Bowling Alley replacing pins

Adding limiters guide

Caution:

If you are not comfortable working on pinball hardware and/or high voltage electronics, please get professional support for this. In general: use your common sense. Don't experiment. Don't be a nihilist. Only skilled and trained people are allowed to open this system. The manufacturer accepts no responsibility for injuries caused by unauthorized operation. Keep long hair, fingers, jewelry, etc. away from turning parts of the system.

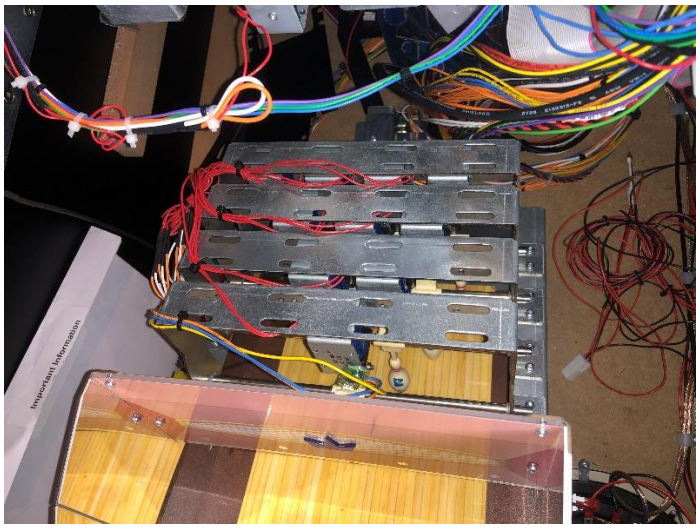
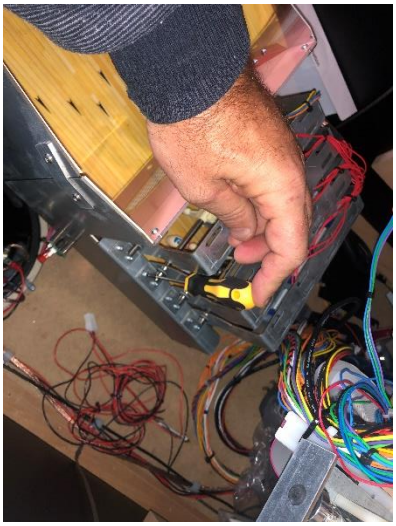
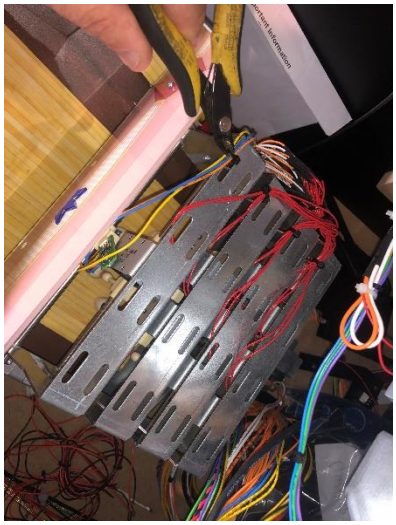
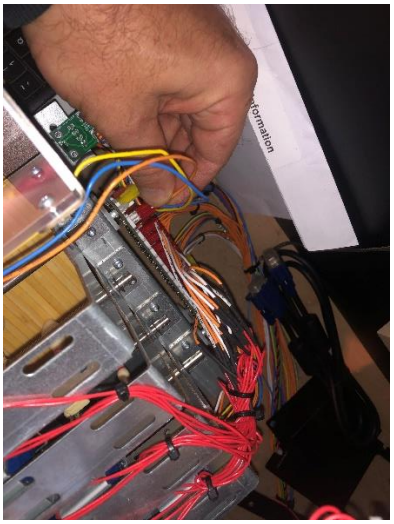
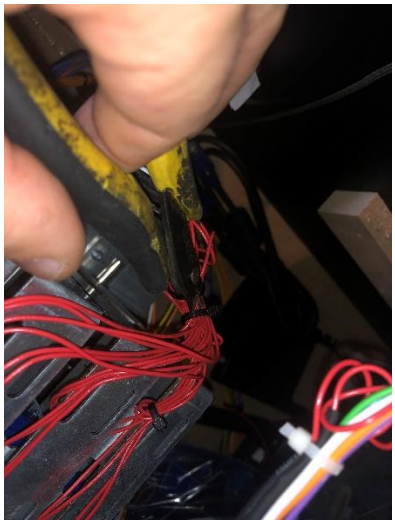
Before doing this make sure the game is TURNED OFF!

