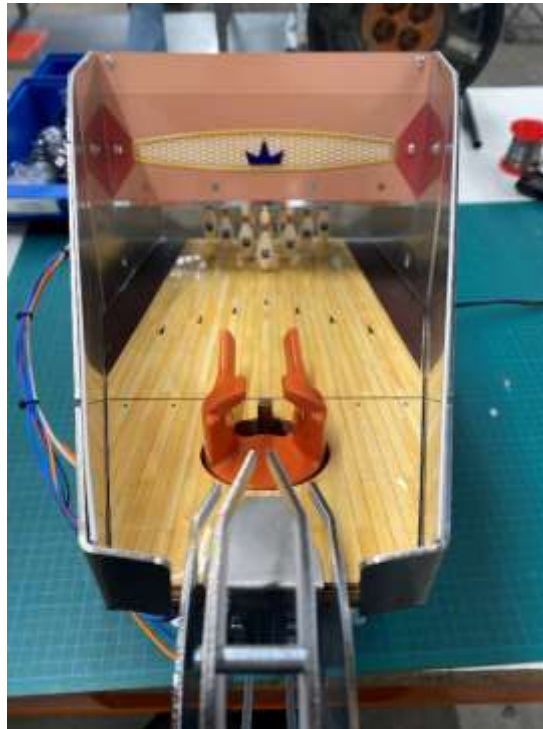




*it's a whole new game!*



### **Bowling Alley Operations FAQ**

**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.

## Principal of Operations

The way the bowling alley-pins work is as follows.

The software calculates the position of the bowling launcher by detecting the left, right and middle position via switches. It also knows the speed of the launcher so it can determine where the launcher is at the moment you push the launch button.

It then calculates the trajectory of the ball and which bowling pins should drop if the ball hits them. The ball passes an opto just before the first bowling pin when moving down and that triggers the software to activate the appropriate coils which pull the calculated bowling pins up. So, it has nothing to do with ball physically hitting the bowling pins! If a bowling pin doesn't 'drop' it means 1) the coil is not OK or 2) the software thinks the ball is in another place.

## Fault seeking

To do some checking you will have to remove the playfield and set it vertical:

- Carefully remove the lockdown bar and playfield glass.
- Remove all five balls from the Ball Trough!
- Lift the playfield a bit and pull the playfield a bit towards you as soon as the playfield support brackets are high enough to do so and rest the playfield onto the front of the cabinet on the playfield support brackets



- Now we need to raise the playfield to vertical position. Lift it up at the servicebars , pull it towards you till you hear two clicks (this means the locking mechanism is in place and the playfield cant drop in the cabinet). Than set it vertical. Let it carefully touch the top part of the backbox, this to avoid damage. You can put something in between like a cloth to reduce the chance of damage even further. To make sure it doesn't drop on your head while working on it, it is recommended to secure it with a strap. Also we recommend to put something over the bowling alley to avoid screws falling into it.



**Is the launcher properly mechanical fixed?**

So if the pins don't go up it's because 1) software is never perfect but mainly because 2) the software thinks the launcher is in a different position as it is in real life. Suppose the launcher is not 100% tight fit on the stepper motor axis it has some space to move to take a different position as the software thinks. The launcher is fixed with a 2.5 mm Allen screw.

To check if its properly fixed pull by hand the ball-launcher to see if it's securely fastened. **Use normal force when pulling !!**



The 2.5 mm Allen screw to tighten the launcher is found at the right and best approachable when the launcher is positioned like in the above picture

**Do the switches of the launcher work?**

Go into the testmenu and activate switch test. Move the launcher **slowly** by hand left-right-left

You should see the following:

- left is left switch
- middle is right switch
- right is left+right switch



If one of these switches does not work check the wiring.

## Do the opto and ball launcher switch work?

To check this go into the Testmenu and select Bowling Opto test

This tests if the switches in the Bowling alley are working properly. It will show if there is a “Ball at Top” or “Ball at Bottom” and the word OPTO will light up if the ball crosses the OPTO beam. It will start with Ball at bottom. If you push Enter now, the coil will be activated which will fire the ball up. Status will now be Ball at Top. If you push Enter again, the ball will be released and will roll down over the bowling playfield. You should see **OPTO** appear briefly on the display.

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!

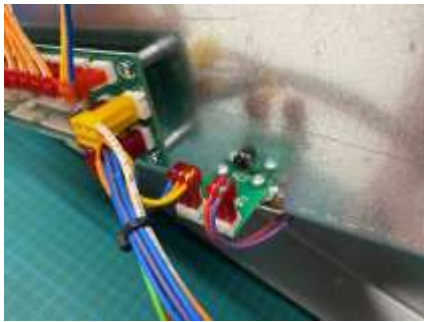
The switch responsible for this protection can be found on a bracket at the left side of the coin door. If you want to disable this protection during testing, you have to pull the pin on this switch till you feel it click. The protection circuit is now disabled! It is important be aware of this when you touch parts at the bottom of the playfield. If you close the coin door, the protection is re-instated for the next time.



