# 16A Bistable Relay Application

UNIV 1.0.2.4

## 1. Features

- Controller of 6 bistable relays (6x16A). These relays take energy only when switching from one state to the other
- Operation voltage 16-24V
- Current consumption from the bus 17mA, maximum 70mA
- For DIN rail mounting.
- Dimensions 90x106x53 mm (6 mod)
- Operating of module depends on firmware uploaded into it.


## 2. Application version

UNIV 1 . 0 . 2 . 4

- 4 — application version
- 2 — bistable relay application
- 0 — hardware version
- 1 — universal node

## 3. Technical data

Bus side

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Power supply voltage | $U_s$ | 16-24V | V |
| Current consumption | $I_s$ | 17 | mA |
| Maximum current consumption | $I_{SMAX}$ | 70 | mA |
| Bus connector type | 2x RJ45 connectors | | |

Relay side

| Parameter | Symbol | Relay type | | | | | |
|---|---|---|---|---|---|---|---|
| | | RT314A12 | RTS3LA12 | RTS3TA12 | RT314F12 RT334F12 | RTS3LF12 | RTS3TF12 |
| Number of coils | n | 1 | | | 2 | | |
| Coil voltage | $U_{COIL}$ | 12V DC | | | | | |
| Maximum contacts voltage | $U_{MAX}$ | 250V AC / 30V DC | | | | | |
| Maximum continuous current | $I_{CMAX}$ | 16A | | | | | |
| Maximum inrush current | $I_{IMAX}$ | 30A/4s | 30A/4s 120A/20ms | 30A/4s 165A/20ms 800A/200us | 30A/4s | 30A/4s 120A/20ms | 30A/4s 165A/20ms 800A/200us |

## 4. Hardware

### 4.1. Wiring

⚠ WARNING 1. This module must be connected only to **one phase** of mains.
⚠ WARNING 2. When inductive load connected, use varistors pararelly with relay contacts.

