Ruptela

FM-Eco3,FM-Pro3, FM-Tco3 configuration manual

Version 1.2

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1. Device connection to personal computer

All examples of connection and configuration will be provided on a personal computer (PC) running Microsoft Windows XP SP3 32bit operating system. Usually identical or analogue procedures should be applied on newer versions of Windows family.

1.1 System requirements

Hardware requirements (not supplied in package):

• CPU: 1,5GHz or better.

• RAM: 512MB or more.

• USB port.

• USB A to mini USB cable (Fig.1.1.1)

Fig. 1.1.1 USB A to mini USB cable.

Software requirements

• Operating system: Microsoft Windows XP, or Microsoft Windows Vista, or Microsoft Windows 7 (32-bit and 64-bit)

• Microsoft .NET framework 4 (available as free download from http://www.microsoft.com/downloads/en/details.aspx?FamilyID=9cfb2d51-5ff4-4491-b0e5-b386f32c0992).

1.2 Preparation for connection

Before connecting FM-Xxx3 to PC please check if you have the latest configuration software. you can download it from here: ftp://dev.ruptela.lt (user name:ftp, password: ftp).

At first connect device to +12/24V ▄▄▄ 1A/500mA power supply, this will prevent from damaging PC when FM-Xxx3 device is active. You can use an AC/DC stabilized converter for this (not supplied with the device). When device is powered up, it is safe to plug in USB cable.

1.3 Driver installation

1. When the FM-Xxx3 device is first time connected to PC the notification should pop up that new hardware was found and configuration window is shown (Fig. 1.3.1). Select „No, not this time" and click „Next" button.
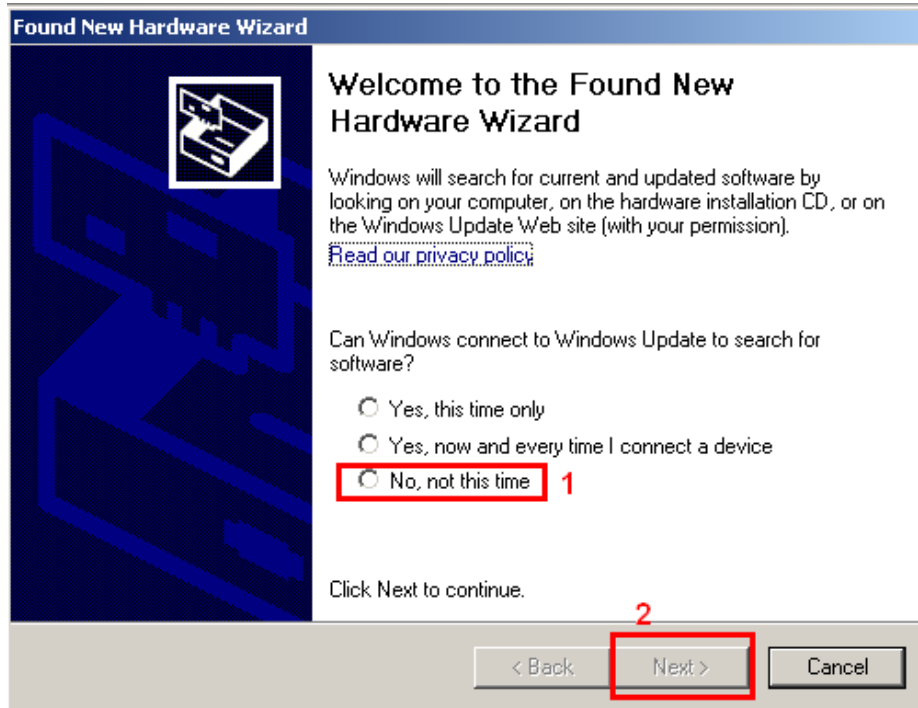

Fig. 1.3.1 Driver installation

2. In the next window select „Install from a list or specific location (Advanced)" (Fig. 1.3.2).
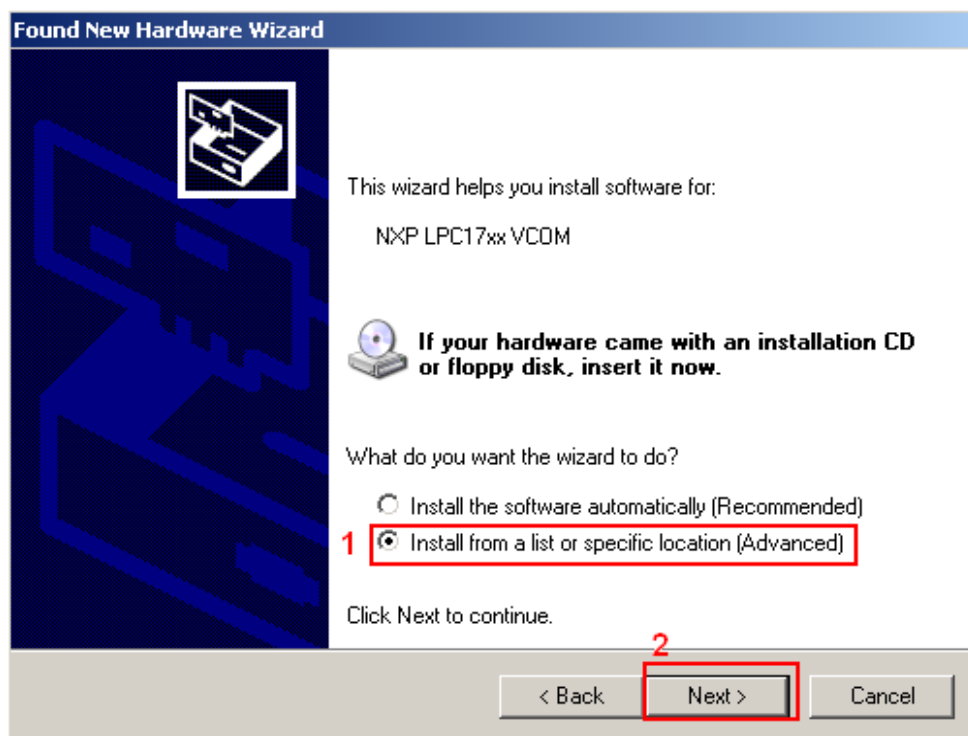

Fig. 1.3.2 Driver installation

3. In the next window select „Include this location in the search:" and click „Browse" and navigate to folder where configuration software is saved (i.e. *F:\FM3 configurator 00.01.15*) then click next(Fig. 1.3.3).
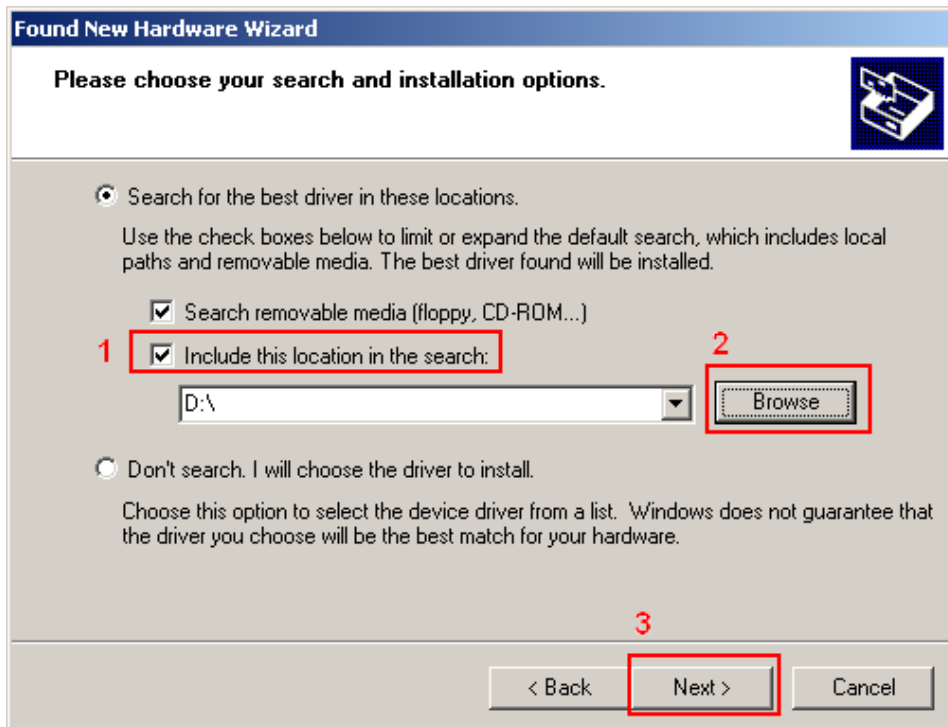
Fig. 1.3.3 Driver installation

