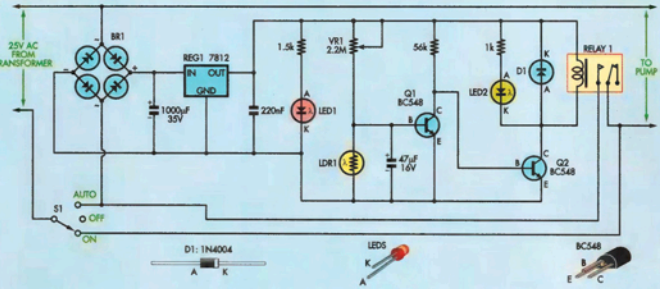
CIRCUIT NOTEBOOK

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.



Light-controlled pond pump

This circuit was constructed to control the pump in a garden pond, so that it automatically turns on at dawn and off again at dusk. Not only does this mean that we don't have to get cold and wet when turning the pump on or off manually but it's also one less job for our kind neighbours when we go away on holidays!

The controller is powered from the pump's existing 25VAC mains transformer. A bridge rectifier (BR1) and 1000µF capacitor provide DC power to the circuit. For dependable operation, this is regulated to +12V by a 7812 regulator (REG1), while a red LED (LED1) provides power-on indication.

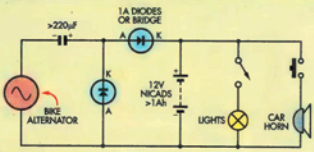
The light sensor (LDR1) is a Cadmium-Sulphide photocell obtained from Tandy Electronics.

The photocell forms a voltage divider with trimpot VR1. With no light on the photocell, the voltage on the base of Q1 is greater than 0.6V and therefore it is switched on. When light falls on the photocell, its resistance decreases, lowering the bias voltage on Q1 and switching it off. This in turn allows Q2 to switch on, energised the relay and turning on the pond pump.

In use, the 2.2MΩ trimpot is adjusted so that the pump cuts out at the desired light level. A 47µF capacitor across LDR1 prevents transient light changes from affecting circuit operation. S1 is a miniature SPDT centre-off toggle switch, allowing the pump to be turned on or off manually, or switched to automatic mode.

The circuit was constructed on a small protoboard from Dick Smith Electronics (Cat. H 5604) and housed in a bulkhead box, which was then attached to the transformer housing. The photocell was soldered to a length of figure-8 cable and sheathed in a short length of heatshrink tubing to form a light probe. This was attached to a nearby fence post to provide suitable exposure to sunlight.

Ian Hogan,
Mt Waverley, Vic. ($35)



Bike battery charger

This simple circuit allows a 12V battery pack to be charged via a bike generator. The generator is rated at 3W and with this voltage multiplier circuit provides about 200mA at about 15km/h. A 12V system was chosen because it allows the use of a car horn (get noticed)!

Two 6V 3W globes in series provides adequate lighting and they last more than six months.

Paul Breuker,
Concord, NSW. ($20)