EMD Class66 with manual "DE" and "DAR" by DALLEE ELECTRONICS, Inc.

DCv3 class66 rv2

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) 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 diesel locomotives that are designed to operate with conventional DC track power or other types of control systems including radio with either track or battery power, also as a stationary sound unit. Because of its dimensions (2.7" x 0.9" x approx. 0.5" high) the sound system may be limited to installations in some powered units making the need for use of a "dummy" unit or a trailing car. This unit differs from other units in that it contains two different horn play patterns as well as diesel startup and shutdown sounds. Therefore, it is suggested to operate this sound unit from only fixed power requiring a battery or constant track power instead of straight DC track power. Triggering the Horn play patterns is done by the use of either momentary switch inputs or via a reed switch passing a fixed magnet (not included). For reed switch operators, magnet trips are placed in the track. Another method of operation is to operate the sound system as a stationary unit and place the magnets on the underside of an engine or car.

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. If more audio power is desired, an amplifier such as item #671 or #672 can be used. 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. Always try to use the largest size speaker for the space allotted or multiple cluster's of four smaller speakers also works well.

Sounds produced via momentary switch closure are automated horn patterns. Non-user controllable sounds include brake release and diesel prime mover sound automatically adjusted to speed and load conditions.

INSTALLATION INSTRUCTIONS: The sound system consists of a printed circuit board, a speaker, five 2-pin connectors with wires and one 3-pin connector with wires. Refer to the drawing on page 2 to familiarize yourself with the connectors and controls on the sound board. Then refer to the specific instruction sheets for the type of installation you intend to make. You can also find more instructions on our web site (www.dallee.com). 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 locomotive body shell. Be certain that the components on the circuit board, or the speaker wires, do not come in contact with any metal objects as such contact can destroy the sound system. 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.

If a DC locomotive is not moving, there is no track power, therefore to have sound it is necessary to have a separate power supply for the sound system. For in locomotive use, this separate supply is a battery. Without a battery, the sound will not work at lower track voltages. For some this is not a problem but for this sound system, since it goes through a startup sequence upon power up, it would be advised to utilize a battery. Drawings are supplied for multiple types of connections. If using batteries, we suggest the use of one 9 volt or 6 AA or 6 AAA batteries in series to maximize volume potential and battery life. Rechargeable batteries can be used. When connecting the battery (DC) power leads be absolutely certain that wires connect to the proper DC input leads.

If using reed switches, nstallation of them is easily done by making the appropriate wire connections and placing the reed switch in the proper location for magnet activation. When removing the reed switches, be careful not to crack the glass. Do not bend the leads at the glass ends, use a needle nose pliers to hold the wire entering the glass and then bend the wire. Bending at the glass will break or deform the alignment of the reed switch. Carefully solder wires and cut excess lead ends. Reed switches are not warranted under any circumstance since they are quite fragile and easily broken physically and electrically. Extra reed switches are available, item 989. After appropriate lengths of wire are placed on the reed switch, secure the reed switch with either double sided tape (item 388) or other type of glue. Make sure that all wires to the reed switches and sound system do not come into contact with any other metal or power wire since this may damage the sound system.

If any connections are not done properly, especially the power connections, you will damage the sound system. This type of damage is not covered under any warranty. The sound system is thoroughly tested and inspected before packing to insure proper function. There is a minimum charge of $40.00 plus s/h for repair.

SPEAKER MOUNTING: The speaker generally should be mounted so that the sound can actually "get out" of the locomotive. A hole in the floor or fuel tank is acceptable but open grills or a doorway may be a better choice as the sound can exit upward rather than down toward the track. In some cases, particularly with plastic body shells, just mounting the speaker against the shell will be adequate as the vibrations of the shell can enhance the sound. Enclosing the speaker in a chamber will also enhance sound reproduction. A very simple enclosure can be made with a tube. The longer the tube the better the speaker will reproduce low frequency sound which is inherent in diesel prime movers. 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. By carefully sealing all openings it may be possible to use the entire body shell as a sound chamber. A simple wall behind the speaker may be all that is possible or perhaps all that is needed.

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.

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 requirement. 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.

SOUND INFORMATION:

All sounds are discussed assuming that the sound unit is fully powered at all times. If only powered from track power, the sounds will only start when sufficient track voltage is obtained.

