



**inoteska**

# FOMUX L

## PRODUCT DOCUMENTATION



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# 1. PRODUCT SPECIFICATION

## FOMUX L

- Optical multiplexer FOMUX L is a pair device which enables to transmit up to 16 x E1 G.703 and Ethernet 10/100 BT over optic fiber. Ethernet max. Baud rate is 100 Mbps.
- FOMUX L can be configured and controlled from connected PC over Ethernet via TCP/ IP, UDP, HTTP, SNMP.
- FOMUX L on the other side of optic fiber line can be configured remotely through locally connected FOMUX L.

### **Technical parameters:**

- E1 unframed 2.048 Mbps
- E1 120 Ohm
- E1 75 Ohm
- Ethernet 10/100 BT, Baud rate 100 Mbps
- Configuration and remote control via TCP/ IP, UDP, HTTP
- Optical interface with connector SC/PC (SM 1300 nm, MM 1300 nm) or SFP module in accordance with customer needs (for Fomux L with SFP)
- Interface V.24 for multiplexer configuration from PC

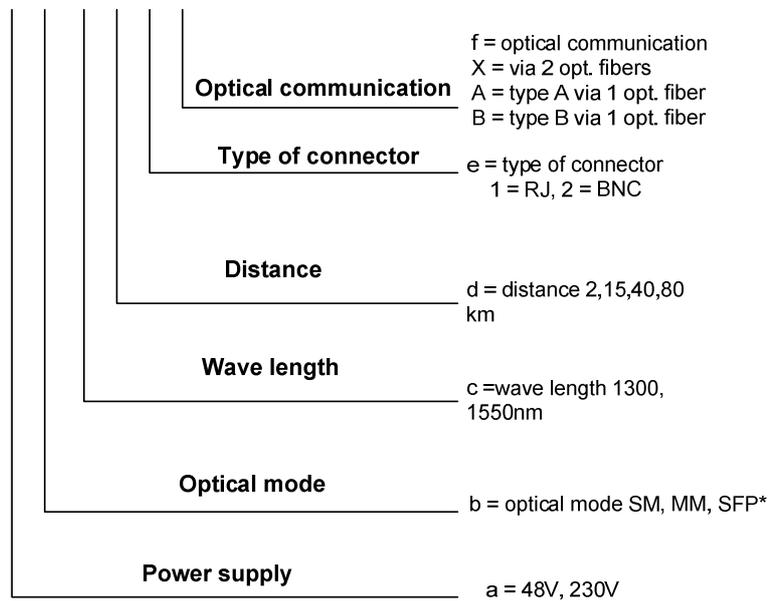
**VARIANTS**

**Version 1U:**

**ITX 495 03 - FOMUX L 8 x E1, 1 x optic, 1 x Ethernet 10/100**

**ITX 495 04 - FOMUX L 16 x E1, 1 x optic, 1 x Ethernet 10/100**

**ITX 495 03/4. a b c d e f**



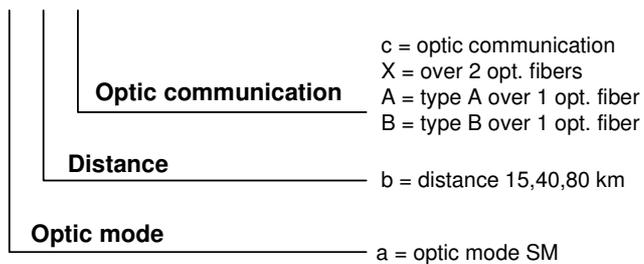
\* Customer can use any SFP module depending on individual requirements. SFP module is not supplied by Inoteska. For Fomux L – SFP variant, please specify only the required power supply.

**Version 6U:**

**ITX 402 36 FOMUX L SM 8 x E1, 1 x optic, 1 x Ethernet 10/100**

**ITX 402 37 FOMUX L SM 16x E1, 1 x optic, 1 x Ethernet 10/100**

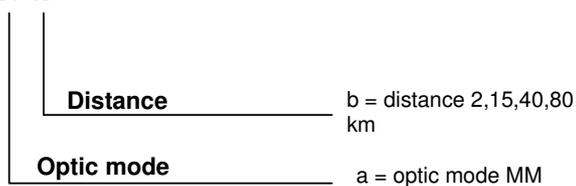
**ITX 402 36/7. a b c**



**ITX 402 46 FOMUX L MM 8 x E1, 1 x optic, 1 x Ethernet 10/100**

**ITX 402 47 FOMUX L MM 16 x E1, 1 x optic, 1 x Ethernet 10/100**

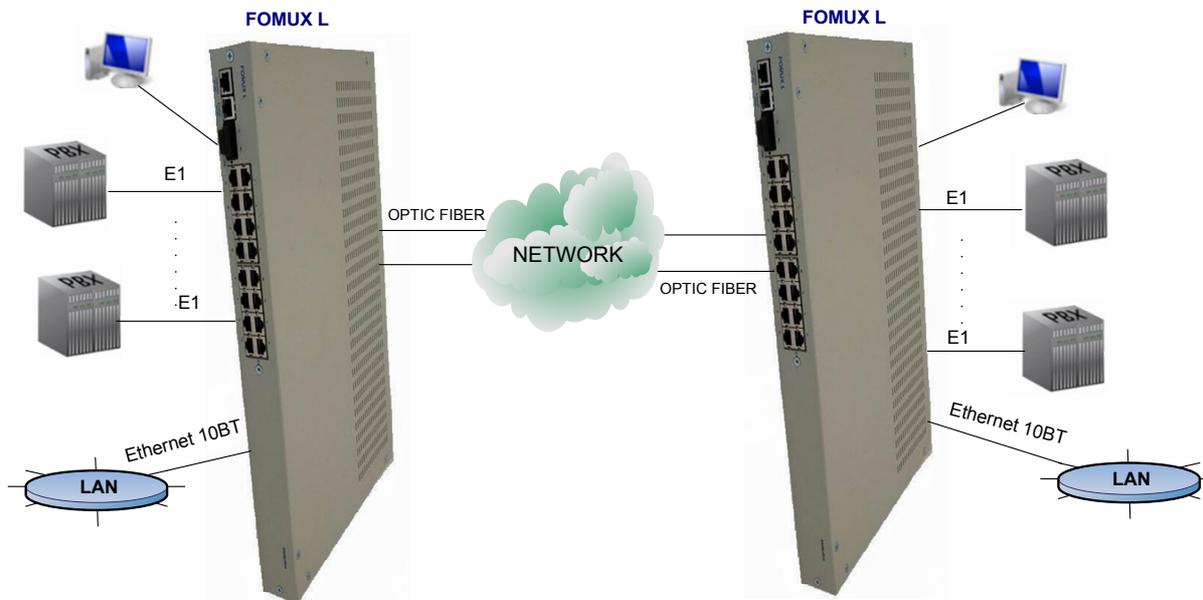
**ITX 402 46/7. a b**



**ITX 402 81 FOMUX L 8 x E1, 1 x SFP, 1 x Ethernet 10/100**

**ITX 402 82 FOMUX L 16 x E1, 1 x SFP, 1 x Ethernet 10 /1**

## APPLICATIONS



## TECHNICAL PARAMETERS

<b>Interface G.703:</b>	Unframed 2.048 Mbps, Connector RJ 45, impedance 120 Ohm/75 Ohm
<b>Interface Ethernet:</b>	Connector RJ 45/BNC, Baud Rate 100 Mbps
<b>Optical interface:</b>	Connector SC/PC (SM 1300 nm, MM 1300 nm) or SFP module
<b>Power supply:</b>	230 V / 50Hz , $\pm 10\%$ , max. 5VA DC 48 V, -40V to -65 V, max. 0,2 A, fuse 1,5 A
<b>Max. input:</b>	5 VA
<b>Dimensions:</b>	Desktop version: 44 x 280 x 430 mm (h x w x d)
<b>Weight:</b>	Desktop version: 4 kg

## 2. OPERATING INSTRUCTIONS

### Operational conditions:

0° C to 55° C, 20% to 75% relative atmospheric humidity

### Storage:

-10° C to 60° C, 20% to 75% relative atmospheric humidity

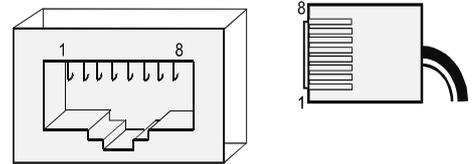
### Interfaces:

Connect the cables to appropriate connectors.

