December 2024

RR Concepts

StationMaster - 5

XL-FULL FEATURED Train Controller

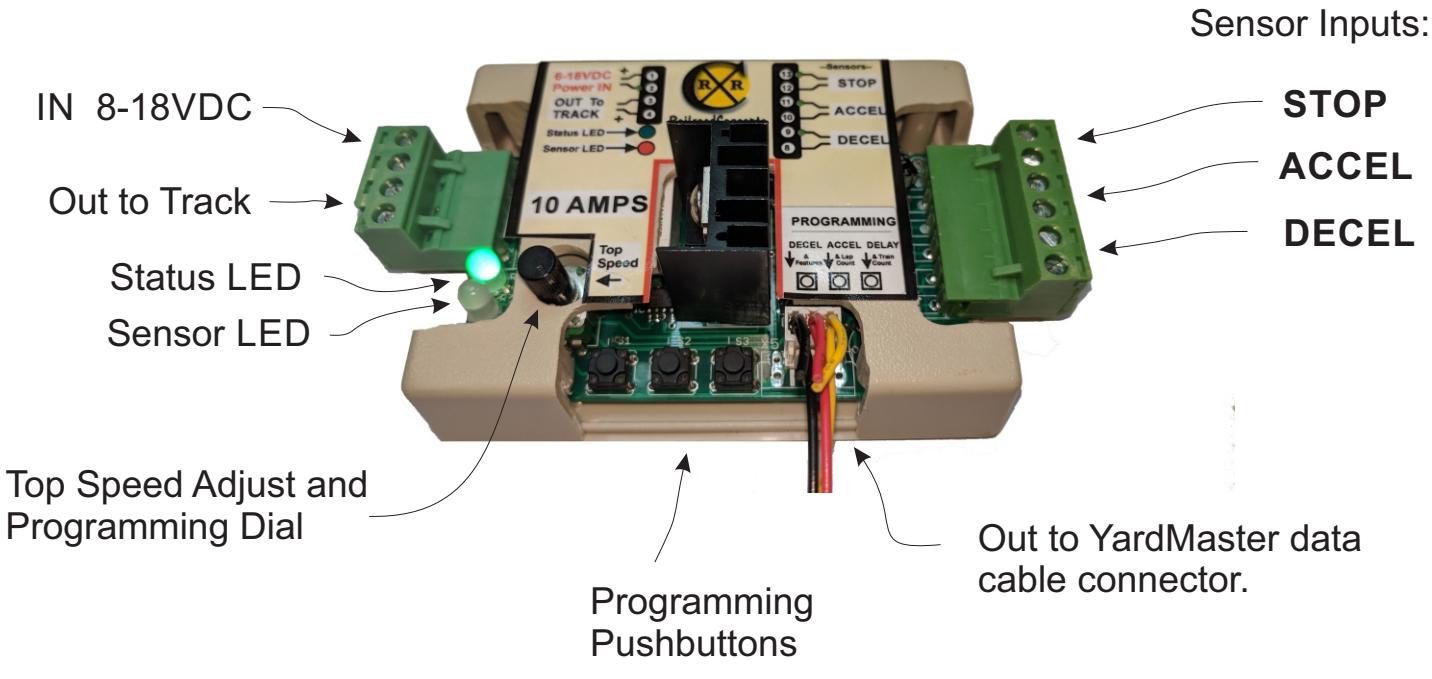
This manual contains detailed hookup and programming instructions for the StationMaster XL-Full Featured train controller available in a 4 AMP or 10AMP configuration. The XL-FullFeatured version contains all features and functions of the StationMaster Station Stop controller, and also all the features and functions of the StationMaster Reverser.

The StationMaster can control DC trains or DCC trains set to linear mode.

Before we Start- Please do not attach power wires (from your power pack or transformer) to any other terminals except the designated input pins 1 and 2. Your StationMaster will be damaged if power is put on any of the sensor terminals.

ONLY ATTACH WIRES WHILE THE POWER IS OFF.
Quick-connect terminals allow easy swap-out and removal of the electronics while leaving the wires in place. The RR Concepts Magnet/Screwdriver tool is recommended for wire-up and testing of operations.

See decal on bottom for optional programming information



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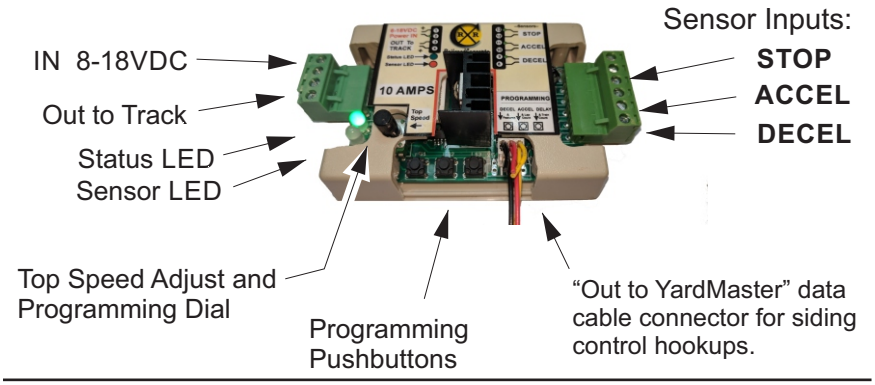
StationMaster - 5

Quick Hookup Instructions

How to do
Realistic Station Stops &
Realisitic Reversing (More details in manual)

The StationMaster works with DC (out of the box) or DCC trains set to linear mode. (N, HO, G, etc.) AC trains cannot be controlled.

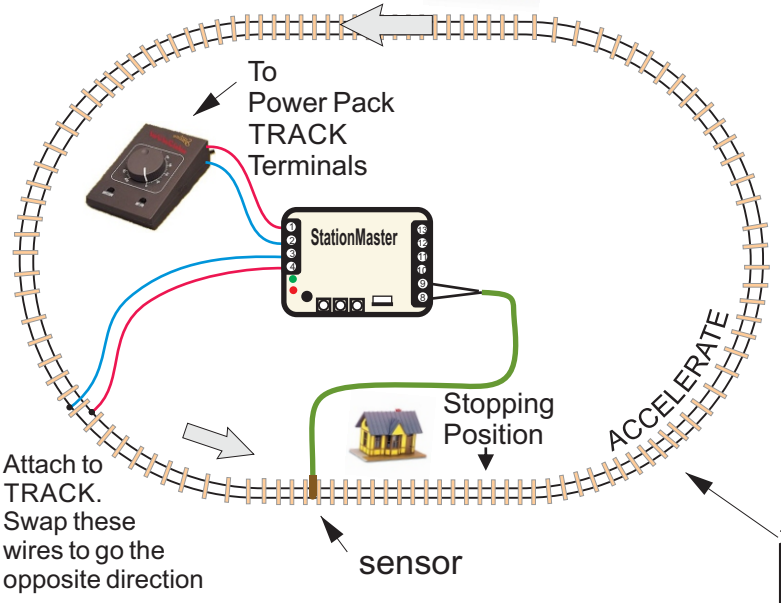
StationMaster CONNECTIONS and CONTROLS



See the label on the bottom for programming and additional information.

10 AMP Version shown, Also available in 4 AMP configuration.

Station Stop Hookup



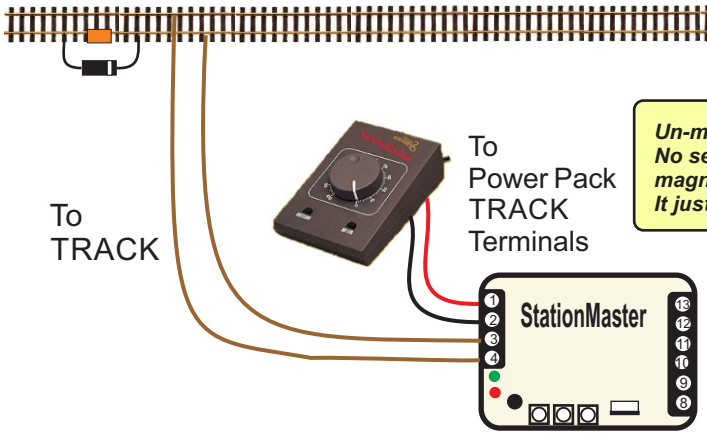
Accelerate + Decelerate Station Stop Hookup

1) Attach terminals 1 & 2 to the transformer.
2) Attach terminals 3 & 4 to the track.
3) Attach terminals 8 & 9 to a train sensor. (No polarity)
4) Mount a magnet on an engine or car.
Set the transformer to the desired top speed. That's it!

See the online manual for optional additional features:
* Change acceleration rate,
* Change deceleration rate,
* Add additional station stops,
* Do multiple laps before stopping,
* Run 2 trains on the same track.
* Change station stop pause duration, (Default 10 seconds)
* Perform "Creep-Stop" deceleration for enhanced realism and exact stopping location. (Requires STOP sensor)

Un-modified track!
No diodes, no breaks, no additional track connections.

Reversing Hookup



Un-modified trains.
No sensors, no magnets.
It just works!

Accelerate + Decelerate Reversing Hookup

1) Attach terminals 1 & 2 to the transformer.
2) Attach terminals 3 & 4 to the track.
3) Program the StationMaster for "Reversing Mode" (see below for programming)

See the online manual for additional in-between stops, self adjusting exact stopping using STOP sensors, delay times, etc,

One time programming for No Sensor Reversing mode":
1. Turn the top speed dial fully counter-clockwise.
2. Simultaneously press buttons 1 and 2.
3. Turn the top speed dial fully clockwise.
4. When train starts to run, press button #3 about 3 feet from the end. Repeat for both directions.
5. Turn dial to desired creep speed into the ends.

Go to ***StationMaster.net*** and download the complete user manual for more info.
Visit **RailroadConcepts.com** for more fun, advanced hookups, and ordering parts.

SCAN FOR INFO

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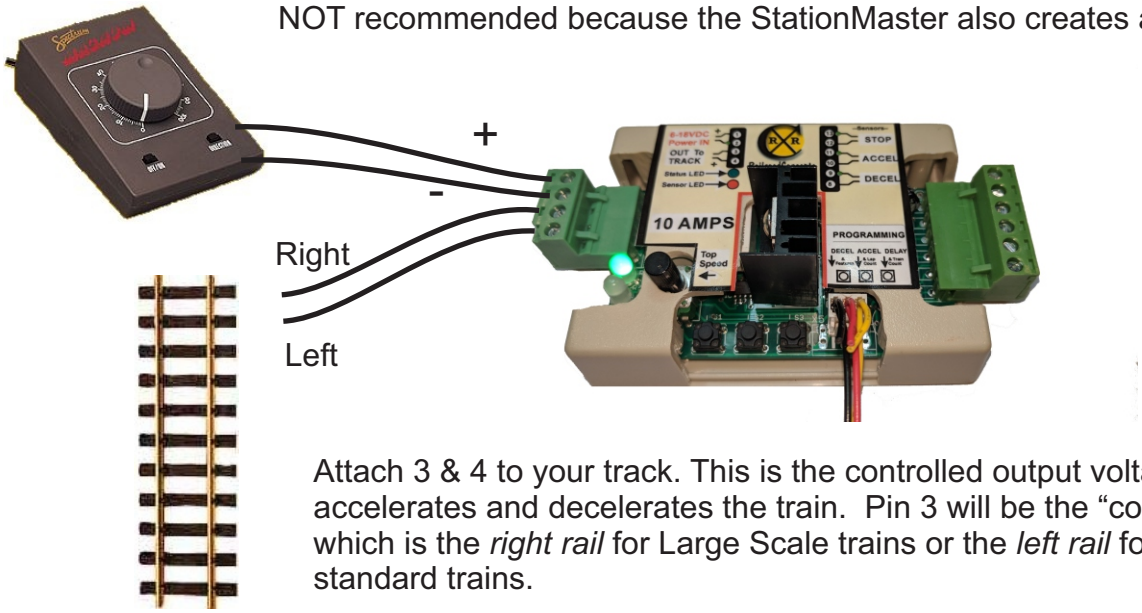
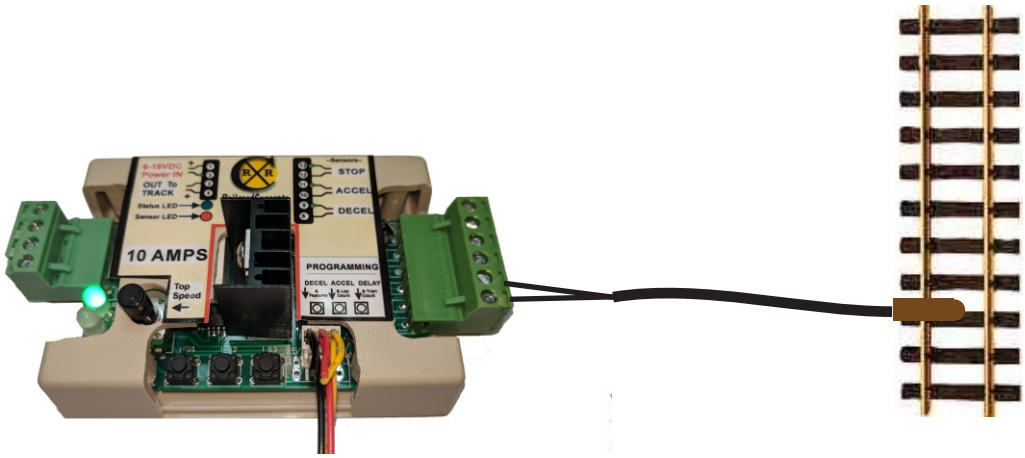
StationMaster Basic Hookup Description

The StationMaster is designed to be installed between the train transformer, and the track.

Attach terminals 1 & 2 to your transformer's DC output (Sometimes labeled as TRACK) or to a constant 12-18 volt power source. If using a train transformer set the throttle position to the desired top speed of the train. If the StationMaster does not "light up", then reverse the direction on the transformer to change the voltage polarity, or swap these two wires. “PWM’ or “momentum” transformers NOT recommended because the StationMaster also creates a PWM signal.



