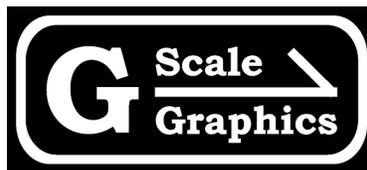
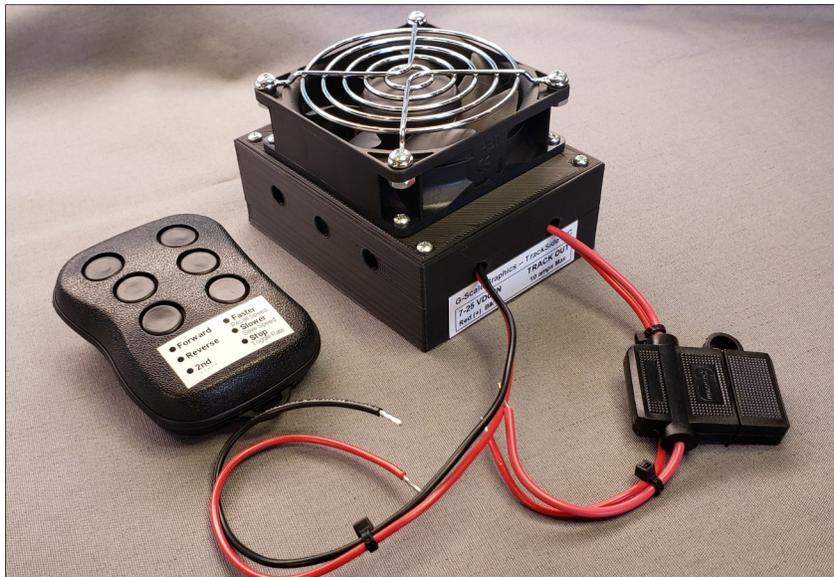


# ***RailBoss 4*** ***Trackside R/C***

The Next Generation of  
**2.4GHz R/C**  
**for Large Scale Trains**  
Operation and Installation Manual



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# Overview

## RailBoss 4 - Trackside R/C (Radio Control)

is an electronic speed control designed for remote control of track powered large scale trains. The pocket sized transmitter allows you to control and follow your trains anywhere, without being tied down to a “control panel”.

A regulated DC power supply (e.g. 24V, 5-10A) must be used to supply power to the Trackside R/C unit, which then throttles the PWM (Pulse Width Modulated) voltage to the track via radio control.

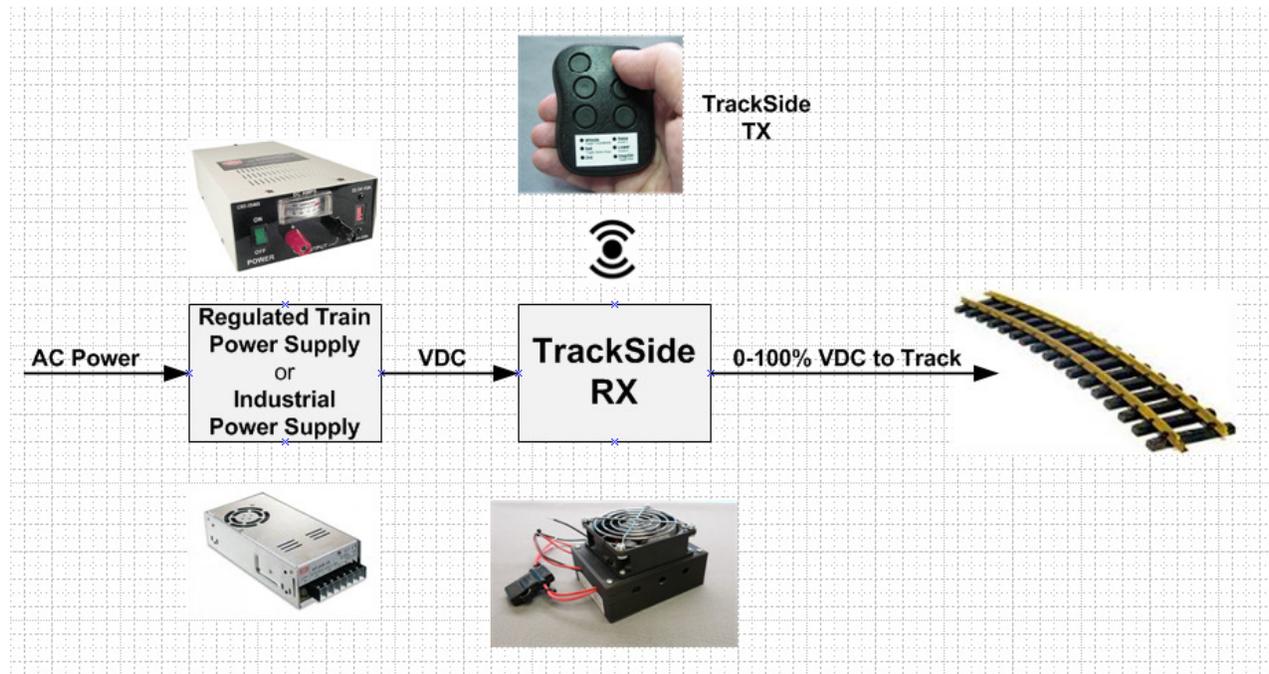
The pocket sized TX (Transmitter) controls the Trackside base station via 2.4GHZ DSSS radio signals.

