Bay Window and Cupola Caboose

Frog Eye Marker Lights

By: Rich Malone

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<table>
<thead>
<tr>
<th>Frog Eye Markers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Different Types/Styles</td>
</tr>
<tr>
<td>• Various rooftop Placements</td>
</tr>
<tr>
<td>• Power and types of controls</td>
</tr>
<tr>
<td>• Designs</td>
</tr>
<tr>
<td>• Construction and installation</td>
</tr>
<tr>
<td>• Additional items of interest</td>
</tr>
</tbody>
</table>
Preamble

• Have Fun

ÅE

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(Electronic’s does not necessarily equal Rocket Science.)

• Background
• Subject Interest
• Use todays clinic as a starting point
Frog Eye.....Roof Mounted electric powered Dual Light Assemblies. Each assembly (tube) has a colored lens on each end. One end is Red, the other is green. Illuminating the Red lens Facing Aft and the Green lens for Forward direction. The other assembly (tube) would have it’s lenses positioned in an opposing manner.

First installed in 1961.
Types & Styles of Markers

Å Bug Eye....Replacement for the Frog Eye.
   Roof Mounted Electrically powered Marker light assemblies.
   Two Round assemblies each with a Red lens and mounted back to back.

Standard equipment in 1978
<table>
<thead>
<tr>
<th>Track Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Standard Variable DC</td>
</tr>
<tr>
<td>B. Standard Variable AC (Non DCC)</td>
</tr>
<tr>
<td>C. Fixed DC (Some forms of Command Control)</td>
</tr>
<tr>
<td>D. Fixed AC (Digital Command Control)</td>
</tr>
</tbody>
</table>
## Types of Controls

1. Slide Switch (Micro Type, mounted on exterior underframe)
2. Reed Switches (Momentary and Latching)
3. Touch Sensor (Uses exposed contacts)
4. Relay (Use Reed Sw’s or exposed contacts)
5. SCR (Use Reed Sw’s or exposed contacts)
6. DCC Decoder
Full Wave Power

- Standardized Power source for most designs.
- 100v, 1.5A Bridge Rectifier
- Capacitors for filtering, surge and keep alive protection.

From Truck Pick-up wires

NOTE
Voltage rating of Capacitor should always be twice the expected voltage coming from the track. Example: Track voltage is 17 volts, use a 35V capacitor.
Half Wave Power

- Specialized Power source
- Use only on Standard Variable AC or DCC
- Utilizes half vs. full wave

CAUTION
Do not use where track voltage can exceed 18V AC/DC.

C1 Should be rated at 35V minimum
Can use a 1N4001 for D1
Voltage Regulated Power

Use this design for Low Voltage Lamps. Can be used with any Track Power, ensures Lamps will not burn out due to voltage spikes or anomalies.

Lamps are wired in series, VR is set at 2.6V, the two lamps need 3V for full brightness, the lower voltage ensures a Scale fine quality (not an in your face, these are MARKERS brightness.)
Components Used In Clinic
<table>
<thead>
<tr>
<th>General Rules to follow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Å Research placements/types prior to starting</td>
</tr>
<tr>
<td>Å Start with a clean workbench</td>
</tr>
<tr>
<td>Å Have the Proper tools ready</td>
</tr>
<tr>
<td>Å Have all required components prior to starting</td>
</tr>
<tr>
<td>Å Good low wattage soldering iron (15/30W)</td>
</tr>
<tr>
<td>Å Utilize an electronics breadboard for testing all circuits before installation.</td>
</tr>
</tbody>
</table>
General Rules to Follow

Take your time
and be careful of the
“Flying Clip Lead Disease”

It can Ruin your day really quick
Design Type 1A.
Frog Eye Markers (Design Type 2A)

From Standard Power source

Note:
For ease of location identification, recommend placing reed switch in middle of caboose roof area directly opposite of Marker Light Assembly.

