Pachislo Repair Guide.

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This is a free down loadable guide, made by Arraking from the Pachislo Data Base.
Pictures used with permission of the Pachislo Data Base Administrator. June 2012

V3.0

This is a guide for repairing and maintaining Pachislo ’Slot’ machines.
Some steps out lined in this guide may be out of your capability so you should consult someone with more experience on a certain subject for your own safety. For the most part these machines run on a very low voltage. However the cord that plugs into the wall and that goes into your machine is 120 Volts AC, Extreme Caution should be used if you are not familiar with connections and handling the high voltage that is present when the cord in plugged into the wall outlet, an electrical shock from this voltage can be fatal!
So please use precautions such as removing the plug from the wall when trying to repair the power aspect of your game, such as changing fuses or checking a loose wire‘s in your game.

There are several sections in this guide designed to give you ideas on what to check to do a repair on problems that might arise while owning your Pachislo machine. It would be nearly impossible to outline every part in every machine in use. There are so many makes and models, and each with it’s own differences, but this is designed to guide you in the right direction. Even though something pictured in this guide may not be exactly like the part in your game.
At the end of this guide you will have an understanding about your game as well as many others out there.

Even though each game is different, essentially it’s the same as another. Parts may be different, but at the same time they do essentially the same thing as ones that are be pictured in this guide.
One thing I learned a long time ago is before you start playing your game, after owning an Arraking game once and playing it for hours, it displayed EEE on the display on either side of the door. Nothing I did would clear the error, finally out of desperation I turned it off and preceded to check every connector, then I turned the game back on to find the EEE gone. From then on I always check every connector in the game first. So check it inside and out for dust loose wires loose connections, and don’t forget those screws! Even the door hardware should be checked.
I have found it better to clean the machine before play is started for the first time.
I think you will enjoy it much more, and you won’t have to look through dirty reel windows at those dusty reels as they turn. A vacuum cleaner is a good tool for some areas and it’s better to use a bag less with a clean dirt cup. If you suck up something valuable you can find it a lot easier than with a bag vacuum.
You can also use ‘canned air’ or an air compressor with the air pressure turned down to about 40 psi for blowing dust out of small areas such as sensors and stop buttons.

Okay, now that you have cleaned & checked that all the connections and wires are in good condition, plug in your machine and turn on the power. If an error is displayed and sound should start this can be normal, most newer games will not maintain a memory for long, or if it has been turned off for a long period of time.
In fact some games only have to be powered off for a couple weeks or even a couple days, and when it is turned on it may show and sound an error, and will need to have a hard reset done, to reset the game for play, see page 8 for instructions on doing a full reset.

It’s important to know,
Some games have a split door. The bottom half opens up then on the inside right is a red handle, pull this down, and then pull the top door towards you. Now you have full access to your game.

Ok, how the heck do I play this thing?

Pachislo's are ***not*** your normal "run of the mill" slot machines. The game play and payout structure are completely different from US slot machines. These games come from Japan, where gambling is of all things, illegal! These are made for entertainment and with that said, and after you play yours for a while you will understand why they are not a typical slot machine. Some games will pay out over 300 tokens after a bonus round is over. A bonus round is sort of like a jack pot, instead of one large amount of pay out it pays in rounds of 15 tokens/ credits. Some games pay out even more than 300 tokens in a bonus round.
So if you want to convert your game to take Quarters, you may want to re think that option.
There is more than one reason!
Reason 1: It may render your game illegal in your state. So you stand to loose more than just your game.
Reason 2: You can loose your shirt, if you have a "Game Night" and the game pays out over $75.00 in quarters in just one bonus round.. You will definitely be the talk of the neighborhood after that night!
You will have 'friends' coming out of the woodwork, all wanting a piece of the action.
Reason 3: Tokens are cheap, about 7 to 8 cents each. A lot cheaper than 25 cents each! And less apt to disappear after a "game night".
One thing that has been done, is pick a certain style of token or even color a token and make that your "Winning" token. And have a inexpensive gift for a winning find of that token. You can even make it joke, like free steak dinner at the winners house or something.

Okay, now for how to play, older games need only one token to start play, at the same time, the 'more lines' you play, the better the chance to get a winning line up. Most games these days use a max bet of three tokens for play. So insert three tokens, now all you need to do is pull the spin knob down to start the reels. At this point you might be asking where is the spin knob?
On the mid section of the door, is what I call the console. This has the bet buttons, stop buttons, spin knob and the coin slot, on the right side on the top of the console.
The picture below shows a play console, The spin knob here is Yellow, the button just to the left is for dumping credits (More about this on page 4) Just above the spin knob is a Max bet button, and just to the left is the single bet button.
In the center are the stop buttons in Red, to the right on the top is the coin slot under that is the coin jam button. Some games may have these and some do not, some are next to the coin slot. Under the coin slot and to the right is the door lock.

With all this now said, pull the spin knob to start the reels, now you can just let them go a bit, and push the reel stop buttons one at a time. Repeat the process for the next round of play. Games have a max credit of 53, 50 will show in the credit display, and three will show up in the play lines side.
Just about any game is set up the same way,

Can I change from token win to credit win?
Some games will let you choose to be paid with tokens in every win, some will not.
If you have an older game, like pre 90's, chances are you can select credit on or off. This button is usually found on the front of the control panel, where the spin knob and stop buttons are. Look for a button, it would be smaller, like a single bet button either near the spin knob, or near the 'coin slot'. If you press and hold the button for about 10 seconds, the credit meter display will either turn on or off depending on if it is already on or not. If you had any credits showing, these will be paid in tokens in the bottom tray.
Note: Newer games may only let you get paid in credits only and not allow you to turn off the credit feature. No this can't be changed, it's all ready been determined in the programming, and what the law calls for in Japan.

Okay, What's wrong with my game?
If you have done everything with your game, like inserting three tokens, and the start light hasn't come on, and the reels don't start. Even after doing the steps of checking all the cables and connectors as discussed on page 2. It still could be something simple, the best thing to try here is to check things like the stop buttons or even the MAX bet button make sure they are not sticking in the down position.

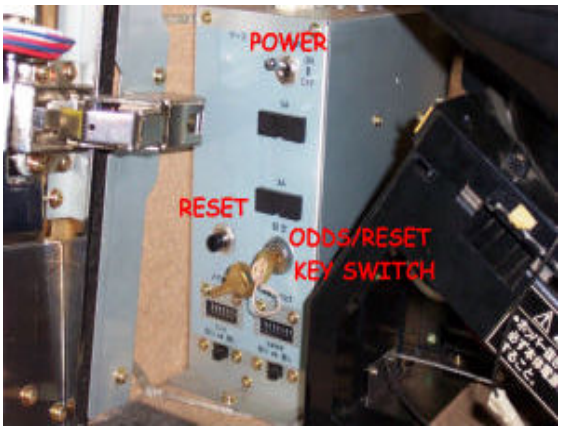
If your game has LED's on the mother board (located in the top back of the cabinet in the top). Push each button or pull the spin knob, while looking at the MB to see what LED does what. Write these down, it could come in handy when trouble shooting later. When you come across an LED that seems to stay on, even though the button is not sticking it very well could be a dirty sensor.
Dust has been known to fool a sensor to think it is being operated when it's actually not.

If you think it might be the stop buttons pull the plug on them, on the back of the door find the connector that the wires from the stop buttons go to. Pull it off of the connecting socket, did the start light come on? If it did, you need to look close at the stop buttons, if one is not stuck down, it could be a bad sensor or even dust in a sensor. Another problem can be that the reels won't start is the stop board (found on page 14), it may be a bad fuse or a burned out stop board.