- No modifications to locomotives required
- Pocket sized transmitter
- Precise speed control
- Up to 10 amps of track power
- User programmable

The Trackside base station can pass up to 10 amps of current from the power supply to your track. That is more than enough to handle one or more locomotives pulling a full train. Typical current draw for one locomotive motor is around 1 Amp.

User programmable options give you control over operating parameters, without the need for a computer.

- 1) NOT for use with older unregulated power packs like PH Hobbies and MRC 6200. Many low cost train “Power Packs” do not have regulated DC outputs. Their outputs contain a high content of AC voltage that will damage the Trackside R/C unit. If in doubt, please call us.
- 2) Locomotives containing DCC decoders that also allow operation on regular DC voltage may not operate properly with the Trackside R/C. Our PWM output signal makes some DCC boards think they are in DCC mode.
- 3) PWM may affect the lighting circuits of some locomotives.



### Wiring Diagram



## The Radio System

The **TrackSide R/C** uses a new high-tech 2.4GHZ system designed for industrial use. The range is excellent, up to 800 ft. Best reception will be obtained with line-of-sight between the TrackSide base station and the TX. Raising the RX above ground level may also improve reception, if needed.

Each Trackside base station “learns” its transmitter and will only respond to that transmitter and no others. Multiple **TrackSide R/C** systems can be used in the same location to run multiple loops of track, without interference. There are no channels or frequency selections to worry about.

The 6-button handheld transmitter uses two long lasting replaceable AAAA batteries. There is no on/off switch. It is always ready to use, and only transmits while a button is pressed. Keep the transmitter in your pocket or attached to a neck lanyard.



One transmitter can control two base units, and therefore two separate trains.

