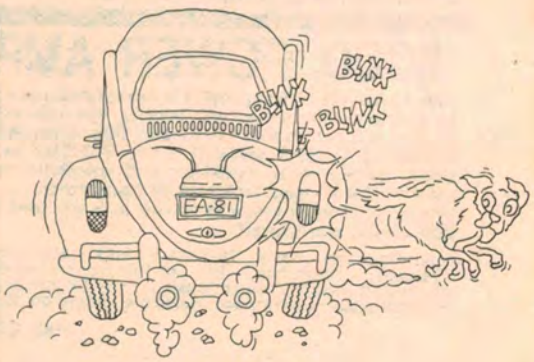
If you can't hear a click, try a bleep!

Fit this audible turn signal indicator

Have you ever had other motorists brandishing their fists at you because your traffic indicators didn't cancel? Fix that problem by building this audible monitor which gives bursts of 500Hz tone in unison with the traffic indicators.

by PAUL DE NOSKOWSKI



"Why doncher turn ya bl---y indicators off, ya --- --- mug!" Maybe this problem has happened to you. You might have been burbling down the bitumen with your latest cassette of Charlie and the Cockroaches bashing the ole eardrums, blissfully unaware of your uncancelled traffic indicators flashing merrily away. No wonder that passing motorist looked a trifle livid!

This simple circuit will solve that problem once and for all and you will not be accused of being deaf or having other inadequacies.

We spent considerable time investigating the ways in which vehicle designers have connected together the flasher, switch, signal lights, and interior repeater lights. To put it mildly, we were surprised. The number of combinations appears endless. Although all the designs are basically similar, it is the details where the differences occur. And this created problems for us in coming up with a unit which could have universal application.

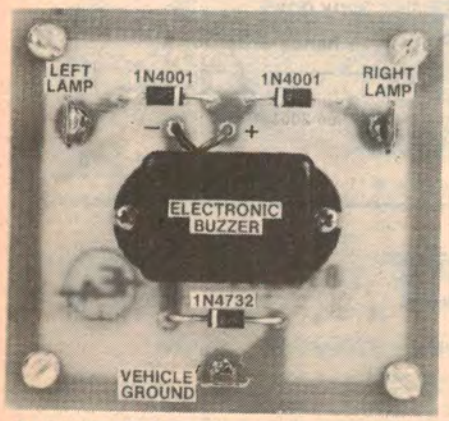
From our investigations it appears that the active conductors between the turn signal switch and the left and right front signal lights are the only connections which are common to all systems. Thus our unit is interfaced with these two conductors. Each of these conductors is connected to the anode of a diode, with the cathodes of the two diodes being joined together. This junction is taken to the positive terminal of a 9 volt electronic buzzer, whose negative terminal is returned to ground via a series 4.7 volt zener diode. The purpose of this zener diode is to both optimise the voltage across the 9 volt buzzer, and to offset the residual voltage across the turn signal lamps.

"What residual voltage across the lamps," did we hear you say? Well, during normal operation there is a residual voltage of some two to three volts across the flashing lamps during the visual "off" part of the signal; and it is provided by an internal circuit in the vehicle's flasher. The flasher contains a pair of normally-open contacts which are connected in series between the battery and the lamps. Paralleled across these contacts is a heating element which completes the circuit to the lamps, allowing current to flow and thus providing a residual voltage in the "off" part of the cycle.

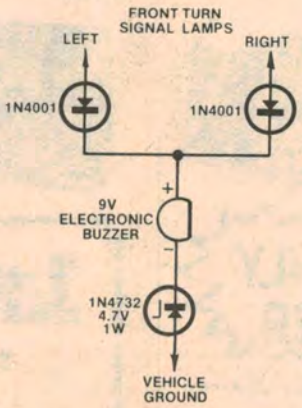
Operation of the turn signal switch initiates the above condition (flasher globes being preheated, and flasher heater warming up). After about a quarter of a second, expansion of the flasher heater reduces the spring tension holding the contacts apart, so that they now close; applying full voltage to the lamps, and de-energising the heater, such that it now cools. After a further quarter of a second, the heater has cooled sufficiently for the spring tension to be restored thus reopening the contacts. This extinguishes the signal lamps and reapplies power to the heater, with the cycle repeating itself. This will continue until such time as the turn signal switch is restored to "off".