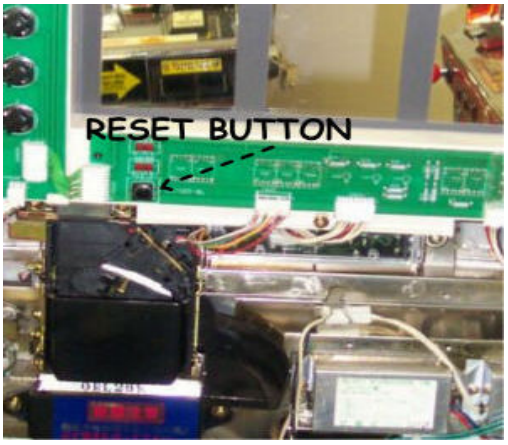
Or it could be that there is a broken wire in the cable from the door to the back of the game. Much more difficult to diagnose and it can kill your game, or just parts of it. You should refer to pages 27 ~ 29 in this guide on using a multimeter for ways to test the cable. It's a pain in the butt, at the same time if you want a working game, it's just another part of owning a game you need to know how to fix some problems.
The main cable in the game is called a ribbon cable, because it looks like a ribbon. On each end is a connector, they are both the same so if you remove the cable, it doesn't matter what end goes where.

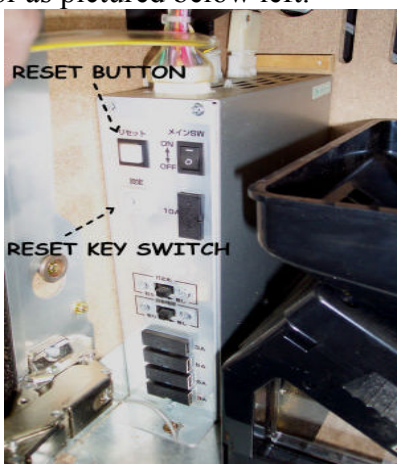
There are certain problems that will arise that you may need replacement parts. Sometimes, these can be hard to find.
Unfortunately, vendors don't always keep replacement parts for these games. In any case your best bet on finding parts would be Stealth Home Amusement, in New York. It's better to call, you will get better service that way. Call them toll free, 1-888-798-1761

MACHINE SPECIFIC INFORMATION FOR ARUZE, UNIVERSAL, MACY, ELECO, ELECTROCOIN BRAND MACHINES: POWER SUPPLY DETAIL AND LOCATIONS OF RESET BUTTONS:

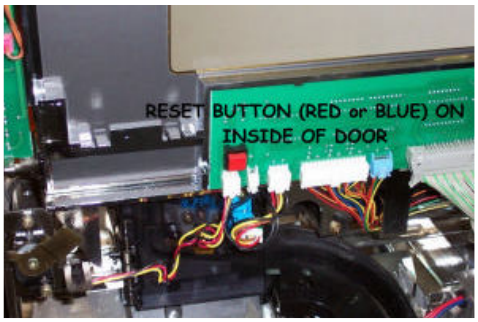


And some have the reset button is on the inside of the door as pictured below left.





FOR OLYMPIA/HEIWA BRAND MACHINES RESET SWITCH, IS SHOWN LOWER LEFT



SAMMY / ARISTOCRAT / RODEO BRAND MACHINES: BELOW:

TAGASAKO BRAND MACHINES BELOW:

YAMASA GAMES:

These images should give you a good idea what to look for when locating the reset and odds changing buttons. If your game's reset is not marked, use a label marked RESET and place it next to the reset button for future reference.

Power supply switches
Games have a switch on the power unit to turn on the game. But since most older games have a separate power transformer, the power switch will not turn off this transformer. So for safety and to keep your electric bill down, put your game on a power strip that has a switch on it, so you can power on and off your game or games that way. If you have lot's of games all on a cabinet you can wire up several outlets all wired to a switch that can be used to turn them all on at the same time.

Some power units may have "Hopper Dump" switches, these are used to empty the hopper entirely with a flick of a switch. While others may have dump switches on the hoppers, usually out of sight.
And some have reverse buttons used to help clear a token jam in the hopper.

As mentioned previously, some games have reset buttons on the power unit or on the door, usually under the reel window on the left side, some have it under the reels.

Some power units have One fuse, where others have several fuses.
So if one thing doesn't work in your game, and others do, check the power supply's fuse(s)

Other switches found on the power unit are, Bonus game reset switch's, pictured below.

What these switch's do: When the switches are set to OFF, after a bonus game you will keep all the credits earned, and you can keep playing on without having to do any resets.
When ON, you will be paid in tokens of any credits earned, and the game will end "Game Over" will display and an alarm will sound. Now you need the door key and it will need to be turned to the left to reset the alarm, and turn off the Game over light, and play again.
NOTE: Some games don't have two switches, some only have one.

Error codes:

Error Code Meaning, And Solution
E-0/ (CE/CJ) A token slot is jammed. Push the button at the token slot.(some don't have this and you need to open the door an clear the jam)
E-1/ (HE/ HJ) The hopper may be jammed. Turn off your machine, remove the hopper and take out all the tokens and look for what ever has jammed it.
E-2/ (HE/ HJ) Hopper dysfunction. Check the hopper.
E-3/ (HE) A hopper is empty. Refill the hopper.
E-4/ (RR) RAM error. Push the reset button.
E-5 Reel error. Restart the machine and push the reset button.
E-6/ (CO) Prize error. Push the reset button.
E-7 Hopper Overflow. Check the hopper, or the over flow sensors to the right of the hopper.
E-8 Hopper disconnected. Check the cable.
CE/ CJ/ C2 A token slot is jammed. Needs to be cleared and clean coin track with alcohol.
Then, press the reset button.

To perform a Full Reset or to Change the Odds, follow these instructions:

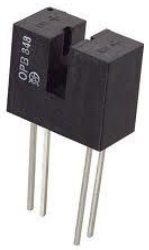
With the door open, locate the reset switch, usually located on the power unit, it may be a key switch or it may have been changed to a toggle switch.
If the **Power** is already on, turn it **off**.

Now turn the reset key switch (or toggle) to ON, now turn the **Power** back on, a number should be displayed either on the door in the Win or Credit display. Now locate the reset button, most of these are located on the power unit. (If your unsure of the reset button try pressing a button on the door or power unit)
Did the number in the display change? If it did, pull on the spin knob to lock the setting in, and turn off the Reset Switch. NOTE: if you forget to pull the spin knob, the game will not reset, and the number will still display in the window.

If you get an error, or music after a bonus game, you can reset this and other minor errors by turning the door lock to the LEFT using the key.

What's the best way to turn on or off my game?
Some machines have a power transformer that may still be on even though you turned 'off 'the switch on the power unit in the game.
So it's a good idea to invest in a surge protector strip, this way you can turn on or off all your games using the switch provided on the power strip as well as protecting them from a power surge.
Or if you know how to do electrical wiring, you can add outlet's and one or two full size switches to cabinet's for powering up or down your games.

Sensors and what they look like:
Games that have been sitting around in a dusty environment can sometimes create problems, sometimes this dust can obstruct the “opto” sensors that most games have.
The opto sensors look for interruption in the beam of light that is made by an LED on one side of the sensor, and read by a photo transistor on the other side.
A typical sensor looks like this:



Cleaning opto sensors:
The best way to clear dust from these sensors is compressed air. But If you don’t have an air compressor, you can buy Canned Air at electronics or computer stores. This is a small can of compressed air used to blow dust from areas not easily accessed by a brush or other means.
Never use something such as WD40 on opto sensors! This could actually make it inoperable.

