



USRA 0-8-0 Steam Engine

OPERATOR'S MANUAL (3V PS-2)

Compatibility

This engine will operate on any traditional O-31 or larger O 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 17 for a complete list of compatible transformers and wiring instructions.)



Freight Yard Sound

PLEASE READ THE MANUAL 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.

Set Up

There are a few simple steps you must take before operating this RailKing steamer.

1. You should prime the operating smoke unit with smoke fluid before operating. Add 15-20 drops of smoke fluid through the smokestack, then gently blow into the stack to eliminate any air bubbles in the fluid. (See Fig. 4 on page 11)
2. If you choose not to prime the unit with fluid, turn the smoke unit control located under the water hatch on the tender to the OFF position. (See Fig. 5 on page 11) Running the engine without a primed smoke unit may cause damage. See the “ProtoSmoke Unit Operation” section of this book for more information on smoke unit maintenance.
3. You should lubricate all side rods and linkage components and pick up rollers to prevent them from squeaking. Use light household oil and follow the lubrication points marked “L” in Fig. 2a & 2b on page 9. Do not over oil. Use only a drop or two on each pivot point.
4. Put your engine on the track and insert the reverse plug that extends out of the tender into the receptacle at the back of the engine. **WARNING: DO NOT CONNECT THIS ENGINE TO A TENDER FROM ANOTHER ENGINE; IT MAY CAUSE SERIOUS DAMAGE TO YOUR MODEL.** Look at the bottom of the engine and tender where each will have an ID sticker. If they match you may connect those two pieces, if not, do not connect them.
5. Connect the draw bar between the engine and the tender. If there are two holes in the draw bar, the hold located farthest from the tender is for the minimum track operation, such as O-31 circles of track. The second hole is for O-72 or larger operation.

At this point, you are ready to begin running your engine.

Basic Operation

Throttle

Throttle up the power to your track. Give enough power so that the engine's headlight shines brightly. Then put the engine in to motion by either firmly pressing the Direction button on your transformer or remote once or dropping and advancing to throttle to put the engine in forward.

Operation Buttons

Use the operation buttons on your transformer as described below.

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

Bell - To sound the bell, firmly press and release the Bell button. 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 the release the button again to turn it off.

Automatic Grade Crossing Signal *DCS Mode Only* - Customers that operate this engine in DCS will find a new feature added to the engine sound set. Now there is a soft key (SXS) that sounds the correct 2 longs, a short and another long whistle blast to announce that the train is approaching a grade crossing.

To sound the grade crossing signal, locate the soft keys at the top of the DCS Remote. Scroll to the left until SXS acronym is showing. A single push and release of the SXS soft key will produce the correct 2 longs, a short and another long whistle blast of the Grade Crossing Signal. Anytime you want to sound the Grade crossing Signal just press and release the SXS soft key.

Direction - Your train is programmed to start in neutral. To put the engine into forward and then to change the direction of the train or to put it into neutral, firmly press and release the Direction button on your transformer. Just as you must stop your car 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 or 10 seconds or more.

To adjust the volume of all sounds made by this engine, turn the master volume control knob located under the tender clockwise to increase the volume and counter-clockwise to decrease the volume. (see Figure 1)

Manual Volume Control

To adjust the volume of all sounds made by this engine, turn the master volume control knob located under the tender clockwise to increase the volume and counter-clockwise to decrease the volume. (see Figure 1)

Volume Adjustment Knob

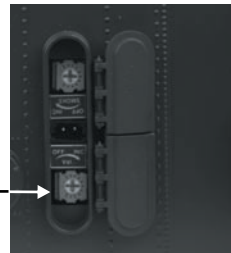


Figure 1 - Proto-Sound 2.0 Volume Adjustment Knob

Proto-Sound 2.0 Operation

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.

Because Proto-Sound 2.0 is an all-new system developed by M.T.H.'s own research and development team, it operates differently from the original Proto-Sound. Most Proto-Sound 2.0 features are automatically enabled, and the reset state has been eliminated, so there is no need to program features as with original Proto-Sound. Although the new system is easier to operate than original Proto-Sound, you should read these instructions thoroughly before using Proto-Sound 2.0 features in order to prevent harm to yourself or your equipment.

