



PinPAC9 MAC for American Pinball Installation Manual



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New single columns!
Corrections to wiring.



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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 for the PinPAC9 MAC. It features four circular controls: 'System Volume Up' (top left), 'System Volume Down' (bottom left), 'Headphone Volume' (top right), and 'Mute' (bottom right). A small yellow jack is labeled 'Headphone Out'.</p>
<p>PinPAC9 Back Box Board (BBB)</p>	 <p>Two views of the PinPAC9 Back Box Board (BBB). The left view shows the board with various components like capacitors and connectors. The right view shows the board with a green PCB and various electronic components.</p>
<p>3.5mm Panel Interface Cable</p>	 <p>A black 3.5mm panel interface cable with two connectors.</p>
<p>Hardware Bag Speaker Wire Label Bag</p>	 <p>Two clear plastic hardware bags. The left bag contains a speaker wire. The right bag contains a speaker wire label with a list of labels.</p>
<p>12V Power Splitter Cable</p>	 <p>A black 12V power splitter cable with a single input and two outputs.</p>
<p>Black Cable Ties</p>	 <p>Black cable ties used for organizing cables.</p>
<p>Sub Cable Kit</p>	 <p>A sub cable kit including a black cable with a 3.5mm jack and a red RCA connector, and a black cable with a 3.5mm jack and a black RCA connector.</p>

2. Requirements

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



Please contact us if you do not have this door.

3. Preparation

Unplug the pinball machine!

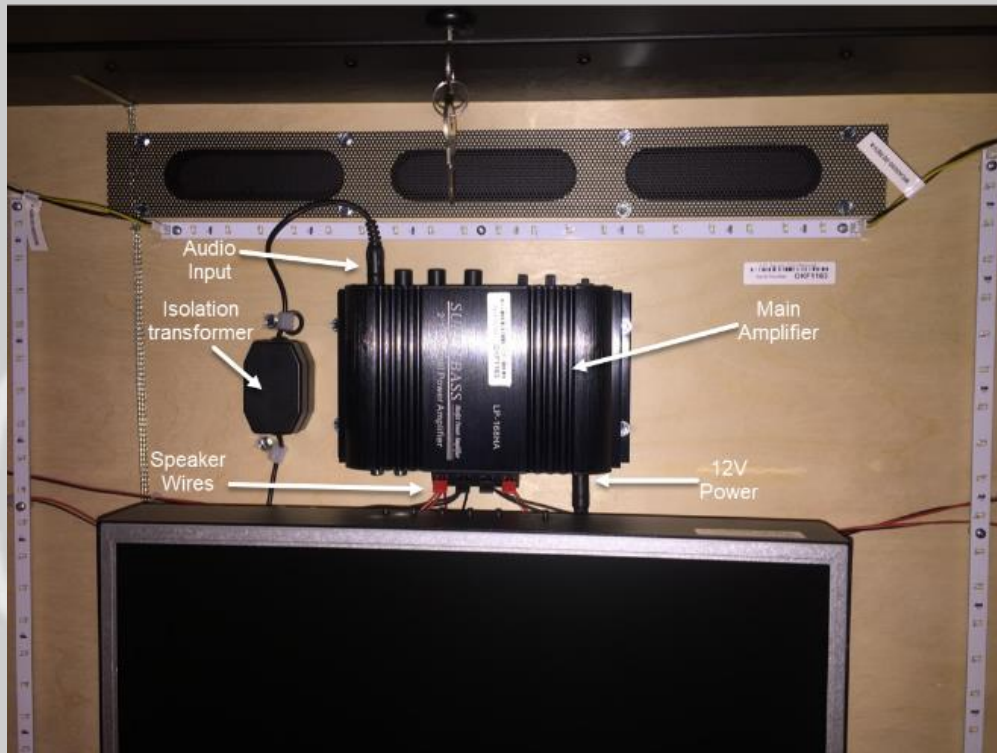


Lay out all the parts included in the kit.

Special tools: You will need a nut driver or a wrench that fits the screws holding the power amplifier to the back box.

4. Back Box Board Installation

Remove the back glass on the system. Locate the Lepai (or Lepy) audio power amplifier.



Take note of where the controls are set to on the amplifier. Use a cell phone camera to capture a picture.

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

As of this writing, American Pinball machines have 4 speakers in the Back Box. A top right and left and a bottom right and left. There is no cabinet speaker.



