



RR-Concepts

StationMaster

Decelerator

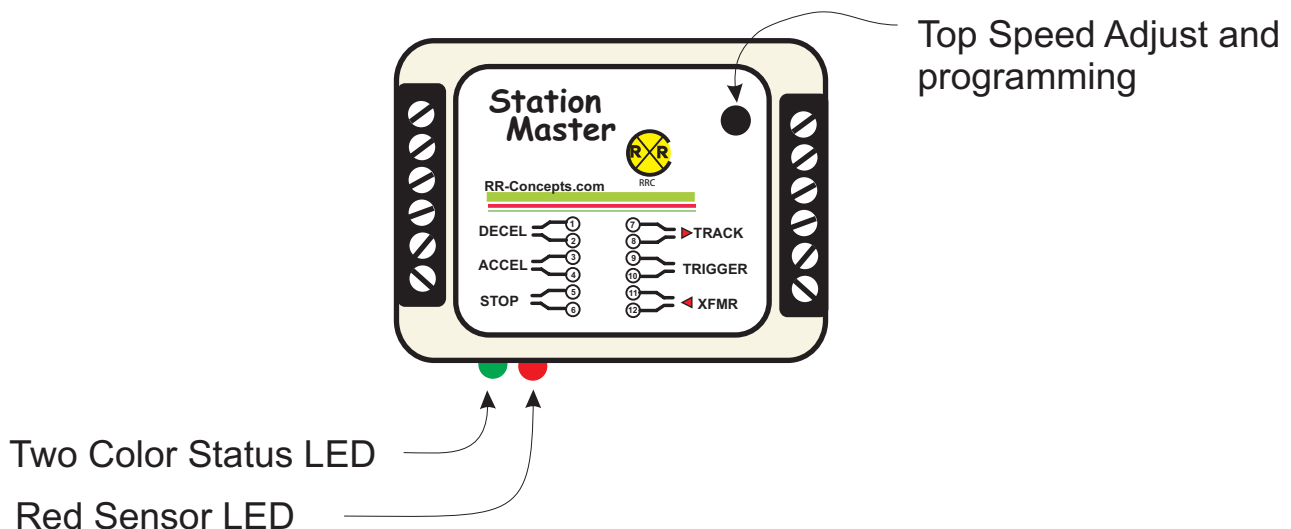


This manual contains detailed hookup and programming instructions for the StationMaster train decelerator.

Please download “wire-to-wire” hookup diagrams at <http://www.RR-Concepts.com>.

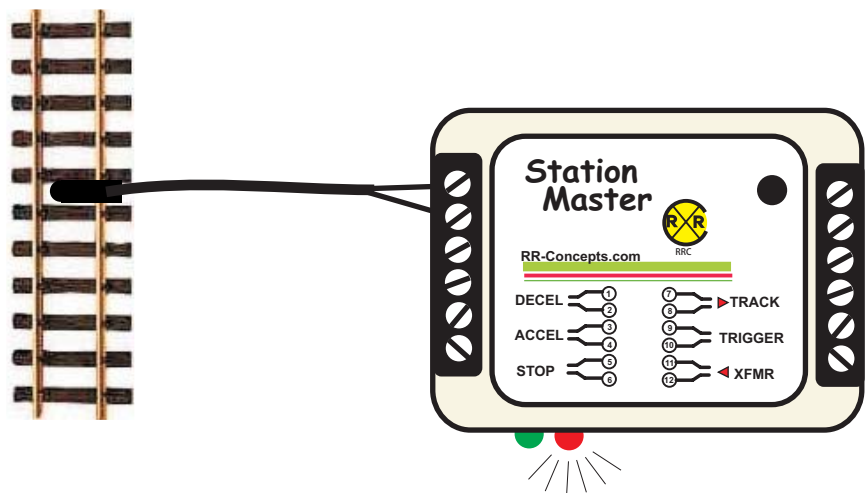
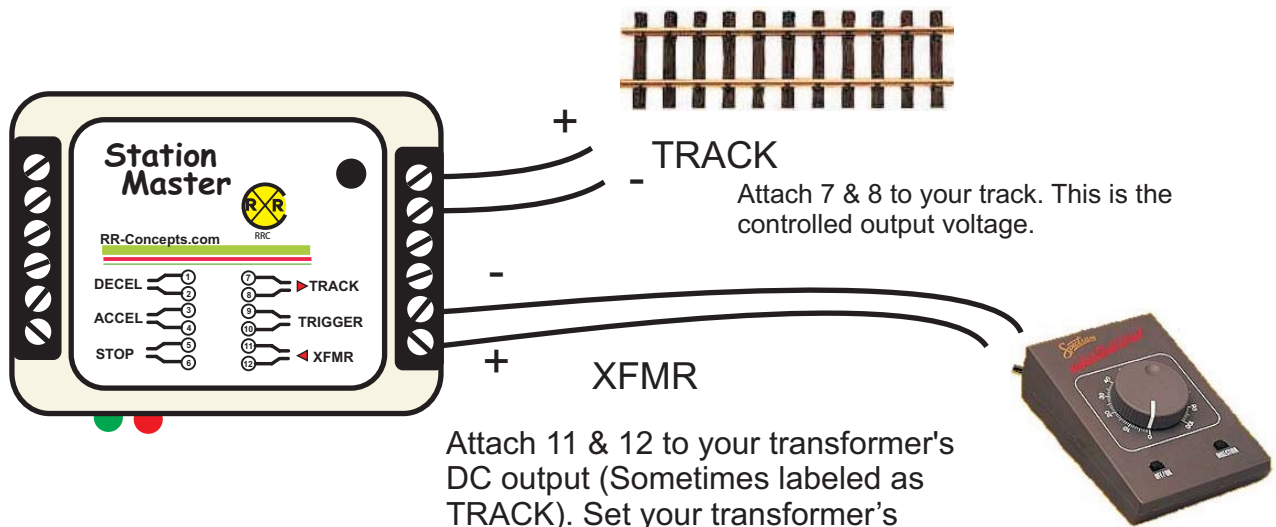
Before we Start- Please do not attach XFMR wires (from your power pack) to any other terminals except the designated transformer inputs. (XFMR) Your StationMaster will be damaged if power is put on any of the sensor terminals!!

