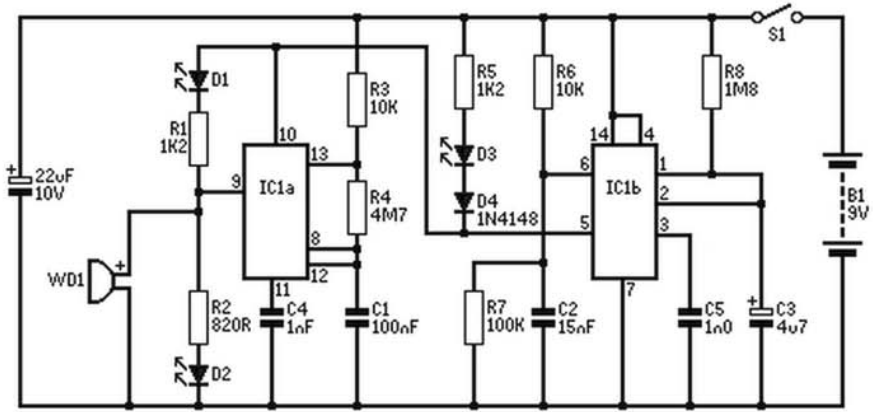
Car Race Starter Mods

The E&MM Car Race Starter (August 1981) worked perfectly on the test bench, but was rather prone to false triggering if placed near the car track. This problem became worse as the battery discharged. In order to avoid this some extra decoupling was added, and the circuit was modified so that a dual CMOS timer (7555) could be used instead of the two discrete timers used in the original, with the consequent reduction in current consumption.

In the original a bipolar timer was used for the monostable period during which the lights flash and the buzzer sounds. A bipolar version was necessary because it had to source the entire supply current for the astable timer, buzzer and LEDs. The modified version here uses the reset line of the astable timer to inhibit its operation. This reset line is connected directly to the output of the monostable timer. As a result the astable will only oscillate when the monostable output is high. The LED D1 must also be a source from this reset line so that it will go out when the monostable period is over. Consequently, the timer for the astable may have the supply connected permanently thus allowing the use of the dual CMOS 555.

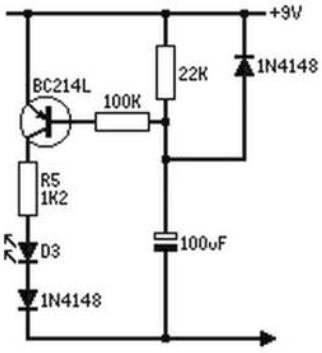


Additional decoupling in the form of two 1n0 capacitors to the control voltage inputs and a 22µF supply line decoupler is also suggested.

Car Race Starter Power Saver

One of the main reasons the E&MM Car Race Starter (August 1981) uses up power is because the red 'start' LED remains on once the race has started and people are too busy controlling cars to think about turning the unit off. The circuit may be modified such that the red LED lights to full brightness as soon as the flashing and buzzer stops, as in the original but over the next six seconds fades away leaving a standing current of only 6 mA (or 1 mA if the dual CMOS 555 version is built - see in other Circuit Maker: Car Race Starter Mods). Needless to say this offers a considerable saving over five minutes!

The circuit shown replaces the LED and resistor which were connected from pin three of IC2 in the original (D3 and R5). During the timing cycle pin three is high, and so the 100µF capacitor is fully discharged since the same voltage is present on both plates. Obviously the LED does not light and the entire circuit may be said to be nonfunctional. Once pin three falls towards 0 volts at the end of the timing cycle the voltage at the top end of the capacitor will also fall since it is still discharged. This turns on the transistor and the LED lights. The capacitor will start to charge up, and as it does so the transistor will become progressively less 'on' until the LED goes out, leaving only a small leakage current.



It has been found necessary to add the extra diode in series with the LED when using some 555's to prevent the LED glowing. This seems well worth adding at the same time.