



picoTalk

OPERATING MANUAL
V1.2 (May 26, 2010)

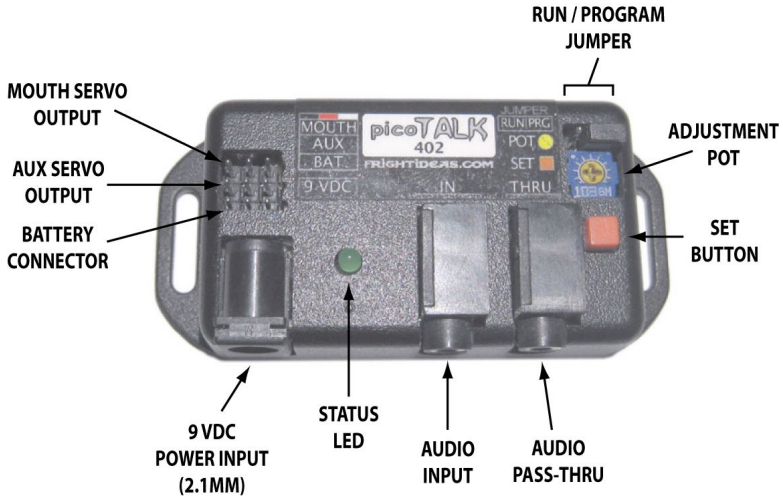
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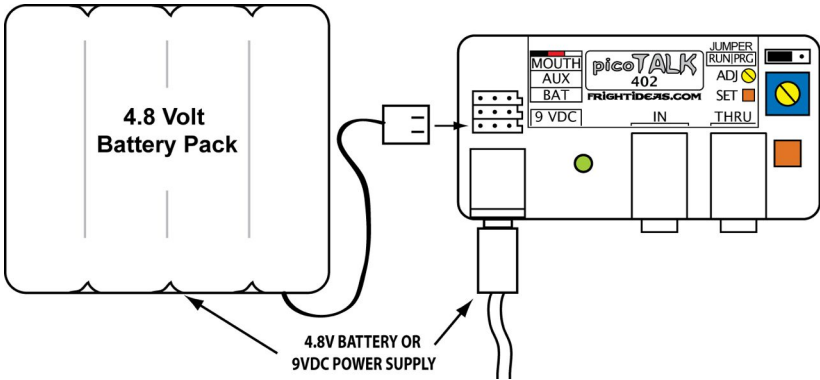
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Getting Familiar with your picoTalk



CONNECTIONS AND CONTROLS	
Mouth Servo Output	Connector for the left audio channel mouth servo
AUX Servo Output	Connector for the right audio channel mouth, eyes, or head turn servo
Battery Connector	Connector for a standard 4.8 volt battery pack if powered from battery
9VDC Power Input	Connector for a 9 volt DC power supply (12 volt max, see next page)
Status LED	Indicates power and programming status
Audio Input	3.5mm stereo audio jack for connection to audio source
Audio Pass-Thru	3.5mm stereo audio jack for connection to speakers or second picoTalk
Set Button	Set button used to enter and navigate the program mode
Adjustment Pot	Used to make adjustments during program mode
Run/Program Jumper	<p>During Program Mode this jumper must be in the PRG position.</p> <p>If the AUX servo is used for random motion, then the jumper can remain in the PRG position at all times.</p> <p>If a mouth is being driven from the AUX servo, then the jumper must be in the RUN position during normal operation.</p>



The picoTalk can be powered by a 4.8 volt battery or 9 volt DC power supply. The required current rating of the power supply will depend on the size and work load of the servos. The included power supply should be adequate for driving small RC (radio control) servos.

There is an internal voltage regulator inside the picoTalk that regulates the 9 VDC power supply down to 5 volts for the servos. This regulator's current output is limited to 1 Amp. Therefore, there's no benefit to using power supplies that output more than 1 Amp (1000mA) of current.