Attach 3 & 4 to your track. This is the controlled output voltage that accelerates and decelerates the train. Pin 3 will be the “common” wire which is the *right rail* for Large Scale trains or the *left rail* for NMRA standard trains.



DECEL Sensor

Terminals 8 & 9 are the start DECEL sensor input.
When these terminals are closed (sensor detects a magnet) the StationMaster will begin a decelerate, pause, and then accelerate sequence. The RED “Sensor LED” will light up for as long as this sensor is detected. By placing multiple sensors wired in parallel, the StationMaster can stop at multiple stations on your railroad.

Pressing button #1 will simulate the DECEL sensor operation.

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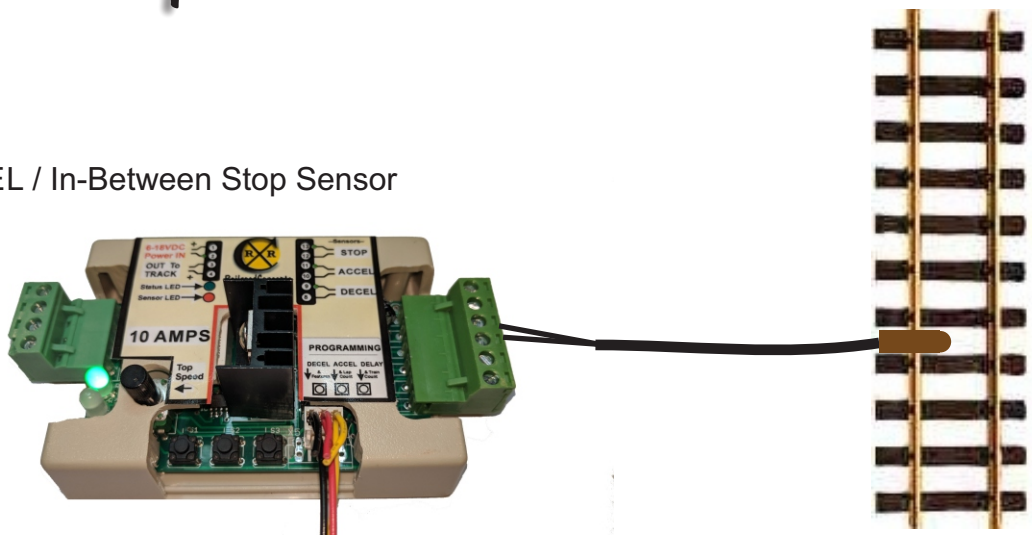
ACCEL / In-Between Stop Sensor



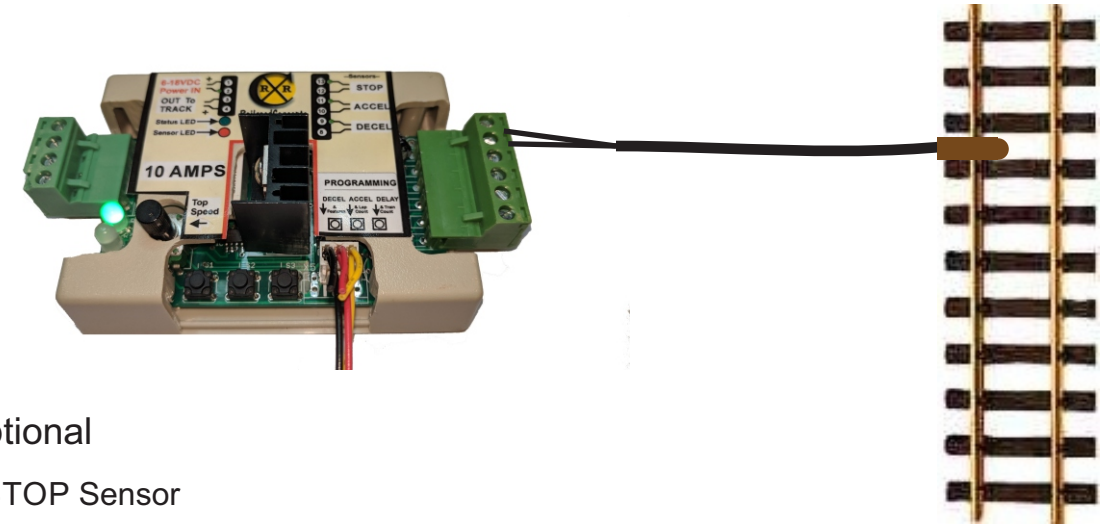
Terminals 10 and 11 are the *optional* **Start Acceleration** sensor inputs.

When these terminals are shorted (sensor detects a magnet) the train will start to accelerate.

This sensor is **not** necessary unless using “Block Control” or the **time delay** is set for maximum blinks (infinite).

Pressing button #2 will simulate the ACCEL sensor.

When programmed for reversing mode, this sensor will perform an in-between station stop and the ACCEL function will not be operational.



Optional

STOP Sensor

Terminals 12 and 13 are the optional STOP sensor inputs.

When the train is decelerating and these terminals are shorted (sensor detects a magnet), the train will immediately STOP. This sensor is not necessary unless using the “Creep-stop” mode in which case it is mandatory.
The STOP sensor will have no affect unless the train has already passed over the DECEL sensor.

Pressing button #3 will simulate the STOP sensor.

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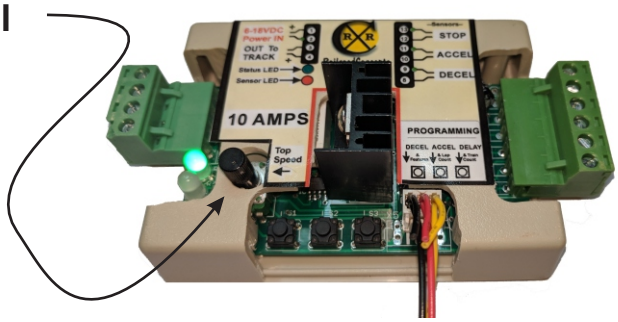
Top Speed and Programming Mode Dial



The Top Speed dial provides 3 functions:

1: Adjust the top "cruising" speed of the train.
2: Enter programming mode.
3. Reduce the “creep speed” when in *No Sensor Reversing* mode.

Top speed adjustment
“Full speed" is clockwise. Turn this dial down as necessary to set the desired cruising speed of the train. This is only necessary when using a “fixed voltage” power supply or when a YardMaster is attached (which requires over 12 volts) and a slower top speed is desired.

Typically, this dial is set fully clockwise and the train throttle (transformer) is used to set the speed of the train.

Programming Mode
To enter programming mode, turn this dial fully counter-clockwise **and press button #1.** The Sensor LED will “twinkle” orange to indicate programming mode.

To exit programming mode turn the dial fully clockwise.

No Sensor Reversing Mode Creep Speed
When in *No Sensor Reversing mode* this dial can be used to reduce the creeping speed into the diode sections. Turn the dial counter-clockwise to decrease the speed.

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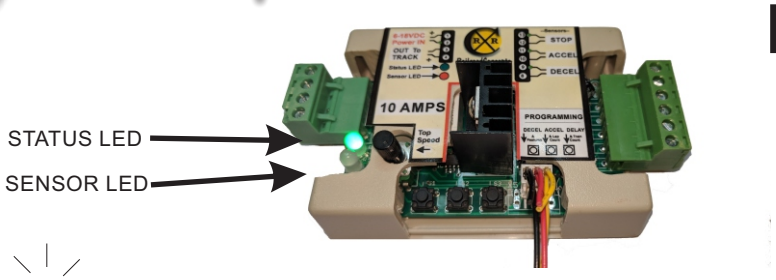
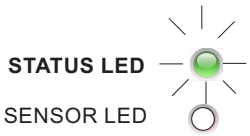
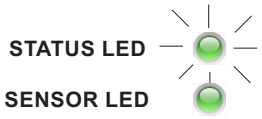
LED indicators

For Information only



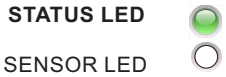


Green flashing: train is **ACCELERATING**.

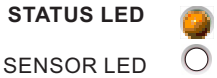


Green flashing with green solid: Train is creeping out of station. After a delay the train will continue to accelerate up to top speed.

Both flashing green is a dead man timer shutdown. See details later in this manual. No train has been detected for several minutes.

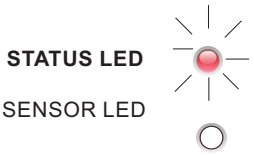


Green NOT flashing**:** Train is **AT TOP CRUISING SPEED.**



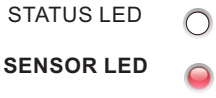
1. Orange NOT flashing, The StationMaster **will ignore next DECEL sensor** due to lap counting or block control.

2. Orange Flashing, The StationMaster is performing a time delay.

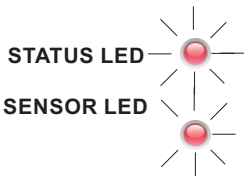


1. Quick Red flashing: Train is **DECELERATING.** Flash rate indicates the rate of deceleration.

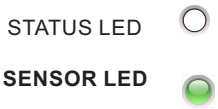
2. Two quick RED flashes at 1 second rate: StationMaster is **waiting for the ACCEL sensor** before accelerating**.** (StationMaster Is programmed for infinite time delay)



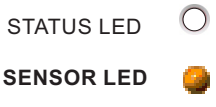
Sensor RED LED ON or flash: The STOP sensor is detected.
The LED will remain on for as long as the sensor is detected. *If a train is parked on the STOP sensor then the deceleration sensor will be ignored.*



Two Red Blinking LED's indicate a **SHORT CIRCUIT** condition. To recover push and hold button 1, or cycle power. If the condition returns after recovery check for a short circuit on the track or **re-program the shutdown threshold**. Pressing and holding button 3 will force a re-program of the shutdown threshold. Make sure the transformer is set to full speed first.



Sensor LED GREEN or flickering indicates secondary Programming mode.



Sensor LED orange flickering: Indicates programming mode.

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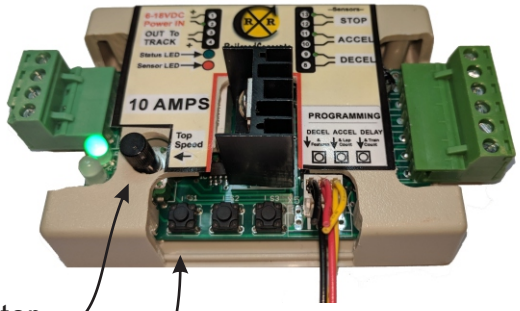
Programming: **Deceleration Rate**



Fully counter clockwise

1. Make sure all three sensor inputs are open.

2. If not already in programming mode, then turn the top speed dial fully counter-clockwise AND press button #1. An orange LED will “twinkle”.

3. Push and hold programming button #1.

4. Watch the status led. Each RED blink will decelerate slower. The fastest deceleration will be with one blink. (TRAIN Stops sooner) Release the pushbutton when the desired number of blinks have occurred. A typical number is 5. Repeat this procedure if you want a different value.

One blink corresponds to a 3 second deceleration rate. Each additional blink adds 1 second. For example, a blink count of 5 would result in a deceleration rate of 8 seconds.

When finished with all programming turn the top speed dial fully clockwise and then turn down to a desired top speed if needed.

All programming values are stored in flash memory and are retained until re-programmed.

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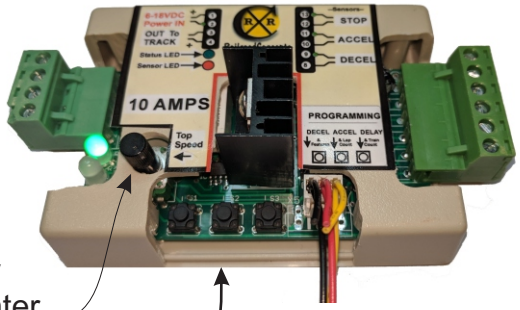


Fully counter clockwise

Programming: **Acceleration Rate**

1. Make sure all three sensor inputs are open. (Red LED is off)

2. If not already in programming mode, then turn the top speed dial fully counter-clockwise AND press button #1. An orange LED will "twinkle".

3. Press and hold programming button #2..

4. Watch the status led. Each GREEN flash will accelerate slower.

<u>The fastest acceleration will be with one blink.</u>

Release the button when the desired number of blinks have occurred.
A typical number is 5. Repeat this procedure if you want a different value.
One blink corresponds to a 3 second acceleration time. Each additional blink adds 1 second. For example, a blink count of 5 would result in a deceleration rate of 8 seconds. A factory default will set to 5.

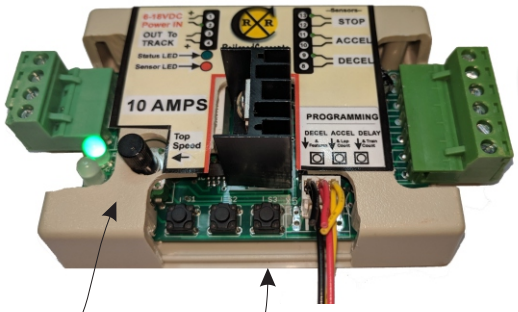
When finished with all programming, increase the top speed dial clockwise to MAX and then down to a desired top speed. All programming values are stored in flash memory and are retained until re-programmed.

<u>A Note on Realistic Accelerations:</u>

* For blinks 1 thru 9 the train will accelerate linearly with the programmed value. This may be required for some block control operations where a second train is approaching and the first train needs to quickly accelerate to get out of the way, or for a trolley which accelerates quickly.

* For blinks 10 and above the train will creep very slowly out of the station and then continue accelerating as it continues down the main line. This provides a very realistic operation as a train creeps out of a siding or station and shows off sound systems with incredible realism.

* 10 blinks will creep for 5 seconds.
* 11 blinks will creep for 10 seconds.
* 12 blinks and up will creep for 15 seconds.



Fully counter clockwise

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Programming: **Pause Time**

1. Make sure all three sensor inputs are open. (red Led is off)

2. If not already in programming mode, then turn the top speed dial fully counter-clockwise AND press button #1. An orange LED will "twinkle"

3. Press and hold programming button #3.

4. Each ORANGE flash will increase the waiting time after a station stop.
A wait time of zero will be with one flash.
Release the button when the desired number of flashes have occurred.
Repeat this procedure if you want a different value.

