



ELECTRONIC PROJECT KIT

Relay Logic

An electromagnet that throws a switch: NOT, memory, an alarm, and the bell.

48
IN ONE

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THE FIVE YOU ARE GRADED ON

- № 16 · One coil, two circuits — ohmsville.com/bench#a=exp-16
- № 17 · Kickback — ohmsville.com/bench#a=exp-17
- № 18 · Dark alarm — ohmsville.com/bench#a=exp-18
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- № 20 · The electric bell — ohmsville.com/bench#a=exp-20

Relay Logic

An electromagnet that throws a switch: NOT, memory, an alarm, and the bell.

A relay is an electromagnet that throws a switch, and a switch it throws is in a circuit it never touches. That one fact is what the whole of this booklet is about, plus the diode you must put across every coil if you would like your transistors to survive the experience.

One-way street

WHAT YOU SHOULD SEE

The LED lights, with about 0.7 V across the 1N4001. Turn the diode round and all is dark.

PARTS

9 V battery, 1N4001 from the drawer, 330 Ω, red LED

THE SHOP TEACHER'S NOTE

A diode passes current from A to K and blocks it the other way. It costs about 0.7 V to get through, which is why the LED is a shade dimmer than without it. Rectifiers, protection, and the detour across a relay coil all start here.

WIRING

1. 1 → 46

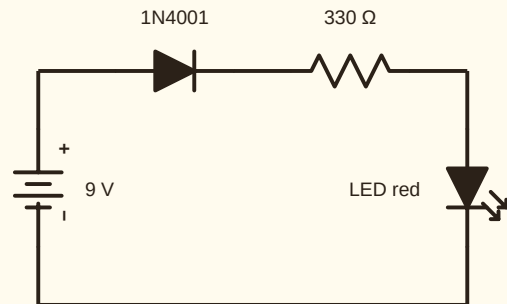
3. 6 → 28

2. 47 → 5

4. 29 → 2

Open it on the bench: ohmsville.com/bench#a=one-way-street

SCHEMATIC



Alarm button

WHAT YOU SHOULD SEE

Hold the button and the buzzer sounds; let go and it stops.

PARTS

9 V battery, pushbutton, buzzer from the drawer

THE SHOP TEACHER'S NOTE

The buzzer has its own oscillator inside, so it only needs DC: 9 V, + to +, and about 16 mA. Anything that can close a loop, a button, a transistor, a relay contact, can sound an alarm.

WIRING

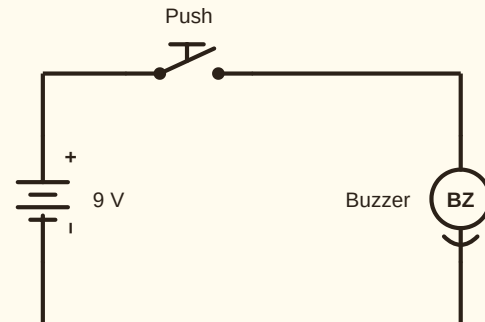
1. 1 → 38

3. 47 → 2

2. 39 → 46

Open it on the bench: ohmsville.com/bench#a=alarm-button

SCHEMATIC



Ghost in the wires

WHAT YOU SHOULD SEE

Slide ON to arm it. Something crosses the shadow once and the buzzer starts — and keeps going after whatever it was has gone. Only the slide shuts it up.

PARTS

9 V battery, slide switch, 100 kΩ, CdS cell, Q1, Q2, 2 × relay and 2 × 1N4001 from the drawer, buzzer from the drawer

SLIDE SWITCH ON.

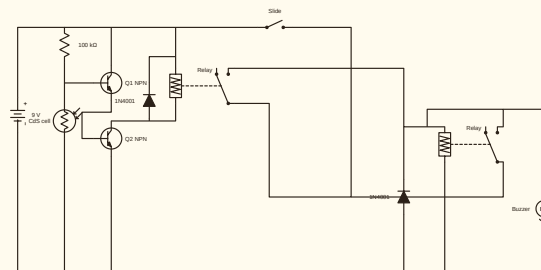
THE SHOP TEACHER'S NOTE

Two relays, and neither of them is clever. The first is experiment 18: the CdS cell goes dark, the transistor pair pulls the coil in, and its contact gives the second relay one push. The second is experiment 19: its own contact feeds its own coil, so once it is in, it holds itself in and the buzzer stays on. The first relay lets go the moment the light comes back and it makes no difference at all. That is a bit of memory, made of a hinge, and it is how every burglar alarm before the microprocessor knew you had been there.

WIRING

- | | |
|------------|-------------|
| 1. 1 → 15 | 12. 1 → 40 |
| 2. 16 → 33 | 13. 41 → 48 |
| 3. 33 → 44 | 14. 41 → 55 |
| 4. 45 → 2 | 15. 49 → 53 |
| 5. 32 → 1 | 16. 56 → 53 |

SCHEMATIC



The touch alarm

WHAT YOU SHOULD SEE

Arm it with the slide. Touch the plates once — dry hands are enough — and the buzzer starts and keeps going after you let go. Only the slide shuts it up.

PARTS

touch plates from the drawer, 1 MΩ resistor from the drawer, Q1, Q2, relay and 1N4001 from the drawer, buzzer from the drawer, slide switch

SLIDE SWITCH ON.

THE SHOP TEACHER'S NOTE

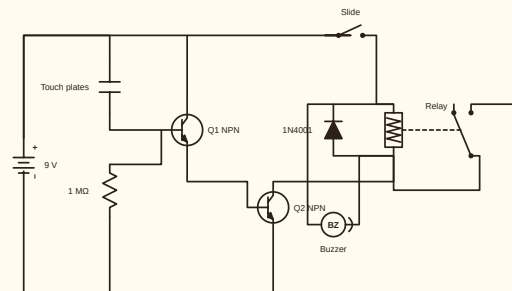
Skin across the plates (about a megohm dry) is enough current through the 1 MΩ base resistor to switch Q1, Q1 switches Q2, and Q2 pulls the relay in. The relay's own contact straight from the battery, so it holds itself in the instant the finger lifts — the same latch as the ghost-in-the-wires alarm (experiment 19), armed by a touch instead of a shadow.

WIRING

1. 1 → 46	9. 41 → 50
2. 47 → 33	10. 51 → 35
3. 33 → 48	11. 55 → 51
4. 49 → 2	12. 56 → 41
5. 32 → 1	13. 52 → 51
6. 34 → 36	14. 53 → 2
7. 37 → 2	15. 57 → 41
8. 1 → 40	16. 58 → 51

Open it on the bench: ohmsville.com/bench#a=touch-alarm

SCHEMATIC



Colophon

Generated from the modules the bench runs on; every circuit in this booklet is the circuit the simulator solves, and every word beside it is the word the manual panel prints.

Built 2026-09-15 from commit 953a47e.

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