

# Effortless Hall Lights Controller



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An assembly hall in an educational institution or industrial shed has multiple light fixtures for lighting purposes. The user has to manipulate a number of switches to switch on a certain number of light fixtures in order to get the desired level of lighting. Also, lights are not switched off when lighting is not required.

The circuit presented here allows switching of an optimal number of lighting fixtures with just one knob of a potentiometer.

## Circuit and working

Fig. 1 shows the circuit diagram of an effortless hall lights controller. The circuit is built around bar-graph IC LM3914 (IC1), ten BC557 transistors (T1 through T10), ten 12V 1C/O relays and some other components.

The heart of the circuit is an LED bar-graph driver IC LM3914. Controlling signals for the ten relays are generated at pins LED1 through LED10 by

### PARTS LIST

#### Semiconductors:

IC1	- LM3914 bar-graph
T1-T10	- BC557 pnp transistor
D1-D10	- 1N4007 rectifier diode
LED1-LED10	- 5mm LED

#### Resistors (all 1/4-watt, $\pm 5\%$ carbon):

R1	- 470-kilo-ohm
R2, R4-R14	- 1-kilo-ohm
R3	- 5.6-kilo-ohm
VR1	- 100k pot

#### Miscellaneous:

CON1-CON10	- 2-pin connector
CON11, CON12	- 2-pin terminal connector
RL1-RL10	- 12V, 1C/O relay
	- 18-pin IC base
	- 12V battery

