

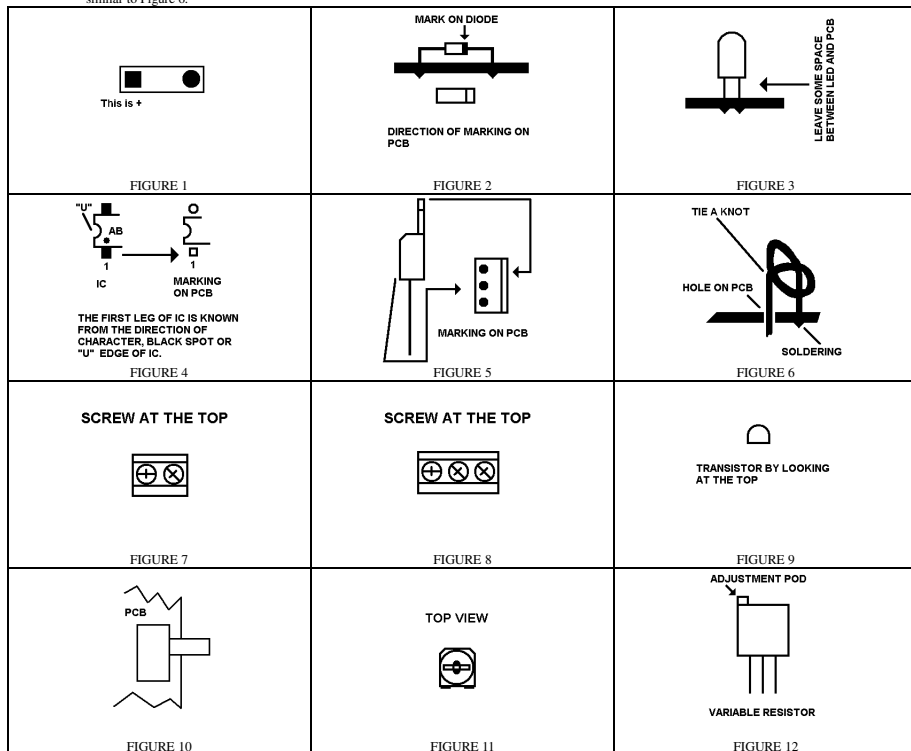
DUAL RAIL VARIABLE DC POWER SUPPLY

PRODUCT CODE: M00270037

DESCRIPTION: Positive and negative variable DC power supply from a gentle single rail DC power supply or battery.

READ BEFORE INSTALLATION:

- Put the component on the side of screen printing and solder on the back of PCB without printing.
- Placing direction of component.
- 1. On component, longer leg is "+".
- 2. On PCB marking, square pad as Figure 1 is always "+".
- 3. For diode, please install as Figure 2.
- Do not put the LED to very bottom, just install as Figure 3.
- For any IC, finding out which leg is first leg (FIGURE 4) is important. Also, solder the socket (chair) to the PCB and the IC sit on the top.
- For 9V Battery Adaptor, Red is B+ and Black is B-. Also, please tie a knot after the red and black wire has passed the neighbors hole before soldering. This is similar to Figure 6.



CIRCUIT EXPLANATION:

Please read the below together with the circuit diagram in Figure 13.

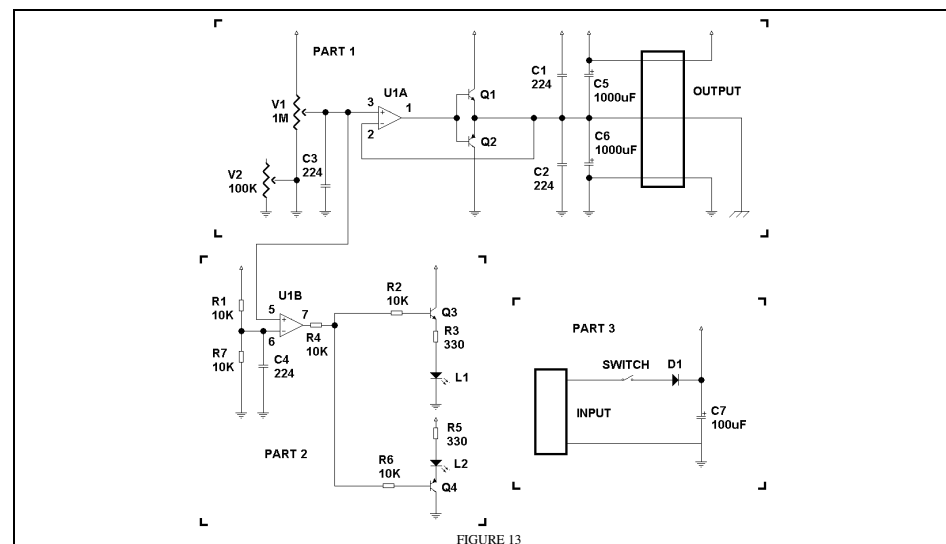
The dual rail power supply is to make sure the voltage different on either rail would not be changed due to resistance change on another rail. This is different to gentle voltage divider circuit formed by two resistors. How to do this? Please check on part 1. Now I say the output is "+" (Arrow in the picture 13), earth and "-" (Ground in picture 13). We connect 10K resistor between "+" and earth and 100K resistor between earth and "-". I assume there is 0.1A is flowing at 10K resistor. For keeping the voltage the same also at 100K resistor, then 0.01A must flow at 100K resistor. The rest of current 0.09A of current originally flow at 100K has gone to "-" through Q2.

