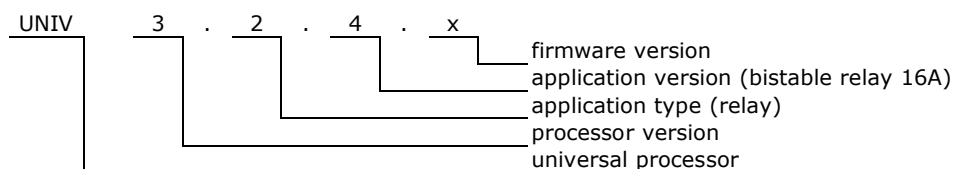


## 1. Features

- 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 13mA
- For DIN rail mounting.
- Dimensions 90x106x53 mm (6 mod)
- Operating of module depends on firmware uploaded into it.
- Schematic and PCB design can be downloaded from [hapcan.com](http://hapcan.com) site



## 2. Application version



## 3. Technical data

### Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	$U_s$	16-24V	V
Current consumption	$I_s$	13	mA
Maximum current consumption (during relay switching, $t_s \approx 40ms$ ) with 1-coil relays (RT314A12) with 2-coil relays (RT314F12)	$I_{smax}$	200 63	mA
Bus connector type	2x RJ45		

### Relay side

Parameter	Symbol	Relay type					
		RT314A12	RTS3LA12	RTS3TA12	RT314F12 RT334F12	RTS3LF12	RTS3TF12
Number of coils	n	1			2		
Coil voltage	U <sub>COIL</sub>	12V DC					
Maximum contacts voltage	U <sub>MAX</sub>	250V AC / 30V DC					
Maximum continuous current	I <sub>CMAX</sub>	16A					
Maximum inrush current	I <sub>IMAX</sub>	30A/4s	30A/4s 120A/20ms	30A/4s 165A/20ms 800A/200μs	30A/4s	30A/4s 120A/20ms	30A/4s 165A/20ms 800A/200μs