In this guide its described 1) how to replace broken bowling pins but also 2) how to prevent this from happening again in the future. This latter is done with a 'limiter'. TBL serialnumer 700 and higher have this installed from the factory.

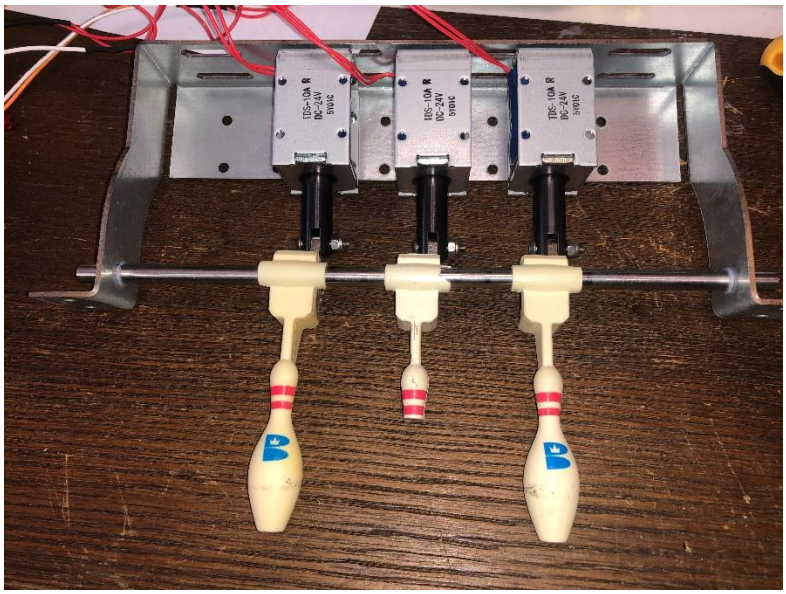
General preparations

In case a bowling pin breaks it's possible to replace it with a new one and its not a difficult process. Let's take you through the required steps.

- Put playfield vertical via usual method explained in other parts of the manual
- Locate the Bowling alley and see in which row the broken pin is
- Remove the 4 screws (2 on each side) and cut the tire wraps holding the cable

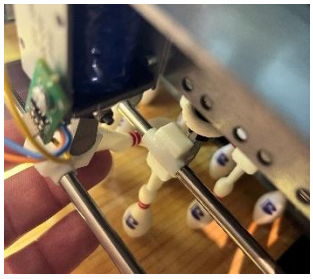






- Take out a complete row



- Next step depends on what you want to do. Just replace broken bowling pins and/or add limiters?

Adding Limiters



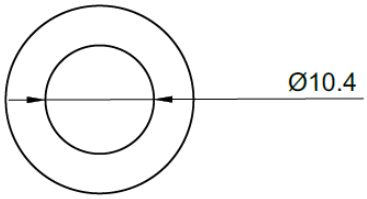
In case this isn't done yet it's advised to add what I call a limiter. This limiter will shorten the bowling pin travel and prevent it touching the metal axis of the row **behind** them. This as shown on the picture to the right.

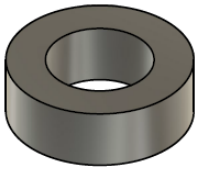
This limiter can be a plastic ring with an inner diameter of 10 mm (the diameter of the plunger) and a height of approx. 6 mm. What however also works fine with a lot of c ustomers is a standard rubber used in Pinballs, a 5/16 Inner Diameter rubber as can be seen for instance at https://www.pinballlife.com/perfectplay-516-silicone-bumper-post-ring.html . This rubber ring is very common in pinball, easy to obtain and most pinheads have them in their parts bin. It has a height of approx. 5 mm (0.2 inch) which is close to what we are aiming for. **Make sure the ones you buy do have a height of at least 5 mm!** Disclaimer: don't know the height of the Pinball Life ones, they are just to show an example!!

