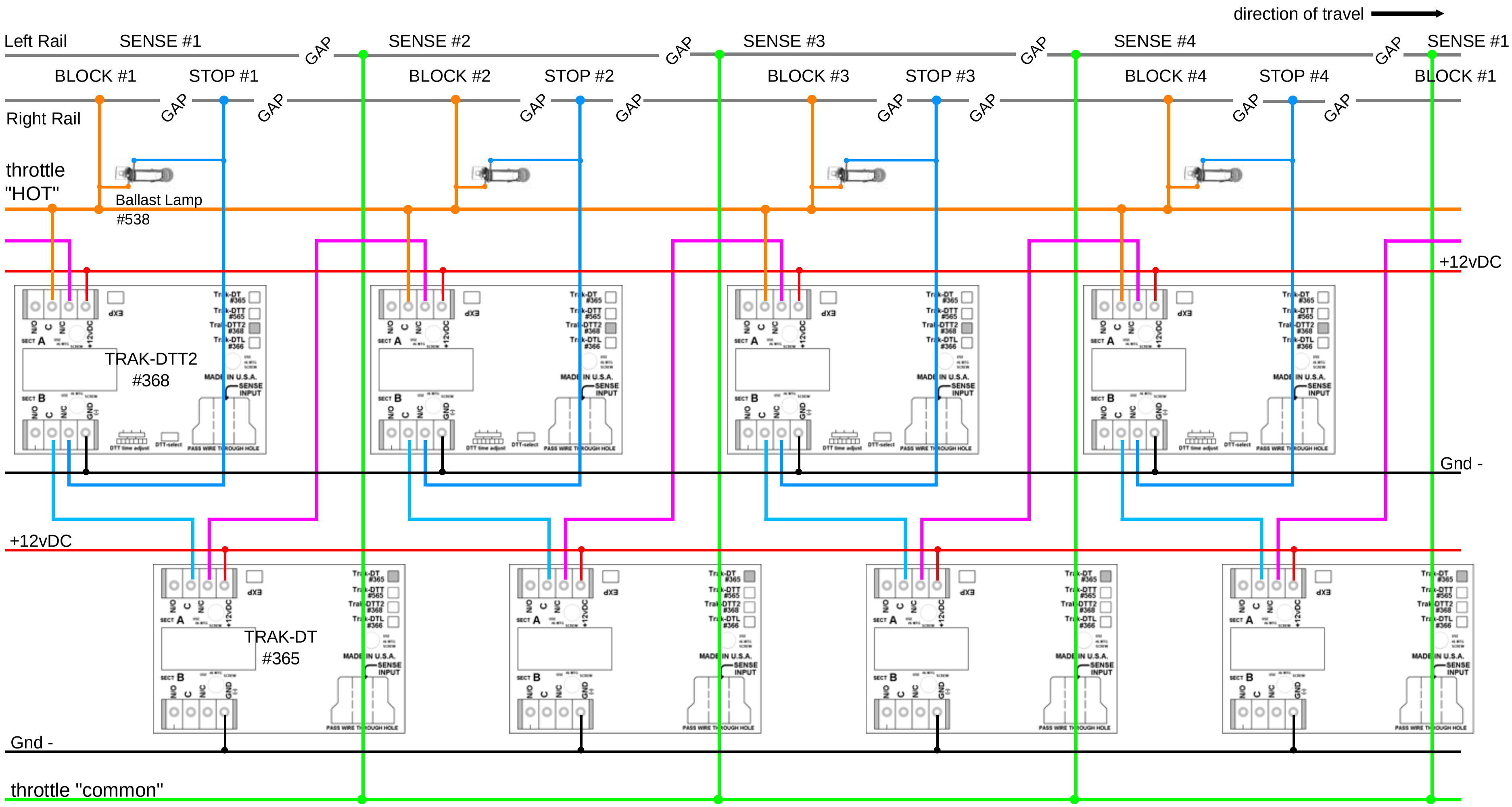
Multiple Trolley's with Timed Station Stops for automation



Connections:

STOP.....section needs to be long enough for the trolley to come to a complete stop without running past the stop section. The next SENSE section needs to occur just after the STOP section.

GAP ....air space between rails, a plastic insulator may be used or just leave an air gap.

Throttle...track power / cab output. One wire to orange wire labeled throttle "HOT", the other wire to throttle "common". For standard NMRA wiring, the right rail is "+" for a forward motion. For "G" equipment, wiring needs to be opposite since they are reversed from standard NMRA wiring.

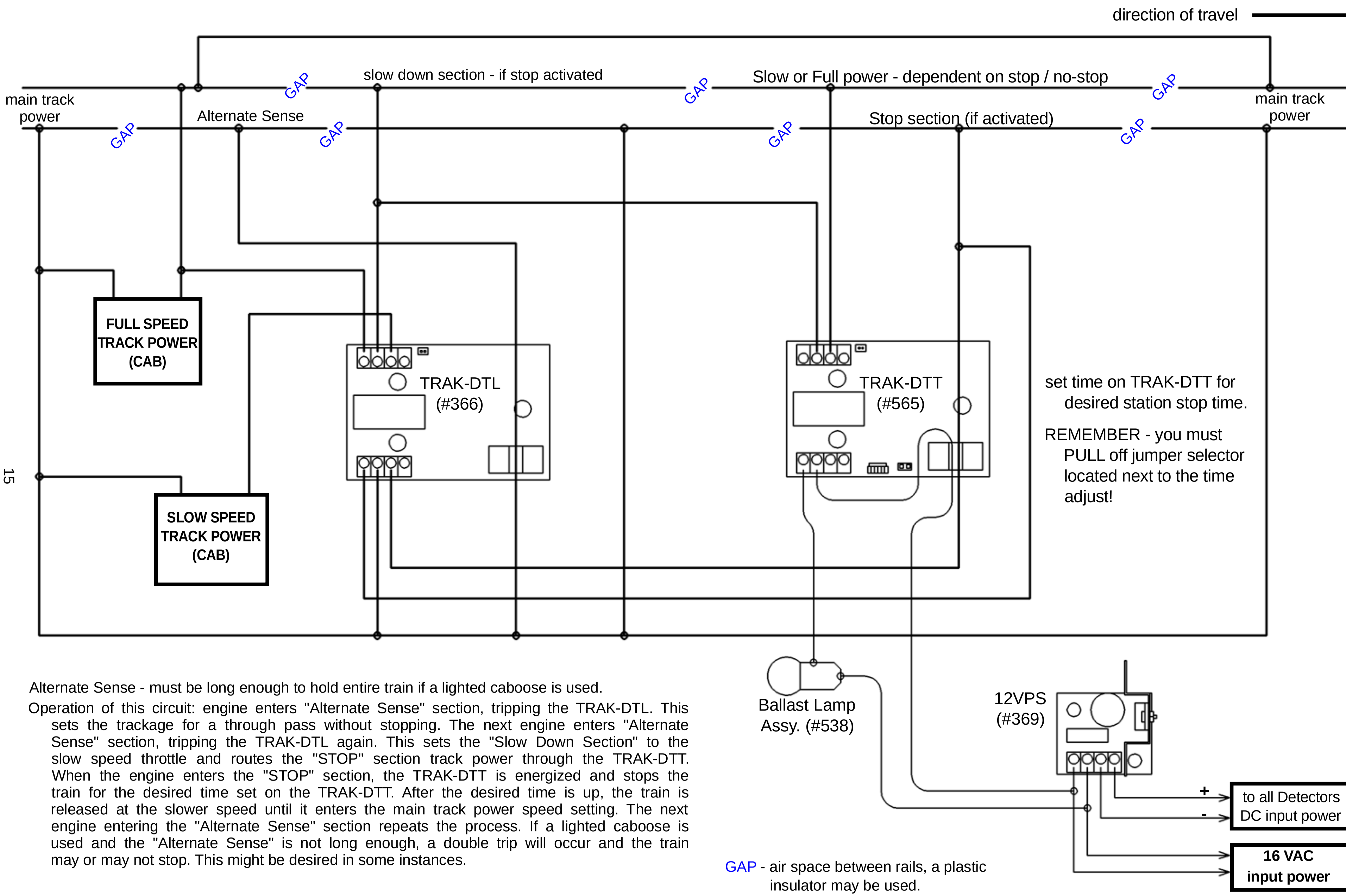
12Vdc.....Trak-DT, Trak-DTT2, require regulated 12 volt DC power to the 12VPS, item #369. Connect as shown to the 12VPS, plus (+) to +12vDC, minus (-) to "Gnd -".

Operation:

Trak-DTT2's must have their selector jumper removed to perform proper station stops. Set the time potentiometer to a position beyond the minimum setting of full CCW for proper timing. A setting of 10 O'clock would be a good starting point. Then adjust the station stop time as desired. Since this setup operates several trolley's on one track, the time should be set with only 1 trolley since others will effect the total time at the stop.

When a trolley enters the stop section, the Trak-DTT2 is activated for a station stop. The Trak-DTT2 will hold the trolley for the time set by the potentiometer . If another trolley is in the block ahead of it, the trolley will also stop at the stop position ahead of it, however it's time to stay in the stop section will be extended by however long the trolley ahead of it takes to leave plus it's set station stop time.

Alternate stops with slow down section

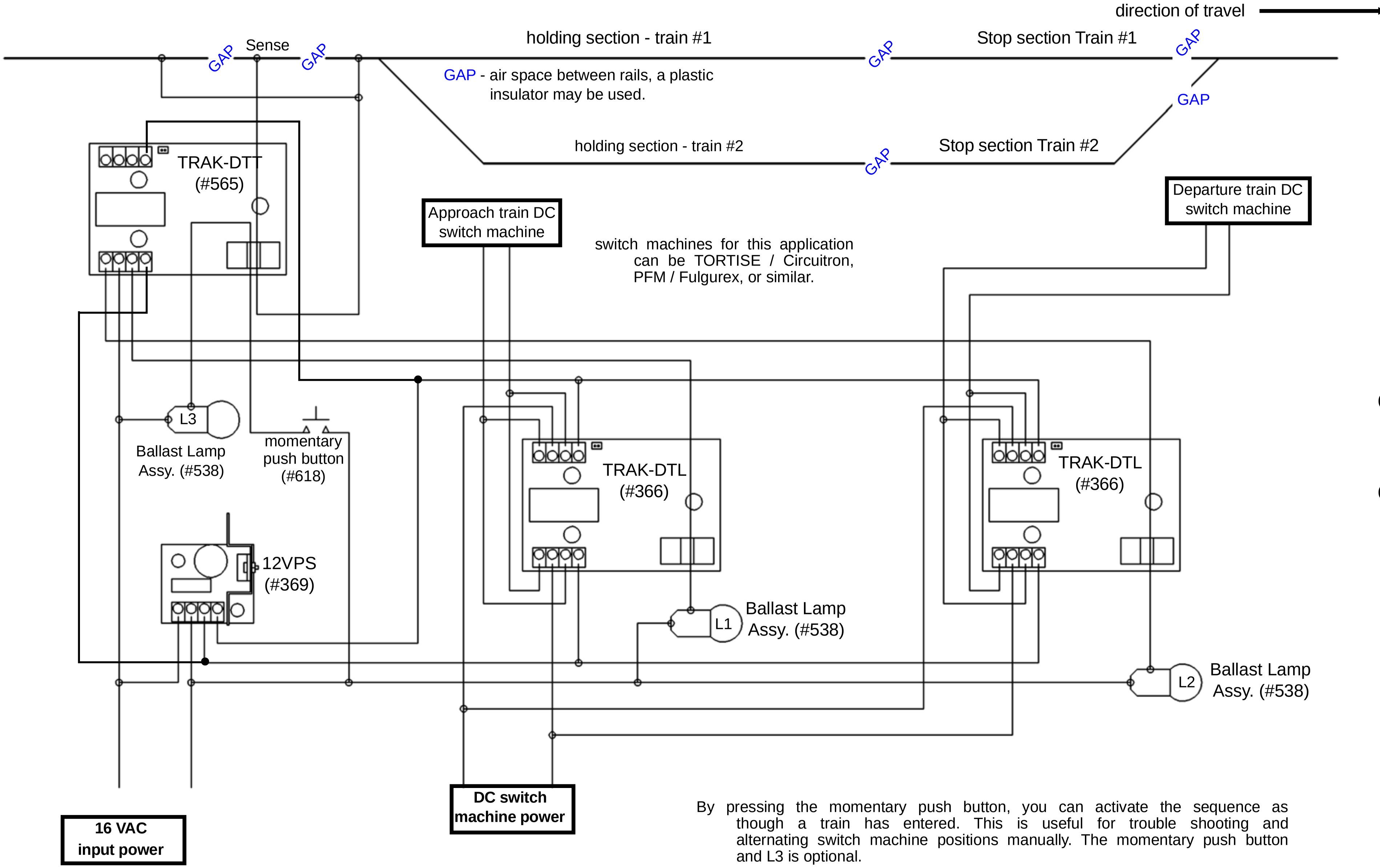


Alternate Sense - must be long enough to hold entire train if a lighted caboose is used.

Operation of this circuit: engine enters "Alternate Sense" section, tripping the TRAK-DTL. This sets the trackage for a through pass without stopping. The next engine enters "Alternate Sense" section, tripping the TRAK-DTL again. This sets the "Slow Down Section" to the slow speed throttle and routes the "STOP" section track power through the TRAK-DTT. When the engine enters the "STOP" section, the TRAK-DTT is energized and stops the train for the desired time set on the TRAK-DTT. After the desired time is up, the train is released at the slower speed until it enters the main track power speed setting. The next engine entering the "Alternate Sense" section repeats the process. If a lighted caboose is used and the "Alternate Sense" is not long enough, a double trip will occur and the train may or may not stop. This might be desired in some instances.

GAP - air space between rails, a plastic insulator may be used.

Two Train Passing using slow motion switches



By pressing the momentary push button, you can activate the sequence as though a train has entered. This is useful for trouble shooting and alternating switch machine positions manually. The momentary push button and L3 is optional.

