ServoTalk 412 FRIGHTIDEAS.COM

POWER UP HOLDING SET | TAP SET | **SETTINGS**
x1: CENTER SERVOS
x2: MOUTH CLOSED
x3: MOUTH OPEN
x4/5: EYES LEFT/RIGHT
x6/7: HEAD LEFT/RIGHT
x1: EYE/HEAD MOVMNT
x2: MOUTH SENSITIVITY
x3: LED COLOR
x4: LED MODE

5-6V

POWER | MOUTH EYES HEAD LEDS | ADJ | SET | AUDIO

Operating Manual
ServoTalk
412

Getting Familiar

ADJUSTMENT POT

SET BUTTON

MOUTH SERVO
HEAD SERVO
EYE SERVO
NEOPIXEL LED EYE OUTPUTS
AUDIO INPUT

POWER INPUT (2.1MM)

STATUS LED
🟢	Running
🟢	Idle Timeout
🟣	Manual Override
🔴🔴🔴	Voltage Too High
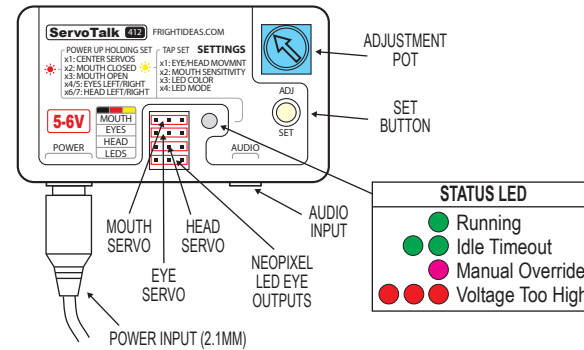
CONNECTIONS AND CONTROLS
Mouth Servo	Connector for the mouth servo. (left audio channel)
Eye Servo	Connector for the eyes / primary animation servo.
Head Servo	Connector for the head / secondary animation servo.
NeoPixel LED Eye Outputs	Connector for up to 14 RGB NeoPixels in series. 4.8VDC output, 500mA Maximum.
Power Input	Connect 4.8 to 8.5VDC power supply or battery. Servos will receive this voltage directly. Anything above 8.5VDC will not pass through to servos and will cause an error.
Status LED	Indicates power and programming status.
Audio Input	3.5mm stereo audio jack for connection to audio source.
Set Button	Set button used to enter and navigate the menus.
Adjustment Pot	Used to make adjustments and move servos.

Audio Preparation

Mastering your audio track correctly is key to getting the best results from your ServoTalk.

Audio Volume - The volume level of the audio going into the ServoTalk must be as high as possible for the best results. If you have the ability to edit the sound, be sure to normalize the audio level to the point just before clipping occurs.

One Character - Simply record a sound track and play it back through the ServoTalk. If sound effects or music are required, they must be in the right audio channel only.

Two Character Conversation - A two character conversation will almost certainly require some audio editing. One character's voice track must be in the left channel, and the other in the right.
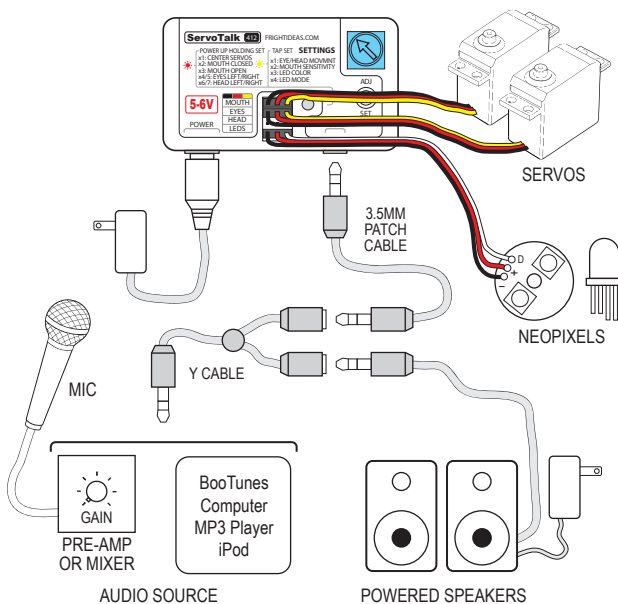
Audio Editing - Audacity is an audio editing program available for free.
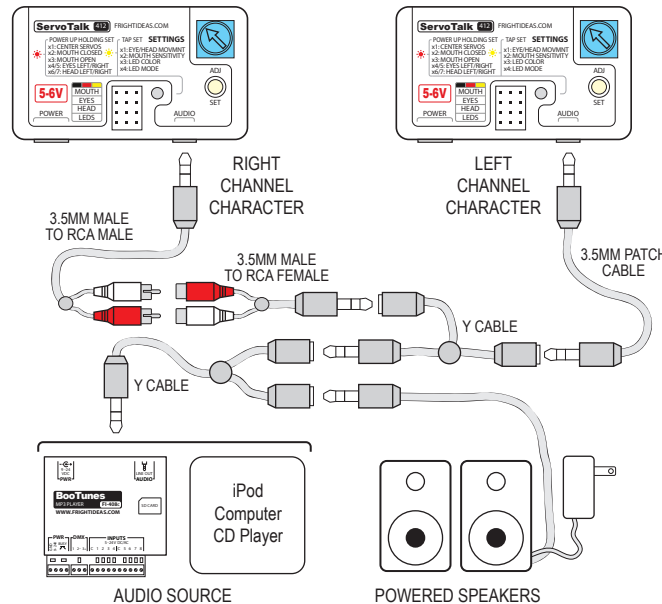
Troubleshooting / Factory Reset

