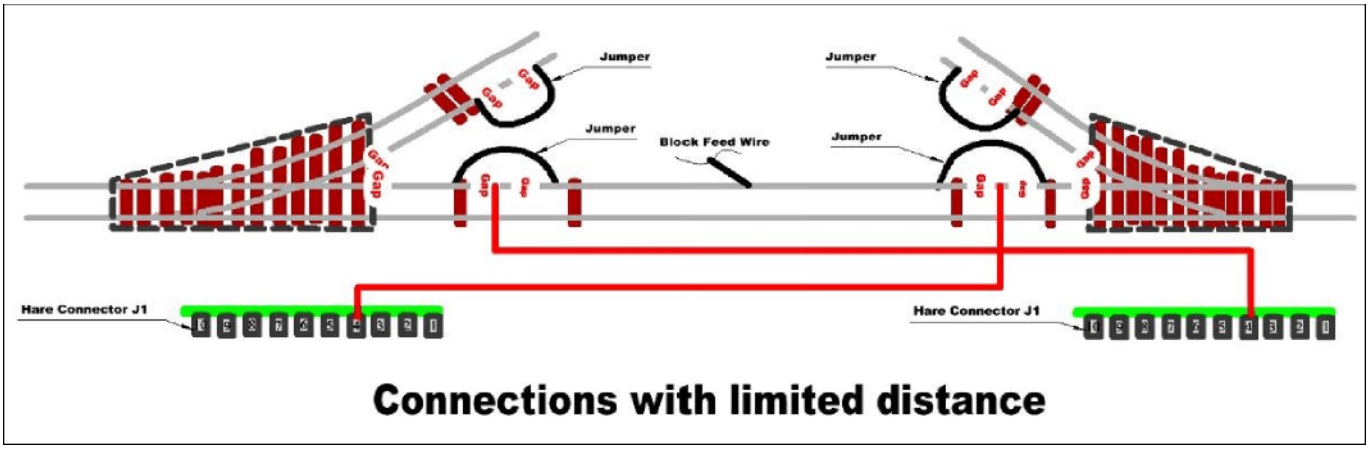
American Hobby Distributors
Hints and Tips
on
The Hare

The Tortoise switch machine (motor) has almost become a standard with model railroaders in all scales. It's slow speed, low current and reliably operation have shown to be a proven design. The Hare adds to the Tortoise a very flexible smart accessory decoder. The Hares flexibility provides a number of ways of controlling the action of the Tortoise. It can either be by a DCC command, triggered by a short section of rail, or by push button. The position can be programmed when power is turned on. In this Hints and Tips we will look at using the Hare with block detections and other possible applications for the Hare. There is also a diagram showing how to build a tester to assist with the installation of a Tortoise.



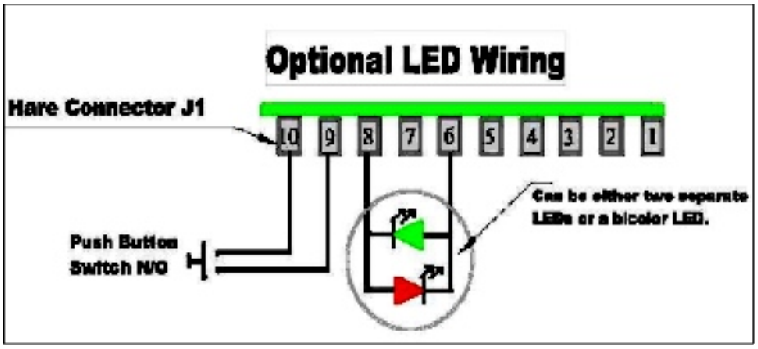
Connections with limited distance

Limited Distance Connections

The Tortoise needs about 2 seconds to throw the points from one position to the other. This is about 2 feet in HO at \60 scale miles per hour. There are places where there is not space between switches for this length of track. This tight spacing can be in areas like the three switches in a turning wye. A way to make it more compact is to overlap over the trigger rail sections (See drawing). This would help to make a semiautomatic turning wye. Just set the path going in and the other switch will line up. For a turning wye you will also need a way to reverse polarity.