Activating Proto-Sound 2.0 Conventional Mode Features: Proto-Sound 2.0

features are activated by sequences of Bell and Whistle 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 whistle or ring the bell, you should press the buttons for a shorter time (1/2 second); you may need to practice your timing to make this work smoothly.

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

Freight Yard Sounds (FYS): Your engine is equipped with a sound package of freight yard sounds that you can play when you pull into a yard. Each sequence described in the following will play as long as it is left on, randomly generating sounds, but be sure to allow approximately 30 seconds between the button pushes described below to allow the FYS sufficient time to run through each sequence.

1. To cue the sound system to play the FYS, quickly but firmly press the Bell button once followed by 2 quick presses of the Whistle button while the engine is moving
2. Press the Direction button once to stop the engine. This will trigger the first sequence of FYS. The reverse unit is temporarily disabled so that the train will not move as you use the the Direction button to trigger the sounds, and Proto-Sound 2.0 has disabled operator control over the Whistle and Bell buttons until the full FYS sequence is complete.
3. After waiting about 30 seconds for that sequence to run, press the Direction button again to trigger the second sequence of FYS.

4. After waiting about 30 seconds, press the Direction button again to trigger the third FYS sequence.

5. Again, after allowing about 30 seconds for that sequence to run, press the Direction button one more time to trigger the fourth and final FYS sequence. The FYS will continue, and within a few seconds, the engine will start and move out on its own at the current throttle setting, in the same direction it was traveling when you began the sequence. Once the bell turns off, the operator regains control of the transformers bell and whistle buttons and can ring the bell or blow the whistle as usual

Tips on Using FYS

- You can terminate FYS at any time by turning off power to the track for 15 seconds.
- You do not have to be in Forward to use FYS. At the conclusion of the full sequence, the train will pull away from the station in whatever direction you were going when you activated the feature.
- You can use FYS even if you are double-heading with another engine. If the second engine is not equipped with Proto-Sound 2.0, you must remember not to leave the throttle at a high voltage level once you have stopped the engine to run the FYS. Otherwise, the engine without FYS will begin vibrating on the track as its motors strain to move the train, since they cannot be automatically disabled during the FYS cycle (or if an original Proto-Sound engine, FYS are triggered differently and that engine's motor-disable feature will not be active when you run FYS in Proto-Sound 2.0).
- FYS can be triggered from Neutral. It will operate the same as if triggered while in motion except that, at the conclusion of the FYS, the engine will depart in the next direction of travel, as opposed to the direction it was traveling before entering Neutral.

Proto-Coupler® Operation

This locomotive is equipped with 2 coil-wound Proto-Couplers for remote uncoupling action. Because the Proto-Coupler is controlled through the Proto-Sound 2.0 microprocessor, it does not require an uncoupling track section or modification to your layout to function. Use the codes listed below.

Rear Coupler: To fire the rear coupler, press the Bell button once followed immediately by four pushes of the Whistle button. The sound of the lift bar and air line depletion will play, and the knuckle will be released.

Front Coupler: To fire the front coupler, press the Bell button once followed immediately by four pushes of the Whistle button. The sound of the lift bar 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 release of cars while on the run. To maintain a constant speed when speed control is turned off, you need to adjust the track voltage yourself. When speed control is off, the volume will drop to allow for better low voltage operation. Full volume is restored upon reactivation of speed control.

To turn speed control on and off: First, put the engine in neutral, then press the transformer's Whistle button one time then immediately press the Bell button two times. Two whistle blasts will indicate that the engine has made the change. Repeat the 1 whistle, 2 bells code to return it to the other state. You will want to do this during the initial neutral start-up if you ever couple this engine with another engine that is not equipped with speed control to avoid damaging the motors in either engine. Each time you shut down the engine completely, it will automatically turn speed control on.