5. Lepai or Lepy Amplifier?

Let's take a minute to talk about the popular "Lepai" amplifier. The Lepai is a great little amplifier for gaming systems. It was so great, it got copied! Some copies even use the Lepai name so they are harder to spot. Some copies use the "Lepy" name.

If you have a "Lepy" amplifier installed in your machine then you will need to swap two speaker wires (shown below) to compensate for a design mistake in the Lepy. If the wires are not corrected then one of your headphone speakers will not work. No problem, it's a simple fix. Just follow the instructions below.

On the "Lepai" amplifier:

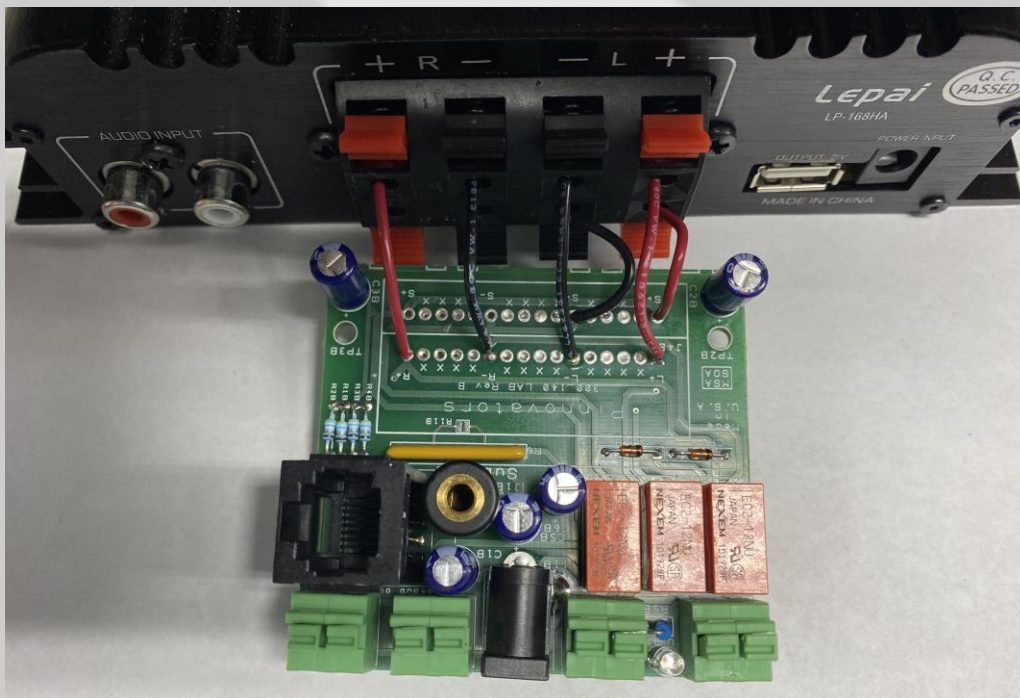
Disconnect the speaker wires.

Disconnect the audio input wires. (These will be either 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.

