Reversing Test Track for Digitrax DCC Users
By Fred Miller, MMR

Many modelers have built small test tracks for exercising their DC propulsion power rolling stock on their workbench. By using one of several alternatives for locomotive detection, the test tracks could be made to automatically reverse the direction of travel at each end. In fact several commercial products are available to provide this feature for DC test tracks or even automated trolley system back-and-forth operation. Products are available from Dallee, ITTC, Heathcote Electronics and others as well as a number of circuits published on the web. A simple circuit using Infrared (IR) detection and a couple of ICs can also accomplish the same goal.

Figure 1—Test Track at Author's Workbench

But alas, this reversing capability falls away when a modeler switches to DCC. Reversing the track polarity does NOT reverse the direction of travel for DCC equipment. In fact the automatic "reversing units" sold for DCC modelers DO reverse the polarity on the track for loops and other situations, but those wonderful decoders installed in the locomotives are smart enough to keep the powered equipment running in the same direction. That's great for normal layout operation. But the only way to reverse the direction of travel in DCC decoder equipped locomotives and other powered rolling stock is to send a DCC reverse command to the specific address of the equipment.

So how can we build an automatic reversing test track for the DCC workbench? No manufacturer, to date, has provided a product to do this. If you really want to get down into the nitties of DCC, you could develop a chip and software to accomplish this reversing. You could also use one of the various software products intended to interface with your DCC system such as *Winlok©* from Digitoys-Systems or *TrainTools©* from KAM Industries which, with appropriate hardware, would respond to a detection signal and send a DCC reverse command.

However, I have a very simple solution for Digitrax DCC users. If you have one of the
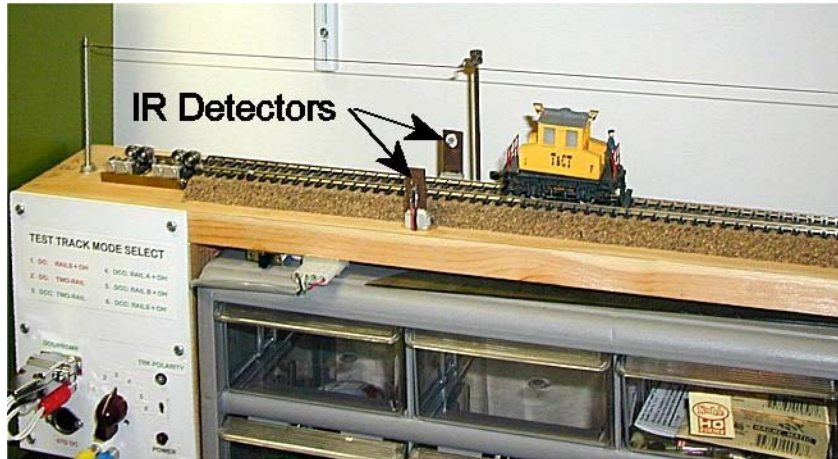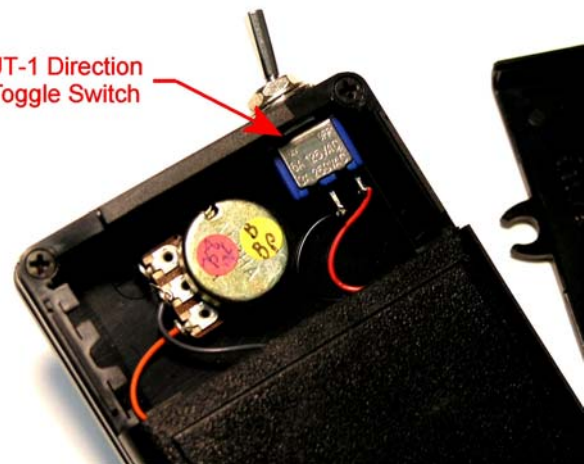

Figure 2—Toggle Switch in opened UT-1

older UT-1 or UT-2 Digitrax throttles, and are willing to do some minor drilling and soldering, my solution is for you.

Caution – making this change to your Digitrax throttle may void the warranty.

