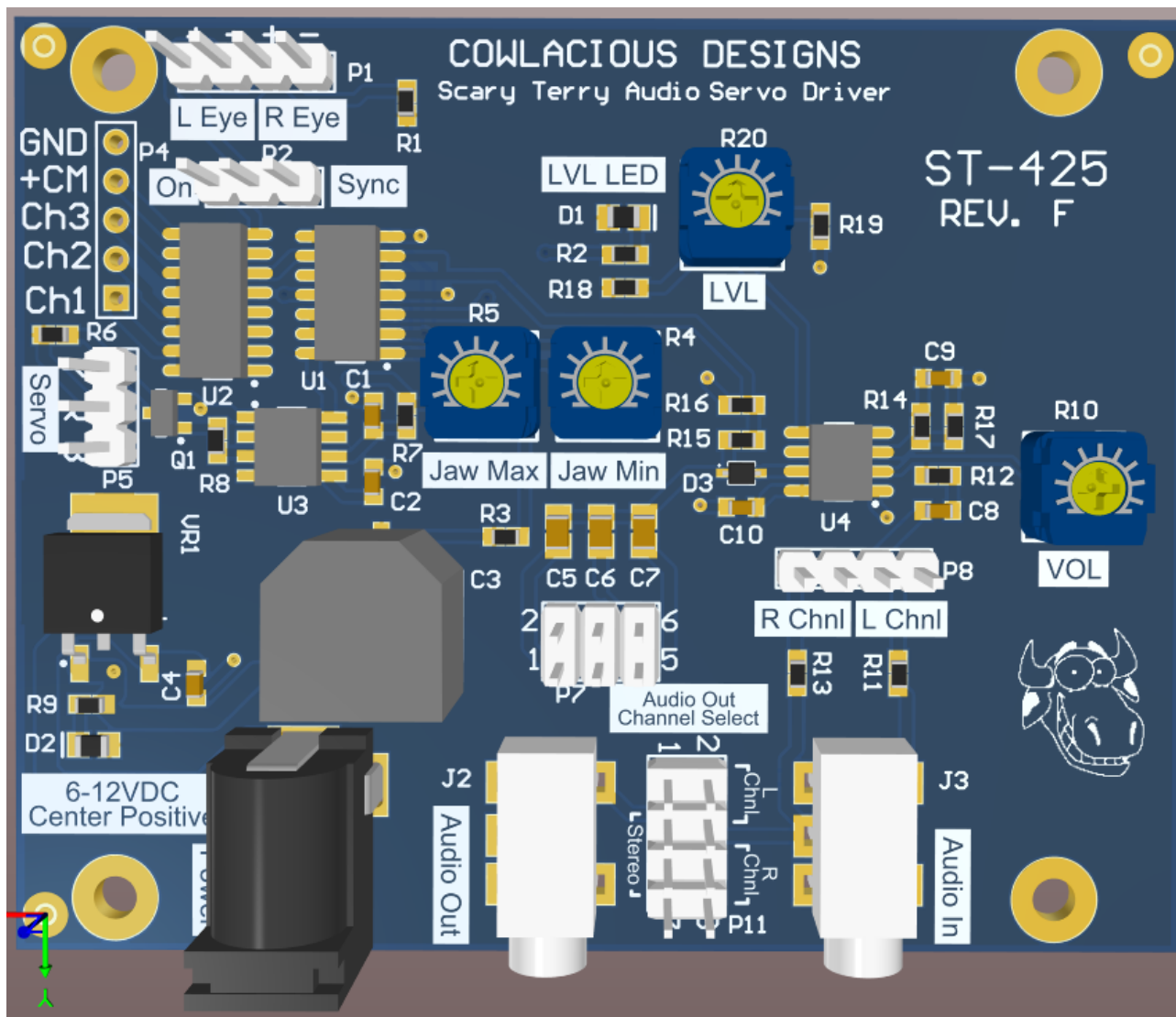


Scary Terry's Audio Servo Driver™

ST-425 Circuit Board



Cowlacious Designs™

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Introduction:

Scary Terry has allowed us at Cowlacious Designs to produce a circuit board from his original design. Over the years we have changed it a little bit, but the main circuitry is still Terry's! We thank him for the great circuit he designed for everyone to enjoy! Sadly, Terry passed away a few years ago.