This wiring diagram requires the switch machine contacts to power the departure track. When the departure switch is aligned to the appropriate track, power is applied to that track, and the train leaves. If you do not want to use the switch machine contacts, add a Relay Board (#555) to the TRAK-DTL (at the right) and wire it appropriatly to power the track. The approach turnout does not have to power route the tracks.

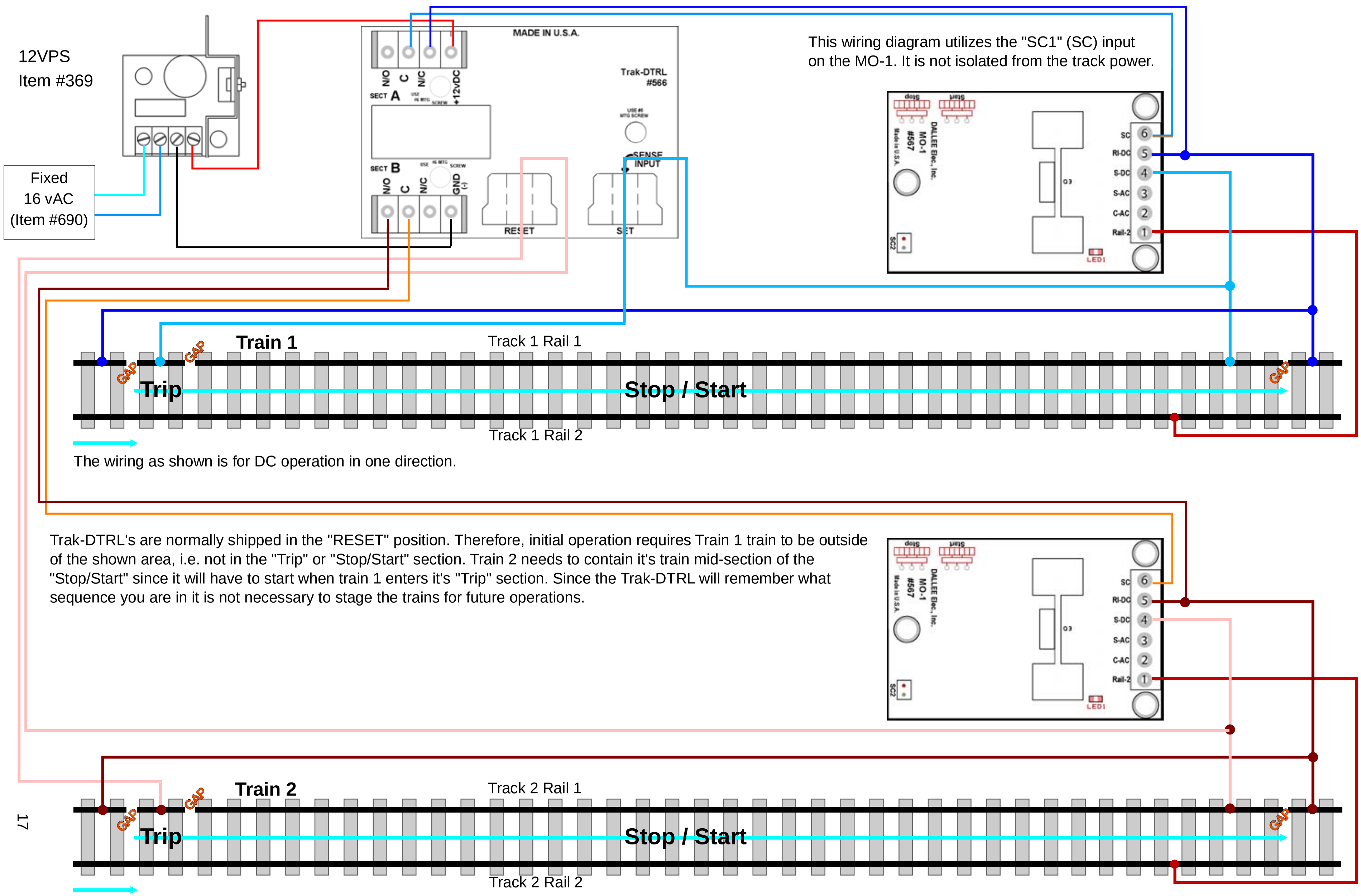
Adjust the TRAK-DTT "ON-TIME" to be long enough for the approaching train to come to a rest. When the TRAK-DTT time is up, the approach switch is thrown to allow the next incoming train to occupy the clear section. The operation sequence is: 1 - incoming train trips "SENSE" section, this turns on L2 activating the appropriate TRAK-DTL and departure switch. The departing train leaves at the same time as the incoming train moves to the stop (holding) section. After the time on the TRAK-DTT is up, Lamp "L1" is powered, tripping the TRAK-DTL which throws the approach turnout to proper alignment of the incoming train. When first powering this application, the switches have to be set so that the approach and departure turnout align to the open track. The stopped train (train waiting for the next to arrive so that it can continue) has to be located on the opposite track. This wiring allows for lighted cars to continue to be illuminated while waiting.

Two Track Alternating Station Stops for DC operators with Momentum

This setup utilizes the Trak-DTRL for setting two MO-1's into action. The direction of travel is from the left to right and as per NMRA conventions, the right rail is the "+" rail. If you operate in the opposite direction, nothing will happen when traversing this section. "G" gauge operators need to switch the rail wiring from what's shown to the opposite polarity since "G" gauge operation is typically the opposite of the standard convention. To have one or both tracks work in an opposite direction, merely move the "Trip" section to the opposite end of the "Stop/Start" section.

Length's: "Trip" sections should be a minimum of one engine length. "Stop/Start" needs to be long enough to hold the train while stopping and starting to full speed. Otherwise, full track power will be put to the locomotive and the momentum affect will not occur. If you are operating with any illuminated cars, then the train needs to completely clear the "TRIP" section before stopping. Adjustment of the "STOP" and "START" times on the MO-1's are necessary as well as the maximum track speed for proper operation.

Operation: When entering the "TRIP" section on track 1, the MO-1 on track 2 will start it's engine and MO-1 on track 1 will begin to decelerate it's engine to a full stop. Track 1 will then remain at a stop while track two accelerates to full speed leaving the "Stop/Start" section.



This wiring diagram utilizes the "SC1" (SC) input on the MO-1. It is not isolated from the track power.

The wiring as shown is for DC operation in one direction.

Trak-DTRL's are normally shipped in the "RESET" position. Therefore, initial operation requires Train 1 train to be outside of the shown area, i.e. not in the "Trip" or "Stop/Start" section. Train 2 needs to contain it's train mid-section of the "Stop/Start" since it will have to start when train 1 enters it's "Trip" section. Since the Trak-DTRL will remember what sequence you are in it is not necessary to stage the trains for future operations.

Two Track Alternating Station Stops for DC operators with Momentum

This setup utilizes the Trak-DTRL for setting two MO-1's into action. The direction of travel is from the left to right and as per NMRA conventions, the right rail is the "+" rail. If you operate in the opposite direction, nothing will happen when traversing this section. "G" gauge operators need to switch the rail wiring from what's shown to the opposite polarity since "G" gauge operation is typically the opposite of the standard convention. To have one or both tracks work in an opposite direction, merely move the "Trip" section to the opposite end of the "Stop/Start" section.

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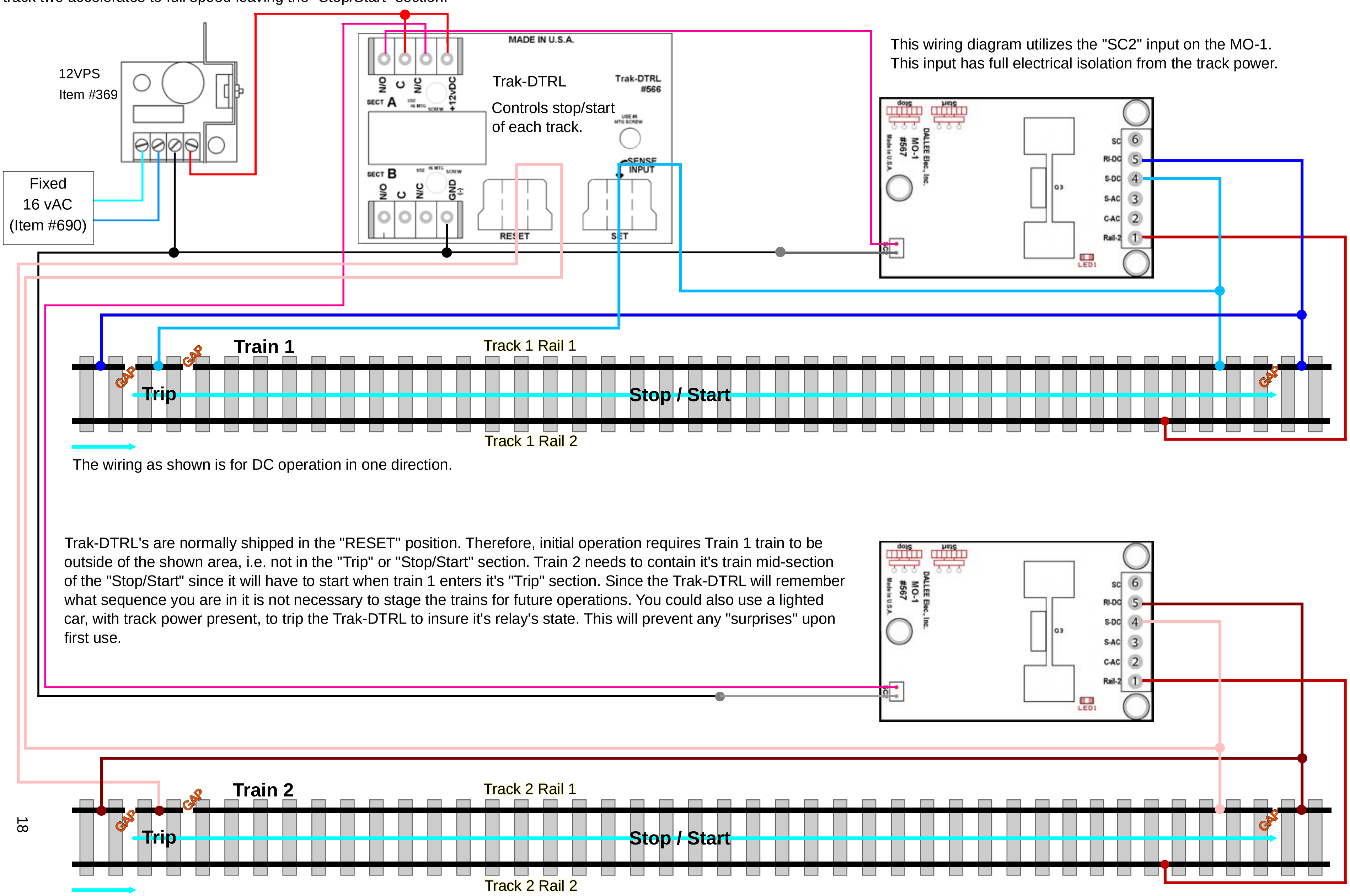
Operation: When entering the "TRIP" section on track 1, the MO-1 on track 2 will start it's engine and MO-1 on track 1 will begin to decelerate it's engine to a full stop. Track 1 will then remain at a stop while track two accelerates to full speed leaving the "Stop/Start" section.

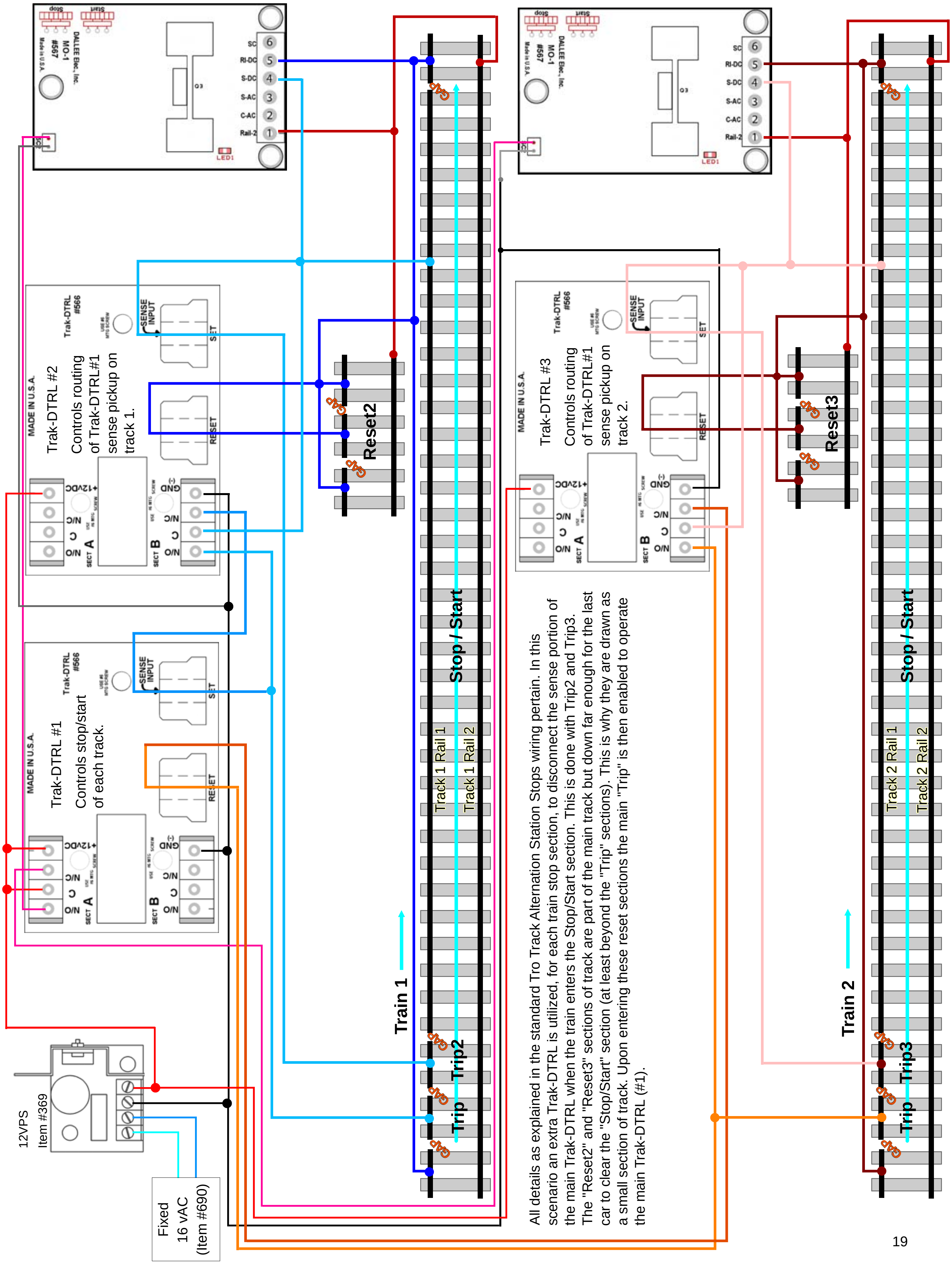


This wiring diagram utilizes the "SC2" input on the MO-1.
This input has full electrical isolation from the track power.

