OHMSVILLE

MISSION BOOKLET

Spooky Shack

The shop is shut, the lights are out and something in the 200 in the still smoking.

Contents

Spooky Shack

The shop is shut, the lights are off, and something in the 200-in-1 is still running.

Six circuits for the dark. Nothing in here is a sound effect: the candle flickers because two clocks that do not divide into each other are fighting over one LED, and the ghost remembers you crossed the room because a relay latched and has not let go.

Two Lamps Taking Turns

BEFORE

Something is out past the window and there are two of it, and it blinks. Not together — one, then the other. Build a pair of lamps that take turns without anybody telling them to.

AFTER

Two transistors, each switching the other off through a capacitor. Nothing is in charge. The eyes have their own opinion about when to blink.

HOW PEOPLE GOT THERE

1919 William Eccles and Frank Jordan published a two-valve circuit in Radio Review in 1919 in which each valve held the other one off, so the pair had two states and would sit in either. They called it a trigger relay; everybody since has called it a flip-flop. Run it with capacitors instead of a steady coupling and it refuses to settle at all, which is the flasher on your board.

W. H. Eccles and F. W. Jordan, "A trigger relay utilising three-electrode thermionic vacuum tubes", Radio Review 1 (1919).

The Wail

BEFORE

The shack needs a voice, and it has to be a voice that answers the room. Put the light cell where a timing resistor was and the tone will follow your hand.

AFTER

Something physical, turned into ohms, turned into a pitch. Wave over the cell and it wails; cover it and it dies away. That is the costume the theremin wears all year.

HOW PEOPLE GOT THERE

1873 Willoughby Smith was testing undersea cable with selenium rods and could not get consistent readings until he noticed the rods behaved differently when the box was open. Light was lowering their resistance. He wrote it up in 1873, and every light sensor since — this CdS cell included — is that observation with better chemistry.

Willoughby Smith, "Effect of light on selenium during the passage of an electric current", Nature, 20 February 1873.

The Groan

BEFORE

A wail is not a groan. The shack wants a door: something low that slides downward. Put a knob in the timing leg and find out how far the pitch will bend.

AFTER

More ohms, slower charge, lower note. You can bend it by hand now; the creaky-door recipe lets a capacitor bend it for you while you stand back.

HOW PEOPLE GOT THERE

1920 Lev Termen was measuring the dielectric properties of gases in Petrograd in 1920 when he noticed the pitch of his monitoring oscillator changed as he moved his hand near it, and built an instrument out of the accident. The theremin is played without being touched, which is why it spent the next thirty years being the sound of anything unearthly — Spellbound in 1945, The Day the Earth Stood Still in 1951.

Albert Glinsky, Theremin: Ether Music and Espionage (2000). The 1920 date is Termen's own account; the film credits are standard.

The Tripwire

BEFORE

Anything that comes down the aisle crosses the beam from the window. The shack needs to know, and it must not go off every time a cloud passes.

AFTER

A cell, two transistors with a gain of ten thousand between them, and a relay with its own hysteresis. Break the beam and something on the other side of the contact wakes up.

HOW PEOPLE GOT THERE

1881 Alexander Graham Bell and Charles Sumner Tainter sent speech 213 metres across a Washington rooftop on a beam of sunlight in 1880, with a selenium cell in the receiver. Bell thought the photophone was his greatest invention. What survived of it was the simpler half: that a broken beam of light, landing on a cell, can mean something.

A. G. Bell, "On the production and reproduction of sound by light", American Journal of Science, October 1880; Smithsonian National Museum of American History on the photophone.

It Remembers You

BEFORE

Whatever crossed the aisle is gone and the alarm has stopped. That is no good. The shack needs a circuit that stays annoyed after the reason has left.

AFTER

The relay feeds its own coil, so once it is in, it holds itself in. One relay is one bit, and the bit says: somebody was here.

HOW PEOPLE GOT THERE

1852 William Channing and Moses Farmer put Boston's fire-alarm telegraph into service in 1852: a street box that, once pulled, latched and kept tapping out its own number until an operator at the central station cleared it. The point was precisely that the person who pulled it could walk away. Latching relays ran alarms and telephone exchanges for a century on that idea.

Channing and Farmer's Boston fire-alarm telegraph, in service 1852 (Smithsonian Institution; Boston Fire Historical Society). The mechanism varied box to box; the latch-until-reset behaviour is the constant.

The Candle's Own Clock

BEFORE

One thing left. The shack needs a candle, and a candle that blinks on a beat is not a candle. Start with a chip that keeps time whether or not anyone is watching.

AFTER

A clock in a package. Run two of them at rates that do not divide into each other and the flame never sits still — which is the flickering candle, and the lightning, and the eyes.

HOW PEOPLE GOT THERE

1910 Georges Claude showed the first neon tubes at the Paris Motor Show in December 1910. A neon lamp with a resistor and a capacitor makes a relaxation oscillator that flickers on its own, and that is what put the guttering light in haunted-house props, the flasher in road barricades and the blink in test gear for the next fifty years. The 555 does the same job without needing ninety volts to strike.

Claude's Paris Motor Show demonstration, December 1910 (widely documented). The neon relaxation oscillator is textbook — e.g. General Electric, Glow Lamp Manual (1965) — but "fifty years" is a span, not a date.

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.

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