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The moon over Union Station



Getting Real column
by Nick Muff

Modeling the evening sky ...

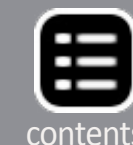
I wanted to have an image of the moon projected on the night sky over Union Station. My first thought was to use

an old 35mm slide projector, or antique 35mm film-strip projector. Neither of these worked well. Worst of all, the fans that cool the bulbs make a lot of distracting noise.

During the Christmas



1: Moon just above the horizon.



season, I noticed the "Holiday Projectors" designed to project Rudolph on your garage door. These units projected an image that was bright enough and did not require a cooling fan. It was a simple matter to insert a portion of a 35mm slide with the image of the moon into the projector where the holiday image would normally be placed. I used black masking tape to mask out the entire slide except for the image of the moon. The projector was mounted on the ceiling and produced a very believable image of the moon over downtown Kansas City.



2: The moon in its mid position.



3: The projector for the moon.

Okay, it's true; I can never leave well enough alone! Should I aim the moon low on the horizon, high, or somewhere in between? Then I thought, why should I be forced to make that choice? Why shouldn't the moon move up and down in the sky so that's it's not always in the same place?

To make a long story short, I accomplished this with a slow speed display motor and three stage gear reduction drive. A bolt protruding from the large gear runs

in a slotted bracket screwed to the back of the projector, moving it up and down as the gear rotates. It cycles over about 20 minutes. The speed is slow enough that the movement is not noticeable.



4: The drive system for the moon

Lastly, it makes no sense for the mechanism to be running during the daytime. I installed a relay interface to the blue night lights, so that the moon projector and drive mechanism are only on during the night time cycle.

Thunder and Lightning

Those who have spent time in the Midwest know that thunderstorms are a common occurrence on humid summer evenings. I wondered how I could effectively create thunder and lightning in the layout room. The thunder is not a problem. The sound could be produced with digital sounds you record yourself and an MP3 player, or any of a number of commercial sound modules available such as those from Innovative Train Technologies. ittproducts.com

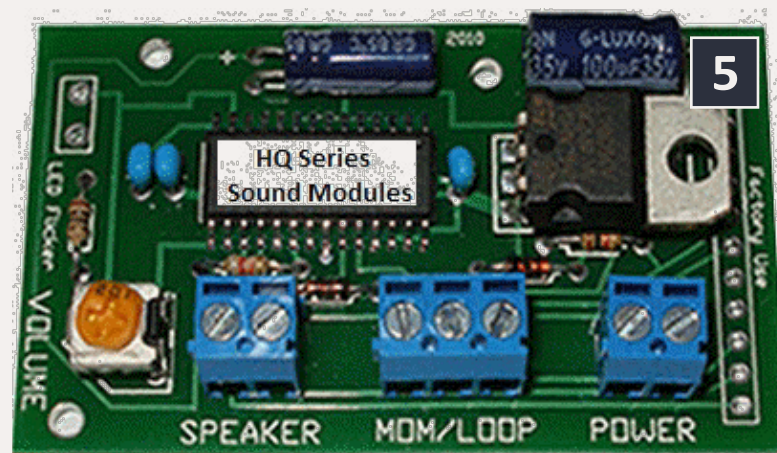
The real challenge was creating lightning. The board I purchased came with a "super-bright" LED. Unfortunately the light from the LED would be wholly inadequate for my 30' x 40' layout room. In addition, I did not want just a bright flash to fill the room. What I wanted was an actual lightning bolt projected onto the sky. How could I accomplish this?

Again, the holiday projectors turned out to be the solution. It was an easy matter to remove the light and socket from the rear of the housing. I then purchased several second-hand strobe flash units on eBay. I used my table saw (a hack saw or any hand saw would work as well) to cut a slot in the back of

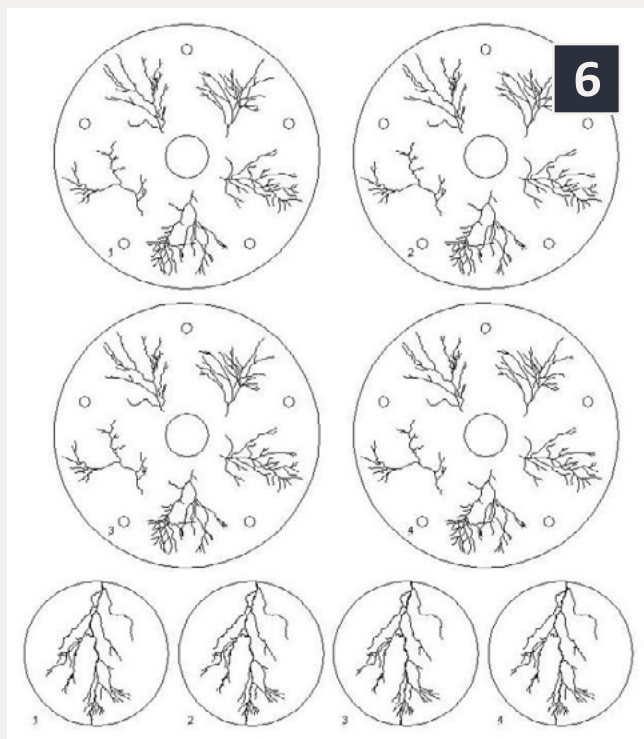
the holiday projector housing that the strobe light would fit into.

