

## **[www.SBS4DCC.com](http://www.SBS4DCC.com) N Scale Marker Light Kit Instructions**

1. All instructions provided here-in are based on installation of this kit in an N-Scale Atlas Trainman 34' Cupola Caboose. All decoder color-codes and CV settings are based on the TCS FL4 function decoder. Adjustments to this procedure may be required for use in any other type of car or decoder.
2. Remove the car body from the car floor. Remove trucks and weight from the car floor. Remove the wheel sets from the trucks. Discard the weight and wheels. If using the 4-40 screws to mount the trucks, discard the King Pins. Otherwise, set them aside for use in Step 8.
3. If using the 4-40 screws to secure the trucks, drill and tap the truck mounting holes in the bolsters. Otherwise, proceed to Step 5.
  - Drill the king pin pilot holes out using a SBS #43 drill bit
  - Tap the holes using a SBS #4-40 tap

(The SBS 4-40 Drill and Tap Set is available at [www.sbs4dcc.com](http://www.sbs4dcc.com))
4. Mark and drill holes in the floor for the power wires.
  - The enclosed drill template has multiple location options for the power wire holes. Before proceeding, study your installation to determine which location is appropriate for your contact and application. It is not necessary to drill holes for every slot shown on the template.
  - Secure the enclosed template to the floor with or mark hole locations with a center punch
  - Drill the power wire slots using a 1/16-inch drill bit. Drill (2) holes for each slot you plan to use, one at each end of the slot. Then use a small file or the drill bit to remove the material left between the holes.
  - Remove the excess flashing with needle files and a hobby knife.
5. Attach the enclosed wires to the SBS F4W-440 contacts.
  - Be sure to lay out the contacts as they will be installed. They will have a definite orientation... Right Front, Right Rear, Left Front, Left Rear.
  - Be sure to lay out the wires as they will be installed. The red wires should be used on the Right contacts and the black wires should be used on the Left contacts.
  - The small hole in the solder lug is to allow the wire to be attached along the same axis as the rotation of the truck. Simply insert the wire into the hole from the side that will face the car body and solder the other side. Be sure to trim or otherwise minimize the height of the final surface so as not to extend below the wheel axles.
6. Mount the contacts in the trucks and mount the trucks to the car floor.
  - Place the Right Front contact in the inside of the truck frame.

- Place the Kapton Washer on top of the contact.
  - Place the Left Front contact on top of the Kapton Washer.
  - Insert the 4-40 screw through the center hole of the assembly.
  - Mount the assembly to the car floor by insert the wires into the power wire slot and tighten the screw to hold in everything in place.
  - Using a pair of fine tipped tweezers or other instrument, gently squeeze the ends of the contacts together and insert one wheel set.
  - Repeat to install the second wheel set.
  - The wheel sets included in the kit are insulated on both ends. While not critical, it is a good idea to note orientation of the insulated wheel if using a different brand.
  - Repeat the process to mount the Rear Truck Assembly.
  - Adjust each trucks pivot friction by turning the screw until the truck pivots freely but has little to no vertical movement along the pivot axis.
  - Place the 4-40 jam-nut on the screw and tighten to lock the assembly in place.
7. Inspect the installation of the contacts and verify they are isolated by performing a continuity test using a multi-meter.
- Place a test lead on each wheel of a single wheel set. The circuit should be open (the meter SHOULD NOT beep). Adjust the contacts until there is no continuity between the wheels.
  - Place a test lead on the same side of each wheel set in the truck. The circuit should be closed (the meter SHOULD beep). Adjust the contacts until there is continuity between the wheels.
  - Inspect the contact pressure between the contacts and the wheel faces. Adjust the contact “wings” until they make good contact AND allow the wheels to roll freely.
  - Inspect the solder lugs. Make sure they are not touching the axle of the wheels set or each other. A light coating of liquid tape will insure they don’t move and are well insulated.
  - Inspect the height of the solder joints. Remove any material protruding below the wheel axles.
8. Mount the Marker Light Pipes to each side of the rear of the car.
- Mark the hole locations with a center punch. If you do not have a preferred location, measure down 3/16 inch from the roof-line rivet line and in 3/16 inch from the end rivet line.
  - Drill the mounting holes using a #67 drill bit.
  - Remove the excess flashing with needle files and a hobby knife.
  - Insert the Marker Light Pipes in the holes and secure with CA glue.
  - Trim the light pipe flush with the inside wall of the car body.
9. Mount the Marker Light Harness to the inside of the caboose body.
- Apply a small drop of CA to each inside wall of the car body at the location of the Marker Light Pipes.

