

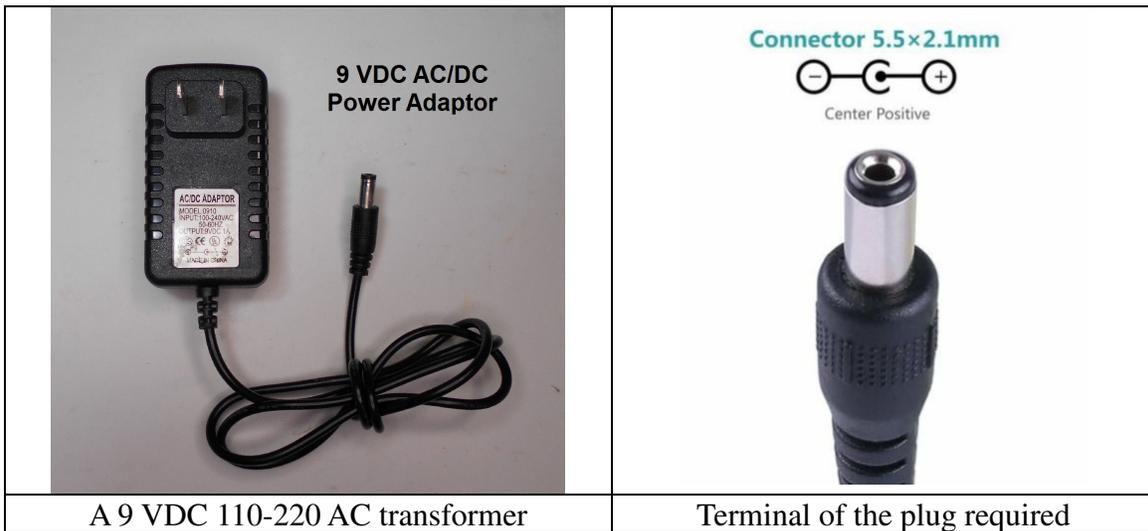
Notes on using the Auto Reversing Unit. (Jan 2022)

1) Powering the Auto Reverse Board.

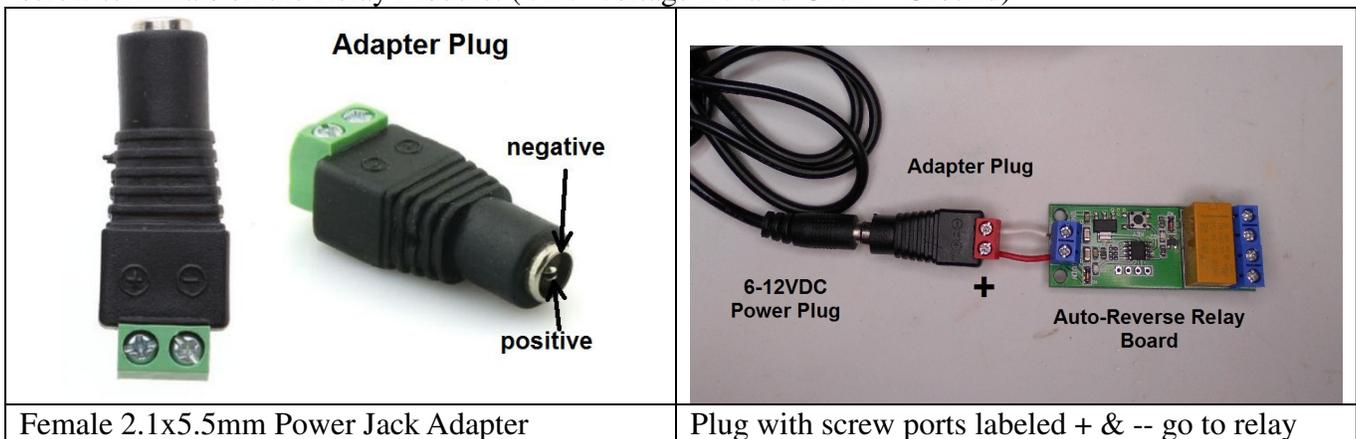
The board can be powered using 6-12 volts DC. We recommend using either a 9 Volt battery (Alkaline or rechargeable) or a 9 Volt DC wall plug-in transformer unit with a 5.5 mm x 2.1 male plug at the terminal end. An adapter plug is used to connect the transformer to the Auto Reversing Board.