### Interface E1

#### Connector RJ 45

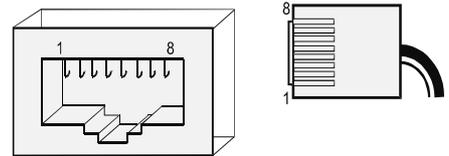
- |                             |            |
|-----------------------------|------------|
| 1 – input wire to device    | ----- RX - |
| 2 – input wire to device    | ----- RX+  |
| 3 –                         |            |
| 4 – output wire from device | ----- TX - |
| 5 – output wire from device | ----- TX+  |
| 6 –                         |            |
| 7 –                         |            |
| 8 –                         |            |



### Interface Fast Ethernet 10/100Base-T

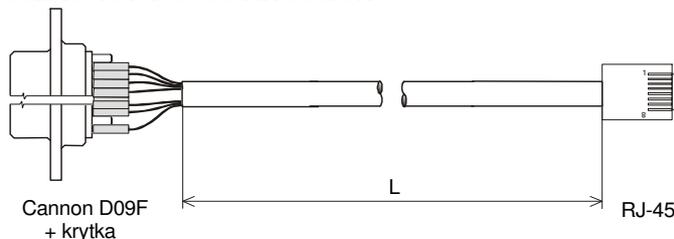
#### Connector RJ 45

- |                          |      |
|--------------------------|------|
| 1 – Transmit from device | Tx + |
| 2 – Transmit from device | Tx - |
| 3 – Receive to device    | Rx+  |
| 4 –                      |      |
| 5 –                      |      |
| 6 – Receive to device    | Rx-  |
| 7 –                      |      |
| 8 –                      |      |



### Connector CONTROL

#### Cable for PC connection



L – cable length – standard 1 m

CANNON - D09F cable female	RJ - 45
-	1
-	2
-	3
2	4
3	5
-	6
-	7
5	8
-	-

## 3. MANAGEMENT SW

### How to proceed:

1. Insert CD to PC (OS Windows '98 and higher).
2. Run **MNDymux.exe**
3. Configure device following the instructions below.

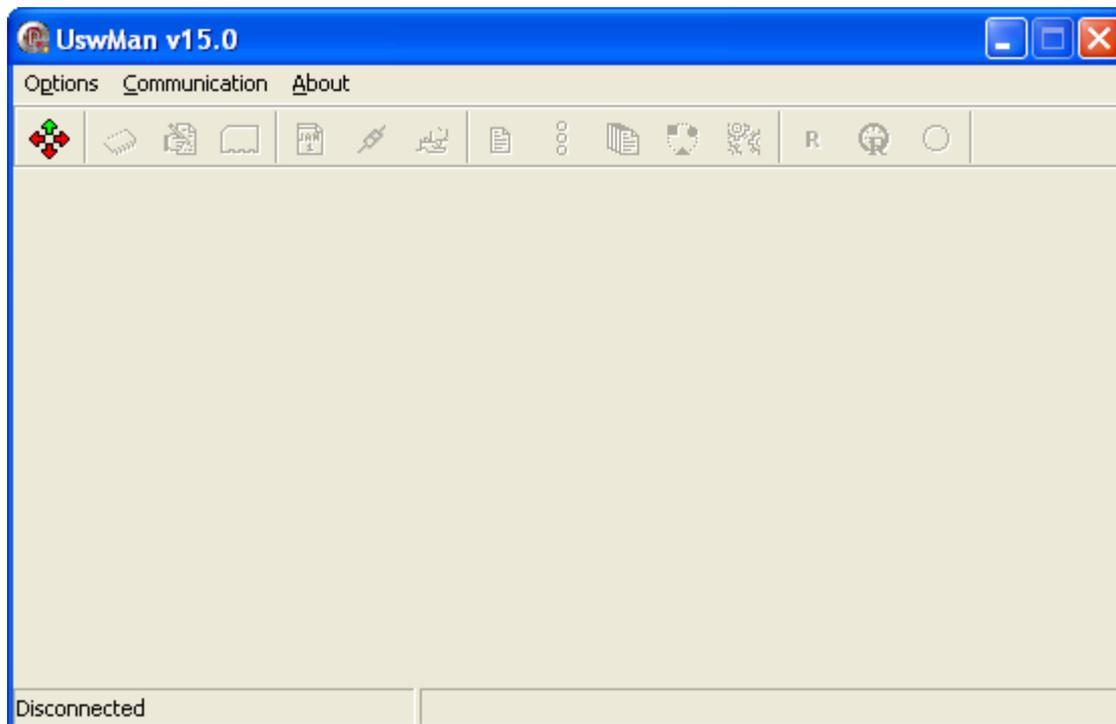
### **Note:**

Latest firmware and management software for FomuxL is available on Inoteska website – [www.inoteska.sk](http://www.inoteska.sk).

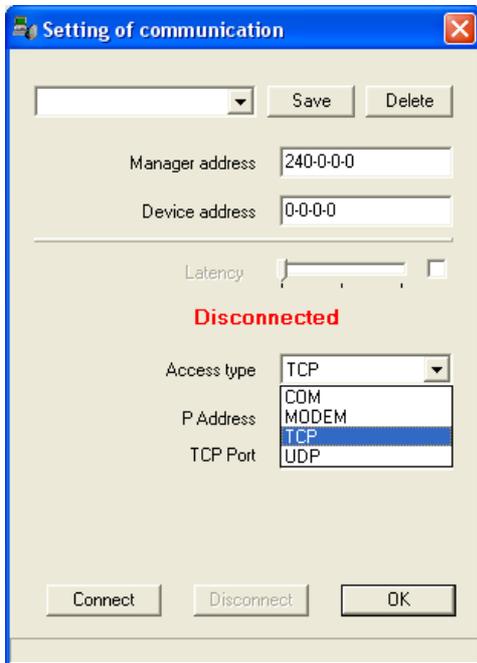
### 3.1 Communication with device

#### 3.1.1 Setting of communication

After running the management software, initial window is displayed:



Set the communication with device. Click on speed button . Following window will be displayed:



**Manager address** – 240-0-0-0 (this address can be changed: first number from interval 240-254, other three numbers from interval 0-255)

**Device address** - 0-0-0-0 – local connection (this address can be changed: first number from interval 0 - 239, other three numbers from interval 0-255)

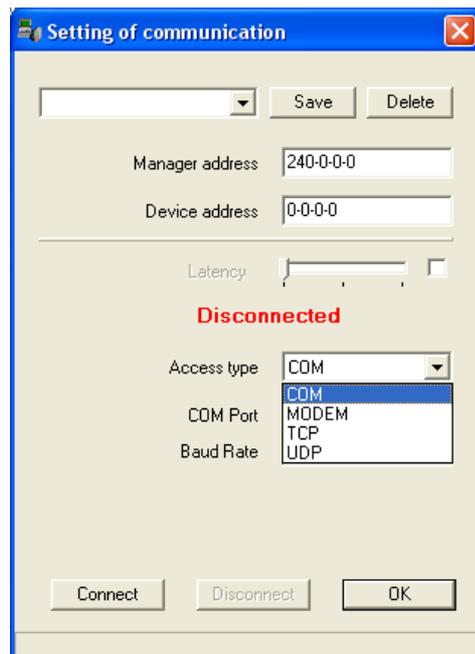
**Latency** – longer time will be waited for requested communication. Used mainly for remote communication through LAN network.

**Note:**  
Device may be reset after writing the configuration. Then it is necessary to make new connection because initial connection is aborted.

**Connection - COM**

Local access to device via device address in format X-X-X.X .

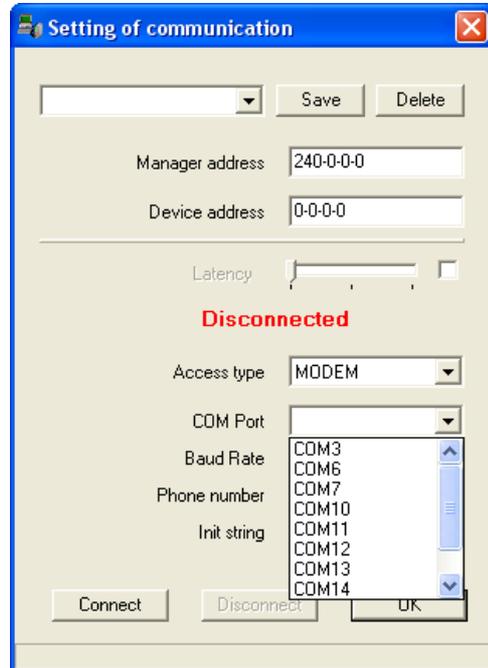
- 1) Set **Access type – COM**.
- 2) Select **COM** port (communication port) and set **Baud Rate** (115200 Bd).
- 3) Click on **Connect**. If connection is successful, **Connected** is displayed.
- 4) Click **OK**.



**Connection - MODEM**

Remote access via modem. Connect the PC serial port to modem.

