

Using the Auto Revere module with Larger Scales (S,O and G)

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The modeltrainsounds.com (MTS) reversing module can be used with larger scale trains or trolleys in G, O and S scales with a some modifications and restrictions noted here. .

1) DC Operation is Required: The system requires Direct Current (DC) operation and will not work with AC motors or in DCC mode. The system will also not work with an AC (Alternating Current) controller . Some large scale locomotives use a DC can motor with a diode installed that restricts the AC current to one direction . A switch on the locomotive is used to reverse direction. The diode can be removed and the wire connected back to the motor to allow the DC controller to provide back and forth motion. Once this is done you will need to determine the polarity of the motor wires to determine forward movement ie Right to Left mode or Left to Right . For ways to set up the diodes refer to the video under Project # 26 at the website.



2) Amperage Restrictions.

The auto-reverse board is rated to handle a current of up to 2 amps. For this reason the use of traction motors that draw more amperage is not recommended. Some older and larger scale motors will draw much more than 1 amp of current requiring a higher rated diode than used with the HO/N kit. You can measure the amperage draw by using a multi-meter set up in the circuit. Refer to this link. (<https://www.wikihow.com/Measure-Amperage>).

For most newer small locomotives and trolleys in O, S and G scales operating in DC mode and using CAN type motors the current draw is usually less than 2 amps.

G Scale Christmas Display Model

3. Diodes Required.

The diodes used for HO and N scale are 1N001, rated for 50 V and 1 amp. These diodes have fine wire leads which are easier to solder to small track. Since voltage limits of the HO and N train controllers do not exceed this voltage and motors do not draw more than 1 amp these diodes are not a problem. Higher amperage rated diodes up to 2 amp diode have a wider diameter wire lead which are soldered across the insulated rail joint or cut gap of the larger scale track and are recommended for the larger scales.

4.Three Rail Operation: In O scale with 3 rails the middle rail is by standard set up as the Positive rail when the controller is set in the forward direction and the Locomotive moves forward from right to left.(Lionel Mode) This is opposite to HO and N scales . Options on how to overcome this are discussed extensively and in a video at the website under Project 26.

With 3 Rail O Scale the Diodes are set on the middle Rail.

O Scale Trolley with DC motor



5. S Scale Operation.

For S Scale the options of using this DC operated auto-reversing system are limited . There are no trolleys or hand cars available. American Flyer ^(TM) locomotion operates on AC power with an open Pul-Mor type motor involving the motor unit and a field electromagnet. These motors can draw more than 2 amps of current. Some of the locomotive do use a can type motor but these are few and electrically modified with E units for manual direction control and circuits that allow them to run with American Flyer transformer/Controllers .

If one wants to use an S scale locomotive for an Auto-reverse system it would need to be modified to meet the criteria listed here.

- 1) It must run in DC mode with a DC Controller
- 2) It must move both forward and in reverse using the train controller
- 3) The motor should not draw more than 2 amps.

To achieve this the conversion to a CAN type motor is an option. S and S Trains in Nevada (www.snstrains.com) supply CAN motors for converting most American Flyer Steam Locomotives and Diesels to run in DC mode. See Project 28

Two American Flyer models that might be considered for use with the MTS Auto-Reversing system are the Dockside switcher and the common cheap 4-4-0 models like the Casey Jones . Unfortunately CAN motors from snstrains are no longer available for these CJ models. For these models an electrical modification of the motor can be made using a Bridge Rectifier circuit to supply power to the motor. (Project28)