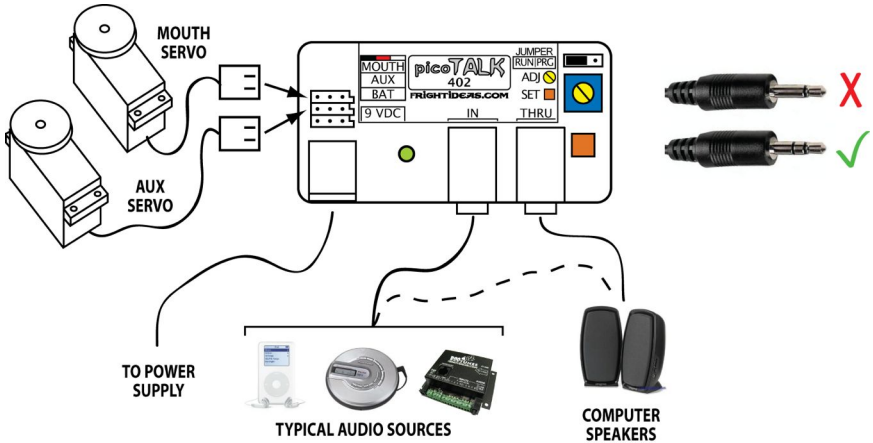


Do NOT exceed 16.5 volts on the picoTalk's input or it may be permanently damaged. Most DC power supplies are un-regulated and actually output a higher voltage than indicated on the label. A typical 12 volt DC power supply can output up to 18 volts when not under load.

If the included power supply is 12 VDC, it has been checked by us to ensure it's output is safe.

Connection Options

Connecting the picoTalk



Start with the power supply or battery **DISCONNECTED**.

Connecting your Servo(s)

The servo headers on the picoTalk are keyed with a notch on one side so most servo connectors will only go in one way. However, if your servos are not keyed, please use the colors on the picoTalk's label as a guide. The black wire should be on the outside, the red wire in the middle, and the white or yellow wire on the inside.

Connecting the Audio In

Connect the IN connector of the picoTalk to a typical audio source such as a CD Player, MP3 Player, or computer. Any line-level audio source can be used. The picoTalk will listen to the left channel of this audio source and move the mouth servo in real-time to make it look like the character is talking. If you have a dual-servo picoTalk, it can be set to move the aux servo in sync with the audio's right channel. However most applications use the aux servo for eye movement. Use only a 3.5mm stereo cable with this connector.

Connecting the Audio Thru (Optional)

Using this connector is optional. It's a simple pass-thru connector for connection to powered speakers or an amplifier. The speakers can be connected here, or they can be connected directly to the source - whichever is more convenient. Use only a 3.5mm stereo cable with this connector.

5. Power Supply or Battery

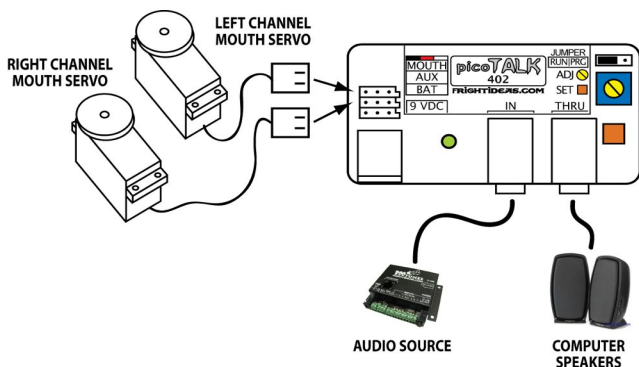


If this is the first time you are powering up the picoTalk you must set the servo limits first (see Program Mode for more details). If you don't, the servos may be strained or possibly damaged. If the picoTalk came pre-installed in a Talking Skull, you can ignore this warning because the servo limits have already been set.

Once powered up, the picoTalk will begin normal operation and begin moving the mouth to the audio. To calibrate it to your audio or servos needs see the Program Mode section. For more information on power supply options see the Power Options section.

