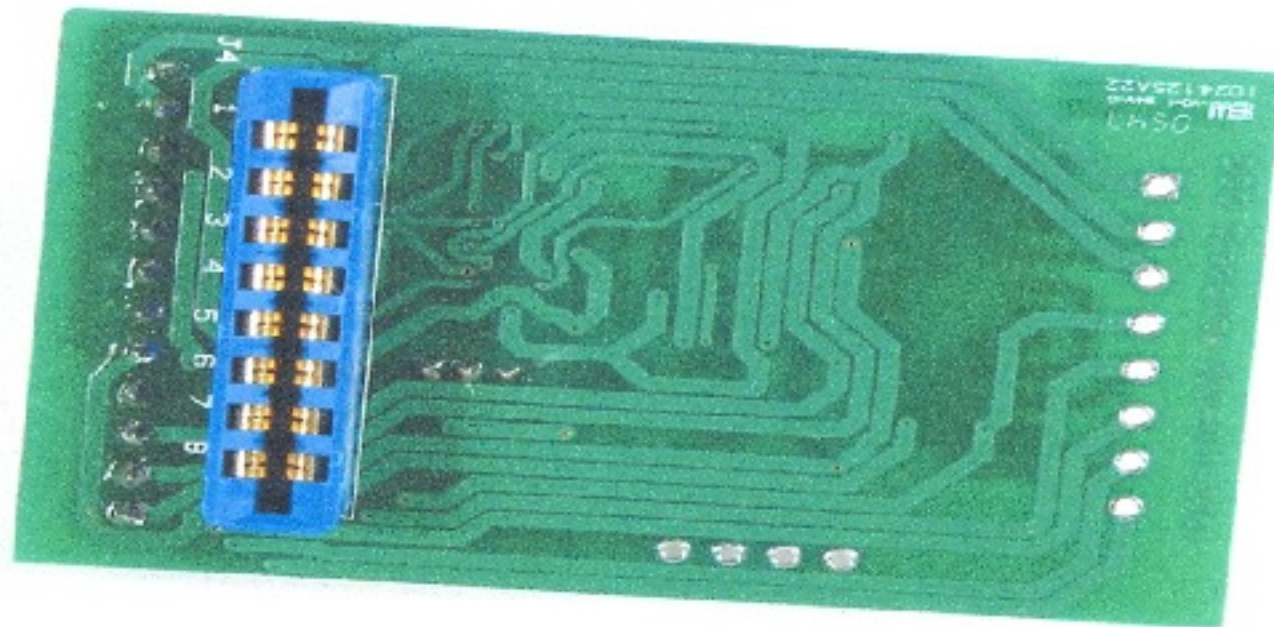


# **Turnout Control**

**Using Hares & Wabbits**

**By Bob Collett**

Guelph, Ontario



Hare™ NG Back (more images)

Here are the specs:

#### Version I (List \$29.95)

Plugs Directly on to Tortoise™: Simplifies wiring and reduces failures.

Auto Throw™ Automatically throws points when a train is approaching against the points!

Auto Throw™ Timer: Provides for timing the auto throw function to prevent two trains from colliding.

Smart Route™ Sets up to 1:1 routes by simple address programming in addition to the primary decoder address.

Dispatcher Over Ride™: Allows the Dispatcher to lock out all other switch commands.

Locked Route Control™: Provides for only one route direction response for either a Throw or Clear command.

Switch Speed Control™: Allows you to control the Tortoise™ motor speed.

Smart Default Ops™: Upon Power-up, Hare™S return to either last thrown position or a programmed default.

Operate Switch Signals or Panel LED Indicators.

Manual Pushbutton or Toggle Switch: Allows single button or toggle switch manual control of the points.

System Reset: A single CV command sets all Addresses and CVs to original factory values.

Direct Current Ops: The Hare™ will operate on DC using Manual Push Button Control Option.

Semaphore Operations: Allows the use of a Tortoise™ for triggered control of a signal head or crossing

gate.

