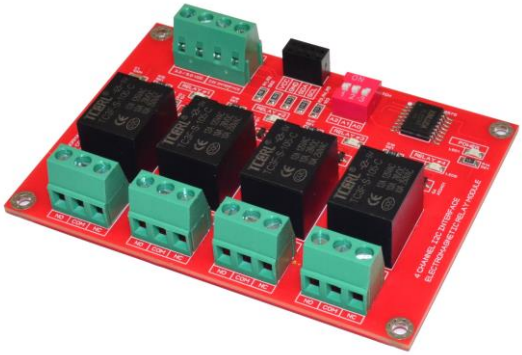
4 Channel Electromagnetic relay module

with I²C controlling interface



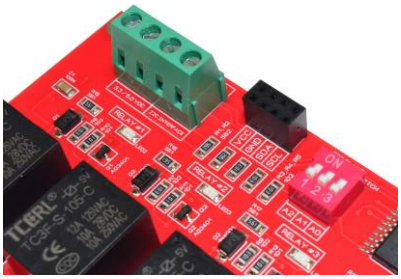
4 Channel electromagnetic board has been designed for easy inductive and resistive load switching via I²C communication protocol. For wiring this board is needed only 4 wires - 2 wires with data lines SCL (serial clock) and SDA (serial data) and 2 wires with power supply VCC and GND. On board is special I²C slave address switch, which help to select board slave address. Total available eight slave addresses, therefor on one I²C line can be connected 8 relays modules. That mean user can control each of 32 relay separately. Please note, can't be connected two board with the same addresses on the I²C line. All I²C slave addresses should be different. For the all available I²C slave addresses watch table below.

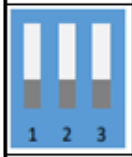
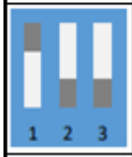
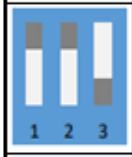
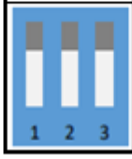
This 4 channel I²C electromagnetic module is fully compatible with any microcontroller (AVR, PIC, ARM, STM32), popular platform of Arduino and Raspberry, Wi-Fi ESP8266 and ESP32, and with other microcontrollers witch was I²C interface. I²C communication speed is up to 100kHz. Module recommended power supply is 5.0V DC, but also it can work at the lower power supply 3.3V DC. Power supply current should be at least 700mA @ 5V. In this module are used high quality electromagnetic relays ZETTLER or RAYEX (depend on batch). These relays have SPDT switching terminals and can switch load current up to 10A at DC and AC voltages. Switching load voltage range for AC is 0…240V and for DC range is 0…100V. For safe switching load wires connection are used quality screw terminals KF-128-3P. Each relay is indicated with led (color red).

Device description:

- PCB board dimension 72mm x 100mm
- PCB board material is FR-4 1.6mm, with solder mask and silk screen
- Compatible with DIN rail plastic holder
- Operation DC voltage – 3.3V and 5.0V(recommended)
- Maximum current @5.0V – 350mA
- Maximum current per relay – 10A peak
- LEDs indicators for each electromagnetic relay channel
- Relays with SPDT switch terminals: Normally Open, Common, Normally Closed
- Relay contact resistance 100 milliohms max. (initial value)
- Relay insulation resistance 100 MOhm min. (DC 500V)
- Relay operation time 8 ms max
- Relay release time 5ms max
- Relay dielectric strength 750 VAC, 50/60Hz between contact
- Relay dielectric strength 1,500 VAC, 50/60Hz between all elements
- Relay expected life Mechanical - 10,000,000 operations min.
- Relay expected life Electrical - 100,000 operations min. at rated load
- Working temperature range - 25 C ~ + 80 C
- Comes with different I^2C slave address 0x27 or 0x3F, depends on the batch
- The module contains an 8bit I^2C expander PCF8574 or PCF8574A chip
- Each board can be assigned an I^2C address between 0x20...0x27 (0x38...0x3F) by the DIP switch
- The logic power supply voltage should match the voltage levels on the I^2C bus
- The SDA and SCL lines are pulled up to VCC with 5.6k resistors on the relay module
- Up to 8 same boards can be connected to one I^2C line
- Soldered under RoHS directive, Pb free
- CE approved

