



PinPAC9 MAC for Spooky Installation Manual

Version 1.2 PRELIMINARY February 04, 2020

Version 2.0 October 08, 2020

New shaker motor mod!

New Single column manual!



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Warnings and Agreements

Welcome! The PinPAC Pinball Personal Audio Controller has been designed for simplicity of installation! As with any pinball machine modification and add on kit there is a required level of expertise for the installation. If you are not proficient in basic pinball parts installation we recommend having our kit installed by someone who is proficient with the basics of pinball repair. Pinnovators requires our kit be installed by an experienced pinball service technician with basic electrical skills. As with any electrical piece of equipment a danger does exist and you must agree to not hold Pinnovators responsible for any injury, damages, etc. before continuing.

Sound Levels: Pinnovators recommends running your headphone sound level at a safe level to prevent long term hearing loss. For a good example of recommend sound levels, we recommend following suggestions given by major audio equipment manufacturers such as Apple and their iPod.

phys.org/news80304823.html

www.macworld.com/article/1060274/hearingprotection.html








ESD: We recommend always discharging the headphone cable by touching it to an exposed metal part of the pinball machine before plugging it into the machine.

Power Cord: ALWAYS UNPLUG THE POWER CORD for safety when working on your pinball machine!



Playfield Propping: Pinnovators highly advises following playfield propping instruction for your pinball machine. These instructions are typically found inside the Operators Manual for each machine. Failure to follow these instructions can cause fatal injuries or even death. Pinnovators also recommends having an assistant hold a propped playfield in the up position when servicing under the playfield.

1. What's Included in the PinPAC9 Kit

<p>PinPAC9 MAC Front Panel</p>	 <p>A black plastic front panel with several controls. From top to bottom, left to right: a knob labeled 'System Volume Up', a knob labeled 'System Volume Down', a small yellow push-button labeled 'Mute', a knob labeled 'Headphone Volume', and a port labeled 'Headphone Out'.</p>
<p>PinPAC9 Back Box Board (BBB)</p>	 <p>Two views of a green printed circuit board (PCB). The left view shows the board populated with various electronic components like capacitors, resistors, and integrated circuits. The right view shows the bare PCB with component footprints.</p>
<p>3.5mm Panel Interface Cable</p>	 <p>A black, flexible audio cable with 3.5mm TRS connectors at both ends.</p>
<p>Hardware Bag Speaker Wire Label Bag</p>	 <p>Two clear plastic bags. The left bag contains a pair of speaker wires. The right bag contains a white label with a list of items.</p>
<p>12V Power Splitter Cable</p>	 <p>A black power splitter cable with a single 12V DC input on one end and two 5V DC outputs on the other end.</p>
<p>Black Cable Ties</p>	 <p>Two black plastic zip-tie cable ties of different lengths.</p>
<p>Sub Cable Kit</p>	 <p>A collection of audio cables including a black 3.5mm to RCA cable, a red and white RCA cable, and a small black cable.</p>

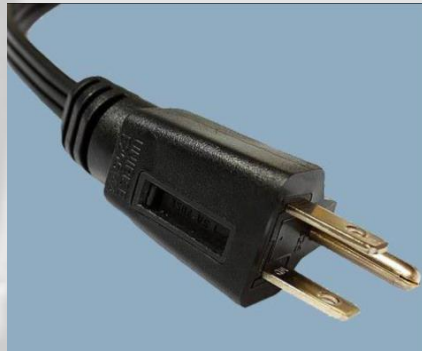
2. Requirements

The Pinnovators PinPAC9 MAC system requires a Universal Validator Door slot on the machine's coin door in the lower left location. (H Door)



3. Preparation

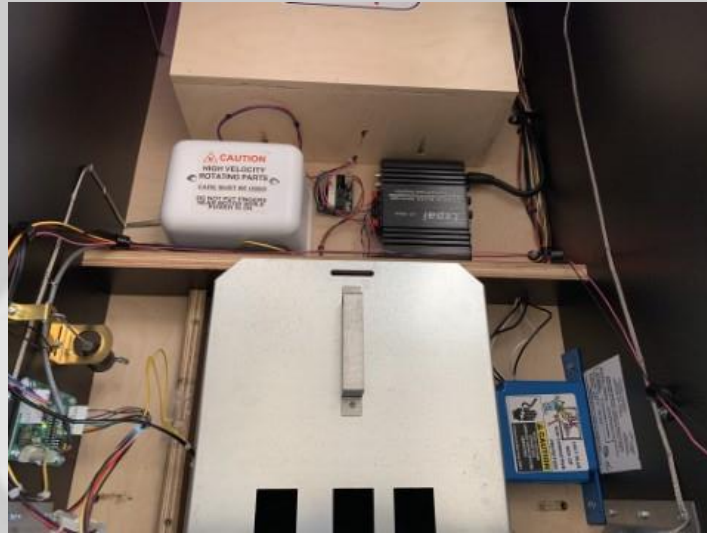
Unplug the pinball machine!



Using a helper, remove the playfield glass and lift up the playfield.

4. Back Box Board Installation

NOTE: Traditionally the Back Box Board is mounted in the back box BUT in this guide, it will be mounted in the cabinet and on the Lepai amplifier. TNA is shown below but this kit will work with most Spooky pinball machines that use the Lepai amplifier.



Using the included labels in the kit, carefully label the speaker wires and the terminals that they go to on the Lepai amplifier.



NOTE: There will be two sets of subwoofer wires.

