

# PINSHAKERS

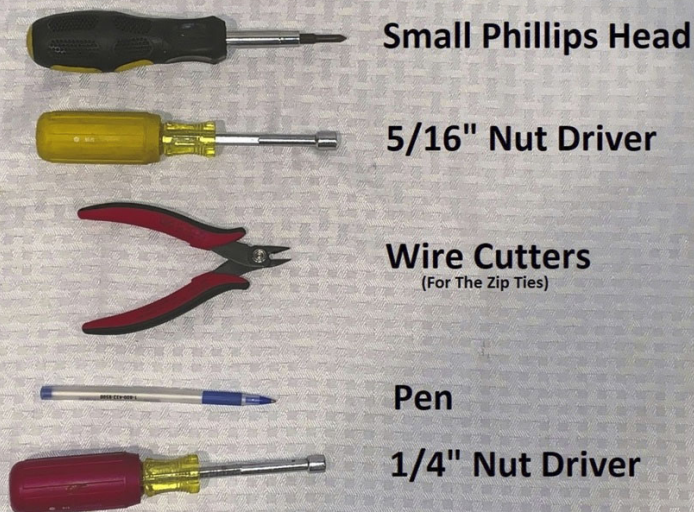
## Pinshakers Universal Shaker Motor Kit Installation

### Williams/Bally WPC Driver Board, Wire Harness, & Power Supply Installation – Updated 08/31/2019

#### Tools Required:

- Small Phillips Head Screwdriver
- 5/16" Nut Driver
- Wire Cutters – (For cutting the ends of the zip ties)
- Pen – (For adjusting the dip switches)
- 1/4" Nut Driver

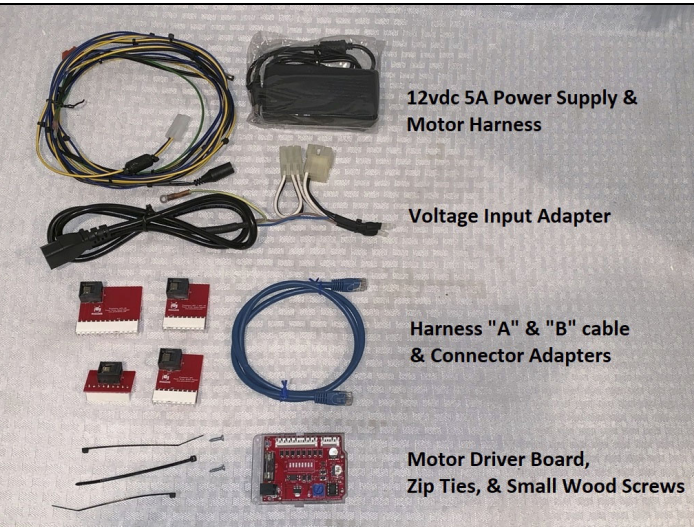
Note: Please hold onto this installation manual! In order to keep the price down on our kits we are only shipping one manual per household. You can still download our manuals from the website or watch the in-depth youtube installation videos.



#### Parts Required (included):

- ☐ 12vdc 5A Power Supply
- ☐ Motor Harness
- ☐ Voltage Input Adapter
- ☐ Wire Harness "A" and "B" Cable & Connector Adapters
- ☐ Motor Driver Board
- ☐ 2 x Small Wood Screws
- ☐ 3 Zip Ties
- ☐ Installation Manual
- ☐ Dip Switch Settings
- ☐ Any Optional Accessories

Unpack and inventory all the included components. Please let us know as soon as possible if you have any missing items.

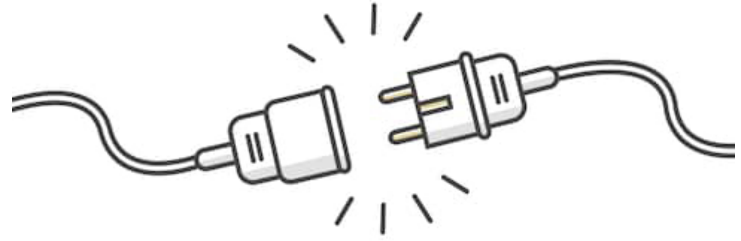


#### EXPECTATIONS OF USE

You agree to use our products in the manner described in the documentation provided. Any deviation from the provided documentation, or any custom modifications to our products, will likely cause damage to persons or property. You agree to only install our products in fully working and operating pinball machines. Any prior issues with grounding, loose connections, game resets, cold solder joints, hacked up circuit boards and other components, or any other pre-existing problems with your pinball machine will likely result in the damage of our product and/or your pinball machine. Other risks of installing our product in a machine that is not fully working is that of fire or bodily harm. Pinshakers will in no way be held responsible or liable for any damage that results in the use of this kit; either to any person, your pinball machine, or structure in which the pinball machine is operated.



