Ethernet Interface Application

UNIV 2.0.2.0

1. Features

- Ethernet interface for HAPCAN system.
- Operation voltage 10-24V
- Current consumption 65mA
- Uses Tibbo programmable Ethernet EM202, EM203 or EM203A module
- Supports 10/100BaseT
- For DIN rail mounting.
- Dimensions 90x36x53 mm (2 mod)
- Operating of module depends on firmware uploaded into it.

2. Application version

UNIV 2 . 0 . 2 . 0

- 0 – application version
- 2 – Ethernet interface application
- 2 – hardware version
- UNIV – universal node

3. Technical data

Bus side

Parameter	Symbol	Value	Unit
Power supply voltage	U_s	10-24V	V
Current consumption	I_s	65 /24V	mA
Bus connector type	2x RJ45 connectors		

Ethernet port side

Parameter	Unit
Connector	10/100BaseT, RJ45
Supported protocols	UDP, TCP, ARP, ICMP (PING), DHCP, PPPoE, LCP
Transmission speed to HAPCAN network	115200 bps

4. Hardware

4.1. Schematic

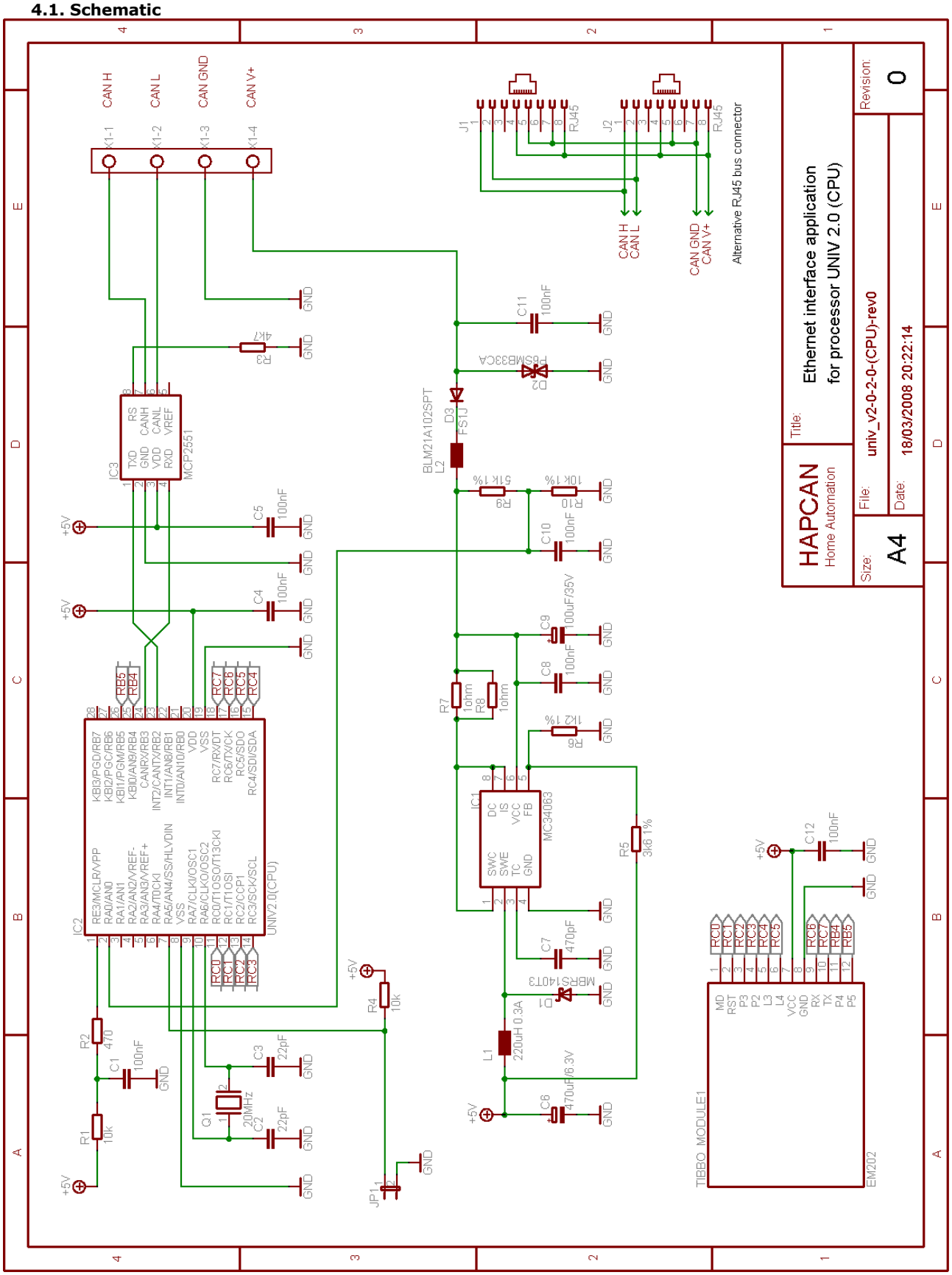
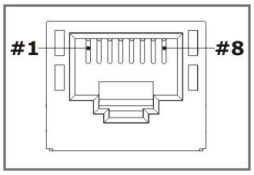


