

# T-TRAK PowerPole Bus Wires

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## **Overview**

These Bus wires (feeders) are based on the NTRAK PowerPole RP. For additional information see the PowerPole information at [www.ntrak.org](http://www.ntrak.org) or The NTRAK Module "How To" Book, twelfth printing, December 2006. Uniformity with NTRAK allows for power supplies and cables to be easily interchanged between NTRAK and T-TRAK and also allows a club to use the same parts for both modular formats.

These bus wires can be used for DCC or DC operations, but are envisioned to be used primarily for larger layouts with more than 6 tables. The bus wire specs allow the individual club to use any plugs that they choose to connect with their own modules (Kato plugs recommended) as long as they are able to connect to a common bus for power distribution. Other possible plug types include: spade plugs, twisted wire, CJ's, PowerPoles, or....

## **Bus Wire Fundamentals**

The bus wires should be constructed in 8 to 10 foot lengths of 12 ga wire with PowerPole connectors (white and blue) on each end. The idea is to provide sufficient length so that the junction between bus wires falls within the central portion of each table.

For these bus wires, where the NTRAK RP shows red, this is equivalent to the Kato white wire. And the RP black wire is the Kato blue wire. The following matches the NTRAK PowerPole RP.

Digitrax DCC "A", Track "A", or Rail "A" / Kato white wire / NTRAK red (rib)  
Digitrax DCC "B", Track "B", or Rail "B" / Kato blue wire / NTRAK black

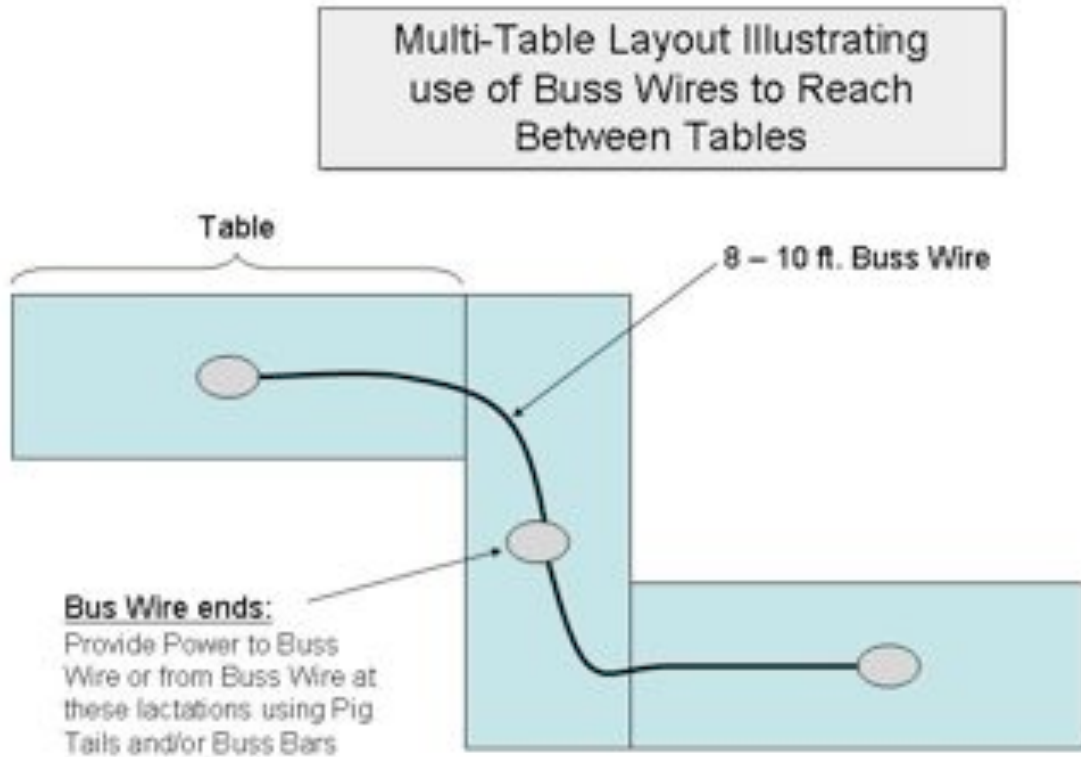
For use with T-TRAK, match the wire colors based on the primary track. The secondary track will be opposite. DCC "A" is the front rail for NTRAK but can be either the front or rear for T-TRAK. The only requirement is that it is uniform for a setup.

