

SOUNDTRAXX

Application Note

Bowser-Stewart VO-1000 *Tsunami Digital Sound Decoder Installation Notes*

Overview

This application note describes how to install a TSU-1000 Digital Sound Decoder into the Bowser-Stewart VO-1000 Locomotive.

Skill Level 4: The entire installation can be completed within a couple of hours and requires some mechanical modifications.



Bill of Materials

<u>Stock No.</u>	<u>Description</u>
827111	TSU-1000 Digital Sound Decoder for Baldwin VO
810113	1.38" x 0.63" Oval Speaker
810037	Assorted Heat Shrink Tubing Kit

Evergreen P.N.

9040	0.040" Styrene Sheet
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For your convenience, Evergreen part numbers have been listed above. Please visit their website: www.evergreenscalemodels.com



Tools You Will Need

- Small Pair of Pliers
- Miniature Screwdriver Set
- Metal Hacksaw 18 tooth per inch Blade
- Miniature Vise /Small Table Vise
- Miniature Files
- Wire Cutters or Shears
- Wire Strippers
- Heat Gun or Blow Dryer
- 25W Solder Iron
- Pin Vise or Electric Drill Motor
- #60 Drill Bit
- X-acto Knife with #11 Blade
- Rosin Core Solder
- Electrical Tape
- Aquarium Sealant or Silicone
- Super Glue
- Liquid Plastic Cement
- 1 foot 30-32 Gauge Wire
- 1K (1000) Ohm Resistors (2)

Installation

1. Remove the locomotive shell by squeezing the sides of the shell and gently lifting it up. (Photo 1)



Photo 1

2. The light board is visible on the top of the motor. This will need to be removed from the model to make room for the TSU-1000 decoder. Start by removing the small clips that hold the wires to the board using a small pair of pliers. (Photo 2)

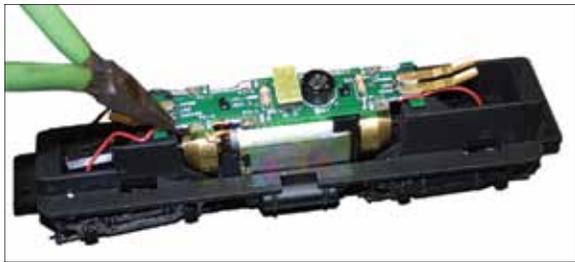


Photo 2

3. After the clips are removed, gently pull the two plastic tabs located toward the center of the circuit board back to allow the board to be removed. (Photo 3)

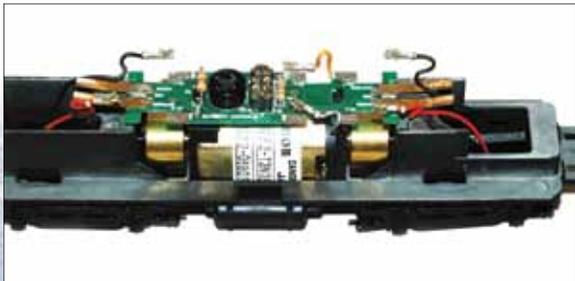


Photo 3

4. While there is space on top of the weight for the speaker alone, it doesn't allow room for a proper speaker baffle. This potentially reduces the volume and clarity of the sound that could be achieved. The best results are reached by cutting down the frame surrounding the front truck gear tower to provide room for a baffle. (If you choose not to create a baffle, mount the speaker to the weight above the front gear tower and skip to Step 16.)
5. To keep metal shavings from getting into the moving parts, disassemble the model to the bare frame. Start by gently removing the clips that hold the driveline to the top of the trucks with small pliers. There are two small tabs on each side of the truck gear tower that hold the cover in place. Gently spread the cover to release it from these tabs. The driveline and worm gear will then lift out. The driveline is held in the flywheel with a hexagonal "dog bone" and simply slides in and out. Repeat for both sides. (Photos 4 and 5)

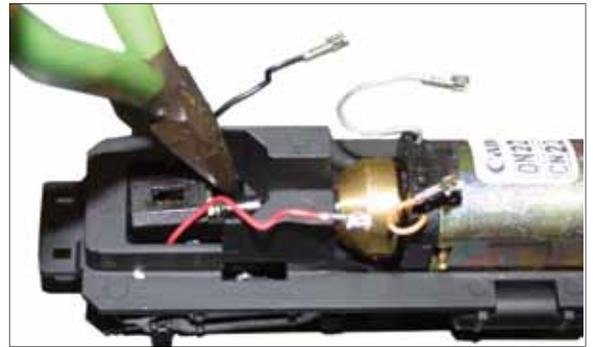


Photo 4



Photo 5

6. Once the drivelines are removed, the trucks will fall out from underneath. Next, remove the motor by removing the four screws that hold it in place from under the fuel tank with a philips head screwdriver. The motor will easily come out. Set aside the screws in a safe place or re-install these into the mounts under the motor for safekeeping. Now the frame has been completely disassembled. (Photos 6 and 7)

