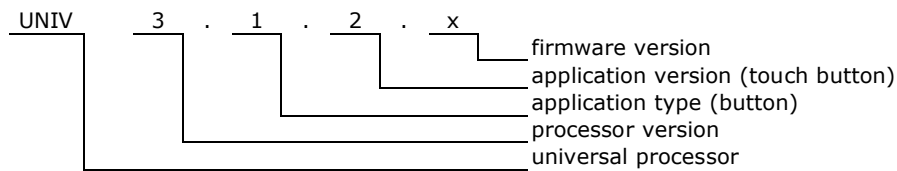


1. Features

- 6 channel touch button module. Up to 6 sensors can be connected to the module. There is no front panel with touch sensors included. Please see Microchip AN1492 and AN1334 notes to find out how to design sensors.
- Possibility to connect 6 LEDs to indicate status of other nodes
- Uses 1-wire digital sensors DS18B20, or DS1822.
- Measures temperatures from -55°C to +125°C.
- Accuracy ±0.5°C when used with DS18B20+, or ±2.0°C with DS1822.
- 12bits temperature resolution.
- Operation voltage 10-24V
- Current consumption 18mA with 6 LEDs turned on
- For deep back box mounting
- Dimensions 44x44x25 mm
- Operating of module depends on firmware uploaded into it.
- Schematic and PCB design can be downloaded from 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 without LEDs	I_s	8	mA
Maximum current consumption with 6 LEDs turned on	I_{smax}	18	mA
Bus connector type	4 terminal blocks 1.5mm ²		

Button input

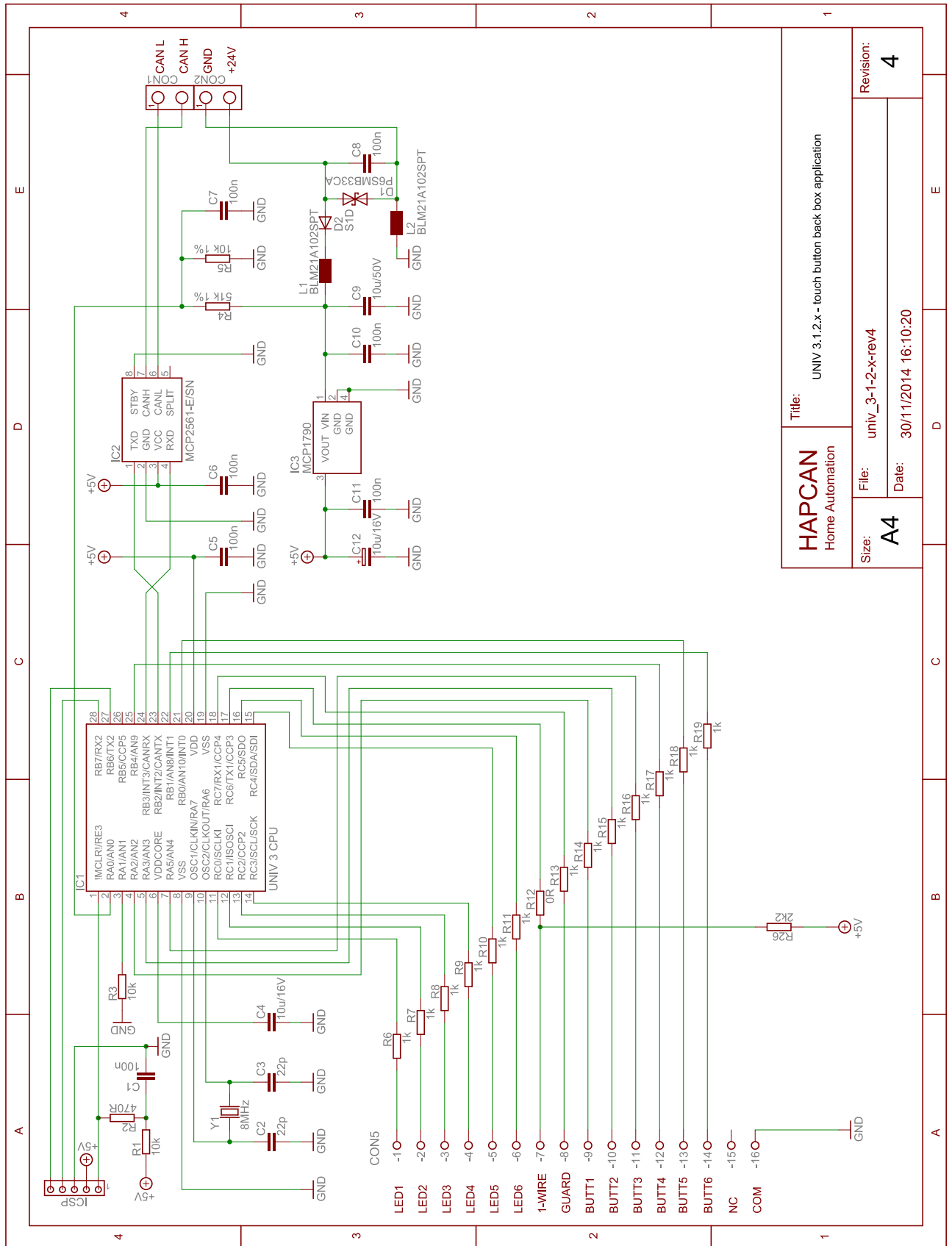
Parameter	Symbol	Value	Unit
Connector type	Stranded ribbon cable		
Size of input wire	s	0.13 26	mm ² AWG
Length of input wire	l	0.25	m

