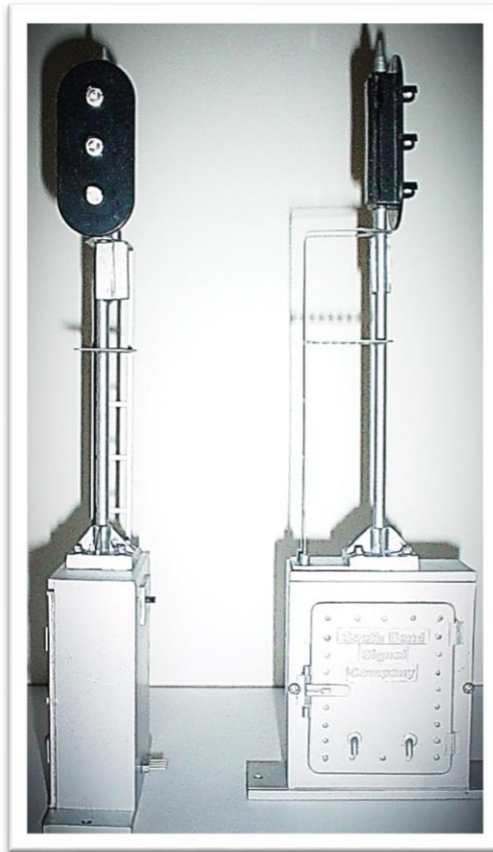


# South Bend Signal Company

## Radio Controlled Block Signals



**AC 100, AC 101, AC 102, AC 103, AC 104**

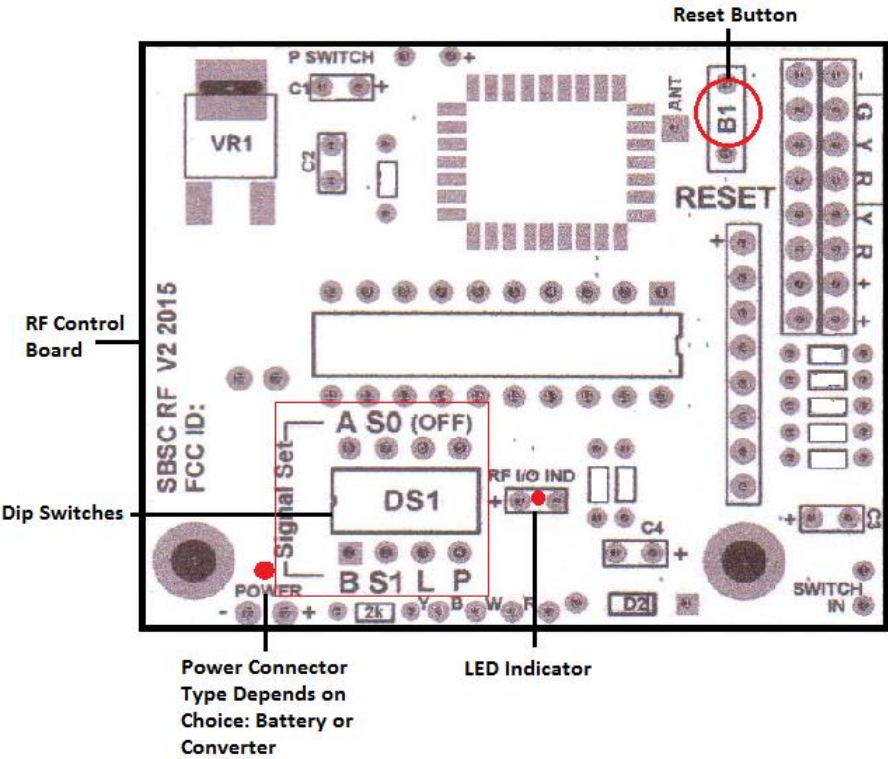
**Manual 2015**

Signal Specifications

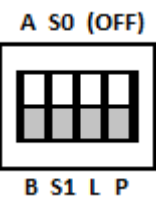
- Large Scale (1/26<sup>th</sup> Scale)
- Styrene and Brass Construction
- Super Bright LEDS
- 2 Power choices (9v snap or NIMH rechargeable)
- On/Off Power Switch
- Plug-in Infrared Detection
- RF Control with a radio transceiver operating at 2.4 GHZ
- Automatic Block Signaling (ABS)\*
- Easy System Setup
- Complete Manual

Figure 1

Signal Control Board



DIP Switch



Dip Switch	Position	Description	Last Signal
A or B	Up	Sig Type A	X
	Down	Sig Type B	X
S0 or S1	Up	Sig # 0	X
	Down	Sig # 1	X
L	Down	Last Sig	BO Only*
P	Down	PAIR	

\* BO only the L dip switch should be set when necessary

## Power Options

The signal has two power options: 9 volt battery snap for a standard 9 volt battery or a 3.6volt NIMH rechargeable battery (1200 ma/h).