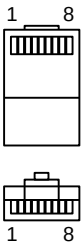
Figure 1. Schematic of Ethernet interface application UNIV 2.0.2.0

4.2. Wiring



1 - Tx+ 5 - NC
2 - Tx- 6 - Rx-
3 - Rx+ 7 - NC
4 - NC 8 - NC

Figure 2. RJ45 10/100 BaseT Ethernet connector.

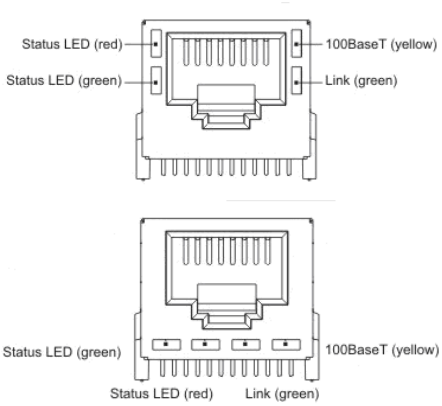


1 – white/orange - **CAN H**
2 – orange - **CAN L**
3 – white/green - NC
4 – blue – **CAN V+**
5 – white/blue – **CAN GND**
6 – green - NC
7 – white/brown – **CAN GND**
8 – brown – **CAN V+**

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

Figure 3. RJ45 bus connector.

4.3. LEDs functions



Link/Data LED (green) is turned on when "live" Ethernet cable is plugged into the Module. The LED is temporarily switched off whenever an Ethernet packet is received.

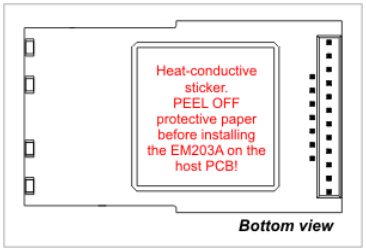
100BaseT LED (yellow) is turned on when the EM202 links with the hub at 100Mb. The LED is off when the link is established at 10Mb.

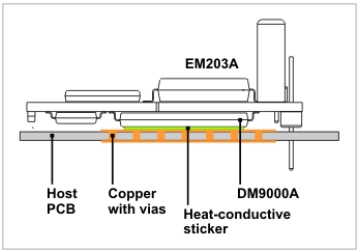
Status LEDs (red and green) give status of the device (see EM202 datasheet).

Figure 4. LEDs functions

4.4. Installing Tibbo module

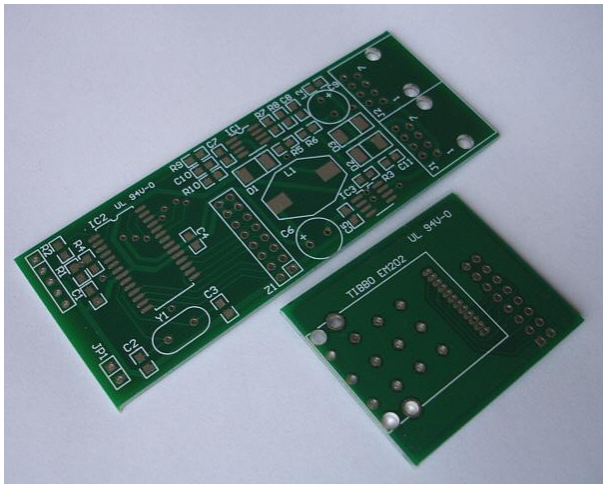
To aid the module in dissipating excess heat, a special heat-conductive sticker is applied to the top of the DM9000B. Protective paper of the sticker **MUST BE REMOVED** prior to installing the module on the host PCB.



