

Modifying S Scale Locomotion for DC Operation.

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Most American Flyer^(TM) locomotion operates on AC power with an open type 1 motor with an armature and field electromagnet. These motors can draw high current amperage. Some of the AF locomotives do use a can type motor but these still use E units for manual direction control and circuits that allow them to run with American Flyer AC transformer/Controllers .

The advantages of running in DC format versus AC are..

- a) The DC controller controls the direction with no need to use a manual switch or E unit.
- b) Speed control is more sensitive at slow speeds
- c) CAN motors draw less current, usually less than 1-2 amps.
- d) The motor works with less noise especially from the E unit
- e) the motor can be used on Automated Point to Point layouts

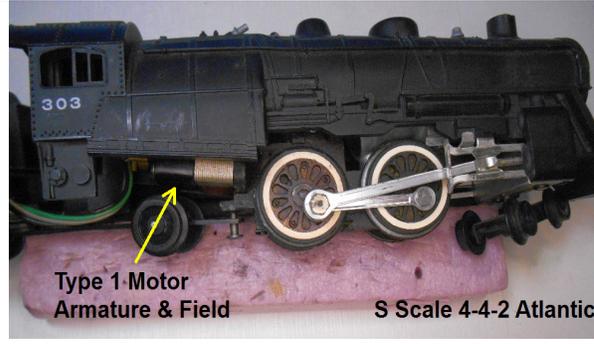
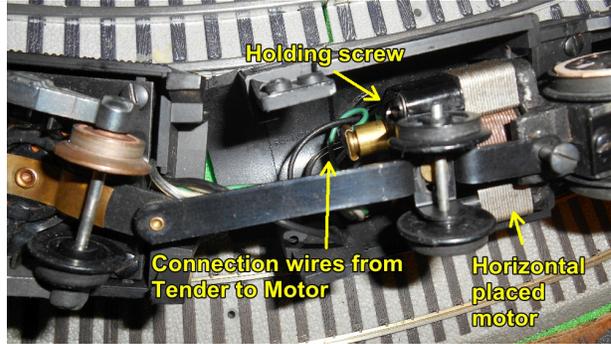
The only disadvantage to consider is that you cannot use an AC Controller.

To achieve DC operation the installation of a CAN type motor is an option.

S and S. Trains.(www.snstrains.com) supplies CAN motors for converting most American Flyer Steam Locomotives and Diesels to run in DC mode. Unfortunately CAN motors from S-n-S trains are no longer available for the Docksider switcher and the common 4-4-0 American models like the lowly Casey Jones loco which currently only runs in one direction . For these models however an electrical modification of the motor can be made using a Bridge Rectifier circuit to supply power to allow for back and forth movement via the controller.

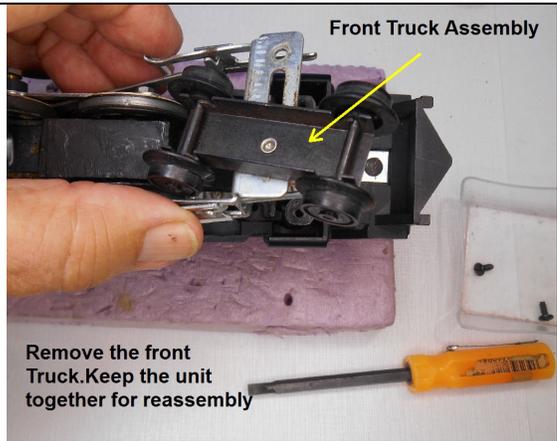
1) Installing a CAN Motor

This AM Flyer 303 Pacific with an open frame motor and E Unit used to manually change direction was converted a Standard CAN type motor from S-n-S trains .

