

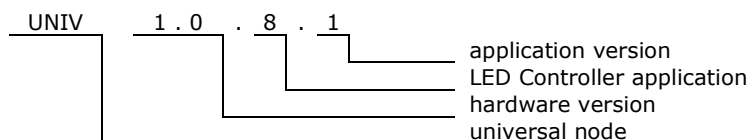


## 1. Features

- 3 channel LED controller
- Maximum load 120VA for each channel
- PWM (Pulse Width Modulation)
- Controller can generate any colour with required intensity of common anode RGB LED.
- Can work with:
  -  - RGB LEDs or three single colour LEDs (eg. LED strips, tapes, tubes etc.)
  -  - low voltage bulbs (classical and halogen 12-24V)
- Can work as 0-10V driver
- Maximum LED supply voltage 12-24V
- Maximum LED current 5A for each channel
- Operation voltage 10-24V.
- Current consumption from the bus 12mA.
- For DIN rail mounting.
- Dimensions 90x58x53 mm (3 mod)
- Operating of module depends on firmware uploaded into it.



## 2. Application version



## 3. Technical data

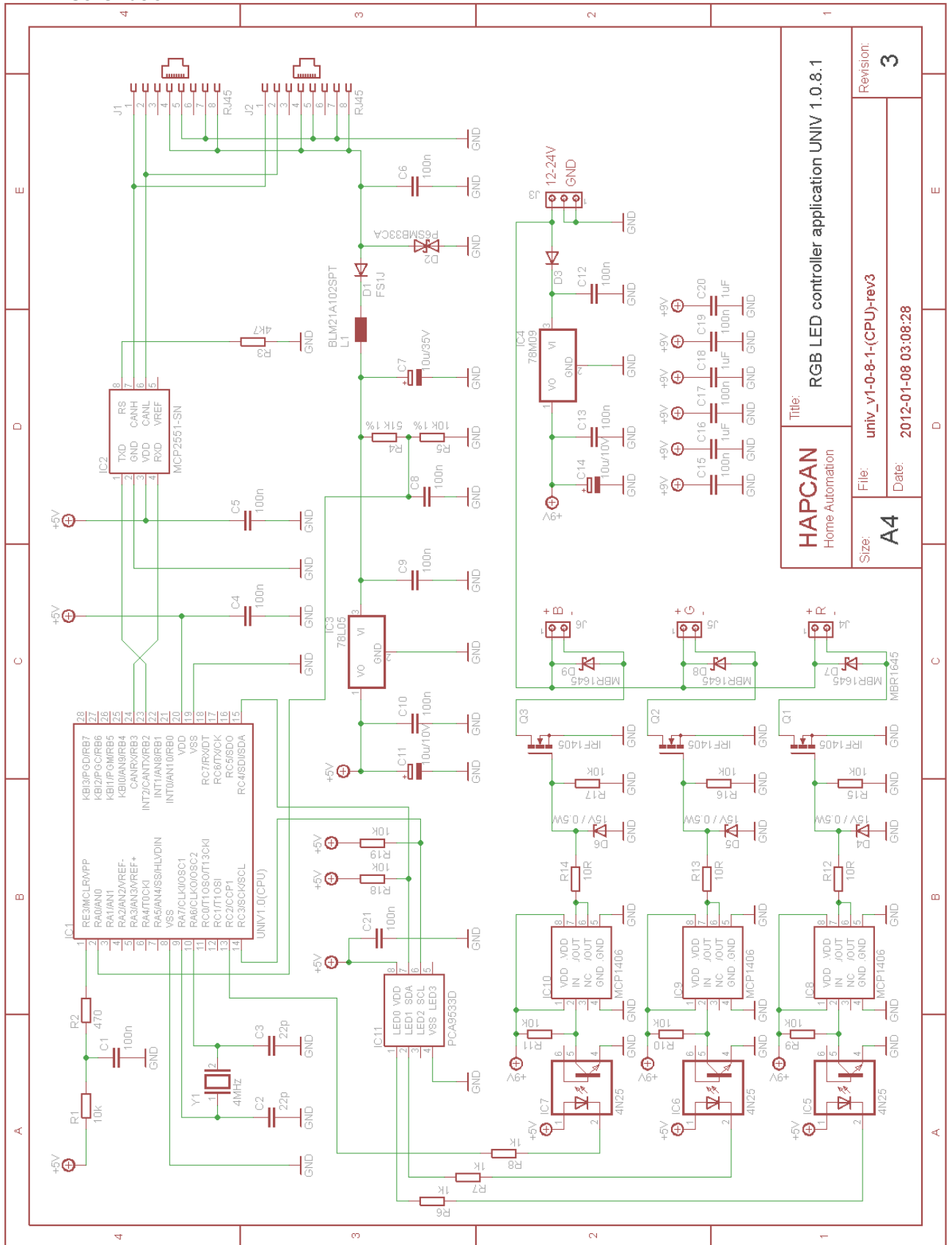
### Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	$U_s$	10-24V	V
Current consumption from the bus	$I_s$	12	mA
Bus connector type	2x RJ45 connectors		