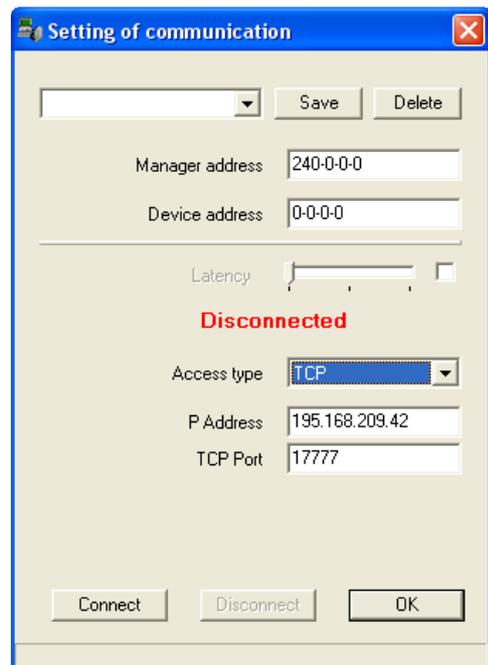
- 1) Set **Access type – MODEM**.
- 2) Select **COM port** (communication port) and set **Baud Rate** (115200 Bd), **Phone number** and **Init string** (according to the type of modem connected).
- 3) Click on **Connect**. If connection is successful, **Connected** is displayed.
- 4) Click **OK**.



**Connection - TCP**

Remote access using IP address and device address.

- 1) Set **Access type – TCP**.
- 2) Set **IP Address** and **TCP Port**.
- 3) Click on **Connect**. If connection is successful, **Connected** is displayed.
- 4) Click **OK**.



**Connection - UDP**

This access type can be used only if the conditions stated below are met.

***If device is connected in network***

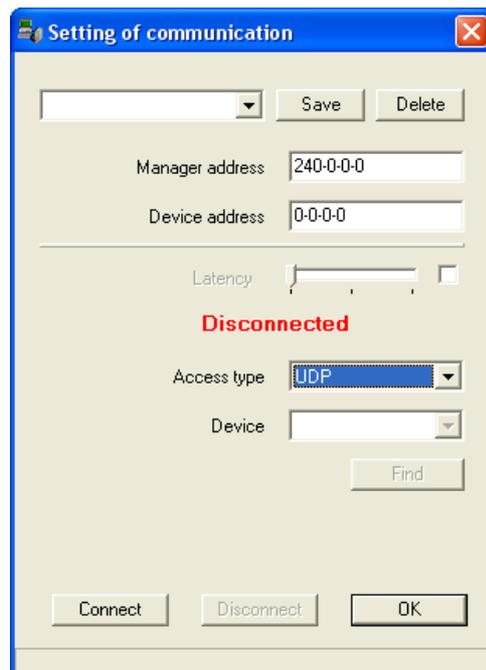
- Device and PC must be connected in the same local network
- Network must transmit *broadcast*
- PC must have IP address allocated

***If device is connected to PC locally***

- PC must have arbitrary IP address allocated (it is necessary to disable DHCP and set static IP address, e.g. 192.168.1.2)
- Receive/Transmit of *broadcast* packets must be enabled on PC
- UDP port 3864 must be enabled on PC

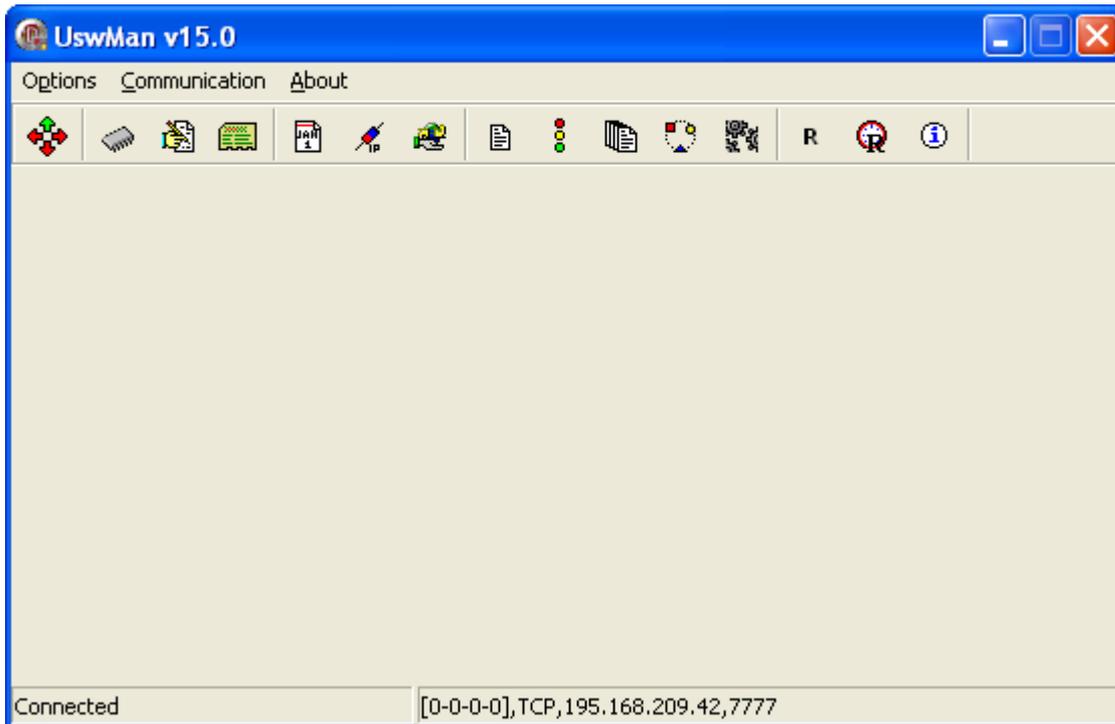
SW transmits broadcast and finds all „Inoteska“ device connected in network.

- 1) Set **Access type – UDP**.
- 2) Click **Find**.
- 3) Select the device from the list and click on **Connect**. If connection is successful, **Connected** is displayed.
- 4) Click **OK**.



**Note:**

In case of successful connection, device address, type and parameters of access are displayed in the line at the bottom of main management SW window.



### In case of error, please check:

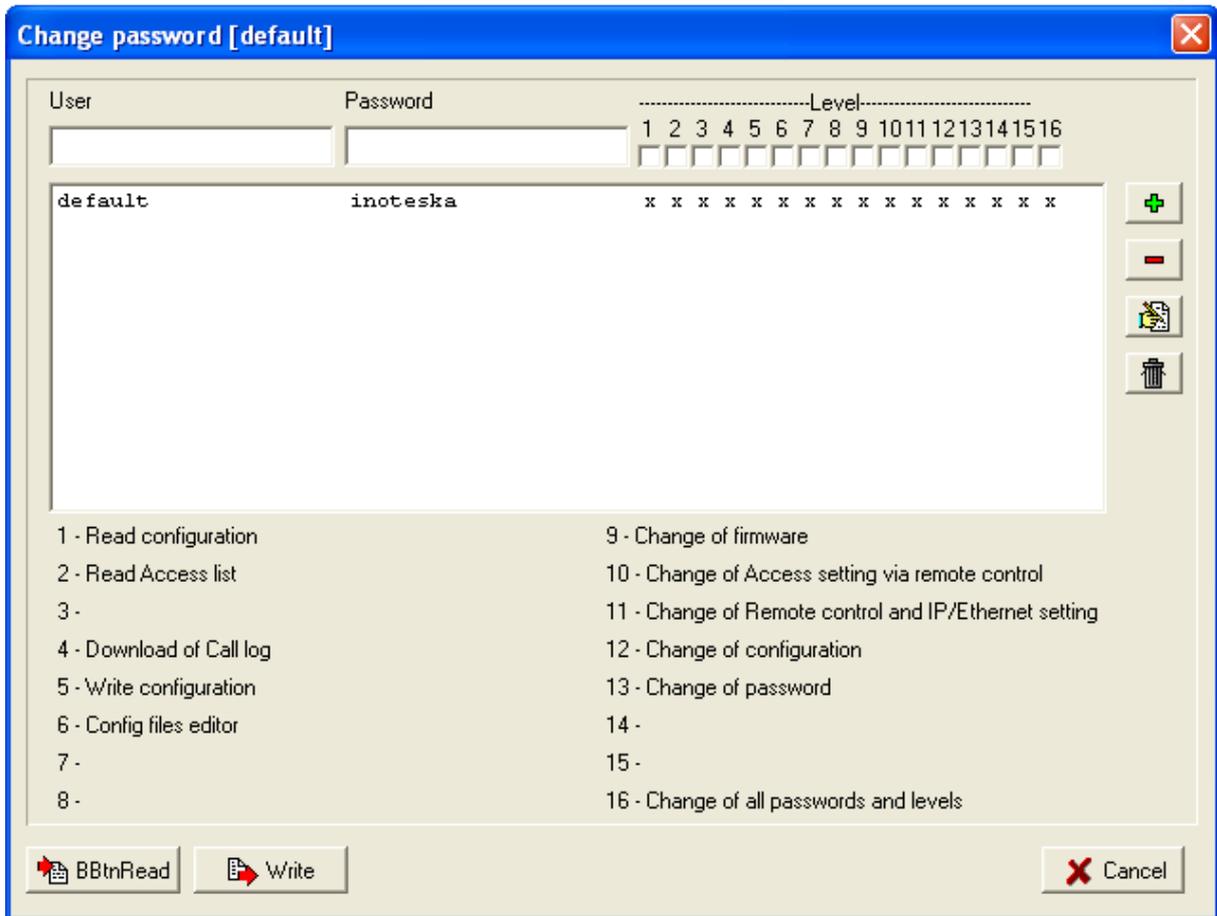
- System power source
- Device address 0-0-0-0 – local connection (this address can be changed: first number from interval 0 - 239, other three numbers from interval 0-255)
- Manager address 240-0-0-0 (this address can be changed: first number from interval 240 –254, other three numbers from interval 0-255 )
- Password correctness
- Serial port connection
- Cable between device and PC
- Baud Rate between DyMUX and PC set to 115200 Bd.

