Ethernet Interface Firmware

UNIV 2.0.2.3

1. Features:

- Module is transparent for all messages sent from Ethernet to HAPCAN bus, and vice versa.
- There are receive and transmit FIFO buffers
- There are 3 Ethernet frame control bytes: stop byte, check sum, and stop byte

2. Compatibility:

- Firmware for **UNIV 2.0.2.0. application.**
- Firmware can be uploaded into devices with bootloader version uart 1.1 or compatible
- Firmware is not compatible with previous version UNIV 2.0.2.2 due to the increased Ethernet frame. Firmware works with HAPCAN Programmer version 3.0 or later.

3. Firmware version

UNIV 2 . 0 . 2 . 3

- 3 – firmware version
- 2 – Ethernet interface firmware
- 0 – hardware version
- UNIV – universal node

4. Overview

This is an Ethernet <-> HAPCAN interface. The module is transparent for all messages sent from PC to HAPCAN bus, and vice versa. It is built using programmable Ethernet EM20X module made by Tibbo. This gives possibility to program and control HAPCAN system over LAN network, or even Internet.
The EM20X module can also be programmed to work as a web server. The EM20X programming is not part of this document. More information can be found on Tibbo website (www.tibbo.com).

5. Firmware

Firmware can be uploaded by using HAPCAN Programmer, which can be downloaded from site http://siwilo.com/hapcan/software.

5.1. Frame building

HAPCAN frame is formed when the module receives a packet 0f 15 bytes from the Ethernet port. The first byte (0xAA) is the starting byte of the frame. The last two bytes are the checksum byte (CHKSUM) and the end of the frame byte (0xA5). The first 4 bytes of a message form CAN message identifier, and the remaining 8 bytes are data (from D0 to D7).
Transmission the frame from HAPCAN bus to the Ethernet port is made by adding the start byte (0xAA), a checksum byte and stop byte (0xA5). The checksum byte value is obtained by adding 12 bytes of HAPCAN message.

Table 1. ETHERNET INTERFACE FRAME

HAPCAN		Frame Type	Flags	Node	Group	D0	D1	D2	D3	D4	D5	D6	D7		
Ethernet	START	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	CHKSUM	STOP

START = 0xAA

CHKSUM = $\sum_{i=1}^{12} Byte\_i$

STOP = 0xA5

5.2. Configuration

Parameters below can be configured with this version of application:

- Module identifier (module number and group number);
- Module description (16 chars);
- Ethernet port settings

Configuration process can be done using HAPCAN Programmer and Tibbo Software.

5.2.1. Module identifier

Every module on the network must have unique identifier. The identifier is made of two bytes, module number (1 byte) and group number (1 byte). Identifier of the Ethernet Interface can be changed in HAPCAN Programmer in software settings.

5.2.2. Module description

Every module can have 16 char description, which makes easier for user (programmer) to distinguish nodes. Example of node descriptions: main interface etc. Module description can be changed with HAPCAN Programmer software.

5.2.3. Ethernet port settings.

1. Download Tibbo Device Explorer (www.tibbo.com), which uploads serial-to-Ethernet firmware.
2. Download serial-to-Ethernet firmware file eg. EM_371D.BIN or newer.
3. Download Tibbo DS Manager (www.tibbo.com) to configure EM20X module with uploaded serial-to-Ethernet firmware.
4. Run Device Explorer. If EM20X does not appear on the list, try to disable Windows firewall.
5. In Device Explorer upload serial-to-Ethernet firmware. Since then the EM20X will behave as serial-to-Ethernet interface and should be visible in DS Manager software.
6. Run DS Manager and configure EM20X module according to hints below.

Ethernet port must be set up according to the local network configuration. The IP address, network mask and communication port have to be given.
The whole Ethernet port configuration process can be done with Tibbo DS Manager (www.tibbo.com). Figures below show parameters to assure correct device operation.
Because EM202 does not require password for normal operation, it is important to protect device from unauthorized access, by proper network firewall configuration.