4. Then driver installation should proceed. If asked, click „Continue Anyway" (Fig. 1.3.4).
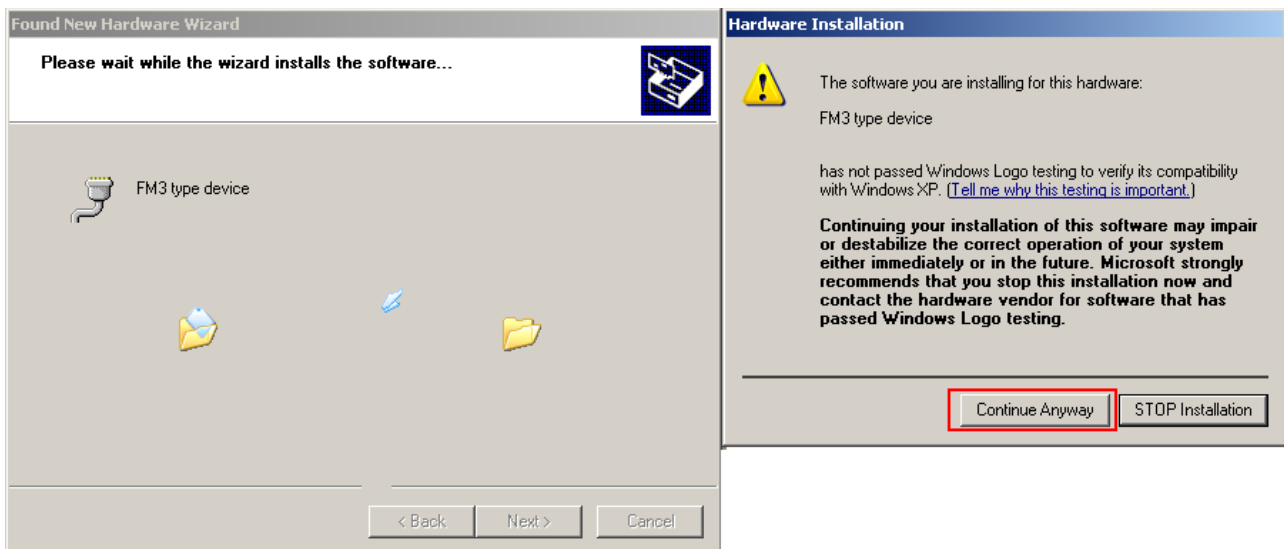
Fig. 1.3.4 Driver installation

5. The driver should be installed and work.

If an error pops up that PC „Cannot Start this hardware" (Fig. 1.3.5), you should restart the PC or do the following actions:

1) click finish and go to „Device Manager".

2) In device manager go to „Ports (COM & LPT)",

3) expand section then right-click on "FM3 type device (COMXX)"

4) and select "Disable" (Fig. 1.3.6).

5) When asked for confirmation click "Yes".

6) Then, again, right-click on "FM3 type device (COMXX)" and

7) select "Enable" (Fig. 1.3.7).

8) Driver now should be completely installed and ready to use (Fig. 1.3.8).

