

ATLAS
Scale Track System
2-Rail



21st Century Signal System™
2-Rail Manual

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INTRODUCTION

Dear "O" Enthusiast,

Prototype signal systems are one of the most familiar trackside details to be incorporated on miniature rail systems. Ever since the modern position light signals were introduced by the railroads in the mid-1920's, model train manufacturers have been eager to offer them as the quintessential layout accessory. While capturing the appearance of the real thing, operation, in most cases, has been far less than prototypical...until now.

The Atlas O 21st Century Signal™ System represents a quantum leap in model signal operation and design. By following the simple installation instructions, the realistic signal structures will provide you with prototypical operation that can be tailored to any layout. The signal circuit board is the "heart" of the system. Installed in the detailed trackside relay shed (or mounted under your layout), the circuit board is capable of four modes of signal operation:

- **Stand-Alone Signal Operation** - Each signal is completely independent and gives a timed Red-Yellow-Green aspect operation. (Simplest hook-up)
- **Integrated Operation** - Each signal is connected together and the Red-Yellow Green aspects are controlled by the blocks and signals in front of and behind your train. Hook-up between signals is accomplished easily with the Atlas O Signal Cable (Items #6937-6939), pre-packaged in lengths of 7', 15' and 25'.

- **Approach-Only Signal Operation** - On some prototype railroads, signals are off until a train approaches. The Atlas O Signal system has the provisions to duplicate this operation.
- **Complex Signaling** *(in conjunction with the signals and signal boards offered by Custom Signals, Inc.)* - The Atlas O Signal System has been designed to be fully compatible with the products offered by Custom Signals, Inc., one of the hobby's premier custom signal builders.

As you can see by the features included with Atlas O's 21st Century Signal System, expert knowledge of the prototype was essential. Many hours and intense research were put into the design of the system to achieve prototype operation in a user-friendly manner. As a result, I would like to thank the following individuals who have assisted with this project from concept to realization: Gary Emmich, Steve Horvath and Terry Christopher.

Happy Railroading!

Sincerely,
Jim Weaver,
Vice President, Atlas O, LLC

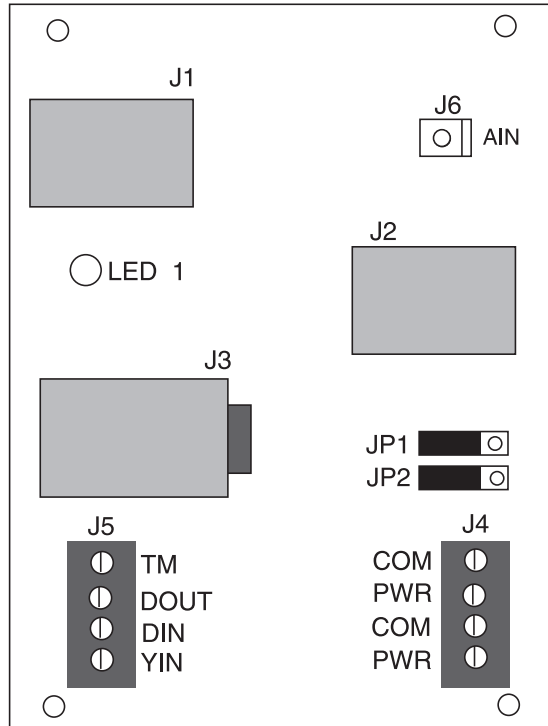
SIGNAL CONTROL BOARD

The signal control board is the "electronic brain" behind the operation of the signal system. By taking a few minutes to study the diagram and read the definitions, you can familiarize yourself with the overall operation of the signal system.

DEFINITIONS

- J1- (Jack 1)** - J1 is used for multiple integrated installations only. In integrated installations, J1 is plugged into J2 of the following board. Atlas 0 carries a variety of modular connectors in 7', 15', and 25' lengths, (Item #'s 6937-6939). See page 11 for further explanation of integrated installation.
- J2- (Jack 2)** - See J1 above.
- J3- (Jack 3)** - J3 is the connection for the 8 pin modular jack from the signal itself.
- J4- (Jack 4)** - J4 is a screw-type power connection terminal strip. It allows stand-alone or daisy-chaining of power leads.