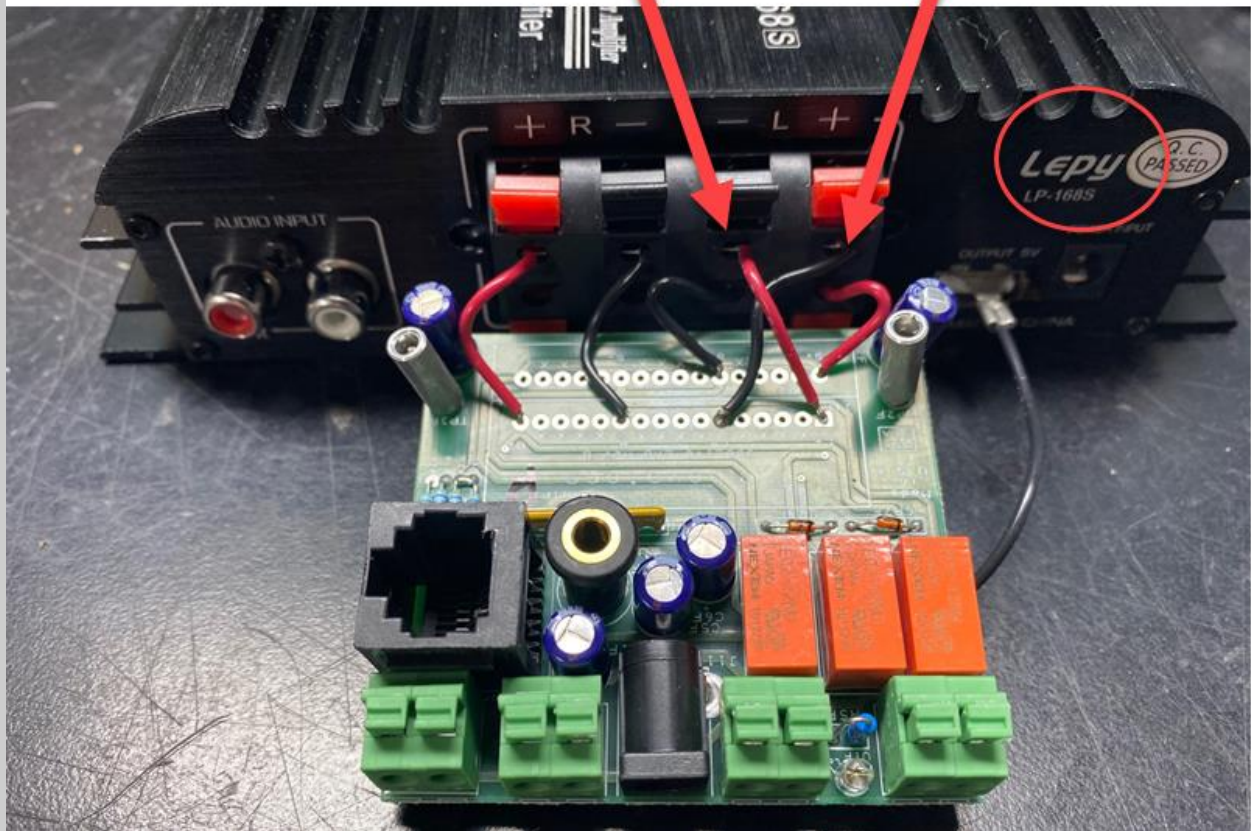
Insert the 6 wires from the Pinnovators back box board (BBB) into the appropriate terminals on the amplifier. Make sure there is a minimum of 1/16 inch of exposed bare metal wire on the speaker terminal block.



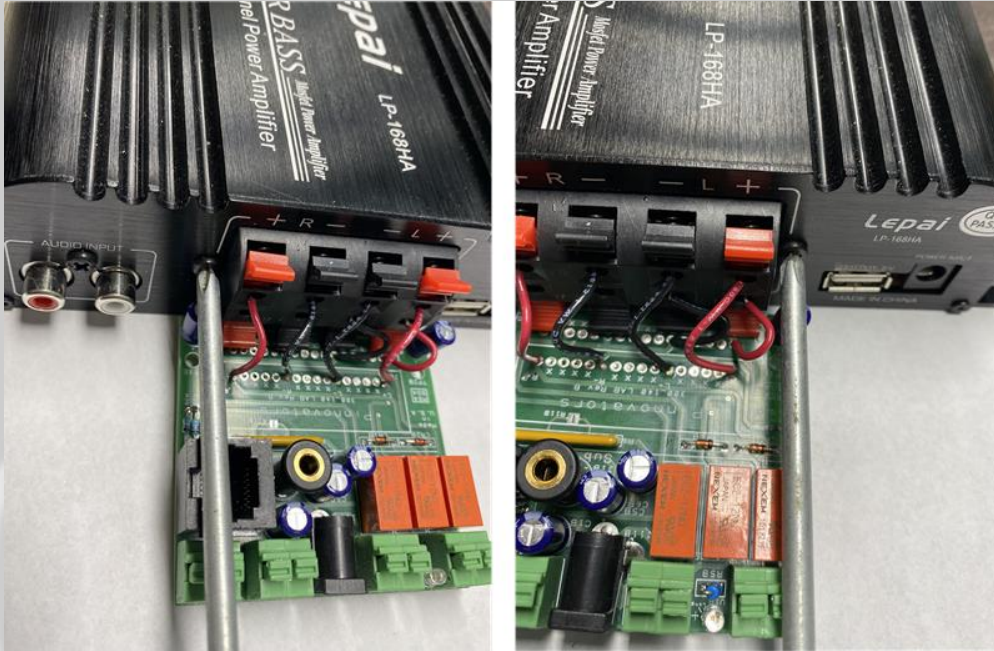
On the Lepy amplifier, wire as shown in below. Note how the name on the amplifier is spelled "Lepy".

Installation steps shown *after this picture* are the same for the Lepai and Lepy amplifiers.

