

The MXR Distortion +

The purpose of this project was to become familiarized with some circuitry. I really do not have experience with building or designing circuits, so for this project I chose something fairly simple in a distortion box. There were not too many parts, and the circuits of distortion pedals did not look too complicated. The project did not turn out to be so simple, however. At least for me. All the schematics I found for distortion pedals had similar circuitry. I basically just picked one at random.

The distortion box can be run on a 9 volt battery. The circuit consists of an operational amplifier, two diodes, and a variety of resistors and capacitors. There are also two variable resistors in the circuit, one of 10 Kohms and another of 1 Mohm. These will presumably control the volume and the gain of the distortion. The operational amplifier has two main inputs. What the op amp does is take the voltage difference of these two inputs and multiplies this difference by a specified gain. Basically, the op amp amplifies this voltage difference. There are two other terminals that are connected to sources. One is connected to the 9 volt battery, and the other is connected to ground. There is a 1 Mohm resistor going from the output terminal of the op amp to the negative input terminal. This is called negative feedback. What this resistor does is allow the gain to be controlled, depending on the resistor value. This is done because the gain of the op amp is the same for all frequencies. The two diodes in the circuit are put in

parallel going in opposite directions. This is called a diode clipping configuration. There is a switch that turns on the pedal. In one position, the distortion part of the circuit is bypassed so the clean signal from the guitar is what comes out of the output. When the switch is put in the other position, the signal goes through the op amp and diode circuit.

I built the circuit straight from the schematic I printed out from the internet. I left out the connection for an AC adapter. I also left out the LED that was in the circuit that indicates whether the box is on or off. I left it out because the switch I had was a three terminal switch. I would have needed a six terminal switch to add the LED in. When I finished building the circuit and first tried it out, all that would come out of the amplifier was a buzzing noise. When I checked the circuit, I realized that the input signal was being grounded instead of going into the circuit. So I removed the incorrect ground and sent the signal into the circuit. After going through the circuit with the oscilloscope some more, I found that I did not ground the DC negative input of the op amp as was shown in the circuit. The pin was not connected to anything. So I connected that pin to ground. At this point I decided to try the box out again through an amplifier. This time I got better results. The signal came out through the amplifier! Unfortunately, it was a clean signal. Even when I pressed the switch, only a clean signal would come out. Now I was really confused. I took the circuit back to the oscilloscope. I had good voltage coming out of the op amp, around 6.5 volts. The odd thing was, there is a capacitor connected right to the output of the op amp, and the voltage

after this capacitor was zero. Was it a bad capacitor? The only thing I could think of was that or maybe the switch was bad.

Well, I never got the chance to find out. As it stands, I have a distortion box that does not distort. I am going to see if I can make this thing work eventually, but as far as the class goes, my project did not work. I cannot say that it was not a success, though. I really learned a lot about circuitry in general and also about sound characteristics.