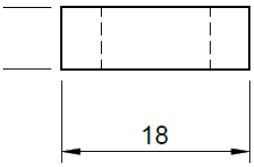
However, we discovered that, due to several changes in part supplier of the Bowling Pins which causes minor design and printing fluctuations that with a height of the rubber ring of 5 mm it can be that the metal rod is still hit. So, check if the rubber ring is truly a solution in your case yes or no. If the Bowling pin Is still hitting the metal axis the solution is to use the plastic rings with a height of 6 mm. A STL file for 3D printing can be downloaded at

https://www.dutchpinball.com/files/support/Limiter_Ring_BA.zip

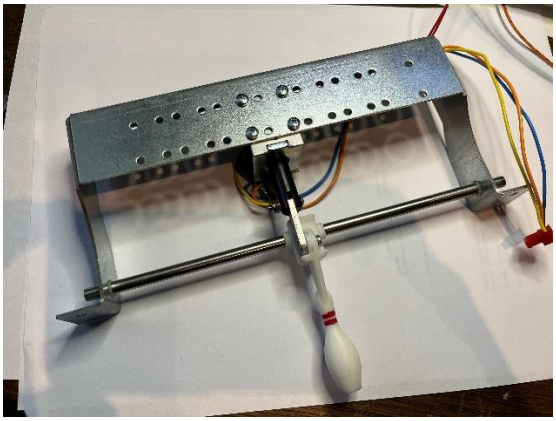
For those wanting to make their own STL file, dimensions (**in mm**) are as follows:



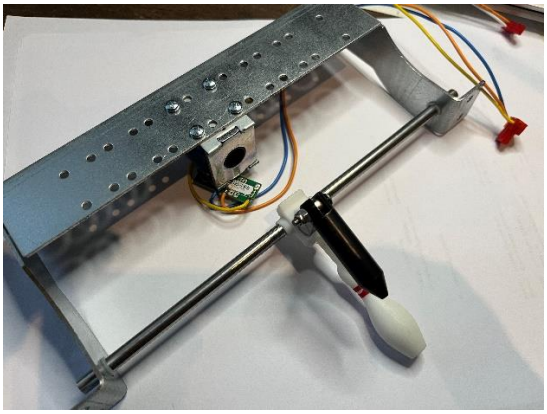




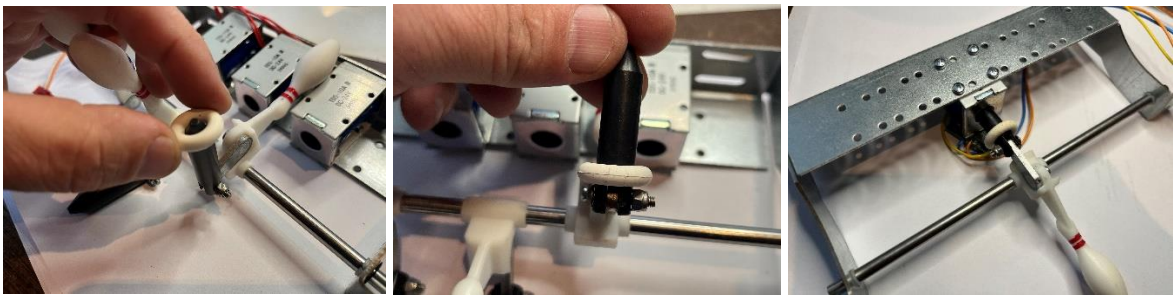
- So, we have taken a row out. In below example it's the first row which has 1 bowling pin