	
<p>An S Scale 4-4-2 #303 with a standard Pull Mor Type 1 open motor</p>	<p>Location of the motor , holding screws and the wire connections from the tender E unit to motor.</p>
	<p>Can Motor from S-n-S Trains (snstrains.com) ready for installation. Included with the motor is the mounting plate and spiral driving worm screw. The installation process is described .</p>



Remove the screw holding the driving rod

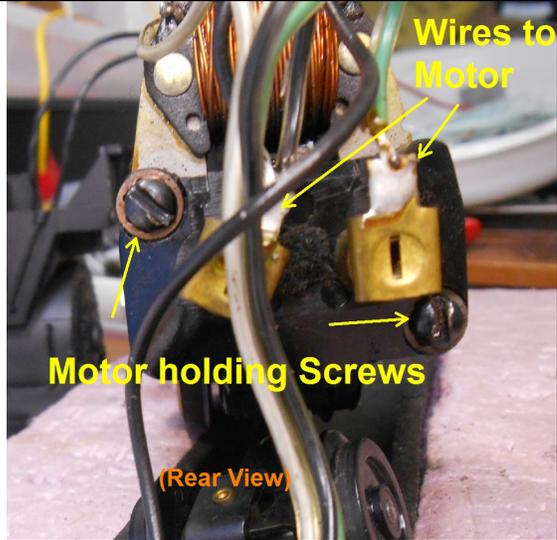
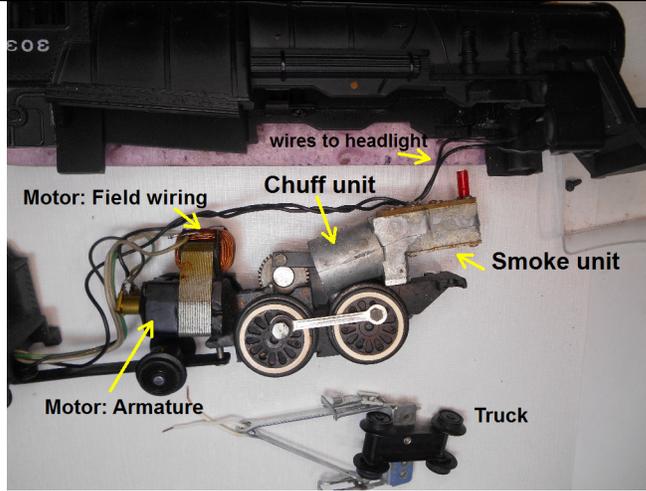


Front Truck Assembly

Remove the front Truck. Keep the unit together for reassembly

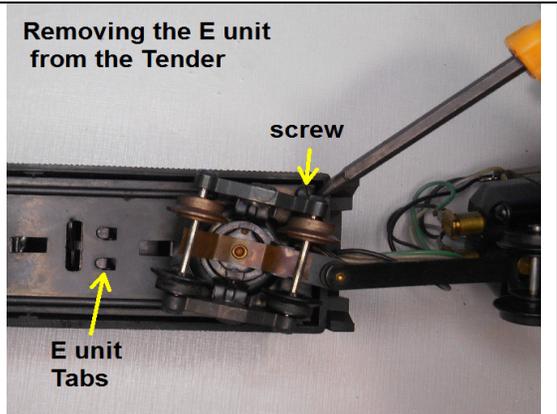
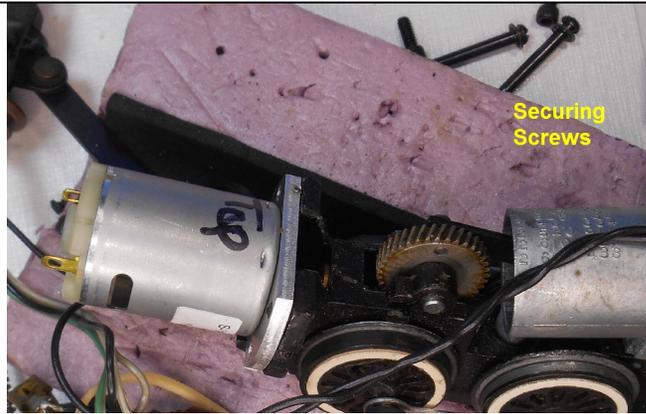
Using a socket wrench disconnect the main driving rod from the wheels on both sides. Reattach the screw to the connection rods intact to avoid losing parts and for later testing..

Next remove the securing screws that hold the front truck. Make a note of the orientation of the connection rod for re-assembly just in case they come apart.



