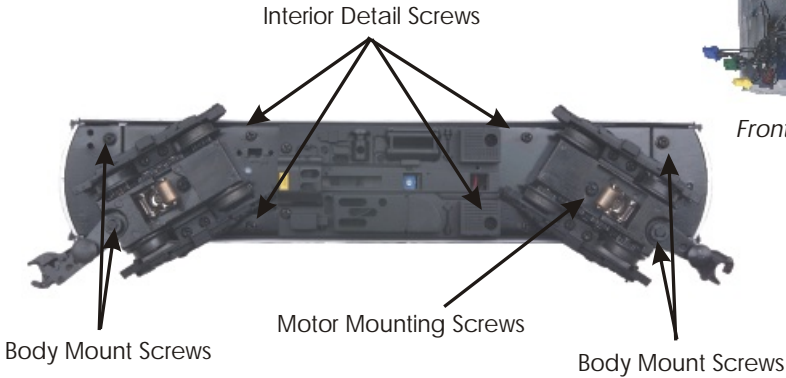


Figure 3

The locomotive's internal gearing was greased at the factory and should not need additional grease until after 50 hours of operation or one year, whichever comes first. Follow the greasing instructions below. Note that in some tightly packed engines you may need to move internal components temporarily in order to access the gears.

1. Remove the four Phillips screws from the chassis, as seen in Figure 3, then lift the body partially away from the chassis. Unplug three connectors (2 pin type) located at the front of the car to separate the body completely from the chassis.
2. Remove the four Interior Detail Screws shown in Figure 3 and separate the interior detail from the chassis.
3. Once the motor mount screw has been removed, pull the motor away from the truck block and lightly coat the motor worm gear and bronze drive gear (in the truck block) with grease.
4. Reassemble the truck and motor, being careful not to pinch any wires between the truck block and motor mount.

5. Repeat the procedure for the other motor and truck.

6. Reassemble the chassis and body, being careful that the wires are not caught between the body and chassis, as this can lead to a short that may damage the electronics beyond repair.

7. Before replacing body mount screws, test the unit on powered track to make sure all light housings are in place and functioning. Replace screws and door slider handles.

Periodically check the locomotive wheels and pickups for dirt and buildup, which can cause poor electrical contact and traction as well as prematurely wear out the neoprene traction tires.



## Cleaning the Wheels, Tires and Track

Periodically check the locomotive wheels and pickups for dirt and buildup, which can cause poor electrical contact and traction and prematurely wear out the neoprene traction tires. Wheels and tires can be cleaned using denatured (not rubbing) alcohol applied with a cotton swab.



To clean the track, use a clean rag and RailKing Track Cleaning Fluid or denatured (not rubbing) alcohol. Unplug the transformer and wipe the rails of the track, turning the rag frequently to ensure that you are using clean cloth on the rails. Because the manufacturing process leaves a coat on RealTrax, you should clean the rails after the first 30 minutes of use (you may smell something burning during initial use as the coat burns off; this is normal). Thereafter, keep an eye on the track and clean it when it gets dirty to ensure good electrical contact and to lengthen the life of the tires.

# Lightbulb Replacement Instructions

## Interior Lights

To replace the interior lights in the powered unit:

1. Follow the shell removal instructions found in the “Lubrication and Greasing” section of this booklet.
2. Pull bulb straight out to remove. (See figure 5)

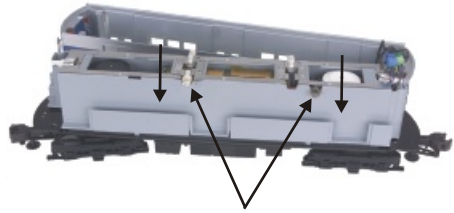
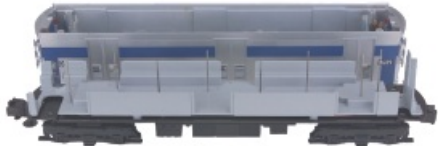


Figure 5

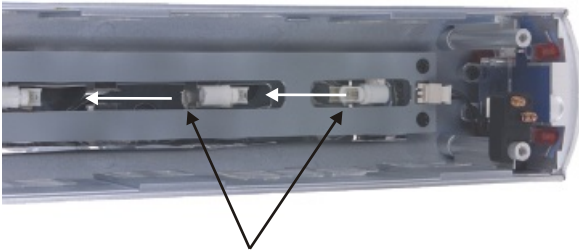
To replace the interior lights in the unpowered units:

1. Remove the four Phillips screws from the chassis (same as power unit), then lift the body away from the chassis. Lift the shell off carefully and turn body shell over to reveal interior lights. (See figure 6)
2. Pull light bulbs straight out and push new bulbs straight in to replace. (See figure 7)



Non-Powered Car Chassis & Body

Figure 6



Gently Pull Bulbs Away From Socket To Remove

Figure 7



## Headlights

To replace the headlights and other end-of-car lights in the powered unit:

1. Remove the shell as described in the “Lubrication and Greasing” section of this booklet.
2. Pull out the bulb shown in Figure 8 to replace the Number/Destination Board bulb.
3. To replace the headlight bulbs, remove the harness with the blue 2 pin connector shown in Figure 9.
4. To replace the top marker lights, remove the harness with the yellow 2 pin connector shown in Figure 9. 5. To replace the marker lights below the headlight, remove the harness with the green 2 pin connector shown in Figure 9.

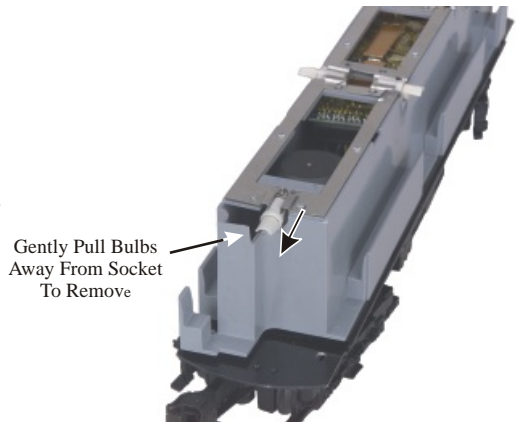


Figure 8

Replacement bulbs and wire ties are available directly from the M.T.H. Parts Department (order online: [www.mth-railking.com](http://www.mth-railking.com), e-mail: [parts@mth-railking.com](mailto:parts@mth-railking.com); mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, FAX: 410-381-6122).



Figure 9

# Self Charging Battery Back-Up

The 2.4v NiCad self-charging battery pack recharges continuously during train operation and should last for up to five years. It is a battery type that should not leak or cause any damage to your engine. Depending upon when your engine was built, the battery may need to be charged right out of the box.

If engine sounds seem distorted or garbled at low voltages or become silent when power from the transformer is turned off, test the batteries to determine whether the battery should be recharged or replaced.

**Test:** Put the engine in neutral and leave the track voltage at 10-12 volts (high enough for the lights to shine brightly) for 15 minutes.

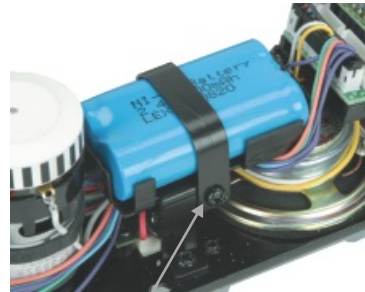
**Recharge:** If the sounds are improved at the end of the 15-minute test charge, the batteries charge has run down and can be recharged. There are a number of ways you can do this:

Leave the engine in neutral with track voltage at 10-12 volts for 6-7 hours so the batteries can fully recharge (if your engine has a smoke unit, be sure it is turned off).

Use M.T.H.'s battery recharger (sold separately) that plugs into a wall outlet and a special port under the engine to recharge the batteries overnight without leaving it on the track. (See figure 11)

**Replace:** If the sounds are not improved at the end of the 15-minute test charge, it is time to replace the batteries. Available through M.T.H. Parts. (See figure 10)

**DO NOT** substitute alkaline batteries for these NiCad batteries. Using alkaline batteries in this system will result in damage to the PS 2.0 circuit board and/or the batteries.