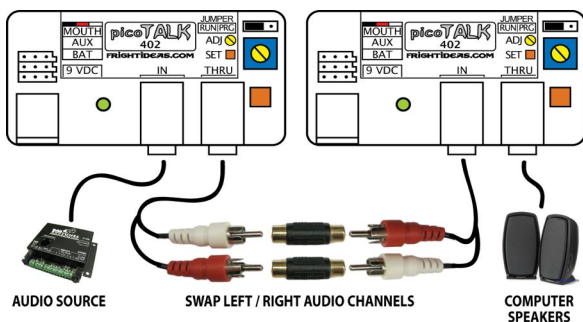
Two Character Conversation with Mouths Only

A single picoTalk can be used to drive two mouths if no random eye or head control is needed.



Two Character Conversation with Eyes/Head and Mouth

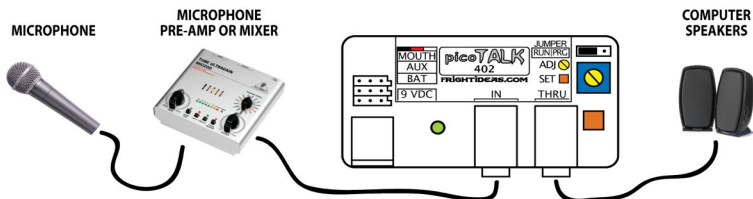
Two picoTalks can each be used to control a mouth, and either eyes or the head from a single audio source.



Live Characters

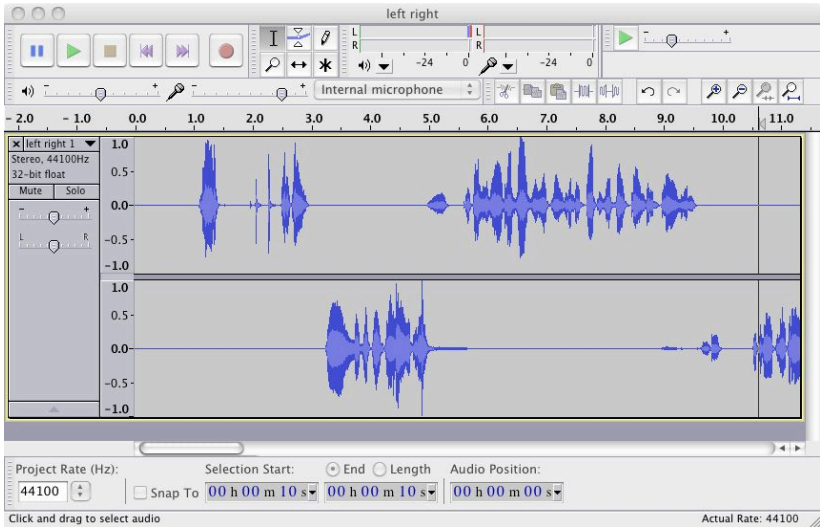
A picoTalk can even decode audio in real-time from a microphone! A mixer or microphone pre-amp must be used to increase the microphone's signal to line-level, which is the typical output of most audio sources. Two live characters are also possible if you use a simple mixer to pan one mic to the left channel, and the other to the right channel.

Either one of the 2 configurations illustrated above apply to live characters as well.



Preparing the Audio Track

Mastering your audio track correctly is key to getting the best results from your picoTalk. The left audio channel must contain only the vocal track, no other background music or sounds. If you're only animating one character then you can use the right channel of the audio track for these sounds. If you're animating two characters, the right channel of the audio track must be used for the second character.



Editing a Two Character Audio File in Audacity

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

For a simple one character setup there is no audio editing necessary unless you want background music or sound effects playing from the same audio source. Simply record a stereo or mono sound track and play it back through the picoTalk.

Two Character Conversation

A two character conversation will almost certainly require some editing. As illustrated in the diagram above, one character's voice track must be in the left channel, and the other in the right.

