Button Application
UNIV 1.0.1.3

1. Features:

- 8 channel button module. Up to 8 buttons with free voltage contacts can be connected to the module
- Possibility to connect 8 LEDs to indicate status of other nodes
- Uses 1-wire digital sensors DS18B20, DS18B20-PAR, or DS1822, DS1822-PAR.
- Measures temperatures from -55°C to +125°C.
- Accuracy ±0.5°C when used with DS18B20, DS18B20-PAR, or ±2.0°C with DS1822 and DS1822-PAR.
- 12bits temperature resolution.
- Operation voltage 10-24V
- Current consumption 40mA
- For back box mounting
- Dimensions 43x32x22 mm
- Operating of module depends on firmware uploaded into it.

2. Application version

UNIV 1 . 0 . 1 . 3

- 3 — application version
- 1 — button application
- 0 — hardware version
- UNIV — universal node

3. Technical data

Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	U_s	10-24V	V
Current consumption from the bus with LEDs without LEDs	I_s	 40 18	mA
Bus connector type	Terminal block 1.5mm2		

Button input

Parameter	Symbol	Value	Unit
Maximum resistance of input loop	R_{MAX}	500	Ohm
Length of input wire	l	0,25	m
Size of input wire	s	0,22 24	mm^2 AWG

Temperature sensor

Parameter	Symbol	Value	Unit
Operating temperature	T	-55 - +125	°C
Operating temperature resolution	T_{RES}	0.0625	°C
Temperature accuracy	T_{ERR}	DS18B20, DS18B20-PAR: ±2 ±0.5 (-10°C - +85°C) DS1822, DS1822-PAR: ±3 ±2 (-10°C - +85°C)	°C
Thermostat switching temperature	T_{THM}	-55 - +125	°C
Thermostat switching temperature resolution	T_{THMRES}	1	°C
Thermostat hysteresis	T_{HIS}	1 – 90	°C
Thermostat hysteresis resolution	T_{HISRES}	1	°C