The UT-1 and UT-2 throttles have a simple SPST toggle switch to signal the enclosed computer chip to initiate reversing. The toggle switch is easily accessible at the top of the throttle in the compartment normally used for batteries in other Digitrax throttles. Opening the case, by sliding the cover as you would to get to the battery, reveals the toggle switch. (See Fig 2.) All we need to do is make access to the two wires attached to the toggle contacts and tie them to relay contacts driven by our detection circuits. My approach was to make a modification to the throttle that would allow me to connect my auto-reversing circuitry or disconnect it for normal use of the throttle on my layout. I used a miniature (1/8"-two conductor) audio jack from Radio Shack mounted in the side
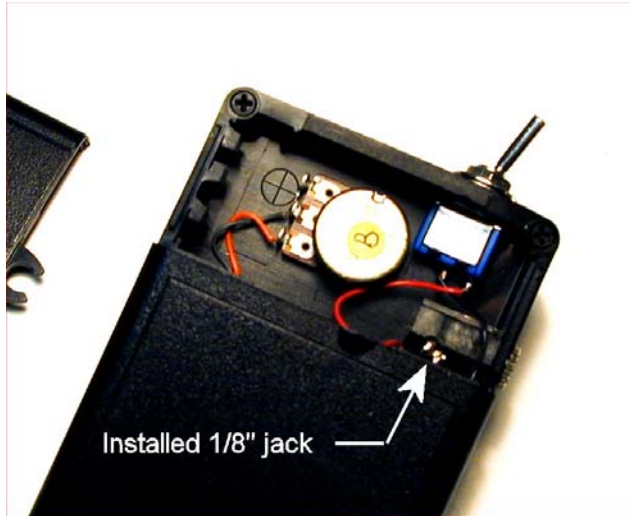

Figure 4—UT-1 with Jack Installed

toggle switch. However, in this case you would have to keep the toggle switch in the open position (thrown to the left for normal reverse throttle direction) when using the throttle connected to your reversing relay. The audio jack I used has the capability of completely disconnecting the toggle circuit when the plug was inserted. This is typically used in radios or CD players to disconnect an internal speaker when earphones are plugged in. These are a bit more complicated to wire, but the benefit is that you don't have to worry about the throttle's toggle position.

Figure 5—UT-1 Adapter Box

Figure 3— UT-1 with added Jack

of the throttle (See Fig 3.) If you were going to dedicate your UT-1 or UT-2 only to your test track, you could simply eliminate the throttle's toggle switch.

The contacts of a simple SPST relay could be used "in parallel" with the contacts of the

I discovered that the wire connecting the throttle's toggle switch to the relay contacts had to be fairly short. I assume this is because of the speed and sensitivity of the computer within the throttle. My solution was to build a circuit in a little Radio Shack "projects box" containing the relay, battery and a plug, which engages the jack in the throttle. (See Fig 5 through 7) The circuit was, in-turn, activated
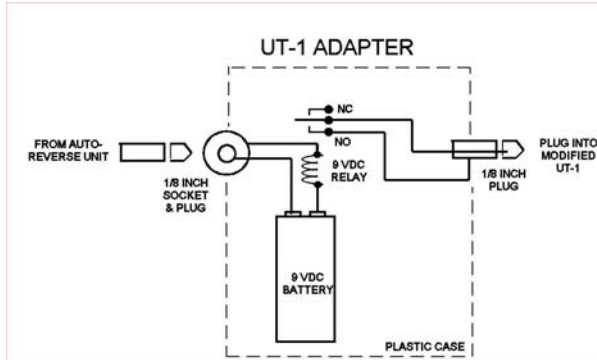
Figure 6—Adapter Box circuit

through a longer wire to my auto-reversing circuitry.

Several commercial auto-reversing products are available which could provide the relay contacts to drive my UT-1 Adapter Circuit.
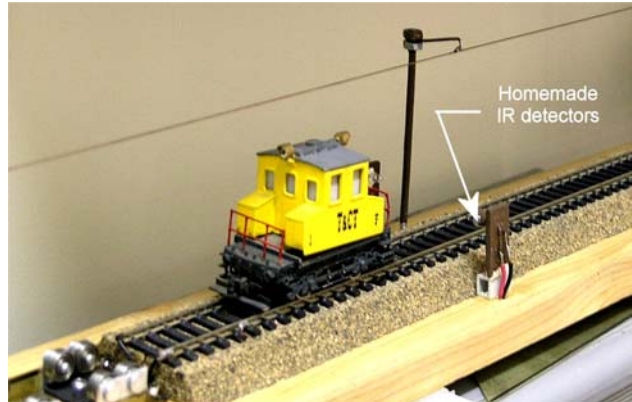

Figure 7—Adapter plugged into UT-1

All that is needed is a relay, which is closed when the locomotive is at one end of the test track, and opened when at the other end. I chose to build my own reversing circuit using IR detection across the track at each end of my test track. The circuit is shown on my website (http://members.aol.com/tractionfan) on the projects page. If there is enough interest perhaps I could write an article for the construction of the auto-reversing circuit. It is built from inexpensive parts readily available from Radio Shack or other electronics parts suppliers

Whether you use a commercial reversing unit or build your own, the modifications to a Digitrax UT-1 or UT-2 will convert that reversing unit, normally designed for DC propulsion power, into a DCC capable facility.

Figure 8—Authors Test Track