Lionel Cab Forward AC-12 Steam Locomotive Owner's Manual

featuring **TRAINmaster**
C·O·M·M·A·N·D

RailSounds 5.0

and

ODYSSEY SYSTEM

Congratulations!

Congratulations on your purchase of the Lionel Cab Forward AC-12 steam locomotive and tender! On the outside, this locomotive features numerous prototypical details and expert decoration in your favorite livery. Inside the body, this locomotive is equipped with some of the most advanced sounds and controls in model railroading. This powerful locomotive is ready for duty on your layout.

Features of this locomotive

- **TrainMaster Command Control equipped—able to run in the TrainMaster Command Control environment or in the conventional environment with only a standard transformer**

- **Odyssey System for speed control with ON/OFF switch**

- **Refined Conventional Transformer Control Mode with lower starting speeds, improved smoke output, and simplified Odyssey System controls**

- **RailSounds 5.0 sound system with intelligible CrewTalk dialog and TowerCom announcements**

- **High-torque Pittman® motor**

- **Wireless Tether connection between locomotive and tender**

- **Directional lighting with operating headlight and back-up light on rear of tender**

- **ElectroCoupler on rear of tender**

- **Illuminated classification lights, marker lights, and number boards**

- **Synchronized fan-driven smoke unit**

- **Illuminated cab interior**

- **Minimum radius: O-72**

Table of contents

Quick Start

Transformer operations

1. **Place your locomotive on Lionel or Lionel-compatible O-72 or larger track.**
2. **Power your locomotive at 8-18 volts with your alternating-current (AC) transformer.**

   Caution! Do not power your locomotive with a direct-current (DC) transformer. Damage to sensitive electronic components may occur.

3. **Wait three to eight seconds as your locomotive determines whether it is in a conventional environment or a TrainMaster Command Control environment. The headlight will stop flashing.**
4. **Move 'em out! Press the DIRECTION button on your transformer, then throttle up.**

TrainMaster Command Control operations

To operate your locomotive in the Command Control environment, you need a Command Base (available separately, 6-12911) and a CAB-1 Remote Controller (available separately, 6-12868). Both products are offered together in the TrainMaster Command Set (6-12969).

1. **Turn off track power and plug-in the Command Base.**
2. **Place your locomotive on Lionel or Lionel-compatible O-72 or larger track.**
3. **Increase track voltage to full power (no more than 19 volts AC).**

   Caution! Do not power your locomotive with a direct-current (DC) transformer. Damage to sensitive electronic components may occur.

4. **Press ENG and 1 to address your locomotive with your CAB-1 Remote Controller.**
5. **Throttle up and move 'em out.**

Conventional transformer operations

Conventional transformer operations

Your locomotive is capable of operating in the conventional environment, controlled by nothing more than a standard Lionel alternating-current (AC) transformer.

In the conventional environment, your locomotive cycles through a repeating pattern of operations: forward, neutral, reverse, neutral, and so on. To advance to the next operation, press the **DIRECTION** button on your transformer. Alternately, you could use the throttle to briefly turn off track power so that the locomotive advances to the next operation when power is restored.

Once you cycle the locomotive into forward or reverse, you control your locomotive's speed by varying track voltage with the transformer's throttle. To increase the speed of the locomotive, you increase track voltage. To decrease the speed, you decrease track voltage. To stop the locomotive and to change directions (or to enter neutral), track voltage is turned off or interrupted.

Use the **WHISTLE** and **BELL** buttons on your transformer (or separate buttons if your transformer is not equipped with these controls) to activate these features.

To experience all of your locomotive's features, we recommend operating in the TrainMaster Command Control environment. With a simple one-wire connection, you can use the CAB-1 Remote Controller to access all of the functions of your locomotive. Refer to pages 20-26 to see how to operate your locomotive in the TrainMaster Command Control environment.

Conventional transformer operations

Operating your locomotive in the conventional environment

1. **With your transformer turned off, place your locomotive on Lionel or Lionel-compatible O-72 or larger track.**

2. **Connect the drawbar between the locomotive and tender as illustrated in Figure 1.**
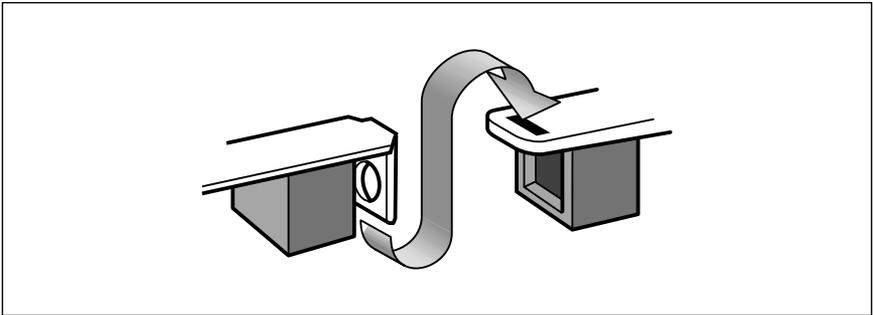
Figure 1. Drawbar connection

3. **Power your locomotive at 8-18 volts with your alternating-current transformer.**

   Caution! Power your locomotive with an alternating-current (AC) transformer only. Powering your locomotive with a direct-current (DC) transformer may result in damage to sensitive electronic components.

4. **Wait three to eight seconds as your locomotive determines whether it is in a conventional environment or a TrainMaster Command Control environment.** The headlight flickers as the locomotive searches for a signal from the Command Base. When the locomotive has determined that a Command Base is not connected to the track, the flickering will stop and the headlight will remain illuminated. You are ready for operation in the conventional environment.

5. **Move 'em out!** Press the **DIRECTION** button on your transformer to sequence your locomotive through the repeating pattern of operations: forward, neutral, reverse, neutral, and so on. You may also briefly turn off track power to advance the locomotive to the next operating state. Adjust the throttle until your locomotive moves at your desired speed.

   Note! When placing your locomotive on your layout for the first time, it will start out in neutral. Thereafter, it will start in forward after every power interruption lasting five seconds or longer.

   Use the **WHISTLE** and **BELL** buttons on your transformer to activate those features. Refer to page 13 if your transformer is not equipped with those buttons.

Conventional transformer operations

Locking your locomotive into a single direction

When the Command reverse unit switch is in the RUN position, your locomotive sequences through a repeating pattern of operations: forward, neutral, reverse, neutral, and so on.
To "lock" your locomotive into a single direction (for example, to operate in forward only), you can deactivate the Command reverse unit's sequencing function. Refer to Figure 2 for the location of the Command reverse unit switch.

1. Use your transformer's **DIRECTION** button or interruptions in track power to get your locomotive moving in the desired direction.

2. Slow the locomotive down without stopping (reduce the throttle without turning off track power).

3. Slide the Command reverse unit switch to the PROG position. At this point, the locomotive is "locked" into your chosen direction. To restore the forward-neutral-reverse sequence, just slide the Command reverse unit switch back to the RUN position.