PRIME MOVER (DIESEL): sounds range from idle to full RPM with eight notches. With no power to the motor input (J3:2, J3:3) the sound system will produce engine idle sounds. As a throttle is advanced to put the locomotive in motion, the "De" horn as well as a brake release will sound (see below) and the diesel will accelerate to the correct notch setting for the locomotive speed. You can also override the diesel's RPM via the "Force N8" input (J5:1). Whenever this input is switched to J2:2 (ground) the prime mover will accellerate to Notch 8 (full RPM) thus simulating a heavy load condition vs locomotive speed. Diesel shut down sound will occur whenever the "run/stop" input (J5:2) is connected to J2:2 (ground). Whenever this pin is open (disconnected), the startup sequence will occur.

BRAKE RELEASE: sound is produced when the throttle is advanced from the idle position. This brake release should always precede locomotive movement but will only occur if the diesel sound is

actually at idle. For DC operators, this requires approximatly 1.5 to 2 volts of input voltage to sense a running mode.

HORN: sound is controlled by the switch inputs. Two type of horn patterns are controlled via the two inputs. J4:1 controls the "De" horn (Horn1), J4:2 controls the "Dar" horn (Horn2). Upon closure of a switch via an external switch to ground (J2:2), radio receiver input, or other, the sound system will play the horn selected for as long as the switch closure is present. The horn inputs are disabled during startup and shutdown play sequences.

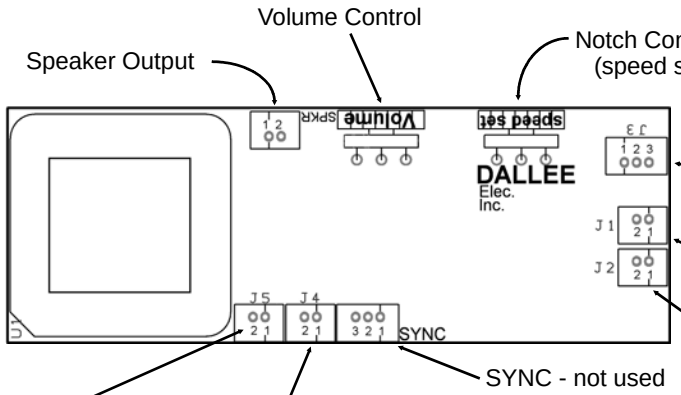
GENERAL OPERATING INFORMATION:

VOLUME ADJUSTMENT: should be set as desired for your application. Please remember that the amplifier can produce more power than a small speaker 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.

NOTCH ADJUSTMENT: full clockwise will yield notch #8 on the diesel at approximately 8 volts to the track / motor. Rotate the control CCW to increase the voltage required to reach notch #8. Gauge 1 and other operators using higher motor voltages will probably want to set this control full CCW.

Sounds for this locomotive were recorded by Francis Leach of www.3d-companions.com

Other installation instructions can be found on our web site as well (www.dallee.com).



J3 connections:
1 - not used (RED)
2 - Motor 1 (BLACK)
3 - Motor 2 (WHITE)

J1 connections:
1 - track power 1 .....also AC input 1.....(RED)
2 - track power 2.....also AC input 2.....(GRAY)

J2 connections:
1 - DC power "+" (RED)
2 - DC power "–" (GRAY)

Wiring standards:

wires with a "•" ARE a connection!

wires crossing over (without a "•") DO NOT CONNECT!

SPECIFIC INSTRUCTION SHEETS

PAGE	INSTALLATION TYPE
3	Conventional DC
4	Conventional DC with rechargeable battery
5	DCC / Radio receiver

Other wiring / application notes can be found on our web site under "Current Product Instruction Index" then "Sound Related, misc".

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**.

DO NOT touch the speaker wires to anything else, this will damage the amplifier which is not covered under warranty!

When connecting DC power to the sound unit be absoloutly 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!

