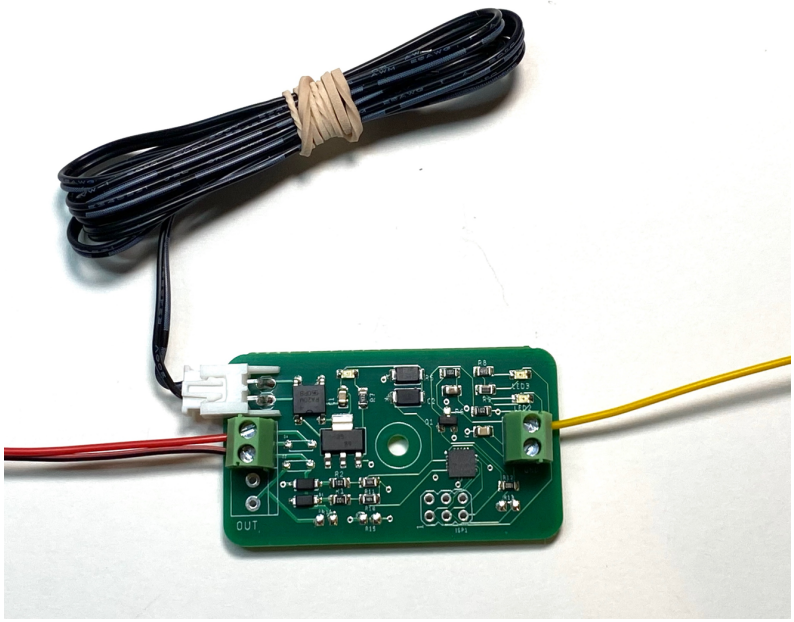
Model Train™ TECHNOLOGY

MTT Coil Sensor™

OPERATIONS MANUAL

Version 1.1b



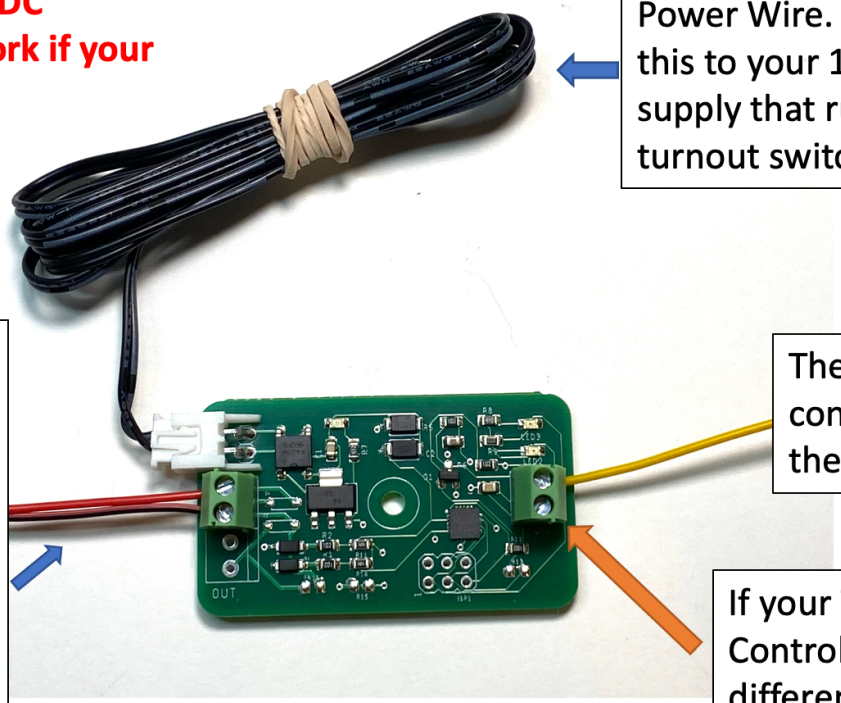
INTRODUCTION

The vast majority of model railroads use coil-based switches. These products use a momentary connection to power to move a left and right coil, or in the case of Kato, a single coil with reverse polarity. In either case, there is no way to know "electrically" which position the physical turnout is in based on the switch. (We will use "switch" to refer to the thing that you push, pull or lever to activate the motion and "turnout" to mean the thing that moves on the layout.)