### LED side

Parameter	Symbol	Value	Unit
Power supply voltage	$U$	230/240	V
Maximum LED current for one channel	$I$	5	A
Load Power for one channel	$S$	120	VA
Voltage regulating range	$U_\phi$	0 - U	V
PWM frequency (channel R & G)	$f_{RG}$	155	Hz
PWM frequency (channel B)	$f_B$	976	Hz
Connector type	Terminal block 1,5mm2		

4. Hardware  
4.1. Schematic



<p><b>HAPCAN</b> Home Automation</p>		<p>Title: <b>RGB LED controller application UNIV 1.0.8.1</b></p>	
<p>Size: <b>A4</b></p>	<p>File: <b>univ_v1-0-8-1-(CPU)-rev3</b></p>	<p>Date: <b>2012-01-08 03:08:28</b></p>	<p>Revision: <b>3</b></p>

Figure 1. Schematic of RGB LED controller UNIV 1.0.8.1

4.2. Wiring

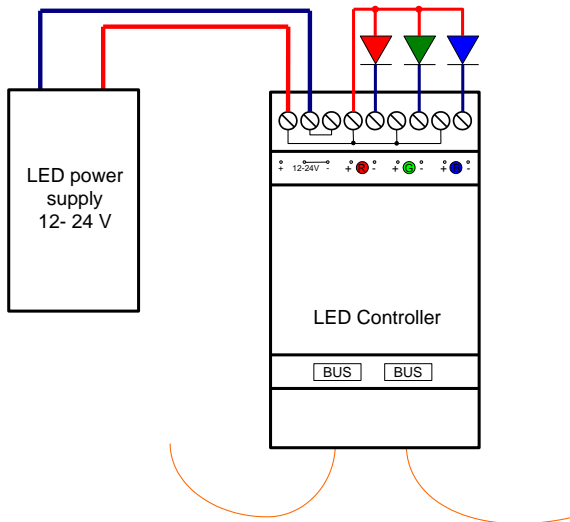


Figure 2. RGB LED wiring.

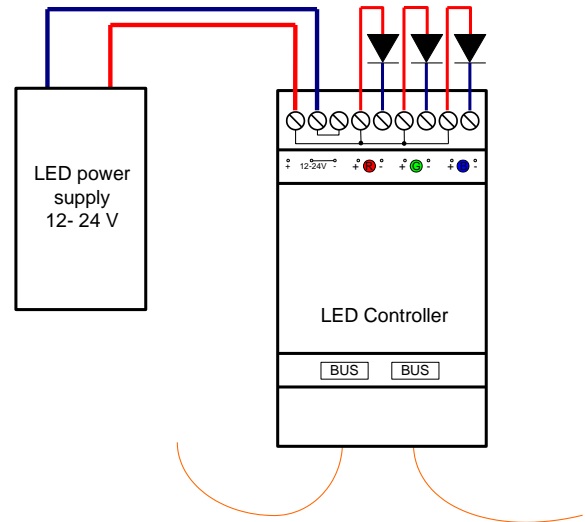


Figure 3. Three single colour LED wiring.

