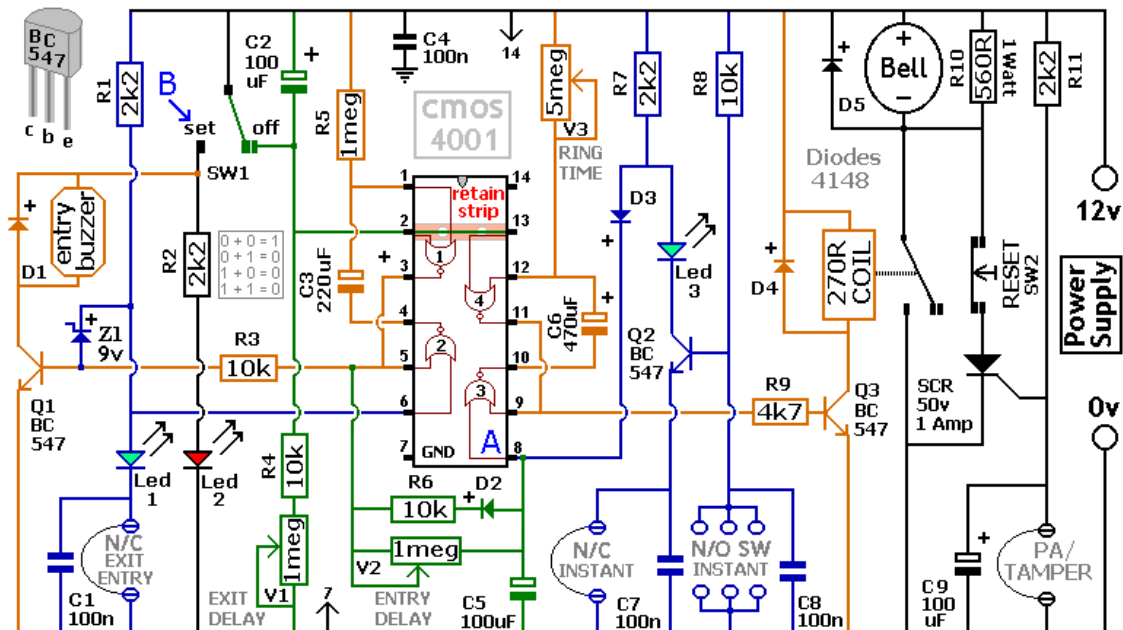# Modular Burglar Alarm

This circuit features automatic Exit and Entry delays and a timed Bell Cut-off. It has provision for both normally-closed and normally-open contacts, and a 24-hour Personal Attack/Tamper zone. It is connected permanently to the 12-volt supply and its operation is "enabled" by opening SW1. By using the expansion modules, you can add as many zones as you require; some or all of which may be the inertia (shock) sensor type. All the green LEDs should be lighting before you open SW1. You then have up to about a minute to leave the building. As you do so, the Buzzer will sound. It should stop sounding when you shut the door behind you. This indicates that the Exit/Entry loop has been successfully restored within the time allowed. When you re-enter the building you have up to about a minute to move SW1 to the off position. If SW1 is not switched off in time, the relay will energise and
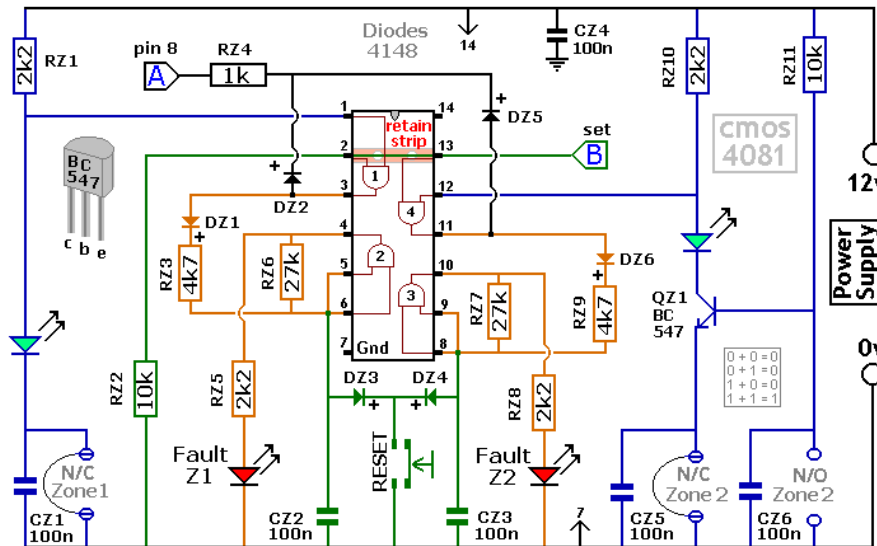
