G6K-2G-Y-TR 5V Relay Module

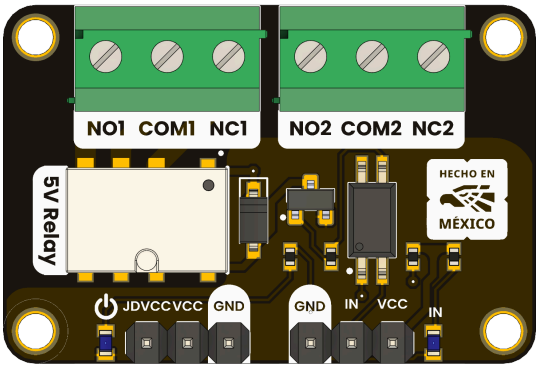
DEVLAB FACTOR

Mfr. Part #: UE0082

Product Reference Manual (V1.0)

Description

This dual-channel relay module isolates high-power operations from sensitive MCU logic. It supplies a dedicated 5V rail (JDVCC) for relay coils while using the VCC pin to match the MCU's operating voltage (5V). A digital high on the IN pin triggers an optocoupler that switches the NO, NC, and COM contacts. LED indicators provide immediate feedback on power and control status.



Key Features

- The module includes one electromechanical relay, with two independent contacts or two channels, both controlled through optocoupler for complete electrical isolation between control logic and relay coil voltage.
- A dedicated power rail (JDVCC) provides 5V specifically to energize the relay coils, while a separate VCC pin supplies 3.3V or 5V to the optocoupler input stage.
- Both relay channels are triggered via an active-low digital input signal (IN) from the microcontroller.
- The relay outputs provide access to a set of contacts: Normally Open (NO), Normally Closed (NC), and Common (COM).
- When triggered, the relay switches the contacts, allowing control of external AC/DC loads while protecting the MCU from high-voltage transients.
- LED indicators (LED PWR and LED IN) provide immediate visual feedback of power and activation status.

Important: Active Low Logic

This relay module implements optocoupler-based inverted logic. The relay coils are energized when the control input (IN) receives a LOW signal (0V), which is opposite to conventional direct relay control.

Control Logic:

- Relay Energized (ON): IN pin = LOW (0V)
- Relay De-energized (OFF): IN pin = HIGH (~VCC)

DevLab format compatibility.

Simplicity and compatibility are the core principles of the **DevLab form factor**. This standard defines a **compact and communication-optimized board layout**, ensuring straightforward connection and interoperability among DevLab modules.

By adhering to this format, the UNIT Capacitive Touch Sensor guarantees **efficient prototyping**, **ease of integration**, and **unified accessibility** across a wide ecosystem of devices and development platforms.

Hardware Features

- Operating voltage (logic side): 3.0 V – 5.5 V (via VCC pin)
- Relay coil voltage: 5 V nominal (via JDVCC)
- Trigger current per channel: 2–15 mA depending on input logic level
- Contact rating: Up to 0.3 A - 125 VAC or 1 A - 30 VDC
- Optocoupler logic threshold: Compatible with 3.3 V and 5 V logic

Software Support

PlatformIO / VS Code
Provides a professional development environment with multi-board build automation, advanced debugging, and integrated version control for streamlined workflows.

MicroPython
General support for scripting and rapid prototyping on selected boards (mainly RP2040, STM32, and ESP32 families).

Development Frameworks by Platform

- **PY32 (Puya / Cortex-M0+)**
  Uses **HAL-based libraries** (PY32 HAL). Offers STM32-like API for GPIO, I²C, SPI, ADC, and timers.

- **STM32 (STMicroelectronics)**
  Compatible with **STM32 HAL** and **Arduino Core**. Supported by STM32CubeMX, PlatformIO, and Arduino IDE.

- **nRF Series (Nordic Semiconductor)**
  Works with **nRF SDK** and **Arduino Core (nRF5/nRF52)**. Enables BLE, Thread, and low-power IoT applications.

- **RP2040 (Raspberry Pi)**
  Supports **Arduino Core**, **MicroPython**, and **Pico-SDK** (official C/C++ SDK).