The wiring as shown is for DC operation in one direction.

Trak-DTRL's are normally shipped in the "RESET" position. Therefore, initial operation requires Train 1 train to be outside of the shown area, i.e. not in the "Trip" or "Stop/Start" section. Train 2 needs to contain it's train mid-section of the "Stop/Start" since it will have to start when train 1 enters it's "Trip" section. Since the Trak-DTRL will remember what sequence you are in it is not necessary to stage the trains for future operations. You could also use a lighted car, with track power present, to trip the Trak-DTRL to insure it's relay's state. This will prevent any "surprises" upon first use.

Two Track Alternating Station Stops for DC operators, with Momentum and illuminated cars / caboose



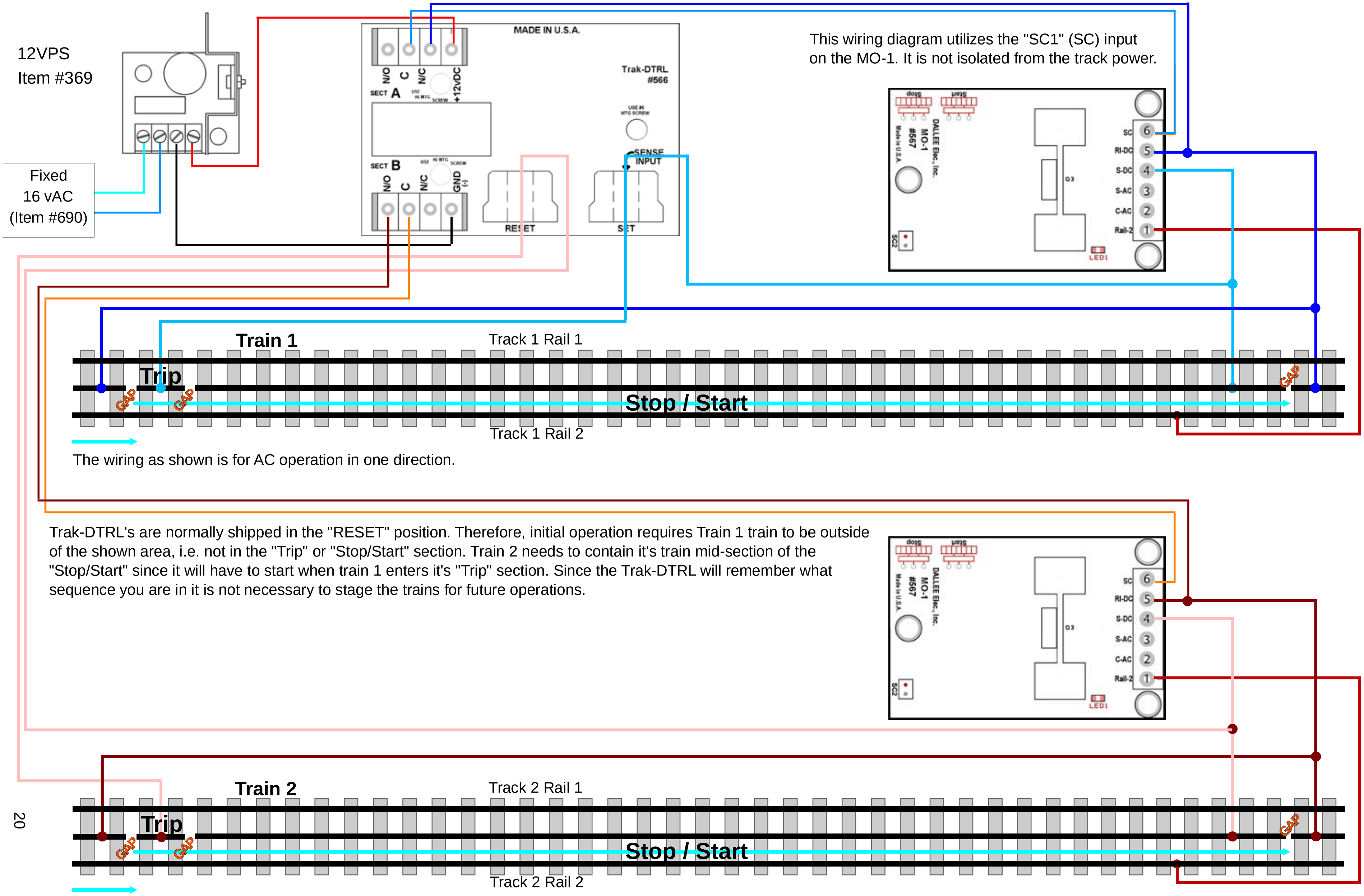
All details as explained in the standard Tro Track Alternation Station Stops wiring pertain. In this scenario an extra Trak-DTRL is utilized, for each train stop section, to disconnect the sense portion of the main Trak-DTRL when the train enters the Stop/Start section. This is done with Trip2 and Trip3. The "Reset2" and "Reset3" sections of track are part of the main track but down far enough for the last car to clear the "Stop/Start" section (at least beyond the "Trip" sections). This is why they are drawn as a small section of track. Upon entering these reset sections the main "Trip" is then enabled to operate the main Trak-DTRL (#1).

Two Track Alternating Station Stops for AC operators with Momentum

This setup utilizes the Trak-DTRL for setting two MO-1's into action. The direction of travel is from the left to right and as per NMRA conventions, the right rail is the "+" rail. If you operate in the opposite direction, nothing will happen when traversing this section. "G" gauge operators need to switch the rail wiring from what's shown to the opposite polarity since "G" gauge operation is typically the opposite of the standard convention. To have one or both tracks work in an opposite direction, merely move the "Trip" section to the opposite end of the "Stop/Start" section.

Length's: "Trip" sections should be a minimum of one engine length. "Stop/Start" needs to be long enough to hold the train while stopping and starting to full speed. Otherwise, full track power will be put to the locomotive and the momentum affect will not occur. If you are operating with any illuminated cars, then the train needs to completely clear the "TRIP" section before stopping. Adjustment of the "STOP" and "START" times on the MO-1's are necessary as well as the maximum track speed for proper operation.

Operation: When entering the "TRIP" section on track 1, the MO-1 on track 2 will start it's engine and MO-1 on track 1 will begin to decelerate it's engine to a full stop. Track 1 will then remain at a stop while track two accelerates to full speed leaving the "Stop/Start" section.



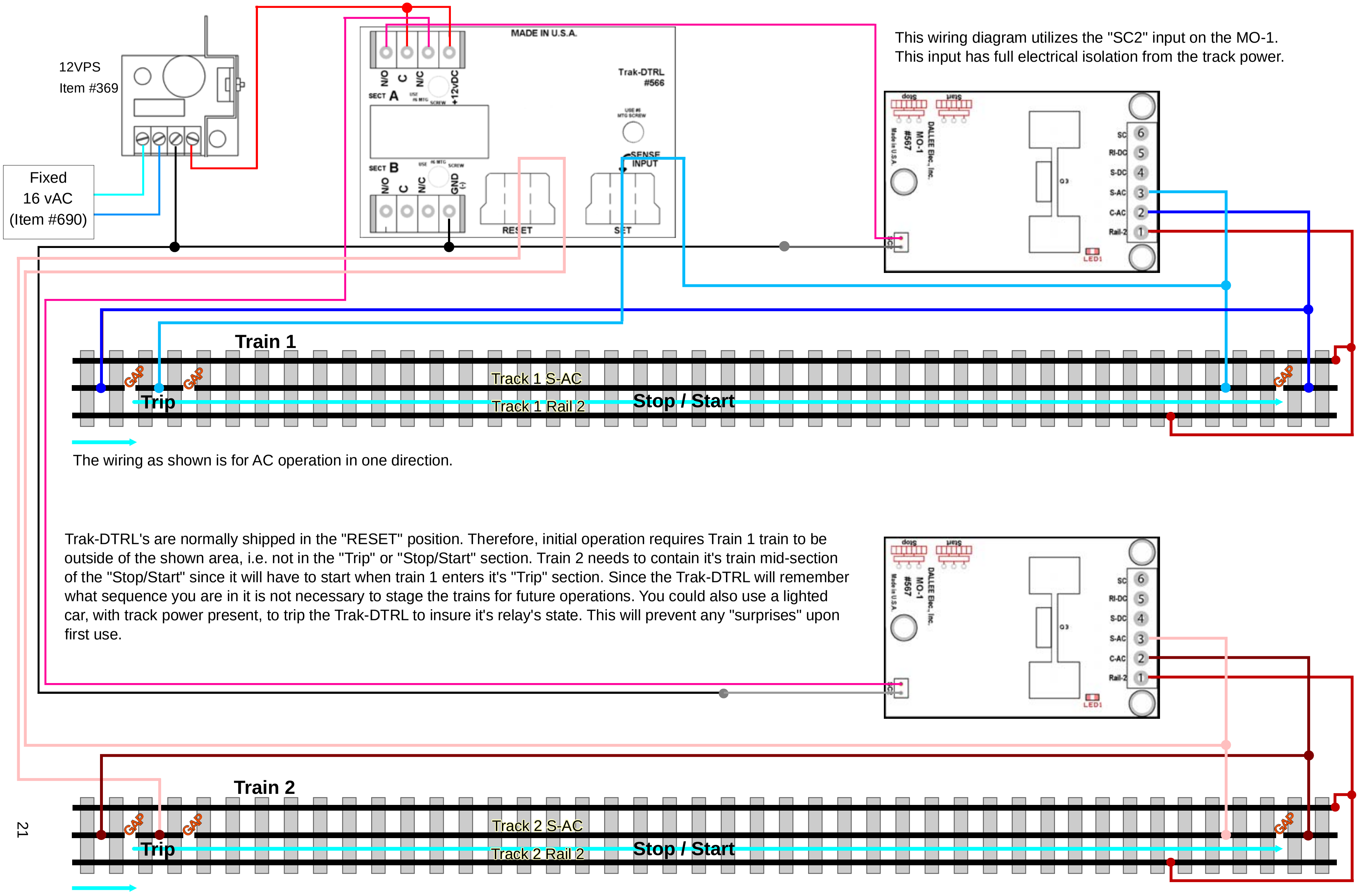
Trak-DTRL's are normally shipped in the "RESET" position. Therefore, initial operation requires Train 1 train to be outside of the shown area, i.e. not in the "Trip" or "Stop/Start" section. Train 2 needs to contain it's train mid-section of the "Stop/Start" since it will have to start when train 1 enters it's "Trip" section. Since the Trak-DTRL will remember what sequence you are in it is not necessary to stage the trains for future operations.

Two Track Alternating Station Stops for AC operators with Momentum

This setup utilizes the Trak-DTRL for setting two MO-1's into action. The direction of travel is from the left to right and as per conventions, the center rail is the "HOT" rail and the outside two are the "COMMON" rails. To have one or both tracks work in an opposite direction, merely move the "Trip" section to the opposite end of the "Stop/Start" section. Two rail AC operators would use the center rail as the right side rail and one of the outside rails as the left rail.

Length's: "Trip" sections should be a minimum of one engine length. "Stop/Start" needs to be long enough to hold the train while stopping and starting to full speed. Otherwise, full track power will be put to the locomotive and the momentum affect will not occur. If you are operating with any illuminated cars, then the train needs to completely clear the "TRIP" section before stopping. Adjustment of the "STOP" and "START" times on the MO-1's are necessary as well as the maximum track speed for proper operation.

Operation: When entering the "TRIP" section on track 1, the MO-1 on track 2 will start it's engine and MO-1 on track 1 will begin to decelerate it's engine to a full stop. Track 1 will then remain at a stop while track two accelerates to full speed leaving the "Stop/Start" section.