Fig. 1.3.5 Driver installation

Fig. 1.3.6 Driver installation

Fig. 1.3.7 Driver installation
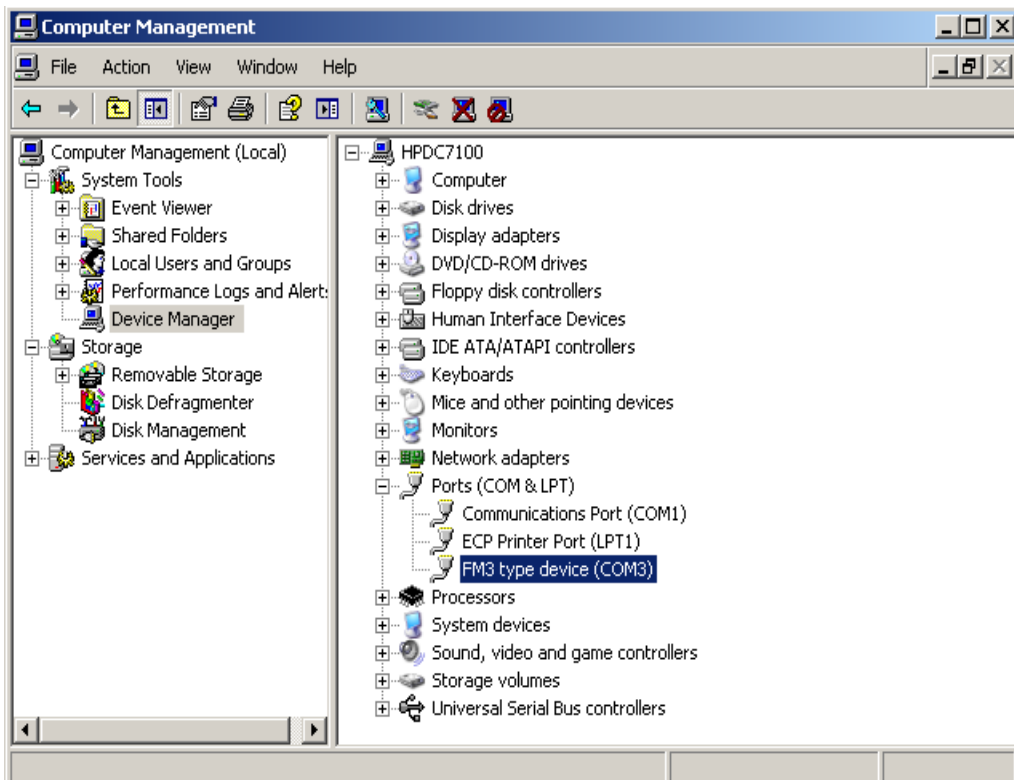
Fig. 1.3.8 Driver installation
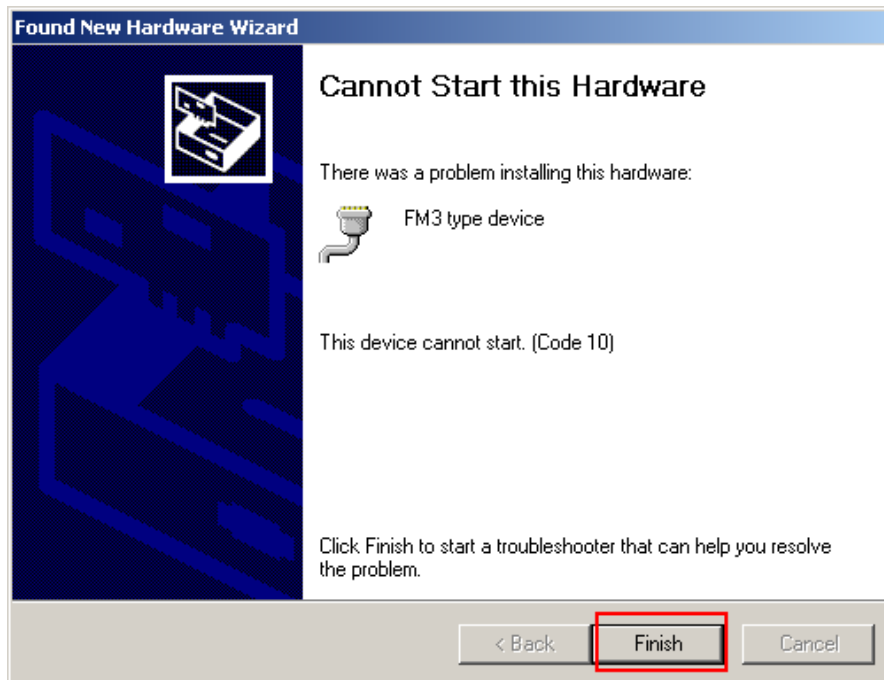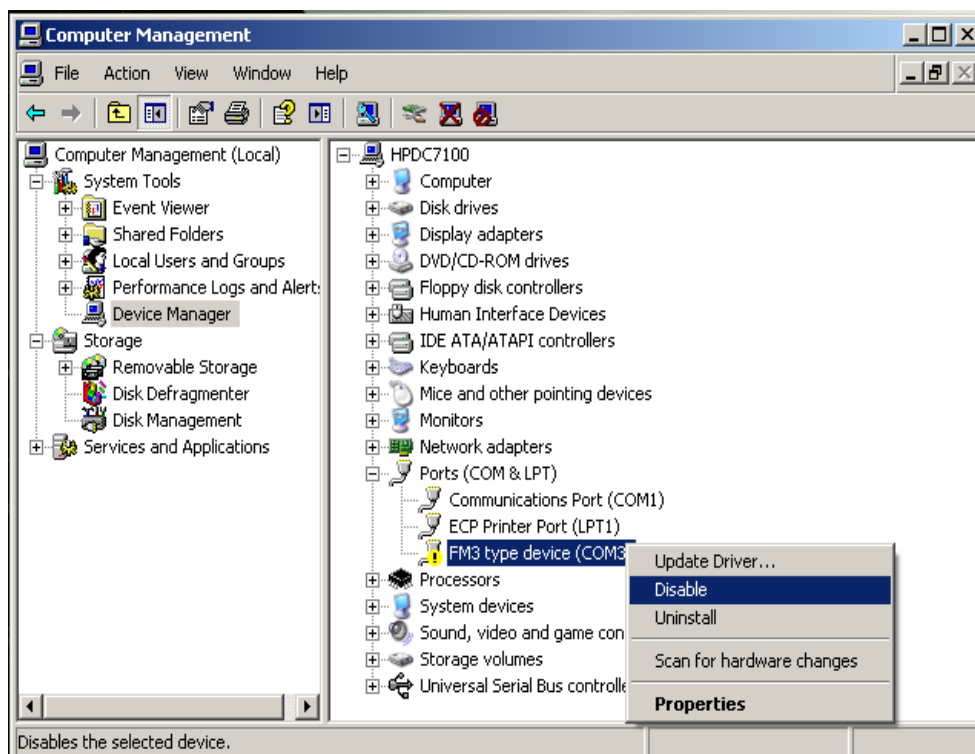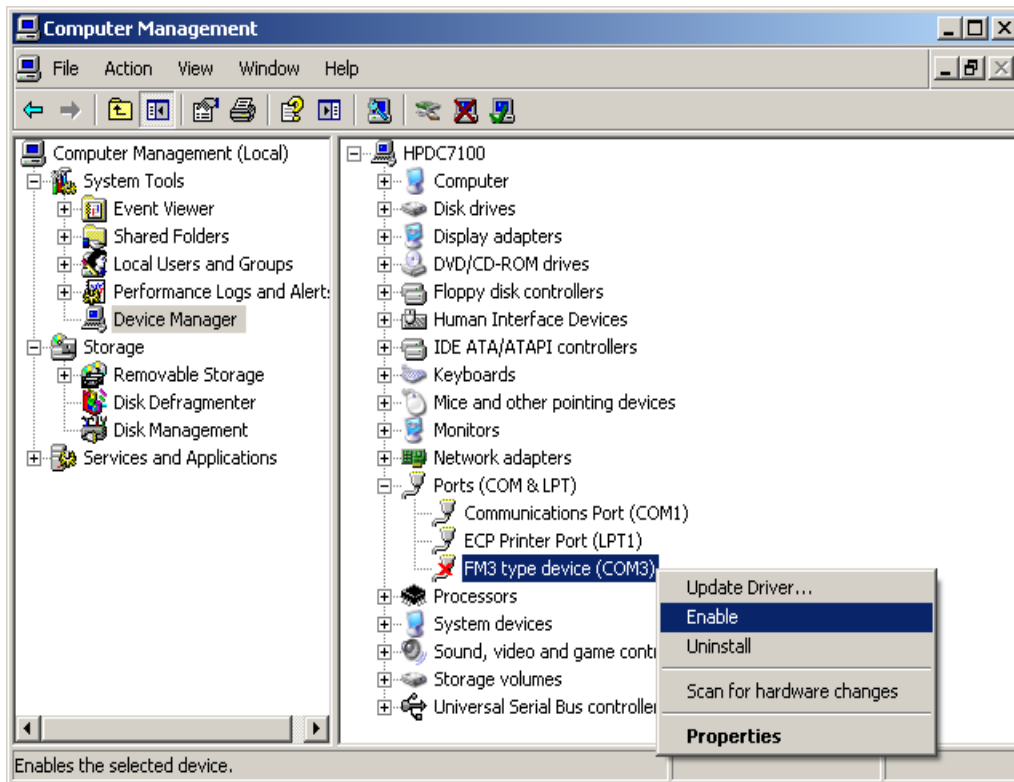
2. Configurator

In order to use configurator go to folder where you saved configuration software and launch „VCP.exe" file. This configurator is intended to configure FM-Eco3, FM-Pro3 and FM-Tco3 devices.