When we were designing the Dwarf Signal Controller, we really wanted to solve this problem so that anybody could add ground-based signals to turnouts on their layout. As you know from our other products, we needed to make it simple, reliable, and easy to hook up.

Once you connect the MTT Coil Sensor to your switch, it will keep track of the direction of the turnout even after you turn off power to your layout. With this in place, you can implement the full switching yard interlocking that is described in the Dwarf Signal Controller manual and in the videos. Or you can keep it very simple and just have the signals keep track of each turnout position individually.

This UNIT REQUIRES that your turnouts are operated with DC voltages only. IT will not work if your switches run AC.



Power Wire. Connect this to your 12-16v DC supply that runs your turnout switches.

The Red and Black wires should connect to the OUTPUT side of the switch that switches the turnout. Anywhere along that wire or at either end is ok. For the Kato, the Red wire from the Coil Sensor must connect to the Red wire on the turnout, and black to black.

The Yellow SIGNAL wire connects to the INPUT of the Signal Controller

If your Turnouts and the Signal Controller are running off different power supplies, you must connect the GND pin here to the GND pin on the Signal Controller. DO NOT CONNECT this pin to POWER.

INSTALLATION

There are a few things to keep in mind as you install the Coil Sensor.

1. The power supply you use to switch the turnouts must also power the Coil Sensor. The Coil Sensor uses about 10ma (tiny) so it will not affect the operation of the turnouts.

2. You connect the two sensor wires to the wire that runs between the Switch and the Turnout. Anywhere along those two wire or at either end via the terminal connection is fine.

3. We suggest you wait to connect the signal wire to the Signal Controller until after you have tested the Coil Sensor by itself.

4. The blue LED means the board has power and is running.

5. The Red and Green LEDs will flip as you use your existing switch to turn the turnout. If it doesn't seem to be acting properly, reverse the green and red inputs. We have tested with many combinations of switches and turnout motors but of course not every known possibility.

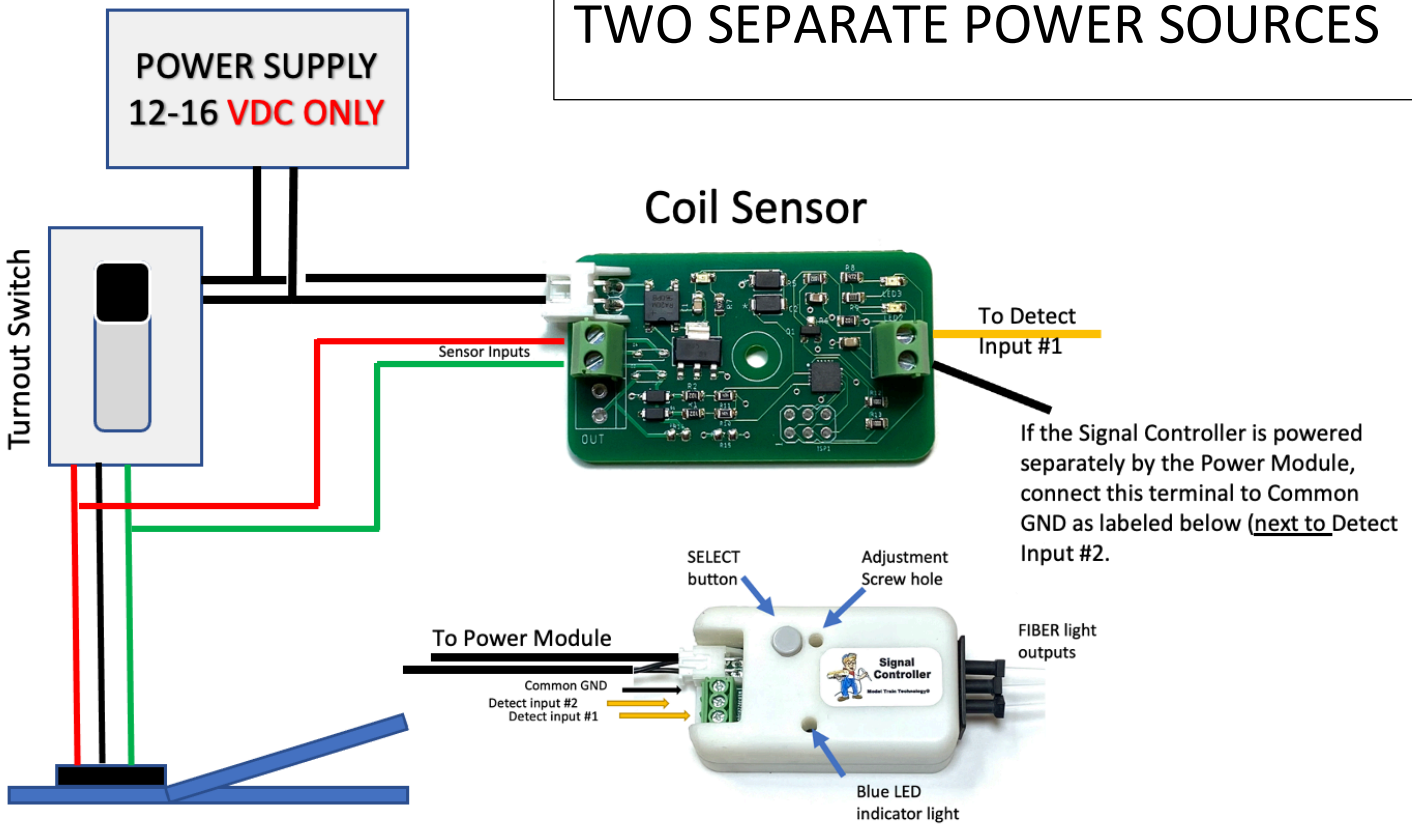
6. Kato switches are different than all the rest but despite that, the Coil Sensor will work with Kato out-of-the-box. Again, if you get odd behaviors, the first thing to troubleshoot is to reverse the two input wires.

