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***Lionel***  
***CAB-1L & BASE-1L***  
***Owner's Manual***

## **Welcome to LEGACY command control**

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**T**he CAB-1L is the simple way to start operating in the LIONEL LEGACY Command Control environment – and an economical way to add operators when running trains with friends! Whether you want to access the basic features of the LEGACY control or operate our older TrainMaster command control (TMCC1) equipment, the CAB-1L remote controller allows you to walk around your layout while controlling your trains. The Base-1L receives signals from the remote and sends your commands across the layout.

If you already have a LEGACY Base (6-14295), you can simply add one or more CAB-1L remotes to your existing LEGACY layout—no need for the Base-1L. If you are looking to get started with the LEGACY Control System, the combination of CAB-1L and Base-1L are an affordable way to start unlocking many of Lionel's celebrated features. Only one Base (either the LEGACY Base or the Base-1L) should be used on a layout.

You may use a combination of LEGACY CAB-2 and CAB-1L remotes with a single LEGACY Base. However, only CAB-1L's may be used with the Base-1L.

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# ***Introduction***

## **Using this manual**

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**W**e designed this manual to give you more than just a solid start in command control. There's detailed discussion as you learn more, so you'll find plenty of helpful information, no matter what your level of expertise.

Getting started is easy. Just go section by section. For additional information, refer to smaller-print sections marked *Detail*.

**Example** Most important are the *Example* boxes. Each is designed to make learning TrainMaster Command quick and easy. Read the text, then press the button commands listed in the Example. Before you know it, you'll be operating locomotives, switches, and accessories from CAB-1L's keypad like a pro.

There's even a glossary to define the terms covered in the manual. If a word or concept is new to you, look it up. The index helps you locate subjects by referencing key words.

Go through each example step by step, repeating the commands. You can't "hurt" the system by pressing the wrong button. The LEGACY Control System is more than just a sophisticated way of operating Lionel trains — it's also a rugged example of modern technology.

The only rule: *have fun*.

## **Preparing your railroad for TrainMaster Command**

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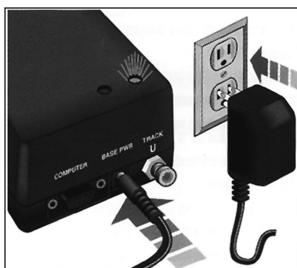
**A**ny three-rail, alternating current-powered model railroad can become a LEGACY railroad. Before you install the Command Base-1L, do these things.

First, make sure there are no short circuits *anywhere* on your railroad. Second, make sure all power supplies are in phase. Finally, consider the power requirements for everything connected to the track: switches, bulbs, operating cars, illuminated cars, and more.

TrainMaster Command operates on constant, high voltage, so some bulbs may burn out prematurely. If they do, replace them with 18-volt bulbs. Remove or disconnect items you believe may not benefit from constant voltage.

# Command Base

## Installing the Command Base



Plug the power supply's cable into the Base-1L's power input, then plug the power supply into a properly grounded wall outlet (110 volts, 50/60 cycles).



Connect a wire between the Command Base's binding post and the common (U) terminal on all transformers powering your track. You can also connect the wire between the Base-1L and the outside rail of your track. (Connect the wire to both outside rails if you use hi-rail track.)

**Y**ou need a CAB-1L remote to operate the Command Base-1L. (The CAB-2 won't work with Base-1L. However, you can mix CAB-1L and CAB-2's on the same layout by using a LEGACY Base.)

To install the Command Base-1L, plug the power supply power cable into the Base input. Plug the power supply into a standard wall outlet (110 volts, 50 or 60 cycles). The outlet must be properly grounded. The Base-1L's top-mounted green light will illuminate. The Command Base-1L doesn't have an on/off switch, so you may leave it on at all times. If you prefer to turn it off after operating sessions, use a power strip with a circuit breaker and on/off switch. Doing so lets you electrify all transformers and the Command Base at once.

**Note!** COMMAND BASE POWER SUPPLY. Do not use the Command Base's power supply to power any other device. Its three-prong plug is unique.

Next, connect a wire between the Command Base binding post and the common (U) terminal on all transformers powering your track. Or, connect the wire to your track's outside rail at any convenient location. *You've just installed The LEGACY Control System on your railroad.*

Be sure the outside (common) rail is electrically continuous throughout your entire layout—this enables unimpeded communication around the track plan. If your layout has block control, make sure only the center (or "hot") rail is insulated with insulating pins at block boundaries. Insulating both outside rails at block boundaries will obstruct the Command Base's signals.

**Hint!** **Be sure the Command Base-1L is ON before you place your Command Control-equipped locomotive on track. Then bring up track power.** When the Base-1L is ON, your Command-equipped Lionel locomotives instantly know they're on a LEGACY railroad. If the Base-1L is OFF, the locomotive will operate like an ordinary engine when power is applied.

# Setting the communication channel

## CAB-1L & Base-1L radio channel selection

---

The CAB-1L communicates with the Base-1L at a frequency of 2.4 GHz. Within this band, there are nine distinct channels available for your use, the default channel is 1. Chances are, channel 1 will be fine for your layout and you'll have no need to change channels on your system.

However, the 2.4 GHz frequency spectrum is also used by WiFi, cordless phones and various other devices you may have near your layout. If you are having trouble maintaining reliable communication between your Lionel remote and layout, experiment with different channels following the instructions shown here.

### Note!

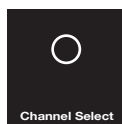
Remember that all your remotes must be set to the same channel number as your Base (this is true for Base-1L as well as the LEGACY Base). To see or change the current channels on CAB-2 and LEGACY Base, refer to the owner's manual for those products.

### Hint!

When changing channels, first change your BASE-1L to the desired channel, then change the CAB-1L to match.

### Start by selecting the radio channel for Base-1L:

1. Press the button on the side of the Base-1L once. The Base's green LED will blink up to nine times, which indicates the current channel number. After a pause the blink pattern repeats. It will do this for a couple of minutes, and then return to normal operating mode unless the button is pressed again.
2. While the Base-1L is blinking its channel number, pressing the button a second time changes the current radio channel to the next higher frequency. Keep pressing the button until the desired radio channel is reached, as indicated by the blink pattern. Immediately proceed to the next step (see next page), and change the radio channel selection for your CAB-1L. Once that is done, the channel blinking pattern on your Base-1L will cease.



