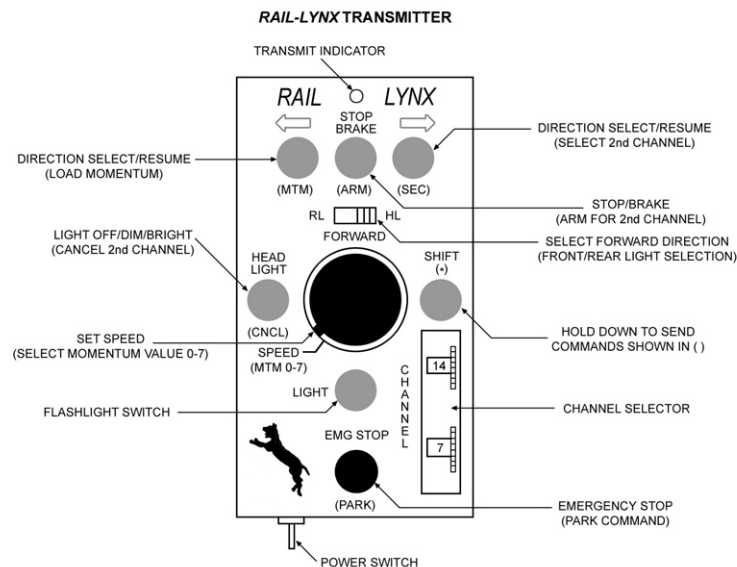




RAIL-LYNX OPERATION MANUAL

This Operation Manual is divided into two main sections. Basic Operation gives all the information you need to quickly get your Rail-Lynx System up and running. The section on Advanced Features explores the full capabilities of the Rail-Lynx System, The basic operation of the system is straight forward. The advanced features are only slightly more complex. Please take a moment to study the diagram below and familiarize yourself with the layout and controls on the Transmitter



BASIC OPERATION

Refer to the Transmitter layout diagram above and locate the three push-buttons, rotary knob, slide switch, and the two channel select switches.

The following assumes that each locomotive has had a receiver installed and set-up according to the installation directions included with the receiver.

Operation is simplicity itself.

1. Set the locomotive(s) on the track
2. Power-up the track (make sure you have the power set to 12 volts)
3. Set the channel selection switches to the channel of the locomotive

NOTE: The switches go from 0 to 15 or 16 different positions. This allows for 256 channels (16 x 16 = 256), except channel 00 is reserved for emergency stop and, thus, is unavailable for normal use. All receivers are initially shipped set to channel 01. The channel of the receiver can easily be changed at any time (see Setting Channel under Advanced Features).

The upper switch is the most significant digit and the lower switch is the least significant digit. This means that if the channel desired is 27, the 2 should be set on the upper switch and 7 set on the lower switch.

4. Turn on the Transmitter by moving the toggle switch to the up position

5. Set the speed knob to '0'
6. Move the slide switch to the position which corresponds to the front of the locomotive as it sits on the track in front of you
7. Press either the left or right white direction button - depending on which direction you want the locomotive to go
8. Turn the speed knob slowly to start the locomotive moving (it should start almost on the first click of the knob)
9. To stop either turn the speed control back to '0' or press the middle white STOP button.

The RED Emergency Stop button at the bottom of the Transmitter will stop your locomotive and any other Rail-Lynx equipped locomotive within range of the Transmitter - great for avoiding collisions!

10. Changing direction is easily accomplished by first pressing the stop button or turning the speed control knob to '0' and then pressing the opposite direction button

The Transmitter does not have to be pointed directly at the locomotive. The infrared signals will normally bounce off ceilings and walls. Typically, you can expect about 10 to 15 feet of range. Light colored ceilings and walls help extend the range, and exposed rafters in an unfinished basement will tend to absorb the signals and reduce the range. With experience, you will find out just how far away you can be and still have reliable control of your layout.

ADVANCED FEATURES

Control of the locomotive can be exercised using only the three buttons after the speed has been selected. Pushing left or right will cause the locomotive to ramp up to the selected speed, and the stop button will ramp the speed back to 0. Thus, for switching moves, the three button mode of operation is very convenient, and it is an easy one handed operation.

The rate at which a locomotive accelerates or decelerates is set by the Momentum (MTM) control. Changing momentum is covered in the Advanced Features section. Receivers are shipped with zero momentum.