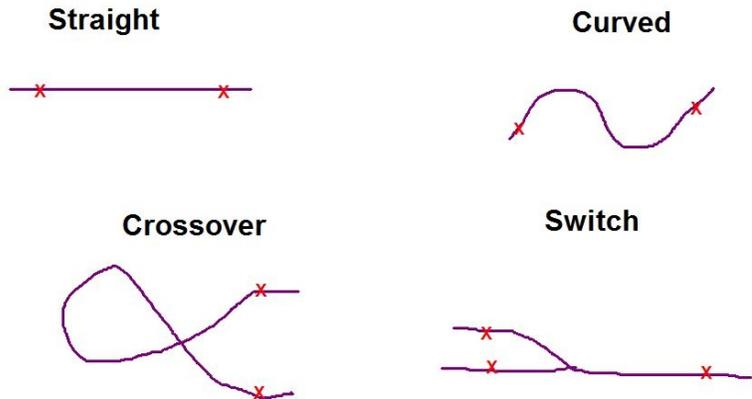
6. G Scale Operation

G scale locomotives use mostly Can motors under DC control . The motors of trolleys such as those made by Bachmann ^(TM) usually draw less than 2 amps so they work well with the large scale version of the modeltrainsounds (MTS) auto reversing system. The only item to determine is the placement of the diodes.

This is determined based on the polarity setup of the motor which determines forward motion of the trolley or locomotive when the speed controller is set to forward . The table shows the diode set up with the direction of the Grey bands set across a rail gap or insulator.

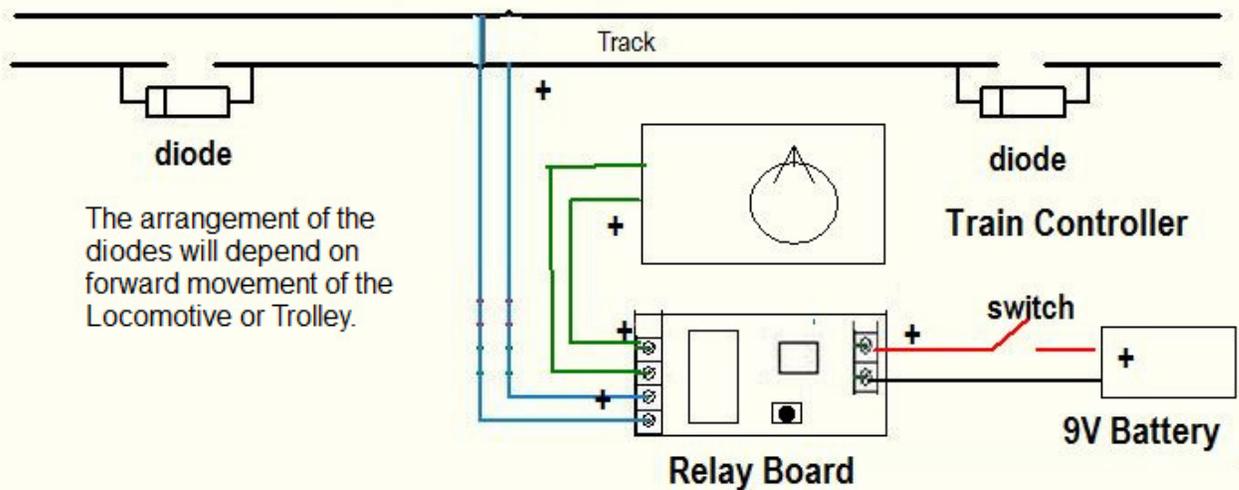
<p>Diode arrangement for forward from Left to Right</p> <p style="text-align: center;">Forward ----></p>	<p>Diode arrangement for Forward Right to Left <-</p> <p style="text-align: center;"><----- Forward (most common)</p>
Movement forward of Train or Trolley	Used with most Bachmann , LGB models

7. Layout Designs. A dedicated track , Point to Point Layout should be setup using a separate DC Controller/Transformer. Although a straight back and forth layout is most common more complex designs that include curves, crossovers and switches can be used. When using switches it is necessary to add additional stop zones with a diode at the end of each branch. Also the layout design should be setup so that the distance traveled on each leg is roughly the same when using one relay board with a fixed on and off timing set. Here are some examples



8. Basic Setup

The basic setup of the Train controller is shown here. The variable DC power is sent to the Board with the Positive wire being identified using a volt meter when the controller is dial is turned forward.