The bus wires are constructed such that each end is opposite in polarity just like the NTRAK power feeder wires. As an example, if one end of the bus wire has a blue over white (NTRAK left) PowerPole configuration, then the other end will be white over blue (NTRAK right). It is recommended that short bus wire segments have a bus bar (terminal strip) suitcased about 4-6 inches from the end to accommodate powering any typed of module using a screwdriver. **This will not require any changes to any T-TRAK module.** The only change that would be required is to allow the power supply used to connect to the PowerPole connectors on the bus wire. It is suggested to add the PowerPoles as additional connectors rather than replacement connectors. Methods to accomplish this are discussed below.

The bus wire length was selected with the idea that the bus wire will reach from the center of one table to the center of the next. The extra cable length can be coiled under modules and allows for some adjustment as to where powered/wired modules are placed on each table. If you choose to use the terminal blocks on short bus wire segments then a 2-terminal block (as shown in the photos in this text) should suffice since only module feeder wires are required to connect to the terminal block. If feeder pigtails are used, the terminal blocks may or may not be used.

Note: There are differences in wire types. You want the most flexible stranded wire for the feeder cables you can obtain, not the regular 12 ga stranded wire (THHN) which tends to be stiff. With some types of wire (low voltage zip wire), the insulation is thicker than others and may need to be shaved slightly to fit into the PowerPole housing.

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The following pictures illustrate two different bus wires. The picture on the left includes the bus bar as discussed above to accommodate any type of wiring, while the picture on the right features only the wire and PowerPole connectors and is intended for use with the pigtails described below.



8 foot bus wire using 12v red/black DC power cable. The left end attaches to the cable from the terminal / splitter block.



8 foot long bus wire made from low voltage lighting cable.

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## Connecting Power Supplies to the Bus Wire

The goal is to connect the power supply (DC or DCC) to the bus wire. This is a little trickier than it sounds because of the larger diameter of the 12 ga wire. Two approaches are discussed here, but they are fundamentally the same.

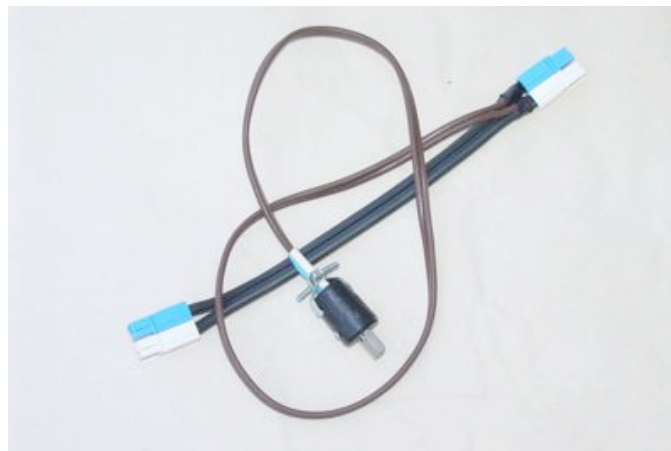
Approach 1: The initial feeder from the DCC booster or throttle should be white over blue PowerPoles, the same as the NTRAK right end. As T-TRAK does not have a continuous loop as NTRAK does, the "Y" cable is not needed. A terminal block is used to split the main feeders from a central location. This will allow the individual extensions to be the same for any direction. The end result is that you have 3 or more sections of wire radiating from a central bus bar. Two of the sections feature PowerPole connections while the third features a connection that is compatible with your power supply. If there is a polarity problem, the wires from your power supply can be reversed at the terminal block. See the picture below for a sample using this approach.



Terminal / splitter block

The left cable is from the power supply. The right cables with PowerPoles attach to the feeder cables.  
The left picture shows a bare wire to the power supply and the right with a CJ.

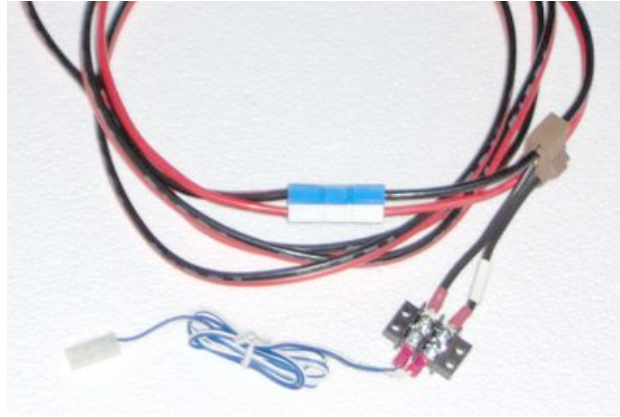
Approach 2: A pigtail can be used to add power to the bus wire. The pig tail is approximately 8 inches long and is similar to the normal 8 foot long bus wire with PowerPoles on either end. The main difference is that an additional shorter section (typically 2 foot length is sufficient) of wire is soldered to one end of the pigtail. The other end of the short section features a connections that is compatible with your power supply. This approach requires soldering skills that the first approach does not. Both accomplish the same goal of feeding power to the bus wire. See the picture below for a sample using this approach.