If you run around a reversing loop or turn the locomotive on a turntable, the left and right buttons will now work backwards. For example, if the left was used to move the locomotive forward and the locomotive was turned on a turntable pressing the left button will now move the locomotive to the right. To correct this, just move the forward slide switch toward the front of the locomotive. That is the main purpose of this switch. It should always be positioned toward the front of the locomotive, and the direction switches will have the correct orientation.

The buttons send a command each time they are pushed, and normally that is all that is required. If the locomotive misses a command due to range, holding the button down will cause it to continue to repeat the command every 1.2 second. The speed knob sends each new speed command twice. This can be seen on the small red light above the stop button. It indicates whenever the Transmitter sends a command.

The locomotive will continue to do what it was last commanded to do, until it receives another command or loses power. Therefore, if it runs into a tunnel or other hidden trackage, it will continue to run until it emerges. To provide control of a locomotive in hidden trackage, Rail-Lynx has produced the Repeater Module, which will receive the control signals from the Transmitter and regenerate them in the hidden areas.

Emergency Stop

The only additional switch you might use during normal operation is the red Emergency Stop (EMG) button. This button uses the reserved channel (00) to send a stop command to all locomotives in the area regardless of their channel assignments. This can be used to stop any train in order to prevent a collision, or regain control of a train that may have accidentally moved out of range of another operator.

Flashlight

One of the bonus features on the Transmitter is the built-in flashlight. To activate it just push the white button above EMG, and the super-bright yellow LED on the front of the Transmitter will light up for you to read car numbers in dim areas or to find something that just rolled under the railroad.

That completes the basic operation section. Do some operating and get the feel of the system and then take a look at the Advanced Features in the following section.

All the features described below utilize the receiver's non-volatile memory. Therefore, the data will not be lost when power is removed. The locomotive will remember the last settings received until you change them.

To activate any of these features, you must utilize the shift button. This button operates similar to the shift key on a typewriter or computer keyboard. The Shift button must be held down while the alternate function is used. Each button has an alternate function (shown below the button in parenthesis). Whenever the shift button is held down, the (XXX) function is activated.

Momentum (MTM)

Momentum is the value used by the receiver to control the rate of change of speed. That is, how fast or slow the locomotive's speed changes. The system has eight levels of momentum. The higher the number, the slower the locomotive will change speed. This is easily changed from the Transmitter. In a prototypical situation a train with a heavy tonnage takes longer to reach its intended operating speed. This effect is simulated by adding a larger number of clicks of momentum. However, when switching, a small amount may be selected, in order to get a quicker response.

Change the Momentum as follows:

1. Set the locomotive on the track
2. Power-up the track (make sure you have the power set to 12 volts)
3. Set the channel selection switches to the channel of the locomotive
4. Set the amount of MTM (0 to 7) by rotating the speed knob from 0 to 7 clicks above 0. If you set any number above 7, the Transmitter will interpret it to be 7.
5. Hold down the Shift button and push the left (MTM) push-button. The new momentum value will be sent to the locomotive, where it will be stored in memory and used by the locomotive until changed.

If, after turning the speed knob to zero, or pressing the stop button, the train is not slowing rapidly enough, simply push the stop button again. Each time the stop button is pressed, the train will slow more rapidly. In effect, the stop button becomes a brake.

Pushing the stop button repeatedly will bring the train to a very quick stop, even though there is a large value of momentum selected. Also, the Transmitter will continue to send a stop command every 1/2 second if the stop button is held down.

Assigning Receiver Channel Number

Each receiver can actually respond to two channels; the Primary and the Secondary. Normally, the primary channel is assigned when the receiver is initially installed in the locomotive, and is seldom changed. The secondary channel can be assigned whenever you want MU (multi-unit/consist) operation. Any number of locomotives can be assigned the same secondary channel number, and they will then operate together. Note that the primary channel is still active and can be used whether or not a secondary channel is assigned. The secondary channel can be canceled at any time, and the same channel reused for other locomotives.

If only two locomotives are to be MU'd, it is only necessary to load one unit's secondary channel with the other locomotive's primary channel, and not create a new MU channel. You may have to think about it a while for it to make sense.

Primary Channel Number

Receiver units are shipped with channel 01 stored in memory.

CAUTION: When changing the primary channel, ANY locomotive that receives the command will take that channel number. This is why it is best to assign a primary channel on the bench during installation of the receiver. The only time that it may have to be changed is if a visitor to the layout has a locomotive with the same channel and wants to operate on your railroad. With 255 channels to choose from, you shouldn't run out of channels.