On the Lepai amplifier:

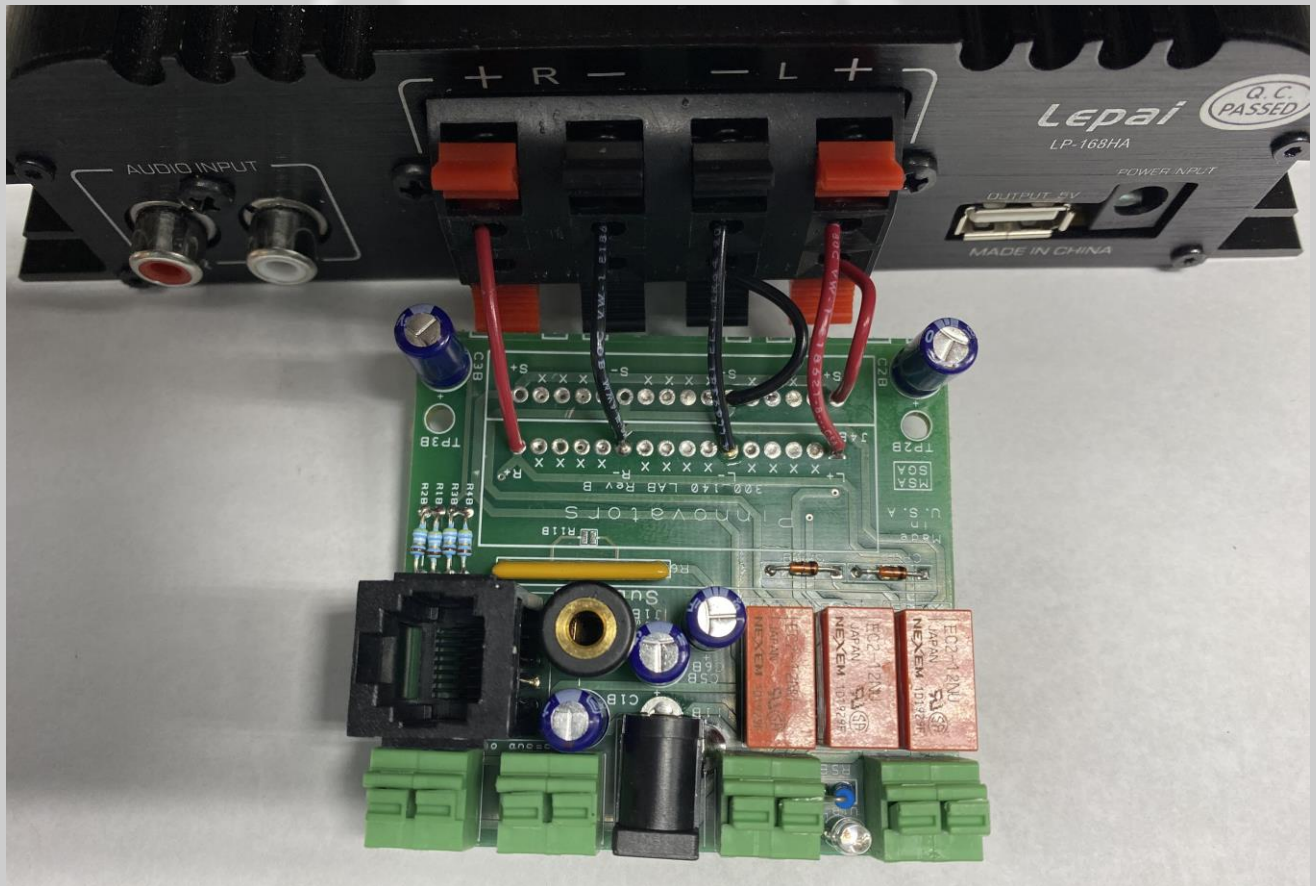
Disconnect the labeled speaker wires.

Disconnect the audio input wires. (These will be an RCA cable or a 3.5 mm cable)

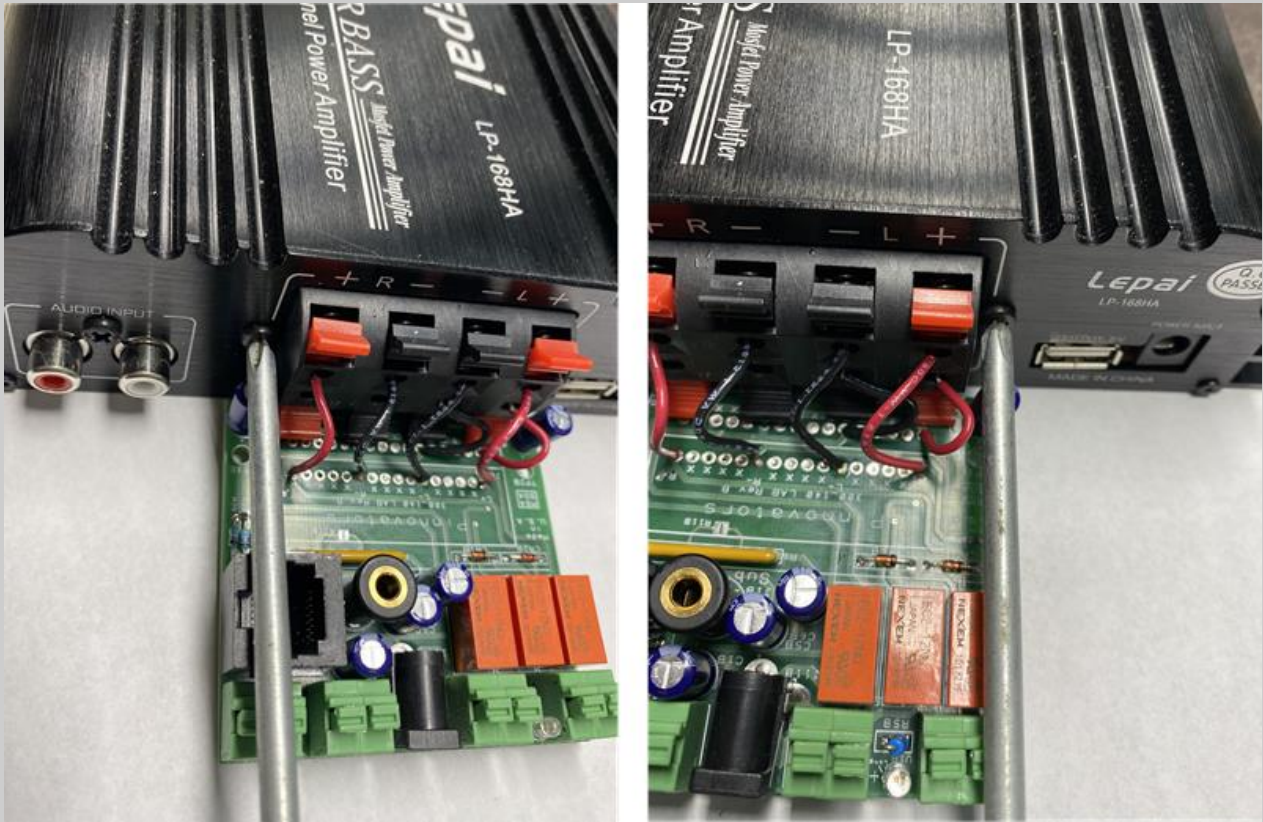
Disconnect the 12V power cable.