SIGNAL CONTROL BOARD



a. COM - COM is the common, or ground. In stand-alone installation, it is connected to the power supply. Power is 6-22 volts AC or DC. While the signal system will run on AC, Atlas O recommends DC for expansion. Use black wire.*

b. PWR - PWR is the positive or (hot) AC or DC power. In stand-alone installation, it is connected to the power supply. Use red wire.

c. COM - The second COM connection is used in multiple integrated installations. This COM is connected to the next signal board. Use black wire.

d. PWR - The second PWR connection is also used in multiple integrated installations. This PWR is also connected to the next signal board. Use red wire.

5. J5- (Jack 5) - J5 is a screw-type connection strip used for input/output connections.

a. TM - TM is the turnout module connection. It can be connected to either the Atlas O switch signal control board for correct output to block signal control board #6930, or to Custom Signals turnout signal control board. Use blue wire.

b. DOUT - DOUT is the optional detector output. It is used to connect an auxiliary piece of equipment, (no more than +5VDC), such as an LED or relay. Wire color optional.

c. DIN - DIN is the detector input. It is connected to the insulated rail detector lead, (or the detector lead from the Atlas O 2-rail detector board, (#7935 in 2-rail installations). Use green wire.

d. YIN - YIN is the yellow input. This connection is used if a second insulated block is planned to control the yellow "aspect" of the signal independent of the "timed" yellow, which is the default setting. Use yellow wire.

6. J6AIN- (Jumper 6) - J6AIN is the approach input. It is a solder pad that is used with the "approach" lighting feature.

7. JP1- (Jumper 1) - JP1 is used for "approach" lighting options. Both JP1 and JP2 come from the factory with the jumper plugs covered by a black plastic cap.

8. JP2- (Jumper 2) - JP2 is used for searchlight style signals that use a single bi-color LED for three color output, available from Custom Signals.

9. LED1 - LED 1 is used to indicate whether the correct power is going to the circuit board. If lit, it is correct.

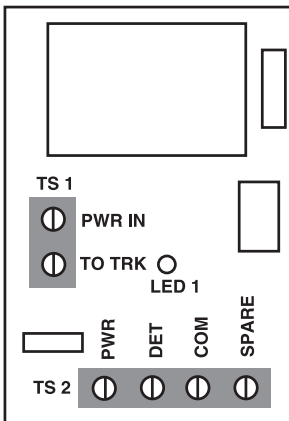
**(Please note-Atlas O recommends their readily available brand of 20 gauge, multi-stranded copper wire that comes in a variety of colors, Item#'s 315-#319.*

TIPS FOR HANDLING THE SIGNAL SYSTEM CIRCUIT BOARD

When handling the signal system circuit board, it is important to follow these simple guidelines to prevent any damage to the circuit board.

1. Unplug your power source before attempting to handle the signal circuit board.
2. Touch some type of metal surface. This action helps protect the circuit board from any damage that could be caused by electrostatic discharge.
3. To avoid generating static electricity, do not walk around the room until you have completed handling or mounting the circuit board.
4. Hold the board by its corners, taking care not to touch the components on the circuit board.
5. Turn off your power supply after every operating session.

#7935 2-RAIL DETECTOR BOARD



DEFINITIONS

TS1

PWR IN - Power from transformer or power supply
TO TRACK - Wire to insulated rail used in "Block"

LED 1 - Used for visual indication of "Block" occupancy. Will be lit whenever "Block" is occupied

