RAS MODEL RAILWAY SOUND SIMULATORS

Product Information

www.RosewarneJunction.me.uk

RAS Sound Simulators are analogue systems designed to simulate steam and diesel locomotive sounds and synchronise them with the model locomotive's speed, acceleration and type. They do not use pre-recorded sounds.

Their most significant advance over other steam sound simulators is the `auto-coast' feature, which senses any deceleration (or coasting) of the locomotive and responds by shutting down the `chuffing' sound, simulating the closing of the regulator.

Various configurations are available, from single-loco built-in circuits to large systems catering for up to 12 different loco types with under-baseboard and/or on-board speakers.

Compared with the digitally pre-recorded sound effects available to users of Digital Command Control (DCC), RAS Sound Simulators offer similar per-locomotive customised sounds at less than half the cost (for 6 or more locomotives).

The single-locomotive built-in circuit boards work with analogue control systems or can also be controlled using DCC or radio control.

Multiple-locomotive System (RAS1 and RAS2)

- By measuring the track supply voltage, the speed of a locomotive on that section of track will dictate the steam 'chuff' rate or diesel sound. Hence one system could be sufficient for a whole layout or cab-control block, and there is no per-locomotive cost.
- A combination of on-board and under-baseboard speakers can be accommodated, giving greater volume at exhibitions, for example.
- Unless on-board sound is required, the locomotives do not need modification.
- Sounds are simulated, not pre-recorded and played back. Realism is created using methods such as reverberation and `auto-coast'.
- Distinction between locomotive synchronisation and tone is possible using a special Remote Control Unit to pre-set up to 12 locomotives.
- Other background sounds such as bird-song, a fireman shovelling coal, etc can be mixed in using an auxilliary input from a tape recorder or a digital play-back circuit.

Single-locomotive Steam System (RAS3)

- Compatible with either analogue control, radio control or DCC, each locomotive has customised tone and steam sounds synchronised either to motor voltage or wheel revolutions using an axle-mounted cam and switch-follower.
- Printed circuit board is either 34 x 95 x 18 mm, or two back-to-back boards 34 x 47 x 36 mm, and requires 12 V smooth DC supplied from the track or from two 6V rechargeable batteries.
- Two different pitch whistles and a safety-valve 'blow-off' can be triggered by either DCC, radio-control or by reed-switches and track-mounted magnets.

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System RAS1: Steam Sound Simulator

The core sound simulator configuration comprises the Steam Sound and Whistle Unit connected to one or more speakers. This low-cost simulator will synchronise the steam-sound 'chuffs' to the voltage on the track, with adjustments allowing the operator to fine-tune the synchronisation to the speed of the locomotive.

Compatibility with controllers:

The sound simulator uses the track voltage but rectifies and smoothes it before using it to determine 'chuff' rate. Hence, either smooth DC or pulsed controllers can be used with this system.

Adjustments:

START	Sets the track voltage corresponding to start of 'chuffing'.
RATE.	Adjusts relationship between rate of 'chuffs' and track voltage.
CUT-OFF	Controls the length of each 'chuff'.
HISS	Volume of background steam 'hiss' when a loco is at rest.
TONE.	Filters the 'chuff' sound giving characteristic tones.
VOLUME.	Master volume control.
WHISTLE VOL.	

Additional sounds:

BLOW-OFF	Makes the sound of a safety valve lifting and steam escaping.
WHEEL-SLIP	Applies, when starting, sudden increase in rate with a decay back.
WHISTLE.	Steam whistle — adjustable pre-set pitch
+LOW.	Lower pre-set pitch of steam whistle
+DISTANCE	More distant whistle if depressed when WHISTLE is pressed.

Speed features:

INT/EXT	Choice of whether to use track voltage or internal pot for speed
CHUFF RATE	Internal control of speed using a potentiometer.
AUTO-COAST	Turns on automatic reduction in chuff volume for coasting or braking.

System RAS2: Diesel & Steam Sound Simulator

This system incorporates all of the features of System 1 plus an additional Diesel plug-in board. The sound of the engine is simulated using a background tone with additional sub-harmonic components at lower fractional frequencies. These components can be individually added to simulate different numbers of cylinders in the engine. An adjustment is provided for the pitch of the sound at idle speed (speed of the engine). The pitch of the sounds then increases with track voltage. Synchronisation is not such an issue with a Diesel and so there are no controls for this. The Horn is a two-tone horn with adjustable pitch on each tone.

Compatibility with controllers: As for the System RAS1: Steam Sound Simulator.

Adjustments:

IDLE SPEED.	Controls the pitch of the diesel sounds when the track voltage is zero.
VOLUME.	Diesel vs Steam volume control. (Diesel volume also subject to the Master Volume on the Steam board.)
SUB-HARMONICS.	Control over the sound of the engine, particularly useful for obtaining an authentic sound at low speeds.

Additional sounds:

HORN HIGH.	Diesel Horn at the higher pitch.
HORN LOW.	Diesel horn at the lower pitch

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Options

These options are actually plug-ins to the steam sound simulator board and therefore can be used with any of the systems: RAS1 or RAS2.

Option A: Remote Control

This unit plugs into the Steam Sound Simulator but affects both the steam and diesel units. The basic idea is that all the parameters that need to be different for each locomotive (tone, chuff start, rate and cut-off, and whether steam or diesel sound should respond to the speed of the loco) are operated from one setting of a multi-pole rotary switch with allowance for up to 12 locomotives. There are also several other controls that are useful to have near to the signalman or station-master's control position. An example of the front panel of such a remote control (in this case for 12 locomotives) is shown below.

The remote control can have as many or as few of the above additional controls as required. They are all wired through to the remote control box via a 25-way ribbon cable, and can be connected to other external switches (eg reed switches or other sensors) if desired.

Option B: Reverberation Unit

Simulating the effects of sound propagating over large distances and reflecting off buildings and terrain such as cuttings, hills etc, requires the addition of some 'reverberation'. The least expensive method for doing this is by using a 'spring line' and associated mixing amplifier to mix in just the right amount of 'echo'. These spring line units have to be imported and built into the enclosure incorporating the multiple-locomotive sound system. They can be retro-fitted but inclusion of such a reverberation unit is recommended at manufacture.

Option C: On-board Sound

This will feed the audio signal back into the track, making it available for playing through small on-board speakers in the trains. A choke will be needed between controller and track to stop the audio-frequency signal affecting the controller. In addition it may be necessary to use two back-to-back diodes near the track feed if locomotives with very low start voltages are used.

Compatibility with controllers: If on-board sound is used with pulsed controllers, the pulsing of the track voltage (most pulsed controllers use 50 to 100 Hz) could be converted to an audible signal by the on-board speakers. It is possible to filter out the pulsed-controller frequency within the locomotive using a capacitor and by using a small speaker that has a very low response to these frequencies.

Option D: 7W Mono Amplifier.

If the system is to be used with Passive speakers (without additional amplification) then this amplifier is recommended. Outputs are then provided both with and without amplification.

Option E: Under-baseboard Speakers.

Two speakers suitable for under-baseboard use and covering a frequency bandwidth from below 45 Hz to above 7 kHz. A stock of suitable second-hand speakers is maintained and prices are negotiable on application. Recommended for use with the diesel simulator is an Active Sub-Woofer Speaker System comprising a sub-woofer speaker cabinet and two satellite speakers, all powered through an amplifier with a separate mains power supply.

Option F: On-board Speaker.

The Specification for these speakers will depend on the scale and amount of room available inside the locomotive, and whether a pulsed controller is to be used.

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