PANIC BUTTON

by Dave Goodman

- ★ **For use with the Maplin Home Security System**
- ★ **Will trigger External Horn even if system is disarmed**
- ★ **Can be reset with existing alarm unit keyswitch**

This project has been designed specifically in response to the many requests we have had for a 'Panic Button' addition to our Home Security System.

The requirement is for a button placed close to the front or back doors, inside the home, or even by the bedside. In any emergency pressing the button would trigger the alarm, setting off sirens, lamps, etc., and hopefully attracting attention and dissuading potential burglars. The Panic Button PCB caters for up to four switches, which should prove adequate for most applications, and complete instructions are given for connection to the Burglar Alarm PCB.

Circuit Description

With reference to figure 1, two diodes, D1 and D2, are wired to the spare change-over contacts on the Burglar Alarm keyswitch (figure 3). Either of these diodes will always be forward biased, allowing D3 only to conduct when the contact changes over. The keyswitch contacts are break-before-make, so that during switching a positive pulse appears at D3, which will, in turn, trigger the monostable IC1b and IC1c. This lengthened trigger pulse forward biases D4 and resets the latch IC1d and IC1e.

The output from IC1d is held low by R9 and a high output from IC1e. This may be thought of as a loop. IC1a and

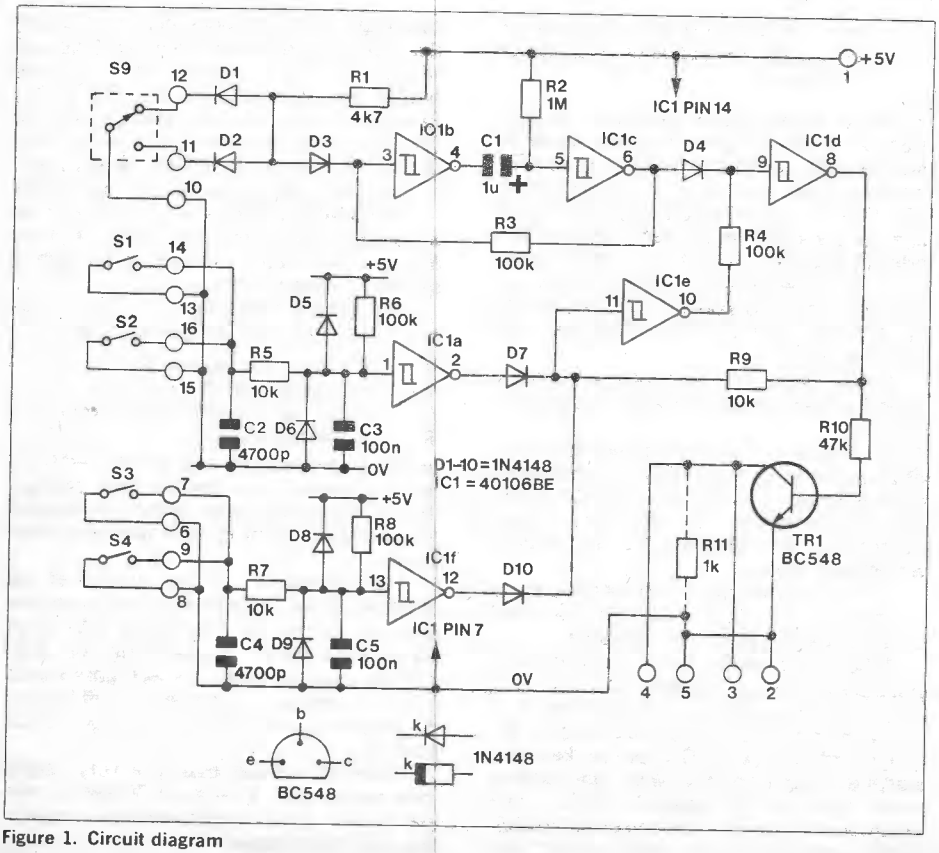
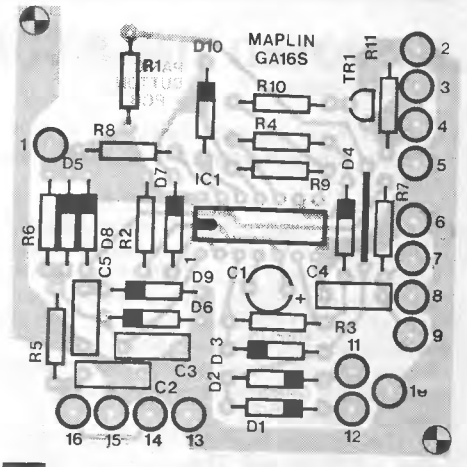