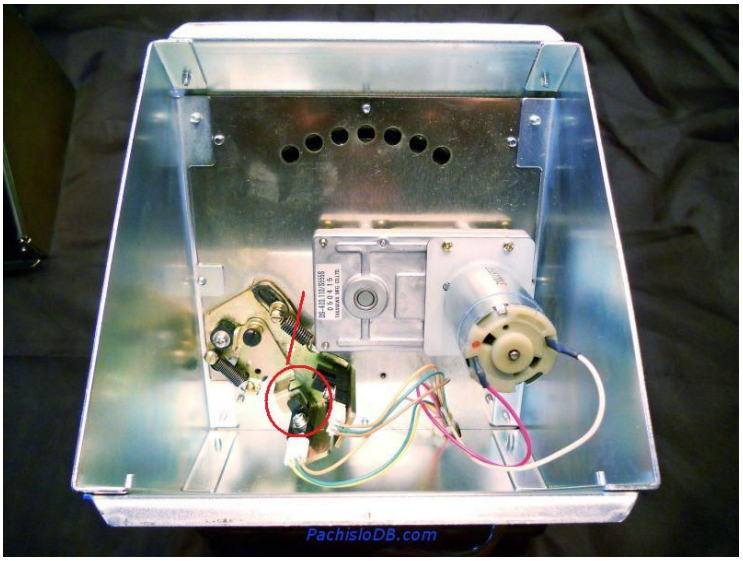
Using a Q tip or an old tooth brush, will clean the sensor, and sometimes you may need to use something with window cleaner on it for cleaning.
Just don’t use too much. You don’t need to over wet the sensor, because that will only create more issues.

Finding out if you have a bad or dirty sensor;
Looking at the Mother Board (MB) there are several LED’s lit as well as not lit. (Note: some games do not have LED’s on the MB)
Each LED is operated by a sensor in the game, familiarize your self with these LED’s and what each one does it will turn **on** or **off** by actions such as the spin knob, stop button’s etc.

Reels have Opto sensors too, to find the corresponding LED’s on the MB turn each reel one at a time, slowly. When the reel get’s to it’s starting point an LED will light. It can happen quick so keep an eye out for an LED that flashes or just goes on or off. Again make note as to which LED corresponds to what reel or button. Some makers built the sensor into the motor, so if you try looking for an external sensor it won’t be there. If the reels act strange or erratic, you should check the opto sensors for that reel. Sometimes they come out of the holder they are in causing the reel to spin and stop spin and stop. If the sensor is still in the holder, clean the sensor. If it still act’s strange, replace the sensor.

As mentioned already, make notes as to which LED corresponds to what button or sensor, and if it turns the LED on or off. In the future this will be a big help to find a problem quickly if it relates to a bad sensor or a dirty sensor.

Hopper Sensors:
If your getting errors indicating a hopper problem it could be a sensor causing the error.
On most hopper's where the tokens are ejected there is a small arm that moves back and forth as the tokens are ejected out. When the token is just about ready to exit the hopper, as the arm swings out, it interrupts the opto sensor located on the underside of the hopper. This is used to count the tokens being ejected from the hopper. See photo below for the detail of the opto (**circled)** and swing arm **(line**).
NOTE: Some hoppers don't have these opto sensors,

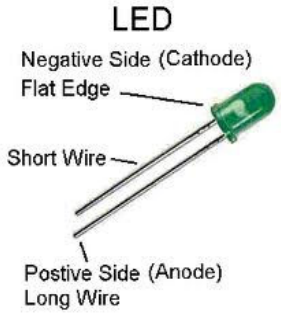


This hopper has two sensors, the arm is shown at rest in one set and just to the right is the second set.

To locate the sensor LED for the hopper, you can do this a couple ways. One is to try turning the hopper by hand counter clock wise so it forces a token out. The other way is to take the hopper out, empty it of tokens, locate the swing arm, under the hopper and operate it by hand.
NOTE: doing this it will trigger an error alarm, to reset these alarms turn the door key to the left, that should reset the error condition (some games may require a hard reset).

Look at the arm as mentioned above, apply a couple drops of light oil to the pivot point to ensure it doesn't stick after it moves. The rest of the hopper should not need any type of oil, as this would get onto tokens and cause them to jam the coin mech. This is a good time to examine the hopper to make sure it is not really dusty or dirty. If it is dirty, remove it from the game and using cleaner and paper towel, or a rag wipe the inside clean as best that you can. You may also be able to remove the token wheel, remove the screw in the center of the reel, and pull upward on the wheel. This will allow you to clean better under the wheel.

LED's or Light emitting Diodes and what they look like.



LED's come in many colors, The picture on the far right is a three color LED, this is a common type used on newer games, mostly on Reel lighting. The games computer makes and combines colors for wins and attract mode. Depending on where you buy a replacement LED, depends on how much you spend on one.
They average from 50 cents for a single color, to about Three Dollars for a three color LED.
When replacing LED's it's important to keep the polarity correct, or they will not work at all.

More on LED's and converting from lamp to LED
Since Led's are a diode, power only passes one way, unlike a light bulb. With an LED the power flows from the Anode to the cathode, Led's also many times require an external dropping resistor, this limit's the current that passes through the Led diode otherwise it will burn out, most times immediately.
LED's typically can handle no more than 2 volt's input voltage, in some ways you can look at these as light bulbs. Light bulbs have different voltage ratings as well, some are 1.5 volts, and go right up to 80+ volts. Although not in pachislo games, the highest lamp (light bulb) voltage you will see is about 30 volts.
Lamps tend to run 'hot', that is one reason so many newer games use LED's. Not to mention they use less power than a filament bulb also, they also last 3000 times longer than lamps so it's a better way to light up things than the typical lamp.
So if you replace lamps with LED's, just measure the output voltage to the current bulb. Add the proper resistor for the voltage drop, (typically 150 ohms) and make sure you put the LED in the right direction in the socket / trace on the circuit board on the door. You can experiment with resistors to get the right brightness is you want, resistors are cheap where ever you get them. Using a ¼ watt is fine, no real need to a 'rugged' resistor, most times it's only 5 volts at the socket.

Refer to the text above on what direction to place the LED in the "circuit". If you use the current sockets, you may have to drill out the hole for the lamp leads a little more to accept the leads from the LED and resistor. Then a dab of solder to the metal tab to hold the LED/ resistor into the socket. Makes a better connection that contacts the circuit board when the socket is put back into the board in the door
Some lamp sockets may only go into the area on the board one way So make sure the leads from the LED are going the right way before you solder the leads to the tabs, it's a lot easier to make sure before you 'mount' the LED into the old lamp socket better to do it right the first time than to have to try again.

Removing reels for service or replacing LED's or Lamps or just cleaning the reels to remove dust or dirt.
***It is very important to mark each reel as to it's position in the reel cage! ***
Use a small piece of masking tape with a number as to where the reel goes in the line up.
If you mix then up, and play the game, the win's won't make any sense and in some cases it may be impossible to find the right order to re set the reels to their proper location.

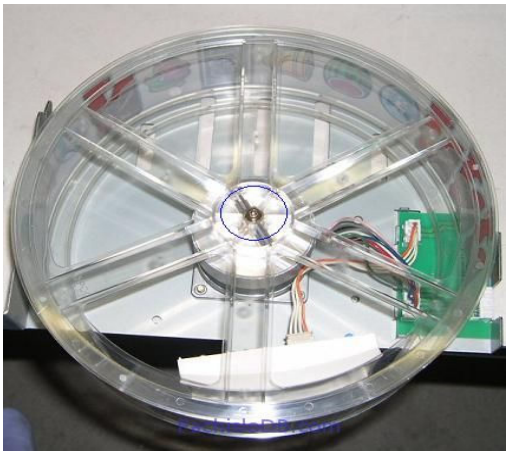
Reels usually come out as a unit, called a "cage", once this is removed each reel can be removed from the assembly. Take your time make sure the cables and screws that connect the cage to the rest of the game are removed. Usually a ribbon cable is all there is for wires to remove the cage, sometimes other wires are their.

