

Tar paper roofing • Prototype Ops • Fix staging access issues

Model Railroad Hobbyist magazine™

July 2013

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Modeling the City of Miami ... car-for-car



HAVING FUN WITH TRAINS



Standard edition - Landscape



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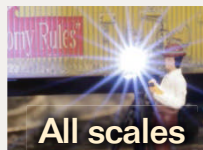
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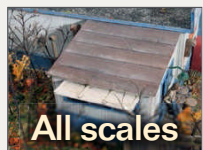
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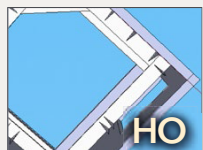
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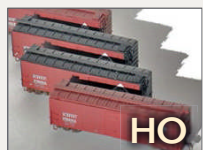
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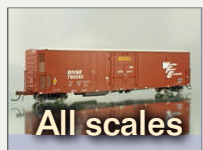
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Scale flash photography



– Dr. Geoff Bunza
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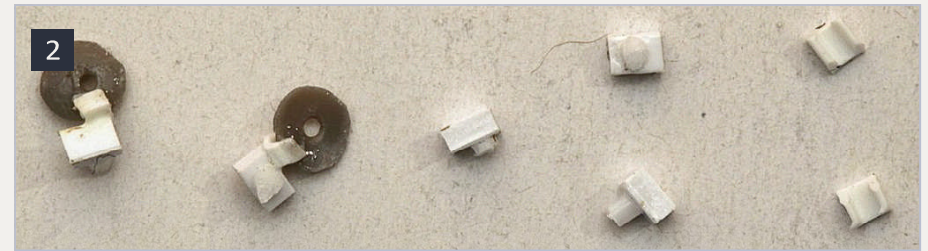
An animated photographer for your layout ...

After I finished my clinic on micro LED lighting at the joint PCR/PNR Convention in Medford, Oregon, Phil Everett asked about using an LED as a flash for a trackside photographer on the River City Modeler Club layout in Spokane, Washington. He wanted the photographer to take only one picture as a train emerged from a

tunnel, and to wait until the train passed before another flash “photo” would occur. I thought it was a great idea, and set to work on hiring my own company photographer.

The project is straightforward. I found that both Woodland Scenics (A1883 Surveyors) and Preiser

1. Company Photographer on the job.

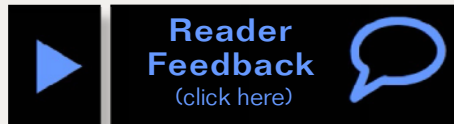


2. Cameras and parts.

(10512 Surveyor Figures) had “surveyor teams. The first step is to mount a “camera” on the top of the tripod with a reflector for a flash on the camera. The photographer in the photo in figure 1 is a Woodland Scenics surveyor with his tripod converted to a camera stand.

First remove the surveyor transit from the tripod and file the top flat. The camera is made from bits of scrap .04” styrene strip cut down to fit with a short stub of .06” styrene rod glued on as the lens. Add the flash next. A Tichy lamp shade acts as a flash reflector. Set it in a small mount formed from U-shaped channel, then trim back, and paint it.

Next wire a #0401 white micro LED (surface mount type with 38 gauge magnet wire). See my article on using micro LEDs in the (issuu.com/mr-hobbyist/docs/mrh12-02-feb2012-ol?viewMode=presentation&mode=embed) February 2012 Model Railroad Hobbyist Magazine for sources and techniques. Leave the leads long enough for placement on your layout. Thread the leads through the hole in the reflector and glue the LED in place with a clear adhesive (ACC, Elmers white glue, watch crystal cement, Micro Kristal Klear, etc). Twist the leads together for strength, run them down one leg of the tripod, and glue them in place. If you did it right, you’ll never notice the wires are there once the tripod is painted. You can see the finished result below and in the video.





3. Preiser surveyor tripod transformed for photography.



4. Tripods after painting without "flash bulb."



5. The company photographer Phil sets up his shot.

The accompanying circuit provides the rest of the magic. It is a simple circuit that pulses the LED with a higher than normal current (about 75 mA measured) for a very brief time (about 8.5 milliseconds) and then waits for some longer period of time for the train to pass. With the component values listed, this time is about 2 minutes. It can be adjusted longer or shorter by increasing or decreasing the 470K resistor and/or the 200uF capacitor. Do not dramatically increase the pulse time to the LED by fiddling with the first NE555's values, or you will blow out the LED. This overdrive technique is used on cell phone flash units all the time, and will reliably yield a nice bright flash.