2.1 Interfacing to COM port

In the main view upper left corner there is a drop box which contains COM ports list. You should select port corresponding to your device (you can check it in "Device manager") and click "Connect" button. If connection is successful, "Connect" button changes into "Disconnect" and on the main view bottom there should be information available about software, hardware and IMEI number (Fig. 2.1.2). Also when connected device type will be detected (Fig. 2.1.3)

Fig. 2.1.1 COM port drop-box.
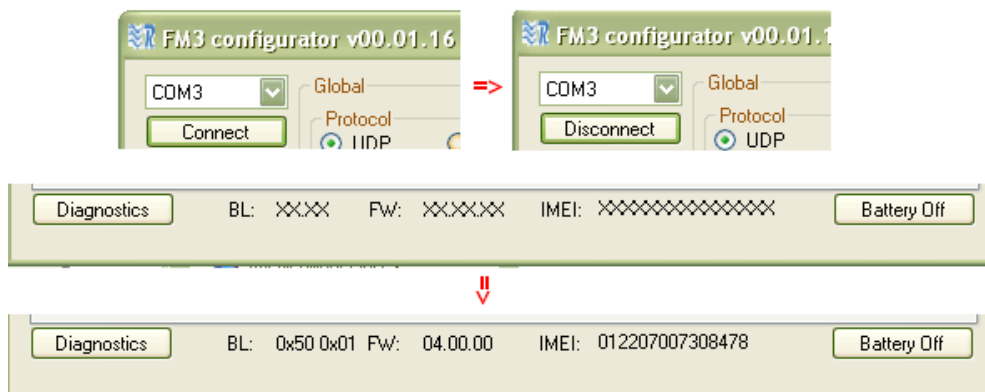
Fig. 2.1.2 Changes after connection to COM port

In order to disconnect click "Disconnect" button. Sometimes when connected IMEI is displayed as few unconditional characters, this means that device is not fully ready. Try to disconnect, wait for a half minute or longer and connect again – this should fix the problem.

Fig. 2.1.3 Device type selection drop-box

2.2 Global parameter configuration

Global parameters are parameters which apply to the system in general. Global parameters are constant and do not change while device is working, unless they are configured by user (Fig.2.2.1).
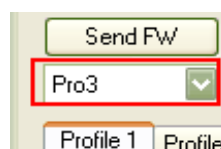

Fig. 2.2.1 Global parameter view

Protocol is a formal description of digital message formats and the rules for exchanging those messages between system's elements. This parameter sets how FM-Xxx3 device communicates with server. Options:

•UDP – consumes less traffic (amount of data send/received), but less reliable.

•TCP – consumes more traffic (about 30% more), but more reliable.

In case of UDP, if data is lost during transfer to server, the device will repeat the same message in next GPRS session, until transfer is successful. This means that in case of UDP there will be more retries to send, but server will receive all the data anyway.

APN (Access Point Name) is a communication protocol that allows a user's device to access the internet using the mobile phone network. Name, User and Psw (password) parameters should be provided by your mobile operator as GPRS settings.

Connection settings:

•IP1 – Internet Protocol address of your server in Ipv4 form (i.e. *127.0.0.1*)

•Port1 – port number through which server is accessible (i.e. 7001)

Configuration Password – password which restricts device configuration through USB cable. When not blank, you will be asked to enter password every time when you start receiving or sending configuration session with device. Leave it blank, if you want everyone to be able to configure your device. If you forget the password, you can reset or delete it by sending configuration via GPRS from your server account, because then you wont be requested for password.

SMS are group of settings to manage your device via SMS messages. Click "Options" to see them (Fig. 2.2.2). FM-Xxx3 device can accept and send specific SMS messages, like device location information or status. In order to prevent third party eavesdropping you can restrict their usage to up to 10 authorised numbers with one password for all of them. Device will receive and send SMS messages only from those Valid Numbers. Numbers are written without spaces and without plus sign in front (i.e. *37012312345678*). Leave them blank, if you want to allow everyone to send SMS to the device. Every request with SMS must be sent with password, if device is protected. Leave blank, if not using this feature.

Warning! If you leave authorised number and password fields blank, 3rd parties who know
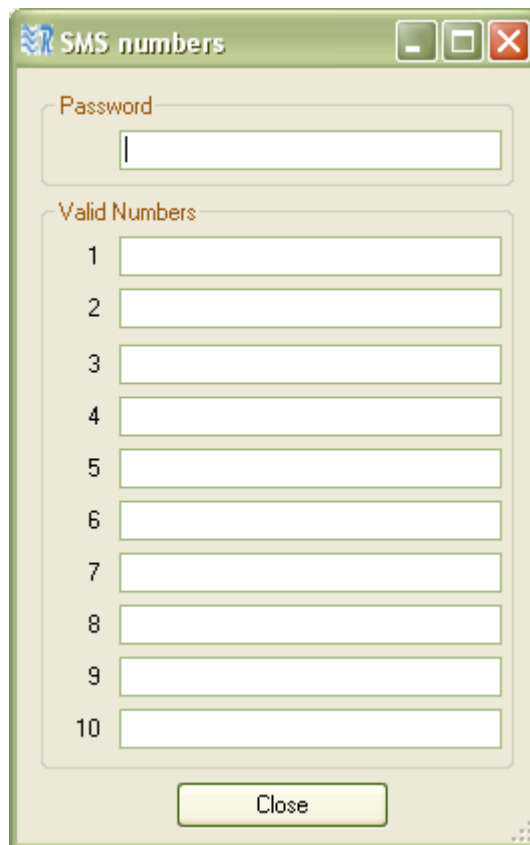
Fig. 2.2.2 SMS numbers and password

SIM card number will be able to change configuration or do any other action with the device.

2.3 Profile configuration

Data sending parameters (bottom left) are used to set-up sending rules. User can disable data sending via GPRS. In this case device will act as black box and only collect records. About 5000 records can be stored and after this, device will start overwriting oldest records. User also define minimum numbers of records in order to start session (saves traffic if your GSM operator has big session rounding like 10kb or 100kb) and sending period (Fig. 2.3.1). For advanced sending rules user can use timetable by enabling it and configuring (click "Timetable").
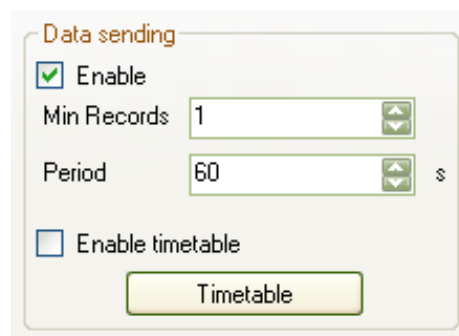
Fig. 2.3.1 Data sending options view

In timetable whole week is divided into periods of 10 minutes (Fig. 2.3.2). User can select day of week and exact time, when GPRS sending is allowed. In order to select/deselect whole hour, user should click on row header cell. It is possible to configure timetable and copy it to another day

