



North Raleigh Model Railroad Club

Application Note

Electrical Control of Unitrack Turnouts

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Questions, comments, corrections and suggestion should be addressed to the NRMRC Standards Committee at wallisjm@att.net

The Unitrack turnout is moved by a turnout motor, a tiny bi-polar solenoid drive which is hidden under and inside the base of the turnout. Because it is bi-polar it operates on direct current (DC), and has only two (2) wires. Most turnouts (Atlas, twin-coil, etc.) will run on AC or DC and have three (3) wires. Because it has only two wires the turnout is operated by simply reversing the polarity of the power feed.

The turnout motor is only fed electricity for the moment it takes to move the points. This is very important — **feeding power for too long a time can burn out the motor.**

Manual Control

Unitrack turnouts can be controlled manually or electrically. There is a manual lever sticking out of the ballast strip next to the free end of the point rails. Simply move the lever to the other position to move the points. **Do not manually push the points. Pushing the points can damage the turnout. Use the manual slide lever.**

DC Control from a Powerpack

Unitrack turnouts can be electrically controlled using all Kato components, or you can make your own control configuration.

Using Kato Components



This involves using the Kato 24-842 DC Converter (shown at top left), the Kato 24-840 Turnout Controller (bank of 5 shown at left) and, if necessary, the Kato 24-841 Turnout Extension Cord (not shown).

For a Kato power pack the DC Converter is not needed. The Turnout controller(s) are snapped into the side of the Kato power pack.

If you are using another brand of power pack then connect the DC Converter wires to the accessory AC terminal, usually 16VAC, on the power pack. DC is fed out the snap connectors.



The Turnout Controllers are blue plastic electrical switches, with snap connectors on both sides (male on one, female on the other) which allow a row of controllers to be snapped together. The DC Controller is snapped to the left side of the first Controller to supply electricity to the entire row. A socket on the back mates with the plug on the cord from the turnout motor, or from the Turnout Extension Cord, where used.

The Turnout Controller is a momentary contact Double-Pole, Double Throw (DPDT) switch. As the control handle is moved from one position to the other, contact is made for a fraction of a second, sending DC power of the appropriate polarity to the turnout motor

Move the control handle in a slow steady manner, but don't let it stop anywhere as it is moved; the stop position could be the point where electrical contact is made, and leaving the handle too long in that position could burn out the motor.

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The Kato 24-842 DC Converter is simply a standard bridge rectifier circuit. It can handle up to 17 VAC in (via the wires) and puts out 12VDC (via the snaps). Since it is a standard bridge rectifier it can be fed DC and the correct polarity power will be output at the snaps.

Constructing your own Control

You can use a momentary contact Double-Pole, Double-Throw (DPDT) switch (Momentary On / Off / Momentary On) to duplicate the operation of the Kato Turnout Controller. This Momentary DPDT switch is wired the same as a reversing switch for track power is wired, but the power coming in is fixed DC from the power pack, and the power going out goes to the turnout motor. Note the following:

- You must use fixed DC output from the power pack. Do not connect to the auxiliary AC power terminals.
- You will have to cut off the Kato connector on the cord from the turnout motor, and hardwire to the momentary DPDT switch.
- The DPDT switch can be mounted on the front or top of the T-TRAK module; the module rear may not be available if the module has a keyboard, or is a full-depth module.
- If you use an ordinary DPDT switch instead of a Momentary DPDT switch you will burn out the turnout motor.
- With the use of a momentary DPDT switch you cannot tell which direction the turnout is in after it has been thrown — the position of the DPDT switch is always in the center. The Kato Turnout Controller always shows the position of the turnout. You can overcome this problem as follows:

If you insert a momentary push button in one of the wires from the DPDT switch to the turnout you can use a normal (non-momentary) DPDT switch. The position of the toggle switch will point in the direction the turnout is thrown. You operate the turnout by moving the DPDT switch to the desired position, and then depress the momentary push button. This is a two-step process since you have to move the DPDT switch then press the button.

There are other alternatives using only push buttons that will work, but they are more complicated and will not be discussed here.

Digital Command Control (DCC) of Unitrack Turnouts

DC control of turnouts requires an additional power bus running to all modules equipped with turnouts. The additional bus can be eliminated using DCC control of turnouts since the stationary decoder used for control will connect to the track. Of course this requires the layout, or at minimum one track, to be DCC powered.

