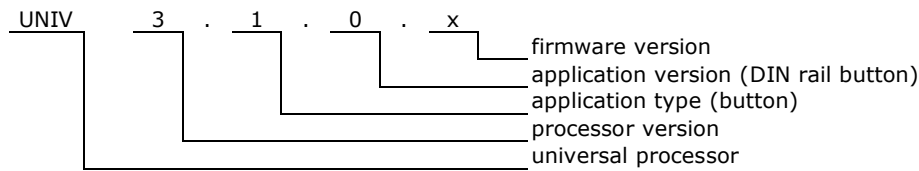


**1. Features**

- 8 channel button module for DIN rail. Up to 8 buttons or other devices with free voltage contacts can be connected to the module
- The inputs are protected against surges
- Buttons can be connected with wire which length is limited with loop resistance
- Operation voltage 10-24V
- Current consumption 12mA
- For DIN rail mounting
- Dimensions 90x58x53 mm
- 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

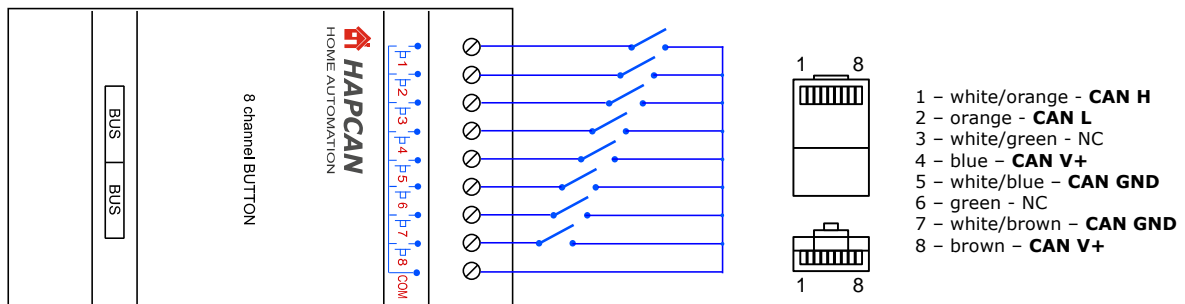
Parameter	Symbol	Value	Unit
Power supply voltage	$U_S$	10-24V	V
Current consumption	$I_S$	7	mA
Maximum current consumption (with shorted all inputs)	$I_{SMAX}$	12	mA
Bus connector type		2x RJ45	

Button input

Parameter	Symbol	Value	Unit
Connector type		9 terminal blocks (solid wire 4mm <sup>2</sup> , stranded 2,5mm <sup>2</sup> )	
Maximum resistance of input loop	$R_{MAX}$	500	Ohm