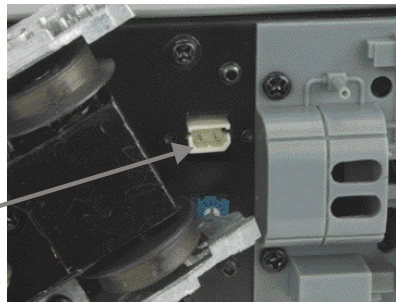


Unhook Wires, Remove, and Replace Battery

Figure 10

Battery charging port under the engine

Figure 11



## Traction Tire Replacement

Your subway set is equipped with two neoprene rubber traction tires on each powered truck block. While these tires are extremely durable, you may need to replace them at some point.

First, remove the truck sides from the truck block. To do this, turn your engine upside down and remove the truckside mounting screws as seen in (figure 12).

Once the truck sides have been removed:

1. Make sure the old tire has been completely removed from the groove in the drive wheel, using a razor blade or small flathead screwdriver to pry away any remains.
2. Slip the new tire onto the wheel. You may find it useful to use two small flathead screwdrivers to stretch the tire over the wheel.
3. If you twist the tire while stretching it over the wheel, you will need to remove and reinstall the tire. Otherwise your engine will wobble while operating.
4. Make sure the tire is fully seated inside the groove. Use a razor blade to trim away any excess tire that doesn't seat itself inside the groove properly.
5. Reassemble in reverse order.

One set of replacement tires is packaged with the model. Additional tires are available directly from the M.T.H. Parts Department (order online: [www.mth-railking.com](http://www.mth-railking.com), e-mail: [parts@mth-railking.com](mailto:parts@mth-railking.com); mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, FAX: 410-381-6122).



*Figure 12*

## Quick-Start DVD

The included DVD Quick-Start video demonstrates the start-up and basic operation of this set as well as other information about model railroading. You may find it helpful to view the DVD before operating this set.

## RailWare Interactive CD ROM

M.T.H. provides a free RailWare CD ROM in each Ready-To-Run set. It is full of helpful information on M.T.H. product history, track planning software, a dealer finder, and information and video clips on Loco-Sound and Proto-Sound 2.0. Follow the directions below to use the CD ROM.

Minimum System Requirements: Pentium 100, 16MB RAM, Windows 95 or later, CD ROM drive, Sound Card, display properties set to greater than 256 colors. The CD will not work on a Mac OS unless you run VirtualPC®.

## Running RR-Track Software

You may run the RR-Track software directly off of the CD ROM or you may install the software to your hard drive.

1. On the Desktop, click on the icon that says My Computer.
2. Find your CD ROM drive.
3. With the M.T.H. CD ROM in the drive, double click on the icon for the CD ROM drive.
4. Find the folder on the CD ROM entitled INSTALLATION.
5. Choose the folder inside entitled RRTRAXSETUP.
6. Run the file in that folder called SETUP.EXE and follow the directions it provides.

The program may ask you for a registration code. If it does type in "M.T.H." and it will run.

Additional track libraries can be obtained directly from RR-Track. See their website for more information [www.rtrack.com](http://www.rtrack.com).

## Installing Adobe Acrobat Software

To read some of the electronic documents included on the CD ROM, you will need to install the Adobe Acrobat Reader® if it is not already on your computer. To install the software:

1. On the Desktop, click on the icon that says My Computer.
2. Find your CD ROM drive.
3. With the MTH CD ROM in the drive, double click on the icon for the CD ROM drive.
4. Find the folder on the CD ROM entitled INSTALLATION.
5. Choose the folder inside entitled ACROBAT READER.

\*If you are running Windows 95, 98 or NT choose the folder 32 BIT. Run the file AR32E301.EXE and follow the directions it provides.

If you have problems you cannot resolve by using these directions, contact [custserv@mth-railking.com](mailto:custserv@mth-railking.com) or call 410-381-2580 for further help.

## Troubleshooting Proto-Sound® 2.0 Problems

Although Proto-Sound 2.0 has been designed and engineered for ease of use, you may have some questions during initial operation. The following table should answer most questions. If your problem cannot be resolved with this table, contact M.T.H. for assistance (telephone: 410-381-2580; fax: 410-423-0009; service@nth-railking.com, 7020 Columbia Gateway Drive, Columbia MD 21046-1532).