Several stationary decoders from several manufacturers are available that can control Kato Unitrack turnouts. Since Digitrax is the system of choice for T-TRAK Digitrax stationary decoders are listed, as follows:

Digitrax DS51K1 Stationary Decoder



The Digitrax DS51K1 can be mounted under the T-TRAK module below the corresponding turnout. It is rated at 0.5 Amp and measures 0.319" x 0.509" x 0.152" (8.11mm x 12.94mm x 3.88mm).

The orange and gray wires from the decoder are connected to the turnout motor, and the red and black wires are connected to track power (perhaps using Terminal UniJoiners). After installation the decoder is programmed to the desired address following the simple instructions provided by Digitrax

Since the DS51K1 does not have a LocoNet connection it must be connected to DCC track power to receive its commands. For T-TRAK modules it is recommended to connect the red and black wires to the Red track. If the module will be used with DC power on the Red track, rather than DCC power, a DPDT switch should be inserted in the red and black leads so the connection to the Red track can be turned off, as DC track power will damage the DS51K1 decoder.

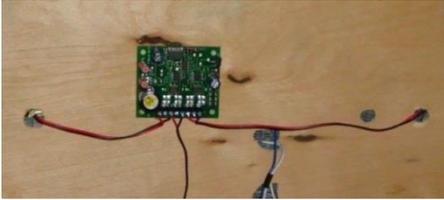
Important note: The DS51K1 stationary decoder does **NOT** have enough power to operate the Unitrack #6 Single or Double Crossovers.

Digitrax DS52 Dual Stationary Decoder

The Digitrax DS52 will operate two individual 2-wire bi-polar solenoid turnouts. Its capacitive discharge provides enough power for the Kato 20-310 #6 Double Crossover. Decoder addresses can be separate or sequential.

The DS52 can be mounted under the T-TRAK module below the corresponding turnouts it will operate. It has screw terminals for connecting to track power and to the turnouts. See photo.

Configuration and programming the desired turnout address is simple and straightforward following the Digitrax instructions included with the decoder.



The DS52 can be mounted to the underside of the module top by double-sided foam tape, as shown. The red and black wires extending out each side connect to the two turnouts being controlled. The red and black wires extending down connect to red track power via terminal UniJoiners. Note the DS52 red and black wires could be connected to a separate bus if a suitable bus is available in the layout. The decoder is configured to operate the bi-polar solenoid motors in the Unitrack turnouts.

Since the DS52 does not have a LocoNet connection it must be connected to DCC track power to receive its commands. For T-TRAK modules it is recommended to connect the DS52 to the Red track. If the module will be used with DC power on the Red track, rather than DCC power, a DPDT switch should be inserted in the leads so the connection to the Red track can be turned off, as DC track power will damage the DS52 decoder.

Digitrax DS64 Quad Stationary Decoder



The Digitrax DS64 can operate four (4) 2-wire bi-polar solenoid turnouts (as well as other types), and the Kato 20-310 #6 Double Crossover. Each output can handle two turnout motors. Power can be track power or an external power supply such as the Digitrax PS14. As well as throttle control the DS64 can be controlled by push-button switches.

The DS64 can be mounted under the T-TRAK module below the corresponding turnouts it will operate. It has screw terminals for connecting to track power and to the turnouts, as well as push-button control switches.

This decoder will most likely have application for modules with several turnouts.

The DS64 has LocoNet connections so it can receive commands both the track or via LocoNet. If the DS64 is connected to DCC track power to receive its commands (connect to Red track is recommended), and if the module will be used with DC power on the Red track, rather than DCC power, a DPDT switch should be inserted in the leads so the connection to the Red track can be turned off, as DC track power will damage the DS64 decoder.

There are several stationary decoders from DCC manufacturers other than Digitrax that will work with Kato Unitrack turnouts. These are not covered here since Digitrax is NRMRC standard.

Turnout Address Assignments

For modules equipped with DCC-actuated turnouts, each turnout must have a unique address not shared with a turnout on any other module. The Chairman of the Standards Committee maintains a register of DCC turnout address assigned to NRMRC club- and member-owned T-TRAK modules. Before assigning an address to a DCC-controlled turnout on any T-TRAK module the owner must obtain the needed address(es) from the Chairman.

References

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