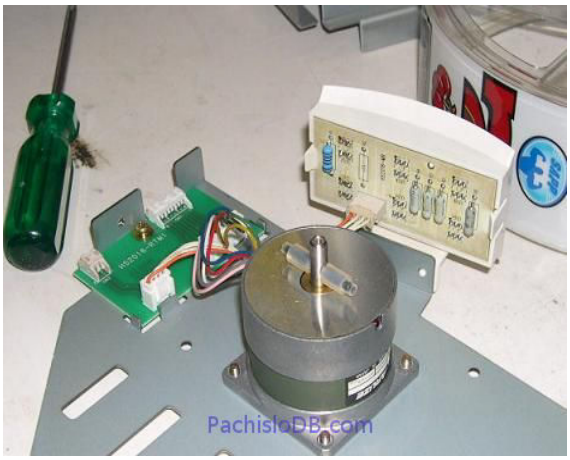
The pictures below are more for showing you what to expect and what to look for as far as removing the reels from both the cage and the motor.

Note the circled area, in this case this is a screw that has to be removed for the reel cage to be removed from the reel shelf. **Above right**; This picture is showing you several connectors that need to be removed before you can remove the individual reel. **NOTE** Your game may not have all these connectors, also some connectors may lock into the mating socket. If the connector does not come out easy, look for a small lock type finger on the side of the connectors. Most often it just needs to be squeezed a little while you pull up on the connector. Also *do not cut any wire retainers* or wire wraps, these will hold the position of the harness for when you need to reconnect them. Now there may be a few screws to be removed in order to remove each reel from the cage assembly, Check on top of the assembly as well as the back. Note the circles marking locations of screws on the top of the reel cage.

Now that the screws are removed, and the connectors are pulled from the sockets, grasp the reel assembly and pull forward. It should come right out. If something is getting hung up look for a screw or wire connectors that got missed.

To remove the reel from the motor lay the reel on it's side as shown below, remove the screw on the hub. Some reels may have set screws on the shaft that need to be loosened in order to remove the reel from the motor.





This is also a good time to clean the reels, using mild soap and water, other cleaners may harm the graphics.

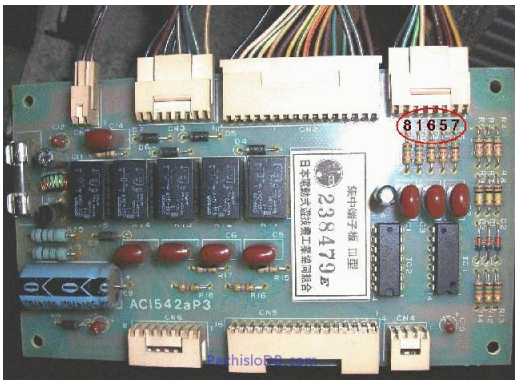
As you can see the motor and lamp assembly, the lamp assembly in the picture is an LED unit.
A lamp unit would be a little different, it would either have lamp sockets or leads soldered to the board from the lamps. Some lamps may be red and also have white on the same board. Such as an Arraking game.
So if you have played your game before, make note on the color of the lamps or LED's.
If your game has problems with LED's that are dim or yellow looking, the LED needs to be replaced.
The pictures above are of what needs to be done to gain access to the LED panel on the back of the reels.
You can go online to : http://www.pachislodb.com/bb2/viewtopic.php?t=1061

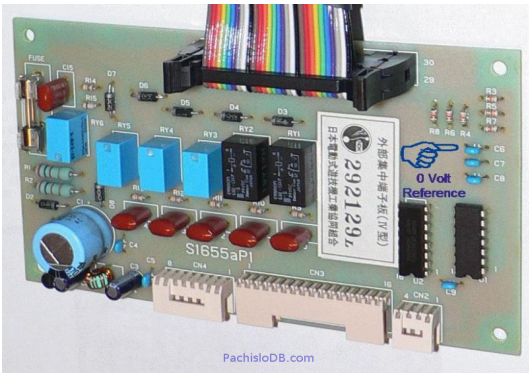
This link will lead you to what you need to do, or you can actually buy replacement boards for a Beast sapp game. If you have another type of game, you may need to do a DIY LED replacement. It isn't really all that hard to do, but you will need to know how to solder, and use a Volt Ohm meter.

If you have noisy reels:
Some games just have noisy reels, like Yamasa, Bellco's and a few others.

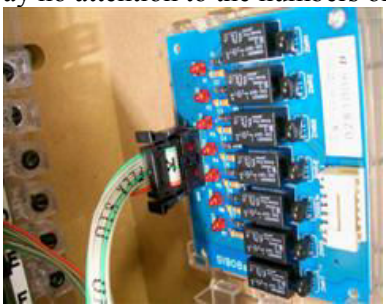
Check for loose screws, like on the reel assembly. Or it could be a broken reel, sometimes if a screw is loose it can cause a reel or reels to hum louder than normal. If you can't find a loose screw in the reel shelf, the part that mounts ins the back of the game, or it could be a crack in the reel wheel.
If nothing seems to quiet the noise, chances are it's in the servo motor and other than replacing the motor there isn't much you can do.

Stop boards are usually found next to the reels on the right side of the game.
These control the reels, both starting and stopping and if something burns out, they simply won‘t work.





The one pictured above, left is an OLDER style found in early games.
The one on the right is a newer type of the one pictured left.
Note: The FUSE located on the left side of the circuit board, this is a Type GMA 1AMP.
The best way to check the fuse to see if it is good, is to use a continuity tester, just looking at it is not a good way to see if it’s good or not. The small wire element can be broken at the end and you may not see it.
Pay no attention to the numbers on the left picture, these are for another application, discussed later in this manual.



The board’s pictured above are a newer type, the one on the left is from a Heiwa/ Olympia game, the one pictured on the right is from a NET machine. The newest boards do not have fuses on them.

Stop boards can be available for replacement, depending on what board you have. Part’s for these games are not plentiful and some can be hard to find.

The reels don't start! If you have inserted the correct amount of tokens, and the start light is on or flashing, but the reels don't start, you can locate a possible cause by looking at the stop board or the fuse there on.

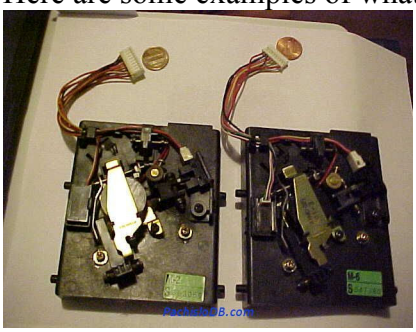
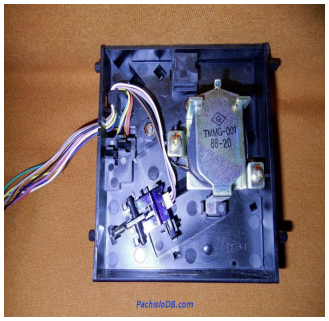
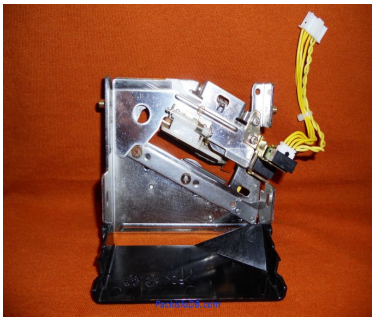
Step One:
Turn off the game's power, remove the fuse on the stop board or if you can't get a good access to the stop board, remove the connectors, then the stop board. NOTE: on older boards, make note as to what connector goes where.
Check the fuse, with a continuity tester to check the fuse, using your eye, you may not always tell you if the fuse is actually "open". If the fuse has tested good, check for loose cables or wires on the reel cage or around the rest of the game.

Step Two:
Check the spin knob make sure it's working correctly like returning to it's resting place, and the connector is seated properly to it's socket. Look at the spin knob's LED on the MB see if it lights, or goes out as it should when you move the knob up or down.