The LED will turn orange when an infinite delay is set (after 10 counts).
When infinite delay is set, then the ACCEL sensor is required to start up the train after a station stop. A fun thing to do would be to connect the ACCEL terminals to a doorbell switch. Your train would patiently wait until someone pushed the button! Motion sensors are another possible way to start the train.

When finished with all programming increase the top speed dial clockwise to maximum and then back down to a desired top speed.
All programming values are stored
in flash memory and are retained until re-programmed.

The number of orange FLASHES will correspond to the following time delays:

1: 0 seconds, no wait.
2: 5 seconds
3: 10 seconds
4 15 seconds
5: 20 seconds
6: 30 seconds
7: 1 minute
8: 2 minutes
9: 5 minutes
10: 10 minutes
11: 30 minutes
12: 60 minutes
13: Infinite, wait for GO sensor. This is for block control operations.

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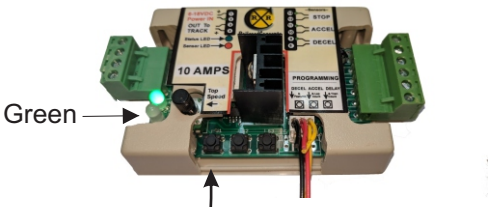

Please go to RRconcepts.com to view an informational video on how to program operating modes.

Programming: **Operating Modes**

HOW TO PROGRAM: (Perform a factory reset to clear everything)

1. **Enter Secondary Programming mode:** (Skip this step if already in secondary programming mode)

   * Turn the Top Speed dial fully counter-clockwise and press button #1 to enter programming mode. (Skip this step if already in programming mode).

   * Turn the Top Speed dial slowly clockwise until the sensor LED turns green. This indicates secondary programming mode. This should be about half-way.

2. **Press and hold programming button #1** until the desired number of blinks have occurred. Each blink will set or clear a different feature. If currently ON it will turn off. If ON it will turn OFF.

When finished do not power off without first turning the dial fully clockwise.

Programmable Modes: (Any or all of these or all can be programmed independently)

Hold button for 1 blink = Simple Reversing Mode, ignore next sensor after reversing, ACCEL sensor will perform an in-between station stop.

Hold button for 2 blinks = Fire YardMaster before acceleration. (Default ON in reversing mode)

Hold button for 3 blinks = Fire YardMaster after train has stopped. (Set after factory reset)

Hold button for 4 blinks = Use automatic train detection to start deceleration. (No-sensor station stops)

Hold button for 5 blinks = Reverse direction before every acceleration. Never ignore sensors.

Hold button for 6 blinks = Only fire YardMaster in forward direction. (For reversing operations with a siding on one end)

Hold button for 7 blinks = Shut off current sensor. This could cause damage to the StationMaster unless the transformer can provide short-circuit shutdown. This is sometimes necessary when running with very small transformers. (1 AMP or less)

Hold button for 8 blinks = Turn on “creep stop”. The train will decelerate then creep until reaching the STOP sensor. LEDs will flash RED/GREEN when creeping.

When the button is released the StationMaster will echo the currently programmed features (modes) by blinking the red/green LED 8 times. *For example*, if “Fire YardMaster after train has stopped” has been programmed (button pressed for 3 blinks, or after factory reset) and nothing else is programmed then the StationMaster will blink:

blink 1 RED: Reversing mode is OFF.
blink 2 RED: Fire YardMaster before acceleration OFF
blink 3 GREEN: Fire YardMaster after stopping ON
blink 4 RED: Use train sensor to start deceleration OFF
blink 5 RED: Reverse direction before every acceleration OFF
blink 6 RED: Only fire YardMaster in forward direction OFF
blink 7 RED: Disable current sensor: OFF
blink 8 RED: Creep-stop mode : OFF

Each time a feature is programmed that feature will toggle on or off. (Toggle means the feature will go OFF if currently ON, or ON if currently OFF). A factory reset will clear all values and set blink 3.

To view the currently programmed operating modes quickly press and release button #1.

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Additional Information on Programming Modes. The hookup diagrams will identify which of these need to be set.

blink 1 = Simple Reversing Mode

This will allow reversing operations with a DECEL sensor placed at the ends wired in parallel. After reversing the very next DECEL sensor will be ignored. In-between station stops can be done by adding sensors in parallel to the ACCEL terminals. The train will stop at every location where a sensor is placed. the ACCEL sensor operation will not be operational.

blink 2 = Fire YardMaster before acceleration.

If programmed for more than 1 train the YardMaster will fire to the next siding after before accelerating

blink 3 = Fire the YardMaster after the train has stopped.

If programmed for more than 1 train the YardMaster will fire to the next siding after the train has stopped. Note that the StationMaster will automatically set this blink after a factory reset.

blink 4 = Use automatic train detection to start deceleration.

When a train is sensed entering the track section the StationMaster will start a deceleration sequence.

blink 5 = Reverse direction before every acceleration

This is similar to blink 1 however the StationMaster will not ignore any sensors and the ACCEL sensor will be operational.

blink 6 = Only fire YardMaster in forward direction. (only active in reversing mode)

This will allow a reversing operation with sidings on one end.

blink 7 = Disable current sense shutdown.

If a double RED blinking shutdown condition occurs too often then the power supply may be too small to provide sufficient current and is not reliably sensed by the StationMaster. The shutdown can be disabled however damage could occur if the transformer does not have short-circuit protection.

blink 8 = Turn on “CREEP STOP” mode.

The train will decelerate using the programmed deceleration rate, then creep until reaching the STOP sensor. If the STOP sensor is not reached within 25 seconds then the creep speed is increased for next time. This creates incredible realism for you trains.

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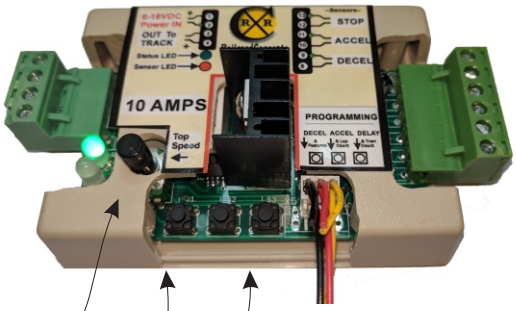

Fully counter clockwise

Programming: **Factory Reset**

To set the StationMaster back to factory defaults perform the following:

1: Enter programming mode by turning the top speed dial fully counter-clockwise and press button #1.
2. Press and hold both button #1 and button #3 at the same time, then release.
3. Save the settings by turning the top speed dial fully clockwise to exit programming mode.

Do not power off without first turning the dial fully clockwise.

The factory default settings are:

* Acceleration rate 5 blinks
* Deceleration rate 3 blinks.
* Time delay 5 seconds.
* Train count: 2 (Note: Block control will not be operation until set for 1 train)
* Lap count: 1
* Operating mode (features):

Blink 1 = RED, Simple Reversing: OFF.
Blink 2 = RED, Fire YardMaster before accelerating: OFF
Blink 3 = GREEN, Fire YardMaster after train has stopped: ON
Blink 4 = RED, Use train sense to start deceleration: OFF
Blink 5 = RED, Reverse before every acceleration: OFF
Blink 6 = RED, Fire YardMaster only in forward direction: OFF
Blink 7 = RED, Disable current sensor: OFF
Blink 8 = RED, Enable CREEP-STOP mode: OFF

With these settings both the *Simple Station Stop*, and the *Alternating Trains* hookups are ready to run!

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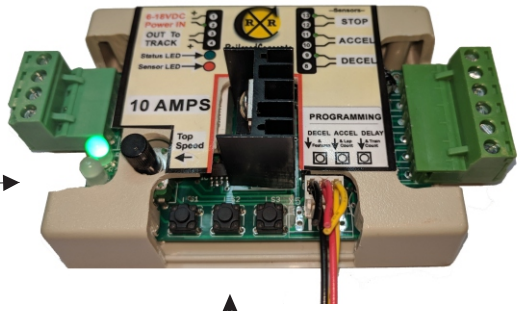


Green →

Programming: **MULTIPLE LAPS**

When a lap value is set the StationMaster will ignore the DECEL sensor until the lap count is satisfied. (It will count laps)

1. Turn the Top Speed dial fully counter-clockwise and press button #1 to enter programming mode. (Skip this step if already in programming mode).

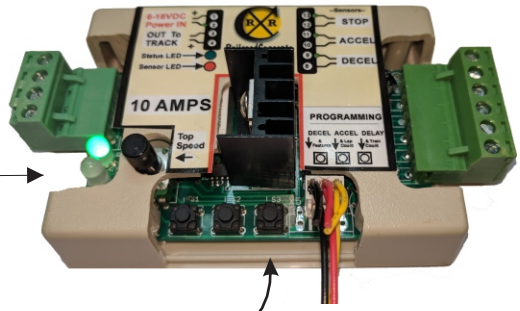
2. Slowly turn the Top Speed dial clockwise until the GREEN indicator turns on. This indicates secondary programming mode.
(Skip this step if already in secondary programming mode)

3. Press and hold button #2.

4. Count the blinks while the button is pressed. Release the button when the appropriate number of blinks (LAPS) are set.

When finished with all programming turn the top speed dial clockwise to maximum.

All programming values are stored in flash memory and saved until re-programmed again.



Green →

RR Concepts

Programming: **Train Count**

The train count is needed for 3 reasons:
1. Use different creep speeds for up to 5 trains.
2. Send signals to one or more YardMasters to correctly fire turnouts.
3. Allow running in a block-control mode. (Must be set for 1 train)

For example, a 3 track siding using 2 YardMasters attached to a StationMaster would have a train count of 3, since 3 trains will be controlled.

For an alternating siding hookup no programming is necessary since the default train count is 2.

Programming:

1. Make sure all three sensor inputs are open.

2. If not already in programming mode turn the top speed dial to zero and press button #1. (fully counter-clockwise.)

3. Slowly turn the top speed dial clockwise until the sensor LED turns GREEN.
This indicates secondary programming mode.
(Skip this step if already in secondary programming mode)

4. Press and hold button #3.

5. Each orange flash counts the number of running trains.

Release the button when the desired number of flashes have occurred.
The number will be echoed back when the button is released..
Repeat this procedure if you want a different value.

When finished with all programming, increase the top speed dial clockwise to MAX, and then down to a desired top speed if necessary.
All programming values are stored in flash memory and saved until re-programmed again.

NOTICE: **A factory reset will set the train count to 2**. Block control will not be operational until set for 1 train.

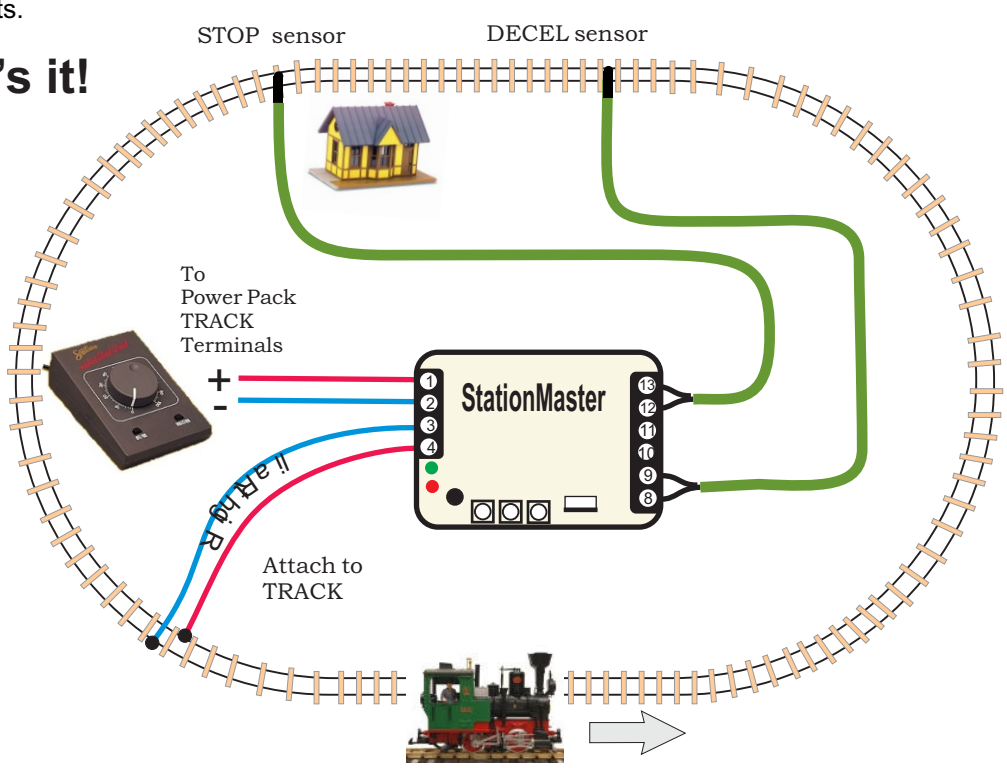
RR Concepts

“Creep-Stop” Deceleration for Incredible Realism

A unique and extremely realistic feature of the StationMaster is “Creep-Stop” Deceleration.
By using both a DECEL sensor and a STOP sensor the StationMaster will provide a very realistic station stop.
Programming your StationMaster to use “Creep-Stop” is very easy:

1. Set bit 8 in programming mode.(Press and hold button #1 in SECONDARY Programming mode until the LED blinks rapidly)
2. Place the **DECEL** and **STOP** sensors on your track as shown. The distance between sensors should be about 2 to 6 feet, or whatever looks good to you.
3. Program the deceleration rate (if needed) to provide a realistic deceleration into the train yard before the creep starts.

That’s it!



When “Creep Stop” is enabled, the train will decelerate using the programmed deceleration rate, then “creep” forward until the STOP sensor is reached. This guarantees the train will always stop on the STOP sensor using a realistic profile. The starting creep speed is relatively slow however the train must reach the STOP sensor within 25 seconds. ***If the train stalls, then the creep speed is increased for the next time.*** When a stall occurs, the voltage will be increased to allow the train to reach the STOP sensor after 25 seconds. **Be patient.** If the train stalls it will eventually carry on and the next run will be better.

