Installing Sound Decoders and LEDs in Brass Steam Locomotives Part 1

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East Coast Santa Fe Modelers

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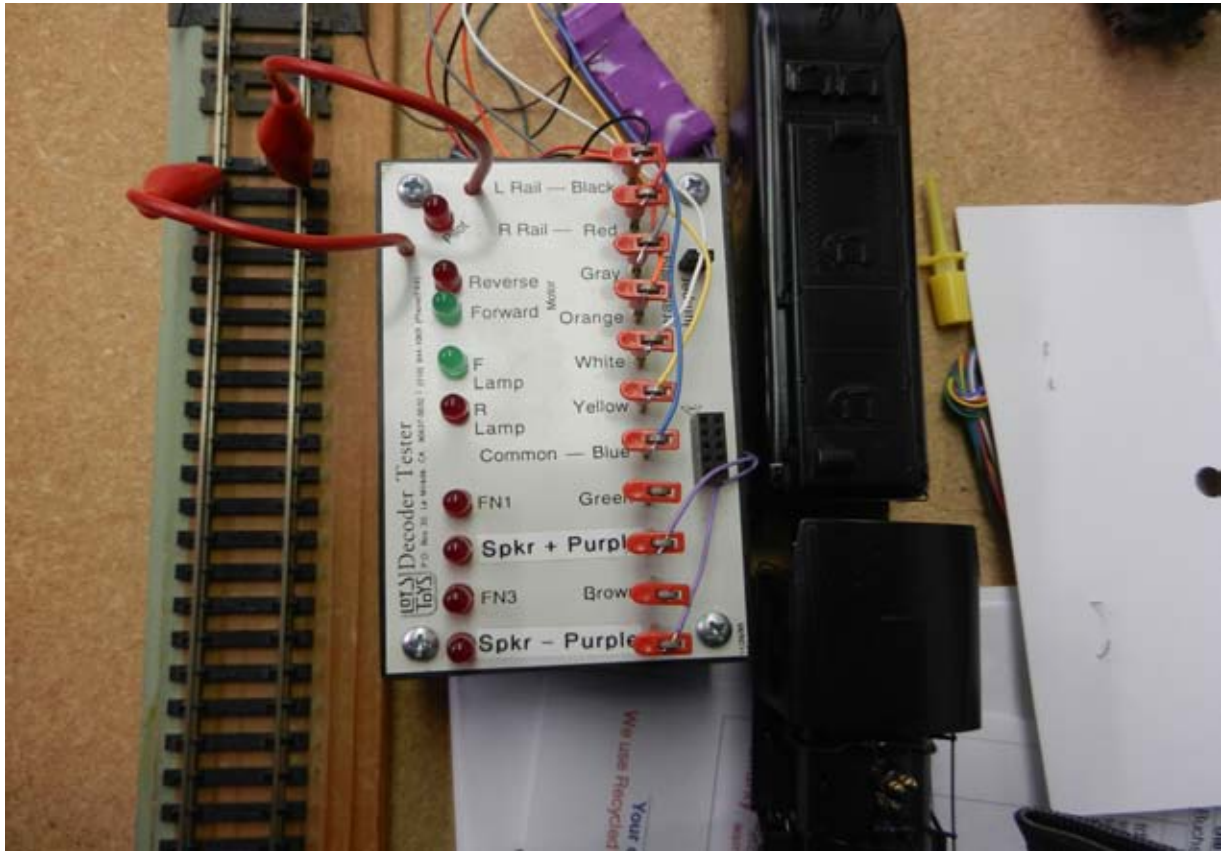
Before beginning installation

- Check DC operation of loco for smoothness.
- Measure DC amps loco draws when stalled by placing an amp meter inline with one power lead and holding motor armature.
- If motor draws over 1 amp, plan to place a 0.5 or 1 amp, 250 volt fast blow fuse in series with the orange or gray wire to the motor.
- If you are not used to doing so, practice soldering small wires together.