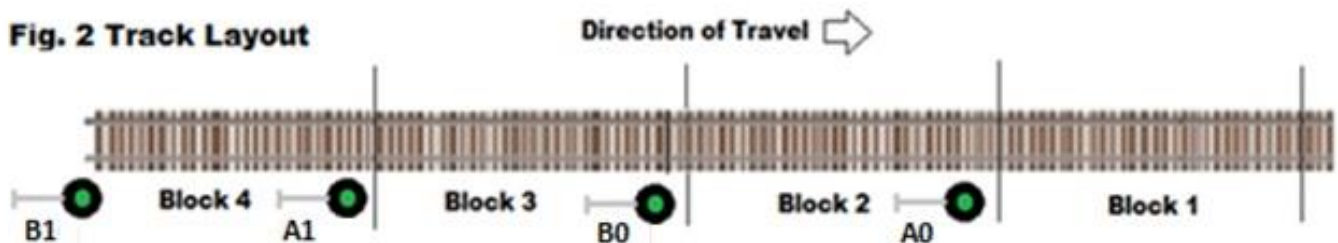
**[1] 9volt battery snap:** The clip is a standard 9 volt battery snap for a 9volt battery. A rechargeable 9 volt battery is recommended. The run time is about 2 hours.

**[2] 3.6volt NIMH rechargeable battery:** This battery is a NIMH rechargeable high-power battery. The run time is about 6 hours on a charge. It comes installed with a plug for recharging. Charger is not included. To order a charger go to [BatterySpace.com](http://BatterySpace.com) and order **product ID 2646**.

## Signal Setup

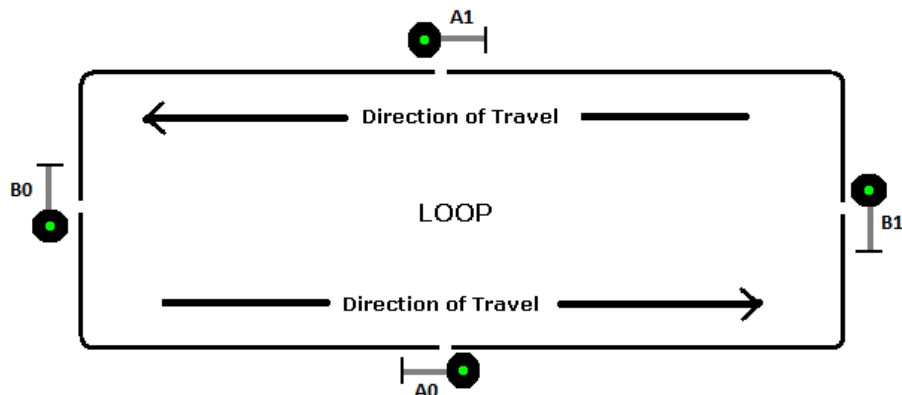
The signals must be configured to operate properly. This requires that the signal be configured to meet your track layout. **Figure 2** is a diagram of track layouts for four signal blocks. **A signal block is a section of track that is protected by signals.** The signals display the status of the block. Green (proceed), yellow (proceed with caution the next block is occupied), and red (this block is occupied). The system is an Automatic Block Signal System (ABS). When a train is detected as it passes over the detector the signal drops to red. The system sends a message to the next signal back to turn yellow. Each signal is set to a signal type (**A or B**), a signal # (**S0 OR S1**), and if the signal **B0** is the last signal in the sequence set the dip switch (**L**) **down**. The signal layout design must always end with a **B** type signal if your track layout is a loop. The system requires that at least 2 signals be installed and additional signal be in multiples of 2. Always begin the signals system with **A0** and end with the last signal as either **B0** or **B1**. Design the signal layout before setting up the signals.

**Figure 2 Track Layout**



### Track Signal Configuration

One Direction of Travel



## Configuring the Signals for Operation

- [1] Remove the 2 screws holding the cover of the relay cabinet.
- [2] Be sure that the on/off switch is in the off position (**opposite the red dot**).
- [3] The NIMH battery is charged when installed. To recharge it you will need the battery charger (part# LSRFB).  
**Follow the instructions that come with the charger>**
- [4] **DO NOT** plug in the detector at this time.