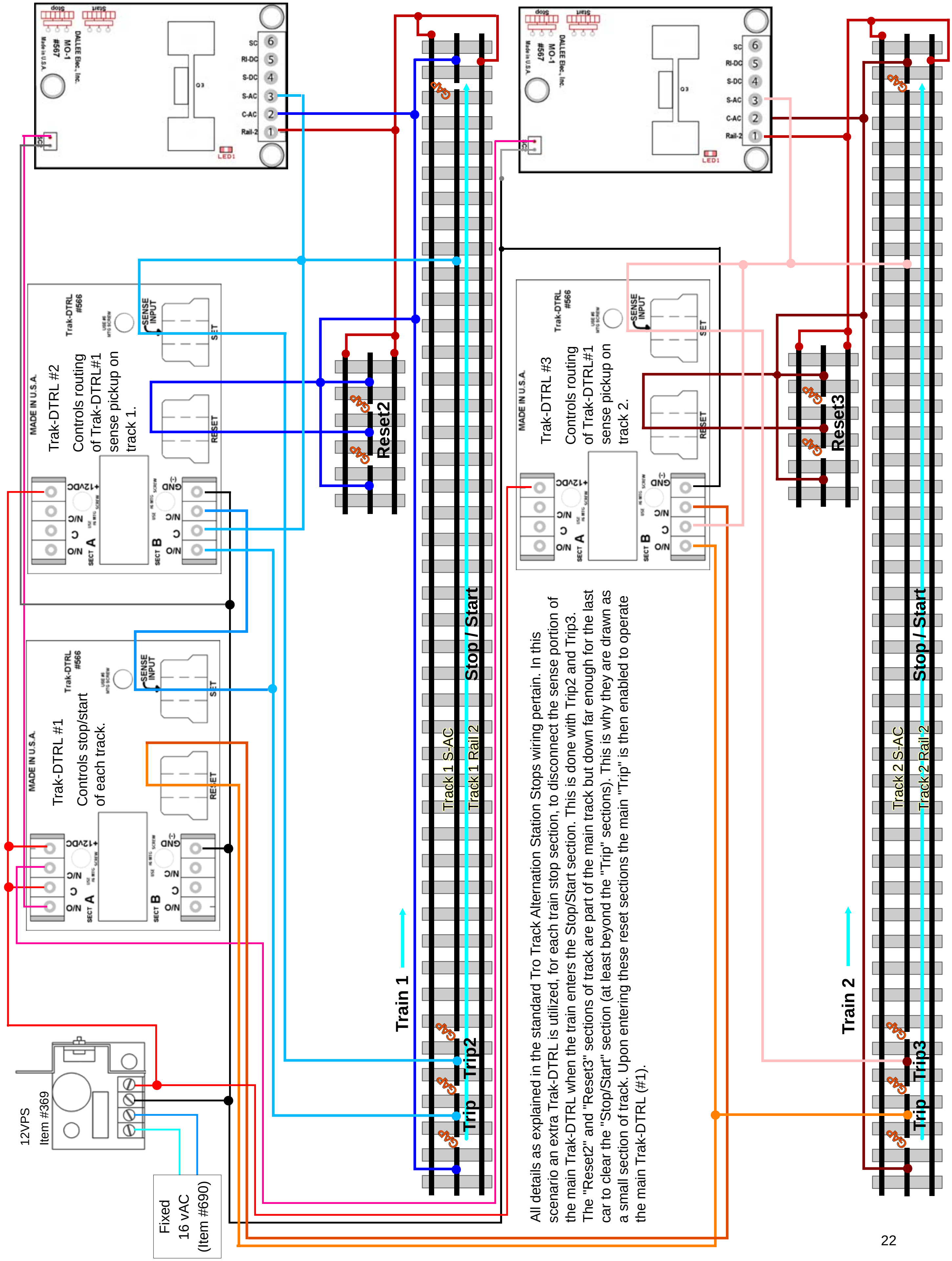


This wiring diagram utilizes the "SC2" input on the MO-1.
This input has full electrical isolation from the track power.

The wiring as shown is for AC operation in one direction.

Trak-DTRL's are normally shipped in the "RESET" position. Therefore, initial operation requires Train 1 train to be outside of the shown area, i.e. not in the "Trip" or "Stop/Start" section. Train 2 needs to contain it's train mid-section of the "Stop/Start" since it will have to start when train 1 enters it's "Trip" section. Since the Trak-DTRL will remember what sequence you are in it is not necessary to stage the trains for future operations. You could also use a lighted car, with track power present, to trip the Trak-DTRL to insure it's relay's state. This will prevent any "surprises" upon first use.

Two Track Alternating Station Stops for AC operators, with Momentum and illuminated cars / caboose



All details as explained in the standard Tro Track Alternation Station Stops wiring pertain. In this scenario an extra Trak-DTRL is utilized, for each train stop section, to disconnect the sense portion of the main Trak-DTRL when the train enters the Stop/Start section. This is done with Trip2 and Trip3. The "Reset2" and "Reset3" sections of track are part of the main track but down far enough for the last car to clear the "Stop/Start" section (at least beyond the "Trip" sections). This is why they are drawn as a small section of track. Upon entering these reset sections the main "Trip" is then enabled to operate the main Trak-DTRL (#1).

AUTOMATIC STAGING TRACKS

PROBLEM:

Automatic operation of several trains where only one train is running at a time can be done by using passing sidings as STAGING TRACKS. Consider a loop of track with one passing siding where the siding is long enough to hold a train. Train 'A' runs the loop and stops on siding 'A'. Train 'B' then runs and stops on siding 'B'.

DISCUSSION:

A dead section of track will cause a train to stop and briefly energizing this dead section will allow the stopped train to depart. If each siding has a stop section which is electrically dead and a trip section to power the stop section of the other siding long enough for a train to escape, then we need only to realign the track turnouts for the other siding and the automation becomes a simple process.

SOLUTION:

If we use a DALLEE ELECTRONICS TRAK-DTT (adjustable Detector Mode) to sense the presence of the train at the trip section, the relay can be adjusted to hold the stop section of the other track "on" for as long as required to allow the train on that track to escape into the running area of the loop. One TRAK-DTT (adjustable detector) is needed for each siding. The second contact set of the relay is available to provide input to activate the track turnouts. If the turnouts are of the twin coil type, the TRAK-DTT (adjustable detector) selects the coil and another TRAK-DTT (timer mode), set at minimum time, gives the momentary activation to that solenoid coil. If the turnouts are powered by DC motors (point drive or stall) then a TRAK-DTL is used instead of the TRAK-DTT. Each TRAK-DTT (adjustable detector) would turn on a lamp and the TRAK-DTL would change the state of its relay every time it senses current flow to this lamp, reversing the DC polarity to the switch motors. If the turnouts are of the non-derailing type no specific turnout activation is required as the movement of the trains will provide for correct turnout alignment.

ALTERNATIVES:

Additional sidings can be added to accomodate more trains as long as only one train is running at one time. If these additional sidings are always added in pairs at other locatiions around the loop we need only to add one TRAK-DTT per siding and either a TRAK-DTT or a TRAK-DTL to throw the turnouts at each siding pair. If sidings are added to any pair, operation must be in a sequence where siding 'A' activates siding 'B' which will then activate siding 'C' and continuing until the last siding activates siding 'A' again. Again, we need one TRAK-DTT per siding, however additional provisions must be made to control the track turnouts for proper alignment. For twin coil solenoids, DC power and a diode matrix will usually be sufficient to insure correct turnout alignment. A sample of diode matrix switching is shown on page 25, titled "using diodes to control twin coil track swtiches".

In all above situations, only powered locomotives are involved. If lighted passenger cars or a lighted caboose is used you should wire according to the drawing on page 27. This TRAK-DT is wired so as to disconnect the trip section of a siding while a train is departing from this siding. If this is not done, the lighted cars passing through the trip section would activate the next track.

OPERATION:

Initially one train should be somewhere in a running area and all others must be in sidings at the stop sections. Turnouts must be aligned for the vacant siding. Running train enters the vacant siding, passes the trip section, aligning the turnouts for the next siding in the sequence and powering the stop section of this siding long enough for the next train to escape into a running area,and then continues on to a stop. This next train then makes its run and enters the next vacant siding which may be the siding it just left.

SUMMATION:

There are limiting factors to consider in this automation. Train length can be no longer than the distance between the clearance of the siding's inbound turnout points and the trip section so that the turnout can not be thrown under the train. There should be at least a locomotive length between the trip section and the stop section. The stop section must be long enough that the locomotive will stop before the clearance point of the siding's outbound turnout so that there will be no chance of a collision between the stopping and the departing trains. This automation will not work in this configuration if multiple powered locomotives are used unless all powered locomtives are jumper wired together so as to function electrically as a single powered unit.

DEVIATION FROM NORMAL STAGING:

More than one run around the loop is also possible by adding an extra trip section following the stop section. This extra trip section activates a TRAK-DTL which is wired so that when its relay is "on" the stop section of this track is also "on" AND the stop section of the other track cannot be connected. When the relay of the TRAK-DTL is relaxed normal staging can occur. In this case Train "A" runs the loop twice before Train "B" can run.

Additional considerations may be required depending on how the track turnouts are powered. It is always necessary to keep the turnouts properly aligned which may require that turnout power be disconnected during continuous run.

AUTOMATIC STAGING TRACKS continued

Additional runs can be added by adding an expansion relay to the TRAK-DTL to illuminate a ballast lamp activating a second TRAK-DTL when the relay is relaxed. Each additional expansion relay, ballast lamp and TRAK-DTL will add two runs around the loop.

As an example, if it is desired to have one train make four circuits of the loop for each circuit by the other train, two TRAK-DTL's are needed. If either TRAK-DTL relay is "on" the stop on track "B" is disconnected AND the stop on track "A" is "on" so Train "A" will continue running.

Train "B" makes its run, trips "A" and stops.

Train "A" starts, trips TRAK-DTL #1; therefore "B" can not go and Train "A" continues for its second run.

Train "A" now relaxes TRAK-DTL #1, illuminating ballast lamp to activate TRAK-DTL #2; therefore "B" can not go and Train "A" continues for its third run.

Train "A" again trips TRAK-DTL #1 turning "off" ballast lamp. Both TRAK-DTL relays are activated so "B" again cn not go and Train "A" continues for its fourth run.

Train "A" now relaxes TRAK-DTL #1, illuminating ballast lamp which now relaxes TRAK-DTL #2. With both TRAK-DTL's relaxed staging is ready so Train "A" will trip "B" and stop.
On initialization (power up) of this automation Train "A" will run as TRAK-DTL #2 will begin "on".

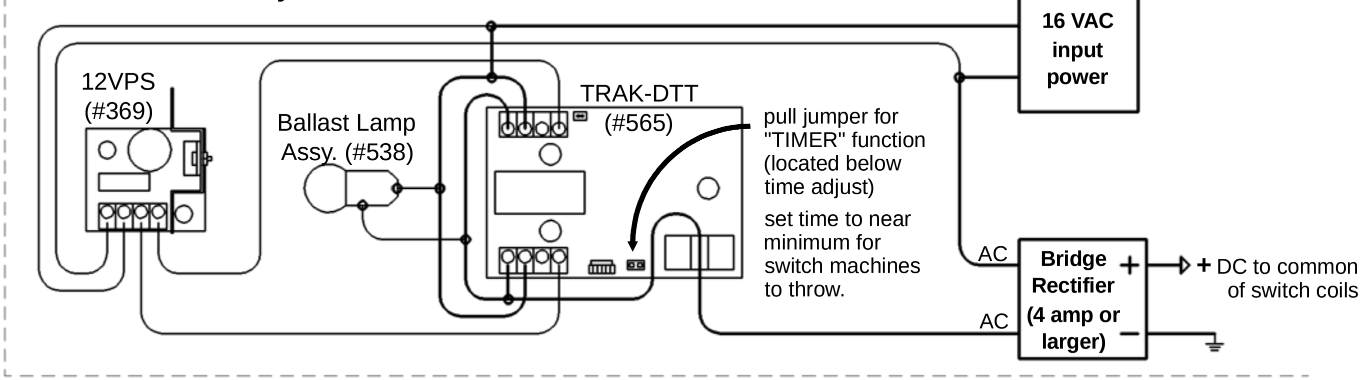
ADDITIONAL ALTERNATIVES:
To avoid having the second or later units in a multi-unit set spinning wheels trying to push a 'dead' engine, rather than use a stop section, we should cut power to the entire siding track once the train is beyond the clearance points. If the turnouts are of the power routing type, where only the aligned track gets power, it is possible to use a TRAK-DTT to do a timed stop when the train reaches a clearance point and to realign the turnouts during the stop. When power returns, only the train on the now aligned track will run. Each siding will need a trip section at the departure end so that the train will stop prior to the clearance point of the siding. This trip section will activate the TRAK-DTT for the timed stop and must also activate what ever is used to realign the turnouts.

SWITCH MACHINE POWER SUPPLY

Twin coil switch machines require a fairly heavy current flow to move the actuator rod and this flow must be momentary to prevent coil burnout. Switching devices such as toggles, push buttons or even relays, once the contacts are tightly closed, will carry considerably more current than they are able to switch. The current sensing characteristic and the momentary setting of the TRAK-DTT allow compensation for these conditions.
If push buttons or momentary toggles are used to control switch machines we can insert a light bulb and a TRAK-DTT between the power supply and the switch machines. The result is a true momentary action and elimination of contact arcing which sometimes occurs with capacitive discharge systems. At the instant of contact the light bulb illuminates causing a current flow which activates the relay of the TRAK-DTT. Current now flows through the closed contacts to the coils of the switch machine but only as long as the relay is activated. With the TRAK-DTT set at minimum time frame we are sure of a momentary activation regardless of the duration of the switch contact.
A single insertion of a TRAK-DTT with ballast lamp between the switch motors and power supply could handle an entire layout. Since there is a short delay needed between activations to allow the time function of the TRAK-DTT to reset it is suggested that the layout be divided into areas with a separate power supply and TRAK-DTT for each area.
An example of a TRAK-DTT being used to activate twin coil switch machines is shown in the drawing on page 25. Another drawing is shown on page 26. This also shows using how to use a diode matrix so that a single push button switch can throw many switch machines. If you choose to use the diode matrix system, automation can be accomplished by utilizing a TRAK-DT to automate each push button location. This is especially useful when approaching a switch thrown the wrong way. A block needs to be made for the sense section of each TRAK-DT used. Please remember that you must clear (remove/open) the switch a few seconds before another switch sequence can begin. On larger layouts the possibility of multiple switches throwing at the same time exists. Therefore, you would need to make zones where each momentary power sources for twin coil switch machines would exist. This way multiple demands could be met.

