

# 1606 Electro-Magnetic Switch

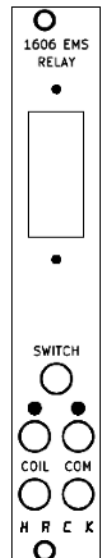
## User Guide

This relay based module is a simple bi-directional, single pole, double throw, momentary switch. The three switch terminals are wired to jack sockets on the panel. The switch can be actuated by the panel push button or externally controlled.

## Controls

### RELAY

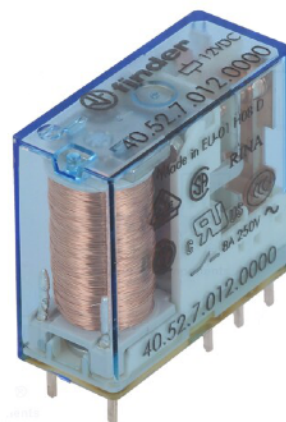
Many different **non-latching 12V DC DPDT** relays are compatible with the module. The most commonly available models are shown below. If the pin footprint of the relay (check datasheet) matches those below chances are it is compatible.



Omron G2R-2



Finder 40.52.7.012.0000



They slot into a socket and are easily swapped - see a comparison [here](#).

Relays were invented in the 1800's for early telecommunications. When current is passed through the coil a magnetic field is created - this moves an armature, which makes or breaks contact between electrical terminals.

Because these are non-latching (momentary) relays, when no current is flowing the switch will rest in the **A** (normally closed) position. Only while current is passing through the coil will the switch move to the **B** (normally open) contact.

As mechanical devices, different relays will have unique switching speeds, sounds and resonant frequencies. These relays are capable of switching at audio rates.

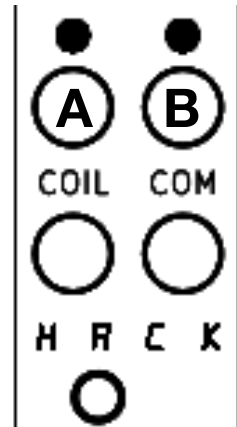
## SWITCH

Push to activate the switch. LED indicators show when the signal path is connected from **COM** to **A** or **B**. Upon release the switch will reset to it's normally closed **A** position.

## A/B/COM

The switch inputs/outputs. As you see in the diagram below, either **A** or **B** can be connected to **COM** (common), but not to each other.

Note that with no jack inserted into **A** or **B** the socket is normalled to ground through a 10K resistor. This is so that a cable connected from **COM** to the input of another module will never be floating, which could lead to unexpected noise. Take this into consideration if you are using the switch in a single throw manner - with either **A** or **B** unconnected. In this case you should take your output signal from **COM**.



## COIL

This is the external control input. A +5V signal will actuate the switch.

Modulating the pulse width of an audio rate control signal can yield interesting results. Different waveforms give sharper or softer switching characteristics.

## BULB DIMMER

Hidden inside the **COIL** socket is a trimmer that controls the brightness of the backlight bulb. This can be reached with the provided screwdriver.

If you are concerned about power consumption in your system, turn the trimmer *all the way down* and the bulb will draw only a small amount of current.

## Additional Notes

- Be careful not to touch the bulb, it may be hot.
- The switch accepts all manner of signals, audio or CV.
- A list of compatible relays can be found via the documentation link on the product page. All relays vary in their mechanical and sonic characteristics. At fast speeds the relay does not have time to fully switch and is bouncing off one contact. A good trick to achieve faster switching is to plug the relay in, *while* sending high frequency CV to the coil.
- Please take care to use the correct relays. Not doing so may expose voltages on the outputs harmful to other modules.
- All inputs and outputs are protected against signals within the standard Eurorack range of  $\pm 12\text{V}$ .
- The power cable is reverse polarity protected, but you should always take care to plug it in correctly. The triangular symbol on an IDC socket as well as the red lead on standard ribbon cables denotes -12V and goes toward the **RED** indicator written on the PCB.
- +12V current draw: Bulb off - 6mA resting, 46.5mA coil engaged. Bulb on - 48.5mA resting, 87.5mA coil engaged.
- The module is 4hp wide with a depth (measured from the backside of the panel, not including power cable header) of 24.5mm.
- Schematics are available on Github.