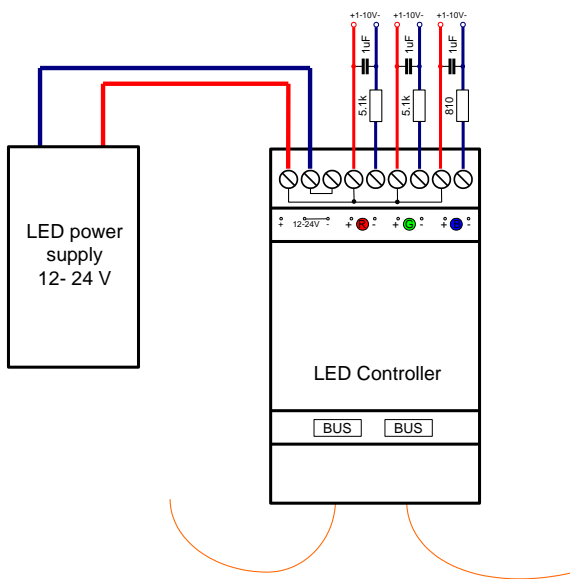
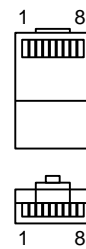


Figure 4. 0-10V driver mode.

Note that if module is first or last on the bus, resistor 120ohm must be connected between pins CAN H and CAN L.

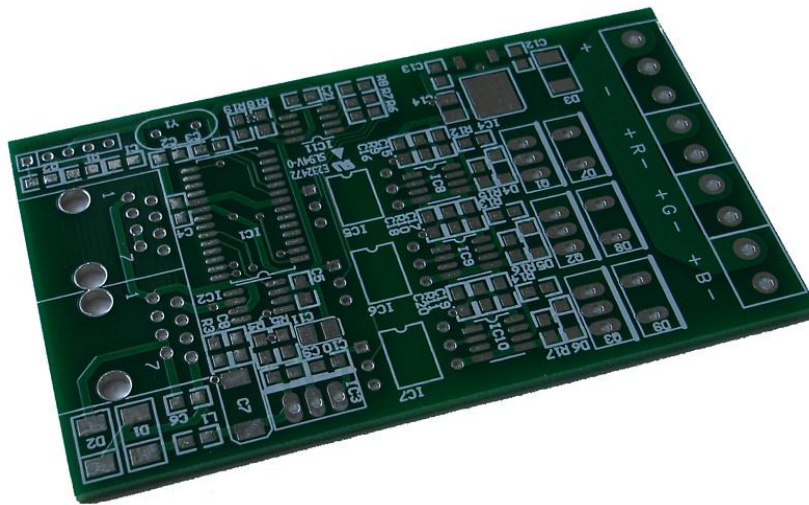


- 1 - white/orange - **CAN H**
- 2 - orange - **CAN L**
- 3 - white/green - NC
- 4 - blue - **CAN V+**
- 5 - white/blue - **CAN GND**
- 6 - green - NC
- 7 - white/brown - **CAN GND**
- 8 - brown - **CAN V+**

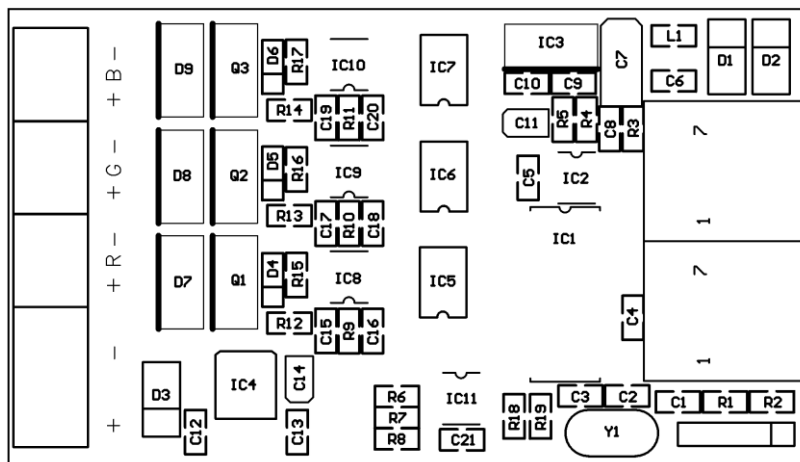
Figure 5. RJ45 bus connector wiring.

