

# SOUNDTRAXX

## Application Note

### **Athearn RTR AC4400CW** *Tsunami Digital Sound Decoder Installation Notes*

#### **Overview**

This application note describes how to install a TSU-AT1000 Digital Sound Decoder into an HO Athearn Ready To Roll AC4400CW.

**Skill Level 2:** The entire installation can be completed in one to two hours.



#### **Bill of Materials**

<u>Stock No.</u>	<u>Description</u>
828038	TSU-AT1000 for GE FDL-16 Modern
810129	Mega Bass Speaker 0.91" square
810023	1.3mm Light Bulbs (2)
810037	Heat Shrink Tubing Kit

#### Evergreen P.N.

9030	0.030" Sheet Styrene
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For your convenience, Evergreen part numbers have been listed above. Please visit their website: [www.evergreenscalemodels.com](http://www.evergreenscalemodels.com)



#### **Tools You Will Need**

- 25W Soldering Iron
- Rosin Core Solder
- Wire Cutters
- Wire Strippers
- X-acto Knife with #11 Blade
- Miniature Screwdriver Set
- #55 Drill Bit
- Pin Vise or Electric Drill
- Aquarium Sealant/Silicone
- Liquid Plastic Cement
- Insulative Electrical Tape
- Double Sided Foam Tape
- Masking Tape
- Small Pliers
- Heat Gun or Blow Dryer
- 30-32 Gauge Wire

## Installation

1. Begin with removing the couplers and coupler boxes. Unscrew the center screws of the boxes and gently pull the coupler boxes from the end. (Photo 1)



Photo 1

2. The shell should lift off easily. The wires for the front and rear headlamps are connected to the 'light board' that is attached to the top of the motor.
3. Begin removing the black clips attached to the 'light board' that hold the wires in place. Be sure to note what each wire is for, and where it goes. Labeling with masking tape will make re-assembly much easier. (Photo 2)

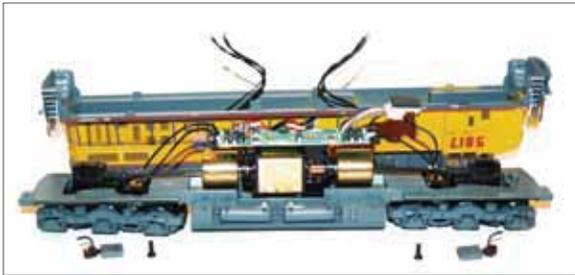


Photo 2

4. Once the wires have all been disconnected, the board can be removed. There is a clip on the bottom of the board that snaps into a second clip on the top of the motor. This clip also acts as the motor + lead. Unsnap the clips and lift off the board. (Photo 3)



Photo 3

5. Steps five through seven are recommended to ensure the reliable operation of the decoder. Remove the motor by removing the four screws under the body that hold the motor mounts to the frame. Once the motor is lifted out, the drivelines will easily pull out of the flywheels. (Photos 4 and 5)



Photo 4

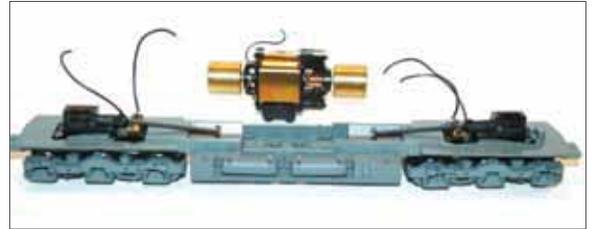


Photo 5

6. Note that on the bottom of the motor is an un-insulated clip which is separated from the frame by a small air gap. If this gap is bridged the decoder will be damaged. To ensure that this will not happen, place a small strip of electrical insulative tape along the bottom of the frame. This will guarantee the motor is insulated from the frame. (Photo 6)

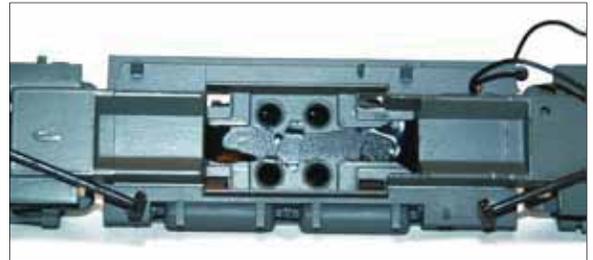


Photo 6

7. Re-install the motor in the frame. Be sure to insert the drive shafts into the flywheels before screwing the motor in place.