Remember that your StationMaster contains a micro controller and can be reset by cycling the power. To do this, turn your transformer off for a few seconds, and then turn it back on.



StationMaster Basic Hookup Description

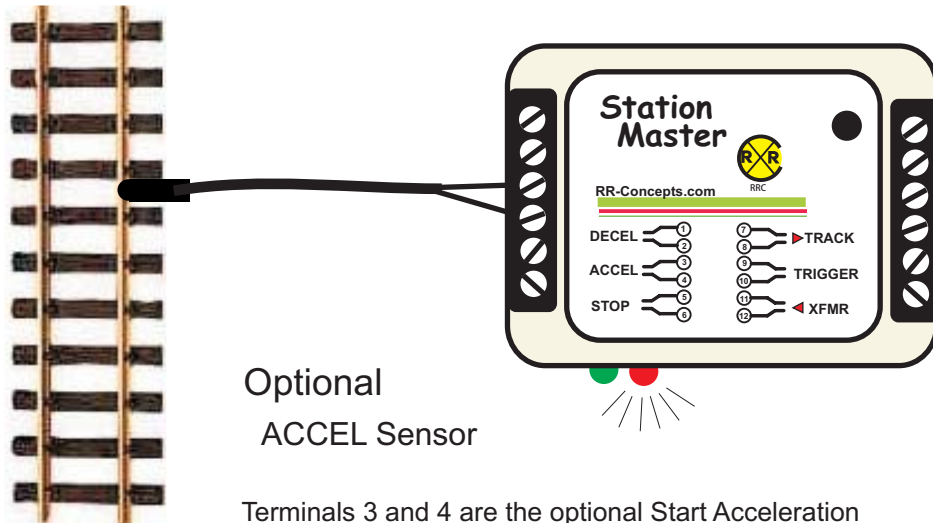
The StationMaster is designed to be installed between the train transformer, and the track.



DECEL Sensor

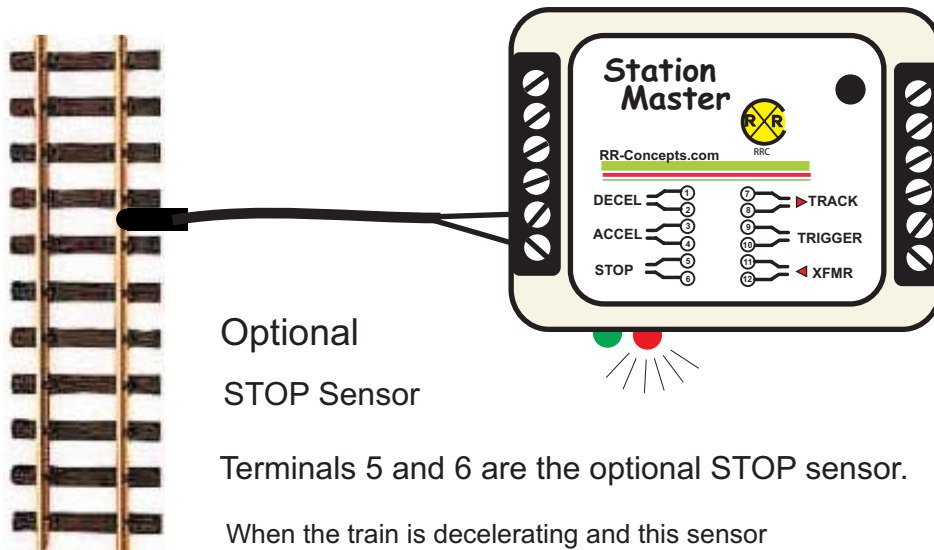
Terminals 1 & 2 are the start DECEL sensor. When this sensor detects a magnet, the StationMaster will decelerate your train, pause, and then accelerate. The RED led will light up when this sensor is detected. By placing multiple DECEL sensors wired in parallel, you can stop at multiple stations on your railroad.

Sensor Descriptions



Optional
ACCEL Sensor

Terminals 3 and 4 are the optional Start Acceleration sensor. When this sensor detects a magnet, your StationMaster will accelerate the train. This sensor is **not** necessary unless using “Block Control”, advanced hookups, or the **time delay** is set for maximum. (See below)

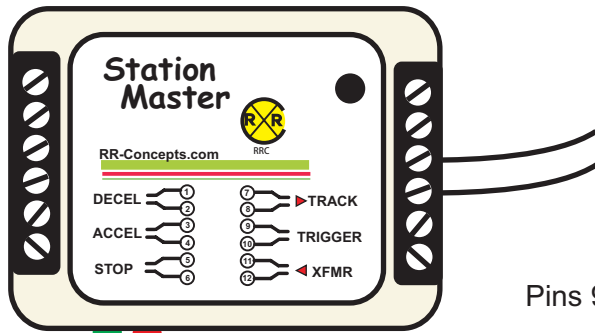


Optional
STOP Sensor

Terminals 5 and 6 are the optional STOP sensor.

When the train is decelerating and this sensor detects a magnet, the train will immediately STOP. This sensor is not necessary unless using the “Self Adjusting Deceleration”, or “Two speed” operations. (See below for details on two speed operations).

For advanced hookups a special feature is available when both the ACCEL and STOP sensors are triggered at the same time. When this happens the StationMaster will put 0 volts on the track, fire the TRIGGER, and accelerate. A decelerate operation will not occur. This can be useful when a train is waiting in a siding that must be released onto the main line.

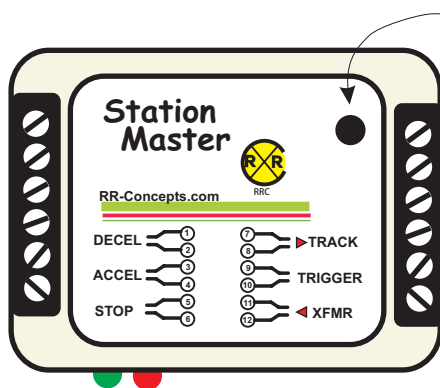


TRIGGER Output Signal

Pins 9 and 10 are TRIGGER.

