

COURTESY L·I·G·H·T EXTENDER

by Tony Bricknell

FEATURES

- ★ Requires no external power supply
- ★ Optional ignition override
- ★ No setting up required
- ★ Low component count
- ★ Kit available

Introduction

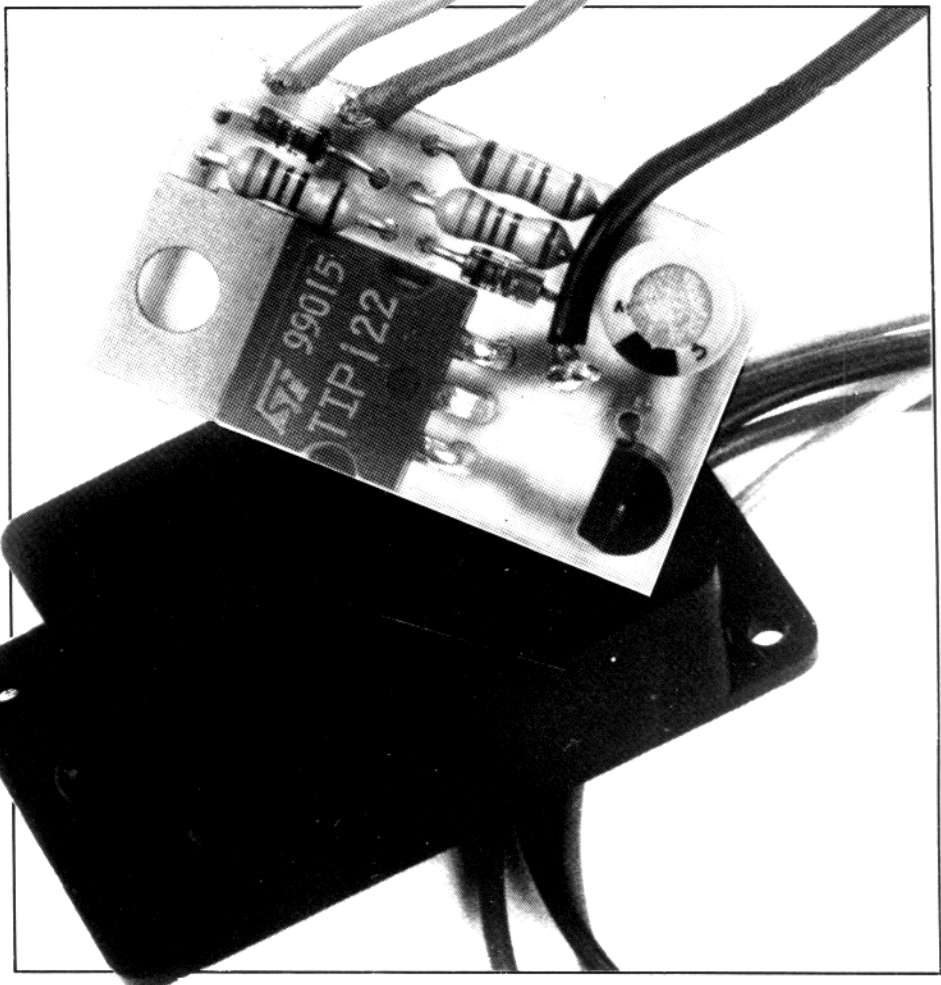
How many times have you got into your car of a night only to find the ignition switch has gone for a walk around the dash-board, as your aimless efforts to start the car only result in the ignition key gouging several grooves into the plastic?

This project keeps the interior light on after the car door has been closed, allowing time to find keys, ignition switch, or even your way out of the garage!

Circuit Description

Figure 1 shows the circuit diagram of the courtesy light extender. P1 and P3 connect directly across a door switch controlling the interior light and P2, to a source that has power while the ignition is on.

With a door open, P1 and P3 are effectively shorted, causing C1 to discharge through D1. As soon as all doors are closed, as C1 is discharged, TR2 is turned off. R1 pulls the base of TR1 high, turning it on and causing current to flow through the courtesy light. C1 now starts to charge through R2 until TR2 turns on, pulling the base of TR1 low and halting the flow of current through the interior light. As C1 charges through R2 and the courtesy light, it can be seen that the wattage of the interior light plays quite an important role in the time delay given. Figure 2 shows typical time delays given at various values of R2 for 5, 10, 15 and 20 Watt courtesy lights.