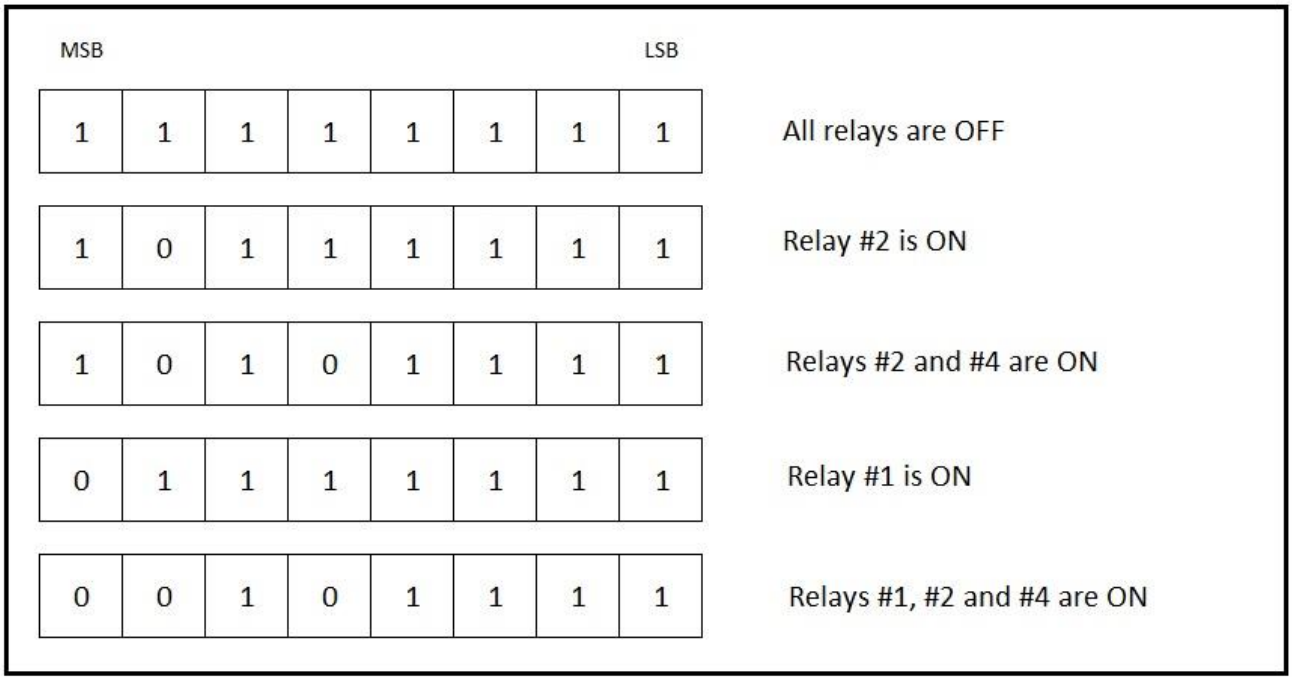
I²C slave addresses switch description:



	PCF8574 I2C-bus slave address	**PCF8574A** I2C-bus slave address
	0x27	0x3F
	0x26	0x3E
	0x25	0x3D
	0x24	0x3C
	0x23	0x3B
	0x22	0x3A
	0x21	0x39
	0x20	0x38

I²C controlling:

This relay module is based on the I²C 8bit PCF8574(A) I/O I2C expander. Chip should be setup to the output mode. Each relay is controlled via logic levels 0 and 1 in the corresponding bit.