These pins are an optically isolated **OUTPUT** used to trigger the sensor input of another module. These terminals should only be attached to a YardMaster, SIM, or to another StationMaster's sensor terminals. Note that the polarity of these wires is important. If the trigger does not occur, then reverse these two wires.

These terminals are used for advanced hookups, and are not necessary for simple installations. Note that putting track power on these terminals will permanently damage the trigger circuitry. See "Trigger Programming" if the TRIGGER signal is used.



Top Speed Adjust

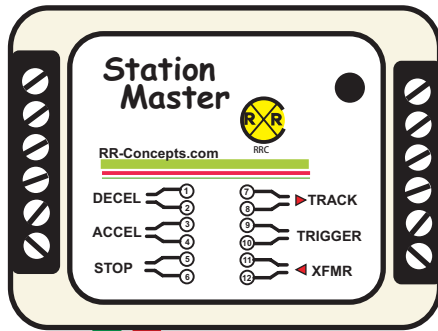
The top "cruising" speed of the train can be adjusted by turning the "top speed" dial.

Fully clockwise is "full speed". Turn this dial down as necessary to obtain the desired speed.

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

If you have a fixed DC power supply, then use this dial to set the top speed of your trains.

To program your StationMaster, turn this dial fully counter-clockwise to enter "programming mode". (See below)



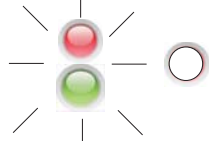
LED indicators

STATUS LED

SENSOR LED



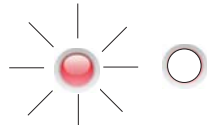
Green flashing: train is **ACCELERATING** and will do one lap.



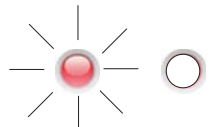
Alternate Red/Green Flashing: train is **ACCELERATING** and will do 2 laps.



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



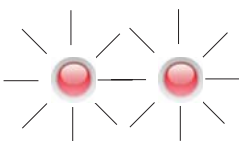
Red flashing: Train is **DECELERATING**.



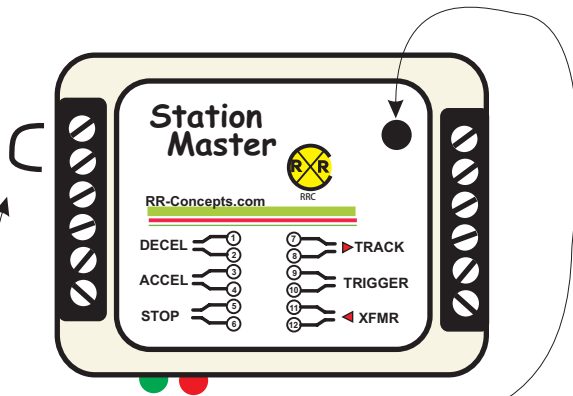
Red flashing at 1 second period: **PAUSED, COUNTING DOWN TIME DELAY**.



RED led ON: One or more of the three sensors is detected.



Two Red Blinking LED's indicate a **SHORT CIRCUIT** or **DERAIL**. The StationMaster will resume after the condition is fixed. The StationMaster will measure the voltage on the track when TOP SPEED is reached and shut down when a voltage drop is detected. Cycle power if the input voltage was reduced and this is a false error.



Programming: Deceleration Rate

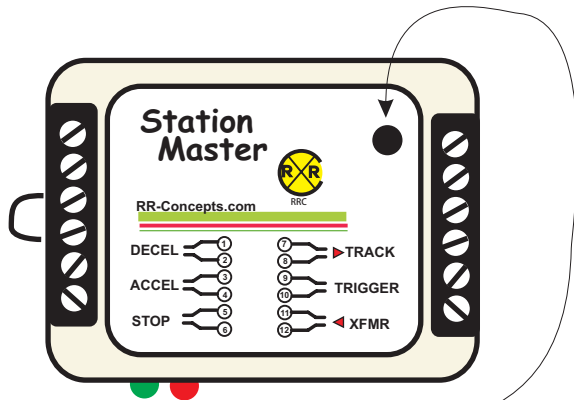
1. Make sure all three sensor inputs are open. (Red LED is off)
2. If the top speed dial is not already at zero, then turn the top speed dial to zero. (fully counter-clockwise.) All LED'S will turn off.
3. Temporarily close terminals 1 and 2. (Either place a magnet over the **DECEL** sensor, or touch terminals 1 and 2 together with a piece of wire or a paperclip) Keep these terminals closed for a few seconds only.
4. Watch the TWO COLOR led. Each RED flash will increase the deceleration distance. The shortest deceleration Distance will be with one flash. (**TRAIN Stops fastest**) Open the terminals when the desired number of flashes have occurred. A typical number is 5. Repeat this procedure if you want a different value. The LED will turn orange when the longest Deceleration rate is set (10 counts).

When orange, the “SELF adjusting deceleration” mode will be set. (See below)

When finished with all programming, increase the top speed dial clockwise to MAX or to a desired top speed. All programming values are stored in flash memory. This means that once you program your StationMaster, it will never forget!

One special feature to note:

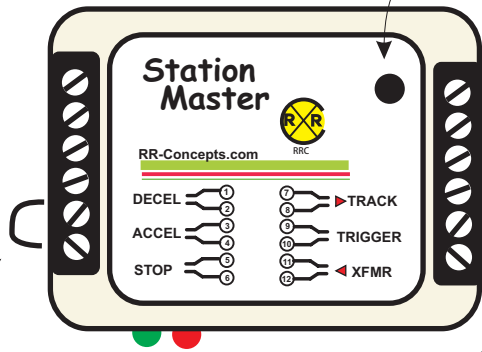
When one or two flashes are programmed the TRIGGER function will not operate. The reason for this is for block control operations. When an ACCEL sensor is tripped the waiting train must immediately start to accelerate without waiting for the trigger delay to occur. To signal a YardMaster the ACCEL rate must be more than 2 blinks.



