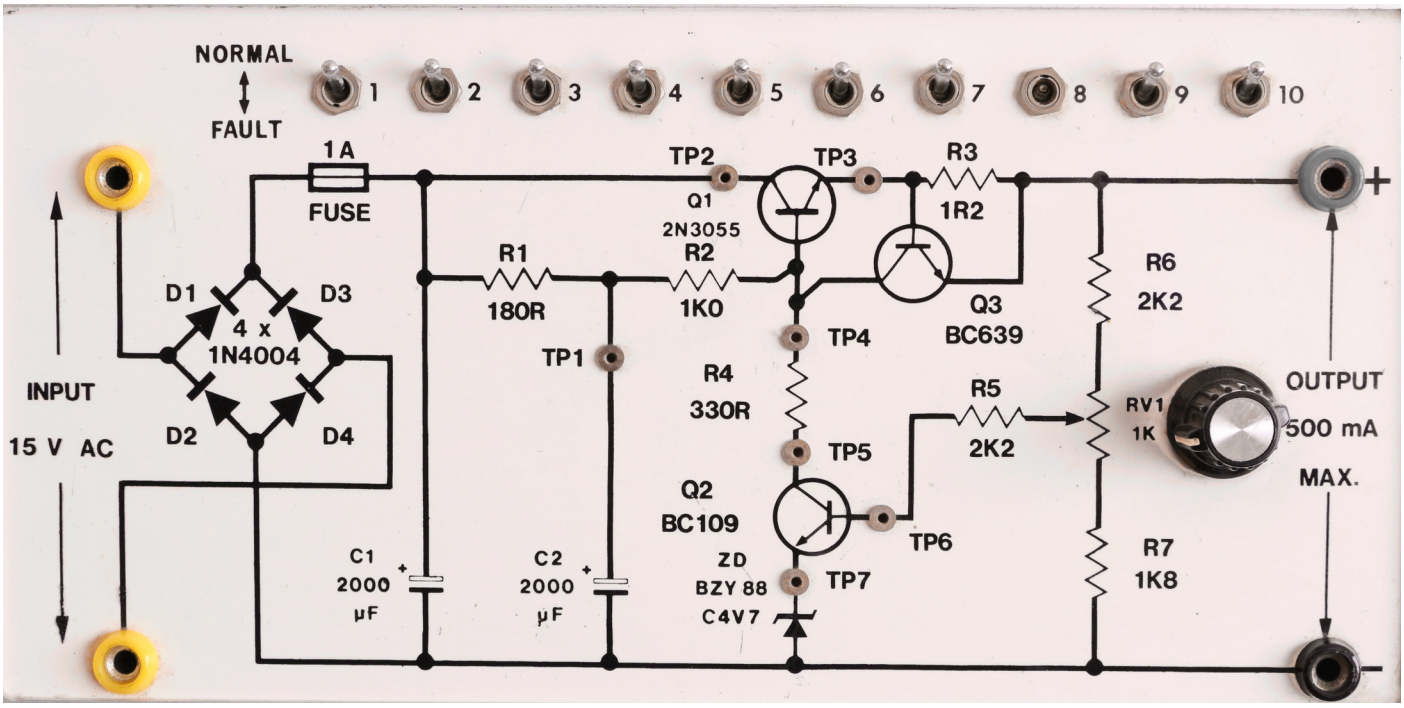

Here is a typical series pass voltage regulator circuit using discrete components. The zener diode voltage is 4.7 Volts. All the component values are shown and there is a unique property in that there are 10 faults which can be introduced. (only one at a time)

We will use this panel in an individually completed class experiment to isolate and prove with measurements and theory each of the 10 faults. You will use the small $15V_{ac}$ supply to power the fault board. Rember this is RMS, so you need to convert it to peak for your calculations to be correct. There are adequate test points but note, you will need to make a small pointy piece of bell wire to fit the test point you are measuring or you will not be able to gain access to the TP. You will need an adequate load resistance to do these tests. Calculate the max power of the supply based on 20 Volts @ 500mA. That will give you a nice constant to work with for changing the load at different output voltages.

Before you begin, run the maths on the circuit to calculate the maximum and minimum output voltage range. Then you can measure the range with the board in it's normal mode (all switches up) and confirm good or bad.

Use another sheet of paper for all of your measurements including oscilloscope measurements fully labelled. Work out what each fault condition is and then confirm with your teacher. Don't forget this supply probably has current foldback (constant current mode) after a certain point of load is reached.

This board is used to confirm student ability to diagnose complex power supply faults for series pass regulators. gm2019