7. There are a couple of reasons that you might want to have the D-Signal Controller powered by our Power Module and not the turnout power, not the least of which is easy hook up. If that is your plan, then the result will be two different power sources running different parts of this schema. That's fine and we have planned for that. We use a modified OPEN DRAIN to GROUND signal so when the Coil Sensor wants to tell the D-Signal Controller that the switch turned, it needs to find an electrical path to ground. Sometimes this happens "by accident" because of how and where each power supply is plugged in. But that is not a reliable solution.

   Instead, the Coil Sensor and the D-Signal Controller have a "Common Ground", also labeled **Common GND**. By connecting these two GND's together with a wire, there is an available electrical path for when the Coil Sensor trips.

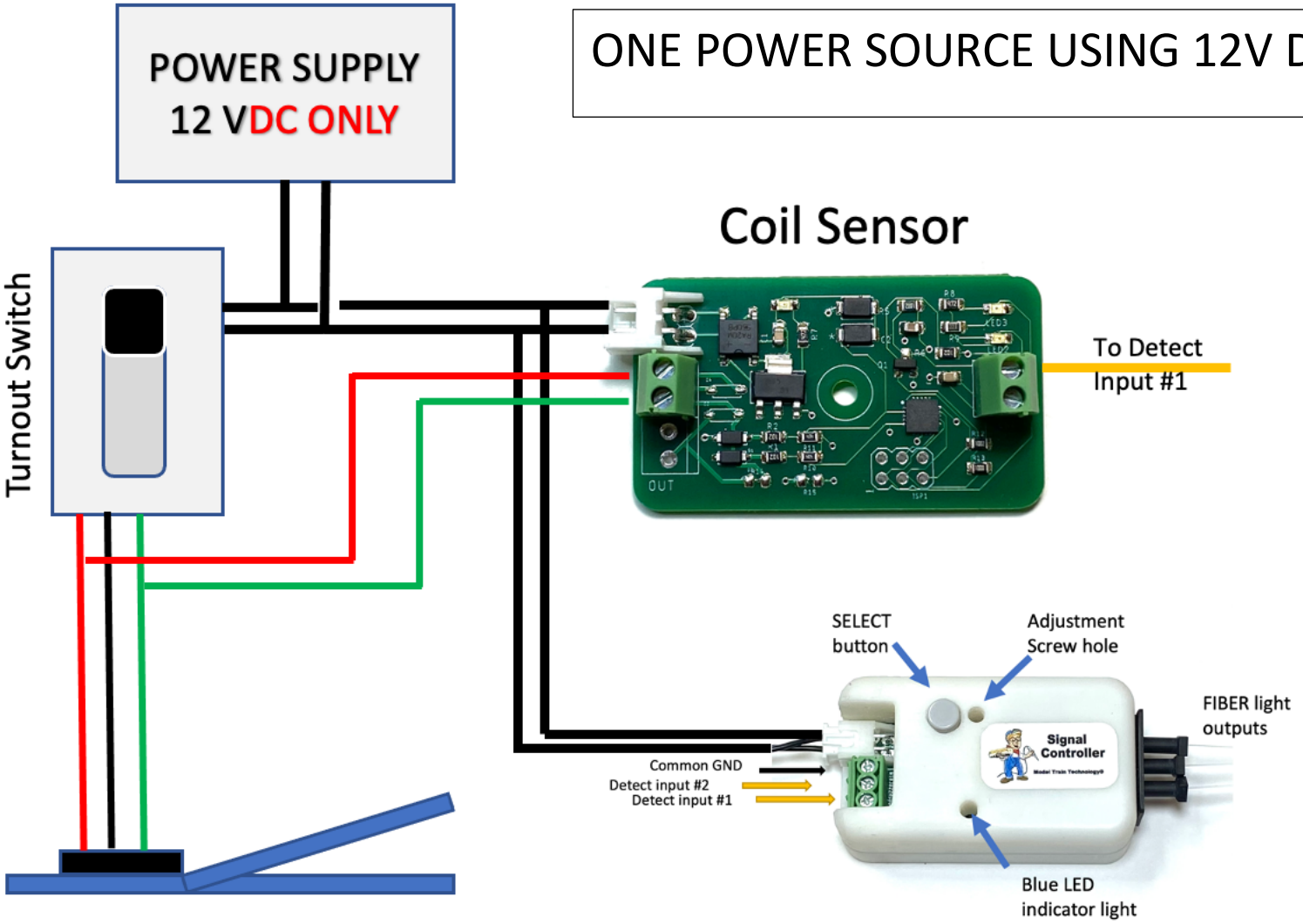
The diagrams below show both of these configurations.

TWO SEPARATE POWER SOURCES



Do Not connect Signal Controller to AC

ONE POWER SOURCE USING 12V DC



ELECTRONICS AND STATIC ELECTRICITY