The length of the creeping can be adjusted by either increasing or decreasing the distance between DECEL and STOP sensors, increasing or decreasing the deceleration rate, or both. Start with a 4 foot distance and see how that looks.

The StationMaster keeps track of up to 5 different creep speeds for each train. Slow trains can run next to fast trains and each will creep perfectly, Use the “train count” to set the number of trains that will be run, the StationMaster will do the rest. A factory reset will program for 2 trains which is perfect for an alternating siding setup.

RR Concepts

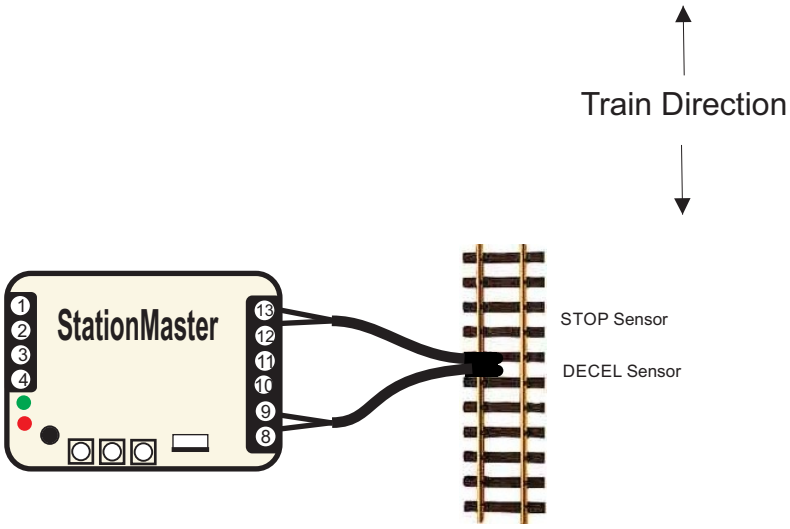
“Justa Station Stop”

Justa-Station-stop performs a decelerate/Pause/Accelerate sequence without triggering an attached YardMaster or reversing.

When operating in an alternating trains setup additional stations stops can be done at different locations around the loop without affecting the parked train.

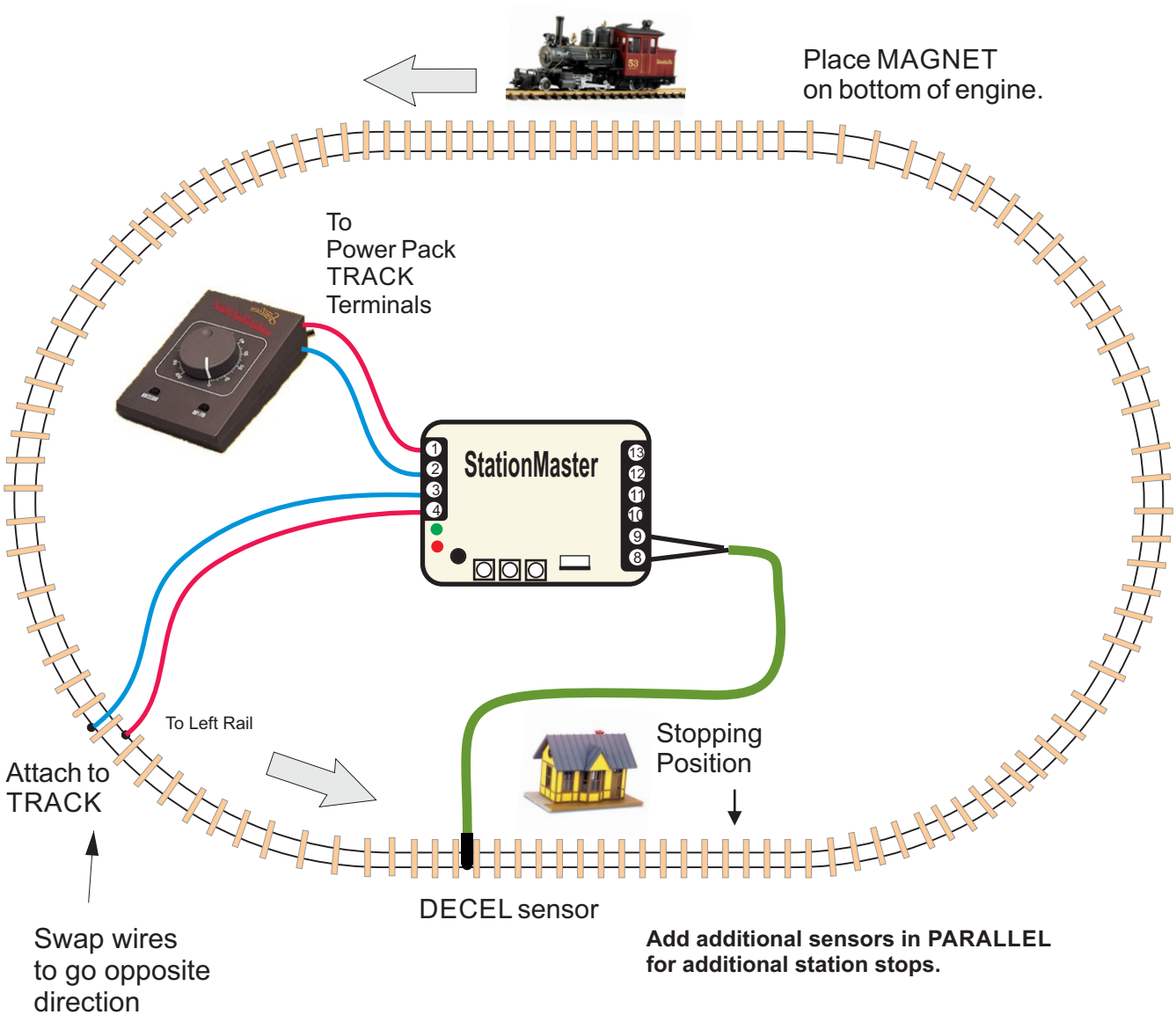
Place a STOP and a DECEL sensor such that they are both triggered at the same time. The train will decelerate, pause and accelerate without triggering a YardMaster and without changing directions.

If self-adjusting mode is programmed then the deceleration rate will be fixed. Otherwise the programmed deceleration rate will be used.



RR Concepts

Basic Hookup Diagram for Automatic Station Stops with Deceleration/Acceleration using train sensors.

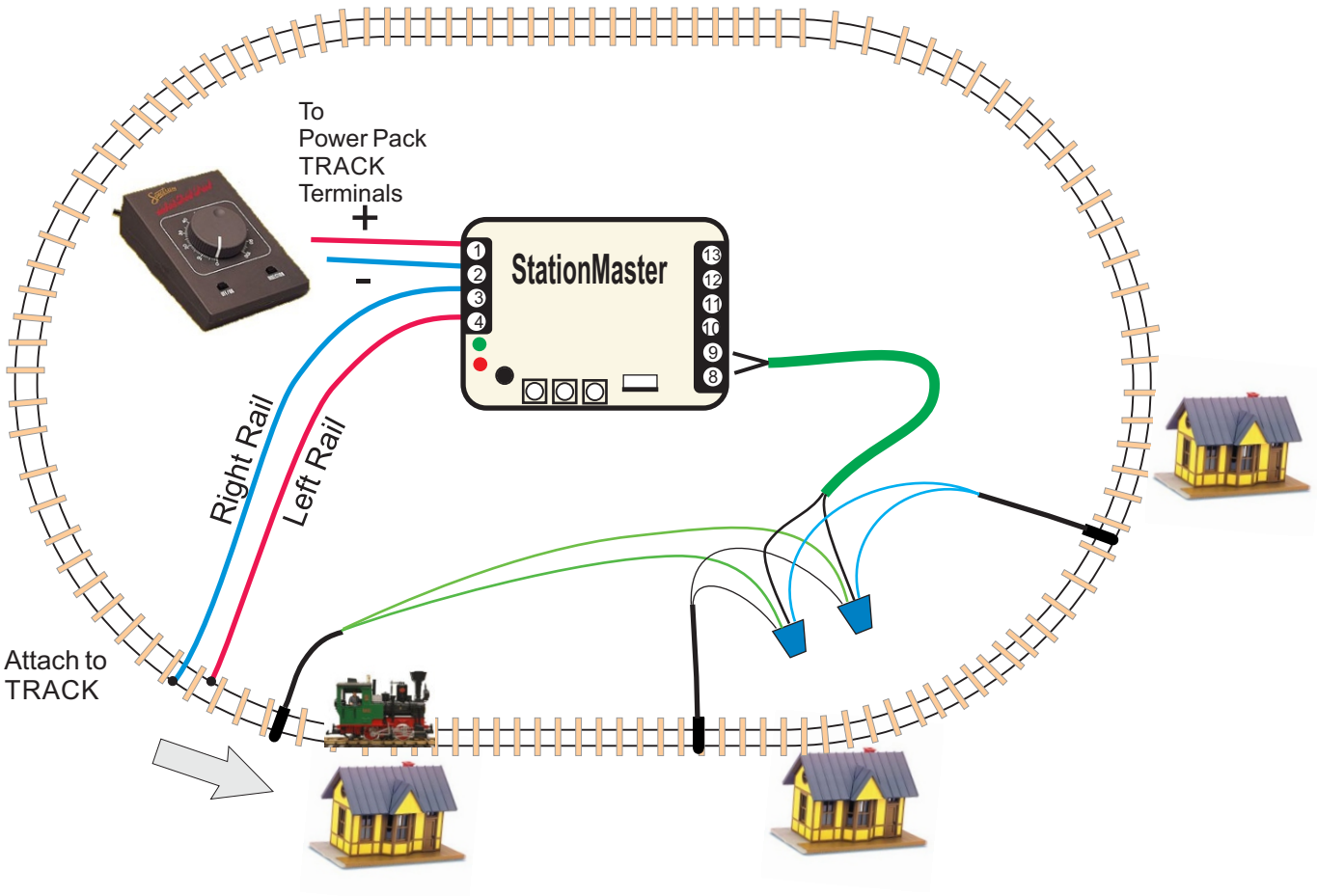


For a simple station stop, this is all you need to do!
Factory settings will be a gradual acceleration, gradual deceleration and 10 second stop.

RR Concepts

Multiple Station Stops

Your train can stop at many stations on the loop by adding DECEL sensors in parallel.



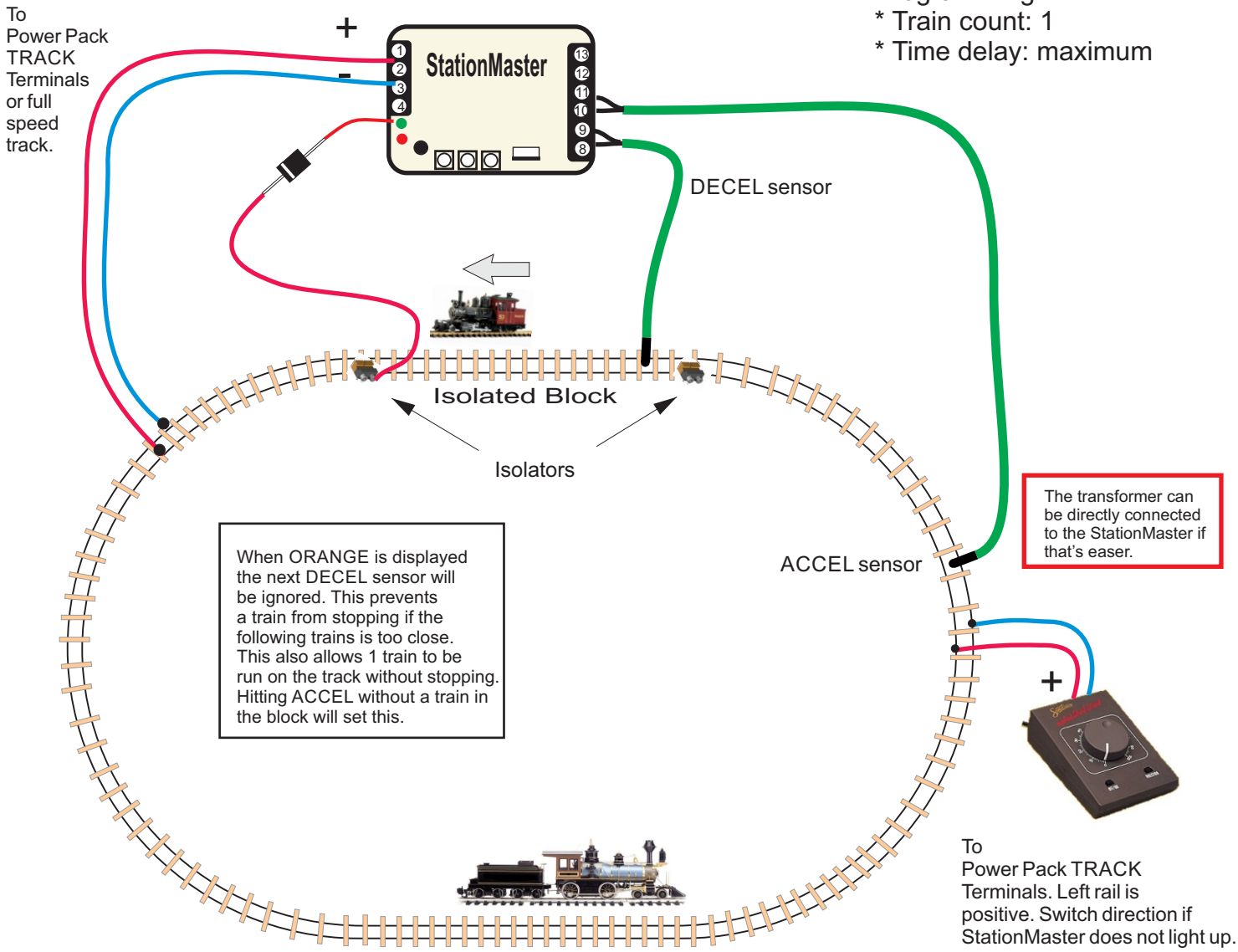
Every sensor that the train passes over will cause a declerate/pause/accelerate sequence.