The circuit is straightforward, and most people familiar with electronics should be able to build it. The track "trigger" consists of wires connected to a bit of a Kadee coupler box spring hovering just above rail height. The ground (or common wire) is connected to the rail below the track sensor. Note: do not use track power in this case to power the flash circuit. I use

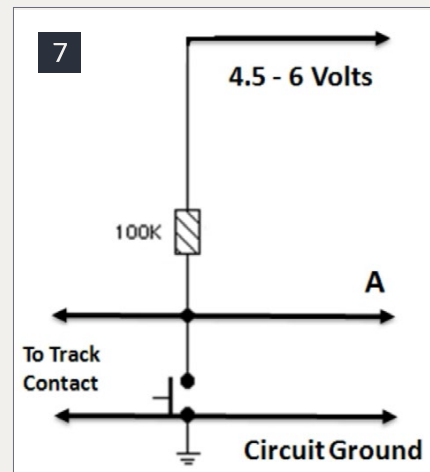
either a three cell AA battery pack or a 5-volt “wall wart” DC power adapter rated 200mA or better.

1. As an alternate sensor, I use an infrared photo-transistor and an infrared LED. The Infrared LED is an LEDTech UT1883-81-940. The infrared phototransistor is a matching LedTech LT9593-91-0125 (data here: allelectronics.com/assets/spec/ILED-8.pdf and ledtechusa.com/data/data-sheets/LT7-9X/LT959X-91-0125.pdf). The IR diodes and transistors are available from All Electronics (allelectronics.com), and others from Jameco (jameco.com).

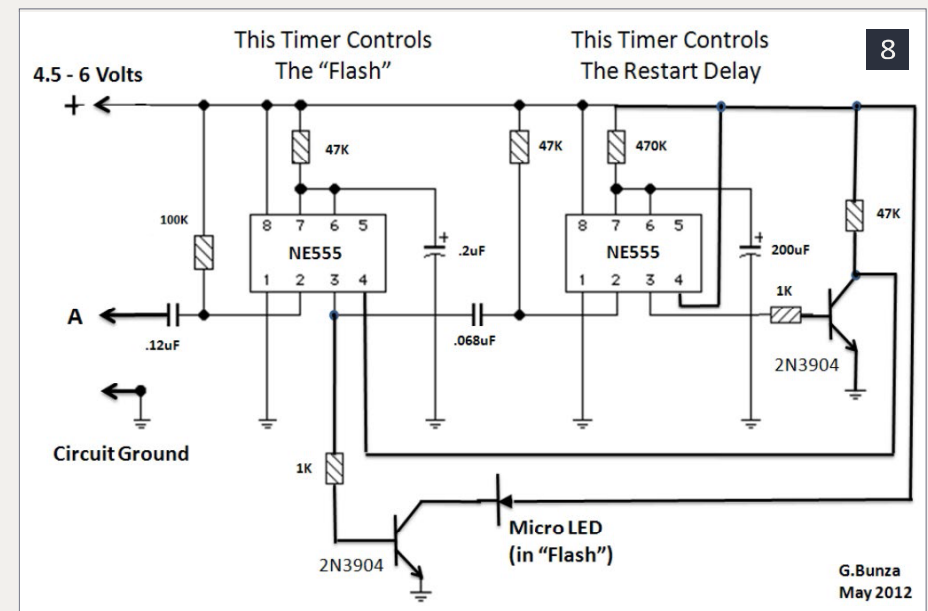
Both trigger circuits are shown in the figures below. The mechanical contact will wear over time, and is subject to abuse – but it is simple! The infrared solution takes longer to set up but, unless you power it with batteries – requires no



6. Track mechanical contact before burial.



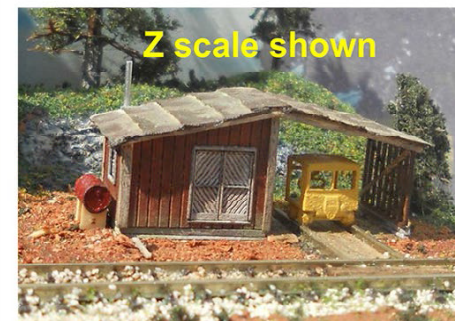
7. Track contact circuit.



