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## **LocoMatic™ Controller for all LocoMatic™ Sound & Control Systems and DC sound systems.**

**OVERVIEW:** The LocoMatic™ Controller contains ten push buttons to operate up to 21 various functions at this time. These functions depend on the LocoMatic™ sound system it is operating. The LocoMatic™ Controller requires a 9 volt external DC source for DC track operators but is self powered when using AC track power. The LocoMatic™ Controller is designed to handle 10 amperes of continuous track current. The LocoMatic™ Controller is a passive device until a button (other than the "ALT") is depressed. This means that it can remain connected to any system without interference. Pressing any button to another system other than the LocoMatic™ system, should not produce any adverse effects. In fact, the signal is generally ignored to any other system that we know of. The LocoMatic™ Controller operates all LocoMatic™ sound systems and all of our present and previous DC sound systems. The functions controlled vary as per installation and sound system. See the instructions for your sound system. The LocoMatic™ Controller is made in U.S.A.. The main label is made of stainless steel and is printed with epoxy ink for long wear.

**INSTALLATION INSTRUCTIONS:** The LocoMatic™ Controller box, when looking at it's back, consists of the DC power input jack and another connector block for four wires. This four place connector block provides for the connection of the LocoMatic™ Controller (refer to fig1) between your existing power pack or throttle and your track. Connect two wires from the output of your power pack or throttle to the terminals labeled "IN" ). The two terminals labeled "OUT" now become the output and are to be connected to your existing layout wiring leading to the track (where the throttle connections previously were). The "A" and "U" are only for polarity reference. The "U" terminal is usually referred to as a "common" connection such as the outer rails for 3 rail operators or "base post" for most 2 rail AF operators. The "A" post is generally the center rail, for 3 rail operators, and the right hand rail for all 2 rail operators. The "U" post is generally the outside rail, for 3 rail operators, and the left hand rail for all 2 rail operators. For those operating in Command Mode with DC track power follow the same as above for 2 rail operators.

If multiple control segments are required you can connect multiple control boxes to one power transformer. When multiple units are connected to one transformer, which is not the preferred method, it is possible for a small signal to cross over to another units output for a locomotive to respond to. Therefore, it is highly recommended to use multiple transformers with equal output and proper phasing. Without proper phasing, doubled voltages can appear at the trackside and shorts will appear when crossing from one block to another. To be sure of proper phasing of power transformers, connect one leg of each transformers output to the other (such as the "U" or "Base Post"). Then place a light bulb (a standard 14-18 volt lamp will do with standard train transformer voltages) between the open legs of each transformer (such as the "A" or "7-16 v Post"). If the light bulb illuminates, you do not have proper phasing between the transformers. To obtain proper phasing, remove the 120v plug to one transformer, rotate it, and plug it in again or swap the

lead on one transformer only to the opposite lead. Recheck for lamp illumination. None should occur (assuming equal voltage settings for an output, the difference in transformer output may show a slight illumination). At this point you can mark your transformer wall plugs for proper polarity for reference in case they were unplugged from the outlet strip and replugged reversed from originally plugged. This is why newer transformers come with polarized plugs.

For common rail operators requiring multiple control boxes, refer to drawing 2 for connections.

DC track operators need to plug the 9vDC wall transformer into an appropriate outlet with the power end plugged into the round power jack at the rear of the box. AC operators can either choose to do this or not. If you are operating in Mode 3, and AC track power, you do not need to use the external power transformer. This version of the LocoMatic™ Controller is self powering from the track power. For those utilizing variable AC track power, you may need to utilize the external DC power transformer when operating at low AC track voltage. This can be determined by the lack of a response by the engine when pressing a button / function but generally the external DC power transformer is not needed for AC operators.

Operating accessory cars or other types of wiring to utilize the LocoMatic™ Controller are shown on the following pages. Refer to those for specific instructions.