Remove the Lepai amp from the system by removing the bolts holding the amplifier down.

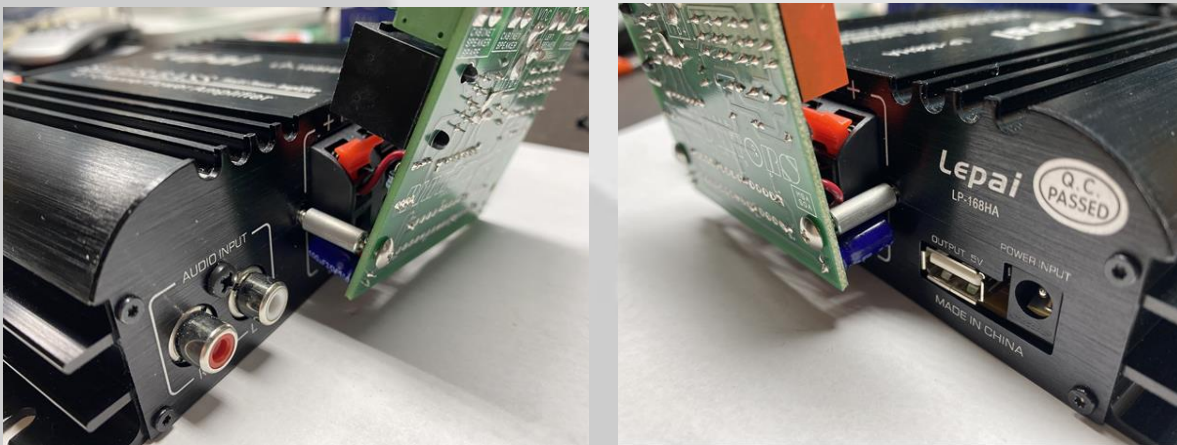
Insert the 6 wires from the Pinnovators BBB into the appropriate terminals on the amp. Make sure there is a minimum of 1/16 inch of exposed bare metal wire on the speaker terminal block.



Unscrew the two screws to the right and left of the speaker terminal block.



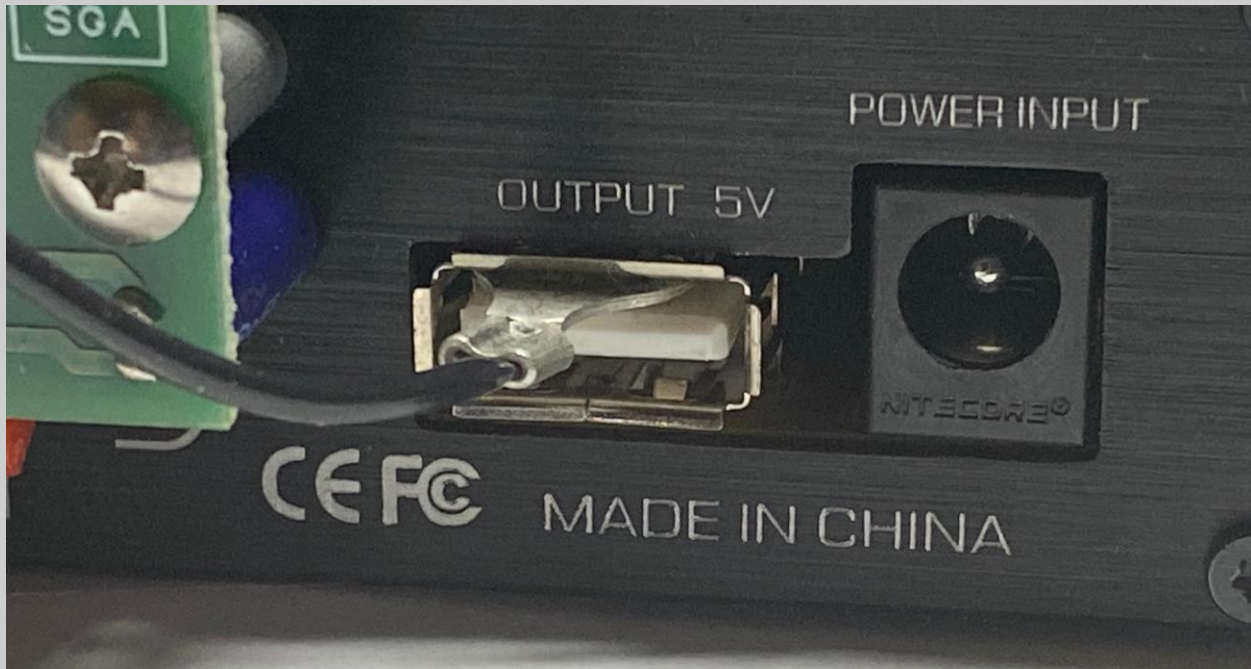
Using the included hardware, place one of the two spacers between the amplifier and the BBB. Insert one of the new screws through the BBB and then through the spacer. Tighten the screw a few turns to hold it in place.



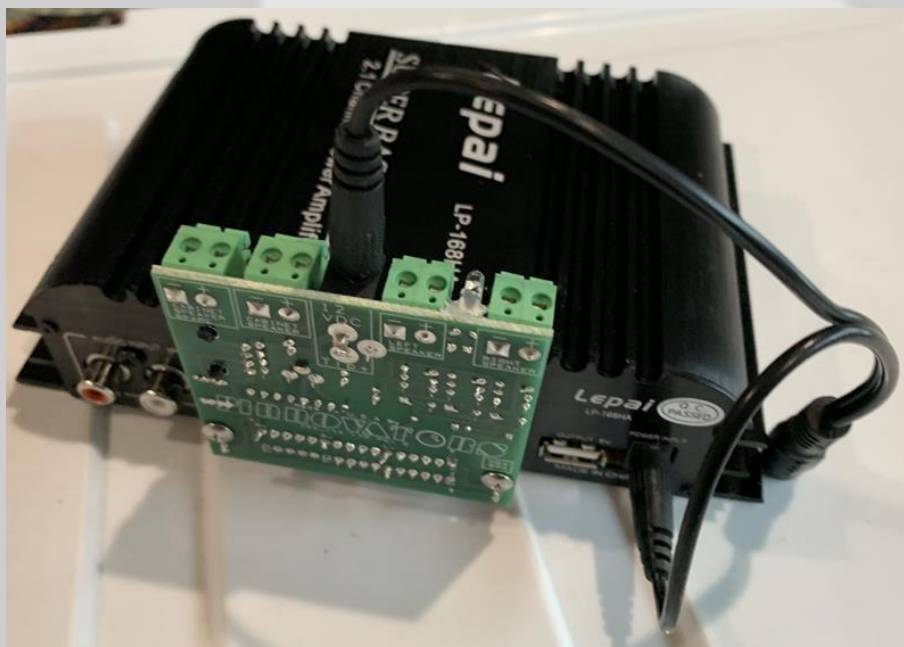
Repeat for the other side and then tighten both screws just enough to hold the BBB securely. **DO NOT OVERTIGHTEN!**