Starting Up	Remedy
When I press the horn button, the bell comes on instead.	That is normal for this model.
I can't get any sound to play when I press the horn button.	You may be pressing the button too quickly to trigger the bell. Try pressing the horn button more slowly, taking approximately one full second to fully depress the button.
Bell	Remedy
When I press the bell button, I get a station stop announcement, not the bell.	You are holding the bell button too long. Press it for only about one second to trigger the bell.
Coupler	Remedy
When I try to fire the coupler, TAS starts.	You are waiting too long between horn button presses.
The Proto-Coupler won't let the engine uncouple on the fly.	Try lubricating the coupler knuckle and rivet with a dry graphite lubricant.
The coupler does not fire or stay coupled.	The coupler needs to be cleaned. Wipe with denatured alcohol (not rubbing alcohol) and let dry.
Platform Action Sounds	Remedy
Sometimes the Platform Action Sounds don't play.	Platform Action Sounds play only in neutral at random intervals.
Lock-out	Remedy
I can't get the engine to run after I power up the transformer. It sits still with the diesel and compressor sounds running.	The engine is locked into the neutral position. Follow the procedure in the "Lock into a Direction" section.
The engine won't lock into forward, neutral, or reverse.	Engine speed must be below 10 scale mph (approx. 10 volts or less in conventional mode).
Volume	Remedy
The sounds seem distorted, especially when the horn or bell is activated.	Proto-Sound 2.0 volume is set too high. Turn the volume control knob on the bottom of the chassis counter-clockwise to reduce the volume.
No Sound	Volume is set too low, adjust volume control knob on the bottom of the chassis clockwise to increase the volume or check connector to speaker.
Battery	Remedy
The engine will not leave the initial neutral setting.	Check to be sure the battery is installed and fully charged. See the "Self-Charging Battery Back-Up" section.
I get no sounds when the engine shifts between directions.	The battery may be dead or need to be charged. See the "Self-Charging Battery Back-Up" section.
After I turn off my transformer, my engine continues to make sounds before quitting.	Proto-Sound 2.0 is designed to continue to sound for a few seconds after power to the track has been shut off to allow for a more realistic shut-down.

## Transformer Compatibility and Wiring Chart

Proto-Sound 2.0 is designed to work with most standard AC transformers. The chart below lists the many compatible transformers. Note that many of the operational commands described in these instructions require a bell button, so if your transformer does not have its own bell button, you should consider adding one to get the full benefit of the system. In addition, the chart details how the terminals on these transformers should be attached to your layout.

Transformer Model	Center Rail	Outside Rail	Min/Max. Voltage	Power Rating	Transformer Type
MTH Z-500	Red Terminal	Black Terminal	0-18v	50-Watt	Electronic
MTH Z-750	Red Terminal	Black Terminal	0-21v	75-Watt	Electronic
MTH Z-1000	Red Terminal	Black Terminal	0-14v 0-18v	80-Watt 100-Watt	Electronic
MTH Z-4000	Red Terminal	Black Terminal	0-22v	390-Watt	Electronic
Lionel 1032	U	A	5-16v	90-Watt	Standard
Lionel 1032M	U	A	5-16v	90-Watt	Standard
Lionel 1033	U	A	5-16v	90-Watt	Standard
Lionel 1043	U	A	5-16v	90-Watt	Standard
Lionel 1043M	U	A	5-16v	90-Watt	Standard
Lionel 1044	U	A	5-16v	90-Watt	Standard
Lionel 1053	U	A	8-17v	60-Watt	Standard
Lionel 1063	U	A	8-17v	60-Watt	Standard
All-Trol	Left Terminal	Right Terminal	0-24v	300-Watt	Electronic
Dallee Hostler	Left Terminal	Right Terminal			Electronic
Lionel LW	A	U	8-18v	75-Watt	Standard
Lionel KW	A or B	U	6-20v	190-Watt	Standard
Lionel MW	Outside Track Terminal	Inside Track Terminal	5-16v	50V.A.	Electronic
Lionel RS-1	Red Terminal	Black Terminal	0-18v	50V.A.	Electronic
Lionel RW	U	A	9-19v	110-Watt	Standard
Lionel SW	U	A	Unknown	130-Watt	Standard
Lionel TW	U	A	8-18v	175-Watt	Standard
Lionel ZW	A,B,C or D	U	8-20v	275-Watt	Standard
Lionel Post-War Celebration Series ZW	A,B,C or D	Common	0-20v	135/190 Watt	Electronic