### **3.3.2 Password setting**

After setting the communication parameters and successful connection, it is necessary to set password. Choose from main menu **Options – Password**.

#### Change password of device

Default password is **inoteska**. It can be changed in menu **Options – Password – Change password of device**.



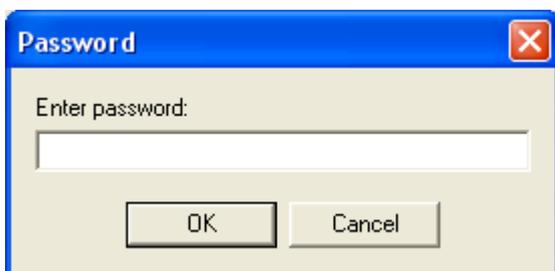
Here it is possible to edit the list of passwords for different users and set the level of their rights for access to device (1 to 16). There are notes below explaining each access level. List of passwords can be edited using the buttons on the right side of the list.

**Write** - write new password settings to device

**Cancel** - quit window

**New login**

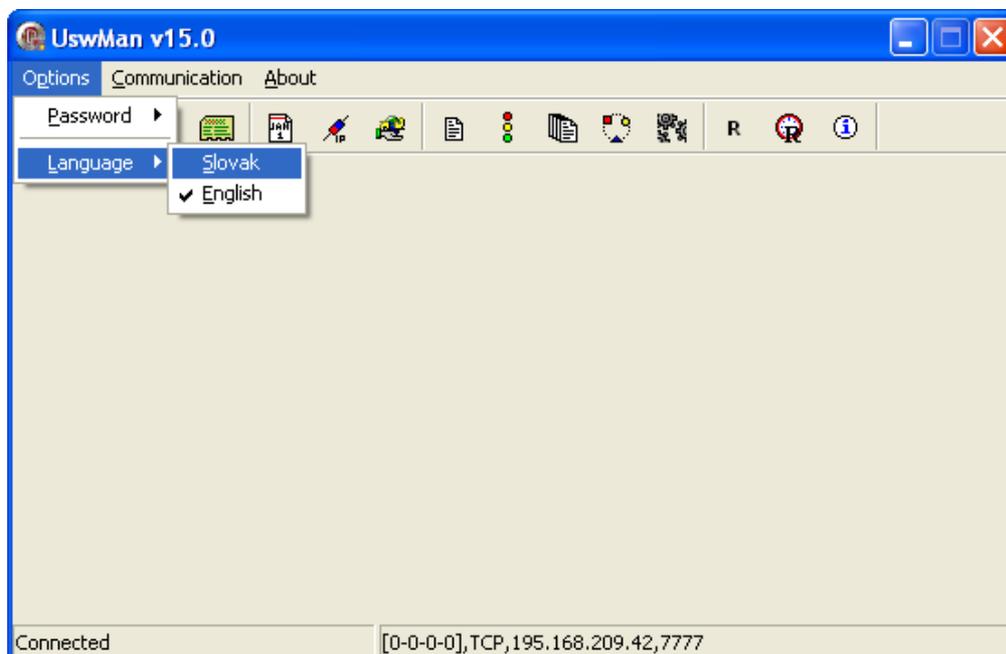
Main menu **Options – Password – New login** using new password.



After setting the correct password, main window will all available SW options be displayed.

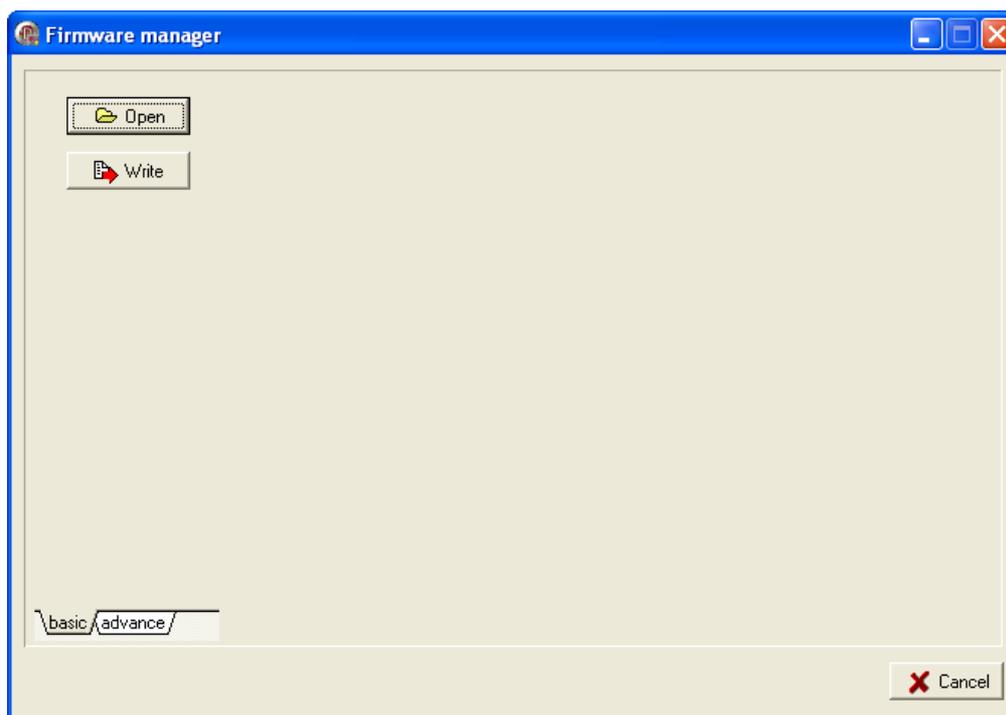
### 3.1.3 Change language

User can choose the language which will be used while working with management software. Main menu **Options – Language - Slovak / English**.



### 3.1.4 Firmware manager

Main menu **Communication – Programmer** or click on speed button . Following window is displayed:



Here it is possible to change the device firmware.

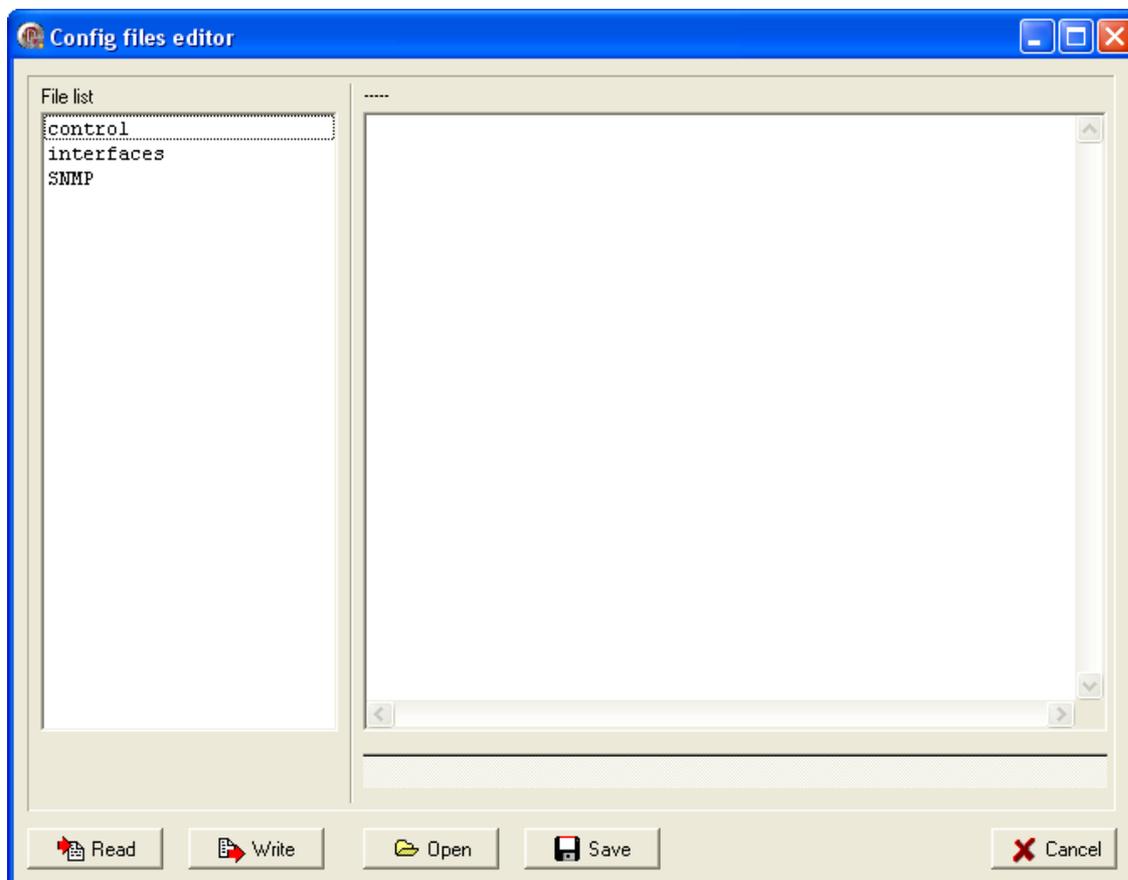
### How to proceed:

Click **Open** and find appropriate \*.txt (batch file). Then click **Write** and new firmware will be written do device flash memory.

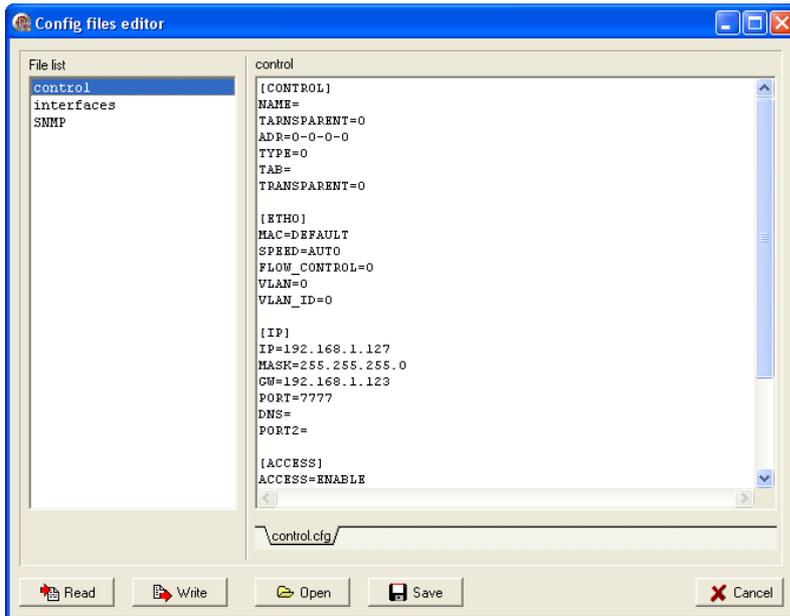
**Cancel** - quit window

## 3.1.5 Config files editor

From main menu choose **Communication – Config files editor** or click on speed button . There is a window displayed:



Here you can configure the device in text format. Double-click on the item from the list in left part and configure the corresponding file in the right part.



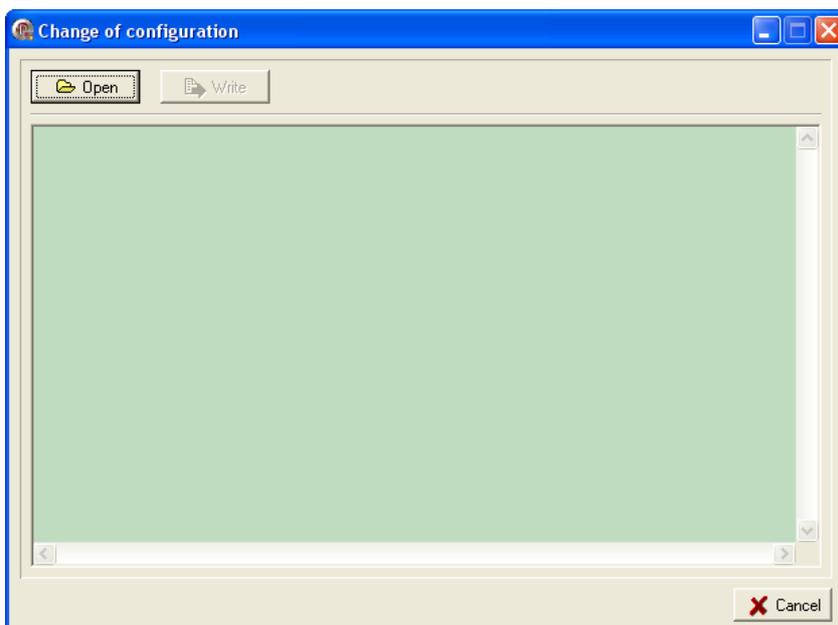
**Control** – information for device access and control  
**interfaces** – able/disable of control of channels  
**SNMP** – parameters for control via SNMP

-  Read - read config files from device
-  Write - write modified config files to device

### 3.1.6 Change of configuration

Main menu **Communication – Change of configuration** or click on speed button

 . This window will be displayed:



Change of configuration means permission/restriction of interfaces or device functions. This operation can be performed with \*.zkf file generated by producer **Inoteska s.r.o.**

Click on **Open** to find a file for changing the configuration and then **Write** to write new configuration to device. New device configuration will be displayed in **Identification** window. Click **Cancel** to quit the window.

### How to order:

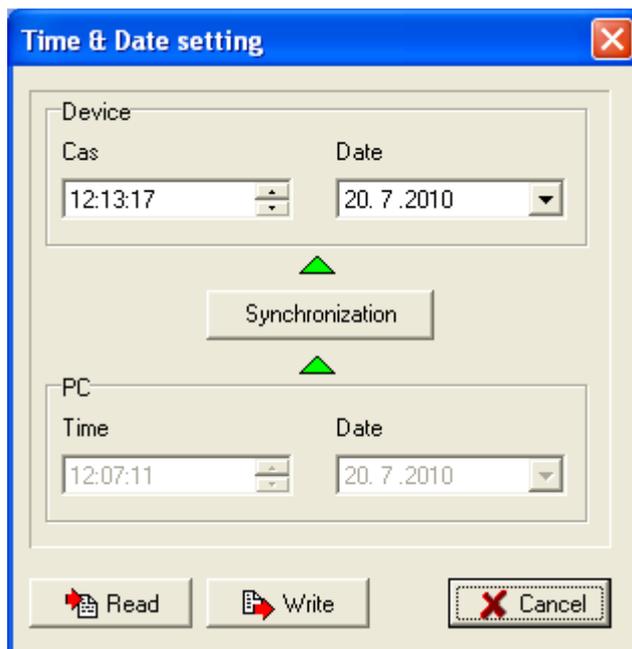
The device's basic configuration can be changed by ordering a new configuration from Inoteska.

### **Specify:**

- Device's serial number
- Requested configuration

## 3.1.7 Time & Date setting

Choose from main menu **Communication – Time & Date setting** or click on speed button . Following window will be displayed:

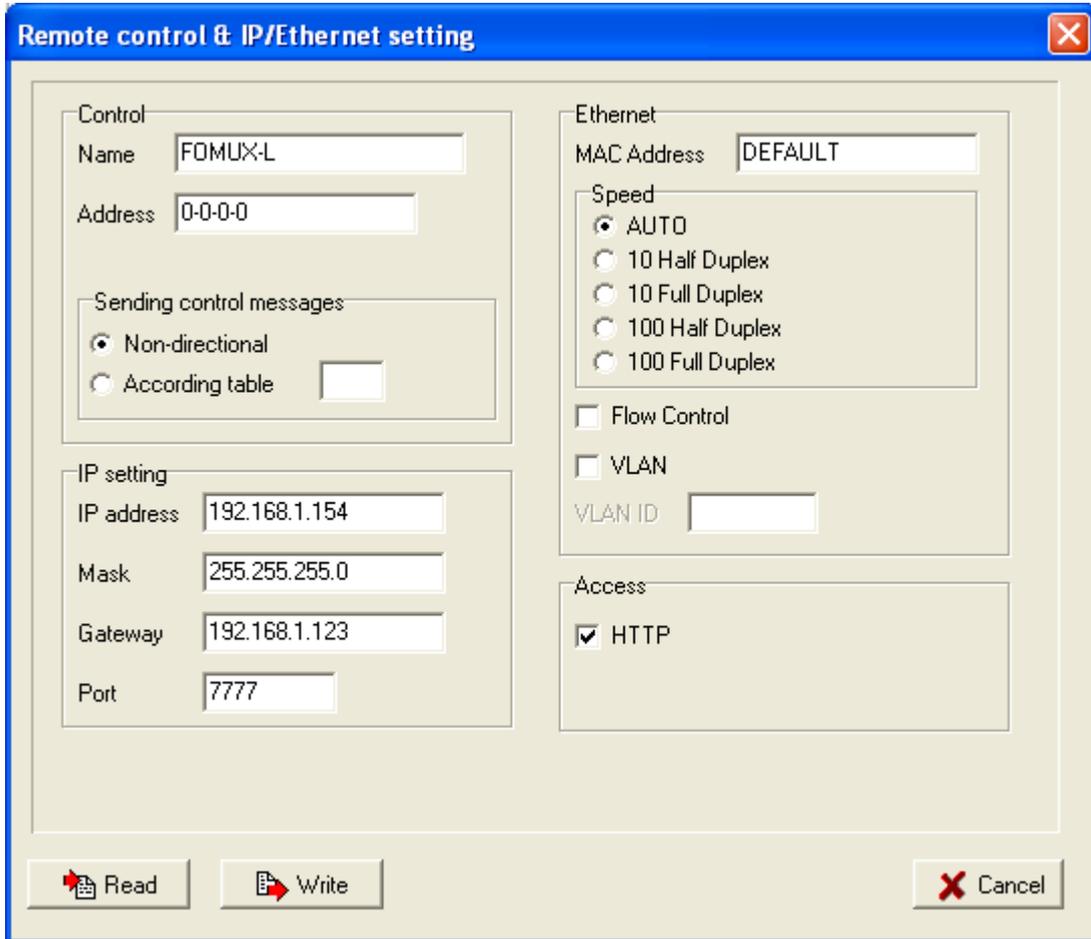


Here you can set **Device** and **PC** time&date or click **Synchronization** to synchronize these settings.

Click on **Read** to read settings from device and **Write** to write new settings to device. Click **Cancel** to quit the window.

### 3.1.8 Remote control and IP/Ethernet setting

Main menu **Communication – Remote control&IP/Ethernet setting** or click on speed button . There will be a window displayed where you can set TCP/IP parameters for communication with device.



#### Control

**Sending control messages** – in case some other Inoteska device is connected to FomuxL, then FomuxL can be controlled over this device. It is necessary to know the direction where the messages have to be sent.

**Non-directional** – messages will be sent to all directions

**According table** – function not available yet

#### Ethernet

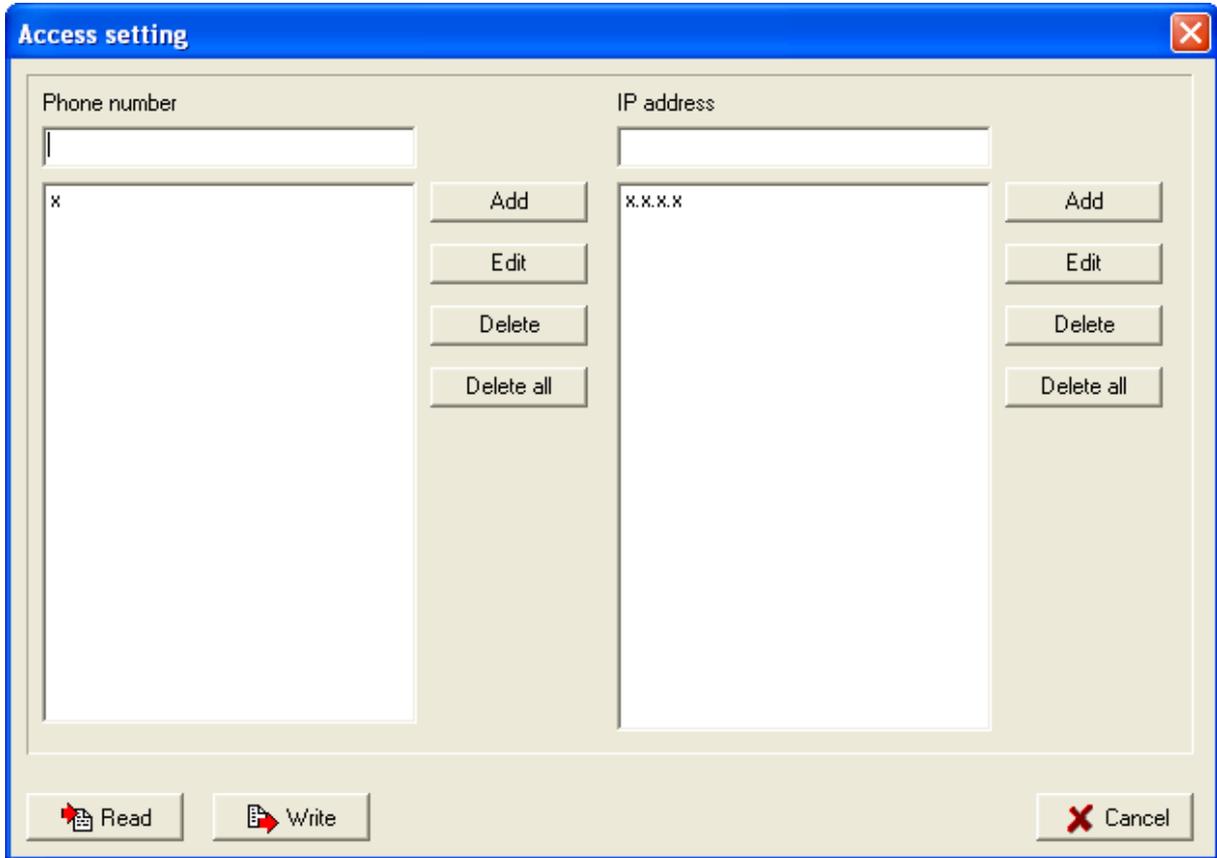
**Flow Control** – control frames transmit when device buffers are overflowed

**VLAN** – VLAN ID – device will expect remote control through VLAN set

Click on **Read** to read settings from device and **Write** to write new settings to device. Click **Cancel** to quit the window.

### 3.1.9 Access setting via remote control

From main menu choose **Communication – Access setting via remote control** or click on speed button .

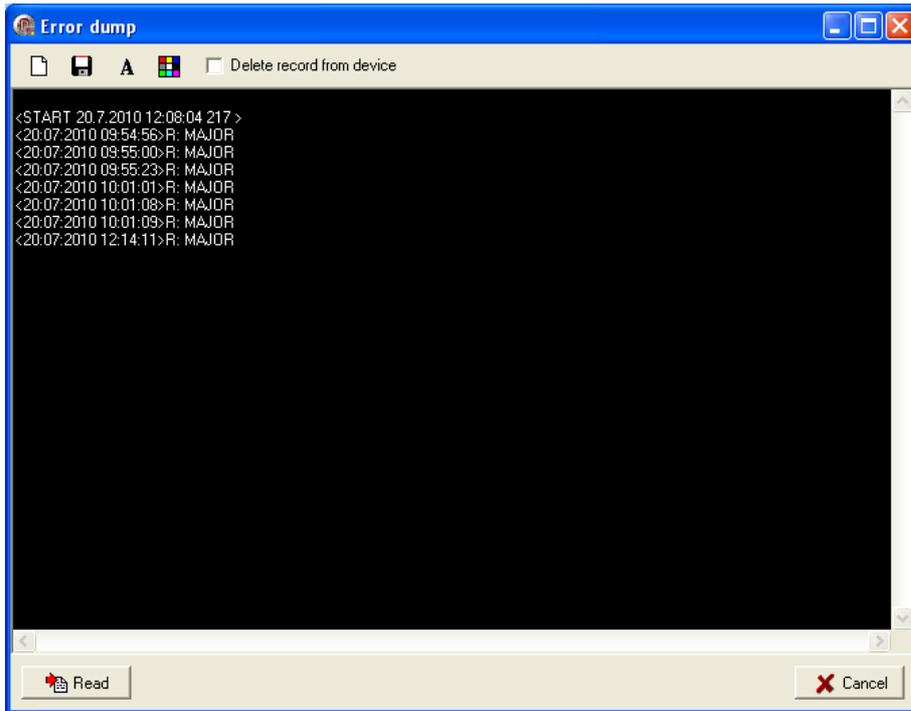


These settings allow to set the access parameters for remote control – **IP address** authorized to communicate with device.

To edit the list, use the buttons on the right side of each list. Click on **Read** to read access setting via remote control from device and **Write** to write new settings to device. Click **Cancel** to quit this window.