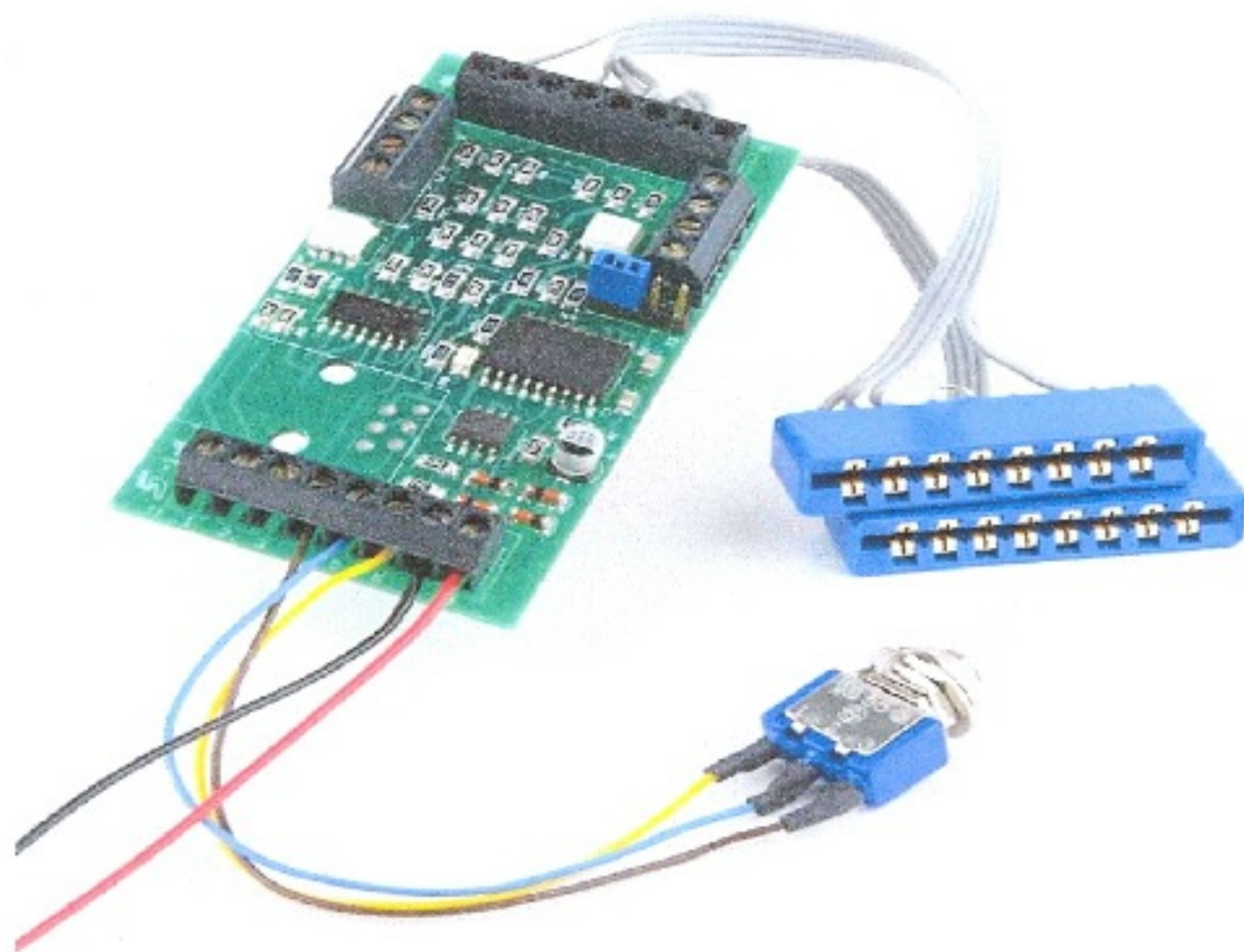
Automates Reverse Loop Turnouts. Using Auto Throw feature.

#### Version II (List \$34.95)

All of the features above plus feedback

Feedback, Turnout Position Reporting to Digitrax LocoNet, Lenz ExpressNet and NCE CabBus.