**OPERATING INSTRUCTIONS:** The LocoMatic™ Controller's sole function is to transmit a signal to the LocoMatic™ Sound & Control system, or DC sound system, to activate the specific functions or appropriate sounds. Since your sound equipped locomotive can be located anywhere on your track it is required that the LocoMatic™ Controller also be connected to the track. In order for your locomotive to operate on the track, propulsion power from your power pack or throttle must also be connected to the track so it was a simple matter to establish the LocoMatic™ Controller as a pass through between the power and the track.

While the LocoMatic™ Controller consumes very little power until a button is pressed to transmit its signal. The LocoMatic™ Controller is activated when any button is depressed (other than the ALT). The correct signal is transmitted for the particular button sequence selected. The response depends on the type of LocoMatic™ Sound & Control system installed and what part is used. Obviously, if all of the lighting is not connected to the LocoMatic™ Sound & Control board you cannot control the lighting from the LocoMatic™ control box.

Any load on the track such as conventionally lighted passenger cars or cabooses will have a tendency to reduce the signal strength of the LocoMatic™ Controller. If the loss is such that the sounds or other requested operations do not activate properly, it will be necessary to install a supplementary circuit in conjunction with the lights. This is referred to as a CHOKE and is available in various amperage ratings (items 702, 703). See the installation instructions of your sound system for proper installation. Also note that the passenger car / caboose lighting can be upgraded to use our RL-ADJ (Item #379) or VRS (Item #378) which has the appropriate filtering already installed.

**PROBLEMS:** One of the best indicators for a problem with an incorrect load, dirty wheel pickup, bad wheel pickup, improper installation is indicated by the intermittency of a Horn/Whistle or lack of being able to control the Bell (at idle or slow speeds). An easy way to determine if a lighted car needs a choke or is

interfering with the signal is to place it on the track with the sound system. If control seems intermittent, it needs the additional choke installation. Also, if another locomotive is on the track that does not have a choke installed the same problem can occur. Or if the existing engine has a separate lighting circuit or a smoke unit connected to the track, it also needs to have its power passed through a choke first.

Remember, the controller only controls items available in the Sound system. If you are using a DC type sound system, the controller will not control any locomotive lights or speed since there are no controls built into the sound system for these features. Only LocoMatic™ Sound & Control systems contain motor control features. Some of our more deluxe DC sound systems also offer lighting or other functions. Again, refer to the sound system for all functions controllable from the LocoMatic™ Controller.

**Older DC sound systems:** If you are operating an older DC sound system (DC-V2 and earlier), you have to use the LocoMatic™ Controller buttons differently than labeled to access the older control signals. Bear in mind that all of the button functions may not operate functions in your sound system. The basic functions for the DC sound systems are, Whistle/Horn, Bell, Cylinder Blow Down/Force N8, Main Sounds Off/On. The additional functions to make this controller operate the older sound systems, which used a two button controller, is as follows:

Whistle/Horn....hold down both the Horn and Forward buttons simultaneously.

Bell.....press and release both the Bell and Headlight buttons to turn the bell on / off.

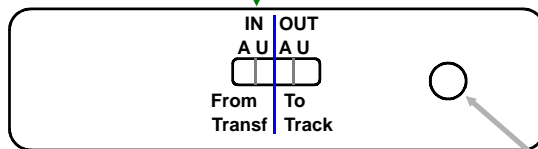
Force N8 .....press and release the Horn and Bell button simultaneously (this is the same operation as the older two button controllers).

Fig1

Rear of LocoMatic™ Controller

IN - variable track power supply (AC or DC). This is your power Transformer or Throttle.

OUT - connects to your layout. For simplicity sake of an explanation, you can take the two wires connecting to your layout at present, cut them in half, insert the LocoMatic™ Controller and your done.