### 3.1.10 Error dump

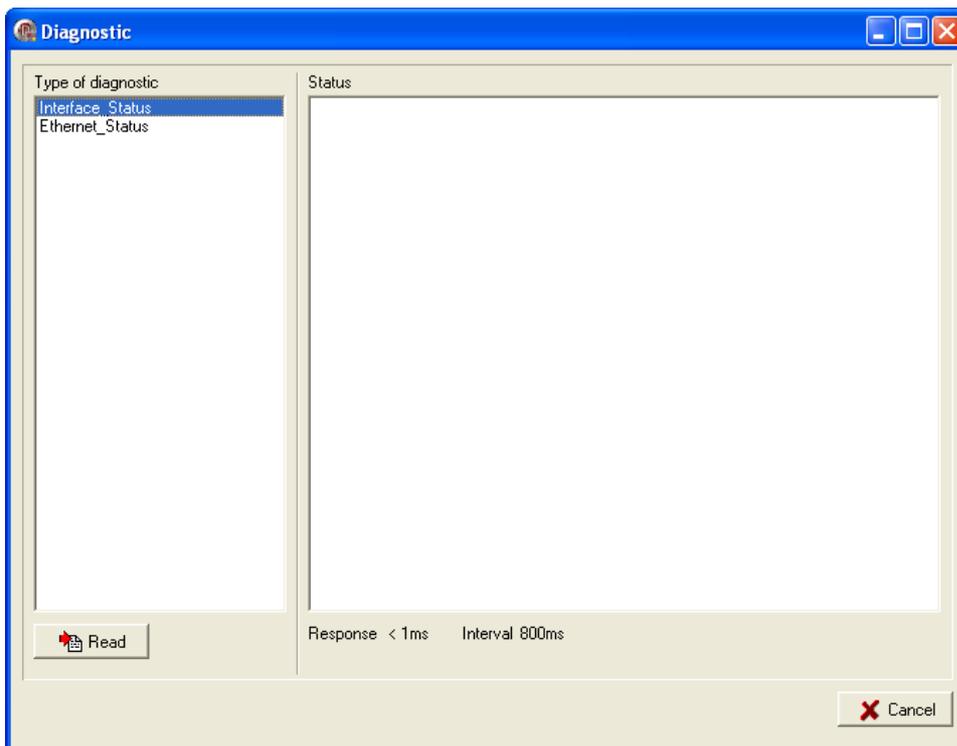
Choose from main menu **Communication – Error dump** or click on speed button . History of device main errors will be displayed – reset, drop-outs, .... If you wish to clear the window, click on  and then click on **Read** to read data from device. User can define text format  and background color . Data can be saved to a file by click on . To **delete record from device** activate this option in the top part of window.



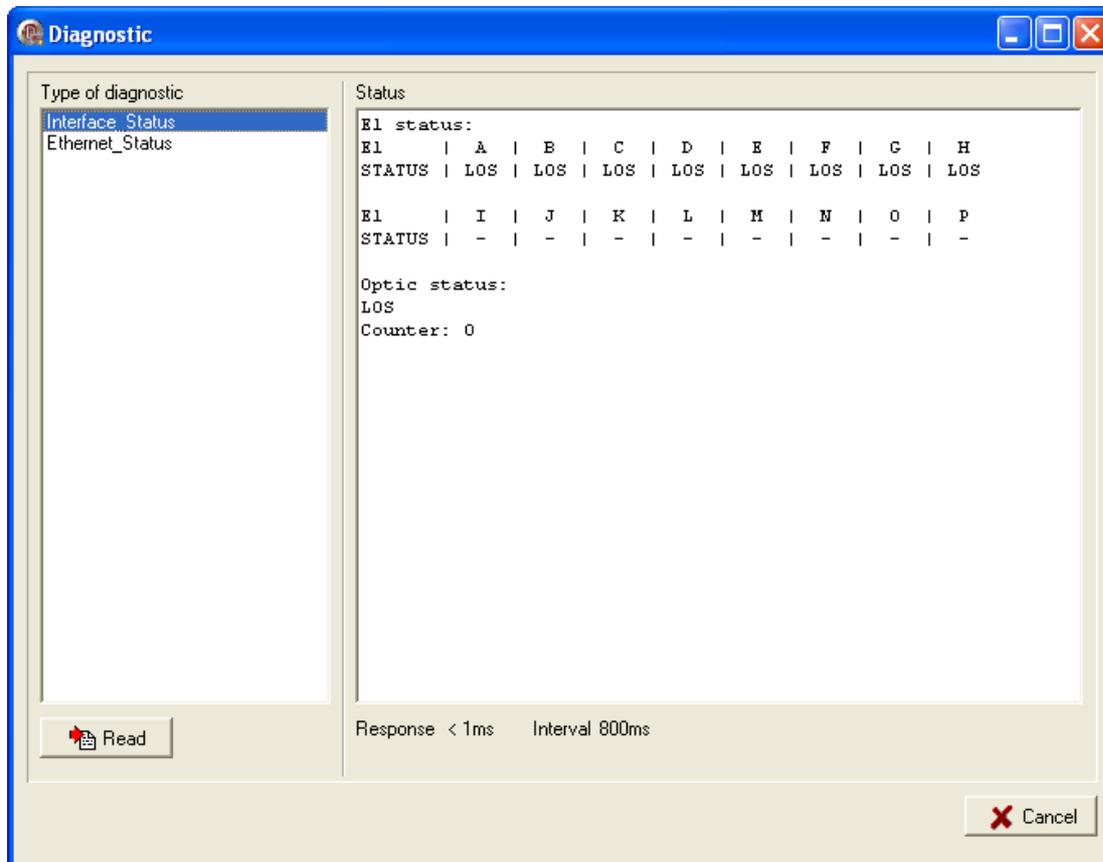
Click **Cancel** to quit this window.

### 3.1.11 Diagnostics

There is a real state of each interface displayed here. From main menu choose **Communication – Diagnostics** or click on speed button .



Then double click on the item from the list in the left part of window – its diagnostic will be displayed in the right part of window.



### Interface status

**E1 status** – status of E1 interface

**Loss of Signal LOS** – detects loss of signal on link level - E1 interface is not connected.

**Alarm Indication Signal AIS** – transmitted signal is constant and data contain value Log1.

**Loss of Frame Alignment LFA** – indicates synchronization error in 0<sup>th</sup> timeslot.

**Receive Remote Alarm RRA** – indicates remote device alarm (error - loss of signal).

**Frame Error Counter FEC** – indicates error rate > 10<sup>-3</sup>

**Datalink layer not active** – Link layer error.

**Slip Detection Indicator SDI** – indicates positive slip if device clock has higher frequency than the clock signal received, and negative slip if device has lower frequency clock .

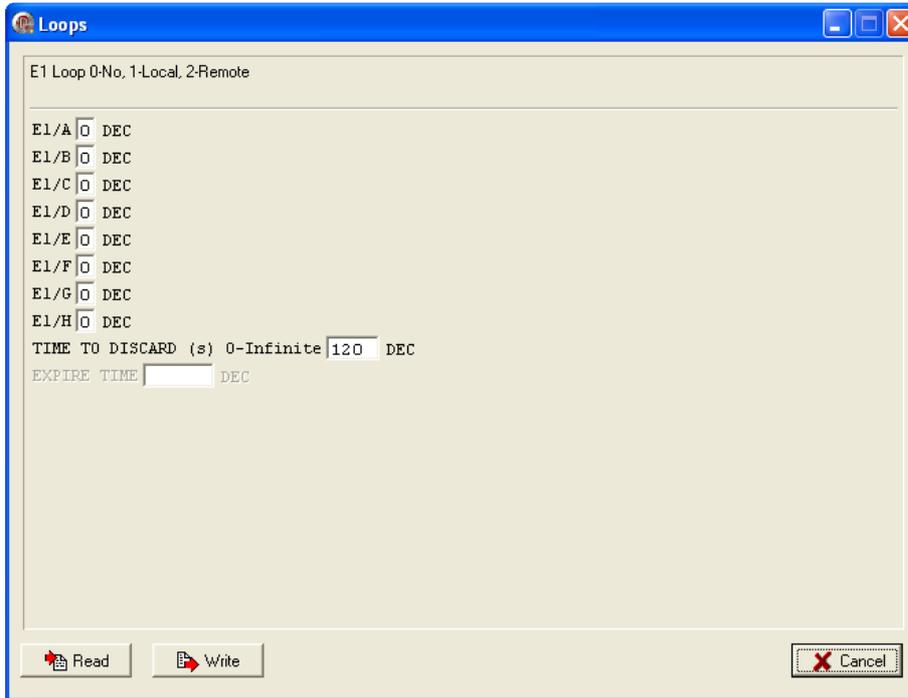
**Optic status** – status of optic interface

**Ethernet status** – status of Ethernet interface

Click **Cancel** to quit Diagnostics window.

