

Installation Instructions

for the

Puff 'N' Chuff

Designed & Manufactured by;

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Overview

The Puff 'N' Chuff circuit is designed to synchronize a fan driven smoke unit with the chuffing of Railsounds. This board can be used in either command or conventional operation, providing the locomotive meets the following requirements;

- Fan Driven Smoke Unit
- Has a cherry switch (momentary contact switch), reed switch or hall effect sensor
- Has Lionel Railsounds

The circuit connects to the fan on a fan driven smoke unit and also connects to the cherry switch, reed switch or hall effect sensor (the devices that tell the sound system when to chuff). The Puff 'N' Chuff circuit then synchronizes the "puffing" of the smoke unit with the "chuffing" of the sound system.

The circuit pulses the fan motor with voltage to achieve a "puff of smoke". It then hits the motor with reverse polarity (a dynamic brake of sorts) to make the motor stop spinning. This way each puff is really defined, with hardly any trail of smoke behind it. Once the locomotive reaches a certain speed (more than 4 pulses per second) the circuit turns the smoke unit on full blast. Once the locomotive enters neutral (or idle in the case of a command environment) and the circuit does not see any pulses for 2 seconds the fan motor turns on at 33% of its capacity. We chose 33% so the smoke would "loft" out of the stack instead of smoking you out of the room.

The Puff 'N' Chuff circuit will be on all the time. So when the smoke unit is turned off (after having run) the remaining smoke left in the chamber will still be pushed out until the heating element has cooled enough not to turn the liquid into smoke. Once the smoke unit is turned on again (after having been turned off) it may take a few seconds (up to 20) for the smoke to reappear.

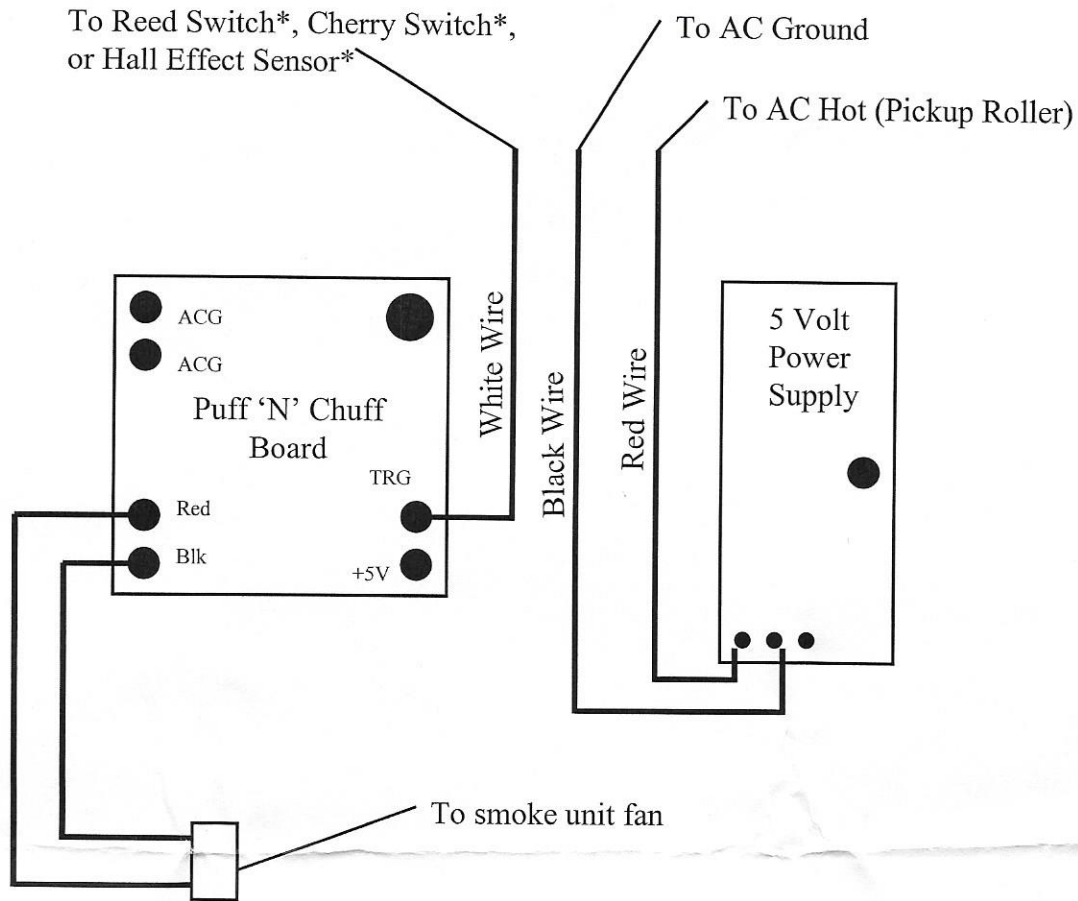
Each Puff 'N' Chuff circuit includes a 5 volt DC power supply. DO NOT disconnect this power supply from the Puff 'N' Chuff circuit. The circuit is protected against power spikes with the 5 volt power supply attached.