To reset the unit back to factory defaults, first disconnect your servos, then power up while holding the SET button. Keep holding the SET button until the light turns solid green. The unit is now reset. Cycle the power to calibrate.

Mouth only moves to some of the audio - Try increasing the volume on your source, or increasing the sensitivity of the ServoTalk.
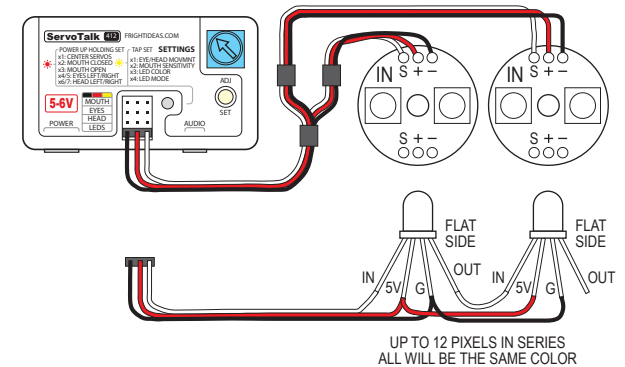
Connection Diagrams

SERVOS

3.5MM PATCH CABLE

NEOPIXELS

Y CABLE

MIC

GAIN

PRE-AMP OR MIXER

BooTunes Computer MP3 Player iPod

POWERED SPEAKERS

AUDIO SOURCE

TYPICAL SETUP

RIGHT CHANNEL CHARACTER

LEFT CHANNEL CHARACTER

3.5MM MALE TO RCA MALE

3.5MM MALE TO RCA FEMALE

3.5MM PATCH CABLE

Y CABLE

Y CABLE

BooTunes
MP3 PLAYER

iPod Computer CD Player

POWERED SPEAKERS

AUDIO SOURCE

TWO CHARACTER SETUP

IN S + −

IN S + −

S + −

S + −

FLAT SIDE

FLAT SIDE

IN 5V G OUT

IN 5V G OUT

UP TO 12 PIXELS IN SERIES
ALL WILL BE THE SAME COLOR

NeoPixel Sources
Cut the end off of a servo extension cable and solder it to some NeoPixels. Check AdaFruit, DigiKey, or Mouser for the parts below ...
5mm LED: Adafruit ID 1938, COM-12986
8mm LED: Adafruit ID 1734, COM-12877
Single Pixel: Adafruit ID 1559, WS2812, WS2812B, SK6812
NeoPixel Jewel: Adafruit ID 2226

NOTE: Do NOT use Ultra Bright NeoPixels as those will take too much power. If you do you must power them separately from a 5V power supply.

NEOPIXEL RGB WIRING

Standard Setup

When it's first installed the ServoTalk needs to be taught how far each of the servos can safely travel. If this calibration has never been performed the ServoTalk will power-up here. Note that if you received the ServoTalk as part of a Talking Skull this calibration was already performed. To enter this mode power-up holding SET for one second, then let go. To only adjust the yellow options tap SET *after* power-up.

| FULL CALIBRATION	
🔴 **x1**	**Servo Centering -** This mode will center all servos. *Use this mode to install the horns on your servos. With the servos centered, position the movements in the center of their range and then install the horn. Tap SET to move to next step.*
🔴 **x2**	**Mouth Closed Position -** Turn ADJ until the mouth is almost closed. *It's best not to set this limit to a point where the bottom half of the jaw is actually touching the top. This will put unnecessary strain on the servo and may cause unwanted sounds during operation. Position the bottom jaw just slightly lower than fully closed.*
🔴 **x3**	**Mouth Open Position -** Turn ADJ until the mouth is open. *Be sure not to open the jaw so far as to strain the servo. An inch or so is usually plenty.*
🔴 **x4**	**Eye Servo Left Limit -** Turn ADJ until the eyes are almost at the left limit. *Rotate POT to center to pickup the eye servo. If the servo struggles turn back, do not go too far.*
🔴 **x5**	**Eye Servo Right Limit -** Turn ADJ until the eyes are almost at the right limit. *Try to move the same distance in the opposite direction so the mid-point is at character center.*
🔴 **x6**	**Head Servo Left Limit -** Turn ADJ until the head is almost at the left limit. *Rotate POT to center to pickup the head servo, then adjust as above.*
🔴 **x7**	**Head Servo Right Limit -** Turn ADJ until the head is almost at the right limit. *Set this last limit then tap SET. You will jump to the partial calibration below.*

PARTIAL CALIBRATION	

To perform a partial calibration instead of a full calibration tap SET *after* power-up.