Note! Your locomotive will "reset" to forward after any power interruption lasting five seconds or longer, regardless of the direction you set.
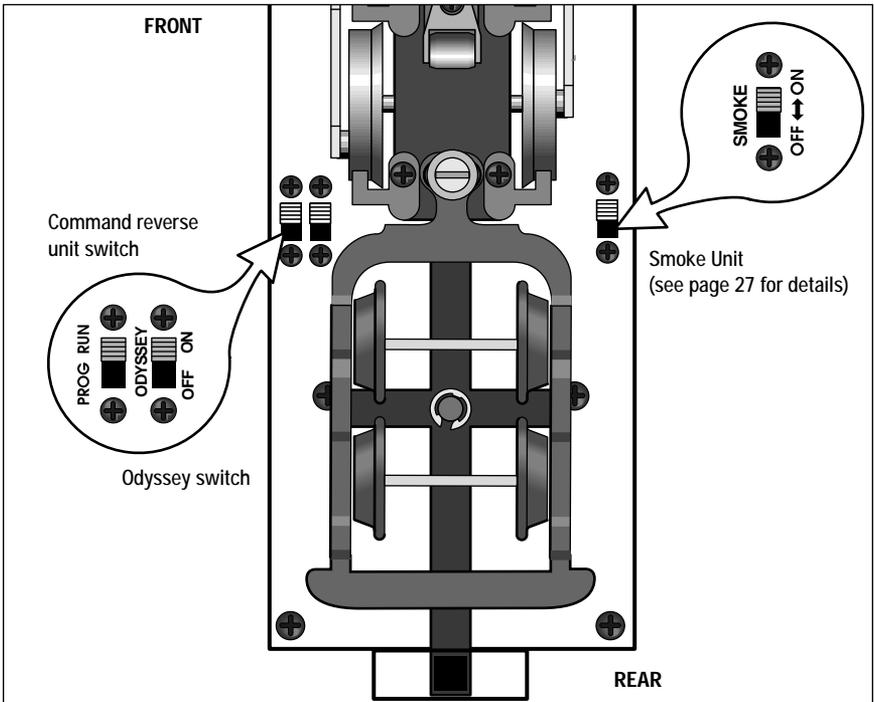
Figure 2. Switch locations

7

Conventional transformer operations

Coupling your locomotive in the conventional environment

The locomotive's tender features one ElectroCoupler that is released by remote control at any point around your layout in the TrainMaster Command Control environment.

In the conventional environment, the ElectroCouplers will not open manually or by using a Remote-Control Track section. To couple your locomotive in the conventional environment, you must rely on a piece of rolling stock equipped with a magnetic coupler. Simply release the magnetic coupler and couple the rolling stock to the locomotive, even if the ElectroCoupler is closed.

Keep in mind that you may still make use of Lionel Remote-Control Track sections (6-65530 for O gauge; 6-12746 and 6-65149 for O-27 gauge; and 6-12020 or 6-12054 for FasTrack layouts) with the magnetic couplers on the rolling stock. Place the trigger disc on the magnetic coupler over the central coil on the Remote-Control Track section, then press UNCOUPLE on the track section's controller. As illustrated in Figure 3, the magnetic field pulls the disc downward, releasing the coupler.

Remote-Control Track Section
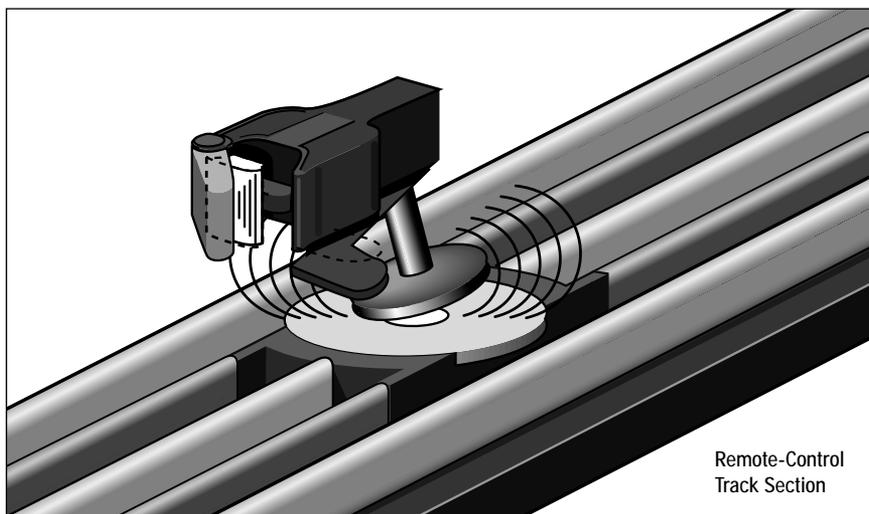
Figure 3. Magnetic coupler operation

RailSounds 5.0 sound system operations

RailSounds 5.0 sound system operations

Your locomotive is equipped with the Lionel RailSounds 5.0 sound system, the most realistic model railroad sound system in the world. The RailSounds 5.0 sound system brings the sounds of the railroad to your layout through high quality digital samples of real locomotives.

When you operate your locomotive in the conventional environment, you get realistic chuffing sounds, which automatically increase through 15 levels as the speed of the locomotive increases. You can sound the locomotive's whistle or activate the ringing of the bell. When you are through with operations and power down the track, your locomotive's RailSounds 5.0 sound system starts a realistic steam shutdown sequence. (A nine-volt battery is required for the operation of the RailSounds 5.0 sound system when the track is powered down, see pages 10-11.)

When you operate your locomotive in the TrainMaster Command Control environment, you get full control of the RailSounds 5.0 sound system, including the whistle, air horn, and bell sounds. The locomotive's chuffing sounds automatically increase, but you can also set a particular chuff intensity level using your CAB-1 Remote Controller. In the Command Control environment, the release of the ElectroCoupler is accompanied by a coupler release sound. Use the **BRAKE** button, and listen for the sound of squealing metal. You can also trigger CrewTalk dialog and TowerCom announcements, which simulate the interaction between the locomotive crew and the yardmaster. Whenever you choose to shutdown your locomotive, the realistic shutdown sequence commences. (A nine-volt battery is required for the operation of the RailSounds 5.0 sound system when the track is powered down, see pages 10-11.)

RailSounds 5.0 sound system operations

Installing the battery

While the RailSounds 5.0 sound system is powered through the track, we recommend that you install a nine-volt alkaline battery in the tender to prevent the sound system from shutting down during track power interruptions (for example, at a switch or a dirty section of track). Follow these steps and refer to Figure 4 as you install the battery.

Note! If the RailSounds sound system turns off during interruptions in track power, you may need to replace the battery.

1. Remove the body screws from the underside of the tender. Refer to Figure 4 for the location of the screws.
2. Lift the body off the frame. Be careful to avoid pulling on the wires that connect the body to the frame.
3. Remove the protective cover from the battery harness.
4. Snap the battery harness onto the nine-volt alkaline battery's terminals.
5. Slide the battery into the battery holder.
6. Replace the body on the frame and secure it with the body mounting screws. Be careful to avoid pinching wires between the body and the frame.

