

Steam Tug Boat Sound

by **DALLEE** 246 W. Main St.
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CAUTION: This device can be damaged by static discharge. Please exercise care during installation to avoid this possibility. Discharge yourself to an electrical ground (outlet cover screw or other appropriate ground) before removing this device from its anti-static bag. Please read instruction sheet completely before attempting to install and operate this product.

Save the anti-static bag for possible reuse of storing or shipping the sound unit!

OVERVIEW:

This device is an electronic, self contained, sound system for installation in model Tug Boats or other Boats that are designed to operate with DC power and various types of control systems.

An on/off switch (not included) must be used to power the sound unit on and off in some applications. The audio amplifier can produce 1.1 watt of power which is in excess of what most small speakers can handle. The speaker impedance must be 8 ohms or higher. Sound volume is adjustable. Refer to our catalog or web site (www.dallee.com) for available speakers. If higher wattage is needed, an auxiliary amplifier may be used. Item 671 or 672 is ideal for this application. Besides being an 11 or 22 watt amplifier, the amplifier also contains Treble and Bass controls.

Sounds produced include user controlled air Whistle, Bell, and Cylinder Blow Down and main sounds on/off (leaves the main sounds off while allowing for horn operation). Non-user controllable sounds include the Tug Boat exhaust chuff which automatically adjusts to the speed of the motor. This can also be controlled via the "SYNC" input for manual operation.

INSTALLATION INSTRUCTIONS:

The sound system consists of a printed circuit board, a speaker, four 2-pin connectors with wires and one 3-pin connector with wires.

Refer to the drawing on page 3 for installation and controls on the sound board. Before proceeding with the installation read the balance of the instructions carefully so you will be completely familiar with what is required and what sounds you should hear.

The circuit board should be mounted so that at minimum, the volume control is accessible either through the frame or via a hatch or a hole in the deck. Be certain that the components on the circuit board do not come in contact with any metal objects, or water, as such contact can destroy the sound system. If contact to water occurs, immediately power the sound system off, if not already, and dry the board thoroughly before applying power again. The speaker should be mounted as per available space bearing in mind that sound reproduction is enhanced when a speaker is properly enclosed and baffled. The hull of a boat makes for a great baffle.

For proper power, this system can utilize battery power from one 9 volt or 6 AA or 6 AAA batteries in series to maximize volume potential and battery life or other battery systems up to 28 volts DC. The power to operate the sound system can be the same as the power for the remote receiver as well. When connecting the battery (DC) power leads be absolutely certain that wires connect to the proper DC input leads, i.e. proper polarity, plus to "+" and minus to "-". **IF THESE CONNECTIONS ARE REVERSED YOU WILL DAMAGE THE SOUND SYSTEM.** This is not covered under any warranty and will be obvious to us when returned for repair (tracks are burned through on the circuit board and parts can be totally destroyed). Damage resulting from water damage, loose wires or other metal making contact with the circuit board or its components is also not covered under warranty. These sound systems are thoroughly tested and inspected before packing to insure proper function. There is a minimum charge of \$35.00 (+\$9.75 s/i, also s/s tax in PA) for non-warranty repair so please be careful when making these power connections. The sound system is packaged in an anti-static bag. It should be stored there until installed. The anti-static bag should be saved in the event that you should need to return it for repairs or keep it in storage between installations. Be sure to discharge yourself to a ground potential before handling any electronic devices to prevent any pre-mature damage from static discharges to the board.

SOUND INFORMATION:

WHISTLE: sound is controlled by the WHISTLE input by a momentary push button or by remote function, dependent upon the type of installation. The WHISTLE will sound as long you are holding the control switch input on. This will allow you to actually play the WHISTLE sound and signal as a real Tug Boat would.

BELL: sound of the BELL is controlled with a toggle switch or by remote function, dependent upon the type of installation. To maintain BELL sounds, the input switch must remain closed. When deactivating, the BELL will stop at the end of a ring and the Tug Boat sound will return to the correct chuff setting. To obtain simultaneous chuff and bell play, two systems must be utilized. You can also use the CHUFF board, item 711, to obtain a wide selection of chuff sounds.

