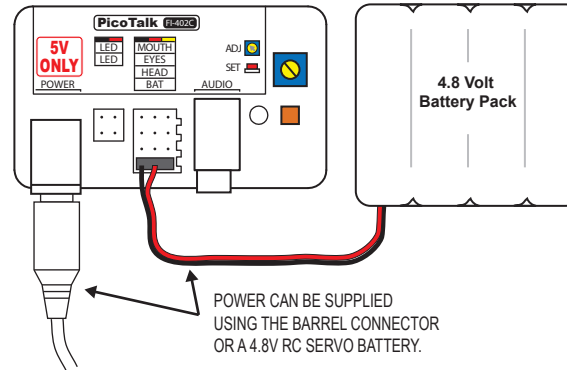


## Operating Manual PicoTalk 402C

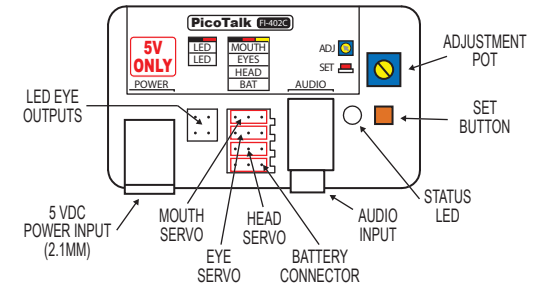
## Power Supply



**!** THE PICOVOLT'S POWER SUPPLY MUST BE 5 TO 6 VOLTS DC. ANYTHING ELSE WILL LIKELY DAMAGE YOUR SERVOS.

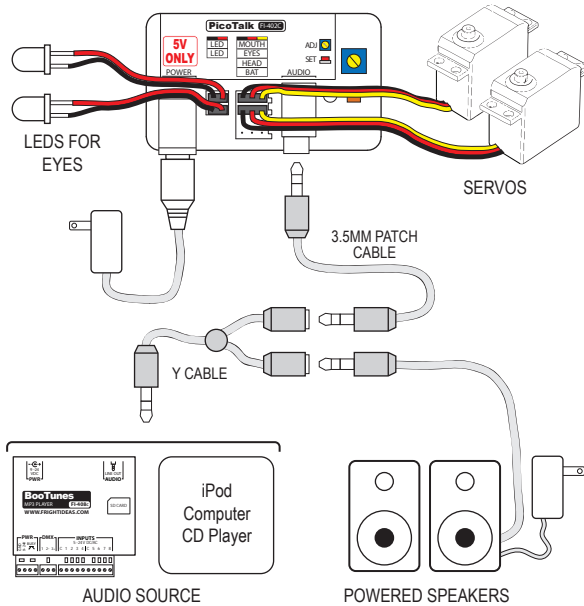
The PicoVolt includes a 5 volt 2 amp power supply, which is more than adequate for almost all applications. If you are using huge servos then you may need a power supply with more current (amps). Do not use a power supply that outputs a voltage higher than your servos can handle. The PicoTalk itself can handle up to 12 volts, but most servos can only handle up to 6 volts.