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.

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

The modeltrainsounds reversing module kit can be used with larger scale trains or trolleys with a few modifications and restrictions noted here. This includes S, O and G scales. If ordering this kit for these scales please specify the scale being used.

a) DC Operation Required: The system requires Direct Current (DC) operation and will not work with AC motors or in DCC mode. In O Scale the reversing system will not work when using it with AC (Alternating Current). Many O scale locomotives use a DC 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 to setup the motor in accordance with NMRA standards for electrical track pickup. This is further discussed below. (see 4)



G Scale Christmas Trolley

b) Amperage Restrictions. The Reversing Relay 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. You can measure the amperage draw by using a multimeter 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 the current draw should be less than 2 amps.

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 such a 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.

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. This denotes correct forward polarity connection to the motor. If the locomotive moves backward the polarity must be reversed. This can be corrected by de-soldering the wire connections at the motor and reconnecting in reverse.



O Scale Trolley with DC motor

5. Layout Designs.

Although a straight back and forth point to point 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.

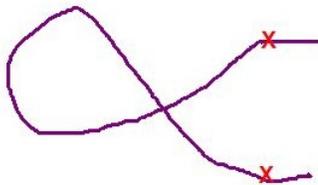
Straight



Curved



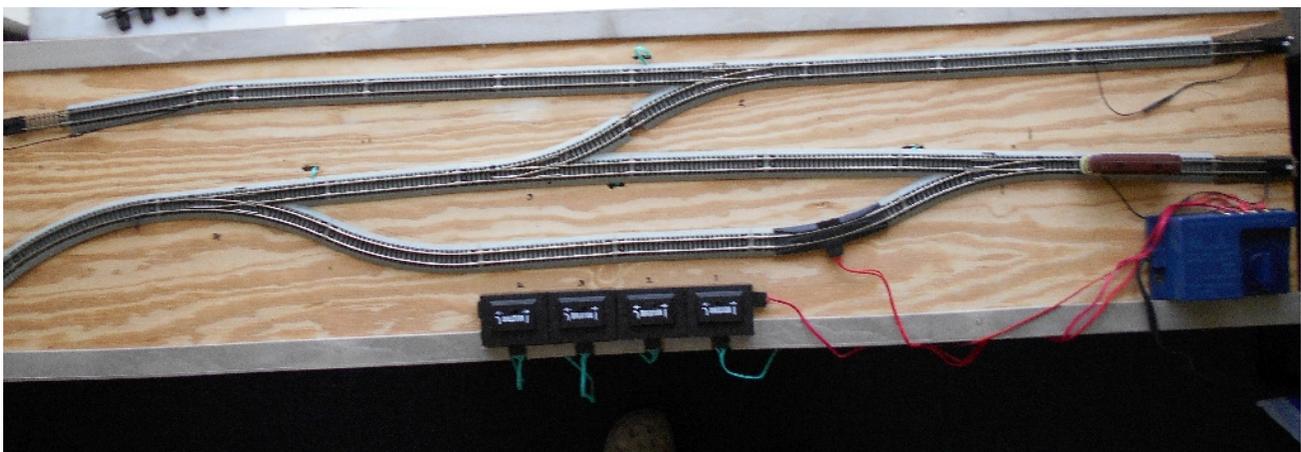
Crossover



Switch



Here is an example of an n Scale layout setup using Bachmann^(TM) EZ track that includes 4 operated switches to provides a fun switching project as the locomotive cycles back and forth up and down the layout. This system is controlled by one Auto-reversing board.



