Nothing special here. Just an N scale locomotive running around a loop. Nothing special at all, or is there?

Well, yes there is. This is Dave Ackmann, and what you might not notice is that this loop of track has a built in speedometer controlled by an Arduino microprocessor. There is a light dependent resistor, or LDR, embedded in the track, connected to the small computer. The Arduino is running a sketch in which the scale of the layout and the length of the loop are stored. The sketch then times the intervals between when the LDR is covered, and then calculates and displays the scale speed. Pretty simple, and pretty neat. Best of all, the technique is documented and the sketch is free. The total investment is under $30 and could take you less than an evening to implement.

Let’s restart the process, and this time focus on the display. At the beginning the system is “Awaiting Transit”; nothing has yet covered the LDR. Once the LDR is covered, the timer starts. When the locomotive again covers the LDR, the speed is calculated and displayed, and the timing cycle starts over again.

There were some technical issues to be overcome, like being able to interpret light hitting the photocell between cars as something other than the beginning of another transit. And resetting the timer when the train stops on the track for a while had to be accounted for. But overcome they were, and I think having a speedometer embedded in the layout is better than a “speedometer on a stick”; simpler, too.

The speedometer is one of several “Amazing Arduino Animations” that will be presented at the August meeting of the Gateway Division of the NMRA. Hope to see you there.

Video of locomotive and several cars running around the track.

Video of a slow zoom into the electronics and a piece of track.

Photo of the LDR

Screen shot of the scale and loop length

Screen shot of the speed calculation

Photo of the display showing the speed

Audio of Honk honk honnnnk honk

Video of the process from before the loco passes until it passes again

Video of a transit on the HO layout

Powerpoint of Amazing Arduino Animations