Insert the GROUND wires from the BBB into the space above the plastic part of the USB connector and the top metal frame of the USB connector.

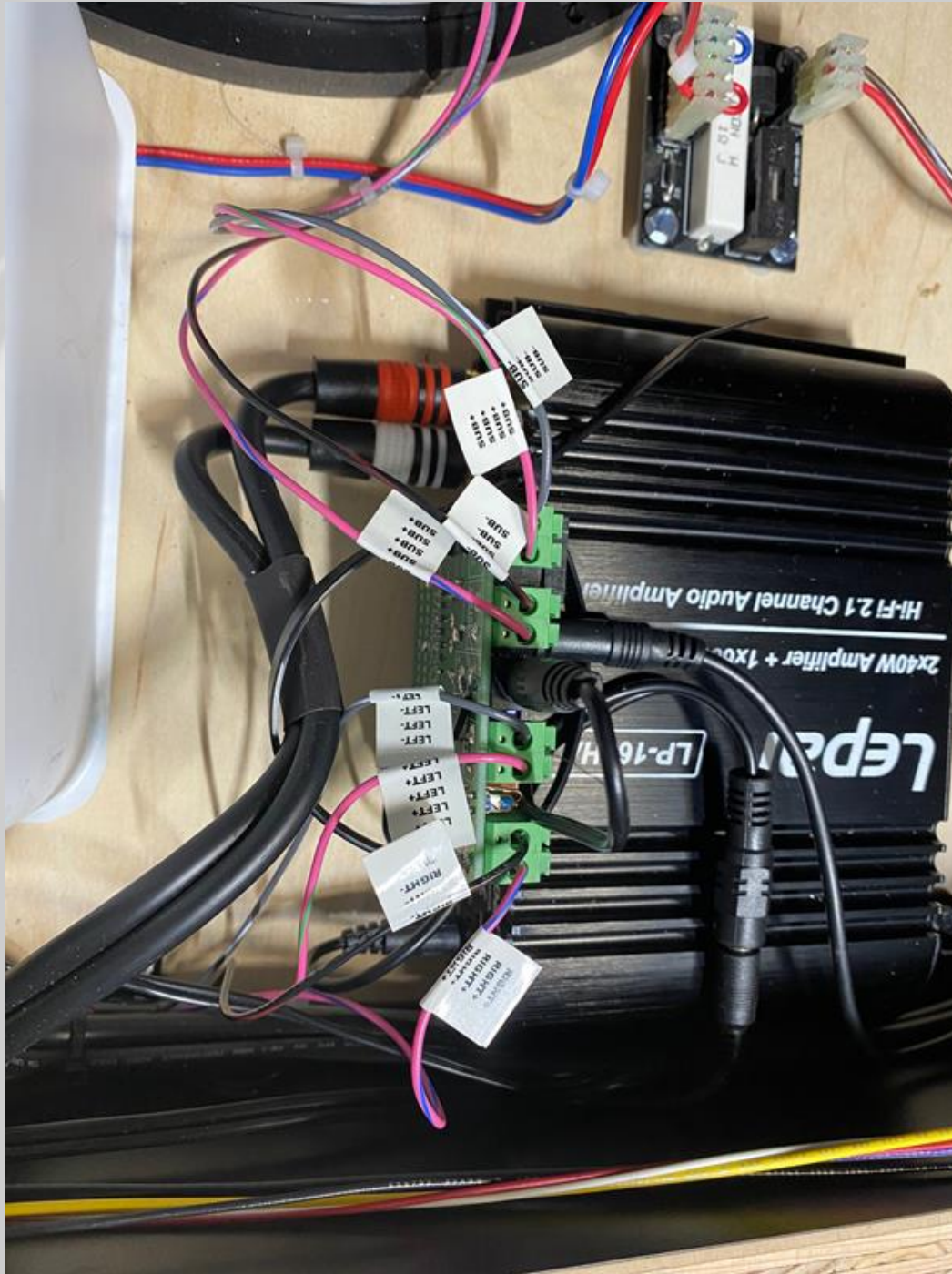
This wire gives the BBB an additional ground. This additional ground will prevent noise in the headphone audio so make sure the ground wire is inserted as shown for the best mechanical connection!



Insert the 12V power splitter cable into the power connector on the BBB and the power connector on the amplifier. Reinstall the amplifier into the cabinet. (Ground wire not shown)



Insert the original speaker wires into the BBB. The BBB speakers and polarity are labeled on the back of the board. Insert the second subwoofer speaker wires into the second sub terminal block.