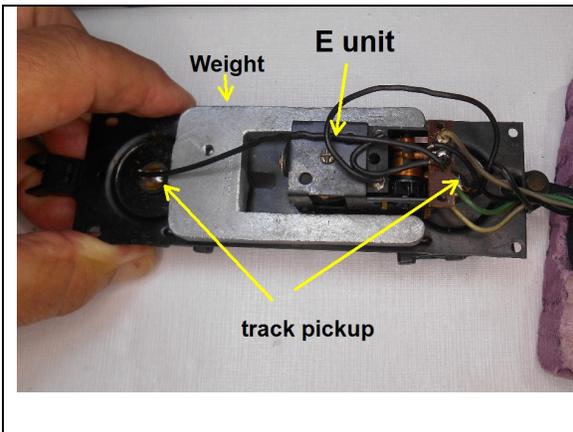
Note which wires go to the motor terminals and mark to identify.

Unscrew the 2 long holding screws that secure the motor to the chassis. Remove the motor intact.

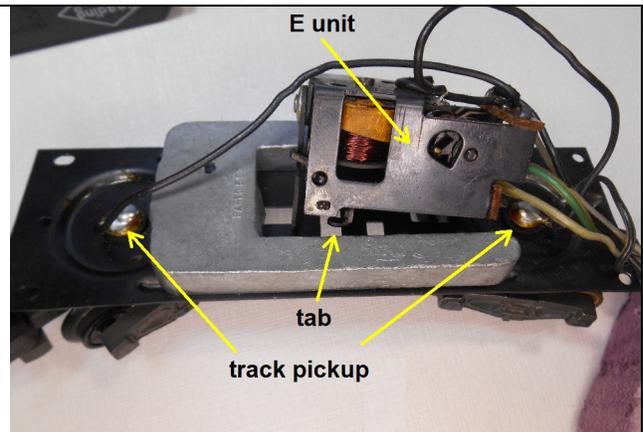


Line up the motor and use the holding screws to attach the motor to the motor mount. The worm screw should line up with the large cog.

The E unit is contained within the Tender. Four screws need to be removed from the four corners of the undercarriage. Two tabs hold the E unit in place



Remove the shell to expose the E unit, it's wiring and the tender weight for traction



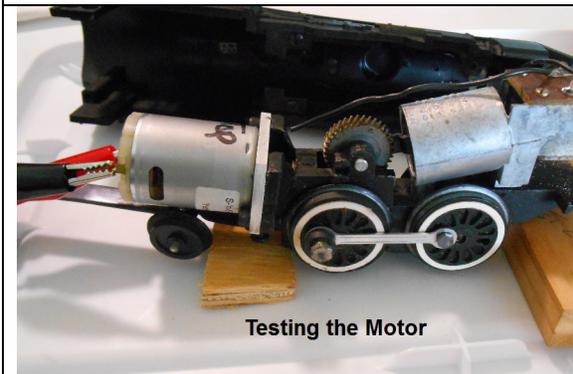
Lift out the E unit via the tabs that hold it in place. Old style E units cannot be reused .



Cut the wires where they attach to track pickup to remove the unit from the tender. New wiring will be used to connect to the motor.



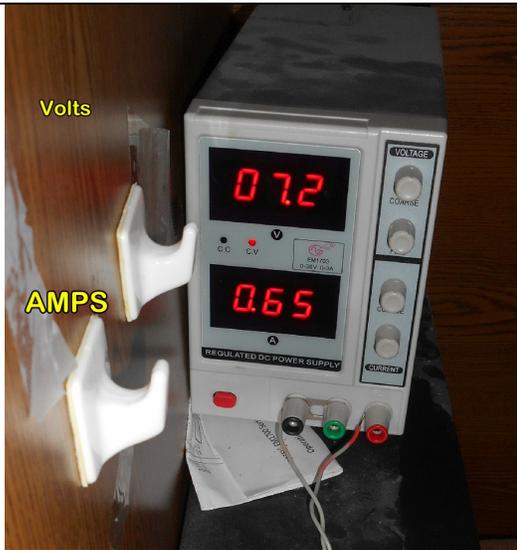
Cut the wires to the light panel and smoke box. Preferably cut at the motor connections. Since the smoke box draws more current it can be eliminated. The incandescent lighting can be replaced with LEDs so these wires will not be used..