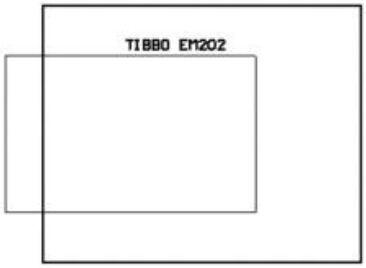


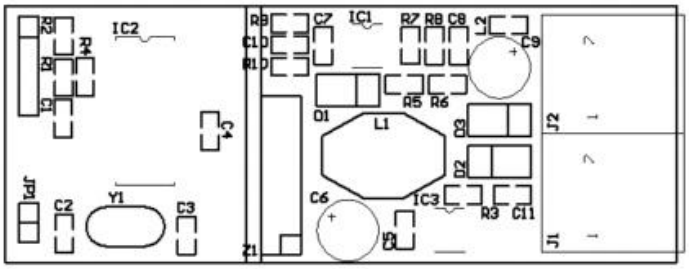
4.5. Printed Circuit Board

- Printed circuit board for Ethernet application UNIV 2.0.2.0 with use of processor UNIV 2.0 (CPU)
- PCBs dimensions: 86mm x 33mm & 41mm x 33mm

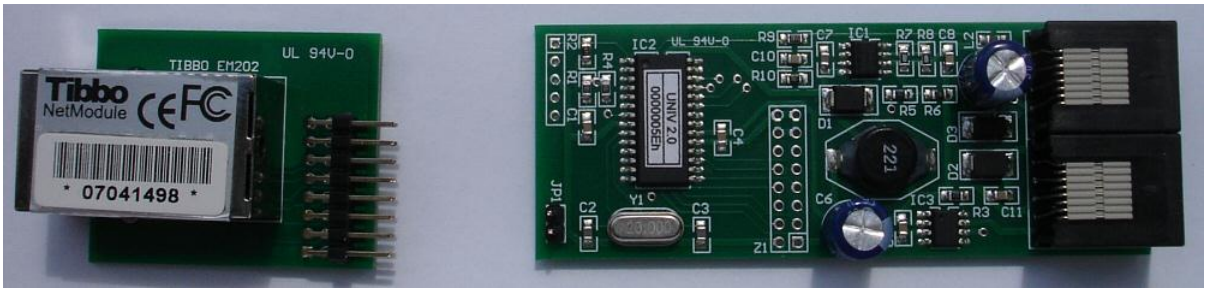


4.5.1. Assembly schematic





4.5.2. Assembled PCB

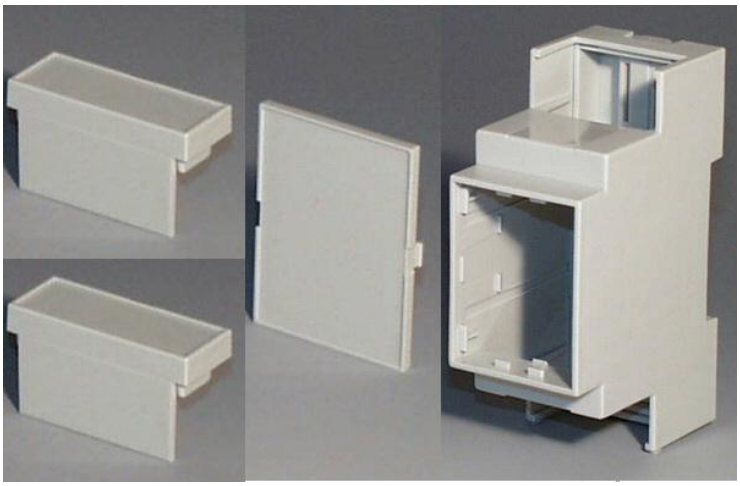


4.5.3. Components

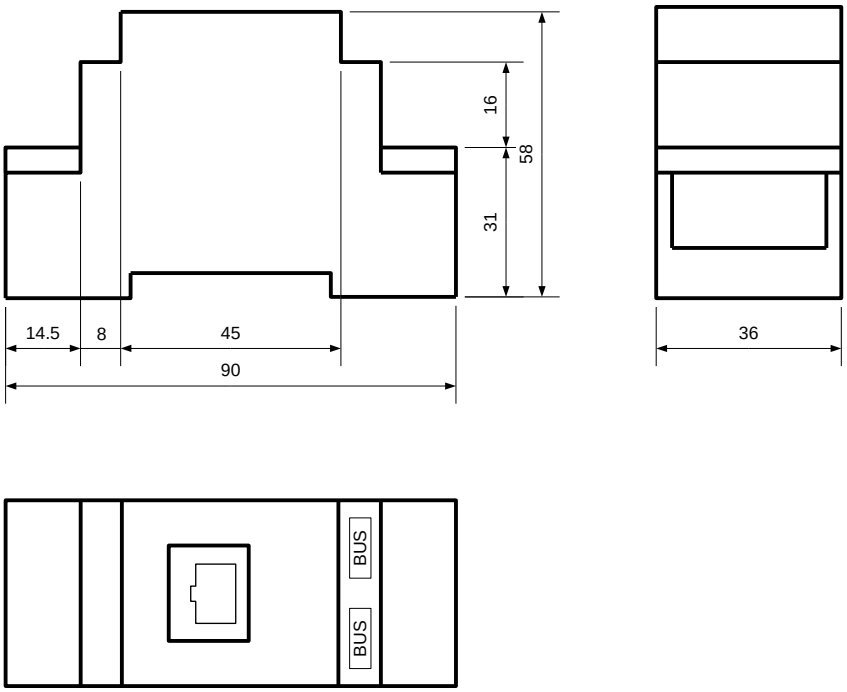
Designator	Type	Footprint	Description
C1, C4, C5, C8, C10, C11, C12	0.1uF	0805	Capacitor
C2, C3	22pF	0805	Capacitor
C6	470uF/6.3V	4/8	Electrolytic Capacitor
C7	470pF	805	Capacitor
C9	100uF/35V	4/8	Electrolytic Capacitor
R1, R4	10k	0805	Resistor
R2	470 Ohm	0805	Resistor
R3	4k7	0805	Resistor
R5	3k6 1%	0805	Resistor
R6	1k2 1%	0805	Resistor
R7, R8	1Ohm	0805	Resistor
R9	51k 1%	0805	Resistor