The next challenge was to find a way to coordinate the flashing of the strobe light with the flashing of the super-bright LED on the circuit board. To do this, I purchased several strobe flash "slave" units.

The device consists of a small box with a cord that plugs into the flash. It senses the flash of light from a nearby strobe light and triggers the device that it's plugged in to. I then taped the slave trigger device on top of the super-bright LED. Now every time the super-bright LED flashes, it triggers the strobe light. The strobe flash, trigger and circuit board are all enclosed in a plastic electronics project case, attached



5: Innovative Train Technology Products sound board.



6: These are the lightning patterns created I with my cad program.



7: The 2 projectors used for the lightning effects over the Kansas City Power & Light and Sheffield Steel.

to the side of the projector housing.

The last hurdle was to figure a way to create a convincing lightning bolt. I tried using aluminum and a knife to cut slits in the foil. This did not work well. The foil just tore into shreds. Next I thought of having the image etched in thin brass, but this would be expensive. Finally I tried using a piece of exposed x-ray film (hey, I am a radi-

ologist!) and scratching the image of the lightning bolt on to the film emulsion with the tip of a knife. This worked well, and projected a believable lightning bolt.

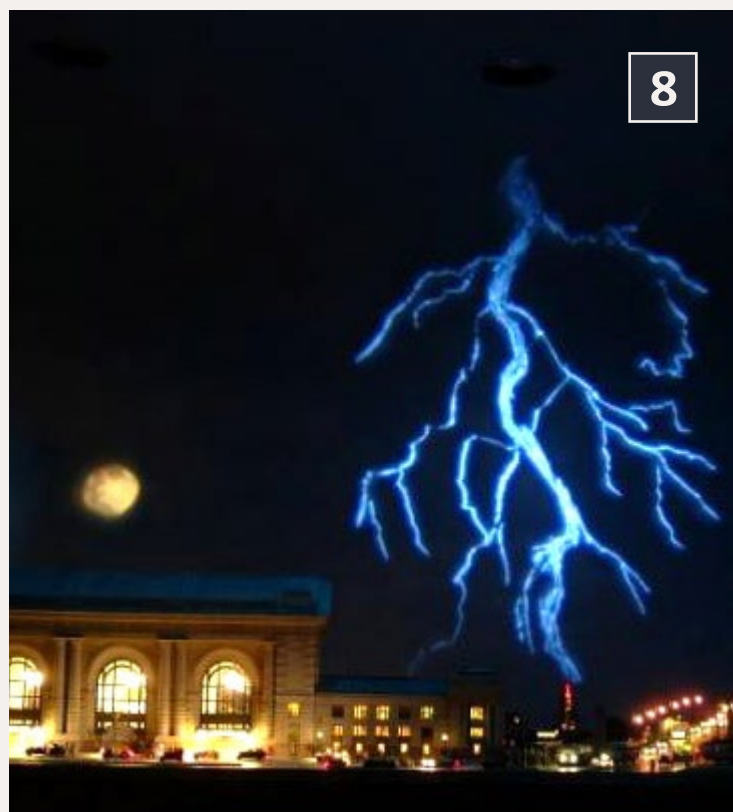
An unexpected problem developed when I tried to photograph a lightning bolt. For the brief time that I could see a lightning bolt with your eye, it looked quite good. However in a photograph, it looked crude, like it had been scratched onto the surface of film with a knife! So it was back to the drawing board.

Actually, it was literally back to the drawing board. The CAD program I use has the capability to bring up any JPEG or bitmap image on the drawing board. This time I used the images of actual lightning bolts to create my miniature version.

I use the CAD program to draw my lightning bolt directly over the prototype image. This also allowed me to accurately transition the width of the lightning bolt from thick at the upper end, to thin at the lower ends. I then scaled the images to fit

the holder in the holiday projectors. I printed the artwork and took it to my local print shop to have a high contrast line negative made. I then cut out the images to the proper diameter and inserted them in the image holders of the holiday projectors.

Now I am talking about two projectors. Innovative train technologies offered two different circuit boards with two different thunder and lightning sequences. It didn't seem right to have the lightning always flash in the same place, in the same way and the same thunder sound. Two circuit boards with two projectors, which are purposely out of synch with each other, solves the problem.



8: The moon is shining through a break in the clouds as the night time thunderstorm rolls through Kansas City with a bolt of lightning striking the top of the top of the Power & Light building.

One lightning bolt would strike the top of the Kansas City Power & Light Building while the second would strike over the area of the Sheffield Steel plant. I used a set of Hi-Fi Heathkit speakers at those separate locations under the layout. With a 10" woofer and no additional amplification, those thunder/lightning circuit boards put out remarkable sound!

I purchased a third holiday projector. This projector was different than the first two I had found. It had a rotating wheel with space for five different images.



9: The third holiday projector that I purchased is capable of holding five different lightning bolt patterns.



10: One of the three lightning bolt patterns.

This meant that for the lightning flash, it can display any of five different lightning bolt patterns. That turned out to be very effective! Visitors are always impressed with the final effect and always ask if it's going to rain! The answer is no, this is where I quit! There is a limit to what I will try.

That's all for this installation. Next time, it's back to laying track.



11: For minimum visual impact the three projectors are clustered on the ceiling and are painted sky blue.

