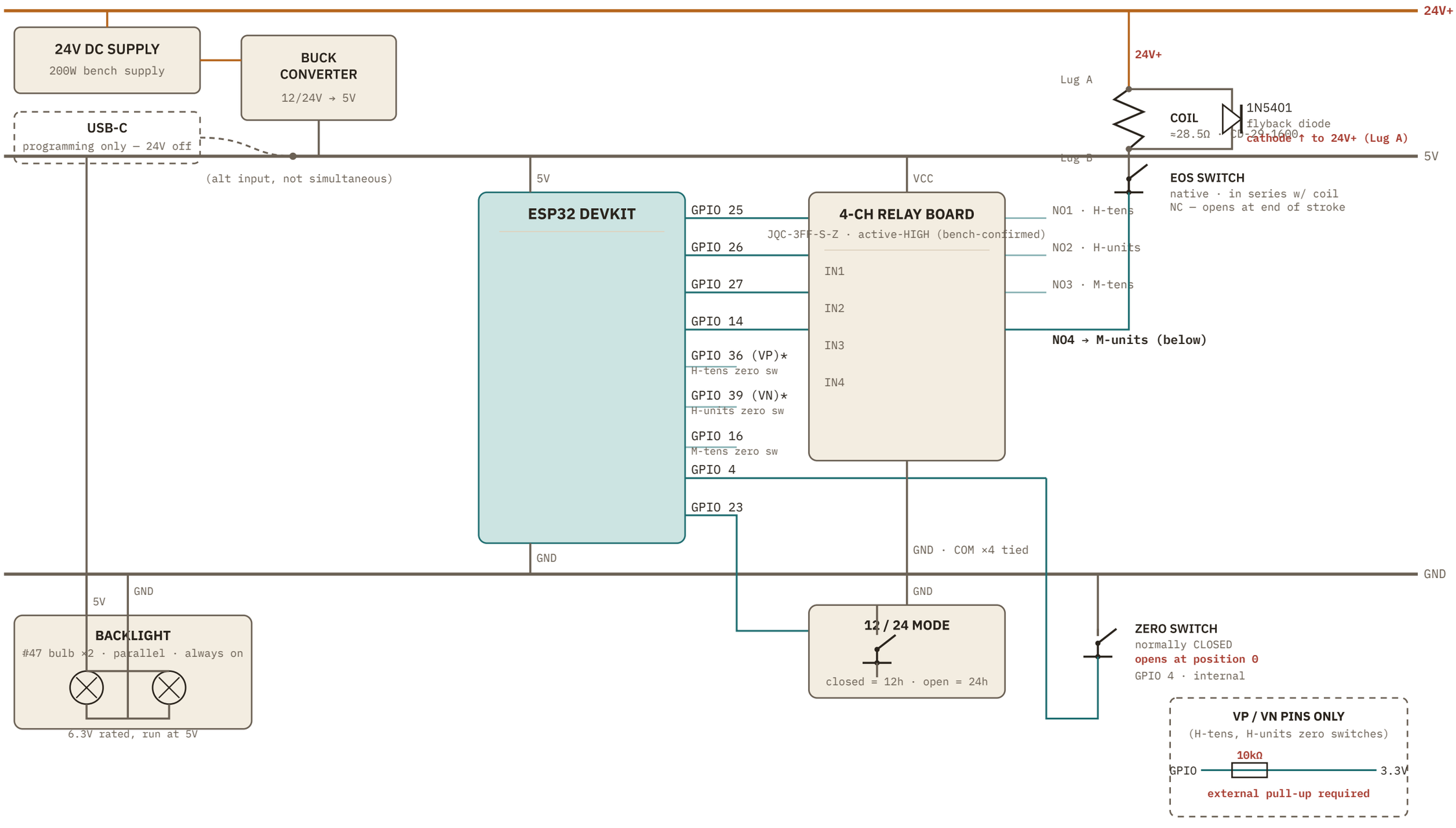
REEL CLOCK WIRING

Full electrical build for the Bally EM score-reel clock: ESP32, a 4-channel relay board, four score-reel solenoids, and the switches that home them — power domains, control signals, and one fully detailed reel circuit standing in for all four.

4 REELS | 24V DC COIL SUPPLY | 5V LOGIC RAIL | ESP32 DEVKIT | SELF-HOMING + DRIFT CORRECTION



One reel (M-units / Minutes-1s) is drawn in full: ESP32 GPIO 14 drives relay channel 4, whose NO contact completes a 24V loop through the reel's native EOS switch and coil back to ground, with a flyback diode across the coil and a separate normally-closed zero switch reporting position back to GPIO 4. The other three reels follow the identical pattern — only their GPIO numbers, pull-up requirement, and tuned pulse timing differ; see the table below.

24V DC (coil supply) — 5V / GND (logic supply) — GPIO signal — alternate / abbreviated path — critical detail — easy to get backwards

PER-REEL REFERENCE

REEL	RELAY #	RELAY GPIO	ZERO GPIO	ZERO PULL-UP	PULSE TIME
H-tens (Hour 10s)	1	25	36 (VP)	**External 10kΩ → 3.3V**	110 ms
H-units (Hour 1s)	2	26	39 (VN)	**External 10kΩ → 3.3V**	60 ms
M-tens (Minute 10s)	3	27	16	Internal (INPUT_PULLUP)	60 ms
M-units (Minute 1s)	4	14	4	Internal (INPUT_PULLUP)	60 ms
12/24 mode switch	—	—	23	Internal (INPUT_PULLUP)	—

BUILD NOTES

Relay trigger polarity varies by board

This board is active-HIGH as jumpered, confirmed by bench-cycling each channel before trusting it — a different board or jumper setting can just as easily be active-LOW. Never assume; test it.

Zero switch is normally CLOSED

It opens at the zero position — the opposite of a typical momentary switch. Confirm with a multimeter before wiring the pull-up logic, or homing will silently find the wrong position.

GPIO 34/35/36/39 have no internal pull-up

These four ESP32 pins lack the hardware for INPUT_PULLUP entirely. Any switch on one of them needs an external 10kΩ resistor to *3.3V*, not 5V — these pins aren't 5V-tolerant.

EOS switch stays in hardware, not code

It's wired in series with the coil itself and never touches the ESP32. It's what actually protects the coil from continuous power — the relay's pulse timing is tuned to respect it, not replace it.

Flyback diode across every coil

Cathode (banded end) toward whichever lug is wired to 24V+ — that's the coil's positive side during normal operation, regardless of whether the relay switches the high side or the ground side.

Pulse timing is per-reel, found by testing

Too long a pulse and a reel can double-fire before its own EOS switch recloses. Start around 120ms and bench-test each reel down until stepping is reliable with no double-fires.

Source: github.com/kd4gar/ReelClock