It should be noted that although the residual current through the globes appears to be a by-product of the operation of the flasher, its presence ensures that the lamp filaments are always preheated prior to "flashing". Benefits are twofold. Firstly, the preheating provides a faster visual switch-on at the start of each flash. Secondly, it increases the service life of the globes.

As many of the readily-available small electronic buzzers operate down to voltages as low as three or four volts, it was necessary for us to offset the residual voltage, which could, in some circumstances be high enough to maintain continuous buzzer operation during



Construction is easy – just follow the above photograph. At right is the circuit.



EA AUDIBLE TURN SIGNAL MONITOR
3/AU/-

the visual "off" periods. Using a 4.7 volt zener diode provides an ample margin of safety, and provides a nominal 9 volts to the 9 volt buzzer; during normal vehicle operation where the system voltage is set to function at about 14 volts (note that the diode OR gates introduce an additional 0.6 volts offset, making a total offset of approx 5.3 volts).

CONSTRUCTION

We constructed the prototype on a printed circuit board measuring 61 x 56mm and coded 81au11. Standard auto electrical connectors are used for making connections to the board and to the vehicle's wiring harness.

Commence assembly by installing and soldering into place the three diodes. Follow the overlay provided to ensure that all diodes are correctly polarised.

PARTS LIST

- 1 printed circuit board 81au11, measuring 61 × 56mm
- 4 18mm threaded spacers
- 8 10mm round head screws to suit spacers
- 1 miniature 9V electronic buzzer
- 2 8BA Screws and nuts for mounting buzzer
- 3 male auto-type ¼" flat blade terminals, Utilux H1170, H1188, H1189, H1925 or equivalent
- 2 1N4001 silcon diodes or equivalent
- 1 1N4732 4.7V 1W zener diode or equivalent
- 3 female auto-type ¼" receptacles, Utilux type H1071, H1072, H1956, H1961, H1972 or equivalent
- 3 insulating sleeves for female ¼" receptacles, Utilux type H1135 or equivalent
- 2 four-way female "bullet" adapters, Utilux type H862 or equivalent
- 6 male "bullet" connectors, Utilux type H852, H863 or equivalent
- ½ metre green 2.5mm auto cable
- 3 metres blue (or white) 2.5mm auto cable
- 3 metres yellow (or orange) 2.5mm auto cable

Although current model vehicles use a negative ground system (and our unit is naturally designed to function with them), quite a few earlier model vehicles, such as Morris 850s and Mini de Luxes, operate on a positive ground system. For these vehicles you will have to reverse the polarity (ie, the connections) of all four components on the board.

Having installed the diodes, install and solder into place the three auto-type ¼" flat blade terminals. Depending upon the exact style of terminals supplied with your kit, it may be desirable to shorten the rear of the terminal so that the projection from the copper side of the board is no greater than 1 or 2mm. In ad-

dition, it will probably be necessary to fold over the "ears" on the rear of the terminals in order for them to pass through the 3.5mm clearance holes on the PCB.

Finally, attach the electronic buzzer to the PCB, with the aid of the screws and nuts provided. The buzzer has two "flying leads", one red, the other black, for connection to the circuit. Cut the positive (red) lead to length, and solder to the pad connected to the junction of the 1N4001 diodes. Likewise, cut the negative (black) lead to length, pass through the hole in the PCB, and solder to the pad connected to the cathode of the zener diode. To complete the PCB, screw the four 18mm threaded spacers to its base.

To check the board, connect one of its inputs to the positive terminal of a 12 to 15 volt DC supply (car battery or bench supply), and its ground terminal to the negative of the supply. The buzzer should sound. If OK, change the positive lead to the other input. Once again, the buzzer should sound.

INSTALLATION

Because of the many differences in mechanical construction and electrical wiring that are present in different makes and models of cars, we suggest that you borrow or buy a Workshop Manual for your particular vehicle to assist in locating and identifying the required cables, and other parts.

With the aid of a lead light or torch, investigate behind the dashboard and instrument panel to find a suitable place for mounting the completed board. Having decided upon a position, install the board.

Now, referring to your Workshop Manual, identify the leads connecting the outputs of the turn signal switch to the left and right front signal lamps. In most cases the Manual will provide the colours of the leads, and also the presence of all connectors between the turn signal switch and the signal lamps.

Having established the required colours, carefully inspect the wiring between the steering column and the bulkhead to try to locate and identify the desired leads.

Having established the lead colours to look for, carefully inspect the vehicle harness to find the best place to "break into" the circuit and connect the traffic indicator monitor. On some vehicles, the easiest place will be underneath the dash but on several we looked at, the easiest place is in the engine compartment, at connectors (or branch off points) just behind the headlights.