8. Flash timer and delay circuit schematic.

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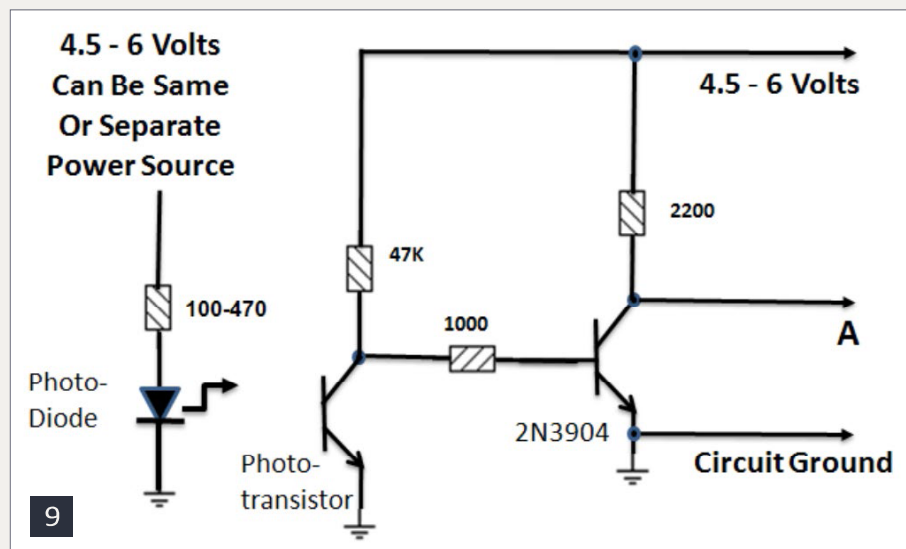
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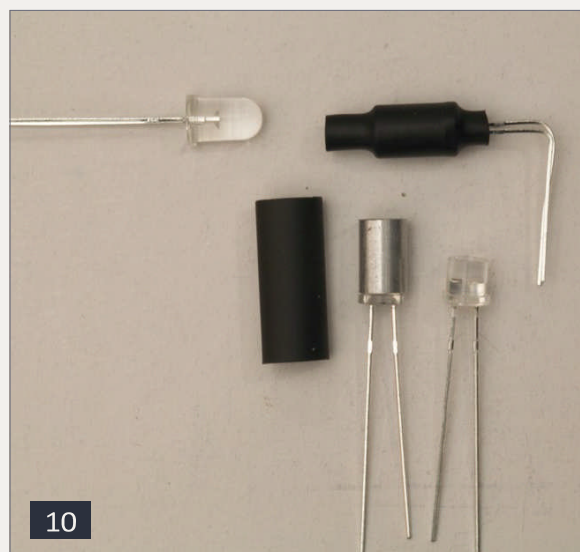




9. Infrared detector circuit.

maintenance, and its light is invisible, allowing you to hide it in your scenery.

Most component values are not critical. The circuits are simple enough that they can be built on a small solderless breadboard. If you use other components, some adjustment to the resistor values may



10. Infrared switch components, LED on the left, phototransistor on the right.



11. The company photographer takes his last shot.

be necessary. The components and values were the ones I used and measured.

If you use the infrared phototransistor and LED, cover the end of the phototransistor with a shield made from an appropriately sized piece of ½ inch long metal tubing – I tried plastic but it did a poor job. Glue the shield in place and then cover the assembly with some heat-shrink tubing or tape. This will make the transistor sensor directional and less sensitive to picking up ambient light. Since you can't see the infrared light, pay close attention to placing the powered infrared LED and the phototransistor on opposite sides of the track (where the train will cross to break the beam) so that they point directly at each other.

Now stand back and ask your visitors if they want any pointers from your company photographer as they watch him document your road's latest in motive power! ☒



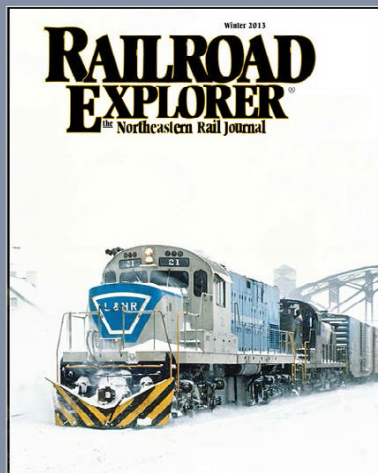


Geoff Bunza started as a model railroader when he received a Mantua train set for Christmas, at age 6. He fed his interests through college, becoming a member of the Tech Model Railroad Club (TMRC) at MIT while getting his doctorate and three

other degrees in Electrical Engineering. Geoff is blessed with his wife, Lin, in marriage for 33 years, and their two terrific sons. He is a member of the New York Central System Historical Society, a life member of the NMRA, and holds an Extra Class amateur radio license.

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