Optional LED Wiring

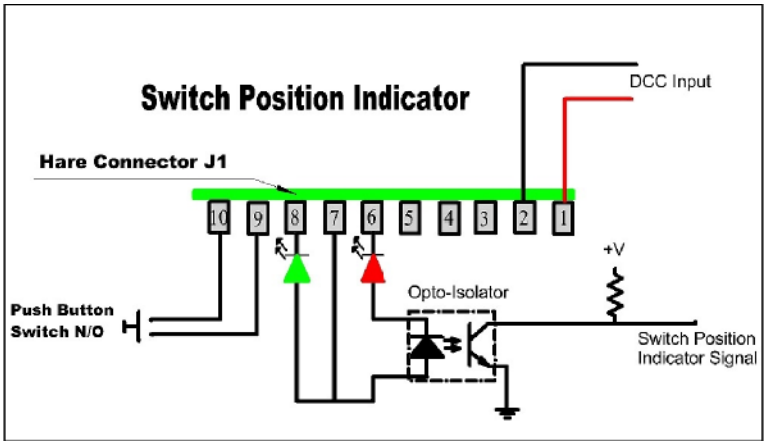
You m ay have noticed that no resistors are shown in series with the LEDS. The current lim iting for the LEDs is done on the Hare. The normal wiring is shown
using three connections. You can wire using only two connections by putting two LEDs back-to-back and connecting to pins 6 and 8. You can also use a bicolor LED. Internally the bicolor LED is two LEDs wired back to back. If you need two LEDs for indication you can wire two bicolor LEDs in series.



Switch Position Indication

W hen operating with a layout with a norm al accessory decoder you can set the switch position and it stays until you change it with a remote com m and. If you have computer control the display will show the position last sent to the accessory decoder. The problem is the Hare can change position either by a train entering the wrong way or an operator changing it with the push button. There are a couple of ways to have the computer detect the change in the switch position. One would be a micro switch connected to the switch linkage. With the Tortoise this is hard to do as it is mounted so tight to the under side of the layout. A better way would be to sense the change in position with an opto-Isolator connected to the LED connection on the Hare. An opto-isolator is an LED and phototransistor in a single inexpensive package. The opto-isolator can be wire in series with either the green or red LED depending or

which indication the system needs. The output can be connected to feedback the switch position to a computer.