TS2

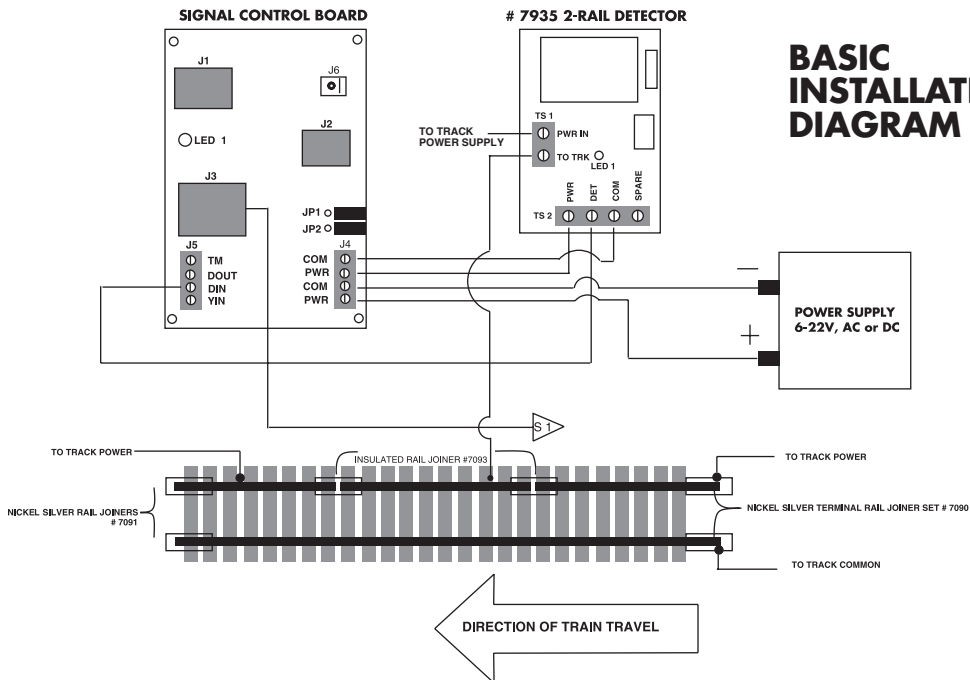
PWR - Circuit board power 6-22VAC or DC
DET - Detector output connects to "DIN" of Signal Control Board
COM - Common or return from power supply
SPARE - Unused

THE BASIC INSTALLATION OF ONE SIGNAL

Now that you have familiarized yourself with the signal board and detector diagrams and definitions on pages 4-7, you are ready to install your first signal using the diagram found below. The initial step is to determine the signal location. The signal is normally placed at the entrance to a block. (A block is any section of track that is electrically isolated from the rest of the layout.) Next to a straight track, the signal should be positioned approximately 2-3 inches from the outside track edge. Placing a signal on a radius should be carefully done in consideration of your longest rolling stock. Experiment with a variety of cars to determine the correct space from the outside track edge.

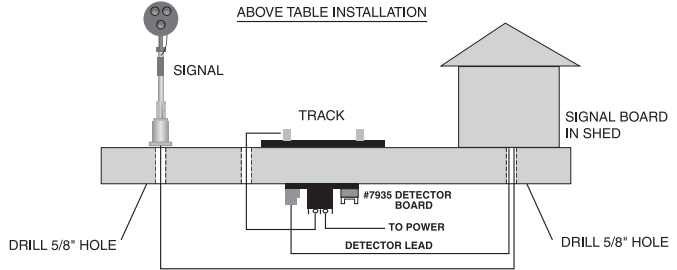
The signal board will be located either within the silver shed that comes with both the single and four pack kits, (Item #'s 7930 and #7934) or it may be mounted under the table with the supplied bracket. The shed can be located on either side of the track in relation to the signal. They should, however, be in close proximity to one another as determined by the length of the signal wire. (See diagrams on right for detailed shed and under the table positioning and installation.)

BASIC INSTALLATION DIAGRAM

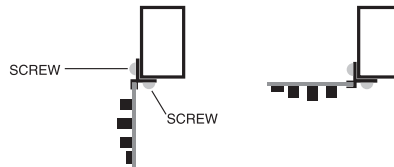
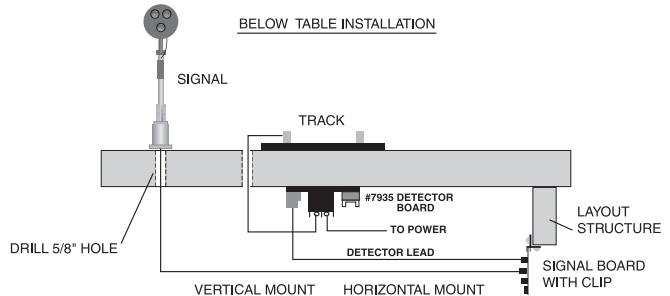


Drill a 5/8" hole under the middle of relay shed location. Run the red and black power wires from the J4 terminal strip, (PWR) of the signal board to power leads of the unplugged source of power, (6-22VAC or DC power pack).