**We welcome comments or suggestions from readers; please write or call.**



Wabbit™ (more images)

#### What's better than one HARE, two HARES?

- The Wabbit DCC stationary decoder operates 2 DC stall motor type switch machines and features the same patented unmatched performance of its popular kin the HARE.
- Compare the Wabbit's price and performance to any other dual output stall motor DCC stationary decoder and you will choose the Wabbit! List: \$29.95
- Look at all the features that are not available from any other stationary decoder at any price!
  - Auto Throw
  - Auto Throw Timer
  - Auto Return
  - Smart Route
  - Dispatcher Over-Ride
  - Lock-Block
  - Locked Route Control
  - Switch Speed Control
  - Smart Default Ops
  - Operate Switch Signals

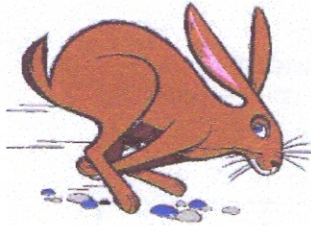
- Manual Button/Toggle
- System Reset
- Direct Current Ops
- Semaphore Operations
- Automates Reverse Loops

#### Wabbit™-FB

Includes all the special features of the Wabbit plus feedback turnout position reporting to Digitrax LocoNet, Lenz ExpressNet and NCE CabBus. ([Buy Wabbit-FB](#))

The HARE and the Wabbit were designed by Larry Maier.

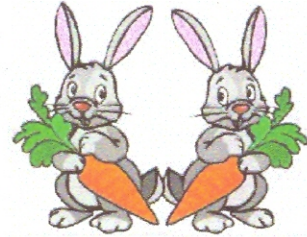




## Hare vs Wabbit: Installations

### Time vs Money

Don Fiehmann



Both the Hare and the Wabbit offer the same exclusive, advanced operating features and program ability. The Hare is designed to plug onto and drive a single Tortoise™ switch machine, the PnP feature eliminates many wiring connections. The Wabbit is designed to control two Stall Motor switch machines so it is not possible plug-in. They both have all the same exclusive features, like **Auto Throw**, **Smart Routes**, etc. Either of these can be installed with all the “bells and whistles”, or as a simple switch machine controller. If they do the same thing, what is the difference between them? The big difference is the time it takes for installation. The Hare has the Tortoise™ connector built-in and the Wabbit requires either wiring in a connector or soldering wires directly to the switch machine. Shown below are various sequential installation steps comparing the # of connections for the HARE vs the Wabbit. The HARE saves you time and the Wabbit saves you \$'s.

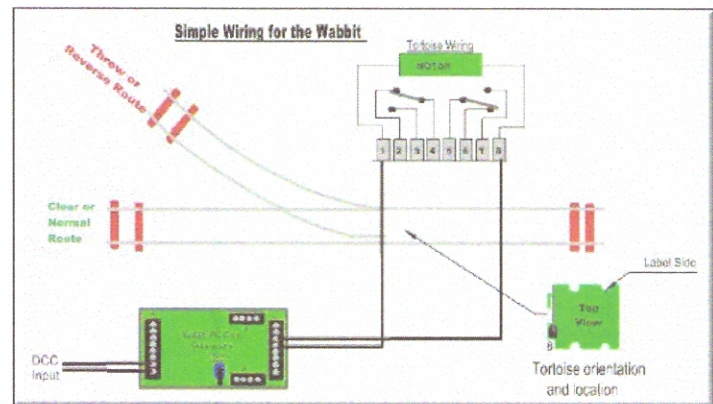
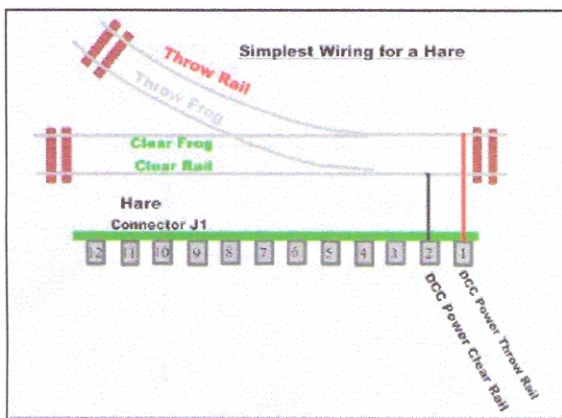
You can start with the simple installation and wire the other features as time permits. One hint, if you are using the Wabbit, the Tortoise™ Connector can save a lot of time. The part # is TORT-CONN. Also Solder ALL of the needed wires to the connector or the tortoise before it is installed. If you are not using a connector, you can still add the wires to the Tortoise before it is installed. This is a lot easier than trying to solder the wires after the connector or the Tortoise is installed. Even if you are not planning on using the **Auto Throw** feature now, adding the wires will make things a lot easier if you decide to add the feature later. Note: The wiring shown below for the Wabbit only shows the “A” Switch This gives a one to one comparison. See page, 4 of this document for Wabbit's **A** and **B** Switch and the Hare's wiring connections.