Figure 1. Circuit diagram



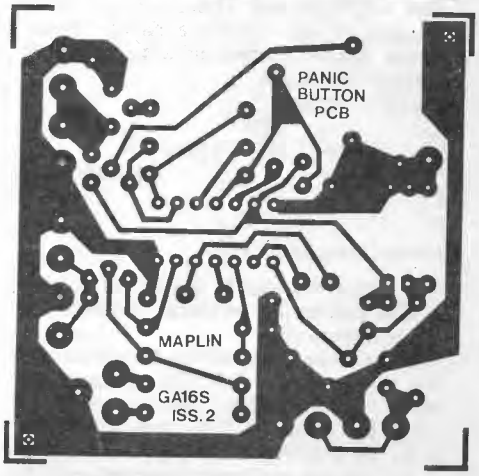


Figure 2. PCB layout and legend

IC1f are input buffers for the panic buttons. These are arranged into two input groups, with provision for two switches per group, allowing up to four switches to be connected. D5, D6, C2, and C3 slow the switching action to avoid contact bounce problems, and give protection from false triggering from RF voltages and spikes induced along connecting cable runs. D8, D9, C4 and C5 perform the same function for the other group.

Both buffer inputs are held high, by R6 and R8, and D7 and D10 will be reverse biased. Pressing button 1 will take IC1a input low and D7 will conduct. IC1e output will go low and IC1d output will switch high. TR1 will then conduct and remain in this state, due to the latching action of IC1d and e, even when button 1 is released. TR1 collector and emitter are wired across the external horn pins on our Burglar Alarm PCB (figure 4), and will now trigger the external horn. If the burglar alarm is in 'set' mode this too will be triggered. To reset the panic button and/or the main alarm/external horn keyswitch S9 must be switched from one position to the other, but it does not matter which way or how many times this is done. Associated circuitry for buttons 2 to 4 functions in the same way.

Assembly

Bend and insert the one link, between D4 and R7, and insert resistors R1 to R11. All ten diodes can now be fitted, making sure that their black tips align with the white bar on the legend. Fit the five capacitors, noting that C1 is polarised. Finally place TR1 and the 14-pin IC socket in position and solder all components carefully. If you are using

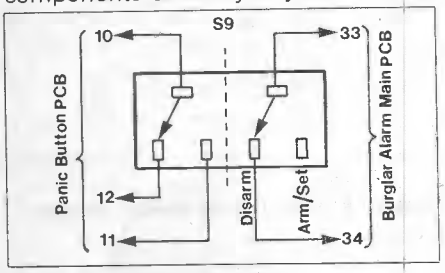
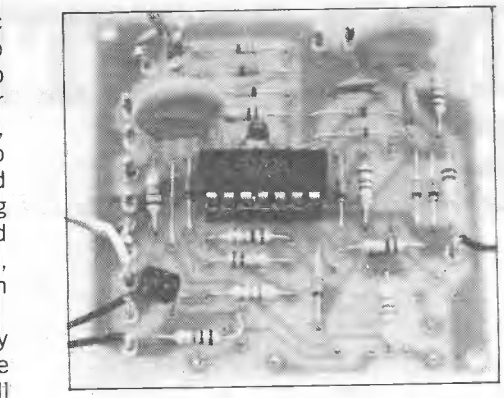


Figure 3. Keyswitch connections



them, fit all sixteen veropins and solder those too. Cut all excess leads and check for dry joints and short circuits. Insert IC1 into the holder and proceed with testing the board.

Testing

Refer to figure 4 before attempting to connect the PCB to your alarm unit, first switching off mains and removing batteries, if fitted. This will cause the external horn to trigger, so disconnect the external wiring from pins 29 and 30 (if used), and reconnect the wire ends to a 4.5V battery. If the horn still sounds, reverse battery connections to these wires and the horn will stop. Of course, the batteries may be removed from the external horn cabinet, but this may prove to be inconvenient in practice.

Connect three wires from the Panic Button PCB to the Burglar Alarm PCB as follows:

Panic Button PCB		Burglar Alarm PCB
pin 1		+5V
pin 4	to	pin 30
pin 5		pin 29

also connect pins 10, 11, and 12 to keyswitch S9, as shown in figures 3 and 4.