EXHAUST CHUFF is the most notable sound of a steam boat in motion. The sound is the result of the used steam from the cylinders being vented through the stack. Each cylinder will exhaust twice during each drive wheel revolution and since most steam boats have two cylinders, the exhaust should chuff four times for each drive wheel revolution. EXHAUST CHUFF sounds should vary from a very slow chuff rate to an almost continuous roar at high speed. EXHAUST CHUFF should also vary as to the load on the engine with a heavy load making a louder exhaust. This sound system will vary the EXHAUST CHUFF sound either by voltage supplied to the motor or, as an option using switch contacts, our Reed Switch unit (Item #584), or our OPTICAL INPUT (Item #583), with actual movement of the drive wheel. When the sound system

is initially powered on, voltage variable automatic exhaust chuff is in operation. The EXHAUST CHUFF volume will increase above normal during acceleration and will be lower when decelerating.

CYLINDER BLOW DOWN is required to remove condensate that accumulates in the cylinders when a steam engine has been at rest. This condensate must be exhausted from the cylinders prior to the pistons being powered by steam or there can be damage to the cylinders. CYLINDER BLOW DOWN sounds will be generated by the sound system when requested via J5 pin2 (S4) input. The CYLINDER BLOW DOWN will automatically turn off when the locomotive starts running (1.5 - 2 volts is required on the motor input terminals, J3 pins 2 and 3, to be sensed) or the input is no longer switched "ON" (making a connection to ground).

BLOWERS are used on a steam engine to maintain fire box draft when the locomotive is not in motion. BLOWER sound will be generated whenever the locomotive has stopped moving and there is no power to the motor (J3 input).

SPEAKER MOUNTING:

The speaker generally should be mounted so that the sound can actually "get out" of the Tug Boat. A hole in the upper floor is acceptable but open grills or a doorway may be a better choice as the sound can exit upward. Enclosing the speaker in a chamber will also enhance sound reproduction but make sure this is a fairly large chamber. Small chamber's don't assist in making proper sound or sound levels. A very simple enclosure can be made with a tube. The longer the tube the better the speaker will reproduce. It is usually best to seal the end of the tube, so there are no air passages to the rear of the speaker, thus creating a sound chamber. However, sometimes a "ducted port" type speaker enclosure is better. This is done by leaving a small opening in the enclosure. An easy way of experimentation is done by placing the speaker where you want it, and if using a tube, take your hand and vary the amount of closing of the end of the tube while noting the sound changes. Also, by carefully sealing all openings it may be possible to use the entire body shell as a sound chamber, which would sound better than a tube. A simple wall behind the speaker may be all that is possible or perhaps all that is needed. An excellent chamber would be the sealed hull of a boat!

Speakers can be attached with double sided tape, with glue, or with "hot melt". Enclosures can be made with plastic, wood, card stock or even metal. Film cans or medicine bottles make excellent sound chamber enclosures for small diameter speakers. Attachment with "hot melt" is advantageous as the "hot melt" can be used as a gap filler when creating an enclosure. Again, most speakers are not water proof, so care in placement should be considered for the least amount of water mist striking the speaker front. Mylar speakers, items 210 - 214, are excellent for water resistance. To get a louder volume for the same amount of audio wattage, a combination of four speakers will do the job or add our 22 watt audio amplifier (item 672). The amplifier also contains true Treble and Bass controls so you can set the tonal timbre of your sound system to your liking.

A second speaker, wired in series with the main speaker, can also enhance sound quality and will permit a higher volume without damage to the individual speakers. A

tube with a speaker at each end or a speaker in a doorway at each end of a body shell is an excellent approach. A four speaker approach will yield the highest volume while still maintaining the 8 ohm minimum speaker impedance requirement from the sound system. Drawings for this are included in the speaker instructions.

Speaker enclosure is an art and experimentation is definitely in order for your installation so as to gain the maximum benefit of the superb sound quality available in this sound system.

GENERAL OPERATING INFORMATION:

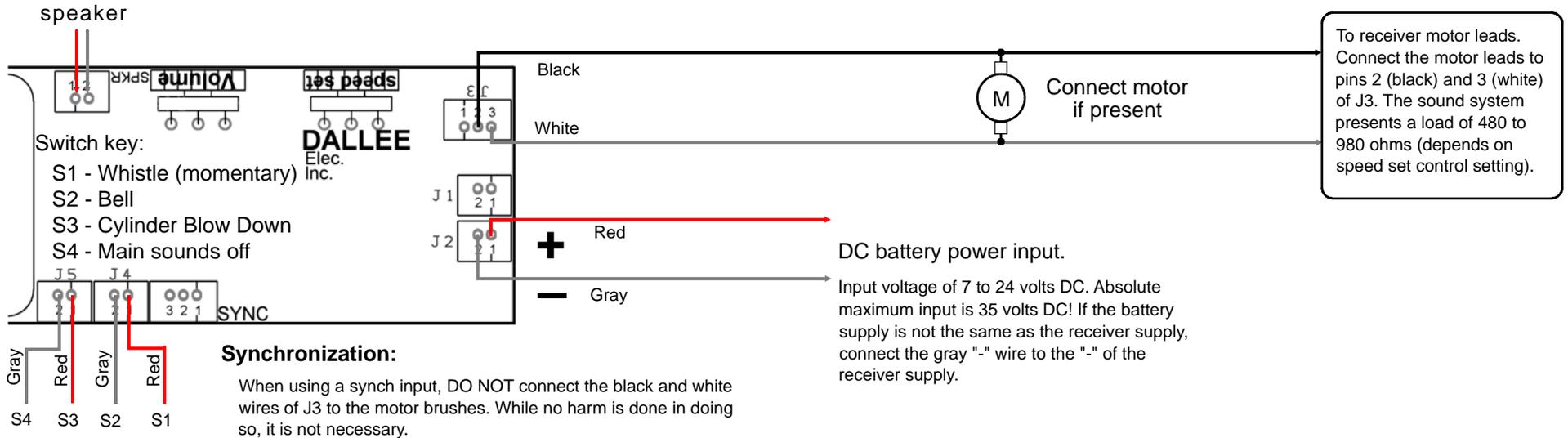
VOLUME ADJUSTMENT: should be set as desired for your application. Please remember that the amplifier can produce more power than most small speakers can handle and that the sound will be louder if the speaker is properly enclosed and baffled. If you are using batteries, the louder the volume the shorter the battery life.

CHUFF RATE control adjusts the rate of chuff when in auto-chuff mode. This adjusts the maximum chuff speed for voltage variable automatic exhaust chuff. Rotate the control CCW to increase the voltage required to reach maximum chuff speed. Adjust as desired for a chuff rate to match your locomotive. When using the "SYNC" input, the CHUFF RATE control has no effect.

Receiver or controller installation using motor power for notch settings and function control for WHISTLE, BELL, Chuff, and Main Sounds ON / OFF

NOTE: The speaker impedance should be kept near or above 8 ohms, therefore four 8 ohm speakers in a series/parallel configuration is acceptable since it yields 8 ohms total impedance. If you care to use two 8 ohm speakers you **must** place them in **SERIES**.

This system features an optically coupled motor input sensor. This means that any connection to J3 pins 2 and 3 do not electrically connect to any other power to the board!



Connect S1 - S4 as desired. Only the functions desired need to be connected for operation. For radio receivers a servo operated switch, or solid state, would be required to operate the Horn or other inputs.

The switch inputs connect to the "-" DC power of J2 for activation.

When connecting DC power to the sound unit be absolutely sure that the "+" and "-" are connect correctly! If not, you will either burn out the sound unit or the supply feeding it. This is not covered under warranty!

S2 -> S4 - function. Connect to receiver function or switch, if desired.
 Normally not activated = "high".
 Activated = "low" (function/switch ON).

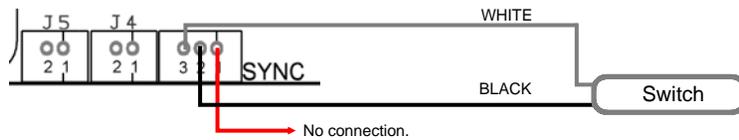
If you are using a receiver that operates higher than 18 volts and using "auto-chuff" (not synchronized), it is necessary to add a resistor in series with one of the inputs to J3 from the motor lead. Typically 1k ohm, 1/2 watt, in each lead or a 2.2k ohm, 1/2 watt, in one motor lead. This would be placed between the motor and sound unit. Not between the motor and receiver! Otherwise the automatic exhaust chuff sounds will not yield a proportional sound in relation to the boats speed.

Synchronization of Exhaust Chuff

Switch Synchronization:

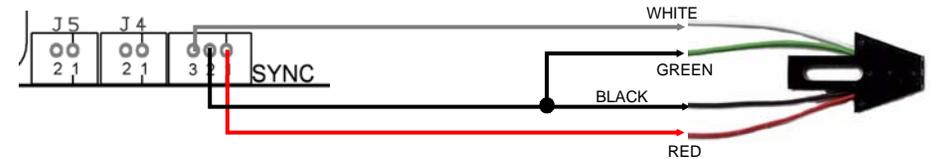
- 1 - connect Common (C) of the switch to the White wire from the SYNC input.
 - 2 - connect Normally Open (NO) of the switch to the Black wire from the SYNC input.
- Switch closure should occur on peaks of quartering lobes. We recommend using optics since they can switch much faster, don't bounce, and do not interfere with the mechanical operation of the axle.