## Setting the communication channel

### CAB-1L & Base-1L radio channel selection (continued)

#### *Then Select the radio channel for CAB-1L:*

1. Remove the sliding cover over the SET key at the bottom front of the CAB-1L.
2. Hold down the SET key and press a number key (1 - 9) to pick the radio channel to transmit on.
3. The speaker will beep to give feedback when the channel is configured, either one beep if a base responds, or three beeps if no base responds. The new channel number will be saved.

Both types of beeps mean that a channel has been configured, but if there happens to be a base in range when the channel is set, then the one beep signal means that communication has been established with the base. Three beeps means that no base responded when test commands were transmitted by the CAB-1L during channel configuration. If this happens when a base is within range, then it may be that the base is set to a different channel than the one you just selected for your CAB-1L (see Base-1L channel selection).

Once you've heard the "single-beep" confirming your CAB-1L has connected to a Base (either Base-1L or LEGACY Base) you're all set. You can further confirm communication is working by turning the throttle or pressing a button on your remote. The red LED on your base should illuminate in response to incoming commands.

#### **Note!**

Once you start this process, make sure to change all remotes to the new channel assignment!



# Command-equipped locomotives

## Programming ID#s for your Command-equipped locomotives

**Example** Assign an engine ID# to Santa Fe 2343 on Track #1

**Command Base ON, track power off**

**Slide the locomotive PROGRAM/RUN switch to PRG/PROG/PROGRAM**

**Place locomotive on track**

**Turn track power on**

**Set TMCC ID to Engine #23:**



**Press ENG**



**Press 23 (the ID#)**



**Press and release the SET (under removable front panel at the bottom-front of your CAB-1L)**

**Hear horn/whistle sound (or see the headlight flash)**

**Slide the switch back to the RUN position.**

**Your engine remembers its ID# forever; change it any time—just repeat these steps**



Every Command-equipped locomotive comes factory-programmed with TMCC ID Engine #1. You may wish to assign a new ID#, using any number from 1 through 98 (do not use engine 99, as this is the universal ID# that all LEGACY-equipped locomotives will respond to). To make it easy to remember, try using part of the locomotive cab number. For example, ID your Lionel F3 no. 2343 to "#23" or "#43." We use 23 in our example.

Here's how to give a Command-equipped locomotive its new ID#. Make sure the Command Base-1L is ON. Refer to the Command-equipped locomotive owner's manual(s) for PROGRAM/RUN switch locations. Holding the locomotive, slide its control switch to the PRG, PROG or PROGRAM setting. Place the locomotive on track and power up your railroad.

Using CAB-1L, press ENG, the ID# (any number 1 to 98), then press and release the SET button located under the removable panel on CAB-1. Hear the horn or whistle blow, or the headlight flash. This confirms your new ID #. Slide the switch back to RUN and you're ready to go.

Want to change your locomotive's ID#? Just repeat these steps *any time*.



# Command-equipped locomotives

## Addressing locomotives

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### **Example** Address Engine #23



Press ENG



Press 23 (the ID#)

Throttle up or press any comand button

To operate a Command-equipped locomotive, press **ENG** and its ID# on CAB-1. Turn the throttle or press any command button; the sound system starts up (equipped locomotives) and the engine is ready to begin operations.

## Activating whistle quilling on LEGACY locomotives (optional)

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The Quilling Whistle is a key feature of LEGACY locomotives. “Quilling” allows you to continuously vary the intensity of the whistle, creating your own unique signature sound. But by default, CAB-1L sends TMCC style horn commands in order to be compatible with non-LEGACY locomotives. Because LEGACY locomotives respond to these older commands, too, you’ll still hear horn or whistle sounds, but you won’t be able to quill.

To set Quilling horn/whistle for one engine or train ID:

1. Remove the sliding cover to expose the SET key at the bottom-front of the CAB-1L.
2. Select a current engine or train in the usual way by pressing either ENG and enter the ID# or TR and enter the ID#.
3. Hold down the SET key and press the WSTL/HRN key to toggle the whistle configuration between TMCC1 and LEGACY style for the current engine or train. The CAB-1L will beep once if the TMCC1 whistle style is selected, or it will beep twice if the LEGACY quilling whistle is selected instead.

Repeat this process for each LEGACY locomotive ID. Note that this horn setting for engines and trains is saved internally within the CAB-1L itself. This means that if more than one CAB-1L is being used on your layout, each one must be programmed to set the horn style for a given engine or train.

### **Note!**


Remember that older TMCC1 locomotives don’t support quilling and won’t sound at all in response to LEGACY quilling commands. If an engine stops responding to the WSTL/HRN button, but its bell is working correctly, change back to TMCC1-style whistle for that particular Engine ID and all will be well.

## Command-equipped locomotives

### Sending basic commands to locomotives with CAB-1L


*The corresponding RailSounds sound system effects are in bold italic type.*


Some locomotives may not support all listed features.


 Opens your locomotive's front coil coupler (equipped locomotives). ***Coupler release sound.***


 Opens your locomotive's rear coil coupler (equipped locomotives). ***Coupler release sound.***

 Toggles the locomotive's headlight on and off.


 Controls the speed of your locomotive. Turn the **THROTTLE** to the right to accelerate, to the left to decelerate. There is no “stop.” If you don't press a button or turn the throttle for 30 seconds, CAB-1L goes into battery-saving “sleep” mode. Turn the throttle or press any button to “wake” it up.

 Activates the locomotive's horn or whistle as long as you hold the button. ***Steam whistle or diesel horn sound.***

 Press **BELL** to activate the bell, again to discontinue. ***Steam bell or diesel bell sound.***

 In command control, **DIR** operates differently than in conventional Lionel operations. Press **DIR**—the locomotive decelerates to complete stop; turn the throttle up, and the locomotive will accelerate in the new, opposite direction. **THERE IS NO NEUTRAL.** ***Steam or diesel letoff sound.***

 Press and hold **BOOST** for extra power. Release **BOOST** and your locomotive returns to its previous speed. ***Labored chuff sound, fuller diesel prime mover.***

 Press and hold **BRAKE** when you want to slow down or stop. Release **BRAKE** and your locomotive returns to its previous speed. ***Squealing brake sounds. Coasting chuff, quieter prime mover.***

 Press **HALT** for emergency stops only. **HALT** stops all Command-equipped locomotives in action and shuts down all remotely-controlled track power transformers.