Create an insulated rail section of track. (See page 10 for detailed instructions.) Connect the wire from the DET terminal of the detector board to the J5 terminal strip marked DIN on the signal board. Drill a 1/2" hole under the signal location and drop the plug from your signal into the hole and work it up through the relay shed hole. Plug the 8 pin signal jack into the input marked J3 on the signal board. The installation is now complete.

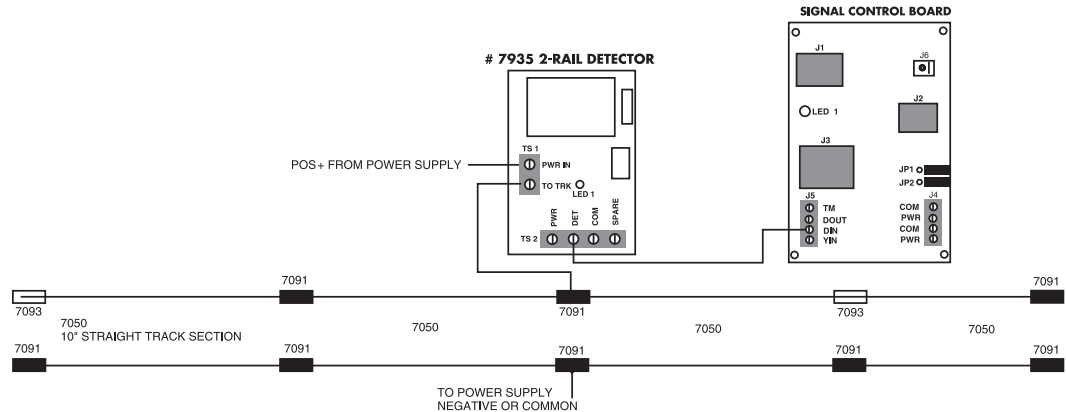


Please Note: The detector board can be attached to the underside of the layout table using double-sided foam tape.



HOW TO MAKE AN INSULATED RAIL SECTION USING ATLAS O TRACK

For best results when using insulated track rails in conjunction with the detector, it is recommended to use a minimum of three 10" sections, (Item #7050), or more. As shown in the diagram below, remove two nickel silver rail joiners, (Item #7091), from one of the running rails and replace with plastic insulated rail joiners, (Item #7093). Between the two insulated rail joiners, solder a detector wire (green) to one of the #7091 nickel silver joiners of the intermediate track sections (Please Note: #7090 Terminal Joiners may also be used). The wire should be of sufficient length to reach the Detector board and is connected to the TO TRACK terminal on the Detector. (#7091 – Solid rectangles in diagram/#7093 – Hollow rectangles in diagram)