If, during the time delay given by the unit, the ignition is turned on, C1 charges up very quickly through R3, turning the interior light off almost immediately. This avoids the possibility of driving away at night with the courtesy light still on.

Construction

The postage stamp sized PCB is of the high quality, single-sided glass fibre type, see Figure 3. The sequence in which the components are fitted is not critical; however, the following instructions will be of use in making these tasks as straightforward as possible.

Insert and solder the PCB pins using a hot soldering iron. If the pins are heated, very little pressure is required to press them into position. Once in place, the pins may then be soldered. It is now easier to start with the smaller components, such as the resistors, work upwards in size, and transistor TR1 is fitted last.

The diodes should be inserted such that the band at one end of the diode corresponds with the white block on the PCB legend. When fitting the electrolytic capacitor, it is essential that the correct polarity is observed. The negative lead of the capacitor, which is usually marked by a full-length stripe and a negative (-) symbol, should be inserted away from the hole marked with a positive (+) sign on the PCB legend. Insert and solder the two transistors, matching the shape of each case to its outline on the legend.

Lastly, solder lengths of wire to the veropins and mount the PCB inside the box, as shown in Figure 4.

For further information on component identification and soldering technique, please refer to the Constructors' Guide included with the kit.

Installation

When carrying out any form of electrical work on a vehicle always disconnect the battery and *never* work inside the engine compartment with the engine running!

The courtesy light extender is extremely simple to fit, however, for someone who is not familiar with automotive electrical installation it is advised that they seek the advice of a qualified person before proceeding.

There are two methods of switching the interior courtesy light;

1) Door switches are fitted to the 0V side of the courtesy light, for installation follow Figures 4a or 4b,

2) Door switches are fitted breaking the +12V supply to the courtesy light, for installation follow Figures 4c or 4d.

In its simplest configuration, the unit connects directly across a door switch; P1 connecting to the more positive side of the switch and P3 to the more negative.

If ignition override is required then P2 must be connected to a source that has power while the ignition is on (for example, +SW terminal of the ignition coil). If no easy connection can be made to the ignition circuit then P2 can be connected into the 'Accessory' circuit.

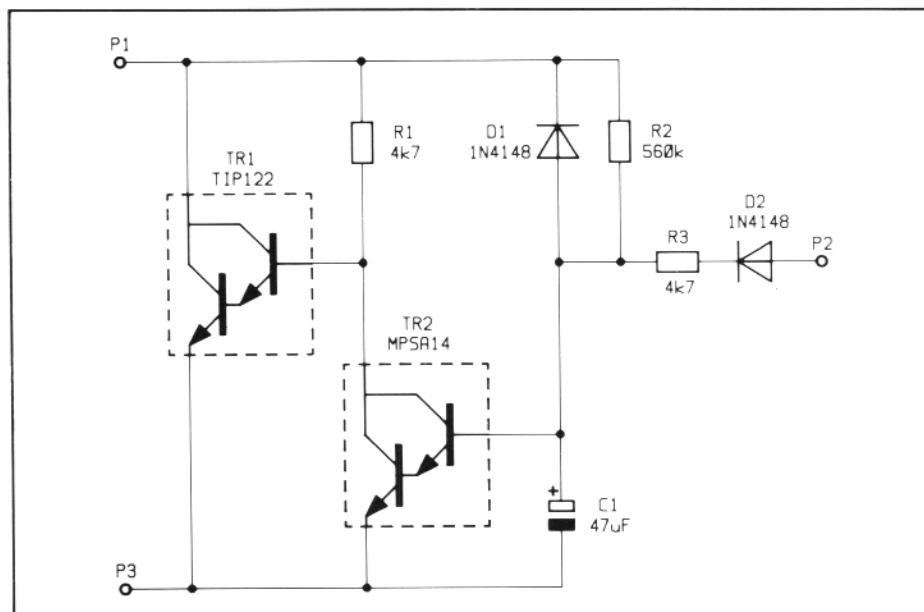


Figure 1. Circuit diagram.