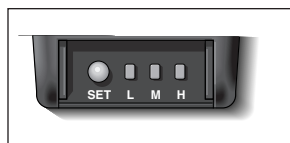
# Command-equipped locomotives

## Tuning your locomotive's performance

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### SETTING MOMENTUM

The LEGACY system's momentum feature simulates the labored performance of a real life locomotive pulling a heavy load. Press **L**, **M**, or **H** (located under CAB-IL's removable panel) for light, medium, or heavy momentum. The locomotive remembers this setting until you change it. For normal (quick) locomotive response, press **L**.



Get a feel for the difference in momentum settings. Select **L**, **M**, or **H**. Turn your throttle slightly and wait a few seconds for the locomotive to respond.

Note that on LEGACY/TMCC2 locomotives, **L**, **M** and **H** settings change the number of individual speed steps your locomotive supports. A setting of **L** gives 32 speed steps, **M** yields 100 speed steps and **H** provides 100 speed steps with added momentum.

### SETTING STALL

Make your locomotive feel more responsive with stall (this tip is especially applicable to Pulmor-powered TMCC locos). Get your locomotive moving and press **SET**; the locomotive will stop. Turn the throttle clockwise to get the engine moving, then decrease speed until the locomotive just stops. Press **SET** again. *Even if your locomotive doesn't move after turning the throttle, just press **SET** again. Stall will be set.* Your locomotive remembers the stall setting until you change it. To clear stall, press **SET** twice, holding it for one second each time.

**Detail** STALL EXPLAINED. Set a command-equipped locomotive's stall, and it skips from zero power to stall when you turn the throttle. Stall eliminates unnecessary throttle rotation—making your locomotive more responsive.

**Note!** Not all engines support Stall.

# Command-equipped locomotives












## Sending numeric commands to locomotives

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When you address a locomotive and press any non-numeric button such as **AUX1**, you enable 10 numeric command buttons. Turning the throttle or entering more than two digits for a locomotive address will also enable numeric commands. The numeric keypad issues commands listed below until you press any top-row button (SW, ACC, RTE, TR, or ENG).



**The corresponding RailSounds sound system effects are in bold italic type.**

-  Halts and resets a locomotive. Resets direction to FORWARD or the control switch's direction setting. **Blows whistle or horn.**
-  Raises the volume in RailSounds-equipped locomotives. **Sound volume increases.**
-  Dialog scene—engineer speaks first. Scene varies in motion vs. stop, optional leading AUX-1.
-  Raises the RMP level in RailSounds--equipped diesel locomotives. Starts up RailSounds in any currently addressed locomotive. **RPMs increase. Steam blowoff. Startup sequence commences.**
-  Lowers the RPM level in RailSounds-equipped locomotives. **Sound volume decreases.**
-  When stopped, activates shutdown sound in RailSounds equipped locomotives. Horn/whistle, bell, and RPMs will not sound until you restart RailSounds by pressing 3. (In motion, triggers dialog scene). **Steam or diesel shutdown sequence commences and/or dialog.**
-  Lowers the RPM level in RailSounds-equipped diesels. RPMs decrease. Steam letoff.
-  Dialog scene--dispatcher speaks first. Scene varies in motion vs. stop, with or without leading AUX-1.
-  Smoke OFF **Air-release.**
-  Smoke ON (see note below). **Air-release.**
-  Turns headlights on and off.

# Command-equipped locomotives

## Adjusting locomotive's smoke level

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**Example** To adjust the smoke output level to Medium



Press AUX1



Press AUX2



Press 9



Press M



Press AUX2

**So set smoke to Low or High, simply substitute the L or H in place of the M key-press above.**

Sound and smoke effects of the engine can be trimmed higher or lower depending on your operating preference.

# Switches

## Controlling switches with CAB-1L

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### **Example** To throw Switch #1 to “out”



Press SW



Press 1



Press OUT

Switch #1 is now curved or “out”

### **Example** throw Switch #12 to “through”



Press SW



Press 12



Press THROUGH

Switch #12 is now curved or “through”

Once you've programmed switch ID numbers (refer to the manual that came with your switch controller for this procedure), you can operate any TMCC remote-controlled switch using CAB-1L.

### **Hint**

SWITCH SHORTHAND. After addressing a “switch”, you can immediately address another switch simply by entering its ID#—you don't have to press SW again. This is so until you press another address button (ACC, RTE, TR, or ENG).

## Notes on AUX1 and AUX2 definitions

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As you'll notice in these sections on switch and accessory control, the AUX1 and AUX2 buttons on CAB-1 gain new meaning. For switches, they are defined as “through” and “out,” respectively. When it comes to accessories, they have even more (and different) functions.

AUX1 and AUX2 are multi-definition buttons. Their definitions depend on which top-row address button (ENG, SW, ACC, etc.) you most recently pressed.

For example, press SW and AUX1/ AUX2 control the direction of switches. Press ENG or TR and AUX1 “opens” the numeric keypad to locomotive feature control, while AUX2 controls headlight illumination. Finally, when you press ACC, the buttons change meaning again, this time to control accessory functions.






As you get comfortable with “jumping” between locomotives, switches, accessories, routes, and multi-locomotive lash-ups (“trains”), you'll acquire a feel for the many definitions of AUX1 and AUX2. Until then, just remember our basic CAB-1 rule: AUX1 and AUX2 functions always depend on which top-row address button you've just pressed.

# Switches






## Creating routes around your railroad

**Example** Assign switches #2 (through), #4 (out), and #14 (through) to Route #1






Command Base ON  
Switch controller accessory is on

 **Begin programming, press RTE**  
 **Press 1 (route number)**  
 **Press 2 (the switch number)**  
 **Press THROUGH**  
 **Press SET**

Switch #2 is in the “through” direction on Route #1

 **Begin programming, press RTE**  
 **Press 1**  
 **Press 4 (the switch number)**  
 **Press OUT**  
 **Press SET**

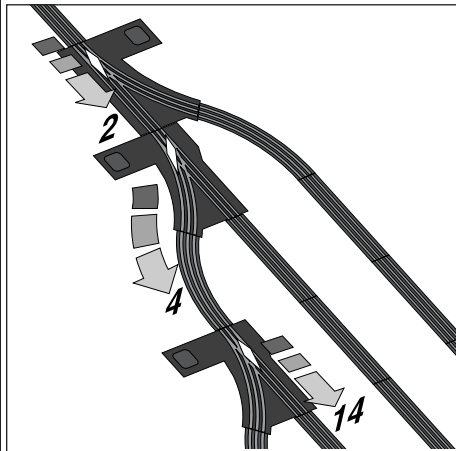
Switch #4 is in the “out” direction on Route #1

 **Begin programming, press RTE**  
 **Press 1**  
 **Press 14 (the switch number)**  
 **Press THROUGH**  
 **Press SET**

Switch #14 is in the “through” direction on Route #1

Every model railroad has switches, which provide plenty of operational variety, especially when thrown in certain patterns—a route.

