## **MAINS MANAGER**

## SHIBASHISH PATEL

ery often we forget to switch off the peripherals like monitor, scanner, and printer while switching off our PC. The problem is that there are separate power switches to turn the peripherals off. Normally, the peripherals are connected to a single of those four-way trailing sockets that are plugged into a single wall socket. If that socket is accessible, all the devices could be switched off from there and none of the equipment used will require any modification.

Here is a mains manager circuit that allows you to turn all the equipment on or off by just operating the switch on any one of the devices; for example, when you switch off your PC, the monitor as well as other equipment will get powered down automatically. You may choose the main equipment to control other gadgets. The main equipment is to be directly plugged into the master socket, while all other equipment are to be connected via the slave socket. The mains supply from the wall socket is to be connected to the input of the mains manager circuit.

The unit operates by sensing the current drawn by the control equipment/load from the master socket. On sensing that the control

equipment is on, it powers up the other (slave) sockets. The load on the master socket can be anywhere between 20 VA and 500 VA, while the load on the slave sockets can be 60 VA to 1200 VA.

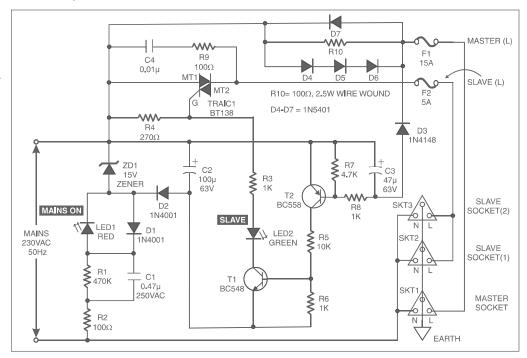
During the positive half cycle of the mains AC supply, diodes D4, D5, and D6 have a voltage drop of about 1.8 volts when current is drawn from the master socket. Diode D7 carries the current during negative half cycles. Capacitor C3, in series with diode D3, is connected across the diode combination of D4 through D6, in addition to diode D7 as well as resistor R10. Thus current pulses during positive half-cycles, charge up the capacitor to 1.8



volts via diode D3. This voltage is sufficient to hold transistor T2 in forward biased condition for about 200 ms even after the controlling load on the master socket is switched off.

When transistor T2 is 'on', transistor T1 gets forward biased and is switched on. This, in turn, triggers Triac 1, which then powers the slave loads. Capacitor C4 and resistor R9 form a snubber network to ensure that the triac turns off cleanly with an inductive load.

possible, plug the unit into the mains via an earth leakage circuit breaker. The mains LED1 should glow and the slave LED2 should remain off. Now connect a table lamp to the master socket and switch it 'on'. The lamp should operate as usual. The slave LED should turn 'on' whenever the lamp plugged into slave socket is switched on. Both lamps should be at full brightness without any flicker. If so, the unit is working correctly and can be put into use.



LED1 indicates that the unit is operating. Capacitor C1 and zener ZD1 are effectively in series across the mains. The resulting 15V pulses across ZD1 are rectified by diode D2 and smoothened by capacitor C2 to provide the necessary DC supply for the circuit around transistors T1 and T2. Resistor R3 is used to limit the switching-on surge current, while resistor R1 serves as a bleeder for rapidly discharging capacitor C1 when the unit is unplugged. LED1 glows whenever the unit is plugged into the mains. Diode D1, in anti-parallel to LED1, carries the current during the opposite half cycles.

Don't plug anything into the master or slave sockets without testing the unit. If

*Note.* 1. The device connected to the master socket must have its power switch on the primary side of the internal transformer. Some electronic equipment have the power switch on the secondary side and hence these devices continue to draw a small current from the mains even when switched off. Thus such devices, if connected as the master, will not control the slave units correctly.

2. Though this unit removes the power from the equipment being controlled, it doesn't provide isolation from the mains. So, before working inside any equipment connected to this unit, it must be unplugged from the socket.