The ***MTT PRECISION DETECTOR™ - Trackside*** circuit board and components are exposed when the cover is off. Electricity can be dangerous. Static electricity can cause component failure. Scuffing along a carpet and then touching one of the component connectors can cause a static spark. These components are fairly rugged – some designed for the automotive industry. Just be mindful of the risk. The current on the board will not harm you if the board is powered and operated as per the instructions.

ONE YEAR MANUFACTURER WARRANTY: We warrant this product to be free from defects in workmanship and materials, under normal residential use and conditions, for a period of one (1) year for the original invoice date. Shipping and handling fees are to be paid for by the customer.

LIMITATION OF LIABILITY

UNDER NO CIRCUMSTANCE SHALL COMPANY OR ITS AFFILIATES, PARTNERS, SUPPLIERS OR LICENSORS BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENCIAL, SPECIAL OR EXEMPLARY DAMAGES ARRISING OUT OF OR IN CONNECTION WITH YOUR USE, OR INABILITY TO USE THE PRODUCT, WHETHER OR NOT THE DAMAGES WERE FORESEEABLE AND WHETHER OR NOT COMPANY WAS ADVISED OF THE POSSIBLITY OF SUCH DAMAGES. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, COMPANY'S AGGREGATE LIABILITY TO YOU SHALL NOT EXCEED THE AMOUNT OF THE PRODUCT. THE FOREGOING LIMITATION WILL APPLY EVEN IF THE ABOVE STATED REMEDY FAILS OF ITS ESSENTIAL PURPOSE.

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