**4. Hardware**

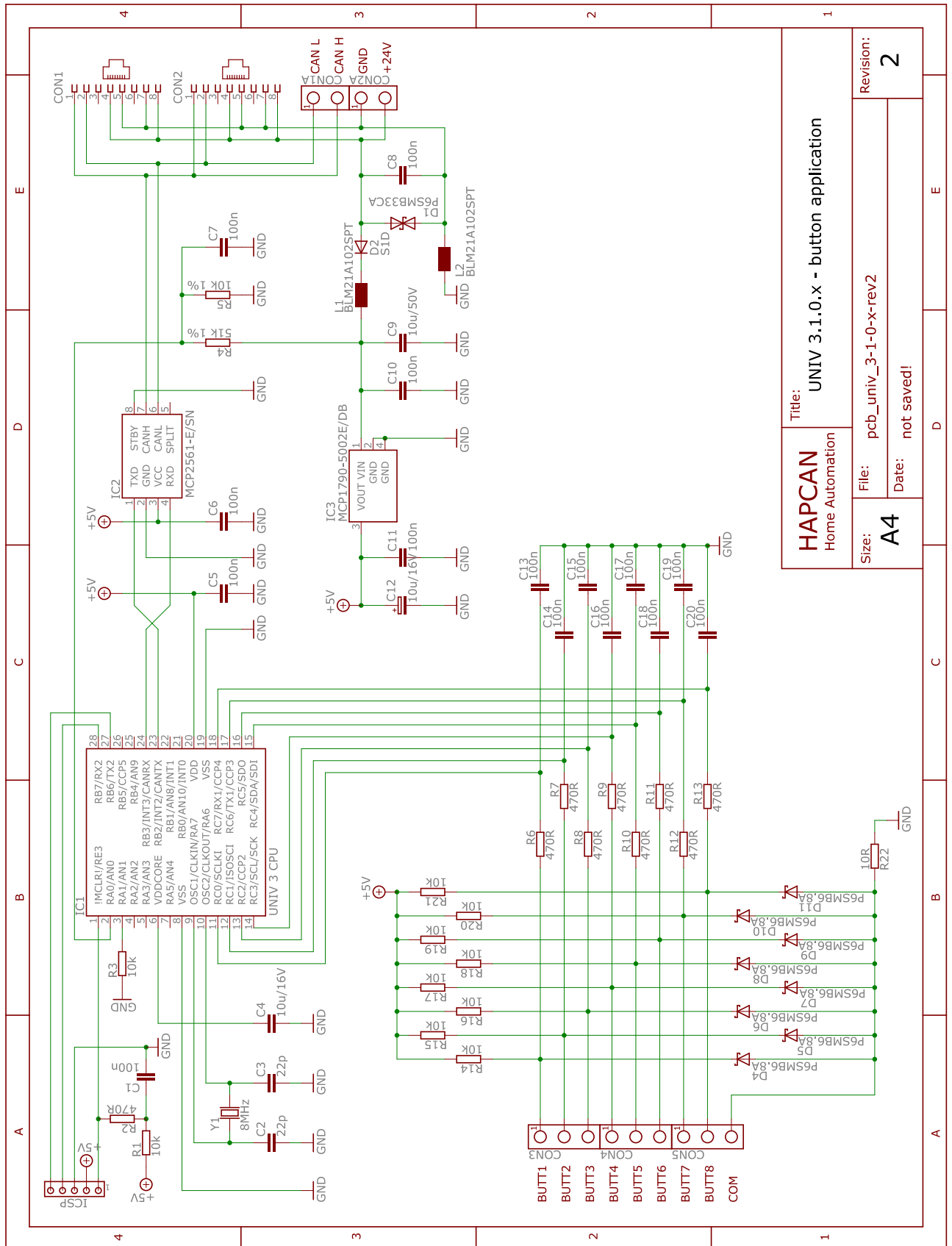
**4.1. Wiring**



Note that if module is first or last on the bus, resistor 120 Ohm must be connected between pins CANH and CANL.

Figure 1. Wiring diagram

**4.2. Schematic**

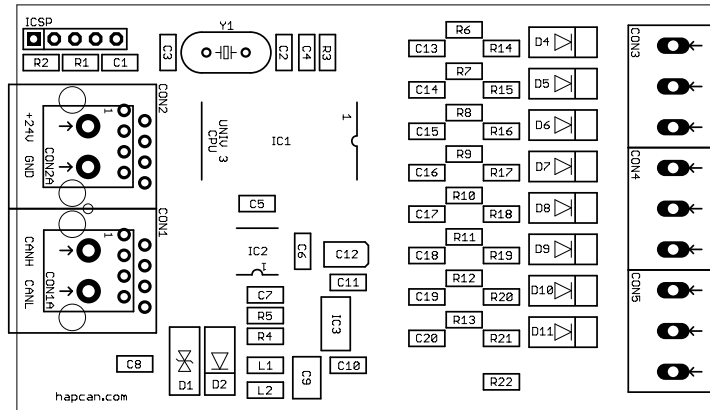


<b>HAPCAN</b> Home Automation		Title: UNIV 3.1.0.x - button application	
Size: <b>A4</b>	File: pcb_univ_3-1-0-x-rev2	Date: not saved!	Revision: <b>2</b>

Figure 2. Schematic of UNIV 3.1.0.x module

**4.3. PCB assembly schematic**

- Printed circuit boards *PCB UNIV 3.1.0.x* for UNIV 3.1.0.x module
- PCBs dimensions: 86.5mm x 50mm

