



Electronics for Model Railroads

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DH-1

MULTICHIME DIESEL HORN

GENERAL DESCRIPTION: The CIRCUITRON **DH-1** is a highly realistic, all electronic diesel air horn simulator. The three frequencies reproduced by the **DH-1** closely match those produced by the Leslie Company's famous S-3L Supertyfon air chime. Each chime on the **DH-1** is individually controllable so that many different tone combinations are possible. It is, in fact, possible to produce seven different horns using just the one **DH-1** circuit board. These would be as follows: single low tone, single middle tone, single high tone, low-middle dual chime, low-high dual chime, middle-high dual chime, and the low-middle-high 3 chime horns. These various combinations are switch selectable. With the addition of extra speakers, these various tones can be produced at any point on a layout. The **DH-1** requires a 10-18 volt AC or DC input for proper operation.

CIRCUIT DESIGN: The **DH-1** uses a CMOS integrated circuit configured as three square wave oscillators. Each of these oscillators are adjusted for the proper frequency output at the factory. The outputs from the three oscillators are combined and drive a darlington output transistor to achieve the necessary current gain to drive a speaker.

INSTRUCTIONS: The **DH-1** can be connected with .110" solderless connectors (available from CIRCUITRON) or by soldering leads directly to the terminals on the printed circuit board. If soldering, use a small pencil-type iron and electronics-grade rosin core 60/40 solder (available at Radio Shack). Use only as much heat as necessary to obtain a good joint and do not wiggle the terminal until the solder has cooled completely. A section of CIRCUITRON'S **PCMT** can be used for simple, snap-in mounting of the circuit board or you may drill holes in the mounting pads in the corners of the board and mount the **DH-1** with screws and standoffs.

MOUNTING THE SPEAKER: For proper reproduction of the lower frequencies produced by the **DH-1**, the speaker supplied must be mounted in some sort of enclosure. A small box can be constructed of wood with a 2" round hole cut in one side. Mount the speaker to the inside of the box, centered over the hole. A silicone sealant, such as aquarium or bathtub caulk, is ideal for cementing the metal speaker frame to the box. Do not get any of the sealant on the paper speaker cone. After the silicone has cured (overnight), solder two wires to the speaker terminals and run them through a small hole in the side of the box. Seal the box with a cover of wood fastened with screws so that access to the speaker is possible. Mount a small piece of window screen or grill cloth across the speaker hole to protect the cone from damage.

It is also possible to use the layout mounting board as the speaker baffle. Cut a 2" round hole through the board at the desired location. Mount the speaker to the underside of the layout using silicone caulk as above. Place a piece of window screen or grille cloth across the hole to protect the speaker cone from damage.

*NOTE: The 2 1/4" speaker supplied with the **DH-1** is rather inefficient. Although it is adequate for most small layout applications, if you care to substitute a larger diameter high-fidelity speaker, the volume and tone will be dramatically improved. Radio Shack sells suitable speakers for automotive and stereo applications. A 5"-6" diameter is ideal. The speaker should be rated 8 ohms impedance. If you require even greater volume, the circuit board can be modified. Consult the factory and request application note AN5701-1.*

CONNECTING THE CIRCUIT BOARD:

- 1) Solder two light gauge (22-24 ga.) wires to the terminal strip on the speaker. These wires must be long enough to reach the circuit board and pushbutton locations.
- 2) Mount the pushbutton on the control panel.
- 3) Connect one wire from the speaker to the Speaker Terminal on the circuit board labeled [-].