# T-TRAK PowerPole Bus Wires

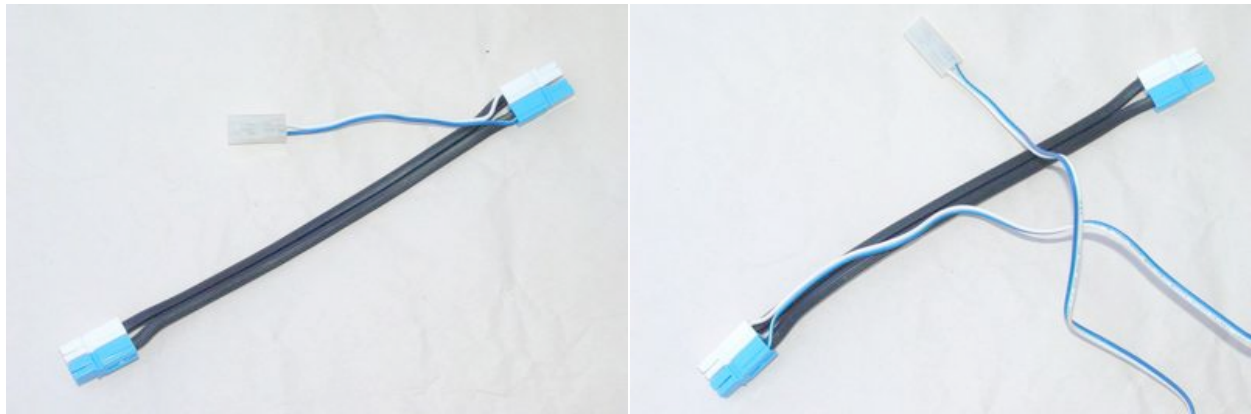
## ***Connecting Modules to the Bus Wire***

**Bus Bar / Terminal Strip:** The simplest method for connecting modules to the bus wire is to use the bus bars with the Kato Terminal Adapter Cord (24-843). This approach requires only a screwdriver to attach any standard T-TRAK module to the bus wire. This method has the advantage of allowing the user to attach a module using any type of connection they see fit including using bare wire. The following photo illustrates the use of the bus bar.



**Pig Tail:** The simple method only has two minor drawbacks. Firstly, if there are many adapter cords to attach, then the method may be tiresome. Secondly, if the inside and outside loops are going to be used as is common with DCC, then powering the inside loop will require that the user insert the adapter cord into the bus bar with the appropriate polarity.