sound the main bell. It will ring for up to about 40 minutes. But it can be turned off at any time by SW1. The "Instant" zone has no Entry Delay. If you don't want to use N/O switches, leave out R8, C8 and Q2; and fit a link between Led 3 and C7. The 24 Hour PA/Tamper protection is provided by the SCR/Thyristor. If any of the switches in the N/C loop is opened, R11 will trigger the SCR and the bell will ring. In this case the bell has no time limit. Once the loop is closed again, the SCR may be reset by pressing SW2 and temporarily interrupting the current flow. The basic circuit will be satisfactory in many situations. However, it's much easier to find a fault when the alarm is divided into zones and the control panel can remember which zone has caused the activation. The expansion modules are designed to do this. Although they will work with the existing instant zone, they are intended to replace it. When a zone is activated, its red LED will light and remain lit until the reset button is pressed. All the modules can share a single reset button.

The Modular Burglar Alarm [Support Material](#) includes the stripboard layout of the prototype, a parts list, a complete circuit description and more.
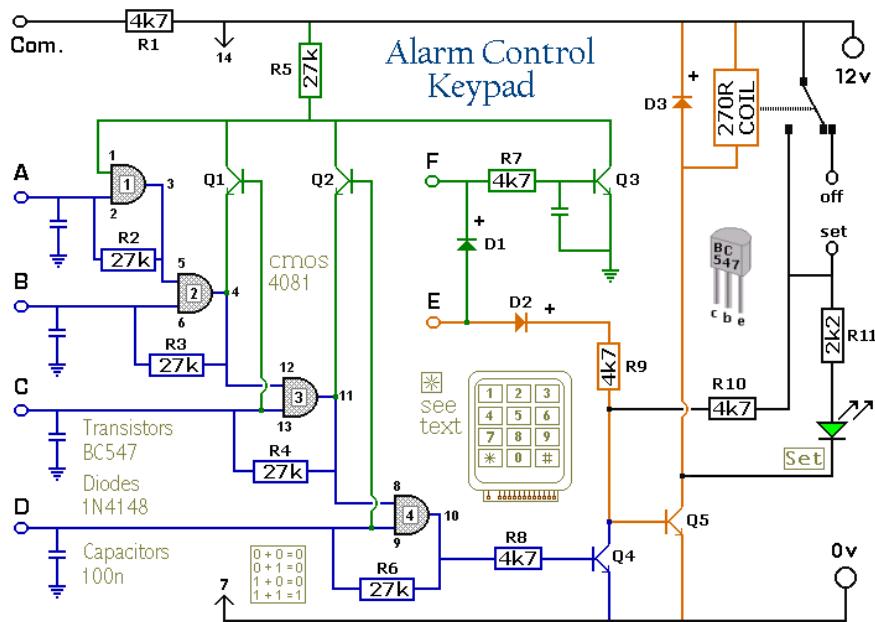
Inertia Sensor Module
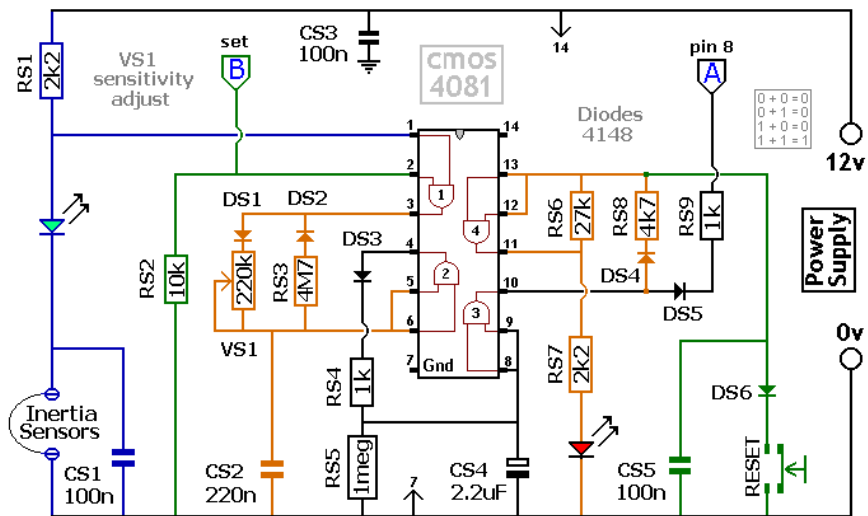
Two Zone Module

