

SELF-SWITCHING POWER SUPPLY

One of the main features of the regulated power supply circuit being presented is that though fixed-voltage regulator LM7805 is used in the circuit, its output voltage is variable. This is achieved by connecting a potentiometer between common terminal of regulator IC and ground. For every 100-ohm increment in the in-circuit value of the resistance of potentiometer VR1, the output voltage increases by 1 volt. Thus, the output varies from 3.7V to 8.7V (taking into account 1.3-volt drop across diodes D1 and D2).

Another important feature of the supply is that it switches itself off when no load is connected across its output terminals. This is achieved with the help of transistors T1 and T2, diodes D1 and D2, and capacitor C2. When a load is connected at the output, potential drop across diodes D1 and D2 (approximately 1.3V) is sufficient for transistors T2 and T1 to conduct. As a result, the relay gets energised and remains in that state as long as the load remains connected. At the same time, capacitor C2 gets charged to around 7-8 volt potential through transistor T2. But when the load is disconnected, transistor T2 is cut off. However, capacitor C2 is still charged and it starts discharging through base of transistor T1. After some time (which is basically determined by value of C2), relay RL1 is de-energised,

which switches off the mains input to primary of transformer X1. To resume the power again, switch S1 should be pressed momentarily. Higher the value of capacitor C2, more will be the delay in switching off the power supply on disconnection of the load, and vice versa.

Though in the prototype a transformer with a secondary voltage of 12V-0V, 250mA was used, it can nevertheless be changed as per user's

requirement (up to 30V maximum and 1-ampere current rating). For drawing more than 300mA current, the regulator IC must be fitted with a small heat sink over a mica insulator. When the transformer's secondary voltage increases beyond 12 volts (RMS), potentiometer VR1 must be redimensioned. Also, the relay voltage rating should be redetermined.