RR Concepts

Block Control

For 1 or 2 Trains on 1 track with gradual Decelerations and Accelerations.
Can be located at a remote location on the railroad

Programming:
* Train count: 1
* Time delay: maximum



Hookup Notes:
1. Your train may not stop if the second train is too close. (ACCEL is hit before DECEL)
2. When the train decelerates it must stop before reaching the 2nd isolator..
3. If the train is slowing or stopped, then the second train will tell it to "go" when it hits the ACCEL sensor. (Start with sensor half-way around the track. Station stop will be longer with ACCEL sensor closer.) Move the location of this sensor to fit your track.
5. Location of ACCEL sensor must allow the stopped train time to accelerate and exit before the 2nd train enters the siding.
6. This hookup can run with 1 train or 2 trains. (1 train will never stop)
7. A longer isolated section will provide more realism for the stopped train to decelerate and accelerate.
8. Station can be located at a remote location on your railroad.

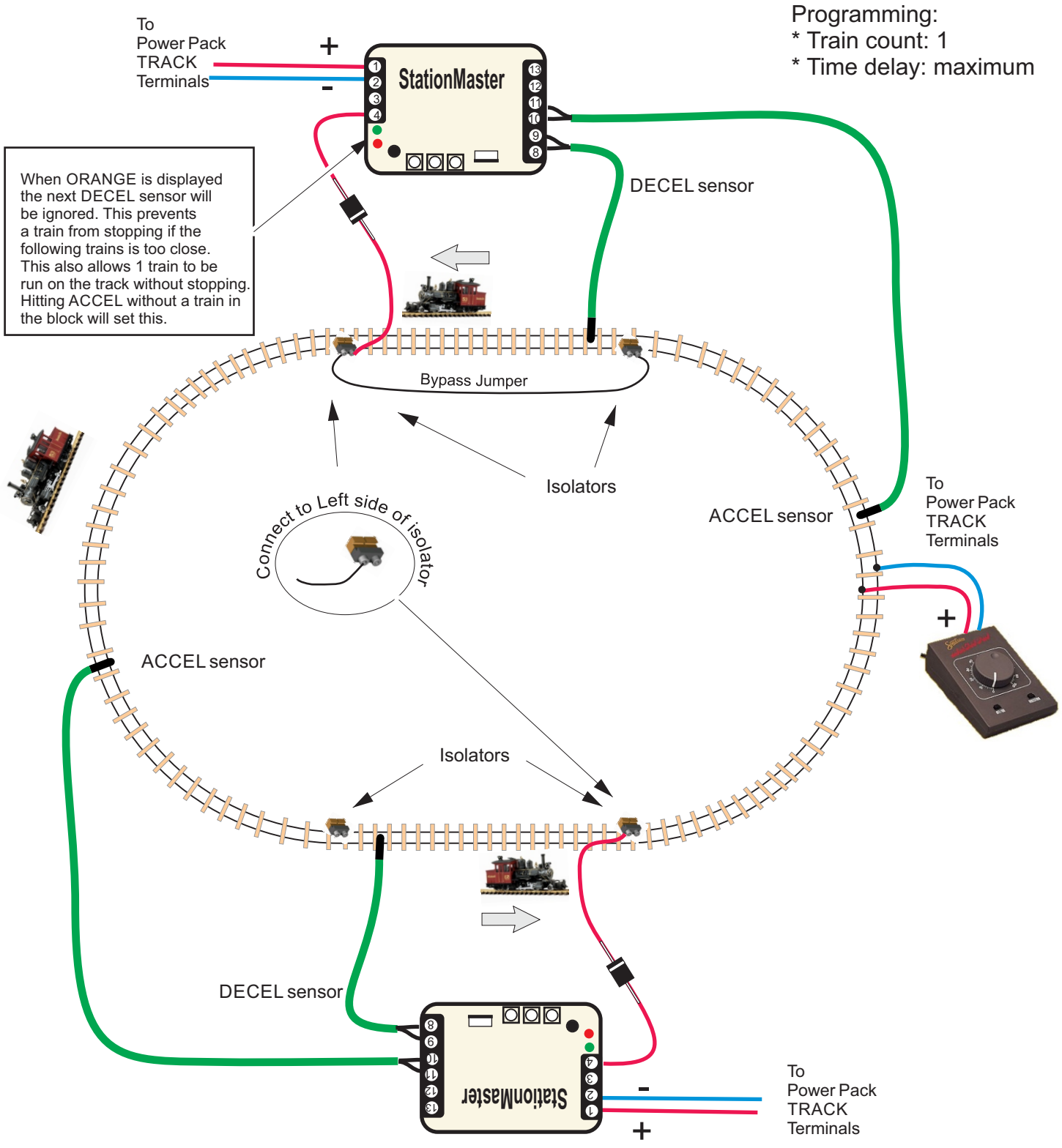
TIP:
The location of the ACCEL sensor determines how long a train will wait at the block:

.
* When closer to the block the pause will be longer.
* When farther away both trains will run for a longer amount of time.

RR Concepts

Block Control

For 1, 2, or 3 Trains on 1 track with gradual Decelerations and Accelerations using StationMasters.

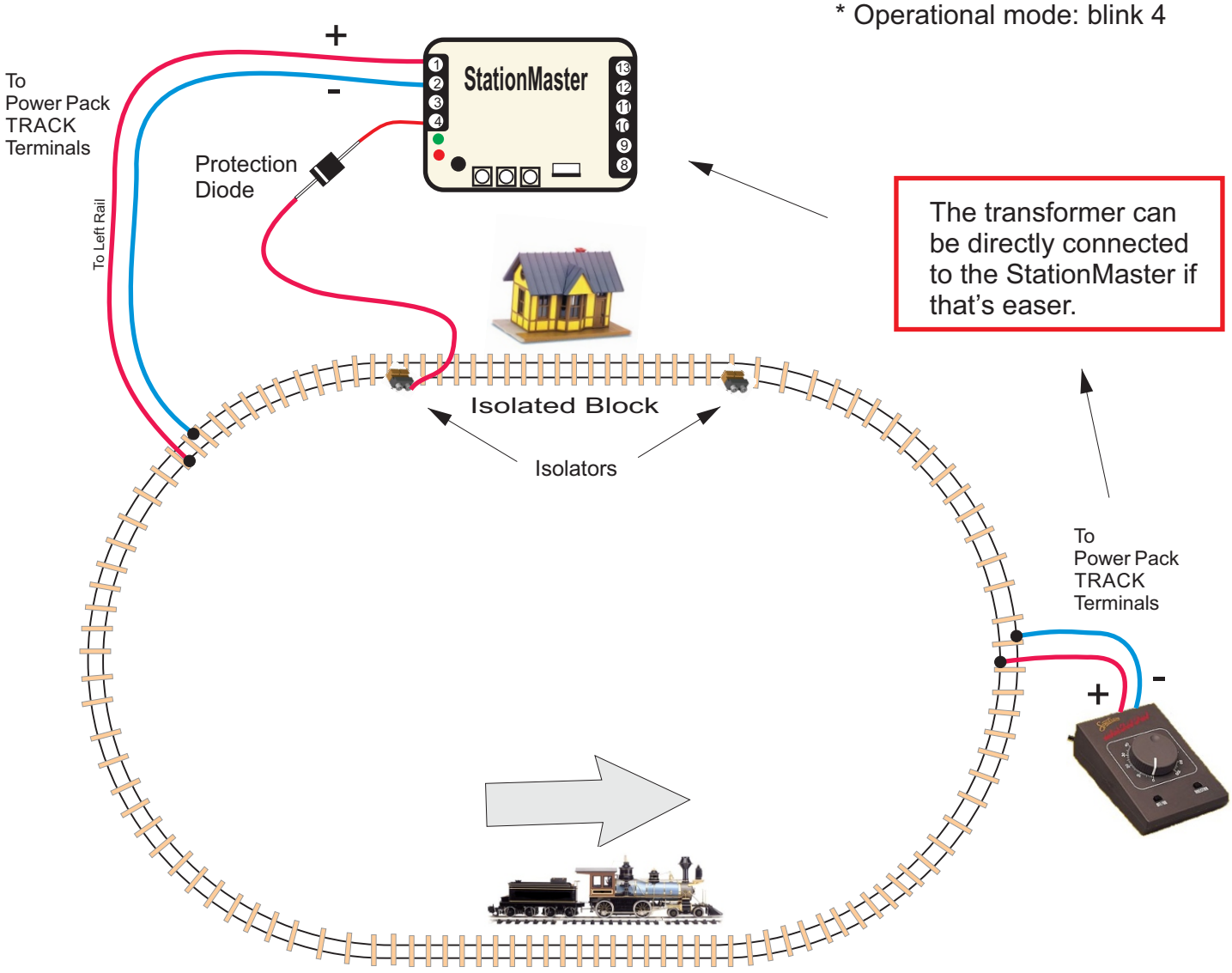


RR Concepts

No Sensor Station Stop

Using the Automatic Train Detection feature.

Programming:
* Operational mode: blink 4



Hookup Notes:

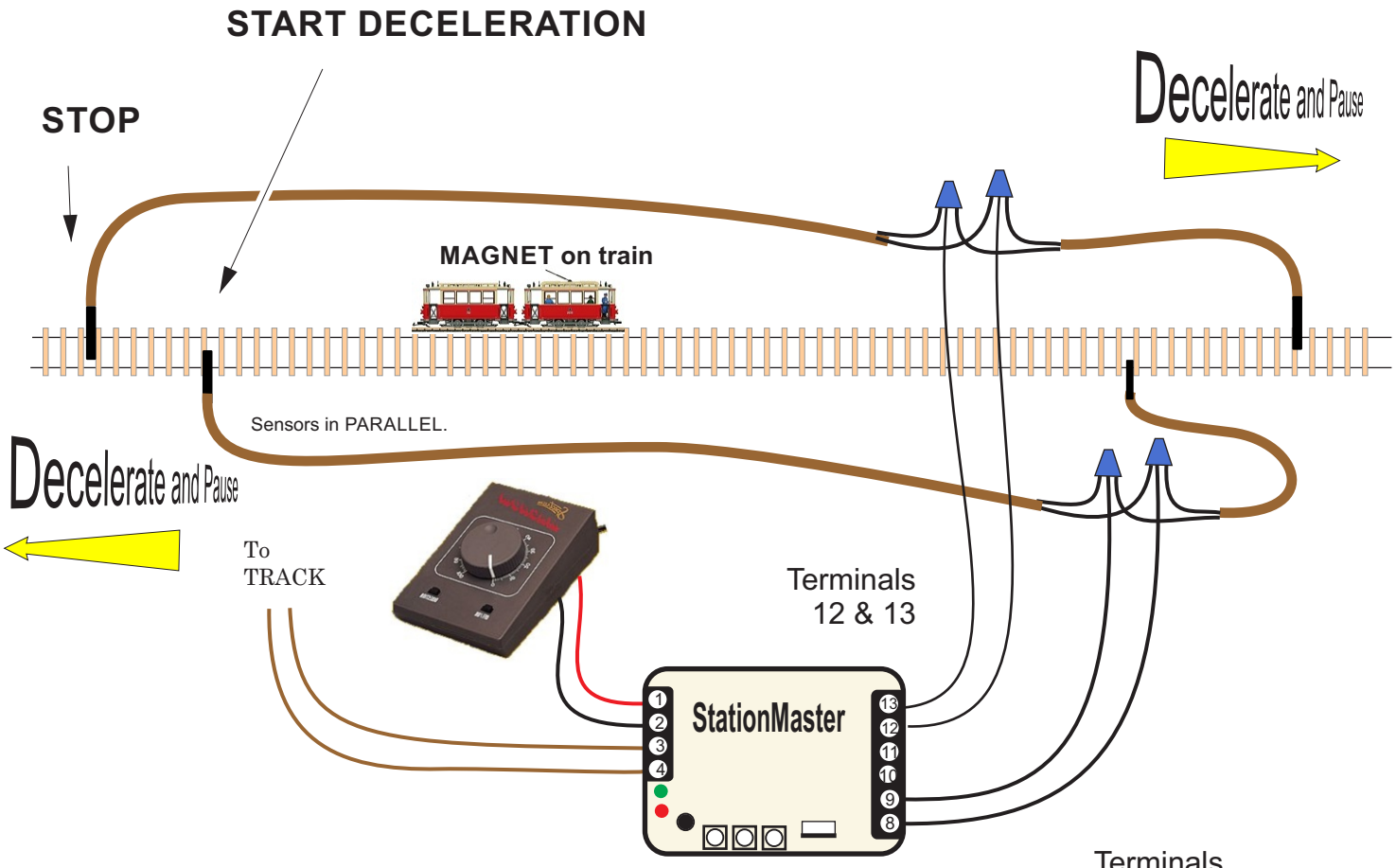
1. Isolated section must be long enough to allow train to decelerate and accelerate.
2. Train can only go in one direction.
3. Protection diode prevents damage in case of train running backwards.
4. Program StationMaster for "blink 4".
5. Program time delay as desired.
6. No magnets and no sensors are required
7. Station stop can be located at a remote location on your railroad far from the transformer.

RR Concepts

Extremely Realistic Reversing Operations

When programming Mode ***blink 1*** is set the StationMaster will go into reversing mode.

Sensors are placed near the ends to signal the StationMaster to begin the deceleration / pause / accelerate operation. Sensors on the ends stop the train at an exact location. Sensors have no polarity. Place sensors about 2 feet apart for realistic operation.
Set the StatioMaster for “Creep-Stop” mode, and program the acceleration and deceleration as desired.



HOOKUP:
①② To Power Pack DC TRACK Terminals.
If StationMaster does not turn on then reverse direction on the transformer.

③④ To Track

⑧⑨ To DECEL sensors wired in parallel.