Audio Editing

Audacity is a great audio editing program that is 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.

Program Mode

The picoTalk needs to be taught how far each of the servos can safely travel, how much random movement is needed, and how loud the audio is. Use the following steps to calibrate it to your setup. If you received the picoTalk as part of a Talking Skull kit then most of this is already done, you may skip ahead to *Partial Calibration*.



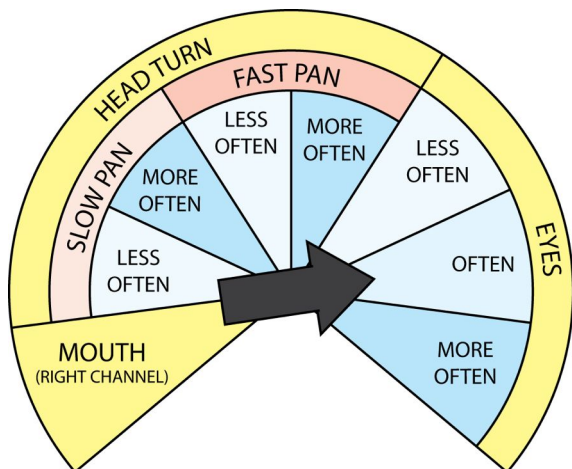
Follow these steps carefully.
Improper calibration or failure to calibrate will damage your servos!

Full Calibration

1. Start with the power supply disconnected. Make sure the jumper is in the PRG position.
2. Connect the power while holding the SET button.
3. The LED will blink and both servos will center. Turn ADJ to the center position. Press SET.
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.
4. The LED will blink 2 times. Turn ADJ until the mouth is almost closed. Press SET.
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.
5. The LED will blink 3 times. Turn ADJ until the mouth is open. Press SET.
It's not necessary to swing the bottom of the jaw fully open here. Open the jaw between 1/2 and 1 inch wide for the most realistic look.
6. The LED will blink 4 times. Turn ADJ until the eyes/head are almost at the left limit. Press SET.
Same as above, there's no need to drive this servo right to the limit. If the eyes or head stop moving during adjustment, turn back a bit so the servo's not struggling.
7. The LED will blink 5 times. Turn ADJ until the eyes/head are almost at the right limit. Press SET.
8. The LED will blink 6 times. Turn ADJ to select the mode for the AUX servo. Press SET.
Use the diagram on the next page as a guide for where to position ADJ to achieve the desired result. Be patient on this step. Turn ADJ, then preview the movement of the eyes or head for a bit before settling on the desired mode. 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.
9. The LED will blink 7 times. Turn ADJ to adjust the sensitivity to the audio. Press SET.
Play the audio track into the unit. The left mouth should start moving. Turn ADJ clockwise all the way until the mouth stays open, then turn it counter-clockwise just a little bit until it starts moving again. Note that only the MOUTH servo will move to the audio during this step.
10. You're done! If you're controlling two mouths with a single picoTalk be sure to move the jumper back to the RUN position.

Partial Calibration

A partial calibration only changes the amount of random movement and audio sensitivity. Press the SET button anytime during normal operation to enter this mode. The picoTalk will jump directly to step 8 in the above process.



ADJ Position for Operating Modes on the AUX Servo

Troubleshooting

TROUBLESHOOTING TABLE	
Problem	Solution
Mouth only moves to some of the audio	- Try increasing the volume on your audio source or increasing the sensitivity on step 9 of calibration.
Mouth moves even when the character's not talking	- Make sure only the voice is in the left channel of the audio track. - Try turning down the sensitivity slightly in step 9 of calibration.

Specifications

SPECIFICATIONS TABLE	
Physical	
Length	2.375", 3.0" including flanged sides
Width	1.375"
Height	1.05"
Weight	1.27 oz. (36 grams)
Electrical	
Operating Voltage	7.5 - 9 VDC recommended, 16.5 VDC absolute max.
Power Consumption	0.1 watts (10mA) not including servos