## **Additional Features Accessible With The DCS Remote Control System**

(Additional equipment required)

While conventional mode operation of a Proto-Sound 2.0 engine yields wonderfully realistic sound and several train control features, command mode operation allows the user to access a world of command functions never before accessible to O Gauge railroaders. With the addition of the DCS Remote Control System (including a DCS remote handheld and Track Interface Unit) users gain many advanced features, including:

- DCS Proto-Speed Control - Establishes desired locomotive speed in scale miles per hour increments via a thumbwheel control and allows operator to set maximum speed and acceleration/deceleration rates
- ProtoSmoke® Variable Output Control - Controls how much smoke each engine outputs and matches smoke to locomotive speed
- Locomotive Lighting Control - Controls locomotive headlights, marker and interior lights, beacon lights, ditch lights, and MARS lights
- Emergency Stop-Single button push stops all Proto-Sound 2.0 trains but does not turn off the power
- One Touch Global Mute/UnMute-Single button mutes or unmutes all DCS-controlled locomotives' user-defined actions, including sound, lights, and smoke
- Proto-Dispatch Operation-Public Address-like feature allows users to speak through locomotive speaker during operation
- Proto-Cast-Allows users to play audio recordings through locomotive speaker during operation
- Proto-Doppler Sound Effects Set Up-Users can configure locomotive for Doppler Operation, including setting distance points for Doppler start, repeat, and stop modes
- Independent Volume Control of Engine Sounds, Bell, Horn & Whistle for each Locomotive
- Control up to 50 different DCS-Equipped Locomotives at one time with multiple TIUs
- Proto-Effects™ Set Up-User can select individual Proto-Effects™ operations to be active or inactive, including cab chatter, train wreck sounds, coupler sounds, and wheel clickety-clack sounds
- Direction Control Set Up-User can set initial individual start-up direction (start in forward or reverse) for double-heading operations
- Locomotive Consist Set-up-User can determine locomotive values for consist make-ups, allowing multiple locomotives belonging to a consist to operate together

# Service & Warranty Information

## How to Get Service Under the Terms of the Limited One-Year Warranty

When you suspect an item is defective, please check the operator's manual for standard operation and trouble-shooting techniques that may correct the problem. Additional information may be found on the M.T.H. Website. Should you still require service, follow the instructions below to obtain warranty service.

First, e-mail, write, call or fax a M.T.H. Authorized Service Center (ASC) in your area to obtain Repair Authorization. You can find the list of ASCs on the M.T.H. Website, [www.mth-railking.com](http://www.mth-railking.com). Authorized Service Centers are required to make warranty repairs on items sold *only* from that store; all other repairs may-- or may not be done at the store's own discretion. If you did not purchase the item directly from the ASC, you will need to select a National Authorized Service Center (NASC). These centers are compensated by M.T.H. to perform warranty service for any customer whose repair qualifies for warranty service. A list of NASC retailers can be located on the M.T.H. Website or by calling 1-888-640-3700. Should the warranty no longer apply, you may choose either an ASC or NASC retailer to service your M.T.H. Product. A reasonable service fee will be charged.

**CAUTION:** Make sure the product is packed in its original factory packaging including its foam and plastic wrapping material to prevent damage to the merchandise. There is no need to return the entire set if only one of the components is in need of repair *unless otherwise instructed by the Service Center*. ***The shipment must be prepaid and we recommend that it be insured. A cover letter including your name, address, daytime phone number, e-mail address (if available), Return Authorization number (if required by the service center, a copy of your sales receipt and a full description of the problem must be included to facilitate the repairs. Please include the description regardless of whether you discussed the problem with a service technician when contacting the Service Center for your Return Authorization.***

Please make sure you have followed the instructions carefully before returning any merchandise for service. Authorized M.T.H. Service Centers are independently owned and operated and are not agents or representatives of M.T.H. Electric Trains. M.T.H. assumes no responsibility, financial or otherwise, for material left in their possession, or work done, by privately owned M.T.H. Authorized Service Centers.

If you need assistance at any time email MTH Service at [service@mth-railking.com](mailto:service@mth-railking.com), or call 410 381-2580.

