

# Mohegan Pequot Model Railroad

<http://www.mpr.org>



## The News for: June 2003

### The Club Show

Bill Paradis has kindly determined that St. Bernards is available for 18/19 October, 18 setup and 19 show.

But no contract has been drawn up with St. Bernards, and no deposit made. Dan, this needs urgent attention please.

Also, Art, would you please place advertisements in the model railroad journals accordingly?

### Passenger Modules Status

As usual, work continues on the passenger station modules. Some track painting took place on May 14, with some laying of ballast on May 21. Hey Jim S., and guys, how about some notes on how to lay ballast. I have tried but can't say I have got it down pat (Ed.).

### Club Meetings

This is being held for June 8 at the Bill Library, 7:30 PM. No June 22 meeting.

### Field Trips

We are planning a field trip to Steamtown, PA, and other venues in the vicinity, during the latter half of June. We are aware of heightened security issues in such trips, and plan to take action accordingly.

### Member News

### John Waller's Column

John Waller's Column

The light-emitting diode or LED is one of the wonders of the technical revolution. Some 4 billion LEDs are manufactured each year. Sales of LEDs began in 1968 with a red LED at 655 nm wavelength, see Figure 1. This type used gallium arsenide phosphide as the material which emits light when excited with electrons.

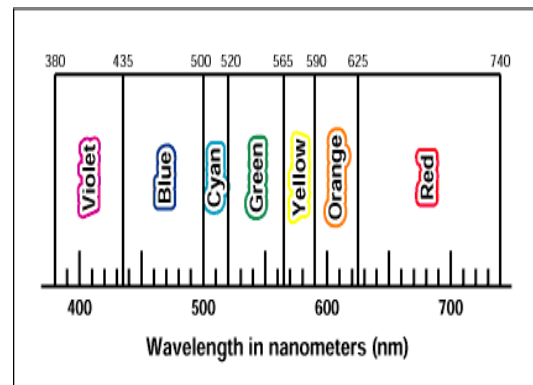


Figure 1. Wavelengths and Colors of LEDs

For a few years LED displays appeared in wristwatches and pocket calculators, but the current drain required that the display only be activated when required. These applications soon saw the use of liquid-crystal displays (LCD), which emit no light, and hence draw little current, but need ambient light to be visible. The LED will work in the dark, but the LCD will not.

Figure 2 shows the inner workings of a LED. A “die” of photo-emitting material is electrically connected to a conductor. The curved black line in the figure is the top bond wire, which connects the top of the die to another conductor (not labelled) on the left. The type of material in the die determines the color or wavelength. A reflector is normally used to form the light output into a beam, whose axis is normal to the substrate.

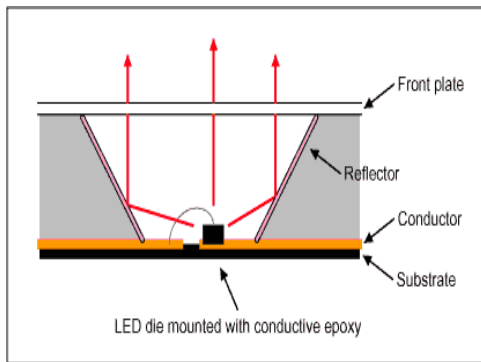


Figure 2. LED Mounting and Connections

Figure 3 shows a common configuration for a LED. The die from Figure 2 is mounted on the anvil, which is the cathode. The bond wire is connected to the post, which is the anode. To make the LED emit, the anode is made more positive than the cathode. The anode wire is, by convention, always longer than the cathode wire in single-color LEDs. If you are not sure which wire is which, the anvil is easily identified by visual inspection. I am not sure if there is an established convention for three-wire bi-color LEDs but, again, the anvils are usually easily identified.

Figure 4 shows LED current vs voltage for different colors. The steepness of the curves above their knee requires all LEDs to be fed from a constant-current source. The simplest form of current source is a resistor connected to a voltage somewhat higher than the knee voltage, such as 5 volts for all colors except blue. Normally, the currents are very low (<20 mA), and the energy

dissipated in the resistor is of little consequence. If this is not so, then constant-current sources are available<sup>1</sup>, which sense the current through the LED and adjust the voltage accordingly. These devices can compensate for decaying battery voltage, keeping the current constant down to some battery voltage threshold, whereby they shut down.

