1. Features

- Isolated RS232C interface for HAPCAN system. It can also work as a controller of devices with RS232C ports.
- Works with USB-RS232C adaptors.
- It has got surge protectors built-in on HAPCAN bus side and the serial port side.
- Operation voltage 10-24V
- Current consumption 28mA
- For DIN rail mounting.
- Dimensions 90x58x36 mm (2 mod)
- Operating of module depends on firmware uploaded into it.

2. Application version

UNIV 3 . 101 . 0 . x

- x – firmware version
- 0 – application version
- 101 – application type (RS232C interface)
- 3 – processor version
- UNIV – universal processor

3. Technical data

Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	U_s	10-24V	V
Current consumption	I_s	66@10V, 28@24V	mA
Bus connector type	2x RJ45 connectors		

Serial port side

Parameter	Unit
Connector	DB9 female
Isolation voltage	2500V RMS @ 1min
Maximum baud rate	460kbps

4. Hardware

4.1. Wiring

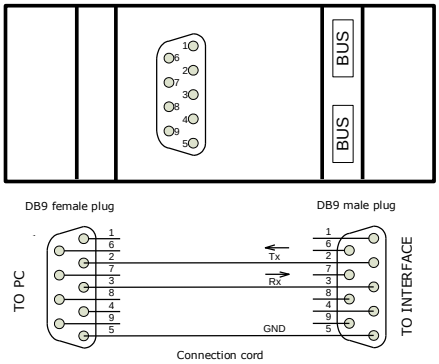
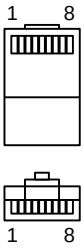


Figure 1. RS232C connector.



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+**

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

Figure 2. RJ45 bus connector.

4.2. Schematic

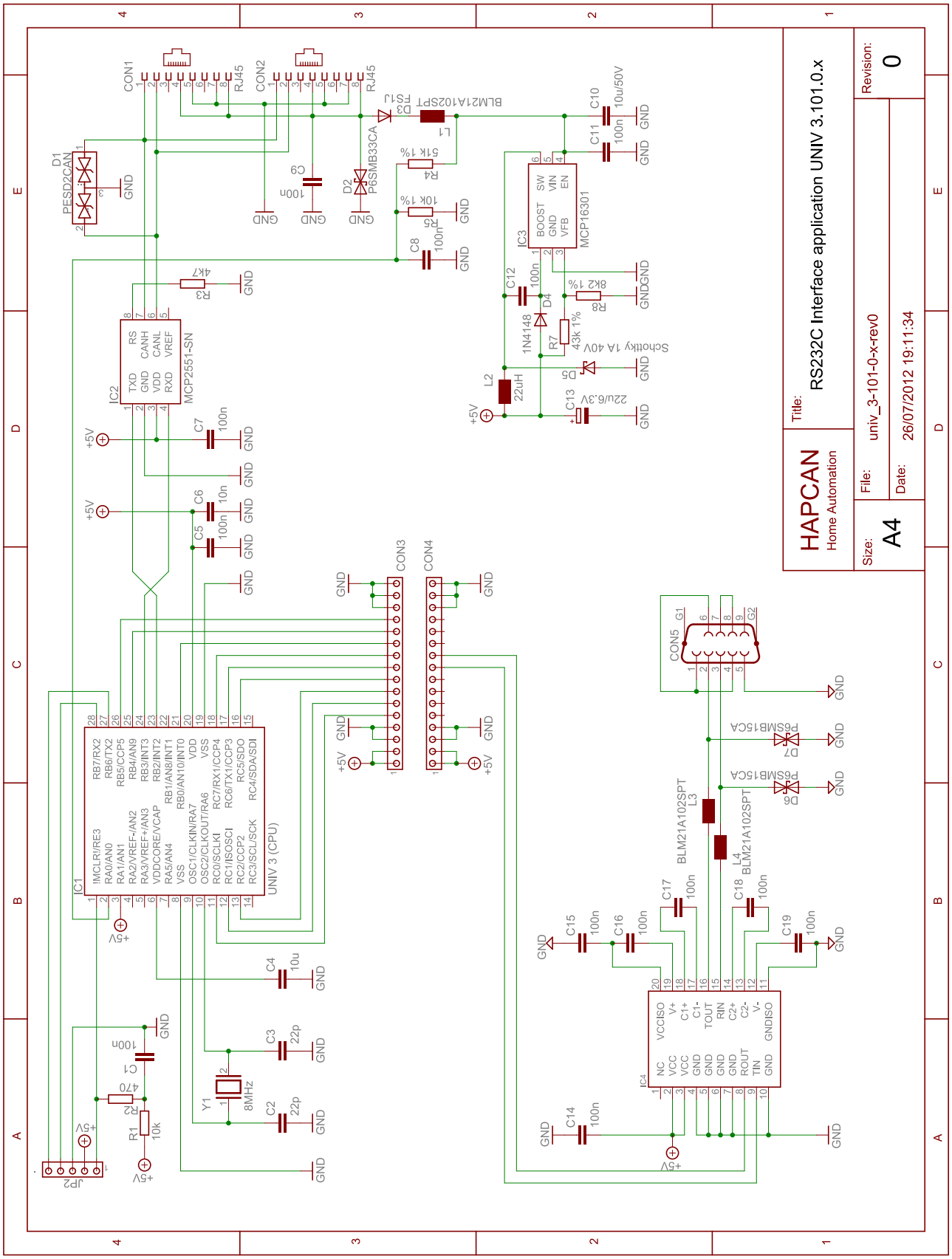
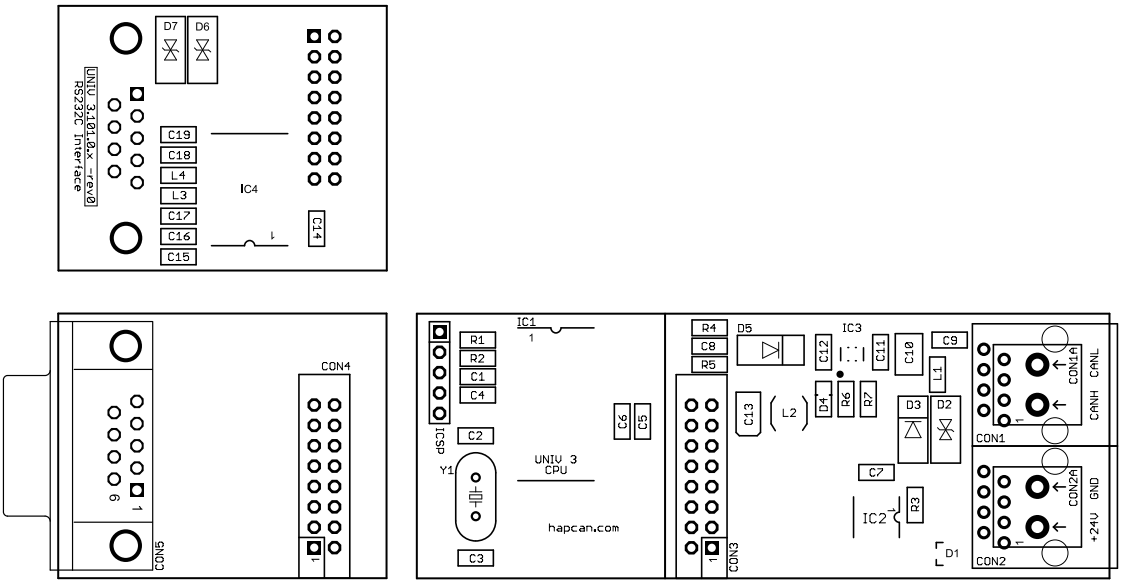