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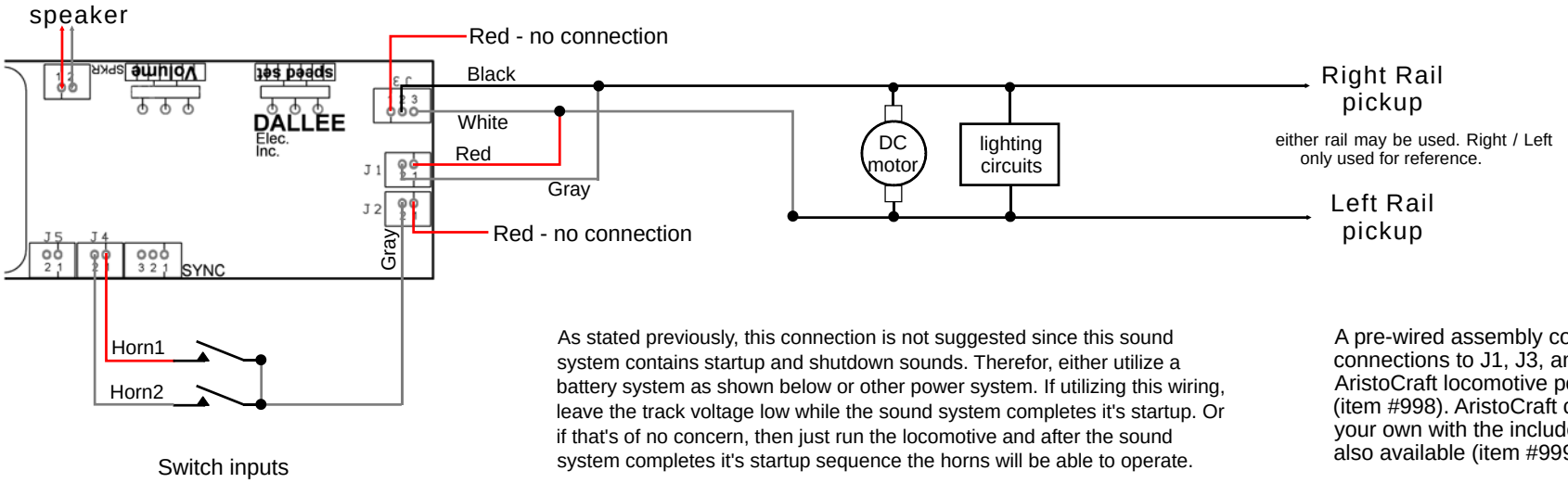
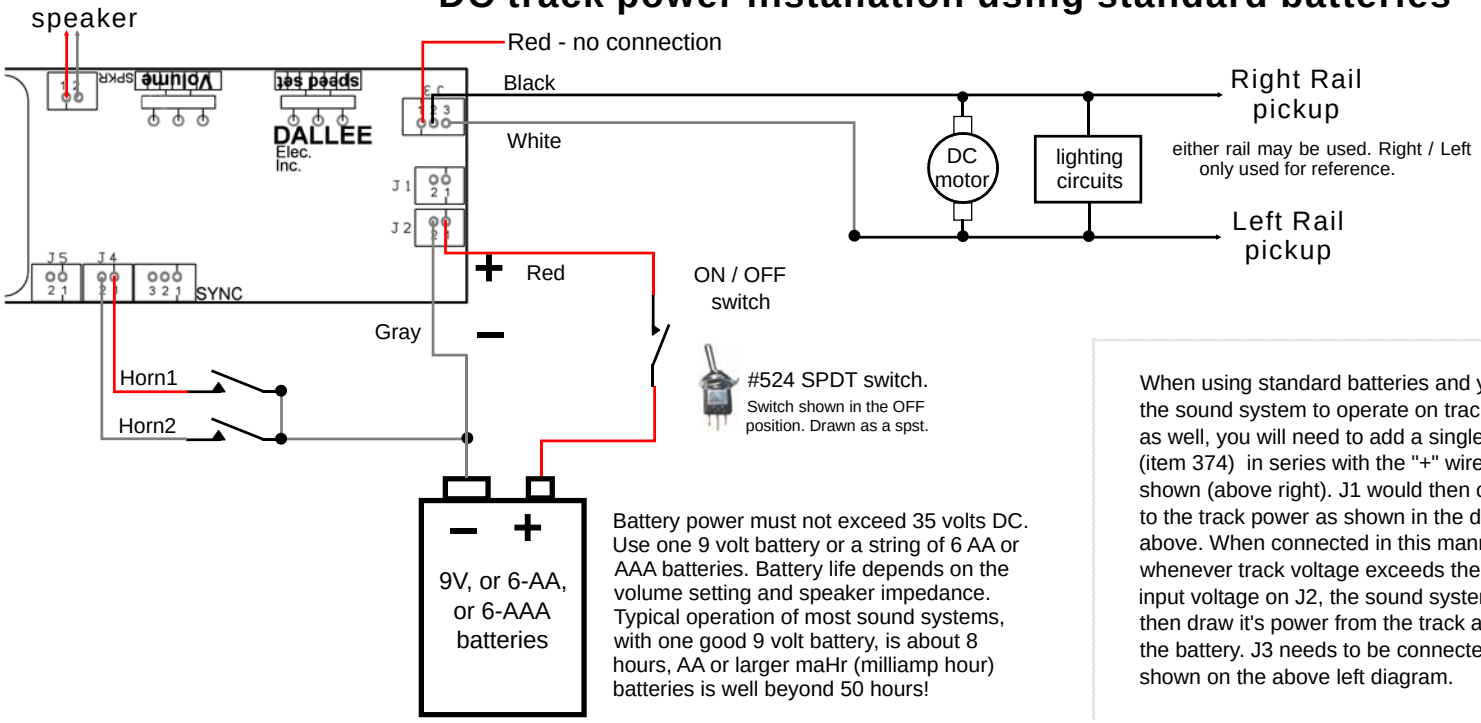
Track power installation without batteries