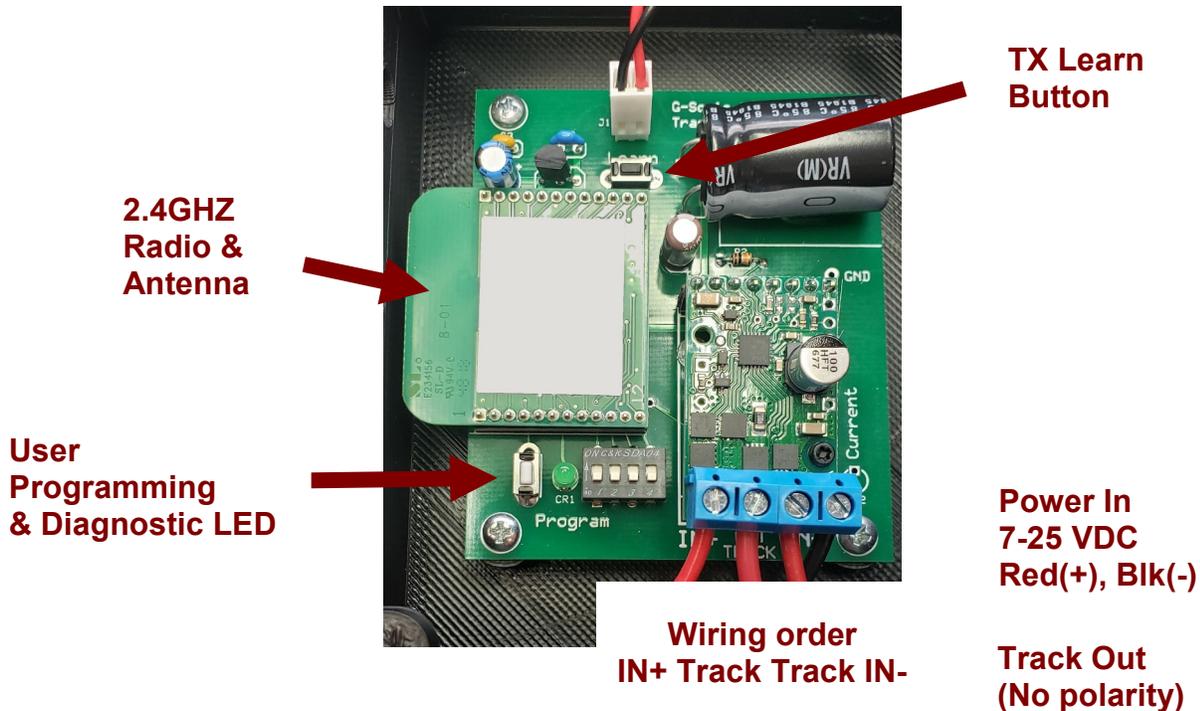
## The TrackSide R/C Control Board

The **TrackSide base station** houses a circuit board, which is a combination control board and radio transceiver. Transmitter commands control a powerful (and silent) PWM (pulse width modulation) motor driver designed to allow nice slow prototypical speed control of your locomotive. Adding momentum to the throttle enhances the prototypical operation. Momentum is fully programmable, and can be turned on and off via the transmitter to assist with switching operations. (Toggle Rate)

**TrackSide R/C** operates over a wide range of DC input voltage (7-25V). The power input is protected from damage due to reverse polarity, it just won't operate until the polarity is correct. The output circuitry is protected from short circuits via an easily accessible in-line fuse.

A DIP switch, push-button and LED provide simple user programming without the need for a computer.

The integrated 2.4GHZ radio receiver and antenna provide excellent operating range.



## Installation

The **TrackSide base station** can be mounted anywhere between the power supply and the track. All wiring power supply to **TrackSide base station**, and **TrackSide base station** to track, should be as short as possible to minimize voltage drops. For long runs, wire gauge should be at least 16 gauge or better. 12 gauge Landscape wiring works well.

The **TrackSide base station** wires are not terminated, just tinned, for you to make connections as needed in your setup. Final connections can be made using wire nuts, crimp terminals, or soldering.

### Power Input

Connect 7 to 25 VDC to the Red and Black wires. Reverse polarity will not cause damage, but the control will not operate. Red is Plus (+), Black is Minus (-). The **TrackSide base station** will not function below 7vdc input. When proper power is supplied, a small green LED inside the box will ON, but only visible with the cover off.

**Warning!** Most train "Power Packs" with a knob on them (e.g. the MRC 6200) are very poor power sources. Their "DC" output is unregulated and unfiltered. The large AC component of their output will cause damage to the Trackside R/C electronics. If you can measure more than 1 volt AC on the "DC" output of your power pack, it is not suitable!



It is assumed that power to the system will be switched on/off at the power supply.

Any DC power supply with a regulated output between 7 and 25 VDC will work. The greater the voltage, the faster your top speed will be. There is nothing special about power supplies made specifically for trains, other than they may have some built-in meters. Industrial power supplies are much better, lower cost, and smaller.

Some common fixed output train supplies:

Crest (Aristo-Craft), Elite Dual, 22V/13.8V, 13A/20A, CRE55465, \$206

Crest (Aristo-Craft), Elite Single, 24V, 15A, CRE55468, \$242

Aristo-Craft, Ultima, 18-21V, 10A, ART-5460, **obsolete, not suitable.**

Industrial Switching Power Supplies:

Meanwell, 24V, 6.5A, LRS-150-24

Meanwell, 24V, 10A, SP-240-24

and many other models by Meanwell, most under \$50.

[Click here for more info.](#)

Must supply your own AC cord/connection to the terminal block.



### Track Output

A maximum of 10 amps is available from the board. An in-line ATC automotive fuse is located in the black plastic case of the output wiring. If you have a derailment or other catastrophe causing a short on your track, it is highly likely that this fuse will blow. We ship with a 5 amp fuse installed. You may increase this to 7.5A, or 10A as needed if you blow fuses during normal operation; i.e. not due to a derailment or direct short. Keeping the fuse size small provides the best protection for the control.

At power-up the track output will provide a voltage to the track that is positive on the output wire containing the in-line fuse, and negative on the other. This is intended to be the "forward" or most often used direction of the locomotive. If it is not, just swap the track output wires or change User Programming parameter 5. At power-up, the train will be ready to run without having to change direction on the TX.



## **Transmitter / Receiver Setup**

There are no channels or frequencies to worry about. The receiver “Learns” the transmitter and will respond to no others. **Your receiver has already learned the transmitter it shipped with at the factory.** So no setup should be required.

In the event you need to re-learn your TX, you will need to remove the cover on the **TrackSide base station**. To re-learn, press the **Learn** button on the **TrackSide R/C** board. The LED will start blinking. Press the **Stop** key on the transmitter until the LED stops blinking. They are now linked together.

The transmitter batteries are accessible by removing the 3 screws on the back. Pressing any key on the transmitter should cause the **TrackSide base station** LED to blink off. If it doesn't, check the transmitter batteries.