**Remove All Power!**

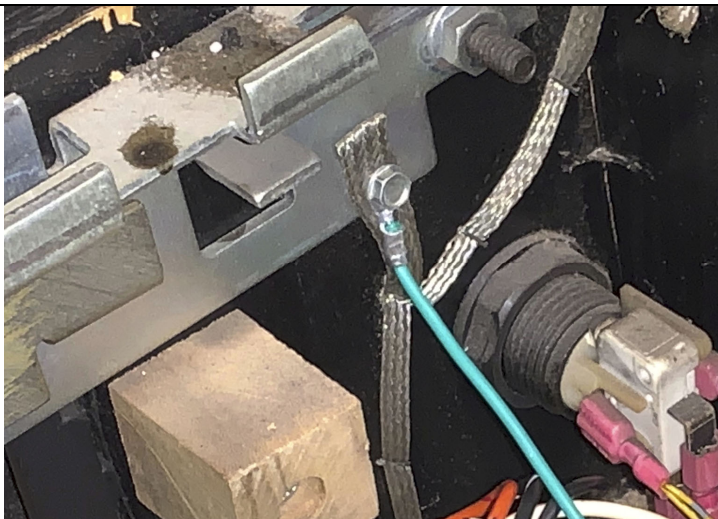
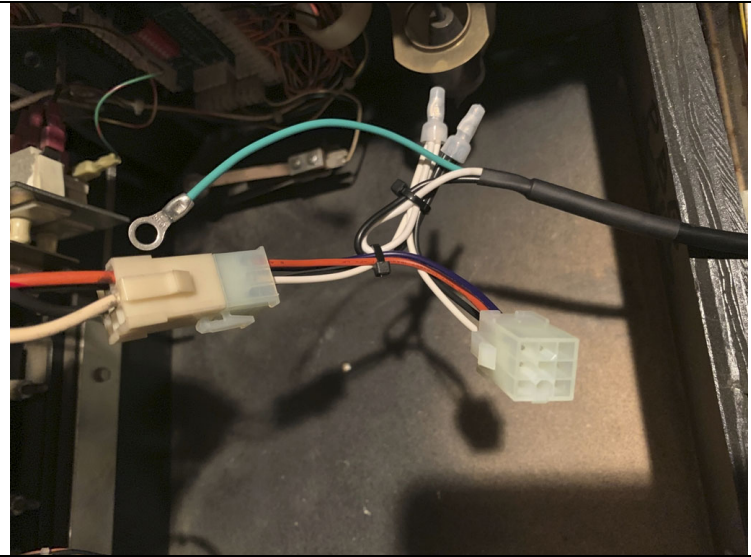


**On/Off Switch Is NOT Enough!**

### **Step 1: Bill Validator Adapter Installation**

If this is not the type of power supply adapter you received, skip to Step 3.

First we will talk about the bill validator. If your machine has this small 9pin connector attached to the coin door harness, you will simply take the included power supply harness and plug it into the bill validator connector as shown in the image to the right.