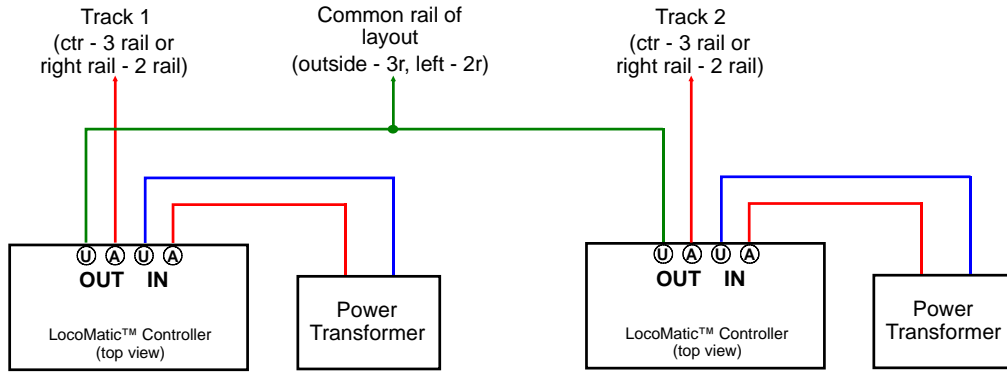


DC input power from wall transformer. This is optional for AC operators. Please read the instructions for more details.

Use only stranded wires from 14 to 22 gauge. Install by stripping insulation back 3/16", place wire in hole, run screw down (CW) to clamp in position. Screw access is from the bottom of the LocoMatic™ Controller box.

When removing wires, back screw almost all of the way out before pulling the wire out.

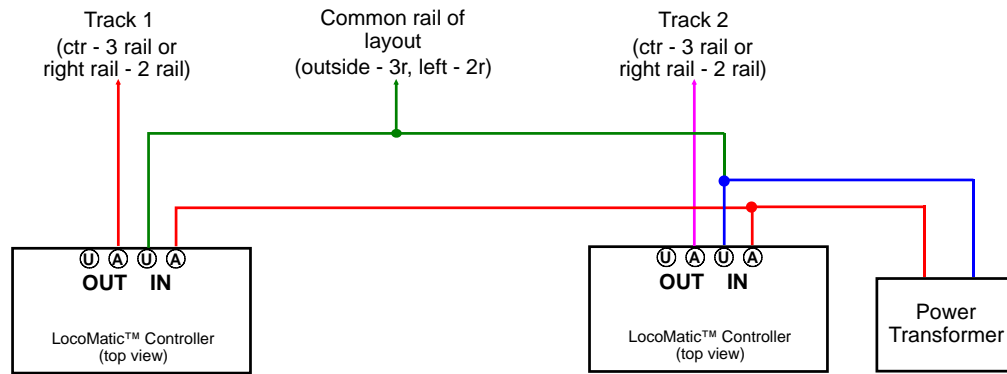
## Controller (#755) wiring instructions, cont.



### Common rail operation with two separate power sources

Remember to have transformers properly phased!

Fig2

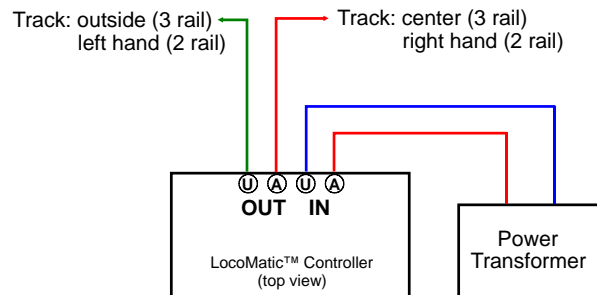


### Common rail operation with one power source

(wired for the least interference between controllers)

The Controller box connection "U" is NOT CONNECTED as shown.