#### Simple Install:

This is the simplest and quickest way to install a Tortoise™, with either a Hare or Wabbit. This will get you up and running. You do need to program the address of each Hare or Wabbit. The programming can be done on the bench before it is installed.

**HARE:** Simplest installation, only **two wires** are needed for DCC input. **(4 Connections)**

**Wabbit:** Simple installation requires only **four wires**. Two wires are needed for the Stall Mtor and two for DCC input. **(8 Connections)**



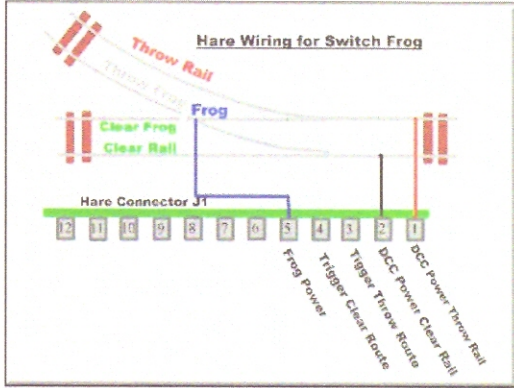
\* The Tortoise™, the Tortoise™ Logo and the Tortoise™ graphic are trademarks of Circuitron, Inc. of Romeoville, IL. They and all photos of the Tortoise™ are used with permission. The Hare™ is a product of DCC Specialties, which is in no way affiliated with Circuitron, Inc. \*



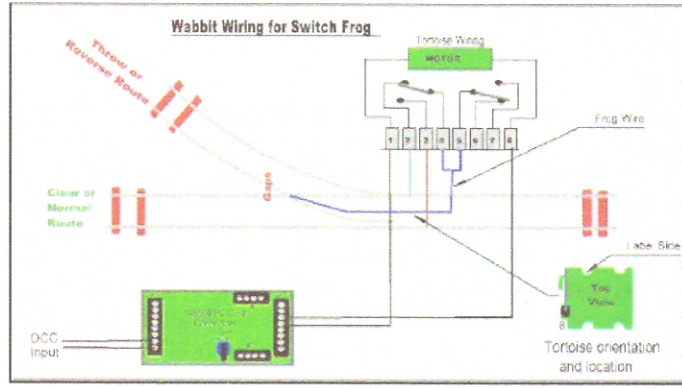
**Frog Power:**

There are provisions on both the Hare and the Wabbit to power the Turnout frog. On Turnouts that use the points to switch power, the powered frog can be used to supplement the connection between the stock rail and the points. Sometimes this type is called **Electro frog** Turnout

(HARE: 6 Connections)



(Wabbit: 14 Connections)