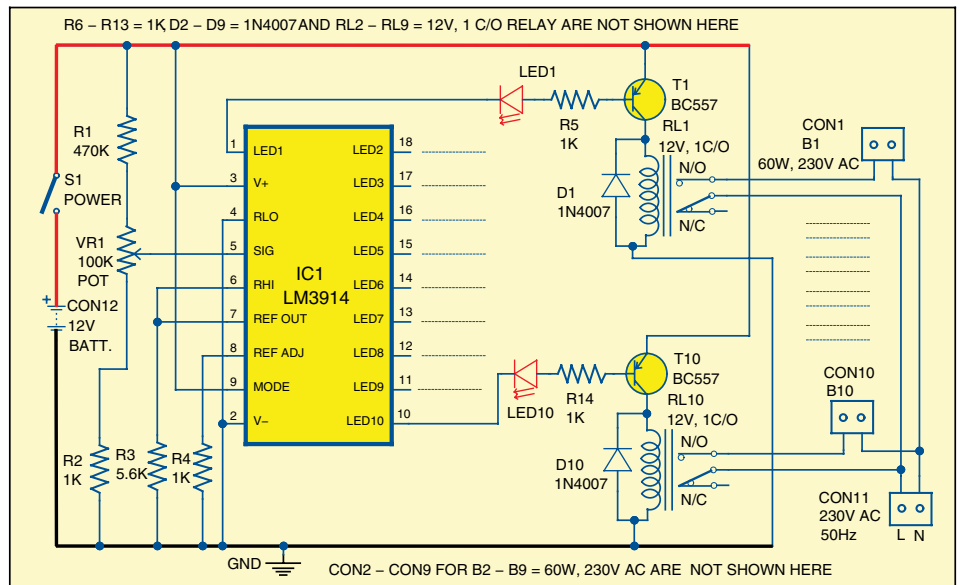


Fig. 1: Circuit diagram of an effortless hall lights controller

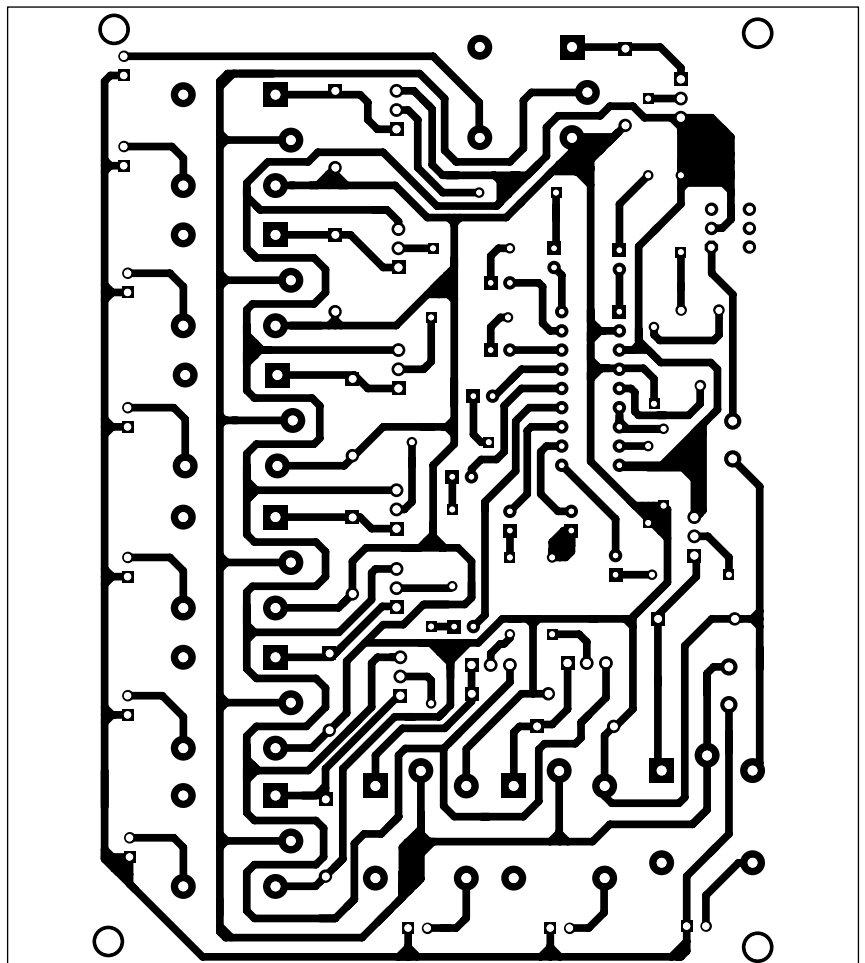


Fig. 2: An actual-size PCB layout of the circuit

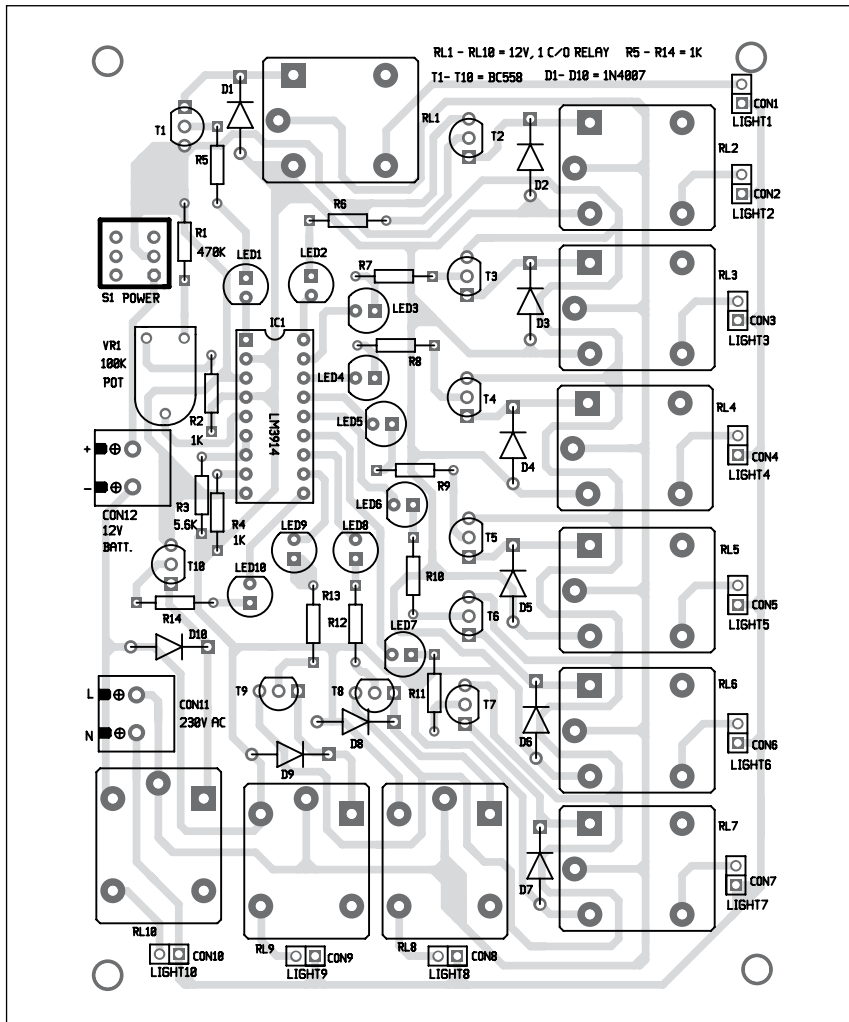


Fig. 3: Component layout of the PCB

varying the voltage at its signal pin 5 through potentiometer VR1. Relays are energised in a progressing manner. Pin 9 is set to 12V positive for operation in bar-graph mode.

Relays energise progressively as voltage at pin 5 increases. This is done by setting VR1, which provides a variable voltage between  $\approx 0V$  and  $\approx 2V$  at pin 5 of LM3914. Pins 2 and 4 are connected to the ground. Pins 6 and 7 are also connected to the ground through resistor R3. VR1 is rotated from  $\approx 0V$  position (all relays remain de-energised) to  $\approx 12V$  position (all relays are energised). At other settings of VR1, relays will progressively energise.

The relay driver circuit is built around pnp transistor BC557. Relays are driven to saturation successively as

we turn the control knob of VR1. LED1 through LED10 indicate the particular relays that are energised.

LEDs can be mounted on the panel board along with drawing of the lighting arrangement in the hall. It will help the user to know the on/off status of the lights.

### Construction and testing

An actual-size, single-side PCB for effortless hall lights controller is shown in Fig. 2 and its component layout in Fig. 3. After assembling the circuit on a PCB, enclose it in a suitable plastic box.

Before using the circuit, ensure that supply voltage is connected correctly. ●

*The author is an embedded professional and electronics hobbyist*

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