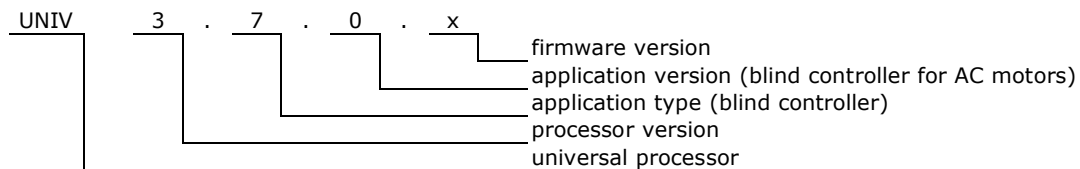


### 1. Features

- 3 channel blind controller for blinds with AC motors 230V 200VA.
- The blind must have built-in limit switches and motor overload protection
- Motor running direction is defined by driven winding (forward or reverse)
- The module makes impossible to drive two motor windings at the same time.
- Motor nominal voltage 230V
- Maximum motor power 200VA
- Bus voltage 16-24V
- Maximum current consumption from the bus 83mA@16V
- For DIN rail mounting.
- Dimensions 90x58x53 mm (3 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	$U_S$	16-24	V DC
Current consumption	$I_S$	8@16V 6@24V	mA
Maximum current consumption (when all relays are on - 3 blinds go up)	$I_{SMAX}$	83@16V 56@24V	mA
Bus connector type	2x RJ45		

#### Relay side

Parameter	Symbol	Value	Unit
Coil voltage	$U_{COIL}$	12	V DC
Coil resistance	$R_{COIL}$	840	$\Omega$
Nominal contacts current	$I_N$	6	A
Maximum inrush current	$I_{INRUSH}$	10	A
Nominal motor voltage.	$U_N$	230	V AC
Maximum load per channel.	$S_{MAX}$	200	VA
Relay connector type	Terminal Blocks (solid wire 4mm <sup>2</sup> , stranded 2,5mm <sup>2</sup> )		