Lock into a directional state:

You can lock your engine into a directional state (forward, neutral or reverse) to prevent it from changing directions. To do this, put the engine into the direction you want or in neutral, run it at a very low speed (<10 scale mph), and quickly but firmly press your remote's Whistle button once followed immediately by three presses of the Bell button. Two whistle 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 whistle, 3 bells code to return the engine to its normal state, even if the engine has been kept without power for extended periods of time.

Reset to Factory Defaults

To override the settings you currently have assigned to the engine and reset it to its factory defaults, while in neutral press the Whistle button once, followed immediately by five quick pushes of the Bell button. Two whistle blasts will indicate that the engine has made the change

Automatic Sounds

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

Squealing Brakes: This sound plays anytime the engine speed decreases rapidly.

Cab Chatter: This sound plays when the engine idles in neutral.

Engine Start-up and Shut-down: This sound plays when the engine is initially powered on or is powered off for five seconds or more.

Maintenance

Lubrication and Greasing

This engine should be oiled and greased in order to run properly. You should regularly lubricate all side rods and linkage components and pick-up rollers to prevent them from squeaking. Use light household oil and follow the lubrication points marked “L” in Figures 2a and 2b. Do not over oil. Use only a drop or two on each pivot.

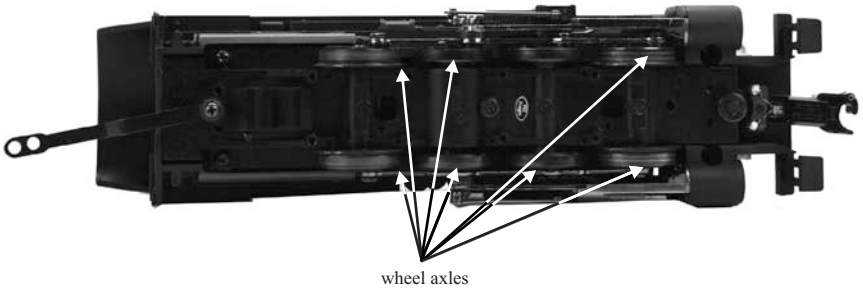


Figure 2: Lubrication Points on the Engine

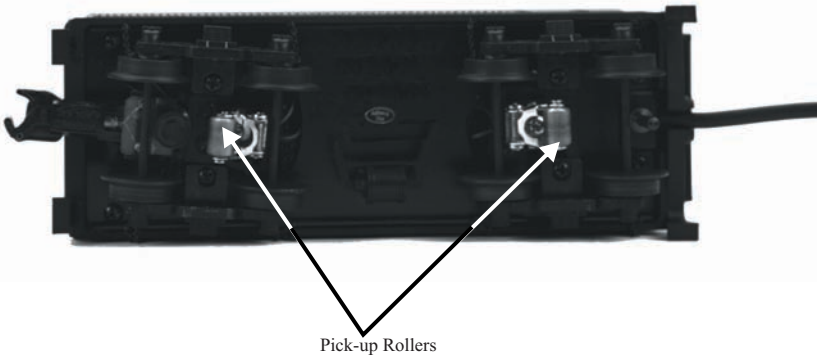
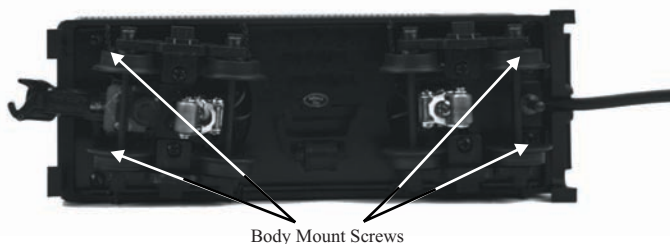


Figure 2b: Pick-up Rollers on the Tender

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. To access the gear box, do the following:

1. Unscrew the Grease screw as shown in Figure 3 and use an applicator to apply grease into these screw holes.



Body Mount Screws

Figure 3: Greasing points on the engine and location of body mount screws

Cleaning the Wheels & Track

Periodically check the locomotive wheels and pick-up rollers 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 alcohol (not rubbing alcohol), which can be found in home improvement stores, applied with a cotton swab.