Here's a common scenario: to travel from the main line to the yard, you have a preset route: Switch #2 is through (straight), Switch #4 is out (curved), and Switch #14 is through. **If your switch controller supports Routes**, you can throw all those switches with a single command—RTE.



**Detail** SWITCHES AND ROUTES. Any switch can be part of any route. And any switch can be on any number of routes, creating a wealth of possibilities. Experiment. Discover new pathways around your railroad with RTE. Routes are remembered forever—or until you clear them.

**Always check your RTE programming: throw switches opposite the RTE direction, then press RTE and the ID#; your route should immediately throw.**

**You can add more switches to a route at any time.**

# Switches

## Activating routes

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### **Example** Address Route #1



**Press RTE**



**Press 1 for one full second**

**Route #1 has been selected. Switch #2 is THROUGH, Switch #4 is OUT, and Switch #14 is THROUGH**

Select any route you've programmed by pressing RTE and your chosen RTE ID#. Make sure you press and hold the ID# button for one full second. This ensures the command is issued to every switch controller on your railroad.

### **Detail**

“PRESS AND HOLD”. When you are pressing the ID button, some of the switches may not actually throw until you've released the button. Switches activate at different times once you've selected the route—this keeps your system (and your railroad's power supplies) from overloading due to simultaneous activation of multiple switches.

## Clearing routes

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### **Example**

**Clear Route #1  
(erase all switch assignments)**



**Press RTE**



**Press 1**



**Press SET**

**Route #1 is now ready for new switch assignments**

**You cannot remove an individual switch from a RTE; you must clear the entire route and start again**

**If you make an error during re-programming, do not press SET; start over—press RTE, the switch number, its position, and then press SET**

Clearing an existing route requires an abbreviated version of programming new route. In this case, do not add any switches to the route. This removes any switches previously stored as part of this route.



# ***The TR button***

## **Tracks or Trains?**

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**T**he “TR” button on your CAB-1L can control two very different things—“TRains,” or remotely controlled “TRack” power accessories. You can run both from the same CAB-1L, as long as every one has a unique ID#.

Let’s talk TRACK power for a moment. Lionel offers a variety of accessories which provide remote control over track power. These enable you to remotely turn on and off power to all or some of your layout. In addition, some of these accessories allow you to vary the AC voltage applied to the track so you can run conventional (non-command controlled) locomotives on a command layout. You may also use variable track voltage to fine-tune performance of your accessories and command-controlled locomotives.

To operate these track power control devices (for example, a LEGACY PowerMaster), you’d assign them a unique TR ID#. Then they’d be addressed in the same way you’ve learned to operate a locomotive: by pressing TR and the ID# of the track power accessory you want to control. Refer to your track power accessory manual for specific information on setting these IDs and other operating instructions.

The second use for the “TR” button, as we’ve noted, is to create and operate “Trains,” a combination of two or more locomotives and/or Command Control-equipped rolling stock, also referred to as a “lash-up” in the world of Lionel. Once you’ve grouped several things into a train, they operate together, as a single locomotive.

A couple of important notes. First, older TMCC1 era equipment only supports TR commands 1-9. This is true for both track power accessories such as the original PowerMaster as well as older TMCC1 locomotives.

Lionel LEGACY locomotives and power accessories such as the LEGACY PowerMaster accept TR commands addressed from 01-99! So if you’re having trouble getting a piece of equipment to respond to TR commands, first try assigning it to TR 01-09 and see if that works. If that works, but higher numbered TR commands (10 and up) are ignored, stick with ID’s 1-9.

A further note about combining locomotives into TRAINS. Older TMCC1 and newer LEGACY locomotives cannot be combined into a single TRAIN. You can make TRAINs from two or more LEGACY engines, or two or more TMCC1 engines, but you cannot assign a mix of old and new locos to the same TRAIN ID#.

For more information on using remote track power accessories, refer to those product’s owner’s manuals. Continue reading this manual to learn to combine multiple locomotives into a single TRAIN.

# Advanced operating techniques

## Building Trains

### **Example** Build Train #07 with Engines #13, #15, and #84

All locomotives' reverse unit control switches set to **FORWARD**

Address each engine individually with its engine ID

Move each engine into position; do not couple them

**"Front"** locomotive should be positioned in the forward direction (headlight in front); middle and rear locomotives can face in either direction

In Train #7, assign the lash-ups front engine (Engne #13) using the F (Front) button:

 Press TR

  Press 07

  Press 13

 Press F

 Press and release SET

Hear the horn/whistle blow

Assign the lash-up's middle engine (Engine #5):

 Press TR

  Press 07

 Press 5

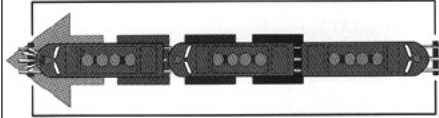
 Press and release SET

Hear the horn/whistle blow

*(continued on next page)*

When we operate two, three, or even four locomotives together we call it a "lash-up" in the world of Lionel. Running multiple locomotives together is Lionelville's answer to steep grades, long trains, and extra-heavy loads.

In the LEGACY system, lash-ups are addressed as "TRAINS"—the TR button on CAB-IL. When you build lash-ups with TrainMaster Command, several engines are grouped under a single TR ID#. Train-building should be attempted only after you've mastered ordinary TrainMaster Command operations.



Pick the locomotives in your lash-up and move them together (but don't couple them) using ENG and each one's ID#.

Finally, make certain each locomotive's direction switch is on FORWARD/RUN (if applicable). Perform a locomotive reset (AUX1, 0) to see what the locomotive's first-start direction is. It's possible to have a "contrary" locomotive that's simply following the direction of the reverse unit control switch.

**Note!** During train configuration, train addresses must be entered as two digits, using a leading zero for train addresses 01-09 (or 01-99 for LEGACY locomotives).

**Note!** If you press a wrong button while building a lash-up, start over with that particular locomotive assignment of the TR command; the assignment isn't sent until you press and release SET.