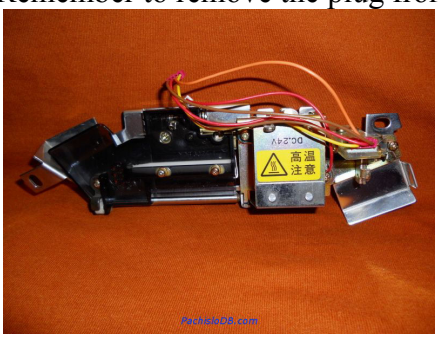
Step Three:
Press one stop button at a time, again looking at the LEDs on the MB, making sure they all work as they should. If they all light as the button's are pressed they should be fine.
Check to see if a button is stuck in the pressed position, or look for a loose connection on the door circuit board or on the buttons them self's.

Step Four:
You may need to replace the stop board. Refer to the type you need above, and check on the Pachislo data base and see if one is available for purchase and try a newer one. Most of the time this will cure the reels not starting problem.

Coin or Token unit's, also referred to as Coin Mech's.
Here are some examples of what your's may look like:

The unit's pictured just above are able to be removed easily from the door, you simply need to find the clip usually on the Left side, pull the clip away and pull out the mech, it should come right out.
Remember to remove the plug from the connector when removing the coin mech.



The mech pictured above, you should see the bottom of the track with out even removing the mech from the door. Others may have screws that need to be removed before you can remove them from the door.
Like the one pictured above. Make note of how the angle of yours looks before you do these types, so you can re-install them properly.

Coin mechanisms and token slots can become dirty and make tokens go slow or jam as it is inserted.
To clean the insert slot, use a Q tip with Rubbing alcohol. Simply wetting the tip should be enough you may have to repeat this a couple times to get everything cleaned. In some coin mech's you will need to open the coin mech as in the type found at the top of this page. They have a small door that swings away, while some may have a cover to be removed then pull open the door on the coin mech.
Just find access to the coin track and using a wetted Q tip, wipe the bottom surface where the coin travels to clean the surface and check the rest of the area and make sure it is also clean. Re-install into the door and try some tokens, you should see a big difference how it works now. Do this periodically to keep tokens flowing freely.
Keep your tokens clean, by placing them into a container such as a large coffee can or rubber maid type container with a mild cleaner and let them soak for a few days, rinse and dry them well before using.
Do this about once a year, or if you play the machines a lot, move it up to twice a year.

Coin Mech problems;
There are so many types of coin mechanisms it's almost impossible to write here what could be an issue with the one you have. Another problem happens when tokens are made of Steel instead of Brass are used. All token mech's have small magnets built in to 'trap' slugs and will set off an error, as well as cause a jam. Steel (Cherry) tokens will cause problems, so it's best to make sure the tokens are made of Brass.
In the Parlor setting the error sound's and alerts an attendant in the parlors to let them know there is a problem. So if you try to insert a bogus token into the game, the attendant will know because the game rejects or jams a token mech and thus the alert of a problem. Often newer games do not have a clearing arm you can operate via push button, so you need to open or remove the coin mech and remove the jam by hand.

Other problems might be when the sensors that read the token as it passes by may have failed / burned out. This problem is common with the unit's that are first in line of the pictures on page 16. Most of the time, it's the second sensor that goes bad, but sometimes the whole unit goes bad, and needs to be replaced.

Another problem that can arise, is from the pass or reject plate and electromagnet that allows the tokens to be accepted, like after a spin. This is the "click" you hear telling you the game is ready to accept tokens or credits.

Or if there is no alarm, or other problem that the computer on the MB is detecting.
In other words, if there is a problem, such as an Error Alarm, a problem with the computer this magnet and plate will not operate, thus tokens that are inserted will be rejected, and fall into the tray on the front of the door. But they can also fail due to a bad wire or connector that supplies the power to the magnet.

To diagnose this, there are a lot of area's to look at, first would be the connector that plugs into the circuit board on the door. Make sure the connector is well seated, use a Volt meter to see if a voltage of about 24 VDC is present for the magnet power. If you don't get a reading, look on the circuit board on the door for any damaged or missing components. Sometimes a diode, or capacitor will be damaged or missing thus causing the power to get to the magnet. If everything looks good, check the ribbon cable that connects from the door to the main part of the cabinet from the MB.

Token's come in two sizes;
The standard size is 25 millimeter (shown right) a bit larger than a US quarter.
The newer size is a 30 millimeter. (shown Left) Below shows the two side by side, the ruler helps define the size.

Replacing light bulb's

Most older machines have light bulbs and sockets that plug into the circuit board on the door.
The lamp "plugs" into Some sockets, however some lamps are "wired" into the sockets, such as some older games, where most newer games have LED's to light the areas on the door.

The lower area of the door with the name of the games is called the **Belly,** and the light that goes in there is a Fluorescent. The most standard size for the belly is a T8 size. It a bulb that is about 1" diameter, and 13" long. Other size is a T5, that is ½ inch diameter, and the length can vary by game.
Numbers will be printed on most lamps, but if you have any question, take it with you to a local hardware store and they should be able to match it up for you. Or you can do a search on the internet and find better prices.
Other games use a T4, about ¼ in diameter very hard to find, and the leads are wired onto the ends of the lamp and use a plug in connector for the power connection.

Smaller wedge base lamps are commonly called "**Sub miniature**".
The 'glass size' is **T 1 ¾.** The length is 8.0", the diameter is 0.219 or 7/32".
and trade numbers are as follows:
 # 86, 6.3 volts. # 73, 14 volts. # 85, 28 volts.
As near as I can figure, this size is called T5 in the following list.

Standard wedge base lamps: The glass size is **T 3 1/4** the Length is 1.06", and the Diameter is 0.41"
Trade **# 147, 7 volts. 161, 14 volts. And #464, 28 volts.** As near as I can figure, this is called a T10 in the following list.

I could not find a size that was labeled **T-A**, nor can I decipher what size that might be.
But from the games I have owned, and based on the sizes of lamps used in them they are one or both of the previous sizes listed, T 1, and T 3 sizes.

If a voltage used to power a light bulb is 24 volts, use a 28 volt lamp. In my research, I couldn't find a 24 volt lamp.

The following list of light bulbs, lamps and holder's are not of a list made by me. It was comprised by a member of the Pachislo data base, I believe on what he has researched, and found in pachislo games he has worked on.

Light bulbs and socket types:

BULB NO. : T-10
SOCKET : V-2 Long Socket
SPECIFICATIONS: 28V/3W or 24V/3W
MACHINE TYPE: BELLCO, DAIDO, KITAC

BULB NO. : T-A
SOCKET : V-2S Long Socket
SPECIFICATIONS: 24V/3W
MACHINE TYPE: KITAC (Reel Back Light Only)

BULB NO. : T-5
SOCKET : V-2S Long Socket
SPECIFICATIONS: 24V
MACHINE TYPE: TAKASAGO

BULB NO. : T-10 (This is a standard. Most machines are using this Bulbs.)
SOCKET : V-2 Standard
SPECIFICATIONS:28V/3W or 24V/3W
MACHINE TYPE:
ARUZE(ELECO,MIZUHO,MACY)=24V, BALTEC=28, BELLCO=28V, DAITO-GIKEN=24V, EIPEX=28V, IGT=24V, KITAC=24V, LUSTER(TECHNO-KOSHIN)=28V, NACOL=28V, NET=28V, OKAZAKI=28V, OLYMPIA=28V, PIONEER=28V, SAMMY(ARISUTOCRAT,RODEO)=28V, TAIYO=28V, YAMASA=28V

BULB NO. : T-A
SOCKET : Bulb with Socket Type
SPECIFICATIONS: 18V
MACHINE TYPE: ELECO(word of Lights etc.)