- **Espressif (ESP32 / ESP32-C6 / ESP32-H2)**
  Compatible with **ESP-IDF**, **Arduino Core**, and **MicroPython**. Includes Wi-Fi, BLE, and 802.15.4 Thread support.

Note: MicroPython is officially supported for **RP2040**, **STM32**, and **ESP32** families. Other platforms may require community ports or custom builds.

Applications

- Home Automation
- IoT Projects
- Automated Irrigation
- Testing & Laboratory
- Robotics & Mechatronics
- Smart Agriculture
- Security & Alarm Systems
- Education & Demos

CONTENTS

1 The Board

1.1 Accessories

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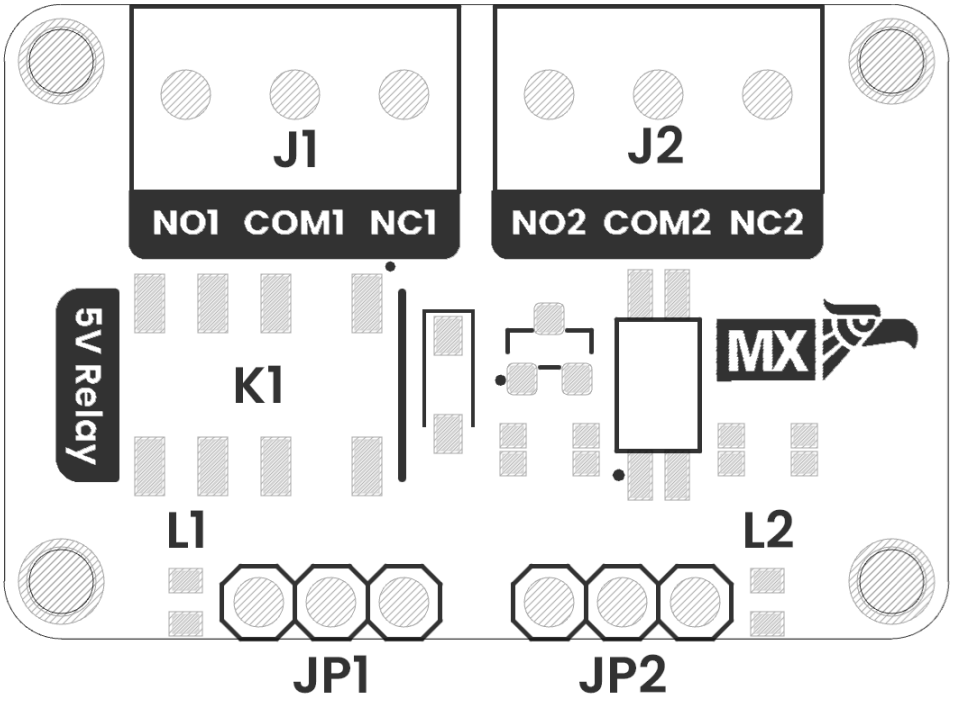
2 Ratings

2.1 Recommended Operating Conditions

Symbol	Description	Min	Typ	Max	Unit
VDD	**Operating voltage**	**5.0**	**—**	**5.5**	**V**
VJD	Relay coil voltage (via JDVCC)	—	5.0	—	V
I_{IN}	Trigger current per channel (input logic)	2	—	15	mA
I_C	Contact current rating	—	—	0.3 (AC) / 1.0 (DC)	A
V_C	Contact voltage rating	—	—	125 (AC) / 30 (DC)	V