RailSounds 5.0 sound system operations
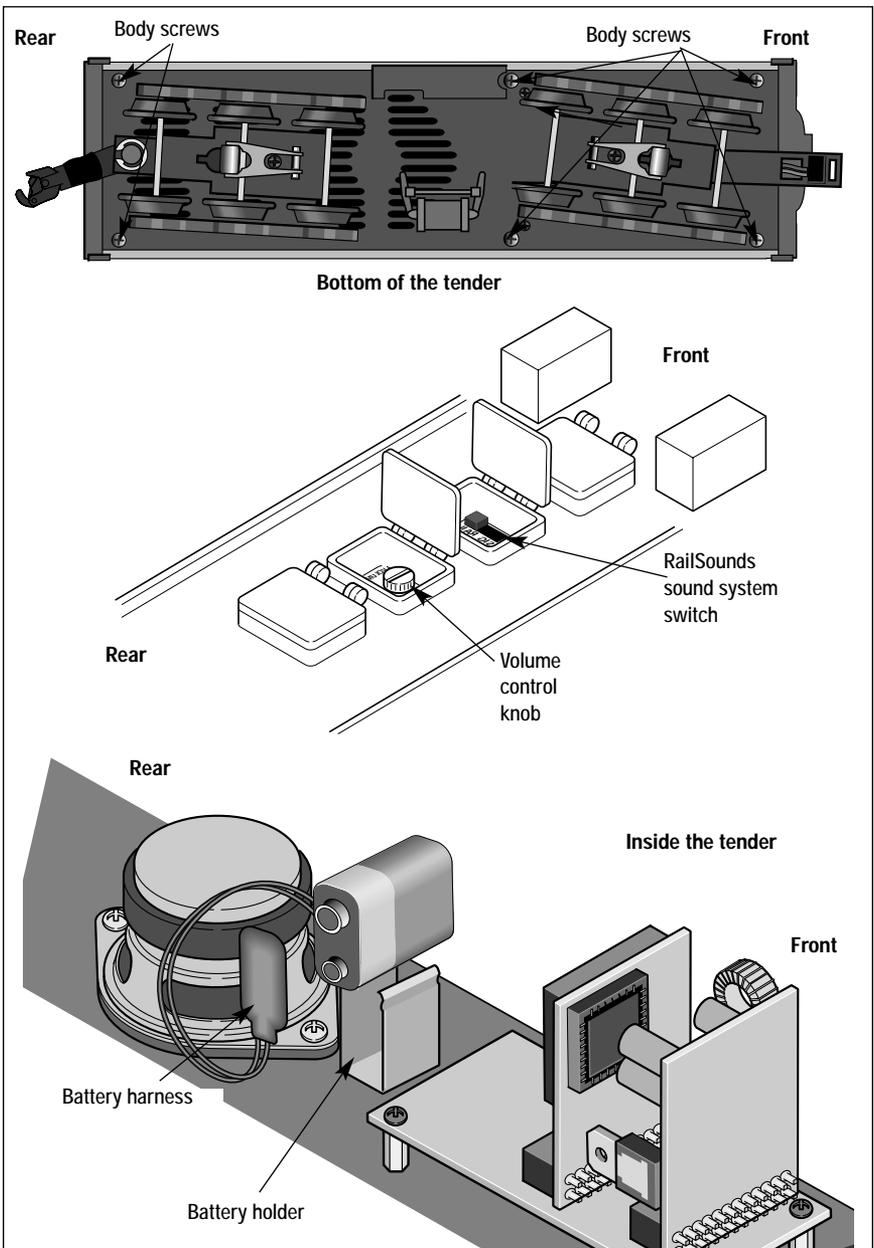
Installing the battery (continued)

Figure 4. RailSounds sound system controls and battery installation

11

RailSounds 5.0 sound system operations

Using the RailSounds 5.0 sound system in the conventional environment

When you first power up your locomotive, you will hear the sounds of the locomotive at rest. As the locomotive moves, the chuffing sounds automatically increase with the locomotive's speed. In the conventional environment, the whistle and bell sounds are activated by your transformer controls.

To silence the chuffing sounds, slide the RailSounds 5.0 sound system switch located under the hatches on top of the tender to the SIGNALSOUNDS position before you power up the locomotive or after the locomotive has been powered down for a minimum of ten seconds. The whistle and bell sounds will still be active. To adjust the volume, use the volume control knob located under the hatches on top of the tender.

Note! For proper operation of the RailSounds 5.0 sound system during track power interruptions and for the locomotive shutdown sequence, you must install a nine-volt alkaline battery. See pages 10-11.

In the conventional environment, you will experience several features of the RailSounds 5.0 sound system.

- **DynaChuff.** Your locomotive's speed automatically determines the level of chuffing sounds. At low speeds, the chuffing intensity is relaxed. When you highball down the mainline, the chuffing intensity is labored.

- **MultiWhistle.** A different whistle sound at different speeds—a RailSounds 5.0 sound system exclusive.

- **Authentic bell.** Press **BELL** on your transformer to begin the effect, then press **BELL** a second time to discontinue the effect.

- **CrewTalk dialog and TowerCom announcements.** These brief conversations between the train crew and the tower are triggered by short whistle blasts.

- **Reverse unit reset sound.** Power down your track, wait three seconds, and listen for the air-release sound—that's the locomotive telling you that its Lionel Command reverse unit has reset to forward.

- **Shutdown sequence.** When you turn off track power, you have two seconds to power up again after you hear the reverse unit reset sound. If you do not restore power, you will hear the realistic shutdown sequence. Because track power is off, a battery is required for this sequence to function.

RailSounds 5.0 sound system operations

Installing a Lionel Sound Activation Button for conventional operation

If your transformer lacks **WHISTLE** and **BELL** buttons, you will need to install Lionel no. 610-5906-001 Sound Activation Buttons (available separately) to activate the locomotive's whistle and bell sounds.

Connect the buttons as shown below. Be sure that all track power passes through the Sound Activation Button(s). Do not bypass the buttons.

For AC transformers lacking a bell button

Black wire

Common/Ground/U

Existing wire

POWER SUPPLY

Red wire

Power/A

LIONEL SOUND ACTIVATION BUTTON

Lionel no. 610-5906-001 Sound Activation Button for activating the bell

For AC transformers lacking bell and horn/whistle buttons
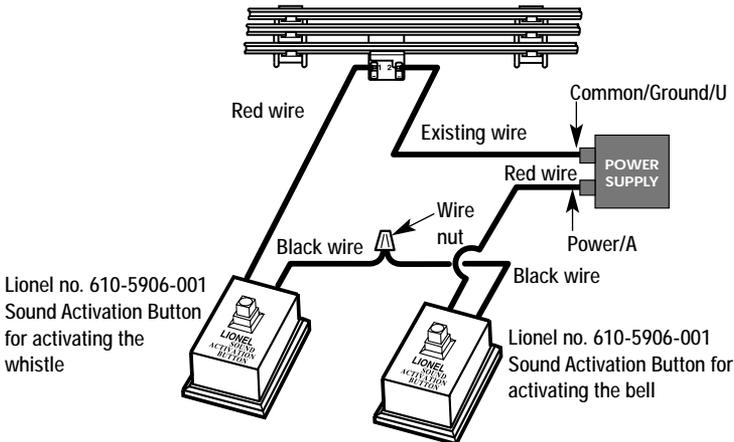
Red wire

Common/Ground/U

Existing wire

POWER SUPPLY

Red wire

Wire nut

Power/A

Black wire

Black wire

Lionel no. 610-5906-001 Sound Activation Button for activating the whistle

LIONEL SOUND ACTIVATION BUTTON

LIONEL SOUND ACTIVATION BUTTON

Lionel no. 610-5906-001 Sound Activation Button for activating the bell

RailSounds 5.0 sound system operations

Activating the CrewTalk dialog and TowerCom announcements in the conventional environment

In the conventional environment, CrewTalk dialog and TowerCom announcements are triggered by short whistle blasts and vary with the state of the locomotive.