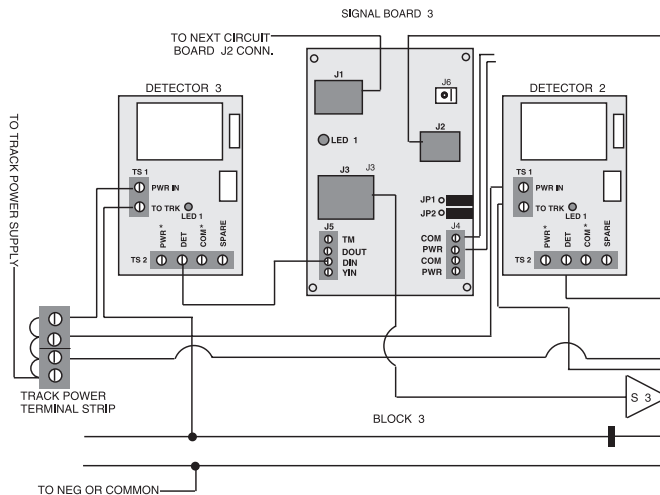


INSTALLING INTEGRATED OPERATION OF 2 OR MORE SIGNALS

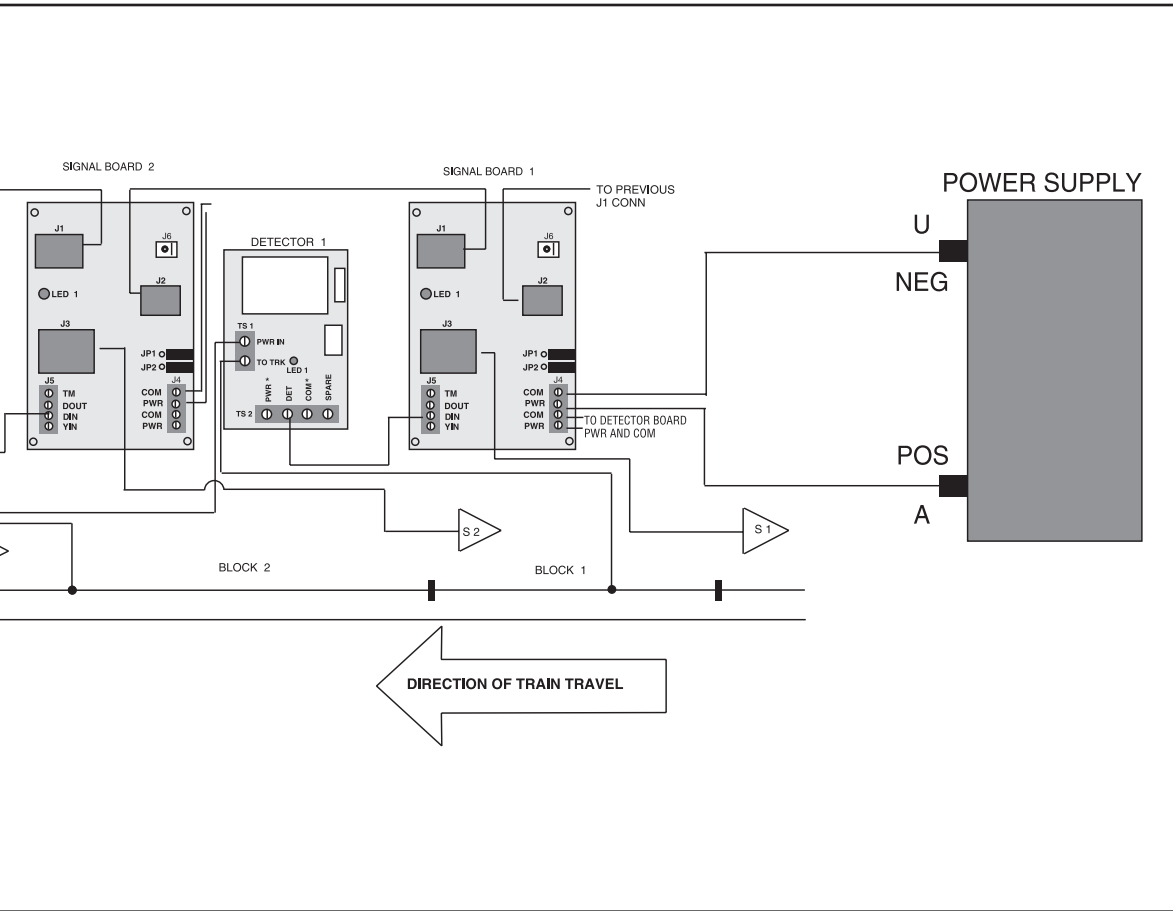
To add integrated signal operation of two or more signals, you need to plug in the modular Atlas \bigcirc Signal Cable (Items #6937- 6939) in the length that is appropriate for your block size. The cable is available in lengths of 7', 15' and 25'.

Plug one end of the cable into J1 of the first signal board. The other end will go into J2 of the second signal board. Repeat for every signal.

Installation of the integrated Signal Cable automatically disengages the timed Red-Yellow-Green aspect operation of the stand-alone signal. All aspects are now under full control of the blocks and signals in-front-of and behind your train.