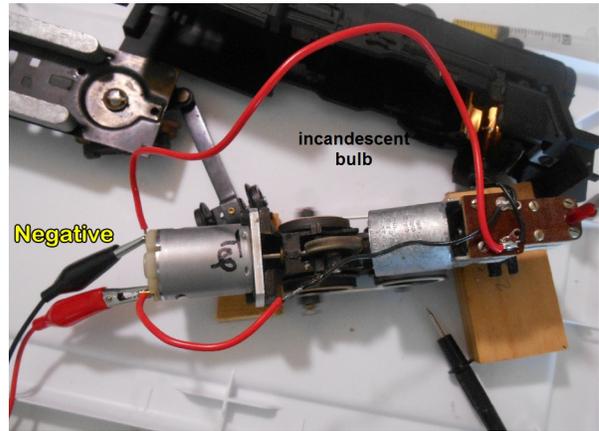
Test the unit by propping up each end on wood supports Connect temporary wires from a DC controller to the motor poles and determine which wiring arrangement gives FORWARD and REVERSE motion to the wheels.



Run two wires soldered to the track pickup terminals in the tender to the motor poles. Use 22 AWG stranded wires. Leave enough slack. going to the tender pickup wheels on the track.. solder the terminal wires once direction is confirmed.



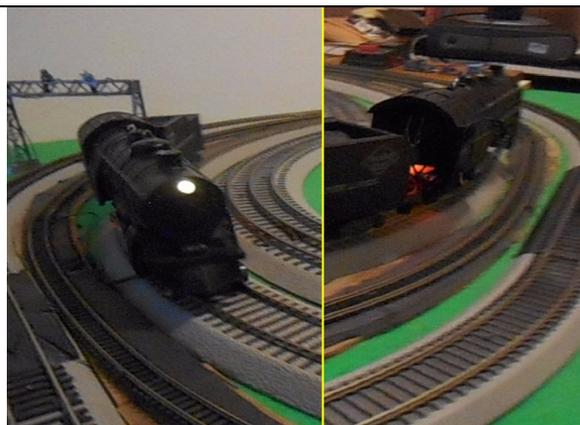
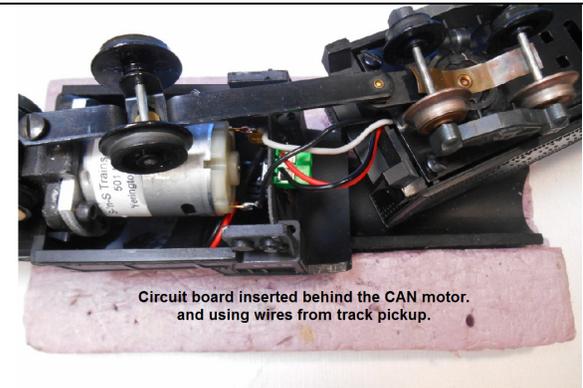
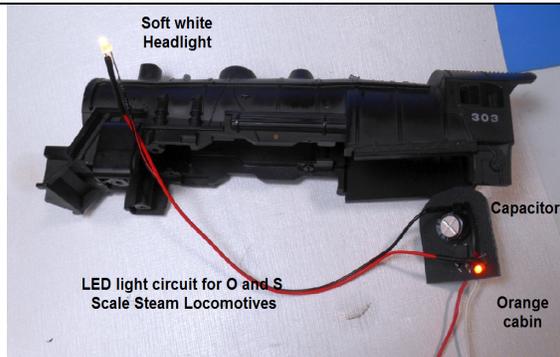
In this test at 7.2 Volts the CAN motor is drawing only 650 milliamps of current



For lighting wires can be run from the motor poles to the incandescent bulb. Here the original wires can be used.



As an alternative I used a simple circuit using the Steam locomotive LED light kit from MTS using a 5mm Flat soft white light LED for the headlight and a 3mm orange LED for the cabin to simulate the firebox.. The electronics are set up on a piece of black plastic or cardboard shaped to the cabin interior.. Power wires can come from the motor poles or from track pickup in the tender.



The Circuit board is inserted behind the motor into the cabin. The forward white LED is inserted into the headlight socket after the incandescent bulb is removed. There is no need to remove the clear plastic light cover just glue or putty the LED behind it. The circuit lights in both forward and reverse. The locomotive and Tender can now be reassembled and ready for the track. For more information visit our website modeltrainsounds.com