Test the Decoder Before Installing



Loy's Toys Decoder Tester with speaker added

Planning Installation

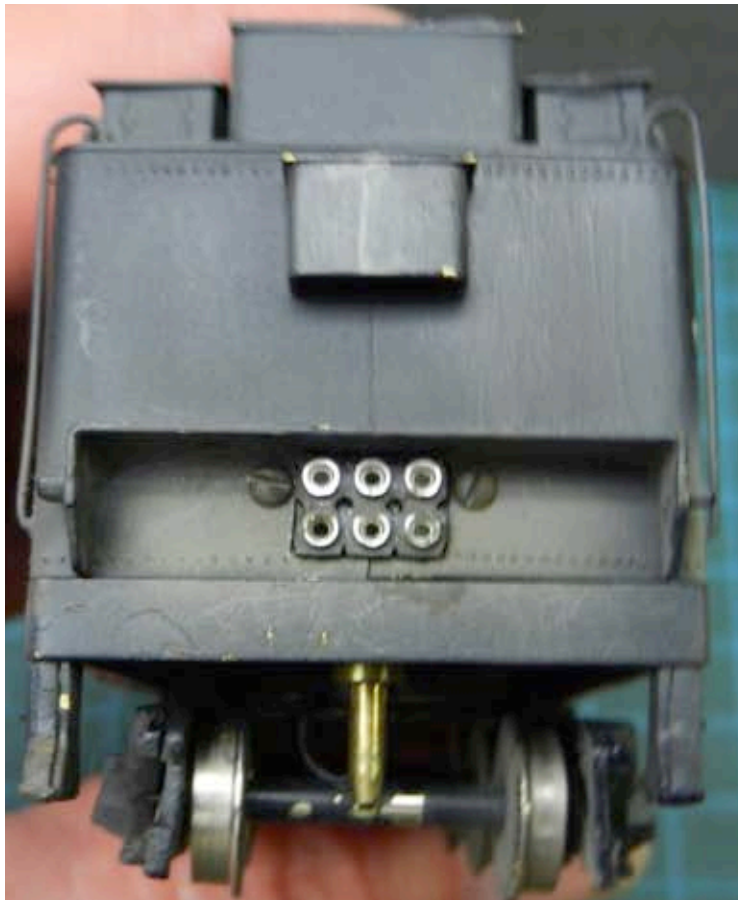
- All drilling and detail additions are best done before painting the loco, but can be done afterwards.
- Decide size and location of speaker
- 15K and 24K ATSF tenders will accommodate 1.1” Hi bass speaker or 30mm x 40mm large oval.
- ATSF shallow, smaller tender may need 1” diameter round speaker which is very thin.

Planning Installation - Continued

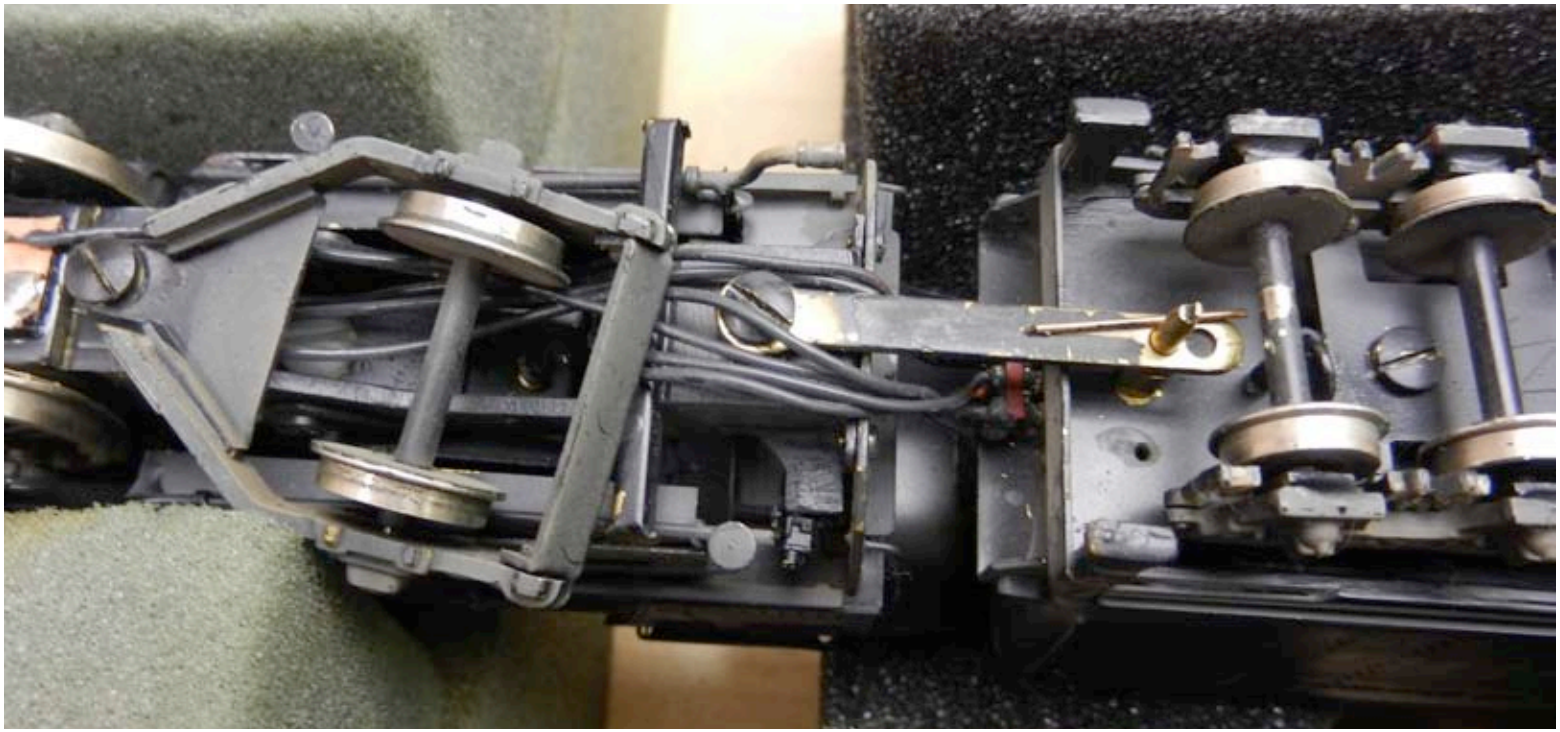
- Decide type of connector to use between loco and tender
- NCE Connector 8 pin cut down to 6 pins - works well with PFM 2-10-2 tenders as the tender step hides it.
- TCS 6 conductor - works well where you don’t want to penetrate the tender shell