Occasional cleaning of the track will also help to ensure good electrical contact and prolong the life of your engine's tires. To clean the track, use a clean rag and denatured alcohol (not rubbing alcohol). Unplug the transformer and rub the rails of the track, turning the rag frequently to ensure that you are using clean cloth on the rails.



Track Cleaning Block (40-1099)



Maintenance Kit (30-50010)

Traction Tire replacement

Your locomotive is equipped with four neoprene rubber traction tires on the rear pair of each set of flanged drivers. While these tires are extremely durable, you may need to replace them at some point.

1. Remove the side rods (the rods that connect each drive wheel to the other) from the wheels in order to slip the new tire over the grooved drive wheel. This screw can be loosened with a 5mm nutdriver.
2. 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.
3. 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.
4. 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.
5. Make sure the tires are fully seated inside the groove. Use a razor blade to trim away any excess tire that doesn't seat itself inside the groove properly.

One set of replacement tires is included with your model.

Additional tires are available directly from M.T.H. Parts Department (Phone: 410.381.2580).

Proto-Smoke® Unit Operation

This locomotive contains a smoke unit that outputs smoke through the smokestack on the boiler of the engine. The smoke unit is essentially a small heating element and wick that soaks up and then heats a mineral oil-based fluid that emits a harmless smoke. The smoke is then forced out of the stack by a small electric fan.

With a few easy maintenance steps, you should enjoy trouble-free smoke unit operation for years.

- When preparing to run this engine, add 15-20 drops of smoke fluid through the smokestack. (see figure 4) We recommend M.T.H. ProtoSmoke, Seuth, LGB, or LVTS fluids (a small pipette of ProtoSmoke fluid is included). Do not over fill the unit or the fluid may leak out and coat the interior engine components.

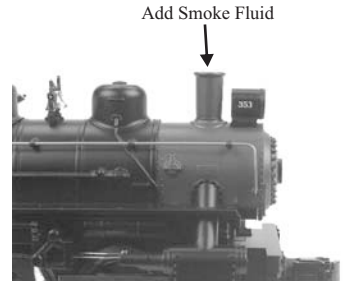


Figure 4: Add Smoke Fluid

- If you choose not to add the fluid (or have already added the fluid but choose to run smoke free), turn off the smoke unit switch located under the water hatch on the tender body. (see figure 5) Failure to either add fluid to the unit or to turn it off may damage the smoke unit heating element and/or wicking material.

Smoke volume control



Figure 5: Smoke Switch

- When the smoke output while running begins to diminish, add another 10-15 drops of smoke fluid or turn the smoke unit off.

- When storing the unit for extended periods of time, you may want to add about 15 drops of fluid to prevent the wick from drying out.

- After removing the engine from storage, add another 25 drops of fluid, letting the wick soak up the fluid for 15 minutes prior to operation.

Smoke Inspection Cover Screws

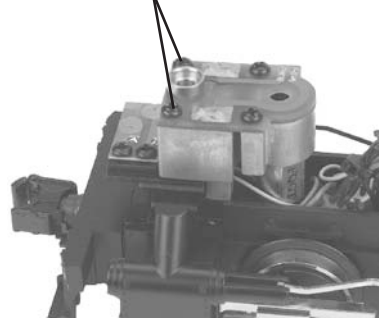


Figure 6: Smoke Unit Inspection Cover

- If you experience poor or no smoke output when the smoke unit is on and has fluid, check the wick to see if it has become hard, blackened, and non-absorbent around the heating element. Remove the smoke unit inspection cover from the smoke unit's body. (see figure 6) After removing the chassis and inspection cover screws, lift the inspection plate away and inspect the wick. If it is darkly discolored and hard, it should be replaced. You can obtain replacement wicks and instructions from the M.T.H. Parts Department.