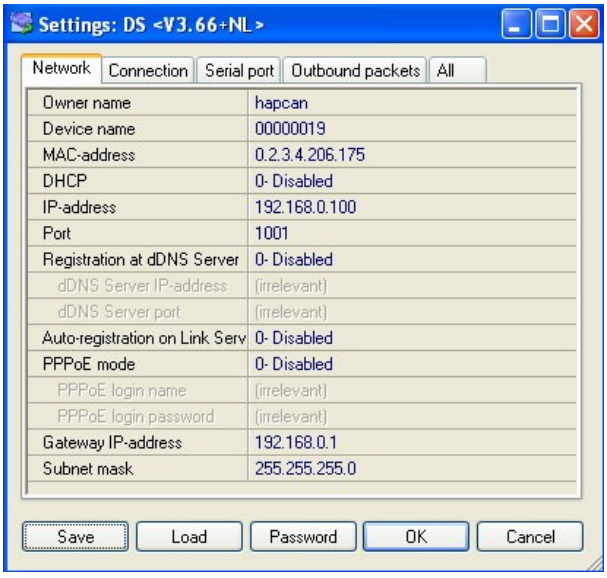

Figure 1. Network settings

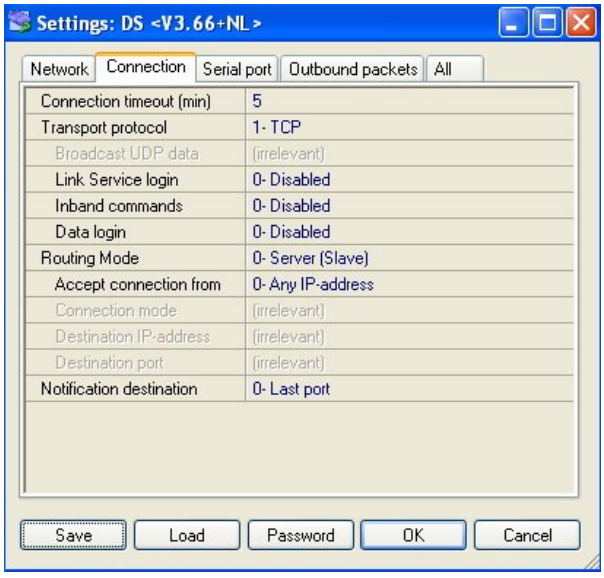

Figure 2. Connection settings

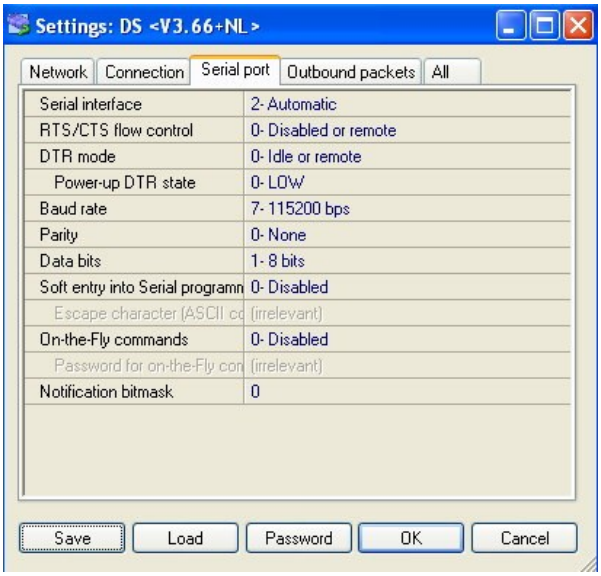

Figure 3. Serial port settings

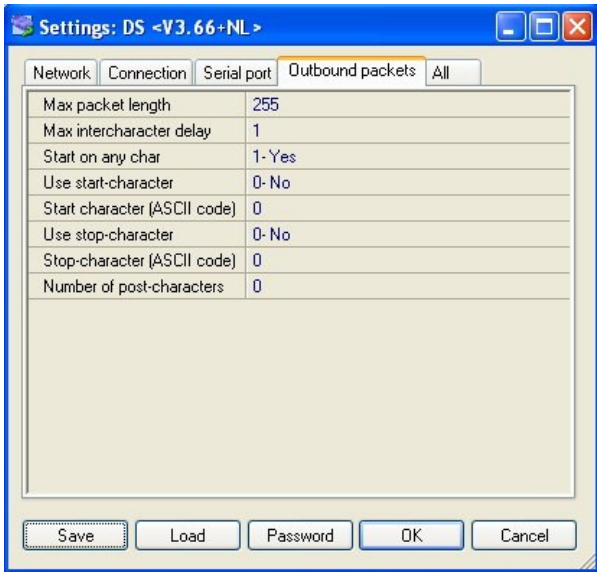

Figure 4. Outbound packets settings

5.2.4. Factory settings.

It is possible to reset all EM20X settings (including configuration access password).

Resetting procedure:

1. Turn power off
2. Short and hold jumper JP1
3. Turn power on and hold jumper shorted for at least 3 seconds
4. Remove jumper

Beginning of the resetting process is indicated by alternate blinking of red and green LED. After resetting all settings have to be entered again using Tibbo DS Manager.

6. Document version

File	Note	Date
univ_v2-0-2-3a.pdf	Original version	June 2012