NCE Connector in United 2-10-2 ATSF 15K Tender

NCE Connector in ATSF 15K Tender



NCE Connector in ATSF 15K Tender w/2-10-2- Bottom View



Bottom of connector painted red to maintain correct polarity

Installing the NCE Connector

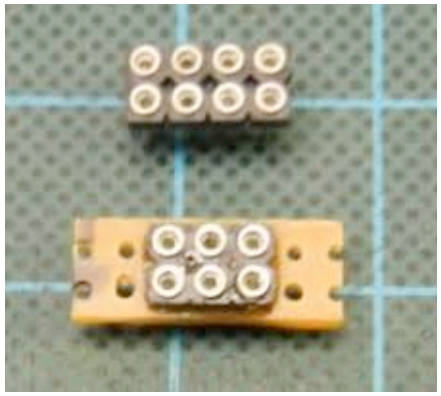
- PC Board can be obtained at Radio Shack that matches the hole pattern of the NCE connector.
- Cut a piece large enough to accommodate the connector and screws to fasten it to the tender.
- Enlarge the holes for the connector with a #53 Drill
- Epoxy the connector to the PC Board

Installing the NCE Connector - Continued

- Cut a rectangular hole in the tender to accommodate the NCE connector.
- Start by drilling two holes using the two holes in the center of the connector as a guide
- Use larger drills to enlarge the holes
- Then file the cutout to size to fit the NCE Connector
- Drill holes to fasten the PC board to the tender with 0-90 RH screws and nuts.

NCE Connector / Wiring

NCE Connector

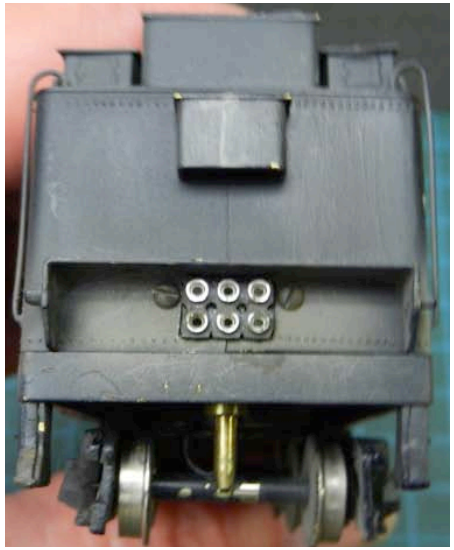


Cut down in PC Bd
for mounting

Red - Right rail
Blue - Function +
Orange - Motor +
Gray - Motor -
White - Headlight -
Black - Cam