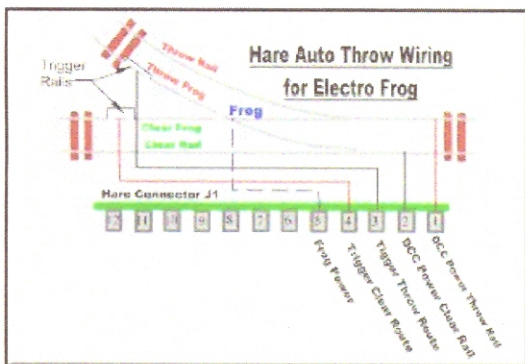
**AutoThrow:™**

To operate the Auto Throw feature you need to set up "Trigger Rails". These are sections of track that are used to sense an incoming train. If the turnout points are set the wrong way, a signal is sent back to the Hare or Wabbit and it then moves the points to correct the misalignment before there is a short. The Tortoise™ takes about 2 seconds to move the points, so the first gap cut for the trigger rail should be back far enough to allow time for the points to move. In yards where speeds are slow, this may only be a short distance. But on the main line this requires a longer space between the trigger rail and the points to allow time for the Tortoise™ to move the points. The length of the trigger rails should be slightly less than the wheel base of a four-wheel diesel truck. This will prevent stalling on the trigger rail with diesels that pickup power only on one truck.

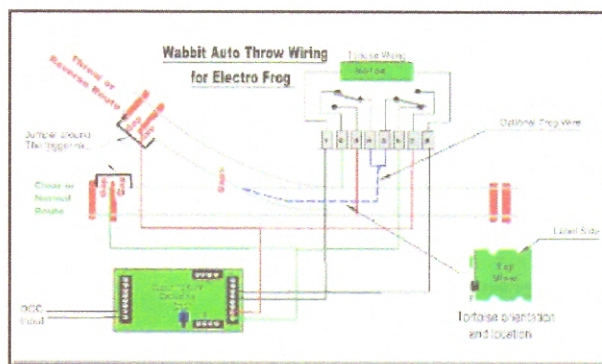
**AutoThrow:™ with Electro Frog**

There is a slight difference between the wiring of the electro frog and insulated frog switches. Jumpers are needed around the trigger rails to feed power back to the insulated section of rail after the switch. Without the gaps after the frog, a short can occur when a train passes over the trigger rail and before the switch points are moved. Frog power wire is optional.

(HARE: 10 Connections)



(Wabbit: 19 Connections)



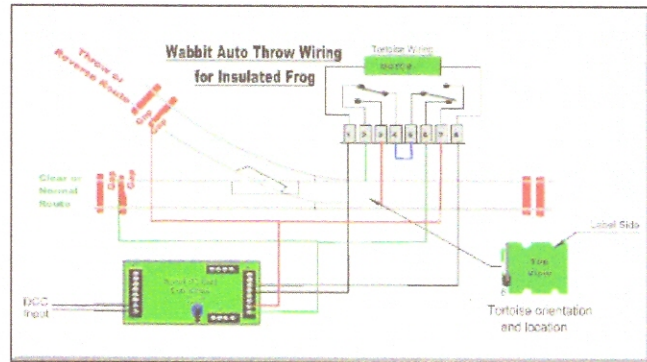
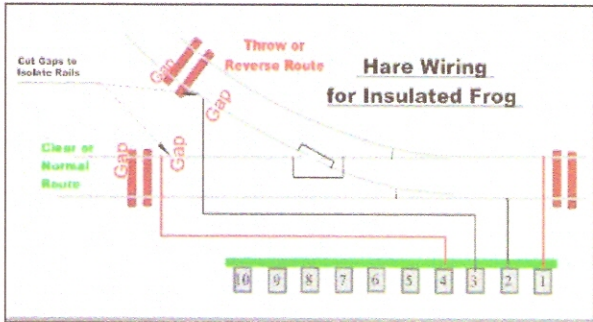


## AutoThrow™ with the Insulated Frog:

The difference in this wiring is the jumper around the trigger rails is not needed. Power is feed from the rails past the frog and onto the section of rail between the trigger rails and the frog. You may need other rail gaps for blocking your layout. Adding gaps between the trigger rail and the frog may require a jumper around the trigger rails.