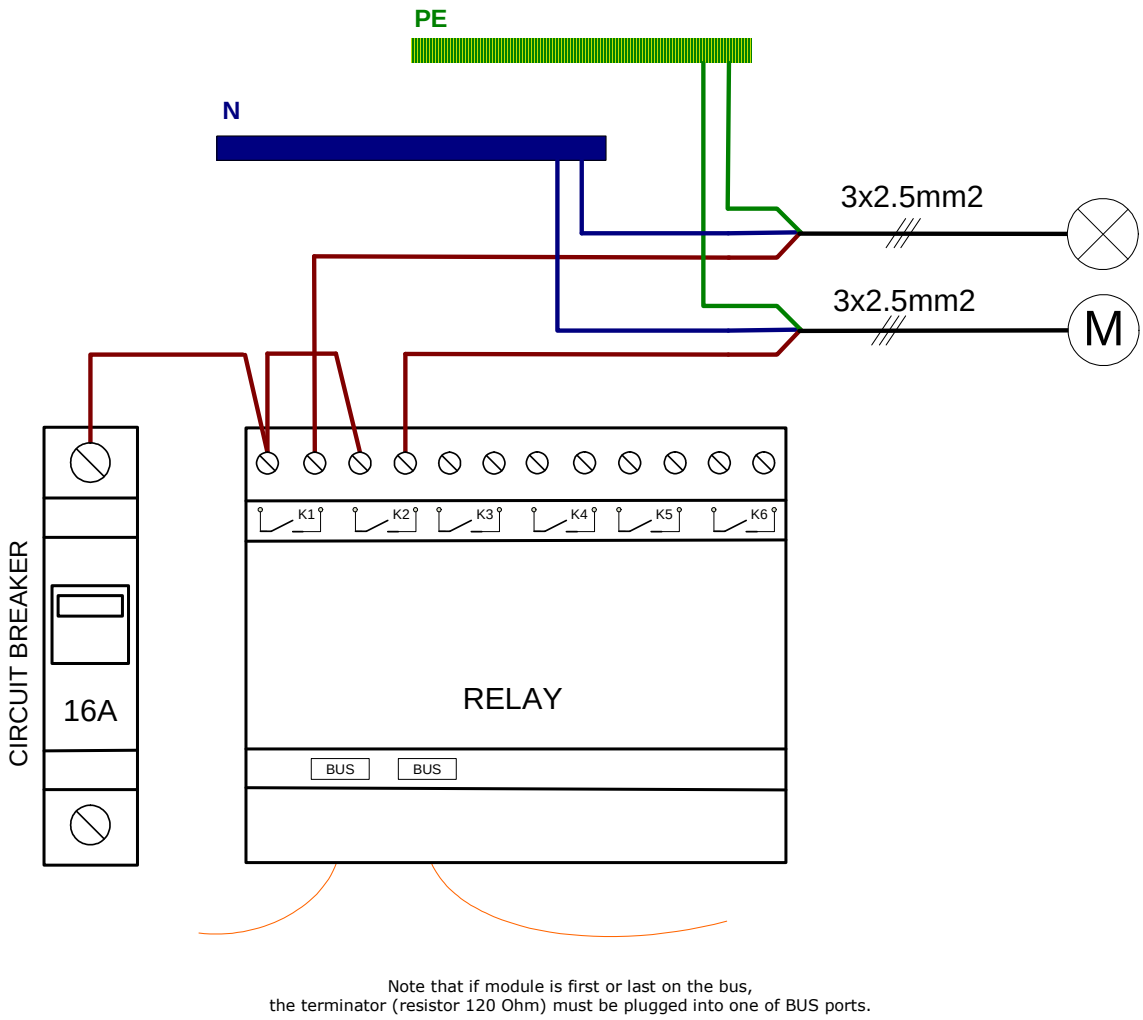



Figure 1. Relay wiring.

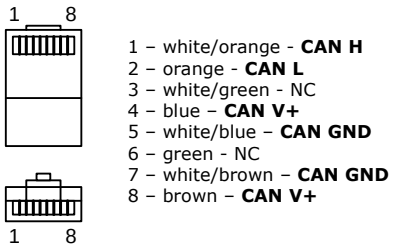



Figure 2. RJ45 bus connector wiring.