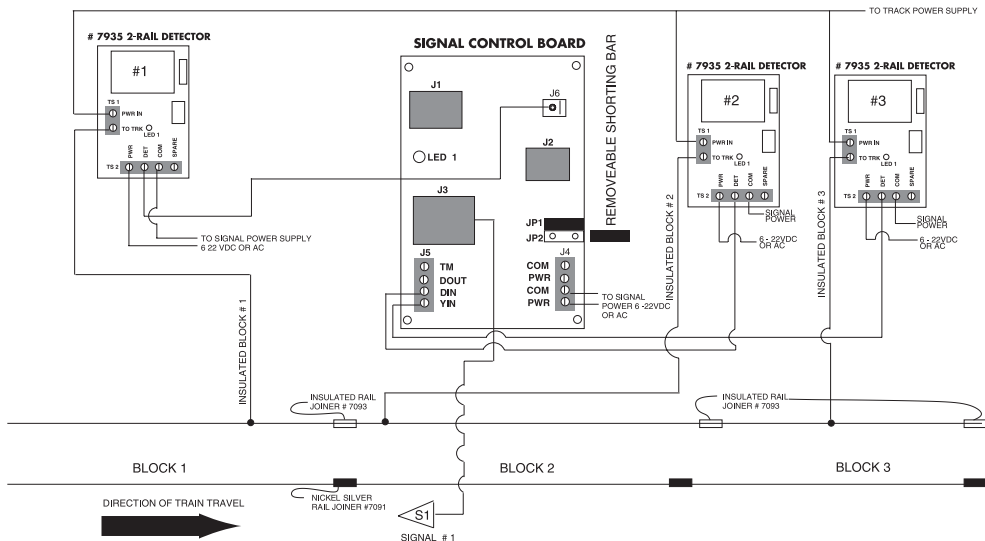
* PWR and COM connections located on detector circuit board can be connected to the spare "PWR" and "COM" terminals of J4 located on the signal control board to eliminate the need to run separate power connections for each board.



APPROACH MODE


On some prototype railroads, the signals remain unlit until a train is approaching. The Atlas \circ Signal System has the provisions to duplicate this operation. In the diagram below, Signal #1, which is connected to Block #2, will remain dark until a train enters Block #1. The signal will then light green for the approaching train.

For stand-alone signal operation, a wire from an insulated rail section in the block ahead of the signal, must be connected to a 2-Rail Detector board (Item #7935) to the TO TRACK terminal on the detector. A wire is then run from the DET terminal of the Detector to the J6 pad on the



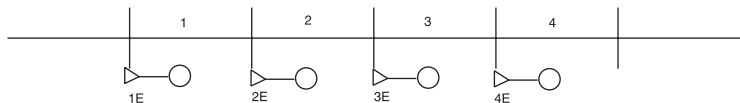
Signal Circuit Board. The wire must be soldered to this pad. Also, a wire from an insulated rail section behind the signal must be connected, through a Detector board, to the YIN terminal of the J5 strip on the Signal Circuit Board. The enclosed jumper plug must be installed across the JP1 pins, (see page 15).

The signal will now follow the pattern of "Off – Green – Red – Off". If a train is occupying Block #2 and another train enters Block #1, the signal will be red. Similarly, if a train is occupying Block #3 and another enters Block #1, the signal will have a yellow aspect.

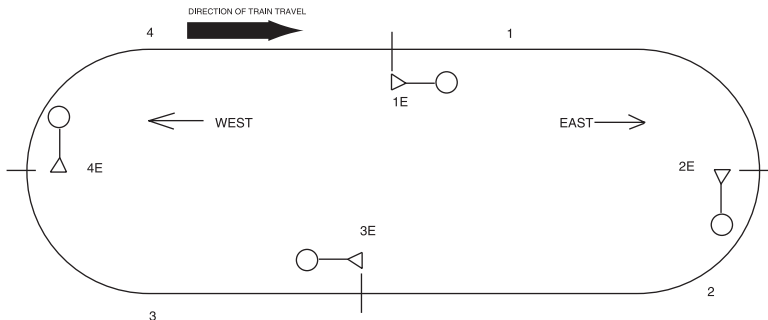
If you are using a fully-integrated wiring scheme, and all of the signals are connected with the Atlas  Signal Cables, approach lighting is very easy.

Only the jumper plugs across the JP1 pins on each of the signal circuit boards is required. Separate wires and detectors for the J6 and YIN terminals are not necessary.