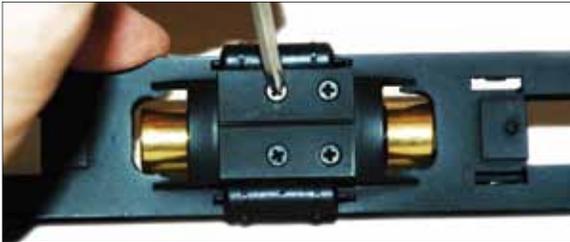


Photo 6



Photo 7

7. Using a metal hacksaw, cut down the front weight 0.30" This will allow the truck to swivel and still allow plenty of room for the speaker and baffle. Hold the frame in a small vice and carefully start your cut. Clean up the cut afterward using a metal file. The cut frame should look like this one. (Photo 8)



Photo 8

8. Re-assemble the mechanism in the reverse order that it was disassembled.

9. Prepare the speaker by building the baffle. Cut the sheet styrene according to the template provided at the end of this application note. Glue the template to the sheet styrene first to make the measuring and cutting easier. Gently sand any rough edges with a small file or fine sandpaper.

10. Begin building the baffle by cementing one of the longer strips of styrene to the side of the speaker using the plastic liquid cement. Be sure the styrene is flush at one end of the speaker. (Photo 9)



Photo 9

11. Next, take an end piece and cement it to one of the short ends. (Photo 10)



Photo 10

12. Continue each side until the basic box is complete. This will give the short elevation needed for the truck pickup wires to freely move if needed. Gently file away any rough or uneven edges. (Photo 11)



Photo 11

- 13 Use a pin vise and a #60 drill bit to drill the hole in the baffle end nearest the speaker terminals for the wires to be fed through as shown on the template. (Photo 12)



Photo 12

14. Feed the two purple speaker wires on the TSU-1000 through the hole and solder to the speaker terminals. (Photo 13)



Photo 13

15. Now, cement the box top to the baffle, leaving the side with the speaker cone open. Set the decoder and speaker aside.

16. Cut the metal clips from the ends of the black, red, grey, and orange wires that remain in the model. (Photo 14)

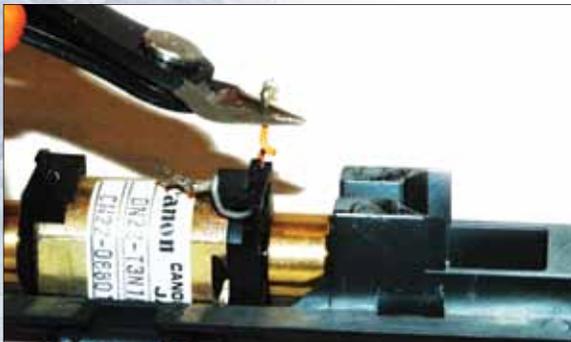


Photo 14

17. Now, clip off the two tabs that were used to hold the factory-installed light board in place with a pair of snippers or shears. (Photo 15)



Photo 15

18. Cut four pieces of the 3/64" black heat shrink tubing from the Heat Shrink Kit into 1/2" lengths.

19. Place the sound decoder over the motor oriented so that the end of the decoder with 9-wires points toward the cab. Trim the red and black wires from the 9-wire harness to 1". Strip approximately 1/8" of the insulation from the wires. Tin the ends of the wires. Slide a 1/2" piece of the black shrink tubing over the black and red wires. (Photo 16)



Photo 16

20. Solder the black wire from the harness to the black track pickup wire on the cab end. Use the cut off extra black wire to solder this connection to the other black track pickup. Do the same to the red pickup wires. (Photo 17)

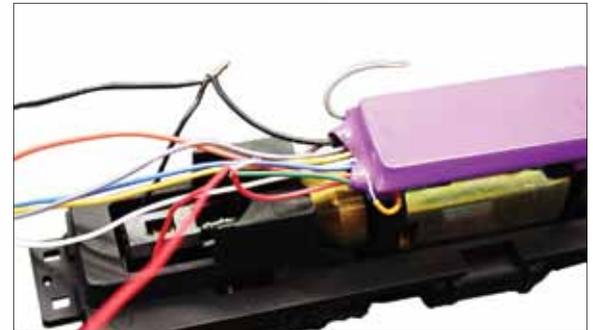


Photo 17

21. Now slide the heat shrink tubing over the connections to insulate the joints. Shrink with a heat gun or hair dryer. Be careful not to melt the soft insulation on the Tsunami's wires.