**4. Hardware**

**4.1. Schematic**

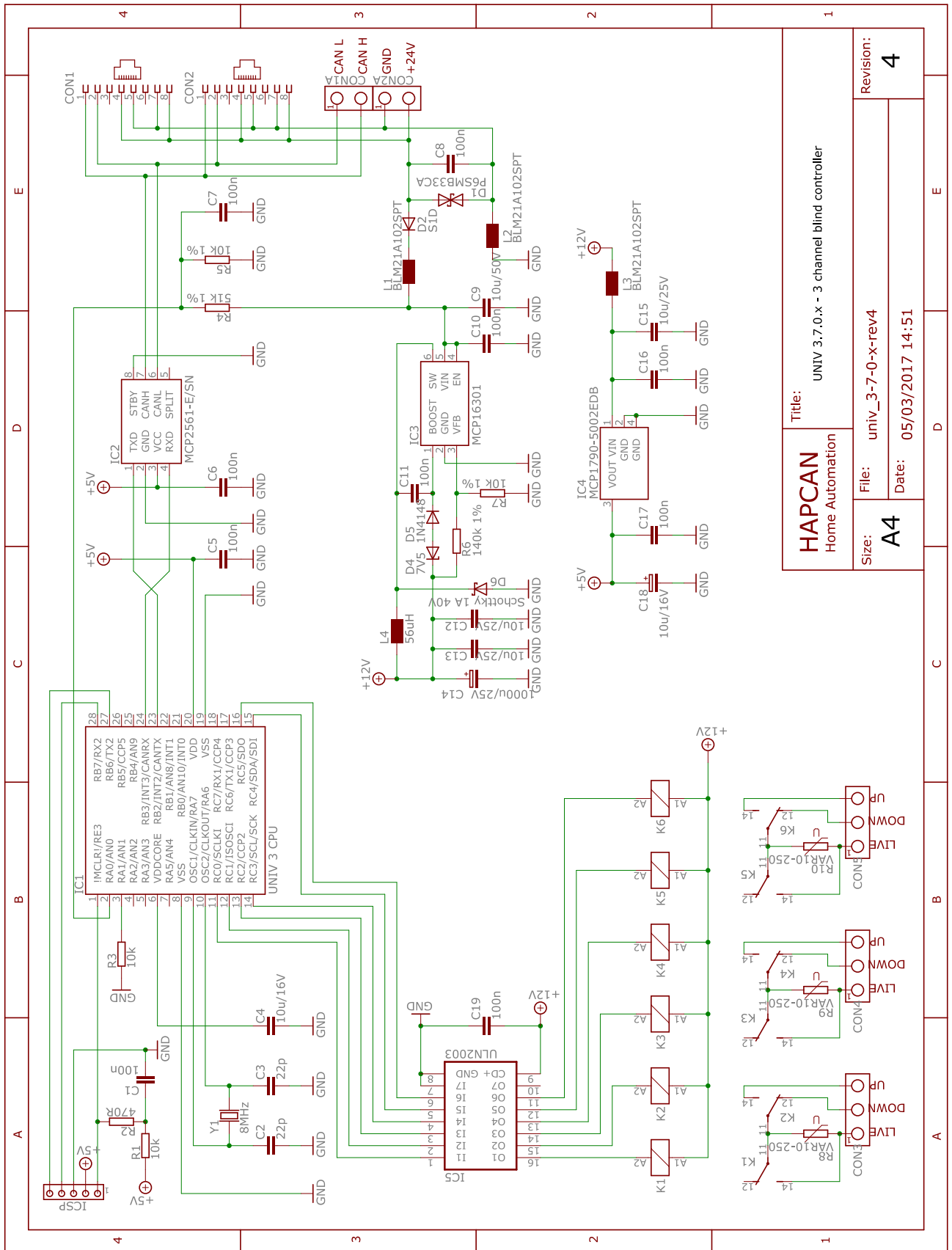


Figure 1. Schematic of blind controller UNIV 3.7.0.x

#### 4.2. Wiring

- ⚠ WARNING. This module must be connected only to **one phase** of mains.
- ⚠ WARNING. Only **one motor** is allowed per channel.

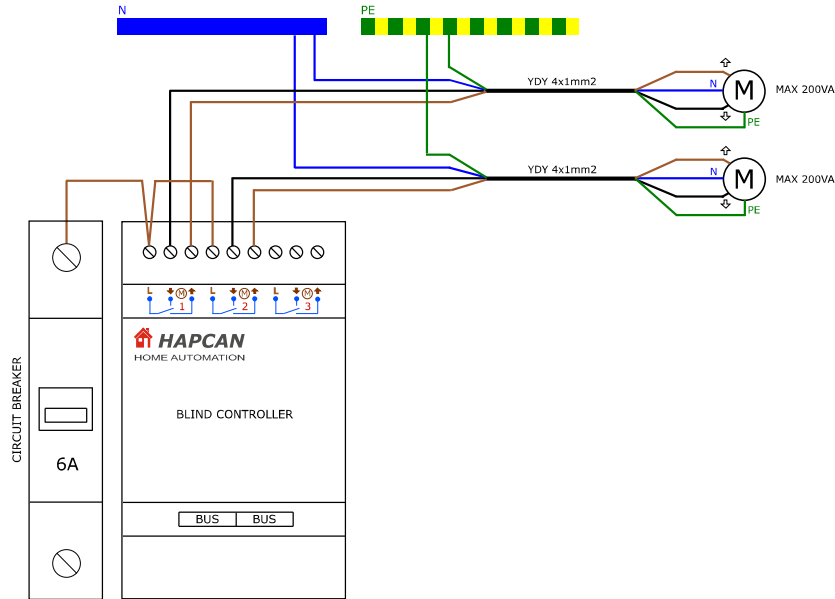
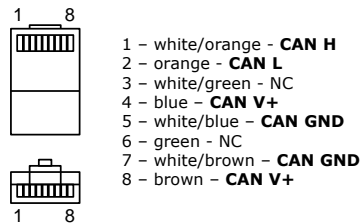


Figure 2. Relay wiring.