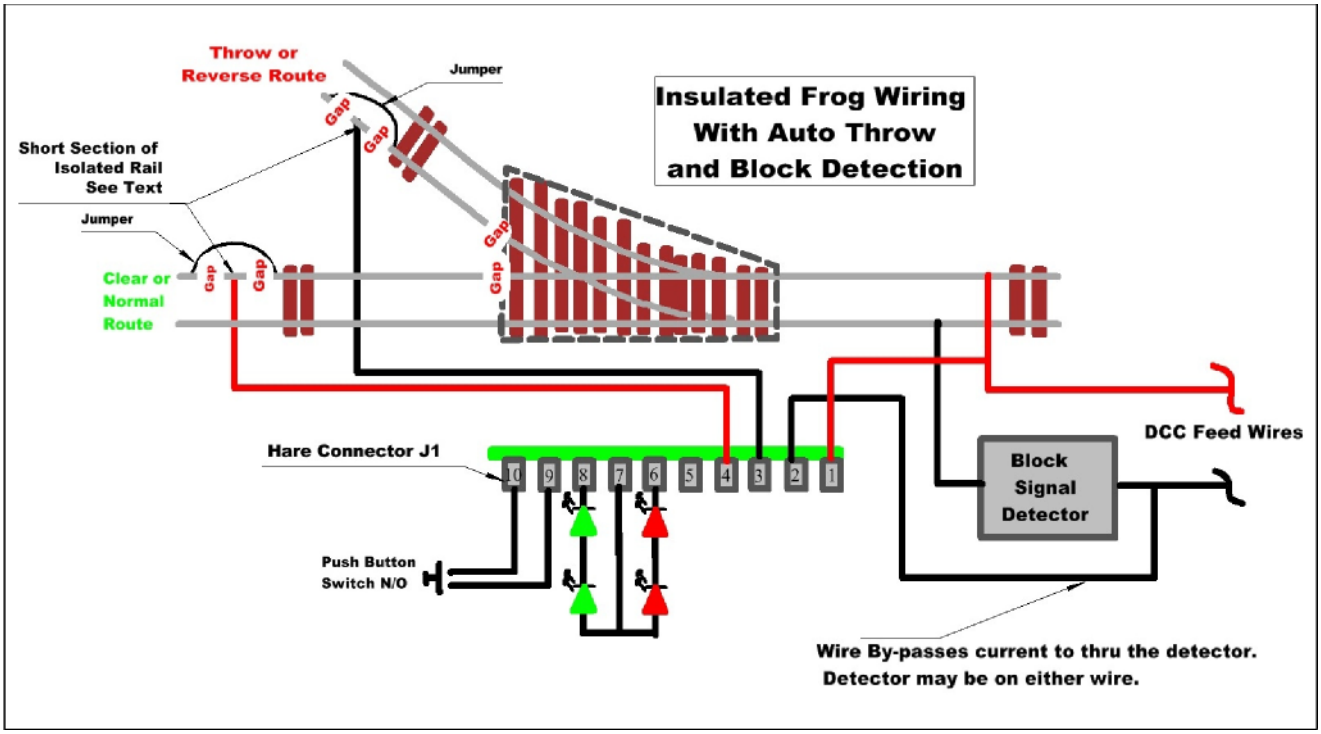
Other Hare Applications

There are a number of other things on a layout that could be powered by a Tortoise and activated by the Hare using the trigger rail. Two items that come to mind are semaphores and crossing gates.

Block Detectors and the Hare

The Insulated Frog

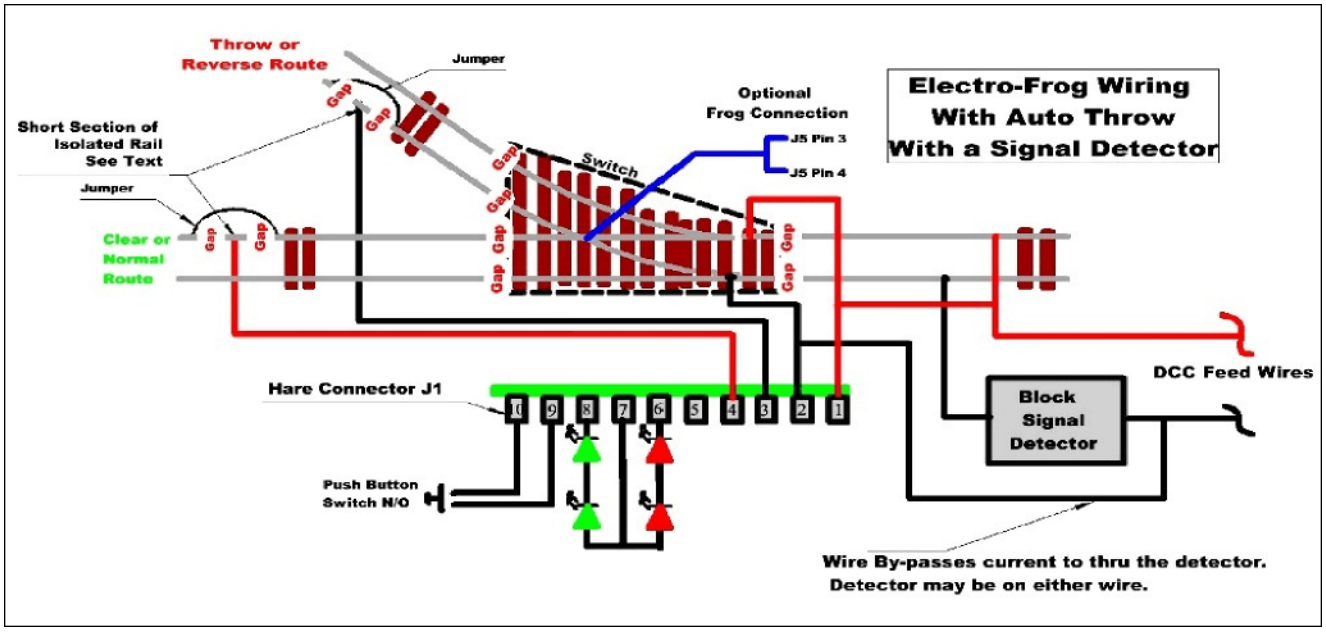
When the Hare in used on a layout with block detectors that sense the current in the rails you may need a little different wiring than shown in the Hare instructions. W hat needs to happen is the current feeding the Hare needs



to come from a source before the block occupancy detector. This way the current to the Hare does not falsely trip the detector. There needs to be some current from the trigger rail to activate the Hare. Since this is such a short section it should not affect the block detection. The insulated frog switch does not require much in the way of changes. As long as the power to Hare bypasses the block detector there should not be any problems. The rails feeding the trigger rail needs to a jumper to continue power up to the switch. Depending on the side of the rail used to connect the detector, more gaps may be needed to isolate the blocks feeding the turnout. You may need to adjust gaps depending on which rails are connected to the different blocks and their detectors.