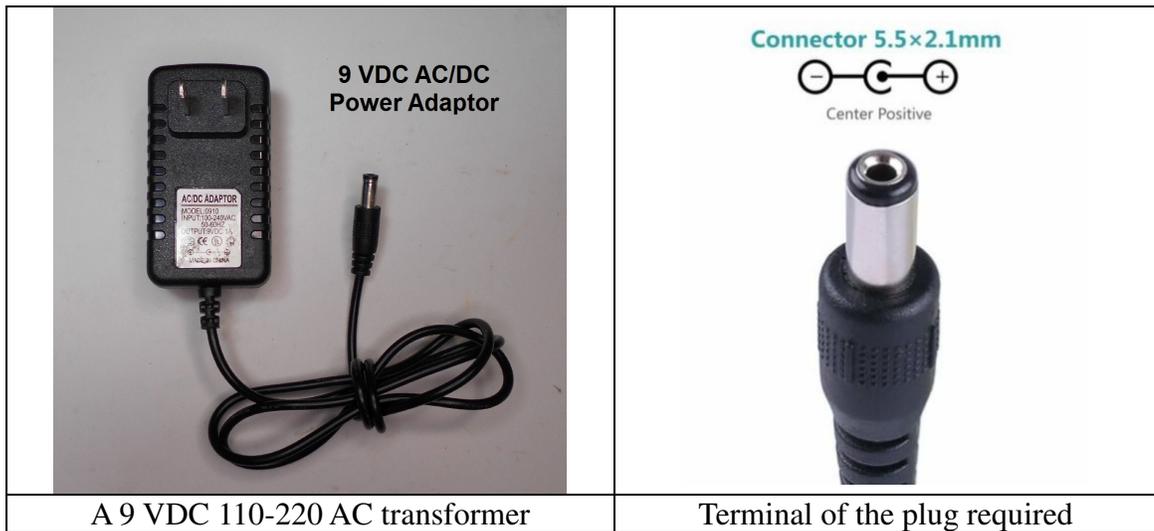


9) Powering the Auto Reverse Board.

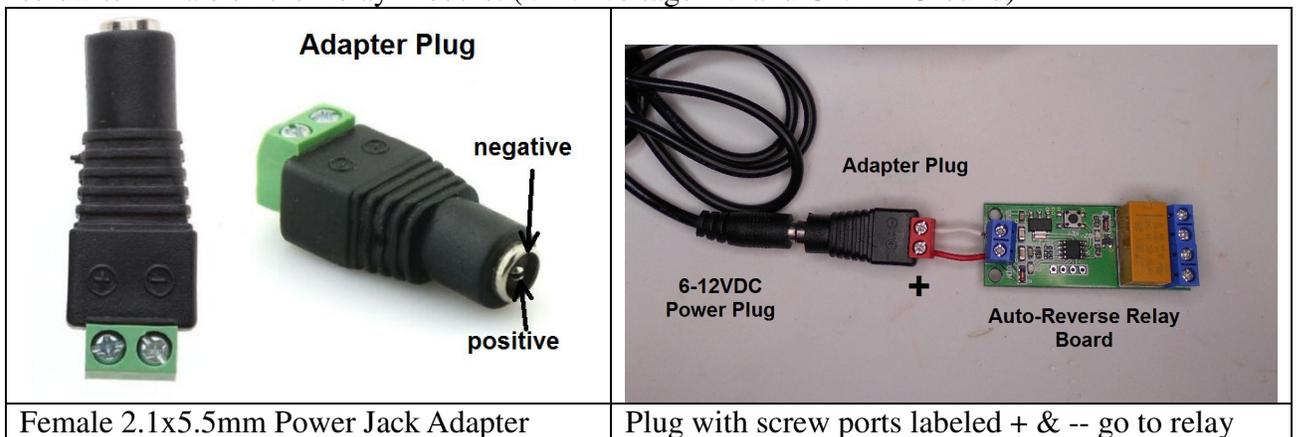
The board can be powered using 6-12 volts DC. We recommend using either a 9 Volt battery (Alkaline or rechargeable) or a 9 Volt DC wall plug-in transformer unit with a 5.5 mm x 2.1 male plug at the terminal end. An adapter plug is used to connect the transformer to the Auto Reversing Board.

Using a 100/240 VAC to 9 VDC Power Transformer for the Auto Reversing Unit.