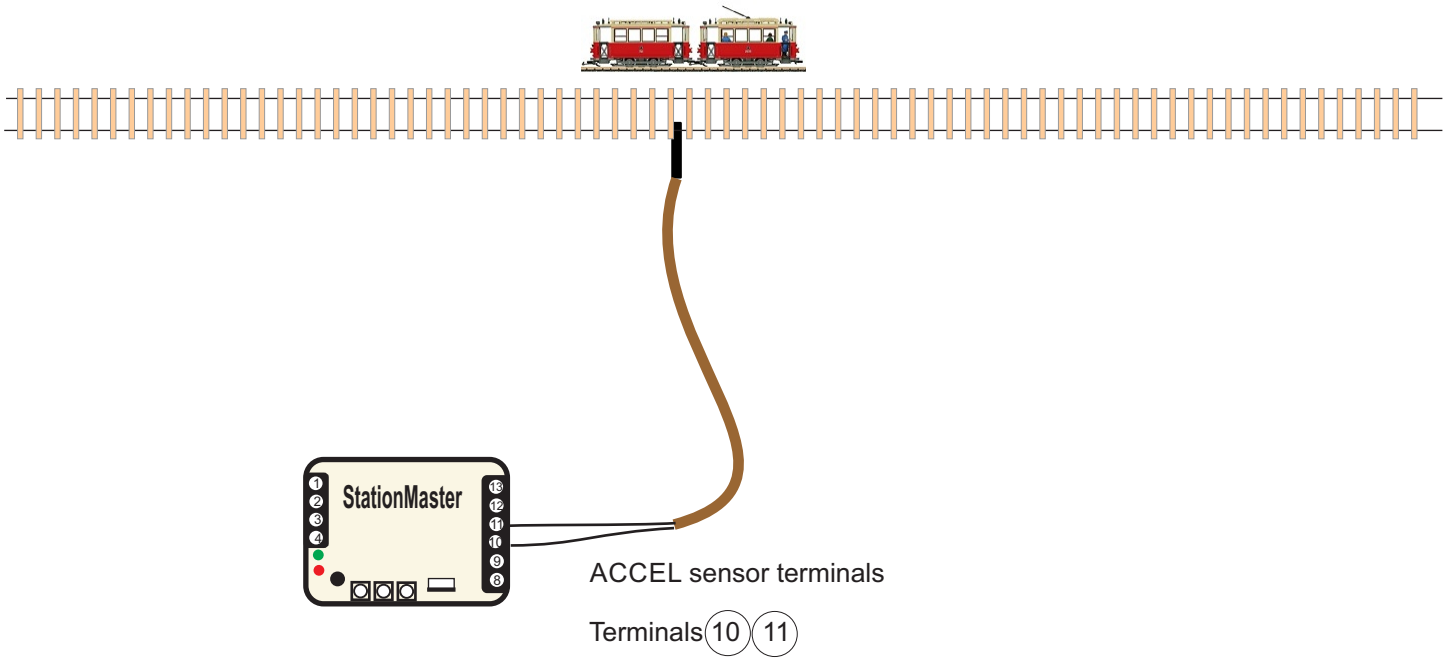
⑫⑬ To STOP sensors wired in parallel.

See next page for optional in-between station stops.

RR Concepts

In-Between Stops while Reversing

When running in a back-and-forth reversing operation, in-between station stops are accomplished by placing one ACCEL sensor on the track. The StationMaster will perform the “Justa-Station-Stop” operation.



NOTES:

1. The deceleration is rather abrupt to have the train stop at about the same location for both directions. The acceleration uses the programmed setting.

2. Sensors have no polarity.

3. Additional station stops can be done by adding additional sensors, all wired in parallel. There is no limit to the number of stops that can be done..

RR Concepts

No Sensor Reversing Hookup

The StationMaster-5 XL can run in a “No-Sensor Diode Reversing Mode” where diodes are placed at the ends. (If desirable, LGB 10151 units can be use in place of diodes.)

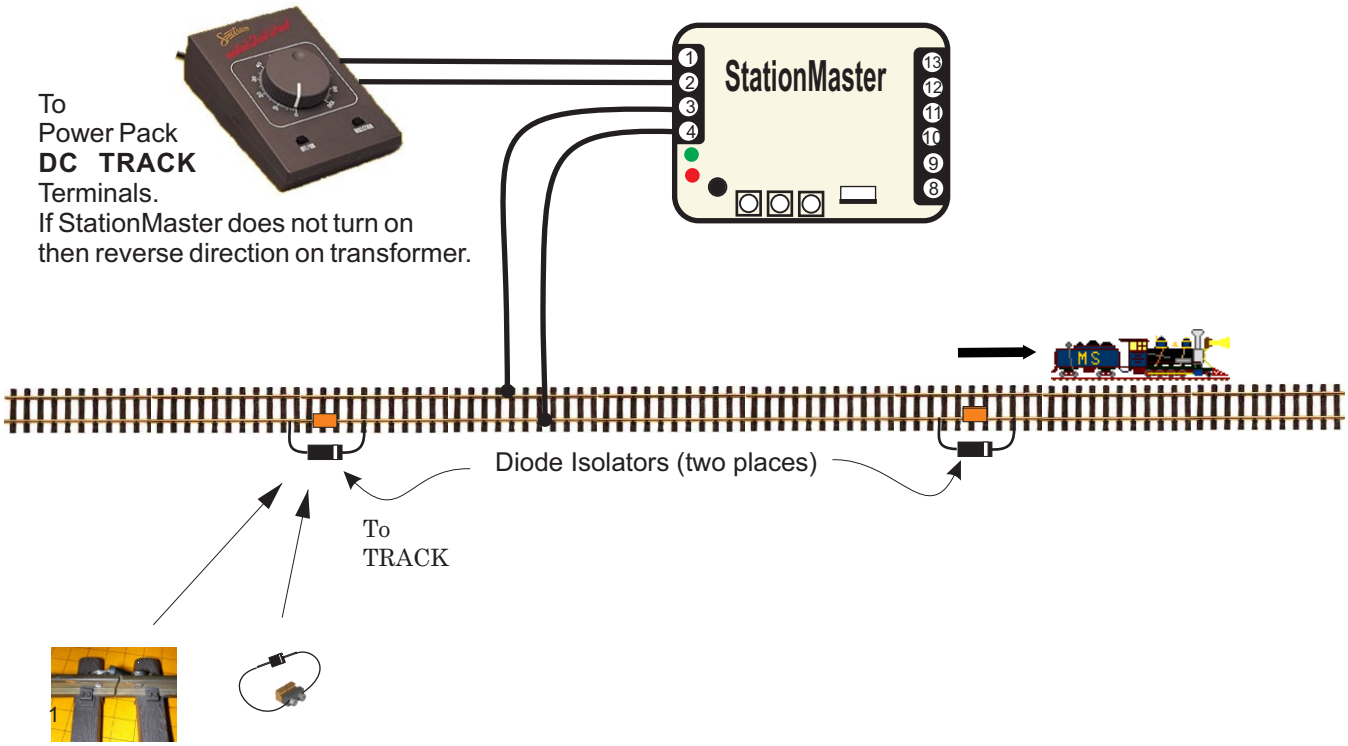
PROGRAMMING:

1. Go to programming mode. (Turn the speed dial full counter-clockwise and press button #1)
   An orange LED will twinkle.
2. Press and hold buttons #1 and #2 at the same time.
3. Exit programming mode. (Turn the speed dial full clockwise)

- ***To return to normal operations perform a factory reset -***

Here is the hookup:
* 2 wires from the transformer to the StationMaster.
* 2 wires from the StationMaster to the track.
* Diodes on the ends where the engine will stop.

Reversing using Diodes



Diodes can be wired to the track using
self-tapping screws or attached to an isolator.
A 1 or 2 AMP diode is usually sufficient.

continued...

RR Concepts

Reversing Operations - No Sensors Continued...

OPERATIONS:

- The Reverser has a 2 step speed profile. Speed #1 is the top speed of the train set by the transformer. Speed #2 is a “creeping” speed which allows the train to always reach the diode isolators on the ends.
- The Reverser will accelerate using the programmed acceleration rate, maintain a top speed, and then decelerate down to Speed #2 into the diodes.

Do This Once:

1. **Set the transformer for the desired top speed of the train.** Turn the StationMaster top speed dial fully clockwise.

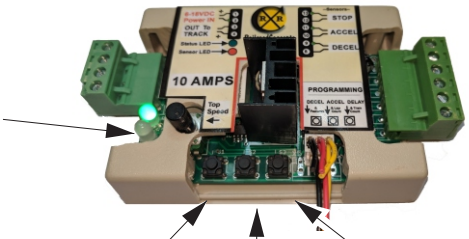
2. **Watch the train and press BUTTON #3 when the train is a foot or two from the diode.** After reversing, repeat for the other direction. This will need to be done THREE times. The first push sets an end location, and the second and third set the location where deceleration starts for each direction.

3. **To start over press programming buttons #1 and #2 at the same time**. Note that this is not always necessary since button #3 can be pressed at any time to set a new deceleration location. Additionally, pressing button #1 will erase the deceleration location for the current direction.

That’s it!

Dial: - optional -
Turn counter-clockwise to **creep slower into the diodes.**

Pushbutton Operations



Button 1:
Reset TIMETO DECELERATE for this direction. (start over)

Button #2: - optional -
Terminate the time delay operation and reverse as soon as possible.
(Convenience during programming)

Button #3:
Start deceleration NOW.

.

Continued...

RR Concepts

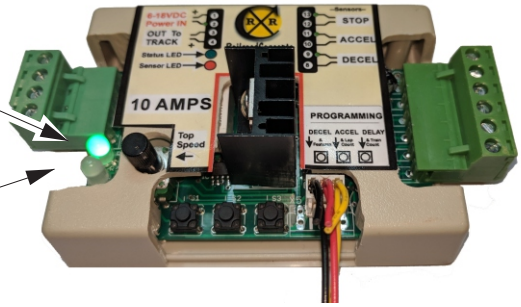
Reversing Operations - No Sensors Continued...

Notes

Most important- Always allow the trains to enter the diode section on the ends before pressing button #3.

LED Indications

This LED will:
Flash GREEN when accelerating,
Flash RED when decelerating,
Slowly flash GREEN/RED during the time delay.
Blink ORANGE when an infinite time delay is running.
(When in this condition button #2 MUST be pressed to continue.)



This LED will:
Turn RED when a TIME TO DECELERATE value is **NOT** set *for this direction.* Button #3 **MUST** be pressed to set the deceleration time or the train will never reverse.

A few more details

All recorded values are stored in flash memory and retained after a power cycle. For consistent operation day after day the transformer throttle setting should be the same. Sometimes trains will run a different speed after operating for awhile, and this is expected. The StationMaster will sense the train and maintain creeping until the train enters the diode so the exact location where deceleration starts is not critical.

When running, button #3 can be pressed at any time to set the location where deceleration should start, and this time is recorded. The button can even be pressed while in the pause operation.

If the deceleration is starting too soon and a different time is desired, then press BUTTON #1 to erase the stored value and the train will creep into the stops (orange blink). Once the train enters the stops, press button #3 to set a new time. This time will be extremely long, so set the time a second time when the train reverses and comes back in this direction.

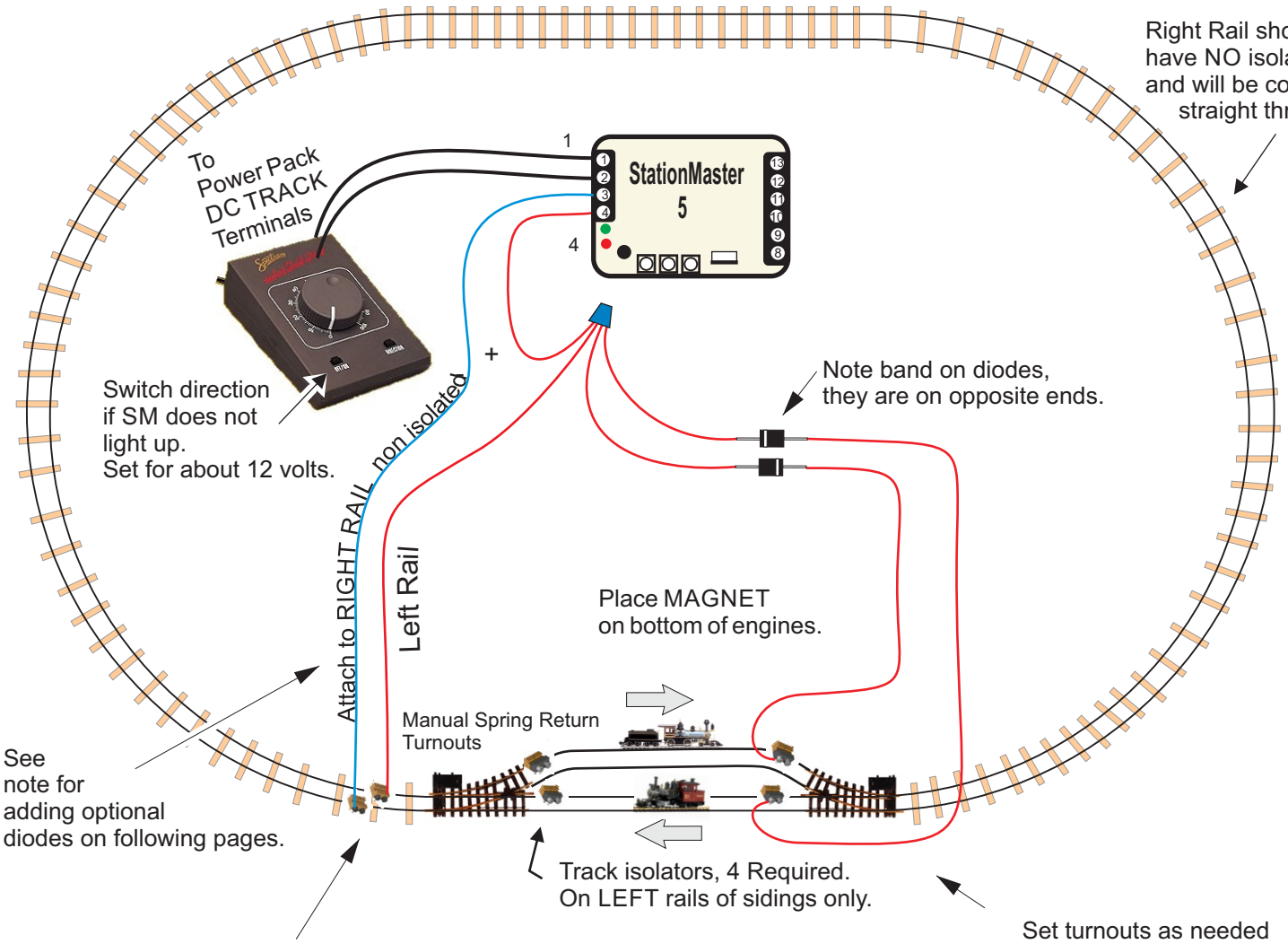
The creep speed is relative to the transformer throttle setting. If a slower creep speed is desired, then turn the top speed dial counter-clockwise to slow the train down while entering the diodes. Note that the creep speed will be the same for both directions and some trains will creep faster in forward than in reverse. If the creep speed is too low the train will stop.