C/C++ Arduino IDE code examples:

```
Wire.beginTransmission(0x27);  // slave address 0x27
Wire.write(0b11111111);        // all relays are OFF
Wire.endTransmission();

Wire.beginTransmission(0x27);  // slave address 0x27
Wire.write(0b10111111);        // relay #2 is ON
Wire.endTransmission();

Wire.beginTransmission(0x27);  // slave address 0x27
Wire.write(0b10101111);        // relays #2 and #4 are ON
Wire.endTransmission();

Wire.beginTransmission(0x27);  // slave address 0x27
Wire.write(0b01111111);        // relay #1 is ON
Wire.endTransmission();

Wire.beginTransmission(0x27);  // slave address 0x27
Wire.write(0b00101111);        // relays #1, #2 and #4 are ON
Wire.endTransmission();
```

Github:

- https://github.com/krida0electronics/relays_i2c_EMR

Sample code:

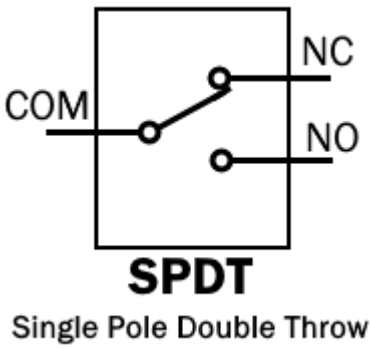
- https://github.com/krida0electronics/relays_i2c_EMR/blob/main/4CH_EMR_TEST.ino

Screw terminal description:

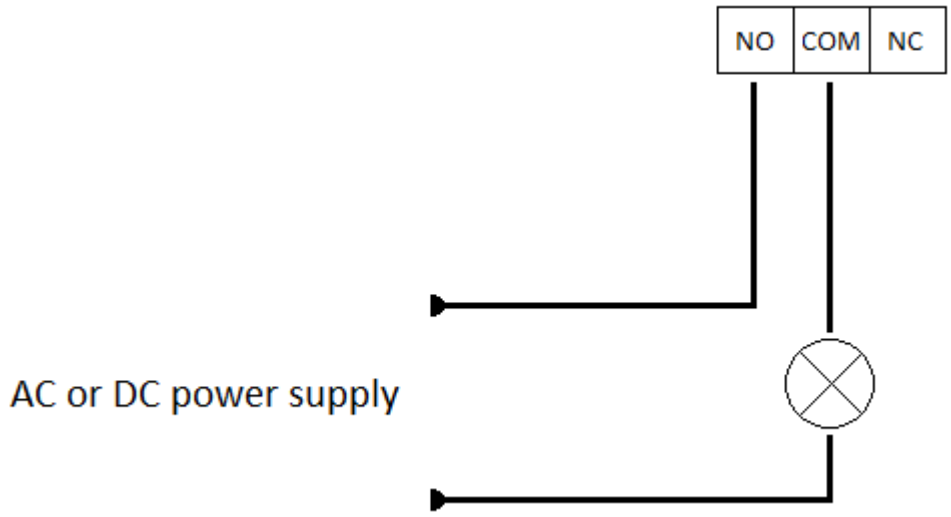
- **VCC** – device power supply (+)
- **GND** - device ground (-)
- **SDA** – I^2C serial data
- **SCL** – I^2C serial clock

Switching relay description:

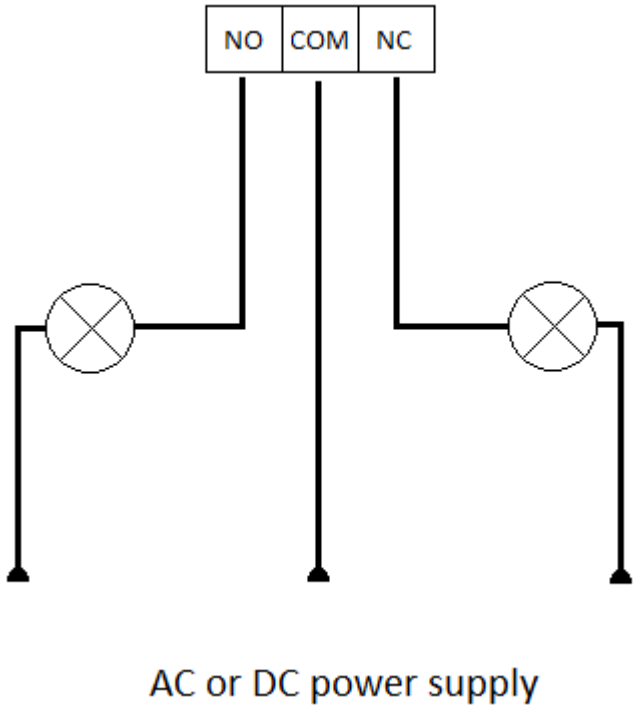
COM – common terminal
NC – normally closed
NO – normally opened



