

I have chosen a play station 1 controller to investigate as I have multiple spares out of use and it will give a glimpse into 1990s technology and is reasonably easy to disassemble and investigate.

Originally launched on December 3rd 1994 in Japan it was the first video game console to sell over 120 million consoles. Due to radio technology not being as advanced as it is now a days so they had to use an old fashioned in today's view wire to give real time engagement with the game console.

The outer shell is made from ABS thermoplastics and is a non-permanent construction utilising seven small threaded screw fasteners to hold the two halves of the ABS thermoplastic shell together. Once the ABS thermoplastic shell is open you are greeted by a multitude of circuit boards made from a thermoset polymer called silicone. All of which are using non-permanent screw fasteners to attach them to the outer shell (I did not unscrew due to the complexity of the internal circuit boards inside the shell.) On each circuit board the different components are permanently constructed using wilding (soldering) to attach to other components on the circuit board however are soldered in such a way to allow easy disassembly and replacement of certain components on the circuit board as this was when people repaired instead of replacing objects. However, the individual circuit boards are all connected to each other using non-permanent interface fits on the electrical connections between wires this allows for easy disassembly. Also connected to the circuit boards are all of the manual controls for user interface (nine buttons and two joysticks) these are all made out of ABS thermoplastics to match with the shell. However, the joysticks which are made out of ABS thermosets also have a covering of vulcanized rubber in a very thin coat so as to provide grip on the joysticks as you are spending large amounts of time using these controls and can lead to sweaty hands which can make using a multidirectional control very hard. All buttons and joy sticks are freely floating in the outer shell using interface fasteners however underneath all the buttons and joysticks are the controls permanently assembled to the circuit boards again using welding (soldering.) these are placed underneath the user controls so activated at the same time but allow the changing of broken buttons and joysticks. Finally, there is the two motors used to make the controller vibrate by spinning a lopsided weight to make an unsteady movement and it makes the controller vibrate in the case of the smaller motor with the smaller weight on the right top to create a fast high frequency vibration and the larger motor with the larger lopsided weight is to create a low frequency vibration and make the controller bounce in your hands. Both of the motors are made from mostly iron as a ferrous metal is required for an electric motor to work the outer casing of the motors made out iron with a iron core mounted on bearings with copper wire wrapped around this to create an electro magnet which is then directly connected to the lopsided weight outside of the motor which is then spun by the motor. And as a final note there is a strip of vulcanized rubber lining the motors to reduce movement of the motor inside of the outer plastic shell using an interface fit to hold the motor in place this ensures that the violent movement of the lopsided weight does not make the motor come lose or create any damage to the outer ABS plastic shell through prolonged use.

The advantages of the chosen methods and materials is overall they have lasted 24 years of abuse and have no damage to show for it. At the time these where all easy and cheap materials to get hold of so made a lot of sense to create it in this way and it has proved that they where right as it is still in a good working order. The next advantage of the chosen assembly methods is that by using so many non-permeant fasteners it is easy to take the controller apart and fix it this allows for a pro longed life and durability.

The future development of this product will probably be to simply make it lighter and the use of a radio signal to communicate with the console instead of a cable attachment as this limits movement and can get in the way. Due to this item being 24 years old we can actually see the development by looking at modern controller and all that has really been advanced is the way that the controller communicates with the console has gone from a wire plugged directly into the console to a solo controller that communicates through radio waves and the internal circuit boards have decreased in size. The only improvement on materials I can see would be the use of a lighter polymer for the outer shell for example carbon fibre. I would also hope that an alternative is developed for the vulcanised rubber covers on the joy sticks as these do not have the best feel and do wear down over time.

In conclusion the 24 year old controller was incredibly well engineered and is still in a good working condition the materials they have used have not corroded except for the abs thermoplastics which have changed colour and been polished in areas that are frequently used and touched but this was designed when things where made to be taken apart, fixed and reassembled and the only improvement I can see to be made is to make it lighter using such materials as carbon fibre for the outer shell and making smaller motors and circuit boards.

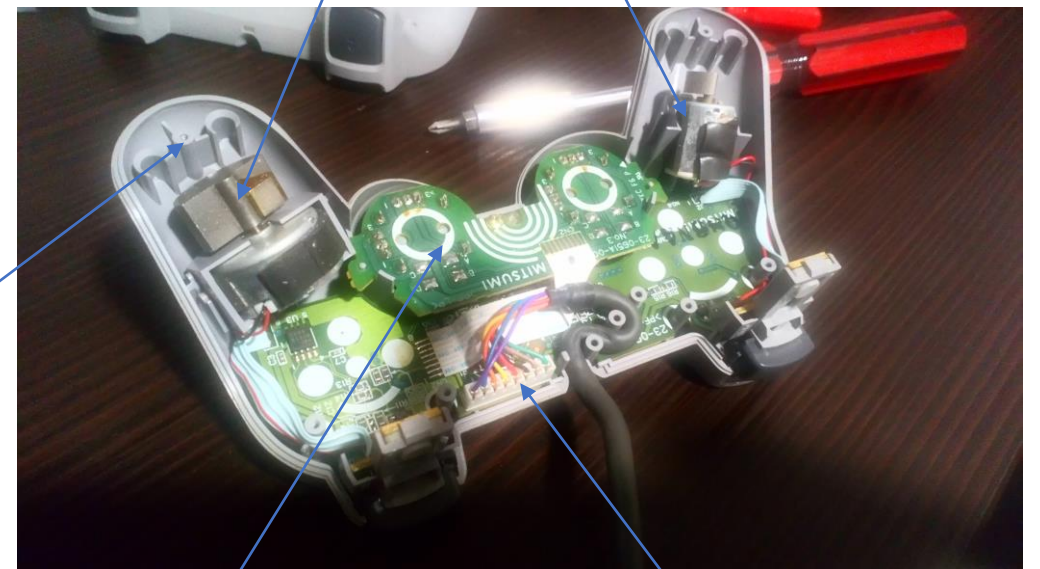


Abs plastic shell

Vulcanised rubber covers on
abs plastic joystick

Abs plastic button casings

Cast Iron case and weight for motor



Iron screw fastening holes

circuit boards made from thermoset polymer silicone

Abs interface clips