## **Operation**

### **Power-Up**

At power-up, the locomotive will be stopped, ready to proceed forward. Momentum is off (fast rate).

### **Setting Direction**

Press Forward or Reverse as desired to change direction while the locomotive is stopped (will not function while in motion). The direction will power up per User Programming parameter 5. Normal power-up is “forward”.

### **Setting Speed**

The Faster and Slower buttons will change the speed setting. Momentary presses for small speed changes, or hold the button down to ramp speed up or down. Min and Max Speed settings are set in Throttle Programming mode. The default settings are Min Speed = 0% power supply voltage, and Max Speed = 100% power supply voltage.

### **Saved Running Speed**

Set the speed of your loco to your normal running speed. To save it, press the 2nd, then Slower button. Now any time you want to recall that speed, including from a dead stop, just press the 2nd, then Faster button. The loco will accelerate (or decelerate) at the current momentum rate.

### **Momentum/Fast Rate**

“Momentum” is a delayed response to a change in speed setting. This simulates the slow response of a heavy train. Toggle the rate from fast to momentum, and vice versa, by pressing “2nd, Stop”. Use the fast rate for a quicker response during switching moves. Momentum refers to the user programmed throttle momentum set by parameter 4 (see User Programming).

### **Emergency Stops**

Pressing the Stop button while running will make a quick stop, but not instantaneous. This avoids gear damage due to the real momentum of the train.

### **Throttle Programming Min and Max speeds**

You can program the min and max throttle speeds (voltage). Most motors require several volts to get moving, so if you set the min speed just slightly less than what it takes to make the loco move, you will eliminate the delay in getting the loco moving. (Note: All locos are different. Max speed setting is useful for setting a safe maximum speed to avoid derailments when children are operating the loco.)

To enter throttle programming mode, hold the 2nd key, Slower, and Stop buttons down until the LED in the **Track-Side base station** starts flashing at a fast rate. You will now have full speed control from 0 to 100% power supply voltage.

To set min speed, use the Faster button to just barely get the loco moving. Then use the Slower button to just Stop it. Press Reverse to save the min speed (Speed must be less than 50% power supply voltage).

To set max speed, use the Faster and Slower buttons to run the loco at the desired speed. Press Forward to save the max speed setting (Speed must be greater than 50% power supply voltage).

To return to default throttle settings (min speed = 0% voltage, max speed = 100% voltage), press the 2nd key to save the default settings.

Press the Stop button to save the setting and exit throttle programming mode. LED will stop flashing. Note: Only one setting, either Min or Max can be set at one time. Exit to save, then re-enter for the second setting.

### **Two Track Operation**

Two different tracks can be controlled by the same transmitter. The keys on the left side of the TX will control track 1, and the right side keys will control track 2. Each base unit must learn the same transmitter. Then using User Programming parameter 7, set up the track 1 base unit to operate in mode 2, and the track 2 base unit to operate in mode 3. Each base unit will respond at the throttle rate set by user parameter 4. Throttle programming, save/recall speed, and toggle rate, and interactive remote functions are all disabled in two track mode.

### **User Feedback**

The transmitter has a vibration motor in it which can be used for user feedback. Pressing any button sends a radio signal to the base station receiver. The receiver (both TX and RX are actually transceivers, capable of bi-directional communication) will then return a signal to vibrate the transmitter. This is useful to find dead spots in your layout or to check radio range. You will likely not want to use this all the time to save TX batteries. This function can be activated using User programming parameter 13.

### **Interactive Remote Transmitter**

An optional remote transmitter board is available for use in train displays. It is basically just another transmitter with two wires for attachment to a momentary push-button switch of your choosing. Mount the board and the switch in a box or panel as needed for your display. You now have a wireless connection between the remote button and the **TrackSide R/C** base unit. If this is more than you like to do, call us to discuss your application. We would be glad to help.

The remote button is enabled whenever momentum mode is selected from the standard transmitter, and disabled when in fast rate mode.

Pressing the button does the same thing as pressing “Recall

Speed” (2nd Key, Faster) on the standard transmitter.

From a dead stop, the train will accelerate at the programmed momentum rate set by parameter 4 to the “Recall Speed” speed setting. It will then run for a period of time set by parameter 6 and then do a “Quick Stop” (same as pressing the Stop key on the standard transmitter).



www.shutterstock.com 100000000



The Interactive Remote Transmitter allows you to have an unmanned display. The train sits idle awaiting the next visitor, minimizing wear and tear on the train and the chance for derailments, etc. If the display is manned, the attendant can take full control of the train using the standard transmitter at anytime, locking out the remote button.

Note: The Interactive Remote Transmitter will only work when User Programming Parameter 7 is set for Single Track, since the Save/Recall Running Speed functions are disabled in Two Track mode.