### 4.2. Schematic

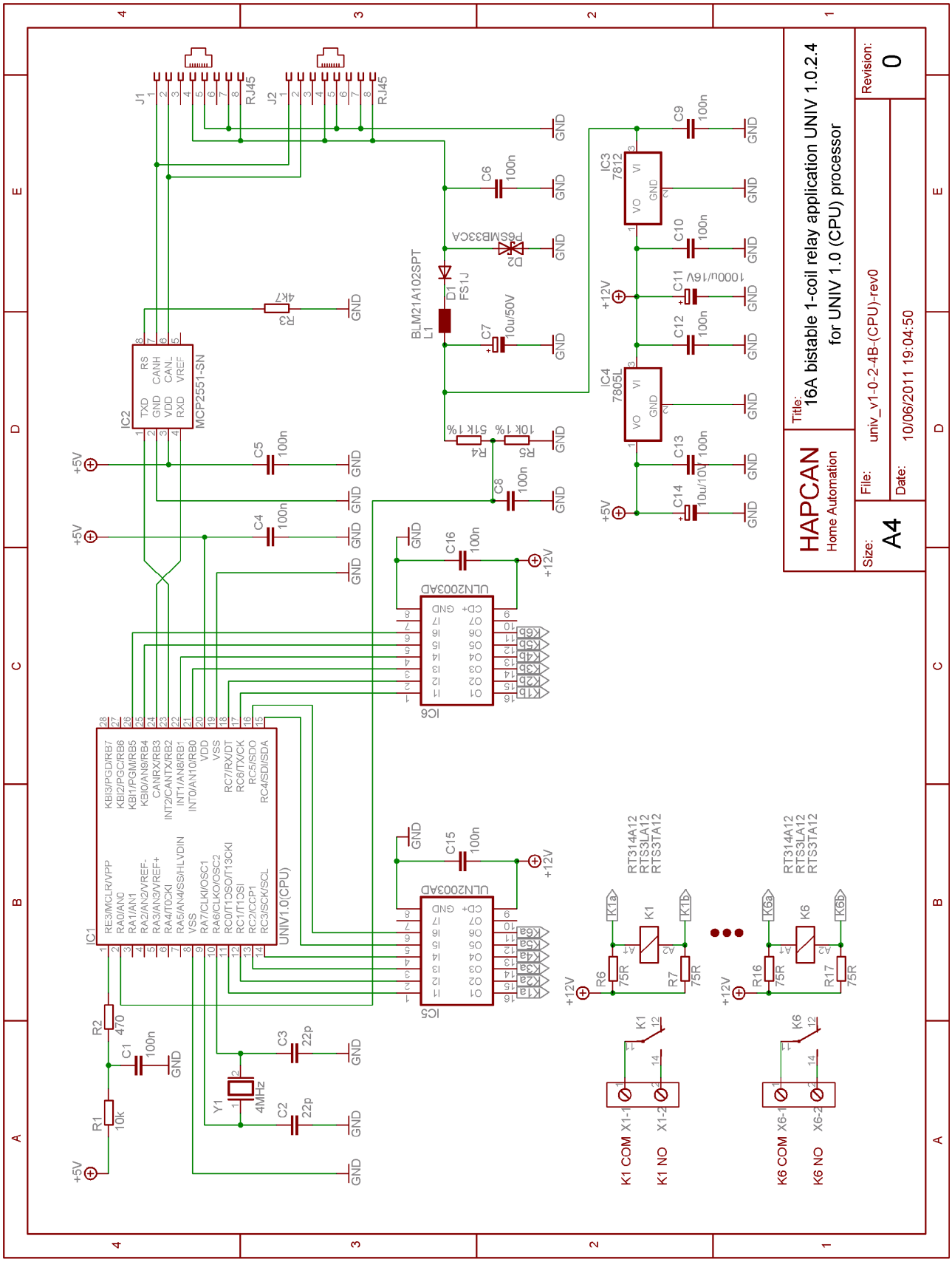



Figure 3. Schematic of bistable relay application UNIV 1.0.2.4 – version with 1-coil relay