As stated previously, this connection is not suggested since this sound system contains startup and shutdown sounds. Therefor, either utilize a battery system as shown below or other power system. If utilizing this wiring, leave the track voltage low while the sound system completes it's startup. Or if that's of no concern, then just run the locomotive and after the sound system completes it's startup sequence the horns will be able to operate.

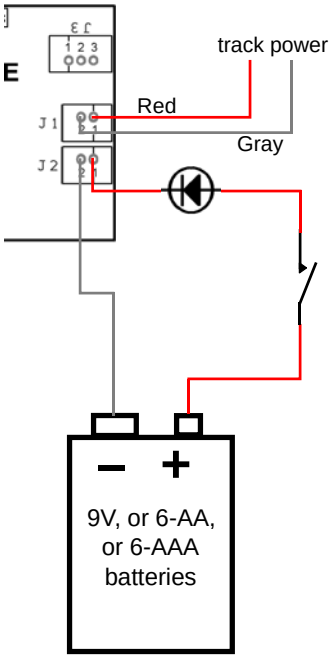
A pre-wired assembly consisting of plug connections to J1, J3, and the "SPKR" to AristoCraft locomotive pc boards is available (item #998). AristoCraft connectors to make your own with the included connectors is also available (item #999).

DC track power installation using standard batteries



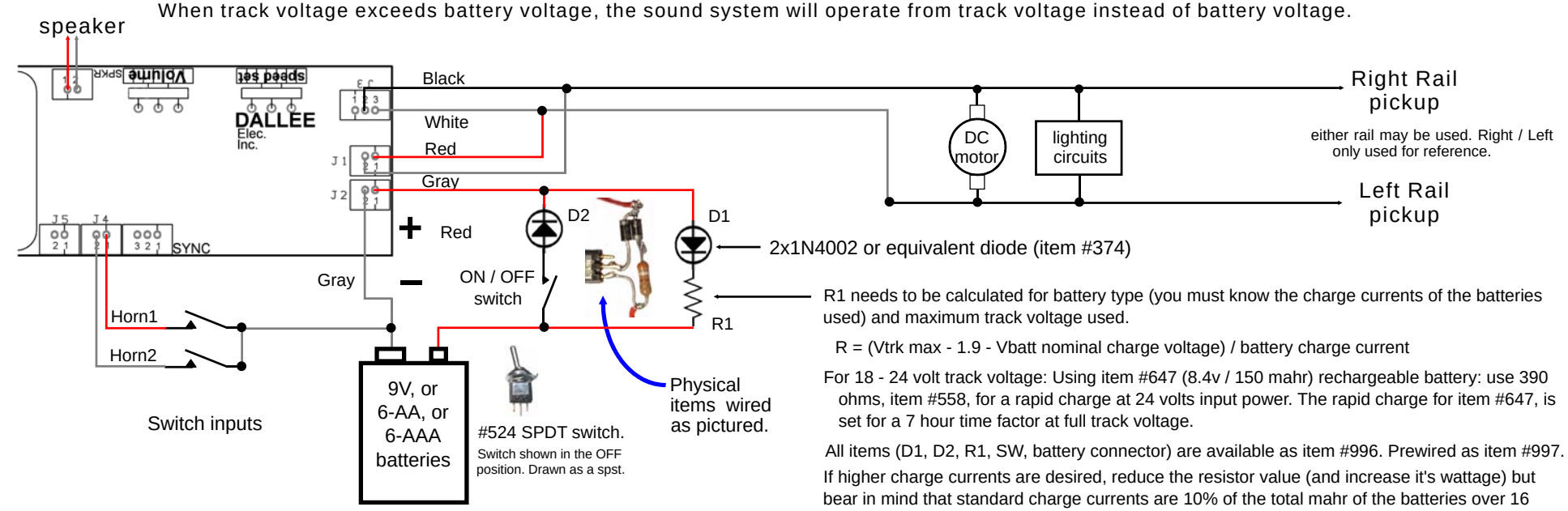
Battery power must not exceed 35 volts DC. Use one 9 volt battery or a string of 6 AA or AAA batteries. Battery life depends on the volume setting and speaker impedance. Typical operation of most sound systems, with one good 9 volt battery, is about 8 hours, AA or larger maHr (milliamp hour) batteries is well beyond 50 hours!