## Limited One-Year Warranty

**All M.T.H. products purchased from an Authorized M.T.H. Train Merchant are covered by this warranty.**

See our website at [www.mth-railking.com](http://www.mth-railking.com) or call 1-888-640-3700 to identify an Authorized M.T.H. Train Merchant near you.

M.T.H. products are warranted for one year from the date of purchase against defects in material or workmanship, excluding wear items such as light bulbs, pick-up rollers, batteries, smoke unit wicks, and traction tires. We will repair or replace (at our option) the defective part without charge for the parts or labor, if the item is returned to the M.T.H. Authorized Service Center (ASC) where it was purchased or a M.T.H. National Authorized Service Center (NASC) within one year of the original date of purchase. This warranty does not cover damages caused by improper care, handling, or use. Transportation costs incurred by the customer are not covered under this warranty.

Items sent for repair must be accompanied by a return authorization number, a description of the problem, and a **copy of the original sales receipt from an Authorized M.T.H. Train Merchant**, which gives the date of purchase. If you are sending this product to an Authorized Service Center, contact that Center for their return authorization.

This warranty gives you specific legal rights, and you may have other rights that vary from state to state. Specific questions regarding this warranty may be forwarded to M.T.H. directly.

Service Department  
M.T.H. Electric Trains  
7020 Columbia Gateway Drive  
Columbia MD 21046-1532





# AUTHORIZED SERVICE CENTER

7020 Columbia Gateway Dr. - Columbia, MD 21046

Information: 410-381-2580 Fax: 410-381-6122

[www.mth-railking.com](http://www.mth-railking.com)