4. Hardware

4.1. Schematic

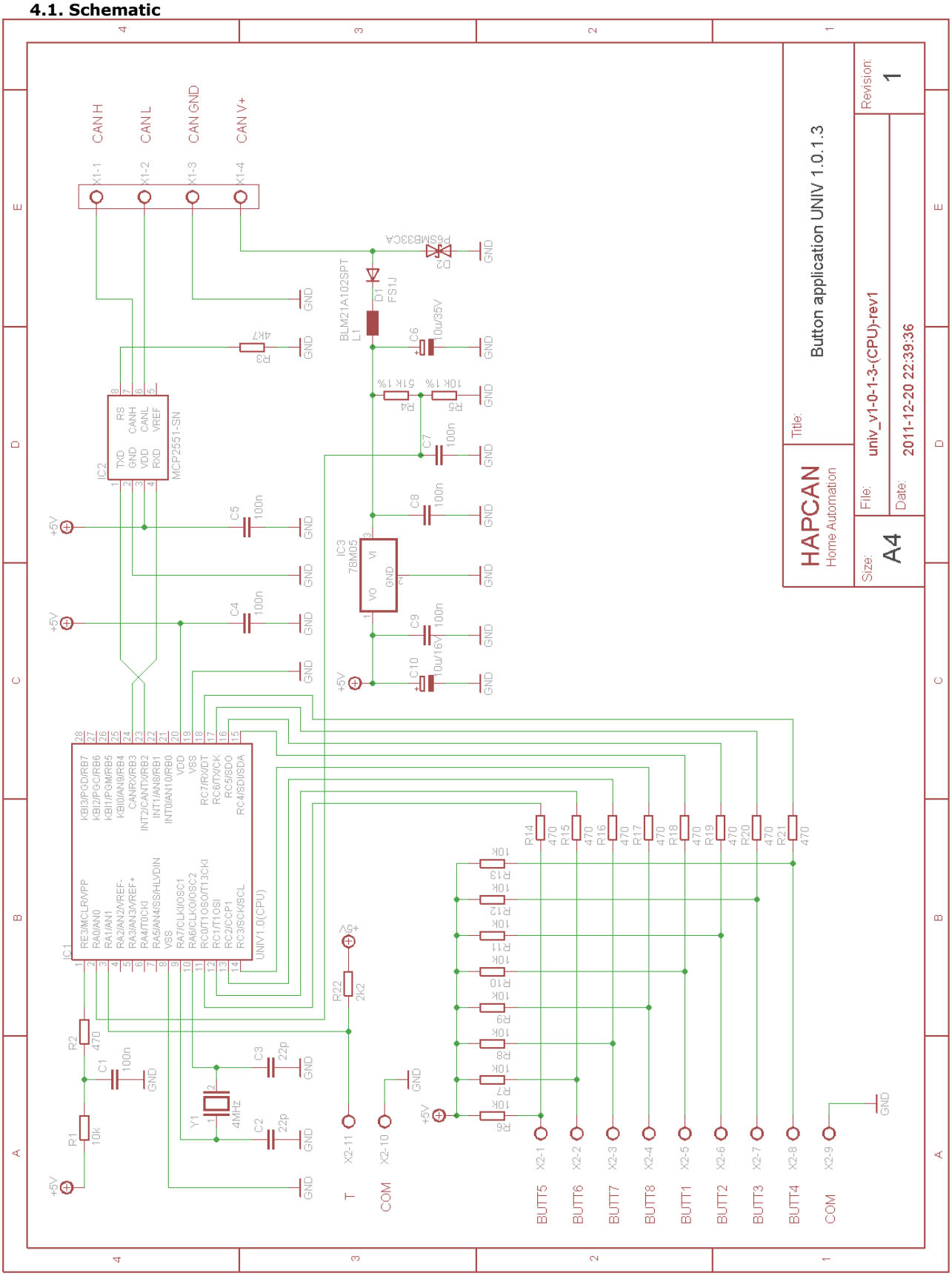
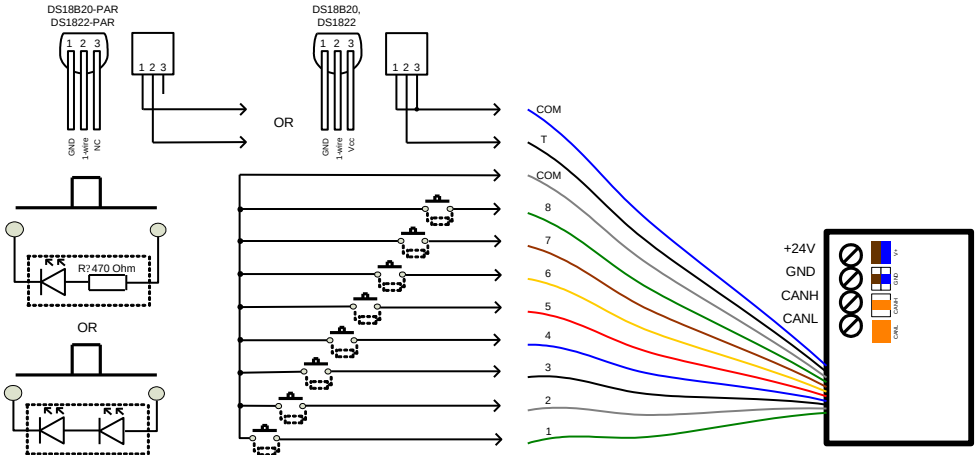


Figure 1. Schematic of button application UNIV 1.0.1.3

4.2. Wiring

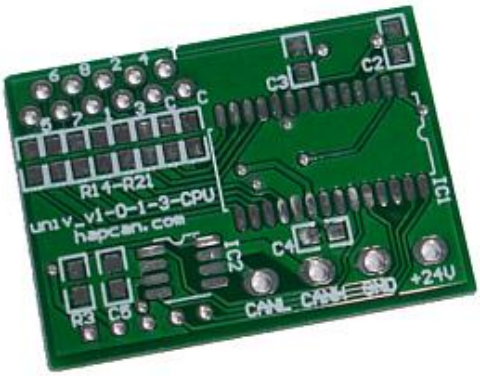


HAPCAN Bus wiring
brown - **V+**
blue - **V+**
white-brown - **GND**
white-blue - **GND**
white-orange - **CAN H**
orange - **CAN L**

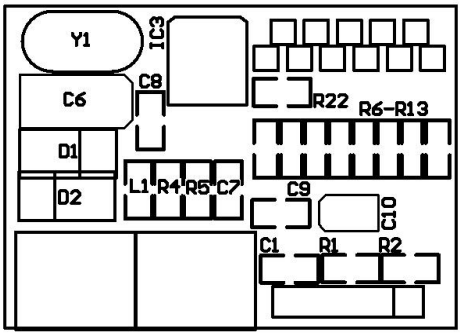
Figure 2. Wiring diagram.