When using standard batteries and you want the sound system to operate on track voltage as well, you will need to add a single diode (item 374) in series with the "+" wire as shown (above right). J1 would then connect to the track power as shown in the drawing above. When connected in this manner, whenever track voltage exceeds the battery input voltage on J2, the sound system will then draw it's power from the track and not the battery. J3 needs to be connected as shown on the above left diagram.



DC track power installation with rechargeable battery.

When track voltage exceeds battery voltage, the sound system will operate from track voltage instead of battery voltage.



Battery power must not exceed 35 volts DC. Use one 9 volt battery or a string of 6 AA or AAA batteries. Battery life depends on the volume setting and speaker impedance. Typical operation of most sound systems, with one good 9 volt battery, is about 8 hours, AA or larger maHr (milliamp hour) batteries is well beyond 50 hours!

R1 needs to be calculated for battery type (you must know the charge currents of the batteries used) and maximum track voltage used.

R = (Vtrk max - 1.9 - Vbatt nominal charge voltage) / battery charge current

For 18 - 24 volt track voltage: Using item #647 (8.4v / 150 mahr) rechargeable battery: use 390 ohms, item #558, for a rapid charge at 24 volts input power. The rapid charge for item #647, is set for a 7 hour time factor at full track voltage.

All items (D1, D2, R1, SW, battery connector) are available as item #996. Prewired as item #997.

If higher charge currents are desired, reduce the resistor value (and increase it's wattage) but bear in mind that standard charge currents are 10% of the total mahr of the batteries over 16 hours. Since most don't operate that long, either external charging may be done or increased charge currents may be used. But increased battery charge currents must also be offset by shorter charge times.