DO NOT use a leaf switch to the chassis (quartering lobe) this will damage the sound unit!



Optical Coupler (item #583) Synchronization:

- 1connect Black and Green optical pickup wires together, this then connects to the Black wire from the SYNC input.
- 2.....connect Red optical pickup wire to the Red wire from the SYNC input.
- 3.....connect White optical pickup wire to the White wire from the SYNC input.



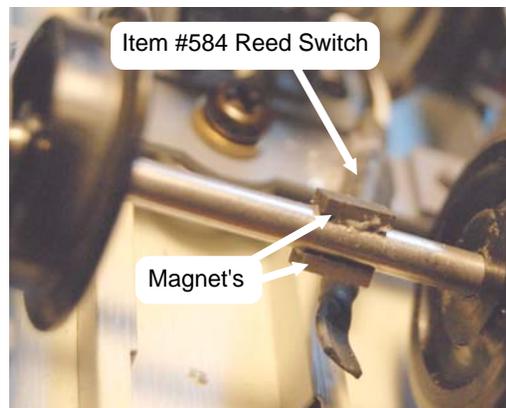
Reed Switch Synchronization

Axle synchronization can also be accomplished by gluing one or two magnets onto any axle. The reed switch is supplied with two wires and encased in heatshrink tubing. These connect to the White and Black wires from the "SYNC" connector as shown above.

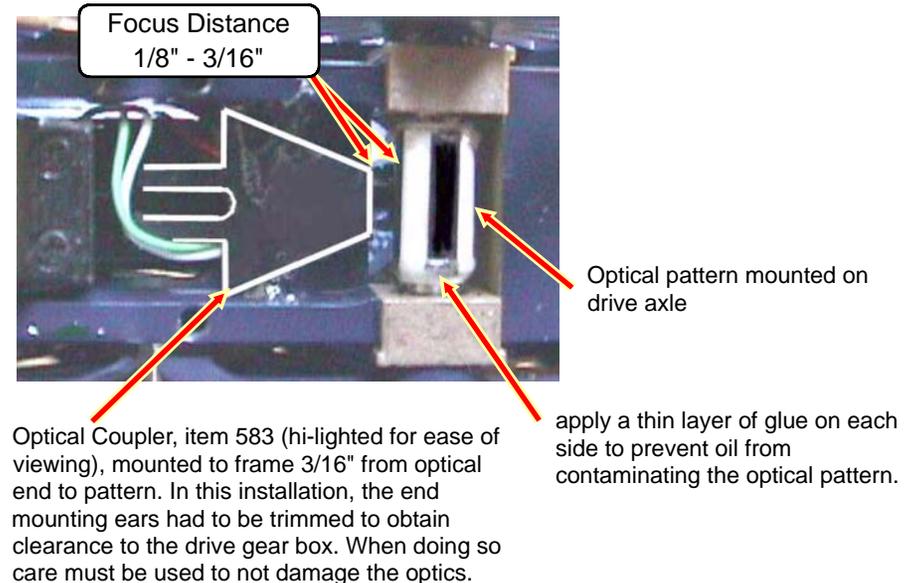
To create one chuff per revolution, which most will find creates the sound effect desired, merely glue one magnet onto the axle. For two chuff's per revolution, the second magnet needs to be glued onto the axle in the opposite position. Most trailing wheel sets are 1/2 the diameter of the main drivers, so two magnets would yield 4 chuffs per revolution of the main drivers.

These magnets are very small and measure only 0.1" wide x 0.2" long x 0.045" thick.

Two magnets and one reed switch assembly are included in this package, item #584.



For extra 2 and 3 pin ultra-miniature connectors, see item's 757 and 758. They are listed under Accessory Items / Connectors.



It is not necessary to use the black / white stripe pattern, anything that will come in and out of focus to the optical reader will work! So, engines with cams installed or a piece of rectangular tubing cut and mounted to the axle may also work with proper alignment. Remember, some paints and other type markers will still reflect the infra-red light. So, just because it's black doesn't guarantee that it will work. The optical coupler comes with laser printed stripes.