Note that the curves in Figure 4 are roughly independent of the color, except for blue, the most recently-developed color. Ultra-bright white LEDs are actually blue with fluorescent material glowing white when excited by the blue output.

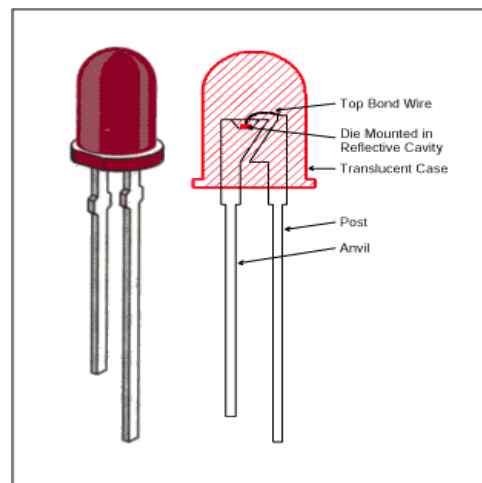


Figure 3. A Typical LED Package

In terms of a light emitter, LEDs are cheap, efficient, and extremely reliable. We can expect the LED to continue to compete in new applications replacing incandescent and fluorescent lamps<sup>2</sup>. This is certainly the case in our model train environment, where LEDs can be expected to continue to infiltrate both rolling stock and accessories. I use Model Power signals in my block and signal demo. Originally these were fitted

<sup>1</sup> Maxim markets such devices, such as the MAX1561, which works at 80% efficiency.

<sup>2</sup> Although cold-cathode fluorescent tubes (CCFT) also have potential as a new light source.

with grain-o-wheat (incandescent) lamps, and I have been changing these to LEDs on each lamp failure.

Obviously, it would be better to start with LEDs in the first place, as they will never fail unless physically damaged or their ratings exceeded. Bob Murphy told me how he scours the dealers at train shows and finds, often discontinued, lines of dummy signals to populate with light sources and use on his impressive layout. Much to my delight, at the last train show at Willimantic, I found a dummy signal, Bachmann part No. 42101, which is a current product. The dummy lights are easily popped out, and the hole enlarged slightly to take 3 mm LEDs, exactly what I was looking for. The total cost per signal is less than \$2.

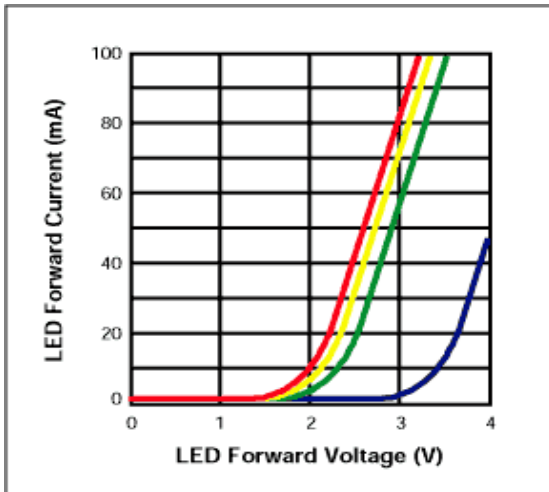


Figure 4. LED Voltage vs Current

For some of the information and all of the above pictures in this month's column, I am indebted to :



Another important application for the LED is the opto-coupler. A LED irradiates a photo-transistor, or other photo device, causing it to conduct when there is current through the LED. The advantage is the two

electrical circuits are quite separate. If required, the voltage difference can be in the thousands. I am using opto-couplers to drive the "Tortoise" turnout machines from the outputs of a microcontroller, as shown in Figure 5.

The figure shows 4 couplers with the output transistors connected in a bridge configuration, often called an "H". To make the motor turn one way, when U1 and U2 conduct. This is accomplished by making the left PIC<sup>3</sup> pin go high to 5 volts, with the right pin low. To reverse the motor, the left PIC pin is made to go low, and the right pin high, causing U3 and U4 to conduct. The voltage from the PIC, and the motor voltage can be selected independently of each other. The motor is too slow if driven from just 5 volts.