Installation

To begin installation you must remove the shell of the locomotive. Once this is complete, locate and identify the fan driven smoke unit. If it is a Lionel smoke unit there will be a small white 2-pin connector attached to red and black leads that go to the motor. Simply unplug this connector and re-insert it into the white connector on the Puff 'N' Chuff wire harness. If the smoke unit is made by MTH you will have to clip the white connector off the Puff 'N' Chuff wire harness and connect it directly to the white and yellow wires on the MTH fan motor (these wires will need to be clipped from their connector).

The diagram on the next page shows the connections required to wire the Puff 'N' Chuff circuit into a locomotive.

1. The Red wire connects to AC hot (or pickup roller).
2. The Black wire connects to AC ground (locomotive frame)
3. The White wire connects to the cherry switch*, hall effect sensor* or reed switch*



DO NOT cut any wires between the 5 Volt Power Supply and the Puff 'N' Chuff Board!

When connecting the white wire to any of the 3 switches make sure you connect it to the correct position on the switch. The cherry switch and reed switch will have one wire connected to ground. The other wire is known as the "trigger" wire. You want to connect the white wire to the "trigger" wire.

For locomotives with hall effect sensors you want to connect the white wire to the lead labeled "T" or "Signal" or "Trigger". These labels will be located on the circuit board that the hall effect sensor connects to. If there is not a label identifying the trigger please call TASTudios at (330)533-7181.

Once the Puff 'N' Chuff circuit and 5 volt power supply board is wired into your locomotive mount the boards using the thick double sided tape provided with the kit. Replace the shell and take it to the test track.

Testing

If your locomotive is command equipped then turn on the track voltage and address the locomotive. Use the Aux1 + 9 command to heat the smoke unit coil. Once you see smoke lofting out of the stack slowly turn the red throttle clockwise until the locomotive begins to move. Every time the sound system chuffs you should see a puff of smoke from the stack. Run the engine at several different speeds so you can see the difference in output.

If you think there isn't enough smoke coming out of the stack, the fan motor wires may be backwards. If this is the case, simply reverse the wires. As mentioned before; the fan blades are louvered, so the polarity of the motor leads will have a direct effect on the output of smoke.

If you not witness any smoke coming out of the smoke unit ensure that there is fluid in the unit. If there isn't simply add some according to the manufacturers specifications and perform the test again.

Troubleshooting

<u>Symptom</u>	<u>Solution</u>
No smoke at all	Turn the volume down on the sound system and verify the fan motor is running. If it is add smoke fluid sparingly. Blow down into the smoke stack to get rid of any liquid blocking the output shaft. Check the wire connections to make sure sure you have power.
Very poor output in neutral	Run the locomotive to see if the output stays the same. If so, reverse the motor leads that are connected to the fan motor.
Looks like the engine is on fire instead of smoking	Too much smoke fluid is in the chamber. Run the engine until the smoke fluid wears off a bit. You should see a big improvement with less fluid in the chamber. Also make sure there is a good seal between the smoke funnel and the shell.
Smoke comes out from under the shell	Poor seal between the smoke unit and shell Also check the fan motor leads, they may be reversed, causing the fan to suck the smoke into the shell.
Runs fine for a while, then stops smoking	This occurs when there is too much fluid in the chamber. Blow down into the stack to get rid of any fluid blocking the output shaft
Smoke output in neutral is poor	If the engine has been running for a while and you enter neutral, this is common. Simply run the engine in any direction for one chuff and enter neutral again.

For Technical Assistance call; (330)533-7181 Mon-Fri 10a-6p EST