- If the locomotive has been stopped for less than 15 seconds, a short whistle blast triggers a "please standby" dialog.

- If the locomotive has been stopped for longer than 15 seconds, a short whistle blast triggers a "cleared outbound" dialog.

- If the locomotive is moving, a short whistle blast triggers an "all clear ahead" dialog.

- If the locomotive is moving with the bell activated, a short whistle blast triggers a "slow to caution" dialog.

RailSounds 5.0 sound system operations

Using the RailSounds 5.0 sound system in the TrainMaster Command Control environment

To access all of the features of the RailSounds 5.0 sound system, you must operate your locomotive in the TrainMaster Command Control environment. The CAB-1 Remote Controller is required to activate features such as TowerCom announcements, CrewTalk dialog, and coupler release sounds. Refer to pages 20-24 to learn how the RailSounds 5.0 sound system is integrated into TrainMaster Command Control operations.

Note! For proper operation of the RailSounds 5.0 sound system during track power interruptions and for the locomotive shutdown sequence, you must install a nine-volt alkaline battery. See pages 10-11.

In the TrainMaster Command Control environment, you will experience all of the features of the RailSounds 5.0 sound system.

- **DynaChuff.** Your locomotive's speed automatically determines the level of chuffing sounds. At low speeds, the chuffing is relaxed. When you highball down the mainline, the chuffing intensity is labored. You may also manually set the chuff sounds to a particular level using your CAB-1 Remote Controller.

- **MultiWhistle.** A different whistle sound at different speeds—a RailSounds 5.0 sound system exclusive.

- **Air horn.** Like the prototype, your locomotive is equipped with air horn sounds.

- **Authentic bell.** Press **BELL** on your transformer to begin the effect, then press **BELL** a second time to discontinue the effect.

- **Squealing brakes.** Press the **BRAKE** button and listen for the squealing of the locomotive's brakes as the locomotive slows down.

- **Coupler release sounds.** Use your CAB-1 Remote Controller to release the ElectroCoupler, and you get the sounds of the coupler opening.

- **CrewTalk dialog and TowerCom announcements.** Use your CAB-1 Remote Controller to trigger conversations between the dispatcher and the locomotive crew. You'll hear "hold for clearance," "cleared for departure," and many other exchanges. See pages 16 and 17.

- **Reverse unit reset sound.** Power down your track, wait three seconds, and listen for the air-release sound—that's the locomotive telling you that its Lionel Command reverse unit has reset to forward.

- **Shutdown sequence.** When you turn off track power, you have two seconds to power up again after you hear the reverse unit reset sound. If you do not restore power, you will hear the realistic shutdown sequence. Because track power is off,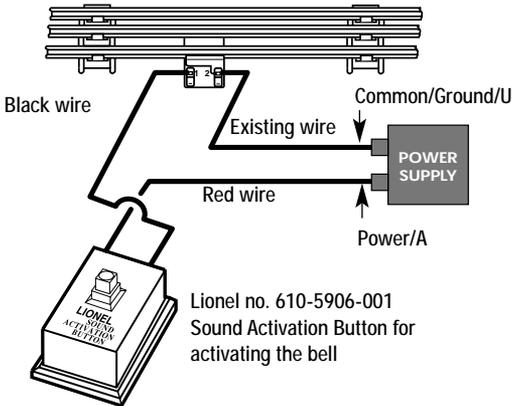 a battery is required for this sequence to function. You may also trigger the shutdown sequence by pressiong **AUX1**,**5** on your CAB-1 Remote Controller.

RailSounds 5.0 sound system operations

Activating the CrewTalk dialog and TowerCom announcements in the Command Control environment

With the RailSounds 5.0 sound system, CrewTalk dialog and TowerCom announcements feature a variety of brief radio conversations between the engineer and dispatcher. All dialog is intelligible, and each comment is followed by at least one automatic response.

CrewTalk dialog is an engineer-initiated radio conversation with the dispatcher. TowerCom announcements are a dispatcher-initiated radio conversation with the engineer. Be sure to listen for the different combinations of words and phrases that comprise these exchanges.

Refer to Table 1 below for the dialog commands. The dialog in the table provides examples of the conversations you can trigger. The actual dialog will vary.

Locomotive	Commands	Example dialog
Stopped	AUX1, 2	Crew: Can we go? Tower: No, please standby
	AUX1, 7	Tower: Stand by for clearance. Crew: Roger.
	2	Crew: Can we go? Tower: Roger, you are clear.
	7	Tower: You are clear for departure. Crew: Roger, we are clear.
	AUX1, 5	Crew: Signing off! Shutdown sequence
Moving	AUX1, 2*	Crew: Train is arriving. Tower: Roger, you are clear inbound.
	AUX1, 7*	Tower: You are clear for arrival. Crew: Roger.
	2	Crew: Are we clear ahead? Tower: You are all clear.
	7	Tower: You are all clear. Crew: Roger.
	AUX1, 5	Tower: Come to an immediate stop. Crew: We are stopping now.
	5	Tower: Slow to caution speed. Crew: Roger, slowing now.

* Activating either **AUX1, 2** or **AUX1, 7** while the locomotive is in motion enables a "train has now arrived" conversation for 15 seconds. If the train stops within this time, pressing **2** or **7** will play this special conversation.

Table 1. CAB-1 Remote Controller dialog commands

RailSounds 5.0 sound system operations

RailSounds 5.0 sound system dialog on a round trip

Refer to Figure 5 for a sample dialog script for the locomotive's round trip.

TOWER-INITIATED DIALOG

AUX1, 7 - "Stand by."
7 - "You are clear."

5 - "Slow to caution speed."
AUX1, 5 - "Come to a full stop."

7 - "Welcome back, stand by."

7 - "All clear ahead."
AUX1, 7 - "You are clear inbound."

ENGINEER-INITIATED DIALOG

AUX1, 2 - "Are we clear?"/" No, stand by."
2 - "Can we go yet?"/"Yes, you are clear."

2 - "Still clear ahead?"/
     "Roger, you are clear."

7 - "We have arrived and
     we are standing by."