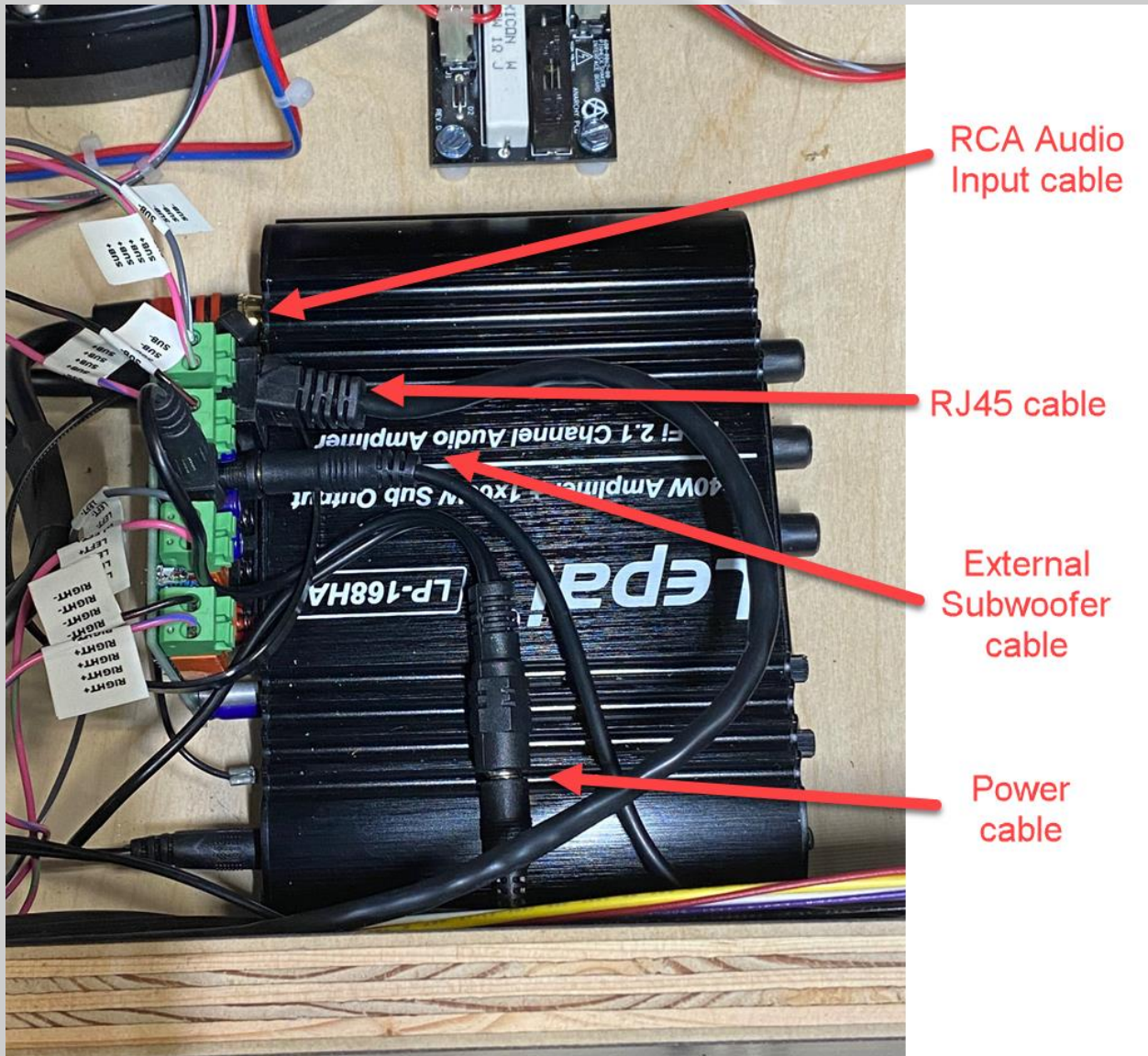


Insert the included RJ45 Cat5 cable into the RJ45 connector on the BBB.

Plug the original amplifier power cable into the new power splitter cable.

Reconnect the input audio cable to the Lepai. This will either be an RCA cable or a 3.5 mm cable that was disconnected earlier. (Spooky used RCA cables)

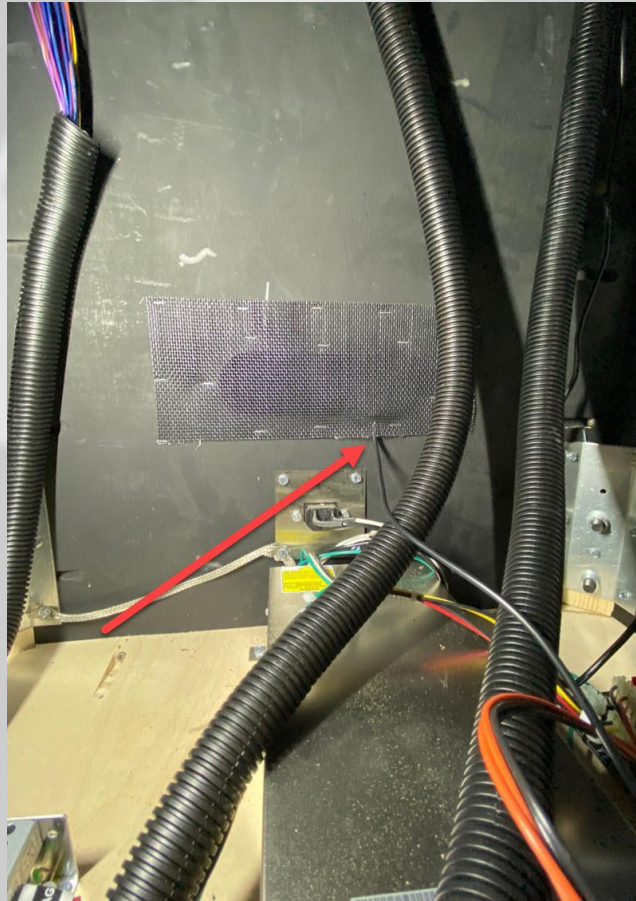
Plug the included 12 foot 3.5mm to 3.5mm external subwoofer cable into the gold jack on the BBB



5. Subwoofer Cable

Plug Pinnovators 3.5 mm 12ft cable from the subwoofer cable kit into the 3.5mm gold 3.5mm jack on the Back Box Board (BBB) (see previous step).

Run this cable to the back of the system and fish it under the screen covering the vent holes. You may have to remove one of the staples.



Use the included Velcro tie to secure the cable to the leg of the pinball machine.



6. Recommended Subwoofer

The Polk PSW10 is a great speaker to have on your game! The price is very reasonable. Please see the Pinnovators website for more details on the subwoofer.