of the week(or whole week). Also similar options are available for timetable clearing. It is important to note that "Timetable" has higher priority than "Period" important. Lets say Period=3600s (1 hour) and timetable allows sending only from 12:30 to12:40 that day. If sending will start at 00:00, next time it will send data at about 01:00. Eventually, device will attempt to send 12:00 and 13:00, but timetable only allows sending 12:30-12:40, so no data will be sent that day. So it is not recommended to have "Period" longer than smallest consecutive timetable period (according to Fig. 2.3.2 "Period" should be no longer than 1h=3600s).
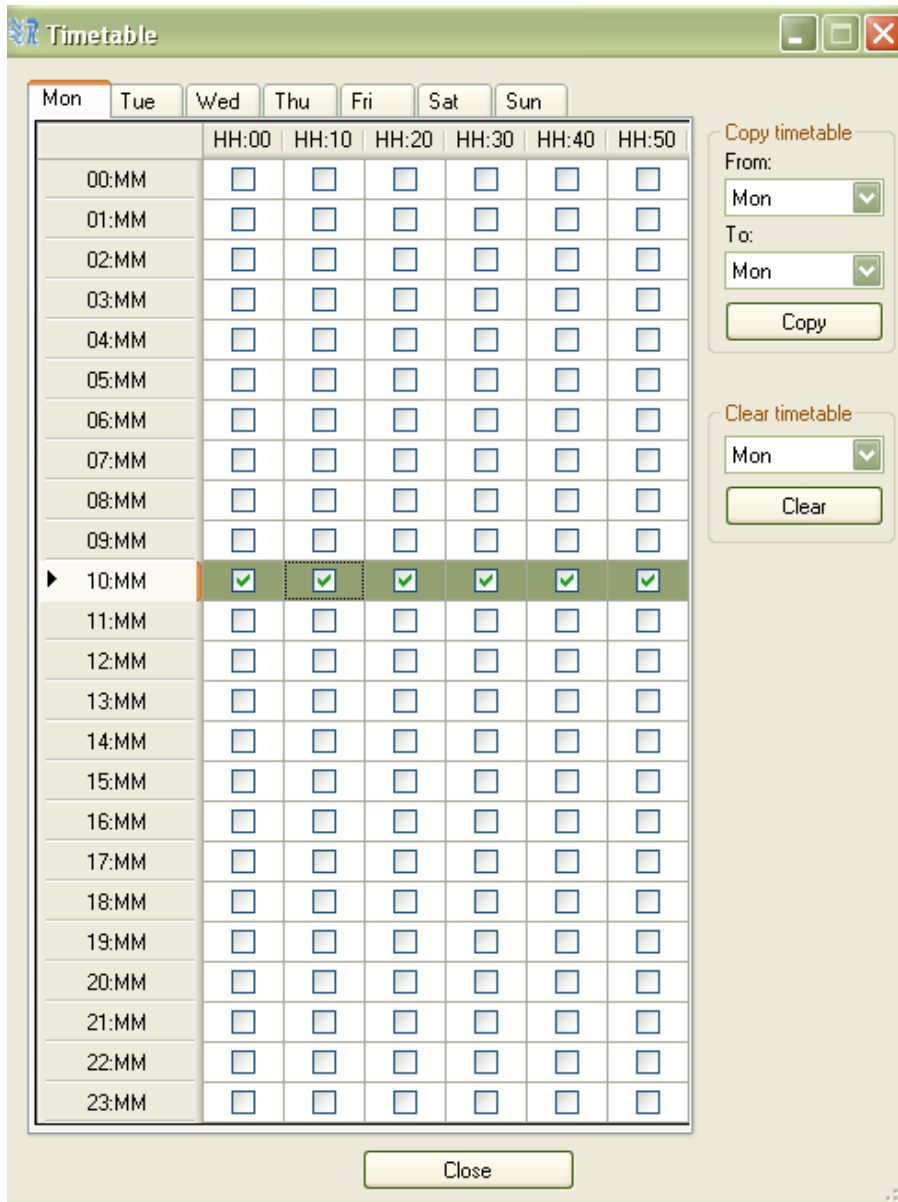
Fig. 2.3.2 Timetable view

Data collection parameters (bottom middle(Fig. 2.3.3)) are used to set-up record collection rules. "Time without engine" sets maximum period within which device must make records. It is mostly used to make records when device is not moving, so this parameter should not be longer than "Time with engine" in coefficients section. "Engine" selection defines how FM-Xxx3 device detects whether it is moving or standing still, this mostly affects record collection time-out:
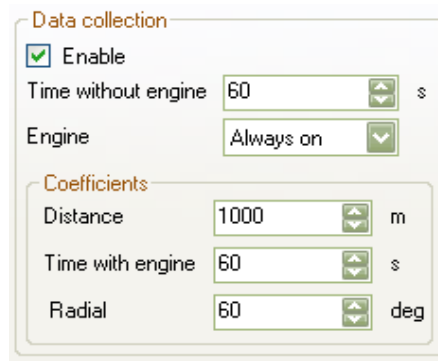
Fig. 2.3.3 Data collection options view

•"Always on" – device collects records only according to "Time with engine"(i.e. Time without engine=120s, Time with engine=60s, then it will always collect data with 60s time-out)

•"Ignition (DIN4)" – device considers that it is moving when ignition is turned on (on digital input 4 (DIN4) voltage level is high)(i.e. Time without engine=120s, Time with engine=60s, then if ignition is on time-out will be 60s, if ignition is off time-out will be 120s)

•"MovSensor" – device will take built-in movement sensor data to state if it is moving (i.e. Time without engine=120s, Time with engine=60s, then if motion sensor detects vibration time-out will be 60s, if no vibrations detected time-out will be 120s).

"Engine" selection also defines how device wakes up from sleep mode. If "Ignition (DIN4)" mode is selected, then device will wake up from high level on DIN4. Else ("Always on" or "MovSensor") movement will be detected from built-in movement sensor.

Coefficients section defines how often device collects records based on GPS readings. "Distance" parameter defines what distance vehicle has to go to make a record. "Time" how much time must pass to make a record. "Radial" how much vehicle has to turn to make a record. All coefficients are counted from last one generated record (i.e. Distance=1000m, Time=60s, Radial=60deg and device was moving for 60s, gone 650m and turned 30 degrees, so record will be made based on Time, and counters will be reset, so device must go for another 1000m, or 60s, or 60deg to make another record).

FM-Xxx3 device has profiled structure, so according to circumstances device can differently send, collect and store data. Profile switching is done in two ways: by GSM operator or by IO event. It is recommended to use single type of switching to avoid confusion. Although advanced users can combine dual switching. At first, when device starts and has no operator, it jumps to first profile. As soon as registered to a GSM network, device checks up operator lists (from 1st profile to 4th) and if it finds GSM operator code (http://en.wikipedia.org/wiki/Mobile_Network_Code) in that list, it jumps to corresponding profile. If no matching profile list found, device jumps to first profile with empty operator list, so it is recommended to leave 4th profile with empty operator list. If the same operator code is entered in two profiles lists, then after the GSM network operator change, it will jump to first one of them – lets say operator X is listed in 2nd profile operator list and 3rd profile operator list and device works in 1st profile, when GSM operator will change to X, device will jump to 2nd profile. If using IO event switching, just set "Switch to" to desired profile (Fig. 2.3.6).

Operator list is placed in the middle right on the main view and is accessible by clicking options (Fig. 2.3.4). In the new opened window you can set up to 50 preferred mobile network operators for each profile. Operators are added as numbers (up to six digits). If you want to add Afghanistan AWCC operator, you should enter *41201* (Fig.2.3.5) and then click "Add". If you want to remove operator, select operator (by clicking it on the list) and then click on "Remove" button. Also you can clear all operators from the list by clicking "Clear All".
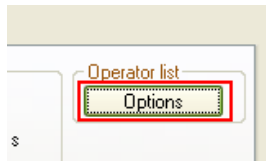
Fig. 2.3.4 Operator list options button
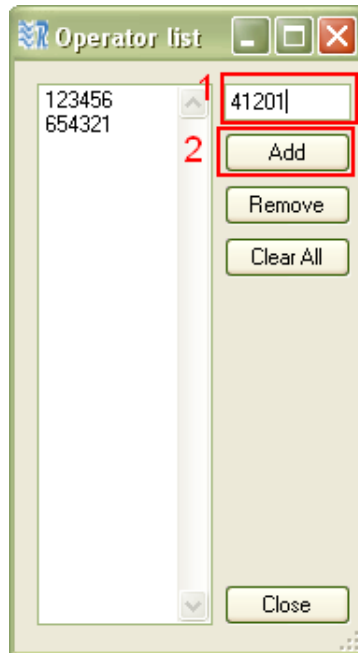
Fig. 2.3.5 Operator list view

IO events settings are located in the bottom right corner on the main view and are accessible by clicking "Options" button (Fig. 2.3.6). IO is a specific property, which can be measured by FM-Xxx3 device and sent to server. IO event is reaction to measured value. When IO event occurs, device makes a record into its memory with measured values, date, time and location. IO events can initiate GPRS session. Also IO can change device operation (by switching profile). You can select up to 40 IO events, from which 20 can be CAN IO events.
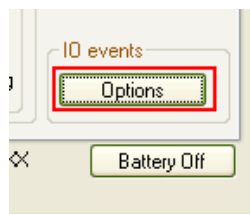
Fig. 2.3.6 IO events settings button

To add IO to data record and create IO event(Fig 2.3.7):

1. Select space for IO. If it is "Disabled" then it is empty and new IO will be added, otherwise you will overwrite IO and it will be replaced with new one.