To cover such situations we have specified, in the parts list, that the two lengths of 2.5mm auto cable should each be 3 metres long.

Having identified the two leads, and decided upon the most convenient place for the junction to be made, cut each in turn and fit male "bullet" connectors to the cut ends. Using four-way female bullet adapters, reconnect the severed leads by pressing the bullet connectors into opposite ends of the appropriate four-way adapters.

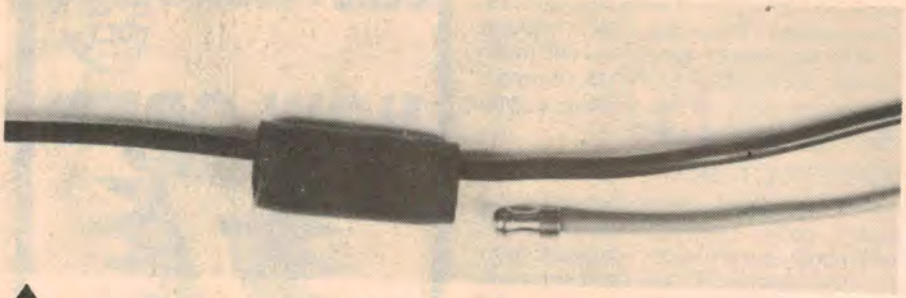
At this point test the left and right turn signal indicators for normal "flashing" operation. Should there be a problem, check the connection of the cables to the four-way adapters. Correct the error and on no account proceed to the next step, before having solved the problem.

Now join one of the ¼" quick-connect female receptacles to one length of 2.5mm auto cable. Place an insulating sleeve on the cable prior to making the joint. If you have access to a suitable crimping tool, crimp the receptacle to the conductors; otherwise solder them together. After completing the electrical joint be sure to bend the end tabs over the cable insulation, so that any mechanical strain is taken by the sheath rather than the conductors. Repeat the above procedure with the other length of 2.5mm auto cable.

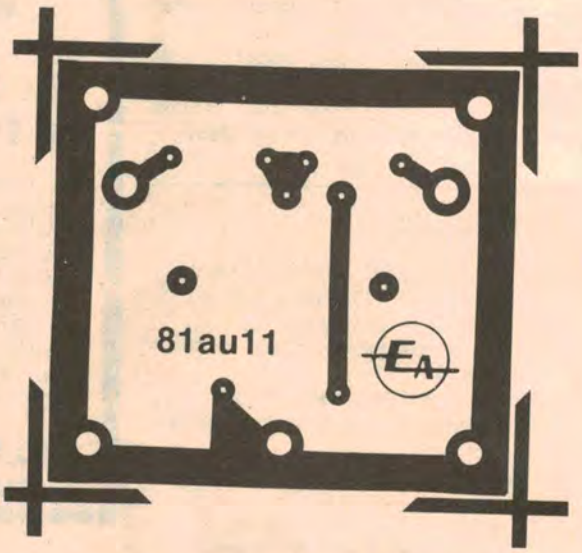
Attach these two cables to the PC board's input circuit by firmly pressing them onto the ¼" flat blade terminals. Lay the cables neatly with the original equipment wiring behind the dash – either using lacing or cable clamps – and take them to where you have previously installed the four-way bullet adapters. Leaving sufficient cable to form two small "goosenecks", cut the cables and fit male bullet connectors to the cut ends. Press one connector into, say, the four-way adapter feeding the left side signal lamps; and the other bullet connector into the adapter feeding the right side signal lamps.

Join the remaining ¼" quick-connect receptacle to the green 2.5mm auto cable, as described for the previous two receptacles. Press this receptacle onto the "ground" terminal of the PC board. Find a suitable nut and bolt behind the dashboard (or on the bulkhead) to which the other end of the green cable can be secured (to provide an earth return for the audible monitor).

This completes the installation, and the unit may be tested by operating the turn signal switch (with the ignition on, or in the "accessories" position). You should hear bursts of 500Hz tone synchronised with the visual flashes from the front and rear signal lamps. Voila! Happy motoring.



Above: the Audible Turn Monitor is connected into circuit using male "bullet" connectors and a 4-way female "bullet" adapter. Two adapters are required, one for each of the front lamps.



At right is an actual-size reproduction of the PC artwork.

We estimate that the current cost of parts for this project is approximately

$7.50

including sales tax.