L1-L4 Miniaturics 1/16", 1.5MM Red & Green LED’s (2ea)

*1N4001 may be used, a slight variance in brilliances may occur.
Bug Eye Markers (Design Type 2B)

From Standard Power source

0-18VDC

R1 4.7K 1/2 W

D1 1N4004*

R2 220 1/2 W

S1 Circuitron Latching Reed Switch Part # RS-2

Red

L1

Red

L2

(-)

* May use a 1N4001, but expect variances in brilliance between LED's

R2 is used to help equal the brilliances between LED's

L1 & L2 Miniatronic 1/16”, 1.5 MM Red LED's
Relay Control

*Can Be Used with both types of Power sources.
*Works best with a Constant voltage on the track.
*Relay needs 12V to operate.
Caution

Supply voltage must not exceed 18VDC.
DCC Power

L2 and L4 are for the Frog Eye or Dual Markers version. See programming instructions for the type of Flashing Light or Strobe feature desired.

L5 can be an Interior or Inspection Light.

Connect FL4 or similar Decoder directly to the track.

D1 and D2 are used to protect LED's from AC voltages.
LED Overview and placement

- Anode (+)
- Cathode (-)

Silver band on back side of LED indicates the Cathode lead
LED Contouring and Shaping

Clip off lead from one end and leave @ 1/32" exposed for a good contact surface. Ref LED placement diagram.

Carefully file all corners to create the look of a light assembly.

Carefully file off @ 1/32" from the Lens. Do not get too close to the LED Die. Then polish to ensure a glass-like shiny surface.

Paint the back of LED Black, Brown or Silver (if a Bug Eye assembly) to ensure light does transfer from one assembly to another.
Frog Eye LED Overview

Place conductive paint here

Frog Eye LED's
Red & Green in series
Frog Eye Construction

- @ 2' 8", 3' Max
- 14' 5" from Rail head to top of Markers

Unit #1
- Plastic Spacer
- Outboard View
- Pre-soldered wires
  - To fit through mounting holes, make same dia. as lead/supports

Unit #2
- Inboard View
- 2C  2A
Frog Eye Markers
Installed in a pre-assembled RTR unit
Frog Eye Markers
Frog Eye Markers
Bug Eye Construction (type 1)

- Common Wire: Formed to look like a support structure.
- Paint ends of units Silver to represent individual light assemblies.
- .030" Plastic at 6"x8" Junction Box.
- Brass wire formed to look like a support.
- Pre-soldered wires to fit through mounting holes, make same dia. as lead/supports.
Bug Eye Construction (type 2)

- Common Wire: Formed to look like a support structure
- "B" End View
- Pre-soldered wires: To fit through mounting holes, make same dia. as lead/supports
- Paint ends of units Silver to represent individual light assemblies

Optional installation arrangement of the support legs
Actual Model w/Bug Eye Markers
Roof Top End View
Cupola Frog Eye construction

- Pre-soldered wires
  - To fit through mounting holes, make same dia. as lead/supports
- 010" Sheet Styrene
  - Fit to cover leads
  - Simulates a single piece sheet metal frame
- Top View
- Units #1 and #2
- Plastic Spacers
- Dimensions: 12" and 5"
Truck & Pick-Up wiring

- Phosphor Bronze Wipers x 2 ea
- Fine Flexible wire soldered to Wipers 1 per wiper
- Secure wires to side of Bolster Span
Truck & Pick-Up wiring
Slide Switch and Pick-Ups

NWSL Wheel Sets and Single set of Wipers/Pick Ups

Slide Switch
Slide Switch Placement
Magnetic Reed Switch Placement
Internal Components Layout

- Resistors
- Capacitor
- Tape Weights
- Rectifier
  (Mounted in Battery Box)
External Wire & Routing Options
Voltage Regulated Power

Use this design for Low Voltage Lamps. Can be used with any Track Power, ensures Lamps will not burn out due to voltage spikes or anomalies.

Lamps are wired in series, VR is set at 2.6V, the two lamps need 3V for full brightness, the lower voltage ensures a Scale fine quality (not an in your face, these are MARKERS' brightness.)
Adlake Style Markers
Flashing Markers

L3
Miniatronic 3MM Blinker/Flasher LED

0-18VDC +

R1
1K 1/2 W

C1
100mfd, 35V

D1
1N4004*

S1
Circuitron Latching Reed Switch
Part # RS-2

L1
Red

L2
Red

L5

L4

R2
220 1/2 W

A

B

(-)

* May use a 1N4001, but expect variances in brilliance between LED's

R2 is used to help equal the brilliances between LED's

C1 is used to provide a better Strobe/Flash effect

L1 & L2 Miniatronic 1/16", 1.5 MM Red LED's

L4 & L5 are optional for Dual Markers
Thank You

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