### Step 2

- [1] Set the signal type by moving the dip switch to **A** (up) or **B** (down).
- [2] Set the signal # by moving the dip switch to S0 (up) or S1 (down).
- [3] If your track is a loop and **B0** is the last signal of the loop then set the **L** dip switch (down). **B0** is the only setting for the L dip switch that needs to be set for the last signal.

### The PAIRING Process

The transceivers for each signal must be paired so that the signals can communicate with each other. Using **Figure 2** as a reference and the chart below to pair the signals. If you have more than 4 signals repeat the pairing process for the additional signals. For a track configuration that is a loop make sure that if the last signal in the sequence is a B type signal. If the last signal is **B0** type the **L** dip switch is set (down) and pair the last signal to the first signal in the sequence.

Signal Type	Signal #
AO	B0
BO	A1
A1	B1
B1	A0 Loop

### PAIRING Steps

- [1] The battery must be installed with the on/off switch in the (off) position (slide to position opposite the red dot).
- [2] The detector should **NOT** be plugged in.
- [3] Move the signals 2 feet apart.
- [4] The signals should be configured according the instructions for signal configuration above. Pair (**A0 to B0**), (**B0 to A1**), (**A1 to B1**) and (**B1 to A0**). The sequence of signals must end with a **B** type signal. If the last signal in the sequence is **B0** the **L** dip switch must be set down before pairing it with the first signal **A0**.
- [5] Turn the two signals on and wait for the signals to turn green. Flip the **P** dip switch for each signal to the down position.
- [6] The Mode Indicator **LED (MODE\_IND)** provides feedback about the current state of the module. When the **PAIRING** process is initiated the LED will blink slowly. Once a pair is established the LED on both signals will begin blinking rapidly. Once the blinking is rapid on both signals the PAIRING process is complete.
- [7] Turn off power to both signals.
- [8] Move the **P** dip switch to the **up** for the first signal. With a Sharpie pen write the block # (**1, 2, 3...**) and the signal type (**A or B**) on the bottom of the signal. This will make placing and removing the signals from the layout much easier. Set the first signal of this pair aside.
- 8)** Repeat this process (steps **1** through **8** for the remaining signals to be paired.

**Note:** If you think that you have made a mistake in the pairing process or want to change the pairing between 2 signals the paired signals can be **RESET** by holding down their **RESET BUTTONS** and turning on the signal until the signal's green light turns on and then turn the signal off.

### Testing the Signal System

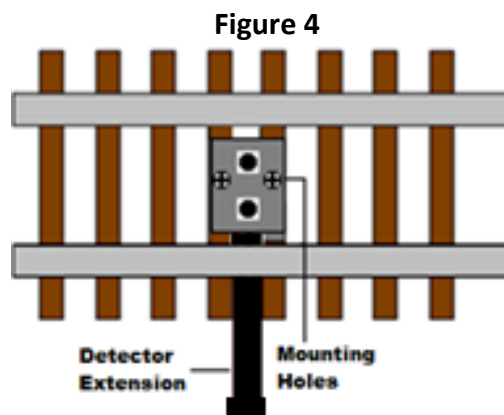
Once the signals have been paired, you can do a preliminary test. Test 2 paired signals at a time. Plug in a detector for each signal. Turn on the 2 signals. With no rolling stock over the detectors the 2 signals should be green. Covering the detector for the first signal. It will be red and the other signal will be yellow. If this is not test result, check your settings for the two signals and try the test again. If you find that the signals were not **PAIRED** properly the signals that were paired can be reset to their original state by pressing the **RESET** button (See **Note** above). This will delete the pairing. Once these two blocks test out OK continue around the track until all signals have been checked. Turn off all signals and replace the relay box covers for each signal. Permanently install the detector at the signal location.

### How the Detector Works

The detector is a combination LED Infrared emitter and a paired Infrared receiver. The infrared Led emits an Infrared light up vertically. The light is reflected off the bottom of the rolling stock and is seen by the receiver which sends a control signal to the microcontroller on the system board and sets the signal to red. The receiver has a clear lens. The detector is weather proof so it can be permanently installed to the track.