BULB NO. : T-5
SOCKET : V-2S Standard
SPECIFICATIONS: 24V
MACHINE TYPE: TAKASAGO, DAITO-GIKEN, BELLCO, PIONEER, OH-IZUMI

BULB NO. : T-5
SOCKET : Bulb with Socket Type
SPECIFICATIONS: 12V
MACHINE TYPE: SAMMY(Reel Back Light Only)

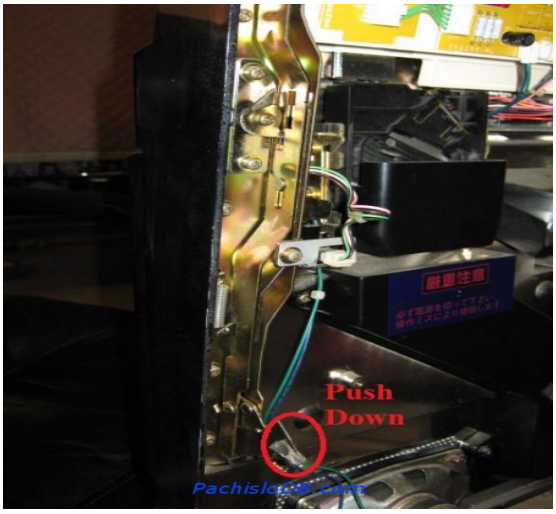
BULB NO. : T-A
SOCKET : Bulb with Socket Type
SPECIFICATIONS: 24V
MACHINE TYPE: TAIYO(Hello Santa body etc.), ELECO(Hanabi-Hyakukei body etc.)

Oh no! I locked my keys in the machine!

The best way to gain access to your game is through the bottom, with your game on the table slide it so the right side is over the side of the table about 5” or so. On the underside of the machine should be an opening some have the “Plug” still in place. Turn off the power by removing the plug from the wall outlet, using your hand find the opening as in the picture below.

Note: if the plug is still in place as seen in the picture, punch it out with a hammer, come in from the side of your game about 3” back from the door /machine edge about 2”.

Not much force is needed but take a whack at the bottom and the piece will break away.
With your fingers pull more out until the opening is large enough for your hand to fit inside and feel for the pointed door release and pull downward to open the door, see picture on the right.
Once you have the door open, you can clean up the rough edges where the plug was.



I'm missing my Reset key! What can I do?

Ok, if your missing a **Reset** key for the switch the best way to get around this is to remove the power unit. Start by un plugging the game from the wall, now remove the connectors from the power unit.

Most connectors have some sort of lock to hold the connector in so it just can't come out, it will look like a finger on one side of the connector. Using a small flat bladed screwdriver press in on this finger to release the lock and gently pull up on the connector. If it does not want to come out look closer at the locking finger and try again. DO NOT FORCE the connectors, or you could break something!

At this point, if you want to take a picture of what cable went where, go ahead and take a shot to refer to when replacing the connectors.

Once all the connectors are out, (*and they will go back in only one way, so don't worry*) Remove at least one screw that holds the power unit into the game, try looking around the top of the power unit. Now you can remove the power unit. Some may have an open back, where others may be all enclosed. Look around the edges of the power unit, locate the screws that may keep the cover on the unit.

DON'T just remove all the screws! Or you may have your hands full when it comes time to put it all back together again.
Once you have the power unit open locate the key switch cut the wires off of the switch and remove it.
NOTE: (Some have three positions on the back of the switch. Use your continuity tester to find the common terminal on the switch, and then the normally open and normally closed. Buy a DPDT double pole double throw switch if needed to replace these types.)

Now with the toggle you bought at Radio Shack, or at a hardware store fit the toggle into the hole where the key switch was ***with the notch on the toggle down*** (the off position) and connect the wires to the switch. It doesn't matter what wire goes to what terminal because it's only a switch. You may need to use a soldering iron or use small crimp connections for the switch. Replace the screws you removed to open the power unit put the unit back into the game and secure it with the screw(s) and plug in all the connectors till they "click". Plug in the power cord turn on the game and turn on the switch. You should see your setting in the Win display or Credit display. Now you can reset the game if you want or just turn the switch off. And resume playing your game.

On a toggle switch, the center contact is the common and either end (if so equipped) is the "on".
In the case of a SPDT, 'single pole, double throw' switch, the end that the handle is away from is on in that

position.

MISSING DOOR KEY,
If your missing the door key, refer to page 20 for how to open the door with out keys.
Once the door is opened locate the door lock and remove the screws holding it in the door.
Now take and measure the length of the lock, and then take some pictures of the mounting end, and the length of the lock, and try locating another lock. You can go to "Pachislo Data Base" sign up and make a post, put up the pictures and you might get lucky and find a lock with a key to fit your game. Or another thing to try is looking under "Vendors" on the Data Base, and call or e mail some one to see if you can buy a lock and key for your game.

The lock pictured above is showing how to measure the entire length of the lock.

You can also "dummy" the lock by opening the lock and de pinning it and use either a screwdriver or a blank key to open the door. On the outside it still looks and act's like a lock but now you simply need something to turn the lock to open the door.

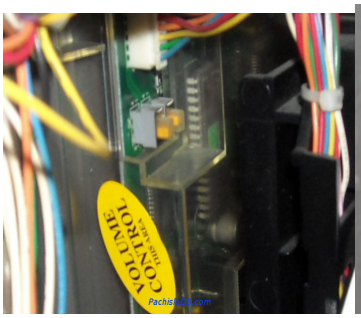
Step one: You will need to drill out the pins that hole the cylinder in the lock assembly.
You may want to start with a very small drill to put a small divot in the pin's center to have a good starting

point for the larger drill bit, or you can use a nail or very small center punch with a point.
This will help keep the drill in the center of the pin, so the drill won't wonder off to the side when drilling. A 1-1/6 " bit should be a good size to drill out the pins, **But don't drill too deep** 2-1/6" should be fine.

Step Two:
Once the pin's have been drilled out, the cylinder will come out of the lock assembly as pictured above.
Now you will need to push out the center of the lock cylinder you may need a small punch or screwdriver to do this.
Once this is done the pins and springs will fall out of the cylinder as pictured above right.
The type pictured above is a Round "Ace" or "Bell" key type lock cylinder now any key that type will turn the lock in the door making it possible to open the door.
Note the shaft in the cylinder and the end shaft of the lock supported by the key in the right picture.
These must mate back together when re assembling the cylinder and lock after being de-pinned.
Cylinders that use a flat key will have brass slide plates that you will see after the cylinder is removed from the rest of the lock. Simply slide these down using a small flat blade screwdriver, the springs will jump out, and tap the cylinder on the table and the tumblers will come out as well.

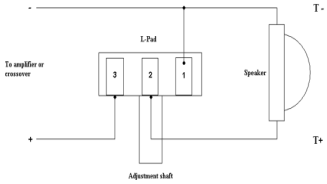
The picture above shows the re- assembled lock and cylinder Epoxy was used to fill the holes to keep the cylinder and the lock together. What ever you use to keep these parts together, it can't protrude past the edges of the lock or it will not fit into the door for mounting.
You can also use an ink pen cartridge to put in place of the pins that had to be drilled out, securing them with some super glue. Just make sure that the fit is a bit tight to start with, if it's loose, it may not stay and the lock may come apart later on.

Volume Controls and were to find them:
Unfortunately manufactures of pachislo machines hardly ever follow basic places to keep the volume controls for any given game. NOTE: Some games may not have them at all!
Some have them to the Left of the reels, Like Bellco Super Bingo, Automatic etc.
Others may be found on the door under the reel window on the left or even the right. While others may have them over the reel window. Some older Yamasa's have them on the bottom left of the game next to the hopper. Some have a slide control, some have a rotary dial type.
Here are some pictures to help you locate some;



The one above is a Yamasa, the next one is Heiwa AquaVenus, the next is Bellco Super Bingo.
This is found above the reel window. This is found to the left of the reels, as is the Bellco.
The last is from a Gundam game, made by Luster/Tekno/Koshim.