<https://pinnovators.myshopify.com/blogs/pinnovators-recommends/pinnovators-favorite-subwoofer>

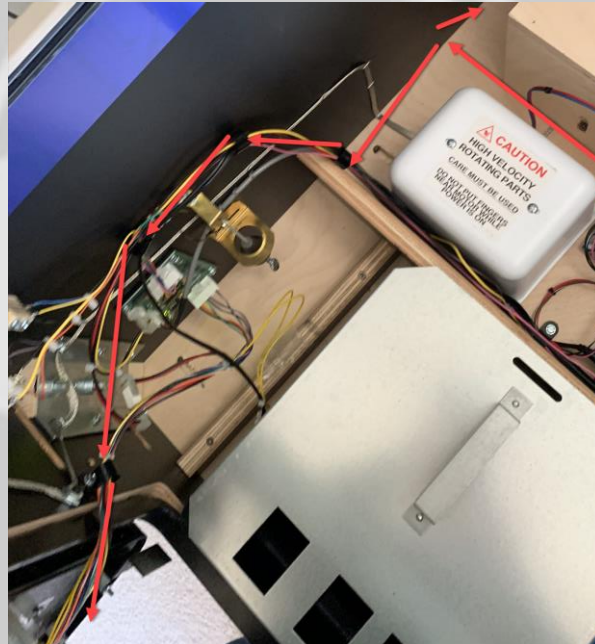


7. Panel Interface Cable

Run the RJ45 cable from the amplifier to the coin door.

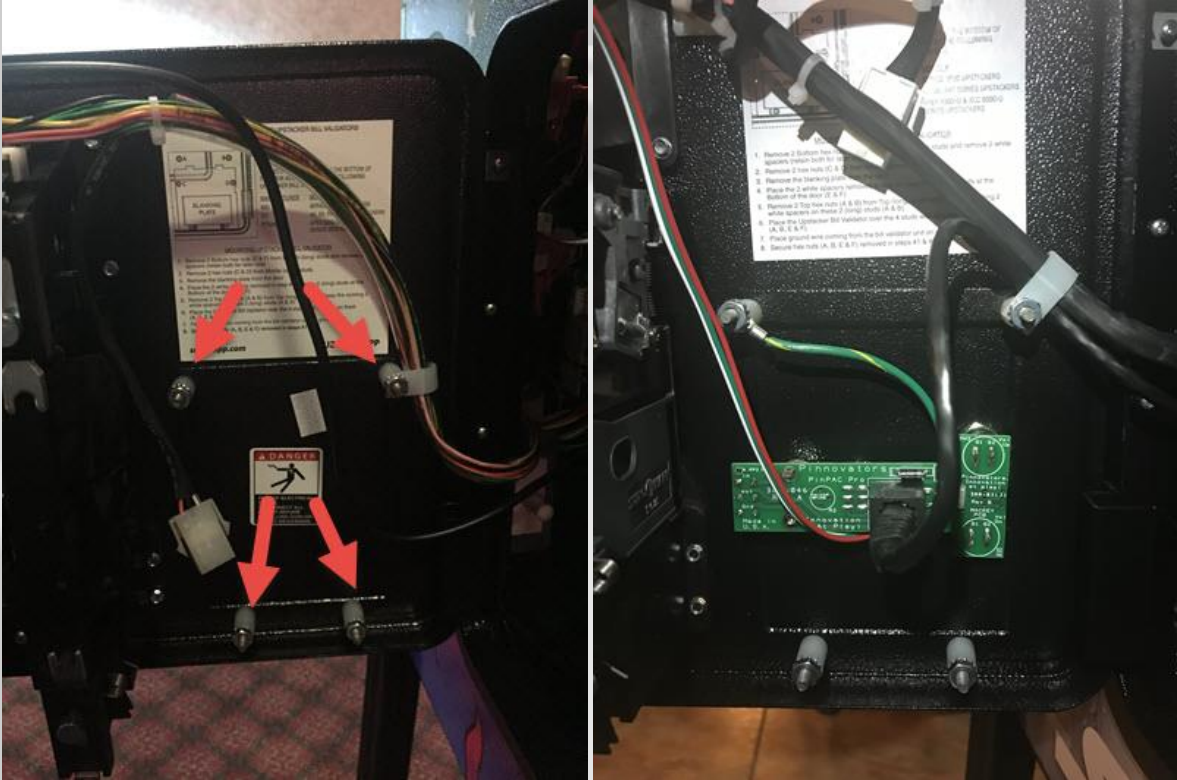
Tuck the new cable into the wire harness clips along the path.

Use the three included wire ties to neatly bundle the excess cable and store the cable next to the speaker cabinet for TNA and next to the shaker motor for Rick and Morty.



8. Coin Door Installation PinPAC9

Remove validator blank plate by unbolting the four nuts as shown. NOTE: Save the spacers. The spacers are used to properly space the length of the screw.



Insert the PinPAC9 plate as shown below. Position the ESD ground wire (the green wire) on the threaded stud. Fasten with the original hardware.

Insert the end of the RJ45 Cable into the connector on the PinPAC9 front control panel as shown.

Route the cable into the cable harness clip behind the door as shown. Test the door to make sure it closes properly. Adjust as necessary.

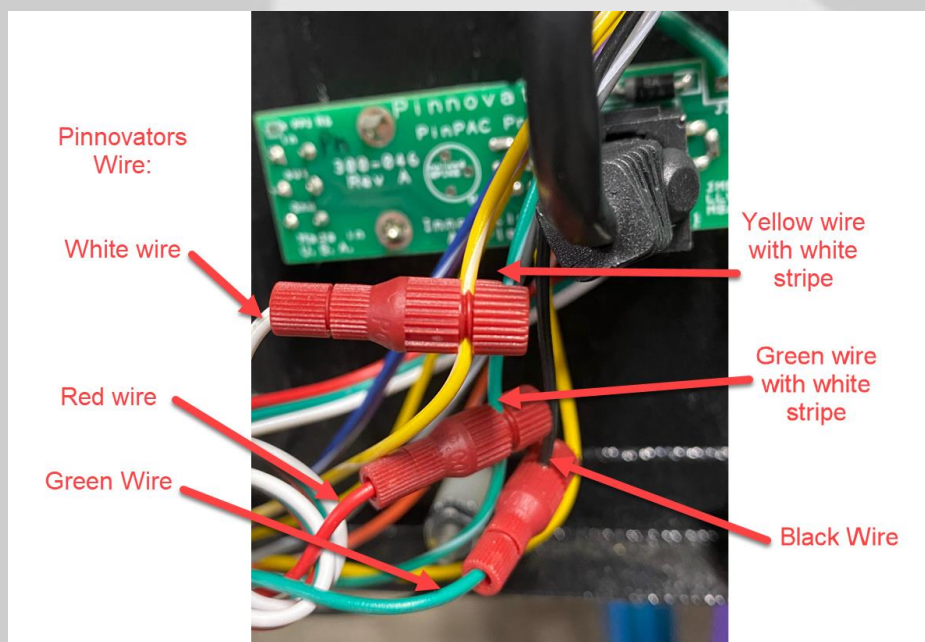
9. MAC Cable Posi-Taps

This MAC cable uses three Posi-Tap connectors. The Posi-Tap connectors will be used to cleanly splice into the button signals for the up and down volume control.