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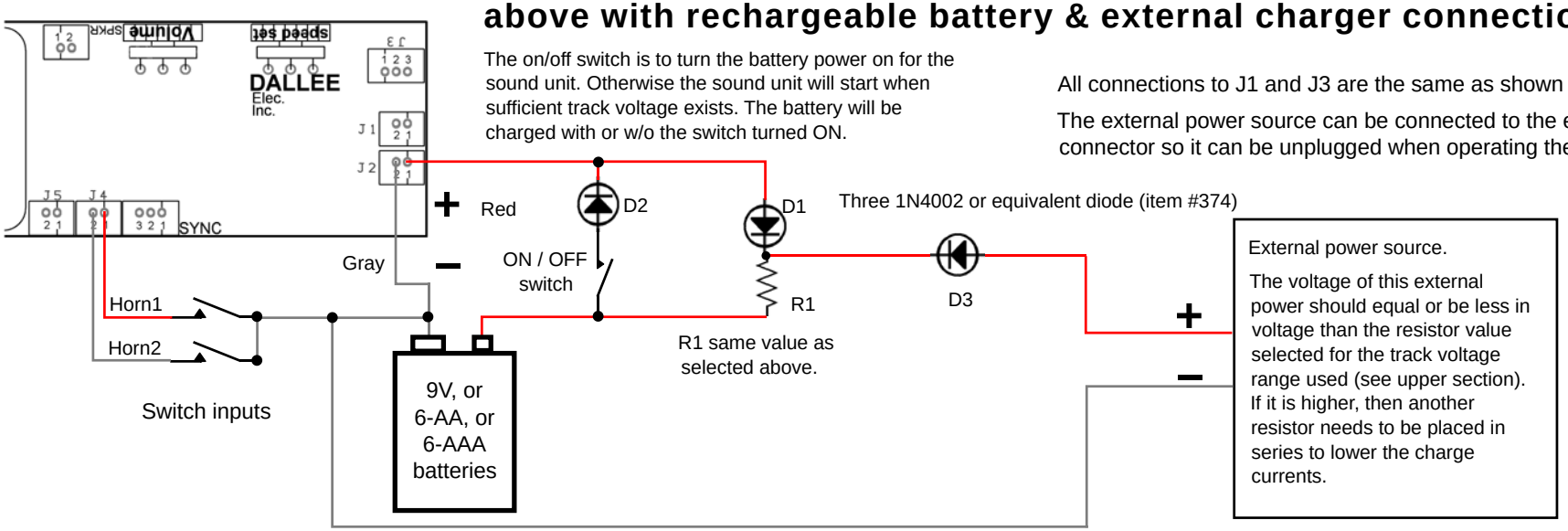
above with rechargeable battery & external charger connection.

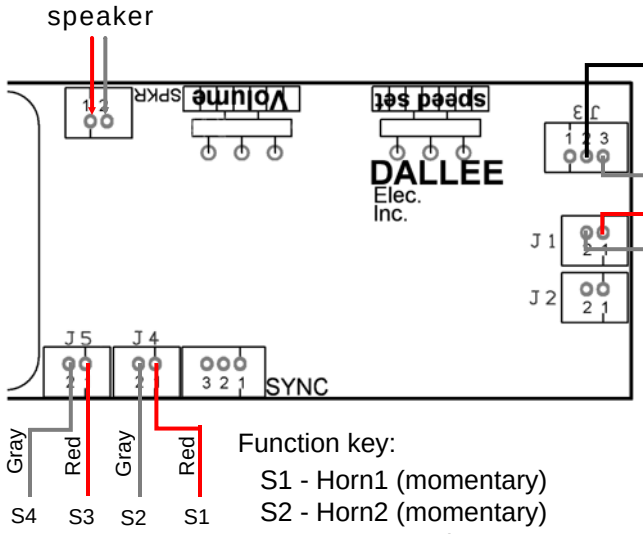
The on/off switch is to turn the battery power on for the sound unit. Otherwise the sound unit will start when sufficient track voltage exists. The battery will be charged with or w/o the switch turned ON.

All connections to J1 and J3 are the same as shown above.

The external power source can be connected to the engine via a connector so it can be unplugged when operating the engine.



DCC receiver installation using motor power for notch settings and function control for HORN's, Full RPM, Shutdown Sounds ON / OFF



Function key:

S1 - Horn1 (momentary)
S2 - Horn2 (momentary)
S3 - Force Notch 8
S4 - shutdown/main sounds off

Black
White
Red
Gray

M
Connect motor if present

DCC track power input

No connection is required to J2. All of the sound system power is supplied from the track via J1.

receiver motor leads (Orange / Gray is standard practice). If you are using a seperate receiver merely connect the motor leads to pins 2 (black) and 3 (white) of J3. The sound system presents a load of 480 to 980 ohms (depends on speed set control setting).

Make sure that your receiver is operating in the same step mode as the transmitter !!

S1 - HORN1 function. Connect to desired function output of module. Activate low to play HORN1.

