VPC1 PEDAL REPAIR

By Taru Designs

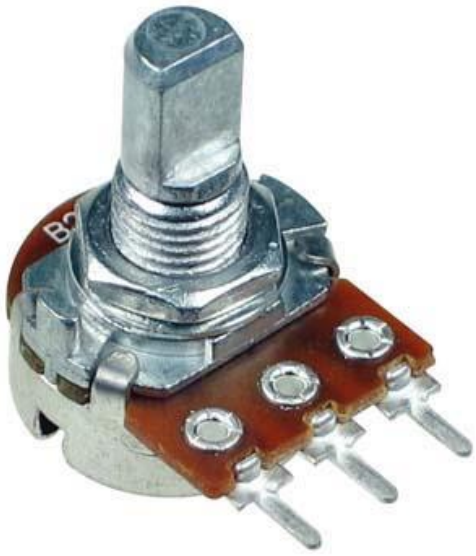
What's wrong with the pedal?: The F-30 triple pedal included in the VPC1 is not the most reliable piece of hardware. The sustain pedal tends to fail over time, and even though there's a calibration tool available, it won't completely fix it. The sustain pedal on the VPC-1 is based on a standard, carbon track potentiometer. This potentiometer is actuated by means of a simple mechanical rack and pinion gearing system. When the pedal is depressed, the linear motion is converted into rotational motion, which then turns the potentiometer shaft directly.

Why it breaks: Resistive track potentiometers such as these are not well suited to constant operation and even those that are specifically rated for high number of operations would eventually fail (incidentally, this is also why the joysticks in some gamepads drift after some use, the Joycons in the Nintendo Switch are especially prone to this for example). Initially, some dust might settle inside the potentiometer (since it's not fully sealed). This is easy to fix with some contact cleaner. However, the wiper inside the potentiometer scratches the carbon track so you end up with unreliable readings on its travel.

This project is heavily based off John O'Flaherty's

This project is going to list a number of alternatives and repairs:

1. Using a cheap, "ON/OFF" sustain pedal, connected to the same jack: You would lose half pedaling as well as the middle pedal, but it's better than having the pedal randomly spit values.
2. Using a not-so-cheap half pedal such as the **Roland DP-10**: You would lose the middle pedal but at least you could have half pedal capabilities.
3. Replacing the potentiometer every few months: This *would* work, but it is more of a temporary fix. I have done this without much trouble, the potentiometer is not the easiest to find but also not particularly hard. You would need a 20K linear potentiometer with a short, "D" shaft such as this one:



You might be able to find this with short, single pin leads such as the one in the picture, or longer, ring leads. Both of those can be used, as you would solder the wires directly to either of them. The important dimensions are

- 6 mm diameter Shaft
- 16mm diameter Base

4. Use an external MIDI pedal: You could use any pedal that outputs continuous CC64 values. Ideally, it would have a standard MIDI connector that would plug straight into the VPC1, but one that simply connects to your computer would work as well. I don't know of any off the shelf pedals that would work for this however.

    - You could also mod your existing F-30 pedal to act as a standalone MIDI pedal. Costis has a fantastic guide on doing this with magnetic sensors. I recommend this approach if you don't want to solder any wires
5. Replace the potentiometer with a rotary encoder: Optical rotary encoders are significantly more reliable than resistive tracks on potentiometers, but they require additional circuitry to convert those steps to the proper voltage: A small microcontroller such as an ATTiny and a digital potentiometer like the MCP4551 should work. Since most rotary encoders come in smaller sizes than the potentiometer, you would still need to match the size and mounting position for the shaft, and/or 3D print a custom mount and adapter for the shaft.
    - I haven't tried it, but the Kawai F-10H allegedly uses "optical sensing". By default, it is not compatible with the VPC1 as the VPC1 does not really provide power through its pedal inputs, but it should be possible to simply add external power supply and reroute the voltage output to the right spot in the original VPC1 pedal's board.
6. Remove the potentiometer altogether and go for a non contact, magnetic sensor: This requires both electronics (including an external power supply) and, well, magnets. In some ways, it is less forgiving than the encoder, but it is just as reliable and much more forgiving to mount. For more details on this option, check *MagneticUpdate*