1. Place the locomotive on the track with the power on (make sure you have the power set to 12 volts)
2. Turn on the Transmitter and turn the speed knob to the '0' position (the 0 is used to indicate no speed offset, see SPEED OFFSET later in this section on Advanced Features).
3. Set the desired channel by turning the upper and lower thumbwheels, e.g. upper to '2' and lower to '7' for a channel of '27.'
4. To set the new channel selection in the receiver turn the Transmitter over and with the tip of a ball-point pen, small screwdriver, or a paper clip, etc., push the hidden button on the back of the Transmitter, just above the battery pack. This will lock the number into the receiver until such time as you want to change it.
5. Test the operation by pressing the left or right white direction button and then turn the speed knob notch by notch until the locomotive moves. If it goes in the opposite direction to that indicated by the direction button pressed, change the position of the slide switch and reload the channel.

Assigning Secondary Channel Number

Receivers are shipped with no secondary channel assigned.

The Secondary Channel (or MU/consist channel) number is assigned in two steps. First, the locomotive must be armed to take a second channel, and then the channel number is loaded.

1. Place the locomotive on the track with the power on (make sure you have the power set to 12 volts)
2. Turn on the Transmitter and turn the speed knob to the '0' position (the 0 is used to indicate no speed offset, see SPEED OFFSET later in this section on Advanced Features).
3. Set the locomotive's Primary Channel number on the channel switches and move the slide switch to either the HL or RL position. HL means the locomotive will be run headlight first, and RL means the locomotive will be run rear light first. (This allows MU'd units to run with end forward).
4. With the shift button held down depress the stop (ARM) button. This arms the locomotive to accept a secondary channel.
5. Set the new secondary channel on the channel switches, and with the shift button held down, depress the right (SEC) button. This loads the secondary channel into the locomotive.

Cancelling Secondary Channel

To cancel the secondary channel, set the primary or secondary channel number on the channel switches. With the shift button held down, push the headlight (CNCL) button. This will cancel the secondary channel in the locomotive.

NOTE: If the secondary channel number is set on the channel switches, all units with the same secondary channel will all cancel with one command. This is useful when breaking up an MU/consist of locomotives. If the primary channel number is used to cancel, only the locomotive with that channel number will cancel. This is useful when a helper may have been assigned to a set of MU'd units, and you wish to cut off the helper, but want to keep the other units MU'd together.

Park/Unpark Command

When a locomotive is not going to be used for a while, the park command may be used. This is just a precaution that you may want to implement. A locomotive that is stopped will remain stopped until it receives a message with it's channel number and a speed command. If you have several operators operating in the same area, occasionally signals from two or more operators may overlap. This is rare (each message is about 0.1 seconds long), but it can happen. And, despite all the message security used by the system, there is the rare possibility of two messages merging together to form a valid but unwanted message. If this also happens to match a nearby locomotive's channel, then it might start to move. The park command will prevent this by locking out speed commands until the unpark command is received.

Parking a Locomotive

1. Completely stop the locomotive by setting the speed knob to 0 and using the stop button.
2. Set the primary or secondary channel (you can park MU'd units with one command) on the channel switches, hold down the shift button, and push the EMG (PARK) button. This parks the locomotive. The locomotive will now ignore any speed commands until unparked.

Unparking a Locomotive

1. Set the primary or secondary channel on the channel switches.
2. Set the speed knob to something other than 0, hold down the shift button and push the EMG (PARK) button. This will unpark the locomotive.

Note that the only difference between the park and unpark commands is the position of the speed knob. 0 speed equals park and anything above 0 equals unpark.

Speed Offset

Speed offsets are used to match locomotives that are to be run together, or to correct for locomotives that require a large speed setting before they start to move. We have found that if the locomotives start together, they will share the load equally at most speeds.

This command essentially adds several clicks (up to 7) to the speed knob's position. Any number over 7 will be interpreted as 7.

Example

Suppose a locomotive does not start to move until the speed knob has reached 6 clicks. A reasonable correction would be to add 4 clicks of positive speed offset.

Adding Positive Speed Offset

1. Place the locomotive on the track with the power on (make sure you have the power set to 12 volts)
2. Turn on the Transmitter
3. Set the locomotive's primary channel on the channel switches, and advance the speed knob 4 clicks above 0. Depress the hidden button on the back of the Transmitter. This will load an offset of 4 into the locomotive. Now the locomotive should start to move after only 2 clicks.