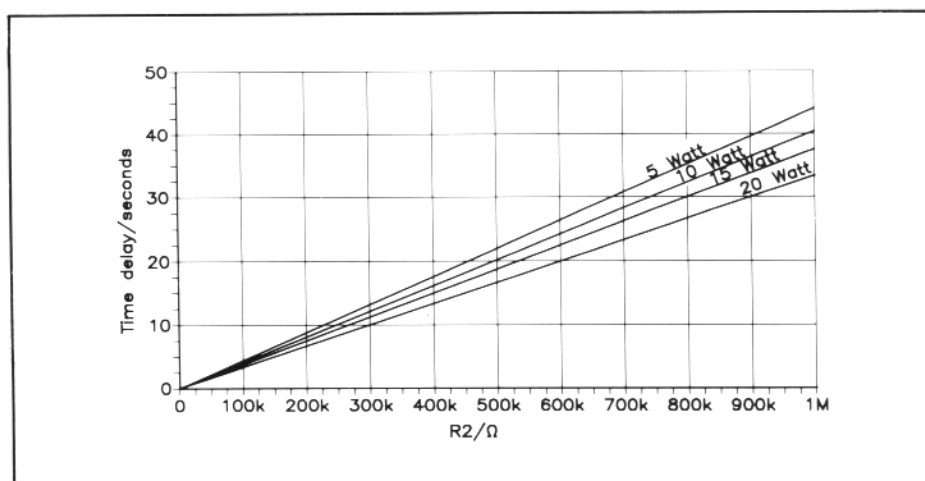


Figure 2. Graph of R2 against time delay for various wattage courtesy lamps.

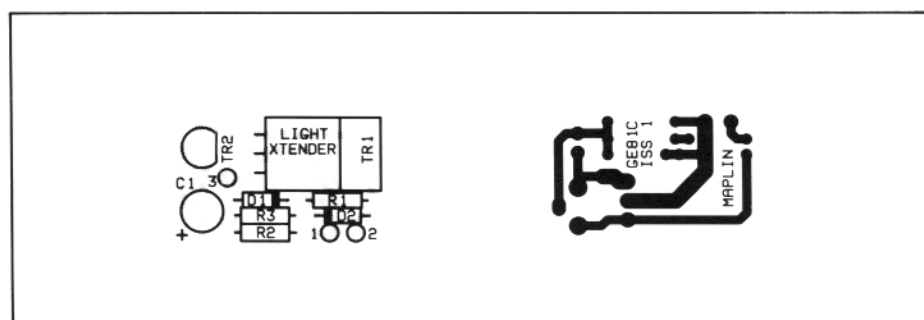
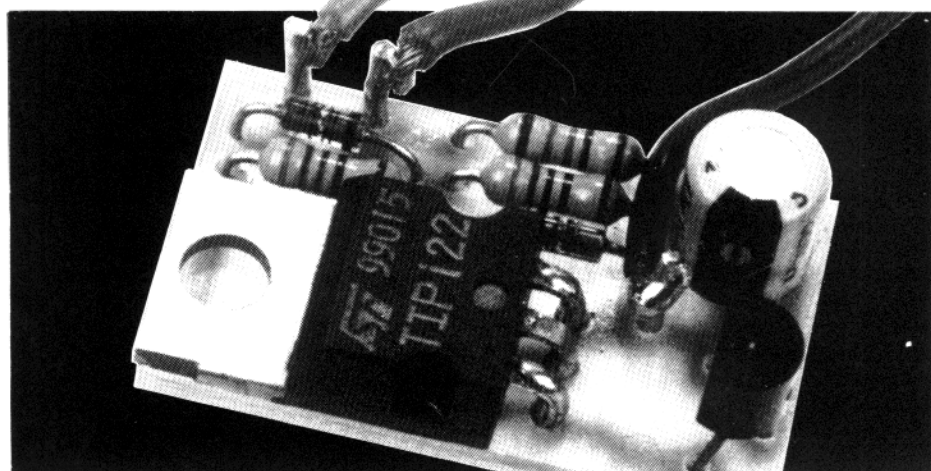
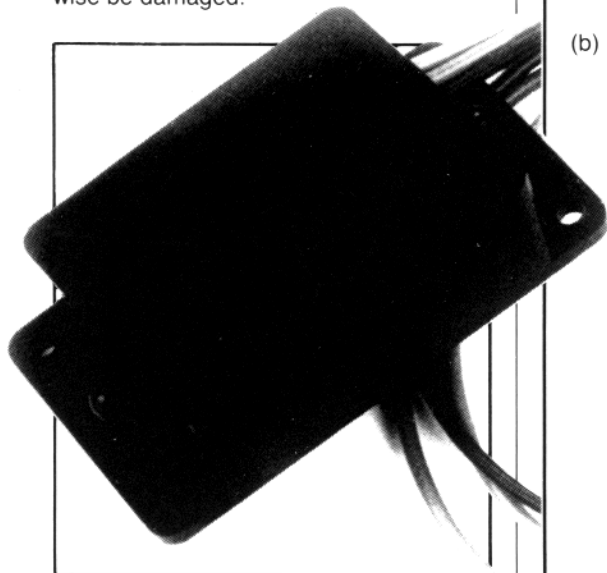