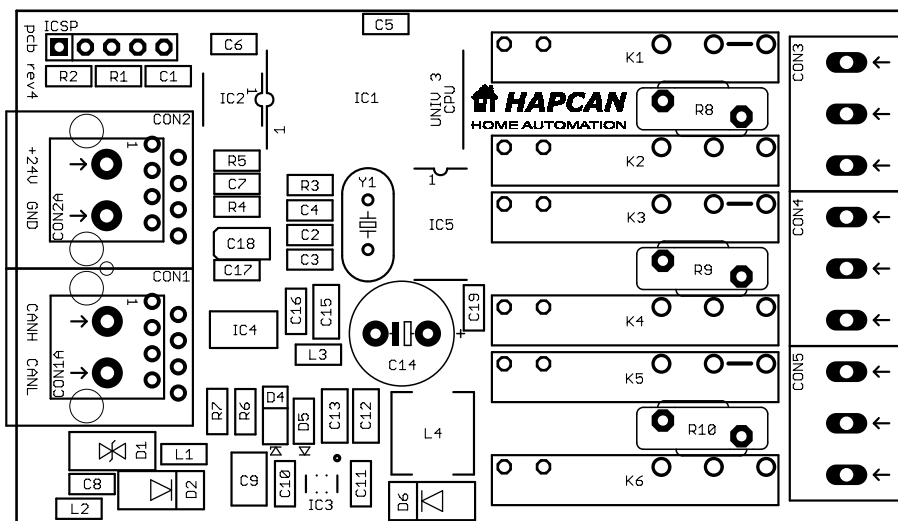


Note that if module is first or last on the bus, the terminator (resistor 120 Ohm) must be plugged into one of BUS ports.

Figure 3. RJ45 bus connector wiring.

#### 4.3. PCB assembly schematic

- Printed circuit board PCB UNIV 3.(2-7).(5-0).x for UNIV 3.7.0.x module
- PCB dimensions: 50mm x 86.5mm