AUX1, 2 - "We are arriving,"/
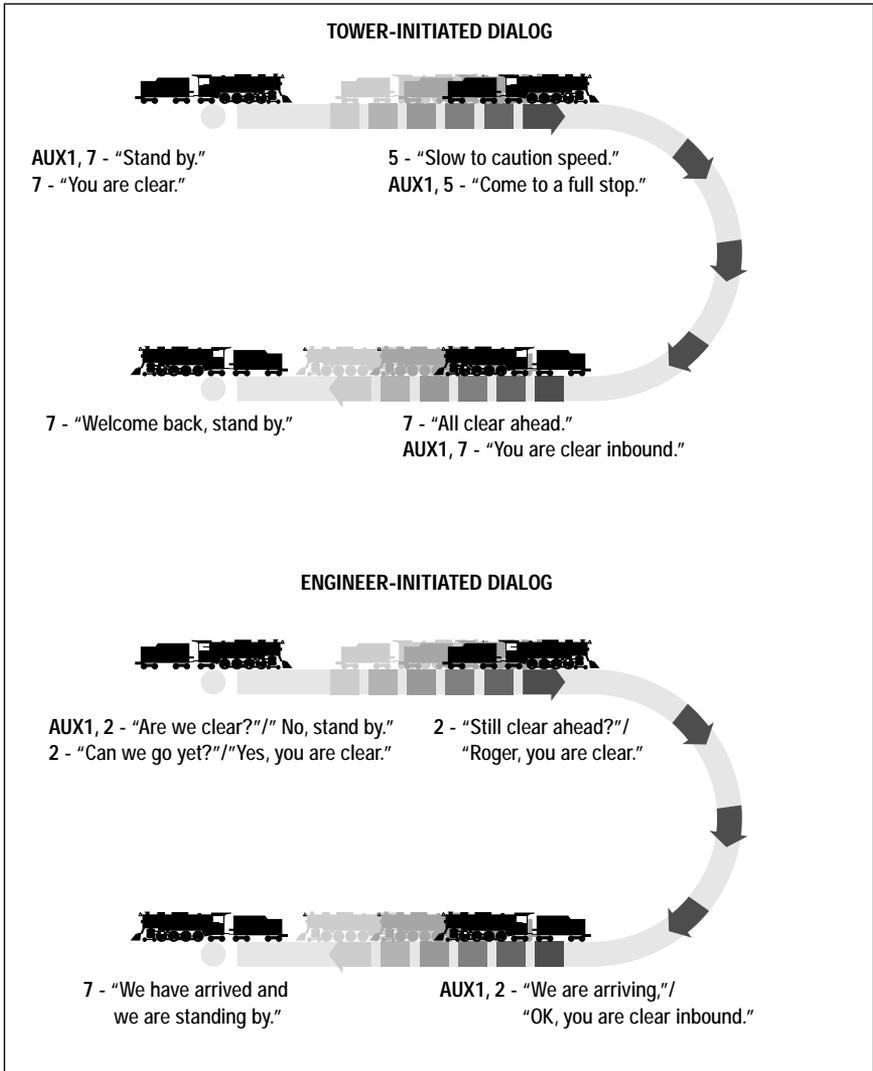   "OK, you are clear inbound."

Figure 5. RailSounds 5.0 sound system dialog on a round trip

Odyssey System operations

Odyssey System operations

The Odyssey System is "cruise control" for your locomotive. Once the speed control is set, your locomotive will maintain a constant speed, no matter what load is placed on the locomotive or what grades you have on your layout. The Odyssey System also allows for extremely slow movement that will amaze any scale enthusiast.

Odyssey System conventional transformer operation

The Odyssey System is automatically operational when you operate your locomotive in conventional (non-Command Control) mode, as long as the Odyssey switch is in the ON position (see Figure 2 on page 7). This means that your locomotive will maintain a constant speed, compensating for grades, loads, and turns. Simply use your transformer's throttle to adjust the speed of your locomotive. If you would like to deactivate the speed control feature, slide the Odyssey switch to the OFF position while the locomotive is not in motion.

Caution! In conventional operation, the lights in both the engine and tender are connected directly to track power. Do not exceed 14-16 volts for extended periods. Doing so will reduce the life of your lamps.

Note! Because of the way that speed control operates in conventional mode, you will notice a slight delay between adjusting your transformer throttle and the change in the speed of your locomotive. If you desire instantaneous response to throttle changes, turn off the Odyssey System.

Odyssey System operations

Odyssey System Command Control operation

When the Odyssey System is activated, changes in the speed of the locomotive will correspond to each signal from the Command Base. For example, when you address the locomotive and slowly turn the throttle knob, the first flash of the red light on the Command Base corresponds to the first speed step, which is the slowest speed of the locomotive. The locomotive will maintain that speed until you increase or decrease the throttle.

In the TrainMaster Command Control environment, you can use your CAB-1 Remote Controller to turn the Odyssey System on or off. The position of the Odyssey System switch (see Figure 2 on page 7) is the Odyssey System default setting when you power up the locomotive. You can override the default setting with the following commands. The override settings will be cleared and the default setting will be restored when you power down the locomotive.

Do not wait longer than two or three seconds between pushing the buttons in each sequence. If the command is not accepted, repeat the sequence.

Note! The locomotive must be in "neutral" when you enable or disable the Odyssey System.

AUX 1 · BRAKE · 7 · BRAKE   Turn off the Odyssey System.

Note! When you press **7**, you will trigger a TowerCom announcement. This has no impact on the Odyssey System function.

AUX 1 · BRAKE · 9 · BRAKE   Turn on the Odyssey System.

Note! When you press **9**, you will activate the Air release sound and turn on the smoke unit (if it was off). This has no impact on the Odyssey System.

TrainMaster Command Control operations

Train Master Command Control is the advanced model railroad control system from Lionel. To operate your locomotive in the Command Control environment, you need a Command Base (available separately, 6-12911) and a CAB-1 Remote Controller (available separately, 6-12868).

Your commands are sent by the CAB-1 Remote Controller to the Command Base, which then translates the command into digital code. That code is sent through the outside rails to your locomotive, which will not respond until it recognizes its unique ID#. TrainMaster Command Control gives you the power to operate multiple Command-equipped locomotives on the same track at the same time.

Keep in mind that track power is like gasoline in the tank of a car—it gives you the power to go places, but it doesn't tell you where to go or how fast to get there.

Operating your locomotive in the Command Control environment

1. **Turn off track power and plug in the Command Base.** Be sure that the Command Base is connected to the outside rail or to the Common/Ground/U terminal on your track power supply.

2. **Place your locomotive on Lionel or Lionel-compatible O-72 or larger track.**

3. **Increase track voltage to full power (no more than 19 volts AC).** On PowerMasters, slide the CMD/CONV switch to CMD. Program Track Power Controllers to Command Control operation.

4. **Press ENG and enter the ID# to address your locomotive with your CAB-1 Remote Controller.** All Lionel locomotives come factory-programmed as ID# 1. To change the ID#, see page 25.