🟡 **x1**	**Random Movement -** Turn ADJ to select how often the character moves. ***Be patient here*** *as each time you move ADJ the timer is reset. Note that the amount of random movement shown at this step represents the character's idle state. The amount of movement will double when the character is talking.*
🟡 **x2**	**Audio Sensitivity -** Turn ADJ to adjust the sensitivity to the audio. *Play the audio track into the unit, the mouth should start moving. Make sure the volume on the source device is nice and loud. Turn ADJ to where the mouth is catching most of the syllables. If the source volume changes you may need to re-adjust.*
🟡 **x3**	**LED Color & Brightness -** Turn ADJ to adjust the color and brightness of your LED eyes.
🟡 **x4**	**LED Eyes Mode -** Turn ADJ to adjust the behavior of your LED eyes. *Make sure your audio is playing. See the diagram below for the different modes.* 🔵 **x1** - Throb eye brightness to audio. **x3** - Eyes stay on until Idle Timeout kicks in. **x2** - Fade out after X seconds. Turn **x4** - Always on clockwise to increase time before fade.

Manual Control

Once you have run through the setup above you have the option to enter Manual Control mode. This can be useful to troubleshoot servo movement in the future. Rotate POT while the ServoTalk is Idle. The Status LED will flash purple. The ServoTalk will automatically return to Idle mode after about 10 seconds of inactivity.

🟣	**Manual Control** Rotate POT to move the selected servo between its limits. Tap SET to move to the next servo. **x1** - Mouth servo **x2** - Eyes servo **x3** - Head servo

Advanced Programming

There are some advanced settings that can be accessed by holding the SET button during normal operation. Hold it until the status LED turns green, then let go.

🟢 **x1**	**Servo Sleep -** Enable or Disable sleeping for each servo. *By default the ServoTalk will stop sending the pulse signal to a servo if it hasn't moved for a few seconds. Most servos will shut down and relax when this happens, extending their life. If your mechanism requires one or more servos to remain on you can set that here.* 🔵 **x1** - Sleep Mouth **x5** - Sleep Head & Mouth **x2** - Sleep Eyes **x6** - Sleep Head & Eyes **x3** - Sleep Mouth & Eyes **x7** - Sleep Head, Mouth, & Eyes (default) **x4** - Sleep Head
🟢 **x2**	**Mouth Servo Speed -** Turn ADJ to adjust the MOUTH speed. *In some setups the mouth speed may need to be changed to achieve a more realistic result. Adjust this option while playing audio into the ServoTalk and watching the mouth.*
🟢 **x3**	**Eye/Primary Servo Speed -** Turn ADJ to adjust the maximum speed. *The servo will move between the limits at maximum speed 3 times, followed by a 5 second pause before repeating. Adjust the speed anytime. At the absolute maximum there is no speed control so the servo will delay before changing directions to ensure the limit was reached.*
🟢 **x4**	**Head/Secondary Servo Speed -** Turn ADJ to adjust the maximum speed. *Works the same as the adjustment above.*
🟢 **x5**	**Idle Time-Out -** Disable Random Movement after a period of no talking. *You may want the random movement to stop if the character hasn't talked for a while. This can extend servo life in situations where the skull only talks occasionally. ALL servos will be forced to sleep when the time-out occurs, regardless of their sleep setting.* 🔵 **x1** - Disabled **x3** - 2 minutes **x5** - 20 minutes **x2** - 30 seconds **x4** - 5 minutes (default) **x6** - 60 minutes

Recording Animation

If you don't like or can't use the random eye/head animation you can program your own. To enter animation mode hold the SET button until the status LED turns blue, then let go.

🔵 **x1**	**Primary Servo Animation (Eye Output) -** Use this output for your primary servo. If you have a movement that is more important or moves more, connect it to this output and program it first. See below for recording info.
🔵 **x2**	**Secondary Servo Animation (Head Output) -** As you record this animation the animation for the primary servo will play so that you can sync these movements to those. Stop recording slightly before or after the end of the primary servo animation for best results.

🔵 **Ready -** This refers to the x1 or x2 blink above. Use the POT to move the servo into its starting position. This position should be the same position you want the character to be in when it first starts up, or before it enters an Idle Time-Out. To start recording hold SET for 2 seconds until the LED turns red, then continue below. If you want to move to the next servo from this menu tap SET.

🔴 **Recording -** The ServoTalk is now recording the movements of the servo. It records the positions where you stop moving, how fast you moved to each position, and how long you wait until you move again. You can record up to 64 positions. You must record at least two positions and 5 seconds. Tap SET to stop recording. To erase animation just start recording and then stop without moving.

🟢 **Playback Loop -** Playback will automatically start when you stop recording. If you recorded the primary servo only it will play. If you recorded the secondary servo both servos will play. The animation will loop until you tap the SET button to return to Ready mode.