Figure 3. Schematic of UNIV 3.101.0.x application

4.3. Assembly schematic

- Printed circuit boards *PCB UNIV 3.101.0.x* for UNIV 3.101.0.x application
- PCBs dimensions: 86.5mm x 33mm i 41mm x 33mm

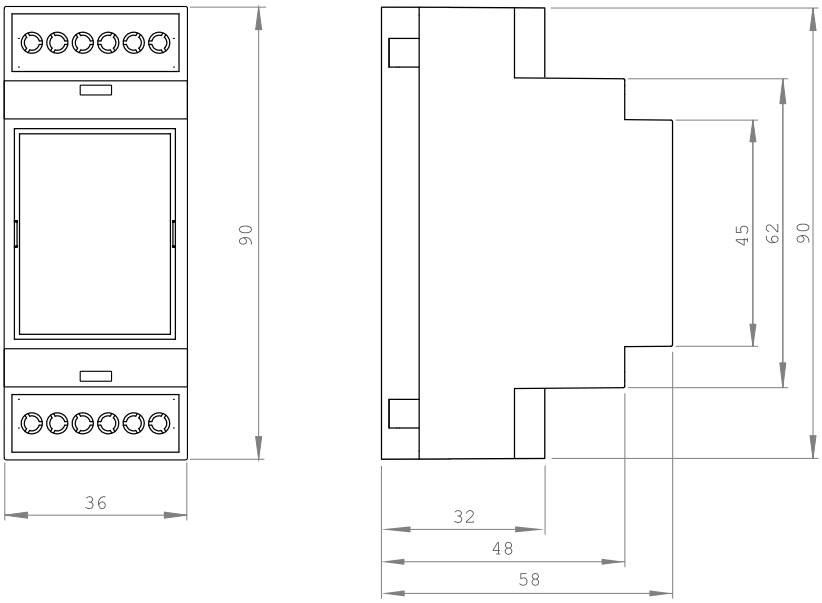


4.4. Components

Designator	Type	Footprint	Description
C1, C5, C7, C8, C9, C11, C12, C14, C15, C16, C17, C18, C19	100nF/50V	0805	Capacitor
C2, C3	22pF/50V	0805	Capacitor
C4	10uF/16V (X5R)	0805	Capacitor
C6	10nF/50V	0805	Capacitor
C10	10uF/50V	1210	Capacitor
C13	22uF/16V	SMA, SMB	Tantalum capacitor
R1	10k	0805	Resistor
R2	470 Ohm	0805	Resistor
R3	4k7	0805	Resistor
R4	51k 1%	0805	Resistor
R5	10k 1%	0805	Resistor
R7	43K 1%	0805	Resistor
R8	8k2 1%	0805	Resistor
L1,L3, L4	BLM21A102SPT	0805	Choke
L2	22uH	DL16	Choke
Y1	8MHz	HC49-S	Quartz crystal
D1	PESD2CAN	SOT-23	Transil diode
D2	P6SMB33CA	DO-214	Transil diode
D3	FS1J	DO-214	Diode 40V 1A
D4	1N4148	0805	Diode
D5	MBRS140T3	DO-214	Schottky diode 40V 1A
D6, D7	P6SMB15CA	DO-214	Transil diode
IC1	UNIV 3 CPU	SOIC-28	HAPCAN universal processor
IC2	MCP2551-SN	SOIC-8	CAN Transceiver
IC3	MCP16301	SOT-23-6	Voltage regulator
IC4	ADM3251E	SOIC-20	Isolated RS232C transceiver
CON1, CON2	RJ45	L18xW15xH11	Connector
CON3/4	2x8pin	Raster 2.54mm	Pin header
CON5	DB9/F	DB9/F horizontal 7.2mm	RS232C connector

4.5. Enclosure

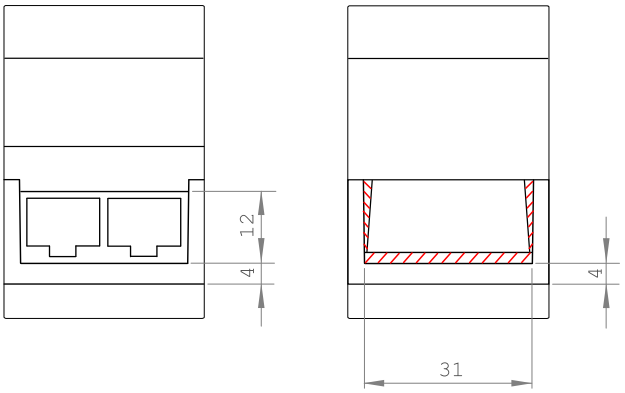
- Gainta D2MG rail mounting enclosure (2 modules wide)
- Dimensions: 90mm x 58mm x 36mm



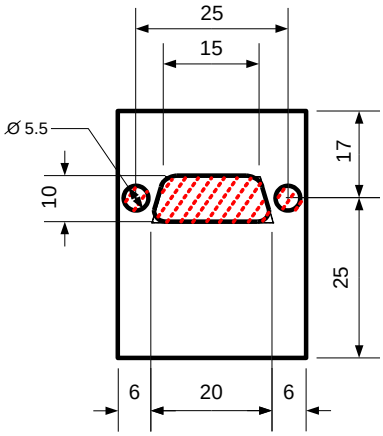
4.6. Mechanical processing

Striped parts must be removed.

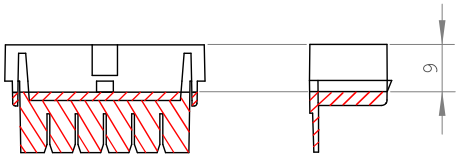
BODY



FRONT PANEL

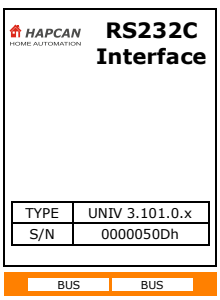


TERMINAL GUARDS



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.

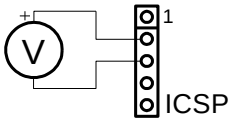


Figure 4. CPU voltage measurement

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 0.5 second on - 0.5 second off. If the processor is in programming mode, the LED lights up only once for 50ms.

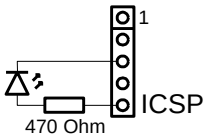


Figure 5. Checking the CPU clock

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 website.

6. Document version

File	Description	Date
univ_3-101-0-x_a.pdf	Original version	July 2012
univ_3-101-0-x_b.pdf	Enclosure has been changed	June 2014