- After the circuit board has been removed, the M+ lead will need to be replaced. On top of the motor, there is a copper clip which should be removed carefully as there is a loose spring below. Using a small pair of pliers grasp the long end of the clip (indicated by the arrow in photo 8) and slowly twist the clip up and away from its mounting so that the spring beneath slowly decompresses and does not fly up from the model. (Photos 7 and 8)



Photo 7

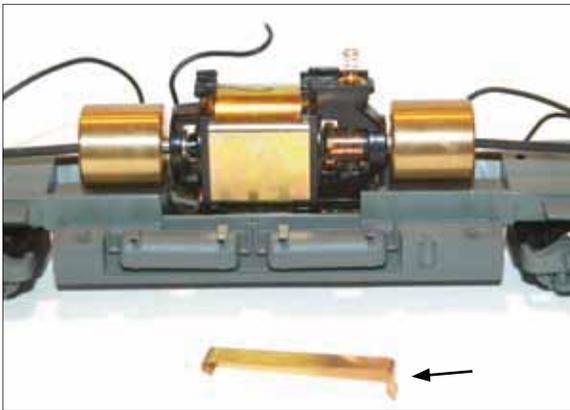


Photo 8

- Once the clip has been removed, solder a 3" piece of the 30-32 gauge wire to the top of the clip so that it extends over the long end. After soldering the wire on, wrap the connection with electrical tape to insulate the joint. Be sure the area where the spring contacts this strip is not covered, or the motor will not work. (Photo 9)



Photo 9

- Once you are done re-mount the clip to the motor. (Photo 10)

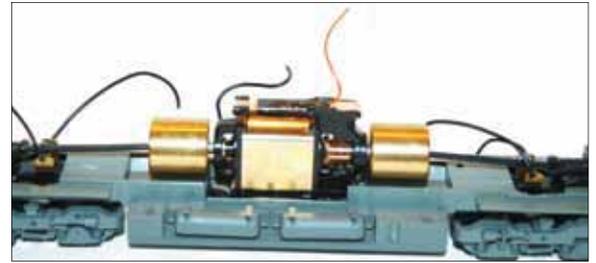


Photo 10

- Next, attach the truck wires to the Tsunami decoder. The truck leads attach to the outer tabs on the end of the board. While it is possible to use the clips that you removed earlier, we recommend that these connections be soldered for a more reliable connection. (Diagram 1)

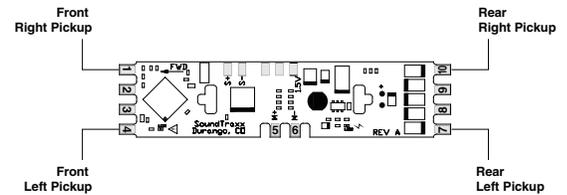


Diagram 1

- Attach the two motor leads to the board. The wire that was attached in Step 9 goes to the M+ tab, while the wire that comes from the bottom of the motor goes to the M- tab.
- After these wires have been attached, mount the decoder to the top of the motor using a piece of the double-sided foam tape. (Photo 11)

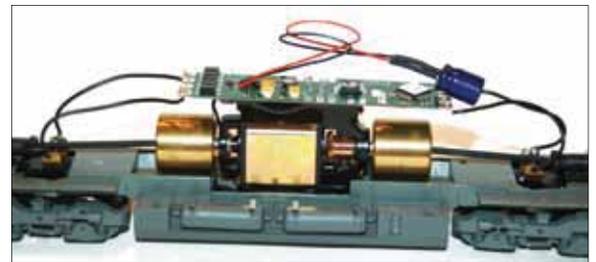


Photo 11

- Now, test the locomotive and decoder by placing the locomotive on the main, selecting address 3, and moving it forwards and backwards. There will be no sound yet, but you will be able to catch any mis-wiring, shorts, or determine if the motor is wired backwards accidentally, and correct them accordingly.

15. These models do not come equipped with operating ditch lights. To add operating ditch lights, start by detaching the ditch light castings from the pilot. Drill out the center of the castings using a #55 drill bit to accommodate the 1.3mm lights. Drill corresponding holes into the pilot. Using liquid plastic cement, line up the holes and glue the castings to the pilot. (Photos 12 and 13)



Photo 12



Photo 13

16. Mount the two light bulbs into the housings for the ditch lights and glue them in place using aquarium sealant. (Photo 14)



Photo 14

17. The recommended speaker for this installation is the Mega Bass Speaker (P.N. 810129). Solder two 6" pieces of 30-32 gauge wire onto each of the terminals on the speaker.