R10	10k 1%	0805	Resistor
L1	220uH / 0.5A	TSL22	Choke
L2	BLM21A102SPT	0805	Choke
Y1	20MHz	HC49-S	Quartz crystal
D1	MBRS140T3	DO-214	Schottky diode 40V 1A
D2	P6SMB33CA	DO-214	Transil diode
D3	FS1J	DO-214	Diode
IC1	MC34063	SOIC-8	DC-DC converter
IC2	UNIV 2.0 (CPU)	SOIC-28	HAPCAN processor
IC3	MCP2551-SN	SOIC-8	CAN Transceiver
TIBBO MODULE	EM202 or EM203+RJ203 or EM203A+RJ203A		Ethernet <-> UART converter
J1, J2	RJ45	L18xW15xH11	Connector
JP1	2pin	Raster 2,54mm	Pin header (Jumper)
Z1	2x8pin,	Raster 2,54mm	Pin header

4.6. Enclosure

- Rail mounting enclosure, 2 modules size
- Dimensions: 90mm x 58mm x 36mm

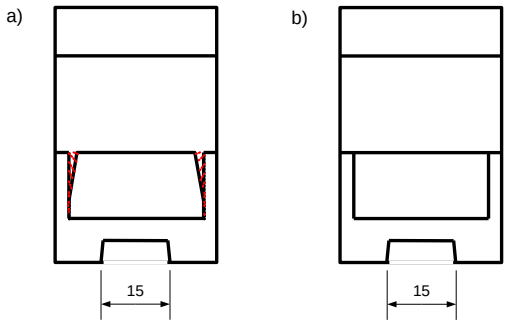


4.6.1. Dimensions



4.6.2. Mechanical processing

4.6.2.1. Main part

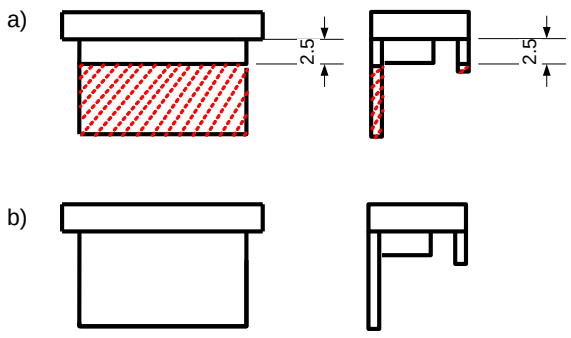


A view from the side, where shown detail is 15mm wide.