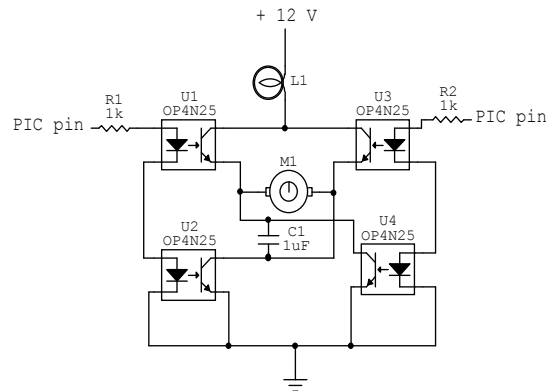


Figure 5. Two-way Drive with "H" Configuration

If a fault occurs, and all four couplers conduct, the supply current would be excessive, except for the non-linear action of the lamp, L1, which is a grain-o-wheat lamp rated at 12V 50 mA. Under normal conditions, it will never light so should last a long time. I actually use a 16-pin DIP which contains four opto-couplers; this saves on the external wiring.

*John*

<sup>3</sup> Microcontroller.

## The President's Corner

Dan, where are you? Are you keeping well?

## Vice President's Niche

I need to clarify the comment about four main tracks I made last month. Although it might be good to have four main tracks right around the layout, that could be some way off. The idea is to introduce some challenging dispatch problems (or should I say tasks?) with passing loops, and crossovers. Thus four tracks in new modules is not strictly necessary; three will present a challenge!

Another thought about the future of the Club. Suppose some rich benefactor offered us a location, free for all time, to set up a fixed layout, would we take it? We might value such a location to set up modules between shows, perhaps.

## The Market Place

### Club Member Ads

Advertise (free) here to reach more than seventy model railroaders eagerly waiting to buy your wonderful stuff.

Editor's Note: Let me know when your item sells or when you want to stop running the ad

### The Club Store

#### **The Storekeeper's Report**

(Ed. Perhaps members could let me know what they need??)

### M&PMRR Officers & Functionaries

<b>The President</b>	Dan Delany	860 643-9303
<b>Vice President</b>	John Waller	564-3114
<b>Trea\$urer</b>	Gary Domer	848-0690
<b>Secretary</b>	George Harran	443-0707
<b>Storekeeper</b>	Larry Southwick	535-2996
<b>Bulk Purchases</b>	Bill Evans	267-9482
<b>Meeting Speakers</b>	Bill Evans	267-9482
<b>Layouts/Name Tags</b>	Stu Dom	536-7637
<b>New Passenger Module</b>	Stu Dom	536-7637

Field Trips	Jim Delany	889-4029
Newsletter	John Waller	564-3114
Club Web Page	Jim Spavins	

## The Technical Section

Contributions are welcome. You can write about anything from prototype to model railroads. Scenery, electrical, benchwork, model building and more are all of interest to the club members.

### Model Railroad Calendar

#### This Month

Work sessions will generally be held each Wednesday at Henry's and Larry's each Thursday. To check on a particular date, call Henry or Larry respectively. Both sessions start at 7 PM.

### Yale-Harvard Regatta Observation Train

Saturday, June 7<sup>th</sup>, 2003

(Thank you Richard Peiffer for this notice. Ed.)

The observation train returns to the Yale-Harvard Regatta for the third year in a row!

Join us for an early summer excursion in vintage open coaches on the Thames River to pace the 151<sup>st</sup> Yale-Harvard Regatta. The observation train is THE ONLY WAY to see all three races from start to finish. The journey begins at Union Station in downtown New London, CT where the "Celebrate Regatta Festival" will be located on adjacent City Pier. After boarding the train, we will proceed to the starting point of the first race. The train will pace all three races to the finish line and return to Union Station and the "Celebrate Regatta Festival".

#### FARE:

Adult ,	\$35.00
Children (under 14),	\$15.00

Food Service available on the train at extra cost. Train operated by the Green Mountain Railway.