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+: ±2 ±0.5 (-10°C - +85°C) DS1822: ±3 ±2 (-10°C - +85°C)	°C

4. Hardware

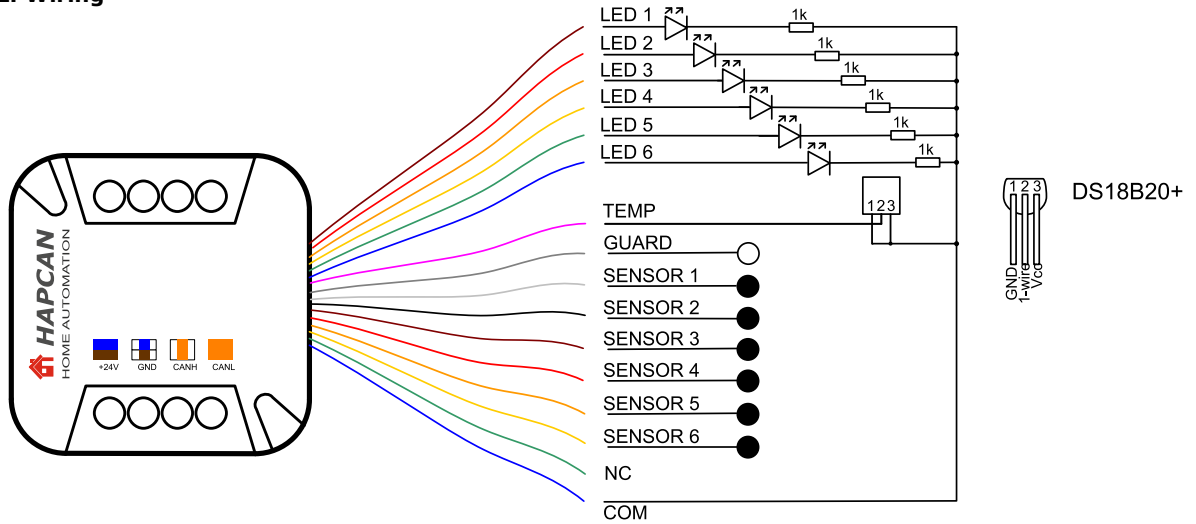
4.1. Schematic



HAPCAN Home Automation	Title: UNIV 3.1.2.x - touch button back box application	
	File: univ_3-1-2-x-rev4	Revision: 4
Size: A4	Date: 30/11/2014 16:10:20	

Figure 1. Schematic of UNIV 3.1.2.x module

4.2. Wiring



HAPCAN bus wiring

- +24V** - brown & blue
- GND** - white/brow & white/blue
- CANH** - white/orange
- CANL** - orange

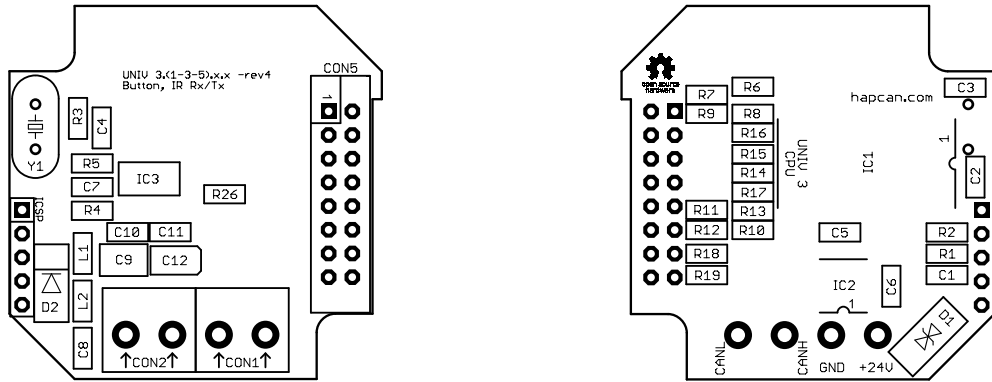
- LED1-LED6** - LED outputs
- TEMP** - DS18B20+ temperature sensor input
- GUARD** - active guard output for touch sensors
- SENSOR1-SENSOR6** - touch sensor input
- COM** - common wire