What it all boils down to, is in most cases of older games especially , the volume controls don't really amount to much actual volume control in game play. So, many Pachislo owners have sought an alternative volume control, like ones pictured below. 50 ohm works, some prefer 50,000 to 500K 'K' being 1000, ohms. linear taper is better than audio taper. You get a better range of adjustment out of them.





The above far right, show how to install these three legged types into your game.

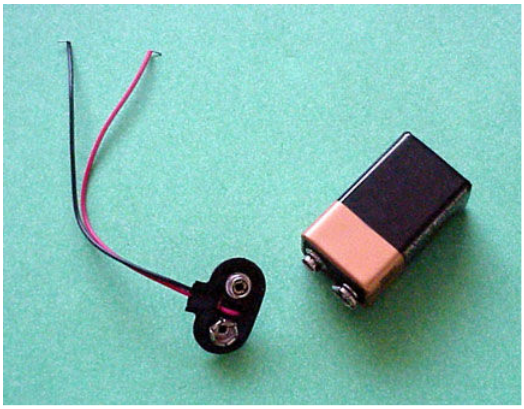
These are installed in the game, by cutting one side of the speaker wire, and using the center and the right side taps on the "POT" or Potentiometer. The type pictured center and to the right, above need to have the leads soldered to them. Where as the type pictured on the left have leads already to connect using small "Butt" connectors that are crimped on to bare ended wires of the speakers.
These work pretty well in most cases to obtain a suitable volume even when playing bonus rounds, where the sound tends to greatly increase in game play.
In most cases people use hot glue or simply use wire ties to hold these out of the way after being installed in

the game.

No sound in my game.

The first thing to look at is, are the speakers connected. If they are connected to the speakers, look for the wires that come from them, trace them back to the connector. Is the connector plugged into the proper area. If not, the mating connector should be near by, locate it and re connect the connector. If the connectors are all plugged in, look at the board they are connected to, are any connectors pulled out? Keep trying to trace back verifying all the connectors/ wires are connected. All it takes is a cut wire, chewed wire, something like that to shut the sound off.

A couple things to try here. One is to use a VOM (volt ohm meter) use it to check for an "Open" speaker. NOTE: when testing a speaker, remove BOTH wires from the speaker, to avoid damaging the meter or the AMP.
There will be no reading with an open speaker. The other thing is: ***but you need to pull the connectors*** either from the speakers, or from the sound board, or it could cause damage to the other parts of the game. Using a battery, a nine volt with a couple leads coming off of it, connect ONE side to the speaker, next with the other lead, quickly touch the other speaker terminal. Did you hear a "POP", if you did the speaker is good, remove the battery connections, move on to the next speaker. Do this with all speakers, don't think because you checked that one speaker they are all good. Remember to use a quick connection from the battery, too long and you could damage the speakers.
Another way is to use a VOM (volt ohm meter) in resistance mode, it should read between 4 and 8 ohms.



Other areas to look, try to locate the volume control, they could be just about anywhere, most often they are on the sound board, where the speakers connect to. Or there may be after market volume controls, some require a small screwdriver, to adjust. Using what ever needs to be used, work the volume controls. Sometimes they get 'dirty' and the sound can stop working. Most often the volume is increased by turning the control clockwise. But if it's some where in the middle that should be fine as well

If everything looks fine, check all the connectors leading into the board. If they are clean and not green colored, then move onto the next areas of connection. The Main Board (MB) for one, lets hope the sound chip is not fried.

What does OF mean and how to fix it:

In newer games, OF means the overflow sensor has been triggered.
However in some older games it means the select switches are on and should be off, (see page 7.)
To reset this kind of an error, turn the door key to the left, to prevent it from happening again, turn off the selector switches as pointed out on page 7.

In newer games it means a token or some thing else has touched the probes or the wires touched for a second, to trigger the alarm.

Some games still have the probes installed, if these become shorted they can cause an OF error do be displayed and an alarm to sound when playing the game.
To keep this from happening anymore, turn off the game, locate the probe's and wires on the bottom right of the game, to the right of the hopper.
Most often these wires go to the power unit, you can just cut these wires off at the source, being careful to cut only these overflow leads ***or*** cut them at the probe end and tape the ends to keep them from coming in contact with any other wires. You can remove the probes mounted on the back with a Phillips screwdriver inside of the game, or just leave them there.
Leave the ground strap if one is present as seen in the above picture, it's the braided wire that is stapled to the cabinet.
It's better to just leave this alone, and do not try to connect any other wires to it.
Now turn the game back on, if the game is still showing an error, try using the door key and turn it to the Left.
If this doesn't work refer to the section titled "Doing a Full Reset". A full reset will clear the error.

How to use a multi meter, VOM:
Using a volt ohm meter is relatively easy, with the setting on the correct voltage, or correct setting for continuity. Just follow basic rules and use common sense and when you test a circuit, things will go well.
I strongly recommend a Digital Multi Meter, (DMM). They are easy to read the voltage, and are far more forgiving than Analog meters are, if you get the setting wrong, or over volt the meter, you won‘t harm it.

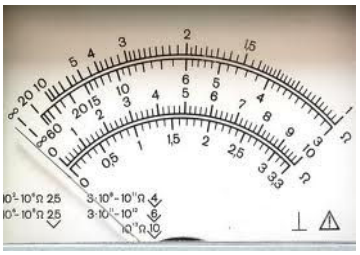
First rule: Never touch the probe ends with your fingers while testing voltages above 50 volts .
Second rule, When testing resistance, don’t touch the probe ends with your fingers- *at all,* it will effect the reading you get.
Third rule, When using the tester for continuity, remove the wire or cable from the game prior to testing.
It can give you an incorrect reading, or cause possible damage to the circuits of the game if you do not remove the wire or cable under test.
Fourth rule, when testing AC or DC voltages, never touch the probes together, this would cause a short circuit, and cause possible damage to your game or to the power unit, other than blowing a fuse.

Setting your Meter: Most meters will show an AC or DC when looking at the setting scale on your meter.

However, some may not, some may show a ~ symbol for AC, and a **-** with **..** Under indicating a DC scale.
With resistance showing a Ω Symbol, this is the symbol for Ohms.
When using a meter as a continuity tester, and your meter is not equipped with a continuity setting move the setting to Ohms, the reading will show Zero, or infinity resistance. This means you have a connection that is good while using it as a continuity tester.

Or if your meter is so equipped, set it for this diode symbol  , when the test leads are shorted you will hear a “Beep” from the meter.

Below are images of meters, the first is a DMM “Digital Multi Meter” the second is of a Analog Scale meter. Notice the ohms scale over to the far right, the number on this scale shows a 1 most show a 0.
The third picture shows the jacks found on a meter the Black test lead ALWAYS goes into the COM jack. And the Red test lead goes into the V Ω Jack. The other symbol is showing a diode symbol. For testing Volts or Ohm’s or continuity use the Red jack with those symbols.
The other jack is for testing AMPS is you place your Red test lead into this jack, you will damage your meter or blow the fuse if so equipped.




Finding the correct setting:
Some meters have an Auto Ranging feature so all you have to do is find the correct setting for Volts or Ohm's and the meter does the rest. Most however do not have this and all they do have is symbols as previously explained such as ~ for AC. And DC with - and .. Under and a Ω Symbol for Ohm's.
You need to select the voltage from numbers shown on the selector scale as seen below:
Notice the DC scale near the *top left* of the OFF in RED shows 1000V this is the top end of the scale. The setting that would be most applicable is the 200 setting. This will cover from 5 to 200 volts, to get a better range with lower voltages use the 20 setting. To the *right* of the OFF position is the AC range with the highest being 750 volts so the next option is the 200 range. This is a good area for testing from 5 to 200 volts AC.