This is an enhanced 5 digit keypad which may be used with the Modular Alarm System.

Alarm Control Keypad

Com. — 4k7 R1 — 14 — R5 27k

A — 1 — 3 — Q1 — Q2 — F — R7 4k7 — Q3

cmos 4081

B — 2 — 5

R2 27k — R3 27k

C — 12 — 13 — 11

Transistors BC547
Diodes 1N4148
Capacitors 100n

D — R4 27k — 8 — 4 — 10 — 9 — R6 27k — 7

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0 + 0 = 0
0 + 1 = 0
1 + 0 = 0
1 + 1 = 1
```

E — D2 — 4k7 R9 — R8 4k7 — Q4

see text

D3 — 270R COIL — 12v — off — set — 2k2 R11 — Set — BC 547 c b e — R10 4k7 — Q5 — Ov

D1

Notes:

The Keypad must be the kind with a common terminal and a separate connection for each key. On a 12-key pad, look for 13 terminals. The matrix type with 7 terminals will NOT do. The Alarm is set by pressing a single key. Choose the key you want to use and wire it to 'E'. Choose the four keys you want to use to switch the alarm off, and connect them to 'A B C & D'. Your code can include the non-numeric symbols. With a 12-key pad, over 10 000 different codes are available. Wire the common to R1 and all the remaining keys to 'F'. When 'E' is pressed, current through D2 and R9 switches Q5 on. The relay energises, and then holds itself on by providing base current for Q5 through R10. The 12-volt output is switched from the "off " to the "set " terminal, and the LED lights. To switch the Alarm off again it is necessary to press A, B, C & D in the right order. The IC is a quad 2-input AND gate, a Cmos 4081. These gates only produce a high output when both inputs are high. Pin 1 is held high by R5. This 'enables' gate 1, so that when 'A' is pressed, the output at pin 3 will go high. This output does two jobs. It locks itself high using R2 and it enables gate 2 by taking pin 5 high. The remaining gates operate in the same way, each locking itself on through a resistor and enabling its successor. If the correct code is entered, pin 10 will switch Q4 on and so connect the base of Q5 to ground. This causes Q5 to switch off and the relay to drop out. Any keys not wired to 'A B C D or E' are connected to the base of Q3 by R7. Whenever one of these 'wrong' keys is pressed, Q3 takes pin 1 low. This removes the 'enable' from gate 1, and the code entry process fails. If 'C' or 'D' is pressed out of sequence, Q1 or Q2 will also take pin 1

low, with the same result. You can change the code by altering the keypad connections. If you need a more secure code use a bigger keypad with more 'wrong' keys wired to 'F'. A 16-key pad gives over 40 000 different codes. All components are shown lying flat on the board; but some are actually mounted upright. The links are bare copper wires on the component side. Two of the links must be fitted before the IC.

[Veroboard Layout](#)

ALARM CONTROL KEYPAD Component Side