## PARTICIPATING A.S.C. RETAILER LIST

### ALABAMA

SOUTHERLAND STATION  
HUNTSVILLE  
256-533-4720

### ARIZONA

ARIZONA TRAIN DEPOT  
MESA  
480-833-9486

### CALIFORNIA

CENTRAL COAST TRAINS  
ATASCADERO  
805-466-1391

### TRAIN SHACK

BURBANK  
818-842-3330

### REED'S HOBBY SHOP

LA MESA  
619-464-1672

### ROUNDHOUSE

NORTH HOLLYWOOD  
818-769-0403

### DOLLHOUSES, TRAINS & MORE

NOVATO  
415-883-0388

### TIN PLATE JUNCTION

OAKLAND  
510-444-4780

### RON'S WORLD

SAN CLEMENTE  
949-361-5596

### BLACK NIGHT TRAINS & HOBBIES

SANTA ROSA  
707-523-3522

### COLORADO

CUSTOM RAILWAY SUPPLY  
COLORADO SPRINGS  
719-634-4616

### CABOOSE HOBBIES, INC.

DENVER  
303-777-6766

### MIZELL TRAINS

WESTMINSTER  
303-429-4811

### CONNECTICUT

TIME MACHINE HOBBY, LL C  
MANCHESTER  
860-646-0610

### FLORIDA

AMHERST DEPOT  
ENGLEWOOD  
941-475-2020

### DEPOT HOBBY SHOP

IANTANA  
561-585-1982

### HOLLYWOOD STATION

MIAMI  
954-921-2700

### READY TO ROLL

MIAMI  
305-688-8868

### COLONIAL PHOTO & HOBBY

ORLANDO  
407-841-1485

### WARRICK CUSTOM HOBBIES

PLANTATION  
954-370-0708

### ROUNDHOUSE SOUTH

PORT ORANGE  
386-304-7002

### ILLINOIS

BERWYN'S TOY TRAINS &  
MODELS  
BERWYN  
708-484-4384

### CHICAGOLAND HOBBY

CHICAGO  
773-775-4848

### BILL'S ENGLEWOOD STATION

ORLAND PARK  
708-460-4906

### BIKE & CHOO CHOO

CONNECTION  
SCHAUMBURG  
847-882-7728

### INDIANA

Y. O. R. K. TRAINS  
MUNSTER  
219-838-9999

### SAMUELSON'S TRAIN SHOP

VALPARAISO  
219-462-2708

### IOWA

CABOOSE STOP HOBBIES  
CEDAR FALLS  
800-642-7012

### KANSAS

HOBBY HAVEN  
OVERLAND PARK  
913-381-3111

### KENTUCKY

L & N TRAINS & THINGS  
LOUISVILLE  
502-897-9005

LOUISIANA  
AMERICA'S TRAIN YARD  
BATON ROUGE  
225-926-5592

MAINE  
WHEELS, WINGS & THINGS  
LUDLOW  
207-532-6277

MARYLAND  
HOBBYTOWN U S A  
FREDERICK  
301-694-7395

FREDERICK JUNCTION  
FREDERICK  
301-694-3434

ENGINE HOUSE HOBBIES  
GAITHERSBURG  
301-590-0816

J & B TRAINS  
HAGERSTOWN  
240-420-4930

THE TRAIN ROOM  
HAGERSTOWN  
301-745-6681

PURKEY'S TOY TRAINS  
SYKESVILLE  
410-549-6061

CATCTIN MOUNTAIN TRAINS  
& HOBBIES  
THURMONT  
301-694-8331

E.L. JONES & SONS  
WILLIAMSPORT  
800-810-8138

MASSACHUSETTS  
FLYING YANKEE HOBBY  
SHOP  
BOSTON  
617-323-9702

NORTHEAST TRAINS  
PEABODY  
978-532-1615

EAST BAY HOBBIES  
SEEKONK  
508-336-5573

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W. SPRINGFIELD  
413-732-5531

MICHIGAN  
MICHIGAN MODEL TRAIN  
CENTER  
PINCKNEY  
734-426-1651

BRASSEUR ELECTRIC  
TRAINS INC.  
SAGINAW  
989-793-4753

MINNESOTA  
DON'S HOBBY CO.  
MANKATO  
507-387-1330

MISSOURI  
SWITCH STAND  
SAINT LOUIS  
314-781-4458

MARK TWAIN HOBBY CENTER  
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636-946-2816

NEVADA  
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RENO  
775-337-6669

NEW HAMPSHIRE  
TREASURED TOYS  
SALEM  
603-898-7224

NEW JERSEY  
HOBBY SHOP  
ABERDEEN  
732-583-0505

COUNTRY AND STUFF  
ANDOVER  
973-786-7086

GENE'S TRAINS  
BRICK  
732-840-9728

COLUMBUS TRAIN STATION  
COLUMBUS  
609-518-1800

ATLANTIC RAILS  
HAMMONTON  
609-567-8490

C B TRAIN DEPOT  
HILLSDALE  
201-666-9598

GRAND CENTRAL STATION  
KEARNY  
201-955-6200

J & B TRAINS, INC.  
MAPLE SHADE  
856-414-0092

HOBBYMASTERS, INC  
RED BANK  
732-842-6020

RIDGEFIELD HOBBY  
RIDGEFIELD  
201-943-2636

TOM'S MODEL TRAINS  
SCOTCH PLAINS  
908-322-6122

TRAINS & THINGS  
TRENTON  
609-883-8790

HOLLY BEACH TRAIN DEPOT  
WILDWOOD  
609-522-2379

NEW YORK  
L B C MODEL TRAINS  
BUFFALO  
716-631-3081

KURT'S TRAINS & HOBBIES  
CALEDONIA  
585-538-2960

AURORA RAILS & HOBBIES  
EAST AURORA  
716-652-5718

NASSAU HOBBY CENTER,  
INC.  
FREEPORT  
516-378-9594

J & R JUNCTION  
LIVERPOOL  
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HOBBY WORLD  
MONTICELLO  
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CITY DEPOT, INC.  
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STATEN ISLAND  
718-317-0008

SCAG'S ELECTRIC TRAIN  
SHOP  
STATEN ISLAND  
718-727-7373

AMERICANA STORE  
TIVOLI  
845-757-4246

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WEST BABYLON  
631-669-3069

WESTCHESTER CENTRAL  
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CARY  
919-465-0810

DRY BRIDGE STATION  
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336-786-9811

THE FREIGHT YARD  
SMITHFIELD  
919-934-6229

LITTLE CHOO CHOO SHOP  
INC.  
SPENCER  
704-637-8717

TRAIN LOFT  
WINSTON-SALEM  
336-760-9817

OHIO  
E & S TRAINS  
AKRON  
330-745-0785

T & K HOBBY SHOP  
BRIDGEPORT  
740-633-6607

PARMA HOBBY  
CLEVELAND  
216-741-6440

SANDY'S HOBBY'S &  
COLLECTIBLES  
ELYRIA  
440-365-9999

DUNHAM'S TOY TRAINS  
LONDON  
740-852-0899

CLEARVIEW TRAIN & HOBBY  
LORAIN  
440-277-4488

DIXIE UNION STATION  
MASON  
513-459-0460

DAVIS TRAINS  
MILFORD  
1-800-448-1060

ERIE RAILWAY DEPOT  
TROY  
937-440-9922

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AMBLER  
215-628-2366

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CHRISTMAS SHOPPE  
BOYERTOWN  
610-369-0755

