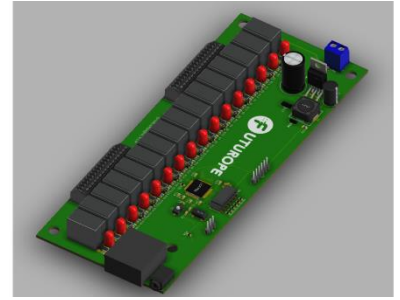


## Board 16 Relays



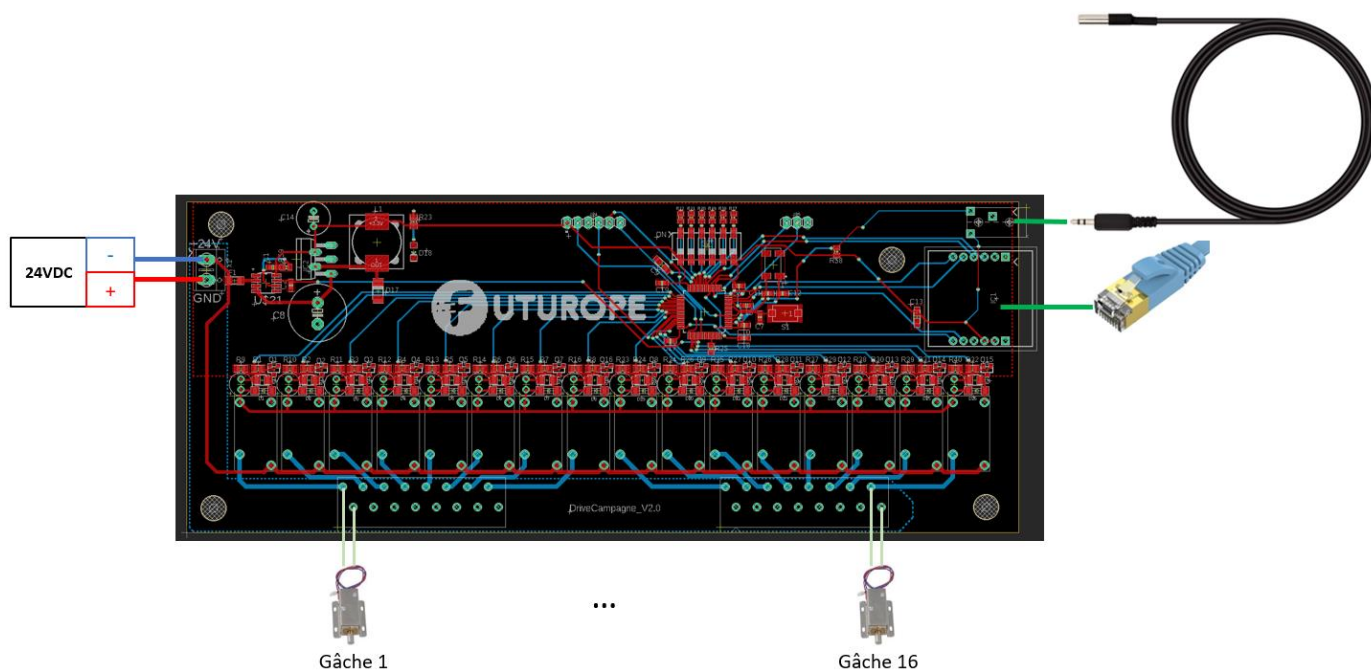
### Features :

- **STM32F411RE** Microprocessor, 32-Bit ARM Cortex
- **W5500** Ethernet module
- **16 Relays** Output
- **1x Jack** connector for temperature sensor
- **ACS711** current sensors
- **2x16 Terminals** fast connector 24 AWG

### Specification :

- DC Current **100 $\mu$ A/MHz**
- Clock speed up to **100 MHz**
- **512KB** Flash Memory
- **128KB** SRAM
- Ethernet **802.3 10/100 Mbit/s**
- **Relays outputs:** 16 x 3A maximum (Normally Open)
- **Input Voltage:** (Vin) 16-30VDC
- **Dimension:** 200mm x 80mm x 35mm
- **Weight:** 250 g

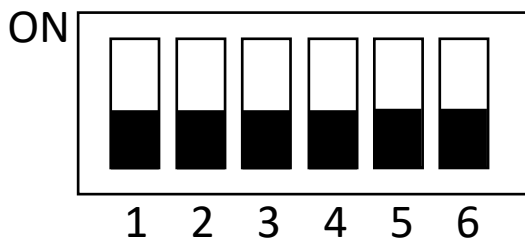
### Wiring :



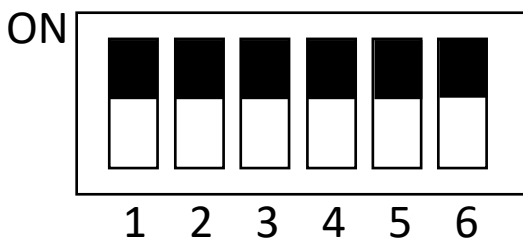
## Hardware Addressing :

IP address = 172.16.10. + DIP SWITCH

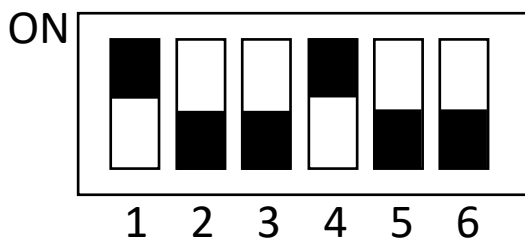
The IP address ended by 0 or 1 are forbidden. Some examples for better understanding :



**IP Adress = 172.16.10.63**



**IP Adress = 172.16.10.2**



**lastDigit =  $2^1 + 2^2 + 2^4 + 2^5$**

**IP Adress = 172.16.10.54**



**lastDigit =  $2^0 + 2^3$**

**IPAdress = 172.16.10.9**

**Notice that 1 and 2 values for DIPSWITCH are forced in the firmware to be 172.16.10.2 IP address. Be careful to have no duplicate in the IP address (both won't work).**

## **Communication :**

The computer talk to the device thanks to UDP protocol, the specifications are as follow :

### **UDP Socket = 12345**

| <b>-UDP<br/>Message-</b> | <b>-Details-</b>                                                       |
|--------------------------|------------------------------------------------------------------------|
| FF0101                   | Relay 1 ON command (ASCII encoding)                                    |
| FF0100                   | Relay 1 OFF command (ASCII encoding)                                   |
|                          | ...                                                                    |
| FF1600                   | Relay 16 OFF command (ASCII encoding)                                  |
| FF1601                   | Relay 16 ON command (ASCII encoding)                                   |
| FFE000                   | All relays OFF command (ASCII encoding)                                |
| FFE0FF                   | All relays ON command (ASCII encoding)                                 |
| FF0000                   | Get relays status (return 2 Bytes)                                     |
| FFF000                   | Get temperature value (only available with sensors relay board option) |
| FFC000                   | Get current value (only available with sensors relay board option)     |

After a command an acknowledgment is sent from the device to the computer, composed as :

### **ACK = BOOL;COMMAND**

BOOL = 1 command is a success

BOOL = 0 command is a failure

A failure could be due to a hardware issue. For example the relay is active but 0Amp is consumed by the electric charge.

For all details, please send a message at:

[sales@futuraope.com](mailto:sales@futuraope.com)