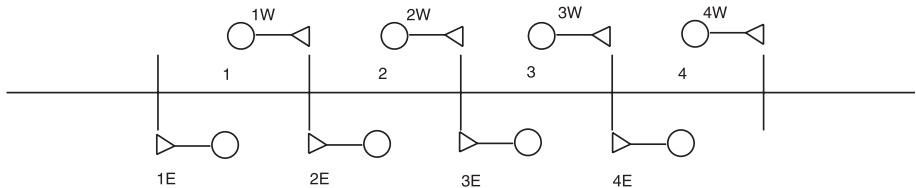
TYPICAL INTEGRATED ONE-DIRECTIONAL SIGNAL SET-UP



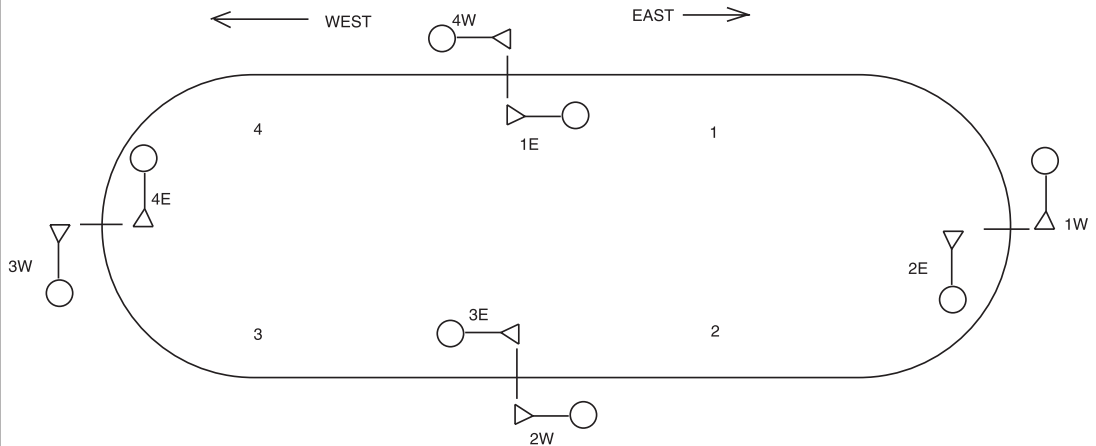
BLOCK NUMBERING EXAMPLE TYPICAL 4 X 8 LAYOUT WITH 4 BLOCKS INSTALLED



TYPICAL INTEGRATED BI-DIRECTIONAL SIGNAL SET-UP



BLOCK NUMBERING AND SIGNAL IDENTIFICATION AND PLACEMENT FOR A BI-DIRECTIONAL INSTALLATION USING FOUR BLOCKS AND FOUR INSULATED RAIL SECTIONS



IN THE ABOVE DIAGRAM SIGNAL CONTROL BOARDS 1E AND 1W WOULD BOTH BE CONNECTED TO THE SAME INSULATED RAIL SECTION CREATED FOR BLOCK ONE

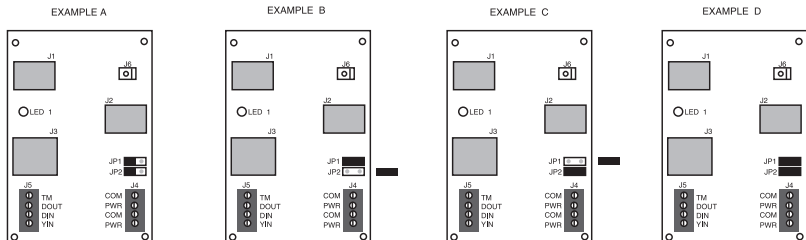
SETTING THE JUMPER PLUGS

The jumper plugs are found on the right hand side of the signal board, location JP1 and JP2. The default, (as delivered) setting has both jumpers partially covered. Basic stand-alone and integrated operation will not require movement of these plugs. The caps are moved into different positions if approach mode, search light, or more advanced optional features are wanted. If needed, the caps may be removed by carefully inserting a knife along the bottom edge of the plastic cap and gently twisting the plastic up. Use the following chart with the corresponding examples below to determine the correct jumper settings for your usage:

Example

Description

- A Both jumpers are partially covered-This is the standard, default setting. Neither approach nor searchlight features are active.
- B The JP1 plug is covered and the JP2 is uncovered-This setting initiates the approach mode option explained on pages 13 and 14 in this manual.
- C The JP2 plug is covered and the JP1 plug is uncovered. This is used only on signals using a single bi-color LED. This option allows the yellow aspect to be added to the bi-color LED.
- D JP1 and JP2 are covered. This would be used if you installed a searchlight style target using a bi-color LED and you wanted it to work in the approach mode.