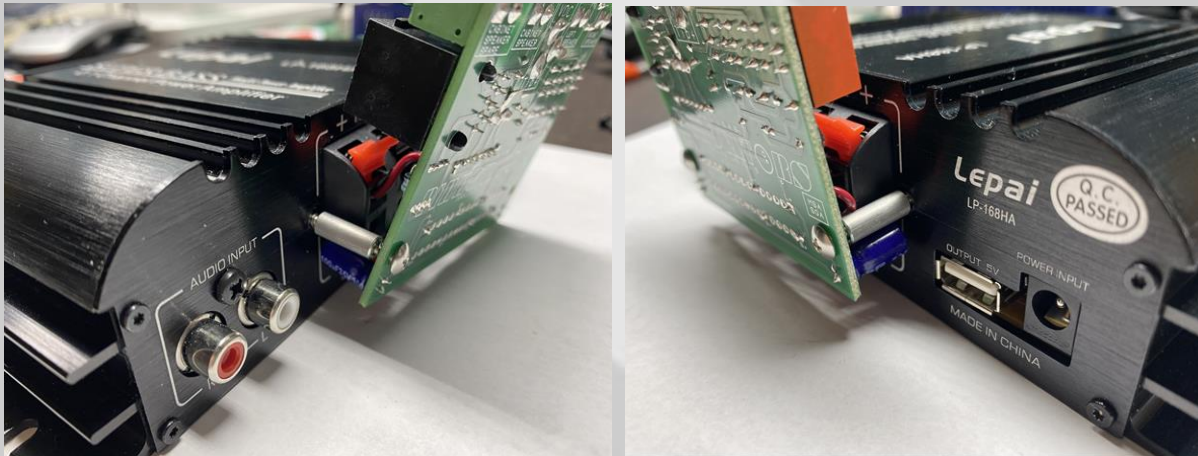
These two wires are switched on a "LEPY"
(Non-Lepai) amplifier



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



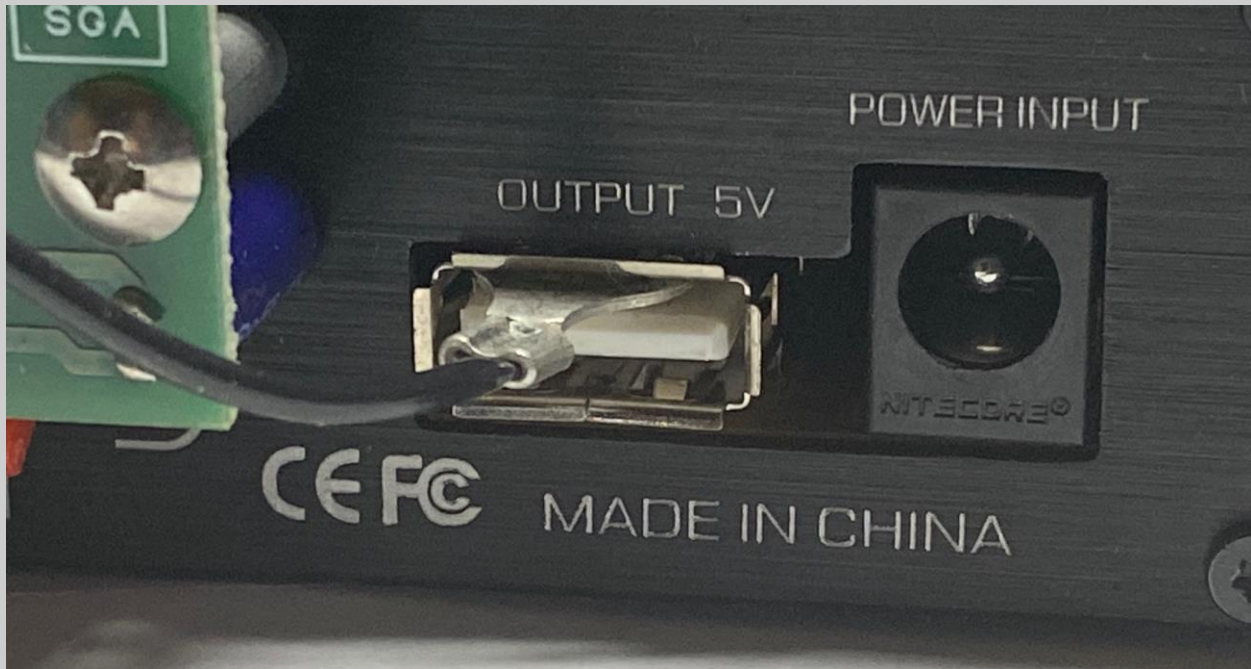
Using the included hardware, place one of the two spacers between the amplifier and the BBB. Insert one of the new screws through the BBB and then through the spacer. Tighten the screw a few turns to hold it in place.