Programming: Acceleration Rate

1. Make sure all three sensor inputs are open. (Red LED is off)
2. If the top speed dial is not already at zero, then turn the top speed dial to zero. (fully counter-clockwise.) All LED'S will turn off.
3. Temporarily close terminals 3 and 4. (Either place a magnet over the **ACCEL** sensor, or touch terminals 3 and 4 together with a piece of wire or a paperclip) Keep these terminals closed while counting blinks.
4. Watch the TWO COLOR led. Each GREEN flash will decrease the acceleration rate. **The fastest acceleration will be with one flash.** Open the terminals when the desired number of flashes have occurred. A typical number is 5. Repeat this procedure if you want a different value. The LED will turn orange when the longest **acceleration** rate is set (about 10 counts).

When finished with all programming, increase the top speed dial clockwise to MAX or to a desired top speed. All programming values are stored in flash memory. This means that once you program your StationMaster, it will never forget!



Programming: Pause Time

1. Make sure all three sensor inputs are open. (red Led is off)
2. If the top speed dial is not already at zero, then turn the top speed dial to zero. (fully counter-clockwise.) All LED'S will turn off.
3. Temporarily close terminals 5 and 6. (Either place a magnet over the **STOP** sensor or touch terminals 5 and 6 together with a piece of wire or a paperclip) Keep these terminals closed while counting blinks.
4. Watch the TWO COLOR led. Each ORANGE flash will increase the waiting time. **A wait time of zero will be with one flash.** Open the terminals when the desired number of flashes have occurred. A 1 minute delay will be with 5 blinks. Repeat this procedure if you want a different value.

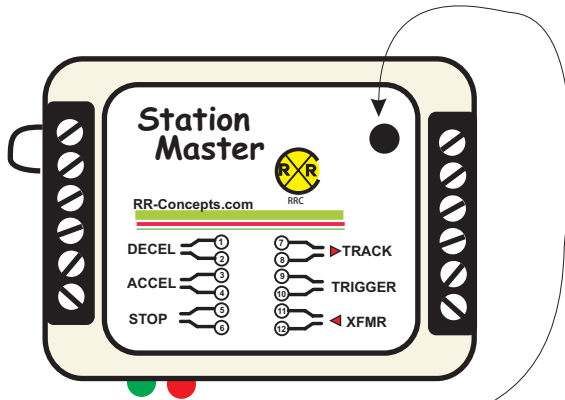
The LED will turn orange when an infinite delay is set (after 10 counts).

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!

When finished with all programming increase the top speed dial clockwise to MAX or to a desired top speed. All programming values are stored in flash memory. This means that once you program your StationMaster, it will never forget!

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

- 1: 0 seconds, no wait.
- 2: 10 seconds,
- 3: 20 seconds,
- 4: 30 seconds,
- 5: 1 minute,
- 6: 2 minutes,
- 7: 5 minutes,
- 8: 10 minutes,
- 9: 30 minutes,
- 10: Infinite, wait for GO sensor.



Advanced Programming: Operating Modes

The operating modes of the StationMaster can be programmed as shown:

1. Turn the Top Speed dial fully counter-clockwise to enter programming mode (Skip this step if already in programming mode).
2. Turn the Top Speed dial clockwise to half position to enter secondary programming mode. (Skip this step if already in secondary programming mode)
3. Close terminals 1 and 2 by either triggering an attached sensor or jumpering the terminals together.
4. Count the blinks while the terminals are closed. Open the terminals when the appropriate number of blinks have occurred.

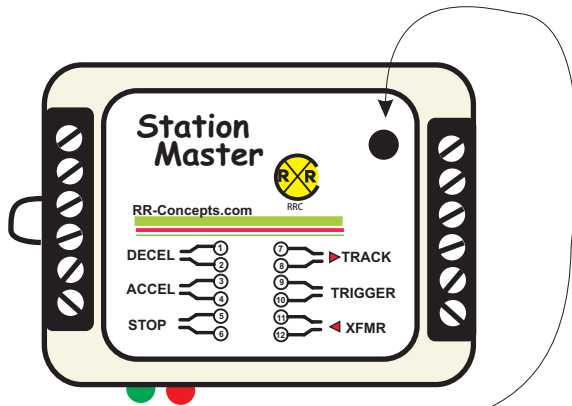
The programming modes correspond to the blink count as shown:

- 1 blink = DO NOT USE SHORT CIRCUIT PROTECTION,
- 2 blinks = Trigger after train has stopped.
- 3 blinks = Trigger before acceleration,

After the terminals are opened the StationMaster will display the current configuration by blinking the red/green LED. For example, if "Trigger after train has stopped" has been programmed the StationMaster will blink RED - GREEN- RED.

Example #2, if "Trigger before acceleration" is also programmed, the StationMaster will blink RED - GREEN - GREEN.

Each time the operating mode is programmed the function will toggle. To view the currently programmed modes quickly close and release the 1 and 2 terminals before the RED/GREEN LED blinks. The StationMaster will echo the currently programmed features.



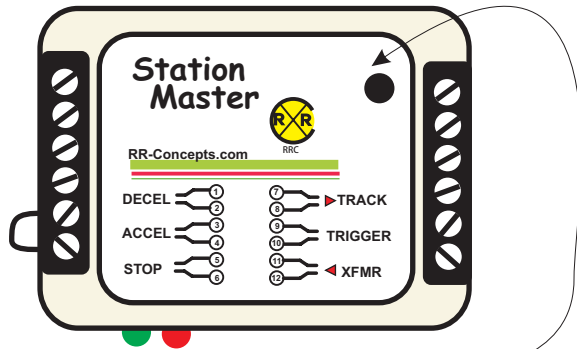
Advanced Programming:
Program the StationMaster for
TWO LAPS

The StationMaster can be programmed to ignore the DECEL sensor to allow running up to 10 laps before stopping. To allow multiple laps, program as follows:

1. Turn the Top Speed dial fully counter-clockwise to enter programming mode (Skip this step if already in programming mode).
2. Turn the Top Speed dial clockwise to half position to enter secondary programming mode. (Skip this step if already in secondary programming mode)
3. Close terminals 2 and 3 by either triggering an attached sensor or jumpering the terminals together.
4. Count the blinks while the terminals are closed. Open the terminals when the appropriate number of blinks have occurred.