4.3. Printed Circuit Board

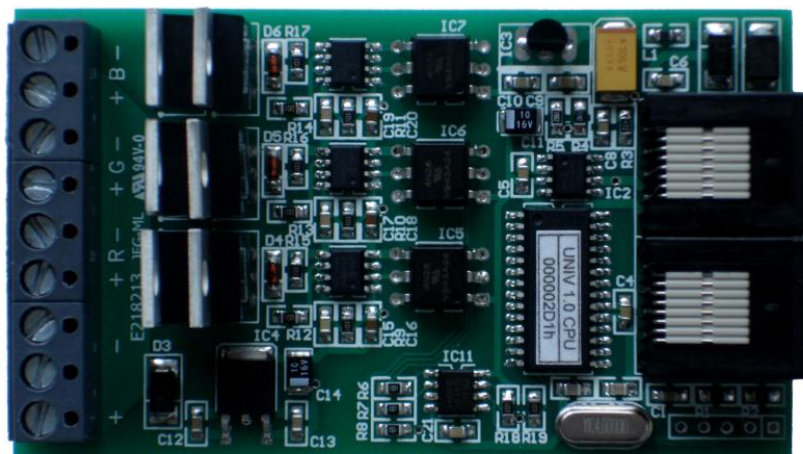
- Printed circuit board UNIV 1.0.8.1 -rev1
- PCB dimensions: 86mm x 50mm

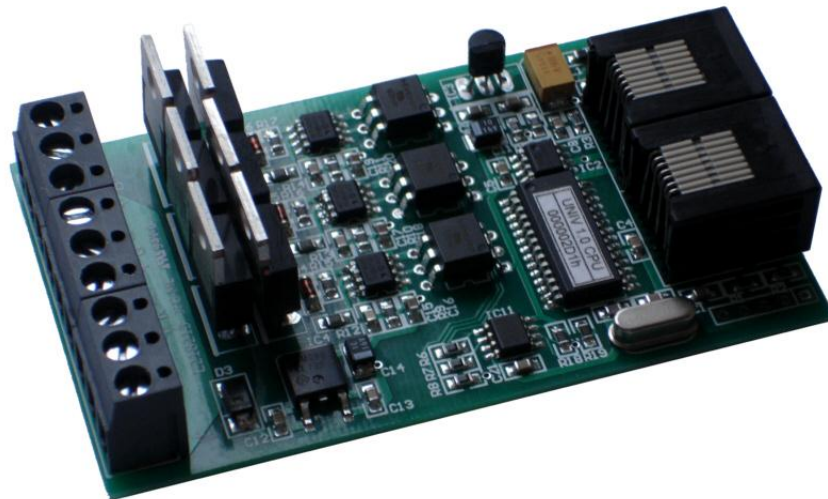


4.3.1. Assembly schematic



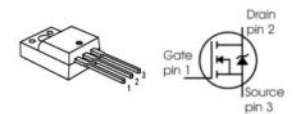
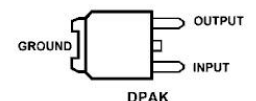
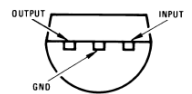
4.3.2. Assembled PCB