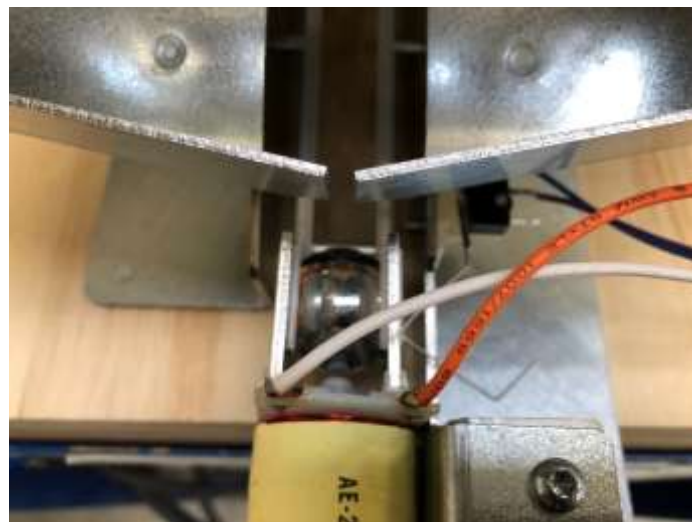
*Possible cause of zero pins dropping?*

As explained the opto doesn't decide which pins have to drop, it just times the coils to pull up the pins which need to fall. So if the opto doesn't trigger this means the pins will not be pulled up and the software will not show on the display pins are hit and fallen. If this happens check wiring of opto and if opto is properly aligned in front of the hole.

Also you will see on the right Opto (which is the Transmitter) a shrinking sleeve is mounted. The purpose of this sleeve is to narrow the beam which goes across and hits the receiver. If the beam is too wide it the ball will not fully block it and the pins will not drop. If this test doesn't show the OPTO in screen, go into Switch test and if your hand does cause the opto switch to trigger this shrinking sleeve is likely not narrow enough



There is one mechanical switch to test and that is at the ball launcher



### Bowling pin coil check

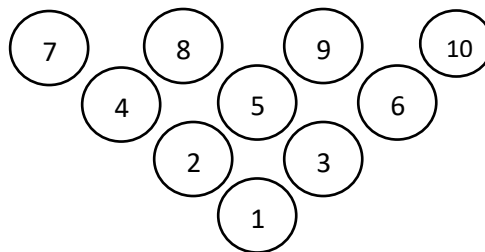
If you see a bowling pin is not dropping it can also be caused because the coil of that pin is faulty. This can be checked in the Testmenu – Solenoids.

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.