## 4. Hardware

### 4.1. Schematic

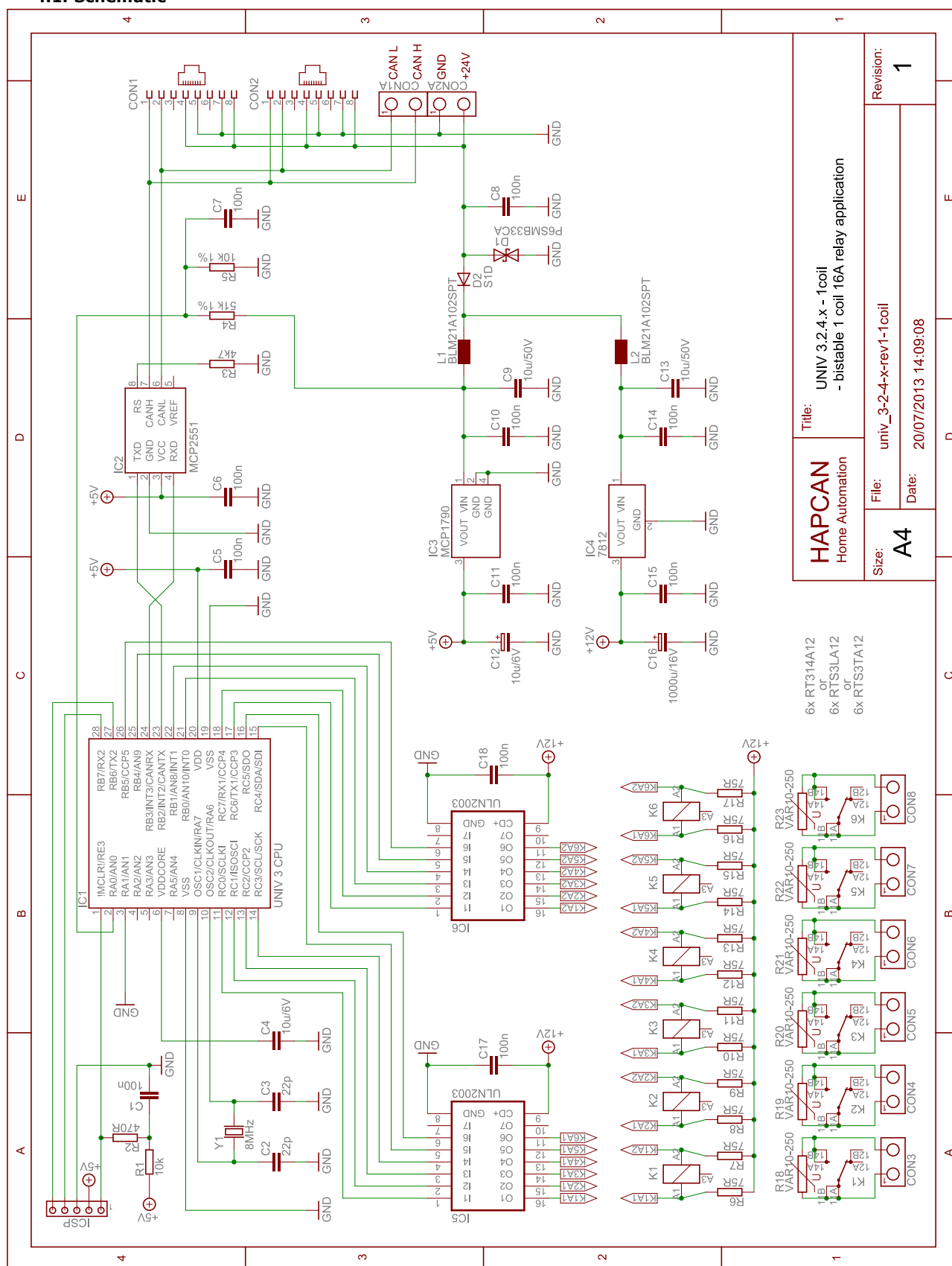


Figure 1. Schematic of bistable relay application UNIV 3.2.4.x – version with 1-coil relay