INFORMATION

<http://newlondonmainstreet.org>

RESERVATIONS / TICKETS

Phone, New London Main Street Corp.  
(860) 444-2489 (cash, check only)  
Yale University Athletic Dept.  
(203) 432-1919 (credit card only)

E-mail, [info@newlondonmainstreet.org](mailto:info@newlondonmainstreet.org)  
(cash, check only)  
[deborah.sterling@yale.edu](mailto:deborah.sterling@yale.edu) (credit card only)

Hotel Reservations:

Queen Anne Inn, (860) 447-2600  
Radisson Hotel, (860) 443-7000

REGATTA TRAIN SCHEDULE

(tentative):

Saturday, June 7<sup>th</sup>, 2003

Load (Track 6, State St.) - 1000  
Depart (New London) - 1010  
First Race (Smith Cove) - 1030 to  
1040  
Second Race (Farnsworth Rd) - 1115 to  
1130  
Third Race (Gold Star Bridge) - 1215 to  
1235  
Arrive (New London) - 1300 or  
1320

All races are up river and end at Upper Bartlett. Race lengths are 2 miles, 3 miles and 4 miles. Distance from New London to Upper Bartlett is just under 5 miles.

Watch for the train to operate again next year with a new feature: optional tour packages that include rare-mileage on the New England Central Railroad.

Next Month and Beyond

Courtesy of the Nutmeg Flyer:

New Haven, August 17, 2003. *The Train Collector, 8<sup>th</sup> Annual All Gauge Train Show*, Yale's Lanman Center/Payne Whitney Gymnasium, 72 Tower Parkway, 0900-1500; Adults \$5, Children under 10 Free.

Vernon, September 14, 2003. *Nutmeg Division, NMRA Train Show*, Colony Inn at the Quality Inn, Route 83, 1000-1500; adults \$5, seniors (62 & up) \$4, children (5-12) \$3, <5 free, family \$7.

Old Greenwich, September 28, 2003. *Train Show*, (modules) Greenwich Civic Center, 1000-1500.

Orange, October 12, 2003. *Annual Train Show*, Knoghts of Columbus Hall, 263 Center street, adults \$3, seniors \$2, children under 12 free.

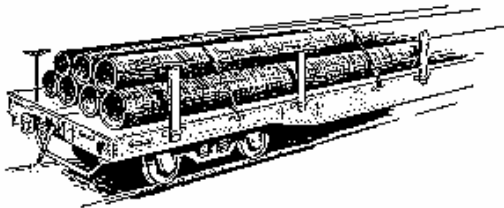
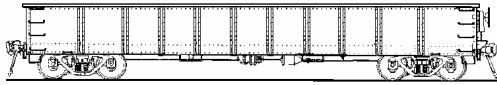
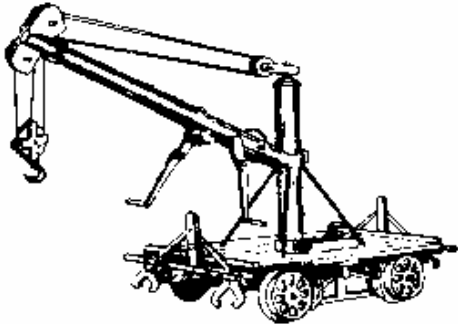
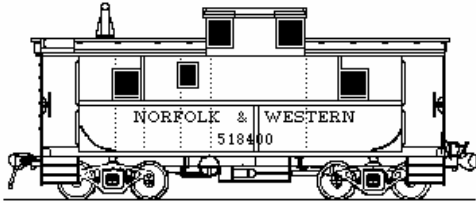
Hartford, November 22-23, 2003. *Great American Train Show*. Hartford Covic Center, One Civic Plaza, 1100-1700, adults \$7, kids < 12 free (with adult).

(Ed. Nothing on October 19; phewww!)

Submitting Newsletter Items

The club has a post office box that can be used for newsletter mailings. It is; P. O. Box 55 Quaker Hill, CT 06375-0055 Electronic versions are preferred so retyping is not necessary. E-mail enclosures can now be opened. Microsoft Word and other compatible word processing programs should be used. Send items to be published by E-mailing them to me at home at: [john.waller@snet.net](mailto:john.waller@snet.net) If you do send something, it is a good idea to phone (860 564 3114) and say that you sent it. Say M&P newsletter article in the subject line. You can also put the items on a floppy disk in Microsoft Word and give it to me or mail it to the post office box (above). The deadline

for submissions is one week before the end of the month.



(Ed. I will try to find time to look for different pretty pictures. If anyone has any, please email them to me.)