### **Fuses**

If you are blowing fuses due to derailments, or other causes of a short circuit, do not increase the size of the fuse. It is doing its job. If you continually blow fuses while simply trying to operate trains, then you can increase the fuse size from the 5 amps, to 7.5 amps, or a maximum of 10 amps. Running with the smallest size fuse that still allows you to operate will provide the best protection for the TrackSide R/C.

# Trackside R/C Transmitter Commands Op Mode 1 (Single Track, Default)

## Single Key Function

*2<sup>nd</sup> Key function*

Examples:

Press “Stop” key once to Stop.

Press the “2<sup>nd</sup> Key”, followed by the  
“Stop” key to Toggle Rate.

**Forward** - Press momentarily to change direction to forward.  
(see note below)

**Reverse** - Press momentarily to change direction to reverse.

**Faster** - Press momentarily to bump speed up. Hold down to ramp speed up.

**Slower** - Press momentarily to bump speed down. Hold down to ramp speed down.

**Stop** - Press momentarily or hold to perform a Quick Stop while running.

**2nd** - Press momentarily, followed by another key to perform the secondary function.

**2nd, Forward** - not assigned

**2nd, Reverse** - not assigned

**2nd, Faster** - Recall the saved running speed.

**2nd, Slower** - Save the current running speed.

**2nd, Stop** - Toggle the momentum rate; either fast for switching or slow per User Parameter 0 for prototypical speed changes.

### Throttle Programming -

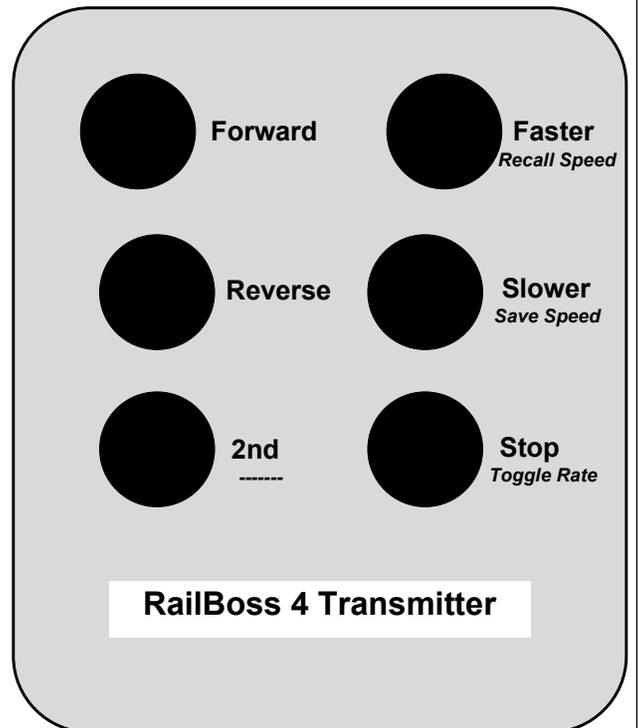
Enter Throttle Programming mode by holding down the **2nd, Slower, and Stop buttons** until the LED inside the Trackside base station starts flashing.

Use Faster/Slower Buttons to control speed (0 to 100%)  
Press Forward to set the Max Speed (must be greater than 50%)  
Press Reverse to set the Min Speed (must be less than 50%)  
Press 2nd to reset throttle to full range (0 to 100%)

Press Stop button to exit and save changes at any time. LED will stop flashing.

**Learn TX** - Press the Learn button on the circuit board inside the Trackside box. LED will start flashing. Then press Stop on the transmitter. LED will stop flashing.

Note: Forward and Reverse won't function while loco is in motion. Direction of locomotive travel is relative to the way you place your loco on the track. Place your locomotive on the track in the direction it will normally travel. When the Trackside is first powered up, “Forward” will be selected. If your loco runs backwards, you can either reverse the wires to the track, or change User Parameter 5.



## Trackside R/C Transmitter Commands Op Modes 2 and 3 (Two Track)

### Single Key Function

*2<sup>nd</sup> Key function*

Examples:

Press "Stop" key once to Stop.

Press the "2<sup>nd</sup> Key", followed by the "Stop" key to Toggle Rate.