using diodes to control twin coil track switches

Momentary Power Source for Twin Coil Switch Machines

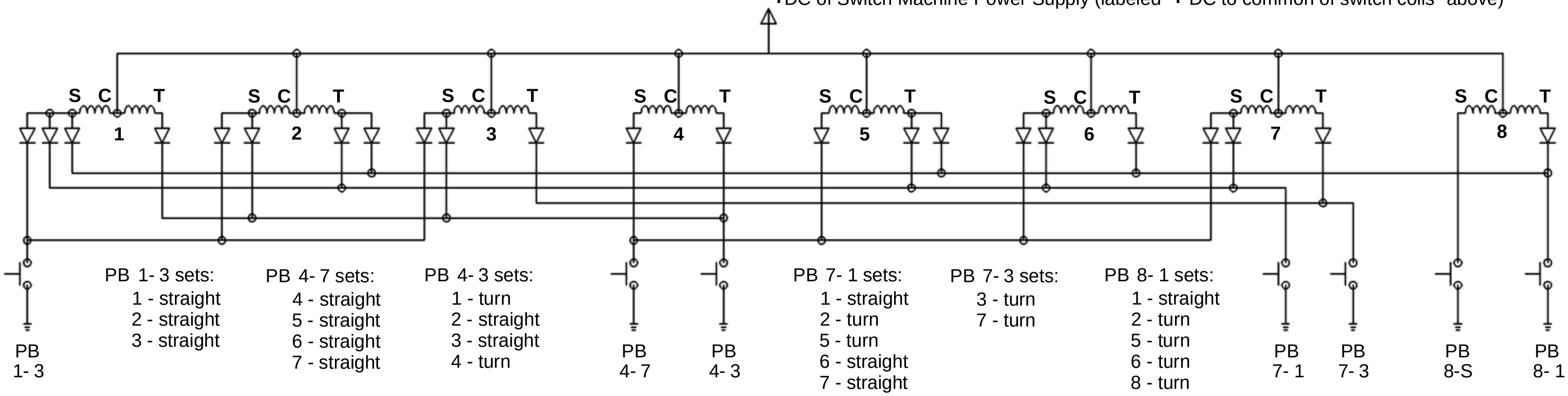


Push Button (PB) momentary (#618)

use 1 ampere for small coils, 6 ampere for larger coils (tinplate type sw mach)

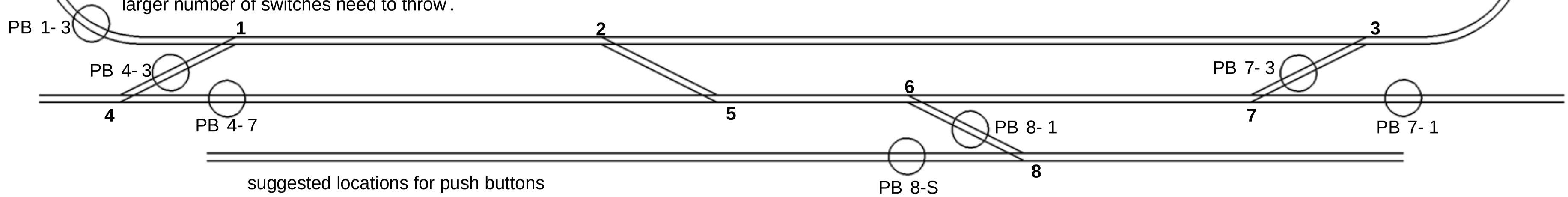
Switch Machine

S - straight coil
C - common
T - turn Coil

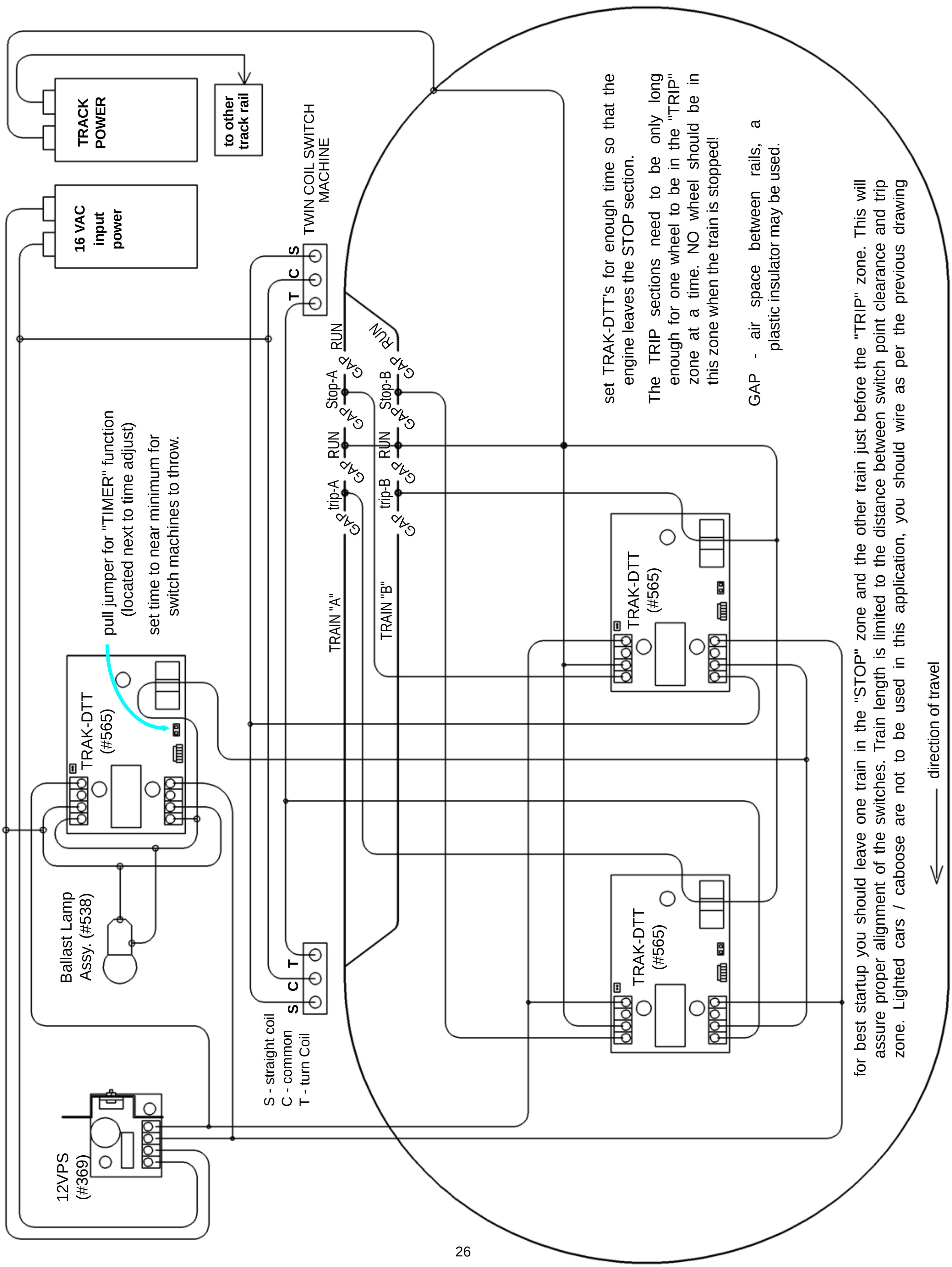


Typical Layout Line Diagram

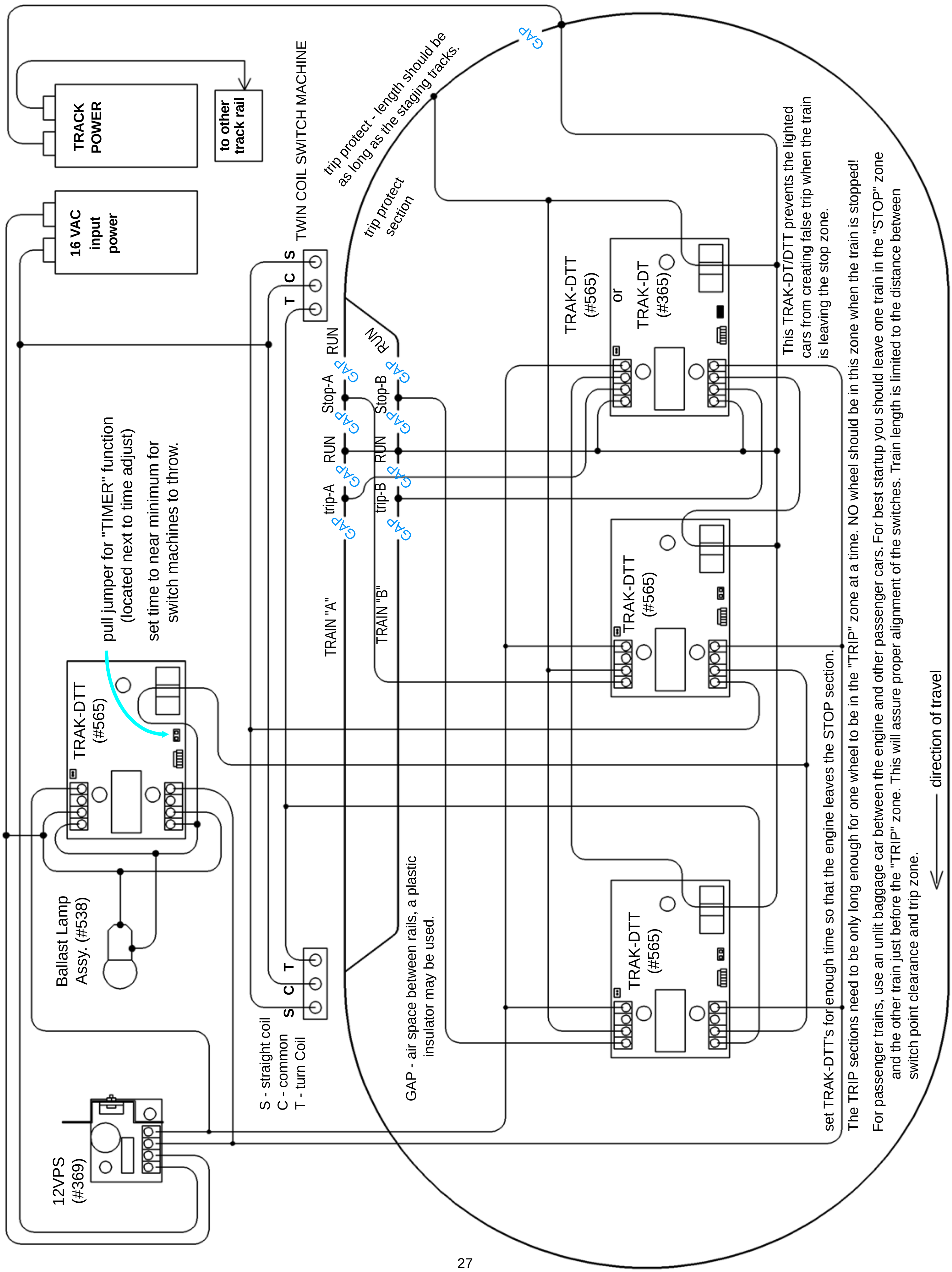
Only some push buttons have been shown for possible routings on this layout . Many more routings can be done . As seen , when more than one switch machine coil has to be thrown at a time , a diode is necessary for proper power routing . This drawing has the push buttons labeled to represent the route set . You can either operate this diode ladder with a fixed DC voltage or use the momentary power source shown above . By using the momentary power source , switch arcing is brought to a minimum. This is due to the fact that when the PB switch is closed you are merely illuminating a light bulb . During the period that the switch contacts are closed , the TRAK-DTT closes it's relay contacts , sending the bulk of the current . Switch contacts can carry a much higher current than they can switch . We do not reccomend capacitor discharge units since they typically charge to a high voltage . This high voltage leaves many push button switches arced together . They also overpower the switch machines when a small number of switches throw and under power when a larger number of switches need to throw .



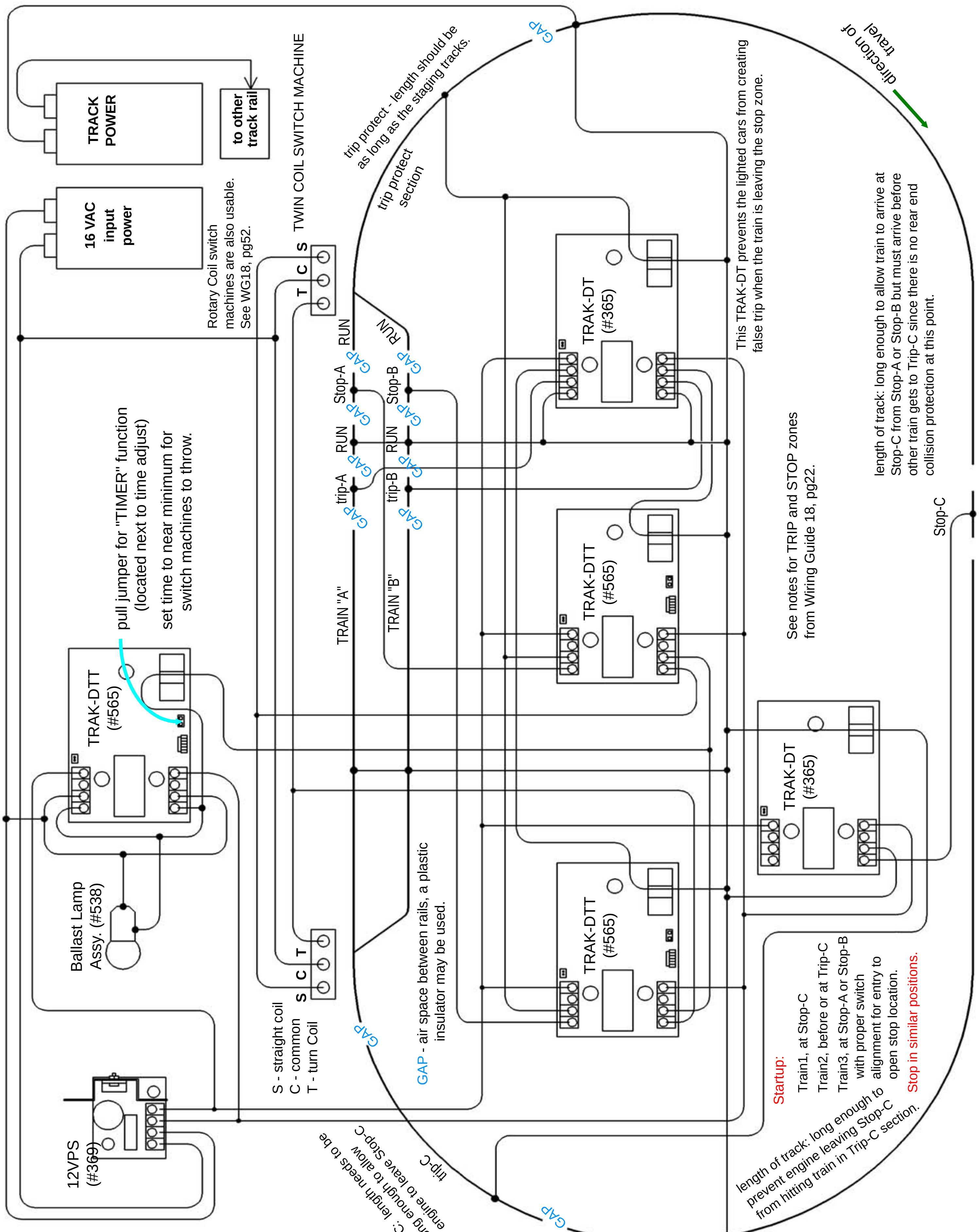
Two Train Staging using twin coil switches



Two Train Staging using twin coil switches with lighted cars



TwoTrain Staging, 3Train's Operating



AUTOMATIC REVERSE OF TURNING LOOPS

USING CONVENTIONAL THROTTLE SYSTEMS

Turning or reverse loops in two rail require additional handling because of the need to match polarity going into the loop and then, again, coming out of the loop. If the turning track is electrically isolated and supplied with a separate, independent, polarity control, the situation is manually solved. Polarity of the turning track is matched to the main track by the separate control and then, once the train is completely within the turning track, polarity of the main is reversed.