Drawing a) shows striped part which must be cut out.

Drawing b) is a view when striped parts have been cut out.

4.6.2.2. Terminal guards

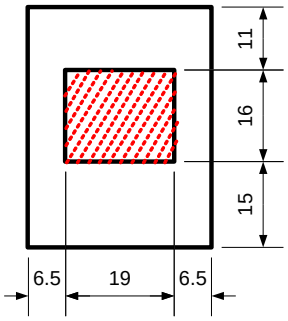


Striped parts must be removed.

Drawing a) shows RJ45 connector guard.

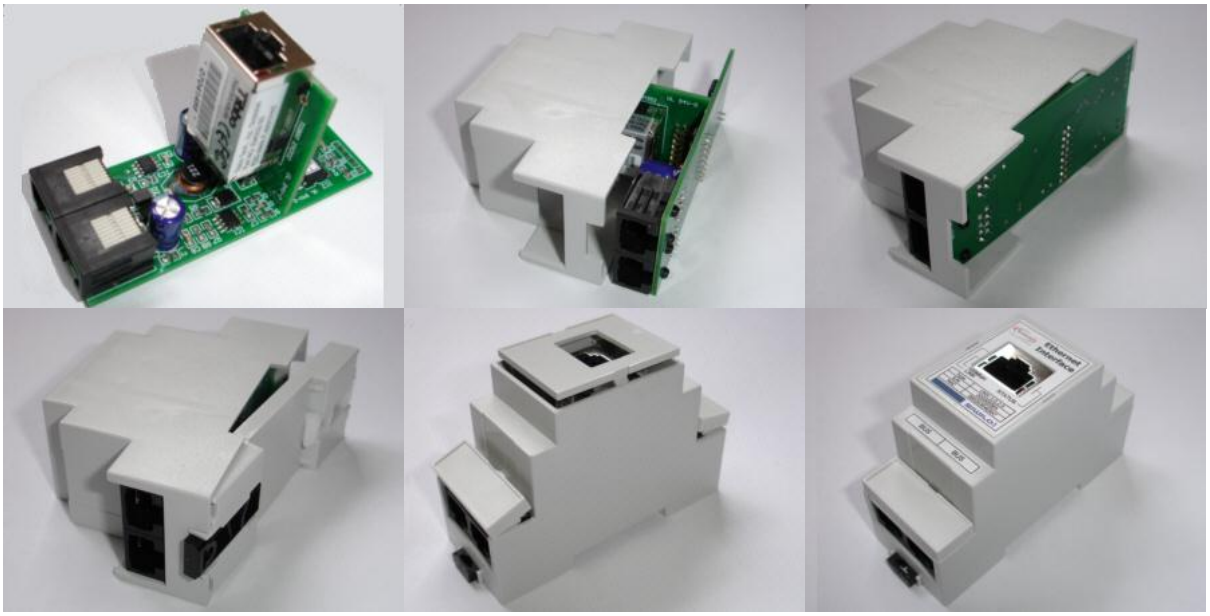
Drawing b) other guard does not need processing

4.6.2.3. Front panel

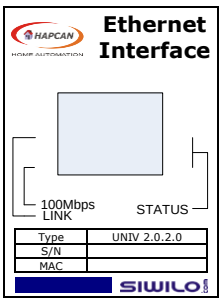


Striped parts must be removed.

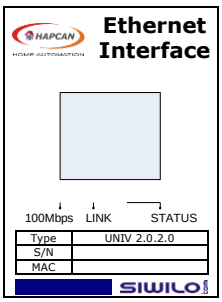
4.6.3. Assembling



4.6.4. Labels



EM202



EM203 or EM203A

5. Document version

File	Description	Date
univ_v2-0-2-0-pcba.pdf	Original version	May 2008
univ_v2-0-2-0-pcbb.pdf	Update with EM203 and EM203A module, correction in components table	May 2009
univ_v2-0-2-0-pcbc.pdf	General update	January 2012