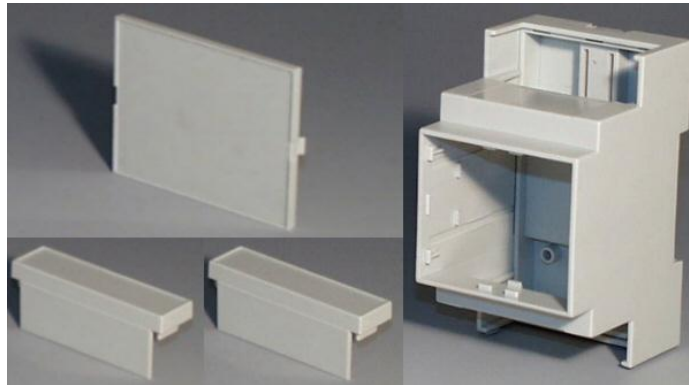
4.3.3. Components

Designator	Type	Footprint	Description
C1, C4, C5, C6, C8, C9, C10, C12, C13, C15, C17, C19, C21, C16, C18, C20	100nF	0805	Capacitor
C2, C3	22pF	0805	Capacitor
C7	10uF/35V	SME	Electrolytic Capacitor
C11, C14	10uF/16V	SMB	Electrolytic Capacitor
R1, R9, R10, R11, R15, R16, R17, R18, R19	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	1k	0805	Resistor
R12, R13, R14	10 Ohm	0805	Resistor
L1	BLM21A102SPT	0805	Choke
Y1	4MHz	HC49-S	Quartz crystal
D1, D3	FS1J	DO-214	Diode
D2	P6SMB33CA	DO-214	Transil diode
D4, D5, D6	15V / 0,5W	MINIMELF	Zener Diode
D7, D8, D9	MBR1645	TO-220	Diode
IC1	UNIV 1.0 (CPU)	SOIC-28	Processor of HAPCAN universal module
IC2	MCP2551-SN	SOIC-8	CAN Transceiver
IC3	78L05	TO-92	Voltage regulator
IC4	78M09	DPAK	Voltage regulator
IC5, IC6, IC7	4N25	DIP6	Phototransistor
IC8, IC9, IC10	MCP1406	SOIC-8	MOSFET Driver
IC11	PCA9533d	SOIC-8	LED driver
Q1, Q2, Q3	IRF1405	TO-220	MOSFET Transistor
J1, J2	RJ45	L18xW15xH11	Connector
X1, X2, X3	ARK3	H=12,5mm raster=5mm	Terminal block

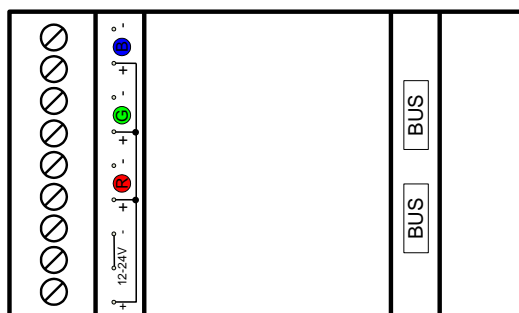
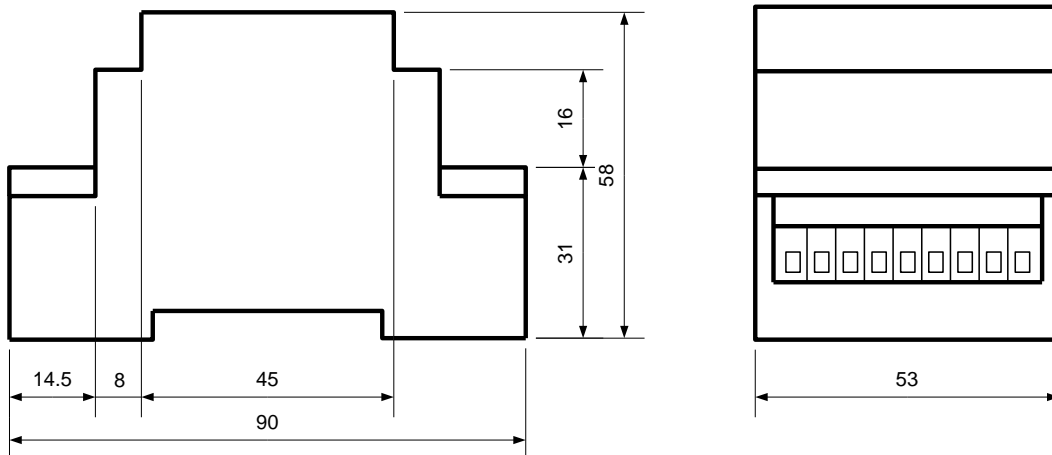


**4.4. Enclosure**

- Rail mounting enclosure, 3 modules size
- Dimensions: 90mm x 58mm x 53mm



**4.4.1. Dimensions**

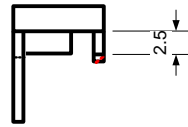
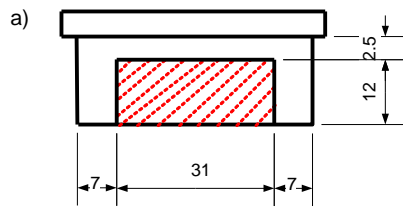


**4.4.2. Mechanical processing**

**4.4.2.1. Main part**

Does not need processing.