# Advanced operating techniques

## Building Trains (continued)

**Example** If any engine in the lash-up faces backwards, press DIR before SET

Assign the lash-up's rear locomotive (Engine #84 facing backwards) using the R (Rear) button and DIR button:



Press TR



Press 07



Press 84



Press R



Press DIR



Press and release SET

Hear the horn/whistle blow

Couple the locomotives by addressing them as ENGINES

Reset the direction of the lash-up:



Press TR



Press 7



Press AUX1



Press 0

Now all engines respond together when you address them as Train #7 (or #07).

If an engine is out of sync after a TR reset, read "Lash-up problem solving" on page 23

**Note!** IT'S STILL AN ENGINE. Whenever a locomotive is in a lash-up, you can still individually address it (using its ENG ID#) to adjust lighting, open individual couplers, trigger sounds and tune performance.

**Note!** STROBES STILL FLASH. Diesel locomotive auxiliary lights (example: flashing warning lights/strobe lights) are independent of the lash-up's direction-specific illumination. In other words, if a lash-up rear locomotive's headlight is dark, the strobe still flashes until extinguished by pressing 8 on the numeric keypad.

**Note!** LOCOMOTIVE CABS FACE "OUT." When operating strobe-equipped locomotives, make sure you build your lash-ups with locomotive cabs facing outward—that is, not facing each other on lash-up-ending units. The reason: older strobe-equipped locomotives may not include directional headlights. To ensure such units' headlights operate in lash-ups, position the "outside" locomotives so that their cabs face "out."

**Note!** DITCH LIGHTS. Locomotive ditch lights (equipped engines only) operate in the locomotive's standard "forward" direction only.

# Advanced operating techniques

## Front, middle, rear and reverse-direction locomotives

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The examples on the previous pages illustrate the general pattern for assigning locomotives to trains.

The position of each locomotive within the train is defined during the train assignment, via the **F** and **R** keys. **F** means the unit is placed first, at the head end of the train. **R** means the unit is placed last. Absence of a F or R means that the unit is placed in the middle of the train.

The facing of a unit in a train is determined by whether or not the DIR key is pressed in the sequence ending with the SET key. If **DIR** isn't included, then the unit is facing forward. If the **DIR** key is included, then the unit is facing backward.

To properly configure the sound of a train, assign the head end locomotive first. The rest of the locomotives can be assigned to the lash-up in any order. If the head engine is a LEGACY locomotive, we recommend you set the Quilling horn/whistle option for this TRAIN ID#.

## Addressing Trains

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### **Example** Address Train #7

**Press TR**

**Press 7 (the ID#)**

**Throttle up or press any command button.**

**Note: For train operation (as opposed to assignment) it is optional to use a leading zero to address trains 1-9)**

When first operating a lash-up, press TR and its ID# on CAB-1. Turn the throttle or press any command button; your lash-up's RailSounds sound system starts up and the engines are ready for operation.

If you've shut down a lash-up's RailSounds system by pressing the 5 button on the numeric keypad, you can restart sounds by pressing the 3 button.

Generally speaking, any command that your head locomotive will respond to when addressed as an engine (ENG) will work the same when when sent to its train (TRN) ID. See the earlier section on sending basic and numeric commands to locomotives for more information.

# Advanced operating techniques

## Removing locomotives from Trains

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**Example** Remove Engine #84 from its lash-up by reassigning it to Train #00



Press TR



Press 00



Press 84



Press and release SET

Hear the horn/whistle blow

Engine #84 is no longer part of the Train

You can remove any locomotive from a lash-up by assigning it to “Train #00.”

Remember to remove all locomotives from a lash-up after you’ve physically separated the locomotives that made up the Train.

# Advanced operating techniques

## Train problem solving

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**Example** I'm operating Train #7; one "out of sync" engine fights the others



Press TR



Press 7



AUX1



Press 0

Hear the horn/whistle blow

This resets the Train; do this whenever you've finished Train building or when you first begin running a lash-up. Still trouble? Reassign the troublesome engine to the lash-up by either using or not using the DIR button. Do another Train reset and try again.

**Note!** Make sure you aren't trying to assign a mix of TMCC1 and LEGACY locomotives to the same train. That won't work!

**Example** I'm operating a Train that includes a number of locomotives, but the circuit breaker keeps tripping

It is possible to operate up to 16 powered and unpowered and unpowered locomotives in a Train, if there is enough power on the track. If the circuit breaker keeps tripping, reduce the number of powered locomotives on the track by removing them from your Train.

**Hint** Single-motored locomotives usually draw less power than dual-motored locomotives

# ***Advanced operating techniques***

## **Notes on Trains**

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**Detail** TRAIN BEHAVIOR. TrainMaster Command lash-ups act like real-life ones. Press HORN; only the lead unit's horn blows. The same is true for BELL. The lead locomotive's headlight illuminates while the others remain dark. Hit DIR and lighting reverses to that of the rear unit (equipped locomotives only). Press COUPLER F and the lash-up's front coupler will open; COUPLER R opens the lash-up's back coupler.

**Detail** PICK THE RIGHT NUMBER. The TR address button talks to remote controllable transformers TRACKs as well as TRAINs. Choose TRAIN ID#s with numbers different from your track power devices. If you have remote controllable transformers assigned to TRACK IDs 1, 2, and 3, use TRAIN ID#s from 04 to 99 (remember that TMCC1 locomotives only support TR addressed up to 9).

**Detail** BE TIDY. Always clear a Train once you've separated its locomotives by assigning each member locomotive to Train #00. This restores engine functions that may have been changed during train configuration.

# Advanced operating techniques

## Tuning Train performance

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### **Example** Set momentum for Train #7

 **Press TR**

 **Press 7**

 **Press L, M, or H (choose one)**

**Train #7's momentum setting has been changed**

**Note!** Setting TR momentum erases preexisting ENG momentum settings for all locomotives in the lash-up

### **TRAIN MOMENTUM**

Press L, M, or H (located under the removable panel) for light, medium, or heavy lash-up momentum. Your Command Control-equipped locomotives remember this setting until you change it.

### **TRAIN STALL.**

**Note!** Not all Lionel Locomotives support Stall. The following is relevant if your lash-up includes Lionel Pulmor-type locomotives.

Get your Train moving slowly. Press SET; the lash-up stops. Turn the throttle clockwise to get the lash-up moving, then decrease speed until the lash-up just stops. Press SET again. Stall will be set. Even if your lash-up doesn't move after turning the throttle, just press SET again. Stall will be set. The lash-up remembers this setting until you change it.

