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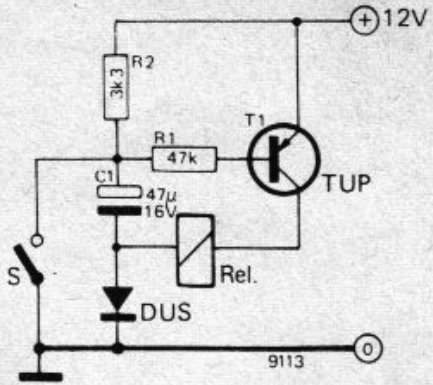
R.L. Rappenecker



economic relay

The supply voltage for a relay is chosen so that the relay will pull-in reliably. The holding voltage is, however, much lower: often even less than half the pull-in voltage.
Consequently most relays function satisfactorily at a reduced voltage provided it is ensured that at the moment of activation the voltage is increased sufficiently. The circuit given here is suitable for relays drawing up to 100 mA, whilst the supply voltage must be lower than 25 V.
Using this circuit has two advantages: firstly the relay draws considerably less current; at half the supply voltage the power consumption has already been reduced to one quarter! Secondly, a given relay can be used at voltages which so far were too low to ensure reliable functioning. (For example a 6 V relay that must function on the 5 V from a TTL supply). The circuit is connected to a supply voltage which is certain to hold the relay. As long as S1 is open, C1 is charged via R2 to the supply voltage. R1 is connected to the + terminal and T1 will not conduct.
As soon as S1 is closed, the base of T1 is connected to supply common via R1, so that it conducts and drives the relay. Via S1 the positive terminal of C1 is connected to supply common, and since this capacitor was charged to the supply voltage its – terminal is now at a negative potential. The voltage across the coil of the relay is now equal to double the supply voltage, and the relay will pull in.
Switch S1 can, of course, be replaced by a transistor (TUP or TUN) which is then switched on or off.