2. Check "Enable".

3. Select property ID you want to measure.

4. Set "Level" (optional, used for Hysteresis (explained below), IO dependant).

5. Set "Delta" (optional, used for Hysteresis (explained below), IO dependant).

6.Set "Average" (averaging is used to ensure that IO value is long time result and not short impulse value). Some parameters, which has static values (like iButton ID) ignores averaging.

7.Select "Event on"(Monitoring – no event generation, only include value to record; Hysteresis – event generation defined by "Level" and "Delta"; Change – event generated when measured property changes, that means its value is different from previous registered value).

8.Select whether to always include value to record or only when event is generated.

9.Select priority (Low – do not start GPRS session after event and send data according to timing defined in parameters "Period" and "Timetable"(Fig. 2.3.1), High – start GPRS session after event and send data if "Timetable" allows GPRS activity at that time).

10.Select whether to switch profile on this event or not.
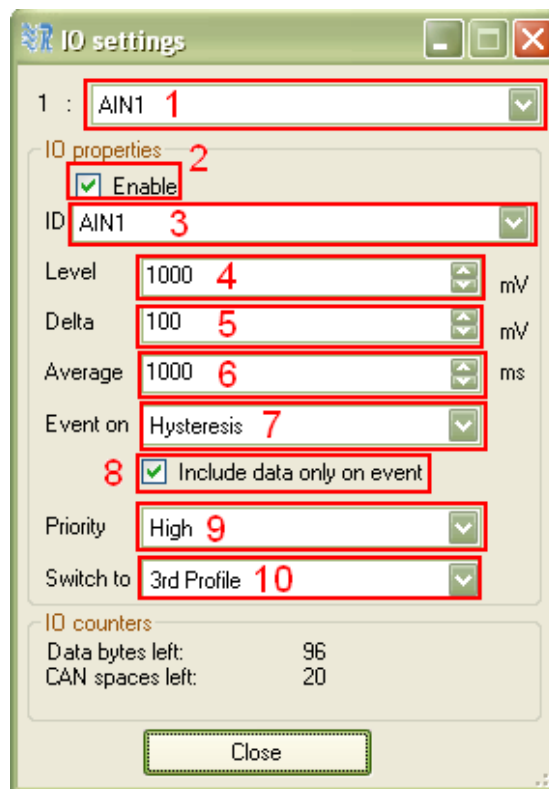
Fig. 2.3.7 IO event settings view

Hysteresis principle is applied to reduce amount of events generated and thus reduce GPRS traffic. For example, take configuration from Fig. 2.3.7: voltage on analog1 input (AIN1) will be measured, event will be generated on hysteresis then signal on analog rises from 1000-100=900mV to 1000+100=1100mV, or falls from 1100mV to 900mV, with a samples averaged within 1s intervals; data will be included only when event is generated; and when event is generated GPRS session will be initiated and device will switch to 3rd profile. To generate event on "Hysteresis" property value must travel from Level-Delta to Level+Delta or vice versa. In Fig. 2.3.8 event will be generated on 9th and 15th seconds.
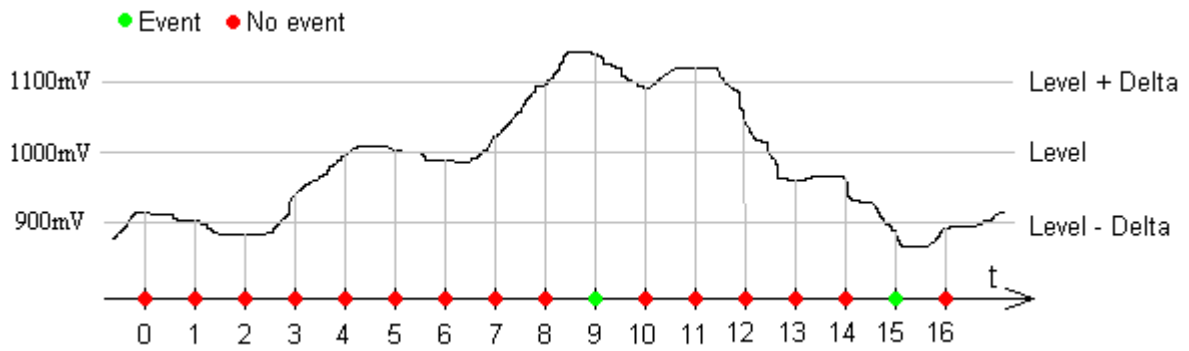
Fig. 2.3.8 Hysteresis explanation

Some IO options have conventional parameter measurement units (analog inputs, temperature measurements, etc.) while others are defined in specific standards (as CAN FMS 2.0).

Sleep can be enabled (Fig. 2.3.9) to reduce power usage of the device, but sleep also reduces response from device, because GSM modem and GPS are switched off (device does not collect records based on GPS information and does not respond to SMS commands). Device enters into sleep mode after no movement or ignition (depends on "Engine" selection (Fig. 2.3.3)) detected for 10minutes. Device resumes instantly after movement or ignition detected.