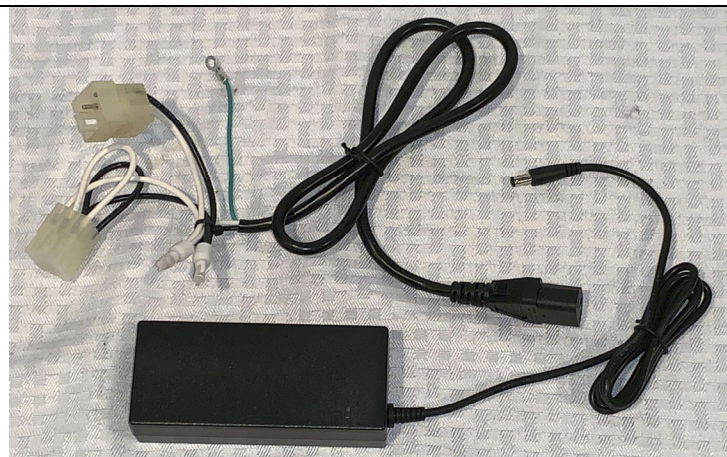
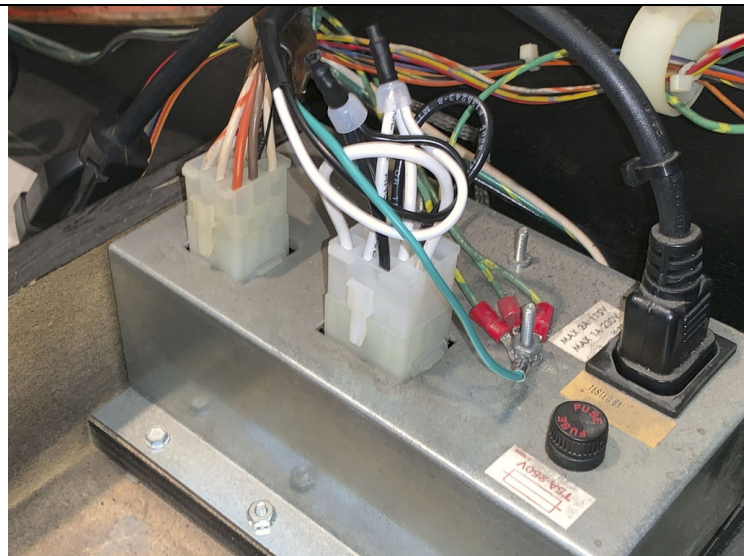
**Step 2:** Take the 1/4" nut driver and install the grounding cable to the grounding braid as shown in the image to the left. This is very important!



### Step 3: 12Pin Transformer Voltage Adapter Installation

If this is not the type of power supply adapter you received, skip to Step 4.

There is a 12pin transformer voltage adapter in newer WPC machines located on the power box as seen from the photo to the right. All you have to do with this is remove the old voltage adapter, and install the included power supply harness with the pre-built voltage adapter. Take the 5/16" nut drive and remove the nut holding the grounding cables and install the grounding loop from the power supply harness. This is very important, do not skip this step!

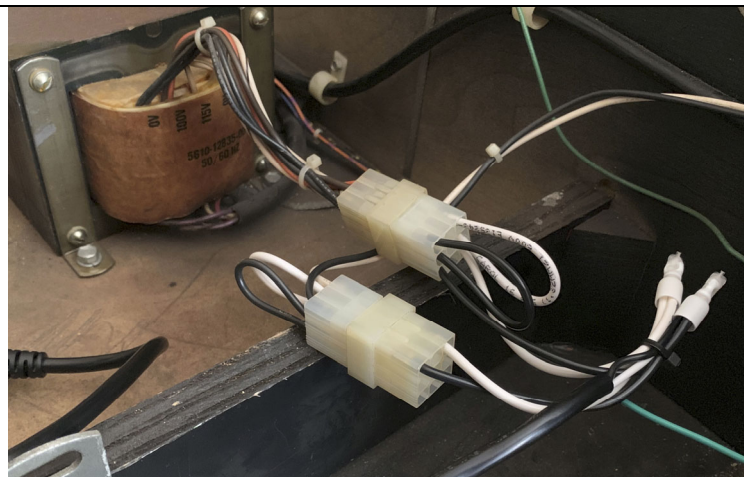


### Step 4: 9pin Transformer Voltage Adapter Installation

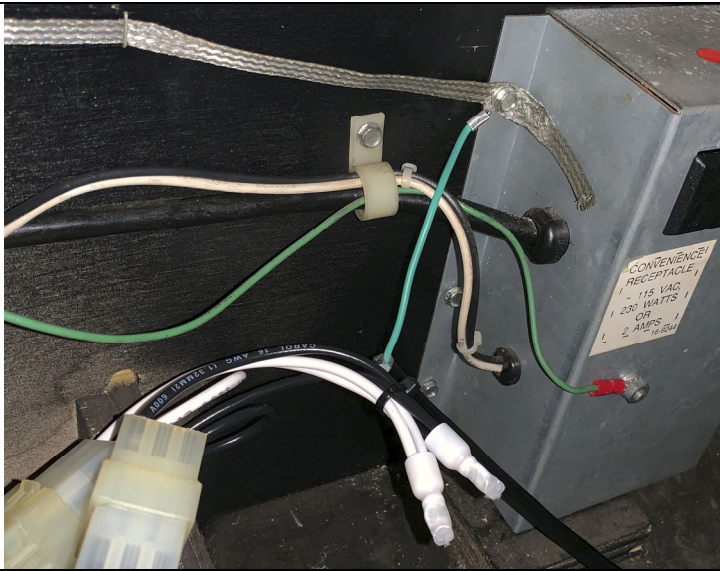
If this is not the type of power supply adapter you received, skip to Step 7.