The function of U1A is voltage control circuit for both rails. You can see there is a feedback from the earth of output. This feedback is important because this monitor the output voltage on real time. This feedback voltage compares the wanted voltage set by V1 and V2. Finally, the U1A would decide which transistor Q1 or Q2 should be open or close more so that the voltage level is stable on both rails whatever what resistor is connected. For example, when leg 3 is little higher than leg 2, leg 1 would be little higher. Then Q1 would open more and Q2 would close more. You can understand as the control of gate for amount of current flow at each rail.

By using dual power supply, mostly we want same voltage at both sides. This is done by part 2. V1 is for major adjustment and V2 is for minor adjustment. When you have adjusted the voltage the same on rails, leg 5 and leg 6 would be the same. The output of leg 7 would be around the middle of "+" and "-", then L1 and L2 would be at "ON" at both sides. Sometime you would see the voltage is not the same (Little different) on both sides even both LED is on. The main reason is that R1 and R2 have maybe 5% of error.

Part 3 is for inputting the DC voltage. D1 is to prevent the wrong connecting of voltage supply.

CIRCUIT DIAGRAM:



INSTALLATION:

Just install the component to the PCB M00260062 according to below table.

ITEM	SYMBOL ON PCB	DESCRIPTION	OUTLOOK	DIRECTION IS IMPORTANT?
1	R1	RESISTOR, 10K ohms	BROWN, BLACK, ORANGE	NO
2	R2	RESISTOR, 10K ohms	BROWN, BLACK, ORANGE	NO
3	R3	RESISTOR, 330 ohms	ORANGE, ORANGE BROWN	NO
4	R4	RESISTOR, 10K ohms	BROWN, BLACK, ORANGE	NO
5	R5	RESISTOR, 330 ohms	ORANGE, ORANGE BROWN	NO
6	R6	RESISTOR, 10K ohms	BROWN, BLACK, ORANGE	NO
7	R7	RESISTOR, 10K ohms	BROWN, BLACK, ORANGE	NO
8	D1	DIODE, 1N4001	FIGURE 2	FIGURE 2
9	C1	CAPACITOR, 22*10E4 pF	MARK WITH 224 OR SAME MEANING OF VALUE	NO
10	C2	CAPACITOR, 22*10E4 pF	MARK WITH 224 OR SAME MEANING OF VALUE	NO
11	C3	CAPACITOR, 22*10E4 pF	MARK WITH 224 OR SAME MEANING OF VALUE	NO
12	C4	CAPACITOR, 22*10E4 pF	MARK WITH 224 OR SAME MEANING OF VALUE	NO
13	C5	CAPACITOR, 1000uF	MARK WITH 1000uF OR SAME MEANING OF VALUE	YES
14	C6	CAPACITOR, 1000uF	MARK WITH 1000uF OR SAME MEANING OF VALUE	YES
15	C7	CAPACITOR, 100uF	MARK WITH 100uF OR SAME MEANING OF VALUE	YES
16	U1	DIP 8 SOCKET	8 LEGS	NO
17	L1	LED	RED	YES
18	L2	LED	YELLOW	YES
19	V1	VARIABLE RESISTOR, 1M ohms	FIGURE 11	YES
20	V2	VARIABLE RESISTOR, 100K ohms	FIGURE 12	NO
21	Q1	TRANSISTOR, NPN	FIGURE 5, MARK WITH TIP41	YES
22	Q2	TRANSISTOR, PNP	FIGURE 5, MARK WITH TIP42	YES
23	Q3	TRANSISTOR, NPN	FIGURE 9, MARK WITH 9014	YES
24	Q4	TRANSISTOR, PNP	FIGURE 9, MARK WITH 9015	YES
25	INPUT	AS INPUT POWER	FIGURE 7	NOTE 1
26	OUTPUT	AS OUTPUT POWER	FIGURE 8	NOTE 1
27	SWITCH	SLIDE SWITCH	SIX LEGS	FIGURE 10
28	ON TOP OF ITEM 16	IC, LM358	8 LEGS	FIGURE 4

Note 1: You can say there are two directions to solder this component. Both are work but this is better the terminal is facing outside the PCB.