3 Functional Overview

3.2 Board Topology

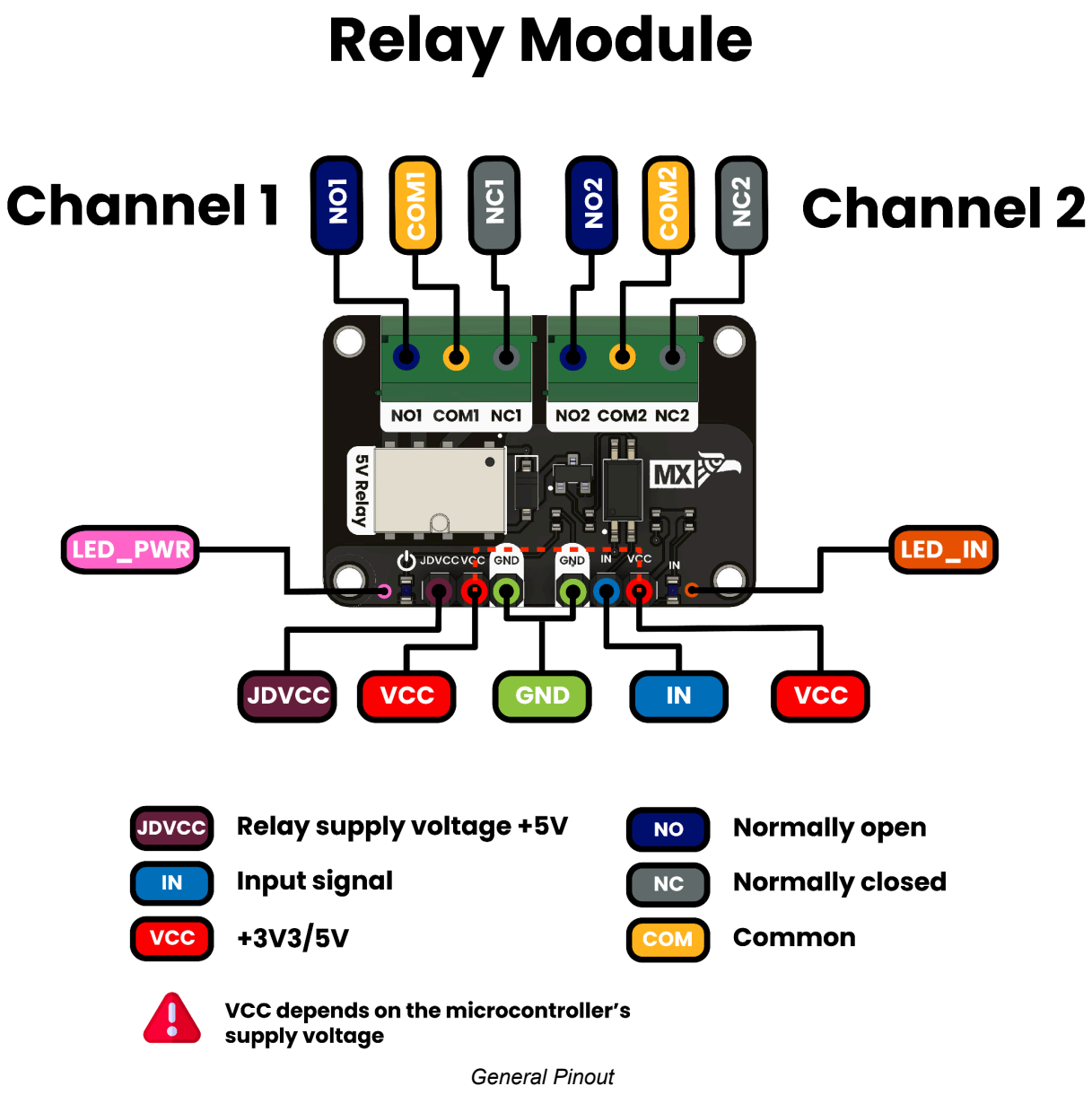


Top View of board Topology

Views of Topology

4 Connectors & Pinouts

4.1 General Pinout



General Pinout

4.2 Pinout General Description

Function	PCB Label	Description
Relay coil supply	JDVCC	+5 V supply to energize the relay coils
Logic supply	VCC	MCU logic voltage (3.3 V or 5 V) for optocoupler/driver circuit
Control input channel 1	IN	Logic-level input from MCU to activate relay channel 1
Normally open contact 1	NO1	Relay 1 contact that closes when the coil is energized
Common contact 1	COM1	Relay 1 common terminal
Normally closed contact 1	NC1	Relay 1 contact that opens when the coil is energized
Normally open contact 2	NO2	Relay 2 contact that closes when the coil is energized
Common contact 2	COM2	Relay 2 common terminal
Normally closed contact 2	NC2	Relay 2 contact that opens when the coil is energized
Power indicator LED	LED_PWR	Lights whenever the module is powered (JDVCC present)
Input-signal indicator LED	LED_IN	Lights or flashes to show an active IN signal from the MCU