Figure 3. PCB legend and track.



The assembled PCB prior to fitting into the box.

As the complete unit is small and unobtrusive it can easily be mounted inside a door-post, behind an existing door switch. The box can be held in place using a self-adhesive pad (such as HB22Y) or bolted down using the two mounting holes provided in the base of the box. Check behind panels before drilling any holes and ensure that no wiring harness or other components are located behind panels that would otherwise be damaged.



The completed unit ready for installation into the car.

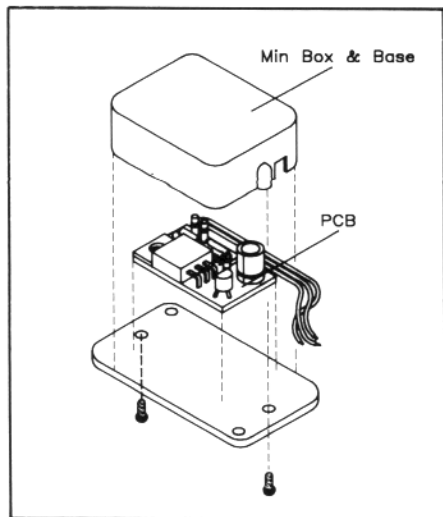


Figure 5. Fitting unit into box.

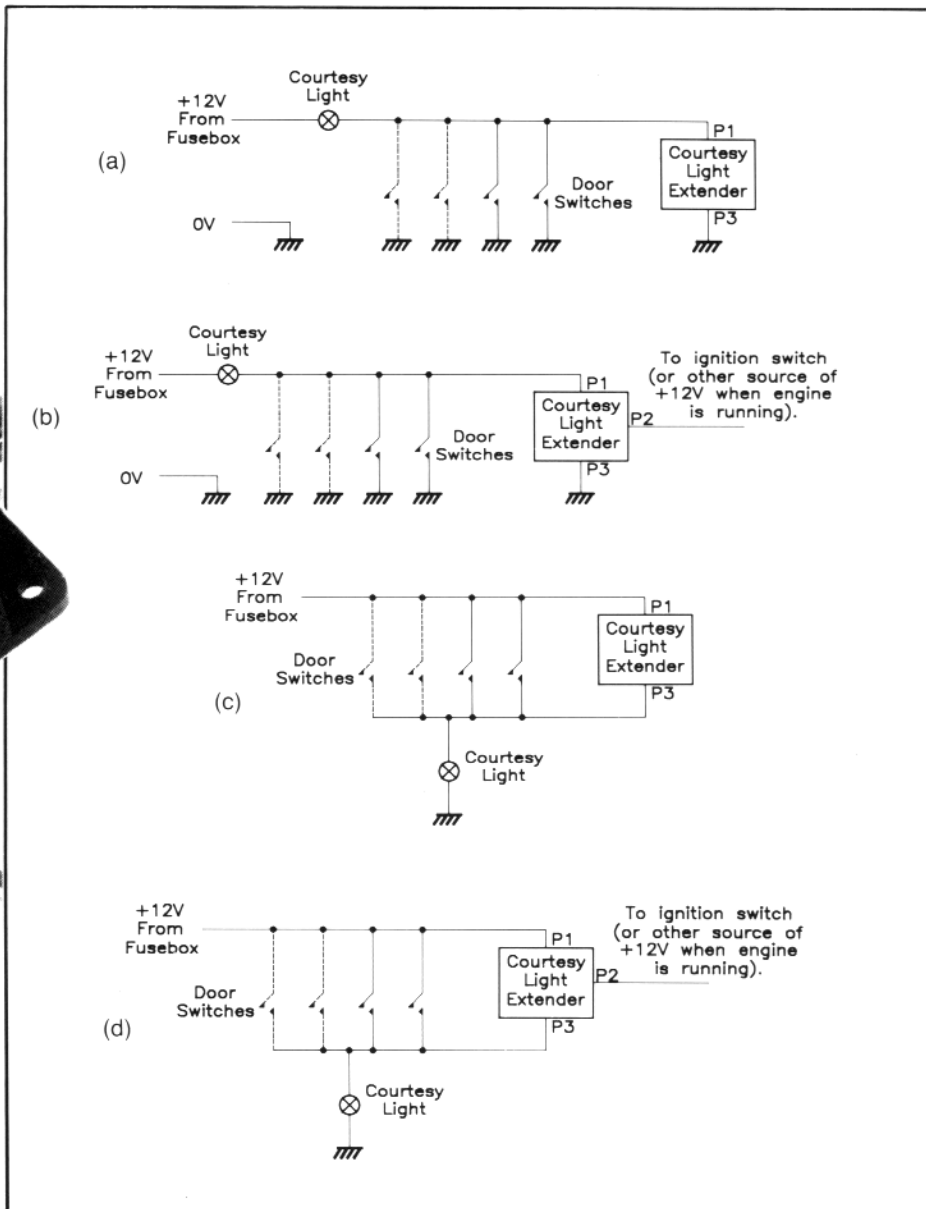


Figure 4a. Simple connection for vehicles with negative switched courtesy light.
Figure 4b. Connection for negative switched courtesy light with ignition override.
Figure 4c. Simple connection for vehicles with positive switched courtesy light.
Figure 4d. Connection for positive switched courtesy light with ignition override.

	Min	Typ	Max	Units
Operating Voltage	10	12	15	V
