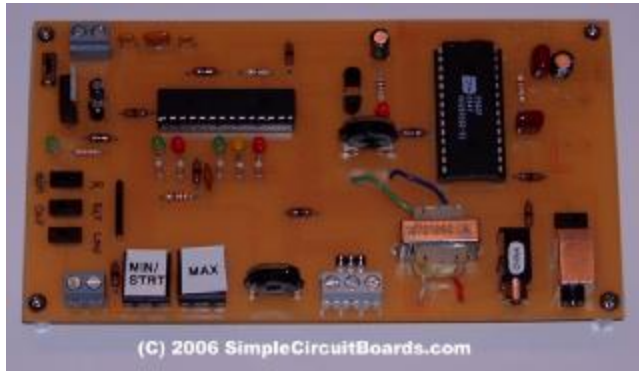


# SimpleCircuitBoards.com

## Sound-To-Servo Board



Here is a nice board that allows you to control a servo motor in response to sound from a non-amplified sound source (computer, CD player, etc.) or you can play back a message recorded on an on-board ISD voice chip. It operates on 7.5 to 24 VDC. ISD Chip (shown on left installed) is not included.

### Details:

This board operates by converting the volume of an incoming sound from an audio source to a voltage signal which is sampled by a PIC microcontroller. When this voltage exceeds a certain amount, the PIC actuates a servo. The sampling rate is very fast which gives a nice servo response to the incoming audio volume.

The sensitivity of this response is controlled by an on-board potentiometer allowing you to fine tune your servo's response. There are 2 LEDs associated with this adjustment. One LED – the Analog Audio Indicator – responds directly to the incoming audio – increasing brightness to increasing volume. The Digital Indicator, next to the PIC, glows when the PIC has determined that the incoming voltage has reached the threshold voltage and has actuated the servo. This response is controlled by the Sensitivity Adjust pot. For sound input and output, the board has two 3.5 mm (1/8") audio jacks. One is to connect to the non-amplified sound source (if you are using an external source) and the other is the output that you can plug your amplified speakers into. Note: the on-board potentiometer will not control the volume of sound coming from this jack – just the sensitivity of the board to the sound as it is fed in.

There is an On/Off switch and a voltage regulator on the board that allows it to operate on voltages ranging from 7.5 to 24 VDC.

The output of the board is mono. The input can be stereo or mono and there is a small slide switch that you can use to select which side (right or left) you want to use. If you plug it in to a stereo source, it will only respond to one channel of the sound. This can be an advantage if you have two of these boards – one using each side of the stereo output. Great for applications like bantering skulls – just record each skull's banter on separate channels.

When setting the board up for use the first time, you must program in the range of movement that you want your servo to operate. For example, if this was being used to control the jaw movement of a