5 Board Operation

5.1 Getting Started with Micropython

This example demonstrates how to control a single-channel relay module using **non-blocking timing logic** in MicroPython. Instead of stopping program execution with `sleep_ms()`, it uses **timestamp comparisons** (`utime.ticks_ms()` and `utime.ticks_diff()`) to toggle the relay while keeping the main loop free for other tasks.

> **Note:** This relay module uses **active LOW logic** — the relay energizes when the GPIO output is set to `0`.

What You'll Need

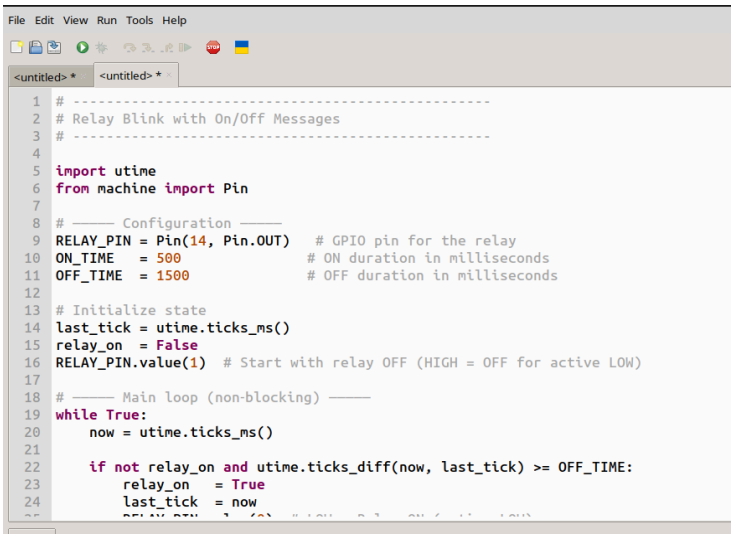
- DevLab 5 V Relay Module (G6K-2G-Y-TR type)
- MicroPython-capable board (e.g., ESP8266, ESP32, or Raspberry Pi Pico)
- Jumper wires
- USB cable
- MicroPython firmware and **Thonny IDE** or **ampy** tool

Pinout and Wiring

Signal	Description	Connection
RELAY_PIN	Relay control input	Connect to chosen GPIO pin
VCC	Power input (3.3 V or 5 V depending on board)	MCU VCC pin
GND	Common ground	MCU GND pin