5. **Throttle up and move 'em out!** Your locomotive will respond to every command from your CAB-1 Remote Controller.

TrainMaster Command Control operations

CAB-1 Remote Controller commands

The CAB-1 Remote Controller commands are detailed below. ***The corresponding RailSounds sound system effects are in bold italic type.***

COUPLER F ***Coupler release sound.***

COUPLER R Releases the rear coupler.
Coupler release sound.

AUX 1 Activates the numeric keypad.
Short steam release sound.

AUX 2 Toggles the headlight on and off.

Accelerates the locomotive with a clockwise rotation. Decelerates the locomotive with a counter-clockwise rotation. ***Speed-dependent chuffing sounds. DynaChuff dynamic chuffing effect.***

WSTL / HRN Activates the locomotive's whistle. Release the button to discontinue the sound. ***MultiWhistle steam whistle sound.***

BELL Toggles the bell sound on and off. ***Bell sound.***

DIR Changes the locomotive's direction. The locomotive decelerates to a stop and continues in the opposite direction when you increase the throttle. ***Air release sound.***

BOOST Increases the locomotive's speed while the button is pressed. Release the button to return to the initial speed.
Labored chuff.

BRAKE Decreases the locomotive's speed while the button is pressed.
Squealing brake sounds.

Shuts down all PowerMasters on your railroad. Stops all TrainMaster Command Control-equipped locomotives in operation. Use **HALT** only in emergency situations.
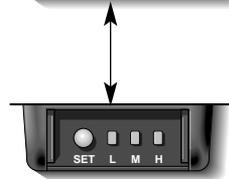
See page 24 for the momentum settings.

21

TrainMaster Command Control operations

CAB-1 Remote Controller numeric keypad commands

When you press the **AUX1** button on your CAB-1 Remote Controller, you turn the numeric keypad into ten command buttons. These commands are specific to your locomotive, and an overlay is included to help you learn these functions. After you press the **AUX1** button, you will be able to press any numbered button until you address a different product. ***The corresponding RailSounds sound system effects are in bold italic type.***
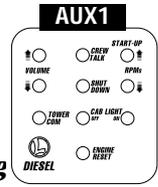
0 Stops and resets the locomotive. Resets the locomotive's direction to forward. Resets the RailSounds 5.0 sound system to Automatic Chuff Mode. ***Air release sound.***

1 Raises the volume of the chuffing and boiler sounds. ***Sound volume increases.*** The whistle, bell, CrewTalk dialog, and TowerCom announcements will play at full volume. Use the volume control knob located under the hatches on top of the tender to adjust the volume.

2 Engineer begins radio dialog. The RailSounds 5.0 sound system will often use different words and phrases when composing the conversation. See pages 15-16 for additional information. ***CrewTalk dialog commences.***

3 Starts the RailSounds 5.0 sound system if the locomotive was previously shutdown. Triggers the water pump sounds. Activates Manual Chuff Mode (see page 23) to set the chuff intensity manually. ***Water injector sounds.***

4 Lowers the volume of the background effects. ***Sound volume decreases.*** The whistle, bell, CrewTalk dialog, TowerCom announcements, and other user-controlled effects will play at full volume. Use the volume control knob located under the hatches on top of the tender to adjust the maximum volume of all effects.

5 Activates the steam locomotive shutdown sequence. If the locomotive is in motion, an "emergency stop" dialog will play. If the locomotive is at rest, the engineer will sign-off. ***Dialog and shutdown sequence.***

6 Activates Manual Chuff Mode (see page 23) to set the chuff intensity manually. ***Air horn sound.***

7 Dispatcher begins radio dialog. The RailSounds 5.0 sound system will often use different words and phrases when composing the conversation. See pages 15-17 for additional information. ***TowerCom announcement.***

8 Turns off the smoke unit. ***Let-off sound.***

9 Turns on the smoke unit if the smoke unit switch is in the ON position. Be sure to add smoke fluid before turning on the smoke unit to prevent damage to your locomotive. ***Let-off sound.***

Note! **AUX1**, **8** and **9** function only if the locomotive's smoke unit switch is in the ON position.

TrainMaster Command Control operations

Tuning your locomotive's performance

TrainMaster Command Control allows you to fine-tune the performance of your locomotive. Use your CAB-1 Remote Controller to make these adjustments.

Note! These settings will be lost if you assign a new ID#.

Chuff intensity

Your locomotive is equipped with DynaChuff, the realistic steam chuffing sounds produced by the RailSounds 5.0 sound system. Your locomotive's chuff rate is always synchronized with the drive wheels and the speed of the locomotive. The chuff intensity is also capable of varying automatically with the speed of the locomotive in automatic chuff mode. You may also choose to set a constant, or fixed, chuff intensity in manual chuff mode. There are 15 chuff intensity levels.

Automatic chuff mode

When you first throttle up, the intensity of the chuff sounds will vary with adjustments to the throttle. When you stop the locomotive for two seconds or more, the sounds will return to their initial intensity.

The initial chuff intensity simulates the sounds of the locomotive pulling a heavy string of cars. Keep in mind that you may choose to reduce the initial intensity of the chuff sounds to simulate a lighter load on the locomotive by pressing the **BRAKE** button while your locomotive is at rest. This will reduce the initial chuff intensity to the lowest level.

Manual chuff mode

Manual chuff mode allows you to set a constant chuff intensity for your locomotive. The intensity of the chuff sounds does not vary with the throttle settings or the speed of the locomotive.

To set a constant chuff intensity, get your locomotive moving, then press **AUX1**, **3** or **AUX1**, **6** to enter manual chuff mode. The locomotive will be locked at the current chuff intensity. To adjust this chuff intensity, press **3** to increase the intensity of the chuffing or press **6** to decrease the intensity of the chuffing. The locomotive will save this intensity level.

If you press **AUX1**, **3** while the locomotive is at rest, the chuffing will be set to the maximum intensity. If you press **AUX1**, **6** while the locomotive is at rest, the chuffing will be set to the lowest intensity. Once the locomotive is in motion, you may use the **3** and **6** buttons to increase and decrease the intensity of the chuff sounds.

When you press **AUX1**, **3** or **AUX1**, **6**, you have a ten-second "window" to adjust the chuff intensity. During this time, the water injector (**3**) and the steam blow-down (**6**) sound will not be triggered by the **3** and **6** buttons. After ten seconds, the **3** and **6** buttons will be reassigned to activate the sounds. To adjust the chuff intensity after the ten seconds have elapsed, simply press **AUX1**, **3** or **AUX1**, **6** again.

To exit manual chuff mode, turn off track power and allow the locomotive to reset, enter the shutdown sequence (**AUX1**, **5**) or reset the locomotive (**AUX1**, **0**).

Note! The water injector sounds (**3**) and the air horn sounds (**6**) are inactive during the first ten seconds of entering manual chuff mode. These sounds are restored after the ten seconds have elapsed. If you wish to adjust the chuff intensity again, press **AUX1**, **3** and **AUX1**, **6** to open another ten-second programming "window".