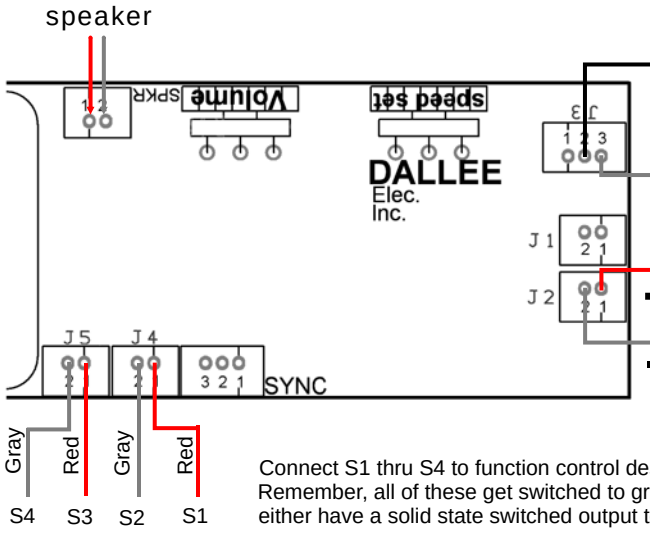
S2 - HORN2 function. Connect to desired function output of module. Activate low to play HORN2.

These need to be connected to non-latching functions.

S2 -> S4 - function. Connect to extra function, if desired. When using an extra receiver you can use either Forward or Reverse lamp function output of module. Normally not activated = "high". Activated = "low" (function ON).

Connect S1 thru S4 to function control desired. You do not need to connect functions you do not intend on using.

Other receiver or controller installation using motor power for notch settings and function control for HORN's, Full RPM, Shutdown Sounds ON / OFF



Black
White
Red
Gray

M
Connect motor if present

DC battery power input.

Input voltage of 7 to 24 volts DC. Absoulute maximum input is 35 volts DC! If the battery supply is not the same as the receiver supply, connect the gray "-" wire to the "-" of the receiver supply.

receiver motor leads. Connect the motor leads to pins 2 (black) and 3 (white) of J3. The sound system presents a load of 480 to 980 ohms (depends on speed set control setting).

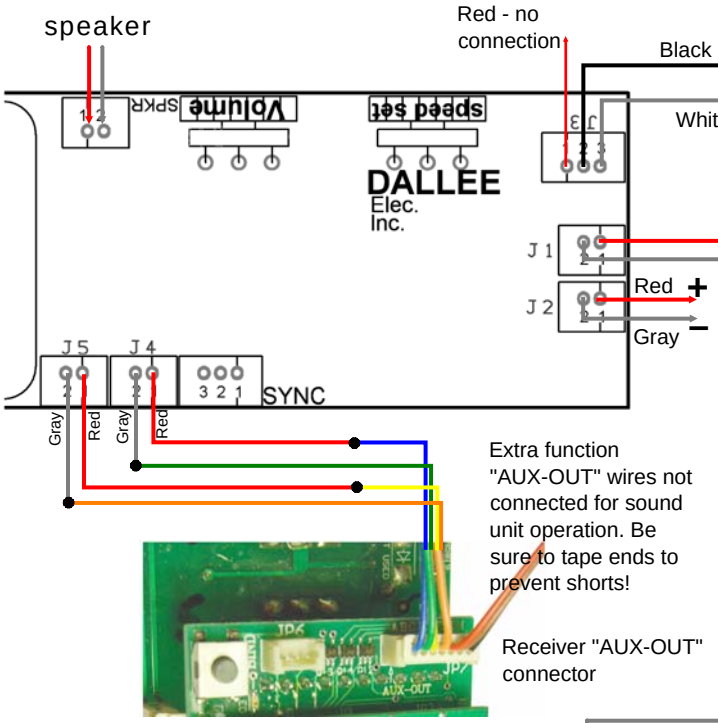
If using in a larger locomotive with constant power, or as a stationary unit, you can always add one of our 11 or 22 watt amplifiers! The amplifiers also have treble and bass controls to tailor the sound to your liking.

Item 671 - 11 watt, Item 672 - 22 watt.

Connect S1 thru S4 to function control desired. You do not need to connect functions you do not intend on using. Remember, all of these get switched to ground (J2:2) to operate the desired sound / function. Most radio receivers either have a solid state switched output to ground or a relay type interface available to do so.

Aristocraft/Crest #CRE-57000 Revolution Receiver (2.4 GHz) installation.

Standard DCv3 or Auto-Horn / Auto-Whistle Sound System



Extra function "AUX-OUT" wires not connected for sound unit operation. Be sure to tape ends to prevent shorts!

Receiver "AUX-OUT" connector

AristoCraft boards labeled "SOUND PWR" are actually connected to the "Motor Power" before the motor "On/Off" switch. While they can be connected to this connector, it is not ideal since the motor switch does not disconnect this connection when the motor power is switched off. Connect these two wires to either the motor power leads or the "Sound Pwr" connector wires. This is the same that goes to the motor. The "Sound Power" should come from the track or battery and not the motor in this application. See wiring example on lower part of this page.

