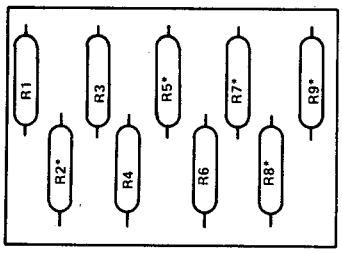
ELECTRONIC LOCK

* REPRESENTS REED SWITCHES THAT HAVE TO BE TURNED ON I.E. MAGNETISED



REED SWITCHES ARE SHOWN IN ONE ROW IN CIRCUIT DIAGRAM BUT SHOULD BE WIRED AS SHOWN ABOVE TO AVOID CROSS TRIGGERING BY CLOSE REED MAGNETS

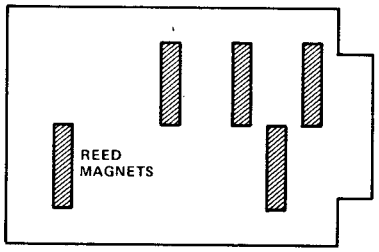
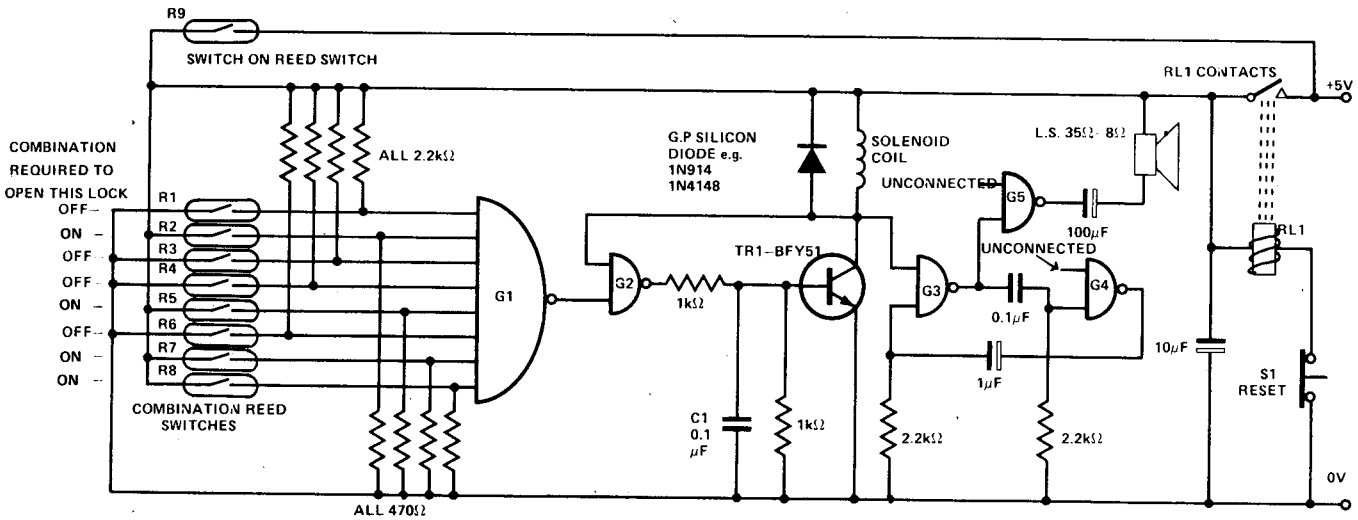


DIAGRAM OF KEY NEEDED TO OPEN THIS LOCK



NOTE G1 = SN7430 8 INPUT NAND GATE I.C. G2,G3,G4,G5 = SN7400 QUAD 2 INPUT NAND GATE I.C.

This device enables a solenoid to be switched on by means of an electronic key. If the correct key is used the circuit will latch, but if an incorrect key is inserted a warning tone rings until the correct key is used. The circuit has automatic switching to turn it on, but this can be replaced by a conventional ON-OFF switch if desired.

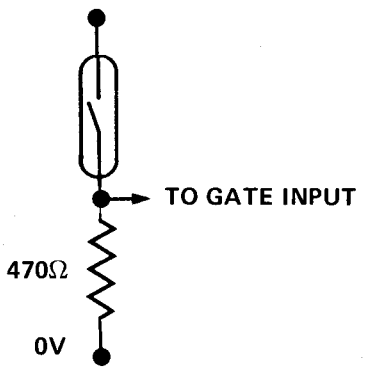
The main element of the circuit is G1 the eight-input NAND gate. If all inputs of the NAND gate are high (achieved by closing the right combination of reed switches) the output will be low. The low output is fed to G2 forcing its output high which turns on TR1 energising the solenoid coil. At the same time a low is fed, back from TR1's collector to G2's other input latching it. Thus once the solenoid is energised the key may be removed. C1 (0.1μF) ensures that TR1 is always 'off' on switch-on of the circuit.

TR1's collector is also connected to G3's input which along with G4 forms a multivibrator. When TR1's output is low the multivibrator is dis-enabled. However if an incorrect key is used TR1's output will be high and the multivibrator will oscillate. G5 acts as a buffer to drive a loudspeaker.

R9 with RL1 forms the automatic switch on circuit. When R9 is closed RL1 is energised pulling in it contacts to permanently connect the supply. If R9 is opened after this the circuit continues to operate. This means if an incorrect key is used and R9 is closed the alarm tone will continue to ring even if the key is removed.

Nine reed switches are used in the circuit. One to switch on the circuit and the other eight to provide the correct input combination. The lock opens only if all eight inputs to the NAND gate are high. To do this the circuit is wired so that some reed switches must be on and some **must be off**. The eight reed switches give 2^8 = 256 possible combinations.

Reed switches that have to be turned on are wired like this



If the reed switch is not closed the 470Ω will pull gate input to low and the lock will not open.