Early WPC machines have a 9pin transformer voltage connector. For this type of machine you should have received our power supply adapter as pictured to the left. It will come pre-jumpered for the voltage your machine is running with, which you should have chosen during checkout.

**Step 5:** Separate the 9pin jumper connector from the connector coming out of the transformer. There is a small tab you will have to lift up on one of the side in order to separate the two connectors. Insert the pre-jumpered end of the included adapter into the transformer connector. Then insert the connector coming from your power box into the other side of the included adapter. When you are all finished, the connection should look like the photo to the right.







**Step 6:** Connect the grounding wire to the machine. I prefer to use the 1/4" nut drive screw that is used to secure the grounding braid. You can also connect it to the 11/32" nut that is securing the grounding cable on the side of the power box.



## Step 7: Service Port Connection

The last option for connecting the power supply is by plugging it directly into the service port. While this method may seem like the easiest of them all, the problem is that service port plug is always live whenever the pinball machine is plugged in. Turning off the switch to the pinball machine does not turn off the power to this service port. So you will need to make sure that whenever the machine is not in use, that you remove all power from the machine otherwise the included power supply, motor driver board, and shaker motor will remain powered. No damage will likely result in doing this, but if you are like me I do not like to leave things like this powered when unattended.

**Step 8:** Connect the power supply adapter to the power supply. Make sure you connect is securely and that it isn't loose when you wiggle it. Connect the 12vdc line from the power supply to the included 6' extension cord and run it to the back of the machine.





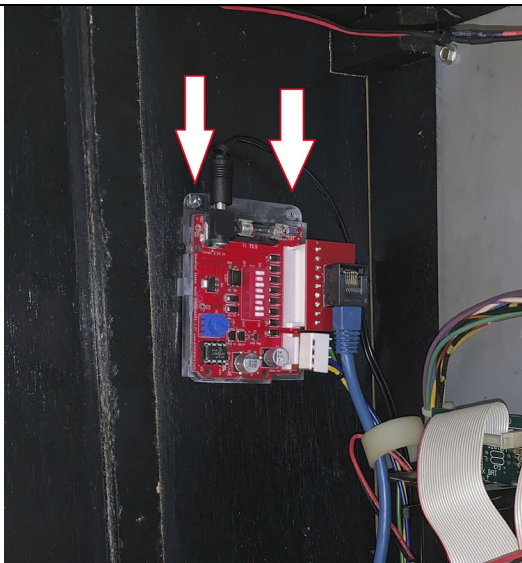
Use the bundle guides shown to the left to run the cord up to the backbox. Do not leave the cord dangling outside these bundle wraps otherwise when you pull the playfield in/out something may get caught on the cord and rip it out from the backbox. I know you are excited to get up and running with your new shaker! But just take your time here and do this right so that you don't have issues down the road.

### Step 9: Motor Driver Board Installation

Next take a look at your motor driver board. This is a good time to select the dip switch(s) you want to drive the shaker motor. Review the included dip switch matrix to determine what inputs you think you may want. You can always change them later after you install the board.

Connect the included Cat5 Connector adapter onto the motor driver board.

Locate the place where you want to mount the motor driver board. The first example to the right is where we recommend installing the board in a WPC-95 era machine. Place it just above the harness strap loop so that the connector fits in easily. There is a strip of velcro already attached to the back of the driver board case. All you have to do is remove the backing and place the board to the side of the backbox.

