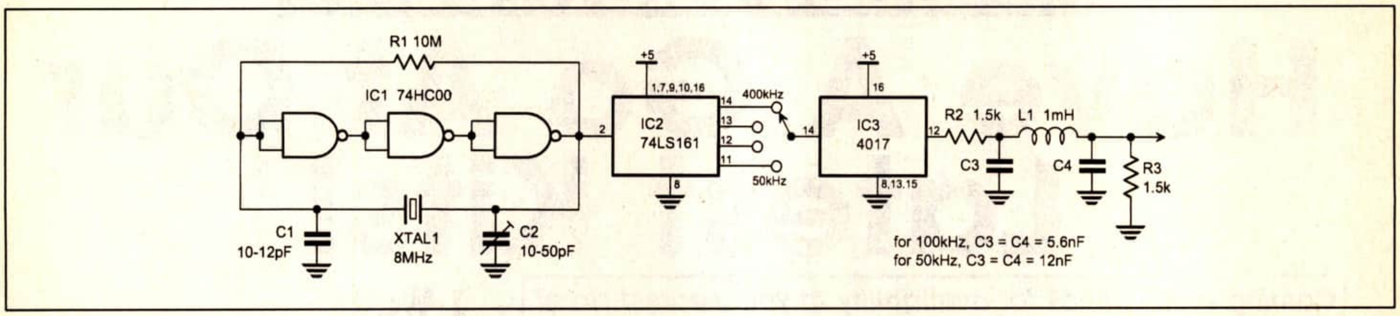
Stable 100kHz source

I needed a very stable sinewave source for alignment of a multi-section crystal filter, which forms the heart of a commercial wave analyser. The source needed to be a stable 100kHz, +/-1Hz sinewave, variable by +/-5Hz.

An 8MHz crystal oscillator is formed by XTAL1 and IC1. Frequency adjustment is provided by variable capacitor C2. IC2 is a binary divider and IC3 is a decade divider. The network consisting of L1, C3, C4, R2 and R3 filters out anything above the second harmonic, giving a relatively pure 100kHz sinewave with excellent stability and variable frequency. By selecting different outputs from IC2 you can also get 50kHz, 200kHz and 400kHz outputs. However the values of C3 and C4 need to be changed to suit. Note that 4000 series CMOS ICs running at 5V have a maximum frequency of around 3MHz, so they are only suitable as a divider in this circuit.

Braham Bloom,
Russell Lea, NSW. **$35**

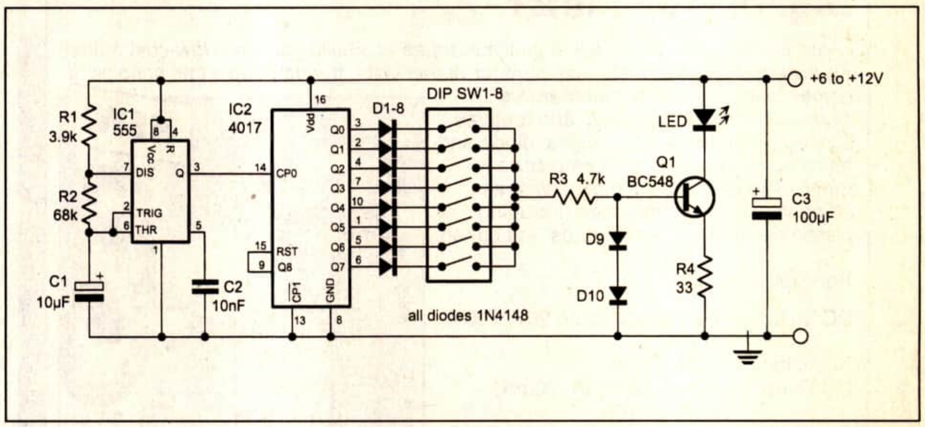


Flashing beacon

This circuit was designed after seeing an advertisement in an American magazine for a programmable beacon, with an output of about 700mCd provided by what appeared to be three LEDs.

It consists of a 555 timer running in astable mode at about 1Hz. This clocks a 4017 decade counter/divider with outputs 0 to 7 going high for one second each in a continuous loop, since the reset pin (15) is connected to output eight (pin 9).

Each output is connected to the base of Q1 via an isolating diode (D1 - D8) and a switch (DIP SW 1-8). Transistor Q1, R4, D8 and D9 form a constant current source for the LED. The current is 0.65 divided by the value of R4. Various flash patterns are possible, depending on the setting of the switches. For instance, one second on, then seven seconds off, or four seconds on and four seconds off.



I used a 3000mCd LED (available from Jaycar) operating at a current of 20mA. For best light output, use two or three LEDs in series, depending on the supply voltage.

Michael Sampson,
Tamworth, NSW. **$35**

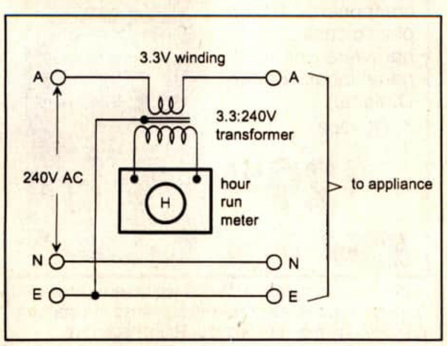
Energy monitor

Living with alternative energy (hydro and solar power) means it's often necessary to measure power consumption, to ensure that power inverters and generators are not overloaded. The measurement of energy consumption of individual appliances is also needed to calculate the amount of battery storage needed, as well as charging options etc.

The measurement of power consumption is straightforward using a moving iron ammeter (giving a true RMS response to the waveform of an inverter). However, the measurement of energy consumption involves time and isn't so easy.

This circuit is a very simple way of measuring energy consumption. A transformer is connected as a current transformer and supplies power to an hour run meter, a Warburton-Franki type obtained from Oatley Electronics for $15. This device is similar to the odometer of a car, in that it registers time on a number of wheels, to 0.01 of an hour. It operates only while power is applied, so the length of time an appliance consumes energy over a given period is recorded.

I used a transformer designed for a Scope soldering iron. However, the secondary voltage rating can be between three and 12 volts, as this rating only affects the lowest power the hour meter will respond to. The current rating of this winding should equal or exceed the full load current being measured. A refrigerator draws around 300 watts or 1.2A at 240 volts, so the winding must be able to carry that current.



Be careful if running the transformer without a load connected to the 240 volt winding, as a high voltage can be developed (more than 1kV in some cases). If using a multi-tap transformer, such as from an old radio or TV, terminate the unused windings with a suitably rated load resistor. By using this device you can check the energy ratings of appliances and compare it to the published rating. The prototype responded to a minimum power of 30 watts or so.

Peter Laughton,
Albion Park, NSW. **$30**