ProtoSmoke Fluid

ProtoSmoke is the recommended fluid for M.T.H. products and can be used in other manufacturers products as well. Choose from 12 different scents:

Christmas, Coal, Diesel, Wood Burning, Coffee, Eggs & Bacon, Vanilla, Candy Cane, Barbeque, Pipe Smoke, Cinnamon Roll, and Apple Pie

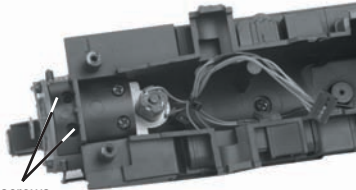


Light Bulb Replacement

To replace the light bulb in the locomotive, follow these instructions below:

Headlight

1. Remove the 2 screws that attach the headlight shell to the smokebox front.
2. Gently pull the original bulb from the rear of the headlight shell.
3. Remove the boiler shell as shown in figure 3 on page 10.
4. Unplug the chassis electrical connector.
5. Remove the 2 screws that attach the smoke unit cover panel to the underside of the boiler.
6. Unplug the headlight connector
7. Pull the original bulb through the boiler shell
8. Follow the above steps in the reverse order to install the replacement bulb



remove screws

Figure 7a

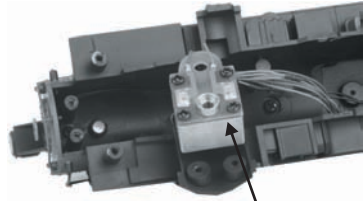


Figure 7b

smokebox

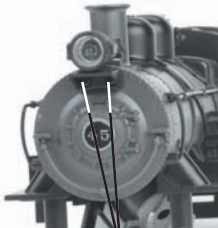


Figure 7c

remove screws



Figure 7d

Headlight

Fire Box Glow

Remove the locomotive boiler from its chassis as shown in figure 3 on page 10. Once the boiler has been removed, pull bulb from grommet. and unplug the wires. Reverse the steps of this procedure to install new bulb.

You can obtain replacement bulbs directly from the M.T.H. Parts Department. (Order online: www.mth-railking.com, e-mail: parts@mth-railking.com, Fax: 410-423-0009, Phone: 410-381-2500, Mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532,).

Self Charging Battery Backup

The special NiCad 2.4v self-charging battery recharges continuously during train operation and should last for up to five years. The battery is a dry battery that should not leak or cause any damage to your engine. Depending upon when your engine was built, it 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 battery to determine whether it 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 battery 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 volt for 6-7 hours so the battery can fully recharge (if your engine has a smoke unit, be sure it is turned off).
- Use M.T.H.'s battery recharger (Item No. 50-1019 sold separately) that plugs into a wall outlet and a special port under the watcher hatch in the tender to recharge the battery overnight without leaving it on the track.

Replace: If the sounds are not improved at the end of the 15-minute test charge, it is time to replace the battery. Available through M.T.H. Parts.

Battery charging Port

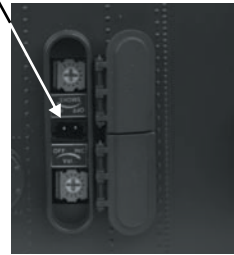


Figure 8: Battery charging Port

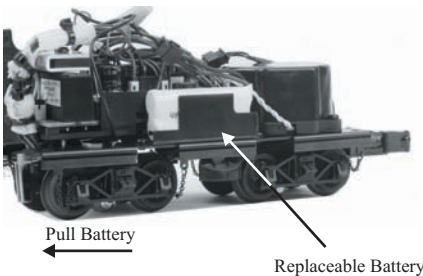


Figure 9: Replacing the Battery

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

****Do not use alkaline batteries for testing or checking purposes for the 3-Volt PS2 boards. Using alkaline batteries will damage the 3-Volt battery charging circuit.****

Troubleshooting Proto-Sound® 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@mth-railking.com, 7020 Columbia Gateway Drive, Columbia MD 21046-1532).