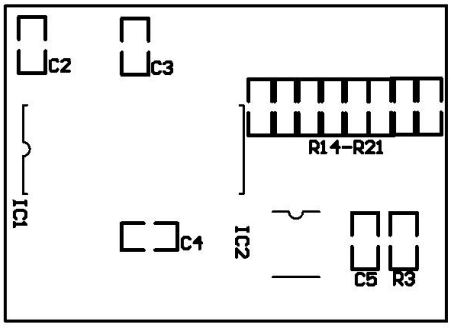
4.3. Printed Circuit Board

- Printed circuit board for button application UNIV 1.0.1.3
- PCB dimensions: 38mm x 27mm

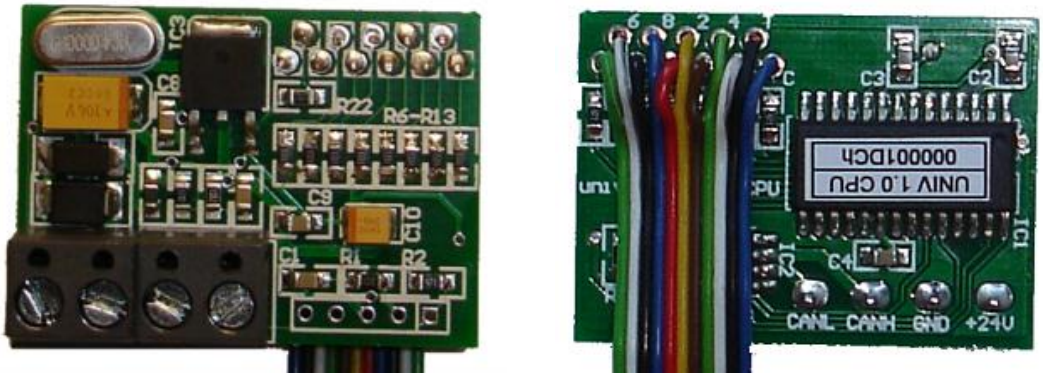


4.3.1. Assembly schematic

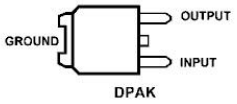




4.3.2. Assembled PCB



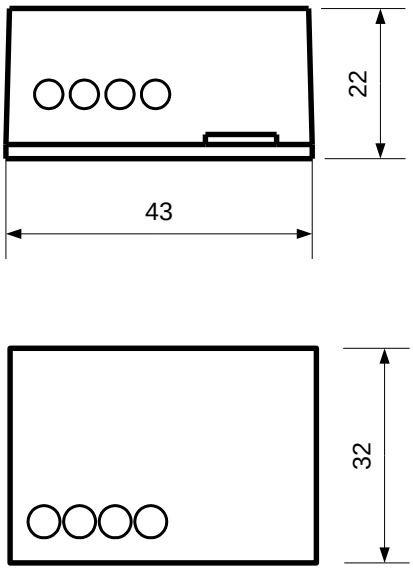
4.3.3. Components

Designator	Type	Footprint	Description
C1, C4, C5, C7, C8, C9	100nF	0805	Capacitor
C2, C3	22pF	0805	Capacitor
C6	10uF/35V	SME	Electrolytic Capacitor
C10	10uF/16V	SMB	Electrolytic Capacitor
R1, R6, R7, R8, R9, R10, R11, R12, R13	10k	0805	Resistor
R2, R14, R15, R16, R17, R18, R19, R20, R21	470 Ohm	0805	Resistor
R3	4k7	0805	Resistor
R22	2k4	0805	Resistor
R4	51k 1%	0805	Resistor
R5	10k 1%	0805	Resistor
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	78M05	DPAK	Voltage regulator 
T	DS18B20+	TO-92	Dallas sensor
X1	2x ARK2	H=12,5mm raster=5mm	Terminal block
X2	12x0,22mm^2 l=0,3m		Multi wire
Enclosure	KM-1	43x32x22	