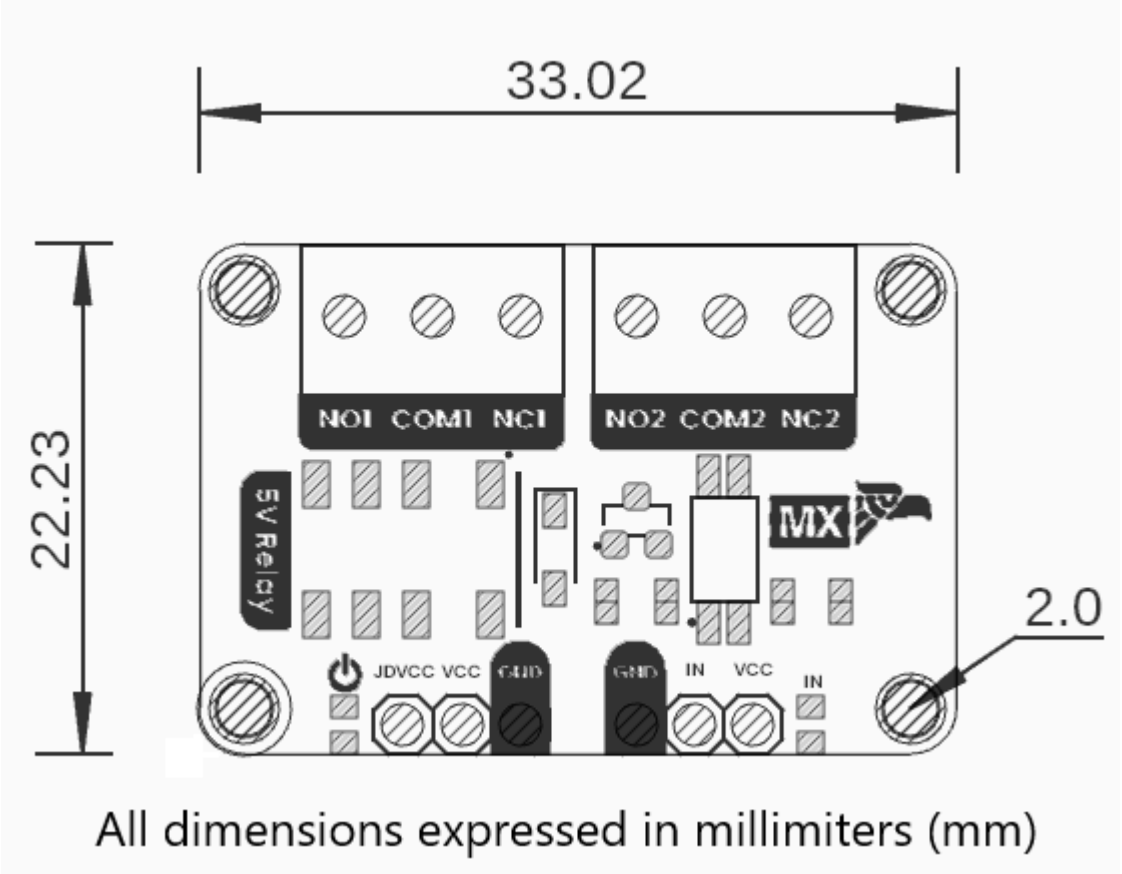
MicroPython Example

The official example is available in the DevLab repository:
https://github.com/UNIT-Electronics-MX/unit_devlab_g6k_2g_y_tr_5v_relay_module/blob/main/software/examples/python_code/blink.py




```python
# ------------------------------------------------
# Relay Blink with On/Off Messages
# ------------------------------------------------

import utime
from machine import Pin

# ——— Configuration ———
RELAY_PIN = Pin(14, Pin.OUT)   # GPIO pin for the relay
ON_TIME   = 500                # ON duration in milliseconds
OFF_TIME  = 1500               # OFF duration in milliseconds

# Initialize state
last_tick = utime.ticks_ms()
relay_on  = False
RELAY_PIN.value(1)  # Start with relay OFF (HIGH = OFF for active LOW)

# ——— Main loop (non-blocking) ———
while True:
    now = utime.ticks_ms()

    if not relay_on and utime.ticks_diff(now, last_tick) >= OFF_TIME:
        relay_on   = True
        last_tick  = now
```