**Faster** - Press momentarily to bump speed up. Hold down to ramp speed up.

**Slower** - Press momentarily to bump speed down. Hold down to ramp speed down.

**Stop** - Press momentarily or hold to perform a Quick Stop while running.  
Press while stopped to change direction.

**Left side keys** - Control the Base Unit that is programmed for Op Mode 2 and connected to track 1.

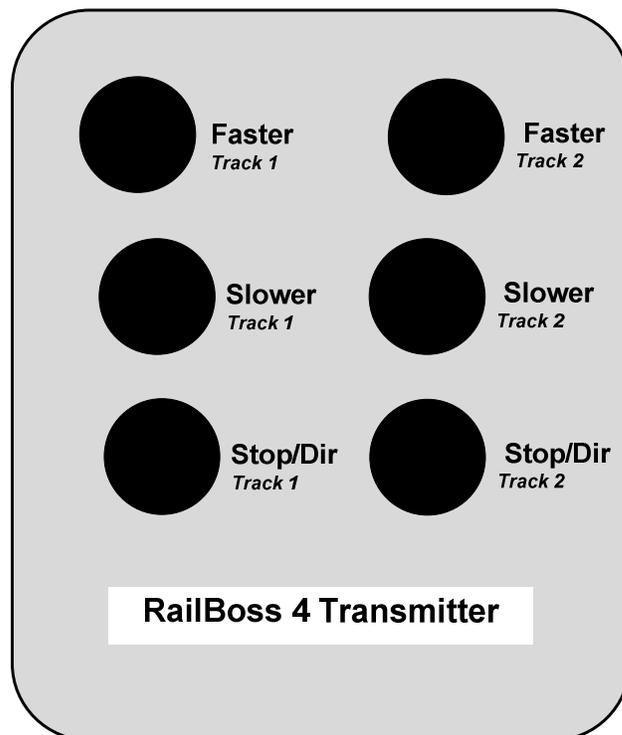
**Right side keys** - Control the Base Unit that is programmed for Op Mode 3 and connected to track 2.

Note: In two track mode, the throttle programming, save/recall speed, and toggle rate, and interactive remote functions are disabled. Speed will change at the User Programmed rate set in Parameter 0 of each base unit.

For two track operation from the same transmitter, both base units need to learn the same transmitter.

**Learn TX** - Press the Learn button on the circuit board inside the Trackside box. LED will start flashing. Then press Stop on the transmitter. LED will stop flashing.

Note: Direction change won't function while loco is in motion. Direction of locomotive travel is relative to the way you place your loco on the track. Place your locomotive on the track in the direction it will normally travel. When the Trackside is first powered up, "Forward" will be selected. If your loco runs backwards, you can either reverse the wires to the track, or change User Parameter 5.



## Trouble Shooting

- Nothing seems to be working ...

Check the power. The TrackSide LED should be ON. You should measure between 7 and 25 volts DC applied to power input wires (Red +, Black -).

Check the fuse. If it is blowing during normal operation (not due to a short during derailment), you may increase the size from 5A to 7.5A, or 10A.

The wires are connected to an internal terminal strip. Open the box and check for loose wires. You may need to remove the main circuit board to gain better access to the terminal strip.

Pressing any button on the transmitter should cause the TrackSide LED to blink off. If not, check the transmitter batteries. Replace with AAAA alkaline batteries (Available on our website, if needed).

- The transmitter doesn't work at all.  
Did the receiver successfully "Learn" the transmitter?  
Open the transmitter case and make sure the batteries and green module are both fully seated.  
Replace the batteries with a AAAA alkaline cells, available on our website.
- Erratic throttle behavior? Reset throttle to default full range values using throttle programming procedure (See Throttle Programming).
- The loco doesn't start moving until I hold the Faster button for a long time.  
The voltage is ramping from 0 volts to that required to move the loco. You can eliminate this dead time by programming the Min Speed setting to a higher value. (See Throttle Programming). However, this setting may be different for each loco.
- The loco starts moving as soon as I turn it on.  
Program the Min Speed setting to a lower value.
- The locos runs in reverse at power up.  
Reverse the wires at the track output or change User Programming parameter 5.
- The loco won't run as fast as I like even though I keep trying to increase the speed setting ...  
Maximum speed is determined by your power supply voltage or the Max Speed setting. You need more power supply voltage or you may need to restore the default throttle programming settings.
- I can't change direction with the loco stopped.  
While the loco may be stopped, the track voltage still isn't close enough to zero volts to allow the direction change. Get into the habit of always pressing the Stop button to insure voltage goes to zero.
- If the lights in your loco are acting funny, not working well, or perhaps flickering, it may be due to the PWM (Pulse Width Modulation) output of the track throttle. It won't cause any harm to your loco, but it can be corrected, if desired, by using a PWM to Linear Converter available from us. This will provide a pure DC output to the track and loco.

### Notes:

- 1) Many low cost train "Power Packs" do not have regulated DC outputs. Their outputs contain a high content of AC voltage that will damage the Trackside R/C unit. It will overheat and burn up the driver stage. If in doubt, please call us. The DC output of your power pack should measure less than 1 volt AC (measured on the AC scale of your meter).
- 2) Locomotives containing DCC decoders that also allow operation on regular DC voltage may not operate properly with the Trackside R/C. Our PWM output signal makes the DCC board think it is in DCC mode. Removing the DCC board and making direct connections between the track pickups and the locomotives motor(s) will solve this problem.