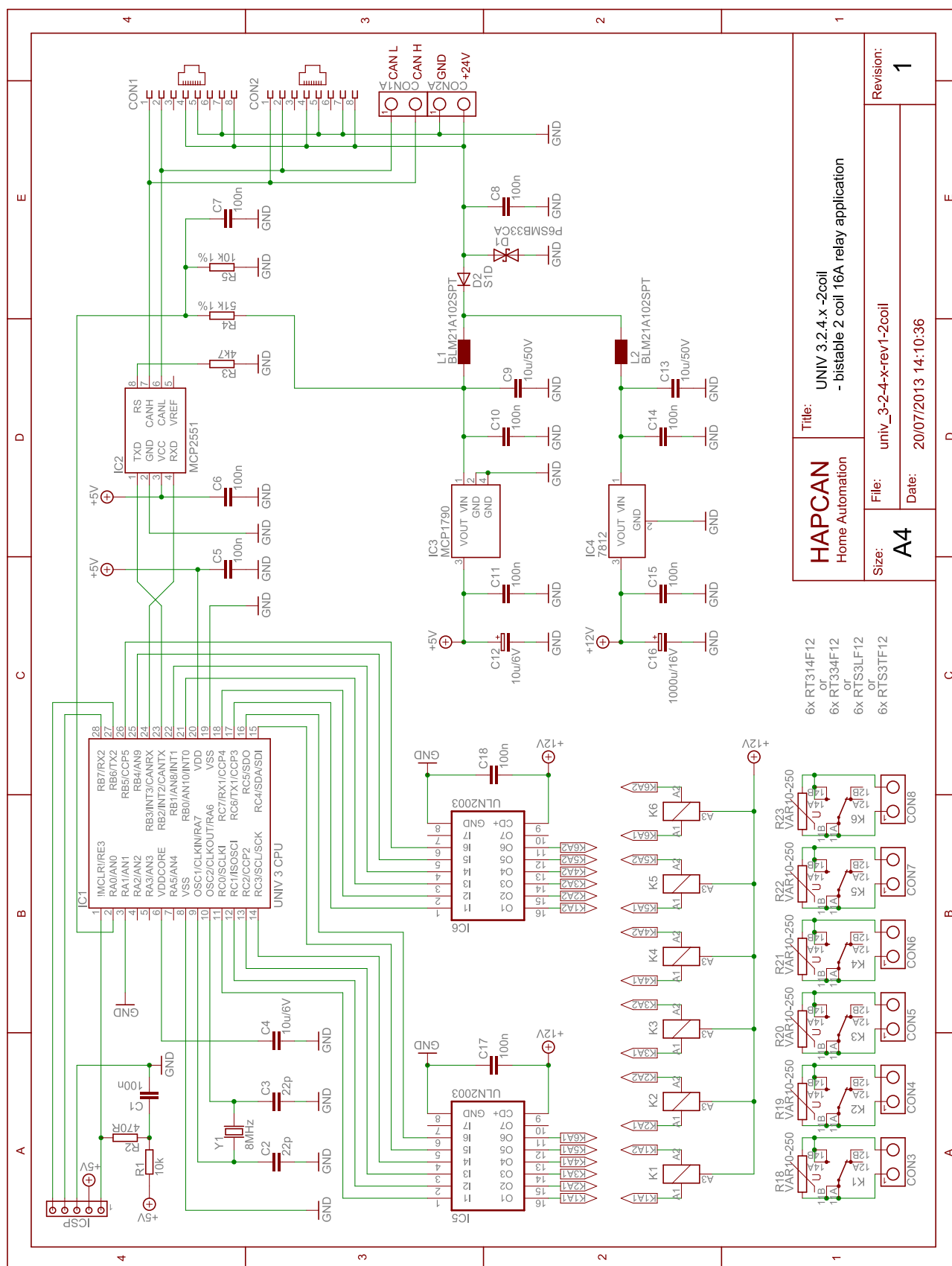


Figure 2. Schematic of bistable relay application UNIV 3.2.4.x – version with 2-coil relay

## 4.2. Wiring

⚠ WARNING. This module must be connected only to **one phase** of mains.

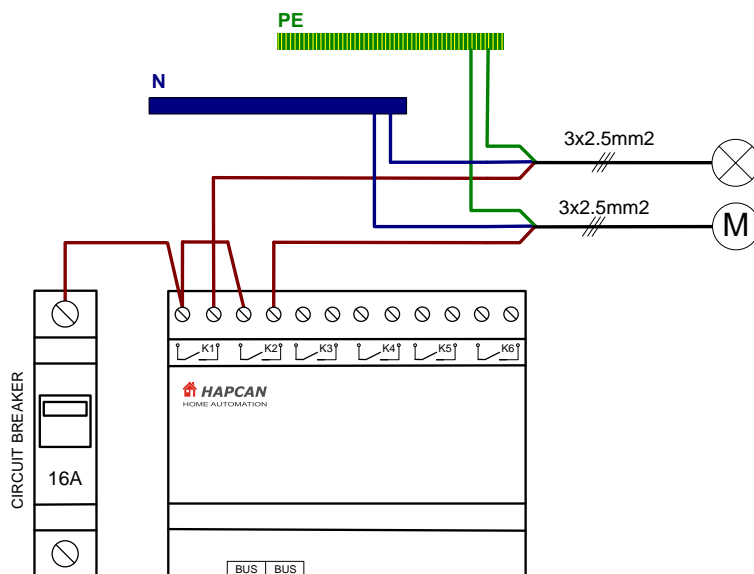
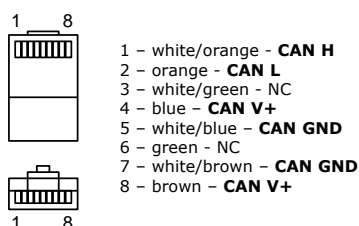


Figure 3. Relay wiring.



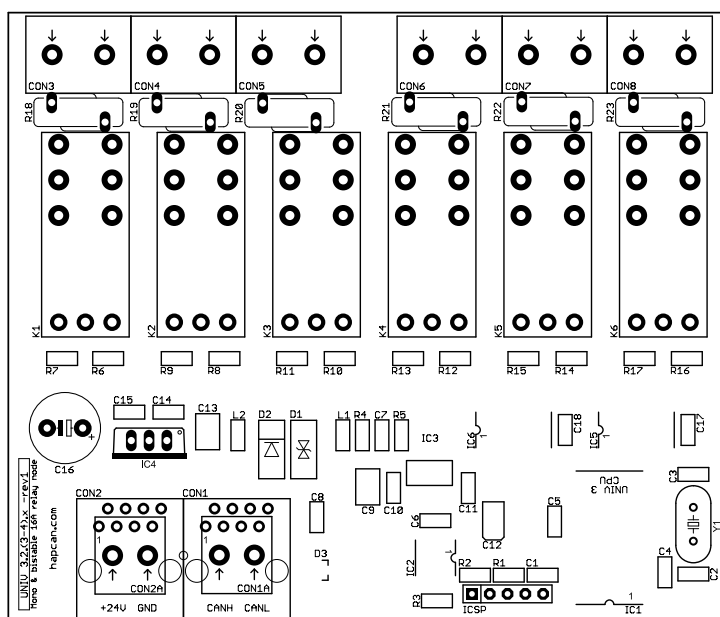
Note that if module is first or last on the bus, the terminator (resistor 120 Ohm) must be plugged into one of BUS ports.