Fig. 2.3.9 Sleep selection buttons

2.4 Saving and loading configuration
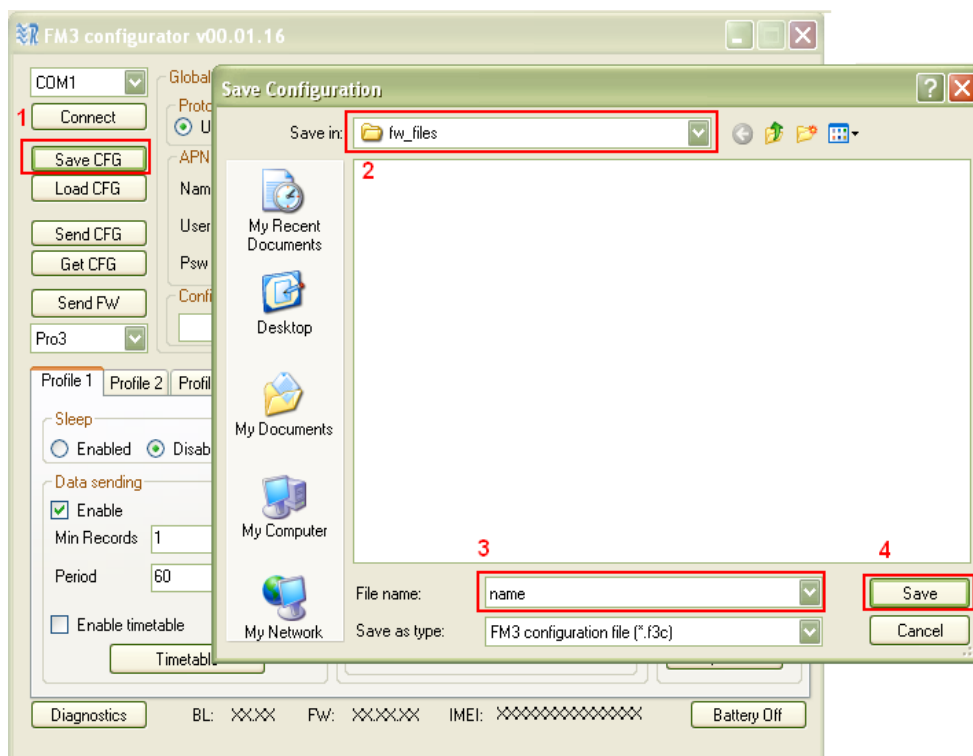
Fig. 2.4.1 Configuration saving scheme

In the main view upper left corner there are "Save CFG" and "Load CFG" buttons, which save and load configuration files. In order to save file click "Save CFG", go to folder where to save configuration, give name to file and click "Save" (Fig. 2.4.1). In order to load configuration, click "Load CFG", navigate to folder where configuration file is saved, select file and click "Open"
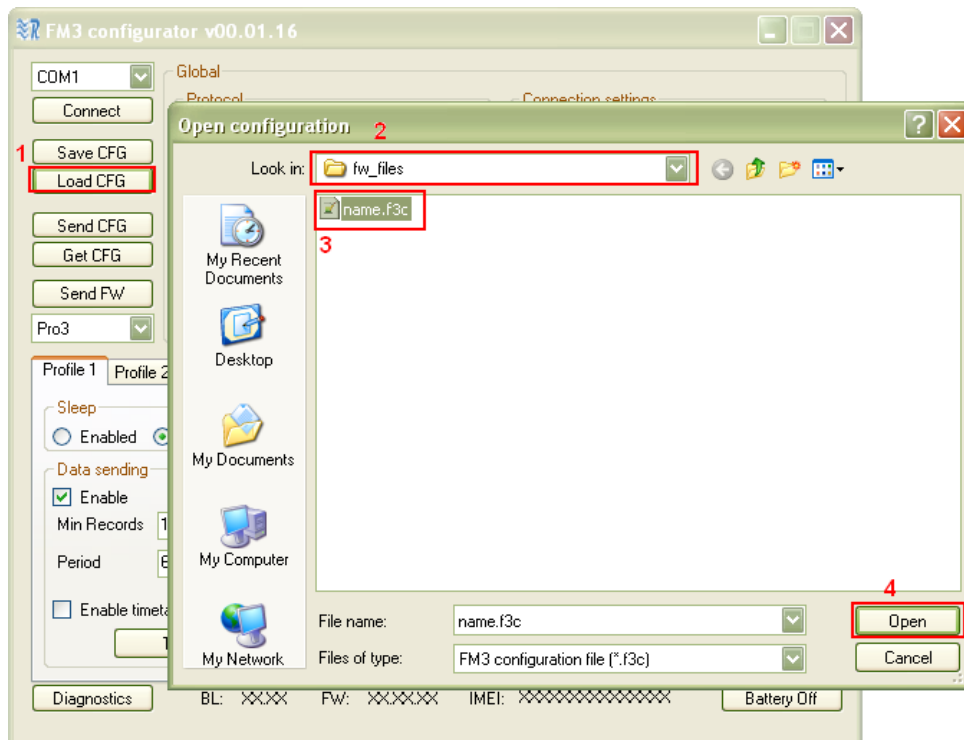
Fig. 2.4.2 Configuration loading scheme

Both actions, saving and loading, can be completed whether device is connected or disconnected from PC.

Different device types (FM-Eco3, FM-Pro3, FM-Tco3) have slightly different configuration options. So when configuring without connected device, pay attention to which type is selected (Fig. 2.1.3). Each device type has its own configuration file extension: FM-Eco3 – .fe3c, FM-Pro3 – .fp3c, FM-Tco3 – .ft3c.

2.5 Configuration exchange with device

In the main view upper left corner there are "Send CFG" and "Get CFG" buttons, which are responsible for configuration exchange with device. These actions can only be performed when connected to COM port (chapter 2.1). In order to get configuration from device click "Get CFG" button. The controls will be frozen for a while and on the bottom you will see progress bar active. Analogue actions should be done to send configuration to device. All profiles are saved and loaded from device at once. Report will be written at the bottom of main view after action. Possible reports:

•Configuration Sent Successfully

•Configuration Send Error!

•Configuration Received Successfully

•Configuration Receiving Error!

If you receive error report, retry your last action once again. In most cases this should fix the problem. If this you still having problems contact our support engineers.

3. Firmware update

Configurator is also used to update firmware version of FM-Xxx3 type device. There is "Send FW" button (on the middle left on the main view (Fig 3.1)), it opens dialogue window search for firmware file. Different device type has its own firmware file: FM-Eco3 – .efwe, FM-Pro3 – .efwp, FM-Tco3 – .efwt. User has to open device COM port, click "Send FW", navigate to appropriate folder, select file and click "Open" (Fig. 3.2).

Fig. 3.1 Firmware update button

Fig. 3.2 Firmware update scheme

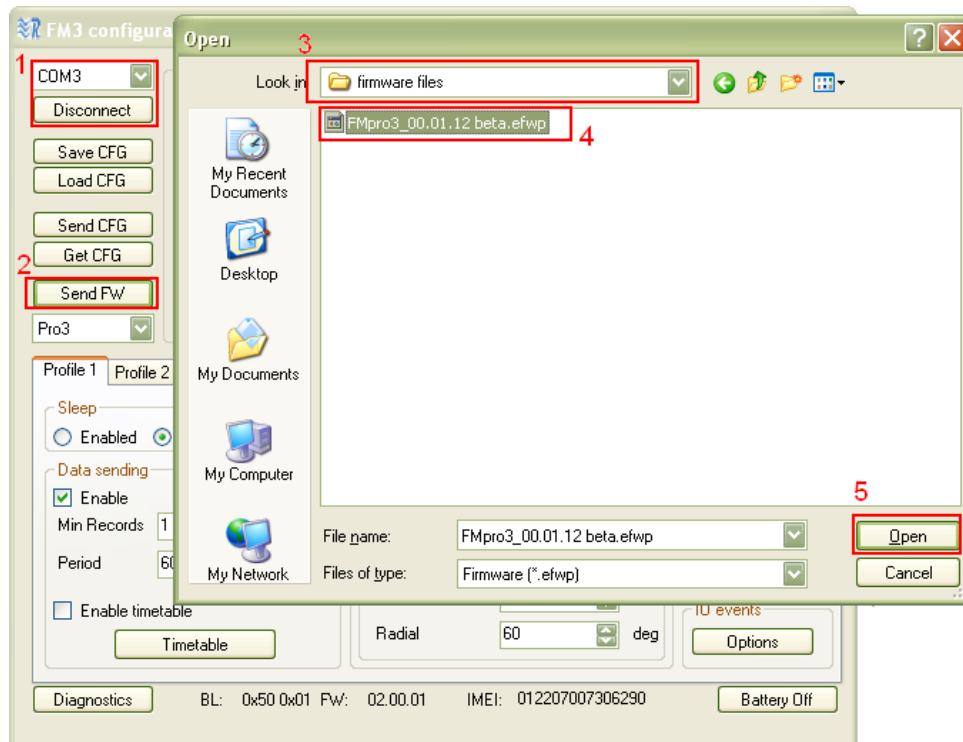After sending firmware file to the device, notification will pop up on the bottom of the device and LEDs will glow continuously for about a minute. Firmware update takes up to 5 minutes, so device must be powered up all that time. Device completely is ready to use when LEDs start blinking.

