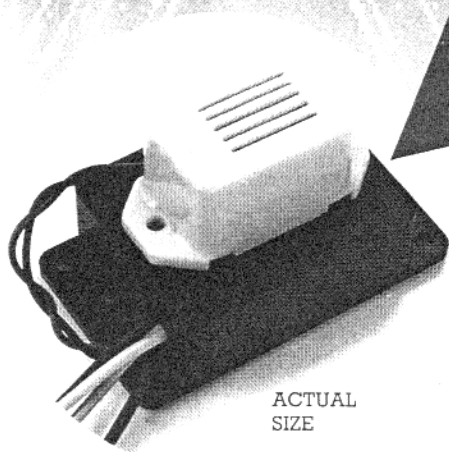


CAR LIGHTS-ON WARNING INDICATOR



ACTUAL SIZE

If your car is not fitted with some kind of 'lights-on warning', the chances are that you will (if you have not already done so!) leave your lights switched on. Murphy's law dictates that when you do so, your absence from the car will be of sufficient duration to ensure that the battery will be well and truly flat. Of course Murphy, not content to do things by halves, will ensure that it happens when you are late for some important occasion and that there is no one else around to give you a push or a jump start!

Modern cars further aggravate the situation as many of them, being fitted with electronic ignition or electronic engine management systems, just plain refuse to be push-started!

It is amazing that such mechanically advanced cars often *do not* have a lights-on warning indicator of some kind. To illustrate this, the prototype was installed in a 2.0 injection Ford Sierra Estate – despite being a 'Ghia', there was no lights-on warning device!

Various warning devices are avail-

by Joe Fuller

- FEATURES**
- ★ Low-cost and small size
 - ★ Easily fitted to most negative earth cars
 - ★ Buzzer sounds when lights are left on

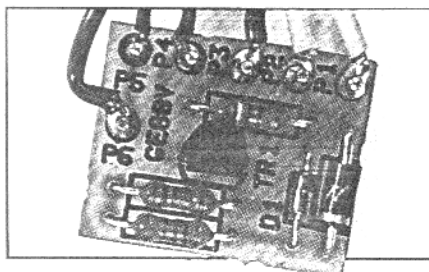
able, however, some become a nuisance because they sound continuously when the lights are deliberately left on. For instance, whilst the driver is waiting in the car at night, with the engine switched off.

Some more sophisticated devices will not sound if the lights are switched on again *after* the ignition has been switched off, i.e. for parking lights. However, this fails to warn the driver if he inadvertently 'knocks' the light switch on when leaving the car – as is the case with

many cars having the light switch 'stalk' on the driver's door side of the steering column.

The Lights-On Warning indicator will emit a clearly audible buzzing sound when the car lights are left on, the ignition switch is turned-off and the driver's door opened. In this manner the buzzer will only sound when the driver is genuinely about to leave the car.

Now that you are thoroughly convinced that for the sake of a few pounds, you need not be caught out in the future, why not build this handy accessory (which the manufacturer should have included as standard) and fit it into your car? Enterprising readers may wish to offer this 'add on' to friends, relatives and neighbours for a suitable fee (don't forget to tell the tax man!). A personal tale of woe and the assurance that, "I've got one and it has stopped me from getting caught out again!" is sure to win a few favourable responses.



The assembled PCB.

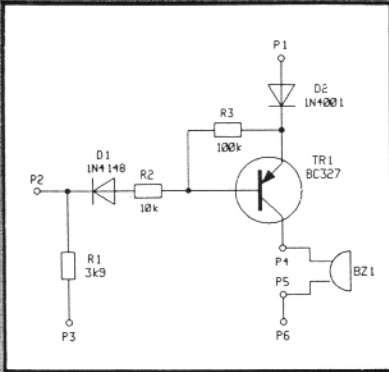


Figure 1. Circuit diagram.

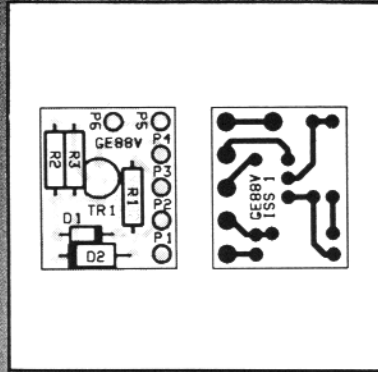


Figure 2. PCB legend and track.