### Installing the Detector

After determining the location of the signal next to the track install the detector. The location should be just before the beginning of the block boundary. The signals should be placed approximate 30 ft. apart maximum. The detector is placed centered between two ties with the extension under the rail. Use the two screws provided to install the detector to the ties. The detectors are sealed so they can be left in the track. Keep the detector clean. No object, ballast or dirt should cover any part of the detector. Use a soft brush to clean the top of the detector. See **Figure 4**



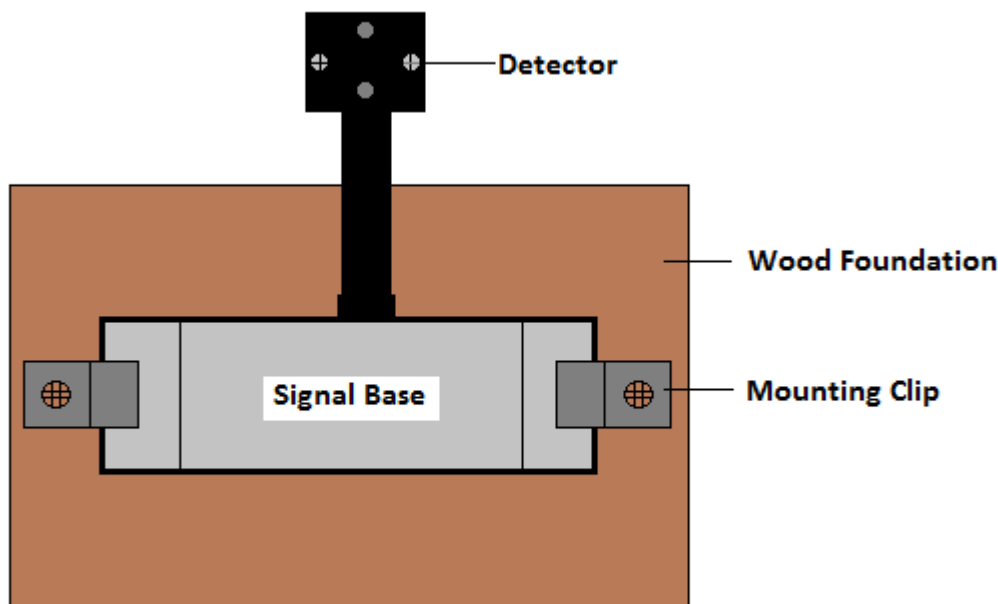
## Installing Signals on the Layout

### Positioning Signals

The signals operate on a radio frequency of 2.4 GHz. The signals can be placed up to 40 feet apart with some restrictions. The signals must be able to communicate through the air so there should be a clear line of sight as much as possible between the signals. The radiation from the signal is emitted in a bubble expanding over a distance. If the transmission is blocked by trees, bushes, buildings etc. the signals may not work properly. Adjust the signal positions accordingly. Once the signal locations have been determined and working properly they can be installed at the locations.

### Signal Installation

The signal is provided with 2 screws and 2 quick release mounting clips. The clips are installed so that they hold down the signal. The clips are installed so that they are over the end of the base plate on each side. (See Fig. 5) Use a piece of treated lumber to mount the signal on. Install the detector at the location that you have established and plug in the signal. The mounting board should be set so that the signal is perpendicular to the board and at the level of the detector plug. Set a mounting clip on one side of the base and mark the hole on board for the clip screw. Do not place the clip tight up against the signal base. It must be able to swivel so that the signal can be removed. Drill a 3/32<sup>nd</sup> inch hole to receive the screw. Do the same process for the clip on the other end of the base. Use the ½ inch screws provided to attach the clips over the base. Do not over tighten. The clips must be able to swivel to remove the signal.



**Signal Quick Release Mounting Clips**

## **Weather Considerations**

However you install the signals weather is a consideration. The signals are weather resistant but not totally water proof. Never allow the signals to be hit with a sprinkler system. Rain can also be a problem. It is best to use some type of cover over the signals that is water resistant such as a plastic bag or a 1 liter bottle with the bottom cut off. Another choice is to use a 4" piece of PVC pipe cut to length with a cap on the end. Just slip the pipe over signal. Make sure that the base is set so that water drains away from the signal. The best way to guard against water damage is to bring the signals in when the railroad is not in use. The quick release clips make this easy

Thanks for purchasing our signals.

**Jim Leslie**

**Address: 2303 Creek Rd. Niles, MI 49120**

**E-mail: [sbsignal@live.com](mailto:sbsignal@live.com)**

**Website: [sbsignal.com](http://sbsignal.com)**

**Phone: 269-357-5221**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC ID: 2AEB9AC101-RC**

This device complies with Part 15 of the FCC Rules.  
Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.
- (3) Note: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- (4) The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.