Appendix A. IO list

IO name	IO size, B	IO value range	IO value explanation	Notes
AIN1	2	0-65535	mV	
AIN2	2	0-65535	mV	
Battery current	2	0-65535	mA	Should not exceed 250mA
Battery Voltage	2	0-65535	mV	Should be between 3300 and 4300mV
CAN accelerator pedal position 1	1	0-255	0-100% pressed, by 0,4% steps	128=51% - pedal pressed to the middle
CAN ambient air temperature	2	0-65535	0.03125 °C/Bit gain -273 °C offset	9376=20°C
CAN at least one PTO engaged	1	0-3	0=No PTO drive is engaged 1=At least one PTO drive is engaged 2=Error 3=Not available	
CAN axle location	1	0-15	Defined in FMS 2.0 standard	
CAN axle weight	2	0-65535	0.5 kg / Bit gain	20000=10000kg
CAN brake switch	1	0-1	0=pedal released 1=pedal pressed	
CAN clutch switch	1	0-1	0=pedal released 1=pedal pressed	
CAN cruise control active	1	0-1	0=switched off 1=switched on	
CAN diagnostics supported	1	0-3	0=diagnostics is not supported 1=diagnostics is supported 2=reserved 3=don´t care	
CAN engine coolant temperature	1	0-255	1°C / Bit gain -40°C offset	128=88°C
CAN engine hours	4	0-4294967295	0.05 h / Bit gain	200000=10000h
CAN engine percent load at current speed	1	0-125	1%/bit, 0 to 125% op. range	60=60%
CAN engine speed	2	0-65535	0.125 rpm / Bit gain	8000=1000rpm
CAN engine total fuel used	4	0-4294967295	0,5 L / Bit gain	20000=10000L
CAN first driver ID	16	-	Driver ID = Card Number	
CAN fuel level1	1	0-255	0,4 % / Bit gain	128=51%
CAN fuel rate	2	0-64255	0.05L/h per bit 0 to 3212,75L/h	600=30L/h

IO name	IO size, B	IO value range	IO value explanation	Notes
CAN high resolution engine total fuel used	4	0- 4211081215	0.001 L/bit 0 to 4211081,215 L	1000000=1000L
CAN high resolution total vehicle distance	4	0-4294967295	5 m/Bit gain	10000=50000m
CAN instantaneous fuel economy	2	0-64256	1/512 km/L per b 0 to 125,5 km/L	2560=5km/L
CAN requests supported	1	0-3	0=request is not supported 1=request is supported 2=reserved 3=don´t care	
CAN second driver ID	16	-	Driver ID = Card Number	
CAN service distance	2	0-65535	5 km / Bit gain -160 635 km offset	32327=1000km (negative means service passed)
CAN system event	1	0-1	0=no tachogr. Event 1=tachogr. Event	
CAN SW-version supported	4		Defined in FMS 2.0 standard	
CAN tacho direction indicator	1	0-1	0=Forward 1=Reverse	
CAN tacho driver 1 card	1	0-1	0=Card not present 1=Card present	
CAN tacho driver 1 time related status	1	0-15	0=normal 1=15 min bef. 4 ½ h 2=4 ½ h reached 3=15 min bef. 9 h 4=9 h reached 5=15 min bef. 16 h 6=16h reached 14=Error 15=not available	
CAN tacho driver 2 card	1	0-1	0=Card not present 1=Card present	
CAN tacho driver 2 time related status	1	0-15	0=normal 1=15 min bef. 4 ½ h 2=4 ½ h reached 3=15 min bef. 9 h 4=9 h reached 5=15 min bef. 16 h 6=16h reached 14=Error 15=not available	

IO name	IO size, B	IO value range	IO value explanation	Notes
CAN tacho driver1 working state	1	0-7	0=Rest 1=Driver available 2=Work 3=Drive 6=Error 7=not available	
CAN tacho driver2 working state	1	0-7	0=Rest 1=Driver available 2=Work 3=Drive 6=Error 7=not available	
CAN tacho handling information	1	0-1	0=no handling information 1=handling information	
CAN tacho vehicle motion	1	0-1	0=Vehicle motion not detected 1=vehicle motion detected	
CAN tacho vehicle overspeed	1	0-1	0=No overspeed 1=Overspeed	
CAN tachograph performance	1	0-1	0=Normal performance 1=Performance analysis	
CAN tachograph vehicle speed	2	0-65535	1/256km/h Bit gain	15360=60km/h
CAN tire location	1	0-15	Defined in FMS 2.0 standard	
CAN vehicle ID	24	-	Defined in FMS 2.0 standard	
CAN wheel based speed	2	0-65535	1/256km/h Bit gain	15360=60km/h
Current profile	1	0-4	0=default pfile 1=1st profile 2=2nd profile 3=3rd profile 4=4th profile	
DIN1	1	0-1	0=low level on input 1=high level on input	
DIN2	1	0-1	0=low level on input 1=high level on input	
DIN3	1	0-1	0=low level on input 1=high level on input	
GSM operator	4	0-4294967295	Unique Mobile operator code	http://en.wikipedia.org/wiki/Mobile_Network_Code
GSM signal level	1	0-31	0=-115dBm or less 1=-111dBm 2...30=-110...-54dBm 31=-52dBm or greater 99=not known or detectable	
iButton ID	8	-	Unique iButton ID	

IO name	IO size, B	IO value range	IO value explanation	Notes
Ignition(DIN4)	1	0-1	0=low level on input 1=high level on input	
Modem temperature	1	-40-90	°C	
Movement sensor	1	0-1	0=No motion detected 1=Motion detected	
PCB temperature	1	-40-80	°C	
Power supply voltage	2	0-65535	mV	
TCO distance	4	0-4294967295	5 m/Bit gain	10000=50000m
TCO engine speed	2	0-65535	0.125 rpm / Bit gain	8000=1000rpm
TCO first driver card	1	0-1	0=Card not present 1=Card present	
TCO first driver ID	16	-	Driver ID = Card Number	
TCO first driver state	1	0-7	0=Rest 1=Driver available 2=Work 3=Drive 6=Error 7=not available	
TCO registration number	16	-	License plate number	
TCO second driver card	1	0-1	0=Card not present 1=Card present	
TCO second driver ID	16	-	Driver ID = Card Number	
TCO second driver state	1	0-7	0=Rest 1=Driver available 2=Work 3=Drive 6=Error 7=not available	
TCO trip distance	4	0-4294967295	5 m/Bit gain	10000=50000m
TCO vehicle ID	24	-	Defined in FMS 2.0 standard	
TCO vehicle speed	2	0-65535	1/256km/h Bit gain	15360=60km/h
Temperature sensor0	2	-550-1250	0,1 °C / Bit gain	200=20°C 2001 – 1wire bus short-circuit 2002 – CRC error 2003 – no sensors 2004 – abnormal temperature

IO name	IO size, B	IO value range	IO value explanation	Notes
Temperature sensor0 ID	8	-	Unique temperature sensor ID	
Temperature sensor1	2	-550-1250	0,1 °C / Bit gain	200=20°C 2001 – 1wire bus short-circuit 2002 – CRC error 2003 – no sensors 2004 – abnormal temperature
Temperature sensor1 ID	8	-	Unique temperature sensor ID	
Temperature sensor2	2	-550-1250	0,1 °C / Bit gain	200=20°C 2001 – 1wire bus short-circuit 2002 – CRC error 2003 – no sensors 2004 – abnormal temperature
Temperature sensor2 ID	8	-	Unique temperature sensor ID	
Virtual odometer	4	0-4294967295	m	