The number of blinks corresponds to the number of laps the train will do before stopping as shown:

- 1 blink = 1 lap,
- 2 blinks = 2 laps
- etc...



Programming: Node Count for YardMasters

The trigger output of the StationMaster is used to trigger external devices. (YardMaster, etc.) When attached to a YardMaster programmed as a “Node” the StationMaster must know the number of nodes that are attached so that the YardMasters will fire in sequence. For example, if a 4 track siding is arranged at one end of the line, the StationMaster/Reverser will send out the signals 1, 2, 3, SYNCHRONIZE to all of the attached YardMaster nodes. YardMaster node #1 will fire when 1 is sent, Yardmaster node #2 will fire when 2 is sent, etc. When SYNCHRONIZE is sent all 3 YardMasters will fire to their upper position. This will cause a 4 track siding to ripple out trains in sequence. Up to 10 sidings can be controlled by only daisy-chaining the pigtail wires to all of the YardMasters. For this 4 train scenario the StationMaster/Reverser must be programmed for “4”. (Total number of sidings)

When programmed for a node number greater than 1 the StationMaster/Reverser must be attached to a Yardmaster programmed as a node.

Programming:

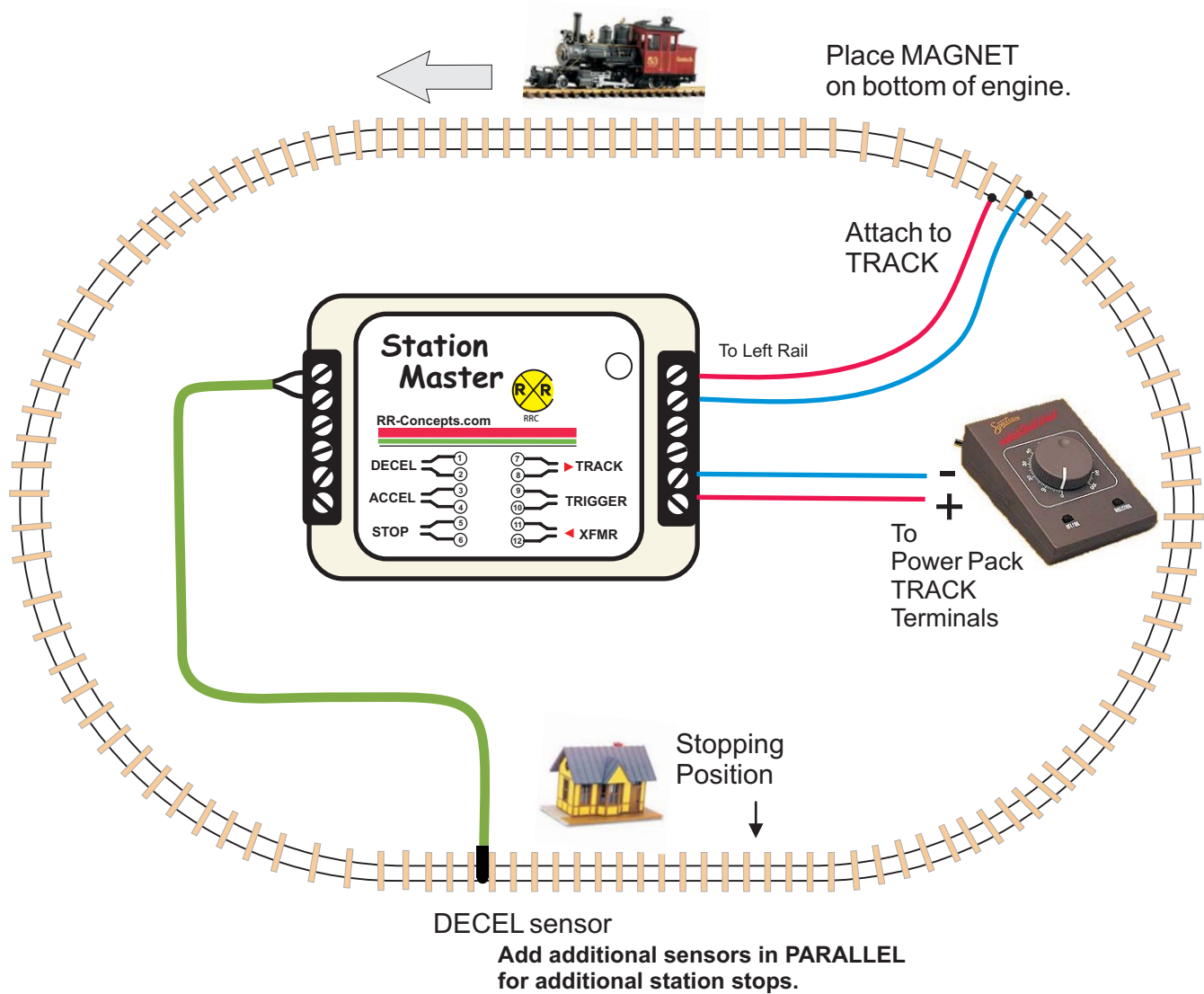
1. Make sure all three sensor inputs are open. (red “Sensor” Led is off)
2. If not already in programming mode turn the top speed dial to zero. (fully counter-clockwise.) All LED'S will turn off.
3. Turn the top speed dial to about half position. This enables the secondary programming options.
4. Close terminals 5 and 6. (Either place a magnet over the STOP sensor, or touch terminals 5 and 6 together with a piece of wire or a paperclip) Keep these terminals closed.
4. Watch the TWO COLOR led. Each flash counts the number of attached YardMasters.

1 flash = No nodes, normal operation
 2 flash = 1 attached YardMaster nodes.
 3 flash = 2 attached YardMaster nodes.
 etc... **When watching the flashes, count 0, 1, 2, 3, 4, 5, 6, etc..**

Open the terminals when the desired number of flashes have occurred. the number will be echoed back then the terminals are opened. 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.
 All programming values are stored in flash memory.