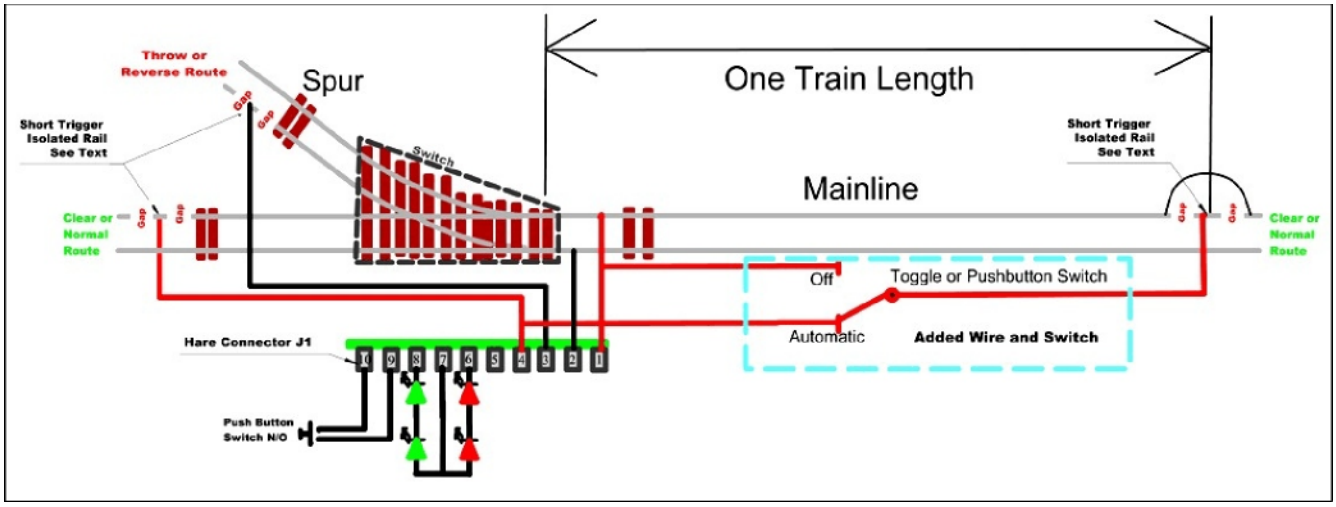
The solid type frog

With this type of switch a few more wiring changes are needed. More isolation is needed to so power to the frog thru the Hare is separated from the power thru the detector. (I understand the prototype leaves the turnout out of the block occupancy wiring.) The easiest way is to gap or use plastic rail joiners to all the rails to the turnout. Then wire feeds to the frog and the outside rails. These wires need to bypass the block detector. (See drawing for electro-frog.) W hen wiring this type of turnout it is easy to have a short due to a reversal of the DCC phases. This is easy to fix by just reversing the leads feeding the Hare or the turnout. The block detector can be wired to either side of the rail. Only the side of rail to the switch used with the detector needs to be isolated. The drawing only shows the detector on one side.



Spur to Mainline Automatic Align

The peddler freight pulls a string of loaded gondolas out of the gravel pit spur on to the mainline. When this westbound freight is clear the eastbound first class passenger train comes roaring down the mainline. Only one problem! Someone forgot to set the turnout at the spur for the mainline. The result is a load of passengers delivered to the gravel pit! This could even mean damage to the engine on the passenger train if it is not stopped in time. The Hare can be setup to prevent this type of problem. The trick is to install a trigger track set for the mainline in the tracks leading to the switch for the spur. The trigger track should be at least the distance of the longest train that will come out of the spur track. Otherwise you will throw the switch under the train as it exits the spur. A toggle



or pushbutton switch can be used to disable the added trigger track auto throw function. See the drawing for the added wires and switch.