Here are some YouTube video links showing how to install the Posi-Taps. Please watch the video first. (NOTE: Pinnovators did not make the videos) <http://www.youtube.com/watch?v=NQWYWuNbpog>
<http://www.youtube.com/watch?v=Yiimgl-Rdmw>

Don't forget to remove the Posi-Tap from the end of the wires before installing.

Attach the three-wire MAC cable from the DBA plate to the system control panel buttons. The wires from the buttons may pass in front of the DBA plate as shown in the example from Rick and Morty. You can also tap into the wires under the control panel buttons. That example will be shown next.



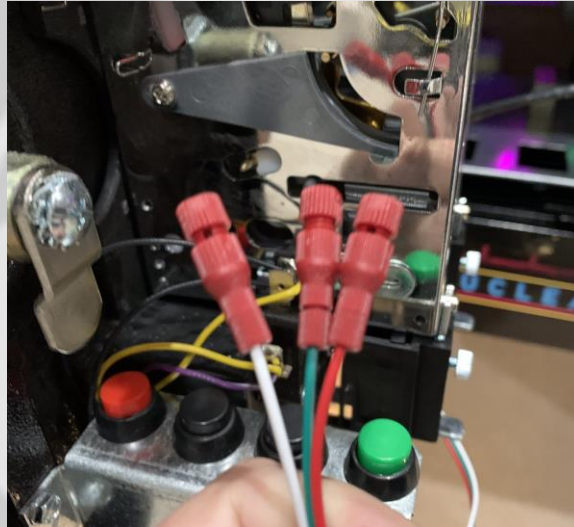
Alternate method for Mac cable hook-up:

Connect the three Posi-Tap wires to the wires coming off of the pushbutton switches as follows:

MAC green to black switch wire.

MAC red to green/white stripe switch wire.

MAC white to yellow/white switch wire.

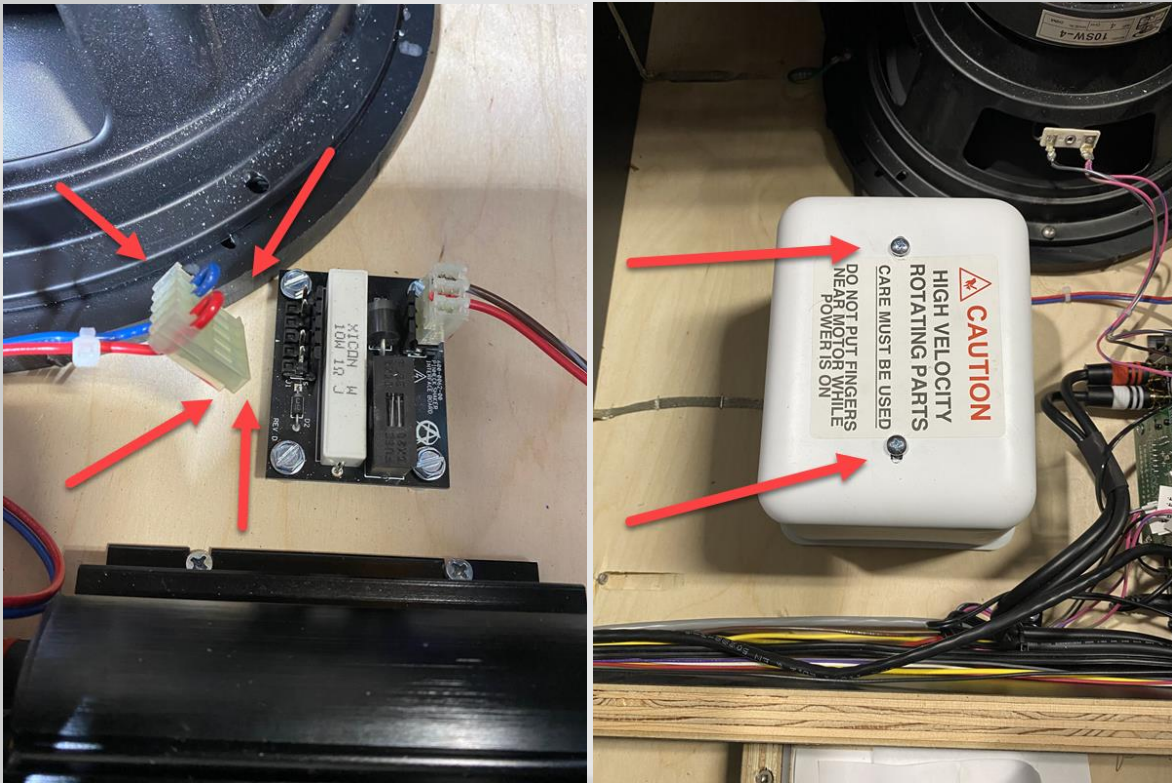


10. Shaker Motor Modification

The shaker motor will need a small modification to remove the capacitor installed on it. The capacitor was used in older Spooky pins before the P3 Multimorphic board set was used and is no longer needed. If the capacitor is installed, motor PWM (Pulse modulation) will get channeled into the system safety ground and will radiate into the headphone system.

