Voice-activated R2-D2 Sound Board
Motion-Activated R2-D2 Sound Board
Hyperdyne Labs, © 2001

This board comes in a standard 8-snippet or deluxe 16-snippet sound version.

Overview

Once R2 hears a voice or sound, he will respond by stitching together random R2 sound snippets to make up an R2 sentence! You will get different sentence structures and lengths each time, and they are never the same (even when powering the circuit on and off)!

The 16 snippet version has more sound snippets to choose from, so you have the potential for less repetition of R2 phrases. The 8-snippet version has longer, more familiar sound snippets, but has a potential for more repetition of R2 phrases over time.

The deluxe 16-snippet sound version also has a *reminder feature*. If you do not talk to R2 for 5 minutes and the circuit is still on, he will whistle for you! If you still do not respond after another minute, R2 will make a sad sound. This is to remind you that he is still active. This feature will only play out once if you do not respond to R2 in the 5-minute window.

The sound package comes with
- assembled voice-activated (VOX) board and mic (with a mic sensitivity knob)
- programmed and assembled sound board
- small speaker (wired up)
- master power switch (wired up).
- 6 AA snap-on battery holder
- optional IR detector add on

Install

Here is a pic of the voice-activated (VOX) board with mic:
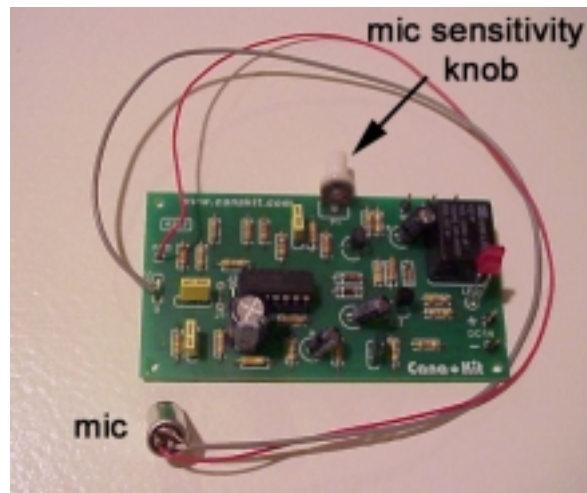
The sound board is already connected up to the voice-activated switch (VOX) board. The VOX board and sound board run off the same battery source, 6 AA batteries.

Once you install the VOX board, place the microphone in a strategic location away from the speaker, but also exposed to the outside environment so it will readily pick up sounds and reject and internal R2 sounds.

If the mic and speaker are placed next to one another, you will see that R2's talking will also trigger the VOX board, but dont worry, this will not affect performance.

Here is a pic of the custom sound board:
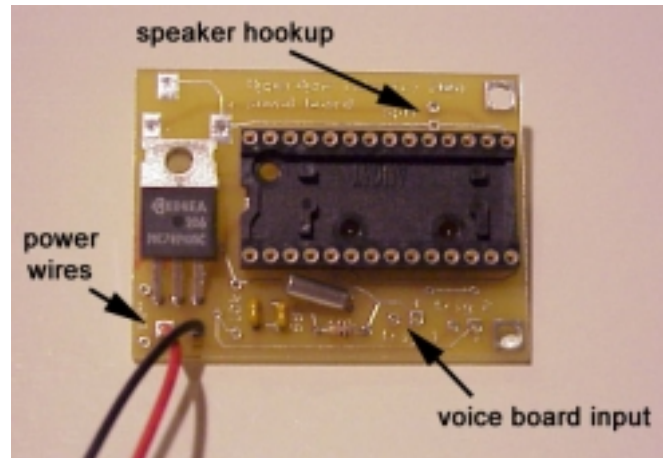
The power wires for the sound board and VOX board are connected up to a master on/off switch. All you have to do is flip this switch to turn on both the sound and VOX board. Turn it off when not in use to conserve the batteries.

The sound board comes with a small speaker which is pretty loud. But, if loudness if an issue, you can replace it with a bigger 5" speaker from Radio Shack. Be sure to enclose the back of the speaker in a closed area. Also, expose the front of the speaker to the outside free air. This will give you maximum volume! Putting the speaker inside the R2 unit and having it face outwards should increase the volume.

Secondary trigger input: The deluxe 16-snippet board also has a secondary trigger input. It is next to the 1st trigger wires that are going to the VOX board (it is labeled trig 2). You can connect this trigger to another relay (total circuit isolation) or another electronic switch (make sure the grounds between the 2 circuits are shared or totally isolated). When you make contact and let go, R2 will also respond to this input. This is useful for connecting up to a remote control channel if you want to control R2's voice responses remotely (the VOX unit input will still work also).

Operation and Troubleshooting:

The R2 board will only respond after it hears a voice or sound that has gone away. The VOX board trigger upon the initial detection of voice, but the sound board will wait for this sound to disappear. This replicates normal conversation as if you were speaking to R2. After R2 is done playing out his response to you, there is a 2 second grace period. That means he will not respond if you immediately make a loud noise. This failsafe is implemented so R2 doesn't trigger himself over and over and speaking nonstop.

