NCE

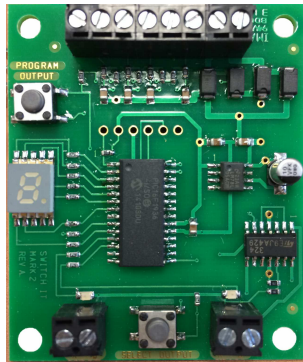## The Power of DCC

Switch-It Mk2

Version 1.0

Age
14+

FOR STALL MOTOR MACHINES ONLY
NOT FOR USE WITH TWIN COIL SWITCH MACHINES

$29.95

All new easy programming!

- ✓ Control for 2 Tortoise™ switch machines
- ✓ Remembers the position of switch during power outages
- ✓ Supports the full range of DCC accessory addresses (1-2044)
- ✓ Easy address programming, no need to connect it to programming track
- ✓ Push button connections for local control panel operation
- ✓ Simple hook up, 2 wires to the track, 2 wires to each switch machine
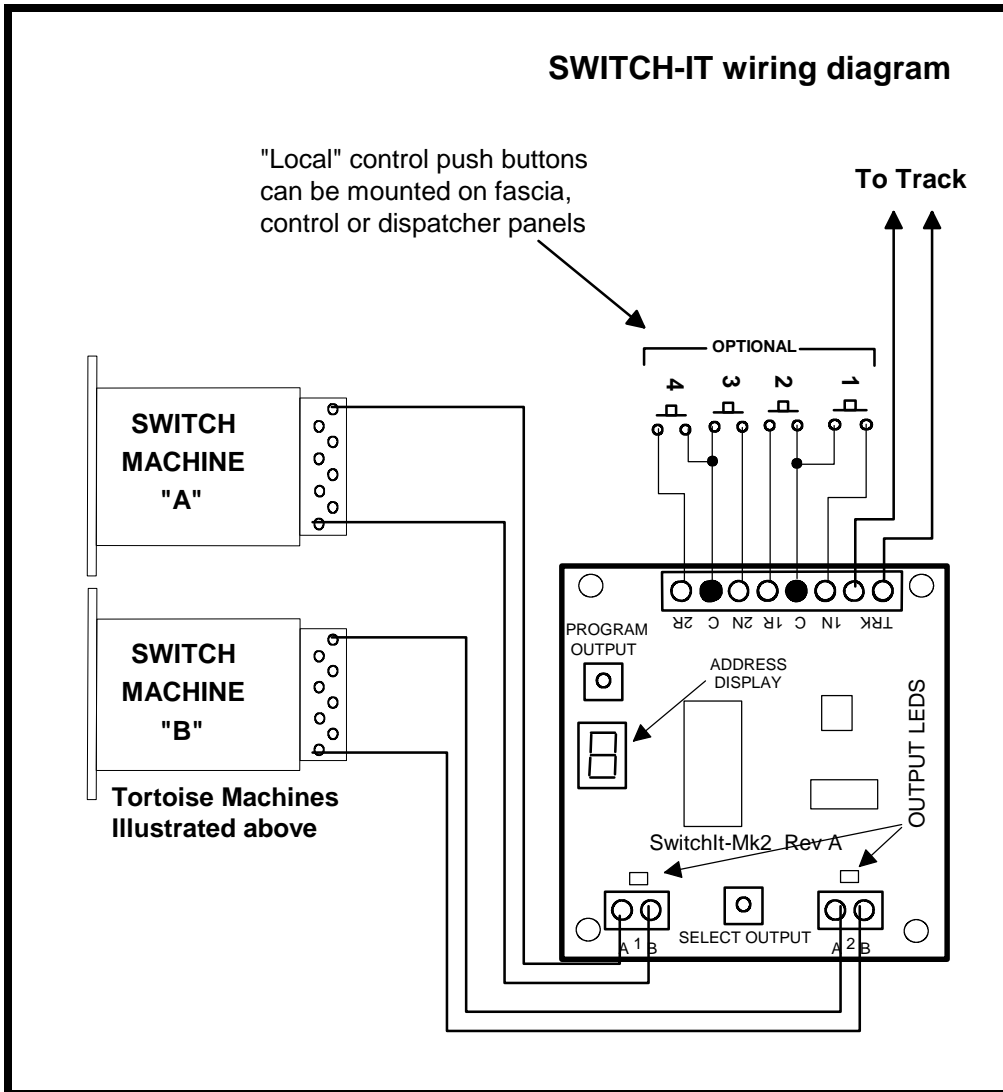
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Notes:

This decoder is designed to control Tortoise, SwitchMaster or other low current "stall motor" switch machines. The outputs are rated for 40mA maximum. Most Tortoise machines draw 10 to 20mA with normal track voltage (about 13-15 volts). There are four mounting holes at the corners of the Switch-It.

Wiring:

See the diagram below for wiring particulars. The only required wires are two wires to the track and two wires to each machine. It is OK to use the Switch-It for control of only one switch machine.

SWITCH-IT wiring diagram

"Local" control push buttons can be mounted on fascia, control or dispatcher panels

To Track

OPTIONAL

SWITCH MACHINE "A"

SWITCH MACHINE "B"

Tortoise Machines Illustrated above

PROGRAM OUTPUT

ADDRESS DISPLAY

OUTPUT LEDS

SwitchIt-Mk2_Rev A

SELECT OUTPUT

TRK 1N C 1R 2N C 2R

A 1 B   A 2 B

Caution when using local control pushbuttons. The "C" in the drawing above used as a common for pushbuttons is circuit common for the Switch-It. Do not connect to other Switch-It common terminals unless the other Switch-Its are connect to the same power district.

Switch machine mounting tip:

On our Tortoise machines we use hot glue to mount the machine. The glue stays liquid just long enough after application to allow alignment of the machine. We manually center the arm of the machine then slide the machine around while the glue sets to align the points to the middle of their throw. The low temperature hot glue is weak enough to allow removal of the machine later on by prying with a putty knife. Use a throw wire that is about 6" (150mm) longer than the one provided with the Tortoise to give you room to put glue on the machine after the wire is put through the roadbed.

If you have never used a Switch-It-MK2 before:

We recommend trying the decoder out first before installing it on the layout.

Connect a Tortoise™ machine to screw terminals 1A/1B of the decoder

Connect two wires from the decoder track connection to your DCC system.

When you first apply power to the Switch-It-MK2 the address display will show some numbers (the software version) then 3 horizontal bars for about 1 second followed by vertical bars"wig wagging" back and forth on the display. The wig-wagging indicates the decoder is receiving DCC information and is ready for use.

Press the "SELECT OUTPUT" button the decoder until the output LED above the 1A/1B terminal strip lights (each push of the button will select a different output - on the ninth push all LEDs will turn off). The address display will now start indicating the output currently programmed for that output. For a factory fresh Switch-It-MK2 output #1 it will flash 1. If you select output 2 it will flash 2 and so on as indicated below:

Factory default values for decoder
Output 1 factory programmed to accessory address 1
Output 2 factory programmed to accessory address 2

Now let's actually test the decoder output #1.
Use your DCC system to throw the switch. The instructions below can be used for throwing a switch depending on which DCC system you have:

To throw a switch using the NCE system:
Press "SEL ACCY"
Type in the desired accessory number followed by "ENTER"
Push "1" (or "2") to throw the switch.

To throw a switch using a Digitrax system:
Press "SWCH"
Type in the desired accessory number
Push "OPTN" to throw the switch.

To throw a switch using a Lenz system:
Press "F"
Press "5"
Type in the desired accessory number followed by "ENTER"
Push "+" (or "-")

If throwing the switch one way doesn't do anything, try the other direction. You should be rewarded with the Tortoise reversing its position.

Address programming:
The Switch-It **cannot** be programmed on your programming track. It is always programmed while connected to the mainline track. This decoder can be programmed by all systems that support accessory control using the procedure below.