**Stuck releasepin**

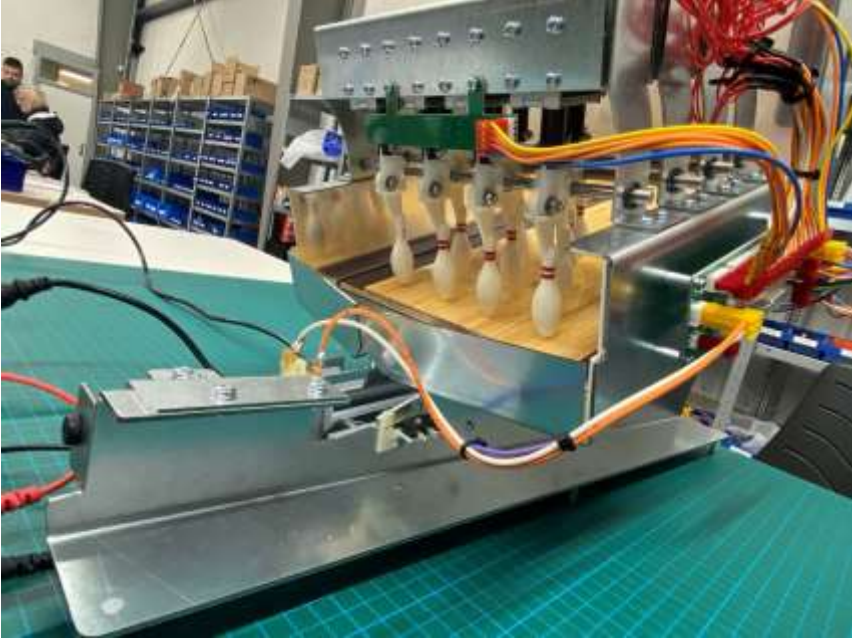
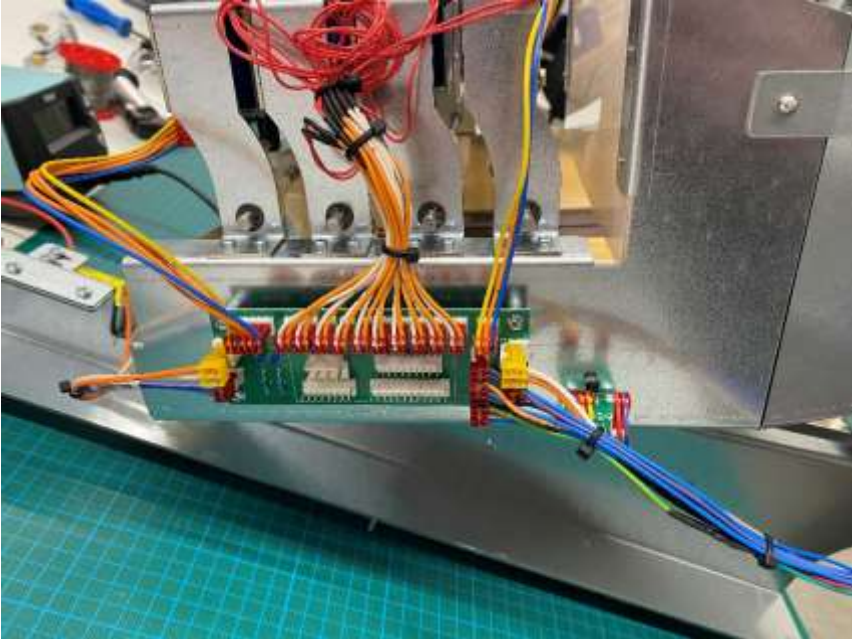
If the bowling ball is not released or a launched ball is immediately drained this can be because the coil is not firing but if you hear it firing check if the release pin is not rubbing against the wood. Can also be that if its rubbing it only slowly returns back in position and a new ball already has passed it. You can release the nuts holding the coil bracket and get some room to fiddle with it to get in in correct position. In Testmenu – Solenoids you can find this coil (bowling alley release post)





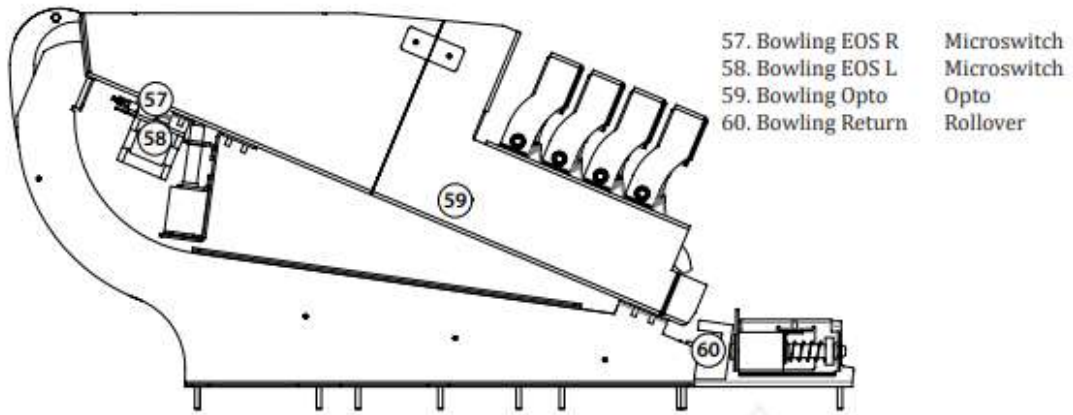
**Miscellaneous checks**

The bowling alley has on one side a 'wiring'-hub. Check if all connectors are properly seated.



Switch Overview

### Switch Overview Bowling Alley



### Switch Overview Cabinet

These switches are all connected to the Switch Board (SW-16) in the front left side of the cabinet.

J2, Pin 1 Flipper Up R	Opto	J6, Pin 1 Menu 1	Button switch
J2, Pin 3 Flipper Lw R	Opto	J6, Pin 2 Credit 2	N/A
J2, Pin 4 Launch Button	Button switch	J6, Pin 4 Credit 1	N/A
J2, Pin 5 Flipper Lw L	Opto	J6, Pin 5 Slam Tilt	Leaf
J2, Pin 6 Start Button	Button switch	J6, Pin 6 Menu 4	Button switch
J2, Pin 7 Tilt	Tilt	J6, Pin 7 Menu 3	Button switch
J2, Pin 8 Coin Door	Interlock switch	J6, Pin 8 Menu 2	Button switch
J2, Pin 9 Credit 3	N/A	J6, Pin 9 Credit 4	N/A