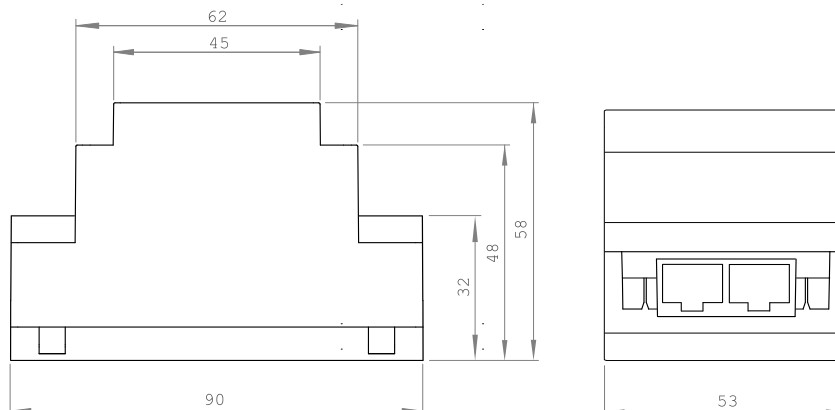


**4.4. Components**

Designator	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11, C13, C14, C15, C16, C17, C18, C19, C20	100nF/50V ±10%	0805	Capacitor
C2, C3	22pF/50V ±10%	0805	Capacitor
C4	10uF/16V ±10% X5R	0805	Capacitor
C9	10uF/50V ±10%	1206, 1210	Capacitor
C12	10uF/16V ±10%	SMA, SMB	Tantalum capacitor
R1, R3, R14, R15, R16, R17, R18, R19, R20, R21	10k	0805	Resistor
R2, R6, R7, R8, R9, R10, R11, R12, R13	470 Ohm	0805	Resistor
R4	51k 1%	0805	Resistor
R5	10k 1%	0805	Resistor
R22	10 Ohm	0805	Resistor
L1, L2	BLM21A102SPT	0805	Murata choke
Y1	8MHz	HC49-S	Quartz crystal
D1	P6SMB33CA	DO-214	Transil diode
D2	S1B	DO-214	Rectifying diode
D4, D5, D6, D7, D8, D9, D10, D11	P6SMB6.8A	DO-214	Transil diode
IC1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	MCP2561-E/SN	SOIC-8	Microchip CAN transceiver
IC3	MCP1790-5002EDB	SOT-223	Microchip Voltage regulator
CON1, CON2	95501-2881	L18xW15xH11	Molex RJ45 connector
CON3, CON4, CON5	AK700/3-5.0-V-GREEN-BR	L15xW10.5xH19 raster=5mm	PTR Messtechnik Terminal block

**4.5. Enclosure**

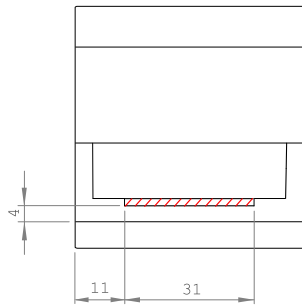
- Gainta D3MG enclosure (3 modules wide)
- Dimensions: 90mm x 58mm x 53mm



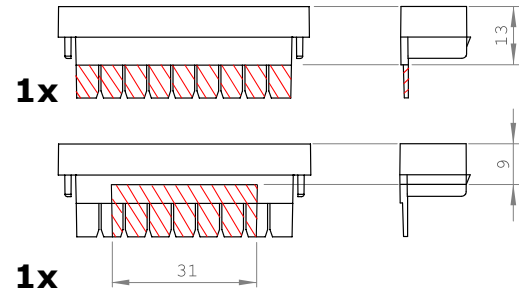
#### 4.6. Mechanical processing

Striped parts must be removed.

##### BODY

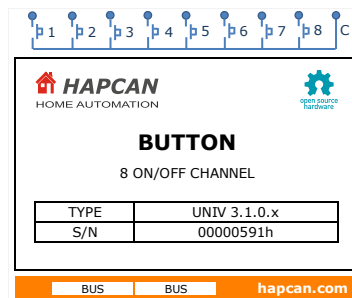


##### TERMINAL GUARDS



#### 4.7. Labels

Editable labels version is available on [hapcan.com](http://hapcan.com) site.



### 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.

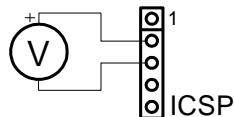


Figure 4. CPU voltage measurement

#### 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.

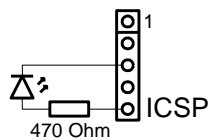


Figure 5. Checking the CPU clock

#### 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_3-1-0-x_a.pdf	rev1	Original version	August 2013
univ_3-1-0-x_b.pdf	rev1	Enclosure has been changed	February 2015
univ_3-1-0-x_c.pdf	rev2	Updated to hardware revision 2	October 2015