If the locomotives in your lash-up are of different types and do not all start at once (even after setting train stall), fine-tune the lash-up's performance by setting stall individually for each locomotive in the Train. See the section on setting locomotive stall voltage.

**Detail** WHY STALL? In command control, stall voltage gives locomotives a common "start threshold." When you run a lash-up with stall set, every locomotive will begin moving in unison. Turning the throttle down completely turns each locomotive down to its own stall setting.



# Advanced operating techniques

## “Sticky” keys

**Example** Master sticky keys by operating a variety of trains and accessories

 Press ENG

 Press 1

Engine #1 is ready; power it up

 Press SW

 Press 34

 Press OUT

Switch #34 throws “out” (curved); this switch is now “stuck” in CAB-1’s memory; press OUT/THROUGH any time without SW and only Switch #34 will respond

 Press WSTL/HRN

Engine #1’s horn sounds; all CAB-1 command buttons are still active for Engine #1—you don’t need to press ENG or the ID# to get response

 Press and hold BRAKE

Engine #1 slow and stops; release when ready to proceed

 Press THROUGH

Switch #34 throws “through”; you don’t need to press SW or the ID#

 Press TR

 Press 8

Train #8 is ready—all CAB-1 command buttons are now active for your chosen consist:

 Press WSTL/HRN

 Press BOOST; release when ready

Throw Switch #34 to “out”:

 Press SW (only press and ID# if it’s different)

 Press OUT

CAB-1 always remembers your last ID# for ENG, TR, SW, and ACC. Here you must press SW with OUT; AUX1/AUX2 were “stuck” to Train #8

(continued on next page)

With CAB-1L, total control of your railroad is in your hands. And experiencing that control is even easier when you master CAB-1L’s “sticky” keys.

In basic terms, “sticky” keys mean that once you’ve pressed a top-row button (SW, ACC, RTE, 11. or ENG) and a specific ID#, CAB-1L will control that engine, train, or accessory until you tell it to control another one. For example, press ENG and an ID#, and CAB-1L remembers that locomotive. Press the command buttons you want (HRN/WSTL, BELL, DIR, BOOST, BRAKE, COUPLER F or R, or AUX 1 and AUX2) and CAB-1L “speaks” to your chosen Command-equipped locomotive. You don’t need to re-enter the ID#. You don’t even have to press ENG again. A locomotive, switch, or accessory “sticks” with CAB-1L until you choose another.

Sticky keys also give you the power to “jump” between control of locomotives, consists, switches, routes, and accessories without re-entering ID#s. Jump between ENGS and TRs simply by pressing the address buttons. Throw switches and routes, and your command buttons like HRN /WSTL activate the last engine or train you “spoke” to. You can even use dual-function buttons like AUX1 and AUX2 to throw switches or open the numeric keypad for locomotive feature control simply by hitting SW or ENG /TR first.

An ID# is “stuck” in CAB-1L’s memory until:

1. you enter another ID #, or
2. you change CAB-1L’s batteries.

# Advanced operating techniques

## “Sticky” keys

Now slow Train #8; TR is the locomotive “stuck” in CAB-1’s memory:

 Press BRAKE

Activate Engine #1’s bell; press ENG (without “1”) to make Engine #1 the active locomotive for CAB-1’s command buttons:

 Press ENG

 Press BELL

Activate Accessory #77:

 Press ACC

 Press 77

 Press AUX1

“Jump” to Train #8 by pressing TR and any command button:

 Press TR

 Press WSTL/HRN

WSTL/HRN sounded the horn and also enabled numeric commands. Raise the RPM level for Train #8 by pressing 3 on the keypad

 Press 3

Press SW to to redefine AUX1 as the THROUGH switch command.

 Press SW

 Press THROUGH (throws switch #34)

“Jump” to Accessory #77 and deactivate it, again using AUX1:

 Press ACC

 Press AUX1

Bring Engine #1 to a stop:

 Press ENG

Throttle down to stall; bring Train #8 to a stop:

 Press TR

Throttle down to stall

**Detail** The CAB-1L NEVER FORGETS. Once you select an ENG or TR, SW or ACC. CAB-1 retains that ID# in its memory, even when you press other top-row address keys like SW, RTE, or ACC.

**Detail** THIS SYSTEM CAN HANDLE IT. The LEGACY Control System allows for the continuous operation of up to 100 locomotives. The only limitations: available power and operator capability.

**Example** Throw several switches

 Press SW

 Press ID# 9

 Press THROUGH/OUT

Throw another switch (don’t press SW again)

 Press ID# 14

 Press THROUGH/OUT

# Problem Solving

## Answers to questions

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### ***Everything is connected, but nothing's happening.***

- Check all power connections to track power transformers and the Command Base. Make sure each component's "on" lamp is illuminated (if applicable). Make sure the circuit breakers on your power transformers are not tripped; reset them as necessary. Verify track voltage with a test light. If all connections are secure and a lamp does not illuminate, contact your Lionel Customer Service for assistance.
- Verify that your CAB-1L and Base-1L are set to the same channel. Another nearby device may be operating on the same frequency, try changing BOTH CAB-1L and Base-1L to a new channel and re-test.

### ***The Command Base-1L's green light is off.***

- Make sure the Base's power supply is properly plugged into a grounded 3-pin outlet. Also check the power connector to ensure it is snug in the Command Base-1L's power input. The green light should illuminate.

### ***The Command Base-1L's red light doesn't blink when I send CAB-1L commands.***

- Try a new location for the Command Base; CAB-1L communications are not being properly received. Press WSTL/HORN and watch the red light for response (it should blink).
- Avoid metal surfaces when installing the Command Base-1L. Metal detunes the Base's antenna and causes poor reception. If you must use a metal table or shelf, place a nonmetallic spacer at least 2" in height between the Base-1L and the metal surface.
- Check CAB-1L's alkaline batteries. Remove one battery; then reinstall it. Make sure batteries are fresh and properly installed. You should hear a small "chirp" with every button press.
- Turn off any interfering electronic devices in your railroad area: televisions, computers, WiFi devices and CB radios.