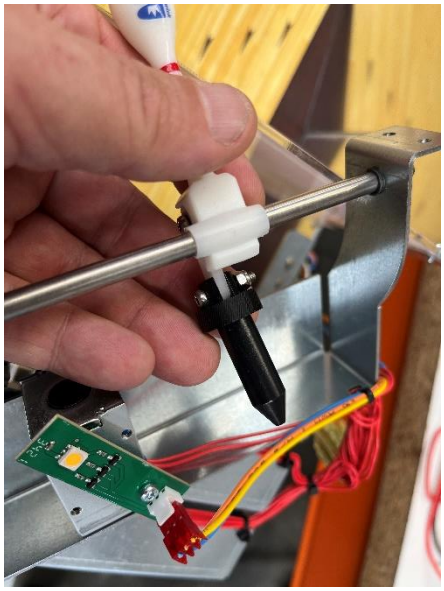
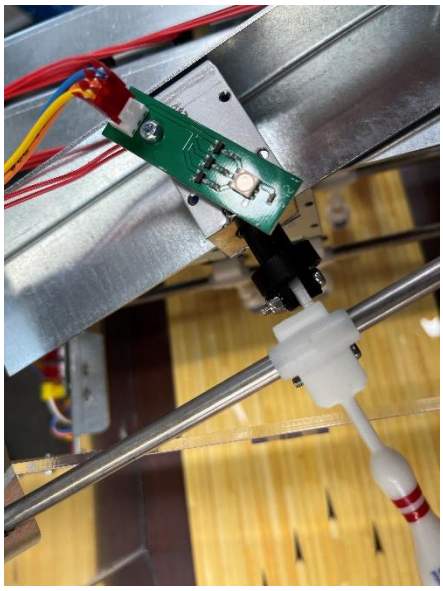
- The bowling pin assy has enough play to remove the plunger from the coil without needing to remove the coil or metal axis. So, take plunger out of coil.



- Slide the rubber or plastic ring over the plunger till it cann't go further en re-insert the plunger back in the coil