TrainMaster Command Control operations

Tuning your locomotive's performance (continued)

Volume

The RailSounds 5.0 sound system gives you greater control over the volume of your locomotive's sounds. Pressing **AUX1**, **1** raises the volume of the chuffing and boiler sounds, and **AUX1**, **4** lowers the volume. There are nine volume levels.

Note! The volume level you set will be saved and restored upon power-up. Press **AUX1**, **1** and **4** to adjust the volume.

The whistle, bell, CrewTalk dialog, and TowerCom announcement sounds play at full volume, regardless of the settings entered with the CAB-1 Remote Controller. To adjust these sound levels, use the volume control knob found under the hatches on the tender.

Momentum

The TrainMaster Command Control momentum feature simulates the labored performance of a locomotive pulling a light, moderate, or heavy load. Press **L**, **M**, or **H** (located under the removable panel on the CAB-1 Remote Controller) to adjust the momentum setting. If you select the high momentum setting, you will find that the locomotive increases and decreases its speed slowly to simulate the weight of the train. For quicker response to your commands, press **L**, which is the factory default setting. You locomotive will keep this setting until it is changed.

Adjusting the speed

The **BRAKE** and **BOOST** buttons give you incremental control of you locomotive's speed while you press and hold these buttons, allowing you to make small, gradual adjustments around curves and over grades. The locomotive will resume its initial speed when the buttons are released. Listen for the squeal of your locomotive's brakes when you use the **BRAKE** button.

Setting the maximum speed (high voltage)

You may use your CAB-1 Remote Controller to set your locomotive's maximum speed. This will prevent the locomotive from derailing as a result of excessive speed.
1. With the Command reverse unit switch in the RUN position, address your locomotive by pressing **ENG** and entering the ID#.
2. Press **SET** on the CAB-1 Remote Controller. The headlight will flash.
3. Get your locomotive moving at your desired maximum speed.
4. Press **BOOST**.
   The maximum voltage has been set. To clear this setting, press **SET** and then **BOOST**, holding each button for one second.

Setting the minimum speed (stall voltage)

You may use your CAB-1 Remote Controller to set your locomotive's minimum, or stall, speed.
1. With the Command reverse unit switch in the RUN position, address your locomotive by pressing **ENG** and entering the ID#.
2. Press **SET** on the CAB-1 Remote Controller. The headlight will flash.
3. Get your locomotive moving at your desired minimum speed.
4. Press **SET** again. The locomotive will stop.

The next time you throttle up, your locomotive will start at the speed you set. To clear this setting, press **SET** twice, holding the button for one second each time.

Note! These settings will be lost when you assign a new locomotive ID#.

TrainMaster Command Control operations

Assigning your locomotive a new ID#

As your roster of TrainMaster Command Control-equipped locomotives grows, you will want to give each unit a unique ID#. The locomotive will respond to commands associated with its ID# while all other units will disregard these commands.

Note! To restore your locomotive's functions, see page 26.

1. Slide the Command reverse unit switch on your locomotive to the PROGRAM position.

2. Place the locomotive on the track.

3. Connect the Command Base and plug it in.

4. Power up the track.

5. Press **ENG**.

6. Enter the unique ID#. Choose any number from 1 to 99 that has not been assigned to another locomotive (**ENG**). We recommend using a part of your locomotive's cab number.

7. Press **SET**. The locomotive's whistle will sound, or the headlights will flash if the RailSounds sound system is off.

8. Slide the Command reverse unit switch back to the RUN position.

   The locomotive's ID# has been set. Be sure to record the new ID# for your reference.

TrainMaster Command Control operations

Reprogramming your locomotive to restore features

If your locomotive is unresponsive to your commands in the TrainMaster Command Control environment, we recommend that you follow this procedure to reset your locomotive. All factory default settings will be restored when you reprogram the locomotive.

1. Slide the Command reverse unit switch to the PROGRAM position.

2. Plug in and connect your Command Base.

3. Place your locomotive on the track, then power up the track.

4. Press **ENG** and enter the locomotive's ID#.

5. Press **SET**.

6. Press **ENG** and enter the locomotive's ID# again.

7. Press **AUX1**.

8. Enter **74** for this particular locomotive.

9. Turn off track power and wait ten seconds.

10. Slide the Command reverse unit switch back to the RUN position.

At this point, your locomotive has been reset. Restore power to the track and operate the locomotive as usual. Be sure to use the ID# entered in Step 4.

Maintaining and servicing your locomotive

Adding fluid to your locomotive's smoke generator

Your locomotive is equipped with a smoke generator that produces a safe, clean, white smoke during operation. In order to function, the smoke generator requires the periodic addition of Lionel smoke fluid. A small bottle of smoke fluid is included with your locomotive.

To add smoke fluid, press down and unscrew the cap of the smoke fluid bottle, then add 10 to 15 drops of fluid into the stack of your locomotive. It is easier to add smoke fluid if your locomotive is powered down or the smoke unit is off. Power up your locomotive with the smoke unit switch in the ON position, and smoke production will start momentarily. Smoke production will start faster if you operate your locomotive at higher speeds. Smoke production is greatest at high voltages and when the locomotive pulls a heavy load. When smoke production decreases, add four to eight additional drops of smoke fluid.

When the smoke unit switch is in the ON position, always keep a small amount of smoke fluid in the smoke unit. Operating your locomotive's smoke unit without smoke fluid will cause damage to the heating element.

If you prefer to operate your locomotive without smoke, locate the smoke unit switch on the underside of the locomotive and slide it to the OFF position. Refer to Figure 2 on page 7 for the location of this switch.

In the TrainMaster Command Control environment, press **AUX1, 8** on your CAB-1 Remote Controller to turn off the smoke unit. To turn on the smoke unit, be sure that the smoke unit switch is in the ON position, then press **AUX1, 9**.

Caution! Always operate your locomotive's smoke unit with the addition of smoke fluid to prevent damage to the heating element.

Maintaining and servicing your locomotive

Lubricating your locomotive

Help your Lionel locomotive lead a long and productive life on your railroad by maintaining it properly. To keep your locomotive lubricated, we recommend that you purchase a Lionel Lubrication and Maintenance Kit (6-62927), available from your authorized Lionel dealer.