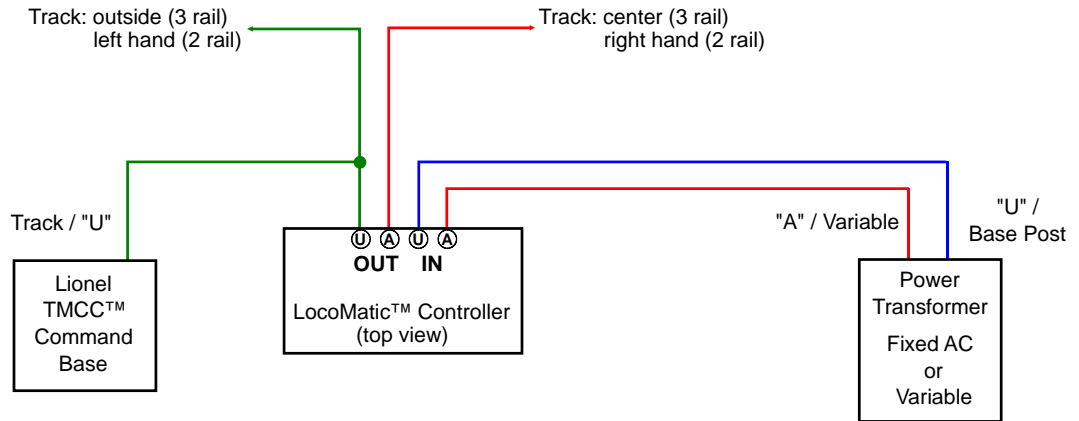
Fig3



### Standard operation with separate power sources

Fig4

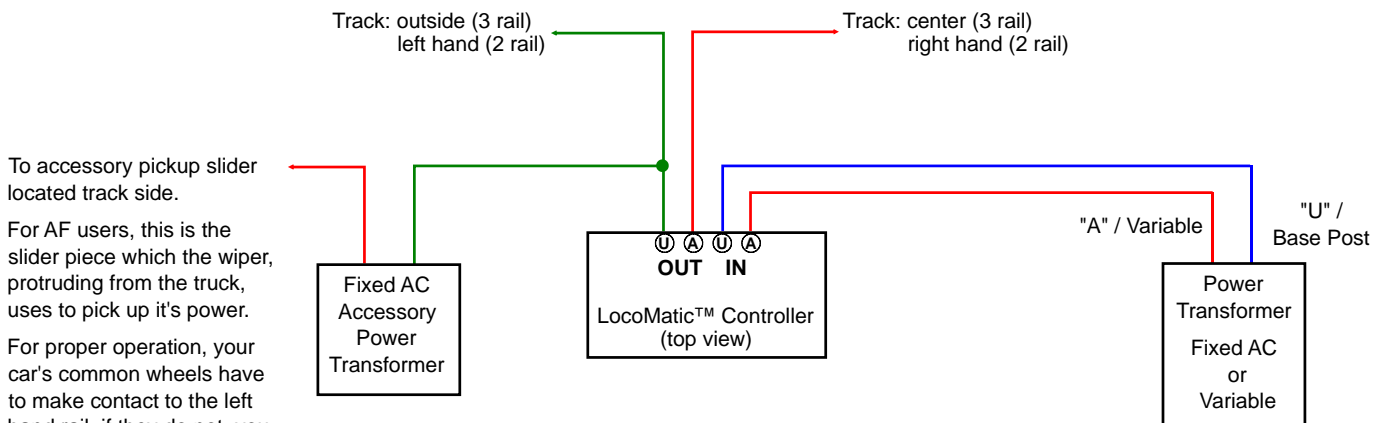
If using a command control system in conjunction with the LocoMatic™ system the "Power Transformer" would be the output from the command system that would normally power the track. For those utilizing a DC source, the "Power Transformer" would be your DC power pack cab output.



If using a command control system, such as TMCC™ as shown above, in conjunction with the LocoMatic™ system the "Power Transformer" would be the output from the command system that would normally power the track. For those utilizing a DC source, the "Power Transformer" would be your DC power pack cab output. The LocoMatic™ Controller and Lionel TMCC™ must be powered by their respective plug in wall transformer.