Single load wiring ON/OFF:

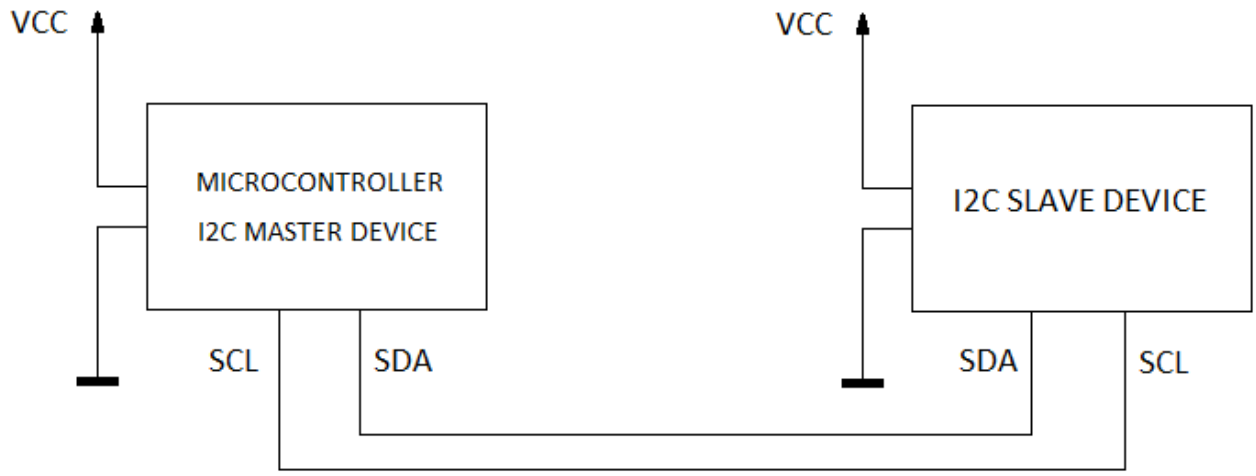


Double load wiring for switching:

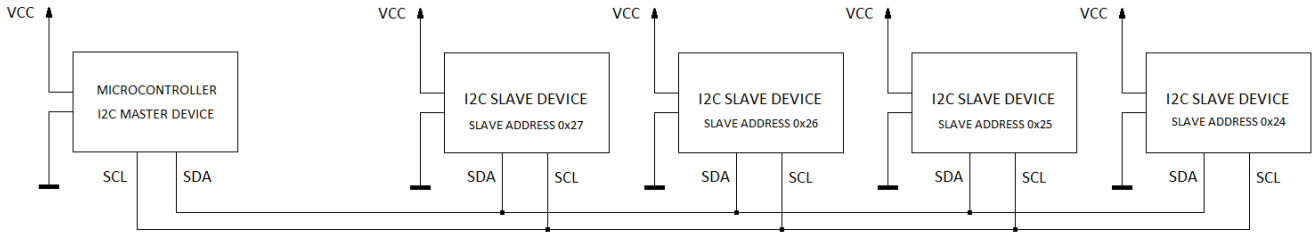


I²C wiring master – slave:

Single board wiring:



Multi boards wiring:



Contacts:

- **Email: krida.electronics@gmail.com**
- **Facebook: www.facebook.com/krida.electronics**
- **Phone for direct contact via WhatsApp and TELEGRAM: +37126784872**