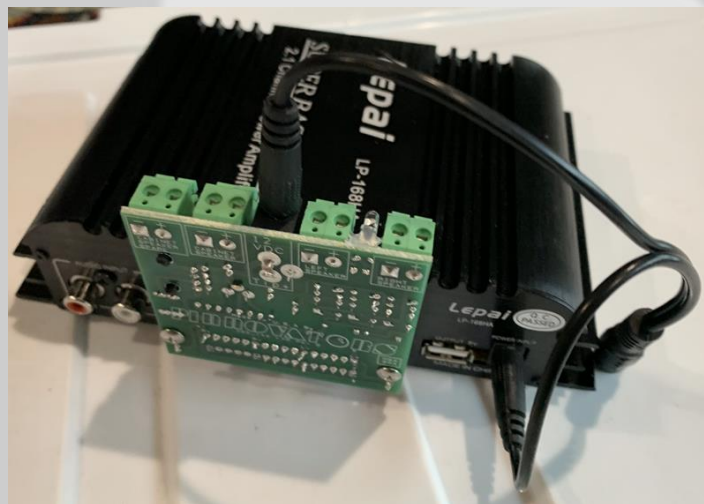
Repeat for the other side and then tighten both screws just enough to hold the BBB securely. **DO NOT OVERTIGHTEN!**

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!



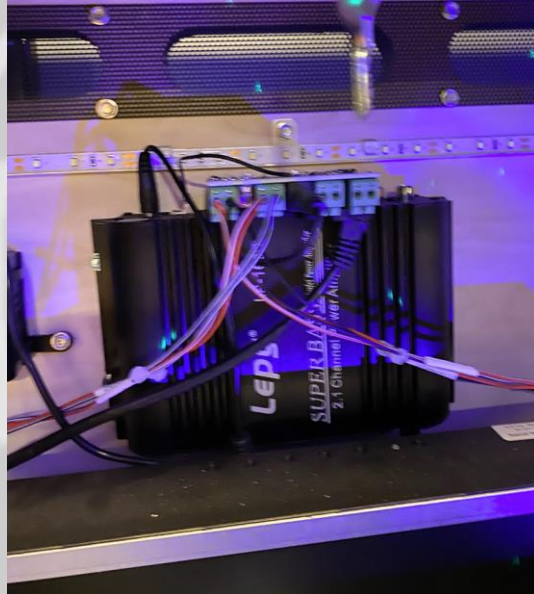
Insert the 12V power splitter cable into the power connector on the BBB and the power connector on the amplifier. (Ground wire not shown)



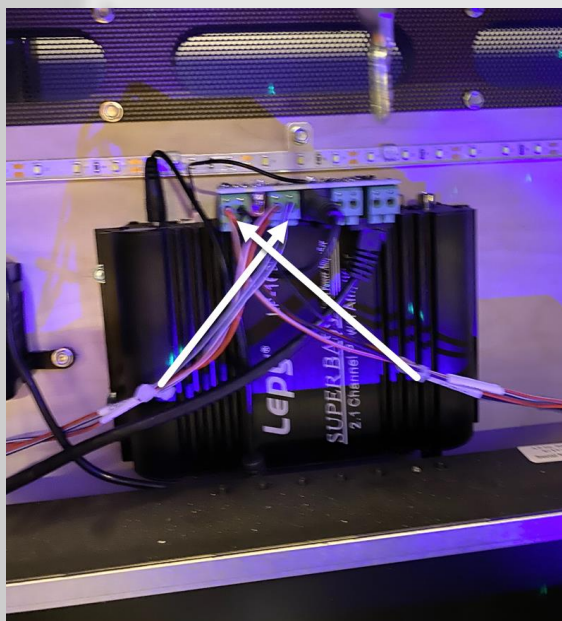
6. Reinstalling the Amplifier

There are a few different ways the amplifier could have been mounted from the factory. The amplifier may have to be rotated 180 degrees from how it was originally mounted in order to allow room for the BBB.