Now that your familiar with putting the test leads into the proper jacks and setting the meter to the proper voltage, set your meter to the DC volt scale, and get a 9 volt battery, and place the test leads onto the terminals. If you have a DMM like pictured above, what does the voltage say? It should say something like this: 9.2.
Note: if you got the black lead onto the + terminal, and the red onto the - terminal, you would have seen this -09.2 reading on the scale, or similar providing the voltage was a full 9 volts.
The - that was first, was telling you that the Black test lead was actually on the positive side of the battery.

If you had done this with a Analog meter, it would have caused the needle to go the wrong way, or to the left and not to the right as it should have. That's one nice thing about DMM's, it's very forgiving when you get the wrong polarity on the test leads.

The same is true if you had the AC or DC mixed up, let's say your testing a voltage in your game and you have it set to AC and not DC, it would not read anything or it would give you a totally strange reading thus indicating its set for the wrong type of voltage.

If you forget to change the range for a DMM as far as the limit of voltage is concerned, the reading will most likely read 'OF' this is what happens when the setting is too low for the voltage your trying to test.
So the Over volt protection kicks in and protects the meter from damage.
If you had done this with an analog meter, it would have pegged the meter needle all the way to the right, and could have caused damage to your analog meter.

Ok, let's move on to testing voltages in the game:
The voltage typical in a pachislo is DC volts, the most voltage is about 24 Volts Dc the lowest being 5 VDC. When testing if you don't know where to find the common or negative voltage ground use the case of the power supply the large part with all the switches and things are find a spot on the power unit where bare metal shows such as a screw or something like that.
NOTE: Some games have a separate transformer to supply power to the power unit- do not use the metal frame as a common for testing voltage there as this will not work.
With the common or Black test lead on the negative test point use the Red test lead to find voltages on connectors either on the door or other points of what you want to find out. DO NOT TOUCH other areas with the tip of the test lead! If at first you don't see a reading, try the other point of reference for testing. You may have simply found the negative point and not the positive.

Lets say your having a problem with lights on the door, you know they should be lit but you can't find the reason they aren't. Now you need to take the test leads from your meter and place them on the trace that leads to the lamp in question. With the lamp removed from the opening on the board, place your test leads on the BARE or silver colored traces on the board. **NOTE:** Placing test points to the green surface on the board will not work because the green actually insulates the traces on the circuit board.
The voltage should read (depending on the type of lamp used) around 24 volts, or less. If LED's are used they are not removable from the board and there would just be a couple small solder points where the led pins protrude through the board. AGAIN **USE CAUTION** when testing these points!! **DO NOT SHORT** the test lead points to each other while testing other points or you will damage your game. It's best to use one test lead on the small tips on the board and put the other lead to the power unit for the ground.
With an LED for the light source your voltage would be in the range of 1.5 to 2. Volts DC.

Now lets say the magnet that is supposed to engage when the game is ready to collect tokens doesn't work, what would you do to test this? It's straight forward, the magnet uses two poles for power with the meter set for DC volts place the leads on each of the poles that come off the magnet you should get about a 24 volt reading from the poles. If you do not get any reading the game is either in an error mode or perhaps your over the 53 credit point and the computer turned off the magnet so no more tokens can be inserted for play.
Or it could be a connector has come loose either on the door or from the main cable from the door to the back cabinet of the game. However if you do get a voltage reading, and the magnet doesn't work, it is the magnet that has failed.

Thing to do to enhance your test leads, or customize them:

Many places that sell test equipment and test leads, also sell items that come in handy when testing some areas in your game. The best is alligator clips that fit over the end of the test lead tips. Get a good quality set of gator clips, and make sure they fit the tip's well, adjust them is needed. The last thing you want is a loose connection, it will always give you erratic readings, something you really don't want when testing continuity. If your handy, you can buy gator clips and 'make them to fit' the tips of the test leads so when you need to check small areas or check connectors you can use something like a pin to fit small holes in the connectors or tight spaces with out the risk of shorting out the tips or shorting to another point while testing.

When I have to check many times the same type of thing, such as a connector, I make special leads for certain jobs. You can do the same thing, if you need to check a ribbon cable for continuity, you can use a cheap set of test leads and solder pins to the ends of the test leads, Ie if you have a spare connector, you can pull out a couple of the small square pins and solder them to the tips, then use small heat shrink tubing to insulate the exposed area except the last ½ inch or so. This way you know the testing you do will with out doubt will give you the correct answer.

Just keep in mind that intermittent "opens" can look erratic on a tester as the cable in question is moved. In other words it can read fine, then if you move the cable, it could read that the wire is broken somewhere in the cable. If this happens, the best thing to do is replace the cable. Again, if your handy you can make a new cable for your game. Ribbon cable can be purchased at many places on line, such as Jameco Electronics. Or Mouser Electronics, you will also need the connectors as well. They are one use only, so get it right the first time! To buy the correct connector all you have to do is count the holes in the connector, one side is all you need to do then double the number. Find the correct parts, examine how the cable that you have now is made, then simply reproduce it with the new cable. When placing the cable in the connector, leave about a half inch beyond the connector, after it's been seated, trim the cable close with a sharp knife for a neat clean look. Score it a few times and it should be fine, just use a SHARP blade, you don't want stray wire burrs to short out.

To crimp the ends on the cable, use a bench vise, or a couple clamps and a couple pieces of wood to squeeze the two halves of the connector together. The connectors used are called Insulation displacement type, you don't need to do anything but put the cable into the connector the correct way making sure the connectors are going the correct way on each end. Once they are used, you can't really re use them because getting them apart can be tricky with out damaging them.

Refinishing the cabinet;

Some games come to us with decent finish's and some we buy look pretty bad. Start with wiping down the door edges, Now with them clean and dry, get some 1.5" or 2" masking or painters tape. I start with the door open, and starting on the top work my way to the right and down the side to cover the edge well.
Don't put it over the edge, just to the edge. If you get it over it just can mess up the final finish around the door after painting the cabinet.
Now close the door, go down the left side, make sure the door is closed all the way. You don't want it popping open if you need to turn the game while painting, it could be a nasty surprise.

With a vibrating hand sander, do the top, side's toward the back, then work your way towards the door, being careful not to hit the edge of the door much. It will happen a little, and the tape will help to protect it, just don't make it a lot, or it will hit the finish and scratch it up. Just sand enough to make the surface smooth, don't try to get all the old paint off.

Now either blow off the dust with compressed air, or wipe it down well with a semi damp cloth. Any divots or holes blow it out well, and fill with a good wood filler, let it all dry for several hours.
Sand down smooth any wood filler, blow off again or wipe again as before. If using a damp cloth, let the surface dry before painting.
Put the machine up on a couple blocks just to get it off the surface your painting on, (it won't stick later).

Now with Semi gloss black (or what ever color you want) use a small roller, about 3" or 4", start around the finger holds first, then roll out the rest. You may want to have small sash brush to work the small areas you can't get to with a roller. Just going to the back edges, I never really do the back, unless it is really bad, because of the labels or stickers that might be there. Some makers put date and model labels there and it's best just to keep them there and not paint over them.

Now let the first coat dry, I don't use primer, as it is hard to cover the white with black, and if needed you can just give the cabinet a third coat to give a nice finish. If after the first coat the surface is a little rough, hand sand it lightly, wipe off well, and re coat.

After the paint is dry to the touch, open the door, let the paint dry the rest of the way. At least a day!
Now carefully remove the tape, if you got a little paint along the door edge, you can remove it with your finger nail, it will come right off.

Cleaning the plastics

When you have a lot of scratches on the plastic Belly, or reel glass. Clean it well with window cleaner first, then you can try Novus #2 for most scratches. It takes time, and elbow grease to diminish them.
I always finish with silver polish paste to give it a nice shine, and remove some other light scratches.
Only use this on the non printed side, not on labels or stickers you want to keep. As it will remove the ink used to print them.

Good luck with your repairs and remember if you need answers to questions, visit Pachislo Data base. A lot of friendly people are waiting there to lend you a hand with what ever you might need.