Automation of this operation is possible in a reasonably simple fashion if certain operating concessions are acceptable:

1. Main track between the turning loops is a single track with only singular control.
2. Direction around the turning tracks is always the same.

Polarity to the turning tracks is wired directly from the throttle so that direction is always the same going through the loop. Polarity to the main track, between the loops, is reversible by the relay contacts of a DALLEE ELECTRONICS TRAK-DTL. A short (engine length) section of rail, at the exit end of each loop, is electrically isolated with rail gaps. The wires to feed power to these trigger sections is routed through the detection coil of the TRAK-DTL. As the train enters this rail section, current flow is detected by the TRAK-DTL, changing the state of its relay, thereby reversing polarity in the main track. At the same time, it is necessary to activate the track turnout to line up for the exit from the loop. If we also activate the turnout at the other end of the main track so that it is aligned to enter the loop in the proper direction, the automation is complete.

Automatic activation of the track turnouts is dependent upon the type of turnout motors installed. If twin coil solenoid motors, which require momentary activation, are used automation can be accomplished by utilizing 2 TRAK-DTT devices. These are timing circuits which can provide a momentary activation whenever current flow is sensed. The wires that feed power to the insulated trigger sections, at the exit of each loop, would also be routed through the detection coil of the TRAK-DTT, one at each loop. Each TRAK-DTT is then wired so that its relay output will activate one coil of each solenoid motor, properly aligning its turnout as needed. If turnouts are activated by rotary coils, slow motion or stall motors which use DC polarity reverse, then automation can be handled by an additional TRAK-DTL or by an expansion relay board connected to the original TRAK-DTL. In either case an additional set of relay contacts will be available to reverse polarity to the turnout motor.

In operation, it is suggested that the train always initialize within the main track, between the loops, and that the turnouts are properly aligned. The train will enter the first loop in the proper direction and as it crosses into the trigger section, the polarity of the main track is reversed and the track turnouts are realigned so that the train can proceed out of the loop and onto the main track. At the other end, the identical thing happens. The train runs through the loop and at the trigger section, the polarity of the main is reversed and the turnouts are again realigned. An example of this type of operation is found on page 35.

If both direction operation is desired within the loops, the automation is no longer a simple process. Each loop must have polarity aligned to match the way the turnouts are aligned inbound and then all factors must realign outbound. Also, if the track, between the turning loops, involves more than just a singularly controlled track, the process is no longer simple. While automation under these extra conditions is certainly possible, the complications resulting from dealing with the variations, are well beyond the scope of "a simple" automation.

USING CARRIER (COMMAND CONTROL) SYSTEMS. While control wiring may be simplified with a carrier system, the turning or reverse loop must be dealt with separately as the need to match polarity, going into the loop and again coming out of the loop, still exists. Locomotive direction is controlled by the carrier receiver rather than the polarity of the track power, therefore it is possible to switch polarity of a track section, while a locomotive is in that track section, without interfering with the actual movement. All main trackage can be wired with uniform polarity and the turning tracks are then electrically isolated and provided with separate polarity controls.

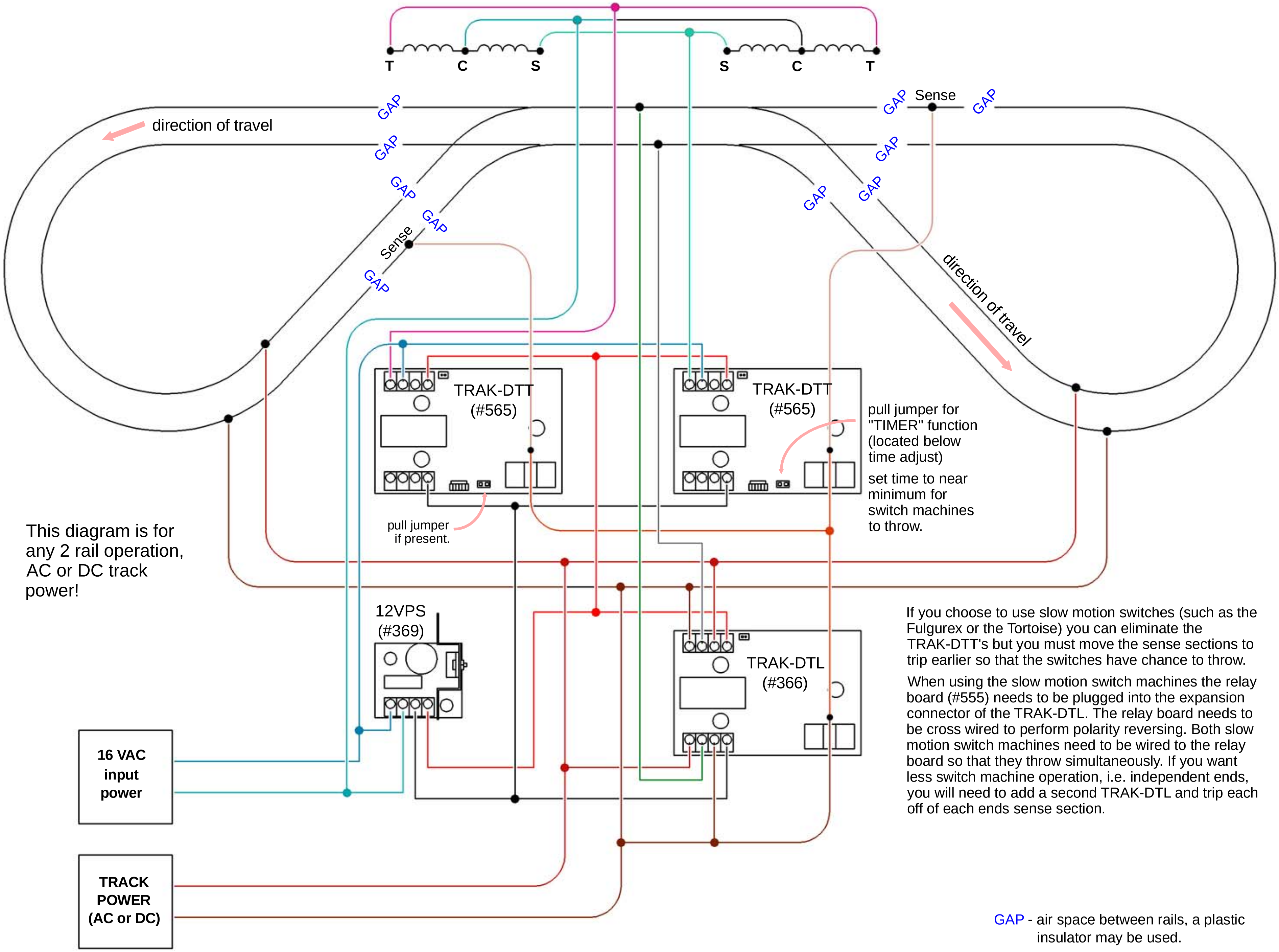
Automation of turning tracks in a carrier system CAN be done in a reasonably simple fashion. If movement direction around the turning track is always the same and if the turnouts are automated so that alignment is for the correct direction into the turning track following each actual use of said turning track longer trains can be operated in the loop.

Polarity in the turning track is reversed by the relay contacts of a DALLEE ELECTRONICS TRAK-DTL (Item 366) which is wired so that the polarity of the turning track is matched to the main trackage for the approach direction after the first activation of the TRAK-DTL. An insulated section of rail on the approach to the turning track, acting as a trip, will activate the relay of the TRAK-DTL for approach polarity. The locomotive then enters the electrically isolated turning track. Near the exit end of the turning track, another trip section activates the TRAK-DTL again, changing the state of the relay, reversing polarity in the turning track to match the main trackage for the outbound movement from the turn track. At this time the turnout must be aligned for the outbound move and after the move is complete the turnout must be realigned for the next inbound.

In actual operation it is suggested that at initial "power up" there are no trains located within the turning tracks. Automatic operation of the track turnouts is, as before, dependent upon the type of turnout motors installed. If bi-directional operation is desired within the turning tracks, the automation is possible, but requires train lengths to be no more than 1/3 the loop (especially if lighted cabooses are present). To do this type of automation, the turning loop is split into three even sections. This way a train can enter the loop in either direction. The center 1/3 becomes the trip section. When current is drawn in the trip section, the TRAK-DTL activates reversing the power within the loop and possibly the switch machine. A drawing of this type of operation can be found on page 36.

The following pages also show variations utilizing station stops for more than one trolley or possibly train, depending on how much space you have available. Page 31 shows two trolley's on one track. Page 32 shows 3 operating on one track. As you can see, various automations can be accomplished. Other automation can also be incorporated between the swiches as well. The easiest would be another Trak-DTT2 to make a station stop or more, between the switches. These drawings have the ends compressed, the space between the switches can be as long as needed. If you would like to have the system remember the direction it was going between power cycles, then the Trak-DTL needs to be changed to a Trak-DTRL. Then each sense coil would go to the respective left and right Trak-DTT located above them in the drawing. That will then force a direction to the trolley's and remember it between power cycles. Then it is not important where the trolley's are located as well. The basic drawing is shown modified this way on page 33.

Automatic Reverse of Turning Loops



This diagram is for any 2 rail operation, AC or DC track power!

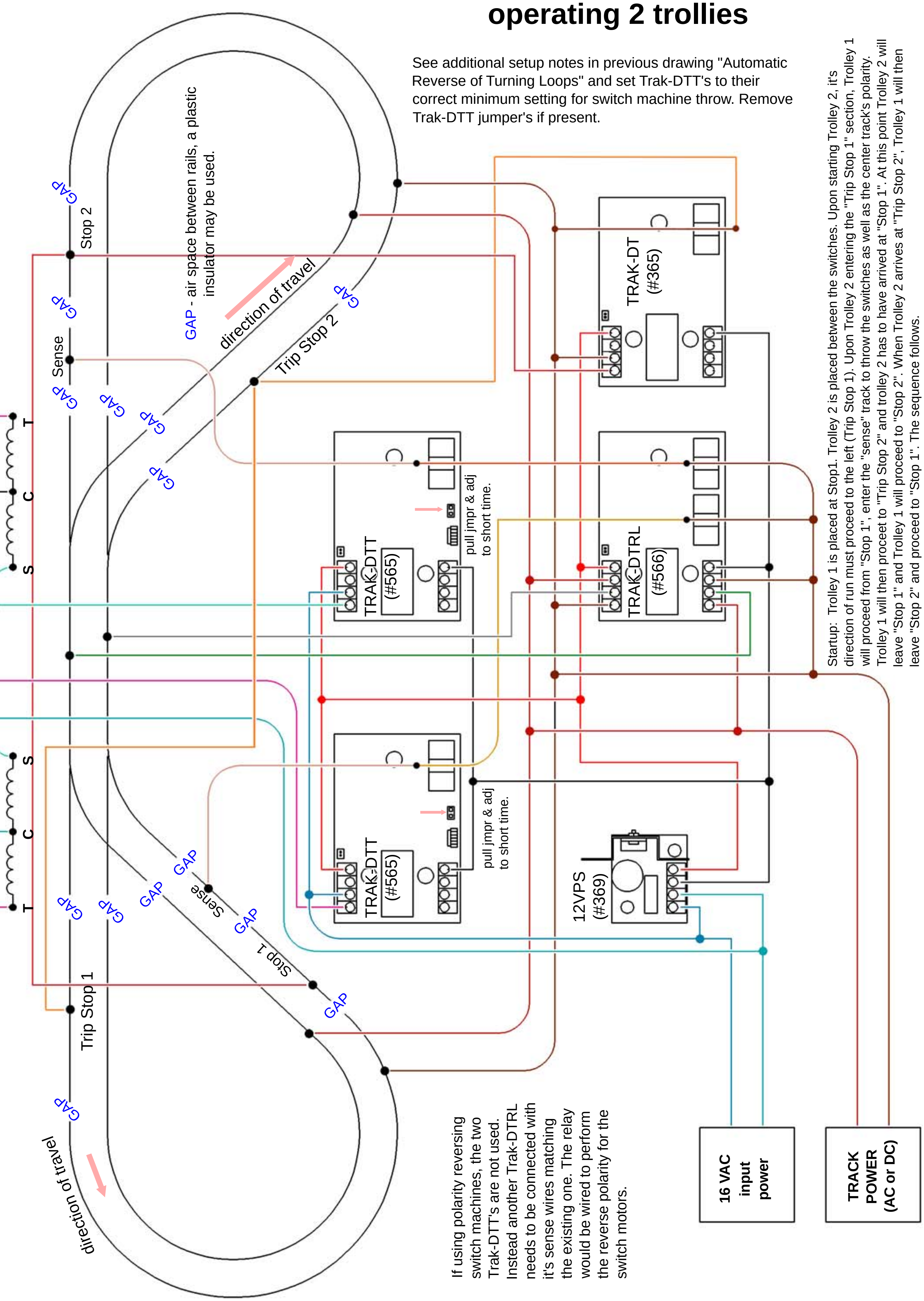
If you choose to use slow motion switches (such as the Fulgurex or the Tortoise) you can eliminate the TRAK-DTT's but you must move the sense sections to trip earlier so that the switches have chance to throw.