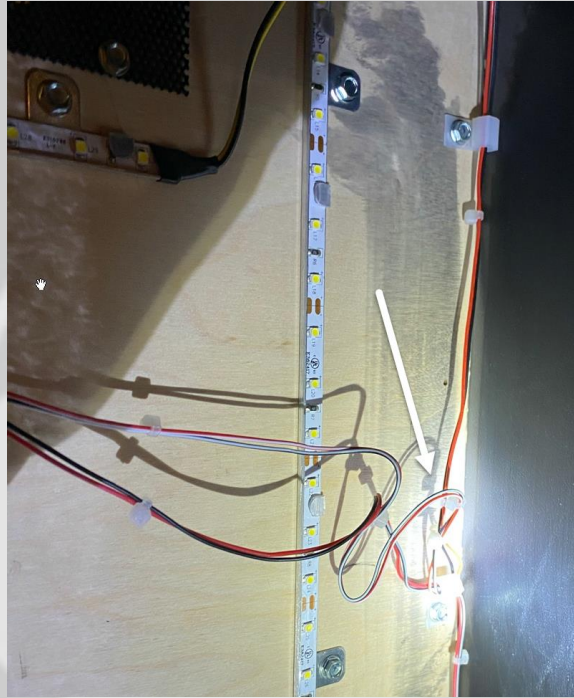
The position of the isolation transformer may have to be adjusted on some machines. Not all machines used the same isolation transformer, and some have longer leads than others.



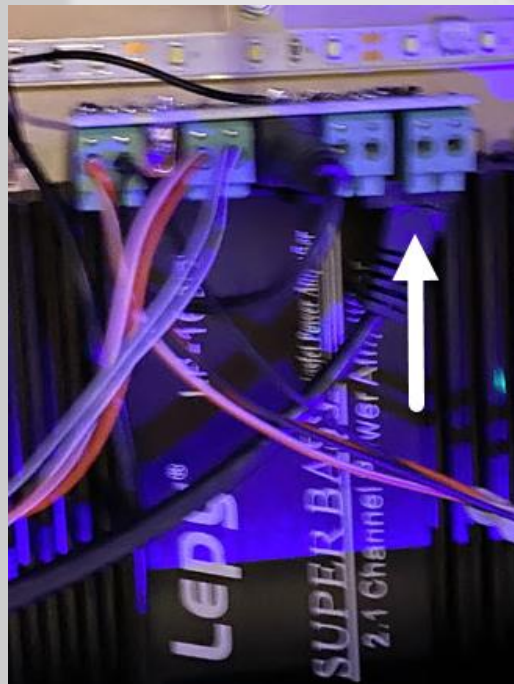
Insert the original speaker wires into the BBB. The BBB speakers and polarity are labeled on the back of the board.
NOTE: This picture does not show all the labels on the wires.



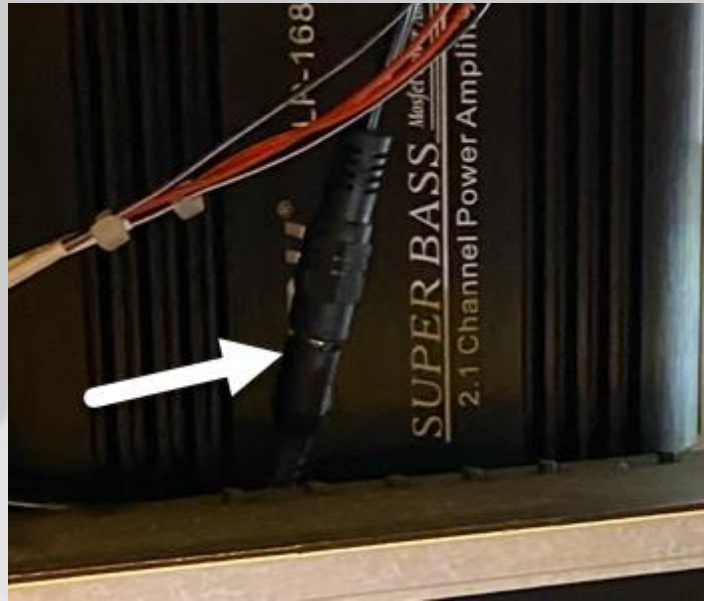
If the speaker wires do not reach the new speaker terminals once the amplifier is rotated, remove the cable ties on the speaker wires in the location shown below to allow more cable slack.



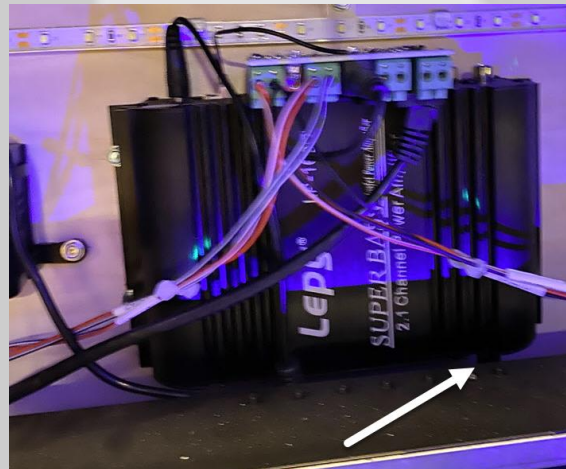
Insert the included Cat5 cable into the RJ45 connector on the BBB.