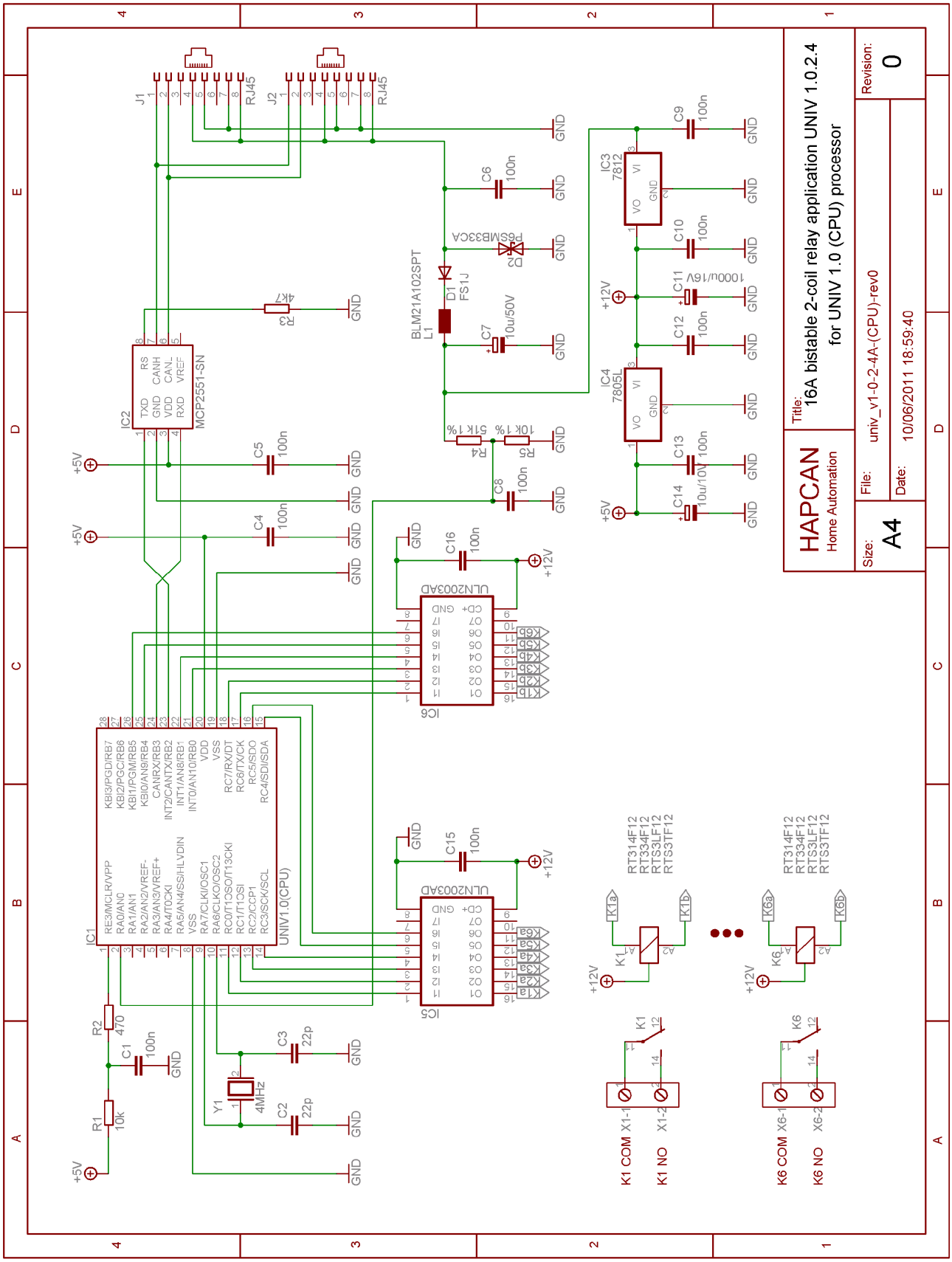
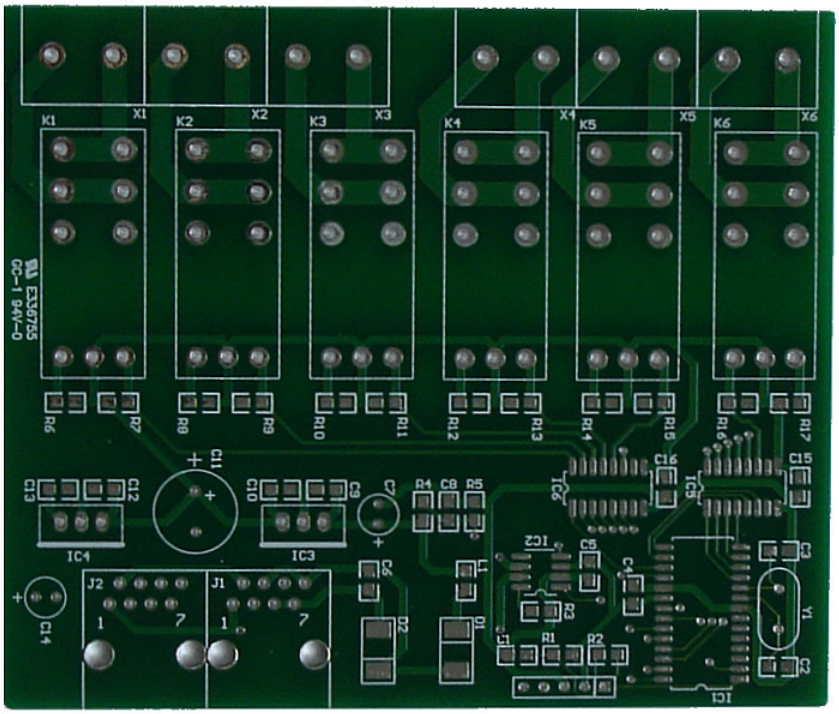



Figure 4. Schematic of bistable relay application UNIV 1.0.2.4 – version with 2-coil relay