Red Blue Orange
▪
O O O
O O O

Gray White Black

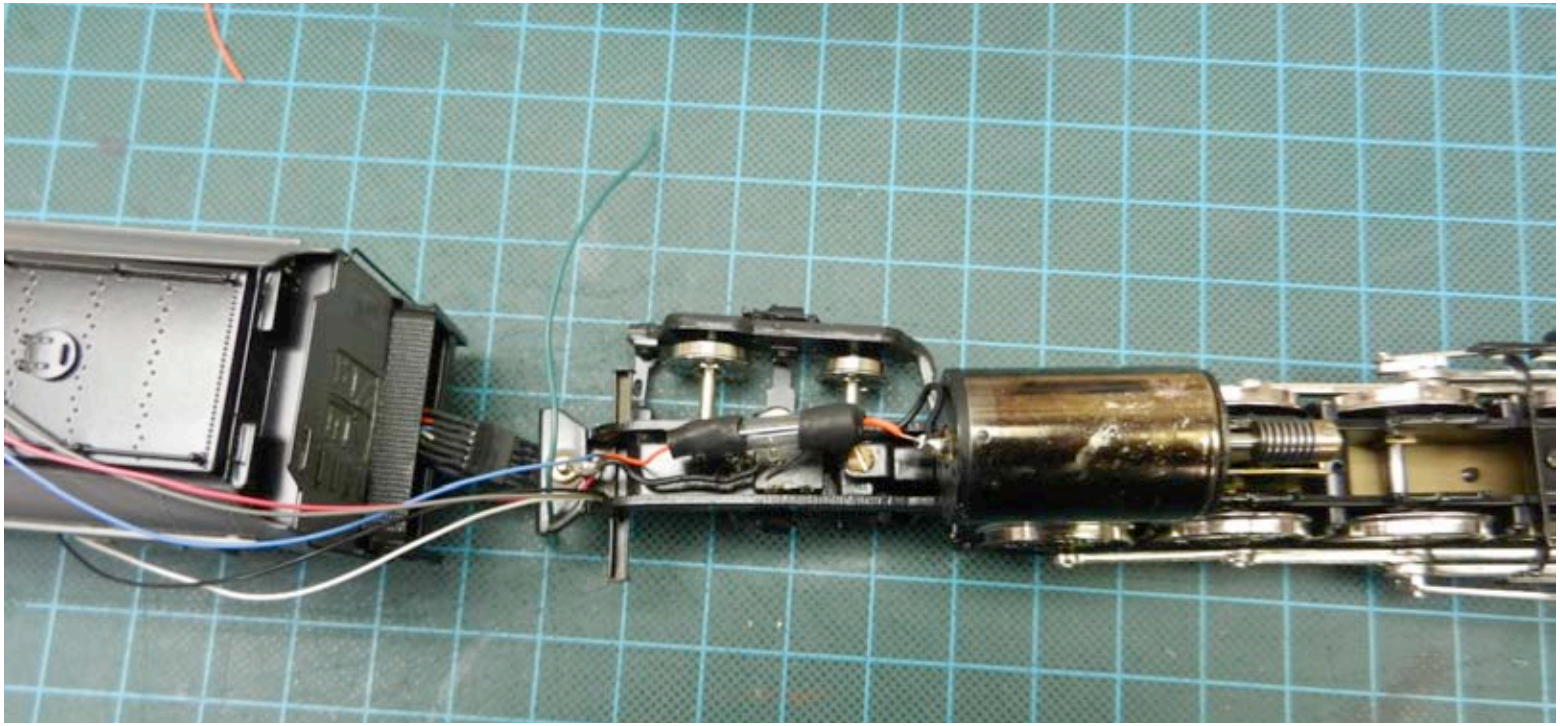


Installed

Wiring configuration to avoid damaging decoder if connector inserted upside down

TCS Connector

TCS Connector being Wired

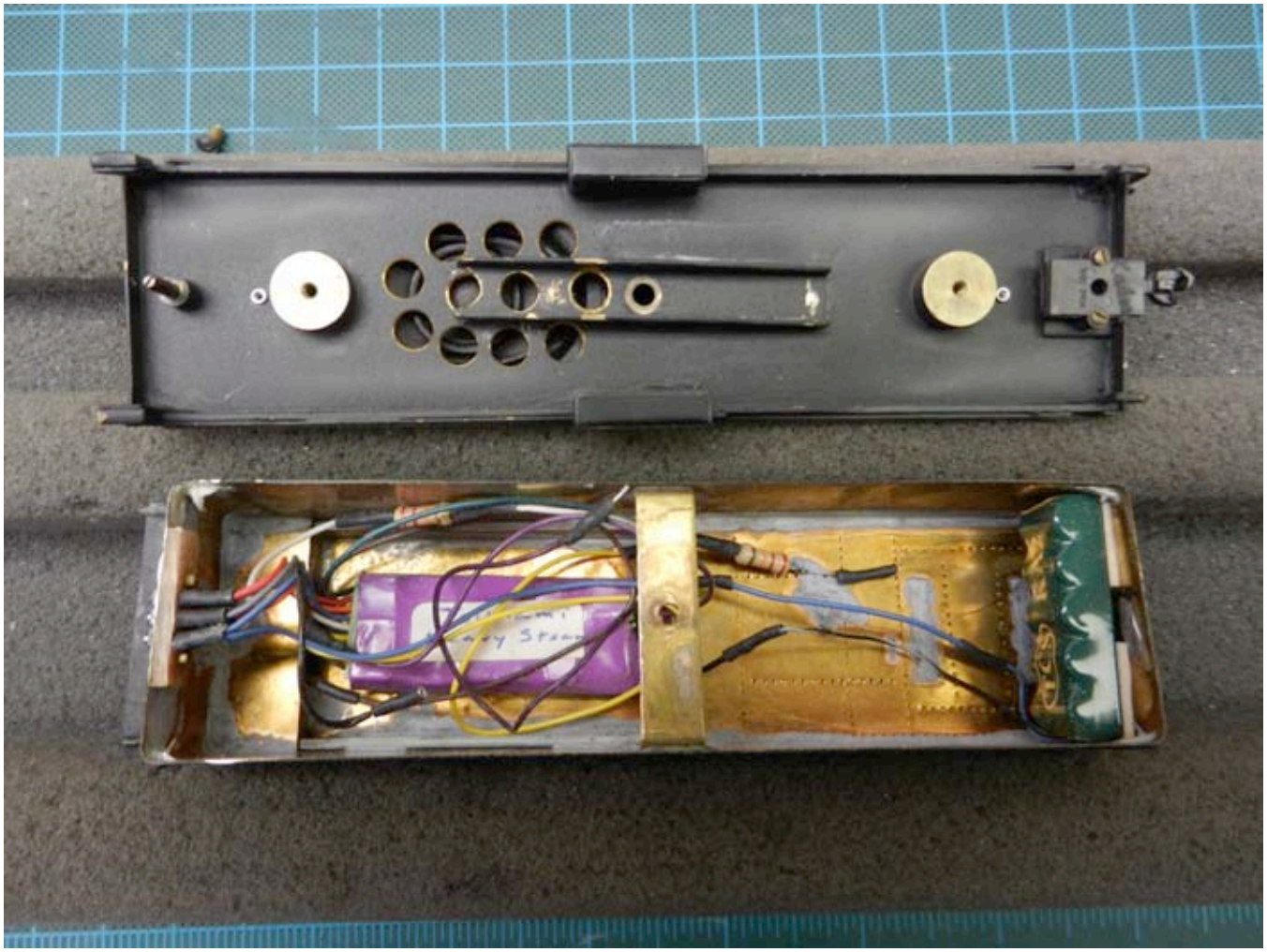


Note: Fuse installed on orange motor lead to protect decoder if stalled motor draws over 1 amp