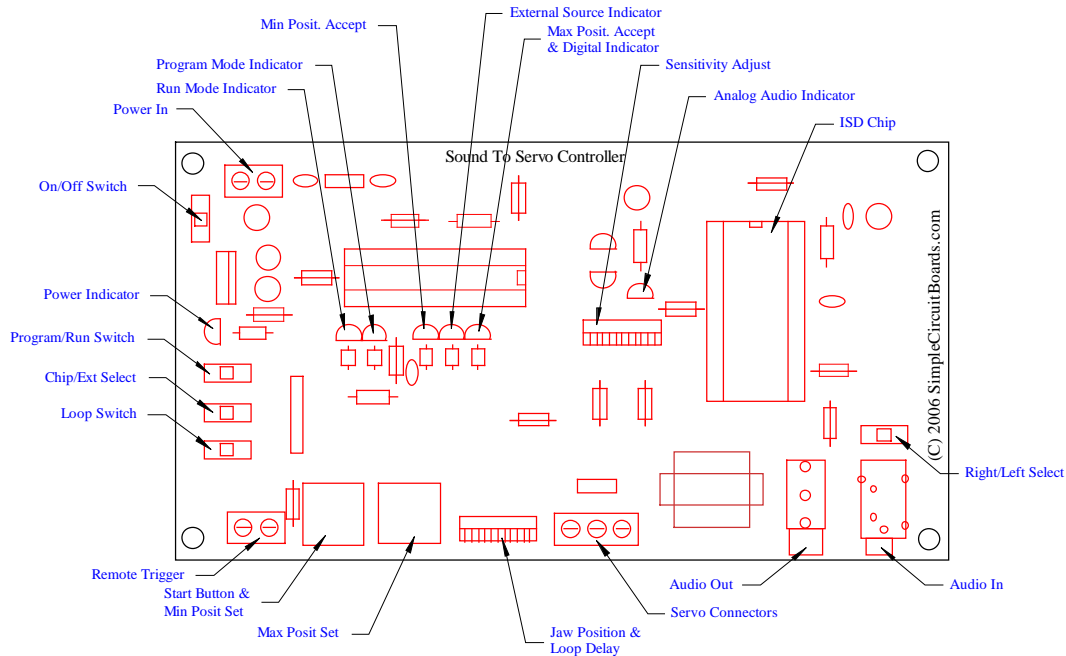
talking skull, you would want to set the position of the jaw when there is little or no sound (minimum position) and the position of the jaw when it is in the full open position (maximum position). This limits the total movement of the jaw when it is “speaking”. To do this, place the board in Program Mode by switching the small slide switch on the board labeled “PROG/RUN” to PROG. A red LED (Program Mode Indicator) will light. Use the Jaw Position potentiometer to position the jaw in the closed position (the jaw moves in unison with the pot) and then press the MIN button. The Min. Posit. Accept LED will flash 3 times indicating that this position has been stored. Now move the jaw to the maximum open position and the press the MAX pushbutton. The Max. Posit. Accepted LED will flash 3 times indicating that it was stored. Once you have entered the 2 positions, put the board back in Run Mode by switching the PROG/RUN slide switch back to the Run position. The Program Mode Indicator will go out and the Run Mode Indicator will light. These 2 positions are now stored in non-volatile memory and will remain there until they are changed.

As mentioned earlier, you can use audio from an external source or audio that has been recorded on an ISD Sound Chip (available separately). The source is selected by a slide switch next to the PROG/RUN switch (Chip/Ext.). If you choose to use the ISD chip, you must first record a sound clip on it. This is accomplished by using my Digital Sound Recorder Board. Depending on which chip you use, you can have up to 2 minutes of audio recorded on this chip. When the ISD chip is selected as the source, you now have the option of playing the sound back by pressing the START/MIN Button or remotely triggering the playback with a normally open contact closure attached to the 2-position terminal next to the START/MIN button. Also, when using the ISD chip, you have the option of continually replaying the sound by putting the board in Loop Mode. This is done by switching the LOOP switch to Loop. The sound will start when the board is triggered and will replay over and over until power is interrupted or the LOOP switch is switched off. When the board is in Loop Mode, the potentiometer that you used to set the jaw position now becomes a delay setting pot. This delay will occur between playbacks and will last up to one minute. While in the delay period, the Run Mode Indicator LED will flash. When the board is using an external audio source, the remote trigger, loop and delay functions are not used.

Next to the Jaw Position / Delay Pot, there is a 3-position terminal block and a 3-terminal header to attach your servo motor to. Watch your polarity!

**Board Layout:**

Below is a diagram showing component placement.

**Miscellaneous Information:**

This board was designed for use with a HITEc servo motor, model HS-425BB. Available from [www.servocity.com](http://www.servocity.com). It should work fine with other RC-type servos.

**Specifications:**

- Input Power: 7.5 – 24 VDC
- Current Draw: Less than 30 mA
- Board Dimensions: 6 x 3.25 inches

**Disclaimer:**

These boards are designed for educational use only. In no circumstances should these circuit boards be used in critical situations where failure could mean injury or property damage.

Please check out the other circuit board designs that I offer at [www.SimpleCircuitBoards.com](http://www.SimpleCircuitBoards.com). Here are just a few examples:

- Thermocouple Amplifiers
- 8-Bit Digital to Analog Converter
- DC to DC Converters
- TTL-Driven Relay Boards – 1 Amp and 10 Amp
- TTL-Driven Latching Relay Board
- Voltage Amplifier Board
- Water Level Monitors
- Water Level Control Boards

- Motor Control Boards
- Programmable Relays
- Programmable Servos

Check back often for new additions!

For more information, contact us at:

[Info@SimpleCircuitBoards.com](mailto:Info@SimpleCircuitBoards.com)