The Lights-On unit attached to a convenient surface.

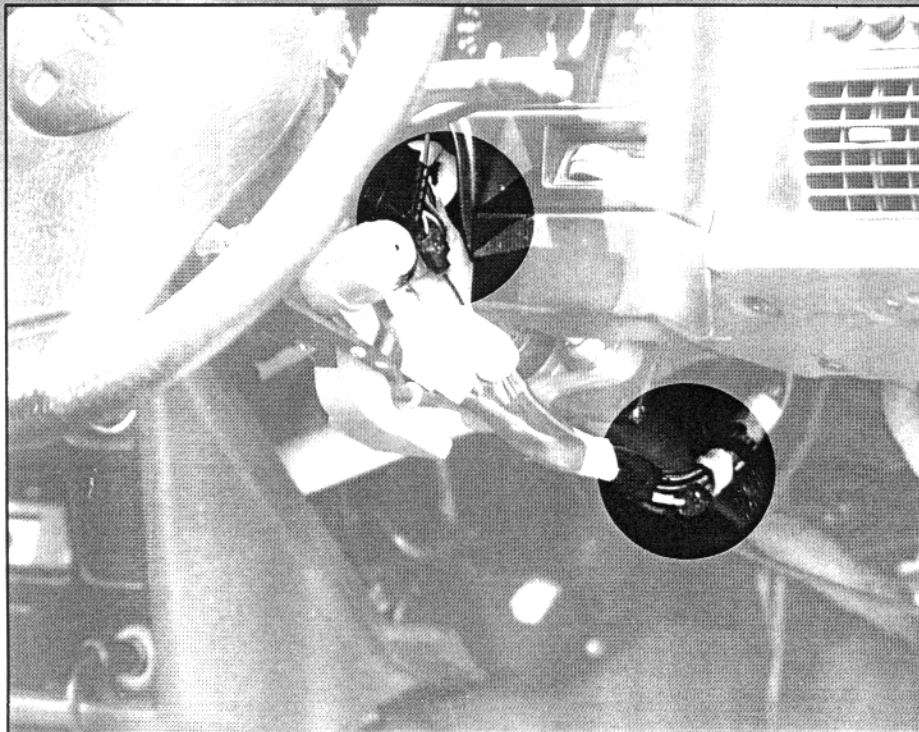


Photo 1. Connections to the sidelight circuit (left) and accessory circuit (right).

Circuit Description and Operation

The circuit of the Lights-On Warning Indicator is very simple, as can be seen from Figure 1. However, it is worthwhile to know how the circuit operates as this will help, should problems occur.

P1 of the unit is connected to the

sidelight circuit of the car and provides power to the circuit only when the lights are switched on. The sidelight circuit is live when either sidelights or headlights are switched on.

P2 is connected to the accessory circuit and when the ignition switch is off, P2 is pulled low via R3 (P3 is connected to 0V). D1 is forward biased and turns on

TR1 via R2. Note that the internal resistance of accessories (i.e. radio-cassette) may be sufficiently low to make the connection to P3 unnecessary; this can be determined by experimentation.

P6 is connected to the driver's door switch, thus when the door is opened, a complete path to 0V is provided by the door switch, allowing the buzzer to sound.

When the ignition switch is on, P2 is pulled high, reverse biasing D1. R3 ensures that TR1 is held in the off state. The positive supply to BZ1 is removed and thus prevents it from sounding, regardless of whether the driver's door is open or shut.

When the lights are off and the car doors are closed, the polarity of the supply to the unit is effectively reversed. D2 prevents damage to the circuit under this condition.

Construction

Assembly of the unit is simplicity itself, however, the complete beginner is referred to the Constructors' Guide supplied with the kit, which contains useful information on construction techniques.

Referring to Figure 2, it is advised that the PCB pins are fitted first, followed by the resistors and the diodes and finally the transistor. Make sure that the transistor is fitted fairly close to PCB otherwise the PCB will not fit into the case.

Next solder the buzzer's wires to the PCB pins, red (+V) to P4, black (-V) to P5. Attach the connecting wires to the PCB pins and label the free ends so that you can identify the wires after the PCB has been fitted into the case!

The PCB simply lays in the case, the wires protruding through the aperture provided. Screw the case together and affix the buzzer onto the lid of the case using one of the double-sided adhesive pads. The other pads can be placed onto the underside of the case ready for fitting into the car.