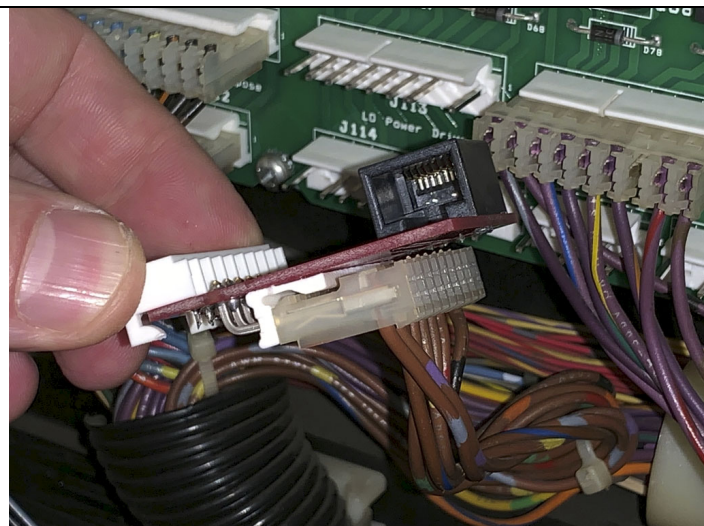
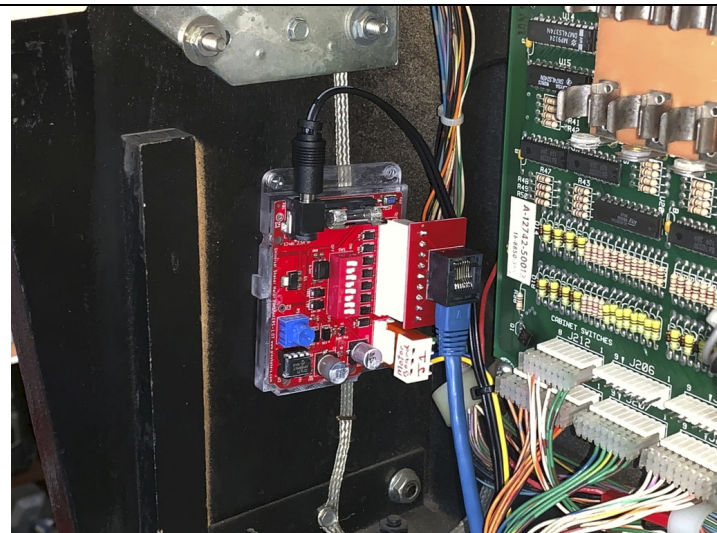


**Step 10:** Use the two wood screws to secure the driver board to the side of the backbox. Only use the two mounting holes at the top of the case as shown in the picture to the left. Do not use any of the other holes that are on the driver board.

You may only have room to install one of the screws, this is fine, the velcro will keep it secure as well.



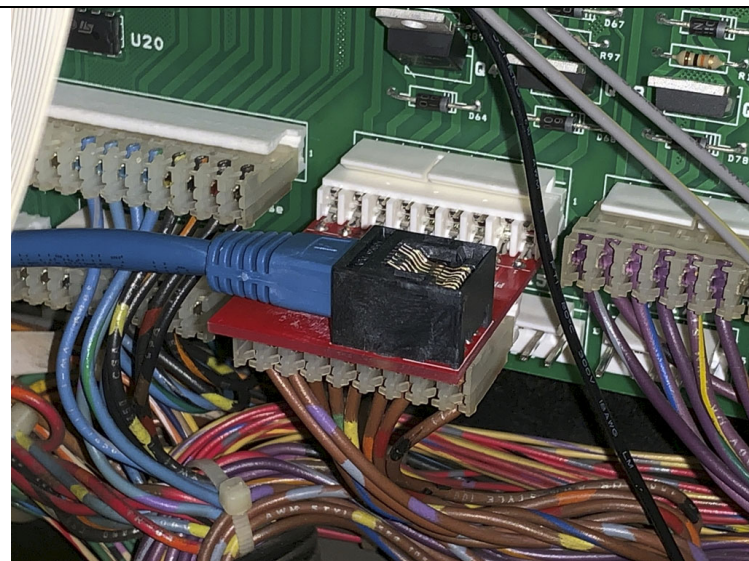
Here is the driver board location for all other WPC generation machines. Make sure you keep enough room for the 12vdc connector to easily connect to the driver board. Also make sure you have room for the Cat5 connector adapter.

