BigSound™ Model 95

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Introduction

To you, our much appreciated customer:

Thank you for your purchase of our BigSound™ system! We trust you will enjoy many hours of listening pleasure as you operate your favorite locomotive equipped with Phoenix Sound. If we can be of service to you, please don't hesitate to give us a call.

CAUTION!

-Beware of static electricity, it is the enemy!
-Be sure to follow the wiring instructions and diagrams.
-Ensure the sound chips are oriented correctly in their sockets.
-Be sure the battery is installed correctly in terminal block P1 and that it is fully charged.
-Do not apply voltage to the terminal block marked P2.

Even though your BigSound™ 95 has built in protection against incorrect wiring, prevent damage to the CPU and other components by guarding against static conditions and taking a moment to review the wiring diagram and installation instructions before you begin work.

If you need to return your board for any reason, protect it by using the packing box we provided. It has anti-static foam padding that will protect against static electricity and also cushion your unit so that it should arrive at Phoenix Sound without damage. We are not responsible for damage due to inadequate packing.

Our warranty is packed in the box with your system. Our goal is to provide you with outstanding realistic sound for your model railroad; we welcome your comments, suggestions, and even your disappointment – if any.

HAPPY LISTENING!

Section 1: The Sound Board & Its Components

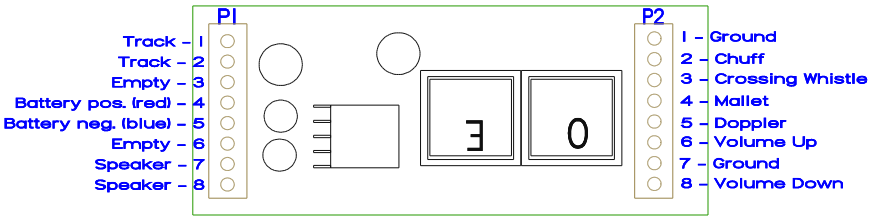
The BigSound™ board for steam is pictured below to help you correctly wire your unit. Be sure to study the appropriate schematic carefully to avoid unwanted results.

On each end of the board is a series of 8 screw terminals numbered 1 through 8. The eight positions on the left side of the board (as pictured above) comprise the P1 Block; the eight positions on the right side of the board comprise the P2 Block. Each terminal controls a specific function or feature of the BigSound™. Most of the wire ends of the kit components have been tinned to make sure you get a good contact when you screw the wires into the terminals. For any wires that are not tinned, we suggest twisting the strands together firmly before inserting the wire into the terminal.

Model 95 Connections

P1 - Left Side	P2 – Right Side
1 – Track	1 – Trigger Ground
2 – Track	2 – Chuff trigger
3 – <*Empty*>	3 – Crossing whistle trigger
4 – Battery positive (red)	4 – Double Chuff / Mallet
5 – Battery negative (blue)	5 – Doppler trigger
6 – <*Empty*>	6 – Volume Increase
7 – Speaker	7 – Volume Ground
8 – Speaker	8 – Volume Decrease

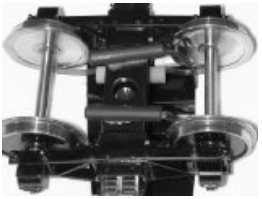
BE SURE THAT YOU ARE USING A TRANSFORMER WITH ENOUGH POWER TO DRIVE YOUR TRAIN WITH THE BIGSOUND™ INSTALLED. WE RECOMMEND A CONTROLLER WITH A MINIMUM OUTPUT OF 2 AMPS (30VA) FOR OPTIMAL PERFORMANCE.



1.1: Reed Switches

Your kit contains three brown cylindrical reed switches, each with two long connecting wires. One switch is used to synchronize the chuff rate which shall be covered later in this guide. The other two can be used for feature activation by track magnets if you so choose.

The crossing whistle will sound without a track magnet triggering a reed switch; this is done by increasing the speed of the engine. If you wish to sound the crossing whistle only at specific locations then a reed switch is necessary. Please see the connection chart for wiring points.



Placement of the reed switches is a matter of personal preference but a few things to keep in mind follow. Keep the reed switches away from the speaker magnet and strong motor magnets. Reed switches should ride about ¼" above the rail head and be spaced ½" on either side of center.

1.2: 3-D SOUND™ Doppler Effect

For Doppler effect, attach the wire leads from the reed switch to terminal block P2 at positions 1 and 5. To activate Doppler, use two magnets and place them on your layout at different locations. The first magnet triggers the Doppler sound as your train approaches. As the train rushes past your observation point and then past the second magnet, you hear our 3-D Sound™ as the train recedes into the distance. Once past the second magnet, the chuff exhaust returns to its normal state.