Starting Up	Remedy
When I first turn the power on, the engine will not begin to run. I have to turn the throttle off and then on again to get the engine to operate.	This is normal behavior. To prevent accidental high-speed start-ups, Proto-Sound 2.0 is programmed to start up in neutral anytime track power has been turned off for several seconds.
Whistle/Horn	Remedy
When I press the whistle/horn button, the bell comes on instead.	Reverse the transformer leads.
I can't get the horn to blow when I press the whistle button.	You may be pressing the button too quickly. Try pressing the whistle/horn button more slowly, taking approximately one full second to fully depress the button.
Bell	Remedy
When I press the whistle button, the bell sounds.	Reverse the transformer leads.
I can't get the bell to ring when I press the bell button.	You may be pressing the button too quickly. Try pressing the bell button more slowly, taking approximately one full second to fully depress the button.
The bell won't work on a separate bell button.	Check the wiring of the separate button.
Bell	Remedy
When I try to fire the coupler, FYS starts.	You are waiting too long between whistle button presses.
The Proto-Coupler won't let the engine uncouple on the fly.	Try lubricating the coupler knuckle with a dry graphite lubricant. Do NOT use oil.
The coupler does not fire or stay coupled.	The coupler needs to be cleaned. Wipe with denatured alcohol (not rubbing alcohol) and let dry.

Cab Chatter	Remedy
Sometimes the Cab Chatter sounds don't play.	Cab Chatter plays 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	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 whistle 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.
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.
FYS	Remedy
The FYS sounds occasionally repeat themselves.	Proto-Sound 2.0 has a built-in random number generator that randomly selects each sound clip to play. Because there are a limited number of sound clips available in each FYS sequence, it is probable that some of these sound clips will be repeated from time to time.

FYS	Remedy
Once in FYS, the engine doesn't go into reverse.	So that FYS effects can be as realistic as possible, Proto-Sound 2.0 disables the reversing unit whenever FYS is enabled. This way the engine remains still at its stop as the operator cycles through the FYS sequences.
When the FYS enters its last sequence the bell automatically comes on.	FYS is programmed to start ringing the bell at that point. After approximately 12 seconds it will automatically turn off.
When FYS is enabled, pressing the whistle and bell buttons has no effect.	Because FYS must control various effects in each sequence, Proto-Sound 2.0 takes control of these sound effects until you exit FYS.
I push the direction button but the next sound clip in the sequence does not play or the engine does not come out of FYS after fourth press of the direction button.	Each FYS clip must play for approx. 30 seconds before FYS will advance to the next step in the FYS cycle. Wait at least 30 seconds in each FYS sound clip before pressing the direction button.

Transformer Compatibility Chart

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, or upgrading your transformer, to get the full benefit of the system.

RECOMMENDED AC TRANSFORMERS					
Transformer Model	Outside 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	0-21v	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
R.O.W.	Red Terminal	Black Terminal	0-24v	384-Watt	Standard
Powermaster	U	A	8-18v	135VA	Electronic
All-Trol	Left Terminal	Right Terminal	0-24v	300-Watt	Electronic
Dallee Hostler	Left Terminal	Right Terminal			Electronic
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 available to G 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 troubleshooting 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 M.T.H. Electric Trains or 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. 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) or contact M.T.H. Electric Trains directly. NASC Dealers 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 410-381-2580. 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, or call 410 381-2580.

Limited One-Year Warranty

All M.T.H. products purchased from an Authorized M.T.H. Retailer are covered by this warranty. See our Website to identify an Authorized M.T.H. Retailer near you.

M.T.H. products are warrantied 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 replace or credit (at our option) any defective item with a manufactured suggested retail price of \$279.95 or less (excluding all motive power and electronic items), if the item is returned to an M.T.H. Authorized Service Center (ASC) or M.T.H. National Authorized Service Center (NASC) within one year of the original date of purchase. For any item with an MSRP greater than \$279.95 (including all motive power and electronics), We will repair, replace or credit (at our option) the defective item without charge for the parts or labor, if the item is returned to an M.T.H. Authorized Service Center (ASC) or 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 to ship the product for warranty service 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. Retailer stating 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 the warranty may be forwarded to M.T.H. directly.

Service Department
M.T.H. Electric Trains
7020 Columbia Gateway Drive
Columbia MD 21046-1532
410-381-2580
service@mth-railking.com