RR Concepts

Alternating Trains in Opposite Directions

SPRING-RETURN TURNOUTS

TRACK CONNECTIONS

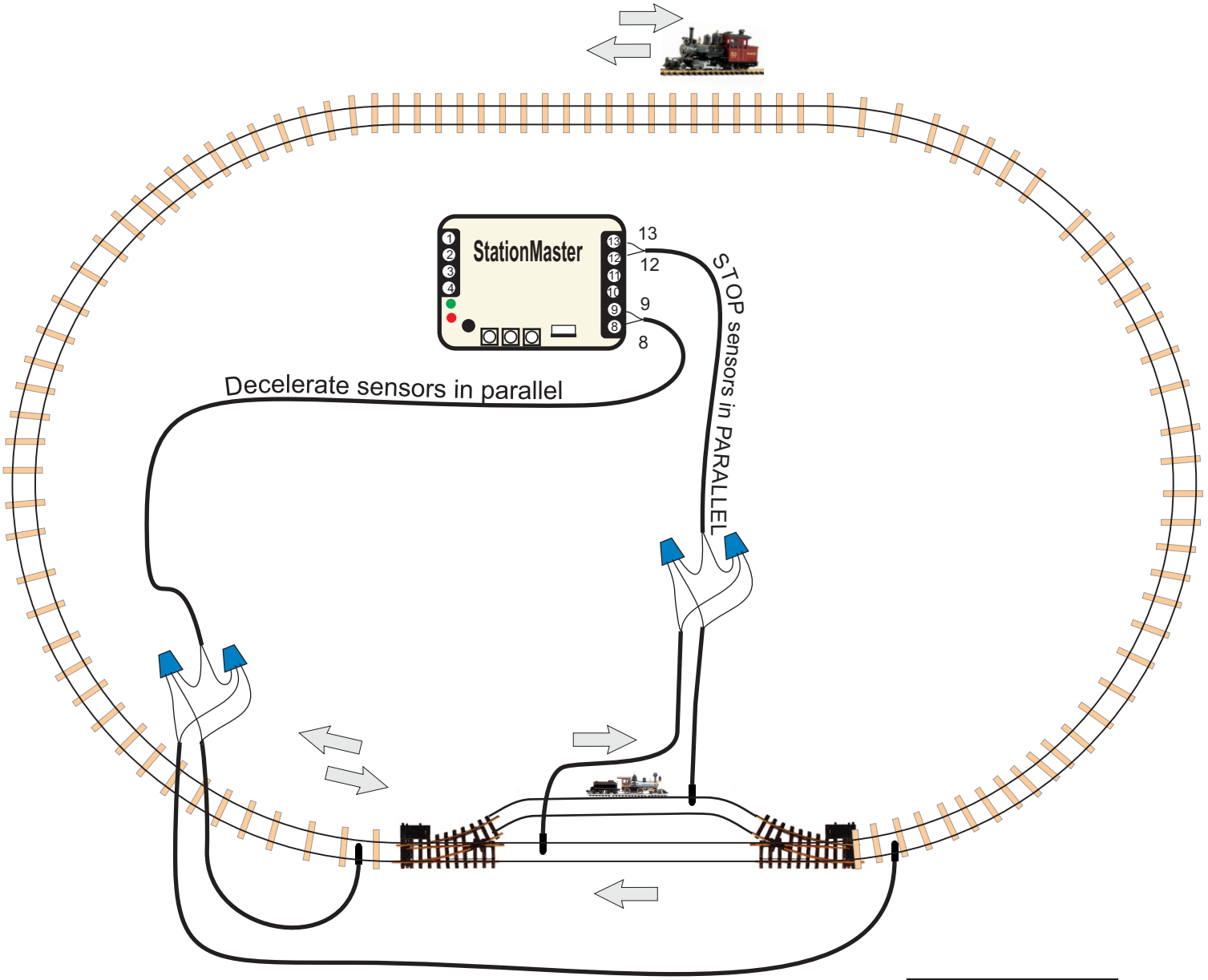


RR Concepts

Alternating Trains in Opposite Directions

SPRING-RETURN TURNOUTS

SENSOR CONNECTIONS



For additional station stops around the loop see"Justa-Station-Stop" in the StationMaster manual.

RR Concepts

Alternating Trains in Opposite Directions
More details...

Parts Required:

StationMaster:	Qty 1	4 AMP or 10AMP version.
Turnouts:	Qty 2	(Both manual spring return)
Track Isolators:	Qty 4	
Magnets:	Qty 2	(or one per train)
Sensors:	Qty 4	
Diodes:	Qty 2	

Description

The Alternating 2 train siding will allow 2 trains to run around the layout in opposite directions. One of them will always be in the siding while the other train will be traveling. Trains will realistically decelerate and then creep into the station.

StationMaster Hookup:

Terminals 8 and 9 are the DECEL sensor inputs and attach to the DECEL sensor as shown. (No polarity) Each sensor is located where the deceleration will start. Sensors are wired in parallel.

Terminals 12 and 13 are the STOP sensor. Attach these to the STOP sensors in each siding wired in parallel as shown. (No polarity) The train will stop just past this sensor.

Terminals 1 and 2 attach to the transformer. Change the train direction on the transformer if the StationMaster does not light up.

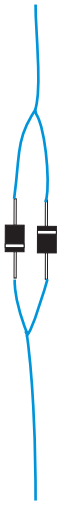
Terminal 3 attaches to RIGHT RAIL which is common ground throughout.

Set the transformer to the desired top speed of the train.

StationMaster Programming:

1) Start with a factory reset for all values
2) Program for “Simple Reverse Mode” and “Creep Stop”
   - How to do this -
   a) Turn top speed dial full counter-clockwise and press button #1.
   b) Turn top speed dial slowly clockwise until the GREEN LED goes on.
   c) Press and hold button #1 for 1 blink and release.
   d) After blinking has stopped press and hold button #1 for 8 blinks.
   d) Turn top speed dial fully clockwise.

Optional Programming:
* Add Multiple laps before stopping.
* Change the Acceleration Rate.
* Change the Pause time at the station.



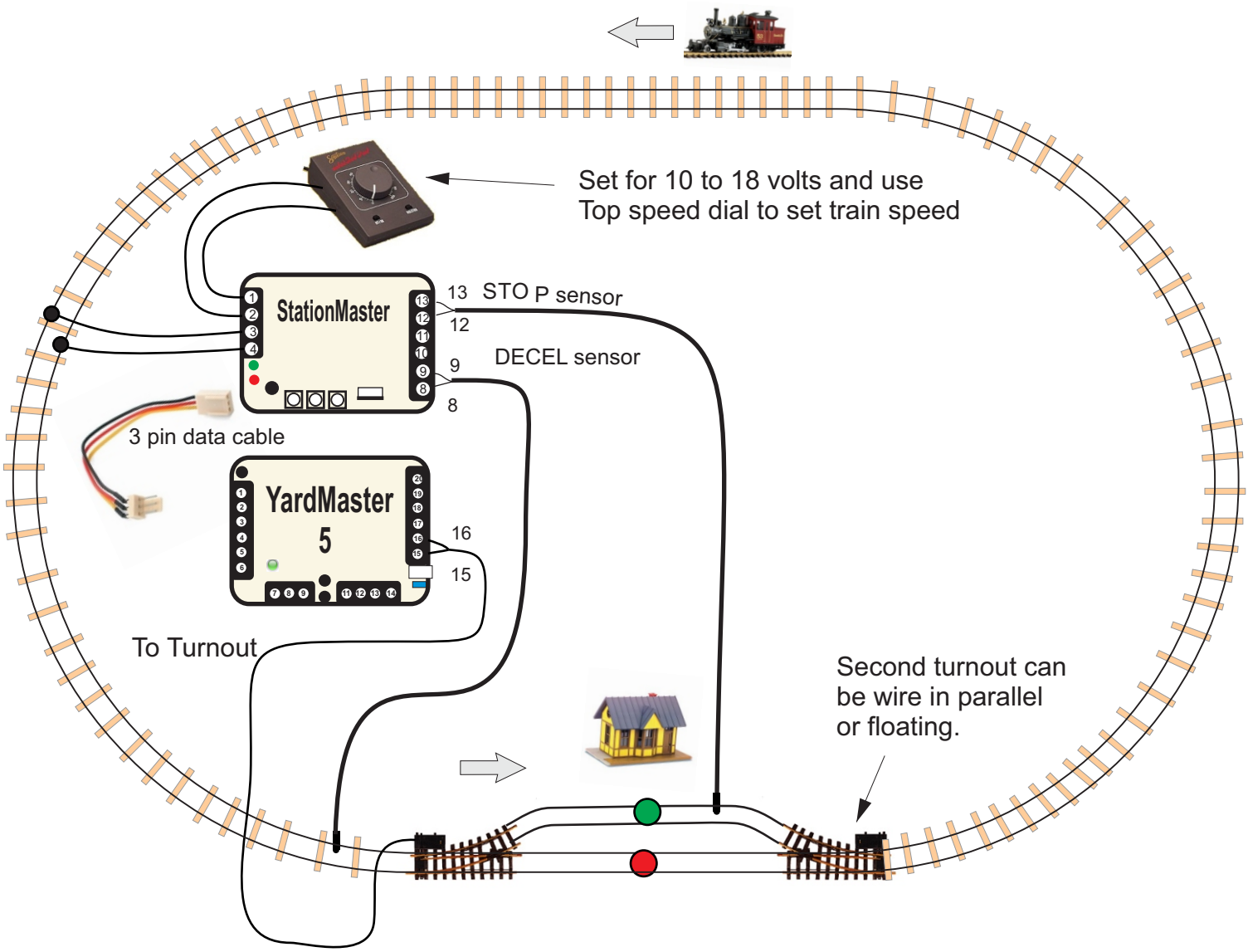
OPTIONAL
Add two diodes in parallel with bands opposite between StationMaster terminal 3 and the right rail. This will prevent the slight jerk that occurs when the train leaves the siding.

RR Concepts

== Parts List ==
1 StationMaster
1 YardMaster-5
2 Train sensors
1 magnet
1 three pin data cable

Station Stop with a Siding

After a few laps on the main line, go into the siding and stop.



OPERATIONS

* While counting laps, the YardMaster will fire to RED each time the DECEL sensor is ran over.
* After the lap counting has finished, the YardMaster will fire to GREEN on the DECEL sensor and the train will stop in the siding.

PROGRAMMING:

1. Turn on blinks 2 and 3 in “features” programming. (3 is set by default after a factory reset)
2. Program a lap count greater than 1.
3. Turn on “Creep stop” in “features” programming OR set a deceleration rate such that the train reaches the STOP sensor.

RR Concepts

Automatic Shutdown Details

The StationMaster has advanced electronics and software which will attempt to protect itself and also your trains when potentially disastrous events occur.

The first level of defense will provide a shutdown when a short circuits occurs due to a train wreck or wring problem. Typically transformers know their current capability and will shut down when a current threshold is reached. For sensitive electronics this is sometimes too late. The only way for the StationMaster to determine a short circuit is to measure the current before that happens and record this value. When that value is reached the StationMaster will shut down and blink both RED LEDs.

HOW TO SET THE SHUTDOWN THRESHOLD

Since this is such an important feature, there have been many software variations, each one better than before. Your StationMaster may have either of the following :

Version 1: The shutdown threshold is set after exiting programming mode. Make sure the train transformer is set to 100% when exiting programming mode. The relays will click.

Version 2: (Current as of 11/2019) The shutdown threshold is set after a **factory reset**, and then exiting programming mode **and also by pressing button #3 when the red blinking is occurring.** In both cases, make sure the transformer is set to 100% when the relays click.

SMALL TRANSFORMER OVERRIDE

For small transformers it may not be possible to obtain a shutdown value, since the transformer could be operating at 100%. In this case the red blinking will occur frequently and the “No Shutdown” option must be programmed. Small transformers will be less than 2AMPS or 30VA. It is unlikely the StationMaster will be damaged with a short circuit of 2 AMPS or less, and the transformer will likely shut down.

RR Concepts

StationMaster “Deadman Timer”

A unique feature of the StationMaster is the *DeadmanTimer.* **If a train is sensed on the track** *and* **no sensor has been detected for 10 minutes,** the StationMaster will SHUT DOWN and flash both green LEDs.

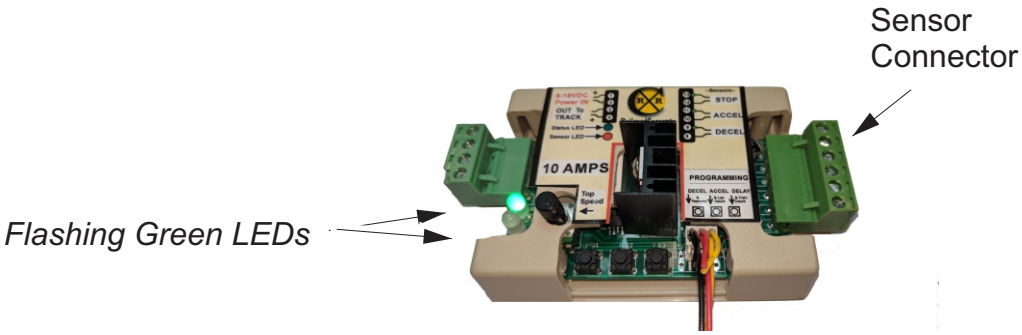
This prevents the condition where a train is hung up on an obstruction and spinning it’s wheels, most probably grinding a divot in the rails and wearing out wheels and gears.