# User Programming via the DIP Switch & Push Button

Some of the operating parameters of the **Trackside base station** can be modified to meet your individual needs. No programming is necessary to get your system up and running, only to modify it, if so desired.

User configurable parameters can be programmed using the 4-position DIP switch, the on-board push-button next to the DIP switch, and on-board LED. The DIP switch selects the parameter to be programmed, and the LED flashes the currently selected option.

## Parameter 4

### Throttle Momentum

This parameter sets the amount of momentum applied to the throttle when the momentum function is turned ON using the "Toggle Rate" button. "Momentum" is the length of time it takes to accelerate or decelerate while holding down the Faster or Slower buttons.

## Parameter 5

### Direction Control

Loco normally runs in the forward direction at power-up. Set this for reverse at power up.

## Parameter 6

### Interactive Remote Timer

Sets the run time upon activation of the remote button. Requires optional Interactive Remote transmitter.

## Parameter 7

### Operation Mode

One transmitter and two base units may be used to control two tracks.

## Parameter 13

### User Feedback

Option 2 enables vibrate mode on transmitters equipped with a vibration motor. Upon pressing any key, the transmitter will vibrate if, and only if, the receiver actually received the signal. This can be used for testing radio range.

## Enter Programming Mode

Hold the button (next to the DIP switch) down on the TrackSide board until the LED goes out. Release the button. The LED will begin flashing the option code of the selected parameter.

## Select Parameter

Select the parameter you wish to view or program using the DIP switch. (the white square indicates position of the switch; e.g. for parameter 0, all switches are in the down or off position).

## View Current Option Code

The LED will repeatedly flash the option code for the currently selected parameter; e.g. two flashes followed by a pause indicate option 2.

## Change the Option Code

Momentarily press the push-button during the pause to advance the option to the next higher number, until you get the desired number of flashes.

## Save the Option Code

During the pause between code flashes, press and hold down the push-button for about 4 seconds until the LED goes off. Upon release, the LED should stay on solid. This saves the option code and exits User Programming. The new option will now be active.

*Continued on next page ...*

Option	Parameter 4 - Throttle Momentum	ON
1	20 secs 0 to 100% Slowest	
2	15 secs	
3	10 secs	
4	6 secs Fastest	

Option	Parameter 5 - Motor Direction	ON
1	Normal - Powers up in Forward	
2	Reverse - Powers up in Reverse	

Option	Parameter 6 - Interactive Remote Timer	ON
1	30 Seconds	
2	1 Minute	
3	3 Minutes	
4	5 Minutes	
5	10 Minutes	

Option	Parameter 7 - Operation Mode	ON
1	Single Track	
2	Two Track - Left Keys	
3	Two Track - Right Keys	

Option	Parameter 13 - User Feedback	ON
1	Disabled	
2	Transmitter Vibration	
3	Not Used	

<b>Factory setting</b>
------------------------

### **Exit Programming Mode**

To exit programming mode, hold down the Program button for 5 secs, then turn off TrackSide power.

To exit programming mode without saving any changes, just turn off TrackSide power.

## **Converting from One Track One Transmitter Operation to Two Tracks on the same Transmitter Operation**

When you receive your new second base unit, it should be labeled "Track 1", with Parameter 7 set for Option 2 (Two Track—Left Keys), Parameter 4 set for Option 3 (10 secs Momentum), and new stickers to label your existing transmitter and base unit. It will be all set to go, except you will need to open it up to "Learn" your existing transmitter. (Press Learn on the PCB then STOP on the transmitter).

Now to set up your existing unit for Track 2 ...

1. Replace the label on your transmitter with the new Two Track label.
2. Open up your base unit and program Parameter 7 for Option 3 (Two Track—Right Keys).
3. Program Parameter 4 for Option 3 (10 secs Momentum, or your choice, but both units should be the same).
4. Place the Track 2 label on your base unit.

# TrackSide R/C - Hardware Specifications

## Board Revision "A"

### Mechanical

#### Enclosure

4.25" X 3.4" X 3.7"H

3D printed ABS or PETG, Black

#### Wiring

User Connections: 16 AWG, tinned leads for wire nut or solder connections

Fuse Holder for ATC type automotive fuse, 5A, 7.5A, or 10A

#### TrackSide Printed Circuit Board

Physical Size: PCB – 2.8" X 2.4", Max component height – 0.7".

Internal Connections: Screw clamp terminal strips accept individual wires, 20 to 16 AWG.