To program an output to a new address using any DCC system:

1) Connect wires from the track to the decoder DCC terminals.
2) Make sure the Power Select Switch is set to DCC.
3) Push the SELECT OUTPUT button until the LED corresponding to the output lights.
4) Push the PROGRAM OUTPUT button (notice the display flashes "P" now) When the display is flashing you have one minute to complete the next step or the decoder will exit programming mode.
5) Use your DCC system to select and operate the switch (see above).
6) The decoder will accept that switch address as its new address and begin showing its new address on the address display. It will show the address one digit at a time in sequence.

You may confirm the address for any output at any time by pressing the OUTPUT SELECT button until the appropriate output LED lights. The address for that output will be displayed.

Setting other options in the Switch-It-Mk2:
Use *Accessory OPs mode* programming ("PROG" followed by "7" on NCE systems). If you have an entry level system that does not support *Accessory OPs mode* programming follow the instructions on the back page for setting CVs with Loco Ops. For CV561 through CV568 use the accessory address for the corresponding output number. For all other CVs use the accessory address programmed for output 1.

Reversing the polarity of an output:
Each of the outputs can have its polarity reversed by programming a CV for that output. The programming commands for changing the polarity must be directed to Accessory address of the respective output number. For example, if output 1 is programmed to Accessory address 226 then you need to select Ops mode programming for address 226, and then set CV561 accordingly

For output #1 program CV561 to a value of 0 (default) for normal polarity, 1 for reverse.
For output #2 program CV562 to a value of 0 (default) for normal polarity, 1 for reverse.

If your DCC system does not support OPs mode programming for accessories you can just swap the two wires to the switch machine.

Setting outputs to toggle when used with optional local control push buttons
Setting CV548 to 1 will cause pushbuttons connected to the Switch-It to "toggle" the switch machine output. Each press of a button will alternate the switch position. Setting CV548 = 1 enables the toggle option. CV548 = 0 disables it. CV548 is "global" to the Switch-It Mk2, meaning it will affect all buttons connected to the Swtich-It . (Factory default = 0) **Note:**CV548 should be programmed via Accessory Ops mode programming to the address of output 1 only.

Pushbutton Lockout (CV556):
On some layouts it may be desirable to disable operation of the local control pushbuttons. Setting CV556 to a value of 1 prevents operation of all the decoder outputs by the optional Button Board pushbuttons. Setting CV556 to 0 enables operation of these buttons. You can disable or enable ALL decoders on the layout at the same time by using the accessory decoder broadcast address of 2044 when programming CV556. CV556 is "global" to the Switch-It Mk2, meaning it will lockout all button inputs from the button board. (Factory default = 0) **Note:**CV556 should be programmed via Accessory Ops mode programming to the address of output 1 only.

Factory reset:
To reset the Switch-It-MK2 to original factory setting program CV8 to 8. <u>A reset will only be performed if you program CV8=8 via Accessory OPs mode programming to the address of output 1.</u>

Upon reset all settings will revert to the factory default setting as indicated below.

Factory default values for decoder
The Switch-It-MK2 is factory programmed to the following values
Output 1 = accessory address 1
Output 2 = accessory address 2
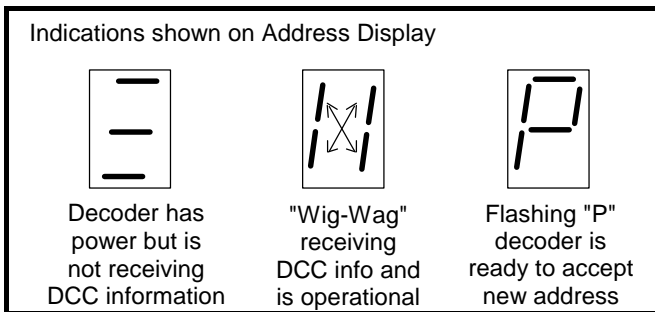CV548 is set to 0 (normal dual pushbutton operation by the optional Button Board)
CV556 is set to 0 (pushbutton lockout not engaged)
CV561 is set to 0 (normal output polarity)
CV562 is set to 0 (normal output polarity)

Other technical stuff:
 • We have successfully controlled two Tortoise switch machines with one decoder
   output when used in a crossover. We can't guarantee this will work in all cases.