Scary Terry described the circuit as follows:

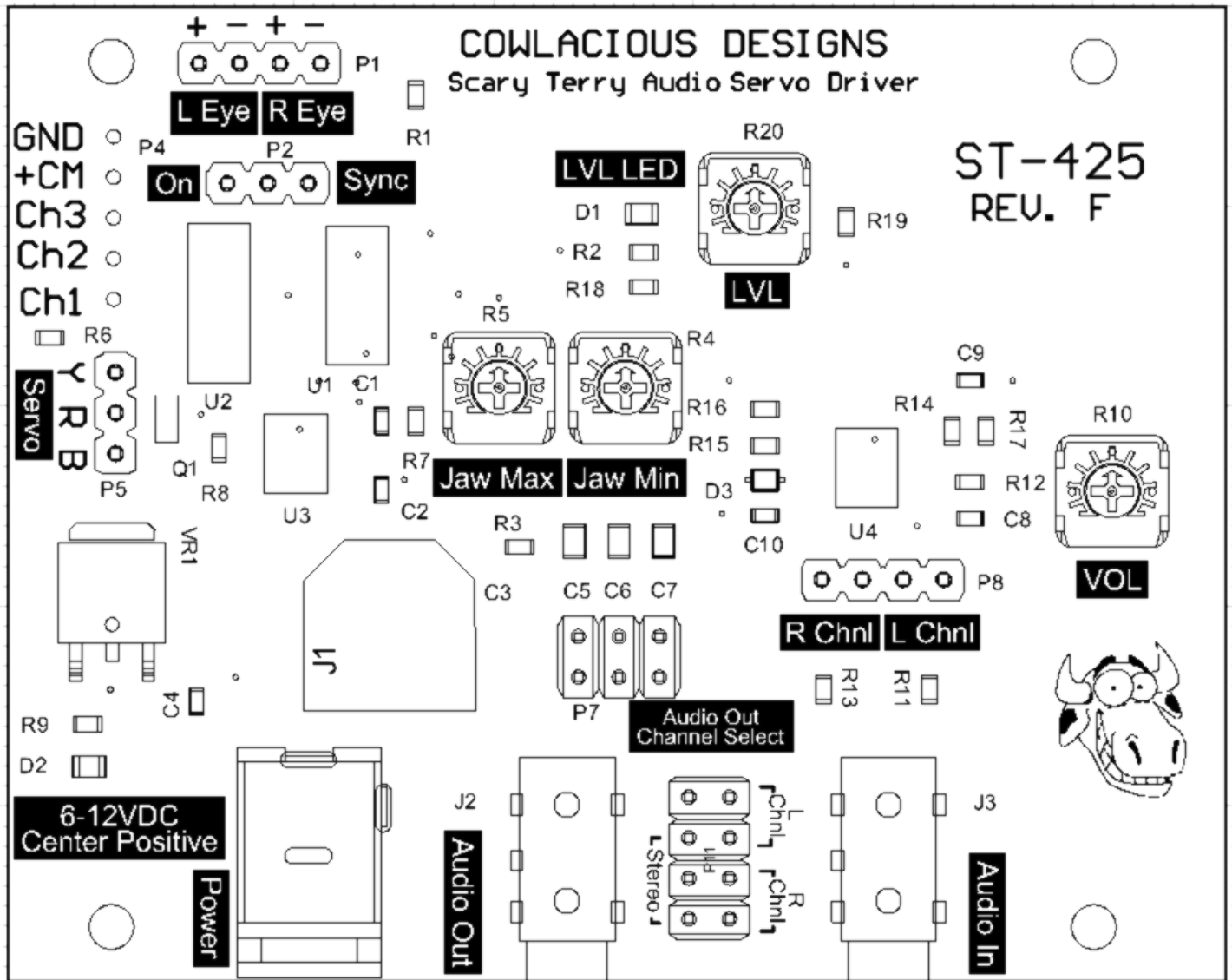
“My goal in creating this was for a simple, inexpensive, and reliable circuit that doesn't require programming a microcontroller for each individual movement. I've used several of these circuits over the last couple of Halloween's to drive Bucky (skeleton skull) and other animatronic heads, and they worked all night long without fail.”

“As long as there is sound present, the servo will drive to its "max" position. If the sound is short in duration, the servo will not have time to drive to "max" but will drive part way and return to "min" position. While this method of moving a mouth is not perfect, it's pretty good and I'm very happy with the effect. It's important to remember that any sound will drive the servo, voice, music or noise, so if you're trying to make a Bucky mouth move to a voice track, you shouldn't have music in the background of that particular track.”

Terry's web site is:

<http://www.scary-terry.com/>

ST-425 Board Overview



- J1** Power Jack 9VDC
- J2** Audio Line Out
- J3** Audio Line In
- P1** LED Eyes connection
- P2** LED Eyes “Sync or On” switch
- P4** High current device connection
- P5** Servo connection
- P7** Servo response speed adjustment

- P8** Audio channel(s) for the servo to follow
- R20** Trigger level pot
- R10** Volume pot
- R5** Jaw maximum adjustment pot
- R4** Jaw minimum adjustment pot
- Audio Out Channel Select** allows you to choose which audio channel(s) go out to the Audio Out jack

Testing and Adjustment

(Note: Please see connection diagrams on the following pages.)