Antenna: The rounded portion of the PCB that sticks out slightly

#### RailBoss 4 TrackSide Transmitters

2.4 GHZ radio with internal antenna: 3 1/4" X 2 1/2" in contoured case.

Interactive Remote: 2.75" X 1.9" X 0.5" circuit board.

### Electrical

#### Power Input (Terminals IN +,-)

7VDC min to 25VDC max, less than 1V p-p ripple.

Reverse polarity protection (prevents damage, but will not operate)

#### Track Output (Terminals OUT, No polarity)

10 amps max at 100% duty cycle

Fuse, automotive blade fuse, type ATC, 5, 7.5, or 10A

PWM (Pulse Width Modulated), 20 KHZ

Max amplitude: Input voltage minus driver loss

Fan - Runs continuously

### Radio Rx and Tx

FCC,IC,CE certified and approved. IEEE 802.15.4.

2.4GHZ, Direct Sequence Spread Spectrum, motor noise and interference tolerant, built-in antenna.

Range: Up to 800 ft.

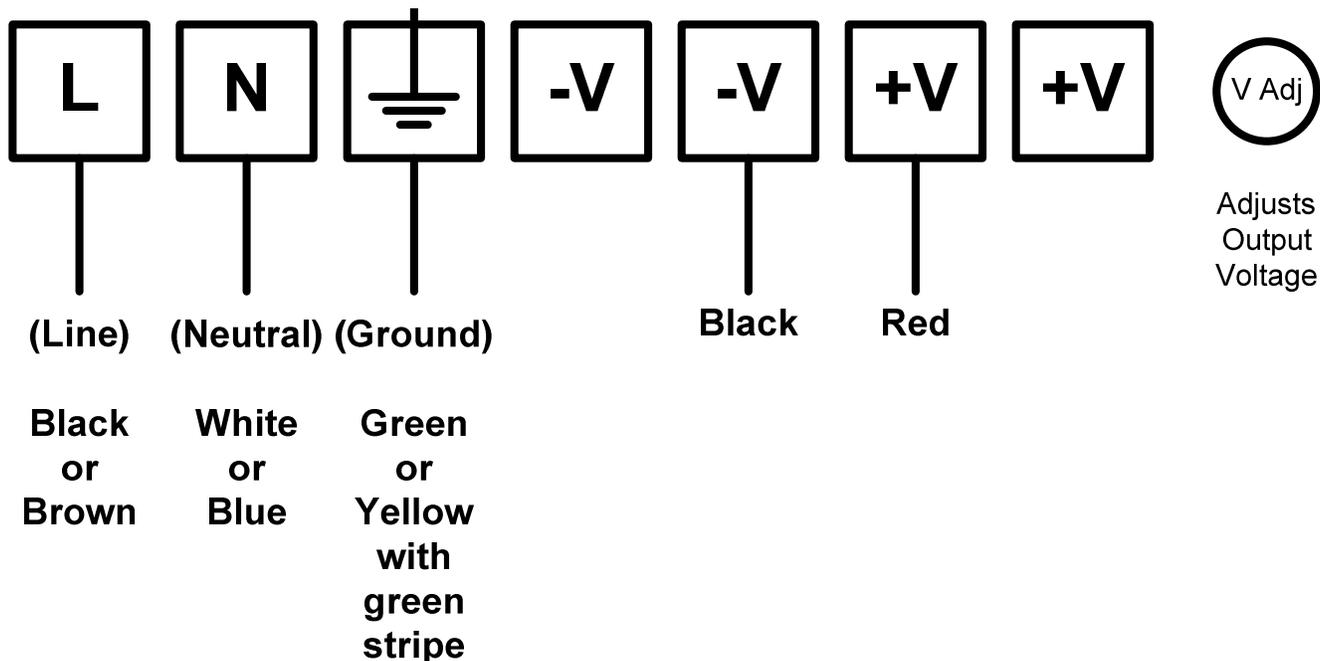
TX batteries: Two AAAA alkaline batteries

Warranty - 12 months from date of purchase. Post warranty repairs can be made for a modest fee.

## Meanwell Power Supplies

You will need to provide or purchase your own AC power cord and connect it to your Meanwell power supply. Any 3-wire power cord will work. Set the power input switch on the side of the power supply for 115 VAC U.S. Output voltage should be 24 VDC maximum for use with the G-Scale Graphics Trackside R/C or Track Throttle. But no adjustment should be necessary as received.

### Meanwell Power Supply



**115 VAC  
Input**

**VDC Output(s) to Track Throttle(s)**

**(Set switch on side of power supply for 115 VAC in U.S.)**

Crimp some spade connectors on the wire ends for a nice neat connection. The AC input terminals on your power supply may be exposed, so you may want to insert a piece of styrene over them for added safety.