(HARE: 8 Connections)

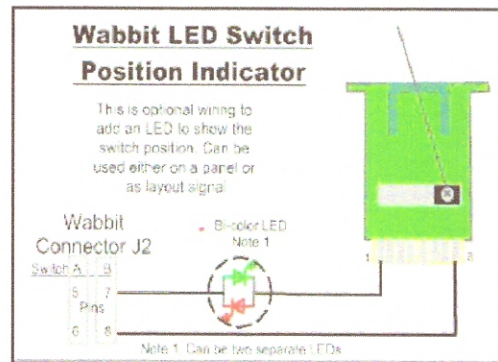
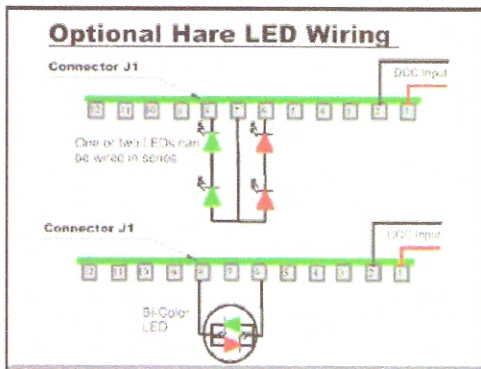
(Wabbit: 12 Connections)



### More Comparative Examples of the HARE vs. the Wabbit Wiring:

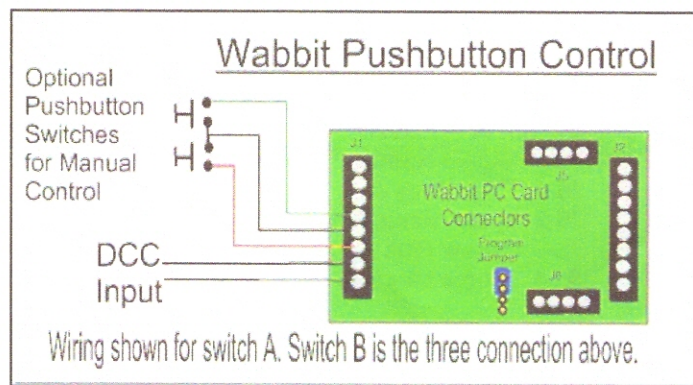
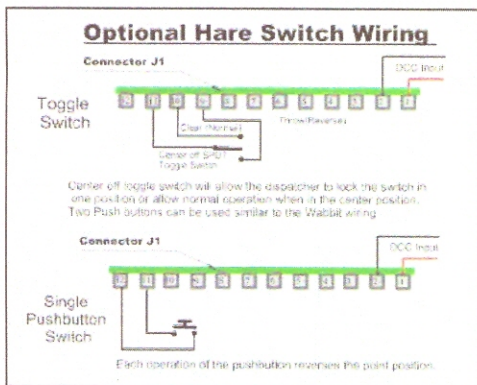
#### Adding LED Position Indicators:

The Hare has three output pins used to drive an LED to indicate the position of the turnout points. The Wabbit can also use LEDs for position indication. For the Wabbit the LEDs can be put in series with the stall motor.



#### Adding Switch Control to the Hare or Wabbit:

Both the Hare and the Wabbit have inputs that allow pushbutton or toggle switches for local control.



## Layout Start Up

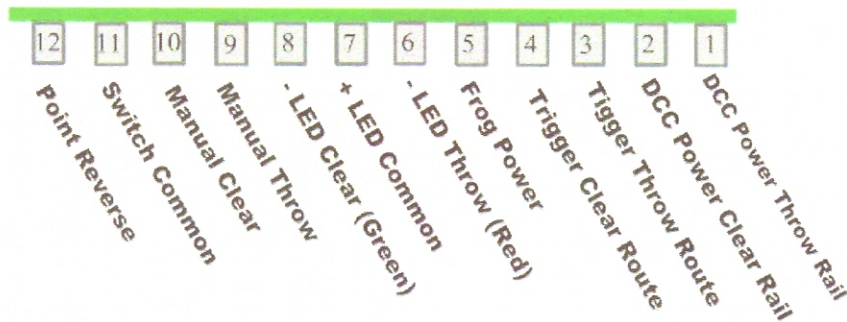
One of the programmable features of both the Hare and the Wabbit is to have a switch return to a set position on power up. Another option is to have it return to the same position it was in when power was turned off. If you have separate power to the Hare or Wabbit from the track power, a short will not affect the position of the switch. But if your power comes from the rails, a short circuit will cause a reset and may change the position of the points right under a train passing over the switch. The results can be a derailment.