When using the slow motion switch machines the relay board (#555) needs to be plugged into the expansion connector of the TRAK-DTL. The relay board needs to be cross wired to perform polarity reversing. Both slow motion switch machines need to be wired to the relay board so that they throw simultaneously. If you want less switch machine operation, i.e. independent ends, you will need to add a second TRAK-DTL and trip each off of each ends sense section.

GAP - air space between rails, a plastic insulator may be used.

Automatic Reverse of Turning Loops
operating 2 trollies

See additional setup notes in previous drawing "Automatic Reverse of Turning Loops" and set Trak-DTT's to their correct minimum setting for switch machine throw. Remove Trak-DTT jumper's if present.



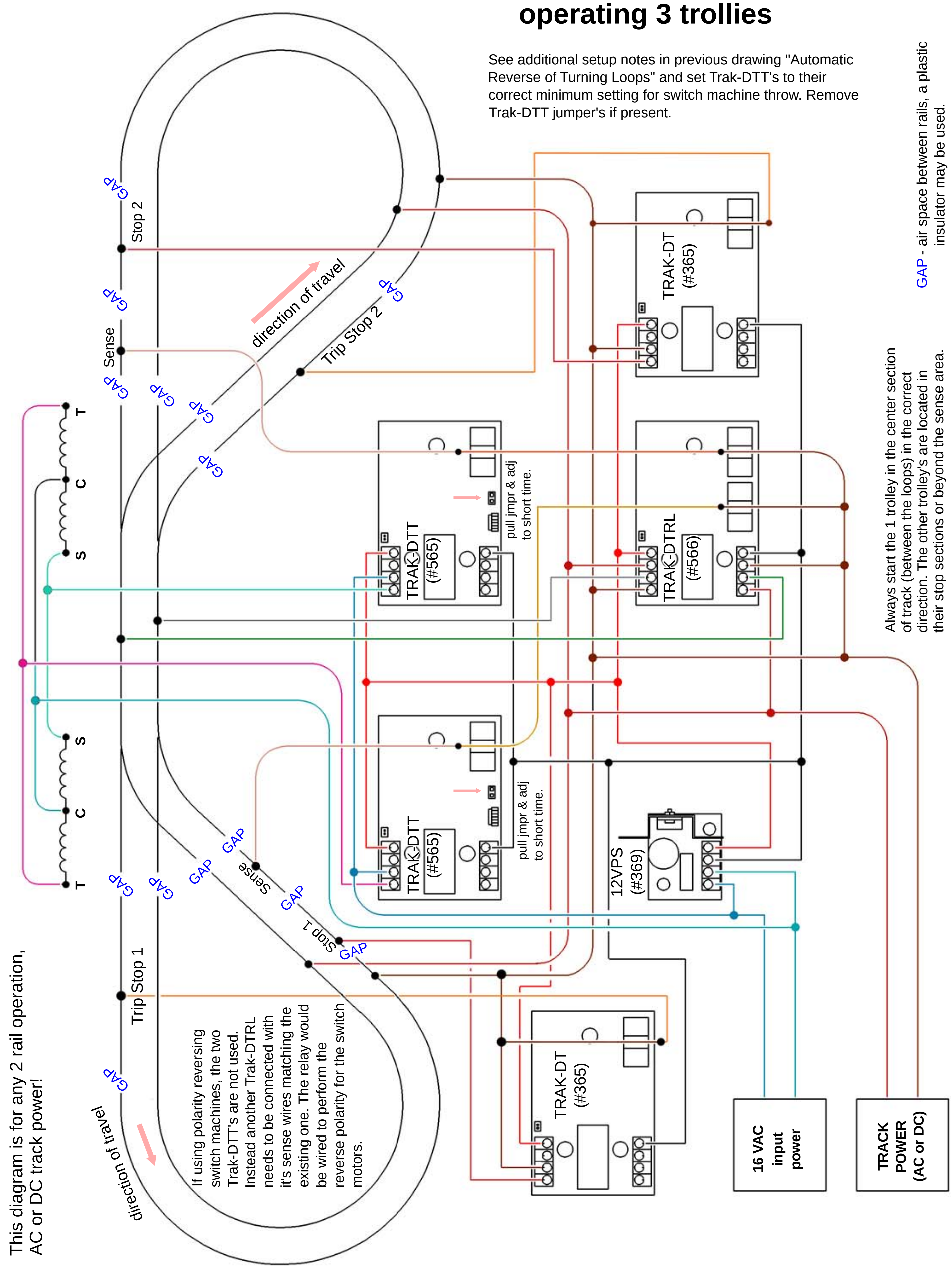
Startup: Trolley 1 is placed at Stop1. Trolley 2 is placed between the switches. Upon starting Trolley 2, it's direction of run must proceed to the left (Trip Stop 1). Upon Trolley 2 entering the "Trip Stop 1" section, Trolley 1 will proceed from "Stop 1", enter the "sense" track to throw the switches as well as the center track's polarity. Trolley 1 will then proceet to "Trip Stop 2" and trolley 2 has to have arrived at "Stop 1". At this point Trolley 2 will leave "Stop 1" and Trolley 1 will proceed to "Stop 2". When Trolley 2 arrives at "Trip Stop 2", Trolley 1 will then leave "Stop 2" and proceed to "Stop 1". The sequence follows.

If using polarity reversing switch machines, the two Trak-DTT's are not used. Instead another Trak-DTRL needs to be connected with it's sense wires matching the existing one. The relay would be wired to perform the reverse polarity for the switch motors.

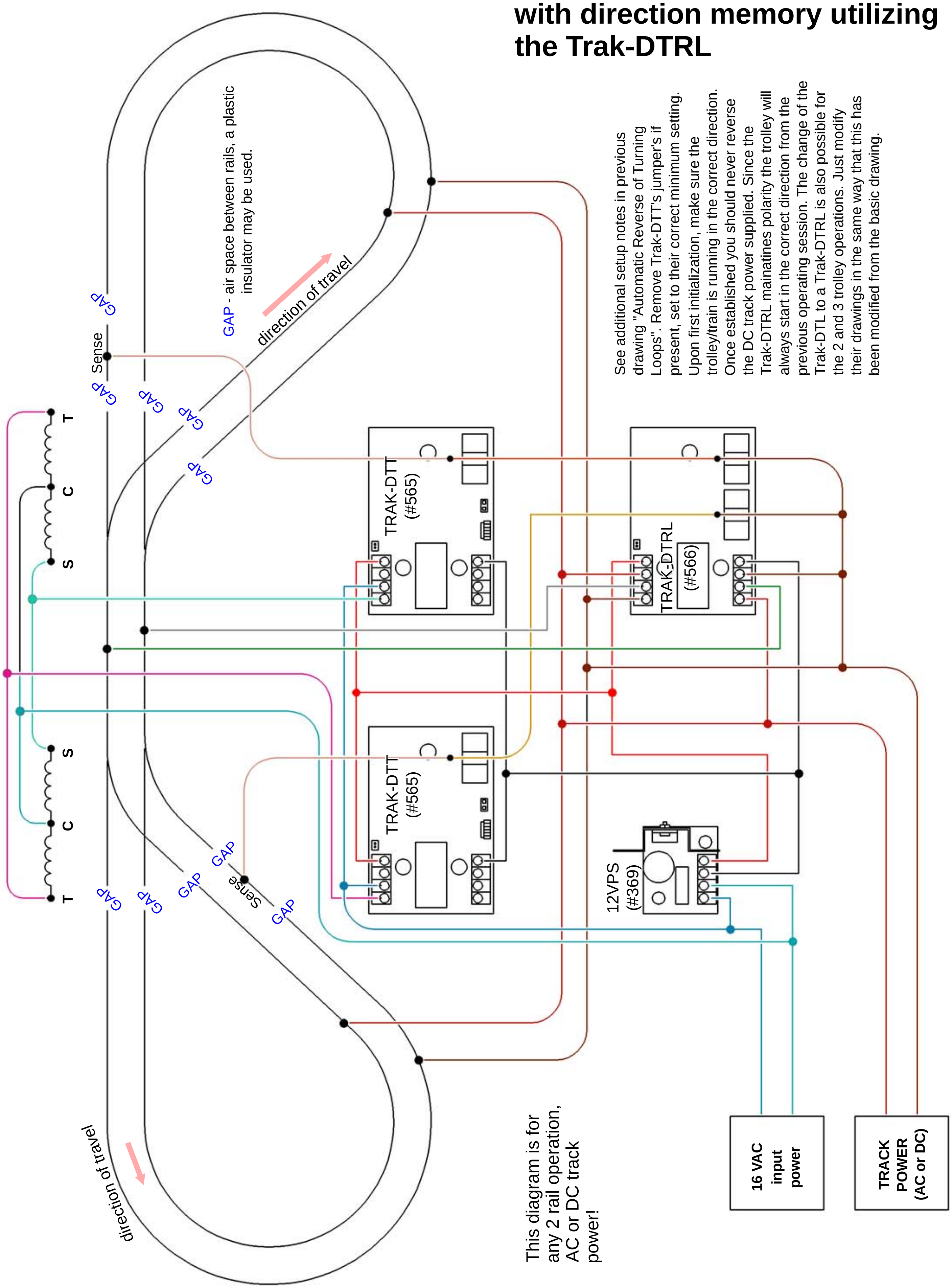
This diagram is for any 2 rail operation, AC or DC track power!

Automatic Reverse of Turning Loops operating 3 trollies

See additional setup notes in previous drawing "Automatic Reverse of Turning Loops" and set Trak-DTT's to their correct minimum setting for switch machine throw. Remove Trak-DTT jumper's if present.

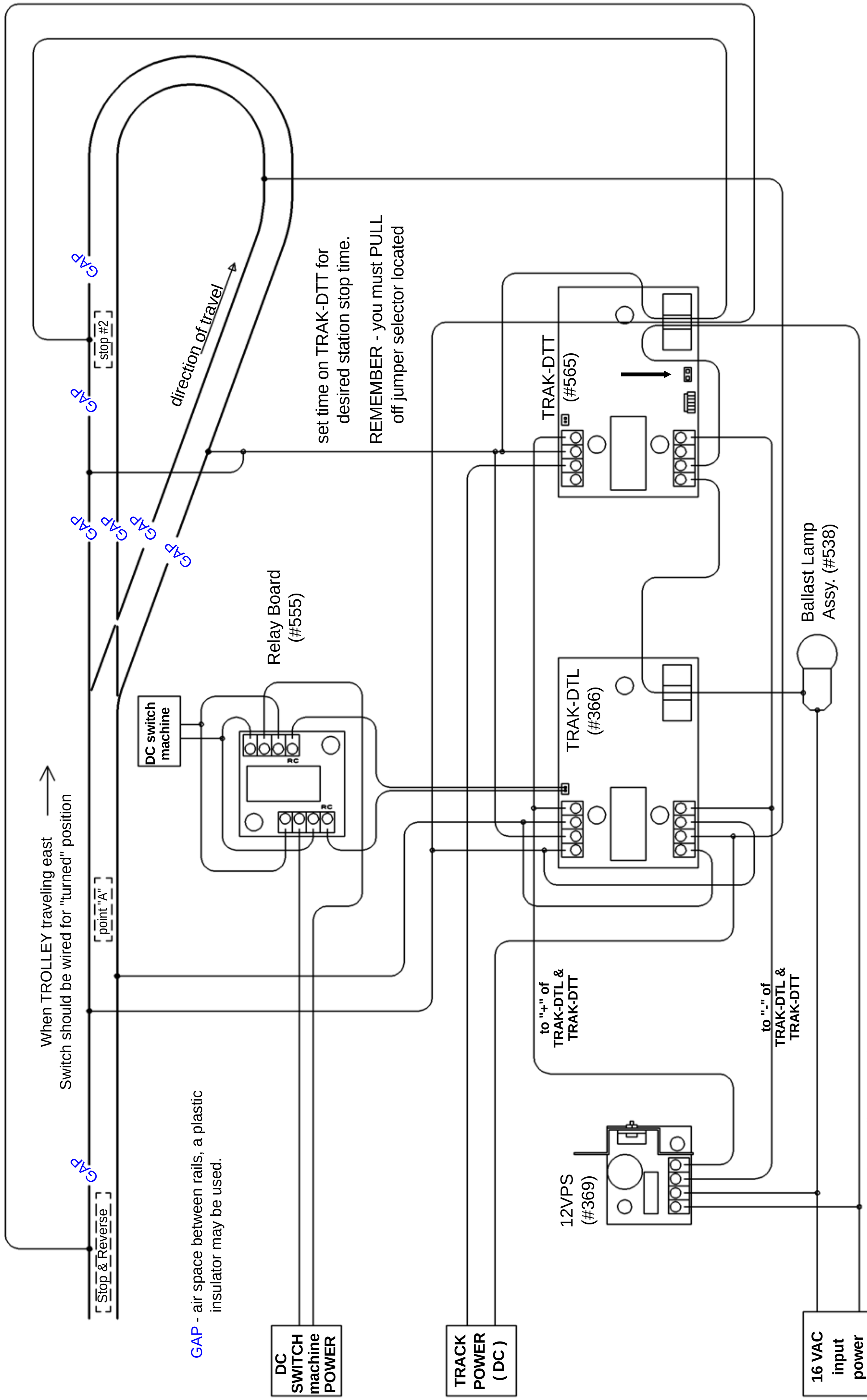


Automatic Reverse of Turning Loops with direction memory utilizing the Trak-DTRL



See additional setup notes in previous drawing "Automatic Reverse of Turning Loops". Remove Trak-DTT's jumper's if present, set to their correct minimum setting. Upon first initialization, make sure the trolley/train is running in the correct direction. Once established you should never reverse the DC track power supplied. Since the Trak-DTRL mainatines polarity the trolley will always start in the correct direction from the previous operating session. The change of the Trak-DTL to a Trak-DTRL is also possible for the 2 and 3 trolley operations. Just modify their drawings in the same way that this has been modified from the basic drawing.

