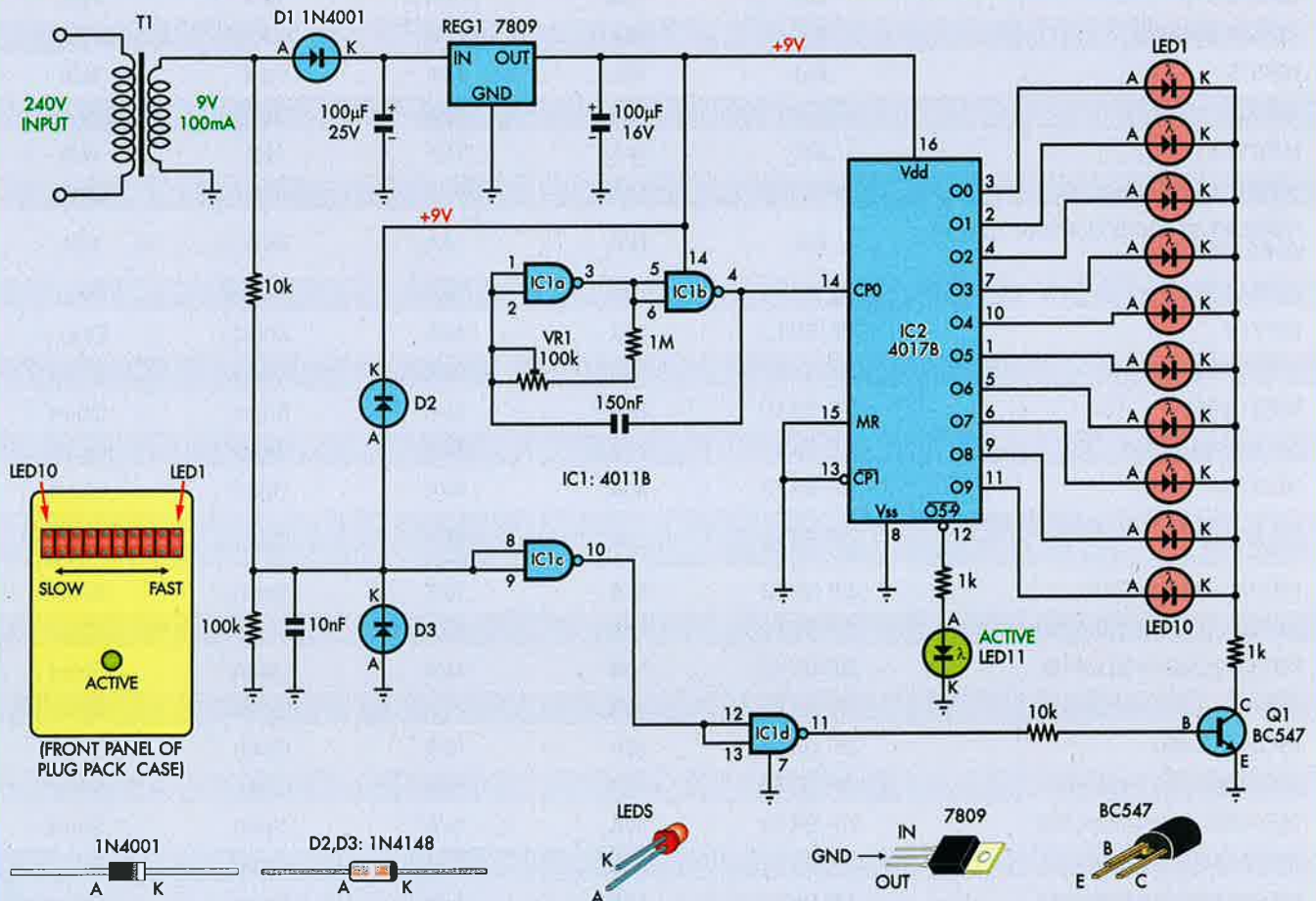


CIRCUIT NOTEBOOK

Interesting circuit ideas which we have checked but not built and tested. Contributions from readers are welcome and will be paid for at standard rates.



Frequency indicator for generating equipment

This circuit was developed to adjust the operating speed (RPM) of portable AC generators. These usually have a speed-control knob but no means of determining the correct (50Hz) frequency. Since this sort of job is done outdoors, a digital frequency counter is not really justified and can be difficult to read, because of the typically long gating time at low frequencies.

Two NAND gates, IC1c & IC1b, are wired as a 500Hz oscillator and this clocks a 4017 decade counter, IC2. This drives 10 LEDs but only one will be on at any particular time, as the counter cycles through from 1-10. However, all the LEDs are

connected to 0V via a common 1kΩ resistor and transistor Q1 which is turned on and off by a 50Hz signal derived from the generator.

If the 50Hz and 500Hz frequencies are precisely locked, the display will show a stationary LED. However, if the 50Hz signal is slightly high in frequency, the LED will appear to move in one direction and if the signal is slightly low, the LED will appear to move in the opposite direction.

The 50Hz 240VAC input from the generator is fed via transformer T1 and it powers the circuit via rectifier diode D1, a 100µF filter capacitor and a 7809 9V 3-terminal

regulator (REG1). The 50Hz signal from the transformer is also fed via a 10kΩ resistor to a squaring circuit comprising gates IC1d & IC1c. This drives transistor Q1.

In use, the unit is plugged into the mains outlet of the portable generator and the governor speed of the engine is adjusted to give a stationary LED display. For 60Hz equipment, the oscillator would be set to 600Hz.

Note that the oscillator frequency should be adjusted precisely with the aid of an accurate frequency meter.

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