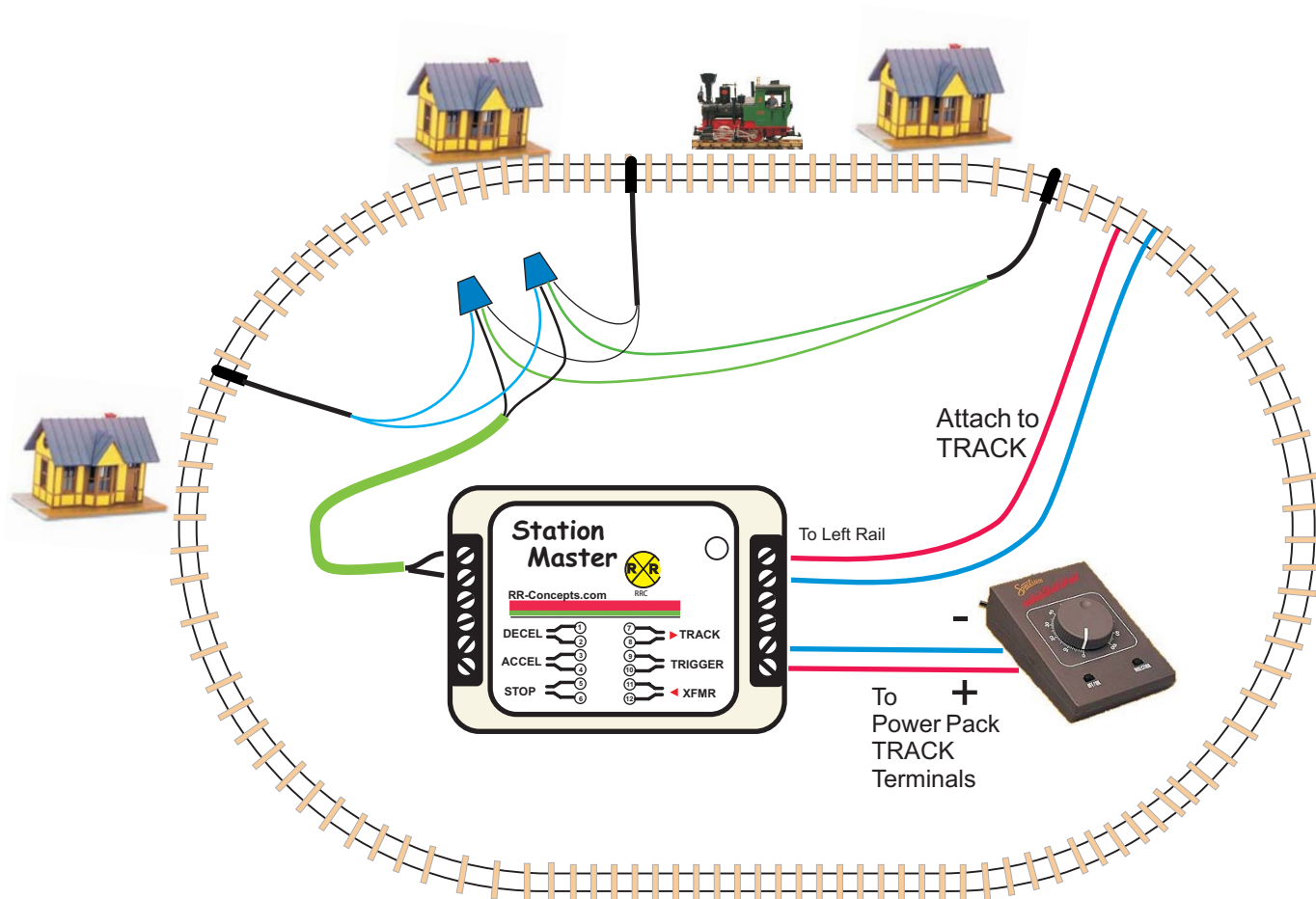
Basic Hookup Diagram for Automatic Station Stops with Deceleration/Acceleration



For a simple station stop, this is all you need to do!