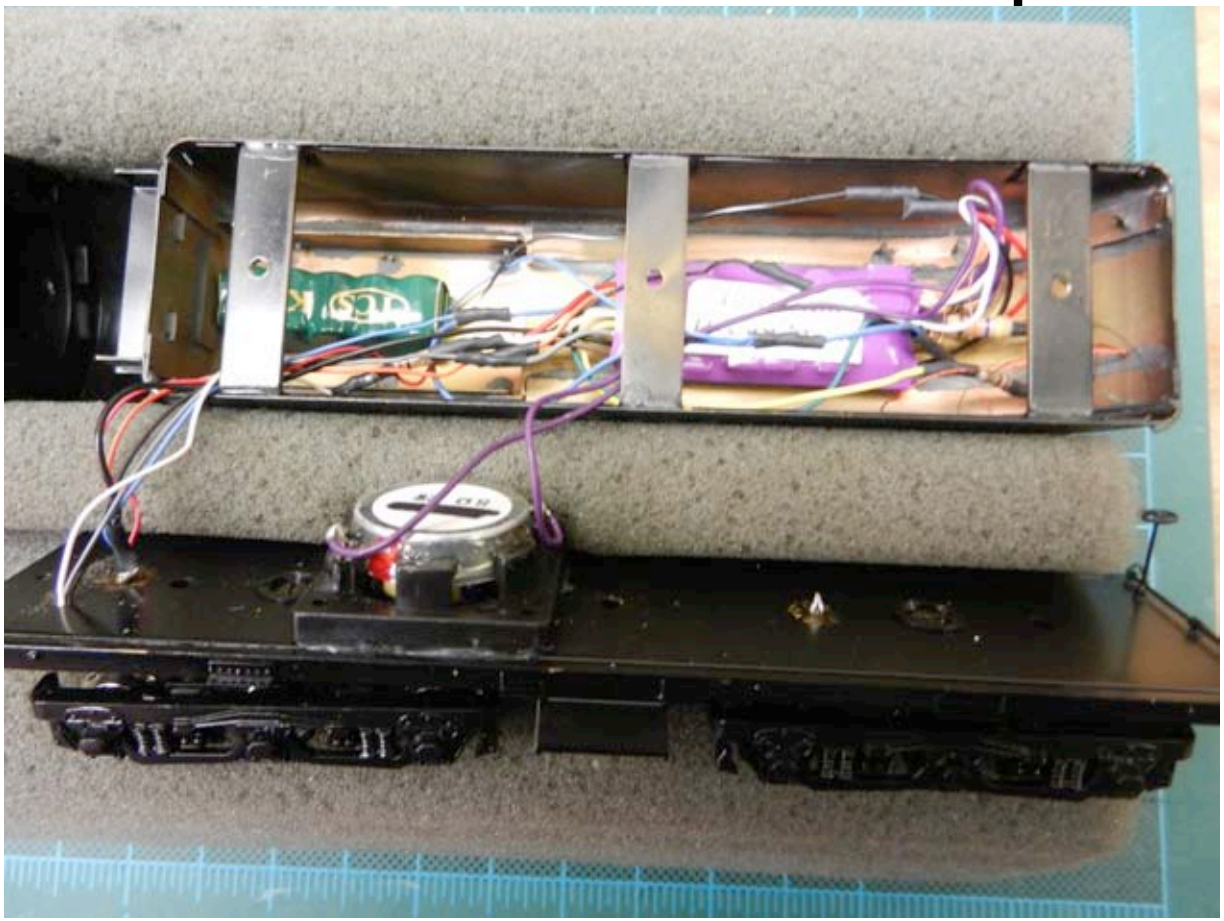
Preparing Tender for Decoder and Speaker Install

- Decoder, TCS KA-2 (keep alive capacitor module), and speaker will in almost all cases have to go in the tender. They fit in 15K and 24K tenders easily, but will fit in even smaller tenders.
- Test fit decoder, TCS KA-2, and speaker into tender.
- Drill holes in bottom of oil tender for speaker
- Coal tender could have holes under the coal load instead