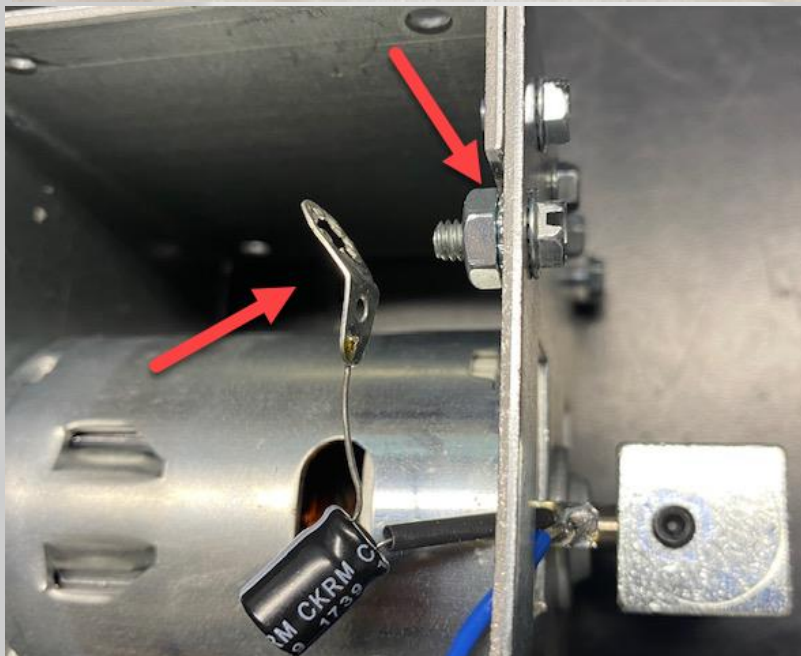
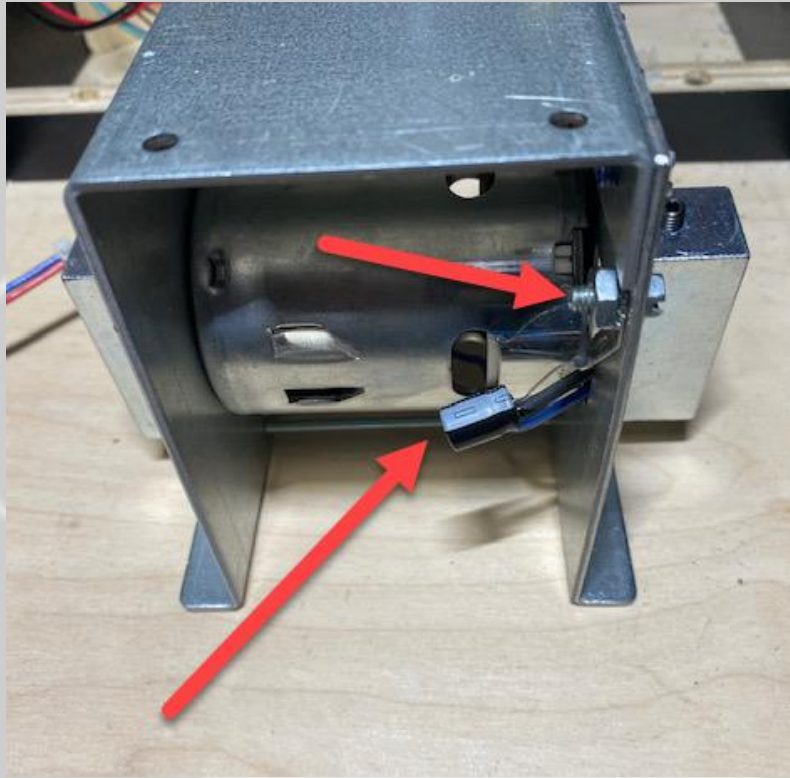
Unplug the shaker motor wire for safety!

Remove the two screws holding the shaker motor cover on.

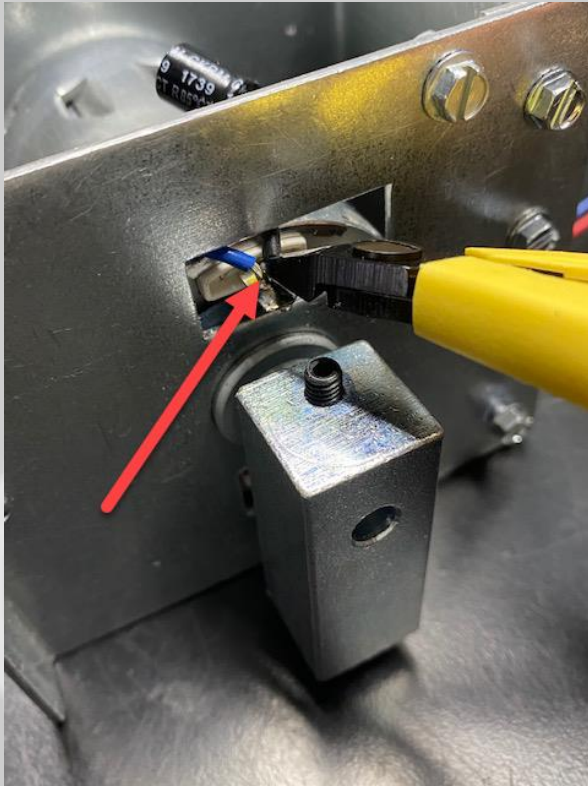


This is the capacitor to be removed.

Remove the nut holding the capacitor ring lug in place. NOTE: you may simply choose to cut this wire and leave the ring lug in place.

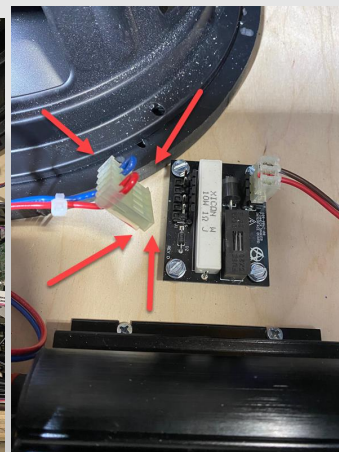


Next, trim off the other lead of the capacitor and then remove the capacitor completely.



Reinstall the shaker motor cover.

Plug the shaker motor power cable back in.



11. Final Checkout

- Power up the system and start a game!
- Verify sound can be heard from the Back Box speakers and the lower cabinet speaker.
- Insert headphones into the jack and verify levels in headphones can be adjusted with the volume control knob.
- Operate the System Volume Up button and verify the system volume increases. Operate the System Volume Down button and verify the system volume decreases.
- Plug in a powered subwoofer to the subwoofer cable exiting the back of the system. Be prepared to be blown away!



12. Recommended Headphones.

Pinnovators tested the PinPAC1, 2,3 on many different headphones. Our favorite was the Beats by Dr. Dre. We also tested a moderately priced set of headphones ~\$30 and were still blown away by how good the bass response was and how clear the treble was!

Thank you for your purchase of our product! We hope you get many years of service from it.

The Pinnovators Team.