- Connect your servo to the servo header. Make sure you properly orient your servo connector with the header. The header is marked with “Y R B”, where Y is for Yellow, R is for Red or positive, and B is for Black or Negative. (Colors for the yellow wire will vary by servo manufacturer, but the Red and Black are usually there.)
- Supply power to the board by connecting a 9 VDC (1000mA) power supply to the barrel connector. **Center pin is positive, sleeve is negative.** You should see the “PWR” LED light up as soon as power is applied.
- Adjust the threshold level, “LVL” (R20), clockwise or counter-clockwise until the “LVL LED” turns on.
- Adjust “MAX” (R5) until the servo is in the maximum position you would like it to move to. This is maximum open mouth position.
- Adjust the threshold level, “LVL” (R20), clockwise just far enough that the “LVL LED” turns off. Note: This control is used to set the sound trigger level needed to make servo head toward the MAX setting. If it is set too far from the point that the LVL LED turns on the servo will not respond to the sound at all or not as much as desired.
- Adjust “MIN” (R4) until the servo is in the position you would like it to move to. This will be the closed mouth position. Don't close it so much that the jaw clenches or it could cause the servo to overheat.
- Feed audio to the circuit through the 3.5mm stereo “Line In” jack. If you want both channels of sound to control the Scary Terry – Retro Basic then make sure that the red shorting jumpers are on P8. If you want only the right channel of audio to control the servo, then remove the red jumper from the switch for left channel. If you want only the left channel audio to control the servo then remove the red jumper from the switch for the right channel.

PLEASE NOTE: Audio Out Channel Select allows you to choose which audio channel(s) go out to the “Audio Out” jack. By placing both jumpers on the headers marked stereo, both audio channels will on the “Audio Out” jack. If both jumpers are on “L Chnl” then the audio “Audio Out” jack will only send the left channel audio out, and vise-versa if the jumpers are on “R Chnl”.

The “Line Out” jack can connect to an external set of powered computer speakers, powered MP3 speakers, or it can feed the Aux or Line In jack of an amplifier that has speakers connected to it.

- Adjust the “VOL” until you get the kind of response you want. Remember, this circuit is designed to move the servo to its maximum position whenever audio is present. If the audio is too loud it will remain in its maximum position until the “Gain” is adjusted to an appropriate audio level. If the audio source has an adjustable output, such as an MP3 players headphone jack, you will probably need to turn the players volume up to maximum.

The “VOL” adjustment and the “LVL” adjustment work in conjunction with each other, so you may need to experiment a little bit with these controls to get the effect you want from the sound source you are using.

OTHER AJUSTMENTS AND CONNECTIONS

There are three header pins on P7 with a red removable jumper across the two middle pins. This header allows you to fine tune how quickly the circuit responds to sounds. In the middle position it is using a 4.7uF capacitor. If you move the jumper over two pins to the right, facing the audio jacks, it will use a 2.2uF capacitor, speeding the reaction time up a little. If you move the jumper to over the other direction it will be using a 10uF capacitor which will slow the reaction time down a little.

High Current Section (P4)

The high current driver of the Scary Terry board allows the board to control devices such as small DC lamps, relays, and solenoids for air and water. This section can be used to control props that require larger eyes than LED’s appear to be and/or to control a jaw that is just too big for a servo to be able to control.

Each of the 3 channels is capable of sinking 1000mA of current. We don't recommend pushing it that hard without attaching a heatsink to the chip, but that is what the specs for the device say.

The chip can sink up to 24VDC devices, even though the Scary Terry board is only a 5VDC board.

SUPPLIED DEVICES

LED AUDIO EYES

The L Eye & R Eye connections can be set so that the LED Eyes are always on or so that they flash with the audio. Setting the red shorting jumper of P2 across the middle pin and the “Sync” pin will make the eyes flash with the audio. Setting the red shorting jumper of P2 across the middle pin and “On” will make the eyes stay on continuously.

The LED eyes attach to the R Eye and L Eye (P1) header with the black wire connecting to the (-) pin and the yellow wire connecting to the (+) pin. Our LED Audio Eyes can simply be plugged onto these connectors.

NOTE: Just about any color LED will work fine with these connections (clear ultrabright red LED's are supplied). Insert one LED into the end of each LED Audio Eyes wire. The short lead or flat side of the LED should be place in the side of the socket with the black wire. They can then be taped or glued in place. You could also use a little heat shrink tubing to hold the LED in its socket.

OPTIONS AVAILABLE FOR PURCHASE

Please see our web site at www.cowlacious.com

9VDC, 500MA, WALL TRANSFORMER THAT PLUGS INTO THE BARREL JACK.

HITECH 425BB SERVO

3.5MM TO 3.55 STEREO CABLE (ONE IS PROVIDED)

3.5MM TO RCA CABLE

HIGH CURRENT WIRING ASSEMBLY

The high current section on the board allows for higher current devices to be controlled by the Scary Terry Audio Servo Driver board. This connection allows devices such as small lamps, relays, and solenoids for air and water to be controlled in sync with the audio, just like the LED Audio Eyes. These devices will turn on and off in sync with the “LVL LED”.

Special Thanks to Scary Terry (Terry Simmons) for letting us use his original design for the development this product!

We hope you enjoy it!



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