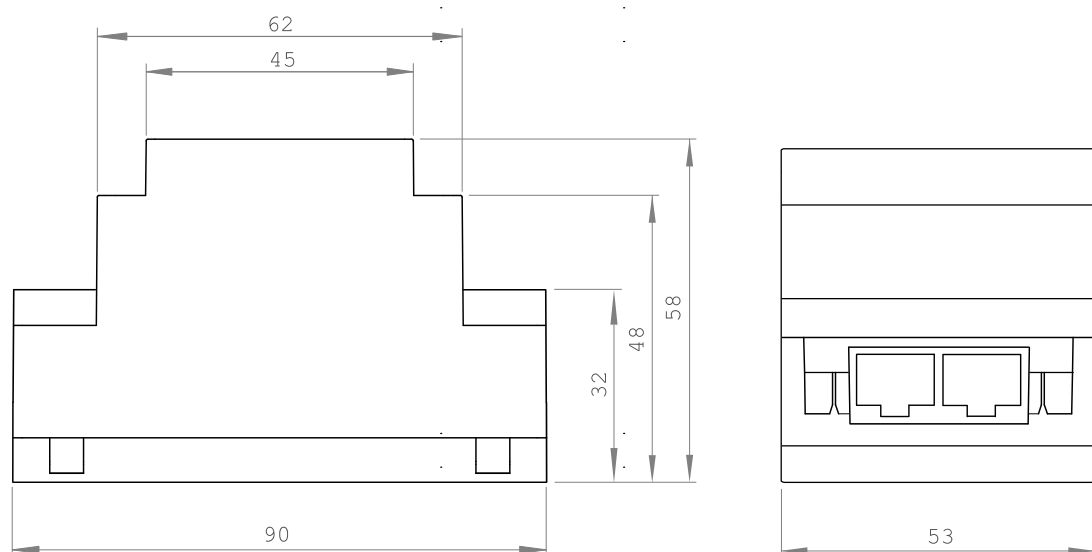


#### 4.4. Components

Designator	Quantity	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11, C16, C17, C19	10	100nF/50V ±10%	0805	Capacitor
C2, C3	2	22pF/50V ±10%	0805	Capacitor
C4	1	10uF/16V ±10% X5R	0805	Capacitor
C9	1	10uF/50V ±10%	1206, 1210	Capacitor
C12, C13, C15	3	10uF/25V ±10%	1206	Capacitor
C14	1	1000uF/25V	ø10, raster 5mm	Electrolytic Capacitor tht
C18	1	10uF/16V ±10%	SMA, SMB	Tantalum capacitor
R1, R3	2	10k	0805	Resistor
R2	1	470 Ohm	0805	Resistor
R4	1	51k 1%	0805	Resistor
R5, R7	2	10k 1%	0805	Resistor
R6	1	140k 1%	0805	Resistor
R8, R9, R10	3	VAR10-250	ø10, raster 7.5mm	Varistor
L1, L2, L3	3	BLM21A102SPT	0805	Choke Murata
L4	1	DER0705-56	7.6mm x7.6mm	Choke Ferrocore
Y1	1	8MHz	HC49-S	Quartz crystal
D1	1	P6SMB33CA	DO-214	Transil diode
D2	1	S1D	DO-214	Rectifying diode
D4	1	Zenera 7V5 0.5W	MiniMELF	Zener diode
D5	1	1N4148	0805	Rectifying diode
D6	1	MBRS140T3G	DO-214	Shottky diode
IC1	1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	1	MCP2561-E/SN	SOIC-8	CAN transceiver Microchip
IC3	1	MCP16301T-I/CHY	SOT-23-6	DC/DC converter Microchip
IC4	1	MCP1790-5002EDB	SOT-223	Voltage regulator Microchip
IC5	1	ULN2003	SOIC-16	Darlington transistors arrays
CON1, CON2	2	95501-2881	8pin RJ45	Connector RJ45 Molex
CON3, CON4, CON5	3	AK700/3-5.0-V-GREEN-BR	raster 7.5mm	Terminal block PTR Messtechnik
K1, K2, K3, K4, K5, K6	6	34.51.7.012.0010 contact 6A/250V AC coil 12V/14.2mA DC	L28xW5xH15	Finder relay

#### 4.5. Enclosure

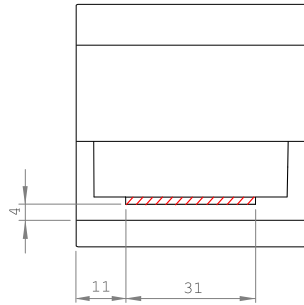
- Gainta D3MG enclosure (3 module wide)
- Dimensions: 90mm x 58mm x 53mm



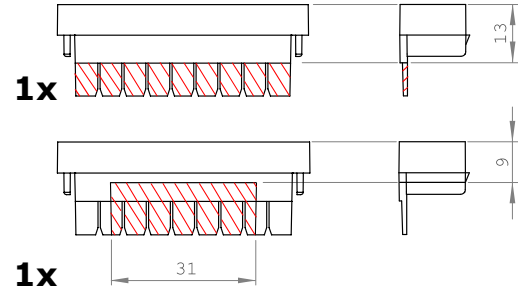
**4.6. Mechanical processing**

Striped parts must be removed.

**BODY**

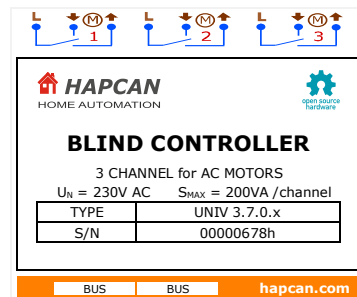


**TERMINAL GUARDS**



**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.

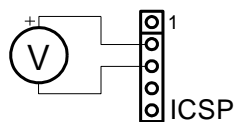


Figure 4. CPU voltage measurement

**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.

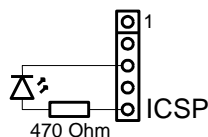


Figure 5. Checking the CPU clock

**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	Hardware Revision	Description	Date
univ_3-7-0-x_a.pdf	rev1	Original version	April 2014
univ_3-7-0-x_b.pdf	rev1	Schematic correction	May 2014
univ_3-7-0-x_c.pdf	rev3	PCB and enclosure change	December 2015
univ_3-7-0-x_d.pdf	rev4	Changes in PCB	March 2017