18. The speaker will be mounted beneath the radiator section of the model. The horizontal bar on the inside of the shell will interfere with the smooth seating of the speaker in the recession of the radiator housing. Use wire cutters to trim. (Photo 15 and 16)

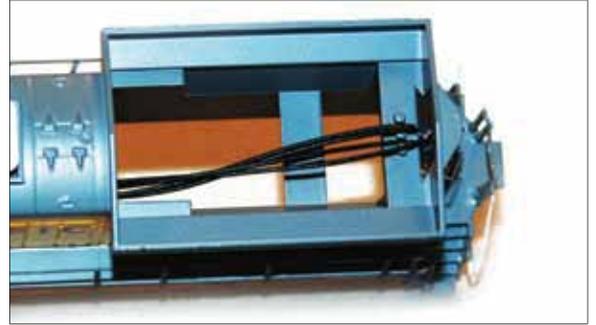


Photo 15

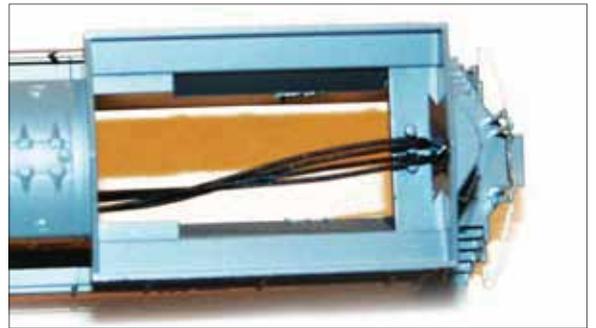


Photo 16

19. Route the wires down through the small opening just behind the light castings. Then install the speaker into the housing with the cone facing up. (Photo 17)



Photo 17

20. Seal off the opening next to the speaker using 0.030" sheet styrene. Use small amounts of aquarium sealant to seal off the area that the light wires were pushed through, and the ends of the styrene sheet. Be careful not to get any on the speaker cone. Re-attach the cover. The radiator grille section has now been converted into a speaker baffle. (Photo 18)

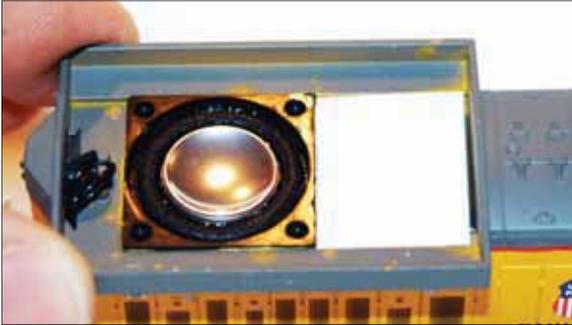


Photo 18

21. After the sealant has dried, begin attaching the wires to the decoder. This model uses 1.5V bulbs so they should be wired into the 1.5V common, instead of the 12V common tab at either end of the board. This eliminates the need for dropping resistors. It is clearly marked on the decoder with 1.5V next to the soldering pad. To avoid soldering six wires into this small hole, the wires will instead be combined into two separate 'branches'. First cut two pieces of 3" long 30-32 gauge wire. Next take one lead from each light bulb in the front, there will be four, and solder them to one of the 3" wire pieces. This is the first 'branch'. (Diagram 2)

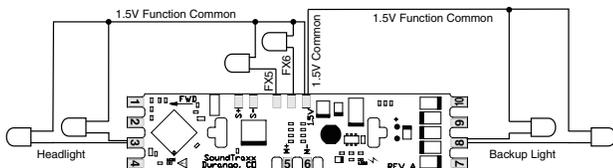


Diagram 2

22. The second 'branch' is created by taking one lead from each of the light bulbs at the back, this time there are only two, and solder these to the second 3" piece of 30-32 gauge wire.

23. Now cut two 3/4" pieces of 1/8" red heat shrink tubing, and slide one piece over each of the 'branches' until they cover the connections. Use a heat gun or blow dryer to shrink the tubing, and then solder the ends of the 'branches' to the 1.5V common. (Photo 19)



Photo 19

24. The headlamps can be soldered to tab 3 while the backup lamps are wired to tab 8. The ditch lamps are then wired into the FX5 and FX6 solder pads. This will allow for alternating ditch lamps if desired. After these connections are done, test the lights to ensure all is wired properly. (Photo 20)

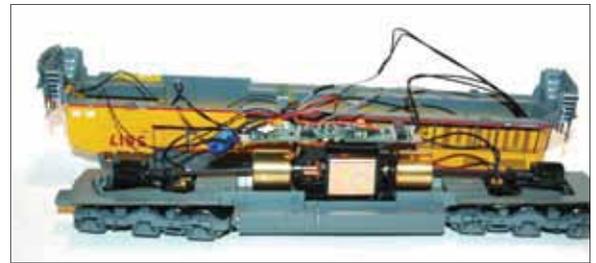


Photo 20

25. Wire the speaker wires to the S+ and S- terminals.
26. Test run the locomotive to ensure that the sound, lights, and motor all work correctly by placing the locomotive on the main, selecting address 3, and moving it forwards, backwards, running the lights, and playing sound through the speaker. After passing this test, tuck the wires up into the model and secure the shell. Test the locomotive to be sure there are no wires getting tangled in the drive train. If this does happen simply tape the wires out of the way. After testing, re-install the couplers.
27. Now is time to program the address and let the fun begin!

**SOUNDTRAXX™**  
New Dimensions in Digital Sound Technology

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