

Design of dual power supply circuit that will produce variable power supply with both positive voltage regulator and negative compliment voltage using Voltage Regulator IC of LM317

Objective

In this lab report, our objective is to design the dual power supply circuit that will produce variable power supply with both positive voltage regulator and negative complement voltage using Voltage Regulator IC of LM317.

Introduction

A power supply is a circuit based electronic device that supplies the needed electrical energy to an electrical load. Power supplies can also be named as electric power converters as they are used to convert electrical energy from one form to another. Power supplies are used in everyday consumer devices and PC's. In such devices the power supply unit is inbuilt along with their loads. The power supplies that we are going to discuss are more discrete and are useful for simple projects and minor electrical applications.

Circuit diagram

The circuit schematic for a dual adjustable power supply employing the ICs LM317 and LM337 is shown below. The LM317 can provide a maximum of 1.5 A across a voltage range of 1.2 V to +30V. The LM317 is a positive voltage regulator, whereas the LM337 is the LM317's negative complement voltage regulator. The LM317 IC is a three-terminal voltage regulator with a DC output voltage range of (1.2-30) Volts and a maximum current of 1.5 Amps. These ICs also feature a specific TO3 packaging, which, when combined with a big heat sink (HS07051, preferable), allows the power supply to manage maximum load current. They also have a short circuit protection built in.

The circuit is set up to provide a dual adjustable output of (+15, 0, -15) in this example. Filtering and ripple rejection are provided by the capacitors C1 through C8. The output of the LM317 is controlled by the resistors R1 and R2. The output of the LM337 is controlled by resistors R3 and R4. The positive and negative voltages may be adjusted by turning R1 and R4.

Two LED indicators can be attached if necessary to show the positive and negative power outputs. A Red LED may be linked to U1 and GND, while a Blue LED can be connected to U2 and GND. The Blue LED may be used as a positive power indication, while the Red LED can be used as a negative power indicator.

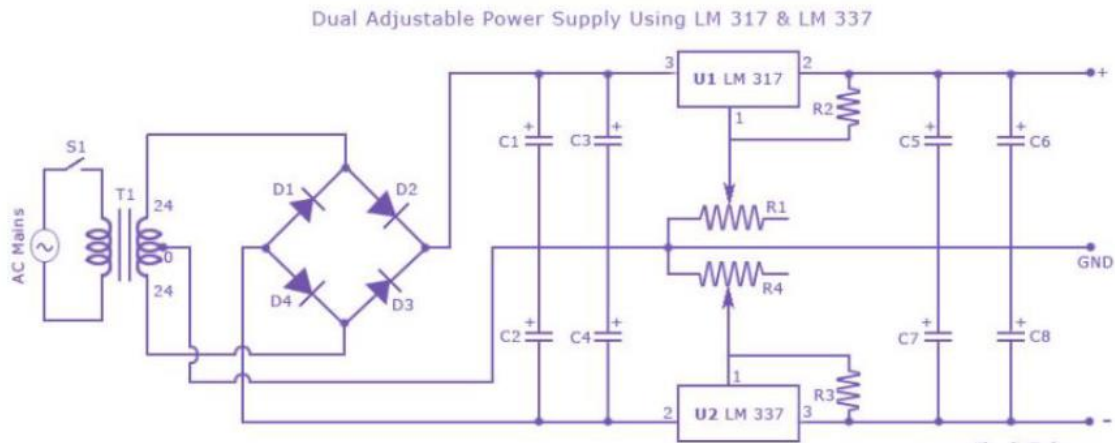


Figure 1 Circuit diagram (As provided in assignment brief)

List of components

List of components are shown in the following table.

Component name	Quantity	Specification
50 V Electrolytic capacitor	2	2200 microfarad
50 V Electrolytic capacitor	4	2.2 microfarad
50 V Electrolytic capacitor	2	100 microfarad
Potentiometer	2	5K ohms
1/4 W resistor	2	220 ohms
Diode	4	IN4007
2 amp switch	1	SPST
Voltage regulator IC	1	LM 317
Voltage regulator IC	1	LM 337
Centre tapped 2 A transformer	1	24-0-24
PCB circuit board, blank	-	Large size
Heat sink for two IC		
Power cord		
Cable		
Wire		
Multi meter		
Solder machine with soldering wire		

Components with designation shown in circuit diagram

Component	Specification	Name
C1, C2	2200 uF	50V Electrolytic Capacitor
C3, C4, C5, C7	2.2 uF	50V Electrolytic Capacitor
C6, C8	100 uF	50V Electrolytic Capacitor
R1, R4	5K Ohms	Potentiometer
R2, R3	220 Ohms	1/4 W Resistor
D1 to D4	IN 4007	Diodes
S1	SPST	2 Ampere Switch
U1	LM317	Voltage Regulator IC
U2	LM337	Voltage Regulator IC
T1	24-0-24	Center Tapped 2 Ampere Transformer

Extra Heat sinks for two IC's , Power Cord,
Casing, Wires