 • The outputs of the decoder are always on to prevent the switch machine from backing
   off due to the spring pressure of the turnout throw mechanism.

Indications shown on Address Display

Decoder has power but is not receiving DCC information

"Wig-Wag" receiving DCC info and is operational

Flashing "P" decoder is ready to accept new address

More wiring tips:
▪ If you use the Tortoise contacts to power the frog of your turnouts we suggest
   wiring a #93 (other useful bulbs #211, #305) automotive bulb in series with the frog
   (see below). This will prevent short circuits from shutting down your power booster
   in the event you enter the turnout from the frog end without aligning the points. For
   larger scales use a #1156 bulb.

▪ See the diagram below for and easy way to have turnout position indicator lights.
   LEDs are wired in series with the switch machine to indicate which position the
   turnout is thrown. Most LEDs will handle up to 20mA, the switch motor acts as the
   current limiting device for the LEDs. We use red and green LEDs but any color will
   do. The switch machine will run a bit slower with LEDs installed due to about a 1.5
   volt loss in the LEDs
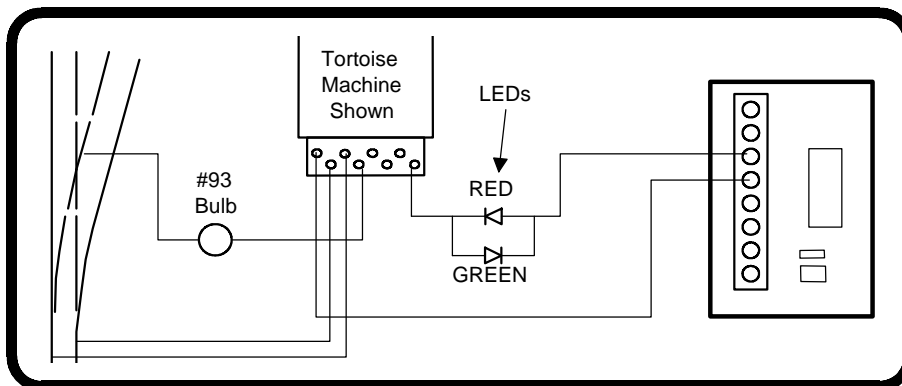
You can connecti normally open (N.O.) pushbuttons or toggle switches to the Switch-It-Mk2 for control of turnouts via a control panel near the Switch-It-Mk2.   Toggle switches can be momentary or non-momentary.

Grounding terminal 1N of the button board will activate output 1 of the Switch-It to the "normal" position. Grounding 1R will throw the Switch-It to the "reverse" position.

Programming CVs with systems that don't support Accessory OPs mode programming:

- Press the SELECT OUTPUT button on the Switch-It-Mk2 until the button for output #1

  lights.

- Press PROGRAM OUTPUT (the display should start flashing "P")

- Use loco OPs mode programming (Program on the Main) to program the desired CV.

  Any loco address can be used for this.

- Repeat the steps above for each CV you wish to program.

If the programming "takes" the display will stop flashing.

Note:
The display will only flash for about 1 minute. When it stops flashing the Switch8-Mk2 will not accept programming. If it times out and stop flashing before you finish programming just press PROGRAM OUTPUT again.

Note:
You can only program CVs using Loco OPs mode when output #1 is selected. If any other output is selected Loco OPs will not work (only Accessory OPs works with all outputs)

The warranty is voided if the decoder is miswired, connected to more than 22 volts, or used with switch motors drawing more than 40mA.

Warranty
This decoder is fully factory tested and warranted against manufacturing defects for a period of 1 year. As the circumstances under which this decoder is installed can not be controlled, failure of the decoder due to installation problems can not be warranted.   This includes misuse, miswiring, operation under loads beyond the design range of the decoder or short circuits.   If the decoder fails for non-warranted reasons NCE will replace the decoder, no questions asked, for $20 US plus $2 shipping.   For warranty or non-warranty replacement send the decoder (an any payment, if required) to:
NCE Warranty Center, 82 East Main Street, Webster, New York 14580

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