Quiescent Current @12V		3		mA
Maximum Switching Current			5	A

Table 1. Specification of prototype.

COURTESY LIGHT PARTS LIST

RESISTORS: All 0.6W 1% Metal Film

R1,3	4k7	2	(M4K7)
R2	560k	1	(M560K)

CAPACITORS

C1	47µF 16V Minelect	1	(YY37S)
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SEMICONDUCTORS

TR1	TIP122	1	(WQ73Q)
TR2	MPSA14	1	(QH60Q)
D1,2	1N4148	2	(QL80B)

MISCELLANEOUS

P1,2,3	Pins 2145	3 Pins	(FL24B)
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PC Board	1	(GE81C)
Min Box and Base	1	(JX56L)
Courtesy Light Leaflet	1	(XK96E)
Constructors' Guide	1	(XH79L)

OPTIONAL (Not in Kit)

Hook up wire 16/0.2 Black	1	(FA26D)
Hook up wire 16/0.2 Red	1	(FA33L)

The above items, excluding Optional, are available as a kit:

Order As LP66W (Courtesy Light Extr)

The following items are also available separately:

Courtesy Light PCB (**GE81C**)

Min Box and Base (**JX56L**)



MAPLIN ELECTRONICS PLC
P.O. Box 777, Rayleigh, Essex, SS6 8LU,
United Kingdom
Telephone: +44 (0) 1702 554000
Fax: +44 (0) 1702 554001
Email: Sales@maplin.co.uk
World Wide Web: <http://www.maplin.co.uk>