When you find that the lubrication points illustrated in Figure 7 appear dry, lubricate your locomotive after you have removed any accumulated dirt and dust. There are two basic rules to keep in mind when you are lubricating your locomotive: use only a small amount of lubrication and avoid getting grease or oil on your locomotive's wheels, roller pick-ups, or the track.
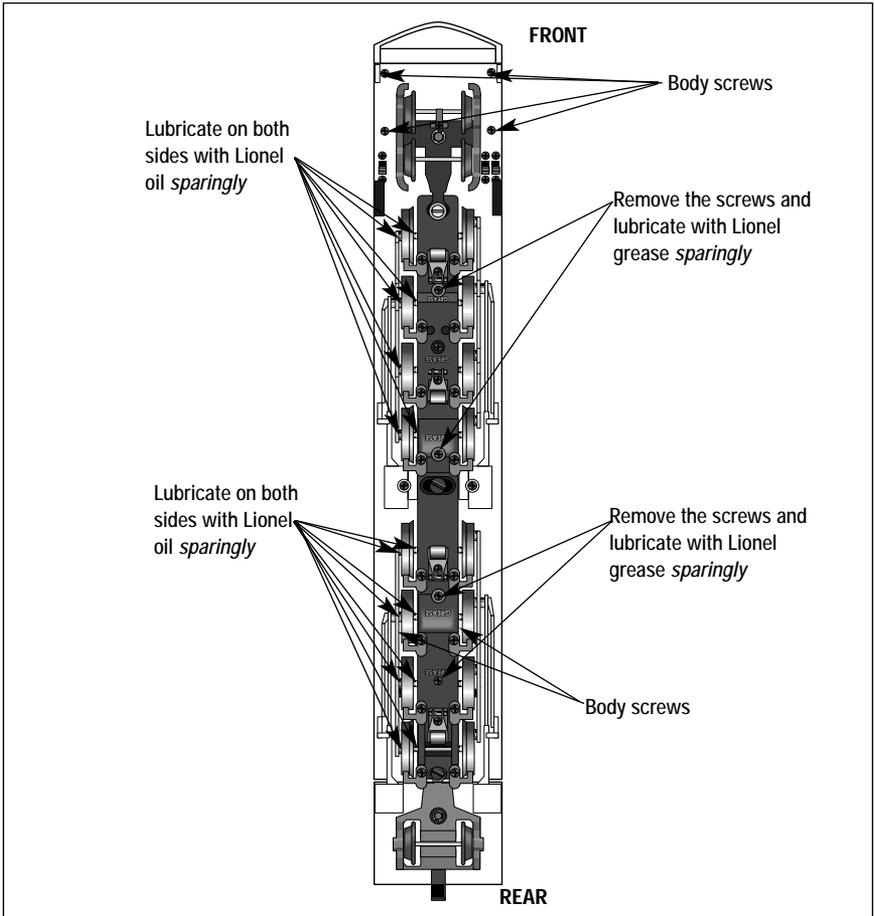

Figure 7. Lubrication points

Maintaining and servicing your locomotive

Maintaining your locomotive's handrail antennas

The handrails on your locomotive are the antennas that receive the digital communication from the Command Base. For optimum reception, the handrails have been insulated from the die-cast body. Please handle the locomotive carefully to avoid handrail damage. The handrails should not touch the locomotive's body.

If your locomotive appears to have problems receiving communications from the Command Base, be sure that the ends of the handrails are insulated from the body with either an insulating washer or handrail stanchion.

Servicing your locomotive's lamps

Note! Before changing the lamps in your locomotive, be sure to check that the **AUX2** command was not used to turn off the front headlight.

Your locomotive is illuminated by several lamps. One is located in the headlight housing on the front of the cab. Two white lights (one assembly) illuminate the cab-front number boards. During the course of normal operations, they may require replacement.

Removing the body screws as shown on page 28 will allow access to the inside of the cab and the expired lamps. However, due to the close fit of many components and the inter-connected wiring, we recommend that you take your locomotive to your authorized Lionel Service Center for any required lamp replacement.

> Lamp Numbers:
> Headlight (1)   620-8029-300
> Number boards (1 assembly)   630-8071-300

Note! The green front classification lights are LEDs (light emitting diodes), and are not user serviceable. They can be replaced by your authorized Lionel Service Center if it is ever required.

Maintaining and servicing your locomotive

Replacing your tender's lamp

Your tender's back-up light and the two red marker lights are LEDs. These LED are expected to last for the life of the locomotive. The LED is not user serviceable. See your authorized Lionel Service Center if service becomes necessary.

Maintaining and servicing your locomotive

Replacing the traction tires

Two of the locomotive's drive wheel are equipped with rubber traction tires to increase the tractive effort of your locomotive, allowing it to pull more cars.

During the course of normal operations, the traction tires may become worn out. Replacement traction tires (Lionel part no. 600-0242-206) are included with your locomotive. Follow these steps to replace a worn traction tire.

1. Unscrew the drive rod nut from the wheel using a 3/16" nut driver.
2. Slip off the old traction tire and remove it from under the drive rod.
3. Stretch the traction tire around the wheel.
4. Reinstall and tighten the drive rod nut.

Installing the O gauge front coupler

A fixed O gauge coupler is included with your locomotive for those who wish to "double-head" their trains with a second Cab Forward or another locomotive. Follow these steps to install the coupler.

Note! If you are double-heading your train with two locomotives in the conventional environment, we recommend that you turn off the Odyssey System.

1. Straighten the wire pin that runs through the scale coupler using a pair of needle-nose pliers.
2. Remove the screw that secures the scale coupler to the frame using a Phillips screwdriver.
3. Slide the scale coupler out of the frame and insert the O gauge coupler. We recommend that you store the scale coupler in a safe place.
4. Replace the screw to secure the coupler in place.

Limited Warranty/Lionel Service

This Lionel product, including all mechanical and electrical components, moving parts, motors and structural components, except for light bulbs, is warranted to the original consumer-purchaser, for **one year** against original defects in materials or workmanship when purchased through an authorized Lionel merchant.

This warranty does NOT cover normal wear and tear, light bulbs, defects appearing in the course of commercial use, or damage resulting from abuse or misuse of the product by the purchaser. Transfer of this product by the original consumer-purchaser to another person voids this warranty. Modification of this product voids this warranty.

Any warranted product which is defective in original materials or workmanship and is delivered by the original consumer-purchaser to Lionel L.L.C. or an authorized Lionel L.L.C. Service Center, together with proof of original purchase will, at the option of Lionel L.L.C., be repaired or replaced, without charge for parts or labor. In the event the defective product cannot be repaired, and a replacement is not available, a refund of the original purchase price will be granted. Any products on which warranty service is sought must be sent freight or postage prepaid, as transportation and shipping charges are not covered by the warranty.

In no event shall Lionel L.L.C. be 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 limited 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 L.L.C. product is required, bring the item, along with your dated sales receipt and completed warranty information to the nearest Authorized Lionel Service Center. Your nearest Lionel Service Center can be found by calling 1-800-4-Lionel, or by accessing our Website at www.lionel.com.

If you prefer to send your product back to Lionel L.L.C. for repair in Michigan, you must first call 586-949-4100 or FAX 586-949-5429, or write to Customer Service, P.O. Box 748, New Baltimore, MI 48047-0748, stating what the item is, when it was purchased and what seems to be the problem. You will be sent a return authorization letter and label to ensure your merchandise will be properly handled upon receipt.

Once you have received your return authorization and label, make sure that the item is packed to prevent damage during shipping and handling. We suggest that you use the product's original packaging. This shipment must be prepaid and we recommend that it be insured.

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 our Authorized Lionel Service Centers after its warranty has expired. A reasonable service fee will be charged.

Warranty Information

Please complete the information below and keep it, along with your dated sales receipt. You must present this and your dated sales receipt when requesting warranty service.

Name _____

Address _____

Place of Purchase _____

Date of Purchase _____

Product Number _____

Product Description _____