Multiple Station Stops

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

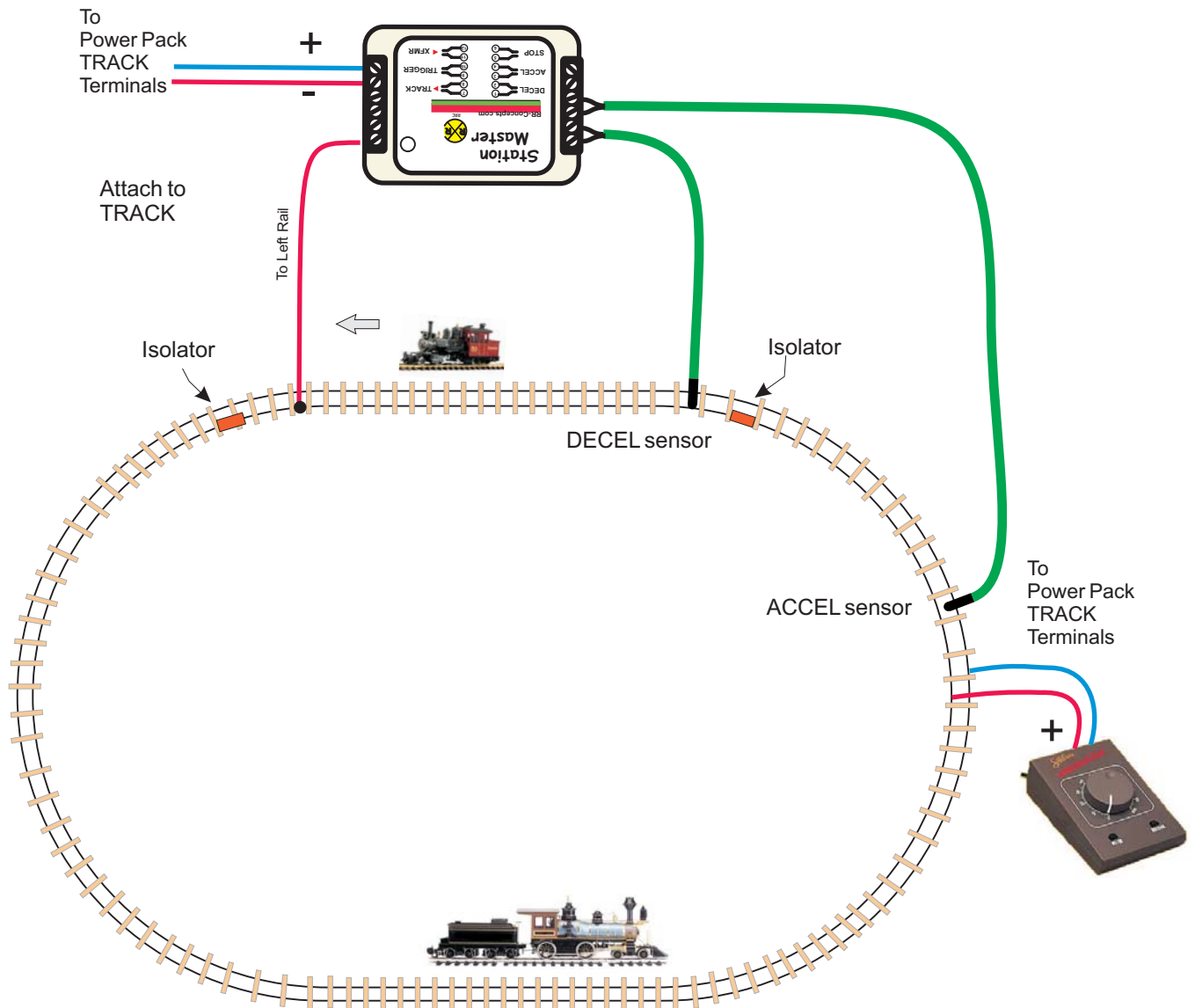


Every sensor that the train passes over will cause a decelerate/pause/accelerate sequence.



Block Control

For 1 or 2 Trains on 1 track with gradual Decelerations and Accelerations.

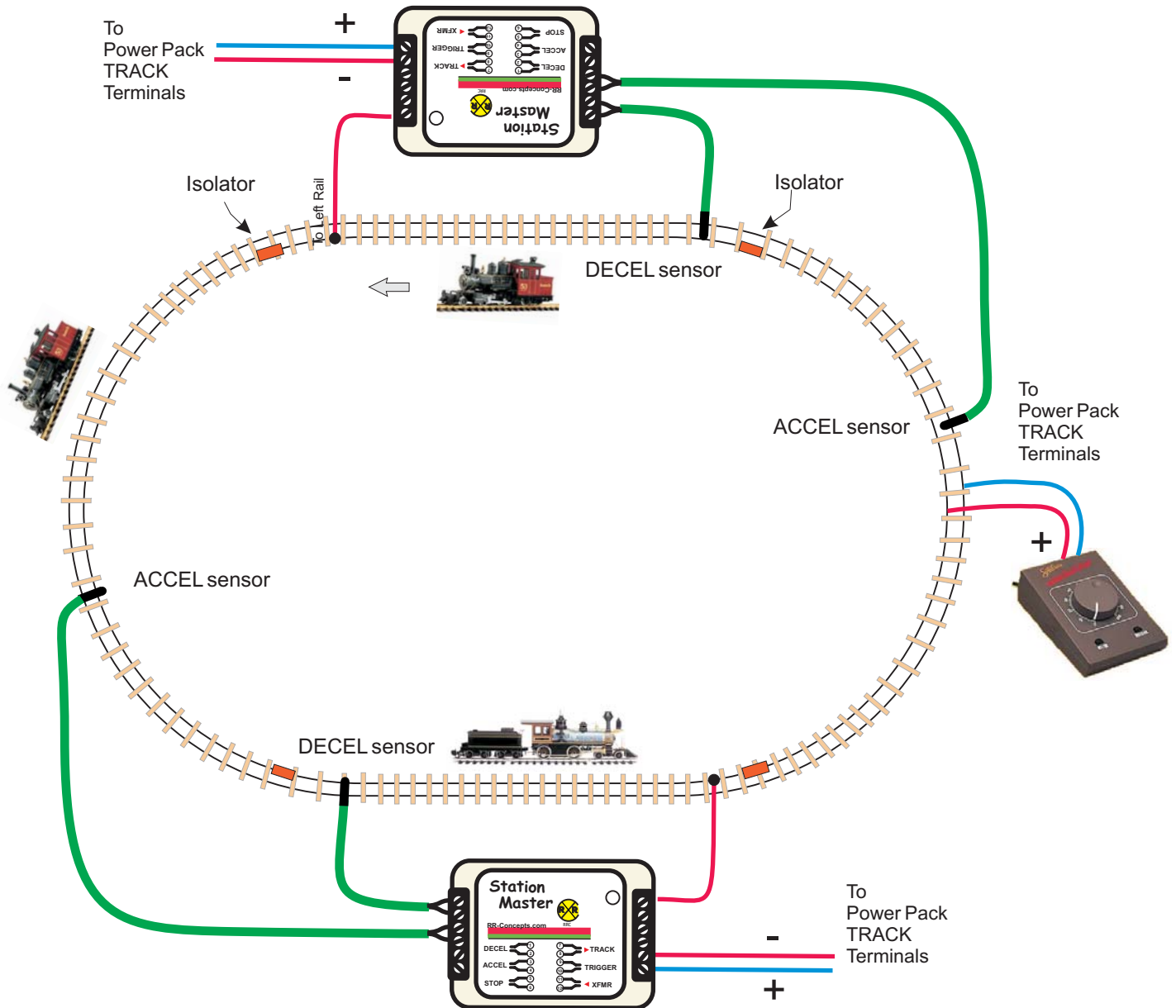


Hookup Notes:

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 isolators.
3. If the train is slowing or stopped, then the second train will tell it to "go" when it hits the ACCEL sensor.
4. The TIME DELAY must be programmed for MAXIMUM. (No time delay desired)
5. Location of ACCEL sensor must allow stopped train time to accelerate and exit before 2nd train enters the siding.