### ***I programmed my ENG ID, but the engine won't move.***

- Make sure the red light is blinking on the Command Base-1L when you send CAB-1L commands. This says your CAB-1L commands are being received by the Command Base-1L.
- Check your wiring connection between the Base and either your power transformer or common rails. The Base-1L's communication wire should be attached to the common (U) binding post of your transformer or the outside rail.
- Make sure no derailments have occurred.
- Make sure your track has power by using a test light—for example, an illuminated freight or passenger car.
- Check track-power circuit breakers. Reset if necessary.
- Make certain there are no connections between your railroad and either earth ground or power-line ground.
- Reprogram the locomotive's ID#. Slide the program/run switch to program. Put the locomotive on unpowered track. Make sure the Command Base is on. Power up your track. Now, press ENG, the locomotive's ID#, and SET. The horn or whistle should sound, indicating receipt of the new programming. Slide the switch back to run. Press ENG and the ID#, WSTL /HIRN or turn the throttle. Your locomotive should respond.

### ***I turned the throttle, but my locomotive doesn't respond.***

- Check batteries! Press any key to make sure CAB-1L is awake and try again. Check for blinking red light on Base-1L while turning the throttle. Blinking indicates throttle commands are being sent; problem may be with loco.
- Readdress the locomotive: press ENG and its ID number. It should now respond to any command button press or throttle change.

### ***My locomotive is acting kind of strange. How can I reset it?***

- Press AUX1 and 0 on the keypad. This resets your locomotive.
- Shut down the track power to the locomotive for 10 seconds after Railbonds finishes its shutdown (assuming you have a battery installed in your loco). This restarts the computer inside your locomotive.

# Problem Solving

## Answers to questions (continued)

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### ***I want to run my conventional locomotives, but they take off at full speed.***

- Use a track power transformer or accessory that can provide variable AC power to the track, allowing for the operation of conventional locomotives, also known as transitional command control.
- Note that you can only operate one conventional train per track power block.

### ***I'm running one conventional locomotive and a few Command-equipped engines at the same time, but they're all running slowly.***

- When you operate in transitional command control, the track power level selected for the conventional locomotive (in essence, it's "speed") is also the maximum voltage available to all Command-equipped locomotives addressed and in action. To increase the maximum speed potential of all locomotives in operation, increase the AC voltage being delivered to the track. The conventional locomotive's speed will increase, and all Command-equipped locomotives in action now have a higher maximum operating speed as well.

### ***My locomotive takes forever when I throttle it up.***

- Reset its momentum to LOW. Your locomotive remembers the momentum setting until you change it.
- Make sure enough power is being applied to the track. Hint: test using a small lamp or lighted car.

### ***Why is there no neutral***

- You don't need neutral in command control. A Command-equipped locomotive doesn't move until it's been addressed, so the "neutral" state in the reverse unit isn't necessary. If you want a locomotive to stay put as if in neutral, simply stop it and select another locomotive.

### ***I built a consist with two locomotives, but it won't respond when I press TR and its ID number.***

- Carefully repeat the consist set-up sequence.
- Make sure you selected a TRAIN (TR) ID# that doesn't identify a track power transformer accessory or another TRAIN consist on your railroad.

### ***The locomotives in my consist seem to fight each other.***

- Do not mix LEGACY and TMCC1 locomotives in the same consist.
- Reset the consist's direction: press TR, the train's ID#, AUX1, and 0. This re-programs each member of the consist to begin operating in their "normal" TRAIN start direction.
- Set ALL reverse unit control switches to FORWARD.
- Reprogram the contrary engine with or without the DIR button command during the consist build sequence.

### ***I want one of the locomotives in my consist to face "backward." How can I do that?***

- Include the DIR command in your consist programming string. For example, if your F3 #89 is to be the "rear" engine in the consist facing backward, press TR, the consist ID#, 89, R, DIR, and SET. This tells the F3 that it should operate in "reverse" during "forward" consist operations.

### ***When I operate my consist, the circuit breaker on my track power accessory trips.***

- Try reducing the number of motors in the consist.
- Make sure you don't have two TRAINS with the same ID#.

### ***The locomotives in my consist all seem to start differently, even though I set the stall voltage for the consist.***

- If you're operating differing locomotives in a consist (for example, a postwar F3, MPC Geep, and LTI RS3), each locomotive will start at a different voltage threshold. Try fine-tuning the stall voltage for the consist by setting individual stall voltages for each locomotive. See "Tuning consist performance."

# Problem Solving

## Answers to questions (continued)

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### ***I connected my switches to throw but they're not working.***

- You must program each switch controller accessory with IDs before you can operate the switches.
- Verify the switch in question is receiving power.

### ***I programmed switch numbers for every one, but now I can't remember which switch is which!***

- Place numbered “flags” or stickers at each switch. This will help you remember switch numbers; later, you can remove them. A layout diagram with numbered switch locations can also help. Small divisional diagrams positioned around a large layout's perimeter can provide another solution.

### ***When I address a switch and press AUX1 to make it go straight, it throws to the curve.***

- Reverse the “outer” wires (those connected to the two outside binding post on 022 and Q-72 switches) either at the switch or at the switch controller.

### ***I incorrectly entered some information when programming a RTE. What should I do?***

- Making errors during route programming is no big deal. Just remember that as long as you don't press SET, you haven't programmed anything. Start over at the RTE command for that particular switch; RTE. route ID#, RTE, route ID#, the switch number, the direction you want the switch to throw (AUX1 or AUX2), and finally. SET. Pressing SET commits the command string to memory. If you pressed SET already, read on.

### ***I added a switch to a route that I don't really want. How can I remove it?***

- You must clear the entire route and reprogram it. Press RTE. route ID# and SET. This erases all switch assignments in the route.

### ***My train derailed and I want to shut down its track—but I don't want to deactivate the entire layout.***

- Shut down the track power accessory controlling that block of track: press TR, the device ID#, AUX1, and 0. To reactivate, press TR, its ID#, and BOOST.

### ***After fixing a derailment (or experiencing an accidental power interrupt), my locomotive runs fine—but RailSounds isn't responding to CAB-1 commands.***

- After a derailment has been corrected, your Command-equipped Lionel may work normally though RailSounds does not fully respond to CAB-1L button commands. If your loco has a battery installed for the Railsounds system, reset Railsounds by removing all power from the track, wait for RailSounds to completely shut down, then wait 5 more seconds. Power up the track again, address the locomotive, and full sound performance should be restored.

### ***After fixing a derailment (or experiencing an accidental power interrupt), my diesel RailSounds is still on—at full RPMs—and won't shut off.***

- Power up your track. RailSounds will return to idle and is ready for operation.