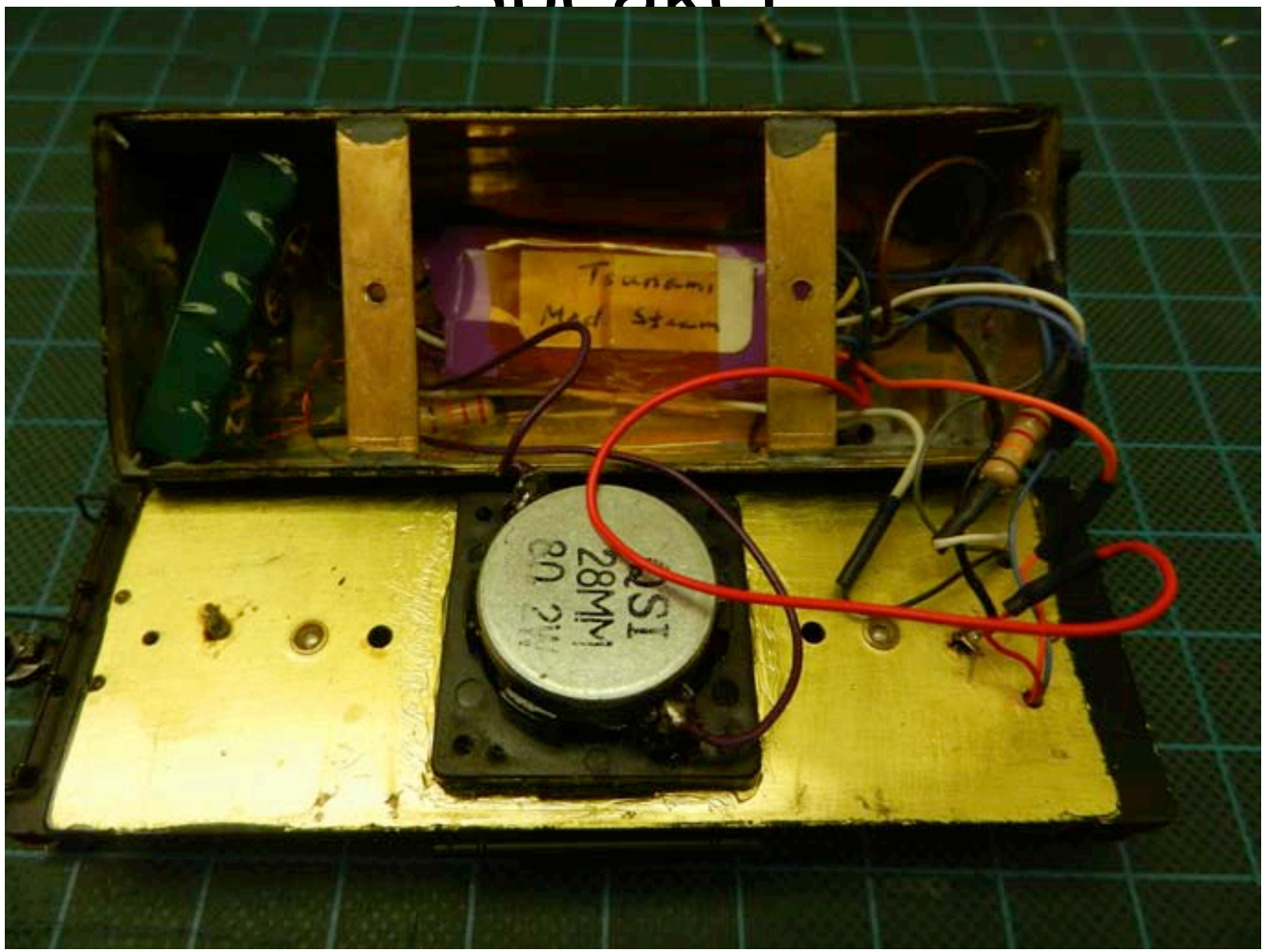
Install in a United ATSF 15K Tender with NCE Connector