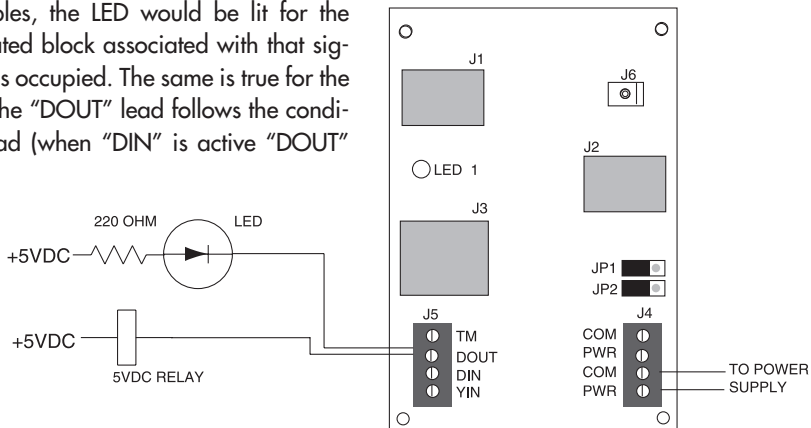


HOW TO USE THE DOUT OPTIONAL FEATURE

DOUT stands for detector output which is located on the lower left hand side J5 terminal strip of the signal control circuit board, (see diagram below). It is used to connect an auxiliary piece of equipment such as a control panel LED or a relay. An important point to keep in mind is that whatever optional piece of equipment you install, it cannot have an operating current that exceeds +5VDC.

The below diagram illustrates some basic applications that can be accomplished by utilizing the output of the DOUT lead found at J5 on the signal board. The top application, shown to the left of the board, represents an LED that could be mounted in a control panel setting where the operator wants to see a visual indication of what blocks are occupied without leaving the control panel. A second application pictures the coil of a relay. This relay could be used to operate a variety of other applications by using the contact sets, (DPDT relay), associated with the relay.

In the above examples, the LED would be lit for the entire time the insulated block associated with that signal control board was occupied. The same is true for the relay. The output of the "DOUT" lead follows the condition of the "DIN" lead (when "DIN" is active "DOUT" will go active).



ATLAS O 21ST CENTURY SIGNAL SYSTEM™ PRODUCTS

| 2-RAIL ITEM# | DESCRIPTION |
|---------------------|---|
| 7930 | Realistic Road Signal - Type "G" signal - <i>red, green and yellow aspects.</i> (Stand-alone operation) |
| 7934 | FOUR PACK Realistic Road Signal (SAVE!) (Integrated operation) |
| 7935 | 2-Rail Detector |
| 6937 | 7' Signal Cable (<i>use 3-Rail Item #</i>) |
| 6938 | 15' Signal Cable (<i>use 3-Rail Item #</i>) |
| 6939 | 25' Signal Cable (<i>use 3-Rail Item #</i>) |

To see a complete list of products that Atlas O has to offer, please visit your local hobby store or check out <http://www.atlasO.com>. You may also send \$5 to the address shown on the back cover for a Track and Accessories Catalog.

CONTACT INFORMATION

If you have any questions about operating or installing your Atlas O Signal System, please call 908-687-9590 (Steve, ext. 7142).

For more information about compatible signal products, please visit the Custom Signals web site at <http://www.customsignals.com> or call 845-643-1318.

WARRANTY

Atlas O, LLC. warrants that this Signal System product will be free from defects in material and workmanship for a period of 90 days from the date of purchase. If this Signal System fails during the warranty period, carefully pack the item in the original carton, together with the dated sales receipt, and return to: Atlas O Signal System Warranty, 378 Florence Avenue, Hillside, NJ 07205. Defects due to misuse, improper maintenance and/or abuse are not covered by the warranty. Items that have been disassembled by the modeler or anyone other than an Atlas repair person are not covered by the warranty. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.

CAUTION - This is an electrically operated product. It is not recommended for children under 12 years of age, as with all electric products.

Precautions should be observed during the handling and use to reduce the risk of electric shock.

Please unplug your power source after you have finished your operating session.



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