Although it is unlikely that there will be any problems with the unit, it is advisable to test it before fitting into the car. It is easier to take remedial action on the work bench than underneath the car dashboard! Using a 9 to 14V supply (i.e. PP3 battery, battery eliminator, etc.) connect P3 and P6 to 0V, then connect P1 to +V, the buzzer should sound. Connect P2 to +V as well, this should silence the buzzer.

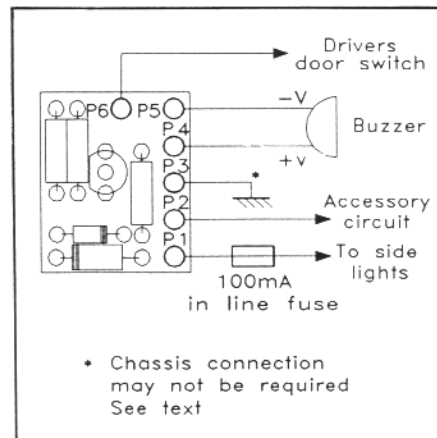
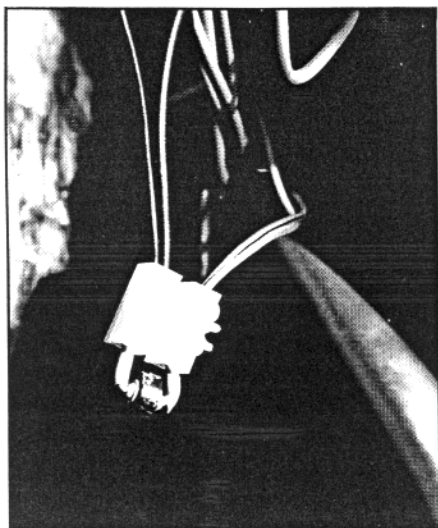


Figure 3 (above). PCB connections.

Photo 2 (left). Connections to the door switch circuit.