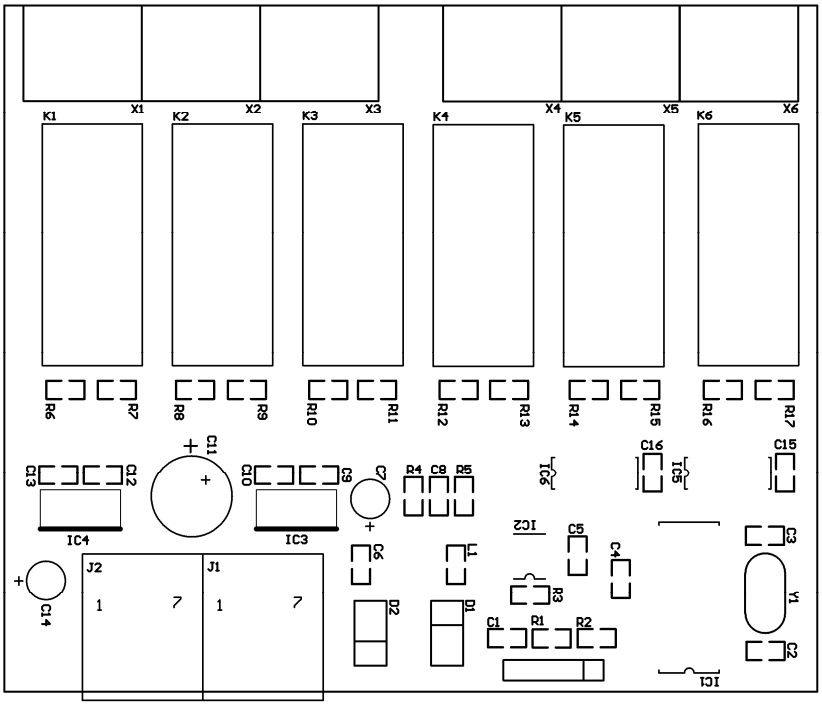
### 4.3. Printed Circuit Board

- Printed circuit board for bistable relay application UNIV 1.0.2.4
- PCB dimensions: 86mm x 103mm

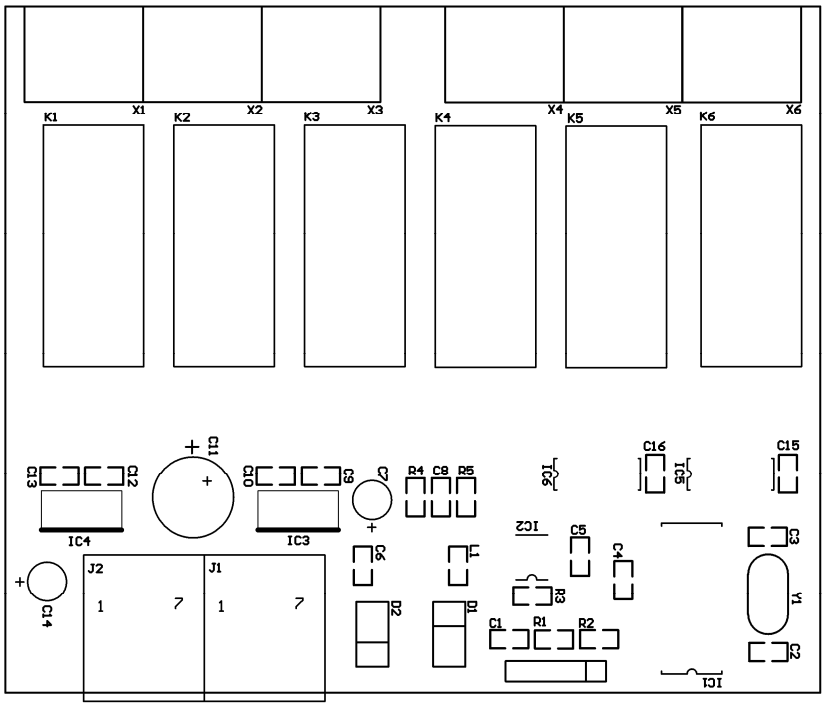



#### 4.3.1. Assembly schematic

– 1 coil relay version (RT314A12)