When running both systems simultaneously, it is necessary to install a choke (item 702 or 703 depending on the current required by the engine or lighted cars) in series with all items utilizing track power. This would be a TMCC locomotive and possibly lighted cars. Without a choke installed, the LocoMatic™ signal will become reduced in strength making the LocoMatic™ equipped locomotive non-responsive to the LocoMatic™ signal. No damage will occur from not doing this, only the lack of proper signal reception. Wiring for this is shown below.

**LocoMatic™ Controller (#755) wiring instructions for use with operating cars utilizing additional pickup with common track power return.**

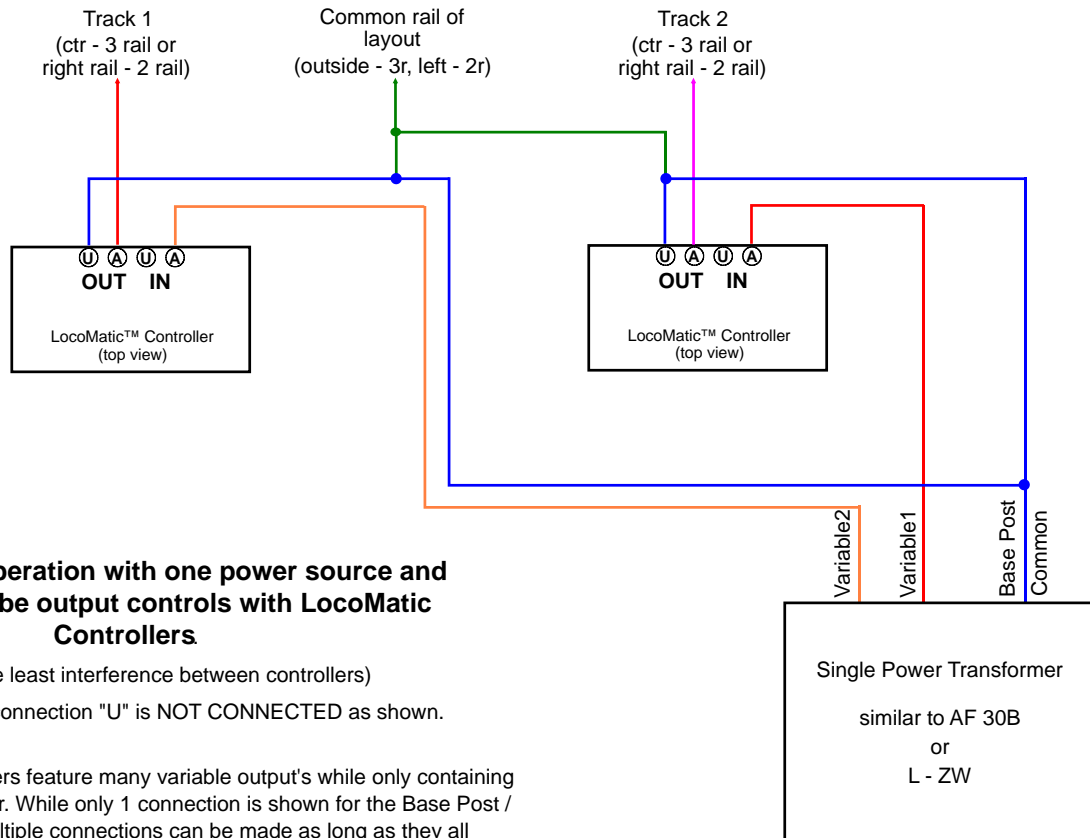


To accessory pickup slider located track side.  
 For AF users, this is the slider piece which the wiper, protruding from the truck, uses to pick up it's power.  
 For proper operation, your car's common wheels have to make contact to the left hand rail, if they do not, you need to make them do so by reversing the wheel set in the cars truck. As noted in the AF instruction manual.