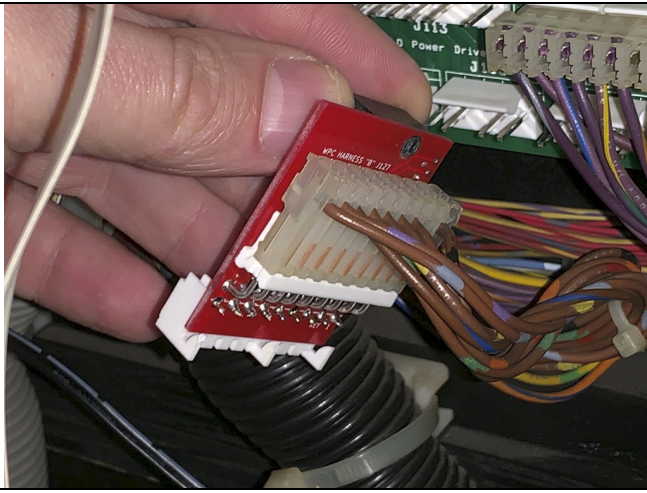


**Step 11:** Locate the power driver board connector for the type of machine you have. Unplug it and connect it to the connection on the bottom of the Cat5 adapter. Then connect the adapter back into the power driver board. Last, connect the Cat5 cable to the adapter. A photo to the left is a side view of the adapter.

The Cat5 adapter will have the connection printed on it for which harness you are installing as well as what connector to use on the power driver board.

Here is an example of the wiring harness “B” connected to J113 of a WPC-95 pinball machine.

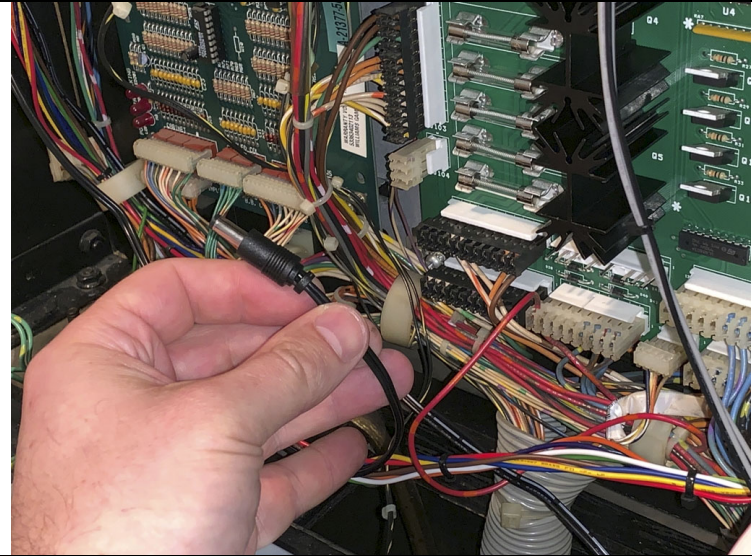




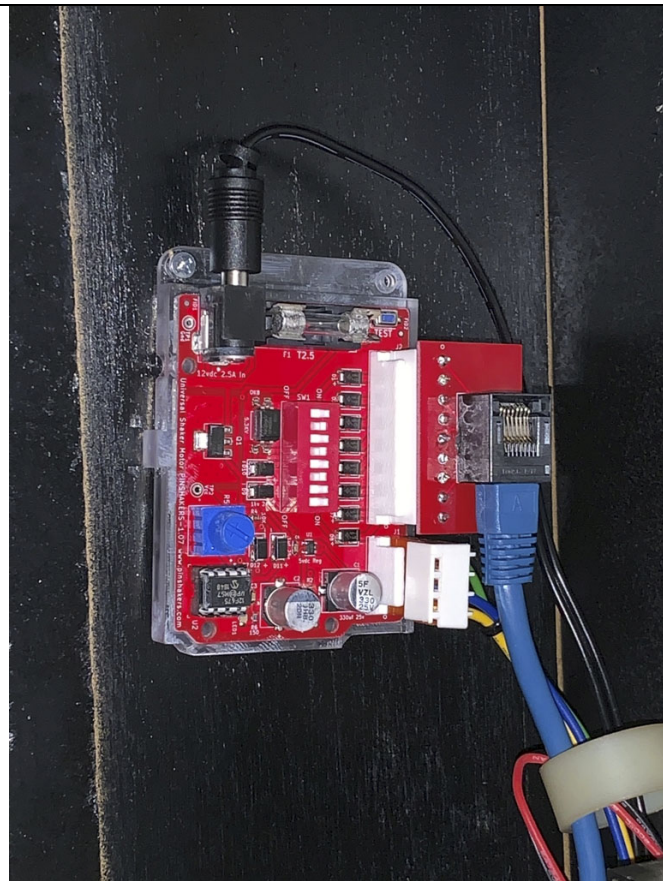
Here is another angle of the original connector installed to the bottom of the adapter.