Re-apply power to the alarm system and turn key-switch S9 to SET. After any time out period the alarm should not trigger. If it does you rnay have left the micro switch (mounted on PSU) released. Simulate the panic buttons with a piece of wire connecting pins 13 and 14. The alarm will trigger, and continue to sound until the keyswitch is turned to DISARM. Remove the short on pins 13 and 14. Now return the keyswitch to SET and short pins 6 and 7 together. Again, the alarm should sound continually. Remove the short on pins 6 and 7.

The next check is made with an external horn connected to the panic button PCB. Either the external horn or the programmable timer PCBs can be used. Figure 4 shows wiring connections for both, so choose the one appropriate to your system. On the panic button PCB R11 must be completely removed, remembering to remove all power sources before you do so.

Reconnect power, sirens, etc., and turn the keyswitch to SET. Short circuit pins 15 and 16 on the panic PCB. Both internal and external horns should sound. Turn key to DISARM. Remove short from pins 15 and 16 and short pins 8 and 9. This time only the external horn should sound, and it should continue sounding until the short is removed. Turn the keyswitch to SET and then back to DISARM to reset the external horn. Tests are now complete and the system is ready for use.

The System In Use

Mount the PCB in the burglar alarm cabinet and connect the wiring as shown in figures 3 and 4.

The type of switches used for the panic buttons will depend on personal preference, but switches ideal for this purpose appear in the parts list. A make-when-pressed action is required, and up to four buttons can be used.

Some points to remember are:—

1. Connect the external horn circuitry direct to the panic PCB, and *NOT* to the burglar alarm PCB as it was previously.
2. The normal burglar alarm functions have not changed in any way.
3. The panic facility will function whether the burglar alarm is set or not. The only difference between the two modes is that although both internal and external horns sound in the ARMED mode, only the external horn will sound in the DISARMED mode.
4. Either type of external horn PCB will function with this project.

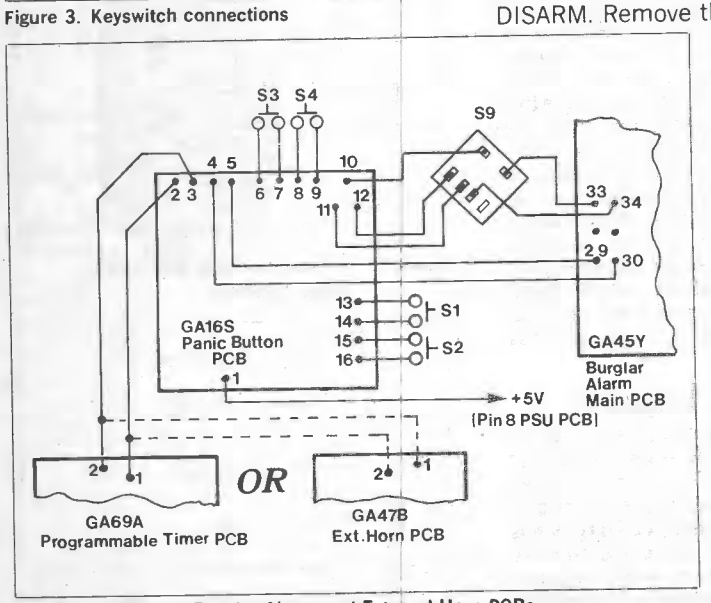


Figure 4. Wiring to Burglar Alarm and External Horn PCBs

PANIC BUTTON PARTS LIST

Resistors - All 0.4W 1% metal film

R1	4k7		(M4K7)
R2	1M		(M1M)
R3, 4, 6, 8	100k	4 off	(M100K)
R5, 7, 9	10k	3 off	(M10K)
R10	47k		(M47K)
R11	1k		(M1K)
Capacitors			
C1	1uF 35V Tantalum		(WW60Q)
C2, 4	4700pF 1000V Disc	2 off	(HY18U)
C3, 5	100nF Disc Ceramic	2 off	(BX03D)
Semiconductors			
TR1	BC548		(QB73Q)
IC1	40106BE		(QW64U)
D1 10 inc.	1N4148	10 off	(QL80B)
Miscellaneous			
	Panic Button PCB		(GA16S)
	Veropin 2141	1 Pkt	(FL21X)
	14 pin DIL skt.		(BL18U)
S1, 2, 3, 4	Lrg push button SPST	(up to 4)	(RK82D)

A complete kit of parts, including one panic button, is available for this project. **Order As LW97F (Panic Button Kit). Price £4.50.**