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



Reconnect the input audio cable to the Lepai. This is a 3.5 mm cable that was disconnected earlier.



Plug the included 12 foot 3.5mm to 3.5mm cable into the gold jack on the BBB (Cable not shown)



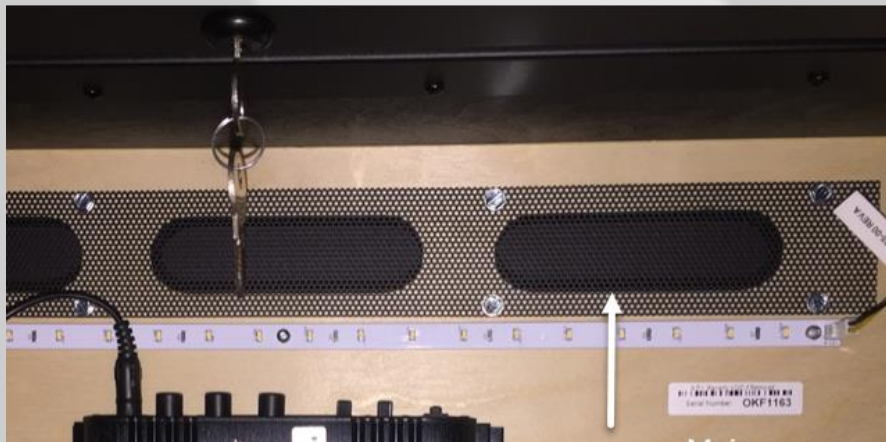
7. Subwoofer Cable

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

You can run this cable out the backbox vent area or out the bottom of the system.

Loosen one of the end screws on the back box screen and fish the cable under the screen.

Back box exit example.



If you would like the cable to come out the bottom of the cabinet, look for an available vent hole on the bottom of the cabinet. Remove the fastener holding the screen and run the sub cable out the hole.

Cabinet exit example:



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



Connect the other end of the subwoofer cable into an external powered 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>





8. Panel Interface Cable

The RJ45 cable runs from the amplifier to the coin door.

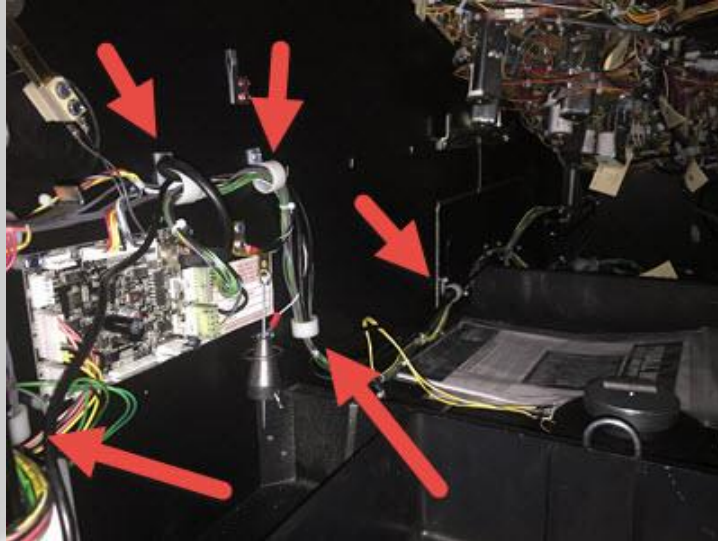
Using a helper, remove the playfield glass and lift up the playfield. Depending on the game, tuck the new cable into the wire harness clips as shown.

NOTE: Leave some slack in the cable so the back box can be easily folded down without stretching the cable!



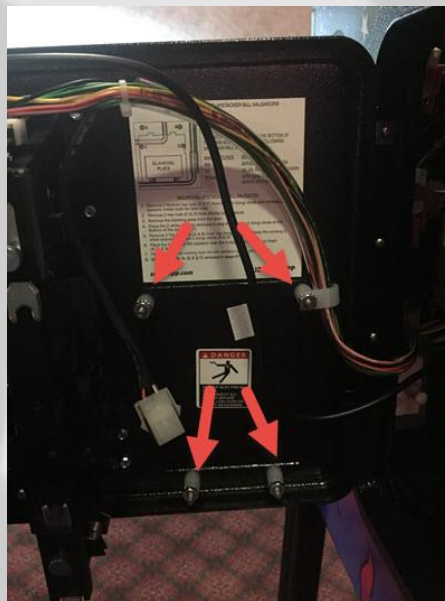
Continue to route the cable along the wire harness. Secure the cable in the white cable clamps. The cable will end up at the coin door.