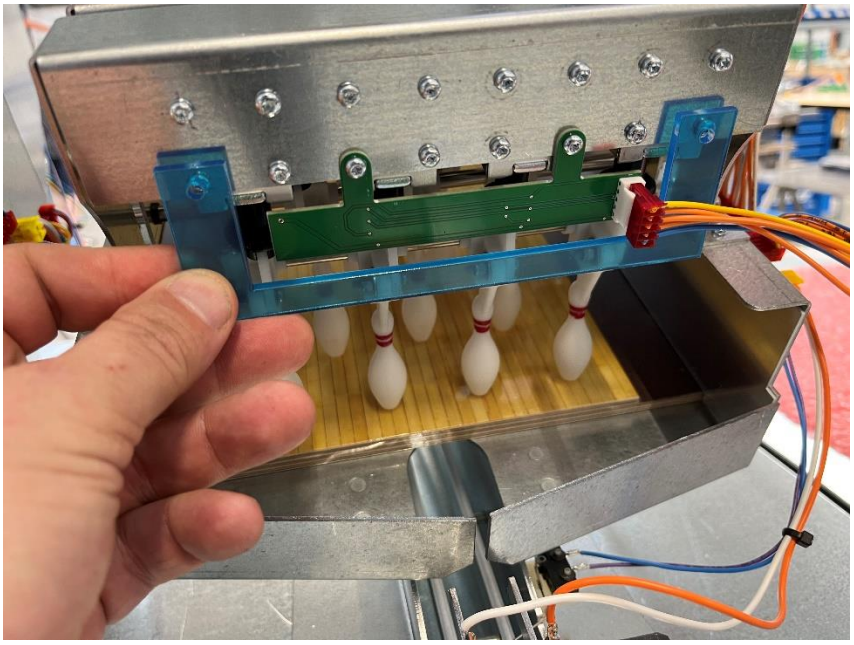


Examples rubber ring

Example plastic ring

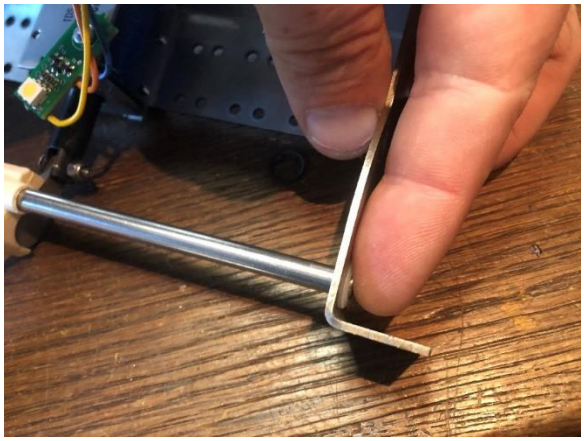
- The last row of 4 pins has in theory no use for a limiter as there is no metal rod behind this row to hit. **We do advise however to do the last row also**. And, if you want all pins to have the same travel upwards you will need to do the last row to. Also, at a certain point DP started to add a plastic protector behind the last row to avoid the plunger getting out of the coil. This is also a place which the Bowling pin can hit and cause breakage. With the limiter in place this plastic has no more function so please remove. *Note: in the picture it is the blue plastic, its blue because it still has the protection film on it to make it more visible in the picture. Your's will be just transparent.*



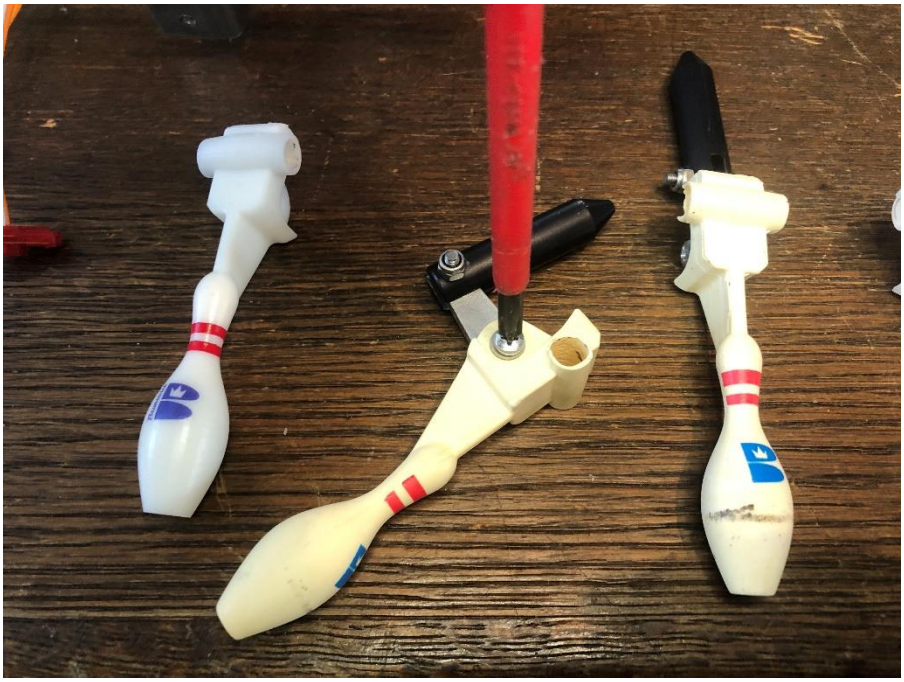
- If there are no broken bowling pins you can skip next section and move direct to the Wrap up section page 9

Replacing broken Bowling pins

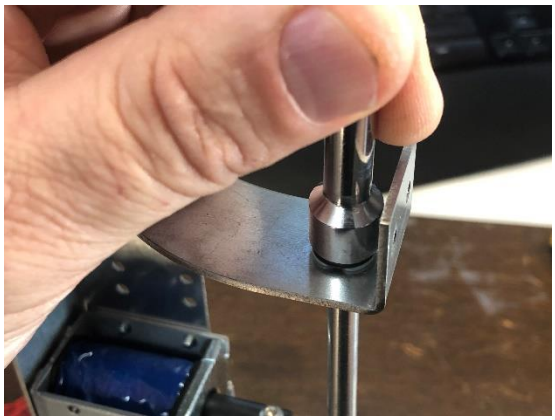
- Push the axis from one side. You will need some force as its hold with a ‘ring’. Take also good note if the bowling pin is held to the coil from the left or right side (the last row is different as the first 3 rows)