### 3.3.14 Loops

Click on speed button .



It is possible to create SW loop for each E1 interface (SW connection of receive with transmit).

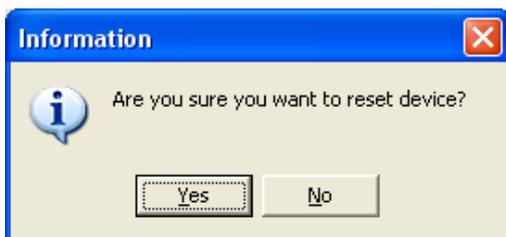
There are 3 types of loop which can be set:

- 0 – No loop
- 1 – Local
- 2 – Remote

Loop **Time to discard** and **Expire time** – in sec. - can be set.

### 3.3.15 Reset

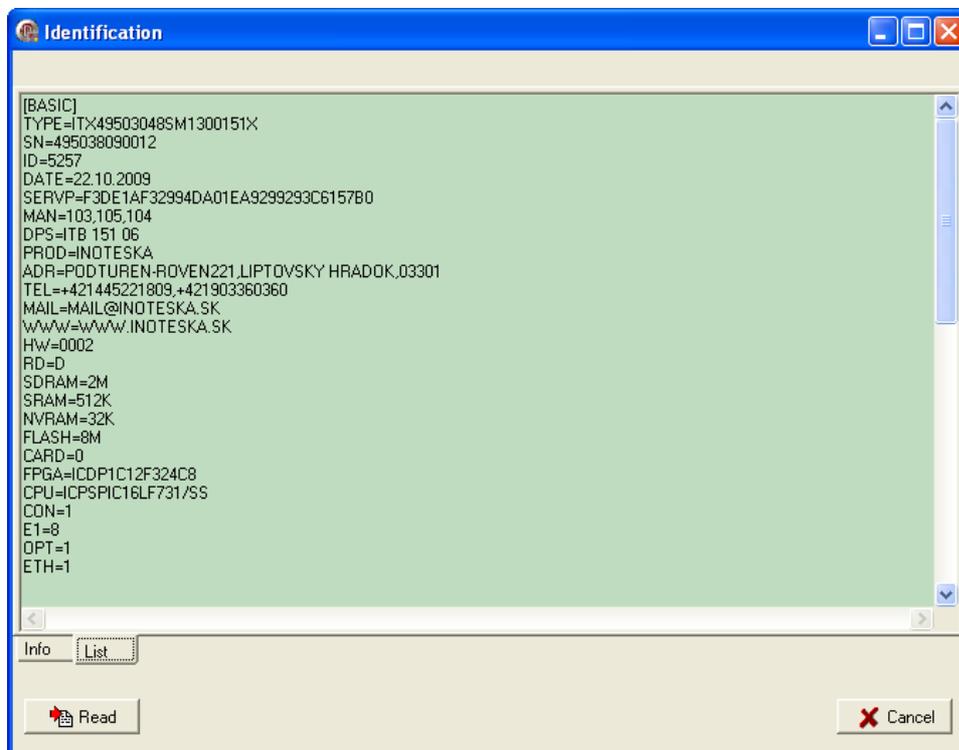
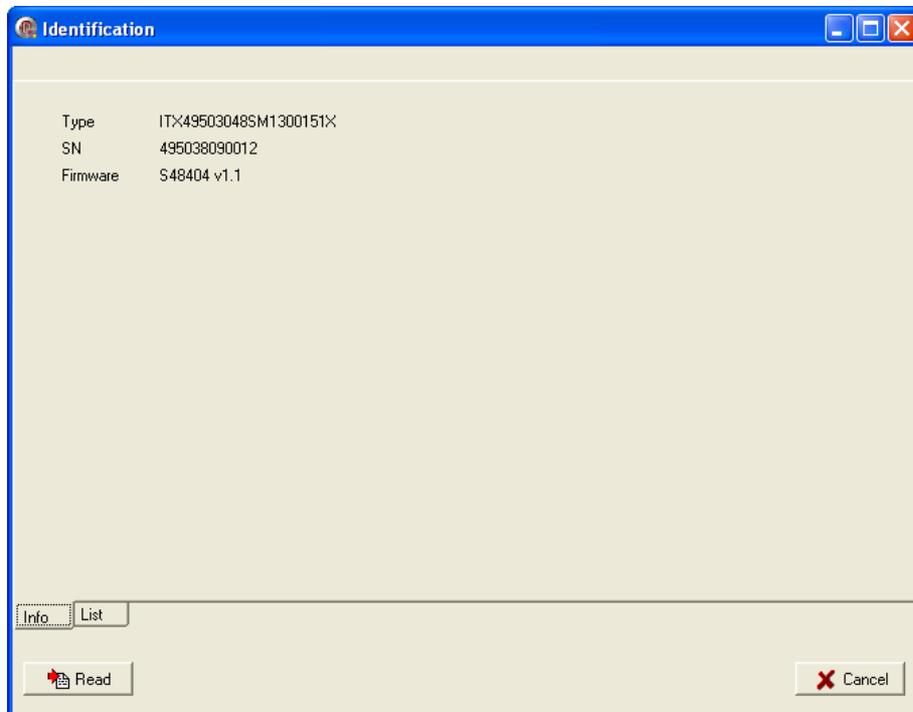
If you want to reset the device, then choose from main menu **Communication – Reset** or click on speed button . Prompt is displayed:



Confirm device reset by click on **Yes**.

### 3.3.16 Identification

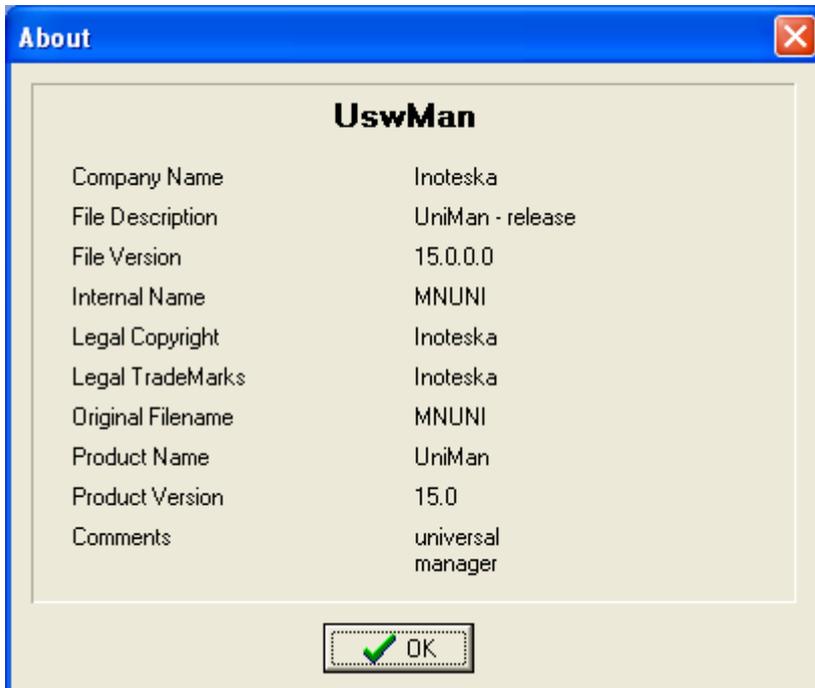
To find out HW information about device, choose from main menu **Communication–Identification** or click on speed button .



**Note:** Configuration SW does not allow to change HW configuration .

## 3.2 About configuration SW

Main menu **About** - information about configuration software will be displayed.



## 4. SALES CONDITIONS

**Warranty:**

Product warranty period is 24 months from the date of delivery or installation. Warranty does not apply in case of an accident, handling by a non-professional or improper use or force majeure.

**Delivery:**

Standard delivery time is max. 6 weeks from the signing of the purchase order or after mutual agreement.

**Contact:****Inoteska s.r.o.**

Podtureň-Roveň 221

Liptovský Hrádok

033 01

Slovenská Republika

**Tel.:** + 421 44 5567911**Fax:** + 421 44 5221 519**Hotline:** + 421 902 774 538**Web:** [www.inoteska.sk](http://www.inoteska.sk)**E-mail:** [mail@inoteska.sk](mailto:mail@inoteska.sk)**VAT no.:** SK2020428300**Bank information:** Všeobecná úverová banka a.s.**Account no.:** 616243342/0200**SWIFT code:** SUBASKBX**IBAN:** SK3402000000000616243342***Sales department:***

Ing. Ľubica Brtáňová 0903 826 079

Ing. Pavel Wolf 0903 800 133

***Technical department:***

Ing. Pavol Perdek 0903 519 908

Ing. Pavel Wolf 0903 800 133