4.4. Enclosure

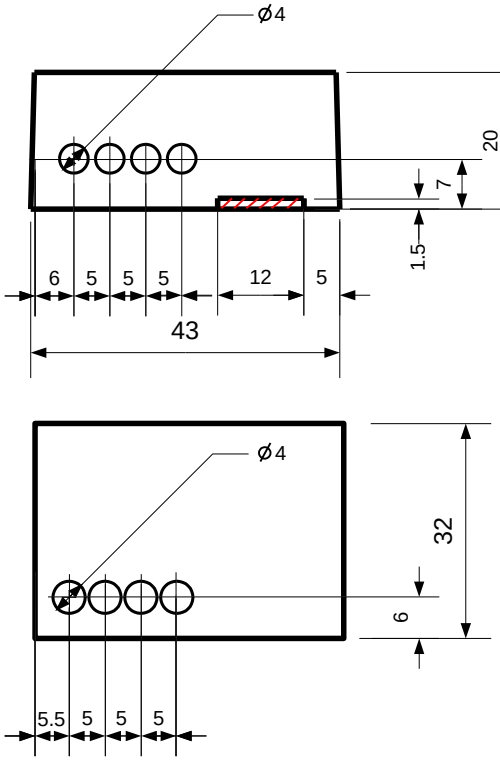
- Enclosure type KM-1
- Dimensions: 43mm x 32mm x 22mm

4.4.1. Dimensions



4.4.2. Mechanical processing

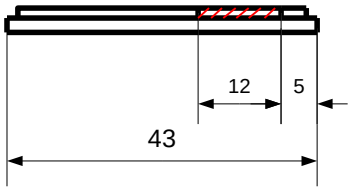
4.4.2.1. Main part



Striped parts must be removed and holes made.

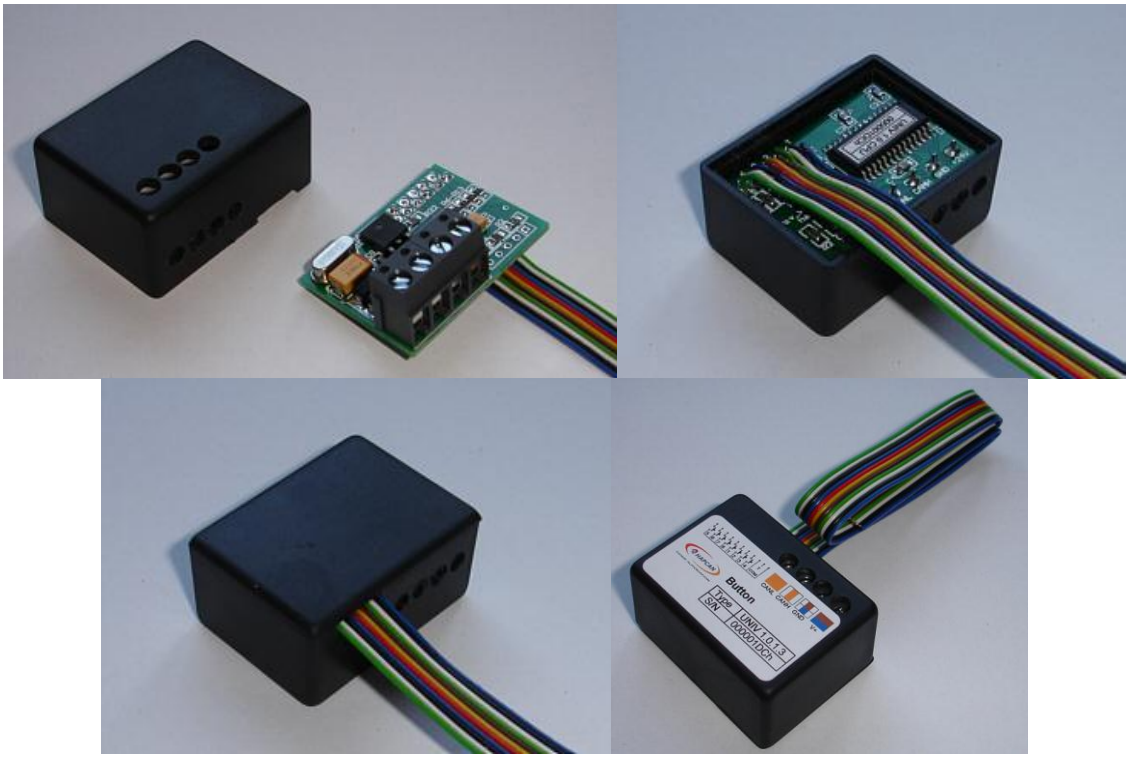
4.4.2.2. Lid

Striped parts must be removed.

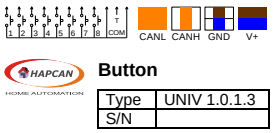


4.4.3. Assembling

The lid has to be glued to the main part.



4.4.4. Labels



5. Document version

File	Description	Date
univ_v1-0-1-3-pcba.pdf	Original version	October 2010
univ_v1-0-1-3-pcbb.pdf	Thermometer implemented	December 2011