1.3: Mallet Effect

When you wish to hear the distinctive 8-chuff exhaust of a mallet type engine or when you are double heading engines and want to hear them move in and out of phase, there are two methods to activate this feature:

1. Connect the small brown toggle switch included with your kit to P2 terminals 4 & 1. When in one direction the locomotive will chuff 'normally'; throw the switch to the other position to activate double chuff mode.
2. Place a jumper wire in terminal block P2 between positions 4 & 1. Insert the jumper with the system powered off. Mallet mode will be

active when the system powers up with the jumper in place. Shut down, remove the jumper and then restart to return to single chuff mode.

1.4: The Volume Switch

The toggle switch in your kit controls the volume of your BigSound™ board. Connect it to the P2 terminal block in positions 6, 7, and 8 with the switch's center wire in position 7. Simply press the lever in one direction or the other and hold until the volume you hear is what you prefer and then release; the lever returns to center position. Once you set the level to your liking, and as long as your battery has a full charge, the setting will remain each time the system starts. If the volume begins to fade from the set point during operation, it's time to charge the battery.

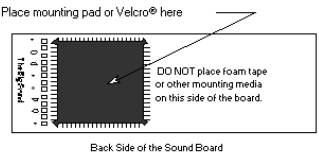
There are as many ways and locations to mount the volume control switch as there are train enthusiasts. The best locations are unobtrusive yet accessible Typically floors of tenders are boxcars work well. Many models have removable pieces, doors, etc. that work well. The proper hole size is 15/64”.

Section 2: Installation and Mounting Considerations

We recommend installation in a tender, boxcar, or other trailing car rather than in an engine for steam locomotives. It is a much simpler installation than taking the engine apart. A boxcar, water car, or tender all work very well. Small squares of foam tape are enclosed in your kit for mounting the BigSound™ system. Mounting foam is available at many hardware stores, hobby shops and general home supply centers. Hook and loop tape (Velcro®) is another popular mounting media that allows easy extraction of the components from the car.

2.1: The Sound Board

The foam tape is best attached to the bottom of the board on the black square (microprocessor) behind the sound chip sockets. DO NOT apply the foam tape on top of other components on the board, this could cause damage to the board. Hook and loop tape can be used, this also should be placed only on the microprocessor.



Back Side of the Sound Board

2.2: The Speaker

To avoid speaker vibration at high volume, the thin walls of some cars should be reinforced for added support and rigidity. Thin sheets of stiff foam (such as Styrofoam™) can be used to line the interior walls of the sound car. The use of silicone sealant around the rim of the speaker will help keep vibration

noise from becoming a nuisance.

Some locomotives have speaker mounting provisions but in many instances you will need to drill holes before mounting the speaker.

2.3: Chuff Reed Switch

One of the reed switches in your kit is used along with the supplied magnets to regulate the chuff for your system. The key to obtaining the correct chuff response is careful attention to the positioning of the reed switch relative to the axle magnets.

Although it is sometimes challenging to get the correct synchronization using magnets and a reed switch, it is well worth the effort. The reed switch has a long lifetime; once it is correctly positioned, your system should be trouble-free. We strongly recommend taking the time to install the magnets and chuff reed switch.

The chuff reed switch must be connected to the P2 terminal block at positions 1 and 2. The switch should be mounted as far away from the speaker magnet as possible. If it is placed directly beneath the speaker holes, the speaker magnet may cause the chuff to be erratic or even non-existent since the large magnet on the speaker may interfere with the switch response.

You may need to experiment to get reliable triggering from rotating axle magnets. After mounting the magnets on the axle, hold the reed switch in various possible positions and hook something to the reed so you can tell when it's tripping. An ohm meter with a beeper works great. You can point the reed switch directly at the axle/magnets but there will be less tolerance. With the magnets sweeping the side of the reed switch (as shown) a clearance of about 3/16" is usually about right. If you are too close you may get extra closures – one as the magnet approaches, and one as it leaves.

NOTE: TO OBTAIN BEST RESULTS, INSTALL MAGNETS ON ONE AXLE 180° APART. THE SWITCH SHOULD BE POSITIONED SO THAT THE TRUCK DOES NOT HIT IT WHEN IT SWIVELING.

Section 3: Troubleshooting

3.1: Missed or Erratic Chuff

If the system skips a beat every once in a while after proper installation the problem may be the result of the wheel binding and not turning smoothly as the train maneuvers curves and dips. Obstructed wheel movement prevents the

magnets from passing by the chuff reed switch in a consistent fashion. To check your car, turn it upside down and swing the truck back and forth. If the truck rubs the king post or does not move easily up and down and side to side, free up the fit. If the truck movement is not too stiff, remove the car body and put a washer on the king post. Reattach the car and check the movement. If this simple solution does not give the "float" that is needed, you may have to open the hole to increase clearance. Once the wheels turn properly along the track the problem should be gone.