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

Figure 2. Wiring diagram

4.3. Assembly schematic

- Printed circuit boards *PCB UNIV 3.(1-3-5).x.x-rev4* for UNIV 3.1.2.x module
- PCBs dimensions: 40mm x 40mm



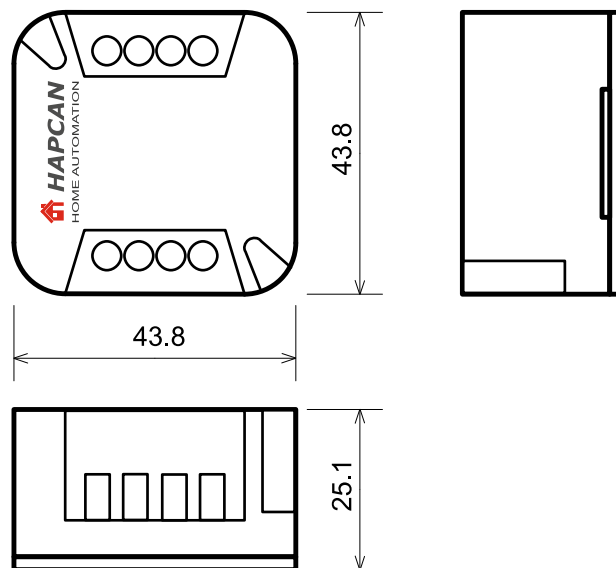
4.4. Components

Designator	Quantity	Type	Footprint	Description
C1, C5, C6, C7, C8, C10, C11	7	100nF/50V	0805	Capacitor
C2, C3	2	22pF/50V	0805	Capacitor
C4	1	10uF/16V (X5R)	0805	Capacitor
C9	1	10uF/50V	1210	Capacitor
C12	1	10uF/16V	SMA, SMB	Tantalum capacitor
R1, R3	2	10k	0805	Resistor
R2	1	470 Ohm	0805	Resistor
R4	1	51k 1%	0805	Resistor
R5	1	10k 1%	0805	Resistor
R6, R7, R8, R9, R10, R11, R13, R14, R15, R16, R17, R18, R19	13	1k	0805	Resistor
R12	1	0 Ohm	0805	Resistor

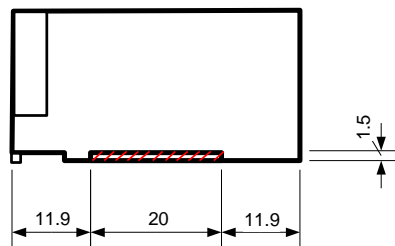
R26	1	2k2	0805	Resistor
L1, L2	2	BLM21A102SPT	0805	Choke
Y1	1	8MHz	HC49-S	Quartz crystal
D1	1	P6SMB33CA	DO-214	Transil diode
D2	1	S1D	DO-214	Rectifying diode
IC1	1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	1	MCP2561-E/SN	SOIC-8	Microchip CAN transceiver
IC3	1	MCP1790-5002EDB	SOT-223	Microchip voltage regulator
CON1, CON2	2	ARK2	L10xW9xH12 raster 5mm	Terminal block
CON5a	1	ZL202-16G	2x8pin, raster 2,54mm	PCB connector
CON5b	1	AWP-16	2x8pin, raster 2,54mm	IDC connector
Cable	1	16 wire	Raster 1,27mm	Ribbon cable
TEMP	1	DS18B20+	TO-92	Temperature sensor

4.5. Enclosure

- Italtronic C-BOX enclosure for deep back box mounting with diameter $\phi 60$ mm
- Dimensions: 43,8mm x 43,8mm x 25,1mm



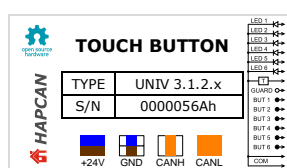
4.6. Mechanical processing



Striped parts must be removed.

4.7. Labels

Editable labels version is available on 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.

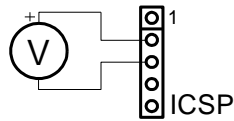


Figure 3. CPU voltage measurement

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.

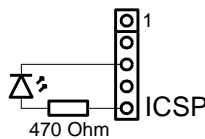


Figure 4. Checking the CPU clock

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 website.

6. License



HAPCAN Home Automation Project hardware, Copyright (C) 2017 hapcan.com

This device is free hardware: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version.



This hardware is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this documentation. If not, see <http://www.gnu.org/licenses/gpl-3.0.html>.

7. Document version

File	Hardware Revision	Description	Date
univ_3-1-2-x_a.pdf	rev2	Initial version	March 2014
univ_3-1-2-x_b.pdf	rev3	Updated to hardware revision 3	June 2014
univ_3-1-2-x_c.pdf	rev4	Updated to hardware revision 4	November 2014
univ_3-1-2-x_d.pdf	rev4	Changes in PCB	April 2017