The use of a 9 Volt DC wall unit power pack should be considered especially if the auto reversing module is going to be used over long periods of time such as with display layouts. The amperage rating of the transformer should be around 400-1000 milliamps. The terminal plug should have the Positive pin in the center of the plug. This data is indicated on the transformer's specification label.

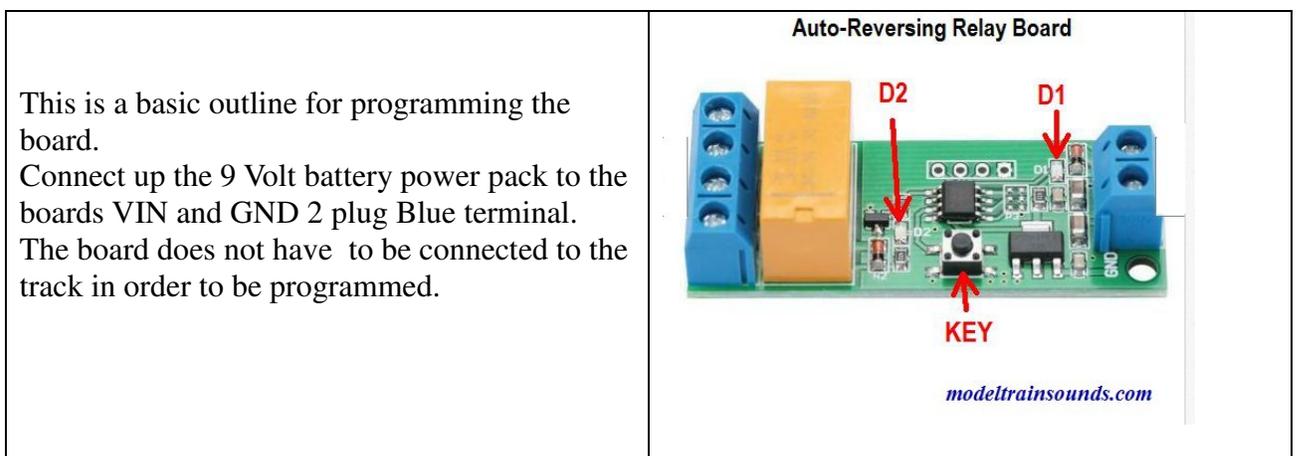


In order to use the power pack transformer an adapter plug is needed to connect to the wires to the screw terminals on the Relay Module. (VIN=Voltage IN and GND = Ground)



The + positive and – negative terminal are marked on the body of the plug. These transformers and plugs are available online from electrical component supply houses, eBay or at our website as accessories under Project #16 Accessories on the Order Form.

10 . Programming the Auto-Reverse Relay Board.



- 1) Turn the power switch ON (D1 blinks) Board enters the working mode.
- 2) With D2 OFF, Press & Hold till D1 comes ON Board is in SETUP mode
- 3) Press KEY twice (D1 goes out - D2 is already out)
- 4) Press KEY again (D1 blinks rapidly, let it blink for time desired)
- 5) Press KEY to stop (The OFF time is now programmed)
- 6) While D1 is ON Press and Hold KEY again till both D1 & D2 light.
- 7) Press KEY twice (D1 goes out but D2 stays on)
- 8) Press KEY again (D1 blinks rapidly, Let it Blink for ON time desired)
- 9) Press KEY to STOP. (ON time is now programmed)
- 10) TURN battery switch OFF then ON

D2 now cycles OFF then ON to the new programmed times in working mode.

Use either an Alkaline battery or rechargeable battery.

The system will not operate if the battery voltage falls below 6 Volts.

A 9 volt power supply wall unit can also be used with an adapter plug or by direct connection of the wires making sure the polarity is correct by checking with a voltmeter, (positive and ground wires).

The Large Scale Kit.

This Project kit includes the Auto-Reversing Board, a 9Volt battery pack, 2 x 2 amp rated Diodes and an adapter plug for powering the board with a 6-12 volt DC power source rated for at least 500 milliamps. This is used instead of the battery.

The Kit is available at the website modeltrainsounds.com on the orders page under Project 26