Fig6

These cars would be like the AF operating log dump car, rocket launcher, mail pickup car, auto unloading car, cattle car, etc..

Fig7



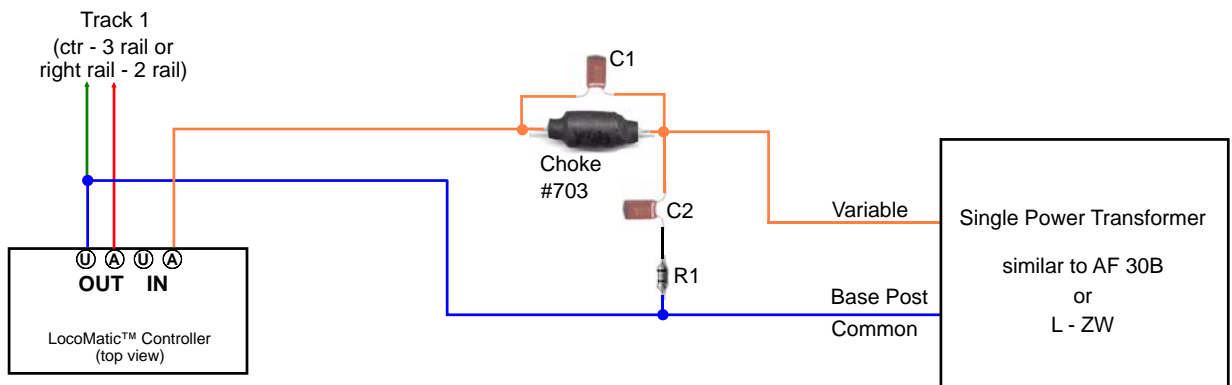
**Common rail operation with one power source and multiple variable output controls with LocoMatic Controllers**

(wired for the least interference between controllers)

The Controller box connection "U" is NOT CONNECTED as shown.

Many older transformers feature many variable output's while only containing one power transformer. While only 1 connection is shown for the Base Post / Common terminal, multiple connections can be made as long as they all connect together when feeding the track as shown.