Also, if an impulsive noise that is less than 400ms is detected, the sound board will reject it, since normal speech typically lasts longer than this.

If the VOX board is sluggish to turn off after an impulsive noise (which would cause R2 to falsely respond to short noises), you can rectify this by speeding up the VOX turn off response time. You can make the VOX turn off faster after detecting a sound by replacing capacitor C6 on the board with a smaller value capacitor value (do this as a last resort). You should first play with the sensitivity knob to fix this problem.

Use the mic sensitivity knob to fine tune the response of the board to outside voices and sounds. Some trial and error will be necessary to find the "sweet spot" in your setup. The location of the mic is also important to picking up sounds.

If the board never responds, either the mic sensitivity is too high, or it is too low and the VOX board is already triggered. The VOX board lights an LED to let you know it has detected a voice or sound over the mic sensitivity threshold. Check the LED to see which situation is occurring. You can use this LED to see the threshold of the VOX board, which will help you fine tune the system.

IR motion detector add on:

If your unit came with the IR motion detector, it will already be attached to the sound board. The IR sensor is hooked up to the secondary trigger input. Here is the pic of it:

The IR sensor derives power from the sound board. When the sound board is powered up, it will take the IR sensor 30 seconds before it responds to any motion. This is its warm up period. After that, it will activate the sound board if any motion is detected in its field of view. Once the sound board plays out a sequence of sounds, the IR sensor will go dormant for 15 seconds. After this time, if motion is once again detected, the sound board will play out another sequence. This wait time functionality will keep R2 from continuously playing out sounds if someone is moving around him or if he is in a crowded area.

Also, if the IR sensor detects motion and plays out a sound, during the wait time the VOX board is still active. So if a voice is heard during the wait time, the board will still play out a sound sequence from the VOX event.

USING AN EXTERNAL SPEAKER FOR MORE SOUND

If you want to get **louder** sound, you can hook up any size 8-ohm speaker that you require. You can also connect up the speaker output to a line-level amplifier/speaker combo (computer sound card, portable PA system, amplified speaker, etc) to get much louder sound.

If you need more volume than the attached speaker can provide, then you use the external speaker jack in conjunction with an amplified speaker (listed on page 1) or other external amplifier/speaker setup.

Simply insert a 1/8" mono cable into the jack and run it to your amplified speaker. Turn the blue pot screw to control the volume going into the amplifier.

NOTE: If you are using the external speaker jack, you must disconnect the existing speaker from the board! If you don't then the resulting amplified sound will not be good.
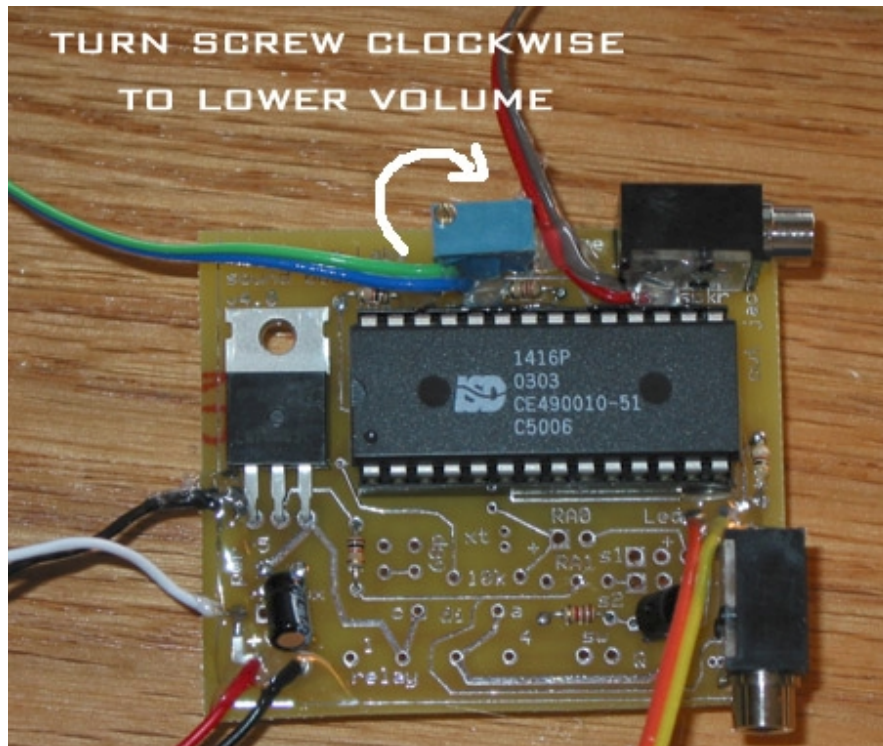
The pot screw **turns 25 times** to go through its entire volume range. So if the volume is too loud going into your external amplifier, you need to reduce the volume from the sound board.

Turn the screw in 4 turn increments (clockwise) until your speaker sounds less distorted. If the volume is too low, turn the screw in 4 turn increments (counterclockwise) to raise the volume.