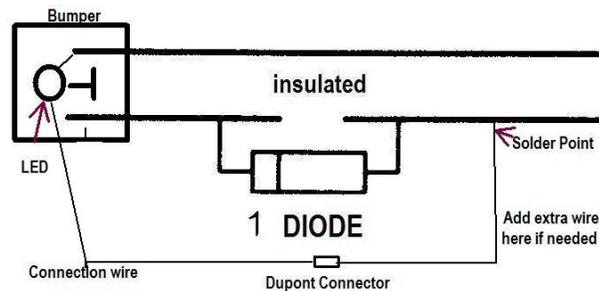
6 Installing Bumpers on Automatic Reversing Layout

Modified Atlas bumpers with bidirectional LED lights can be specially wired for use with the automatic reversing circuit as the STOP zone has no current flow as the train approaches. A bidirectional Red/Green LED is used so that the red lights when the train or trolley approaches the end bumper and changes to green when it leaves.

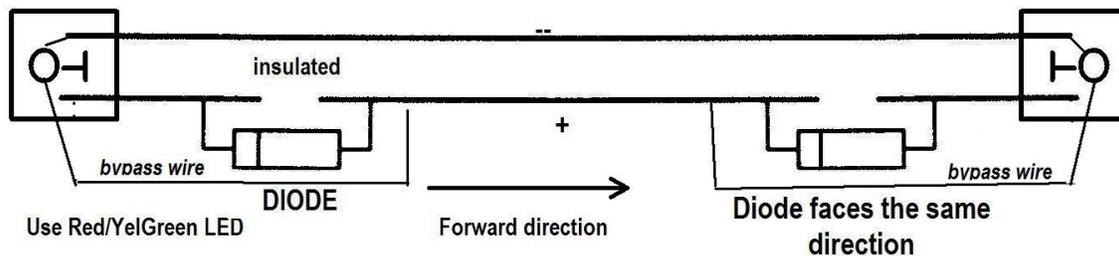
The bumper has a wire soldered to the LED lead that is on the diode side of the track. This wire will extend to beyond the insulator and diode and is soldered to the outside of the track. A wire with a Dupont M-F connector plug, shown below is used for this connection. The wire and can be lengthened by soldering on additional wire (26 or 28G) should the terminal track be long. The wire is soldered to the bumper LED and to the track beyond the insulator and diode. This ensures that the bumper is electrified even when the terminal end track is not.