### ***My kid likes running trains, but she runs 'em too fast. Is there anything I can do?***

- Set a maximum voltage output for every track power controller installed on your railroad.
- If you're using a Lionel ZW or other manually operated hobby transformer, turn down its output.

### ***Bulbs keep burning out all over my railroad. Help!***

- Light bulbs powered by constant voltage may burn out quicker than those receiving variable voltage during conventional operations. Replace them with higher-voltage bulbs.

## ***Problem Solving***

**Answers to questions (continued)**

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# Glossary

## The language of command control

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### **Accessory**

Any operating accessory produced by Lionel, American Flyer, or Marx.

### **Addressing**

To “call” a device using a numeric name, known as an “ID#”

### **Address buttons**

The top row of buttons on CAB-1L that selects various locomotive and layout elements. Addresses include switch (SW), accessory (ACC), route (RTE), track and train (TR), and engine (ENG).

### **Block**

An electrically isolated section of Lionel track, separated from the normal flow of transformer-supplied voltage by the presence of plastic insulating pins located in the center rail at either end of the block.

### **Block control**

A form of model railroad locomotive control that uses electrically isolated blocks and manually or automatically controls the distribution of power.

### **Coil couplers**

Operating locomotive couplers that feature an electromagnetic coil. When energized, the coil opens the coupler without the aid of a remote uncoupling session.

### **Command Base-1L**

The component that generates digital communications in response to CAB-1L commands and narrow-casts it's communication on the common (outside) rails of any Lionel railroad.

### **Command buttons**

The large buttons on CAB-1L that controls locomotive functions. Command buttons include whistle/horn, bell, direction, boost, brake, coupler front and rear, and AUX1/AUX2.

### **Command control**

A method for controlling model locomotives that involves the simultaneous operation of multiple locomotives; also includes total layout control (switches, accessories, and more). In TrainMaster Command, command control involves the use of digital signaling on the track which is picked up by specially equipped locomotives, enabling the locomotives to perform individually on the same track without complicated wiring schemes.

### **Command-equipped**

A description that means a locomotive is capable of responding to TMCC1 and possibly TMCC2 commands. Command-equipped locomotives run in both command and conventional operating environments.

### **Constant (continuous) voltage**

A steady application of electricity applied to the track. In command control, constant voltage is usually in the 18-volt range. Only command-equipped locomotives will operate properly in a constant voltage environment.

### **Conventional operations**

The transitional way of running Lionel trains: track power up the locomotive moves; track power down, the locomotive stops. Generally involves the operation of only one locomotive at a time.

### **Division**

A large, electrically isolated section of model railroad. Usually encompasses a number of electrically isolated track power control accessories with the same ID#. This ID# is known as the “division number.”

# ***Glossary***

## **The language of command control (continued)**

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### ***Ground***

The “common” or return electrical device. Ground is the electrical pathway that must be connected to SC-1 for proper operation.

### ***Hot***

The direct pathway of electricity that first passes through an electrical device. The side of a transformer that is not connected to track ground.

### ***ID#***

The one- or two-digit number that helps identify a locomotive, switch, accessory, etc. to the Command Base or when issuing command with CAB-IL.

### ***Lash-up***

A multiple locomotive set; consist.

### ***Momentum***

A locomotive behavior that simulates the performance of a real-life engine laboring under load.

### ***Neutral***

The nonmoving operational state in a three-position reverse unit. When operating in the Command environment, Command-equipped locomotives do not have a “neutral” state like they do in conventional realms.

### ***Numeric keypad***

The 10-digit (0-9) section of the CAB-IL layout that allows you to issue ID#s as well as special locomotive commands when preceded by a press of AUX1.

### ***Phasing***

The act of “matching” power applied to a model railroad. When a railroad features multiple power supplies, each supply’s output must be “phased” at block boundaries to prevent excess third-rail sparking and digital communication problems during operation.

### ***Route***

A multi-switch pathway around your railroad. Switches thrown in select directions cause a train to proceed around a layout in a specific way—a route.

### ***Stall***

A voltage level that is not enough to energize a locomotive’s motor into movement but is enough to keep that locomotive’s reverse unit from sequencing to the next operational state. Stall can be used to tune engine performance and to match lash-up start thresholds among differing locomotive types. Not all Lionel command-equipped locomotives need or support the stall feature.

### ***Switch***

A section of railroad track that allows one tract to diverge into two—or combine two tracks into one. Also called a “turnout.”

### ***Throttle***

The Circle-L knob on the CAB-1 that controls locomotive speed and PowerMaster voltage output settings.

### ***Transitional command control***

A way of operating TrainMaster Command that retains the digital signaling required for individual locomotive control but foregoes continuous track voltage in favor of variable track power, as a conventional operations. Variable power allows for the operation of non-Command-equipped engines.



## ***Glossary***

### **The language of command control (continued)**

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***Turnout***

A railroad switch.

***ZW***

A high-output alternating-current transformer produced by the Lionel Corporation from 1948-1969; sufficient power for TrainMaster Command railroads.

## **FCC Statement**

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The Lionel CAB-1L and Base-1L are covered by FCC rules for a Class B computing device. As required by FCC regulations, the following is provided for the information and guidance of the user.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. To determine if the equipment does cause interference to radio or television reception turn the equipment off and on. The user is encouraged to try to correct the interference by one or more of the following measures: (1) Where it can be done safely, reorient or relocate the receiving antenna; (2) Increase the separation between the equipment and receiver; (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; and (4) Consult your Lionel dealer or an experienced radio/ TV technician for help.

Changes or modifications not expressly approved by Lionel L.L.C. could void the user's authority to operate the equipment.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Notes

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## Lionel Limited Warranty Policy & Service

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

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

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

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

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

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

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

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

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

### Instructions for Obtaining Service

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

If you prefer to send your Lionel product directly to Lionel, for repair you must FIRST call 586-949-4100 extension 2 or FAX Lionel at 586-949-5429 or write to Lionel Customer Service, 6655 Seville Drive, Canfield, OH 44406. Please have the 6-digit Lionel product number, the date of original purchase, the dealer where the item was purchased and what seems to be the problem. You will receive a return authorization (RA) number to ensure your merchandise will be properly tracked and handled upon receipt at Lionel LLC.

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

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

### Warranty Information

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

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

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

Name \_\_\_\_\_

Address \_\_\_\_\_

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

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

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

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



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