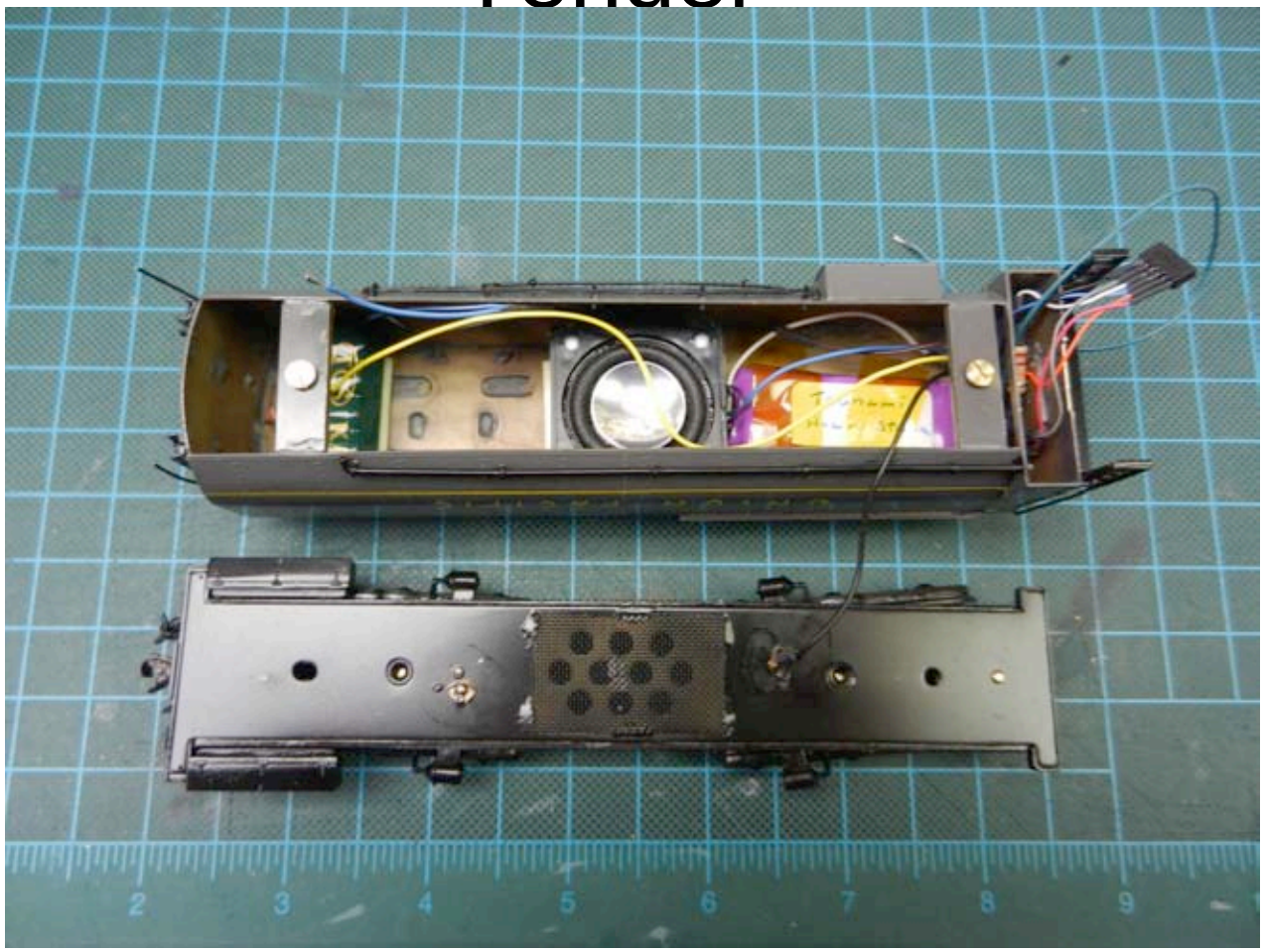
Install in a Westside ATSF Whaleback Tender with TCS Connector and HiBass Speaker