- Center the front of each marker light LED over the pipe and hold until the glue is dry.
  - Test the LEDs with a 9V battery. Correct any issues with placement or operation before proceeding.
  - Apply a generous drop of Microscale Krystal Kleer or equivalent over the entire LED and allow it to run over the top down to the side wall and allow to dry completely (12 to 24 hours).
  - Apply a generous drop of black liquid tape or equivalent over the entire LED and allow it to run over the top down to the side wall and allow to dry completely (1 to 2 hours). Apply multiple coats as required.
  - NOTE! The Krystal Kleer acts as a glue to semi-permanently secure the LED to the side wall and also as a diffuser to help distribute the light. The liquid tape provides an opaque seal to keep the light out of the interior of the car.
10. Mount the Conductors Cupola Light (0603 SMD) to the inside of the caboose body.
- Apply a small drop of CA to the inside wall of the car body at a location between the windows in the side of the cupola where a kerosene lantern or simple light fixture might be mounted.
  - Center the back of the LED on the desired location and hold until the glue is dry.
  - Test the LEDs with a 9V battery. Correct any issues with placement or operation before proceeding.
  - Apply a generous drop of Microscale Krystal Kleer or equivalent over the entire LED and allow it to run over the top down to the side wall and allow to dry completely (12 to 24 hours).
  - NOTE! The Krystal Kleer acts as a glue to semi-permanently secure the LED to the side wall and also as a diffuser to help distribute the light.
11. Mount the Stove Light (0603 SMD) to the inside of the caboose body.
- Apply a small drop of CA to the inside wall of the car body at a location under the smoke stack on the side wall of the car body where a coal stove might be mounted.
  - Center the back of the LED on the desired location and hold until the glue is dry.
  - Test the LEDs with a 9V battery. Correct any issues with placement or operation before proceeding.
  - Apply a generous drop of Microscale Krystal Kleer or equivalent over the entire LED and allow it to run over the top down to the side wall and allow to dry completely (12 to 24 hours).
  - NOTE! The Krystal Kleer acts as a glue to semi-permanently secure the LED to the side wall and also as a diffuser to help distribute the light.
12. Connect the Contact Power Wires to the decoder using the third set of pre-cut wires if needed.

- WARNING! Be sure to make note of and match the polarity of the Contact Power Wires with the circuit. The decoder may be damaged if wired incorrectly.
- Insulate the solder joints with liquid tape or shrink tubing.

13. Connect the LEDs to the decoder.

- Each LED cathode has a resistor soldered to it.
- Connect wires by color as follows:
  - Black w/ White - Not used
  - Blue - (3x) LED Annode
  - Green - Marker Light Green Cathode
  - Pink - Marker Light Red Cathode
  - Brown - Stove Light Cathode
  - Violet - Cupola Light Cathode
- CAUTION! You must follow this color code for the CV setting provided to work properly.
- Insulate the solder joints with liquid tape or shrink tubing.

14. Mount the decoder in the car body.

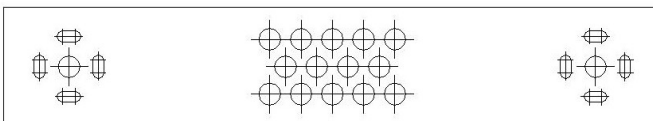
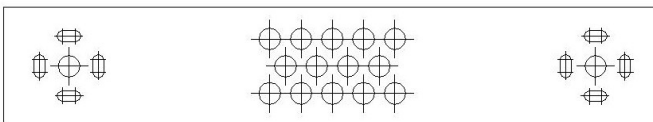
- Use double-sided tape or other material to secure the decoder to the floor inside the car body.

15. Mount the weights to the car floor

- Be sure to select a suitable location that will not interfere with the other components used in the installation.
- Additional weight can be added if desired. The NMRA recommends ½ ounce plus 0.15 ounces per inch of car length for N-Scale cars.

16. Place the car body on the car floor.

17. Test the installation by placing the unit on the programming track and reading the address. If successful, place on a DCC powered track and test. Finally, program the decoder as desired for use in your fleet and enjoy all of the sights of N-Scale Model Railroading!



**www.SBS4DCC.com N Scale Marker Light Kit CV Settings**

CV1	Address
CV17	Address
CV18	Address
CV35	16
CV36	32
CV39	64
CV40	128
CV51	32
CV52	32
CV53	33
CV54	44
CV64	4
CV135	255

NOTE: The brightness of the cabin and stove LEDs can be adjusted by changing the value of CV64 (Range = 0-15).

These setting will provide the following function controls for this installation.

F3	Green Marker
F4	Red Marker
F5	Stove Light
F6	Cupola Light