6 Mechanical Information



Mechanical dimensions in millimeters

7 Company Information

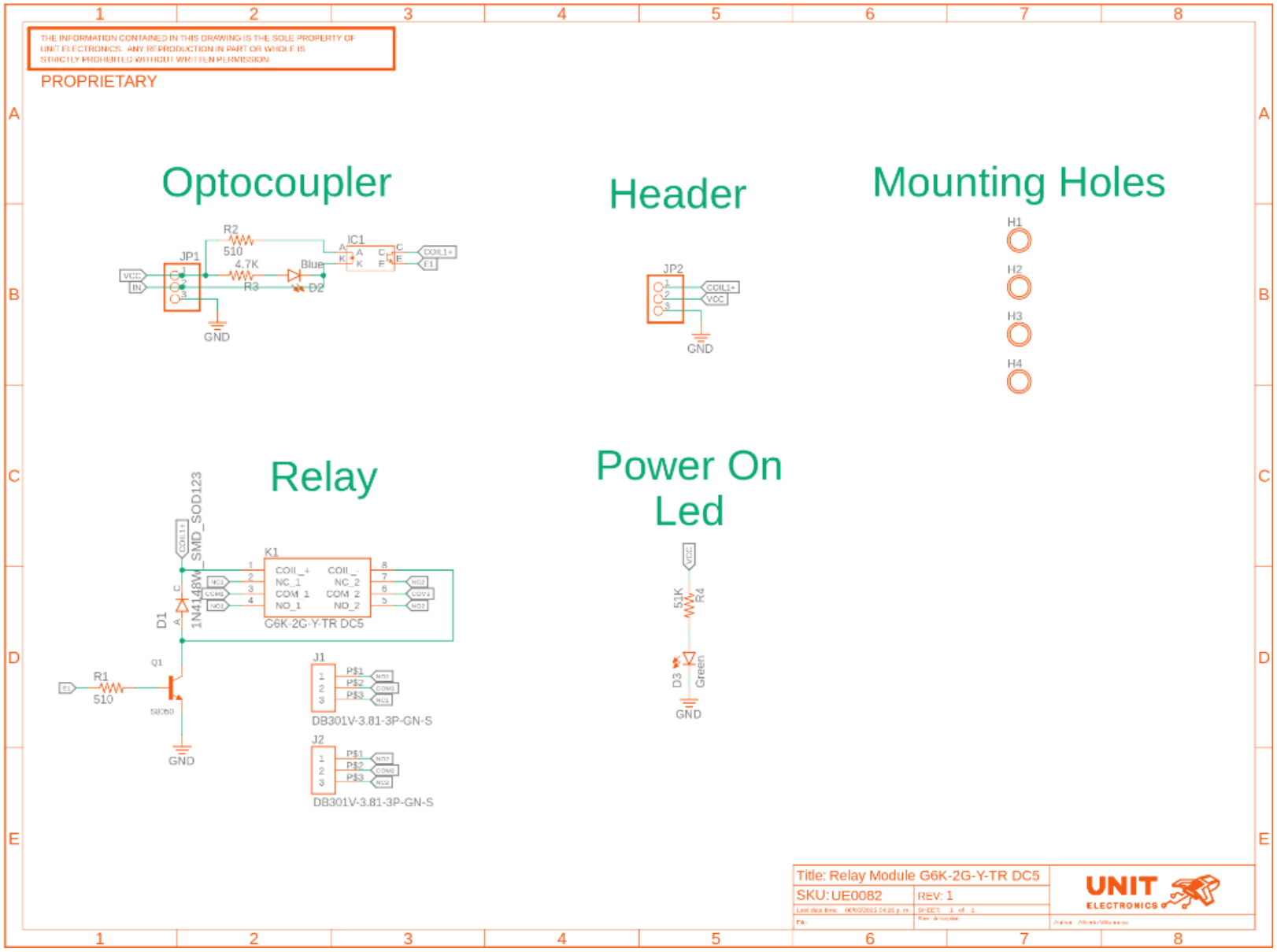
Company name	UNIT Electronics
Company website	https://uelectronics.com/
Company Address	Salvador 19, Cuauhtémoc, 06000 Mexico City, CDMX

8 Reference Documentation

Ref	Link
Documentation	https://github.com/UNIT-Electronics-MX/unit_devlab_g6k_2g_y_tr_5v_relay_module
Thonny IDE	https://thonny.org/
Arduino IDE	https://www.arduino.cc/en/software
Visual Studio Code	https://code.visualstudio.com/download

9 Appendix

9.1 Schematic (*https://github.com/UNIT-Electronics-MX/unit_devlab_g6k_2g_y_tr_5v_relay_module/blob/main/hardware/unit_sch_v_0_0_1ue0082_modulo_rele_g6k_.pdf*)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PROPRIETARY
Optocoupler
Header
Mounting Holes
Relay
Power On Led
R2
510
4.7K
R3
Blue
D2
JP1
IC1
JP2
H1
H2
H3
H4
GND
VCC
IN
COIL1+
SMD_SOD123
1N4148W
D1
K1
G6K-2G-Y-TR DC5
R1
Q1
J1
J2
DB301V-3.81-3P-GN-S
51K
R4
D3
Green
Title: Relay Module G6K-2G-Y-TR DC5
SKU: UE0082
REV: 1