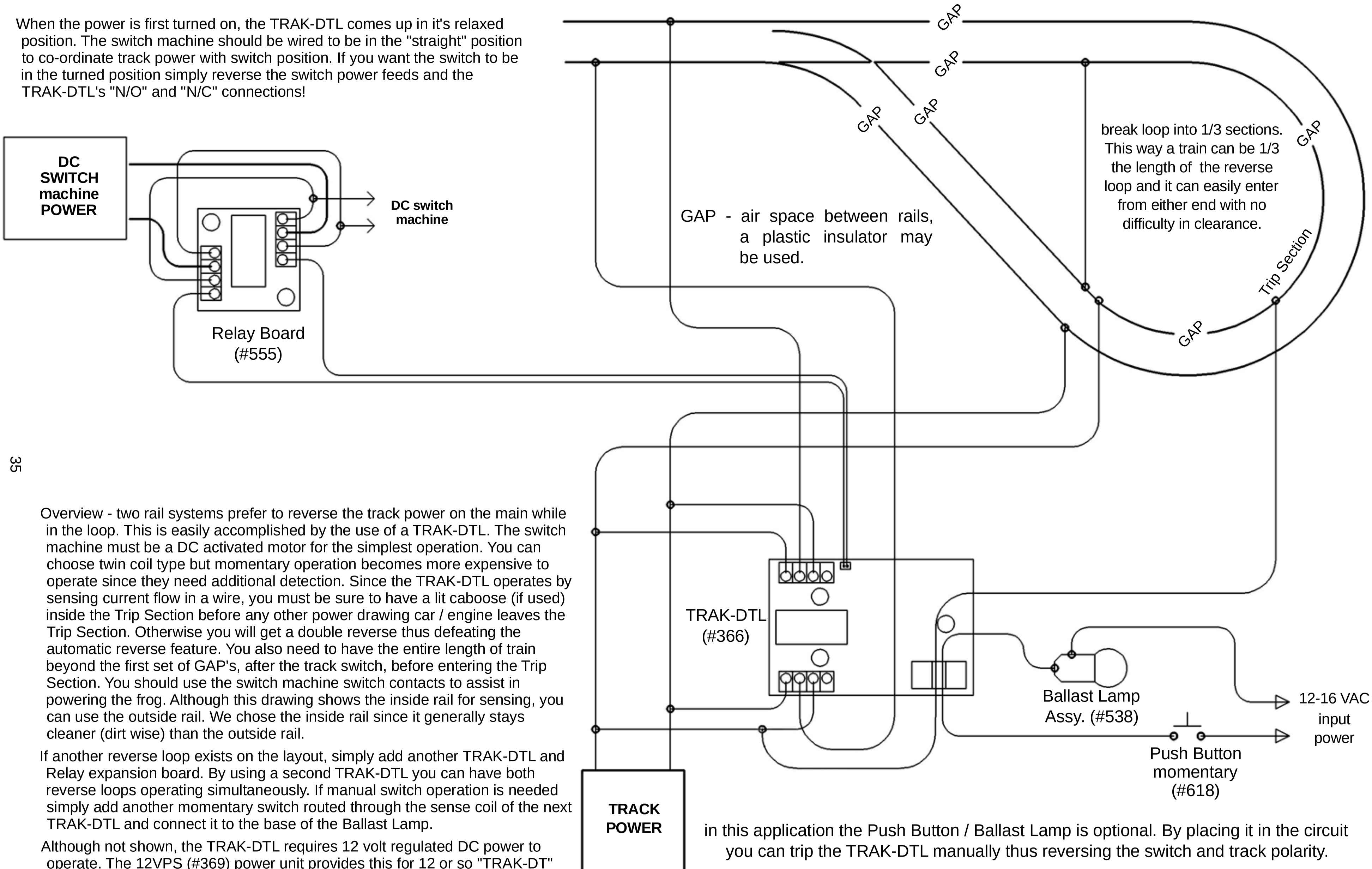
Automatic Reverse with Turning Loop & Station Stop within loop



SETUP: 1 - place trolley on track at POINT "A"
2 - turn power "ON", wait 20 seconds.
3 - if switch "STRAIGHT" reverse switch wires to make switch set to "TURN".
4 - Put power on track (advance speed control). If trolley does not head toward track switch, reverse track feed wires AT THE POWER PACK (speed control), NOT AT THE TRACK!!
5 - Always power down when trolley near "POINT A". This insures proper startup for the next operating session.

Two Rail Systems Automatic Reverse Loop

When the power is first turned on, the TRAK-DTL comes up in it's relaxed position. The switch machine should be wired to be in the "straight" position to co-ordinate track power with switch position. If you want the switch to be in the turned position simply reverse the switch power feeds and the TRAK-DTL's "N/O" and "N/C" connections!



in this application the Push Button / Ballast Lamp is optional. By placing it in the circuit you can trip the TRAK-DTL manually thus reversing the switch and track polarity.

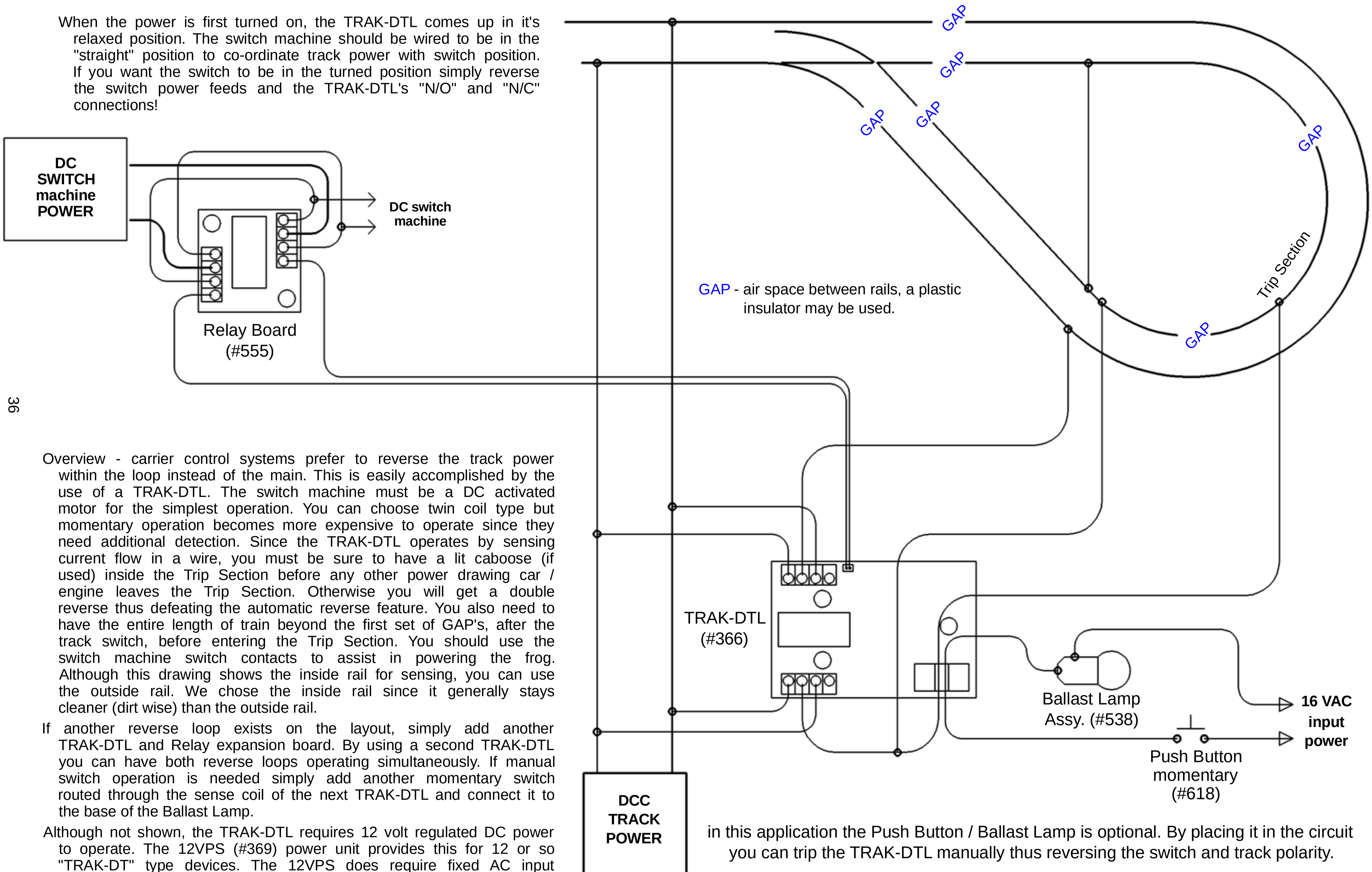
Overview - two rail systems prefer to reverse the track power on the main while in the loop. This is easily accomplished by the use of a TRAK-DTL. The switch machine must be a DC activated motor for the simplest operation. You can choose twin coil type but momentary operation becomes more expensive to operate since they need additional detection. Since the TRAK-DTL operates by sensing current flow in a wire, you must be sure to have a lit caboose (if used) inside the Trip Section before any other power drawing car / engine leaves the Trip Section. Otherwise you will get a double reverse thus defeating the automatic reverse feature. You also need to have the entire length of train beyond the first set of GAP's, after the track switch, before entering the Trip Section. You should use the switch machine switch contacts to assist in powering the frog. Although this drawing shows the inside rail for sensing, you can use the outside rail. We chose the inside rail since it generally stays cleaner (dirt wise) than the outside rail.

If another reverse loop exists on the layout, simply add another TRAK-DTL and Relay expansion board. By using a second TRAK-DTL you can have both reverse loops operating simultaneously. If manual switch operation is needed simply add another momentary switch routed through the sense coil of the next TRAK-DTL and connect it to the base of the Ballast Lamp.

Although not shown, the TRAK-DTL requires 12 volt regulated DC power to operate. The 12VPS (#369) power unit provides this for 12 or so "TRAK-DT" type devices. The 12VPS does require fixed AC input voltage.

Carrier Control Systems Automatic Reverse Loop

When the power is first turned on, the TRAK-DTL comes up in it's relaxed position. The switch machine should be wired to be in the "straight" position to co-ordinate track power with switch position. If you want the switch to be in the turned position simply reverse the switch power feeds and the TRAK-DTL's "N/O" and "N/C" connections!



in this application the Push Button / Ballast Lamp is optional. By placing it in the circuit you can trip the TRAK-DTL manually thus reversing the switch and track polarity.

Overview - carrier control systems prefer to reverse the track power within the loop instead of the main. This is easily accomplished by the use of a TRAK-DTL. The switch machine must be a DC activated motor for the simplest operation. You can choose twin coil type but momentary operation becomes more expensive to operate since they need additional detection. Since the TRAK-DTL operates by sensing current flow in a wire, you must be sure to have a lit caboose (if used) inside the Trip Section before any other power drawing car / engine leaves the Trip Section. Otherwise you will get a double reverse thus defeating the automatic reverse feature. You also need to have the entire length of train beyond the first set of GAP's, after the track switch, before entering the Trip Section. You should use the switch machine switch contacts to assist in powering the frog. Although this drawing shows the inside rail for sensing, you can use the outside rail. We chose the inside rail since it generally stays cleaner (dirt wise) than the outside rail.

If another reverse loop exists on the layout, simply add another TRAK-DTL and Relay expansion board. By using a second TRAK-DTL you can have both reverse loops operating simultaneously. If manual switch operation is needed simply add another momentary switch routed through the sense coil of the next TRAK-DTL and connect it to the base of the Ballast Lamp.

Although not shown, the TRAK-DTL requires 12 volt regulated DC power to operate. The 12VPS (#369) power unit provides this for 12 or so "TRAK-DT" type devices. The 12VPS does require fixed AC input voltage.

AUTOMATIC TIMED STATION STOPS

STOP sections have power removed during timed stops. This section must contain the locomotive when coasting to a stop.

If using with sequence reverse units, the E-Unit must be locked in forward.

For MU operation (more than one locomotive), either jumper power between all units or use an expansion relay (#555) and wire it to make the stop section grow to encompass all of the locomotives when the first locomotive enters the STOP section of track. If operating the stop from either direction, this must be done to cover the MU for either direction.

3-Rail operators, use the center rail as the upper sense rail or both outer rails.

All operators: If using an illuminated caboose (3-rail operators if using the center rail), a re-trip of the Trak-DTT2 will occur making for improper operation since the Trak-DTT2 will most likely re-trip when the caboose enters the stop section and not remain there for the sequence to complete. This will result in the train stopping at the station every other pass. If this is not desired and you are running in the same direction, make the stop section long enough to encompass the locomotive and the caboose. The stop will occur when the locomotive enters the stop section.

More stops can be generated using the same TRAK-DTT2. Simply isolate another section as a "STOP" section and connect the two stop track power feeds together. The time at each stop will be the same. For differnt timing, you will have to utilize another TRAK-DTT2 connected to the same 12VPS.

Another method of operation is to connect the "STOP / SENSE SECTION" through the SENSE COIL and not to the relay contacts as shown. Then connect the "C" and "N/C" terminals to disconnect the track power in the opposite rail. This will remove the power from the entire layout or area sectioned off with the opposite rail.