Block Control

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



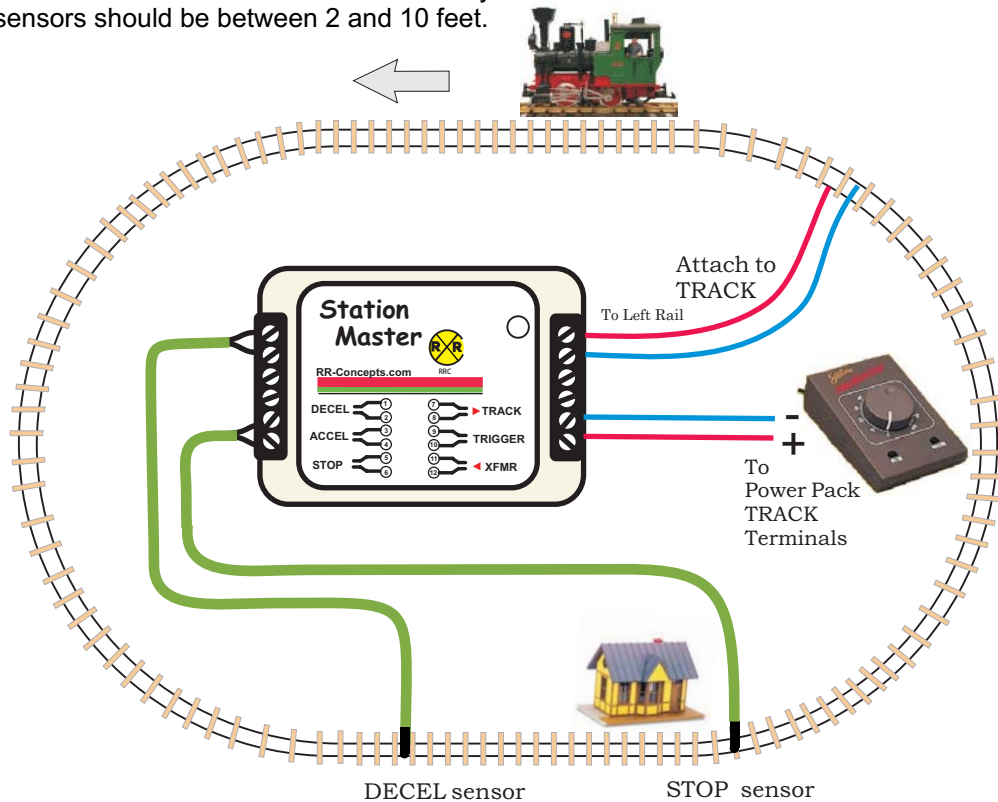
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5. Location of ACCEL sensor must allow stopped train time to accelerate and exit before 2nd train enters the siding.

Self Adjusting Deceleration Mode

A unique feature of the StationMaster is “Self Adjusting Deceleration”. By using both a DECEL sensor and a STOP sensor, the StationMaster will self-program itself for the most optimum and realistic deceleration profile. Programming your StationMaster to use “Self Adjusting Deceleration” is very easy:

1. Program your **deceleration** to **MAXIMUM**. (About 10 flashes)
2. Place the **DECEL** and **STOP** sensors on your track as shown. The distance between sensors should be between 2 and 10 feet.

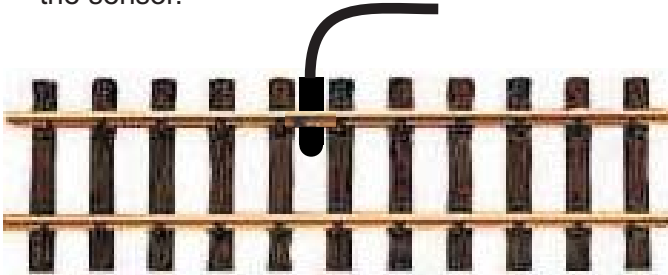


When “Self Adjusting Deceleration” is turned on for the first time, the train will operate as follows:

1. After traveling over the DECEL sensor, the train will travel until the STOP sensor is detected, and then abruptly stop.
2. The deceleration time will be automatically adjusted each lap, such that the train will “ease” into the stopping location after about 5 laps. This time will be saved in memory.
3. If the speed of the train is so slow that it does not move while “hunting” for the STOP sensor, then the “hunting” speed will be increased after 25 seconds. **Please wait at least 30 seconds for the StationMaster to self-adjust if your train ever stops before reaching the STOP sensor.**
4. Trains will not “park” on the STOP sensor. If your train stops on top of a STOP sensor, then it will slowly move forward until the sensor is clear. Please be patient if your train seems to be stopped. It’s being automatically controlled like a real train!
5. One last thing to note: The Self-Adjusting Deceleration can be used with one train, or two totally different trains. If two trains are controlled, then they will EACH have their own unique deceleration profile. The StationMaster actually maintains two deceleration profiles, alternating between them every time a deceleration starts. This is perfect when you have a slow train followed by a fast train.

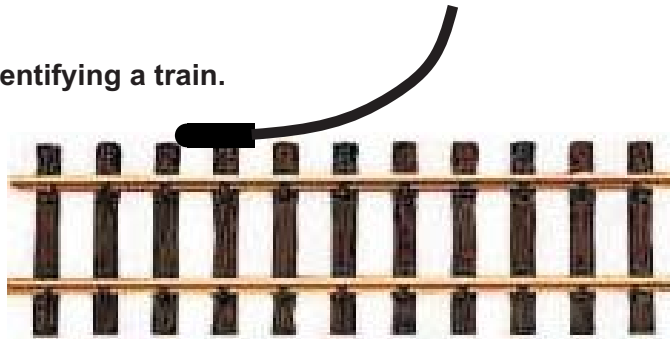
Sensor Placements on Track

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.



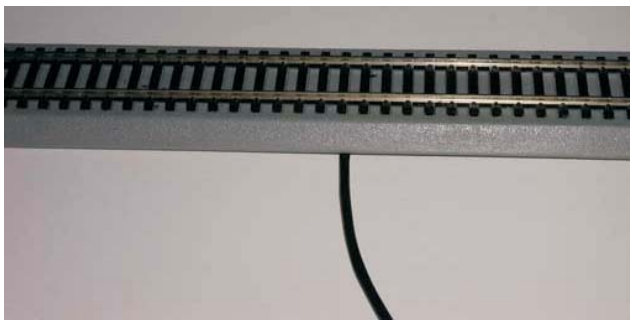
Sensor Placement for identifying a train.

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.