CAUTION: This command is an offshoot of the primary channel command, and will be accepted by any locomotive receiving the message. It should normally be used only on the bench during installation of the receiver, or be very careful to prevent any other locomotives in the area from accidentally accepting the command.

Speed Table Selection

There are five different speed tables loaded into the receiver. Four are stored in the program memory, and therefore cannot be modified. This fifth is stored in data memory, and can be loaded with a custom program, using any PC compatible computer. See Custom Speed Table.

The tables in the program are linear, and go from 0 to a Maximum Speed (MS). Table 0 operates 0 to 100% of MS. Table 1 operates 0 to 3/4 MS. Table 2 operates 0 to 1/2 MS. Table 3 operates 0 to 3/8 MS. Table 4 is not defined as shipped.

Using the higher number tables spreads the smaller speed range over the full rotation of the knob for smoother, more precise operation.

Selecting Speed Table

1. Place the locomotive on the track with the power on (make sure you have the power set to 12 volts)
2. Turn on the Transmitter
3. Set the locomotive channel on the channel switches.
Set the speed knob to position 0 to 4 (table section) and while holding down the SHIFT button, depress the hidden button the bottom of the Transmitter.

NOTE: This command is sent only to the selected locomotive, however older receivers (RX-1/2) will accept this command as a negative speed offset command regardless of channel, and caution should be exercised if the railroad has RX-1 and/or RX-2 receivers in operation. This selection can be made at any time. Table 0 can be used for mainline operation, and then table 3 or 4 can be used for switching.

Custom Speed Table

The custom speed table can be loaded using any PC compatible computer and an infrared interface module. This table is created by selecting a speed for each of the 32 knob positions from 126 speed steps. Step 0 is zero speed and step 126 is maximum speed. Table 0 in the standard receiver is a linear line from 0 to 126 with each knob position increasing the speed by approximately 4 steps. The receiver moves through all the speed steps between each knob position to produce very smooth speed transitions.

Contact RAIL-LYNX for software (DOS-only) and detailed instructions for the creation of a Custom Speed Table.

Headlight Commands

The headlight commands provide two dual outputs that can independently drive front and rear lights in the following sequence: OFF 50% 75% 100%. In addition to head light and rear light outputs, all current receivers, with the exception of RX-3 and RX-3P have TWO Auxiliary Light Outputs, which may be used for MARS, Strobe or Ditch lights. How these outputs will be used must be specified at the time of ordering. The RX-3 and RX-3P receivers have a SINGLE Auxiliary Light Output, the function of which must be specified when ordering. Selection of the headlight mode is done at the factory.

For headlight operation, set the forward switch to HL (for headlight) or to RL (for rear light), and push the headlight button. The selected light will step through the sequence of OFF/ON, or OFF/DIM/BRIGHTER/BRIGHTEST, etc., depending on the mode. If the MARS, Ditch, or Strobe light mode is used, then they turn on or off each time the headlight is cycled through the OFF 50% 75% 100% sequence.

NOTE: On Rev 10 and later receivers, the lighting command only works using the primary channel and not when using the secondary channel.

ACCESSORY MODULES

Rail-Lynx currently offers the two auxiliary products described below.

POWER-LYNX Dual Channel Circuit Breaker

These modules can be used to divide the railroad into several blocks for isolation of faults (shorts) and to limit the maximum short circuit current.

The circuit breaker module automatically and continuously attempts to reset three times per second, until the fault is cleared. Each breaker can be set to trip at the desired maximum value required for that block. Thus, even though 10 amp supply is being used, the maximum allowed in that block might be only 2 amp. This prevents pitted wheels and melted feeder and frog wiring.

The other advantage of using a breaker is that a short in one block will not affect other blocks. So, when someone runs a switch in the yard, the mainline trains keep running.

Each module contains 2 circuit breakers.

Repeater Module

Any time a locomotive is hidden from the transmitter, a repeater may be used to re-transmit the signal from the Transmitter to the locomotive.

The repeater consists of a Sensor (to receive the signal from the Transmitter), a repeater circuit board (to regenerate the signal), and 10 infrared LEDs which can be located in the hidden area to forward the signal to the locomotive. As each LED can cover approximately 2 feet, up to 20 feet of hidden track can be controlled with a single repeater. However if the repeater is powered by 24VDC, it can drive up to 24 LEDs resulting in coverage for 48 feet of hidden track.

LEDs can be distributed among several hidden areas; so one repeater may be used for several tunnels. Repeaters may also be used to provide coverage in non-hidden areas, such as large yards.

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