22. Next, slide two 1/2" pieces of black shrink tubing over the orange and grey wires. Trim the orange and grey wires from the 9-wire harness to 1". Solder the orange wire from the decoder to the orange wire in the locomotive. Solder the grey wire from the decoder to the grey wire in the locomotive. Slide the heat shrink over these connections, then shrink with the heat gun. (Photo 18)

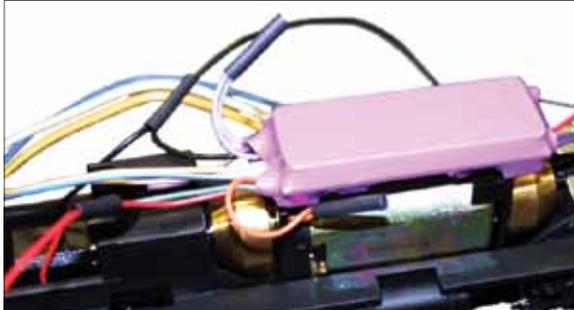


Photo 18

23. Lay the wires from the capacitor back across the decoder. This allows the capacitor to sit just past the decoder in the open area. Secure the decoder and these wires in place using a small piece of black electrical tape. Tuck the gray and orange wires under the tape to hold them out of the way. (Photo 19)

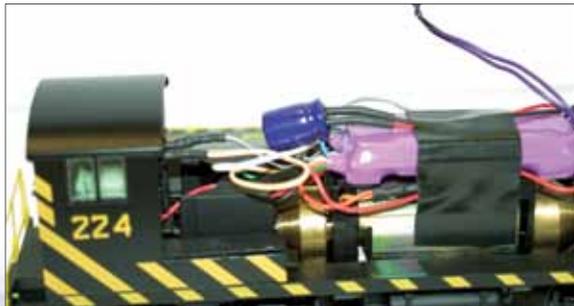


Photo 19

24. Re-install the walkway at this time. Test the motor and sound installation by placing the locomotive on the main, selecting address 3, and moving it forwards, backwards, and playing sound through the speaker.

25. Now, secure the speaker/baffle assembly to the area above the front truck using sparing amounts of clear aquarium sealant. Using aquarium sealant, silicone, or RTV allows for easier removal of the speaker assembly if the need should arise. Take care not to get any glue on the speaker cone. (Photo 20)

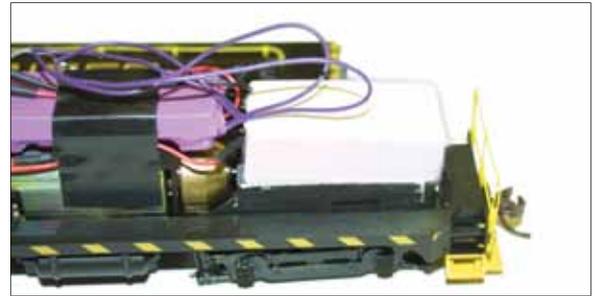


Photo 20

26. The front headlamp is an LED held in place by the plastic clip secured to the inside of the shell. Grasp the center of the black headlight-detailing clip with a pair of pliers. Gently pull the assembly out of the model. Trim the leads to 0.30" at the bend. (Photo 21)



Photo 21

27. Looking inside the LED, you will see a small "flag" attached to one lead. This is the cathode, or negative (-) lead. It is also the longer of the two leads. The other lead is the anode, or positive (+) lead. LEDs are polarity sensitive, so if it is wired backwards, the light will not illuminate. Cut four 1/2" pieces of 3/64 black heat shrink tubing from the Heat Shrink Kit. Slide one piece over the free end of the white wire on the sound decoder and another over the blue wire. Solder the white wire to the negative lead of the LED and shrink the tubing around the connection with the heat gun. (Photo 22)



Photo 22

28. Trim the leads of a 1K resistor to 1/2". Solder a shortened lead of the resistor to the positive lead of the LED. Add a 3" piece of 30 – 32 gauge wire to the positive lead. Insulate with a 1" piece of 1/8" red heat shrink tubing slid over the whole connection. (Photo 23)