Swapping between the two harnesses is a breeze. Simply install the other Cat5 adapter and connect the cable into it. It may be a tight fit to have both adapters installed, but you shouldn't have to remove the old adapter to swap to the other one.

**Step 12:** Run the motor harness to the motor driver board. This harness has the 12vdc connector from the power supply, the shaker motor connection, and the grounding strap all bundled together. Try to keep things neat and tidy and use the strap loop whenever possible to keep the wiring secure. You can use the included zip ties here if you like to help secure anything.

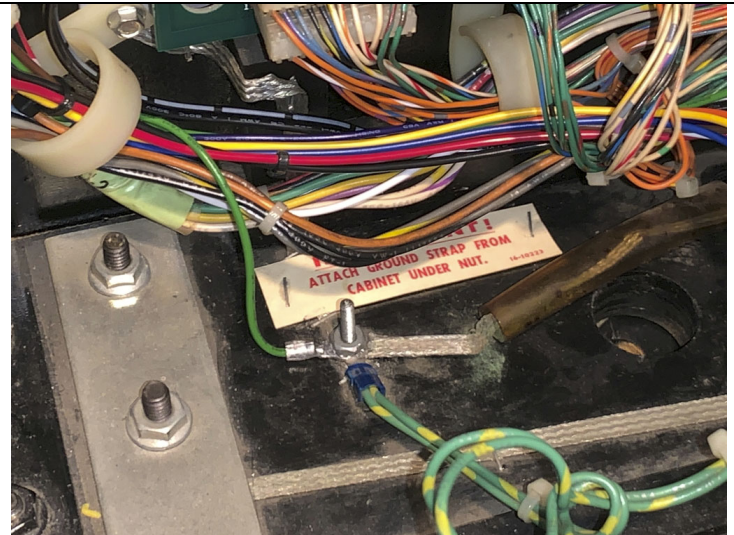




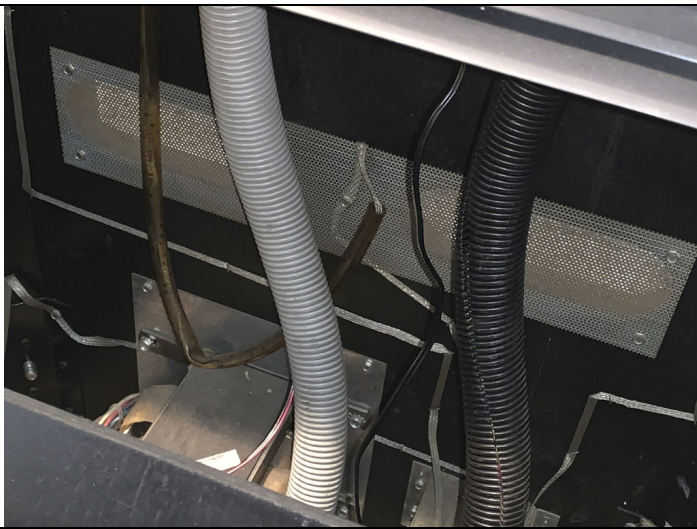


Here you can see everything connected to the driver board. You will want to connect the motor power/grounding strap connect to J1 of the motor driver board before connecting the Cat5 cable.

**Step 13:** Find the grounding strap below the MPU. It will either be secured with a wing nut or a 5/16" nut. Remove it and connect the grounding cable that is on the wiring harness. Replace the nut. Do a visual check to make sure the grounding braid goes from this junction to the circuit boards and down into the cabinet. To be completely sure, I recommend you use a DMM in the continuity test mode and check for proper grounding between the circuit boards, this junction, and all the way to the front of the cabinet. If you notice any breaks in your grounding strap you must repair them prior to applying power to this motor driver board. Installing this kit in a machine where something is not properly grounded will result in the damage to your shaker motor driver board, the shaker motor, and possibly even your pinball machine circuit boards. **DO NOT SKIP THIS STEP, IT IS THE MOST IMPORTANT STEP OF ALL BESIDES UN-PLUGGING YOUR MACHINE!**