- Slide the axis out and remove the broken bowling pin from the assy via removing a screw

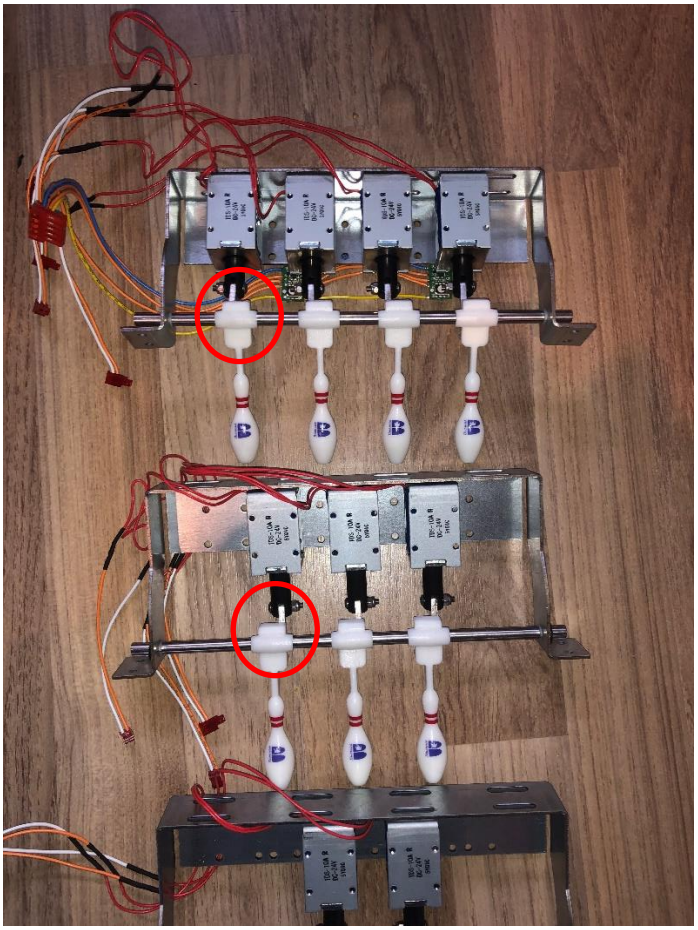


- Slide the new bowling assy in the coil and slide the axis through the bowling pins
- The ring is most easily placed back via placing it first loose on the top of the axis and then take a large enough nutdriver and push it over the axis. Make sure the bowling pins move freely and fall back themselves when held vertical



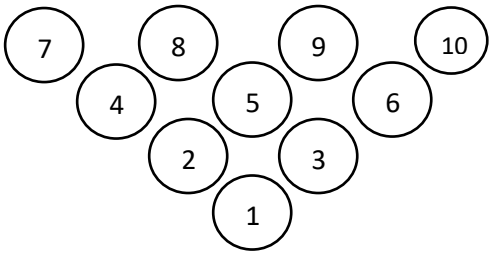
The ring has 4 ‘teeth’ pointing inwards and upwards. The easiest way to slide it over the axis is have the ‘teeth’ pointing upwards to the end of axis

- As mentioned, the last row has the bowling pin on the opposite site of rows 1-2-3. See below picture. Row 4 is left, other rows are right

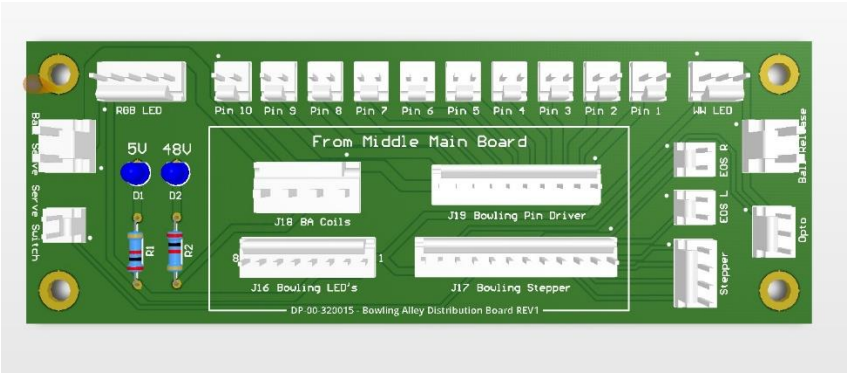


Wrap-up

- Re-assemble in the opposite order of the de-assembling. The pins have to be assembled in the following order:



The bowlingpins 1-10 are connected from right to left, see below picture.



First and last row have an extra connector for the Led mounted on that row

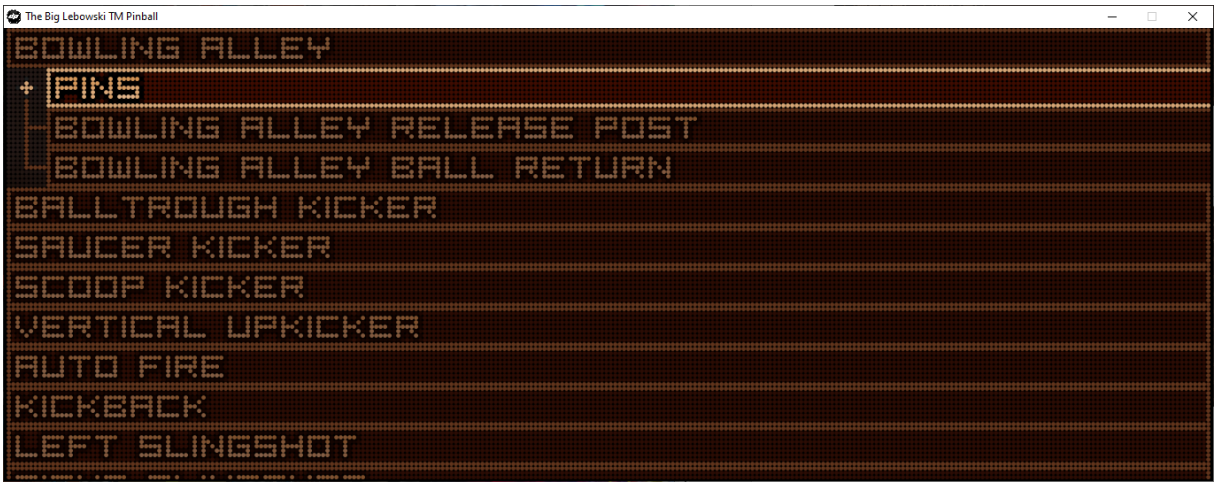
- If everything is re-assembled, you can go into the test menu and test if the correct bowling pins are activated and if they drop down properly. Procedure how to do this, is described below

Bowling pin coil check

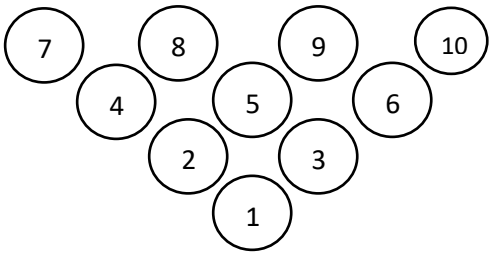
If you see a bowling pin is not dropping it can also be caused because the coil of that pin is faulty. This can be checked in the Test menu – Solenoids.

Remember that for the coils to work in the Test Menu, the switch which enables power supply to the 12 & 48 VDC circuits must be enabled!

If you select Bowling Alley you get the following choices:



If you select PINS you can select which pin you want to check. Pin 1 is the one front middle.



All coils can be activated by pushing the Enter button. You will hear and/or see the coil being activated. If not, something is faulty.

If a coil is not working check the wiring first. If a wrong pin is activated connectors are very likely swapped. See also previous for the diagram

- Tuck away the cabling and put some tire wraps in place to hold it

If this all goes OK put back all balls in the TBL, glass back on and enjoy.