## Getting Familiar

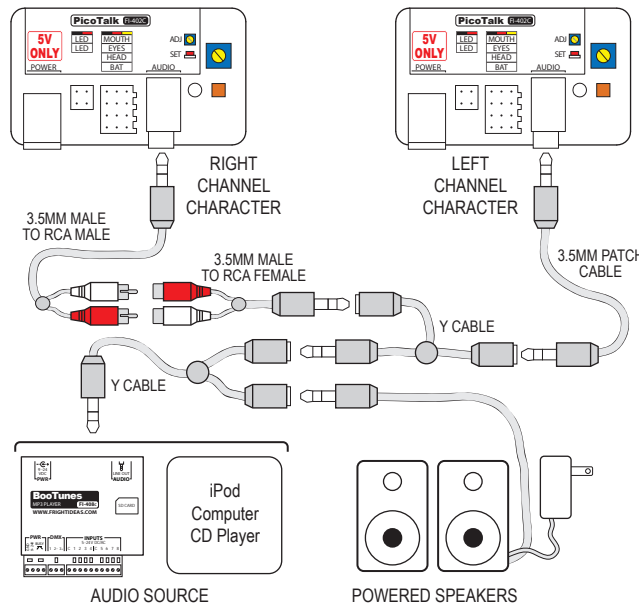


CONNECTIONS AND CONTROLS	
Mouth Servo	Connector for the left audio channel mouth servo.
Eye Servo	Connector for the eyes servo.
Head Servo	Connector for the head turn servo. (-3 Model Only)
LED Eye Outputs	Connectors for two eye LEDs. No resistors required. An internal 160 ohm resistor connects each LED to 5VDC. For most LEDs, this allows a 20mA maximum current.
Battery Connector	Connector for a standard 4.8 volt RC battery pack.
5 VDC Power	Connector for a 5 VDC regulated power supply.
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 program mode.
Adjustment Pot	Used to make adjustments during program mode.

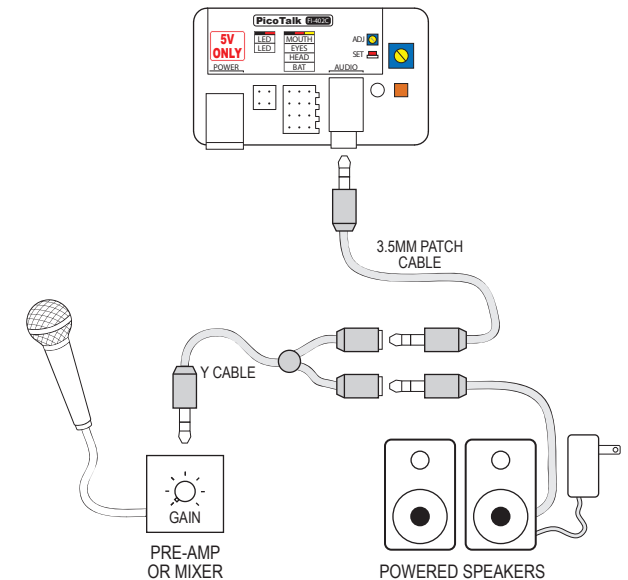
## Connection Diagrams



TYPICAL SETUP



TWO CHANNEL SETUP














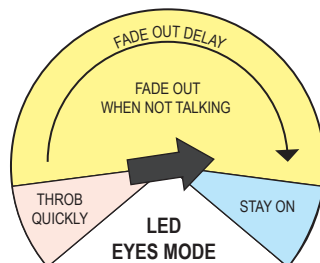
LIVE AUDIO SETUP

## Programming

When it's first installed, the PicoTalk needs to be taught how far each of the servos can safely travel. If this calibration has never been performed, the PicoTalk will power up in this mode. Note that if you received the PicoTalk as part of a Talking Skull this calibration was done for you at the factory.

If you only want to adjust one of the yellow options below then you can start a partial calibration by tapping the SET button during normal operation. To enter the full calibration mode you must power up the PicoTalk while holding the SET button, let go when the LED blinks red. In either mode, the LED will blink as shown below. Tap the SET button to move to the next step.