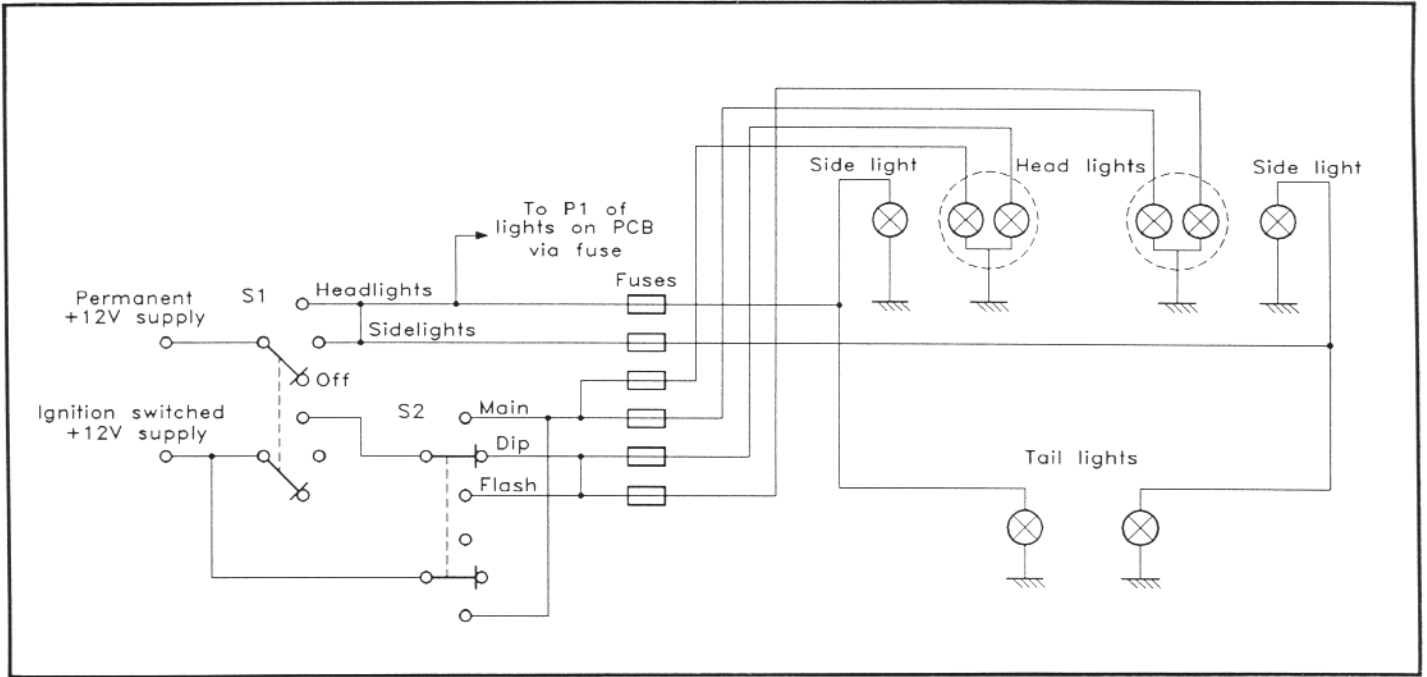


Figure 4. Typical lighting circuit and connections.

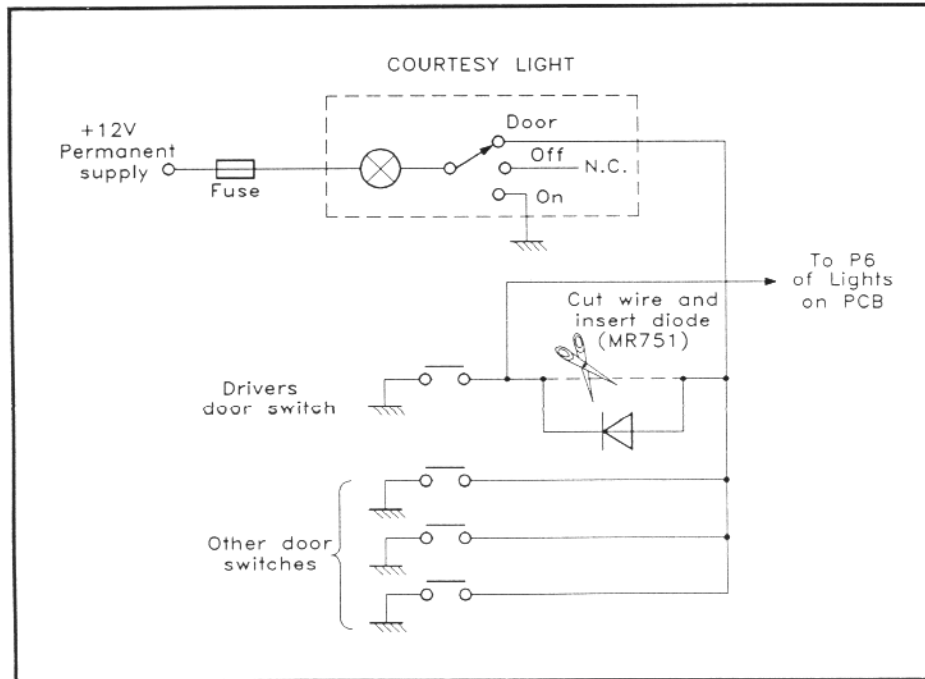


Figure 5. Typical courtesy light circuit and connections.

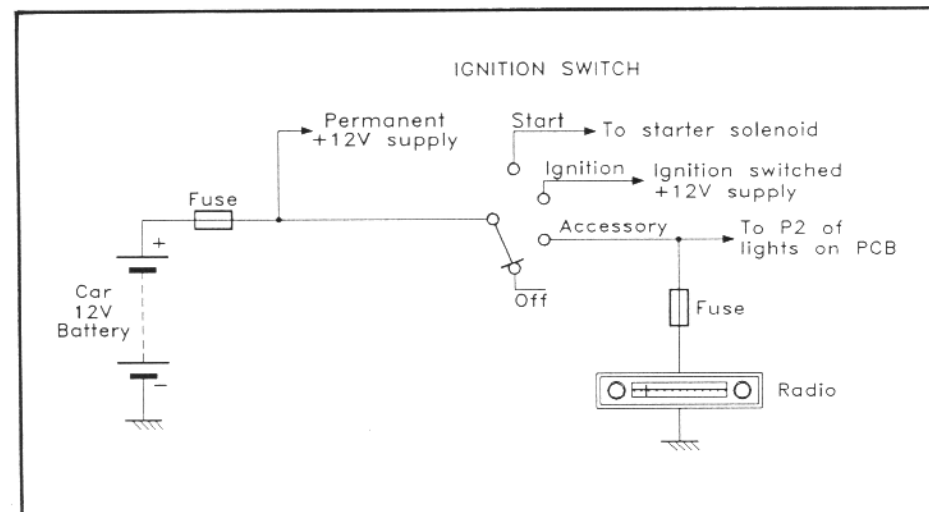


Figure 6. Typical ignition switch circuit and connections.