Diesel sound: This connection tells the sound system what speed / RPM to operate the diesel's prime mover sound.

Steam sound: This connection tells the sound system what rate to operate the auto-chuff. If you are using the "SYNC" input, don't connect anything to J3!

J2: DC power input/output.

This is the rectified power from the sound system. When operating on DC track power, since the polarity is unknown, the input power must be connected to J1 input power.

The J2 power is an input for the sound system as well as a DC power output when J1 is the input power. It can be used to power our 11 or 22 watt amplifier's (item 671, 672). The DC output is limited and is not intended to operate other items.

If you purchased the "Auto-Horn" or "Auto-Whistle" type sound units, you will not have enough 2 pin connectors to utilize both J2 and J5. Normally this is not a problem since J2 is normally not connected. Extra wire harnesses can be purchased if needed.

J1: Track Input Power.

Input voltage of 7 to 24 volts DC or AC. Absolute maximum input is 35 volts DC!

Connect to the track input from each truck, detailed picture shown below for AristoCraft engines.Remember that track powered units will not operate properly until the track power is at least above 6 volts. Amplifier's require a minimum of 12 volts DC to operate!

Your receiver battery power may be the same power as the sound system and amplifier (if present). If you have a different battery for the receiver and sound system, then you should connect the "-" of each battery system together.

Sound Function	Keypad	Wire Clr	Std	Auto
J4-1 - Whistle/Horn	A	Blue	M	M
J4-2 - Bell	B	Green	L	M
J5-1 - Force N8/Cyl Blow Down	C	Yellow	L	L
J5-2 - Main Sounds OFF/ON	D	Orange	L	L

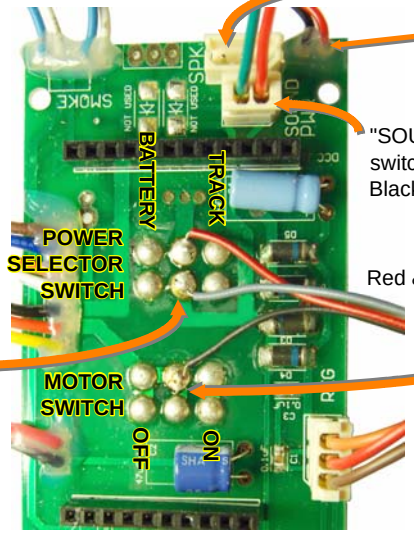
you may elect to connect all, some, or none.

Std: Standard DC type sound unit. These allow the Horn/Whistle to be played on demand.

Auto: Auto-Horn/Whistle unit. These units play Horn/Whistle patterns each time they are triggered.

M: Momentary L: Latching

Mother Board w/o receiver:



"SPK" : Speaker connector. Connect to Sound units "SPKR" connector wires.

If you did not purchase connectors, cut or splice the Red & Gray wires that connect to the "SPKR" socket to the Red & Black wires from the main board. Either wire nut or solder and tape / heat shrink tube the connection.

"SOUND PWR" connector is internally connected to the motor power before the Motor ON/OFF switch. Therefore if you use the Red & Green wires from this and connect them to the J3 White & Black wires, the sound unit will ramp up/down with speed setting changes w/o the motor running when the MOTOR switch is set to the OFF position. To prevent this from happening, solder the Black J3 wire as shown to the middle of the MOTOR switch and the "SOUND PWR" Green wire to the White J3 wire (cut or tape the Red "SOUND PWR" wire since it is not used). By doing so, when the motor power switch is turned OFF the sound system will produce idle sounds.

Red & Gray to J1

J1: "Sound Power" connection.

As shown, solder the red & gray wires to the center of the "Battery / Track" power selector switch. This connects to J1 of the sound system and is the best selection to power the sound unit since polarity is not important. This is also true when operating the sound unit w/o a receiver as well.

Remember, if this is a steam sound unit and you are intending to synchronize the chuff sound, don't connect the J3 black & white wires to this board. They get connected to the synchronization device and to the "SYNC" connector and not J3! Only older software units require both J3 and the SYNC connector to be used.