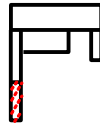
4.4.2.2. Terminal guards



Striped parts must be removed.

Drawing a) shows RJ45 connector guard.

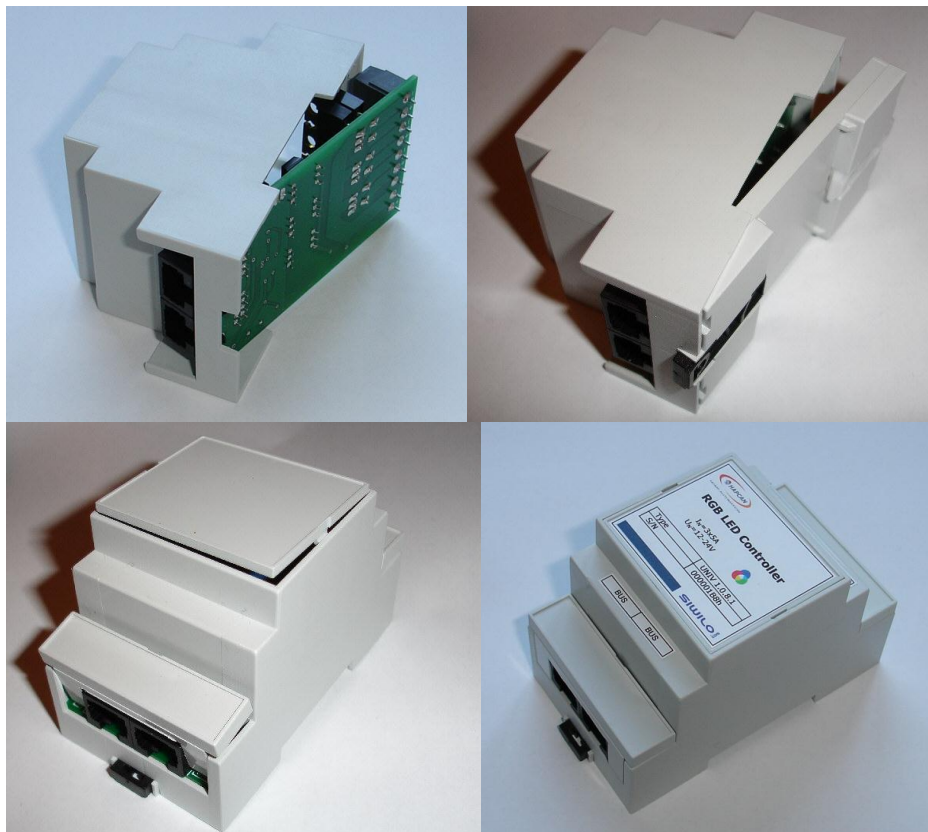
Drawing b) shows terminal block guard.



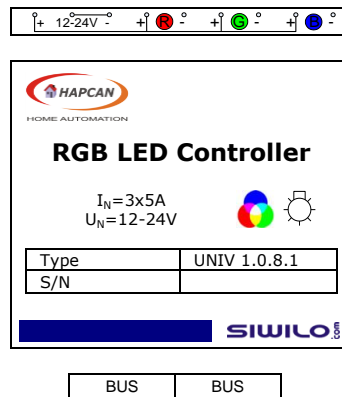
4.4.2.3. Front panel

Does not need processing.

4.4.3. Assembling



**4.4.4. Labels**



**5. Document version**

File	Description	Date
univ_v1-0-8-1-pcba.pdf	Original version	July 2010
univ_v1-0-8-1-pcbb.pdf	Figure 1 correction	November 2010
univ_v1-0-8-1-pcbc.pdf	Corrected 4.1 & 4.3.3	September 2011
univ_v1-0-8-1-pcbd.pdf	Update with hardware revision 1	January 2012