NICHOLAS SMITH TRAINS  
BROOMALL  
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CHARLEROI SWEEPER  
CENTER  
CHARLEROI  
724-483-3397

JERRY QUINN TRAINS & TOYS  
COATESVILLE  
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CRANBERRY HOBBY DEPOT  
CRANBERRY TWP  
724-776-3640

FAIRCHANCE PHARMACY  
FAIRCHANCE  
724-564-7817

TRAINS R FUN  
FRAZER  
610-644-4585

THE CABOOSE  
LEHIGHTON  
570-386-5352

SCHUYLKILL FLYER HOBBIES  
LEESPORT  
484-248-2100

HOBBY CITY  
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ENGLISH MODEL RR  
MONTOURSVILLE  
800-327-5126

STATION/M H INDUSTRIES  
NEW CUMBERLAND  
717-774-7096

FRYER'S STORE  
ORWIGSBURG  
570-366-2258

TOBY TYLER'S HOBBY  
CENTER  
PITTSBURGH  
412-653-5030

WILCOX GREENHOUSE &  
NURSERY  
TITUSVILLE  
814-827-3823

EASTERN DEPOT  
TROY  
570-297-1975

J & J RAILROAD CROSSING  
INC  
TURTLE CREEK  
412-824-6009

THE TRAIN SHOPPE & HOBBY  
CENTER LD  
WILKES BARRE  
570-824-7688

RHODE ISLAND  
GRANDMA'S HOUSE  
GRANDPA'S TRAIN  
WARWICK  
401-463-7803

SOUTH CAROLINA  
EMERALD TRAIN & HOBBY  
GREENWOOD  
864-223-2247

TENNESSEE  
MODEL RAILROAD & HOBBY  
SHOP  
MEMPHIS  
901-384-6500

TRAINS-N-THINGS  
PARIS  
731-641-8880

TEXAS  
HOBBY TIME  
AMARILLO  
806.352.9660

RIVERVIEW TRAINS  
ANGLETON  
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GREAT TRAINS & HOBBIES  
LONGVIEW  
903-757-2720

UTAH  
ALMOSTA JUNCTION  
CLEARFIELD  
801-776-1656

VIRGINIA  
LEESBURG HOBBIES &  
COLLECTIBLES  
LEESBURG  
703-779-8600

LOCUST GROVE TRAINS  
LOCUST GROVE  
540-854-8955

TRAINS, ETC.  
LORTON  
703-550-1779

TRAIN DEPOT  
MANASSAS  
703-335-2216

CHESTERFIELD HOBBIES  
MIDLOTHIAN  
804-379-9091

DAVIS HOBBY SUPPLIES  
PORTSMOUTH  
757-397-1983

TOY TRAIN CENTER  
RICHMOND  
804-288-4475

T S G HOBBIES  
WARRENTON  
540-347-9212

NORGE STATION  
WILLIAMSBURG  
757-564-7623

WASHINGTON  
EASTSIDE TRAINS  
KIRKLAND  
425-828-4098

WEST VIRGINIA  
PATRICK'S TRAINS  
WHEELING  
304-232-0714

WISCONSIN  
WOODCRAFTERS SHOP  
BURLINGTON  
262-763-5239

SOMMERFELD'S TRAINS  
BUTLER  
262-783-7797  
HOBBY OUTLET  
FOND DU LAC  
920-924-3770

G B T V & TRAINS  
GREEN BAY  
920-496-9697

GRAMPA'S TRAIN SHOP  
RICE LAKE  
715-234-2996

CANADA  
TOY TRAIN WORKSHOP  
CUMBERLAND  
613-833-8331

THE TRAIN ROOM  
FERGUS  
19-787-3280

CREDIT VALLEY RAILWAY  
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