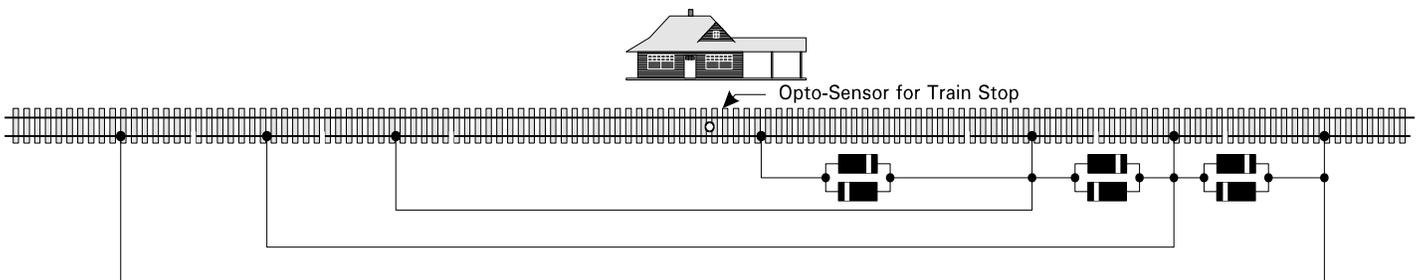


## AUTOMATIC SLOWDOWNS and STARTUPS

There are a number of reasons that a modeler might want to incorporate automatic slowdown sections on his/her layout. Sometimes it is desired to have a train realistically slow on a grade (either up or down) or on approach to a congested turnout area. Other times a modeler may desire gradual starts and stops on a point to point layout that is to run unattended. The traditional ("old-fashioned") way to accomplish this is with a resistor or series of resistors wired in series with the track sections where the slowdown is to occur. The main drawback of this system is that the resistors must be matched to a specific locomotive's current draw. A different locomotive that draws more current may slow too much or even come to a stop, and one that draws less may not exhibit much slowing action at all.

An improvement over the resistor design is to use diodes in series with the track section. A single diode will drop the voltage to the track by 0.6 - 0.7 volts, pretty much independent of current draw. As many diodes as desired may be wired in series to provide the required amount of slowing. Reverse wired diodes must be provided if the trackage is bi-directional. One limitation of both diodes and resistors is that the speed reduction is essentially instantaneous as soon as the locomotive enters the section of track. The CIRCUITRON AS-1 has the same limitation, although with the AS-1, the amount of slowing is adjustable between certain set limits. An electronic circuit to provide gradual slowdowns and startups is feasible. CIRCUITRON has constructed a number of these for specific applications on a custom-order basis. These circuits are essentially self-contained momentum throttles, and must be able to handle the full current draw of the layout. They are therefore rather costly, and we have not considered adding them to our line as a regularly stocked item.

If the track is sub-divided into a number of nested sections, a gradual slowing effect can be accomplished without complicated circuitry. Diodes are wired across the gaps as shown below. This setup will need to be adapted to each specific application. A slow-stop/slow-start station setup is shown. Some experimentation will be required to determine the most effective number of diodes and breaks necessary for your application. This will depend upon train speed and desired



deceleration and acceleration rates. This setup may not be practical for a mainline application where a variety of train speeds are encountered.

The diodes used should be rated at a minimum current capacity of 3 amps for HO Scale and 1 amp for N Scale. 50 volt rated parts are adequate for this application. As shown there will be three steps of speed reduction, each about 0.7 volts. If greater reduction is required, add more sub-blocks or use 2 diode pairs for each step wired in series for a 1.4 volt drop per step.