Fig8



**Common rail operation - Extra Filtering**

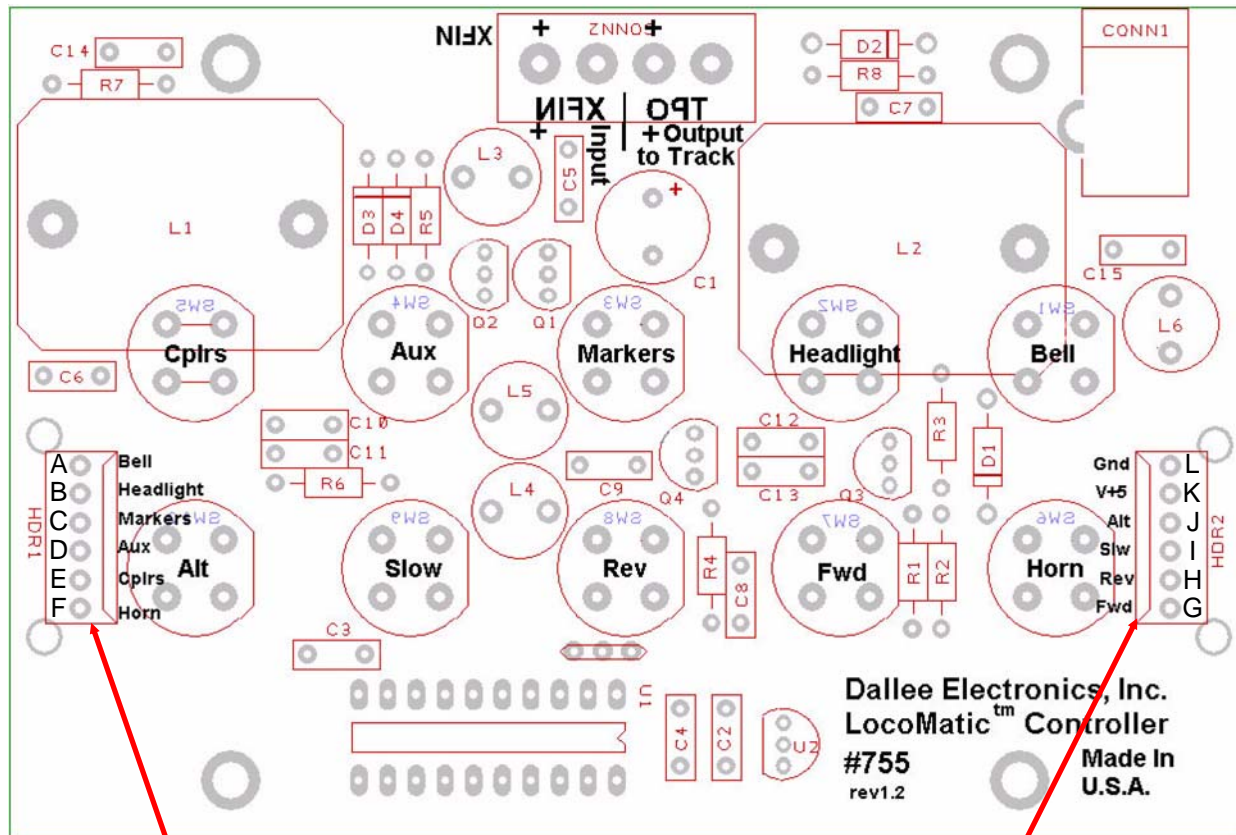
The LocoMatic Controller contains it's own filtering to prevent the majority of signal from back feeding the power transformer. However, when operating a single transformer with multiple taps and none of the previous wiring diagrams help, it may be time to try extra filtering as shown above.

If extra RF filtering is desired it can be made as shown above utilizing only the extra Choke (item 703). C1, C2, and R1 are all optional items but will improve the filtering obtained. (C1=C2=0.01mfd, R1=100 ohms)

For multiple output's, just repeat adding the filtering circuit above to the variable output. The Base Post / Common connection would connect to the common rail and output "A" terminal as shown.

# LocoMatic™ Sound Controller - Remote input control.

backside of main bord (r1.2) pictured



## Header input key:

- |                    |                     |
|--------------------|---------------------|
| A - Bell / restore | G - Forward / SF 2  |
| B - Headlights F/R | H - Reverse / SF 1  |
| C - Markers F/R    | I - Slowdown / Stop |
| D - Aux 1 / Aux 2  | J - Alt             |
| E - Couplers R/F   | K - +5 volts        |
| F - Horn / Aux 3   | L - ground          |

Remote input control is necessary when operating a function with a remote device. This can be from a radio receiver with isolated switch contacts or from our Trak-DT to automatically activate the Horn or a motion control, when using a full LocoMatic system, for automation. You can also with the controller to produce a constant output signal for sections of track to signal a slowdown condition. Then using another controller with a Trak-DTT timer control, automatically pull the train out from the station. This way all of the momentum effects are utilized and sound is never disrupted!

To activate any particular switch, connect inputs A through J to the +5 volt line. To activate an alternate function and main function both the input "J" and other function (switch) must be connected to the +5 volts. Diodes may be used to accomplish this with one spst switch. Care must be taken when wiring the inputs, they go directly to the microcontroller. Any static spike or other voltage input will damage the microcontroller's input.

When using with any other activation device, make sure that it is electrically isolated from the controller. This controller has a common ground connection between it's power ground and the input power ground. A ground connection with external equipment is not a good idea unless it is completely isolated such as our Trak-DT and Opto-DT series of detectors.

Connectors to be soldered onto the board with mating ends for wires are available separately (see items 520 and 521).