Figure 4. RJ45 bus connector wiring.

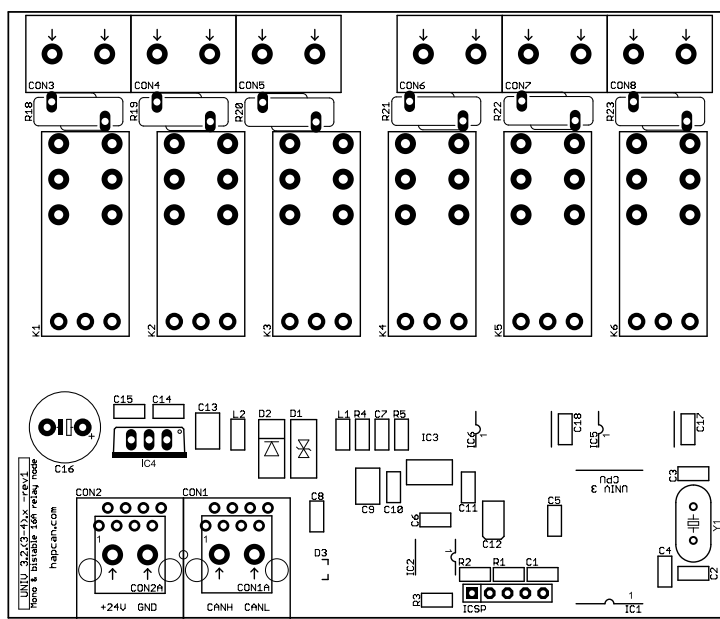
## 4.3. Assembly schematic

- Printed circuit board *PCB UNIV 3.2.(3-4).x -rev1* for UNIV 3.2.4.x module
- PCB dimensions: 103mm x 86.5mm

– 1 coil relay version (RT314A12)



– 2 coil relay version (RT314F12)