Each time a sensor is triggered, or the train is not sensed, the deadman 10 minute timer is reset.

The Deadman Timer will be enabled AFTER the first sensor is detected, or a pushbutton is pressed.

If a train stalls on the track for more than 10 minutes the deadman timer may also be triggered. This prevents a constant voltage on a motor winding preventing damage to the motor.

To continue, press and hold button #1, or cycle power.



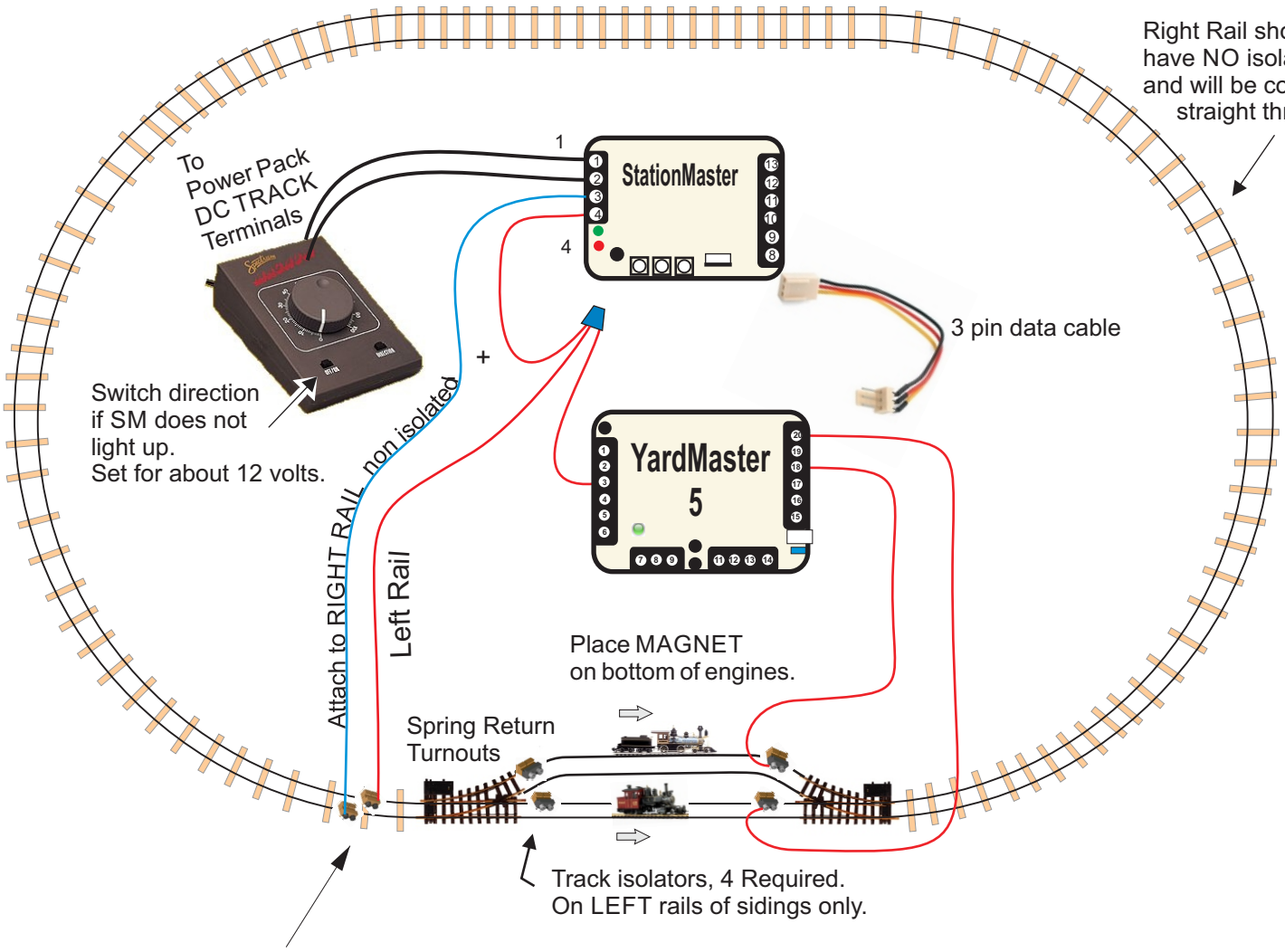
RR Concepts

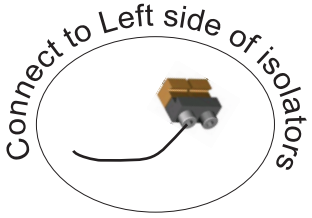
Alternating Trains

Powered Turnouts

Two trains take turns with a time delay station stop.

TRACK CONNECTIONS



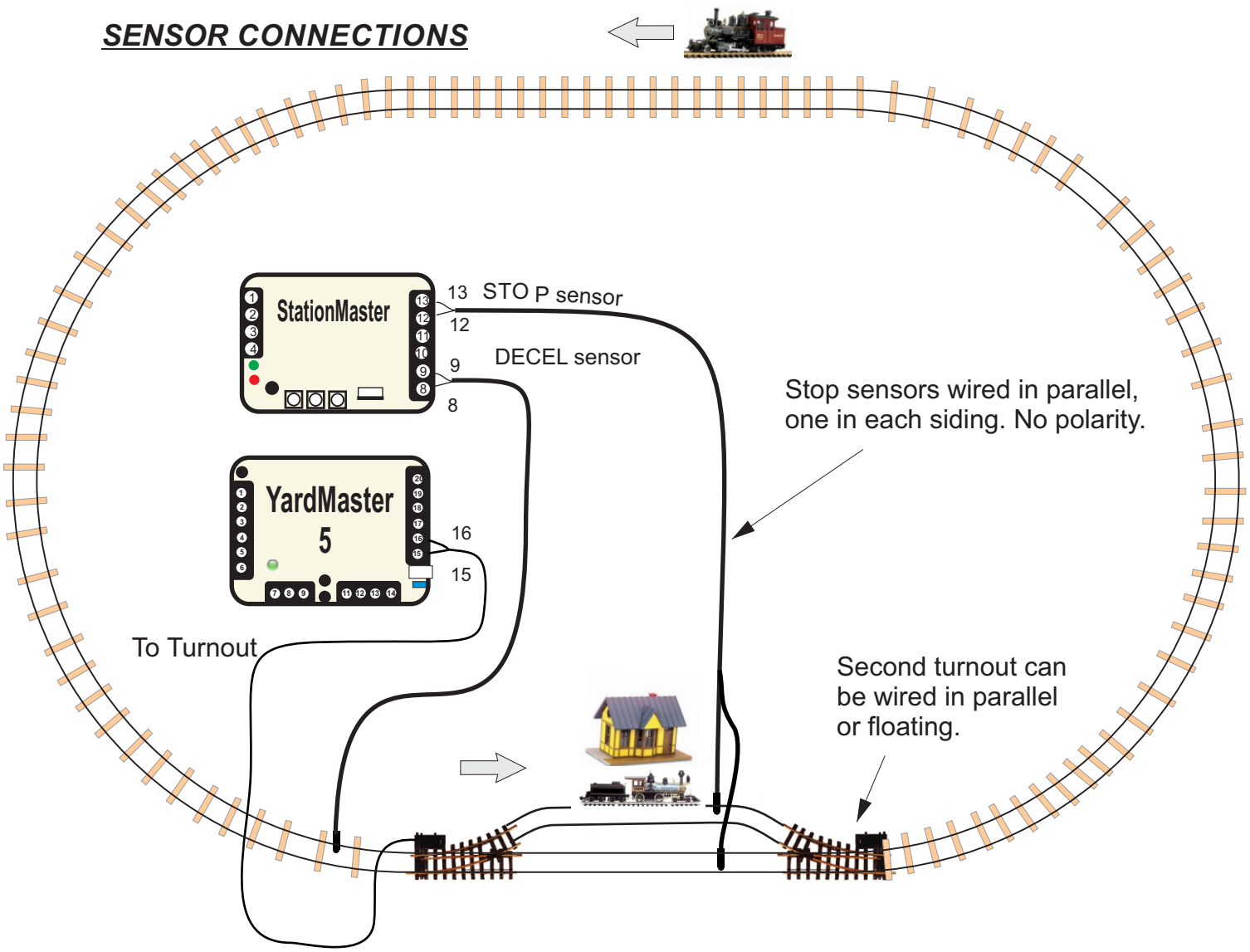


RR Concepts

Alternating Trains

Powered Turnouts

SENSOR CONNECTIONS



OPERATIONS

* Two trains will take turns running on the loop using an optional lap count. When the train has stopped the next train will run after the time delay.

PROGRAMMING:

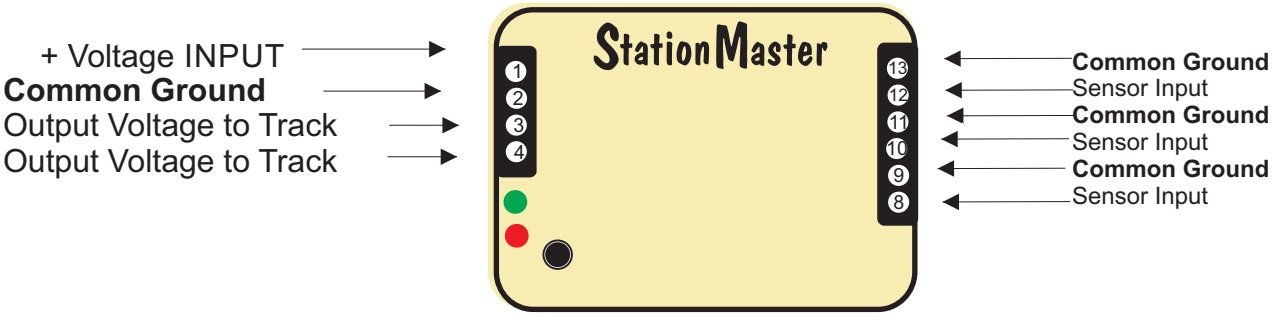
1. This is the default operation after a factory reset.
2. Turn on optional “Creep Stop” for more realism so the trains creep to the STOP sensor.
3. Set an optional lap count if desired.
4. Set a longer acceleration rate if desired to creep out of the station.

RR Concepts

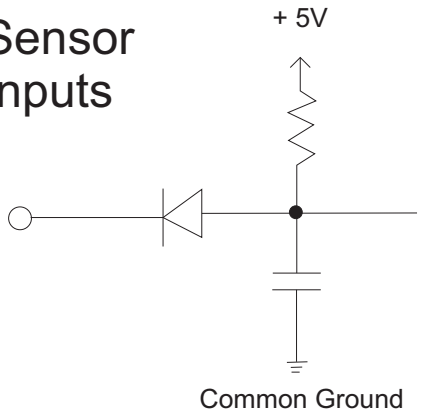
Electrical Details

For reference only

The locations of the common grounds could be useful for some wiring harnesses.



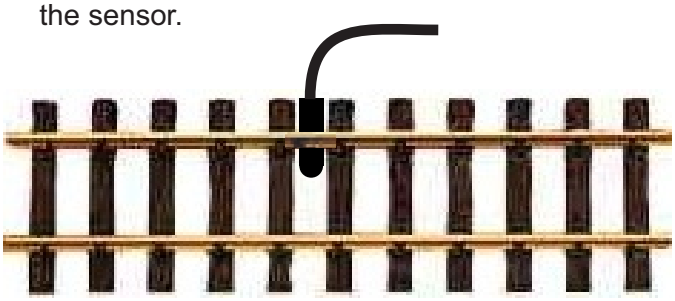
Sensor Inputs



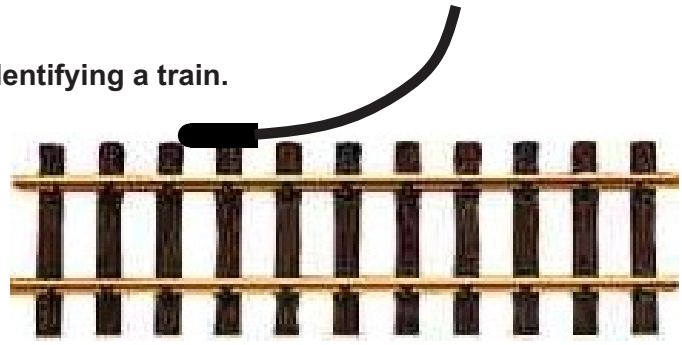
RR Concepts

Sensor Placements on Track

The suggested sensor placement on track is shown below with the train magnet installed in the center of the train. Best sensing is done with the magnet passing over the tip of the sensor.



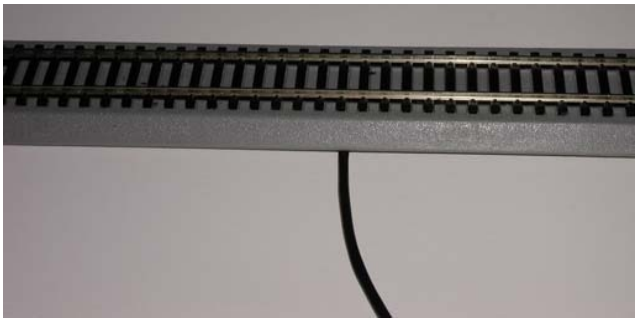
Sensor Placement for identifying a train.



Offset the train's magnet to the same side as the sensor as shown.

For example,
passenger trains have the magnet offset to the right and freight trains have the magnet offset to the left side.

Sensor placement for HO EZ track is under the roadbed.



Other scale trains can place the sensors where appropriate. Very small sensors are available which do not have the waterproof housing. These smaller sensors can be used for N, HO, etc. Contact RR Concepts for these sensors.

WARRANTY
Your StationMaster is warranted, and guaranteed operational for 1 year. It will be repaired or replaced at no charge within that time period. Contact http://www.RR-Concepts.com for additional information.