

Introduction

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The proper name for the hum or buzz you typically hear from the Vectrex speaker is called the "Vectrex Buzz". It is there at the same level and does not change when you turn up the volume. It measures typically 70 to 75 dB (Decibels) and has been know to reach as high as 85 dB. This is measured with a Radio Shack sound pressure meter at 1/4-inch from the speaker grill. The reason for the buzz is a poor job of laying out the power board pcb. The power amp is placed right near the yoke driver circuit. The 13-inch audio cable acts as an antenna and also feedbacks the signal of the magnetic flux from the yoke. The resulting feedback and ground loop problem produces a buzz, the "Vectrex Buzz". What you see on the screen, comes out the speaker.

Ground loop defined - When 2 or more points within a system are acting as ground, the resulting fluctuations in voltage between the ground points creates feedback and produces undesirable oscillations in that system.

The VECTREX is one giant ground loop. There is a giant ground strap on the side that connects the power and logic boards, which was added due to FCC regulations. There is also a green wire (see * note below) on the 4-wire cable assembly (J204 - GND) still connected which results in a ground loop. It was removed for units produced after April 1983.

The following are two ways to reduce the "Vectrex Buzz":

Buzz Reduction #1 (easy)

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Take a pair of wire cutters and cut the green wire (see * note below) in half that runs from J204 on the logic board to a hole labeled GND on the power board. Just put heat shrink tubing on both ends. Leave the short ground strap soldered between the power and logic boards. This modification typically results in 0 to 6 dB reduction in noise.

Buzz Reduction #2 (harder)

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Perform Buzz Reduction #1. Remove the short ground strap that is soldered between the power and logic boards. Remove the audio cable that is connected between J107 on the power board and J302 on the logic board. Remove the logic board so you can get at the connections easier. Remove the 2 pin connectors J107 and J302 as well. We are going to replace this audio cable with a piece of heavy duty shielded coaxial cable (RG-11) that will be soldered directly between the power and logic pcbs. It has to have a good braided outer shield, unlike some cables that just have a cheap foil-like shield. This is going to be your new shielded audio cable. The inner conductor of the coaxial cable is the new audio signal connection. The braided shielding around it is the ground. We will replace the system ground with a piece of stranded 14 AWG wire, which will run in parallel with the audio cable's shield. Both the shield and the 14AWG wire complete the system ground, but the thought is that the 14AWG is doing a better job than the coaxial braiding could do by itself.

Ground the logic board, near the audio connector where J302 was removed, to the power board from audio connector's pcb holes (GND pin is labeled EP108). There is no ground pin on J302 so you must connect this end of the coaxial cable's shield to the ON/OFF Volume potentiometer's ground (R236), which is just above J302. Make sure to solder to the ground connection on R236, as only one of the three pins is ground. This is why the logic board needed to be removed. Solder the center conductor of the coaxial cable in the previous hole where J302 was, and make sure to solder it into the right one. Solder one end of the stranded 14AWG wire to the same node the audio cable was connected to. Replace the logic board and run the

cable and the wire under the logic board and over and around the cartridge port. Locate the hole labeled "G2" and remove the solder from it. It should be above C408, just to the left of the actual "C408" label. Solder the coaxial cable's shield into this hole labeled G2 from the back side of the power board. Solder the center conductor to the open hole from the removed J107 (labeled EP107). Solder the stranded 14AWG wire to the braided shield of the new audio cable that is soldered into G2.

Running the wiring under the logic board and to the back of the power board is intentionally keeping the wire away from the stronger magnetic fields within the Vectrex, thereby minimizing any electro-magnetic interference (EMI, aka noise) that the cables could pick up.

Make sure all of the boards are secure and power it up.

With the volume turned up to its maximum setting, you should have to put you ear right up to the speaker to hear a buzz. This modification typically results in a 25 to 30 dB noise reduction.

* NOTE: The power cable is on the back edge of the logic board and has 4-wires. J204's ground wire may not be green on all units. Some are black. Just make sure that it goes to the hole labeled "GND" or "Ground" on the power board.

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