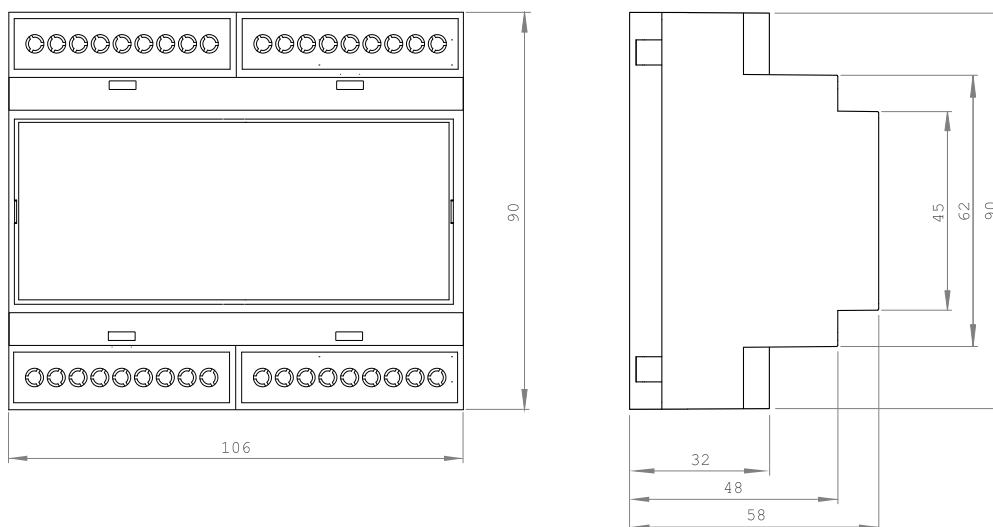


#### 4.4. Components

Designator	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11, C14, C15, C17, C18	100nF/50V	0805	Capacitor
C2, C3	22pF/50V	0805	Capacitor
C4	10uF/16V (X5R)	0805	Capacitor
C9, C13	10uF/50V	1210	Capacitor
C12	10uF/16V	SMA, SMB	Tantalum capacitor
C16	1000uF/16V	5/10	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
R18, R19, R20, R21, R22, R23	VAR10-250	raster 10mm	Varistor
L1, L2	BLM21A102SPT	0805	Choke
Y1	8MHz	HC49-S	Quartz crystal
D1	P6SMB33CA	DO-214	Quartz crystal
D2	S1D	DO-214	Diode 50V 1A
IC1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	MCP2551-SN	SOIC-8	CAN Transceiver
IC3	MCP1790-5002EDB	SOT-223	Voltage regulator
IC4	LM7812	TO-220	Voltage regulator
IC5, IC6	ULN2003A	SOIC-16N	Darlington transistors arrays
CON1, CON2	RJ45	L18xW15xH11	Connector
CON3, CON4, CON5, CON6, CON7, CON8	ARK2	L15xW10.5xH19 raster 7.5mm	Terminal block
K1, K2, K3, K4, K5, K6	RT314A12 SCHRACK Contacts 16A/250V Coil 12V/33mA	L29xW12,7xH16	1-coil version bistable relay
	RT314F12 SCHRACK Contacts 16A/250V Coil 12V/50mA	L29xW12,7xH16	2-coil version bistable relay

#### 4.5. Enclosure

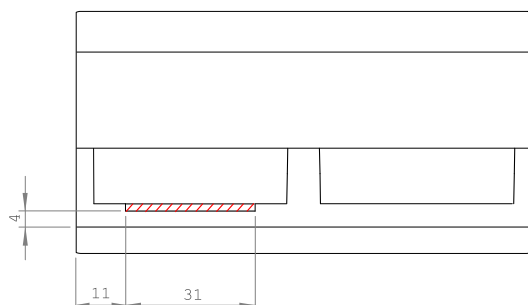
- Gainta D6MG enclosure (6 modules wide)
- Dimensions: 90mm x 58mm x 106mm



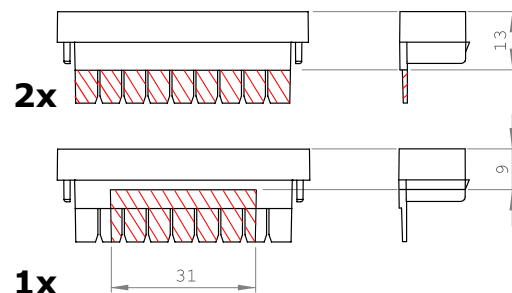
#### 4.6. Mechanical processing

Striped parts must be removed.

##### BODY

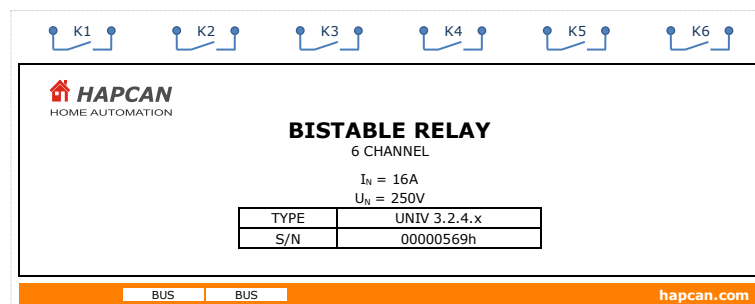


##### TERMINAL GUARDS



#### 4.7. Label

Editable label version is available at [hapcan.com](http://hapcan.com) website.



### 5. Commissioning

#### 5.1. CPU voltage measurement

After verifying the correctness and quality of the soldering, the bus voltage should be connected while measuring the processor voltage. To do this, connect a voltmeter to pins 2 and 3 of the ICSP connector. Processor supply voltage should be about 5V.

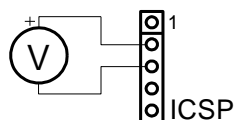


Figure 3. CPU voltage measurement

### 5.2. Checking the CPU clock

Proper operation of the CPU can be checked by temporarily connecting the LED to pins 3 and 5 of the ICSP connector. When device is powered, the LED should light up four times in the sequence 1 second on - 1 second off - 1 second on. The LED lights up only once for 50ms, if the processor is in programming mode.

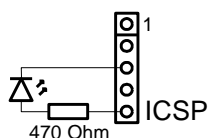


Figure 4. Checking the CPU clock

### 5.3. Firmware uploading

The device requires a firmware uploading for proper operation. It can be done with HAPCAN Programmer software. Both, firmware and HAPCAN Programmer can be downloaded from [hapcan.com](http://hapcan.com) website.

## 6. License



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## 7. Document version

File	Description	Date
univ_3-2-4-x_a.pdf	Original version	July 2013
univ_3-2-4-x_b.pdf	General correction	September 2013
univ_3-2-4-x_c.pdf	Changing enclosure	May 2014