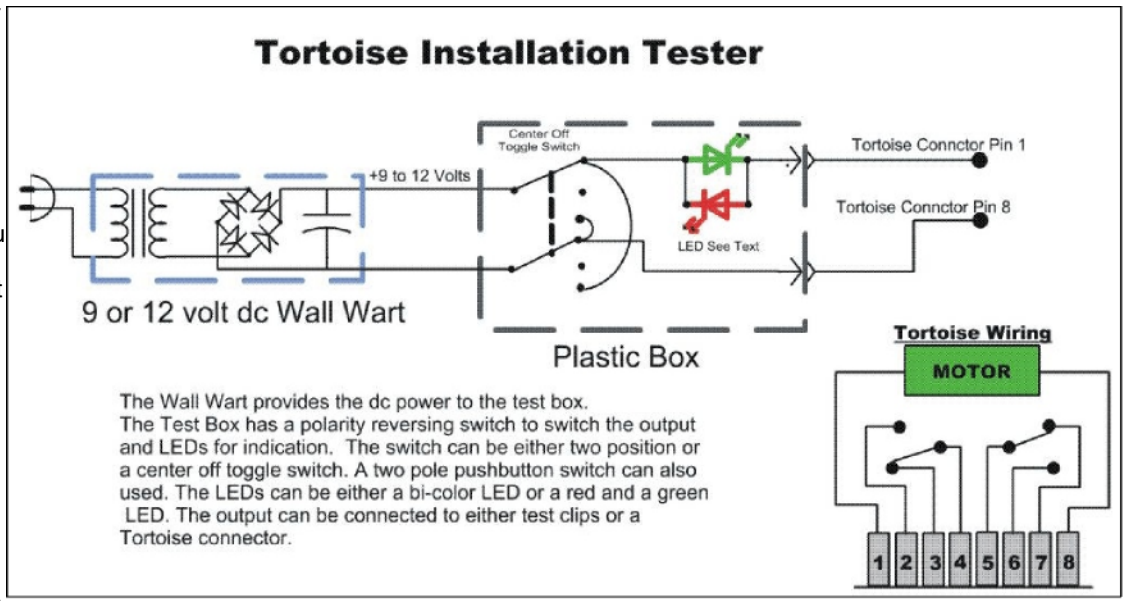
Tortoise Installation Tester

With the introduction of the Hare and DCC control I'm in the process of replacing many of the older twin-coil switch machines with Tortoises using the Hare for control. In some cases the turnout is replaced, in other I'm using the existing turnout. In either case once a hole is drilled in the layout and the Tortoise installed under the layout, some testing and adjustment is needed to be sure the switch points throw is correct. Since I have a number of Tortoises to install it would be easier check the points on top if I had a portable control to run the Tortoise under the layout. That was the inspiration for the "Tortoise Installation Tester".

Most of the parts I used were out of my various "junk" boxes. The plastic box was from Radio Shack; the wall wart

was from a collection saved from devices that have been scraped. I did have to buy a Tortoise connector for the output of the tester. (Tony part # TTE-TORT-CONN) Test clips will also work, but the Tortoise connector is a better choice. The lengths of the wires from the wall wart and to the test connector depend on what is needed on your layout. They should be long enough to be able to go from the wall socket to the test location and then the from the tester to the Tortoise under the layout.

The best choice for the toggle switch should be the center off DPDT type, but a standard two position will work. The advantage of the center off is you can turn the output off. This will protect the LEDs if there is a short between the output lead when power is on.



Either a 9 or 12-volt **dc** wall wart will work. I found that a 9 volt 300 milliamp dc wall wart worked fine. A 12-volt should also work. I measured the 9-volt wall wart and found the voltage was about 11 volts with the light load of the Tortoise.

The only holes needed in the box were one in the top for the switch, one in the top for the LED(s), one for the power in, and one for the test leads to the Tortoise. The current is so low that I used four-wire phone wire and tied two of them together to get the two wires. Be sure to use stranded wire.

The LED(s) show two things: first current is flowing and you are connected, second the position of the switch. No resistor is needed in series with the LED(s) because the resistance of the Tortoise limits the current.

Happy Rails to You **Don Fiehmann** 18Jun05