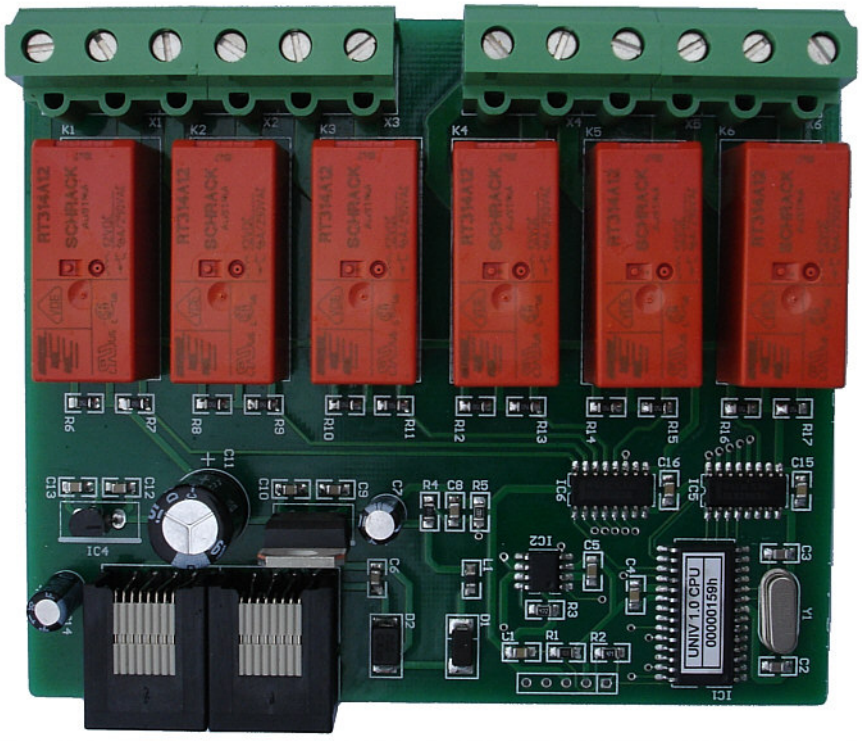


– 2 coil relay version (RT314F12)

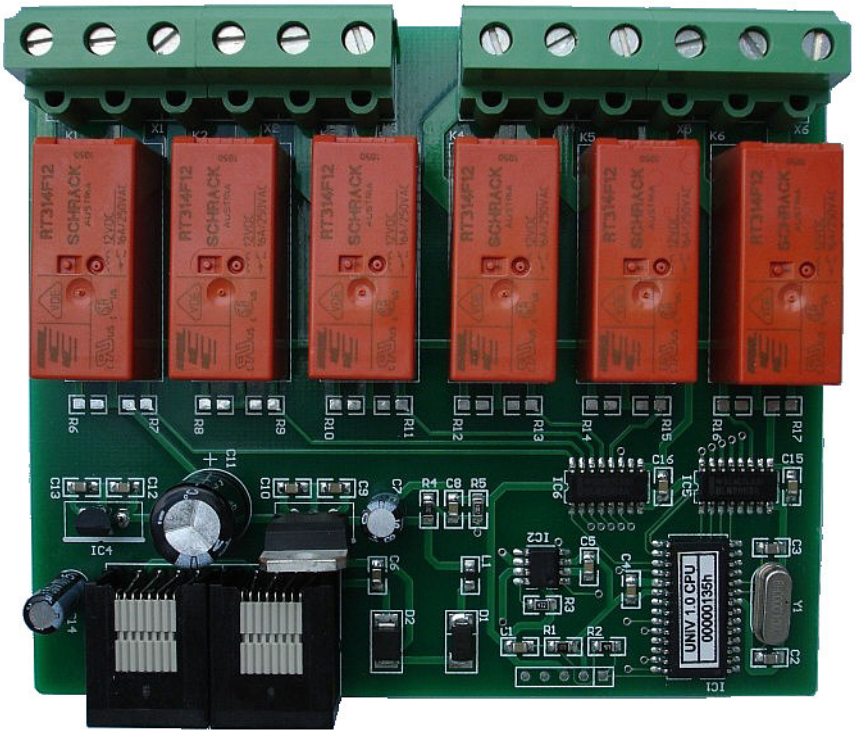



### 4.3.2. Assembled pcb

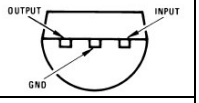
– 1 coil relay version (RT314A12)

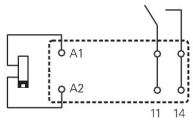
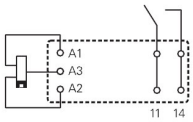


– 2 coil relay version (RT314F12)