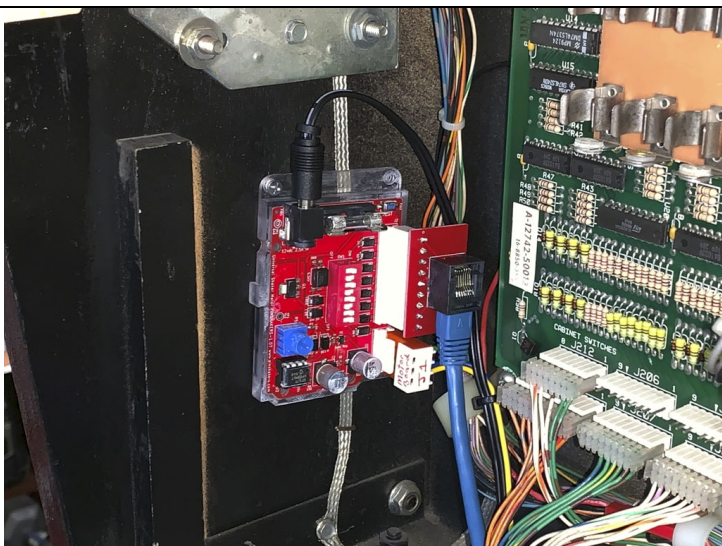
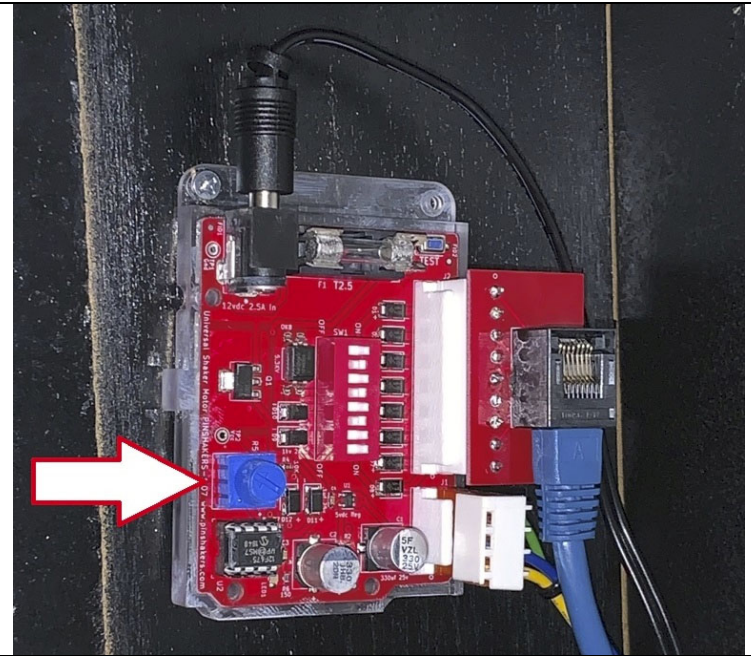




**Step 14:** Now run the shaker motor connection wires down into the cabinet. Use the wire wraps like the ones shown to the left to neatly secure the shaker motor wires. Connect the shaker motor and the power supply, and leave all slack in the lines for both the shaker motor wires and the 12vdc cord in the back of the cabinet at the base of these wire wraps. That way when you go to fold the backbox down, the slack will be used and nothing will get caught and ripped out.

**Step 15:** Power the machine on and look for the led on the motor driver board. It should flash 5 times during it's power-on routine. Once it is steady green, it is ready for action. Press the test button next to the fuse and the motor should shake. If it doesn't, then go back through the above steps to make sure you didn't miss a connection somewhere.

You can also use this test button to fine tune the intensity of the shaker using the speed adjust knob as shown to the right. Move this adjustment knob by hand only, counter-clockwise to reduce the shake and clockwise to increase the shake. Do not use a screwdriver as you might slip and accidentally short something out on the driver board. Continue to test the motor and adjust the shake to provide the perfect amount of shake you desire.



**Step 16:** Feel free to change the dip switch settings with a pen or other like device on the motor driver board for the desired inputs that you want to drive the shaker motor. Do this while the machine is powered down. Do not mix up the dip switch on the motor driver board with the dip switch that may be on your MPU. The one on your MPU is used for setting the country settings only. You may turn on any dip switch on the motor driver board that does not have the "Do Not Use" label on the dip switch chart. You can choose to have more than one switch turned on at a time. Have fun with it and try to make it so that it feels as if this kit was always meant to be installed from the factory.

Congratulations, you have successfully installed the motor driver board, shaker motor, wiring harness, and power supply! If you have any questions or problems please do not hesitate to reach out to us for help.