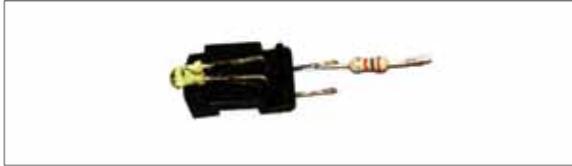


Photo 23

29. In order to wire both the headlight and backup light, you will need to disassemble the cab. Remove the interior by gently prying the cab side away from the floor.
30. To wire the backup light, start by removing the LED clip from the roof of the cab. To remove the LED, use a pair of pliers to take out the small clip on the inside front of the cab, and pull the LED down through the opening. (Photo 24)

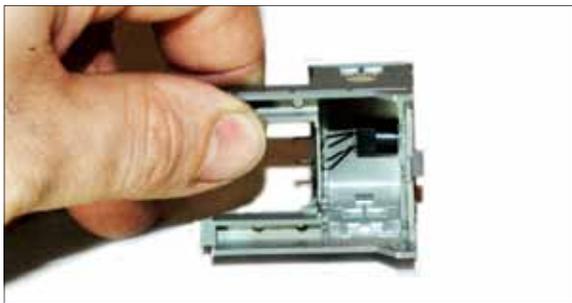


Photo 24

31. Trim the ends of this LED to 0.50" at the bend. Slide a piece of 3/64" black shrink tubing over the decoder's yellow wire and solder this wire to the minus end of the LED. Follow Step 29 to find the lead. (Photo 25)



Photo 25

32. Solder a 1K resistor to the positive side of the LED. (Photo 26)



Photo 26

33. Slide a 1" piece of 1/8" red heat shrink tubing over the decoder's blue wire and the positive lead wire from the headlamp. Trim the blue wire to 2" long. Now solder these wires to the remaining resistor lead. Slide the tubing up to cover the connections and shrink with a heat gun. (Photo 27)

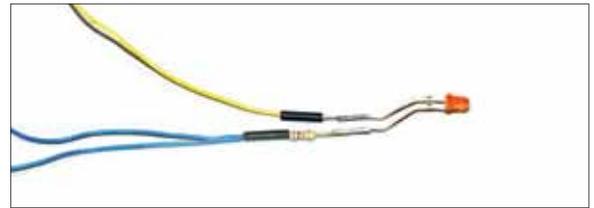


Photo 27

34. Reassemble the cab by re-installing the backup lamp and cab interior, then mount it in place reversing Steps 31 and 32. Re-install the headlamp using the clip you removed in Step 28.
35. At this point, check to be sure the front truck wires are still free to move about. Install the long hood. Tuck the wires up under the shell, and take care that they do not interfere with the drive train.

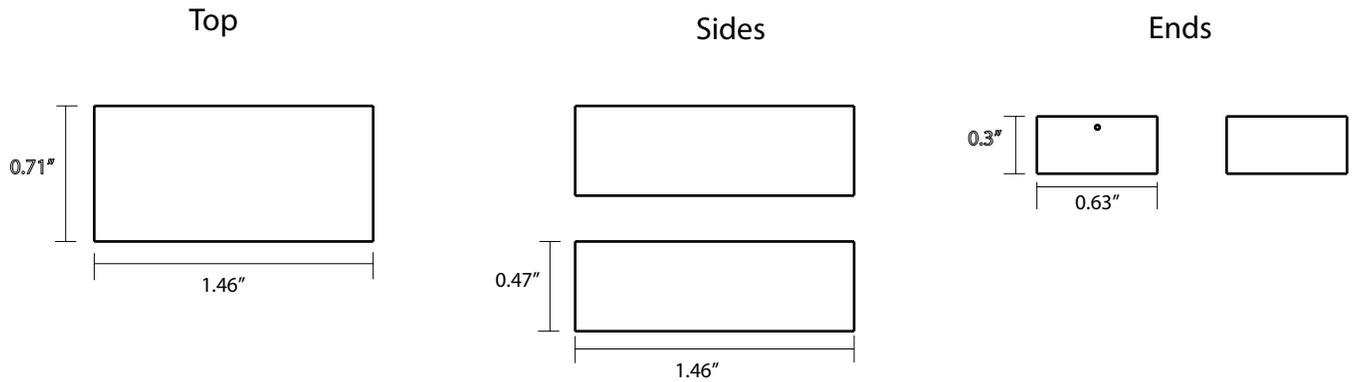
Now, put it on the track and start your yard duties!

36. **CV Programming**

Most of the sounds from the decoder will not need to be changed. You may wish to change the address of the decoder by changing CV1 (see your command station manual for instructions.)

The **Tsunami Diesel Users Guide** is available for download at our web site (www.soundtraxx.com/manuals.php). This manual will give you additional information regarding CV set up and customizing the decoder for your operations.

Speaker Baffle Dimensions



SOUNDTRAXX™
New Dimensions in Digital Sound Technology

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