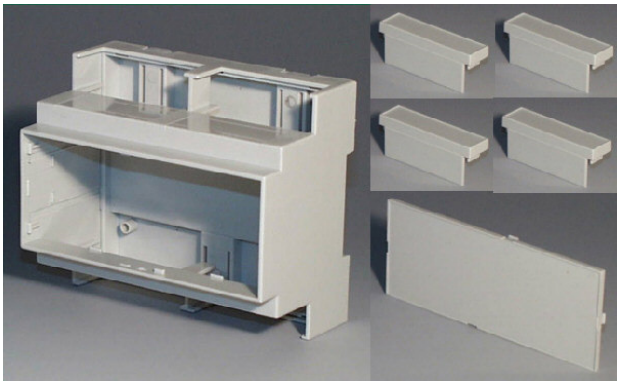

### 4.3.3. Components

| Designator | Type | Footprint | Description |
|---|---|---|---|
| C1, C4, C5, C6, C8, C9, C10, C12, C13, C15, C16 | 0.1uF | 0805 | Capacitor |
| C2, C3 | 22pF | 0805 | Capacitor |
| C7 | 10uF/50V | 2.5/5 | Electrolytic Capacitor |
| C11 | 1000uF/16V | 5/10 | Electrolytic Capacitor |
| C14 | 10uF/10V | 2.5/5 | Electrolytic Capacitor |
| R1 | 10k | 0805 | Resistor |
| R2 | 470 Ohm | 0805 | Resistor |
| R3 | 4k7 | 0805 | Resistor |
| R4 | 51k 1% | 0805 | Resistor |
| R5 | 10k 1% | 0805 | Resistor |
| R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17 | 75 Ohm | 0805 | Resistors only for 1-coil relay version |
| L1 | BLM21A102SPT | 0805 | Choke |
| Y1 | 4MHz | HC49-S | Quartz crystal |
| D1 | FS1J | DO-214 | Diode |
| D2 | P6SMB33CA | DO-214 | Transil diode |
| IC1 | UNIV 1.0 (CPU) | SOIC-28 | Processor of HAPCAN universal module |
| IC2 | MCP2551-SN | SOIC-8 | CAN Transceiver |
| IC3 | LM7812 | TO-220 | Voltage regulator  |
| IC4 | LM7805L | TO-92 | Voltage regulator   |
| IC5, IC6 | ULN2003A | SOIC-16N | IC |
| J1, J2 | RJ45 | L18xW15xH11 | Connector |

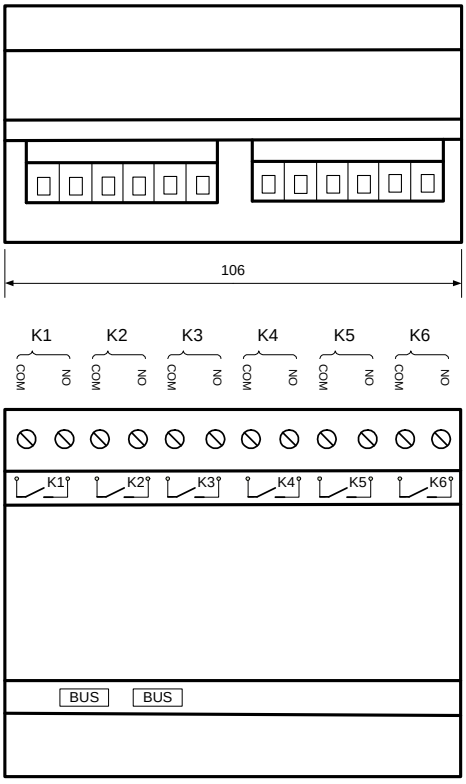
| | | | |
|---|---|---|---|
| X1, X2, X2, X3, X4, X5 | ARK2 | raster=7.5mm | Terminal block |
| K1, K2, K3, K4, K5, K6 | RT314A12<br>SCHRACK<br>Contacts<br>16A/250V<br>Coil 12V/33mA | L29xW12,7xH16 | 1-coil version bistable relay<br>  |
| | RT314F12<br>SCHRACK<br>Contacts<br>16A/250V<br>Coil 12V/50mA | L29xW12,7xH16 | 2-coil version bistable relay<br>  |