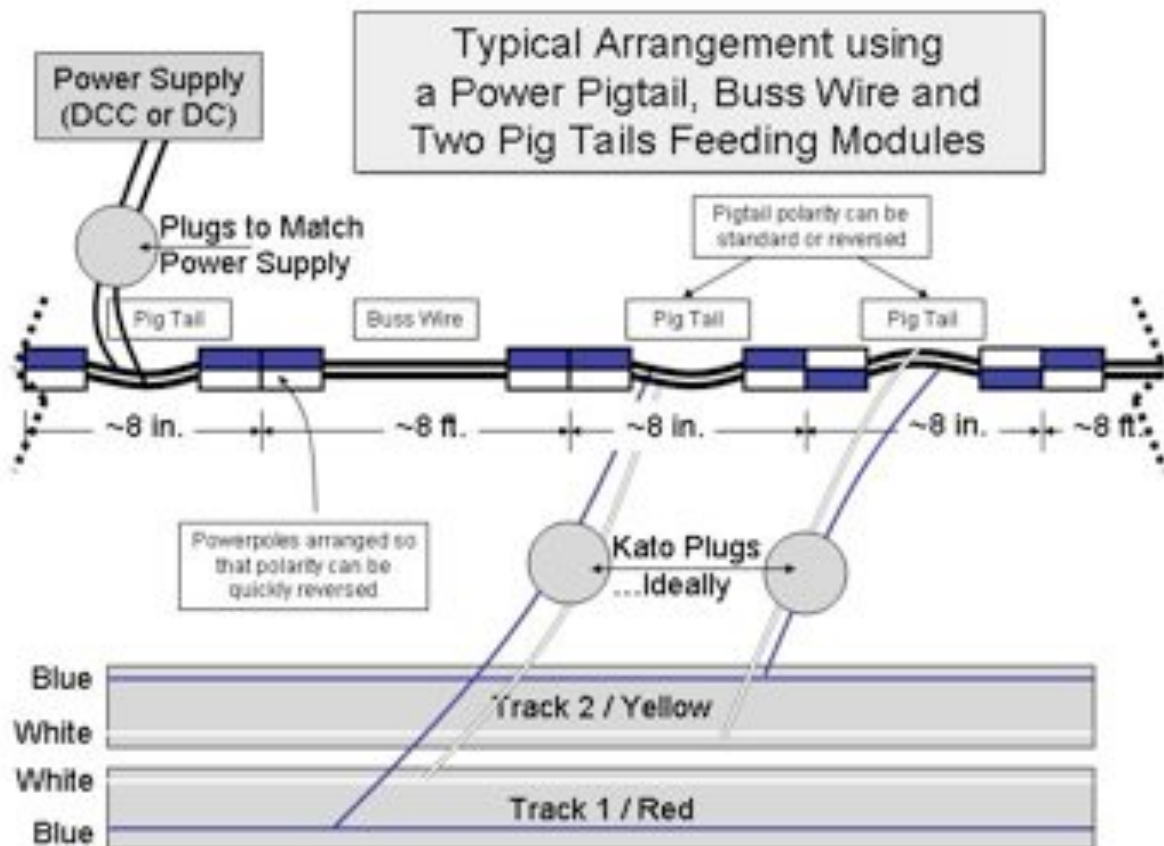
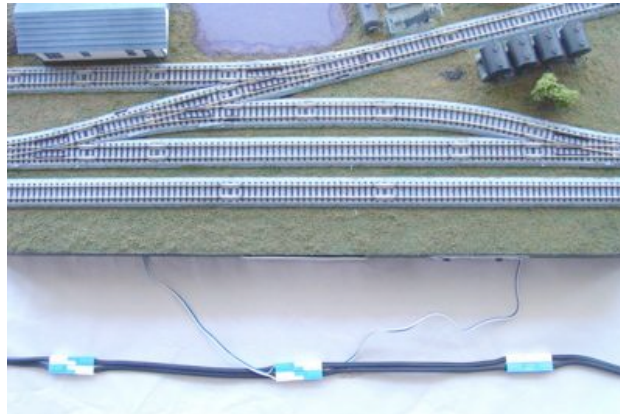
The following photo illustrates the use of a pigtail (similar to approach 2 in the section above) to provide power to the tracks. This approach eliminates the first drawback entirely because the pigtails are inserted directly between the bus wire sections without any tools required. In order to alleviate the second drawback, this bus wire methodology's use of the NTRAK RP for PowerPoles inherits an interesting feature. In NTRAK, if the layout planner turns a standard 3 foot corner with PowerPoles around, they can use it as a fitting replacement for a 4 foot inside corner. The PowerPoles reverse the polarity of the feeder wires automatically. This same concept is borrowed here with the use of the pig tails. If you flip a pig tail end for end and plug it in to the bus wire, then you have created a pig tail with reversed polarity. The following photo shows two pigtails that were created using Kato plugs. The left one was created by clipping the female end from the Kato DC Extension Cord (24-825). The male end was saved for another project. The right one features a longer cord because it was created by clipping the spade lugs from a Kato Terminal Adapter Cord (24-834).



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## Putting it all Together

The following photo illustrates the use of the pigtail with the bus wire. The module is a standard T-TRAK module with the blue-white white-blue wiring. The bus wire enters the photo on the left, there are two pig tails and then the bus wire leaves the photo on the right. If you look at the color of the PowerPoles on the right side of the right pig tail you should notice that blue is connected to blue and white to white. This is the usual way that pig tails are arranged and represents power to the front track of the module. If, however, you examine the left pig tail, you will notice that the PowerPoles are opposite at each end. Blue plugs into white and white into blue. This pig tail has been flipped end for end. The result is that for the module pictured, the front rail on both tracks is powered by the blue bus wire and the back rails by the white.



## T-TRAK PowerPole Bus Wires

Changes from Ver 2.0 to Ver 2.1

1. Added stranded wire type THHN
2. Changed Buss to Bus
3. Minor text corrections