FULL CALIBRATION START	
 <b>x1</b>	<b>Servo Centering</b> - This mode will center both servos. <i>Use this mode to install the horns on your servos. With the servos centered, position the movements of the mouth or eyes in the center of their range and then install the horn. This will ensure you get the most range of movement from your servos without driving them beyond their usable range. Turn ADJ to the center position before pressing SET to move on.</i>
 <b>x2</b>	<b>Mouth Closed Position</b> - Turn ADJ until the mouth is almost closed. <i>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 cause unwanted sounds during operation. Position the bottom jaw just slightly lower than fully closed.</i>
 <b>x3</b>	<b>Mouth Open Position</b> - Turn ADJ until the mouth is open. <i>Be sure not to open the jaw so far as to strain the servo. An inch or so is usually plenty.</i>
 <b>x4</b>	<b>Eye Servo Left Limit</b> - Turn ADJ until the eyes are almost at the left limit. <i>If the eyes stop moving during adjustment, turn back a bit so the servo's not struggling.</i>
 <b>x5</b>	<b>Eye Servo Right Limit</b> - Turn ADJ until the eyes are almost at the right limit. <i>If the eyes stop moving during adjustment, turn back a bit so the servo's not struggling.</i>
 <b>x6</b>	<b>Head Servo Left Limit (-3 Model Only)</b> - Turn ADJ until the head is almost at the left limit. <i>If the head stops moving during adjustment, turn back a bit so the servo's not struggling.</i>
 <b>x7</b>	<b>Head Servo Right Limit (-3 Model Only)</b> - Turn ADJ until the head is almost at the right limit. <i>If the head stops moving during adjustment, turn back a bit so the servo's not struggling.</i>
PARTIAL CALIBRATION START	
 <b>x1</b>	<b>Random Movement</b> - Turn ADJ to select how often the eyes and head will move. <i>Note that the amount of random movement shown represents the character's idle state. The amount of movement will double when the character is speaking.</i>
 <b>x2</b>	<b>Audio Sensitivity</b> - Turn ADJ to adjust the sensitivity to the audio. <i>Play the audio track into the unit, the mouth should start moving. Start with ADJ turned fully counter-clockwise, then turn it clockwise bit by bit if the mouth isn't moving to all the words.</i>
 <b>x3</b>	<b>LED Brightness</b> - Turn ADJ to adjust the maximum brightness of your LED eyes.
 <b>x4</b>	<b>LED Eyes Mode</b> - Turn ADJ to adjust the behavior of your LED eyes. <i>Make sure your audio is playing. See the diagram below for the different modes.</i>



## Audio

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

### Audio Volume

The volume level of the audio going into the PicoTalk must be as high as possible for the best results. If you're using a portable CD or MP3 player, make sure the output volume is at max. 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 PicoTalk. 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 from <http://audacity.sourceforge.net/>. The program is available for both mac & pc, and it's fairly easy to use to create your own two-character audio track, or to add effects to a single character track. Be sure to use the Normalize function in the Effect menu to increase the audio level to almost maximum. If you're intending to play your sound file on an MP3 player, you'll also need to download the Lame MP3 encoder. See the Audacity website for more details.

## Advanced Programming

There are also some advanced settings that can be accessed by holding the SET button for five seconds during normal operation. **Turn ADJ fully counter-clockwise before entering this mode.**

 <b>x1</b>	<b>Servo Range</b> - Select between 90 or 180 degrees of servo range. <i>Keep ADJ in the counter-clockwise position for the default 90 degree range setting. If you need more range from your servos, disconnect them, then turn ADJ past the half-way point. Complete the steps below, then reconnect your servos and perform a full-calibration. Note that not all servos support this. Check your servos specs to be sure, or you could damage them.</i>
 <b>x2</b>	<b>Servo Sleep</b> - Enable or Disable the servo sleeping option. <i>Turn ADJ counter-clockwise to enable servo sleeping, or clockwise to disable it. By default sleeping is enabled. In this mode the PicoTalk stops sending servo position signals after 1 second of inactivity. If your servos need to remain energized at all times to hold their positions, then disable this option. Beware that disabling it will reduce the life of your servos.</i>
 <b>x3</b>	<b>Mouth Servo Speed</b> - Turn ADJ to adjust the mouth speed. <i>In some setups the mouth speed may need to be increased to achieve a more realistic result. Adjust this option while playing audio into the PicoTalk and watching the mouth. Keep in mind that the slower the servos have to move the longer they'll last.</i>
 <b>x4</b>	<b>Head Servo Speed (-3 Model Only)</b> - Turn ADJ to adjust the maximum head turn speed. <i>Be patient on this step as the head will not always turn at the maximum speed. For a more realistic appearance the PicoTalk will use either 1/4, 1/2, 3/4, or full speed. Watch it for 15 seconds or so to get a good idea of the speeds it will use at the current setting.</i>

## Troubleshooting and 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 PicoTalk. If that's still not enough, the audio will most likely have to be edited and increased in software.

### Mouth moves even when the character's not talking

Make sure only the voice is in the left channel of the audio. You can also try reducing the PicoTalk's sensitivity.