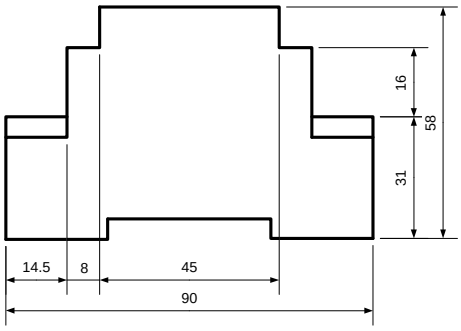
### 4.4. Enclosure

- Rail mounting enclosure, 6 modules size
- Dimensions: 90mm x 106mm x 53mm



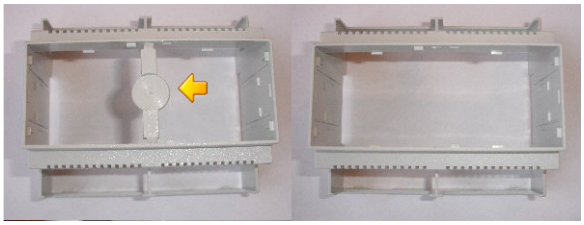
#### 4.4.1. Dimensions



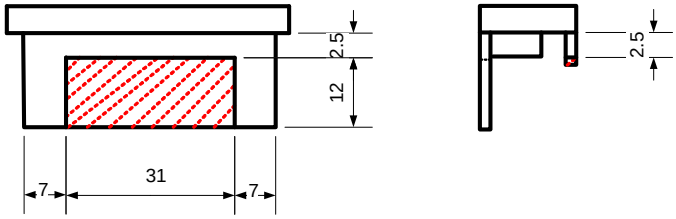



### 4.4.2. Mechanical processing

#### 4.4.2.1. Main part
The part shown on drawings has to be removed from enclosure.



#### 4.4.2.2. Terminal guards



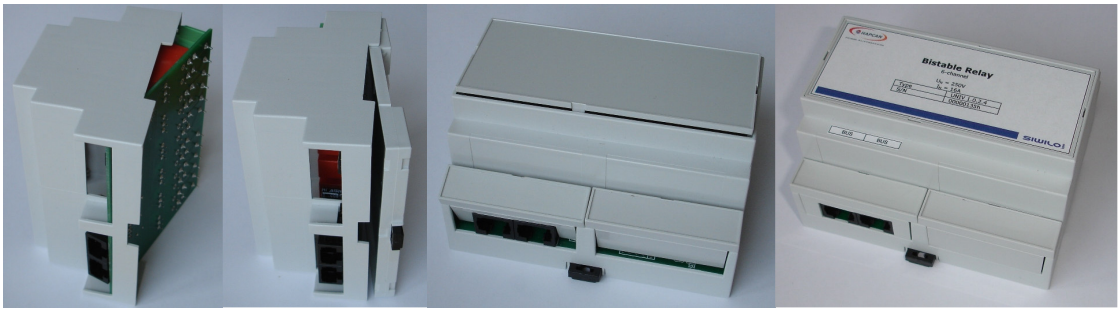

Striped parts must be removed.

Drawing shows RJ45 connector guard (1 piece).

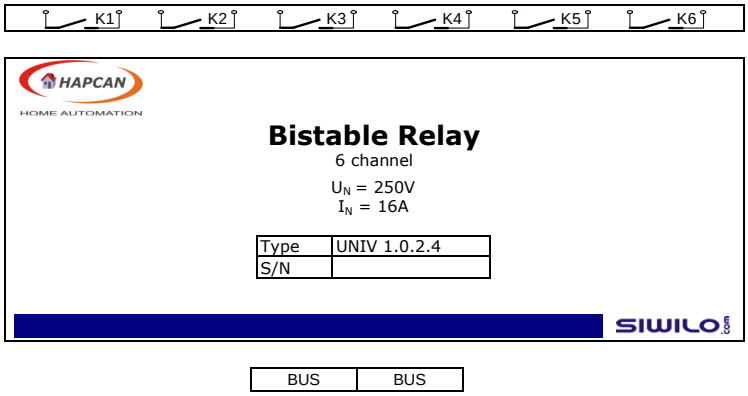
There is nothing to change in second piece; third and forth piece is not used.

#### 4.4.2.3. Front panel
Does not need processing.

### 4.4.3. Enclosure Assembling



### 4.4.4. Labels




## 5. Document version

| File | Description | Date |
|---|---|---|
| univ_v1-0-2-4-pcba.pdf | Original version | June 2011 |
| univ_v1-0-2-4-pcbb.pdf | 4.3.1 and 4.3.2 updated | June 2011 |