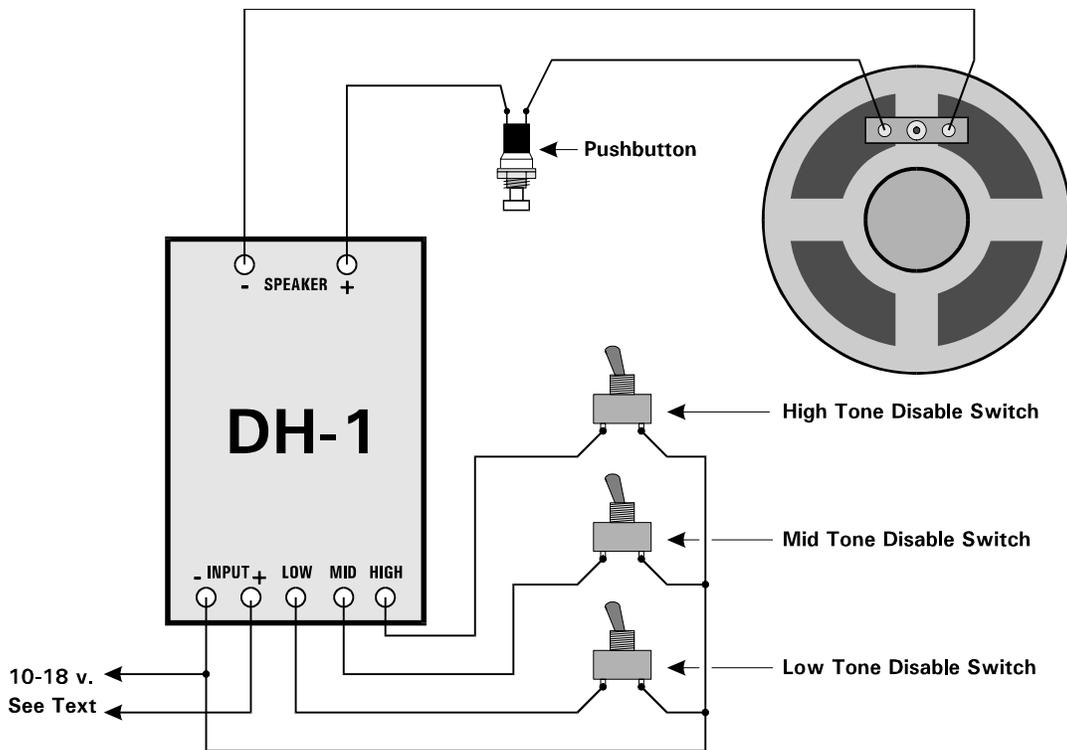
- 4) Connect the remaining wire from the speaker to one terminal on the pushbutton.
- 5) Connect a wire to the remaining terminal on the pushbutton and run it to the Speaker Terminal on the circuit board labeled [+].

NOTE: Additional speakers and pushbuttons may be connected in similar fashion following steps 2 through 5 above.

- 6) Connect a source of 10-18 volts AC or DC to the [INPUT] Terminals. Observe the proper polarity if you are using DC.

This completes the basic connections for the **DH-1**. Pressing the pushbutton should produce a 3 chime tone from the speaker. To generate dual chime and single note horns, a switching hookup as shown below may be used. By connecting jumper wires between [-] and the selected Disable Terminal, the associated tone will be eliminated. If three toggle switches are used, all seven horn combinations will be available by selecting the appropriate tone(s) and activating the corresponding toggle switch(s). If more than one speaker and pushbutton are used in conjunction with the toggle setup, different horns can be reproduced at different points on a layout to corresponding to mainline diesel service, switchers, factory whistles, interurbans, etc.

WARNING: The *DH-1* is designed for intermittent use. Very frequent, prolonged or continuous operation of the horn may result in failure of the output transistor due to overheating. Use of a power supply rated 10-12 volts (rather than 16-18) will minimize the heat produced in the transistor and allow safer operation. If frequent or prolonged use with a higher voltage supply is necessary for your application, consult the factory.



WARRANTY

CIRCUITRON warrants this device against defects in materials and workmanship for a period of one year from the date of purchase. This warranty covers all defects incurred in normal use of the device and does not apply in the following cases:

- a) damage to the device resulting from abuse, mishandling, accident or failure to follow operating instructions.*
- b) if the device has been serviced or modified by other than the CIRCUITRON factory.*

EXCEPT AS MENTIONED ABOVE, NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED INCLUDING MERCHANTABILITY, ON THE PART OF THE UNDERSIGNED OR ANY OTHER PERSON, FIRM OR CORPORATION, APPLIES TO THIS DEVICE.