Install in a Sunset ATSF 6K Tender with TCS Connector and HiBass Speaker

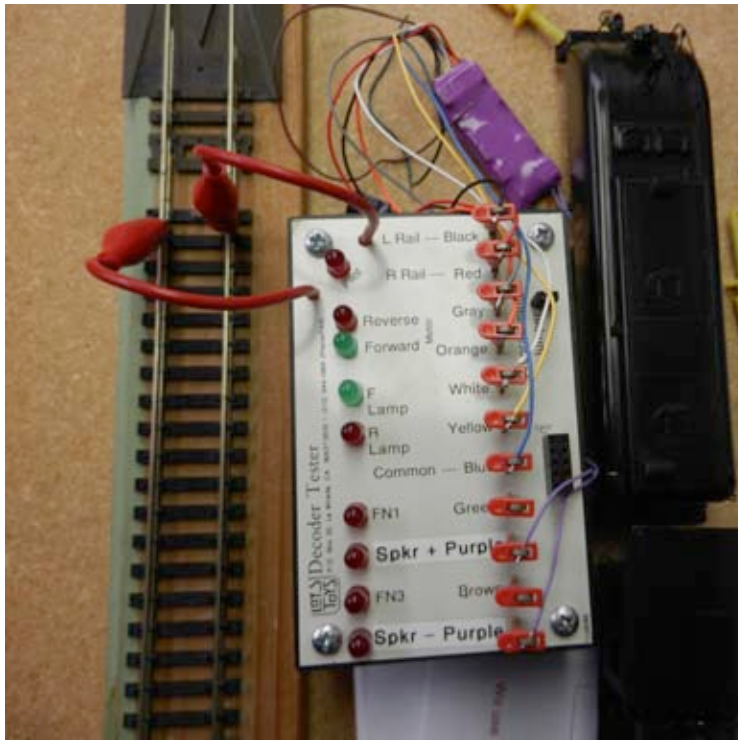


Install with TCS Connector and Speaker in an Enclosure in a UP Tender



Preparing to Install Decoder

- Before installing the decoder you should test it
- Strip and tin the ends of all of the leads.
- A decoder tester like this one simplifies the testing.



Wiring the Decoder

- Generally, red, orange, gray, blue, white (with a resistor in-line for head light), and black (cam wire) will go forward to loco. If speaker in loco, then purple leads will need to go forward too.
- Locate the decoder in the tender and cut wires to the correct length to reach the connector.
- Leave the blue lead long. You can strip and tin it without cutting it for attachment to the connector (or TCS lead) to the loco.

Wiring the Decoder - Continued

- You can strip the blue lead again multiple times for connection to the back light, safety light, and TCS KA-2 keep alive.
- Wire connections and exposed connections should be covered with 1/16” shrink tubing
- Resistors should be put in series in the white, yellow, and green (safety light) leads to protect and lower the output of LEDs.