This picture is a sample from a Stern system.



9. 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 (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.

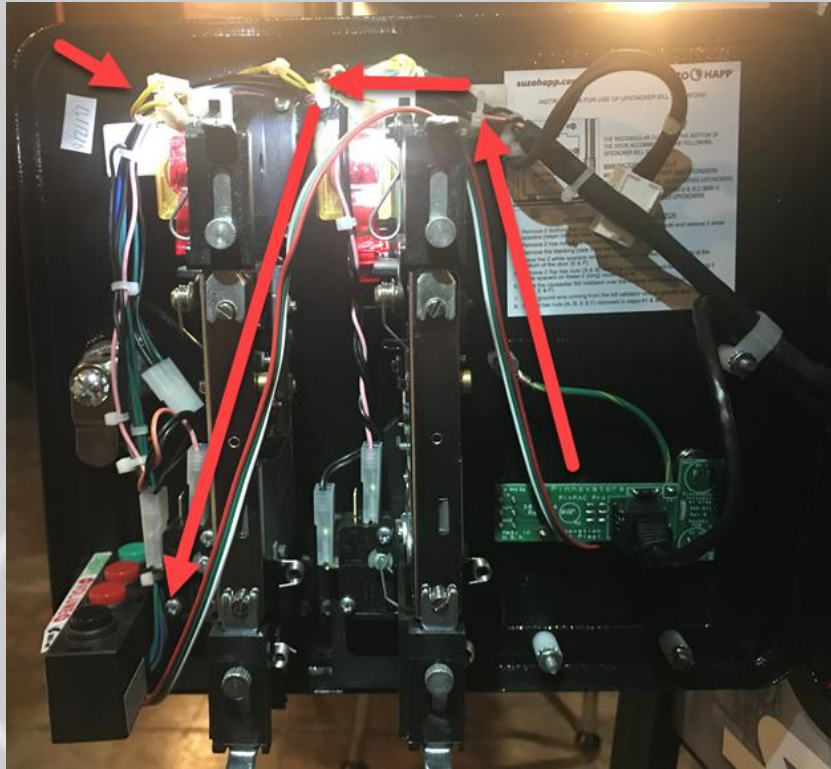
Route the cable into the cable harness clip behind the door as shown. Test the door to make sure it closes properly. Adjust as necessary.

Run the three-wire MAC cable from the DBA plate over to the system control panel buttons. Follow the path of the existing wires.

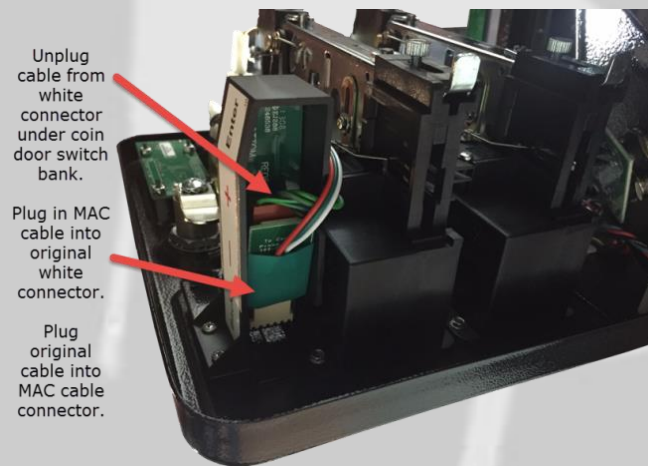
10. MAC Cable Installation

Route the PP9 MAC remote cable over the top of the coin slot as shown below. Continue down to the system control panel buttons.

Clip the tie-wrap in the upper left corner of the coin door to allow more cable slack to the control buttons.



The MAC cable has a small printed circuit board (PCB) with connectors mounted to it. The PCB is inserted in line with the cable going to the coin door pushbuttons as shown below.



If your coin door does not have the inline connector shown above then please contact us.

11. Final Checkout

- Power up the system and start a game!
- Verify sound can be heard from the Back Box speakers.
- 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 PinPAC system 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.