Setup

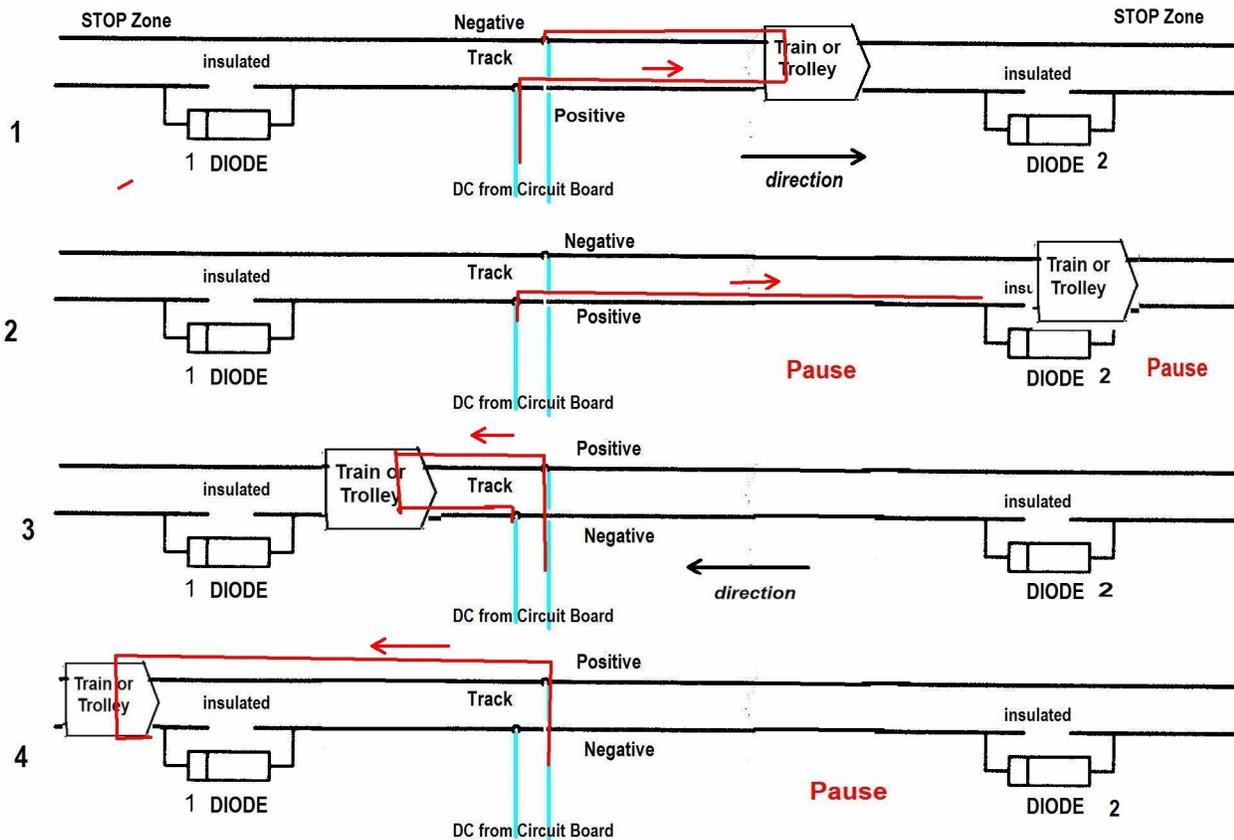


The Dupont connection is used so that the bumper can be removed. Note that in linking the Dupont connector both open spaces should line up as shown above. The diagram below shows how the Bumpers are set up on the Auto Reversing Track when the electrical controller is setup according to NMRA standards



7 How the System Works.

The illustration below shows the way current flows during the cycling of the relay.



The diodes control the current direction flow as the relay changes the direction of flow . When the train or trolley passes into the end STOP zone it stops until the current is reversed , at which stage it proceeds to the other end.

1 shows the loco traveling to the right with the (+) Positive on the right Diode 2 does not allow current flow in this direction but current flows through the loco motor.

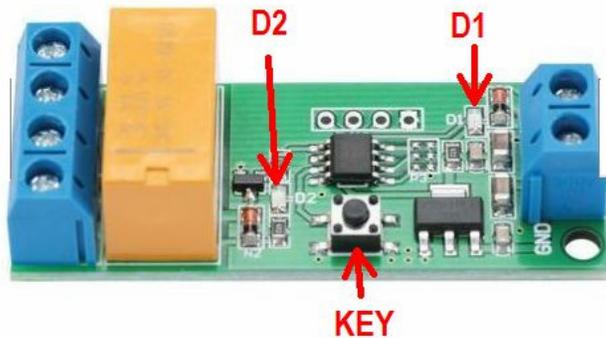
2 The loco has reached the end and stops once the electric pickup wheels cross the insulated gap diode junction. The loco waits till the current is reversed by the relay switch on the Board.

3 Current is reversed and the loco moves back to the other end.

4 Once the loco crosses the insulated track with diode one it stops and awaits the countdown on the relay to reverse current flow at which stage it returns.

8. Programming the Auto-Reverse Relay Board.

Auto-Reversing Relay Board



modeltrainsounds.com

Connect up the 9 Volt battery* or 9 VDC Power pack to the board only.

- 1) Turn the 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) 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 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.