

Circuit Ideas

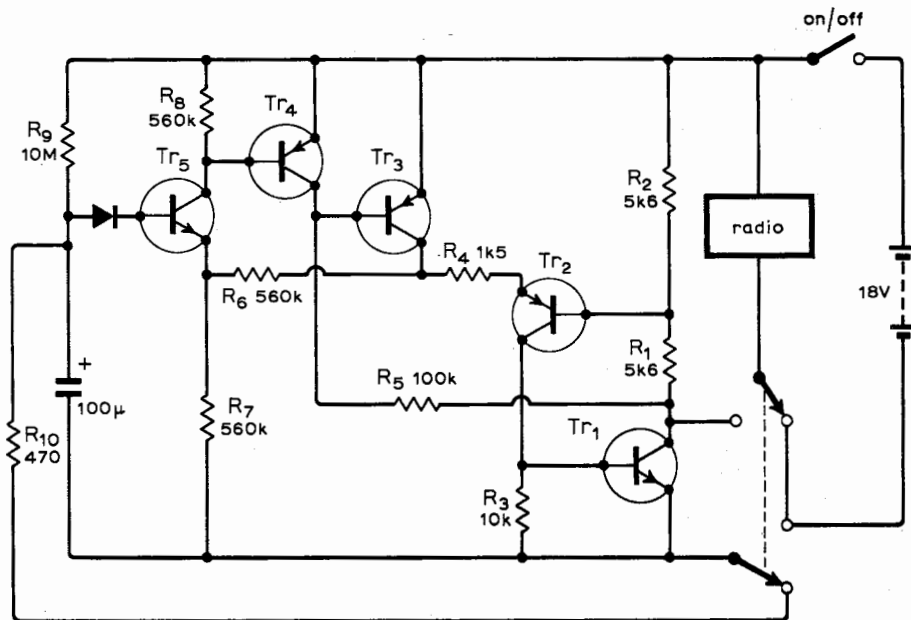
Make your description of a new circuit concise and say how it is an improvement over previously-published circuits, preferably in the first sentence. We pay £5 for published circuits.

Delayed switch off for transistor radios

This circuit switches off a transistor radio after a delay of approximately 30 minutes with a small current consumption while on and negligible consumption when off. The circuit uses Tr_1 , Tr_2 as an equivalent but cheaper silicon controlled switch. Resistor R_4 determines Tr_1 base current and Tr_3 is used to cut off this current and hence turn off the radio. The switch is shown in the normal position. When operated the radio supply decoupling capacitor, charged, is connected across R_1 , R_2 . This turns on Tr_2 , Tr_3 which turn on Tr_1 . The capacitor charges via R_9 until Tr_5 turns on (its emitter is held at half supply voltage by R_6 , R_7). This turns Tr_4 on, turning Tr_3 off and hence Tr_2 and Tr_1 . The only current flow now is that due to R_7 , R_9 and Tr_1 , Tr_2 leakage currents, measured as $20\mu A$.

The diode prevents the capacitor charging via Tr_5 base/emitter junction if its reverse voltage rating is exceeded.

All transistors should have low leakage and a current gain greater than 50 at low currents except Tr_1 which need only have a current gain greater than 25 with collector currents from 10 to 100mA. (I used



2N3706 for Tr_1 , Tr_3 and 2N3702 for Tr_2 , Tr_3 , Tr_4 .) The capacitor must also have low leakage and some experimentation may be necessary. Resistor R_{10} discharges the capacitor rapidly to permit another operation immediately. The switch requires a good insulation resistance.

Operation of the circuit was between

9 and 18V. To enable operation from $4\frac{1}{2}$ to 9V, halve the values given for R_6 , R_7 , R_4 and R_5 . Also omit the diode as the maximum reverse bias for Tr_5 will then only be 4.5V.

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