Here is a hint to avoid this problem. First program the Hare and Wabbit to return to the same position on power up. Both of these have many accessory addresses. Pick a Smart Route address that is outside the normal range of addresses for your layout. Program all of the Hares and Wabbits (both the A and B sides) with this as one of the many available addresses.

When a short occurs, the switch will not change position. When you need to reset all switches to a startup position, simply issue an accessory command for that address.

## HARE Connections:

### Hare Connector J1



## Wabbit Connections by Switch A and B:

SWITCH A		SWITCH B	
Pin	Signal	Pin	Signal
J1-6	Switch A Manual Throw	J1-3	Switch B Manual Throw
J1-5	Switch A Common	J1-2	Switch B Common
J1-4	Switch A Manual Clear	J1-1	Switch B Manual Clear
J2-1	Switch A Frog Clear Rail	J2-3	Switch B Frog Clear Rail
J2-2	Switch A Frog Throw Rail	J2-4	Switch B Frog Throw Rail
J2-5	Switch A Tortoise Pin #1	J2-7	Switch B Tortoise Pin #1
J2-6	Switch A Tortoise Pin #8	J2-8	Switch B Tortoise Pin #8

Switch A Position		Switch B Position	
Pin	Signal Name	Pin #	Signal Name
J6-1	Clear Plus A	J5-1	Clear Plus B
J6-2	Clear Minus A	J5-2	Clear Minus B
J6-	Throw Plus A	J5-3	Throw Plus B
J6-4	Throw Minus A	J5-4	Throw Minus B

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## **A Better Way to Mount Tortoise Switch Machines Quick, Easy and Accurate**

### **For 1/2" Homasote on 1/2" plywood**

1. Position switch exactly where it will be, temporarily connected to adjoining track. Holding the points exactly centered between the rails, take a ball point pen or pin or whatever you have, put it through the center hole in the throw bar, and mark the roadbed under the turnout **exactly** where the hole should be drilled.
2. Drill a 3/8 inch hole where you have marked the roadbed being sure you hold the drill vertically straight so the hole is perpendicular to the surface of the roadbed.
3. Take a 2" piece of 3/8" wooden dowel and using a drill press (yours or a friend's) drill a 1/16" hole vertically through the dowel making sure it is centered in the dowel. Push the dowel up through the bottom of the hole in the roadbed until it's flush with the underside of the roadbed.
4. Take the template supplied with your Tortoise and using a push pin secure the template to the bottom of the dowel, and mark the 4 points where screws will hold the Tortoise in place. Make sure that the template is oriented in the same direction as the track. Remove the template and make initial screw holes where the four screws will go, that will hold the Tortoise in place.
5. Secure the "throw" wire to the Tortoise, making sure it is perfectly vertical. The wire supplied is .025". I always replace it with .032" piano wire to give it a little more strength. Manually move the mechanism so the wire is perfectly centered on the Tortoise. Then mount a piece of 2 sided foam tape to the top of the Tortoise, and push the throw wire up through the hole in the dowel, and pressing the Tortoise in place. Secure the Tortoise to the bottom of the roadbed with small screws which will secure the Tortoise to the underside of the roadbed, and then remove the dowel. Your throw wire should be dead center in the hole.
5. Take your turnout and slide it over the throw wire, and secure it to your track with your rail joiners, making sure the points are centered when you do. If you are using Peco turnouts remove plate on the turnout and remove the spring, as you do not want the spring fighting the throw bar. Using wire cutters cut the throw wire where it comes up through the hole in the throw bar.

Since this method results in the throw spring being perfectly centered this should work fine for a total 1" of roadbed, and in many cases will work for 1.5". If your roadbed is more than 1.5 " or even 1.5" you may want to use a 1/2" dowel, and drill a 1/2" hole.