Installation

Refer to Figures 3, 4, 5 and 6. It is necessary to gain access to the car's wiring, which will undoubtedly involve removing the underside of the dashboard, trim panels, etc. It is advisable to refer to a workshop manual, e.g. of the 'Haynes' variety; if you do not have one, either buy one – as it will be useful anyway, or borrow one from your local library. A workshop manual will also help you ascertain the correct wires to connect to – otherwise it will be a case of tracing the correct wires with a multimeter.

Important Notes: disconnect the car battery before making connections to the wiring. Connections to existing wiring can be made using 'snap lock' connectors or terminal blocks of adequate current rating – remember the Lights-On unit draws very little current, but two 55W headlamp bulbs draw considerably more! Ensure that the new wiring will not become entangled with any controls, especially the brake pedal and steering column. To prevent short circuits, make sure that all connections are properly insulated, use adhesive electrical tape.

Connect P1, via a fuse and fuse-holder, to a point in the wiring which becomes live when the sidelights are switched on (Figure 4 and Photo 1).

Connect P6, to the driver's door switch (Figure 5 and Photo 2). To prevent other doors from operating the buzzer, install an MR751 diode in series with the wire to the courtesy light.

Connect P2 to a point in the wiring which becomes live when the ignition switch is turned to 'accessory', i.e. +V supply to the radio (Figure 6 and Photo 1). Alternatively, if there is no 'accessory' position, connect P2 to a point in the wiring which becomes live when the ignition switch is turned to 'ignition'.

Connect P3 to the car's chassis (0V) or to a point in the wiring which is

permanently connected to the car's chassis. Note that this connection may be unnecessary if the internal resistance of any accessory is sufficiently low. This may be ascertained by testing the unit with P3 left unconnected and all accessories switched *off*. If in doubt connect P3 as previously described.

Double-check connections, reconnect the car battery.

Testing

Switch lights on, leave ignition switched off and open the driver's door; the buzzer *should* sound.

With the driver's door shut, opening any other door should *not* cause the buzzer to sound.

With the ignition switched to 'accessory' or 'ignition', opening the driver's door

should *not* cause the buzzer to sound.

With lights turned off, the buzzer should *not* sound with any combination of ignition switch positions or doors open or closed.

Assuming the unit is working correctly, refit underside of dashboard and trim panels.

Happy Motoring!

LIGHTS-ON WARNING PARTS LIST

RESISTORS: All 0-6W 1% Metal Film

R1	3k9	1	(M3K9)
R2	10k	1	(M10K)
R3	100k	1	(M100K)

SEMICONDUCTORS

D1	1N4148	1	(QL80B)
D2	1N4001	1	(QL73Q)
TR1	BC327	1	(QB66W)
	MR751	1	(YH96E)

MISCELLANEOUS

BZ1	Buzzer 12V	1	(FL40T)
P1-6	Pins 2145	6 pins	(FL24B)★
	In-line Fuse Holder 1¼in.	1	(RX51F)★
	100mA 1¼in. Fuse	1	(WR08J)
	PCB	1	(GE88V)
	Mini Box and Base	1	(JX56L)
	Quickstick Pads	3 pads	(HB22Y)★
	Instruction Leaflet	1	(XT11M)
	Constructors' Guide	1	(XH79L)

OPTIONAL (Not in kit)

16/0-2 Wire	As Req.	(FA26D-FA36P)
Snap Lock Cable Connector	As Req.	(JR88V)
Terminal Block 5A	As Req.	(HF01B)

The Maplin 'Get-You-Working' Service is available for this project, see Constructors' Guide or current Maplin Catalogue for details.

The above items (excluding Optional) are available as a kit.

Order As (Lights-On Reminder) LP77J

Please Note: Order Codes marked with a ★ are not available singly, see current Maplin Catalogue for full ordering information.

The following new item (which is included in the kit) is also available separately.

Lights-On PCB **Order As GE88V**

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