If you experience consistently erratic chuffs, experiment with the placement of the magnets on the axle and/or adjustments in the distance between the reed switch and magnets. Every installation is unique.

The chuff trigger too often causing a double chuff as the magnet passes by the reed switch. When the chuff skips, the rhythm may sound odd, erratic or seem the engine is traveling too fast. As double chuffing occurs, the whistle will blow too often and at slow speeds; the BigSound™ system thinks the engine is going much faster, and triggers the crossing whistle.

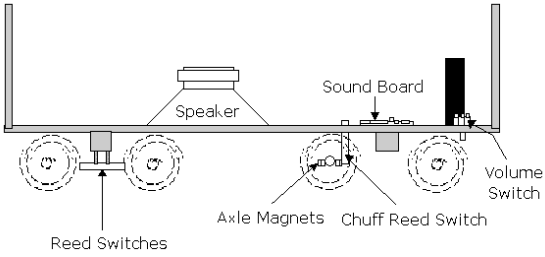
3.2: Power

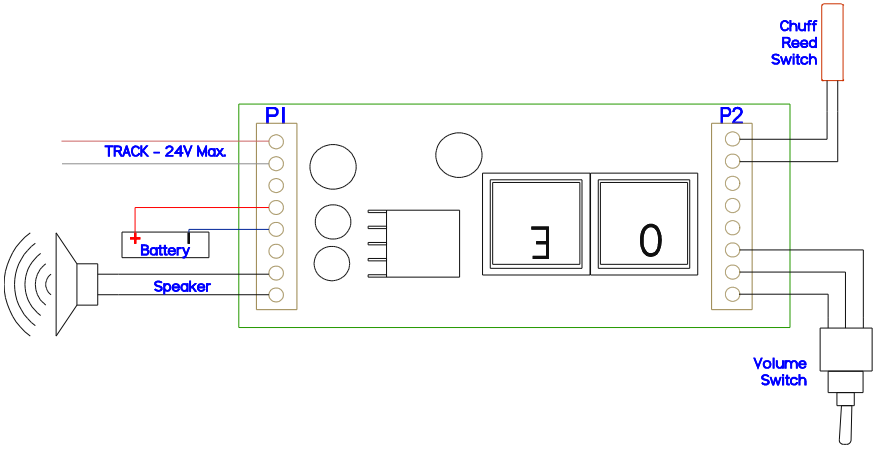
We recommend at least two sources of power input; e.g. two axles with metal wheels and brush pickups. Some manufacturers install sockets for track power in their cars designated for sound – these sockets can be used with the BigSound™ system as a second source of electrical pick up. If your car or tender seems to have poor pick up through the engine, try using two metal wheel sets instead.

If the BigSound™ board is not getting consistent power, the sound sequence may sputter or reset unexpectedly; the train may move a short distance with no sound and then suddenly burst into full sound. The problem may be as simple as dirty wheels or track, coating on the brushes or poor pick up from the car or tender. A little alcohol on a cotton ball will remove debris from the wheels and track.

Blackened wheels are very popular and add a special look to your train, however the blackening agent interferes with the conductivity of the wheels. To ensure current flow, carefully scrape away some of the black finish on the pickup wheel where it makes rail contact, this is not visible and gives the current a clear path through the wheels.

Section 4: Suggested Placement and Wiring





Section 5: AutoChuff™ Board

The AutoChuff™ board can be used in place of a reed switch to synchronize the chuff with the engine speed. The AutoChuff™ board converts the track voltage into a signal pulse to trigger the chuff, varying the speed in relation to the track voltage.

5.1: Wiring the AutoChuff™ Board

1. Connect the two adjacent black wires from the AutoChuff™ board to the sound board track inputs, P1 terminals 1 & 2.
2. From the opposite end of the AutoChuff™ board connect the red wire to P2 terminal 2 and the black wire to P2 terminal 1.

5.2 Start and Rate Adjustment Potentiometers

When you are using the AutoChuff™ board, the chuff start voltage and the chuff rate can be adjusted to synchronize the chuff with the motion of the train.

The pot on side with the two black wires sets the voltage at which the BigSound™ begins to chuff. Set this pot first by using a small screwdriver. If the screwdriver is too small, it will not lock in the slots on either side of the turning ring of the pot. The pot moves 360°; continued rotation in one direction will return you to the starting position. The pot on the other side sets the chuff rate. After you set the chuff start voltage, adjust the second pot to get the proper number of chuffs to correspond to the train speed. In order to synchronize the chuff, the above process may have to be repeated after running the train around the track and observing how the chuff rate corresponds to the train movement.

5.3 Jumper Options

Option selection jumpers are located near the middle of the board. These can be used to further adjust the speed of the chuff as well as enable demonstration mode. Options are selected by removing jumpers from pins as shown below.

The medium range is a typical starting point for large scale engines.